

## WCDMA Evaluation Board for PLL Frequency Synthesizer

### FEATURES

**Self-contained board including synthesizer, VCO, and loop filter for generating WCDMA frequencies (1.93 GHz to 1.99 GHz)**

**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  $-85$  dBc/Hz at 1 kHz offset**

### GENERAL DESCRIPTION

This board is designed to allow the user to evaluate the performance of the [ADF4118](#) frequency synthesizer for phase-locked loops (PLLs). The block diagram of the board is shown in Figure 1. It contains the [ADF4118](#) synthesizer, a PC connector, TCXO for the reference input, SMA connectors for the power supplies, and an RF output. There is also a low-pass loop filter (20 kHz) and a VCO (Vari-L VCO190-1960T) 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.

### BLOCK DIAGRAM

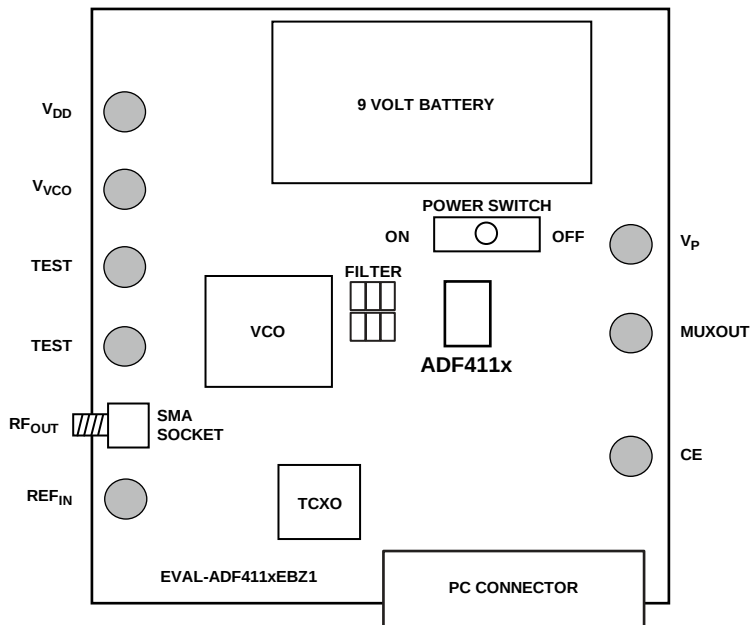


Figure 1.

TABLE OF CONTENTS

|                           |   |                                  |   |
|---------------------------|---|----------------------------------|---|
| Features .....            | 1 | Evaluation Board Hardware.....   | 3 |
| General Description ..... | 1 | Loop Components.....             | 3 |
| Block Diagram .....       | 1 | Evaluation Board Software.....   | 4 |
| Revision History .....    | 2 | Evaluation Board Schematics..... | 5 |

REVISION HISTORY

6/11—Revision 0: Initial Version

## EVALUATION BOARD HARDWARE

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 schematics are shown in Figure 5 and Figure 6.

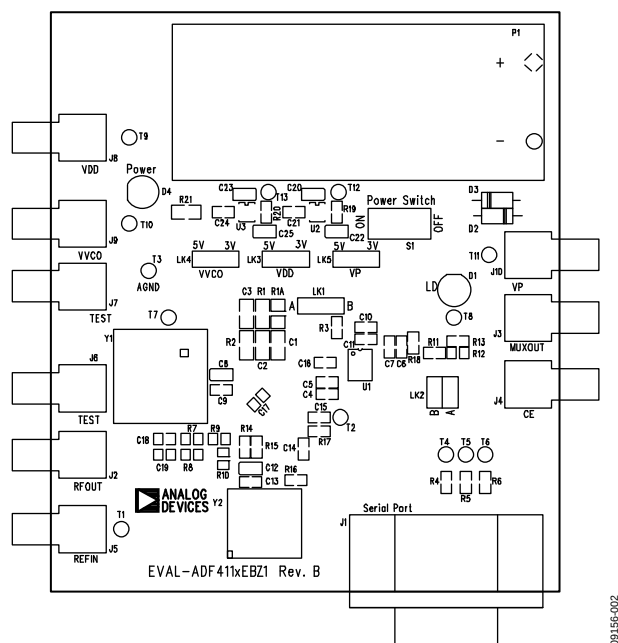


Figure 2. Evaluation Board Silkscreen

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 **ADF4118**  $V_{DD}$  and  $V_P$  and for the VCO supply. The default settings are 3 V for the **ADF4118**  $V_{DD}$  and 5 V for the **ADF4118**  $V_P$  and for the VCO supply. It is very important to note that the **ADF4118**  $V_{DD}$  should never exceed the **ADF4118**  $V_P$ . This can damage the device.

