

SE868-V3 EVK User Guide



Making machines talk.



APPLICABILITY TABLE

PRODUCT

SE868-V3 EVK



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 2 of 45



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Notice

While reasonable efforts have been made to assure the accuracy of this document, Telit assumes no liability resulting from any inaccuracies or omissions in this document, or from use of the information obtained herein. The information in this document has been carefully checked and is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies or omissions. Telit reserves the right to make changes to any products described herein and reserves the right to revise this document and to make changes from time to time in content hereof with no obligation to notify any person of revisions or changes. Telit does not assume any liability arising out of the application or use of any product, software, or circuit described herein; neither does it convey license under its patent rights or the rights of others.

It is possible that this publication may contain references to, or information about Telit products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that Telit intends to announce such Telit products, programming, or services in your country.

Copyrights

This instruction manual and the Telit products described in this instruction manual may be, include or describe copyrighted Telit material, such as computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and its licensors certain exclusive rights for copyrighted material, including the exclusive right to copy, reproduce in any form, distribute and make derivative works of the copyrighted material. Accordingly, any copyrighted material of Telit and its licensors contained herein or in the Telit products described in this instruction manual may not be copied, reproduced, distributed, merged or modified in any manner without the express written permission of Telit. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit, as arises by operation of law in the sale of a product.

Computer Software Copyrights

The Telit and 3rd Party supplied Software (SW) products described in this instruction manual may include copyrighted Telit and other 3rd Party supplied computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and other 3rd Party supplied SW certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted Telit or other 3rd Party supplied SW computer programs contained in the Telit products described in this instruction manual may not be copied (reverse engineered) or reproduced in any manner without the express written permission of Telit or the 3rd Party SW supplier. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit or other 3rd Party supplied SW, except for the normal non-exclusive, royalty free license to use that arises by operation of law in the sale of a product.



Page 3 of 45



SE868-V3 Evaluation Kit User Guide 1VV0301206 r1 – 2015-07-29

Usage and Disclosure Restrictions

License Agreements

The software described in this document is the property of Telit and its licensors. It is furnished by express license agreement only and may be used only in accordance with the terms of such an agreement.

Copyrighted Materials

Software and documentation are copyrighted materials. Making unauthorized copies is prohibited by law. No part of the software or documentation may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, without prior written permission of Telit

High Risk Materials

Components, units, or third-party products used in the product described herein are NOT faulttolerant and are NOT designed, manufactured, or intended for use as on-line control equipment in the following hazardous environments requiring fail-safe controls: the operation of Nuclear Facilities, Aircraft Navigation or Aircraft Communication Systems, Air Traffic Control, Life Support, or Weapons Systems (High Risk Activities"). Telit and its supplier(s) specifically disclaim any expressed or implied warranty of fitness for such High Risk Activities.

Trademarks

TELIT and the Stylized T Logo are registered in Trademark Office. All other product or service names are the property of their respective owners.

Third Party Rights

The software may include Third Party Right software. In this case you agree to comply with all terms and conditions imposed on you in respect of such separate software. In addition to Third Party Terms, the disclaimer of warranty and limitation of liability provisions in this License shall apply to the Third Party Right software.

TELIT HEREBY DISCLAIMS ANY AND ALL WARRANTIES EXPRESS OR IMPLIED FROM ANY THIRD PARTIES REGARDING ANY SEPARATE FILES, ANY THIRD PARTY MATERIALS INCLUDED IN THE SOFTWARE, ANY THIRD PARTY MATERIALS FROM WHICH THE SOFTWARE IS DERIVED (COLLECTIVELY "OTHER CODE"), AND THE USE OF ANY OR ALL THE OTHER CODE IN CONNECTION WITH THE SOFTWARE, INCLUDING (WITHOUT LIMITATION) ANY WARRANTIES OF SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO THIRD PARTY LICENSORS OF OTHER CODE SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND WHETHER MADE UNDER CONTRACT, TORT OR OTHER LEGAL THEORY, ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE OTHER CODE OR THE EXERCISE OF ANY RIGHTS GRANTED UNDER EITHER OR BOTH THIS LICENSE AND THE LEGAL TERMS APPLICABLE TO ANY SEPARATE FILES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Copyright © Telit Communications S.p.A. 2015.



