

# SE873 EVK User Guide

1VV0301214 r0 - 2015-07-29



Making machines talk.



# **APPLICABILITY TABLE**

PRODUCT SE873 EVK



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# 1. Introduction

### 1.1. Scope

The scope of this manual is provide product information for the SE873 Evaluation Kit (EVK).

# **1.2.** Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-EMEA@telit.com TS-AMERICAS@telit.com TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

### 1.3. Text Conventions



Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.



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## 1.4. Related Documents

• SE873 Product User Guide



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# 2. Evaluation Kit Requirements

To use the SE873 Evaluation Kit (EVK), you will need:

- USB Drivers (on the included flash drive)
- SiRFLive 2.07P4 or later (on the included flash drive)
- A PC with a USB port that fulfills the minimum software requirements:
- Windows XP or later
- NET Framework 2.0 (automatically installed by the SiRFLive package if necessary internet connection is required).



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- 3. Evaluation Kit Description
- 3.1. Evaluation Kit Contents



Note: The antenna is included but not visible under the ground plane. Figure 3-1 SE873 Evaluation Kit Contents



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<b>Evaluation Kit Con</b>	ntents
Plastic case	
USB cable	
Multi-constellation a	ntenna
Ground Plane	
USB drive with software and	documentation
Evaluation Kit	

Table 3-1 SE873 Evaluation Kit Contents



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# 3.2. Evaluation Kit



Figure 3-2 SE873 Evaluation Kit



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### 3.3. SE873 Module



Figure 3-3 SE873 Module



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# 3.4. Evaluation Board Picture



Figure 3-4 SE873 Evaluation Board



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# 3.5. Evaluation Board Layout

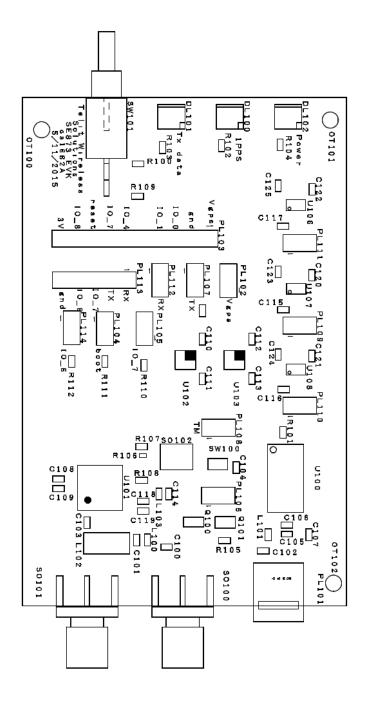


Figure 3-5 SE873 Evaluation Board Layout



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ID	Description
DL102	LED - System ON
DL100	LED - 1PPS
DL101	LED - TX data
SW101	On/off switch – 1.8 V to module On/Off pin
PL101	USB connector – Power, ground, Tx, and Rx
S0100	SMA connector – 1PPS
S0101	SMA connector - RF input
PL102	1.8 V module power (current measurement)
PL104	Boot pin to 1.8 V
PL105	GPIO7 to ground
PL106	3.3 V active antenna power (remove for passive antenna)
PL107	TX output
PL108	1PPS output
PL109	1.8 V regulator enable
PL110	3.3 V regulator enable
PL111	1.8 V module regulator enable
PL112	RX input
PL114	GPIO6 pin to 1.8 V

<u> (</u>

#### Table 3-2 SE873 Evaluation Board Components



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# 3.6. Evaluation Board Schematic Diagram

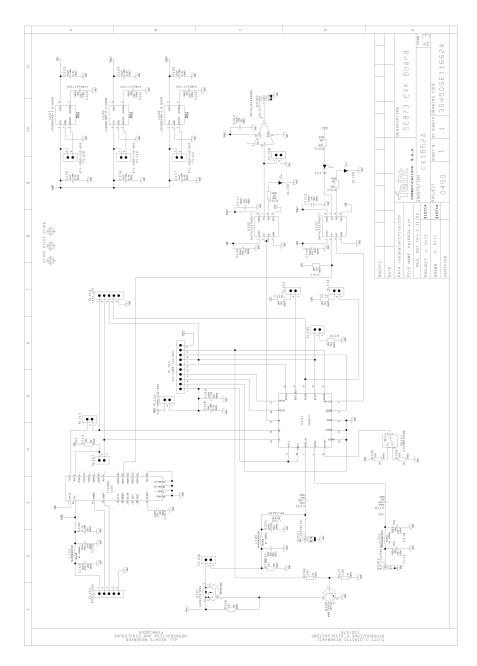


Figure 3-6 SE873 Evaluation Board Schematic Diagram



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# 4. Evaluation Kit Setup

# 4.1. Installing the USB Drivers

Before connecting the SE873 Evaluation Kit, install the necessary USB drivers.

• Double-click the USB driver executable CDM v2.12.00 WHQL Certified.exe, and follow the directions to install the USB drivers.



Figure 4-1 Hardware Installation

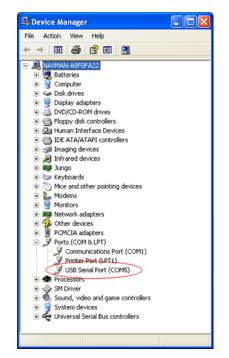
- Click "Continue Anyway" to install the USB COM port driver
- When the EVK board is connected to a personal computer USB port, the driver will create a COM port.
- Use the Windows "Device Manager" to check the identification of the new COM port. This port identification is necessary for EVK tools to connect to the evaluation kit.



