

SL876Q5-A EVK User Guide

1VV0301345 Rev 0 2017-05-04



SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

NOTICE

While reasonable efforts have been made to ensure 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 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 manual and the Telit products described herein 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 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 Third Party supplied Software (SW) products described in this instruction manual may include copyrighted Telit and other Third Party supplied computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and other Third Party supplied SW certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer programs. Accordingly, any copyrighted Telit or other Third Party supplied SW computer programs contained in the Telit products described in this manual may not be copied (reverse engineered) or reproduced in any manner without the express written permission of Telit or the Third 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 Third 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.

Telit

USAGE AND DISCLOSURE RESTRICTIONS

I. 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.

II. 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

III. 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.

IV. Trademarks

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

V. 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.

PRODUCT APPLICABILITY TABLE

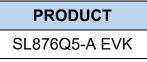


Table 0-1 Product Applicability Table

CONTENTS

NOTIC	E2
COPYI	RIGHTS2
СОМР	UTER SOFTWARE COPYRIGHTS2
USAGI	E AND DISCLOSURE RESTRICTIONS
PROD	UCT APPLICABILITY TABLE4
CONT	ENTS5
TABLE	S
FIGUR	ES8
1	INTRODUCTION9
1.1 1.2 1.3 1.4 1.4.1	Purpose
1.4.1	
2	EVALUATION KIT REQUIREMENTS
2 3 3.1 3.2 3.3 3.4	
2 3 3.1 3.2 3.3 3.4 3.5	EVALUATION KIT REQUIREMENTS 10 EVALUATION KIT (EVK) DESCRIPTION 11 EVK Contents 11 SL876Q5-A Evaluation Board 12 SL876Q5-A Module 13 Evaluation Board Layout 14 Evaluation Board Component Identification 15
2 3 3.1 3.2 3.3 3.4 3.5 3.6	EVALUATION KIT REQUIREMENTS 10 EVALUATION KIT (EVK) DESCRIPTION 11 EVK Contents 11 SL876Q5-A Evaluation Board 12 SL876Q5-A Module 13 Evaluation Board Layout 14 Evaluation Board Component Identification 15 Evaluation Board Schematic Diagram 17
2 3 3.1 3.2 3.3 3.4 3.5 3.6 4 4.1	EVALUATION KIT REQUIREMENTS 10 EVALUATION KIT (EVK) DESCRIPTION 11 EVK Contents 11 SL876Q5-A Evaluation Board 12 SL876Q5-A Module 13 Evaluation Board Layout 14 Evaluation Board Component Identification 15 Evaluation Board Schematic Diagram 17 EVALUATION KIT SETUP 18 Installing the USB Drivers 18

6.2.2	Radar View	26
6.2.3	Debug View	27
6.2.4	Location View	
6.3	Logging Data	
6.4	Receiver Commands	31
6.4.1	Reset commands	
6.4.2	Switching Protocols	
6.4.3	Setting the Receiver Type	
6.4.4	Enabling 5Hz Update	
6.4.5	OSP MID 136 - Mode Control Command	
7	UPDATING FIRMWARE WITH SIRFLIVE	
7 7.1		
-	UPDATING FIRMWARE WITH SIRFLIVE Flashing Requirements Flashing Instructions	
7.1	Flashing Requirements	
7.1 7.2	Flashing Requirements Flashing Instructions	
7.1 7.2 8	Flashing Requirements Flashing Instructions SOFTWARE INTERFACE NMEA Output Messages	
7.1 7.2 8 8.1	Flashing Requirements Flashing Instructions	

TABLES

Table 0-1 Product Applicability Table	. 4
Table 3-1 EVK Contents	
Table 3-2 SL876Q5-A Evaluation Board Components	16
Table 6-1 MID 136 - Mode Control command	36
Table 8-1 Default NMEA Output Messages	39
Table 8-2 Available Messages	40
Table 8-3 NMEA Talker IDs	

FIGURES

Figure 3-1 EVK photo	11
Figure 3-2 SL876Q5-A Evaluation Board	12
Figure 3-3 SL876Q5-A Module	13
Figure 3-4 SL876Q5-A Evaluation Board Layout	14
Figure 3-5 SL876Q5-A Evaluation Board Schematic Diagram	17
Figure 4-1 USB Driver Installation	18
Figure 4-2 Identify new COM port	19
Figure 6-1 Connection settings window	21
Figure 6-2 Click Receiver, then Connect on the menu bar	22
Figure 6-3 Switch Comm Settings window	22
Figure 6-4 The OSP protocol window	23
Figure 6-5 Features, Power Mode window	23
Figure 6-6 Full Power Mode window	
Figure 6-7 Verify NMEA window	24
Figure 6-8 Satellite signal levels	25
Figure 6-9 Satellites by azimuth and elevation	26
Figure 6-10 Receiver Messages (OSP)	27
Figure 6-11 Details of the position fix	28
Figure 6-12 Log File command	29
Figure 6-13 Enter the filename to specify the log file	30
Figure 6-14 Receiver commands	31
Figure 6-15 Reset Window	32
Figure 6-16 Switching to OSP protocol with its default 115200 baud rate	33
Figure 6-17 Click Receiver, Receiver Family, then the desired family	34
Figure 6-18 Enable 5Hz Nav command	34
Figure 7-1 Firmware file selection	37
Figure 7-2 Select Firmware file	38
Figure 7-3 Successful firmware installation	38

1 INTRODUCTION

1.1 Purpose

The scope of this manual is provide product information for the SL876Q5-A Evaluation Kit (EVK).

