Evaluation Board for the AD5706R

FEATURES

- Full featured evaluation board for the AD5706R
- Various link options
- PC control in conjunction with the EVAL-SDP-CK1Z board

EVALUATION KIT CONTENTS

- EVAL-AD5706R-ARDZ

HARDWARE REQUIRED

- EVAL-SDP-CK1Z (SDP-K1) board (purchased separately)
- USB-C cable
- Programmable bench DC power supply (with 1.8V to 12V, 1.2A ratings)

GENERAL DESCRIPTION

This user guide explains the operation of the EVAL-AD5706R-ARDZ for the AD5706R, enabling quick prototyping and reduced design time. The AD5706R operates on a 2.9V to 3.6V AVDD supply and includes a 2.5V internal low noise reference. Refer to the AD5706R data sheet for complete details when using the EVAL-AD5706R-ARDZ.

The EVAL-AD5706R-ARDZ features a power solution using the switching regulator to generate 3.8V from a +5V supply via USB-C or an external +5V to +12V supply. On-board regulators generate power for IOVDD, AVDD, and PVDD0/1/2/3. It also has an on-board 2.5V reference.

The evaluation board offers flexible interfaces, allowing the user to control it using common hardware platforms such as Arduino Shield connectors and the SPI PMOD connector.

EVALUATION BOARD PHOTOGRAPH

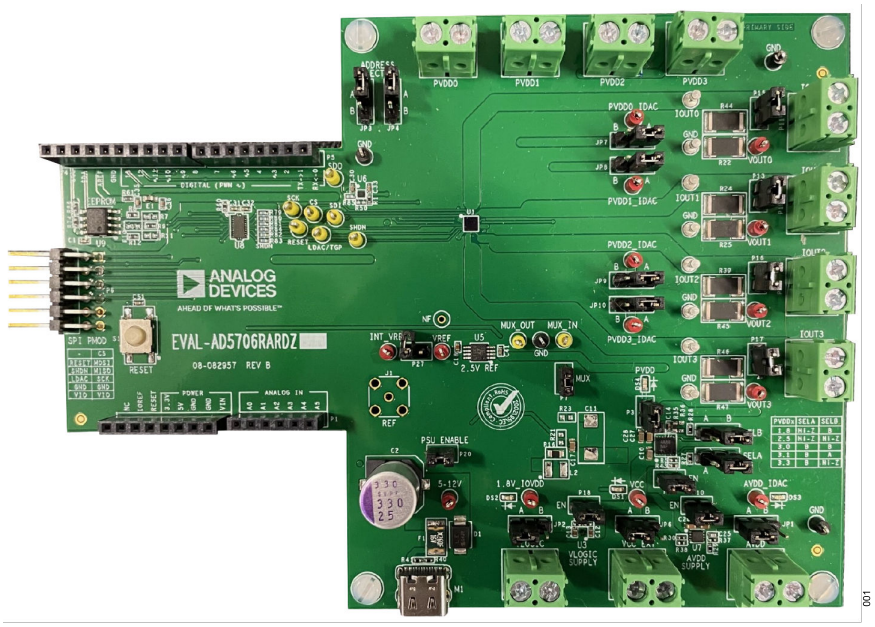

Figure 1. EVAL-AD5706R-ARDZ Evaluation Board

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REVISION HISTORY

1/2026—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 the jumpers are in Position A and insert all but P27, which is removed as shown in Table 3 and Table 4.
2. Plug EVAL-AD5706R-ARDZ into EVAL-SDP-CK1Z.
3. Connect a USB-C cable to the M1 connector on the EVAL-AD5706R-ARDZ.
4. Confirm that light emitting diodes (LEDs) DS1, DS2, DS3, and DS4 are brightening.
5. Connect a USB-C from the PC to the EVAL-SDP-CK1Z.

