

**Test Procedure****EVAL-AD5766ARDZ****Document No.** : **18-070959-01 A****Title** : **EVAL-AD5766ARDZ Customer Evaluation Board Test Procedure**

REVISION HISTORY				
Revision	ECR #	Description of Change	Date	Author
A	ECR-120635	Initial Release	4/10/23	Denyelle Dalisay

Required Approvers	
Approver Roles	Approver Names
Apps Engineer	Ian Vincent Andal

## Hardware List

- Computer or laptop (OS: Windows 10 64 bit)
- Mini-USB/ USB-C to USB Cable
- EVAL-AD5766ARDZ
- [EVAL-SDP-CK1Z](#)
- Digital Multimeter

## Software List

- [ACE Software](#) (download the latest version)
- SDPEEPROMProgrammerInstall\_1.0.110.0
- Board.AD5766.1.2024.17500-dev00xx.acezip

## Setup

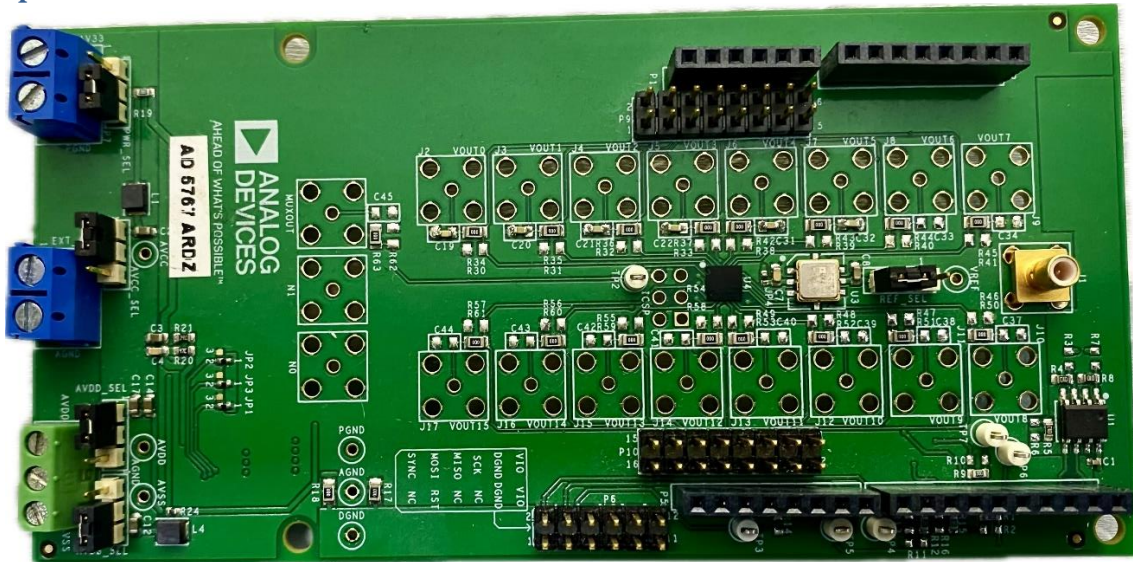
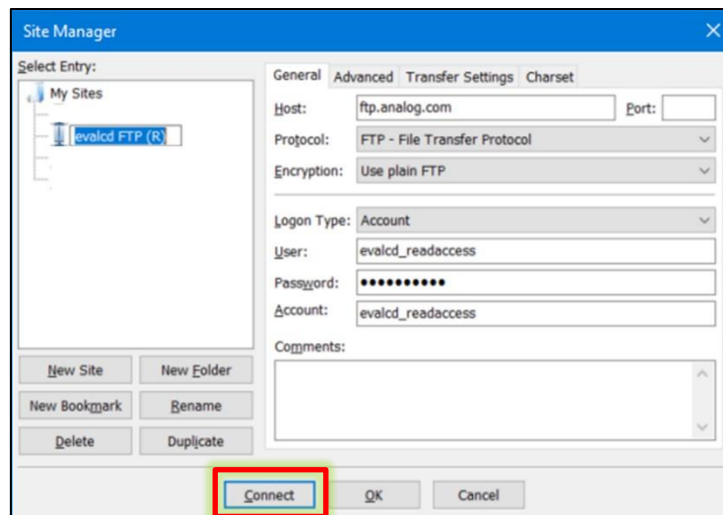


Figure 1 Board Image

## Software Download and Installation

1. Before connecting the evaluation boards, download and install the required software and files by following the proceeding instructions.
2. Access the FTP server using the provided FTP details:
  - Username: evalcd\_readaccess
  - Password: !Subcon123
  - Account: evalcd\_readaccess
  - FTP Server/Host: ftp.analog.com
  - Logon Type: Account
  - FTP Link or Directory: [/users/evalcd\\_readaccess/evalcd\\_read/AD5766 AD5767](#)



SSFigure 2 FTP Details

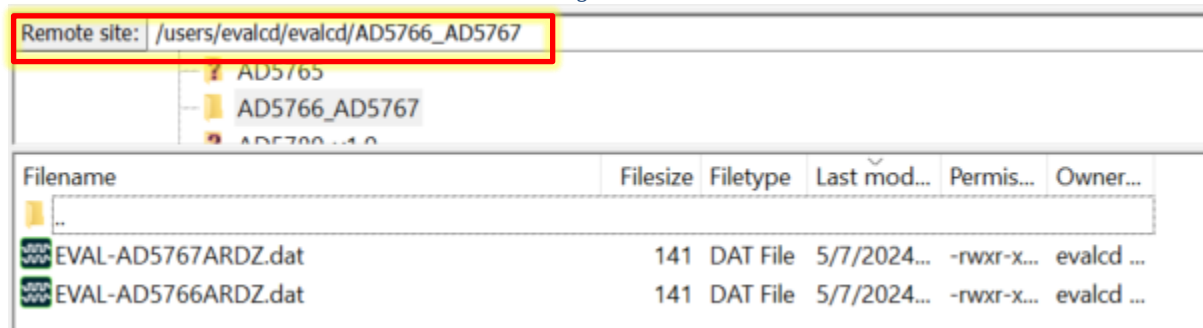


Figure 3 FTP Folder Directory / Link

1. Download or copy the software listed in the "Software List" from the FTP link provided above to your designated local folder (these are all one-time software installations).
2. Install the SDP EEPROM Programmer (SDPEEPROMProgrammerInstall\_1.0.110.0).
3. Download and install the latest version of the ACE Software.
4. Once step 3 is complete, install the AD5766 plugin (Board.AD5766.1.2024.17500dev00xx.acezip) by following the procedures on the next page:

- a. Go to Start Menu  > Analog Devices> ACE

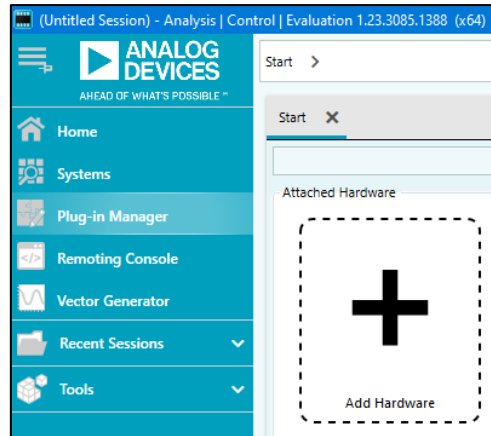


Figure 4

- b. Go to the side bar > Plug-in Manager

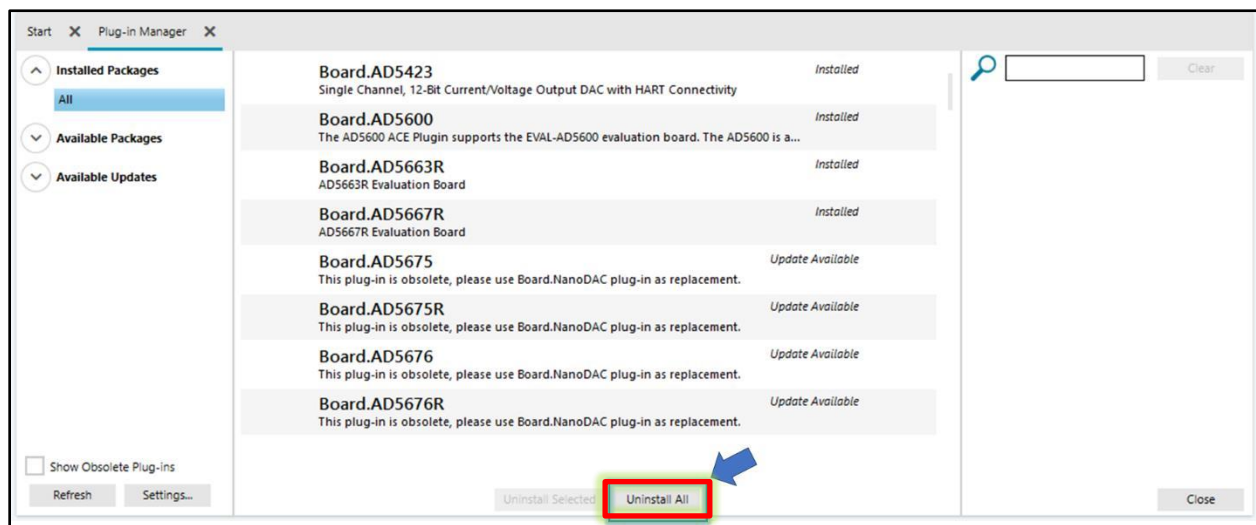


Figure 5

- c. Click "Uninstall All".

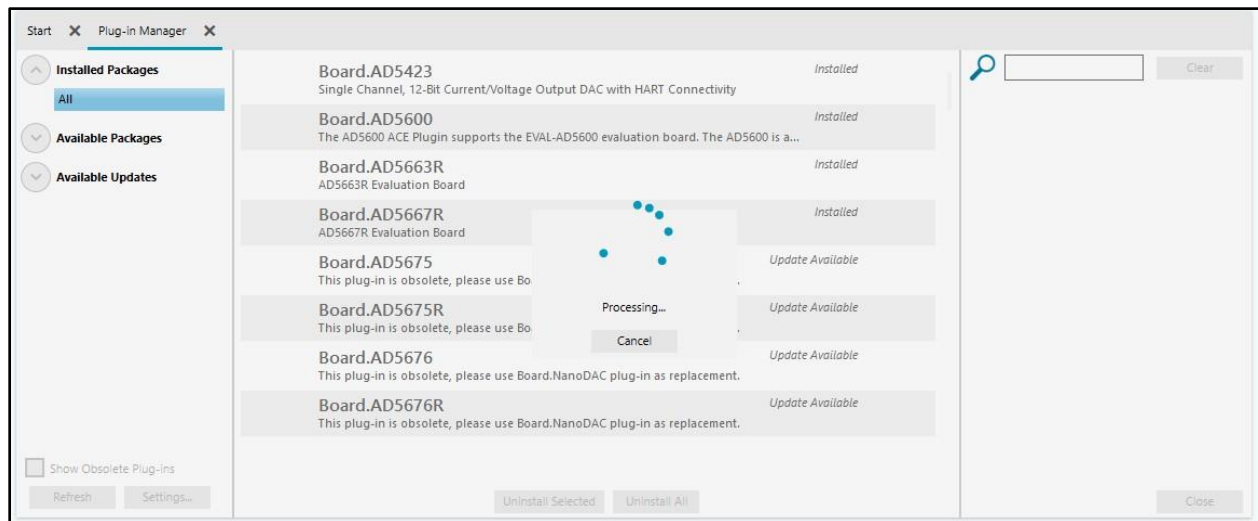


Figure 6

- d. Wait until the plug-ins are uninstalled. Then close all windows related to ACE.
- e. Run the plug-in installation of EVAL-AD5766ARDZ by double-clicking Board.AD5766.1.2024.17500dev00xx.acezip on your local folder.

