

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®(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

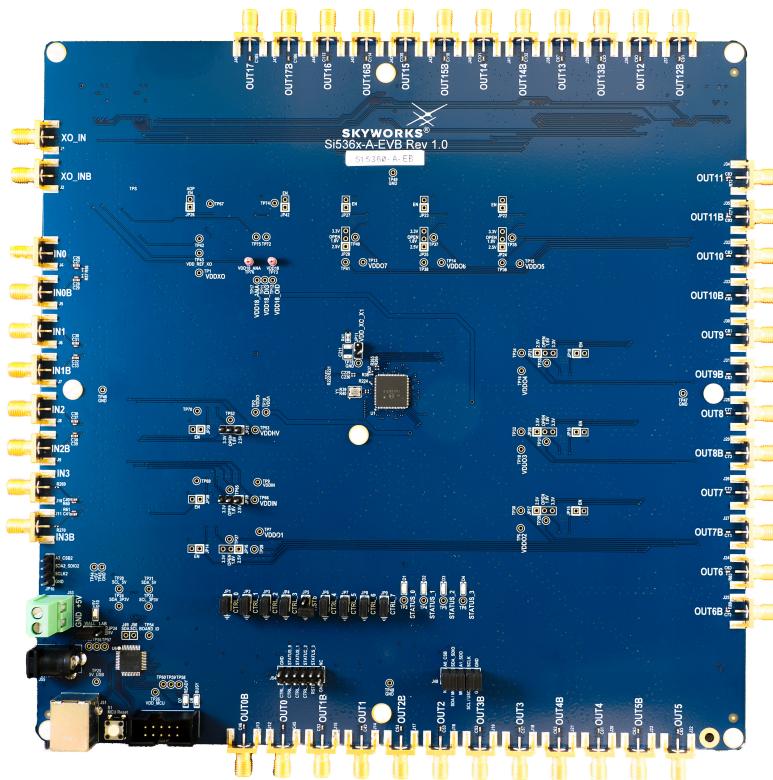


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1. Functional Block Diagram

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.

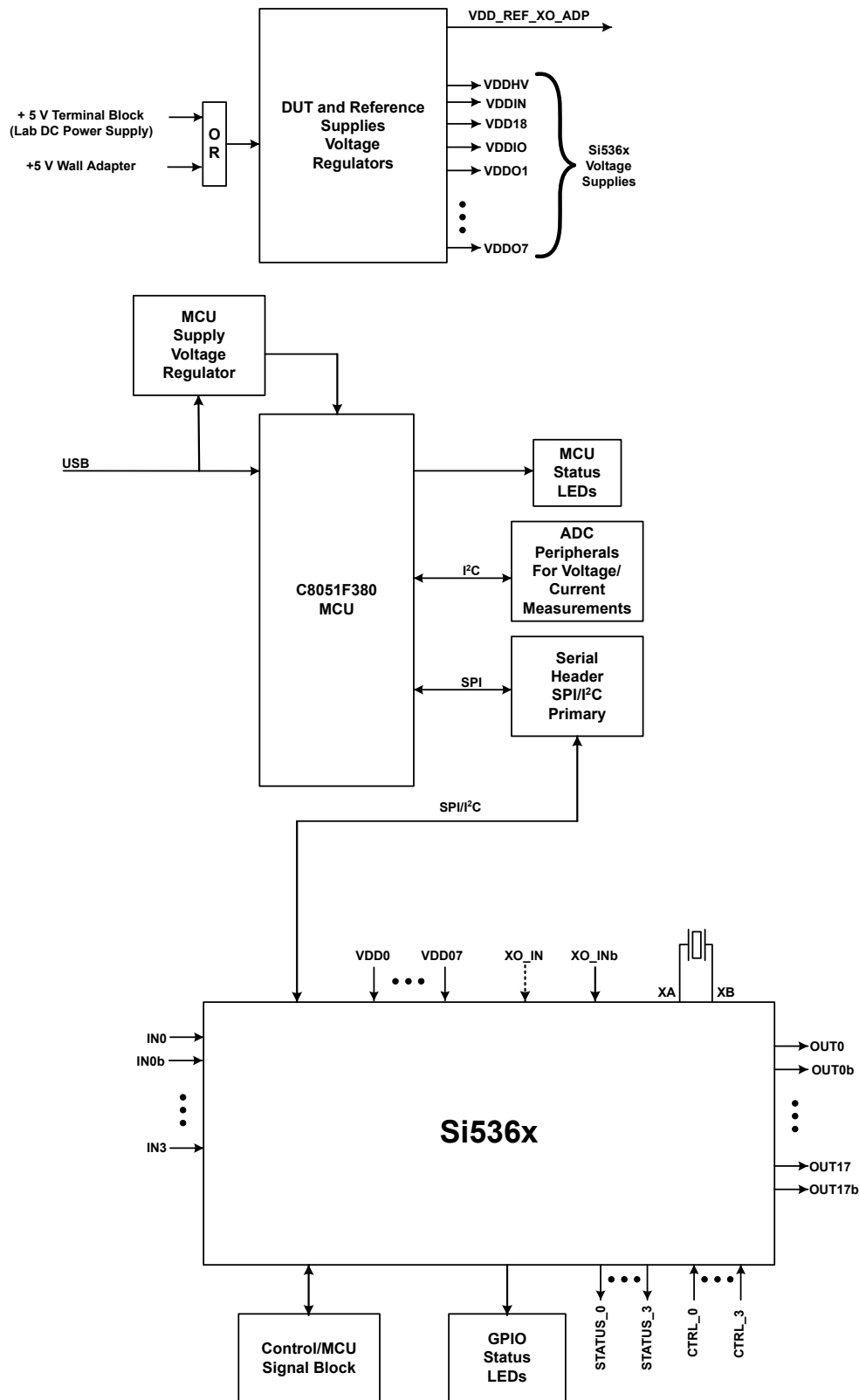
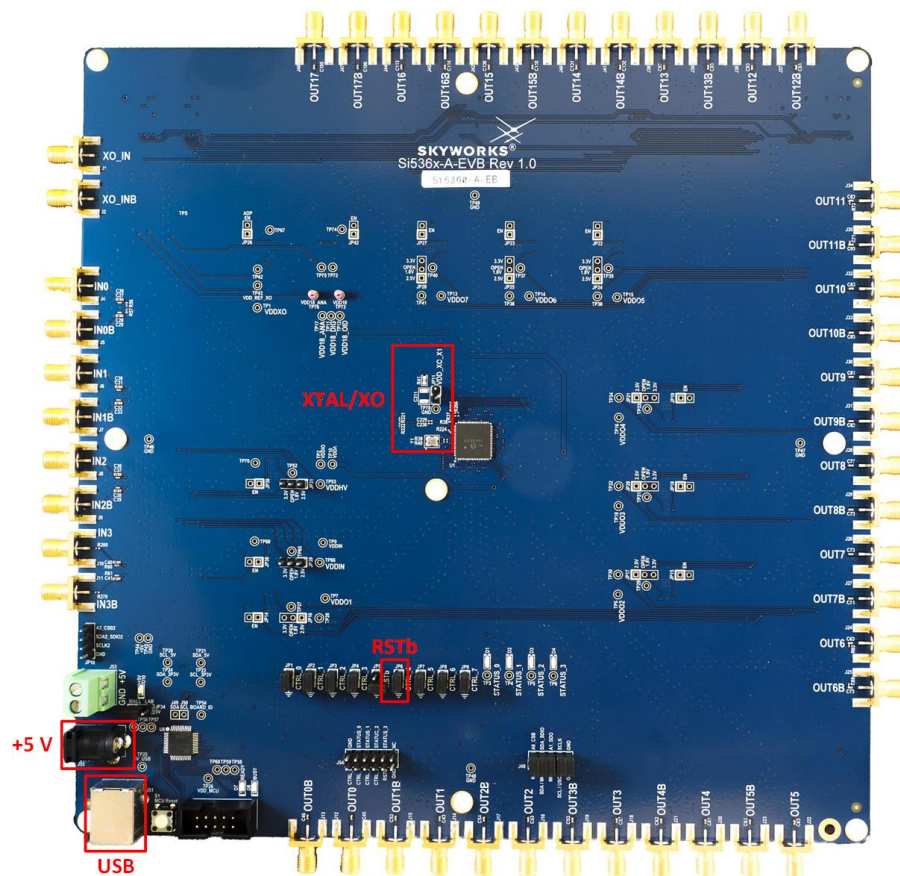


Figure 1.1. Si536x-EVB Functional Block Diagram

2. Quick Start Guide

1. Download and install the latest version of the ClockBuilder Pro desktop software from <https://www.skyworksinc.com/en/application-pages/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 corresponding 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.

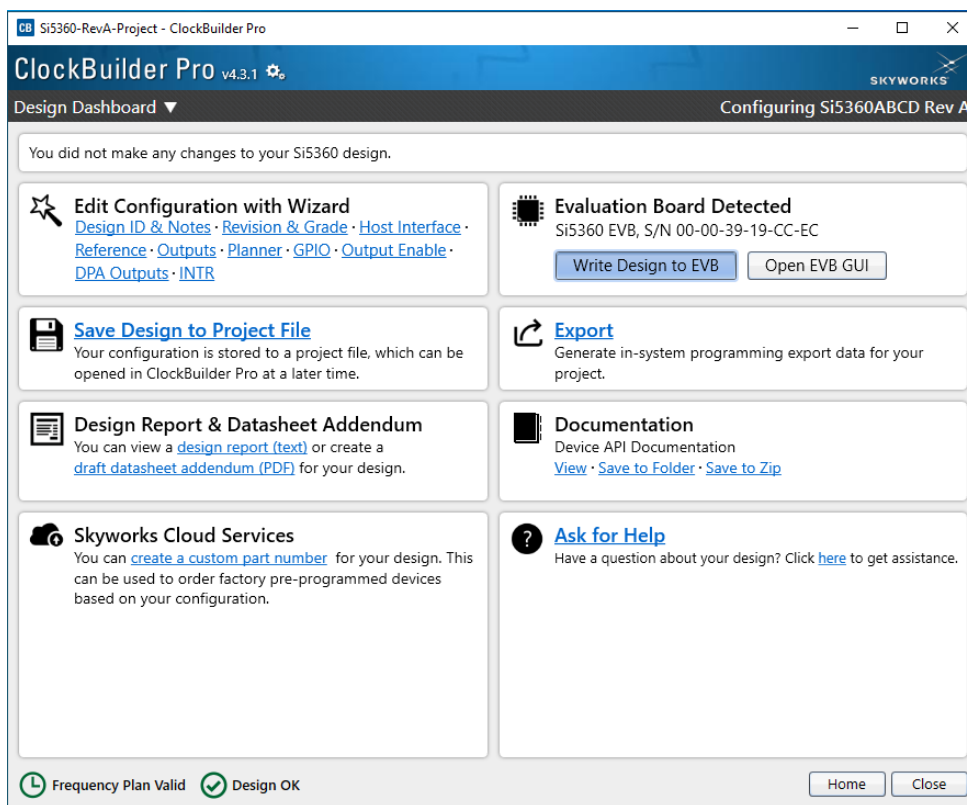


Figure 2.2. CBPro Wizard Home Page – Write Project File To EVB

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.

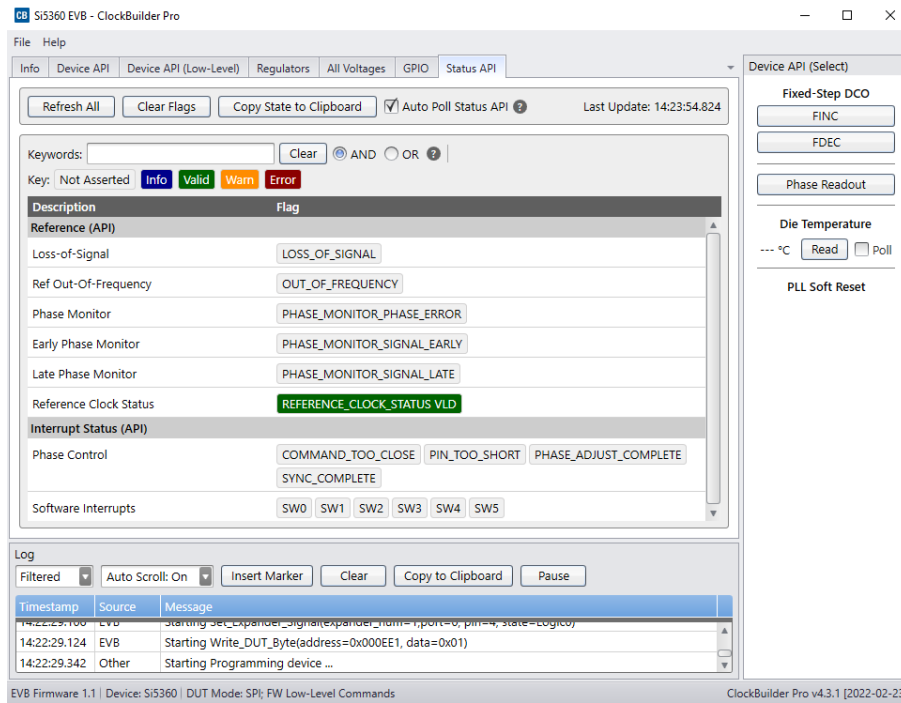


Figure 2.3. CBPro EVB GUI API Status

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

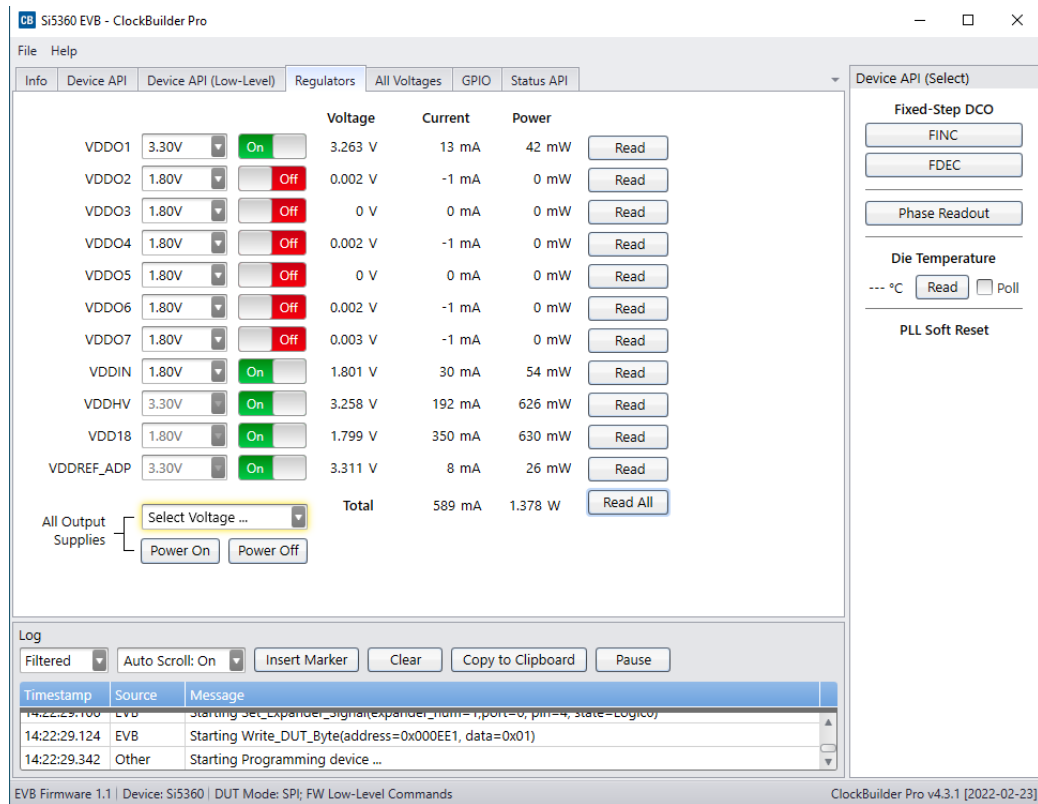


Figure 2.4. CBPro EVB GUI Regulators Tab

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.

