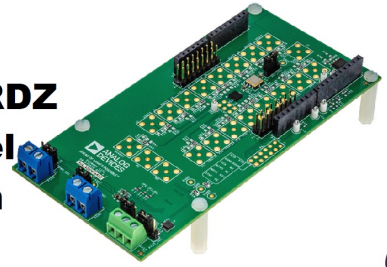




**EVAL-
AD5767ARDZ
16 Channel
Evaluation
Board**



ANALOG DEVICES EVAL-AD5767ARDZ 16 Channel Evaluation Board User Guide

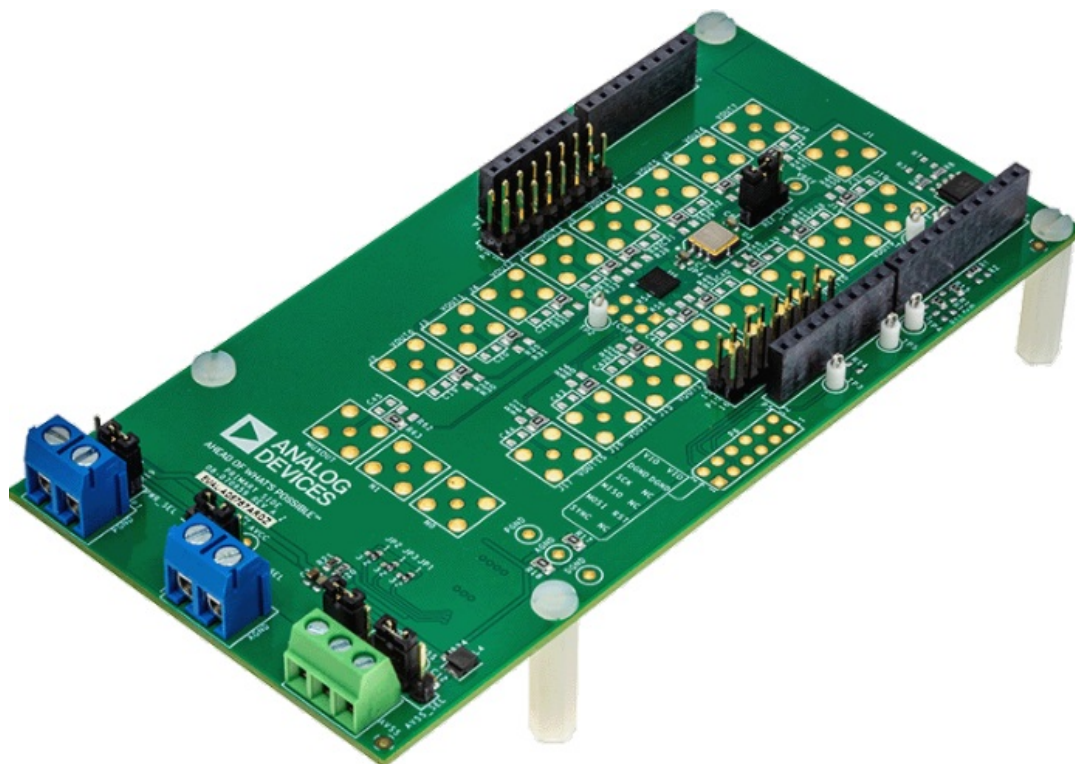
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ANALOG DEVICES EVAL-AD5767ARDZ 16 Channel Evaluation Board



Product Information

Specifications

- Product Name: EVAL-AD5766ARDZ/EVAL-AD5767ARDZ
- Product Type: Evaluation Board
- Compatibility: AD5766/AD5767 16-channel, 16-bit/12-bit voltage output DACs
- Features:
 - Full featured evaluation boards
 - PC control using EVALSDP-CK1Z controller board
 - ACE Software for control
 - Integrated power solution with ADP5071
- Power Supply Requirements:
 - AVDD and AVSS: Positive and negative high voltage power supplies
 - AVCC: Analog supply for low voltage DAC circuitry
 - VLOGIC: Logic levels for digital interface pins

Product Usage Instructions

Power Supply Options

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ board can be powered using the on-board ADP5071 or from well-regulated bench supplies.

Using On-Board Power Supply (ADP5071)

The ADP5071 switching regulator provides bipolar supply of +8 V and -22 V from a +3.3 V input. This generates a DAC voltage output range of -20 V to +6 V. Alternatively, linear power supply via AVDD_SEL and AVSS_SEL can be used to generate all ranges.

Power Supply Connections

The board requires four power supplies: AVDD, AVSS, AVCC, and VLOGIC. Ensure correct connections for proper functionality.

ACE Software Operation

The ACE Software offers an intuitive GUI for configuring the modes of operation for AD5766/AD5767. Refer to the software manual for detailed instructions.

Consulting Data Sheet

For complete specifications and detailed information on the AD5766/AD5767, refer to the respective data sheet provided by Analog Devices.

FAQs

- **Q: Can I power the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ board using external bench supplies?**

A: Yes, the board can be powered using well-regulated bench supplies. Refer to the user manual for jumper configurations.

- **Q: What is the purpose of the ACE Software?**

A: The ACE Software provides a graphical user interface for configuring the modes of operation for the AD5766/AD5767 DACs.

FEATURES

- Full-featured evaluation boards for the AD5766/AD5767 with the ADP5071 power solution
- PC control in conjunction with the Analog Devices, Inc., EVAL-SDP-CK1Z (SDP-K1) controller board
- PC software for control using the Analysis | Control | Evaluation (ACE) Software

EVALUATION BOARD PHOTOGRAPHS

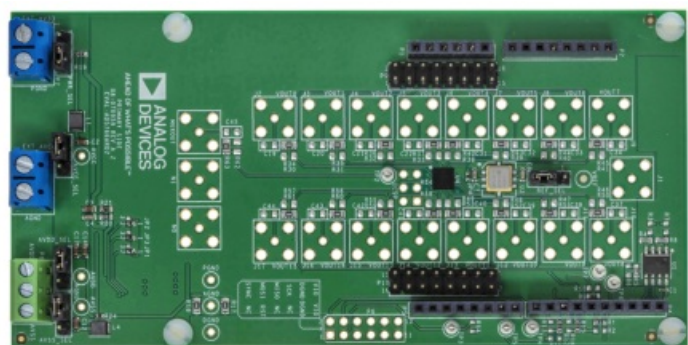


Figure 1. EVAL-AD5766ARDZ Evaluation Board

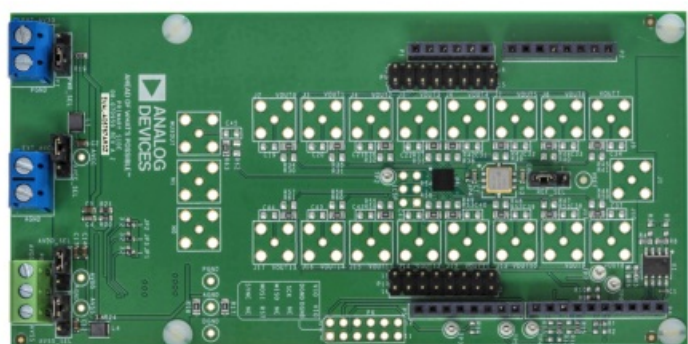


Figure 2. EVAL-AD5767ARDZ Evaluation Board

GENERAL DESCRIPTION

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ are fully featured evaluation boards designed to easily evaluate all features of the AD5766/AD5767 16-channel, 16-bit/12-bit, voltage output digital-to-analog converters (DACs). These evaluation boards integrate a power solution using the ADP5071. The ADP5071 switching regulator offers a power solution by generating a bipolar supply of +8 V and –22 V from a +3.3 V input to create a DAC voltage output range of –20 V to +6 V. Alternatively, supplying the DAC with a linear power supply via AVDD_SEL and AVSS_SEL generates all ranges.

The onboard connector, via P6, or the EVALSDP-CK1Z (SDP-K1) system demonstration platform (SDP) board, can control the AD5766/AD5767. The SDP-K1 enables the control of the evaluation boards through the USB port of a Windows®-based PC using the AD5766/AD5767 evaluation software, ACE.

The AD5766/AD5767 are 16-channel, 16-bit/12-bit, voltage output denseDAC® converters. The DACs generate output ranges from a 2.5 V reference. Output buffers permit the AD5766/AD5767 to source or sink up to 20 mA. The AD5766/AD5767 requires four power supplies. AVDD and AVSS are the positive and negative high-voltage power supplies, AVCC is the analog supply for the low-voltage DAC circuitry, and a VLOGIC supply pin sets the logic levels for the digital interface pins.

The ACE Software of the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ has an intuitive graphical user interface (GUI) for the configuration of AD5766/AD5767 modes of operation. Visit the ACE Software page to view the plug-in modules for the evaluation boards of many other Analog Devices devices.

Complete specifications for the AD5766/AD5767 are available in the AD5766/AD5767 data sheet, which must be consulted in conjunction with this user guide when using the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ.

EVALUATION BOARD HARDWARE

POWER SUPPLIES AND DEFAULT LINK OPTIONS

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation board can be powered using the onboard ADP5071 or from well-regulated bench supplies. See Table 1 for the onboard jumper configurations for each power supply solution.

