

SL869-V3 EVK User Guide

1VV0301306 Rev.0 2016-08-19



Making machines talk.



APPLICABILITY TABLE

PRODUCT SL869-V3



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1. Introduction

1.1. Purpose

The purpose of this document is to provide information for using the SL869-V3 Evaluation Kit.

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:

<u>TS-EMEA@telit.com</u> <u>TS-NORTHAMERICA@telit.com</u>

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</u> <u>injury 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.

1.4. Related Documents

- Telit SL869-V3 Product User Guide
- Telit SL869-V3 Software User Guide

1.5. Product Usage Notes



- To prevent ESD and EOS damage, a properly grounded ESD wrist strap should be worn when working inside the EVK
- Do not alter shunt jumpers while power is applied
- Do not short the RF signal to ground if antenna voltage is installed. Damage to the EVK may occur.

Always follow ESD safety precautions when utilizing the evaluation kit.

Please refer to your sales representative for additional documentation.





2. Evaluation Kit Requirements

To use the SL869-V3 Evaluation Kit (EVK), you will need the following items:

- 1. An SL869-V3 Evaluation Unit (included in the kit)
- 2. GNSS Antenna (included in the kit)
- 3. FTDI USB Drivers (included in the kit)
- 4. Current version of TelitView (included in the kit) Note: There is a version of TelitView on the USB Drive supplied in the kit, however for full functionality, the latest version should be downloaded from the Telit Support Site.
- 5. A PC with a USB port and:
 - Windows 7 or later
 - o .NET Framework 4.0

2.1. Installing the USB Drivers

Before connecting the SL869-V3 EVK, install the necessary USB drivers

1. Double-click the USB driver executable and follow the onscreen directions for installation.





Evaluation Kit Description 3.

3.1. SL869-V3 EVK Contents



SL869-V3 Eval Unit: Evaluation Unit including the Telit SL869-V3

GNSS Antenna: An active antenna powered by the EVK.

The antenna supports GPS/Glonass/Beidou with an LNA Gain 30 dB)

USB Cable: A 6ft mini USB cable used to supply power and communicate to the EVK

USB Flash Drive: Contains the tools and documentation for the SL869-V3







Note: PL105 and PL106 must be jumpered 1-2 to operate the on-board Teseo 3 Antenna Sense circuit.

Figure 3-2 SL869-V3 Evaluation Board components

Required External Connections

Connect the PC to UART-USB (PL102) Connect the GNSS antenna to RF-IN (SO101)



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3.3. SL869-V3 EVK Board Component Identification

	SL869-V3 EVK Board Components		
ID	Name	Description	
DL101	TX LED	TX data display	
DL102	1PPS LED	1PPS output display	
SW 201	ON/OFF Switch	Applies power to the EVK.	
SO 102	1PPS Output SMA	1PPS buffer output connector	
PL 108	SL869 BOOT Pin	To place the module into BOOT mode, place a shunt jumper on pins 2 & 3 before powering the unit up. Not connected for normal operation.	
PL104	Vcc Supply	Place a shunt jumper to apply 3.3 V to the module Vcc. Required for normal operation.	
PL 107	Vbatt Supply	Place a shunt jumper to apply 3.3 V to the module Vbatt. Required if standby power is desired when Vcc is removed.	
PL 102	UART-USB1	USB: DC, Ground, TX, RX. Connect to laptop.	
PL 101	USB2	Reserved	
PL 113	Vant Supply	Place a shunt jumper to apply 3.3 V to the SMA connector for an external active antenna.	
PL 201	+3.3 V LDO Antenna supply	Pins 1 & 2: Power LDO_Enable with On/Off switch Pins 2 & 3: Power LDO_Enable with module Pin 4 output	
SO 101	Antenna SMA	Antenna: RF Input + Vant	

Table 3-1 SL869-V3 EVK Board Component Identification



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3.4. SL869-V3 EVK Board schematic diagram



Figure 3-3 SL869-V3 EVK Board schematic diagram - Page 1 / 2



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3.5. SL869-V3 EVK Unit Connections



Figure 3-5 EVK Unit connections



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4. Step-by-Step: First Time Running the SL869-V3 Evaluation Board

4.1. Step-by-Step: First Time Connection

- 1. Before connecting the evaluation board, ensure that the USB drivers are installed.
- 2. Ensure that jumpers are installed on J2, J6, and J7.
- 3. Ensure that there are no jumpers installed on J3 and J4.
- 4. Connect the provided Active Antenna to the SMA connector.
- 5. As soon as the evaluation board is connected to the PC, it will be detected and installed.

