# ADSP-21469 EZ-Board®
# Evaluation System Manual

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DEVICES**

# Regulatory Compliance

The ADSP-21469 EZ-Board is designed to be used solely in a laboratory environment. The board is not intended for use as a consumer end product or as a portion of a consumer end product. The board is an open system design which does not include a shielded enclosure and therefore may cause interference to other electrical devices in close proximity. This board should not be used in or near any medical equipment or RF devices.

The ADSP-21469 EZ-Board has been certified to comply with the essential requirements of the European EMC directive 2004/108/EC and therefore carries the "**CE**" mark.

The ADSP-21469 EZ-Board has been appended to Analog Devices, Inc. EMC Technical File (EMC TF) referenced **DSPTOOLS1**, issue 2 dated June 4, 2008 and was declared CE compliant by an appointed Notified Body (No.0673) as listed below.

Notified Body Statement of Compliance: Z600ANA2.033, dated May 2009.

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The EZ-Board evaluation system contains ESD (electrostatic discharge) sensitive devices. Electrostatic charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused EZ-Board boards in the protective shipping package.

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# PREFACE

Thank you for purchasing the ADSP-21469 EZ-Board®, Analog Devices, Inc. evaluation system for SHARC® processors.

SHARC processors are based on a 32-bit super Harvard architecture that includes a unique memory architecture comprised of two large on-chip, dual-ported SRAM blocks coupled with a sophisticated IO processor, which gives a SHARC processor the bandwidth for sustained high-speed computations. SHARC processors represents today's de facto standard for floating-point processing, targeted toward premium audio applications.

The evaluation board is designed to be used in conjunction with the CrossCore® Embedded Studio (CCES) and VisualDSP++® development environments to test the capabilities of the ADSP-21469 SHARC processors. The development environment aids advanced application code development and debug, such as:

- Create, compile, assemble, and link application programs written in C++, C, and ADSP-21469 assembly

- Load, run, step, halt, and set breakpoints in application programs

- Read and write data and program memory

- Read and write core and peripheral registers

- Plot memory

Access to the ADSP-21469 processor from a personal computer (PC) is achieved through a USB port or an external JTAG emulator. The USB interface of the standalone debug agent gives unrestricted access to the

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ADSP-21469 processor and evaluation board's peripherals. Analog Devices JTAG emulators offer faster communication between the host PC and target hardware. To learn more about Analog Devices emulators and processor development tools, go to `http://www.analog.com/dsp/tools`.

The ADSP-21469 EZ-Board provides example programs to demonstrate the capabilities of the product.

# Product Overview

The board features:

- Analog Devices ADSP-21469 SHARC processor

    - Core performance up to 450 MHz

    - 324-pin PBGA package

    - 25 MHz oscillator

    - 5 Mb of internal RAM memory

- Double data rate synchronous dynamic random access memory (DDR2)

    - Micron MT47H64M16HR-3 – 128 MB (64M x 16 bits)

    - Performance of up to 225 MHz clock rate

- Parallel flash memory

- Numonyx M29W320EB – 4 MB (4M x 8 bits)

- SPI flash memory

  - Numonyx M25P16 – 16 Mb

- Analog audio interface

  - Analog Devices AD1939 audio codec

  - Eight DAC outputs for four channels of stereo output

  - Four ADC inputs for two channels of stereo input

  - Two DB25 connectors for differential inputs/outputs

  - 3.5 mm headphone jack with volume control connected to one of the stereo outputs

  - Supports all eight DACs and four ADCs in TDM and $I^2$S modes at 48 KHz, 96 KHz, and 192 KHz sample rates

- Digital audio interface (S/PDIF)

  - RCA phono jack output

  - RCA phono jack input

- Link port interface

  - Two Samtec ERF8/ERM8 series connectors

  - Link ports performance up to 166 MHz

  - Two EZ-Boards can mate with no cables required

- Temperature monitor

  - ON Semiconductor ADM1032

  - Local and remote temperature sensing

# Product Overview

- Universal asynchronous receiver/transmitter (UART)

    - ADM3202 RS-232 line driver/receiver

    - DB9 female connector

- LEDs

    - Eleven LEDs: one board reset (red), eight general-purpose (amber), one temperature sensor LED (amber), and one power (green)

- Push buttons

    - Five push buttons: one reset, two connected to DAI, two connected to `FLAG` pins of the processor

- Expansion interface II

    - Next generation of the expansion interface design, provides access to most of the ADSP-21469 processor signals

- Land grid array

    - Easy probing of all port pins and most asynchronous memory interface (AMI) signals

- Other features

    - JTAG ICE 14-pin header

    - SHARC power measurement jumpers

Please visit `www.analog.com/21469EZBoard` for additional information, including CCES support.

For information about the hardware components of the EZ-Board, refer to "ADSP-21469 EZ-Board Hardware Reference" on page 2-1.

# Purpose of This Manual

The *ADSP-21469 EZ-Board Evaluation System Manual* provides instructions for installing the product hardware (board). The text describes operation and configuration of the board components and provides guidelines for running your own code on the ADSP-21469 EZ-Board. Finally, a schematic and a bill of materials are provided for reference.

# Intended Audience

The primary audience for this manual is a programmer who is familiar with Analog Devices processors. This manual assumes that the audience has a working knowledge of the appropriate processor architecture and instruction set.

Programmers who are unfamiliar with Analog Devices processors can use this manual, but should supplement it with other texts that describe your target architecture. For the locations of these documents, see "Related Documents".

Programmers who are unfamiliar with CCES or VisualDSP++ should refer to the online help and user's manuals.

# Manual Contents

The manual consists of:

- Chapter 1, "Using the ADSP-21469 EZ-Board" on page 1-1 Describes EZ-Board functionality from a programmer's perspective and provides an easy-to-access memory map.

- Chapter 2, "ADSP-21469 EZ-Board Hardware Reference" on page 2-1 Provides information on the EZ-Board hardware components.

- Appendix A, "ADSP-21469 EZ-Board Bill Of Materials" on page A-1
  Provides a list of components used to manufacture the EZ-Board.

- Appendix B, "ADSP-21469 EZ-Board Schematic" on page B-1
  Provides the resources to allow EZ-Board board-level debugging or to use as a reference guide. Appendix B is part of the online help.

# What's New in This Manual

This is revision 1.1 of the *ADSP-21469 EZ-Board Evaluation System Manual*. The manual has been updated to include CCES information.

For the latest version of this manual, please refer to the Analog Devices Web site.

# Technical Support

You can reach Analog Devices processors and DSP technical support in the following ways:

- Post your questions in the processors and DSP support community at EngineerZone®:
  http://ez.analog.com/community/dsp

- Submit your questions to technical support directly at:
  http://www.analog.com/support

- E-mail your questions about processors, DSPs, and tools development software from **CrossCore Embedded Studio** or **VisualDSP++**:

  Choose **Help > Email Support**. This creates an e-mail to processor.tools.support@analog.com and automatically attaches your **CrossCore Embedded Studio** or **VisualDSP++** version information and license.dat file.

- E-mail your questions about processors and processor applications to:
  processor.support@analog.com or
  processor.china@analog.com (Greater China support)

- In the **USA only**, call **1-800-ANALOGD** (1-800-262-5643)

- Contact your Analog Devices sales office or authorized distributor. Locate one at:
  www.analog.com/adi-sales

- Send questions by mail to:
  Processors and DSP Technical Support
  Analog Devices, Inc.
  Three Technology Way
  P.O. Box 9106
  Norwood, MA 02062-9106
  USA

# Supported Processors

This evaluation system supports Analog Devices ADSP-21462, ADSP-21465, ADSP-21467, and ADSP-21469 SHARC processors.

# Product Information

Product information can be obtained from the Analog Devices Web site and the online help system.

## Analog Devices Web Site

The Analog Devices Web site, `www.analog.com`, provides information about a broad range of products—analog integrated circuits, amplifiers, converters, and digital signal processors.

To access a complete technical library for each processor family, go to `http://www.analog.com/processors/technical_library`. The manuals selection opens a list of current manuals related to the product as well as a link to the previous revisions of the manuals. When locating your manual title, note a possible errata check mark next to the title that leads to the current correction report against the manual.

Also note, `myAnalog` is a free feature of the Analog Devices Web site that allows customization of a Web page to display only the latest information about products you are interested in. You can choose to receive weekly e-mail notifications containing updates to the Web pages that meet your interests, including documentation errata against all manuals. `myAnalog` provides access to books, application notes, data sheets, code examples, and more.

Visit `myAnalog` (found on the Analog Devices home page) to sign up. If you are a registered user, just log on. Your user name is your e-mail address.

## EngineerZone

EngineerZone is a technical support forum from Analog Devices. It allows you direct access to ADI technical support engineers. You can search FAQs and technical information to get quick answers to your embedded processing and DSP design questions.

Use EngineerZone to connect with other DSP developers who face similar design challenges. You can also use this open forum to share knowledge and collaborate with the ADI support team and your peers. Visit http://ez.analog.com to sign up.

# Related Documents

For additional information about the product, refer to the following publications.

Table 1. Related Processor Publications

| Title | Description |
|---|---|
| *ADSP-21467/ADSP-21469 SHARC Processor Data Sheet* | General functional description, pinout, and timing of the processor |
| *ADSP-214xx SHARC Processor Hardware Reference* | Description of the internal processor architecture, registers, and all peripheral functions |
| *SHARC Processor Programming Reference* | Description of all allowed processor assembly instructions |

# Notation Conventions

Text conventions used in this manual are identified and described as follows.

| Example | Description |
|---|---|
| **Close** command (**File** menu) | Titles in reference sections indicate the location of an item within the development environment's menu system (for example, the **Close** command appears on the **File** menu). |
| {this \| that} | Alternative required items in syntax descriptions appear within curly brackets and separated by vertical bars; read the example as this or that. One or the other is required. |
| [this \| that] | Optional items in syntax descriptions appear within brackets and separated by vertical bars; read the example as an optional this or that. |
| [this,…] | Optional item lists in syntax descriptions appear within brackets delimited by commas and terminated with an ellipse; read the example as an optional comma-separated list of this. |
| .SECTION | Commands, directives, keywords, and feature names are in text with letter gothic font. |
| *filename* | Non-keyword placeholders appear in text with italic style format. |
| | **Note:** For correct operation, ...<br>A Note provides supplementary information on a related topic. In the online version of this book, the word **Note** appears instead of this symbol. |
| | **Caution:** Incorrect device operation may result if ...<br>**Caution:** Device damage may result if ...<br>A Caution identifies conditions or inappropriate usage of the product that could lead to undesirable results or product damage. In the online version of this book, the word **Caution** appears instead of this symbol. |
| | **Warning:** Injury to device users may result if ...<br>A Warning identifies conditions or inappropriate usage of the product that could lead to conditions that are potentially hazardous for the devices users. In the online version of this book, the word **Warning** appears instead of this symbol. |

# 1 USING THE ADSP-21469 EZ-BOARD

This chapter provides specific information to assist you with development of programs for the ADSP-21469 EZ-Board evaluation system.

The following topics are covered.

- "UART Interface" on page 1-20

- "LEDs and Push Buttons" on page 1-21

- "JTAG Interface" on page 1-23

- "Land Grid Array" on page 1-24

- "Expansion Interface II" on page 1-25

- "Power Measurements" on page 1-26

- "Power-On-Self Test" on page 1-26

- "Example Programs" on page 1-27

- "Board Design Database" on page 1-27

For information on the graphical user interface, including the boot loading, target options, and other facilities, refer to the online help.

For more information about the ADSP-21469 SHARC processor, see documents referenced in "Related Documents".

# Package Contents

Your ADSP-21469 EZ-Board evaluation system package contains the following items.

- ADSP-21469 EZ-Board

- Universal 5.0V DC power supply

- 3.5 mm stereo headphones

- 6-foot RCA audio cable

- 6-foot 3.5 mm/RCA x 2 Y-cable

- 3.5 mm stereo female to RCA male Y-cable

If any item is missing, contact the vendor where you purchased your EZ-Board or contact Analog Devices, Inc.

# Default Configuration

The EZ-Board evaluation system contains ESD (electrostatic discharge) sensitive devices. Electrostatic charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused EZ-Board in the protective shipping package.

The ADSP-21469 EZ-Board is designed to run outside your personal computer as a standalone unit. You do not have to open your computer case.

When removing the EZ-Board from the package, handle the board carefully to avoid the discharge of static electricity, which can damage some components. Figure 1-1 shows the default jumper and switch settings, connector locations, and LEDs used in installation. Confirm that your board is in the default configuration before using the board.

## Default Configuration
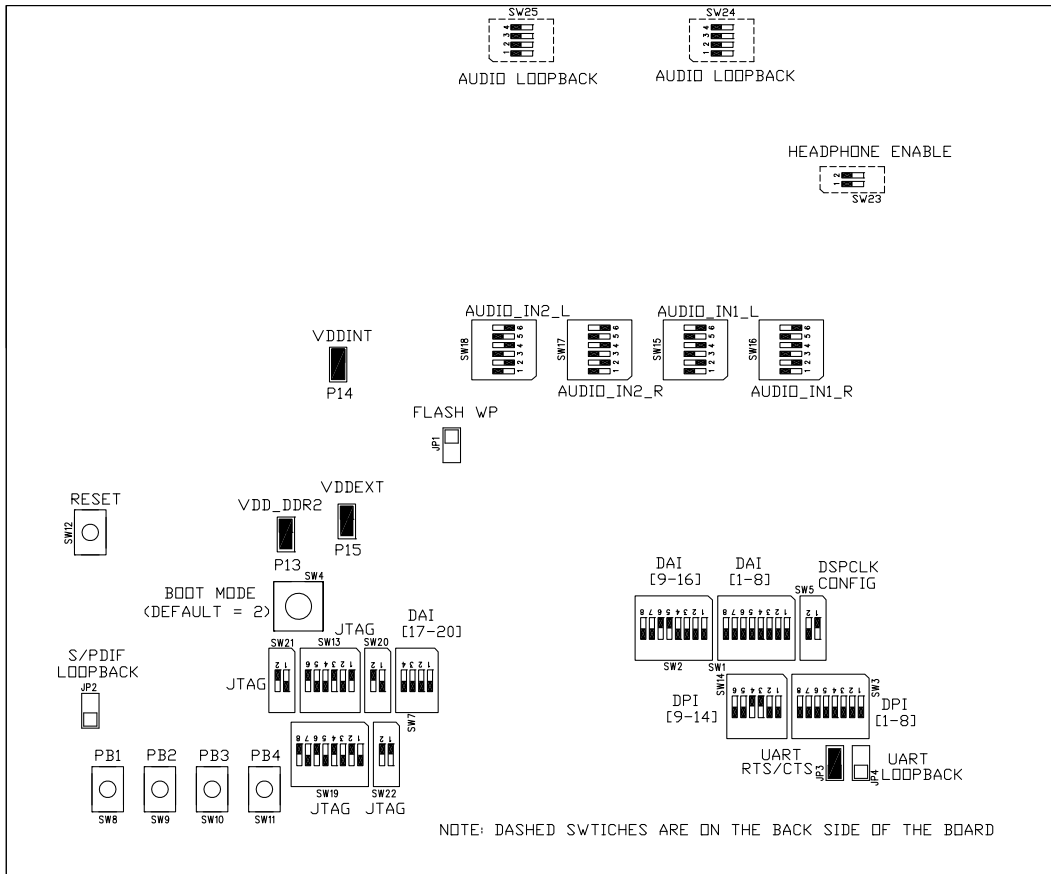


Figure 1-1. Default EZ-Board Hardware Setup

# CCES Install and Session Startup

For information about CCES and to download the software, go to www.analog.com/CCES. A link for the ADSP-21469 EZ-Board Support Package (BSP) for CCES can be found at http://www.analog.com/SHARC/EZKits.

Follow these instructions to ensure correct operation of the product software and hardware.

**Step 1:** Connect the EZ-Board to a personal computer (PC) running CCES using one of two options: an Analog Devices emulator or via the debug agent.

### Using an Emulator:

1. Plug one side of the USB cable into the USB connector of the emulator. Plug the other side into a USB port of the PC running CCES.

2. Attach the emulator to the header connector P1 (labeled JTAG) on the EZ-Board.

### Using the standalone Debug Agent:

1. Attach the standalone debug agent to connectors ZP1 and ZP4 of the EZ-Board.

2. Plug one side of the provided USB cable into the USB connector of the debug agent ZP1 (labeled USB). Plug the other side of the cable into a USB port of the PC running CCES.

**Step 2:** Attach the provided cord and appropriate plug to the 5V power adaptor.

1. Plug the jack-end of the power adaptor into the power connector `P16` (labeled `5V`) on the EZ-Board.

2. Plug the other side of the power adaptor into a power outlet. The power LED (labeled `LED9`) is lit green when power is applied to the board.

3. Power the emulator (if used). Plug the jack-end of the assembled power adaptor into the emulator and plug the other side of the power adaptor into a power outlet. The enable/power indicator is lit green when power is applied.

**Step 3 (if connected through the debug agent):** Verify that the yellow USB monitor LED (labeled `LED2`) and the green power LED (labeled `LED1`) on the debug agent are both on. This signifies that the board is communicating properly with the host PC and ready to run CCES.

## Session Startup

It is assumed that the CrossCore Embedded Studio software is installed and running on your PC.

(i) Note: If you connect the board or emulator first (before installing CCES) to the PC, the Windows driver wizard may not find the board drivers.

1. Navigate to the CCES environment via the **Start** menu.

   Note that CCES is not connected to the target board.

2. Use the system configuration utility to connect to the EZ-Board.

   If a debug configuration exists already, select the appropriate configuration and click **Apply and Debug** or **Debug**. Go to step 8.

   To create a debug configuration, do one of the following:

   - Click the down arrow next to the little bug icon, select **Debug Configurations**

   - Choose **Run > Debug Configurations**.

   The **Debug Configuration** dialog box appears.

3. Select **CrossCore Embedded Studio Application** and click  (**New launch configuration**).

   The **Select Processor** page of the **Session Wizard** appears.

4. Ensure **Blackfin** is selected in **Processor family**. In **Processor type**, select **ADSP-21469**. Click **Next**.

   The **Select Connection Type** page of the **Session Wizard** appears.

5. Select one of the following:

   - For standalone debug agent connections, **EZ-Board** and click **Next**.

   - For emulator connections, **Emulator** and click **Next**.

   The **Select Platform** page of the **Session Wizard** appears.

6. Do one of the following:

    • For standalone debug agent connections, ensure that the selected platform is **ADSP-21469 EZ-Board** via Debug Agent.

    • For emulator connections, choose the type of emulator that is connected to the board.

7. Click **Finish** to close the wizard.

    The new debug configuration is created and added to the program(s) to load list.

8. In the **Program(s) to load** section, choose the program to load when connecting to the board. If not loading any program upon connection to the target, do not make any changes.

    Note that while connected to the target, there is no way to choose a program to download. To load a program once connected, terminate the session.

(i) To delete a configuration, go to the **Debug Configurations** dialog box and select the configuration to delete. Click ✖ and choose **Yes** when asked if you wish to delete the selected launch configuration. Then **Close** the dialog box.

(i) To disconnect from the target board, click the terminate button (red box) or choose **Run > Terminate**.

To delete a session, choose **Target > Session > Session List**. Select the session name from the list and click **Delete**. Click **OK**.

# VisualDSP++ Install and Session Startup

For information about VisualDSP++ and to download the software, go to www.analog.com/VisualDSP.

There are two options to connect the EZ-Board hardware to a personal computer (PC) running VisualDSP++: via an Analog Devices emulator or via a standalone debug agent module. The standalone debug agent allows a debug agent to interface to the ADSP-21469 EZ-Board. The standalone debug agent is shipped with the kit.

**To connect the EZ-Board to a PC via an emulator:**

1. Plug the 5V adaptor into connector P16 (labeled 5.0V).

2. Attach the emulator header to connector P1 (labeled JTAG) on the back side of the EZ-Board.

**To connect the EZ-Board to a PC via a standalone debug agent:**

The debug agent can be used only when power is supplied from the wall adaptor.

1. Attach the standalone debug agent to connectors P1 (labeled JTAG) and ZP1 on the backside of the EZ-Board, watching for the keying pin of P1 to connect correctly.

2. Plug the 5V adaptor into connector P16 (labeled 5.0V).

3. Plug one side of the provided USB cable into a USB connector of the standalone debug agent. Plug the other side of the cable into a USB port of the PC running VisualDSP++.

4. Verify that the yellow USB monitor LED on the standalone debug agent (LED4, located on the back side of the board) is lit. This signifies that the board is communicating properly with the host PC and ready to run VisualDSP++.

# Session Startup

1. If you are running VisualDSP++ for the first time, navigate to the VisualDSP++ environment via the **Start > Programs** menu. The main window appears. Note that VisualDSP++ is not connected to any session. Skip the rest of this step to step 2.

   If you have run VisualDSP++ previously, the last opened session appears on the screen. You can override the default behavior and force VisualDSP++ to start a new session by pressing and holding down the **Ctrl** key while starting VisualDSP++. Do not release the **Ctrl** key until the **Session Wizard** appears on the screen. Go to step 3.

2. To connect to a new EZ-Board session, start **Session Wizard** by selecting one of the following.

   - From the **Session** menu, **New Session**.

   - From the **Session** menu, **Session List**. Then click **New Session** from the **Session List** dialog box.

   - From the **Session** menu, **Connect to Target**.

3. The **Select Processor** page of the wizard appears on the screen. Ensure **SHARC** is selected in **Processor family**. In **Choose a target processor**, select **ADSP-21469**. Click **Next**.

4. The **Select Connection Type** page of the wizard appears on the screen. For standalone debug agent connections, select **EZ-Board** and click **Next**. For emulator connections, select **Emulator**, and click **Next**.

5. The **Select Platform** page of the wizard appears on the screen. For standalone debug agent connections, ensure that the selected platform is **ADSP-21469 EZ-Board via Debug Agent**. For emulator connections, choose the type of emulator that is connected.

Specify your own **Session name** for the session or accept the default name.

The session name can be a string of any length; although, the box displays approximately 32 characters. The session name can include space characters. If you do not specify a session name, VisualDSP++ creates a session name by combining the name of the selected platform with the selected processor. The only way to change a session name later is to delete the session and open a new session.

Click **Next**.

