KNCTEK GPS Module

SLF-1313 Specification

Version 2.0
2009/04/11

KNCTEK Company LTD.

14F-14, Byucksan Digital Valley 5th, 60-73,
Gasangdong, Geumcheon-gu
SEOUL, KOREA
TEL: 82-2-839-5701
FAX: 82-2-830-5703
E-Mail: sales@knctek.com
http://www.knctek.com

SLF-1313 Specification

Revision History

1. 2009-02-13 : Initiated Version 1.0
2. 2009-04-11 : Updated Version 2.0 for re-organized Electrical characteristics and performance characteristics chart on page 6&7.

SLF-1313 Operational Manual

INTRODUCTION

The **SLF-1313** is the newest generation of KNCTEK GPS Module. The GPS Module is powered by SkyTraq technology and KNCTEK proprietary navigation algorithm that providing you more stable navigation data. The miniature design is the best choice to be embedded in a portable device like PND, PDA, Telematics and vehicle locator. The excellent sensitivity of **SLF-1313** gets the great performance when going though the urban canyon and foliage environmental condition.

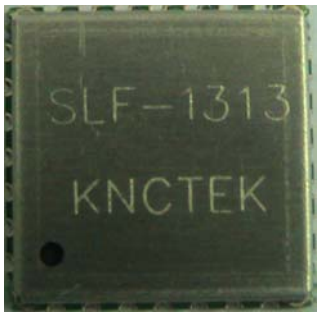
PRODUCT FEATURES

- ✧ Total 65 channels: 51 Channels for Acquisition, 14 Channels for Tracking
- ✧ Operable from 3.3V/Max 50mA for Acquisition and 23mA for Tracking Mode
- ✧ Available Navigation or LBS F/Ws
- ✧ A-GPS and SBAS(WAAS, EGNOS, GAGAN) supported
- ✧ Signal Detection better than -161dBm in Ultra High Tracking Sensitivity
- ✧ Enhanced Warm/Hot Acquisition Sensitivity at -157dBm
- ✧ Fast TTFF <25 seconds in Warm start and 29 seconds for Cold start
- ✧ Excellent Sensitive for Urban Canyon and Foliage Environmental condition
- ✧ NMEA-0183 compliant protocol
- ✧ Automotive-grade Quality GPS solution
- ✧ Small form factor (13X13X2.5mm)
- ✧ ODM/OEM development is fully supported Application Engineering
- ✧ Hardware and Software support from a dedicated GPS team

PRODUCT APPLICATION

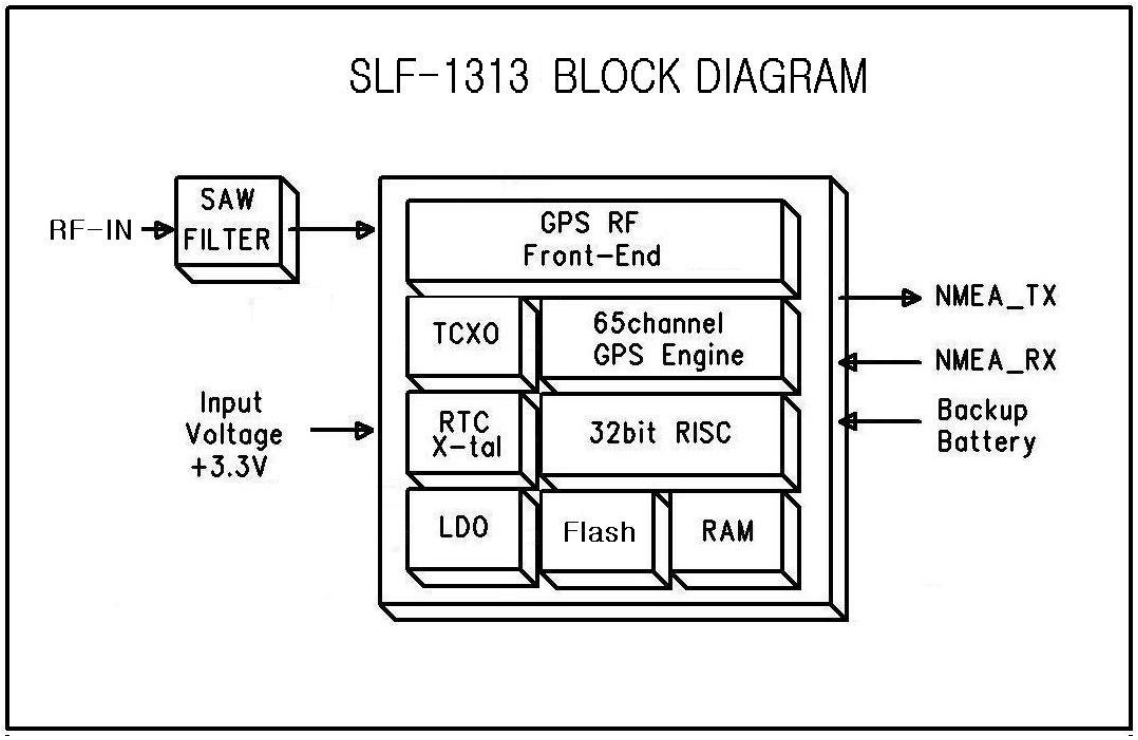
- ✧ Automotive applications
- ✧ Speed camera detector and Data logger
- ✧ Personal and Car Navigation Devices
- ✧ Marine navigation and Timing Application
- ✧ LBS(Location Based Service F/W) application