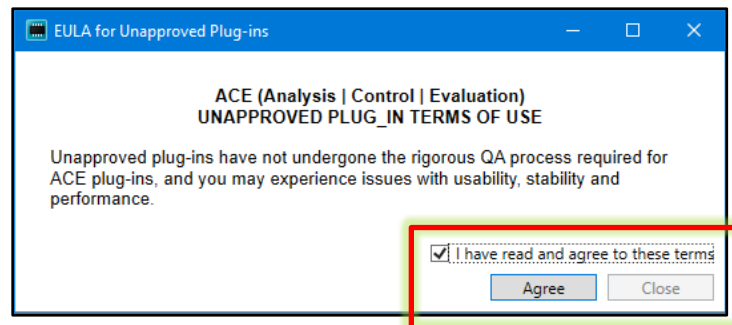


Figure 7

- f. Tick "I have read and agree to these terms" and click "Agree".

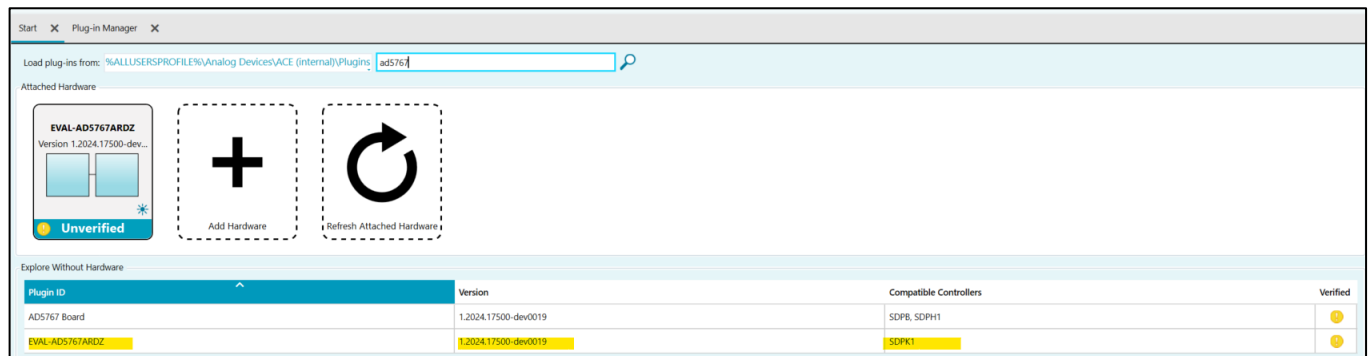


Figure 8

- g. On the Start window of ACE, search for AD5766ARDZ. Once plugin is visible, installation has been completed.

## Hardware Connection

- Set the link connections as shown in Figure 9:
  - PWR\_SEL:** Position 1-2 (Uses a +3.3V External Power Supply)
  - AVCC\_SEL:** Position 1-2
  - AVDD\_SEL:** Position 1-2
  - AVSS\_SEL:** Position 2-3
  - REF\_SEL:** Position 2-3

