**Document No. : 18-070775-01-Rev A**

**Title :** **EVAL-AD5781ARDZ Customer Evaluation Board Test Procedure**

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| --- | --- | --- | --- | --- |
| REVISION HISTORY | | | | |
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| A | 119303 | Prelim | Jan 2024 | Jose Enrique Pabalan |
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# Requirements

## Hardware List

* Computer or Laptop (Windows 10 64-bit)

* EVAL-AD5781ARDZ
* [EVAL-SDP-K1](https://www.analog.com/en/design-center/evaluation-hardware-and-software/evaluation-boards-kits/sdp-k1.html#eb-overview) board
* EV-LTC6655-REFZ
* USB type C to USB type A Cable
* DMM

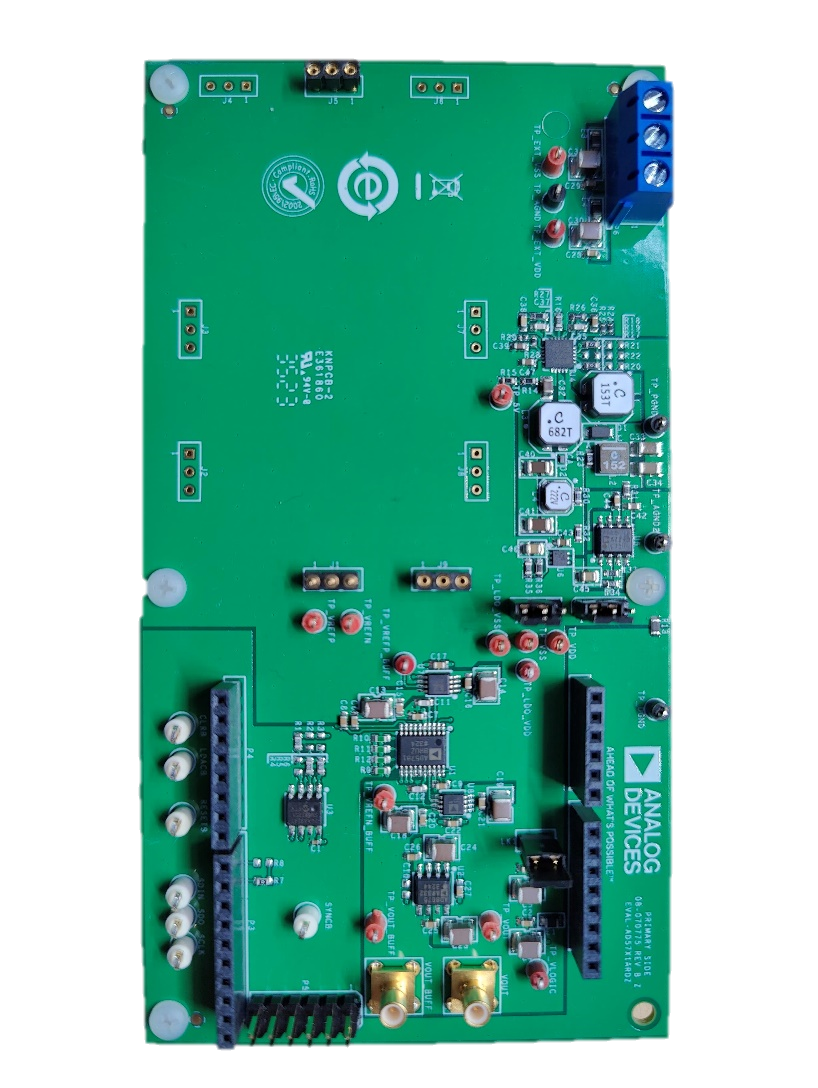


Figure 1. EVAL-AD5781ARDZ

## Software List

* EEPROM Programmer file: EEPROM\_Content\_AD5781.dat
* Binary file: AD5781\_Firmware.bin
* ACE-Plugin: Board.AD579X\_8X\_6XIIO
* ACE Software

# Setup

## Software Setup

1. Before connecting the evaluation boards, download and install the required software and files int the FTP site.
2. Access the FTP server using the provided FTP details:
   1. Username: evalcd\_readaccess
   2. Password: !Subcon123
   3. Account: evalcd\_readaccess
   4. FTP Server/Host: ftp.analog.com
   5. Logon Type: Account
   6. FTP Link or Directory: /users/evalcd\_readaccess/evalcd\_read/EVAL-AD5781ARDZ
3. Copy the files in the FTP to a desired directory.
4. Install ACE software through this link: [Analysis | Control | Evaluation (ACE) Software | Design Center | Analog Devices](https://www.analog.com/en/design-center/evaluation-hardware-and-software/evaluation-development-platforms/ace-software.html)
5. Run the “Board.AD579X\_8X\_6XIIO.1.2024.2400-dev0004” file to install the plug-in.