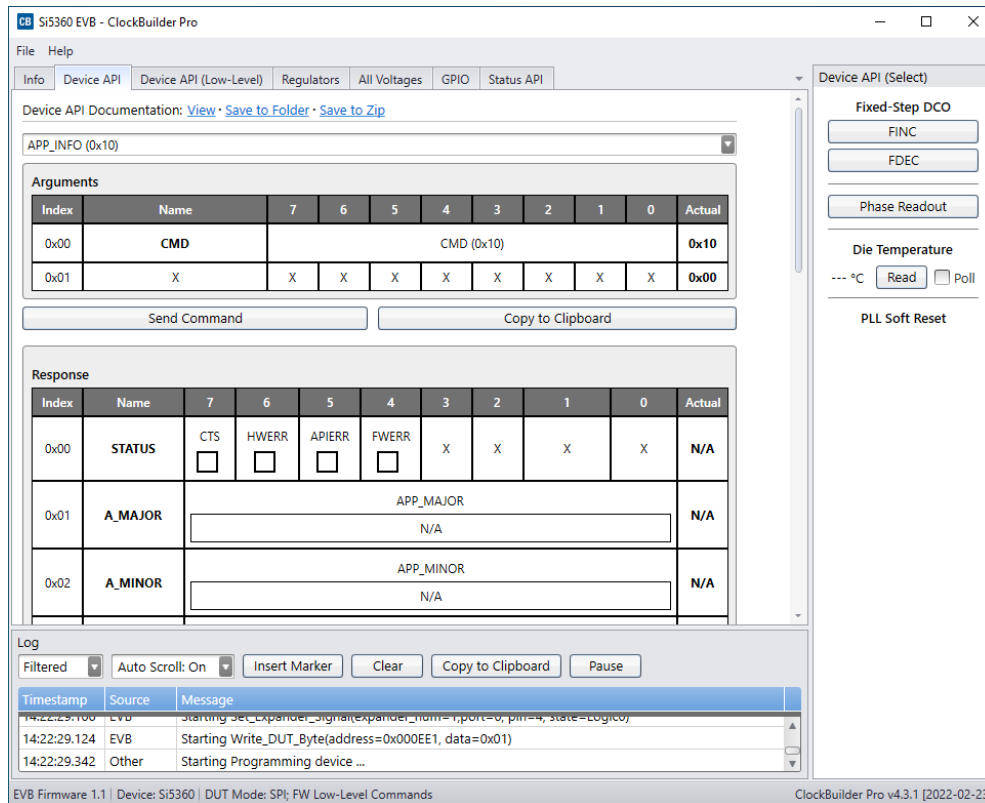


Figure 2.5. CBPro EVB GUI—Device API

3. Jumper Defaults

Table 3.1. Si536x EVB Jumper Defaults

Location	Type	Description or Signal (NI = Jumper header pins Not Installed)	Jumper Shunt I=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	O
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)	O
JP15	2-pin	VDDO2_EN to GND (NI)	O
JP16	3-pin	VDDO1_25VB or VDDO1_33VB to GND (NI)	O
JP17	3-pin	VDDO2_25VB or VDDO2_33VB to GND (NI)	O
JP18	2-pin	VDDO3_EN to GND (NI)	O
JP19	2-pin	VDDO4_EN to GND (NI)	O
JP20	3-pin	VDDO3_25VB or VDDO3_33VB to GND (NI)	O
JP21	3-pin	VDDO4_25VB or VDDO4_33VB to GND (NI)	O
JP23	2-pin	VDDO5_EN to GND (NI)	O
JP24	3-pin	VDDO5_25VB or VDDO5_33VB to GND (NI)	O
JP25	3-pin	VDDO6_25VB or VDDO6_33VB to GND (NI)	O
JP26	2-pin	VDD_REF_EN to GND (NI)	O
JP27	2-pin	VDDO7_EN to GND (NI)	O
JP28	3-pin	VDDO7_25VB or VDDO7_33VB to GND (NI)	O
JP30	2-pin	VDDHV_EN to GND (NI)	O
JP31	3-pin	VDDHV_25VB or VDDHV_33VB to GND (NI)	O
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	O
JP38	2-pin	VDDIN_EN to GND (NI)	O
JP39	3-pin	VDDIN_25VB or VDDIN_33VB to GND (NI)	1-2
JP42	2-pin	VDD18_EN to GND (NI)	O

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"

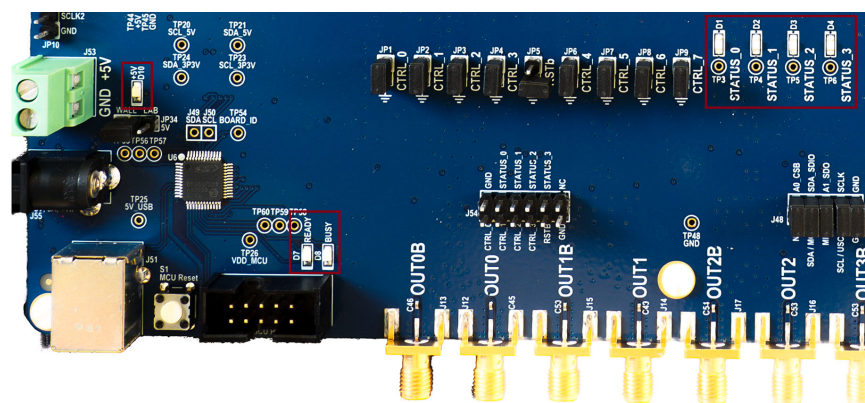


Figure 4.1. Status LEDs and CTRL Pins

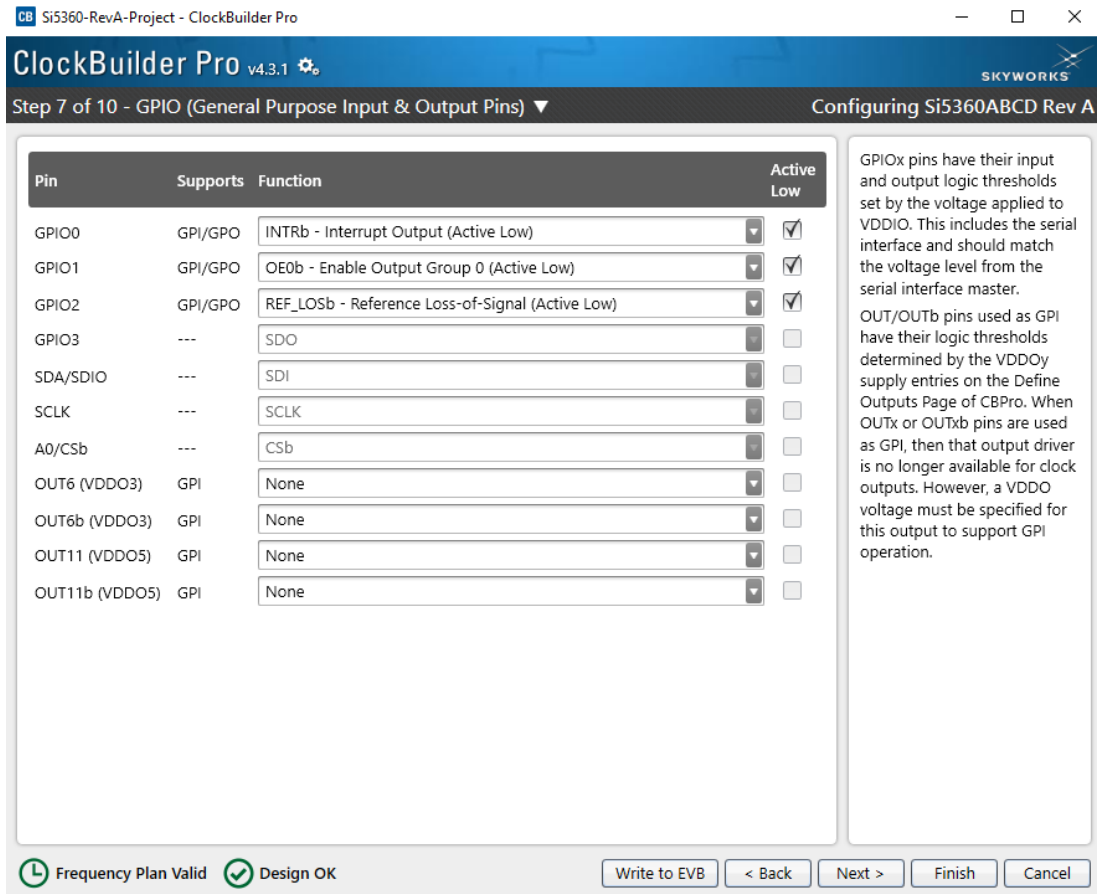


Figure 4.2. CBPro Wizard GPIO

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 switch between XO and XTAL frequency plans during evaluation.

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

Reference Designator	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		

REFERENCE CONNECTIONS

Reference Population Options:
 Short JP11 enable XO
 Populate R39, R40 enable crystal

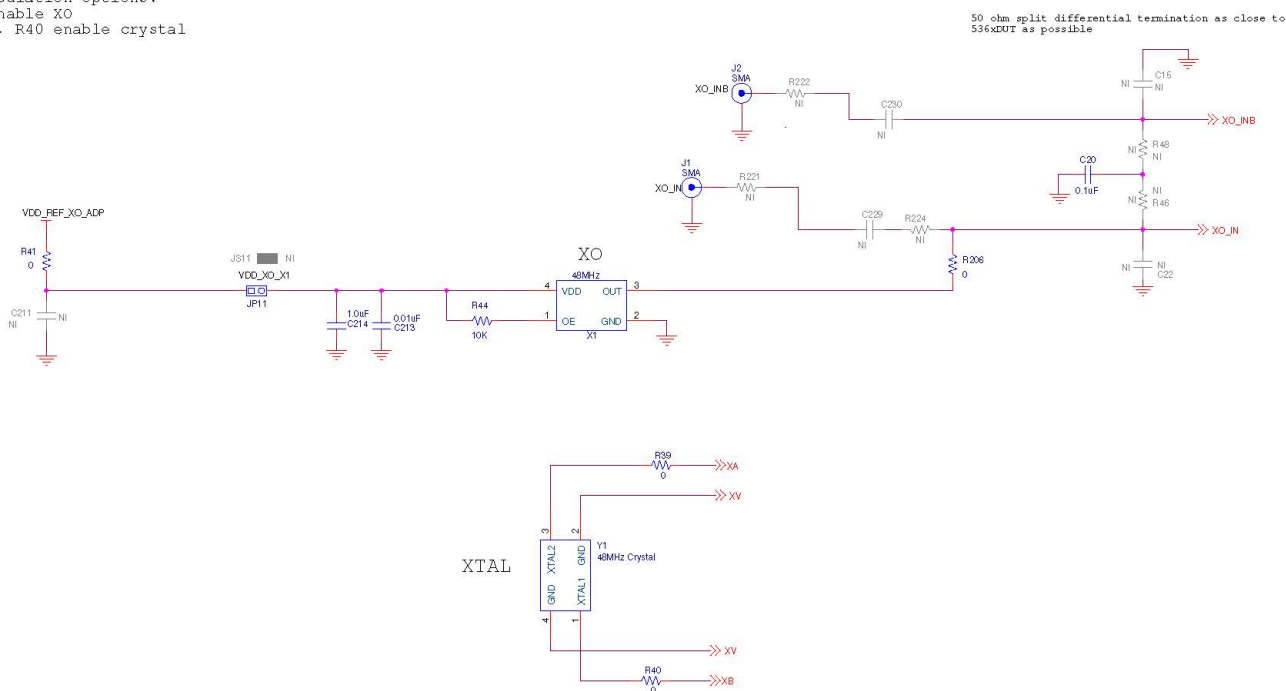


Figure 5.1. Reference Connections Schematic Excerpt

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 Ω 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 Ω termination and replace the ac coupling capacitor with a 0 Ω resistor.

