

***TRF3750 (QFN/TSSOP)***  
***Evaluation Module***

*User's Guide*

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

<b>Products</b>		<b>Applications</b>	
Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>	Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>	Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
		Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
		Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
		Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments  
Post Office Box 655303 Dallas, Texas 75265

## EVM IMPORTANT NOTICE

Texas Instruments (TI) provides the enclosed product(s) under the following conditions:

This evaluation kit being sold by TI is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not considered by TI to be fit for commercial use. As such, the goods being provided may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety measures typically found in the end product incorporating the goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may not meet the technical requirements of the directive.

Should this evaluation kit not meet the specifications indicated in the EVM User's Guide, the kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods. Please be aware that the products received may not be regulatory compliant or agency certified (FCC, UL, CE, etc.). Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

**EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.**

TI currently deals with a variety of customers for products, and therefore our arrangement with the user **is not exclusive**.

TI assumes **no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein**.

Please read the EVM User's Guide and, specifically, the EVM Warnings and Restrictions notice in the EVM User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact the TI application engineer.

Persons handling the product must have electronics training and observe good laboratory practice standards.

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used.

Mailing Address:

Texas Instruments  
Post Office Box 655303  
Dallas, Texas 75265

---

## **EVM WARNINGS AND RESTRICTIONS**

It is important to operate this EVM within the specified input and output voltage ranges described in the EVM user's guide.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 25°C. The EVM is designed to operate properly with certain components above 65°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

### **Mailing Address:**

Texas Instruments  
Post Office Box 655303  
Dallas, Texas 75265

Copyright © 2004, Texas Instruments Incorporated

# Read This First

---

---

---

---

### ***About This Manual***

This user's guide provides an overview of the TRF3750 evaluation module (EVM) and the software environment to get you started using the TRF3750 EVM right away. It also provides a general description of the features and functions to be considered while using this module.

### ***How to Use This Manual***

This document contains the following chapters:

- Chapter 1—Introduction
- Chapter 2—Software Installation
- Chapter 3—Hardware Configuration
- Chapter 4—Physical Description
- Chapter 5—Schematic

### ***FCC Warning***

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

### ***Trademarks***

Windows is a trademark of Microsoft.

### ***Information About Cautions and Warnings***

This book may contain cautions and warnings.

**This is an example of a caution statement.**

**A caution statement describes a situation that could potentially damage your software or equipment.**

**This is an example of a warning statement.**

**A warning statement describes a situation that could potentially cause harm to you.**

The information in a caution or a warning is provided for your protection. Please read each caution and warning carefully.

# Contents

---

---

---

<b>1</b>	<b>Introduction</b> .....	<b>1-1</b>
1.1	EVM Basic Functions .....	1-2
1.2	Power Requirements .....	1-2
<b>2</b>	<b>Software Installation</b> .....	<b>2-1</b>
2.1	Software Installation .....	2-2
2.2	Selecting Menus and Settings .....	2-4
2.3	TRF3750 Reference Latch Menu .....	2-5
2.4	TRF3750 N-Counter Latch .....	2-6
2.5	TRF3750 Function Latch .....	2-7
2.6	TRF3750 Initialization Latch .....	2-8
2.7	TRF3750 Set Bits Individually .....	2-9
2.8	Parallel Port .....	2-10
2.9	Help Menu .....	2-11
2.10	Exit .....	2-12
<b>3</b>	<b>Hardware Configuration</b> .....	<b>3-1</b>
3.1	EVM Configuration .....	3-2
3.1.1	REFIN .....	3-2
<b>4</b>	<b>Physical Description</b> .....	<b>4-1</b>
4.1	PCB Layout .....	4-2
4.2	Parts List .....	4-10
<b>5</b>	<b>Schematics</b> .....	<b>5-1</b>

# Figures

---

---

---

2-1	Structure of the Main Menu . . . . .	2-3
2-2	Example of N-Counter Latch . . . . .	2-6
4-1	Top Layer 1 (TSSOP EVM) . . . . .	4-2
4-2	Ground Plane Layer 2 (TSSOP EVM) . . . . .	4-3
4-3	Power Plane Layer 3 (TSSOP EVM) . . . . .	4-4
4-4	Bottom Layer 4 (TSSOP EVM) . . . . .	4-5
4-5	Top Layer 1 (QFN EVM) . . . . .	4-6
4-6	Ground Plane Layer 2 (QFN EVM) . . . . .	4-7
4-7	Power Plane Layer 3 (QFN EVM) . . . . .	4-8
4-8	Bottom Layer 4 (QFN EVM) . . . . .	4-9

# Tables

---

---

---

3-1	Reference Oscillator Configuration . . . . .	3-2
4-1	TRF3750 EVM Parts List . . . . .	4-10



# Introduction

---

---

---

---

The TRF3750 EVM provides a platform for evaluating the TRF3750 integer-N PLL frequency synthesizer under various signals, reference, and supply conditions. This document should be used in combination with the EVM schematic diagram supplied. Using the TRF3750 EVM, you can rapidly evaluate the TRF3750 PLL with a minimum of manual setup. The CD-ROM provides all the software you need to test the device.

<b>Topic</b>	<b>Page</b>
<b>1.1 EVM Basic Funcations</b> .....	<b>1-2</b>
<b>1.2 Power Requirements</b> .....	<b>1-2</b>

## 1.1 EVM Basic Functions

The reference input can be provided using the on-board oscillator (Y1) or brought in externally using the SMA connector J4. The VCO output can be monitored through the SMA connector J3.

Power connections to the EVM are via a five terminal screw style connector J1. EMI filters provide isolated power for the analog, digital, and charge pump power inputs to the TRF3750 and the high-frequency VCO power input. A mating connector is provided to allow for easy connections to external power supplies.

The TRF3750 EVM allows the user to program the TRF3750 internal registers via the supplied computer parallel port cable and serial interface software. The interface allows read and write access to all registers that define the operation modes of the TRF3750.

## 1.2 Power Requirements

The EVM has four terminals for dc power supply and one for ground. Connect a 5-V dc supply to terminal 1 (VVCO) for the VCO power. Connect 3.3 Vdc or 5 Vdc to terminal 2 (AVDD) for the TRF3750 analog power. DVDD must be set equal to AVDD, connect either 3.3 Vdc or 5 Vdc to terminal 4 (DVDD) for the TRF3750 digital power. Connect 7 Vdc to terminal 5 (Vp) for the TRF3750 charge pump supply. Connect ground to terminal 3 (GND).

Note: The operating range for the charge pump supply (VCP) is 8 Vdc max.

### **Voltage Limits**

**Exceeding the maximum input voltages can damage EVM components. Undervoltage may cause improper operation of some or all of the EVM components.**

# Software Installation

---

---

---

---

This section explains how to install the software and gives an overview of the main parts tool menus.

<b>Topic</b>	<b>Page</b>
<b>2.1 Software Installation</b> .....	<b>2-2</b>
<b>2.2 Selecting Menus and Settings</b> .....	<b>2-4</b>
<b>2.3 TRF3750 Reference Latch Menu</b> .....	<b>2-5</b>
<b>2.4 TRF3750 N-Counter Latch</b> .....	<b>2-6</b>
<b>2.5 TRF3750 Function Latch</b> .....	<b>2-7</b>
<b>2.6 TRF3750 Initialization Latch</b> .....	<b>2-8</b>
<b>2.7 TRF3750 Set Blts Individually</b> .....	<b>2-8</b>
<b>2.8 Parallel Port</b> .....	<b>2-8</b>
<b>2.9 Help Menu</b> .....	<b>2-9</b>
<b>2.10 Exit</b> .....	<b>2-10</b>

## 2.1 Software Installation

All necessary software to operate the serial interface is provided on the enclosed CD-ROM.

Version 1.0 of the TRF3750 software allows full control and programmability of all the different functions and modes of the TRF3750. The software is GUI-based and employs an intuitive graphical environment. You can load the software in the following ways:

- 1) Insert the CD-ROM into the computer to be used to operate the serial interface.
- 2) Double click the file called setup.exe.

The installer prompts you to select the directory in which you wish to install the program. The installer automatically installs the TRF3750 software, the National Instruments LabVIEW run-time engine, and the LabWindows run-time engine in one seamless installation. After the computer goes through the automatic installation, you will be prompted to restart your computer. The software was created using LabVIEW, but it does not require LabVIEW to be installed on the PC. This is why the run0time engines are installed.

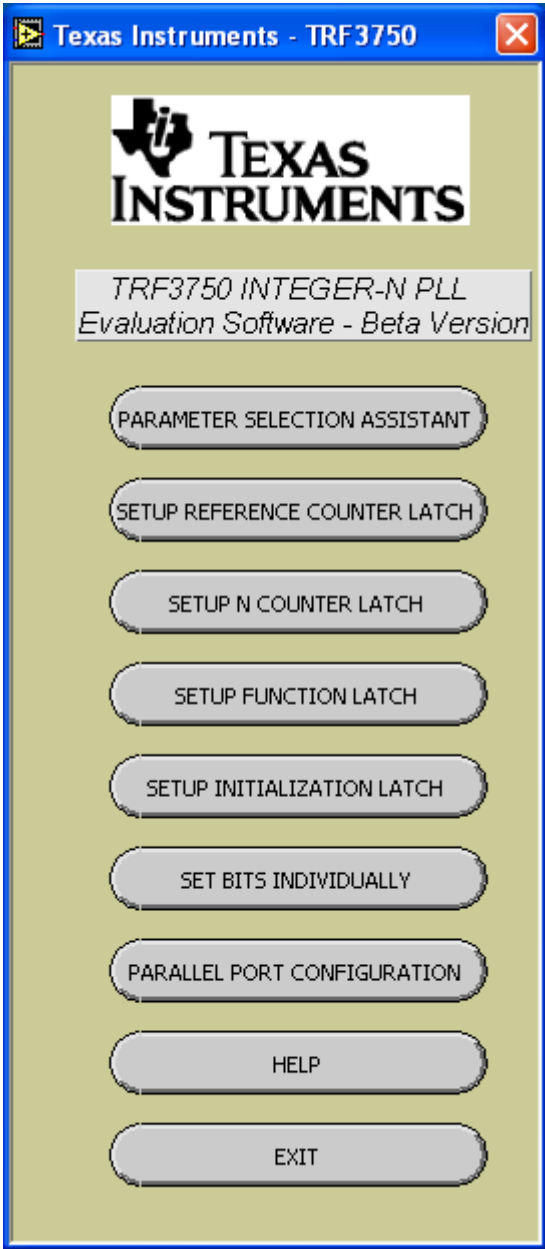
Once you restart, the program is ready to function. Ensure that you have connected your PC's parallel port cable to the TRF3750 EVM (connector J5).

