



Evaluation Board For ADF4252 Fractional-n PLL

EVAL-ADF4252EB2

FEATURES

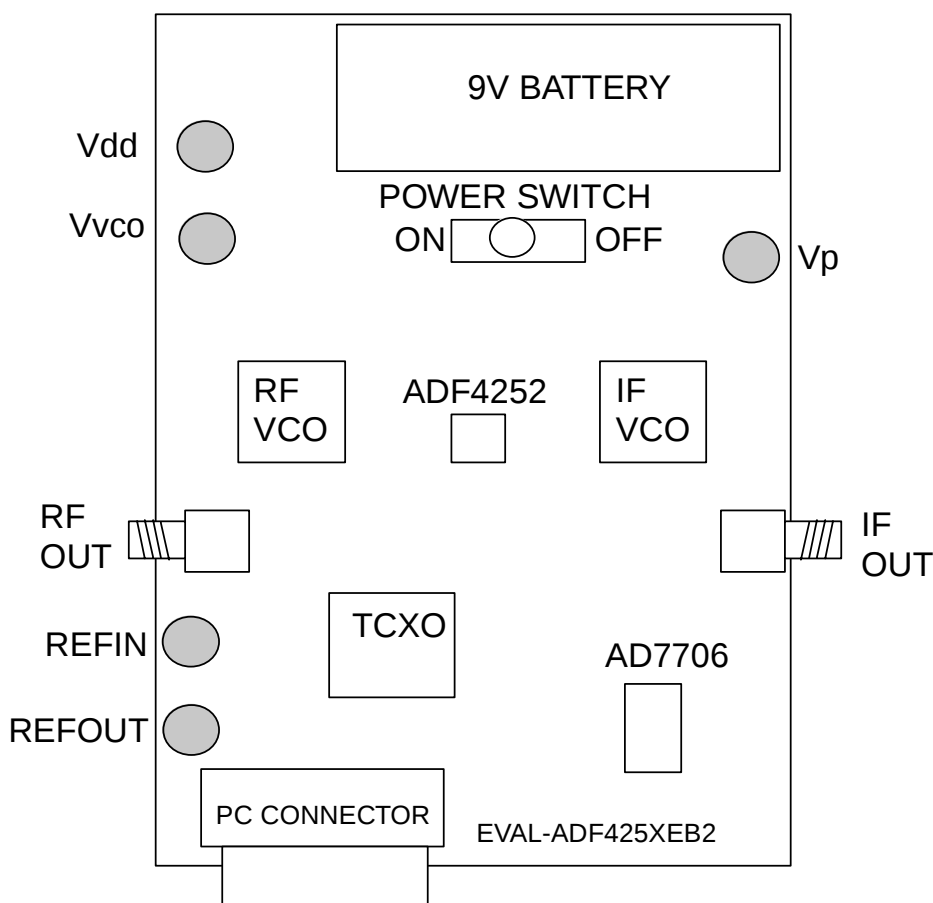
**General Purpose PLL Evaluation Board excluding VCOs,
Loop Filters for generating generic PLL standards.
Compatible with ADF4252 synthesizer.
Accompanying Software allows complete control of syn-
thesizer functions from PC
Battery Operated: Choice of 3V or 5V supplies
Includes ADIsimPLL filter design and analysis Software**

GENERAL DESCRIPTION

This board is designed to allow the user to evaluate the performance of the ADF4252 Frequency Synthesizer for PLL's (Phase Locked Loops). The block diagram of the board is shown below. It contains the ADF4252 synthesizer, a pc connector, SMA connector for the reference input, power supplies and RF output. There is also a footprint for a loop filter and a VCO for both the RF and IF section on board. This allows the user to customize the eval board to their specific application. 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



REV.0 05/02

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Hardware Description

The evaluation board comes with a cable for connecting to the printer port of a PC. The silk screen and cable diagram for the evaluation board are shown below. The board schematic is shown on pages 3 and 4.

