ADHV4710

Evaluates the ADHV4710, 110V, High Voltage, 1A Current, Operational Amplifier

Features and Benefits

- Enables easy evaluation of the ADHV4710
- Robust thermal management
- Galvanic isolation for LVDS interface
- Provision for user-defined circuit configurations
- Edge-mounted connectors and test point provisions

Applications

- High voltage power amplifier (PA)
- High voltage SMU/VI source
- High voltage arbitrary waveform generator (AWG)
- Piezoelectric transducer drive
- Programmable power supplies

Evaluation Kit Contents

- EVAL-ADHV4710SDZ evaluation board
- Aluminium heat sink
- Tubeaxial fan
- Mechanical components - screws and standoffs

Hardware and Software Required

- SDP-K1 controller board, purchase separately
- ACE software
- EVAL-ADHV4710SDZ ACE plugin
- GC Electronics 10-8109 heat sink Z9 compound or equivalent
- 6 to 20 in-oz torque screwdriver (Tohnichi RTD20Z or equivalent)
- Kapton tape (Bertech KPT-1/2 or equivalent)

General Description

This user guide describes the EVAL-ADHV4710SDZ board, which evaluates the ADHV4710 offered in a 12mm × 12mm, 80-lead thin quad flat package (TQFP) with an exposed pad at the top for a mountable heat sink. The evaluation board provides a platform for quick and easy evaluation of the ADHV4710 for various user-defined configurations.

The ADHV4710 is ideally suited for demanding applications such as piezo drivers, LCD/OLED panel formation, and programmable power supplies.

The ADHV4710 data sheet provides the full specifications of the ADHV4710 and details on the device's operation. Consult it in conjunction with the user guide.

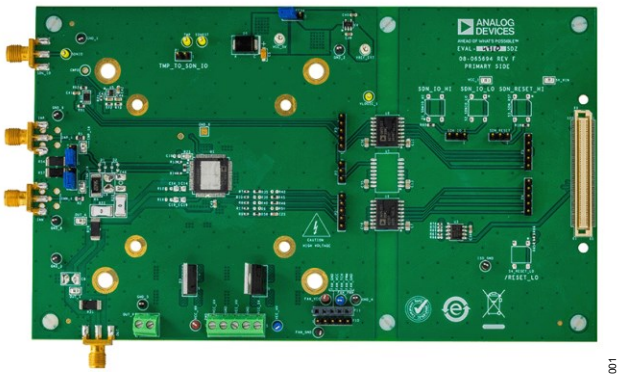

Figure 1. Front of ADHV4710 Evaluation Board

Warning: This high-voltage evaluation board contains exposed metal carrying lethal voltages when under power. Take all necessary steps to protect users during operation. For full precautions when using this high voltage evaluation board, see the *High Voltage Evaluation Board* section.

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TABLE OF CONTENTS

Initial Setup

The complete ADHV4710 evaluation system includes the ADHV4710 evaluation board, SDP controller board, and the ADHV4710 ACE plugin. Plugins are product-specific applications downloaded and executed in the analysis/control/evaluation (ACE) software environment. The ADHV4710 evaluation board communicates with Microsoft Windows 10 operating system (OS) and ACE software through the SDP controller board. The ADHV4710 evaluation board and SDP controller board are ordered separately. The SDP boards that can interface with the ADHV4710 evaluation board: SDP-K1.

Figure 2. SDP-K1 Controller Board

The SDP-K1 controller board has the SDP 120-pin connectors and enables the configuration of the ADHV4710 for overcurrent, overvoltage, and overtemperature protection using the SPI communication protocol. However, if the user does not intend to use the SPI configuration of the device, the protection features of the device are disabled. In this case, connect the SDN_IO to TMP using P1 so that the part turns off when the junction temperature exceeds 150°C. See *Evaluation Board Hardware Features* for more information on shutdown.

See the *Additional Resources* section for more information on the SDP controller boards. Refer to the ADHV4710 data sheet for more information on configuring the SPI communication protocol.

Evaluation Board Software Installation

1. Download the ACE installer software from *www.analog.com/ace.*
2. Install the ACE application and any other recommendations like SDP drivers.
3. Note: This might require a system reboot at the end. Ensure any open files are saved and any other running applications beforehand are closed.
4. Open the ACE platform. A successfully installed ACE application displays a list of preinstalled plugins of released ADI products.
5. Note: Reinstall the software if existing plugins are not shown.
6. Install **Board.ADHV471X** using the **Plugin Manager** in the ACE toolbar. Locate or search in the **Available Packages** section. Then, click **Install Selected**. On the **Start** tab, the package is now available on the list of installed ACE plugins.

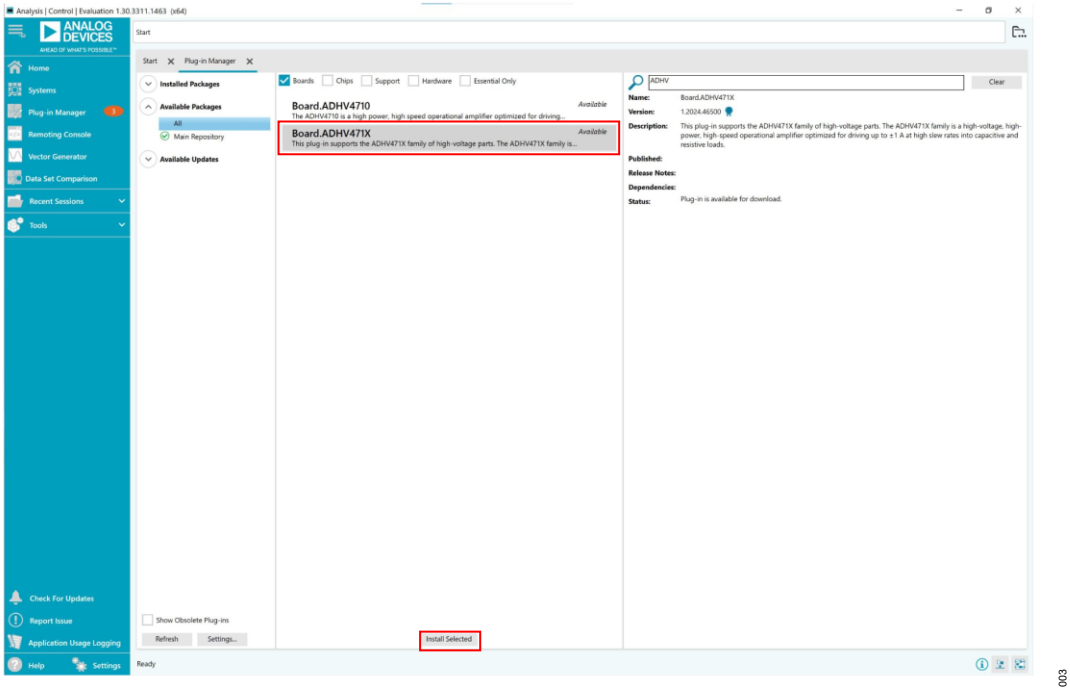

Figure 3. Plugin Available Through ACE Plugin Manager

Updating Installed Plugins

If an earlier version of the ADHV4710 plugin is installed already, update to the newest version by following these steps.

1. Go to **Plugin Manager** and select **Available Updates**.
2. Select **Board.ADHV471X** and click **Update Selected**.

Configuring Hardware

To configure and test the ADHV4710 evaluation board, the following equipment is recommended:

- N6705B power supply or equivalent
- 34401A DMM or equivalent
- 33250A function generator or equivalent
- Oscilloscope, Tektronix DPO 3014 or equivalent
- GC Electronics 10-8109 heat sink Z9 compound or equivalent
- System development platform (EVAL-SDP-CK1Z)
- 6-20 in-oz torque screwdriver (Tohnichi RTD20Z or equivalent)
- Kapton tape (Bertech KPT-1/2 or equivalent)

1. Confirm the jumpers are in the factory default positions, as shown in *Figure 4*.
    a. Connect VCC_5V to VREF_5V through the EXT_VREF5V three-pin header.
    b. Connect INP to ground with a 50Ω termination through shunting pins 1 and 2 on P12 three-pin header.
    c. Connect INN to ground through shunting pins 2 and 3 on P13 three-pin header.