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved.

Page 4 of 45



Contents

1.	Intr	oduction	8
1	.1.	Scope	8
1	.2.	Contact Information, Support	8
1	.3.	Text Conventions	8
1	.4.	Related Documents	9
2.	Eva	aluation Kit Requirements	10
3.	Eva	aluation Kit Description	11
3	.1.	Evaluation Kit Contents	11
3	.2.	Evaluation Kit	13
3	.3.	SE868-V3 Module	14
3	.4.	Evaluation Board Picture	15
3	.5.	Evaluation Board Layout	17
3	.6.	Evaluation Board Schematic Diagram	19
4.	Eva	aluation Kit Setup	20
4	.1.	Installing the USB Drivers	20
4	.2.	Installing SiRFLive	22
5.	Ru	nning the SE868-V3 Evaluation Board	23
6.	Usi	ng SiRFLive	24
6	.1.	Starting SiRFLive	24
6	.2.	SiRFLive Windows	28
	6.2.	1. Signal View	.28
	6.2.	2. Radar View	29
	6.2. 6.2	Debug View Location View	30
6	3	Logging Data	32
6	4	Receiver Commands	34
Ū	6.4.	1. Reset commands	.35
	6.4.	2. Switching Protocols	.36





6.4.	.3. Setting the Receiver Type	
6.4.	.4. Enabling 5Hz Update	
6.4.	.5. OSP MID 136 - Mode Control Command	
7. Up	dating Firmware with SiRFLive	40
7.1.	Flashing Requirements	40
7.2.	Flashing Instructions	40
8. Sof	ftware Interface	42
8. Sol 8.1.	ftware Interface NMEA Output Messages	42 42
8. Sof 8.1. 8.2.	ftware Interface NMEA Output Messages NMEA Input Commands	42 42 44
8. Sof 8.1. 8.2. 8.3.	ftware Interface NMEA Output Messages NMEA Input Commands One Socket Protocol (OSP) Output Messages	42 42 44 44





Figures

Figure 3-1 SE868-V3 Evaluation Kit Contents	11
Figure 3-2 SE868-V3 Evaluation Kit	13
Figure 3-3 SE868-V3 Module	14
Figure 3-4 SE868-V3 Evaluation Board	15
Figure 3-5 SE868-V EVK board with jumpers	16
Figure 3-6 SE868-V3 Evaluation Board Layout	17
Figure 3-7 SE868-V3 Evaluation Board Schematic Diagram	19
Figure 4-1 Hardware Installation	20
Figure 4-2 Identify new COM port	21
Figure 6-1 Connection settings window	24
Figure 6-2 Click Receiver, then Connect on the menu bar	25
Figure 6-3 Switch Comm Settings window	25
Figure 6-4 The OSP protocol window	26
Figure 6-5 Features, Power Mode window	26
Figure 6-6 Full Power Mode window	27
Figure 6-7 Verify NMEA window	27
Figure 6-8 Satellite signal levels	28
Figure 6-9 Satellites by azimuth and elevation	29
Figure 6-10 Receiver Messages (OSP)	30
Figure 6-11 Details of the position fix	31
Figure 6-12 Log File command	32
Figure 6-13 Enter the filename to specify the log file	33
Figure 6-14 Receiver commands	34
Figure 6-15 Reset Window	35
Figure 6-16 Switching to OSP protocol with its default 115200 baud rate	36
Figure 6-17 Click Receiver, Receiver Family, then the desired family	37
Figure 6-18 Enable 5Hz Nav command	38
Figure 7-1 Firmware file selection	40
Figure 7-2 Select Firmware file	41
Figure 7-3 Successful firmware installation	41

Tables

Table 3-1 SE868-V3 Evaluation Kit Contents	12
Table 3-2 SE868-V3 Evaluation Board Components	18
Table 6-1 MID 136 - Mode Control command	39
Table 8-1 Default NMEA Output Messages	42
Table 8-2 Available Messages	43
Table 8-3 NMEA Talker IDs	43





1. Introduction

1.1. Scope

The scope of this manual is provide product information for the SE868-V3 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



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



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.



