

# UG514: Si5360/61/62/63 Evaluation Board User's Guide

This document is intended for all Si536x-A-EVB product variants, including Si5363, Si5362, Si5361 jitter attenuators and Si5360 clock generator. The exact device and revision is distinguished by a white 1 inch x 0.187 inch label underneath the board's silkscreen name. In this user guide, the Si5360 is used as a representation for the evaluation of all the Si536x variants. CBPro software is used to select the specific product variant to be evaluated. The label "Si5360-A-EB" indicates the evaluation board has been assembled with an Si5360 device, Revision A, installed. Strictly for ordering purposes, the terms "EB" and "EVB" refer to the board and kit, respectively. In this document, the terms are synonymous.



#### KEY FEATURES

- Si536x-A-EVB used with CBPro software to evaluate Si5363, Si5362, Si5361, and Si5360
- Powered from USB port and an external power supply, via either a terminal block or a compatible wall mount AC adapter
- Onboard 48 MHz crystal and a 48 MHz low phase noise XO
- ClockBuilder Pro<sup>®</sup>(CBPro) GUI programmable VDD supply supports device core voltages of 3.3 V and 1.8 V
- CBPro GUI programmable VDDO supplies allow each of the outputs to have its own power supply voltage selectable from 3.3 V, 2.5 V, or 1.8 V
- CBPro GUI-controlled voltage, current, and power measurements of VDD and all VDDO supplies
- Status LEDs for power supplies and control/ status signals of the Si536x device
- SMA connectors for input clocks, output clocks, optional external reference

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#### 1. Functional Block Diagram

Below is a functional block diagram of the Si536x-EVB. This evaluation board can be connected to a PC via the main USB connector for programming, control, and monitoring. See 2. Quick Start Guide for more information.





# 2. Quick Start Guide

- 1. Download and install the latest version of the ClockBuilder Pro desktop software from https://www.skyworksinc.com/en/applicationpages/clockbuilder-pro-software on any PC with Windows 7 or above.
- 2. Confirm RSTb (JP5) jumper is open. When installed, the jumper will reset the Si536x device on the EVB.
- 3. If using XTAL reference, confirm that the 48 MHz crystal is installed on the front side of the EVB near the Si536x DUT at position Y1.
- 4. If using XO reference, confirm that the 48MHz XO is installed on the back side of the EVB at position X1 and VDD\_XO\_X1 (JP11) jumper is installed so that it is powered up.
- 5. Connect a USB cable from the Si536x-A-EB (J51) to the PC where the CBPro software was installed.
- 6. Connect the +5V wall adapter to an outlet and install the power plug into the power jack at J55 OR Connect a 1.5 A or greater +5V lab supply to the green terminal block (J53).
- 7. Check the board is powered correctly by observing the corresonding LEDs.

Figure 2.1. Si536x-A-EB Quick Start Jumper Settings, Power Connections, and USB Port



8. The figures in the following steps are shown only for the Si5360 device. Similar methods can be employed for the Si5361, Si5362, and Si5363 devices. Write the CBPro project file (.slabtimeproj) provided by Skyworks support or created by the user for the EVB.

The CBPro tool is used to create and load the frequency configuration to the Si536x devices. The purpose of the CBPro EVB GUI is to monitor and interact with the EVB in real-time.



Figure 2.2. CBPro Wizard Home Page – Write Project File To EVB

9. Launch the ClockBuilder Pro EVB GUI application and navigate to the "Status API" tab.

- Select "Auto Poll Registers" for continuous polling of the status registers. If Auto Poll Status API is not checked, then the status' can be manually updated with the "Refresh All" button.
- Use the GUI to monitor for PLL lock and valid input clocks.
- The sticky API status' are viewable in the panel.
- · Select "Clear Flag/Sticky Bits" to clear sticky Status API.

B Si5360 EVB - ClockBui	ter Pro	– 🗆 ×						
ile Help								
Info Device API Dev	ice API (Low-Level) Regulators All Voltages GPIO Status API	<ul> <li>Device API (Select)</li> </ul>						
Refresh All	ear Flags Copy State to Clipboard 🕅 Auto Poll Status API 🕢 Last Update: 14:23:54.824	Fixed-Step DCO						
Keywords:	Clear O AND O R	FDEC						
Key: Not Asserted	Info Valid Warn Error	Phase Readout						
Description	Description Flag							
Reference (API)	A	Die Temperature						
Loss-of-Signal	LOSS_OF_SIGNAL	°C Read Poll						
Ref Out-Of-Frequence	y OUT_OF_FREQUENCY	PLL Soft Reset						
Phase Monitor	hase Monitor PHASE_MONITOR_PHASE_ERROR							
Early Phase Monitor	PHASE_MONITOR_SIGNAL_EARLY							
Late Phase Monitor	PHASE_MONITOR_SIGNAL_LATE							
Reference Clock Stat	IS REFERENCE_CLOCK_STATUS VLD							
Interrupt Status (API								
Phase Control	COMMAND_TOO_CLOSE PIN_TOO_SHORT PHASE_ADJUST_COMPLETE							
	SYNC_COMPLETE							
Software Interrupts	SW0 SW1 SW2 SW3 SW4 SW5							
00								
Filtered 🔽 Auto S	roll: On 📱 Insert Marker Clear Copy to Clipboard Pause							
Timestamp Source	Message							
14.22.23.100 240	starting set_cxpanuel_signal(expanuel_num= i,port=0, pin=4, state=cogico)							
14:22:29.124 EVB	Starting Write_DUT_Byte(address=0x000EE1, data=0x01)							
14:22:29.342 Other	Starting Programming device							
B Firmware 1.1 Device:	3i5360   DUT Mode: SPI; FW Low-Level Commands	ClockBuilder Pro v4.3.1 [2022-02-						

Figure 2.3. CBPro EVB GUI API Status

10. Use the Regulators tab to take real time voltage, current and power measurements for each voltage regulator on the evaluation board.

CB Si5360	0 EVB - Cloc	kBuilder Pro							- 🗆 ×
File Help	р								
Info D	Device API	Device API (Low-Level)	Regulators	All Voltages	GPIO	Status API		Ŧ	Device API (Select)
			Voltag	je Curr	ent	Power			Fixed-Step DCO
	VDDO1	3.30V 🔽 On	3.263	V 13	mA	42 mW	Read		EDEC
	VDDO2	1.80V	Off 0.002	V -1	mA	0 mW	Read		
	VDDO3	1.80V 🔽	Off 0	v o	) mA	0 mW	Read		Phase Readout
	VDDO4	1.80V	Off 0.002	V -1	mA	0 mW	Read		
	VDDO5	1.80V	Off 0	v o	) mA	0 mW	Read		one remperature
	VDDO6	1.80V	Off 0.002	V -1	mA	0 mW	Read		
	VDD07	1.80V 🔽	Off 0.003	V -1	mA	0 mW	Read		PLL Soft Reset
	VDDIN	1.80V 🔽 On	1.801	V 30	) mA	54 mW	Read		
	VDDHV	3.30V	3.258	V 192	mA	626 mW	Read		
	VDD18	1.80V On	1.799	V 350	) mA	630 mW	Read		
VDD	DREF_ADP	3.30V On	3.311	v ٤	mA	26 mW	Read		
All Oi Sup	pplies	Select Voltage Power On Power O	Tot. Off	al 589	) mA	1.378 W	Read All		
Log									
Filtered	Au	ito Scroll: On 🔽 🛛 Ins	ert Marker	Clear	Сору	to Clipboard	Pause		
Timestar 14:22:29 14:22:29	mp         Sou           9.100         EVB           9.342         Oth	rce Message Starting Sec_Exp Starting Write_I er Starting Progra	pander_orgna DUT_Byte(add mming device	rexpander_nor lress=0x000EE e	n= 1,po 1, data=	nt=0, pm=4, 3 =0x01)	tate=Logicoj	- •	
EVB Firmw	vare 1.1   De	vice: Si5360   DUT Mode:	SPI; FW Low-Le	evel Commands				Clo	ckBuilder Pro v4.3.1 [2022-02-23]

Figure 2.4. CBPro EVB GUI Regulators Tab

11. Use the Device API tab to write API commands to the Si536x device.

- Device API commands may be invoked via the EVB GUI Wizard.
- See the Si536x Command/Property API Documentation provided separately for additional details.

