Rikaline **GPS-6031-X7**

SiRF High sensitivity

Bluetooth GPS
Receiver

User's Guide

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Rikaline International Corp.
10F, 64, Kang-Ding Road, Taipei 108, Taiwan, R.O.C.
Phone: +886-2-2370-4688 Fax: +886-2-2370-4686
E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

TABLE OF CONTENTS

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

0. Quick Use & Basic Specification

0.1 Check The Package

0.1.1 Standard Package

GPS-6031-X7 (Bluetooth GPS Receiver) + Battery + Cigarette Adapter + CD + Warranty Card + Quick Installation.

0.1.2 Optional Accessories

1. A-6001: Recharging adapter, Universal for 120V, 230V, 240V-AU.
2. A-9001: Battery, Lithium-Polymer, 1650mAh

The shop may bundle different accessories for you as follows:

1. PDA Holder
2. Software (Navigation Software + Digital Map)
3. Others

0.2 Have the Battery Fully Recharged.

Before use the battery, please put it in GPS-6031-X7 and have it be recharged for 10 hours. Details please refer to Appendix D at P.17.

0.3 Power on GPS-6031-X7.

Once you put the battery in the unit, the unit starts to work for you. There is no ON-OFF switch in the unit. It is always in stand-by mode with very low power consumption at 60 μA. The battery will run out of power itself after 114 days (2,750 hrs) if it gets no recharge.

0.4 Turn on your machine (PDA or PC).

Execute your Bluetooth function to handle GPS-6031-X7. If your PDA has no built-in Bluetooth, you need An optional CF (PD-3005) or SD Bluetooth card. Activate the Bluetooth card. Then your GPS-6031-X7 Starts to provide you full GPS function.

0.5 Turn off your machine (PDA or PC).

Before turn off your machine, please stop Bluetooth function. Once the Bluetooth stops linking with GPS-6031-X7, The GPS function will be automatically turned off.

0.6 Basic Specifications

0.6.1 Bluetooth GPS

0.6.1.1 Operation Time:

16 hours at continuous mode. Longer time at power saving mode.

0.6.1.2 LED Indicator:

4-LED functions as follows:

1. External Power (Red, The left one):	ON: Available	OFF: Not available
2. Bluetooth (Green, the 2nd one):	Blinking: Paring	ON: In Transmitting mode
3.GPS(Green, The 3rd one):	ON: GPS powered	OFF: GPS not powered
4. Battery (Red, The right one):	Blinking: Low Battery	OFF: Full power or still sufficient
	ON: Recharging	

0.6.1.3 Bluetooth Class:

Class 2 up to 10 meters

0.6.2 Battery

1. Capacity: 1,650mAHr
2. Material: Lithium-Polymer (Non-exploration risk and light weight)

0.6.3 GPS

1. SiRF Star II-LP\HS: Low power and high sensitivity
2. Setting:
   Datum: WGS84
   Baud Rate: 4,800
   Sentence: NMEA 0183, GGA, GSA, GSV, RMC& VTG

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

1. Introduction

1.1 Overview

The ***Rikaline*** **GPS-6031-X7 Bluetooth GPS Receiver** is a total solution GPS receiver with **Bluetooth** wireless transmitting ability, designed based on **SiRF Star II LP** (Low Power) GPS architecture, enabled with the most advanced **HS (High Sensitivity)** ability and CSR Bluetooth technology. This revolutionary system provides you unbelievable positioning sensitivity allowing you to have easy position fix in urban canyon conditions. You may use this device for strict needs of positioning applications such as car navigation, mapping, surveying, security, agriculture and so on. Only clear view of sky is necessary to the unit.

The GPS-6031-X7 communicates with other electronic utilities via wireless Bluetooth technology and saves critical satellite data by built–in backup memory. With low power consumption, the **GPS-6031-X7** tracks up to 12 satellites at a time, re-acquires satellite signals in 100 ms and updates position data every second.

