



**THE DATASHEET OF  
LMP93601EVM**



# LMP93601 EVM User Guide

## User's Guide



Literature Number: SNIU020A  
March 2014—Revised March 2014

# **LMP93601EVM User's Guide**

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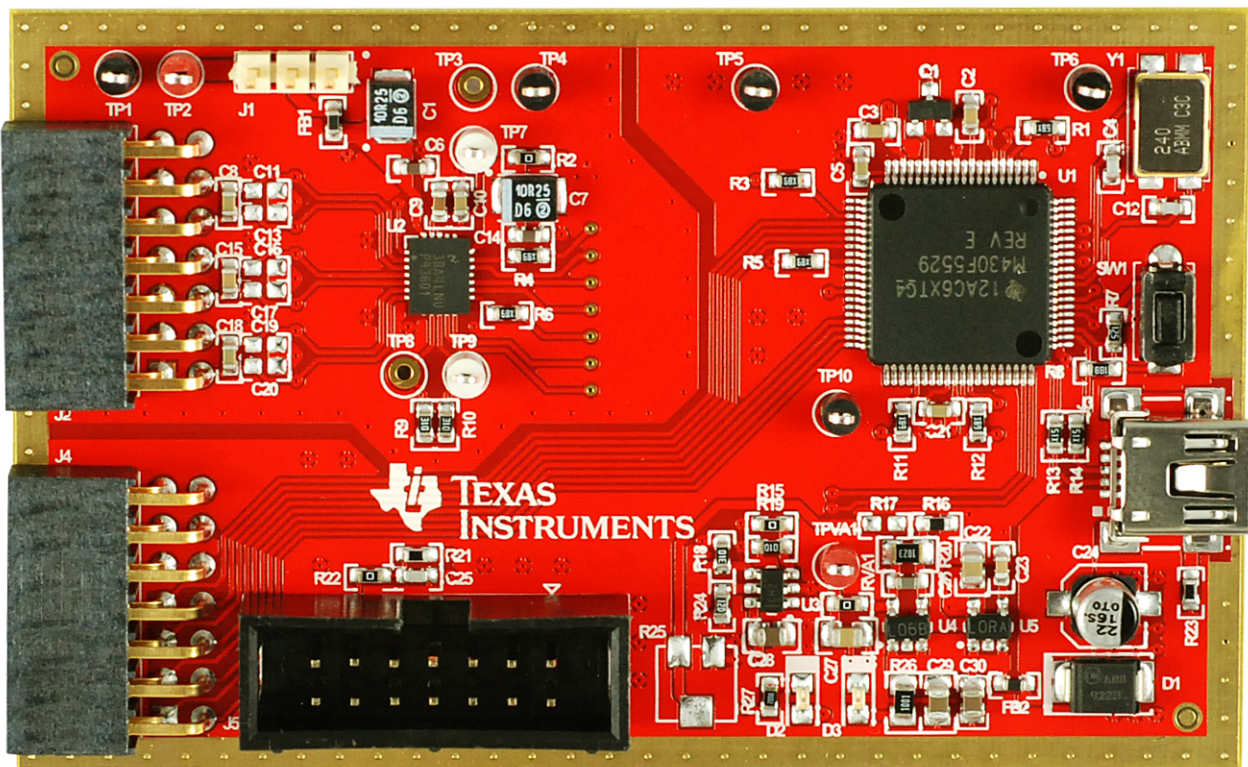
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## 1 General Description

This guide details the use of the LMP93601 evaluation module, LMP93601EVM (referred to as EVM for the remainder of this document).

The LMP93601 analog-front-end (AFE) is an Integrated Circuit (IC) for signal conditioning of thermopile sensors used in various applications. It can interface with thermopile occupancy detector arrays, thermopile flow sensors, and a range of transducers connected in a bridge configuration. The device contains a low power, low noise AFE consisting of a PGA and a 16-bit delta-sigma analog-to-digital converter (ADC), with a SPI interface in an LLP-24 package.

The EVM facilitates evaluation of the integrated circuit shown in [Figure 1](#). For more information on the LMP93601, refer to the datasheet: LMP93601 Low-noise 16-bit, 3-Channel AFE for Building Automation (<http://www.ti.com/product/lmp93601>).



**Figure 1. LMP93601 Evaluation Board**

## 2 EVM Package Contents

The EK-LMP93601 evaluation kit comes with the following:

- The LMP93601 EK- evaluation board with:
  - On board MPS430 microcontroller
  - USB Mini-B to USB-A plug cable
- LMP93601 GUI software for host PC available for download from <http://www.ti.com/product/lmp93601>

### 3 Requirements for Using the EVM

The EVM interfaces to a host computer via USB interface as shown in Figure 2. The PC must be running Windows® 7 or Windows XP loaded with the LMP93601EVM-SW graphical user interface (GUI). The LMP93601 GUI can be obtained from the following site: <http://www.ti.com/product/lmp93601>.

