

FEATURES**Tx baseband to RF, Rx RF to baseband operation****Flexibility for reference input, output frequency, phase-frequency detector (PFD) frequency, and loop bandwidth****Accompanying software allows complete control of part functions from PC****Typical voltage-controlled oscillator (VCO) phase noise performance of -120 dBc/Hz at 100 kHz offset****Typical spurious performance of -70 dBc at 250 kHz offset (900 MHz setup)****GENERAL DESCRIPTION**

The ADF9010 evaluation board is designed to evaluate the performance of the ADF9010 RF front end, which consists of an integrated PLL, VCO, upconverter, and Rx filter. The board

also contains an [ADL5382](#) demodulator and an [ADL5501](#) rms detector, as well as some [ADP3334](#) power management devices. A photograph of the board is shown in Figure 1.

In addition to these parts, the board contains various connectors, including a 9-pin connector for the PC interface cable, power supply banana connectors, and several SMA connectors to access the RF ports on the board. The evaluation board can be modified as necessary for a customer's requirements.

The package also contains the PC interface cable and Windows® software on a CD to allow quick, user-friendly programming. In addition, the CD contains numerous other PLL data sheets, technical notes, articles, and ADIsimPLL™ PLL simulation software from Analog Devices, Inc. More information is available at www.analog.com/pll.

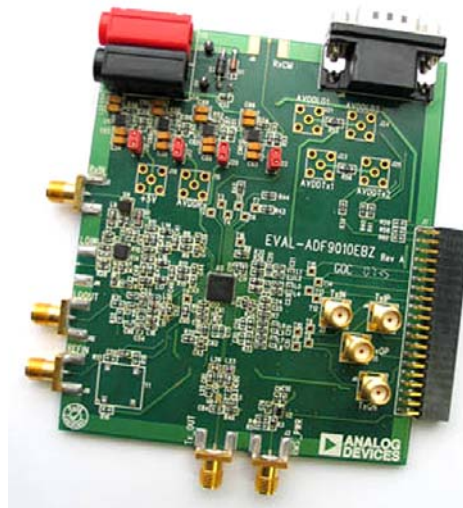
DIGITAL PICTURE OF THE EVALUATION BOARD

Figure 1.

Rev. 0

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REVISION HISTORY

4/09—Revision 0: Initial Version

SOFTWARE DESCRIPTION

INSTALLING THE SOFTWARE

The ADF9010 software comes on a bundled installation CD. To install the software, use the following procedure:

1. Double-click **setup.exe**.
2. The installation wizard starts installing the software. (Note that administrator access on the PC is required to install the software.)
3. Follow the on-screen instructions.

The software is installed in the default directory, **C:/Program Files/Analog Devices/ADF9010**.

USING THE SOFTWARE

To run the software,

1. Double-click **ADF9010.exe** in the **C:/Program Files/Analog Devices/ADF9010** directory.
2. The **Device** window appears and asks you to select a device to evaluate.
3. Choose the appropriate version of the ADF9010 and click **OK**.
4. The **Main Interface Page** window appears (see Figure 6).

Programming the Reference Frequency

From the **Main Interface Page** window, you can program the reference frequency as follows:

1. In the **LO Frequency Settings** box of the **Main Interface Page** window, click **RF Output Frequency**.
2. The **Output Frequency** window appears.
3. Enter the desired channel spacing (in kilohertz) and click **OK**.
4. Click **REF IN Frequency**, which is also in the **LO Frequency Settings** box.
5. Type the desired frequency in megahertz.

Changing the Charge-Pump Settings

To modify Charge-Pump Setting 1 or Charge-Pump Setting 2,

1. Click **Charge Pump Current** in the **Settings** box of the **Main Interface Page** window.
2. The eight programmable settings for each setting appear and can be modified.

Optimizing Operation

It may be necessary to adjust the Tx output power level and the LO output power level to optimize operation. These settings are displayed in the **Main Interface Page** window (see Figure 6).

