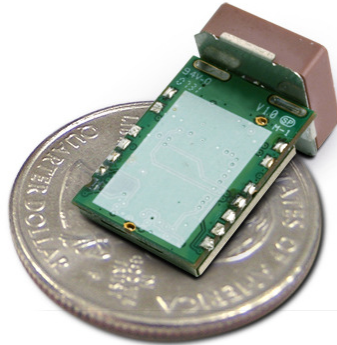


**Model: TK-1315TA GPS Receiver**

**USER'S GUIDE**

***uN3010 Single-Chip GPS Receiver Series***



The objective of The TK-1315TA User's Guide is to help users to understand the properties of TK-1315TA thoroughly and, therefore, obtain the maximum performance from the module easily. This document describes and provides useful information of the TK-1315TA GPS module, which includes the functions of pins on the module, configuration setting and utility. It guides users to understand the capability of the module and helps to successfully integrate the TK-1315TA into users' GPS systems.

Each chapter is one of the pieces for the module and carries its own purpose.

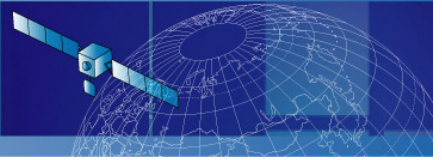
**Title: TK-1315TA**

**Subtitle: GPS Receiver Module**

**Doc Type: Data Sheet**

**Doc ID: GPS.TK-1315TA-080926**

All specifications subject to change without prior notice.



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## Chapter 1 Introduction

TK-1315TA is a high-sensitivity GPS receiver module of low cost. With built-in and high-gain LNA and filter, the GPS engine board of low power consumption and 20 channels is best suitable for GPS-enabled handheld or AVL applications. Its compact size factor and SMT type pads allow for automatic assembly and soldering.

TK-1315TA is designed to be applied as part of integrated system, which includes but not limited to PND (Personal Navigation Device), PVT (Position-Velocity-Time) system, GPS-mouse, GPS Bluetooth Receiver and complex wireless applications such as systems with GSM or GPRS transmission-enabled tracking devices. The TK-1315TA GPS module is the best candidate for systems that requires stable performance, excellent start-up time, high sensitivity, low power consumption, positioning accuracy and/or compact size for placement.

Should you have any technical enquiry, please feel free to contact us.

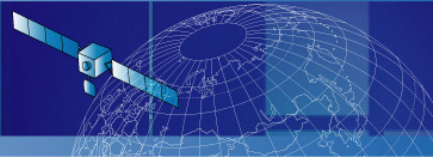
Email: [sanav@sanav.com](mailto:sanav@sanav.com)

Tel: +886-2-2269-4456

Fax: +886-2-2269-4451

Please prepare the following information as much as possible that may help us to answer your question as soon as possible:

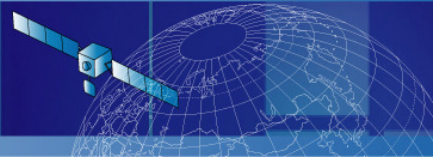
1. Simple description of your application
2. Specifications of the antenna that is connected to the module;
3. Description of failure including the environment where the module was used by text and/or figures;
4. Contact information: name, address, phone number, and e-mail address.



## 1.1 Specifications

### TK-1315TA

<b>PHYSICAL CONSTRUCTION</b>			<b>PERFORMANCE</b>		
Dimension	L24.0 x W14.0 x H13.0mm		Sensitivity	-159dbm	
Weight	<6 gram		Receiver architecture	20 parallel channels	
Receiving frequency	1575.42MHZ; C/A code		Start-up time	Hot start	<2 sec
Mounting	14-pin stamp holes			Warm start	30 sec
Construction	Full EMI shielding			Cold start	38sec
<b>ENVIRONMENTAL CONDITIONS</b>			Position accuracy	Autonomous	3.0 m
Temperature	Operating: -30 ~ +85 °C			Velocity	<515 m/s
	Storage: -40 ~ +85 °C		Altitude	<18,000 m	
<b>COMMUNICATION</b>			Update Rate	1 Hz	
Protocol	NMEA0184 V3.00, RTCM		Power Supply	3.3V +- 5%	
Signal level	UART @ 3.3V		Current Consumption	Acquisition: 53mA	
<b>INTERFACE CAPABILITY</b>				Tracking: 43mA	
Output Sentences	Standard	GGA, RMC, GSV, GSA, VTG	Baud Rate	9600 bps (default) & 4800/9600/38400/57600/115200 bps are adjustable	
	Option	GLL, ZDA			



## Chapter 2 Pin Assignment

### 2.1 Pin Assignment

Figure 2.1 shows the pin definitions of TK-1315TA. Table 2.1 describes the corresponding definitions for pins.

