

客 户

CUSTOMER \_\_\_\_\_

# 承 认 书

## SPECIFICATION FOR APPROVAL

客 户 编 号

CUSTOMER PART NO: \_\_\_\_\_

品 名 编 号

DESCRIPTION NO. FU-168

提 出 日 期

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深圳市铨顺宏科技有限公司

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# 1. Introduction

## 1.1 Over view

FU-168 is a GPS Mouse receiver build-in high performances -160dBm GPS chipset. FU-168 provides customer high position, velocity and time accuracy performances as well as high sensitivity and tracking capabilities. Customers benefit from the strength of both companies. Thanks to the low power consumption technology, the GPS-Mouse receiver is ideal for many portable applications such as PDA, Tablet PC, smart phone etc.

## 1.2 Feature

- Build on high performance GPS single chip
- Low power consumption
- RF Receiver of Noise Figure at 2.5 dB
- High Sensitivity -161 dBm (indoor)
- Integrated LNA with low-gain mode for active antenna option
- Assisted/Autonomous Operation
- Seamless Outdoor/Indoor Operation
- 48 channels in Search mode and 12 channels "All-in-View" tracking
- Up to 60,000 simultaneous search windows for fast TTFF and high sensitivity acquisitions
- Average cold start time under 35 seconds
- Support standard NMEA-0183 and binary protocol
- SBAS (WAAS, EGNOS and MSAS) support
- Integrated MIPS M4K CPU with software engineering services and available for embedded customer defined applications

## 1.3 Product Application

- Handheld GPS receiver application
- Ideal for PDA, Pocket PC and other consumer devices requiring Positioning capability
- Geographic Surveying
- Sports and Recreation
- Marine Navigation, Fleet Management
- Automotive application

- Car navigation and tracking
- AVL and Location-Based Services
- Timing application

## 1.4 Product Picture



## 2 Technical Specifications

### 2.1 General Characteristics

#### 2.1.1 General

Frequency	L1, 1575.42 MHz
C/A code	1.023 MHz chip rate
Acquisition Channel	48
Tracking Channel	12

#### 2.1.2 Accuracy

Position	2m CEP
Velocity	0.1 m/s
Time	1PPS <20 ns resolution

### 2.1.3 Datum

WGS-84	Default WGS84
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### 2.1.4 Time To First Fix (TTFT)

Hot start	<2sec., average
Warm start	<32sec., average
Cold start	<35sec., average

### 2.1.5 Sensitivity

Tracking Sensitivity	-161dBm, typical
Acquisition Sensitivity	-142dBm, typical for cold start

### 2.1.6 Dynamic condition

Altitude	18000m(Max)
Velocity	515m/s(Max)
Acceleration	4g
Jerk	1g/s

## 2.2 Electrical Characteristics

### 2.2.1 DC Power

Voltage	+3.3V DC
Supply current	Under 40mA @ 3.3V DC Typical
Backup Battery Power	+3.3V DC

### 2.2.2 Serial Port

Electrical Interface	Two full duplex serial communication
Baud rate	4.8K ( Default ) /9.6K/19.2K /38.4

	/57.6K/115.2K
Navigation update rate	1Hz
Protocol Message	NMEA-0183 Ver 3.01

### 2.2.3 Antenna

Type	Active patch antenna
Center Frequency	1575.42 +/-1.032MHz
Polarization	RHCP
Impedance	50 Ohm

### 2.3 Environmental Characteristics

Operating range	-40°C ~ +85°C
Storage range	-40°C ~ +150°C
Relative Humidity	5% ~ 80%

### 2.4 Physical Characteristics

Length	15.0 mm
Width	13.1 mm

### 2.5 Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Power supply voltage	-0.1	3.3	5	V
Input voltage	-0.3		VDD	V

## 3 Software Interface

### 3.1 NMEA V3.01 Protocol

Its output signal level is TTL: 4800bps (default), 8 bit data, 1 stop bit and no parity.

It supports the following NMEA-0183

Messages: GGA, GLL, GSA, GSV, RMC and VTG.

NMEA Output Messages: the module board outputs the following messages as shown in Table.

