UM1454
User manual

STEVAL-IDZ3xxV1 demonstration kit for the SPZB32W1x2.x series of 802.15.4/ZigBee® radio communication modules

Introduction

The STEVAL-IDZ3xxV1 is a demonstration kit from the SPZB32W1x2.x series of 802.15.4/ZigBee® RF modules based on the STM32W108CB microcontroller that integrates a 32-bit ARM® Cortex™ M3 microprocessor and a 2.4 GHz, IEEE 802.15.4 radio. Accordingly, with the loaded protocol stack and application SW, the STM32W108CB microcontroller is suitable for different types of wireless network scenarios.

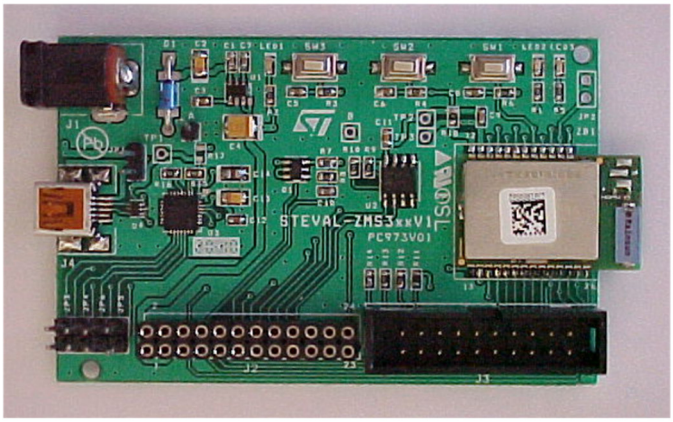
Each STEVAL-IDZ3xxV1 kit enables the user to test the RF module performances, the features of the protocol libraries defined for the microcontroller, and to prototype the target 802.15.4/ZigBee application. The kit includes a development board and a software library that can be integrated into the structure of the packages available from the ST website for the use of ZigBee PRO, Zigbee RF4CE and simplified MAC on the STM32W108CB microcontroller. The STEVAL-IDZ3xxV HW integrates an RF module belonging to the SPZB32W1x2.x series together with an extended number of external connectors that allow the integration of peripherals as requested by the target application.

The STEVAL-IDZ3xxV1 kit can be used for the following purposes.

- Demonstration: ZigBee PRO. By using the sensor/sink application example integrated in the kit and two development boards, the user can easily set up a demo showing a few of the basic features of the ZigBee protocol stack.
- Development: by using external equipment consisting of a development environment for the STM32W, the kit can be used to prototype and debug a target application.

This document describes the hardware and software components of the STEVAL-IDZ3xxV1 and provides instructions for setting up the hardware and loading and running the application examples. This document is not meant to be a ZigBee tutorial and assumes that the user is familiar with IAR development tools and the basic features of the STM32W108CB microprocessor.

Figure 1. STEVAL-IDZ301V1



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1 Kit parts

As specified in *Table 1*, several versions of the STEVAL-IDZ301V1 and STEVAL-IDZ302V1 are defined based on the SPZB32W1x2.x module type that is integrated.

Table 1. The STEVAL-IDZ3xxV1 versions

Order codes	Integrated module
STEVAL-IDZ301V1	SPZB32W1A2
STEVAL-IDZ302V1	SPZB32W1C2

The following abbreviations are used throughout this document.

Table 2. Abbreviations

Full name	Abbreviation
STEVAL-IDZ3xxV1	The kit
STEVAL-IDZ3xxV1 HW	STEVAL
STEVAL-IDZ3xxV1 SW	IDZ3LIB
Radio communication module	RCM
SPZB32W1xx	RCM
STM32W108CB	STM32W

The kit consists of the parts described in the following sections.

1.1 Hardware

Fully featured development board that targets the prototyping of network devices. External connectors allow to integrate the peripherals as desired. The board can be supplied by means of an external +5 V supply or through the integrated mini-USB connector.

STEVAL integrates the following:

- An RF module belonging to the series of ZigBee/802.15.4 SPZB32W1x2.x modules
- A 20-pin JTAG connector for programming and debugging purposes
- Hardware support for application development:
  - Temperature sensor
  - Voltage battery measure circuitry
  - Two configurable pushbuttons
  - Two configurable LEDs
- Mini-USB connector and USB-RS-232 bridge
- A reset pushbutton
- A DC power source selection between the external power supply or external USB supply

- Power indicator LED
- A jumper for boot activation
- Jumpers for serial communication setup (RS232 or mini-USB)
- 24-pin double-row header for access to the remaining STM32W GPIO signals and interfaces.

1.2 Software

The kit contains a software package including application samples and utilities for using the STEVAL.

1.3 CD

The kit includes a CD that contains the software and documentation for use of the kit. A datasheet, application notes, and user guides for use of STM32W, and an IAR tools suite can be found at the ST and IAR websites respectively.

1.4 External equipment

The following minimum external equipment is required to use the kit functions:

- A PC with Windows XP®
- A mini-USB cable to connect the board with the PC via the mini-USB interface
- The IAR toolset to debug and reprogram the STM32W micro
- An IAR J-Link or an ST-Link in-circuit debugger/programming
- The kit is compatible with the tools, IAR and Perytons supported by the STM32W-SK kit for STM32W108xx. See related documentation for details.

1.4.1 IAR toolset

The IAR embedded Workbench IDE for ARM is a very powerful integrated development environment used for developing and managing complete embedded application projects.

Note: For programming (and/or debugging) using the IAR toolset, an IAR J-Link JTAG emulator is required. The IAR J-LINK is a JTAG emulator designed for ARM cores. It connects via a USB port to a PC running Windows 2000 or XP. It has a built-in 20-pin JTAG connector, which is compatible with the standard 20-pin connector defined by ARM. When using the IAR J-Link, an external power supply is required to power the STEVAL board. The first time the IAR J-Link is plugged into the PC's USB port, the user is requested to provide the relative J-Link driver. To do this, browse to the IAR installation directory and select the folder ARM > Driver > J-Link. The IAR toolset and the IAR J-Link are not provided with the kit. For detailed information and documentation about IAR products, refer to www.iar.com. As an alternative, ST-Link can be used in place of the IAR J-Link emulator. ST-Link is a very low-cost, in-circuit debugger/programmer for STM32. It connects to the application or demonstration board for programming and debugging via a JTAG std connection. The complete ST-Link documentation is available from www.st.com.

1.5 HW and SW compatibility

The STEVAL-IDZ301V1 and STEVAL-IDZ302V1 have been successfully tested with the following libraries and ToolSuite versions:

EmberZnet package, versions 4.0.2. and 4.3.0

STM32W_flasher.1.1.0 available on the CD of the kit

Sink-Sensor example. Included in the kit

IAR version 5.41.2

CP2102 driver. Available at www.silabs.com and also included in the CD of the kit.