1.2 Features

The GPS-6031-X7 provides a host of features that make it easy for integration and use.

1. Wireless transmitting positioning status up to 10 meters.
2. SiRF Star II chipset with embedded ARM7TDMI CPU available for customized applications in firmware.
3. High sensitivity receiver tracks up to 12 satellites while providing first fast fix and low power consumption.
4. Differential capability utilizes real-time RTCM corrections producing 1-5 meter position accuracy.
5. Advanced design ideal for applications with minimal space.
6. A rechargeable battery sustains GPS internal clock and memory. It is recharged during normal operation.
7. User initialization is not required.
8. Dual communication channels and user selectable baud rates allow maximum interface capability and flexibility.
9. FLASH based program memory: New software revisions upgradeable both for GPS and Bluetooth.
10. LED display status: The LED provides users visible operating status for Recharging, Battery power lever, Bluetooth and GPS. No more extra device needed.
11. Built-in WAAS / EGNOS demodulator.
12. Rechargeable Li-Polymer battery provide you a danger-Free device.

1.3 Technology specifications

1.3.1 Physical Dimension

Single construction integrated antenna/receiver.
Size: 80.1(W) x 56.8(D) x 30.3(H) (mm)
3.15"(W) x 2.24"(D) x 1.19"(H).
Weight: 87g

1.3.2 Environmental Characteristics

1) Operating temperature: -40°C to +85°C with external power (internal temperature).
-20°C to +60°C with internal rechargeable battery.
2) Storage temperature: -55°C to +100°C.

1.3.3 Electrical Characteristics

1) Input voltage: +4.75 ~ 5.5 VDC without accessories.
2) GPS Internal backup power: 3V Rechargeable Lithium cell battery, up to 767 hours (31.9 days) discharge.

1.3.4 Performance

1.3.4.1 LED functions

We built in 4 LEDs with the GPS-6031-X7 Bluetooth GPS and function as follows:

1) External Power (Red, The left one)
ON: Outside power available

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

OFF: Outside power not available

2) Bluetooth (Green, the 2nd one from left)
   Blinking (every 1 seconds): Paring
   ON: In Transmitting mode

3) GPS (Green, The 3rd one from left)
   ON: GPS is powered
   OFF: GPS is not powered

4) Battery (Red, The right one)
   Blinking: Low Battery
   OFF: Full power or still sufficient
   ON: Recharging

1.3.4.2 GPS Functions

1) Tracks up to 12 satellites.
2) Update rate: 1 second.
3) Acquisition time

Reacquisition	0.1 sec., averaged
Snap start	3 sec., averaged
Hot start	15 sec., averaged
Warm start	45 sec., averaged
Cold start	90 sec., averaged

4) Position accuracy:
   Non DGPS (Differential GPS)

Position	5-25 meter CEP with SA off
Velocity	0.1 meters/second, with SA off
Time	1 microsecond synchronized GPS time

5) Dynamic Conditions:

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

1.3.4.3 Bluetooth Functions

1) Transmits up to 10 meters.
2) Details specifications please refer to appendix D at page 16.

1.3.4.4 Battery

1) Capacity: 1650mAh.
2) Type: Li-Polymer rechargeable, danger-free (Non-fire, Non-explosion).

1.3.5 Interfaces

1) Dual channel RS-232 compatible level, with user selectable baud rate (4800-Default, 9600, 19200, 38400).
2) NMEA 0183 Version 2.2 ASCII output (GPGGA, GPGLL, GPGSA, GPGSV, GPRMC, GPVTG).
3) SiRF protocol.

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

2. Operational characteristics

2.1 Initialization

Once you insert the battery into the housing, the GPS-6031-X7 is in standby mode and ready to work for you. When you activate the Bluetooth function in your machine (PDA or PC) and get pairing with PGS-6031-X7, you may start GPS function. As soon as the initial self-test is complete, the GPS-6031-X7 begins the process of satellite acquisition and tracking automatically. Under normal circumstances, it takes approximately 90 seconds to achieve a position fix at the first time, 45 seconds if ephemeris data is known. After a position fix has been calculated, information about valid position, velocity and time is transmitted over the output channel.