CB	Si5360 E\	/B - Clock	Builder	Pro													- 🗆 ×
File	Help																
Inf	o Devi	ice API	Device	API (Low-I	Level)	Regu	lators	All Voltages	GPIO	Status	API					Ŧ	Device API (Select)
De	vice API	Docume	ntation	: <u>View</u> · <u>S</u>	ave to I	Folder	• <u>Save</u>	to Zip								î	Fixed-Step DCO
	PP INFO	(0×10)													1		FINC
											_	1		FDEC			
	rgumen	its	N			7				2							Dhase Readout
	Index		Nar	ne		/	0	3	4	3	2		U	Actual			
	0x00		CM	D					CMD	(0x10)			_	0x10			Die Temperature
	0x01		Х			Х	X	X	X	Х	Х	Х	X	0x00			°C Read Poll
			Send	Comman	d					Co	py to Cli	pboard			í		PLL Soft Reset
															, I		
R	esponse	9															
	Index	Nar	ne	7	6		5	4	3	2	1		0	Actual			
	0x00 STAT	STATUS	CTS	HWE	RR	APIERR	FWERR	Y	v		,	Y					
	0x00	STAI	US						X	X	′	·	X	N/A			
								APP	MAJOR	OR							
	0x01	A_MA	JOR						N/A					N/A			
								400	MINIOR					$\vdash$			
	0x02	A_MI	NOR					APP_						N/A			
									N/A							-	
Log																	
Filt	tered	Aut	to Scrol	l: On 🔽	Inse	ert Ma	rker	Clear	Сору	to Clipt	oard	Pau	se				
Tin	nestamp	Sour	ce	Message													
14	22:29.10	24 EVB		Starting Starting \	Write D		_əignai /te(add	ress=0x000E	E1, data	=0x01)	1-4, 318	e-togi	(0)				
14	22:29.34	12 Othe	er	Starting F	Program	nming	device	·								•	
EVB	Firmware	1.1   Dev	ice: Si53	60   DUT I	Mode: S	PI; FW	Low-Le	evel Comman	ds							Clo	ockBuilder Pro v4.3.1 [2022-02-23]

Figure 2.5. CBPro EVB GUI—Device API

# 3. Jumper Defaults

			Jumper Shunt
Location	Туре	Description or Signal (NI = Jumper header pins Not Installed)	l=Installed
			O=Open
JP1	2-pin	CTRL_0	I
JP2	2-pin	CTRL_1	I
JP3	2-pin	CTRL_2	I
JP4	2-pin	CTRL_3	I
JP5	2-pin	RSTb	0
JP6	2-pin	CTRL_4	I
JP7	2-pin	CTRL_5	I
JP8	2-pin	CTRL_6	I
JP9	2-pin	CTRL_7	I
JP11	2-pin	VDD_XO_X1	I
JP14	2-pin	VDDO1_EN to GND (NI)	0
JP15	2-pin	VDDO2_EN to GND (NI)	0
JP16	3-pin	VDDO1_25VB or VDDO1_33VB to GND (NI)	0
JP17	3-pin	VDDO2_25VB or VDDO2_33VB to GND (NI)	0
JP18	2-pin	VDDO3_EN to GND (NI)	0
JP19	2-pin	VDDO4_EN to GND (NI)	0
JP20	3-pin	VDDO3_25VB or VDDO3_33VB to GND (NI)	0
JP21	3-pin	VDDO4_25VB or VDDO4_33VB to GND (NI)	0
JP23	2-pin	VDDO5_EN to GND (NI)	0
JP24	3-pin	VDDO5_25VB or VDDO5_33VB to GND (NI)	0
JP25	3-pin	VDDO6_25VB or VDDO6_33VB to GND (NI)	0
JP26	2-pin	VDD_REF_EN to GND (NI)	0
JP27	2-pin	VDD07_EN to GND (NI)	0
JP28	3-pin	VDDO7_25VB or VDDO7_33VB to GND (NI)	0
JP30	2-pin	VDDHV_EN to GND (NI)	0
JP31	3-pin	VDDHV_25VB or VDDHV_33VB to GND (NI)	0
JP34	3-pin	5V_LAB (pin 3) or 5V_WALL (pin 1) to 5V (pin 2)	1-2
JP35	2-pin	VDD_OUT_REF_TPS_EN to GND	0
JP38	2-pin	VDDIN_EN to GND (NI)	0
JP39	3-pin	VDDIN_25VB or VDDIN_33VB to GND (NI)	1-2
JP42	2-pin	VDD18_EN to GND (NI)	0

#### Table 3.1. Si536x EVB Jumper Defaults

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# 4. Status LEDs and DUT GPIO

Location	Silkscreen	Color	Status Function Indication
D7	READY	Green	MCU ready
D8	BUSY	Green	MCU busy
D10	+5 V	Green	+5 V supplied by wall adapter or lab dc power supply

The LEDs showing on-board MCU activity status are D7, D8. When the required +5 V is supplied to the board, D10 will be illuminated. This supply is separate from the USB.

The DUT GPIO is configurable through CBPro. STATUS\_0 - STATUS\_3 and CTRL\_0 - CTRL\_3 are available for programming via the CBPro Wizard as shown in the image below. To use CTRL\_4 - CTRL\_7, OUT6/OUT11 needs to be repurposed as GPI. To repurpose these outputs as GPI, install R68, R69 (OUT6) and R70, R71 (OUT11). Remove the AC coupling capacitors C69, C70, C89, C90 accordingly.

Note the STATUS\_x LEDs will by default be programmed as sticky flags and needs to be cleared with either the device API or the EVB GUI "Clear Flag/Sticky Bits"



Figure 4.1. Status LEDs and CTRL Pins

Pin	Supports	Function	Active Low	GPIOx pins have their input and output logic thresholds set by the voltage applied to
GPIO0 GPIO2 GPIO3 SDA/SDIO SCLK A0/CSb OUT6 (VDDO3) OUT6 (VDDO3) OUT11 (VDDO5) OUT11b (VDDO5)	GPI/GPO GPI/GPO   GPI GPI GPI GPI	INTRb - Interrupt Output (Active Low) OE0b - Enable Output Group 0 (Active Low) REF_LOSb - Reference Loss-of-Signal (Active Low) SDO SDI SCLK CSb None None None None None		VDDIO. This includes the ser- interface and should match the voltage level from the serial interface master. OUT/OUTb pins used as GPI have their logic thresholds determined by the VDDOy supply entries on the Define Outputs Page of CBPro. Whe OUTx or OUTxb pins are used as GPI, then that output driv is no longer available for clo outputs. However, a VDDO voltage must be specified fo this output to support GPI operation.

Figure 4.2. CBPro Wizard GPIO

UG514: Si5360/61/62/63 Evaluation Board User's Guide • References and External Reference Connections (XA/XB, XO\_IN/XO\_INB)

## 5. References and External Reference Connections (XA/XB, XO\_IN/XO\_INB)

For connection of an external reference, the board has both SMA connectors and installed components. In addition, crystal and oscillator capabilities are installed on the board with TXC 7M48072009 XTAL and TXC 7X48070007 XO. Details of the XO and XTAL are summarized in the schematic excerpt and reference designator table below. For each reference designator, all required components are already installed on the board. A list of components to install or remove in order to support a designated reference is provided as additional information in the table.

To avoid degrading performance due to coupling, only one reference should be powered up at a time. The VDD\_XO\_X1 jumper (JP11) can be used to control the power supply to the installed XO allowing the user to easily swtich between XO and XTAL frequency plans during evaluation.