2 HW description

2.1 STEVAL description

Figure 2. STEVAL block diagram

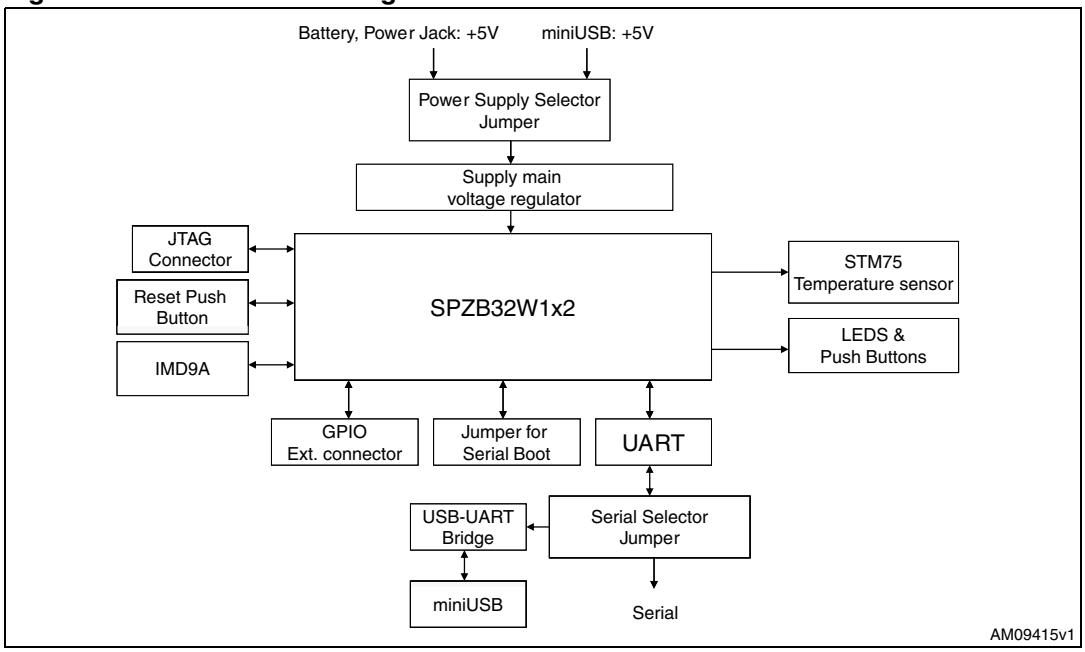
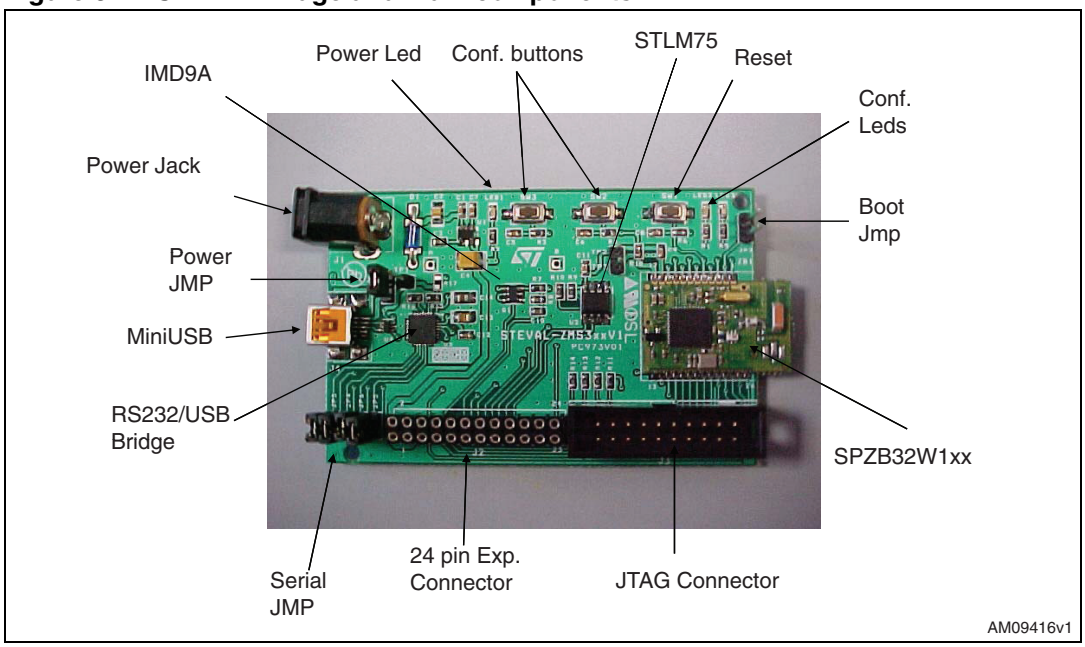


Figure 3. STEVAL image and main components



2.2 Recommended operating conditions

Table 3. Recommended operating conditions

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
J1- Ext.VIN	Main board supply voltage	-20 °C < T < 70 °C	4	5	6	V
J2- Ext.VIN	Alternate board (ext. battery) supply voltage	-10 °C < T < 60 °C	4	5	6	V
Tamb	Operating ambient temperature		-20		+70	°C

2.3 Board connections

Table 4. Board connections and configuration

Description		
J1	(2 poles)	Ext. VIN (typ. +5 V) external power supply plug
J2	1	Extension connector: +Vext. - Positive pole for an external +5 V supply (i.e battery). To be used as an alternative to J1. See *Section 2.5.9* for use of the JMP1
	2	Extension connector: GND - Negative pole for an external + 5 V supply (i.e. battery). To be used as an alternative to J1. See *Section 2.5.9* for use of the JMP1
	3	Extension connector: +3.3 V_O - (current limited 3.3 V output, max. 10 mA)
	4	Extension connector: GND - (system ground 0 Volt)
	5	Extension connector: PC5 - (STM32W108CB signal)
	6	Extension connector: PC1 - (STM32W108CB signal)
	7	Extension connector: PA7 - (STM32W108CB signal)
	8	Extension connector: PA6 - (STM32W108CB signal)
	9	Extension connector: PB6 - (STM32W108CB signal)
	10	Extension connector: PB7 - (STM32W108CB signal)
	11	Extension connector: PB5 - (STM32W108CB signal)
	12	Extension connector: PB0 - (STM32W108CB signal)
	13	Extension connector: PA5 - (STM32W108CB signal)
	14	Extension connector: PA4 - (STM32W108CB signal)
	15	Extension connector: PA3 - (STM32W108CB signal)
	16	Extension connector: PA0 - (STM32W108CB signal)
	17	Extension connector: PA1 (I^2Cbus SDA) - (STM32W108CB signal)
	18	Extension connector: PA2 (I^2Cbus SCL) - (STM32W108CB signal)
	19	Extension connector: PC0/JTRST - (STM32W108CB signal)
	20	Extension connector: PC3/JTDI - (STM32W108CB signal)
	21	Extension connector: PC4/JTMS - (STM32W108CB signal)
	22	Extension connector: SWCLK/JTCK - (STM32W108CB signal)
	23	Extension connector: PC2/JTDO - (STM32W108CB signal)
	24	Extension connector: nRESET - (STM32W108CB signal)
J3	1	JTAG connector +3.3 V supply output (warning: current limited, max. 10 mA)
	2	JTAG connector +3.3 V supply output (warning: current limited, max. 10 mA)
	3	JTAG connector - JTRST
	4	JTAG connector - GND (system ground 0 V)
	5	JTAG connector - JTDI
	6	JTAG connector - GND (system ground 0 V)

