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Si4312 Demo Board User's Guide

1. Overview

The Silicon Laboratories Si4312-DEMO board provides a complete OOK radio design with numerous selectable features that demonstrate the capabilities of the Silicon Laboratories Si4312 OOK receiver. The Si4312-DEMO board can be configured to receive OOK data from an SMA connector or wirelessly with an on-board printed circuit board (PCB) antenna. The demodulated output data from the Si4312-DEMO board can be measured via an SMA connector and/or observed with an LED and/or heard with an audio buzzer. The system is powered by a 9 V battery or an external 3.3 V power supply.

2. Features

- Single chip OOK receiver
- Selectable 315/433.92 MHz carrier frequency
- Selectable data rate, threshold hold time

3. Description

Figures 1 and 2 show the physical layout of the board with key components indicated.

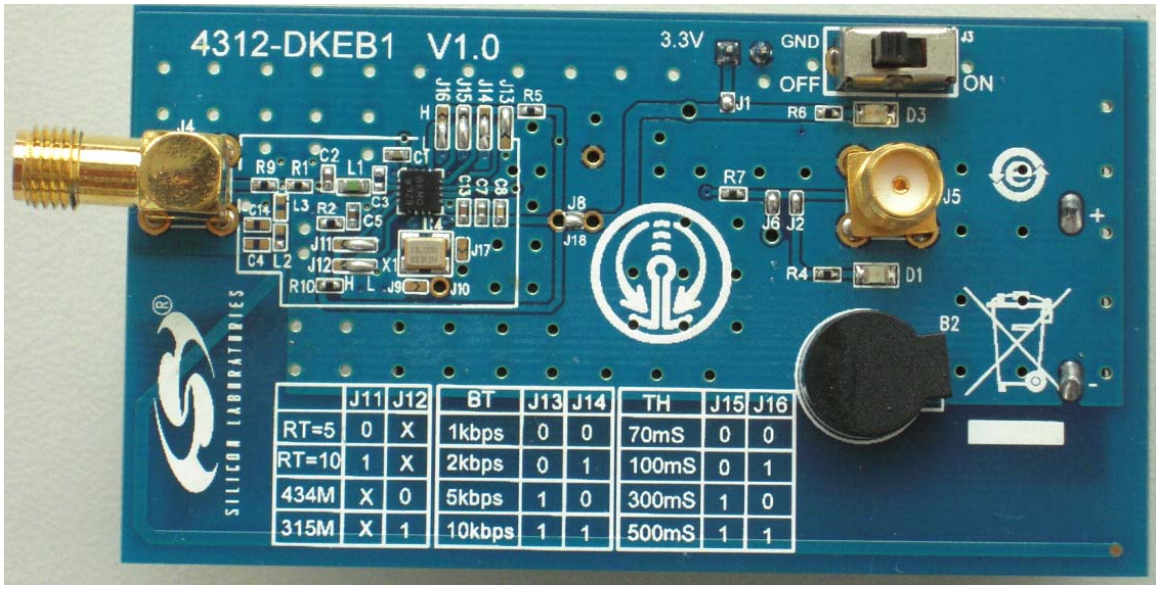


Figure 1. Si4312 DEMO Board Top Side

Figure 2. Si4312 DEMO Board Bottom Side with 9 V Battery

Power Supply Connector

J1: Jumper to select external 3.3 V supply. This is a solderable jumper and should be shorted when used.

J7: External 3.3 V supply connector: +3.3 V with the jumper on the right side and GND on the left side.

J3: 9 V battery supply connector: Power on with the jumper on the right side and power off with the jumper on the left side.

J8: Jumper used to measure Si4311 current consumption.

- Jumper connected (shorted) is normal operation.
- Jumper connected with an ammeter in series to measure current.

D3: Power-on indicator. LED lights up when powered on.

RF Input

J4: SMA connector for an external RF input. Ensure inductor L3 is open to remove the PCB antenna when using the SMA input.