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 installation, select "Continue Anyway" to proceed

- 6. After the evaluation board has been installed, check the "Device Manager" window for the evaluation board COM port number. This information is needed for use with the GPS tools.
- 7. Turn the switch vertically UP to turn On the EVK.
- 8. Refer to Chapter 5 for using the EVK with software.

NOTE:



On some occasions, Windows will install a "Microsoft Serial BallPoint mouse after connecting the USB. Uninstall the Microsoft Serial BallPoint mouse if Windows mistakenly installs it.



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5. TelitView

Launch the TelitView application



Figure 5-1TelitView application

5.1. Main Interface

After launching TelitView, first notice the application's main interface.

Connecting to the EVK

5.1.1. Main Menu Bar

Under the "Tools" option on the *Main Menu Bar*, select "Connect to GPS." This will open the 'Connect to GPS' window.

File Edit View Tools Help

Figure 5-2 Main Menu Bar

5.1.2. Main Tool Bar

Select the "Connect to GPS" icon under the *Main Tool Bar* and the 'Connect to GPS' window will open.



Figure 5-3 Main Tool Bar



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5.1.3. 'Connect to GPS' Window

Connect to GPS			×
Communication 5 - (USB Serial	Port: Port)		•
Baud Rate: 9600			•
	ОК	Cancel	

Figure 5-4 Connect to GPS Window

- 1. Select the correct Communication Port
- 2. Select the correct baud rate (default 9600)

5.2. TelitView Tabular View

TelitView implements a tabular view. Switching between tabs displays different information parsed from the receiver.



Figure 5-5 TelitView Application



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• • • 0 30 25 74 10 13 16 19 20 23 28 76 75 65 84 83 85 85 71 72 3 6 8 = GPS = GLONASS = SBAS = QZSS 33.67080 Latitude: Ň Longitude: -117.65382 Altitude: 256.430 M H Time (UTC): 22:13:06 <mark>м</mark>83 н 74 Date (UTC): 16 04/18/2013 PDOP 1.4 ∎ 6 œ HDOP: 0.7 н н10/ м 13 VDOP: 1.2 8 <mark>м</mark> З w ы Satellites in View (GPS): -E 11 м 76 Satellites in View (GLONASS): 10 ₩ 23 GPS Satellites Used For Nav: 11 ы 19 GLONASS Satellites Used For Nav: 5 н 72 Course: 0.0 h Speed: 0.0 Knots м 28 Mode: 3D Status: Valid \$0 71

5.2.1. Front Panel Status

The Front Panel Status Tab displays satellite information as well as position information.

Figure 5-6 Front Panel Status Tab

5.2.2. Scatter Plot

The Scatter Plot displays position points that are updated every second. The position points are compared to each other in an axis in meters.



Figure 5-7 Scatter Plot





5.2.3. NMEA Monitor

w - Connected (Comm 11, 960

The NMEA Monitor displays the NMEA output of the receiver. The user can also type in commands in the Transmit toolbar.

TelitView automatically adds a checksum to the command being sent.

File Edit View Tools Help			
Front Panel Status Scatter Plot NMEA Monitor			
PSTMHOT		-	Send
\$PSTMHOT*6D			
Transmit		Receive	Pause Rx
	Biology, J. Ju, 21, July, 20, 27, 23, 200, 43,		

Figure 5-8 NMEA Monitor Tab

5.3. User Menu Commands Manager

The TelitView user has the option to enter in custom commands through the "User Menu Command Manager." There are 10 available slots for custom commands. Each slot requires a 'Menu Caption' and 'NMEA Command.'

The User Menu Command Manager is accessible through the "Tools" selection on the **Main Menu Bar**.

User Menu Commands	x
Liser Menu Item:	
User Menu Item 1	•
Menu Caption: Poll GNSS Library Version	
NMEA Command:	
\$PSTMGETSWVER,0	
	OK Cancel

Figure 5-9 User Menu Command Manager



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6. Flashing Firmware with TeseoIII X-Loader

Note that X-loader requires use of the BOOT pin. If this pin is not available in a user's design, you will need to run the FW Upgrade Tool (UPG).