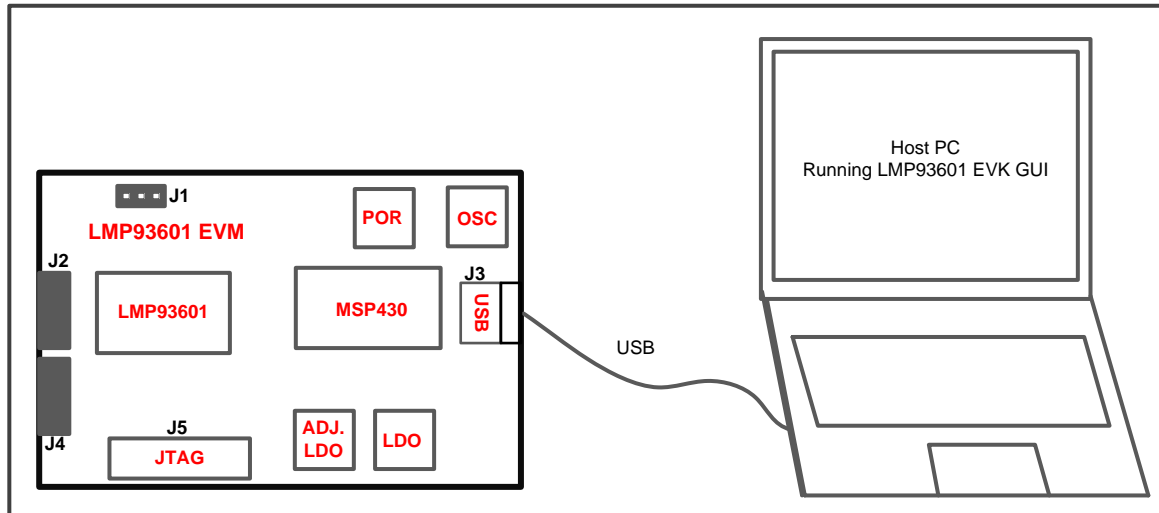


Figure 2. LMP93601 EVM Interface to a Host PC

### 4 Connection and Software Installation

This section describes the jumpers and connectors on the EVM, software installation, and how to properly connect, set up, and use the LMP93601EVM.

#### 4.1

Table 1. Headers and Jumpers

Reference Designator	Name	Description
J1	AVDD_Select_JMP	AVDD source selection; internal LDO is connected if jumper is placed in position 1-2
J2	Analog inputs connector	Connection to protected AVDD source for external use; Connection to analog inputs; connection to MSP430 ADC_A0 and Vref.; Connection to the EVM board ground
J3	USB connector	USB to host PC connector
J4	GPIO connector	Connection to MSP430 to GPIO pins for external use; Connection to the EVM board ground
J5	JTAG interface	MSP430 JTAG interface

## 4.2 Software Installation

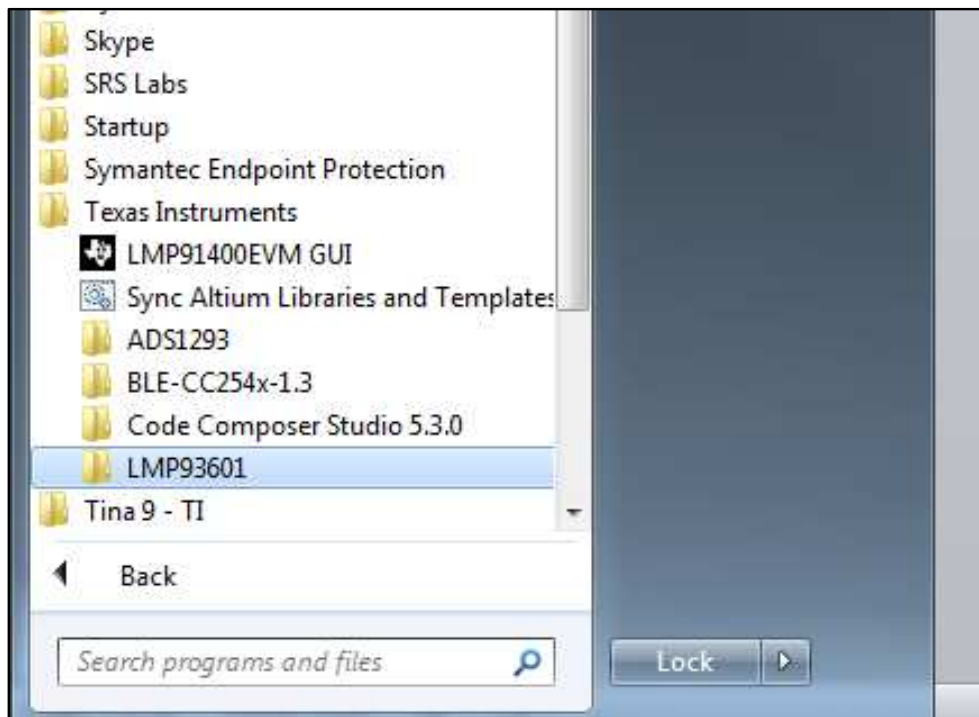
To ensure that you are using the latest version of LMP93601 software, download the software from our website at <http://www.ti.com/product/LMP93601>. You must install the software before you connect the LMP93601EVM to your PC.

**Step 1.** Log onto <http://www.ti.com/product/LMP93601>, then scroll down to the “Software” section to download the latest version of the LMP93601 software package into a known local directory

**Step 2.** UnZip the downloaded file into the local hard drive and click to open the created subdirectory. Click on the “setup.exe” to install the software in the host computer

