

Integrated Noise KWIK Demo Board

General Description

The EVAL-KW4501Z demonstration board evaluates and differentiates the integrated noise of a two-channel operational amplifier, with both channels having the default gain of $G = -1000$ but different combination of resistor values for each channel.

Refer to [Figure 1](#) for the circuit configuration of each channel; the resistor values are set as follows: (1) $R_F = 1M\Omega$ and $R_G = 1K\Omega$, for Channel A; and (2) $R_F = 10K\Omega$ and $R_G = 10\Omega$, for Channel B.

The EVAL-KW4501Z is a companion board to the Integrated Noise KWIK Lecture and Lab Training Module. It is part of the KWIK Demo Board family, a series of instructional and demonstrative evaluation boards that can be directly plugged into the ADALM2000, ADI's portable, USB-powered, software-defined test and measurement instrument.

The ADA4510-2, the EVAL-KW4501Z's featured IC, is a dual-channel, high-precision, low-offset voltage, low-noise, rail-to-rail input, and output operational amplifier. This part has a wide 6V to 40V supply voltage operation range. It can be powered up by the ADALM2000's on-board $\pm 5V$ voltage supplies.

The EVAL-KW4501Z uses the SOIC-8 version of ADA4510-2 and accommodates other ICs with the same footprint and pin configurations. Full specifications for the ADA4510-2 are available on www.Analog.com.

Features

- Allows for Quick Measurement of Operational Amplifier's Integrated Noise
- Accommodate Other 8-Lead SOIC, Dual-Channel Operational Amplifiers with Similar Pin Configurations as DUT
- Plug-and-Play Feature Facilitates Attachment onto the ADALM2000 to Run Quick Tests and Measurements in Scopy (companion software of ADALM2000)

Evaluation Kit Contents

- EVAL-KW4501Z Evaluation Board

Equipment Needed

- ADALM2000 Active-Learning Module
- USB-A to Micro-USB Cable
- Computer

Documents Needed

- ADA4510-2 Data Sheet
- Integrated Noise KWIK Lecture and Lab Training Module
- ADALM2000 User Guide

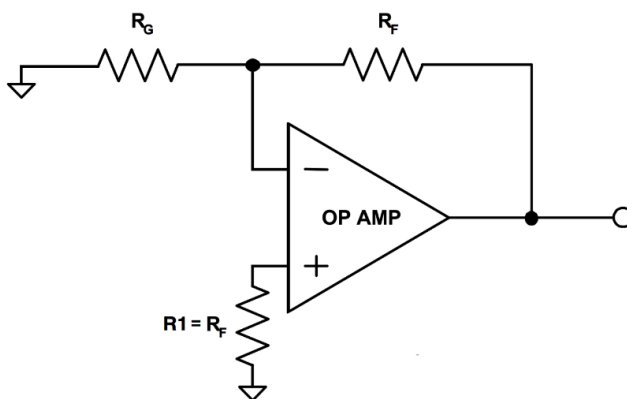


Figure 1. Circuit Configuration of Each Channel

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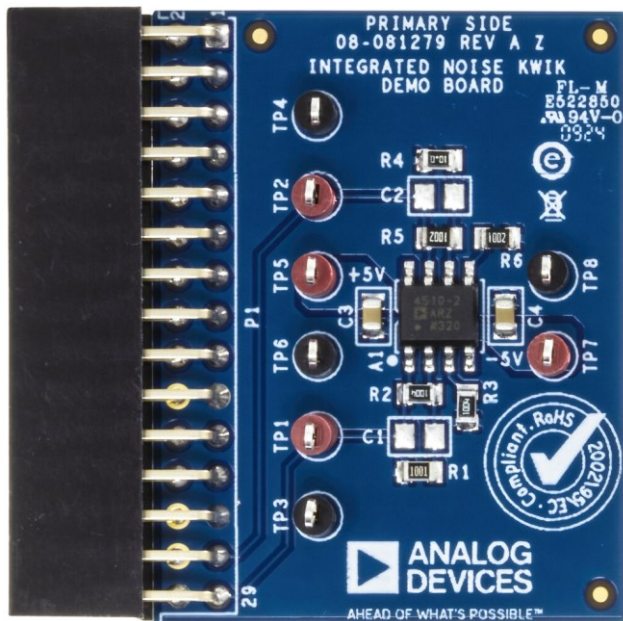


