

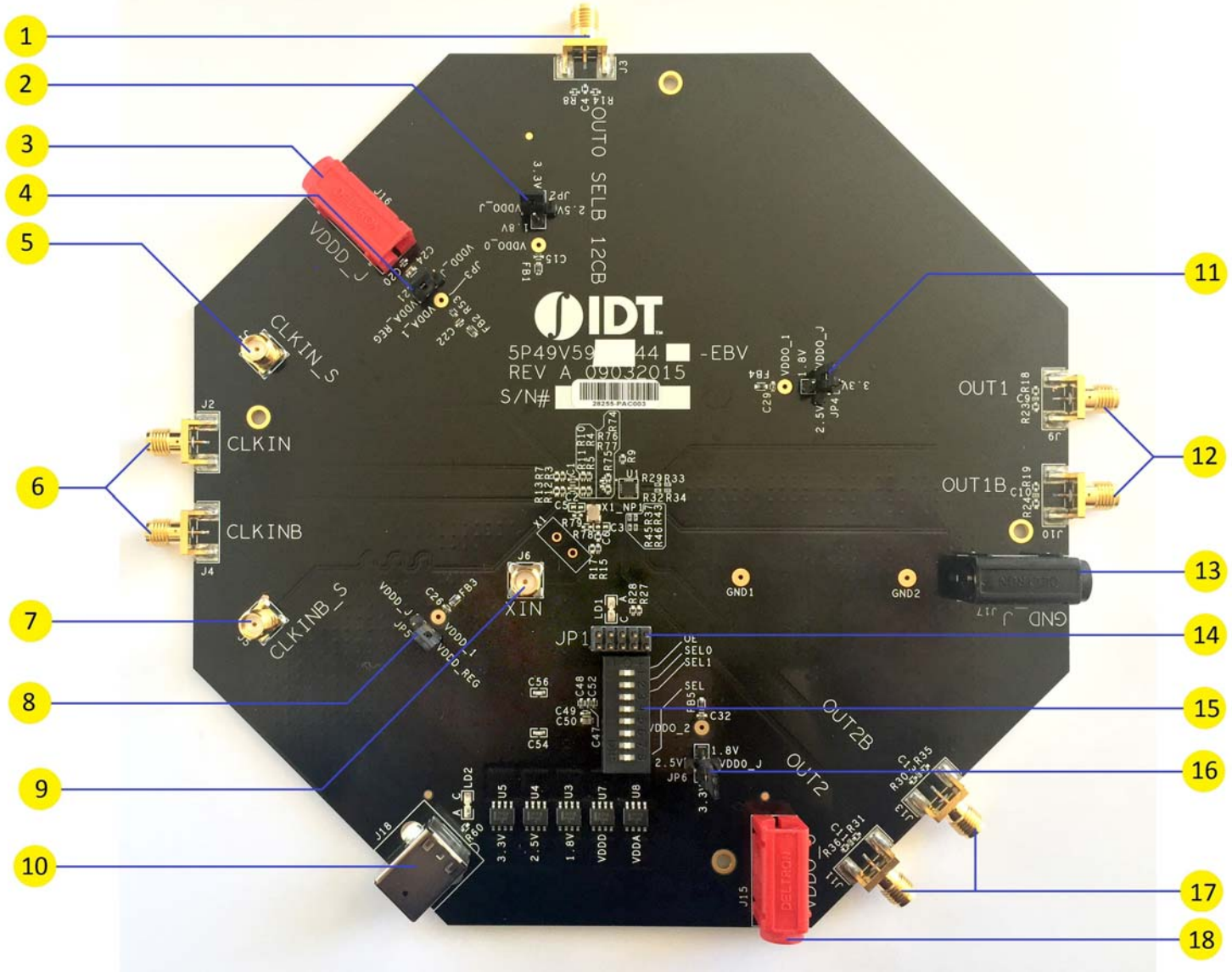
## Introduction

The evaluation board is designed to help the customer evaluate the 5P49V5943/44, the latest addition to the family of programmable devices in IDT's Timing portfolio. When the board is connected to a PC running IDT Timing Commander™ Software through USB, the device can be configured and programmed to generate frequencies with best-in-class performances.

## Board Overview

Use the following diagram and table to identify: power supply jacks, USB connector, input and output frequency SMA connectors.

Figure 1. 5P49V5943/44 Evaluation Board



**Table 1: 5P49V5943/44 EBV Pins and Functions**

Item	Name	On-Board Connector Label	Function
1	Output 0	J3	Single ended buffered output of input reference clock
2	Output Voltage Power Supply Selector	OUT0_SELB_I2C : JP2	4-way header to select a power supply method for output 0. The center pin is the output voltage. Use jumper JP2 to select 3.3V, 2.5V, 1.8V or VDDO_J supply. VDDO_J is the voltage from J15
3	Power Supply Jack	J16	Connect 3.3V, 2.5V or 1.8V for the core voltage of the device
4	Input Voltage Power Supply Selector	JP3	Provides selection of VDDA_REG supply from regulators or VDDD_J supply from J16
5	CLKIN_S	J1	SMA Pair used to monitor differential input CLKIN
6	Clock Input	J2/J4	Used as primary clock input in 5P49V5943
7	CLKINB_S	J5	SMA Pair used to monitor differential input CLKINB
8	Input Voltage Power Supply Selector	JP5	Provides selection of VDDD_REG supply from regulators or VDDD_J supply from J16
9	Xin	J6	Used as primary single ended clock input in 5P49V5944. Maximum full swing limited to 1.2V
10	USB Interface	J18	Used for connection with a PC and for interaction with the IDT Timing Commander Software.
11	Output Voltage Power Supply Selector	OUT1 : JP4	4-way header to select a power supply method for output 1. The center pin is the output voltage. Use jumper JP4 to select a 3.3V, 2.5V, 1.8V or VDDO_J supply. VDDO_J is the voltage from J15
12	Output 1	J10/J9	Can be differential pair output or two individual single ended outputs
13	Ground Jack	J17	Used for grounding. If J15 and/or J16 is used for power supply, this jack functions as the power return.
14	Aardvark Connector	JP1	For Aardvark connection
15	DIP Switch	U2	S1: Output Enable(OE/SD) S2: Sel0 S3: Sel1 S8: Sel [1:0] ; Default: I <sup>2</sup> C mode
16	Output Voltage Power Supply Selector	JP6	4-way header to select a power supply method for output 2. The center pin is the output voltage. Use jumper JP6 to select a 3.3V, 2.5V, 1.8V or VDDO_J supply. VDDO_J is the voltage from J15
17	Output 2	J13/J11	Can be differential pair output or two individual single ended outputs
18	Output Voltage Jack	J15	Connect 3.3V, 2.5V or 1.8V for the core voltage of the device

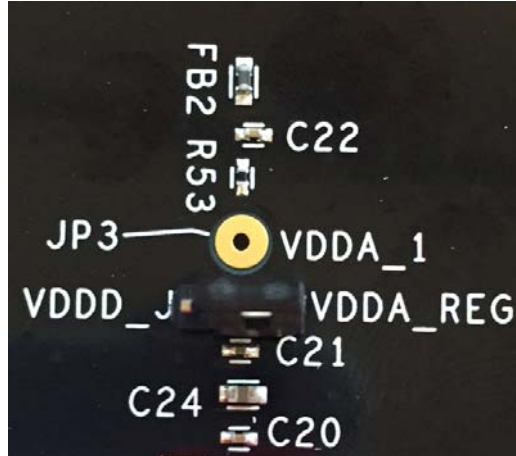
## Board Power Supply

### Power Supply Options

**Bench Power Supply** – An external power supply can be used to supply a 3.3V, 2.5V or 1.8V supply. To supply VDDD\_J with a bench power supply, connect power to J16. Concurrently, place the jumpers in JP3 to connect VDDA\_1 to VDDD\_J.

**USB Power Supply** – When the board is connected to a PC through a USB cable, on-board voltage regulators will generate a 3.3V for the device. In this case, place the jumpers in JP3 to connect VDDA\_1 to VDDA/D. See JP3 jumper position for VDDA/D in the [Figure 2](#). USB power source is recommended for ease of use.

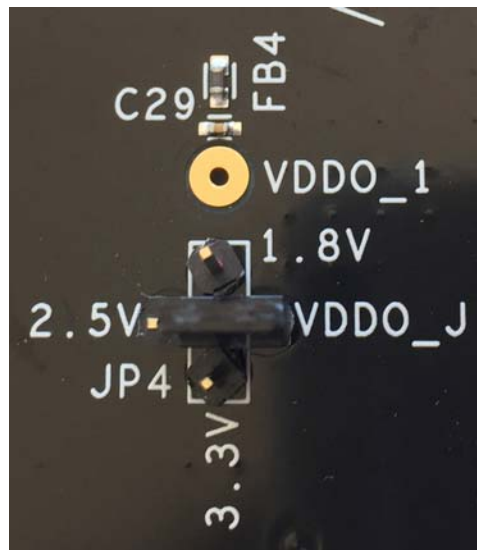
**Figure 2. Selecting the VDDA\_REG side will select power source from on-board regulators powered by USB; Selecting the VDDD\_J side will select external bench power supply**



### Output Clock Voltages

Similar to VDDA\_1 having two sources, each output voltage is also provided with two sources to choose from: Bench power supply or USB power supply connection. The selection is made by a 4-way header as shown in [Figure 3](#) below. Selection of VDDO\_J will enable external power supply (J15 and J16 are connected to external power supply); selection of 3.3V, 2.5V or 1.8V will enable the on-board voltage regulators powered by USB port.

**Figure 3. In the 4-way header, the central pin is the output and the other pins are 1.8V, 2.5V, 3.3V and VDDO\_J (from J15) respectively. Jumper settings are selected according to the output voltage required for outputs 0, 1 and 2.**



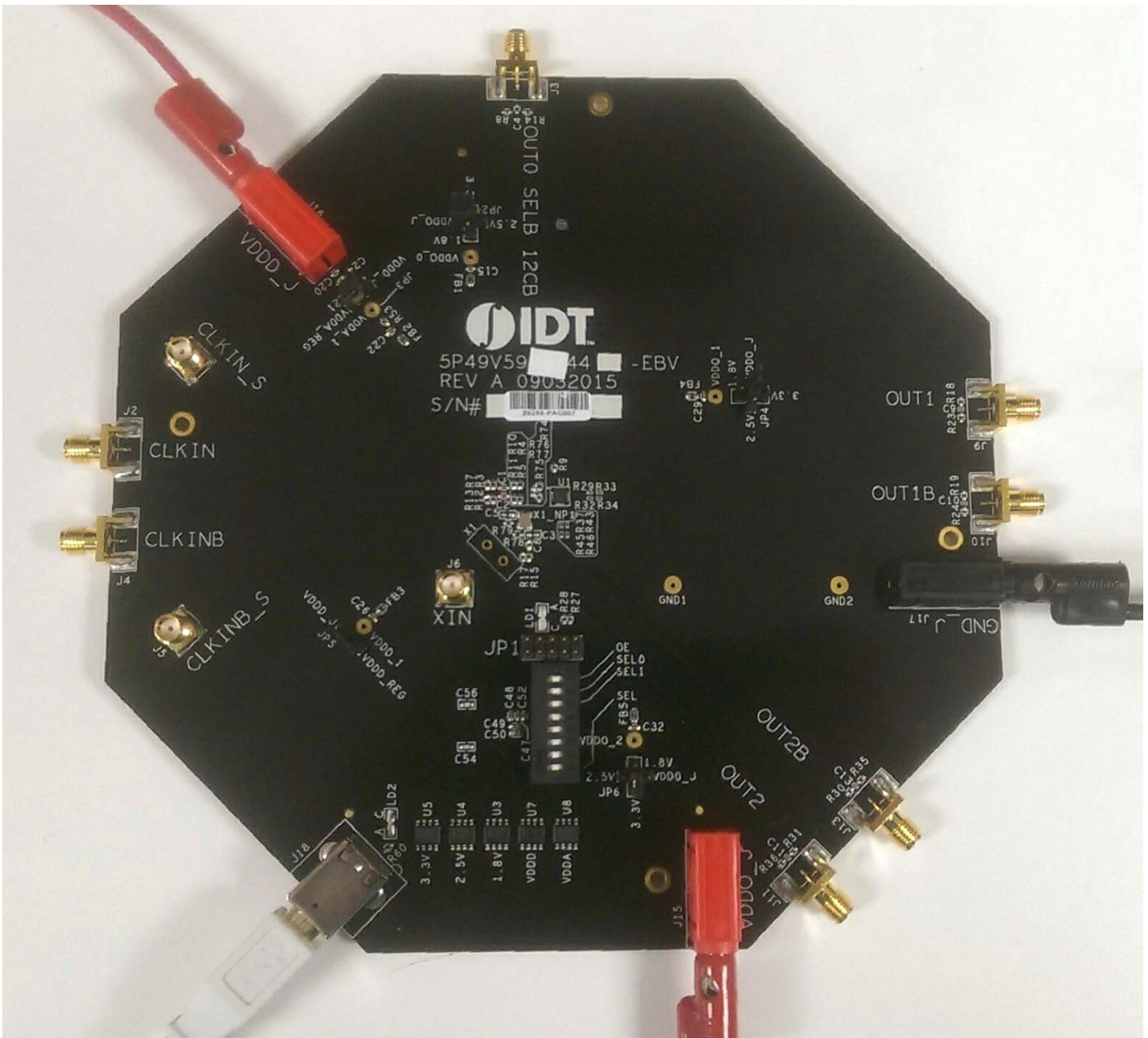
## Connecting the Board

The board is connected to a PC through a USB connector for configuring and programming the device, as shown in [Figure 4](#) below. The USB interface will also provide +5V power supply to the board, from which on-board voltage regulators generate various voltages for the core as well as for each output.

The board can also be powered by a bench power supply by connecting two banana jacks J15, J16 for output and core voltages, respectively. Please see board power supply section for details.

**Note:** The USB port only supports USB 2.0; USB 3.0 is not supported at this time.

**Figure 4. Connecting 5P49V5943/44 - EVB USB Port for Communications with Timing Commander Software and input voltage supplies**



## On-Board Crystal

A 25MHz crystal is installed on the board. Note: For the 5P49V5943, the clock input is given through J2 and J4 SMA connections.

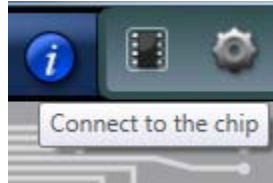
## Board Default Frequency Output

When 25MHz crystal is installed, the device will have the following default outputs: OUT0 = 25MHz, OUT1=100MHz

## Configuration and Setup

Use the following steps to setup the board using I<sup>2</sup>C and start the configuration of the board.

1. Set SEL pin (pin 8) of dip switch (U2) to "0" to select I2C mode.
2. Connect J18 to a USB port of the PC using the supplied I2C cable.
3. Launch VC5 Timing Commander Software (refer to VC5 Timing Commander User Guide - Getting Started Step 1~7)  
[Download the VersaClock 5 Timing Commander User Guide Here](#)
4. Following the Getting Started steps in the Timing Commander software, an I2C connection is established between the GUI software and the VersaClock 5 chip.
5. Select "Open Settings File" if you have existing settings or "New Settings File" and select 5P49V5943 or 5P49V5944 depending on your evaluation board. In the same screen, browse for a personality file, by clicking on the button at the bottom right, to be used with the evaluation board.
6. Connect to the EVB by clicking on the microchip icon located at the top right of the Timing Commander.



7. Once connected, new options will be available on a green background indicating that the EVB has successfully connected with the board. Write the settings to the chip by clicking on the write all registers to the chip option.



8. All intended outputs should now be available for measurement.

## Board Schematics

Evaluation board schematics are shown on the following pages.

Figure 5. 5P49V5943/44 VersaClock 5 Evaluation Board Schematics – Page 1

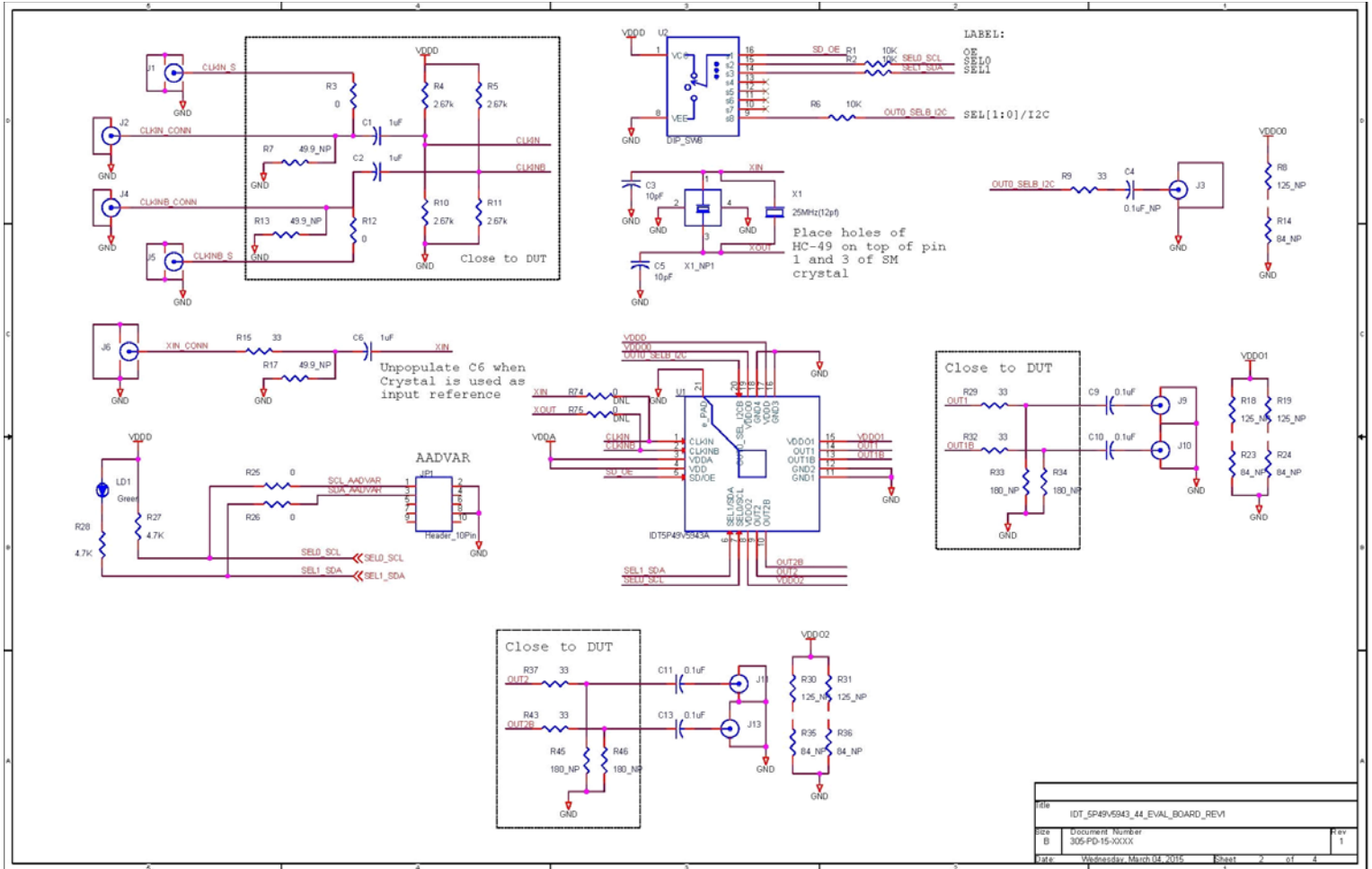


Figure 6. 5P49V5943/44 VersaClock 5 Evaluation Board Schematics – Page 2

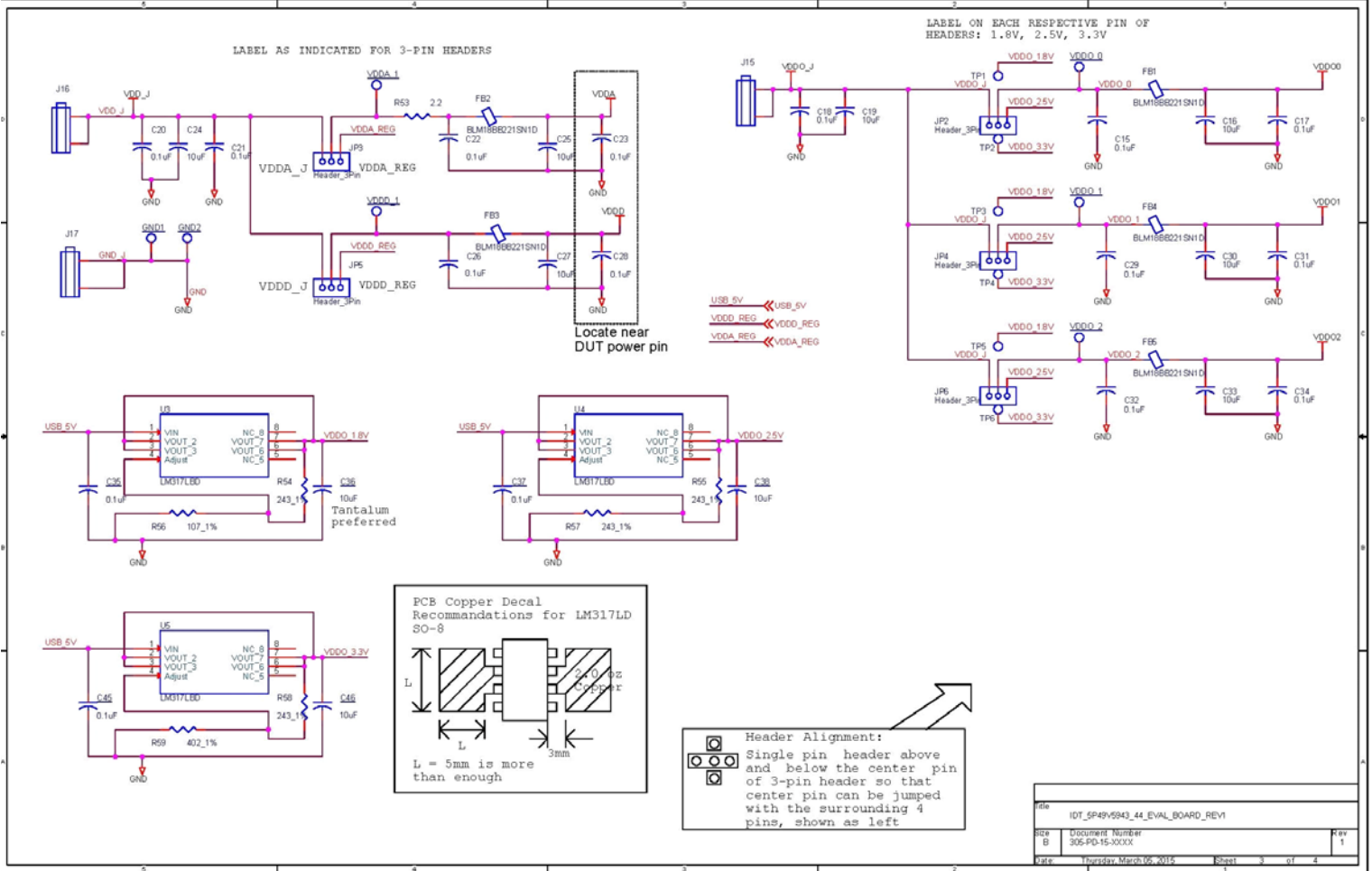
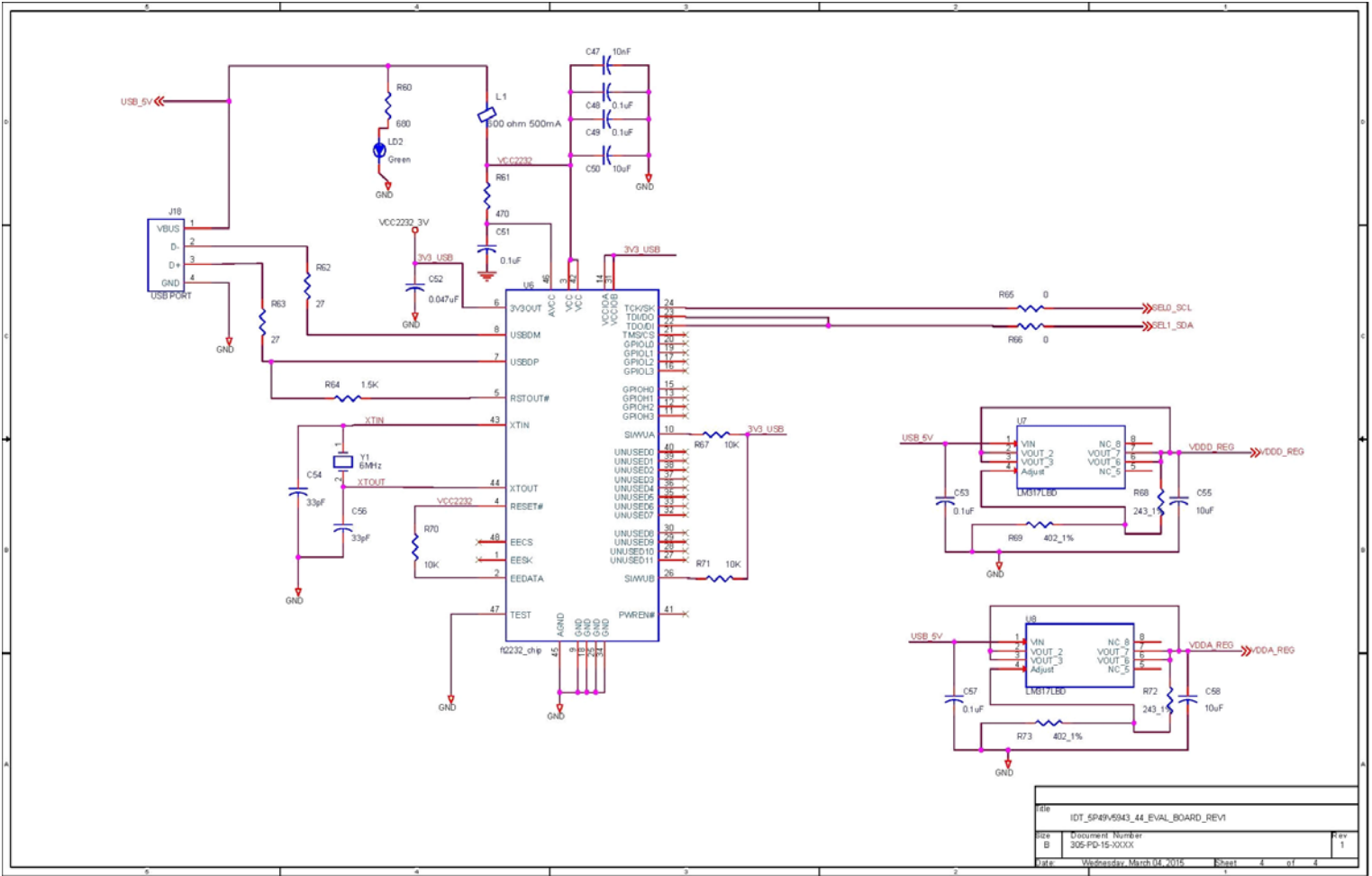


Figure 7. 5P49V5943/44 Evaluation Board Schematics – Page 3



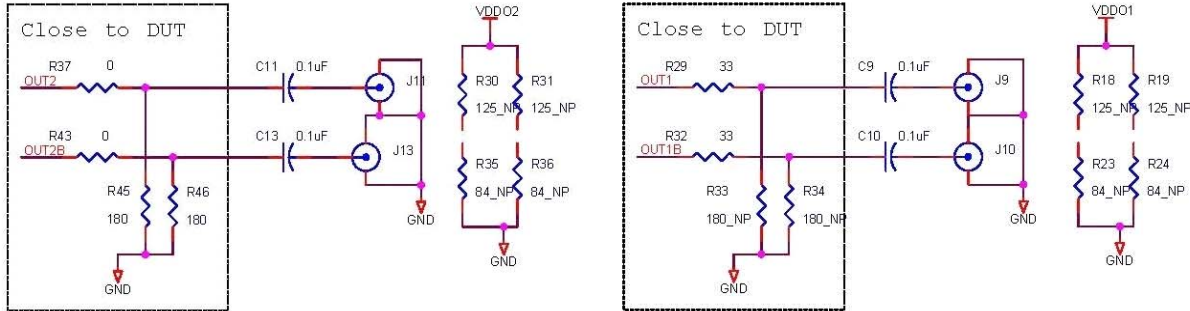


## Signal Termination Options

Termination options for OUTPUT 1 and 2 for the 5P49V5943 and 5P49V5944 EVB board are displayed in Figure 8. The termination circuits are designed to optionally terminate the output clocks in LVPECL and LVDS signal types by populating (or not-populating) some resistors. DC or AC coupling of these outputs are also supported.

Table 2 and Table 3 tabulate component installations to support LVPECL and LVDS signal types for OUTPUT 1 and 2 on the 5P49V5943 and 5P49V5944 EVB. Please note that by doing so, the output signals will be measured and terminated by an oscilloscope with a 50Ω internal termination.

**Figure 8. 5P49V5943 Output Termination Options**



### Termination Options for 5P49V5943 and 5P49V5944

**Table 2: Termination Options for OUTPUT1**

Signal Type	Series Resistors: R29, R32	Pull-down Resistors: R33, R34	Series Capacitor: C9, C10	Resistor Network: R18, R19, R23, R24
LVC MOS	33 Ω	Not installed	0.1 μF	Not installed

**Table 3: Termination Options for OUTPUT2**

Signal Type	Series Resistors: R37, R43	150-ohm pull-down: R45, R46	Series Capacitor: C11, C13	Resistor Network: R30, R31, R35, R36
LVPECL	0 Ω	Not installed	0.1 μF	Not installed

As noted, 4-resistor network is not installed in Table 2 and 3 because oscilloscope with internal 50Ω termination is utilized for signal termination and measurement. If an AC-coupled, stand-alone LVPECL output is needed (without oscilloscope connections), the 4-resistor network needs to be installed accordingly.

## Orderable Part Numbers

The following evaluation board part numbers are available for order.

**Table 4: Orderable Part Numbers**

<b>Part Number</b>	<b>Description</b>
EVKVC5-5943ALL	5P49V5943 Evaluation board with one output of each type of signal termination.
EVKVC5-5944ALL	5P49V5944 Evaluation board with one output of each type of signal termination.



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