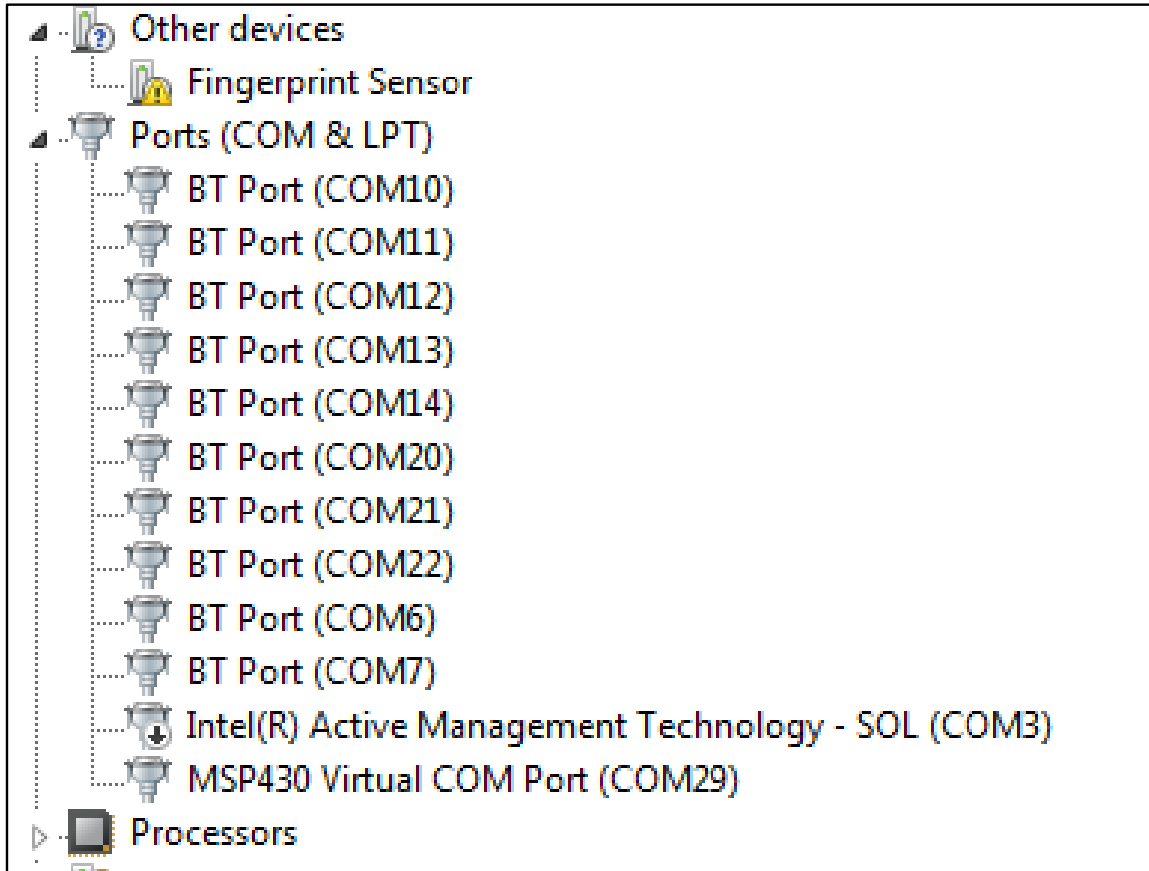
**Step 3.** Connect the EVM board via the USB cable included in the package to the host PC

**Step 4.** Click on Start tab, to open the “All programs” menu. Click on “Texas Instruments” subdirectory as shown in [Figure 3](#). Then, on the LMP93601 subdirectory. Click on the “LMP93601 GUI” (see [Figure 3](#)) to run the program in the host PC.



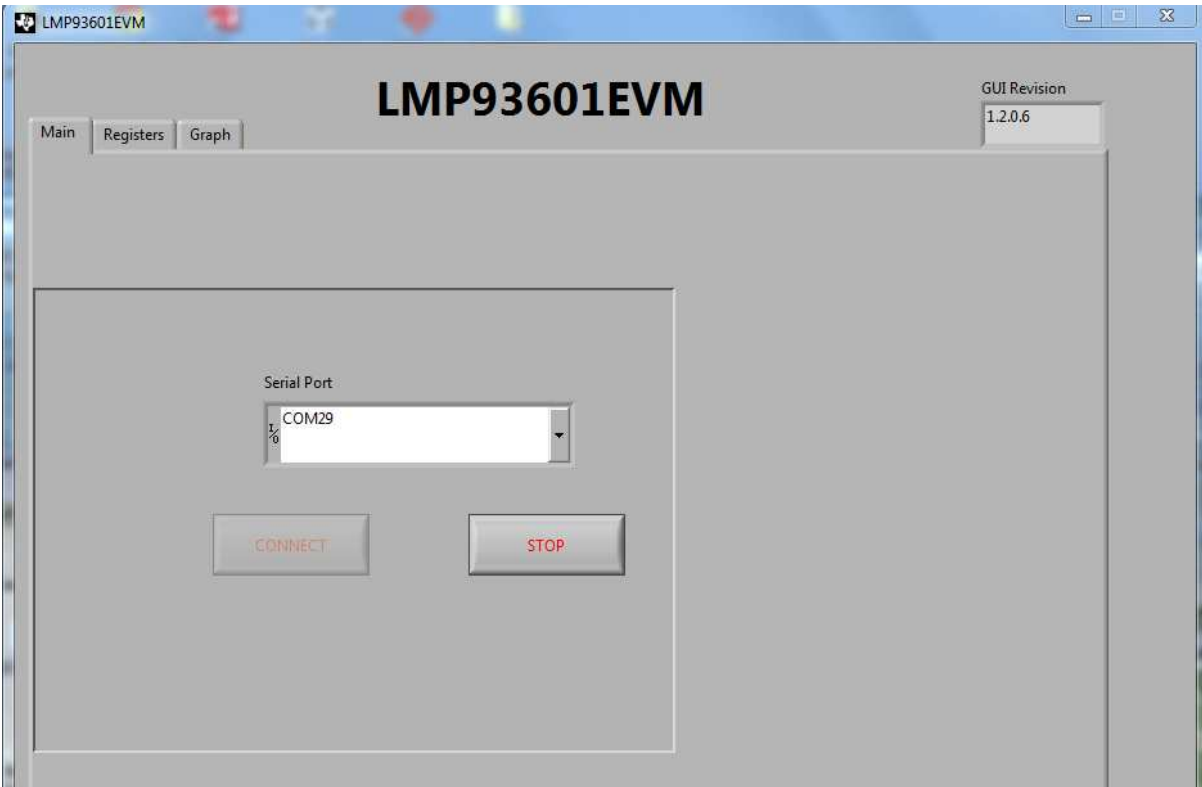
**Figure 3. The LMP93601 GUI Installation**

**Step 5.** Make sure the included USB cable is connected to the host PC and the LMP93601EVM. Next, select the communication port on the host PC by looking up the allocated port in the device manager. To open the "Device Manager" in MS Windows, click on the "Start" tab, then on the "Control Panel". In the Control Panel window, locate the "Device Manager" tab, and click on the tab to open it. Click on Ports (COM&LPT) to identify the allocated communication port in the host in the host PC as shown in [Figure 4](#).