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 8 of 45



1.4. Related Documents

• SE868-V3 Product User Guide



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 9 of 45



2. Evaluation Kit Requirements

To use the SE868-V3 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).



Page 10 of 45



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



Note: The antenna is not visible (under the ground plane)

Figure 3-1 SE868-V3 Evaluation Kit Contents



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2

Page 11 of 45



Evaluation Kit Contents
Plastic case
USB cable
Multi-constellation antenna
Ground Plane
USB drive with software and documentation
Evaluation Kit

Table 3-1 SE868-V3 Evaluation Kit Contents



Page 12 of 45



3.2. Evaluation Kit



Figure 3-2 SE868-V3 Evaluation Kit



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 13 of 45



3.3. SE868-V3 Module



Figure 3-3 SE868-V3 Module



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 14 of 45



3.4. Evaluation Board Picture



Figure 3-4 SE868-V3 Evaluation Board



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 15 of 45





Figure 3-5 SE868-V EVK board with jumpers



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 16 of 45



Evaluation Board Layout 3.5.



Figure 3-6 SE868-V3 Evaluation Board Layout



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2



ID	Description							
DL100	LED – System On							
DL102	LED – 1 PPS							
DL101	LED – Tx Data							
SW100	On-Off Switch (1.8V to module On-Off pin)							
PL101	USB connector – Power, Ground, Tx, and Rx							
S0101	SMA connector – 1PPS output							
S0100	SMA connector – RF input							
PL100	Tx output							
PL102	Module power (current measurement)							
PL104	Rx input							
PL105	Boot pin to 1.8 V							
PL106	1PPS output and ground							
PL108	1.8 V regulator enable							
PL109	3.3 V regulator enable							
PL110	1.8 V module regulator enable							
PL111	Active antenna on (remove for passive antenna)							
PL112	GPIO 6 to 1.8 V							
PL115	GPIO7 to ground							

Table 3-2 SE868-V3 Evaluation Board Components



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2

Page 18 of 45



NLO RM \triangleleft 30424SE11669B AND CONTRACTOR Ч Ч S DRAWING CODE ar ccanacter CC SA SE868V3 100 En 11 DESCRIPTION 151 6113 10 0110 88 88 88 SHEETS i--B-ION-B-NOPB ACC - LUCK - 1724 ч cs16998 14 諁 묥 ż S. p. A. -. . -68 18 Bug 0424 •• •• •• ROJECT DL 500 Com 10 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 1 2 C 1 2 52 48 9 E all and a 030113 030113 DATE PAIN /Sedma/archive/sch FILE MANE Ge16668.ch Med. 067 rev.1 11/02 ... Jordan H. 07 U 104 BN74LVC214A ÷ Jordan **FRIFIED** N 100 MODIFY DRAWN PL114 हे हु -68 ALD 3 101 101 101 105 3 **00** 9 • • 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,1055111 1,10551111 PL103 U100 ICA88V 1000 E : 5 C10 -States in a YEA to be attention t 5100 F8 103 Sold House 1.4 1112 S0102 ٦ŀ VIETATE VIETATE VIETATE VIETATE ALL RIGHTS RESERVED REPRODUCTION AND DISCLOSURE FORBIDDEN

3.6. Evaluation Board Schematic Diagram





Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 19 of 45



4. Evaluation Kit Setup

4.1. Installing the USB Drivers

Before connecting the SE868-V3 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.



Page 20 of 45





Figure 4-2 Identify new COM port

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



Page 21 of 45



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.





