



Instruction

UZB Product Manual

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REVISION RECORD

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1	20110824	SNA	ALL	Created
2	20120223	SNA	1,2,5	Added USB info, corrected diagram caption
3	20120522	SNA	4, 8	Added ANZ info, made RF/Electrical spec more generic
4	20130205	SNA WYNN	ALL	Changed to SD3503, opaque casing, no LEDs Added Zniffer version Measurements need to be reverified with updated tools and firmware for 500
	20130409			Modified part #
	20130528	SNA	9,11	Using Oracle p/n; changing template; updated references
1	20130927	SNA	1,6 8	G5, USB 1.1->2.0 low power; SDK 6.50->6.50.01; removed (TBC)s Removed INF & referred to SDK
2	20131002	SNA	9	Added FCC & CE regulatory certification information
3	20131129	SNA	1 7	Added photo, & KR. Clarified firmware used. Move ordering info here. Added JP, ANZ, KR regulatory certification information; USB certification
4	20150515	SNA	1, 5	Added UZB2; Removed Korean certification; Added NVR info
5	20150730	SNA	1, 5	Added UZB3; removed Korea from ordering
6	20151203	GQUAT	Fig 1,3,4,6 4.1 9	Revised Figure 1, 3, 4,6 Revised Section 4.1 Revised References
7	20160425	SNA	1,9	Fixed Table 1 error, Updated certification information
8	20160524	SNA	1,9	Remove EOL info; Updated regulatory regions
9	20161017	JFR	Section 4.2	Added UZB3 certification number
10	20180306	BBR	All	Added Silicon Labs template

Table of Contents

1	INTRODUCTION	1
2	HARDWARE	3
2.1	Specific Components	4
2.2	Programming Test Points.....	4
2.3	NVR	5
2.4	RF.....	6
2.4.1	Matching and SAW Filter	6
2.4.2	Antenna.....	6
2.4.3	Specification.....	6
2.5	Electrical Specification	6
2.6	PCB.....	7
2.7	Casing	7
3	SOFTWARE	8
3.1	Firmware.....	8
3.2	Installation	8
3.2.1	Windows 2000/XP/Vista/7/8 32 & 64 bit	8
3.2.2	Linux kernel 2.6.24+.....	8
3.2.3	MAC OS X 6.4.....	8
3.3	Application.....	8
4	CERTIFICATION	9
4.1	Regulatory Compliance	9
4.2	Z-Wave Plus Certification.....	9
4.3	Z-Wave QFN	10
4.4	USB Certification	10
	REFERENCES	11

Table of Figures

Figure 1:	UZB.....	1
Figure 2:	Block Diagram	3
Figure 3:	PCBA top view	3
Figure 4:	PCBA bottom view	3
Figure 5:	PCB Stack Up	7
Figure 6:	PCB dimensions.....	7

Table of Tables

Table 1:	Hardware Revisions	1
Table 2:	Ordering Information.....	2
Table 3:	Components	4
Table 4:	Test Points.....	4
Table 5:	UZB3-E SD3503 NVR0	5

Table 6: UZH3-U/H SD3503 NVR0 SAW values..... 5
Table 7: UZH Revision 1 & 2 SD3503 NVR0 SAW values..... 5
Table 8: RF Specifications..... 6
Table 9: Absolute Maximum Ratings..... 6
Table 10 : Regulatory Compliance 9
Table 11: Z-Wave Certification 9
Table 12: Z-Wave QFN..... 10
Table 13: USB Certification 10

Not Recommended for New Designs

1 INTRODUCTION

The UZH is a USB v2.0 full speed low power CDC-ACM compliant Z-Wave adapter in a thumb drive form factor.



Figure 1: UZH

There are 3 revisions of hardware with slight differences in hardware.

