

QICK RF216 MAIN BOARD AND DAUGHTER BOARD INITIAL POWERUP

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CAUTION!!

Always power down RF216 Main Board before installing daughter boards!

The ZCU216 has high current power supplies!

Use extreme caution when making cable connections (power down if possible)!

Always install plastic covers on loose SMA cables! Users have destroyed their ZCU216 boards by dropping cables on the boards!

Contents

Contents	1
Figures	2
Test Software And Hardware	3
Main Board Initial Power Up	5
RF In Board Initial Power Up	9
RF Out Board Initial Power Up	11
DC In Board Initial Power Up	13
DC Out Board Initial Power Up.....	15
Balun In Board Initial Power Up	16
Balun Out Board Initial Power Up.....	17
RF Board Testing.....	18
DC Board Testing.....	18

Figures

Figure 1 – ZCU216/RF216Main Board Test Setup.....	3
Figure 2 - IDC Connector	4
Figure 3 - Wiring Diagram for Loopback	4
Figure 4 - Photo of PMOD Loopback	4
Figure 5 - IO Loopback Diagram	5
Figure 6 - RF216 Main Board	5
Figure 7 - Example Power Jumper	6
Figure 8 - Pin 12 of U46	7
Figure 9- RF216 Main Board Showing Power Supply Locations.....	8
Figure 10 - RF In Board.....	9
Figure 11 - RF In Board to Board Voltage Test Points	9
Figure 12 - RF In Chan 0	10
Figure 13 - RF In Chan 1	10
Figure 14 - RF Out Board.....	11
Figure 15 - RF Out Board to Board Voltage Test Points	11
Figure 16 - RF Out Chan 0	12
Figure 17 - RF Out Chan 1	12
Figure 18 - DC In Board	13
Figure 19 - DC In Board to Board Voltage Test Points	13
Figure 20 - DC In 0.7V Test Point.....	14
Figure 21 - DC Out Board	15
Figure 22 - DC Out Board to Board Voltage Test Points	15
Figure 23 - Balun In Board.....	16
Figure 24 - Balun In Board to Board Voltage Test Points	16
Figure 25 - Balun Out Board	17
Figure 26 - Balun Out Board to Board Voltage Test Points.....	17

Test Software And Hardware

ZCU216 with QICK installed: <https://qick-docs.readthedocs.io/latest/>

LEDs need to be connected to board as shown below. LED connectors are labeled with appropriate wire color.

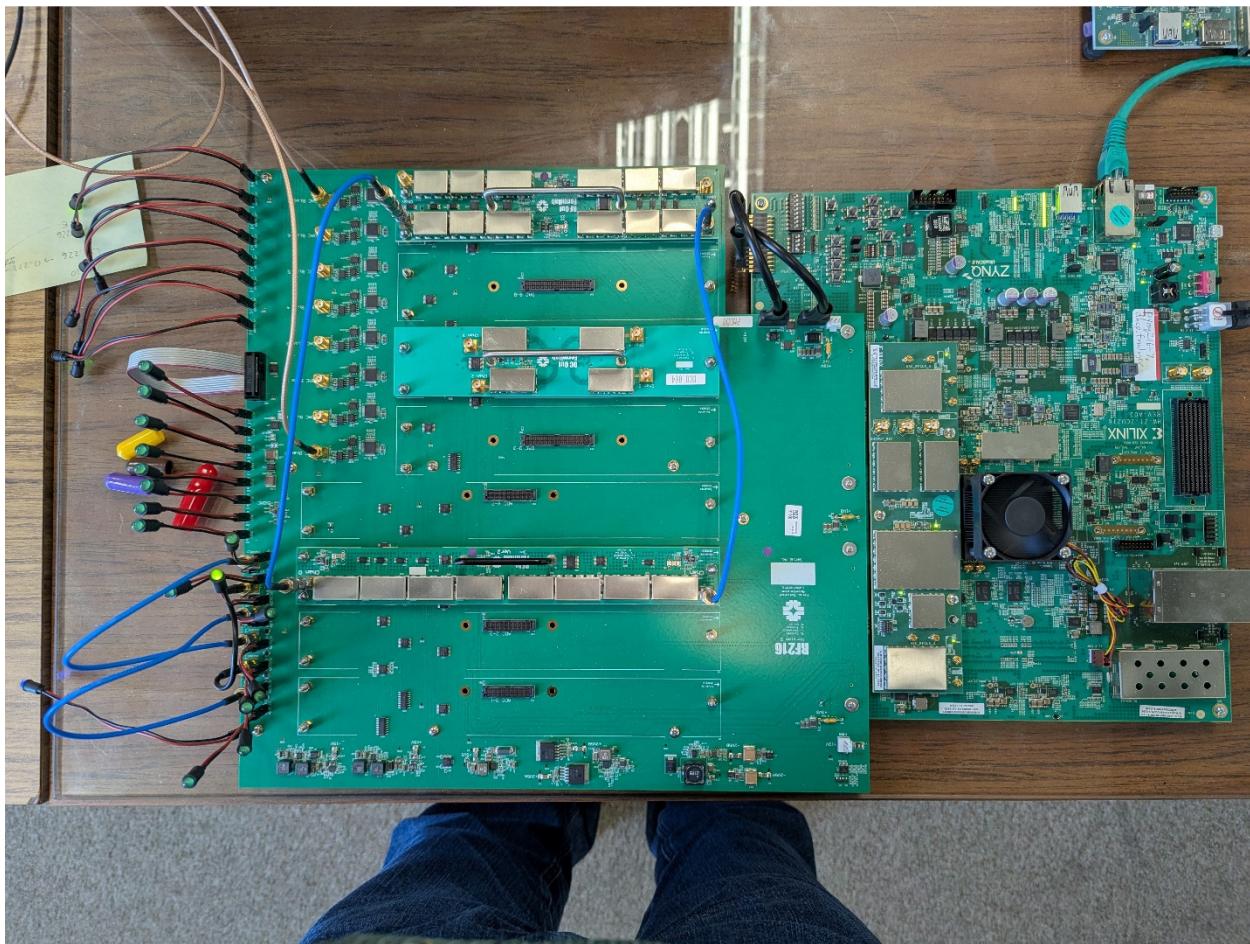


Figure 1 – ZCU216/RF216 Main Board Test Setup

Oscilloscope for Bias and DC out testing if no DC is available. DC out test requires 100MHz bandwidth.

Custom PMOD port loopback cable. Loops lower 4 bits to upper 4 bits. These are 3.3v TTL signals. IDC Connector, wiring diagram, and example loopback cable shown below.