5.

Running the SE868-V3 Evaluation Board

- 1. Power will be applied to the SE868-V3 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 PL111 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.





6. Using SiRFLive

6.1. Starting SiRFLive

- 1. Connect Power and Antenna to the EVK. See Section 5 Running the SE868-V3 Evaluation Board.
- 2. Turn on the EVK Power switch (up).
- 3. Launch the SiRFLive application.



RFLive 2.07P4 Marketing			\sim	ICIH.
Receiver Features AGPS Windo	w Help A ko o a a co o a co a co a co a co a co	8 K		
	V 12 14 12 15 M 1 2 11 1			
	TCP7555: Debug View SW Version: No	t detected		
	Courier New • 9	•		
		Connection Settings		
		-		
		Receiver: COM15		
	bytes/s	Baud Rate: 115200 Auto Detect		
		Protocols: OSP		
TCP/555: Signal View	23			
Mode: No Fix		OK Cancel		
Power: Very Low	Avg CNo: 0.0 dBHz			
Src SV Elev Azim StateC/	NO 0 -5			

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.



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 24 of 45



- 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								
-	Disconnect									
	View	•								
	Comr	Þ								
	Naviç	÷								
	Plot D		÷							
	Set R	ation								
	Autor	mation Test		•						

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

- 8. The SE868-V3 defaults to a power-saving mode called SiRFSmartGNSS, 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				ICILI#
◎ ◆ 11 💋 🗑 🖉 🏶 🔲 ● 🖼 🗟 😫 🚭	2 I 😂 🖬 🕨 II = 🖾 🖆			
CORDS: Signal View	COALS Rader Yew	COMIS Location View Comis Location View Run Time View Proteiner Time(UTC) 23 54 12 10 V/ 342857 00 Ent View: NA Receiver Time(UTC) 23 54 12 10 V/ 342857 00 Ent View: NA Antude 24 86 m Heading 10 057 Ent Comis Settings Ent Comis Settings Comis Setting Comis Settings Comis Settings Comis Comis Set		
■ CONSTANT ■ P	10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10	Use (a) 555 Mag Tale SA (b) Massape Rate (b) (b) (b) (b) (b) (b) (b) (b) (b) (b) (c) (b) (c) (b) (c) (b) (c) (c) (c) (c) <td>(0) 0 U</td> <td></td>	(0) 0 U	
byter/s Brand: TTFF-Rein TFFF-Audr TTFF-Ruin Reference Reference	13 Line Line Line Line Line Line Line Line	Adrog Rogi		

Figure 6-3 Switch Comm Settings window



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 25 of 45



- 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	N 27 ≥ 0 ► H = 0 ≤		
	Ύ	·	
COM15: Signal View	COM15: Radar View	COM15: Location View	8
Mode: > 4-SV# KF	AZ=0	Run Time Vew Position Fix Report	
$ \begin{array}{c} \text{Power I low } & \text{Arg Olic 19.1 d} \\ \\ \begin{array}{c} \text{Construction} \\ \text{Construction} \\ \\ \\ \\ \text{Construction} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Number Time UTCL DOUGNAL State View. 1448 Landwidt 37022** Longhude: 171.553843** Athute: 25.05 m Hotor: 25.05 m HODP 0.00 Seed: 0.05 m is Heading: 0.00* Mode: 45.45 M HE 22.10 m Number of SNs, seed in Fix: 13 (GP3.25 M 12.17.47.38 - GL0.270.24 76.77.79.81 - 584.5 - G255 - 80.5) G255 - 80.5) G255 - 80.5	
		Lat:33.670941, Lng:117.653809	
■ CARDA L Hondy are on a finite a SALTHERMA ■ D ² Constructions ■ D	101.01.07.03.05.102.07 101.01.07.03.05.102.07 101.01.02.05.02.07 101.01.02.05.02.07 101.01.01.02.02 101.01.01.01.01.01 101.01.01.01 101.01.01.01 101.01.01 101.01.01 101.01.01 101.01.01 1	E 500	
bytes/s	21 (4)		
Reset/# TTFF-Rest TTFF-Rest TTFF-Rest TTFF-Rest Horz 9200 9200 9200 9200 5200 570185.8	Vet Acc. Time Time Freq Freq (m) (avg: 238.60) Error Unc. Error Unc. (ppm)	Adng Page	
0 9.2 9.2 9.2 570185.8	7 238.6 0.000000 Acc<1.0 0.000000 Acc<0.		
COM15/115200:None:One8:FC:None1 Protocol: OSP View: GPS SV	/ Version: S2XLN96801 Log: idle		