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#### Figure 4-2 Identify new COM port

• In this example, the COM port is assigned as COM5



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### 4.2. Installing SiRFLive

Minimum PC requirements:

- Pentium CPU 2 GHz
- 1 GB of RAM
- 100 MB hard drive

Recommended:

- 2 GB of RAM
- 1280 x 1024 screen resolution

Double-click the SiRFLiveInstaller\_MKTG\_Lite.msi file to install the SiRFLive program, then follow the installer directions until finished.

It is recommended that SiRFLive be installed to the default location – C:\CSR\SiRFLive.



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# 5. Running the SE873 Evaluation Board

- 1. Power will be applied to the SE873 module when the USB interface is connected to a USB port on a personal computer. When the EVK On-Off switch is turned ON, the module ON\_OFF pin will be powered up and the module will begin operation.
- 2. Connect the provided GNSS Active Antenna.

NOTE: The evaluation kit supplies 3.3V to the antenna. For a passive antenna, jumper PL106 must be removed.

- 3. Place the antenna face up in a location with a clear view of open sky.
- 4. Use SiRFLive or TelitView to send commands to and display output from the module.



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# 6. Using SiRFLive

### 6.1. Starting SiRFLive

- 1. Connect Power and Antenna to the EVK. See Section 5 Running the SE873 Evaluation Board.
- 2. Turn on the EVK Power switch (up).
- 3. Launch the SiRFLive application.



4. Connection Settings window: Select the Receiver. This is where you select the COM port that was previously created by the USB driver. See Section 4.1 Installing the USB Drivers. Use the **Receiver** drop-down box.

	TCP7555: Debug View SW Version: No     TCP7555: Courier New 9	n deeted	
TCP7555 Signal View	bytes/s	Receiver: COM15	
Mode: No Fix Mode: No Fix Power: Very Low Src SV Elev Arim Stated	Avg CNo: 0.0 dBHz	OK Cancel	

Figure 6-1 Connection settings window

5. If the default **Baud Rate** is 115200 and **Protocol** is OSP on your EVK, leave those boxes with their values as presented.

If the default **Baud Rate** is 9600 and **Protocol** is NMEA on your EVK, change those boxes to match.

If you have changed the receiver's defaults, select them using the **Baud Rate** and **Protocol** drop-down boxes.



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- 6. Click **OK**. The remainder of these screen captures will show NMEA protocol. OSP will present somewhat different data.
- 7. If necessary, click Receiver, then Connect on the menu bar.

Rec	eiver	Features	AGPS	Window
-0-	Conn	ect		
<b>()</b>	Disco			
	View			•
	Comr	nand		Þ
	Naviç	ation		÷
	Plot D	Data		•
	Set R	eference Loo	ation	
	Autor	mation Test		•

#### Figure 6-2 Click Receiver, then Connect on the menu bar

- 8. The SE873 defaults to a power-saving mode called SmartGNSS2, so you may see the GLONASS satellites disappear from the Radar View. This is normal. If you wish to command the full-time use of GLONASS as well as GPS, use the following procedure:
  - a. Click Receiver, Command, then Switch Comm Settings.

SiRFLive 2.07P4 Marketing				
File Receiver Features AGPS Window H	elp 2 23, 92 📢 📈 😂 🖾 🕨 💷 📾 🖆			
COM15: Signal View	COM15: Radar View	COM15: Location View		<u>^</u>
		i 🗞 40 × 📫		
Mode: 3-D 1Hz Power: Nominal Avg CN	o: 33.0 dE	Run Time View Position Fix Report		
Src SV FreqElev Azim State C/NO 0 GBS 02 58.0 191.0 00 40.0	-5 25 12 11 17	65 Receiver Time(UTC): 23:54:12 TOW: 345267.00 EX	xt. Week: N/A	
STC SV FreqElev Arim State C/WO 0		S Switch Comm Settings	Altitude: 224.60 m	
	82 <sup>24</sup> (79 EI=90		Heading: 0.00*	
		Action Set		
		C Switch Baud Baud Hate	- QZSS: BDS:)	
		C Switch Message Rate 115200 -		E
COM15: Debug View SW Version: S2XLN96B01		Update Rate (s) SSB Mag Rate		
II p <sup>2</sup> Courier New • 9 •		GGA: 1 v Message Rate GLL: 0 v 2 v 1 v Set		
FGLGSV, 2, 1, 08, 78, 43, 161, 35, 82, 39, 258, 33, 8				
4GLGSV, 2, 2, 08, 88, 18, 038, 27, 80, 21, 329, 25, 6 4GNRMC, 235411.000, A, 3340.2543, N, 11739.231		GSV: 5 v DMC- 1 v Messane Bate		
\$GNVTG,0.00,T,,M,0.00,N,0.0,K,A*13 \$GPGGA,235412.000,3340.2543,N,11739.2316,	W,1,07,0.8,258.7,H,-			
34.1,M,,0000*6E #GNGNS,235412.000,3340.2543,N,11739.2316, *5F	W, AANN, 13, 0.8, 258.7, -34.1,,0000	EPE: 0 v Mode		
\$GNGLL, 3340.2543, N, 11739.2316, W, 235412.00 \$GNGSA, A, 3, 17, 12, 06, 02, 24, 10, 28,, 1.5,				
<pre>#GNGSA, A, 3, 78, 82, 81, 79, 88, 80, , , , , , 1.5, 0. #GNRMC, 235412.000, A, 3340.2543, N, 11739.231</pre>	8,1.3*28 6 W 0 00 0 00 100615 A*6D			
\$GNVIG,0.00,T,,M,0.00,N,0.0,K,A*13	-			
bytes/s	2			
Reset # Reset TTFF-Rese TTFF-Aidr TTFF-Fi	rst Horz Vert Time Time Fre Acc. Acc. Error Unc. En			
Heset# Type (s) (s) Nav (s)	(m) (m) (ms) (ms) (p;	m) (ppm) Flaga		
COM15[9600:None:One:8:FC:None]   Protocol: NMEA   V	iew: NMEA/Text   SW Version: S2XLN96B01   Log: i	de		

Figure 6-3 Switch Comm Settings window



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- b. Verify that **Switch Protocol (to OSP)** and **Baud Rate** of **115200** are selected as shown above.
- c. Click Set. The receiver and display will both switch to OSP protocol at 115,200 bps.

