



Instruction

UZB User Manual

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1 ABBREVIATIONS

Abbreviation	Explanation
LED	Light Emitting Diode
OTP	One Time Programmable
PC	Personal Computer
PCB	Printed Circuit Board
PCBA	PCB Assembly
RF	Radio Frequency
SPI	Serial Peripheral Interface
USB	Universal Serial Bus www.usb.org

2 INTRODUCTION

2.1 Purpose

The Z-Wave USB Adapter [1], UZB, exports the Z-Wave Serial API, compliant to ZDK 6.02 and above, through a USB CDC/ACM compliant connection over a USB A plug. A PC running the Z-Wave PC Controller software can control a Z-Wave Home Area Network through it. It is currently available for the US & EU frequencies only.

This document describes the hardware and software features of this reference design.

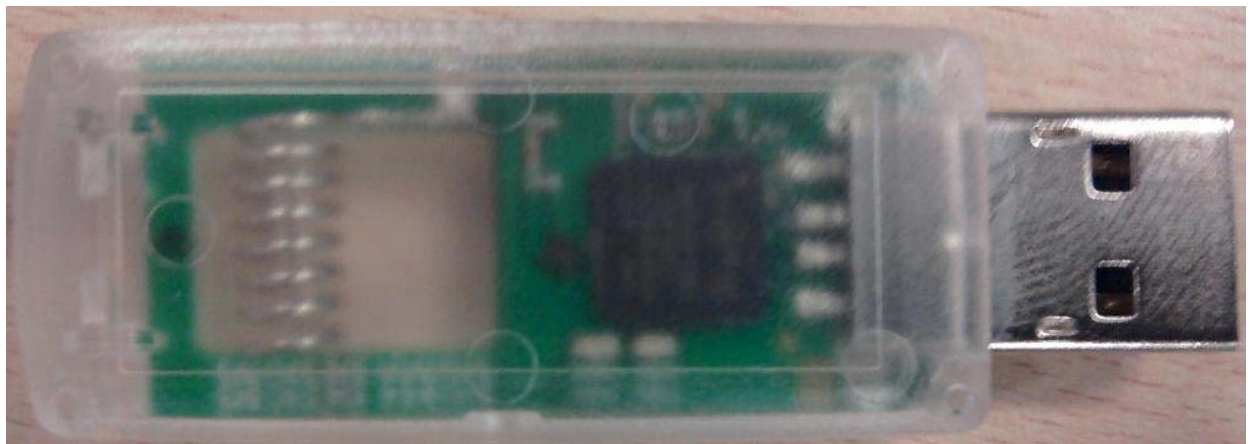


Figure 1: Enclosed top view

2.2 Audience and prerequisites

Z-Wave partners.

3 HARDWARE

The USB is a relatively simple 4-Layer PCB design as shown in the block diagram below. There are older versions using ZM4101 instead of SD3402 but the functionality remains the same.