The GPS-6031-X7 utilizes initial data, such as last stored position, date, time and satellite orbital data, to achieve maximum acquisition performance. If significant inaccuracy exists in the initial data, or the orbital data is obsolete, it may take more time to achieve a navigation solution. The GPS-6031-X7 Auto-locate feature is capable of automatically determining a navigation solution without intervention from the host system. However, acquisition performance can be improved when the host system initializes the GPS-6031-X7 in the following situation:

1) Moving further than 1,500 kilometers.
2) Failure of data storage due to the inactive internal memory battery.

2.2 Navigation

After the acquisition process is complete, the GPS-6031-X7 sends valid navigation information over output channels. These data include:

1) Latitude/longitude/altitude
2) Velocity
3) Date/time
4) Error estimates
5) Satellite and receiver status

The GPS-6031-X7 sets the default of auto-searching for real-time differential corrections in RTCM SC-104 standard format, with the message types 1, 5, or 9. It accomplishes the satellite data to generate a differential (DGPS) solution. The host system, at its option, may also command the GPS-6031-X7 to output a position whenever a differential solution is available.

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

3. Hardware interface

3.1 Physical

Size: 80.1(W) x 56.8(D) x 30.3(H) (mm)
3.15"(W) x 2.24"(D) x 1.19"(H).
Weight: 87g

3.2 Hardware Interface

The GPS-6031-X7 includes a SiRF LP (Low Power) and HS (High Sensitivity) GPS module, Bluetooth module and a Li-Polymer rechargeable battery in a unique style gadget. Simply place it on the dashboard of the car or any place facing to the sky for transmitting GPS signal to your notebook PC, PDA or other devices, which facilitated with Bluetooth functions.

3.3 Connector

Battery recharging connector: DC jack 2.35mm, with center “+” (positive).

3.4 Accessories

A-6016-235 Cigarette Adapter, 2A, with input 6-30Vdc, Dc jack 2.35mm
A-6001: recharging adapter, Universal, 120V, 230V, 240V-AU
A-9001: Battery, Lithium-Polymer, 1650mAh

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

4. Bluetooth Connection

Please follow up below instructions step by step:

4.1 Browse Devices

Firstly, you should find the device with which you want to establish connection.

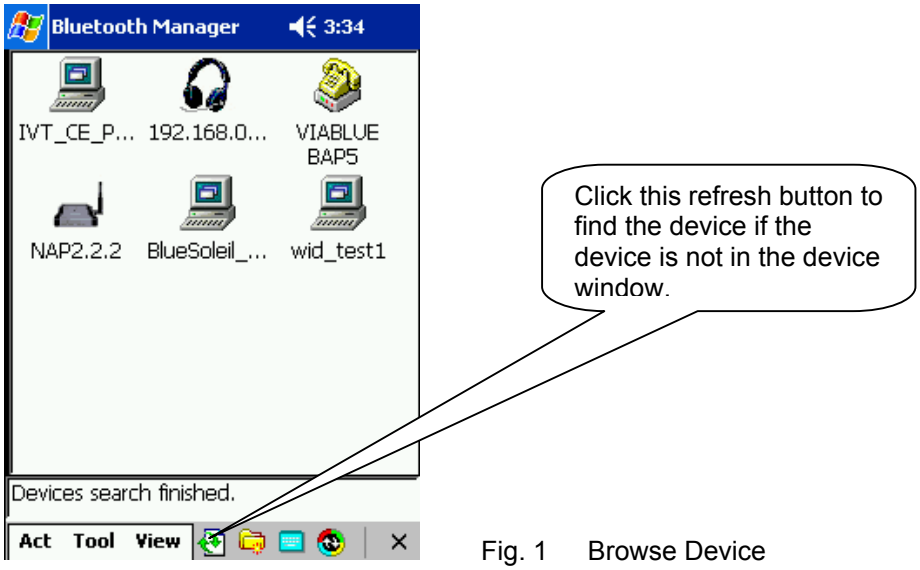

Fig. 1 Browse Device

If the device with which you want to establish connection is not shown in the remote device list, you can click the Refresh button to search devices nearby again.