Figure 2. EVAL-KW4501Z Top View

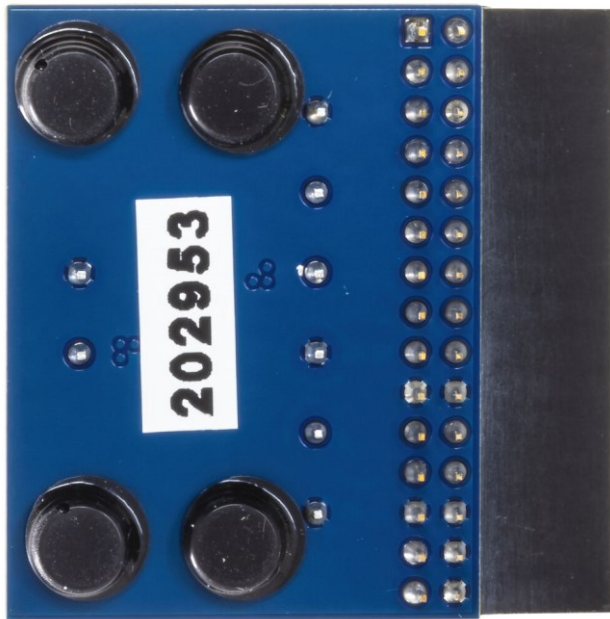


Figure 3. EVAL-KW4501Z Bottom View

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Getting Started

Software Installation

The ADALM2000 driver and Scopy software are necessary to use and control the ADALM2000 device through a computer.

The quick start procedure to get the ADALM2000 running can be found on the [ADALM2000 Quick Start wiki page](#) (click the links on each step for more details and some troubleshooting tips).

For a more detailed walkthrough of the device, refer to the information nested on the [ADALM2000 User Guide for End User](#).

Hardware Integration

- Mate the EVAL-KW4501Z board into the ADALM2000, aligning their pinouts, as shown in [Figure 4](#).



Figure 4. Connecting EVAL-KW4501Z to ADALM2000

- Plug in a micro-USB cable to the connectivity port as shown in [Figure 5](#) and connect the ADALM2000 into the computer.

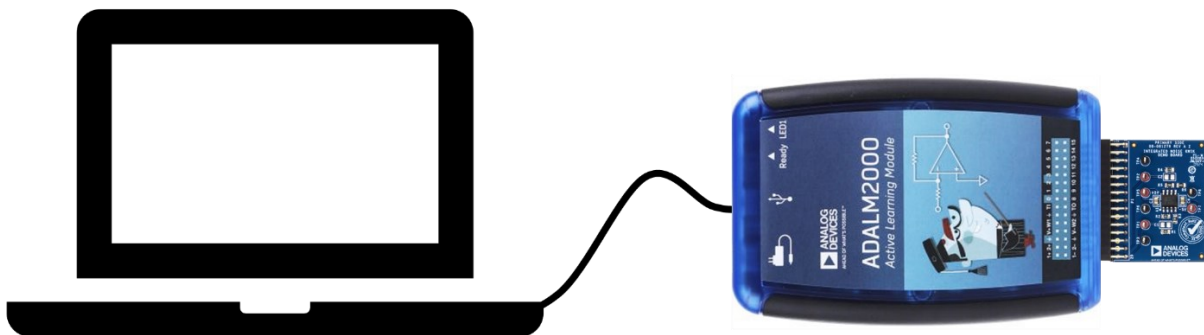


Figure 5. Connecting the ADALM2000 to the computer

- Open Scopy, click the Preferences Icon on the lower left panel, and select 'Reset Scopy'. Refer to the [Figure 6](#).
- On the landing page of Scopy, select the detected ADALM2000 device (also known as M2K), then click connect. The program will run a calibration routine and will notify via text in the status console that the device is ready to operate. See [Figure 7](#).