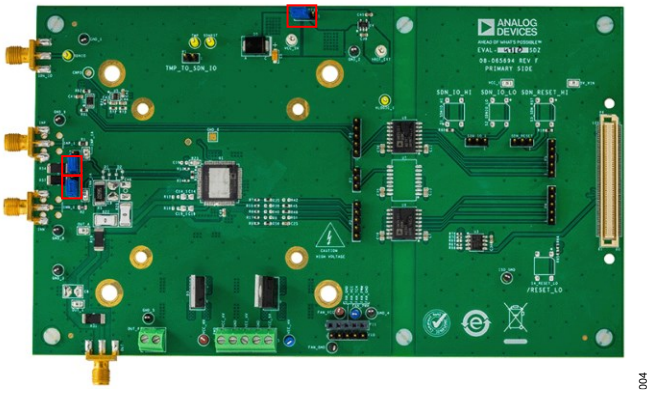

Figure 4. ADHV4710 Evaluation Board Factory Default Jumper Position

2. Secure the six plastic standoffs (PN 1902C) to the back of the board with six plastic screws (PN NY PMS 440 0025 PH), as seen in *Figure 5*.

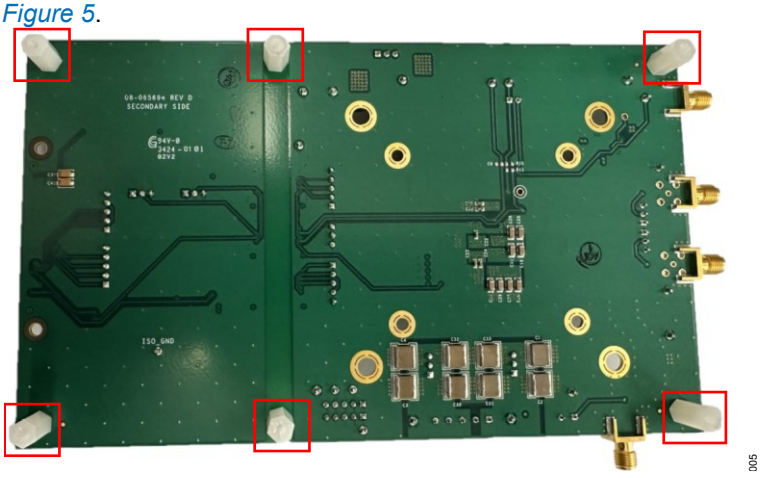

Figure 5. Back of Evaluation Board with Plastic Standoffs

3. Spread a thin layer of low-impedance thermal compound about one mil thick on top of the ADHV4710. Apply Kapton tape to the edges of the heat sink, as seen in *Figure 6*, to not touch the ADHV4710. This is to prevent the heat sink from contacting

some surface mount components, located under the heat sink from becoming shorted, that creates unwanted connections. The heat sink is black anodized. However, black anodize can scratch easily, exposing aluminum as a good conductor.

Figure 6. Back of Heat Sink with Kapton Tape

4. Mount the heat sink and secure four screws (PN 9902) onto the board with four hex nuts (PN HNSS440), as shown in *Figure 7*. Use a torque screwdriver to alternatively tighten the four screws, alternating diagonally like tightening lug nuts on a car tire, to 6 in-oz on each.

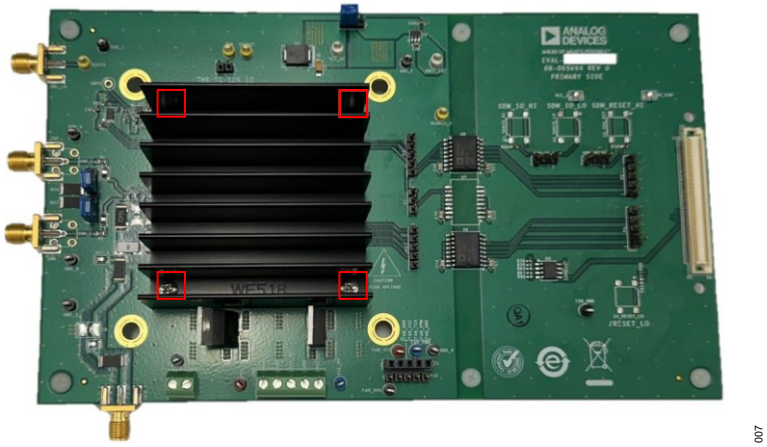

Figure 7. ADHV4710 Evaluation Board with Heat Sink

5. Secure the four fan standoffs (PN 2114-440-AL) onto the board with four screws (PN 9900) from the bottom of the board, as seen in *Figure 8*.

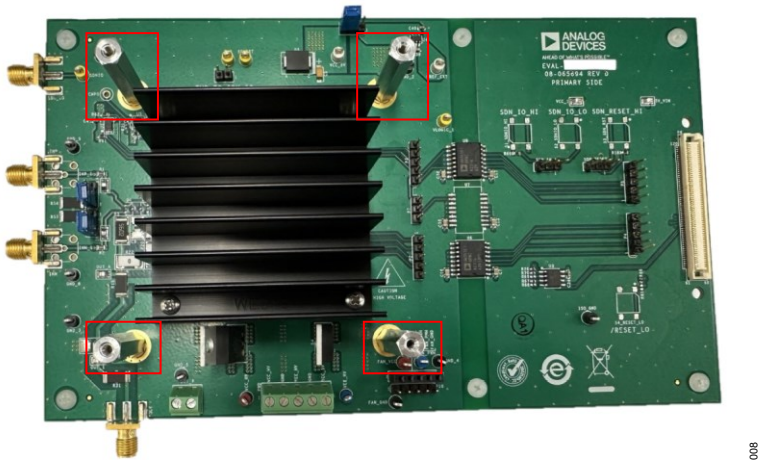

Figure 8. ADHV4710 Evaluation Board with Fan Standoffs Attached

6. Use four screws (PN 010440CD125) to secure the fan onto the standoffs. Then, attach the black wire of the fan to FAN_GND and attach the red wire of the fan to FAN_VCC of the female connector P11. See *Figure 9*.

Figure 9. ADHV4710 Evaluation Board with Fan Attached

7. The board's default configuration is a noninverting op-amp with a gain of 57. The noninverting input (INP) is terminated with a 50Ω resistor due to the default position of jumper P12, where pins 1 and 2 are shorted. Jumper P13, in its default position (pins 2 and 3 shorted), provides a ground path for the INN_SMAB net.
8. A load capacitor can be installed on the board at C8, or an off-board load using the OUT_P test point. **Use caution when driving a load that the ADHV4710 does not exceed its maximum allowable temperature of 150°C.**
9. Connect the high-voltage supply through VEE_HV, VCC_HV, and GND ports. Make sure that the GND port is connected first before VEE_HV and VCC_HV. The recommended high voltage supply is ±50V for the ADHV4710. If available, set the current limit of the high-voltage supply to 1A. Confirm power connections are securely connected before turning on the power supplies to avoid damaging the board.
10. Connect a 5V supply at VCC_5V test point. Make sure that the GND is connected first.
11. Connect a 12V supply to FAN_VCC and set the 12V supply to have a current limit of 100mA.
12. Turn on the supplies at the same time. If supplies cannot be turned on simultaneously, turn on the HV supplies first, then the 5V supply.
13. Check the supply currents. Under normal operation, the VEE_HV and VCC_HV current should be ~8mA to +14mA. The 5V digital supply current should be ~10mA to +20mA.