4.2 Browse Services

Double click the device with which you want to establish SPP connection to browse its service as Fig. 2.

Fig. 2 Browse Service

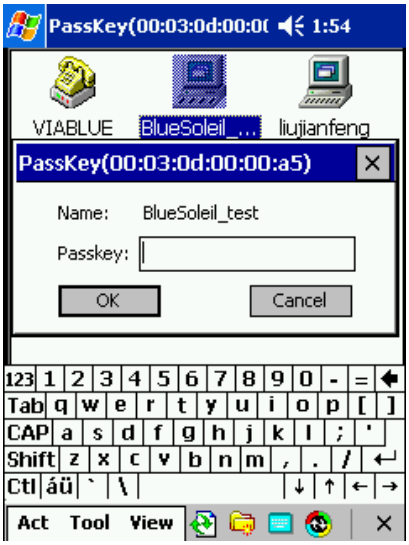

Fig. 3 Ask for Passkey

During this period, if you didn't paired the device before, it will ask you input passkey as Fig. 3. Please input the correct Passkey to connect the device.

The Default Passkey is **1234**.

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Finally, it will show as follows:

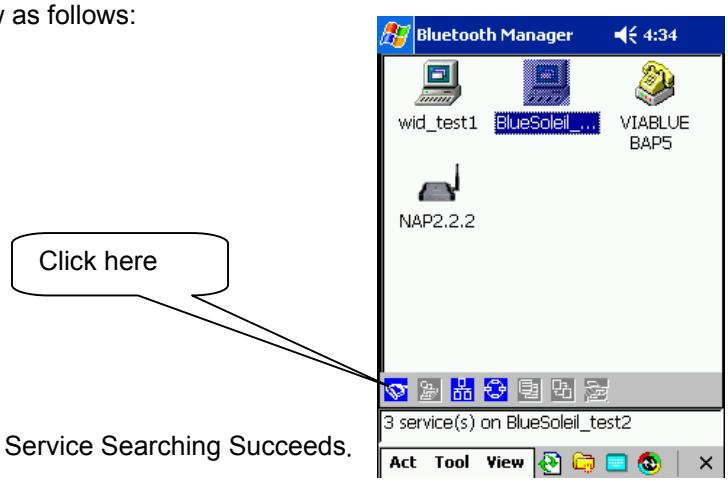

Fig. 4 Service Searching Succeeds.

After you click the SPP service, it will show at left of followings:

Fig. 5 Connect to SPP

Fig. 6

After connect successfully, it will show as Fig. 6

4.3 Application

Now you can use any Navigation system through Bluetooth SPP Profile.