Figure 6-4 The OSP protocol window

d. Click Features, Power Mode, then Advanced.

SiRFLive 2.0	07P4 Marke	ting											o x
File Rece	iver Feat	ures AGP	S Wind	ow Help									
COM15: 1	Signal View				8	CON	V15: Radar V	liew		8	🔛 cor	COM15: Location View	, i
N 🕉 Pow	er Mode				•	Msg67					ે 🗌 રડ્	收 🗙 📑 Msg67 🔹	
Po Po	ower Manage	ment						AZ=0			Ru	Run Time View Position Fix Report	
Sr	Please pro	ovide the foll	lowing infi	ormation o	r	25	76	71	79			Devices Time (1771) 00/01/01 77044 045000 00 East 1040	
		. 0	1000				7/	06	\ ~ \			Latitude: 33.670918' Longitude: 117.653837' Altitude: 226.14 m	
	Opdate	e Plate:		•		+	74 14 7	EI=90	\rightarrow			HDDP:0.80 Speed:0.00 m/s Heading:0.00* Mode:>4-SVs KF EPE:2.03 m	
	Quality of I	Position:	High	•			. \ 🖣	2 /	102			Number of Cle sand in Sir. 11	
	Advanced	1	ок	Can	ncel			70	//			(GPS2 6 10 12 17 24 28 - GLO:70 74 77 81 SBAS: GZSS: BDS:)	
								05					
👷 COM15: I	Debug View	SW Version	: S2XLN96E	301							La	Lar: 33 /6 /0941, Ling: 117 /803809	
li 🗗 Ca	ourier New	• 9											
C6 DE CD	C3 D2 CF	CE DE CD	C7 12 C		CE C8 D2	DE CS DE	C C 8 C 9 D	2.7.5					
, C6, DF, C8,	C6, D2, DF	C6, DF, C8,	,CC,D2,C	E,CE,DF,	C8, C7, D2, DF, DF, CF	DF, CC, DB	F, C8, C7, D	2, DF					
68,225,00, ,CC,CA,C9,	BE, B8, BC DF, 99, 8D	A0, CF, C5, 9A, 8E, DF,	DF,91,9	0,96,8C, F,CF,CA,	9A, DF, C8, DF, 98, 9E	C9, CD, CE 96, 91, DB	5,C9,C9,D F,CD,C6,D	F,C6 F,CC					
, DF, C7, CA, , C7, DF, C8,	CD, CF, CE CE, CA, C7	CC, CF, CF, CD, C6, CB,	,DF,CA,C ,CC,CD	B, DF, CB,	CA, C7, CD,	DF,CE,CE	E,CC,CE,C	E,CE				R = 5.00m	
68,225,00, ,CD,CB,CD,	BE, B8, BC CA, DF, 99	, AO, CE, C5, , SD, 9A, SE,	,DF,91,9 ,DF,C8,C	0,96,8C, 6,C6,CB,	9A, DF, C7, C9, DF, 98,	CF,C7,CE 9E,96,91	E, C6, CE, D L, DF, CC, C	F,CE E,DF					
,CC,DF,C7, ,C7,CD,C6,	CA, CD, CF CB, CC, CD	, CE, CC, CF,	,CF,DF,C	A, CB, DF,	CB, CD, CE,	CF, DF, CI	F, DF, C8, C	E,CA					
2698000 BG 68,255,CW	ADC-AGC 3	000 100H2: 1	: 0 1082	: 10 182	: 1 Ser:	15 Idle	Loops: 1	••					
bytes/s									-				
			_				_	_			-		
Reset#	Reset	TTFF-Resi (s) (avg:	TTFF-Aidir (a) (avg:	TTFF-First Nev (s) (avor:	Horz Acc. (m)	Vert Acc. (m) (avg:	Time Error	Time Unc.	Freq Error	Freq Unc.	Aiding		
	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	9.20)	9.20)	9.20)	(avg: 570185.87	238.60)	(ma)	(ms)	(ppm)	(ppm)			
0		9.2	9.2	9.2	570185.87	238.6	0.000000	Acc<1.0	0.000000	Acc<0.0	0000000		
COM15[11520	0:None:One	:8:FC:None1	Protocol:	OSP View	· v: GPS I SW	Version: S2	XLN96801	I Log: idle					
-													

