

Model: TK-1315LA GPS Receiver

USER'S GUIDE

uN3010 Single-Chip GPS Receiver Series



The objective of The TK-1315LA User's Guide is to help users to understand the properties of TK-1315LA thoroughly and, therefore, obtain the maximum performance from the module easily. This document describes and provides useful information of the TK-1315LA 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-1315LA into users' GPS systems.

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

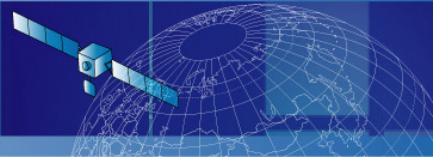
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Subtitle: GPS Receiver Module

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All specifications subject to change without prior notice.



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Chapter 1 Introduction

TK-1315LA 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-1315LA 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-1315LA 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.

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

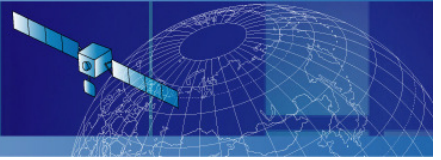
1. Simple description of your application
2. Specifications of the antenna that is connected to the module;
3. Description of failure including the environment where the module was used by text and/or figures;
4. Contact information: name, address, phone number, and e-mail address.



1.1 Specifications

TK-1315LA

PHYSICAL CONSTRUCTION		PERFORMANCE	
Dimension	L42.0 x W14.0 x H9.2mm	Sensitivity	-159dbm
Weight	<8 gram	Receiver architecture	20 parallel channels
Receiving frequency	1575.42MHZ; C/A code	Start-up time	Hot start <2 sec
Interface	6-pin connectors		Warm start 30 sec
Construction	Full EMI shielding		Cold start 38sec
ENVIRONMENTAL CONDITIONS		Position accuracy	Autonomous 3.0 m
Temperature	Operating: -30 ~ +85 °C	Velocity	<515 m/s
	Storage: -40 ~ +85 °C	Altitude	<18,000 m
COMMUNICATION		Update Rate	1 Hz
Protocol	NMEA0184 V3.00, RTCM	Power Supply	3.3V +- 5%
Signal level	UART @ 3.3V	Current Consumption	Acquisition: 58mA
INTERFACE CAPABILITY			Tracking: 43mA
Output Sentences	Standard	GGA, RMC, GSV, GSA,VTG	
	Option	GLL, ZDA	
External Antenna	MMCX Edge mount	Baud Rate	9600 bps (default) & 4800/9600/38400/57600/115200 bps are adjustable



Chapter 2 Pin Assignment

2.1 Pin Assignment

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

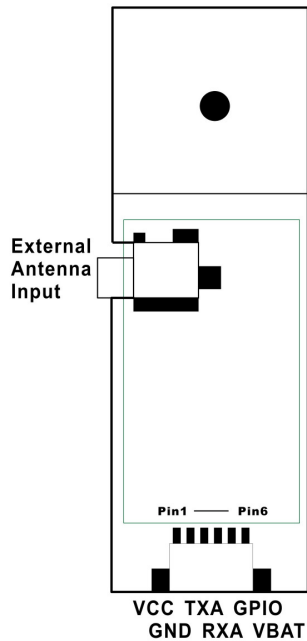
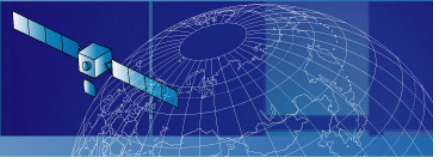
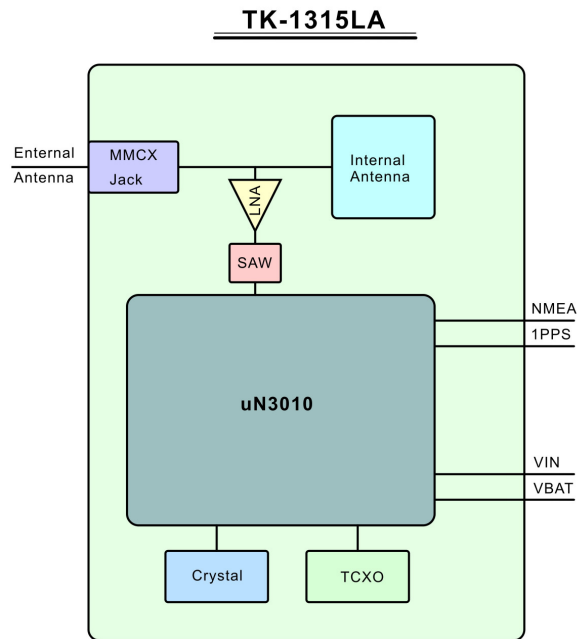