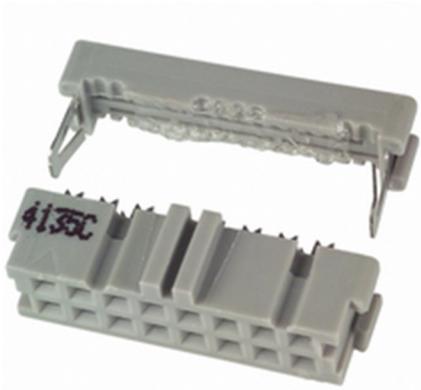


Figure 2 - IDC Connector

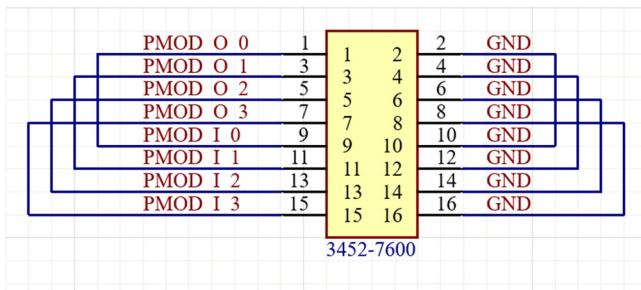


Figure 3 - Wiring Diagram for Loopback



Figure 4 - Photo of PMOD Loopback

SMA to BNC cable for scope connections. Bias outputs are high impedance.

3 SMA cables for user IO loopback test. Connect as shown below. Note location of jumpers. These can drive a 50ohm load.

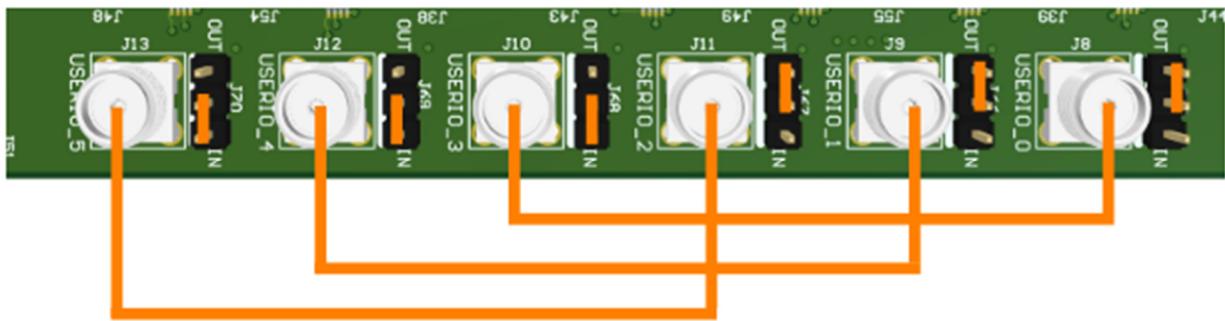


Figure 5 - IO Loopback Diagram

SMA cables for RF loopback test.

40 dB of attenuation for RF loopback test.

RF and DC boards are 50 ohm impedance.

Main Board Initial Power Up

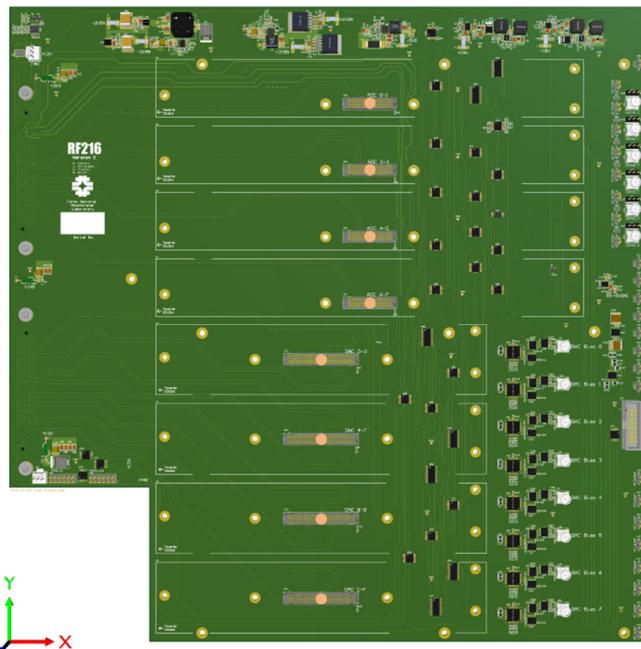


Figure 6 - RF216 Main Board

1. Install standoffs on bottom of board to elevate pcb away from testing surface
2. Check for shorts between the power supply jumpers/fuses and GND. There are multiple GND vias available on the board. See figure 9.
3. ***Be sure to follow the power up order shown here. Failure to do so will result in errors:***

- a. Connect +3.3V power to associated fuse.
 - b. Connect +12V power to associated fuse.
 - c. Connect +1.8V power to associated fuse.
4. Check for correct voltages at power jumpers for:
- a. -2.5V
 - b. +2.5V
 - c. +5.5V
 - d. +15V
 - e. -15V