PRODUCT PICTURE



SLF-1313 SYSTEM BLOCK DIAGRAM

The SLF-1313 consists of SkyTraq chipsets Technology, KNCTEK LNA and proprietary software. The system is described as follows.



TECHNICAL SPECIFICATION

1. Electrical Characteristics

1.1 Absolute Maximum Rating

Parameter	Symbol	Min	Max	Units
Power Supply				
Power Supply Volt.	VCC	-0.3	3.6	V
Input Pins				
Input Pin Voltage I/O	RX	-0.3	3.6	V
Backup Battery	Vbat	1.8	3.6	V
Environment				
Operating Temperature	Topr	-40	85	℃
Storage Temperature	Tstg	-40	125	℃
Peak Reflow Soldering Temperature < 10S	Tpeak		260	℃
Humidity			95	%

Note : Absolute maximum ratings are stress ratings only, and functional operation at the maximums is not guaranteed. Stress beyond the limits specified in this table may affect device reliability or cause permanent damage to the device.

For functional operating conditions, please refer to the operating conditions tables as follow.

1.2 Operating Condition

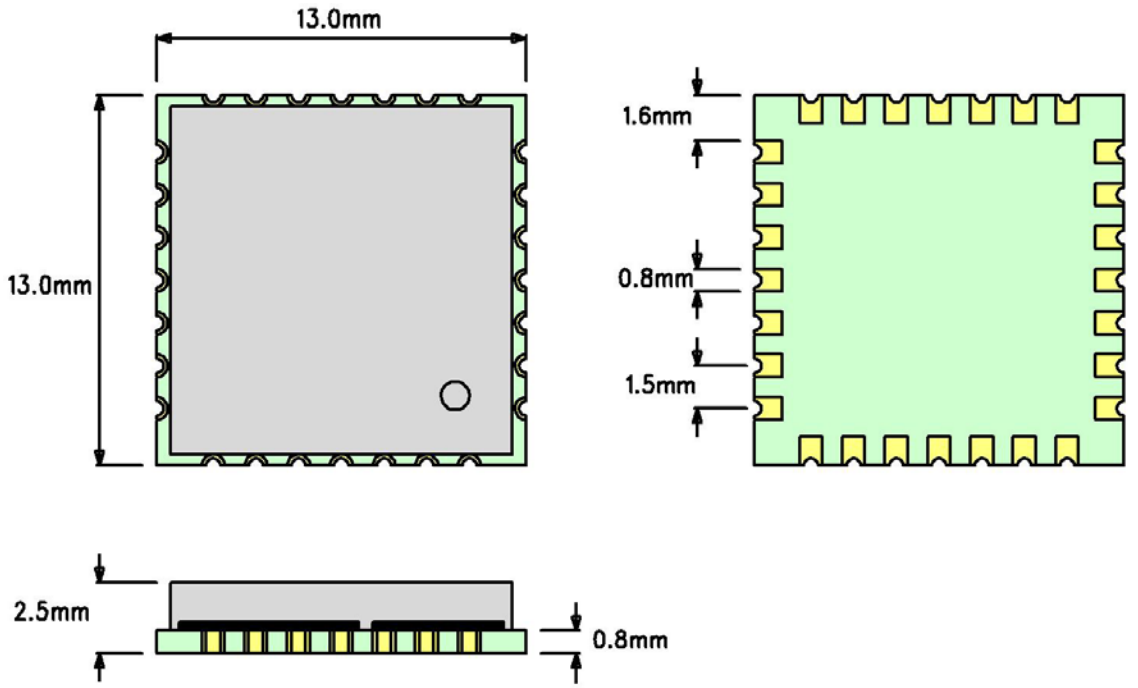
Parameter	Symbol	Condition	Min	Typ	Max	Units
Power supply voltage	Vcc		3.0	3.3	3.6	V
Power Supply voltage ripple	Vcc_PP	Vcc = 3.3V			30	mV
Acquisition current	IccA	Vcc = 3.3V		45	50	mA
Tracking current	IccT	Vcc = 3.3V		23		mA
Input high voltage	V_{IH}		2.0			V
Input low voltage	V_{IL}				0.8	V
Output high voltage	V_{OH}		2.9			V
Output low voltage	V_{OL}				0.4	V

