DS90UB954-Q1EVM User's Guide

User's Guide

Literature Number: SNLU223
December 2016

Texas Instruments

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DS90UB954-Q1EVM User's Guide

1.1 Introduction

The Texas Instruments DS90UB954-Q1EVM evaluation module (EVM) is a functional board design for evaluating the DS90UB954-Q1 FPD-Link III deserializer, which converts serialized camera data to MIPI CSI-2 for processing. The MIPI CSI-2 output has four available lanes, and can be configured for either four-lane output or replicated two-lane output. When paired with a DS90UB953-Q1 serializer, the DS90UB954-Q1 receives data from imagers supporting 2MP/60fps and 4MP/30fps cameras as well as satellite RADAR. The DS90UB954-Q1 also supports 1MP/60fps and 2MP/30fps imagers when coupled with DS90UB913A/933 serializers. The DS90UB954-Q1EVM is configured for communication with a DS90UB953-Q1 on channel 0 (RX0), and a DS90UB933-Q1 on channel 1 (RX1). The EVM has two Rosenberger FAKRA connectors and configurable power-over-coax (POC) voltage for connecting the camera modules (not included). FPD-Link III interfaces also includes a separate low latency bi-directional control channel that conveys control information from an I^2C port. General purpose I/O signals such as those required for camera synchronization and functional safety features also make use of this bi-directional control channel. There is an onboard MSP430 which functions as a USB2ANY bridge for connecting a PC, which works with the Analog LaunchPAD GUI tool.

NOTE: The demo board is not intended for EMI testing. The demo board was designed for easy accessibility to device pins with tap points for monitoring or applying signals, additional pads for termination, and multiple connector options.

1.2 DS90UB954EVM Changes and Revisions from E1

- Deserializer receive ports re-labeled from CN1 and CN2 to RX0 and RX1
- Updated net names
- Removed R84 and R85
- Removed R12
- Removed LVCMOS connector
- Removed R187, R188, R189
- Removed R112
- Changes Power over Coax network
  - Updated RX0 channel for use with DS90UB953 at 4Gbps. Updated ferrite bead to 1.5k
  - Added second ferrite bead to both Power over Coax networks
  - Updated 10uH inductors L21,L22 to ACQ to match DS90UB953 EVM
- Updated schematic to reflect DS90UB954 instead of DS90UB934
- Connected EN_25MHz J2 pin 15 (adjacent to GPIO6)
- Removed R155
- Change R74 to 4kΩ
- Update MODE resistors to match datasheet

1.3 Quick Start Guide

1.3.1 System Requirements

The major components of the DS90UB954-Q1EVM are:

- DS90UB954-Q1
- On-board Power-over-Coax (POC) interface
- Two FAKRA coax connectors for digital video, power, control and diagnostics
- Samtec QSH type connector for CSI-2 interface
- On-board I^2C programming interface

In order to demonstrate, the following is required (not included):

- One DS90UB953EVM
- One DACAR/FAKRA coax cable
- USB to mini USB cable OR I^2C host controller that support clock stretching (such as USB2ANY)
- Power supply for 12V @ 1A (current limited bench supply recommended)
- Applications Processor Card

1.3.2 Applications Diagram

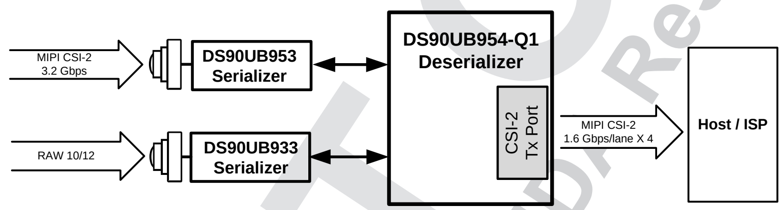


Figure 1-1. Applications Diagram

1.3.3 Major Components of DS90UB954EVM

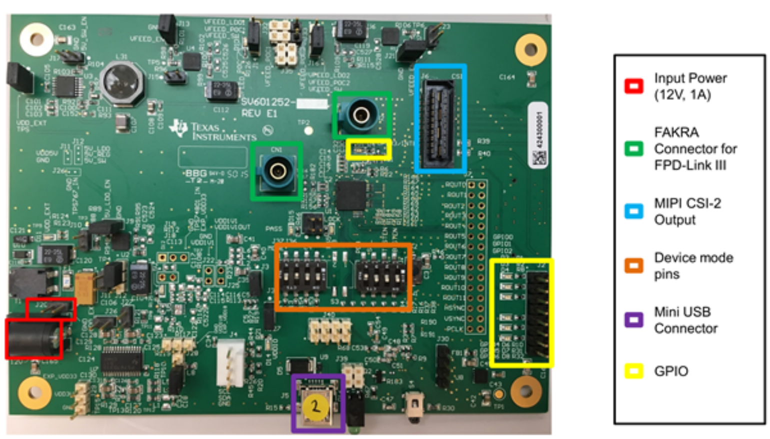


Figure 1-2. Interfacing to the EVM

1.3.4 Setup the DS90UB954EVM

1. Use mini USB to USB cable to connect J7 to computer USB port for register programming and open Analog LaunchPAD. See Section 1.5 for details on installing and using Analog LaunchPAD.
2. Configure switches S1 and SW1 to set device's operating modes
3. Configure VFEED power supply for RX0 and RX1 with J32 header
4. Connect the DS90UB954-Q1EVM to DS90UB953EVM using coax cable
5. Interface MIPI CSI-2 output signals (J5) to application processor
6. Provide power to board. Recommend using current limited bench supply to provide power to J20.
7. For details of pin-names and pin-functions, please refer to the DS90UB954-Q1 datasheet.

1.4 Demo Board Connections

1.4.1 Default Configuration

Use this as a guide to set up your EVM.

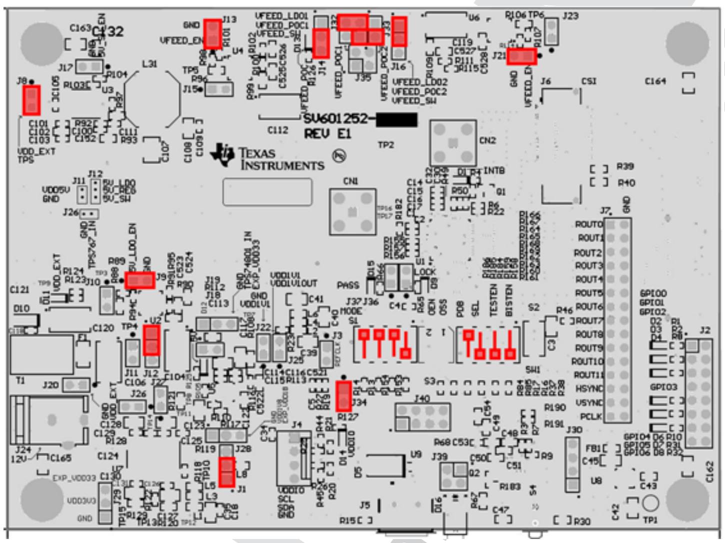


Figure 1-3. DS90UB954EVM with Jumpers Highlighted

1.4.2 Power Supply

Table 1-1. Power Supply

Reference	Signal	Description
Option 1		Power board with single +12V rail and use on-board regulators
J20.1	+12V	Main Power Single +12VDC (nominal) power connector that supplies power to the entire board.
Option 2		Provide power to each power rail independently
J22.1	+1.1V	1.1V ±5% Alternative to Main Power
J28.2	+1.8V	1.8V ±5% Alternative to Main Power
J29.2	+3.3V	3.3V ±5% Alternative to Main Power

1.4.3 Power Over Coax Interface

The DS90UB954-Q1EVM offers two power over coax interfaces (POC) to connect cameras through a coaxial cable with FAKRA connectors. Power is delivered on the same conductor that is used to transmit video and control channel data between the host and the camera. By default, 5V power supply is applied over the coax cable. Refer to Table 1-2 for other POC configurations.

NOTE: For port RX0, the POC network is configured for a DS90UB953, and for RX1 the POC network is configured for a DS90UB933. Only use a serializer EVM with the correct POC network. To use POC with two DS90UB953 or DS90UB933 EVM's, one of the POC networks must be reworked. You may also open the POC circuit and power the serializer EVM directly from another supply.

For power over coax (POC) on the EVM, the circuit uses a filter network as shown in Figure 1-5. The POC network frequency response corresponds to the bandwidth compatible with DS90UB953-Q1 chipsets.

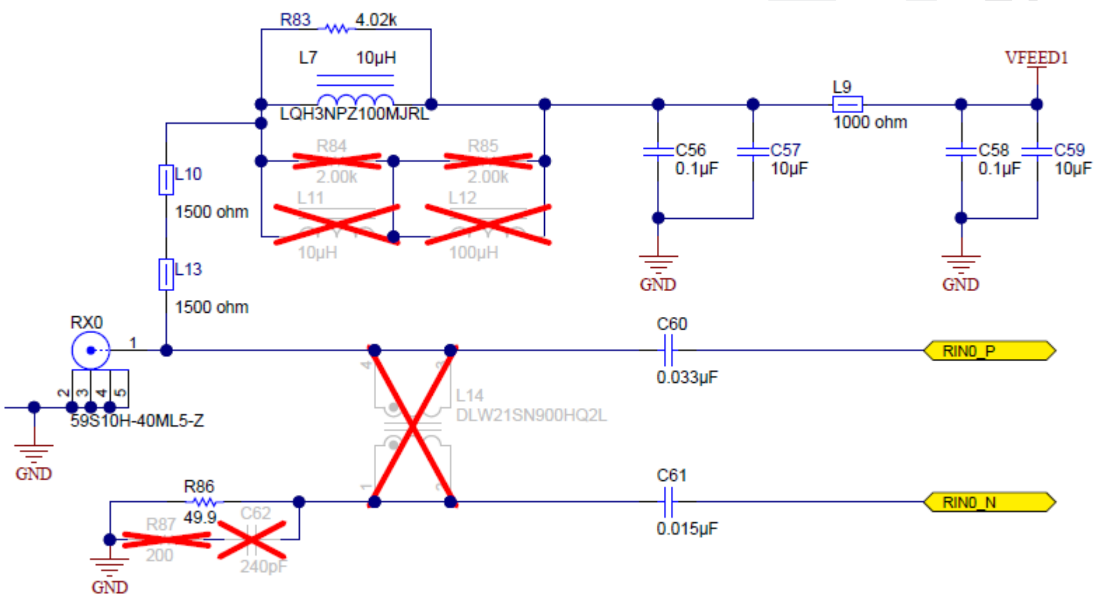


Figure 1-4. Power over Coax Network for use with DS90UB953

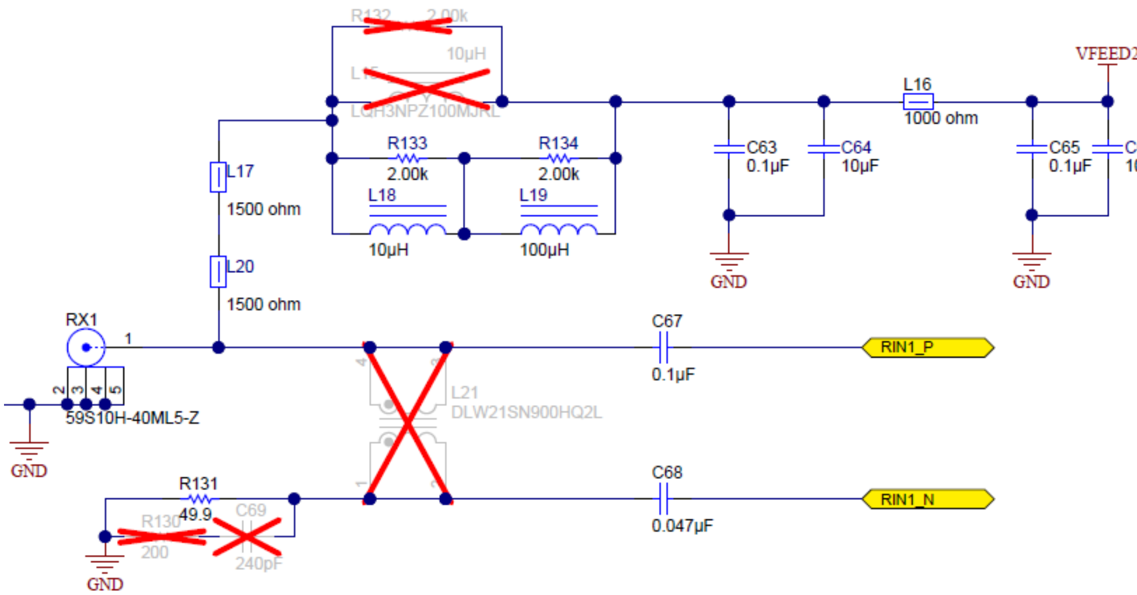


Figure 1-5. Power Over Coax Network for use with DS90UB933

> **WARNING**
>
> **Verify that the power over coax voltage is properly set before plugging into RX0 or RX1. Power supply is not fused. Over-voltage will cause damage to boards directly connected due to incorrect input power supplies.**

Table 1-2. Power Over Coax Power Supply Feed Configuration

Reference	Signal	Description
J14	VFEED_POC1	Power Over Coax Power Feed 1. This sets the voltage level for POC option 1
		Short pins 1-2: +9V power supply from VFEED_LDO1
		Short pins 2-3: +5V power supply from 5V_SW (Default)
J16	VFEED_POC2	Power Over Coax Power Feed 2. This sets the voltage level for POC option 2
		Short pins 1-2: +9V power supply from VFEED_LDO2
		Short pins 2-3: +5V power supply from 5V_SW (Default)
J35	VDD_EXT	Power Over Coax Power Feed using +12V Main Power (J21) **Note: J16 and J14 must to left OPEN if using this configuration**
		Short pins 1-2: +12V power supply to VFEED_POC1
		Short pins 3-4: +12V power supply to VFEED_POC2
J32.1	VFEED1	VFEED option selection for power over coax connection to RX0 for DS90UB953-Q1
		Short J32.1-2: VFEED_POC1 (Default)
		Short J32.1 & J33.1: VFEED_POC2
J32.3	VFEED2	VFEED option selection for power over coax connection to RX1 for DS90UB933-Q1
		Short J32.3-4: VFEED_POC1 (Default)
		Short J32.3 & J33.2: VFEED_POC2

1.4.4 MIPI CSI-2 Output Signals

Provided on the DS90UB954-Q1EVM, J5 and J6 are Samtec QSH-type connectors that can be mated with a matching QTH type connector. This Samtec connector provides a means to route CSI-2 signals out of the DS90UB954-Q1. The J5 connector is on the top side of the EVM for accessability, and the J6 connector is on the bottom for mating with a TDAx evaluation kit. The signals to the connectors are the same, including access to I^2C and other miscellaneous GPIO signals. Only one connector should be used at a time. If the J6 connector on the bottom is to be used, populate the zero ohm resistors on the bottom of the board which extened the traces to the J6 connector. The mating connector part number is QTH-020-01-H-D-DP-A.

There are third party solutions like the HDR-128291-XX breakout board from Samtec which can be used. The HDR- 128291-XX is a breakout board with a mating connector to J5 or J6, providing access to each pin through standard SMA male connectors. More info on this breakout board can be obtained from Samtec website. Another third party option is the ZX100 by Zebax Technologies. More information on this board can be obtained from Zebax website.

Table 1-3. MIPI CSI-2 Output Signals - J5 and J6 Pinout

Pin #	Signal Name	Pin #	Signal Name
1	NC	2	EXP_SCL (I2C_SCL or I2C_SCL2)
3	NC	4	EXP_SDA (I2C_SDA or I2C_SDA2)
5	CSI_CLK0_P	6	NC
7	CSI_CLK0_N	8	NC
9	CSI_D0_P	10	EXP_REF_CLK (REFCLK)
11	CSI_D0_N	12	GND
13	CSI_D1_P	14	RESETn (PDB)
15	CSI_D1_N	16	GND
17	CSI_D2_P	18	SPI_MOSI (GPIO0 or GPIO3)
19	CSI_D2_N	20	SPI_SCLK (GPIO1 or GPIO4)

Table 1-3. MIPI CSI-2 Output Signals - J5 and J6 Pinout (continued)

Pin #	Signal Name	Pin #	Signal Name
21	CSI_D3_P	22	SPI_CSn (GPIO2 or GPIO5)
23	CSI_D3_N	24	GND
25	CSI_CLK1_P	26	NC
27	CS_CLK1_N	28	NC
29	NC	30	VDD_3V3
31	NC	32	VDD_3V3
33	NC	34	VDD_3V3
35	NC	36	VDD_3V3
37	NC	38	VDD_1V8
39	NC	40	VDD_1V8

NOTE: Populate R3,R8,R10,R30,R32,R40,R43,R45,R47,R49,R51,R53 (0Ω resistors) only when using the J6 connector on the bottom of the board. Do not use J5 and J6 connectors at the same time.

