
Getting started with the STEVAL-ISB038V1R wearable wireless power receiver based on STWLC04

Introduction

This user manual explains the STEVAL-ISB038V1R hardware and software installation, as well as details on the board evaluation and the GUI interface.

The STEVAL-ISB038V1R wireless power receiver evaluation board is a reference design based on the STWLC04 device.

This receiver operates with the STWBC-WA wearable reference design (STEVAL-ISB038V1T) as a 5 V power supply or a simple CC/CV battery charger. Mode and parameter changes can be performed through the I²C bus which is easily accessible via the graphical interface.

Figure 1: STEVAL-ISB038V1R evaluation board



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1 Getting started

1.1 System requirements

To use the STEVAL-ISB038V1R RX board with the GUI, you need a PC with Microsoft Windows® XP and higher.

The board is connected to the PC through the USB to I²C converter included in the STEVAL-ISB038V1R package.

1.2 Package contents

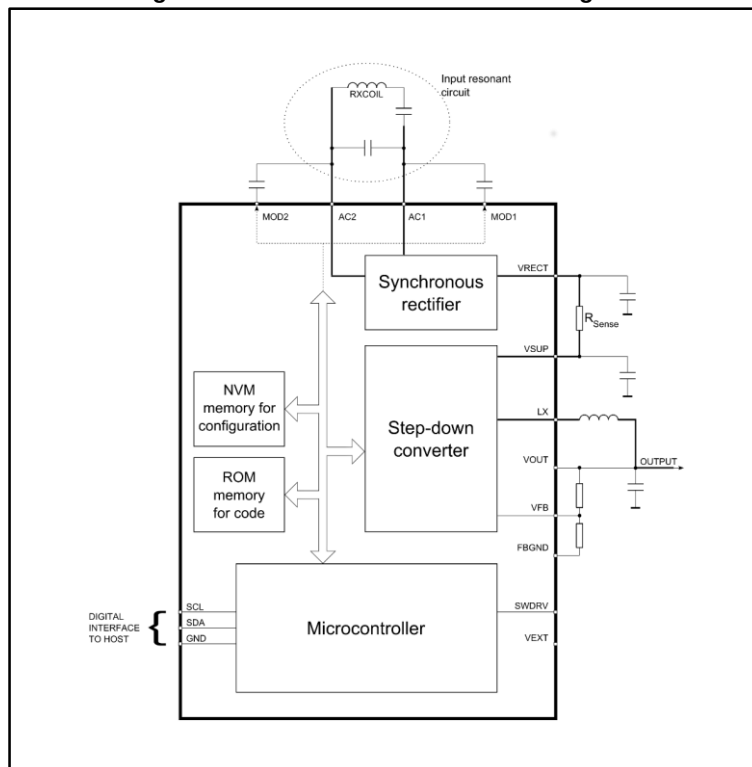
To evaluate the STEVAL-ISB038V1R board, you need:

- Hardware:
 - STEVAL-ISB038V1R board
 - the USB-I²C converter board
- Software:
 - PC GUI application (no drivers, no installation)
 - documentation: user manual

2 Hardware description and setup

2.1 System block diagram

Figure 2: STEVAL-ISB038V1R block diagram



2.2 STEVAL-ISB038V1R RX wireless power receiver board

The STEVAL-ISB038V1R RX board has the following features:

- NVM memory to store default configuration
- a 5 V output or CC/CV charger (configurable)
- overvoltage, overcurrent and overtemperature protection
- a LED for power transfer progress status
- an I²C connection for the user interface and for default configuration update

Table 1: STEVAL-ISB038V1R electrical performance

Parameter	Description	Min	Typ	Max	Unit
5 V mode					
Vout	Output voltage		5		V
Iout_lim_max	Output current limit max.		0.2		A
Charger mode					
Vout	Charge voltage		3.6/4.1/4.2		V
Ichg	CC charging current		0.1/0.15/0.2		A
Ipre	Precharge current		0.05		A

Parameter	Description	Min	Typ	Max	Unit
Vpre	Precharge to CC charge threshold		2.5		V