6. The **Finish** page of the wizard appears on the screen. The page displays your selections. Check the selections. If you are not satisfied, click **Back** to make changes; otherwise, click **Finish**. VisualDSP++ creates the new session and connects to the EZ-Board. Once connected, the main window's title is changed to include the session name set in step 5.

To disconnect from a session, click the disconnect button  or select **Session > Disconnect from Target**.

To delete a session, select **Session > Session List**. Select the session name from the list and click **Delete**. Click **OK**.

# CCES Evaluation License

The ADSP-21469 EZ-Board software is part of the Board Support Package (BSP) for the SHARC ADSP-2146x family. The EZ-Board is a licensed product that offers an unrestricted evaluation license for 90 days after activation. Once the evaluation period ends, the evaluation license becomes permanently disabled. If the evaluation license is installed but

not activated, it allows 10 days of unrestricted use and then becomes disabled. The license can be re-enabled by activation.

An evaluation license can be upgraded to a full license. Licenses can be purchased from:

- Analog Devices directly. Call (800) 262-5645 or 781-937-2384 or go to:
  http://www.analog.com/buyonline.

- Analog Devices, Inc. local sales office or authorized distributor. To locate one, go to:
  http://www.analog.com/salesdir/continent.asp.

ⓘ The EZ-Board hardware must be connected and powered up to use CCES with a valid evaluation or full license.

# VisualDSP++ Evaluation License

The ADSP-21469 EZ-Board installation is part of the VisualDSP++ installation. The EZ-Board is a licensed product that offers an unrestricted evaluation license for the first 90 days. Once the initial unrestricted 90-day evaluation license expires:

- VisualDSP++ restricts a connection to the ADSP-21469 EZ-Board via the USB port of the standalone debug agent interface only. Connections to simulators and emulation products are no longer allowed.

- The linker restricts a user program to 27306 words of memory for code space with no restrictions for data space.

ⓘ To avoid errors when opening VisualDSP++, the EZ-KIT Lite hardware must be connected and powered up. This is true for using VisualDSP++ with a valid evaluation or full license.

# Memory Map

The ADSP-21469 processor has internal static random access memory (SRAM) for instructions and data storage; see Table 1-1. The internal memory details can be found in the *ADSP-214xx SHARC Processor Hardware Reference*.

The ADSP-21469 EZ-Board includes three types of external memory: double data rate two synchronous dynamic random access memory (DDR2 SDRAM), serial peripheral interconnect (SPI) flash, and parallel flash. See Table 1-2. For more information about a specific memory type, go to the respective section in this chapter.

Table 1-1. Processor Internal Memory Space

| Start Address | End Address | Contents |
|---|---|---|
| 0x0000 0000 | 0x0003 FFFF | IOP Registers |
| 0x0009 2000 | 0x0009 DFFF | BLOCK 0 RAM |
| 0x0009 E000 | 0x000B 1FFF | Reserved |
| 0x000B 2000 | 0x000B DFFF | BLOCK 1 RAM |
| 0x000B E000 | 0x000B FFFF | Reserved |
| 0x000C 0000 | 0x000C 7FFF | BLOCK 2 RAM |
| 0x000C 8000 | 0x000D FFFF | Reserved |
| 0x000E 0000 | 0x000E 7FFF | BLOCK 3 RAM |

Table 1-2. EZ-Board External Memory Map

| Start Address | End Address | Content |
|---|---|---|
| 0x0020 0000 | 0x021F FFFF | DDR2 (DDR2CS0) |
| 0x0400 0000 | 0x043F FFFF | Flash memory (MS1) |
| 0x0800 0000<br>0x0800 0000 | 0x08FF FFFF<br>0x0BFF FFFF | Unused chip select (MS2) for non-DDR2 addresses<br>Unused chip select (DDR2_CS2) for DDR2 addresses |
| 0x0C00 0000<br>0x0C00 0000 | 0x0CFF FFFF<br>0x0FFF FFFF | Unused chip select (MS3) for non-DDR2 addresses<br>Unused chip select (DDR2_CS3) for DDR2 addresses |

# DDR2 Interface

The ADSP-21469 processor connects to a 128 MB Micron MT47H64M16HR-3 chip through the DDR2 SDRAM controller. The DDR2 memory controller on the processor and DDR2 memory chip are powered by an on-board 1.8V regulator. Data is transferred between the processor and DDR2 on both the rising and falling edges of the DDR2 clock. The DDR2 controller on the processor can operate at a maximum clock frequency of half the processor's core clock. This equates to a DDR2 clock rate of 225 MHz, which is the ADSP-21469 processor limitation.

With a CCES or VisualDSP++ session running and connected to the EZ-Board via the USB standalone debug agent, the DDR2 registers are configured automatically each time the processor is reset. The values are used whenever DDR2 is accessed through the debugger (for example, when viewing memory windows or loading a program).

To disable the automatic setting of the SDRAM registers, do one of the following:

- CCES users, choose **Target > Settings > Target Options** and clear the **Use XML reset values** check box.

- VisualDSP++ users, choose **Settings > Target Options** and clear the **Use XML reset values** check box.

For more information on changing the reset values, refer to the online help.

An example program is included in the EZ-Board installation directory to demonstrate how to setup and access the DDR2 interface.

For more information on how to initialize the registers after a reset, search the online help for "reset values".

# Parallel Flash Memory Interface

The parallel flash memory interface of the ADSP-21469 EZ-Board contains a 4 MB (4M x 8 bits) Numonyx M29W320EB chip. Flash memory connects to the 8-bit data bus and address lines 0 through 21. Chip enable is decoded by the MS1 select line (default) through switch SW13 position 2; see "Asynchronous Control Enable Switch (SW13)" on page 2-13. To use the MS0 line instead of MS1 to interface to flash memory, make the respective change to SW13. The address range for flash memory is 0x0400 0000 to 0x043F FFFF.

Flash memory is pre-loaded with boot code for the power-on-self test (POST) program. For more information, refer to "Power-On-Self Test" on page 1-26.

By default, the EZ-Board boots from the 8-bit parallel flash memory. The processor boots from flash memory if the boot mode select switch (SW4) is set to position 2; see "Boot Mode Select Switch (SW4)" on page 2-10. Flash memory also is preloaded with configuration flash information, such as board revision, BOM revision, and other data.

Flash memory code can be modified. For instructions, refer to the online help and example program included in the EZ-Board installation directory.

For more information about the parallel flash device, refer to the Numonyx Web site: http://www.numonyx.com.

# SPI Interface

The ADSP-21469 processor has two SPI ports which can be accessed via the digital peripheral interface (DPI) pins.

The SPI flash memory, a 16 Mb ST M25P16 device, connects to the SPI port of the processor and designates:

- DPI pin 5 (DPI_P5) as a chip select

- DPI pin 3 (DPI_P3) as the SPI clock

- DPI pin 1 (DPI_P1) as the master out slave in (MOSI) pin

- DPI pin 2 (DPI_P2) as the master in slave out (MISO) pin

The same SPI port and DPI pins connect to the serial flash memory and audio codec via switch SW3. See "DPI [1–8] Enable Switch (SW3)" on page 2-9. The DPI pins also are available on the expansion interface II.

By default, the EZ-Board boots from the 8-bit flash parallel memory. SPI flash can be selected as the boot source by setting the boot mode select switch (SW4) to position 1. See "Boot Mode Select Switch (SW4)" on page 2-10.

The audio codec is set up to use DPI pin 4 as the SPI chip select. For more information, refer to "Audio Interface" on page 1-19.

# Link Port Interface

The ADSP-21469 processor has two dedicated link ports. Each link port has a clock pin, an acknowledge pin, and eight data pins. The ports can operate at up to 166 MHz and act as either a receiver or a transmitter. The ports can be used to interface gluelessly to other ADSP-21469 processors that also have the link port pins brought out.

The EZ-Board enables access to link ports 0 and 1 via connectors P12 and J3, respectively. Two ADSP-21469 EZ-Boards can mate gluelessly via the link port connectors. The processors can communicate via the link ports, all while performing independent tasks on each of the EZ-Boards. To loopback the link port connectors on one EZ-Board or connect three or more EZ-Boards, obtain a standard, off the shelf connector from Samtec. For more information, see "Link Port 0 Connector (P12)" on page 2-30.

The EZ-Board design enables a multi-processor JTAG session using connectors J3 and P12. Two or more EZ-Boards can connect via the link ports and JTAG interfaces and run in a single multi-processor debug session. For more information, see "JTAG Interface" on page 1-23.

By default, the EZ-Board boots from the 8-bit flash parallel memory. Link port 0 can be selected as the boot source by setting the boot mode select switch (SW4) to position 4. See "Boot Mode Select Switch (SW4)" on page 2-10.

# Temperature Sensor Interface

Two external pins (THD_P and THD_M) of the processor are connected to an internal thermal diode. The EZ-Board uses ON Semiconductor's ADM1032 digital thermometer and under/over temperature alarm to monitor the processor's temperature as well as the thermal diode that exists inside the ADM1032 device. The device uses the $I^2C$ bus, DPI pins, and flag pins to communicate to the processor. The following DPI and flag pins are used by the processor and temperature sensing monitor.

- DPI pin 8 (DPI_P8) as the serial clock signal (SCK)

- DPI pin 7 (DPI_P7) as the serial data signal (SDA)

- Flag 3 as the IRQ (not used by default)

- Flag 0 as the thermal limit (not used by default)

The two DPI pins are required; the pins are connected to the temperature sensing monitor via a switch (SW3) and can be shut off if the pins are used on the expansion II interface. The thermal limit flag is connected to a LED (LED11) for a visual alarm if the limit is exceeded. The thermal limit flag and ADM1032 IRQ connect to the flag pins of the processor, but are nonessential for communications. Consequently, SW13 has both flag pins defaulted in the OFF position.

See "DPI [1–8] Enable Switch (SW3)" on page 2-9 and "Asynchronous Control Enable Switch (SW13)" on page 2-13 for more information.

Example programs are included in the EZ-Board installation directory to demonstrate sensor operations.

# S/PDIF Interface

The ADSP-21469 processor has a built-in S/PDIF transmitter and receiver for digital audio applications. The EZ-Board supports the S/PDIF interface and brings out both the transmitter and receiver via RCA connectors J4 and J5, respectively. The S/PDIF's in and out pins are connected by DAI pins via switches SW1 and SW7:

- DAI pin 1 (DAI_P1) as SPDIF_OUT

- DAI pin 18 (DPI_P18) as SPDIF_IN

SW1 and SW7 can be turned off to disconnect the DAI pins from the RCA connectors if the pins are used on the expansion II interface. See "DAI [1–8] Enable Switch (SW1)" on page 2-8 and "DAI [17–20] Enable Switch (SW7)" on page 2-11 for more information.

# Audio Interface

The AD1939 device is a high-performance, single-chip codec featuring eight digital-to-analog converters (DACs) for audio output and four analog-to-digital converters (ADCs) for audio input. This translates to four stereo channels of audio out and two stereo channels of audio in. The codec can input and output data at a sample rate of up to 192 kHz on all channels.

The analog audio channels are available via single-ended RCA connectors (J4 and J5) or differential DB25 connectors (P8 and P9). By default, the EZ-Board is shipped with the RCA connectors used by the AD1939 codec for audio in and out. To use the differential connectors, change DIP switches SW15-18. A standard, off the shelf DB25 connector to XLR cables is required to operate in this mode.

For more information, see "Audio In1 Left Selection Switch (SW15)" on page 2-14 through "Audio In2 Left Selection Switch (SW18)" on page 2-16, and "ADSP-21469 EZ-Board Schematic" on page B-1.

The processor interfaces with the codec via the DAI and DPI pins. The DAI pins can be configured to transfer serial data from the codec in Time-Division Multiplexing (TDM) or Integrated Interchip Sound (I$^2$S) mode. See "DAI Interface" on page 2-3 for more information about the AD1939 connection to the DAI. The DPI interface pins can be configured to use the SPI interface of the processor to set up the codec's control registers. See "DPI Interface" on page 2-4 for more information about the AD1939 connection to the DPI.

The master input clock (MCLK) of the codec is generated by the on-board 12.288 MHz oscillator. The internal PLL of the codec is used to generate varying sample rates. The codec can be set up for 48 KHz, 96 KHz, or 192 KHz frequencies. The codec can run at these frequencies in both TDM and I$^2$S modes with all ADCs inputs and DACs outputs. To run 192 KHz with all ADCs and DACs in TDM mode, the codec must run in dual-line TDM mode.

For information on how to configure the multi-channel codec, refer to the product datasheet at `www.analog.com/AD1939`.

The EZ-Board is connected to the AD1939 codec in master mode. The internal PLL drives the `ABCLK` and `ALRCLK` clock signals out. Both clocks are driven back to the codec's `DBCLK` and `DLRCLK` pins via the `R257` and `R258` resistors. The `ABCLK` and `ALRCLK` clocks that are driven by the codec also connect to the processor's serial ports via the DAI pins. Resistors `R262` and `R263` are used to feed the bit clock and frame sync signals of the processor's serial ports. Connecting the codec in this manner enables a flexible audio sample rate and allows the processor to run at the maximum core frequency.

The audio interface also has a 3.5 mm connector (`J8`) for headphones. The headphones share the output with the external `DAC5` and `DAC6` circuits of the analog audio interface. Switch `SW23` must be enabled for the head-phones. A volume control potentiometer (`R493`) is used to increase or decrease the headphone's volume. For more information, see "Headphone Enable Switch (SW23)" on page 2-19.

Example programs are included in the EZ-Board installation directory to demonstrate how to configure and use the board's analog audio interface.

The DAI and DPI pins going to the AD1939 device can be disabled, then used on the expansion II interface. Refer to "DAI Interface" on page 2-3 and "DPI Interface" on page 2-4 for more information about the DAI and DPI switches.

# UART Interface

The ADSP-21469 processor features a built-in universal asynchronous receiver and transmitter (UART). The UART interface supports full RS-232 functionality via the Analog Devices 3.3V ADM3202 line driver and receiver (`U42`). The UART signals are available on the EZ-Board via DIP switch `SW14`. The UART signals are routed through a DIP switch, can

be disconnected from the respective DPI interface, and used on the expansion II interface. The following DPI pins are used for the RS-232 interface.

- DPI pin 9 (`DPI_P9`) as `UART_TX`

- DPI pin 10 (`DPI_P10`) as `UART_RX`

- DPI pin 11 (`DPI_P11`) as `UART_RTS`

- DPI pin 12 (`DPI_P12`) as `UART_CTS`

Example programs are included in the EZ-Board installation directory to demonstrate UART and RS-232 operations.

For more information about the UART interface, refer to the *ADSP-214xx SHARC Processor Hardware Reference*.

# LEDs and Push Buttons

The EZ-Board has eight general-purpose user LEDs connected directly to the processor, one LED connected to the temperature sensing monitor (ADM1032), one EZ-Board power LED, and one board reset LED. The EZ-board also has five push buttons: four general-purpose push buttons, connected directly to the processor, and one push button for a board reset.

Table 1-3 summarizes the LED connections to the processor. To use the LEDs connected to the DAI or DPI interface, configure the respective registers of the processor. For more information, refer to the *ADSP-214xx SHARC Processor Hardware Reference*.

Table 1-3. LED Connections

| LED Reference Designator | Processor Pin | Connected via Switch |
|---|---|---|
| LED1 | DPI_P6 | SW3.6 |
| LED2 | DPI_P13 | SW14.5 |
| LED3 | DPI_P14 | SW14.6 |
| LED4 | DAI_P3 | SW1.3 |
| LED5 | DAI_P4 | SW1.4 |
| LED6 | DAI_P15 | SW2.7 |
| LED7 | DAI_P16 | SW2.8 |
| LED8 | DAI_P17 | SW7.1 |

Two general-purpose push buttons are attached to the flag pins of the processor, while the other two are attached to the DAI pins. All of the push buttons and LEDs connect to the processor through DIP switches. The DIP switches can disconnect the processor pins, which, in turn, connect to the push buttons and LEDs. See the respective switch section in "ADSP-21469 EZ-Board Hardware Reference" on page 2-1.

The state of the push buttons, connected to the flag pins, can be determined by reading the FLAG register. The push buttons connected to the DAI pins must be configured as interrupts. It is necessary to set up an interrupt routine to determine each pin's state. Table 1-4 shows the push button and processor connections.

Table 1-4. Push Button Connections

| PB Reference Designator | Processor Pin | Connected via Switch |
|---|---|---|
| SW8 (PB1) | FLAG1/IRQ1 | SW13.4 |
| SW9 (PB2) | FLAG2/IRQ2/MS2 | SW13.5 |
| SW10 (PB3) | DAI_P19 | SW7.3 |
| SW11 (PB4) | DAI_P20 | SW7.4 |

An example program is included in the ADSP-21469 installation directory to demonstrate functionality of the LEDs and push buttons.

# JTAG Interface

The JTAG connector (P1) allows the standalone debug agent module to connect a debug session to the ADSP-21469 processor. The debug agent operates only when the external 5V wall adaptor (P16) is used.

The standalone debug agent can be replaced by an external emulator, such as the Analog Devices high-performance USB-based emulator. Be careful not to damage the connectors when removing the debug agent. The emulator connects to P1 on the back side of the board; see "CCES Install and Session Startup" on page 1-5 or "VisualDSP++ Install and Session Startup" on page 1-9 for more information.

The ADSP-21469 EZ-Board can be set up as a single- or multi-processor system. By default, the board is set up in single-processor mode. In single-processor mode, create a session based on a standalone debug agent or an external emulator. To use the EZ-Board in multi-processor mode, install an external emulator. Only one external emulator is required for the main EZ-Board; other EZ-Boards in the JTAG chain do not require an emulator. In this mode, create a platform based on the number of JTAG devices in the JTAG chain using the VisualDSP++ Configurator. Then create a session in VisualDSP++ based on the newly created platform. For multiprocessor mode under CCES, create a platform based on

the number of JTAG devices in the JTAG chain using the Target Configurator. Then create a Debug Configuration in CCES based on the newly created platform.

For a dual ADSP-21469 EZ-Board session, connect two EZ-Boards via connectors `J3` and `P12`. Flip one of the two EZ-Boards by 180 degrees to allow the boards to mate. To switch between single- and multi-processor modes, use DIP switches `SW19-22`. For more information, see "JTAG Switches (SW19–22)" on page 2-17.

For three or more ADSP-21469 EZ-Board sessions, connect each of the EZ-Board with the link port cables. The cables connect the link ports and JTAG pins of each EZ-Board. By using the link port cables, you put the EZ-Board in a JTAG serial chain and the ADSP-21469 processors' link ports in a ring. For three EZ-Boards, three link port cables are required. Similarly, for four EZ-Boards, four link port cables are required. Note that each respective EZ-board also requires its own power supply.

Part numbers for Samtec standard, off the shelf link port cables can be found in "Link Port 0 Connector (P12)" on page 2-30.

For more information about emulators, go to:
http://www.analog.com/processors/tools/sharc.

# Land Grid Array

The ADSP-21469 EZ-Board has provisions for probing every DAI pin, DPI pin, and the asynchronous memory interface pins of the processor on connectors `P5-7`. The connector locations are designed to be used in conjunction with a Tektronix DMAX logic analyzer connector, but can be probed with any oscilloscope or logic analyzer. For pinout information, refer to "ADSP-21469 EZ-Board Schematic" on page B-1.

For more information on the Tektronix DMAX logic analyzer interface, go to the Tektronix Web site.

# Expansion Interface II

The expansion interface II allows an Analog Devices EZ-Extender® or a custom-design daughter board to be tested across various hardware platforms with identical expansion interfaces.

The expansion interface II implemented on the ADSP-21469 EZ-Board consists of two connectors: a 0.1 in. shrouded header (P2) and a Samtec QMS series header (J1). The connectors contain a majority of the ADSP-21469 processor's signals.

(i) DDR2 interface is not brought out to the expansion interface because the interface layout and net length is critical.

For pinout information, go to "ADSP-21469 EZ-Board Schematic" on page B-1. The mechanical dimensions of the expansion connectors can be obtained by contacting Technical Support.

For more information about daughter boards, visit the Analog Devices Web site at:
http://www.analog.com/processors/tools/sharc.

Limits to current and interface speed must be taken into consideration when using the expansion interface II. Current for the expansion interface II is sourced from the EZ-Board; therefore, the current should be limited to 1A for 5V and 500 mA for the 3.3V planes. If more current is required, then a separate power connector and a regulator must be designed on a daughter card. Additional circuitry can add extra loading to signals, decreasing their maximum effective speed.

(i) Analog Devices does not support and is not responsible for the effects of additional circuitry.

# Power Measurements

Several locations are provided for measuring the current draw from various power planes. Precision 0.05 ohm shunt resistors are available on the VDDINT, VDDEXT, and VDD_DDR2 voltage domains. For current draw measuments, the associated jumper on connector P13–15 must be removed. Once the jumper is removed, voltage across the resistor can be measured using an oscilloscope. Once voltage is measured, current can be calculated by dividing the voltage by 0.05. For the highest accuracy, a differential probe should be used for measuring voltage across the resistor.

For more information, see "VDD_DDR2 Power Connector (P13)" on page 2-30, "VDDINT Power Connector (P14)" on page 2-30, and "VDDEXT Power Connector (P15)" on page 2-30.

# Power-On-Self Test

The power-on-self-test program (POST) tests all EZ-Board peripherals and validates functionality as well as connectivity to the processor. Once assembled, each EZ-Board is fully tested for an extended period of time with a POST. All EZ-Boards are shipped with the POST preloaded into one of its on-board flash memories. The POST is executed by resetting the board and pressing the proper push button(s). The POST also can be used as a reference in custom software designs or hardware troubleshooting. Note that the source code for the POST program is included in the installation directory along with the readme file, which describes how the EZ-Board is configured to run a POST.

ⓘ The POST program is only available when using VisualDSP++.

# Example Programs

Example programs are provided with the ADSP-21469 EZ-KIT Lite to demonstrate various capabilities of the product. The programs are included in the product installation kit and can be found in the `Examples` folder of the installation. Refer to a readme file provided with each example for more information.

CCES users are encouraged to use the example browser to find examples included with the EZ-KIT Lite Board Support Package.

# Board Design Database

A `.zip` file containing all of the electronic information required for the design, layout, fabrication and assembly of the product is available for download from the Analog Devices board design database at: `http://www.analog.com/sharc-board-design-database`.