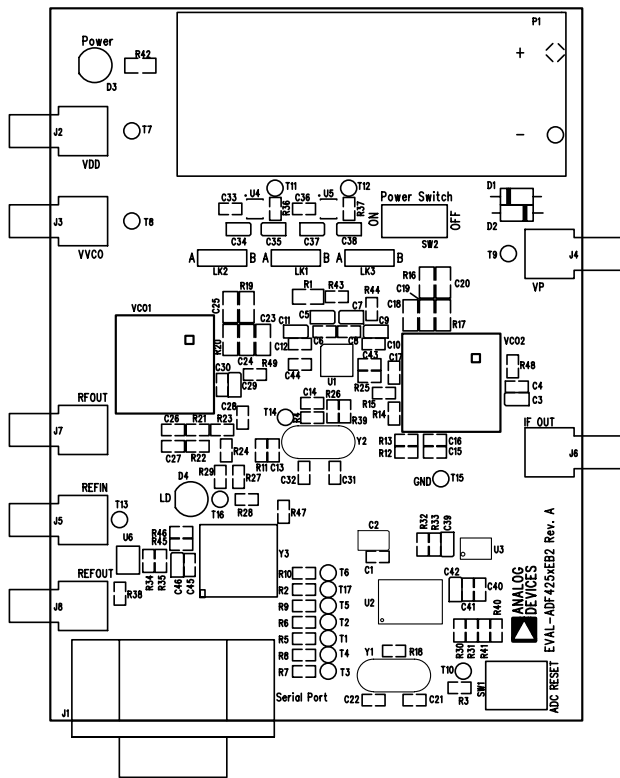
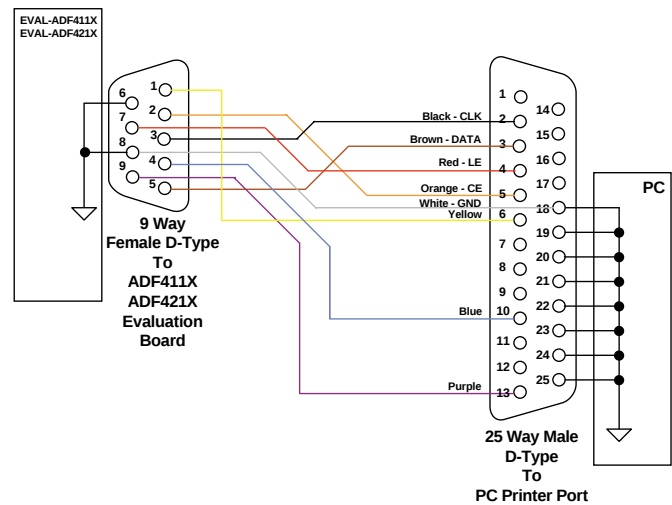


Figure 1. Evaluation Board Silkscreen

The board is powered from a single 9V battery. The power supply circuitry allows the user to choose either 3V or 5V for the ADF4252 V_p , and for the VCO supply. The default settings are 3V for the ADF4252 V_{DD} and 5V for the ADF4252 V_p and for the VCO supply. **It is very important to note that the ADF4252 V_{DD} should never exceed the ADF4252 V_p . This can damage the device.** All components necessary for LO generation are catered for on-board. The TCXO provides the necessary Reference Input. A complete RF PLL is made up of the ADF4252, passive loop filter and a VCO (190-XXXT from Vari-L). The IF PLL is made up of the ADF4252, passive loop filter and a VCO (190-XXXT from Vari-L). The output is available at IFOUT through a standard SMA connector. If the user wishes they may use their own power supplies and reference input. In this case, they need to insert SMA connectors to as shown on the silkscreen and block diagram.



ADF411X/ADF421X CABLE CONNECTIONS Rev 2 (15/3/99)

Figure 2. PC Cable Diagram

The AD7706 A/D converter is used to monitor the power supply voltage and current consumption of the ADF4252. This helps the user pick the optimum synthesizer settings for power consumption and also provides an alert if the battery voltage is too low to sustain the required 3V or 5V for the board supply. For this to function correctly, the PC interface cable must be connected, and the power supply on before turning on the eval software. The reason for this is that the AD7706 gets calibrated when the software is turned on. If the software is turned on before the cable is connected, or power has been turned on, then the AD7706 will not be calibrated, and will give incorrect readings.

ADIsimPLL

A copy of ADIsimPLL is also included on the eval kit CD. This software package designs, simulates and analyses the entire frequency domain and time domain response. Various passive and active filter architectures are allowed.

