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ADUX1020-EVAL-SDP User Guide
UG1022

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Evaluating the ADUX1020 Photometric Sensor for Gesture and Proximity

FEATURES

ADUX1020 full configuration
- **Register level**
- **Parameter level**

Graph views
- **Time series view**
- **Gesture recognition view**

UDP transfer capability

EVALUATION KIT CONTENTS

ADUX1020-EVAL-MCM standard evaluation board
ADUX1020-EVAL-SMALL breakout board
EVAL-SDP-CB1Z controller board
Mini USB cable

ADDITIONAL EQUIPMENT NEEDED

PC running Windows 7 operating system
ADUX1020-EVALZ-LED daughterboard (optional)

ONLINE RESOURCES

ADUX1020 data sheet
Optical Gesture Evaluation Tool

GENERAL DESCRIPTION

The ADUX1020-EVAL-SDP evaluation kit provides users with a simple means of interfacing with the ADUX1020, collecting data from the ADUX1020, and evaluating gesture recognition capabilities.

The ADUX1020-EVAL-SDP is a kit that includes the ADUX1020-EVAL-SMALL and the ADUX1020-EVAL-MCM.

The evaluation kit requires the Optical Gesture Evaluation Tool, which can be downloaded from the ADUX1020-EVAL-SDP product page, 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 so the evaluation board can easily interface to a PC.

The USB port of the PC powers the ADUX1020-EVAL-SDP kit. On-board voltage regulators provide voltage supplies for the ADUX1020.

The evaluation board schematics indicate signal names for easy identification. For additional information on the functionality of the ADUX1020, refer to the ADUX1020 data sheet.

ADUX1020-EVAL-SDP EVALUATION KIT PHOTOGRAPHY

Figure 1.

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REVISION HISTORY

6/2016—Revision 0: Initial Version

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

INSTALLING THE OPTICAL GESTURE EVALUATION TOOL

Download the Optical Gesture Evaluation Tool software package from the ADUX1020-EVAL-SDP product page. Unzip the downloaded software folder, run the enclosed **ADI_OpticalGesture_EvaluationTool.exe** file, and follow the prompts for installing the Optical Gesture Evaluation Tool software (see Figure 2). For further information, follow the full installation guide included with the Optical Gesture Evaluation Tool software in the downloaded folder.

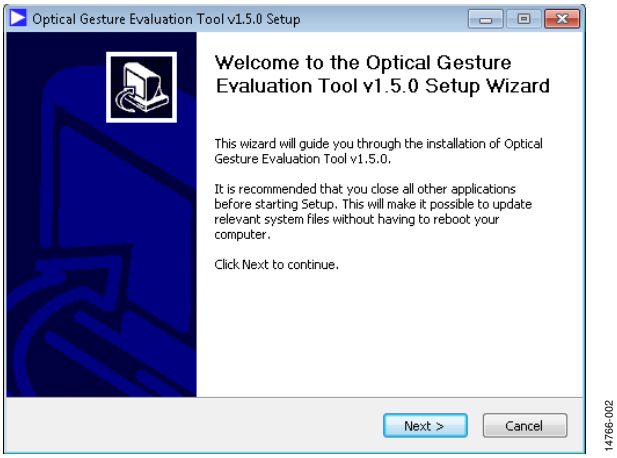

Figure 2. Optical Gesture Evaluation Tool Setup

To start the Optical Gesture Evaluation Tool application, navigate to the **ADI_OpticalGesture_EvaluationTool** from the **Start** menu and click the **ADI_OpticalGesture_EvaluationTool** icon (see Figure 3).

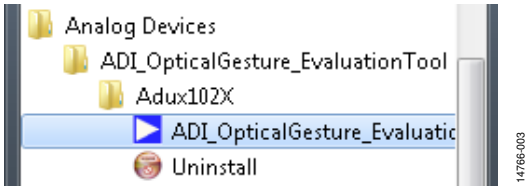

*Figure 3. Navigate to **Optical Gesture Evaluation Tool** from **Start** Menu*

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

EVALUATION BOARD USB CONNECTION

Ensure the provided EVAL-SDP-CB1Z controller board and ADUX1020-EVAL-MCM connect together and connect to a PC via the USB cable included with the evaluation kit. After the **Optical Gesture Evaluation Tool** application opens, click **File** > **Connect** (see Figure 4) and select **SDP ASIC Bridge (Debug).** The Optical Gesture Evaluation Tool then acknowledges the ADUX1020-EVAL-SDP kit is connected.

