

# ***ADS1256EVM and ADS1256EVM-PDK Test Procedure***



*Test Plan: ADS1256EVM “6450839”*

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## IMPORTANT NOTICE

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All test equipment used for production testing of the ADS1256EVM shall be current calibrated equipment.

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# Test Procedure

## Summary

This ADS1256EVM and ADS1256EVM-PDK test plan is designed to highlight the ADS1256 (24-bit) analog to digital converter.

This test plan outlines the necessary tests, adjustments and configuration that must be performed by the manufacturer to confirm that the EVM is functioning properly. Tests are to be performed on a pass / fail basis.

Rework of failed assemblies due to improper handling, soldering, failed parts, or incorrectly installed parts is to be performed in accordance with all applicable industry standards. Assembly failures due to manufacturing defects in the raw PCB are to be reported to Texas Instruments and the PCB manufacturer immediately. No rework must be performed on this type of failure.

It is assumed that the manufacturer, and their employees, are familiar with standard Electro Static Discharge (ESD) control procedures, and will handle all assemblies accordingly. Failures due to static electricity damage will be the responsibility of the manufacturer.

## Recommended Test Equipment

Table 1 shows the list of the test equipment required to test the ADS1256EVM. Equipment other than the recommended model may be used if it satisfies the specification listed in Table 1.

***Table 1 – Required Equipment***

Equipment Required	Specifications	Recommended Model
Power Supply	5V output 3.0A output	Wall Wart supply that is packaged with MMB0
Function Generator	15MHz Function / Waveform Generator with DC offset capability	HP33120A
MMB0 Modular EVM Motherboard	Rev D	n/a
Oscilloscope	General Purpose	Tektronics Model TDS754D (500 MHz B/W, 4-Channels)
Small jumper wires with clips	General Purpose	Any Model
USB cable	n/a	n/a
Computer	Windows XP operating system	n/a

## ADS1256EVM Functional Test

### Test Set-up

The MMB0 Modular EVM Motherboard must be configured appropriately before the daughter cards are installed.

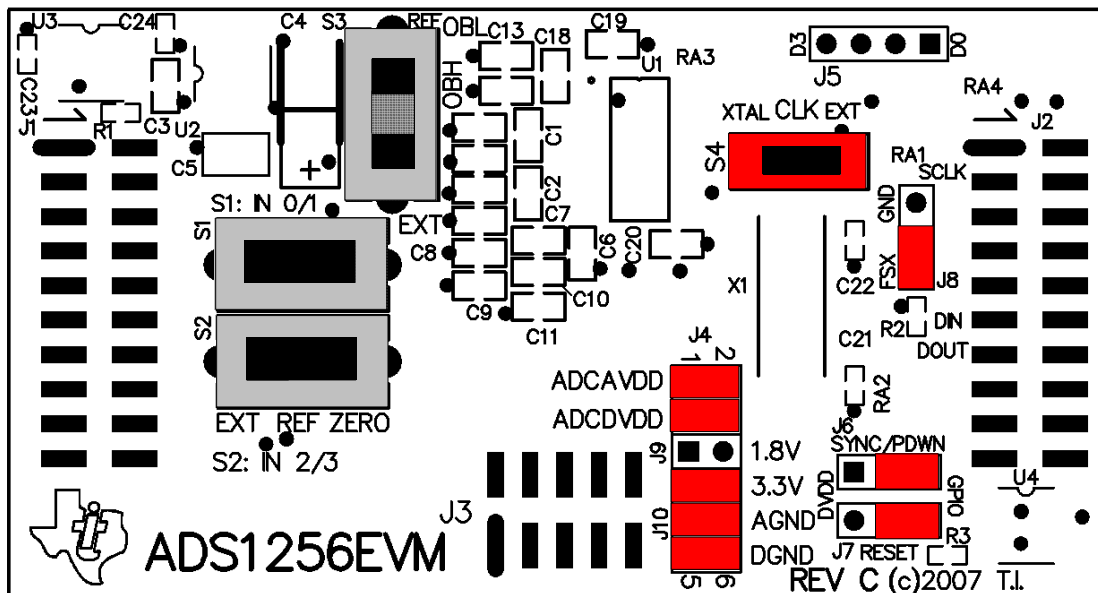
**Table 2 – Default Jumper Setting for the MMB0 Modular EVM Motherboard**