- 3) Once the installation is complete, the software is launched by running C:\TRF3750.exe.

Once you launch the program, it automatically runs and gives you several options (icons).

Figure 2–1 shows the structure of the main menu.

Figure 2-1. Structure of the Main Menu



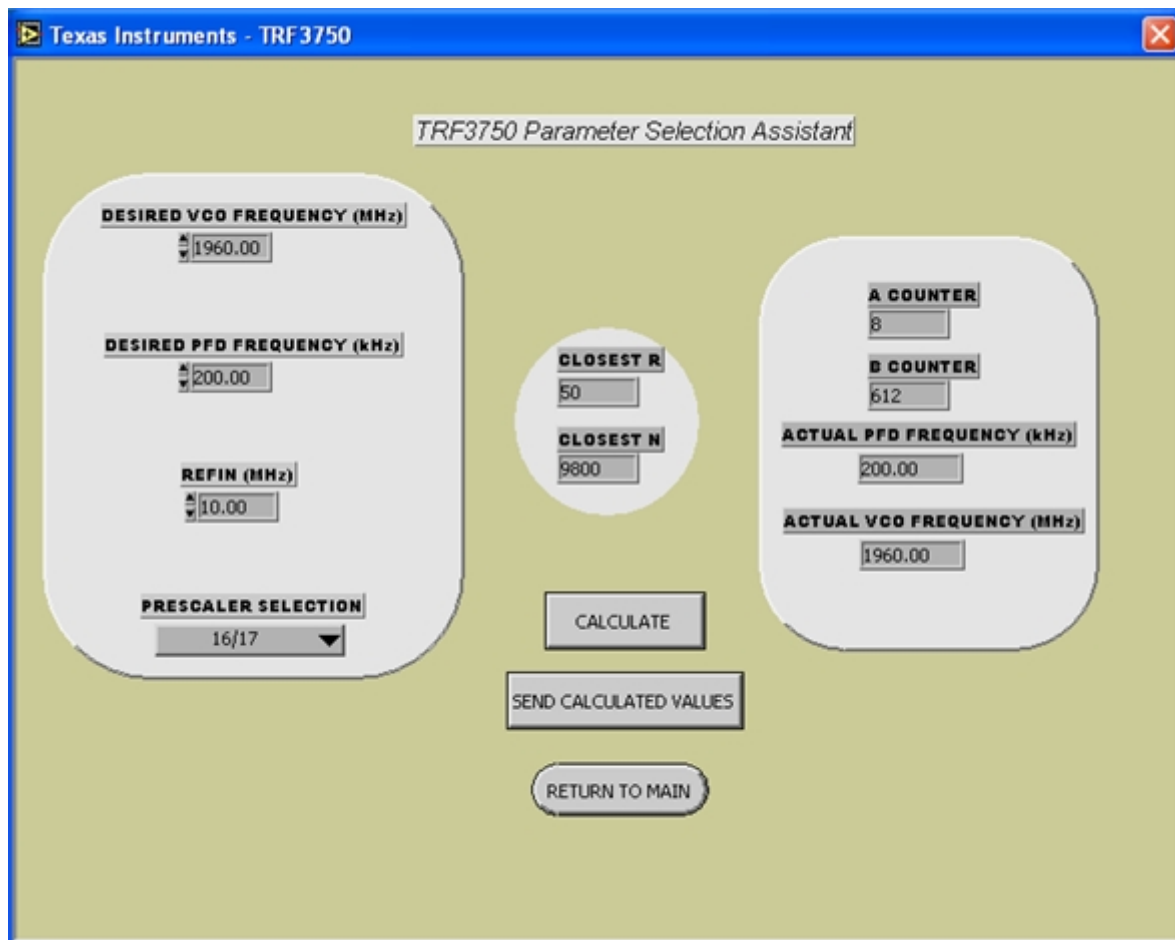
## 2.2 Selecting Menus and Settings

- 1) Left click the *PARAMETER SELECTION ASSISTANT* to display the menu for configuring the PLL.

The menu is shown edited for:

- VCO frequency = 1960 MHz
- PFD frequency = 200 kHz
- Reference frequency (REFIN) = 10 MHz and
- Prescaler selection 16/17

- 2) Left click on the *CALCULATE* button and the program calculates the data-set for the A counter and B counter. You also have the option of setting a specific value directly in the A and B counters that equates to the set or desired PFD frequency.

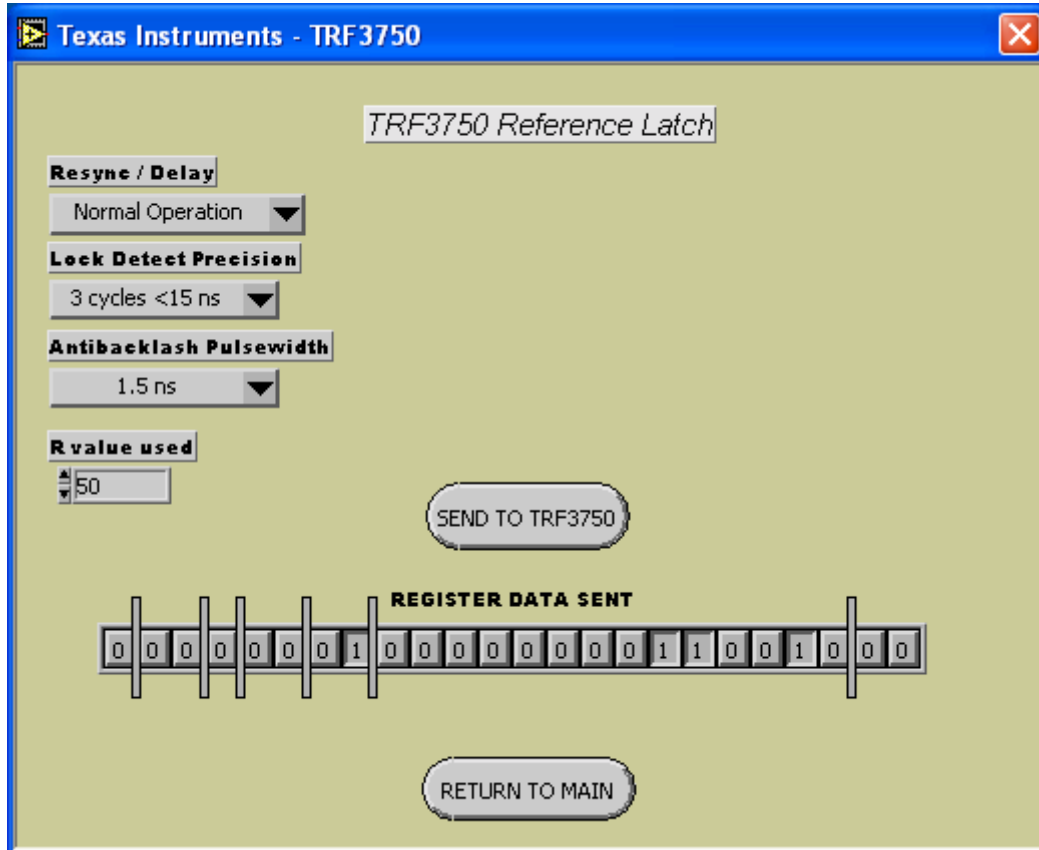


- 3) Left click the *SEND CALCULATED VALUES* to load the PLL registers.
- 4) Left click *RETURN TO MAIN* returns to the main menu.

## 2.3 TRF3750 Reference Latch Menu

- Select a menu item using the pulldown arrows.
- Press the *SEND TO TRF3750* button to send the data to the register.
- Press the *RETURN TO MAIN* button to close the menu.

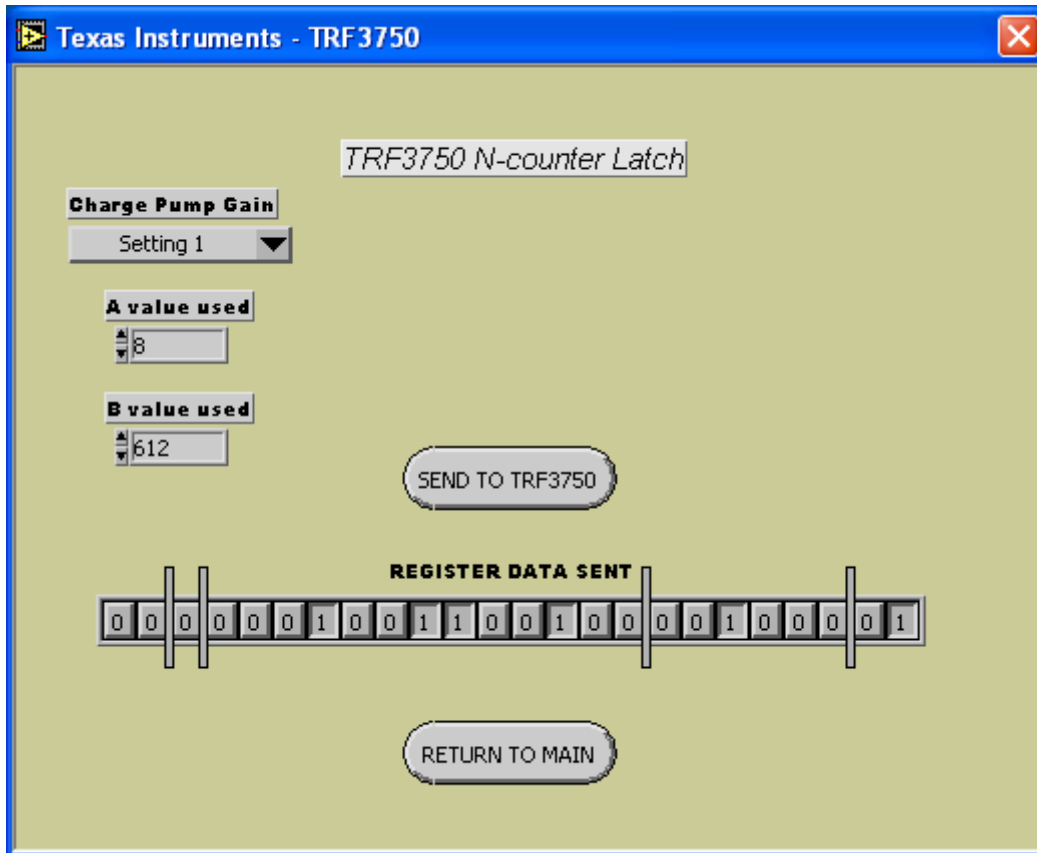
The palette settings displayed are typical and the R-value representing the relationship between the reference 10-MHz oscillator and the 200-kHz comparison frequency.