**Board Design Database**

# 2 ADSP-21469 EZ-BOARD HARDWARE REFERENCE

This chapter describes the hardware design of the ADSP-21469 EZ-Board board.

The following topics are covered.

# System Architecture

This section describes the processor's configuration on the EZ-Board (Figure 2-1).
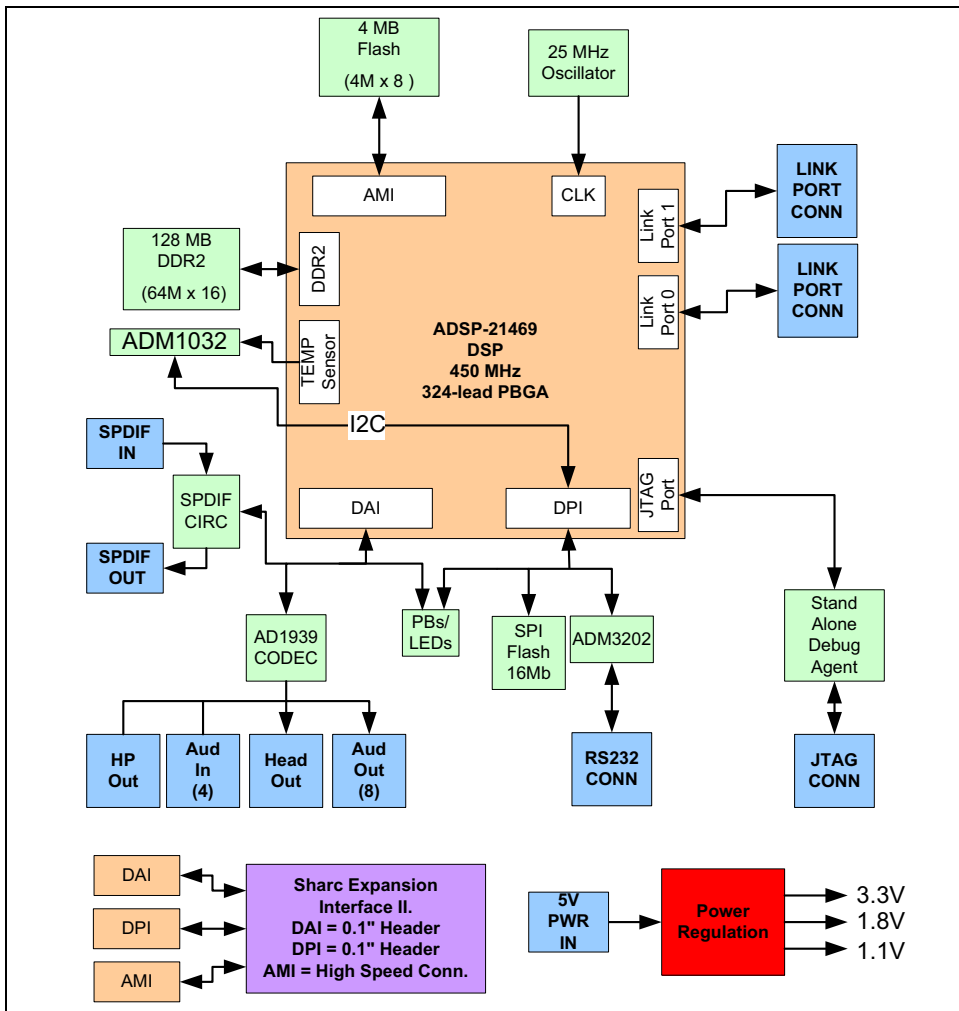


Figure 2-1. System Architecture

The EZ-Board is designed to demonstrate the ADSP-21469 SHARC processor capabilities. The processor has an I/O voltage of 3.3V. The core voltage of the processor is 1.1V, and the double data rate (DDR2) voltage is 1.8V.

The input clock is 25 MHz. The default boot mode of the processor is external parallel flash boot. See "Boot Mode Select Switch (SW4)" on page 2-10 for information on how to change the default boot mode.

## DAI Interface

The digital application interface (DAI) pins are connected to the signal routing unit (SRU) of the processor. The SRU is a flexible routing system providing a large system of signal flows within the processor. The SRU allows you to route the DAI pins to different internal peripherals in various combinations.

The DAI connects various peripherals on the EZ-Board. Table 2-1 shows the DAI pin names, associated peripheral and net names, switch designators through which the pins connect to the peripherals, and default switch settings.

Table 2-1. DAI Connections

| DAI Pin | Peripheral | Peripheral Net | Connected via Switch | Switch Setting (Default) |
|---------|------------|----------------|----------------------|--------------------------|
| DAI_P1  | S/PDIF     | SPDIF_OUT      | SW1.1                | ON                       |
| DAI_P2  | AD1939     | SOFT_RESET     | SW1.2                | ON                       |
| DAI_P3  | LEDs       | LED4           | SW1.3                | ON                       |
| DAI_P4  | LEDs       | LED5           | SW1.4                | ON                       |
| DAI_P5  | AD1939     | ASDATA1        | SW1.5                | ON                       |
| DAI_P6  | AD1939     | ASDATA2        | SW1.6                | ON                       |
| DAI_P7  | AD1939     | ABCLK          | SW1.7                | ON                       |
| DAI_P8  | AD1939     | ALRCLK         | SW1.8                | ON                       |

Table 2-1. DAI Connections (Cont'd)

| DAI Pin | Peripheral | Peripheral Net | Connected via Switch | Switch Setting (Default) |
|---------|-----------|----------------|----------------------|--------------------------|
| DAI_P9 | AD1939 | DSDATA4 | SW2.1 | ON |
| DAI_P10 | AD1939 | DSDATA3 | SW2.2 | ON |
| DAI_P11 | AD1939 | DSDATA2 | SW2.3 | ON |
| DAI_P12 | AD1939 | DSDATA1 | SW2.4 | ON |
| DAI_P13 | AD1939 | DBCLK | SW2.5 | ON |
| DAI_P14 | AD1939 | DLRCLK | SW2.6 | ON |
| DAI_P15 | LEDs | LED6 | SW2.7 | ON |
| DAI_P16 | LEDs | LED7 | SW2.8 | ON |
| DAI_P17 | LEDs | LED8 | SW7.1 | ON |
| DAI_P18 | S/PDIF | SPDIF_IN | SW7.2 | ON |
| DAI_P19 | Push buttons | PB3 | SW7.3 | ON |
| DAI_P20 | Push buttons | PB4 | SW7.4 | ON |

To use the DAI on the expansion II interface, disable any signal driving a DAI pin with the associated switch. The pinout of the expansion connectors can be found in "ADSP-21469 EZ-Board Schematic" on page B-1.

# DPI Interface

The digital peripheral interface (DPI) pins are connected to a second signal routing unit of the processor (SRU2). The SRU2 unit, similar to the SRU, is a flexible routing system providing a large system of signal flows within the processor. The SRU2 allows you to route the DPI pins to different internal peripherals in various combinations.

The DPI connects various peripherals on the EZ-Board. Table 2-2 shows the DPI pin names, associated peripheral and net names, switch designators through which the pins connect to the peripherals, and default switch settings.

Table 2-2. DPI Connections

| DPI Pin | Peripheral | Peripheral Net | Connected via Switch | Switch Setting (Default) |
|---------|-----------|----------------|----------------------|--------------------------|
| DPI_P1 | SPI memory AD1939 | SPI_MOSI | SW3.1 | ON |
| DPI_P2 | SPI memory AD1939 | SPI_MISO | SW3.2 | ON |
| DPI_P3 | SPI memory AD1939 | SPI_CLK | SW3.3 | ON |
| DPI_P4 | AD1939 | AD1939_CS | SW3.4 | ON |
| DPI_P5 | SPI memory | SPI_CS | SW3.5 | ON |
| DPI_P6 | LEDs | LED1 | SW3.6 | ON |
| DPI_P7 | Temp sensor | TEMP_SDA | SW3.7 | ON |
| DPI_P8 | Temp sensor | TEMP_SCK | SW3.8 | ON |
| DPI_P9 | UART | UART_TX | SW14.1 | ON |
| DPI_P10 | UART | UART_RX | SW14.2 | ON |
| DPI_P11 | UART | UART_RTS | SW14.3 | OFF |
| DPI_P12 | UART | UART_CTS | SW14.4 | OFF |
| DPI_P13 | LEDs | LED2 | SW14.5 | ON |
| DPI_P14 | LEDs | LED3 | SW14.6 | ON |

To use the DPI on the expansion II interface, disable any signal driving a DPI pin with the associated switch. The pinout of the expansion connectors can be found in "ADSP-21469 EZ-Board Schematic" on page B-1.

# Flags and Memory Selects

The processor has four asynchronous memory selects, four flag pins, three interrupt request pins, and one timer expired pin. All flag/memory pins are multi-functional and depend on the ADSP-21469 processor setup. Table 2-3 shows the pin names, corresponding peripheral and net names,

switch designators through which the pins connect to the peripherals, and default switch settings.

To use the flags or memory selects on the expansion II interface, disable any signal driving a flag or memory pin with the associated switch. The pinout of the expansion connectors can be found in "ADSP-21469 EZ-Board Schematic" on page B-1.

Table 2-3. Flags and Memory Select Connections

| Flag/Memory Pin | Peripheral | Peripheral Net | Connected via Switch | Switch Setting (Default) |
|---|---|---|---|---|
| MS0 | Parallel flash memory | FLASH_CS | SW13.1 | OFF |
| MS1 | Parallel flash memory | FLASH_CS | SW13.2 | ON |
| FLAG0/IRQ0 | Temp sensor | THERMAL_LIMIT | SW13.3 | OFF |
| FLAG1/IRQ1 | Push buttons | PB1 | SW13.4 | ON |
| FLAG2/IRQ2/MS2 | Push buttons | PB2 | SW13.5 | ON |
| FLAG3/TIMEXP/MS3 | Temp sensor | TEMP_IRQ | SW13.6 | OFF |

# Push Button and Switch Settings

This section describes operation of the push buttons and switches. The push button and switch locations are shown in Figure 2-2.
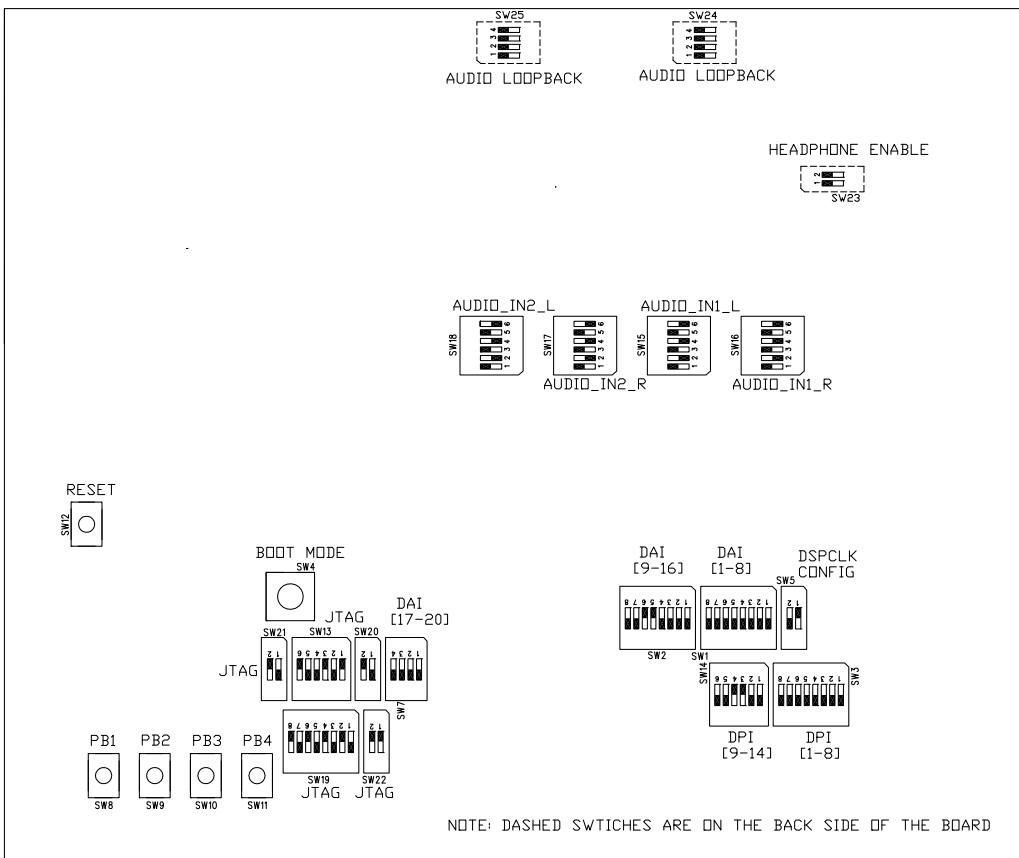


Figure 2-2. Push Button and Switch Locations

## DAI [1–8] Enable Switch (SW1)

The DAI [1–8] enable switch (SW1) disconnects the DAI pins one through eight on the processor from the associated peripherals on the EZ-Board and allows the DAI signals to be used on the expansion II interface; see Table 2-4.

Table 2-4. DAI [1–8] Enable Switch (SW1)

| SW1 Position | DAI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW1.1 | DAI_P1 | S/PDIF | SPDIF_OUT | ON |
| SW1.2 | DAI_P2 | AD1939 | SOFT_RESET | ON |
| SW1.3 | DAI_P3 | LEDs | LED4 | ON |
| SW1.4 | DAI_P4 | LEDs | LED5 | ON |
| SW1.5 | DAI_P5 | AD1939 | ASDATA1 | ON |
| SW1.6 | DAI_P6 | AD1939 | ASDATA2 | ON |
| SW1.7 | DAI_P7 | AD1939 | ABCLK | ON |
| SW1.8 | DAI_P8 | AD1939 | ALRCLK | ON |

## DAI [9–16] Enable Switch (SW2)

The DAI [9–16] enable switch (SW2) disconnects the DAI pins nine through 16 on the processor from the associated peripherals on the EZ-Board and allows the DAI signals to be used on the expansion II interface; see Table 2-5.

Table 2-5. DAI [9–16] Enable Switch (SW2)

| SW2 Position | DAI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW2.1 | DAI_P9 | AD1939 | DSDATA4 | ON |
| SW2.2 | DAI_P10 | AD1939 | DSDATA3 | ON |
| SW2.3 | DAI_P11 | AD1939 | DSDATA2 | ON |
| SW2.4 | DAI_P12 | AD1939 | DSDATA1 | ON |
| SW2.5 | DAI_P13 | AD1939 | DBCLK | OFF |
| SW2.6 | DAI_P14 | AD1939 | DLRCLK | OFF |
| SW2.7 | DAI_P15 | LEDs | LED6 | ON |
| SW2.8 | DAI_P16 | LEDs | LED7 | ON |

## DPI [1–8] Enable Switch (SW3)

The DPI [1–8] enable switch (SW3) disconnects the DPI pins one through eight on the processor from the associated peripherals on the EZ-Board and allows the DPI signals to be used on the expansion II interface; see Table 2-6.

Table 2-6. DPI [1–8] Enable Switch (SW3)

| SW3 Position | DPI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW3.1 | DPI_P1 | SPI memory AD1939 | SPI_MOSI | ON |
| SW3.2 | DPI_P2 | SPI memory AD1939 | SPI_MISO | ON |
| SW3.3 | DPI_P3 | SPI memory AD1939 | SPI_CLK | ON |
| SW3.4 | DPI_P4 | AD1939 | AD1939_CS | ON |
| SW3.5 | DPI_P5 | SPI memory | SPI_CS | ON |
| SW3.6 | DPI_P6 | LEDs | LED1 | ON |

Table 2-6. DPI [1–8] Enable Switch (SW3) (Cont'd)

| SW3 Position | DPI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW3.7 | DPI_P7 | Temp sensor | TEMP_SDA | ON |
| SW3.8 | DPI_P8 | Temp sensor | TEMP_SCK | ON |

# Boot Mode Select Switch (SW4)

The boot mode select switch (SW4) determines the boot mode of the processor. Table 2-7 shows the available boot mode settings. By default, the processor boots from the on-board parallel flash memory.

The selected position of SW4 is marked by the notch down the entire rotating portion of the switch, not the small arrow.

Table 2-7. Boot Mode Select Switch (SW4)

| SW4 Position | Processor Boot Mode |
|---|---|
| 0 | SPI slave boot |
| 1 | Boot from SPI flash memory (SPI master boot) |
| 2 | **Boot from 8 external parallel flash memory (default)** |
| 3 | Reserved |
| 4 | Link port 0 boot |
| 5 | Reserved |
| 6 | Reserved |
| 7 | Reserved |

# DSP Clock Configuration Switch (SW5)

The clock configuration switch (SW5) controls the core frequency of the processor at power up. The core to clock-in ratio is multiplied by the 25 MHz oscillator (U41) to produce the power up core frequency. Table 2-8 shows the switch settings.

The core clock frequency can be increased or decreased via software by writing to the PMCTL register. For more information on changing the core clock frequency and other settings, refer to the *ADSP-214xx SHARC Processor Hardware Reference.*

Table 2-8. Processor Clock Configuration Switch (SW5)

| Position 1 CLKCFG0 | Position 2 CLKCFG0 | Clock Ratio Core: Clock |
|---|---|---|
| ON | ON | Reserved |
| ON | OFF | 32:1 |
| **OFF** | **ON** | **16:1 (default)** |
| OFF | OFF | 6:1 |

# DAI [17–20] Enable Switch (SW7)

The DAI [17–20] enable switch (SW7) disconnects the DAI pins 17 through 20 on the processor from the associated peripherals on the EZ-Board and allows the DAI signals to be used on the expansion II interface; see Table 2-9.

Table 2-9. DAI [17–20] Enable Switch (SW7)

| SW7 Position | DAI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW7.1 | DAI_P17 | LEDs | LED8 | ON |
| SW7.2 | DAI_P18 | S/PDIF | SPDIF_IN | ON |

Table 2-9. DAI [17–20] Enable Switch (SW7) (Cont'd)

| SW7 Position | DAI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW7.3 | DAI_P19 | Push buttons | PB3 | ON |
| SW7.4 | DAI_P20 | Push buttons | PB4 | ON |

# Programmable Flag Push Buttons (SW8–11)

Four momentary push buttons (SW8-11) are provided for general-purpose user input. The buttons are connected to the GPIO pins of the processor. The push buttons are active high and, when pressed, send a high (1) to the processor. Switches SW7 and SW13 disconnect the push buttons from the responding signals. Refer to "DAI [17–20] Enable Switch (SW7)" on page 2-11 and "Asynchronous Control Enable Switch (SW13)" on page 2-13 for more information.

# Reset Push Button (SW12)

The reset push button (SW12) resets the following ICs:

- ADSP-21469 processor (U1)

- AD1939 audio codec (U45)

- Parallel flash memory (U18)

The reset also is linked to the expansion II interface; any daughter card connected to the expansion interface that requires a reset can use SW12.

The reset push button does not reset the standalone debug agent once the debug agent is connected to a personal computer (PC). After communication between the debug agent and PC is initialized, pushing a reset button does not reset the USB chip on the debug agent. The only way to reset the USB chip on the debug agent is to power down the EZ-Board.

## Asynchronous Control Enable Switch (SW13)

The asynchronous control enable switch (SW13) disconnects the control pins of the processor from the associated peripherals on the EZ-Board and allows the respective control signals to be used on the expansion II interface; see Table 2-10.

Table 2-10. Asynchronous Control Enable Switch (SW13)

| SW13 Position | Processor Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW13.1 | MS0 | Parallel flash memory | FLASH_CS | OFF |
| SW13.2 | MS1 | Parallel flash memory | FLASH_CS | ON |
| SW13.3 | FLAG0/IRQ0 | Temp sensor | THERMAL LIMIT | OFF |
| SW13.4 | FLAG1/IRQ1 | Push buttons | PB1 | ON |
| SW13.5 | FLAG2/IRQ2/MS2 | Push buttons | PB2 | ON |
| SW13.6 | FLAG3/TIMEXP/MS3 | Temp sensor | TEMP_IRQ | OFF |

## DPI [9–14] Enable Switch (SW14)

The DPI [9–14] enable switch (SW14) disconnects the DPI pins nine through 14 on the processors from the associated peripherals on the EZ-Board and allows the DPI signals to be used on the expansion II interface; see Table 2-11.

Table 2-11. DPI [9–14] Enable Switch (SW14)

| SW14 Position | DPI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW14.1 | DPI_P9 | UART | UART_TX | ON |
| SW14.2 | DPI_P10 | UART | UART_RX | ON |

Table 2-11. DPI [9–14] Enable Switch (SW14) (Cont'd)

| SW14 Position | DPI Pin | Peripheral | Peripheral Net | Switch Setting (Default) |
|---|---|---|---|---|
| SW14.3 | DPI_P11 | UART | UART_RTS | OFF |
| SW14.4 | DPI_P12 | UART | UART_CTS | OFF |
| SW14.5 | DPI_P13 | LEDs | LED2 | ON |
| SW14.6 | DPI_P14 | LEDs | LED3 | ON |

# Audio In1 Left Selection Switch (SW15)

The audio selection switch (SW15) connects the left channel of the In1 line, connected to the AD1939's ADC1 circuit, to either the single-ended RCA connectors or the differential DB25 connector. By default, SW15 is set up to use the RCA connectors. To use the standard, off the shelf DB25 connector to XLR cables, change the switch to the differential setting; see Table 2-12. For more information, see "Differential In/Out Connectors (P8–9)" on page 2-29.

Table 2-12. Audio In1 Left Selection Switch (SW15)

| SW15 Position | Single-Ended RCA IN (Default) | Differential DB25 IN (P8) |
|---|---|---|
| SW15.1 | ON | OFF |
| SW15.2 | OFF | ON |
| SW15.3 | ON | OFF |
| SW15.4 | OFF | ON |
| SW15.5 | ON | OFF |
| SW15.6 | OFF | ON |

# Audio In1 Right Selection Switch (SW16)

The audio selection switch (`SW16`) connects the right channel of the `In1` line, connected to the AD1939's `ADC2` circuit, to either the single-ended RCA connectors or the differential DB25 connector. By default, the switch is set up to use the RCA connectors for audio in. To use the standard, off the shelf DB25 connector to XLR cables, change the switch to the differential setting; see Table 2-13. For more information, see "Differential In/Out Connectors (P8–9)" on page 2-29.