#### Table 5.1. References and Corresponding Connectors Available on the Si536x EVB

Reference Des- ignator	Silkscreen or Device Description	Connector or Device Footprint	Default BOM	Components to Install	Components to Remove
J1	XO_IN	SMA	Installed	R221, R224, R46, C229	R206
J2	XO_INB	SMA	Installed	R222, R48, C230	
X1	48 MHz S/E XO	3.2 mm x 2.5 mm	Installed	JS11	
Y1	48 MHz XTAL	3.2 mm x 2.5 mm	Installed		



Figure 5.1. Reference Connections Schematic Excerpt

UG514: Si5360/61/62/63 Evaluation Board User's Guide • Clock Input Circuits (INx/INxB)

# 6. Clock Input Circuits (INx/INxB)

Si536x devices can be configured to have four differential inputs or up to six single-ended CMOS inputs.

The EVB has SMA connectors (IN0, IN0B - IN3, IN3b) for receiving external clock signals. All input clocks are terminated as shown below. Note that input clocks IN0-IN2 are AC-coupled and 50  $\Omega$  terminated. This represents three differential input clock pairs. Single-ended clocks can be used by appropriately driving one side of the differential pair with a single-ended clock. To use CMOS signals, remove the 50  $\Omega$  termination and replace the ac coupling capacitor with a 0  $\Omega$  resistor.



R56 and R57 can be used to ground IN0 and IN0B for added isolation when using XTAL reference









Figure 6.1. Input Clocks Schematic Excerpt

UG514: Si5360/61/62/63 Evaluation Board User's Guide • Clock Output Circuits (OUTx/OUTxB)

## 7. Clock Output Circuits (OUTx/OUTxB)

Si536x devices support 18 differential output drivers configurable as LVPECL, LVDS, S-LVDS, CML, or LVCMOS. When in LVCMOS mode, the differential pair becomes two single-ended outputs for a maximum of 36 possible outputs.

Each of the 36 output drivers (18 differential pairs) is AC-coupled to its respective SMA connector. The output clocks schematic excerpt is shown below. Note several component selections:

• UT6, 6B and OUT11, 11B can be configured as controls (GPI) or clock output by installing R68/R69 and/or R70/R71.



OUT6,6B and OUT11,11B can be congifured as controls(GPI) or clock outputs

Figure 7.1. Output Clocks Schematic Excerpt

## 8. Using CBPro with the Si536x EVB

After ClockBuilder Pro software is installed, connect a USB cable from the Si536x-A-EB (J51) to the PC where the software was installed.

**Note:** The following instructions and screen captures may vary slightly depending on your version of ClockBuilder Pro. The screen captures below are from using an SI5360-A-EB, but a similar workflow can be used for the Si5361/62/63 evaluation boards. The ClockBuilder Pro installer will install two main applications:

- ClockBuilder Pro Wizard
- ClockBuilder Pro EVB GUI



Figure 8.1. Application #1: ClockBuilder Pro Wizard

Use the CBPro wizard to:

- · Create a new design
- Review or edit an existing design
- · Export project design configuration for programming a Si536x device

e H	elp		-		1					
nfo	Device API	Device API (Low-Level)	Regulators	All Voltages	GPIO	Status API		Ŧ	Device API (Select)	
			Voltag	je Curr	ent	Power			Fixed-Step DC	o
	VDDO1	3.30V 🔽 On	3.263	V 1	3 mA	42 mW	Read		FINC	_
	VDDO2	1.80V	Off 0.002	v -	1 mA	0 mW	Read		FDEC	_
	VDDO3	1.80V	Off 0	v	0 mA	0 mW	Read		Phase Readour	t
	VDDO4	1.80V	Off 0.002	v -	1 mA	0 mW	Read		Die Temperatu	
	VDDO5	1.80V	Off 0	v e	0 mA	0 mW	Read		°C Read	e n
	VDDO6	1.80V	Off 0.002	v -	1 mA	0 mW	Read			_
	VDD07	1.80V	Off 0.003	v -	1 mA	0 mW	Read		PLL Soft Reset	t
	VDDIN	1.80V 🔽 On	1.801	V 30	0 mA	54 mW	Read			
	VDDHV	3.30V On	3.258	V 193	2 mA	626 mW	Read			
	VDD18	1.80V On	1.799	V 35	0 mA	630 mW	Read			
v	DDREF_ADP	3.30V On	3.311	v a	B mA	26 mW	Read			
		Colort Valtage	Tota	al 58	9 mA	1.378 W	Read All			
All	Output	select voltage								
		Power On Power	Off							
pq										
ilter	ed 🔽 Au	ito Scroll: On 📱 🔲	sert Marker	Clear	Сору	to Clipboard	Pause			
imes	tamp Sou	rce Message								
4.22	29.100 EVB	Starting Set_EX	panuer_orgna	(expander_no	m=1,po	nt=0, pin=4, 3	tate-Logico)			
4:22:29.124 EVB Starting Write_DUT_Byte(address=0x000EE1, data=0x01)										

Figure 8.2. Application #2: EVB GUI

Use the EVB GUI to:

- Download configuration to EVB's DUT (Si5360/61/62/63)
- · Control the EVB's regulators
- · Monitor voltage, current, and power on the EVB
- Use API commands

The three common workflow scenarios when using CBPro and the Si536x EVB are as follows:

- · Workflow Scenario 1: Testing a Skyworks-Created Default Configuration
- · Workflow Scenario 2: Modifying the Default Skyworks-Created Device Configuration
- · Workflow Scenario 3: Testing a User-Created Device Configuration

Each workflow scenario is described in more detail in the following sections.

#### 8.1 Workflow Scenario 1: Testing a Skyworks Default Configuration

The workflow for using the EVB GUI to initialize and control a device on the EVB is as follows:

After the PC and EVB are connected, launch ClockBuilder Pro by clicking this icon on your PC's desktop:



Figure 8.3. ClockBuilder Pro Desktop Icon

If an EVB is connected, CBPro automatically detects the EVB and device type. After you open the default plan (based on your EVB model number), a popup will appear.

Select which sample project file to write the default plan to the Si536x device mounted on your EVB. This ensures the device is completely reconfigured per the default plan for the DUT type mounted on the EVB.

CB Clo	ockBuilder Pro v4.3.1 -		$\times$
A	Write Design to EVB?		
	The EVB may be out-of-sync with your design. Would you your design to the EVB?	ı like to w	rite
	Yes No		

Figure 8.4. Write Design to EVB Dialog

Select "Yes" to write the default plan to the Si536x device mounted on your EVB.



Figure 8.5. Writing Design Status

At this point, verify the presence and frequencies of the output clocks using appropriate external instrumentation connected to the output clock SMA connectors. To verify that the output clocks are toggling at the correct frequency and signal format, click on View Design Report as highlighted below.



Figure 8.6. View Design Report

Your configuration's design report will appear in a new window, as shown below. Compare the observed output clocks to the frequencies and formats noted in your default project's Design Report. The details about all the inputs, outputs, reference, P/Q/N/R divider values.