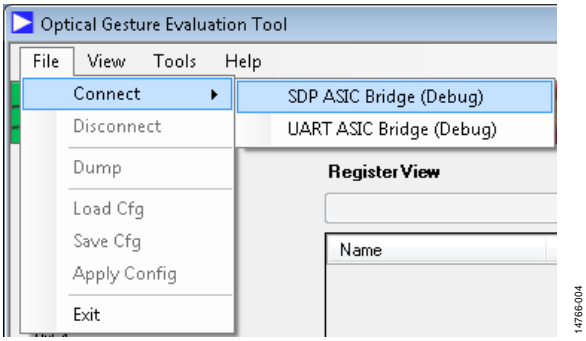

Figure 4. SDP ASIC Connection

CONFIGURING THE ADUX1020-EVAL-SDP EVALUATION KIT

Before operating the ADUX1020-EVAL-SDP kit, connect any jumper across Header J7 on the ADUX1020-EVAL-MCM. If using the ADUX1020-EVALZ-LED daughterboard, disconnect the jumper from Header J7.

To operate the ADUX1020 in gesture detect mode, click **File** > **Load Cfg**. Select the **004_ADUX1020_StandardR1.dcfg** file and click **Open** (see Figure 5).

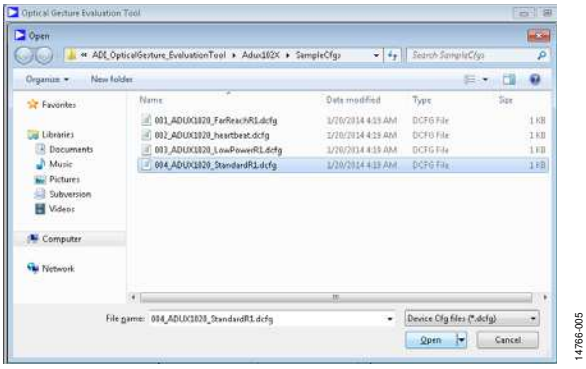

Figure 5. Loading the Configuration File

Next, click **View** > **Off-Chip Analysis and Gesture View** to open the **Graph XYI** tab (see Figure 6). With the evaluation board positioned so there are no objects around it within at least a 20 cm radius, click the **Channel Auto Calibration** button to calibrate the ADUX1020-EVAL-SDP kit. The Optical Gesture Evaluation Tool then acknowledges if calibration is successful.

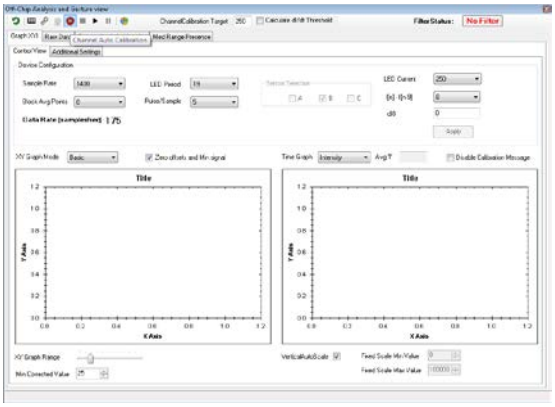

Figure 6. Running the Channel Auto Calibration

STREAMING DATA

Press the **Play** button to begin streaming data from the evaluation board. Move an object or hand within 15 cm above the ADUX1020 to see the corresponding output of the device on the graphs. The **Y Ratio vs X Ratio** graph shows the calculated x, y position of the object above the device (see Figure 7). The **Intensity** graph shows the average intensity of reflected light seen by the device, represented in ADC codes.