INPUT CLOCKS

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

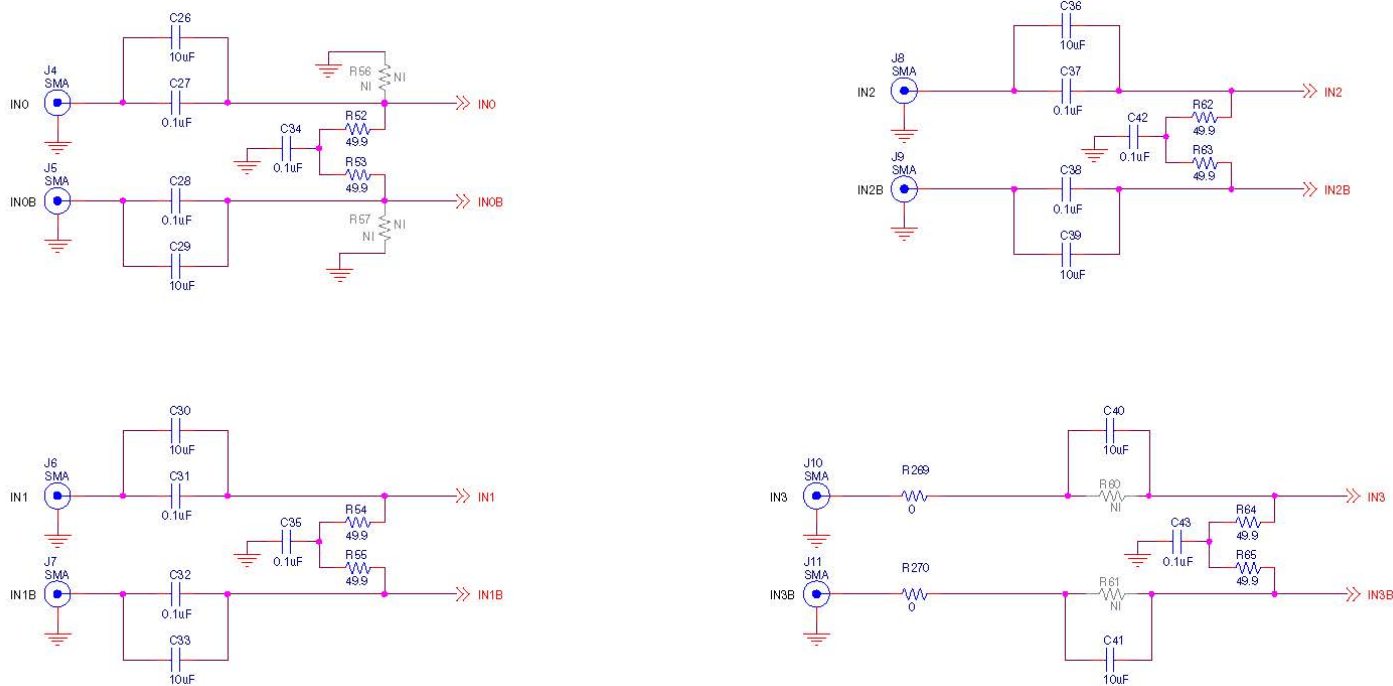


Figure 6.1. Input Clocks Schematic Excerpt

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.

OUTPUT CLOCKS

All OUTX/OUTXB traces on the schematic should be trace length matching and impedance controlled

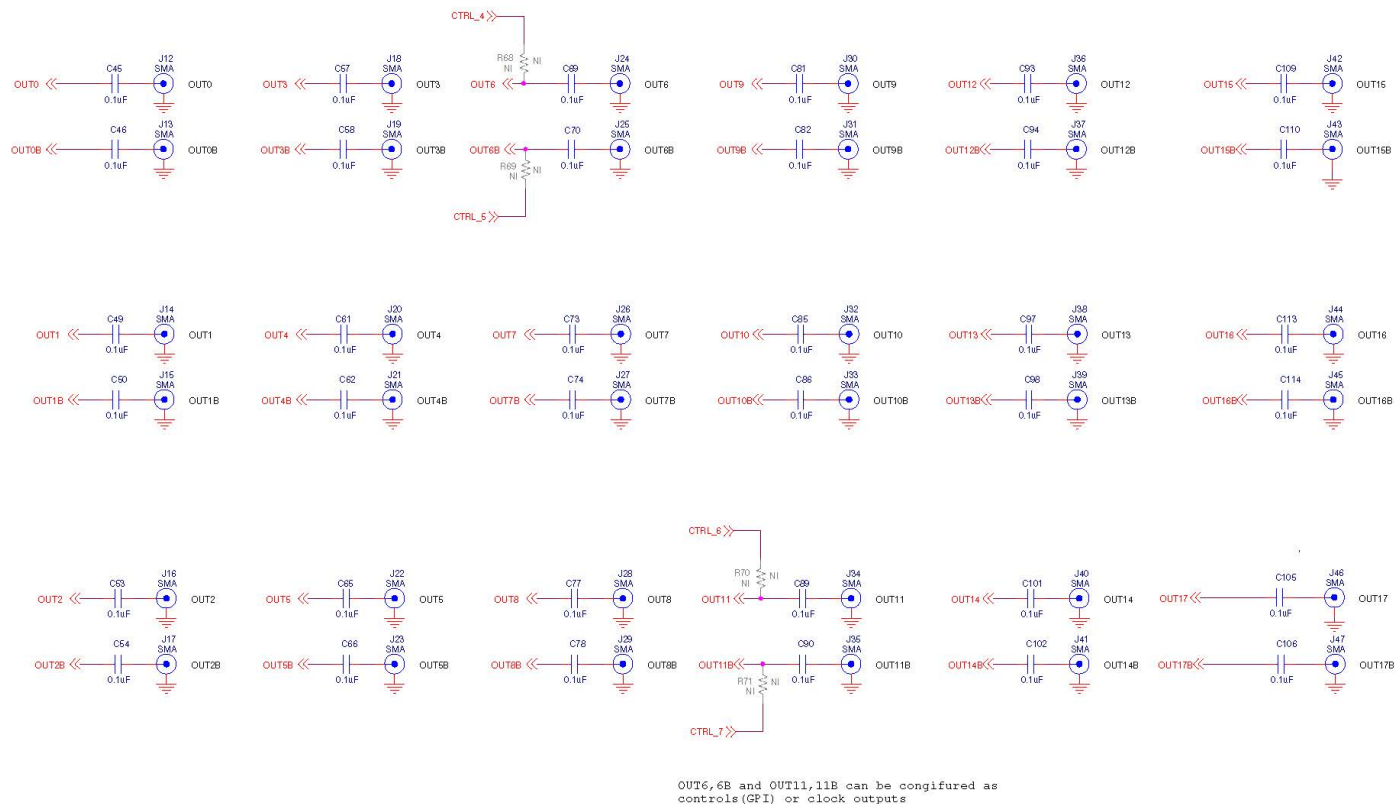


Figure 7.1. Output Clocks Schematic Excerpt

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

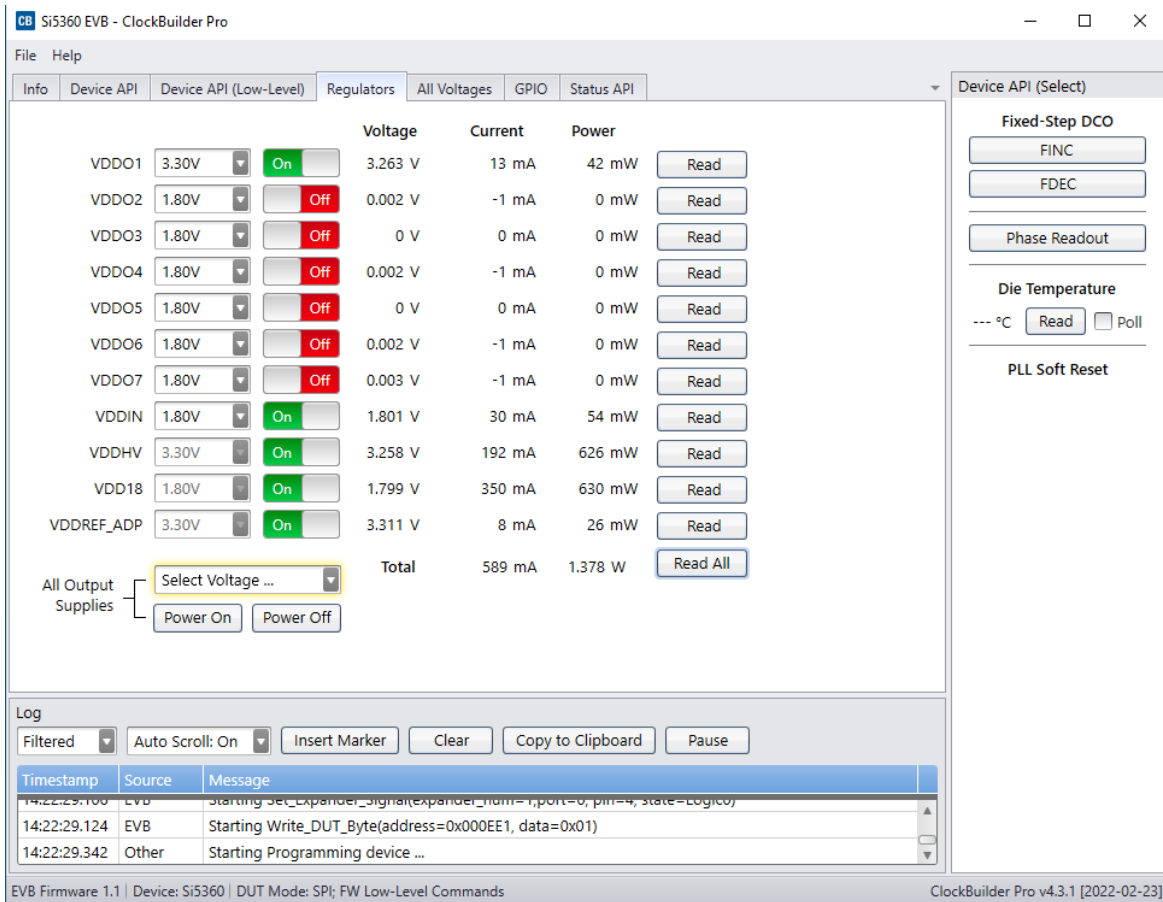


Figure 8.2. Application #2: EVB GUI

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.

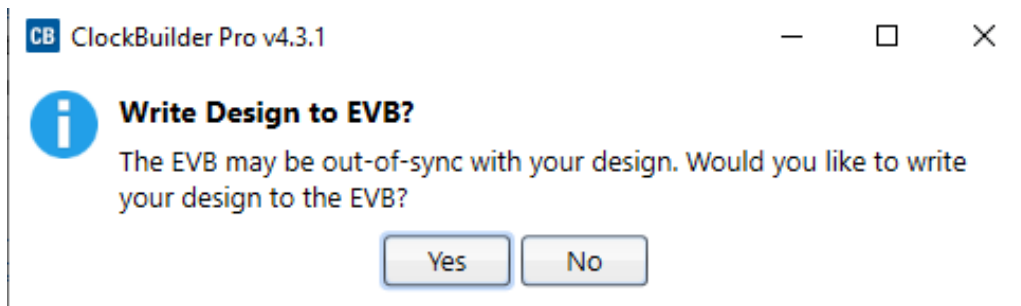


Figure 8.4. Write Design to EVB Dialog

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

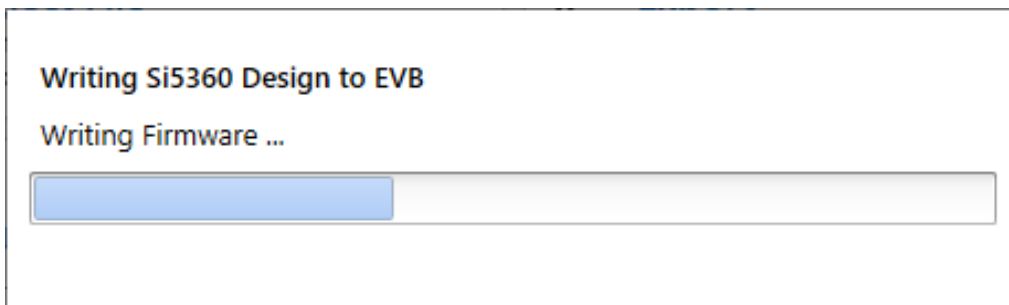


Figure 8.5. Writing Design Status

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.

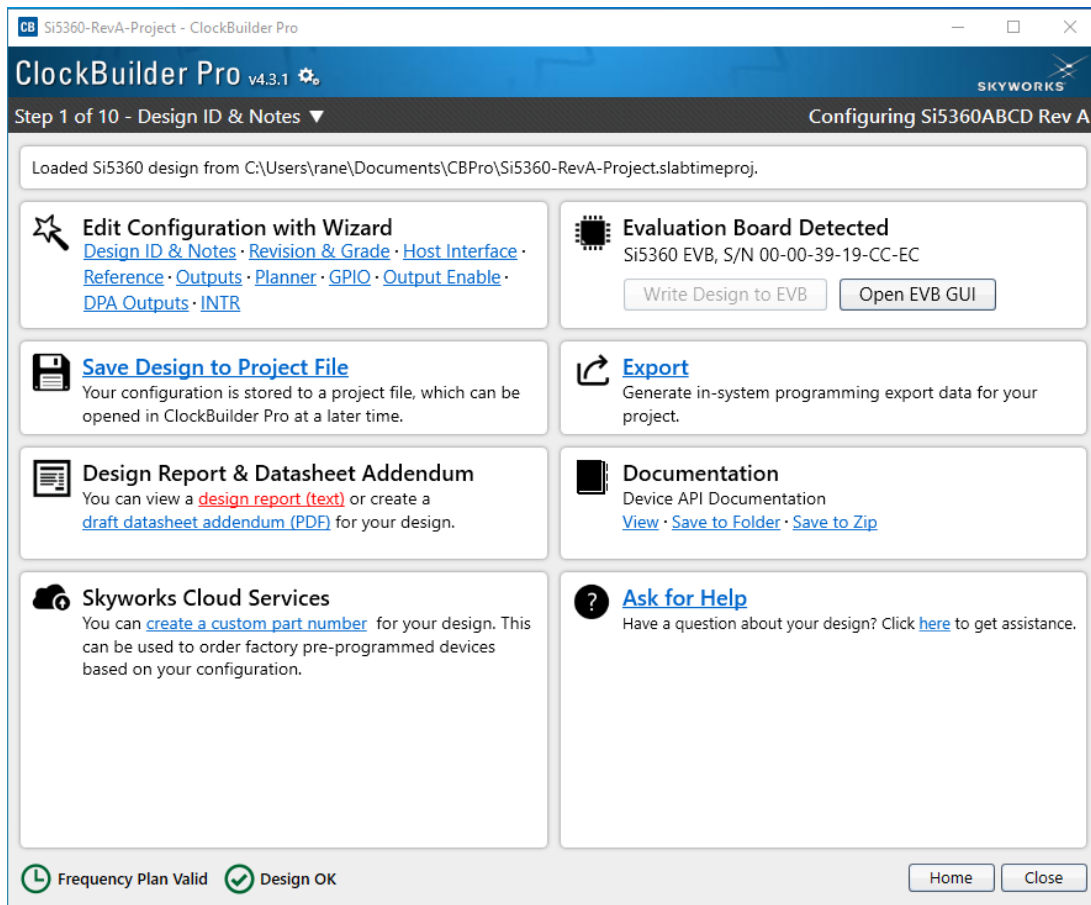


Figure 8.6. View Design Report

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.