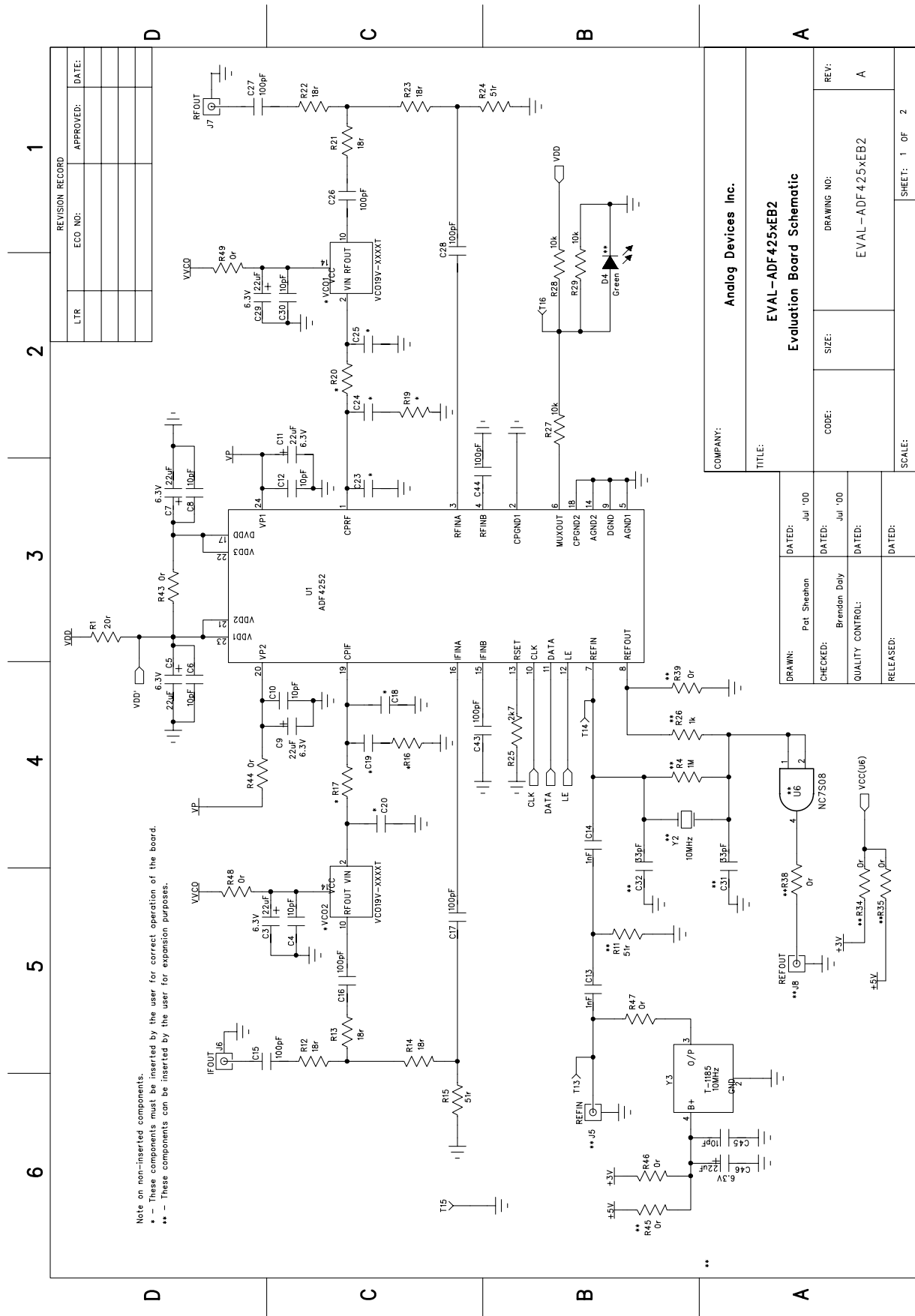


Figure 3. Evaluation Board Circuit Diagram (Page 1)