1.4.5 FPD-Link III Signals

Table 1-4. FPD-Link III Signals

Reference	Signal	Description
RX0	RIN0+	FAKRA connector
RX1	RIN1+	FAKRA connector

1.4.6 I^{2}C Interface

In addition to the on-board USB2ANY controller accessible via the mini-USB port, a standalone external I^{2}C host can connect via J4 for programming purposes. Examples of external I^{2}C host controllers are Texas Instruments USB2ANY and Total Phase Aardvark I^{2}C/SPI host adapter (Total Phase Part#: TP240141).

Optional access to I^{2}C signals are also available via CSI-2 connectors J5 (top) and J6 (bottom). I^{2}C signal levels can be configured through J1 to be at 1.8V or 3.3V when the I^{2}C interface is accessed through connector J4.

Table 1-5. IDx I^{2}C Device Address Select - J34

Reference	Signal	Description
J34	IDX	Selects I^{2}C Device Address
		Open: 0x30 (7'b) or 0x60 (8'b)
		Short: 0x3D (7'b) or 0x7A (8'b) (Default)

Table 1-6. I^{2}C Interface Header - J4

Reference	Signal	Description
J4.1	VDDIO	I^{2}C bus voltage (tied to VDDIO)
J4.2	I2C_SCL	I^{2}C Clock Interface for primary I^{2}C bus
J4.3	I2C_SDA	I^{2}C Data Interface for primary I^{2}C bus
J4.4	GND	Ground

1.4.7 Control Interface

Table 1-7. VDDIO Interface Header - J1

Reference	Signal	Description
J1	VDDIO	Selects VDDIO bus voltage
		Short pins 1-2: 3.3V IO (Default)
		Short pins 2-3: 1.8V IO

Table 1-8. GPIO Interface Header - J2

Reference	Signal	Description
J2.1	GPIO0	General Purpose Input/Output 0
J2.3	GPIO1	General Purpose Input/Output 1
J2.5	GPIO2	General Purpose Input/Output 2
J2.7	GPIO3/INTB	General Purpose Input/Output 3 / Interrupt (Active Low). Pulled up to VDDIO by 4.7kΩ
J2.9	GPIO4	General Purpose Input/Output 4
J2.11	GPIO5	General Purpose Input/Output 5
J2.13	GPIO6	General Purpose Input/Output 6
J2.15	EN 25MHz	Enable/Disable 25MHz Oscillator

Table 1-9. CMLOUTP Output Signals

Reference	Signal	Description
TP16	CMLOUTP	Test Pad for Channel Monitor Loop-through Driver
TP17	CMLOUTN	Test Pad for Channel Monitor Loop-through Driver

Table 1-10. Mode SW-DIP4 - S1(1)

Reference	Mode	Description
S1.1	1	CSI Mode (DS90UB953-Q1 compatible)(2)
S1.2	2	RAW12 / LF (DS90UB933A compatible)
S1.3	3	RAW12 / HF (DS90UB933A compatible)
S1.4	4	RAW10 (DS90UB933A compatible)

(1) Only set one ON.
(2) This function is only available with 2-MP ADAS chipsets.

Table 1-11. Control SW-DIP2 - SW1

Reference	Signal	Input = L	Input = H	Description
SW1.1	BISTEN	For Normal operation (Default)	Test Mode enable	Test Mode
SW1.2	RES	Tied to GND (Default)	N/A	Reserved
SW1.3	VDD_SEL	Internal 1.1V regulator from 1.8V supply (Default)	1.1V is supplied to VDD1V1 pins	VDD 1.1V Source Select
SW1.4	PDB	Device is powered down	Device is enabled (Default)	Power-down Mode

Table 1-12. LEDs

Reference	LED Color	LED Name	Description
D2	Green	GPIO0	Illuminates if GPIO0 is HIGH
D3	Green	GPIO1	Illuminates if GPIO1 is HIGH

Table 1-12. LEDs (continued)

Reference	LED Color	LED Name	Description
D4	Green	GPIO2	Illuminates if GPIO2 is HIGH
D1	Green	GPIO3/INTB	Illuminates if GPIO3 is HIGH, or GPIO3 disabled (pulled-up)
D6	Green	GPIO4	Illuminates if GPIO48 is HIGH
D7	Green	GPIO5	Illuminates if GPIO5 is HIGH
D8	Green	GPIO6	Illuminates if GPIO6 is HIGH
D9	Green	LOCK	Illuminates if LOCK pin is HIGH
D15	Orange	PASS	Illuminates if PASS pin is HIGH
D11	Red	VDD_EXT	Illuminates if 12V Power is applied to DC-IN J24
D12	Red	VDD5V	Illuminates on +5V
D13	Orange	VFEED_POC	Illuminates if VFEED_POC Power is ON
D14	Red	VDDIO	Illuminates on VDDIO Power

1.5 Enable and Reset

There are two device enable and reset/power-down options for the EVM.

- RC timing option: The C65 external capacitor and R17 pull-up resistor connected to the PDB pin ramp time after the device is powered on.
- External control option: A push-button (S2) or SW1 position 4 is available for the manual control of the PDB signal.

1.6 Typical Connection and Test Equipment

The following is a list of typical test equipment that may be used to monitor the MIPI CSI-2 signals from the DS90UB96X-Q1:

1. Logic Analyzer
2. Any SCOPE with a bandwidth of at least 4 GHz for observing differential signals.
3. UNH-IOL MIPI D-PHY Reference Termination Board (RTB)
4. UNH-IOL MIPI D-PHY/CSI/DSI Probing Board
5. UNH-IOL CSIGUI Tool

1.7 Termination Device

A termination device is required in order to properly monitor and measure the transmission of the MIPI DPHY signals. The termination device should support the change of signals as it switches between LP and HS modes. This can be provided by either a CSI-2 receiver or a dedicated dynamic termination board. The recommended termination board is the UNH-IOL MIPI D-PHY Reference Termination Board (RTB).

1.8 Typical Test Setup

Figure 1-6 and Figure 1-7 illustrate the typical test setups used to measure and evaluate DS90UB96X-Q1.

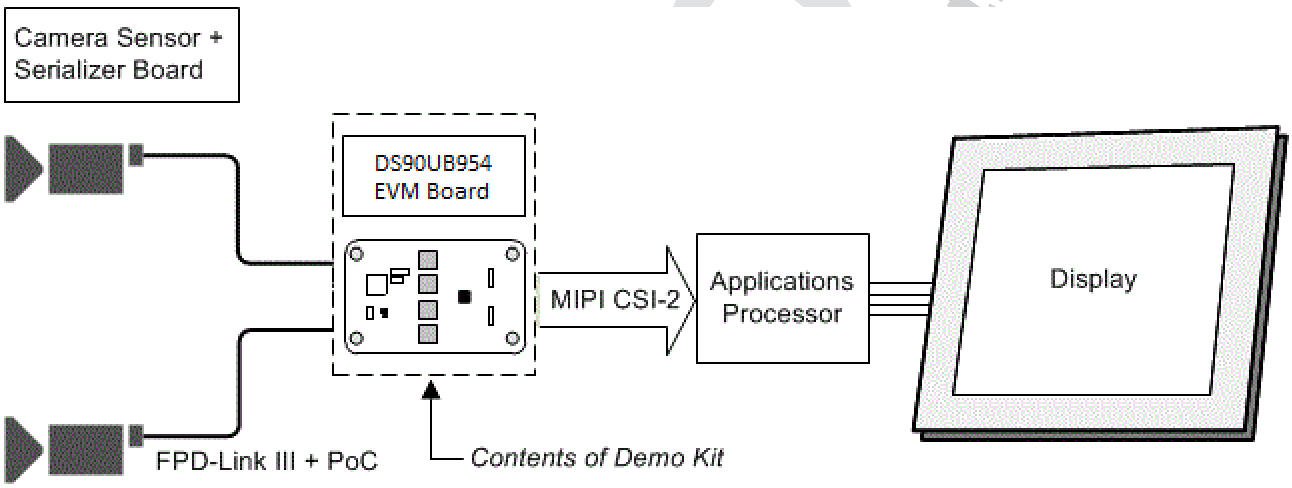


Figure 1-6. Typical Test Setup for Application

The picture below shows a typical test set up using a video generator and logic analyzer.

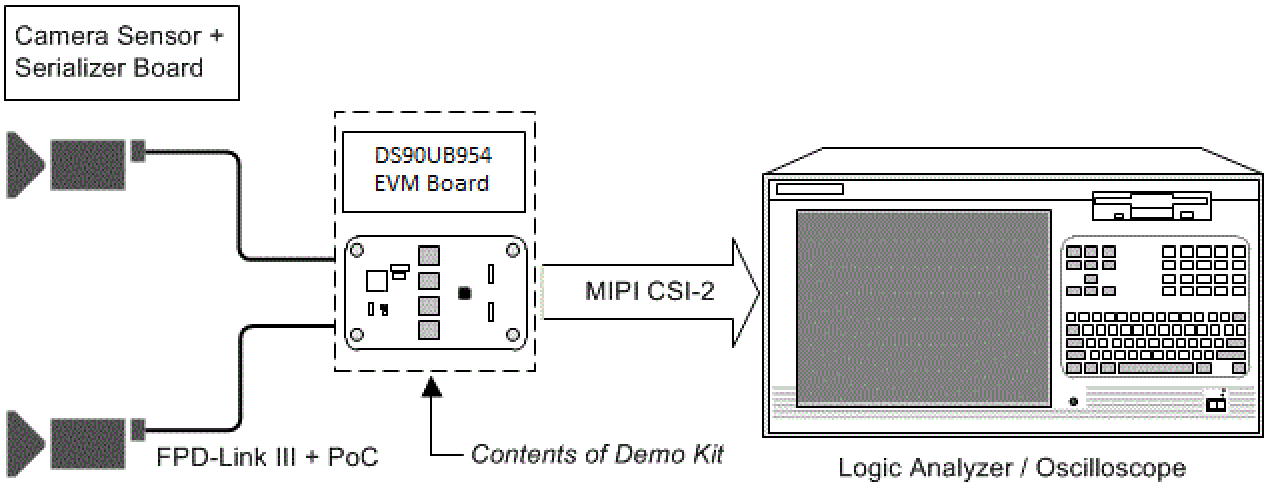


Figure 1-7. Typical Test Setup for Evaluation

1.9 Equipment References

NOTE: Please note that the following references are supplied only as a courtesy to our valued customers. It is not intended to be an endorsement of any particular equipment or supplier.

Logic Analyzer:

Keysight Technologies

www.keysight.com

MIPI Test Fixtures:

University of New Hampshire InterOperability Laboratory (UNH-IOL)

www.iol.unh.edu/services/testing/mipi/fixtures.php

Aardvark I²C/SPI Host Adapter Part Number: TP240141

www.totalphase.com/products/aardvark_i2cspi

1.10 Cable References

FAKRA coaxial cable:

www.leoni-automotive-cables.com

Rosenberger FAKRA connector:

http://www.rosenberger.com/en/products/automotive/fakra.php

1.11 Analog LaunchPAD (ALP) Software Setup

1.11.1 System Requirements

Operating System:	Windows 7 64-bit
USB:	USB2ANY
USB2ANY Firmware Version:	2.5.2.0
USB:	Aardvark I^2C/SPI host adapter p/n TP240141

1.11.2 Download Contents

Latest TI Analog LaunchPAD can be downloaded from: http://www.ti.com/tool/alp.

Download and extract the zip file to a temporary location that can be deleted later.

The following installation instructions are for a PC running Windows 7 64-bit Operating System.

1.11.3 Installation of the ALP Software

Execute the ALP Setup Wizard program called “ALPF_setup_v_x_x_x.exe” that was extracted to a temporary location on the local drive of your PC.

There are 7 steps to the installation once the setup wizard is started:

1. Select the "Next" button.
2. Select “I accept the agreement” and then select the “Next” button.
3. Select the location to install the ALP software and then select the “Next” button.
4. Select the location for the start menu shortcut and then select the “Next” button.
5. There will then be a screen that allows the creation of a desktop icon. After selecting the desired choices select the “Next” button.
6. Select the “Install” button, and the software will then be installed to the selected location.
7. Uncheck “Launch Analog LaunchPAD” and select the “Finish” button. The ALP software will start if “Launch Analog LaunchPAD” is checked, but it will not be useful until the USB driver is installed and board is attached.

Power the DS90UB96X-Q1 EVM board with a 12 VDC power supply.

1.11.4 Startup - Software Description

Make sure all the software has been installed and the hardware is powered on and connected to the PC. Execute “Analog LaunchPAD” shortcut from the start menu. The default start menu location is under All Programs > Texas Instruments > Analog LaunchPAD vx.x.x > Analog LaunchPAD to start MainGUI.exe.

Figure 1-8. Launching ALP

The application should come up in the state shown in the figure below. If it does not, see Section 1.12, “Troubleshooting ALP Software”.

Under the Devices tab click on “DS90UB96X” to select the device and open up the device profile and its associated tabs.

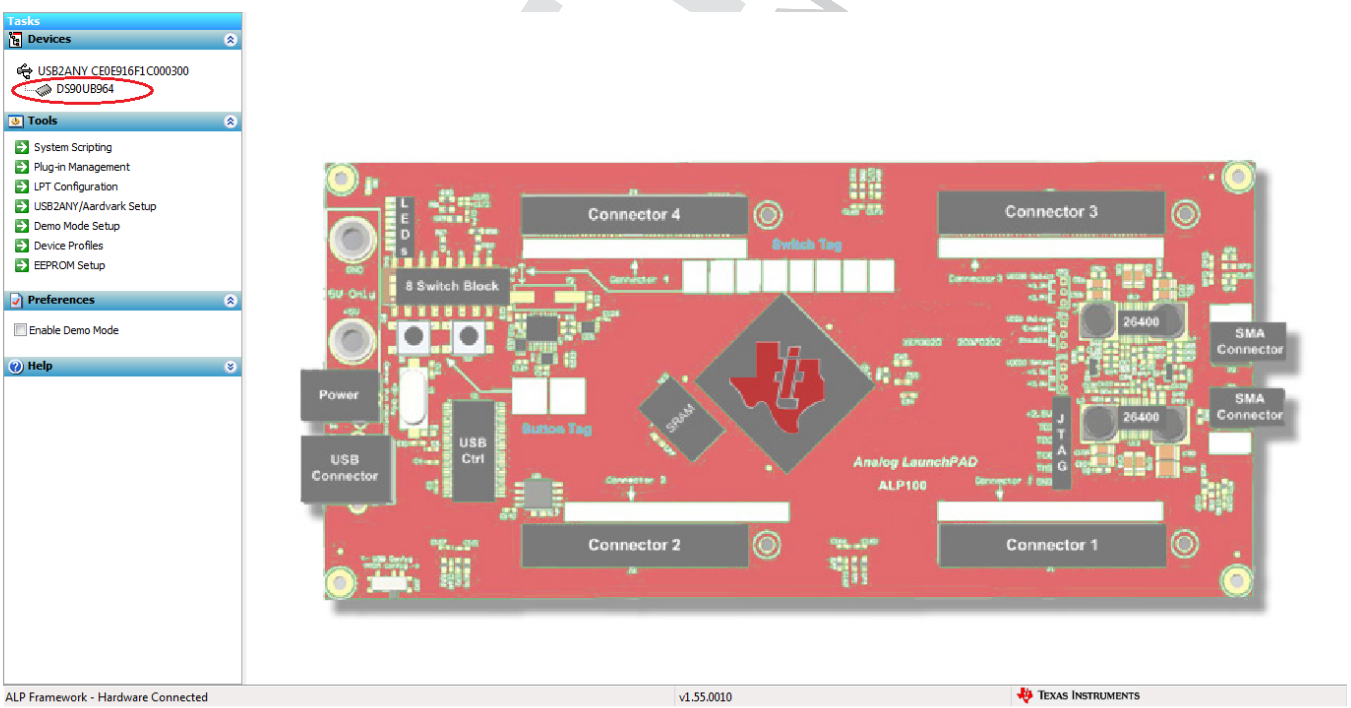


Figure 1-9. Initial ALP Screen

After selecting the DS90UB96X, the following screen shown in Figure 1-10 should appear.