Table 1. Power Supply Limits

Supply	Expected Value
VCC_HV	8mA to 14mA
VEE_HV	−8mA to −14mA
VCC_5V	10mA to 20mA
TMP	1.7V to 2.2V

14. Turn off the supplies.
15. Mate the SDP-K1 board to EVAL-ADHV4710SDZ using P6 and the 120-pin connector at the primary side of the evaluation board. For a more secure connection, screw the boards together through the connector's mounting holes. See *Figure 10*.

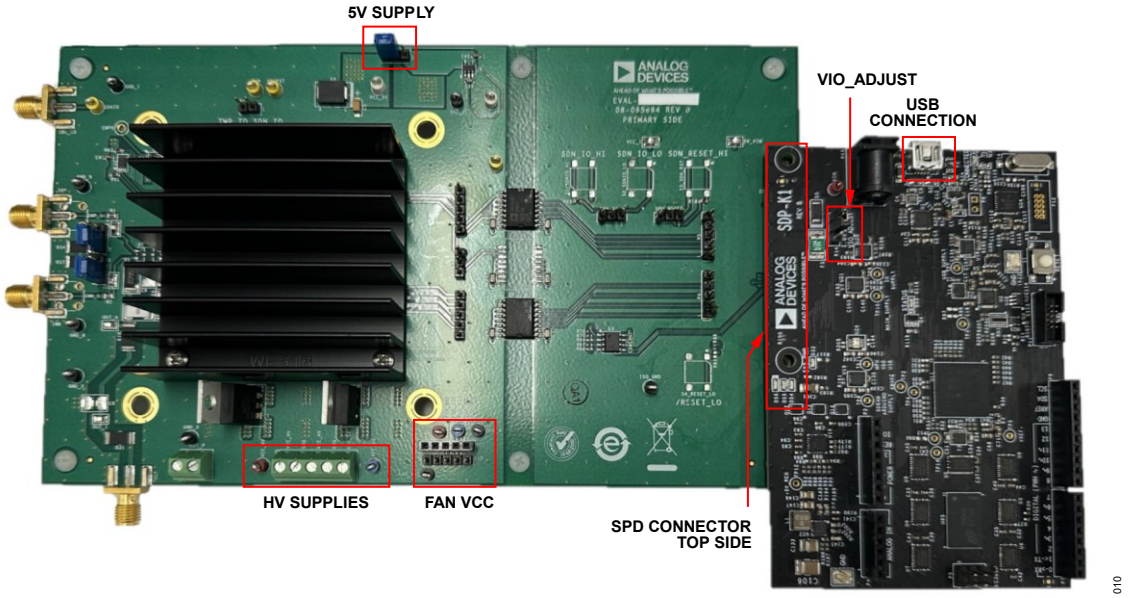

Figure 10. ADHV4710 and SDP Board Connected to P6 on the Secondary Side

16. Connect the SDP-K1 board to the host computer with the USB cable. The SDP-K1 is powered through the USB cable.
17. Change the digital logic level of the SDP-K1 from 1.8V to 3.3V by moving the shunt located at VIO_Adjust, as shown in *Figure 10*.
18. Turn on the supplies and run the ACE application. The ADHV4710 board plugin appears in the attached hardware section of the **Start** tab, as shown in *Figure 11*. If the board does not appear under the attached hardware section, see item 1 in the *Troubleshooting Errors* section.

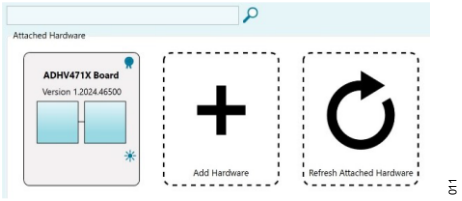

Figure 11. ADHV4710 Plugin Start Tab

19. Double-click the plugin to open the board view. A successful hardware connection is indicated by a green indicator in the **ADHV471X Board.**

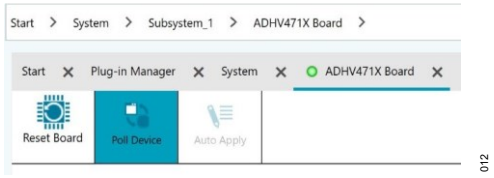

Figure 12. Successful Connection Indicator for SDP Connected Board

20. The ADHV4710 chip view can be accessed by double-clicking on the ADHV4710 symbol. This view provides a basic representation of the board's functionality. The main functions are labeled in the **Block Diagram View** or **Chip View**.

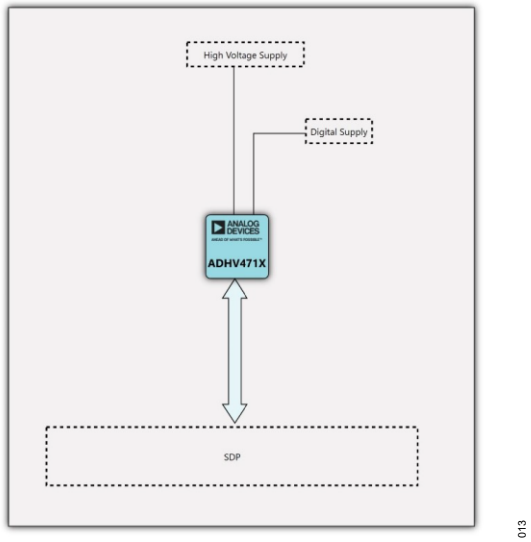

Figure 13. ADHV471X ACE Plugin Board View

Configuring Software

This section describes the main functions of the block diagram. The ADHV4710 data sheet gives a full description of each register and its settings. Some blocks and their functions are described here.

Sleep/Wake

This button toggles the ADHV4710 in and out of SLEEP mode.

Shutdown Indicator

This button and LED indicator light up green in normal operation and red when the part goes into shutdown.

Shutdown Reset

After a shutdown event due to a fault condition, reset the shutdown feature to turn the ADHV4710 back on. This button resets the shutdown feature by writing a 1 and then a 0 to bit[7] of 0x00.

Protection Panel

This panel enables parameter protection individually. To enable protection for a given fault type, click the corresponding **Enable Protection** checkbox. Each fault type is mapped to an indicator on the graphical user interface (GUI). Also specify the corresponding thresholds in **Desired Value** fields to trigger an alarm and shut down the high voltage driver. To clear alarms, make sure the fault event is gone, and the part's shutdown feature is reset. Click **Clear All Alarms** to clear the alarm registers and indicators.

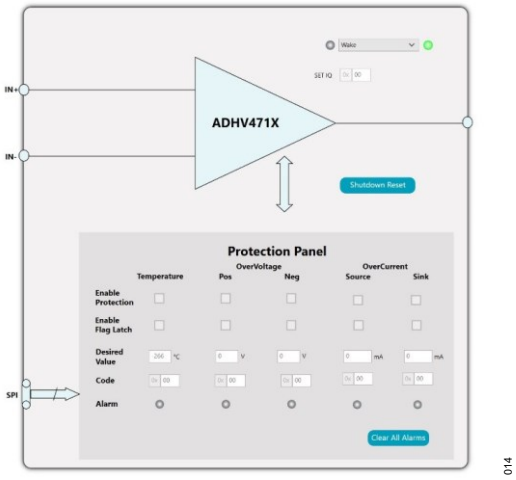

Figure 14. ADHV471X Plugin Chip View Block Diagram

Using the Top Bar

- **Apply Changes**: Apply all values to the device and then read back all values from the device to ensure consistency with the GUI's indicators.
- **Read All**: Read all hardware registers from the device. Note that by clicking **Read All**, all software changes not applied to the device are removed.
- **Reset Chip**: Resets hardware to its default state.
- **Diff**: The ADHV4710 plugin does not use this.
- **Software Defaults**: Shows software default values. This can be helpful in going back to software defaults. These changes can be applied to the hardware by clicking **Apply Changes**. Note that by clicking **Read All**, all software changes not applied to the device are removed.
- **Memory Map Side-By-Side**: Shows the memory map of the ADHV471X side-by-side with the chip plugin. This can be useful in seeing what changes to the plugin bind with which hardware register.