SiRFLive 2.07P4 Marketing			
File Receiver Features AGPS Window Help			
💿 🖝 II 🔟 📓 🕫 🜻 🎟 🚳 📾 🔶 🚾 🖉 🏹 😂 🖾 I			
COM15: Signal View	dar View 🔯 🖬 🛛	COM15: Location View	
Msg67 • Msg67		y 谈 × 赠 Mag67 -	
Mode: > 4-SVs KF	AZEU	Run Time View Position Rx Report	
Power: Low Avg CNo: 29.2 dl Src SV FreqElev Azim State C/NO 0 -5 76	79		
Start Frequency Alpha State (/M) ∂ -5 Start Start State (/M) ∂ -5 Start Start Sta	71 17 78	Receiver Time(UTC): 00:00:53 TOW: 345669.00 Ext. Week: 1848	
		Latitude: 33.670921° Longitude:-117.653843° Altitude: 225.09 m HDOP: 0.80 Speed: 0.00 m/s Heading: 0.00°	
	77 EI=90	Mode: > 4-SVs KF EPE: 2.10 m	
	02 102 73	Number of SVs used in Fix: 13	
	70	( GPS:2 6 10 12 17 24 28 - GLO:70 74 76 77 79 81 SBAS: QZSS: BDS:)	
		Lat.33.670941, Lng:117.653809	
III o <sup>™</sup> Courier New • 9 •			
CF, D2, C9, D2, C8, DF, C8, CB, D2, C9, D2, C8, DF, C8, CE, D2, C9, D2, C8, DF, C8, C , D2, C8, DF, C8, C9, D2, C9, D2, C8, DF, C8, CC, D2, C9, D2, C8			
68, 225, 00, CD, CA, CA, C7, C6, CE, CF, DF, AC, AC, AF, 9D, C5, DF, C8, C7, D2, CE, D 68, 225, 00, CD, CA, CA, C7, C6, CE, CF, DF, BC, 97, 9B, 9A, 89, 8C, BE, C5, DF, DF, C			
, CF, DF, CE, CD, D2, CE, CF, DF, CD, CB, D2, CE, CF, DF, DF, CD, D2, CE, CF, DF, CE, C , CF, DF, CE, CF, D2, CE, CF, DF, C8, C9, D2, CE, CE, DF, C8, CB, D2, CE, CE, DF, C8, C	8, D2, CE		
, CE, DF, C8, C6, D2, CE, CE, DF, C8, CC, D2, CE, CE, DF, C8, CF, D2, CE, CE, DF, C8, C	E, D2, CE	R = 5.00m	
, CE, DF, CD, CA, D2, DF, C6, DF, CD, CA, D2, CE, CF, DF, CD, C7, D2, CE, CF, DF, CD, C7, D2, DF, C6, DF, CD, D2, DF, C6, DF, C6, C7, D2, DF, CC, DF, C8, C7, D2, DF, C6, D2, DF, C6, DF, C8, C7, D2, DF, C6, D7, D2, DF, C6, D7, D2, DF, C6, D7, D2, DF, C6, D7, D2, D7, C8, D2, D7, C8, D2, D2, D2, D2, D2, D2, D2, D2, D2, D2			
, CC, DF, CE, C6, C8, D2, CE, CD, DF, CD, CA, CA, D2, CE, CA, DF, DF, CF, D2, CE, CA 2559000 BG OS 2559000 100Hz: 0 10Hz: 10 1Hz: 1 Ser: 14 Idle Loops	: 157		
68,255,CMADC-AGC 31 68,255,CMADC-AGC 31			
	•		
bytes/s	2 14		
TTEC TIEFFIRE			
Reset # Reset (s) (avg; (s) (avg; (n) (avg; (n) (m) (avg; Error	Time Freq Freq Adm Unc. Error Unc. Flags		
Type 9.20) 9.20 9.20 9.20 (ms)	(ms) (ppm) (ppm) Hagi		
0 9.2 9.2 9.2 570185.87 238.6 0.0000	00 Acc<1.0 0.000000 Acc<0.0 0000	1000	
COM15[115200:None:One:8:FC:None]   Protocol: OSP   View: GPS   SW Version: S2XLN968	301  Log: idle		

Figure 6-4 The OSP protocol window

d. Click Features, Power Mode, then Advanced.