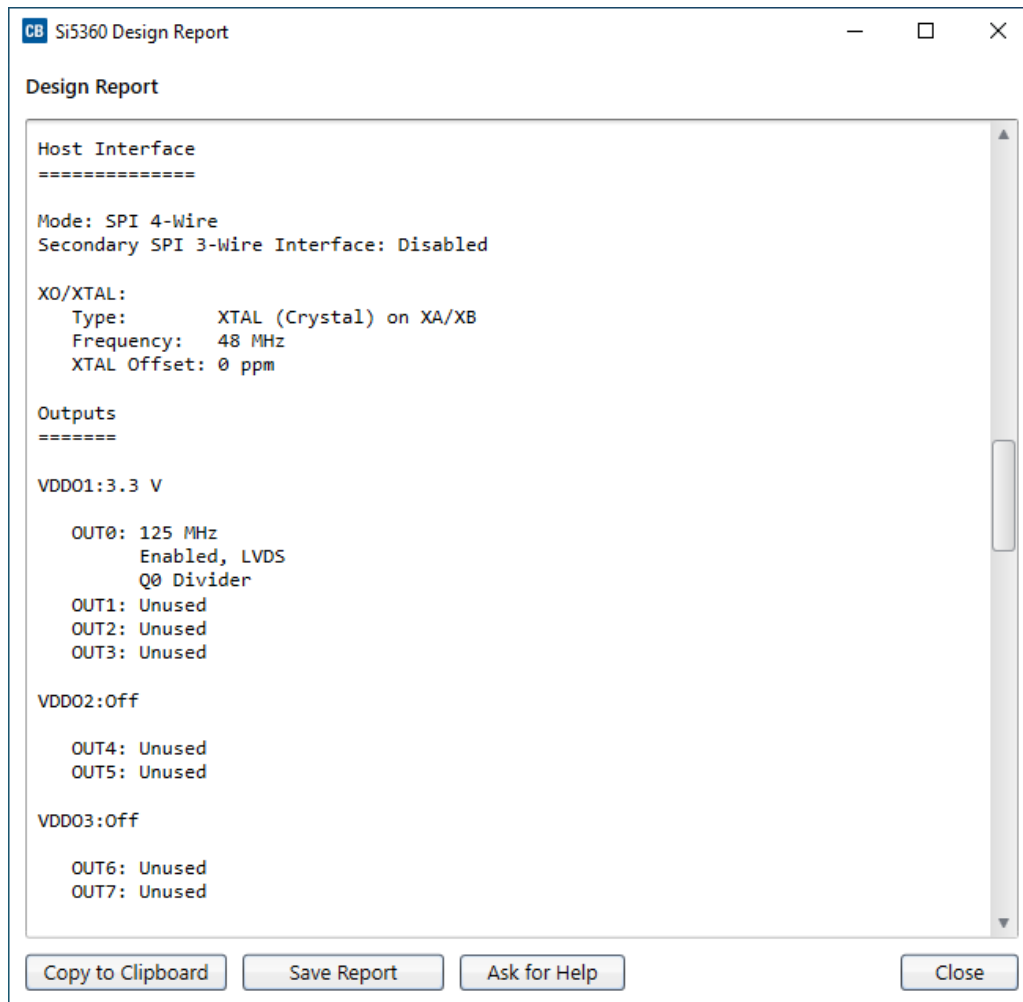


Figure 8.7. Design Report Window

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

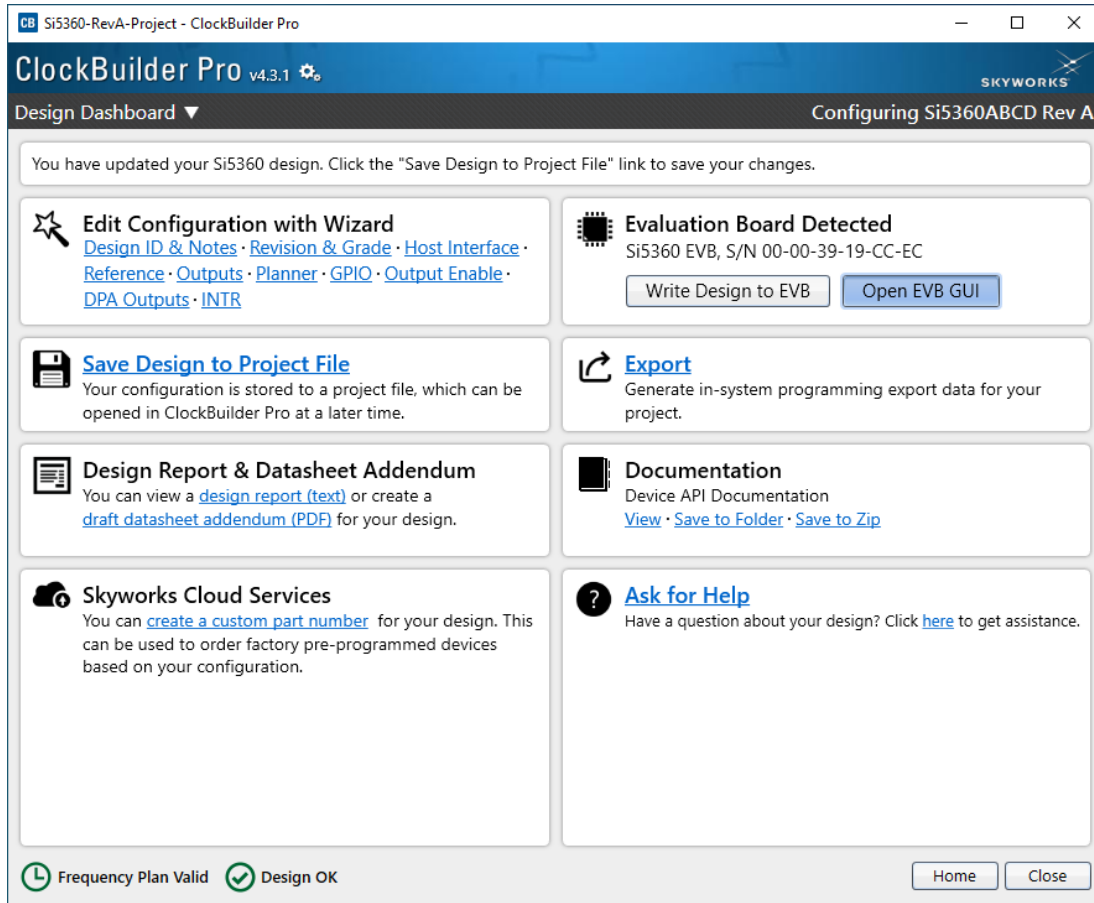


Figure 8.8. Open EVB GUI

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:

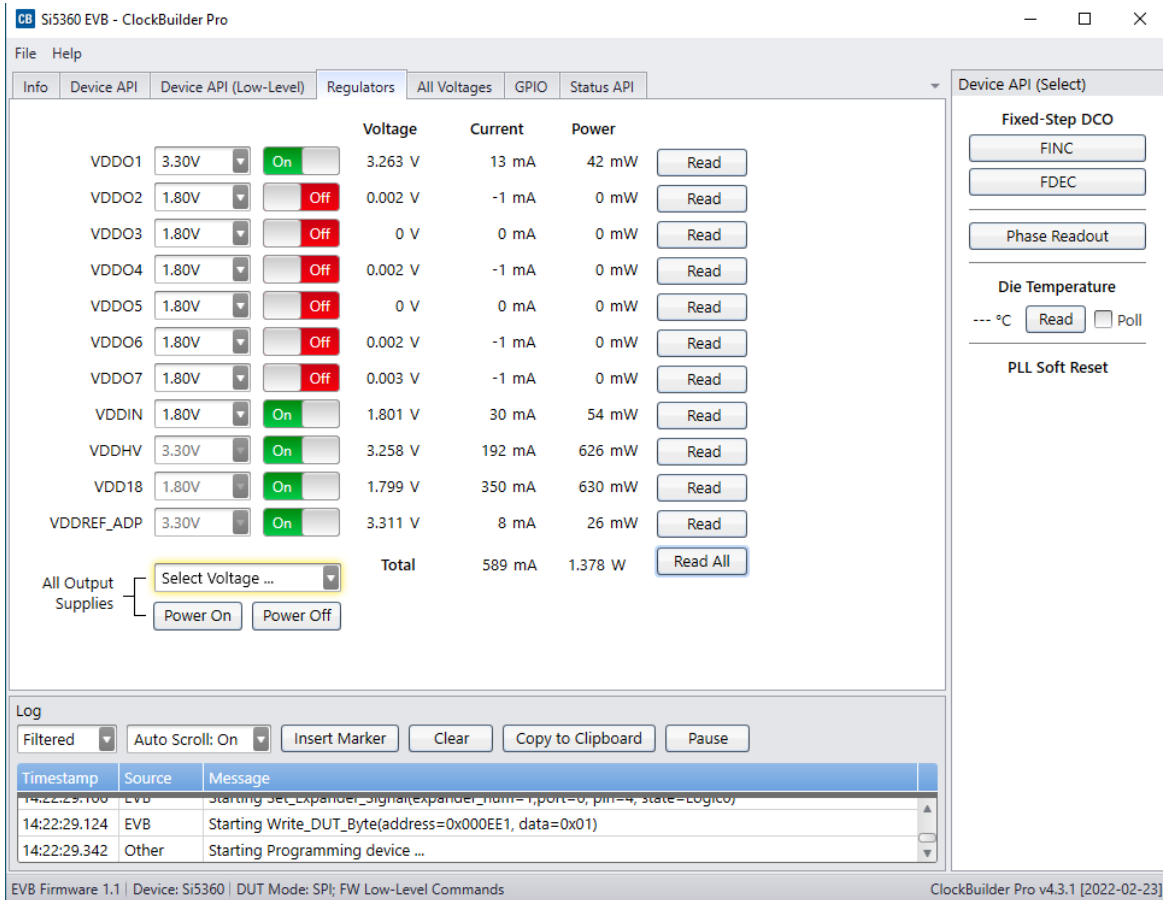


Figure 8.9. EVB GUI Window

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.

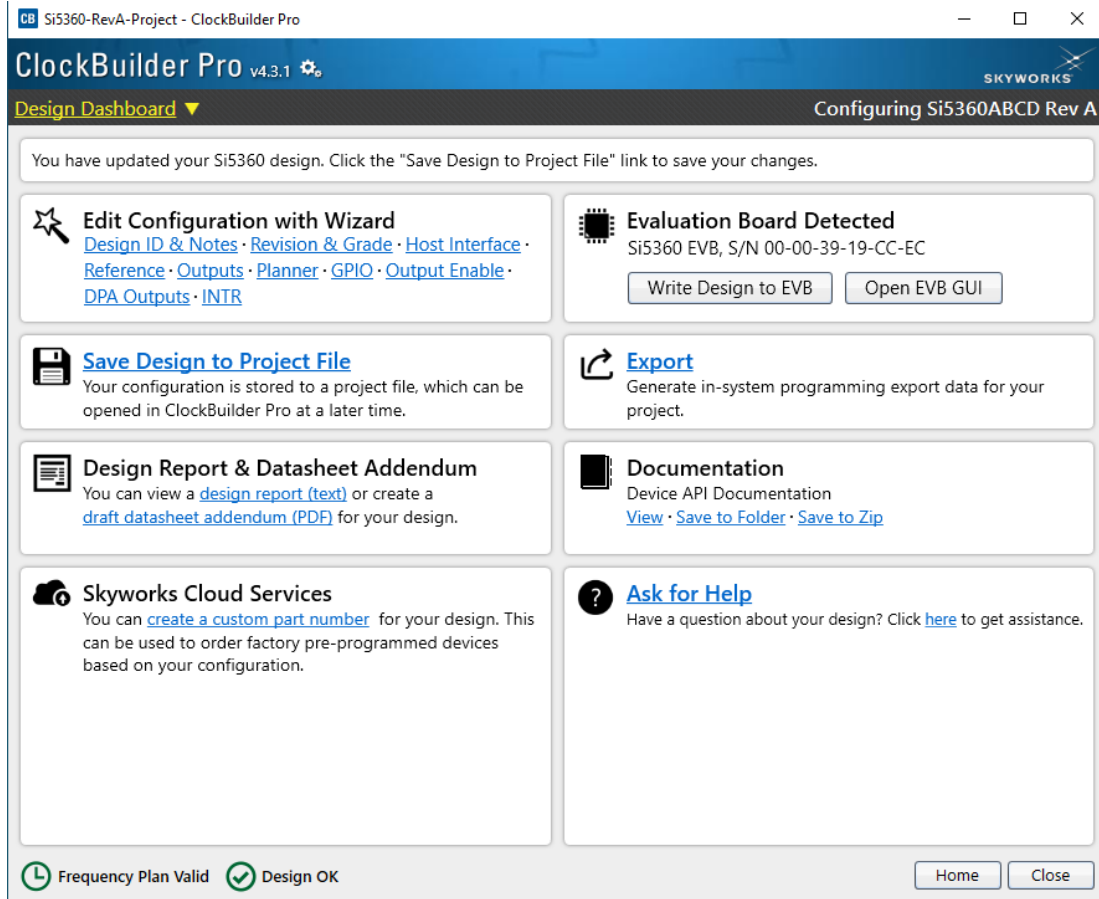


Figure 8.10. Edit Configuration with Wizard

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.

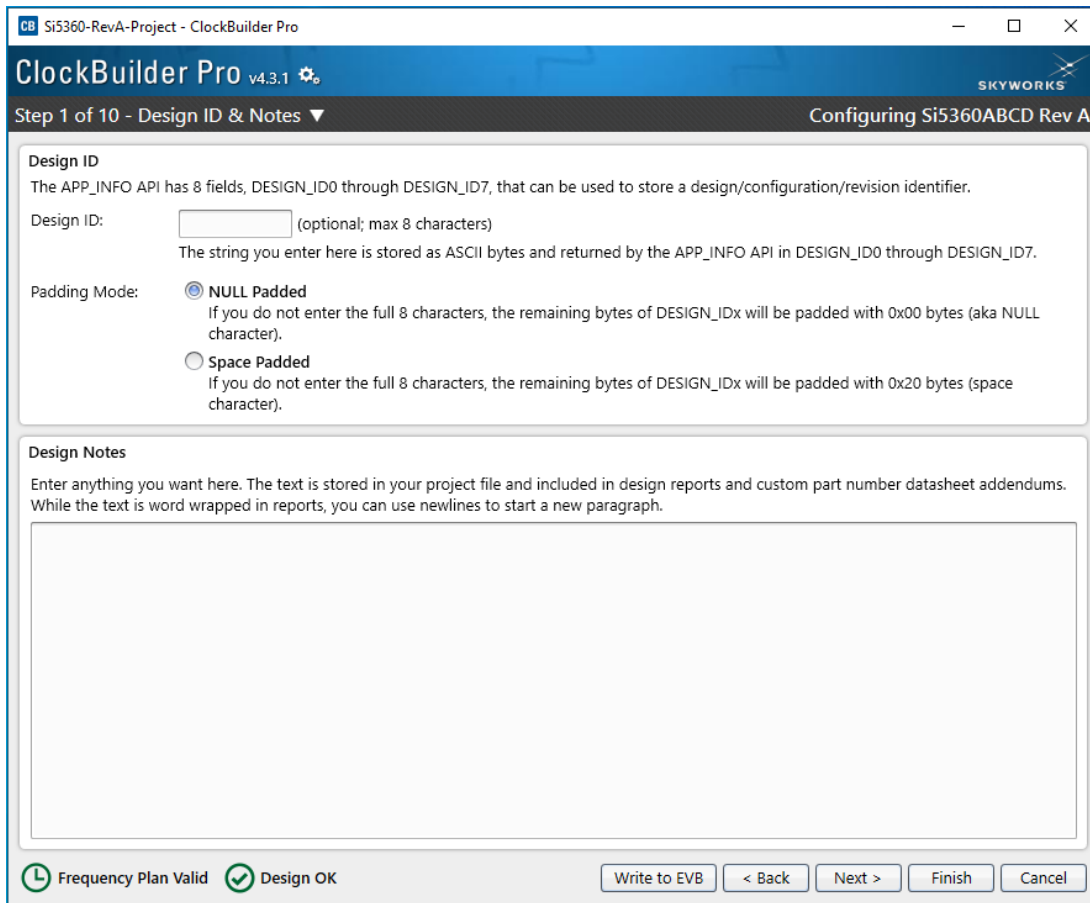


Figure 8.11. Design Wizard

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.