4.4 Disconnect

There are 3 different ways to disconnect the operation

4.4.1 Double click the SPP shortcut, and click Disconnect on popup Menu.

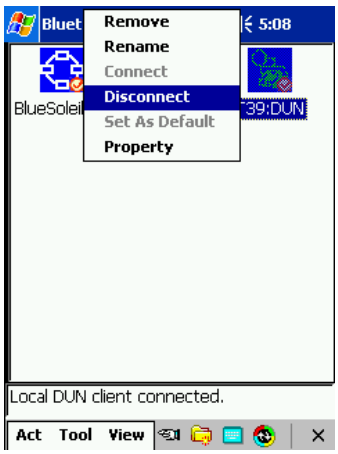

Fig. 7 Disconnect from pop menu

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

4.4.2 In the Status window, select the SPP connection, and then click Disconnect button.

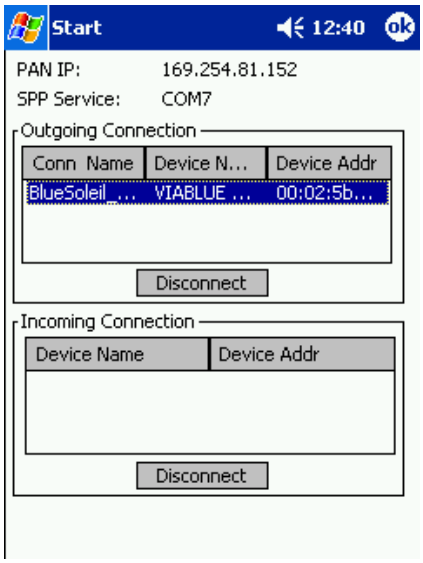

Figure 8 Disconnect from Status Window

In most navigation system when you select disable GPS icon, the SPP connection will be disconnected automatically. If you want to use the navigation again, you need to establish the Bluetooth SPP connection first.

4.4.3 Use Shortcut

After a new connection was established successfully, a shortcut for the connection will be generated. Users also can double click the particular short cut icon (represented by the Connection Name) and click the connect on the Pop_Menu to re-establish the connection.

5. Warranty

The GPS-6031-X7 is warranted to be free from defects in material and functions for one year from the date of purchase. Any failure of this product within this period under normal conditions will be replaced at no charge to the customers.

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Appendix A Software Interface

The GPS-6031-X7 interface protocol is based on the National Marine Electronics Association's NMEA0183 ASCII interface specification, which is defined in NMEA0183, Version 2.2 and the Radio Technical Commission for Maritime Services (RTCM Recommended Standards For Differential Navstar GPS Service, Version 2.1, RTCM Special Committee No.104).

A.1 NMEA Transmitted Messages

The GPS-6031-X7 outputs data in NMEA-0183 format as defined by the National Marine Electronics Association (NMEA), Standard.

The default communication parameters for NMEA output are 4800 baud, 8 data bits, stop bit, and no parity.

Table A-1 NMEA-0183 Output Messages

NMEA Sentence	Description
GPGGA	Global positioning system fixed data
GPGLL	Geographic position latitude \ longitude
GPGSA	GNSS DOP and active satellites
GPGSV	GNSS satellites in view.
GPRMC	Recommended minimum specific GNSS data
GPVTG	Course over ground and ground speed

A.1.1 Global Positioning System Fix Data (GGA)

Table A-2 contains the values for the following example:

$GPGGA,161229.487,3723.2475,N,12158.3416,W,1,07,1.0,9.0,M, , , ,0000*18

Table A-2 GGA Data Format

Name	Example	Units	Description
Message ID	$GPGGA		GGA protocol header
UTC Time	161229.487		Hhmmss.sss
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Position Fix Indicator	1		See Table 5-3
Satellites Used	07		Range 0 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude	9.0	Meters	
Units	M	Meters	
Geoid Separation		Meters	
Units	M	Meters	
Age of Diff. Corr.		Second	Null fields when DGPS is not used
Diff. Ref. Station ID	0000		
Checksum	*18		
<CR> <LF>			End of message termination

Table A-3 Position Fix Indicator

Value	Description
0	0 Fix not available or invalid
1	GPS SPS Mode, fix valid
2	Differential GPS, SPS Mode, fix valid
3	GPS PPS Mode, fix valid

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

A.1.2 Geographic Position with Latitude/Longitude (GLL)

Table A-4 contains the values for the following example:

$GPGLL,3723.2475,N,12158.3416,W,161229.487,A*2C

Table A-4 GLL Data Format

Name	Example	Units	Description
Message ID	$GPGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
UTC Position	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Checksum	*2C		
<CR> <LF>			End of message termination

A.1.3 GNSS DOP and Active Satellites (GSA)

Table A-5 contains the values for the following example:

$GPGSA,A,3,07,02,26,27,09,04,15, , , , , ,1.8,1.0,1.5*33

Table A-5 GSA Data Format

Name	Example	Units	Description
Message ID	$GPGSA		GSA protocol header
Mode 1	A		See Table 5-6
Mode 2	3		See Table 5-7
Satellite Used (1)	07		Sv on Channel 1
Satellite Used (1)	02		Sv on Channel 2
……			….
Satellite Used			Sv on Channel 12
PDOP	1.8		Position Dilution of Precision
HDOP	1.0		Horizontal Dilution of Precision
VDOP	1.5		Vertical Dilution of Precision
Checksum	*33		
<CR> <LF>			End of message termination

(1) Satellite used in solution.

Table A-6 Mode 1

Value	Description
M	Manual—forced to operate in 2D or 3D mode
A	2D Automatic—allowed to automatically switch 2D/3D

Table A-7 Mode 2

Value	Description
1	Fix Not Available
2	2D
3	3D

A.1.4 GNSS Satellites in View (GSV)

Table A-8 contains the values for the following example:

$GPGSV,2,1,07,07,79,048,42,02,51,062,43,26,36,256,42,27,27,138,42*71
$GPGSV,2,2,07,09,23,313,42,04,19,159,41,15,12,041,42*41

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Table A-8 GSV Data Format

Name	Example	Units	Description
Message ID	$GPGSV		GSV protocol header
Number of Messages	2		Range 1 to 3
Message Number	1		Range 1 to 3
Satellites in View	07		Range 1 to 12
Satellite ID	07		Channel 1 (Range 1 to 32)
Elevation	79	degrees	Channel 1 (Maximum 90)
Azimuth	048	degrees	Channel 1 (True, Range 0 to 359)
SNR (C/No)	42	dBHz	Range 0 to 99, null when not tracking
....	....		
Satellite ID	27		Channel 4 (Range 1 to 32)
Elevation	27	degrees	Channel 4 (Maximum 90)
Azimuth	138	degrees	Channel 4 (True, Range 0 to 359)
SNR (C/No)	42	dBHz	Range 0 to 99, null when not tracking
Checksum	*71		
<CR> <LF>			End of message termination

NOTE: Items <4>,<5>,<6> and <7> repeat for each satellite in view to a maximum of four (4) satellites per sentence. Additional satellites in view information must be sent in subsequent sentences. These fields will be null if unused.

A.1.5 Recommended Minimum Specific GNSS Data (RMC)

Table A-9 contains the values for the following example:

$GPRMC,161229.487,A,3723.2475,N,12158.3416,W,0.13,309.62,120598, ,*10

Table A-9 RMC Data Format

Name	Example	Units	Description
Message ID	$GPRMC		RMC protocol header
UTC Time	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Speed Over Ground	0.13	Knots	
Course Over Ground	309.62	Degrees	True
Date	120598		ddmmyy
Magnetic Variation (1)		Degrees	E=east or W=west
Checksum	*10		
<CR> <LF>			End of message termination

(1) SiRF Technology Inc. does not support magnetic declination. All “course over ground” data are geodetic WGS84 directions.

A.1.6 Course Over Ground and Ground Speed

Table A-10 contains the values for the following example:

$GPVTG,309.62,T, ,M,0.13,N,0.2,K*6E

Table A-10 VTG Data Format

Name	Example	Units	Description
Message ID	$GPVTG		VTG protocol header
Course	309.62	Degrees	Measured heading
Reference	T		True
Course		Degrees	Measured heading

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Reference	M		Magnetic (1)
Speed	0.13	Knots	Measured horizontal speed
Units	N		Knots
Speed	0.2	Km/hr	Measured horizontal speed
Units	K		Kilometers per hour
Checksum	*6E		
<CR> <LF>			End of message termination

(1) SiRF Technology Inc. does not support magnetic declination. All “course over ground” data are geodetic WGS84 directions.