Table 4. Board connections and configuration (continued)

Description		
J3	7	JTAG connector - JTMS
	8	JTAG connector - GND (system ground 0 V)
	9	JTAG connector - JTCK
	10	JTAG connector - GND (system ground 0 V)
	11	JTAG connector - (R6 - 10 kΩ pull-down connection)
	12	JTAG connector - GND (system ground 0 V)
	13	JTAG connector - JTDO
	14	JTAG connector - GND (system ground 0 V)
	15	JTAG connector - nRESET
	16	JTAG connector - GND (system ground 0 V)
	17	JTAG connector - (R7 - 10 kΩ pull-down connection)
	18	JTAG connector - GND (system ground 0 V)
	19	JTAG connector - (R8 -10 kΩ pull-down connection)
	20	JTAG connector - GND (system ground 0 V)
J4	1	Mini-USB-RS232 bridge connector: USB_VCC - (+5 V USB power supply)
	2	Mini-USB-RS232 bridge connector: USB_D- - (USB DATA- signal)
	3	Mini-USB-RS232 bridge connector: USB_D+ - (USB DATA+ signal)
	4	Not connected
	5	Mini-USB-RS232 bridge connector: USB_GND - (USB GND)
JP1	Jumper	Configurable power jumper. See *Section 2.5.10* for configuration cases
JP2	Jumper	Configurable boot jumper. See *Section 2.5.11* for configuration cases
JP3	Jumper	Configurable serial jumper. RTS pin on the Zigbee module. See *Section 2.5.10* for configuration cases
JP4	Jumper	Configurable serial jumper. CTS pin on the Zigbee module. See *Section 2.5.10* for configuration cases
JP5	Jumper	Configurable serial jumper. RX pin on the Zigbee module. See *Section 2.5.10* for configuration cases
JP6	Jumper	Configurable serial jumper. TX pin on the Zigbee module. See *Section 2.5.10* for configuration cases
SW1	Pushbutton	nRESET - pushbutton acting on the STM32W108CB reset pin
SW2	Pushbutton	FW configurable pushbutton - this pushbutton acts on the STM32W108CB “PB6” pin
SW3	Pushbutton	FW configurable pushbutton - this pushbutton acts on the STM32W108CB “PB0” pin
LED1	Green	LED showing the presence of the 3.3 V board internal voltage
LED2	Yellow	User configurable LED showing status of PA7 internal signal - (supplied by +3.3 V board voltage)
LED3	Red	User configurable LED showing status of PB7 internal signal - (supplied by +3.3 V board voltage)

2.4 STEVAL layout

Figure 4. STEVAL layout

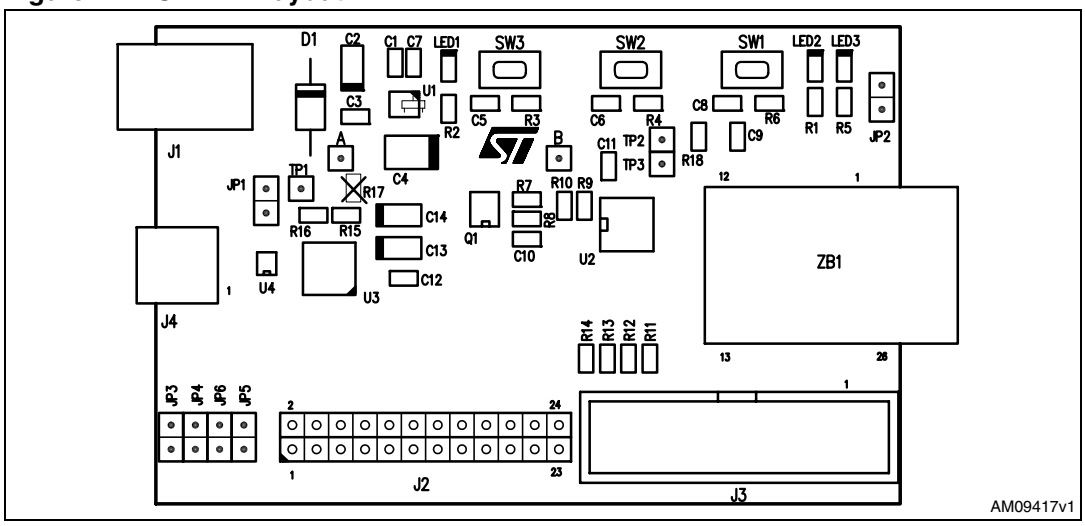
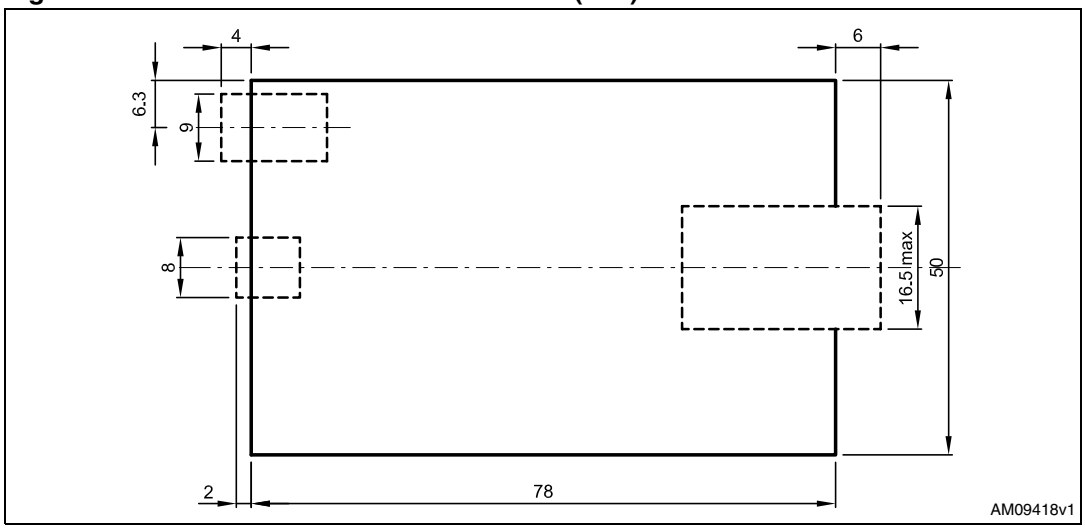


Figure 5. STEVAL mechanical dimensions (mm)



2.5 HW general features

2.5.1 I/O signal voltage configuration

Table 5. STEVAL interfaces maximum voltage configuration

Connector	Pin	Range values	Description
J2 extension connector	Pin 1	Max. 6 V external power supply voltage (may be used also as supply input if selected by user using the proper jumper positioning).	This pin is totally user settable (pay attention to avoid power supply conflicts).
	Pin 2	0 V interface	GND - system ground (0 V)
	Pin 3	3.3 V output board power supply (10 mA maximum current available).	Take care when used to supply external circuits
	Pin 4	0 V interface	GND - system ground (0 V)
	Pin 5 to 24	Max. 3.3 V interface voltage	All the system logic signals and I/O signals must be interfaced by a maximum 3.3 V level voltage
J3 emulator connector	Pin 1,2	Max. 3.3 V interface voltage	Supply and enable for the external emulator (pay attention to avoid power supply conflicts).
	Pin 4,6,8,10,12, 14,16,18,20	0 V interface	GND - system ground (0 V)
	Pin 3,5,7,9,13,15	Max. 3.3 V interface voltage	All the emulator interface logic signals must be interfaced by a maximum 3.3 V level voltage
	Pin 11,17,19	10 kΩ pull-down interface	10 kΩ resistor connected to GND internally on the board

2.5.2 Reset

STEVAL integrates a reset pushbutton that generates a reset pulse for the STM32W. The reset signal can also be externally generated via pin 24 of the J2 connector.