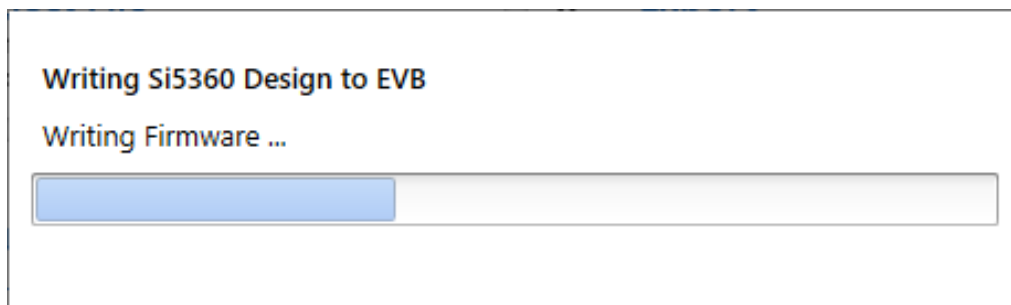


Figure 8.12. Writing Design Status

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.

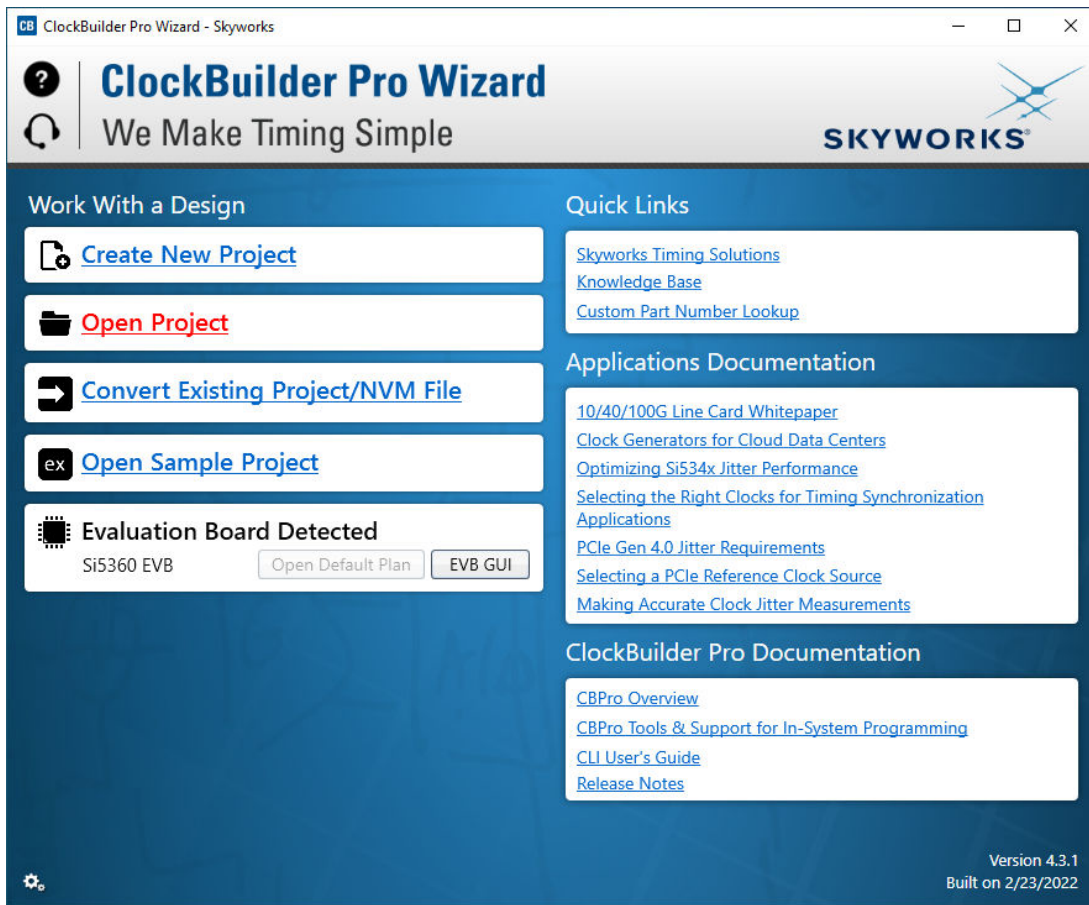


Figure 8.13. Open Design Project File

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.

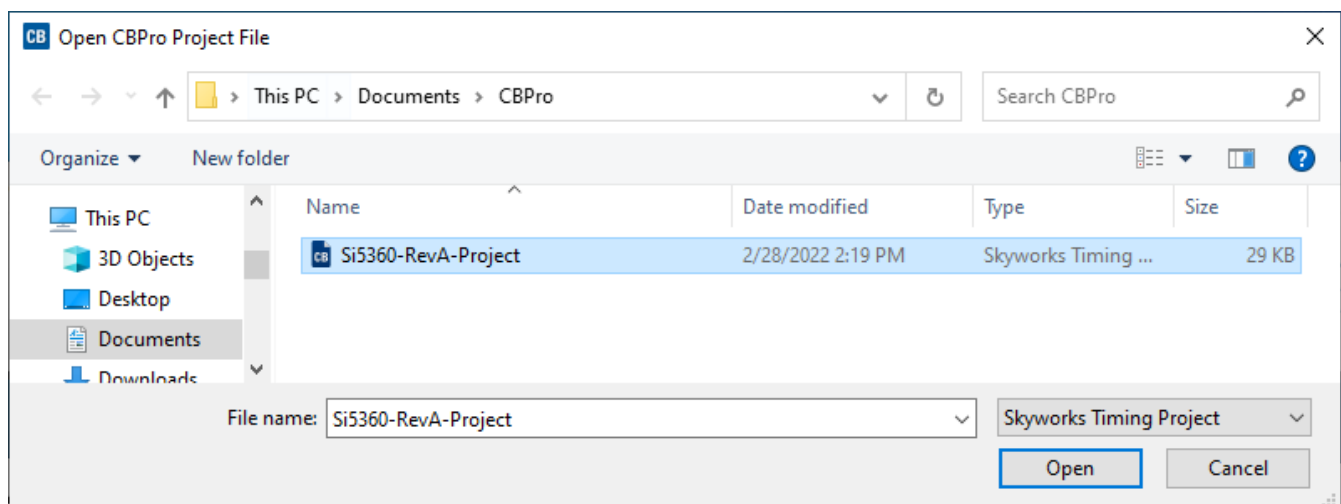


Figure 8.14. Browse to Project File

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

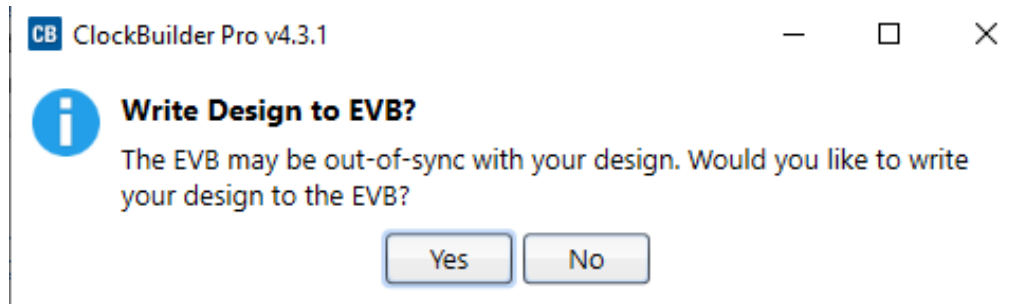


Figure 8.15. Write Design to EVB Dialog

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.

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 I²C 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 I²C 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 I²C 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 I²C 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, I²C operation should use J48 pin 4 (SDA_SDIO) as the I²C SDA and J48 pin 8 (SCLK) as the I²C SCLK. Note that the external I²C controller will need to supply its own I²C signal pull-up resistors.

Please note that if I²C communication is required at the DUT, this can be obtained by contacting customer support to order a custom configured factory programmed part.

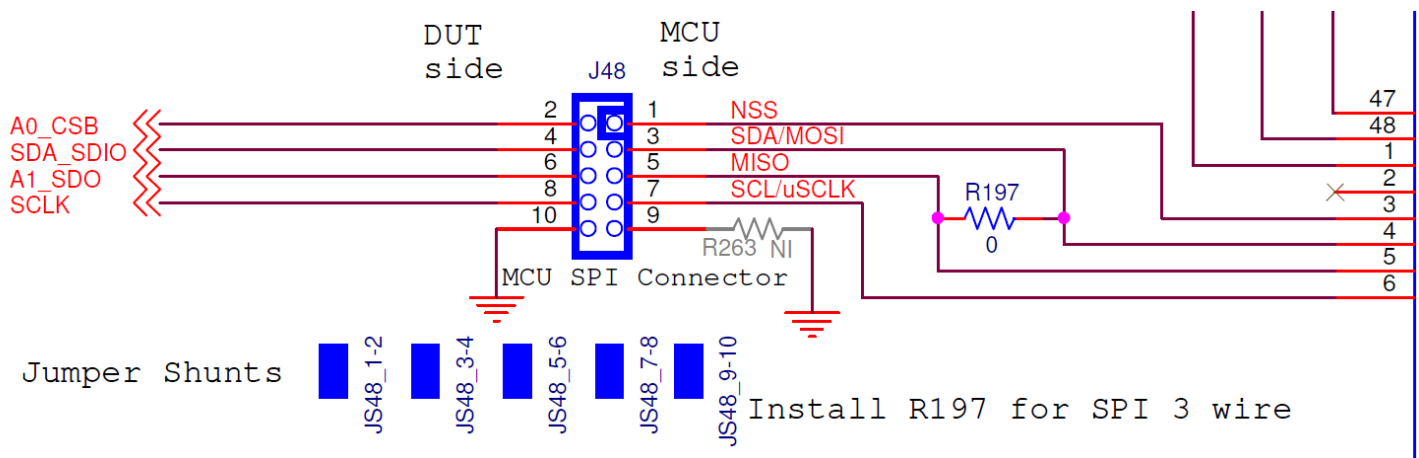


Figure 9.1. Serial Communications Header J48

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.

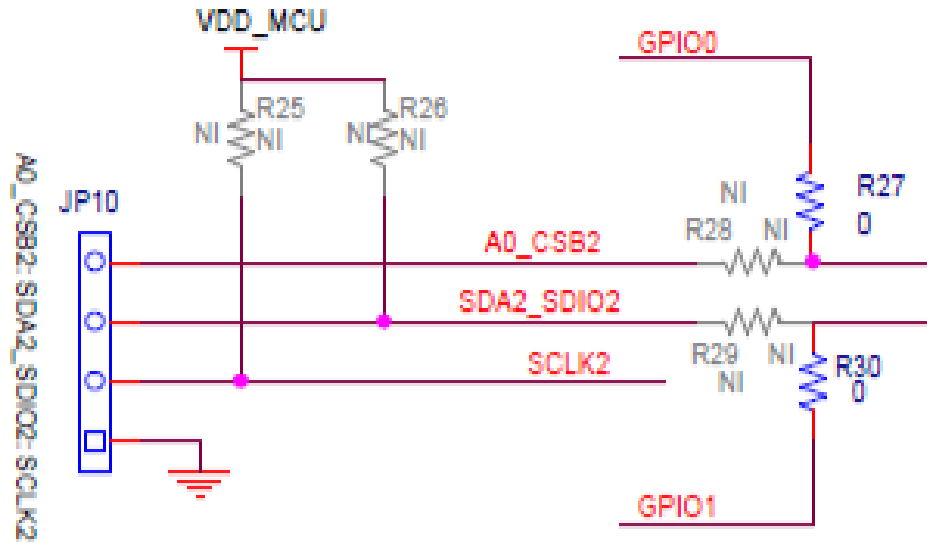


Figure 9.2. Secondary SPI Header JP10

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).