Figure 3: STEVAL-ISB038V1R charger mode configuration

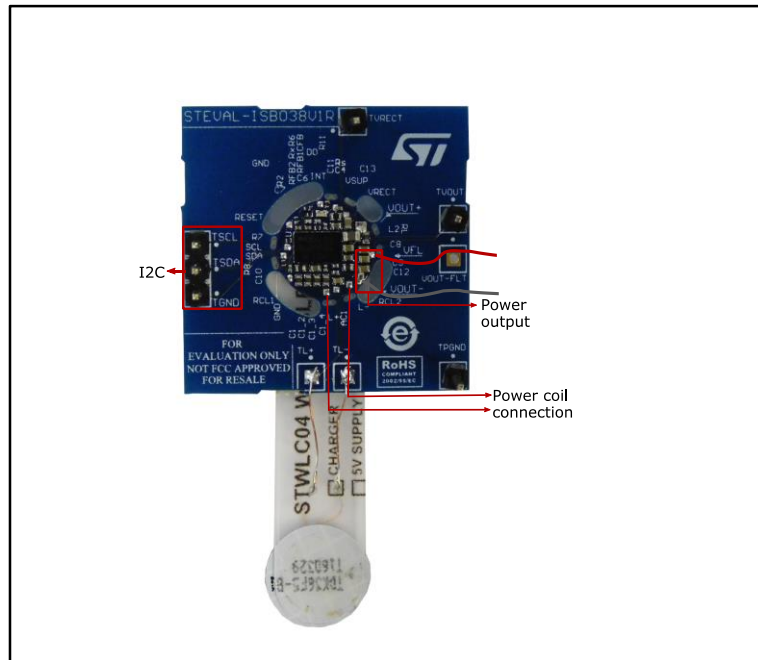
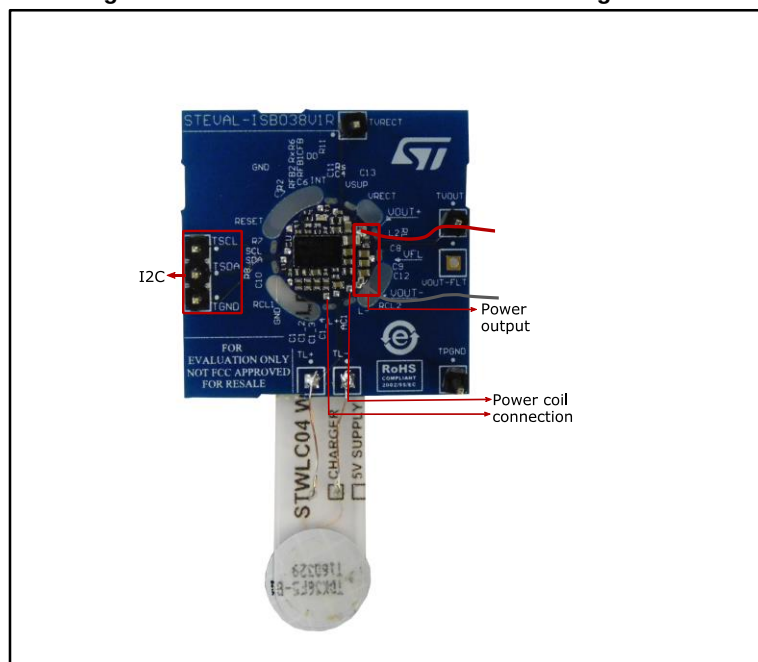


Figure 4: STEVAL-ISB038V1R 5 V mode configuration



2.3 Prerequisites

The following tools are necessary:

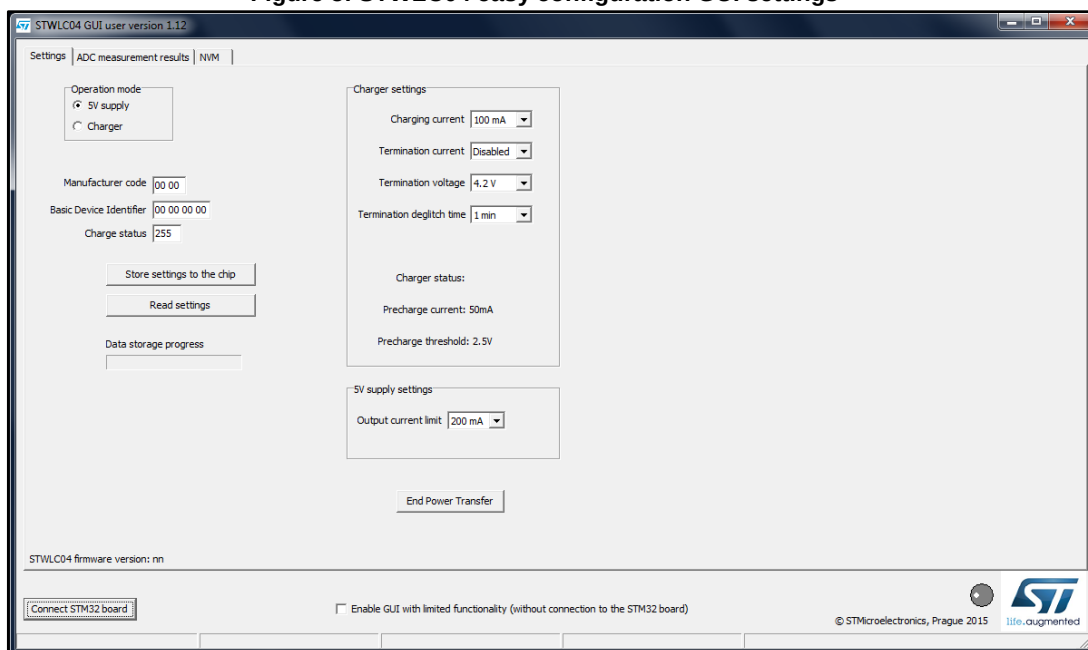
- a STEVAL-ISB038V1R board including the USB to I²C converter
- a USB to I²C converter
- a Windows PC and the STWLC04 GUI (no installation needed, no dedicated drivers)

2.4 Procedure

This GUI provides an easy way of configuring the most common parameters; the STWLC04 device configuration is, however, not limited to these.

The following picture shows the GUI main screen. To access the parameters, power the STWLC04 either by placing it on a Tx or by providing an external 5-7 V through TVRECT.

Figure 5: STWLC04 easy configuration GUI settings



The wireless power receiver can operate in the following modes:

1. 5 V power supply
2. CC/CV battery charger



Never set 5 V supply mode with battery connected to the device output.

In 5 V power supply mode, the following parameters can be configured:

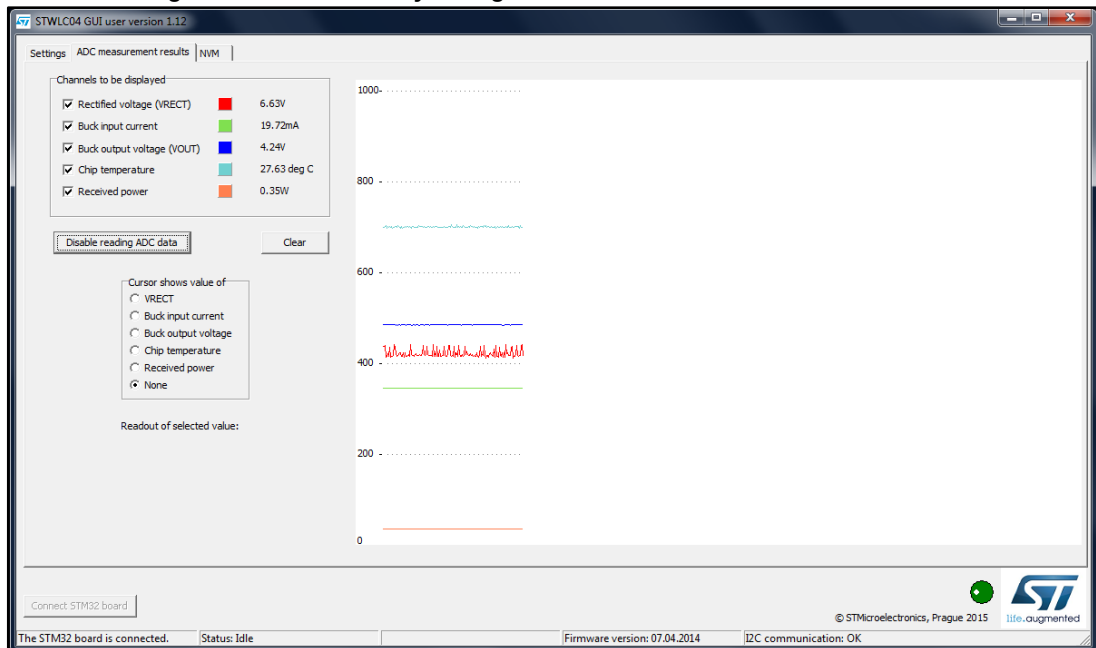
- charging current
- termination voltage
- termination current
- termination deglitch time

In charger mode, only the output current limit can be configured.