SiRFLive 2.07P4	4 Marketing												-	- 0 <b>-</b> X
File Receiver		AGPS Win		c) 8 🖻	N 11	F 🖾 🕨 I	1 = 2	15						
					×									
COM15: Sign						/15: Radar \	/iew		83		115: Location View	83		1
N S Power N	Mode				Msg67						X 📑 Msg67 -			
Power Po	r Management						AZ=0			Run	Time View Position Fix Report			
		the following i			25	76		79						
Sr Pk	lick on Advar	ce button to co	ntinue:		1 /	12	<u>^n</u>	17 /8			Receiver Time(UTC): 00.03:12 TOW: 345808.00 Ext. Week: 1848 Latitude: 33.670918* Longitude:-117.653837* Altitude: 226.14 m			
	Update Rat	: 1112	•			16	06				HDOP: 0.80 Speed: 0.00 m/s Heading: 0.00*			
	uality of Positi	- High	-			74 14	E=90				Mode: > 4-SVs KF EPE: 2.03 m			
	uality of Positi	on: I. w.				. 🔍		10 2.	3		Number of SVs used in Fix: 11			
Ad	dvanced	ОК	Can	cel			70	/7			( GPS:2 6 10 12 17 24 28 GLO:70 74 77 81 SBAS: QZSS: BDS:)			
	_						05							
😭 COM15: Deb					-			1	_	Lat:3	33.670941, Lng:117.653809			
COWLS: Deb		<ul> <li>9</li> </ul>	•				1 65							
,C6,DF,CD,CA,										/				
,C6,DF,C8,C6, ,CC,DF,C8,C7,	,D2,CE,CD,	DF, CD, CA, CA,	D2, CE, CA, I	DF, DF, CF,	D2, CE, CA									
68,225,00,BE, ,CC,CA,C9,DF,														
, DF, C7, CA, CD, , C7, DF, C8, CE,	,CF,CE,CC,	CF, CF, DF, CA,									R = 5.00m			
68,225,00,BE,	, B8, BC, A0,	CE, C5, DF, 91,												
,CD,CB,CD,CA, ,CC,DF,C7,CA	,CD,CF,CE,													
,C7,CD,C6,CB, 2698000 BG CS	\$ 2698000	100Hz: 0 10H	iz: 10 1Hz:	: 1 Ser:	15 Idle	Loops: 1	55							
68,255,CWADC-	-AGC 31													
bytes/s								2 14		2				
					_				1					
		F-Resi TTFF-Aid wg: (a) (avg:		Horz Acc. (m)	Vert Acc. (m) (avg:	Time Error	Time Unc.	Freq	Freq Unc.	Aiding				
Ty	ype 9.20	9.20)	(avg: 9.20)	(avg: 570185.87	238.60	(ms)	(ms)	(ppm)	(ppm)	Flags				
0	9.2	9.2	9.2	570185.87		0.000000	Acc<1.0	0.000000	Acc<0.0	0000000				
ON 415(115200-NI-	0.050		LOCALLE	COCLON										

Figure 6-5 Features, Power Mode window



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Ray 3 + 479         Image: Im	RFLive 2.0	07P4 Market	ing										
Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:         Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:         Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mode:       Image: Series Mod	_					3. 원 등	) i i i i i i i i i i i i i i i i i i i	E III 🕨		ti j			
gar	COM15: S	Signal Vig <u>w</u>				83					22	( EB CON	MS-Location View
Prest Hall         If The Tore of	Asg67	- 3	S Power M	lode					×			i 🎲 🤅	3 X ∰ Msg67 -
Image: Tree Tore       Image: Tore												Ru	n Time Wew Postion Fix Report
(28/2 6 10 12 2 / 2 - (L) 70 / 17 / 77 / 19 1 - 542.6 - 025.5 - 805.)         (28/2 6 10 12 / 2 / 2 - (L) 70 / 17 / 77 / 19 1 - 542.6 - 025.5 - 805.)         (28/2 6 10 12 / 2 / 2 - (L) 70 / 17 / 77 / 19 1 - 542.6 - 025.5 - 805.)         (18/2 6 10 12 / 2 / 2 - (L) 70 / 17 / 77 / 19 1 - 542.6 - 025.5 - 805.)         (18/2 6 10 12 / 2 / 2 - (L) 70 / 17 / 77 / 19 1 - 542.6 - 025.5 - 805.)         (18/2 6 10 12 / 2 / 2 - (L) 70 / 17 / 77 / 19 1 - 542.6 - 025.5 - 805.)         (18/2 6 10 12 / 2 / 2 - (L) 7 / 17 / 17 / 10 / 17 / 17 / 17 / 17 /	SV F	regEle	○ Fu	ll Power sh To Fix			·		0	79 17 78			Latitude: 33 670916" Longitude: 117 653830" Altitude: 227.17 m HDOP: 0.80 Speed: 0.00 m/s Heading: 0.00"
		L			ок	Cano	el		ľ	102.7			Number of SNs used in Fiz: 12 (GPS 26 10 12 24 25 - GLO-70 74 76 77 98 81 SBAS QZSS BDS))
								_	05	-	_	Lat	133.670959, Lng-117.653876
Construction     C				n: S2XLN96	B01				8				
Participant         Tit Friedda	9, D2, C8, , 225, 00, , 225, 00, F, DF, CD, F, DF, CE, E, DF, C8, E, DF, C0, F, DF, CE, 8, DF, DF, CE, 8, DF, DF, CE, 59000 BG, 255, CMA	DF, C8, C6, CD, C7, CA, CD, C7, CA, C7, D2, CE, C7, D2, CE, C6, D2, CE, C8, D2, DF, C8, D2, DF, C4, D2, CE, C4, D2, CE, C4, D2, CE, C4, D2, CE, C5, C5, C5, C5, C5, C5, C5, C5, C5, C5,	D2, C9, D2 C7, C6, CE C7, C6, CE CF, DF, CI CF, DF, CE CE, DF, CE C6, DF, CE C6, DF, CE C6, DF, CE	2, C8, DF, C E, CF, DF, B E, CF, DF, E D, CB, D2, C 8, C9, D2, C 8, C9, D2, C 8, C7, D2, C D, CA, D2, C 8, CC, D2, C D, CA, CA, E	28, CC, D2, C AC, AC, AF, 9 3C, 97, 9B, 9 3E, CF, DF, I 2E, CE, DF, C 3E, CE, DF, C 3E, CF, DF, C 3E, CF, DF, I 32, CE, CA, I	29, D2, C8 30, C5, DF, 34, 89, 8C, DF, CD, D2, C8, CB, D2, C8, CF, D2, C8, CF, D2, C1, C7, D2, DF, CE, D2, DF, CE, D2, DF, CF, CF,	, CA, D2, CE , BE, C5, DF , CE, CF, DF , CE, CE, DF , CE, CE, DF , DF, C6, DF , DF, C6, DF , DF, C8, DF , D2, CE, CA	1, D2, CE 7, DF, C9, D 7, C8, C8, D	2,CE 2,CE 2,CE 2,CE 2,CE 2,CE 2,DF 54				
Reset:         TFF-Res         TFF-Res         TFF-Res         TFF-Res         TFF-Res         TFF-Res         TFF-Res         TFF-Res         TFF-Res         Nor	tes/s									7 (A)			
Reset:         10 (mm)         10 (mm) <th< td=""><td></td><td></td><td>-</td><td></td><td>TTELD</td><td>_</td><td> </td><td> </td><td> </td><td></td><td></td><td></td><td></td></th<>			-		TTELD	_							
	Reset#		(s) (avg:	(s) (avo:	Nav (s) (avg:	Acc. (m)	(m) (avg: 238.60)	Error	Unc.	Error	Unc.	Aiding Flags	
IS[115200.Hone@nedlFCNone] Protocok OSP [Vew GPS [SW Version S2XLb66001   Log idle	0		9.2	9.2	9.2	570185.87	238.6	0.000000	Acc<1.0	0.000000	Acc<0.0	0000000	
US[115200:None:One:Bi-FC:None]   Protocok OSP   View: GPS   SW Version: S2ULNB6B01   Log: idle													
	415(115200	):None:One:	8:FC:None	]   Protocol	I: OSP   View	GPS   SW	Version: S2	XLN96801	Log: idle.				