## Hardware Setup

1. Visually check the board if there are missing components.
2. Confirm if the link connections are at default positions as per Table 1 on the EVAL-AD5781ARDZ board.

Table 1. Jumper Default Positions

|  |  |
| --- | --- |
| Jumpers | Default Position |
| LK1 | Installed |
| LK2 | 1 and 2 Position |
| LK3 | 1 and 2 Position |

1. Connect reference board to EVAL-AD5781ARDZ.
2. Connect the EVAL-AD5781ARDZ to SDP-K1 as shown in Figure 2.
3. Use the USB type C to USB type A Cable to connect the SDP-K1 board to a USB port of your laptop.
4. The (Connected) Orange LED should light up on SDP-K1 board, next to the USB-C connector.

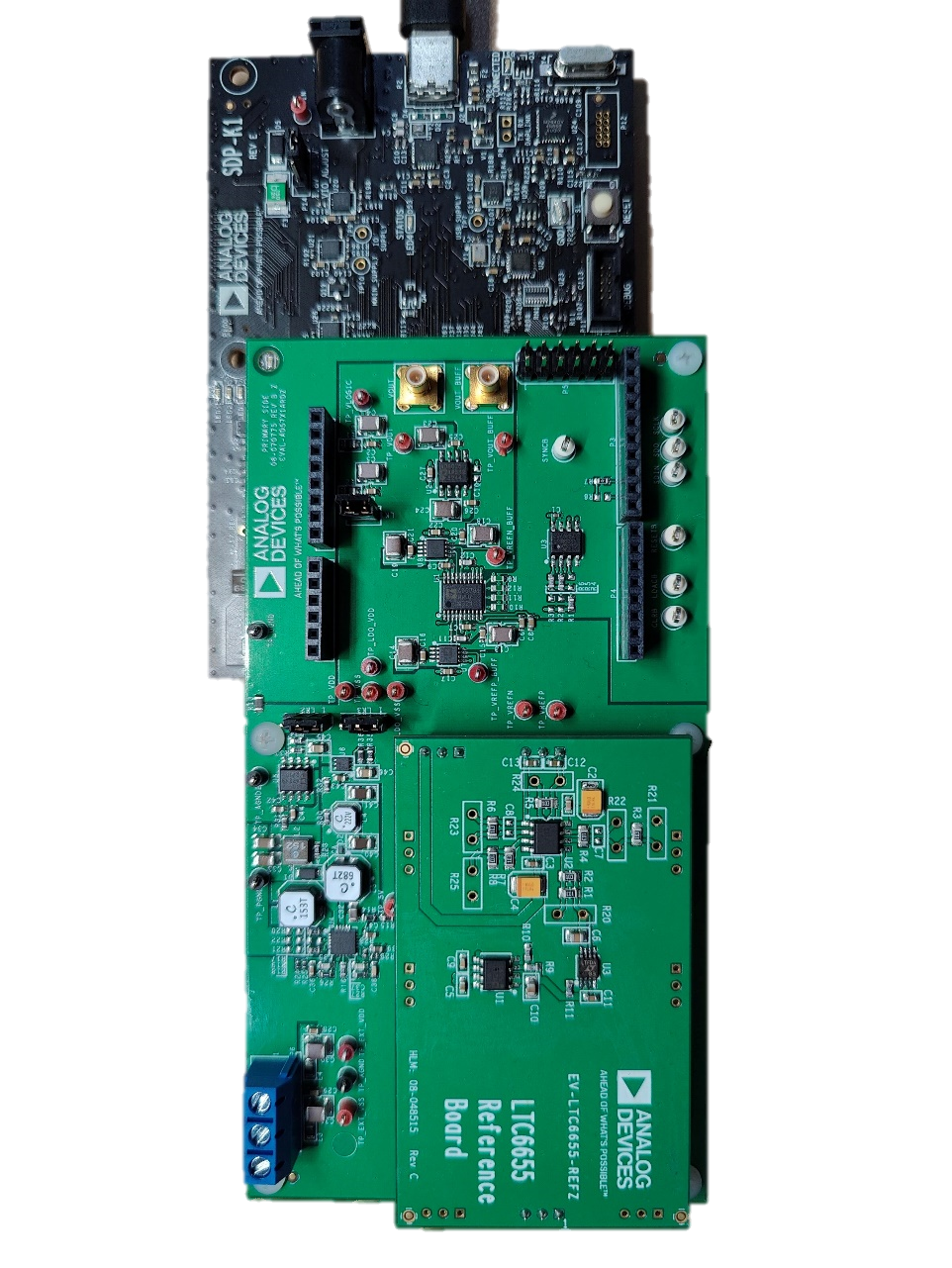


Figure 2. EVAL-AD5781ARDZ Connected set-up.

## Power Supply and Reference Voltage Test

1. Probe the following Tests Points as per Figure 3 and confirm they read as in Table 2.

Table 2. Test Points and Voltage Limit