Table 2-13. Audio In1 Right Selection Switch (SW16)

| SW16 Position | Single-Ended RCA IN (Default) | Differential DB25 IN (P8) |
|---|---|---|
| SW16.1 | ON | OFF |
| SW16.2 | OFF | ON |
| SW16.3 | ON | OFF |
| SW16.4 | OFF | ON |
| SW16.5 | ON | OFF |
| SW16.6 | OFF | ON |

# Audio In2 Right Selection Switch (SW17)

The audio selection switch (`SW17`) connects the right channel of the `In2` line, connected to the AD1939's `ADC4` circuit, to either the single-ended RCA connectors or the differential DB25 connector. By default, the switch is set up to use the RCA connectors for audio in. To use the standard, off the shelf DB25 connector to XLR cables, change the switch to the differential setting; see Table 2-14. For more information, see "Differential In/Out Connectors (P8–9)" on page 2-29.

Table 2-14. Audio In2 Right Selection Switch (SW17)

| SW17 Position | Single Ended Use RCA IN (Default) | Differential DB25 IN (P8) |
|---|---|---|
| SW17.1 | ON | OFF |
| SW17.2 | OFF | ON |
| SW17.3 | ON | OFF |
| SW17.4 | OFF | ON |
| SW17.5 | ON | OFF |
| SW17.6 | OFF | ON |

# Audio In2 Left Selection Switch (SW18)

The audio selection switch (SW18) connects the left channel of the In2 line, connected to the AD1939's ADC3 circuit, to either the single-ended RCA connectors or the differential DB25 connector. By default, the switch is set up to use the RCA connectors for audio in. To use the standard, off the shelf DB25 connector to XLR cables, change the switch to the differential setting; see Table 2-15. For more information, see "Differential In/Out Connectors (P8–9)" on page 2-29.

Table 2-15. Audio In2 Left Selection Switch (SW18)

| SW18 Position | Single Ended RCA IN (Default) | Differential DB25 IN (P8) |
|---|---|---|
| SW18.1 | ON | OFF |
| SW18.2 | OFF | ON |
| SW18.3 | ON | OFF |
| SW18.4 | OFF | ON |
| SW18.5 | ON | OFF |
| SW18.6 | OFF | ON |

## JTAG Switches (SW19–22)

The JTAG switches (SW19-22) select between a single-processor (one EZ-Board) and multi-processor (more than one EZ-Board) configurations. By default, the four DIP switches are set up for a single EZ-Board configuration; see Table 2-16.

The default configuration applies to either a debug agent or an external emulator, such as the Analog Devices high-performance USB-based emulator (HP-USB ICE for short). To use an external emulator and multiple EZ-Boards simultaneously in one multi-processor session, set up the boards as shown in Table 2-17. Attach the boards to each other via connectors J3 and P12. For two EZ-Boards, no external cables are required. For three or more EZ-Boards, obtain Samtec link port cables described in "Link Port 1 Connector (J3)" on page 2-26 and "Link Port 0 Connector (P12)" on page 2-30.

Table 2-16. Single-Processor Configuration

| Switch Position | Single EZ-Board Use (Default) |
| --- | --- |
| SW19.1 | ON |
| SW19.2 | OFF |
| SW19.3 | ON |
| SW19.4 | OFF |
| SW19.5 | ON |
| SW19.6 | OFF |
| SW19.7 | ON |
| SW19.8 | OFF |
| SW20.1 | ON |
| SW20.2 | OFF |
| SW21.1 | ON |
| SW21.2 | OFF |

**Push Button and Switch Settings**

Table 2-16. Single-Processor Configuration (Cont'd)

| Switch Position | Single EZ-Board Use (Default) |
|---|---|
| SW22.1 | OFF |
| SW22.2 | OFF |

Table 2-17. Multiple-Processor Configuration

| Switch Position | Main EZ-Board Attached to Emulator | EZ-Board(s) Not Attached to Emulator |
|---|---|---|
| SW19.1 | ON | OFF |
| SW19.2 | ON | ON |
| SW19.3 | ON | OFF |
| SW19.4 | ON | ON |
| SW19.5 | ON | OFF |
| SW19.6 | ON | ON |
| SW19.7 | ON | OFF |
| SW19.8 | ON | ON |
| SW20.1 | ON | OFF |
| SW20.2 | OFF | OFF |
| SW21.1 | OFF | OFF |
| SW21.2 | ON | ON |
| SW22.1 | OFF | ON |
| SW22.2 | ON | OFF |

# Headphone Enable Switch (SW23)

The headphone enable switch (SW23) connects the AD1939's OUT3 circuit to the 3.5 mm headphone connector (J8). By default, the headphone enable switch is disabled. To use the headphones, set SW23 to all ON. For more information, see "Headphone Out Connector (J8)" on page 2-28.

# Audio Loopback Switches (SW24–25)

The audio loopback switches (SW24 and SW25) are used for testing only. The switches loop back any analog signal generated from the AD1939's digital-to-analog converter (DAC) circuit to analog-to-digital converter (ADC) circuit.

# Jumpers

This section describes functionality of the configuration jumpers.
Figure 2-2 shows the jumper locations.



FLASH WP
JP1

S/PDIF
LOOPBACK
JP2

UART
RTS/CTS
JP3

UART
LOOPBACK
JP4
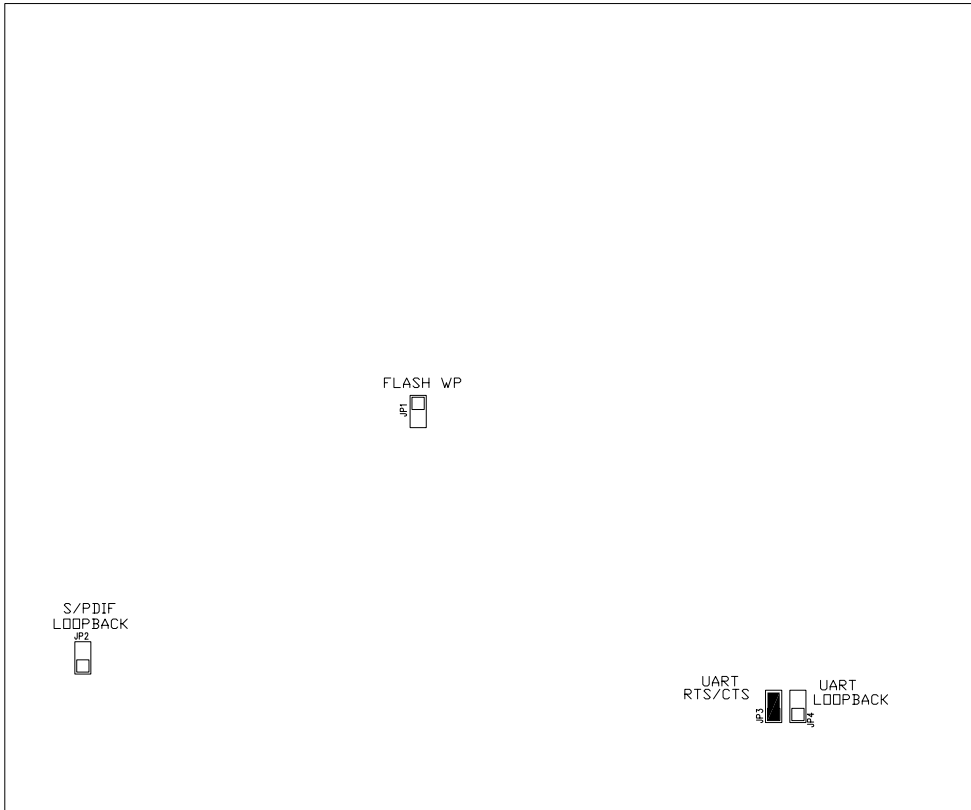
Figure 2-3. Configuration Jumper Locations

# Flash WP Jumper (JP1)

The flash WP jumper (`JP1`) write-protects block 0 of the parallel flash chip. Block 0 is located at address range `0x0400 0000-0x0400 1FFF`. The POST begins at block 0 and continues on to other blocks in flash memory. When the jumper is installed on `JP1`, and the parallel flash driver from Analog Devices is used, block 0 is read-only. By default, `JP1` is not installed.

# S/PDIF Loopback Jumper (JP2)

The S/PDIF loop back jumper (`JP2`) is used for internal testing only. The jumper loops back any digital audio signal from the S/PDIF's `Data Out` pin to the S/PDIF's `Data In` pin. By default, `JP2` is not installed.

# UART RTS/CTS Jumper (JP3)

The UART RTS/CTS jumper (`JP3`) connects the `RTS` and `CTS` pins of the RS-232 interface. By default, `JP3` is installed.

# UART Loopback Jumper (JP4)

The UART loop back jumper (`JP4`) is used for internal testing only. The jumper loops back the UART receive data from the UART transmit data. By default, `JP4` is not installed.

# LEDs

This section describes the on-board LEDs. Figure 2-4 shows the LED locations.

```
LED9 LED10
 [][]RESET              LED11
PWR                     []
                      THERMAL
                       LIMIT




   LED8  LED6 LED4 LED2
    [][][][][][][][]
    LED7 LED5 LED3 LED1
```
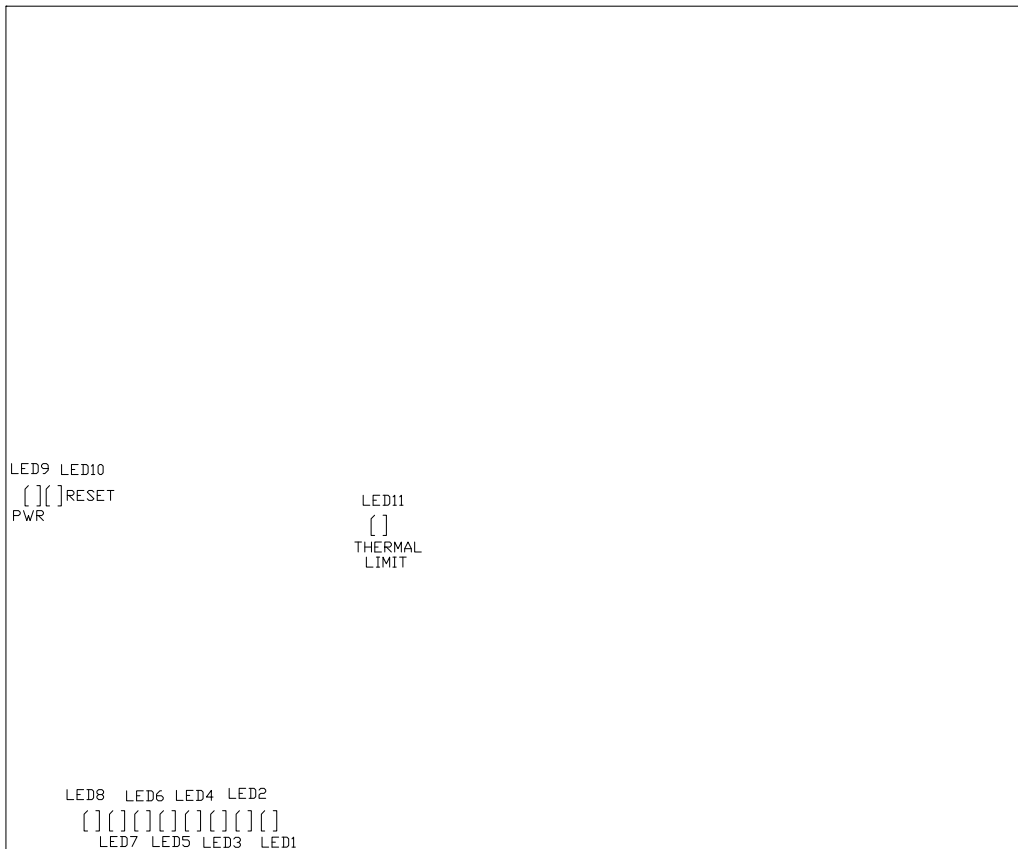
Figure 2-4. LED Locations

# GPIO LEDs (LED1–8)

Eight LEDs connect to the DAI and DPI pins of the processor; see Table 2-18. The LEDs are active high and lit by writing a '1' to the correct DAI or DPI pin.

Table 2-18. GPIO LEDs

| LED Reference Designator | Processor Pin |
|---|---|
| LED1 | DPI_P6 |
| LED2 | DPI_P13 |
| LED3 | DPI_14 |
| LED4 | DAI_P3 |
| LED5 | DAI_P4 |
| LED6 | DAI_P15 |
| LED7 | DAI_P16 |
| LED8 | DAI_P17 |

# Power LED (LED9)

When LED9 is lit solid, it indicates that the board is powered.

# Reset LED (LED10)

When LED10 is lit, it indicates that a master reset of all major ICs is active. The reset LED is controlled by the Analog Devices ADM708 supervisory reset circuit. You can assert the reset push button (SW12) to assert a master reset and activate LED10. For more information, see "Reset Push Button (SW12)" on page 2-12.

# Thermal Limit LED (LED11)

The thermal limit LED (`LED11`) reports a status of the thermal sensor, ADM1032 (`U43`). The thermal sensor monitors the processor's temperature. When the high temperature limit set by the IC is violated, `LED11` is turned on as a visual indicator. The ADM1032 has built-in hysteresis, which causes the LED to de-activate only when the temperature is significantly within the limit. For more information, see "Temperature Sensor Interface" on page 1-17.

# Connectors

This section describes connector functionality and provides information about mating connectors. The connector locations are shown in Figure 2-5.
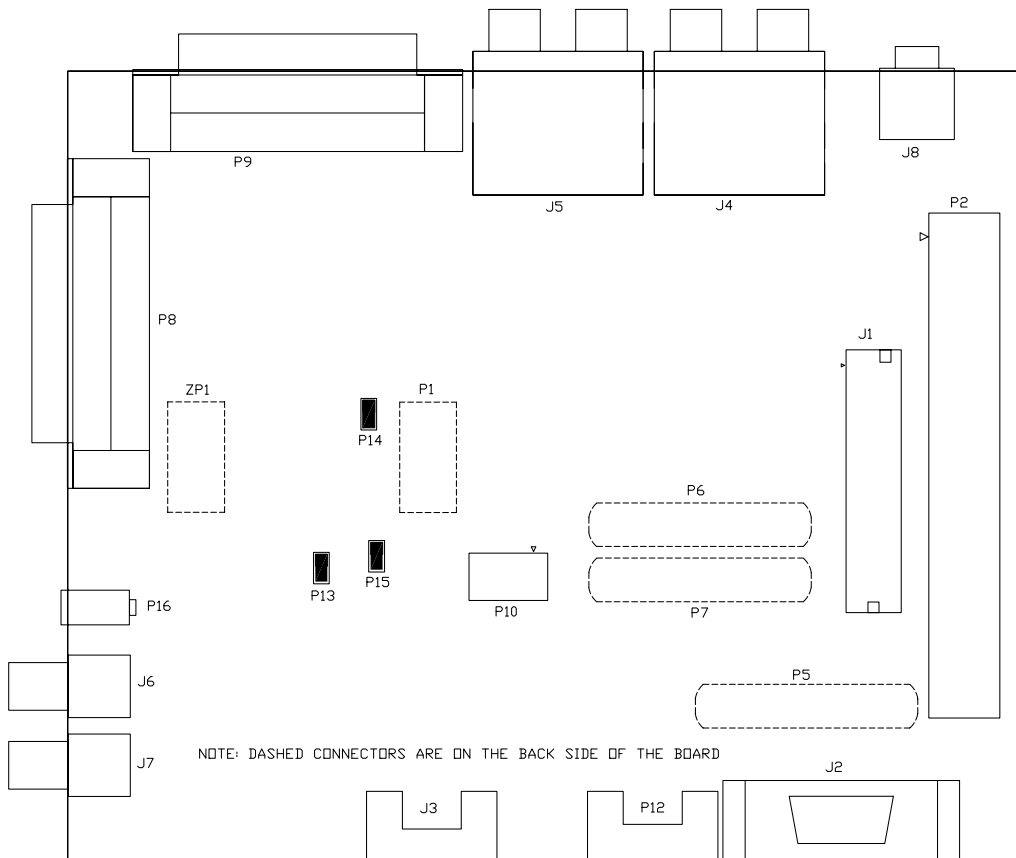
Figure 2-5. Connector Locations

# Expansion Interface II Connector (J1)

J1 is a board-to-board connector providing signals from the asynchronous memory interface (AMI) of the processor. The connector is located on the right edge of the board. For more information, see "Expansion Interface II" on page 1-25. For availability and pricing of the connector, contact Samtec.

| Part Description | Manufacturer | Part Number |
|---|---|---|
| 104-position 0.025", SMT header | SAMTEC | QMS-052-06.75-L-D-A |
| Mating Connector | | |
| 104-position 0.025", SMT socket | SAMTEC | QFS-052-04.25-L-D-A |

# RS-232 Connector (J2)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| DB9, female, vertical mount | NORCOMP | 191-009-213-L-571 |
| Mating Cable | | |
| 2m female-to-female cable | DIGI-KEY | AE1020-ND |

# Link Port 1 Connector (J3)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| ERF8 10X2, RA female | SAMTEC | ERF8-010-01-S-D-RA-L |
| Mating Cable | | |
| 6" cable ERF8 to ERM8 10X2 | SAMTEC | ERCD-010-06.00-TBL-SBR-1 |

## RCA Audio Connector (J4)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| RCA 2x3 | KYOYAKU ENT | WSP-256V1-09 |
| **Mating Cable** (shipped with the EZ-KIT) | | |
| 6' RCA audio cable | CABLESTOGO | 03171 |

## RCA Audio Connector (J5)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| RCA 2x3 | KYOYAKU ENT | WSP-256V1-09 |
| **Mating Cable** (shipped with the EZ-KIT) | | |
| 6' RCA audio cable | CABLESTOGO | 03171 |

## S/PDIF IN Connector (J6)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| RCA 1X1 | SWITCHCRAFT | PJRAN1X1U01X |
| **Mating Cable** (shipped with the EZ-KIT) | | |
| 6' RCA audio cable | CABLESTOGO | 03171 |

## S/PDIF OUT Connector (J7)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| RCA 1X1 | SWITCHCRAFT | PJRAN1X1U01X |
| **Mating Cable** (shipped with the EZ-KIT) | | |
| 6' RCA audio cable | CABLESTOGO | 03171 |

# Headphone Out Connector (J8)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| 3.5mm stereo_jack | CUI | SJ1-3525NG |
| **Mating Headphones** (shipped with the EZ-KIT) | | |
| Stereo headphones | KOSS | 151225 UR5 |

# JTAG Connector (P1)

The `P1` connector provides access to the JTAG signals of the ADSP-21469 processor. The standalone debug agent requires two connectors, `P1` and `ZP1`. Pin 3 is missing to provide keying. Pin 3 in the mating connector must have a plug. For more information, see "JTAG Interface" on page 1-23.

Remove the standalone debug agent when an emulator is used with the EZ-Board. Follow the installation instructions provided in "CCES Install and Session Startup" on page 1-5 or "VisualDSP++ Install and Session Startup" on page 1-9, using `P1` as the JTAG connection point.

# Expansion Interface II Connector (P2)

`P2` is a board-to-board connector providing signals for the DAI and DPI interfaces and GPIO signals of the processor. The connector is located on the right edge of the board. For more information, see "Expansion Interface II" on page 1-25. For availability and pricing of the connectors, contact Samtec.

| Part Description | Manufacturer | Part Number |
|---|---|---|
| 60-position 0.1", SMT header | SAMTEC | TSSH-130-01-L-DV-A |
| **Mating Connector** | | |
| 60-position 0.1", SMT socket | SAMTEC | SSW-130-22-F-D-VS |

## DMAX Land Grid Array Connectors (P5–7)

The land grid array areas (`P5-7`) are intended for probing of the processor signals. The pads are exposed and designed to attach a Tektronix logic analyzer to the connectors listed in the following table. For more information about the land grid array, consult the Tektronix Web site.

| Part Description | Manufacturer | Part Number |
|---|---|---|
| Primary retention | TEKTRONIX | 020290800 |
| Alternate retention | TEKTRONIX | 020291000 |

## Differential In/Out Connectors (P8–9)

The differential in and out connectors (`P8-9`) are intended for an evaluation of the AD1939 codec via XLR connectors. A standard, off the shelf DB25 connector to XLR cables is required; the cable details can be found in the following table.

| Part Description | Manufacturer | Part Number |
|---|---|---|
| 25-position DB25 socket | TYCO | 1734350-2 |
| **Mating cables** | | |
| Snake (8)XLRF-25P 9.9' | HOSA | DTF-803 |
| Snake (8)XLRM-25P 9.9' | HOSA | DTM-803 |

## MLB Connector (P10)

The media local bus (MLB) connector (`P10`) is intended for an evaluation of the ADSP-21462 processor's MLB interface. `P10` is not available on the ADSP-21469 EZ-Board because the ADSP-21469 processor does not support MLB.

## Link Port 0 Connector (P12)

| Part Description | Manufacturer | Part Number |
|---|---|---|
| ERM8 10X2, RA Male | SAMTEC | ERM8-010-01-S-D-RA |
| Mating Cable | | |
| 6" cable ERF8 to ERM8 10X2 | SAMTEC | ERCD-010-06.00-TBL-SBR-1 |

## VDD_DDR2 Power Connector (P13)

The `VDD_DDR2` power connector (`P13`) is used to measure voltage and current supplied to the DDR2 memory interface of the processor. By default, `P13` is `ON`, and the power flows through the two-pin IDC header. To measure power, remove the jumper on `P13` and measure voltage across the 0.1 ohm resistor. Once voltage is measured, power can be calculated. For more information, refer to "Power Measurements" on page 1-26.

## VDDINT Power Connector (P14)

The `VDDINT` power connector (`P14`) is used to measure voltage and current supplied to the processor core. By default, `P14` is `ON`, and the power flows through the two-pin IDC header. To measure power, remove the jumper on `P14` and measure voltage across the 0.1 ohm resistor. Once voltage is measured, power can be calculated. For more information, refer to "Power Measurements" on page 1-26.

## VDDEXT Power Connector (P15)

The `VDDEXT` power connector (`P15`) is used to measure the processor's I/O voltage and current. By default, `P15` is `ON`, and the power flows through the two-pin IDC header. To measure power, remove the jumper on `P15` and measure voltage across the 0.1 ohm resistor. Once voltage is measured, power can be calculated. For more information, refer to "Power Measurements" on page 1-26.