Table 1: Hardware Revisions

Label	Flash	SAW
UZH	M25PE10 (1Mb)	SF1010-01/02/03-SX (4-pin)
UZH2	M25PE20 (2Mb)	SF1010-01/02/03-SX (4-pin)
UZH3	M25PE20 (2Mb)	SF1256-908/923-02, SF1256-867-04 (5-pin)

It is available in the following flavors, labeled accordingly on the casing:

Table 2: Ordering Information

Name	Part Number	Label	Purpose	Region
UZB-S	ACC-UZB-S	Z-Wave Sniffer PN:ACC-UZB-S UZB S	Z-Wave Sniffer	Any
UZB-E	ACC-UZB-E	Z-Wave Static Controller PN:ACC-UZB-E UZB EU	Z-Wave Static Controller	Europe
UZB-U	ACC-UZB-U	Z-Wave Static Controller PN:ACC-UZB-U UZB US	Z-Wave Static Controller	US
UZB-H	ACC-UZB-H	Z-Wave Static Controller PN:ACC-UZB-H UZB JP	Z-Wave Static Controller	Japan, Hong Kong, Australia/New Zealand
UZB-S	ACC-UZB-S	Z-Wave Sniffer PN:ACC-UZB-S UZB S	Z-Wave Sniffer	Any

UZB in the part number & label is modified according to the revision. The UZB2/3 version with an additional '-BRG' suffix will contain a Bridge Controller instead of the Static Controller.

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

2 HARDWARE

The UZB uses a relatively simple 4-Layer PCB design as shown in the block and PCBA diagrams below.

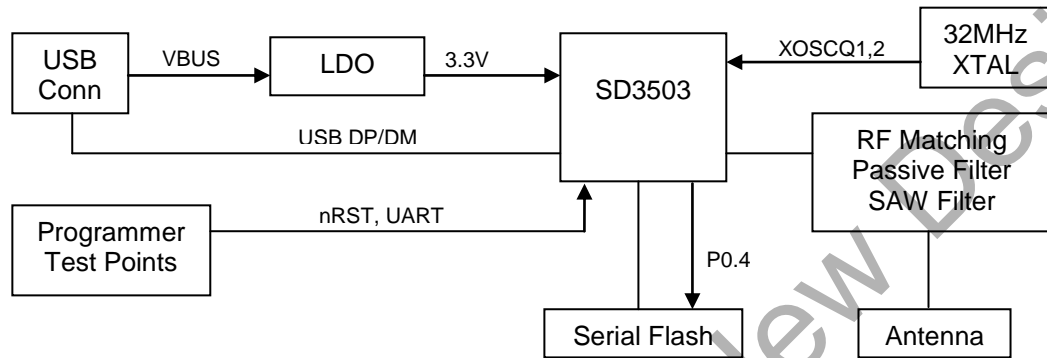


Figure 2: Block Diagram



Figure 3: PCBA top view

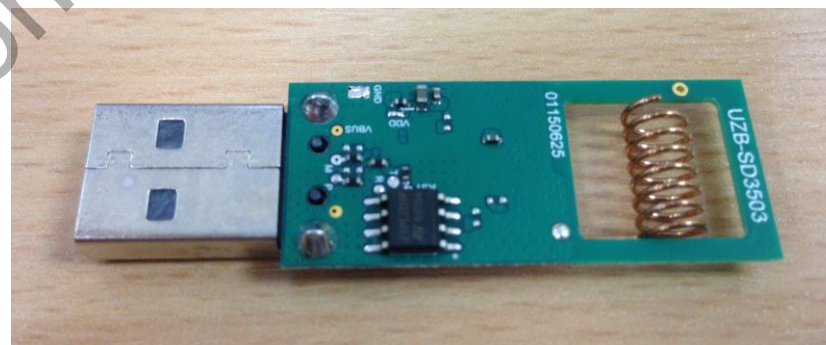


Figure 4: PCBA bottom view

2.1 Specific Components

Some components which have specific designs purposes are described below.

Table 3: Components

Component	Purpose
SD3503	MCU with code/data memory and Z-Wave transceiver running the firmware
LDO	Step down 5V to 3.3V for SD3503 MCU
Serial Flash	Node & routing information storage. Connected via SPI to MCU

2.2 Programming Test Points

The SD3503's Flash is programmed prior to assembly via a test jig to access the programming test points. The diagram below depicts the location of the test points for UART programming port that can be connected to an external level shifter.