|  |  |  |  |
| --- | --- | --- | --- |
| Test Point / Header | Ideal Voltage | Voltage Limit | Function |
| TP\_VDD | 14 V | 13.5 V to 14.5 V | On-board Positive Supply |
| TP\_VSS | -14 V | -14.5 V to -13.5 V | On-board Negative Supply |
| VLOGIC | 3.3 V | 3 V to 3.6 V | On-board Digital Supply |
| TP\_VREFP | 10 V | 9.9 V to 10.1 V | Positive Reference |
| TP\_VREFP\_BUFF | 10 V | 9.9 V to 10.1 V | Buffered Positive Reference |
| TP\_VREFN | -10 V | -10.1 V to -9.9 V | Negative Reference |
| TP\_VREFN\_BUFF | -10 V | -10.1 V to -9.9 V | Buffered Negative Reference |
| 5V | 5 V | 4.5 V to 5.25 V | SDP-K1 Supply |

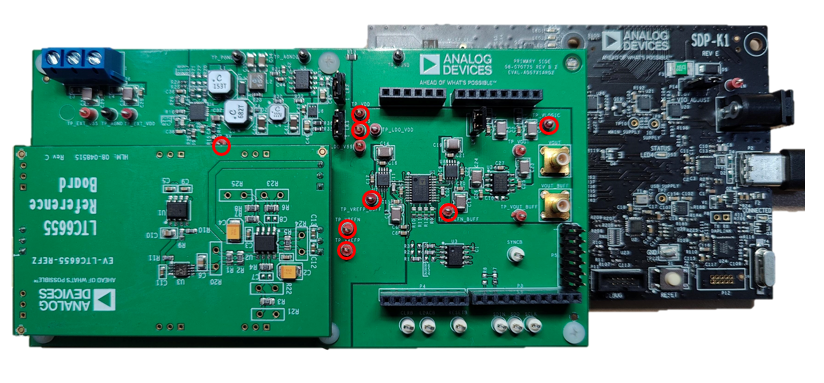


Figure 3. EVAL-AD5781ARDZ Probe point location

## EEPROM Setup

1. Install and open EEPROMProgrammer.exe (you can search for it as shown in Figure 4). Retain the connection of SDP-K1, eval-board and computer.

