# 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.
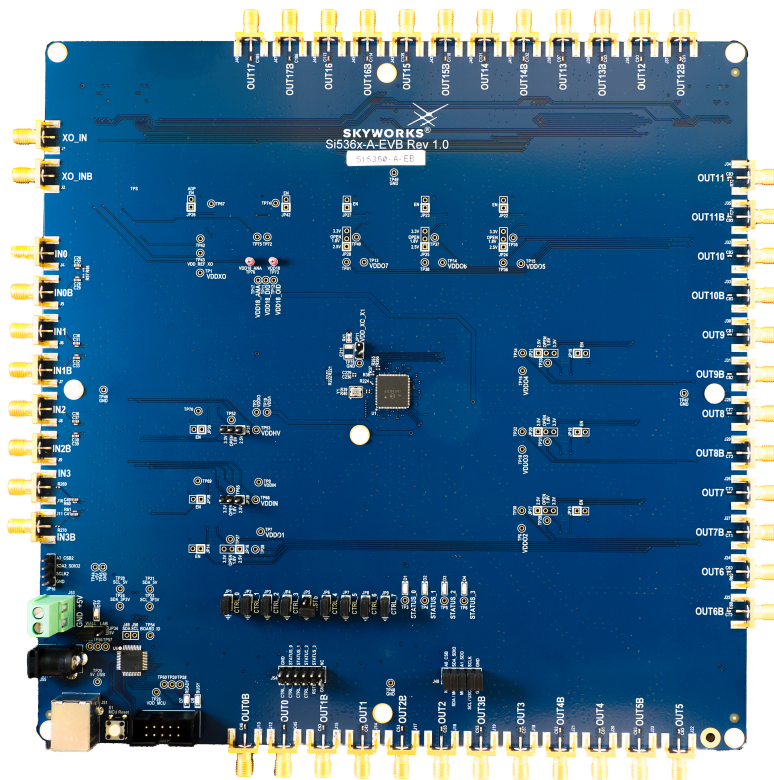
KEY FEATURES
- Si536x-A-EVB used with CBPro software to evaluate Si5363, Si5362, Si5361, and Si5360
- Powered from USB port and an external power supply, via either a terminal block or a compatible wall mount AC adapter
- Onboard 48 MHz crystal and a 48 MHz low phase noise XO
- ClockBuilder Pro®(CBPro) 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

# Table of Contents

# 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.
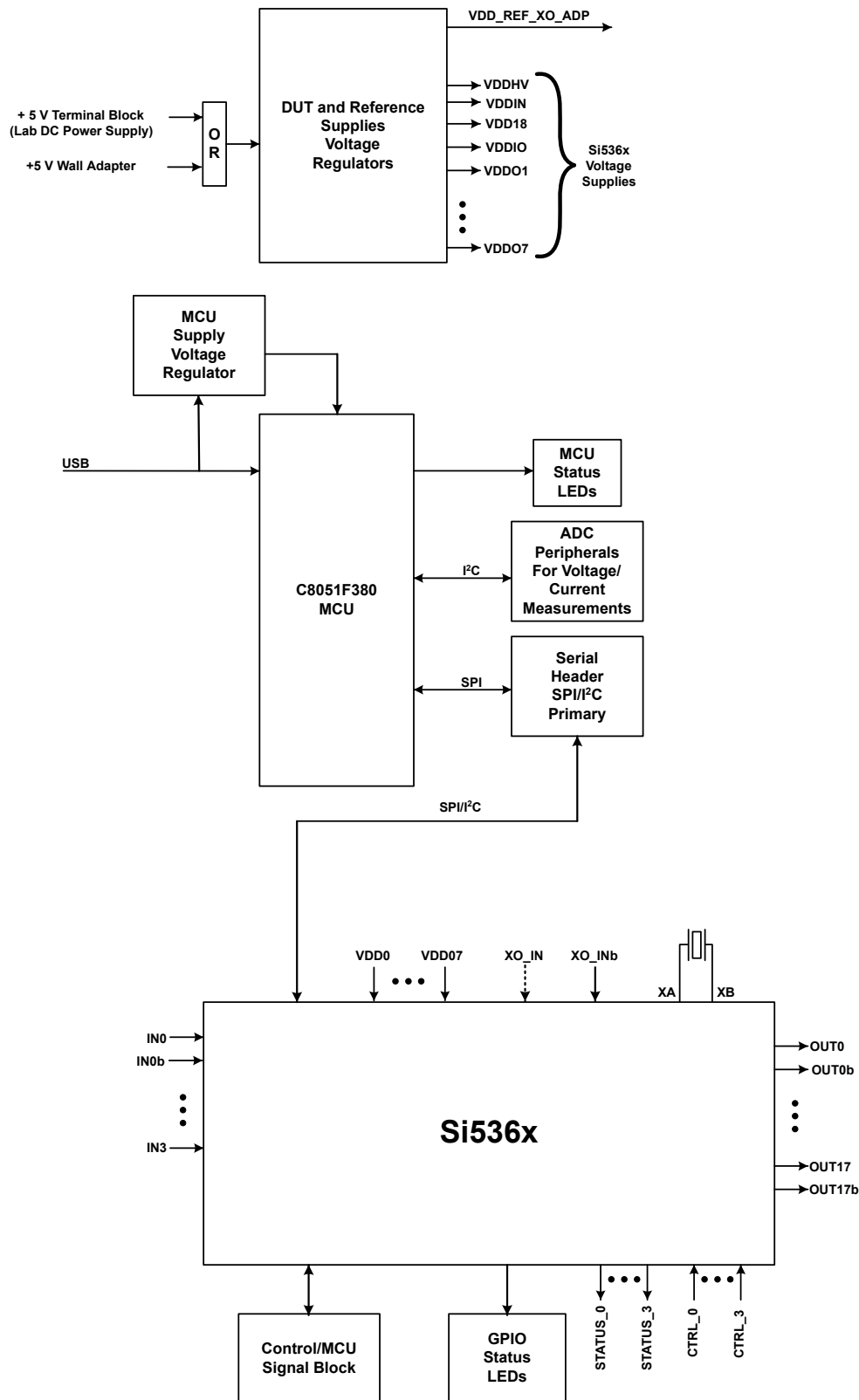


**Figure 1.1. Si536x-EVB Functional Block Diagram**

# 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 corresonding LEDs.

**Figure 2.1.  Si536x-A-EB Quick Start Jumper Settings, Power Connections, and USB Port**
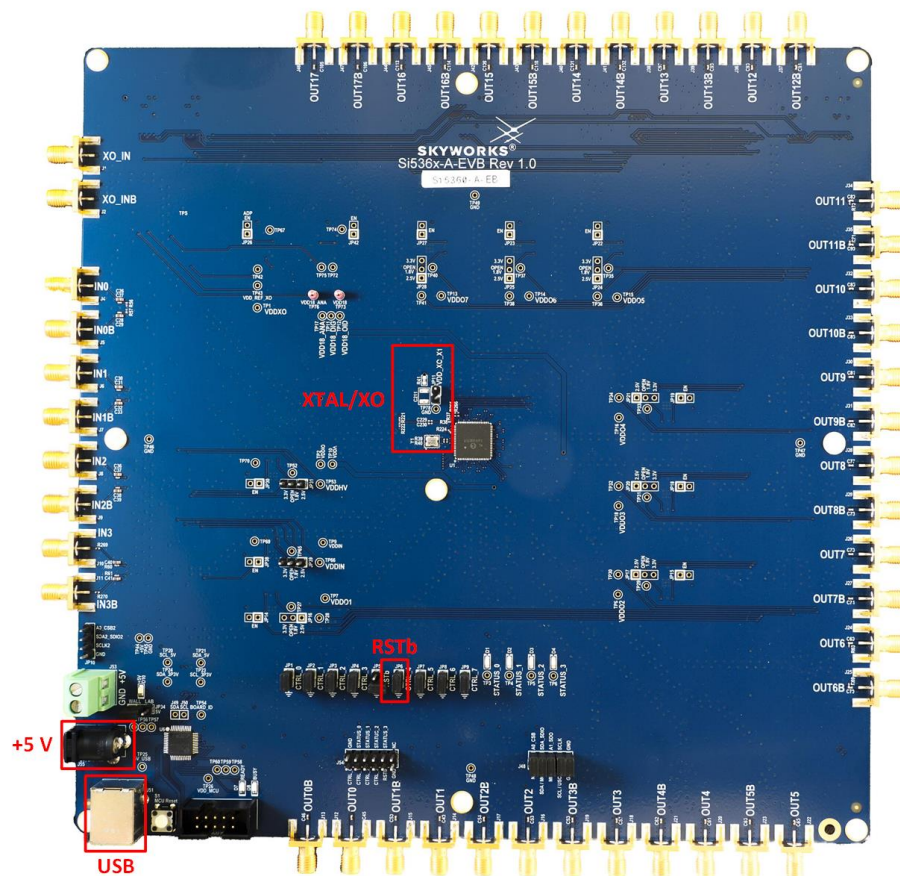
8. The figures in the following steps are shown only for the Si5360 device. Similar methods can be employed for the Si5361, Si5362, and Si5363 devices. Write the CBPro project file (.slabtimeproj) provided by Skyworks support or created by the user for the EVB.

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.
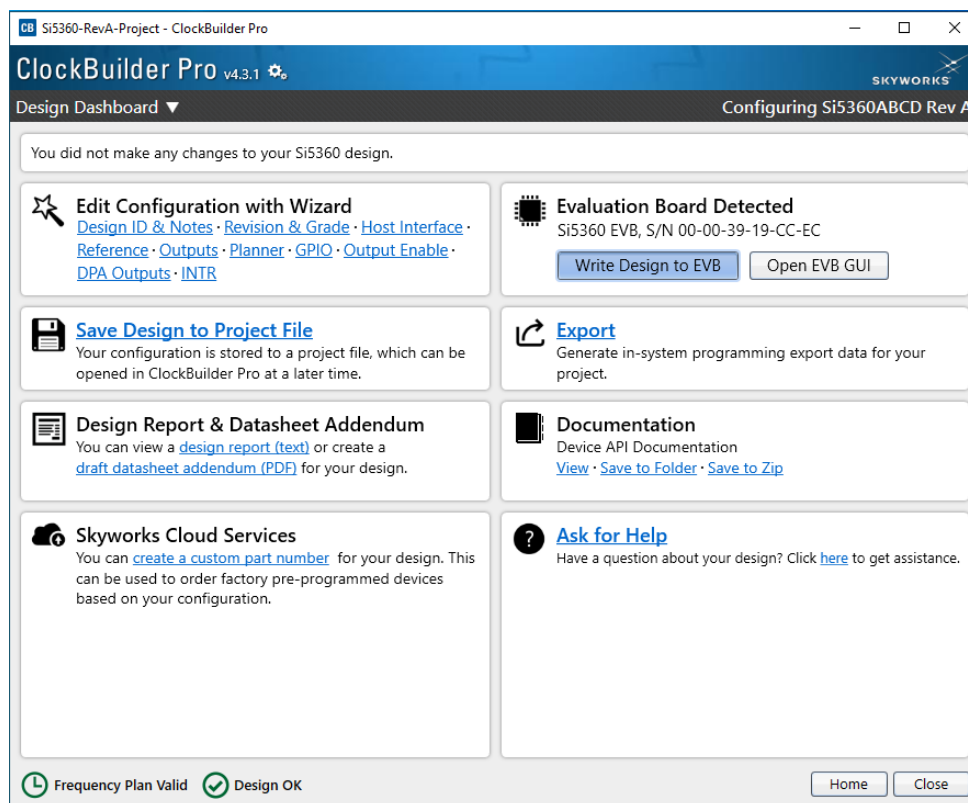


**Figure 2.2. CBPro Wizard Home Page – Write Project File To EVB**

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.
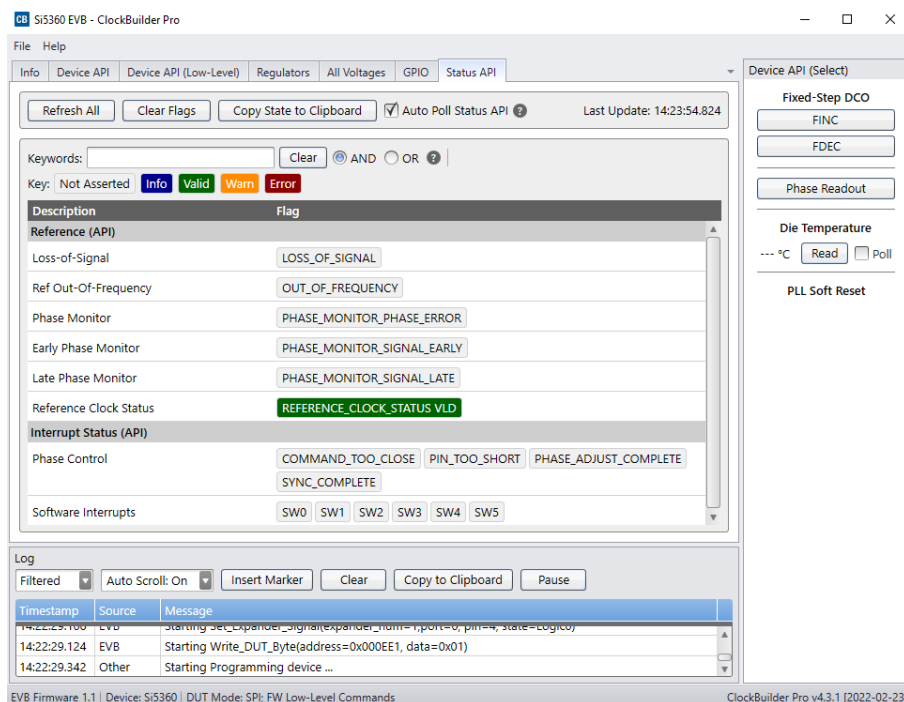