1.2 Contact and Support Information

For general contact, technical support services, technical questions, and to report documentation errors contact Telit Technical Support at:

- <u>TS-EMEA@telit.com</u>
- <u>TS-AMERICAS@telit.com</u>
- <u>TS-APAC@telit.com</u>

Alternatively, use: <u>http://www.telit.com/support</u>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit: http://www.telit.com

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

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

Symbol	Description
STOP	Danger – This information MUST be followed or catastrophic equipment failure and/or bodily injury may occur.
	Caution or Warning – This is an important point about integrating the product into a system. If this information is disregarded, the product or system may malfunction or fail.
0	Tip – This is advice or suggestion that may be useful when integrating the product.

1.4 Related Documents

• SL876Q5-A Product User Guide

1.4.1 Related Documents Requiring a Non-Disclosure Agreement

None

2 Evaluation Kit Requirements

To use the SL876Q5-A 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).

3 Evaluation Kit (EVK) Description

3.1 EVK Contents



Figure 3-1 EVK photo

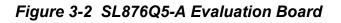
EVK Contents
Plastic case
USB cable
USB drive with software and documentation
Evaluation Board

Table 3-1 EVK Contents

3.2 SL876Q5-A Evaluation Board



With default jumpers

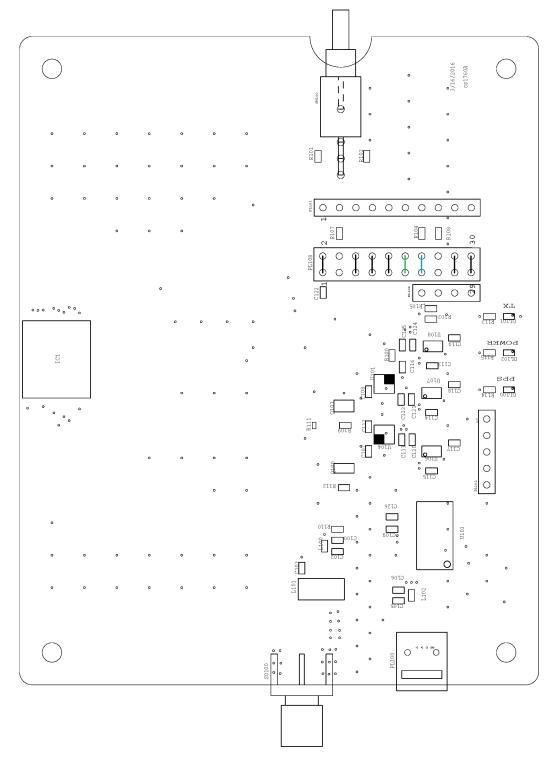


3.3 SL876Q5-A Module



Figure 3-3 SL876Q5-A Module

3.4 Evaluation Board Layout



See Table 3-5 PL-108 Pin Description for jumper color code.

Figure 3-4 SL876Q5-A Evaluation Board Layout

3.5 Evaluation Board Component and Pin Identification

ID	Description	
IC 1	SL876Q5-A Module (including chip antenna)	
SO 100	SMA connector - External Antenna	
SW 100	On-Off Toggle Switch Applies 1V8 to the Module On-Off pin	
DL 100	LED – 1PPS output	
DL 101	LED - TX data output	
DL 102	LED – System ON output	
PL 100	Mini USB connector – Power, ground, Tx, and Rx	
PL 102	1 x 5 Header Pins	
PL 104	1 x 4 Header Pins	
PL 108	2 x 10 Header Pins	
PL 101 1 x 10 Header Pins		
See tables below for Header Pin descriptions		

Table 3-2 Evaluation Board Components

Pin	PL-102 Description
1	Ground
2	PL104-4 & 10 KΩ to 1V8 pullup
3	PL104-3 & 10 KΩ to 1V8 pullup
4	PL104-2
5	PL104-1

Table 3-3 PL-102 Pin Description

Pin	PL-104 Description
1	PL 102-5
2	PL 102-4
3	PL 102-3 & 10 KΩ to 1V8 pullup
4	PL 102-2 & 10 KΩ to 1V8 pullup

