![ANALOG DEVICES]

Evaluation Board User Guide
UG-521

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Evaluating the CN-0285 Wideband Tx Modulator Solution

FEATURES

Self-contained board including
ADF4351 wideband PLL + VCO
ADL5375 wideband IQ modulator
Ultralow noise voltage regulators: **ADP150**, **ADP3334**
25 MHz TCXO reference
USB interface
Accompanying **ADF4351** software allows control of
synthesizer functions from PC

ONLINE RESOURCES

Documents Needed
ADF4351 Data Sheet
ADL5375 Data Sheet
ADP150 Data Sheet
ADP3334 Data Sheet
Required Software
ADF435x programming software
Design and Integration Files
Schematics, Layout Files, Bill of Materials

EQUIPMENT NEEDED

A standard PC running Windows® XP, Windows Vista (32-bit),
or Windows 7 with a USB port
EVAL-CN0285-EB1Z circuit evaluation board
5.5 V power supplies
An IQ signal source, such as the Rohde & Schwarz AMIQ
A spectrum analyzer, such as the Rohde & Schwarz FSQ8

GENERAL DESCRIPTION

The EVAL-CN0285-EB1Z is the evaluation board described in
the Circuits From the Lab™ Circuit Note CN-0285, *Broadband
Low EVM Direct Conversion Transmitter*. A photo of the board
is shown in Figure 1. It contains the ADF4351 synthesizer, the
ADL5375 wideband transmit modulator, and ultralow noise
LDOs. The board can be controlled using the ADF4351
programming software. A USB cable is included with the board
to connect to a PC USB port.

Additional information, including other PLL data sheets,
technical notes, articles, and ADIsimPLL™ PLL simulation
software from Analog Devices, Inc., is available at
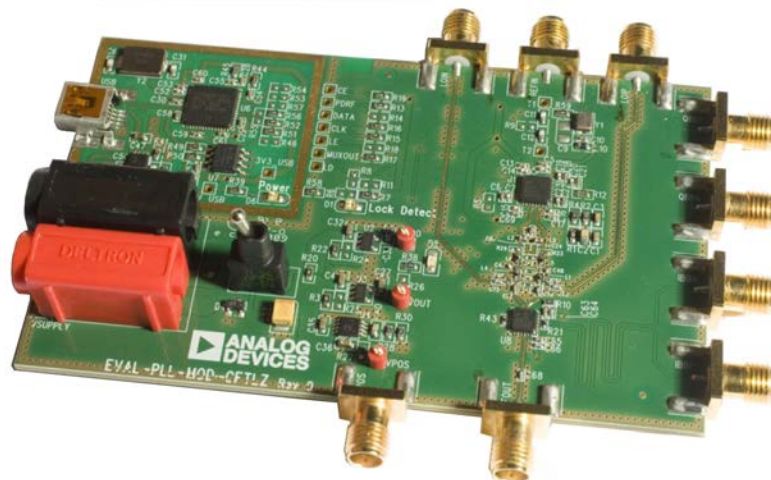www.analog.com/pll.

PHOTO OF THE EVALUATION BOARD

Figure 1. EVAL-CN0285-EB1Z

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REVISION HISTORY

3/13—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

POWER SUPPLIES

The user must apply 5.5 V to the VSUPPLY power connectors (4 mm banana connectors). An LED, D6, indicates when USB power is available, and another LED, D5, indicates when the main board is powered. Switch SW-EXT is used to switch in the 5.5 V supply.

IQ INPUTS

The ADL5375 has four differential IQ inputs. These are accessible from the SMA connectors and should be connected to an appropriate analog baseband IQ source such as the Rhode & Schwarz AMIQ. Set the dc bias voltage for the IQ inputs at 0.5 V.

RF/LO OUTPUTS

The ADL5375 RF output is ac-coupled out to the RFOUT SMA. There are also two LO output SMA connectors that can be used to view the filtered ADF4351 RF outputs on a spectrum analyzer. When connecting to an analyzer, terminate the unused LO output with a 50 Ω termination. When measuring EVM or adjacent channel leakage current (ACLR), disconnect these LO outputs by removing Capacitors C72 and C73 to prevent loading the circuit.

LOOP FILTER AND CHARGE PUMP CURRENT

The loop filter schematic is included in the evaluation board and can be found at www.analog.com/CN0285-DesignSupport.