Figure 6-5 Features, Power Mode window



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 26 of 45



SIRFLive 2	.07P4 Marke	ting										
File Rec	eiver Fea	tures AG	PS Wind	ow Help	7 8 6	¥ 16		1 = 13	ni j			
COM15	Signal View	C Denne M	lada	_	X		t15: Radar	liew .		8	CON	MLS Location View
Msg67	· · ·	>> Power in	oue			C.		-		_	199 SE	R X ∰ Migb7
OWEII N	prinal FreqEle	Power Fu C Pu C Tri	Mode Power sh To Fix ickle Power	C SIRFSn C SIRFSn OK	martGNSS martGNSS Cance	I SIRF	aware Buffer		79 17 18 102			An inner verwer president is respect [Receiver: Tente(UTC): 00:553 TOV: 345955 00 Ext: Verke: 1348 Labeler: 28:50% 00:553 TOV: 34595 00 Ext: Verke: 1348 HODIO: 00:05 Severe: 00:nis Heading: 0.00* Mode: > 4-5% 40:57 EFE: 11.7 m Nomber: 345% out of Film: 12 (UFS:24:59 - 56,07:09:14:16:77:98 1 - 584% - 0.25% - 805.)
							-	05	-	_	Lat	#33.670959. Lng117.653876
COM15	Debug Viev	SW Version	n: S2XLN96I	B01				8				
CB, CB, D2, C (CB, CB, D2, C (CB, D2, C (CF, DF, CL, C (CF, DF, CE, DF, CC (CF, DF, CE, DF, CC (CF, DF, CC, CF, DF, CC (CF, DF, CC, CF, DF, CC (CF, DF, CC, CF, DF, CC (CF, DF, CC), C (CF, DF, CC), C (CF), C (1, C3, D2, C1 , DF, C4, C4 , CD, C7, C3 , CC, C7, C2 , C6, D2, C5 , C6 , C6, D2, C5 , C6 , C6 , C6 , C6 , C6 , C6 , C6 , C6	, DF, C8, C1 , D2, C9, D3 , C7, C6, CE , C7, DF, C1 , C7, DF, C1 , C7, DF, C1 , C6, DF, C1 , C6, DF, C1 , C6, DF, C1 , C6, DF, C1 , C0, DF, C1 , C0, DF, C1 , C1, DF, C1 , C2, DF, C1 , C4, DF, C1 , C7, DF, C1 , C4, DF, C1 , C7, DF, C1 , C6, DF, C1 , C7, DF, C1 , C6, DF, C1 , C1 , C1 , C1 , C1 , C1 , C1 , C1	F, D2, C9, D 2, C8, DF, C 2, C7, DF, A 5, C7, DF, A 5, C7, DF, A 0, C8, D2, C 5, C7, D2, C 0, C4, D2, C 0, C4, D2, C 0, C4, D2, C 0, C4, C2, C 1, C4, C4, D 2; C 10Hz	2, CE, DF, CI 8, CC, D2, CI C, AC, AF, 91 (C, 97, 9B, 91 E, CE, DF, CI E, CE, CE, DF, CI E, CE, CE, CE, CE, CE E, CE, CE, CE E, CE, CE, CE E, CE, CE, CE E, CE, CE E, CE, CE E,	8, C9, D2, 9, D2, C8 D, C5, DF, A, 89, 8C, F, CD, D2, 8, C8, D2, 8, C7, D2, C7, D2, F, C2, D2, F, C2, D2, F, C2, D2, 1 Ser:	C9, D2, C8 CA, D2, CE BE, C5, DF CE, CF, DF CE, CE, DF DF, C6, DF DF, C6, DF DF, C8, C4 DF, C8, DF D2, CE, CA	, DF, C8, C , D2, CE , D7, C9, D , C8, C8, D	7, D2 + 2, CE 2, CE				
bytes/s								_	2 🛍			
Reset#	Reset Type	TTFF-Resk (s) (evg: 9.20)	TTFF-Aidir (s) (avg: 9.20)	TTFF-First Nav (s) (avg: 9.20)	Horz Acc. (m) (avg:	Vert Acc. (m) (avg: 238.60)	Time Error (me)	Time Unc. (ms)	Freq Error (ppm)	Freq Unc. (ppm)	Ading Flags	
0		9.2	9.2	9.2 5	570185.87	238.6	0.000000	Acc<1.0	0.000000	Acc<0.0	0000000.	2
OM15[1152	00:None:On	:8:FC:None] Protocol	OSP View:	GPS SW	Version: SZ	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