2. General & Performance Specification

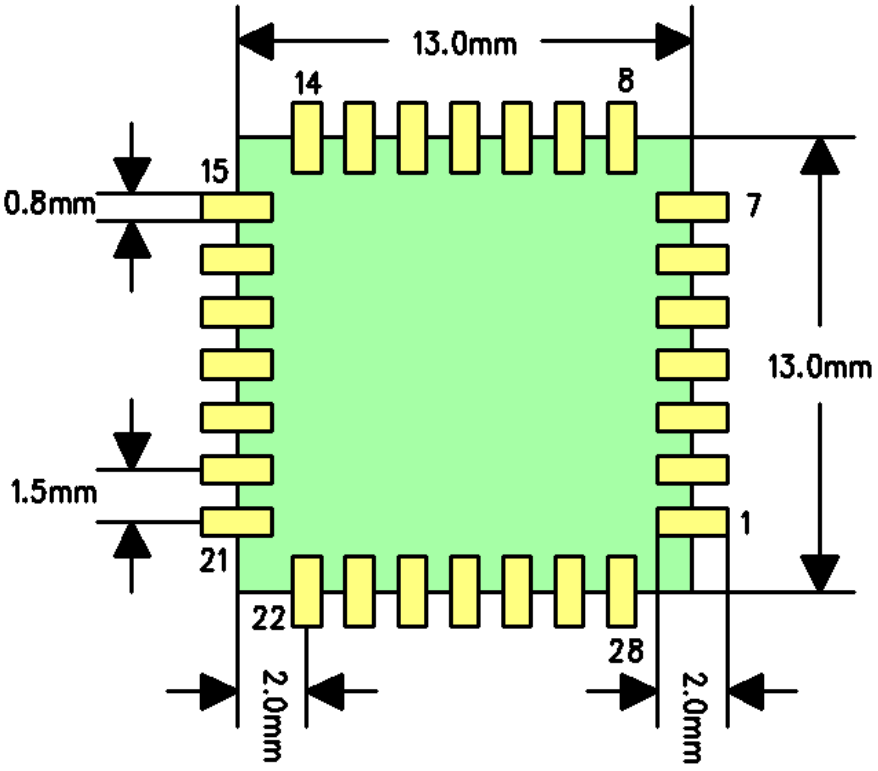
Parameter	Specification	
Receiver Type	L1 frequency band, 51 Channel Acquisition, 14 Channel Tracking	
Sensitivity	Tracking	-161dBm
	Re-acquisition	-157dBm
	Cold Start	-148dBm
Accuracy	Position	2.5m CEP
	Velocity	0.1m/s
	Timing(PPS)	61ns RMS
Acquisition Time	Cold Start	29 sec. typical (Open sky[1])
	Warm Start	25 sec. typical (Open sky)
	Hot Start	1 sec. typical (Open sky)
	Reacquisition Time	1 sec
	AGPS Support	4 sec. average
Power Consumption	Tracking	23mA @ 3.3V
	Acquisition	45mA
	Back-up	6uA @ 3V
Navigation Data Update Rate	1Hz	
Operational Limits	Velocity	Max 515 m/s
	Altitude	Max 18,000m
	Acceleration	Less than 1g
Mechanical data	Dimension	13.0 X 13.0 X 2.5mm
	Weight	0.98grams±5%
Protocol	NMEA-0183 V3.01	

