EVAL-ADPD2140Z User Guide
UG-1358

Evaluating the ADPD2140 IR Light Angle Sensor

FEATURES

ADPD2140 full configuration
    Register level
    Parameter level
Graph views
    Time series view
    Gesture recognition view
    Triangulation view
UDP transfer capability

EVALUATION KIT CONTENTS

EVAL-ADPD2140Z standard evaluation board
USB-C cable

ADDITIONAL EQUIPMENT NEEDED

EVAL-ADPDM3Z evaluation board
PC running Windows® 7 operating system

ONLINE RESOURCES

ADPD2140 data sheet
Applications Wavetool

GENERAL DESCRIPTION

The EVAL-ADPD2140Z evaluation kit allows users to interface with the ADPD2140 infrared (IR) light angle sensor, collect data from the ADPD2140, and evaluate gesture recognition and triangulation capabilities.

The evaluation kit requires the EVAL-ADPDM3Z evaluation board and the Applications Wavetool, a graphical user interface (GUI) that provides users with low level and high level configurability, real-time data analysis, and user datagram protocol (UDP) transfer capability, which allows the EVAL-ADPDM3Z evaluation board to interface to a PC. The Applications Wavetool can be downloaded from the EVAL-ADPD2140Z evaluation board product page.

The USB port of the PC powers the EVAL-ADPDM3Z evaluation board and provides power to the EVAL-ADPD2140Z evaluation board. On-board voltage regulators provide voltage supplies for the ADPD2140.

The EVAL-ADPD2140Z evaluation board schematic indicates signal names for easy identification (see Figure 12).

Full specifications for the ADPD2140 are available in the ADPD2140 data sheet, which should be consulted in conjunction with this user guide when working with the EVAL-ADPD2140Z evaluation board.
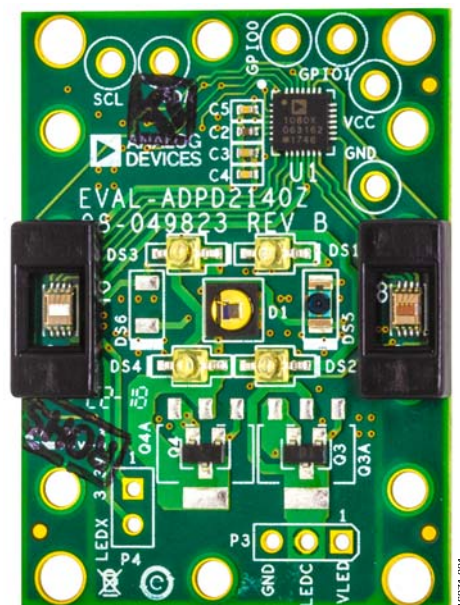
EVALUATION BOARD PHOTOGRAPH

Figure 1.

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REVISION HISTORY

8/2018—Revision 0: Initial Version

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

INSTALLING THE APPLICATIONS WAVETOOL

Download the Applications Wavetool software package from the EVAL-ADPD2140Z evaluation board product page. Unzip the downloaded software folder, run the enclosed **Applications_Wavetool_1853.exe** file, and follow the prompts for installing the Applications Wavetool software (see Figure 2).
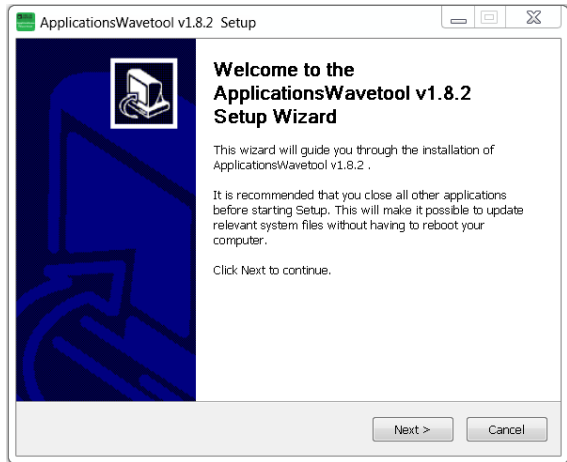

