

LTC5594 300MHz to 9GHz High Linearity I/Q Demodulator with Wideband IF Amplifier

DESCRIPTION

Demonstration circuit 2645A showcases the **LTC®5594** 300MHz to 9GHz high linearity I/Q demodulator with wideband IF amplifiers. The USB serial controller, DC590B, is required to control and configure LTC5594 for its evaluation.

The DC2645A's single-ended RF input is optimized for 500MHz to 9GHz and can be easily modified for lower frequency evaluations down to 300MHz. Its single-ended LO input is programmable for 300MHz to 9GHz operation via SPI bus. The demo circuit includes discrete L-C interstage lowpass filters between the demodulator outputs

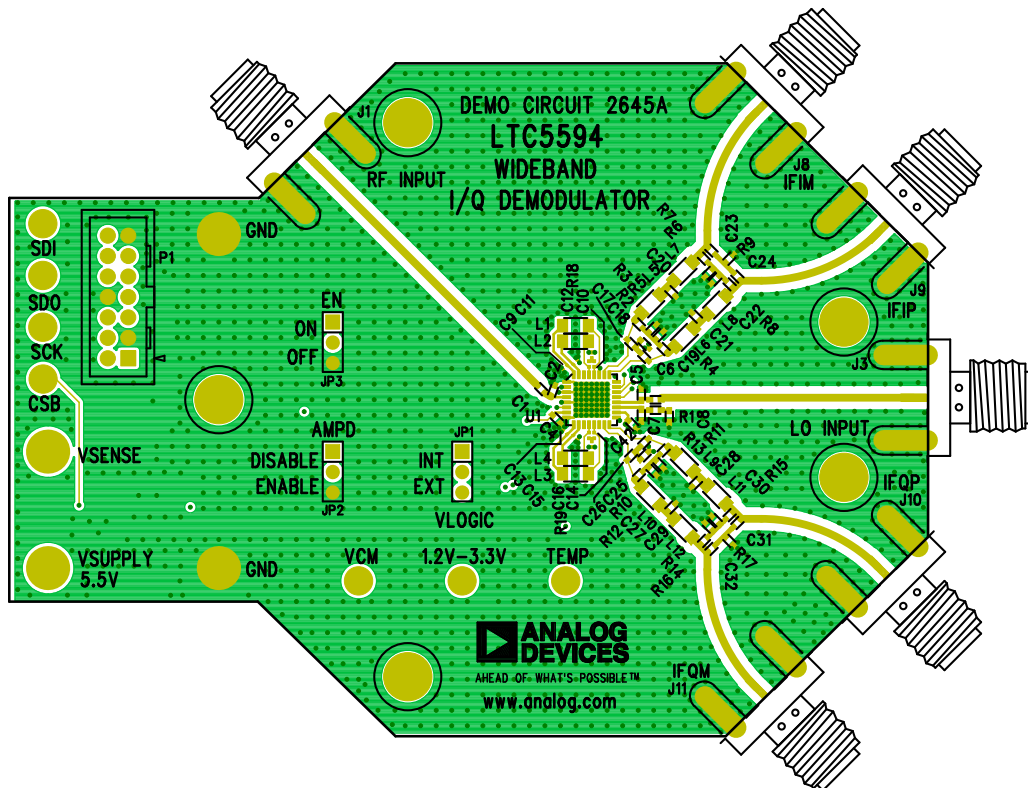
and the IF amplifier inputs, which limits the DC-coupled differential I and Q outputs to about 1GHz. (The LTC5594 data sheet lists filter component values for other cutoff frequencies.)

By writing to specific registers through SPI bus, LTC5594's 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/DC2645A>

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BOARD PHOTO



QUICK START PROCEDURE

NOTE 1: Evaluation of demonstration circuit 2645A requires DC590B USB serial controller and QuikEval™ software. Please refer to DC590B demo manual for their setup and installation.

NOTE 2: An internet connection is required for automatic download and installation of the LTC5594 software GUI. If an internet connection is not available, contact technical support 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 DC590B's isolated supply voltage to 3.3V by moving its VCCIO jumper (JP6) to 3.3V position.
3. Verify that the DC2645A's jumpers are set to:
 - JP1 (VLOGIC) = INT (onboard 3.3V digital supply)
 - JP2 (AMPD) = ENABLE (enable IF amplifiers)
 - JP3 (EN) = ON (turn on LTC5594 IC)
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 DC2645A 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 LTC5594 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 LTC5594 QuikEval GUI to configure the LTC5594 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 LTC5594 QuikEval GUI can be used to control and configure various functions of the LTC5594. Press the button "Show Regs" will make the LTC5594's internal register visible and accessible on screen. See Figure 3.