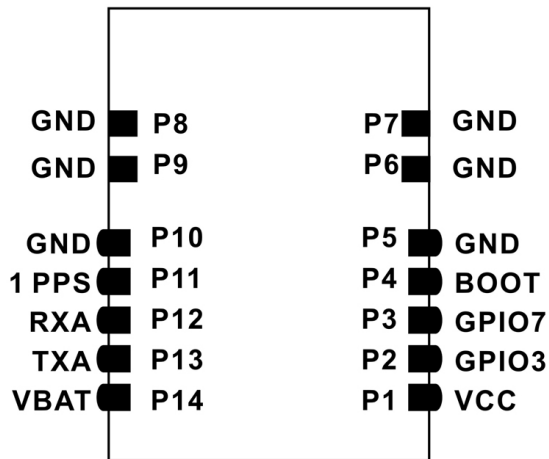
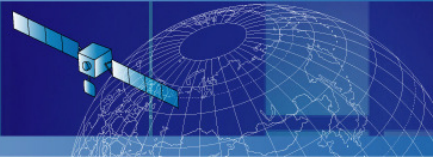
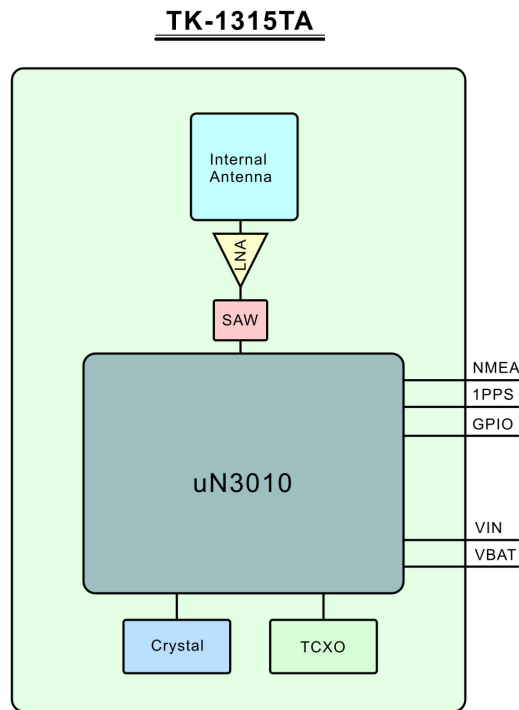