Jumper	Position
J12	CLOSED
J13A	OPEN
J13B	CLOSED
SW4 (if installed)	USB

The jumper and switch configuration for the ADS1256EVM test set-up is shown in Table 3 below and in Figure 1.

**Table 3 – Default Jumper and Switch Setting for testing the ADS1256EVM (Test Settings)**

Jumper	Position
J6, J7, J8	2-3
J4.1-2, J4.3-4, J4.7-8, J4.9-10, J4.11-12	CLOSED
J4.5-6	OPEN
S1, S2	Left position
S3	Up position
S4	Left position



**Verify Test Set-up:**

The following procedure needs to be performed once prior to individual board testing to verify that the test setup is correct

1. Perform a thorough visual inspection on the board under test to make sure that there are no physical damages.
2. Verify all jumper settings for both the MMB0 and ADC EVM board against Table 2 and, Table 3 above for each respective board. Figure 1 is in place for further detail of the appropriate jumper settings.
3. Open the internet browser and go to [www.ti.com/adcpro](http://www.ti.com/adcpro). Here download and install the ADCPro software. Follow the on screen directions to complete the installation.
4. Once the installation is complete, go to <http://focus.ti.com/docs/toolsw/folders/print/ADS1256evm-pdk.html> and download the ADS1256EVM-PDK Plugin Version 1.2.3 installation.
5. Install the plug-in once it is downloaded.
6. Verify that the Wall Wart is working by plugging it into the wall and attaching it to the J2 connector on the MMB0. You should see four green LEDs light up when connected.

### Power up and programming the EEPROM:

1. Verify that the test setup matches that of Figure 2 shown below. Connect the USB cable to the MMB0 as shown.

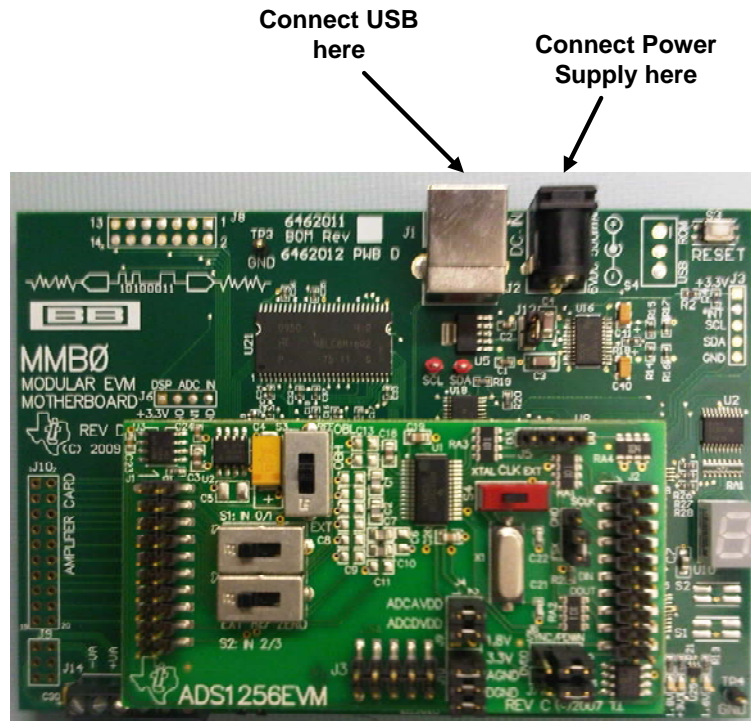


Figure 2

2. Power up the MMB0 by plugging in the wall wart into the wall and then into the J2 connector. Once powered, four green LEDs should power on the MMB0 indicating that the on board regulators are powered properly. See Figure 3.