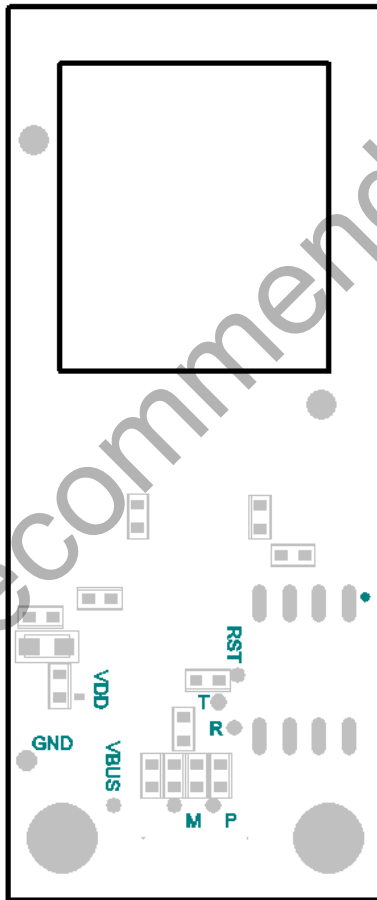


Table 4: Test Points

Test Points	Description
VDD	3.3V Supply
GND	Ground
R	UART RX
T	UART TX
RST	Reset
VBUS	USB 5V VBUS
M	USB D-
P	USB D+

2.3 NVR

The SD3503 also contains non volatile RAM, NVR0, which is programmed at factory and not part of the firmware upgrade – see Ref [3]. The contents are 0xFF except for the addresses 0x10 to 0x30, with the contents in hex as shown below.

Table 5: UZH3-E SD3503 NVR0

Offset	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
10	01	FF	00	15	0D	3C	AC	03	02	01	00	01	00	FF	FF	FF
20	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	06	58	02
30	00	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

UZH revision 1 will have “00 80” instead of “01 00” at offset 0x19-0x1A owing to doubling of Serial Flash size. The other flavors are different at addresses 0x14 to 0x17 to account for the different SAW used.

Table 6: UZH3-U/H SD3503 NVR0 SAW values

Type\Offset	14	15	16	17
UZH3-U	0D	F6	38	0D
UZH3-H	0E	19	60	04

Table 7: UZH Revision 1 & 2 SD3503 NVR0 SAW values

Type\Offset	14	15	16	17
UZH-E	0D	40	44	19
UZH-U	0D	DC	84	19
UZH-H	0E	17	6C	09

2.4 RF

SAW, matching components and antenna can be varied to support different regions.

2.4.1 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 required to achieve optimal RF performance.

2.4.2 Antenna

The same helix antenna is used to achieve a relatively compact size and cost for all regions.

2.4.3 Specification

Table 8: RF Specifications

RF	Description		
Typical RF receiver sensitivity	9.6kbps: -104dBm	40kbps: -99dBm	100kbps: -94dBm
RF Output Power	+2.5 dBm @ PA32		
Range (typical)	Indoor >30 meters line of sight, in unobstructed environment		

2.5 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 9: Absolute Maximum Ratings

Electrical	Value
Operating Temperature	-30 – 80°C
Storage Temperature	-40 – 85°C
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 is 30mA (TBC).

2.6 PCB

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

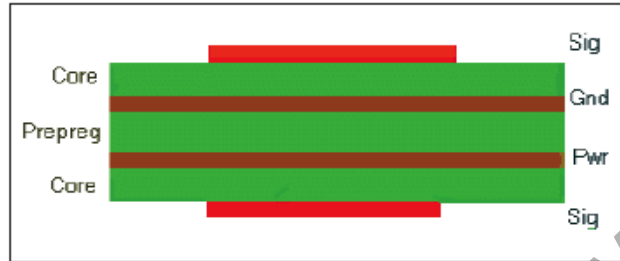


Figure 5: PCB Stack Up

Its dimensions of 38.10x16mm are shown below.