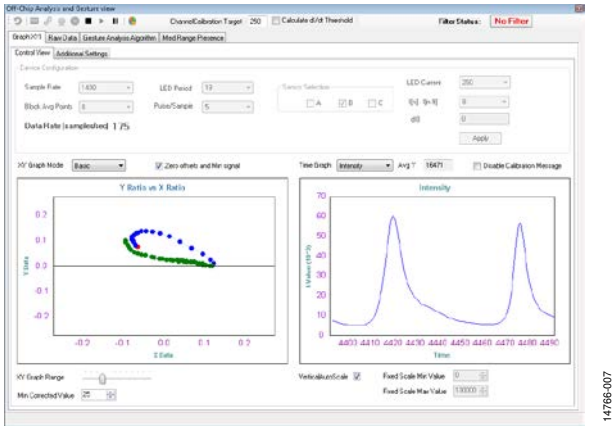

Figure 7. Graph of Streaming Data

GESTURE RECOGNITION

To view the gesture recognition capability, navigate to the **Gesture Analysis Algorithm** tab and select **LSLF Swipe determination** from the drop-down menu. Click the **Play** button if the device is not already streaming data.

Move a hand within 15 cm above the device and swipe in any of the four indicated directions. Alternatively, the center indicator can be activated by quickly lowering a hand towards the sensor (see Figure 8).

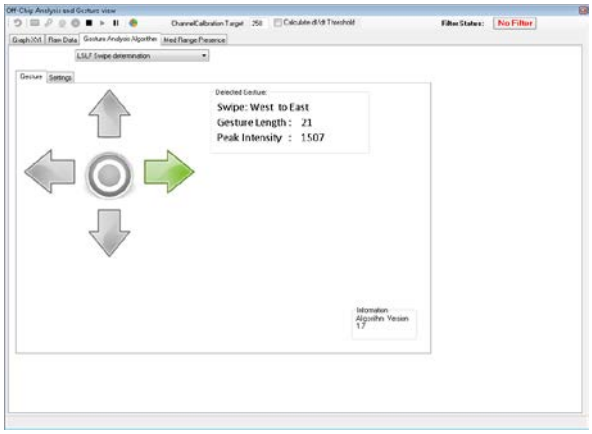

*Figure 8. **Gesture Recognition Algorithm** Tab*

For more detailed information Optical Gesture Evaluation Tool and additional features of the software, see the **Optical Gesture Evaluation Tool User Manual**, which can be found in the **Help** > **Help Topics** menu.

ADDITIONAL EVALUATION BOARDS

HIGH POWER LED DAUGHTERBOARD

The ADUX1020-EVALZ-LED is an optional daughterboard for the standard ADUX1020-EVAL-MCM evaluation board. It functions as a high-power LED driver intended for gesture recognition at distances greater than 15 cm.

To use the ADUX1020-EVALZ-LED, attach it to the ADUX1020-EVAL-MCM evaluation board as shown in Figure 9. The daughterboard connects to the ADUX1020-EVAL-MCM via five pins, labeled on the daughterboard as GND, GND1, LEDX, 3.3V, and VLED. These pins on the daughterboard plug into five similarly spaced test points on the ADUX1020-EVAL-MCM labeled JL1, JL2, JL3, JL4, and JL5. When connecting the ADUX1020-EVALZ-LED, ensure Header J7 on the ADUX1020-EVAL-MCM is not connected, as shown in Figure 9.

Operation and configuration of the ADUX1020-EVAL-SDP with the ADUX1020-EVALZ-LED daughterboard follows the instructions instructions listed in the Evaluation Board Software Quick Start Procedures section.

Figure 9. Connecting the ADUX1020-EVALZ-LED Daughterboard

SMALL FORM-FACTOR BREAKOUT BOARD

The ADUX1020-EVAL-SMALL is a small form-factor breakout board (see Figure 10) for the ADUX1020 that allows easy access to the ADUX1020 pinout via a standard connector cable.

