

## **ADS5493EVM Evaluation Module**

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This evaluation module (EVM) user's guide gives an overview of the ADS5493EVM and provides a general description of the features and functions to be considered while using this module.

### **Contents**

1	Evaluation Module Description .....	2
2	Software Installation .....	3
3	ADS5493EVM Software – SPI Control .....	4
4	Initial EVM Setup and Basic Test Procedure .....	5
5	Power Supply Options .....	6

### **List of Figures**

1	ADS5493EVM Overview .....	2
2	Installation Process of ADS5493EVM Software .....	3
3	EVM Software Front Panel .....	4
4	EVM Software Advanced Tab .....	4
5	Basic EVM Hardware Setup .....	5
6	Schematic Modification of the Analog Input Path .....	5
7	Typical Performance Screenshot .....	6
8	Power Supply Options on the ADS5493EVM .....	6

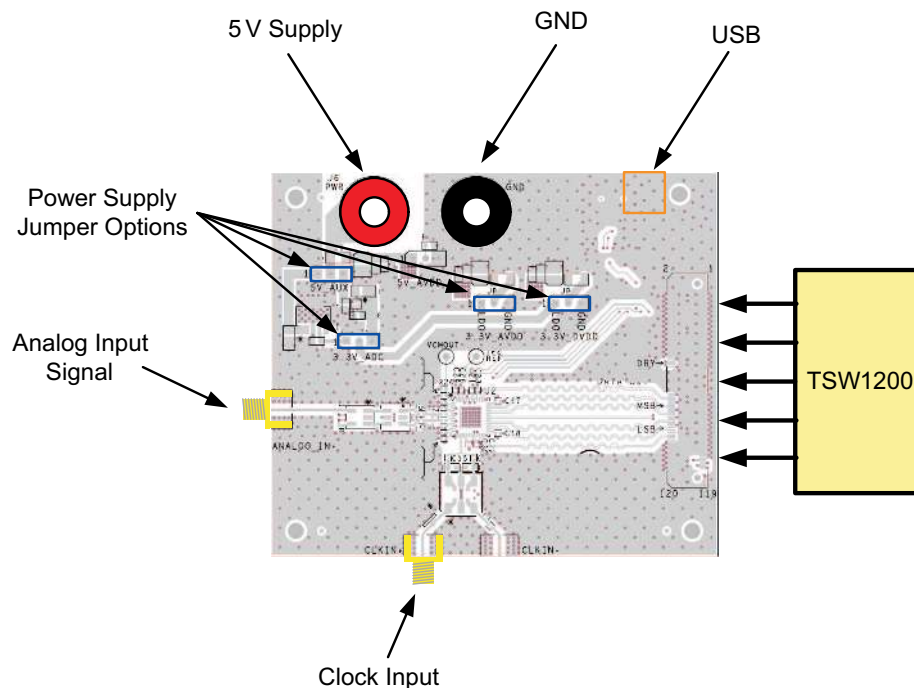
## 1 Evaluation Module Description

The ADS5493 evaluation module (EVM) is easy to set up and provides the user flexibility. On the analog side, the user can evaluate different transformers and configurations while the EVM also allows a single-ended or differential clock input.

The EVM is powered from a single 5-V power input; the user can select either LDO or switching regulator option for generating the analog and digital 3.3-V supplies for the ADS5493.

On the digital side, the EVM provides a seamless interface to the TSW1200 capture card in order to evaluate received data directly on a personal computer (PC).

The internal registers of the ADS5493 can be conveniently accessed and programmed via SPI through the USB connection using the GUI or the TSW1200. The ADS5493EVM works well in default configuration; no register programming is required.



**Figure 1. ADS5493EVM Overview**

## 2 Software Installation

1. Open the folder named ADS5493\_Installer\_vxpx (xpx represents the latest version).
2. Run Setup.exe.
3. Follow the on-screen instructions.
4. Once installed, launch by clicking on the ADS5493\_GUI\_vxpx program in Start >Texas Instruments ADCs.
5. When plugging in the USB cable for the first time, you are prompted to install the USB drivers for USB Serial Converter and USB Serial Port (see [Figure 2](#)).
  - (a) Follow the on-screen instructions to install the USB drivers.
  - (b) If needed, you can access the drivers directly in the install directory



**Figure 2. Installation Process of ADS5493EVM Software**

### 2.1 ADS5493.ini file for TSW1200

The ADS5493 software package comes with a new ini file for the TSW1200. Manually place this ADS5493.ini file into the following directory in order for the TSW1200 to recognize it:

C:\Program Files\Texas Instruments\TSW1200\ADC Files

### 3 ADS5493EVM Software – SPI Control

The ADS5493 is fully functional without the need for register writes; however, the EVM software provides register access to the user.