2.5.3 Configurable button

STEVAL integrates two SW-configurable pushbuttons that are connected to the PB6 and PB0 pins of the STM32W micro.

2.5.4 Voltage battery meter

STEVAL allows to measure the residual voltage available when an external battery is used. The function is enabled through the SW and is derived by means of an IMD9A component whose output is connected to one of the analog ports of the STM32W micro.

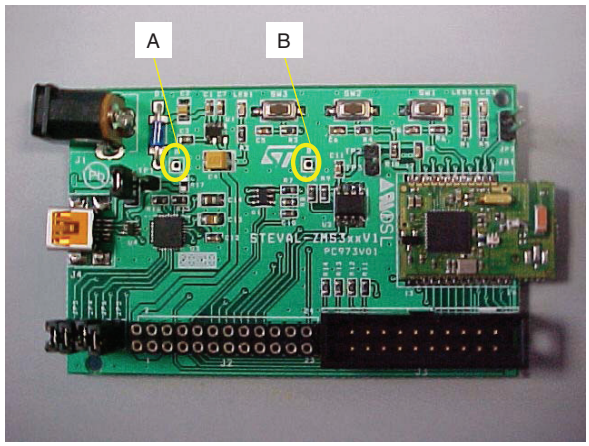
2.5.5 Temperature sensor

An STM-STTS75 CMOS digital temperature sensor is integrated in STEVAL. The sensor presents an accuracy of +/- 2 °C in the -25 °C to +70 °C range. Refer to the relevant datasheet available at http://www.st.com for detailed specifications of the device.

2.5.6 Ground points

The A and B ground points shown in *Figure 6* facilitate the stacking of a daughterboard.

Figure 6. Ground points for daughterboard connection



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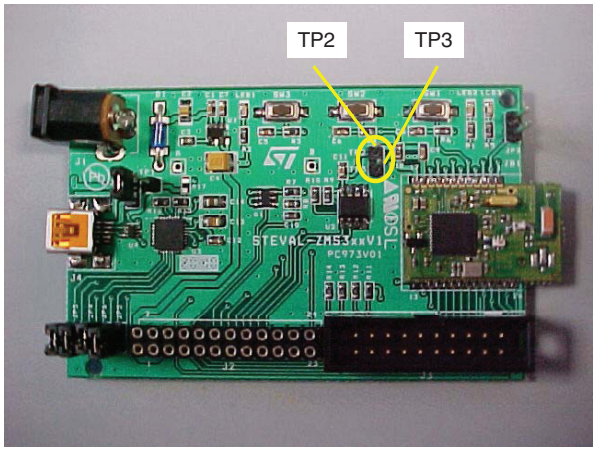
2.5.7 Test points

The test points shown in *Figure 7* can be optionally used to measure the RCM power consumption. To use them, the user needs to unsolder the 0 Ω R18 resistor that is, by default, integrated in the STEVAL.

Figure 7. Test points for RCM power measuring



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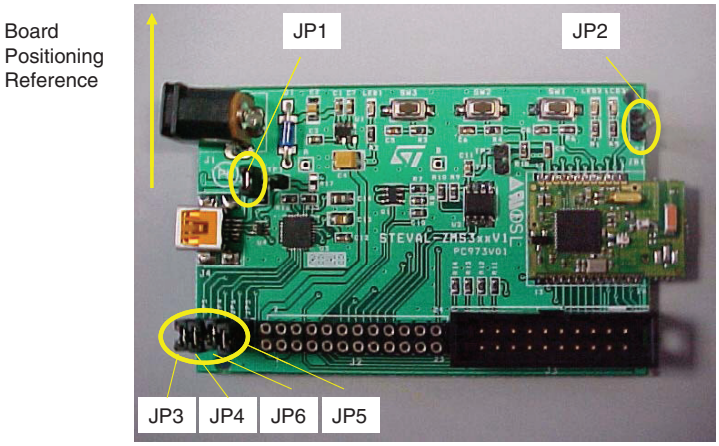
2.5.8 Setting up STEVAL

Figure 8. Jumper positioning



2.5.9 Powering setup

STEVAL can be supplied with a standard DC 5 V external power supply via the Jack J1 connector, or via the mini-USB connector, or by connecting an external supply to pin1 of the J2 connector.

The jumper JP1 is used to select the power source supply.

Warning: The user is recommended to use only one power source supply at a time and in particular to remove any other supplier when the mini-USB is selected with JP1.

Figure 9 and *10* show how the J1 jumper must be configured in the different cases.

Figure 9. External power supply JP conf.

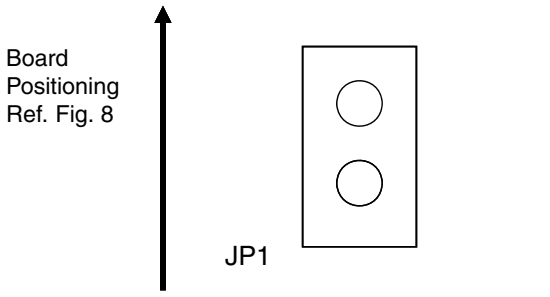
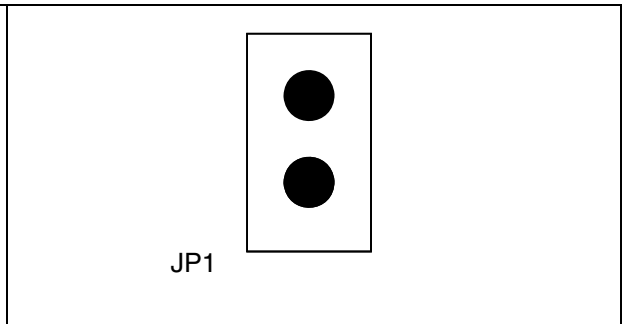


Figure 10. Mini-USB power supply JP conf.



2.5.10 Serial communication interface setup

STEVAL can be connected via the mini-USB or via an RS-232 based connection. The jumpers JP3, JP4, JP5, and JP6 are used to select which serial interface to use, as shown in *Figure 11* and *12*.

When jumpers are configured for using the RS-232, the following RS-232 signal configuration is available (Zigbee module side).

JP3 --> RTS

JP4 --> CTS

JP5 --> RX

JP6 --> TX

Figure 11. Mini-USB connection JP conf.