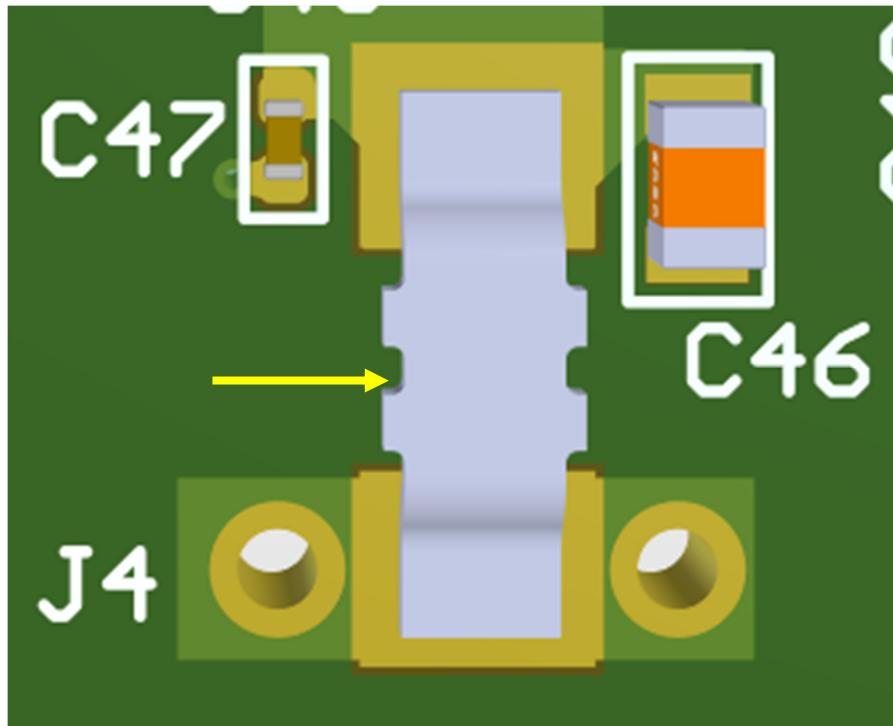


Figure 7 - Example Power Jumper

5. Check for correct +5V at pin 12 of U46

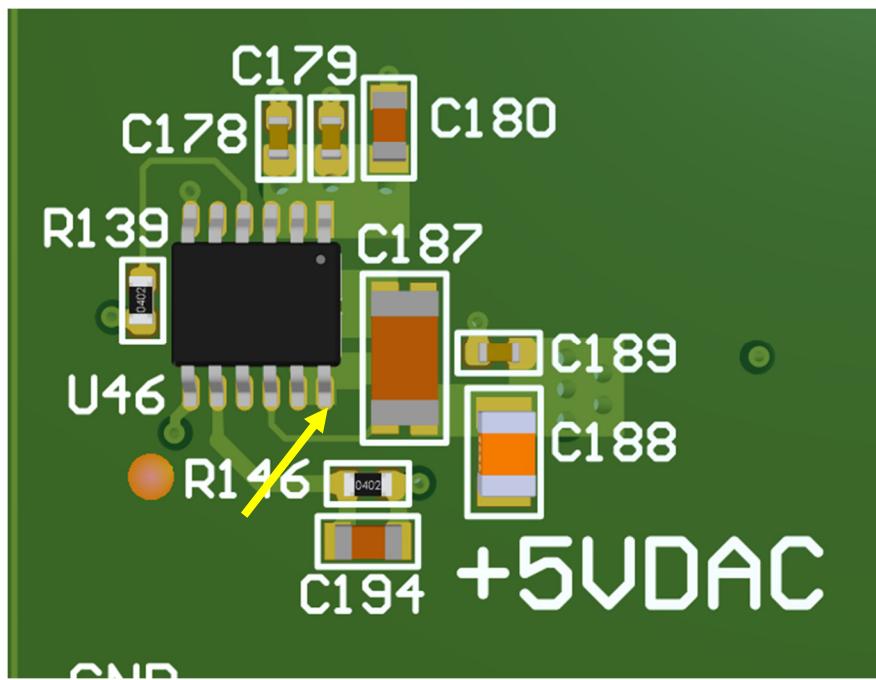


Figure 8 - Pin 12 of U46

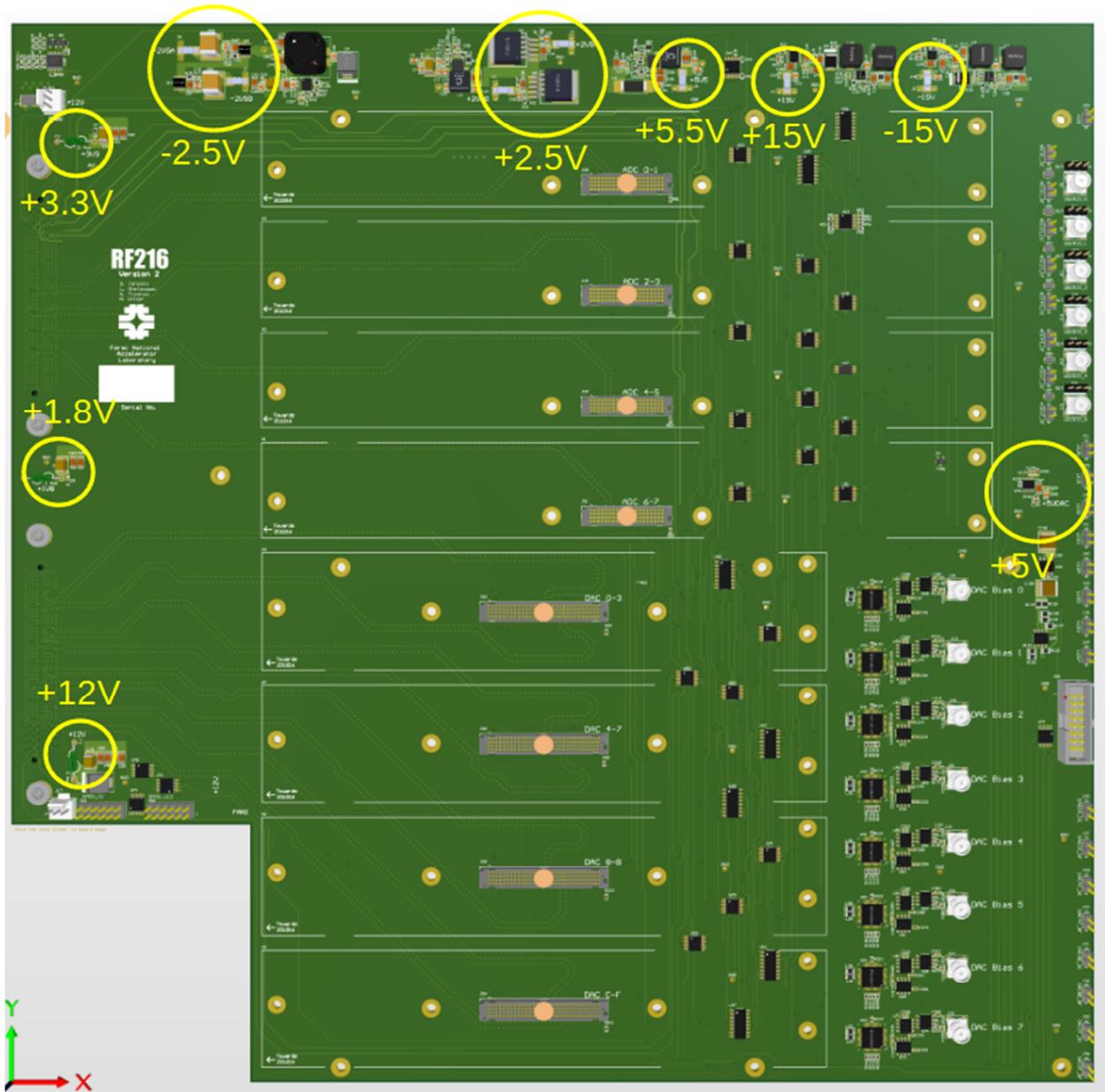


Figure 9- RF216 Main Board Showing Power Supply Locations

6. Connect the RF216 Main Board to the ZCU216.
7. Power up and make sure the ZCU216 boots up.
8. Run the Main board test in the 'test_RFQickSoc216V1.ipynb' notebook.