Figure 2.1 TK-1315TA Pin definitions

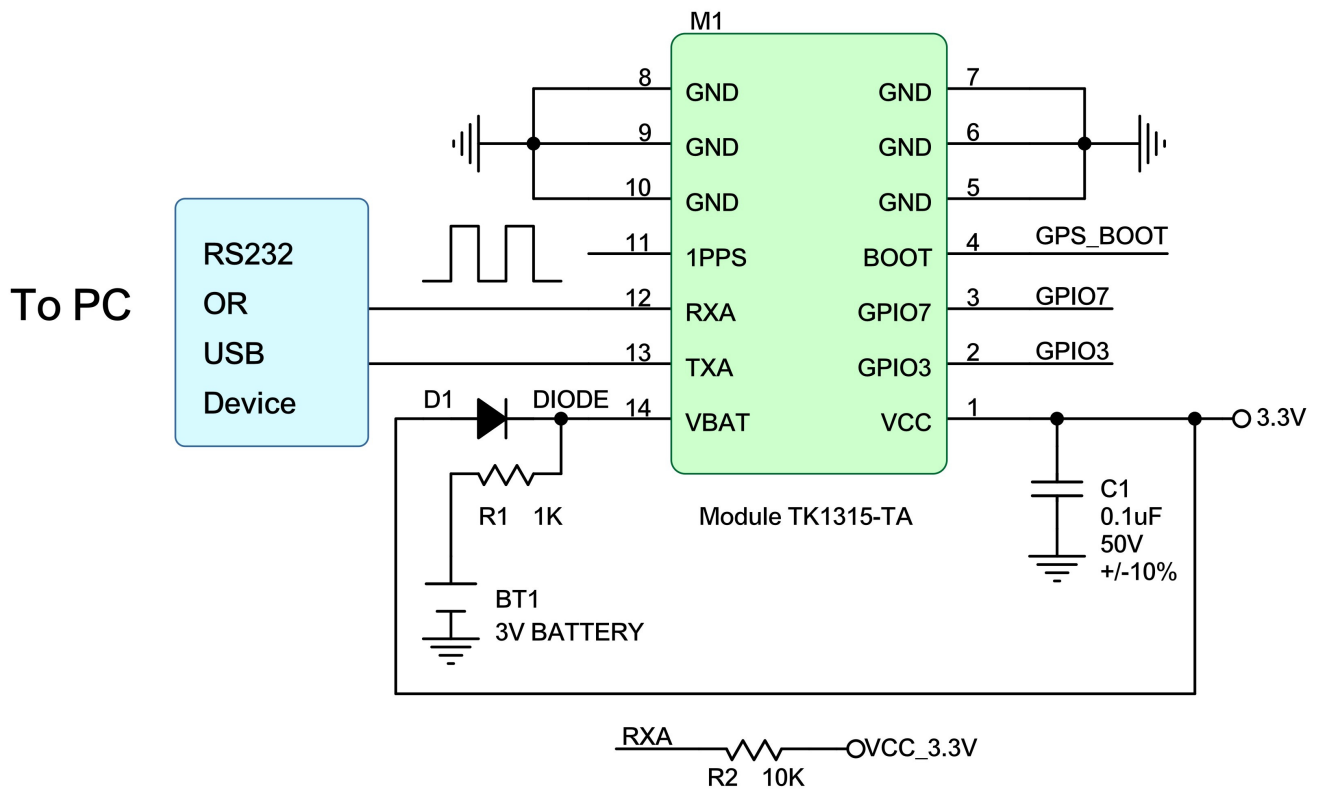
Pin	Name	Type	Description
1	VCC	P	Main power input ( 3.0 ~ 3.6VDC )
2	GPIO3		GPIO
3	GPIO7		GPIO
4	BOOT	I	Keep floating ( For internal manufacturing use )
5	GND	P	Ground
6	GND	P	Ground
7	GND	P	Ground
8	GND	P	Ground
9	GND	P	Ground
10	GND	P	Ground
11	1 PPS	O	TIME PULSE output
12	RX_A	I	CMOS level asynchronous input for UART A PULL HIGH is required ( please refer to p.6 for reference design )
13	TX_A	O	CMOS level asynchronous output for UART A
14	VBAT	P	Backup Battery Input ( 1.8 ~ 3.6VDC )