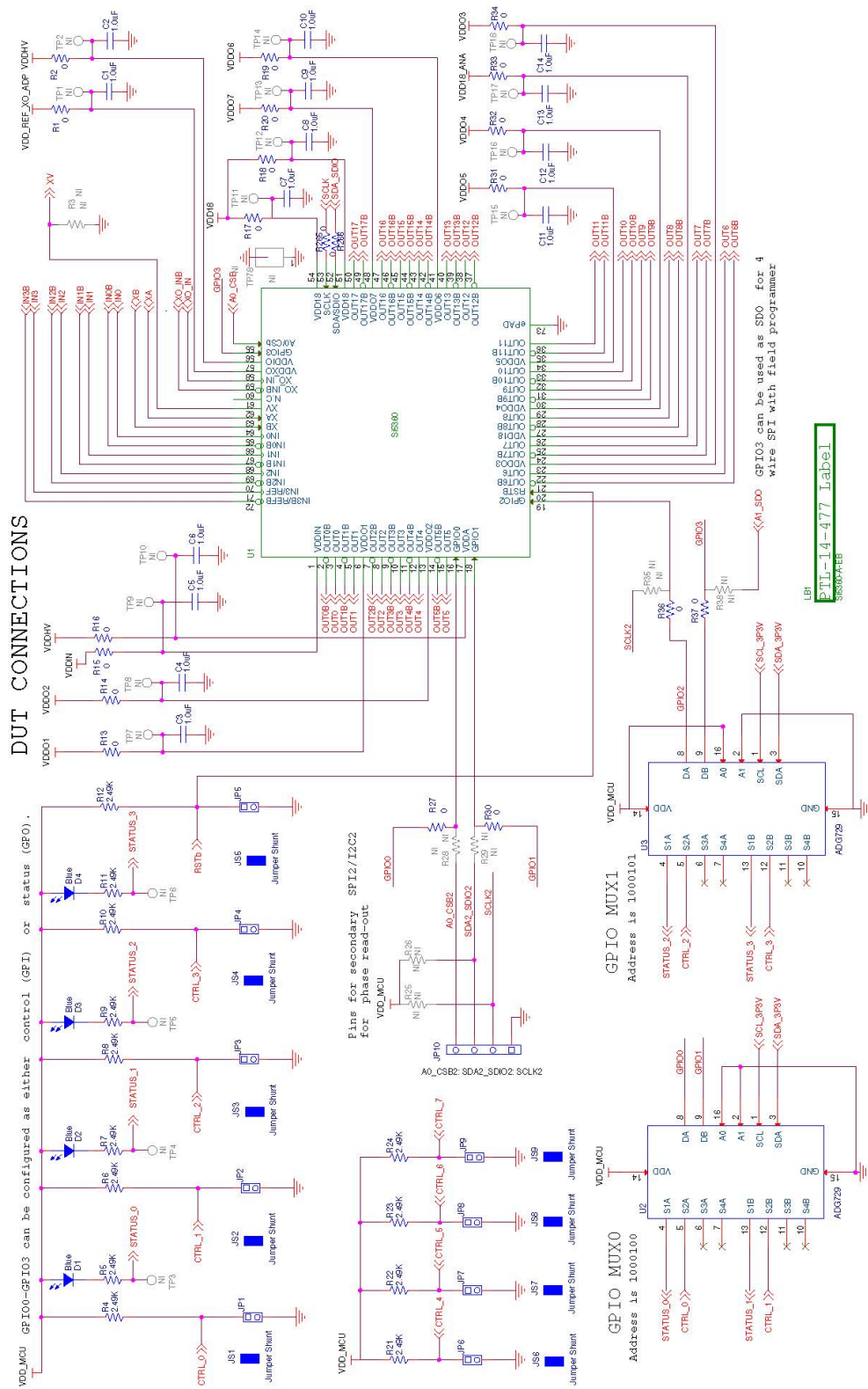


Figure 10.1. Si536x-EVB Schematic (1 of 10)

REFERENCE CONNECTIONS

Reference Population Options:
 Short JP11 enable XO
 Populate R39, R40 enable crystal

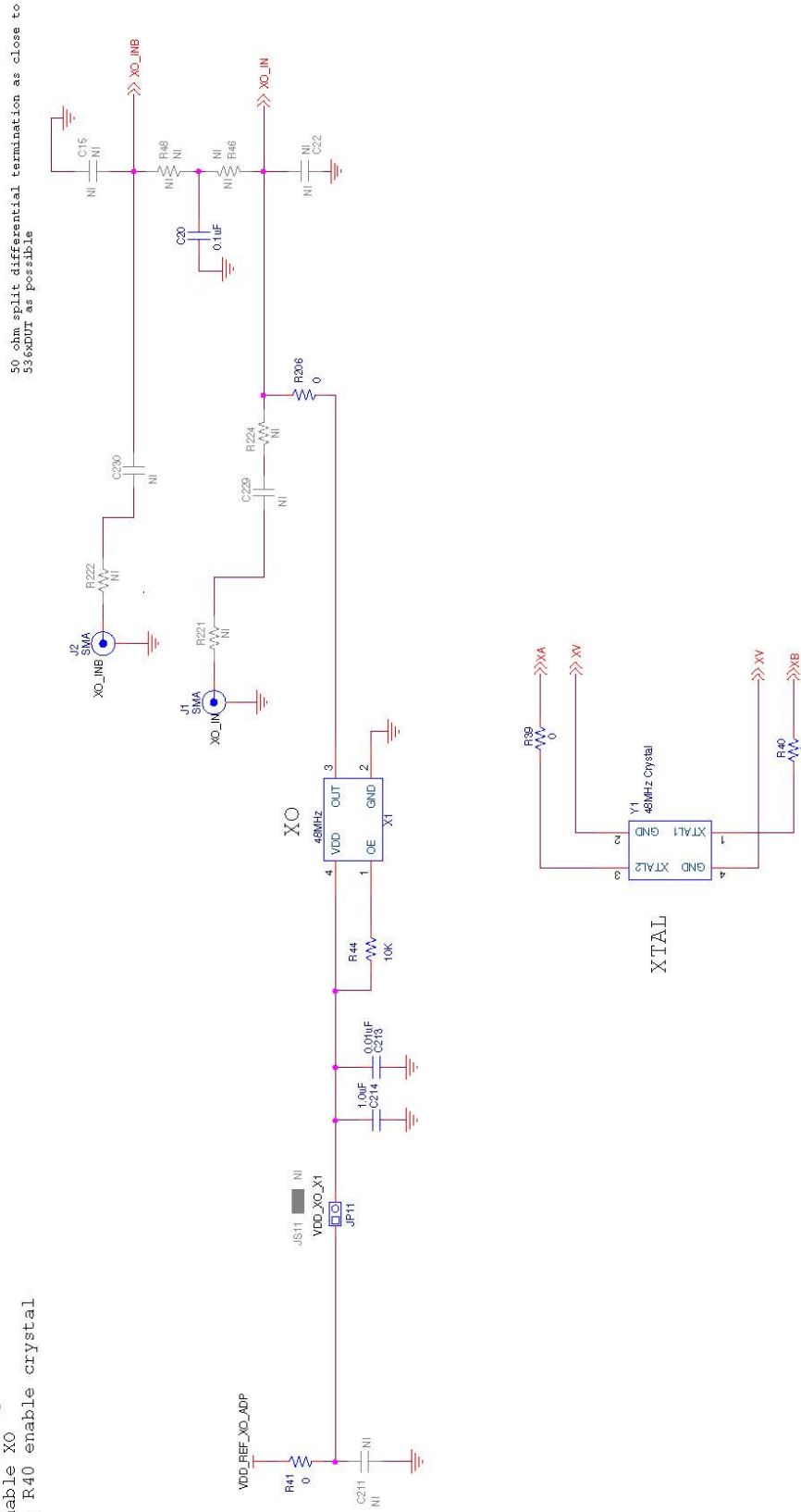


Figure 10.2. Si536x-EVB Schematic (2 of 10)

INPUT CLOCKS

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

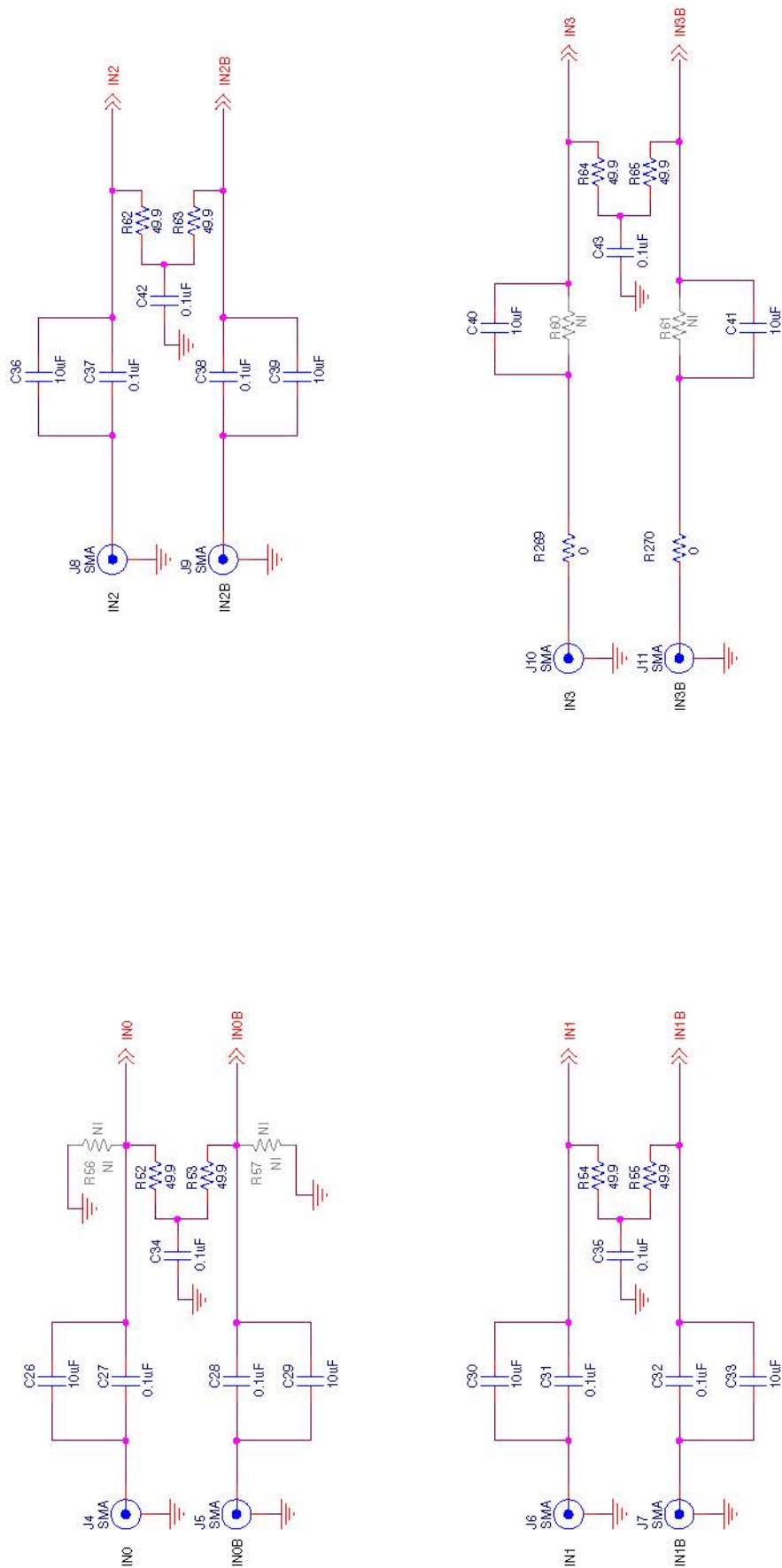
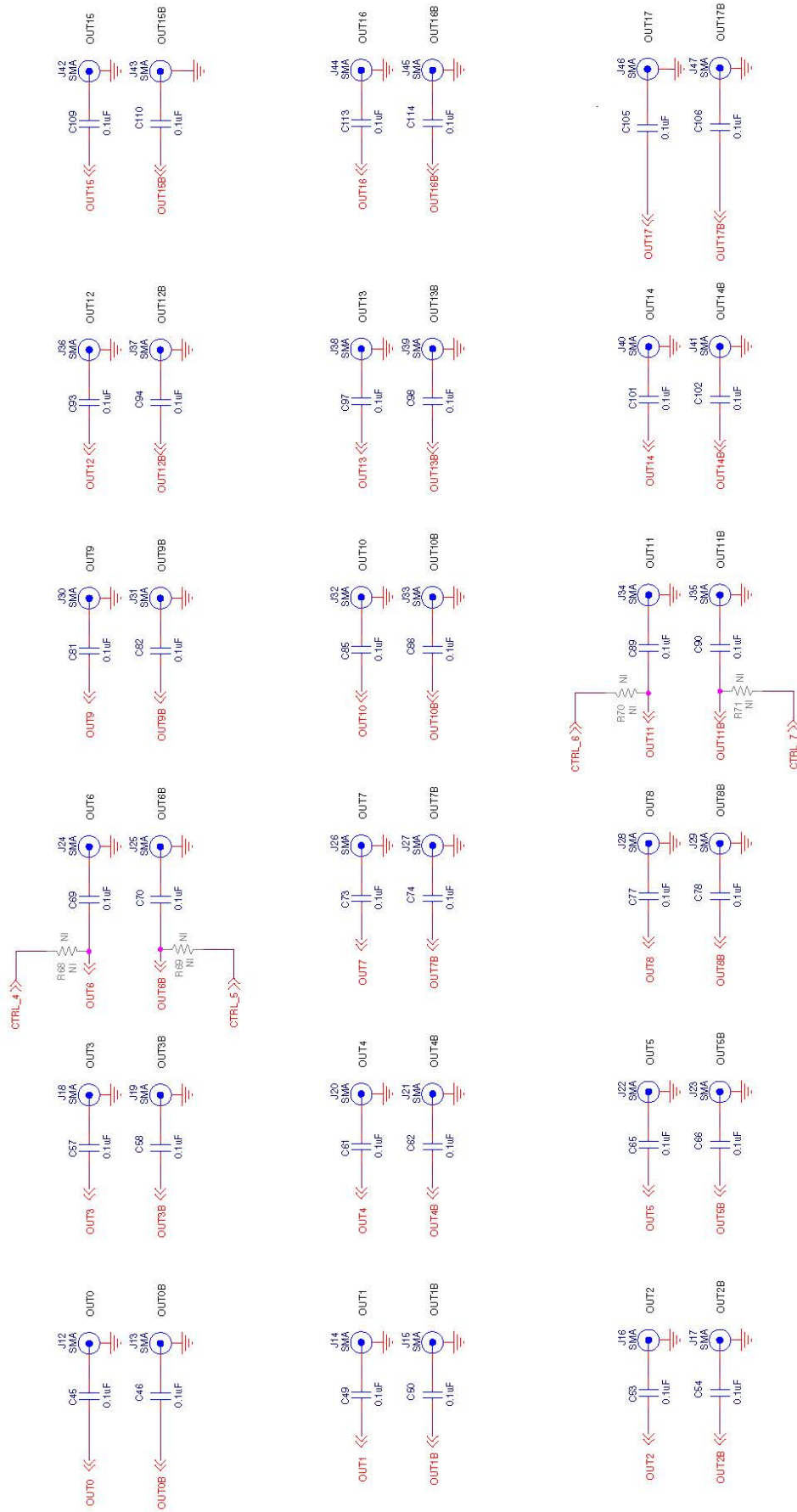


Figure 10.3. Si536x-EVB Schematic (3 of 10)

OUTPUT CLOCKS

All OUTX/OUTXB traces on the schematic should be trace length matching and impedance controlled