Table 3-4 PL-104 Pin Description

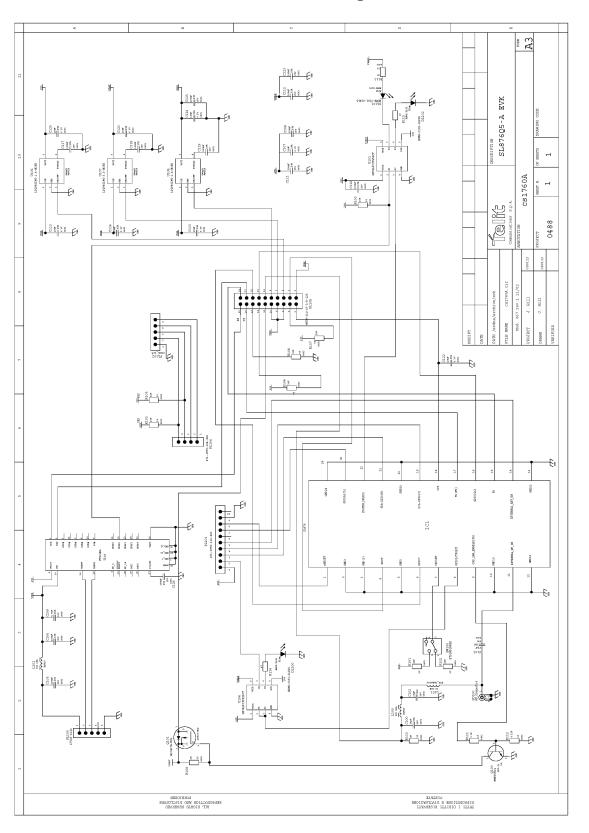
Telit

Pin	PL-108 Description	Pin	Description	For normal operation
1	V _{GPS}	2	module V_{CC} (module supply current)	Yes
3	module BOOT	4	10 KΩ pullup to 1V8	No
	using SiRFflash).		f a "hardware" boot is required (e.g. if do not jumper these pins.	
5	Enable 1V8	6	V _{USB}	Yes
7	Enable 3V _{ALT}	8	V _{USB}	Yes
9	Enable V _{GPS}	10	V _{USB}	Yes
11	V _{ANT} (Antenna Voltage Supply)	12	$3V_{ALT}$ controlled by LNA Enable	Option
13	module GPIO6	14	10 KΩ pullup to 1V8	UART - Yes
15	module GPIO7	16	10 KΩ pulldown to Ground	UART - No
17	USB RXD	18	module TX	Yes
19	module RX	20	USB TXD	Yes

Table 3-5 PL-108 Pin Description

Pin	PL-101 Description
1	1V8
2	module 1PPS pulse output (level translated)
3	module SDA (GPIOB)
4	module SCL (GPIOC)
5	module nExternal Ant Enable (input) Connect to ground (e.g. pin 9) to enable an external antenna.
6	NC
7	module GPIOA
8	module nRESET
9	Ground
10	NC

Table 3-6 PL-101 Pin Description



3.6 Evaluation Board Schematic Diagram

4 Evaluation Kit Setup

4.1 Installing the USB Drivers

Before connecting the SL876Q5-A 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.

Hardwa	re Installation
1	The software you are installing for this hardware: USB Serial Converter has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
	Continue Anyway STOP Installation

Figure 4-1 USB Driver 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.



Figure 4-2 Identify new COM port

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

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 Evaluation Board Operation

- 1. Verify that the correct jumpers are installed. See Sections **3.4 Evaluation Board** Layout and **3.5 Evaluation Board Component Identification**.
- Power will be applied to the SL876Q5-A module when the USB interface is connected to a USB port on a personal computer. When the EVB On-Off switch is turned ON, the module ON_OFF pin will be powered up and the module will begin operation.
- 3. Place the board 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 the EVK to a USB port on the PC.
 - 2. Turn on (up) the EVK Power switch.
 - 3. Launch the SiRFLive application.



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

SRFLive 20794 Marketing File Receiver Features AGPS Wind @ 1 11 12 12 10 10 10 10 10 10 10 10 10 10 10 10 10	ov Hep ● E & g G 7 2	•••	•	 a x
TCP7555 Signal View Nodes 100 Fix Power: Very Low Src SV Liev Asim Stared	TCP7355 Debug View SW Viewion Not detected If p ² CounterNew + 9 + View SW Viewion Not detected View View + 9 + View + View + 9 +	rem Connection Settings Paceiver: [CDM15	22 • Auto Detect cel	
P Client[127.0.0.1:7555] Protocol: NMEA Vi	w: NMEA/Text Log:idle			

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.

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		
-	Disco	nnect		
	View	•		
	Comr	Þ		
	Naviç	÷		
	Plot D	Data		÷
	Set R			
	Autor	mation Test		•

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

- 8. The SL876Q5-A 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.

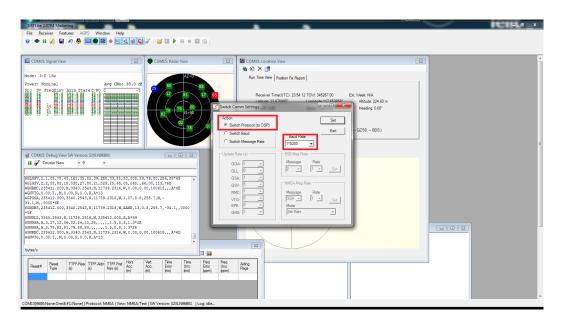


Figure 6-3 Switch Comm Settings window

b. Verify that **Switch Protocol (to OSP)** and **Baud Rate** of **115200** are selected as shown above.