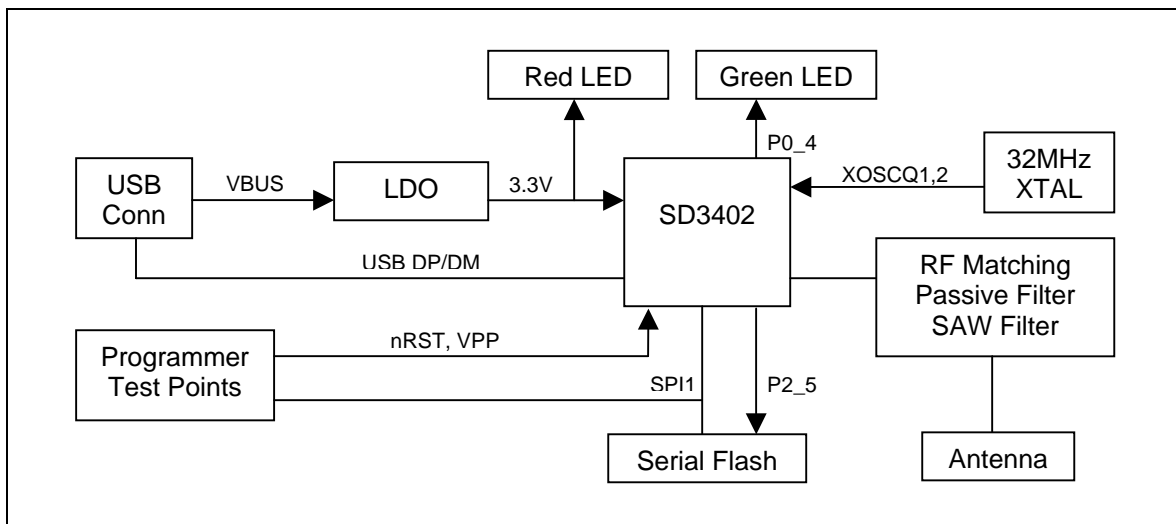


Figure 2: Block Diagram

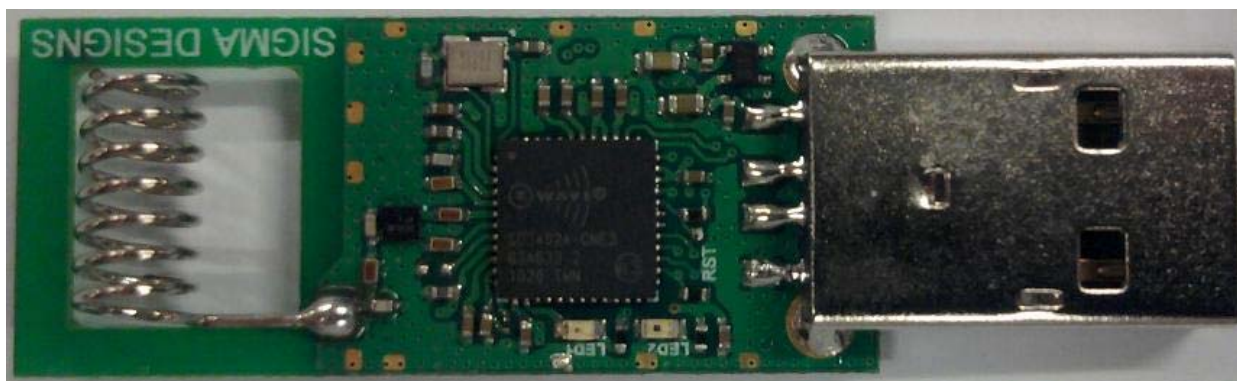


Figure 3: PCBA view

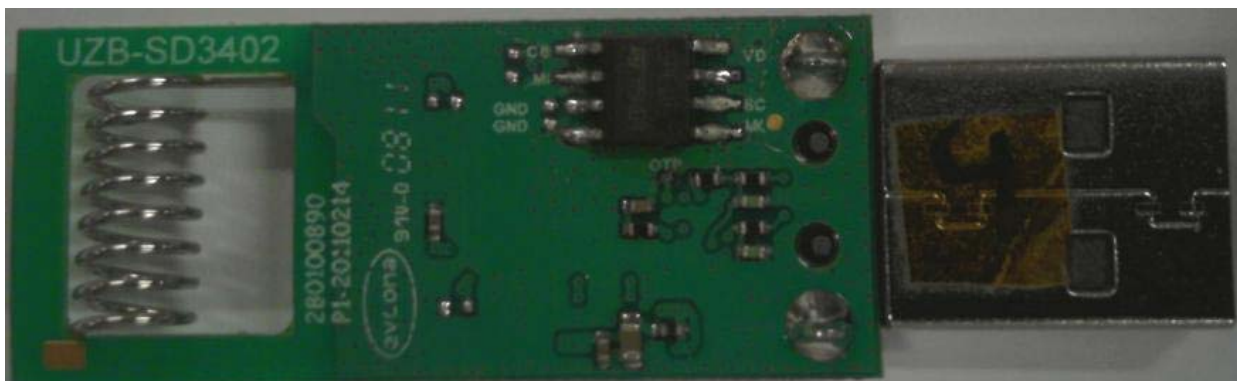


Figure 4: PCBA view

3.1 Specific Components

Some components which have specific designs purposes are described below.

Table 1: Components

Component	Purpose
LDO	Step down 5V to 3.3V for SD3402 MCU
Red LED	USB Power indicator (on when powered)
Green LED	Firmware Serial API state machine indicator (blinks on activity) P0_4 is used to drive the LED.
Serial Flash	For Serial API Controller firmware's node & routing information storage. P2_5 is used as the chip select, and SPI1 is used to communicate with it.

3.2 Programming Test Points

The programmer test points are strictly for internal use only (for product evaluation and testing). The SD3402's OTP is programmed prior to assembly. Refer to "*Appendix A Programming Test Points*" for more information regarding the location of the test points.

3.3 RF

Different SAW, matching components and Helix dimensions are used for different regions.

3.3.1 Matching and SAW Filter

A Pi Low pass filter is incorporated to match the impedance of Helix Antenna; as well as reducing emission of high frequency noise, if any.

The use of SAW filter is optional but highly recommended to achieve optimal RF performance. The SAW filters tested and approved are

3.3.2 Antenna

A helix antenna is used to achieve a relatively compact size and cost.