In each operation mode, the manufacturer code and device identifier can be set. The device also provides charge status information.

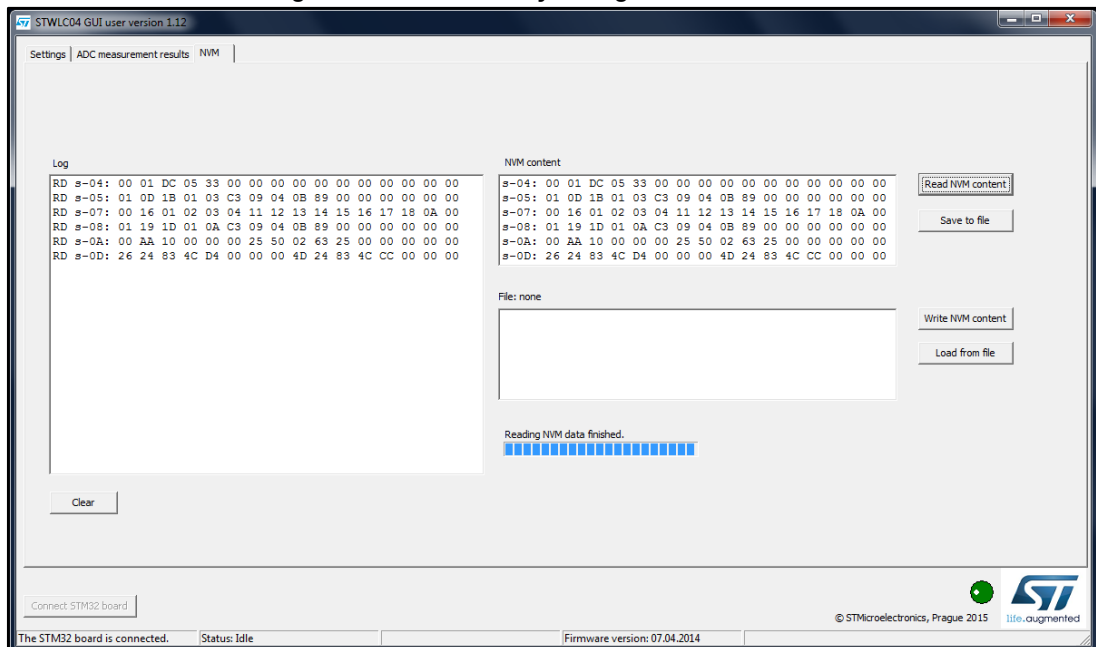
The “ADC measurement results” tab in the figure below shows internally measured values.

