![Chipsmall logo]

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

One Technology Way • P.O. Box 9106 • Norwood, MA 02062-9106, U.S.A. • Tel: 781.329.4700 • Fax: 781.461.3113 • www.analog.com

Evaluating the AD5535B, 32-Channel, 14-Bit, High Voltage Output DAC

FEATURES

Full featured evaluation board for the AD5535B
On-board reference
PC control in conjunction with the EVAL-SDP-CS1Z
    system demonstration platform
PC software for voltage output control

EVALUATION KIT CONTENTS

EVAL-AD5535BSDZ evaluation board
Evaluation software CD for the AD5535B

ADDITIONAL EQUIPMENT NEEDED

EVAL-SDP-CS1Z system demonstration platform,
    includes a USB cable
Power supply with 5 V output
DC voltage calibrator or 60 V power supply
PC running Windows XP SP2, Windows Vista, or
    Windows 7 with USB 2.0 port

ONLINE RESOURCES

Documents
    AD5535B data sheet
    EVAL-AD5535BSDZ user guide
Required Software
    EVAL-AD5535BSDZ evaluation software

GENERAL DESCRIPTION

The EVAL-AD5535BSDZ is a full featured evaluation board that can be used to easily evaluate all the features of the AD5535B. The AD5535B is a 32-channel, 14-bit, high voltage output *dense*DAC® with an on-chip high voltage output amplifier.

The AD5535B output voltage range is programmable via the REF_IN pin. The output range is 0 V to 50 V when REF_IN = 1 V, and 0 V to 200 V when REF_IN = 4 V. Each amplifier can source 550 µA. REF_IN is buffered internally on the AD5535B and must be driven from a stable reference source.

The selected digital-to-analog converter (DAC) register is written to via the 3-wire interface. The serial interface operates at clock rates of up to 30 MHz and is compatible with DSP and microcontroller interface standards.

The EVAL-SDP-CS1Z board allows the EVAL-AD5535BSDZ evaluation board to be controlled via the USB port of a PC using the AD5535B evaluation board software.

The EVAL-AD5535BSDZ requires 60 V and 5 V external power supplies. The EVAL-AD5535BSDZ evaluation board provides power to the EVAL-SDP-CS1Z controller board. On-board components include the REF198, 4.096 V, precision micropower, low dropout, low voltage reference.
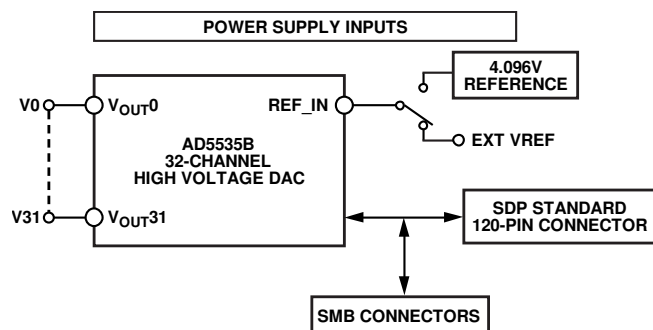
FUNCTIONAL BLOCK DIAGRAM

Figure 1.

TABLE OF CONTENTS

REVISION HISTORY

9/14—Revision 0: Initial Version

GETTING STARTED
QUICK START STEPS

To begin using the evaluation board, take the following steps:

1. With the EVAL-SDP-CS1Z board disconnected from the USB port of the PC, install the AD5535B evaluation board software from the CD included in the evaluation board kit. The PC must be restarted after the software installation is complete. (For complete software installation instructions, see the Software Installation Procedures section.)

2. Connect the EVAL-SDP-CS1Z board to the EVAL-AD5535BSDZ evaluation board as shown in Figure 2. Screw the two boards together using the nylon screw/nut set included in the evaluation board kit to ensure that the boards are connected firmly together.