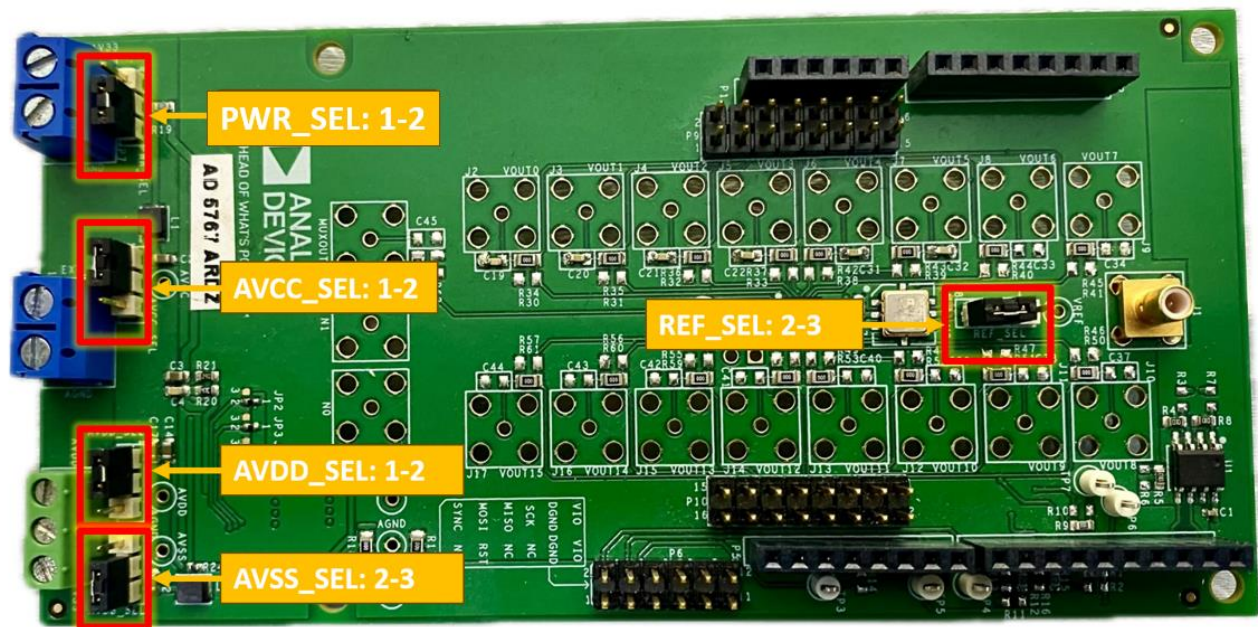


Figure 9 Link or Jumper Connections Location and Settings



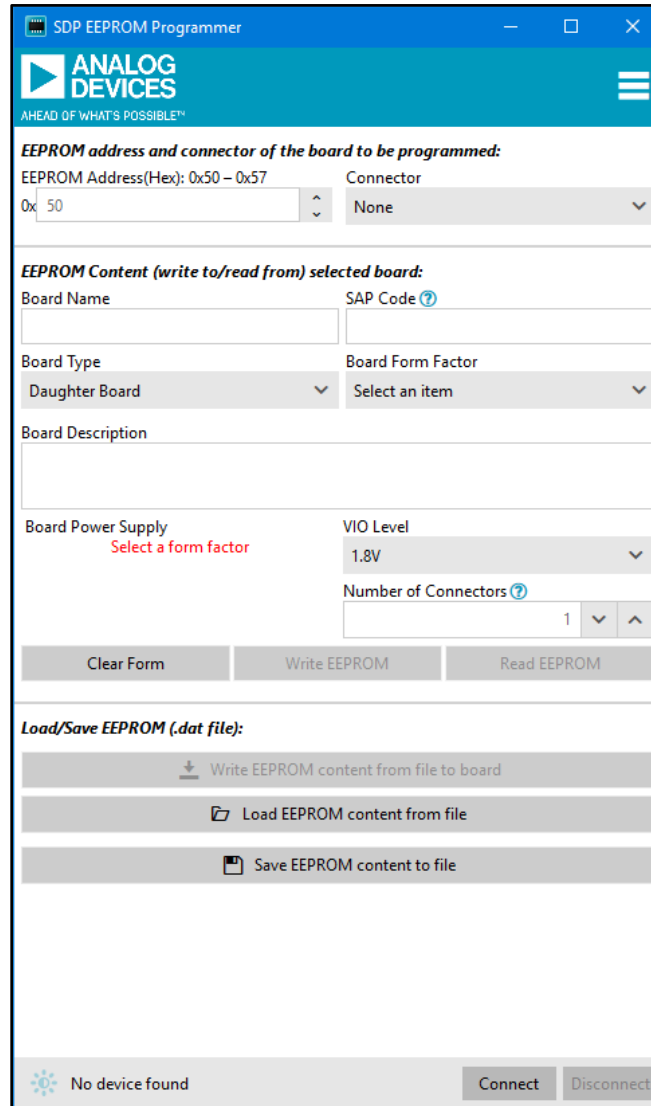
2. Connect an external power supply to “P7” (EXT\_3V3) with +3.3V.
3. Connect the EVAL-AD5766ARDZ to the Arduino connector of SDP-K1 (EVAL-SDP-CK1Z) as shown in Figure 10.
4. Attach the USB cable from the SDP-K1 to the PC.



*Figure 10 EVB, SDP-K1 and Laptop Connection*

## SDP EEPROM Programmer Procedures

1. Open the SDP EEPROM Programmer in Start Menu > SDP EEPROM Programmer (.NET). The main window shown in Figure 11 would be launched.



**SDP EEPROM Programmer**

**EEPROM address and connector of the board to be programmed:**  
 EEPROM Address(Hex): 0x50 – 0x57  
 Connector: None

**EEPROM Content (write to/read from) selected board:**  
 Board Name:  SAP Code:   
 Board Type: Daughter Board Board Form Factor: Select an item  
 Board Description:   
 Board Power Supply: Select a form factor VIO Level: 1.8V  
 Number of Connectors: 1

Clear Form Write EEPROM Read EEPROM

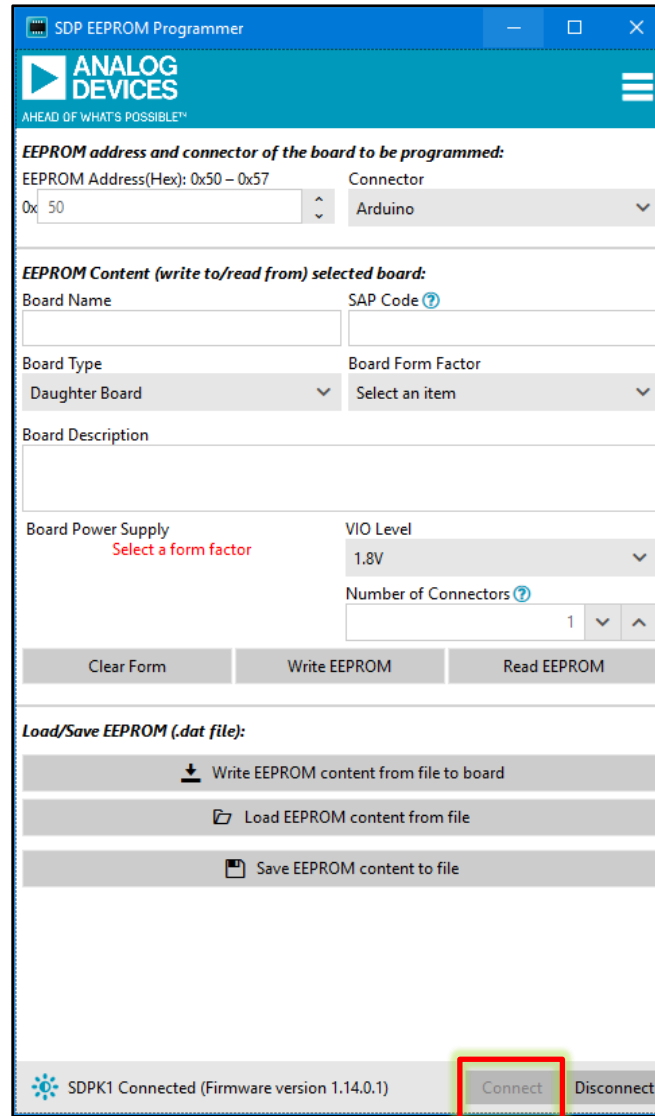
**Load/Save EEPROM (.dat file):**  
 Write EEPROM content from file to board  
 Load EEPROM content from file  
 Save EEPROM content to file

No device found Connect Disconnect

Figure 11. SDP EEPROM Programmer Window



- On the bottom right portion of the window click on Connect. The main window will change the display as shown in Figure 12.



SDP EEPROM Programmer

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**EEPROM address and connector of the board to be programmed:**  
EEPROM Address(Hex): 0x50 – 0x57  
Connector: Arduino

**EEPROM Content (write to/read from) selected board:**  
Board Name:  SAP Code:   
Board Type: Daughter Board Board Form Factor: Select an item  
Board Description:   
Board Power Supply: Select a form factor VIO Level: 1.8V  
Number of Connectors: 1