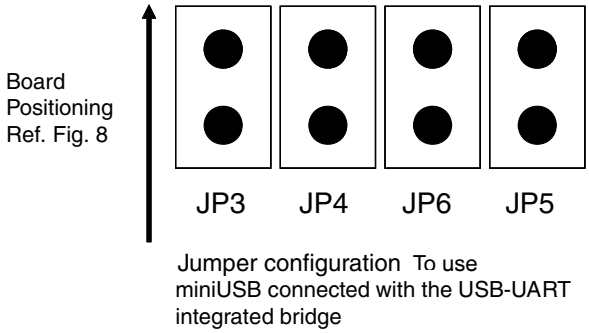
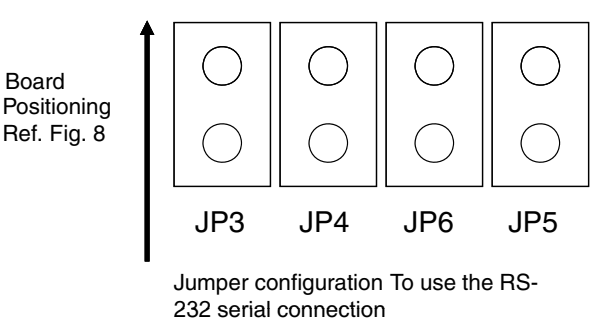


Figure 12. RS-232 connection JP conf.



2.5.11 Boot mode setup

It is possible to boot the STM32W via the serial connection by configuring the JP2 jumper as shown in *Figure 13* and *14*. The Flasher utility integrated in the kit is used to run the boot function, as explained in *Section 2.6.6* of this manual.

Figure 13. Boot JP conf.

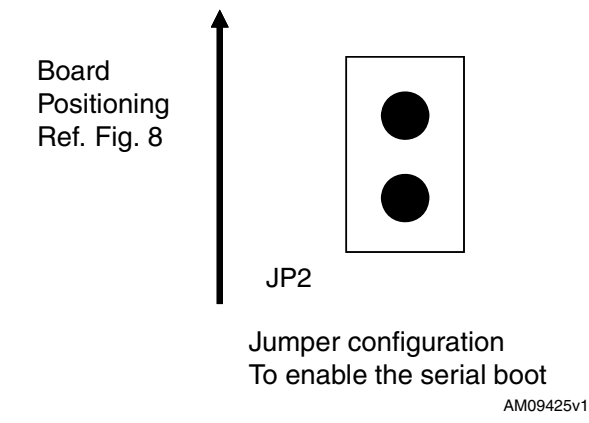
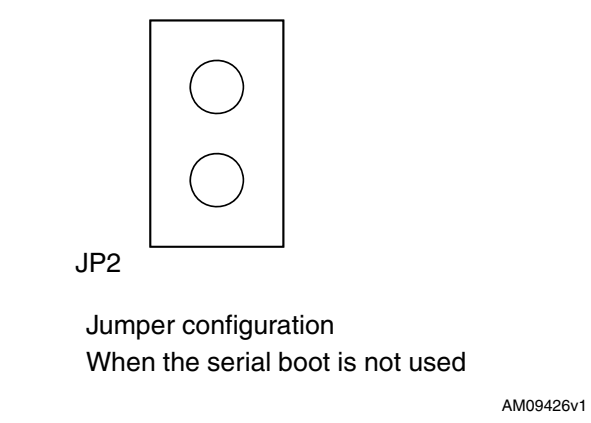


Figure 14. Disabled boot JP conf.



2.6 Getting started with the kit

2.6.1 Installing the IDZ3LIB library

The protocol packages libraries defined for use of the STM32W micro with the STM32W-SW kit can be also used with the STEVAL-IDZ3xxV1. Customized files and utilities are provided in the IDZ3LIB to allow the use of a STEVAL board in place of the MB851/MB850 boards on which the STM32W-SK kit is based. The content of the IDZ3LIB can be integrated into the STM32W protocol packages as described below.

2.6.2 IDZ3LIB content

Copy the file IDZ3LIB.zip contained in the CD in a folder of the PC and unzip it. In the following the installation folder is indicated as $IDZ3PATH. The library contains:

pro/idz3lib which contains a customization of the sensor-sink application for version 4.0.2 and 4.3.0 of the EmberZNet protocol stack library

- prebuilt contains binary files
- sensor contains source files and an IAR project tailored to this application

HAL contains the hardware configuration files for STEVAL

documentation/idz3lib contains documents related to the kit and the SPZB32W1x2.x series of modules

tools/idz3lib contains

- flasher utility to be used with STEVAL for loading a bin file on the STM32W
- CP2102 contains a driver and a configuration tool for use of the CP2102 USB bridge device
- batch files for installation of idz3lib in the package EmberZnet 4.0.2 or EmberZnet 4.3.0, as detailed in the following paragraphs.

2.6.3 Integration of IDZ3LIB in EmberZnet 4.0.2

Install the EmberZnet 4.0.2 package available from ST. The package is installed in C:\Program Files\STMicroelectronics\EmberZnet-4.0.2

Run the batch file “set IDZ3LIB v402.bat” in $IDZ3PATH --> tools --> idz3lib.

The batch file integrates the files contained in IDZ3LIB in the structure of EmberZNet 4.0.2.

2.6.4 Integration of IDZ3LIB in EmberZnet 4.3.0 package library

Install the EmberZnet 4.3.0 package available from ST. The package is installed in C:\Program Files\STMicroelectronics\EmberZnet-4.3.0

Run the batch file “set IDZ3LIB v430.bat” in $IDZ3PATH --> tools --> idz3lib.

The batch file integrates the files contained in IDZ3LIB in the structure of EmberZNet 4.3.0.

2.6.5 Install the CP2102 drivers

The following steps are needed to install the driver for use of the USB-UART bridge CP2102 on your PC.

Note: The driver can be found on the silicon labs web page at www.silabs.com, and a copy is also included in the IDZ3LIB.

Unzip the file CP210x_VCP_Win2K_XP_S2K3.zip

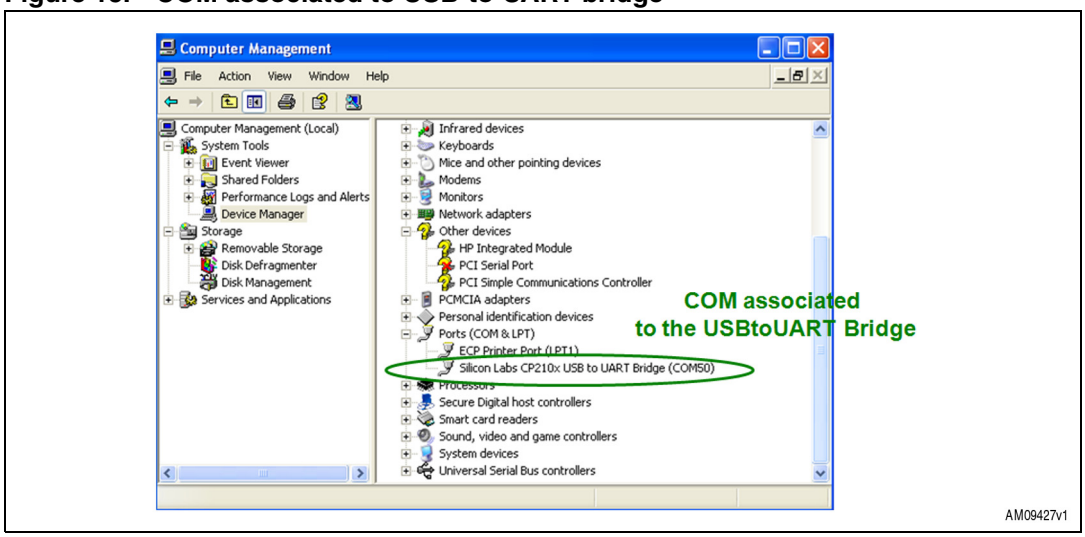
Double click on CP210x_VCP_Win2K_XP_S2K3.exe to install the driver

Connect the STEVAL by inserting the USB connector in one of the USB slots of the PC.