Table 1. Jumper Configurations for the ADP5071 and Bench Supply

Link	ADP5071	Bench Supply
PWR_SEL	Position 1-2	Position 1-2
AVDD_SEL	Position 1-2	Position 2-3
AVSS_SEL	Position 2-3	Position 1-2
AVCC_SEL	Position 1-2	Position 1-2
REF_SEL	Position 2-3	Position 2-3
JP4	Connected	Connected

The on-board ADP5071, supplied with a 3.3 V supply via the PWR_SEL connector, or the supply from the SDP-K1 (in this configuration, make sure to supply AVCC externally; AVCC_SEL: 2-3), can power the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation boards. Alternatively, the evaluation boards can also be powered externally; AVDD and AVSS through the P8 connector while AVCC uses the EXT_AVCC connector. See Figure 3 for a functional block diagram of the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation boards.

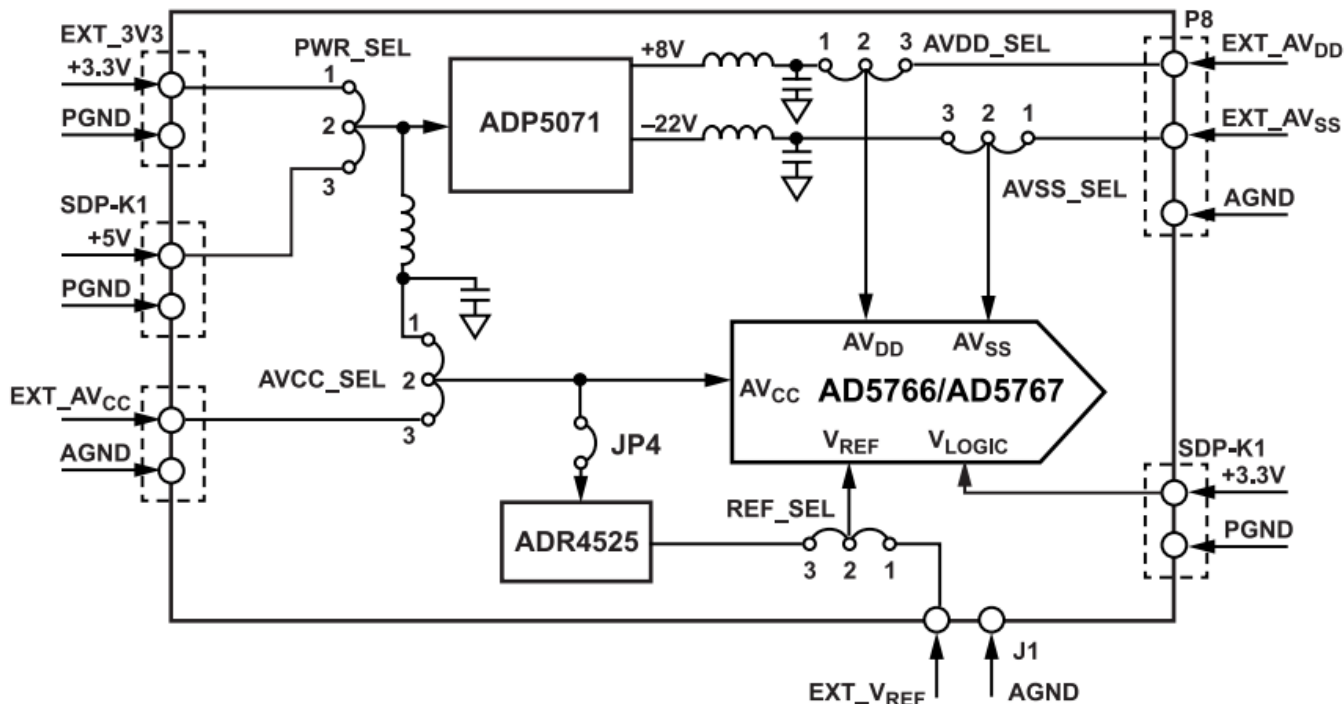


Figure 3. Powering the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ Evaluation Boards

For either power supply option, place the links in their required operating setup before supplying the evaluation boards (see Table 3).

Table 2. Quick Start on Power Supply Requirements for the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ

Board Supply	Compatible Output Voltage Ranges (V)	Power Supplies Required		
		AV _{SS} Maximum (V)	AV _{DD} Minimum (V)	AV _{CC} and V _{LOGIC} Nominal(V)
ADP5071	-20 to 0	Not required	Not required	3.3
	-16 to 0	Not required	Not required	3.3
	-10 to 0	Not required	Not required	3.3
	-10 to +6	Not required	Not required	3.3
	-5 to +5	Not required	Not required	3.3
Bench Supply	-20 to 0	-22	2.97	3.3
	-16 to 0	-18	2.97	3.3
	-10 to 0	-12	2.97	3.3
	-10 to +6	-12	8	3.3
	-12 to +14	-14	16	3.3
	-16 to +10	-18	12	3.3
	-5 to +5	-7	7	3.3
	-10 to +10	-12	12	3.3

ADP5071 POWER SOLUTION OPTION

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation boards are populated with the ADP5071 switching regulator. This regulator generates +8 V and -22 V supplies. The ADP5071 data sheet recommends 3.3 V for correct operation.

Two ways to power the ADP5071 are available using the PWR_SEL options. First, use an external 3.3 V supply (recommended). This method involves connecting an external 3.3 V supply, which provides a stable and reliable power source, especially for more demanding applications. This method is recommended for most cases to ensure optimal performance. The other option is to use the SDP-K1 as the power supply.

To select the power source for AVCC, use the AVCC_SEL jumper. Position 1-2 on AVCC_SEL ties AVCC and the ADP5071 supplies together to operate from a single 3.3 V supply. Alternatively, Position 2-3 on AVCC_SEL powers AVCC with an external supply via the EXT_AVCC connector. Refer to Table 3 for all the link options. Note that the -12 V to +14 V, -16 V to +10 V, or -10 V to +10 V output voltage ranges are not available with the default configuration of the ADP5071 because a minimum of 2 V headroom is required.

Table 3. Link Options

Link Options	Description
AVCC_SEL	Selects the power supply for the DAC AV _{CC} pin; requires 2.97 V to 3.6 V for correct operation Position 1-2: supplied by PWR_SEL connector Position 2-3: supplied by external power supply through the EXT_AVCC connector, see Table 4 for more information
AVDD_SEL	Selects the power supply for the DAC AV _{DD} pin; ensure that the voltage between AV _{DD} and AV _{SS} does not exceed 34 V Position 1-2: supplied by the ADP5071 power solution Position 2-3: supplied by an external power supply through the P8 connector
AVSS_SEL	Selects the power supply for DAC AV _{SS} pin; ensure that the voltage between AV _{DD} and AV _{SS} does not exceed 34 V Position 1-2: supplied by an external power supply through the P8 block Position 2-3: supplied by the ADP5071 power solution
REF_SEL	Selects the voltage reference source Position 1-2: selects an external reference source that can applied at the EXT_VREF SMB connector Position 2-3: selects the ADR4525 2.5 V reference
PWR_SEL	Selects the power supply source Position 1-2: supplied by an external reference source that can applied at the EXT_3V3 (P7) connector Position 2-3: supplied by the SDP-K1 controller board
JP1	Selects the switching frequency of the ADP5071; this link is replaced with a 0 Ω resistor to either position Position A: 2.4 MHz switching frequency Position B: 1.2 MHz switching frequency No link inserted: external clock
JP2	Selects the slew rate of the ADP5071 output; this link is replaced with a 0 Ω resistor to either position Position A: normal slew rate Position B: slowest slew rate (best noise performance) No link inserted: fastest slew rate (best efficiency)
JP3	Selects the start-up sequence of the ADP5071 outputs Position A: positive and negative output rails power up simultaneously when EN2 is high Position B: positive and negative output rails are sequenced based on the state of the EN1 and EN2 pins No link inserted: manual enable mode
JP4	Connected and supplied by the AV _{CC} supply

BENCH POWER SUPPLY OPTION

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation boards can access all output voltage ranges of the AD5766/AD5767 when powered by a bench supply. A headroom and footroom of at least 2 V is required. Refer to Table 2 for the supply requirements. It is important that the voltage across AVDD to AVSS does not exceed the absolute maximum rating of 34 V. Otherwise, device reliability may be affected.

Following the jumper configuration in Table 1 and Table 3 gives more details about the options offered. For VLOGIC, users can use the 3.3 V provided by the SDP-K1 controller board when interfaced with the USB port of a PC or use an external power supply interfaced with Pin 11 or Pin 12 (VIO) of the peripheral module (PMOD, P6).

ON-BOARD CONNECTORS

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation boards have various on-board connectors for the external power supplies and header pins, and these connectors are described in detail in Table 4.

Table 4. On-Board Connectors

Connector	Connector Description
EXT_3V3 (P7)	
Pin 1	External power supply that connects to Pin 1 of PWR_SEL
Pin 2	Analog ground
EXT_AVCC	
Pin 1	External power supply that connects to Pin 3 of AVCC_SEL
Pin 2	Analog ground
P8	
Pin 1	External power supply that connects to Pin 3 of AVDD_SEL
Pin 2	Analog ground
J1	External voltage reference supply, SMB Connector
J2 to J17	SMB connectors for VOUT 0 to VOUT 15
P6	Peripheral module (PMOD) connection pins
P9	Header pins for VOUT 0 to VOUT 7 and AGND
P10	Header pins for VOUT 8 to VOUT 15 and AGND

PMOD Connector (P6) Pin Descriptions

The PMOD connector allows the user to control the EVAL-AD5766ARDZ/EVAL-AD5767ARDZ by means of communicating with the AD5766/AD5767 through the 12 pins of P6. For further information on the functionality of the P6 pins, see Table 5.