** [1]Open Sky means no obstructions in the sky

MECHANICAL PIN LAYOUT



RECOMMENDED LAND PATTERN DIMENSION



RECOMMENDED GPS ACTIVE EXTERNAL ANTENNA

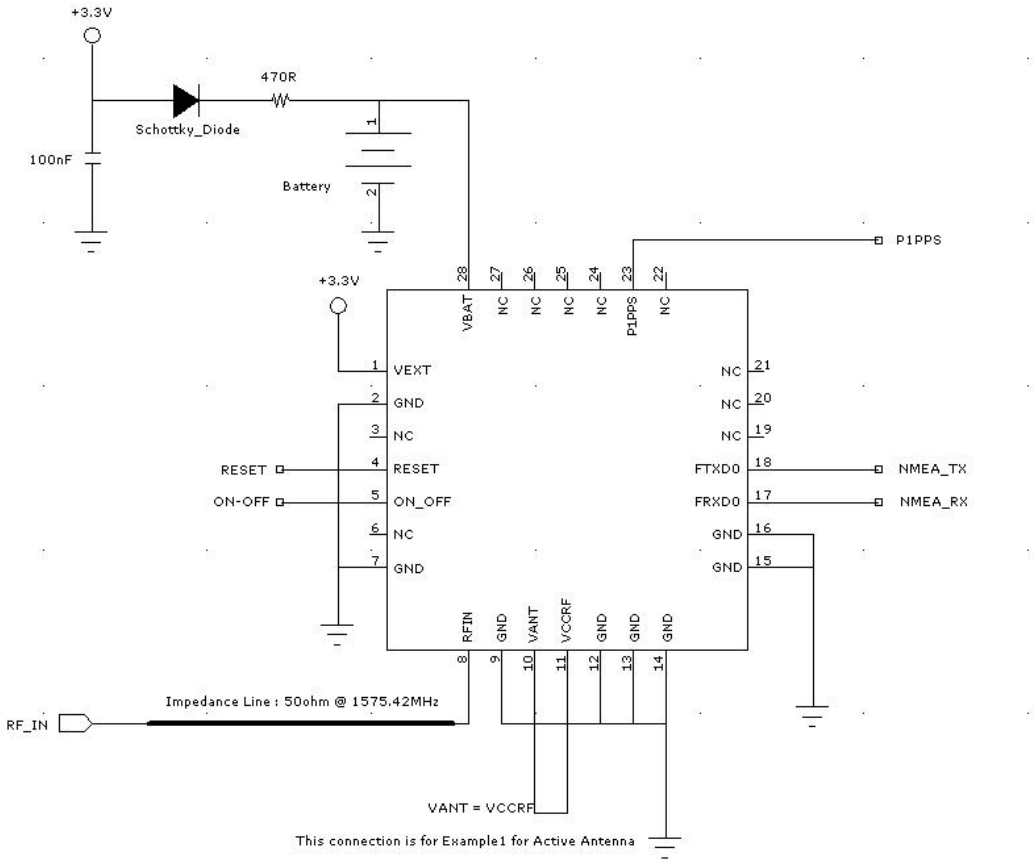
It's recommended to use an GPS active external antenna with supply voltage of 3.3VDC and a current draw of 15mA maximum. The quality of the GPS active external antenna chosen is of paramount importance for the overall sensitivity of the GPS system. An GPS active external antenna should have a typical gain 20dB and a noise figure ≤ 1.5dB, which applies to more than 90% of the antennas available in the market.

