

## Advantiv **EVAL-ADV7625-SMZ** Video Evaluation Board

### FEATURES

5 HDMI inputs, 2 HDMI outputs  
PC communication via RS-232  
[ADSP-21487](#) or [ADSP-21489](#) for audio processing

### EVALUATION BOARD KIT CONTENTS

[EVAL-ADV7625-SMZ](#) Advantiv video evaluation board

### ADDITIONAL EQUIPMENT/SOFTWARE NEEDED

Computer with RS-232 I/O for  
Sending commands to the repeater software and viewing software output of the board  
Controlling the board via Advantiv video evaluation software (AVES3 or newer) application  
Updating the firmware of the board (if desired or necessary)

### GENERAL DESCRIPTION

The [EVAL-ADV7625-SMZ](#) Advantiv® video evaluation board (AVEB) is a low cost solution for evaluating the performance of the [ADV7625](#) HDMI® transceiver.

The evaluation board uses a Blackfin® [ADSP-BF524](#) processor for system control and includes software (firmware) that provides a serial command interface to control the functionality of the board.

This evaluation board is available in one option:

- With High Bandwidth Digital Content Protection (HDCP) support ([EVAL-ADV7625-SMZ](#)), available only to licensees of HDCP.

### PHOTOGRAPH OF EVALUATION BOARD

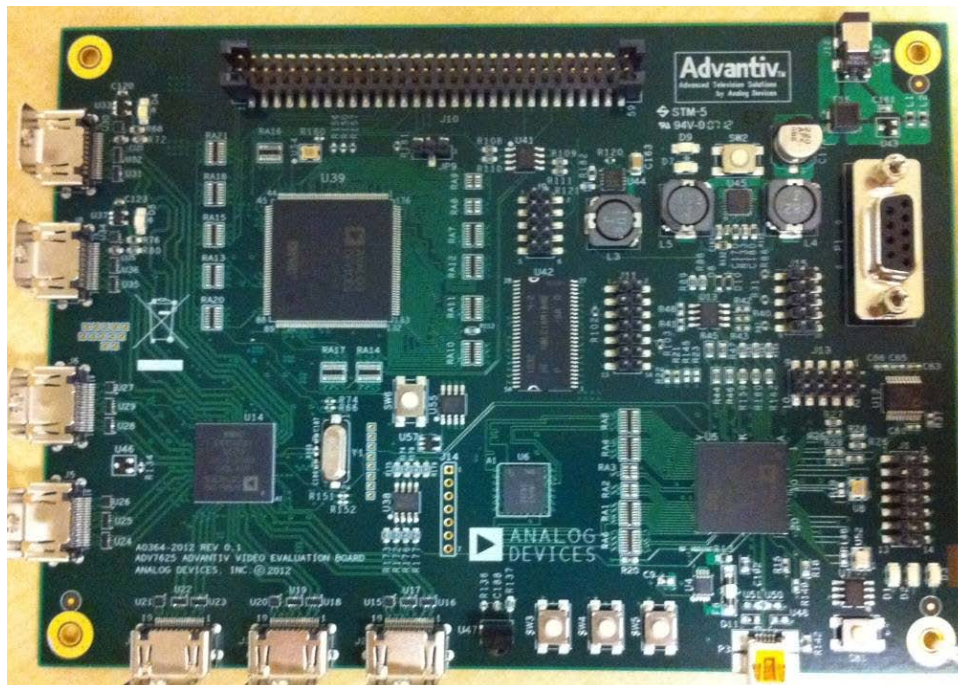


Figure 1. [EVAL-ADV7625-SMZ](#) Advantiv Video Evaluation Board

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**REVISION HISTORY**

2/14—Revision 0: Initial Version

## TERMINOLOGY

### Source

A source outputs digital audio/video over a DVI/HDMI interface. This can be a DVD/Blu-ray player, set-top box, game console, or any other device with a DVI/HDMI output.

### Sink

A sink accepts video through a DVI/HDMI interface. This is nearly always a display with DVI/HDMI input in the context of this user guide.