## Power Connector (P16)

The power connector (P16) provides all of the power necessary to operate the EZ-Board.

| Part Description | Manufacturer | Part Number |
|---|---|---|
| 0.65 mm power jack | CUI | 045-0883R |
| **Mating Power Supply** (shipped with the EZ-Board and EZ-KIT) | | |
| 5.0VDC@3.6A power supply | GLOBTEK | GS-1750(R) |

# Standalone Debug Agent Connector (ZP1)

ZP1 connects the standalone debug agent to the EZ-Board. The standalone debug agent requires two connectors, ZP1 and P1. For more information, see "JTAG Connector (P1)" on page 2-28.

**Connectors**

# A  ADSP-21469 EZ-BOARD BILL OF MATERIALS

The bill of materials corresponds to "ADSP-21469 EZ-Board Schematic" on page B-1.

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 1 | 1 | 74LVC14A SOIC14 | U14 | TI | 74LVC14AD |
| 2 | 1 | IDT74FCT3244 APY SSOP20 | U17 | IDT | IDT74FCT3244APYG |
| 3 | 1 | 12.288MHZ OSC003 | U12 | EPSON | SG-8002CA MP |
| 4 | 1 | 25MHZ OSC003 | U41 | EPSON | SG-8002CA MP |
| 5 | 3 | SN74LVC1G08 SOT23-5 | U48-50 | TI | SN74LVC1G08DBVR |
| 6 | 1 | SN65LVDS2D SOIC8 | U44 | NATIONAL SEMI | DS90LV018ATM |
| 7 | 1 | M25P16 SO8W | U40 | ST MICRO | M25P16-VMW6G |
| 8 | 1 | MT47H64M16 FBGA84 | U2 | MICRON | MT47H64M16HR-3 |
| 9 | 1 | ADM1032 SOIC_N8 | U43 | ON SEMI | ADM1032ARZ |
| 10 | 2 | SI7601DN ICS010 | U15-16 | VISHAY | SI7601DN |
| 11 | 1 | 21469 M29W320EB "U18" | U18 | ST MICRO | M29W320EB70ZE6E |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|---|---|---|---|---|---|
| 12 | 1 | ADM708SARZ SOIC8 | U46 | ANALOG DEVICES | ADM708SARZ |
| 13 | 1 | ADM3202ARNZ SOIC16 | U42 | ANALOG DEVICES | ADM3202ARNZ |
| 14 | 1 | ADSP-21469 PBGA324 | U1 | ANALOG DEVICES | ADSP-21469KBZ-ENG |
| 15 | 2 | ADP1864AUJZ SOT23-6 | VR2-3 | ANALOG DEVICES | ADP1864AUJZ-R7 |
| 16 | 1 | ADP1710 TSOT5 | VR1 | ANALOG DEVICES | ADP1710AUJZ-R7 |
| 17 | 1 | ADP1715 MSOP8 | VR4 | ANALOG DEVICES | ADP1715ARMZ-1.8-R7 |
| 18 | 1 | AD1939 LQFP64 | U45 | ANALOG DEVICES | AD1939YSTZ |
| 19 | 16 | AD8652ARZ SOIC_N8 | U20-26,U28-30,U32-34,U36-38 | ANALOG DEVICES | AD8652ARZ |
| 20 | 1 | AD8397 SOIC_N8_EP | U51 | ANALOG DEVICES | AD8397ARDZ |
| 21 | 1 | ADM1085 SC70_6 | U52 | ANALOG DEVICES | ADM1085AKSZ-REEL7 |
| 22 | 2 | RCA 1X1 CON012 | J6-7 | SWITCH-CRAFT | PJRAN1X1U01X |
| 23 | 5 | MOMENTARY SWT013 | SW8-12 | PANASONIC | EVQ-PAD04M |
| 24 | 4 | DIP8 SWT016 | SW1-3,SW19 | C&K | TDA08H0SB1 |
| 25 | 6 | DIP6 SWT017 | SW13-18 | CTS | 218-6LPST |
| 26 | 3 | DIP4 SWT018 | SW7,SW24-25 | ITT | TDA04HOSB1 |
| 27 | 1 | DB9 9PIN CON038 | J2 | NORCOMP | 191-009-213-L-571 |
| 28 | 5 | DIP2 SWT020 | SW5,SW20-23 | C&K | CKN9064-ND |

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| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 29 | 3 | IDC 2X1 IDC2X1 | P13-15 | FCI | 90726-402HLF |
| 30 | 4 | IDC 2X1 IDC2X1 | JP1-4 | FCI | 90726-402HLF |
| 31 | 3 | IDC 2PIN_JUMPER_SHORT | SJ1-3 | DIGI-KEY | S9001-ND |
| 32 | 1 | 3.5MM STEREO_JACK CON001 | J8 | DIGI-KEY | CP1-3525NG-ND |
| 33 | 1 | PWR .65MM CON045 | P16 | CUI | 045-0883R |
| 34 | 1 | 5A RESETABLE FUS005 | F1 | MOUSER | 650-RGEF500 |
| 35 | 1 | QMS 52x2 QMS52x2_SMT | J1 | SAMTEC | QMS-052-06.75-L-D-A |
| 36 | 1 | IDC 7x2 IDC7x2_SMTA | P1 | SAMTEC | TSM-107-01-T-DV-A |
| 37 | 1 | ROTARY SWT027 | SW4 | COPAL | S-8110 |
| 38 | 2 | RCA 2x3 CON_RCA_6B | J4-5 | KYOYAKU ENT. | WSP-256V1-09 |
| 39 | 1 | ERM8 10X2 ERM8_10X2_SMT | P12 | SAMTEC | ERM8-010-01-S-D-RA |
| 40 | 1 | ERF8 10X2 ERF8_10X2_SMT | J3 | SAMTEC | ERF8-010-01-S-D-RA-L |
| 41 | 2 | DB25 25PIN DB25F | P8-9 | TYCO | 1734350-2 |
| 42 | 1 | IDC 30x2 IDC30X2_SMTA | P2 | SAMTEC | TSSH-130-01-L-DV-A |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 43 | 9 | YELLOW LED001 | LED1-8,LED11 | PANASONIC | LN1461C |
| 44 | 2 | 22PF 50V 5% 0805 | C262-263 | AVX | 08055A220JAT |
| 45 | 2 | 0.22UF 25V 10% 0805 | C126-127 | AVX | 08053C224KAT2A |
| 46 | 1 | 0.1UF 50V 10% 0805 | C123 | AVX | 08055C104KAT |
| 47 | 1 | 600 100MHZ 200MA 0603 | FER5 | DIGI-KEY | 490-1014-2-ND |
| 48 | 2 | 600 100MHZ 500MA 1206 | FER7-8 | STEWARD | HZ1206B601R-10 |
| 49 | 2 | 10UF 16V 20% CAP002 | CT59-60 | PANASONIC | EEE1CA100SR |
| 50 | 1 | 190 100MHZ 5A FER002 | FER9 | MURATA | DLW5BSN191SQ2 |
| 51 | 8 | 10UF 6.3V 10% 0805 | C97-98,C100-101, C103-104,C254, C257 | AVX | 08056D106KAT2A |
| 52 | 2 | 4.7UF 6.3V 10% 0805 | C240,C246 | AVX | 08056D475KAT2A |
| 53 | 35 | 0.1UF 10V 10% 0402 | C26-27,C53,C117-120,C148,C151-152, C160,C162,C169-170,C178,C188-189, C191,C197,C199-200,C211,C213-214, C225,C227-228, C237,C264,C267-271,C273 | AVX | 0402ZD104KAT2A |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|---|---|---|---|---|---|
| 54 | 94 | 0.01UF 16V 10% 0402 | C28,C30-43,C45-50, C52,C54-96,C99, C102,C105-116, C121-122,C125, C128-131,C136-142, C266 | AVX | 0402YC103KAT2A |
| 55 | 33 | 10K 1/16W 5% 0402 | R99,R190,R196-200, R202,R205-210,R217, R224-225,R233-239, R256,R259-260, R463-466,R469,R494 | VISHAY | CRCW040210K0FKED |
| 56 | 2 | 4.7K 1/16W 5% 0402 | R185,R501 | VISHAY | CRCW04024K70JNED |
| 57 | 4 | 0 1/16W 5% 0402 | R462,R485,R492, R498 | PANASONIC | ERJ-2GE0R00X |
| 58 | 1 | 22 1/16W 5% 0402 | R230 | PANASONIC | ERJ-2GEJ220X |
| 59 | 13 | 33 1/16W 5% 0402 | R191-192,R201, R203-204,R211, R257-258,R261-263, R495-496 | VISHAY | CRCW040233R0JNEA |
| 60 | 1 | 100UF 10V 10% C | CT61 | AVX | TPSC107K010R0075 |
| 61 | 2 | 2.2UF 10V 10% 0805 | C238-239 | AVX | 0805ZD225KAT2A |
| 62 | 1 | 1000PF 50V 5% 0402 | C51 | AVX | 04025C102JAT2A |
| 63 | 2 | 1A SK12 DO-214AA | D4-5 | DIODES INC | B120B-13-F |
| 64 | 1 | 107.0 1/10W 1% 0805 | R228 | DIGI-KEY | 311-107CRTR-ND |
| 65 | 1 | 249.0 1/10W 1% 0805 | R227 | DIGI-KEY | 311-249CRTR-ND |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|---------------------|--------------|-------------|
| 66 | 2 | 0.1UF 16V 10% 0603 | C255-256 | AVX | 0603YC104KAT2A |
| 67 | 2 | 1UF 16V 10% 0603 | C260-261 | PANASONIC | ECJ-1VB1C105K |
| 68 | 2 | 68PF 50V 5% 0603 | C243,C249 | AVX | 06035A680JAT2A |
| 69 | 2 | 470PF 50V 5% 0603 | C242,C248 | AVX | 06033A471JAT2A |
| 70 | 1 | 220UF 6.3V 20% D2E | CT45 | SANYO | 10TPE220ML |
| 71 | 11 | 330 1/10W 5% 0603 | R248-255,R467-468, R497 | VISHAY | CRCW0603330RJNEA |
| 72 | 2 | 0 1/10W 5% 0603 | R452,R458 | PHYCOMP | 232270296001L |
| 73 | 4 | 10 1/10W 5% 0603 | R244-247 | VISHAY | CRCW060310R0JNEA |
| 74 | 1 | 10.0K 1/16W 1% 0603 | R231 | DALE | CRCW060310K0FKEA |
| 75 | 8 | 237.0 1/10W 1% 0603 | R267,R272,R280, R285,R293,R298-299, R304 | DIGI-KEY | 311-237HRTR-ND |
| 76 | 24 | 49.9K 1/10W 1% 0603 | R265,R271,R282, R284,R295,R297, R300,R302,R310, R336-337,R343-344, R363-364,R369,R378, R397-398,R403,R412, R431-432,R437 | DIGI-KEY | 311-49.9KHRTR-ND |
| 77 | 1 | 75.0 1/10W 1% 0603 | R229 | DALE | CRCW060375R0FKEA |
| 78 | 4 | 1UF 6.3V 20% 0402 | C132-135 | PANASONIC | ECJ-0EB0J105M |

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| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 79 | 4 | 100 1/16W 5% 0402 | R240-243 | DIGI-KEY | 311-100JRTR-ND |
| 80 | 1 | 562.0 1/10W 1% 0603 | R461 | VISHAY | CRCW0603562RFKEA |
| 81 | 1 | 390PF 25V 5% 0603 | C258 | AVX | 06033A391FAT2A |
| 82 | 1 | 5600PF 16V 5% 0805 | C259 | AVX | 0805YA562JAT2A |
| 83 | 1 | 15.0K 1/16W 1% 0603 | R232 | DIGI-KEY | 311-15.0KHRTR-ND |
| 84 | 40 | 4.99K 1/16W 1% 0603 | R264,R273,R278-279, R291-292,R305-306, R311,R313-314,R324, R326-328,R342, R349-350,R352-354, R357,R366,R371, R383-384,R386-388, R391,R400,R405, R417-418,R420-422, R425,R434,R439 | VISHAY | CRCW06034K99FKEA |
| 85 | 2 | 24.9K 1/10W 1% 0603 | R448,R454 | DIGI-KEY | 311-24.9KHTR-ND |
| 86 | 1 | 31.6K 1/16W 1% 0603 | R473 | PANASONIC | ERJ-3EKF3162V |
| 87 | 3 | 10UF 10V 10% 0805 | C29,C161,C265 | PANASONIC | ECJ-2FB1A106K |
| 88 | 8 | 5.76K 1/16W 1% 0603 | R266,R269,R277, R281,R290,R294, R303,R307 | PANASONIC | ERJ-3EKF5761V |
| 89 | 3 | 0.05 1/2W 1% 1206 | R446,R459-460 | SEI | CSF 1/2 0.05 1%R |
| 90 | 3 | 10UF 16V 10% 1210 | C244-245,C250 | AVX | 1210YD106KAT2A |
| 91 | 1 | GREEN LED001 | LED9 | PANASONIC | LN1361CTR |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 92 | 1 | RED LED001 | LED10 | PANASONIC | LN1261CTR |
| 93 | 2 | 1000PF 50V 5% 1206 | C236,C251 | AVX | 12065A102JAT2A |
| 94 | 1 | 255.0K 1/10W 1% 0603 | R447 | VISHAY | CRCW06032553FK |
| 95 | 2 | 80.6K 1/10W 1% 0603 | R449,R455 | DIGI-KEY | 311-80.6KHRCT-ND |
| 96 | 3 | 5A MBRS540T3G SMC | D1-3 | ON SEMI | MBRS540T3G |
| 97 | 2 | 2.5UH 30% IND013 | L1-2 | COILCRAFT | MSS1038-252NLB |
| 98 | 3 | 1.0K 1/16W 1% 0402 | R194-195,R287 | PANASONIC | ERJ-2RKF1001X |
| 99 | 1 | 8.20K 1/10W 1% 0603 | R502 | DIGI-KEY | 541-8.20KHCT-ND |
| 100 | 6 | 10.0K 1/16W 1% 0402 | R474,R486-488,R491, R499 | DIGI-KEY | 541-10.0KLCT-ND |
| 101 | 10 | 100K 1/16W 5% 0402 | R475-484 | DIGI-KEY | 541-100KJTR-ND |
| 102 | 1 | 30.9K 1/16W 1% 0402 | R453 | DIGI-KEY | 541-30.9KLCT-ND |
| 103 | 25 | 33 1/32W 5% RNS005 | RN1-14,RN18,RN22, RN26-34 | PANASONIC | EXB-28V330JX |
| 104 | 4 | 51.1 1/16W 1% 0402 | R218-221 | DIGI-KEY | 541-51.1LCT-ND |
| 105 | 16 | 2.67K 1/16W 1% 0402 | R316,R318,R322, R338,R367-368,R373, R377,R401-402,R407, R411,R435-436,R441, R445 | PANASONIC | ERJ-2RKF2671X |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 106 | 31 | 100.0 1/16W 1% 0402 | R193,R274-275,R288, R309,R331-335,R340, R351,R358-362,R385, R392-396,R419, R426-430,R489-490 | DIGI-KEY | 541-100LCT-ND |
| 107 | 2 | 47UF 16V 20% ELEC_6MM | CT57-58 | PANASONIC | EEE-FC1C470P |
| 108 | 4 | 37.4K 1/16W 1% 0402 | R268,R276,R289, R308 | DIGI-KEY | 541-37.4KLCT-ND |
| 109 | 8 | 1000PF 50V 5% 0402 | C144,C150,C154, C159,C164,C168, C171,C176 | DIGI-KEY | 490-3244-1-ND |
| 110 | 4 | 100pF 50V 5% 0402 | C147,C155,C165, C175 | MURATA | GCM1555C1H101JZ13 D |
| 111 | 8 | 300PF 100V 5% 0603 | C143,C145,C153, C157,C163,C173, C177,C179 | DIGI-KEY | 490-1362-1-ND |
| 112 | 16 | 2.43K 1/16W 1% 0402 | R315,R319,R323, R325,R346-347, R374-375,R380-381, R408-409,R414-415, R442-443 | DIGI-KEY | 541-2.43KLCT-ND |
| 113 | 16 | 750.0 1/16W 1% 0402 | R317,R320-321,R341, R345,R348,R372, R376,R379,R382, R406,R410,R413, R416,R440,R444 | DIGI-KEY | 541-750LCT-ND |
| 114 | 16 | 620PF 50V 5% 0402 | C181,C186-187, C192,C194-195, C201,C204,C208-209,C215,C218, C222-223,C229,C232 | DIGI-KEY | 490-3239-1-ND |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|------|------|-------------|----------------------|--------------|-------------|
| 115 | 16 | 680PF 50V 5% 0402 | C182-183,C185, C193,C202-203, C206-207,C216-217, C220-221,C230-231, C234-235 | DIGI-KEY | 490-3240-1-ND |
| 116 | 4 | 0.036 1/2W 1% 1206 | R450-451,R456-457 | SUSUMU | RL1632S-R036-F |
| 117 | 1 | 470UF 2.5V 20% D2E | CT47 | SANYO | 2R5TPE470MF |
| 118 | 40 | 22UF 6.3V 20% ELEC_4MM | CT1,CT3,CT5-6, CT8-11,CT14,CT16, CT18-19,CT23-24, CT27-28,CT31-32, CT35-36,CT39-40, CT43-44,CT49-56, CT62-69 | PANASONIC | EEE-FC0J220R |
| 119 | 8 | 22UF 6.3V 20% ELEC_5MM | C180,C184,C196, C205,C210,C219, C224,C233 | MOUSER | 647-UWP0J220MCL |
| 120 | 1 | 5K 1/20W 20% RES_POT_DUAL | R493 | PANASONIC | EVJ-Y15F03A53 |
| 121 | 4 | 51 1/32W 5% RNS005 | RN35-38 | DIGI-KEY | EXB-28V510JX |
| 122 | 9 | 10 1/32W 5% RNS005 | RN15-17,RN19-21, RN23-25 | PANASONIC | EXB-28V100JX |
| 123 | 9 | 82 1/32W 5% RNS005 | RN40-48 | PANASONIC | EXB-28V820JX |
| 124 | 9 | 47PF 50V 10% CNS001 | CN1-9 | TDK CORP | CKCL44C0G1H470K |
| 125 | 16 | 6.81K 1/10W 1% 0603 | R312,R329-330,R339, R355-356,R365,R370, R389-390,R399,R404, R423-424,R433,R438 | DIGI-KEY | 311-6.81KHRTR-ND |

| Ref. | Qty. | Description | Reference Designator | Manufacturer | Part Number |
|---|---|---|---|---|---|
| 126 | 1 | 806 1/10W 1% 0402 | R286 | VISHAY | CRCW0402806RFKED |
| 127 | 1 | 30A GSOT05 SOT23-3 | D6 | VISHAY | GSOT05-GS08 |
| 128 | 2 | 30A GSOT03 SOT23-3 | D7,D10 | VISHAY | GSOT03-GS08 |
| 129 | 1 | 40A ESD5Z2.5T1 SOD-523 | D8 | ON SEMI | ESD5Z2.5T1G |
| 130 | 1 | 7A VESD01-02V-GS 08 SOD-52 | D9 | VISHAY | VESD01-02V-GS08 |
| 131 | 1 | 16.9K 1/16W 1% 0402 | R500 | VISHAY | CRCW040216K9FKED |
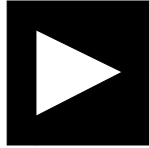
ADSP-21469 EZ-Board Evaluation System Manual