e. Verify that **Full Power** is selected, and click OK.

Figure 6-6 Full Power Mode window

f. To return to the NMEA display, click Receiver, Command, Switch Comm Settings

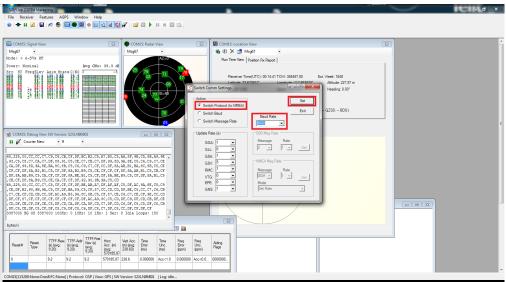


Figure 6-7 Verify NMEA window



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- g. Verify NMEA at 9600 bps (or your desired rate), and click Set.
- 9. There are many additional functions available in SiRFLive. Please refer to the built-in User Manual for further details. Click **Help** in the Menu Bar, **then User Manual**.

### 6.2. SiRFLive Windows

After a successful connection with the receiver is established, the default SiRFLive windows should be arranged and become filled with data.

If not all the default windows are arranged or opened, under the Main Menu Bar, Click **Window**, **Restore Layout**, and **Default**.

### 6.2.1. Signal View

(Tool Bar icon)	
	of Fix Satellite Data
COM99: Signal View	×
Msg67 •	
Mode: > 4-SVs KF	
Power: Nominal	Avg CNo: 34.3 dBHz
Src SV FreqElev Azim StateC/NO	0 -5
GPS 15 78.5 186.2 AD 30.8	
GPS 09 51.2 272.7 BF 39.6	
GPS 26 42.0 130.9 BF 30.8	· · · · · · · · · · · · · · · · · · ·
GPS 18 35.4 287.5 BF 38.4	
GPS 28 31.7 050.4BF 51.6	
GPS 17 24.6 100.4BF 31.4	
GPS 22 14.3 321.6 BF 41.1	
GPS 12 12.6 208.5 BF 35.7	
GPS 14 12.8 312.100 00.0	
GPS 25 06.4 223.6 00 00.0 GPS 27 75.7 063.9 00 00.0	
GPS 27 75.7 065.900 00.0 GPS 01 01.8 012.800 00.0	
GLO 75 -2 71.0 011.4 AD 37.7	
GLO 83 6 47.3 302.6 AD 34.4	
GLO 82 5 46.5 225.4 AD 39.5	
GLO 70 -7 41.0 268.6 AD 31.1	
GLO 74 -3 26.2 061.3 AD 33.3	
GLO 81 4 11.0 009.6 AD 40.9	
GLO 78 1 06.6 339.2 AD 49.4	
GL0 76 -1 23.9 060.7 25 21.9	
GLO 80 3 13.8 113.6 2D 25.7	
GL0 73 -4 04.8 179.18C 04.0	······

Figure 6-8 Satellite signal levels



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COM24: Radar View     Seps_Msg4
AZ=0 20 20 32 31 14 23 24 EI=90 24 10 20 20 25 14 20 20 20 20 20 20 20 20 20 20 20 20 20