### Software driver

Within this user guide, this term refers to the software that runs on the [ADSP-BF524](#) and implements the link between a source and a sink.

## EVALUATION BOARD HARDWARE

A block diagram of the [EVAL-ADV7625-SMZ](#) is shown in Figure 2, and the most frequently used connectors are shown in Figure 3. For more information about evaluation board hardware components, see Table 1.

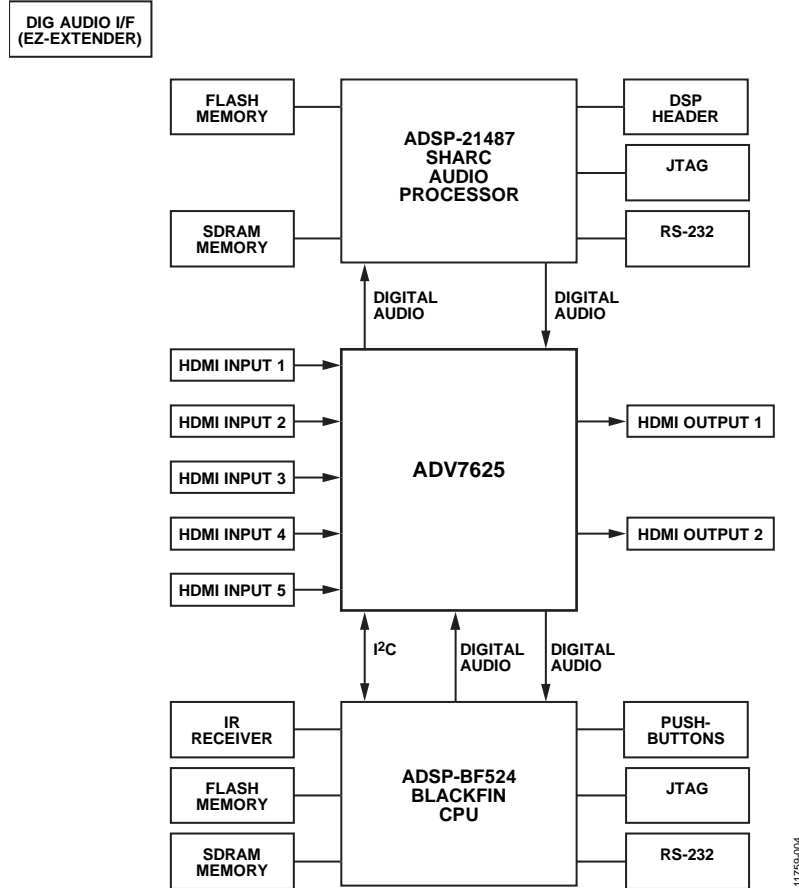


Figure 2. Block Diagram of the [EVAL-ADV7625-SMZ](#)