1VV0301345 Rev 0

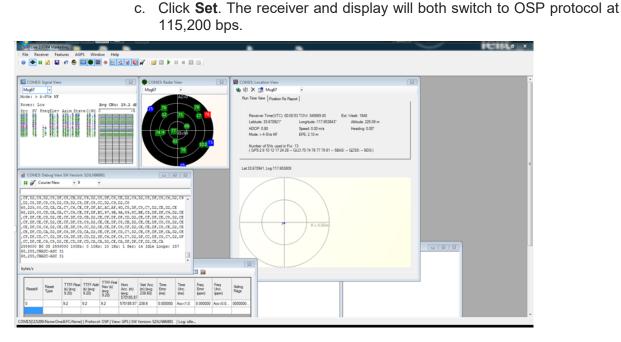


Figure 6-4 The OSP protocol window

d. Click Features, Power Mode, then Advanced.

SRFUre 20174 Marketing Tile Receiver Februre: AGPS Window Help ● ● III 201 ■ Inf ⊕ □ ● 图 ● I2 ● 2 ● 2 ● 11 = □ □	
COM25 Started View COM25 Relative Prese Rook Image: Comparison of the started view Prese Rook Image: Comparison of the started view Prese Rook Image: Comparison of the started view Update Rook Image: Comparison of the started view Update Rook Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Comparison of the started view Image: Compa	COM25 Location View Image:
Reset Reset TTFF-Ape TTFF-App TTFF-App TTFF-App TTFF-App TTFF-App TTFF-App TTFF-App T	Adro Reg
0 92 92 92 570185.87 238.6 0.000000 Acc-1.0 0.000000 Acc-0.0. COMIS(115200/None-OmeBrECNone] Protocol: OSP (View: GPS) SW Version: S2XLN96601 Log: Idle	

Figure 6-5 Features, Power Mode window

Telit

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

SiRFLive 207P4 Marketing		
File Receiver Features AGPS Window Help		
COM15: Signal View 22 COM15: Radar View 23	B COM15: Location View	23
Msg67 • S Power Mode		
Node: > 4-SVa X	Run Time Wew Position Fix Report	
Power: Noninal		
	Receiver Time(UTC): 00:05:53 TOW: 345969.00 Ext. Week: 1848 Latitude: 33 670916' Longitude: 117.653830' Altitude: 227.17 m	
C Push To Fix C SIRFSmetGNSS II LP Buller	HDOP: 0.80 Speed: 0.00 m/s Heading: 0.00*	
E Trickle Power	Mode: > 4-SVs KF EPE: 1.87 m	
OK Cancel 102. ³	Number of SVs used in Fix: 12 (GPS:2.6.10.12.24.25 GLO:70.74.76.77.79.81 SBAS: QZSS: BDS:)	
	Lat 33.670959. Lng117.653876	E
COM15: Debug View SW Version: S2XLN96801		
II of Courier New • 9 •		
, C8, C8, D2, C9, D2, C8, DF, C8, CF, D2, C9, D2, C6, DF, C8, C9, D2, C9, D2, C6, DF, C8, C7, D2		
, C9, D2, C8, DF, C8, C6, D2, C9, D2, C8, DF, C8, CC, D2, C9, D2, C8 68, 225, 00, CD, C7, CA, C7, C6, CE, CF, DF, AC, AC, AF, 9D, C5, DF, CA, D2, CE, D2, CE		
68, 225, 00, CD, C7, CA, C7, C6, CE, CF, DF, BC, 97, 98, 9A, 89, 8C, BE, C5, DF, DF, C9, D2, CE , CF, DF, CD, C7, D2, CE, CF, DF, CD, CB, D2, CE, CF, DF, DF, CD, D2, CE, CF, DF, CE, C8, D2, CE		
, CF, DF, CE, CF, D2, CE, CF, DF, C8, C9, D2, CE, CE, DF, C8, C8, D2, CE, CE, DF, C8, C8, D2, CE , CE, DF, C8, C6, D2, CE, CE, DF, C8, C7, D2, CE, CE, DF, C8, CF, D2, CE, CE, DF, C8, CE, D2, CE	R = 5.00m	
, CE, DF, CD, CA, D2, DF, C6, DF, CD, CA, D2, CE, CF, DF, CD, C7, D2, DF, C6, DF, CE, CD, D2, CE , CF, DF, CE, C8, D2, DF, C6, DF, C8, CC, D2, CE, CE, DF, DF, CE, D2, DF, C8, DF, DF, CE, D2, DF		
, C8, DF, DF, CA, D2, CE, CD, DF, CD, CA, CA, D2, CE, CA, DF, DF, CF, D2, CE, CA 2859000 BG OS 2859000 100Hz: 0 10Hz: 10 1Hz: 1 Ser: 13 Idle Loops: 154		
68,255,CWADC-AGC 31 68,255,CWADC-AGC 31		
bytes/s		
Peset TTFF-Rest TTFF-Aidr TTFF-First Horz Vet Acc. Time Time Freq Freq Line	Adag	
Reset# Type (b) (srvg: 9.20) (b) (srvg: 9.20) (b) (srvg: 9.20) Acc. (m) (srvg: 9.20) (m) (srvg: 238.60) Error (ms) Unc. Error (ppm) Unc.	Flags	
0 9.2 9.2 9.2 570185.87 238.6 0.000000 Acc<1.0 0.000000 Acc<0.0.		
COM15[115200:None:One:8:FC:None] Protocol: OSP View: GPS SW Version: S2XLNB6B01 Log: idle		

