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1750 MHz Evaluation Board for the PLL Frequency Synthesizer

FEATURES

Self-contained board including synthesizer, VCO, and loop filter for generating frequencies of 1700 MHz to 1800 MHz
Designed for 20 kHz loop bandwidth
Accompanying software allows complete control of synthesizer functions from a PC
Battery operated: choice of 3 V or 5 V supplies
Typical phase noise performance of −86 dBc/Hz at 1 kHz offset

GENERAL DESCRIPTION

This board is designed to allow the user to evaluate the performance of the ADF4113 frequency synthesizer for phase locked loops (PLLs). The block diagram of the board is shown in Figure 1. It contains the ADF4113 synthesizer, a PC connector, an SMA connector for the reference input, power supplies, and an RF output. There is also a loop filter (20 kHz bandwidth) and a VCO on board. A cable is included with the board to connect to a PC printer port.

The package also contains Windows® software to allow easy programming of the synthesizer.

EVALUATION BOARD CONNECTION DIAGRAM

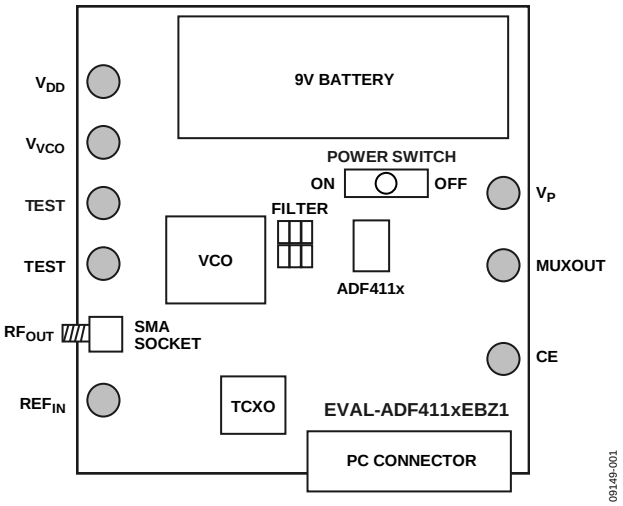

Figure 1.

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REVISION HISTORY

8/11—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

HARDWARE DESCRIPTION

The evaluation board is supplied with a cable for connecting to the printer port of a PC. The silkscreen and cable diagram for the evaluation board are shown in Figure 2 and Figure 3, respectively. The board schematic is shown in Figure 5 and Figure 6.

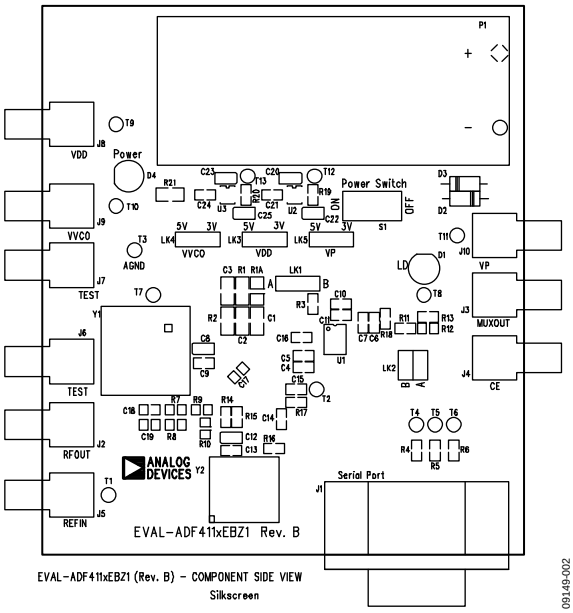

Figure 2. Evaluation Board Silkscreen

The board is powered from a single 9 V battery. The power supply circuitry allows the user to choose either 3 V or 5 V for the ADF4113 V_{DD} and V_P and for the VCO supply. The default settings are 3 V for the ADF4113 V_{DD} and 5 V for the ADF4113 V_P and the VCO supply. It is very important to note that the ADF4113 V_{DD} should never exceed the ADF4113 V_P. This can damage the device. All components necessary for LO generation are on board. The 10 MHz TCXO from Vectron provides the necessary reference input. The PLL is made up of the ADF4113, a passive loop filter (20 kHz bandwidth), and the VCO 190-1750 from Vari-L. The output is available at RF_{OUT} through a standard SMA connector. Users can use their own power supplies and reference input. In this case, they need to insert SMA connectors as shown in Figure 2 and Figure 3.