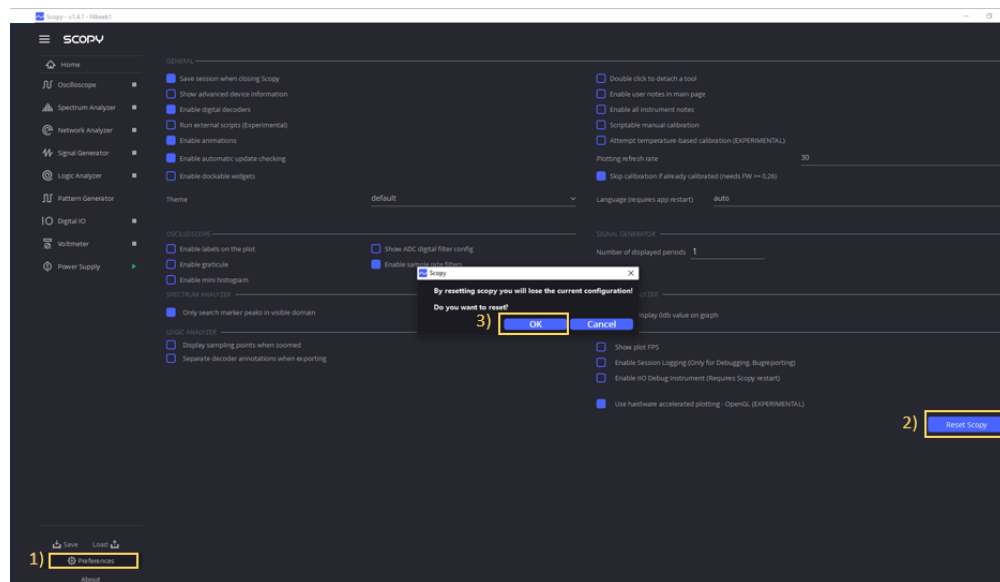


Figure 6. Configuring Scopy

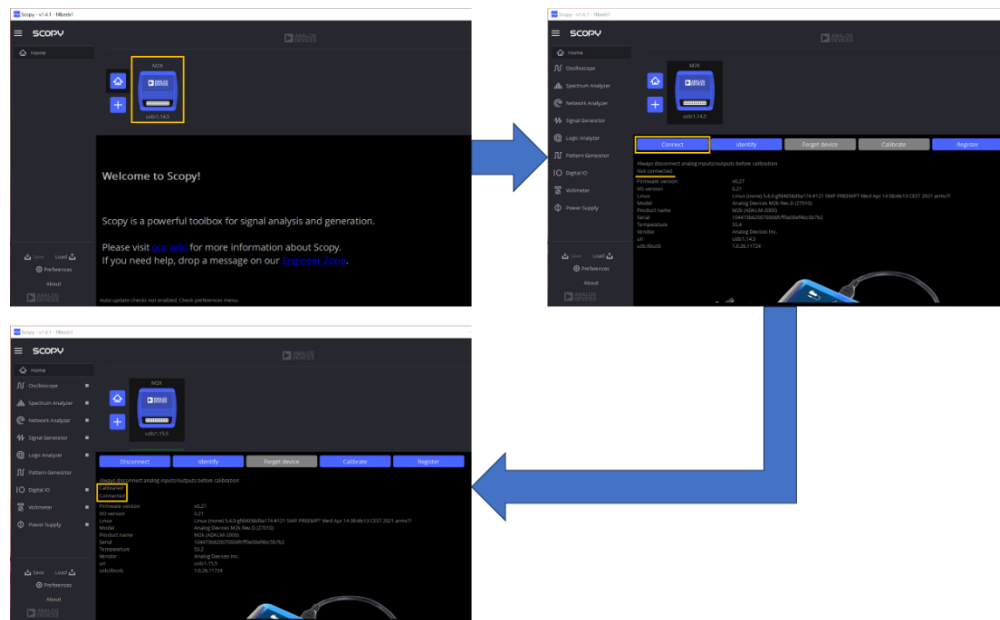


Figure 7. Detecting the ADALM2000 in Scopy

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Quick Evaluation

The ADALM2000 is a portable data acquisition instrument that provides users with varied high-performance instrumentation options; for this demonstration board, the power supply and oscilloscope must be selected and enabled in order to verify that the board is functioning as intended.