3. Connect the 60 V power supply to V_{PP} and connect the 5 V supply to AV_{CC}, DV_{CC}, and V_+ (5 V).

4. Connect the EVAL-SDP-CS1Z board to the PC using the supplied USB cable. If you are using Windows® XP, you may need to search for the EVAL-SDP-CS1Z drivers. Choose to automatically search for the drivers for the EVAL-SDP-CS1Z board if prompted by the operating system.

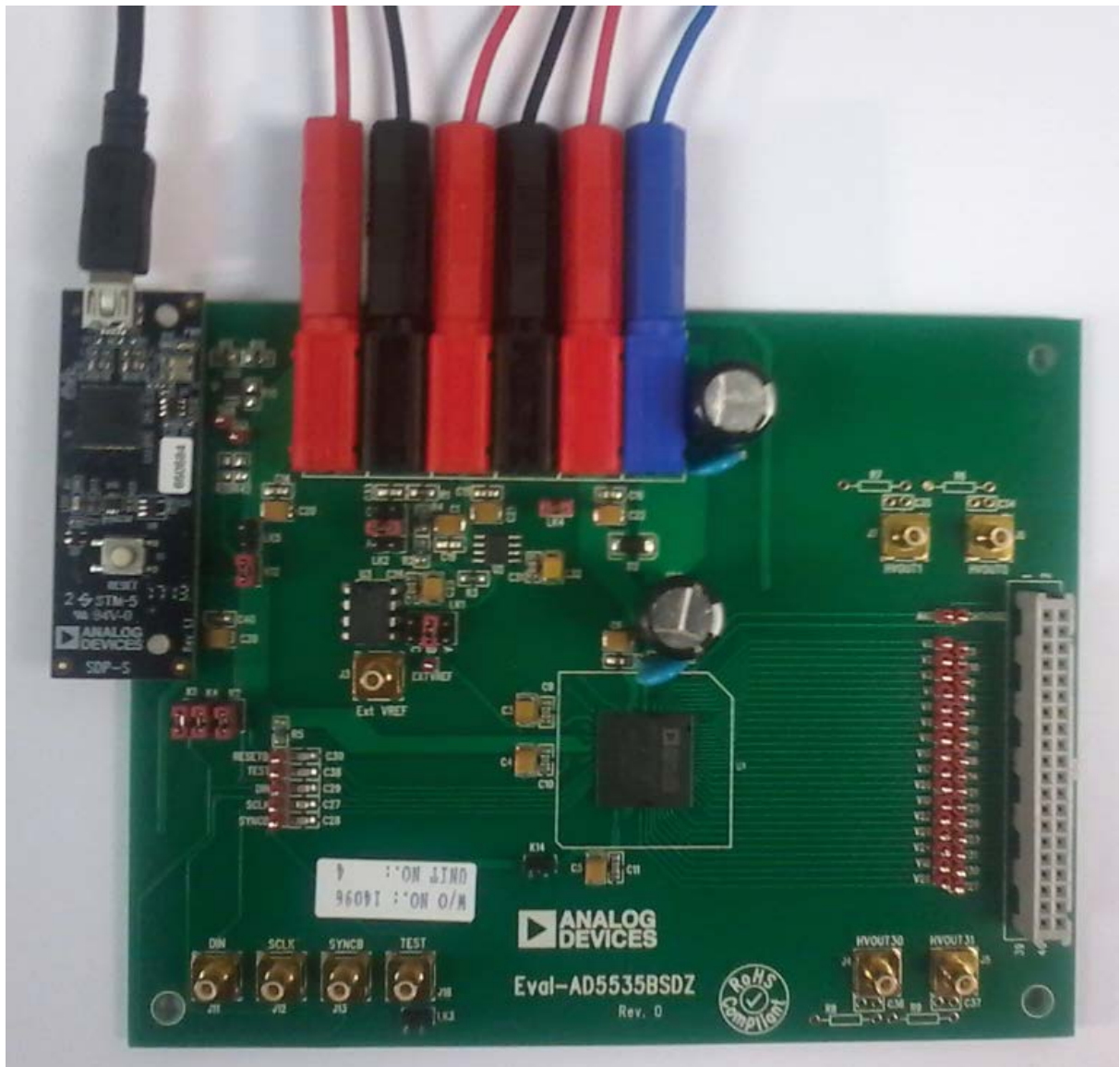5. Launch the AD5535B evaluation board software from the **Analog Devices** subfolder in the **Programs** menu.