To use the USB-to-UART bridge, the jumpers JP3, JP4, JP5, and JP6 must be configured as shown in *Figure 11*. When the driver is correctly installed, it is possible to see the COM associated to the STEVAL listed in the “Ports” field of the computer management utility of the PC (see *Figure 15*).

If you want to connect multiple STEVALs to the PC via the USB-to-UART bridge, it is necessary to appropriately reprogram the ID associated to the CP2102 component. A tool from silicon labs can be used for this operation. That tool and related documentation is also available (an144sw.zip) in the IDZ3LIB.

Figure 15. COM associated to USB-to-UART bridge

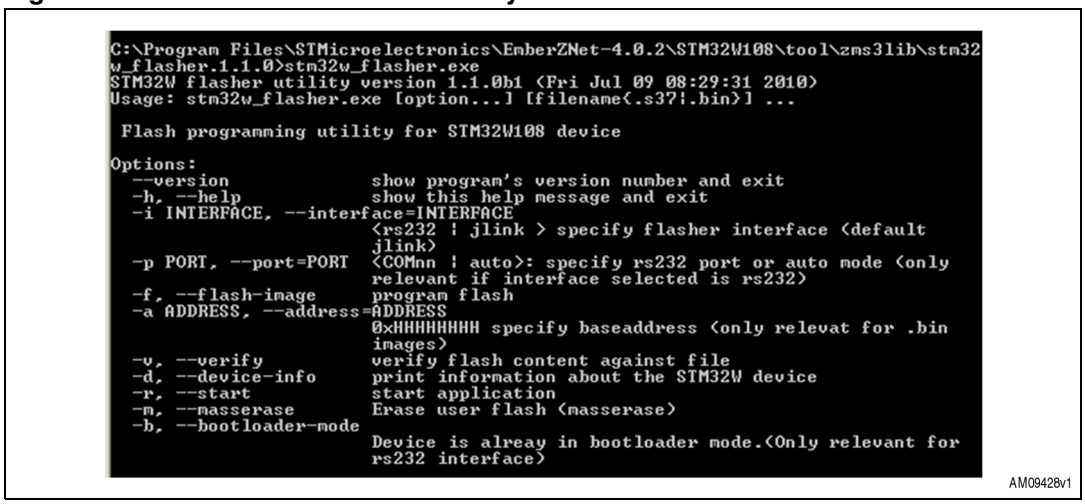


2.6.6 Install and run the Flash loader demonstrator tool

STM32W Flasher, is a useful utility for loading the bin files on the STEVAL via the USB connector.

Running stm32w_flasher.exe without arguments shows all the available command options, as shown in *Figure 16*.

Figure 16. stm32w-flasher command syntax



Also refer to the batch file contained in tools/idz3lib for the syntax of the command to be used to run the flasher.

Remember to configure the options in the batch file by specifying the correct file name to be uploaded and the COM port to be used.

3 Install and run the sink-sensor application

The sink-sensor application included in the IDZ3LIB is provided to allow the STEVAL user to easily set up a ZigBee network by using the hardware included in the kit. The sink-sensor is derived from the homonymous application included in the EmberZnet package libraries and shows the basic features of a distributed sensor network for remote monitoring.

The sink-sensor application requires the use of at least two different STEVALs (or other compatible hardware), respectively running sink and sensor applications in the same network.

3.1 Sink-sensor sample application

The sensor-sink application is an example of a complete application that implements a distributed sensor network with one or more data collection points (called “sensors”) and one data storage point (called “sink”). This application uses a “push” style of communication, where the sensor periodically sends reports to the sink without needing to be asked for this data.

In this specific case, sensors capture temperature data measured by the sensor that is integrated in the STEVAL and sends that data to a sink that is connected to a PC. Data collected by the sink are then available at serial ports associated to the STEVAL when it is connected to a PC and they can be used by every kind of application running on it.

The sink node is also set up to be the ZigBee coordinator device, and it forms the network automatically on first startup, therefore retaining these settings across reboots. The sink sends out advertisements (SINK_ADVERTISE) at regular intervals using a multicast (after making a many-to-one route request). If the joining procedure is activated by pushing a button on the board, a not joined sensor hearing a SINK_ADVERTISE sends a message (SENSOR_SELECT_SINK) requesting to use that sink (after setting its address table entry to the sink). If the sink has a free address table entry it responds with a sink ready message (SINK_READY) and, at that point, the sensor is free to send data (DATA) to the sink at fixed intervals (as set by SEND_DATA_RATE).

The sink sensor communication is set with the following network parameters:

CHANNEL - 26

PANID 0x01ff

APP_EXTENDED_PANID {'s','e','n','s','o','r',0,0}.

The payload of the packet sent by the sensor is 12 bytes long and it includes:

8 bytes corresponding to the 64-bit address of the sender

2 bytes corresponding to the temperature values as captured by the sensor integrated in the STEVAL

2 bytes corresponding to the voltage level as measured on the voltage meter integrated in the STEVAL.

The sensor-sink application allows the user to interact with STEVAL by sending commands through a serial port (the COM associated to STEVAL when connected to the PC). Refer to the sink and sensor source files for the list of supported commands and implementation.

3.2 Load sink-sensor on the STEVAL

The kit includes the “bin” images of the sink-sensor application that can be loaded onto the STEVAL by using the Flasher downloader tool. The following steps should be followed.

Configure the jumpers JP3, JP4, JP5 and JP6 as in *Figure 11* for use of USB-UART bridge

Configure the jumpers JP2 as in *Figure 13* to activate the boot signal

Plug the STEVAL into one of the USB slots on the PC and identify the serial port associated to the STEVAL (by using the Computer Management Utility of the PC) (See *Figure 15*). The power-LED (LED1) goes on to indicate the STEVAL is powered via the USB

Run the Flasher as described in *Section 2.6.6* by using the batch file where the user has specified the COM port to use and the sink.bin or sensor.bin (from C:\Program Files\STMicroelectronics\EmberZNet-4.x.x\STM32W108\app\idz3lib\prebuilt\sensor) file as per user needs

Unplug the STEVAL and configure the jumper JP2 as in *Figure 14* to use the loaded application.

Note: The previous step can be followed to load any other “bin” images on the STEVAL.

3.3 Setting-up a network and running the sink-sensor application

This section describes how to use the STEVAL to run the sink-sensor application. Refer to the source code files for details on the implementation and use of the EmberZnet APIs.

