

Evaluation Board for the AD5710R 16-Bit, 8-Channel Configurable IDAC/VDAC with On-Chip Reference

FEATURES

- ▶ Full featured evaluation board for the AD5710R
- ▶ Various link options
- ▶ PC control in conjunction with the [EVAL-SDP-CK1Z](#) board

EVALUATION KIT CONTENTS

- ▶ EVAL-AD5710R-ARDZ

HARDWARE REQUIRED

- ▶ [EVAL-SDP-CK1Z](#) (SDP-K1) board (purchased separately)
- ▶ USB-C cable
- ▶ Programmable bench DC power supply (with 1.8V to 6V, 500mA ratings)

EVALUATION BOARD PHOTOGRAPH

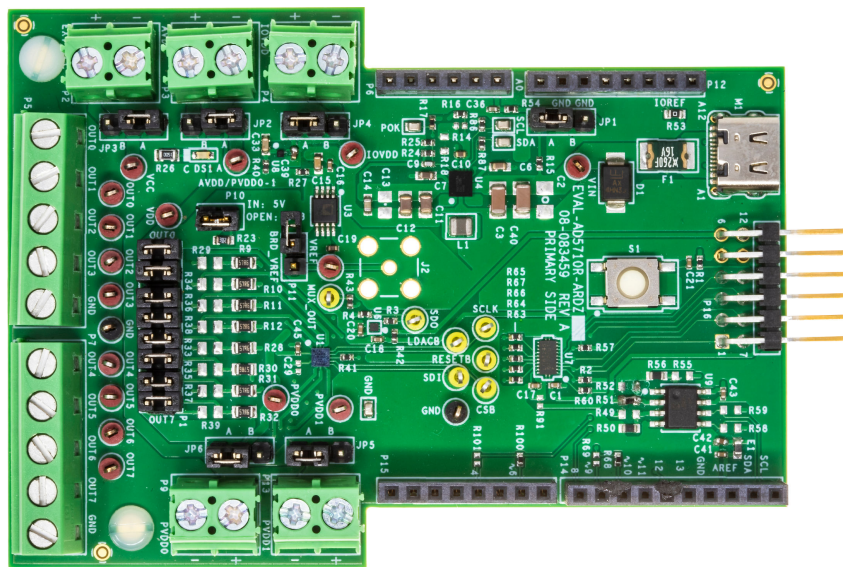


Figure 1. EVAL-AD5710R-ARDZ Board

GENERAL DESCRIPTION

This user guide details the operation of the EVAL-AD5710R-ARDZ for the AD5710R.

The EVAL-AD5710R-ARDZ features a power solution using the [MAX77859](#) switching regulator to generate 6V via a USB-C cable. Additionally, on-board regulators such as the [ADP150ACBZ-1.8](#) generate power for IOVDD and the [ADM7171ACPZ](#) to supply AVDD and PVDD. Also, an additional on-board voltage reference, the [ADR3625BRMZ](#), is incorporated.

The EVAL-AD5710R-ARDZ interfaces with a PC via USB through the SDP-K1 board. A peripheral module interface (PMOD) is also available, allowing the evaluation board to operate without the SDP-K1. When using a microcontroller via the PMOD connection, the SDP-K1 must be disconnected, and ACE software functionality is not available.

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REVISION HISTORY

10/2025—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

UNBOXING HARDWARE AND QUICK SETUP

For a quick evaluation of the board, complete the following steps:

1. Check that all jumpers are in default Position A, except P10 and P11, which are not inserted as shown in [Figure 2](#) and [Table 3](#).
2. Plug EVAL-AD5710R-ARDZ into EVAL-SDP-CK1Z.
3. Connect a USB-C cable to the M1 USB 2.0 Type-C connector on the EVAL-AD5710R-ARDZ.
4. Check that the light-emitting diode (LED) DS1 is glowing.
5. Connect a USB-C cable from the PC to the EVAL-SDP-CK1Z.