Table 5. Connector P6 Pin Descriptions

Pin No.	Description
1	No connection (NC)
2	SYNCB
3	RESETB
4	SPI_MOSI
5	NC
6	SPI_MISO
7	NC
8	SPI_SCK
9	DGND
10	DGND
11	VIO
12	VIO

EVALUATION BOARD SOFTWARE

ACE SOFTWARE INSTALLATION

The EVAL-AD5766ARDZ/EVAL-AD5767ARDZ evaluation boards use the Analog Devices Analysis | Control | Evaluation (ACE) Software, a desktop software application that allows the evaluation and control of multiple evaluation systems.

The ACE Software is available for download from the EVAL-AD5766ARDZ and EVAL-AD5767ARDZ evaluation board pages and must be installed before connecting the EVAL-SDP-CK1Z (SDP-K1) controller board to the USB port of the PC to ensure that the EVAL-SDP-CK1Z (SDP-K1) is recognized when it connects to the PC. The ACE

installer installs the necessary SDP drivers and the Microsoft® .NET Framework 4 by default. For full instructions on how to install and use this software, see the ACE Software page on the Analog Devices website. After the ACE Software installation is completed and the user opens this software, the EVAL-AD5766ARDZ or EVAL-AD5767ARDZ evaluation board plug-in appears.

ACE SOFTWARE OPERATION

To use the ACE Software with the AD5766 or AD5767, take the following steps:

1. To launch the ACE Software, click Start > All Programs > Analog Devices > ACE. The ACE Software then opens in the Start tab and recognizes the EVAL-AD5766ARDZ. Note that the interface is the same for the EVAL-AD5767ARDZ, except for the board name (see Figure 4).

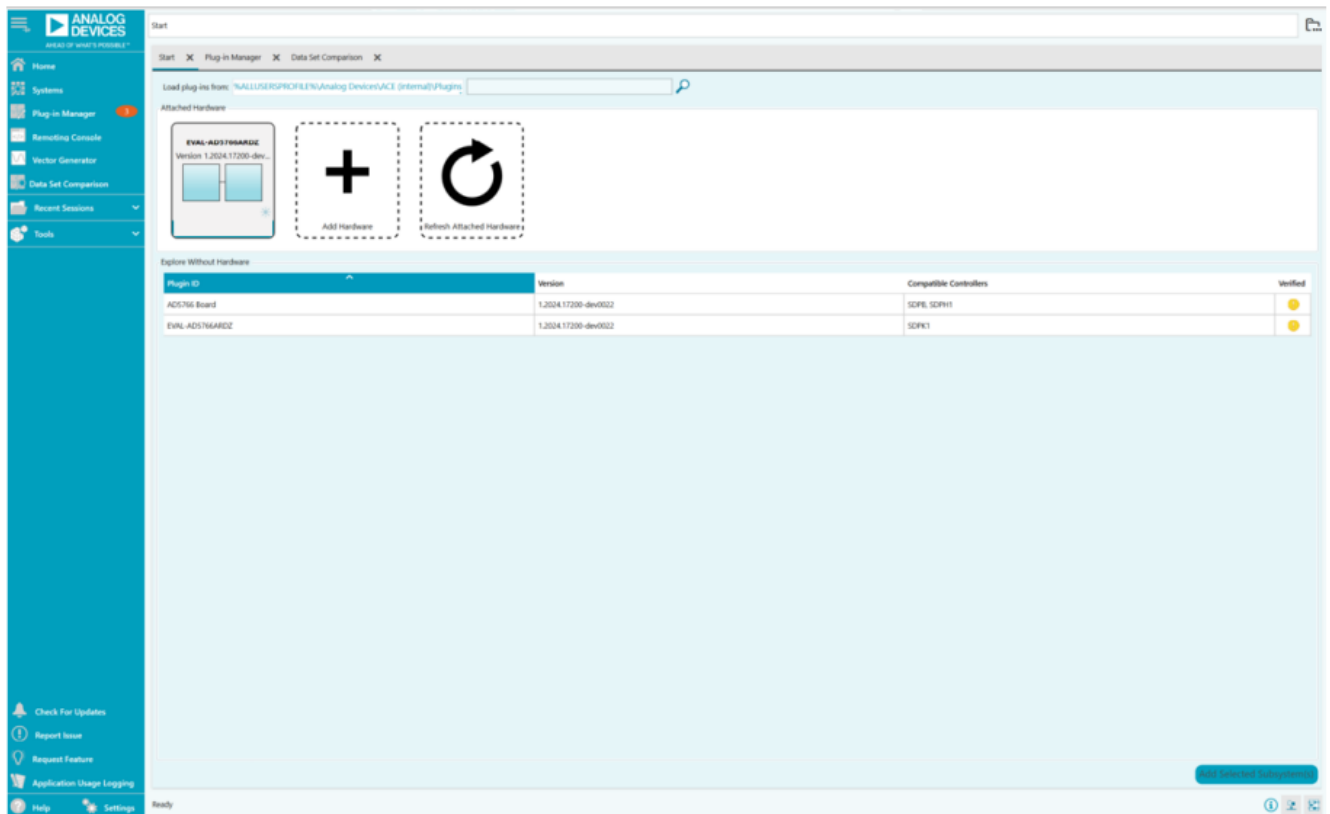


Figure 4. Start Tab for the EVAL-AD5766ARDZ ACE Software

2. Double-click the EVAL-AD5766ARDZ icon under the Attached Hardware section to open the EVAL-AD5766ARDZ tab (see Figure 4 and Figure 5).

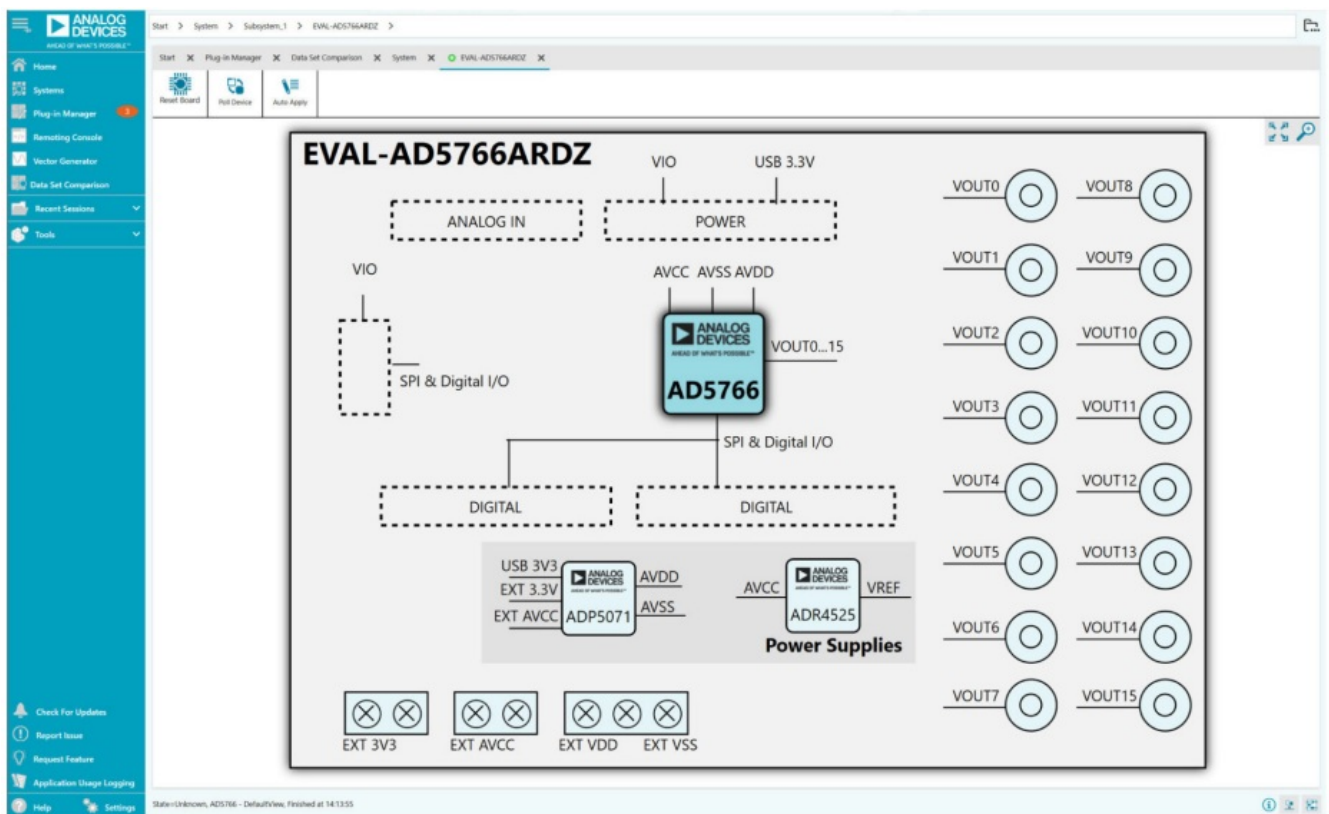


Figure 5. AD5766 Board Tab for the EVAL-AD5766ARDZ ACE Software

- Double-click the AD5766 icon to open the AD5766 chip tab (see Figure 6). This tab displays the block diagram and allows the user to configure the digital-to-analog converter (DAC) input registers and control registers. The hardware registers on the AD5766/AD5767 are not altered until the Apply Changes button is clicked.