Demodulated Data Output

J5: SMA connector for demodulated data output.

External Clock Driver

J9/J17: These solder jumpers should be shorted when an external clock driver is used.

J10: External clock connection point.

Ratio Setting

J11: Jumper used to select ratio setting.

- Logic High (left side connection) for ratio = 10.
- Logic Low (right side connection) for ratio = 5.

Carrier Frequency Selection

J12: Jumper used to select 315 or 433.92 MHz carrier frequency.

- Logic High (left side connection) for 315 MHz.
- Logic Low (right side connection) for 433.92 MHz.

Bit Time Selection

J13/J14: Two jumpers used for bit time selection.

Table 1. Bit Time Selection

J13	J14	Bit Time [µs]
0	0	1000
0	1	500
1	0	200
1	1	100

Frequency Deviation Selection

J15/J16: Two jumpers used for frequency deviation selection.

Table 2. Frequency Deviation Selection

J13	J14	Threshold Hold Time [ms]
0	0	70
0	1	100
1	0	300
1	1	700

Key Components

U4: Si4312 single chip OOK receiver.

X1: 16 MHz crystal.

D1: LED lights up when data output present.

B2: Audio buzzer sounds when data output is present.

4. Schematic

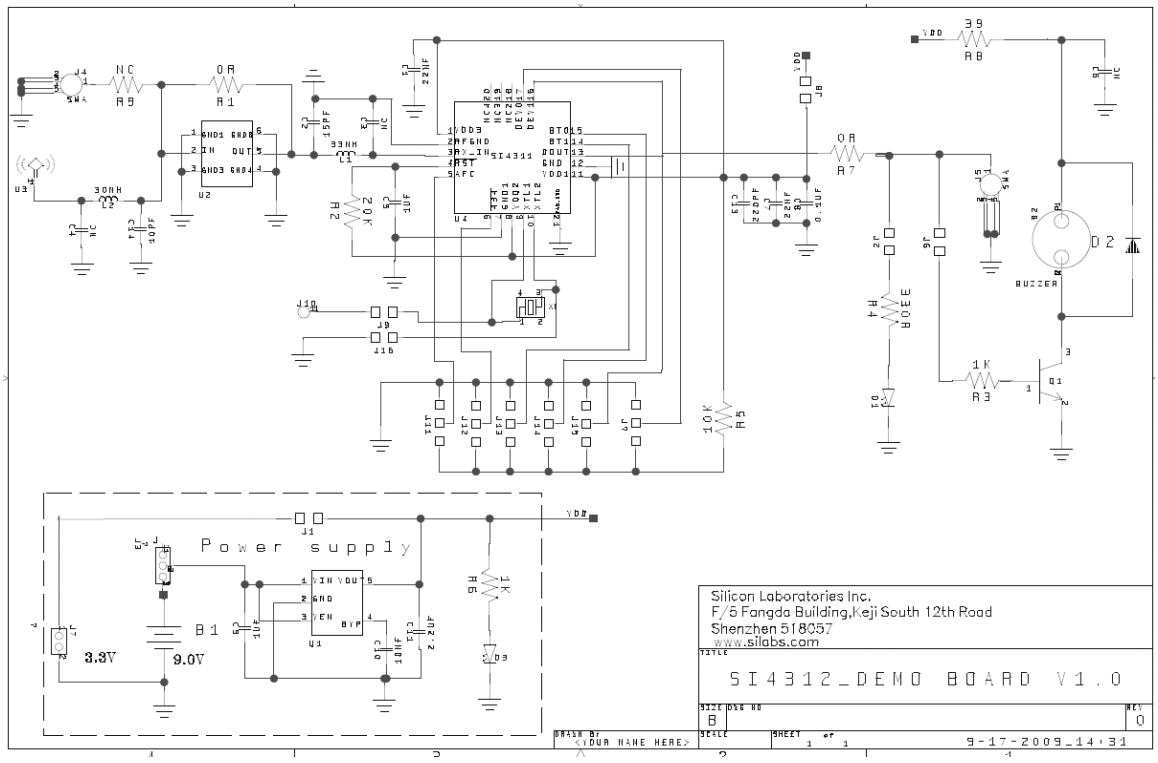