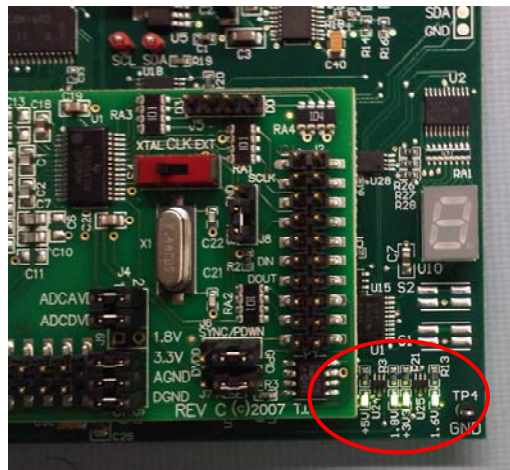


Figure 3

3. Load the EEPROM Programmer plug-in. It should be in the EVM pull-down menu as “EEPROM Programmer.” **Do not** use the EEPromPrgMMB3. See Figure 4 below –

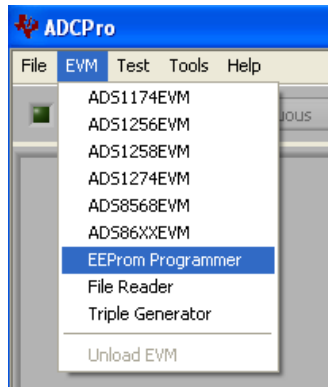


Figure 4

4. The programmer will prompt you to load the EEPROM programming file. Locate the proper ini EEPROM programmer file; The ADS1256EVM-PDK.ini for the ADS1256EVM and ADS1256EVM-PDK. Make sure that you can locate it and place it somewhere convenient. It may reside in: C:\ProgramFiles\ADCPro\plugins\EEPROM\_PROGRAMMER\
5. If you want to check it, the contents of the ADS1256EVM-PDK.ini file should read:

```
[EEPROM Data]
Date Modified=8FEB2012
EVMName=ADS1256EVM
EDGE_PWB=6450839
EDGE_PCA=6450839
EDGE_BOM=6450839
Previous Firmware=""
```

6. Loading the ADS1256VM-PDK.ini file will populate the EDGE, PCA, and BOM numbers along with the EVM Name field.
7. Make sure the EVM Name is ADS1256EVM, all EDGE numbers are as shown above and that all versions are "A".
8. Program the EEPROM by pressing the "Program EEPROM" button. See Figure 5