**Figure 2.3. CBPro EVB GUI API Status**

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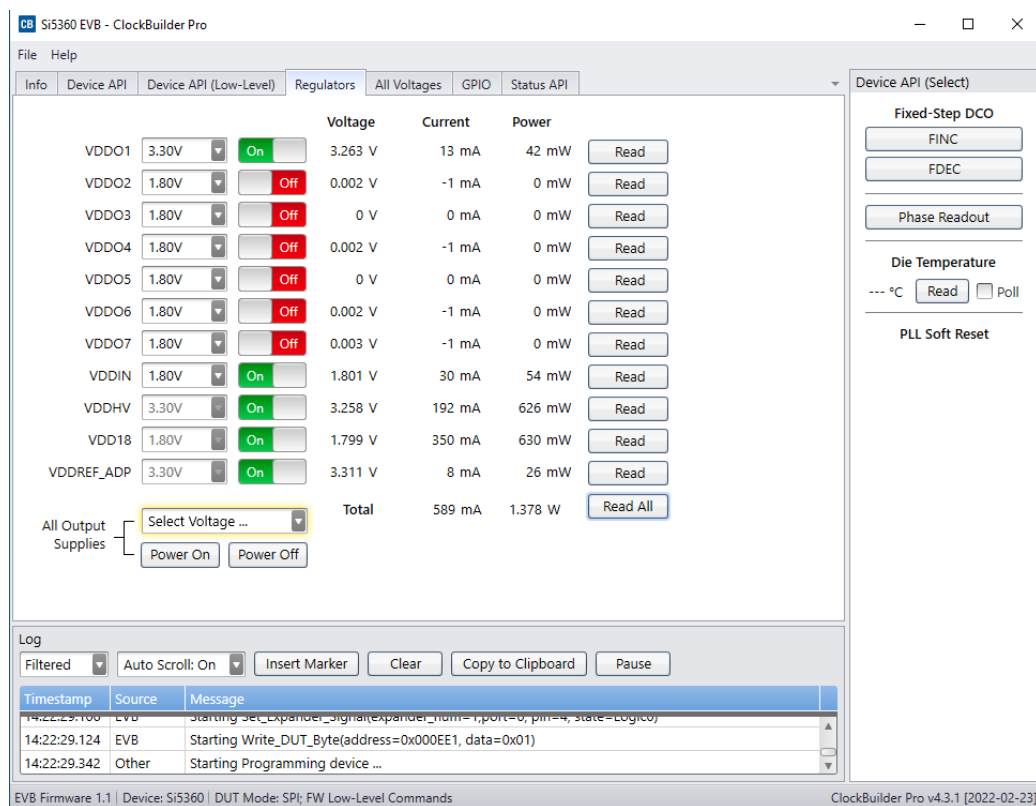


**Figure 2.4. CBPro EVB GUI Regulators Tab**

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.
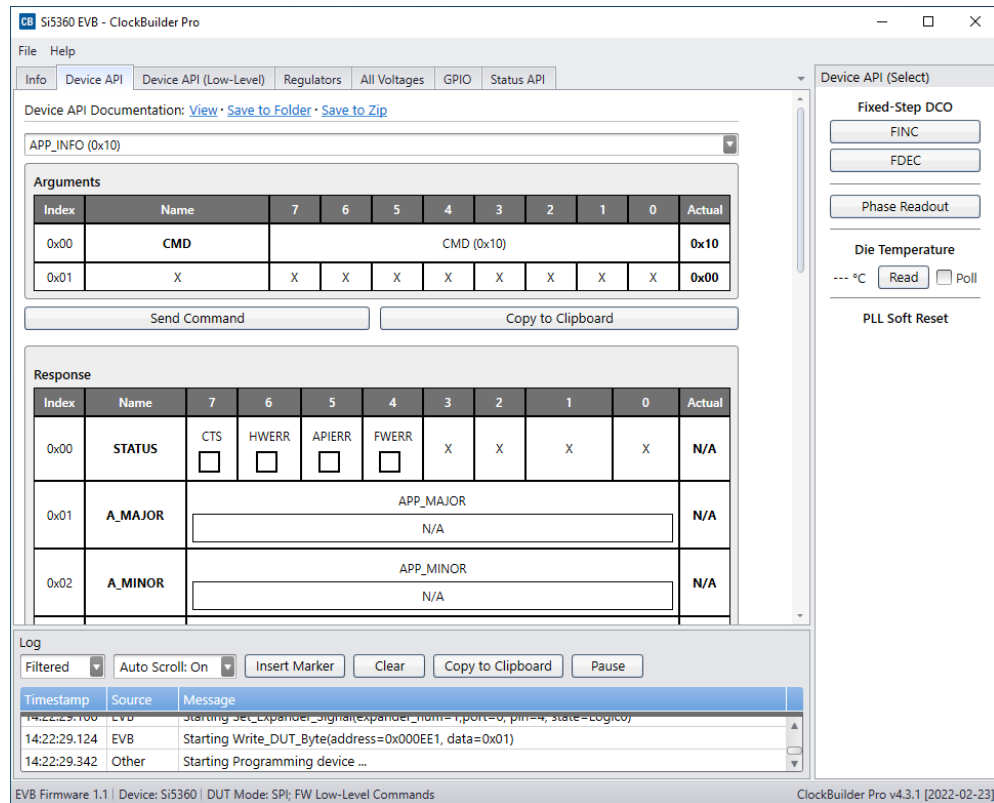- See the Si536x Command/Property API Documentation provided separately for additional details.



**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"
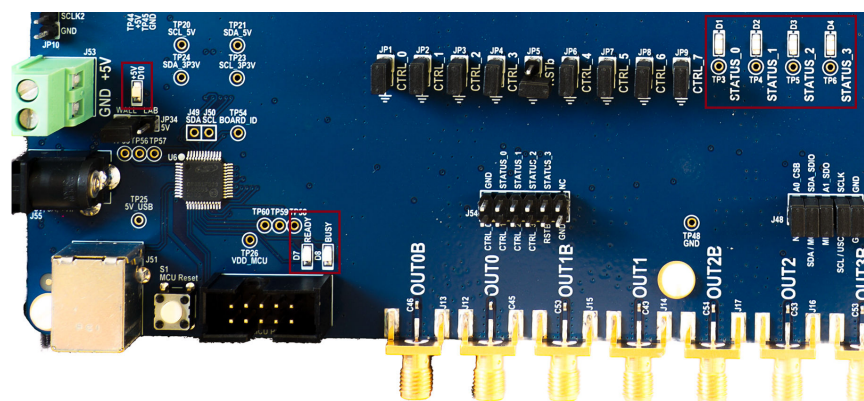


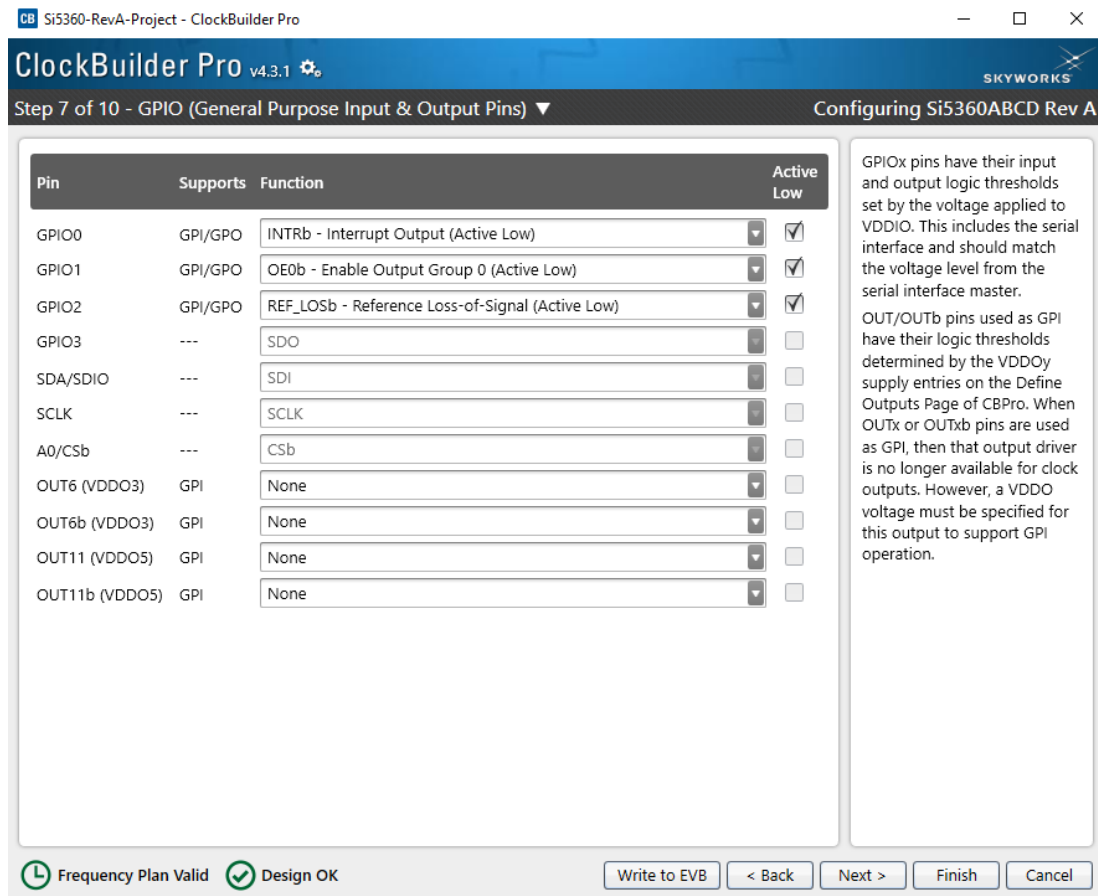**Figure 4.1. Status LEDs and CTRL Pins**

**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 swtich 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 | | |
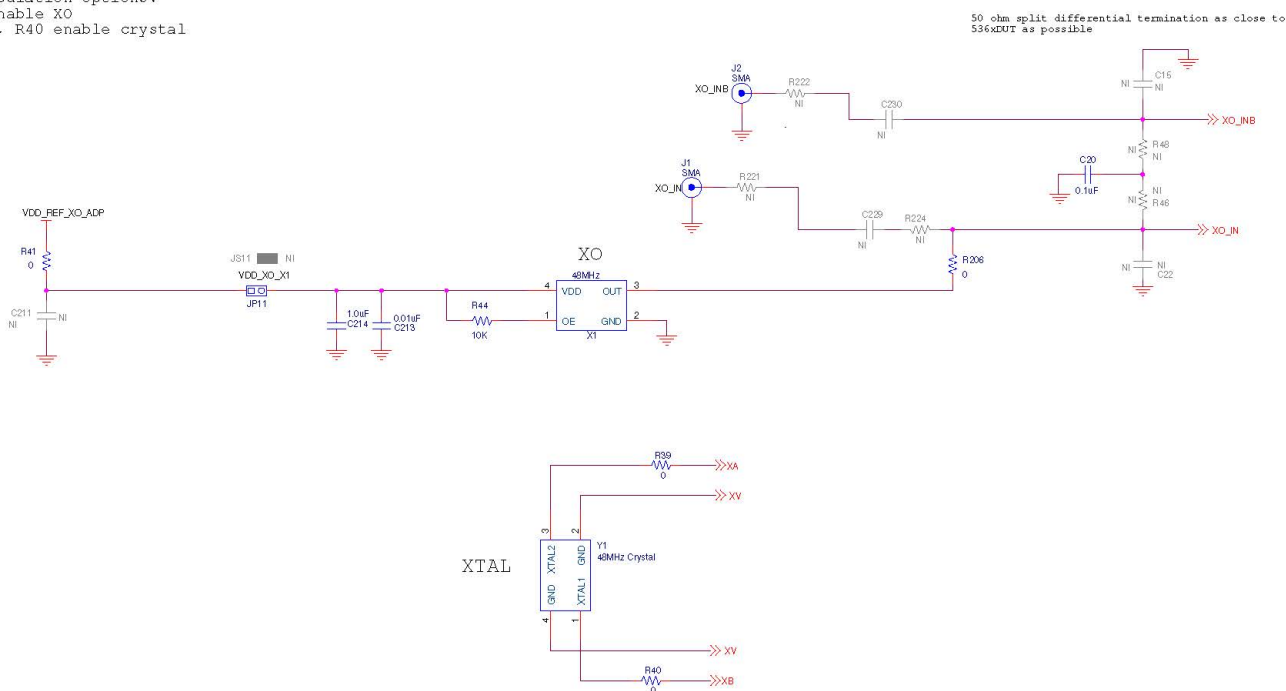


