

LTC5586

6GHz High Linearity I/Q Demodulator with Wideband IF Amplifier

DESCRIPTION

Demonstration circuit 2349A showcases the [LTC®5586](#) wideband high linearity IQ demodulator with IF amplifier. The Linear Technology USB serial controller, DC590B, is required to control and configure LTC5586 for its evaluation.

Demo circuit 2349A's two switchable single-ended RF inputs are optimized for 700MHz to 6GHz. Its single-ended LO input is programmable for 300MHz to 6GHz operation via SPI bus. The demo circuit includes discrete L-C inter-stage lowpass filters between the demodulator outputs and the IF amplifier inputs, which limits the

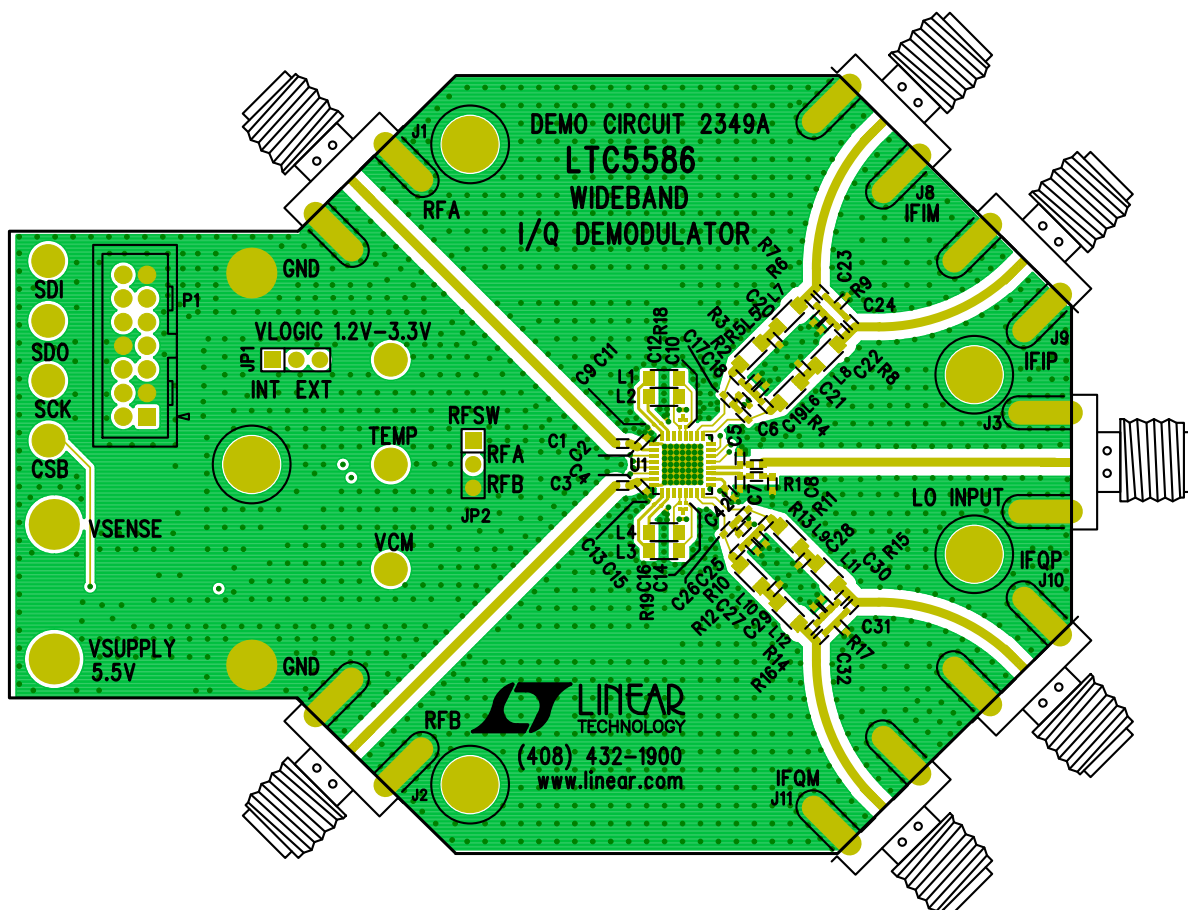
DC-coupled differential I and Q outputs to about 500MHz (−1dB bandwidth).

