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## **ACCESSORY BOARDS**

# **GPS-SIM18C User Manual**



# **USER MANUAL**

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#### Introduction



GPS Kit, is proposed to smooth the progress of developing and debugging of various designs encompassing of GPS Based applications with MCU. This evaluation board for our various GPS modules that

incorporates many new features and supports connection to the various GPS modules. Serial interface for USB over the FT232RL and a classic RS232 interface.

#### **Packages**



- EVB-GPS Kit (sim18)
- Serial Port Cable
- CD contains
  - Software
  - Example Programs | User Manual

#### **Technical or Customer Support**

Post your questions	:
Pantech forum	:
	www.pantechsolutions.net/forum
Website	:
	www.pantechsolutions.net

#### **1.** Introduction

This GPS Kit is a high sensitivity, ultra low power consumption and low cost GPS Board. This evaluation board for our various GPS modules that incorporates many new features and supports connection to the various GPS modules. Power is provided over USB or a External +5VDC Adaptors. In this board by default sim18 GPS Module is mounted

#### **Supported Modules**

• SIM18

#### **Base Board Specifications**

- On-Board Voltage Regulator
- Data Flow Indicators (PSS)
- Power ON status Indication LED.
- DB9 Connector for PC or MCU Interface FOR NMEA protocols.
- USB connection provides (power and a serial link), will show GPS NMEA data every second.

#### **General Block Diagram**



#### 2. GPS Module – SIM18

It has 44 channel GPS receivers and Simcom chipset solution to track up to 20 satellites at a time while providing fast time-to-first-fix and 1Hz navigation updates. This hardware capability combined with software intelligence makes the board easy to be integrated and used in all kinds of navigation applications or products. The module communicates with application system via RS232 or UART level with NMEA0183 protocol.

#### **GPS Receiver**

- 44 channel Simcom SIRF4 positioning engine
- Ultra high sensitivity to -160 dBm
- Supports AGPS, WAAS, EGNOS and MSAS
- Support UART RS232 ports
- Support 5Hz position update rate capability @3D fix
- Low power consumption 65mA
- Backup battery
- Low position/velocity drift in static mode
- RoHS compliant (lead-free)

#### **Other Features**

Chipset	:	SIRF4 Simcom GPS chip
Frequency	:	L1, 1575.42MHz Channels, C/A code 44,
		1.023 MHz chip rate,

Accuracy	:	Position 2.5 meters CEP   Time 1us rms (1
		PPS)
Acquisition	:	Cold start 35 sec, typical
Rate	:	Warm start 33 sec, typical   Hot start 1.3 sec,
		typical
Dynamic	:	Altitude 18,000 meters (60,000 Feet) max.
Condition	:	Velocity 400 Km/hr (1000 Knots) max.





Pin diagram SIM18

#### **NMEA Sentence Description**

1	GGA (default)	Global Positioning System Fixed Data			
2	GLL	Geographic Position - Latitude/Longitude			
3	GSA (default)	GNSS DOP and Active Satellites			
4	GSV (default)	GNSS Satellites in View			
5	5RMC (default)Recommended Minimum Specific GNSS data				
6	VTG	Course Over Ground and Ground Speed			
7	ZDA	Time and Date			

#### **PIN Details**

PIN	SIGNAL	ю	DESCRIPTION	
1	SCL 1	0	I2C Clock	
2	SDA 1	ю	I2C Data	
4	EINT O	I	External interrupt input	
5	TIME MARK	0	IPPS output	
6	NRESET	I	Reset input	
11	RF_IN	I	GPS signal input	
13	VCC_ANT	I	Power input active antenna	
14	VCC_RF	0	1.8V output power supply for active antenna	
15	VRTC	I	1.8v VRTC input	
17	VCC	I	Main Power input	
18	ON_OFF	I	ON_OFF control input	
19	WAKE UP	0	Status indicate	
20	RXD/MOSI/SDA2	I	For UART:receive data,SPI:slave input,I2C:data line	
21	TXD/MISO/SCL2	0	For UART:transmit data,SPI:clock input,I2C:clock line	
23	RTS/SCS	0	For UART:RTS signal, SPI:chip select input	

24	CTS /SCLK	I	For UART:CTS signal,SPI:clock input
3,7,8,9,1 0,12,	GND		GROUND
16,22			

#### Note :

The detail information please refers to SIMXXX series GPS module NMEA protocol reference manual.

#### **3. Connector Details**



### 4. RS-232 Communication (USART)

- RS-232 communication enables point-to-point data transfer. It is commonly used in data acquisition applications, for the transfer of data between the PC.
- The voltage levels of a GPS Module and PC are not directly compatible with those of RS-232, a level transition buffer such as MAX3232 be used.

	UART DB-9 Connector	GPS Module Lines	Serial Port Section
T0(P1)	TXD	тх	
UAR'	RXD	RX	

#### **GPS Data Viewer Softwares**

- GPS Viewer
- U-Blox
- GPS Trace
- Trimble GPS Monitor
- Mini GPS

#### Note :

SIMXXX GPS Module Datas can be viewed following softwares GPS Viewer | U-Blox | Mini GPS.