**Figure 5.1. Reference Connections Schematic Excerpt**

# 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.
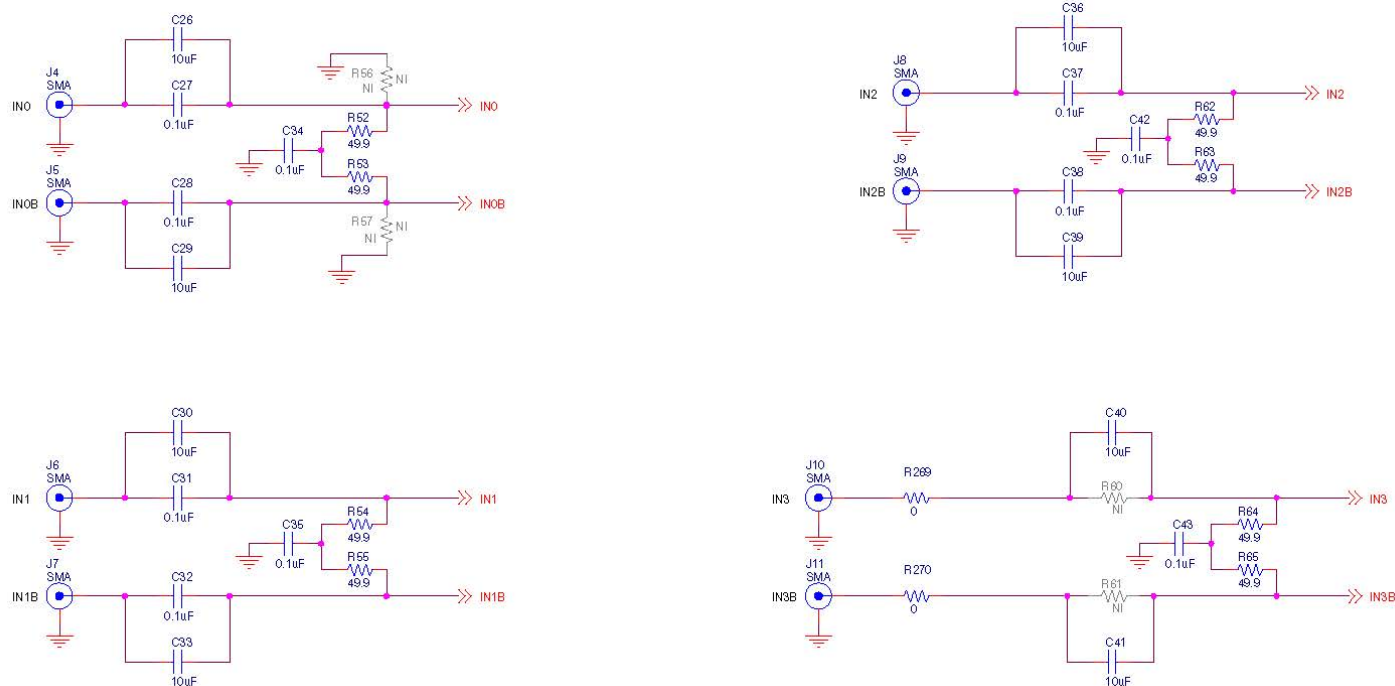


**Figure 6.1. Input Clocks Schematic Excerpt**

# 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.
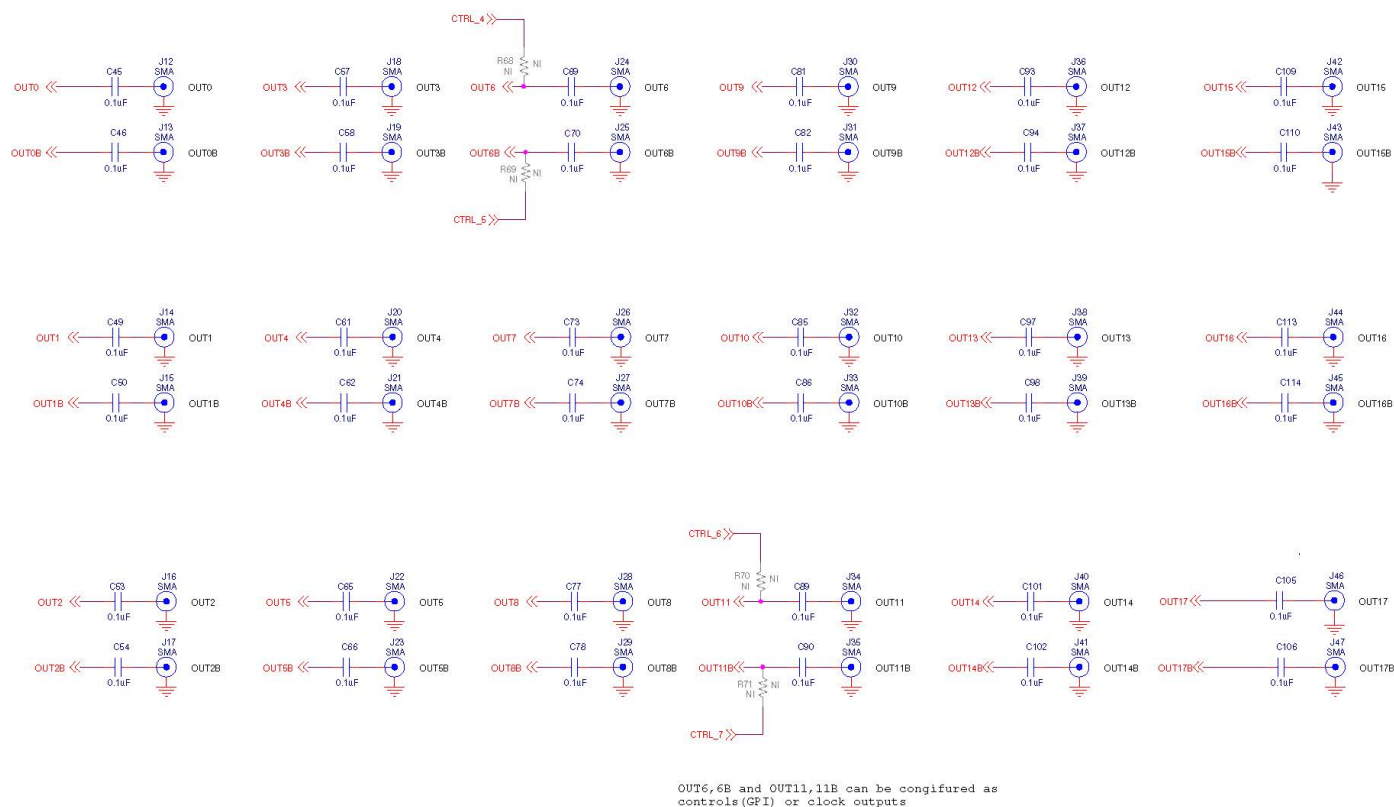


**Figure 7.1. Output Clocks Schematic Excerpt**

## 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
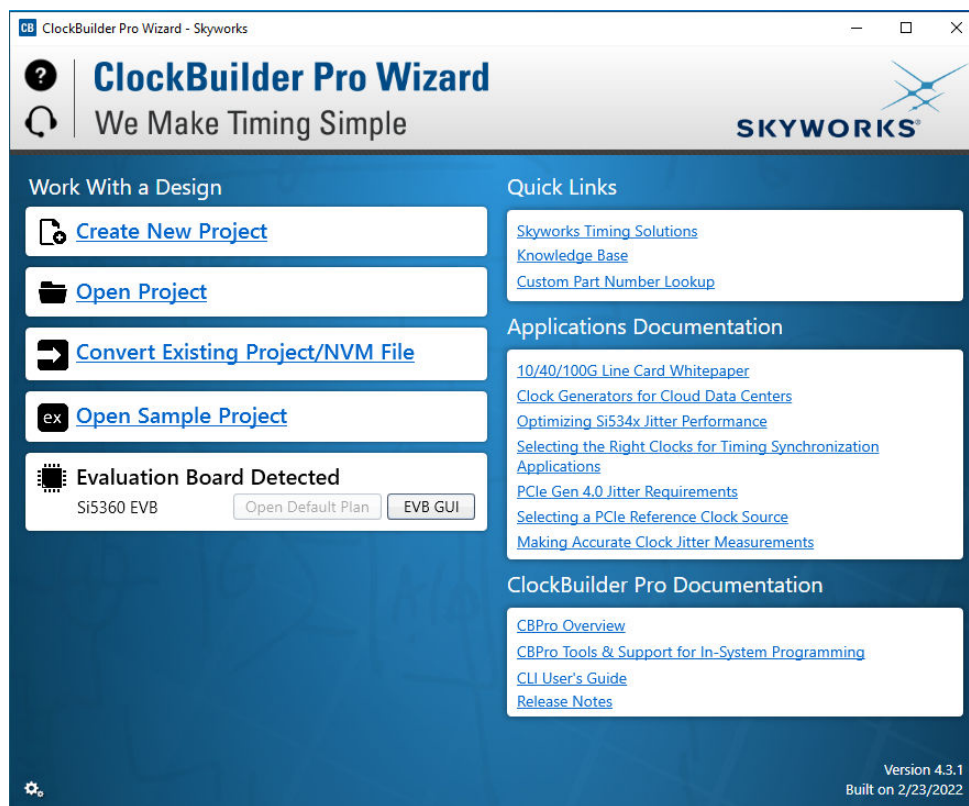


**Figure 8.1. Application #1: ClockBuilder Pro Wizard**

Use the CBPro wizard to:

• Create a new design

• Review or edit an existing design

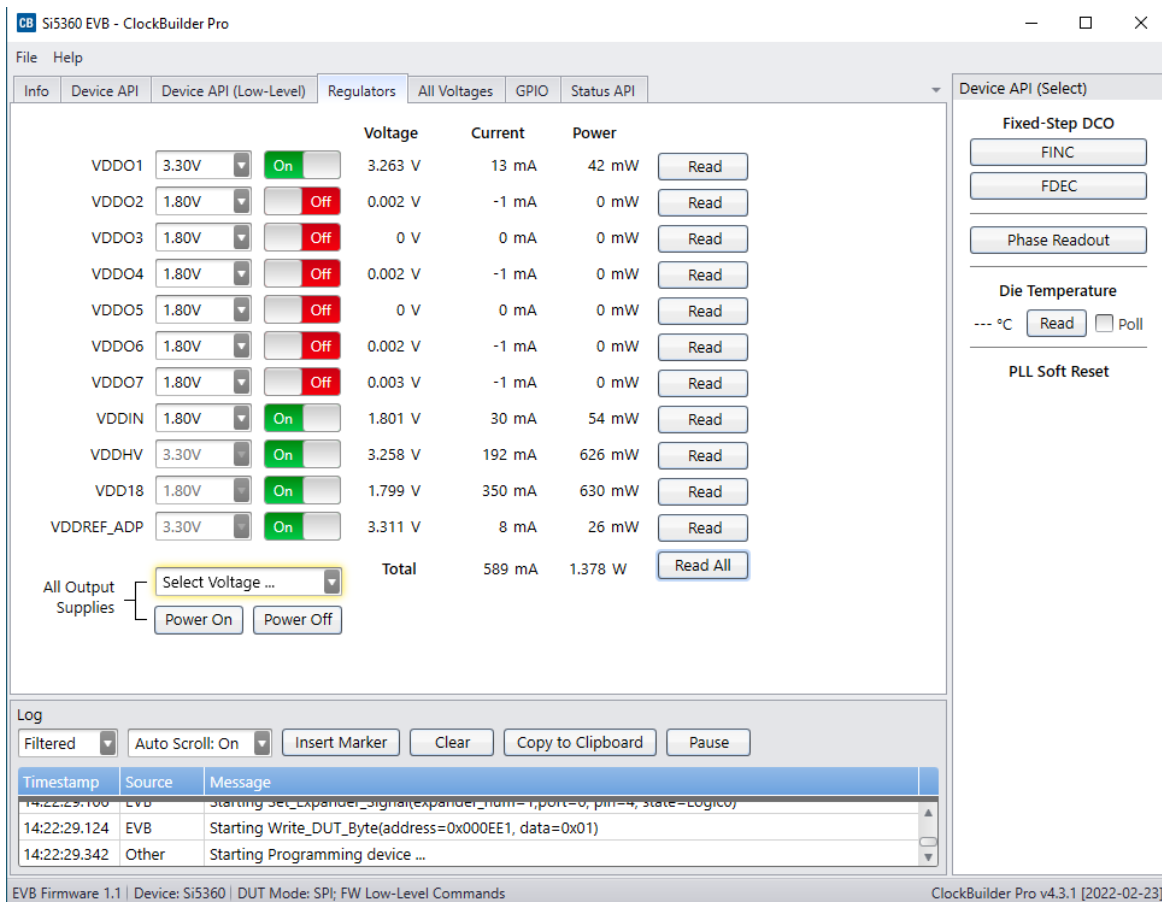• Export project design configuration for programming a Si536x device