To optimize the evaluation board operation,

1. Ensure that the Rx filters are operating correctly. To accomplish this, the filter calibration must be set correctly, which involves setting the Rx calibration divider to divide the PLL reference (REFIN) to exactly 2 MHz and setting the correct timeout period for the high-pass filter boost. For more information, refer to the [ADF9010](#) data sheet.
2. Select the desired Rx filter bandwidth and gain.
3. Ensure that all registers are programmed by clicking each update button at the bottom of the window. Follow the recommended sequence of buttons from left to right: Update R1, Update R5, Update R0, Update R2, and finally Update R3.

The part should now be set up, allowing you to modify other features. As stated in the ADF9010 data sheet, the correct sequence of register writes is as follows: R1, R5, R0, R2, and R3.

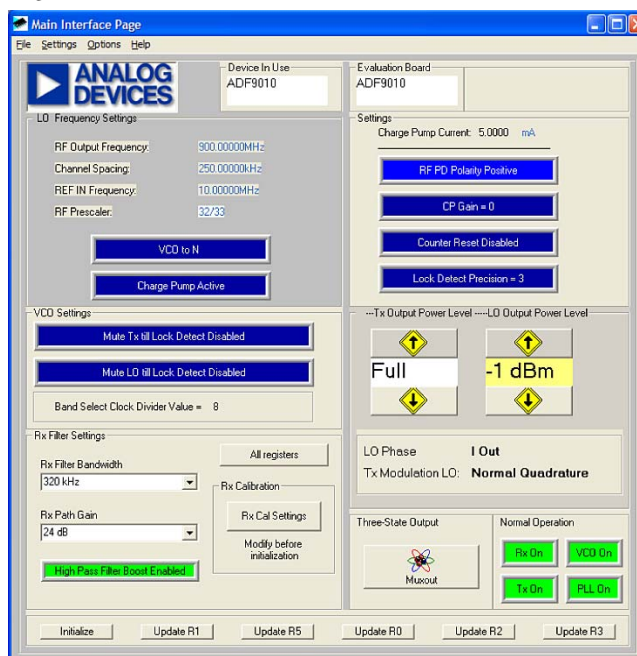


Figure 6. Software Front Panel Display

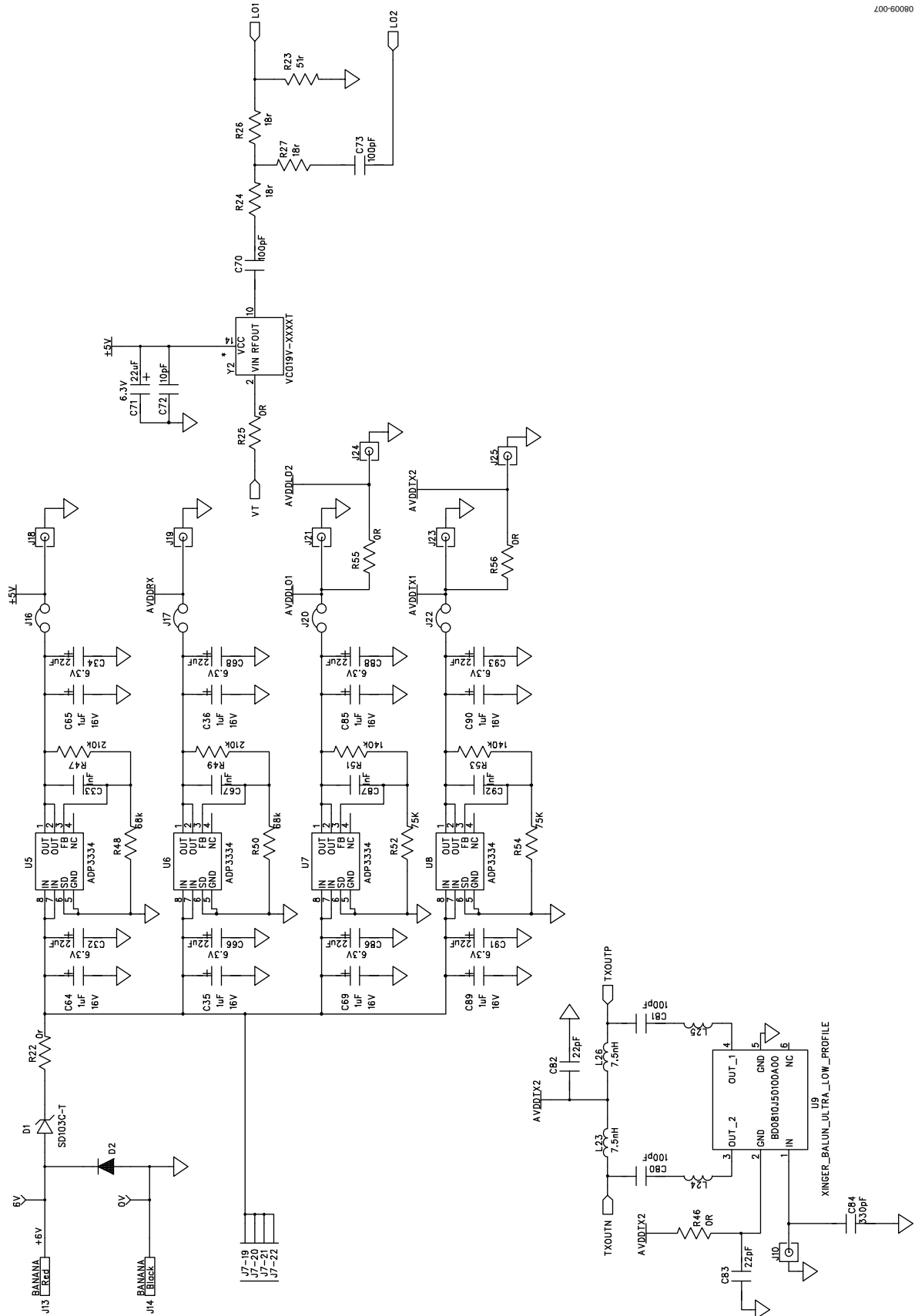


Figure 8. EVAL-ADF9010 Circuit Diagram—Power Management Section

EVAL-ADF9010

ORDERING INFORMATION

BILL OF MATERIALS

Table 1.

Qty	Reference Designator	Description	Supplier/Part Number
23	C1, C3, C7, C9, C11, C13, C15, C17, C18, C19, C24, C25, C26, C39, C40, C44, C45, C49, C52, C55, C57, C76, C78	0.1 μ F, 0402 capacitor	Phycomp (Yageo) 2238 787 19849
13	C2, C4, C8, C10, C12, C14, C16, C27, C50, C51, C77, C79, C94	100 pF, 0402 capacitor	Murata GRM1555C1H101JD01D
3	C5, C6, C63	1000 pF, 0402 capacitor	Murata GRM1555C1H102JA01D
8	C20, C21, C22, C23, C28, C29, C30, C31	0402 capacitor	Do not insert
7	C32, C66, C68, C86, C88, C91, C93	22 μ F, CAP\TAJ_A capacitor	AVX TAJA226K006R
1	C33	0603 capacitor	Do not insert
2	C34, C71	CAP\TAJ_A capacitor	Do not insert
7	C35, C36, C64, C69, C85, C89, C90	1 μ F, CAP\TAJ_A capacitor	AVX TAJA105K016R
10	C37, C38, C42, C47, C59, C60, C67, C87, C92, C95	1 nF, 0603 capacitor	AVX 06035A102JAT2A