RF In Board Initial Power Up

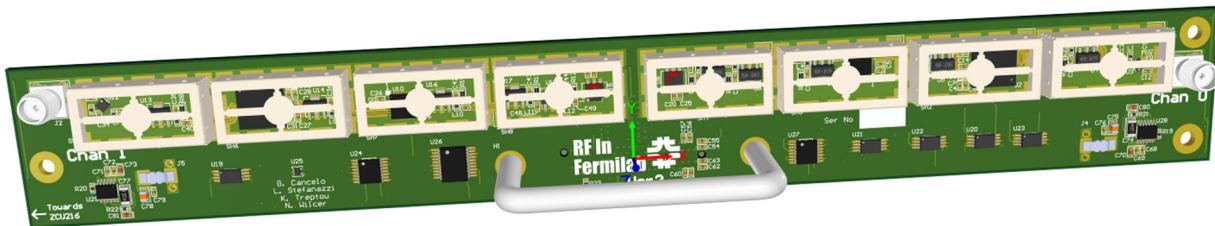


Figure 10 - RF In Board

1. Check for shorts between the power supply capacitor pins and GND.

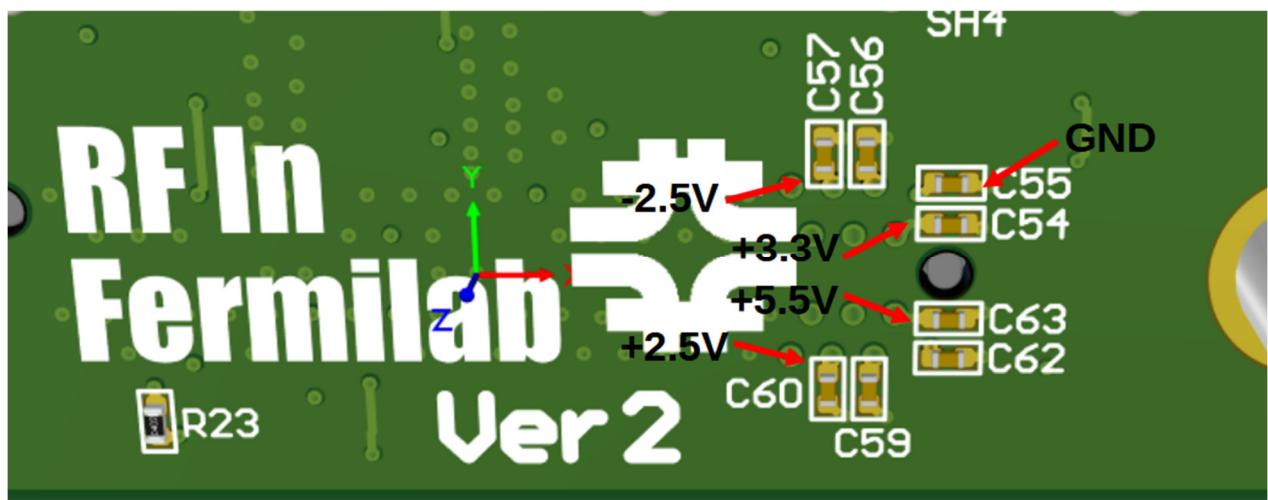


Figure 11 - RF In Board to Board Voltage Test Points

2. Check for shorts between power supply jumper and GND on Chan 0 and Chan 1

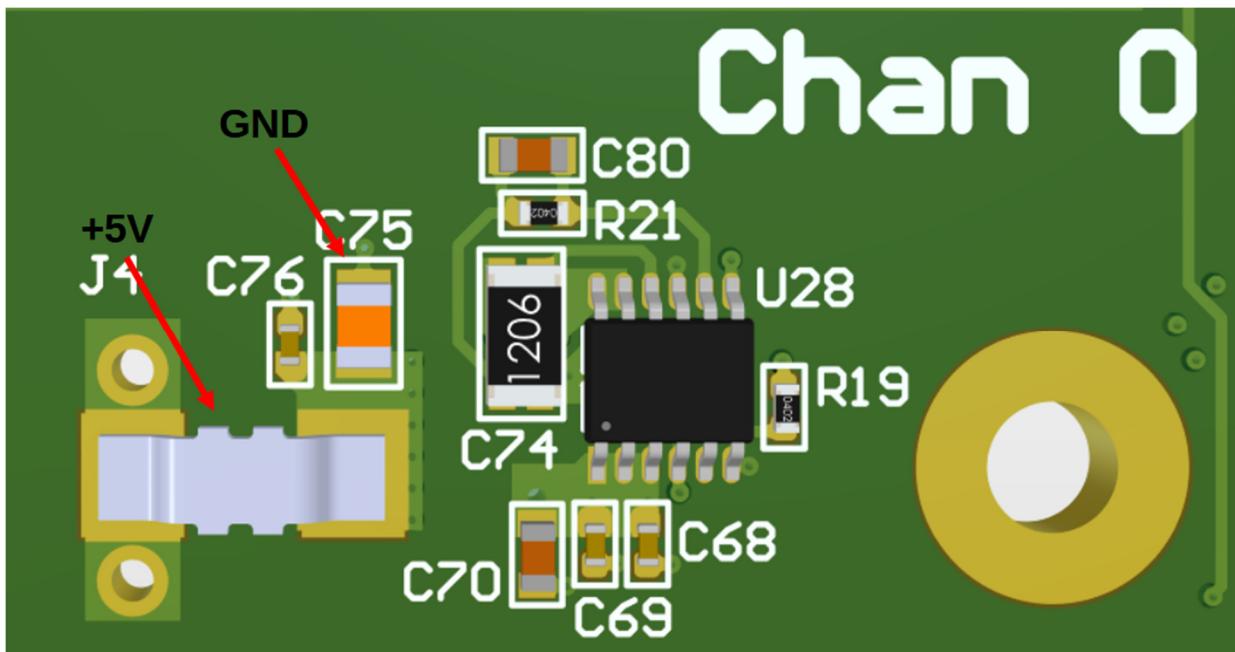


Figure 12 - RF In Chan 0

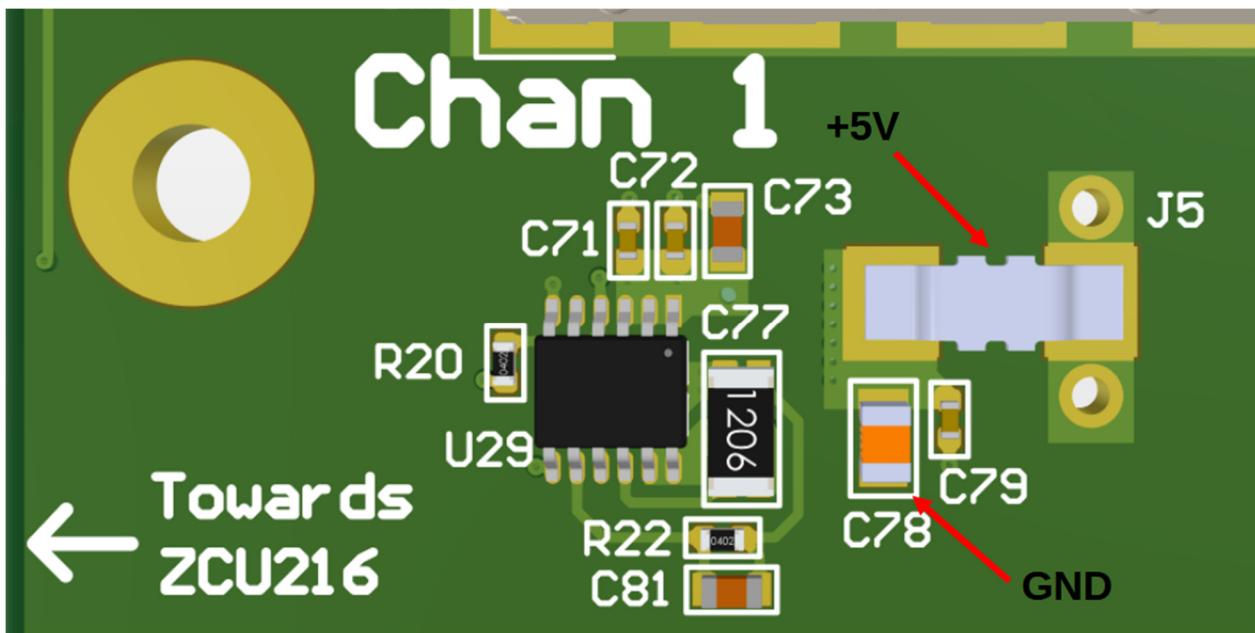


Figure 13 - RF In Chan 1

3. Power down ZCU126/RF Main Board if energized.
4. Install RF In Board.
5. Power up ZCU216/RF Main Board
6. Check for correct voltages as shown in previous RF In figures