Figure 6-6 Full Power Mode window

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

SIRFLive 2	07P4 Marke			-										-	
	river Feat			low Help		17 I 🖬	i (1) 🕨	1 = 2	6						
COM15:	Signal View						v15: Radar '	liew		83			ation View		
Msg67 Mode: > 4	-SVa KF					Msg67		AZEU		_			Msg67		
Power: No	minal			Avg CNo:	33.3 dE			F			nur	rime v	ew Position Fix Report		
Src SV F	regilev	Azim Sta	teC/NO ()	-5		76	71	<mark>/8</mark>			Receiv	er Time(UTC): 00:14:41 TOW: 346497.00 Ext. Week: 1848		
						I	1	10		Switch Co	mm Settir		- 33 670912* Loopinde-117 653820* Altitude: 227.97 m Heading: 0.00*		
Compared to the	1					9	24 7	EI=90	ΤĔ	Action		3,			
									10		ch Protocol	(to NM			
								70			ch Baud		Exit = QZSS: BDS;) Baud Rate		
			6				-	05		C Swit	ch Messag	Rate	<u>€600</u>		
COM15:		SW Version	n: S2XLN96	B01						Update F	Rate (s)		-SSB Msg Rate		
11 p7 C	ourier New	- 9									A: 1	•	Message Rate		
68,225,00										GL GS		•			
,93,C5,C8	8D, 9A, 8E	BA, 8C, 8E	3, C5, C6, C	9, C7, CF, C	CC, DF, SA,	AB, B1, B2	A, 8C, 8B, C	5,CE		GS		•	-NMEA Msg Rate		
, CF, CF, DF, , DF, SA, AB	B9,C5,CA	CF, CF, DE	F, SA, BE, B	81, C5, CF, 1	DF, SA, BE,					RM	0	-	Message Rate GGA V 1 V Set		
,CB,CF,DF 68,225,00	, CC, CC, C7	C8,CF,CE	F, CF, DF, E	E, AB, A7, I	DF, AF, AF,					EPI	E: 0 IS: 1	•	Mode Set Rate		
,CE,DF,B2 ,C7,CE,CF	CD, CB, CC	DF, AC, AS	9,83,96,8	C,8B,C5,0	CF,87,CE,	C6, C7, CE	E, CF, 9E, C	C,CD		GN	15: IV	-			
, DF, CF, 87 , CD, DF, CE , DF, C8, CE	CF, DF, CE	C8, DF, CI	D, CA, DF, C	A, DF, CD,	C7, DF, CD,	C6, DF, C8	B,C8,DF,C			_					
3387000 B	G 05 3387	100 100H	2: 0 10Hz	: 10 1Hz	: 1 Ser:	8 Idle I	Loops: 15	•				\rightarrow			
bytes/s									2 🏨			83			
		TTFF-Rea	TTFF-Adr	TTFF-First	11-1	Mar Las				P		٦			
Reset#	Reset Type	(s) (avg: 9.20)	(s) (avg: 9.20)	Nav (s) (avg:	Horz Acc. (m) (avg:	Vert Acc. (m) (avg: 238.60)	Time Error (ms)	Time Unc. (ms)	Freq Error (com)	Freq Unc. (com)	Aiding Flags				
0		9.2		9.20) 9.2	570185.87 570185.87		0.000000	Acc<1.0	0.000000		0000000.				
COM15[11520	0:None:One	8:FC:None	1 Protocol	: OSP View	GPS I SW	Version: S2	XLN96801	I Log: idle					11		

Figure 6-7 Verify NMEA window

- 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,

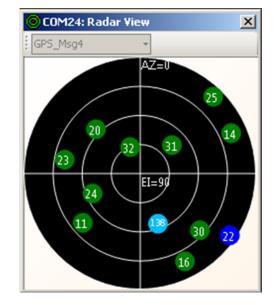
Click Window, Restore Layout, and Default.

6.2.1 Signal V	/iew	
(Tool Bar i	icon)	
Ty	/pe of Fix	Satellite Data
	1	
COM99: Signal View		×
Msg67 -		
Mode: > 4-SVs KF		
Power: Nominal	_	Avg CNo: 34.3 dBHz
Src SV FreqElev Azi	im StateC/NO (0 -5
GPS 15 78.5 186 GPS 09 51.2 272		
GPS 26 42.0 130		
GPS 18 35.4 287		
GPS 28 31.7 050		
GPS 17 24.6 100	D.4BF 31.4	
GPS 22 14.3 321		
GPS 12 12.6 208		
GPS 14 12.8 312		
GPS 25 06.4 223 GPS 27 75.7 063		
GPS 01 01.8 012		
GL0 75 -2 71.0 011		
GLO 83 6 47.3 302		
GLO 82 5 46.5 225	5.4 AD 39.5	
GLO 70 -7 41.0 268		
GL0 74 -3 26.2 061		
GLO 81 4 11.0 009		
GLO 78 1 06.6 339 GLO 76 -1 23.9 060		
GLO 80 3 13.8 113		
GL0 73 -4 04.8 179		
1	i i	