Red	$C/N_0 = 0$
Blue	$C/N_0 \neq 0$ and <u>not</u> used in the navigation
Green	$C/N_0 \neq 0$ and used in the navigation solution
Skyblue	SBAS
Circle	GPS
Square	GLONASS
Orange	ABP is being used to acquire satellites
Purple	CGEE is being used
Pink	SGEE is being used

Figure 6-9 Satellites by azimuth and elevation



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### 6.2.3. Debug View



Displays the messages incoming from the receiver

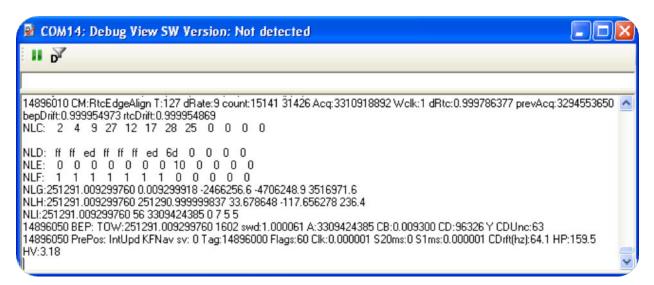


Figure 6-10 Receiver Messages (OSP)



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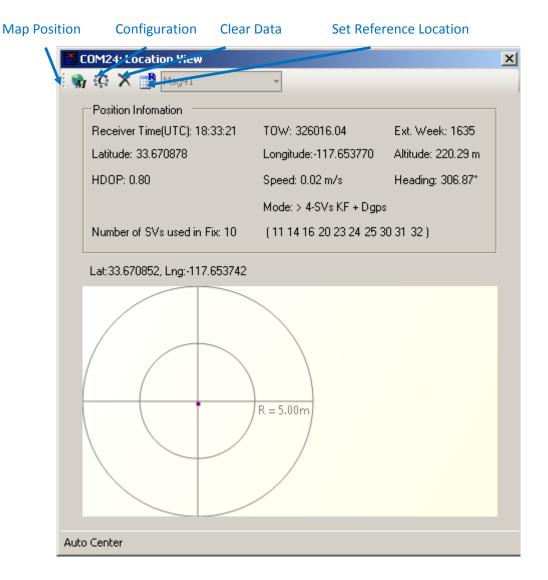
### 6.2.4. Location View



(Tool Bar icon)



Map position button requires Internet access.



#### Figure 6-11 Details of the position fix



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# 6.3. Logging Data

R

(Main Tool Bar icon)

SiRFLive can record the current message stream (OSP or NMEA) into a log file. From the Menu Bar, click **File, Log File, Start** or click the **Log File** icon on the Tool Bar.

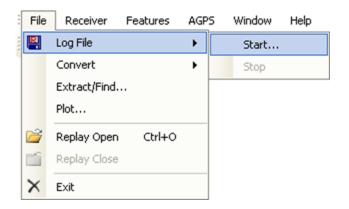


Figure 6-12 Log File command



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Enter the desired log file path and filename in the **Log File Path** box, as shown below, then click **Start** to begin logging.

COM15: Log File	X
Clear Log Path Update Log Pat	h Config Log Message
Log File Path C:\Logs\B02.txt	
Log User Specified Messages	Log Data Format
Duration Logging	TEXT
Duration Logging Start Time 11:05:02 AM	6/12/2015 <u>-</u> 6/12/2015 <u>-</u>
Duration 60 🕂 Minu	tes
🗖 Delayed Start 🔲 Repeat Du	uration Log
Start	Cancel

Figure 6-13 Enter the filename to specify the log file



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### 6.4. Receiver Commands

Many of the receiver commands can be accessed through the Menu Bar under **Receiver**, **Command**. There are also equivalent shortcuts on the Tool Bar for frequently used commands

E File	Rec	eiver	Feat	tures	AGPS	Win	dov	v H	Help	
i 🕜   •		Recei	iver Fa	mily			×	t) 🕀	🗵 🖾 🖉 😫	📈   💕 🔄 🕨 II
C:\Temp	-0-	Conr	nect					-		-
r	•••	Disco	onnect	t				-		( _
CC		View					١.		23	OM15: Radar View
		Com	mand				۶.	Ø	Reset	
Mode		Navig	gation	I			×		Poll	•
Power		Plot I	Data				×.			
Src		Set Reference Location					Switch Opera	ting Mode		
		Automation Test			×		Switch Power	r Mode		
		Update Firmware					Switch Comn	n Settings		
	88	8 4	X:8	499.0		38:8	Luu		Switch Satelli	te Settings
	Cooperation of the second seco	H ISBOO	Suebo-B	1000000		10000000			Set	•
	100			101.0		11.0			Low Power C	ommands Buffer
									IC Configure.	
									Input Comm	ands 🕨

#### Figure 6-14 Receiver commands

 $\bigcirc$ 

Some receiver commands are available in One Socket Protocol (OSP) only.



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### 6.4.1. Reset commands

🙋 (Tool Bar icon)

Select from the Menu Bar **Receiver**, **Command**, **Reset** or click the **Reset** icon on the Tool Bar.

Resets are used to measure the TTFF of the receiver. The TTFF/Nav Accuracy window conveniently displays the TTFF in seconds and Navigation accuracy based on the Reference Location.

Reference Location allows the user to change the position used as the reference. This helps determine position accuracy in conjunction with Time-To-First-Fix values.

R COM15: Reset	- • • ×				
Reference Location         Sim_BDS_FixedPwr_BDS3_         Latitude       31         Use         Fixed         Set as Default         Altitude       5         Check Position Accuracy					
Position           X (m)         -2686727         E           Y (m)         -4304282         Z           Z (m)         3851642         E	Use Current PC Time txt Week # 1311 TOW 86400 Channels 12				
Clock Drift (Hz) 75000	Control Mode				
© Factory Reset	d Cancel				

Figure 6-15 Reset Window

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### 6.4.2. Switching Protocols

On the Menu Bar, select Receiver, Command, Switch COMM Settings.

