DEMO CIRCUIT DC1513
QUICK START GUIDE

LTM9004 14 Bit Direct Conversion Receiver Subsystem

DESCRIPTION

Demonstration circuit DC1513 is an evaluation board featuring Linear Technology Corporation's LTM9004 14-Bit Direct Conversion Receiver Subsystem. DC1513 demonstrates good circuit layout techniques and recommended external circuitry for optimal system performance.

DC1513 comes with Linear Technology's 14-bit LTM9004 receiver subsystem installed. The board includes output CMOS buffers. DC1513 plugs into the DC890 Data Acquisition demo board and the output can be easily analyzed with Linear Technology's PScope data processing software, which is available for no charge on our website at http://www.linear.com.

Design files for this circuit board are available. Call the LTC factory.

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QUICK START PROCEDURE

Validating the performance of the LTM9004 is simple with DC1513, and requires only two input sources, a clock source, a computer, and a lab power supply. Refer to Figure 1 for proper board evaluation equipment setup and follow the procedure below:

1. Connect the power supply as shown in Figure 1. There are on-board low-noise voltage regulators that provide the two supply voltages for the DC1513. The entire board and all components share a common ground. The power supply should still be a low-noise lab power supply capable of supplying at least 0.5 Amp @ 5.0VDC, and 1 Amp @ 3.0VDC.

2. Provide an encode clock to the ADC via SMA connector J7. Use a low-phase-noise clock source such as a filtered RF signal generator or a high-quality clock oscillator.

   NOTE. Similar to having a noisy input, a high-jitter (phase noise) encode clock will degrade the signal-to-noise ratio (SNR) of the system.

Table 1: DC1513 Connectors and Jumpers

REFERENCE	FUNCTION
J3 (SHDN)	Enables/disables the ADC. Default is ON.
J4 (MODE)	Output Format and Clock Duty Stabilizer pin. Default is VDD.
J5 (SHDN_AMP)	Enables/disables the Amplifers. Default is ON.
J6 (LO)	Board LO Signal Input. Impedance-matched to 50Ω for use with lab signal generators.
J7 (CLK)	Board Clock Input. Impedance-matched to 50Ω. Drive with a low-phase-noise clock oscillator or filtered sine wave signal source.
J8 (MIXER ENABLE)	Enables/disables the RF mixer. Default is ON.
J11 (RF)	Board RF Signal Input. Impedance-matched to 50Ω for use with lab signal generators.
TP1 (SENSE_I)	Reference input to adjust the full-scale range of the DC1513, I Channel. Default is VDD.
TP2 (GND)	DC ground.
TP4 (GND)	DC ground.
TP5 (+3V)	DC Supply input (3VDC).
TP7 (+5V)	DC Supply input (5VDC).
TP8 (GND)	DC ground.
TP12 (SENSE_Q)	Reference input to adjust the full-scale range of the DC1513, Q Channel. Default is VDD.

3. Apply an RF input signal to the board. For best results, use a low distortion, low noise signal

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generator with sufficient filtering to avoid degrading the performance of the receiver.

4. Apply an LO input signal to the board. Note that the difference in frequency between this signal and the RF signal will be the IF frequency resulting at the IF filter and ADC input.

5. Observe the ADC output with demo circuit DC890B, a USB cable, a Windows computer, and Linear Technology's PScope data processing software.