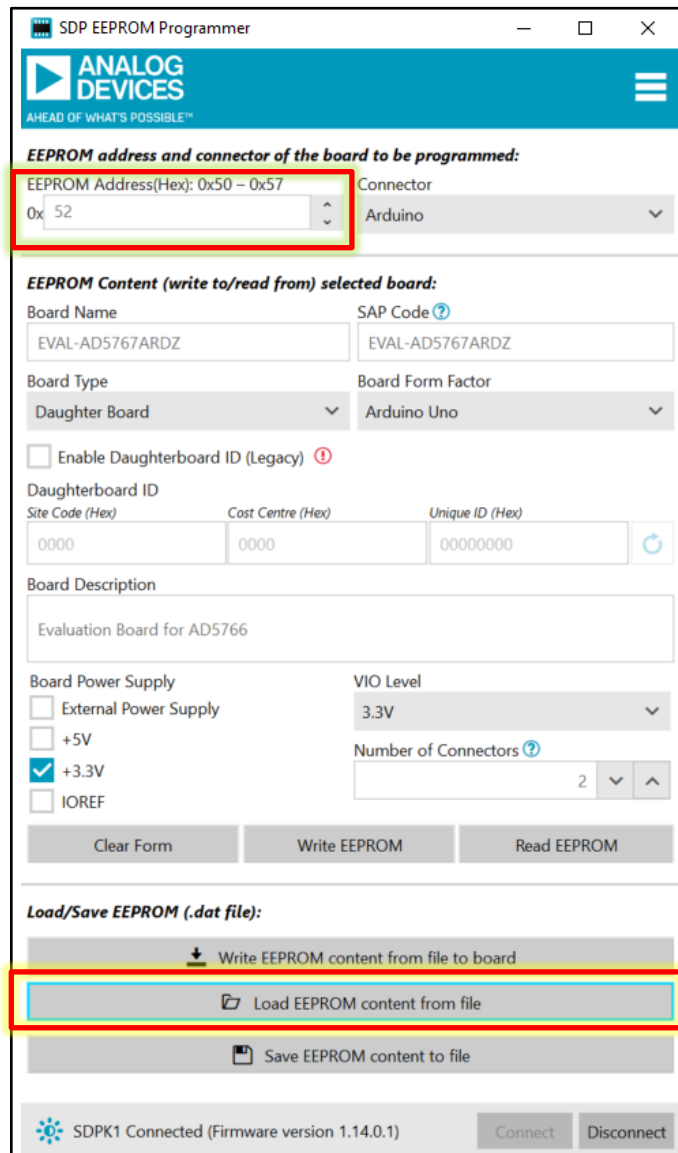
Clear Form Write EEPROM Read EEPROM

**Load/Save EEPROM (.dat file):**  
Write EEPROM content from file to board  
Load EEPROM content from file  
Save EEPROM content to file

SDPK1 Connected (Firmware version 1.14.0.1) **Connect** Disconnect

Figure 12. SDP-K1-connected Window

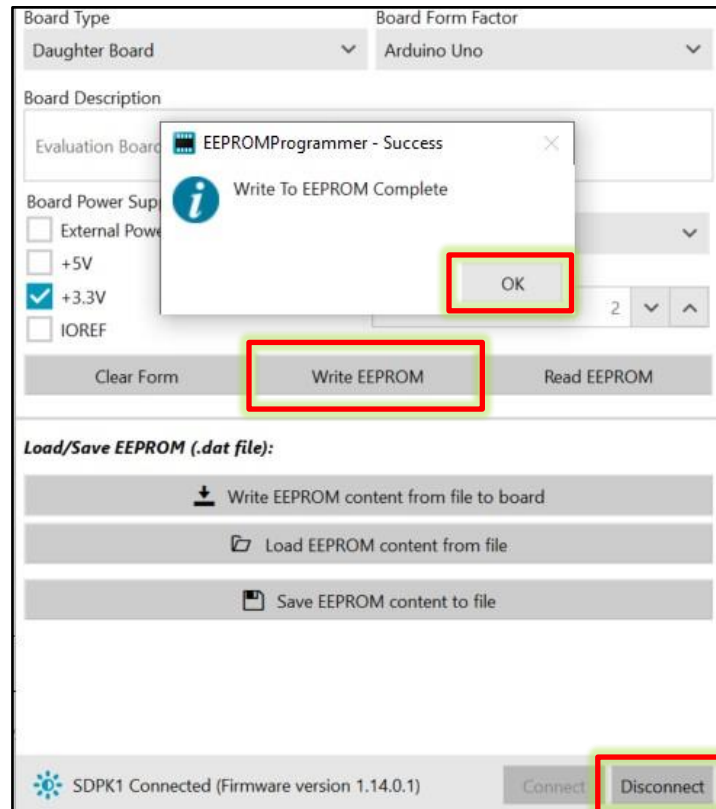
3. Select the "Load EEPROM content from file" option and navigate to the local folder where the EVAL-AD5766ARDZ.dat file is located and then select it. The main window will update to reflect the contents of the file. **Please verify that the "EEPROM address" and other entries on the forms match those displayed in Figure 13.**



The screenshot shows the 'SDP EEPROM Programmer' window. The 'EEPROM address and connector of the board to be programmed:' section has 'EEPROM Address(Hex): 0x50 - 0x57' and 'Connector: Arduino'. The 'EEPROM Content (write to/read from) selected board:' section shows 'Board Name: EVAL-AD5767ARDZ', 'SAP Code: EVAL-AD5767ARDZ', 'Board Type: Daughter Board', and 'Board Form Factor: Arduino Uno'. The 'Board Description' is 'Evaluation Board for AD5766'. The 'Board Power Supply' section has 'External Power Supply' unchecked, '+5V' unchecked, '+3.3V' checked, and 'IOREF' unchecked. The 'VIO Level' is '3.3V' and the 'Number of Connectors' is '2'. The 'Load/Save EEPROM (.dat file):' section has three buttons: 'Write EEPROM content from file to board', 'Load EEPROM content from file' (highlighted with a red box), and 'Save EEPROM content to file'. The status bar at the bottom shows 'SDPK1 Connected (Firmware version 1.14.0.1)' and 'Connect'/'Disconnect' buttons.

Figure 13 EEPROM Content Load From File Window

4. Click on the "Write EEPROM" button located in the center of the window. Wait for the pop-up window to appear, indicating the completion of the EEPROM write process, as shown in Figure 14. Click on the "OK" button to proceed.
5. Click the "Disconnect" button situated at the bottom right corner of the window. Finally, close the SDP EEPROM Programmer window to conclude the procedure.