Figure 2. Applications Wavetool Setup

To start the Applications Wavetool application, navigate to the **ApplicationsWavetool** folder from the **Start** menu and click the **Applications Wavetool** icon (see Figure 3).
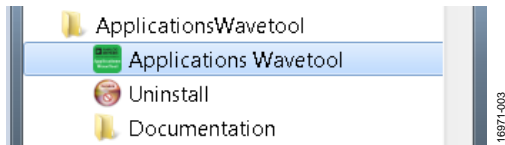
*Figure 3. Navigate to the **ApplicationsWavetool** Folder from the **Start** Menu*

At startup, the Applications Wavetool application automatically checks if the installed Applications Wavetool software version is up to date. If there is a newer version available, the user is prompted to download the newest version.
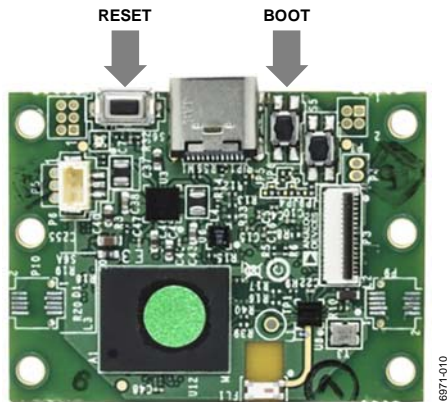

Figure 4. EVAL-ADPDM3Z Evaluation Board

EVAL-ADPD2140Z EVALUATION BOARD USB CONNECTION

Prior to starting the Applications Wavetool application, connect the EVAL-ADPD2140Z evaluation board to the EVAL-ADPDM3Z evaluation board via the board to board connectors. Connect the EVAL-ADPDM3Z evaluation board to a PC via the USB-C cable included with the evaluation kit. The PC automatically finds the device drivers and installs them if they have not been previously installed. When the EVAL-ADPDM3Z evaluation board is connected, open the Applications Wavetool application (see Figure 5).
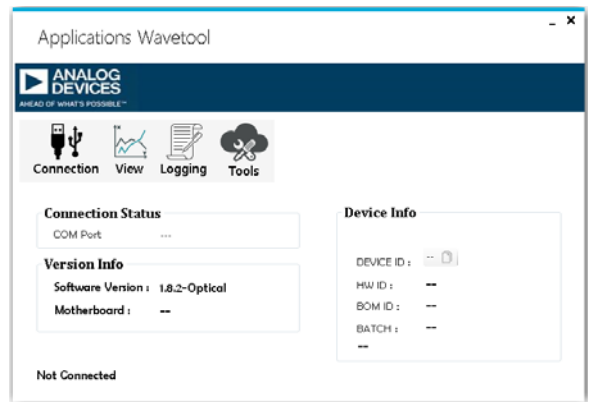

Figure 5. Applications Wavetool Window

After the Applications Wavetool application opens, click **Connection** > **Connect** to open the communication (COM) port selection window. Select the appropriate COM port from the **Connect** dropdown menu and click **Connect** (see Figure 6). The Applications Wavetool then acknowledges that the EVAL-ADPD2140Z evaluation board is connected by displaying **M3 Motherboard Found** on the screen.
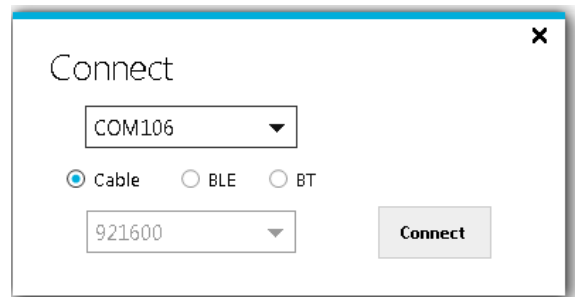