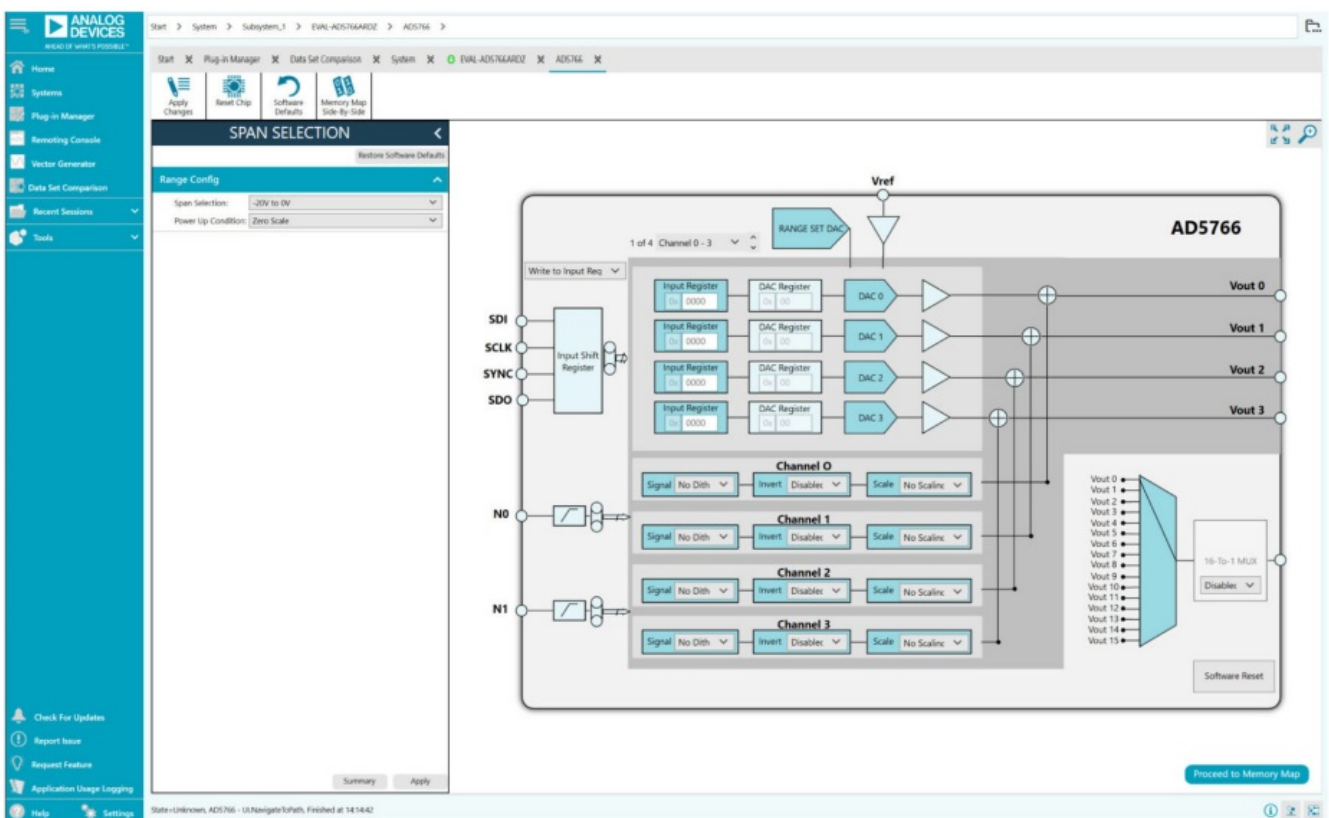


Figure 6. AD5766 Chip Tab for the EVAL-AD5766ARDZ ACE Software

- Click Proceed to Memory Map (Label 12 in Figure 8) to open the AD5766 Memory Map tab and allow access to all registers (see Figure 7). The hardware registers on the AD5766 or AD5767 are not altered until the Apply Changes button is clicked.

Address (Hex)	Name	Register Map	Side Effects	Modified	Data (Hex)	Data (Binary)
+ 0000	MONITOR_MUX	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0002	DITHER_CTRL	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0010	DAC_INPUT_0	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0011	DAC_INPUT_1	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0012	DAC_INPUT_2	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0013	DAC_INPUT_3	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0014	DAC_INPUT_4	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0015	DAC_INPUT_5	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0016	DAC_INPUT_6	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0017	DAC_INPUT_7	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0018	DAC_INPUT_8	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0019	DAC_INPUT_9	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 001A	DAC_INPUT_10	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 001B	DAC_INPUT_11	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 001C	DAC_INPUT_12	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 001D	DAC_INPUT_13	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 001E	DAC_INPUT_14	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 001F	DAC_INPUT_15	INPUT_REG_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0030	SW_DAC	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0040	SPAN_REG	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0051	DITHER_FIRMWARE	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0070	RESET	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 0090	APPLY_DITHER_DAC0_DAC7	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 00A0	APPLY_DITHER_DAC8_DAC15	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 00B0	DITHER_INVERT	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 00C0	DITHER_SCALE_DAC0_DAC7	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ 00D0	DITHER_SCALE_DAC8_DAC15	COMMANDS_MAP	<input type="checkbox"/>	<input type="checkbox"/>	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Figure 7. AD5766 Memory Map Tab for the EVAL-AD5766ARDZ ACE Software

For a detailed description of all GUI options, see Figure 8 and Table 6.