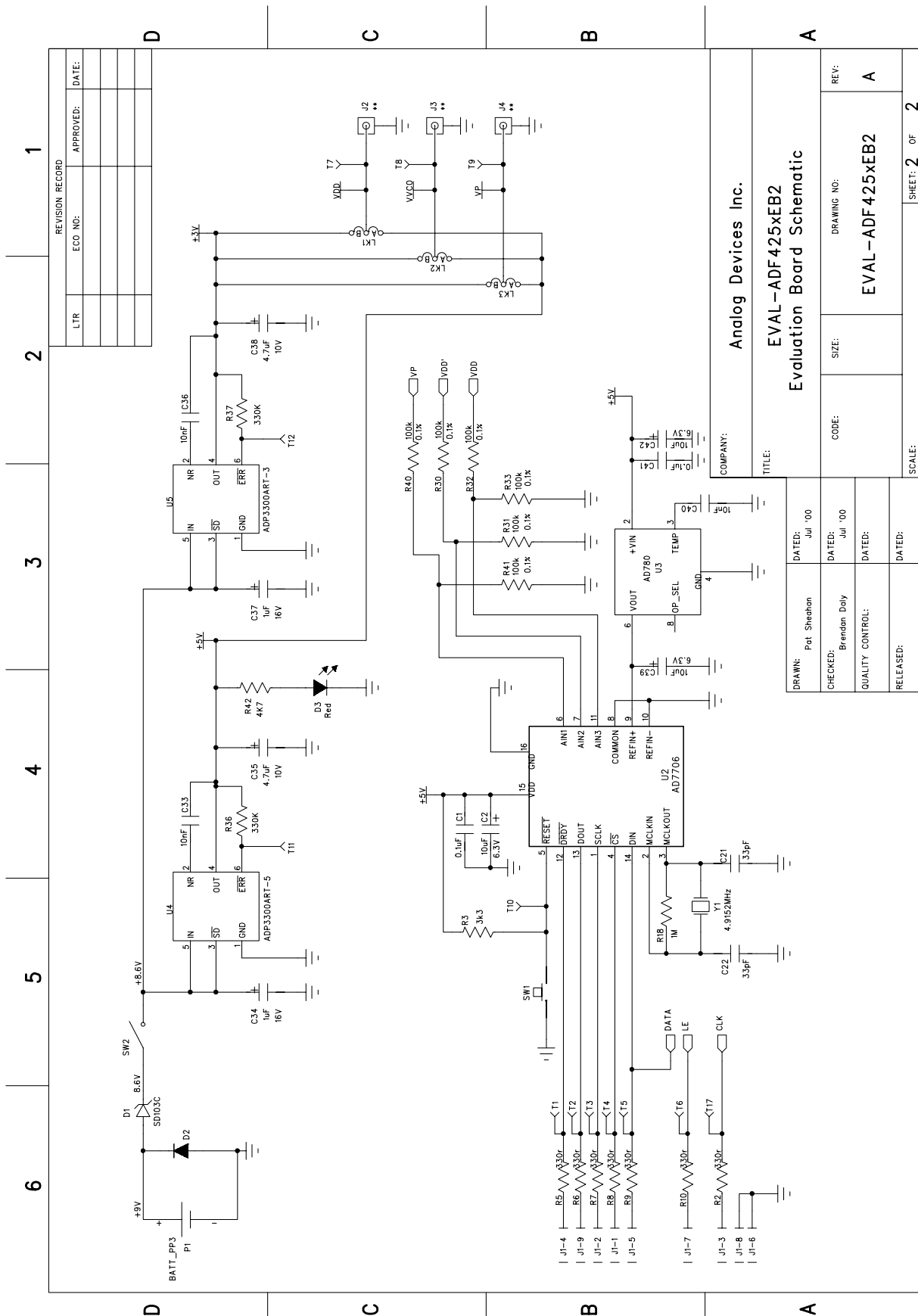


Figure 4. Evaluation Board Circuit Diagram (Page 2)

Software Description

The evaluation software comes on a CD. If the user double clicks on "setup.exe" on the CD, then the install wizard installs the software. Follow the on-screen directions. The software will be installed in a default directory called "C:/Program Files/Analog Devices". To run the software, simply double-click on "ADF_Frac_Rev0.exe".

The front panel of the evaluation board software is shown below. When the device window appears, choose the ADF4252 and click OK. The main software screen now appears. Follow the steps below for initial setup to interface to the part.

Click on RF Output Frequency, and the RF Frequency window will appear. Enter the RF frequency, Reference freq, PFD frequency and channel step resolution being used and click Load Now (Normal Mode).

On the Main Interface Window, click on Prescaler, and the Prescaler drop down menu will appear. Choose the desired RF prescaler value. Click OK.

Click on RF Charge Pump Current Setting and the Current Setting window will appear. Grab the pointer to set the Charge Pump Current Setting. Click OK.

Click on IF Output Frequency, and the IF Frequency window will appear. Enter the IF frequency and PFD frequency being used and click OK.

The data is now set up, and other features can now be examined by the user.

At the bottom of the Min Interface Window, are the Update Register buttons.

Anytime a parameter has been changed, the appropriate register button will turn bright blue. To update this register, click on the Update Register button. The user can choose to update just the registers which have changed, update all the RF registers, all the IF registers, or all registers.

The Main Interface Window also displays (in binary and hex form) the settings currently loaded into all of the registers.