POWER SUPPLIES

The EVAL-AD5706R-ARDZ provides on-board regulators of 1.8V (U3) for IOVDD, 3.3V (U7) for AVDD, and 3V (U4) for PVDD0/1/2/3. These regulators are powered through the U2, which provides a 3.8V output at a switching frequency of 1.8MHz. The 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 5).

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 connector.

The USB-C cable connection powers the U2 switcher regulator that, in turn, powers the on-board regulators. Table 1 shows the default outputs configured for devices U4, U3, and U7.

Table 1. Default Output Configuration

Device	V_{OUT} (V)	Test Point Name
U3	1.8	1.8V_IOVDD
U4	3	PVDD0/1/2/3_IDAC
U7	3.3	AVDD_IDAC

Using the on-board regulator U4 different supply voltages for PVDD0, PVDD1, PVDD2, and PVDD3 can be generated via the SELA and SELB jumpers. See Table 2 for the different outputs that can be generated.

Table 2. U4 Output Configuration

V_{OUT} (V)	SELA	SELB
1.8	Not Connected	Position B
2.5	Not Connected	Not Connected
3 (By default)	Position B	Position B
3.1	Position B	Position A
3.3	Position B	Removed

EXTERNAL POWER SUPPLY OPTION

Follow the link connections under the external supply column in Table 3 to connect external voltages to AVDD, PVDD0/1/2/3, and IOVDD. Refer to Table 4 for full link options.

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

Links	On-board Power Solution	External Supply
JP6	A	B
JP1	A	B
JP7, JP8, JP9, and JP10	A	B
JP2	A	B
P3, P20, P10, P21, and P18	Inserted	Removed