Figure 3. Si4312-DEMO Schematic

5. PCB Layout

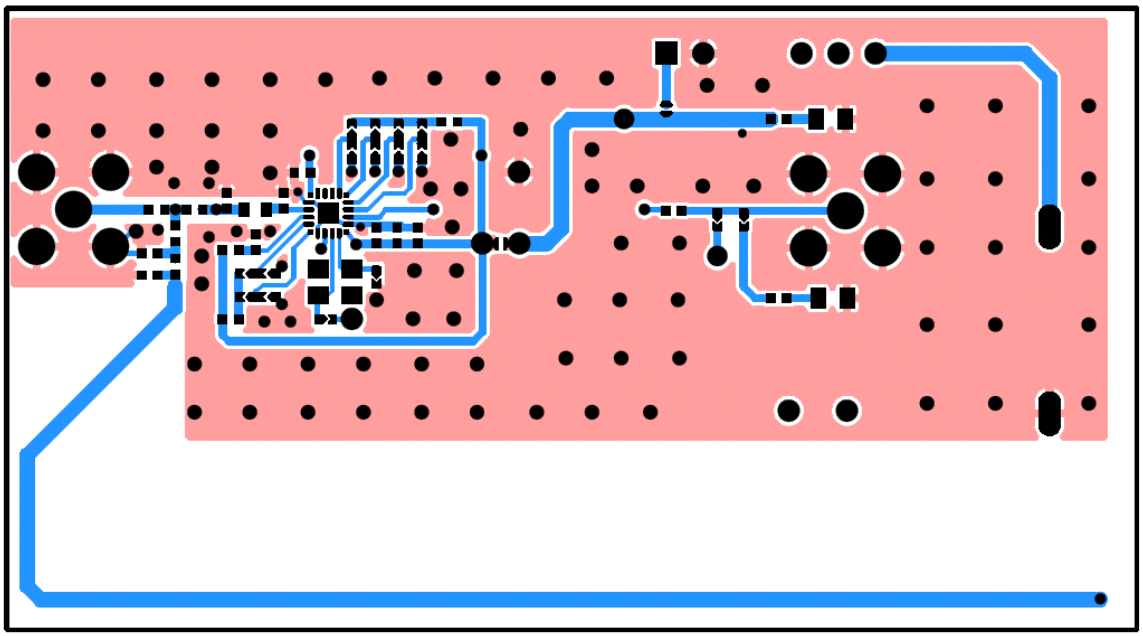


Figure 4. Si4312 PCB Top Layer

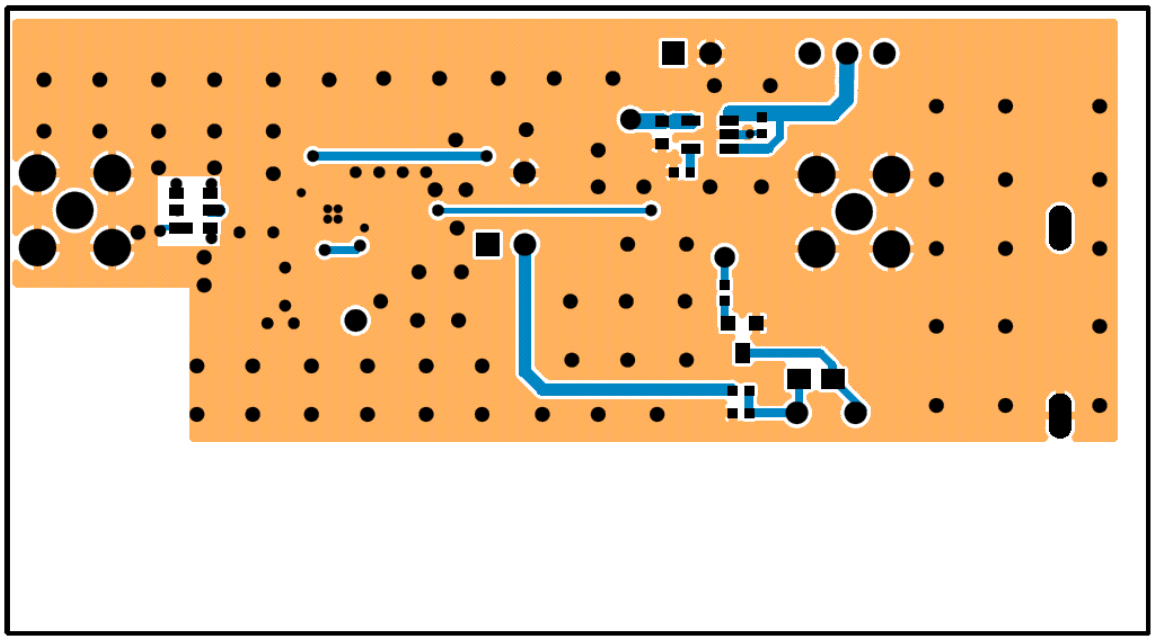


Figure 5. Si4312 PCB Bottom Layer

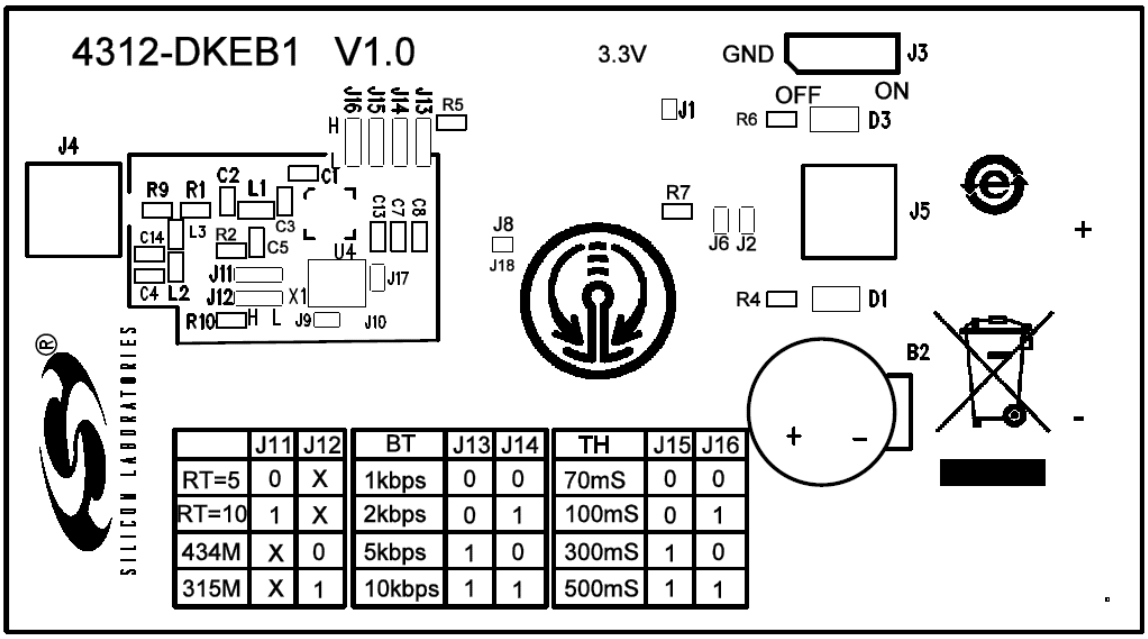


Figure 6. Si4312 PCB Top Silkscreen

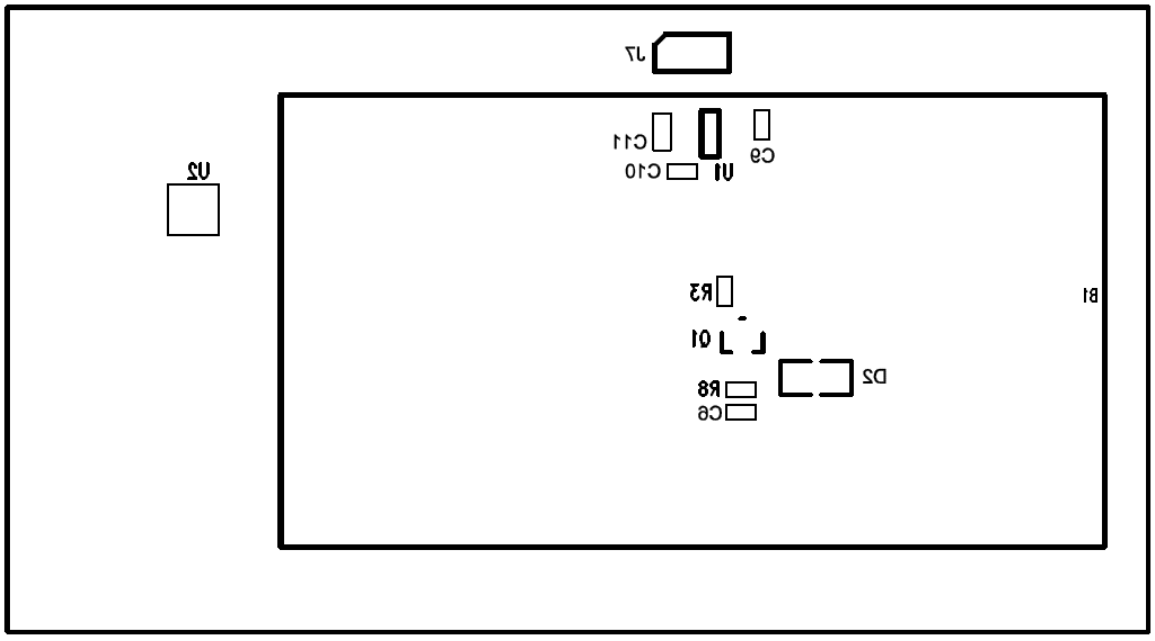
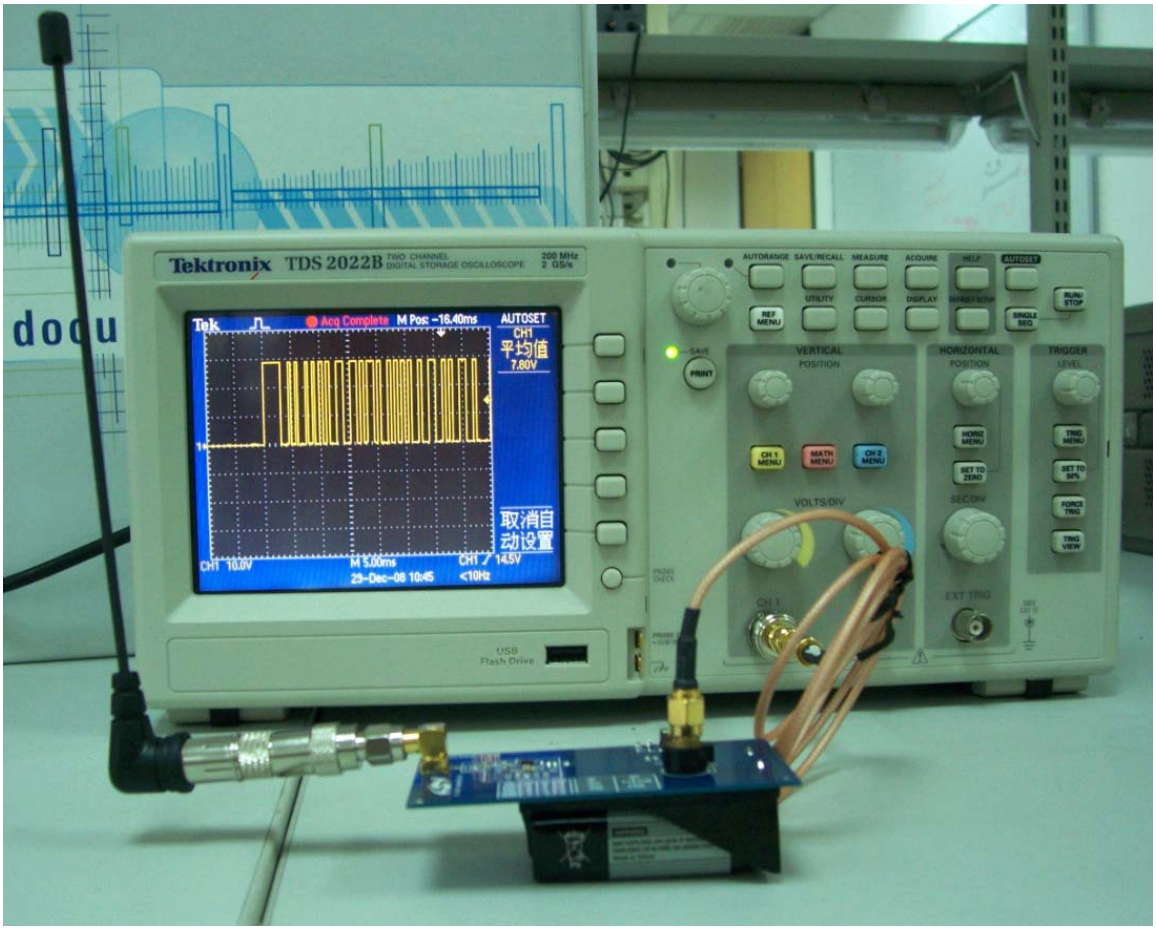