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

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

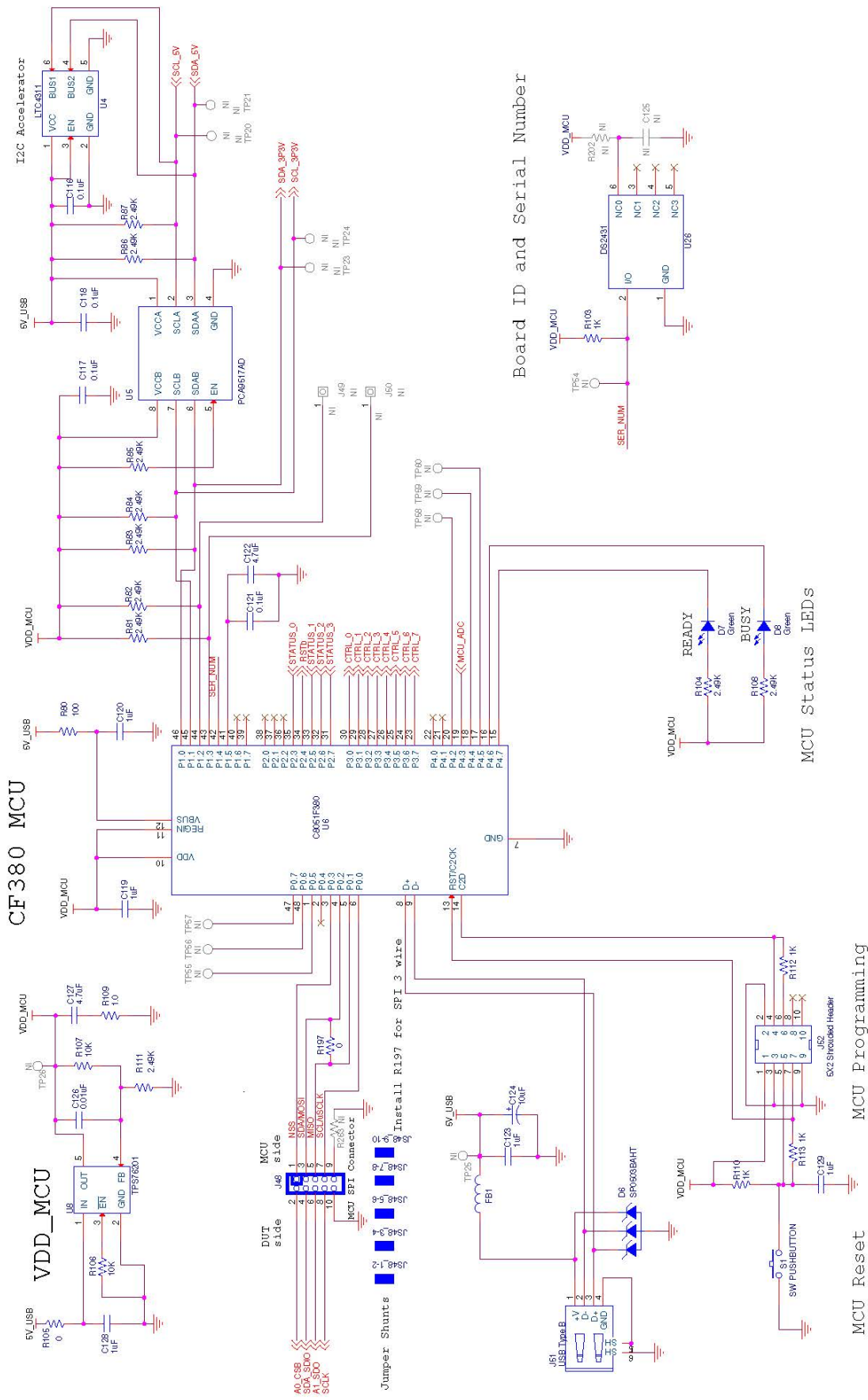


Figure 10.5. Si536x-EVB Schematic (5 of 10)

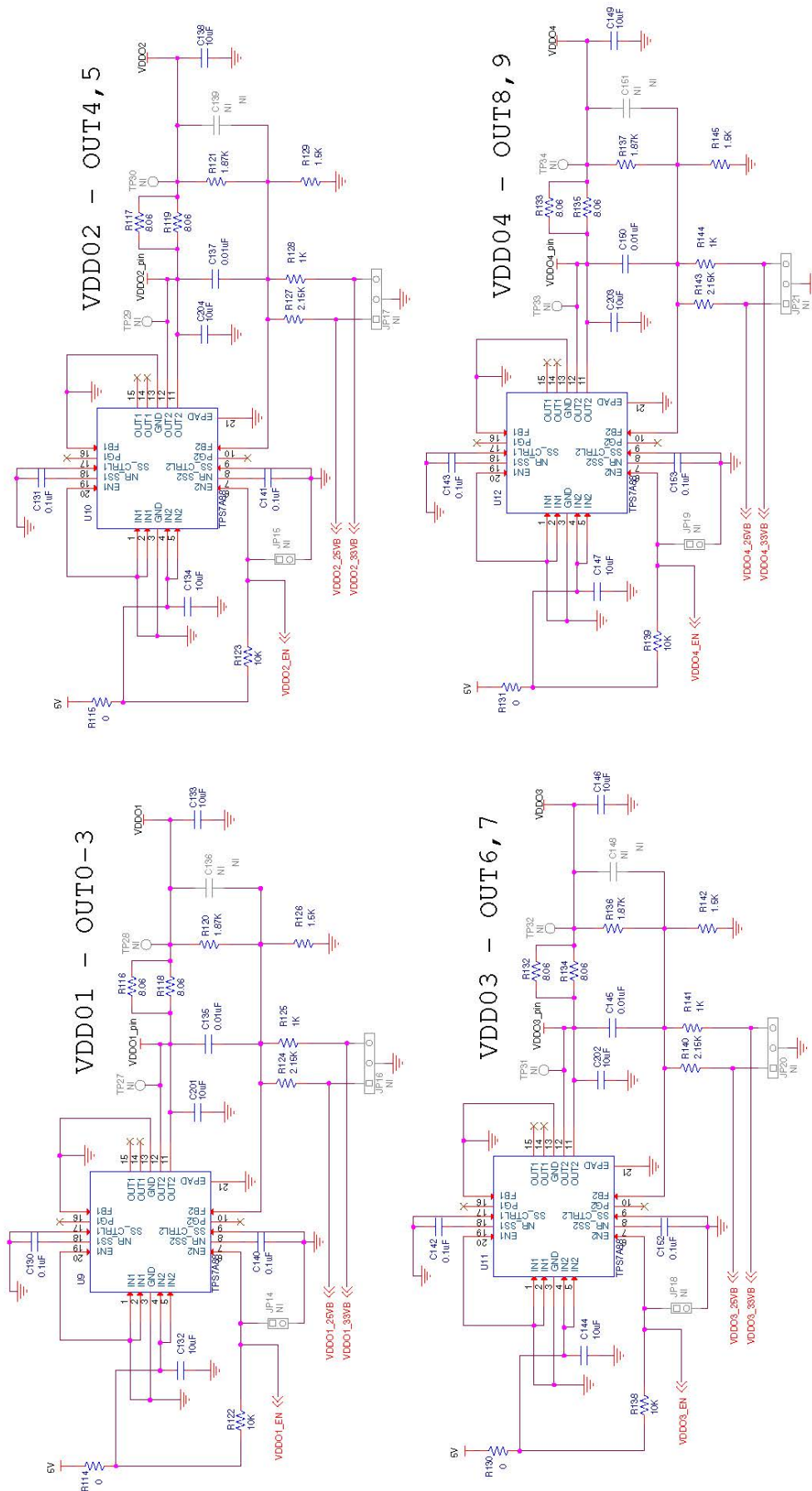


Figure 10.6. Si536x-EVB Schematic (6 of 10)

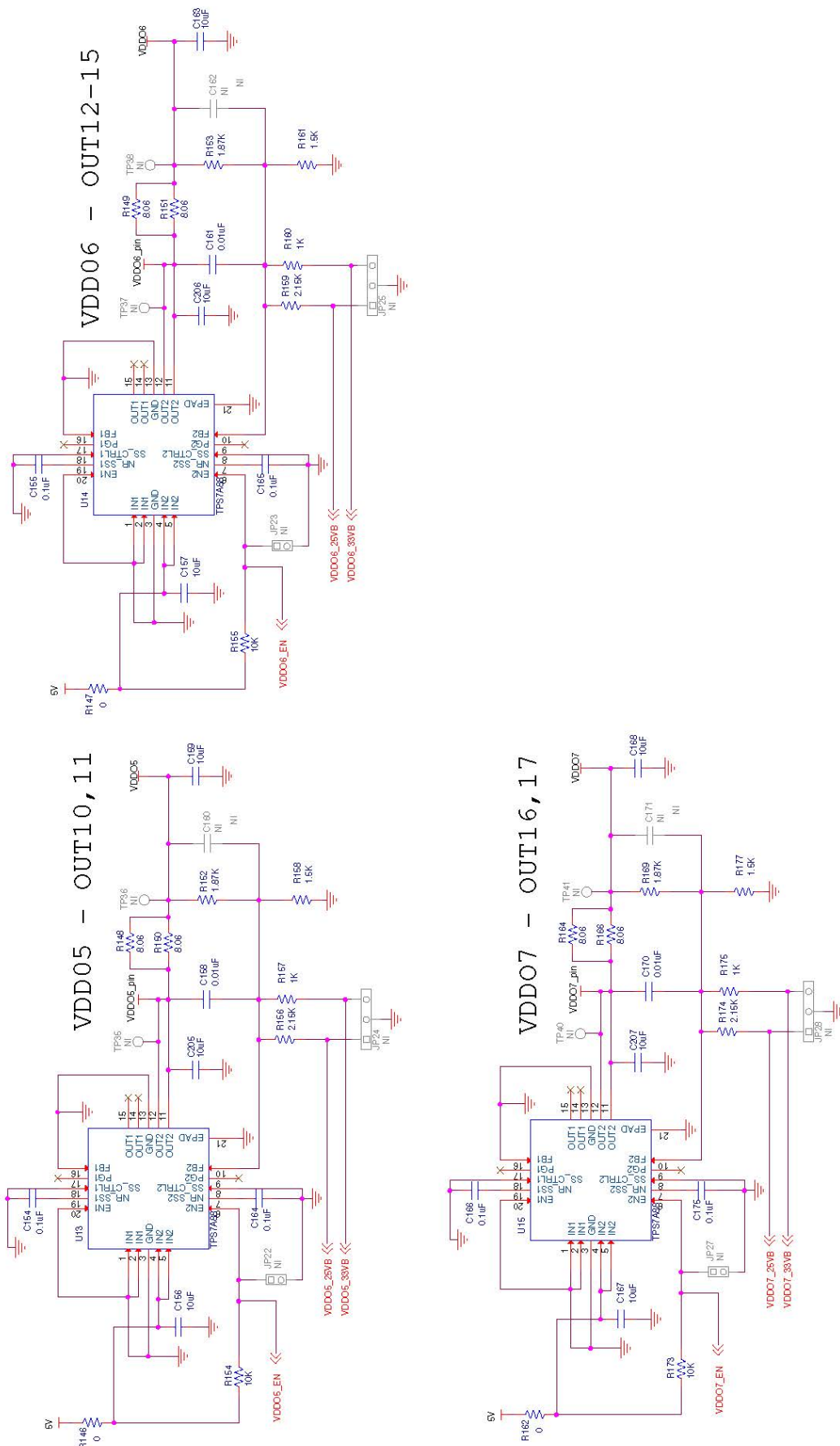
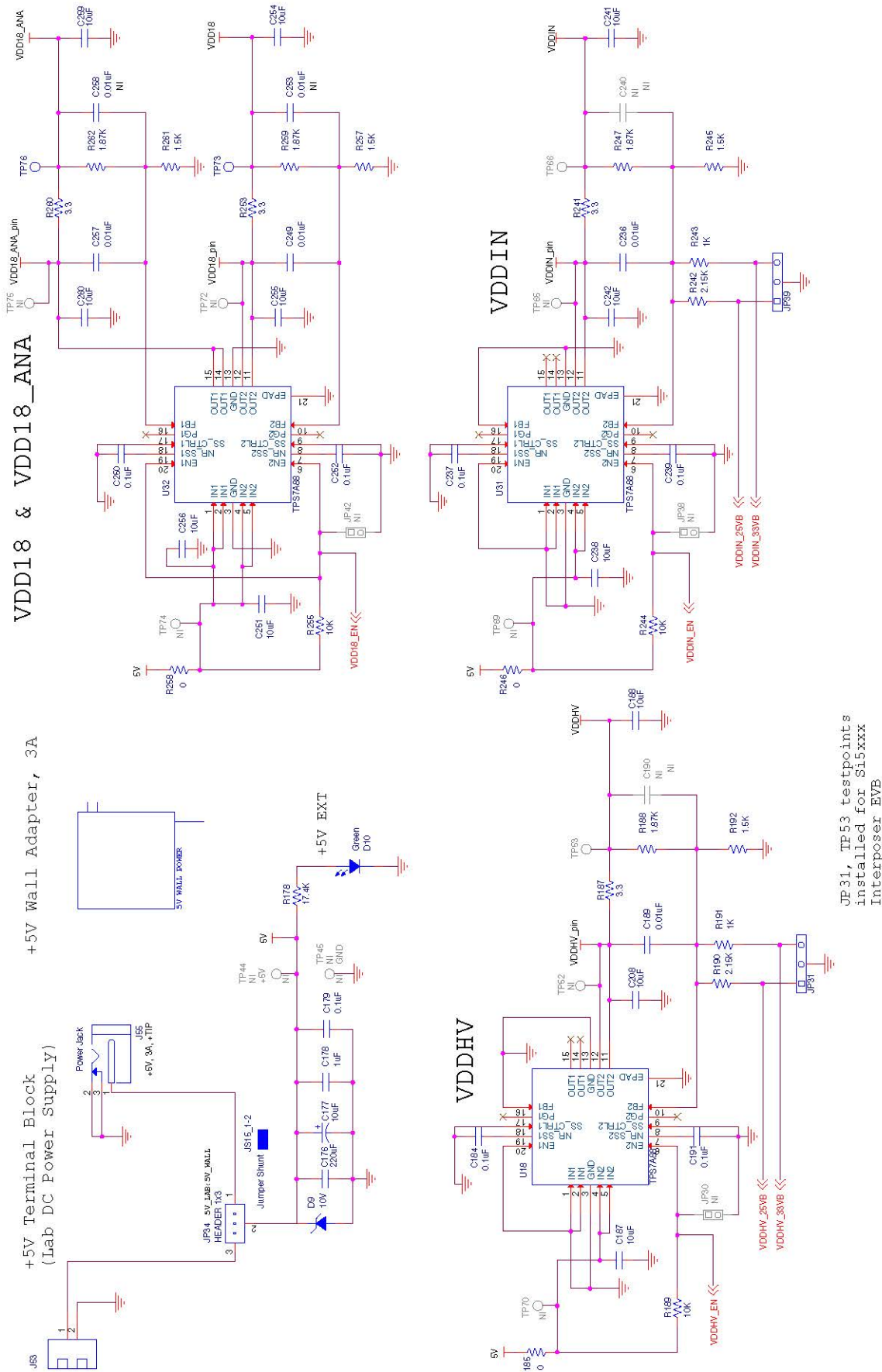