POWER SUPPLIES

The EVAL-AD5710R-ARDZ provides on-board regulators of 1.8V (U8) for IOVDD and 3.3V to 5V (U2) for AVDD and PVDD0 and PVDD1. The U2 regulator is powered through the high-efficiency buck-boost converter (U4) that provides a 6V output at a switching frequency of 1.5MHz. Main power is provided by the USB-C connector (M1). To connect other power supplies without using the on-board regulators, the screw connectors can be used, see [Table 3](#).

ON-BOARD POWER SOLUTION OPTION

To use the power solution option on the board, follow these steps:

1. Check the default jumper connections. See [Figure 2](#).
2. Connect a USB-C cable to the M1, which is a USB 2.0 connector that operates according to the 5V and 500mA standard.

The USB-C powers the U4 switcher regulator, which in turn powers the U2 on-board regulator and the output of U2 power the [ADP150](#) (U8). The default outputs configured for devices U4, U2, U3, and U8 are shown in [Table 1](#).

Table 1. Default Output Configuration

Device	V _{OUT} (V)	Test Point Name
U2	3.3	AVDD/PVDD0-1
U3	2.5	VREF
U4	6	VCC
U8	1.8	IOVDD

Using the on-board regulator U2, different supply voltages for AVDD, PVDD0, and PVDD1 can be generated via P10 jumper. See [Table 2](#) for the different outputs that can be generated.

Table 2. U2 Output Configuration

V _{OUT} (V)	P10 Position
3.3	Removed
5	Inserted

EXTERNAL POWER SUPPLY OPTION

Follow the link connections under the external supply column in [Table 3](#) to connect external voltages to AVDD, PVDD0, and PVDD1 and IOVDD. Refer to for full link options.

Table 3. Quick Start Link Configuration for Power Solution and External Supply

Links	On-Board Power Solution	External Supply
JP2	A (default)	B
JP3	A (default)	B
JP4	A (default)	B
JP5	A (default)	B
JP6	A (default)	B