By writing to specific registers through SPI bus, LTC5586's RF input step attenuator, IF amplifier gain, LO input frequency, output DC offset, image rejection, and linearity can be adjusted or optimized.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2349A>

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BOARD PHOTO



QUICK START PROCEDURE

NOTE 1. Evaluation of demonstration circuit 2349A requires the Linear Technology USB serial controller, DC590B, and the Linear Technology QuikEval™ software. Please refer to DC590B demo manual for their setup and installation.

NOTE 2. An internet connection is required for the automatic download and installation of the LTC5586 software GUI. If an internet connection is not available, contact Linear Technology for installation files

NOTE 3. Refer to Figure 1 for proper equipment setup.

NOTE 4. Make all connections without RF and DC applied.

NOTE 5. Care should be taken to never exceed absolute maximum input ratings.

1. If not already done, install the QuikEval software and connect the DC590B USB serial controller to an internet-connected computer's USB port.
2. Set the DC590B's isolated supply voltage to 3.3V by moving its VCCIO jumper (JP6) to 3.3V position.
3. Verify that the DC2349A's jumpers are set to:
JP1 = INT (on-board 3.3V digital supply)
JP2 = RFA (RFA input selected)
4. While the RF sources and the DC power supplies are switched off, connect all test equipment as shown in Figure 1.
5. When the DC2349A demo board is connected to the DC590B USB serial controller, the QuikEval software will automatically download and install the proper software GUI.
6. While monitoring the voltage on VSENSE, increase the VSUPPLY DC power supply voltage until VSENSE reaches 5V (VSUPPLY voltage should be approximately 5.5V). Verify the current consumption is close to the figure listed in the data sheet.
7. Increase the IF amplifier common-mode output voltage, VCM, to 0.9V.
8. In the LTC5586 QuikEval computer GUI, verify that "Connected" is displayed, then press the "Soft Reset" button. See Figure 2.
9. Set the desired LO frequency and LO power, and turn on the LO signal source.
10. Use the LTC5586 QuikEval GUI to configure the LTC5586 to the same LO frequency.
11. Set the desired RF frequency and RF power, and turn on the RF source.
12. Perform measurements.
13. The LTC5586 QuikEval GUI can be used to control and configure various functions of the LTC5586. Press the button "Show Regs" will make the LTC5586's internal register visible and accessible on screen. See Figure 3.