## 2.4 TRF3750 N-Counter Latch

Figure 2–2 shows an example of the N-counter settings.

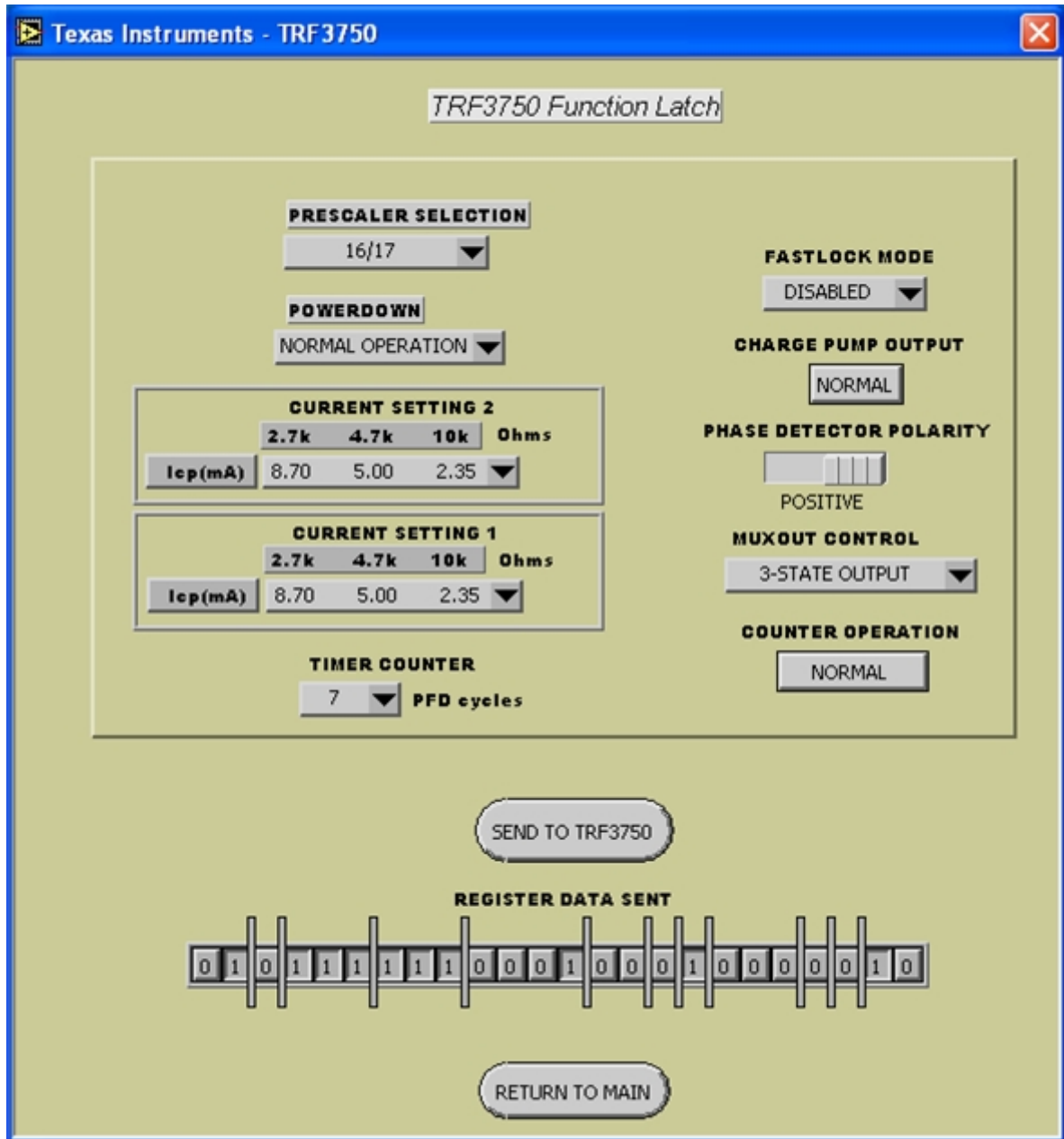
Figure 2–2. Example of N-Counter Latch





## 2.5 TRF3750 Function Latch

Use the *Pull* button to set the charge pump current and other function latch-specific features supported.



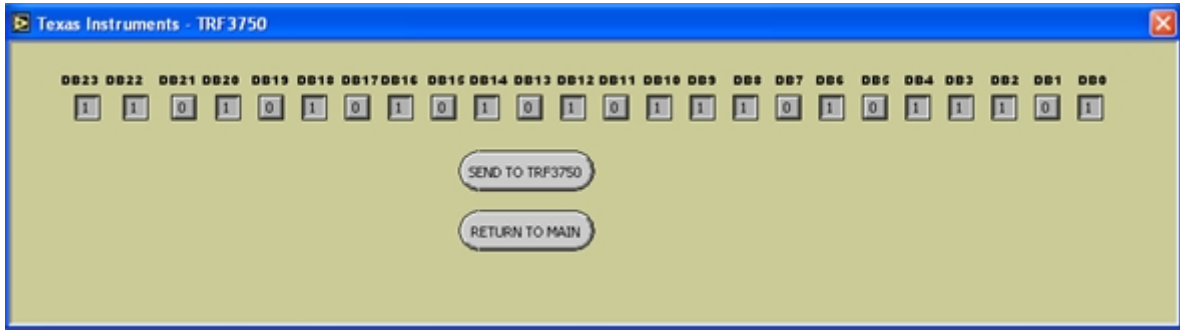
## 2.6 TRF3750 Initialization Latch

The screenshot shows a software window titled "Texas Instruments - TRF3750" with a sub-window "TRF3750 Initialization Latch". The interface contains several configuration sections:

- PRESCALER SELECTION:** A dropdown menu set to "16/17".
- POWERDOWN:** A dropdown menu set to "NORMAL OPERATION".
- CURRENT SETTING 2:** A table with columns for resistance values (2.7k, 4.7k, 10k, Ohms) and a corresponding  $I_{cp}$  (mA) value (8.70, 5.00, 2.35). A dropdown menu is set to the 2.35 mA value.
- CURRENT SETTING 1:** A table with columns for resistance values (2.7k, 4.7k, 10k, Ohms) and a corresponding  $I_{cp}$  (mA) value (8.70, 5.00, 2.35). A dropdown menu is set to the 2.35 mA value.
- TIMER COUNTER:** A dropdown menu set to "7" with the label "PFD cycles".
- FASTLOCK MODE:** A dropdown menu set to "DISABLED".
- CHARGE PUMP OUTPUT:** A button labeled "NORMAL".
- PHASE DETECTOR POLARITY:** A graphical slider set to "POSITIVE".
- MUXOUT CONTROL:** A dropdown menu set to "3-STATE OUTPUT".
- COUNTER OPERATION:** A button labeled "NORMAL".

At the bottom of the window, there is a "SEND TO TRF3750" button, a "REGISTER DATA SENT" display showing a 16-bit binary sequence: 010111110001000100000011, and a "RETURN TO MAIN" button.