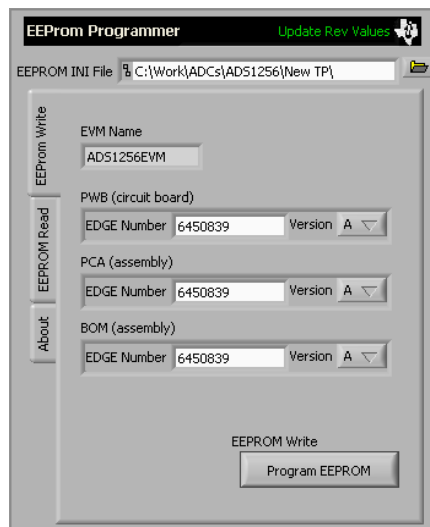


Figure 5

9. Go to the EEPROM Read tab of the plug-in.



10. Read the EEPROM by pressing the Read EEPROM button. See Figure 6

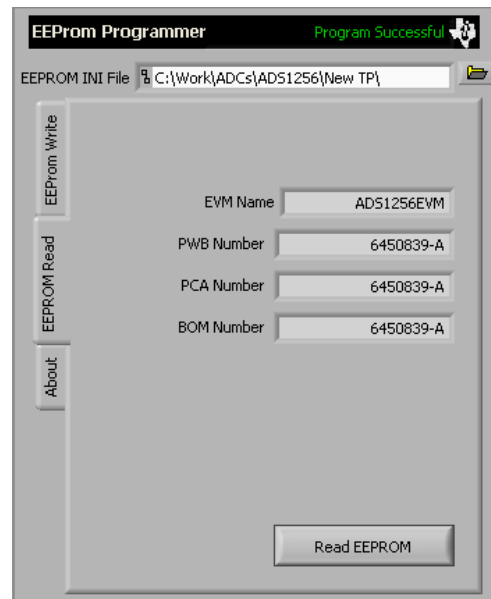
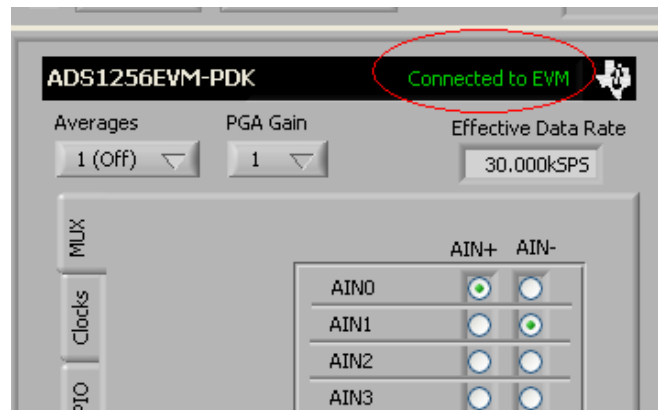


Figure 6

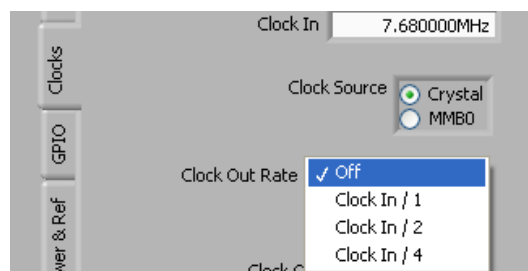
11. Verify that the EVM Name, PWB Number, PCA Number, and BOM Number are correct and are the current revision.
12. Unload the EEPROM Programmer plug-in from ADCPro, and RESET the MMB0 board by pressing the RESET button found on the MMB0.

### Verifying EVM References and ADC Operation for the ADS1256EVM and ADS1256EVM-PDK:

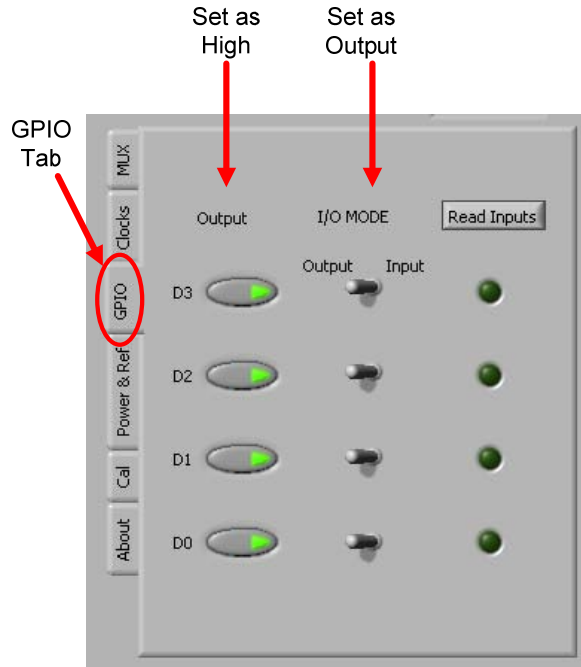
1. On the computer, start the ADCPro software (if not already loaded), and load the ADS1256EVM plug-in by clicking on the EVM menu item and selecting ADS1256EVM.
2. Verify that the plug-in loaded correctly by observing that the black box at the top of the plug-in screen reads “Connected to EVM” and that the LED display on the MMB0 is lit up. See Figure below