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2



- 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)								
				Туре	of Fix Satellite Data			
	IIII COM99: Sinnal View							
м	5067	-				_		
Mor	le: >	4-SVs KF						
					have different of a strifter			
POT	Jer: 1 . ev	Nominai ExecTler	Arin Chat	- C /NO	AVG LNO: 34.3 GBHZ			
SL	5 DV	FreqLiev	Azim Stat	cet/NO	0	-5		
GP	1 1 5	78 5	186 2 AD	30.8				
GP	5 09	51.2	272.7 BF	39.6				
GP:	5 26	42.0	130.9 BF	30.8				
GP:	5 18	35.4	287.5BF	38.4		11		
GP	5 28	31.7	050.4BF	51.6		Щ		
GP:	5 17	24.6	100.4BF	31.4	· · · · · · · · · · · · · · · · · · ·	щ		
GP	5 22	14.3	321.6BF	41.1		Щ		
GP	5 12	12.6	208.5BF	35.7		щ		
GP	5 14	12.8	312.1 00	00.0		_		
GP:	5 25	06.4	223.6 00	00.0		_		
GP:	5 27	75.7	063.900	00.0		_		
GP	5 01	01.8	012.8 00	00.0				
GLI	1 /5	- 47.0	011.4 AD	31.1				
GL	1 03	5 47.3	225 4 MD	20 5				
GLI) 02) 70	-7 41 0	268 6 AD	31 1		H.		
GL	1 74	-3 26.2	061.3 AD	33.3		H		
GL	1 81	4 11.0	009.6 AD	40.9		Π.		
GL	78	1 06.6	339.2 AD	49.4		ΪÌ		
GL	76	-1 23.9	060.725	21.9				
GL	08 (3 13.8	113.6 2D	25.7		<u> </u>		
GL	73	-4 04.8	179.180	04.0	·····			
						_		
						_		
						_		
						-		
						-		

Figure 6-8 Satellite signal levels



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 28 of 45









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



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 29 of 45



6.2.3. **Debug View**



Displays the messages incoming from the receiver



Figure 6-10 Receiver Messages (OSP)





Location View 6.2.4.



(Tool Bar icon)

Map position button requires Internet access.