Figure 6. COM Port Selection Window

UPDATING THE EVAL-ADPDM3Z EVALUATION BOARD FIRMWARE

If the EVAL-ADPDM3Z evaluation board firmware is out of date, the software displays a warning, as shown in Figure 7. If this warning occurs, click **Tools > Firmware Update** from the main window, and click **Ok** in the dialog box. Follow the instructions shown in Figure 7 to update the EVAL-ADPDM3Z evaluation board firmware.
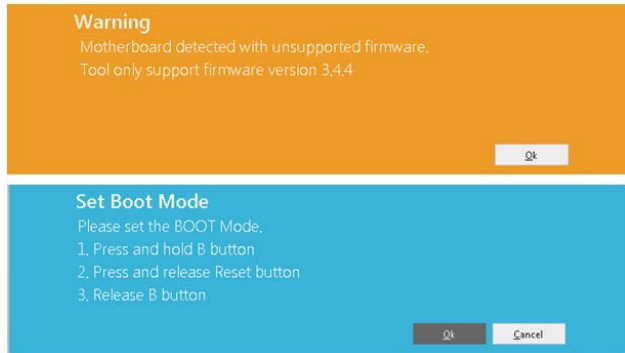
Figure 7. Updating the EVAL-ADPDM3Z Evaluation Board Firmware

CONFIGURING THE EVAL-ADPD2140Z EVALUATION KIT

To operate the EVAL-ADPD2140Z evaluation board in gesture detect mode, click **View > Gesture Device**. Click **ADPD Config** to enter the gesture configuration window. Click **Load DCFG**, select **ADPD1080Z-GST_Gesture.dcfg**, and click **Open** (see Figure 8).
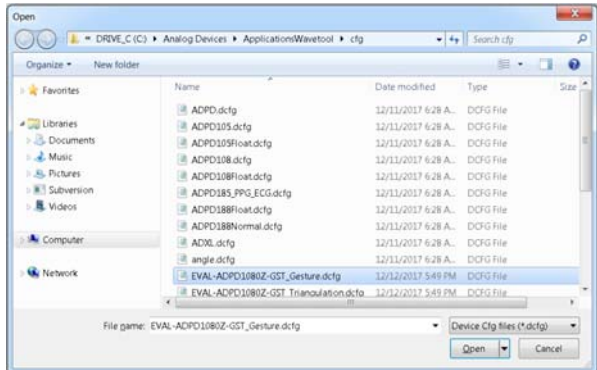
Figure 8. Loading the Configuration File

By default, this file configures the EVAL-ADPD2140Z evaluation board to use the LEDX1 light emitting diode (LED) driver, which is optimized for gesture recognition. After loading the configuration file, click **Power Calculation**, which opens a new window. Press M on the keyboard. In the new window, under **Boost Enable**, ensure that the **Boost Enable** check box is selected (see Figure 9). This control is automatically selected upon connecting the EVAL-ADPD2140Z evaluation board and the EVAL-ADPDM3Z evaluation board to the PC.
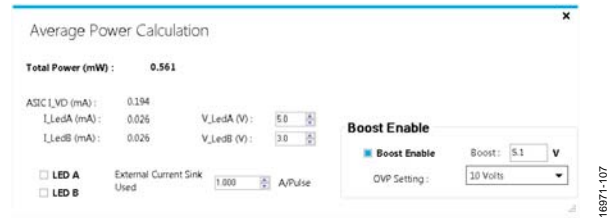
*Figure 9. **Boost Enable** Selection*

STREAMING DATA

Return to the **Gesture Device** window and click the **Play** icon to begin streaming data from the EVAL-ADPD2140Z evaluation board. Move an object or hand within 30 cm above the EVAL-ADPD2140Z evaluation board to see the corresponding output of the device on the graphs. The **Y Ratio vs X Ratio** graph shows the calculated x and y positions of the object above the device (see Figure 10). The **Raw Data** graph shows the four data output channels (x_R, x_L, y_T, and y_B) change as a function of reflected light seen by the device, represented in analog-to-digital converter (ADC) codes. In the **Y Ratio vs X Ratio** graph, an offset of 255 codes is applied to all four channels to prevent division by zero in the calculation of x and y. See the ADPD2140 data sheet for more information.