- Go to the power supply tab; select tracking and set the positive supply to +5V (the negative supply automatically inversely mirrors this). Click Enable to turn the power supplies on. Reference [Figure 8](#).



Figure 8. Setting the Power Supply

- Go to the oscilloscope tab. [Figure 9](#) below shows the UI and its functions.
- Configure each channel by clicking the settings button beside the channel names. Set the vertical scale of both channel to Volts/div = 50mVolts and position = 0. Set the horizontal scale to time base = 2ms and position = 0 (horizontal scale is uniform for both channel). See [Figure 10](#) for reference.
- Configure the trigger by clicking the settings button beside it. Turn off the trigger. See [Figure 10](#) for reference.

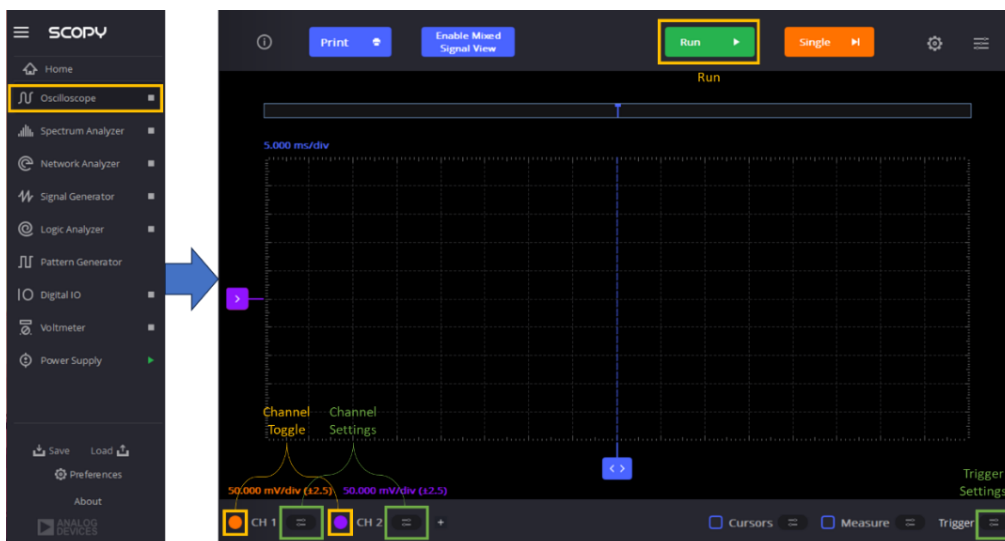


Figure 9. Oscilloscope UI of Scopy

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- Enable the Measure feature within Scopy by clicking the appropriate box. See [Figure 11](#) for reference.
- Click “Single”. The result should be similar to [Figure 12](#) below.