#### 5. Introduction to Trimble GPS monitor

The new Trimble GPS Monitor (TGM) application is a tool that can replace many of the previous "Monitor" and "chat" programs used for Trimble Embedded and Resolution T products.

The TGM has the features found in the older Trimble applications to configure a GPS receiver as

Well as improvements in the user interface. It will work with the standard RS 232 serial interface. As well as the USB version found in the later starter kits. Instructions for the USB interface are Included below. It has new features such as "Detect Receiver" that will test a GPS receiver port for protocol and baud rate if the user cannot remember, or has lost the settings.

#### Working procedure of Trimble GPS monitor

a) This is the Trimble GPS monitor icon if we double click the icon the main window will be opened



b) Connect the GPS receiver to the PC using the RS232 straight cable



c) click the **initiliaze** menu→and select **connect** option.

Trimble GPS Monitor		
File Initialize View Configure Tools	Window Help	
File       Initialize       View       Configure       Tools         COM       Connect       Detect Receiver       Detect Receiver         Ti       Cold Reset       Ctrl+O         T       Warm Reset       Ctrl+W         D       Hot Reset       Ctrl+H         V       Semi-Hot Reset       Semi-Warm Reset         Semi-Warm Reset       Factory Reset       Factory Reset         E       Initialize Receiver       M         Get from Receiver       M       Load A-GPS Data Ctrl+G         Speed:       mi/hr	Window Help   Image: Status Mode   Mode Status   Almanac Status   DOPs Status   PDOP BBRAM   HDOP ANT   VDOP Osc (ppb)   TDOP Status	Satellite Data           SV         C/No         Az.         Elev.           Image: Signal state
Longitude MHAE	Application GPS Core	
Tx @ Rx @		IDLE

d) Select the configure pull down from the main screen select the receiver configuration, from that select the port configuration parity, baud rate, stop bits required. And click Save configuration.

Trimble GPS Monitor	
File Initialize View Configure Tools	; Window Help
COM 1 💌 쥷 🏈 GPS DATA	N II II 0 1
Time	Select Port & Settings Satellite Data SV C/No Az. Elev.
Date	COM Port: COM 1
Week TOW	Auto-detect settings. If not checked, select below:
East m/s	Baud Rate: 4800
North m/s	Parity: None V
Speed mi/hr	Stop Bits: 1
Position Latitude	OK Cancel
Altitude m HAE	GPS Core
Tx 🐵 Rx 🐵   Monitoring GPS receiver	. NMEA 00:02:42 COM 1: 4800-8-N-1

#### e) Select the Auto query from the configure

Primble GPS Mo	nitor		
File Initialize View	Configure <mark>Tools</mark>	Window Help	
сом 1 🔽 👼 🄏	🗸 Auto Query	<b> </b>   0 4	
Time Time Date	Receiver Configur Save Configuration Settings	nation on Auto (0 SV) don't have GPS time	Satellite Data SV C/No Az. Elev.
Week T	ow	Almanac	
Velocity East Speed Speed	m/s m/s m/s mi/hr	DOPs     Status       PDOP     BBRAM     O       HDOP     RTC     O       VDOP     Osc (ppb)       TDOP	
Position Latitude Longitude Altitude	m HAE	Firmware Info Application GPS Core	
Tx 🐵 Rx 🚳 🛛 Monitorir	ng GPS receiver	NMEA	00:00:21 COM 1: 4800-8-N-1

 f) Select the configure pull down menu from the main window. Select the receiver configuration and the output tab, after selecting the required options from window click the save configuration

g) show the window and satellite data coverages appear with green mark and also display latitude and lontitude value .

ጅ Trimble	GPS Moni	tor						
File Initialize	File Initialize View Configure Tools Window Help							
COM 1 💌	COM 1 🔽 🚿 🧭 GPS DATA 🔽 🗟 🔲 🚰 🥝							
⊂ Time ——			Receiver Moc	le & Status	Satellit	e Data -		
Time	Thu 1	2:04:38	Mode	3-D, Auto (9 SV)	S۷	C/No	Az.	Elev.
Date	June 3	30, 2011	Status	doing position fixes	8	27.0	134.0	65.0
Week	1642 TO	W 389078	Almanac		17	39.0	328.0	52.0
					4	32.0	190.0	48.0
Speed and	Heading		DOPs	Status	28	39.0	21.0	40.0
Speed	0.0	km/hr	PDOP   1.60	BBRAM O	7	32.0	145.0	36.0
Heading	145.	1 deg	HDOP 0.90		26	17.0	266.0	27.0
n/a		m/s	VDOP 1.30		24	31.0	42.0	13.0
nla		mi/br	TDOP		27	25.0	207.0	12.0
	1				2	25.0	207.0	12.0
Position —			Firmware Info	<b>.</b>	10	20.0	184.0	9.0
Latitude	N 13°	2.56240'	Application		11	20.0	40.0	1.0
Longitude	E 80°	13.76640'	- Application		15	29.0	296.0	4.0
Altitude	-63.10	m HAE	GPS Core		25	0.0	148.0	20.0
Tx 👰 Rx 🎯	Monitoring	GPS receiver		NMEA	00:07:	49   C	OM 1: 48	300-8-N-1