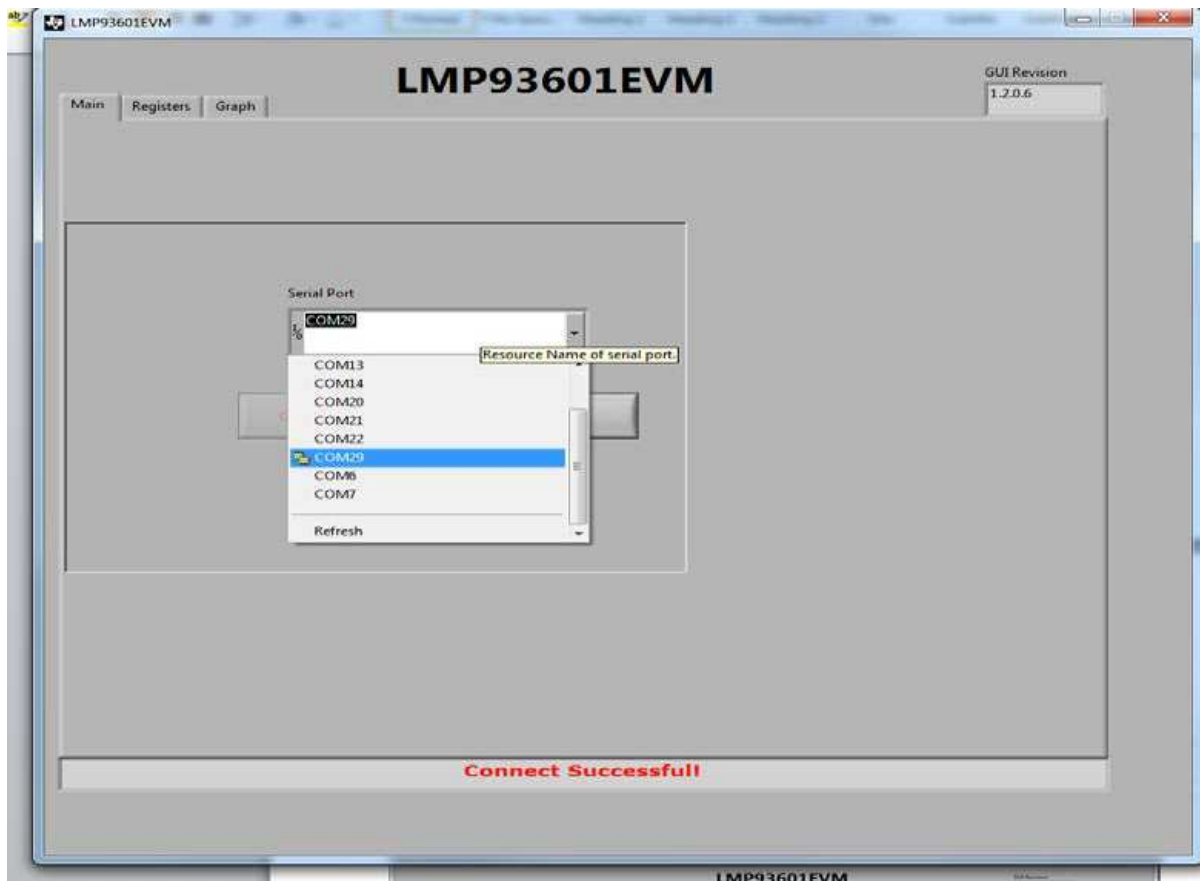
**Figure 4. Determining which Port is Assigned by Windows in the Host PC for Communication to the LMP93601**

**Step 6.** In the “Main tab” display mode in the LMP93601 GUI, select the “PortCOM” identified in step 5 and then Click on connect tab and the display as shown in [Figure 5](#).



**Figure 5. GUI Communication Port Selection**

If the correct COM port has been selected after clicking on the “Connect” tab, at the bottom of the display the message “connection successful will be displayed as shown in [Figure 6](#).



**Figure 6. Successful Connection to the LMP93601 EVM**

## 5 The LMP93601 GUI Menus

The LMP93601 EVB GUI provides a simple interface to the EVM board for quick evaluation of the features of the LMP93601 AFE. The GUI provides three display Windows (selectable by clicking on the appropriate tabs): “Main”, “Registers”, and “Graph”. The tabs are located at the top of the display window. The default display upon the execution of the software is the “Main” and shown in [Figure 6](#).

## 6 Register Menu

The register menu is displayed by clicking on the “Register” tab as shown in Figure 7. In this menu, the LMP93601 user registers are available for various settings.

To see the options in each register window, place the cursor in the desired register window and left clicking in this position, the list of possible options will be displayed as shown in Figure 8. Just move the curse to the option and click to select.

To program the registers, the device has to be in unlock state (select “Config Writable” in the Lock pull-down window).