All components necessary for LO generation are included on board. The 10 MHz TCXO from Vectron provides the necessary reference input. The PLL is made up of the ADF4118, a passive

loop filter (20 kHz), and the VCO 190-1960T from Vari-L. The output is available at  $RF_{OUT}$  through a standard SMA connector. Alternatively, users can use their own power supplies and reference input. In this case, insert SMA connectors as shown on the silkscreen in Figure 2 and the block diagram in Figure 1.

### LOOP COMPONENTS

$C1 = 150$  pF,  $C2 = 1.5$  nF,  $C3 = 82$  pF.

$R1 = 22$  k $\Omega$ ,  $R1a = 22$  k $\Omega$ ,  $R2 = 20$  k $\Omega$ .

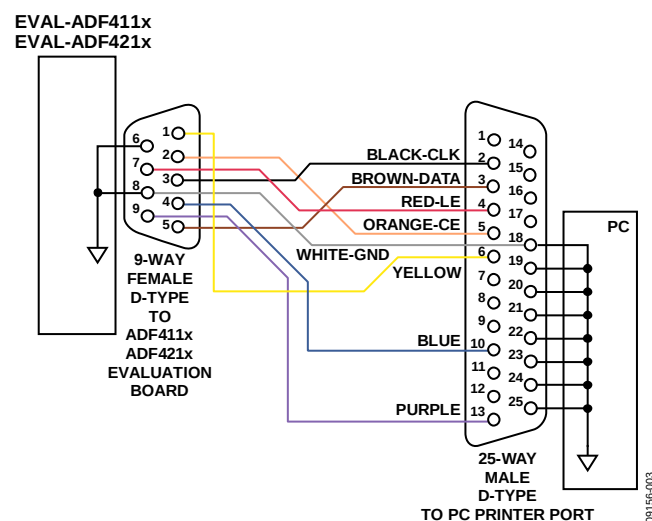


Figure 3. PC Cable Diagram

Loop component values shown in the circuit diagrams (see Figure 5 and Figure 6) are for a 1.96 GHz RF output, 1 mA charge pump (CP) current, 200 kHz channel spacing, and 20 kHz loop bandwidth, with a VCO190-1960T.

## EVALUATION BOARD SOFTWARE

The software is supplied 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: **C:/ProgramFiles/ADF4XXX/ADF4XXX\_revx**. To run the software, simply double-click **adf4XXX\_revx.exe**.

Before the main **Main Interface Page** appears, the device window opens, which prompts you to choose the device to be evaluated.

1. Select the **ADF4118** and click **OK**.
2. The **Main Interface Page** window opens (see Figure 4).
3. Click the **Eval Board** box near the top right corner of the **Main Interface Page** window.
4. When the evaluation board window opens, select the **Eval-ADF4118EBZ1** and click **OK**.

The data is now set up, and you can explore the other features of the **Main Interface Page** window.