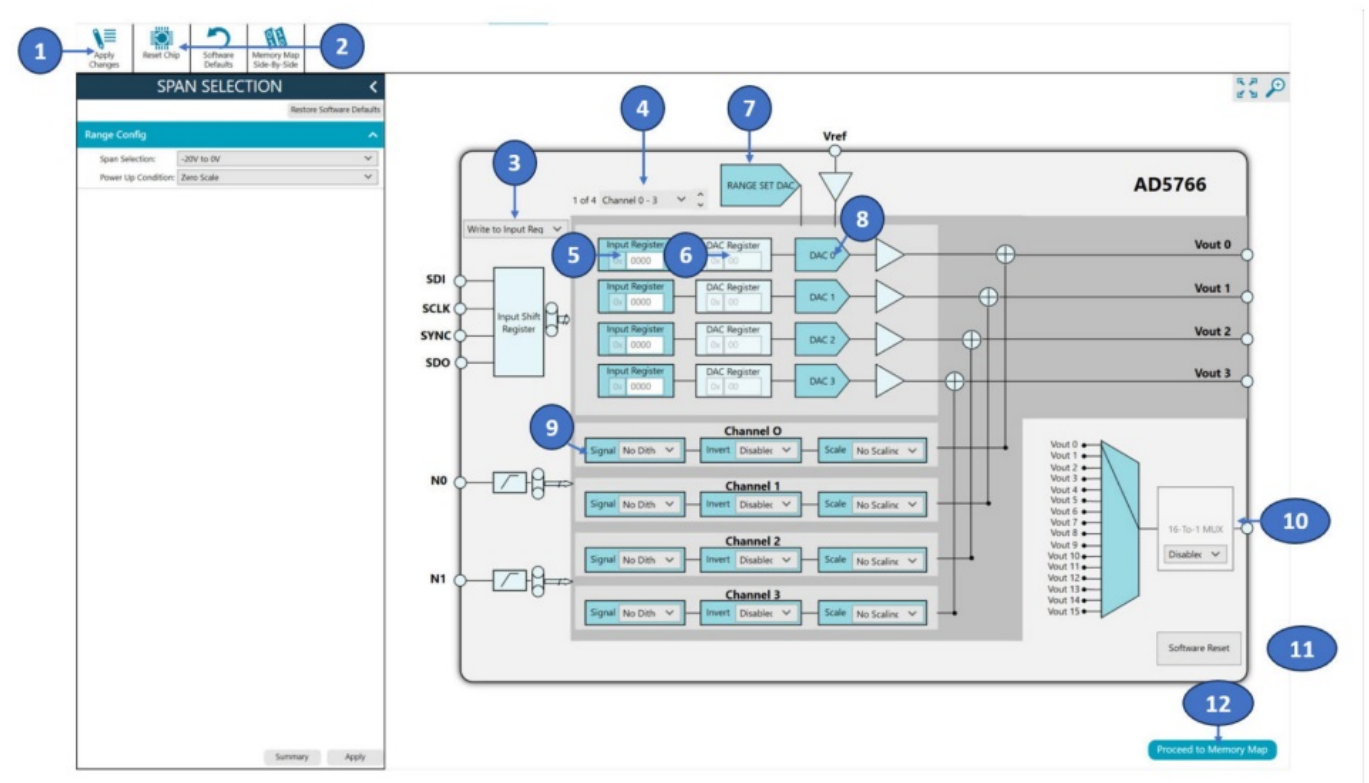


Figure 8. Main Window for the EVAL-AD5766ARDZ ACE Software

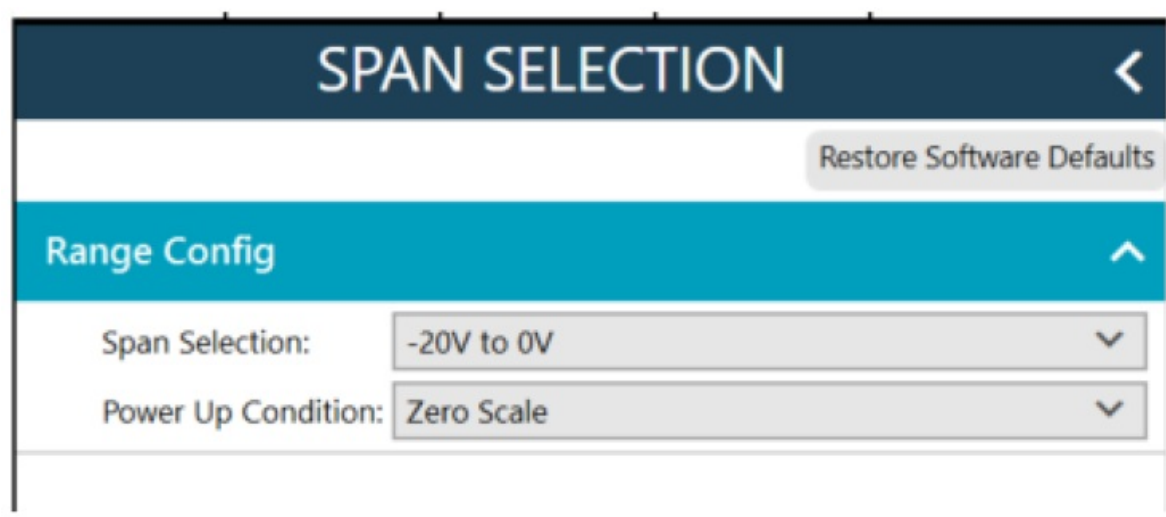


Figure 9. Span Selection Window

Table 6. GUI Options¹

Label No.	GUI Element	Description
1	Apply Changes	Click this button to submit any changes on the GUI to the hardware of the evaluation boards.
2	Reset Chip	Click this button to issue a hardware reset and revert the software and hardware registers to their default settings.
3	Write to Input Reg	This dropdown menu allows users to write to the input register, write to the input register and the DAC register, or write to the input register and update all DAC registers.
4	Select output	Channels display. This dropdown menu allows users to select Channel 0 - 3 , Channel 4 - 7 , Channel 8 - 11 , or Channel 12 - 15 for V_{OUT} in the AD5766 Chip tab.
5	Input Register	The user can input data to write to the input register. Note that there is one input register per channel.
6	DAC Register	This is a graphical representation of the DAC register. Note that there is one DAC register per channel.
7	RANGE SET DAC	Click RANGE SET DAC to select the output voltage range from the SPAN SELECTION window (see Figure 9).
8	DAC 0 to DAC 3	Click the DAC x to apply a dither signal or to enable or disable the update for the selected DAC register with data from the corresponding input register (software load DAC).
9	Signal , Invert, and Scale	These dropdown menus allow users to select the dither options for each channel.
10	16-To-1 MUX	Use this area to select which channel to route to the AD5766/AD5767 MUX_OUT pin.
11	SOFTWARE RESET	Issues a software reset and reverts the software and hardware registers to their default settings.
12	Proceed to Memory Map	Click this button to open the AD5766 Memory Map tab (see Figure 7).

¹ See [Figure 8](#)

EVALUATION BOARD SCHEMATICS AND ARTWORK

Note that an x on a reference designator stands for do not install (DNI) in Figure 10 through Figure 13.

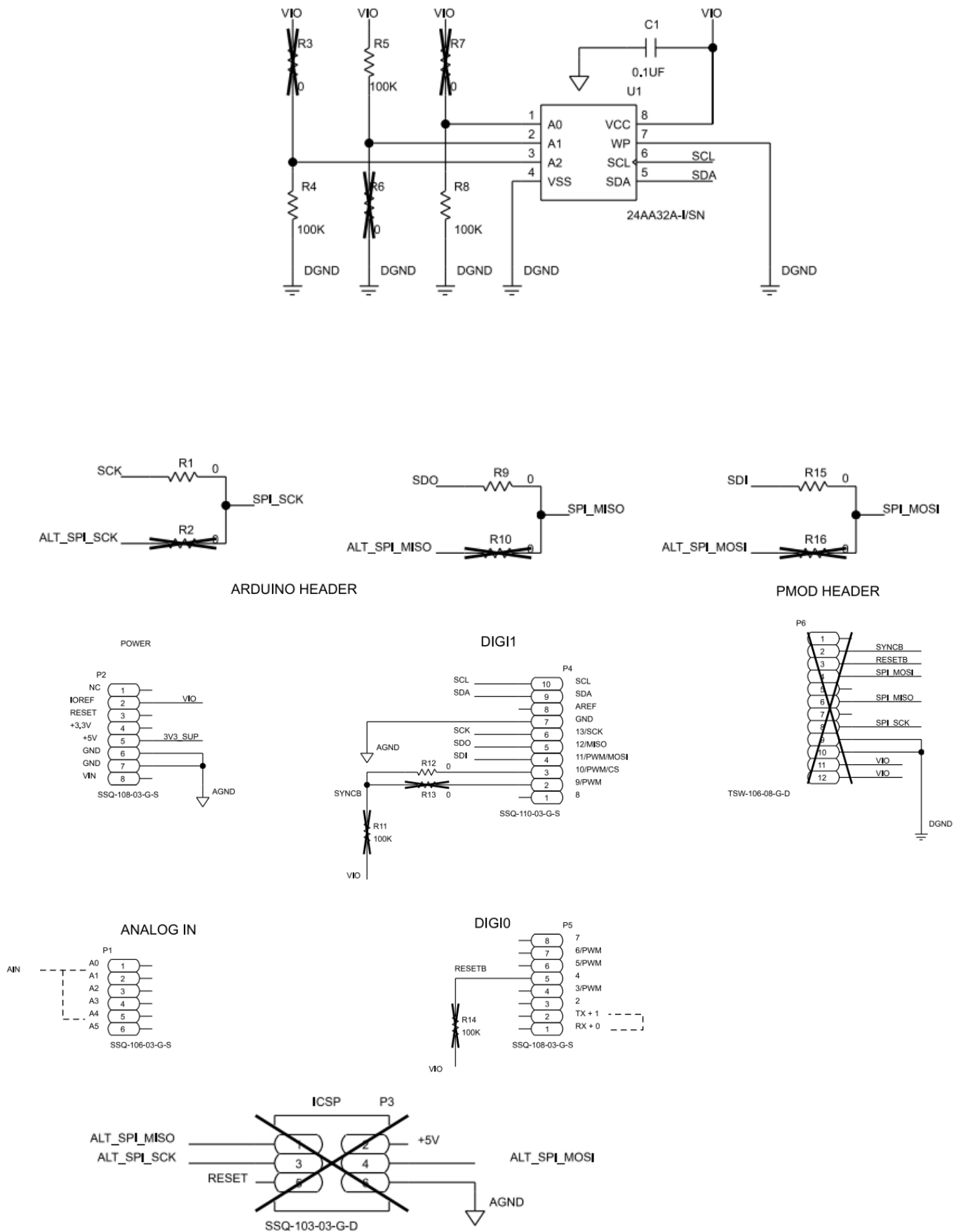


Figure 10. SDP-K1, EEPROM and PMOD Connections

The schematic diagram illustrates the power and ground connections for the HTSW-103-07-G-S board. Key components and connections include:

- Power Input:** A 3V_{SUP} input is connected to the PWR_SEL pin (P7) and the 3V_{VIN} pin (R19). The default setting is 1-2.
- Grounding:** Multiple ground connections are shown, including PGND, AGND, and AVDD/AVSS connections.
- Capacitors:** Various capacitors are used for decoupling and filtering, including C3 (10uF), C4 (0.1uF), C5 (1uF), C6 (10uF), C7 (10uF), C8 (10uF), C9 (10uF), C10 (10uF), C11 (27pF), C12 (10uF), C13 (33pF), C14 (10uF), C15 (27nF), C16 (0.01uF), C17 (10uF), C18 (1uF), C19 (10uF), and C20 (10uF).
- Resistors:** Resistors are used for current limiting and signal conditioning, including R20 (30.1K), R21 (10.8K), R22 (25K), R23 (1.37K), R24 (14.7), R25 (11.8K), R26 (82.5K), R27 (82.5K), R28 (9.09K), and R29 (100K).
- Connectors:** Connectors are used for external connections, including P7, P8, and P19.
- Labels:** Labels include P7, P8, P19, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L43, L44, L45, L46, L47, L48, L49, L50, L51, L52, L53, L54, L55, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, L67, L68, L69, L70, L71, L72, L73, L74, L75, L76, L77, L78, L79, L80, L81, L82, L83, L84, L85, L86, L87, L88, L89, L90, L91, L92, L93, L94, L95, L96, L97, L98, L99, L100, L101, L102, L103, L104, L105, L106, L107, L108, L109, L110, L111, L112, L113, L114, L115, L116, L117, L118, L119, L120, L121, L122, L123, L124, L125, L126, L127, L128, L129, L130, L131, L132, L133, L134, L135, L136, L137, L138, L139, L140, L141, L142, L143, L144, L145, L146, L147, L148, L149, L150, L151, L152, L153, L154, L155, L156, L157, L158, L159, L160, L161, L162, L163, L164, L165, L166, L167, L168, L169, L170, L171, L172, L173, L174, L175, L176, L177, L178, L179, L180, L181, L182, L183, L184, L185, L186, L187, L188, L189, L190, L191, L192, L193, L194, L195, L196, L197, L198, L199, L200, L201, L202, L203, L204, L205, L206, L207, L208, L209, L210, L211, L212, L213, L214, L215, L216, L217, L218, L219, L220, L221, L222, L223, L224, L225, L226, L227, L228, L229, L230, L231, L232, L233, L234, L235, L236, L237, L238, L239, L240, L241, L242, L243, L244, L245, L246, L247, L248, L249, L250, L251, L252, L253, L254, L255, L256, L257, L258, L259, L260, L261, L262, L263, L264, L265, L266, L267, L268, L269, L270, L271, L272, L273, L274, L275, L276, L277, L278, L279, L280, L281, L282, L283, L284, L285, L286, L287, L288, L289, L290, L291, L292, L293, L294, L295, L296, L297, L298, L299, L300, L301, L302, L303, L304, L305, L306, L307, L308, L309, L310, L311, L312, L313, L314, L315, L316, L317, L318, L319, L320, L321, L322, L323, L324, L325, L326, L327, L328, L329, L330, L331, L332, L333, L334, L335, L336, L337, L338, L339, L340, L341, L342, L343, L344, L345, L346, L347, L348, L349, L350, L351, L352, L353, L354, L355, L356, L357, L358, L359, L360, L361, L362, L363, L364, L365, L366, L367, L368, L369, L370, L371, L372, L373, L374, L375, L376, L377, L378, L379, L380, L381, L382, L383, L384, L385, L386, L387, L388, L389, L390, L391, L392, L393, L394, L395, L396, L397, L398, L399, L400, L401, L402, L403, L404, L405, L406, L407, L408, L409, L410, L411, L412, L413, L414, L415, L416, L417, L418, L419, L420, L421, L422, L423, L424, L425, L426, L427, L428, L429, L430, L431, L432, L433, L434, L435, L436, L437, L438, L439, L440, L441, L442, L443, L444, L445, L446, L447, L448, L449, L450, L451, L452, L453, L454, L455, L456, L457, L458, L459, L460, L461, L462, L463, L464, L465, L466, L467, L468, L469, L470, L471, L472, L473, L474, L475, L476, L477, L478, L479, L480, L481, L482, L483, L484, L485, L486, L487, L488, L489, L490, L491, L492, L493, L494, L495, L496, L497, L498, L499, L500, L501, L502, L503, L504, L505, L506, L507, L508, L509, L510, L511, L512, L513, L514, L515, L516, L517, L518, L519, L520, L521, L522, L523, L524, L525, L526, L527, L528, L529, L530, L531, L532, L533, L534, L535, L536, L537, L538, L539, L540, L541, L542, L543, L544, L545, L546, L547, L548, L549, L550, L551, L552, L553, L554, L555, L556, L557, L558, L559, L560, L561, L562, L563, L564, L565, L566, L567, L568, L569, L570, L571, L572, L573, L574, L575, L576, L577, L578, L579, L580, L581, L582, L583, L584, L585, L586, L587, L588, L589, L590, L591, L592, L593, L594, L595, L596, L597, L598, L599, L600, L601, L602, L603, L604, L605, L606, L607, L608, L609, L610, L611, L612, L613, L614, L615, L616, L617, L618, L619, L620, L621, L622, L623, L624, L625, L626, L627, L628, L629, L630, L631, L632, L633, L634, L635, L636, L637, L638, L639, L640, L641, L642, L643, L644, L645, L646, L647, L648, L649, L650, L651, L652, L653, L654, L655, L656, L657, L658, L659, L660, L661, L662, L663, L664, L665, L666, L667, L668, L669, L670, L671, L672, L673, L674, L675, L676, L677, L678, L679, L680, L681, L682, L683, L684, L685, L686, L687, L688, L689, L690, L691, L692, L693, L694, L695, L696, L697, L698, L699, L700, L701, L702, L703, L704, L705, L706, L707, L708, L709, L710, L711, L712, L

[illegible]

The schematic diagram illustrates the AD5766BCBZ-RL7 evaluation board. The central component is the AD5766BCBZ-RL7 IC, which is connected to various power and signal pins. The power pins include AVCC, AVSS, AVDD, and AGND. The signal pins include SCLK, SDO, SDI, SPI_SCK, SPI_MISO, SPI_MOSI, and VIO. The board also features a DAC output (VOUT0-VOUT14) and a DAC input (VREF). The schematic includes a table of pin connections and a list of components.

Pin	Signal	Connection
A1	DNC	VOUT1
A2	VOUT1	VOUT1
A3	VOUT2	VOUT2
A4	VOUT4	VOUT4
A5	VOUT5	VOUT5
A6	VOUT6	VOUT6
A7	DNC	VOUT7
B1	AVCC	AVCC
B2	AGND	AGND
B3	VOUT0	VOUT0
B4	VOUT3	VOUT3
B5	VOUT7	VOUT7
B6	DGND	DGND
B7	RESET_N	RESET_N
C1	MUX_OUT	MUX_OUT
C2	NIC	NIC
C3	NIC	NIC
C4	NIC	NIC
C5	NIC	NIC
C6	NIC	NIC
C7	SDI	SDI
C8	VLOGIC	VLOGIC
D1	AVDD	AVDD
D2	NIC	NIC
D3	NIC	NIC
D4	NIC	NIC
D5	NIC	NIC
D6	AGND	AGND
D7	AVSS	AVSS
E1	N1	N1
E2	NIC	NIC
E3	NIC	NIC
E4	NIC	NIC
E5	NIC	NIC
E6	SPI_MISO	SPI_MISO
E7	SCLK	SCLK
F1	N0	N0
F2	VREF	VREF
F3	VOUT15	VOUT15
F4	VOUT12	VOUT12
F5	AGND	AGND
F6	SYNC_N	SYNC_N
F7	DNC	VOUT14
G1	VOUT14	VOUT14
G2	VOUT13	VOUT13
G3	VOUT11	VOUT11
G4	VOUT10	VOUT10
G5	VOUT9	VOUT9
G6	DNC	VOUT8
G7	VOUT8	VOUT8

Components:

- TP2: MUXOUT
- TP3: RESETB
- TP4: WHT
- TP5: WHT
- TP6: WHT
- TP7: WHT
- N0: 131-3701-261
- N1: 131-3701-261

Figure 12. AD5766/AD5767 49-Ball WLCSP

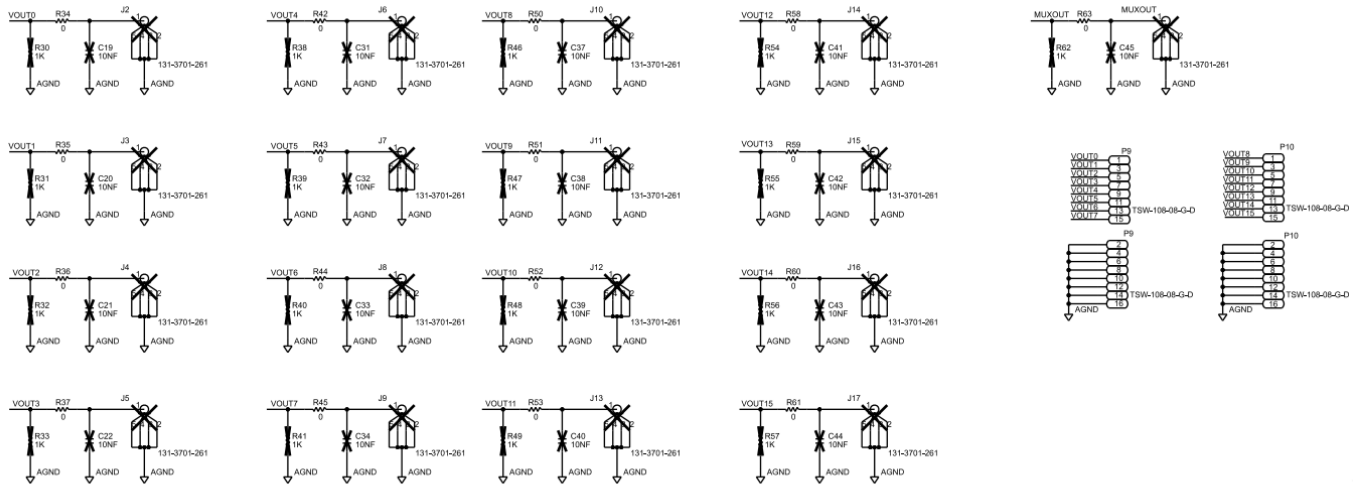


Figure 13. Channel Outputs

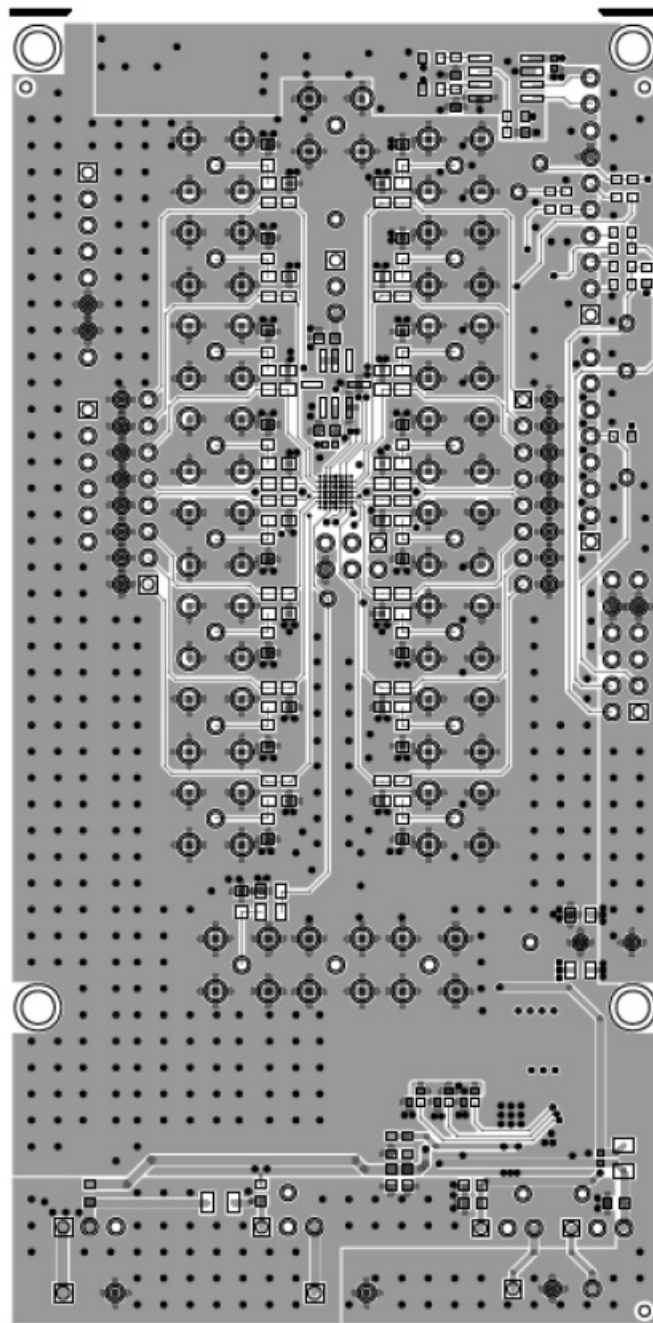


Figure 14. PCB Top Layer

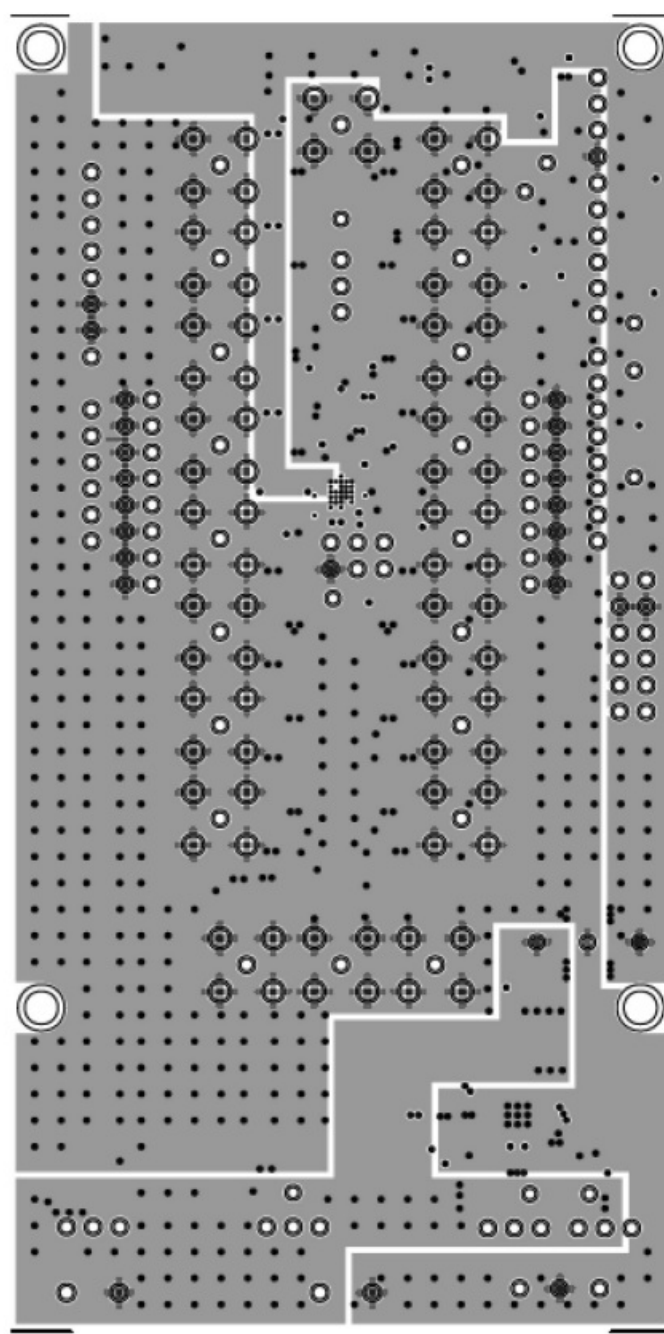


Figure 15. PCB GND Plane

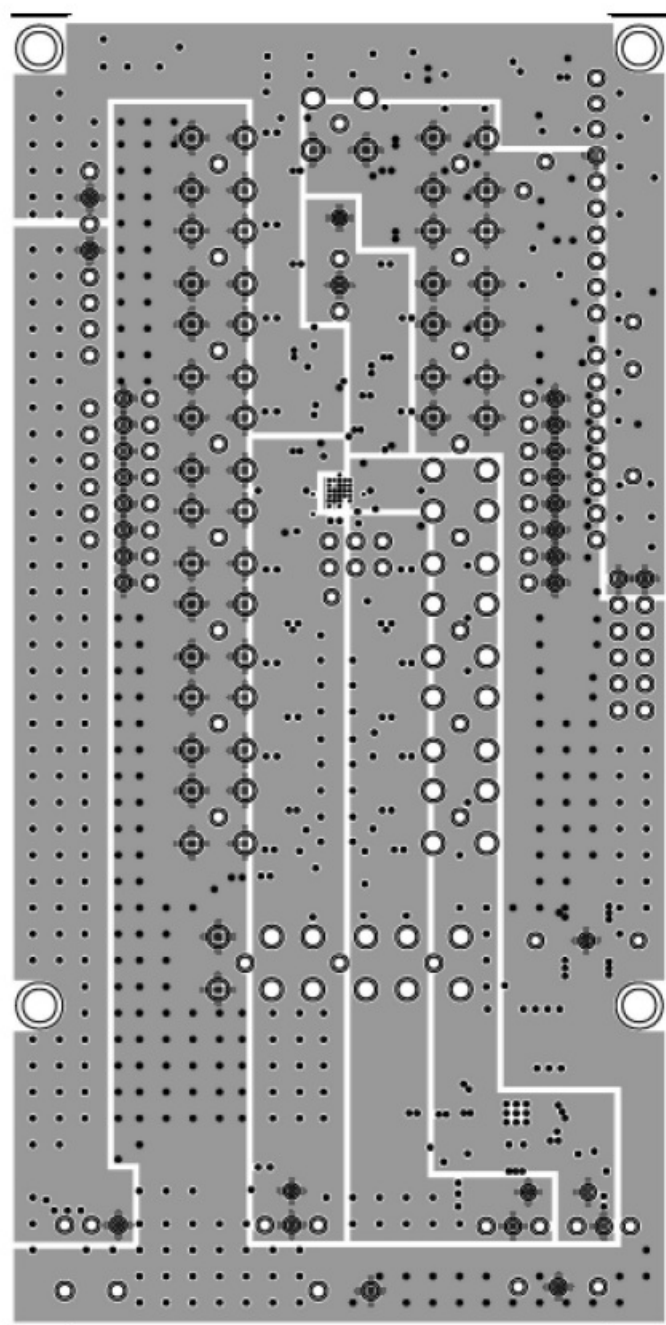


Figure 16. PCB Power Plane

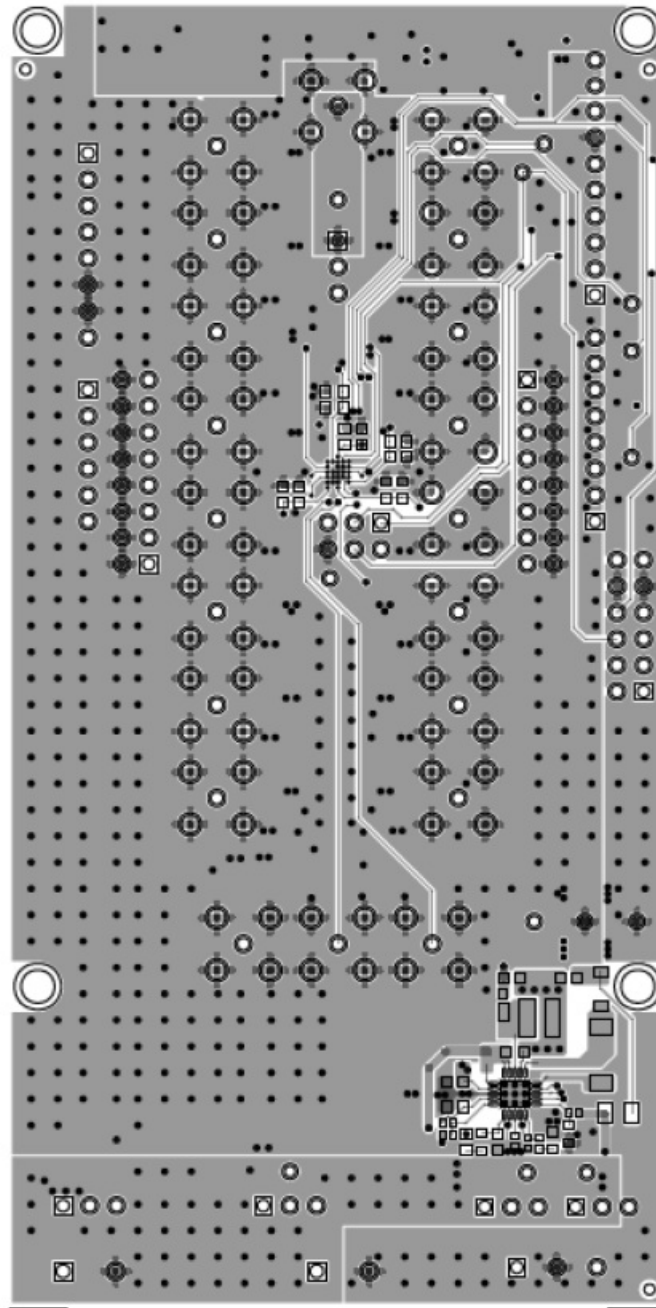


Figure 17. PCB Bottom Layer

ORDERING INFORMATION

BILL OF MATERIALS

Table 7. Bill of Materials

Reference Designator	Description	Part Number
AVCC_SEL, AVDD_SEL, AVSS_SEL, PWR_SEL, REF_SEL	Connectors, printed circuit board (PCB), 3-position male header, unshrouded, single row straight, 2.54 mm pitch, 5.84 mm post height, 2.54 mm solder tail	HTSW-103-07-G-S
C1	Ceramic capacitor, 0.1 μ F, 16 V, 10%, X7R, 0402, AEC-Q200	GCM155R71C104KA55D
C2, C3, C6, C9, C10, C12, C14, C17, C23, C24, C27, C28, C35	Ceramic capacitors, 10 μ F, 10V, 20%, X5R, 0603	GRM188R61A106ME69D
C4, C25, C26, C29, C30, C36	Ceramic capacitors, 0.1 μ F, 16 V, 10%, X7R, 0603	0603YC104KAT2A
C5, C18	Ceramic capacitors, 1 μ F, 25 V, 10%, X5R, 0603	CC0603KRX5R8BB105
C7	Ceramic capacitor, 0.1 μ F, 50 V, 10%, X7R, 0603	C0603R104K5RACT500
C8	Ceramic capacitor, 1 μ F, 16 V, 10%, X7R, 0603	0603YC105KAT2A
C11	Ceramic capacitor, 27 pF, 50 V, 5%, C0G, 0603	2238 867 15279
C13	Ceramic capacitor, 33 pF, 50 V, 5%, C0G, 0402	CL05C330JB5NNNC
C15	Ceramic capacitor, 27 nF, 50 V, 10%, X7R, 0603	06035C273KAT2A
C16	Ceramic capacitor, 0.012 μ F, 50 V, 5%, X7R, 0603	06035C123JAT2A
D1	Schottky diode, barrier rectifier	PD3S160-7
D2	Schottky diode, power rectifier surface-mounted device (SMD)	MBR0520LT1G
EXT_AVCC, P7	Connector, PCB, 2-position terminal, block side entry, 5 mm pitch	6.91103E+11
JP1 to JP3	Resistor, SMD, 0 Ω , jumpers, 1/10 W, 0402, AEC-Q200	ERJ-2GE0R00X
JP4	Resistor, SMD, 0 Ω , jumper, 1/10 W, 0402, AEC-Q200	ERJ-2GE0R00X
L1, L4, L5	Inductors, power shielded, wire wound, 1.6 A, 0.0912 Ω , DC resistance (DCR)	LQH32PN2R2NN0L
L2	Inductor, power shielded, 0.016 Ω DCR, 4.1A	SLF6045T-1R5N4R0-3PF
L3	Inductor, power shielded, DCR, 0.0522 Ω , 2.7 A	XFL4020-472MEC
P1	Connector, PCB, receptacle, 25 mil, square post, 2.54 mm pitch	SSQ-106-03-G-S
P2, P5	Connector, PCB, receptacles, 25 mil, square post, 2.54 mm pitch	SSQ-108-03-G-S
P4	Connector, PCB, receptacle, 25 mil, square post, 2.54 mm pitch	SSQ-110-03-G-S
P8	Connector, PCB, term block, 3-position	1727023
P9, P10	Connector, PCB, 16-pin headers, straight	TSW-108-08-G-D