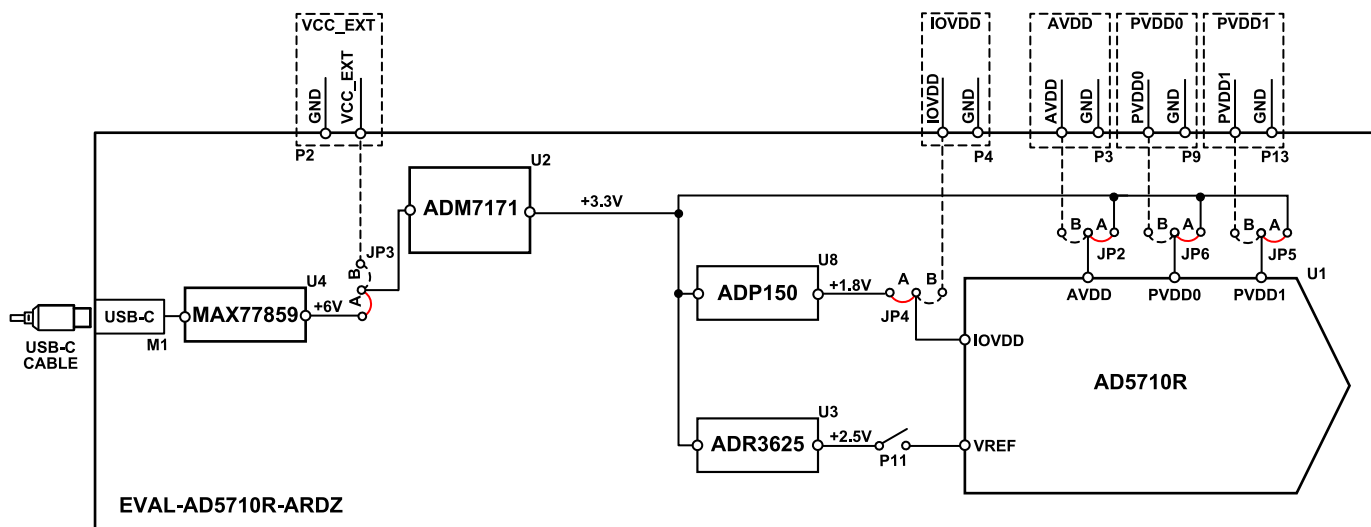


Figure 2. Powering the EVAL-AD5710R-ARDZ Evaluation Board

EVALUATION BOARD HARDWARE

Table 4. Link Options

Link No.	Description	Positions
JP1	Enables or disables the buck-boost converter, MAX77859 .	A (default): Enable U4. B: Disable U4.
JP2	Selects the connection between the U2 output or the AVDD screw connector.	A (default): Source AD5710R AVDD, PVDD0, and PVDD1 from U2. B: Source AD5710R AVDD, PVDD0, and PVDD1 with terminal P3.
JP3	Selects the connection between the U4 output or the EXT VCC screw connector.	A (default): Source U2 from U4. B: Source U2 with terminal EXT_VCC (1.8V to 12V, 500mA ratings).
JP4	Selects the connection between the U8 output or the IOVDD screw connector.	A (default): Source AD5710R IOVDD from U8. B: Source U1 from terminal IOVDD.
JP5	Selects the connection between U2 output or the PVDD1 screw connector to power the PVDD1 pin of the AD5710R.	A (default): Source U1 from U2. B: Source U1 from terminal P13.
JP6	Selects the connection between U2 output or the PVDD0 screw connector to power the PVDD0 pin of the AD5710R.	A (default): Source U1 from U2. B: Source U1 from terminal P9.
P1	Connect or disconnect the AD5710R outputs to on-board loads.	Inserted (default): R1, R10, R11, R12, R28, R30, R31, and R32 from U1. Removed: Disconnect for a 2K Ω load for VDAC mode.
P10	Selects the resistive divider at output U2 to generate 3.3V or 5V.	Removed (default): 3.3V. Inserted: 5V.
P11	Connect or disconnect the reference on the board.	Inserted (default): On board reference U3 used. Removed: Internal reference used.

EVALUATION BOARD HARDWARE

ON-BOARD CONNECTORS

A number connectors are incorporated on the EVAL-AD5710R-ARDZ. The functions of these connectors are described in Table 5.

Table 5. On-Board Connectors

Connector Label	Voltage Supplies Description
P2/VCC_EXT	External power supply for U2 regulator when the U4 is not to be used.
P4/IOVDD	External power supply direct to the IOVDD pin of the AD5710R. Use when the U8 regulator is not to be used.
P3/AVDD	External power supply direct to the AVDD pin of the AD5710R. Use when the U2 regulator is not to be used.
P9/PVDD0	External power supply direct to the PVDD0 pins of the AD5710R. Use when the U2 regulator is not to be used.
P13/PVDD1	External power supply direct to the PVDD1 pins of the AD5710R. Use when the U2 regulator is not to be used.
P5	Load connection OUT0 to OUT3.
P7	Load connection OUT4 to OUT7.
P16	Digital interface pin header connector (PMOD).
M1 (USB-C Connector)	USB 2.0 connector that operates according to the 5V and 500mA standard.
J2	VREF pin connector.

ON-BOARD REFERENCE

The EVAL-AD5710R-ARDZ board includes an ADR3625 (2.5V, 3ppm/°C) voltage reference, designated as U3. By default, U3 is not connected. To use U3 as the reference, first disable the internal reference of the AD5710R, then insert jumper P11. If the internal reference of the AD5710R is used, remove jumper P11 (see Figure 2).

ON-BOARD LOADS

EVAL-AD5710R-ARDZ board presents eight resistive loads in each OUTx with a resistance of 57.6Ω. External loads can also be connected via P5 and P7 connectors. Refer to Table 5 and Figure 3 for all the connectors on the board. Remove all shunts in P1 if the on-board loads are not to be used.