Figure 7. Si4312 PCB Bottom Silkscreen

6. Bill of Materials

Reference	Qty	Package	Value
B1	1	AA_BATTERY	9.0 V
B2	1	BUZZER2	
C1,C7	2	CMS0402	22 nF
C2	1	CMS0603	15 pF
C3,C4	2	CMS0603	NC
C5,C9	2	CMS0402	1 µF
C6	1	CMS0402	NC
C8	1	CMS0402	0.1 µF
C10	1	CMS0402	10 nF
C11	1	CMS0603	2.2 µF
C13	1	CMS0402	220 pF
C14	1	CMS0603	TBD
D1,D3	2	CMS0805	LED
D2	1	CMS0805	IN4148
J3	1	DIP SWITCH	
J4,J5	2	SMA	
J7	1	HEADER2	
L1	1	CMS0402	33 nH
L2	1	CMS0402	TBD
L3	1	CMS0402	0R/NC
Q1	1	SOT23	9013
R1	1	CMS0603	0R
R2	1	CMS0402	20 kΩ
R3,R6	2	CMS0402	1 kΩ
R4	1	CMS0402	330R
R5	1	CMS0402	10 kΩ
R7	1	CMS0402	0R
R8	1	CMS0402	39R
R9	1	CMS0603	NC
U1	1	SOT-23-5	LP2985
U2	1	SC33	SAW filter
U3	1	ANT	
U4	1	MLP20-3MM	Si4312
X1	1	XTAL_32X25	16 MHz

7. Receiving Data Status



8. References

- Si4312 Data Sheet

NOTES:

CONTACT INFORMATION

Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
Tel: 1+(512) 416-8500
Fax: 1+(512) 416-9669
Toll Free: 1+(877) 444-3032

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