*Figure 14 Write to EEPROM Complete Pop-up Window*

## EVAL-AD5766ARDZ Test Procedure

### Testing Internal Supplies of the DAC

1. With the Evaluation boards connected, measure the following test points:
  - a. Measure the **AV<sub>CC</sub>** test pin (Analog supply for the low voltage DAC circuitry):
    - i. VDD Test Pin = 3.3 V (Pass)
    - ii. VDD Test Pin < 3.1 V (Fail)
  - b. Measure the **V<sub>IO</sub>** test pin (Digital / VLOGIC supply checking):
    - i. VLOGIC Test Pin = 3.3 V (Pass)
    - ii. VLOGIC Test Pin < 3.1 V (Fail)
  - c. Measure the **V<sub>REF</sub>** test pin (Internal DUT Reference checking):
    - i. VREF Test Pin = 2.5 V (Pass)
    - ii. VREF Test Pin < 2.4 V (Fail)
  - d. Measure the **AV<sub>SS</sub>** test pin (Negative High Power Supply):
    - i. AV<sub>SS</sub> Test Pin = 22 V (Pass)
    - ii. AV<sub>SS</sub> Test Pin < 21.7 V (Fail)
  - e. Measure the **AV<sub>DD</sub>** test pin (Positive High Power Supply):
    - i. AV<sub>DD</sub> Test Pin = 8 V (Pass)
    - ii. AV<sub>DD</sub> Test Pin < 7.7 V (Fail)

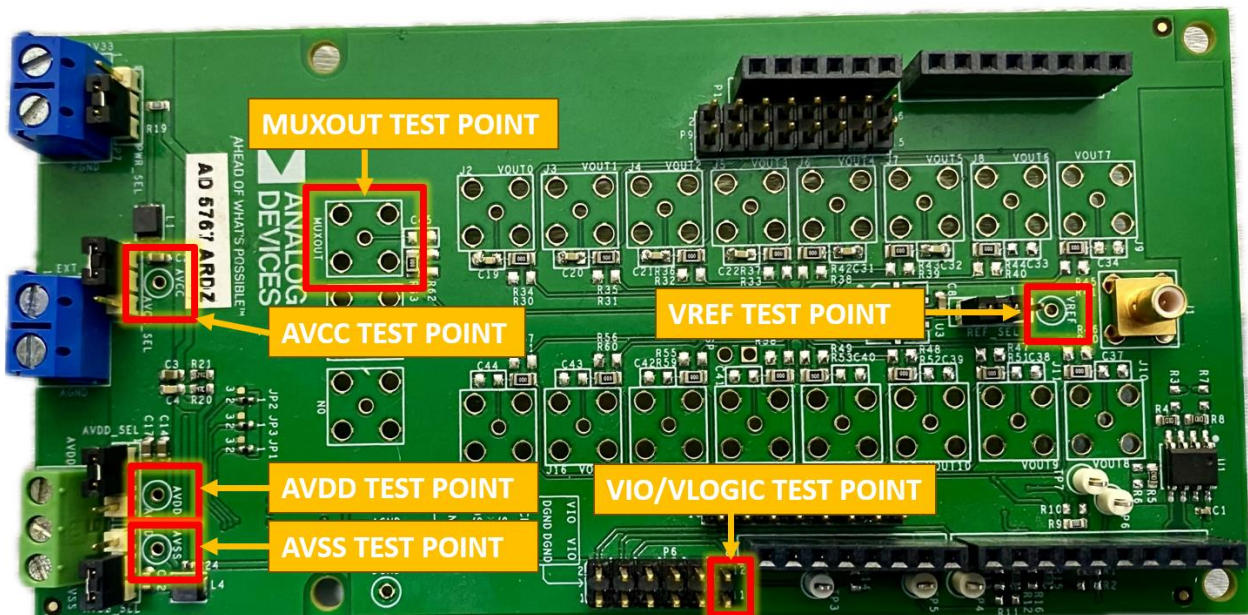


Figure 15 Test Points Location

## ACE Software and Plugin Set-up

1. Open the ACE Software. EVAL-AD5766ARDZ will show up as an Attached Hardware, shown in Figure 16. Double-click on the EVAL-AD5766ARDZ image.
  - a. If the expected attached hardware is not shown, reconnect the USB connection from SDP-K1 Board to PC. ACE should automatically detect the attached hardware.
  - b. This version of ACE Plug is in “Unverified” status.