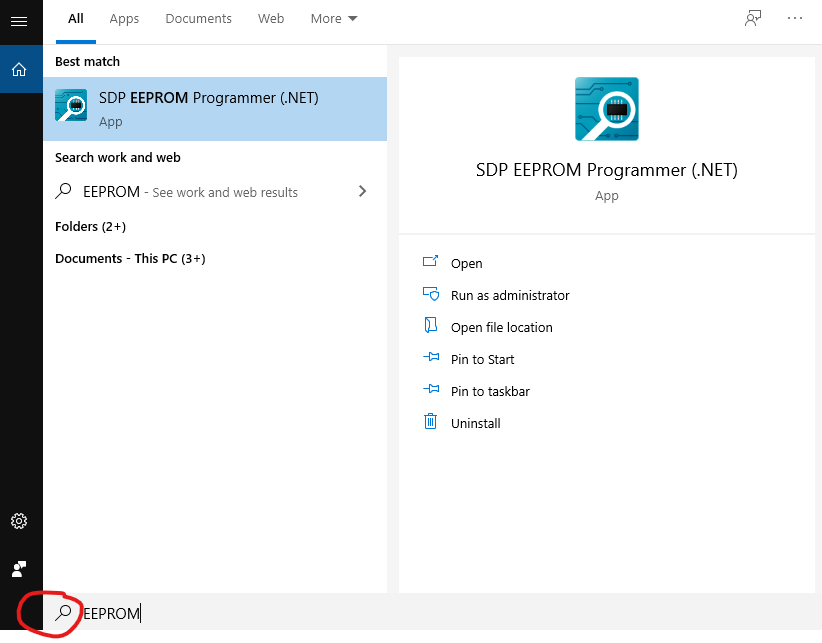


Figure 4. Opening of SDP EEPROM Programmer

1. Figure 5 shows the EEPROM Programmer window upon opening the program. Click Connect, the window will display the message “System Connected” in the lower left corner as in Figure 6. In case that the app asked to reprogram the firmware, click **YES**.

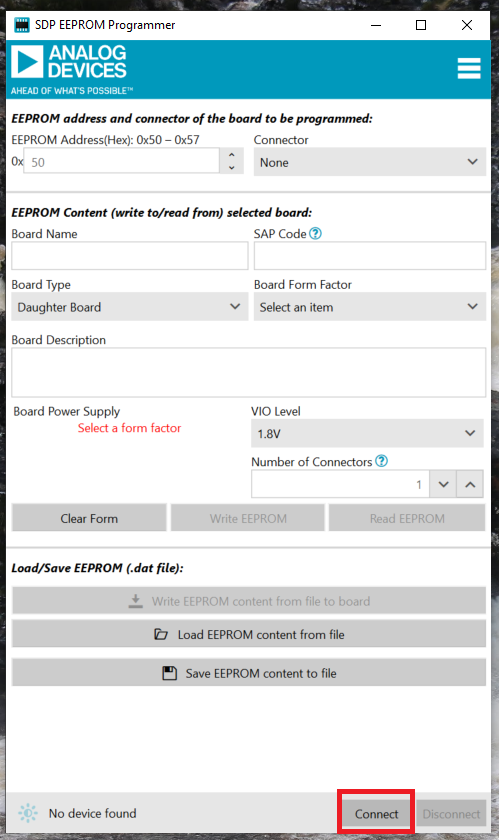


Figure 5. SDP EEPROM Connect

1. Select the Load EEPROM from File button, browse and select the EEPROM\_Content\_AD5781.dat file. The setting should load into the EEPROM programmer as shown in Figure 6.
2. Set the EEPROM Address (Hex) to 54 and click on Write EEPROM as shown in Figure 6.
3. Set the Connector and Board Form Factor to “Arduino”.
4. A pop-up window with the message “Write to EEPROM Complete” will appear. Click “OK” to remove and continue.
5. Click Disconnect and close the SDP EEPROM Programmer window.

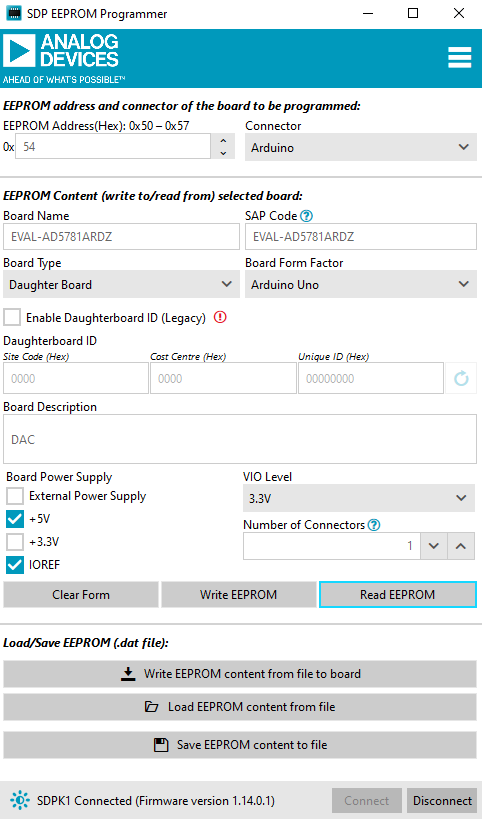


Figure 6. SDP-K1 Connected

## ACE Setup

1. Retain the setup.
2. Copy the AD5781\_Firmware.bin file to the SDP-K1 drive.
3. Open ACE Software.
4. Board.AD579X\_8X\_6XIIO will show up as an Attached Hardware, shown in Figure 7. Double-click the selected portion of the screen. If the expected attached hardware is not shown, just remove the USB connection from the computer, and reconnect the USB connection, ACE should automatically detect the attached hardware. You can also relaunch the ACE.
5. If the EVAL-AD5781ARDZ Board view appears as in Figure 8, double-click the EVAL-AD5781ARDZ and the ACE window will show the Chip View and Wizard Panel as in Figure 9.