The default loop filter is set to 70 kHz. Using a charge pump setting of 2.5 mA is recommended.
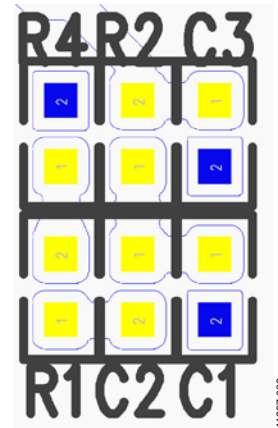

Figure 2. Loop Filter Layout

REFERENCE SOURCE

The 25 MHz TCXO from Rakon provides the necessary reference signal. An external REFIN can be used if desired. In this case, disable the on-board TCXO by removing R59. R9 can be populated with 50 Ω to match the impedance of the evaluation board to the external reference source.

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

The control software for EVAL-CN0285-EB1Z uses the standard ADF4351 programming software. For more details on the installation of this software, consult UG-435, *Evaluation Board for the ADF4351 Fractional-N PLL Frequency Synthesizer*.

After installing the software, run the software by clicking the **ADI ADF435x** file on the desktop or in the **Start** menu. The software front panel opens (see Figure 3).

Confirm that **Analog Devices RFG.L Eval Board connected** is displayed in the bottom left corner of the window. Otherwise, the software has no connection to the evaluation board. In this case, check that the cable connection and USB drivers are correctly installed.

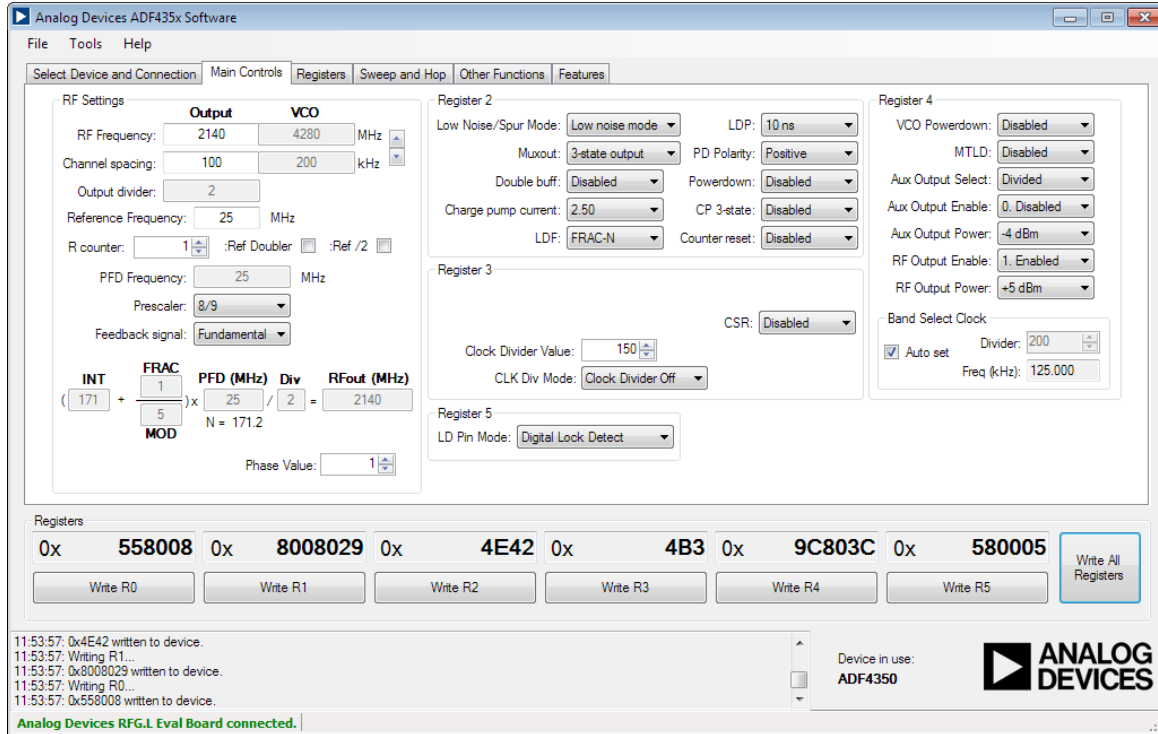Program the RF output frequency in the **Main Controls** tab of the software front panel.

Figure 3. Software Front Panel

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