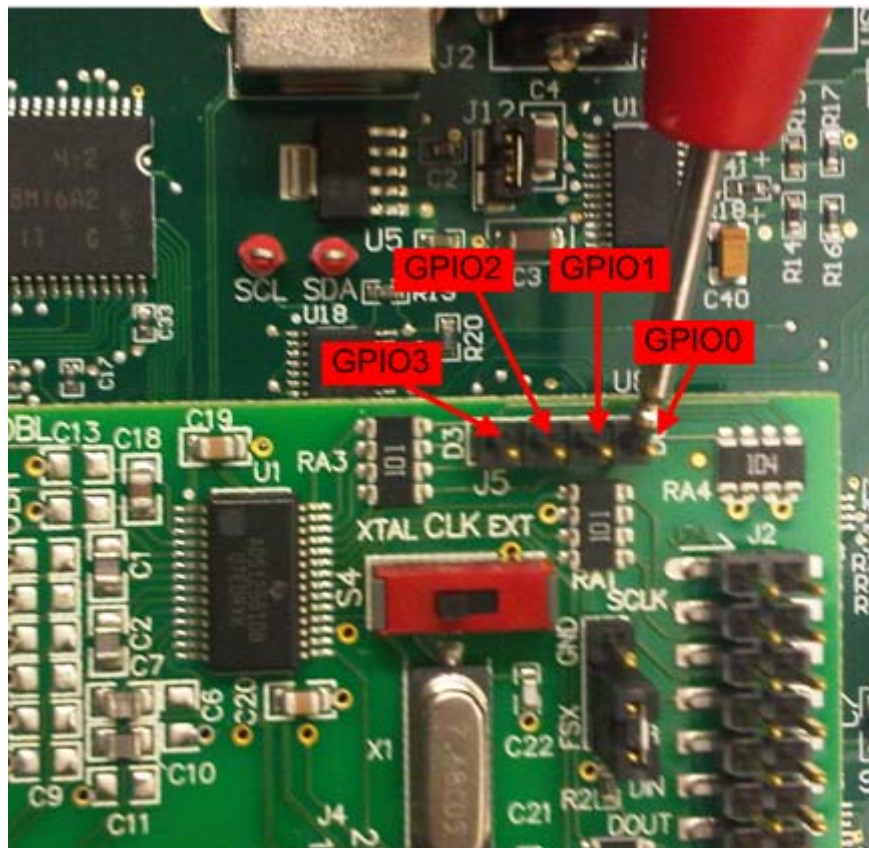
3. Click on the CLOCKS tab and set Clock Out Rate to OFF.



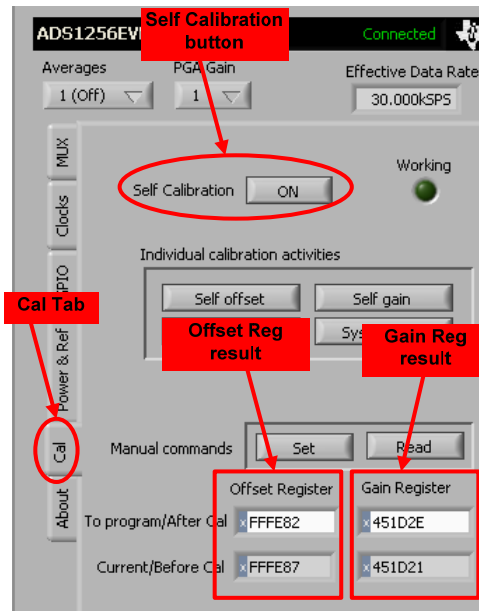
4. Click on the GPIO tab to enter the GPIO settings. Here, set D0-D4 to outputs by flipping the switch on the GUI to the left indicating output. Then, press the output button for all the channels setting them all high.