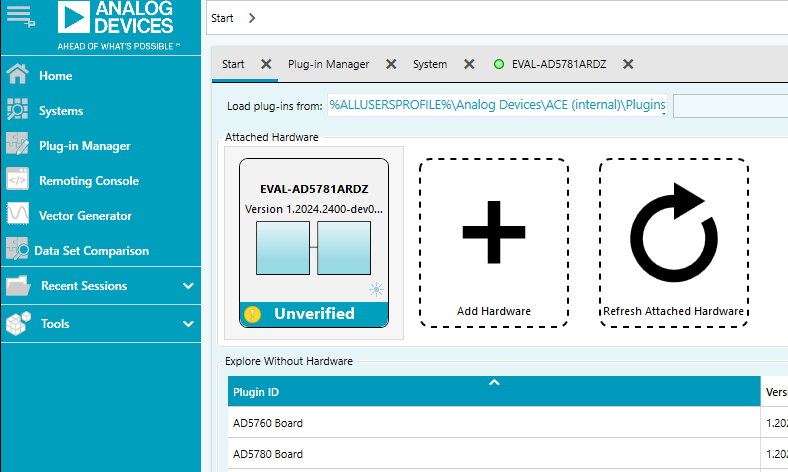


Figure 7. ACE Opening Screen

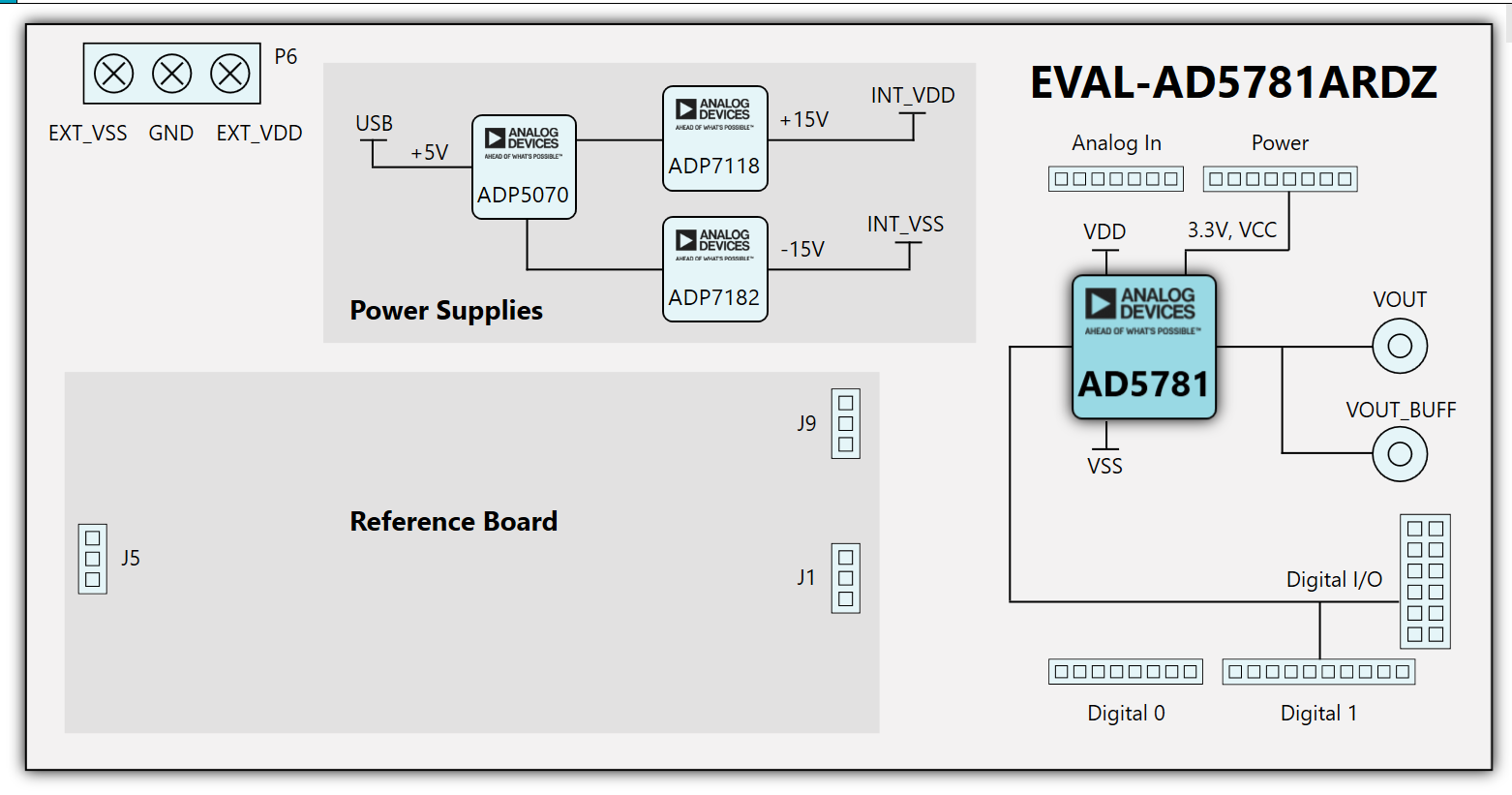


Figure 8. EVAL-AD5781ARDZ Board View

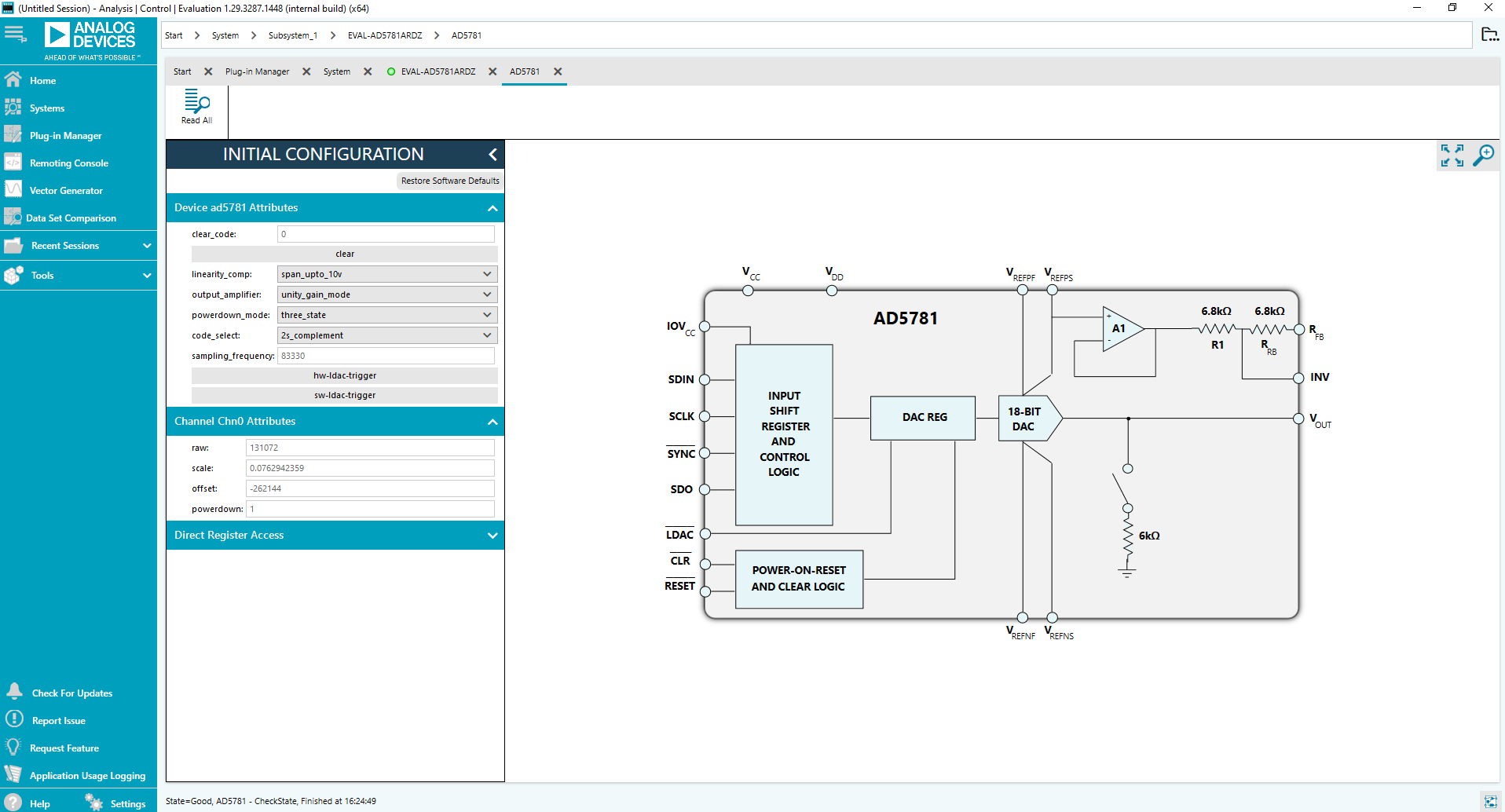


Figure 9. EVAL-AD5781ARDZ Chip View

# EVAL-AD5781ARDZ Test

## Output Test

1. Connect the DMM to the Vout\_buff and the other cable to AGND. Set the DMM to voltage meter.
2. Within the Demo Wizard Panel on the left side of the chip view under the Channel Attributes, set powerdown to 0 (disable). Set linearity\_comp to “span\_10V\_to\_20V”.
3. Under the direct register address, Write Address = 0x1 and Data = 0x40000 then click “Write Register”. Click the Hardware LDAC button and see if the DMM shows **5V**. Voltage limit is **4.95V to 5.05V**, the test fails if the output voltage is beyond the limit.