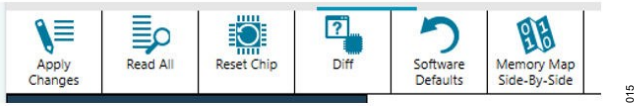

Figure 15. ADHV471X Plugin Chip View Top Bar

Using Macro

Macros can be used to save the previous states of the evaluation process. Macros can be accessed from the left sidebar under the **Tools** section. Macros can also be saved as a script and run again.

The following actions can be performed from the Macro's toolbar from left to right:

- **Record/Stop**: Record/stop recording commands.
- **Play**: Playback the recorded commands.
- **Edit Script**: Allows to make changes, skip commands, set breakpoints, and make notes for future use to a recorded Macro.
- **Save/Save As**: Allows to save the macro for future use.
- **Open**: Opens already recorded macros and plays them. This feature also allows macros to be shared among teams and helps the device return to a known state.
- **Close**: Closes an open Macro. Keep in mind the user can open multiple macros and play them as needed.
- **Delete**: Deletes a macro.
- **Generate**: The tool can generate the scripts in five different languages to port them into various other tools. The five programming language options available are ACE Macro, C#, MATLAB, Python, and ACE Hex.

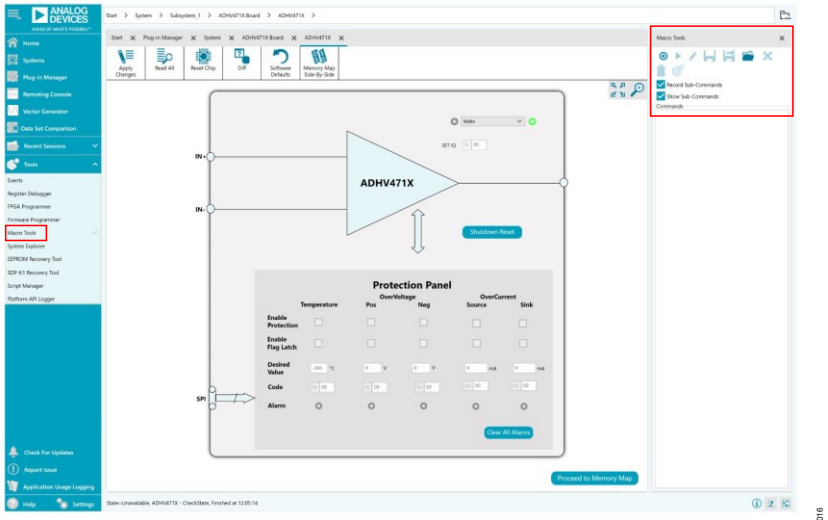

Figure 16. Accessing Macros from Tools and Generating Scripts

SDP-K1 Recovery Tool

If the SDP-K1 firmware is not updated, ACE prompts to update the firmware. The **SDP-K1 Recovery Tool** can be accessed from the left sidebar under the **Tools** section. See *Figure 17.*

If necessary, follow these steps to update the SDP-K1 firmware:

1. Access the **SDP-K1 Recovery Tool** under the **Tools** section.
2. Check to see if the SDP-K1 is connected by clicking **Search** in the **SDP-K1 Recovery Tool View**.
3. Click on the SDP-K1's **Device ID** and press the **Blink "CONNECTED" LED** to verify the correct SDP-K1 is connected.
4. Press the **Standard** check box.
5. Press **Flash Firmware** to update the SDP-K1's firmware.

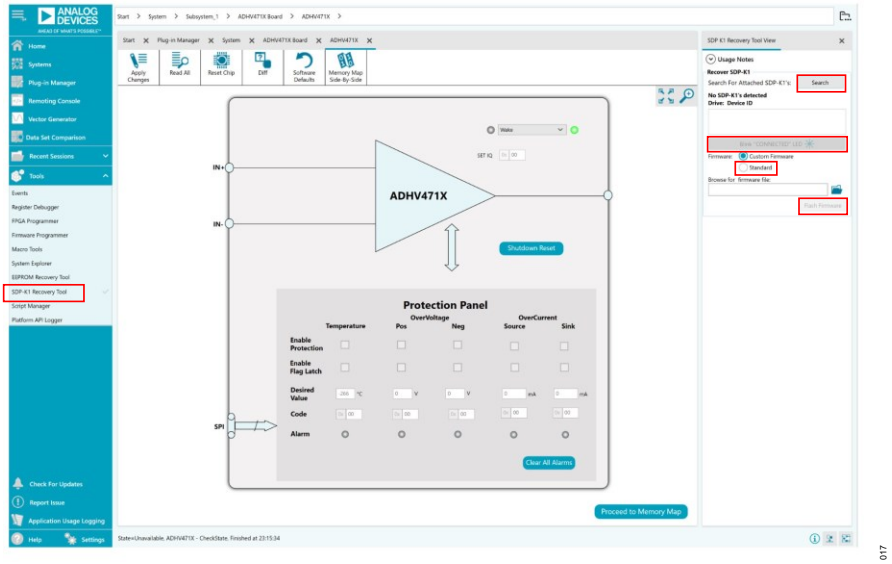

Figure 17. Accessing the SDP-K1 Recovery Tool

Quick Start

Once the initial setup is complete, install the ACE software, and load the plugin. Follow these steps to generate a sample waveform and evaluate the ADHV4710 protection features.

1. With the INN input SMA terminated by a 0Ω/short circuit male termination load, the ADHV4710 is configured as a noninverting amplifier with a gain = +57V/V. Refer to the ADHV4710 data sheet to make sure the output headroom requirements are met. Recommended gain resistors are RF = 56kΩ and RG = 1kΩ for a gain of 57V/V.
2. Ensure that GND is connected first. Then, power on the ADHV4710 by applying +50V to VCC_HV, −50V to VEE_HV, and 5V to VCC_5V. The high voltage power supplies and VCC_5V can be brought up individually, in any order. If available, set the current limit of the high-voltage supply to 1A. Confirm the power connections are securely connected before turning on the power supplies to avoid damaging the board. See the **Power Supply Sequencing** section in the ADHV4710 data sheet for additional information about power supply sequencing.
3. Apply an input sine wave of 100mVp-p at 1kHz with a 50% duty cycle at the INP SMA connector for a 5.70Vp-p output. At higher frequencies, the DUT is in continuous slewing operation and thus, increased dynamic power dissipation is observed. Evaluate the ADHV4710 at 1kHz.
4. Connect OUT_1 test point or OUT SMA to an oscilloscope to check the output waveform.
5. Monitoring TMP pin voltage is recommended. Stop or slow down the input waveform immediately when the TMP reading is above 2.5V. The 2.5V voltage reading at TMP indicates 150°C junction temperature. Refer to the **Thermal Monitoring** section of the data sheet for more details.
6. Set overtemperature, overvoltage, and overcurrent protection on the ACE plugin by updating their corresponding **Desired Value** boxes, as shown in *Figure 18*. Check **Enable Protection** and **Enable Flag Latch** to monitor faults. Refer to the ADHV4710 data sheet for more information on the programmable thresholds, and fault monitoring/protection features.
7. When a programmed limit is exceeded, the ADHV4710 shuts down, and **Alarm** indicators on the plugin turn red. These indicators remain red unless the alarm event is resolved and intentionally cleared. To turn the ADHV4710 back on and clear the alarm indicators after the alarm event is resolved, click **Shutdown Reset** and **Clear All Alarms**. If **Enable Flag Latch** is not selected, alarm indicators clear as soon as the alarm event is resolved. Refer to the **Fault Monitoring and Protection** section of the ADHV4710 data sheet for more details.

