LMX2582EVM High Performance, Wideband PLLatinum™ RF Synthesizer Evaluation Board Operating Instructions

User's Guide

Literature Number: SNAU194
December 2015
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1. **Power:**
   (a) Set power supply to 3.3 V with 500-mA current limit.
   (b) Connect $V_{CC}$ with SMA cable or clip to test point $V_{CC\_TP}$.

2. **Input Signal**
   (a) Option 1 (default): The on-board Oscillator is powered on and outputs 100-MHz signal to OSCinP (pin 8) of the device input.
   (b) Option 2: MUST switch R14p to R14, which routes the input signal from the OSCinP SMA connector instead of on-board Oscillator. Set a low phase noise signal generator to 100 MHz with 6-dBm power level. Connect to OSCinP or OSCinM if you have a single-ended signal. Connect to both if you have a differential signal.

**NOTE:**
Phase noise of input signal should be below $-150$ dBC/Hz at 10-kHz offset for 100-MHz signal, otherwise the input reference noise will dominate the in-band phase noise at RF output. The On-board Oscillator is only at $-134$ dBC/Hz.
3. Output
   (a) Connect RFoutAM or RFoutAP to a phase noise analyzer. Connect a 50-Ω termination on the unused output if you are using only single-end. Use a balun if you are using differential-ended.

4. Programming Interface
   (a) Connect your laptop to the EVM as shown with included USB2ANY module.
1. Download TICS software from TI.com: http://www.ti.com/tool/TICSPRO-SW
2. To start the EVM software, open TICS.exe from installed directory.
1. The software should be opened as shown in Figure 3-1:

![Figure 3-1. Software Screenshot](image)

2. Top Menu
   - File: Allows you to load or save a setting, export or import the registers in HEX values.
   - USB Communications: Check your connection with the USB2ANY module. (If there is new software follow the on-screen instructions to upgrade.) Load the device (the keyboard shortcut is CTRL+L), which programs all the registers into the device.
   - Default configuration: Load a pre-set setting file given to start from a known state.
   - To select the LMX2582: Click Select Device on top menu. Click PLL + VCO and select LMX2582.

3. Left Panel
   - User Controls: Here you can configure registers, organized by function. Hover your mouse over the register and its information will appear in the Context tab on the left panel.
   - Raw Registers: See the entire register map. Enter a HEX value in to the Data cell then click Write Register to program that value. To read registers you must have MUXout pin (pin 20) connected to the USB2ANY (by default it is connected to the LED, switch R40 to R39 for readback). Also set MUXOUT_SEL=0 for readback. You can also read a register by the name of the register in Register/Field Name section.

4. PLL
   - Fosc: Enter the input signal frequency between 5 to 1400MHz
• Doubler: Can double input signal frequency (input must be 50% duty cycle to use this)
• Pre-R divider: Divides frequencies up to 1400 MHz
• Multiplier: Multiplies frequencies between 40 to 70 MHz and outputs between 180 to 250 MHz
• R divider: Used for dividing frequencies below 5 MHz for very low PFD
• Charge Pump Gain: This tab will auto-update both UP and DN to be equal. Go to bits/pins section if you want to force different values.
• Gain multiplier: Multiplies Charge Pump Gain by a factor
• State: Changes the charge pump output state
• FCAL_EN: Every time you change the output frequency, toggle this off or on to calibrate the device to the frequency.
• Fvco: Set the VCO frequency between 3550 to 7100 MHz.
• Divider MUX: This determines which of the 3 segments is included for a total division between 2 to 192.
• Output MUX: Selects the signal from the VCO output or the Divider.
• Power Settings: Changes the output power (increase 0 to 31, then additional boost with 49 to 63).

5. Burst Mode
• Enter a register in Load Register or delay in seconds.
• You can run and stop the commands in a single burst or continuous loop.
<table>
<thead>
<tr>
<th>DESIGNATOR</th>
<th>DESCRIPTION</th>
<th>MANUFACTURER</th>
<th>PART NUMBER</th>
<th>QUANTITY</th>
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<td>AVX</td>
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<td>OscInM, OscInP, RFoutAM, RFoutAP, RFoutBM, RFoutBP, Vcc</td>
<td>Connector, SMT, End launch SMA 50 ohm</td>
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<td>R1, R2, R4_LF, R10, R13, R21, R22, R23, R30, R35, R37, R38</td>
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Figure 6-1. Top Overlay

Figure 6-2. Top Solder
### Figure 6-9. Drill Drawing

![Drill Drawing](image)

### Figure 6-10. Board Dimensions

![Board Dimensions](image)

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<th>Symbol</th>
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Layout

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210

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This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
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Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs,

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