QUICK START PROCEDURE

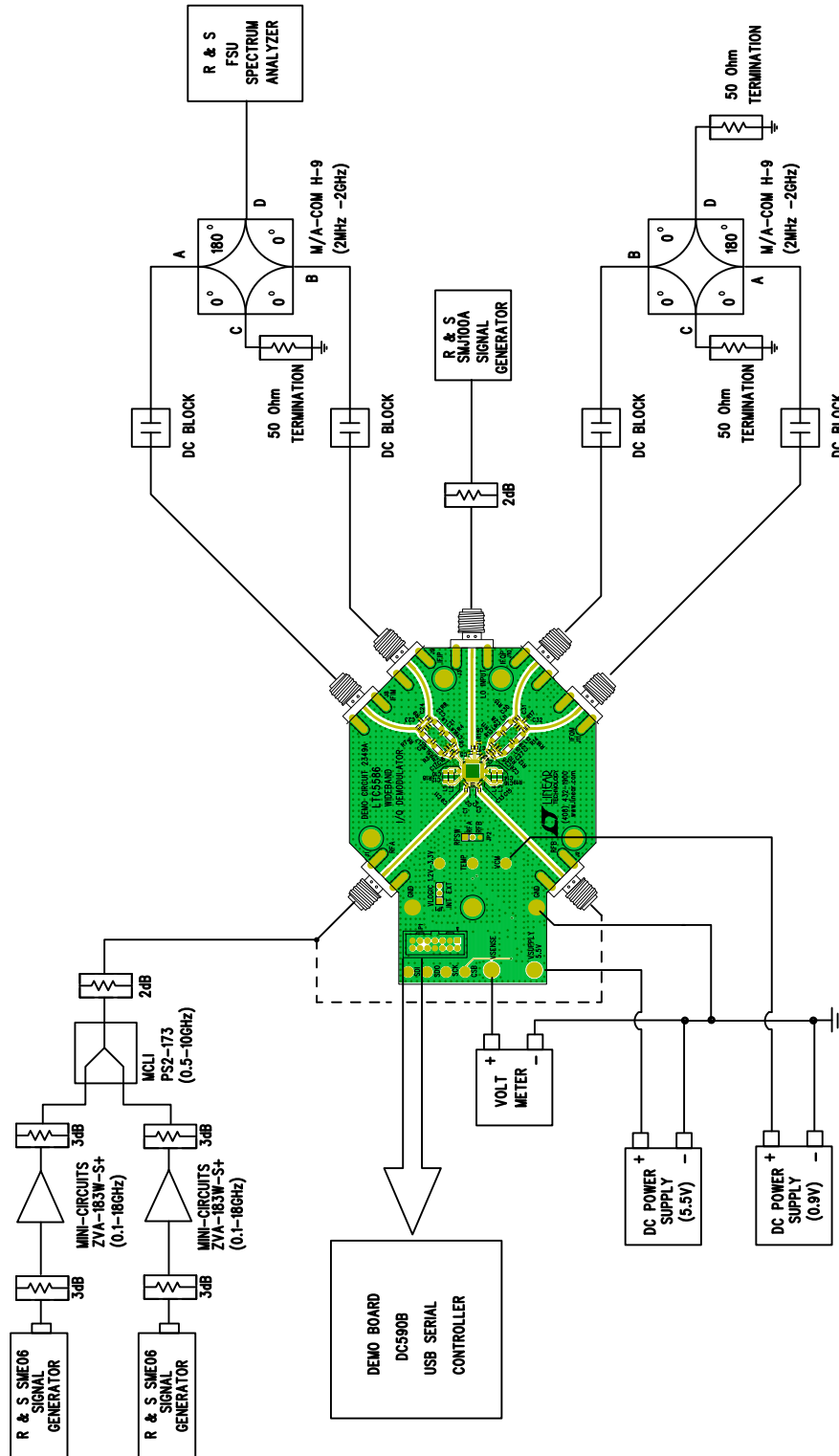


Figure 2. Proper Measurement Equipment Setup

QUICK START PROCEDURE

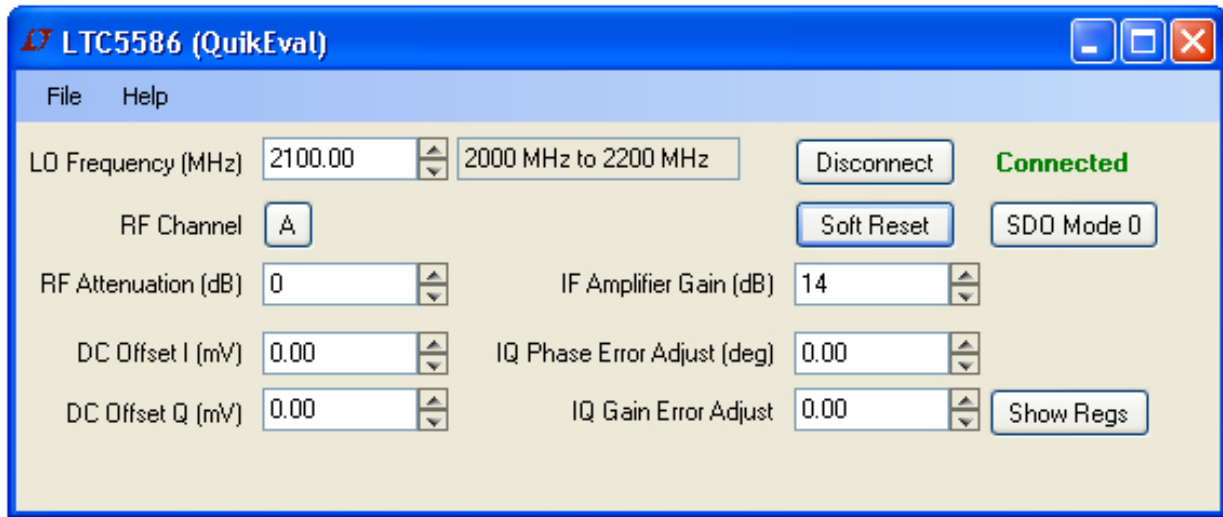