Figure 2.1 TK-1315LA Pin definitions

Pin	Name	Type	Description
1	VCC	P	Main power input (3.0 ~ 3.6VDC)
2	GND	P	Ground
3	TX_A	O	CMOS level asynchronous output for UART A
4	RX_A	I	CMOS level asynchronous input for UART A PULL HIGH is required (please refer to p.6 for reference design)
5	GPIO		GPIO
6	VBAT	P	Backup Battery Input (1.8 ~ 3.6VDC)

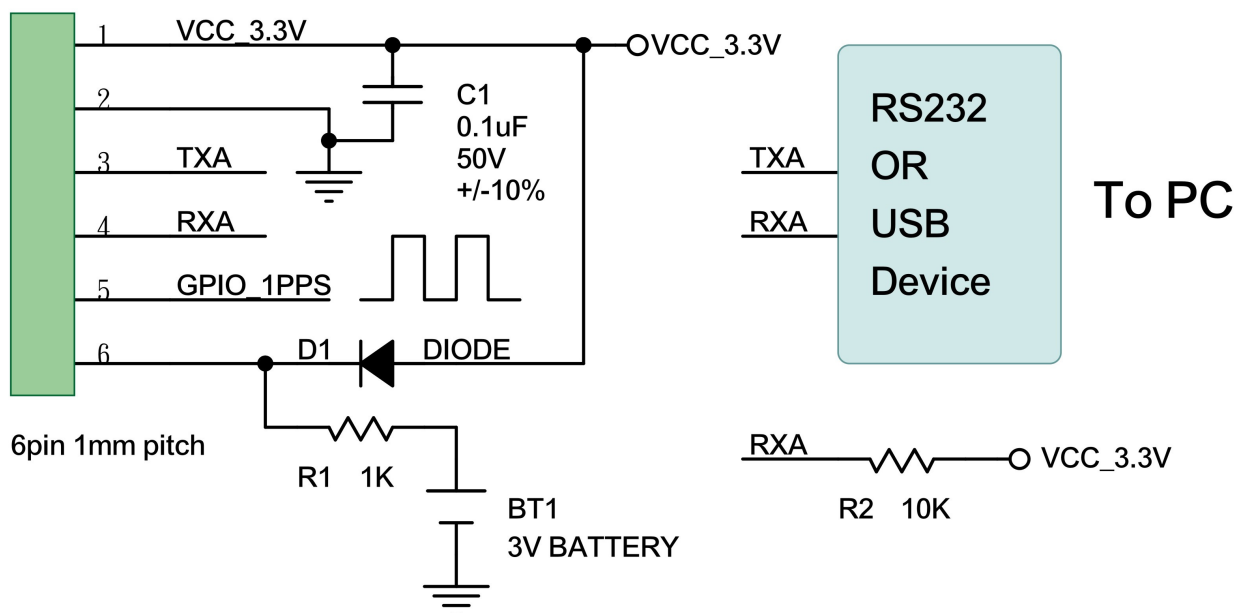


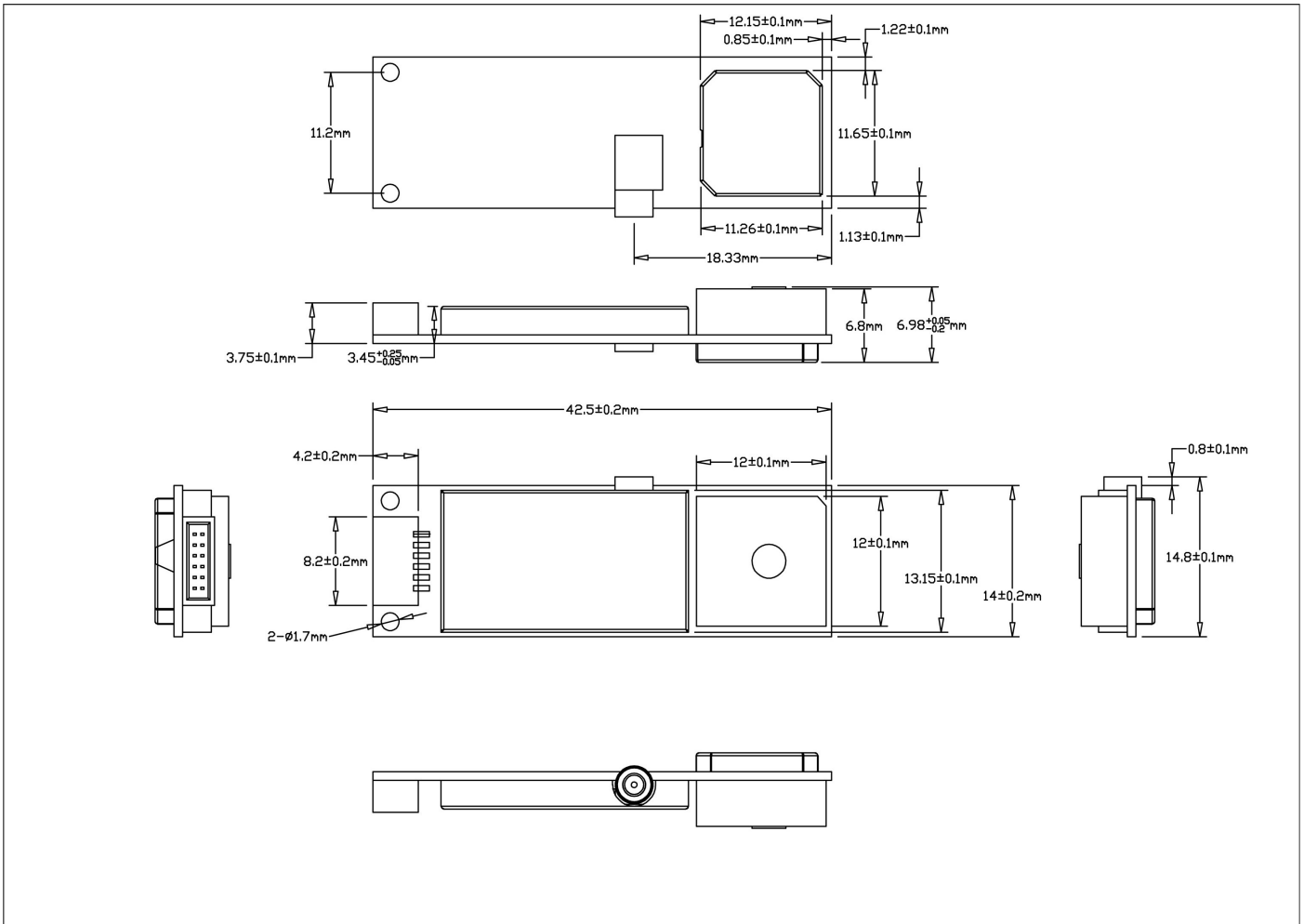
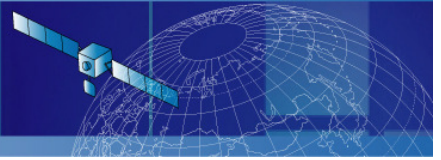
2.2 Block Diagram

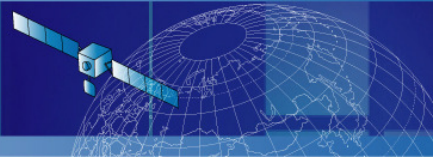


2.3 Reference Design

J1_TK-1315LA







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-1315LA\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”.

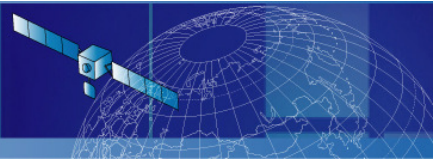
The screenshot shows the GPS Locator Utility 2.90 interface. The 'PortSetting' dialog box is open, showing the following settings:

- Comm port: COM1 (indicated by a red arrow and the text "Select correct Com port")
- Baud rate: 4800 (indicated by a green arrow and the text "Select Com Port")

The 'Command Setting' section shows the following options:

- Antaris 4
- SV3301
- SIRF III
- TK Series (indicated by a red arrow and the text "Select TK Series")

At the bottom of the 'PortSetting' dialog, there are 'Connect' and 'Disconnect' buttons. The main application window also shows a 'Map View' with a circular grid, a 'Terminal View' at the bottom left, and a 'User Setting' dialog box on the right with various checkboxes and a 'Set' button.