2	C41, C46	47 pF, 0603 capacitor	Murata GRM1885C1H470JA01D
2	C43, C48	220 pF, 0603 capacitor	Phycomp (Yageo) 2238 586 15614
2	C53, C54	0402 capacitor	Do not insert
2	C56, C58	100 pF, 0402 capacitor	Murata GRM1555C1H101JZ01D
1	C61	560 pF, 0603 capacitor	Phycomp (Yageo) 2238 867 15561
1	C62	12 nF, 0603 capacitor	Phycomp (Yageo) 2238 916 16637
1	C65	CAP\TAJ_A capacitor	Do not insert
2	C70, C73	0603 capacitor	Do not insert
1	C72	0603 capacitor	Do not insert
3	C74, C75, C96	0402 capacitor	Do not insert
2	C80, C81	100 pF, 0603 capacitor	Murata GRM1885C1H101JA01D
2	C82, C83	22 pF, 0603 capacitor	Murata GRM1885C1H220JA01D
1	C84	0603 capacitor	Do not insert
1	D1	20 V Schottky diode, DO-35	Diodes Inc. SD103C-T
1	D2	Diode, DO-41	Multicomp 1N4001
5	J1, J2, J9, J10, J12	SMA connector	Johnson (Emerson) 142-0701-851
4	J3, J4, J5, J15	SMA connector	Pasternack PE4118
2	J6, J11	SMA connector	Do not insert
1	J7	Header, 40-position	Samtec Inc. SSW-120-02-G-D-RA
1	J8	9-way D sub connector	ITW McMurdo SDEX9PNTD
1	J13	Banana socket	Del-Tron Precision 571-0500-01
1	J14	Banana socket	Del-Tron Precision 571-0100-01
4	J16, J17, J20, J22	Jumper, SIP-2P	Harwin M20-9990246, M7566-05
6	J18, J19, J21, J23, J24, J25	SMA	Do not insert
8	L1, L2, L3, L4, L5, L6, L7, L8	0 Ω , 0603 inductor (resistor)	Multicomp MC 0.063W 0603 0R
2	L9, L10	120 nH, 0805 inductor	Coilcraft 0603CS-R12X_LU
4	L11, L21, L23, L26	7.5 nH, 0402 inductor	Coilcraft 0603CS-7N5X_LU
6	L14, L15, L16, L17, L18, L19	0 Ω , 0603 inductor	Multicomp MC 0.063W 0603 0R
1	L20	0402 inductor	Do not insert
1	L22	0402 inductor	Do not insert
2	L24, L25	0 Ω , 0402 inductor	Phycomp (Yageo) 232270591001
1	R1	3 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 3K
11	R2, R4, R5, R16, R17, R18, R21, R57, R58, R59, R60	0603 resistor	Do not insert
10	R3, R6, R22, R29, R35, R36, R37, R38, R42, R46	0 Ω , 0603 resistor	Multicomp MC 0.063W 0603 0R
1	R7	4.7 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 4K7