The ADS5493EVM software controls the ADS5493 via SPI register writes through a USB connection with the PC. Figure 3 is a snapshot of the GUI front panel, highlighting the two tabs to control the setup of ADS5493.

It is necessary to perform a USB reset after applying power to the EVM to establish proper connection with the PC. Otherwise, a warning sign on the bottom right flashes, indicating a USB communication failure.

The EVM software also provides the option to save all registers to a file or to load registers from a file. The display in the bottom right corner provides a summary of all the registers being currently written.

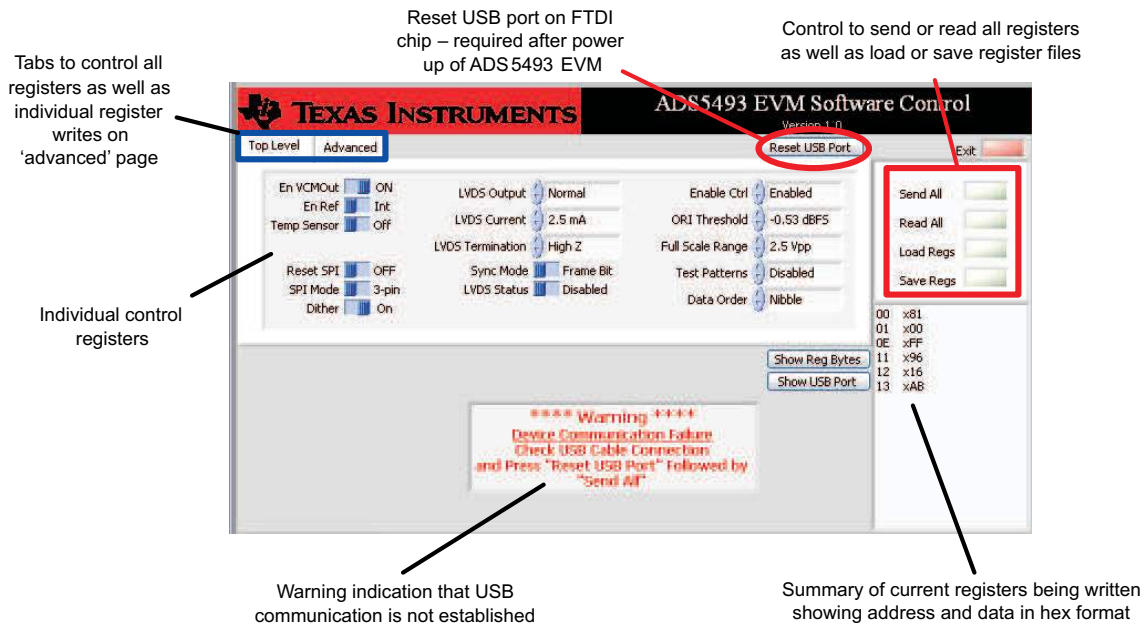


Figure 3. EVM Software Front Panel

The Advanced tab allows the user to access the SPI registers directly using individual register writes.

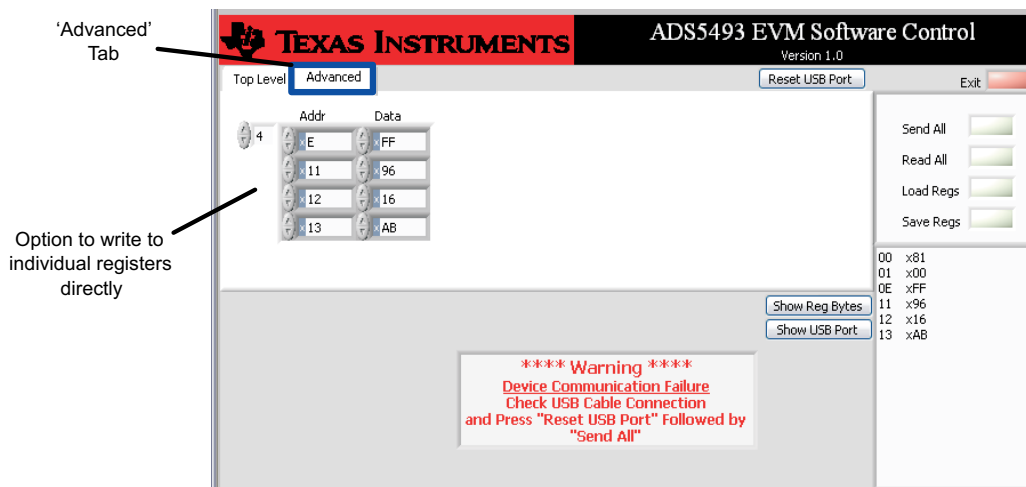


Figure 4. EVM Software Advanced Tab

#### 4 Initial EVM Setup and Basic Test Procedure

The fastest way to get the ADS5493EVM up and running is to follow this operating procedure:

1. Two signal generators must be connected to the clock and data input of the EVM – preferably with band-pass filter and the 10-MHz reference locked for coherency
2. The TSW1200 capture card must be plugged in ADS5493EVM and connected to the PC via USB.
3. All appropriate power supplies must be connected.
4. After performing a USB reset in the ADS5493EVM software, the flashing USB warning sign disappears, indicating successful USB communication.

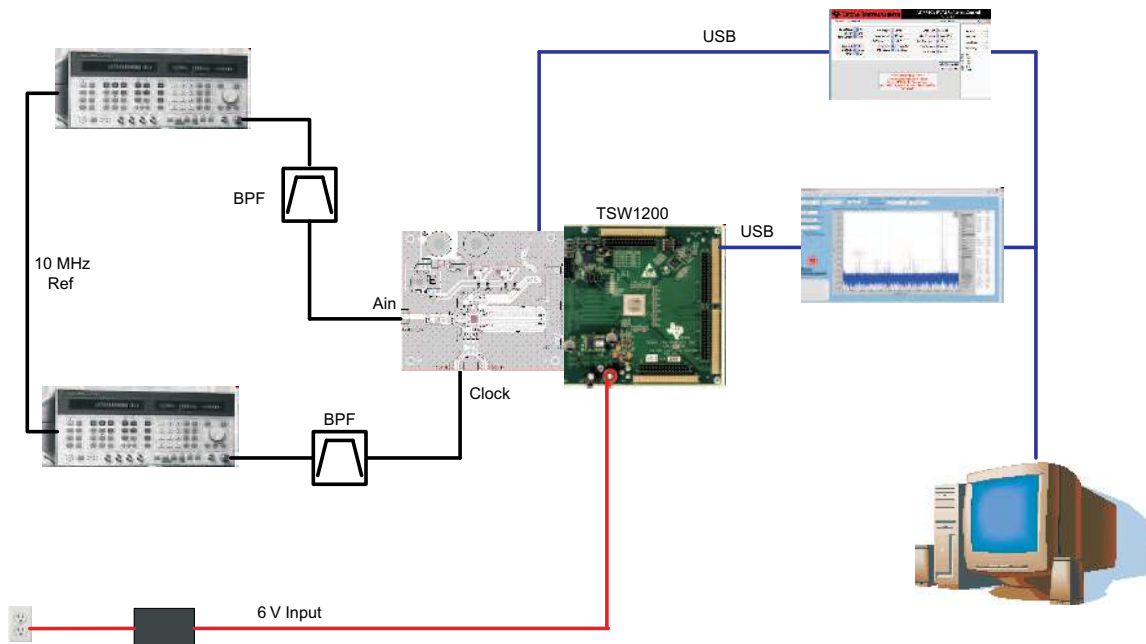


Figure 5. Basic EVM Hardware Setup

The analog input path has a 8.2-pF differential input capacitor at the analog inputs of the ADC as shown in the EVM schematic. This capacitor helps to boost the SFDR performance at higher input frequencies (>50 MHz) but is less effective at lower input frequencies.

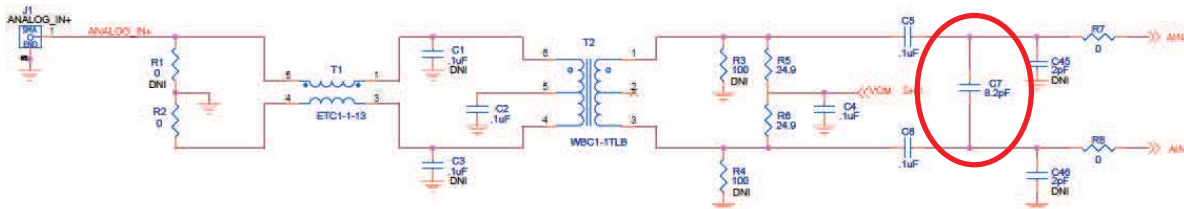


Figure 6. Schematic Modification of the Analog Input Path

In the TSW1200, the ADC selection must be set to ADS5493.

Figure 7 shows a typical performance plot at 100-MHz IF with a sample rate of 130 Msps. In this specific setup, SNR is expected to be in the range of 74–76 dBFS whereas SFDR is expected to be better than 91dBc.