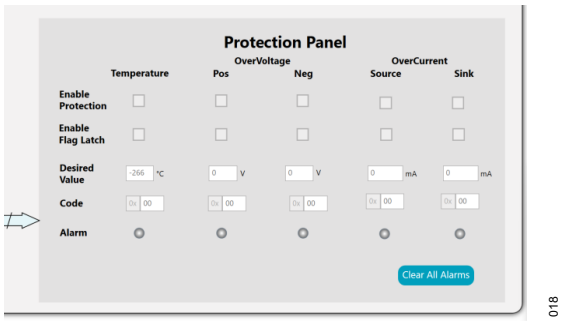

Figure 18. ADHV4710 Fault Protection Features

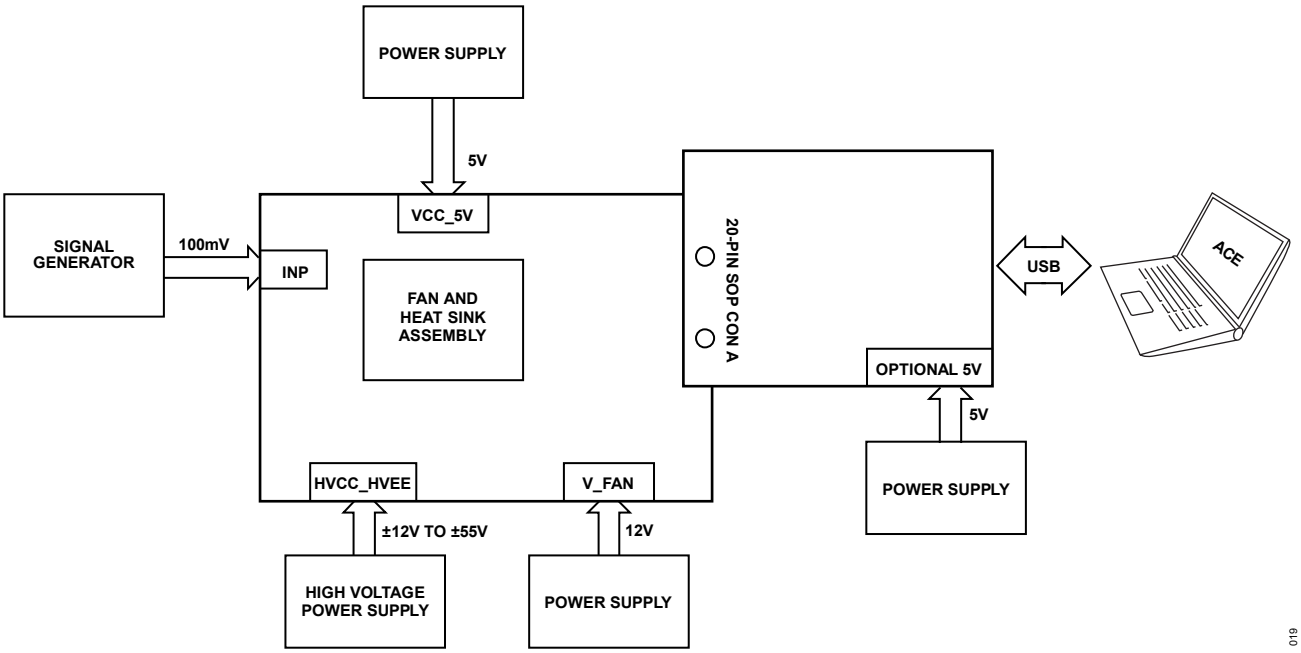

Figure 19. EVAL-ADHV4710SDZ Default Setup

Evaluation Board Hardware Features

A. SPI Connectors

In addition to the SDP connector, the EVAL-ADHV4710SDZ evaluation board includes a SPI breakout jumper for custom controller board operation.

B. Compensation (COMP_H AND COMP_L)

The EVAL-ADHV4710SDZ evaluation board includes provisions with 0603 footprints for compensation capacitors, COMP_H and COMP_L. These capacitors must be high voltage types to withstand the full-scale range of the output signal; minimum 250V capacitors are recommended when running on the +/−50V supplies.

C. Thermal Monitor (TMP) and Thermal Management

The TMP pin can be used to monitor relative changes in die temperature. At a junction temperature of 25°C, the typical TMP pin voltage is 1.75V and changes at approximately 6mV/°C. More precise temperature readings can be achieved through a one-time room temperature calibration.

The TMP pin can be connected to the SDN_IO pin for optional thermal shutdown by installing a 0Ω resistor at R11 or installing a shunt (65474-001LF) on P1 to connect TMP to SDN_IO. The ADHV4710's thermal monitoring capability is independent of any overtemperature shutdown threshold and may be used whether TMP is strapped to SDN_IO. If the ADHV4710 is powered on while the TMP pin is shorted to SDN_IO, there is a possibility the ADHV4710 powers on in shutdown and needs a shutdown reset to exit the shutdown state.

D. VLOGIC_OUT

Test point VLOGIC_1 connects to VLOGIC_OUT on the ADHV4710. This pin is an output only. Do not drive this pin. Refer to the **Power Supplies and Decoupling** section of the ADHV4710 data sheet for more details.

E. Galvanic Isolation

The EVAL-ADHV4710SDZ evaluation board includes provisions to protect from high voltages on the evaluation board when interfacing with the ADHV4710 for digital communication. In this process, all digital communication lines interfacing the SDP-K1 are moved from the main PCB area onto an electrically isolated portion of the PCB. The ADuM341E is used to isolate all digital communication lines from the SDP-K1 to the ADHV4710.

It is not recommended to power VCC_1 with an external power supply. Instead, simply connect the SDP-K1 to the 120-pin SDP connector to power the isolation circuitry. The VCC_1 connection should only be used to monitor the voltage powering the isolation circuitry.

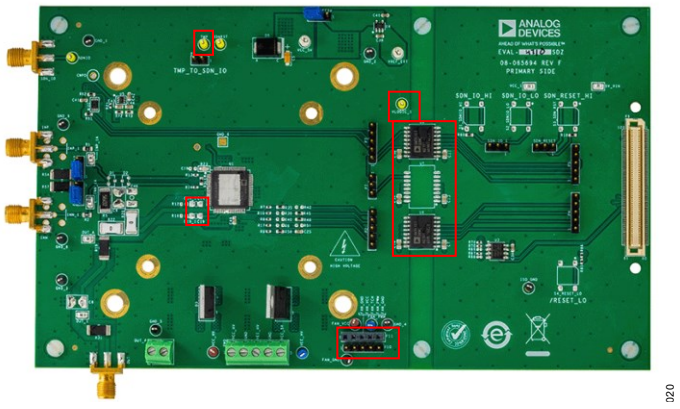

Figure 20. Front of ADHV4710 Evaluation Board with Highlighted Hardware Features

Troubleshooting Errors

The ADHV4710 board does not appear in the attached hardware section:

- Check for a firm connection between the SDP board and the evaluation board.
- Check the power of the SDP board and reconnect the USB.
- If still not working, try to reset the SDP board using the white reset button switch.

Application-Specific Information

When using the fault monitoring and protection:

a. Triggering the alarm requires the desired threshold to be met for a minimum duration (400ns) before a shutdown is initiated. When operating at a higher operating frequency, depending on the waveform, the threshold value may not be met for a long enough duration to trigger an alarm. See the ADHV4710 data sheet for more information regarding shutdown turn-on and turn-off times.

b. Programming a desired threshold of 0 always causes the alarms flags to be in a high state as the protection circuitry inherently senses any noise on the output node, causing the alarm to constantly retrigger.