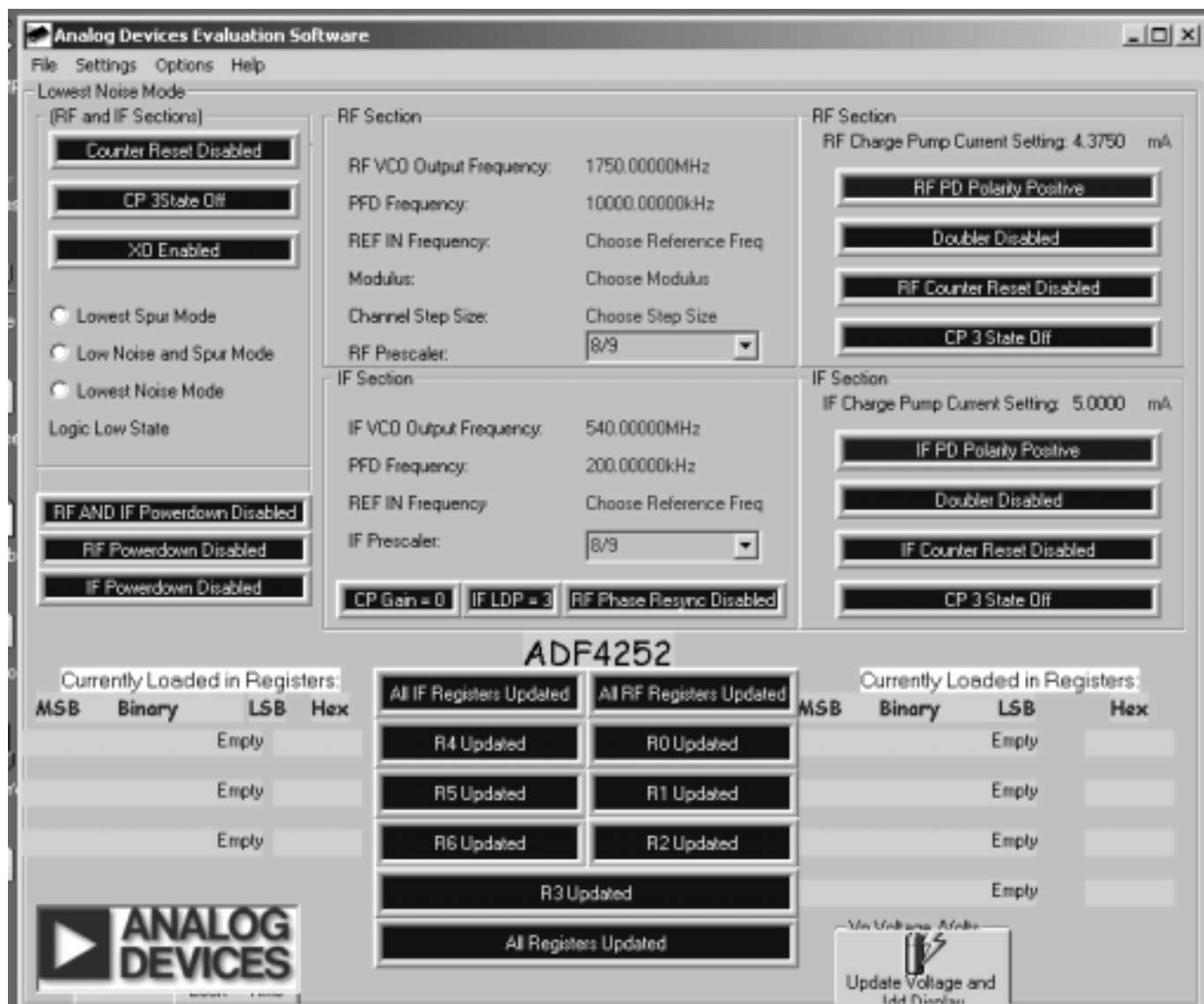


Figure 5. Main Interface Window

Table 1. Bill of Materials for the EVAL-ADF4252EB2

Qty	Reference	Description	Manufacturer	PCB DECAL	VALUE
1	U1	ADF4252BCP	ADI	LFCSP-24	ADF4252BCP
1	U2	AD7706BR	ADI	SO16WB	AD7706BR
1	U3	AD780AR	ADI	SO8NB	AD780AR
1	U4	ADP3300ART-5	ADI	SOT23-6	ADP3300ART-5
1	U5	ADP3300ART-3	ADI	SOT23-6	ADP3300ART-3
1	U6	Do Not Insert	Fairchild	SOT23-5	NC7SM508
1	VCO1	Do Not Insert	Vari-L		
1	VCO2	Do Not Insert	Vari-L		
1	Y1	4.9152MHz Crystal	Vectron International	HC49 low profile	VXA4-1011
1	Y2	10MHz Crystal	Vectron International	HC49 low profile	VXA4-1B2-10M00
1	Y3	13MHz TCXO	Vectron International		
1	D1	SD103C Schottky Diode	General Semiconductor	DO35	SD103C
1	D2	1N4001		DO35	FEC 365-117
1	D3	Red Low Power LED	Vishay	LED	FEC 657-130
1	D4	Green Low Power LED (Do Not Insert)	Vishay	LED	FEC 657-141
6	C1 C5 C7 C9 C11 C41	Multi Layer Ceramic Capacitor	Murata	Case 0603	0.1uF
1	C2	Tantalum Capacitor	AVX	CAP\TAJ_B	10uF 6.3V
3	C3 C29 C46	Tantalum Capacitor	AVX	CAP\TAJ_A	22uF 6.3V
7	C4 C6 C8 C10 C12 C30 C45	Multi Layer Ceramic Capacitor	Murata	Case 0603	10pF
2	C13-14	Multi Layer Ceramic Capacitor	Murata	Case 0603	1nF
8	C15-17 C26-28 C43-44	Multi Layer Ceramic Capacitor	Murata	Case 0603	100pF
1	C18	Do Not Insert	Murata	Case 0805	
1	C19	Do Not Insert	Murata	Case 0805	
1	C20	Do Not Insert	Murata	Case 0805	
2	C21-22	Multi Layer Ceramic Capacitor	Murata	Case 0603	33pF
1	C23	Do Not Insert	Murata	Case 0805	
1	C24	Do Not Insert	Murata	Case 0805	