A.2 RTCM Received Data

The default communication parameters for DGPS Input are 9600 baud, 8 data bits, stop bit, and no parity. Position accuracy of less than 5 meters can be achieved with the GPS-6031-X7 by using Differential GPS (DGPS) real-time pseudo-range correction data in RTCM SC-104 format, with message types 1, 5, or 9. As using DGPS receiver with different communication parameters, GPS-6031-X7 may decode the data correctly to generate accurate messages and save them in battery-back SRAM for later computing.

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Appendix B Earth Datums & Output Setting

B.1 Earth Datums

The GPS-6031-X7 is built in earth datum with WGS84.

B.2 Setting

B.2.1 Manufacturing Default

Datum: WGS84.
Baud Rate: 4800.
Output: GGA, GSA, GSV, RMC, VTG.
WAAS OFF

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Appendix C Bluetooth Specifications

C.1 Specifications

C.1.1 Major Specification

	Specifications
Wireless Interface	Compliant with Bluetooth Spec. Version 1.1
Bluetooth Protocol Stack Supported	L2CAP, RFCOMM, SDP
Bluetooth Profiles Supported	SPP
Frequency	2.4 GHz license-free ISM band
Range (Open Environment)	Up to 10 meters Range (30ft)
Radio Receiver Sensitivity	<-84dBm at 1 e-3 BER
Compatibility	----

C.1.2 UART

The UART interface uses the parameters: 4800-8-N-1 and no flow control.

C.2 LED status specification

NO.	Function	Description
1	P1	ON: Recharging Blinking: Battery Low
2	P2	On: Vin (Recharging) Available. OFF: Vin (Recharging) Not available
3	BT	ON: Data Transmitting Blinking interval in 4 sec.: Standby Blinking interval in 1 sec.: Pairing
4	GPS	ON: Position fix Blinking: Satellite Acquiring

C.3 Switch

NO.	Function	Description
1	SW-1	For clear link key information of Bluetooth.

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

Appendix D Battery Specifications

D.1 Specifications

D.1.1 General Specification

	ITEM	SPECIFICATION
1	Type	Lithium-Polymer Rechargeable Battery
2	Model	A-9001
3	Typical Capacity Minimum Capacity	1650 mAh 1500 mAh
4	Nominal Voltage	3.7 V
5	Internal Resistance (packed)	≤ 80mΩ
6	Weight	Approx 12 g
7	Maximum Charge Current	1.0 C (1650 mA)
8	Charge Voltage	4.20 ± 0.05 V
9	Maximum Discharge Current	2.0 C (3300 mA)
10	End of Discharge Voltage	2.8V by pcb protection, cell can be 2.6V
11	Temperature For Recharge For Discharge	 0 ~ 45 °C -20 ~ +60 °C
12	Storage Temperature Within 1 month Within 6 months	 -20~+45 °C* -20~+35 °C*

D.1.2 Testing Data

	ITEM	MEASURING PROCEDURE	CRITERIA
1	Appearance /dimensions	Visual and calipers	No defect or leakage. Dimension refers to drawing.
2	Open circuit voltage	Within 1 hour after charge as 1C, 4.2V, measure open circuit voltage.	≥ 4.15 V
3	Discharge capacity(1.0C)	Within 1 hour after charge as 1C, 4.2V, discharge until end of discharge voltage at 1C, measure the capacity.	Capacity ≥ 1650 mAh
4	Cycle life	Recharge: as 1C, 4.2V Discharge:1C to 3.0 V at 25±3 ºC This charge-discharge cycle shall be repeated 400 times and the discharge capacity≥ 80% of the minimum capacity.	Capacity ≥ 1320mAh
	Self-discharge	After recharge as 1C, 4.2V, store the testing cells at 25±3 ºC for 28 days. Then discharge at 0.2 C to 3.0 V, the capacity≥ 85% of minimum capacity.	Capacity≥ 1402mAh
	High-Temperature Charge retention	After recharge as 1C, 4.2V, store the testing cells at 60±3 ºC for 4 hours. Then discharge at 1.0 C to 3.0 V, the capacity≥ 90% of minimum capacity.	capacity ≥ 1485 mAh
8	Low-Temperature Charge retention	After charge as 1C, 4.2V, store the testing cells at -20±3 ºC for 4 hours. Then discharge at 0.2 C to 3.0 V, the capacity≥ 70% of minimum capacity.	capacity ≥ 1155 mAh
9	Leakage checking	After charge as 1C, 4.2V, store the testing cells at -20±3 ºC zone for 1 hour then transfer into 60±3 ºC zone for 1 hour. Repeat this 2- hour cycle 32 times for a total of 64 hours.	Weight lost＜40 mg
10	Drop test	Drop the cells from 1.5 m above a concrete floor for 18 times (3 times per face, 6 faces per cell), measure the AC impedance.	AC impedance increase ≤ 100%