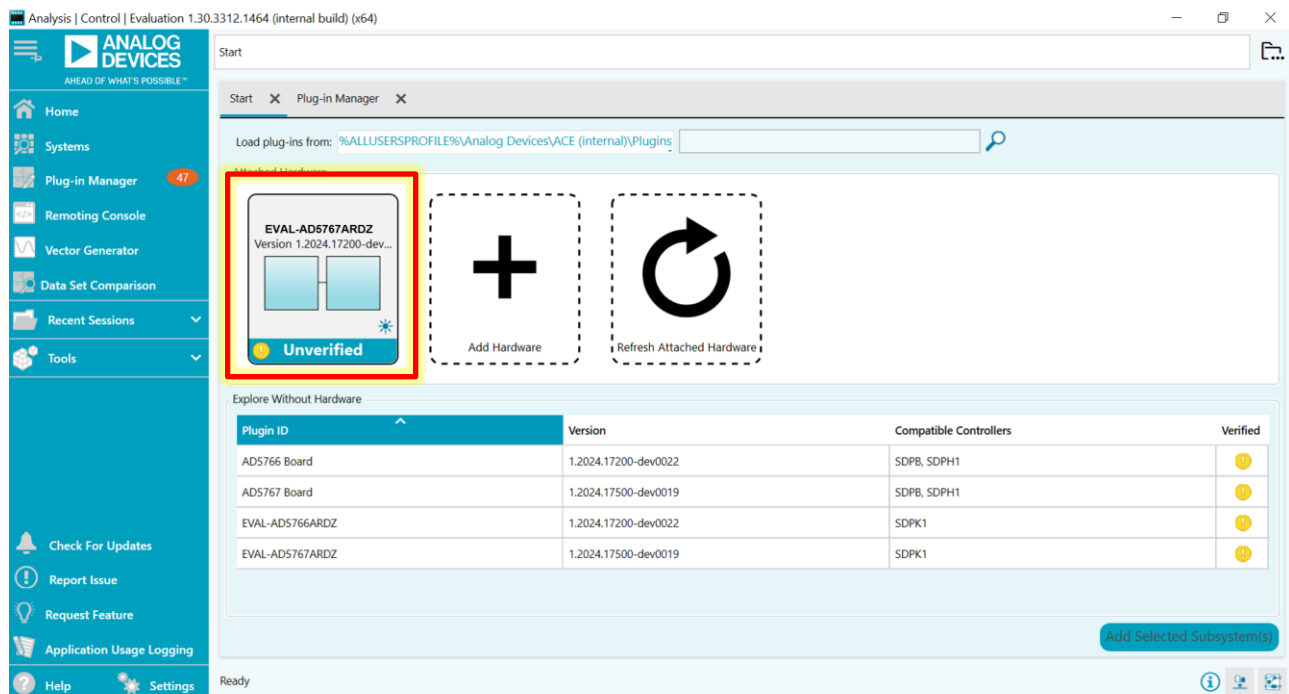
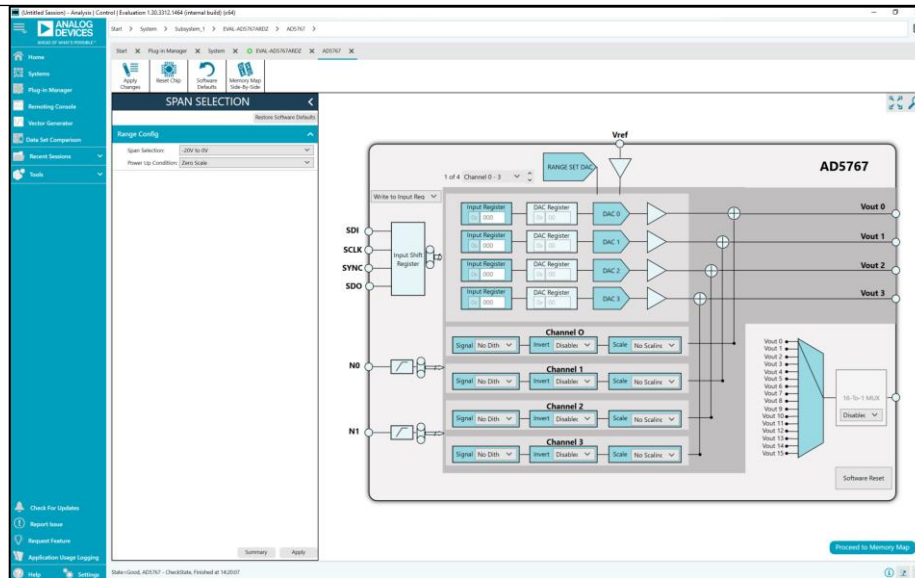


Figure 16 ACE Software's Homepage

2. The Board view should appear. Click on the “AD5766” chip in the middle. After that, the Chip View should be visible. This view includes the UI that you may use to interact with the device as shown in Figure 17 Chip View.

## EVAL-AD5766ARDZ



*Figure 17 Chip View*

3. On the Span Selection > Range Config (as shown in Figure 18 Span Selection) set:
  - a. **Span Selection:** -5 V to 5 V
  - b. **Power Up Condition:** Midscale
  - c. Click **Apply**

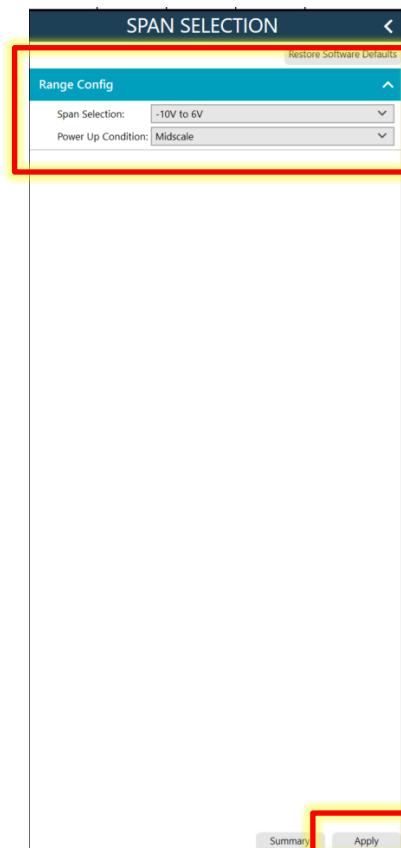


Figure 18 Span Selection



## Test Procedure

## EVAL-AD5766ARDZ

4. Measure the output voltage on any of the channels (Vout 0 to Vout 15):
  - a. Voutx Test Pin = 0 V (Pass)
  - b. Voutx Test Pin > 0.2 V (Fail)

### Testing the Write Function of the DAC

1. Choose **"Write to and Update DAC Channel n"** and on the Input Register of **DAC 0** type in **"FFFF"**.  
This will write a full-scale code on the DAC. Refer to Figure 19:
  - a. Vout 0 = 5 V (Pass)
  - b. Vout = 4.7 V (Fail)
2. Click **"Software Reset"** and then measure the output voltage:
  - a. Vout 0 = 0 V (Pass)
  - b. Vout 0 > 0.1 V (Fail)

