ANALOG DEVICES

EVAL-ADV7613FEBZ User Guide
UG-946

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Evaluation Board User Guide for the ADV7613FEBZ

FEATURES

HDMI input connector
HDMI output connector
LVDS output connectors

EQUIPMENT NEEDED

HDMI video generator (input)
USB cable (supplied for I²C communication)
TV monitor or LCD (output)

SOFTWARE NEEDED

XRC 2p0RC2 (XRC_Ver2p0_RC2.zip), found on the ADV7613 Design Support Files page in EngineerZone
SDPDrivers.exe found on the ADV7613 Design Support Files page in EngineerZone

GENERAL DESCRIPTION

The EVAL-ADV7613FEBZ evaluation board user guide is intended to provide application support for the EVAL-ADV7613FEBZ. This application note provides details on the setup and configuration of the evaluation board.

The ADV7613 is a High-Definition Multimedia Interface (HDMI®) input to a low voltage differential signaling (LVDS) output device, developed to convert HDMI input signals to LVDS output signals, to drive a connected liquid crystal display (LCD) capable of handling LVDS type signals.

The EVAL-ADV7613FEBZ allows the user to evaluate the ADV7613 by either driving an attached LCD output or directly driving a connected TV monitor. The TV monitor and the LCD display can be driven simultaneously.

There is a field-programmable gate array (FPGA) device and a Blackfin® device on the evaluation board that allows output to a TV monitor. The Blackfin device provides the I²C communication on the EVAL-ADV7613FEBZ evaluation board.

The FPGA and the Blackfin devices come programmed on the evaluation board.

For full details, see the ADV7613 data sheet, which must be used in conjunction with this user guide when using the evaluation board.

EVALUATION BOARD PHOTOGRAPH

Figure 1.

TABLE OF CONTENTS

REVISION HISTORY

9/2018—Revision 0: Initial Version

EVAL-ADV7613FEBZ EVALUATION BOARD

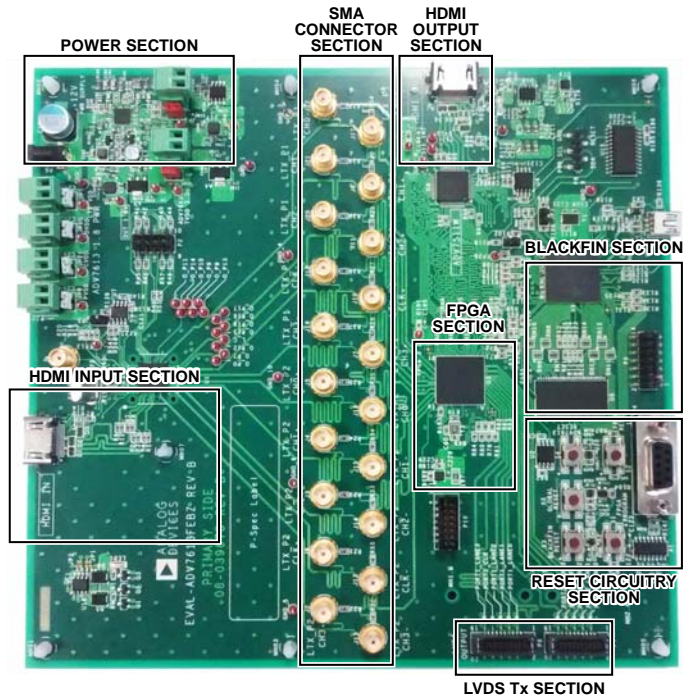Figure 2 shows the main sections of the EVAL-ADV7613FEBZ evaluation board.

Figure 2. Main Sections of the EVAL-ADV7613FEBZ

EVALUATION BOARD HARDWARE

This section outlines the connectors, headers, jumpers, push button switches, and light emitting diodes (LEDs) that are available or present on the EVAL-ADV7613FEBZ evaluation board. The jumper positions are set for the correct functioning of the evaluation board.

CONNECTORS

Table 1 details the connectors for the HDMI input and the HDMI output on the evaluation board. The USB connector is used as a means for I²C communications on theEVAL-ADV7613FEBZ. The power connector serves as the point of power supply to the EVAL-ADV7613FEBZ. The SMA connectors (20) provide access to connect SMA cables to a high speed scope serializer to measure the LVDS data and LVDS clock, if desired. The J6 connector is an SMA connector that allows the user to input an external clock when not using the Y2 crystal on the evaluation board. To use an external clock, the user must modify the existing evaluation board hardware schematic. Consult the printed circuit board (PCB) schematic before proceeding. To retrieve the PCB schematic, go to the ADV7613 Design Support Files page in EngineerZone.