# ADSP-21469 EZ-BOARD
# SCHEMATIC

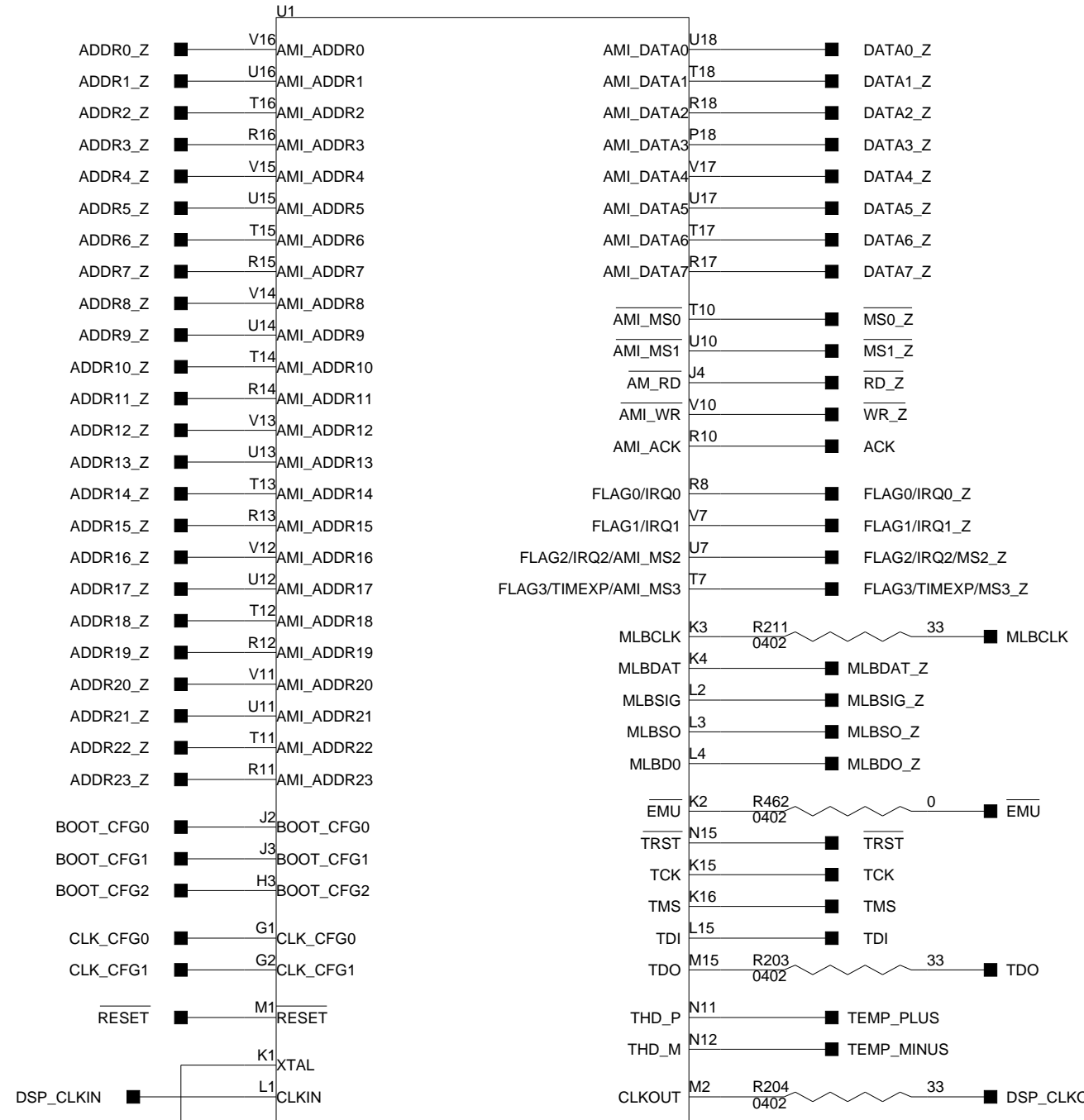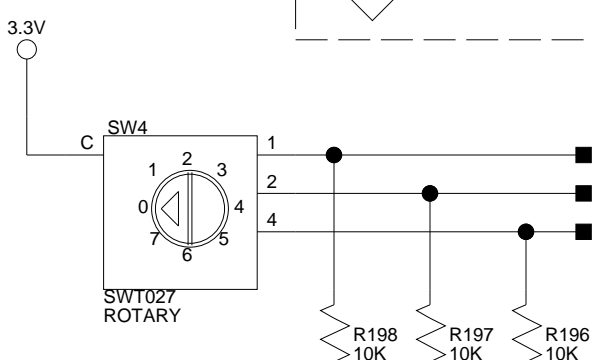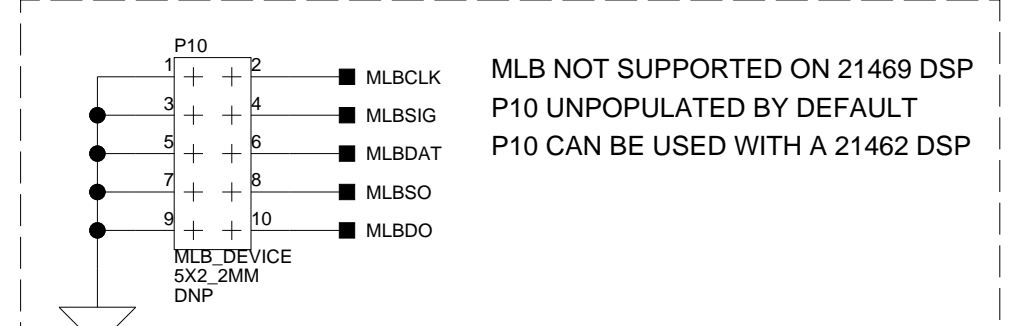| Title | ADSP-21469 EZ-BOARD TITLE | | |
|---|---|---|---|
| Size C | Board No. | A0221-2008 | Rev 0.2 |
| Date | 3-13-2009_14:36 | Sheet 1 of 16 | |
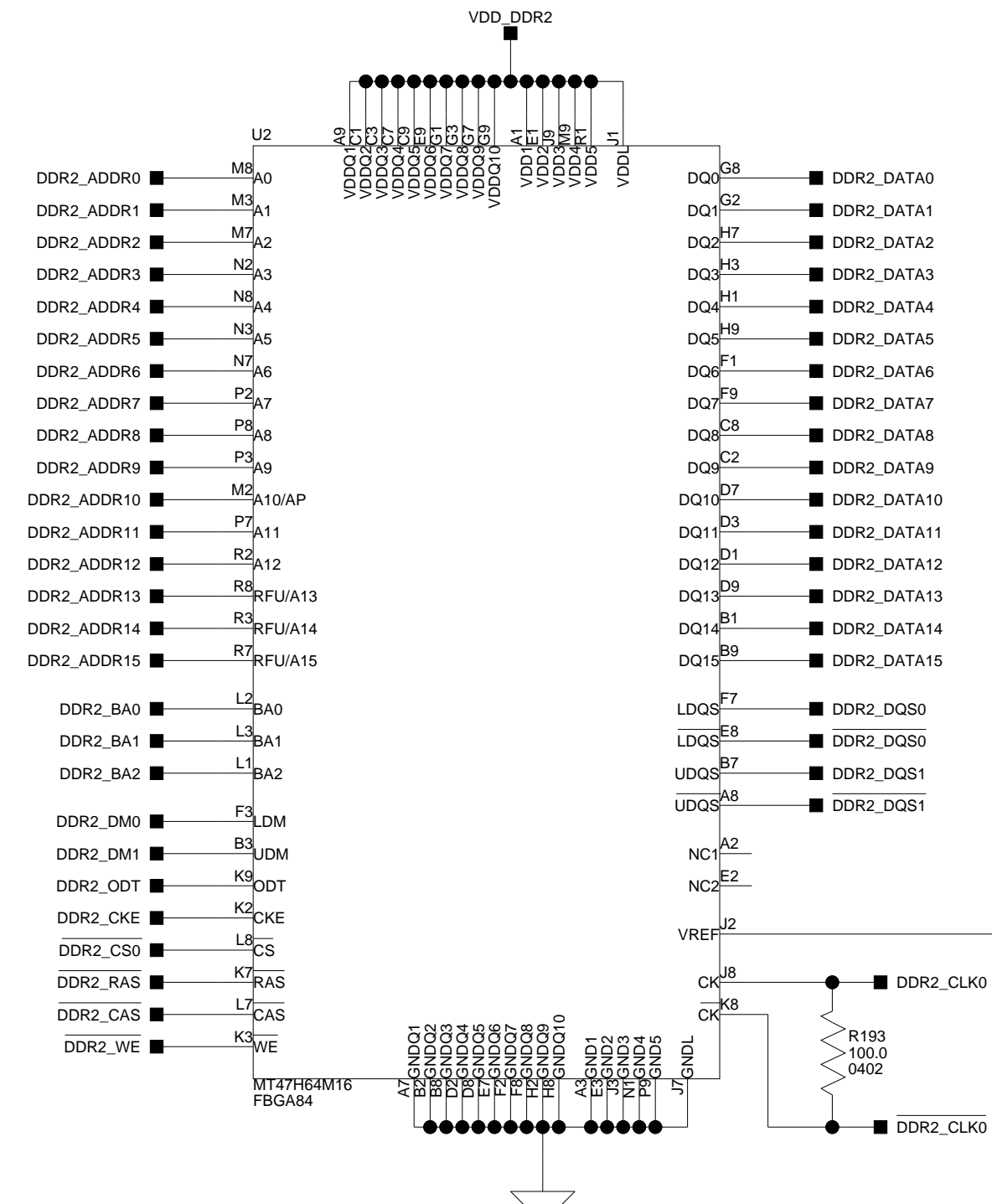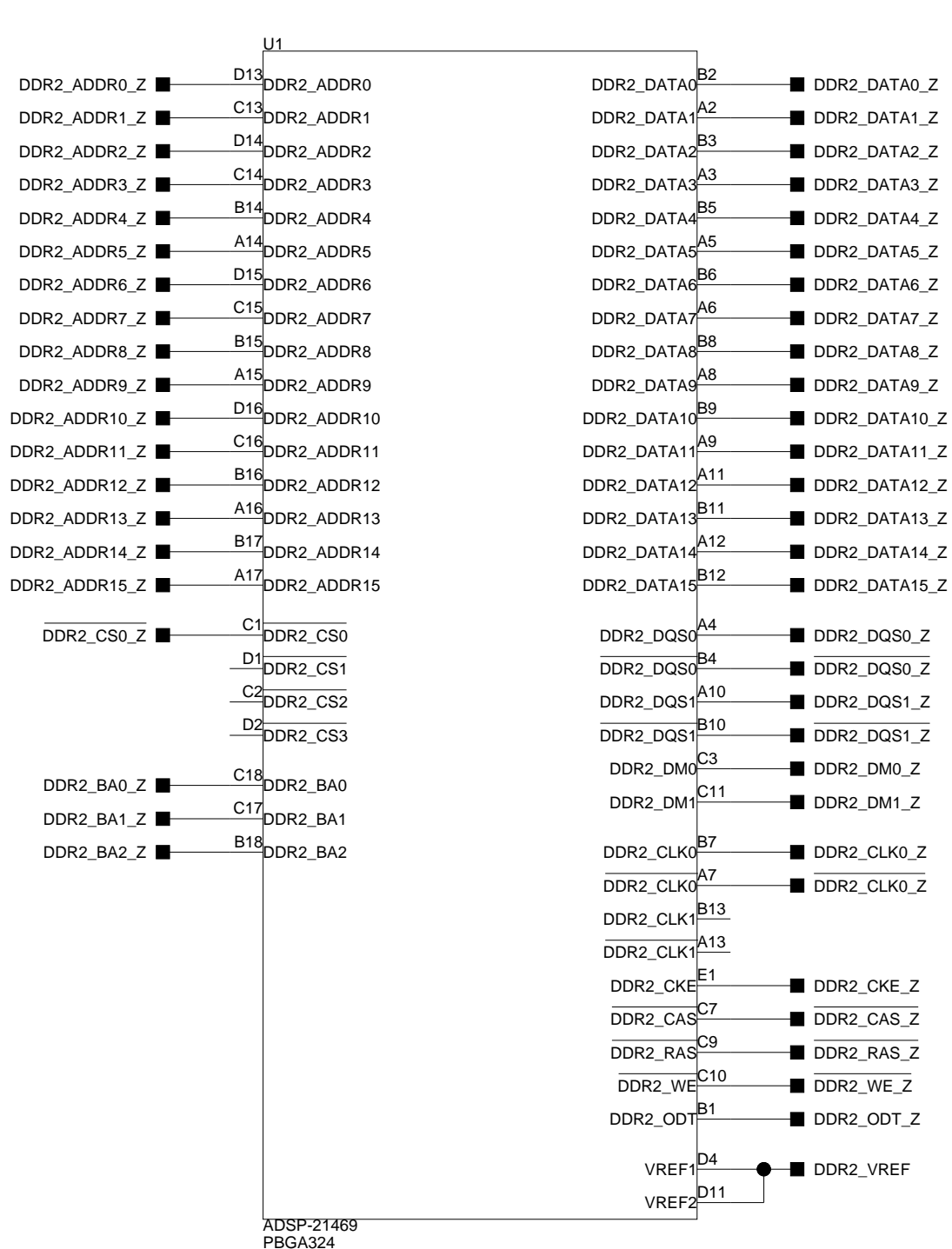
DDR2 end of line terminators and VTT tracking circuit have been omitted since overall trace length is less than 2.5" for each net.

For a custom design, please adhere to any EE-note from ADI and any recommendations by the memory manufacturer.

U1
ADSP-21469
PBGA324

U2
MT47H64M16
FBGA84
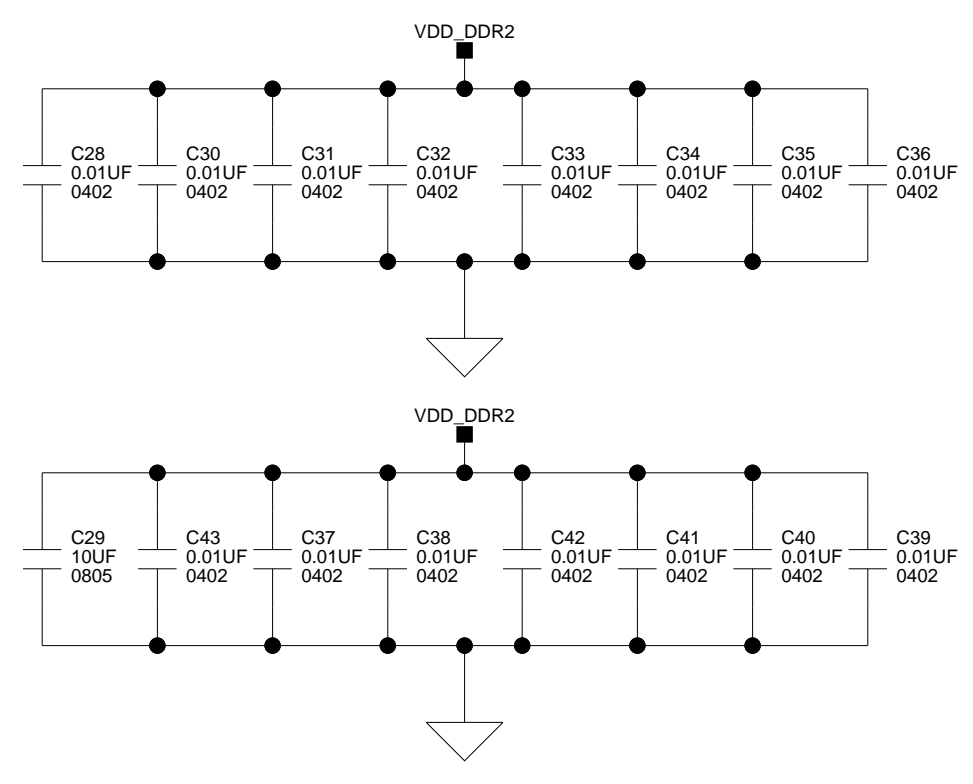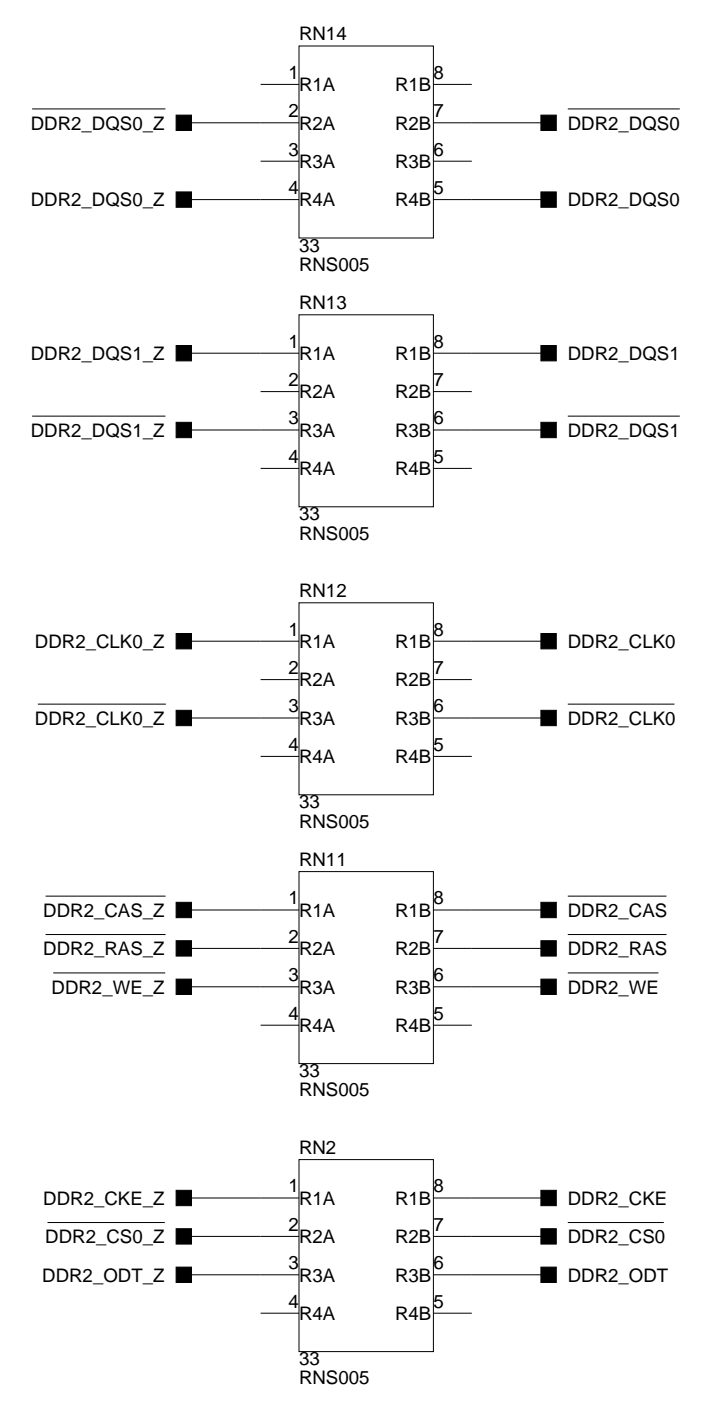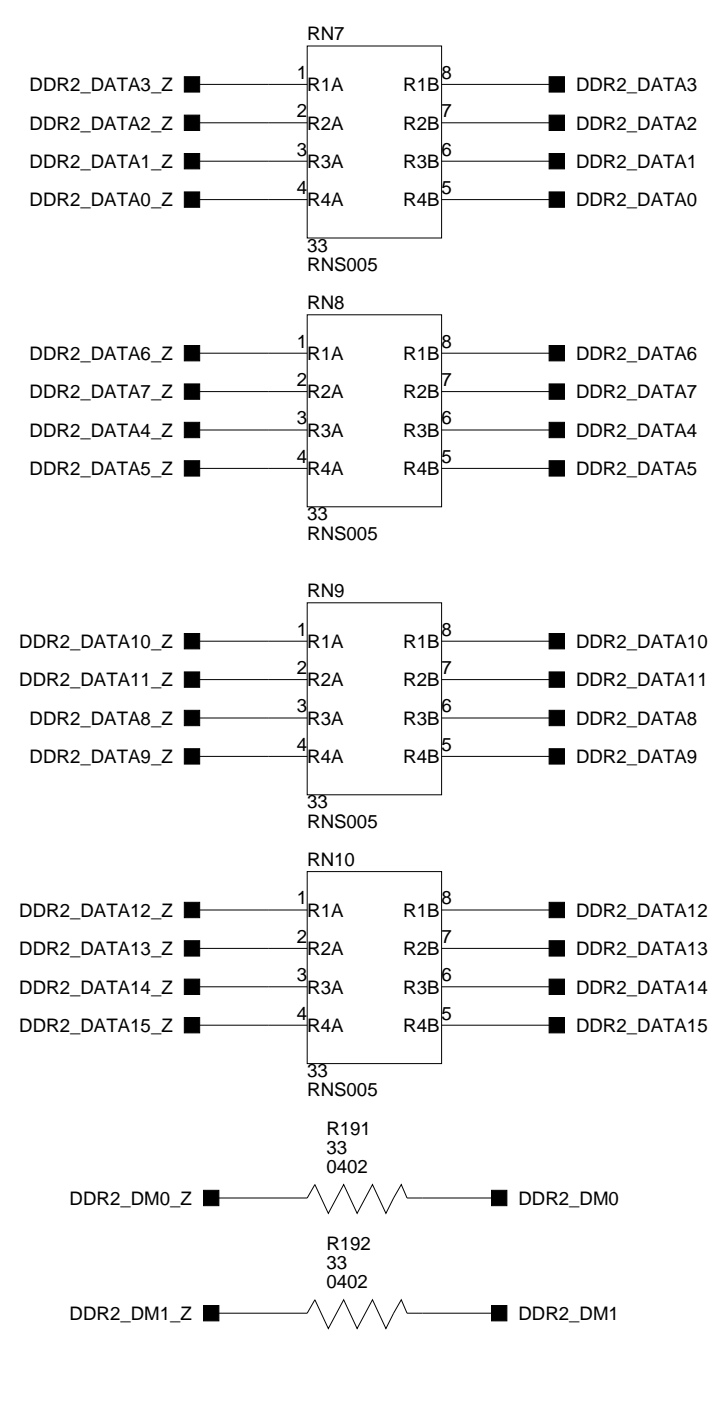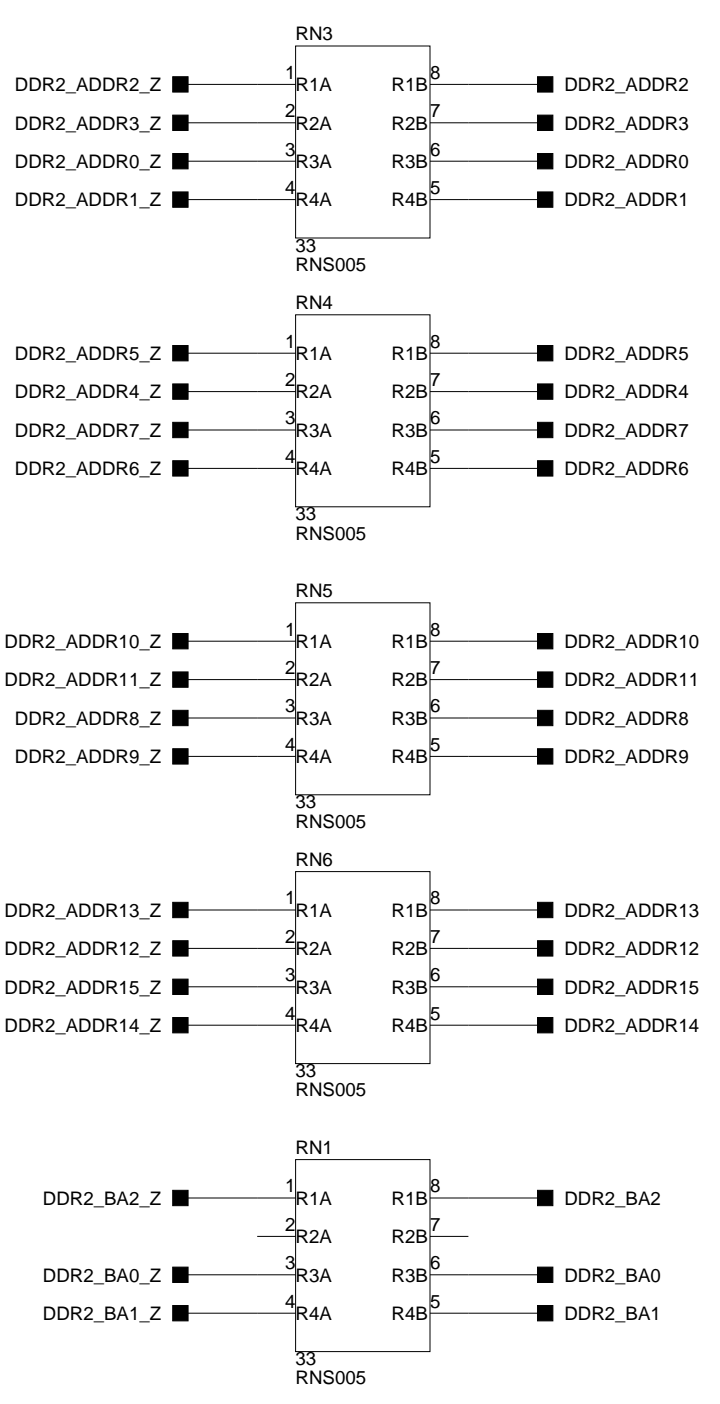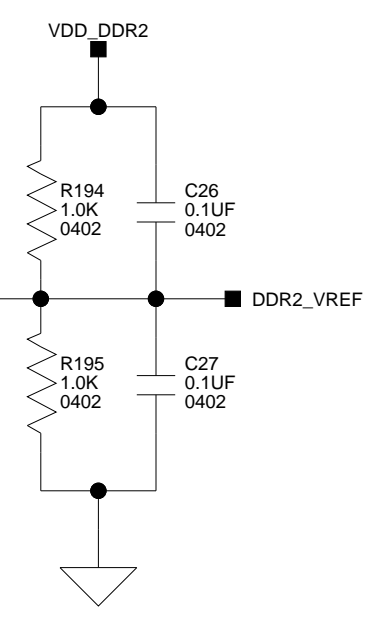
| Title | ADSP-21469 EZ-BOARD DSP - DDR2 INTERFACE | |
|---|---|---|
| Size C | Board No. A0221-2008 | Rev 0.2 |
| Date 3-31-2009_10:10 | Sheet 2 of 16 | |