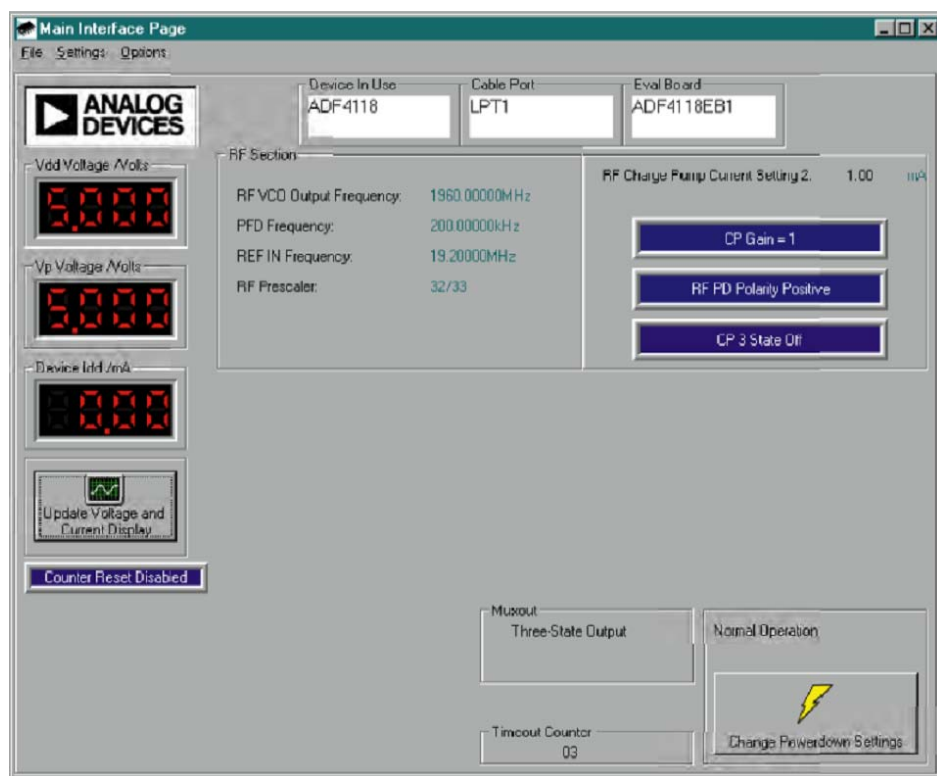


Figure 4. Main Interface Page

## EVALUATION BOARD SCHEMATICS

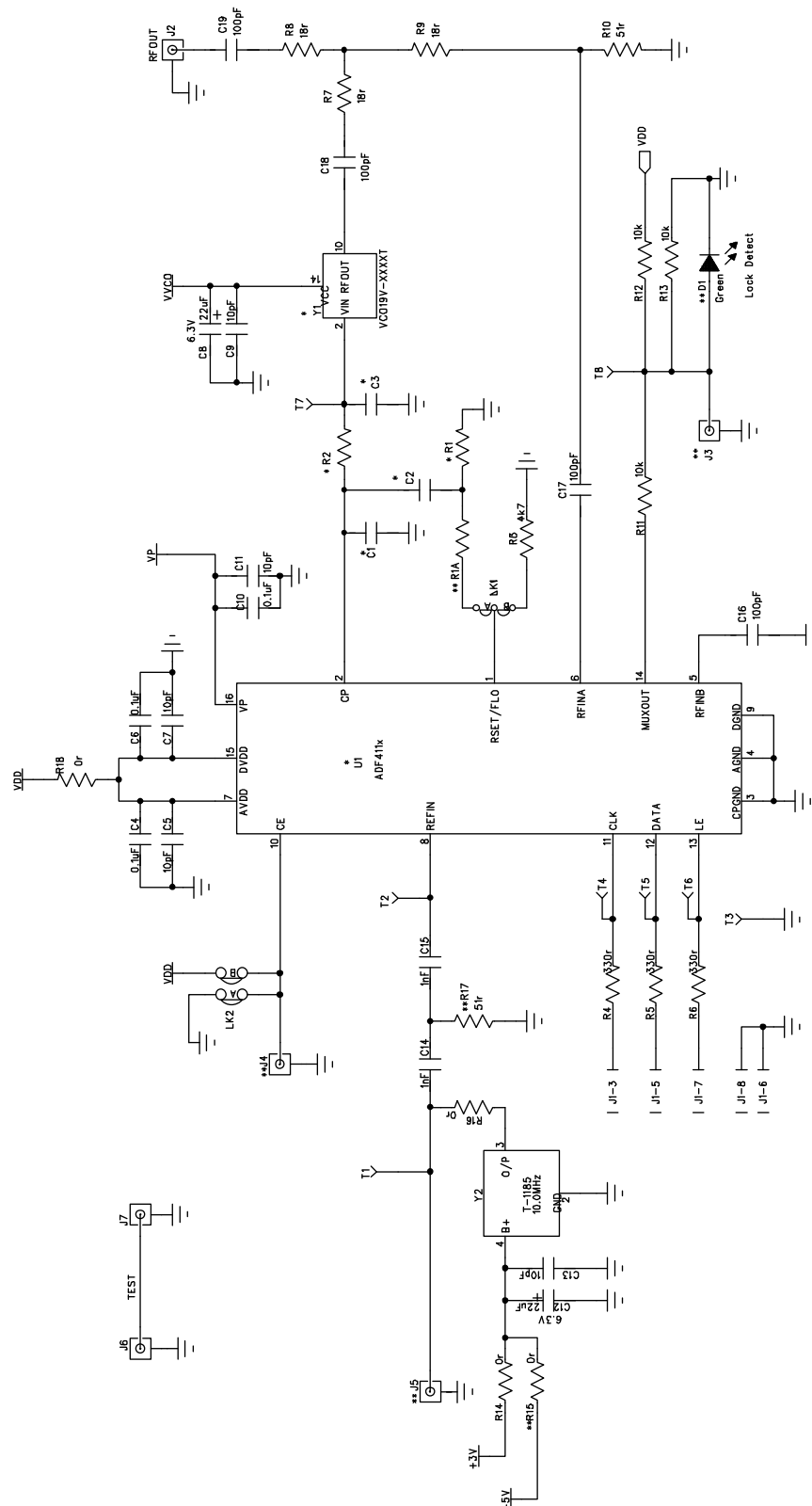


Figure 5. Evaluation Board Circuit Diagram (Page 1)

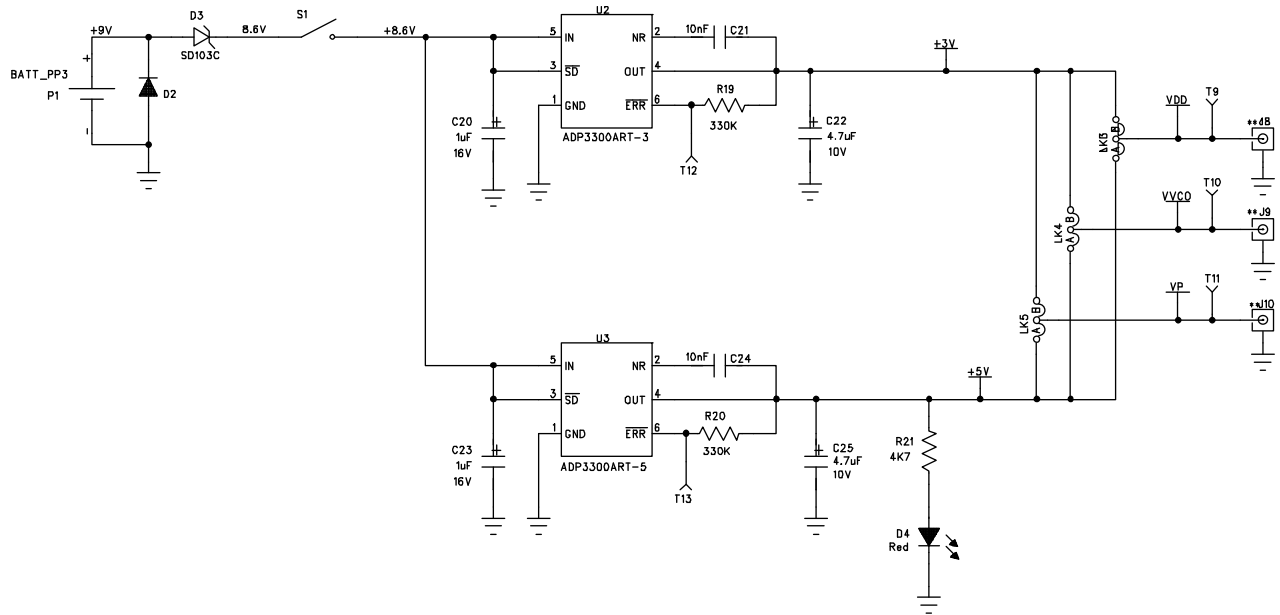


Figure 6. Evaluation Board Circuit Diagram (Page 2)

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## NOTES

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**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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