Figure 6-8 Satellite signal levels

6.2.2 Radar View

(Tool Bar icon)



Symbol	Description
Circle	GPS
Square	GLONASS
Sky blue	SBAS
Red	$C/N_0 = 0$
Blue	$C/N_0 \neq 0$ and <u>not</u> used in the navigation solution
Green	$C/N_0 \neq 0$ and used in the navigation solution
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

6.2.3 Debug View

(Tool Bar icon)

Displays the messages incoming from the receiver

😰 COM14: Debug View SW Version: Not detected	
14896010 CM:RtcEdgeAlign T:127 dRate:9 count:15141 31426 Acq:3310918892 Wolk:1 dRtc:0.999786377 prevAcq:329455	3650
bepDrift: 0.999954973 rtcDrift: 0.999954869 NLC: 2 4 9 27 12 17 28 25 0 0 0 0	
NLD: ff ff ed ff ff ff ed 6d 0 0 0 NLE: 0 0 0 0 0 0 10 0 0 0	
NLF: 1 1 1 1 1 1 1 0 0 0 0 0 NLG:251291.009299760 0.009299918 -2466256.6 -4706248.9 3516971.6 NLH:251291.009299760 251290.999999837 33.678648 -117.656278 236.4	
NLI:251291.009299760 56 3309424385 0 7 5 5 14896050 BEP: TOW:251291.009299760 1602 swd:1.000061 A:3309424385 CB:0.009300 CD:96326 Y CDUnc:63	
14896050 PrePos: IntUpd KFNav sv: 0 Tag:14896000 Flags:60 Clk:0.000001 S20ms:0 S1ms:0.000001 CDrft(hz):64.1 HP:159. HV:3.18 I	5

Figure 6-10 Receiver Messages (OSP)

6.2.4 Location View



(Tool Bar icon)

Map position button requires Internet access.

Map Position	Configuration Clear	Data <u>Set Reference</u>	ce Location	
	OM2 : Location View			×
1 👒	r 🌾 🗙 📑 Msg41	Ŧ		
	Position Information Receiver Time(UTC): 18:33:21 Latitude: 33.670878	TOW: 326016.04 Longitude:-117.653770	Ext. Week: 1635 Altitude: 220.29 m	
	HDOP: 0.80	Speed: 0.02 m/s		
		Mode: > 4-SVs KF + Dgps		
	Number of SVs used in Fix: 10	(11 14 16 20 23 24 25 3	0 31 32)	
	Lat: 33.670852, Lng:-117.653742			
		R = 5.00m		
Auto) Center			

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.

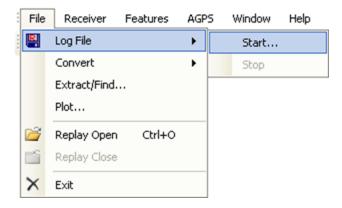


Figure 6-12 Log File command

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								
	Clear Log Path Update Log Path Config Log Message								
	Log File Path C:\Logs\B02.txt								
	Log User Specified Messages Log Data Format								
	Duration Logging TEXT								
	Duration Logging								
1	Start Time 11:05:02 AM 6/12/2015								
1	End Time 12:05:02 PM 🔶 6/12/2015 💌								
	Duration 60 🕂 Minutes								
	Delayed Start 🔲 Repeat Duration 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

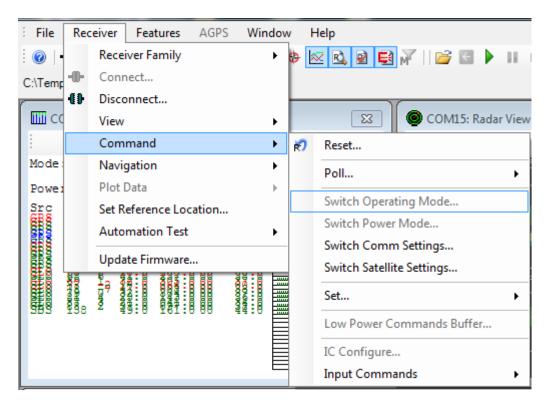


Figure 6-14 Receiver commands

0

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

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 Longitude 121	Position
Altitude 5	as Ref
Warm Init Params	
Update with current fixed data 🔽 Use Current PC 1	Time
Position	
X (m) -2686727 Ext Week # 1311	
Y (m) -4304282 TOW 86400	
Z (m) 3851642 Channels 12	
Clock Drift (Hz) 75000	
Use New Factory Reset	
Reset Mode Control Mode	
C Hot Start	
C Warm Start (No Init) 🔽 Enable Deve	elopment Data
C Warm Start (Init)	
C Cold Start	
Factory Reset	
Config AutoRepl Send C	ancel

Figure 6-15 Reset Window

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 ▼ GLL: 0 ▼ GSA: 1 ▼ GSV: 5 ▼	SSB Msg Rate Message Rate 2 1 Set NMEA Msg Rate
RMC: 1 ▼ VTG: 0 ▼ EPE: 0 ▼ GNS: 1 ▼	Message Rate GGA Mode Set Rate Termination of the set of th

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

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.