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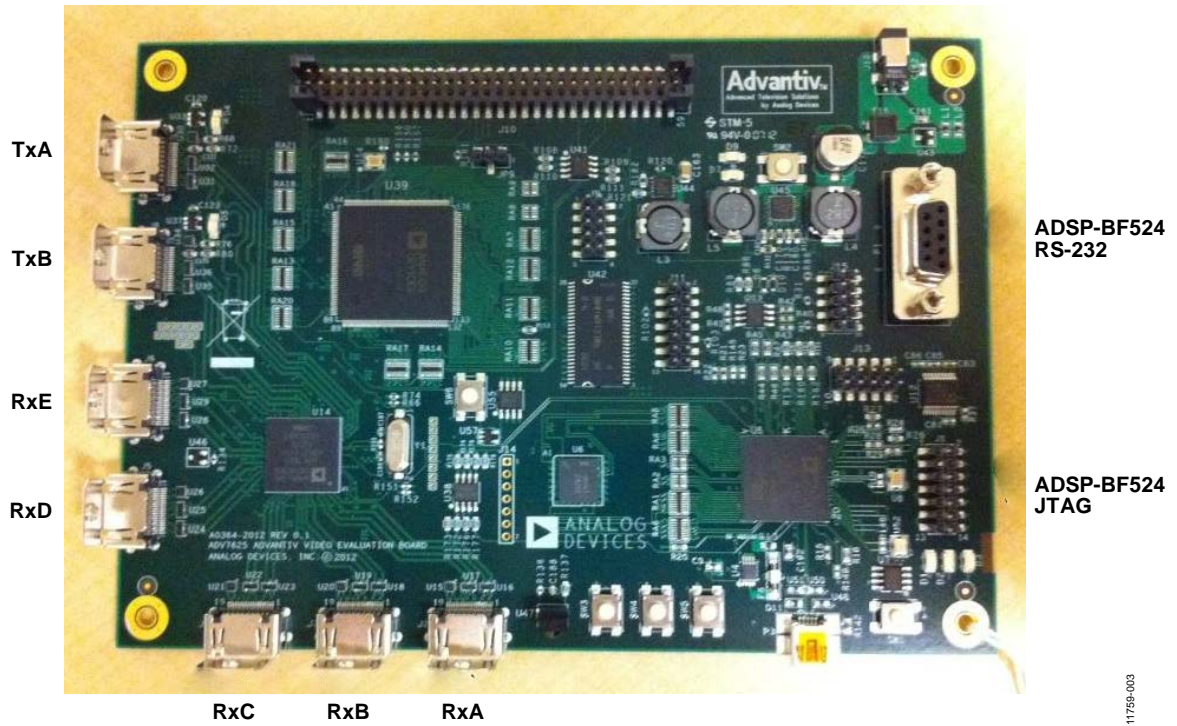


Figure 3. Photograph of Board with Most Frequently Used Connectors Labeled

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Table 1. Evaluation Board Hardware Components

Reference Designator	Function	Description
J12	Power connector	J12 is where the 5 V, 3.6 A power supply is connected.
SW1	ADSP-BF524 reset	This switch resets the ADSP-BF524 processor.
P1	ADSP-BF524 RS-232 port	RS-232 interface between the ADSP-BF524 and the computer (for user control and debug output).
J1	ADSP-BF524 JTAG	The ICE-100B or the HPUSB-ICE is connected here to program the ADSP-BF524 flash or to execute source code debugging.
SW6	SHARC® reset	This switch resets the SHARC processor.
J11	SHARC JTAG	The ICE-100B or the HPUSB-ICE is connected here to program the SHARC flash or to execute source code debugging.
J2, J3, J4, J5, J6	HDMI inputs	J2 is RxA, J3 is RxB, J4 is RxC, J5 is RxD, and J6 is RxE.
J7, J8	HDMI outputs	J7 is TxA, and J8 is TxB.
J10	Digital audio interface	A modified SHARC Audio EZ-Extender® board can be connected to this if analog audio output is desired.

## CONFIGURING THE EVALUATION BOARD

The evaluation board can be connected as shown in Figure 2. You can use either the software driver or the scripts to configure the board such that RxA/RxB/RxC/RxD/RxE are connected to TxA/TxB.

Whether the software driver starts automatically depends on if a jumper is installed across Pin 1 and Pin 2 of J15, as follows:

- Without a jumper installed across Pin 1 and Pin 2 of J15, the application automatically starts the software driver after power-up, allowing an HDMI sink to receive content from an HDMI/HDCP source soon after it is connected.
- With a jumper installed across Pin 1 and Pin 2 of J15, the application pauses at the command prompt after power-up and does not start the software driver, allowing you to configure the board. Configuring the board is typically accomplished with the AVES3 application but can also be accomplished using I<sup>2</sup>C write commands.

The RS-232 command line interface operates at 115,200 baud, eight data bits, no parity, one stop bit, and no flow control. Typing **help** via RS-232 lists the commands that can be used to control the board and indicates the version of the firmware and the build date.