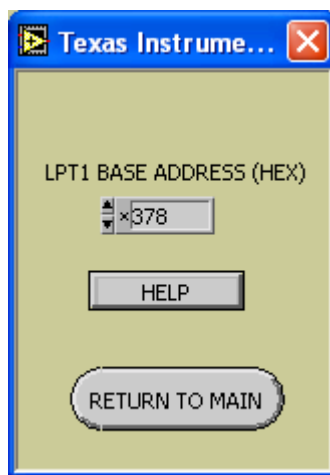
## 2.7 TRF3750 Set Blts Individually



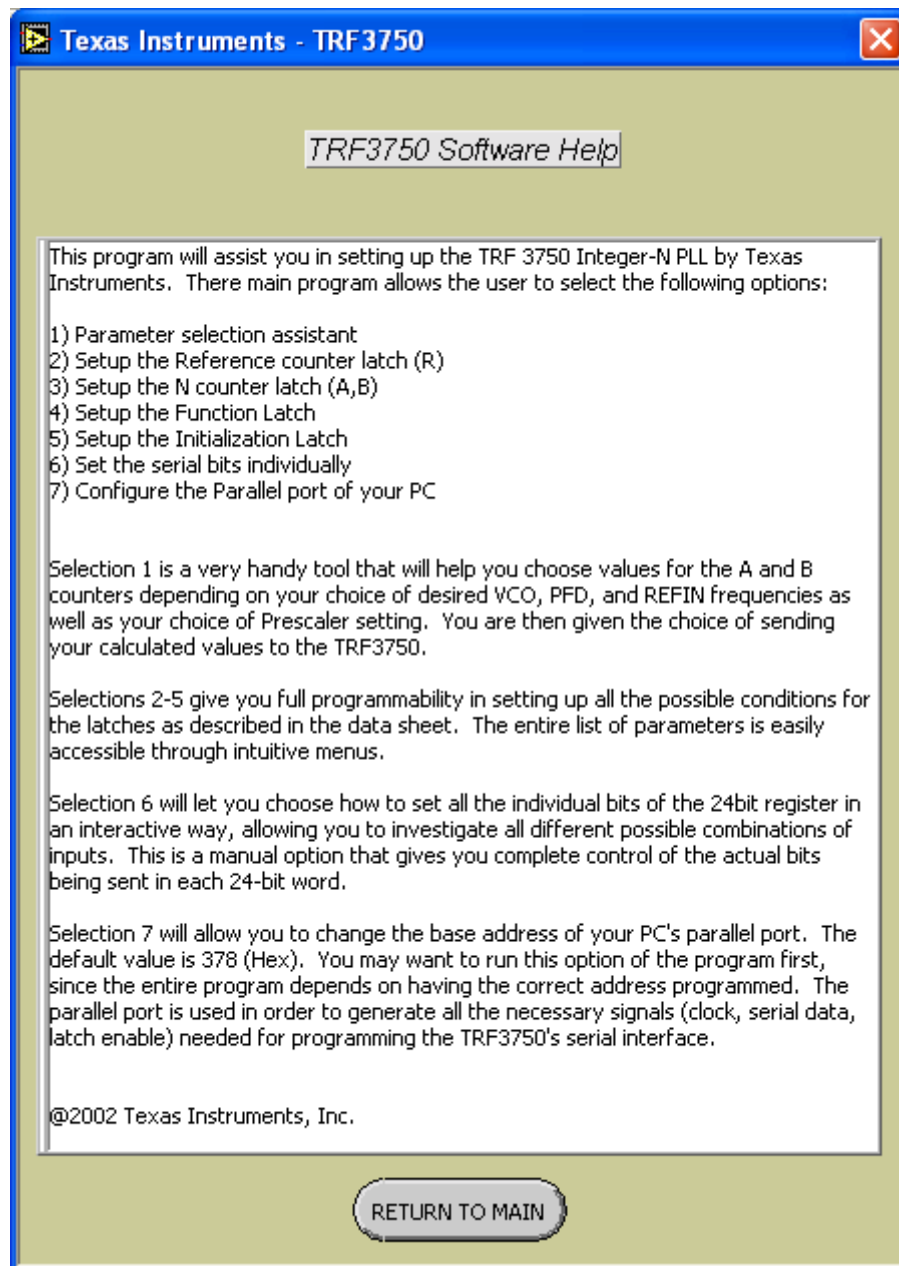
## 2.8 Parallel Port

The program assumes that the base address of your parallel port is Hexadecimal 378. If that is not the case, you can change the base address by left clicking on the parallel port configuration button. You can access the built-in help file by left clicking on the *HELP* button. The program includes the parameter assistant, which can help you choose divider ratios and parameters depending on your choice of VCO frequency, prescaler value, and PFD frequency. By simply Left clicking on each of the respective buttons brings up a window from which you can control the individual registers and all the settings. There is also an option to set all the bits of the serial interface manually, if so desired.

If you have any questions or encounter any difficulties, contact [yiannis@ti.com](mailto:yiannis@ti.com).

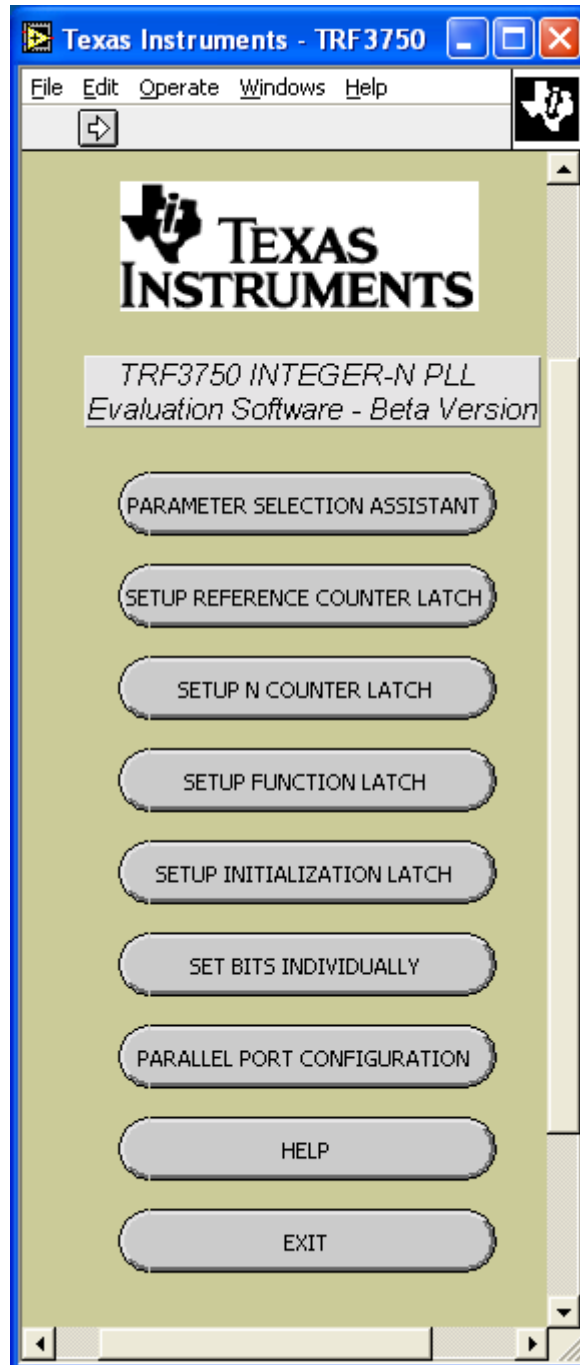


## 2.9 Help Menu



## 2.10 Exit

Pressing the *EXIT* button stops the execution of the program and returns you to the main menu. You can also rerun the last configuration automatically by left clicking on the arrow located on the tool bar, just below *Edit*.



# Hardware Configuration

---

---

---

---

This chapter discusses the EVM configuration and also contains the EVM schematic.

<b>Topic</b>	<b>Page</b>
<b>3.1 EVM Configuration .....</b>	<b>3-2</b>

### 3.1 EVM Configuration

The TRF3750 EVM can be set up in a variety of configurations to accommodate a specific mode of operation. Before starting evaluation, the user should decide on the configuration and make the appropriate connections or changes. The basic synthesizer circuit is shown in the schematic (Chapter 5). The demonstration board comes with the following factory-set configuration:

#### 3.1.1 REFIN

This is the input reference signal to the PLL. It is advantageous to have the capability of the REFIN input either via a stable on-board reference TCXO or a stable external frequency source. The default setting for the EVM is with REFIN provided externally through SMA connector J4. Note that the user can change the on-board TCXO and if the oscillator has an adjustment voltage input, TP8 can be used to fine-tune the frequency by applying an external voltage.

**Note:**

**When using the on-board oscillator, make sure DVDD is within the oscillator input power specification.**

Only minor modifications have to be made to the circuit when using the internal source and these are shown in Table 3–1.

Table 3–1. Reference Oscillator Configuration

REFIN Signal Source	Circuit Configuration
Y1	Remove R3, install R20 and FB1 or FB2 <sup>‡</sup>
External signal source	Install R3, remove R20 and FB1/FB2

<sup>‡</sup> Use FB2 and E1 to provide the TCXO power if different then DVDD.

- An easy and reliable way to provide this signal is by using the 10-MHz output of a spectrum analyzer or phase-noise analyzer.
- The current setting resistor jumper, J6, can be used to select one of three resistors for setting the maximum charge pump current. The values installed are 2.7 kΩ, 4.7 kΩ, and 10 kΩ. Use a jumper to short pin 1 (the center pin) to the preferred resistor. The default setting for the EVM uses R15 (4.7 kΩ).
- RFINA (J3), RFINB (J7)—The reference oscillator (U2) output is connected to J3 and to the reference input A pin of the TRF3750. The TRF3750 can accept either single ended or differential inputs. The TRF3750 EVM uses a single-ended VCO and the reference B input (J7) unconnected. If a differential input was to be used, C16 must be removed. J3 is connected through a resistive splitter to the output of the VCO and is the output of the board. Connect this to a 50-Ω load (spectrum or phase-noise analyzer) for monitoring purposes.
- MUXOUT—MUXOUT is used to output internal TRF3750 signals. The signal type is selected through the interface software. TP2 allows direct



access to the MUXOUT pin. An LED is also connected for visual identification. Note that R13 and R14 are removed. R12 limits the current going into the LED. To connect the MUXOUT output to the parallel port connector J5, install R2 (0  $\Omega$ ).

- W1—This jumper controls the chip enable. When this signal is a logic 1, the device is in operate mode. The default setting for the EVM is with W1 between pins CE and HI.

To prepare the TRF3750 EVM for evaluation, connect the following:

- 1) 5 V to J1-1 and the return to J1-3.
- 2) 7 V to J1-5 and the return to J1-3.
- 3) 3.3 V to J1-2 and J1-4 and the return to J1-3.
- 4) If a crystal oscillator (usually 10 MHz) is installed go to step 5.
- 5) Use a frequency generator with 50- $\Omega$  output to input a 10-MHz single-ended, 3 V<sub>pp</sub>, 0-V offset square or sine wave signal to SMA connector J4 (REFIN). Another option is to use the 10-MHz output of a spectrum analyzer or phase-noise analyzer.
- 6) Connect the supplied serial interface cable to the parallel port of a PC and the EVM.
- 7) Start the TRF3750 interface software and load the desired settings.
- 8) The VCO RF output can now be monitored using SMA connector J3. The TRF3750 internal signals can be monitored using TP2 or the PC if R2 is installed.



# Physical Description

---

---

---

---

This chapter describes the physical characteristics and PCB layout of the EVM and lists the components used on the module.