Click **Set** to apply settings.

OSP has many commands that are not available in NMEA. Therefore, switching to OSP is recommended for testing purposes.

Switch Comm Settings	
Action Switch Protocol (to OSP) Switch Baud Switch Message Rate	<u>S</u> et Exit 115200 ▼
Update Rate (s) GGA: 1	SSB Msg Rate Message Rate 2 • 1 • Set NMEA Msg Rate Message Rate GGA • 1 • Set Mode Set Rate •

Figure 6-16 Switching to OSP protocol with its default 115200 baud rate



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### 6.4.3. Setting the Receiver Type

SiRFLive will normally auto-detect the connected chipset, but if not, click **Receiver**, **Receiver Family**, then the desired family.

SiRFLive 2.07P4 Marketing		
Eile Receiver Features AGPS Window Help		
Image: Simple state stat		
Disconnect		
🛄 CC View , 💽 @ COM15: Radar View 🖾	COM15: Location View	
<u>C</u> ommand →	· ● · · · · · · · · · · · · · · · · · ·	
Mode Navigation Powei Plot Data P CNo: 33.4 df	Run Time View Position Rx Report	
SEE_Beference Location        3           Automation Test        3           Update Firmware        3           25        3           41        3           42        3           42        3           42        3           43        3	Receiver Time(UTC): 01:32:48 TOW: 351183.00 Ext. Week: N/A Latitude: 33.670895* Longitude: 117.653827* Altitude: 231.60 m	
Update Firmware	HDOP: 0.70 Speed: 0.00 m/s Heading: 0.00*	
	Mode: 3-D 1Hz EPE: 0.00 m	
	Number of SVs used in Fix: 15	
24 79 29	( GPS 2 5 6 10 12 20 24 25 29 GLO:73 74 75 76 77 80 SBAS: QZSS: BDS:)	
COM15: Debug View SW Version: S2XLN96801	Lat, Long:	
II p Courier New • 9 •		
\$GLGSV, 3, 3, 09, 65, 01, 021, *5D	( C 2 R ≠ 5.00m)	
<pre>\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$</pre>	= - R = 5.00m	
SGNGNS,013248.000,3340.2537,N,11739.2296,W,AANN,15,0.7,265.7,-34.1,,0000*5D #GNGSA,A,3,12,05,10,25,29,02,24,20,06,,,,1.4,0.7,1.2*26		
\$GNGSA, A, 3, 80, 66, 82, 79, 73, 83, , , , , 1.4, 0.7, 1.2*2E		
4GNRMC,013248.000,A,3340.2537,N,11739.2296,W,0.00,0.00,110615,,,A*69 #GPGGA,013249.000,3340.2537,N,11739.2296,W,1,09,0.6,265.7,M,-34.1,M,0000*64	Auto Center	
\$GNGNS,013249.000,3340.2537,N,11739.2296,W,AANN,16,0.6,265.7,-34.1,,0000*5E	🚵 COM15: Response View 🖂 💷 🖾 COM15: Error View 🗤	
bytes/s		
COM15: TTFF/Nav Accuracy		
😥 Curve Label 🔣 TTFF Since Reset 🔻 😮 Color [Red] 📑 🗶 🗵 🏨		
Reset# TEFF-Re TTFF-Aic TTFF-Rin Horz Vert Time Time Freq Freq Aiding Days (A) Nav (A) Acc. Error Unc. Error Unc.		
Type (b) (c) Nav (b) Acc. (m) Not. End Unc. End Unc. Hage		
COM15/9600:None:One:8:FC:None]   Protocol: NMEA   View: NMEA/Text   SW Version: S2XLN96B01   Log: idle		•
contraction contract, recease the efficiency rection as we have a few mean		

Figure 6-17 Click Receiver, Receiver Family, then the desired family

### 6.4.4. Enabling 5Hz Update

First, set the baud rate high enough so that characters are not dropped. The default rates (9600 for NMEA and 115.200 for OSP) may be too low depending on the configured message set.

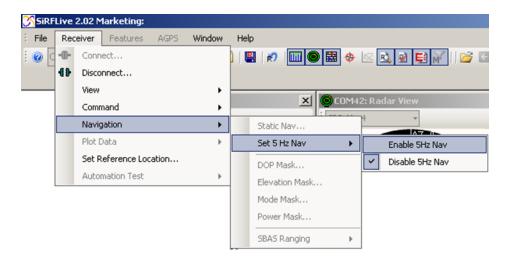
Through the SiRFLive Menu Bar, click **Receiver**, **Navigation**, **Set 5Hz Nav** and select **Enable 5Hz Nav**.