Loop filter components include

C1 = 1.0 nF, C2 = 10 nF, C3 = 120 pF

R1 = 3.9 kΩ, R2 = 20 kΩ

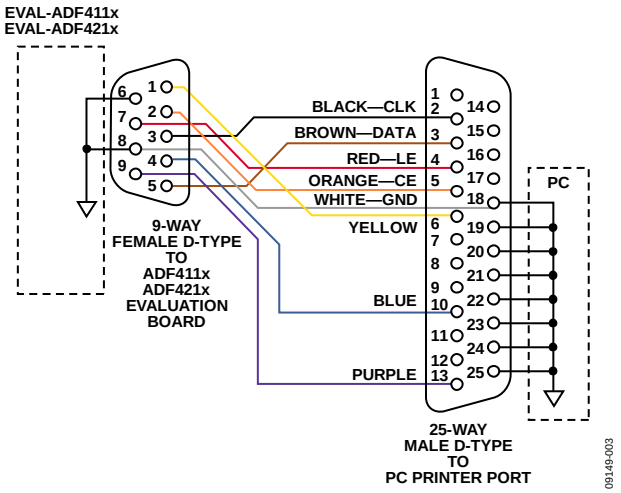

Figure 3. PC Cable Diagram

EVALUATION BOARD SOFTWARE

The evaluation board software is provided on a CD. Double-click **setup.exe** to open the install wizard, which installs the software. Follow the on-screen instructions. The software is then installed in a default directory called **C:/Program Files/Project1**. To run the software, double-click **adf411X.exe**. The front panel of the evaluation board software is shown in Figure 4.

Before the **Main Interface Page** opens, the device window appears, which prompts you to select the device being evaluated. Follow these steps for initial setup to interface to the part.

1. Choose **ADF4113EBZ1** and click **OK**.
2. Click the **Cable Port** box, and the port connector window opens. Select the port that the cable is connected to on the PC and click **OK** (normally LPT1).
3. Click the **OSC In** text under the **RF Section** to open the crystal frequency window. Enter the reference frequency being used and click **OK**.
4. Click **RF VCO Output Frequency** to open the output frequency window. Enter the output frequency and the PFD reference frequency, and click **OK**.
5. Click **RF Prescaler** to open the prescaler window. Select the desired prescaler value, and click **OK**.
6. Click the **RF PD Polarity Positive** button to set the RF PD polarity bit high.
7. Click **RF Charge Pump Current Setting 2** or **Charge Pump Current Setting 1** to open the current setting window. Set the charge pump current setting, and Click **OK**.

At this point, the data is set up, and you can modify the other features in the **Main Interface Page**.