Figure 2. LTC5586 QuikEval GUI

QUICK START PROCEDURE

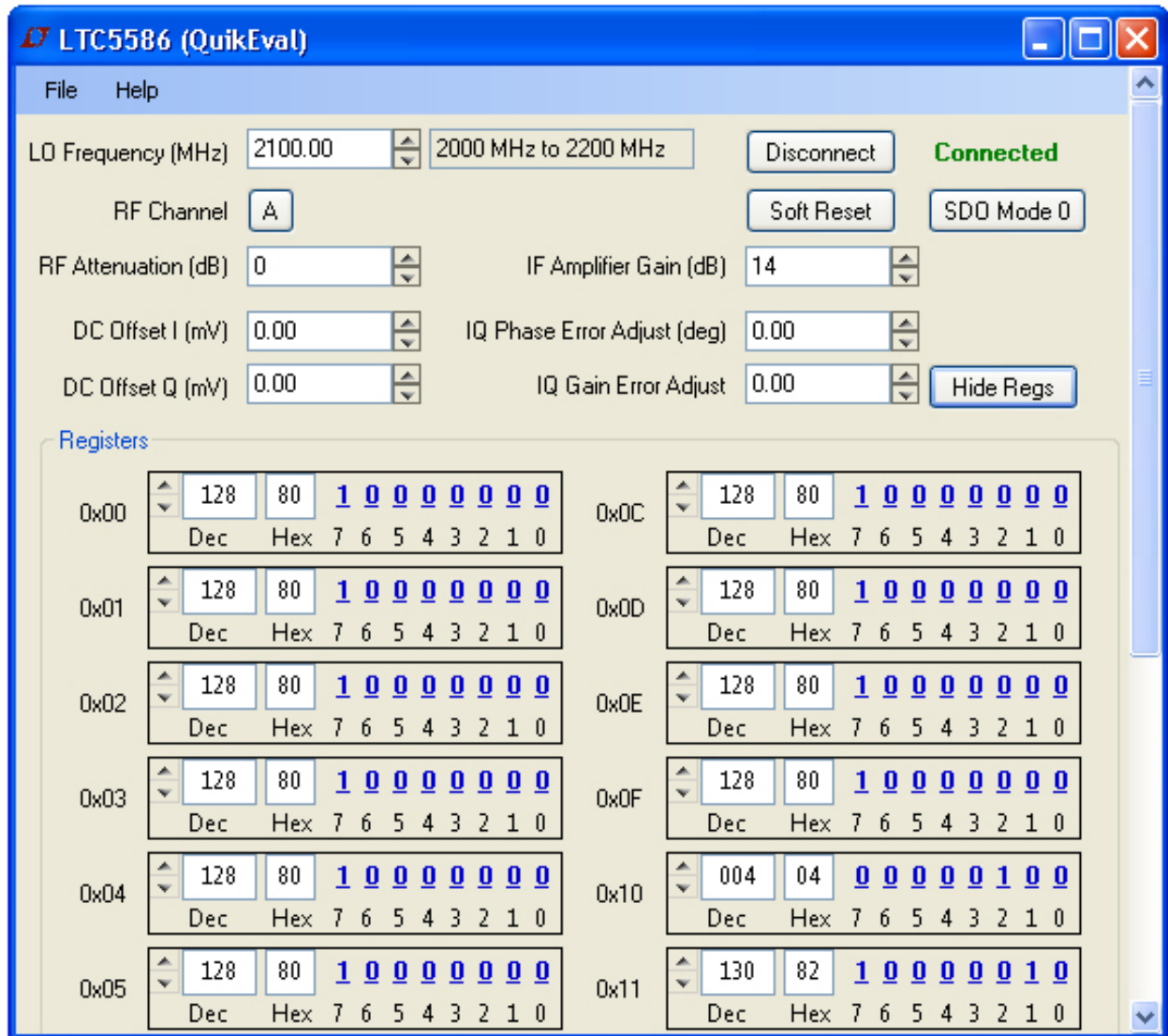
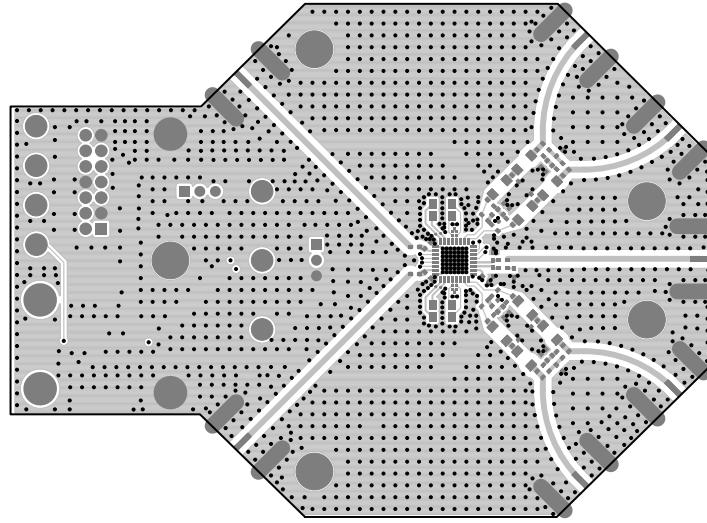
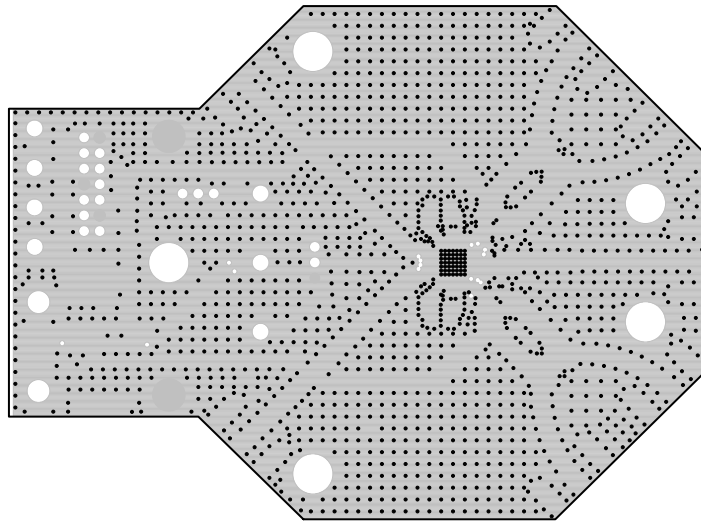