RF Out Board Initial Power Up



Figure 14 - RF Out Board

1. Check for shorts between the power supply capacitor pins and GND.

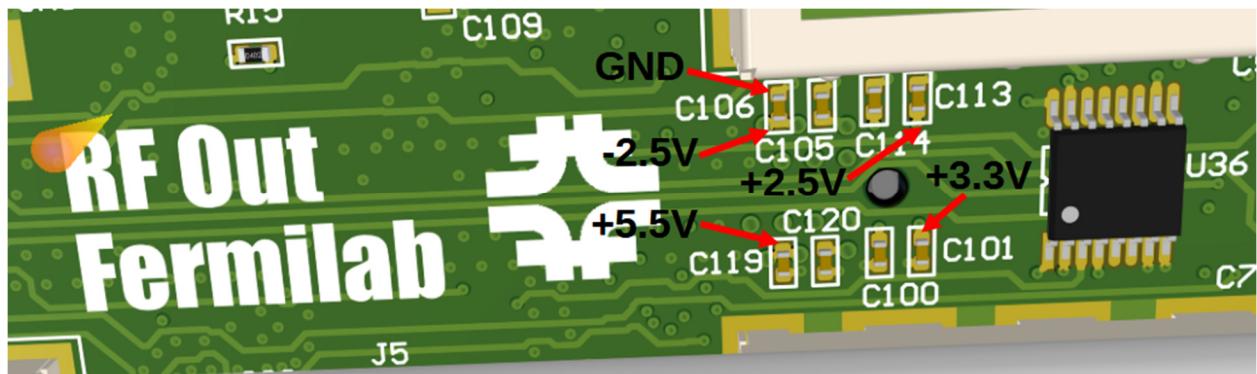


Figure 15 - RF Out Board to Board Voltage Test Points

2. Check for shorts between power supply jumper and GND on Chan 0 and Chan 1

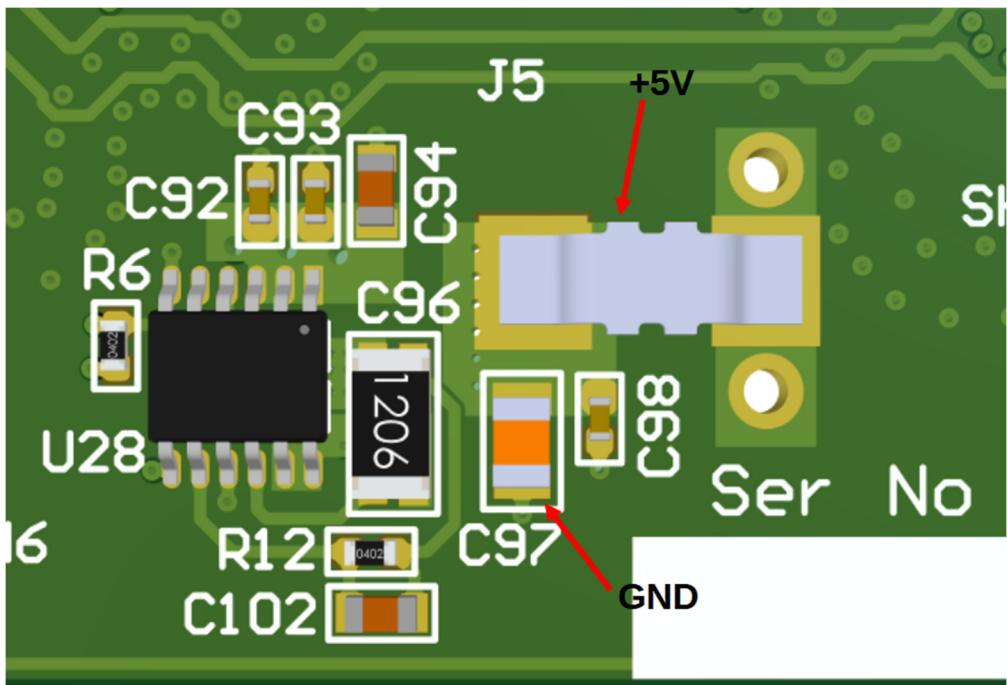


Figure 16 - RF Out Chan 0

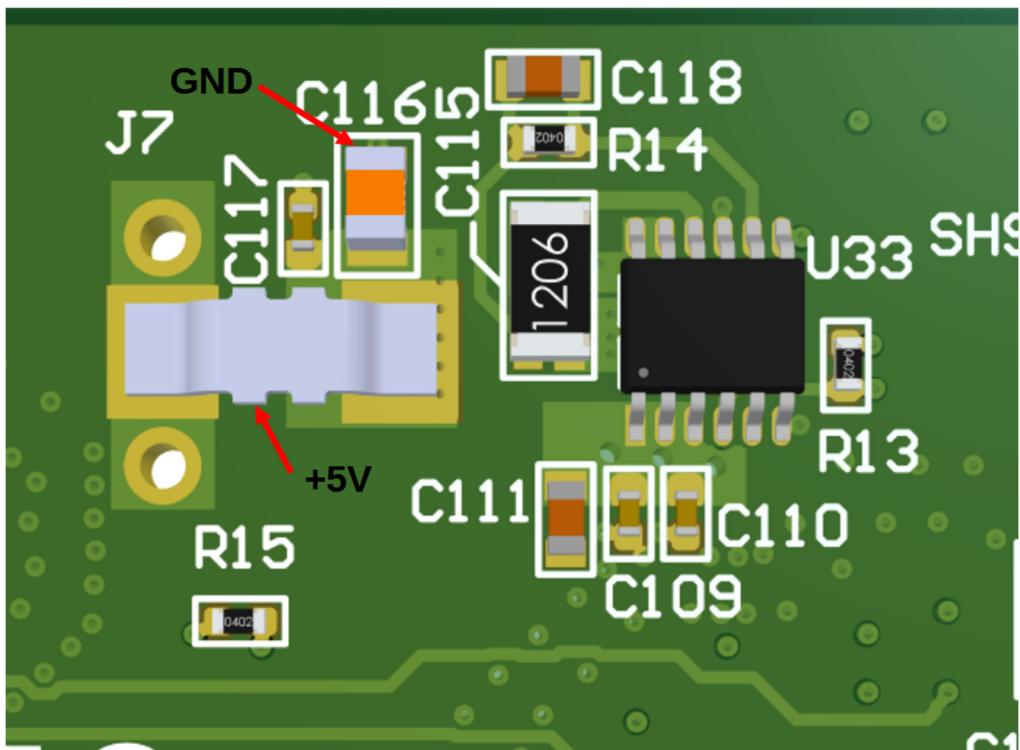


Figure 17 - RF Out Chan 1

3. Power down ZCU126/RF Main Board if energized.
4. Install RF Out Board.
5. Power up ZCU216/RF Main Board
6. Check for correct voltages as shown in previous RF Out figures