<b>Topic</b>	<b>Page</b>
4.1 PCB Layout .....	4-2
4.2 Parts List .....	4-10

### 4.1 PCB Layout

The EVM is constructed on a 4-layer, 3.4 inch x 4 inch, 0.062 inch thick PCB using FR-4 material. Figure 4-1 through Figure 4-4 show the PCB layout for the TSSOP EVM and Figures 4-5 through 4-8 show the PCB layout for the QFN EVM.

Figure 4-1. Top Layer 1 (TSSOP EVM)

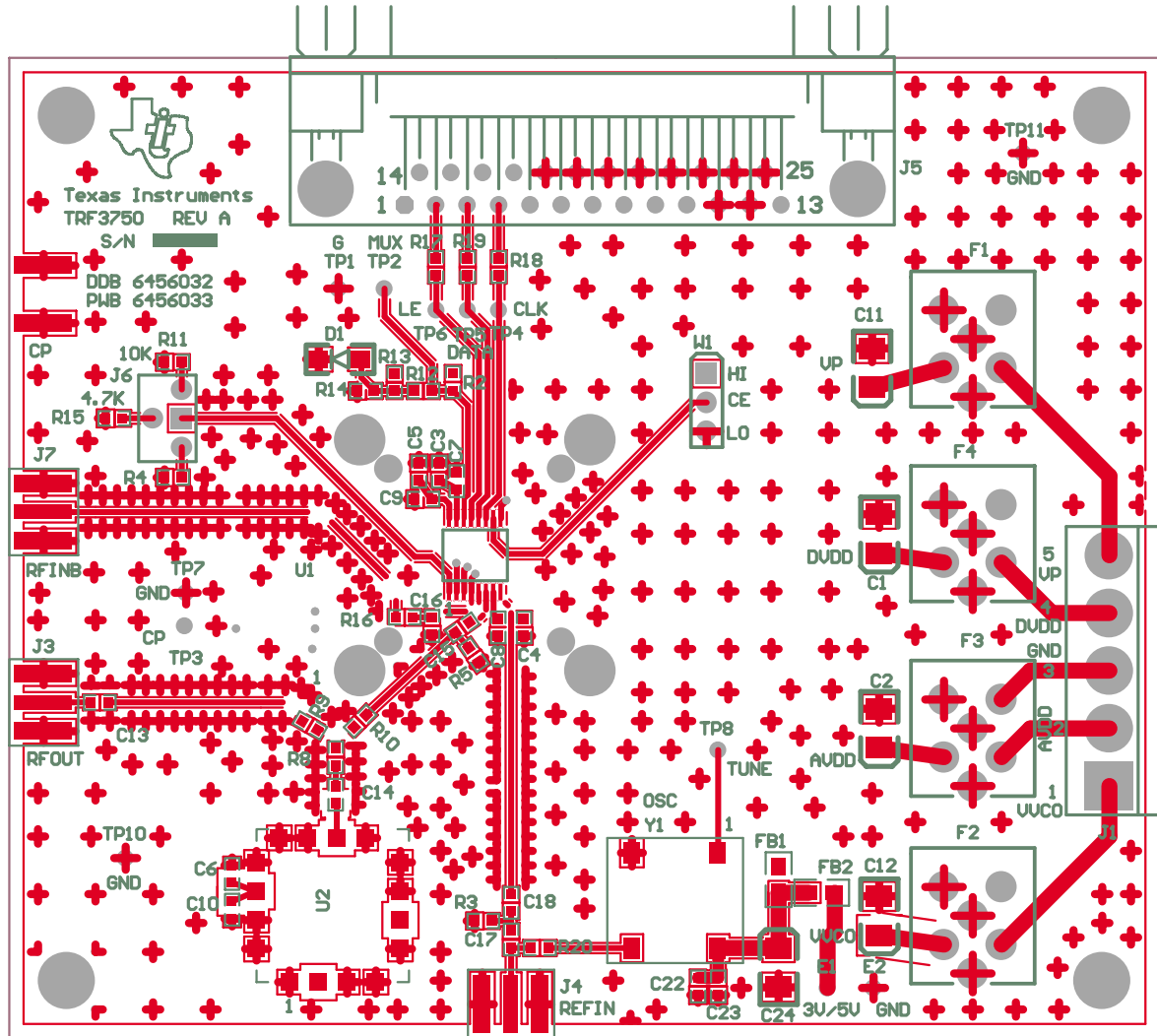


Figure 4-2. Ground Plane Layer 2 (TSSOP EVM)

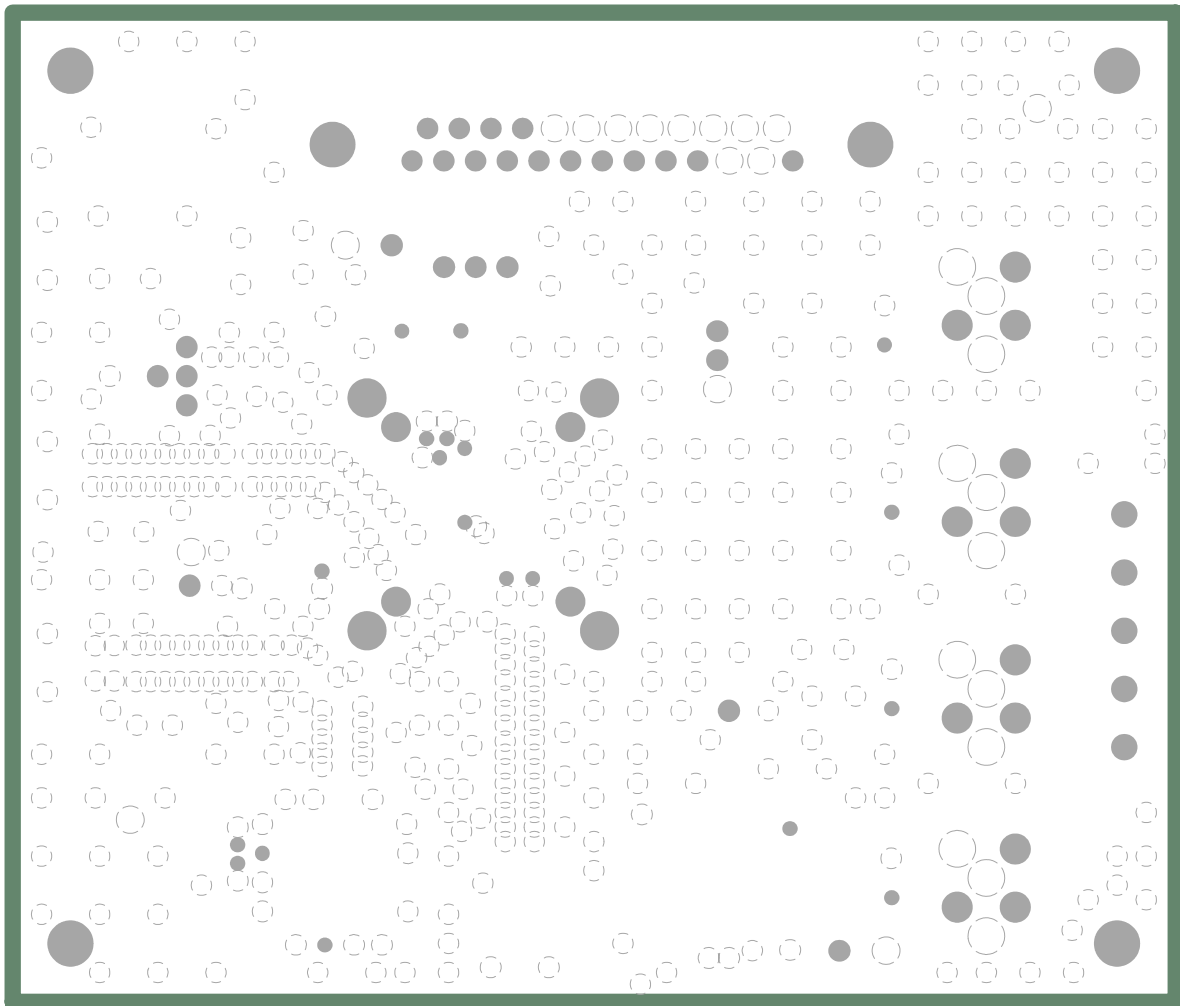


Figure 4–3. Power Plane Layer 3 (TSSOP EVM)