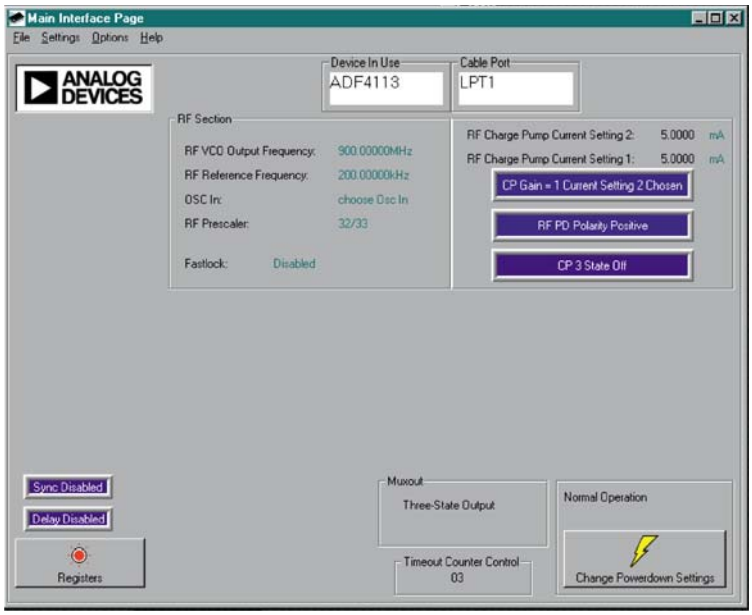

Figure 4. Software Front Panel

EVALUATION BOARD SCHEMATICS

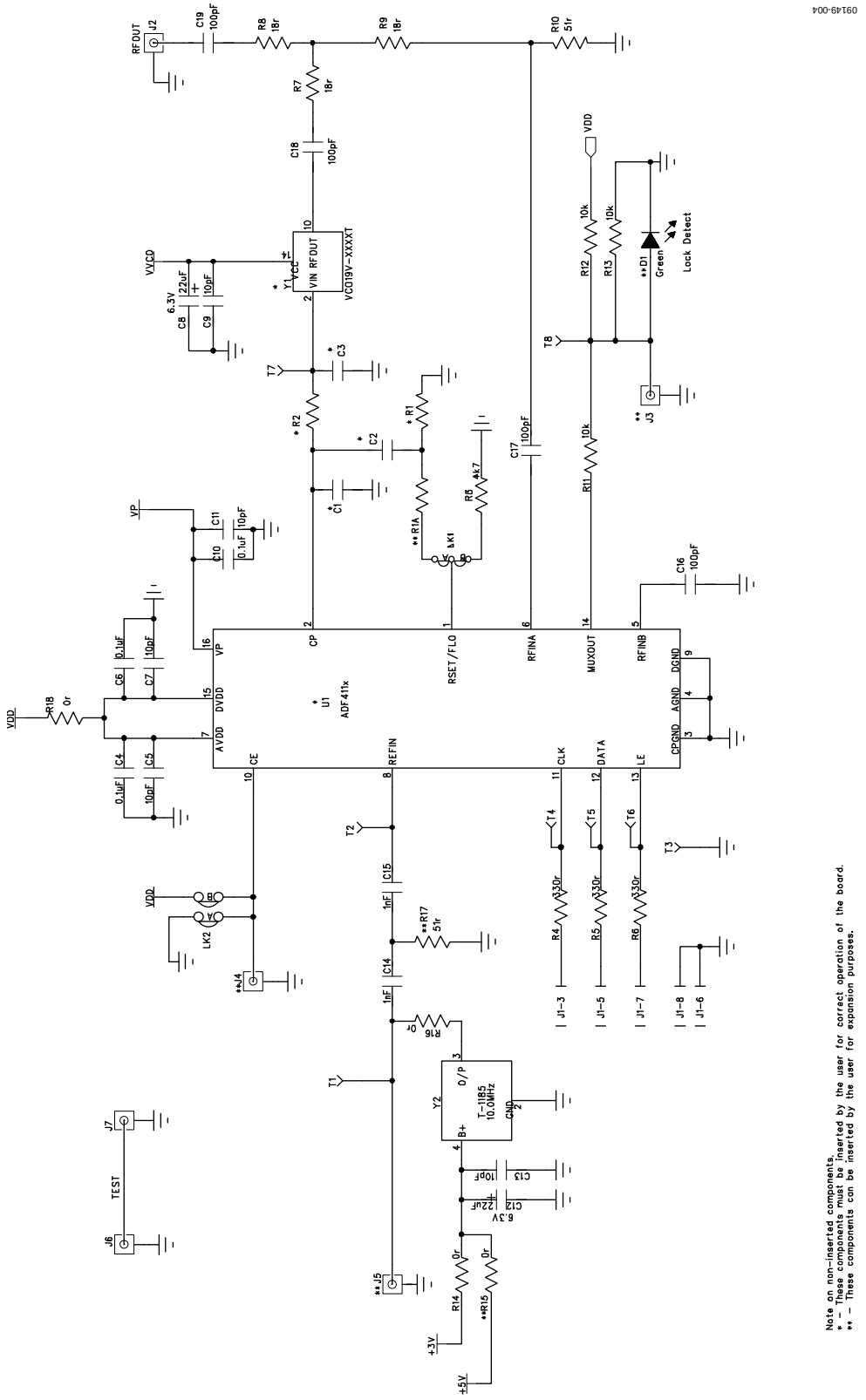

Figure 5. Evaluation Board Circuit Diagram (Part 1)

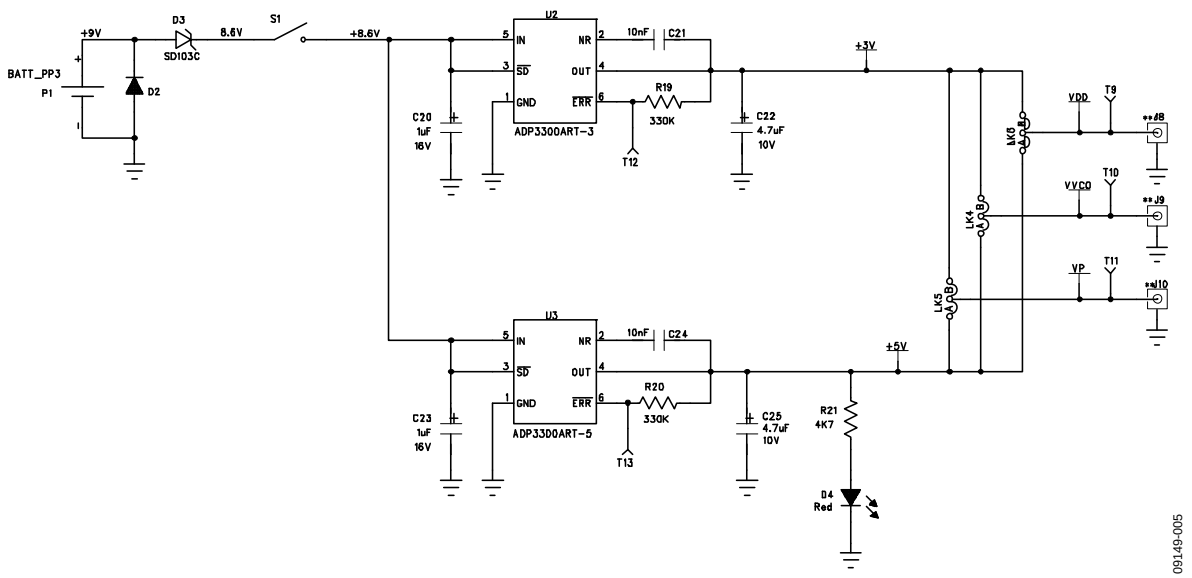

Figure 6. Evaluation Board Circuit Diagram (Part 2)

NOTES

NOTES

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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