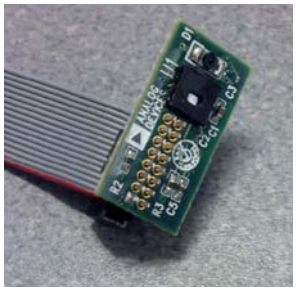

Figure 10. ADUX1020-EVAL-SMALL Breakout Board

The top view of the connector pinout for the ADUX1020-EVAL-SMALL is shown in Figure 11.

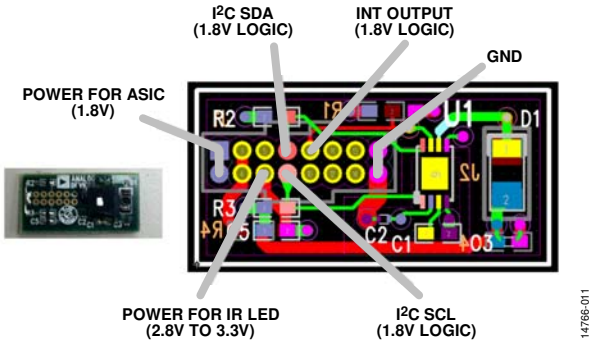

Figure 11. ADUX1020-EVAL-SMALL Breakout Board

EVALUATION BOARD SCHEMATICS AND ARTWORK

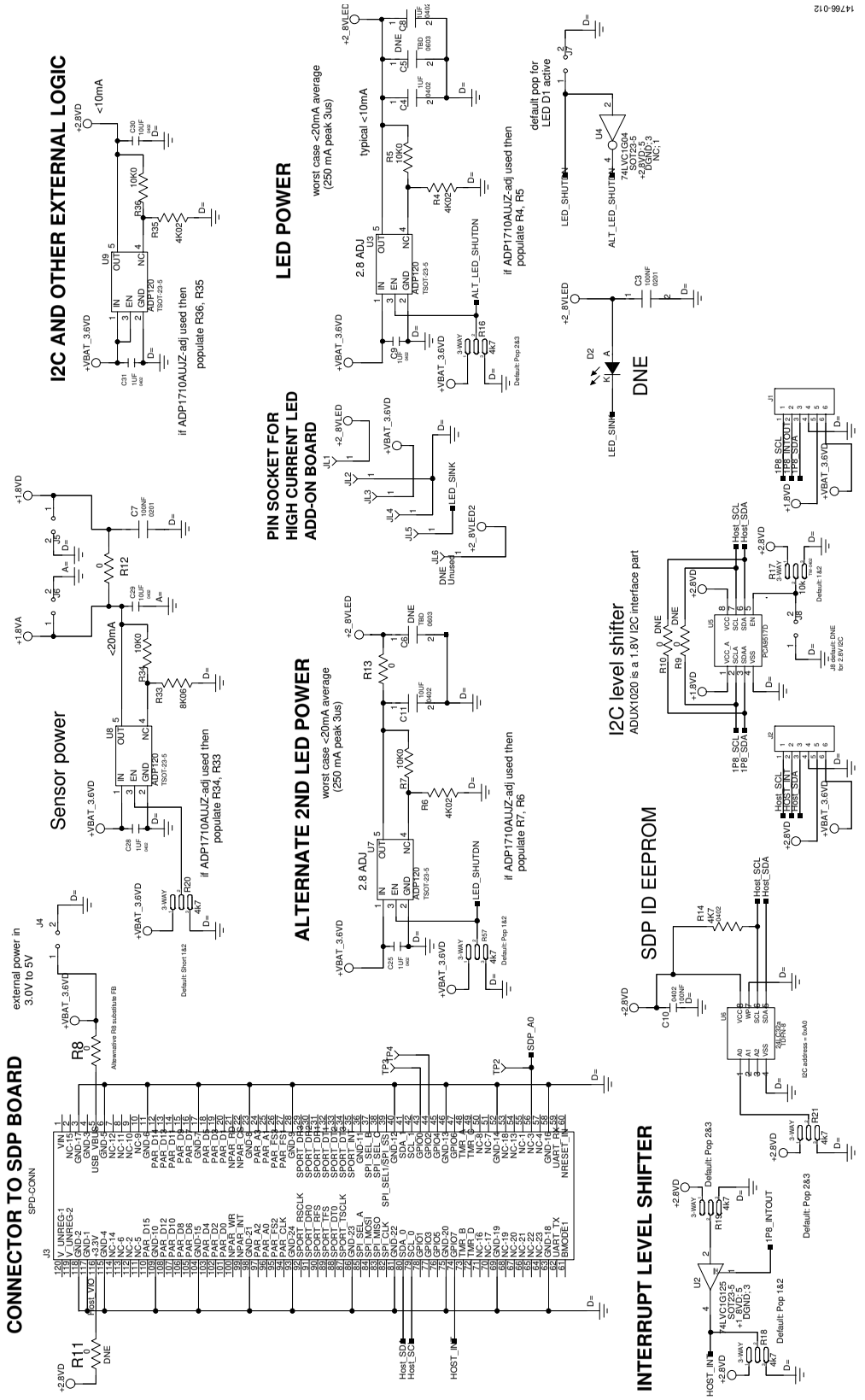

Figure 12. ADUX1020-EVAL-MCM Evaluation Board Schematic

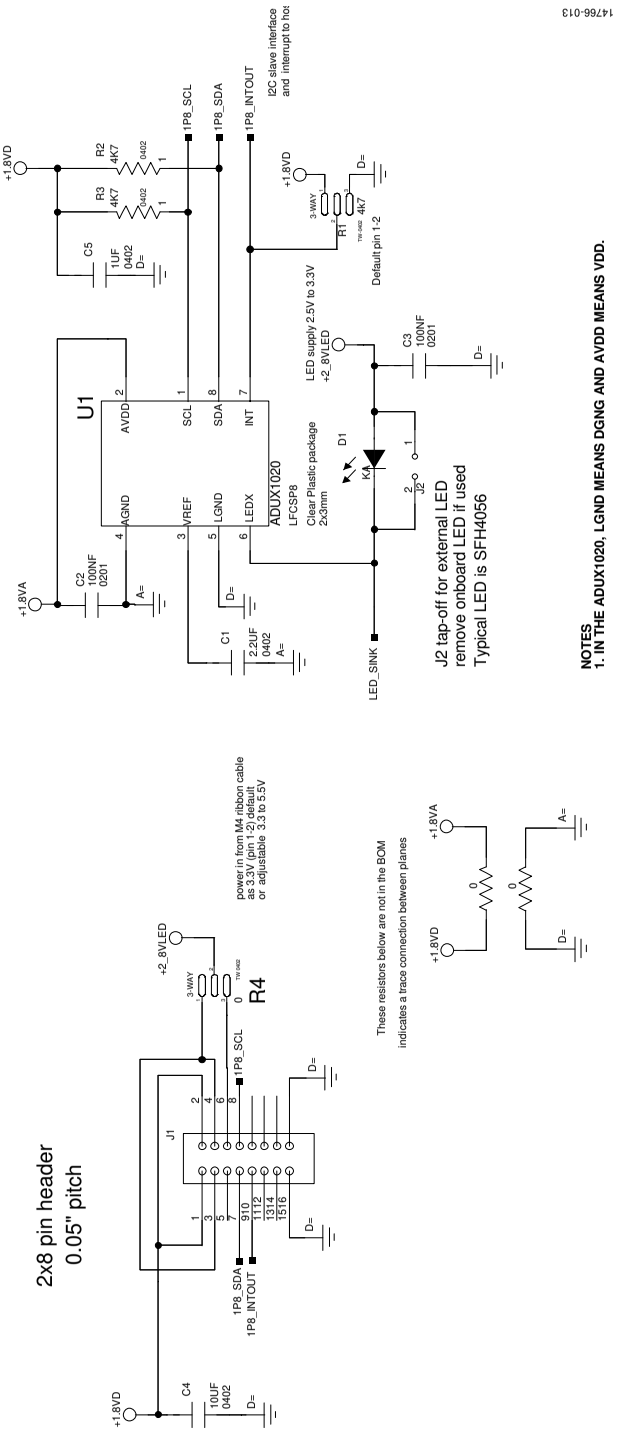

Figure 13. ADUX1020-EVAL-SMALL Small Form-Factor Breakout Board Schematic