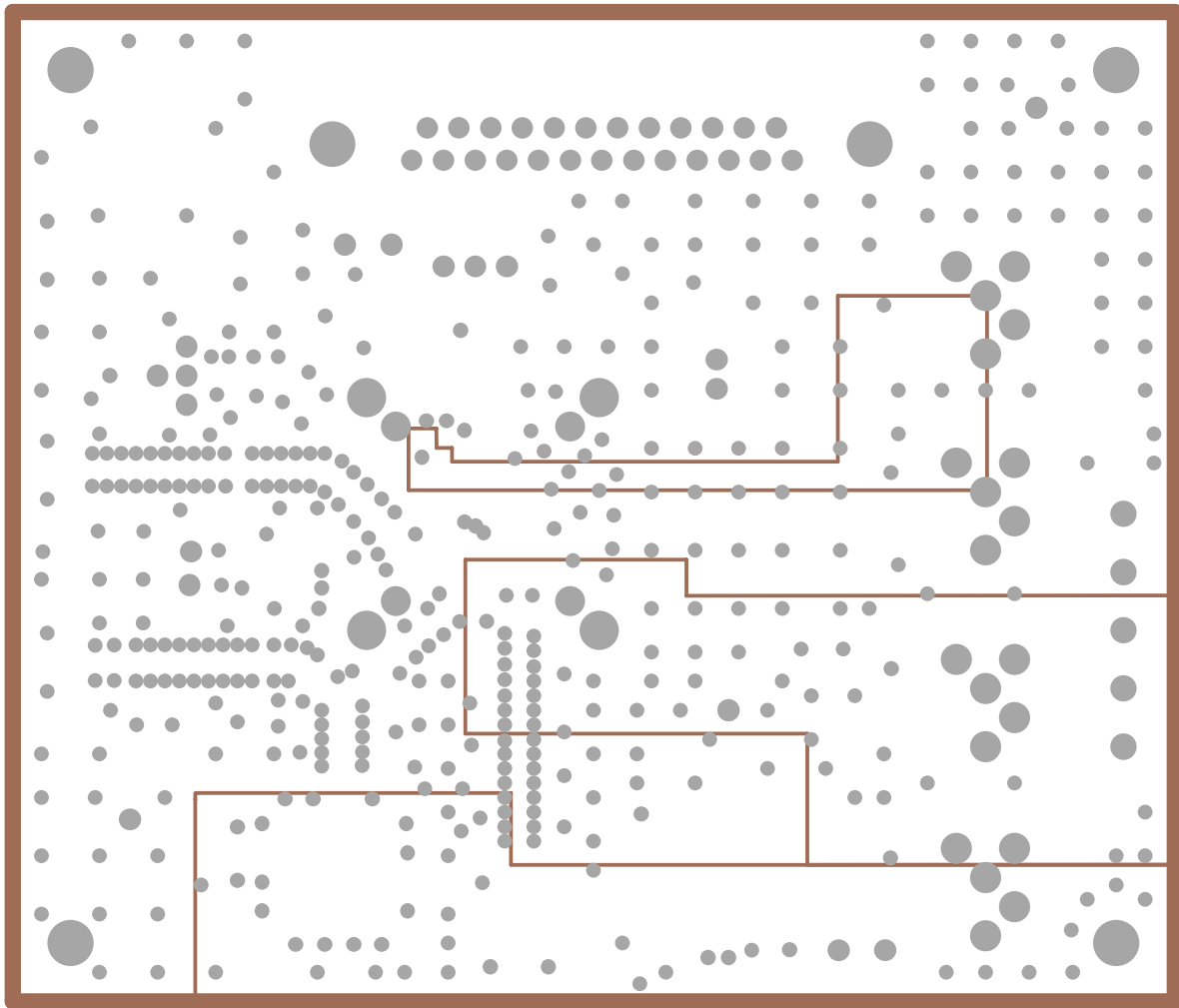


Figure 4-4. Bottom Layer 4 (TSSOP EVM)

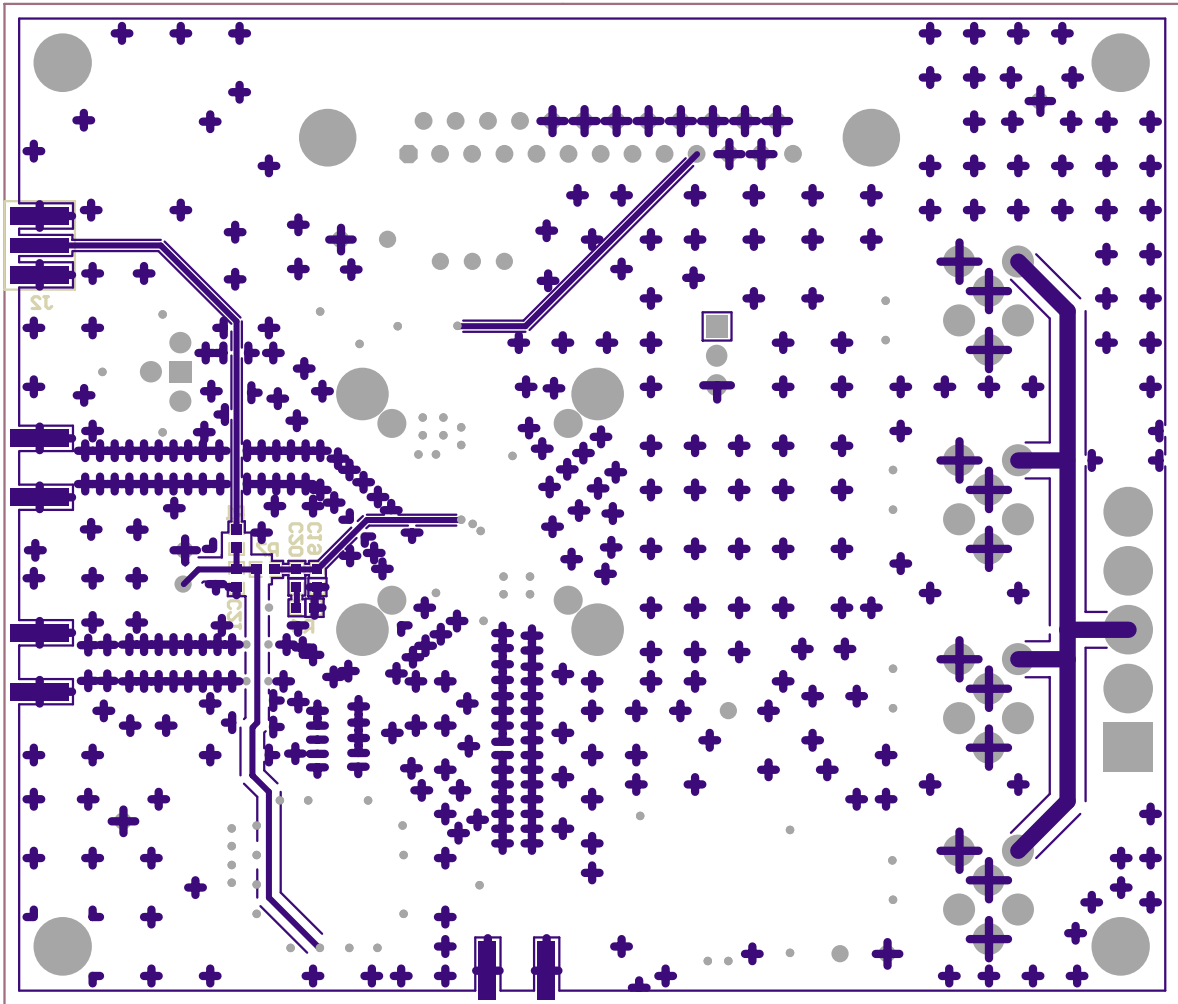


Figure 4-5. Top Layer 1 (QFN EVM)

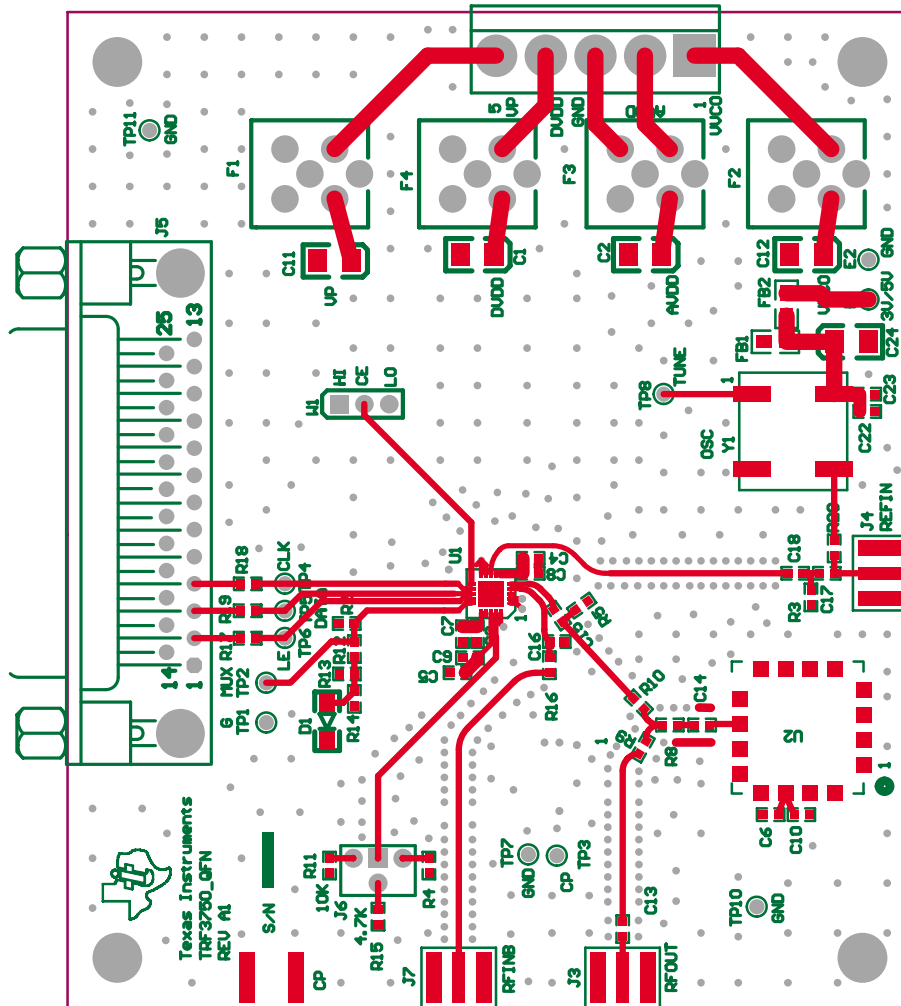




Figure 4-6. Ground Plane Layer 2 (QFN EVM)