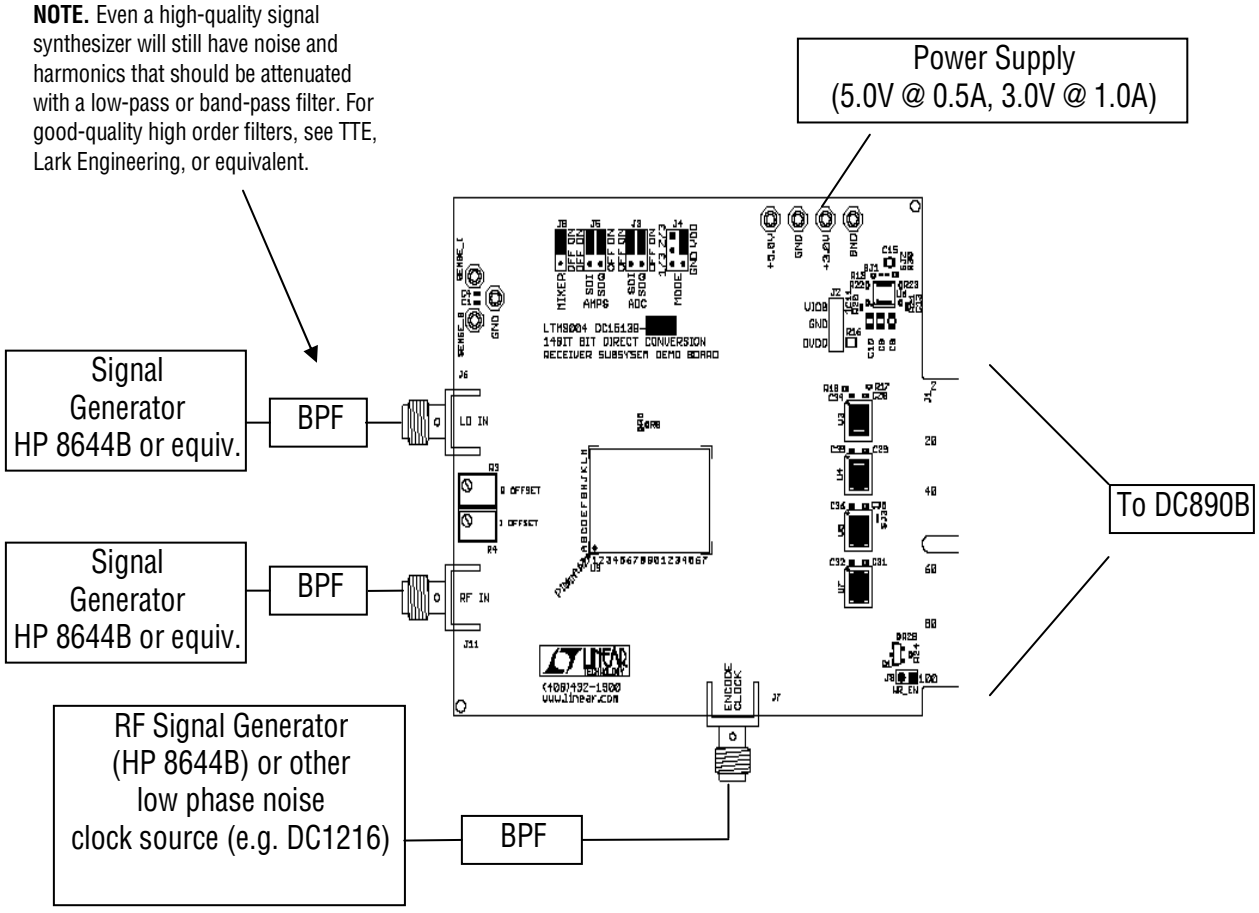

Figure 1. Proper Measurement Equipment Setup

OTHER BOARD CIRCUITRY

Device U1 is an EEPROM device that is used by the PScope software to identify the board and apply the correct settings for the data collection.

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USING PSCOPE SOFTWARE

PScope, downloadable from Linear Technology's website http://www.linear.com/, processes data from the DC890B FastDAACS board and displays FFT and signal analysis information on the computer screen.

The on-board EEPROM U1 should enable automatic board detection and auto-configuration of the software, but if the user wishes to change the settings, they can easily do so.

From the Configure menu in the toolbar, uncheck "Autodetect Device". The default settings for DC1513 are shown in Figure 2.

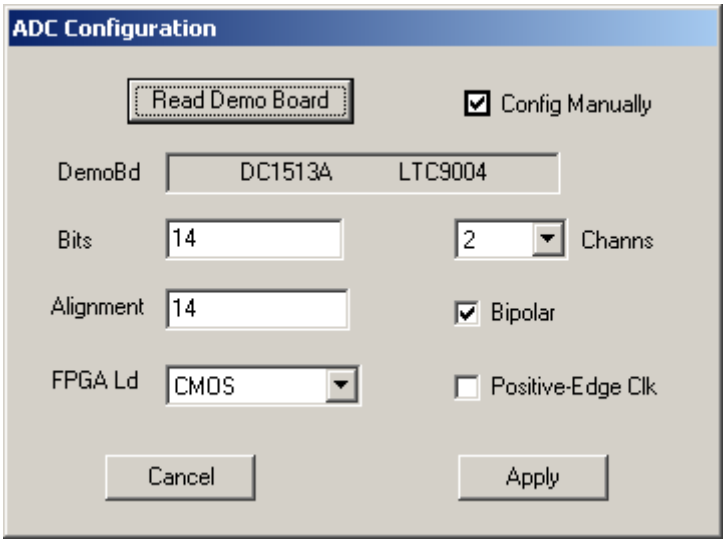

Figure 2. Entering the correct device information for your ADC. Select the correct parameters for the DC1513. Under normal conditions, PScope should automatically recognize the board and adjust the software settings accordingly.