The sensor-sink application can be run once the user has successfully loaded the sensor and sink applications as described in *Section 3.2* on two different STEVAL boards

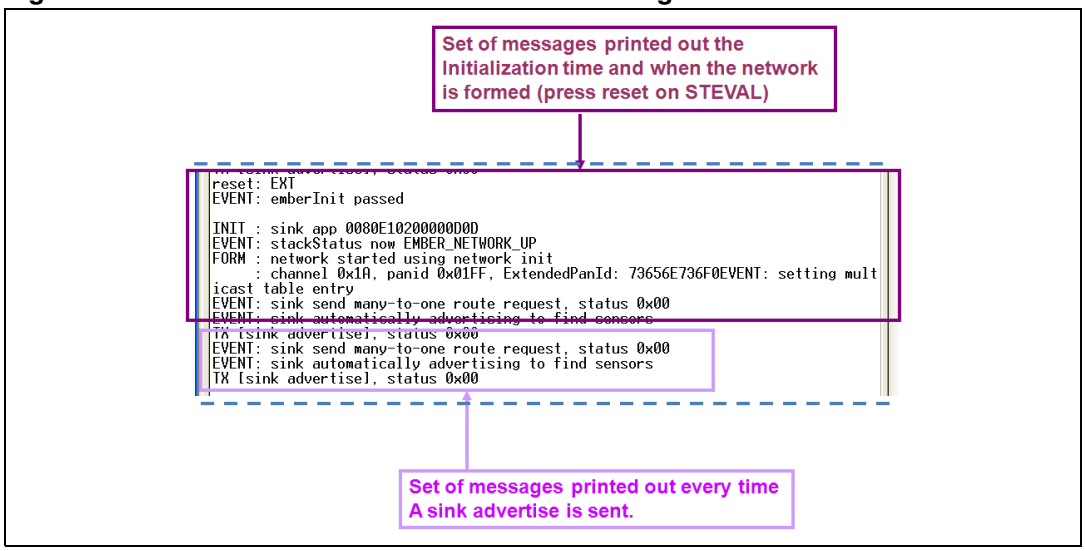
Verify that jumper JP2 is configured as represented in *Figure 14*

In the procedure described below, the choice made was to connect both sensor and sink to a PC via the mini-USB connector. That allows to monitor the serial messages of both the sensor and the sink by using the HyperTerminal utility on your PC

Connect sink. Verify JP3-4-5-6 are as in *Figure 11* and connect STEVAL-sink to one of the USB slots of the PC. LED2 and LED3 start toggling which indicates the sink has appropriately formed the network as coordinator

Open a HyperTerminal by specifying the COM associated to STEVAL-sink (see *Figure 15*) and by using the configuration 115200-8-NONE-1-NONE. The serial messages are seen, as shown in *Figure 17*. Press the reset button on STEVAL to make the sink application start from the beginning. The init, form and sink advertise messages are shown in *Figure 17*.

Figure 17. Sink advertise and form network messages



Connect sensor. Verify JP3-4-5-6 are as in *Figure 11* and connect STEVAL-sensor via the mini-USB to the PC. You see LED3 'on'

Open a HyperTerminal by specifying the COM associated to STEVAL-sensor (see *Figure 15*) and by using the configuration 115200-8-NONE-1-NONE

To allow the sensor to join the network set up by the STEVAL-sink, press the SW3 button on STEVAL-sink and the SW3 button on STEVAL-sensor in an interval shorter than 60 seconds. If this join operation sequence runs successfully the LED2 and LED3 on the STEVAL-sensor start toggling

Figure 18 and *19* respectively show the serial messages of sink and sensor respectively during the join phase. After the network is set up, the sensor sends a data packet every 10 seconds that contains the temperature value, the power supply voltage and the node ID, as also shown in the same figures.

Figure 18. Sink: join and data messages

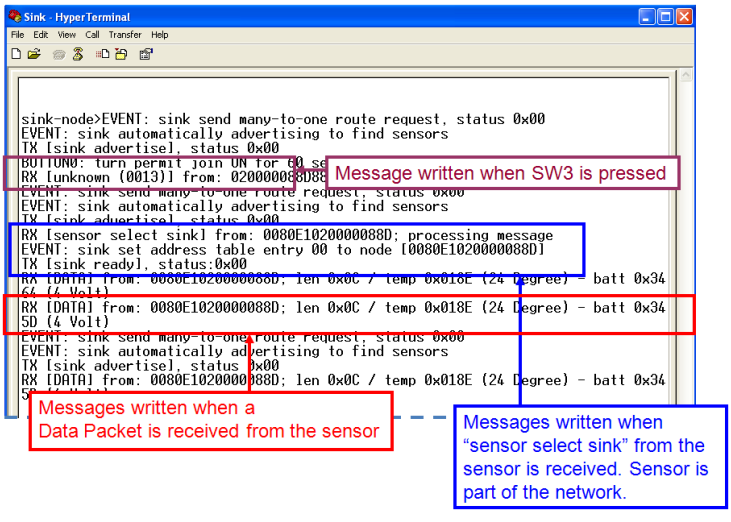
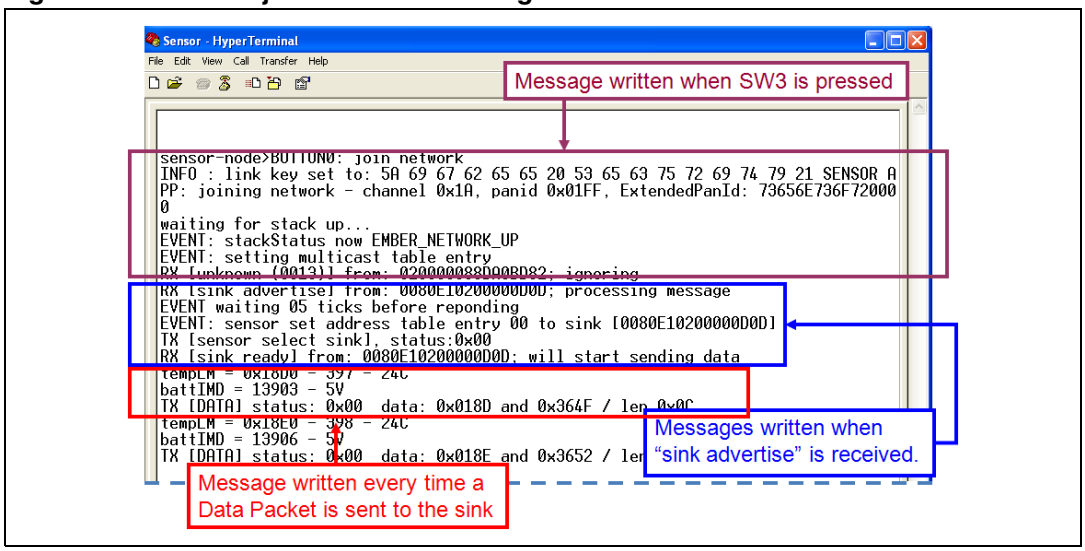
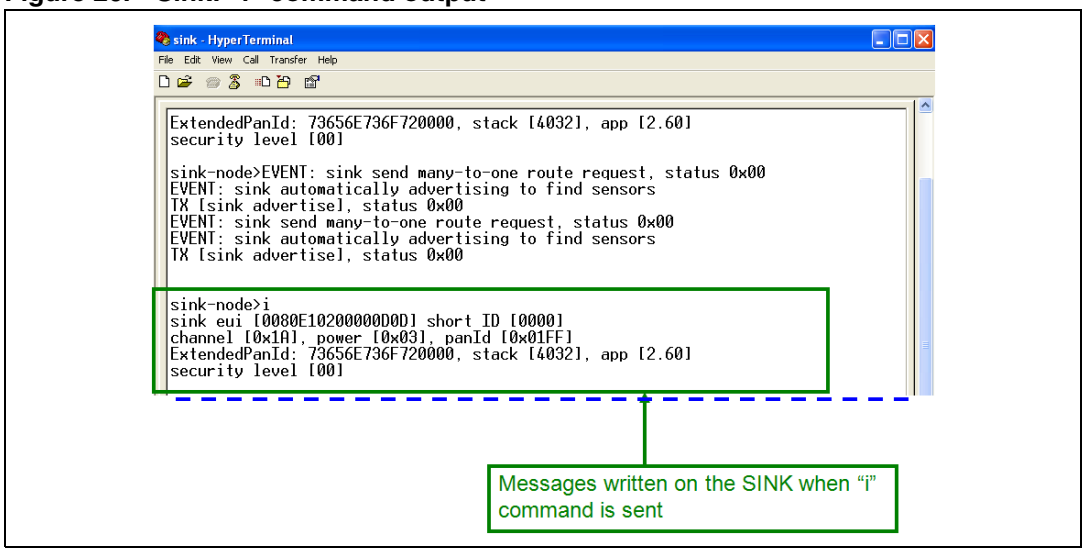