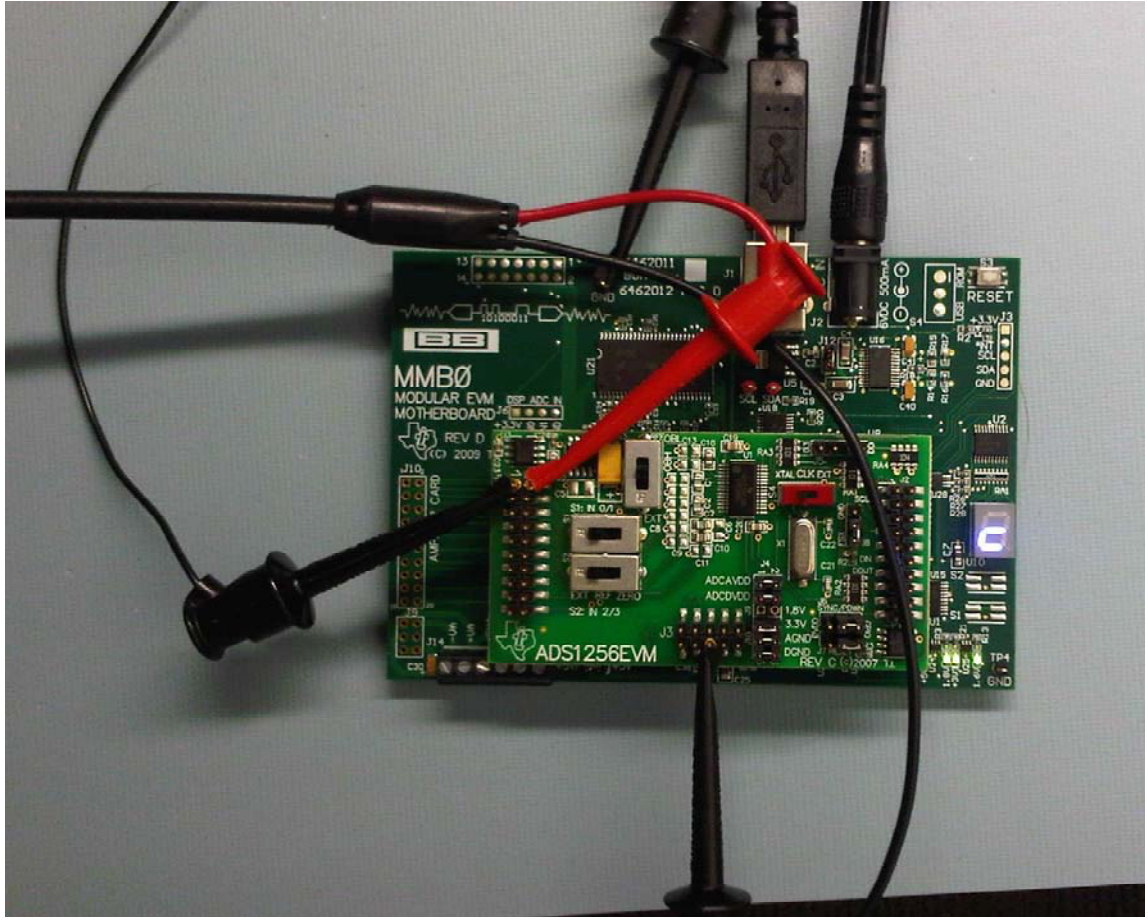
- On the ADS1256EVM board probe to check that the GPIO pins are all set to high. Connect the ground probe of the DMM to either the ground of the MMB0 using one of the test points or use a clip to connect it to the ground of the EVM board (pin 5 or 6 of the J5A header). Then, probe the GPIO outputs on the J5 header to make sure they all read back 3.3V +/-0.1V. See the picture below.



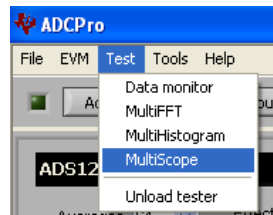
6. Turn on the function / waveform generator and configure it for a 100Hz, 1V peak to peak sine wave with a 500mV DC offset and high Z output.
7. On the EVM plug-in GUI, select the Cal tab. Here, press the “Self Calibration **ON**” button to have the converter perform a self calibration and write the results to the offset and gain registers. See the picture below. The values written to the offset and gain registers do not have to and probably will not match what the picture shows.