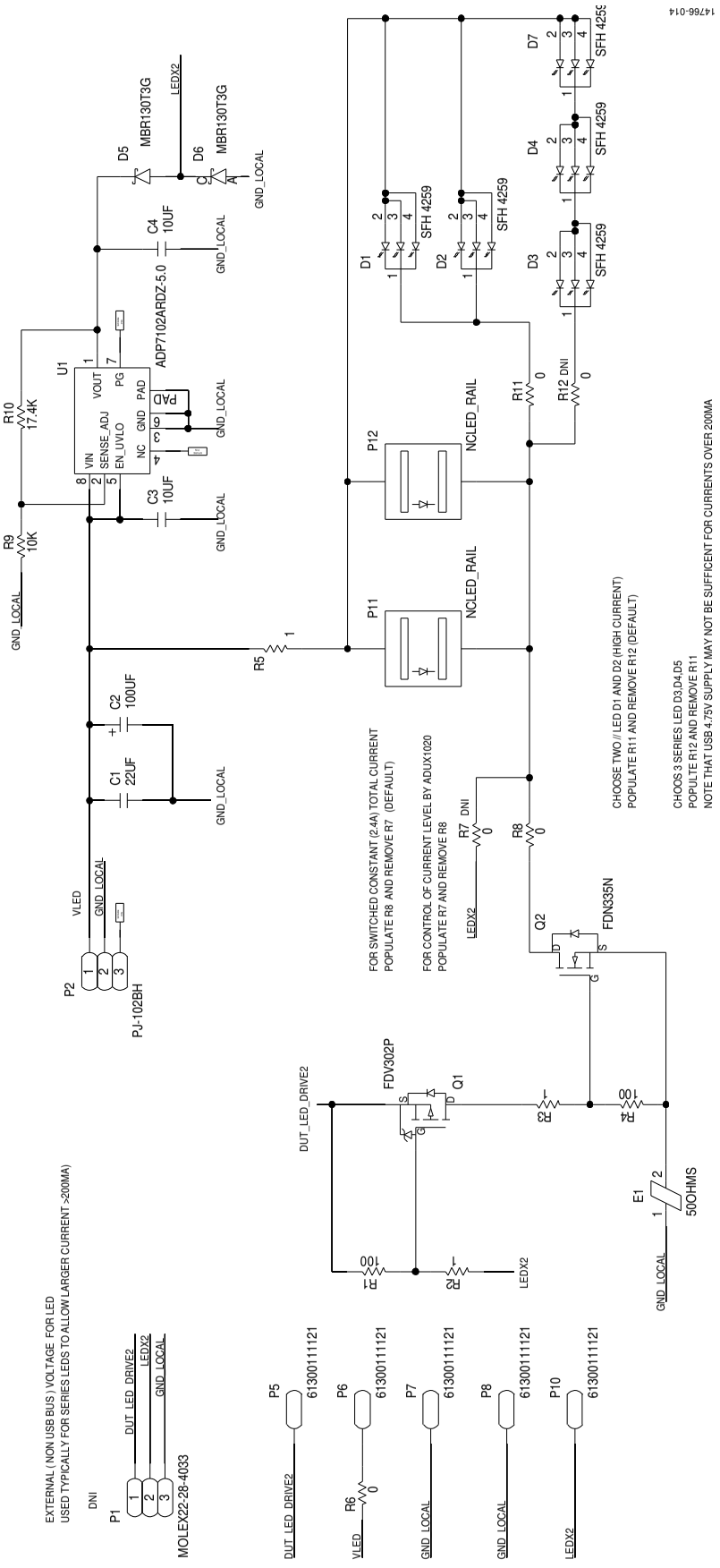

Figure 14. ADUX1020-EVALZ-LED High power LED daughterboard Schematic

NOTES

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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