3.3V GPS Active External Antenna Specification

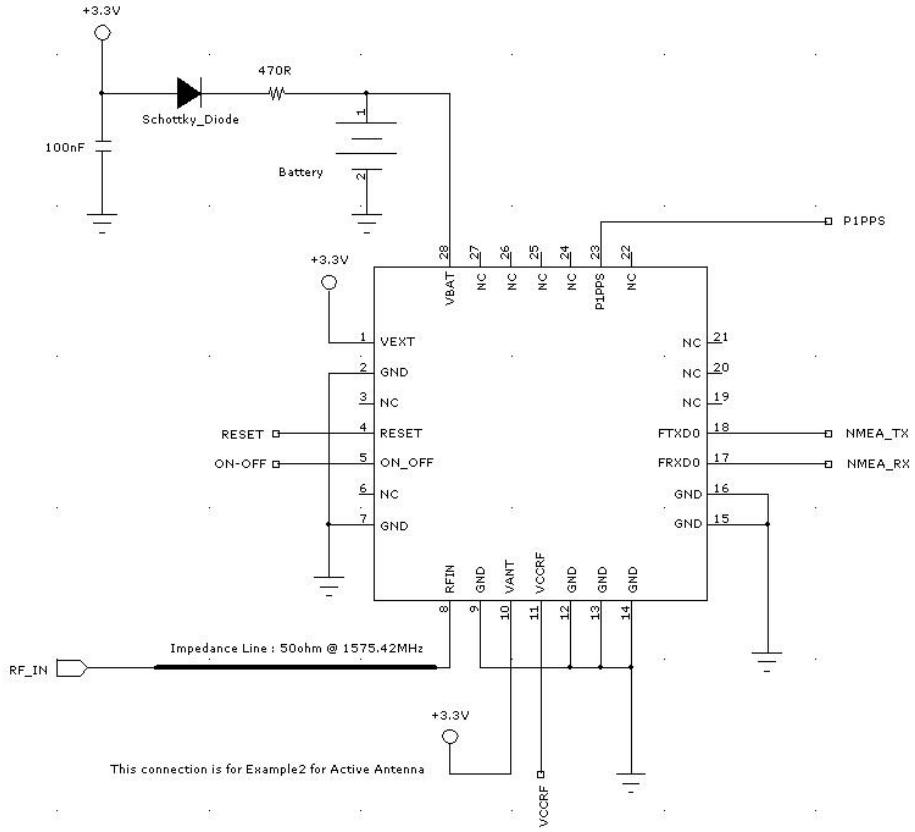
Characteristics	Specification
Center Frequency	1575.42±1.023MHz
Band Width(-10dB return loss)	10MHz
Gain at Zenith	5.0dBi Typical
VSWR	2.0 : 1 Max
Polarization	R.H.C.P
Axial Ratio	3.0dB max
Gain	Typical 25dB (minimum 20dB)
Noise Figure	Less than 1.5dB
Out Band Attenuation	20dB min for ±50MHz
Voltage	3.3 ± 10%VDC or 3.0 ~ 3.6 VDC
Current	< 15 mA