QUICK START PROCEDURE

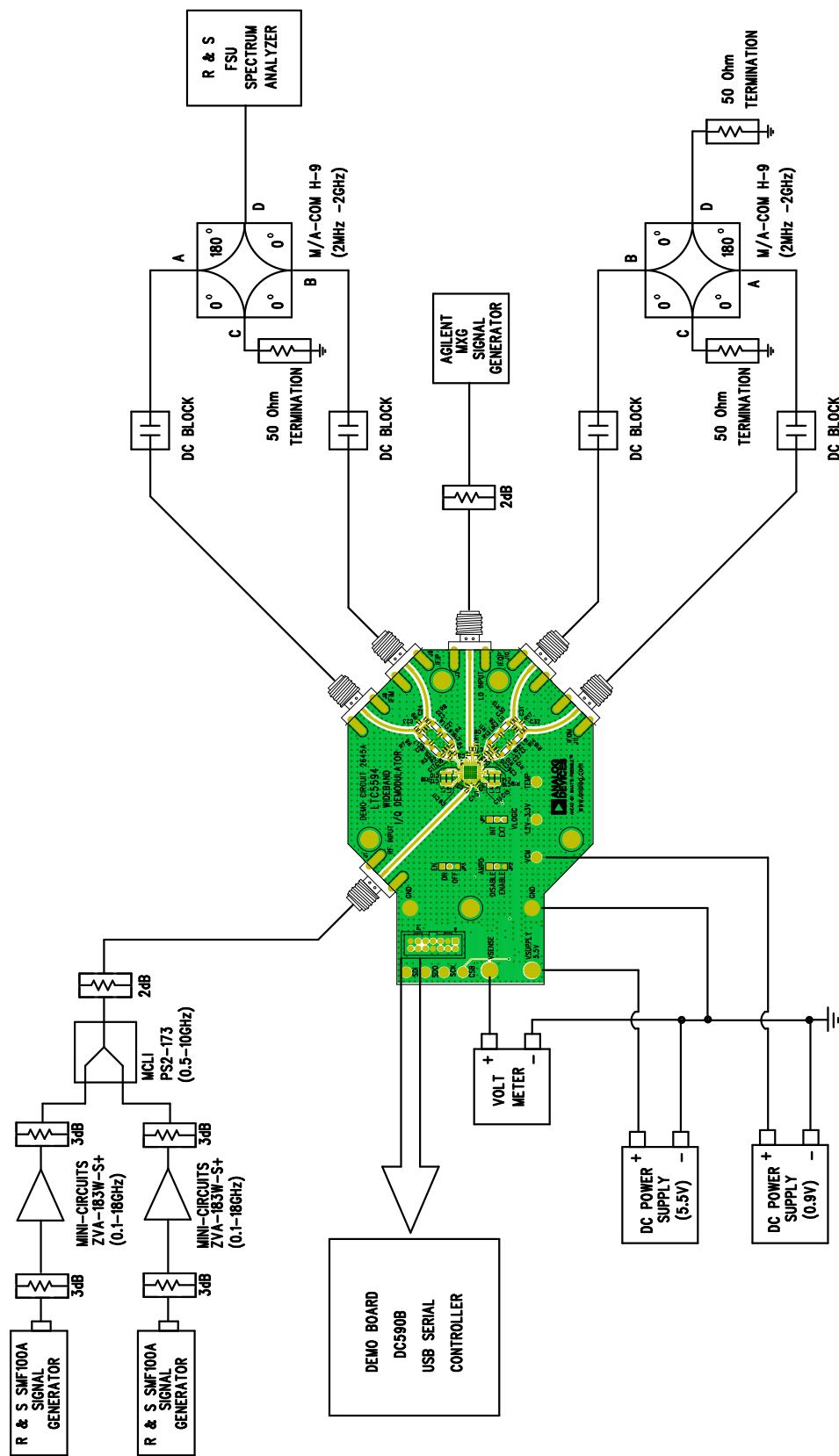


Figure 1. Proper Equipment Setup

QUICK START PROCEDURE

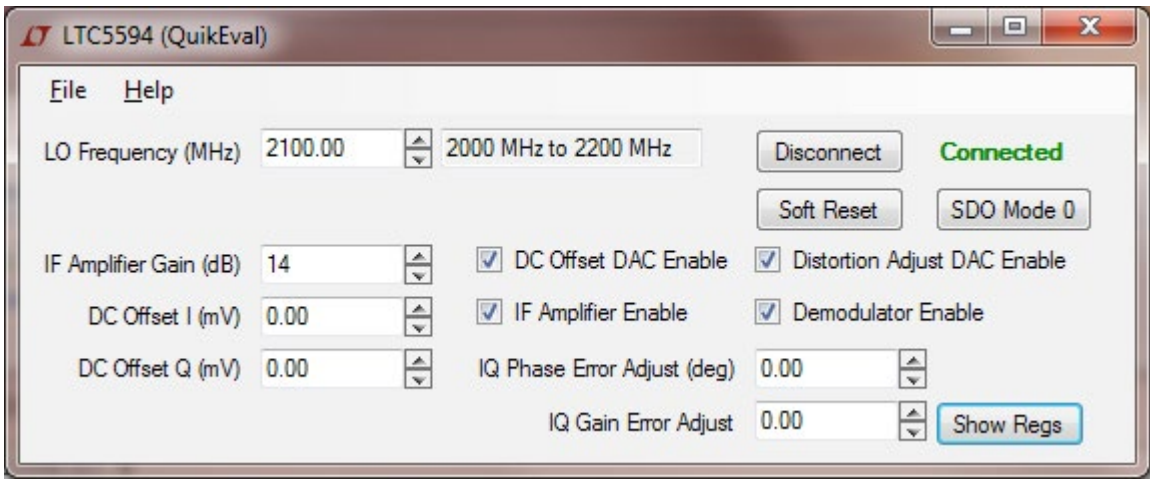


Figure 2. LTC5594 QuikEval GUI

QUICK START PROCEDURE