3.3.3 Specification

Table 2: RF Specifications

RF	Description		
Typical RF receiver sensitivity	EU: 9.6kbps: -97dBm US: 9.6kbps: -97dBm	EU: 40kbps: -95dBm US: 40kbps: -95dBm	EU: 100kbps: -88dBm US: 100kbps: -88dBm
RF Output Power	EU: +1.5dBm US: +1.5dBm		
Range (typical)	Indoor >30 meters line of sight, in unobstructed environment. Outdoor > 100 meters line of sight		

3.4 Electrical Specification

The “Absolute Maximum Ratings” specifies the conditions in which the UZB is guaranteed not to be damaged but correct operations are not guaranteed.

Table 3: Absolute Maximum Ratings

Electrical	Value
Operating Temperature	0 – 60°C (TBC)
Storage Temperature	TBD
Voltage on input pins (USB D+ / D-)	-0.3V to ‘+3.3V’ +0.3V
Minimum Operating Voltage (USB VBUS supply)	-0.3V
Maximum Operating Voltage (USB VBUS supply)	6V

The typical current consumption of UZB in transmitting and receiving mode are shown below.

Table 4: Typical current consumption

Region	TX / RX	Current (typ.)
US / EU	Transmitting	35mA
	Receiving	32mA
JPN	Transmitting	30mA
	Receiving	28mA

3.5 PCB

The PCB is a 4-layer FR4 design with a standard thickness of 0.8mm and stacked up as shown below.

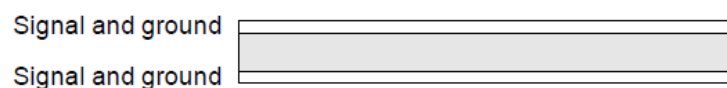


Figure 5: PCB Stack Up

Its dimensions of 38.35x16mm are shown below.

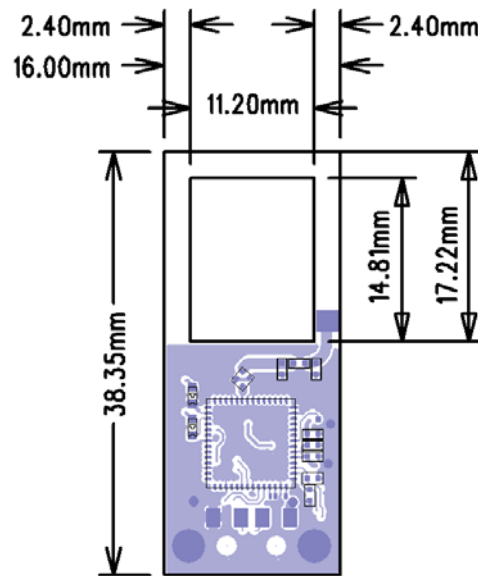


Figure 6: PCB dimensions

The area reserved for the antenna is approximately 14.81mm x 16mm. The additional bar at the end of the board of ~ 2.41mm x 16mm is to allow a better fit of the board to the off-shelf USB casing.

3.6 Casing Outline

An off-the-shelf USB casing (PN 180804), measuring 45.72mm x 20.32mm x 10.16mm, from New Age Enclosures is used for UZB specified at

http://www.newageenclosures.com/cart.php?m=product_detail&p=1&c=5 .

4 SOFTWARE

4.1 Firmware

The device is preprogrammed with the Serial API Static Controller for UZB.

4.2 Installation

As the device exports a USB CDC/ACM class compliant interface, it appears as a serial port, reusing existing standard drivers on most popular PC operating systems. As such there is no vendor driver required. Over the serial port, the Z-Wave Serial API is exported.

4.2.1 Windows 2000/XP/Vista 7 32 & 64 bit

UZB.INF is provided that reuses the standard Windows usbser.sys or usbser64.sys driver. The device appears in the Device Manager under the Ports section, and is accessible through the Windows CreateFile API by applications as “\\.\COMxxx” where xxx is the COM Port number assigned by the OS.

Table 5: UZB.INF

```
[Version]
Signature="$Windows NT$"
Class=Ports
ClassGuid={4D36E978-E325-11CE-BFC1-08002BE10318}
Provider=%manu%
DriverVer=02/17/2010,0.0.3.0

[Manufacturer]
%manu%=ZComDev, NTx86, NTamd64

[ZComDev.NTx86]
%dev%=ZComInst, USB\VID_0658&PID_0200

[ZComDev.NTamd64]
%dev%=ZComInst, USB\VID_0658&PID_0200

[ZComInst]
include=mdmcpq.inf
CopyFiles=FakeModemCopyFileSection
AddReg=LowerFilterAddReg, SerialPropPageAddReg

[ZComInst.Services]
include = mdmcpq.inf
AddService = usbser, 0x00000002, LowerFilter_Service_Inst

[SerialPropPageAddReg]
HKR,,EnumPropPages32,, "MsPorts.dll,SerialPortPropPageProvider"

[Strings]
manu = "Sigma Designs"
dev = "UZB"
svc = "UZB"
```

4.2.2 Linux kernel 2.6.24+

The device appears as “/dev/ttyACMxx” where xxx is the tty number assigned by the OS.