CB Si5360 Design Report	_		×
Design Report			
Host Interface			
Mode: SPI 4-Wire Secondary SPI 3-Wire Interface: Disabled			
XO/XTAL: Type: XTAL (Crystal) on XA/XB Frequency: 48 MHz XTAL Offset: 0 ppm			
Outputs			
VDD01:3.3 V			
OUT0: 125 MHz Enabled, LVDS Q0 Divider OUT1: Unused			
OUT2: Unused OUT3: Unused			
VDD02:Off			
OUT4: Unused OUT5: Unused			
VDD03:Off			
OUT6: Unused OUT7: Unused			
Copy to Clipboard Save Report Ask for Help		Clos	se

Figure 8.7. Design Report Window

After CBPro writes the default plan to the EVB, click on "Open EVB GUI" as shown below:



Figure 8.8. Open EVB GUI

The EVB GUI will appear. Note that all power supplies will be set to the values defined in the device's default CBPro project file created by Skyworks, as shown in the following figure:

CB Si5360	) EVB - Cloc	kBuilder Pro					– 🗆 ×		
File Help	<b>)</b>								
Info D	evice API	Device API (Low-Level)	Regulators	All Voltages	GPIO	Status API	- Device API (Select)		
			Voltag	e Curre	ent	Power	Fixed-Step DCO		
	VDDO1	3.30V 🔽 On	3.263	V 13	mA	42 mW	Read		
	VDDO2	1.80V	0.002	V -1	mA	0 mW	Read		
	VDDO3	1.80V	Off 0	v o	mA	0 mW	Read Phase Readout		
	VDDO4	1.80V	0.002	V -1	mA	0 mW	Read		
	VDDO5	1.80V 🔽 🚺 🤇	Off 0	v o	mA	0 mW	Read Read Poll		
	VDDO6	1.80V	0.002	V -1	mA	0 mW	Read Read		
	VDDO7	1.80V	0.003	V -1	mA	0 mW	Read PLL Soft Reset		
	VDDIN	1.80V 🔽 On	1.801	V 30	mA	54 mW	Read		
	VDDHV	3.30V	3.258	V 192	mA	626 mW	Read		
	VDD18	1.80V	1.799	V 350	mA	630 mW	Read		
VDD	REF_ADP	3.30V 🔄 On	3.311	V 8	mA	26 mW	Read		
All Ou Sup	utput	Select Voltage Power On Power O	Tota Off	I 589	mA	1.378 W	Read All		
Log Filtered	Au	to Scroll: On 🔽 🛛 Ins	ert Marker	Clear	Сору	to Clipboard	Pause		
Timestan 14:22:29 14:22:29	Timestamp     Source     Message       14:22:29.124     EVB     Starting Set_Expander_signatexpander_num= r,port=0, pin=4, state=Logico)       14:22:29.124     EVB     Starting Write_DUT_Byte(address=0x000EE1, data=0x01)       14:22:29.342     Other     Starting Programming device								
EVB Firmwa	are 1.1 De	vice: Si5360   DUT Mode: \$	SPI; FW Low-Le	vel Commands			ClockBuilder Pro v4.3.1 [2022-02-2		

Figure 8.9. EVB GUI Window

#### 8.2 Workflow Scenario 2: Modifying the Default Skyworks-Created Device Configuration

To modify the "default" configuration using the CBPro Wizard, click on the links below under "Edit Configuration with Wizard". You can also use the drop down arrow next to "Design Dashboard" to navigate through the steps.

CB Si5360-RevA-Project - ClockBuilder Pro	– 🗆 X
ClockBuilder Pro 🖽 🕫	skyworks
Design Dashboard	Configuring Si5360ABCD Rev A
You have updated your Si5360 design. Click the "Save Design to Proj	ect File" link to save your changes.
Edit Configuration with Wizard Design ID & Notes · Revision & Grade · Host Interface · Reference · Outputs · Planner · GPIO · Output Enable · DPA Outputs · INTR	Evaluation Board Detected         Si5360 EVB, S/N 00-00-39-19-CC-EC         Write Design to EVB       Open EVB GUI
Your configuration is stored to a project file, which can be opened in ClockBuilder Pro at a later time.	C Export Generate in-system programming export data for your project.
Design Report & Datasheet Addendum You can view a <u>design report (text)</u> or create a <u>draft datasheet addendum (PDF)</u> for your design.	Documentation Device API Documentation <u>View</u> · <u>Save to Folder</u> · <u>Save to Zip</u>
Skyworks Cloud Services You can create a custom part number for your design. This can be used to order factory pre-programmed devices based on your configuration.	Ask for Help Have a question about your design? Click <u>here</u> to get assistance.
E Frequency Plan Valid O Design OK	Home Close

Figure 8.10. Edit Configuration with Wizard

You will now be taken to the Wizard's step-by-step menus to allow you to change any of the default plan's operating configurations.

CB Si5360-RevA-Proj	iect - ClockBuilder Pro			Х
ClockBuild	er Pro <sub>v4.3.1</sub> 🎭		SKYWOI	жя кя
Step 1 of 10 - De	esign ID & Notes 🔻 Confi	guring Si53	50ABCD	Rev A
Design ID The APP_INFO AP	I has 8 fields, DESIGN_ID0 through DESIGN_ID7, that can be used to store a design/configuration/re	vision identifie	r.	
Design ID:	(optional; max 8 characters)			
	The string you enter here is stored as ASCII bytes and returned by the APP_INFO API in DESIGN_	D0 through DE	SIGN_ID7.	
Padding Mode:	NULL Padded If you do not enter the full 8 characters, the remaining bytes of DESIGN_IDx will be padded v character).	vith 0x00 bytes	(aka NULL	
	Space Padded If you do not enter the full 8 characters, the remaining bytes of DESIGN_IDx will be padded v character).	vith 0x20 bytes	(space	
Enter anything yo While the text is v	u want here. The text is stored in your project file and included in design reports and custom part n vord wrapped in reports, you can use newlines to start a new paragraph.	Imber datashe	et addendu	ims.
Frequency Pla	an Valid 🕢 Design OK Write to EVB < Back Ne	t > Finis	h Ca	ncel

Figure 8.11. Design Wizard

Note that you can click on the icon in the lower left hand corner of the menu to confirm that your frequency plan is valid. After making your desired changes, click on Write to EVB to update the DUT and reconfigure your device real-time. The Design Write status window will appear each time you make a change.



Figure 8.12. Writing Design Status

## 8.3 Workflow Scenario 3: Testing a User-Created Device Configuration

To test a previously created user configuration, open the CBPro Wizard by clicking the icon on your desktop and selecting Open Design Project File.

CB ClockBuilder Pro Wizard - Skyworks	– D X
<ul> <li>ClockBuilder Pro Wizard</li> <li>We Make Timing Simple</li> </ul>	SKYWORKS
Work With a Design	Quick Links
Create New Project	Skyworks Timing Solutions
🖶 <u>Open Project</u>	Custom Part Number Lookup
Convert Existing Project/NVM File	Applications Documentation           10/40/100G Line Card Whitepaper
ex Open Sample Project	Clock Generators for Cloud Data Centers Optimizing Si534x Jitter Performance
Evaluation Board Detected Si5360 EVB Open Default Plan EVB GUI	Selecting the Right Clocks for Timing Synchronization Applications PCle Gen 4.0 Jitter Requirements Selecting a PCle Reference Clock Source Making Accurate Clock Jitter Measurements
	ClockBuilder Pro Documentation
	CBPro Overview CBPro Tools & Support for In-System Programming CLI User's Guide Release Notes
0,	Version 4.3.1 Built on 2/23/2022

Figure 8.13. Open Design Project File

Locate your CBPro design file (\*.slabtimeproj or \*.sitproj file) in the Windows file browser. Select the project file according to the DUT used on the Si536x EVB.

CB Open CBPro Projec	t File				×
$\leftrightarrow$ $\rightarrow$ $\checkmark$ $\uparrow$	> This PC > Documents > CBPro	Ū	Search CBPro	م	
Organize 🔻 New	v folder				• 🔳 💡
💻 This PC	^ Name	Date modified	١	Гуре	Size
🧊 3D Objects	Gi Si5360-RevA-Project	2/28/2022 2:19 PM	S	Skyworks Timing	29 KB
E. Desktop					
🗄 Documents					
L Downloads	¥				
	File name: Si5360-RevA-Project		~	Skyworks Timing P	roject $\vee$
				Open	Cancel



Select "Yes" when the WRITE DESIGN to EVB popup appears:



Figure 8.15. Write Design to EVB Dialog

The progress bar will be launched. After the new design project file has been written to the device, verify the presence and frequencies of your output clocks and other operating configurations using external instrumentation.

UG514: Si5360/61/62/63 Evaluation Board User's Guide • Serial Device Communications

# 9. Serial Device Communications

#### 9.1 Onboard SPI Support

Configuration and operation of the Si536x DUT is controlled by reading and writing to the API via the primary  $I^2C$  or SPI serial communication interface. SPI operates in either four-wire or three-wire modes. The default DUT and EVB are configured as three-wire mode. The EVB reserves flexibility of four-wire mode Si536X DUT control. To change it to four-wire SPI mode, remove resistors R197, R37 and install R38. The onboard MCU automatically detects the SPI mode and communicates with the Si536x device through a SPI link on the evaluation board. The MCU is the SPI master and the Si536x device is the SPI slave. The Si536x evaluation board does NOT support the  $I^2C$  mode of operation with the onboard MCU. SPI communication was chosen for the evaluation board because of the higher bus speed capability.