Figure 2. Hardware Configuration—Photo of the EVAL-AD5535BSDZ Board Connected to SDP-S and Powered

SOFTWARE INSTALLATION PROCEDURES

The EVAL-AD5535BSDZ evaluation kit includes a CD containing software to be installed on the PC before using the evaluation board.

There are two parts to the installation:

- AD5535B evaluation board software installation
- EVAL-SDP-CS1Z system demonstration platform board drivers installation

Warning

The evaluation board software and drivers must be installed before connecting the evaluation board and the EVAL-SDP-CS1Z board to the USB port of the PC to ensure that the evaluation system is correctly recognized when it is connected to the PC.

Installing the AD5535B Evaluation Board Software

Take the following steps to install the AD5535B evaluation board software:

1. With the EVAL-SDP-CS1Z board disconnected from the USB port of the PC, insert the installation CD into the CD-ROM drive.
2. Double-click the **setup.exe** file to begin the evaluation board software installation. The software is installed to the following default location: **C:\Program Files (x86)\AD5535B**.
3. A dialog box appears requesting permission to allow the program to make changes to your computer. Click **Yes**.
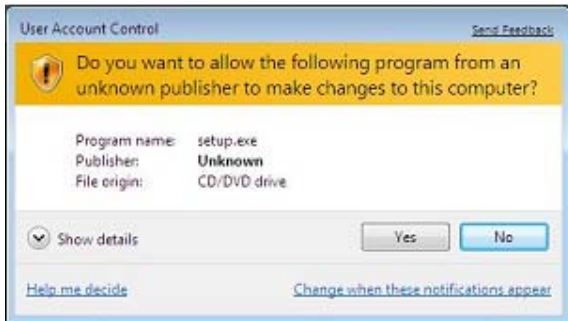
Figure 3. AD5535B Evaluation Board Software Installation: Granting Permission for Program to Make Changes

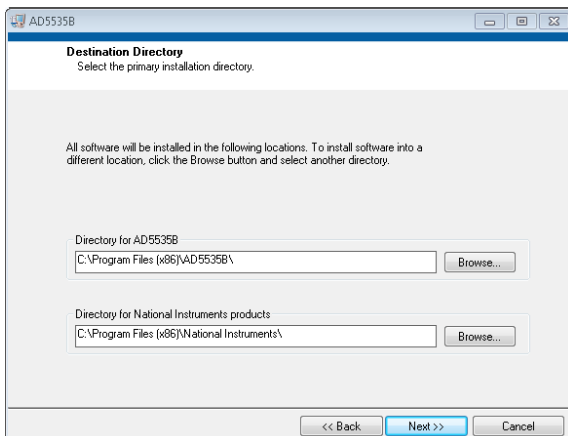4. Select the location to install the software, and then click **Next**.

Figure 4. AD5535B Evaluation Board Software Installation: Selecting the Location for Software Installation

5. A license agreement appears. Read the agreement, and then select **I accept the License Agreement** and click **Next**.
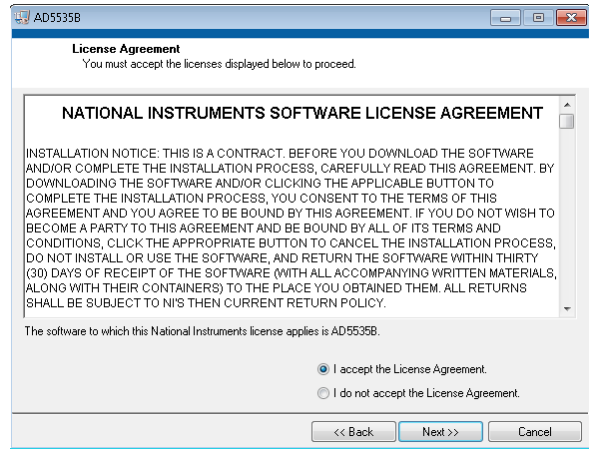
Figure 5. AD5535B Evaluation Board Software Installation: Accepting the License Agreement