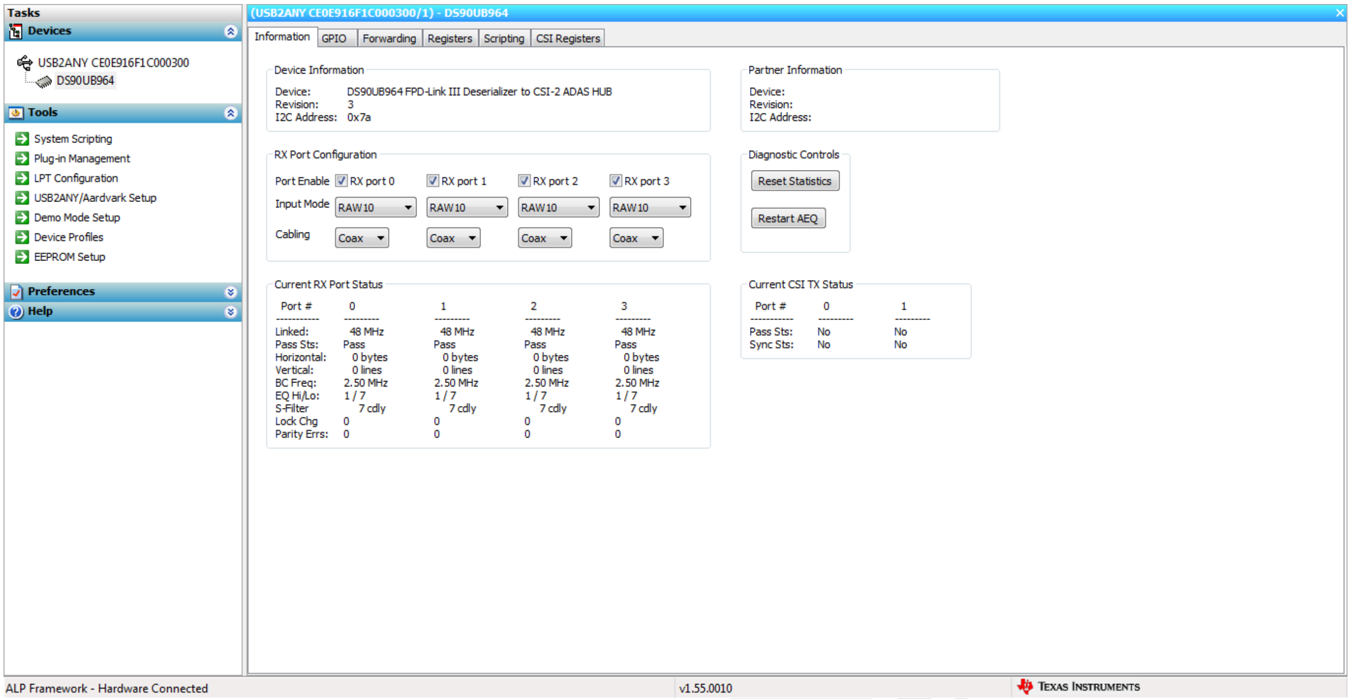


Figure 1-10. Follow-up Screen

1.11.5 Information Tab

The Information tab is shown below.

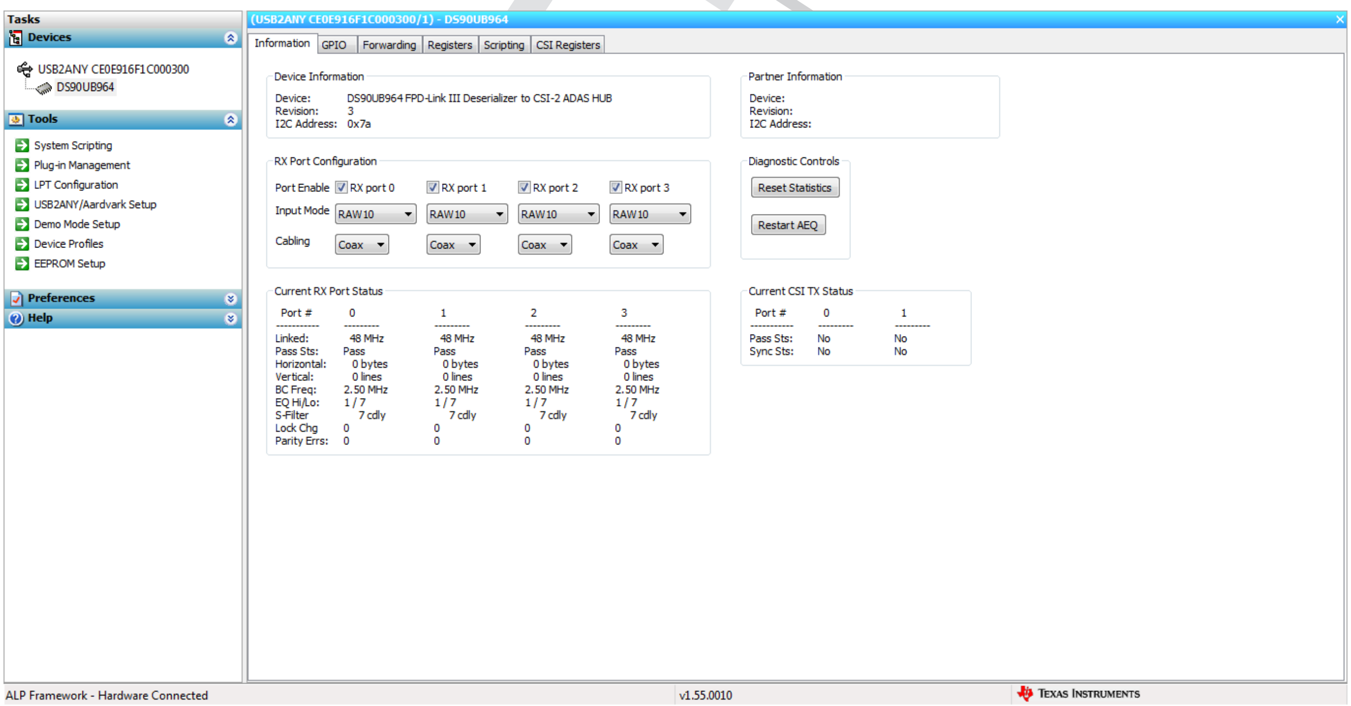


Figure 1-11. ALP Information Tab

1.11.6 Registers Tab

The Register tab is shown in Figure 1-12.

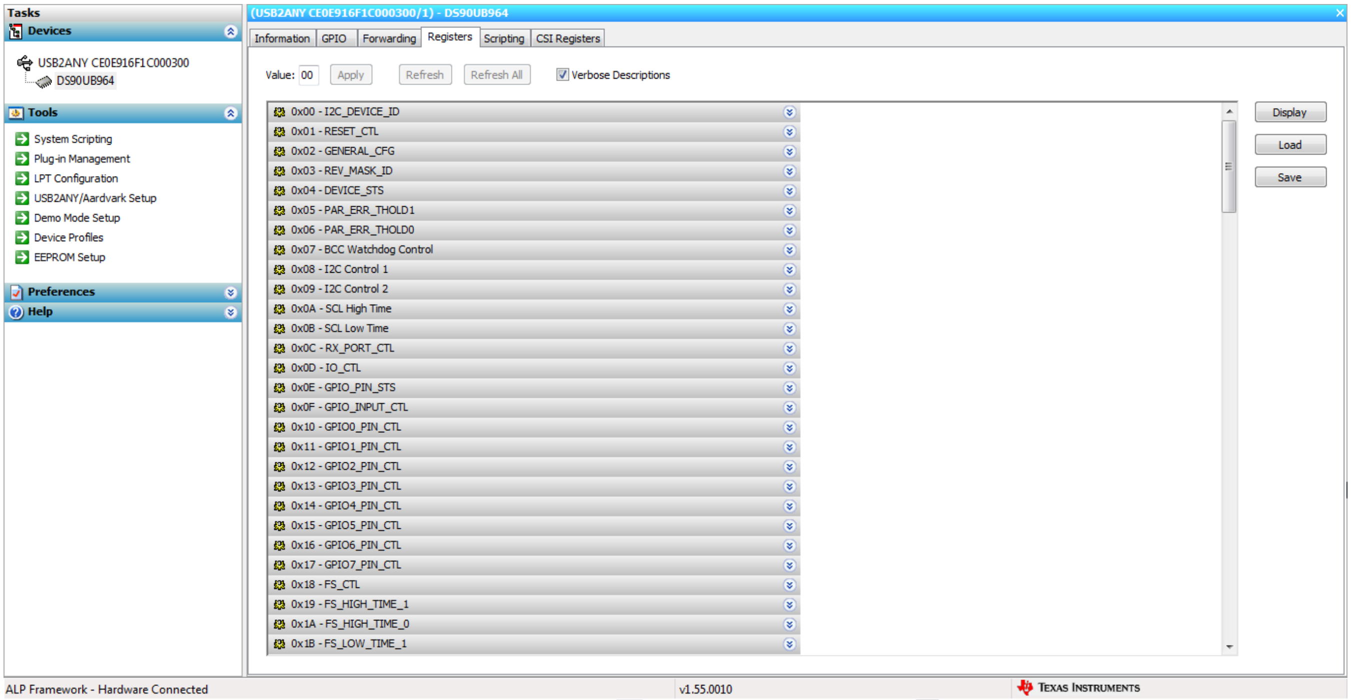


Figure 1-12. ALP Registers Tab

1.11.7 Registers Tab - Address 0x00 Selected

Address 0x00 selected as shown in Figure 1-13. Note that the “Value:” box,  , will now show the hex value of that register.

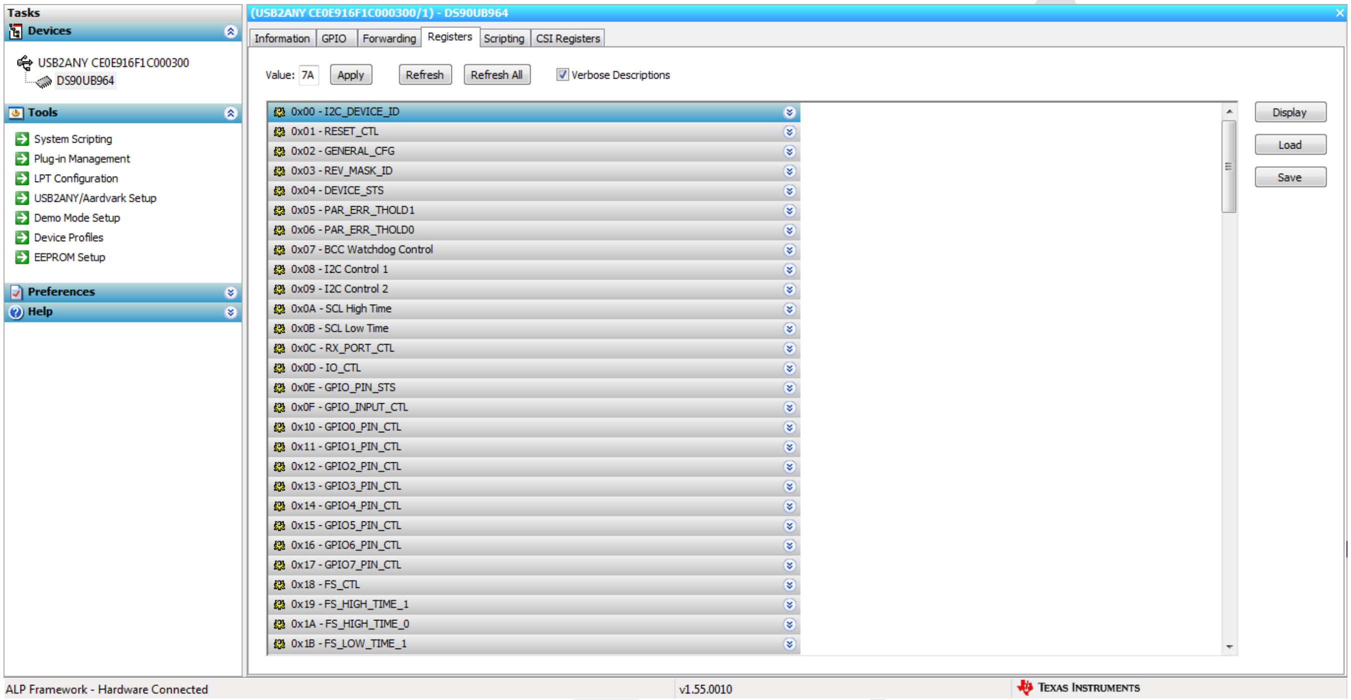


Figure 1-13. ALP Device ID Selected

1.11.8 Registers Tab - Address 0x00 Expanded

By double clicking on the Address bar

or a single click on  . Address 0x00 expanded reveals contents by bits. Any register address displayed can be expanded.

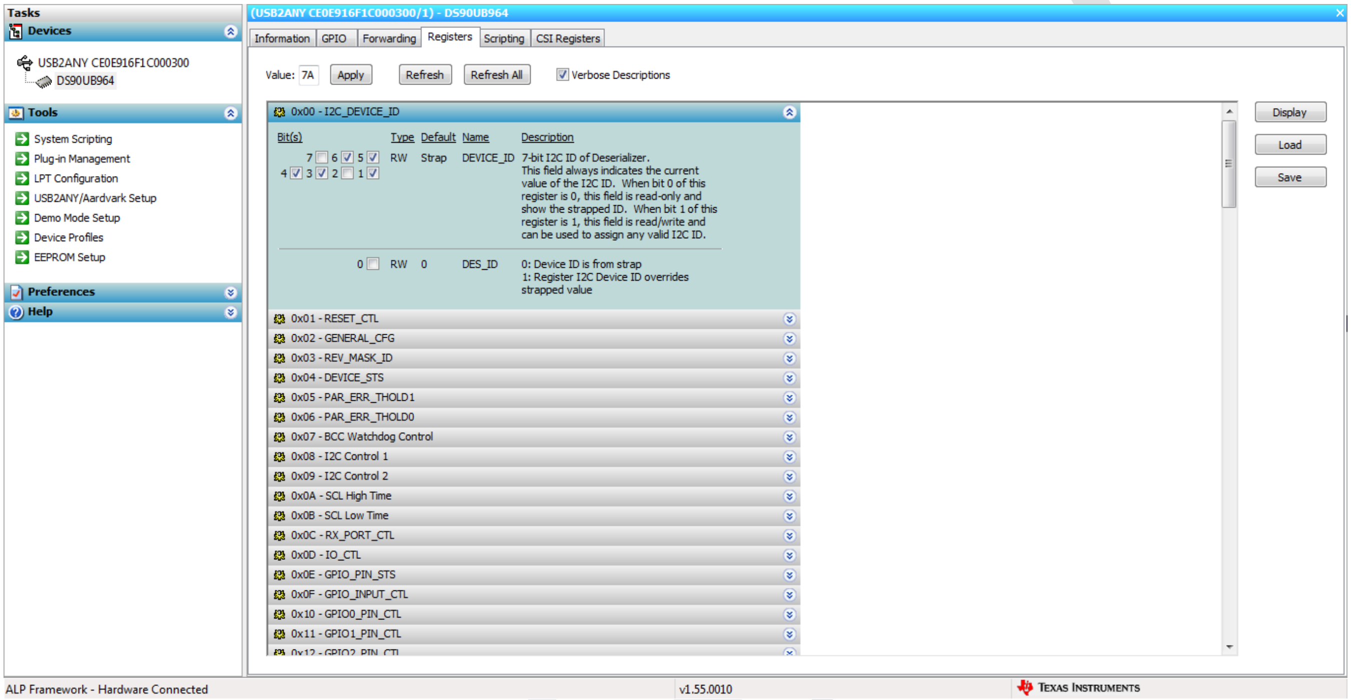
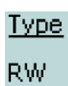
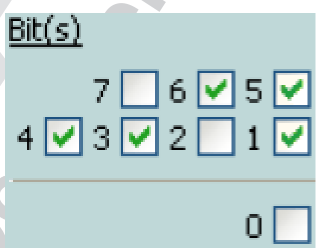


Figure 1-14. ALP Device ID Expanded

Any RW Type register, 

, can be written into by writing the hex value into the “Value:” box, 

or putting the pointer into the individual register bit(s) box by a left mouse click to put a check mark (indicating a “1”) or unchecking to remove the check mark (indicating a “0”). Click the “Apply” button to write to the register, and “refresh” to see the new value of the selected (highlighted) register.



The box toggles on every mouse click.

1.11.9 Scripting Tab

The Scripting tab is shown below.