## Attribute Test

1. Retain the setup.
2. Change the code\_select to offset binary.
3. Under the direct register address, Write Address = 0x1 and Data = 0x40000 again then click “Write Register”. Click Hardware LDAC button and see if the output is now equal to -5V. Voltage limit is **-5.05V to -4.95V**, the test fails if the output voltage is beyond the limit.
4. Input 262143 in clear\_code. Click “Hardware CLR” button and see if DMM shows 10V. Voltage limit is **9.9V 10.1V**, the test fails if the output voltage is beyond the limit.
5. Change the output amplifier to gain\_of\_two. Then input 131072 in raw attribute.
6. See if DMM shows -10V. Voltage limit is **-10.1V -9.9V**, the test fails if the output voltage is beyond the limit.
7. Input 196608 to raw attribute.
8. Set powerdown\_mode to “6kohm\_to\_gnd”. Set powerdown to 1 (enable).   
   See if DMM shows -10V. Voltage limit is **-10.1V -9.9V**, the test fails if the output voltage is beyond the limit.
9. Change the output\_amplifier to “unity\_gain”. See if the output returns to 0V.
10. Click Restore software defaults.
11. Congratulations! You are done testing.

# Repackaging

1. Close the ACE software window.
2. Disconnect SDP-K1 first from the computer, then disconnect the reference board and SDP-K1 from the Evaluation board.
3. Return Board to default jumpers as per Table 1 – can be left on single header.
4. Place a sticker with the label “EVAL-AD5781ARDZ” in the area shown in fig 10.

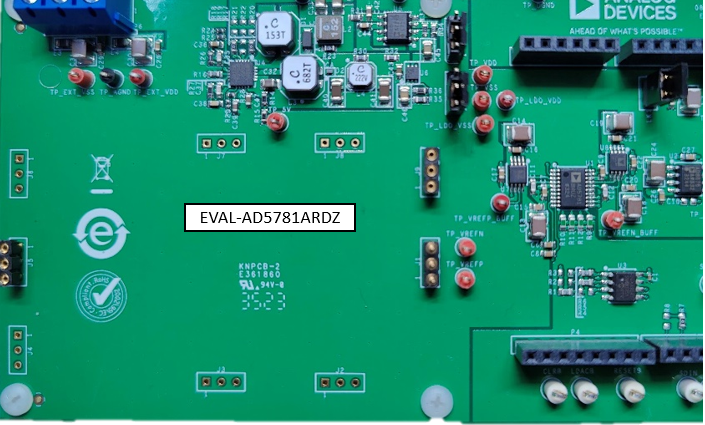


Figure 10 Sticker Location

1. Repack in boxes.