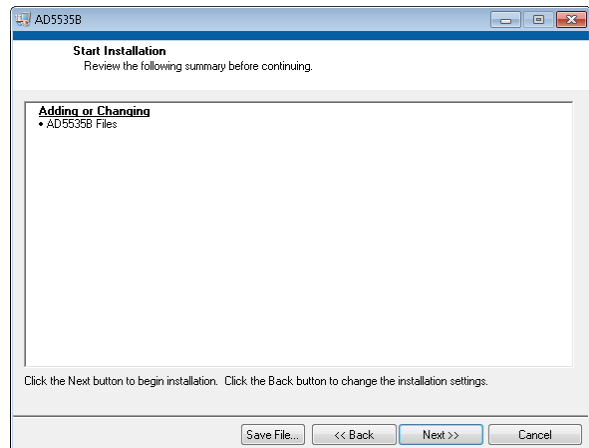6. A summary of the installation is displayed. Click **Next** to continue.

Figure 6. AD5535B Evaluation Board Software Installation: Reviewing a Summary of the Installation

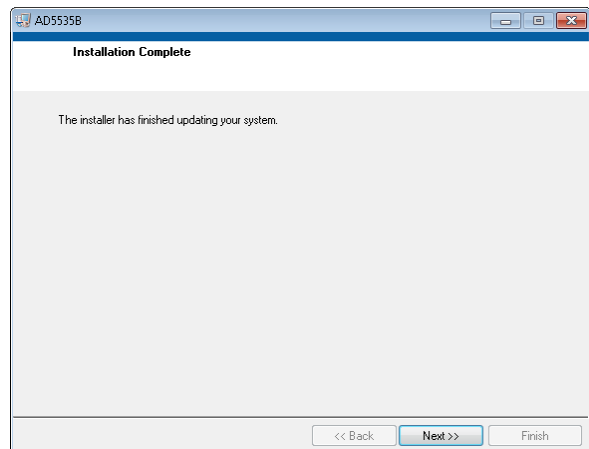7. The message in Figure 7 appears when the installation is complete. Click **Next**.

Figure 7. AD5535B Evaluation Board Software Installation: Indicating When the Installation Is Complete

Installing the EVAL-SDP-CS1Z System Demonstration Platform Board Drivers

After the installation of the evaluation board software is complete, the **ADI SDP Drivers Setup Wizard** opens for the installation of the EVAL-SDP-CS1Z system demonstration platform board drivers.

1. With the EVAL-SDP-CS1Z board still disconnected from the USB port of the PC, make sure that all other applications are closed, and then click **Next**.

Figure 8. EVAL-SDP-CS1Z Drivers Setup:
Beginning the Drivers Installation

2. Select the location to install the drivers, and then click **Next**.
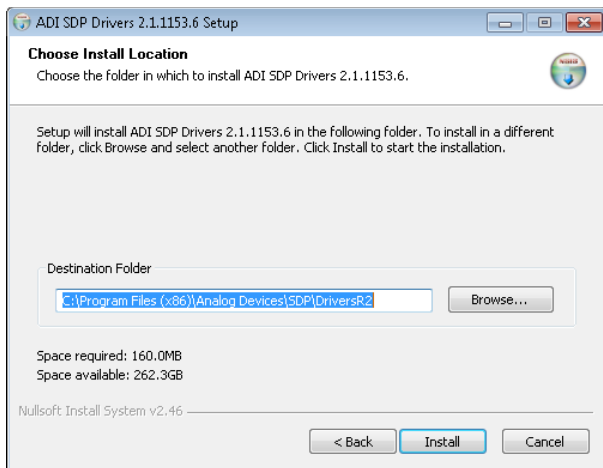
Figure 9. EVAL-SDP-CS1Z Drivers Setup:
Selecting the Location for Drivers Installation

