CML Microcircuits
COMMUNICATION SEMICONDUCTORS

Evaluation Board Quick Start

EV9942E/EV9942A/EV9942

1   Introduction

Thank you for your interest in the EV9942E/EV9942A/EV9942 Evaluation Board.

This quick start guide will help you get started with your CMX994E/CMX994A/CMX994 evaluation. The respective datasheets and user manuals provide full details on the boards but this "quick start" guide consolidates information from multiple sources to accelerate your testing.

This guide walks the user through the following steps:
- Downloading necessary files
- Connecting the EV9942 and PE0003
- Installing PE0003 USB driver
- Using PE0003 graphical user interface (GUI) to configure CMX994 for 448.001MHz signal reception.

The EV9942E (CMX994E), EV9942A (CMX994A), and EV9942 (CMX994) share the same PCB design, graphical user interface, and "quick start" steps. For simplicity, "EV9942" will be used throughout this document to refer to all three evaluation boards. The specific evaluation board will be identified in situations where operations differ.

2   History

Version	Changes	Date
2	Added EV9942E and EV9942A	15-10-26
1	Initial release	14-12-11

3 EV9942 Operation

3.1 Download of Documents and Software
Please visit the CML website (www.cmlmicro.com) and download the following files:
- CMX994E/CMX994A/CMX994A Datasheet (single document for all three devices)
- EV9942 User Manual
- EV9942 Schematic
- EV9942 Evaluation Software package
- PE0003 User Manual
- PE0003 Driver

3.2 Preparing for Operation
- Unzip the EV9942 evaluation software package, locate the "ES9942xx.exe" graphical user interface (GUI), and create a shortcut to it on your desktop.
  - A single GUI is used for all three evaluation boards.
- Unzip the PE0003 driver package. You will need this driver later.
- Connect EV9942 to PE0003 "C-BUS1" connector.
- Apply +5V supply to PE0003 (J11). Typical PE0003 current consumption at this point is approximately 90mA.
- Apply +7.2V supply (rated for 1A) to EV9942 (J12). Typical EV9942 current consumption at this point is approximately 30mA. Please ensure the current limit on 7.2V power supply is set to allow 1A.
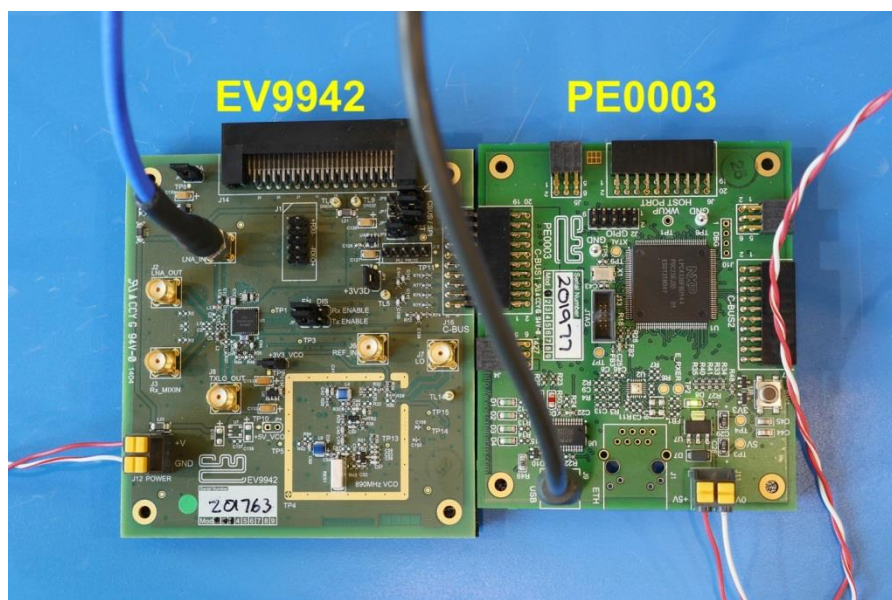

Figure 1: Assembled EV9942 and PE0003

3.3 PE0003 Installation
- Connect PE0003 to PC with USB cable.
- The PC will ask for a USB driver the first time a PE0003 is connected. When prompted, load the USB driver from the unzipped PE0003 Driver package.
  - Your PC may attempt to use "Windows Update" to find the PE0003 USB driver. Cancel the "Windows Update" search. On your PC click "Start" button, right click on "Computer" and select "Properties". Select "Device Manager". Right click "PE0003 Evaluation Kit" and choose "Update driver software". Choose "Browse my computer" and locate the PE0003 driver you downloaded earlier. Click "Install anyway" if you get a driver warning message.

4 Using ES9942xx GUI to Configure CMX994

- Apply 448.001MHz @ -60dBm to EV9942 "LNA_IN" (J5 SMA connector).
- Launch the ES9942xx.exe GUI with your desktop shortcut.
    - Click "Run" if you get a "The publisher could not be verified" warning message.
    - The GUI will automatically detect which EV9942 variant is connected to PE0003.
- Click "Gen Reset" on C-BUS Control tab.

The following sections provide images of properly configured GUI tabs for all three evaluation boards. Choose the section that matches your evaluation board, and then configure Reg 1 and Reg 2 tabs in accordance with the relevant figures. Click "Write All" when configuration is complete:
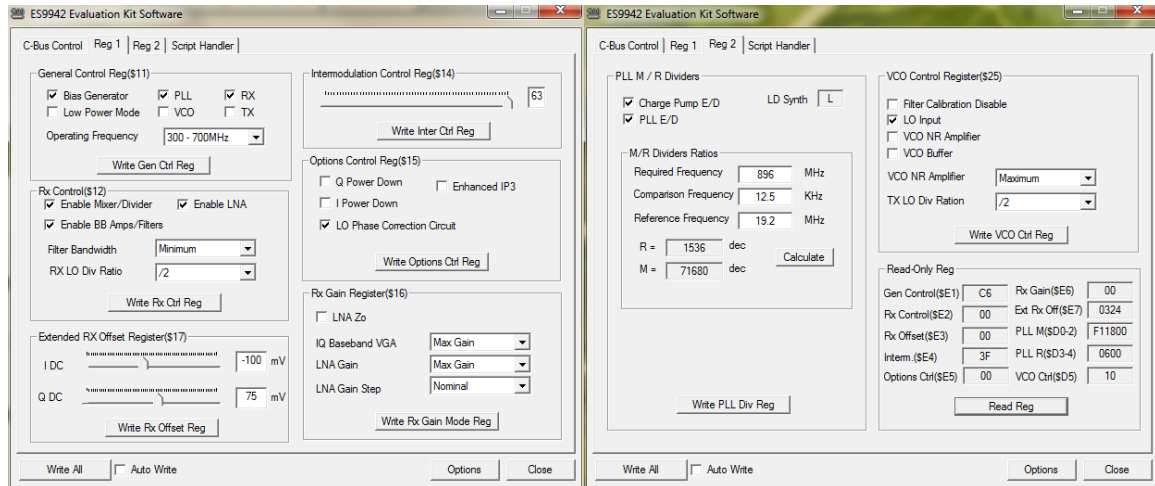
4.1 EV9942E Configuration

Figure 2: EV9942E Configuration Settings
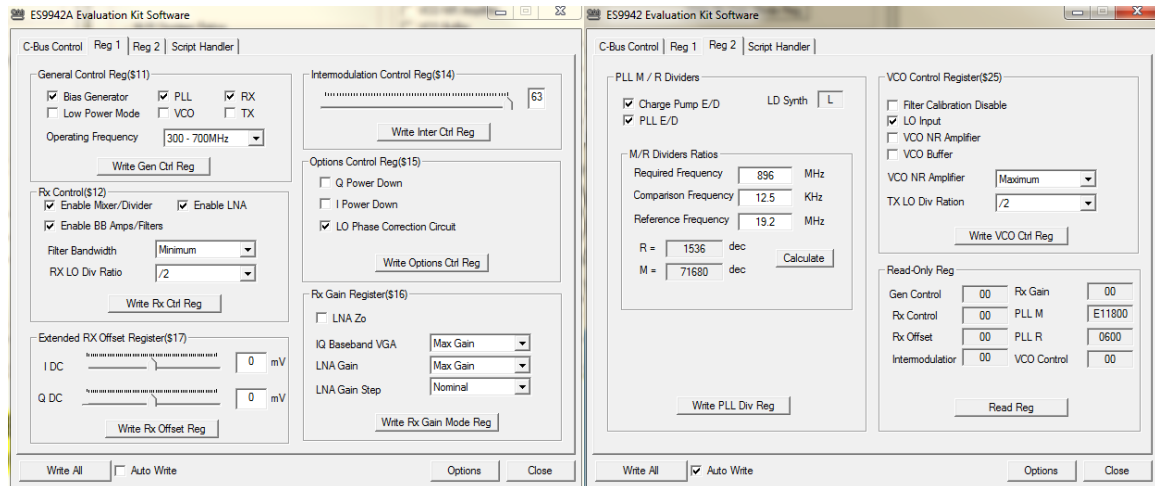
4.2 EV9942A Configuration