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw

11	Over-Recharging	After recharge as per 1C, 4.2V, connect the cell to a power supply with constant current-constant voltage function. Adjust current to 3A and max voltage to 4.6V. Then recharging with 3A until voltage reaches 4.6V, current decreases to almost 0 A. Stop the test when battery temperature decreases by 10 ºC from the maximum.	No fire, no explosion
12	Hot box test	Preheat the oven to 150℃, place the cell with an attached thermal couple in the oven, monitor the temperature of the cell, keep for 10 minutes after the cell temperature reaches 150℃.	No fire, no explosion
13	Nail test	A stainless steel nail having a diameter of 3mm shall be punched through the cell until the nail has passed through the opposite side of the cell.	No explosion

D.2 Cautions

1) The best operating performance is between -20 ~ +60 °C. Higher or lower temperature could cause damage to the battery.

2) Operated with external power supply will not hurt battery life since battery does not discharge. Therefore, it operating temperature range is -40 ~ +85 °C

3) Recharge the battery for 10 hours before use.

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Appendix E Ordering Information

E.1 Product Options

E.1.1 Standard Package

GPS-6031-X7 (Bluetooth GPS Receiver) + CD + Warranty Card + Cigarette Adapter + Battery Instruction + Quick Installation Reference + 2 Sets of Wings.

E.1.2 Color Option

Dark Grey Base + Color Wings (Standard)
White Base + Color Wings (Optional)

E.2 Accessories

E.2.1 Power Adapter

A-6017-235 Cigarette Adapter, 2A, with input 6-30Vdc, Dc jack 2.35mm
A-6001: Recharging Adapter, Universal, 120V, 230V, 240V-AU

E.2.2 Battery

A-9001: Battery, Lithium-Polymer, 1650mAh

E.2.3 PDA Holder

1	A-2001	PDA Holder, Suction Cup, 150mm, Short Arm
2	A-2001-L	PDA Holder, Suction Cup, 150-320mm Adjustable
3	A-2002	PDA Holder, Suction Cup, 150mm, Short Arm, Magnetic Pad
4	A-2002-L	PDA Holder, Suction Cup, 320mm, Long Arm, Magnetic Pad
5	A-2005	PDA Holder, Suction Cup, 150mm, Short Arm, 4-Claw
6	A-2005-L	PDA Holder, Suction Cup, 320mm Long Arm, 4-Claw
7	A-2006	PDA Holder, Suction Cup, 150mm Short Arm, 3-Claw
8	A-2006-L	PDA Holder, Suction Cup, 150mm Long Arm, 3-Claw
9	A-2007	PDA Holder, Suction Cup, 150mm Short Straight Arm, 4-Claw
10	A-2008	PDA Holder, Suction Cup, 150mm Short Straight Arm, 3-Claw

Rikaline International Corp. 10F, 64, Kang-Ding Road, Taipei 108, Taiwan
Tel: ++886 2 2370 4688 Fax: ++886 2 2370 4686 E-Mail: info@rikaline.com.tw Web: www.rikaline.com.tw