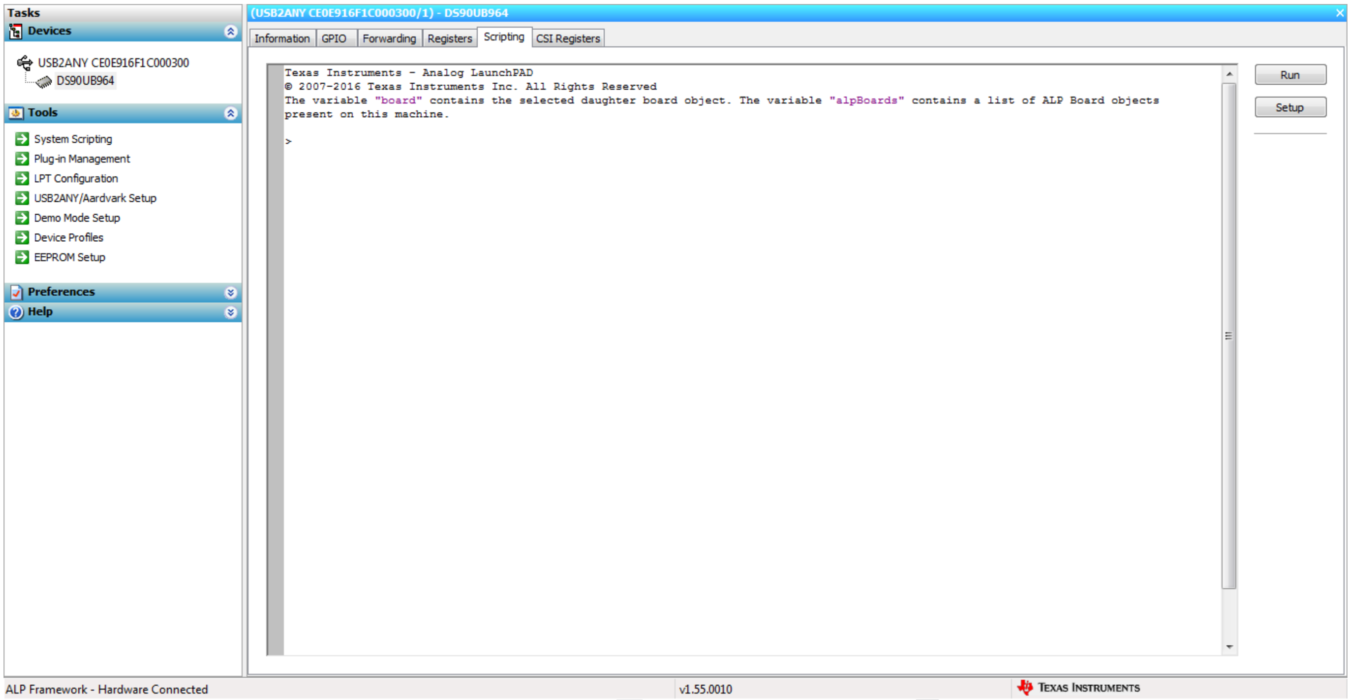


Figure 1-15. ALP Scripting Tab

The script window provides a full Python scripting environment which can be for running scripts and interacting with the device in an interactive or automated fashion.

> **WARNING**
>
> **Directly interacting with devices either through register modifications or calling device support library functions can effect the performance and/or functionality of the user interface and may even crash the ALP Framework application.**

1.11.10 Sample ALP Python Script

1.11.10.1 Initialization

The following two python scripts should be run before attempting to transmit video data from a serializer.

The first is a DS90UB954 script to allow the user to apply an external reference clock after powering up the device.

```
#954A0 Reference Clock Fix
import time

devAddr = 0x7A

print "This is my address: ", hex(board.ReadI2C(devAddr,0x00,1))
# SBPLL CSI Charge-HI
board.WriteI2C(devAddr,0xB0,0x1C)
board.WriteI2C(devAddr,0xB1,0x15)
board.WriteI2C(devAddr,0xB2,0x30)
```

```
looprange = range(10)

# Apply external REF CLOCK within 10 seconds
for i in looprange:
    time.sleep(.9)
    print i

# SBPLL CSI Charge-LOW
board.WriteI2C(devAddr,0xB0,0x1C)
board.WriteI2C(devAddr,0xB1,0x15)
board.WriteI2C(devAddr,0xB2,0x00)
```

The second is a DS90UB954 initialization script to run after providing an external reference clock.

```
import time

#NOTE1: Initial script sets the BC Rate to 25Mbps, and sets BC VOD higher than intended to ensure
953 can receive the BC data correctly

devAddr = 0x7A
devAddr_953A = 0x30
devAddr_953B = 0x30
devAddr_953C = 0x30
devAddr_953D = 0x30

print  "\n"
print  "devAddr = 0x60"
print  "devAddr_953 = 0x30"

board.WriteI2C(devAddr,0x0d,0x90)
print  "** select 3p3V IO"

print board.ReadI2C(devAddr, 0x00,1)
#
# board.WriteI2C(devAddr,0x0C,0x01)
board.WriteI2C(devAddr,0x4c,0x01)

# board.WriteI2C(devAddr,0x4c,0x12)
#print  "** select PORT 0"
#time.sleep(0.1)
#
####### DISABLE LINK PARITY ERROR
board.WriteI2C(devAddr,0xB6,0x18)
#print  "** DISABLE LINK PARITY ERROR"
#
####### DISABLE DISABLE_DCA_CRC
board.WriteI2C(devAddr,0xBA,0x83)
#print  "** DISABLE DISABLE_DCA_CRC"
#
####### SET BC RATE TO 25MBPS & ENABLE PASS-THROUGH & AUTO ACK
#board.WriteI2C(devAddr,0x58,0x7D)  #25Mbps
#print  "** SET BC RATE TO 25MBPS & ENABLE PASS-THROUGH & AUTO ACK"
#time.sleep(0.1)
#
####### SET ALIAS FOR THE SERIALIZER
#board.WriteI2C(devAddr,0x5B,devAddr_953A+1)
#print  "** SET ALIAS FOR THE SERIALIZER to 0x30"
#board.WriteI2C(devAddr,0x5C,devAddr_953A)
#print  "** SET ALIAS FOR THE SERIALIZER to 0x30"
#time.sleep(0.1)
#
########### RX0 ##########
#
## REPLICA R SETTING
board.WriteI2C(devAddr,0xB0,0x18)   # CH0:04, CH1:08, CH2:0C, CH3:10
board.WriteI2C(devAddr,0xB1,0x03)   # REPLICA RDAC (STP)
```

```
board.WriteI2C(devAddr,0xB2,0x20)   # FROM 00 TO 3F
board.WriteI2C(devAddr,0xB1,0x13)   # REPLICA RDAC (COAX)
board.WriteI2C(devAddr,0xB2,0x20)   # FROM 00 TO 3F
print  "** REPLICA R SETTING to 0x20"
#
## FIX EQ Setting
board.WriteI2C(devAddr,0xB0,0x18)   # CH0:04, CH1:08, CH2:0C, CH3:10
board.WriteI2C(devAddr,0xB1,0x0E)   #
board.WriteI2C(devAddr,0xB2,0x20)   # FROM 00 TO 7
print  "** FIX EQ Setting TO 0X20"
#
## EQ Floor Setting
board.WriteI2C(devAddr,0xD5,0xF0)   # Set to minimum
#print  "** EQ Floor Setting to Min, 0xF0"
#
## TRF Control SETTING
board.WriteI2C(devAddr,0xB0,0x18)   # CH0:04, CH1:08, CH2:0C, CH3:10
board.WriteI2C(devAddr,0xB1,0x04)   # TRF (STP)
board.WriteI2C(devAddr,0xB2,0x1F)   # FROM 00 TO 3F
board.WriteI2C(devAddr,0xB1,0x14)   # TRF (STP)
board.WriteI2C(devAddr,0xB2,0x1F)   # FROM 00 TO 3F
#print  "** TRF Control SETTING to 0x30"
#
## VCO INITIAL VOLTAGE SETTING & RS
##board.WriteI2C(devAddr,0xB0,0x04)   # CH0:04, CH1:08, CH2:0C, CH3:10
##board.WriteI2C(devAddr,0xB1,0x06)   # INITIAL VOLTAGE REGISTER
##board.WriteI2C(devAddr,0xB2,0x40)   #
#
####### Adaptive S-Filter
board.WriteI2C(devAddr,0x40,0x00)
print  "** Adaptive EQ to Dynamic S-Filt4er 0x40=0x00"
board.WriteI2C(devAddr,0x42,0x71)
print  "** Disable Default 2-STEP Adaptation"
board.WriteI2C(devAddr,0x41,0xF0)
print  "** Set S-Filter Range to Min and Max 0x41=0xF0"
#
## BC VOD Controls
#board.WriteI2C(devAddr,0xB0,0x14)  # Shared channel
#board.WriteI2C(devAddr,0xB1,0x03)  # [4:0] (STP)
#board.WriteI2C(devAddr,0xB2,0x04)  # Set to higher VOD ~250mV
#board.WriteI2C(devAddr,0xB1,0x04)  # [4:0] (COAX)
#board.WriteI2C(devAddr,0xB2,0x04)  # Set to higher VOD ~250mV
#print  "** Set BC VOD Higher 0x04 to Ensure Robust BC on 953"
#print  "\n"

# board.WriteI2C(devAddr,0x5B,0)

# print  "** SET ALIAS FOR THE SERIALIZER back to 0x00 to auto load"
```

1.12 Troubleshooting ALP Software

1.12.1 ALP Loads the Incorrect Profile

If ALP opens with the incorrect profile loaded the correct profile can be loaded from the USB2ANY/Aardvark Setup found under the tools menu.

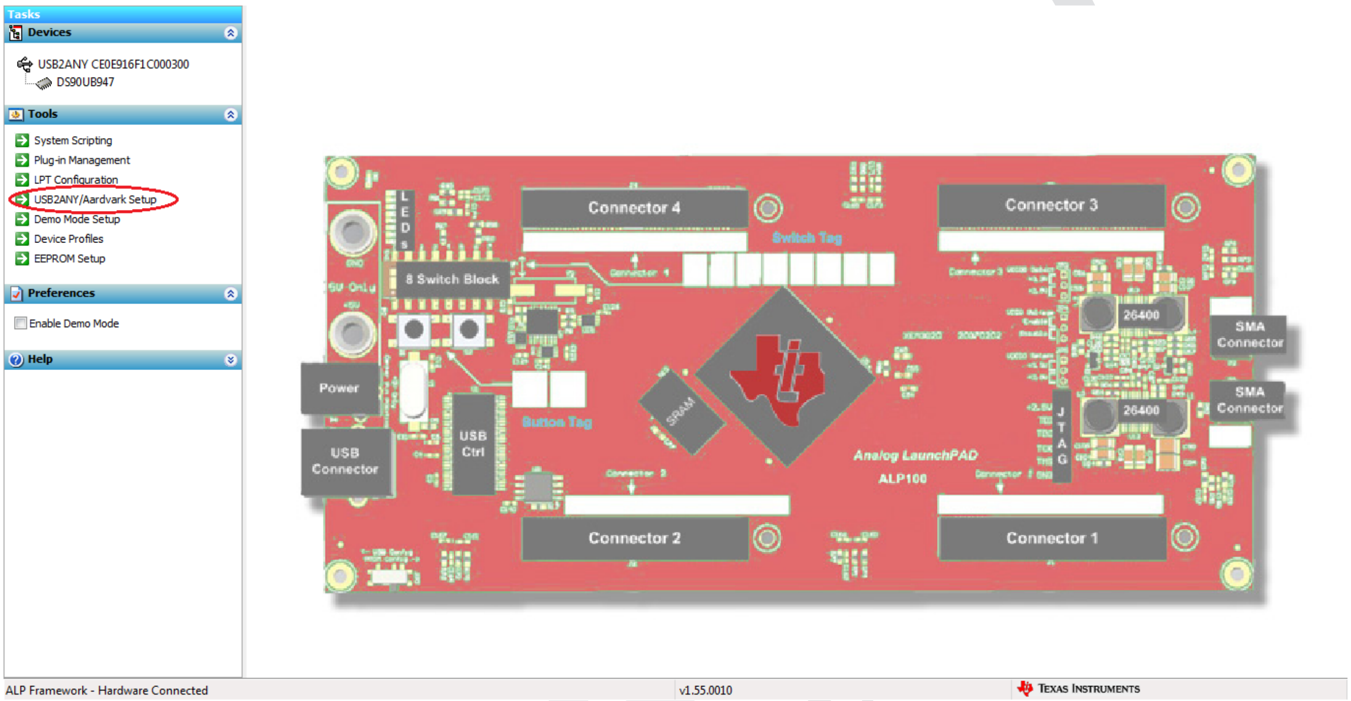


Figure 1-16. USB2ANY Setup

Highlight the incorrect profile in the Defined ALP Devices list and press the remove button.

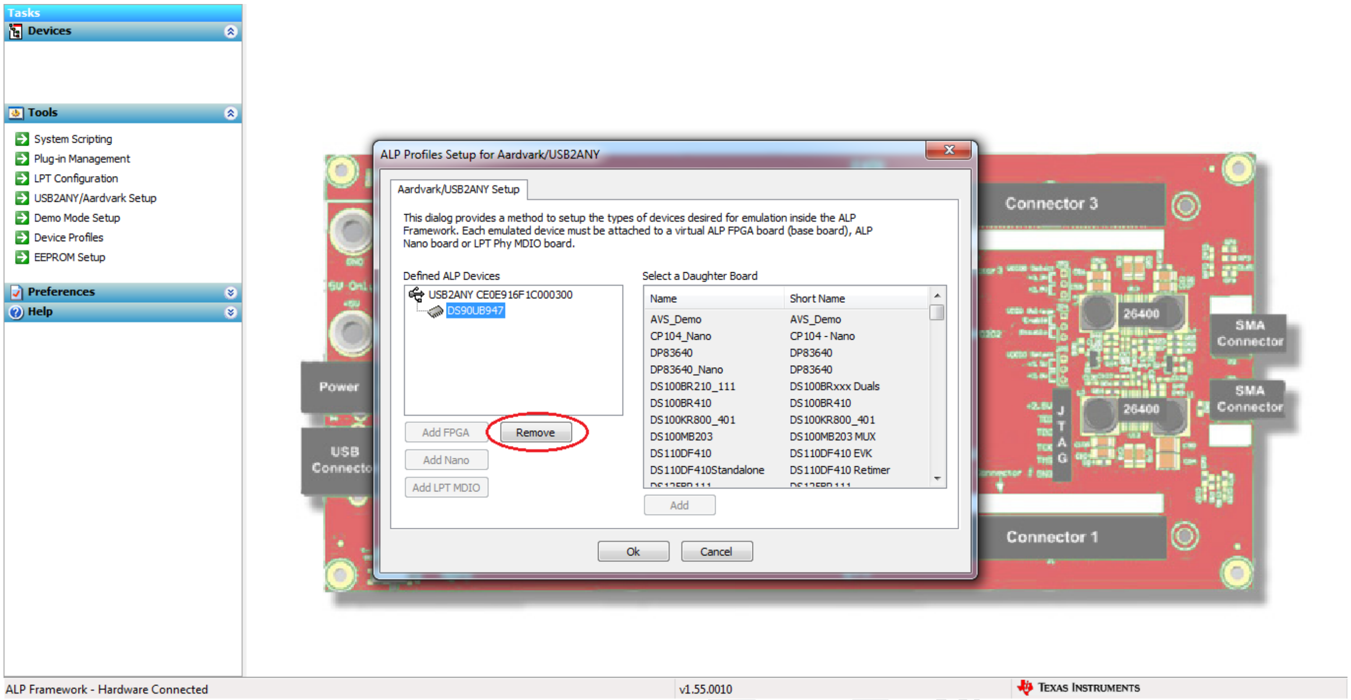


Figure 1-17. Remove Incorrect Profile

Find the correct profile under the Select a Daughter Board list, highlight the profile and press Add.

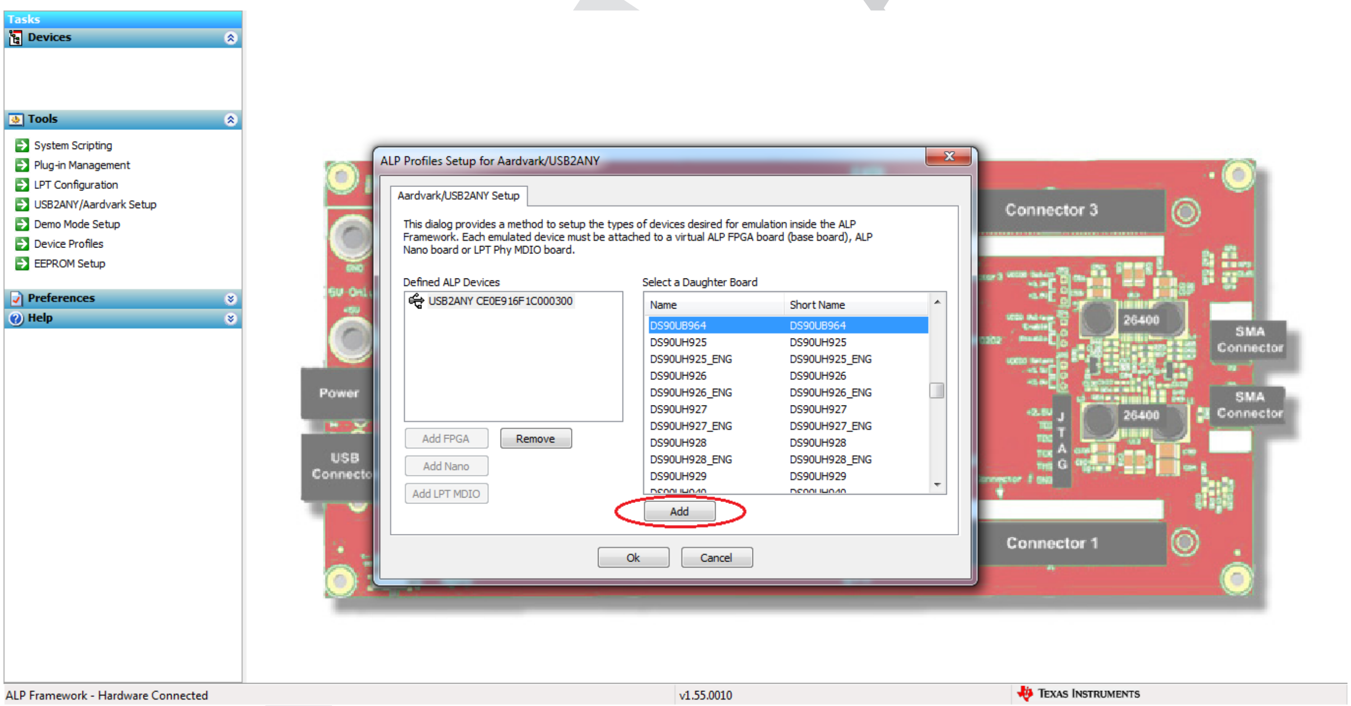


Figure 1-18. Add Correct Profile

Select Ok and the correct profile should now be loaded.