There are two main ways to configure the board:

- Software driver via RS-232
- Advantiv video evaluation software (AVES3 or newer)

### Using the Software Driver via RS-232

In this mode, the RS-232 interface is used primarily to control the software driver. The software driver outputs messages via RS-232 as it establishes an encrypted HDMI link and sources, sinks, or formats changes. Registers can still be read/written from the command line, but anything that is written to a

register can be overwritten by the software driver. To access a full list of commands, type **help**. The most frequently used commands are described in Table 2.

**Table 2. Most Frequently Used Commands**

Command	Description
hdmia a	(RxA to TXA)
hdmib a	(RxB to TXA)
hdmic a	(RxC to TXA)
hdmid a	(RxD to TXA)
hdmie a	(RxE to TXA)
hdmia b	(RxA to TXB)
hdmib b	(RxB to TXB)
hdmic b	(RxC to TXB)
hdmid b	(RxD to TXB)
hdmie b	(RxE to TXB)

### Using AVES3

AVES3 is a Windows®-based application that runs on a PC and allows you to use scripts to configure registers on the [ADV7625](#). This application also displays the individual bit fields for each register and allows you to read/write individual bit fields. The software supports RS-232, USB, and I<sup>2</sup>C (using the Total Phase, Inc., Aardvark™ I<sup>2</sup>C/SPI host adapter).

Unlike in the previous version of AVES (AVES2), in AVES3 each evaluation board has its own AVES3 folder, which contains .xml files and scripts specific to that evaluation board.

If you purchased an [EVAL-ADV7625-SMZ](#) evaluation board, there is documentation in the evaluation kit that explains where to download the AVES3 software and the AVES3 folder.

If you received an [EVAL-ADV7625-SMZ](#) evaluation board from an Analog Devices sales representative, ask your sales contact about the AVES3 software and the AVES3 folder.

## UPGRADING THE SOFTWARE DRIVER

The software driver on the evaluation board can be updated using the U-Boot bootloader that comes with the evaluation board. However, it is preferable to purchase VisualDSP++<sup>®</sup> 5.0 and a low cost JTAG debugger for Blackfin processors ([HPUSB-ICE](#) or [ICE-100B](#)) to use in case the U-Boot software is accidentally erased or corrupted.

### USING U-BOOT

Every [EVAL-ADV7625-SMZ](#) evaluation board is shipped with the U-Boot bootloader firmware. Assuming this software has not been erased or corrupted, you have the option of upgrading the firmware using only an RS-232 cable and software.

An example of output from the U-Boot follows:

```
-----
U-Boot 2012.07-rc2 (ADI-2012R2) (Jul 01 2013
- 15:24:32)

CPU:   ADSP bf524-0.2 (Detected Rev: 0.2)
      (spi flash boot)
Board: ADI Advantiv™ Video Evaluation Board
      Support: http://ez.analog.com
Clock: VCO: 300 MHz, Core: 300 MHz, System:
      100 MHz
RAM:   8 MiB
SF: Detected M25P80 with page size 64 KiB,
total 1 MiB
In:    serial
Out:   serial
Err:   serial
KGDB: [on serial] ready
Hit any key to stop autoboot:
-----
```

For this RS-232 output, you can use the following steps to upgrade the software driver on your board, if you determine this is necessary. Note that these instructions assume you are using the latest version of Tera Term for Windows (which is free to download and use), but any RS-232 software with YMODEM upload capability should also work.

1. At the **hit any key to stop autoboot** prompt, press a key during the countdown.
2. At the **bfm** >prompt, type the following command:  
`sf probe 0:1`

You should see the following:

```
SF: Detected M25P80 with page size 256,
total 1 MiB
1024 KiB M25P80 at 0:1 is now current
device
bfm>
```

3. At this prompt, type the following command:

```
loady
```

You should see the following output:

```
## Ready for binary (ymodem) download to
0x00100000 at 115200 bps...
C
```

