**DESCRIPTION**

Demonstration circuit 2310A is optimized for evaluation of the LTC5549 passive double-balanced mixer with integrated LO frequency doubler. Its RF port is matched to 50Ω from 2GHz to 13.6GHz with 9dB return loss, and the LO port is matched to 50Ω from 1GHz to 12GHz with 10dB return loss. The IF output is matched to 50Ω from 700MHz to 6GHz with 10dB return loss. The LTC5549 can be used for upconverting and downconverting applications.

The internal LO doubler can be enabled to allow operation with a lower frequency LO input signal such as that from the LTC6945/LTC6946 or LTC6947/LTC6948 family of frequency synthesizers.

Design files for this circuit board are available at [http://www.linear.com/demo/DC2310A](http://www.linear.com/demo/DC2310A)

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**ABSOLUTE MAXIMUM INPUT RATINGS**

Supply Voltage (VCC) .................................................. 4V
Enable Input Voltage (EN) .............. –0.3V to VCC + 0.3V
LO Input Power (1GHz to 12GHz) .............. +10dBm
LO Input DC Voltage ........................................... ±0.1V
RF Input Power (2GHz to 14GHz) .............. +20dBm
RF Input DC Voltage ........................................... ±0.1V
IF Input Power (0.5GHz to 6GHz) .............. +20dBm
IF Input DC Voltage ........................................... ±0.1V
Operating Temperature Range (Tc) ........... –40°C to 105°C
Junction Temperature (Tj) ......................... 150 °C
Storage Temperature Range ................. –65°C to 150°C

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**BOARD LAYOUT**

![Figure 1. DC2310A](http://www.linear.com/demo/DC2310A)

CAUTION: This part is sensitive to electrostatic discharge (ESD). Observe proper ESD precautions when handling the LTC5549.
PROPER TEST SETUPS

Figure 2. Test Setup for Downconverting Mixer 2-Tone Measurements

Figure 3. Test Setup for Upconverting Mixer 2-Tone Measurements
NOTES ON TEST EQUIPMENT AND SETUP

- High performance signal generators with low harmonic outputs should be used for 2-tone measurements. Otherwise, low pass filters at the signal generator outputs should be used to suppress harmonics.

- High quality combiners should be used to present a broadband 50Ω termination on all ports as well as provide good port-to-port isolation. Adding attenuator pads further improves source isolation and helps prevent the signal generators from producing intermodulation products.

- Spectrum analyzers can produce significant internal distortion products if they are overdriven. Generally, spectrum analyzers are designed to operate at their best with about –30dBm to –40dBm at their input. The spectrum analyzer’s input attenuation setting should be used to avoid saturating the instrument.

- Set the spectrum analyzer’s input attenuation depending on the spectrum analyzer used.

- Before performing measurements on the DUT, the system performance should be evaluated to ensure that a clean input signal is obtained and that the spectrum analyzer’s internal distortion is minimized.

QUICK START PROCEDURE

1. Connect all test equipment as shown in Figure 2.

2. Set the power supply output voltage to 3.3V, and set the current limit to 200mA.

3. Connect the ground and VCC turrets to the power supply. **BE SURE TO CONNECT THE VCC TURRET BEFORE THE EN TURRET TO ENSURE THAT THE PART DOES NOT GET DAMAGED. ALSO, REMOVE POWER FROM EN TURRET BEFORE REMOVING POWER FROM THE VCC TURRET.**

4. Connect the EN turret to the power supply.

5. Set the LO signal generator to provide a 3910MHz CW signal at about 0dBm to the demo board’s LO port.

6. Set the RF signal generators to provide one 5799MHz CW signal and one 5801MHz CW signal. The signals should be applied to the 2-way combiner. The output of the combiner should be applied to the demo board’s RF input port. The two tones should be set to –5dBm each at the mixer’s RF input port.

7. Set the spectrum analyzer’s center frequency to 1890GHz.

8. Perform various measurements (Conversion Gain, OIP3, LO leakage, etc.)
## PARTS LIST

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<th>ITEM</th>
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</table>
Figure 4. DC2310A Schematic
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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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