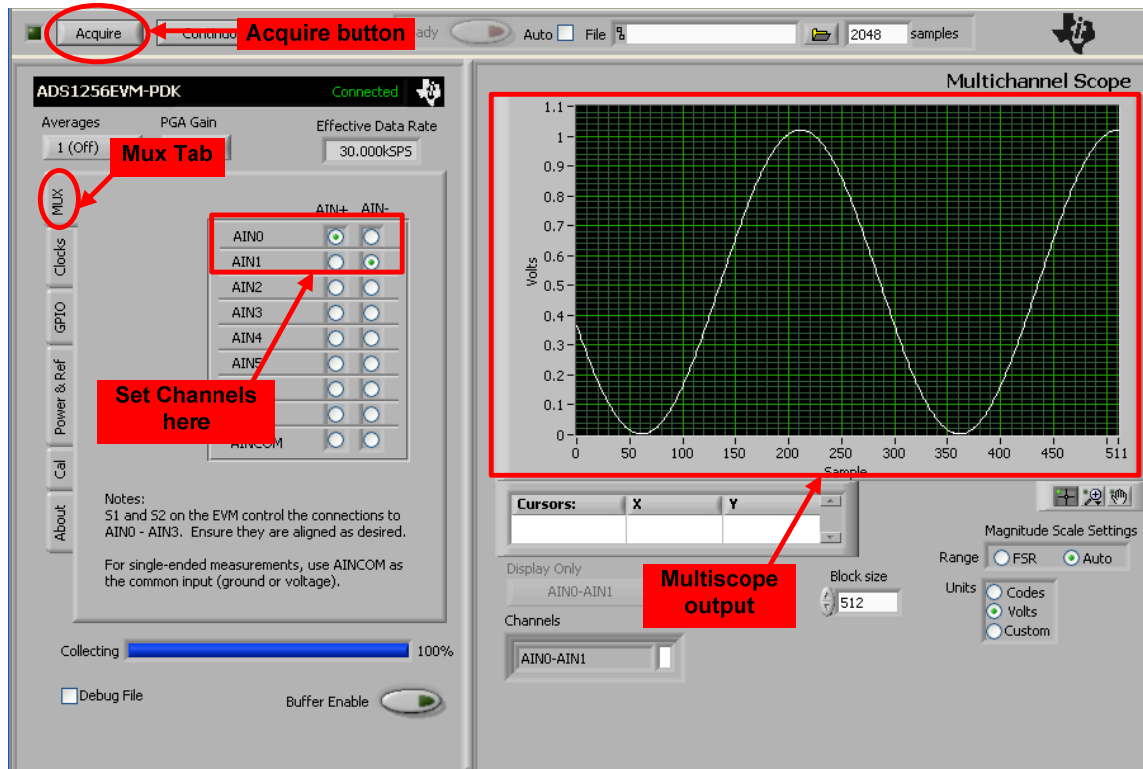
8. On the EVM board, use a clip lead to connect pin 1 on the J1 header to ground. You can use either of the ground test points on the MMB0 or pin 5 or 6 on the J3 header. Then connect the output of the function generator to the EVM board by connecting the positive (red) clip lead to pin 2 on the J1 header and the negative (black) clip lead to the ground of the board (either pin 5 or 6 on the J3 header) or a GND test point. See the figure below.