**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.
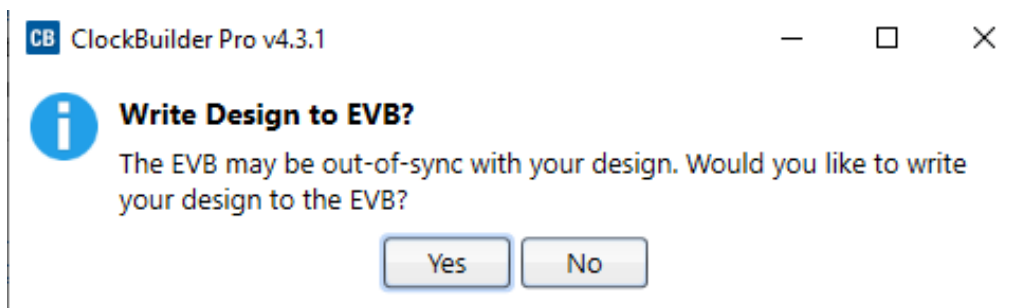


**Figure 8.4. Write Design to EVB Dialog**

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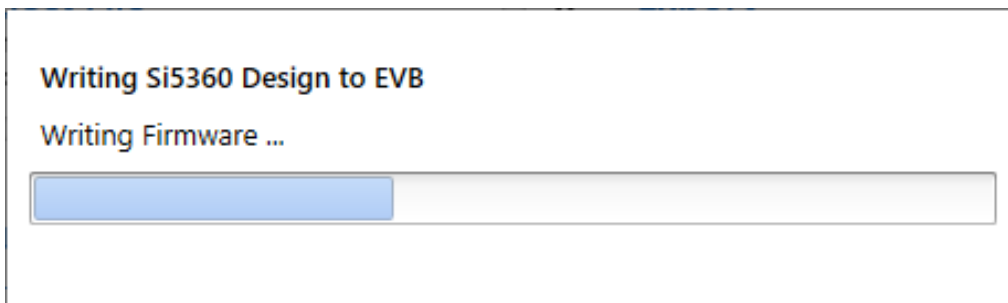


**Figure 8.5. Writing Design Status**

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.
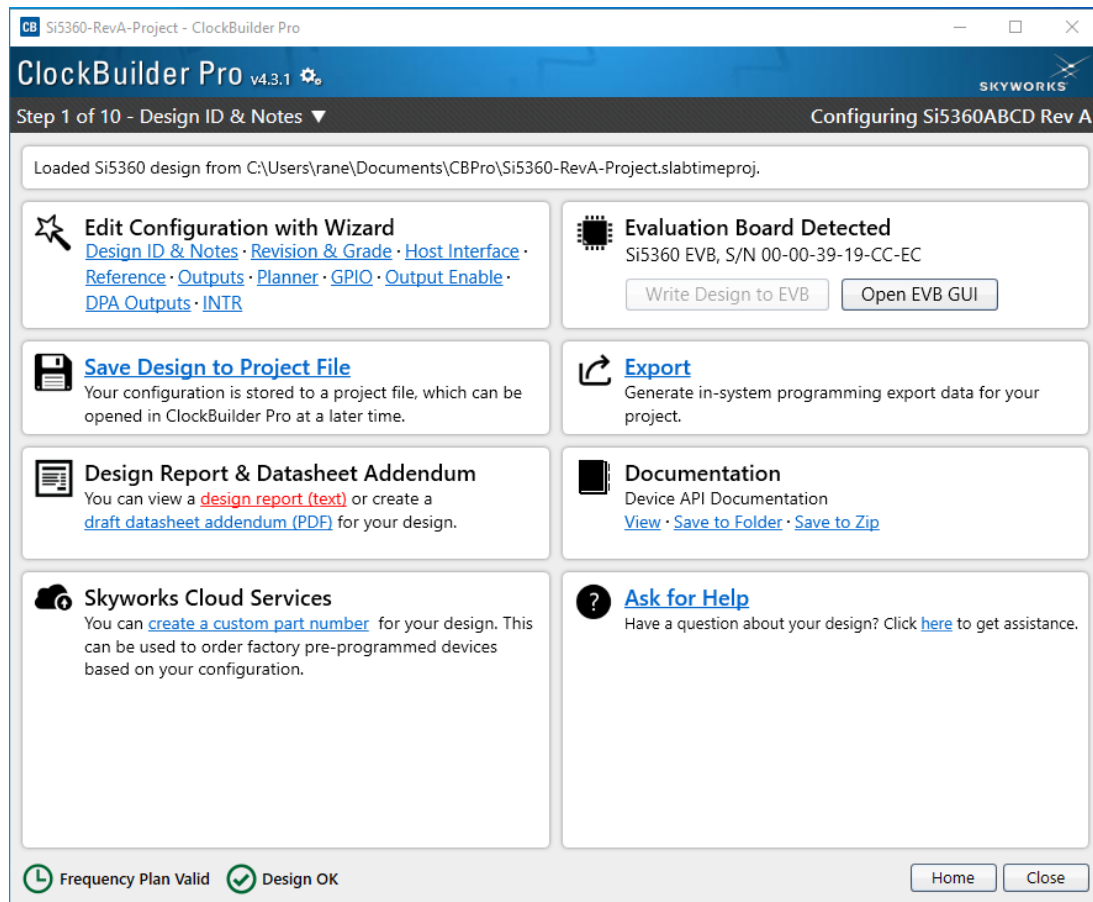


**Figure 8.6.  View Design Report**

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.
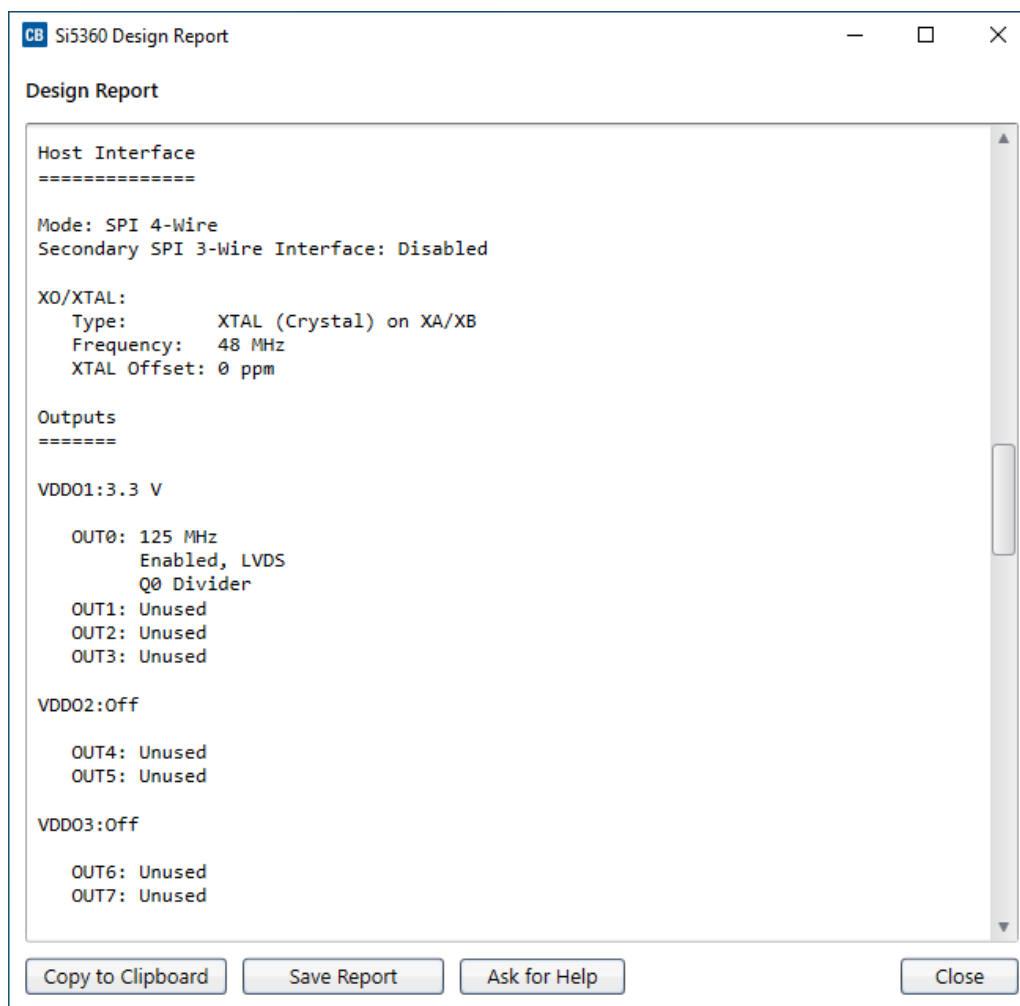


**Figure 8.7. Design Report Window**

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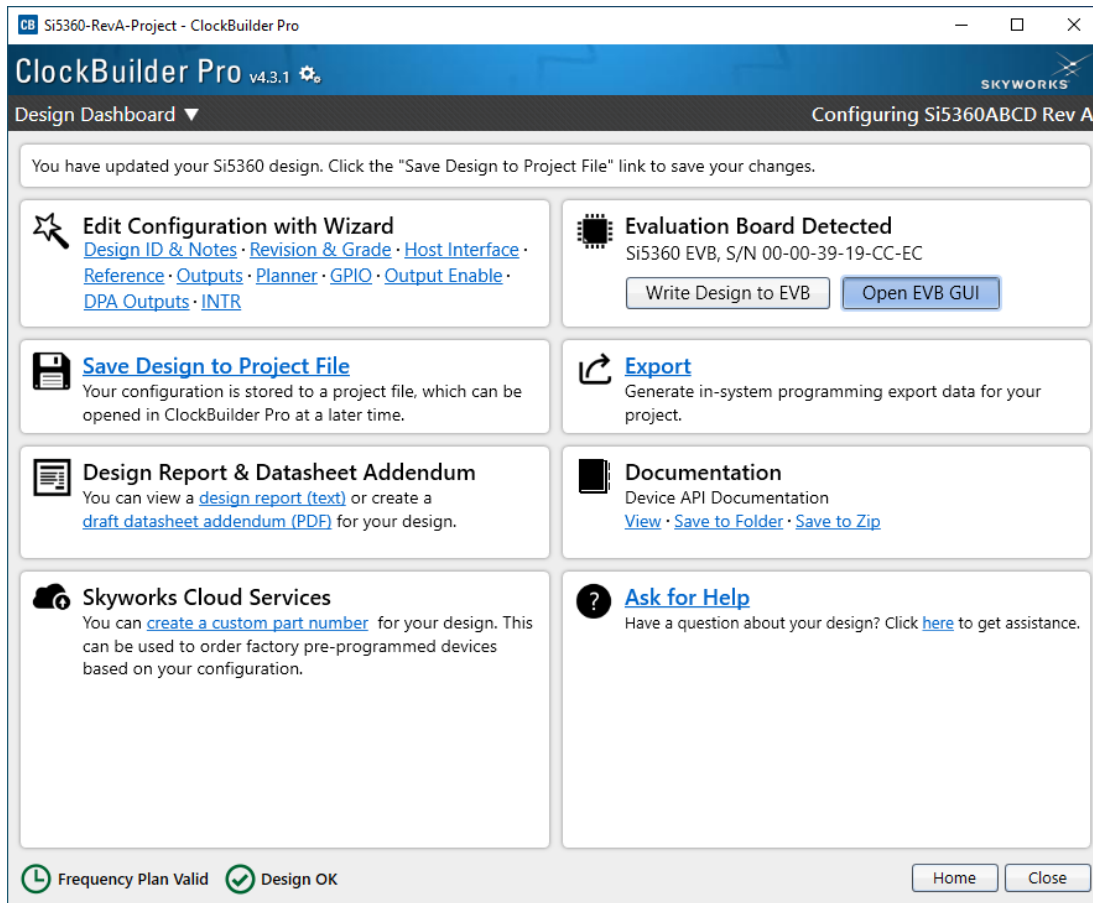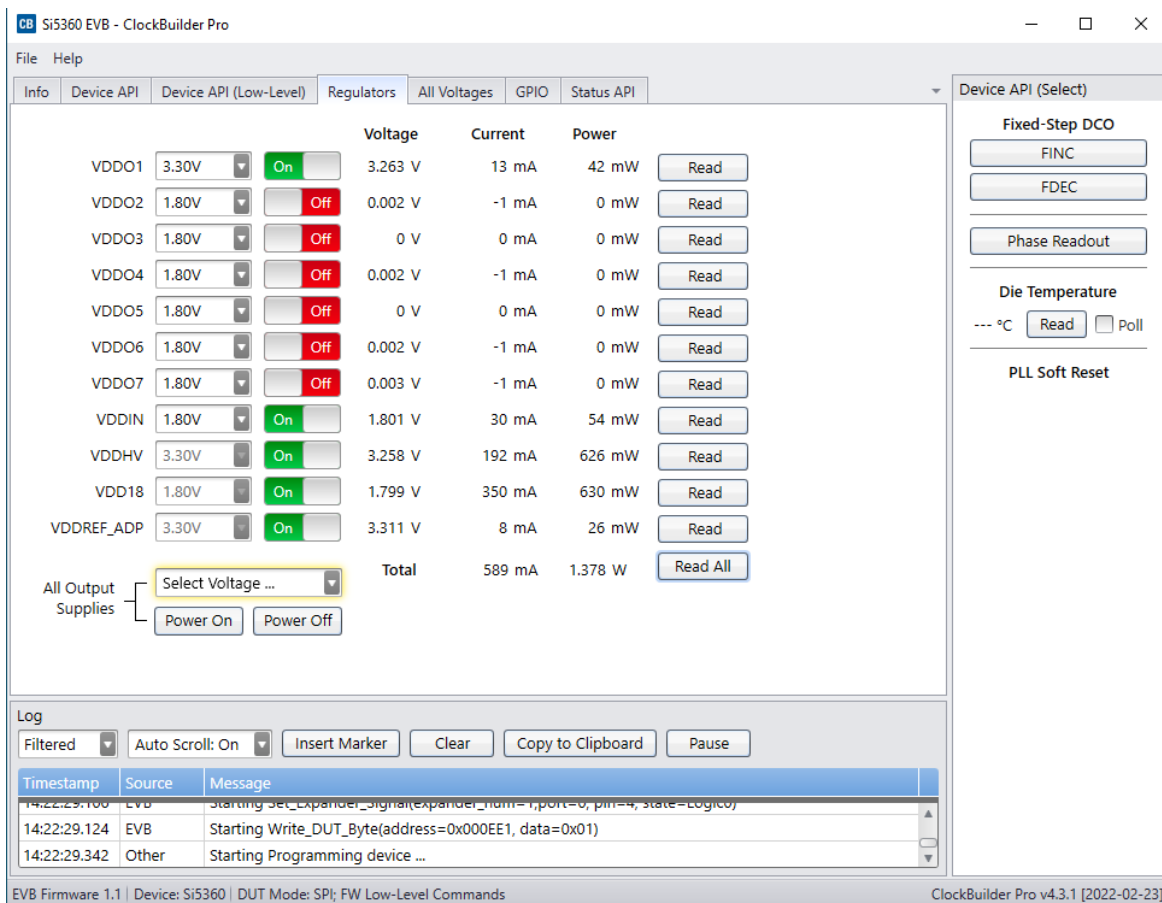


**Figure 8.8. Open EVB GUI**

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.
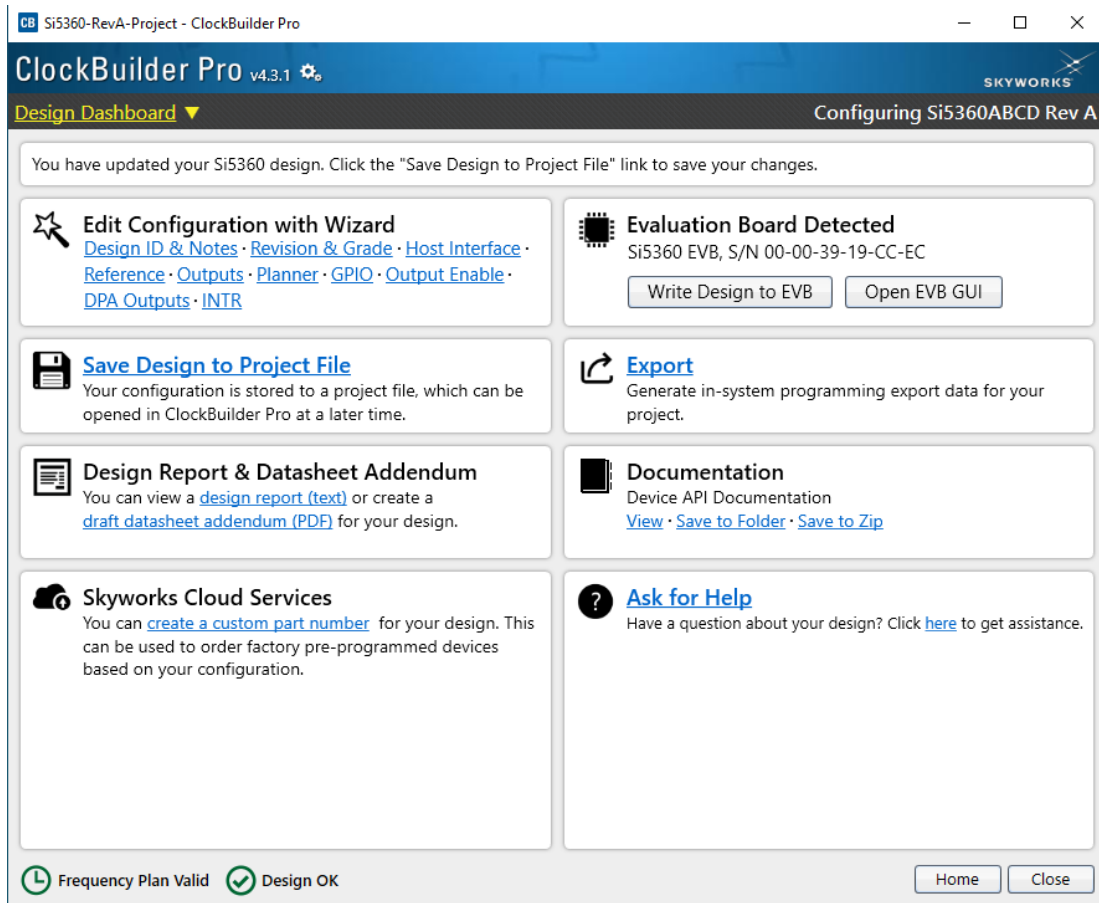


**Figure 8.10. Edit Configuration with Wizard**

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.
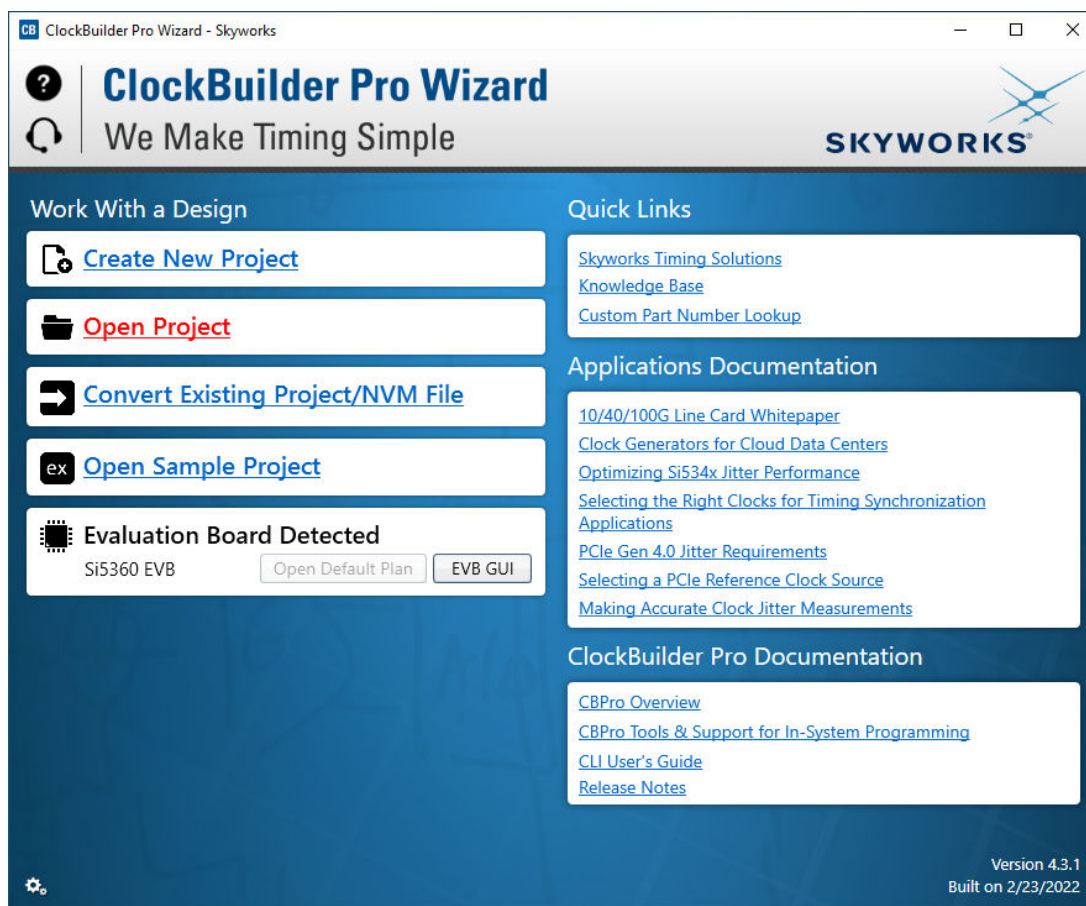


**Figure 8.13. Open Design Project File**

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.
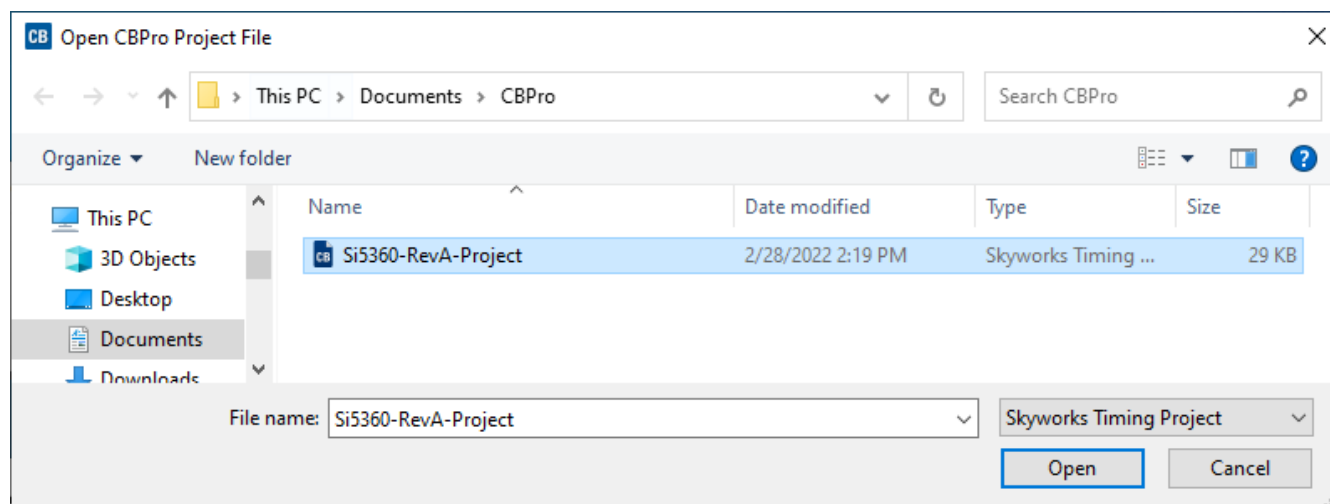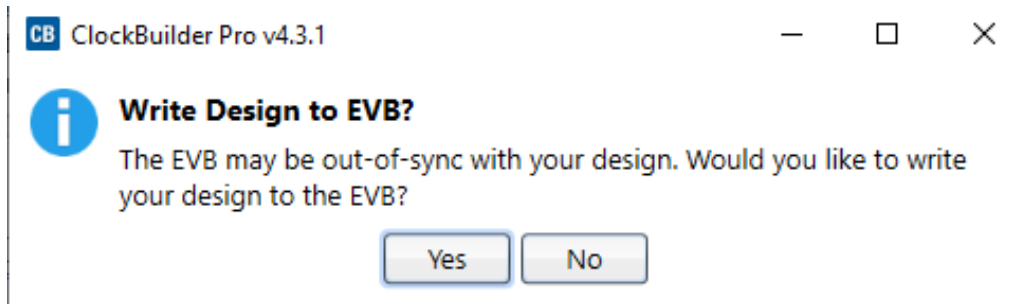


**Figure 8.14. Browse to Project File**

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 $I^2C$ 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 $I^2C$ 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 $I^2C$ 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, $I^2C$ operation should use J48 pin 4 (SDA_SDIO) as the $I^2C$ SDA and J48 pin 8 (SCLK) as the $I^2C$ SCLK. Note that the external $I^2C$ controller will need to supply its own $I^2C$ signal pull-up resistors.

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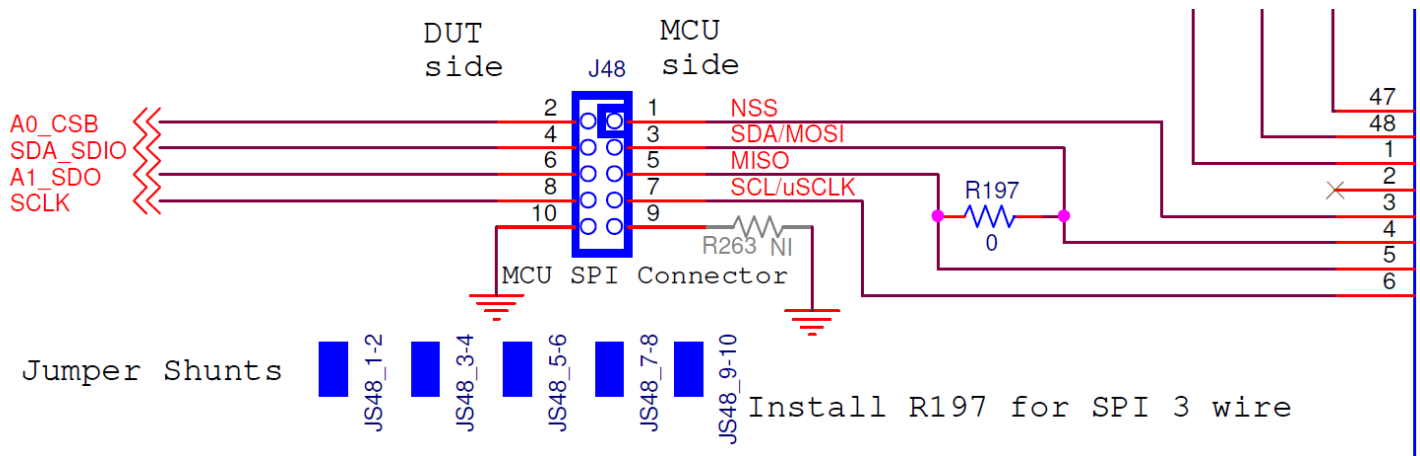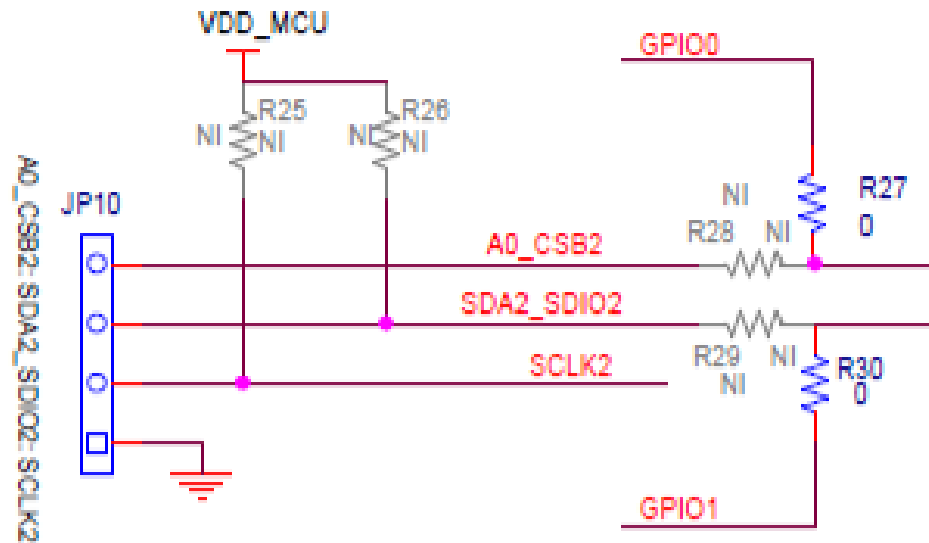


**Figure 9.1. Serial Communications Header J48**

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).
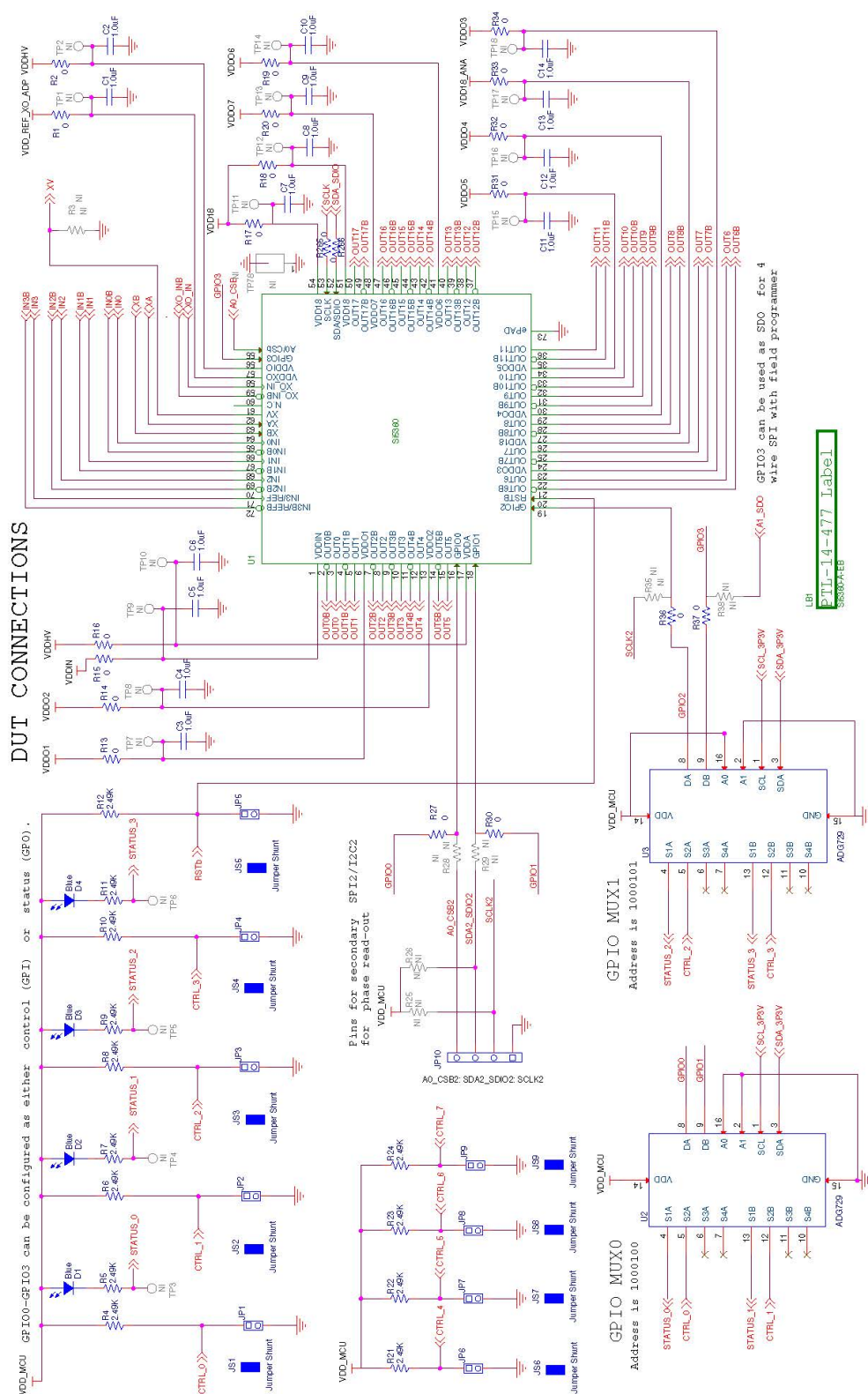


**Figure 10.1. Si536x-EVB Schematic (1 of 10)**
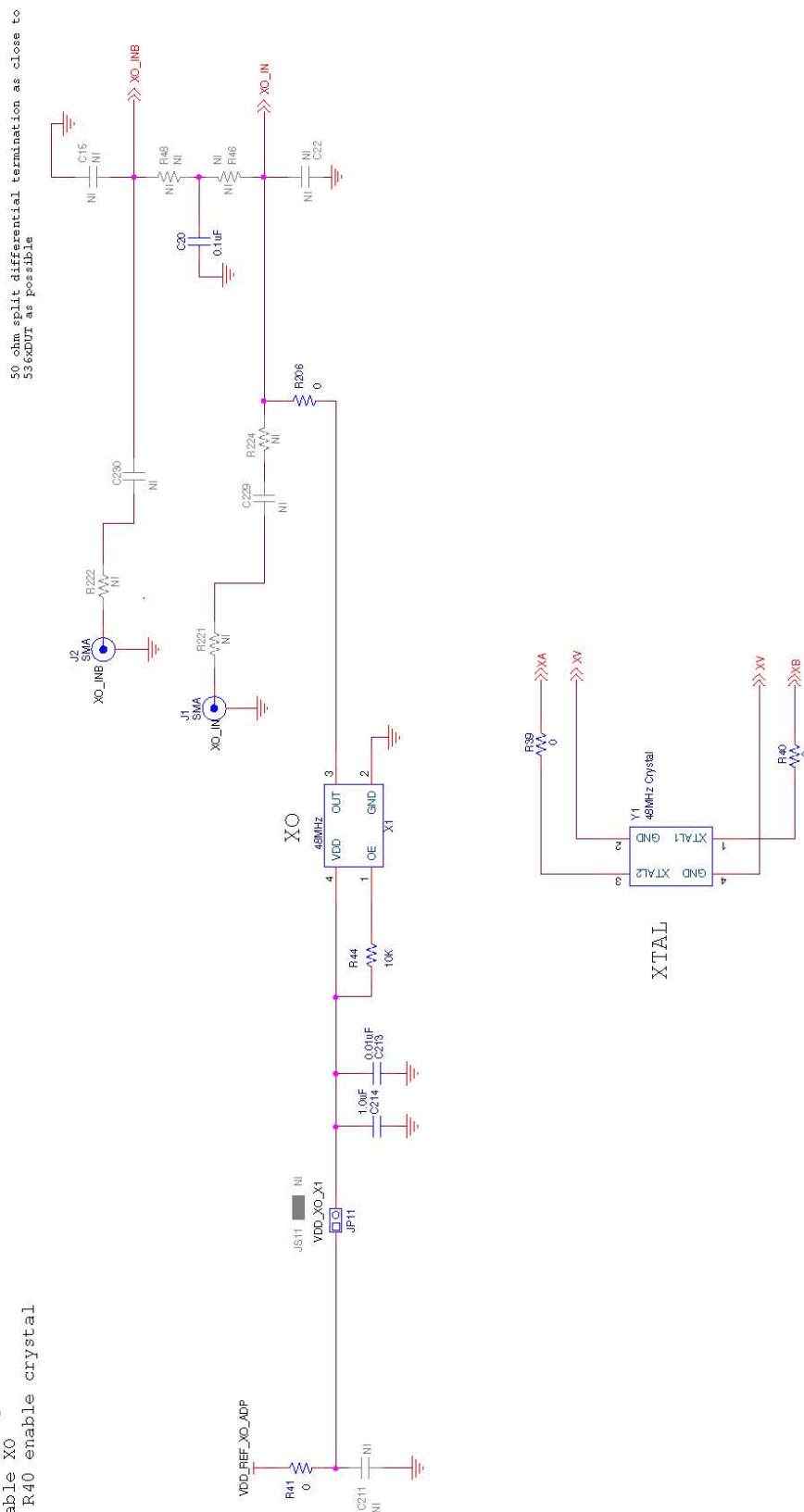
**Figure 10.2.  Si536x-EVB Schematic (2 of 10)**

Skyworks Solutions, Inc. • Phone [781] 376-3000 • Fax [781] 376-3100 • sales@skyworksinc.com • www.skyworksinc.com

206415A • Skyworks Proprietary Information • Products and Product Information are Subject to Change Without Notice • November 4, 2022     29
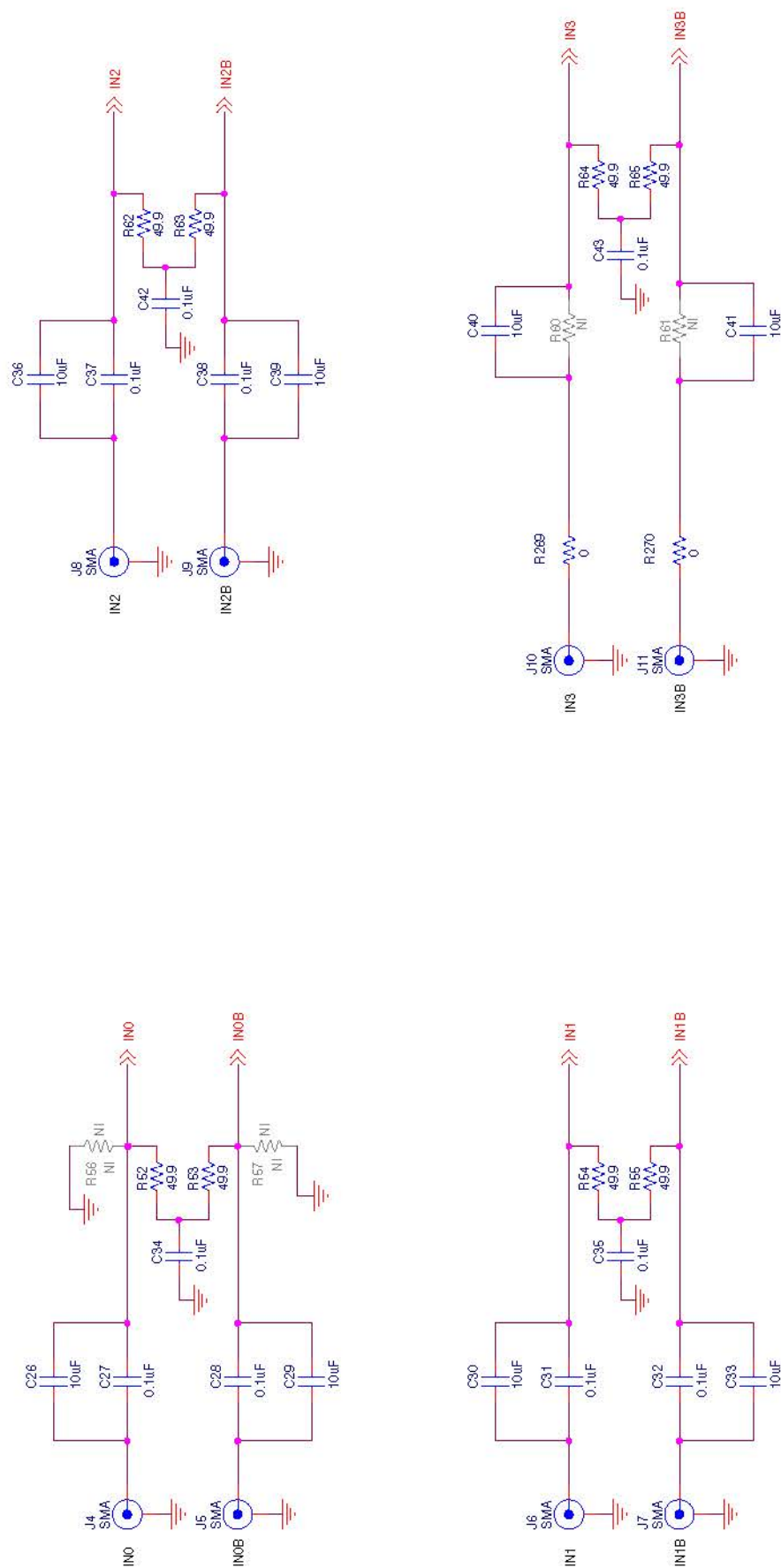
# INPUT CLOCKS



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

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## OUTPUT CLOCKS

All OUTX/OUTXB traces on the schematic should be
trace length matching and impedance controlled
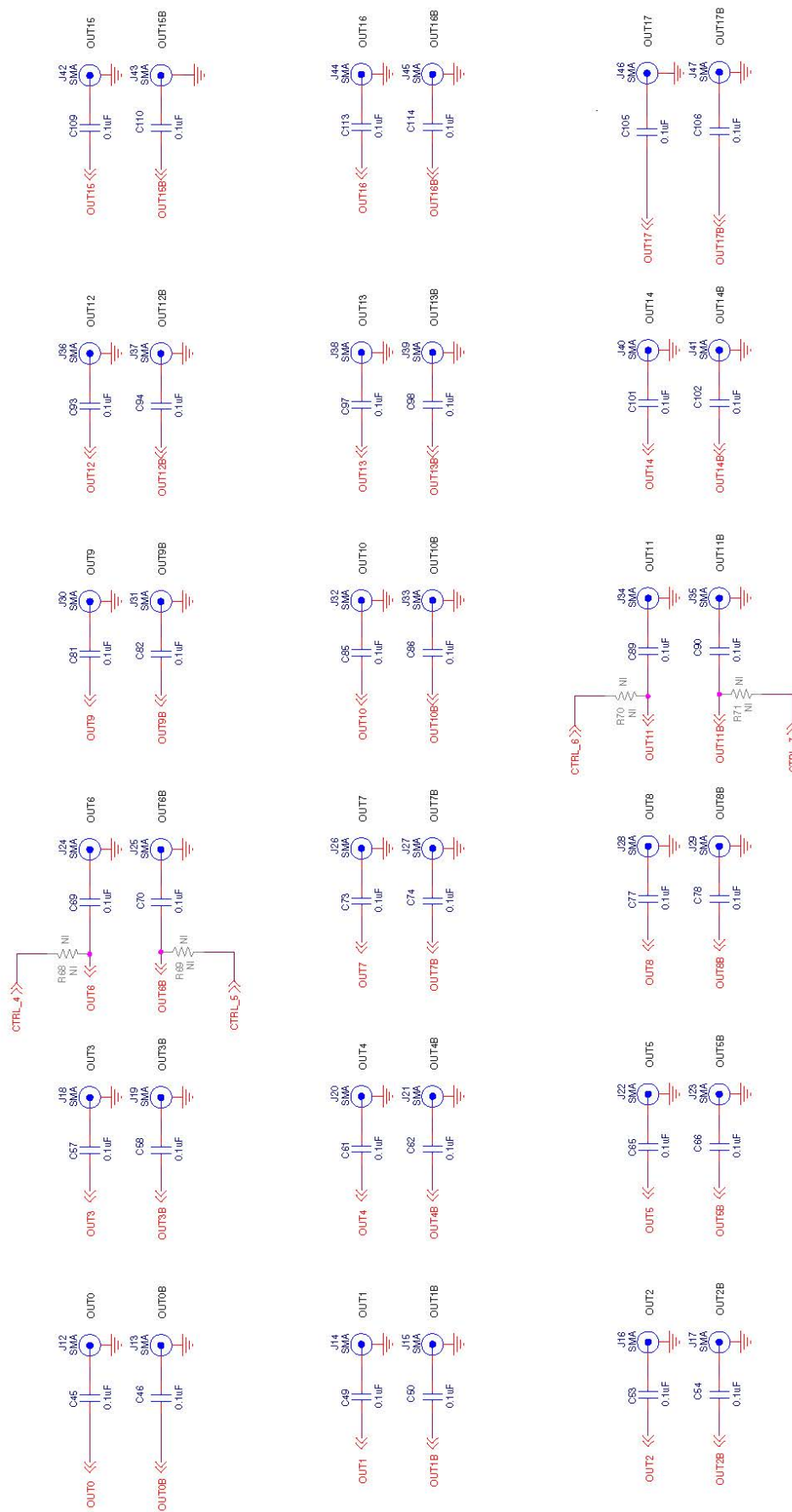
OUT6,6B and OUT11,11B can be congifured as
controls (GPI) or clock outputs
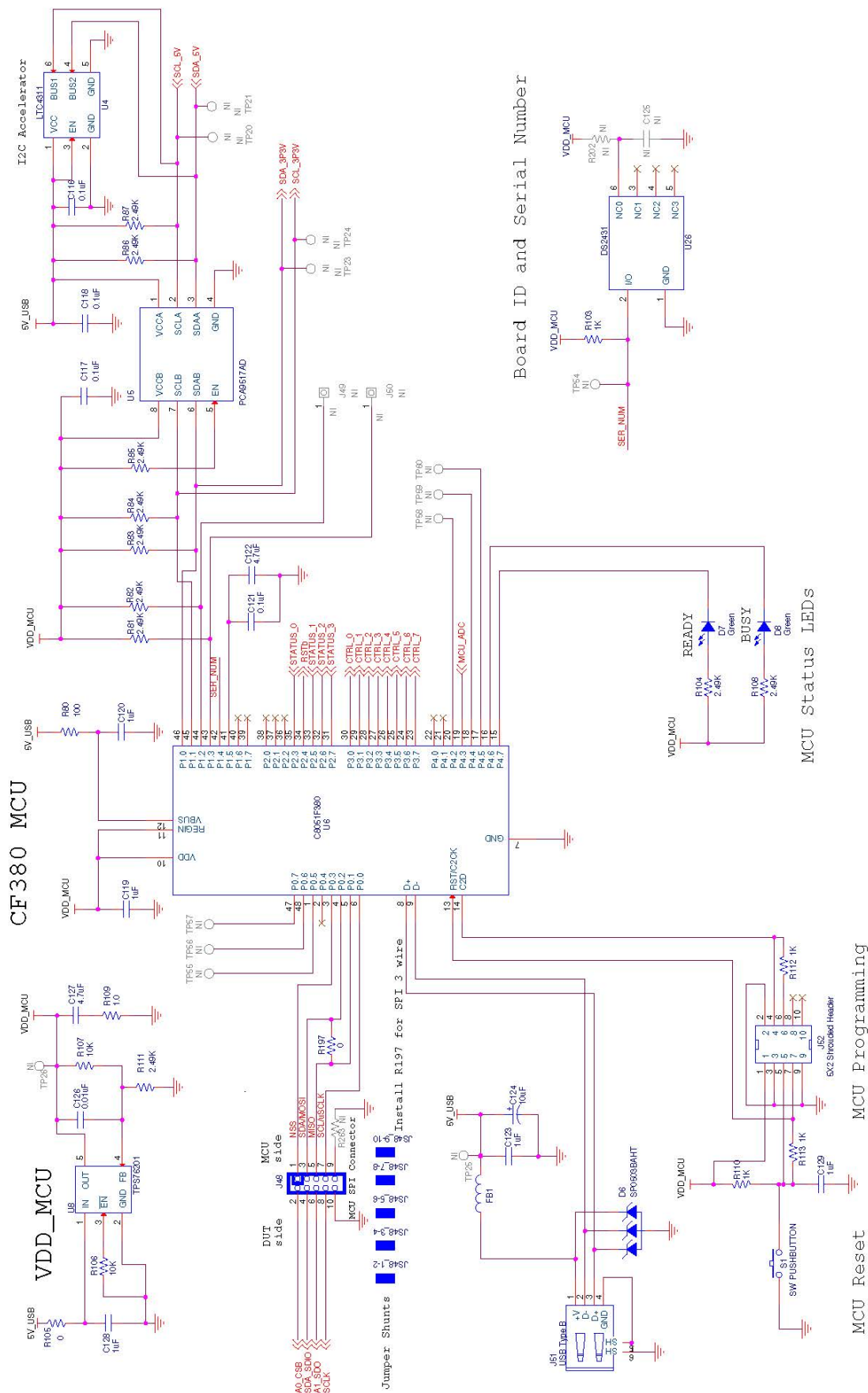
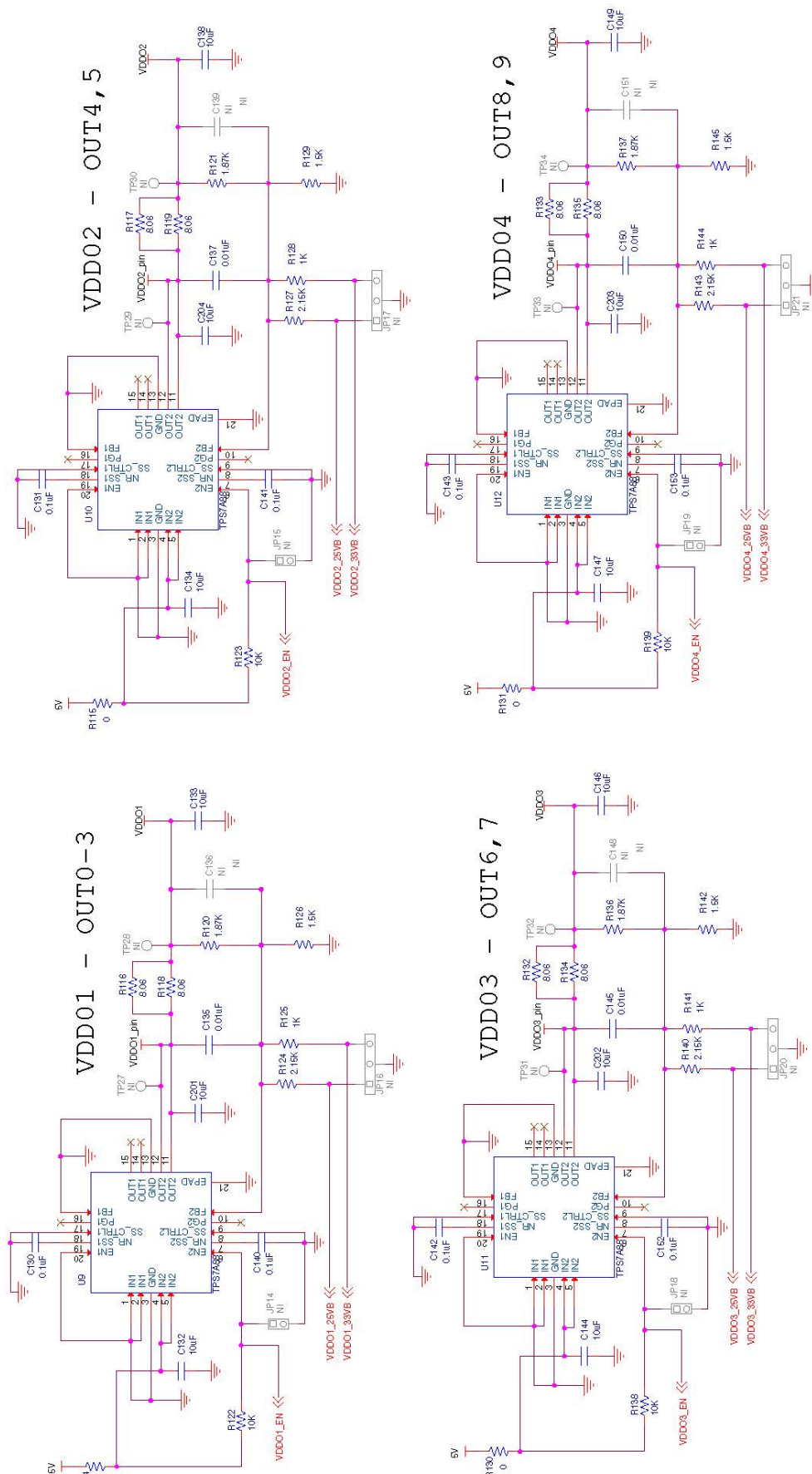**Figure 10.4. Si536x-EVB Schematic (4 of 10)**