R1, R9, R12, R15, R19	Resistors, SMD, 0 Ω jumper, 1/10 W, 0603	RC0603JR-070RL
R4, R5, R8	Resistors, SMD, 100 k Ω , 1%, 1/16 W, 0603	MC 0.063W 0603 1% 100K
R17, R18	Resistors, SMD, 0 Ω , 1/8 W, 0805, for combination footprint use ALT_SYMBOLS	RCG08050000Z0EA
R20	Resistor, SMD, 30.1 k Ω , 1%, 1/10 W, 0603, AEC-Q200	ERJ-3EKF3012V
R21	Resistor, 19.6 k Ω , 0.5%, 1/10 W, 0603, AEC-Q200	RNCF0603DTE19K6
R22	Resistor, SMD, 255 k Ω , 1%, 1/10 W, 0402, AEC-Q200	ERJ-2RKF2553X
R23	Resistor, SMD, 3.57 k Ω , 1%, 1/10 W, 0402, AEC-Q200	ERJ-2RKF3571X
R24	Resistor, SMD, 14.7 Ω , 1%, 1/16 W, 0402, AEC-Q200	CRCW040214R7FKED
R25	Resistor, SMD, 11.8 k Ω , 1%, 1/10 W, 0603	RC0603FR-0711K8L
R26	Resistor, SMD, 13.7 k Ω , 1%, 1/16 W, 0402, AEC-Q200	CRCW040213K7FKED
R27	Resistor, SMD, 82.5 k Ω , 1%, 1/16 W, 0402	RC0402FR-0782K5L
R28	Resistor, SMD, 9.09 k Ω , 1%, 1/10 W, 0603, AEC-Q200	ERJ-3EKF9091V
R29	Resistor, SMD, 102 k Ω , 1%, 1/10 W, 0402, AEC-Q200	ERJ-2RKF1023X
R34 to R37, R42 to R45, R50 to R53, R58 to R61, R63	Resistors, SMD, 0 Ω jumper, 1/2 W, 0805, AEC-Q200, pulse proof	CRCW08050000Z0EAHP
TP2 to TP7	Connector, PCB, white test points	5002
U1	IC, 32 KBIT serial electrically erasable programmable read-only memory (EEPROM)	24AA32A-I/SN
U2	2 A/1.2 A dc-to-dc switching regulator with independent positive and negative outputs	ADP5071ACPZ-R7

Reference Designator	Description	Part Number
U3	Ultralow noise, high-accuracy 2.5 V voltage reference	ADR4525DEZ-R7
U4	16-channel, 16-bit/12-bit voltage output denseDAC	AD5766BCBZ-RL7/ AD5767BCBZ-RL7
AVCC, AVDD, AVSS, VREF	Connector, PCB, red test points, DNI	Not applicable
C19 to C22, C31 to C34, C37 to C45	Ceramic capacitors, 10 nF, 200 V, 10%, X7R, 0805, FLEXITERM, DNI	Not applicable
J1 to J17, MUXOUT, N0, N1	Connector, PCB, coax, Subminiature Version B (SMB), jacks, RF vertical, gold, DNI	Not applicable
P3	Connector, PCB, receptacle, 25 mil, square post, dual-row, 2.54 mm pitch, DNI	Not applicable
P6	Connector, PCB, Berg, header, straight male, 12-position, DNI	Not applicable
R2, R10, R13, R16	Resistors, SMD, 0 Ω , jumper, 1/10 W, 0603, DNI	Not applicable
R11, R14	Resistors, SMD, 100 k Ω , 1%, 1/10 W, 0603, AEC-Q200, DNI	Not applicable
R3, R6, R7	Obsoleted: resistors, SMD, 0 Ω , 1%, 1/16 W, 0603, DNI	Not applicable
R30 to R33, R38 to R41, R46 to R49, R54 to R57, R62	Resistors, SMD, 1 k Ω , 1%, 1/8 W, 0805, AEC-Q200, DNI	Not applicable

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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References

- [User Manual](#)

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