#### h) Click a view option and select the raw data monitor window

🖗 Trimble C	iPS Monitor						
File Initialize	View Configure Tools	Window H	Help				
СОМ 1 💌	Position Map Sky Plot		x 🥹 🖉				
Time Time	Position Output Velocity Output	Þ	Mode & Status 3-D, Auto (9 SV)	- Satellit SV	e Data - C/No	Az.	Elev.
Week	Signal Output Double Precision	Þ	aoing position rixes	17	36.0 28.0	328.0 190.0	52.0
Speed and H Speed	GPS System Data GPS Receiver Version		60 Status BBRAM O RTC O	28 7	36.0	21.0	40.0
n/a	Raw Data Monitor	Ctrl+R VDOP	1.30 ANT n/a Osc (ppb)	26 24	25.0 28.0	265.0 42.0	26.0 13.0
n/a	mi/hr	TDOP		2	24.0	208.0	12.0
Position Latitude	N 13° 2.56200'	Applicat	ion	11	22.0	40.0	9.0
Longitude Altitude	E 80° 13.76620' -62.50 m HAE	GPS Cor	re	15 20	25.0 28.0	296.0 93.0	4.0 8.0
Tx 👁 Rx 🍯	Monitoring GPS receiver		NMEA	00:08:	50 C	OM 1: 48	300-8-N-1

i) To view the sent data as well as the received, select the Show Sent Data box.

🔲 Raw Data Monitor 📃 🗖 🔀
Show Received Data Show Sent Data Display packet IDs only Copy to Clipboard Pause Clear
<pre>\$GPGSV, 3, 3, 12, 06, 13, 165, 33, 03, 12, 179, , 23, 08, 303, , 19, 04, 206, 30*71 \$GPGLL, 1302.5652, N, 08013.7646, E, 050522.000, A, A*54 \$PTNLQTF*45 \$GPGPQ, GSA*28 \$GPGPQ, GSA*28 \$GPGPQ, ZDA*22 \$GPRMC, 050523.000, A, 1302.5651, N, 08013.7645, E, 0.28, 217.08, 060611, ., A*64 \$GPVTG, 217.08, T, M, 0.28, N, 0.53, K, A*3D \$GPGGA, 050523.000, 1302.5651, N, 08013.7645, E, 1, 8, 0.84, 30.3, M, -88.8, M, , *41 \$GPGSA, A, 3, 16, 20, 11, 31, 06, 32, 24, 14, ., ., 1.23, 0.84, 0.89*0C \$GPGSV, 3, 1, 12, 16, 49, 167, 35, 32, 44, 335, 47, 31, 38, 016, 48, 24, 32, 274, 36*72 \$GPGSV, 3, 2, 12, 22, 28, 134, 17, 11, 23, 251, 29, 20, 19, 324, 41, 14, 18, 066, 43*7C \$GPGSV, 3, 3, 12, 06, 13, 165, 33, 03, 12, 179, .23, 08, 303, .19, 04, 206, 30*71 \$GPGLL, 1302.5651, N, 08013.7645, E, 050523.000, A, A*55 \$PTNLQTF*45 \$GPGPQ, GSA*28 \$GPGPQ, GSA*28 \$GPGPQ, GSA*28&lt; \$GPGPQ, GSA*28&lt; \$GPGPQ, GSA*28</pre>

#### j) click a **view** option and select the **position map** from window

🖗 Trimble (	GPS Monitor			×
File Initialize	View Configure Tools	Window	Help	
сом 1 💌	Position Map Sky Plot		🔤 🗃 🕘 🍓	
Time Time Date Week	Position Output Velocity Output Timing Output Signal Output		Mode & Status         Satellite Data           3-D, Auto (10 SV)         SV         C/No         Az.         Elev.           doing position fixes         8         30.0         136.0         64.0           17         35.0         330.0         52.0	
Speed and H Speed	GPS System Data GPS Receiver Version		Status         4         33.0         190.0         49.0           .50         BBRAM         28         37.0         22.0         40.0           RTC         7         28.0         145.0         35.0	
n/a [ 	Raw Data Monitor mi/hr	Ctrl+R VDOP TDOP	1.80         ANT         n/a         26         30.0         264.0         26.0           P         1.20         Osc (ppb)         2         20.0         208.0         13.0           P          24         29.0         42.0         12.0	
Position Latitude Longitude Altitude	N 13° 2.56220' E 80° 13.76470' -62.00 m HAE	Firmwa Applic GPS C	IO         23.0         183.0         9.0           ication         20         28.0         92.0         8.0           Core         11         26.0         40.0         0.0           15         22.0         295.0         4.0	
Tx @ Rx @	Monitoring GPS receiver		NMEA 00:10:14 COM 1: 4800-8-N-	-1

k) view the map and location of the gps is mark in red colour.

🕏 Position Map 📃 🗖 🗙
File Edit Command Configure Help
Position Map (Microsoft Virtual Earth) Position Plot (Horizontal, 2D) Position Map (Microsoft Virtual Earth) Position Plot (Horizontal, 2D)

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