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#### Figure 6-18 Enable 5Hz Nav command

The **Enable 5Hz Nav** command in SiRFLive sends the following OSP: **A0 A2 00 0E 88 00 00 04 04 00 00 00 00 00 00 0F 02 00 A1 B0 B3** 

The **Disable 5Hz Nav** command in SiRFLive sends the following OSP: **A0 A2 00 0E 88 00 00 04 00 00 00 00 00 00 00 0F 02 00 9D B0 B3** 



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### 6.4.5. OSP MID 136 - Mode Control Command

Name	Bytes	Binary (Hex)		Unit	Description
		Scale	Example		
Message ID	1 U		88		Decimal 136
Reserved	2 U		0000		Reserved
Degraded Mode	1 U		01		Controls use of 2-SV and 1-SV solutions
Position Calc Mode	1 U		01		xxxx xxx0 = ABP, OFF $xxxx xxx1 = ABP, ON$ $xxxx xx0x = Reverse EE OFF$ $xxxx xx1x = Reverse EE ON$ $xxxx x0xx = 5Hz nav update OFF$ $xxxx x1xx = 5Hz nav update ON$ $xxxx 0xxx = SBAS Ranging use OFF$ $xxxx 1xxx = SBAS Ranging use ON$
Reserved	1 U		00		Reserved
Altitude	2 S		0000	meters	User specified altitude, range - 1,000 to 10,000
Alt Hold Mode	1 U		00		Controls use of 3-SV solution
Alt Hold Source	1 U		00		0 = Use last computed altitude 1 = User user-input altitude
Reserved	1 U		00		Reserved
Degraded Time Out	1 U		05	sec	0 = disable degraded mode, 1 to 120 seconds degraded mode time limit
DR Time Out	1 U		02	sec	0 = disable dead reckoning, 1 to 120 seconds dead reckoning mode time limit
Measurement and Track Smoothing	1 U		00000011		xxxxxx0 = disable track smoothing xxxxxx1 = enable track smoothing xxxxxx0x = use raw measurements xxxxxx1x = use smooth measurements

#### Table 6-1 MID 136 - Mode Control command



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# 7. Updating Firmware with SiRFLive

# 7.1. Flashing Requirements

Personal Computer with a USB/COM port running SiRFLive Firmware file

## 7.2. Flashing Instructions

Click on Receiver, Update Firmware from the Menu Bar.

se Update COM15 Firmware
Firmware updates can be downloaded from <u>www.csrsupport.com</u> Select update file:
Progress
Update Cancel

Figure 7-1 Firmware file selection



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Enter the filename or browse to the firmware file.

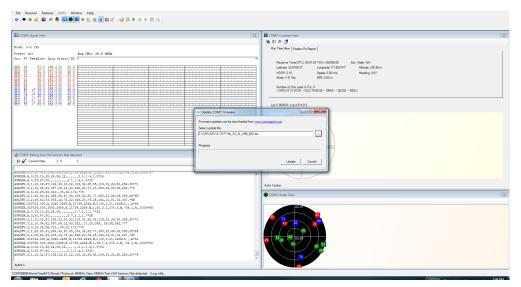
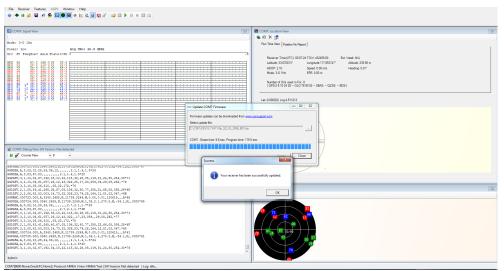


Figure 7-2 Select Firmware file



#### Click Update.

#### Figure 7-3 Successful firmware installation

The new firmware will be installed, and the receiver will begin operation.



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# 8. Software Interface

The host serial I/O port (UART, I<sup>2</sup>C, or SPI) supports full duplex communication between the receiver and the user.

The default UART configuration is: NMEA, 9600 bps, 8 data bits, no parity, and 1 stop bit.

Two protocols are available for data output and command input:

- NMEA-0183 V4.10
- SiRF One Socket Protocol (OSP)

More information regarding the software interface can be found in the Telit CSR Software User Guide. Access to this document requires a Non-Disclosure Agreement (NDA) with Telit.

### 8.1. NMEA Output Messages

Defaults:

 $\mathbf{0}$ 

- NMEA-0183
- 1 Hz fix rate. Maximum is 5 Hz.
- Message Set

#### **Standard Messages**

Message ID	Description	Frequency		
RMC	GNSS Recommended minimum navigation data	1		
GGA	GNSS position fix data	1		
GSA	GNSS Dilution of Precision (DOP) and active satellites	1		
GSV	GNSS satellites in view.	1 / 5		
Note: Multiple GSA and GSV messages may be output per cycle.				

#### Table 8-1 Default NMEA Output Messages



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The following messages can be enabled by command:

Message ID	Description
GLL	Geographic Position – Latitude & Longitude
GNS	GNSS Fix Data
VTG	Course Over Ground & Ground Speed

#### Table 8-2 Available Messages

Talker ID	Constellation
GA	Galileo
GB	BeiDou
GL	GLONASS
GP	GPS
GN	Solutions using multiple constellations

#### Table 8-3 NMEA Talker IDs

#### **Proprietary Messages**

The receiver can issue several proprietary NMEA output messages (\$PSRF) which report additional receiver data and status information.



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### 8.2. NMEA Input Commands

The receiver uses NMEA proprietary messages for commands and command responses. This interface provides configuration and control over selected firmware features and operational properties of the module.

The format of a command is:

#### \$<command-ID>[,<parameters>]\*<cr><lf>

Commands are NMEA proprietary format and begin with "\$PSRF".

Parameters, if present, are comma-delimited as specified in the NMEA

### 8.3. One Socket Protocol (OSP) Output Messages

SiRF One Socket Protocol (OSP) is supported. This is an extension of the existing SiRF Binary protocol. The following messages are output once per second:

- MID 2
- MID 3
- MID 4
- MID 7
- MID 9
- MID 41
- MID 64 SUB ID 2 (One message for each satellite being tracked).
- MID 138



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# 9. Document History

Revision	Date	Changes
0	2015-07-29	First Issue



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