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

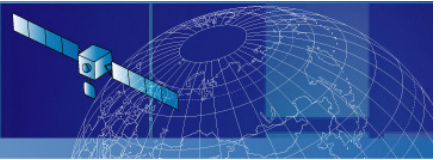
Notice the figure

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,0.0,0.0,0.15
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
$GPGGA,074603.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02
$GPGSA,A,3,03,06,07,11,13,16,19,23,25,27,31,42,1.9,0.9,1.6*3C
$GPRMC,074603.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.15
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
$GPGGA,074604.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02
$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,0.0,0.0,0.15
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,42,16,27,065,42,23,35,228,44,06,44,0
$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”.

The screenshot shows the 'GPS Locator Utility 2.90' software interface. The 'User Setting' dialog box is open, and the 'Restart' tab is selected. A red box highlights the 'Restart' tab with the text 'Select "Restart"'. A green box highlights the 'Cold Start', 'Warm Start', and 'Hot Start' radio buttons with the text 'Select restart settings'. A 'Set' button is visible at the bottom of the dialog. Other panels include 'Map View', 'Channel Signal Level View', 'Terminal View', and 'Measured Navigation Message View'.

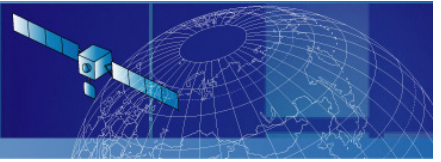
Channel	1	2	3	4	5	6	7	8
SV Number	27	25	07	19	13	16	23	06
Elevation	21	51	31	78	36	26	35	44
Azimuth	321	321	322	298	269	065	228	033
SN Ratio	40	44	41	44	44	42	42	43
Used in Position	0	X	X	X	X	X	X	X

```

$GPRMC,074622.000,A,2457.8108,N,12125.5391,E,0.0,0.0,0.19
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,44,16,27,065,42,23,35,228,42,06,44,0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
$GPGGA,074623.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02
$GPGSA,A,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
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,30,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,44,16,27,065,42,23,35,228,42,06,44,0
$GPGSV,3,3,12,03,57,021,45,31,10,137,38,11,18,196,40,42,54,1
$GPGGA,074624.000,2457.8108,N,12125.5391,E,1.12,0.9,96.02
$GPGSA,A,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
$GPGSV,3,1,12,27,21,321,40,25,51,321,44,07,31,322,41,19,78,2
$GPGSV,3,2,12,13,36,269,44,16,26,065,42,23,35,228,42,06,44,0
$GPGSV,3,3,12,03,56,022,45,31,10,137,38,11,18,196,40,42,54,1
    
```

GPS Information

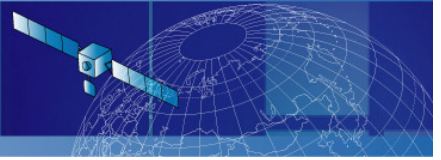
UTC Date : 19/08/08
 UTC Time : 07:46:24.000
 Lat : 2457.8108
 Lon : 12125.5391
 Alt : 96.02
 SVs(Used/All) : 12 / 12
 Mode : 3D Mode
 PDOP : 0.9
 Speed : 0.0
 True Course : 000.0
 DGPS ID : 0
 GPS Quality : GPS SPS Mode, fix valid.



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%.



3.5 Tracking View

This window shows the points that the GPS receiver fixed.

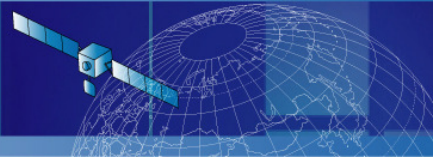
User can change the scale by clicking on “Zoom in” or “Zoom out”.

The screenshot displays the GPS Locator Utility 2.90 interface with several panels:

- Map View:** A circular plot showing satellite positions and signal strength.
- User Setting:** Configuration for NMEA Output (GGA, GLL, GSA, GSV, DTM) and Port Setting (Baud Rate: 4800, RS-232 Bandwidth: 106.7%).
- Tracking View:** A zoomed-in circular plot of satellite positions. A red box highlights the "Zoom in" and "Zoom out" buttons with the text: "Click on 'Zoom in/Zoom out' to change the scale".
- Channel Signal Level View:** A table and bar chart showing SNR for 8 channels.
- Terminal View:** A text window displaying raw NMEA data.
- Measured Navigation Message View:** A panel showing GPS information such as UTC Date, Time, Lat, Lon, Alt, Mode, and Quality.

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

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>