Qty	Reference Designator	Description	Supplier/Part Number
4	R8, R9, R12, R15	200 Ω , 0603 resistor	Multicomp MC0603WGF2000T5E-TC
4	R10, R11, R13, R14	620 Ω , 0603 resistor	Multicomp MC0603WGF6200T5E-TC
1	R19	3.3 k Ω , 0603 resistor	Phycomp (Yageo) 232270463302
1	R20	2 k Ω , 0402 resistor	Welwyn PCF0402-R-2K-B-T1
1	R23	0603 resistor	Do not insert
3	R24, R26, R27	0603 resistor	Do not insert
1	R25	0805 resistor	Do not insert
5	R28, R31, R32, R33, R34	0603 resistor	Do not insert
3	R39, R40, R41	330 Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 330R
3	R43, R44, R45	10 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 5% 10K
2	R47, R49	210 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 210K
2	R48, R50	68 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 68K
2	R51, R53	140 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 140K
2	R52, R54	75 k Ω , 0603 resistor	Multicomp MC 0.063W 0603 1% 75K
2	R55, R56	0 Ω , 0805 resistor	Multicomp MC 0.1W 0805 0R
16	T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16	Test point	Do not insert
1	U1	Quadrature demodulator, 24-lead LFCSP	Analog Devices ADL5382ACPZ-R7
1	U2	TruPwr™ detector, 6-lead SC-70	Analog Devices ADL5501AKSZ-R7
1	U3	Analog RF front end, 48-lead LFCSP	Analog Devices ADF9010BCPZ-RL7
1	U4	Transformer, SOT23-5	M/A-COM ETC1-1-13TR
1	U5	anyCap® adjustable low dropout regulator, 8-lead MSOP	Analog Devices ADP3334ARMZ-REEL (do not insert)
3	U6, U7, U8	anyCap adjustable low dropout regulator, 8-lead MSOP	Analog Devices ADP3334ARMZ-REEL
1	U9	Balun transformer, ultralow profile	Anaren BD0810J50100A00
1	Y1	Temperature-controlled crystal oscillator	Do not insert
1	Y2	Optional external voltage-controlled oscillator	Do not insert

EVAL-ADF9010

ORDERING GUIDE

Model	Description
EVAL-ADF9010EBZ1 ¹	Evaluation Board

¹ Z = RoHS Compliant Part.

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.

NOTES

EVAL-ADF9010

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