Ordering Information

Bill of Materials

Item	Qty.	Reference Designator	Part Description	Manufacturer, Part No.
1	1	U1	IC-ADI high voltage high current amplifier	Analog Devices, ADHV4710BSVZ
2	6	5V_VIN, INN_1A, INP_1A, OUT_1, OUT_A, VCC_1	Connector-PCB SMT test points	Keystone Electronics, 5015
3	8	C1, C2, C3, C4, C30, C31, C32, C33	Capacitor ceramic, 1.2µF, 250V, 10% X7R 2225	Kemet, C2225C125KARACTU
4	8	C10, C11, C20, C21, C26, C27, C28, C29	Capacitor ceramic, 0.1µF, 250V, 10% X7R 1206 AEC-Q200	Kemet, C1206X104KARACTU
5	14	C12, C15, C22, C23, C24, C25, C34, C39, C40, C41, C42, C43, C44, C49	Capacitor ceramic, 0.1µF, 16V, 10% X7R 0603	Yageo, CC0603KRX7R7BB104
6	6	C7, C13, C16, C17, C35, C36	Capacitor ceramic, 0.1µF, 50V, 5% X7R 0805	Kemet, C0805C104J5RACTU
7	2	C14, C19	Do not install (DNI) (TBD_C1206). Use SYM_3 and/or SYM_4.	TBD1206, TBD1206
8	2	C14_1, C19_1	Do not install (DNI) (TBD_C0805). Use SYM_3 and/or SYM_4.	TBD0805, TBD0805
9	2	C6, C18	Do not install (DNI). Capacitor ceramic, 100pF, 50V, 10% X7R 0603	Kemet, C0603C101K5RAC
10	3	C5, C37, C45	Capacitor tantalum,10µF, 16V, 10% 3216-18	Kemet, T491A106K016AT
11	1	C46	Do not install (DNI) (TBD_C1812). Use SYM_3 and/or SYM_4	TBD1812, TBD1812
12	2	C8, C9	Non-preferred. Do not install (DNI). Use SYM_3 and/or SYM_4	TBD0805, TBD1210, TBD1812
13	1	CMPO	Do not install (DNI). Connector-PCB test point yellow	Components Corporation, TP-104-01-04

Item	Qty.	Reference Designator	Part Description	Manufacturer, Part No.
14	2	D1, D2	Do not install (DNI). Diode switch dual	ON Semiconductor, BAV199LT1G
15	2	D3,D4	Diode switch-mode Schottky power rectifier, 250V, 40A to 220A	ON Semiconductor, MBR40250TG
16	1	D5	Diode Schottky barrier rectifier, 3A	Vishay, SS36-E3/57T
17	6	EXT_VREF5V, P7, P12, P13, SDN_IO_1, SDN_RESET	Connector-PCB berg HDR ST, male, 3P	Samtec, TSW-103-08-G-S
18	9	FAN_GND, GND_1, GND_2, GND_3, GND_4, GND_5, GND_8, GND_9, ISO_GND	Connector-PCB test point black	Components Corporation, TP-104-01-00
19	2	FAN_PWM, VEE_HV	Connector-PCB test point blue	Components Corporation, TP104-01-06
20	2	FAN_VCC, VCC_HV	Connector-PCB test point red	Components Corporation, TP-104-01-02
21	1	GND_7	Do not install (DNI). Connector-PCB test point black	Components Corporation, TP-104-01-00
22	4	INN, INP, OUT, SDN_IO	Connector-PCB coax SMA end launch	Cinch Connectivity Solutions, 142-0701-801
23	2	INN_1, INP_1	Do not install (DNI). Connector-PCB SMB PL, 0HZ to 4GHZ, 50Ω, ST	Amphenol, 142134
24	1	OUT_P	Connector-PCB term block 2POS GRN	Phoenix Contact, 1727010
25	1	P1	Connector-PCB header 2POS	Samtec, TSW-102-09-G-S
26	5	P2, P3, P4, P5, P10	Connector-PCB berg HDR ST, male, 5P	Samtec, TSW-105-08-G-S
27	1	P11	Connector-PCB 5POS female HDR/SKT single row ST, 2.54mm pitch, 10mm solder tail	Samtec, SSQ-105-03-G-S
28	1	P6	Connector-PCB vertical type rcpt-for SDP breakout board,	HRS, FX8-120S-SV(21)

Item	Qty.	Reference Designator	Part Description	Manufacturer, Part No.
			for EMC test use Alt_Symbols	
29	1	PWD	Connector-PCB term block 5POS GRN	Phoenix Contact, 1727049
30	1	R1	Resistor, surface-mount device (SMD), 0Ω, 1/8W 0805 AEC-Q200	Panasonic, ERJ-6GEY0R00V
31	5	R7, R8, R9, R10, R17	Resistor, surface-mount device (SMD), 0Ω jumper 1/16W 0402	Yageo, RC0402JR-070RL
32	2	R11, R15	Do not install (DNI) (TBD_R0603). Use SYM_3 and/or SYM_4	TBD0603, TBD0603
33	2	R12, R16	Do not install (DNI). Obsolete - use E007502 ROHS-compliant equivalent, resistor, surface-mount device (SMD), 0Ω, 0603 AEC-Q200	Vishay, CRCW0603000ZRT1
34	4	R13, R14, R21, R85	Resistor, surface-mount device (SMD), 0Ω, jumper 1/10W 0402 AEC-Q200	Panasonic, ERJ-2GE0R00X
35	4	R18, R60, R72, R73	Resistor, surface-mount device (SMD), 10KΩ, 1% 1/10W 0603 AEC-Q200	Panasonic, ERJ-3EKF1002V
36	2	R19, R31	Resistor, surface-mount device (SMD), 0Ω,1W 2512 AEC-Q200	Vishay, CRCW25120000Z0EG
37	1	R2	Resistor, surface-mount device (SMD), 1KΩ, 1% 1/8W 0805 AEC-Q200	Panasonic, ERJ-6ENF1001V
38	2	R20, R22	Resistor, surface-mount device (SMD), 0Ω, jumper 2W 2512 AEC-Q200	Stackpole Electronics, HCJ2512ZT0R00

Item	Qty.	Reference Designator	Part Description	Manufacturer, Part No.
39	1	R23	Resistor, surface-mount device (SMD), 0Ω, 0.008W 0603	Vishay, PZHT0603-0R00GT
40	6	R35, R45, R48, R58, R61, R62	Resistor, surface-mount device (SMD), 49.9KΩ, 1% 1/10W 0603 AEC-Q200	Panasonic, ERJ-3EKF4992V
41	3	R6, R38, R40	Do not install (DNI). Resistor, surface-mount device (SMD), 0Ω, jumper 1/10W 0603 AEC-Q200	Panasonic, ERJ-3GEY0R00V
42	2	R42, R51	Do not install (DNI). Resistor, surface-mount device (SMD), 49.9KΩ, 1% 1/10W 0603 AEC-Q200	Panasonic, ERJ-3EKF4992V
43	1	R5	Resistor, surface-mount device (SMD), 56KΩ, 1% 2W 2512 AEC-Q200	TE Connectivity, CRGP2512F56K
44	2	R54, R57	Resistor, surface-mount device (SMD), 49.9Ω, 1% 1W 2512 AEC-Q200	Vishay, CRCW251249R9FKEG
45	2	R67, R70	Resistor, surface-mount device (SMD),100KΩ, 5% 1/10W 0402 AEC-Q200	Panasonic, ERJ-2GEJ104X
46	2	R68, R69	Do not install (DNI). Resistor, surface-mount device (SMD), 0Ω, jumper 1/16W 0402	Yageo, RC0402JR-070RL
47	1	R76	Resistor, surface-mount device (SMD), 1MΩ, 1% 1/10W 0402 AEC-Q200	Panasonic, ERJ-2RKF1004X
48	1	R86	Resistor, surface-mount device (SMD), 1KΩ, 1% 1/10W 0402 AEC-Q200	Panasonic, ERJ-2RKF1001X
49	1	R_{SLEW}	Resistor, surface-mount device (SMD),	Vishay, CRCW06030000Z0EAHP

Item	Qty.	Reference Designator	Part Description	Manufacturer, Part No.
			0Ω, jumper 1/3W 0603 AEC-Q200	
50	4	S1_SDNIO_HI, S2_SDNIO_LO, S3_SDN_RST, S4_RESET_LO	Do not install (DNI). SW SM mechanical keyswitch	Omron, B3S1000
51	4	SDNIO, SDNRST, TMP, VLOGIC_1	Connector-PCB test point yellow	Components Corporation, TP-104-01-04
52	1	U2	IC dual buffer with 3-state outputs	ON Semiconductor, NL27WZ125USG
53	1	U3	IC 32kbit serial EEPROM	Microchip Technology, 24LC32A/SN
54	1	U4	IC-ADI low power, low noise VREF with sink/source capability	Analog Devices, ADR365BUJZ
55	1	U5	IC-ADI rail-to-rail, fast, low power TTL/CMOS COMP	Analog Devices, ADCMP608BKSZ
56	2	U6, U8	IC-ADI 5.7KV RMS quad digital isolators	Analog Devices, ADUM341E1BRWZ
57	1	U7	Do not install (DNI). IC-ADI 5.0KV RMS triple channel digital isolators	Analog Devices, ADUM230E0BRIZ
58	2	VCC_5V, VREF_EXT	Connector-PCB test point white	Components Corporation, TP-104-01-09

ADHV4710 Evaluation Board Schematics

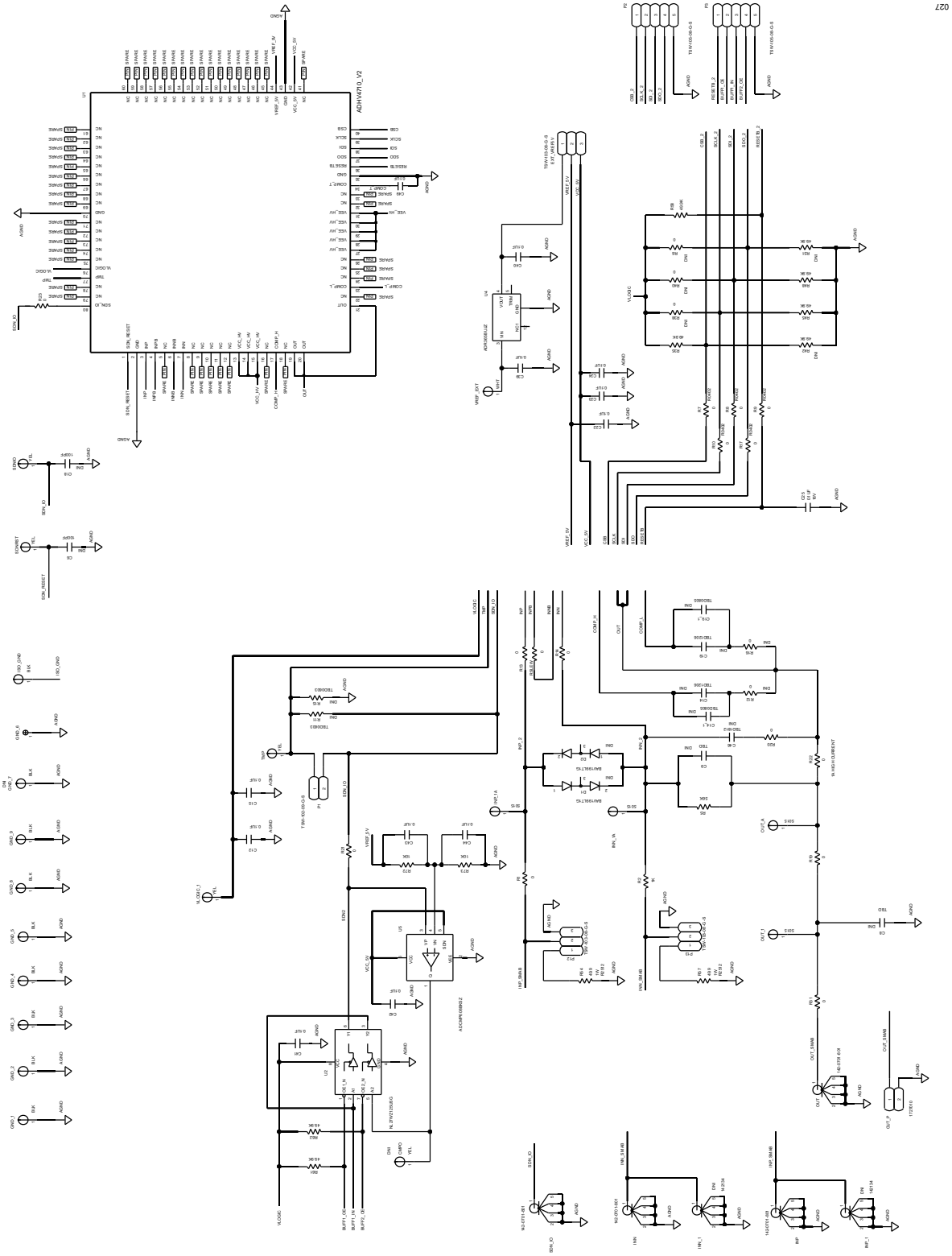

Figure 21. ADHV4710 Evaluation Board Schematic (Page 1)

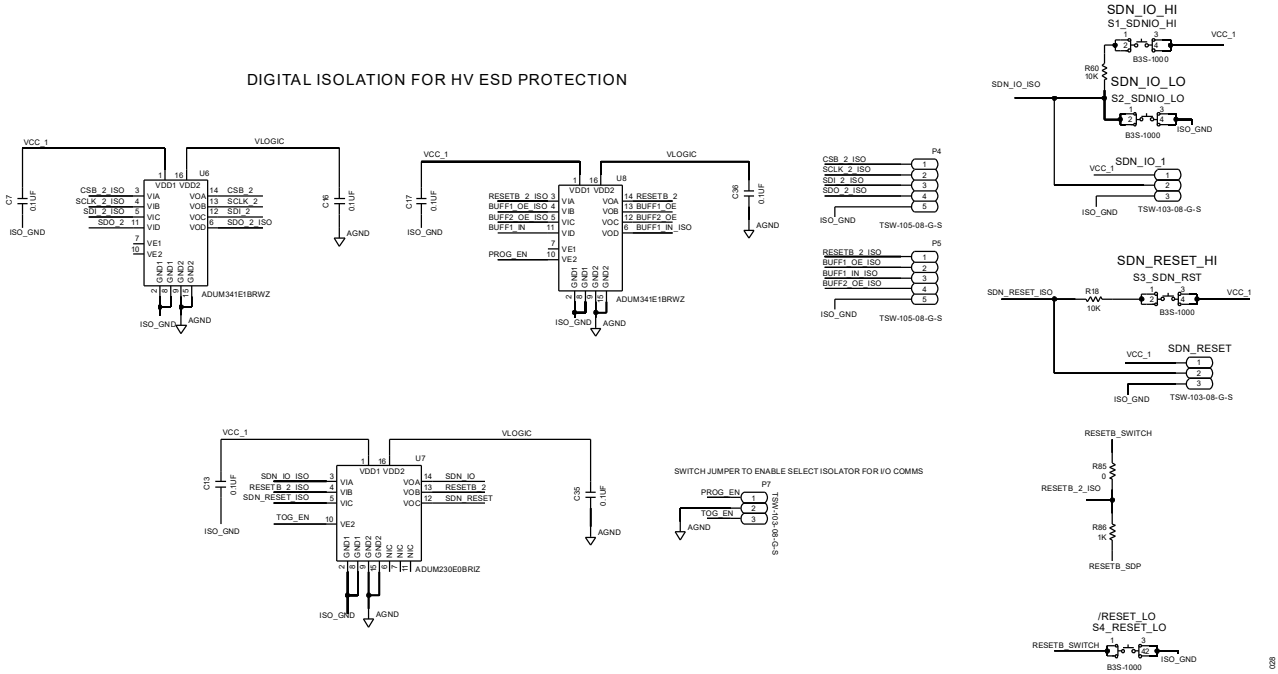

Figure 22. ADHV4710 Evaluation Board Schematic (Page 2)