Figure 19. Sensor: join and data messages



Commands can be sent through the HyperTerminal to both the STEVAL-sink and the STEVAL-sensor. For example, in *Figure 20* the result of the command "i=print node info" sent to STEVAL-sink can be seen.

Figure 20. Sink: "i" command output



Note: The application uses a constant called MISS_PACKET_TOLERANCE as a threshold for fault tolerance. On the sensor, this threshold controls how many message timeouts can be permitted between the sensor and sink before the sensor decides to attach itself to a different sink.

For a sink, this controls how many data reports can be missed from a sensor before the sink "forgets" about the sensor (stops maintaining a record of its attachment). Although bindings are kept on the sink node to track the attached sensors, these could easily be made temporary (used only for the SINK_READY message) to allow the sink application to support more nodes without enlarging the binding table, assuming that the sink application does not care which sensors and how many sensors are attached to it.

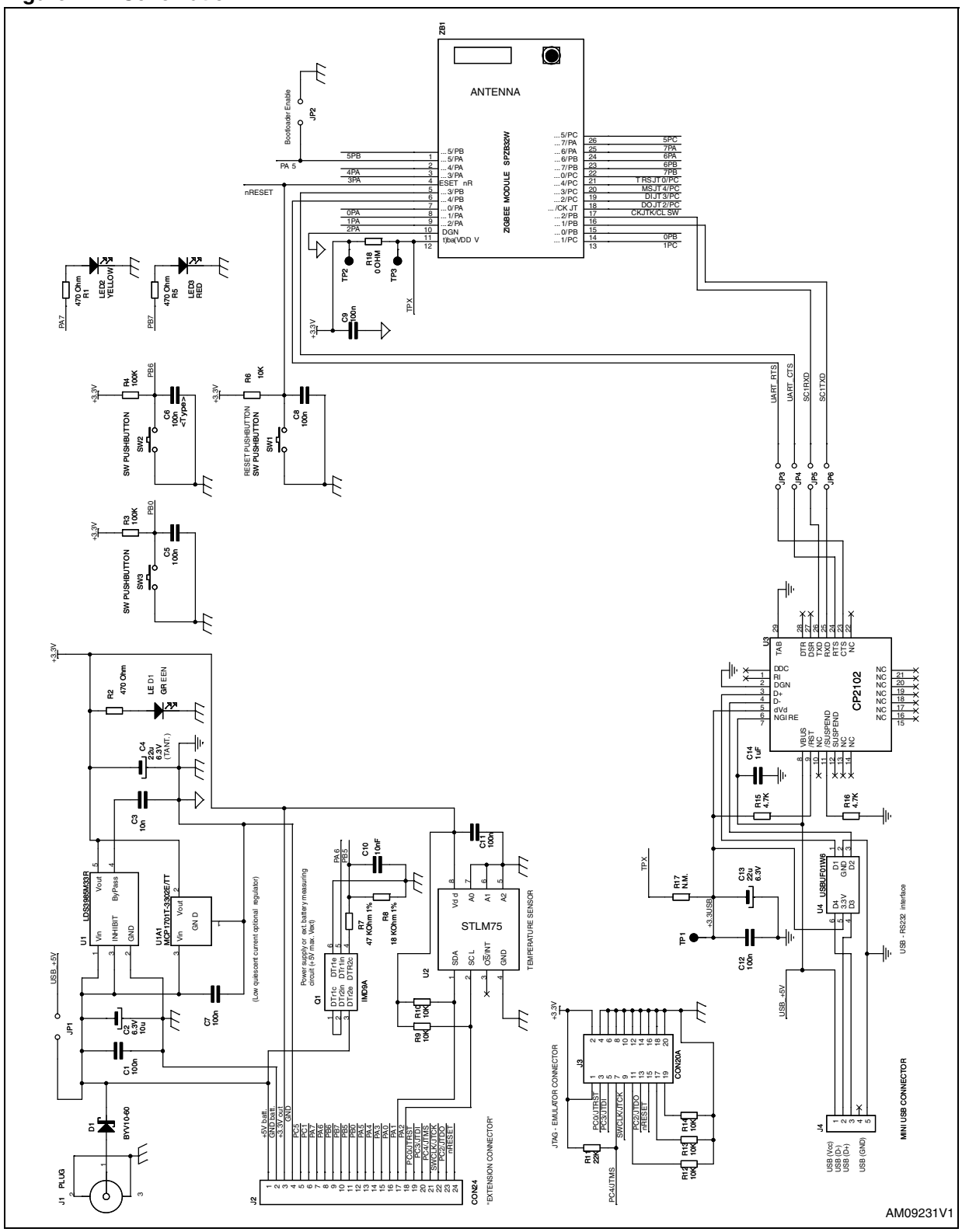
Note: The sensor advertisement is a broadcast. The behavior of such a broadcast in the network depends on the network topology and density. ZigBee limits the number of broadcasts that can be active in a network to 10 to minimize the network disruption and loss of bandwidth. As this network increases in size or density, the rate of the sensor advertisement should be reduced in frequency.

4 RoHS compliance

ST modules and demonstration boards are RoHS compliant and comply with ECOPACK® norms.

Appendix A STEVAL electrical schematic

Figure 21. Schematic



Revision history

Table 6. Document revision history

Date	Revision	Changes
29-Nov-2011	1	Initial release.
12-Dec-2011	2	Minor text changes to improve readability

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