

Integrated Noise KWIK Demo Board

General Description

The EVAL-KW4501Z demonstration board evaluates and differentiates the integrated noise of a 2-channel operational amplifier. Both channels have a default gain of $G = -1000$, and each channel has a different combination of resistor values.

See [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, Analog Devices Inc.'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 8-pin SOIC 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](#)

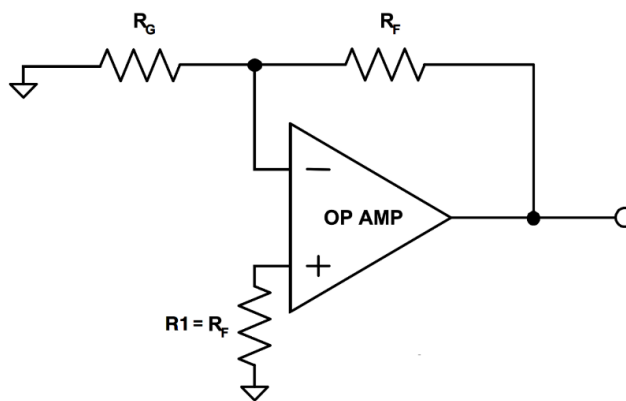


Figure 1. Circuit Configuration of Each Channel

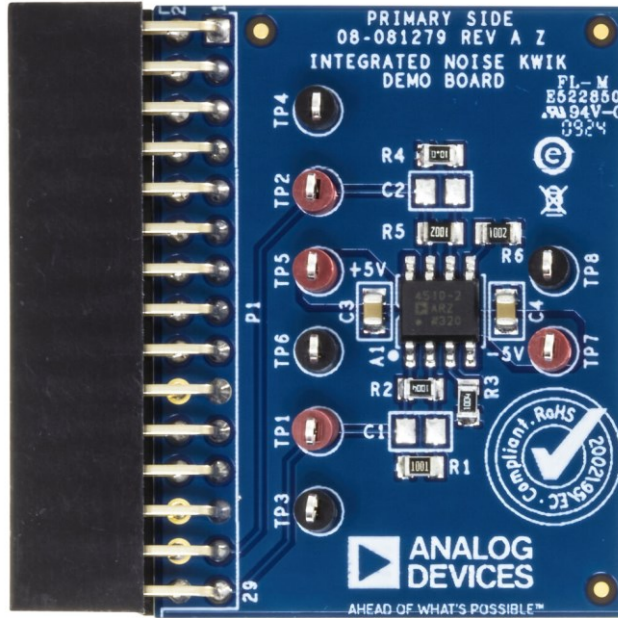


Figure 2. EVAL-KW4501Z Top View

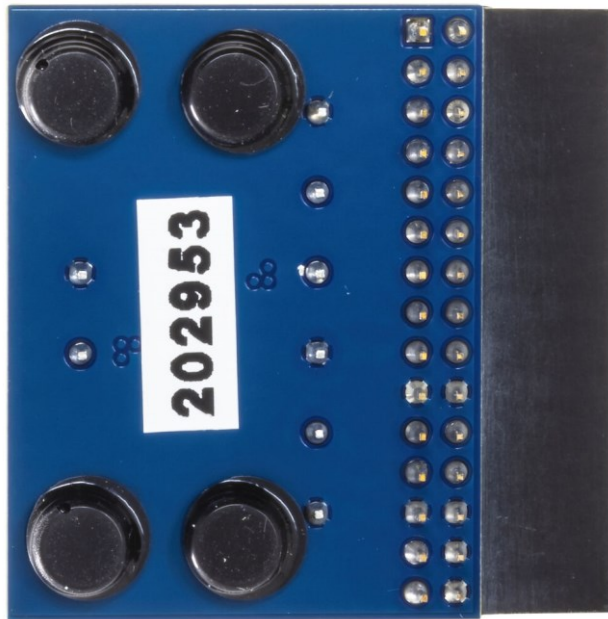


Figure 3. EVAL-KW4501Z Bottom View

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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](#). Follow the links in each step for more details and troubleshooting tips.

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

Hardware Integration

1. Align the pinouts to connect the EVAL-KW4501Z board to the ADALM2000 as shown in [Figure 4](#).



Figure 4. Connecting EVAL-KW4501Z to ADALM2000

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

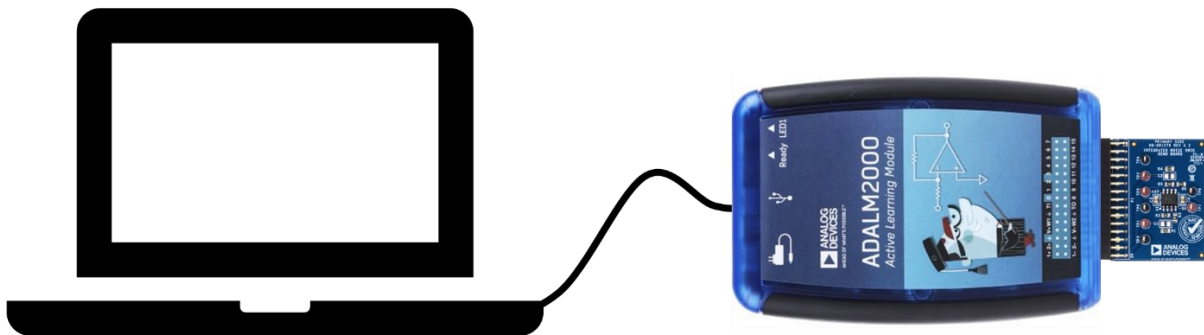


Figure 5. Connecting the ADALM2000 to the Computer

3. Open Scopy. Then click the **Preferences** icon on the lower-left panel, and select **Reset Scopy**. See [Figure 6](#).
4. On the Scopy landing page, select the detected ADALM2000 device (also known as M2K), then click **Connect**. The program runs a calibration routine and notifies via text in the status console that the device is ready to operate. See [Figure 7](#).

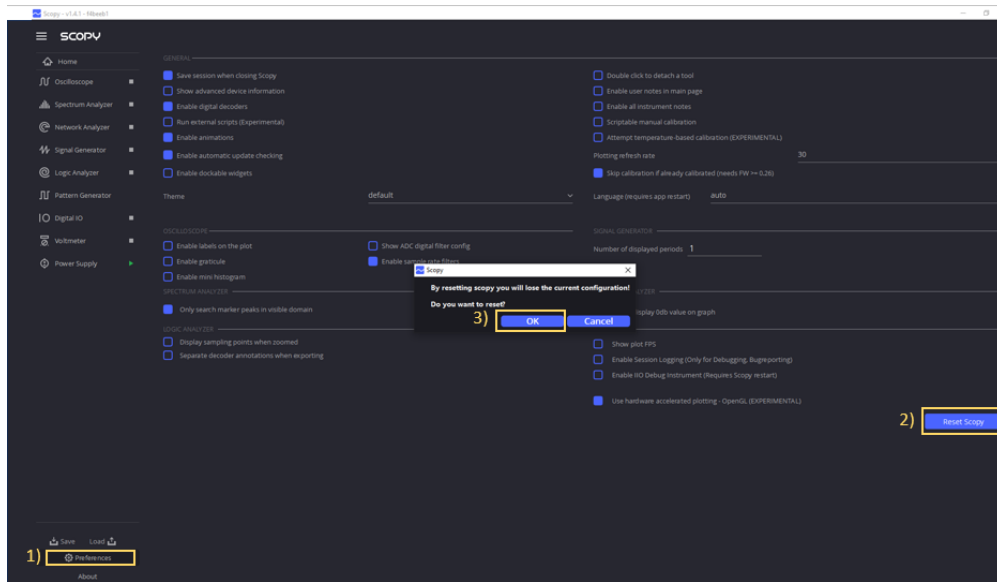


Figure 6. Configuring Scopy

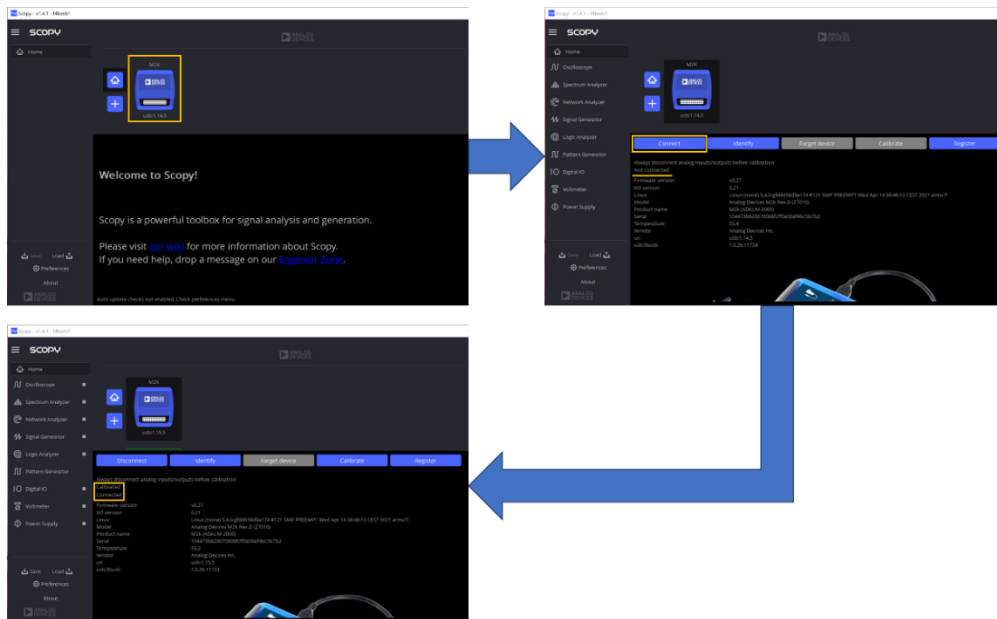


Figure 7. Detecting the ADALM2000 in Scopy

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 to verify that the board is functioning as intended.

1. Go to the **Power Supply** tab. In the **Tracking ratio control** field, select **Tracking** and set the positive supply to +5V (the negative supply automatically inversely mirrors this). Click **Enable** to turn on the power supplies. See [Figure 8](#).



Figure 8. Setting the Power Supply

2. Go to the **Oscilloscope** tab. [Figure 9](#) shows the UI and its functions.
3. Configure each channel by clicking the settings button beside the channel names. Set the vertical scale of both channel to **Volts/Div = 50** and **Position = 0**. In the **Horizontal** pane, set the **Time Base = 2** and **Position = 0** (horizontal scale is uniform for both channel). See [Figure 10](#).
4. Configure the trigger by clicking the **Settings** button beside it. Turn off the trigger. See [Figure 10](#).

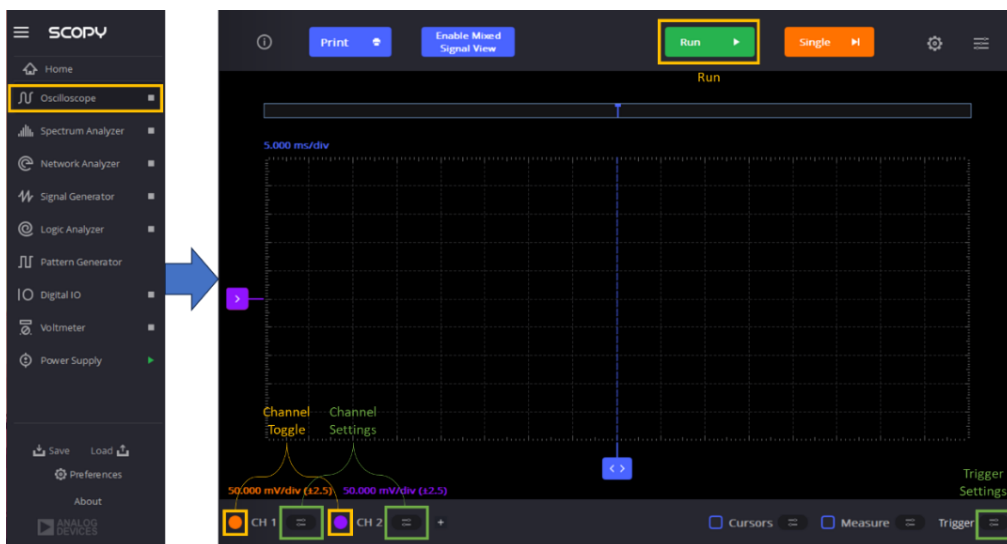


Figure 9. Oscilloscope UI of Scopy

- Enable Scopy's **Measure** feature by clicking the appropriate box. See [Figure 11](#).
- Click **Single**. The result is similar to what is shown in [Figure 12](#).

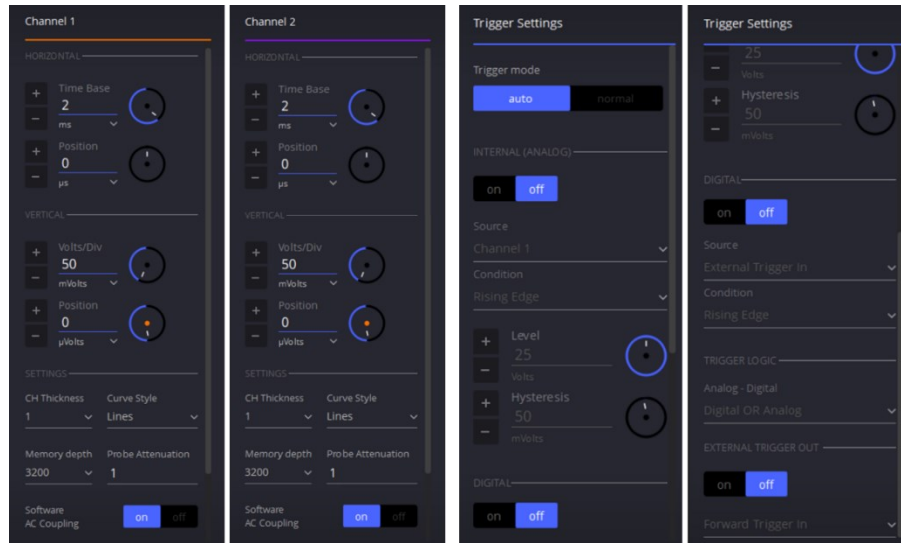


Figure 10. Channel and Trigger Settings

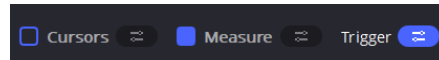


Figure 11. Enabling the Measurement Feature in Scopy

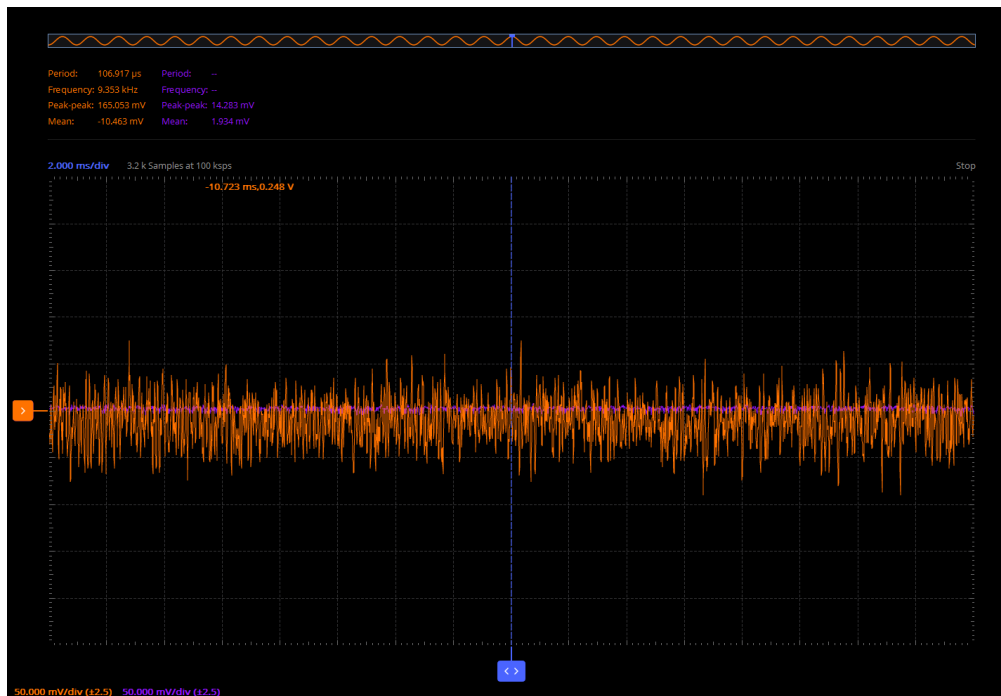
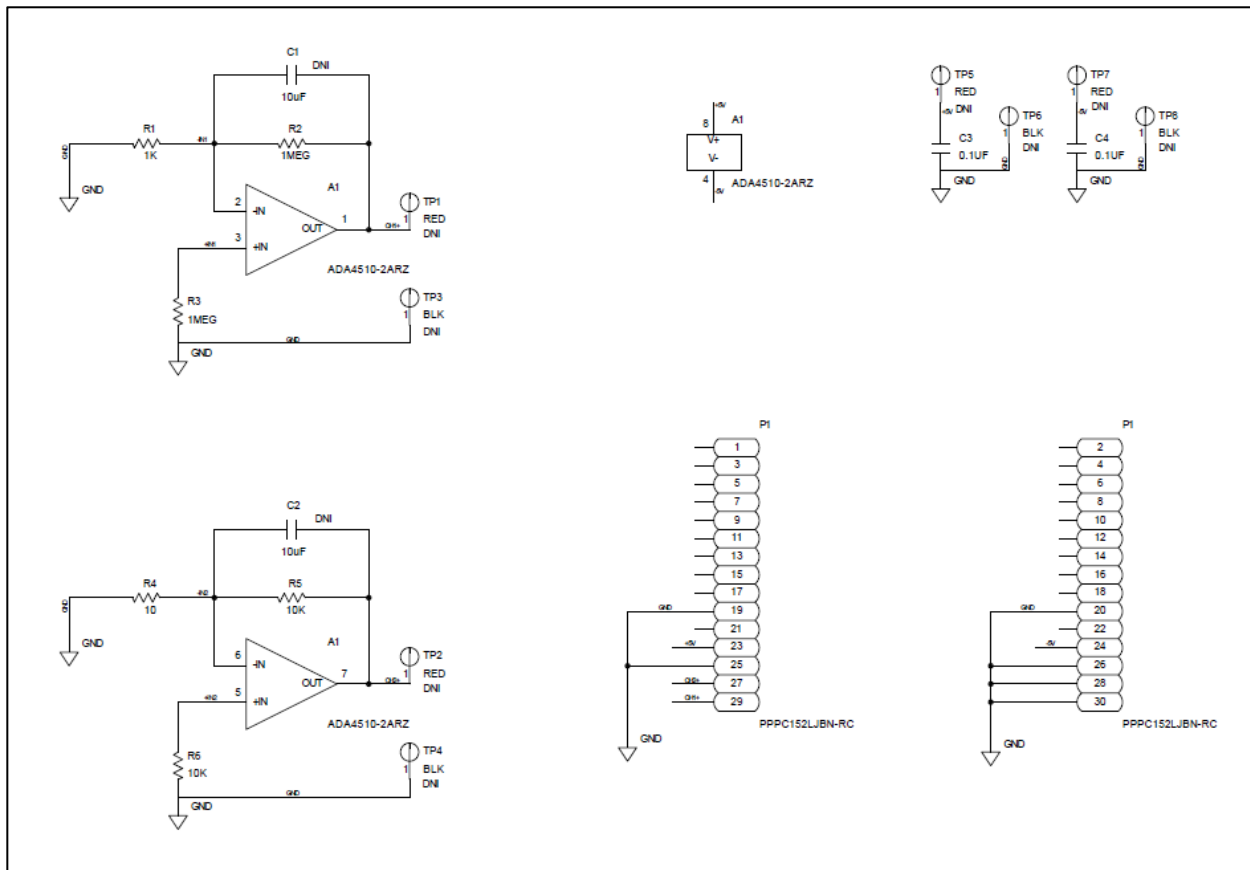


Figure 12. Expected Output

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

Evaluation Board Schematic



Ordering Information

Bill of Materials

QTY	REFERENCE DESIGNATOR	DESCRIPTION	PACKAGE
1	ADA4510-2 (A1)	ADI precision, rail-to-rail input and output op amplifier with Digitrim	8-pin SOIC
2	C3, C4	0.1µF capacitor	X7R 0805
1	P1	30-pin socket strip	30-pos 2.54mm right-angle through hole female socket strip
1	R1	1kΩ resistor	0805 AEC-Q200
2	R2, R3	1MΩ resistor	0805 AEC-Q200
1	R4	10Ω resistor	0805
2	R5, R6	10kΩ resistor	0805 AEC-Q200
1	None	EVAL-KW4501Z Printed circuit board	

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	12/24	Initial release	—

Notes

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