Figure 6-11 Details of the position fix





6.3. Logging Data

(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





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 💌
End Time 12:05:02 PM	6/12/2015 <
Duration 60 🕂 Minu	ites
🗖 Delayed Start 🔲 Repeat D	uration Log
Start	Cancel

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





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



Figure 6-14 Receiver commands

 \bigcirc

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



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 34 of 45



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.

🔊 COM15: Reset 🗖 🗖 💻 🏹					
Reference Location Sim_BDS_FixedPwr_BDS3 ▼ Latitu Set as Default Longi Altitut	ide 31 Use Fixed Position de 5 as Ref				
Warm Init Params Update with current fixed data Position	Use Current PC Time				
X (m) -2686727 E Y (m) -4304282 Z (m) 3851642 Clock Drift (Hz) 75000	xt Week # 1311 TOW 86400 Channels 12				
Use New Factory Reset Reset Mode O Hot Start	Control Mode				
C Warm Start (No Init) C Warm Start (Init) C Cold Start	I♥ Enable Development Data				
Factory Reset					
Config AutoRepl Sen	d Cancel				

Figure 6-15 Reset Window



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2



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	Set Exit 115200 ▼
Update Rate (s) GGA: 1 GLL: 0 GSA: 1 GSV: 5 RMC: 1 VTG: 0 EPE: 0 GNS:	SSB Msg Rate Message Rate 2 1 Set NMEA Msg Rate Message Rate GGA 1 Set Mode Set Rate 1

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



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 36 of 45



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		
File Beceiver Features AGPS Window Help ● Receiver Family ● SRFstant/ IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		
Command Command Command Pores Dots 23.4 dl Pores Dot 20.0 dl	Image: Condition View Image: Condition View Image: Condition View Image: Condition View Image: Condition View Position File Report Pace Trans View Position File Report Image: Condition View Condition View Image: Condit View	
	LR.Log:	
Image: Spread is TTFF Since Reset Image: Spread is	A COMIS Reponse View	

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**.







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 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 00 0F 02 00 9D B0 B3**





OSP MID 136 - Mode Control Command 6.4.5.

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 Cale 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



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2



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.

csR Update COM15 Firmware
Firmware updates can be downloaded from <u>www.csrsupport.com</u>
Progress
<u>U</u> pdate <u>C</u> ancel

Figure 7-1 Firmware file selection



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 40 of 45



| File Receiver Features AGPS Window Help | ● | ● # # 12 | ■ | # # ● | ● | ● | ● | ● | ● | ● | ■ | ■ | = | = | = | = | Ban Time View Avg CNo: 26.9 dBHz Heceiver Time(UTC) Letitude: 33.670813* HDOP: 2.10 Node: 3-0 1Hz : 00:07:24 TOV: 432455.0 Longitude:117.6 Speed: 0.00 m/s EPE: 0.00 m Number of SVs used in Fix: 8 (GPS 2 6 10 24 28 -> GLD:76 80 82 -> SBAS: -> QZSS Let -0.000020, Lng 4 51121 Select u CNCSR 6P156_S2_XL_N96_801.bi ----Progress и ома и о Update Cancel 7,80,77,258,21,66,08,058,26+ 5,78,28,164,11,81,02,047,48 1249,W,0.00,0.01,120615,,A* 19,W1,062,21,270.0,N,-34.1,1 1,1.725 7479 .,7*2E 12,28,05,119,31,24,50,254,30*7 17,23,059,29,08,262,*77 05.119.31.24.50.254 /Text | SW Version: No

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.



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2



8. Software Interface

The host serial I/O port (UART, I²C, 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)

8.1. NMEA Output Messages

Defaults:

- 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



Page 42 of 45



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.



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2

Page 43 of 45



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





9. Document History

Revision	Date	Changes
0	2015-07-014	First Issue
1	2015-07-29	Updated module photo Added photo of board with jumpers Updated component chart



Reproduction forbidden without written authorization from Telit Communications S.p.A. - All Rights Reserved. Mod. 0810 2011-07 Rev.2 Page 45 of 45