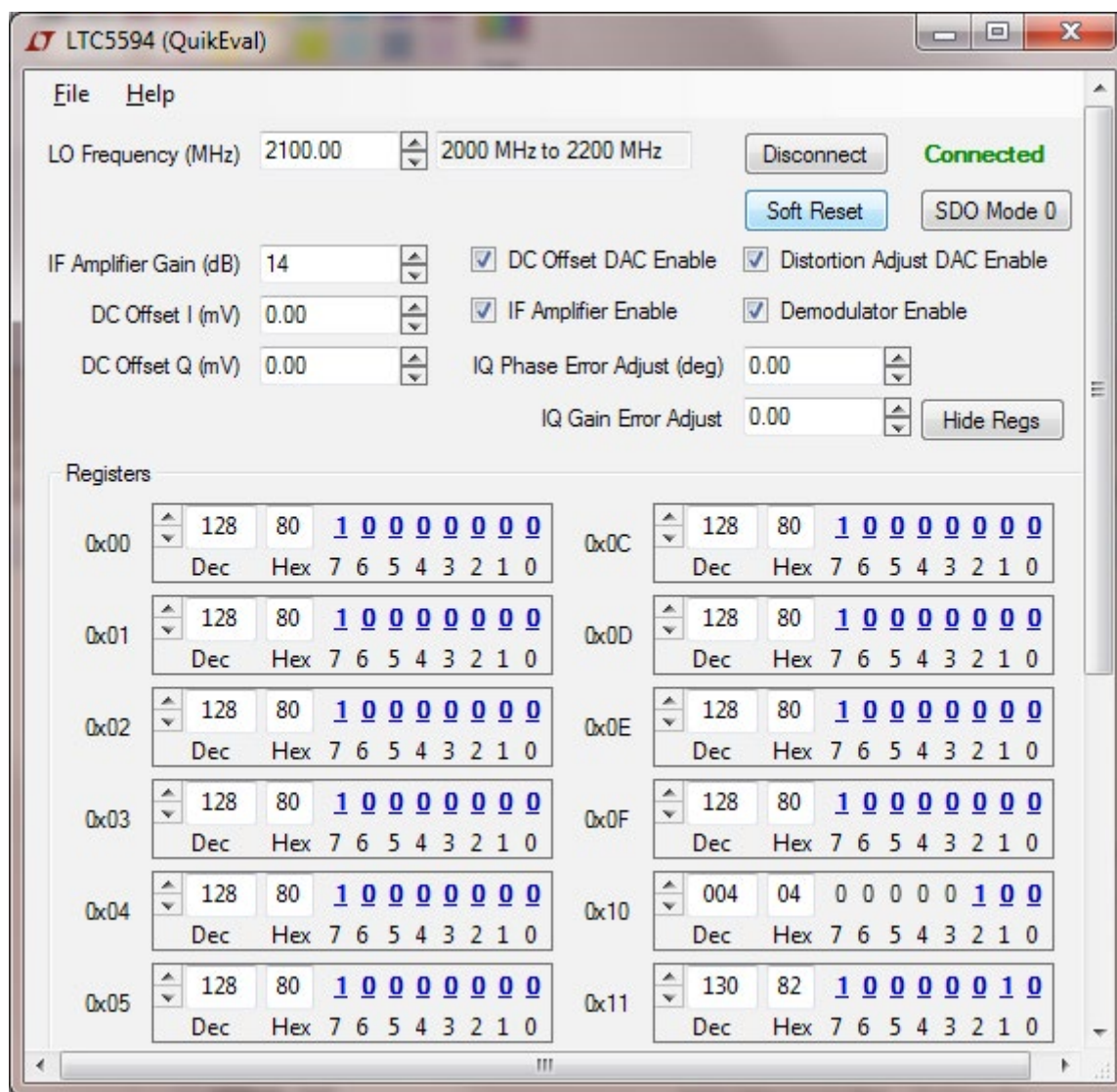


Figure 3. LTC5594 QuikEval GUI Showing Internal Registers

DEMO MANUAL DC2645A



ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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