HARDWARE INTERFACE

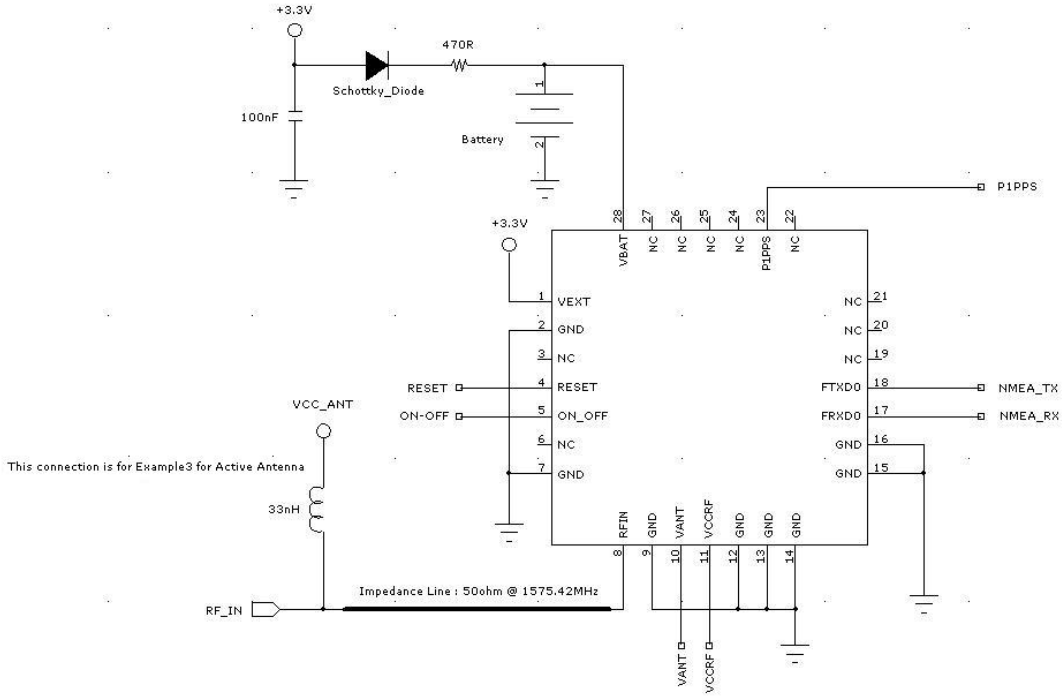
1. Example 1 for GPS active antenna



2. Example 2 for GPS active antenna



3. Example 3 for GPS active antenna



DEFINITION OF PIN ASSIGNDMENT

PIN	SIGNAL NAME	I/O	DESCRIPTION	CHARACTER
1	VEXT	I	DC Power Supply Voltage input	DC +3.3V ±10%
2	GND	GND	Ground	
3	NC	-	Not connecting	
4	RESET	I	RESET(Active LOW)	Active LOW
5	NC	-	Not connecting	
6	NC	-	Not connecting	
7	GND	GND	Ground	
8	RF_IN	I	GPS SIGNAL INPUT	50Ω Impedance Line @1.57542GHz
9	GND	GND	Ground	
10	VANT	I	Voltage Supply for Active Antenna	33nH Inductor Connected at RF_IN
11	VCC_RF	O	Voltage output of VCC_RF	VCC_RF Voltage : VEXT
12	GND	GND	Ground	
13	GND	GND	Ground	
14	GND	GND	Ground	
15	GND	GND	Ground	
16	GND	GND	Ground	
17	NMEA_RX	I	UART RX	NMEA_RX : UART input,3.3V LVTTL
18	NMEA_TX	O	UART TX	NMEA_TX : UART output, 3.3V LVTTL
19	NC	-	Not connecting	
20	NC	-	Not connecting	
21	NC	-	Not connecting	
22	NC	-	Not connecting	
23	1PPS	O	1 Pulse per Second	If the position is fixed, the output is ok
24	NC	-	Not connecting	
25	NC	-	Not connecting	
26	NC	-	Not connecting	
27	NC	-	Not connecting	
28	VBAT	I	Backup Battery supply	DC +1.8V ~ +3.3V

VEXT(DC Power Input)

This is the main power supply for the Engine board. The power range is from 3.3V ±10%(the maximum and minimum voltage is 3.0V to 3.6V). Suitable decoupling must be provided by external decoupling circuitry.

GND

GND provides the ground for the Engine board. Connect all grounds.

VBAT

This is the battery backup supply that powers the SRAM and RTC when main power is removed. The input voltage level is from 1.8V ~ 3.3V. Without an external backup battery or on board battery, engine board will execute a cold start after every turn on. To achieve the faster start-up offered by a hot or warm start, either a backup battery must be connected or battery installed on board.

NMEA_TX

UART output, 3.3V LVTTL logic level. This is the main transmit channel and is used to output navigation. The default setup is NMEA Output, 9600bps, 8 data bits, no parity, 1 stop bit. The default sentences are GPGGA, GPGSA, GPRMC, GPGSV once per second.

NMEA_RX

UART input,3.3V LVTTL logic level. This is the main receiving channel.

RESET

This is the function to restart the system, If the pin is lied to low. Leave unconnected if not used.

RF_IN

The line on the PCB from the antenna(or antenna connector)has to be a controlled line (Micro strip at 50Ω @ 1575.42MHz)

It was strongly recommend you to use the GPS active antenna. Please refer to suggested external or internal GPS Active Antenna circuit in page 10.

GPS Receiver User's Tip

1. GPS signal will be affected by weather and environment conditions, thus suggest to use the GPS receiver under less shielding environments to ensure GPS receiver has better receiving performance.
2. When GPS receiver is moving, it will prolong the time to fix the position, so suggest to wait for the satellite signals to be locked at a fixed point when first power-on the GPS receiver to ensure to lock the GPS signal at the shortest time.
3. The following situation will affect the GPS receiving performance:
   a. Solar control filmed windows.
   b. Metal shielded, such as umbrella, or in vehicle.
   c. Among high buildings.
   d. Under bridges or tunnels.
   e. Under high voltage cables or near by radio wave sources, such as mobile phone base stations.
   f. Bad or heavy cloudy weather.
4. If the satellite signals can not be locked or encounter receiving problem (while in the urban area), the following steps are suggested:
   a. Please plug the external active antenna into GPS receiver and put the antenna on outdoor or the roof of the vehicle for better receiving performance.
   b. Move to another open space or reposition GPS receiver toward the direction with fewer blockages.
   c. Move the GPS receiver away from the interference resources.
   d. Wait until the weather condition is improved.

While a GPS with a backup battery, the GPS receiver can fix a position immediately at next power-on if the build-in backup battery is full-recharged.

Packing Information

1. **Tray Packing**
   TBD : To be determined

2. **Inner Box Packing**
   TBD : To be determined

Contact Information Section

Contact : sales@knctek.com

Web Site: www.knctek.com

Headquarter:

14F-14, 60-73 Byucksan Digital Valley 5th,
Gasang-dong, Geumcheon-gu
SEOUL, KOREA
TEL: 82-2-839-5701
FAX: 82-2-830-5703

*** As for the explantion of NMEA-0183 V3.01 Protocol : Please refer to KNCTEK Website (www.knctek.com)**