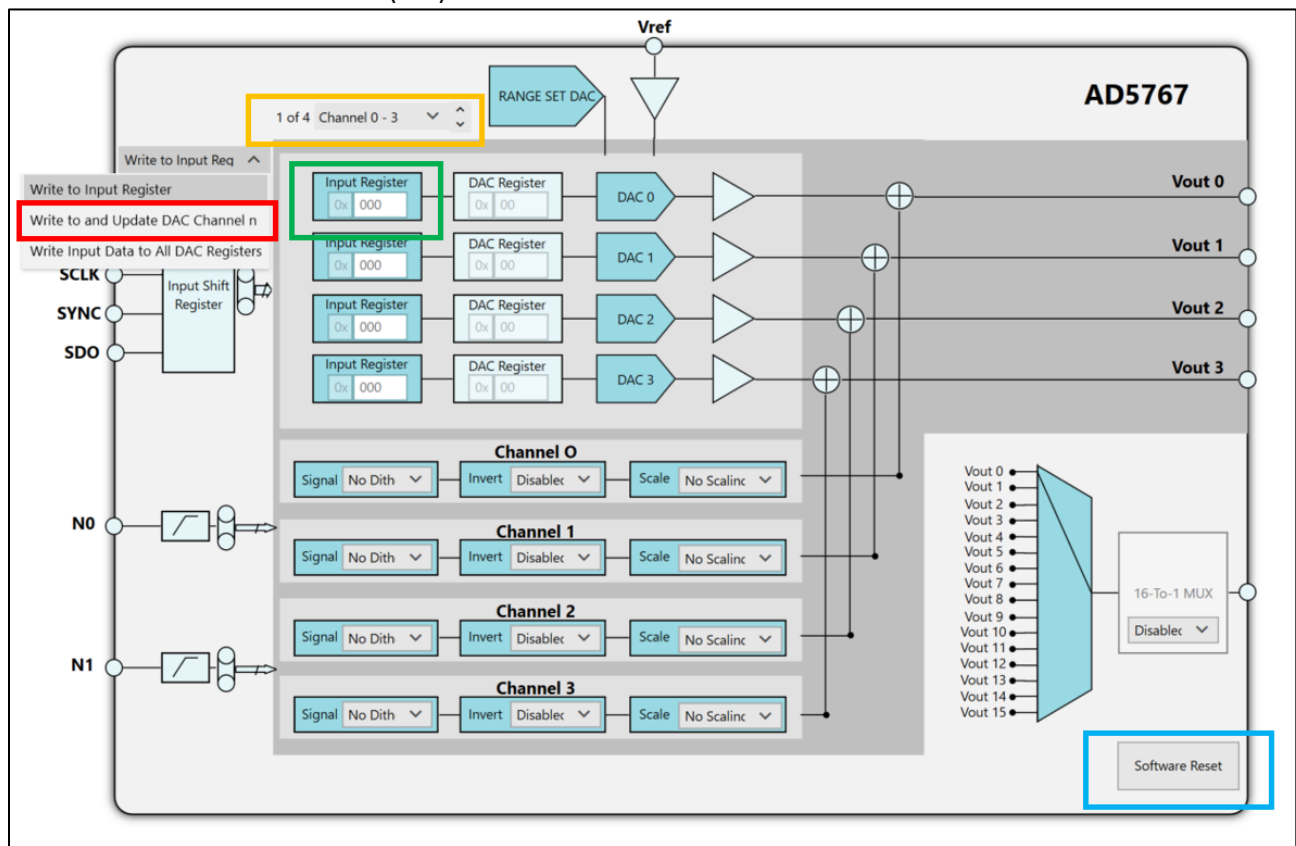


Figure 19 Writing on DAC using ACE

## Testing the Multiplexer Feature

1. On the Span Selection click the Modify button as shown on Figure 20.

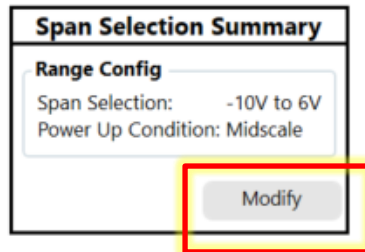


Figure 20 Span Selection Summary

2. On the “Span Selection” > Range Config similar to Figure 18. Span Selection set:
  - a. **Span Selection:** -10 V to 6 V
  - b. **Power Up Condition:** Midscale
  - c. Click **Apply**
3. Measure any of the Vout channels:
  - a. Voutx = -2 V (Pass)
  - b. Voutx > -1.8 V (Fail)
4. On the Multiplexer Setting of the software as shown in Figure 21, 16-to-1 MUX, choose “Enabled”. Choose Vout 15 by tapping on the space as indicated on Figure 21 until the line goes down to Vout 15.

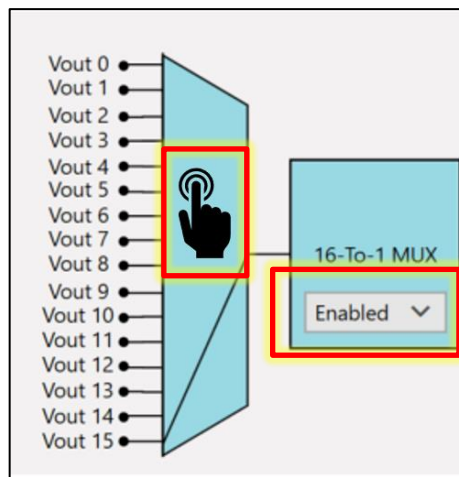


Figure 21 16-to1 MUX

5. On the **channel selection** choose **Channel 12-15** as shown in Figure 19.
6. Choose “**Write to and Update DAC Channel n**” and on the Input Register of **DAC 15** type in “**FFFF**”. (Refer to Figure 19) and measure using the MUXOUT test point:
  - a. Vout 15 = 6V (Pass)
  - b. Vout 15 < 5.7 V (Fail)

## Sticker Placement and Repacking

1. Make sure that the jumper settings are in the default positions.
2. Make sure to observe the best practices and notes in sticker placements.
  - a. Double check if the right sticker with the correct part number will be installed. Refer and cross reference with the BOM, Board Number and layout notes. For this board the name should imply “**EVAL-AD5676R2ARDZ**”.
  - b. Cut the stickers straightly so that they fit the empty box of the board without covering any labels. Avoid the mistakes shown in Figure 22, where the sticker is dirty and not properly placed, cuts are not straight, the wrong model number is written on the sticker, and a Test Point Label is covered.



Figure 3 Sticker Mistakes to Avoid

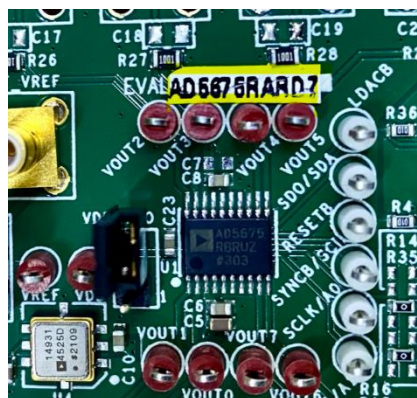


Figure 4 Sample of Sticker Placement not covering any labels

3. Repack the board that has been tested.
4. Repeat the entire process for the next board, excluding the one-time software installations. However, restart the ACE Software and disconnect then reconnect the SDP-K1 before proceeding to test the other evaluation boards.