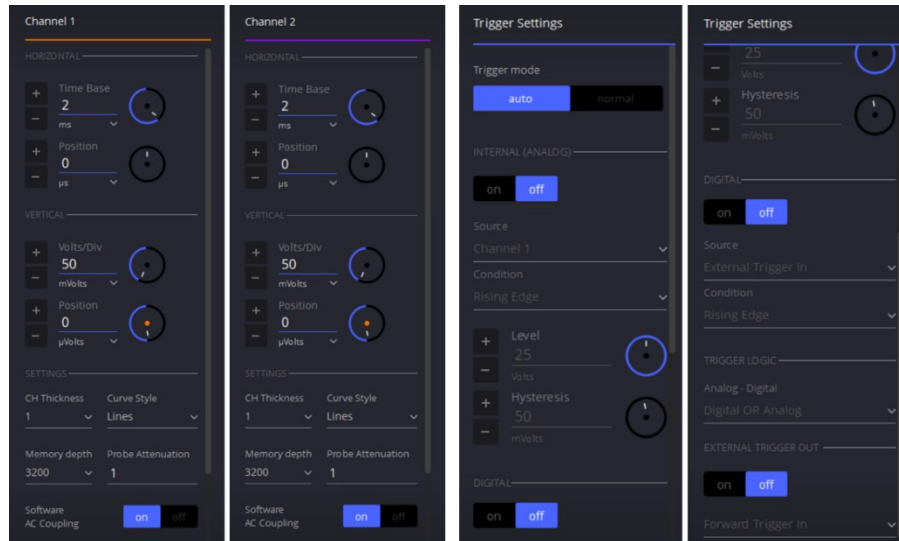


Figure 10. Channel and Trigger Settings

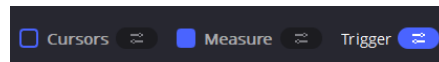


Figure 11. Enabling the Measurement Feature in Scopy

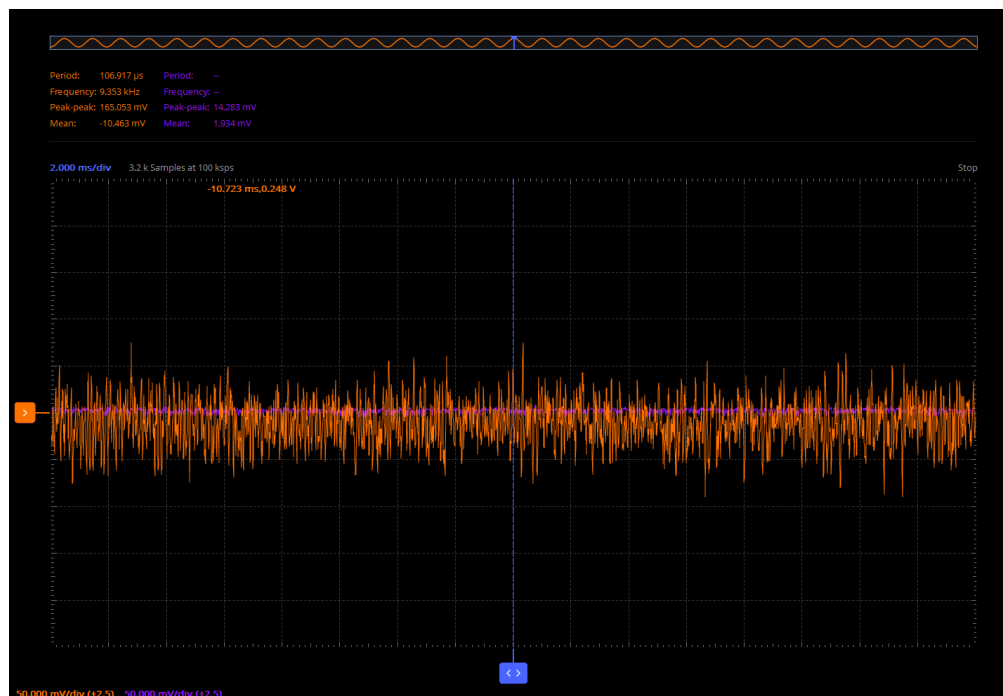
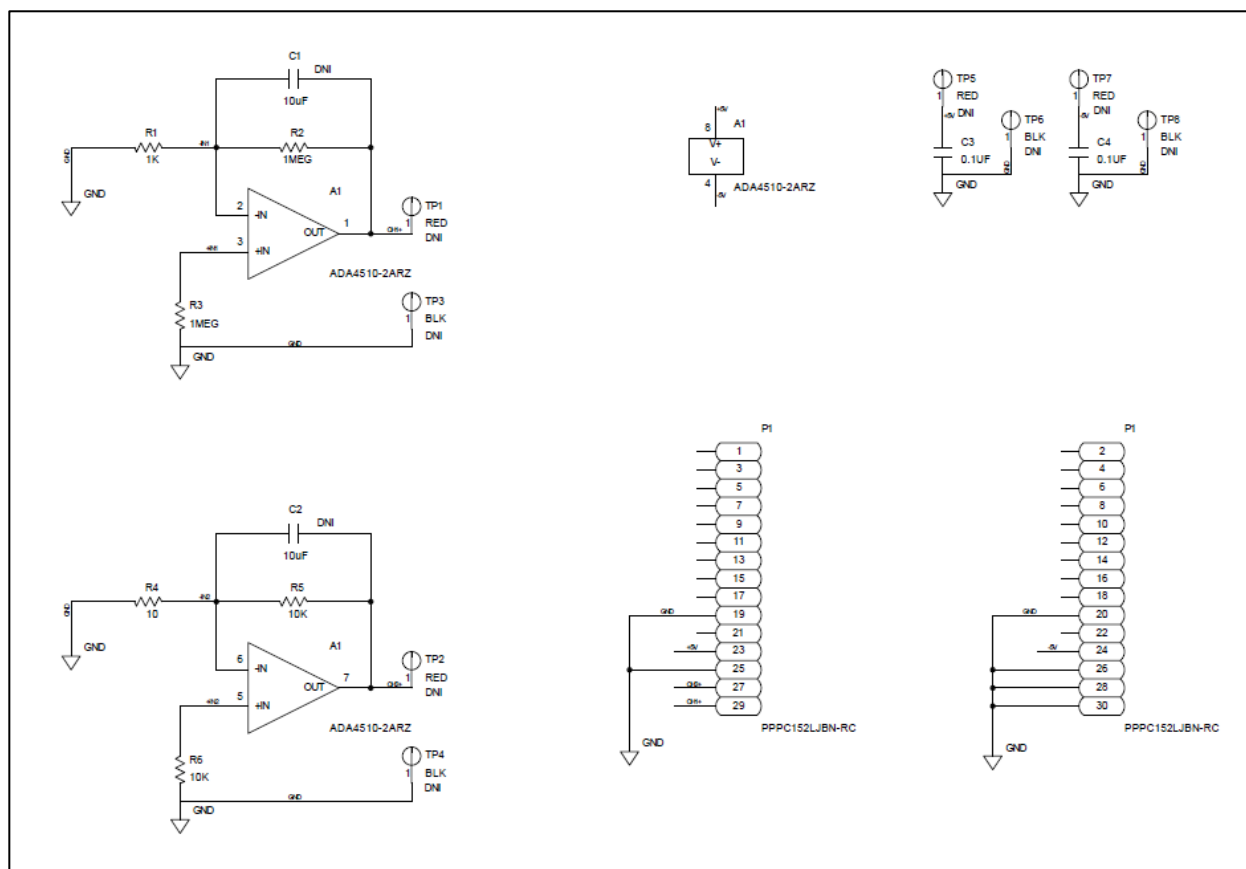


Figure 12. Expected Output

(CH1: 100mVpp < CH1 Peak-peak < 220mVpp | CH2: 5mVpp < CH2 Peak-peak < 20mVpp)

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Evaluation Board Schematic



Ordering Information

Bill of Materials

Quantity	Reference Designator	Description	Package
1	ADA4510-2 (A1)	ADI Precision, Rail-To-Rail Input and Output Op Amp with Digitrim	8-pin SOIC
2	C3, C4	0.1 μ F capacitor	X7R 0805
1	P1	30-Pin Socket Strip	30-pos 2.54mm Right Angle Through Hole Female Socket Strip
1	R1	1K Ohm resistor	0805 AEC-Q200
2	R2, R3	1M Ohm resistor	0805 AEC-Q200
1	R4	10 OHM resistor	0805
2	R5, R6	10K Ohm resistor	0805 AEC-Q200
1	None	EVAL-KW4501Z Printed Circuit Board	

Notes

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