FEATURES
Six video input ports capable of accepting any of the following formats: single-ended CVBS, differential CVBS, S-Video (Y/C), and component (YPbPr)
MIPI CSI-2 Tx output

SOFTWARE NEEDED
DVP evaluation software
ADV7282A-M script
Windows OS

GENERAL DESCRIPTION
The EVAL-ADV7282AMEBZ evaluation kit is the platform provided by Analog Devices, Inc., to evaluate the ADV7282A-M video decoder. The EVAL-ADV7282AMEBZ evaluation kit contains an EVAL-ADV7282AMEBZ evaluation board and all of its necessary peripherals.

This user guide provides a detailed overview of the EVAL-ADV7282AMEBZ evaluation board hardware and the software required to use it.

The ADV7282A-M data sheet and the ADV7280A/ADV7281A/ADV7282A Device Manual should be consulted in conjunction with this user guide when using the EVAL-ADV7282AMEBZ evaluation board.

EngineerZone can be accessed to find additional information about the ADV7282A-M.
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REVISION HISTORY

9/2017—Revision 0: Initial Version
EVALUATION BOARD HARDWARE

EVALUATION BOARD OVERVIEW

The EVAL-ADV7282AMEBZ evaluation board features an ADV7282A-M video decoder and a bank of subminiature version A (SMA) connectors. Six analog video inputs (A\textsubscript{IN}1 to A\textsubscript{IN}6) are connected to the ADV7282A-M video decoder. The ADV7282A-M can receive analog video in several different formats; hardware configuration changes can be required to support certain configurations, for example, single-ended CVBS vs. differential CVBS (see Table 1). The ADV7282A-M converts the analog video received into a mobile industry processor interface (MIPI\textsuperscript{TM}) CSI-2 Tx (MIPI Tx) digital stream. The ADV7282A-M MIPI Tx output consists of one differential data channel (D0P and D0N) and one differential clock channel (CLKP and CLKN); both channels are available at the SMA connectors on the evaluation board.

Analog Video Input Format Configurations

Configuring A\textsubscript{IN}5 and A\textsubscript{IN}6 for Single-Ended CVBS

To configure the A\textsubscript{IN}5 and A\textsubscript{IN}6 inputs to receive single-ended CVBS, make the following resistor changes on the evaluation board:
1. Remove resistor R51.
2. Replace resistors R33 and R35 with 24 Ω resistors.
3. Replace resistors R28 and R29 with 51 Ω resistors.

Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS

To configure A\textsubscript{IN}1 and A\textsubscript{IN}2 to receive differential CVBS, make the following resistor changes on the evaluation board:
1. Replace resistors R24 and R25 with 1.3 kΩ resistors.
2. Replace resistors R21 and R23 with 430 Ω resistors.
3. Replace R54 with a 75 Ω resistor for pseudo differential CVBS or with a 150 Ω resistor for fully differential CVBS.
4. Connect the positive input to A\textsubscript{IN}1 and the negative input to A\textsubscript{IN}2.

Configuring A\textsubscript{IN}3 and A\textsubscript{IN}4 for Differential CVBS

To configure A\textsubscript{IN}3 and A\textsubscript{IN}4 to receive differential CVBS, make the following resistor changes on the evaluation board:
1. Replace resistors R11 and R12 with 1.3 kΩ resistors.
2. Replace resistors R4 and R10 with 430 Ω resistors.
3. Replace resistor R32 with a 75 Ω for pseudo differential CVBS or with a 150 kΩ for fully differential CVBS.
4. Connect the positive input to A\textsubscript{IN}3 and the negative input to A\textsubscript{IN}4.

Configuring A\textsubscript{IN}5 and A\textsubscript{IN}6 for S-Video (Y/C)

To configure A\textsubscript{IN}5 and A\textsubscript{IN}6 to receive S-Video (Y/C), make the following resistor changes on the evaluation board:
1. Remove resistor R51.
2. Replace resistors R33 and R35 with 24 Ω resistors.
3. Replace resistors R28 and R29 with 51 Ω resistors.
4. Connect the luma channel (Y) to A\textsubscript{IN}5 and the chroma channel (C) to A\textsubscript{IN}6.