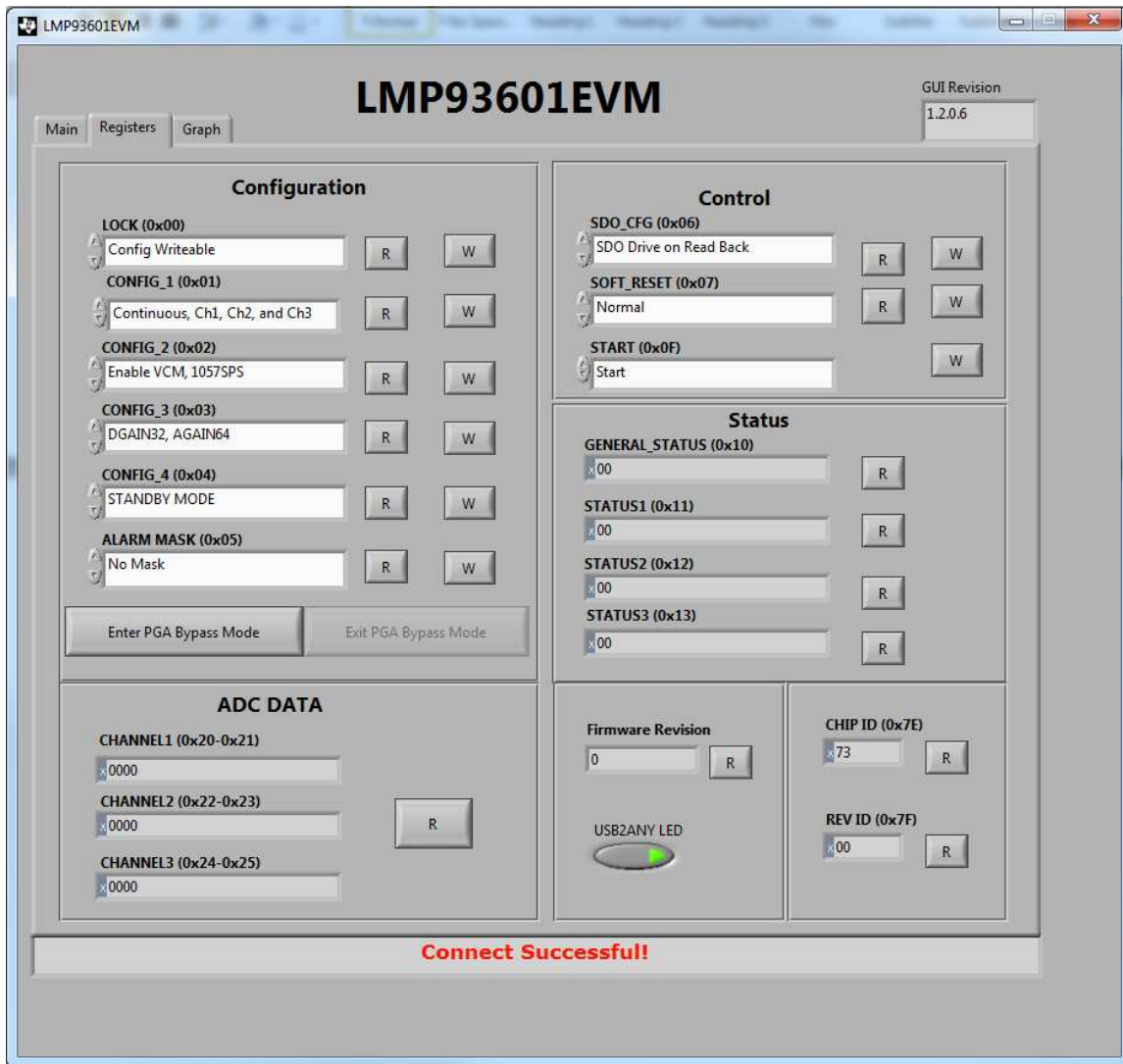


Figure 7. Register Menu

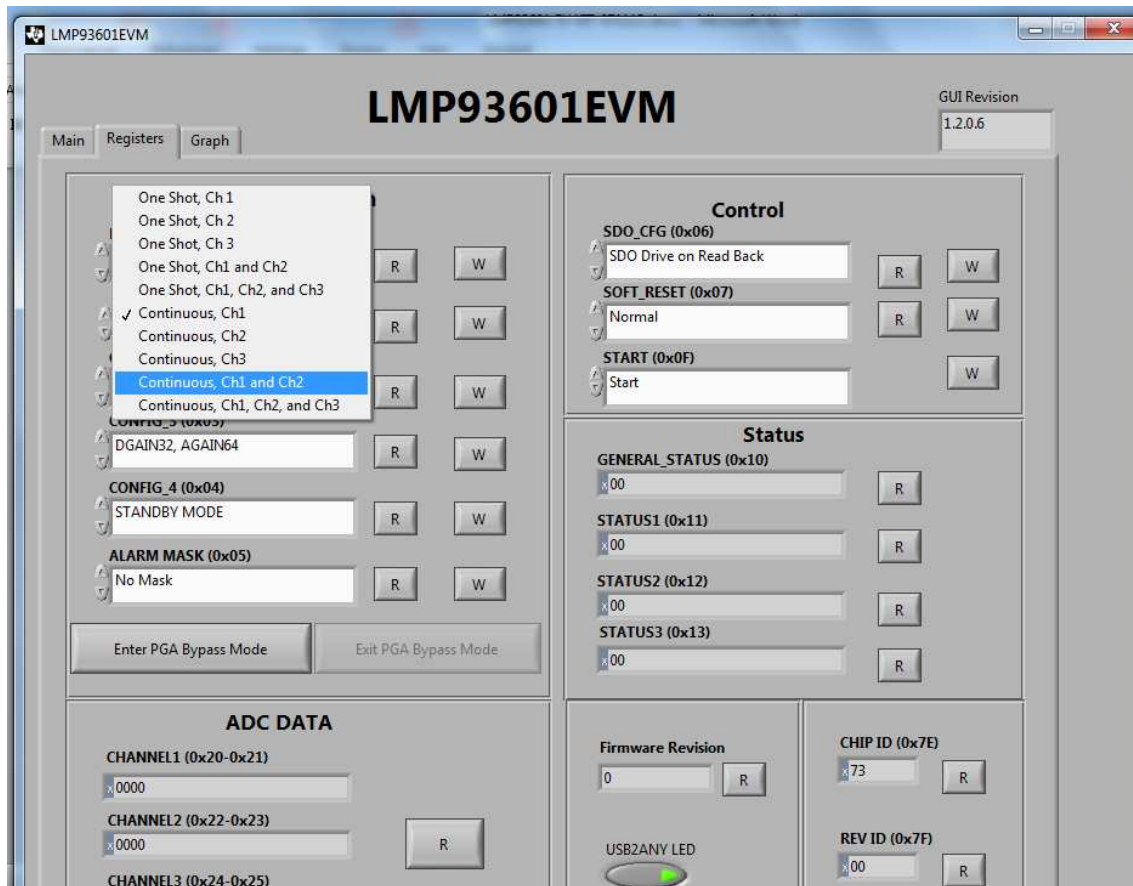


Figure 8. Selecting an Option in a Register Pull-Down Window

## 7 Graph Display Menu

The “Graphic” display menu includes three windows for displaying the outputs of the three multiplexed channels of the LMP93601 as shown in [Figure 9](#),

To Display the outputs after setting the device for a specific mode of operation in the Register window, click on the “Start Graph” button. You can stop the GUI from displaying the outputs by pressing the “Stop Graph” button at any time.

Additional display options can be selected by placing the cursor in the graph display area and right clicking to display the drop-down menu as shown in [Figure 10](#).