A secondary SPI interface can be used to communicate with the Si536x device, but the MCU on the EVB does not have a connection to the secondary SPI (JP10).

#### 9.2 External SPI and I<sup>2</sup>C Support

The evaluation boards are by default configured for SPI communication. The serial interface signals between the MCU and Si536x pass through jumper shunts installed on header J48. These jumper shunts must be installed for normal EVB operation using SPI with CBPro. If testing of I<sup>2</sup>C operation via external controller is desired, the shunts in J48 can be removed thereby isolating the onboard MCU from the Si536x.

The figure below illustrates the J48 header schematic. J48 even numbered pins (2, 4, 6, and so on) connect to the Si536x device, and the odd numbered pins (1, 3, 5, and so on) connect to the MCU. After the jumper shunts have been removed from J48 and J4, I<sup>2</sup>C operation should use J48 pin 4 (SDA\_SDIO) as the I<sup>2</sup>C SDA and J48 pin 8 (SCLK) as the I<sup>2</sup>C SCLK. Note that the external I<sup>2</sup>C controller will need to supply its own I<sup>2</sup>C signal pull-up resistors.

Please note that if I<sup>2</sup>C communication is required at the DUT, this can be obtained by contacting customer support to order a custom configured factory programmed part.



Figure 9.1. Serial Communications Header J48

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In addition to the above, the Si536x EVB also comes with a second SPI header JP10. Install R28, R29 and R35 and remove R27, R30 and R36 when using the secondary SPI.



Figure 9.2. Secondary SPI Header JP10

# 10. Si536x EVB Schematic, Layout, and Bill of Materials (BOM)

Contact Skyworks for details on the Si536x EVB Layout. The following section gives details about the Si536x EVB Schematic and Bill of Materials (BOM).



Figure 10.1. Si536x-EVB Schematic (1 of 10)



![](_page_28_Figure_2.jpeg)

![](_page_29_Figure_1.jpeg)

Figure 10.3. Si536x-EVB Schematic (3 of 10)

![](_page_30_Figure_1.jpeg)

Figure 10.4. Si536x-EVB Schematic (4 of 10)

![](_page_31_Figure_1.jpeg)

![](_page_31_Figure_2.jpeg)

![](_page_32_Figure_1.jpeg)

![](_page_32_Figure_2.jpeg)

![](_page_33_Figure_1.jpeg)

Figure 10.7. Si536x-EVB Schematic (7 of 10)

![](_page_34_Figure_1.jpeg)

![](_page_34_Figure_2.jpeg)

![](_page_35_Figure_0.jpeg)

Figure 10.9. Si536x-EVB Schematic (9 of 10)

![](_page_36_Figure_1.jpeg)

![](_page_36_Figure_2.jpeg)