4. In Tera Term, under **File**, click **Transfer**, and then click **YMODEM** and select **Send ...**.
5. Select the application firmware (for example, **EVAL-ADV7625\_v1p65\_app.bin**) and click **Open**.
6. You should see the **YMODEM Send** dialog box progress quickly from 0% to 100%. If the software stalls at Packet 1 or Packet 2 for a few seconds, you may need to cancel the transfer and retry. (You may need to repeat Step 3 through Step 5 a few times to accomplish the transfer.) After the transfer is complete, you should see the following:

```
CCxyzModem - CRC mode,
0(SOH)/215(STX)/0(CAN) packets, 5 retries
## Total Size      = 0x000357fc = 219132
Bytes
bfm>
```

7. At this prompt, type the following command to erase the application area of the SPI flash memory:

```
sf erase 0x60000 0xa0000
```

You should then see the following output:

```
bfm>
```

8. At this prompt, type the following command to program the application area of the SPI flash memory:

```
sf write $(loadaddr) 0x60000 $(filesize)
```

You should then see the following output:

```
bfm>
```

9. At this prompt, if you reset your board and allow the countdown to complete, U-Boot launches the newly programmed application firmware.

# EVALUATION BOARD ARTWORK

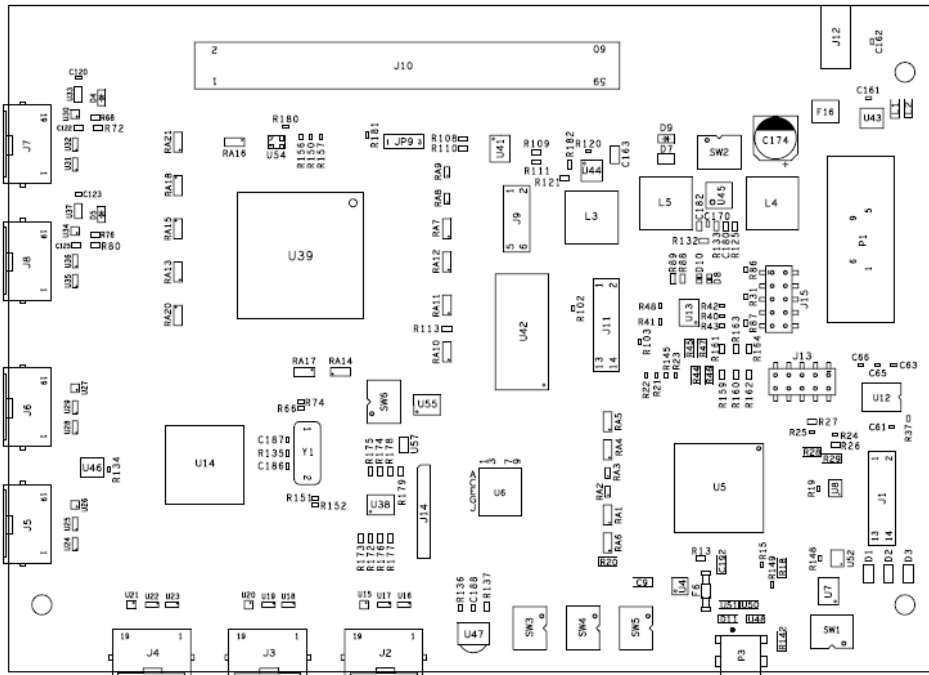


Figure 4. Assembly Drawing (Top Side) of the EVAL-ADV7625-SMZ

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**RELATED LINKS**

<b>Resource</b>	<b>Description</b>
<a href="#">ADV7625</a>	Product Page: Dual Port, Xpressview, 225 MHz HDMI Receiver
<a href="#">ADSP-BF524</a>	Product Page: Low Power Blackfin Processor with Advanced Peripherals and Low Standby Power
<a href="#">HPUSB-ICE</a>	Product Page: USB-Based Emulator and High Performance USB-Based Emulator
<a href="#">ICE-100B</a>	Product Page: Analog Devices Blackfin Emulator

**NOTES**

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I<sup>2</sup>C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).

**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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