Figure 3: EV9942A Configuration Settings

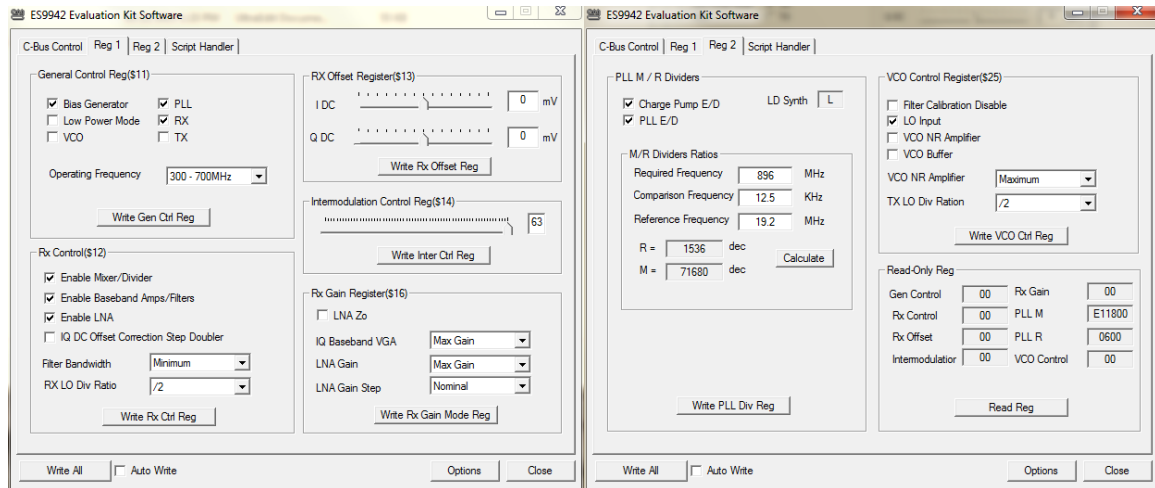## 4.3   EV9942 Configuration

Figure 4: EV9942 Configuration Settings

4.4   CMX994 IQ Output Pin DC Voltage Adjustment

Measure DC voltage between CMX994 I+ and I- output pins, and then repeat for Q+ and Q- pins. Voltage difference between I pins (and between Q pins) should be < 25mV.
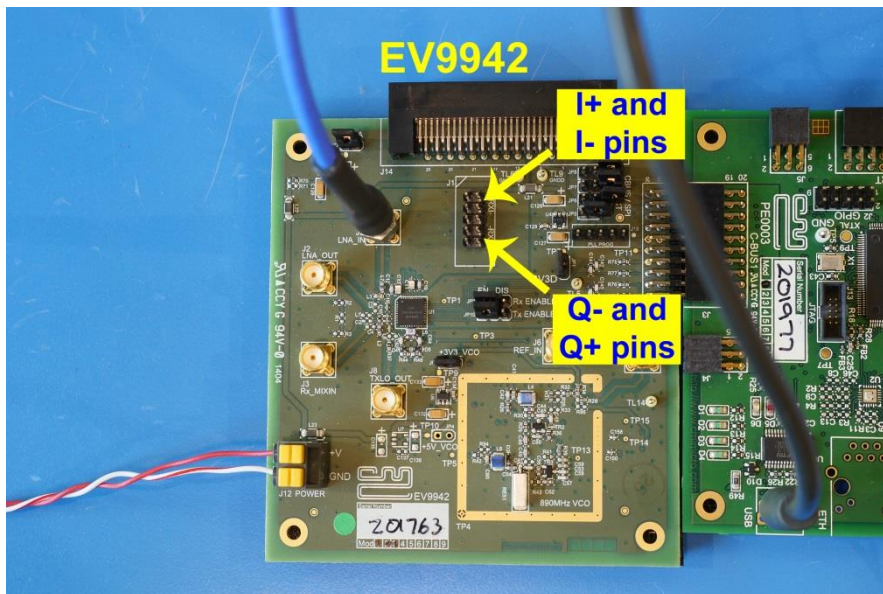

Figure 5: Important Monitoring Points on EV9942

If the voltage difference is > 25mV for I or Q pins, follow one of the following procedures depending on the model of your evaluation board.

- EV9942E/EV9942A
    - Adjust I and/or Q slider in "Extended RX Offset Register" as necessary to achieve difference < 25mV, and click "Write Rx Offset Reg" button.
    - Correction range is +775mV to -775mV, in 25mV steps.
- EV9942
    - Adjust I and/or Q slider in "Rx Offset Register" as necessary to achieve difference < 25mV, and click "Write Rx Offset Reg" button.
    - Nominal correction range is +175mV to -175mV, in 25mV steps.
    - If voltage difference is > 175mV, check "IQ DC Offset Correction Step Doubler" in "Rx Control" field (Reg1 GUI tab) and click "Write Rx Ctrl Reg" button. These actions will double the DC offset correction range to +/-350mV.

At this point the CMX994 is using an 896MHz LO (PCB-mounted VCO with CMX994-internal integer-N synthesizer) to receive a 448.001MHz signal. An oscilloscope can be used to view I and Q output signals. Typical EV9942 current consumption at this point is approximately 110mA-130mA.

The EV9942 user manual and CMX994 datasheet should be reviewed for further testing.

4.5   Helpful Hints

Detailed PE0003 driver installation information can be found in the PE0003 User Manual. For Win7 and Win8 driver signing issues see the FAQ tab on the CML website's PE0003 Product page.

Detailed information on GUI operation can be found in the PE0003 User Manual.

A reference document for the Script language can be downloaded from the CML website's PE0003 product page on the Knowledge Base tab.

Keep a reasonable space between RF evaluation boards to avoid RF coupling issues.

Keep RF leads routed away from the boards and other when making precise measurements. This will avoid signal coupling affecting the results.

The PE0003 generates high spurious noise typical of high speed processors and this may be coupled into the RF circuits. While every care has been taken to avoid issues, optimum performance will be achieved with a production design that includes overall shielding and consideration of the layout with respect to the processor speed and proximity.

Please contact CML Technical Support if you have any questions or require further assistance.

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