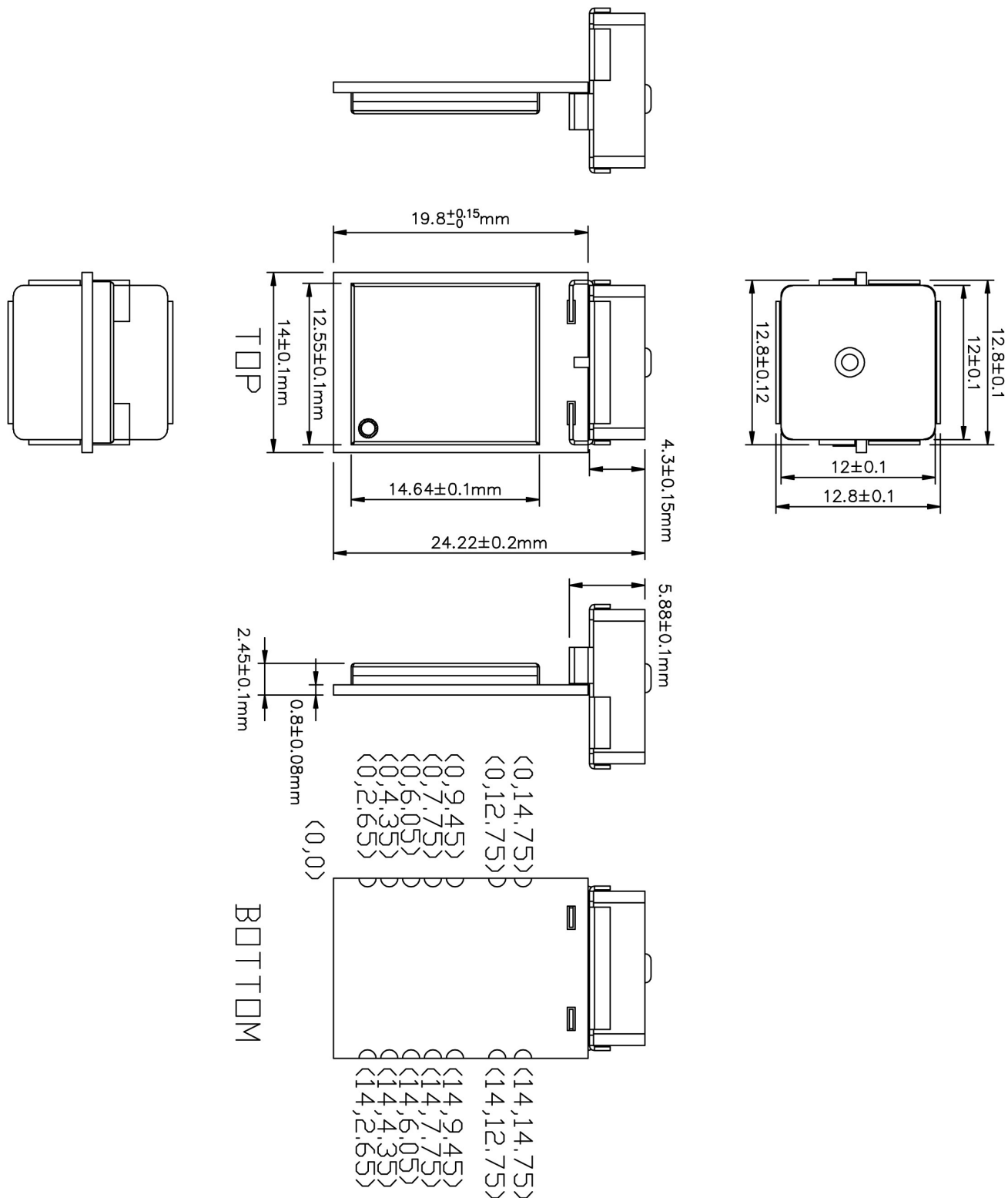
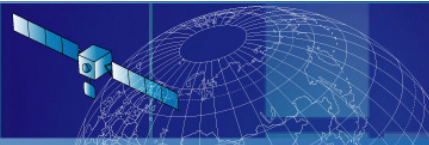


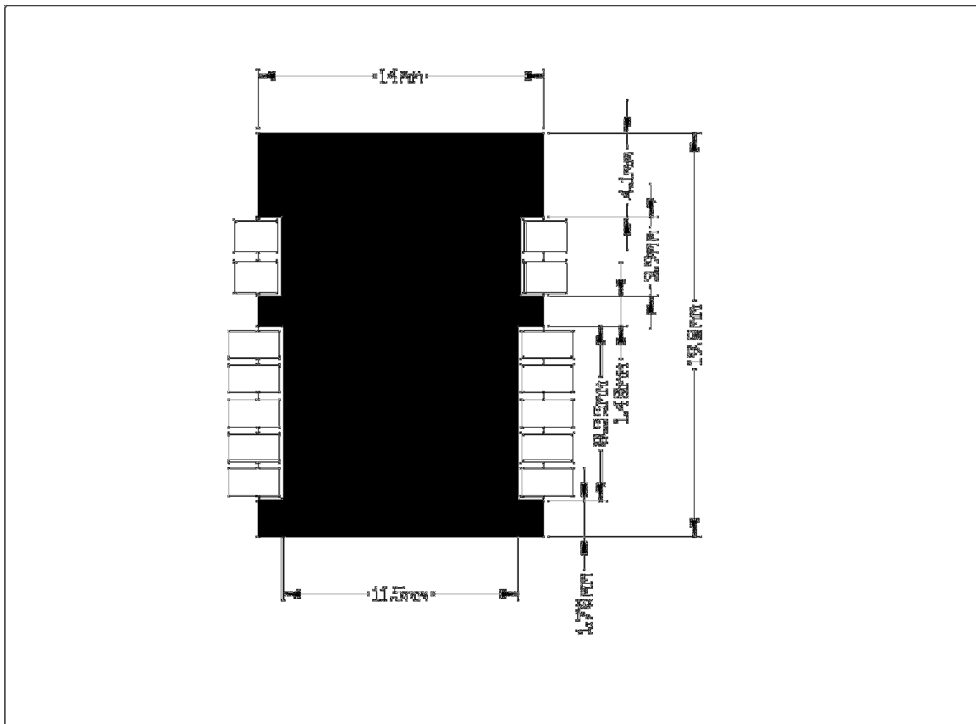
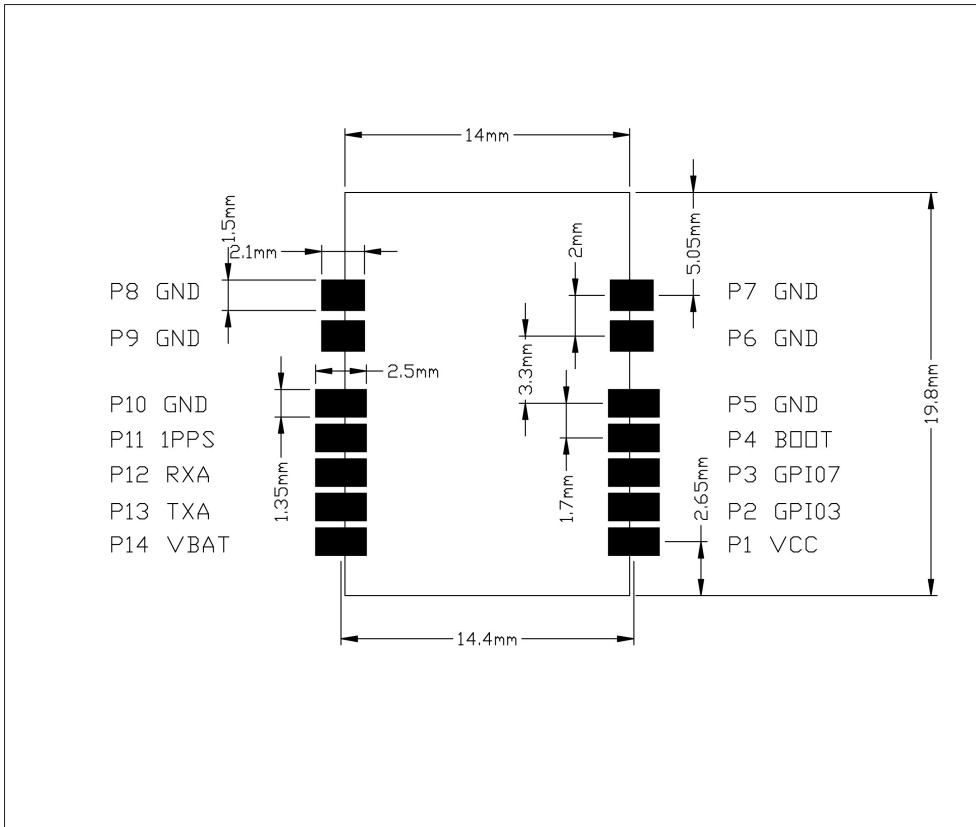
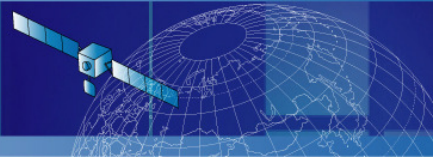
## 2.2 Block Diagram



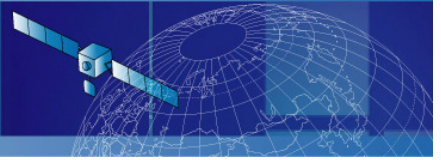
## 2.3 Reference Design











## Chapter 3 Operating GPS Utility

GPS Locator Utility V2.90 is the latest utility for configuring the GPS settings of SANAV GPS receivers. The application software can be found in the CD (TK-1315TA\Utility\Setup) and the password is in License.txt. Double click on the Setup.exe and follow the installation procedures. Below shows the instructions of how to use this software, with the assumption that you have successfully installed GPS Locator Utility.

### 3.1 Connecting Com Port

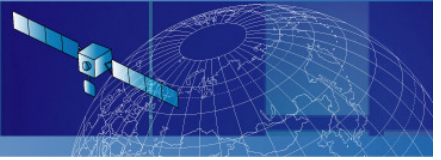
Select “Com port” in the Port Setting → Select “Baud rate” → Select “TK Series” in the Command Setting → Click on “Connect”.

The screenshot shows the GPS Locator Utility 2.90 interface. The 'PortSetting' dialog box is the central focus, with the following settings:

- Comm port:** COM1 (indicated by a red arrow and a red callout box: "Select correct Com port")
- Baud rate:** 4800 (indicated by a green arrow and a green callout box: "Select Com Port")
- Command Setting:** TK Series (indicated by a red arrow and a red callout box: "Select TK Series")

Other visible windows include:

- Map View:** A circular plot with concentric circles and radial lines, showing a compass rose with angles 360, 30, 60, 90, 180, and 270.
- Measured Navigation Message View:** A panel for displaying GPS information, including UTC Date and UTC Time.
- Channel Signal Level View:** A table with columns for Channel (1-8), SV Number, Elevation, Azimuth, SN Ratio, and Used in Position.
- User Setting:** A panel for NMEA Output settings, including checkboxes for GGA, GLL, GSA, GSV, RMC, VTG, ZDA, and DTM, and a 'Port Setting' section with a Baud Rate of 115200 and RS-232 Bandwidth of 0.0%.



### 3.2 User Setting (NMEA Output)

Select GPS output sentences you need in the “NMEA Output” → Select “Baud rate” → Check the figure of “RS-232 Bandwidth” → Click on “Set”.

The indicator of the “RS-232 Bandwidth” should not exceed 100%.

**Select GPS output sentences**

**Select baud rate**

**Notice the figure**

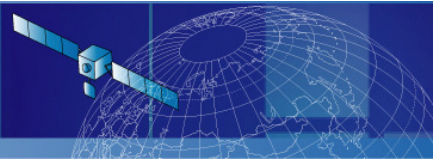
Channel	1	2	3	4	5	6	7	8
SV Number	27	25	07	19	13	16	23	06
Elevation	21	51	30	78	36	27	35	44
Azimuth	321	321	322	297	269	065	228	033
SN Ratio	40	44	41	44	42	42	44	43
Used in Position	0	x	x	x	x	x	x	x

```

$GPRMC,074602.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,C
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
$GPGGA,074603.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,
$GPRMC,074603.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,C
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
$GPGGA,074604.000,A,2457.8108,N,12125.5391,E,1.12,0.9,96.02
$GPRMC,074604.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,C
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
    
```

GPS Information

UTC Date : 19/08/08  
 UTC Time : 07:46:04.000  
 Lat : 2457.8108  
 Lon : 12125.5391  
 Alt : 96.02  
 SVs(Used/All) : 12 / 12  
 Mode : 3D Mode  
 PDOP : 0.9  
 Speed : 0.0  
 True Course : 000.0  
 DGPS ID : 0  
 GPS Quality : GPS SPS Mode, fix valid



### 3.3 User Setting (Restart)

Restarting the unit by selecting and setting the restart modes.

Select among “Restart” modes → Click on “Set”.