Table 1. Connectors for HDMI Input and Output

Connector No.	Quantity	Description
J1	1	HDMI input connector/ ADV7613
J2 to J5, J7 to J22	20	SMA connectors
J6	1	SMA connector, external clock input reference
P1	1	HDMI output connector/ ADV7511W
P3	1	USB connector
P5	1	Power connector
P6, P7	2	LVDS output connectors

HEADERS

Table 2 outlines I²C access on the EVAL-ADV7613FEBZ if not using the conventional USB. The JTAG header programs the FPGA via its memory. There is no need for the user to program the FPGA device on the evaluation board because it comes preprogrammed.

Table 2. Headers of the EVAL-ADV7613FEBZ

Header No.	Description
P2	Audio output header
P8	I²C header
P10	JTAG header

JUMPERS

Table 3 outlines the jumpers for the various supply voltages needed for the ADV7613 device under test (DUT) to be functional. The jumpers are preset on the EVAL-ADV7613FEBZ evaluation board and must not be moved or changed

Table 3. Jumpers for the Various Supply Voltages

Jumper No.	Description
JP6	ADV7613_TVDD, 3.3 V
JP7	ADV7613_DVDDIO, 3.3 V
JP8	ADV7613_PVDD, 1.8 V
JP9	ADV7613_LTX VDD, 1.8 V
JP10	ADV7613_DVDD, 1.8 V
JP11	ADV7613_CVDD, 1.8 V

PUSH BUTTON SWITCHES AND LEDS

Table 4 lists the push buttons on the EVAL-ADV7613FEBZ evaluation board that function as described by the following:

- Pushing the S1 switch reprograms the device.
- The S2 switch resets the FPGA and the data programmed in the FGPA is lost.
- Switch S4 resets the DUT.
- Switch S5 resets the entire evaluation board.

Table 5 outlines the LEDs on the EVAL-ADV7613FEBZ. When a power supply is attached to the P5 power connector, the DS3 LED lights up indicating that the 12 V power supply is good. Shortly after the DS3 LED lights up, the DS1 LED lights up indicating that the FPGA is programmed. The FPGA pulls the configuration data or builds the file data from a flash memory device.

The FPGA configuration data allows routing of the video received on the HDMI input connector (J1) for output on both the HDMI output connector (P1) and the LVDS output connector.

When the HDMI input cable is connected on Connector J1, LED1 lights up. When the HDMI output cable is connected to the P1 connector, the DS2 LED lights up.

Table 4. Push Button Switches

Switch No.	Description
S1	FPGA program button
S2	FPGA reset button
S3	Blackfin reset button
S4	ADV7613 DUT reset button
S5	Global reset button

Table 5. LEDs

LED No.	Description
DS1	FPGA done pin LED
DS2	HDMI out LED
DS3	Board power indicator
LED1	HDMI in LED

INSTALLING THE SDP DRIVERS

SDP DRIVERS TO INTERFACE TO THE USB PORT

The SDP driver must be installed on the PC to allow the XRC 2p0RC2 software to function properly when evaluating the ADV7613. Figure 3 to Figure 5 show the USB driver installation process.