3. Click **Install** to install the drivers.
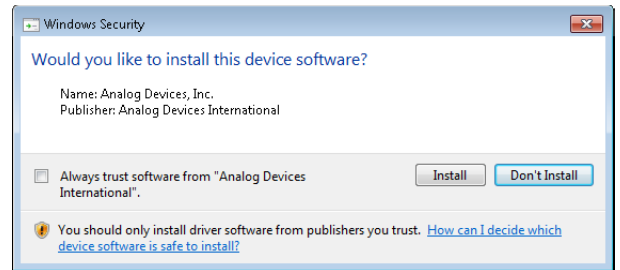
Figure 10. EVAL-SDP-CB1Z Drivers Setup:
Granting Permission to Install Drivers

4. To complete the drivers installation, click **Close**, which closes the setup wizard.
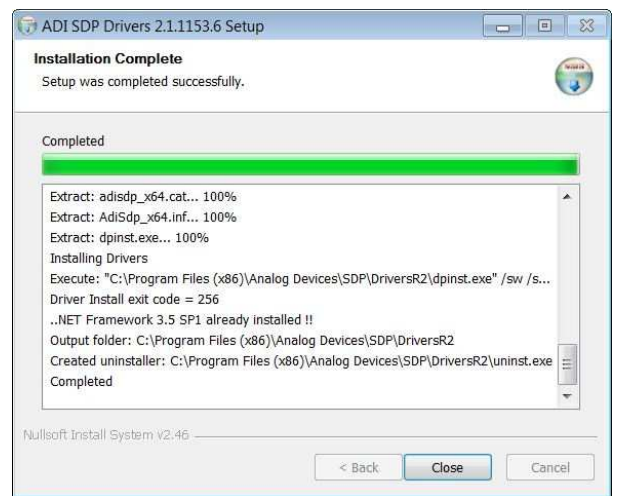

Figure 11. EVAL-SDP-CB1Z Drivers Setup:
Completing the Drivers Installation

5. Before using the evaluation board, you must restart your computer. A dialog box opens with the following options: **Restart**, **Shut Down**, and **Restart Later**. Click the appropriate button.
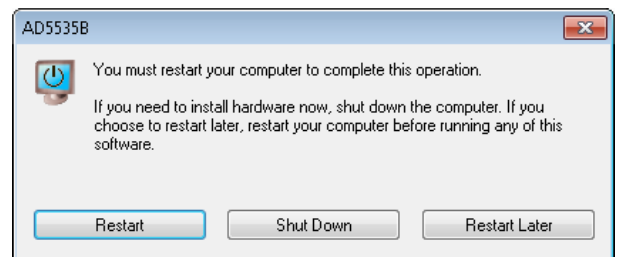

Figure 12. EVAL-SDP-CS1Z Drivers Setup:
Restarting the Computer

EVALUATION BOARD SETUP PROCEDURES

The EVAL-AD5535BSDZ evaluation board connects to the EVAL-SDP-CS1Z system demonstration board. The EVAL-SDP-CS1Z board is the controller board, which is the communication link between the PC and the EVAL-AD5535BSDZ evaluation board. Figure 2 shows a photograph of the connections made between the EVAL-AD5535BSDZ daughter board and the EVAL-SDP-CS1Z board.

After following the instructions in the Software Installation Procedures section, set up the evaluation board and the SDP board as detailed in this section.

Warning

The evaluation software and drivers must be installed before connecting the evaluation board and EVAL-SDP-CS1Z board to the USB port of the PC to ensure that the evaluation system is correctly recognized when it is connected to the PC.