Table 1 NMEA-0183 Output Messages

NMEA Record	Description
GGA	Global positioning system fixed data
GLL	Geographic position – latitude / longitude
GSA	GNSS DOP and active satellites
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course over ground and ground speed

#### 3.1.1 GGA-Global Positioning System Fixed Data

Table 2 contains the values of the following example:

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

Table 2 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Position	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 2-1
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 2-1 Position Fix Indicator

Value	Description
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

### 3.1.2 GLL-Geographic Position-Latitude/Longitude

Table 3 contains the values of the following Example:

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

Table 3 GLL Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		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		N=north or S=south
UTC Position	161229.487		Hhmmss.ss
Status	A		A=data valid or V=data not valid
Checksum	*2C		



<CR><LF>		End of message termination
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### 3.1.3 GSA-GNSS DOP and Active Satellites

Table 4 contains the values of the following example:

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

Table 4 GSA Data Format

Name	Example	Units	Description
Message ID	\$GPGSA		GSA protocol header
Mode 1	A		See Table 4-2
Mode 2	3		See Table 4-1
Satellite Used	07		Sv on Channel 1
Satellite Used	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

Table 4-1 Mode 1

Value	Description
1	Fix not available
2	2D
3	3D

Table 4-2 Mode 2

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

### 3.1.4 GSV-GNSS Satellites in View

Table 5 contains the values of 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

Table 5 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Number of Messages <sup>1</sup>	2		Range 1 to 3
Messages Number <sup>1</sup>	1		Range 1 to 3
Satellites in View	07		
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 )
Azimuth	27	degrees	Channel 4 ( Maximum 90 )
Elevation	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

<sup>1</sup> Depending on the number of satellites tracked multiple messages of GSV data may be required.

### 3.1.5 RMC-Recommended Minimum Specific GNSS Data

Table 6 contains the values of the following example:

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

Table 6 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Position	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		ddmm.mmmm
E/W Indicator	W		E=east or W=west
Speed Over Ground	0.13	knots	
Course Over Ground	309.62	degrees	Ture
Date	120598	dBHz	ddmmyy
Magnetic Variation			E=east or W=west
Checksum	*10		
<CR><LF>			End of message termination

### 3.1.6 VTG-Course Over Ground and Ground Speed

Table 7 contains the values of the following example:

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

Table 7 VTG Data Format

Name	Example	Units	Description
Message ID	\$GPVTG		VTG protocol header
Course	309.62	degrees	Measured heading
Reference	T		Ture
Course		degrees	Measured heading
Reference	M		Magnetic
Speed	0.13	knots	Measured horizontal speed
Units	N		knots
Speed	0.2	Km/hr	Measured horizontal speed
Units	K		Kilometer per hour
Checksum	*6E		
<CR><LF>			End of message termination

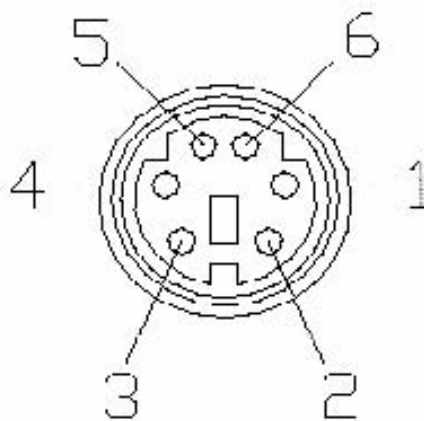
## 4 Hardware Interface

The FU-168 includes an antenna in a unique style waterproof gadget. We can manufacture variable connector cable to suit your demands. Like USB, PHR(JST), GHR(JST), Molex, PS2, RJ11, D-Sub 9..etc. You provide me specification, we manufacture the cable and connector.



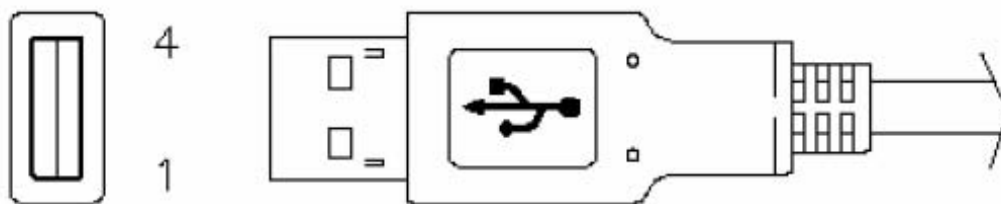
### Definition of Pin assignment

#### 1、PS/2 connector (male plug)



PIN	Signal
1	NC
2	GND
3	Tx (TTL)
4	Rx (TTL)
5	NC
6	+5VDC

#### 2、USB connector



PIN	Signal
1	+5VDC
2	D+
3	D-
4	GND

**VIN** (+3.3-5.0V DC power Input)

This is the main DC power supply input pin. It provides voltage to module.

**GND**

GND provides the ground.

**RX (D+ )**

Serial input for channel A (Default,NMEA)

**TX (D- )**

Serial output for channel A (Default NMEA)

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