*Figure 10. **Gesture Device** Window*

GESTURE DEVICE

To view the gesture recognition capability, remain in the **Gesture Device** window with data streaming turned on.

Move a hand or other reflective object within 30 cm above the device and swipe in any of the four indicated directions. Alternatively, the center indicator can be activated by quickly lowering an object towards the sensor.

ANGLE DEVICE

To view the x and y response and triangulation data, stop data streaming by clicking the **Stop** icon. Exit the **Gesture Device** window and click **View > Angle Device** in the Applications Wavetool main application window. Click **ADPD Config** to open the configuration window. Click **Load DCFG** and select **ADPD1080Z-GST_Angle_nominal_01.dcfg** to load the triangulation settings.

Return to the **Angle Device** window. Click the **Play** icon to begin streaming data. Ensure that no objects are within 50 cm of the EVAL-ADPD2140Z evaluation board and then select the **Zero Offsets** check box.

Move a hand or other reflective object within 20 cm directly above the device. The **Y Ratio vs X Ratio** graph shows the x and y data without added offsets. On the right side, the **Log Intensity** field shows the log of the sum of the four channels. The **Distance (mm)** field shows the distance calculated through triangulation of the angles seen by the two ADPD2140 devices on the EVAL-ADPD2140Z evaluation board (see Figure 10).
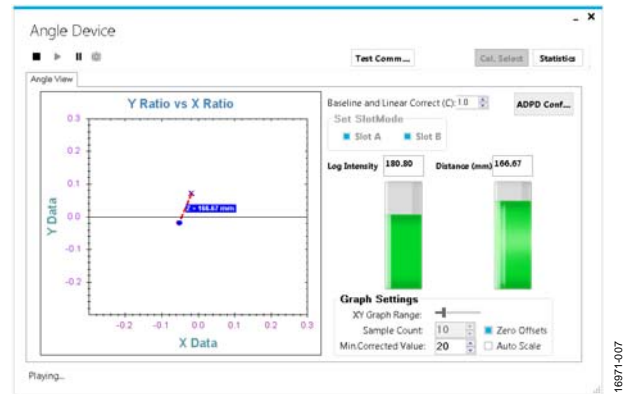
*Figure 11. **Angle Device** Window*

For more detailed information on the Applications Wavetool and additional features of the software, see the Applications Wavetool user manual, which can be found in the **Help > Help Topics** menu.