Configuring the Evaluation and SDP Boards

1. Connect the EVAL-AD5535BSDZ evaluation board to Connector A of the EVAL-SDP-CS1Z board (see Figure 2).
   a. Screw the two boards together using the nylon screw/nut set included in the evaluation board kit to ensure that the boards are connected firmly together.
2. Connect the external power supplies as shown in Table 3
3. Connect the EVAL-SDP-CS1Z board to the PC using the supplied USB cable.

EVALUATION BOARD HARDWARE

LINK CONFIGURATION OPTIONS

There are multiple jumper (LKx and Kx) options that must be set correctly to select the appropriate operating setup before using the evaluation board. The functions of these options are shown in Table 1.

Setup Conditions

Before applying power and signals to the evaluation board, ensure that all link positions are as required by the operating mode. There are two modes in which to operate the evaluation board. The evaluation board can be operated in SDP controlled mode to be used with the SDP board, or the evaluation board can be used in standalone mode.

Table 2 shows the default positions in which the links are set when the evaluation board is packaged. When the board is shipped, it is assumed the evaluation board is to be operated with the SDP board in SDP controlled mode.

Table 1. Link Option Functions

Link No.	Function
LK1	Reference selection
	Position A: external reference (via J3)
	Position B: 4.096 V reference
	Position C: scaled reference selection (see LK2 for selection)
LK2	Scaled reference selection
	Position A: 3.072 V reference
	Position B: 2.048 V reference
	Position C: 1.024 V reference
LK3	TEST input pin set inactive
LK4	AV_{CC} to V_+ connection
LK5	DV_{CC} to 3.3 V connection
K1	SYNCB to J19 connector
K2	DIN to J19 connector
K4	SCLK to J19 connector
K12	3.3 V to VIO (3.3 V) on J19 connector
K14	AV_{CC} to VIN on J19 connector

Table 2. Default Link Positions for Packaged EVAL-AD5535BSDZ

Link No.	Position	Function
LK1	Position B	4.096 V on-board reference is selected
LK2	Position B	Selection of scaled reference option
LK3	Not inserted	TEST pin control
LK4	Inserted	AV_{CC} to V_+
LK5	Not inserted	DV_{CC} to 3.3 V
K1	Inserted	SYNCB to J19 connector
K2	Inserted	DIN to J19 connector
K4	Inserted	SCLK to J19 connector
K12	Inserted	3.3 V to VIO (3.3 V) on J19 connector
K14	Not inserted	AV_{CC} to VIN on J19 connector

POWER SUPPLIES

Table 3. External Power Supplies Required

Power Supply	Connector	Voltage Range	Purpose
DV_{CC} (5 V)	J15	2.7 V to 5.25 V	Supplies the DV_{CC} digital supply
AV_{CC} (5 V)	J14	4.75 V to 5.25 V	Supplies the AV_{CC} analog supply
V_+ (5 V)	J9	4.75 V to 5.25 V	Supplies the V_+ (5 V) supply
V_{PP} (210 V)	J8	60 V to 225 V	Supplies the V_{PP} high voltage part supply

HOW TO USE THE SOFTWARE FOR EVALUATING THE AD5535B

SETTING UP THE SYSTEM

After completing the steps in the Software Installation Procedures section and the Evaluation Board Setup Procedures section, set up the system for data capture as follows:

1. Allow the **Found New Hardware Wizard** to run after the EVAL-SDP-CS1Z board is plugged into your PC. (If you are using Windows XP, you may need to search for the EVAL-SDP-CS1Z drivers. Choose to automatically search for the drivers for the EVAL-SDP-CS1Z board if prompted by the operating system.)
2. Check that the board is connected to the PC correctly using the **Device Manager** of the PC.
   a. Access the **Device Manager** by right-clicking **My Computer** and then clicking **Manage**.
   b. A dialog box appears requesting permission to allow the program to make changes to your computer. Click **Yes**.
   c. The **Computer Management** box appears. Click **Device Manager** from the list of **System Tools** (see Figure 13).
   d. Under **ADI Development Tools**, **Analog Devices System Development Platform SDP-S** appears, which indicates that the EVAL-SDP-CS1Z driver software is installed and that the board is connected to the PC correctly.