1	C25	Do Not Insert	Murata	Case 0805	
2	C31-32	Do Not Insert	Murata	Case 0603	33pF
3	C33 C36 C40	Multi Layer Ceramic Capacitor	Murata	Case 0603	10nF
2	C34 C37	Tantalum Capacitor	AVX	CAP\TAJ_A	1uF 16V
2	C35 C38	Tantalum Capacitor	AVX	CAP\TAJ_A	4.7uF 10V
2	C39 C42	Tantalum Capacitor	AVX	CAP\TAJ_A	10uF 6.3V
1	R1	Resistor (Surface Mount)	Bourns	Case 0805	20r 1.0%
7	R2 R5-10	Resistor (Surface Mount)	Bourns	Case 0603	330r 1.0%
1	R3	Resistor (Surface Mount)	Bourns	Case 0603	3k3 1.0%
1	R4	Do Not Insert	Bourns	Case 0603	1M 1.0%
1	R11	Do Not Insert	Bourns	Case 0603	51r 1.0%
6	R12-14 R21-23	Resistor (Surface Mount)	Bourns	Case 0603	18r 1.0%
2	R15 R24	Resistor (Surface Mount)	Bourns	Case 0603	51r 1.0%
1	R16	Do Not Insert		Case 0805	
1	R17	Do Not Insert		Case 0805	
1	R18	Resistor (Surface Mount)	Bourns	Case 0603	1M 1.0%
1	R19	Do Not Insert		Case 0805	
1	R20	Do Not Insert		Case 0805	
1	R25	Resistor (Surface Mount)	Bourns	Case 0603	2k7 1.0%
1	R42	Resistor (Surface Mount)	Bourns	Case 0603	4k7 1.0%
1	R26	Do Not Insert	Bourns	Case 0603	1k 1.0%
3	R27-29	Resistor (Surface Mount)	Bourns	Case 0603	10k 1.0%
6	R30-33 R40-41	Resistor (Surface Mount)	Meggitt	Case 0603	100k 0.1%
5	R34 R35 R38 R39 R45	Do Not Insert		Case 0603	0r 1.0%
2	R36 R37	Resistor (Surface Mount)	Bourns	Case 0603	330k 1.0%
6	R43 R44 R46 R47 R48 R49	Resistor (Surface Mount)	Bourns	Case 0603	0r 1.0%
1	SW1	Push Button Switch	Omron	SW\PB-SMALL	FEC 176-986
1	SW2	SPDT Switch - (Washable)	Apem	SW_SIP-3P	FEC 150-559