DC In Board Initial Power Up

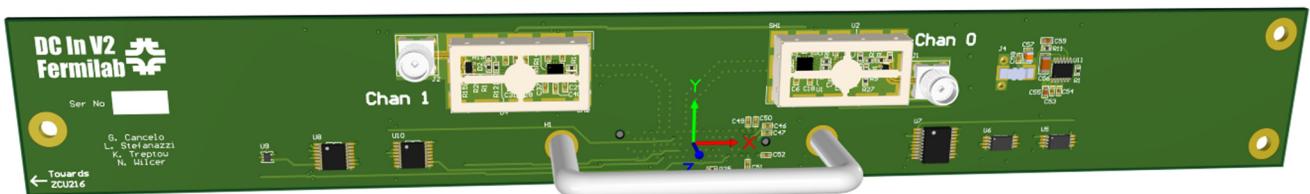


Figure 18 - DC In Board

1. Check for shorts between the power supply capacitor pins and GND.

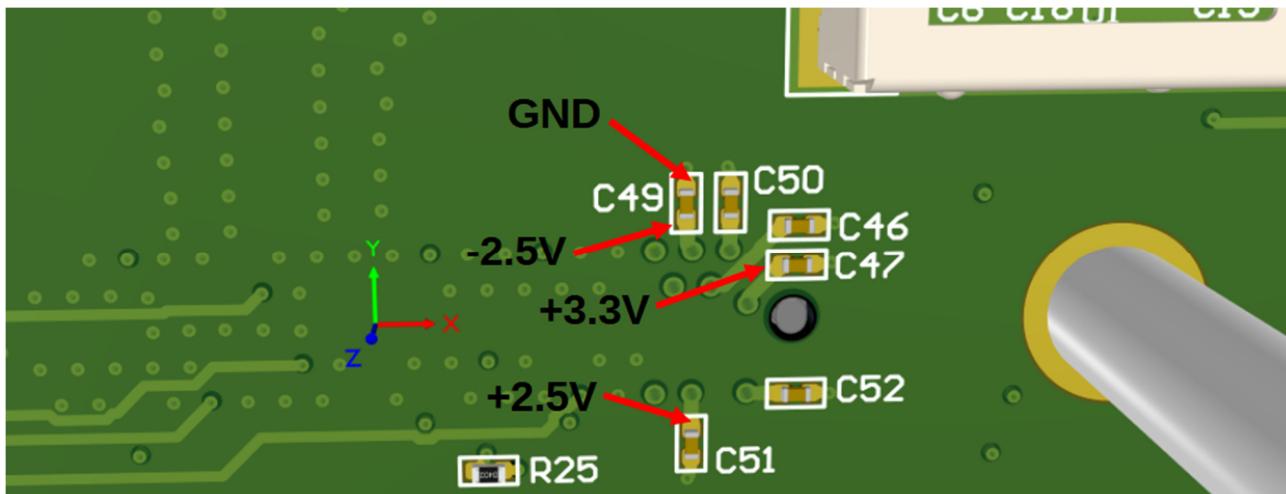


Figure 19 - DC In Board to Board Voltage Test Points

2. Check for shorts between +0.7V power supply jumper and GND

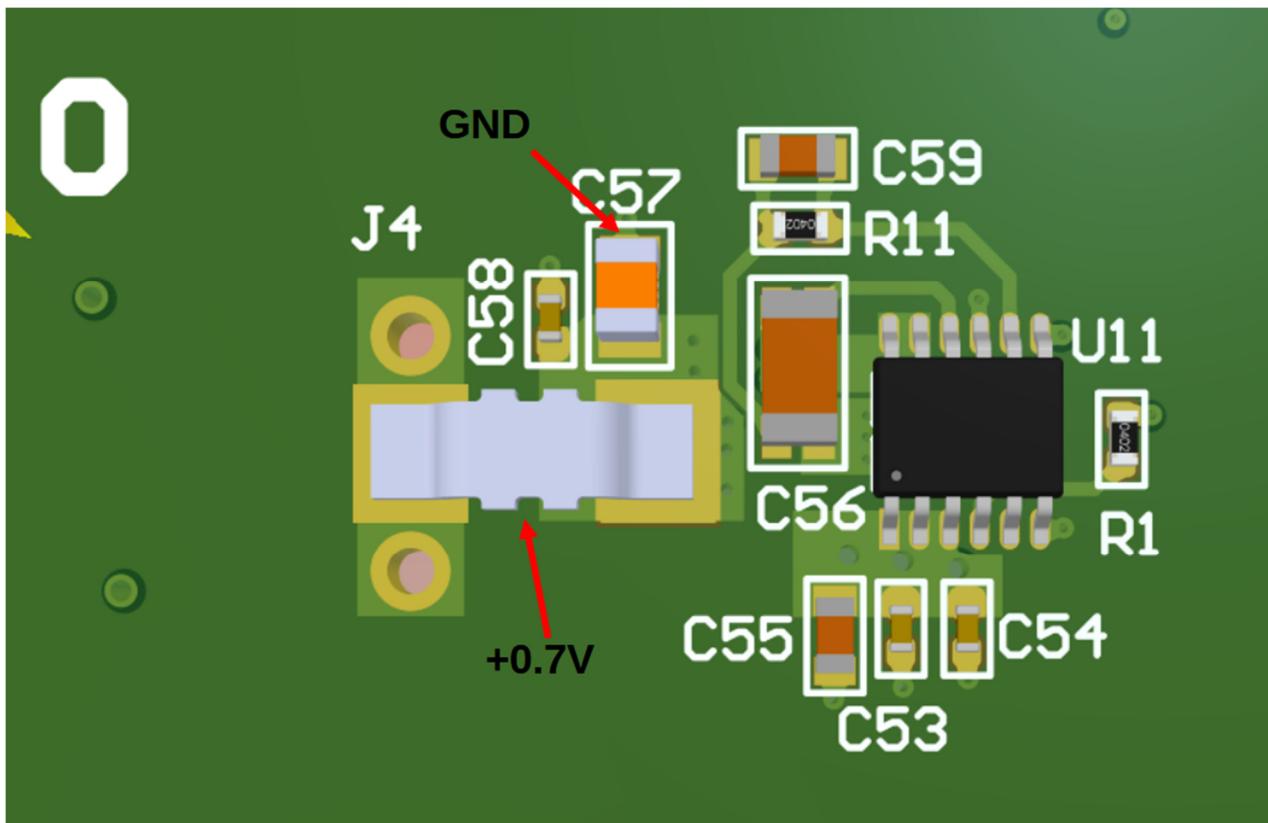


Figure 20 - DC In 0.7V Test Point

3. Power down ZCU126/RF Main Board if energized.
4. Install DC In Board.
5. Power up ZCU216/RF Main Board
6. Check for correct voltages as shown in previous DC In figures