**Select “Restart”**

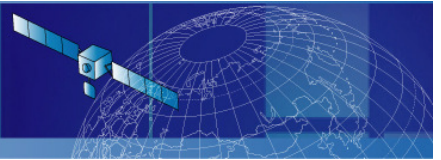
**Select restart settings**

Channel	1	2	3	4	5	6	7	8
SV Number	27	25	07	19	13	16	23	06
Elevation	21	51	31	78	36	26	35	44
Azimuth	321	321	322	298	269	065	228	033
SN Ratio	40	44	41	44	44	42	42	43
Used in Position	0	x	x	x	x	x	x	x

```

$GPRMC,074622.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,19.78,2.2,0.0,0.0,0.0
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2.2
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1.6
$GPGGA,074623.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02,3.0,3,03,06,07,11,13,16,19,23,25,27,31,42,1,9,0.9,1.6,3C
$GPRMC,074623.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,19.78,2.2,0.0,0.0,0.0
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2.2
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1.6
$GPGGA,074624.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02,3.0,3,03,06,07,11,13,16,19,23,25,27,31,42,1,9,0.9,1.6,3C
$GPRMC,074624.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,19.78,2.2,0.0,0.0,0.0
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,31,322,41,19,78,2.2
$GPGSV,3,2,12,13,36,269,44,16,26,065,42,23,35,228,42,06,44,0.4
$GPGSV,3,3,12,03,56,022,45,31,10,137,38,11,18,196,40,42,54,1.6
    
```

GPS Information	
UTC Date :	19/08/08
UTC Time :	07:46:24.000
Lat :	2457.8108
Lon :	12125.5391
Alt :	96.02
SVs(Used/All) :	12 / 12
Mode :	3D Mode
PDOP :	0.9
Speed :	0.0
True Course :	000.0
DGPS ID :	0
GPS Quality :	GPS SPS Mode, fix valid



### 3.4 User Setting (Default)

Select GPS output sentences you need in the “Default” → Select “Baud rate” → Check the figure of “RS-232 Bandwidth” → Click on “Set”.

The indicator of the” RS-232 Bandwidth” should not exceed 100%.

The screenshot shows the 'User Setting' window of the GPS Locator Utility 2.90. The 'Default' sheet is selected under 'NMEA Output'. The 'Messages - TK Series' section has checkboxes for GGA, RMC, GSA, GSV, GLL, VTG, ZDA, and DTM. The 'Baud Rate' is set to 115200, and the 'RS-232 Bandwidth' is 106.7%. Annotations include: 'Select “Default” sheet' pointing to the 'Default' sheet tab; 'Select GPS sentences' pointing to the GGA and RMC checkboxes; 'Select Baud Rate' pointing to the Baud Rate dropdown; and 'Bandwidth indicator' pointing to the RS-232 Bandwidth percentage.

**Channel Signal Level View**

Channel	1	2	3	4	5	6	7	8
SV Number	27	25	07	19	13	16	23	06
Elevation	21	51	31	78	36	26	35	44
Azimuth	321	321	322	298	269	065	228	033
SN Ratio	40	44	41	46	44	41	42	43
Used in Position	0	X	X	X	X	X	X	X

**Terminal View**

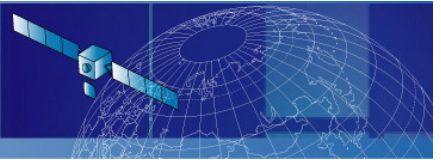
```

$GPRMC,0.74646,0.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.0,19.0,0.0,0.0,19.0
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,31,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,44,16,26,065,41,23,35,228,42,06,44,0
$GPGSV,3,3,12,03,56,022,45,31,10,137,40,11,18,196,40,42,54,1
$GPGGA,0.74647,0.000,2457.8108,N,12125.5391,E,1.1,12.1,2.96,0.2
$GPGSA,A,3,03,06,07,11,13,16,19,23,25,27,31,42,2,2.1,2.1,9*31
$GPRMC,0.74647,0.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.0,19.0
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,31,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,44,16,26,065,41,23,35,228,42,06,44,0
$GPGSV,3,3,12,03,56,022,45,31,10,137,40,11,18,196,40,42,54,1
$GPGGA,0.74648,0.000,2457.8108,N,12125.5391,E,1.1,12.1,2.96,0.2
$GPGSA,A,3,03,06,07,11,13,16,19,23,25,27,31,42,2,2.1,2.1,9*31
$GPRMC,0.74648,0.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.0,19.0
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,31,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,44,16,26,065,41,23,35,228,42,06,44,0
$GPGSV,3,3,12,03,56,022,45,31,10,137,40,11,18,196,40,42,54,1
    
```

**Measured Navigation Message View**

GPS Information

UTC Date : 19/08/08  
 UTC Time : 07:46:48.000  
 Lat : 2457.8108  
 Lon : 12125.5391  
 Alt : 96.02  
 SVs(Used/All) : 12 / 12  
 Mode : 3D Mode  
 PDOP : 1.2  
 Speed : 0.0  
 True Course : 000.0  
 DGPS ID : 0  
 GPS Quality : GPS SPS Mode, fix valid.