CL (2 C3 C4 C5 (65, C7 C8 C7 C1) CL (2 C3 C4 C4) CL (2 C4 C4 C4) CL (2	NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Type	PCB Footprint	ManufacturerPN	Manufacturer
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		Quantity	C1 C2 C3 C4 C5	Value	nating	vonage	Toterance	турс		manaracturen n	
C11 (12 C13 C14)       Ab       Ab<			C6 C7 C8 C9 C10								
195       C214       L0.F       5.3V       10%       X8.       0020002.       004035633.05K       Weekel         C137 C18 C137       L0.F       10V       10%       X7.       0603       0603X78160-104K       Weekel         C137 C18 C137       L1F       10V       20%       X7.       0603       0603X78160-104K       Weekel         C135 C12 C137       L1F       10V       20%       X7.       0603       0603X78160-104K       Weekel         2       C124 C137       10F       10V       20%       X7.       0603       0603X78160-105K       Weekel         2       C124 C177       10F       10V       20%       X7.       0603       0603X78100-105K       Weekel         C135 C137 C145       10V       20%       X7.       0603       0603X78100-103K       Weekel         C135 C137 C145       10V       10V       20%       X7.       0603       0603X78100-103K       Weekel         C135 C137 C145       10V       10V       20%       X7.       0603       0603X78100-103K       Weekel         C135 C137 C145 C13       10V       20%       X7.       0603       0603X78100-105K       Weekel         C136 C147 C15 C13       1			C11 C12 C13 C14								
10       116 C 17       0.14 F       16V       10%       X7R       00805       00805X7R160-104K       Venkel         C119 C 129 C 123       114 F       16V       20%       X7R       0603       06033X7R160-104M       Venkel         C119 C 120 C 123       114 F       16V       20%       X7R       0603       C06033X7R160-105K       Venkel         2       C122 C 127       4.74 F       10V       20%       X7R       0603       C06033X7R160-105K       Venkel         2       C122 C 127       4.74 F       10V       20%       X7R       0603       C06033X7R160-105K       Venkel         1       C125 C 125 C 15       10F       25V       20%       X7R       0603       C060337R160-103K       Venkel         C135 C 125 C 15       10F       16V       20%       X7R       06063       C060337R160-103K       Venkel         13       C 258       0.014F       16V       20%       X7R       05063       C060337R160-105K       Venkel         14       C 126       20.7       50.9       20%       X7R       05063       C060337R160-105K       Venkel         15       C 258       0.014F       16V       20%       X7R       05		15	C214	1.0uF		6.3V	+10%	X5R	C0402   C0402	C0402X5R6R3-105K	Venkel
C127 C18 C121 C19 C129 C129 C139 C129 C123 C132 C124 C137 C137 C138 C101 C135 C101 C137 C138 C138 C138 C138 C138 C138 C138 C138		2	C116 C179	0.1uF		16V	+10%	X7R	C0805	C0805X7B160-104K	Venkel
10       5       C132 C137       0.14F       16V       20%       V7.8       C0603       C0603778169-105M       Venkel         1       C123 C123       1.0F       16V       210%       X7.8       C0603       C0603X78169-105M       Venkel         2       C123 C127       4.74F       10V       220%       X7.8       C0603       C0603X78169-105M       Venkel         2       C124 C177       10.4F       10V       220%       X7.8       C0603       C0603X78169-103M       Venkel         1       C126 C137       15V       220%       X7.8       C0603       C0603X78169-103M       Venkel         1       C126 C137       15V       210%       X7.8       C0603       C0603X78169-103M       Venkel         1       C126 C137       15V       210%       X7.8       C0603       C0603X78169-103M       Venkel         1       C126 C27       2205       15V       210%       X7.8       C0603       C0603X78169-103M       Venkel         1       C20 C27       2204       520%       X7.8       C0605       C0805X78169-103M       Venkel         1       C20 C27       C204 C13       C30       C050X78169-103K       Venkel       Venkel		_	C117 C118 C121	01201		101			00005	000000000000000000000000000000000000000	· critici
-1       C10 C10 C123       Luf       10V       210%       X7R       C0603       C0603X7R160-105K       Venkel         2       C124 C127       A.Juf       10V       220%       X7R       C1265       C1206X7R160-475M       Venkel         1       C126       Obluf       15V       20%       XAR       C0603       C0603X7R160-105K       Venkel         1       C126       Obluf       15V       20%       XAR       C0603       C0603X7R160-103K       Venkel         C135 C137 C145       C135 C137 C145       C135 C137 C145       Venkel       C0603       C0603X7R160-103K       Venkel         13       C286       C247 C233 C257       16V       10%       X7R       C0603       C0603X7R160-103K       Venkel         13       C285       0.01uF       16V       120%       X7R       C0603       C0603X7R160-103K       Venkel         1       C176       220uF       6.3V       220%       X7R       C0603       C0603X7R160-103K       Venkel         1       C176       220uF       6.3V       220%       X7R       C0603       C0203X7R160-103K       Venkel         1       C176       220uF       6.3V       220%       X7R		5	C192 C197	0.1uE		16V	+20%	X7R	0603	C0603X7R160-104M	Venkel
1       1.12       1.12       1.17       1.10%       1.78       0.0603       006033771160-105K       Venkel         2       0.122 0.127       1.0uf       1.0V       2.00%       TANT       0.0203       0.06033771160-105K       Venkel         1       0.15       0.01uF       1.6V       2.00%       X7R       0.0603       0.06933771160-105K       Venkel         1       0.13       0.14       1.6V       2.00%       X7R       0.0603       0.06933771160-103K       Venkel         1.3       C.258       0.01uF       1.6V       1.0%       X7R       0.0603       0.06933771160-103K       Venkel         1.3       C.258       0.01uF       1.6V       1.0%       X7R       0.0603       0.6033771160-103K       Venkel         1.3       C.258       0.01uF       1.6V       1.0%       X7R       0.0603       0.6033771160-103K       Venkel         1.43       C.258       0.01uF       1.6V       1.0%       X7R       0.0603       0.6033771160-103K       Venkel         1.43       C.250       0.01uF       1.6V       1.0%       X7R       0.0803       0.6033771160-103K       Venkel         1.5       C.0077728.613       1.67			C119 C120 C123	01201		101			00000	000000000000000000000000000000000000000	- critici
2       C122 C127       A70F       10V       20%       X7R       C1206       C1205X7R100-475M       Venkel         1       C126       D.01uF       15V       220%       X7R       C0603       C0603X7R106-103M       Venkel         C135 C137 C145       C135 C137 C145       LV       220%       X7R       C0603       C0603X7R160-103M       Venkel         C135 C137 C145       C135 C137 C145       LV       220%       X7R       C0603       C0603X7R160-103M       Venkel         13       C258       0.01uF       16V       10%       X7R       C0603       C0603X7R160-103M       Venkel         13       C256       0.01uF       16V       10%       X7R       C0603       C0603X7R160-103M       Venkel         14       C176       220uF       6.3V       20%       X7R       C0603       C0603X7R160-103M       Venkel         14       C176       220uF       6.3V       20%       X7R       C0603       C0603X7R160-103M       Venkel         13       C176       220uF       6.3V       20%       X5R       C1210       C1210X5R6R3-227MNE       Venkel         14       C176       C160       C160       C160       C160		5	C128 C129	1uF		16V	+10%	X7R	C0603	C0603X7R160-105K	Venkel
1       0107       100F       25V       20%       NAT       C6032       749(C106N025T       Kemet         1       010       0010F       10V       20%       N7R       00603       0060377160-103M       Venkel         1       0100 C189 C23       10V       20%       N7R       06003       00603X71160-103M       Venkel         1       0118       128       10V       10%       N7R       06003       00603X71160-103K       Venkel         13       0258       0.010F       16V       10%       X7R       06005       06003X71160-103K       Venkel         14       017       0176       220rF       6.3V       20%       X7R       06005       06003X71160-103K       Venkel         15       012       017       220rF       6.3V       20%       X7R       06005       06005X71160-103K       Venkel         16       016       016       10%       X7R       06005       06005X71160-103K       Venkel         17       020277283       164       6.3V       20%       X7R       06005       06005X71160-104K       Venkel         18       016       016       016       016       10%       10%		2	C122 C127	4.7uF		10V	±20%	X7R	C1206	C1206X7R100-475M	Venkel
1       C126       0.01u <sup>F</sup> 16V       220%       X7R       00603       00603X7R160-103M       Venkel         C135 C137 C145       C105 C135 C161       C107 C189 C235       C204 C232 C25       C		2	C124 C177	10uF		25V	+20%	TANT	C6032	T491C106M025ZT	Kemet
C135 C137 C145       C135 C135 C151       C150 C158 C152       C150 C158 C152 C15       C150 C158 C152 C151       C150 C158 C152 C151       C150 C150 C152		1	C126	0.01uF		16V	±20%	X7R	C0603	C0603X7R160-103M	Venkel
13       C20       C30       101 JF       10%       10%       77R       C6003       C6003X77.160-103K       Venkel         13       C240       C33       C174       15%       20%       X7R       C6005       C6003X77.160-103K       Venkel         10       17       C176       20 JF       18%       20%       X7R       C8005       C6003X77.160-103K       Venkel         10       17       C176       20 JF       6.3V       20%       X5R       C120       C120X58.68.3-227MNE       Venkel         10       C20       C27       C28.01       S3       S18       C120       C120X58.68.3-227MNE       Venkel         10       C20       C27 <c28.01< td="">       S3       S18       S18<th></th><th></th><th>C135 C137 C145</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></c28.01<>			C135 C137 C145								
133       C250       0.01uF       10V       10W       17R       C0603       C0603X7R160-103K       Venkel         13       C174 C175 C19       1uF       10V       20%       X7R       C0605       C0805X7R160-105K       Venkel         10       10       20uF       6.3V       20%       X7R       C0805       C0805X7R160-105K       Venkel         11       C20 C27 C28 C31       S20uF       6.3V       20%       X7R       C1210X57683-227MNE       Venkel         12       C20 C27 C28 C31       S20uF			C150 C158 C161								
13       C28       0.01uF       10%       10%       X7R       C0603       C0603X7R160-105K       Venkel         1       C174 C778 C136       140       220%       X7R       C0805       C0805X7R160-105K       Venkel         1       C176       220uF       6.3V       20%       X7R       C0805       C1210X5R6R3-227MNE       Venkel         1       C176       220uF       6.3V       20%       X5R       C1210       C1210X5R6R3-227MNE       Venkel         1       C20 C27 C28 C31       C20 C27 C28 C31       S3X       S			C170 C189 C236								
13       C258       0.01uF       16V       ±0%       X7R       C0603       C0603X7R160-103K       Venkel         1       1       C17       20.0F       6.3V       ±20%       X7R       C0805       C0805X7R160-103K       Venkel         1       C17       20.0F       6.3V       ±20%       X7R       C1210       C1210X5R68.3:227MNE       Venkel         1       C17       C20.077.28.51			C249 C253 C257								
3       C174 C178 C196       Juf       16V       ±20%       X7R       C0805       C0805X7R160-105M       Venkel         1       C176       220uF       6.3V       ±20%       X5R       C1210       C1210X5R6R3-227MNE       Venkel         2       C20 C27 C28 C31       C32 C34 C35 C37       C38 C42 C43 C45       C46 C49 C00 C33       C54 C37 C58 C61       C62 C65 C66 G9       C70 C73 C74 C77       C76 C81 C82 C85       C56 C69 00 C33       C56 C69 00 C33       C56 C69 00 C33       C110 C102 C105       C101 C102 C105       C103 C144 C143 C152       C133 C144 C155       C138 C159 C237       C145       C144 C155 C166       C139 C199 C237       C40022/C04022L       C04022/R100-104K       Venkel		13	C258	0.01uF		16V	±10%	X7R	C0603	C0603X7R160-103K	Venkel
1       C176       220uF       6.3V       ±20%       X5R       C1210       C1210X5R6R3-227MNE       Venkel         2       3       2       3       2       3       2       3       2       3       2       3       2       3       2       3       2       3       2       3		3	C174 C178 C196	1uF		16V	±20%	X7R	C0805	C0805X7R160-105M	Venkel
C20 C27 C28 C31         C32 C34 C35 C37         C38 C42 C43 C45         C46 C49 C50 C53         C54 C57 C58 C61         C52 C55 C66 C69         C70 C73 C74 C77         C78 C81 C82 C85         C66 C89 C90 C93         C94 C97 C98         C101 C102 C105         C106 C109 C110         C131 C144 C141         C142 C143 C152         C153 C154 C155         C164 C165 C166         C175 C184 C191         C198 C199 C237         72       C239 C250 C252         0.104 F         72       C239 C250 C252         0.104 F       10V       ±10%       X78       C0402 [C04021       C0402 X78100-104K       Venkel		1	C176	220uF		6.3V	±20%	X5R	C1210	C1210X5R6R3-227MNE	Venkel
		72	C20 C27 C28 C31 C32 C34 C35 C37 C38 C42 C43 C45 C46 C49 C50 C53 C54 C57 C58 C61 C62 C65 C66 C69 C70 C73 C74 C77 C78 C81 C82 C85 C86 C89 C90 C93 C94 C97 C98 C101 C102 C105 C106 C109 C110 C131 C140 C141 C142 C143 C152 C153 C154 C152 C164 C165 C166 C175 C184 C191 C193 C194 C195 C198 C199 C255 C195 C154 C155	0.145		101/	+10%	¥7R	04021(0402)	C0402X78100-104K	Venkel
1 (213 D)D1uE 10V +20% X7R C0402(C0402) C0402Y7P100-103M Vanad		1	C213	0.01uE		101/	+20%	X7R	C0402   C0402	C0402X7R100-103M	Venkel