Table 1. Analog Video Input Format Configurations for the EVAL-ADV7282AMEBZ Evaluation Board

<table>
<thead>
<tr>
<th>Configuration</th>
<th>A\textsubscript{IN}1</th>
<th>A\textsubscript{IN}2</th>
<th>A\textsubscript{IN}3</th>
<th>A\textsubscript{IN}4</th>
<th>A\textsubscript{IN}5</th>
<th>A\textsubscript{IN}6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>Single-Ended CVBS Input 1</td>
<td>Single-Ended CVBS Input 2</td>
<td>Single-Ended CVBS Input 3</td>
<td>Single-Ended CVBS Input 4</td>
<td>Differential CVBS Input 1, positive channel See the Configuring A\textsubscript{IN}5 and A\textsubscript{IN}6 for Single-Ended CVBS section</td>
<td>Differential CVBS Input 1, negative channel See the Configuring A\textsubscript{IN}5 and A\textsubscript{IN}6 for Single-Ended CVBS section</td>
</tr>
<tr>
<td>Single-Ended CVBS</td>
<td>Default</td>
<td>Default</td>
<td>Default</td>
<td>Default</td>
<td>See the Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS section</td>
<td>See the Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS section</td>
</tr>
<tr>
<td>Differential CVBS</td>
<td>See the Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS section</td>
<td>See the Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS section</td>
<td>See the Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS section</td>
<td>See the Configuring A\textsubscript{IN}1 and A\textsubscript{IN}2 for Differential CVBS section</td>
<td>Default</td>
<td>Default</td>
</tr>
<tr>
<td>S-Video (Y/C)</td>
<td>S-Video Input 1 (Y channel)</td>
<td>S-Video Input 1 (C channel)</td>
<td>S-Video Input 2 (Y channel)</td>
<td>S-Video Input 2 (C channel)</td>
<td>See the Configuring A\textsubscript{IN}5 and A\textsubscript{IN}6 for S-Video (Y/C) section</td>
<td>See the Configuring A\textsubscript{IN}5 and A\textsubscript{IN}6 for S-Video (Y/C) section</td>
</tr>
<tr>
<td>YPrPb</td>
<td>YPrPb Input 1 (Y channel)</td>
<td>YPrPb Input 1 (Pb channel)</td>
<td>YPrPb Input 1 (Pr channel)</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
EVALUATION BOARD DESCRIPTION

This section outlines how to power up, communicate with, and use the evaluation board. For an outline of the evaluation board connections, see Figure 2.

Power Supply

To power up the evaluation board, connect a mains cable to the 7.5 V power supply block included in the EVAL-ADV7282AMEBZ evaluation kit. Connect the output jack plug of the 7.5 V power supply block to the input power connector (J8) on the evaluation board. LED D6 illuminates when the power supply is enabled and successfully connects to the evaluation board.

Only use the 7.5 V power supply block provided with the evaluation kit to power the evaluation board.

Communicating with the Evaluation Board

To establish communication with the evaluation board, connect the USB cable included in the EVAL-ADV7282AMEBZ evaluation kit to a computer with DVP Eval Software installed. Connect the USB cable to the USB connector (J7) on the evaluation board. LED D7 illuminates when the USB cable successfully connects between an active USB port and the evaluation board.

Connecting Input Video

Connect an analog video input(s) to the desired analog input (A0N1 to A0N6) of the evaluation board. Refer to Table 1 to determine how different types of input (for example, single-ended CVBS and S-Video) connect to the evaluation board. Refer to the ADV7282A-M data sheet and the ADV7280A/ADV7281A/ADV7282A Device Manual for more information on input muxing options.

Connecting Output Video

To observe the output of the evaluation board, connect the MIPI Tx output SMA connectors to a MIPI Tx compatible receiver.

Other Considerations

The 28.63636 MHz crystal (Y1) on the evaluation board does not oscillate until the ADV7282A-M is configured (see the Configuring the Evaluation Board section). The I²C master works independently of the crystal, using a ring oscillator in the ADV7282A-M.

Specific components on the evaluation board are outlined in Table 2 and highlighted in Figure 3. Additional details on components are outlined in Table 3.
Figure 2. Outline of Evaluation Board Connections
Figure 3. ADV7282A-M Evaluation Board
Table 2. Essential Evaluation Board Components

<table>
<thead>
<tr>
<th>Reference Designator</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1 to J6</td>
<td>Analog video inputs</td>
<td>Analog video inputs (A\textsubscript{IN1} to A\textsubscript{IN6}) connected to the ADV7282A-M video decoder.</td>
</tr>
<tr>
<td>D0N, D0P, CLKN, CLKP</td>
<td>MIPI Tx outputs</td>
<td>MIPI Tx data (D0P and D0N) and clock (CLKP and CLKN) outputs.</td>
</tr>
<tr>
<td>J8</td>
<td>Power</td>
<td>Connection for 7.5 V power supply. A 7.5 V power supply block is included in the EVAL-ADV7282AMEBZ evaluation kit.</td>
</tr>
<tr>
<td>D6</td>
<td>Power enabled LED</td>
<td>The LED illuminates when the 7.5 V supply is connected and enabled.</td>
</tr>
<tr>
<td>J7</td>
<td>USB</td>
<td>Connecting a USB cable between this connector and a PC with DVP Eval Software and ADV7282A-M scripts(^1) installed allows control of the evaluation board. See the Evaluation Board Software section for more information on DVP Eval Software and ADV7282A-M scripts.</td>
</tr>
<tr>
<td>D7</td>
<td>USB connected LED</td>
<td>The LED illuminates when the USB cable is connected between an active USB port on a PC and the evaluation board.</td>
</tr>
</tbody>
</table>

\(^1\) These scripts enable control of the ADV7282A-M video decoder.

Table 3. Additional Evaluation Board Components

<table>
<thead>
<tr>
<th>Reference Designator</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRQ</td>
<td>INTRQ output</td>
<td>Interrupt output from the ADV7282A-M.</td>
</tr>
<tr>
<td>Reset and S2</td>
<td>Reset</td>
<td>The evaluation board can be reset by pressing and releasing the push button “S2”. The evaluation board can also be reset by momentarily connecting the “Reset” test point to 0V.</td>
</tr>
<tr>
<td>SDA and SCL</td>
<td>I\textsuperscript{2}C communication bus</td>
<td>Test points. The SDA (I\textsuperscript{2}C data) and SCL (I\textsuperscript{2}C clock) test points provide access to the I\textsuperscript{2}C communication bus on the evaluation board. This allows an external I\textsuperscript{2}C master to be connected instead of using a PC to configure the evaluation board.</td>
</tr>
<tr>
<td>GPO0, GP01, GP02</td>
<td>General purpose output</td>
<td>General purpose output test points.</td>
</tr>
<tr>
<td>K3</td>
<td>EEPROM programming</td>
<td>Never short Jumper K3 and only employ K3 during initial programming. K3 can disable the USB interface on the evaluation board.</td>
</tr>
</tbody>
</table>
EVALUATION BOARD SOFTWARE

SOFTWARE REQUIRED
To complete the initial setup of the evaluation board, it is necessary to download the following:

- ADV7282A-M script files
- DVP Eval Software

DOWNLOADING THE ADV7282A-M SCRIPT FILES
To download the ADV7282A-M script files, complete the following steps:
1. Go to the ADV7282A-M product page.
2. Download the ADV7282AM_Cust.zip file.
3. Unzip the ADV7282AM_Cust.zip file.

DOWNLOADING THE DVP Eval SOFTWARE
To download the DVP Eval Software, complete the following steps:
1. Open the Install DVP Eval Software thread on EngineerZone.

INSTALLING DVP Eval SOFTWARE
To install the DVP Eval Software, complete the following steps:
1. Run the executable file Install DVP Eval Latest Source 10-14-11.exe.
2. Read the Software License Agreement. If in agreement, click the I Agree button.
3. Select the desired Desktop or Start Menu shortcuts, and click the Next button.
4. Select an installation destination folder and click the Install button (see Figure 4). It is recommended to use the default destination folder. Selecting a different destination folder can cause compatibility issues with some versions of the Windows OS.
5. Restart the PC after the installing the DVP Eval Software.

LOADING THE ADV7282A-M SCRIPT FILES
This section describes how to combine the ADV7282A-M script files with the DVP Eval Software.
1. If possible, disconnect the PC from the internet, as some automatic backup agents can interfere with the script file loading process.
2. Copy the unzipped ADV7282AM_Cust folder to the following directory: C:\Documents and Settings\USER_NAME\My Documents\Analog Devices\DVP Eval Latest Source 10-14-11\xml\New Boards.
3. The location of this folder is influenced by the install location of the DVP Eval Software and USER_NAME must be defined by the user.
4. Open the DVP Eval Software by selecting Start > All Programs > Analog Devices > DVP Eval Latest Source 10-14-11.
5. Select File > Update Boards to combine the ADV7282A-M script files with the DVP Eval Software (see Figure 5).
6. After the Update Boards process completes, click OK on the Update Boards Successful window. The PC can now reconnect to the internet if it is disconnected.
CONFIGURING THE EVALUATION BOARD

After connecting and powering up the hardware and downloading and installing the software, begin using the evaluation board.

To configure the evaluation board, complete the following steps:

1. Select Start > All Programs > Analog Devices > DVP Eval Latest Source 10-14-11.
2. Click the Choose Board button in the top left corner of the DVP Eval Software window to open the Board Selector window (see Figure 6).
3. Select ADV7282AM_CUST in the Rx list box of the Board Selector window, select None in the MotherBoard list box, and select None in the Tx list box.
4. Click the Load button. A window similar to Figure 7 appears.
5. Select Scripts > ADV7282AM_CUST to select and run a script to configure the evaluation board (see Figure 8).
6. To monitor the registers of the ADV7282A-M, click on the associated device tab within the DVP Eval Software (see Figure 8).
I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).

Figure 8. Running EVAL-ADV7282A-M Script on DVP Eval Software

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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