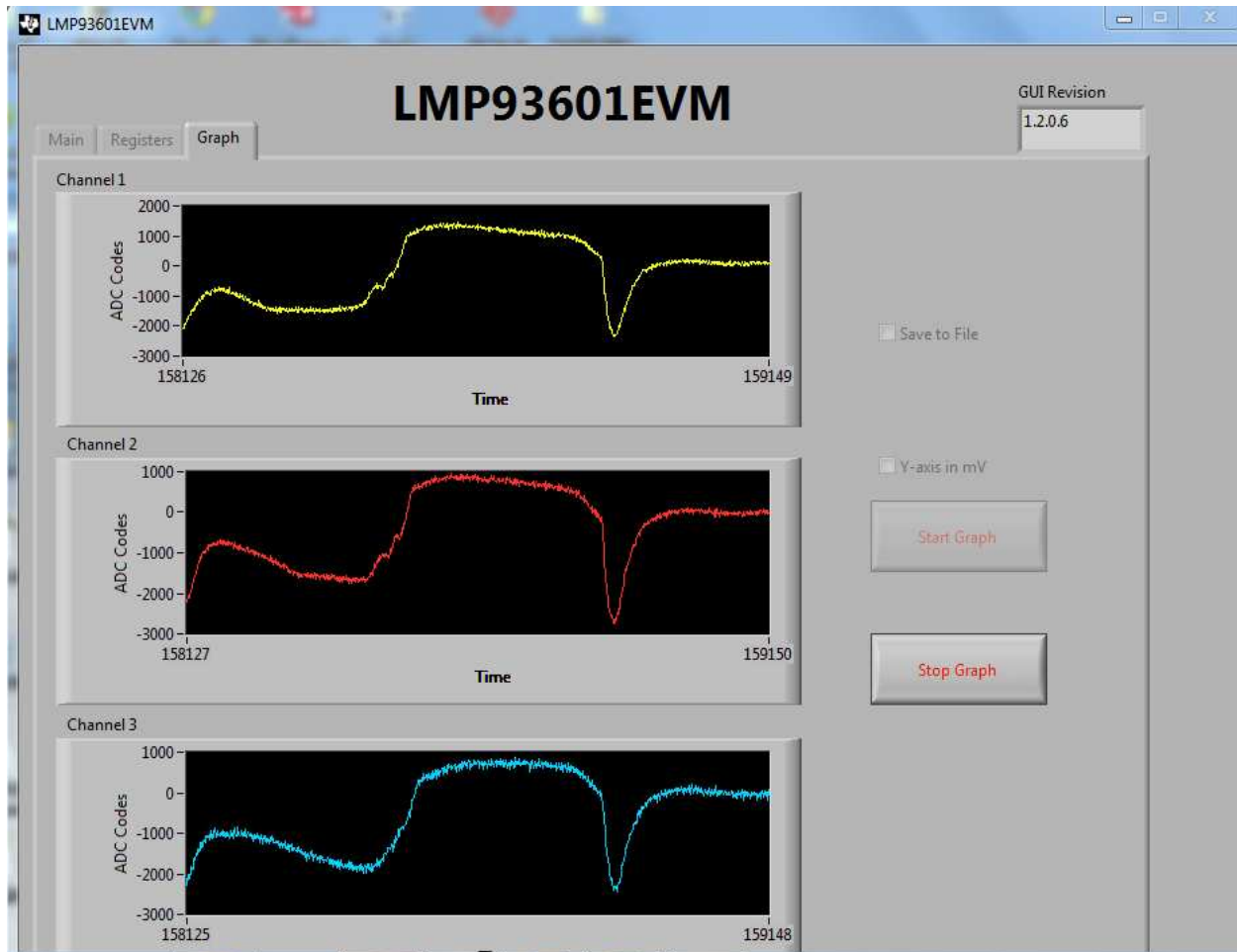


Figure 9. Graph Display Showing The Outputs of the Three MUXed Channels

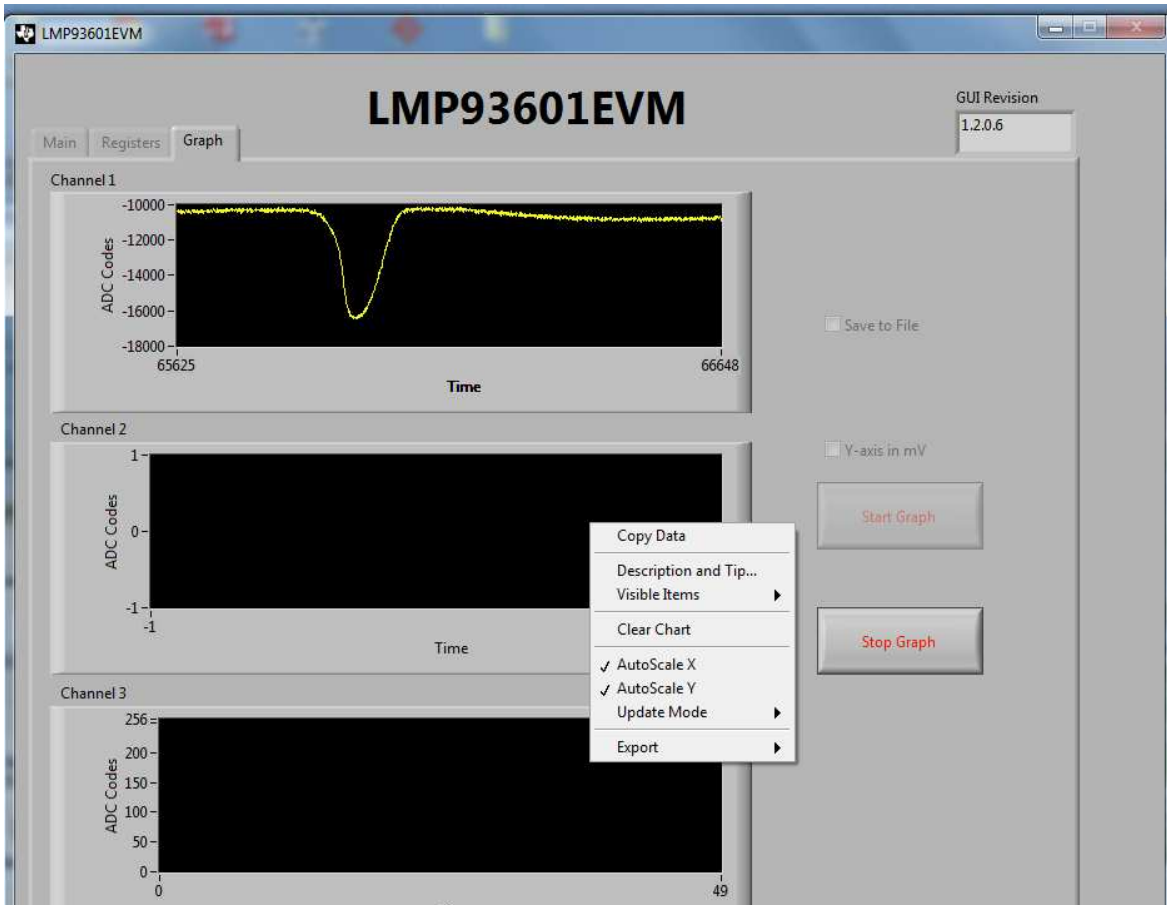
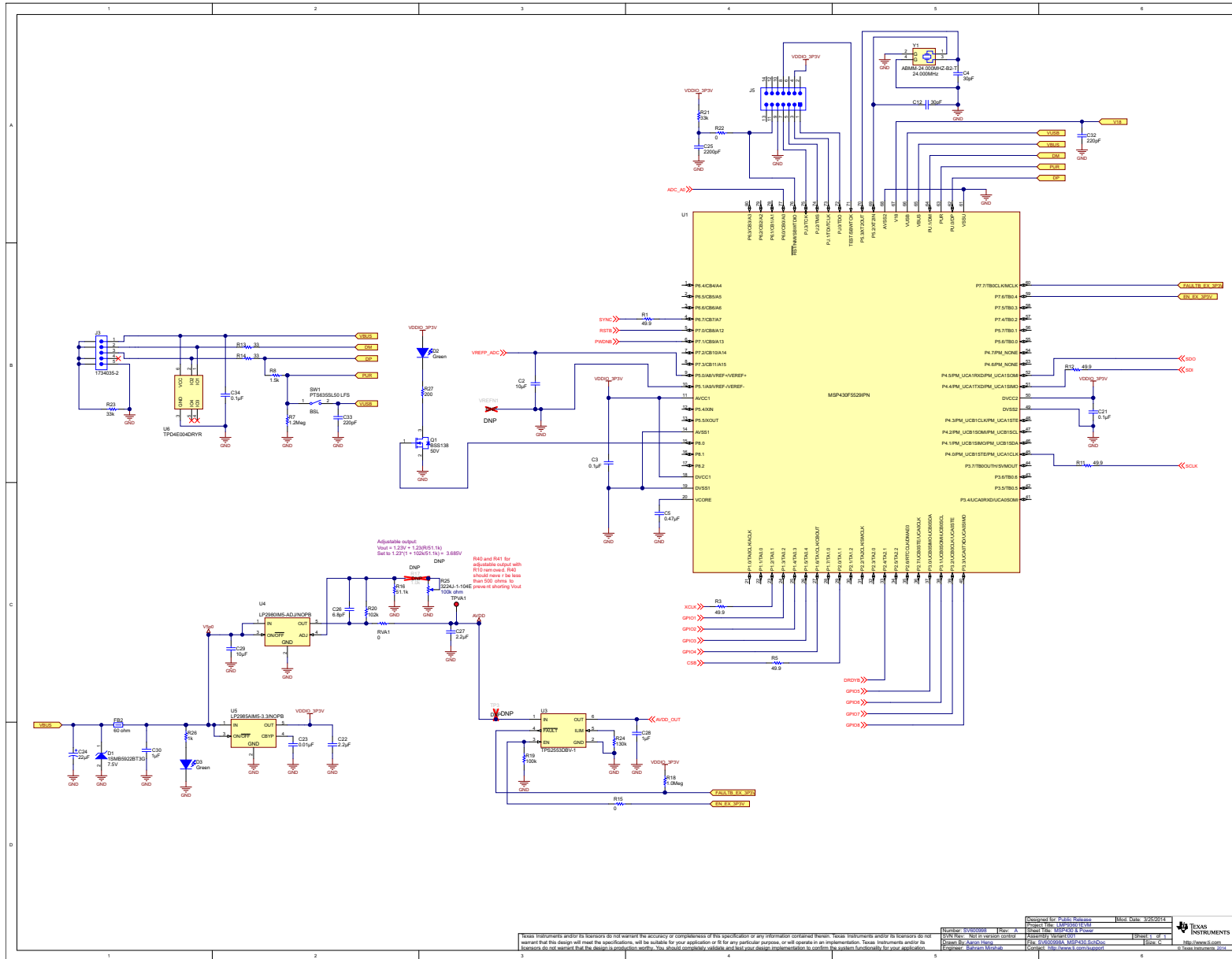
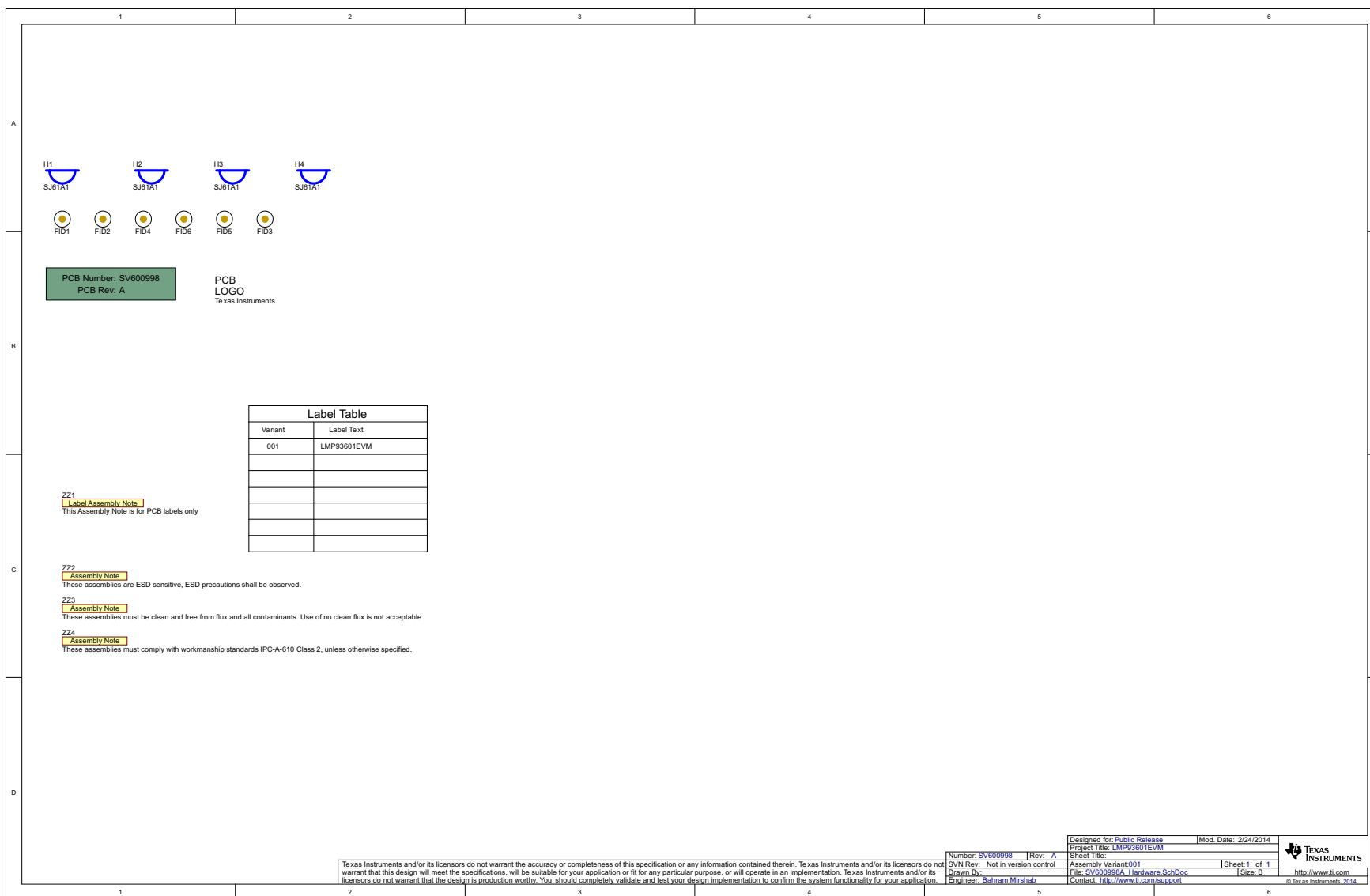


Figure 10. Drop-Down Menu Enable Set Auto Scaling

8 Schematic Diagrams







**9 Revision History**

<b>DATE</b>	<b>REVISION</b>	<b>NOTES</b>
March 2014	*	Initial release.
March 2014	A	Updated schematic images.

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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.
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Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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#### Concernant les EVMs avec antennes détachables

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