1. To install the SDP drivers, download the executable file from the ADV7613 Design Support Files page in EngineerZone.
2. When the executable file installs, run the XRC 2p0RC2, which can be downloaded from the ADV7613 Design Support Files page in EngineerZone.
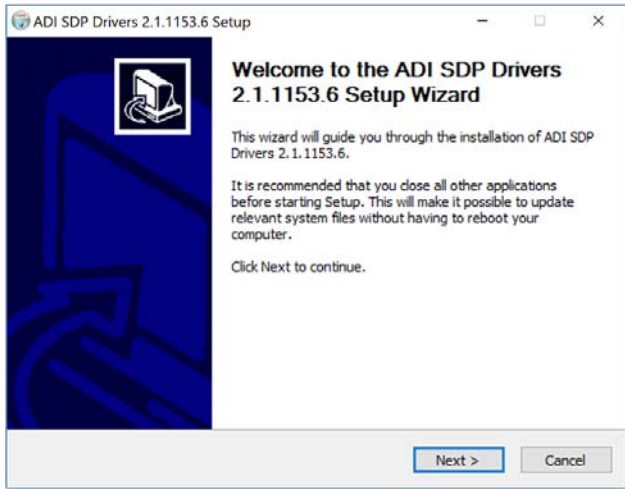
Figure 3. USB Driver Installation Setup Wizard
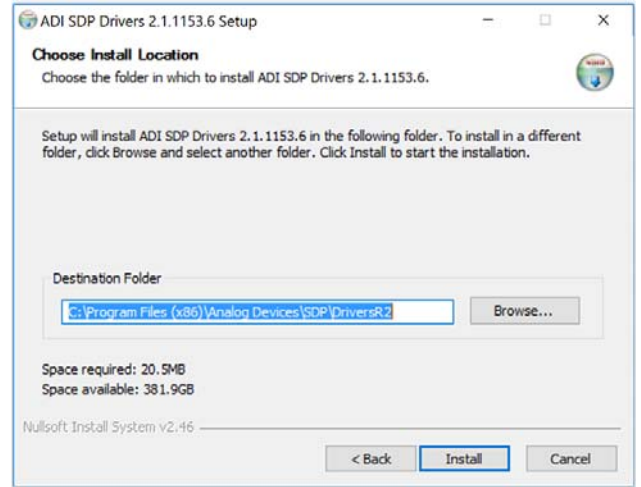
Figure 4. SDP Drivers Installation Location
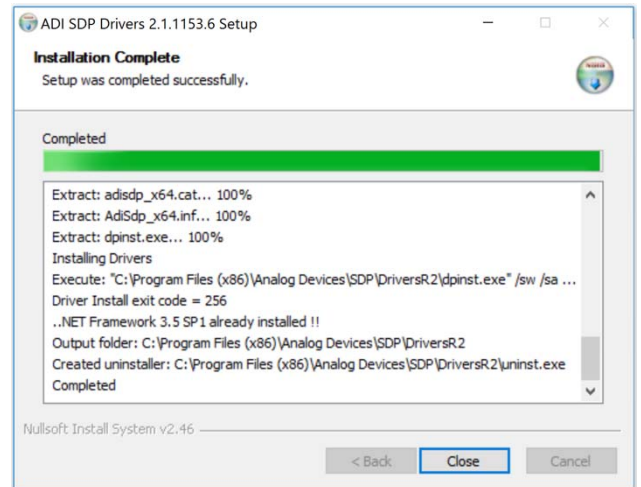
Figure 5. SDP Drivers Installation Complete

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

CONFIGURING THE EVAL-ADV7613FEBZ

This section describes how to configure the EVAL-ADV7613FEBZ evaluation board for operation in basic mode. Basic mode refers to example script configuration that is provided in the ADV7613 script file used in the XRC 2p0RC2 software (see the Installing the SDP Drivers section). The evaluation software is available for download from the ADV7613 Design Support Files page under the **Attachments** section in EngineerZone.

The evaluation board must be powered and connected via a USB to a PC with the XRC 2p0RC2 evaluation software and the related ADV7613 board files (**ADV7613_2** and **ADV7511**) must be installed. Note that the **ADV7511** file is also referred to as **OUTPUT_MODULE_E** in the XRC 2p0RC2 software. See the Controlling the Board using XRC 2p0RC2 section for more information.

BASIC MODE 1 HDMI IN LVDS OUT

The ADV7613 XRC 2p0RC2 evaluation software script file includes an example Basic Mode 1 script, which configures the ADV7613 as follows:

The Basic Mode 1 is used for receiver (Rx) to transmitter (Tx) processing of the input video. The input video is applied via the ADV7613 HDMI Connector J1 from the input video source, and the output video is applied through the LVDS P6 or P7 connectors, HDMI Connector, P1. Run the **02-03 HDMI Input_LVDS_Output Port A and B** script to configure the internal registers of the ADV7613, which allows the applied input video to display on the output monitor in use.
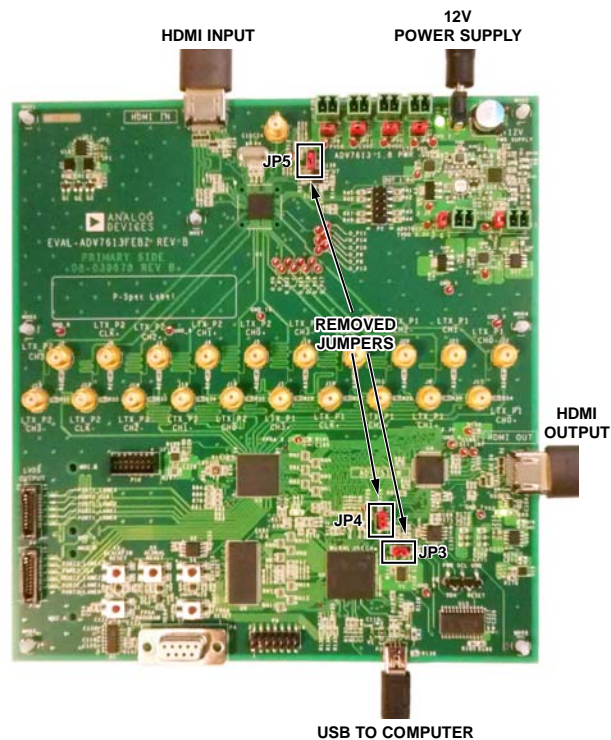
Figure 6. ADV7613 Basic Mode 1

CONTROLLING THE BOARD USING XRC 2p0RC2

1. Ensure that the latest version of the XRC is installed with the ADV7613 scripts and the XML (XRC 2p0RC2 is used in this guide). The executable file is found in the ADV7613 Design Support Files page in EngineerZone. Follow the instructions in the executable file. After installation, drag and drop the EVAL-ADV7613FEBZ files, **ADV7613_2** and the **OUTPUT_MODULE_E** file (**ADV7511** file) into the XRC window.

2. Implement the set up as shown in Figure 7. Note each of the necessary connections and the removed jumpers

3. Open XRC. The **SDP is connected** dialog box appears. Click **OK** to continue to the main XRC window.

4. Select **Choose Board…**, **ADV7613_2** as the **Rx** and **OUTPUT_MODULE_E = ADV7511** as the **Tx** from the window shown in Figure 8, and click **Load**. It can take a while for the boards to load.

5. When the boards load, select **Scripts** from the menu bar at the top of the screen and navigate to **02-03 HDMI Input_LVDS_Output Port A and B** script, as shown in Figure 9. The source video feed appears on the output display.
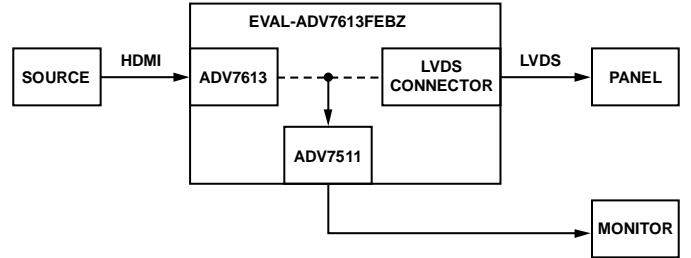
Figure 7. Evaluation Board Set Up for Controlling with XRC
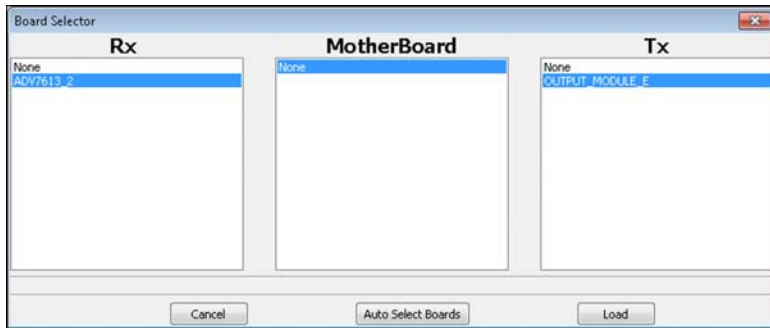
Figure 8. Choosing Boards in XRC
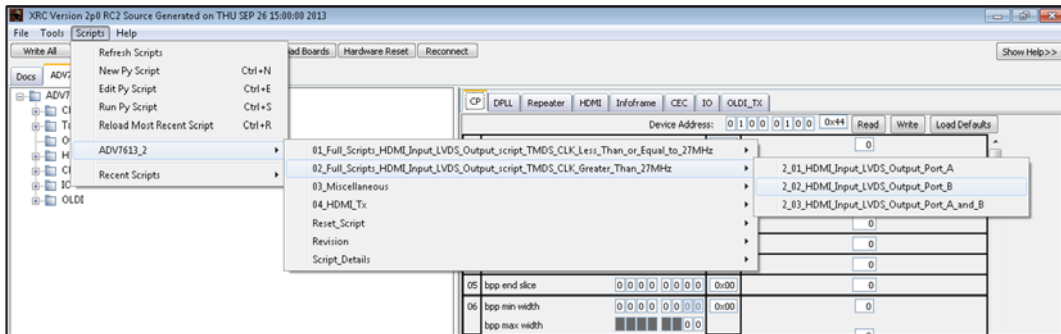
Figure 9. Selecting and Running a Script in XRC

NOTES

I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).

HDMI, the HDMI Logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

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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