Figure 10.11. Si536x-EVB BOM (1 of 6)

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Туре	PCB Footprint	ManufacturerPN	Manufacturer
		C26 C29 C30 C33								
		C36 C39 C40 C41								
		C132 C133 C134								
		C138 C144 C146								
		C147 C149 C156								
		C157 C159 C163								
		C167 C168 C173								
		C187 C188 C201								
		C202 C203 C204								
		C205 C206 C207								
		C208 C238 C241								
		C242 C251 C254								
		C255 C256 C259								
	42	C260	10uE		6 3V	+20%	X5R	C06031C06031	C0603X5R6R3-106M	Venkel
	4	D1 D2 D3 D4	Blue	20mA	3.4V	22070	SMT. Chipl FD	LED-HSMX-C170	HSMB-C170	Avago Technologies
	1	D6	SP0503BAHT	300mW	20V		TVS	SOT143-AKKK	SP0503BAHTG	Littelfuse
	3	D7 D8 D10	Green	20mA	3.4V		SMT. Chipl FD	LED-HSMX-C170	HSMO-C170	Avago Technologies
	1	D9	10V	500mW	10V	5%	Zener	SOD-123	MMSZ4697T1G	On Semi
	1	FB1	22 Ohm	6000mA			SMT	L0805	BLM21PG220SN1	MuRata
		J1 J2 J4 J5 J6 J7 J8								
		J9 J10 J11 J12 J13								
		J14 J15 J16 J17								
		J18 J19 J20 J21								
		J22 J23 J24 J25								
		J26 J27 J28 J29								
		130 131 132 133								
		134 135 136 137								
		J38 J39 J40 J41								
		142 143 144 145								
	46	J46 J47	SMA				SMA	SMA-SMT-50 OHMISMA-EDGE-SISMA-SMT-50 OHM 10NIL	142-0701-851	Johnson Components
	1	J48	HEADER 5x2				Header	CONN2X5	TSW-105-07-T-D	Samtec
	1	J51	USB Type B				USB	CONN-USB-B	292304-1	Тусо
	1	J52	5X2 Shrouded Header				Shrouded	CONN2X5-4W	5103309-1	Тусо
	1	J53	CONN TRBLK 2	24A			TERM BLK	CONN-TB-1711026	1711026	PHOENIX CONTACT
	1	J54	HEADER 6x2				Header	CONN-2X6	TSW-106-07-T-D	Samtec
	1	J55	Power Jack	2.5A			BARREL	CONN-3-PWR   PJ-002A	PJ-002A	CUI
		JP1 JP2 JP3 JP4								
		JP5 JP6 JP7 JP8								
	10	JP9 JP11	Header 1x2 TH				Header	CONN1X2	TSW-102-07-G-S	Samtec
	1	JP10	HEADER 4X1				Header	CONN-1X4	TSW-104-07-T-S	Samtec
	3	JP31 JP34 JP39	HEADER 1x3				Header	CONN-1X3	TSW-103-07-T-S	Samtec

Figure 10.12. Si536x-EVB BOM (2 of 6)

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Tyne	PCB Footprint	ManufacturerPN	Manufacturer
		JS1 JS2 JS3 JS4		<u> </u>	, i i i i i i i i i i i i i i i i i i i					
		JS5 JS6 JS7 JS8								
		JS9 JS15_1-2								
		JS48_1-2 JS48_3-								
		4 JS48_5-6								
		JS48_7-8 JS48_9-								
	15	10	Jumper Shunt				Shunt	N/A SHUNT	SNT-100-BK-T	Samtec
	1	LB1	Si5360-A-EB				POLYIMIDE, WHITE	PTL-14-477	LABEL-Si5360-A-EB	Skyworks
		MH1 MH2 MH3								
		MH4 MH5 MH6								
	9	MH7 MH8 MH9	4-40				SCREW	MH-125 MH-125NP	NSS-4-4-01	Richco Plastic Co
	1	PCB1	SI536x-A-EB REV 1.0				BARE PCB	N/A	SI536x-A-EB REV 1.0	Skyworks
		D1 D2 D12 D14								
		D15 D16 D17 D19								
		R19 R20 R31 R32								
		R33 R34 R41								
		R105 R114 R115								
		R130 R131 R146								
		R147 R162 R167								
	27	R185 R246 R258	0	1A			ThickFilm	R0603 R0603L	CR0603-16W-000	Venkel
		R103 R110 R112								
	4	R113	1K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-1001F	Venkel
		R106 R107 R122								
		R123 R138 R139								
		R154 R155 R171								
	12	R173 R189 R244	401/	4.46.044			71.1.1.7.1	50000	CD0C02 4CW 40025	
	13	R255	10K	1/16W		±1%	ThiskFilm	RU6U3	CR0603-16W-1002F	Venkel
	1	R116 R117 R119	1.0	1/1000		11/0	THICKFIIIII	10003	CU0003-1014-1000	Venikel
		R119 R132 R133								
		R134 R135 R148								
		R149 R150 R151								
	14	R164 R166	8.06	1/2W		±0.1%	±50PPM	R2010	TFCR2010-2W-C-8R06B	Venkel
		R120 R121 R136								
		R137 R152 R153								
		R169 R188 R247								
	11	R259 R262	1.87K	1/10W		±1%	ThickFilm	R0603	CR0603-10W-1871F	Venkel
		R124 R127 R140								
		R143 R156 R159								
	9	R174 R190 R242	2.15K	1/10W		±1%	ThickFilm	R0603	CR0603-10W-2151F	Venkel
		R125 R128 R141								
		R144 R157 R160	412	4 (4 0) 14			-	B0000	000000 4011/ 40045	
	9	R175 R191 R243	IK	1/10W		±1%	ThickFilm	K0603	CR0603-10W-1001F	Venkel

Figure 10.13. Si536x-EVB BOM (3 of 6)