EVALUATION BOARD SCHEMATICS AND ARTWORK
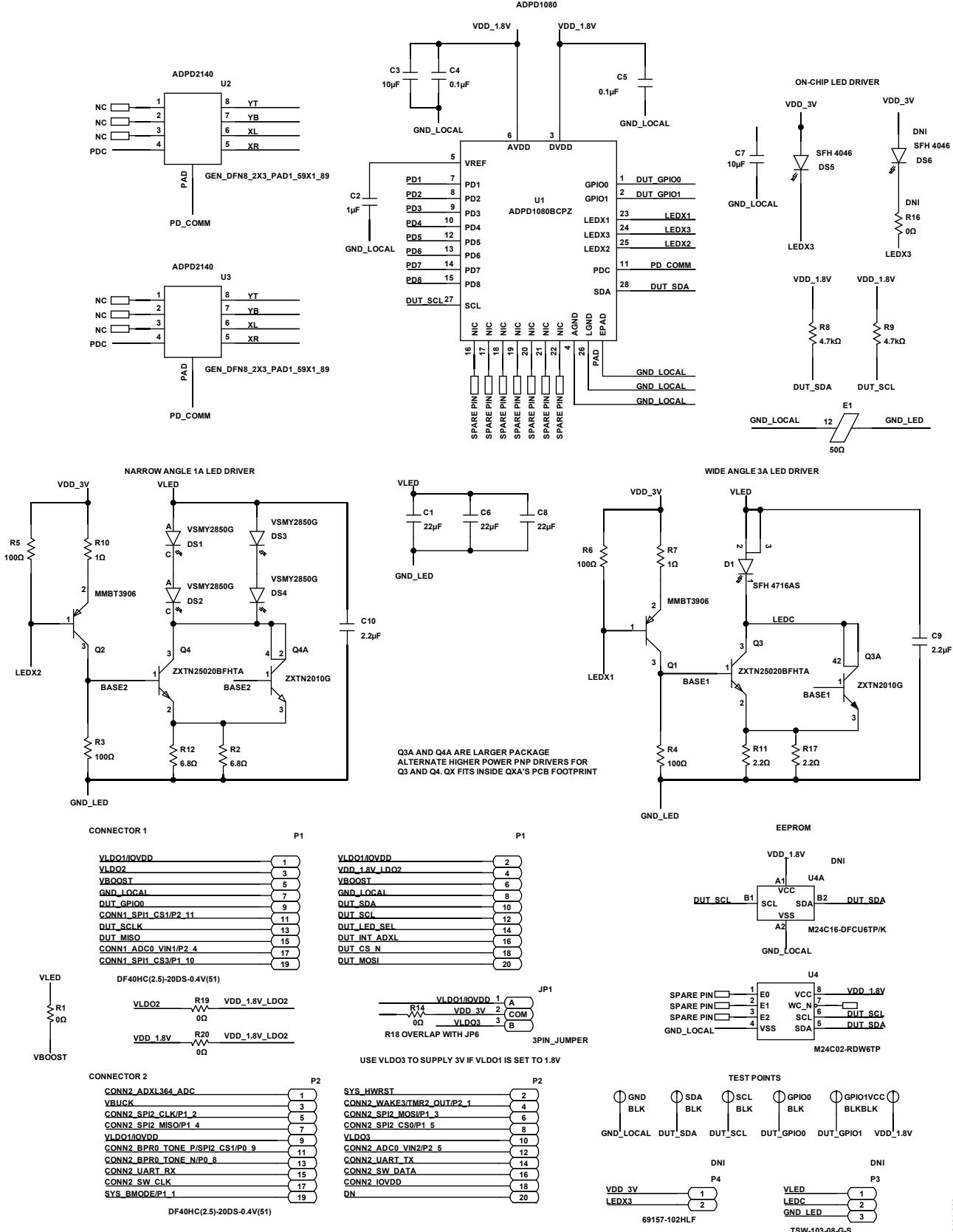
Figure 12. EVAL-ADPD2140Z Evaluation Board Schematic
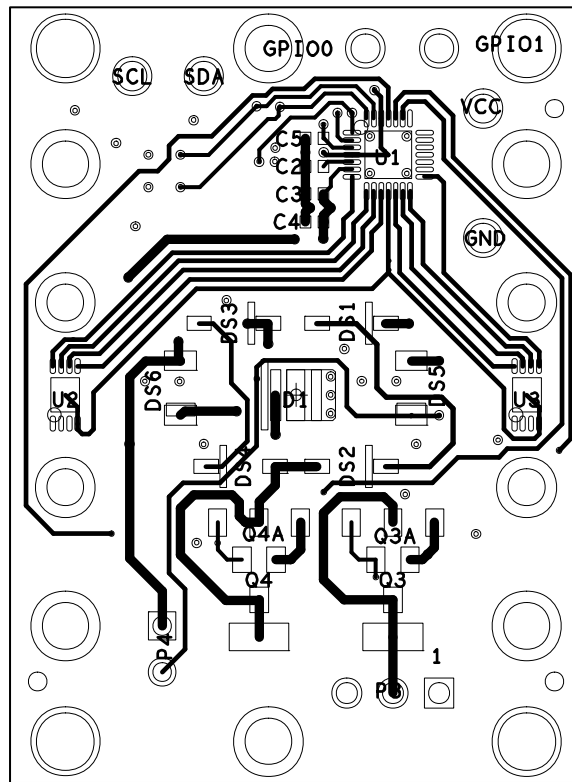
Figure 13. EVAL-ADPD2140Z Evaluation Board Layout

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

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