### 3.5 Tracking View

This window shows the points that the GPS receiver fixed.

User can change the scale by clicking on “Zoom in” or “Zoom out”.

The screenshot displays the GPS Locator Utility 2.90 interface. The 'Tracking View' window is active, showing a circular plot with a red crosshair and a red box highlighting the 'Zoom in' and 'Zoom out' buttons. A red arrow points to the 'Zoom in' button, and a red box contains the text: "Click on 'Zoom in/Zoom out' to change the scale".

The 'User Setting' window shows the following configuration:

- NMEA Output: Restart, Default
- NMEA Output: Message is sent every 1 second
- Checked: GGA, GSA, GSV
- Port Setting: Baud Rate: 4800, RS-232 Bandwidth: 106.7%

The 'Channel Signal Level View' window shows the following data:

Channel	1	2	3	4	5	6	7	8
SV Number	27	25	07	19	13	16	23	06
Elevation	21	51	30	78	36	27	35	44
Azimuth	321	321	322	297	269	065	228	033
SN Ratio	40	44	41	44	42	42	44	43
Used in Position	0	X	X	X	X	X	X	X

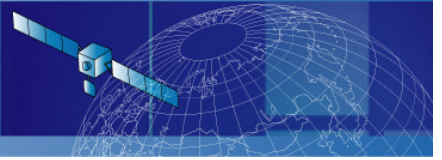
The 'Terminal View' window shows the following NMEA data:

```

$GPRMC,074602.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,19.78,2.2
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2.2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,0.0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1.1
$GPGGA,074603.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02,0.0,0.0,0.0,0.0
$GPRMC,074603.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,19.78,2.2
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2.2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,0.0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1.1
$GPGGA,074604.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02,0.0,0.0,0.0,0.0
$GPGSA,A,3,03,06,07,11,13,16,19,23,25,27,31,42,1,9,0.9,1.6,3C
$GPRMC,074604.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19,19.78,2.2
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2.2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,0.0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1.1
    
```

The 'Measured Navigation Message View' window shows the following GPS information:

- UTC Date: 19/08/08
- UTC Time: 07:46:04.000
- Lat: 2457.8108
- Lon: 12125.5391
- Alt: 96.02
- SVs(Used/All): 12 / 12
- Mode: 3D Mode
- PDOP: 0.9
- Speed: 0.0
- True Course: 000.0
- DGPS ID: 0
- GPS Quality: GPS SPS Mode, fix valid



## Ch 4 Available NMEA Messages

### 4.1 NMEA Output Messages

GGA	Global Positioning System Fixed Data
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites in View
RMC	Recommended Minimum Specific GNSS Data
VTG	Course Over Ground and Ground Speed
GLL	Geographic Position – Latitude / Longitude (Optional)
ZDA	Data and Time (Optional)

**(Update rate is 1 Hz)**

## Chapter 5 Limited Warranty

This unit can be used as part of navigational aids, and is not intended to replace other means of navigation or aids. San Jose Technology, Inc. warrants this GPS receiver and accessories to be free of defect for a period of 12 months from the date of original purchase.

**THIS WARRANTY APPLIES ONLY TO ORIGINAL PURCHASE.**

In any event of a product defect while in normal usage, San Jose Technology, Inc. will replace or repair the defective product at no charge to the original the original purchaser for parts and labor. However, San Jose Technology, Inc. reserves the right of determination to replace or repair the defective product.

The replacement or repaired product will be warranted for a total of 90 days from the date of return shipment, or for the remaining balance of the original warranty, whichever is longer.

### **PURCHASER DUTIES**

The purchaser must return defective unit postpaid, with the proof of original purchase and a return address to:

San Jose Technology, Inc.

11F., No.2, Sec. 4, Jhongyang Rd., Tucheng City, Taipei County, Taiwan

Tel: +886-2-2269-4456

Fax: +886-2-2269-445

Website: <http://www.sanav.com>