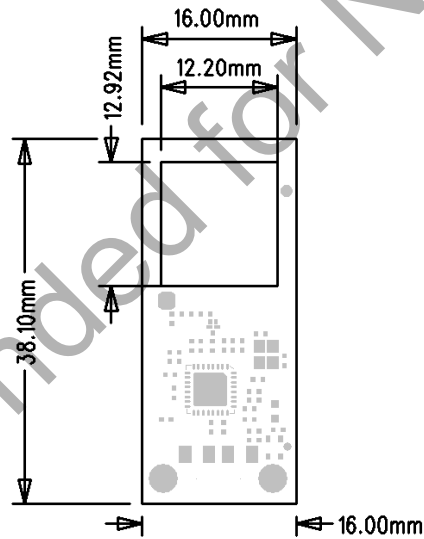


Figure 6: PCB dimensions

The area reserved for the antenna is approximately 12.9 mm x 16mm. The additional bar at the end of the board of ~2.43mm x 16mm is to allow a better fit of the board to the off-shelf USB casing.

2.7 Casing

The UZB is enclosed with an off-the-shelf USB casing (PN 180804), measuring 45.72mm x 20.32mm x 10.16mm, from New Age Enclosures at http://www.newageenclosures.com/cart.php?m=product_detail&p=1&c=5.

The UZB-S casing is black while the rest are white.

3 SOFTWARE

3.1 Firmware

The device is preprogrammed with the 500 series Z-Wave Developer's Kit Serial API Static Controller for ZM5304 USB firmware as required. The firmware can be upgraded via USB using the Z-Wave PC Programmer tool. Both the firmware and the programmer tools will be available in the Z-Wave SDK.

3.2 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.

3.2.1 Windows 2000/XP/Vista/7/8 32 & 64 bit

UZB.INF & UZB.CAT are provided in the Z-Wave SDK 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.

3.2.2 Linux kernel 2.6.24+

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

3.2.3 MAC OS X 6.4

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

3.3 Application

Z-Wave Zniiffer and PC Controller applications are supported by UZB-S and UZBs respectively but these applications only run on Windows.

4 CERTIFICATION

4.1 Regulatory Compliance

Table 10 : Regulatory Compliance

Part	Region(s)
ACC-UZH3-E	CE (Europe) - EN 300 220-1/2, 301 489-1/3, 55022, 61000-4-2/3, 62479, 60950-1; Mauritius; Morocco; Armenia, Egypt; Jordan; Kazakhstan; Yemen; Libya; Qatar; Saudi Arabia;
ACC-UZH3-U	FCC (US) - CFR 47 Part 15 Subparts B & C
ACC-UZH3-H	MIC (Japan) - ARIB STD-T108
ACC-UZH-H	ACMA (AS/NZ) - CISPR 22 & AS/NZS 4268; MIC (Japan); Costa Rica; El Salvador; Paraguay; Peru; Uruguay
ACC-UZH-E	CE (Europe); Indonesia
ACC-UZH-U	FCC (US); Bahamas; Barbados; Bermuda; Bolivia; Cayman Islands; Chile; Columbia; Ecuador; Guatemala; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; St. Kitts & Nevis; Suriname; Trinidad & Tobago; Turks & Caicos