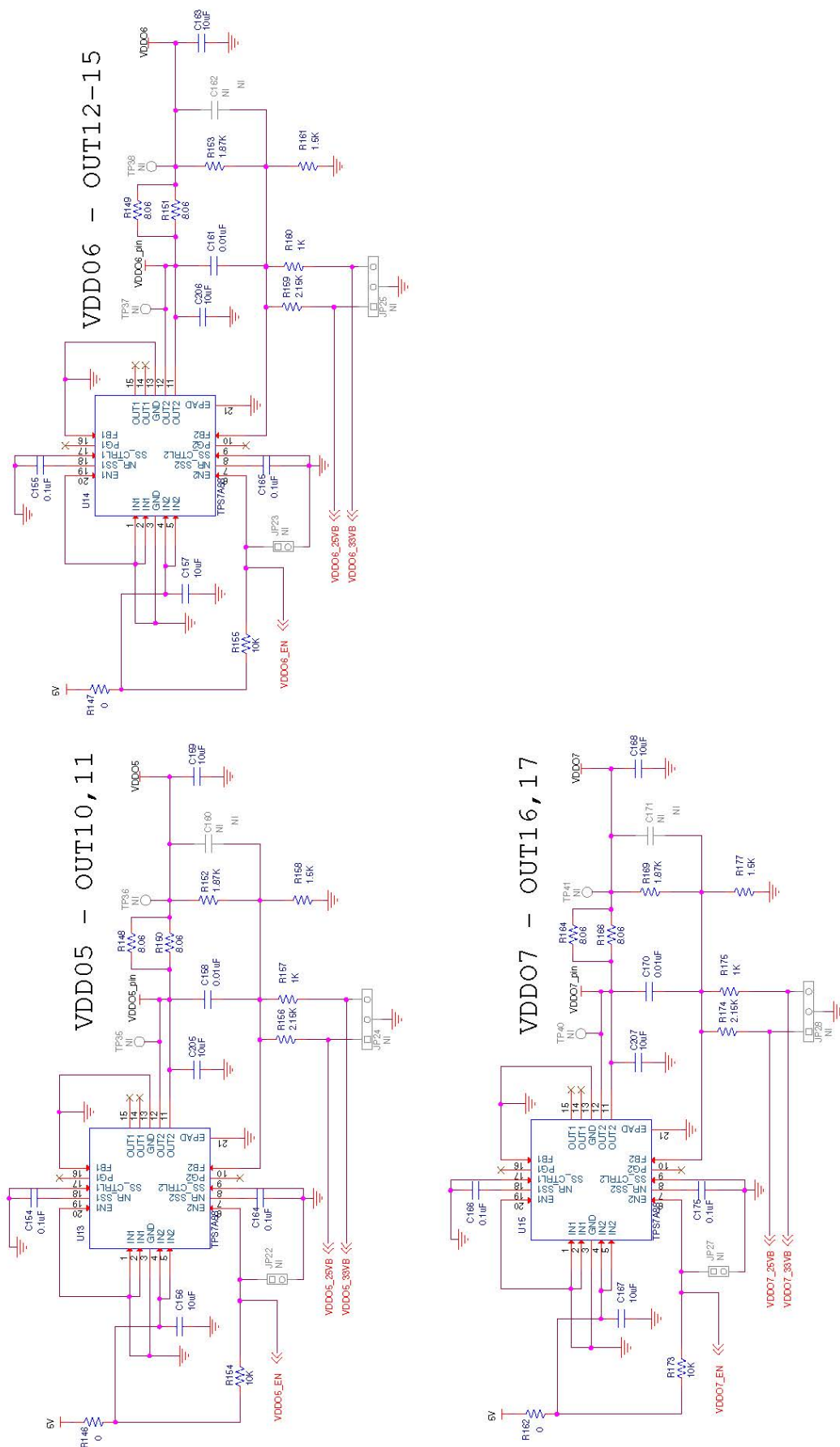**Figure 10.5.  Si536x-EVB Schematic (5 of 10)**

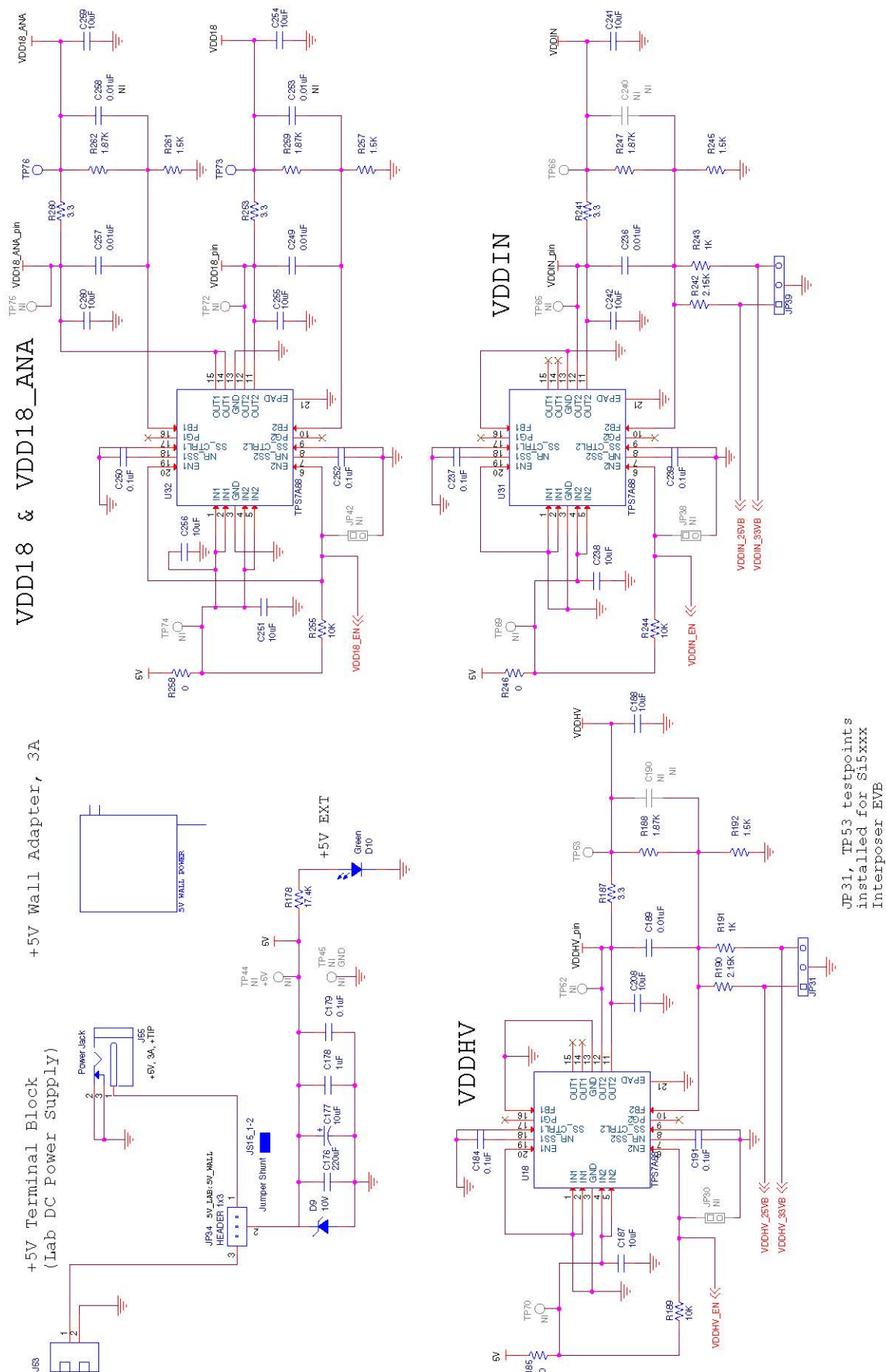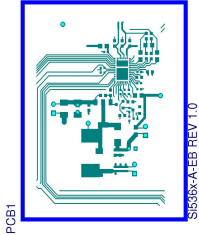**Figure 10.6. Si536x-EVB Schematic (6 of 10)**

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

**Figure 10.8.  Si536x-EVB Schematic (8 of 10)**
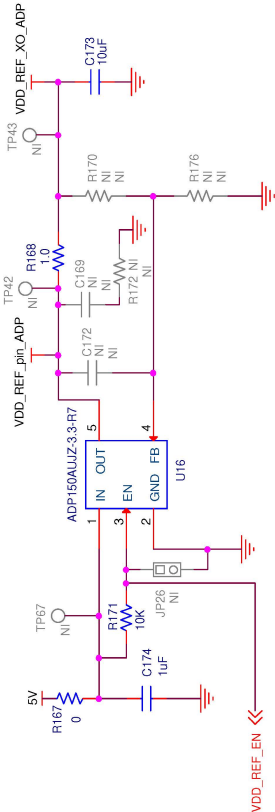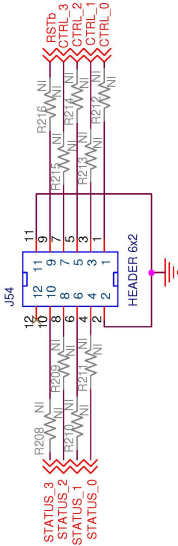
**Figure 10.9. Si536x-EVB Schematic (9 of 10)**

VOLTAGE MEASUREMENT MULTIPLEXING
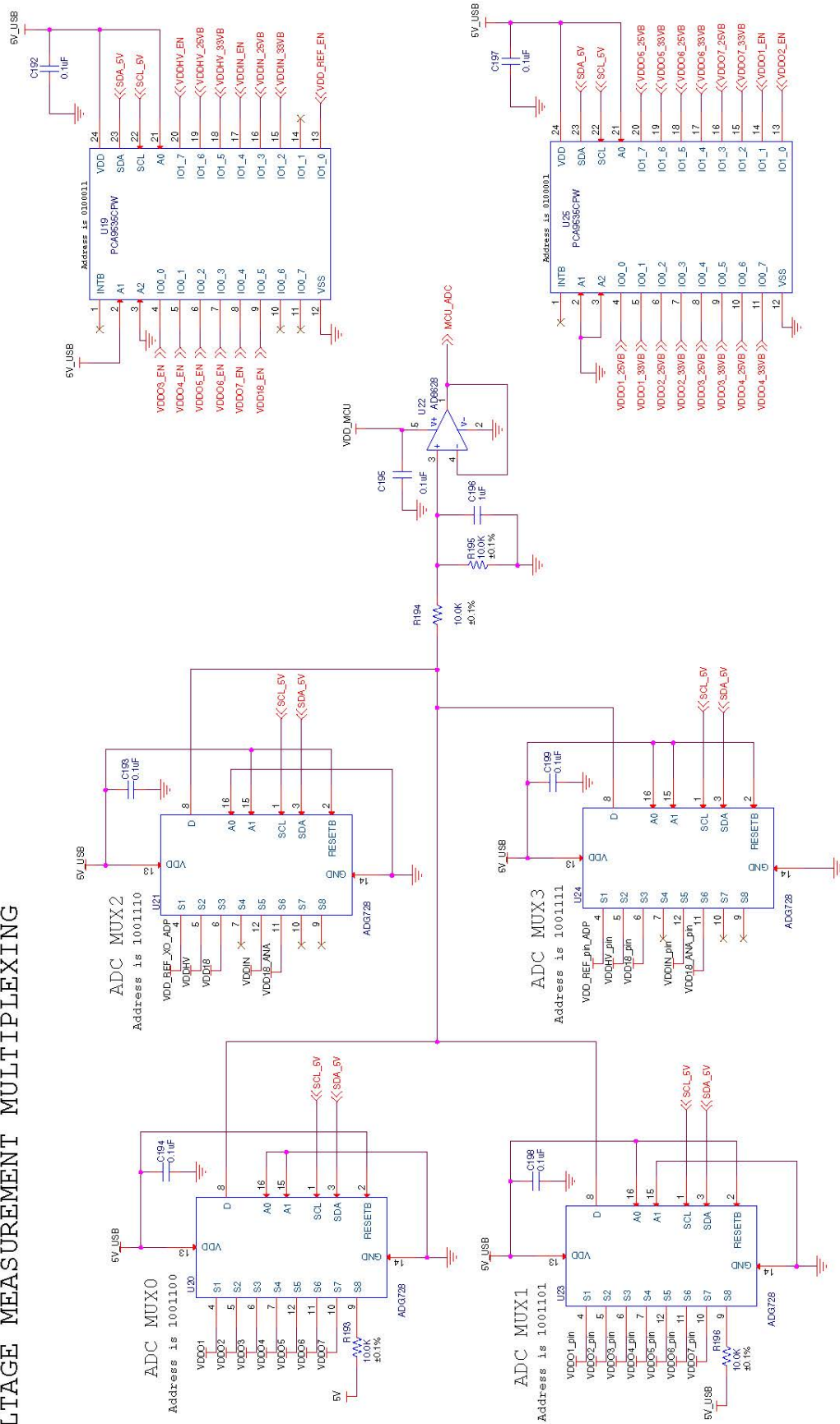
**Figure 10.10. Si536x-EVB Schematic (10 of 10)**

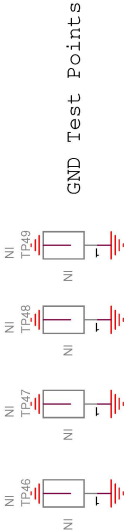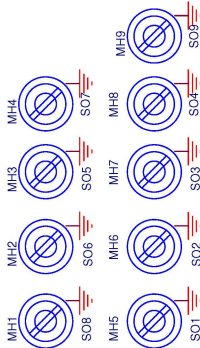| NI | Quantity | Reference | Value | Rating | Voltage | Tolerance | Type | PCB_Footprint | ManufacturerPN | Manufacturer |
|----|----------|-----------|-------|--------|---------|-----------|------|---------------|----------------|--------------|
| | 15 | C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 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 | T491C106M025ZT | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 42 | 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 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 |
| | 46 | 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 J46 J47 | SMA | | | | | SMA | SMA-SMT-50_OHM\|SMA-EDGE-3\|SMA-SMT-50_OHM_10MIL | 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 |
| | 10 | 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)**

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| 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_9-10 | 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 |
| | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | R126 R129 R142 R145 R158 R161 R177 R192 R245 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.

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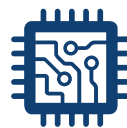
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