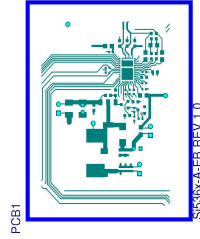
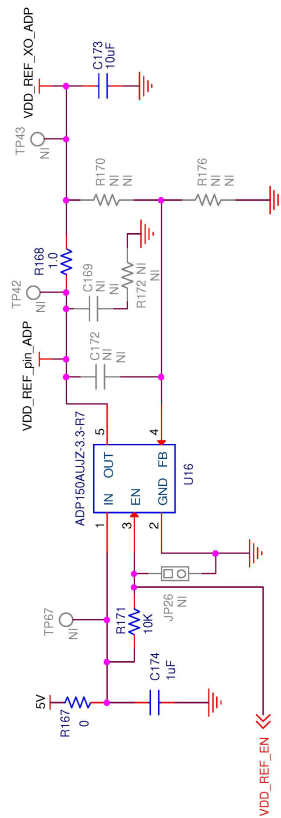
Figure 10.7. Si536x-EVB Schematic (7 of 10)



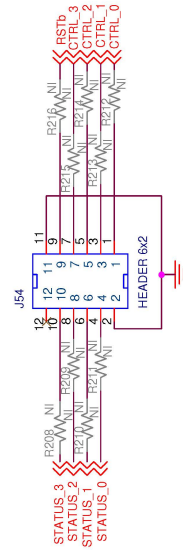
JP31, TP53 testpoints installed for Si5xxx Interposer EVB

Figure 10.8. Si536x-EVB Schematic (8 of 10)

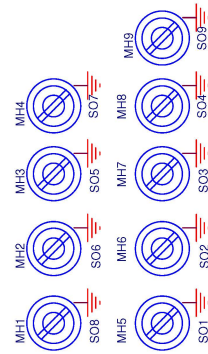
VDD_REF_XO, VDD_OUT_REF



GPIO HEADER for Si536xX_INTERPOSER-EB



Mounting Holes, Screws, and Standoffs



GND Test Points

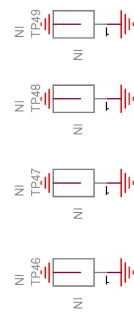


Figure 10.9. Si536x-EVB Schematic (9 of 10)

VOLTAGE MEASUREMENT MULTIPLEXING

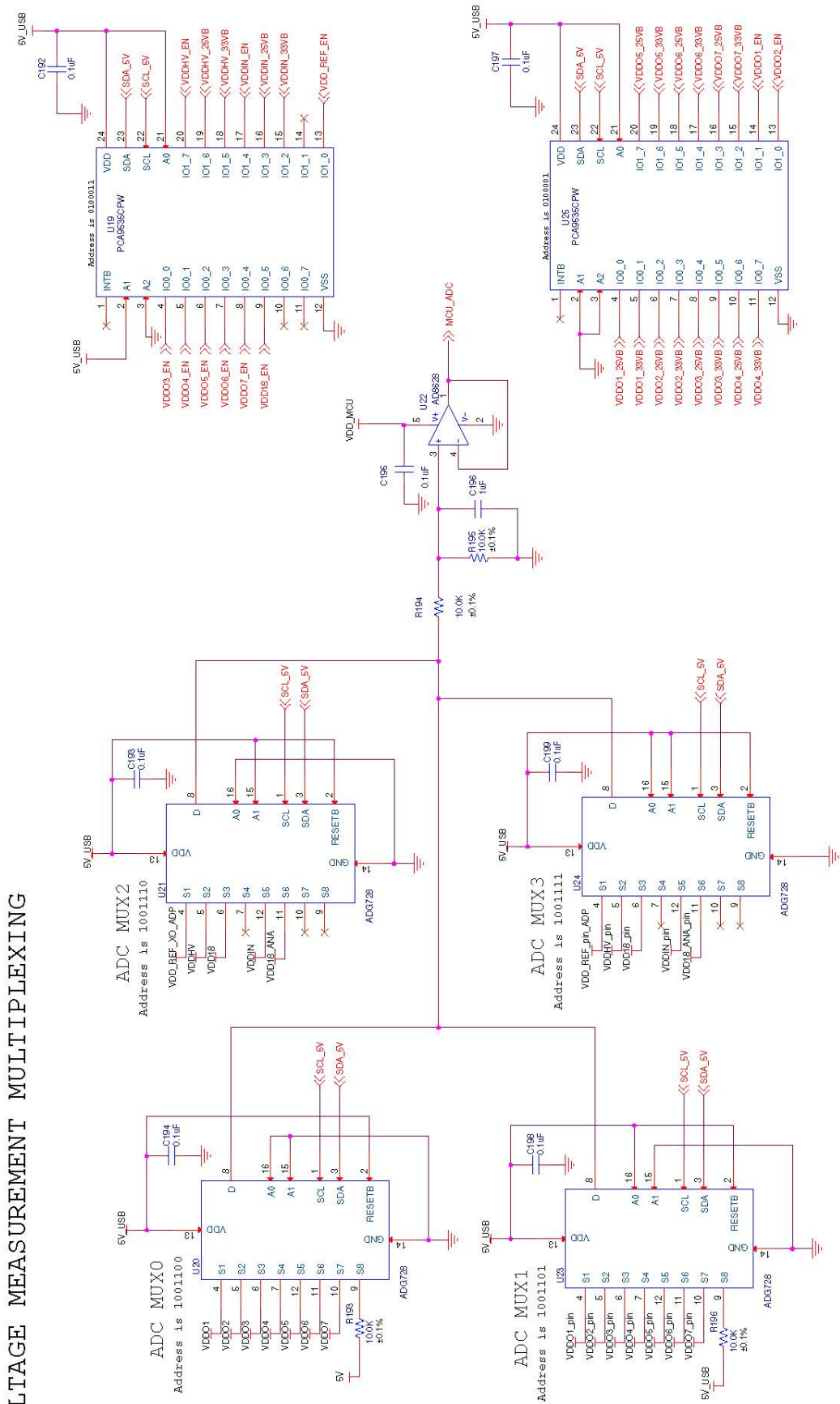


Figure 10.10. Si536x-EVB Schematic (10 of 10)

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Type	PCB Footprint	ManufacturerPN	Manufacturer
	15	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C214	1.0uF		6.3V	±10%	X5R	C0402 C0402L	C0402X5R6R3-105K	Venkel
	2	C116 C179	0.1uF		16V	±10%	X7R	C0805	C0805X7R160-104K	Venkel
	5	C117 C118 C121 C192 C197	0.1uF		16V	±20%	X7R	C0603	C0603X7R160-104M	Venkel
	5	C119 C120 C123 C128 C129	1uF		16V	±10%	X7R	C0603	C0603X7R160-105K	Venkel
	2	C122 C127	4.7uF		10V	±20%	X7R	C1206	C1206X7R100-475M	Venkel
	2	C124 C177	10uF		25V	±20%	TANT	C6032	T491C106M0252T	Kemet
	1	C126	0.01uF		16V	±20%	X7R	C0603	C0603X7R160-103M	Venkel
	13	C135 C137 C145 C150 C158 C161 C170 C189 C236 C249 C253 C257 C258	0.01uF		16V	±10%	X7R	C0603	C0603X7R160-103K	Venkel
	3	C174 C178 C196	1uF		16V	±20%	X7R	C0805	C0805X7R160-105M	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 C113 C114 C130 C131 C140 C141 C142 C143 C152 C153 C154 C155 C164 C165 C166 C175 C184 C191 C193 C194 C195 C198 C199 C237 C239 C250 C252	0.1uF		10V	±10%	X7R	C0402 C0402L	C0402X7R100-104K	Venkel
	1	C213	0.01uF		10V	±20%	X7R	C0402 C0402L	C0402X7R100-103M	Venkel

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

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Type	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	10uF		6.3V	±20%	X5R	C0603 C0603L	C0603X5R6R3-106M	Venkel
	4	D1 D2 D3 D4	Blue	20mA	3.4V		SMT, ChipLED	LED-HSMX-C170	HSMR-C170	Avago Technologies
	1	D6	SP0503BAHT	300mW	20V		TVS	SOT143-AKKK	SP0503BAHTG	Littelfuse
	3	D7 D8 D10	Green	20mA	3.4V		SMT, ChipLED	LED-HSMX-C170	HSMQ-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 J30 J31 J32 J33 J34 J35 J36 J37 J38 J39 J40 J41 J42 J43 J44 J45								
	46	J46 J47	SMA				SMA	<small>SMA-SMT-50_OHM SMA-EDGE-50OHM-1MP-50_OHM_120V</small>	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	Tyco
	1	J52	5X2 Shrouded Header				Shrouded	CONN2X5-4W	5103309-1	Tyco
	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 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	Type	PCB Footprint	ManufacturerPN	Manufacturer
	15	JS1 JS2 JS3 JS4 JS5 JS6 JS7 JS8 JS9 JS15_1-2 JS48_1-2 JS48_3-4 JS48_5-6 JS48_7-8 JS48_9-	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
	9	MH1 MH2 MH3 MH4 MH5 MH6 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
	27	R1 R2 R13 R14 R15 R16 R17 R18 R19 R20 R31 R32 R33 R34 R41 R105 R114 R115 R130 R131 R146 R147 R162 R167 R185 R246 R258	0	1A			ThickFilm	R0603 R0603L	CR0603-16W-000	Venkel
	4	R103 R110 R112 R113	1K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-1001F	Venkel
	13	R106 R107 R122 R123 R138 R139 R154 R155 R171 R173 R189 R244 R255	10K	1/16W		±1%	ThickFilm	R0603	CR0603-16W-1002F	Venkel
	1	R109	1.0	1/10W		±1%	ThickFilm	R0603	CR0603-10W-1R00F	Venkel
	14	R116 R117 R118 R119 R132 R133 R134 R135 R148 R149 R150 R151 R164 R166	8.06	1/2W		±0.1%	±50PPM	R2010	TFCR2010-2W-C-8R06B	Venkel
	11	R120 R121 R136 R137 R152 R153 R169 R188 R247 R259 R262	1.87K	1/10W		±1%	ThickFilm	R0603	CR0603-10W-1871F	Venkel
	9	R124 R127 R140 R143 R156 R159 R174 R190 R242	2.15K	1/10W		±1%	ThickFilm	R0603	CR0603-10W-2151F	Venkel
	9	R125 R128 R141 R144 R157 R160 R175 R191 R243	1K	1/10W		±1%	ThickFilm	R0603	CR0603-10W-1001F	Venkel

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

NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Type	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
	4	R187 R241 R253 R260	3.3	1W		±1%	ThickFilm	R2010	CR2010-1W-3R30FT	Venkel
	4	R193 R194 R195 R196	10.0K	1/10W		±0.1%	±25PPM	R0603	ERA-3AEB103V	Panasonic
	12	R27 R30 R36 R37 R39 R40 R197 R206 R265 R266 R269 R270	0	1A			ThickFilm	R0402 R0402L	CR0402-16W-000	Venkel
	23	R4 R5 R6 R7 R8 R9 R10 R11 R12 R21 R22 R23 R24 R81 R82 R83 R84 R85 R86 R87 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
	8	R52 R53 R54 R55 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
	9	SO1 SO2 SO3 SO4 SO5 SO6 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				I2C	TSSOP24N6.4P0.65	PCA9535CPW	NXP
	2	U2 U3	ADG729		2.7-5.5V		DUAL	TSSOP16N6.4P0.65	ADG729BRUZ	Analog Devices
	4	U20 U21 U23 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	U4	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
	10	U9 U10 U11 U12 U13 U14 U15 U18 U31 U32	TPS7A88	1A			LDO	QFN20N4X4P0.5E2.7	TPS7A88	TI
	1	X1	48MHz				XO	OSC4N3.2X2.5-7M	7X48070007	TXC
	1	Y1	48MHz Crystal				Quartz	XTAL4N3.2X2.5-7M48072002	7M48072009	TXC
Not Installed Components										
NI	Quantity	Reference	Value	Rating	Voltage	Tolerance	Type	PCB Footprint	ManufacturerPN	Manufacturer
NI	1	C125	0.1uF		16V	±20%	X7R	C0603	C0603X7R160-104M	Venkel
NI	9	C136 C139 C148 C151 C160 C162 C171 C190 C240	0.01uF		16V	±10%	X7R	C0603	C0603X7R160-103K	Venkel
NI	2	C15 C22	0.01uF		10V	±20%	X7R	C0402 C0402L	C0402X7R100-103M	Venkel
NI	1	C169	4.7uF		10V	±20%	X7R	C1206	C1206X7R100-475M	Venkel
NI	1	C172	0.01uF		16V	±20%	X7R	C0603	C0603X7R160-103M	Venkel
NI	1	C211	220uF		6.3V	±20%	X5R	C1210	C1210X5R6R3-227MNE	Venkel
NI	2	C229 C230	0.1uF		10V	±10%	X7R	C0402 C0402L	C0402X7R100-104K	Venkel
NI	2	J49 J50	HEADER 1x1				Header	HDR1X1	TSW-101-07-T-S	Samtec
NI	11	JP14 JP15 JP18 JP19 JP22 JP23 JP26 JP27 JP30 JP38 JP42	Header 1x2 TH				Header	CONN1X2	TSW-102-07-G-S	Samtec
NI	7	JP16 JP17 JP20 JP21 JP24 JP25 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
NI	26	R3 R28 R29 R35 R38 R56 R57 R60 R61 R68 R69 R70 R71 R208 R209 R210 R211 R212 R213 R214 R215 R216 R221 R222 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	Type	PCB Footprint	ManufacturerPN	Manufacturer
NI	38	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 TP75	RED				Loop	TESTPOINT	151-207-RC	Kobiconn
NI	14	TP3 TP4 TP5 TP6 TP20 TP21 TP23 TP24 TP55 TP56 TP57 TP58 TP59 TP60	BLUE				Loop	TESTPOINT	151-205-RC	Kobiconn
NI	6	TP42 TP43 TP67 TP69 TP70 TP74	RED				LOOP	TESTPOINT	5000	Keystone
NI	1	TP45	BLACK				Loop	TESTPOINT	151-203-RC	Kobiconn
NI	5	TP46 TP47 TP48 TP49 TP78	HEADER 1x1				Header	CONN-1X1	TS-101-T-AA	Samtec

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

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.