R SRFLive 2.07P4 Marketing	
Elle Receiver Features AGPS Window Help	
- Connect SiRFstarV	
Disconnect	·
CC View • COM15: Radar View 🖾	
<u>Command</u> →	_ I 喻 称 X 💼
Mode Navigation A7=0.65	Run Time View Position Rix Report
Power Plot Data > g CNo: 33.4 dF	
	Receiver Time(UTC): 01:32:48 TOW: 351183.00 Ext. Week: NA
Automation Test >	Latitude: 33.670895' Longitude: 117.653827' Altitude: 231.60 m
Update Firmware	HDDP: 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 05	(GPS:2 5 6 10 12 20 24 25 29 GLO:73 74 75 76 77 80 SBAS: QZSS: BDS:)
20	
	Lat. Long:
GOM15: Debug View SW Version: S2XLN96801 □ □ □ □	
II of Courier New - 9 -	
4GLGSV, 3, 3, 09, 65, 01, 021, *5D 4GNRMC, 013247.000, A, 3340.2537, N, 11739.2296, W, 0.00, 0.00, 110615, , , A*66	L 2 R 1 5.00m
SGPGGA,013248.000,3340.2537,N,11739.2296,W,1,09,0.7,265.7,M,-34.1,M,,0000*64 #GNGNS,013248.000,3340.2537,N,11739.2296,W,AANN,15,0.7,265.7,-34.1,,0000*5D	
\$GNGS3,013240.000,3340.2537,N,11739.2296,W,AANN,15,0.7,265.7,-34.1,0000*50 \$GNGS3,A,3,12,05,10,25,29,02,24,20,06,,,,1.4,0.7,1.2*26	
\$GNRMC,013248.000,A,3340.2537,N,11739.2296,W,0.00,0.00,110615,,,A*69	
sGPGGA,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	Y Y
bytes/s	🕰 COM15: Response View 🛛 🖼 COM15: Error View 🔅 🖾
COM15: TTFF/Nav Accuracy	
🚾 Curve Label 🖄 TTFF Since Reset 🔻 🌚 Color [Red] 📑 🗶 🗷 🏨	
Reset# TTFF-Re TTFF-Aid TTFF-Ris Horz Veit Time Time Freq Freq Aiding	
Reset# Type (s) (s) Nav (s) Acc. (m) (m) (ms) (ppm) (ppm) Rage	
COM15[9600:None:One:8:FC:None] Protocol: NMEA View: NMEA/Text SW Version: S2XLN96B01 Log: idle	
ourseless sectored is considered and sectored in the sectored and sectored in the sectored and sectored in the sectored and sectored an	

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**.

File Rec	eiver Features AGPS	Window	Help	
🕜 🛛 🕕	Connect) 🖳 🌮 🎹 🔘 🖽 🔶	🗠 🖻 😫 📈 💕 🛙
40	Disconnect			
_	View	•		
	Command	•		: Radar View
	Navigation	•	Static Nav	
	Plot Data	►	Set 5 Hz Nav 🔹 🕨	Enable 5Hz Nav
	Set Reference Location		DOP Mask	 Disable 5Hz Nav
	Automation Test	►	Elevation Mask	
			Mode Mask	
			Power Mask	
			SBAS Ranging	

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**



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
PositionCalc 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
DegradedTime 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		xxxxxxx0 = disable track smoothing xxxxxxx1 = enable track smoothing xxxxxx0x = use raw measurements xxxxxx1x = use smooth measurements

Table 6-1 MID 136 - Mode Control command

7 Updating Firmware with SiRFLive

7.1 Flashing Requirements

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

7.2 Flashing Instructions

Note: Do NOT use the BOOT pin on the module (leave it floating).

1. Click on **Receiver**, **Update Firmware** from the Menu Bar.

CSR Update COM15 Firmware	-	
Firmware updates can be downloaded from www.csrsupport.com		
Select update file:		
		<u> </u>
Progress		
-		
_	<u>U</u> pdate	Cancel

Figure 7-1 Firmware file selection

2. Enter the filename or browse to the firmware file.

Fre Receiver Features AGPS Window Help 😔 🌩 H 💋 🔛 🔊 🏶 🛄 🜑 🎯 🖄 🚸 🔯 🐧 🛱 🖉 🐨 🕨 H = 💷 🖆	
Image: Control Signal Size: Siz	COAD Location View Clip Image: Section 2010 Control (Control (Contro) (Contro) (Control (Control (Control (Contro) (Control (Control (
88 89 29 80 90 90<	
<pre>public de la formation de la formatione de la formation de la formatione de la formatione de la formatione de la formatione de la formation de la formatione de la formation</pre>	At Criter
bytes/s CONTID6003None:One:RFC:Nonal Protocol: NMEA Vien: NMEA/Text SW Vienion: Not detected Log: idle	