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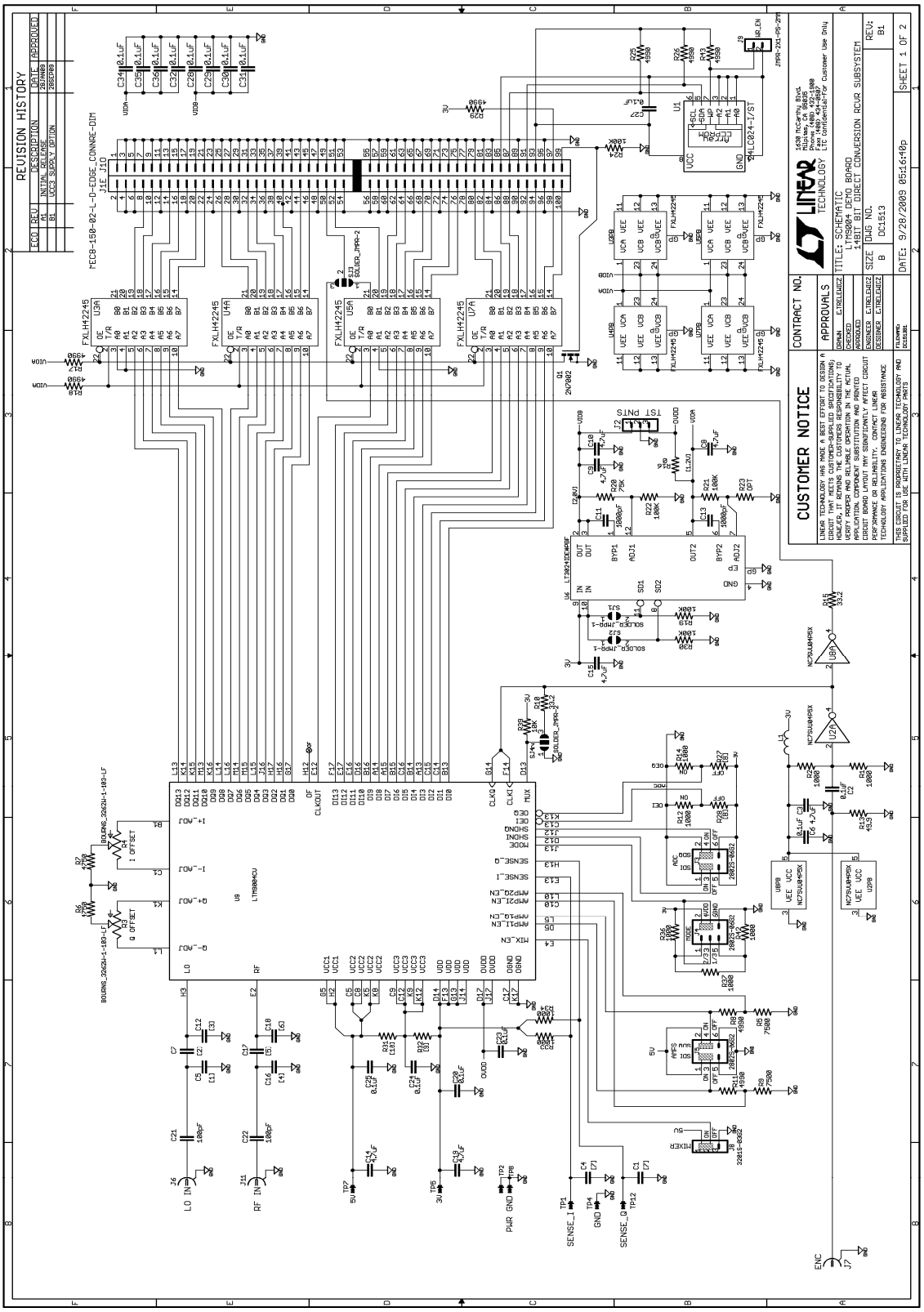

Figure 3. Schematic.

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