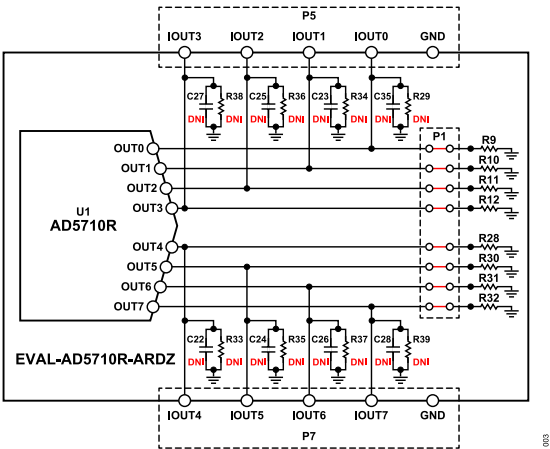


Figure 3. OUTx Connections

MULTIPLEXER OUTPUT

The AD5710R diagnostic feature allows monitoring of the IOUTx, VOUTx outputs, and the internal die temperature of the device at the MUX_OUT pin, which is driven to the Arduino header A0 analog input.

PMOD CONNECTOR DESCRIPTION

Figure 4 shows both a PMOD and connections for digital lines that serve as inputs and outputs to and from the external digital controller. Refer to Table 6 for descriptions of each pin number (digital line).

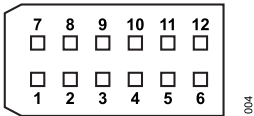


Figure 4. Connector P16 Pin Configuration

Table 6. Connector P16 Pin Descriptions

Pin No.	Mnemonic
1	$\overline{CS}$
2	SDI
3	SDO
4	SCLK
5	GND
6	VIO
7	No connection
8	$\overline{RESET}$
9	$\overline{LDAC}$
10	No connection
11	GND
12	VIO

EVALUATION BOARD HARDWARE

ARDUINO CONNECTOR

The EVAL-AD5710R-ARDZ digital interface includes a serial peripheral interface (SPI) for reading and writing data and different general function I/O (GPIOs) with multiple functions. The EVAL-

AD5710R-ARDZ digital interface signals are transmitted by the controller board via the Arduino Uno digital headers (P6, P12, P14, and P15). [Table 7](#) details the digital signal names, functions, and digital header pin assignments.

Table 7. Arduino Header Connections

Signal Name	Function	Header Pin	Arduino Pin Name	Pull-Up
ARD_SPI_CSB	SPI Chip-Select.	P14 Pin 3 and 2	10/PWM/CSB and 9/PWM (optional)	10k Ω (R2)
ARD_SPI_SDI	SPI Serial Data In (MOSI).	P14 Pin 4	11/PWM/MOSI	10k Ω (R1)
ARD_SPI_SDO	SPI Serial Data Out (MISO).	P14 Pin 5	12/MISO	
ARD_SPI_SCK	SPI Serial Clock.	P14 Pin 6	13/SCK	
ARD_SDA	I ² C Serial Data. Used to read board ID data from the electrically erasable programmable read-only memory (EEPROM).	P14 Pin 9	SDA	2.2k Ω (DNI - R58)
ARD_SCL	I ² C Serial Clock. Used to read board ID data from the EEPROM.	P14 Pin 10	SCL	2.2k Ω (DNI - R59)
ARD_RESETB	Active Low Device Reset. Asserting this pin low resets the device to its default configuration.	P14 Pin 1	9/PWM	10k Ω (R1)
ARD_LDACB	This pin acts as LDAC for an asynchronous load.	P15 Pin 7 and 45	6 and 5 (optional)	10k Ω (R57)
ARD_VIO	Provides power from the SDP-K1 controller, either 1.8V or 3.3V.	P12 Pin 2	IOREF	
ARD_MUX_OUT	Analog Output with Internal Buffer. An external analog-to-digital converter (ADC) reads voltages on this pin for diagnostic purposes.	P6 Pin 1	A0	

ORDERING INFORMATION

EVALUATION BOARD

Model ¹	Description
EVAL-AD5710R-ARDZ	Evaluation Board

¹ Z=RoHS Compliant Part

**ESD Caution**

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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