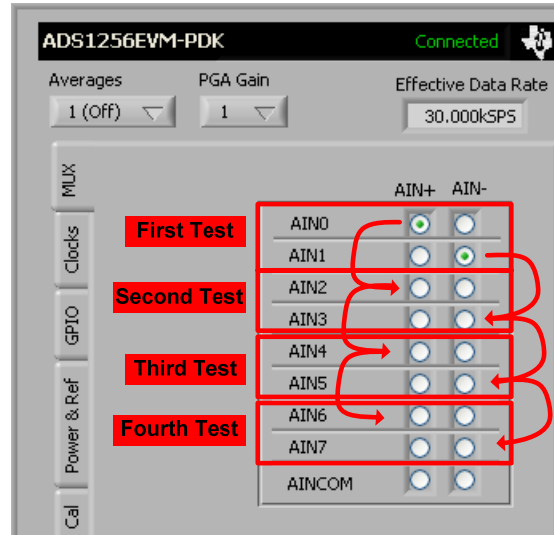
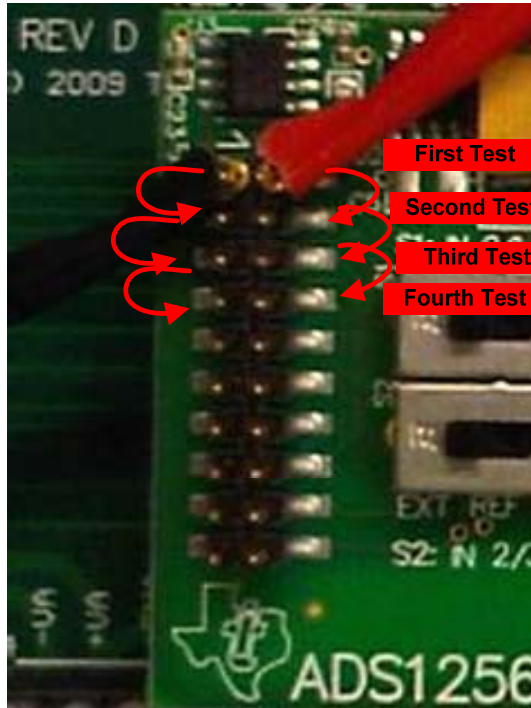
9. In ADCPro, select the multi-scope plug-in in the test drop down menu – see below.



10. On the EVM plug-in GUI, select the MUX tab. In the MUX tab select AIN0 as AIN+ and AIN1 as AIN-. Then press the Acquire button and you should see a sine wave appear in the MultiScope box. See the Figure below



11. On the EVM board move the black clip lead on the J1 header from pin 1 to pin 3 and move the red clip lead from pin 2 to pin 4. Essentially, you are moving each clip lead vertically down one pin. Then, on the GUI, select AIN2 as AIN+ and AIN3 as AIN-. Press Acquire and you should see a sine wave appear on the Multiscope output as seen in step 10. Take a look at the Figures following Step 12 to help clear up any questions. This step is explained as “Second test” in the diagrams.
12. Repeat step 11 two more times (Third test and Fourth test), each time moving the clip leads down vertically by one and incrementing the channels on the GUI. When the Acquire button is pushed, a sine wave should display on the Multiscope portion of the GUI. If not, double check to make sure you have the correct pins on the J1 header connected to the clip leads and the correct channels are selected on the EVM GUI. The two figures below should help explain.



- Once all channels have been verified, you can close ADCPro and power off the EVM by disconnecting the power from the J2 plug on the MMB0.

## Preparation for shipment

All functional tests are now complete. Before packaging the ADS1256EVM or ADS1256EVM-PDK for shipment, verify the following:

1. Remove all test equipment and temporary jumpers.
2. Ensure all final jumpers and switches are securely seated per Table 3.
3. Mark the board appropriately, indicating that it has passed the functional/visual test.
4. **Do not** remove the MMB0 from the ADS1256EVM-PDK boards. These will be shipped as a unit. If only the ADS1256EVM is needed, carefully remove the MMB0 from the ADS1256EVM.
5. Ensure the BoM Rev box and PCA box are marked on the back side of the EVM board to show the revision.
6. Perform a thorough visual inspection on the ADS1256EVM to make sure that no physical damage has occurred during testing.
7. Place/seal the tested board in an anti-static bag for shipment to distribution center. Label bag with the appropriate assembly number (ie. ADS1256EVM-PDK or ADS1256EVM)



# ADS1256EVM Schematic.