# DSP - ASYNC INTERFACE (Schematic)

U1 — ADSP-21469 PBGA324

**SW13: ASYNC CONTROL ENABLE**
DEFAULT: OFF ON OFF ON ON OFF

SW13 — DIP6 SWT017

XTAL PIN TEST POINT
DO NOT POPULATE C44

C44 0.1UF 0402 DNP
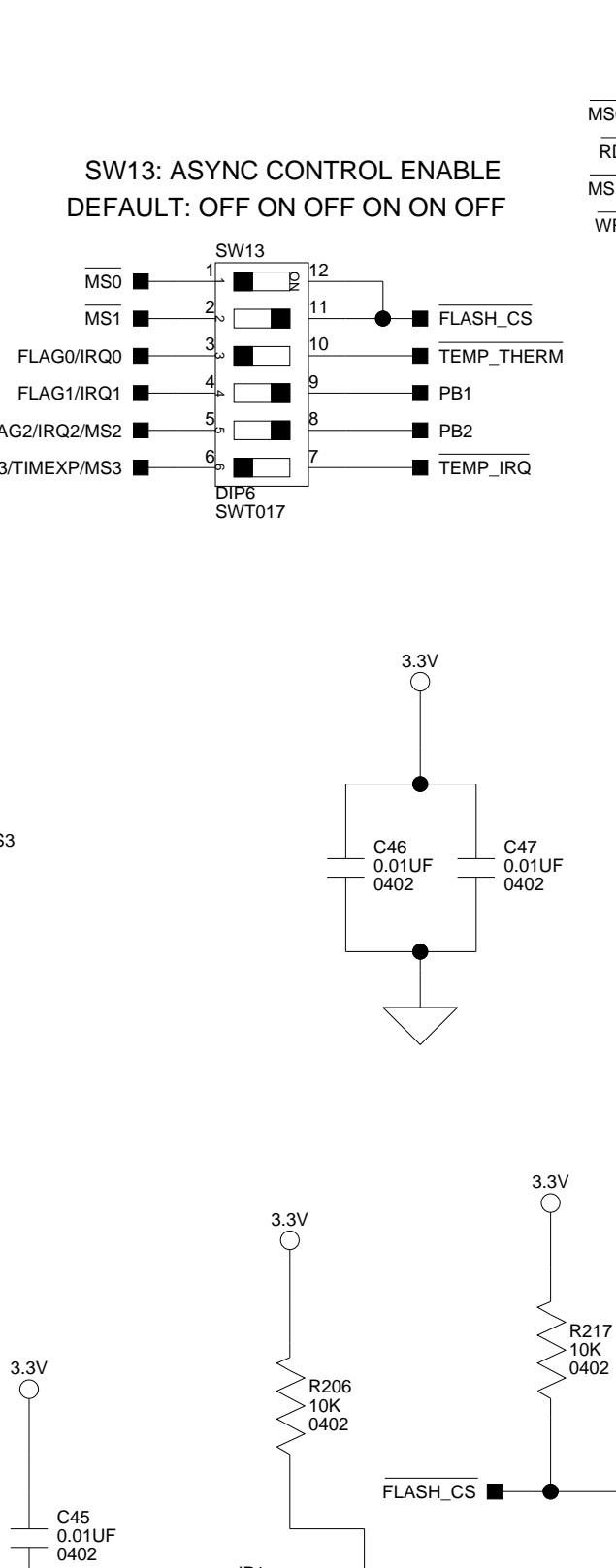
**P10**
MLB NOT SUPPORTED ON 21469 DSP
P10 UNPOPULATED BY DEFAULT
P10 CAN BE USED WITH A 21462 DSP

MLB_DEVICE 5X2_2MM DNP

DSP OSC
U41 — 25MHZ OSC003
R201 33 0402 → DSP_CLKIN

JP1 — IDC2X1
JP1 DEFAULT: OFF

U18 — M29W320EB TFBGA48

U43 — ADM1032 SOIC_N8

**SW4: BOOT MODE SELECT**

| POSITION | BOOT MODE |
|---|---|
| 0 | SPI Slave Boot |
| 1 | SPI Master Boot |
| 2 | AMI Boot (Parallel Flash) |
| 4 | Link Port 0 Boot |
| 3,5,6 or 7 | Reserved |

DEFAULT

SW4 — SWT027 ROTARY

R198 10K 0402 R197 10K 0402 R196 10K 0402
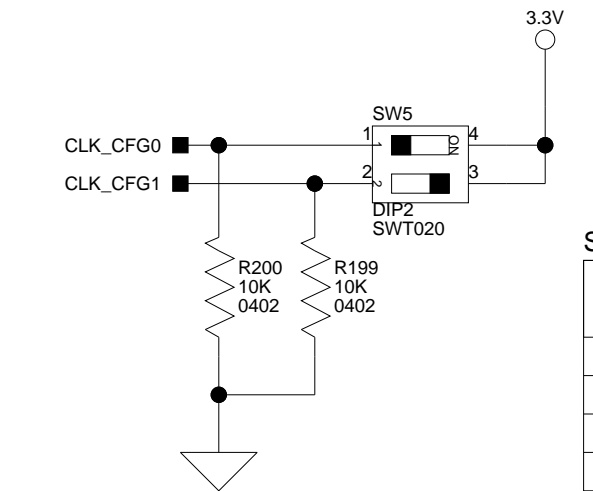
**SW5: DSP CLOCK CONFIG**

| 1 | 2 | CLOCK RATIO |
|---|---|---|
| CLKCFG0 | CLKCFG1 | CORE:CLKIN |
| ON | ON | Reserved |
| ON | OFF | 32:1 |
| OFF | ON | 16:1 |
| OFF | OFF | 6:1 |

DEFAULT

SW5 — DIP2 SWT020

R200 10K 0402 R199 10K 0402
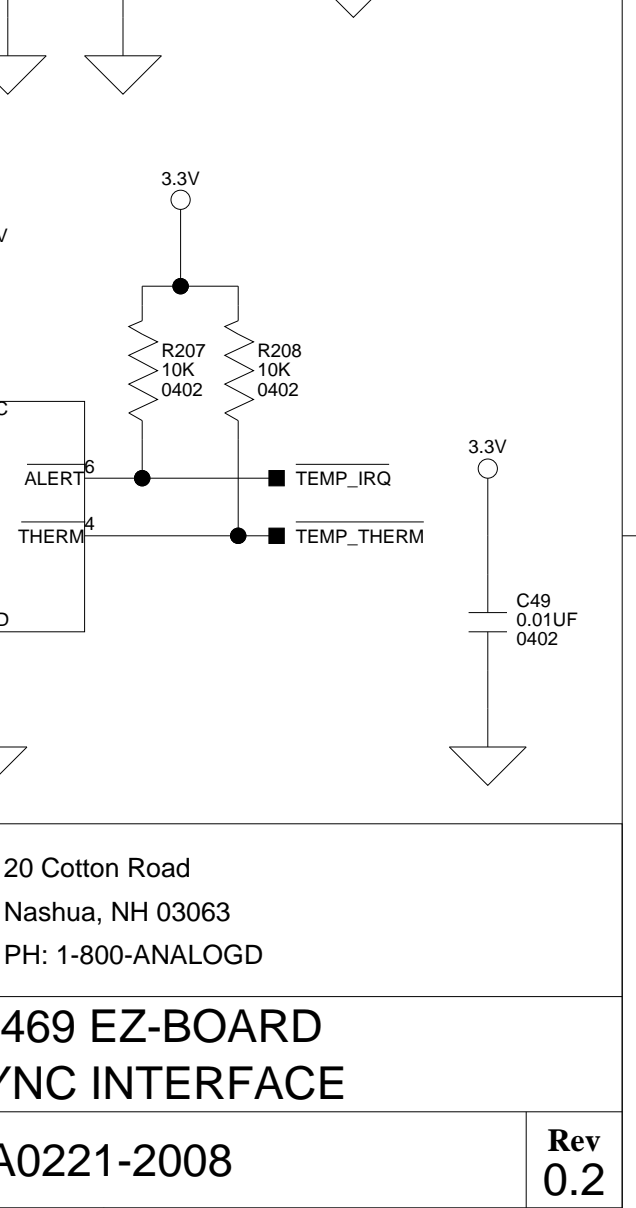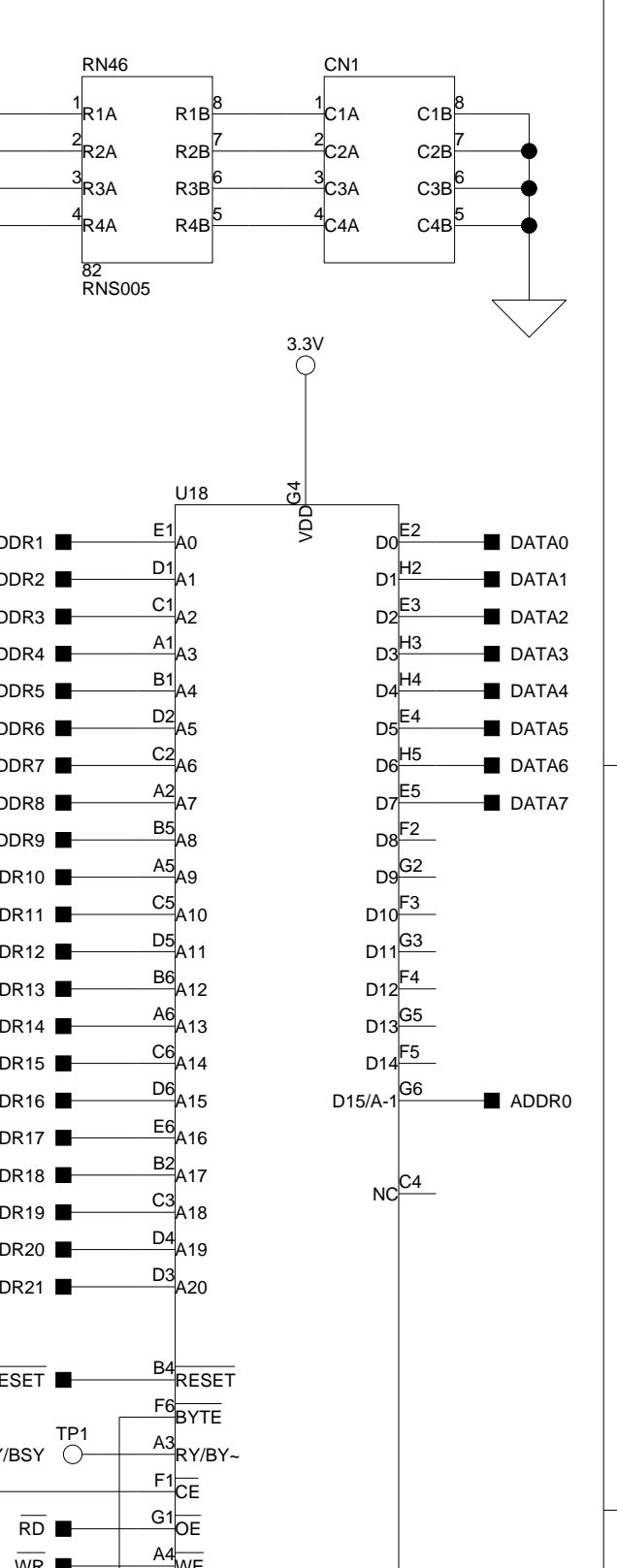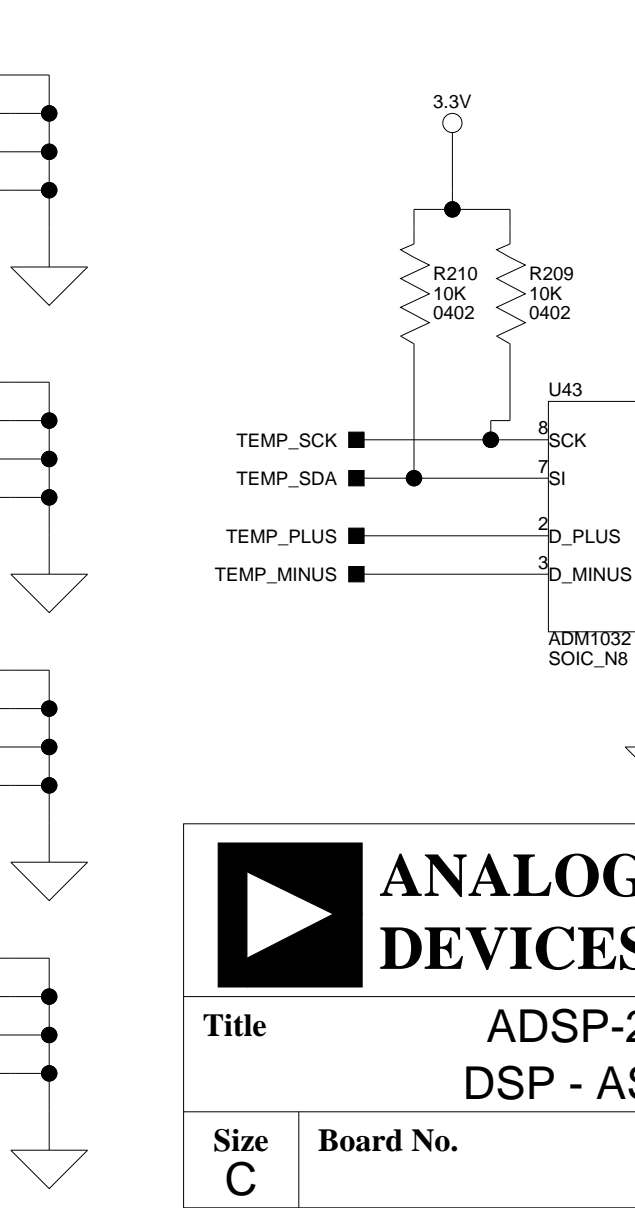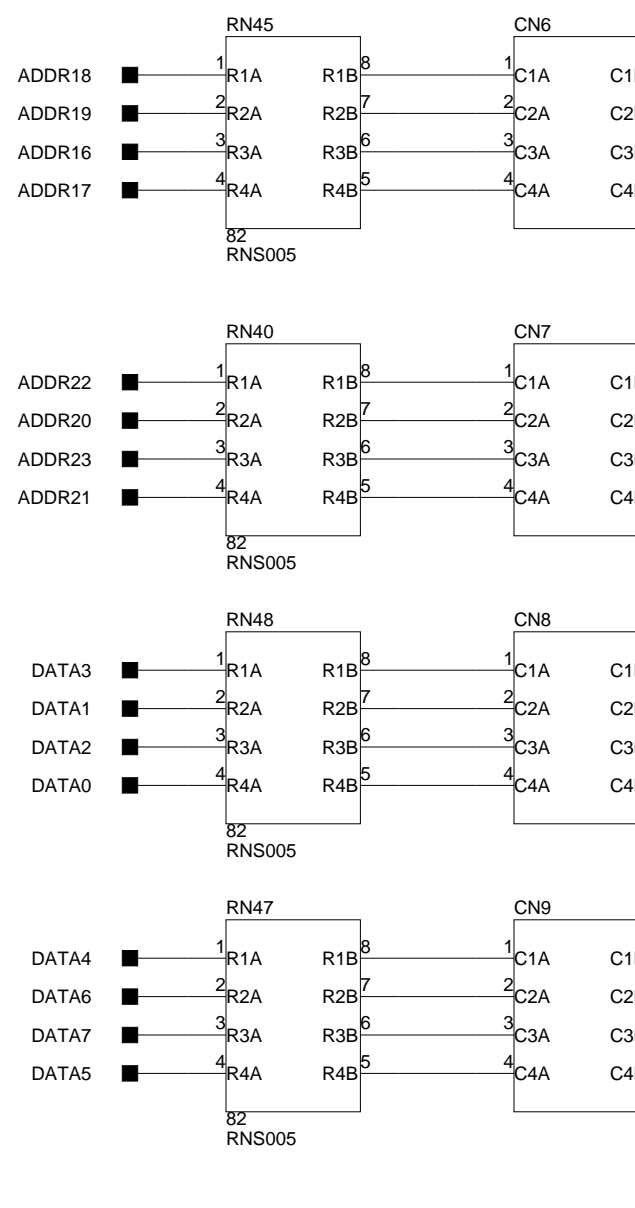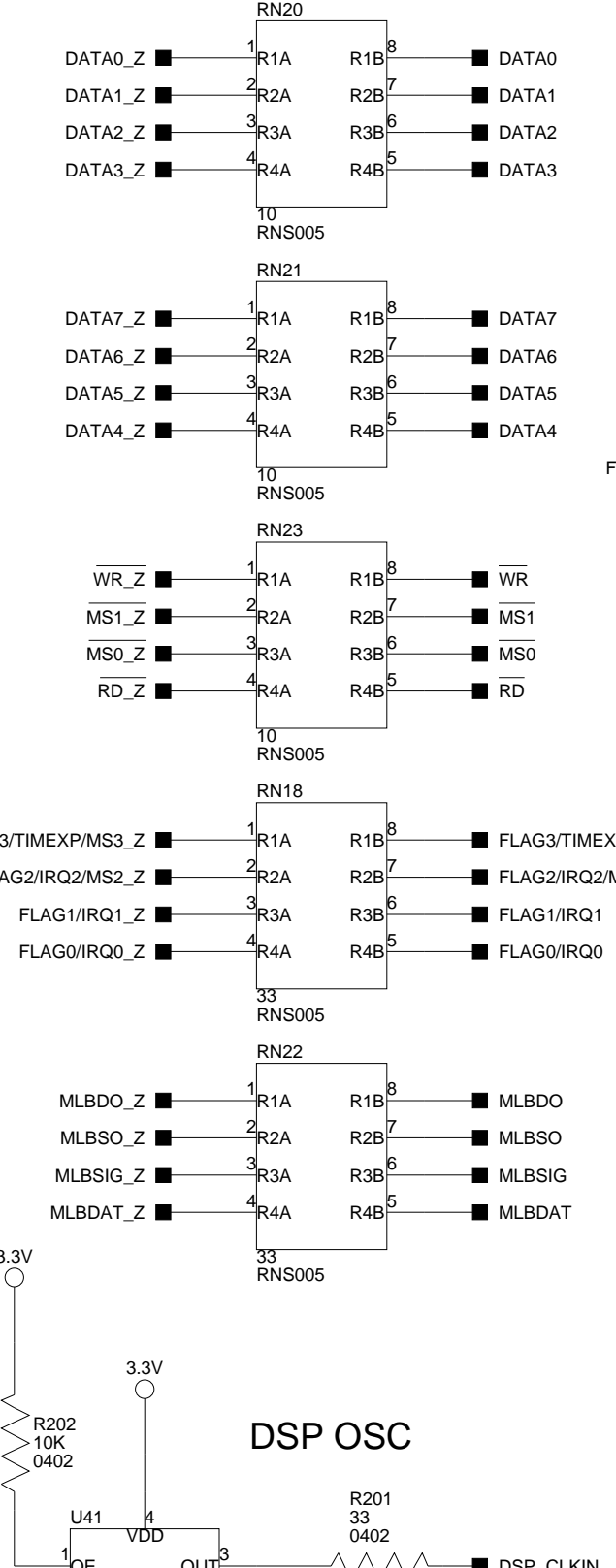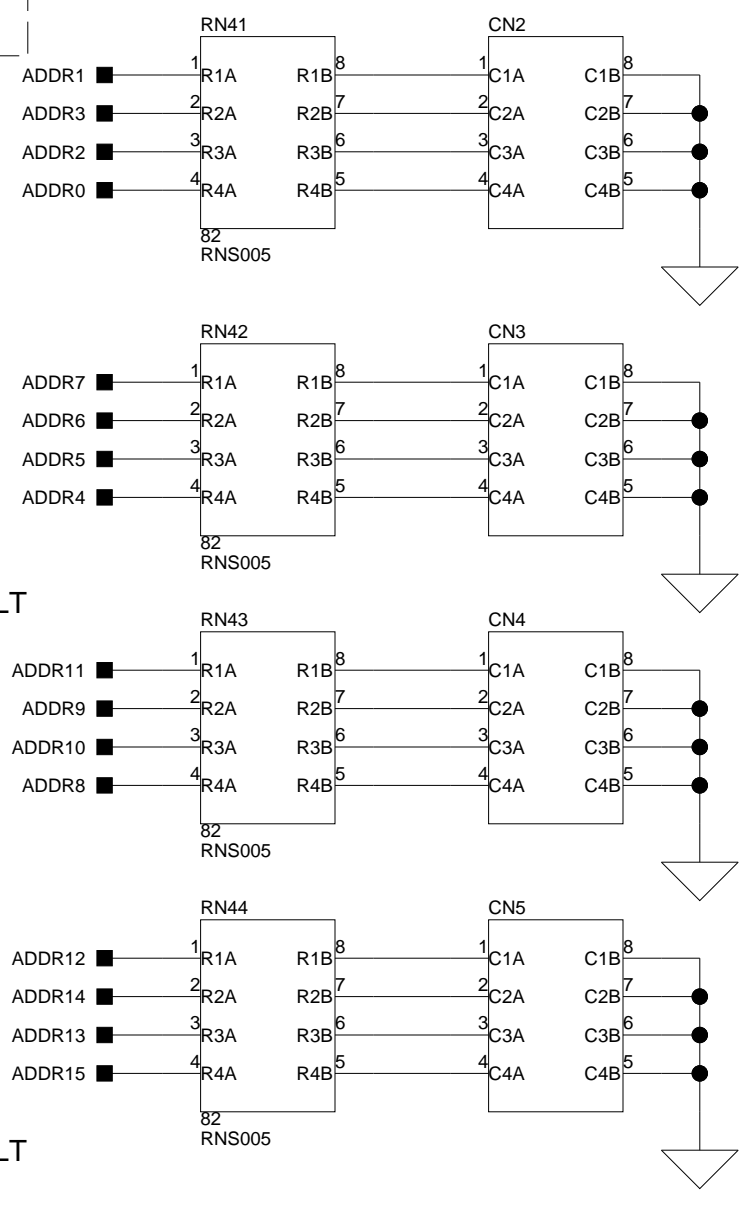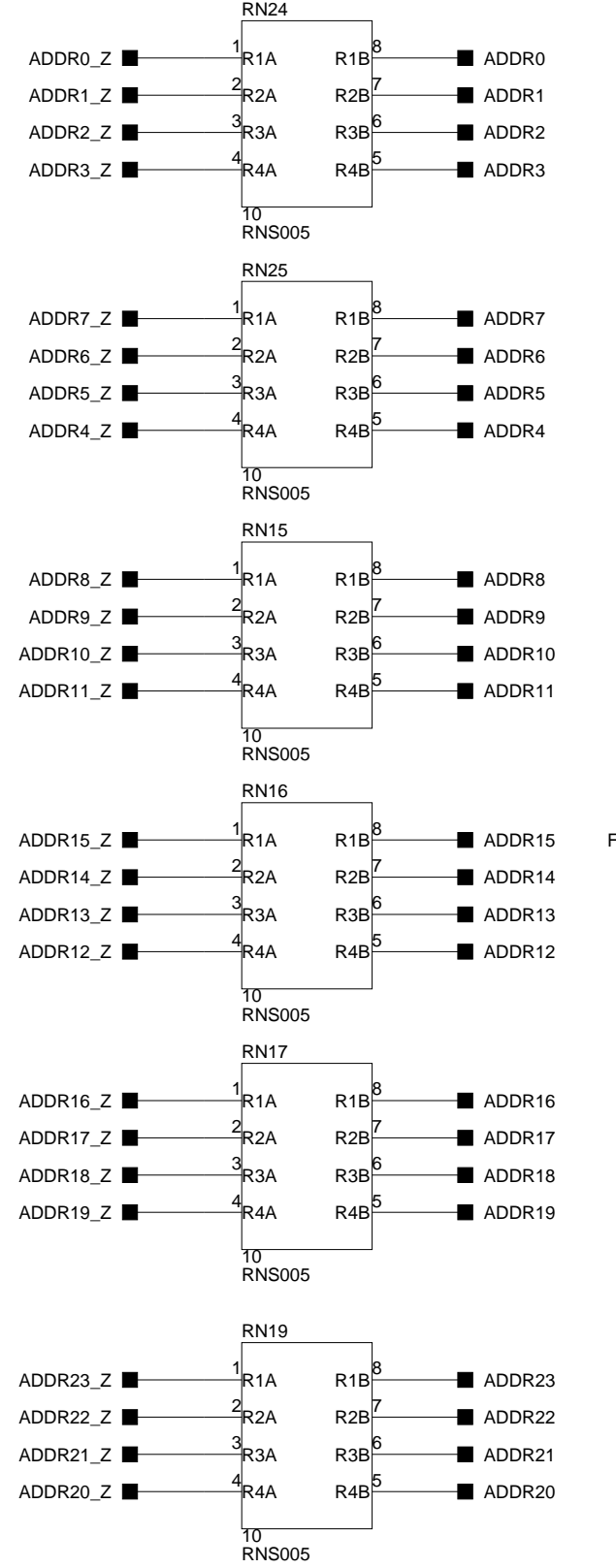
| Title | ADSP-21469 EZ-BOARD DSP - ASYNC INTERFACE | |
|---|---|---|
| Size C | Board No. A0221-2008 | Rev 0.2 |
| Date 4-14-2009_10:36 | Sheet 3 of 16 | |