The EVK will be preloaded with firmware, however if updates are required, perform the following steps:

6.1. Flashing Requirements

- SL869-3DR software from TELIT
- TESEOIII X-Loader v1.13 (or newer) from TELIT

6.2. Flashing Instructions

Note: Do not erase NVM, or the Initialization procedure will have to be performed.

- 1. Install a shunt jumper on Main Board SL869 BOOT (pins 2 & 3), shorting the pins together.
- 2. Connect the USB cable and let the Host PC machine enumerate the USB connection.
- 3. Set SW201 (Main Power) to ON (up) to power the SL869-3DR receiver.
- 4. Launch the TESEOIII X-Loader and set the selections as shown in the figure below.

🏂 TeseoIII XLoader 1.13			×
Target device	Binary image settings		
SRAM	Destination address 10000000	Size	
SQI flash	Entry point offset 00000000	CRC32	
NOR flash	Load		
Loading settings	Options		
Output port COM7	Erase NVM	1024 KB 🕅 STA	8090FG only
Baud rate 115200	Erase only	Program only 📃 Use	4KB sector size
Debug options			
Enable			
⊚ Dump ⊘ Set	Address 00000000 Si	ize O Di	ata 00000000
	Send	А	bout 🕎
Idle			

Figure 6-1TESEOIII X-Loader





- 5. Click on the Load button, then locate and select the software provided by Telit.
- 6. Verify selections as follows:
 - a. "Target device" is SQI flash
 - b. "Erase NVM" is not selected
 - c. "STA8090FG Only" is selected
 - d. Output Port matched your configuration
- After selecting the correct configuration and the selected COM port is properly identified (Look under Device Manager in Windows OS for COM port if cannot be identified/found), click on "Send" to program the device.
 When done, a pop up window will confirm, "Device successfully programmed".
- 8. Remove the shunt jumper from Step 1.
- 9. Cycle power to EVK. Verify NMEA data is streaming out with TelitView under the NMEA Monitor window.





7. Communication Interface

The SL869-V3 offers several ways of communication between itself and the host processor. For simplicity in this document, the interface described in the examples is in UART mode.

7.1. Commands

A command is a defined Data Packet sent from a host processor to the GPS-Baseband Controller. The regular structure of the command is

command-ID[,<parameters>]<cr><lf>

Parameters, if present, are delimited by "," characters as per the NMEA protocol. All SL869-V3 commands are proprietary and therefore all command-ID's begin with the "\$PSTM" character sequence.

The user interaction with the EVK can be achieved through the use of a PC terminal emulator program that is connected to the appropriate COM port with settings of:

- 9600 Baud
- 0 Parity Bits
- 1 Stop Bit
- 8 Data Bit

7.2. Messages Description

The table below summarizes the periodic output messages of the SL869:

Message ID	Description
\$GPGGA	NMEA: Global Position System fix data
\$GNGSA	NMEA: GNSS Dilution of Precision (DOP) and active satellites
\$GSV	NMEA: GNSS satellites in view. "GP" talker ID reports GPS, "GL" talker ID reports GLONASS satellites.
\$GPRMC	NMEA: Recommended minimum specific GNSS data

Table 7-1 Output messages

All messages are output once per second. There are multiple GSA and GSV messages output each second.



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7.3. Commands Description

The table below summarizes the set of commands for the SL869:

Command ID	Description
\$PSTMINITGPS	Initialize GPS position and time
\$PSTMCLREPHS	Clear all ephemeris data
\$PSTMDUMPEPHEMS	Dump ephemeris data
\$PSTMEPH	Load ephemeris data
\$PSTMNMEAONOFF	Toggle the NMEA output ON and OFF
\$PSTMCOLD	Perform a COLD start
\$PSTMWARM	Perform a WARM start
\$PSTMHOT	Perform a HOT start
\$PSTMSRR	Perform a system reset
\$PSTMGPSRESET	Reset the GPS engine
\$PSTM2DFIXONOFF	Enable/disable 2-D acquisition fixes
\$PSTMGETSWVER	Get the GNSS Library version
\$PSTMSBASONOFF	Toggle the SBAS feature ON and OFF
\$PSTMSTAGPSONOFF	Enable/disable the STAGPS engine
\$PSTMSETCONSTMASK	Set the GNSS constellation mask

Table 7-2 Commands

Unless otherwise noted in the SL869-V3 SW User Guide document, commands are echoed by the SL869-V3 after the command is executed.



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8. Document History

Revision	Date	Changes
0	2016-08-19	First Issue



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