Figure 3. LTC5586 QuikEval GUI Showing Internal Registers

PCB LAYOUT

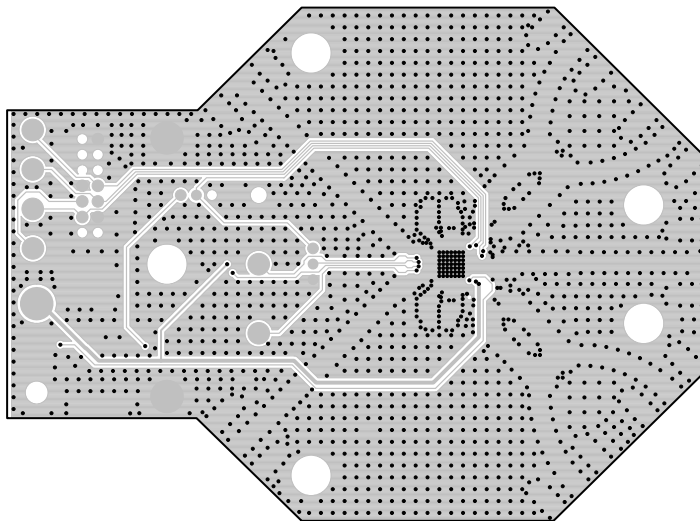


LAYER 1 - TOP LAYER
LINEAR TECHNOLOGY
WIDEBAND IQ DEMODULATOR
DC2349A-3-LTC5586
DATE: 05-06-2016

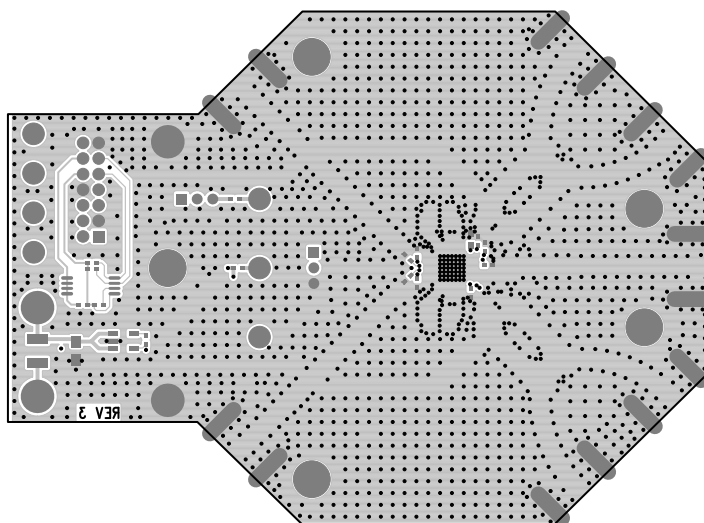


LAYER 2
LINEAR TECHNOLOGY
WIDEBAND IQ DEMODULATOR
DC2349A-3-LTC5586
DATE: 05-06-2016

PCB LAYOUT



LAYER 3
LINEAR TECHNOLOGY
WIDEBAND IQ DEMODULATOR
DC2349A-3-LTC5586
DATE: 05-06-2016



LAYER 4 - BOTTOM LAYER
LINEAR TECHNOLOGY
WIDEBAND IQ DEMODULATOR
DC2349A-3-LTC5586
DATE: 05-06-2016

DEMO MANUAL DC2349A

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Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

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