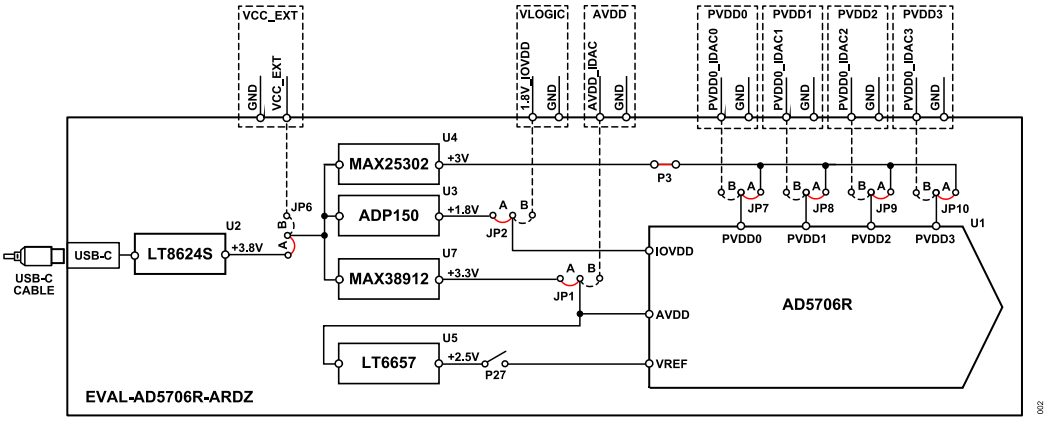

Figure 2. Powering the EVAL-AD5706R-ARDZ Evaluation Board

EVALUATION BOARD HARDWARE

Link Options

Table 4. Link Options

Link No.	Description	Positions
JP1	Selects the connection between the U7 output or the AVDD screw connector.	A (default): Source AD5706R AVDD from U7. B: Source AD5706R AVDD for terminal AVDD.
JP2	Selects the connection between the U3 output or the VLOGIC screw connector.	A (default): Source AD5706R IOVDD from U3. B: Source AD5706R IOVDD for terminal VLOGIC.
JP3	Sets the address of the A1 pin of the AD5706R.	A (default): GND. B: 1.8V_IOVDD.
JP4	Sets the address of the A0 pin of the AD5706R.	A (default): GND. B: 1.8V_IOVDD.
JP6	Selects the connection between the U2 output or the VCC_EXT screw connector to power the on-board regulators.	A (default): Source U3, U4, and U7 from U2. B:Source U3, U4, and U7 from terminal VCC_EXT.
JP7	Selects the connection between the U4 output or the PVDD screw connector to power the PVDD0 pin of the AD5706R.	A (default): Source X1 from U4. B: Source X1 from terminal PVDD0.
JP8	Selects the connection between the U4 output or the PVDD screw connector to power the PVDD1 pin of the AD5706R.	A (default): Source X1 from U4. B: Source X1 from terminal PVDD1.
JP9	Selects the connection between the U4 output or the PVDD screw connector to power the PVDD2 pin of the AD5706R.	A (default): Source X1 from U4. B: Source X1 from terminal PVDD2.
JP10	Selects the connection between the U4 output or the PVDD screw connector to power the PVDD3 pin of the AD5706R.	A (default): Source X1 from U4. B: Source X1 from terminal PVDD3.
SEL A	Select the connection between VCC and GND to configure the U4 output for 3V on the SEL A pin.	A: VCC. B (default): GND.
SEL B	Select the connection between VCC and GND to configure the U4 output for 3V on the SEL B pin.	A: VCC. B (default): GND.
P3	Connect the U4 output to jumpers JP7, JP8, JP0, and JP10.	Inserted (default): Source JP7, JP8, JP0, and JP10 from U4. Removed: U4 output disconnected.
P7	Analog input to the MUX_IN pin of the AD5706R.	Inserted (default): AVDD_IDAC signal driven to MUX_IN pin. Removed: MUX_IN pin floating.
P10	Enable LDO U7. Remove to disable the LDO.	Inserted (default): Enable U7. Removed: Disable U7.
P13	Connects the IDAC1 output to the resistive loads on the board.	Inserted (default): On board loads used (R25 and R24). Removed: External loads to be used.
P15	Connects the IDAC0 output to the resistive loads on the board.	Inserted (default): On board loads used (R44 and R22). Removed: External loads to be used.
P16	Connects the IDAC2 output to the resistive loads on the board.	Inserted (default): On board loads used (R45 and R39). Removed: External loads to be used.
P17	Connects the IDAC3 output to the resistive loads on the board.	Inserted (default): On board loads used (R47 and R46). Removed: External loads to be used.
P18	Enable low dropout (LDO) regulator U3.	Inserted (default): Enabled. Removed: Disabled.
P20	Enable switcher U2.	Inserted (default): Enabled. Removed: Disabled.
P21	Enable LDO regulator U4.	Inserted (default): Enabled. Removed: Disabled.
P27	Connect or disconnect the reference on the board.	Inserted : On board reference U5 used. Removed (default): Internal reference used.

EVALUATION BOARD HARDWARE

ON-BOARD CONNECTORS

A number of connectors are incorporated on the EVAL-AD5706R-ARDZ. The functions of these connectors are described in Table 5.

Table 5. On-Board Connectors

Connector Label	Voltage Supplies Description
VCC_EXT	External power supply for U3, U7, and U4 regulators when the U2 is not to be used.
VLOGIC	External power supply direct to the IOVDD pin of the AD5706R. Use when the U3 regulator is not to be used.
AVDD	External power supply direct to the AVDD pin of the AD5706R. Use when the U7 regulator is not to be used.
PVDD0/1/2/3	External power supply direct to the PVDD0/1/2/3 pins of the AD5706R. Use when the U4 regulator is not to be used.
P6	Digital interface pin header connector (PMOD).
P11	External connection to IOUT0 output.
P12	External connection to IOUT1 output.
P22	External connection to IOUT2 output.
P26	External connection to IOUT3 output.
J1	VREF pin connector.