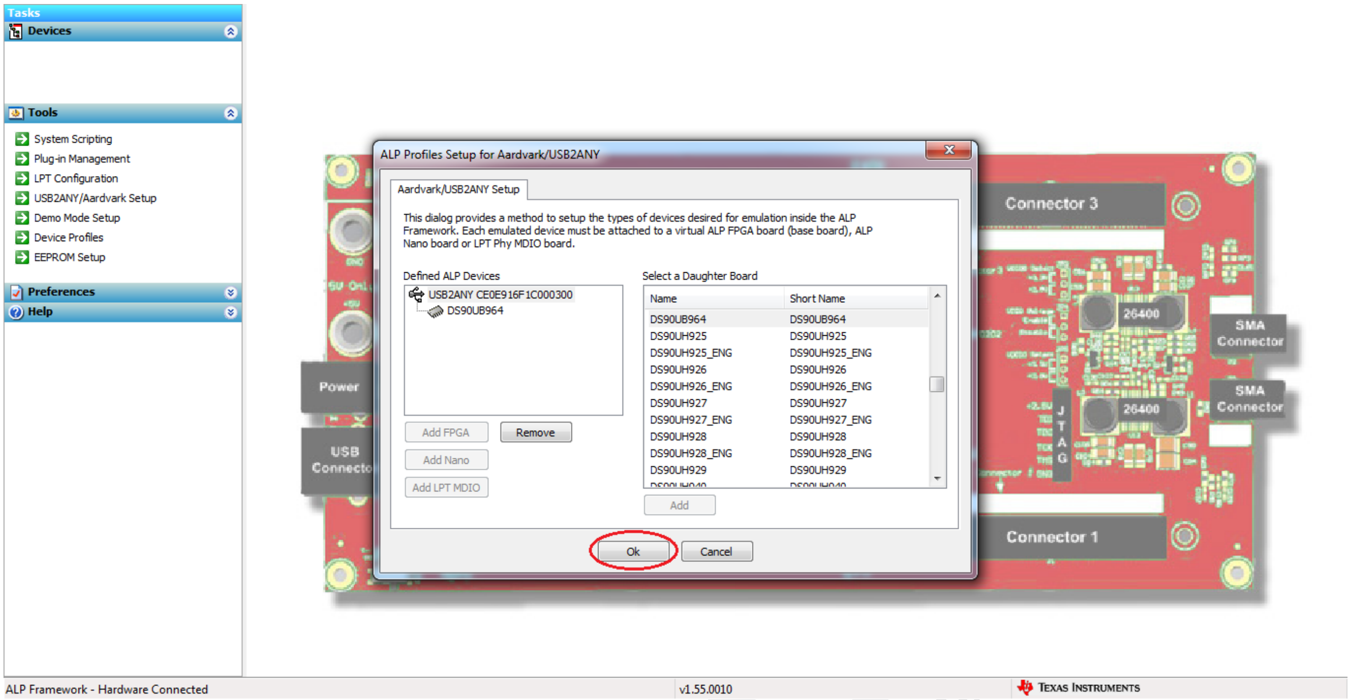


Figure 1-19. Finish Setup

1.12.2 ALP does not detect the EVM

If the following window opens after starting the ALP software, double check the hardware setup.

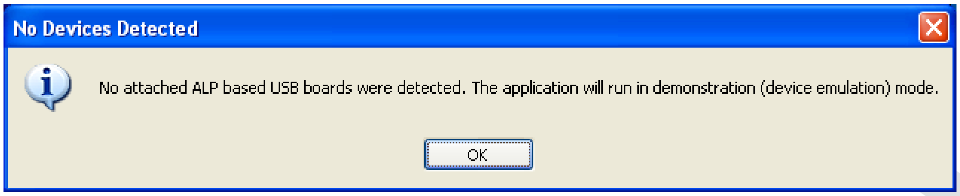


Figure 1-20. ALP No Devices Error

It may also be that the USB2ANY driver is not installed. Check the device manager. There should be a “HID-compliant device” under the “Human Interface Devices” as shown below.

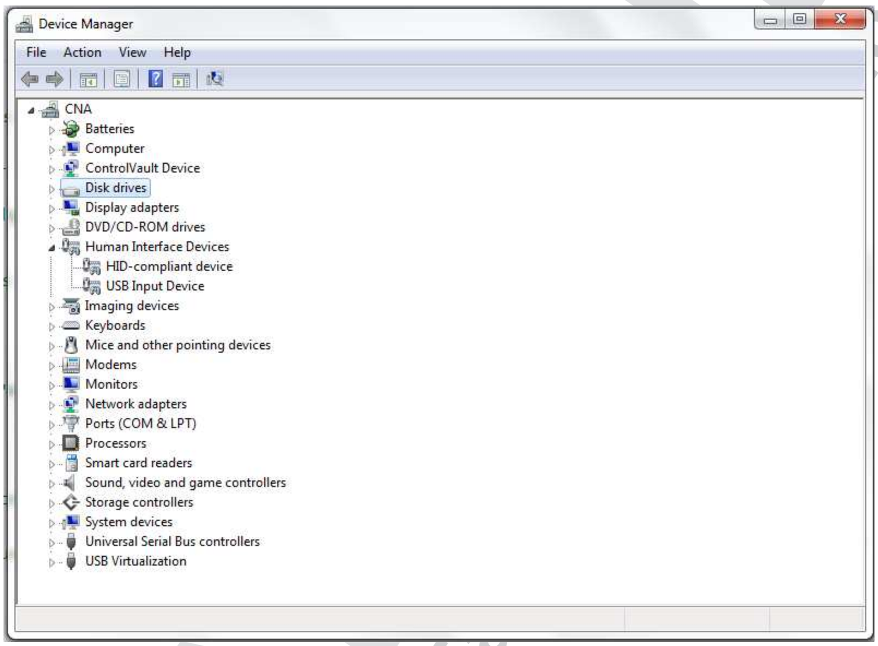


Figure 1-21. Windows 7, ALP USB2ANY Driver

The software should start with only “DS90UB96X” in the “Devices” pull down menu. If there are more devices then the software is most likely in demo mode. When the ALP is operating in demo mode there is a “(Demo Mode)” indication in the lower left of the application status bar as shown below.

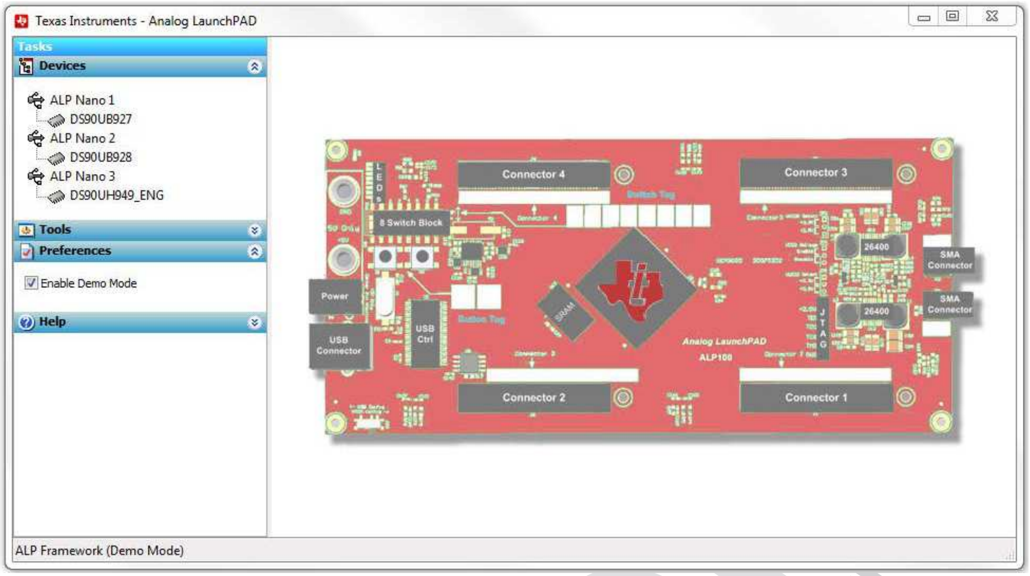


Figure 1-22. ALP in Demo Mode

Disable the demo mode by selecting the “Preferences” pull down menu and un-checking “Enable Demo Mode”.

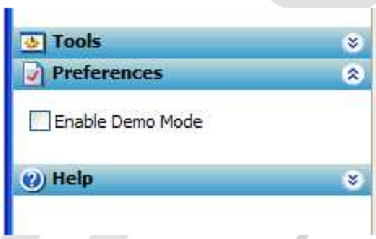


Figure 1-23. ALP Preferences Menu

After demo mode is disabled, the ALP software will poll the ALP hardware. The ALP software will update and have only “DS90UB96X” under the “Devices” pull down menu.

1.13 Bill of Materials

Table 1-13. DS90UB954EVM BOM

Item	Quantity	Designator	Value	PartNumber	Manufacturer	Description
1	1	!PCB1		SV	Any	Printed Circuit Board
2	3	C1, C2, C60	0.033uF	CGA2B3X7R1H333K050BB	TDK	CAP, CERM, 0.033 µF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402
3	5	C3, C108, C117, C127, C131	10uF	GRM21BR71A106KE51L	MuRata	CAP, CERM, 10uF, 10V, +/-10%, X7R, 0805
4	2	C4, C5	0.1uF	C1005X5R1H104K050BB	TDK	CAP, CERM, 0.1 µF, 50 V, +/- 10%, X5R, 0402
5	5	C6, C46, C49, C54, C55	0.1uF	0603YC104JAT2A	AVX	CAP, CERM, 0.1 µF, 16 V, +/- 5%, X7R, 0603
6	1	C7	0.01uF	06031C103KAT2A	AVX	CAP, CERM, 0.01 µF, 100 V, +/- 10%, X7R, 0603
7	8	C8, C18, C22, C24, C26, C28, C30, C114	1uF	C1005JB1V105K050BC	TDK	CAP, CERM, 1 µF, 35 V, +/- 10%, JB, 0402
8	8	C9, C11, C12, C15, C19, C23, C27, C31	0.1uF	CGA2B3X7R1H104K050BB	TDK	CAP, CERM, 0.1 µF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402
9	9	C10, C13, C14, C16, C20, C25, C29, C32, C33	0.01uF	GCM155R71H103KA55D	MuRata	CAP, CERM, 0.01uF, 50V, +/-10%, C0G/NP0, 0402
10	3	C21, C35, C36	10uF	CL21A106KAFN3NE	Samsung	CAP, CERM, 10 µF, 25 V, +/- 10%, X5R, 0805
11	12	C34, C101, C103, C105, C109, C115, C116, C118, C125, C126, C129, C130	0.1uF	GRM155R71C104KA88D	MuRata	CAP, CERM, 0.1uF, 16V, +/-10%, X7R, 0402
12	2	C37, C38	12pF	GRM1555C1E120JA01D	MuRata	CAP, CERM, 12pF, 25V, +/-5%, C0G/NP0, 0402
13	4	C39, C40, C41, C75	4.7uF	C0805C475K3PACTU	Kemet	CAP, CERM, 4.7 µF, 25 V, +/- 10%, X5R, 0805
14	1	C42	2.2uF	0805YD225KAT2A	AVX	CAP, CERM, 2.2 µF, 16 V, +/- 10%, X5R, 0805
15	1	C43	0.01uF	C1608X7R1H103K080AA	TDK	CAP, CERM, 0.01 µF, 50 V, +/- 10%, X7R, 0603
16	1	C44	22uF	EEE-1AA220WR	Panasonic - ECG	CAP ALUM 22UF 10V 20% SMD
17	1	C45	1uF	C0805C105K3RACTU	Kemet	CAP, CERM, 1 µF, 25 V, +/- 10%, X7R, 0805
18	2	C47, C48	220pF	06035A221FAT2A	AVX	CAP, CERM, 220 pF, 50 V, +/- 1%, C0G/NP0, 0603
19	2	C50, C51	30pF	GRM1885C2A300JA01D	MuRata	CAP, CERM, 30 pF, 100 V, +/- 5%, C0G/NP0, 0603
20	1	C52	0.47uF	GRM188R71A474KA61D	MuRata	CAP, CERM, 0.47 µF, 10 V, +/- 10%, X7R, 0603
21	1	C53	2200pF	C0603X222K5RACTU	Kemet	CAP, CERM, 2200 pF, 50 V, +/- 10%, X7R, 0603
22	5	C56, C58, C63, C65, C67	0.1uF	C1005X7R1H104K050BB	TDK	CAP, CERM, 0.1 µF, 50 V, +/- 10%, X7R, 0402
23	4	C57, C59, C64, C66	10uF	C1608X5R1E106M080AC	TDK	CAP, CERM, 10 µF, 25 V, +/- 20%, X5R, 0603
24	1	C61	0.015uF	CGA2B3X7R1H153K050BB	TDK	CAP, CERM, 0.015 µF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402

Table 1-13. DS90UB954EVM BOM (continued)

25	2	C62, C69	240pF	GRM1555C1H241JA01D	MuRata	CAP, CERM, 240 pF, 50 V, +/- 5%, C0G/NP0, 0402
26	1	C68	0.047uF	C1005X7R1H473K050BB	TDK	CAP, CERM, 0.047 µF, 50 V, +/- 10%, X7R, 0402
27	2	C70, C102	1uF	GCM188R71C105KA64D	MuRata	CAP, CERM, 1 µF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603
28	4	C71, C72, C73, C74	4700pF	08051C472KAT2A	AVX	CAP, CERM, 4700 pF, 100 V, +/- 10%, X7R, 0805
29	1	C100	10pF	GRM1555C1H100JA01D	MuRata	CAP, CERM, 10pF, 50V, +/-5%, C0G/NP0, 0402
30	4	C104, C112, C119, C120	22uF	293D226X0025D2TE3	Vishay-Sprague	CAP, TA, 22uF, 25V, +/-20%, 0.7 ohm, SMD
31	1	C106	100uF	T495D107M016ATE100	Kemet	CAP, TA, 100uF, 16V, +/-20%, 0.1 ohm, SMD
32	1	C107	47uF	GRM32ER61C476ME15L	MuRata	CAP, CERM, 47uF, 16V, +/-20%, X5R, 1210
33	1	C110	3300pF	GRM155R71H332KA01D	MuRata	CAP, CERM, 3300pF, 50V, +/-10%, X7R, 0402
34	4	C113, C123, C124, C128	4.7uF	GRM21BR71C475KA73L	MuRata	CAP, CERM, 4.7uF, 16V, +/-10%, X7R, 0805
35	1	C121	2.2uF	293D225X9025A2TE3	Vishay-Sprague	CAP, TA, 2.2uF, 25V, +/-10%, 6.3 ohm, SMD
36	1	C122	0.01uF	06031C103JAT2A	AVX	CAP, CERM, 0.01uF, 100V, +/-5%, X7R, 0603
37	1	C132	10uF	GRM188R61E106MA73D	MuRata	CAP, CERM, 10 µF, 25 V, +/- 20%, X5R, 0603
38	9	C152, C521, C522, C523, C524, C525, C526, C527, C528	1uF	GRM185R61C105KE44D	MuRata	CAP, CERM, 1 µF, 16 V, +/- 10%, X5R, 0603
39	14	C500, C501, C503, C504, C506, C507, C509, C510, C512, C513, C515, C516, C518, C519	22uF	GRT31CR61E226KE01L	MuRata	CAP, CERM, 22 µF, 25 V, +/- 10%, X5R, AEC-Q200 Grade 3, 1206_190
40	2	C529, C530	22uF	GRT31CR61E226KE01L	MuRata	CAP, CERM, 22 µF, 25 V, +/- 10%, X5R, AEC-Q200 Grade 3, 1206
41	8	D1, D2, D3, D4, D6, D7, D8, D15	Green	150060VS75000	Wurth Elektronik eiSos	LED, Green, SMD
42	1	D5	7.5V	1SMB5922BT3G	ON Semiconductor	Diode, Zener, 7.5 V, 550 mW, SMB
43	2	D9, D13	Orange	LTST-C190KFKT	Lite-On	LED, Orange, SMD
44	1	D10	40V	1N5819HW-7-F	Diodes Inc.	Diode, Schottky, 40V, 1A, SOD-123
45	3	D11, D12, D14	Super Red	150060SS75000	Wurth Elektronik eiSos	LED, Super Red, SMD
46	1	D16	Green	SSF-LXH305GD-TR	Lumex	LED, Green, SMD
47	1	F1		0440002.WR	Littelfuse	Fuse, 2 A, 32 V, SMD
48	1	FB1	60 ohm	BK1608HS600-T	Taiyo Yuden	Ferrite Bead, 60 ohm @ 100 MHz, 0.8 A, 0603
49	1	H1		BMI-S-201-F	Laird-Signal Integrity Products	EMI SHIELD, 13.66 x 12.70 mm, SMT