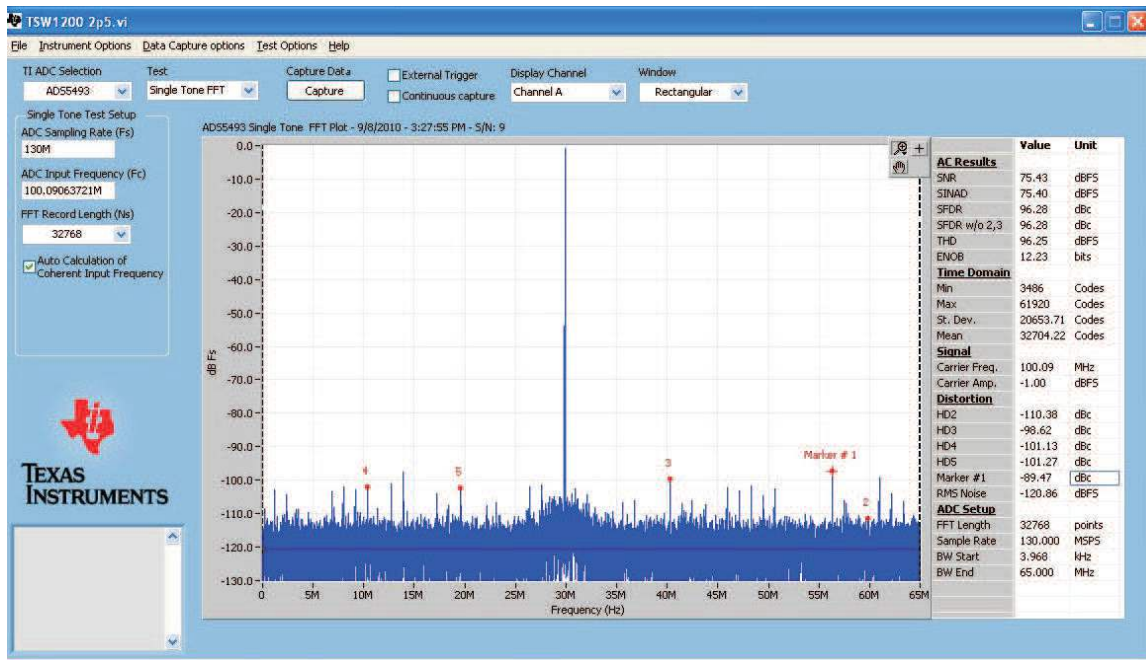


Figure 7. Typical Performance Screenshot

## 5 Power Supply Options

The ADS5493EVM is designed to operate from an external 5-V supply, which also connects to the 5-V analog supply of the ADS5493. The user has the option to generate the 3.3 V for the analog and digital supplies of the ADS5493 either with a LDO (TPS79533) or a switching regulator (TPS62237) by setting jumper JP2 and JP3 accordingly.

The EVM also provides additional pin headers so that the individual voltages for 5V VDDA, 3.3V VDDA and 3.3V DVDD can be supplied directly, e.g., for accurate power consumption measurements.

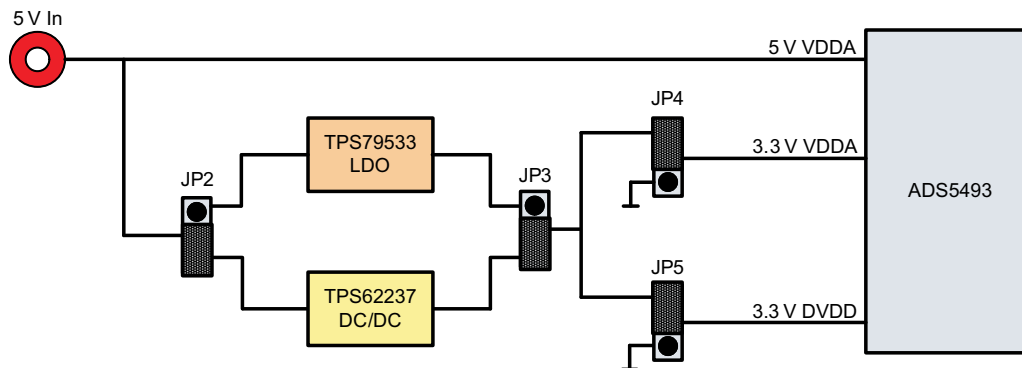


Figure 8. Power Supply Options on the ADS5493EVM

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## EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of -0.3 V to 5.3 V and the output voltage range of -0.3 V to 3.6 V. 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 50° C. The EVM is designed to operate properly with certain components above 25° 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.

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Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Energy	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</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>
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