Figure 13. Device Manager: Checking that the Board Is Connected to the PC Correctly

Launching the Software

After completing the steps in the Setting Up the System section, launch the AD5535B evaluation board software as follows:

1. From the **Start** menu, go to **Programs** > **Analog Devices** > **AD5535B**. The main window of the AD5535B evaluation board software opens.
2. If the EVAL-AD5535BSDZ evaluation system is not connected to the USB port via the EVAL-SDP-CS1Z when the software is launched, a connectivity error displays (see Figure 14). Connect the evaluation system to the USB port of the PC, wait a few seconds, and then follow the on-screen instructions.
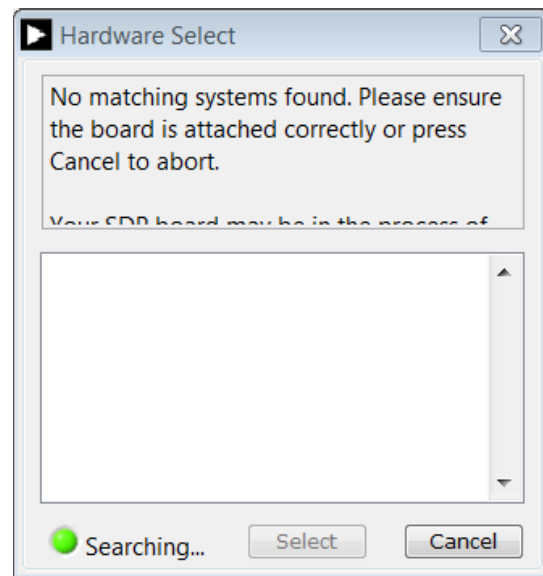
Figure 14. Connectivity Error Alert

When the AD5535B evaluation board software starts running, it searches for hardware connected to the PC. A dialog box indicates when the evaluation board attached to the PC is detected, and then the evaluation software main window appears (see Figure 15).

OVERVIEW OF THE MAIN WINDOW

The main window of the AD5535B evaluation board software is shown in Figure 15. The software has the following features.

RESET

RESET OFF is the default configuration, and the selection must be in this condition to update the device.

Update Single Channel

Clicking **Update Single Channel** performs a single channel update to the selected DAC channel with the value entered in the **DAC Code** field.

Update All Channels

Clicking **Update All Channels** updates all DAC channels with the value entered in the **DAC Code** field.
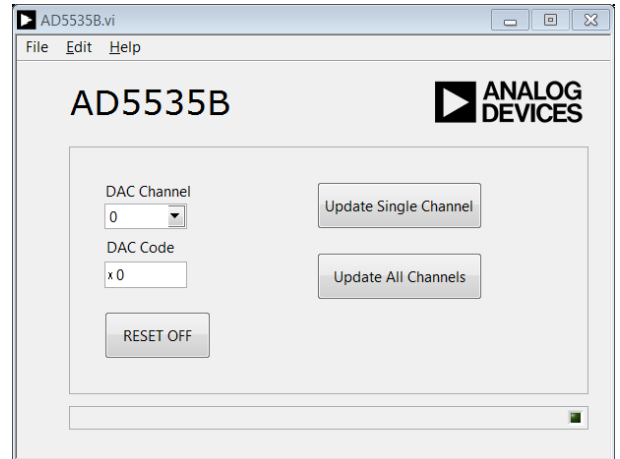
Figure 15. Evaluation Board Software Main Window

RELATED LINKS

Resource	Description
AD5535B	32-channel, 14-bit, high voltage output DAC
REF198	4.096 V, precision micropower, low dropout, low voltage reference
EngineerZone	Analog Devices, Inc., online technical support community

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.

ANALOG DEVICES

w w w . a n a l o g . c o m