4.2 Z-Wave Plus Certification

Table 11: Z-Wave Certification

Part	Document
ACC-UZH3-E	ZC10-16065114

4.3 Z-Wave QFN

Table 12: Z-Wave QFN

Part	Document
ACC-UZB3-U	CEF19693
ACC-UZB3-E	CEF19695
ACC-UZB3-H	CEF19694

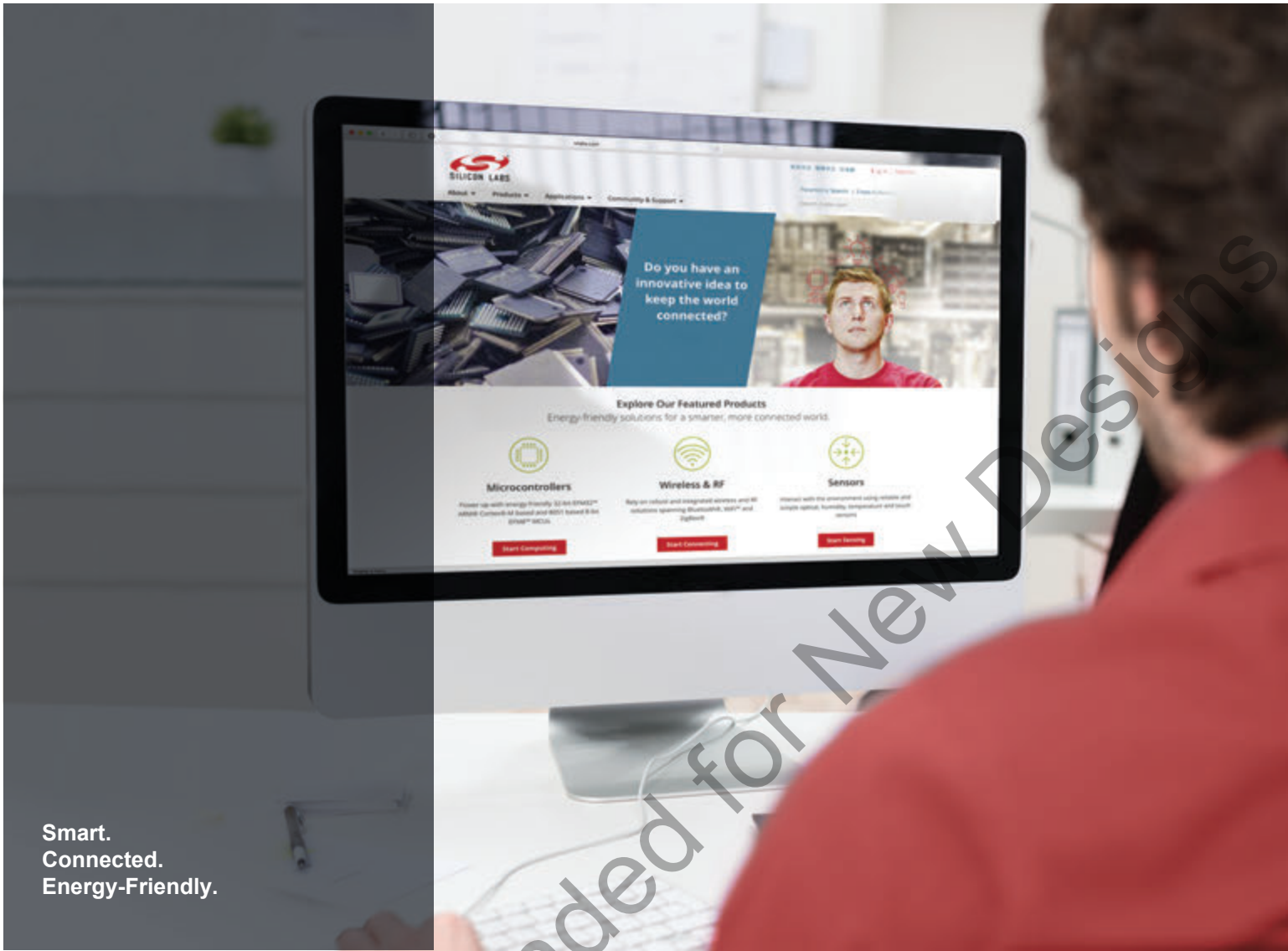
4.4 USB Certification

Table 13: USB Certification

Part	USB Test ID (TID)
ACC-UZB	10007151

REFERENCES

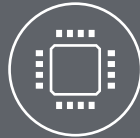
- [1] Silicon Labs, INS12308, Instruction, Z-Wave 500 Series Application Programming Guide
- [2] Silicon Labs, DSH12469, Datasheet, SD3503
- [3] Silicon Labs, SDS12467, SW Design Spec, 500 Series NVR Content
- [4] Silicon Labs, INS10249, Instruction, Ziffer User Guide
- [5] Silicon Labs, INS10240, Instruction, PC Controller User Guide
- [6] Silicon Labs, INS10679, Instruction, PC Programmer User Guide
- [7] Silicon Labs, SCH13396, Schematic, UZB3
- [8] Silicon Labs, PCB13397, UZB3 PCB
- [9] Silicon Labs, BOM13395, BOM, UZB3-H
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- [11] Silicon Labs, BOM13393, BOM, UZB3-E
- [12] Silicon Labs, BOM13463, BOM, UZB3-S
- [13] Silicon Labs, DSH11697, Datasheet, UZB Helix Antenna



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