Figure 7-2 Select Firmware file

3. Click Update.

ERe Receiver Features AGPS Window Help	
● + H Z II # # # II ● III ● IIII ● III ●	
CONT: Signal View	COM7: Location View
	★ # X 1
Node: 3-D 1Hz	Run Time Wev Position Rx Report
Power: Low Avg CNo: 26.9 dBHz	
Src SV FreqElev Azim State C/ND 0 -5	Receiver Time(UTC): 00.07.24 TO(V) 432459.00 Ext. Week: N/A
	Lafitude: 33.670613* Longitude: 117.653747* Altitude: 225.90 m
	HDDP. 2.10 Speed: 0.00 m/s Heading: 0.01* Mode 3-D 1Hz EPE 0.00 m
	Number of SVs used in Fix: 8 (GPS.2.6.10.24.28 – GLO.76.80.82 – SBAS – QZSS – BDS.)
	Lat-0.000000 Late 4 511213
CON Update COM7 firmware	
Firmware updates can be downloaded from www	Lastracian and a second s
Select update file: [:::::::::::::::::::::::::::::::::::	
COM7: Erase Sime: 9.8 sec. Program Sime: 115.5	iseo
CONT: Debug View SW Version: Not detected	
II Z Courier New - 9 -	Lindate Close
Success	
V00005, 30, 02, 10, 28, 24, 06, 12, , , , , , 2.1, 1.4, 1.5*24	
400053, A, 3, 83, 67, 80,, 2.1, 1.4, 1.5*20 505557, 3, 1, 10, 02, 67, 102, 33, 10, 22, 115, 32, 20, 05, 119, 31, 24, 50, 254, 30*71	successfully updated.
¢GPG5V, 3, 2, 10, 06, 61, 057, 26, 12, 43, 322, 25, 17, 23, 059, 09, 29, 08, 262, *79	
#0905V,3,3,10,25,06,310,,05,02,172,*78 #0505V,2,1,00,83,41,265,38,67,05,106,32,80,77,258,21,66,08,058,26*60	OK III
\$22,657,2,2,08,82,53,003,14,73,32,326,23,79,28,164,11,81,02,047,*48 pONMB0C,000723.000,A,3340.2488,W,11739.2249,W,0.00,0.01,120615,,A*66	
#09908,000724.000,3340.2488,N,11739.2249,W,1,05,2.1,270.0,N,-34.1,N,,0000*65 #08655A,A,3,02,10,28,24,06,,,2.7,2.1,1.7*25	
GONGER, A, 3, 53, 67, 50,, 2, 7, 2, 1, 1, 7*2E p00057, 3, 1, 10, 02, 67, 132, 33, 10, 22, 115, 32, 28, 05, 119, 31, 24, 50, 254, 30*71	
#0P05V, 3, 2, 10, 06, 61, 057, 26, 12, 43, 322, ,17, 23, 059, ,29, 08, 262, *77	
40P05V, 3, 3, 10, 25, 06, 310, ,05, 02, 172, *78 402.65V, 2, 1, 08, 53, 41, 265, 40, 67, 05, 106, 32, 50, 77, 258, 22, 64, 08, 058, 28*67	
PGLGSV, 2, 2, 08, 82, 53, 003, 14, 73, 32, 326, 23, 79, 28, 164, 12, 81, 02, 047, *68 ≠0KR0C, 000724. 000, 3, 3340.2488, N, 11739. 2249, N, 0.00, 0.01, 120615, , , , 3*61	
4GP95A,000725.000,3840.2488,B,11739.2249,W,1,06,1.4,270.0,N,-34.1,N,,0000*61 GGN25A,A,3,02,10,28,24,06,12,,,,,,2.1,1.4,1.5*24	
000038, A, 3, 53, 67, 60,,, 2.1, 1.4, 1.5*2C #0P05V, 3, 1, 10, 02, 67, 192, 34, 10, 22, 115, 32, 28, 05, 119, 31, 24, 50, 254, 30*76	
· · · · · · · · · · · · · · · · · · ·	
bytes/s	
COM7[3600:None:One8:FC:None] Protocol: NMEA View: NMEA/Test SW Version: Not detected Log: idle	

Figure 7-3 Successful firmware installation

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

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)

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:

- NMEA-0183
- 1 Hz fix rate. Maximum is 10 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 1		
GNSS satellites in view. 1/5			
Note: Multiple GSA and GSV messages may be output per cycle.			

Table 8-1 Default NMEA Output Messages

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.

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><If>

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	2017-03-21	First Issue

SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

www.telit.com

Telit Communications S.p.A. Via Stazione di Prosecco, 5/B I-34010 Sgonico (Trieste), Italy

Telit IoT Platforms LLC 5300 Broken Sound Blvd, Suite 150 Boca Raton, FL 33487, USA Telit Wireless Solutions Inc. 3131 RDU Center Drive, Suite 135 Morrisville, NC 27560, USA

Telit Wireless Solutions Co., Ltd. 8th Fl., Shinyoung Securities Bld. 6, Gukjegeumyung-ro8-gil, Yeongdeungpo-gu Seoul, 150-884, Korea



Telit Wireless Solutions Ltd. 10 Habarzel St. Tel Aviv 69710, Israel

Telit Wireless Solutions Technologia e Servicos Ltda Avenida Paulista, 1776, Room 10.C 01310-921 São Paulo, Brazil

Telit reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. The information contained herein is provided "as is". No warranty of any kind, either express or implied, is made in relation to the accuracy, reliability, fitness for a particular purpose or content of this document. This document may be revised by Telit at any time. For most recent documents, please visit www.telit.com Copyright © 2016, Telit