DC Out Board Initial Power Up

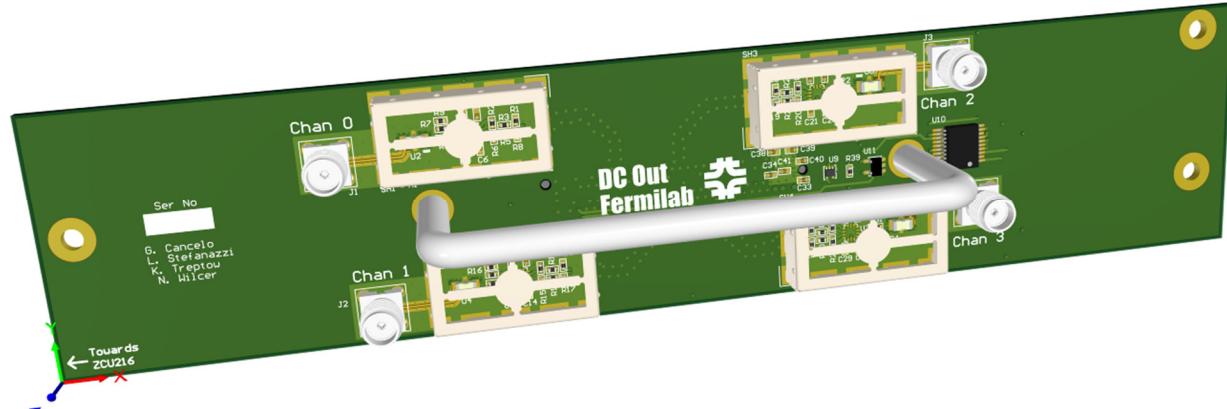


Figure 21 - DC Out Board

1. Check for shorts between the power supply capacitor pins and GND.

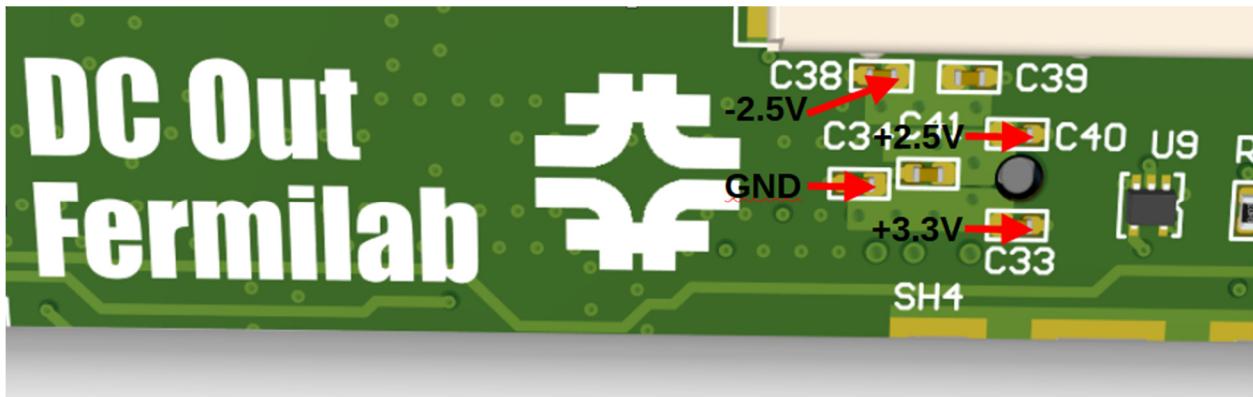


Figure 22 - DC Out Board to Board Voltage Test Points

2. Power down ZCU126/RF Main Board if energized.
3. Install DC Out Board.
4. Power up ZCU216/RF Main Board
5. Check for correct voltages as shown in previous DC Out figure