4.2.3 MAC OS X 6.4

The device appears as “/dev/tty.usbmodemxxx” where xxx is the tty number assigned by the OS.

4.3 Application

Only Windows XP and 7 are supported for now by the existing Z-Wave PC Controller application.

The new Z-Wave Host Controller Web Application supports it on Linux as well.

APPENDIX A PROGRAMMING TEST POINTS

To program a PCBA with an unflashed SD3402, a test jig is required to access the programming test points. The diagram below depicts the location of the test points for programming port that can be connected to an external programmer such as "J6 of ZDP03A".

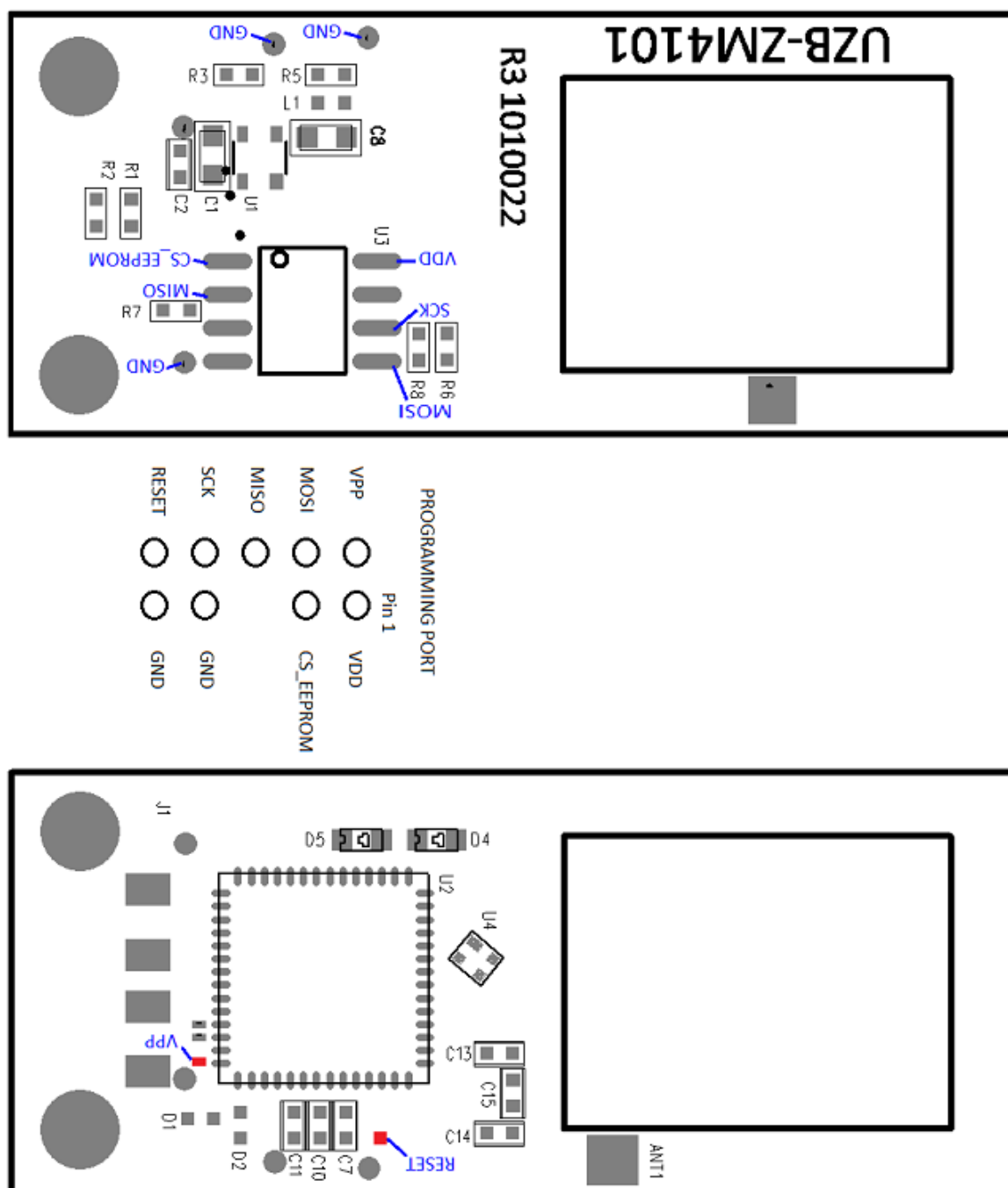


Figure 4: Test Points Location and Programming Port diagram

REFERENCES

- [1] SD, DSH11698, Datasheet, USB-ZM4101 Z-Wave USB Adapter Datasheet