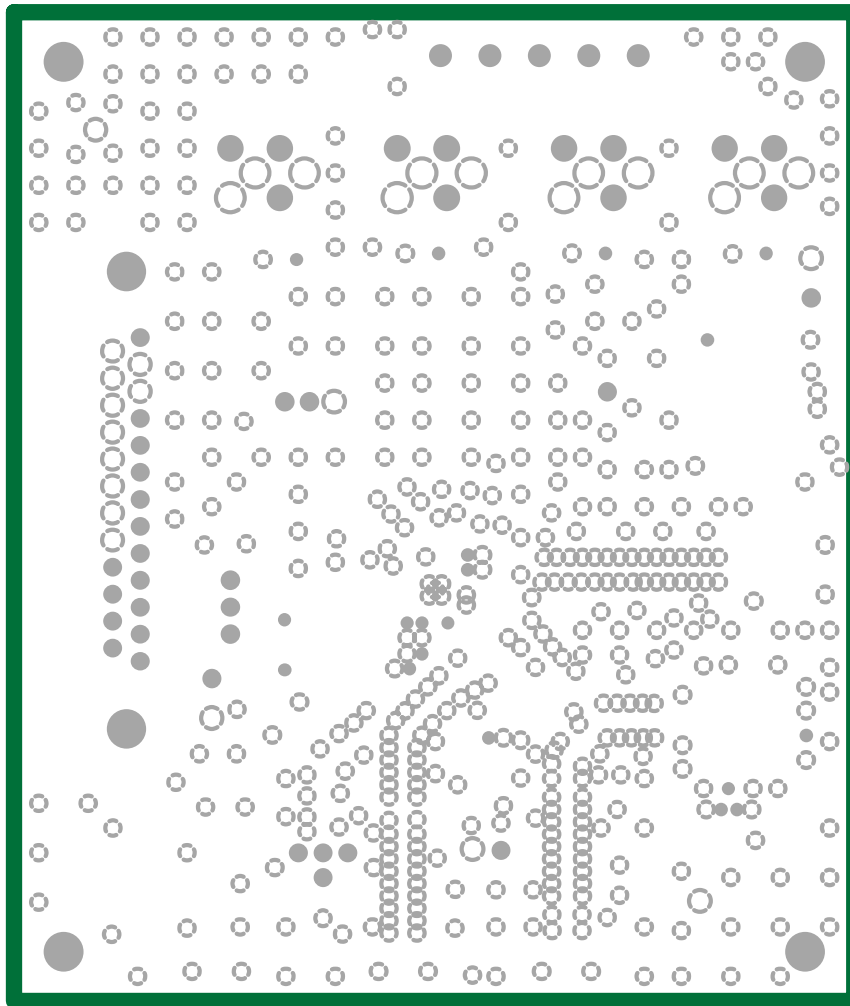


Figure 4-7. Power Plane Layer 3 (QFN EVM)

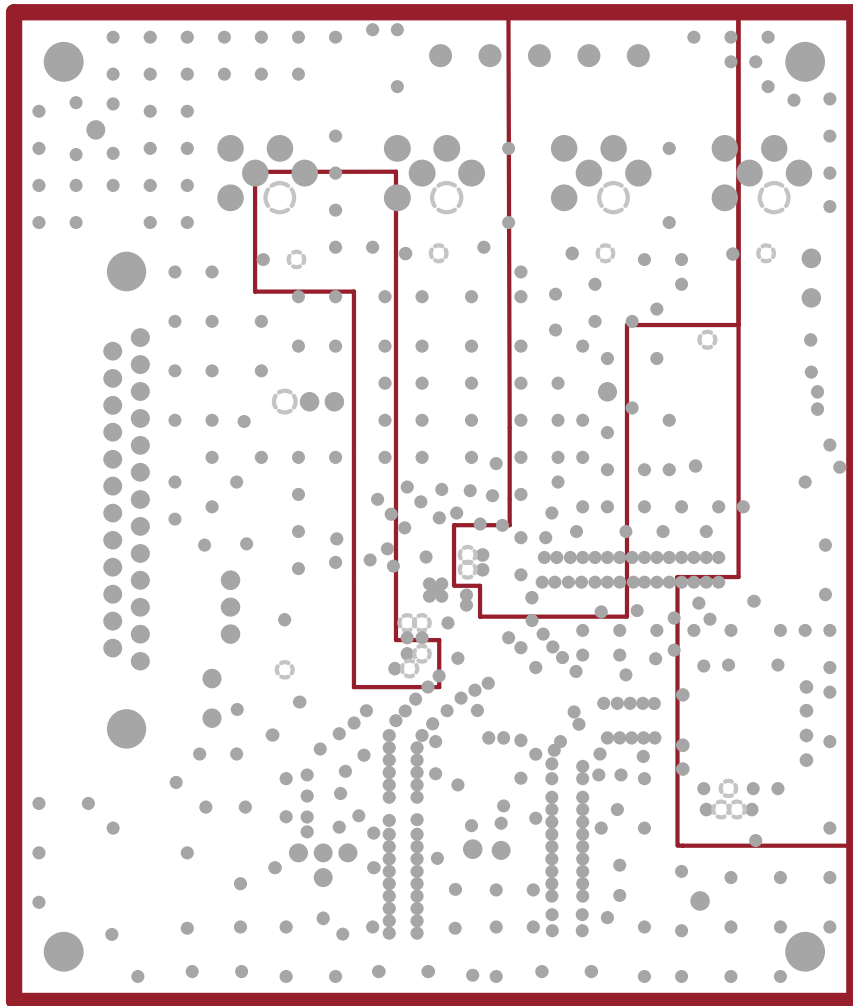
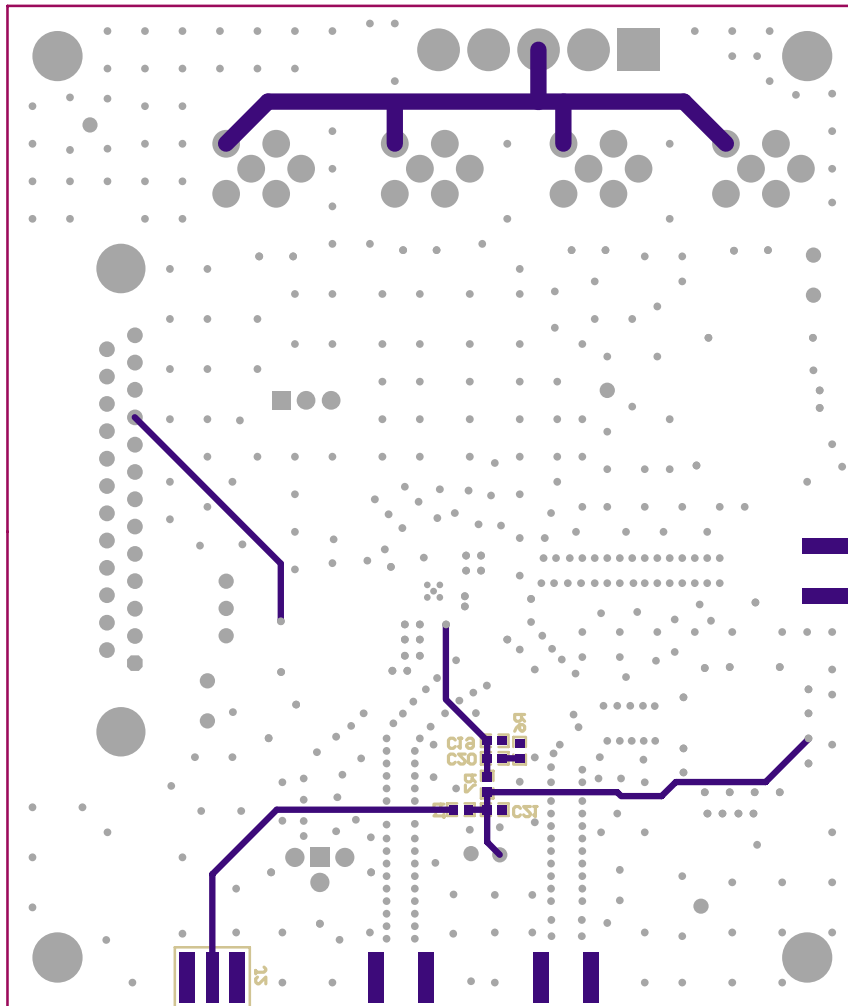


Figure 4–8. Bottom Layer 4 (QFN EVM)



## 4.2 Parts List

Table 4–1 lists the parts used in constructing the EVM.

Table 4–1. TRF3750 EVM Parts List

Value	QTY	Part Number	Vendor	REF DES	Not Installed
<b>Capacitors</b>					
10 $\mu$ F, 16 V, 10% capacitor	5	293D106X9016B2T	Kemet	C1, C2, C11, C12, C24	
0.1 $\mu$ F, 16 V, 10% capacitor	5	ECJ-1VB1C104K	Panasonic	C3–C6, C22	
100 pF, 50 V, 5% capacitor	5	ECJ-1VC1H101J	Panasonic	C13–C16, C23	
0.01 $\mu$ F, 16 V, 10%, capacitor	1	ECJ-1VB1C103K	Panasonic	C20	
10 pF, 50 V, 5% capacitor	4	GMC10CG100J50NT	CALCHIP	C7–C10	
0.001 $\mu$ F, 50 V, 10% capacitor	3	ECJ-1VB1H102K	Panasonic	C17, C18, C19	
82 pF, 50 V 5% capacitor	1	ECU-V1H820J	Panasonic	C21	
<b>Resistors</b>					
0- $\Omega$ resistor, 1/16 W, 1%	0	ERJ-3EKF0R00V	Panasonic		R1, R2, R16, R20
300- $\Omega$ resistor, 1/16 W, 1%	1	ERJ-3EKF3000V	Panasonic	R12	
10-k $\Omega$ resistor, 1/10 W, 1%	1	ERJ-3EKF1002V	Panasonic	R11	R13, R14
16.5- $\Omega$ resistor, 1/10 W, 1%	3	ERJ-3EKF16R5V	Panasonic	R8, R9, R10	
2.7-k $\Omega$ resistor, 1/16 W, 1%	1	9C06031A2701FKHFT	Yageo–America	R4	
200- $\Omega$ resistor, 1/16 W, 1%	3	ERJ-3EKF2000V	Panasonic	R17, R18, R19	
20-k $\Omega$ resistor, 1/16 W, 1%	1	ERJ-3EKF2002V	Panasonic	R7	
3.9-k $\Omega$ resistor, 1/10 W, 1%	1	9C06031A3901FKHFT	Yageo–America	R6	
4.7-k $\Omega$ resistor, 1/16 W, 1%	1	9C06031A4701FKHFT	Yageo–America	R15	
49.9- $\Omega$ resistor, 1/16 W, 1%	1	ERJ-3EKF49R9V	Panasonic	R5	R3
<b>Connectors, Jumpers, Headers, IC'S, etc.</b>					
BNX002_01	4	BNX002_0100	MuRata	F1–F4	
3POS_HEADER	1	TSW-150-07-L-S	Samtec	W1	
4POS_JUMPER	1	87089-0616	Molex	J6	
CON_5TERM_SCREW (male)	1	39860-0705	Molex	J1	
CON_5TERM_SCREW (female)	1	39860-0105	Molex	J1 mate	
DB25F-RA	1	745536-2	AMP	J5	
SMA connectors	4	16F3627	Newark	J2, J3, J4, J7	
Ferrite bead	1	EXC-ML20A390U	Panasonic	FB1	FB2
Green SM_LED_1206	1	CMD15-21VGC/TR8	Panasonic	D1	
Red test point	6	5001K-ND	Keystone	TP2–TP6, TP8	
Black test point	4	5000K-ND	Keystone	TP1, TP7, TP10, TP11	
Crystal oscillator	0	T1115 / OSC3B0 at 10 MHz or TCO-986 at 10 MHz	Vectron or Toyocom		Y1
TRF3750	1	TRF3750	TI	U1	
VCO-19V	1	VCO-190-902T	Varil	U2	
Screws	4				
Stand off hex (1/4 x 0.5")	4	1902CK-ND	Allied		