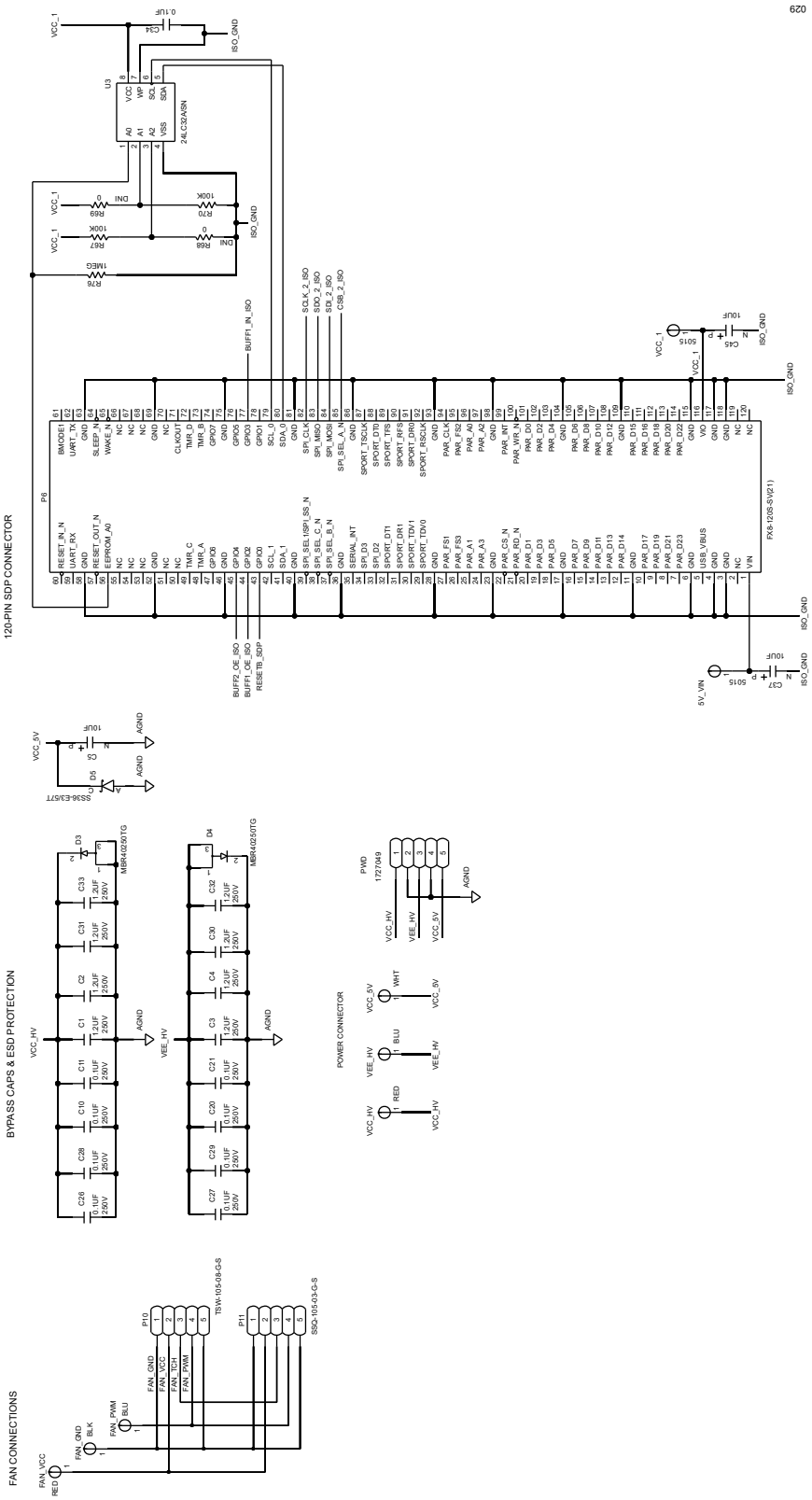

Figure 23. ADHV4710 Evaluation Board Schematic (Page 3)

High Voltage Evaluation Board

Warning: This high voltage evaluation board contains exposed metal carrying lethal voltages when under power. Take all necessary steps to protect users during operation.

Warnings, Restrictions, and Disclaimers

This evaluation board is for evaluation only, in laboratory or development environments, by professionals trained to handle high voltage devices. This evaluation board is not a finished electrical equipment and is not intended for consumer use. It is intended solely for preliminary feasibility evaluation in laboratory or development environments by technically qualified electronics experts familiar with the dangers and application risks associated with handling high voltage electrical components, systems, and subsystems. It is not to be used as all or part of a finished or end product.

Your responsibility and risk. You acknowledge, represent, and agree that:

- You have knowledge of all federal, state, and local regulatory requirements that relate to your products and that relate to your use (and/or that of your employees, affiliates, contractors, or designees) of the evaluation board for evaluation, testing, and other purposes.
- You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors, or designees, using the evaluation board. Further, you are responsible for ensuring that any interfaces (electronic and/or mechanical) between the evaluation board and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazards.
- You must employ reasonable safeguards to ensure that your use of the evaluation board does not result in any property damage, injury, or death, even if the evaluation board fails to perform as described or expected.
- You must properly dispose of or recycle the electronic components of the evaluation board to avoid injury to any other person.

Key Instructions

It is important to operate this evaluation board within Analog Devices recommended specifications and environmental considerations per the user guidelines. Exceeding the specified evaluation board ratings (including but not limited to input and output voltage, current, power, temperature, and environmental ranges) may cause property damage, personal injury, or death. If there are questions concerning these ratings, contact an Analog Devices representative prior to connecting interface electronics or loads. Any loads applied outside of the specified output range may result in unintended and/or inaccurate operation and/or possible permanent damage to the evaluation board and/or interface electronics. Consult the evaluation board user guide prior to connecting any load to the evaluation board output. If there is uncertainty as to the load specification, contact an Analog Devices representative. During normal operation, some circuit components may generate significant heat, which may cause fire, melting, or burns. When placing measurement probes near these devices during normal operation, be aware that these devices may be hot. As with all electronic evaluation tools, only qualified personnel knowledgeable in electronic measurement and diagnostics are to use the evaluation board.

Agreement to Defend, Indemnify and Hold Harmless

You agree to defend, indemnify, and hold Analog Devices, its directors, officers, employees, and their representatives harmless from and against any and all claims, damages, losses, expenses, costs, and liabilities (collectively, "Claims") arising out of or in connection with any use of the evaluation board not in accordance with the terms of the agreement. This obligation applies whether claims arise under law of tort or contract or any other legal theory, and even if the evaluation board fails to perform as described or expected.

Additional Resources

- *ACE Glossary*
- *ACE Getting Started*
- *ACE Quick Start Guide*
- *ACE Known Issue*
- *System Demonstration Platform (SDP) - Homepage*

Revision History

Revision Number	Revision Date	Description	Pages Changed
0	02/25	Initial release	—

Notes