Balun In Board Initial Power Up

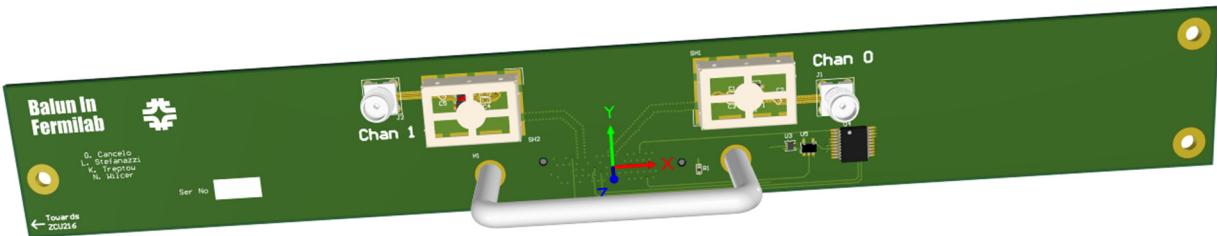


Figure 23 - Balun In Board

1. Check for shorts between the U5 pin 5 and U5 pin 3.

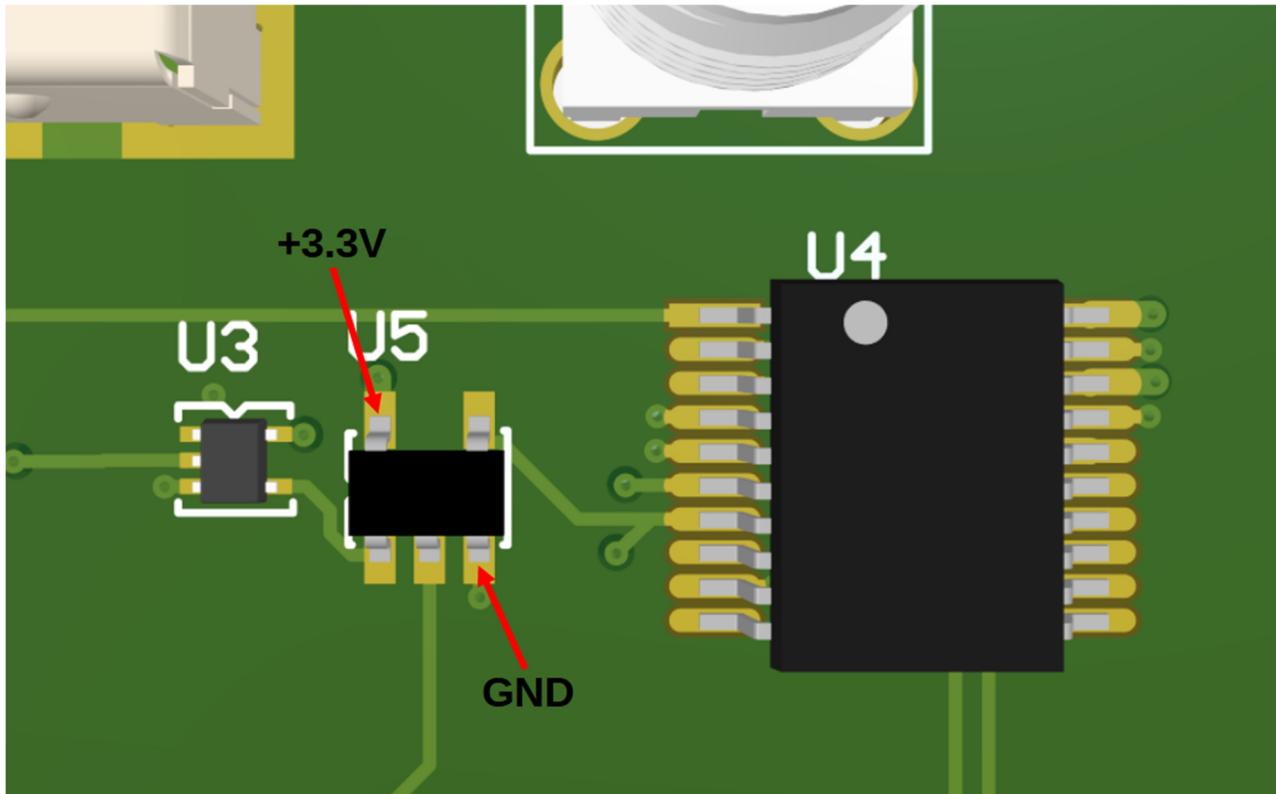


Figure 24 - Balun In Board to Board Voltage Test Points

2. Power down ZCU126/RF Main Board if energized.
3. Install Balun In Board.
4. Power up ZCU216/RF Main Board
5. Check for correct voltage as shown in previous Balun In figure

Balun Out Board Initial Power Up

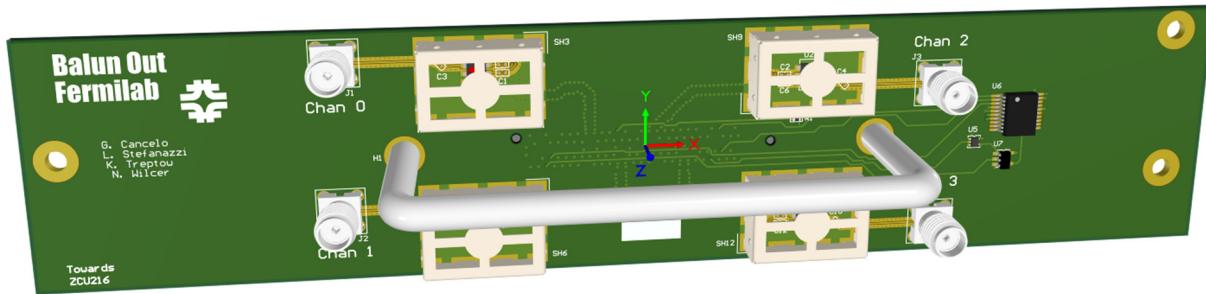


Figure 25 - Balun Out Board

1. Check for shorts between the U7 pin 5 and U7 pin 3.

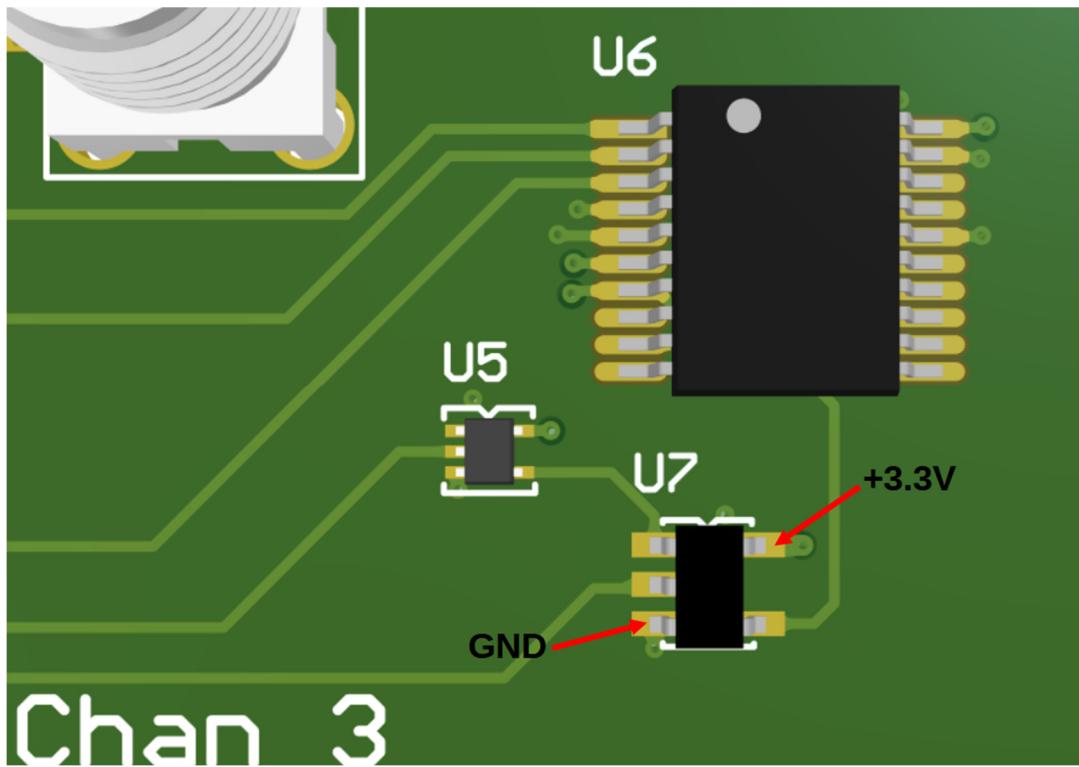


Figure 26 - Balun Out Board to Board Voltage Test Points

2. Power down ZCU126/RF Main Board if energized.
3. Install Balun Out Board.
4. Power up ZCU216/RF Main Board
5. Check for correct voltage as shown in previous Balun Out figure

RF Board Testing

1. Power down and install RF Out and RF In boards and loop-back cables.
2. Power up ZCU216/RF216 Main Board and make sure the ZCU216 boots up.
3. Run the RF loop-back test in the 'test_RFQickSoc216V1.ipynb' notebook.

DC Board Testing

1. Power down and install the DC Out and optionally the DC In if available and cables.
2. Power up ZCU216/RF216 Main Board and make sure the ZCU216 boots up.
3. Connect a Scope to the output you are testing if the DC In board is not available.
4. Run the RF DC board test in the 'test_RFQickSoc216V1.ipynb' notebook.