ON-BOARD REFERENCE

The EVAL-AD5706R-ARDZ board contains the U5 (2.5V, 1.5ppm/°C) voltage reference. To use it as the reference source for the AD5706R, insert a shunt into the jumper P27. When using on-board voltage reference, disable the AD5706R internal reference (see Figure 2). Additionally, there is a Subminiature Version A (SMA) connector J1 that allows sourcing an external reference signal.

MULTIPLEXER INPUT AND OUTPUT

There are two test points mirroring the device pins: MUX_IN (input) and MUX_OUT (output). The user can inject an external signal at MUX_IN and, with the appropriate register settings, route internal diagnostic nodes of the AD5706R, along with the MUX_IN signal, to the MUX_OUT for measurement. There is an onboard voltage divider derived from the AVDD_IDAC supply that can be fed into MUX_IN. To enable it, insert a shunt on P7. Refer to the AD5706R data sheet for more details.

ON-BOARDS LOADS

The evaluation board presents two resistive loads in parallel for each IOUTx output, each with a resistance of 17.8Ω.

External loads can also be connected via the connectors P11, P12, P22, and P26. Refer to Table 5 and Figure 3 for all the connectors on the board. Remove P15, P13, P16, and P17 when using external loads on the respective outputs.

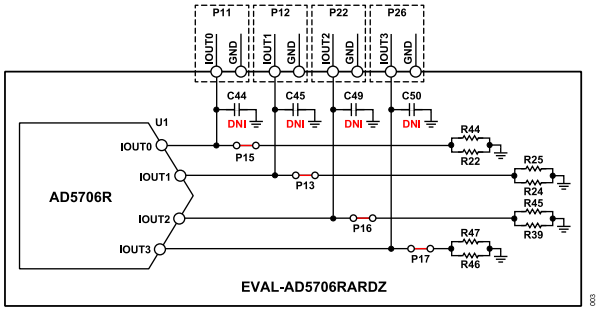

Figure 3. IOUTx Connections

CONNECTOR P6 PIN DESCRIPTIONS

Figure 4 shows standard serial peripheral interface (SPI) PMOD connections 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).

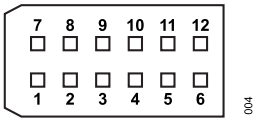

Figure 4. Connector P6 Pin Configuration

Table 6. Connector P6 Pin Descriptions

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

EVALUATION BOARD HARDWARE

ARDUINO CONNECTOR

The EVAL-AD5706R-ARDZ digital interface signals are transmitted by the controller board via the Arduino Uno digital headers (P1, P2, P4, and P5). 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_CS	SPI chip-select.	P4 Pin 3	10/PWM/CSB	10kΩ (R59)
SDI	SPI serial data in (MOSI).	P4 Pin 4	11/PWM/MOSI	
SDO	SPI serial data out (MISO).	P4 Pin 5	12/MISO	10kΩ (R1)
SCLK	SPI serial clock.	P4 Pin 6	13/SCK	2.2kΩ (R74)
SDA	I^2C serial data. Used to read board ID data from the electrically programmable read-only memory (EEPROM).	P4 Pin 9	SDA	2.2kΩ (R86)
SCL	I^2C serial clock. Used to read board ID data from the EEPROM.	P4 Pin 10	SCL	
ARD_LDAC/TGP	This pin has several functionalities. It can act as LDAC for an asynchronous load, as the clock for the DCK dither, or as a toggle pin TGP.	P4 Pin 2	9/PWM	10kΩ (R15)
ARD_RESET	Active low device reset. Asserting this pin low resets the device to its default configuration.	P4 Pin 1	8	10kΩ (R57)
ARD_OUT_EN	Device output enable.	P5 Pin 8	7	10kΩ (R2)
ARD_MUX_OUT	Analog output with internal buffer. An external analog-to-digital converter (ADC) reads voltages on this pin for diagnostic purposes.	P1 Pin 1	A0	

ORDERING GUIDE

EVALUATION BOARDS

Model[1]	Package Description
EVAL-AD5706R-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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