Table 1-13. DS90UB954EVM BOM (continued)

50	7	J1, J12, J14, J16, J19, J28, J29		TSW-103-07-G-S	Samtec, Inc.	Header, TH, 100mil, 3x1, Gold plated, 230 mil above insulator
51	1	J2		TSW-108-07-G-D	Samtec	Header, 100mil, 8x2, Gold, TH
52	19	J3, J8, J9, J10, J11, J13, J15, J17, J18, J20, J21, J22, J23, J25, J26, J27, J34, J36, J37		5-146261-1	TE Connectivity	Header, 100mil, 2x1, Gold plated, TH
53	1	J4		22112042	Molex	Header, 100mil, 4x1, White, TH
54	1	J5		QSH-020-01-H-D-DP-A	Samtec	Receptacle, Differential, 0.5mm, 10 pair x2, Gold, SMT
55	1	J6		QTH-020-04-L-D-DP-A	Samtec	Header(shrouded), 0.5mm, 10 pair x 2, Gold, SMT
56	1	J7		1734035-2	TE Connectivity	Connector, Receptacle, Mini-USB Type B, R/A, Top Mount SMT
57	1	J24		PJ-102A	CUI Inc.	Connector, DC Jack 2.1X5.5 mm, TH
58	3	J30, J35, J38		TSW-102-07-G-D	Samtec	Header, 100mil, 2x2, Gold, TH
59	1	J31		TSW-104-07-G-D	Samtec	Header, 100mil, 4x2, Gold, TH
60	1	J32		TSW-102-07-G-S	Samtec	Header, 100mil, 2x1, Gold, TH
61	1	J33		TSW-104-07-G-S	Samtec	Header, 100mil, 4x1, Gold, TH
62	8	L1, L2, L3, L4, L5, L6, L8, L22	120 ohm	BLM18SG121TN1D	MuRata	Ferrite Bead, 120 ohm @ 100 MHz, 3 A, 0603
63	2	L7, L15	10uH	LQH3NPZ100MJRL	MuRata	Inductor, Wirewound, Ferrite, 10 µH, 0.81 A, 0.288 ohm, AEC-Q200 Grade 1, SMD
64	2	L9, L16	1000 ohm	BLM18AG102SN1D	MuRata	Ferrite Bead, 1000 ohm @ 100 MHz, 0.4 A, 0603
65	4	L10, L13, L17, L20	1500 ohm	BLM18HE152SN1D	MuRata	Ferrite Bead, 1500 ohm @ 100 MHz, 0.5 A, 0603
66	2	L11, L18	10uH	LQH3NPN100MJRL	MuRata	Inductor, Wirewound, Ferrite, 10 µH, 0.81 A, 0.24 ohm, SMD
67	2	L12, L19	100uH	CLF6045NIT-101M-D	TDK	Inductor, Wirewound, Ferrite, 100 µH, 0.61 A, 0.32 ohm, AEC-Q200 Grade 0, SMD
68	2	L14, L21		DLW21SN900HQ2L	MuRata	Coupled inductor, 0.28 A, 0.41 ohm, +/-25%, SMD
69	1	L31	4.7uH	7440650047	Wurth Elektronik	Inductor, Shielded Drum Core, Ferrite, 4.7 µH, 4.2 A, 0.02 ohm, SMD
70	1	LBL1		THT-14-423-10	Brady	Thermal Transfer Printable Labels, 0.650 W x 0.200" H - 10
71	2	Q1, Q2	50V	BSS138	Fairchild Semiconductor	MOSFET, N-CH, 50 V, 0.22 A, SOT-23

Table 1-13. DS90UB954EVM BOM (continued)

72	22	R1, R11, R12, R18, R19, R25, R26, R29, R36, R41, R56, R59, R60, R61, R62, R63, R64, R78, R79, R110, R119, R128	0	ERJ-2GE0R00X	Panasonic	RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0 ohm, 5%, 0.063W, 0402, RES, 0 ohm, 5%, 0.063W, 0402, RES, 0 ohm, 5%, 0.063W, 0402, RES, 0 ohm, 5%, 0.063W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0, 5%, 0.063 W, 0402, RES, 0 ohm, 5%, 0.063W, 0402, RES, 0 ohm, 5%, 0.063W, 0402, RES, 0 ohm, 5%, 0.063W, 0402
73	12	R2, R7, R9, R15, R31, R39, R42, R44, R46, R48, R50, R52	0	ERJ-1GE0R00C	Panasonic	RES, 0, 5%, 0.05 W, 0201
74	13	R3, R8, R10, R30, R32, R40, R43, R45, R47, R49, R51, R53, R81	0	ERJ-1GE0R00C	Panasonic	RES, 0, 5%, 0.05 W, 0201
75	1	R4	470	CRCW0402470RJNED	Vishay-Dale	RES, 470 ohm, 5%, 0.063W, 0402
76	6	R5, R14, R16, R17, R37, R38	10k	CRCW040210K0JNED	Vishay-Dale	RES, 10k ohm, 5%, 0.063W, 0402, RES, 10 k, 5%, 0.063 W, 0402, RES, 10k ohm, 5%, 0.063W, 0402, RES, 10k ohm, 5%, 0.063W, 0402, RES, 10k ohm, 5%, 0.063W, 0402, RES, 10k ohm, 5%, 0.063W, 0402
77	5	R6, R97, R105, R118, R122	100k	CRCW0402100KJNED	Vishay-Dale	RES, 100k ohm, 5%, 0.063W, 0402
78	1	R13	25.5k	CRCW040225K5FKED	Vishay-Dale	RES, 25.5 k, 1%, 0.063 W, 0402
79	3	R20, R21, R22	4.7k	CRCW04024K70JNED	Vishay-Dale	RES, 4.7k ohm, 5%, 0.063W, 0402
80	4	R23, R135, R136, R137	0	CRCW02010000Z0ED	Vishay-Dale	RES, 0, 5%, 0.05 W, 0201
81	8	R24, R28, R89, R95, R98, R103, R107, R117	10.0k	CRCW040210K0FKED	Vishay-Dale	RES, 10.0k ohm, 1%, 0.063W, 0402
82	1	R27	40.2k	CRCW040240K2FKED	Vishay-Dale	RES, 40.2 k, 1%, 0.063 W, 0402
83	1	R33	97.6k	CRCW040297K6FKED	Vishay-Dale	RES, 97.6 k, 1%, 0.063 W, 0402
84	2	R34, R153	78.7k	CRCW040278K7FKED	Vishay-Dale	RES, 78.7 k, 1%, 0.063 W, 0402
85	1	R35	95.3k	CRCW040295K3FKED	Vishay-Dale	RES, 95.3 k, 1%, 0.063 W, 0402
86	14	R54, R55, R57, R58, R88, R90, R96, R99, R106, R108, R109, R120, R121, R129	0	CRCW06030000Z0EA	Vishay-Dale	RES, 0 ohm, 5%, 0.1W, 0603
87	11	R65, R66, R69, R71, R74, R75, R76, R77, R125, R126, R127	220	CRCW0402220RJNED	Vishay-Dale	RES, 220, 5%, 0.063 W, 0402
88	2	R67, R68	33	CRCW040233R0JNED	Vishay-Dale	RES, 33 ohm, 5%, 0.063W, 0402
89	1	R70	1.5k	CRCW04021K50JNED	Vishay-Dale	RES, 1.5k ohm, 5%, 0.063W, 0402
90	2	R72, R82	33k	CRCW040233K0JNED	Vishay-Dale	RES, 33k ohm, 5%, 0.063W, 0402

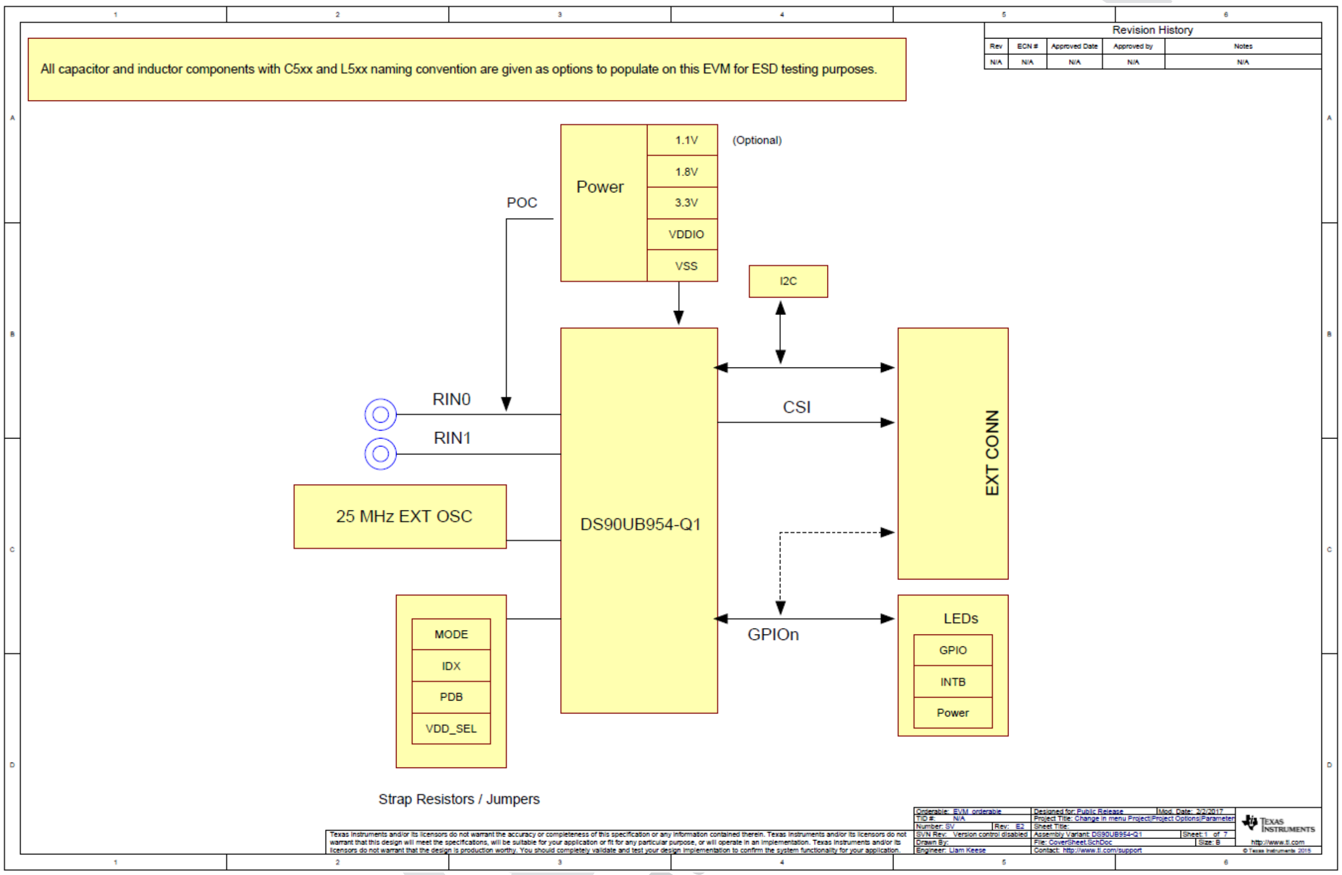
Table 1-13. DS90UB954EVM BOM (continued)

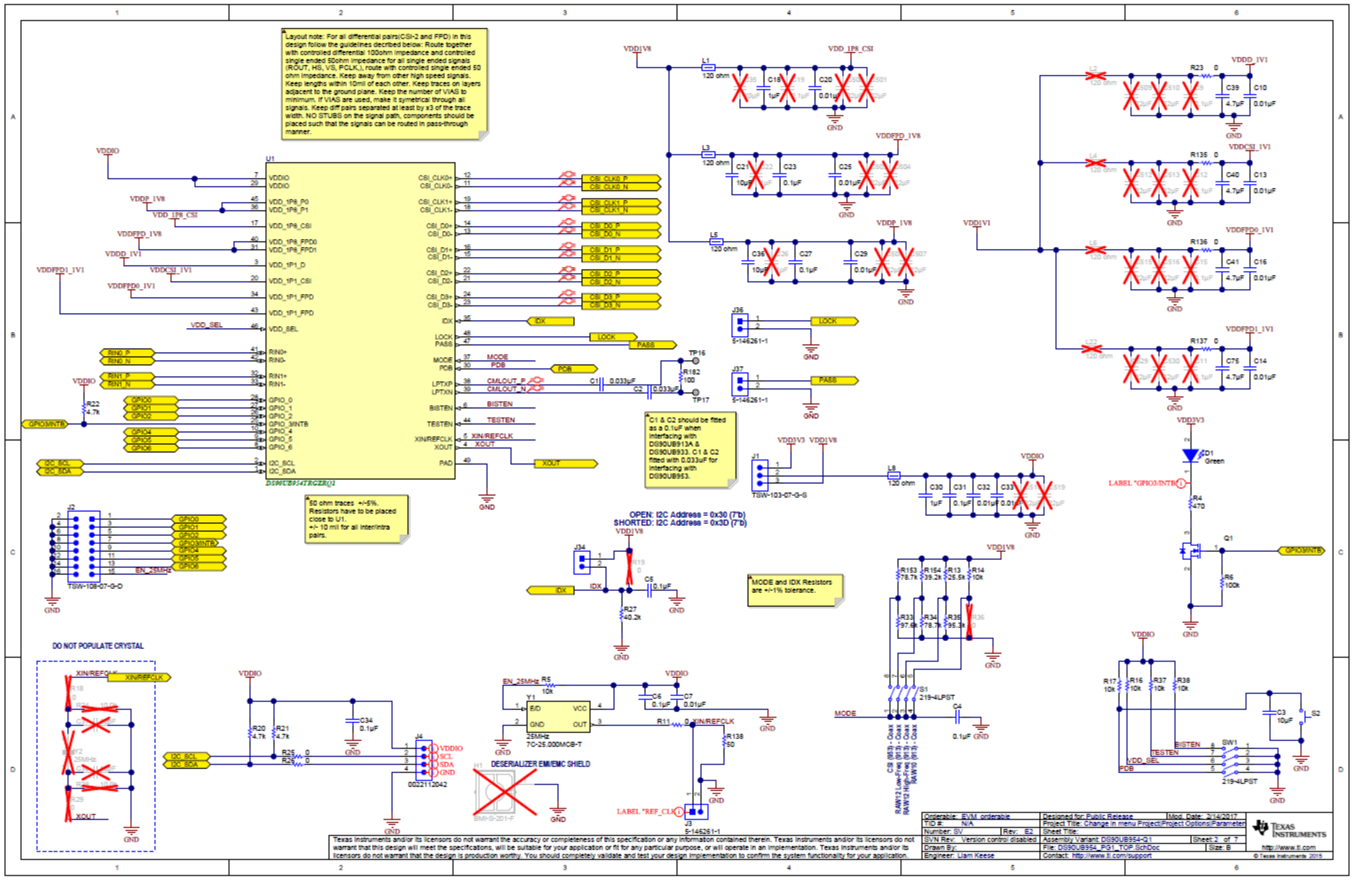
91	1	R73	1.2Meg	CRCW06031M20JNEA	Vishay-Dale	RES, 1.2 M, 5%, 0.1 W, 0603
92	1	R80	200	CRCW0603200RFKEA	Vishay-Dale	RES, 200, 1%, 0.1 W, 0603
93	1	R83	4.02k	CRCW06034K02FKEA	Vishay-Dale	RES, 4.02 k, 1%, 0.1 W, 0603
94	5	R84, R85, R132, R133, R134	2.00k	CRCW06032K00FKEA	Vishay-Dale	RES, 2.00 k, 1%, 0.1 W, 0603
95	2	R86, R131	49.9	ERJ-2RKF49R9X	Panasonic	RES, 49.9, 1%, 0.1 W, AEC-Q200 Grade 0, 0402
96	2	R87, R130	200	CRCW0402200RJNED	Vishay-Dale	RES, 200, 5%, 0.063 W, 0402
97	3	R91, R100, R111	29.4k	CRCW040229K4FKED	Vishay-Dale	RES, 29.4 k, 1%, 0.063 W, 0402
98	1	R92	124k	CRCW0402124KFKED	Vishay-Dale	RES, 124k ohm, 1%, 0.063W, 0402
99	1	R93	22.1k	CRCW040222K1FKED	Vishay-Dale	RES, 22.1k ohm, 1%, 0.063W, 0402
100	4	R94, R101, R104, R114	3.24k	CRCW04023K24FKED	Vishay-Dale	RES, 3.24k ohm, 1%, 0.063W, 0402
101	2	R102, R115	5.6k	CRCW04025K60JNED	Vishay-Dale	RES, 5.6 k, 5%, 0.063 W, 0402
102	1	R113	1.87k	CRCW04021K87FKED	Vishay-Dale	RES, 1.87k ohm, 1%, 0.063W, 0402
103	1	R116	4.99k	CRCW04024K99FKED	Vishay-Dale	RES, 4.99k ohm, 1%, 0.063W, 0402
104	2	R123, R124	2.4k	CRCW04022K40JNED	Vishay-Dale	RES, 2.4 k, 5%, 0.063 W, 0402
105	1	R138	50	504L50R0FTNCFT	AT Ceramics	RES, 50, 1%, 0.125 W, AEC-Q200 Grade 1, 0402
106	1	R154	39.2k	CRCW040239K2FKED	Vishay-Dale	RES, 39.2 k, 1%, 0.063 W, 0402
107	1	R182	100	ERJ-2RKF1000X	Panasonic	RES, 100, 1%, 0.1 W, 0402
108	2	RX0, RX1		59S10H-40ML5-Z	Rosenberger	Connector, HF, 50 Ohm, TH
109	2	S1, SW1		219-4LPST	CTS Electrocomponents	Switch, SPST 4 Pos, Top Actuated, SMT
110	1	S2		KSR221GLFS	C and K Components	Switch, Normally open, 2.3N force, 200k operations, SMD
111	1	S3		EVQ-PSD02K	Panasonic	Switch, Tactile, SPST-NO, SMT
112	1	T1		ACM9070-701-2PL-TL01	TDK	Coupled inductor, 5 A, 0.01 ohm, SMD
113	1	TP1	Red	5000	Keystone	Test Point, TH, Miniature, Red
114	1	U1		DS90UB954TRGZRQ1	Texas Instruments	FPD\Link III Deserializer with CSI\2 interface for 2.3MP/60fps cameras, RGZ0048B (VQFN-48)
115	3	U2, U4, U6		LM2941LD/NOPB	Texas Instruments	1A Low Dropout Adjustable Regulator, 8-pin LLP, Pb-Free
116	1	U3		TPS54225PWPR	Texas Instruments	4.5V to 18V Input, 2-A Synchronous Step-Down SWIFT™ Converter, PWP0014E
117	1	U5		TPS74801TDRCRQ1	Texas Instruments	Single Output LDO, 1.5 A, Adjustable 0.8 to 3.6 V Output, 0.8 to 5.5 V Input, with Programmable Soft Start, 10-pin SON (DRC), -40 to 105 degC, Green (RoHS & no Sb/Br)
118	1	U7		TPS767D318PWP	Texas Instruments	Dual Output LDO, 1 A, Fixed 1.8, 3.3 V Output, 2.7 to 10 V Input, 28-pin HTSSOP (PWP), -40 to 125 degC, Green (RoHS & no Sb/Br)
119	1	U8		TPD4E004DRYR	Texas Instruments	4-CHANNEL ESD-PROTECTION ARRAY FOR HIGH-SPEED DATA INTERFACES, DRY006A
120	1	U9		MSP430F5529IPN	Texas Instruments	25 MHz Mixed Signal Microcontroller with 128 KB Flash, 8192 B SRAM and 63 GPIOs, -40 to 85 degC, 80-pin QFP (PN), Green (RoHS & no Sb/Br)

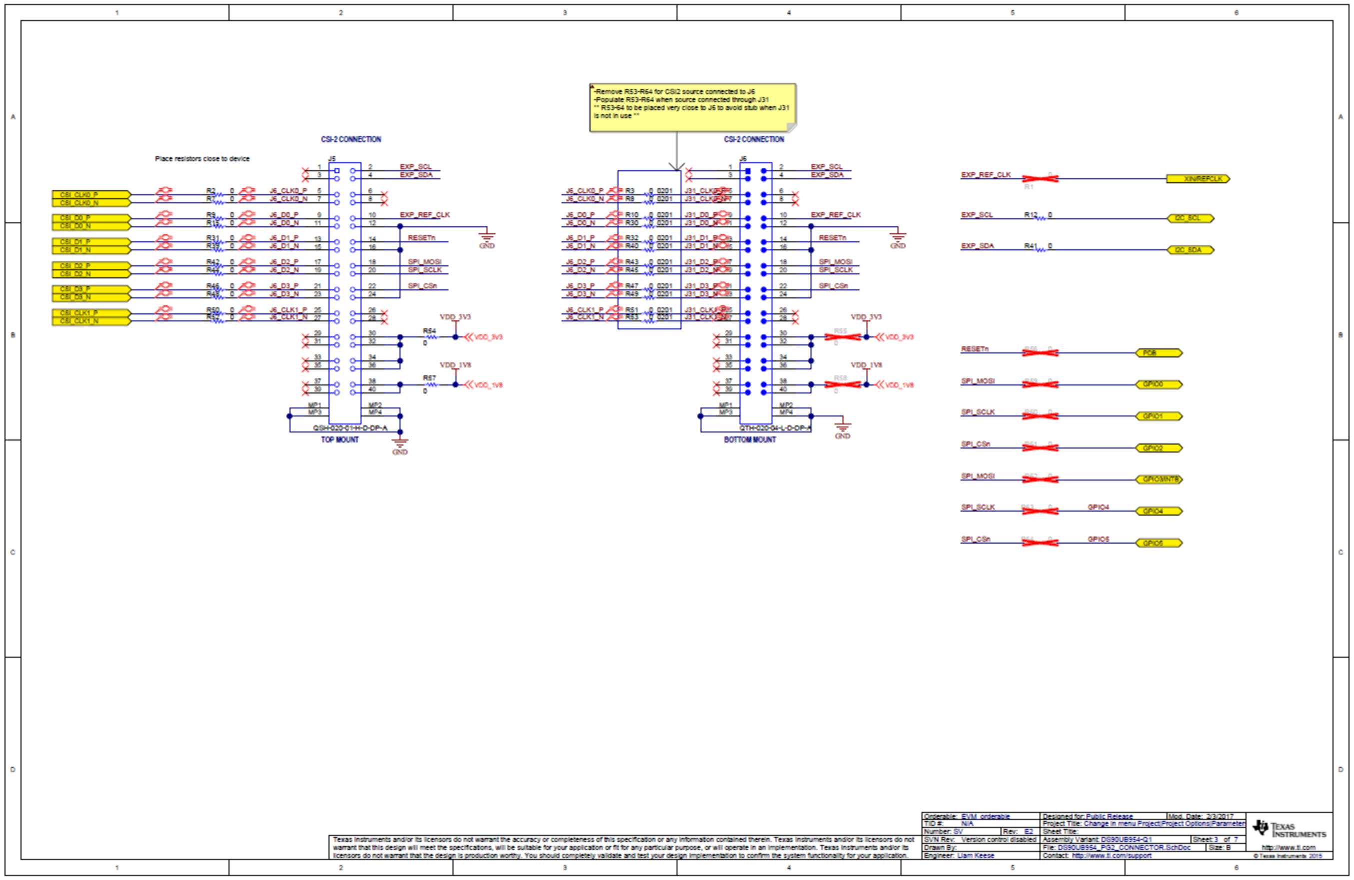
Table 1-13. DS90UB954EVM BOM (continued)

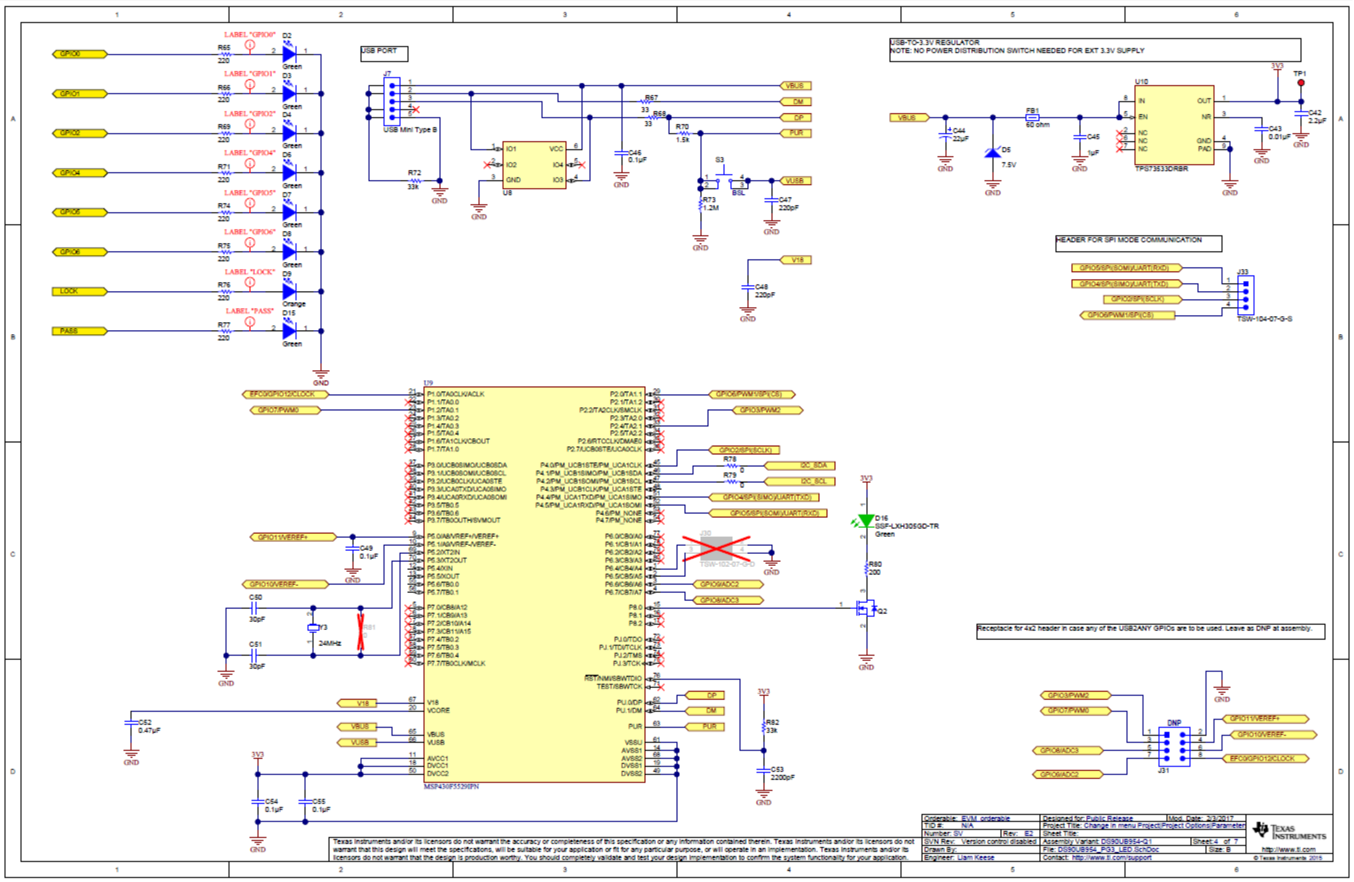
121	1	U10		TPS73533DRBR	Texas Instruments	500mA, Low Quiescent Current, Ultra-Low Noise, High PSRR Low-Dropout Linear Regulator, DRB0008A
122	1	Y1		7C-25.000MCB-T	TXC Corporation	XO, 25.000MHz, 2.5V, SMD
123	1	Y2		ABM3-25.000MHZ-D2W-T	Abracon Corportation	Crystal, 25 MHz, 18 pF, SMD
124	1	Y3		ECS-240-20-5PX-TR	ECS Inc.	Crystal, 24.000MHz, 20pF, SMD

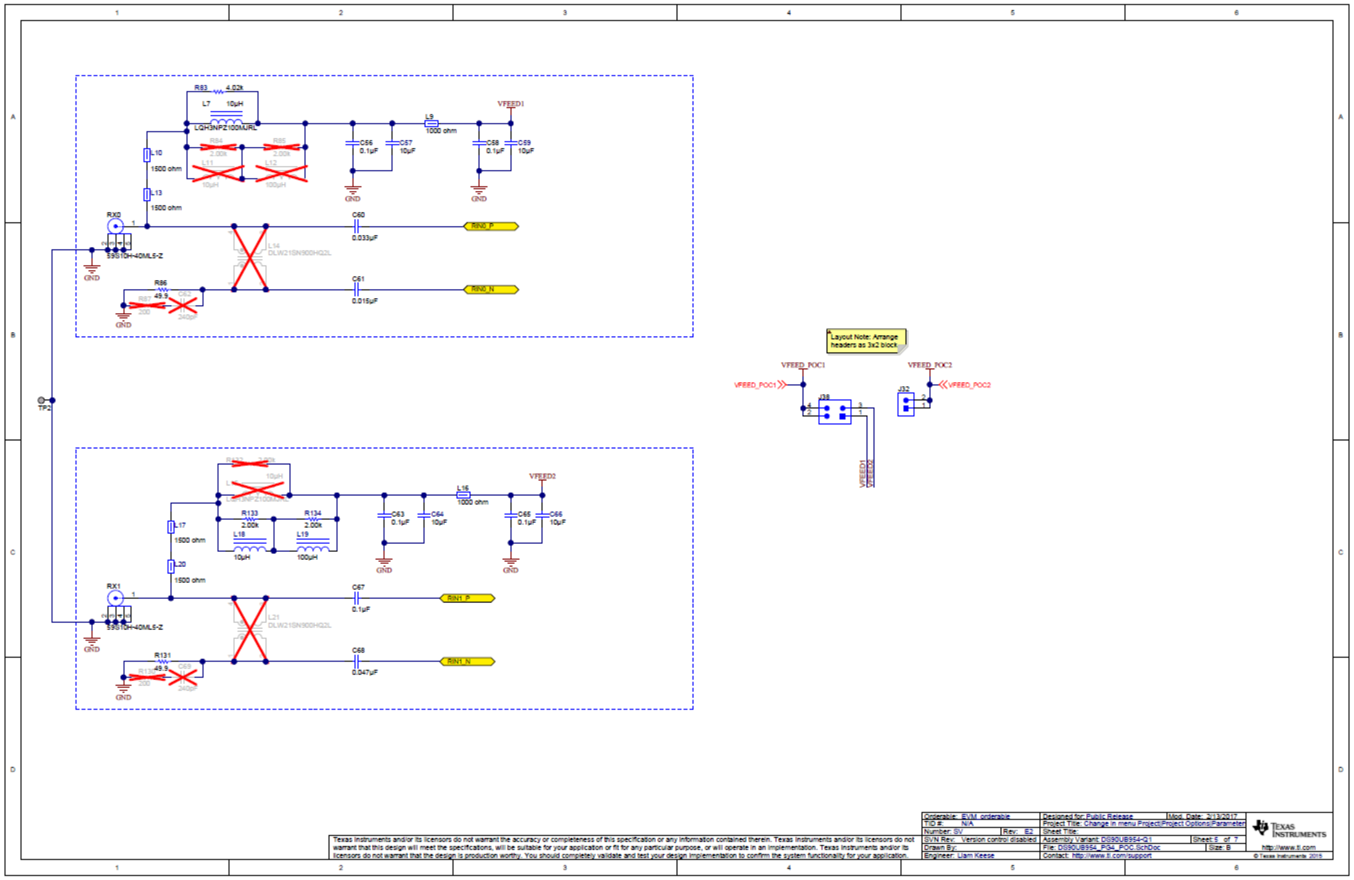
PCB Schematics

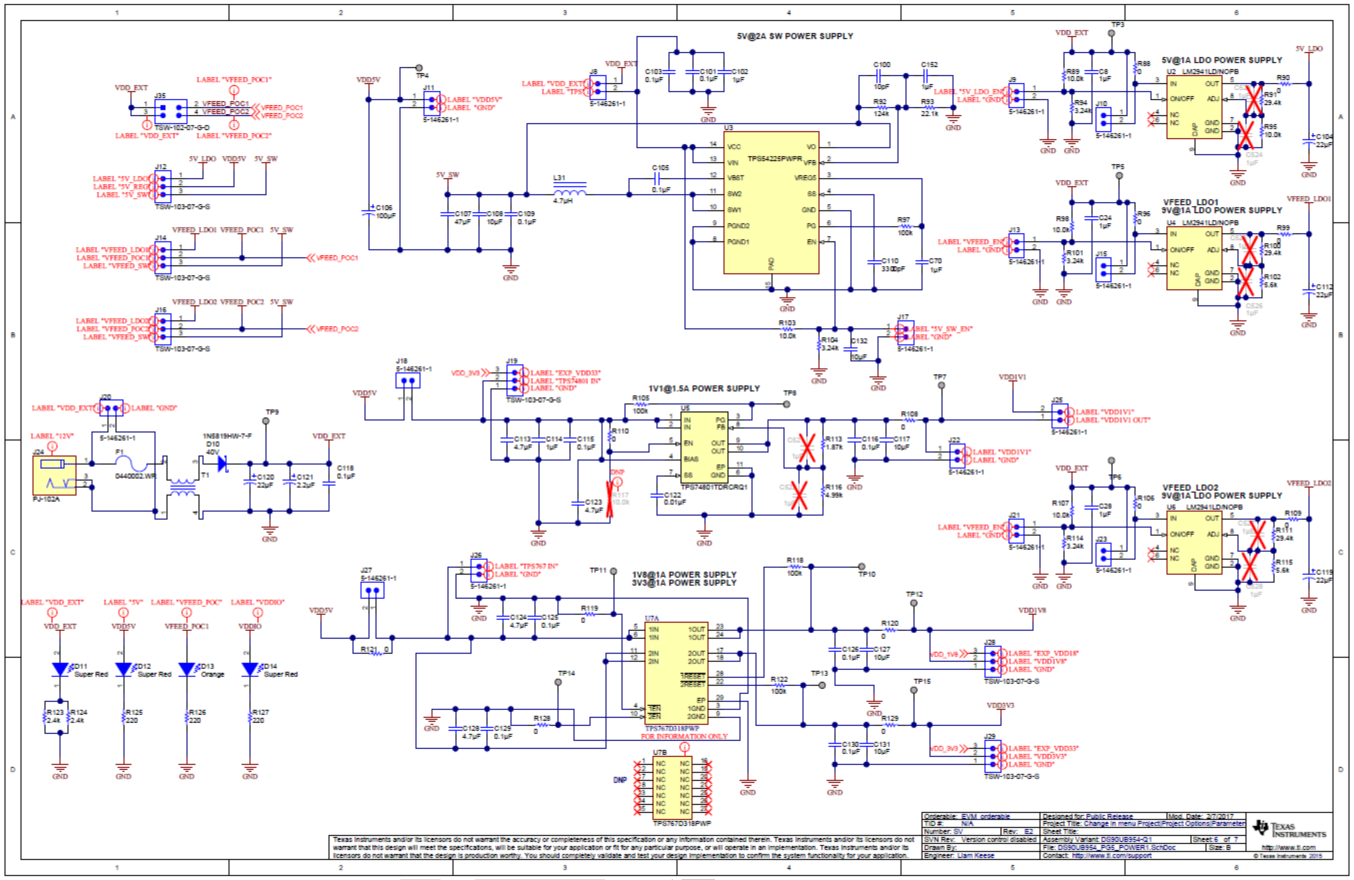




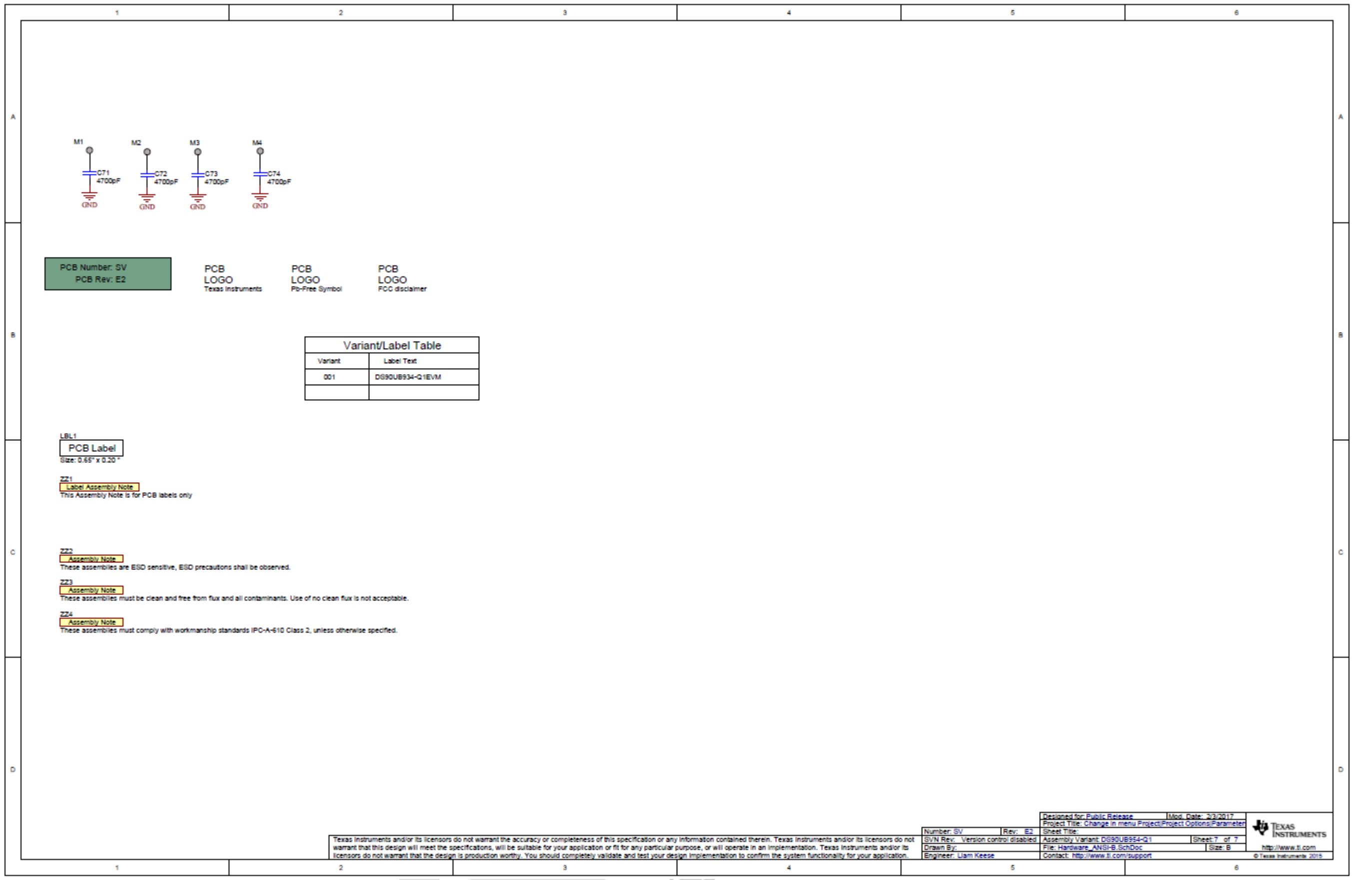








5V@2A SW POWER SUPPLY
5V@1A LDO POWER SUPPLY
VFEED_LDO1 5V@1A LDO POWER SUPPLY
1V1@1.5A POWER SUPPLY
VFEED_LDO2 5V@1A LDO POWER SUPPLY
1V8@1A POWER SUPPLY
3V3@1A POWER SUPPLY


M1
M2
M3
M4
C71 4700pF
C72 4700pF
C73 4700pF
C74 4700pF
GND
PCB Number: SV
PCB Rev: E2
PCB LOGO Texas Instruments
PCB LOGO Pb-Free Symbol
PCB LOGO FCC disclaimer
Variant/Label Table
Variant
Label Text
001
DS90UB934-Q1EVM
LBL1
PCB Label
Size: 0.65" x 0.20 "
ZZ1
Label Assembly Note
This Assembly Note is for PCB labels only
ZZ2
Assembly Note
These assemblies are ESD sensitive, ESD precautions shall be observed.
ZZ3
Assembly Note
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.
ZZ4
Assembly Note
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.
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Number: SV
Rev: E2
SVN Rev: Version control disabled
Drawn By:
Engineer: Liam Keese
Designed for: Public Release
Mod. Date: 2/3/2017
Project Title: Change in menu Project|Project Options|Parameter
Sheet Title:
Assembly Variant: DS90UB954-Q1
Sheet: 7 of 7
File: Hardware_ANSI-B.SchDoc
Size: B
Contact: http://www.ti.com/support
http://www.ti.com

Board Layout

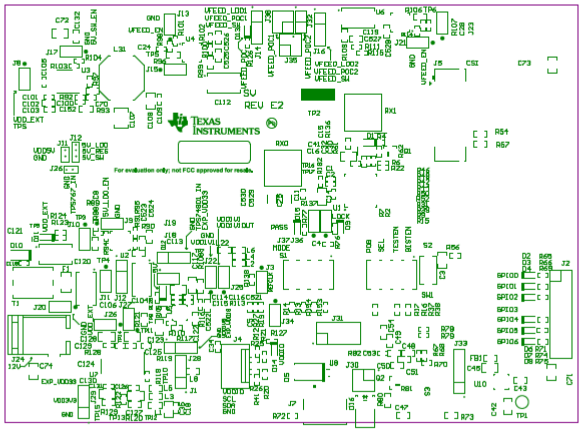

Figure 3-1. Top Overlay

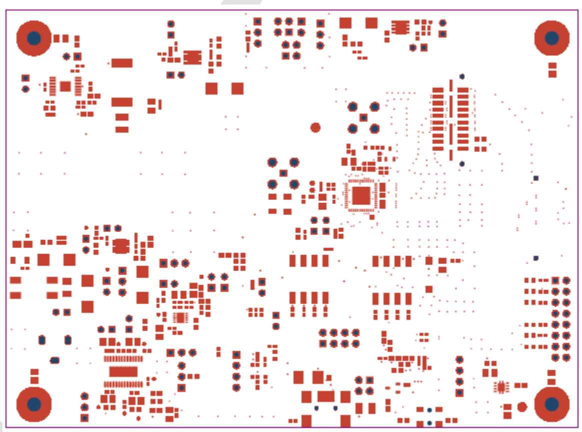

Figure 3-2. Top Solder

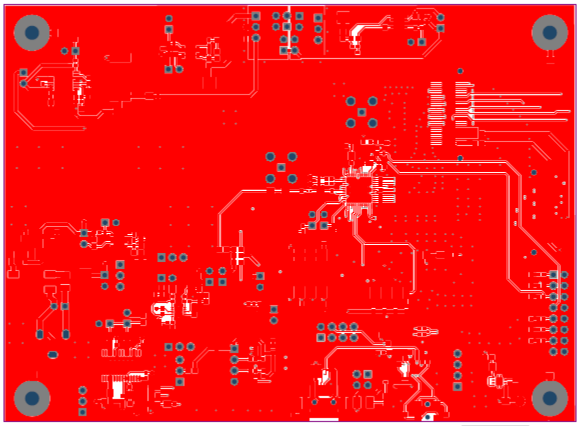

Figure 3-3. Top Signal Layer

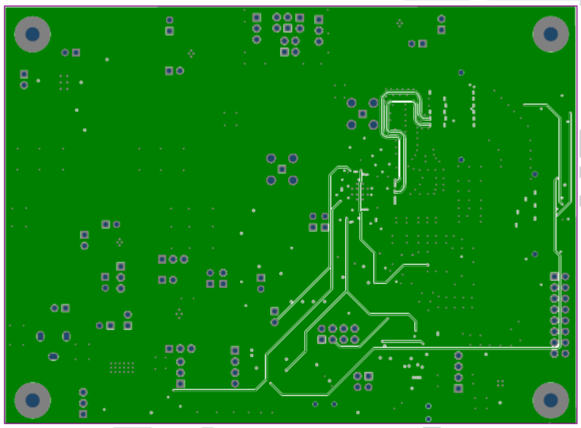

Figure 3-4. Mid Signal Layer 1

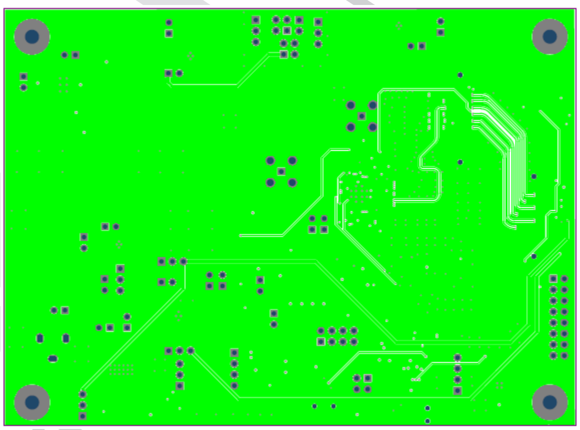

Figure 3-5. Mid Signal Layer 2

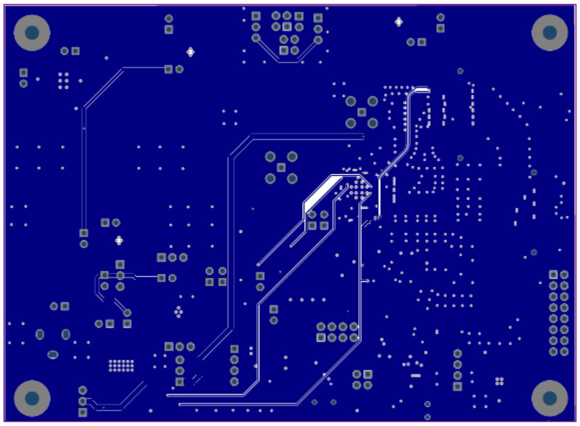

Figure 3-6. Mid Signal Layer 3

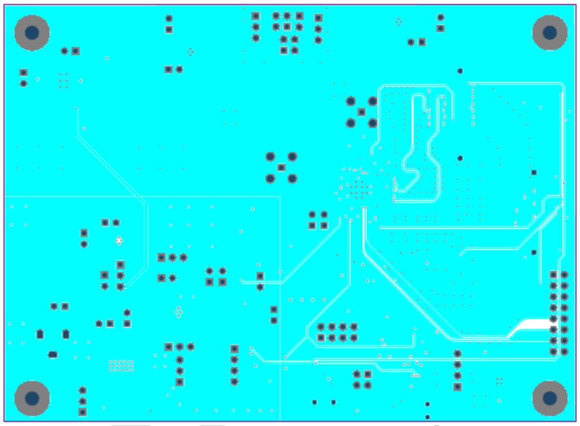

Figure 3-7. Mid Signal Layer 4

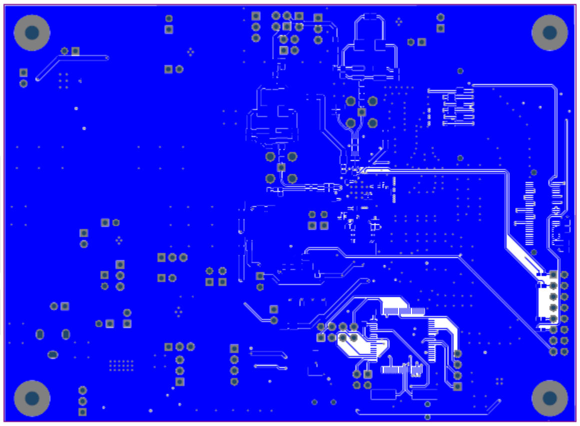

Figure 3-8. Bottom Signal Layer

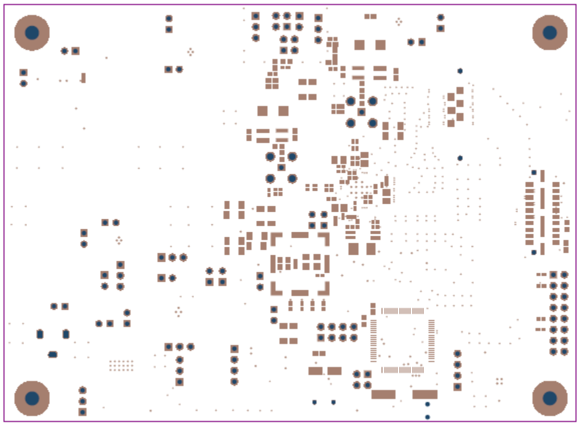

Figure 3-9. Bottom solder

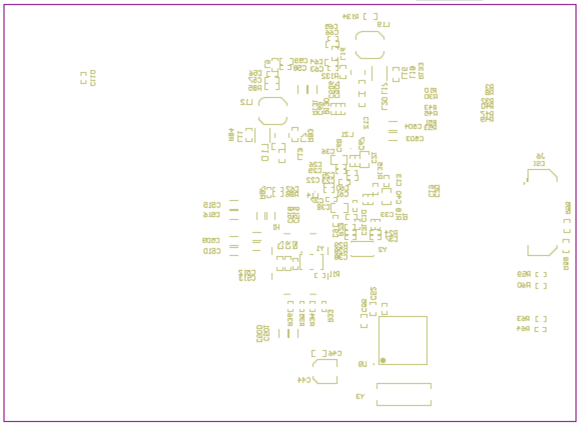

Figure 3-10. Bottom Overlay

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