# **Schematics**

---

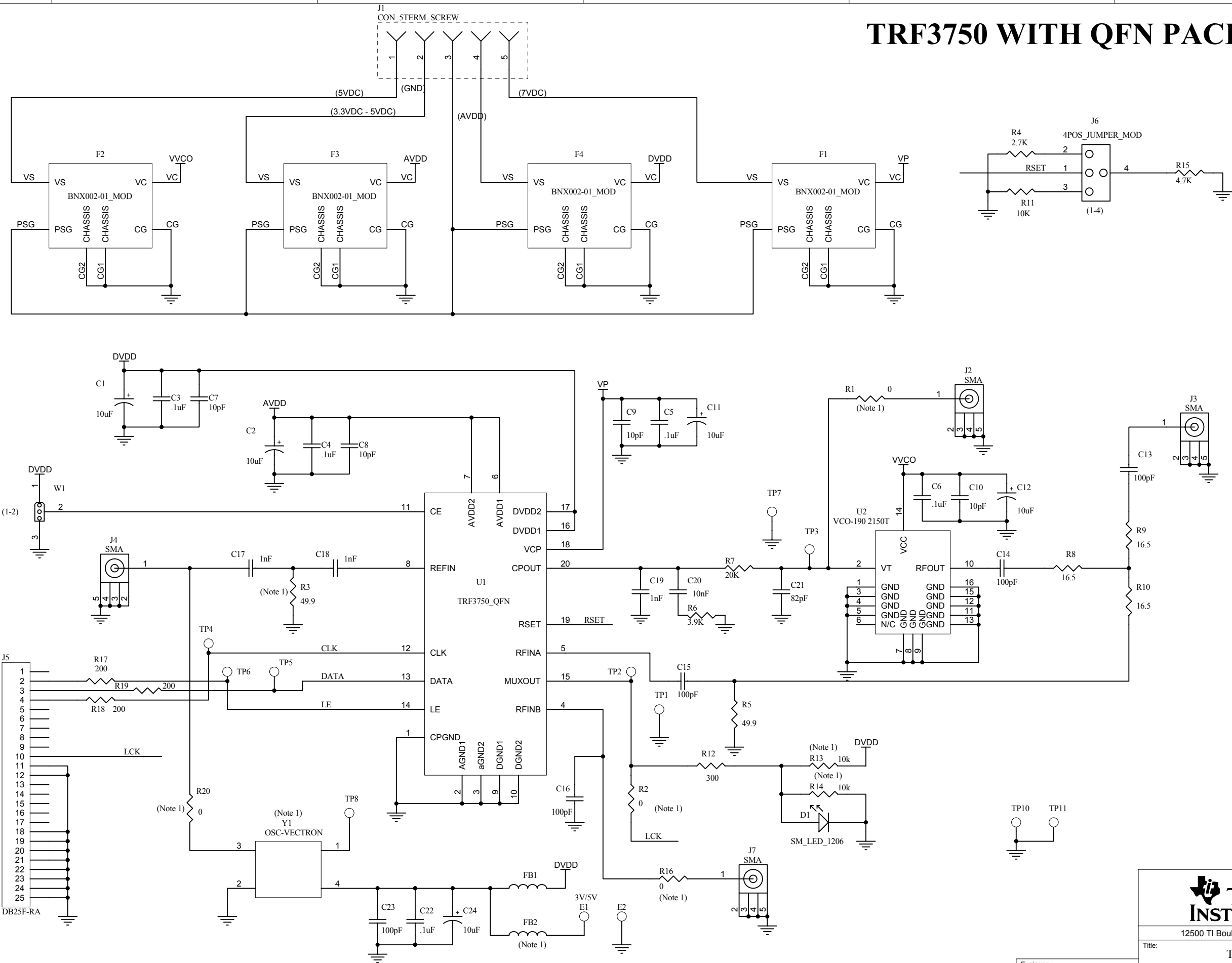
---

---

---

This chapter contains the schematics for both the TRF3750 TSSOP and QFN EVMs.

# TRF3750 WITH QFN PACKAGE



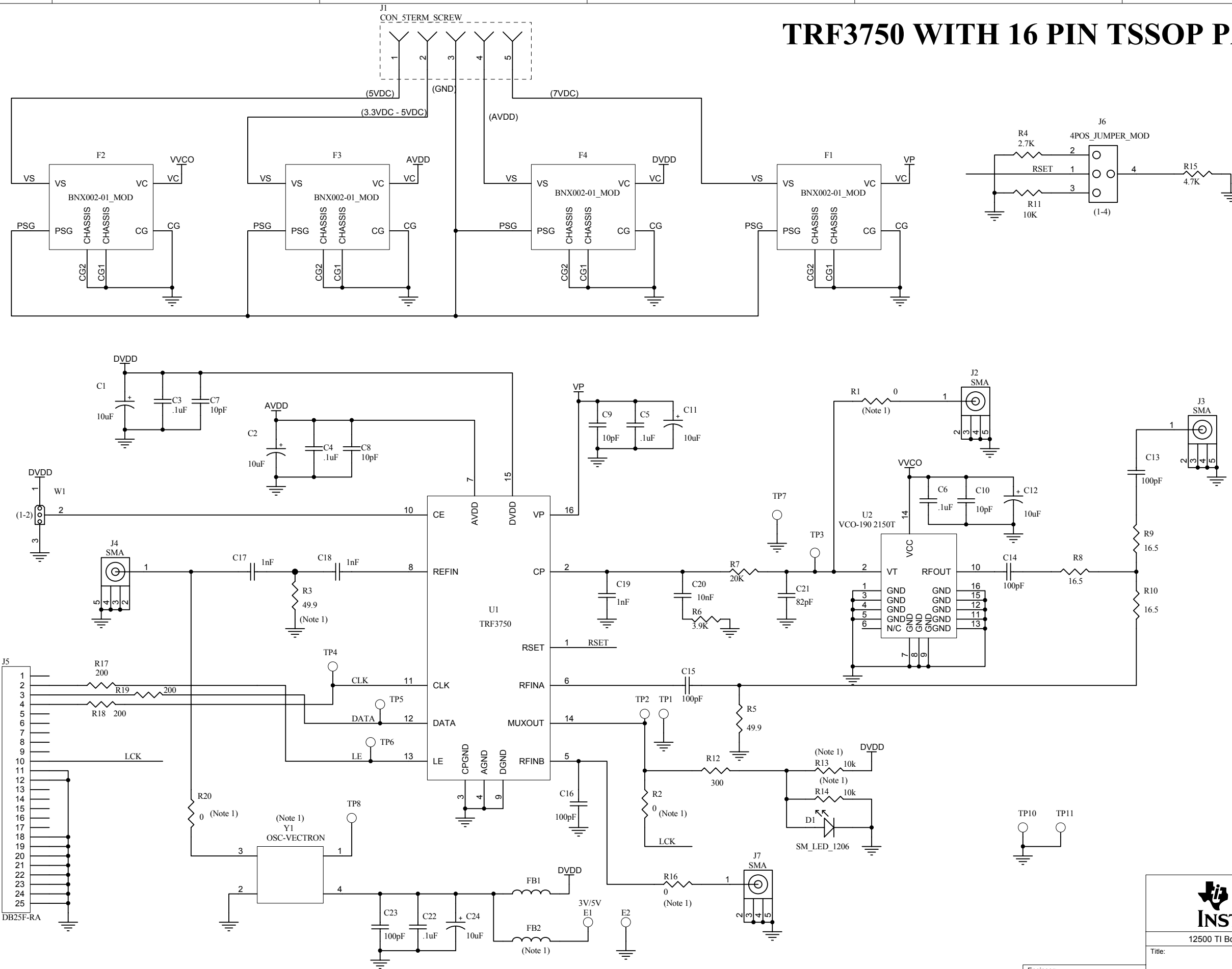
NOTE 1. PART NOT INSTALLED

**TEXAS INSTRUMENTS**  
 12500 TI Boulevard, Dallas, Texas 75243

Title: TRF3750\_QFN

Engineer: Y. PAPANOTOPOULOS	DOCUMENT CONTROL #	REV: A1
Drawn By: Y. DEWONCK	DATE: 26-Aug-2004	SIZE:
FILE:	DATE: 26-Aug-2004	SHEET: 1 OF:

# TRF3750 WITH 16 PIN TSSOP PACKAGE



NOTE 1. PART NOT INSTALLED

**TEXAS INSTRUMENTS**  
 12500 TI Boulevard, Dallas, Texas 75243

Title: **TRF3750**

Engineer: Y. PAPANOTOPOULOS	DOCUMENT CONTROL #	REV: A
Drawn By: Y. DEWONCK	DATE: 26-Aug-2004	SIZE:
FILE:	DATE: 26-Aug-2004	SHEET: 1 OF: