

## Evaluating the AD8369, 600MHz, 45dB Digitally Controlled Variable Gain Amplifier

### FEATURES

- ▶ Full featured evaluation board for the AD8369-ACE-EVALZ
- ▶ Single supply operation
- ▶ Easy to use interface with [Analysis | Control | Evaluation \(ACE\) Software](#)

### EQUIPMENT NEEDED

- ▶ 5V DC power supply
- ▶ [EVAL-SDP-CS1Z \(SDP-S\)](#)
- ▶ Signal generator
- ▶ Spectrum analyzer
- ▶ Microsoft Windows PC with a USB port

### DOCUMENTS NEEDED

- ▶ [AD8369](#) data sheet

### SOFTWARE NEEDED

- ▶ ACE software
- ▶ ACE AD8369 plug-in software

### GENERAL DESCRIPTION

The AD8369-ACE-EVALZ evaluation board allows the manual control of the AD8369 through the USB port on a Microsoft® Windows® PC via a SDP-S interface board.

Additional information on the AD8369 is provided in the AD8369 data sheet. Consult the data sheet in conjunction with this user guide when using the AD8369-ACE-EVALZ evaluation board.

### EVALUATION BOARD PHOTOGRAPH

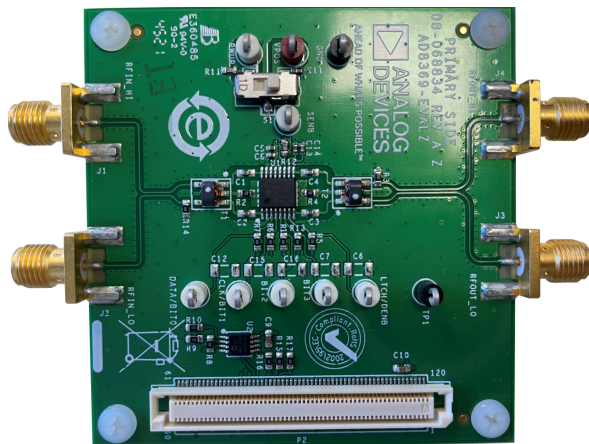


Figure 1. Evaluation Board Photograph

TABLE OF CONTENTS

Features.....	1	Evaluation Board Software Quick Start	
Equipment Needed.....	1	Procedures.....	5
Documents Needed.....	1	Installing the ACE Software and AD8369	
Software Needed.....	1	Plug-Ins.....	5
Evaluation Board Photograph.....	1	Single-Tone Demonstration with the ACE	
General Description.....	1	Software.....	5
Evaluation Board Connection Diagram.....	3	Evaluation Board Schematic.....	7
Evaluation Board Hardware.....	4	Ordering Information.....	8
Hardware Setup.....	4	Evaluation Boards.....	8

REVISION HISTORY

7/2025—Revision 0: Initial Version

EVALUATION BOARD CONNECTION DIAGRAM

See Figure 2 for the typical measurement setup.

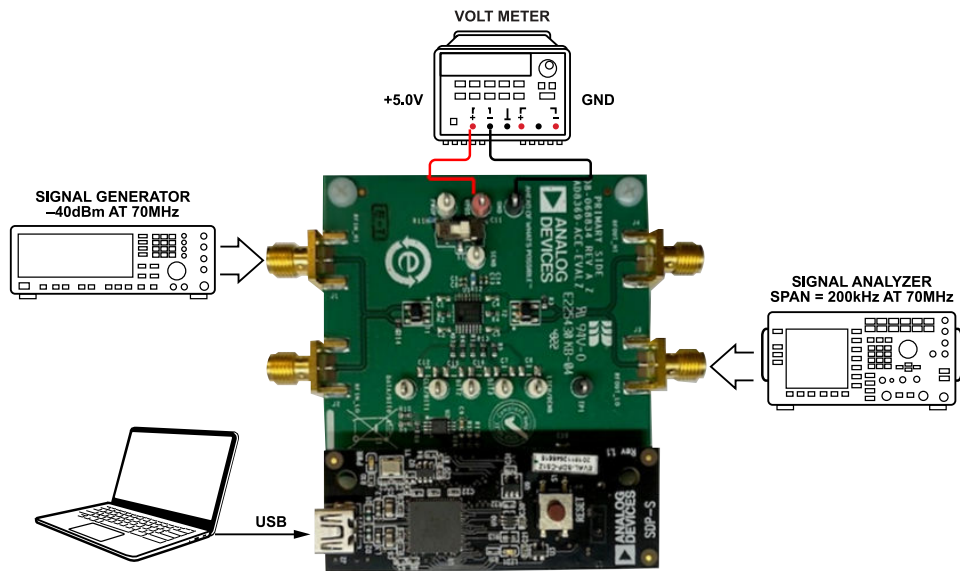


Figure 2. AD8369-ACE-EVALZ Typical Measurement Setup

EVALUATION BOARD HARDWARE

HARDWARE SETUP

The hardware is connected as shown in [Figure 3](#). To power up the AD8369-ACE-EVALZ, use 5V at 50mA DC power supplies. Connect the [SDP-S](#) to the PC through a USB cable.

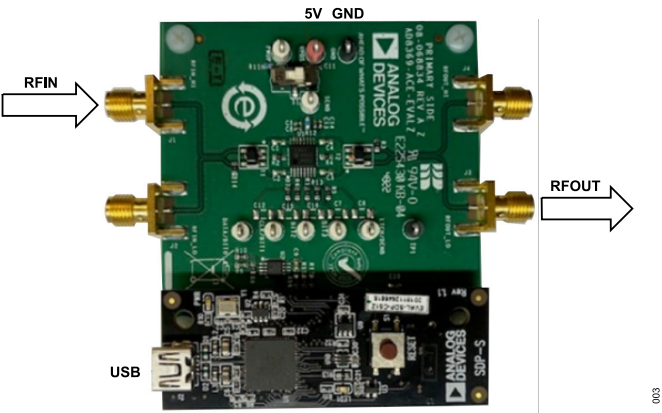


Figure 3. AD8369-ACE-EVALZ and SDP-S Connections

See [Table 1](#) to connect the equipment needed to evaluate the AD8369-ACE-EVALZ.

Table 1. AD8369-ACE-EVALZ Equipment Connections

Equipment	Connection
Power Supply	VPOS (5.0V) GND (GND)
Signal Source	J1
Signal Generator	Set the source to 70MHz with a -40dBm output signal level (see <a href="#">Figure 2</a> )
SDP-S	P2
Signal Analyzer	J3
Spectrum Analyzer	Connect to port (see <a href="#">Figure 2</a> )

Table 2. SDP-S Connections

Equipment	Connection
PC USB Cable	J2

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

INSTALLING THE ACE SOFTWARE AND AD8369 PLUG-INS

The AD8369-ACE-EVALZ evaluation board connects to the [SDP-S](#) for quick evaluation of the AD8369. The AD8369-ACE-EVALZ evaluation board is configured over the USB from a panel within the [ACE Software](#), which can be downloaded from the [Analysis | Control | Evaluation \(ACE\) Software](#) website at [www.analog.com/ace](#). When the [ACE Software](#) installation is complete, the user must install the AD8369 evaluation board ACE plug-ins that are provided with the evaluation package to the hard drive of the PC.

The plug-in for the AD8369 product family can be downloaded and installed in two different ways once the [ACE Software](#) is already installed:

- 1. Launch the [ACE Software](#) application by going to **Tools** → **Manage Plugins**, under **Available Package** search for the AD8369 and install the selected plug-in.
- 2. Create an account on the Analog Devices [myAnalog](#) website and submit a request for the **AD8369.acezip** file.

Once the **AD8369.acezip** file is downloaded on your PC, double-click on the file, and it installs the plug-in and launches the [ACE Software](#) automatically. Note that, if using [Internet Explorer](#), it is possible that the **.acezip** file extension automatically changes to **.zip** during the download. If this happens, simply rename the extension back to **.acezip** and double-click the file to install it.

SINGLE-TONE DEMONSTRATION WITH THE ACE SOFTWARE

Use the following settings to configure the AD8369 to amplify a 70MHz sine wave using the [ACE Software](#):

- 1. Configure the hardware according to the [Hardware Setup](#) section and what is shown in [Figure 2](#).
- 2. Set the frequency of the signal generator to 70MHz and the output level to -40dBm.
- 3. Connect the spectrum analyzer to RF\_OUT connector.
- 4. Launch the [ACE Software](#) application. This action displays the initial [ACE Software Start](#) page as shown in [Figure 4](#). The **AD8369 Board** is detected automatically and displays within the **Attached Hardware** section. The current at 5.0V consumes around 35mA.
- 5. Click the **AD8369 Board** icon in [Figure 4](#) to open the **AD8369 Board** level view.
- 6. Click the **AD8369** icon in [Figure 5](#) to open the **Chip** level view.
- 7. Set **GainCode15**, which is the maximum gain, and click **Apply Change** in [Figure 6](#).
- 8. Measure the signal levels with a signal analyzer. However, this value is affected by cabling and balun losses on the signal path. Assume that -6.6dBm is measured with the signal analyzer and that the device gain is roughly calculated as 35.3dB. With a measured -6.6dBm on the signal analyzer, the input signal is -40dBm on the signal generator, the board losses are 1.76dB (which is from two pieces of the on-board balun), cable losses are 0.1dB, and series resistor ( $R_S$ ) = load resistor ( $R_L$ ) = 200Ω.

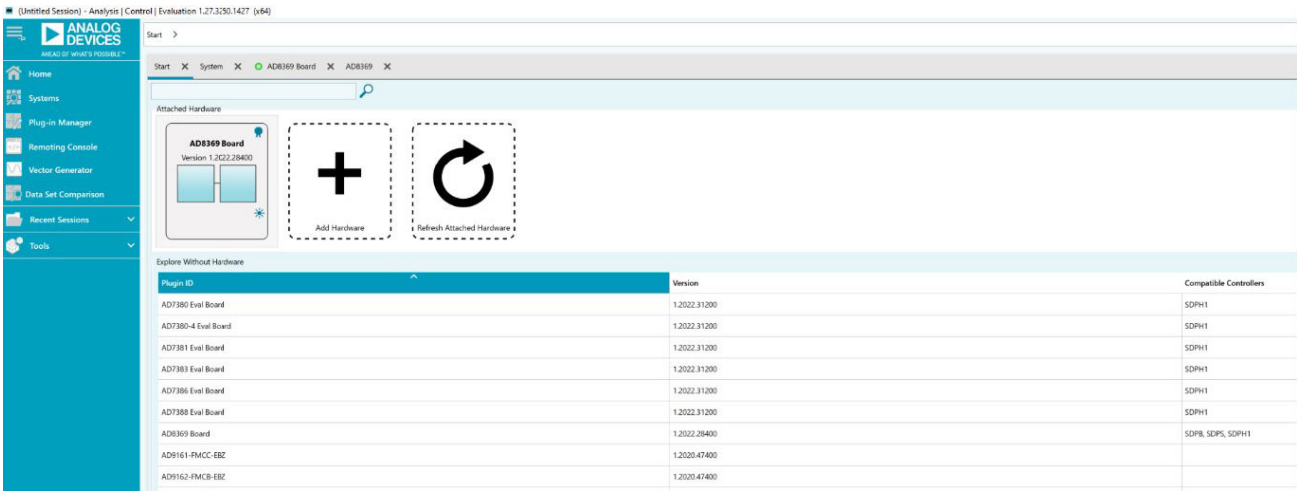
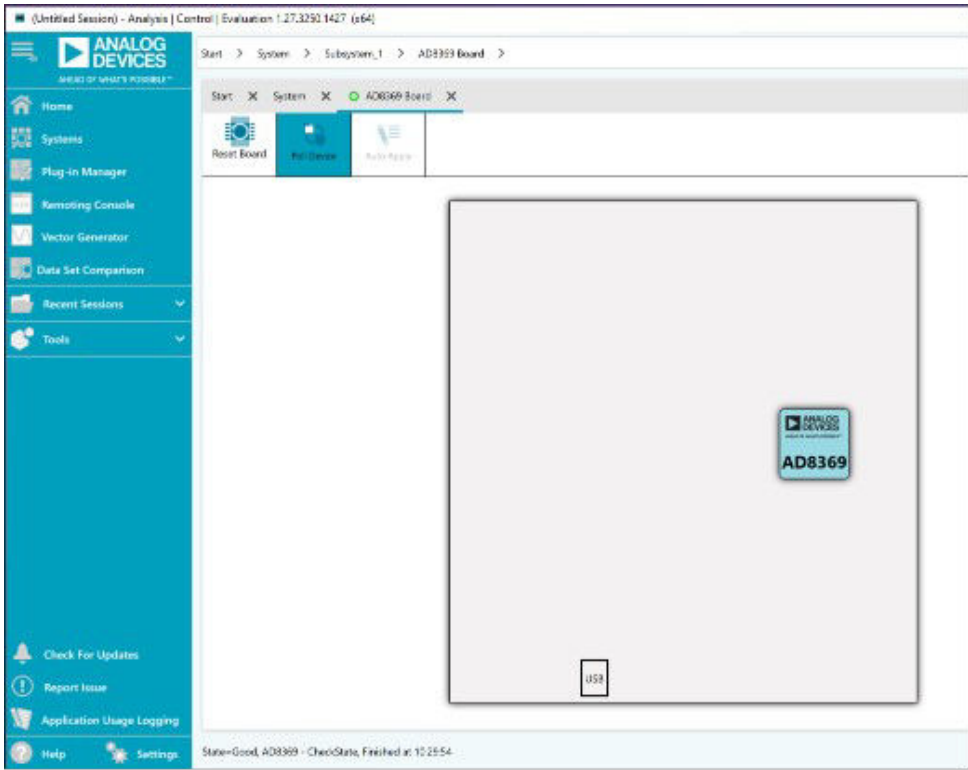


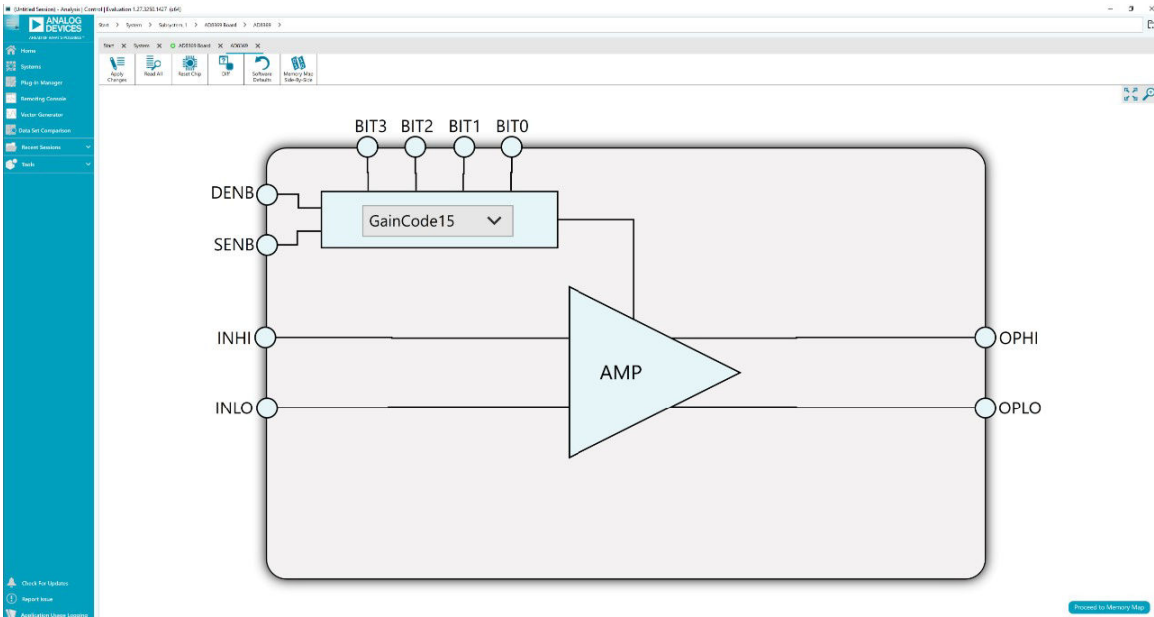
Figure 4. Initial ACE Start Page

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES



005

Figure 5. AD8369 Board Level View



006

Figure 6. AD8369 Chip Level View

The schematic diagram illustrates the electrical connections between the FXB-1208-SV(21) and the AD8369ARUZ IC. The FXB-1208-SV(21) provides various control signals (RESET\_IN\_N, UART\_RX, RESET\_OUT\_N, EEPROM\_A0, NC, GND, CLKOUT, TMR\_C, TMR\_A, GPXOS, SCL\_1, SDA\_1, SPI\_SEL\_1/SPI\_SS\_N, SPI\_MISO, SPI\_SEL\_C\_N, SPI\_SEL\_B\_N, SERIAL\_INT, SPI\_D3, SPORT\_DT1, SPORT\_TFS, SPORT\_DR1, SPORT\_TDVI, SPORT\_TDVO, PAR\_FS1, PAR\_FS3, PAR\_A1, PAR\_A3, GND, PAR\_CS\_N, PAR\_RD\_N, PAR\_D1, PAR\_D3, PAR\_D5, PAR\_D7, PAR\_D9, PAR\_D11, PAR\_D13, PAR\_D14, GND, PAR\_D17, PAR\_D19, PAR\_D21, PAR\_D23, GND, USB\_VBUS, GND, VN) to the AD8369ARUZ. The AD8369ARUZ is configured with VPOS (RED), GND (BLK), and TP1 (BLK). It also features a 200-OHM DIFFERENTIAL output stage with components like C1, R2, C2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124, R125, R126, R127, R128, R129, R130, R131, R132, R133, R134, R135, R136, R137, R138, R139, R140, R141, R142, R143, R144, R145, R146, R147, R148, R149, R150, R151, R152, R153, R154, R155, R156, R157, R158, R159, R160, R161, R162, R163, R164, R165, R166, R167, R168, R169, R170, R171, R172, R173, R174, R175, R176, R177, R178, R179, R180, R181, R182, R183, R184, R185, R186, R187, R188, R189, R190, R191, R192, R193, R194, R195, R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R212, R213, R214, R215, R216, R217, R218, R219, R220, R221, R222, R223, R224, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234, R235, R236, R237, R238, R239, R240, R241, R242, R243, R244, R245, R246, R247, R248, R249, R250, R251, R252, R253, R254, R255, R256, R257, R258, R259, R260, R261, R262, R263, R264, R265, R266, R267, R268, R269, R270, R271, R272, R273, R274, R275, R276, R277, R278, R279, R280, R281, R282, R283, R284, R285, R286, R287, R288, R289, R290, R291, R292, R293, R294, R295, R296, R297, R298, R299, R300, R301, R302, R303, R304, R305, R306, R307, R308, R309, R310, R311, R312, R313, R314, R315, R316, R317, R318, R319, R320, R321, R322, R323, R324, R325, R326, R327, R328, R329, R330, R331, R332, R333, R334, R335, R336, R337, R338, R339, R340, R341, R342, R343, R344, R345, R346, R347, R348, R349, R350, R351, R352, R353, R354, R355, R356, R357, R358, R359, R360, R361, R362, R363, R364, R365, R366, R367, R368, R369, R370, R371, R372, R373, R374, R375, R376, R377, R378, R379, R380, R381, R382, R383, R384, R385, R386, R387, R388, R389, R390, R391, R392, R393, R394, R395, R396, R397, R398, R399, R400, R401, R402, R403, R404, R405, R406, R407, R408, R409, R410, R411, R412, R413, R414, R415, R416, R417, R418, R419, R420, R421, R422, R423, R424, R425, R426, R427, R428, R429, R430, R431, R432, R433, R434, R435, R436, R437, R438, R439, R440, R441, R442, R443, R444, R445, R446, R447, R448, R449, R450, R451, R452, R453, R454, R455, R456, R457, R458, R459, R460, R461, R462, R463, R464, R465, R466, R467, R468, R469, R470, R471, R472, R473, R474, R475, R476, R477, R478, R479, R480, R481, R482, R483, R484, R485, R486, R487, R488, R489, R490, R491, R492, R493, R494, R495, R496, R497, R498, R499, R500, R501, R502, R503, R504, R505, R506, R507, R508, R509, R510, R511, R512, R513, R514, R515, R516, R517, R518, R519, R520, R521, R522, R523, R524, R525, R526, R527, R528, R529, R530, R531, R532, R533, R534, R535, R536, R537, R538, R539, R540, R541, R542, R543, R544, R545, R546, R547, R548, R549, R550, R551, R552, R553, R554, R555, R556, R557, R558, R559, R560, R561, R562, R563, R564, R565, R566, R567, R568, R569, R570, R571, R572, R573, R574, R575, R576, R577, R578, R579, R580, R581, R582, R583, R584, R585, R586, R587, R588, R589, R590, R591, R592, R593, R594, R595, R596, R597, R598, R599, R600, R601, R602, R603, R604, R605, R606, R607, R608, R609, R610, R611, R612, R613, R614, R615, R616, R617, R618, R619, R620, R621, R622, R623, R624, R625, R626, R627, R628, R629, R630, R631, R632, R633, R634, R635, R636, R637, R638, R639, R640, R641, R642, R643, R644, R645, R646, R647, R648, R649, R650, R651, R652, R653, R654, R655, R656, R657, R658, R659, R660, R661, R662, R663, R664, R665, R666, R667, R668, R669, R670, R671, R672, R673, R674, R675, R676, R677, R678, R679, R680, R681, R682, R683, R684, R685, R686, R687, R688, R689, R690, R691, R692, R693, R694, R695, R696, R697, R698, R699, R700, R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725, R726, R727, R728, R729, R730, R731, R732, R733, R734, R735, R736, R737, R738, R739, R740, R741, R742, R743, R744, R745, R746, R747, R748, R749, R750, R751, R752, R753, R754, R755, R756, R757, R758, R759, R760, R761, R762, R763, R764, R765, R766, R767, R768, R769, R770, R7

**Figure 7. AD8369-ACE-EVALZ Schematic**


ORDERING INFORMATION

EVALUATION BOARDS

Table 3. Evaluation Boards

Model <sup>1</sup>	Description
AD8369-ACE-EVALZ	Evaluation Board

<sup>1</sup> 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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