	-			Contraction of the second			-			
NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Туре	PCB_Footprint	ManufacturerPN	Manufacturer
		R126 R129 R142								
		R145 R158 R161								
		R177 R192 R245								
	11	R257 R261	1.5K	1/10W		±1%	ThickFilm	R0603	CR0603-10W-1501F	Venkel
	1	R168	1.0	1/4W		±1%	ThickFilm	R1206	CR1206-4W-1R00F	Venkel
	1	R178	17.4K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-1742F	Venkel
		R187 R241 R253								
	4	R260	3.3	1W		±1%	ThickFilm	R2010	CR2010-1W-3R30FT	Venkel
		R193 R194 R195								
	4	R196	10.0K	1/10W		±0.1%	±25PPM	R0603	ERA-3AEB103V	Panasonic
		R27 R30 R36 R37								
		R39 R40 R197								
		R206 R265 R266								
	12	R269 R270	0	1A			ThickFilm	R0402 R0402L	CR0402-16W-000	Venkel
		R4 R5 R6 R7 R8								
		R9 R10 R11 R12								
		R21 R22 R23 R24								
		R81 R82 R83 R84								
		R85 R86 R87								
	23	R104 R108 R111	2.49K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-2491F	Venkel
	1	R44	10K	1/16W		±1%	ThickFilm	R0402 R0402L	CR0402-16W-1002F	Venkel
		R52 R53 R54 R55								
	8	R62 R63 R64 R65	49.9	1/16W		±1%	ThickFilm	R0402 R0402L	CR0402-16W-49R9F	Venkel
	1	R80	100	1/10W		±1%	ThickFilm	R0603   R0603L	CR0603-10W-1000F	Venkel
	1	S1	SW PUSHBUTTON	50mA	12Vdc		Tactile	SW4N6.5X4.5-PB	101-0161-EV	Mountain Switch
		SO1 SO2 SO3								
		SO4 SO5 SO6								
	9	SO7 SO8 SO9	STANDOFF				STANDOFF		1902D	Keystone Electronics
	2	TP73 TP76	RED				Loop	TESTPOINT	151-207-RC	Kobiconn
	1	U1	Si5360				Timing	QFN72M10X10P0.5E8.7	Si5360A-A-GM	Skyworks
	1	U16	ADP150AUJZ-3.3-R7	150mA			LDO	SOT5N2.8P0.95	ADP150AUJZ-3.3-R7	ANALOG DEVICES
	2	U19 U25	PCA9535CPW				12C	TSSOP24N6.4P0.65	PCA9535CPW	NXP
	2	U2 U3	ADG729		2.7-5.5V		DUAL	TSSOP16N6.4P0.65	ADG729BRUZ	Analog Devices
		U20 U21 U23								
	4	U24	ADG728		2.7-5.5V			TSSOP16N6.4P0.65	ADG728BRUZ	Analog Devices
	1	U22	AD8628		5V		OPAMP	SOT23-5N	AD8628AUJ-R2	Analog Devices
	1	U26	DS2431					SOJ6N4.45P1.27	DS2431P+	Maxim
	1	U30	WSU050-3000	15W	5V		MISC		WSU050-3000	TRIAD
	1	∪4	LTC4311		5.5V			SOT6N2.1P0.65	LTC4311CSC6#TRMPBF	Linear Technology
	1	U5	PCA9517AD				DO NOT SUB	SO8N6.0P1.27	PCA9517AD,118	NXP
	1	U6	C8051F380				MCU	QFP48N9X9P0.5	CF380P0997AGQ	SiLabs
	1	U8	TPS76201	100mA			LDO	SOT5N2.8P0.95	TPS76201DBV	TI

Figure 10.14. Si536x-EVB BOM (4 of 6)

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Type	PCB Footprint	ManufacturerPN	Manufacturer
	a contract y	119111011111112	- drat	ind cirrig		Torcruite				
		113114115								
	10	1118 1121 1122	TDS7A99	1.4				OEN20N4X4P0 5E2 7	TD\$7499	ті
	10	V1	197A00	IA			XO	OSCAN2 222 E 7M	7749070007	TVC
	1	×1 V1	40MUz Cructal				Quartz	VTALAND 222 5 7M48072002	71448070007	TXC
Not Installed Com	nononts	11	40iviniz Crystar				Quartz	XTAL4103.2X2.3-710148072002	/101480/2005	INC
Not installed com	Quantity	Poforence	Value	Pating	Voltage	Tolerance	Tuno	PCB Ecotorint	ManufacturorPN	Manufacturer
NI	Quantity	C125		Naung	16V		V7P	C0603		Vonkol
	1	C125	0.10		101	120%	A/N	00005	C0803X7K180-104W	venker
		C150 C155 C148								
NI	0	C131 C100 C102	0.01E		101	100/	VTD	60603	COCO2X701CO 102K	Verdel
NI NI	9	C171 C190 C240	0.01uF		101	±10%	X/R	C0603	C0603X7R160-103K	Venkel
NI	2	C15 C22	0.010F		101	120%	X7R	C0402   C0402L	C0402X7R100-105W	Verkel
NI	1	C169	4.70F		161	±20%	X/K	C1206	C1206X/R100-4/5M	Venkel
NI	1	C1/2	0.010F		160	±20%	X/R	C0603	C0603X7R160-103M	Venkel
NI	1	(211	220uF		6.3V	±20%	X5R	C1210	C1210X5R6R3-227MINE	Venkel
NI	2	C229 C230	0.1uF		10V	±10%	X/R	C0402   C0402L	C0402X/R100-104K	Venkel
NI	2	J49 J50	HEADER 1x1				Header	HDR1X1	TSW-101-07-T-S	Samtec
		JP14 JP15 JP18								
		JP19 JP22 JP23								
		JP26 JP27 JP30								
NI	11	JP38 JP42	Header 1x2 TH				Header	CONN1X2	TSW-102-07-G-S	Samtec
		JP16 JP17 JP20								
		JP21 JP24 JP25								
NI	7	JP28	HEADER 1x3				Header	CONN-1X3	TSW-103-07-T-S	Samtec
NI	1	JS11	Jumper Shunt				Shunt	N/A SHUNT	SNT-100-BK-T	Samtec
NI	1	R170	10K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-1002F	Venkel
NI	1	R172	1.0	1/10W		±1%	ThickFilm	R0603	CR0603-10W-1R00F	Venkel
NI	1	R176	6.04K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-6041F	Venkel
NI	1	R202	0	1A			ThickFilm	R0603   R0603L	CR0603-16W-000	Venkel
NI	2	R25 R26	2.49K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-2491F	Venkel
		R3 R28 R29 R35								
		R38 R56 R57 R60								
		R61 R68 R69 R70								
		R71 R208 R209								
		R210 R211 R212								
		R213 R214 R215								
		R216 R221 R222								
NI	26	R224 R263	0	1A			ThickFilm	R0402   R0402L	CR0402-16W-000	Venkel
NI	2	R46 R48	49.9	1/16W		±1%	ThickFilm	R0402   R0402L	CR0402-16W-49R9F	Venkel

#### Figure 10.15. Si536x-EVB BOM (5 of 6)

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Туре	PCB_Footprint	ManufacturerPN	Manufacturer
		TP1 TP2 TP7 TP8								
		TP9 TP10 TP11								
		TP12 TP13 TP14								
		TP15 TP16 TP17								
		TP18 TP25 TP26								
		TP27 TP28 TP29								
		TP30 TP31 TP32								
		TP33 TP34 TP35								
		TP36 TP37 TP38								
		TP40 TP41 TP44								
		TP52 TP53 TP54								
		TP65 TP66 TP72								
NI	38	TP75	RED				Loop	TESTPOINT	151-207-RC	Kobiconn
		TP3 TP4 TP5 TP6								
		TP20 TP21 TP23								
		TP24 TP55 TP56								
		TP57 TP58 TP59								
NI	14	TP60	BLUE				Loop	TESTPOINT	151-205-RC	Kobiconn
		TP42 TP43 TP67								
NI	6	TP69 TP70 TP74	RED				LOOP	TESTPOINT	5000	Keystone
NI	1	TP45	BLACK				Loop	TESTPOINT	151-203-RC	Kobiconn
		TP46 TP47 TP48								
NI	5	TP49 TP78	HEADER 1x1				Header	CONN-1X1	TS-101-T-AA	Samtec

#### Figure 10.16. Si536x-EVB BOM (6 of 6)

UG514: Si5360/61/62/63 Evaluation Board User's Guide • Revision History

# **11. Revision History**

#### Revision 206415A

November, 2022

- · Removed watermark.
- · Updated document title.
- · Updated decimal-based revision numbering system to alpha-numeric revision code.

#### Revision 0.2

May, 2022

- Updated 5. References and External Reference Connections (XA/XB, XO\_IN/XO\_INB).
- Updated 9.1 Onboard SPI Support.
- Updated 10. Si536x EVB Schematic, Layout, and Bill of Materials (BOM).

#### **Revision 0.1**

April, 2022

· Initial release.

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![](_page_43_Picture_4.jpeg)

**Portfolio** skyworksinc.com SW/HW skyworksinc.com/CBPro

![](_page_43_Picture_7.jpeg)

![](_page_43_Picture_8.jpeg)

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