Figure 6: STWLC04 easy configuration GUI ADC measurement results



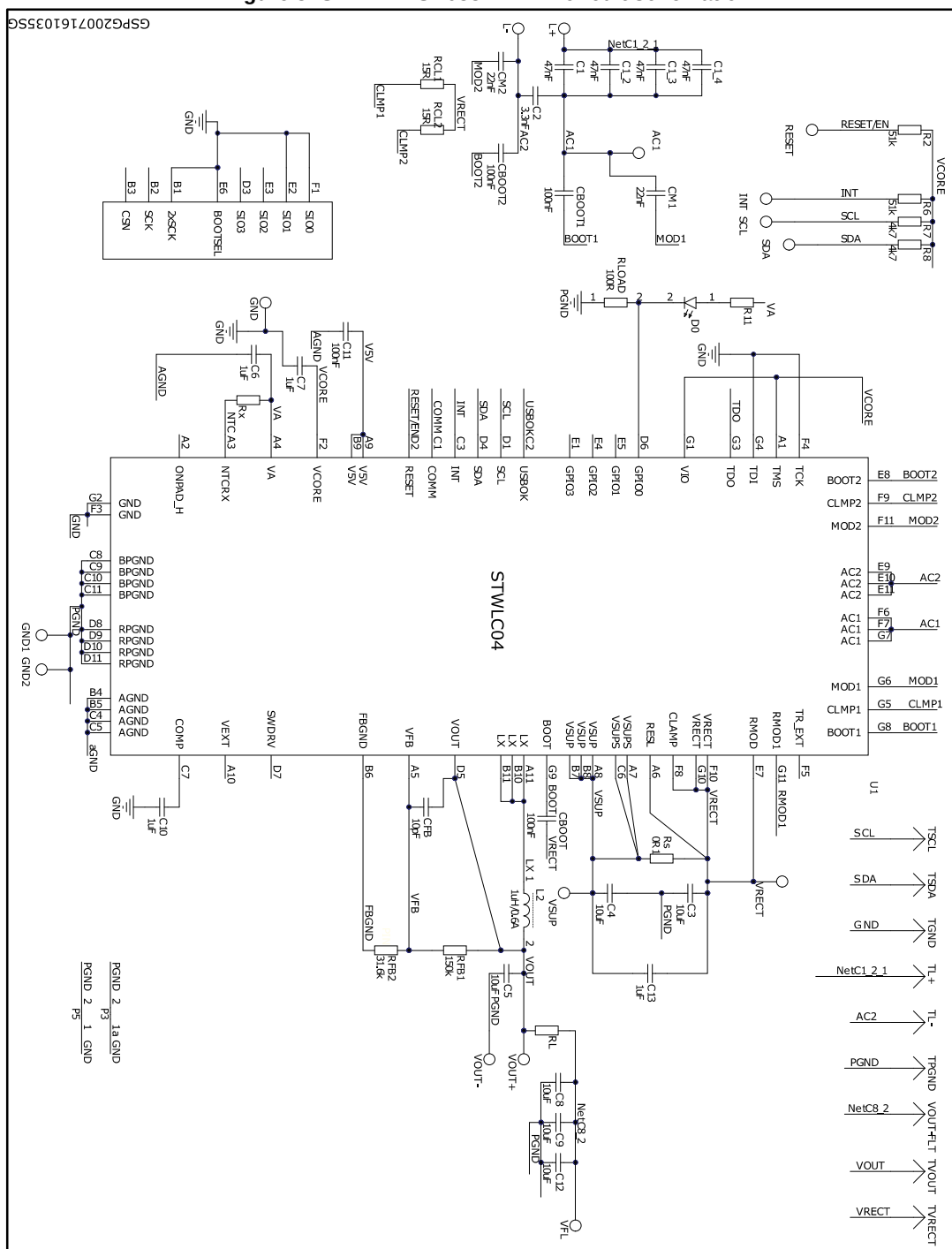
The “NVM” tab lets you download or update settings stored in the internal non-volatile memory.

Figure 7: STWLC04 easy configuration GUI NVM



3

Figure 8: STEVAL-ISB038V1R RX circuit schematic



4 Bill of materials

Table 2: STEVAL-ISB038V1R RX board bill of materials

Component	Manufacturer	Order code	Value	Size
L1	TDK	WR111118-36-F5-B1	18 μ H	11 x 1.4 mm
L2	TOKO	MFD160806-1R0	1 μ H/600 mA	0603
C1	MURATA	4x GRM155R61H473KE19	47 nF/X7R	0402
C2	MURATA	GRM155R71H332KA01	3.2 nF/C0G	0402
C3, C5	MURATA	GRM155R61A106ME11	10 μ F/10 V	0402
C4	MURATA	GRM155R61A105KE15D	1 μ F/10 V	0402
CBOOT1, CBOOT2, CBOOT, C11	MURATA	GRM033R61A104KE84D	100 nF/10 V	0201
C10	MURATA	GRM035R60J475ME15D	4.7/6.3 V	0201
C6, C7, C13	MURATA	GRM033R60J105MEA2D	1 μ F/6.3 V	0201
CM1	MURATA	GRM155R71H473KA12	47 nF/50 V	0402
CM2	MURATA	GRM155R71H472KA12	4.7 nF/50 V	0402
RCL1, RCL2	PANASONIC	ERJ-PA2J150X	15 R	0402
CFB	MURATA	GRM0335C1H150JA01	15 pF	0201
RS	PANASONIC	P.10AKCT	0.1 Ω /1%	0402
R1			51 k Ω	0201
RFB1	STACKPOLE	RGC0201DTD150K-ND	150 k Ω	0201
RFB2	TE-CONNECTIVITY	7-2176074-1	30.9 k Ω	0201
RNTC	MURATA		100 k Ω	0402
CCHG (filter)	MURATA	3x GRM155R61A106ME11	10 μ F/10 V	0402
LCHG (filter)	MURATA	LQB15NNR47J10D	470 nH	0402

6 Revision history

Table 3: Document revision history

Date	Version	Changes
05-Aug-2016	1	Initial release.

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