LINK PORT 1 / JTAG IN

LINK PORT 0 / JTAG OUT

SW1: DAI [1-8] ENABLE
DEFAULT: ALL ON

SW3: DPI [1-8] ENABLE
DEFAULT: ALL ON

SW14: DPI [9-14] ENABLE
DEFAULT: ALL ON EXCEPT POS 3 & 4 OFF

SW2: DPI [9-16] ENABLE
DEFAULT: ALL ON EXCEPT POS. 5 & 6 OFF

SW7: DPI [17-20] ENABLE
DEFAULT: ALL ON
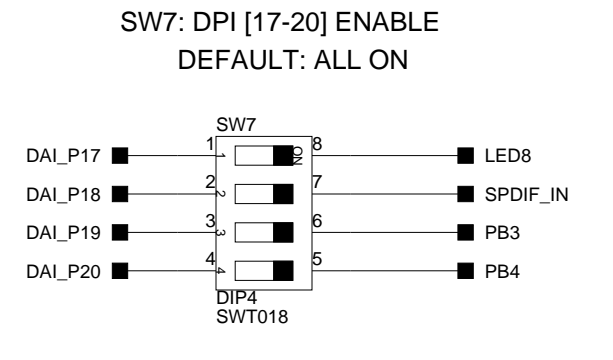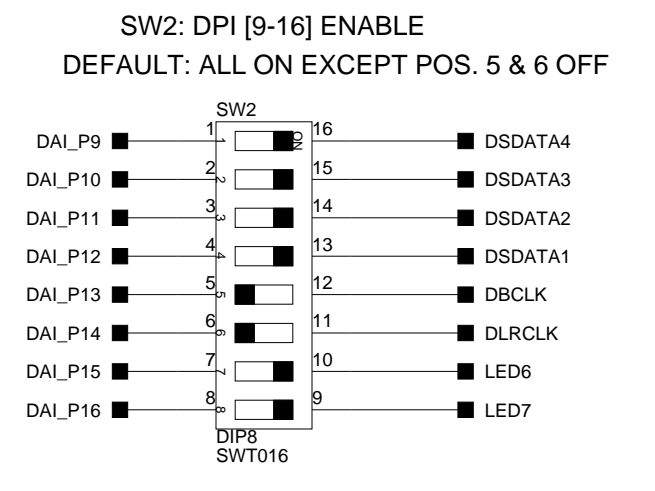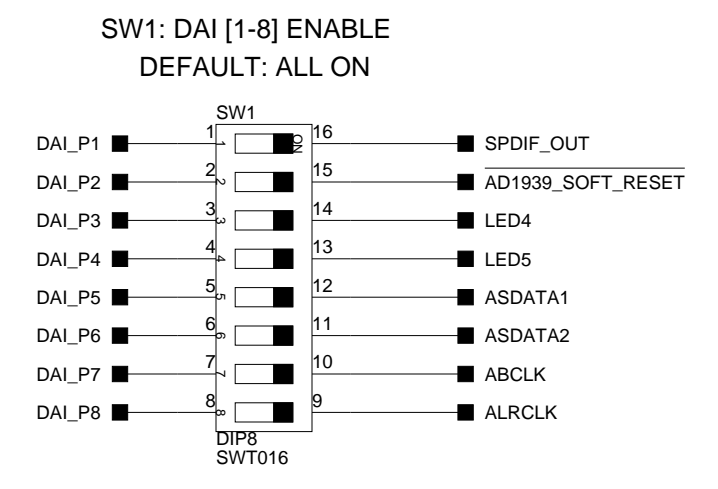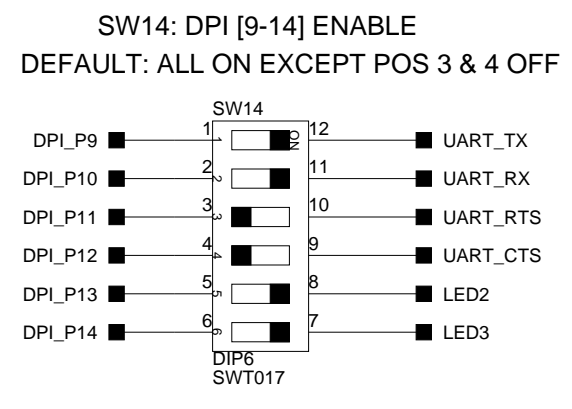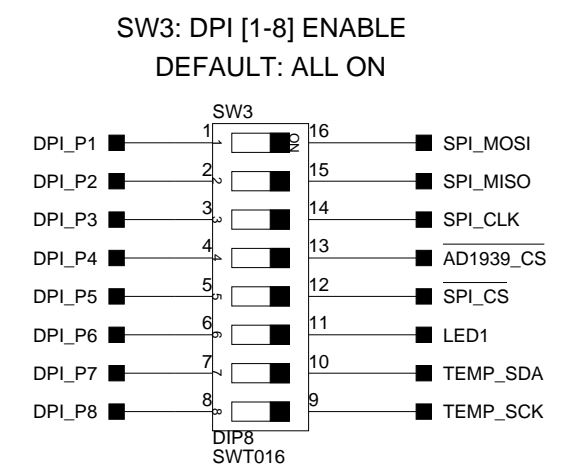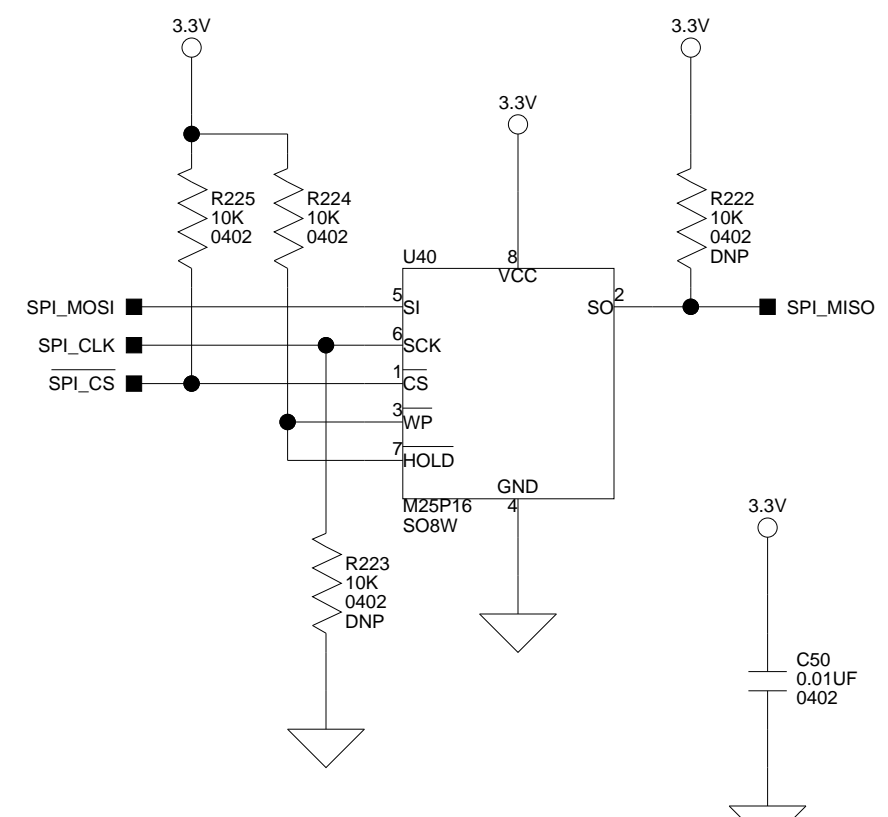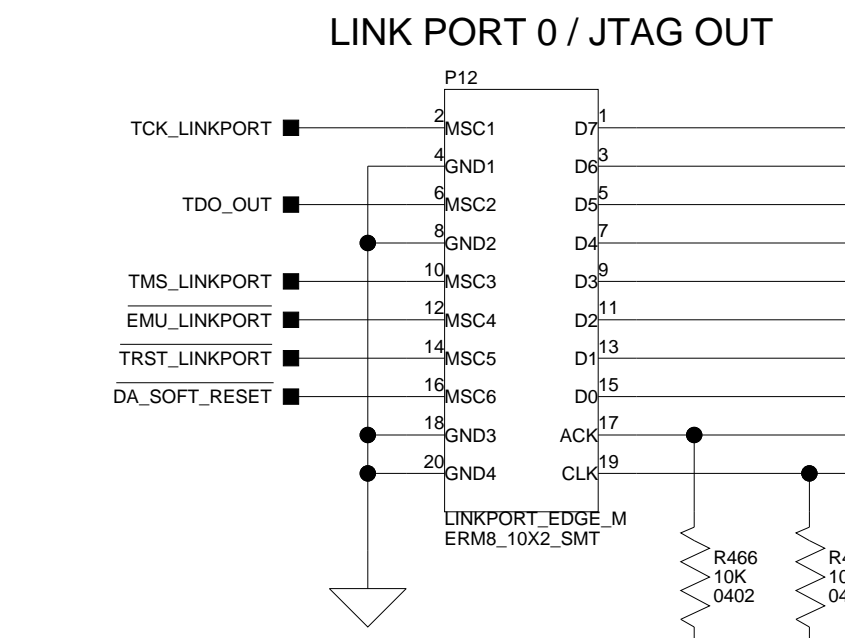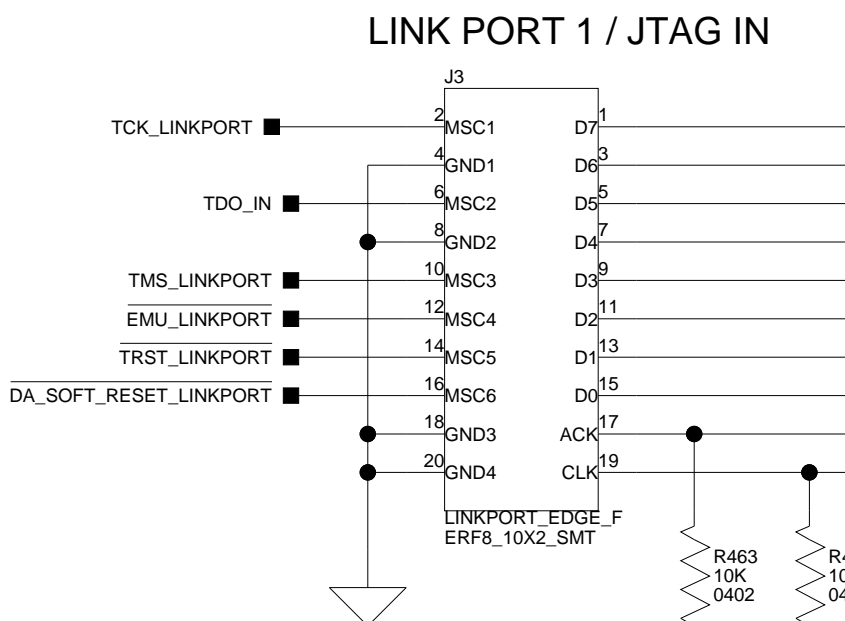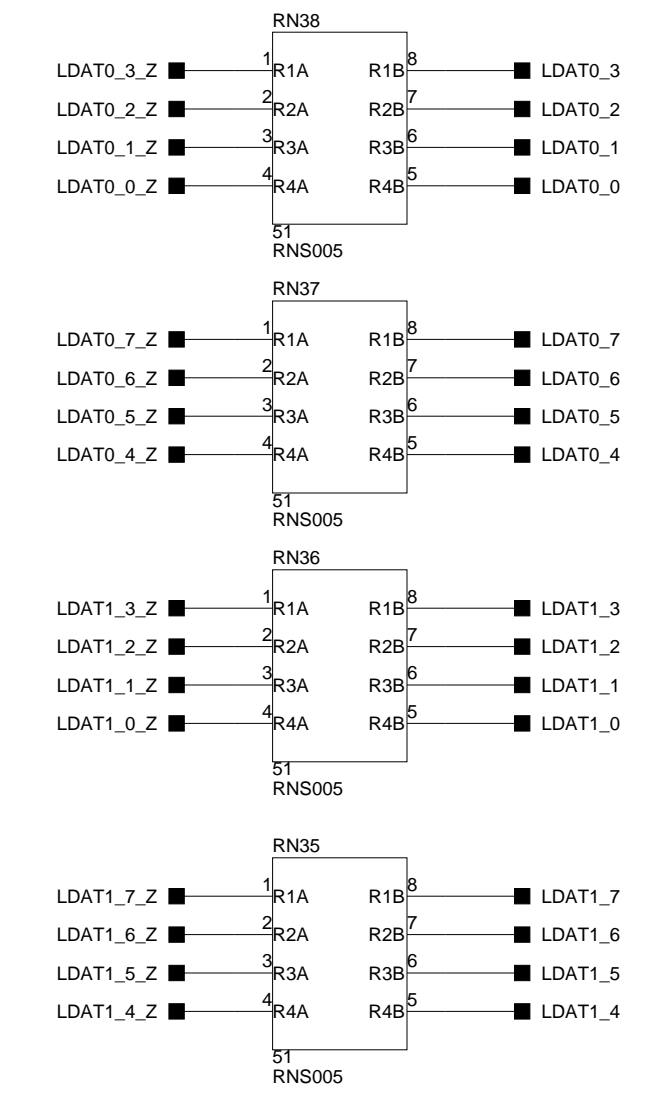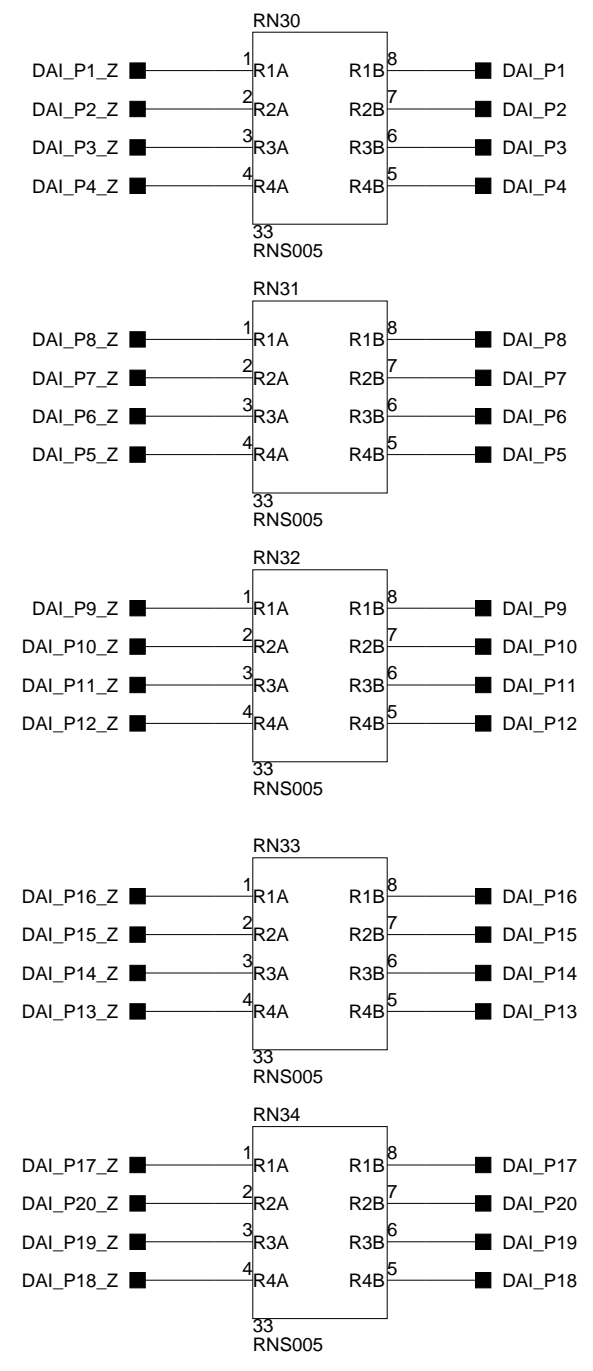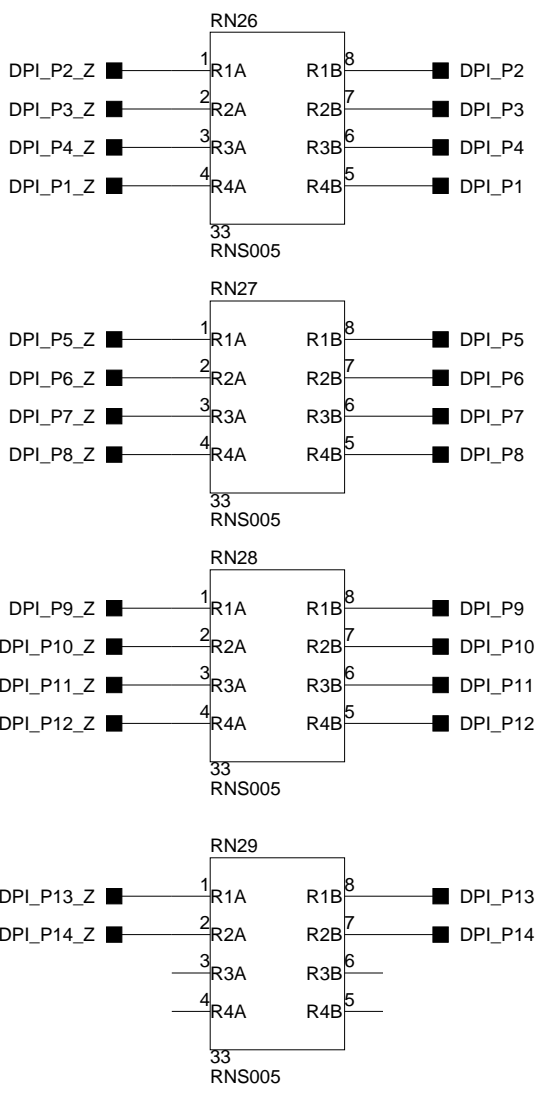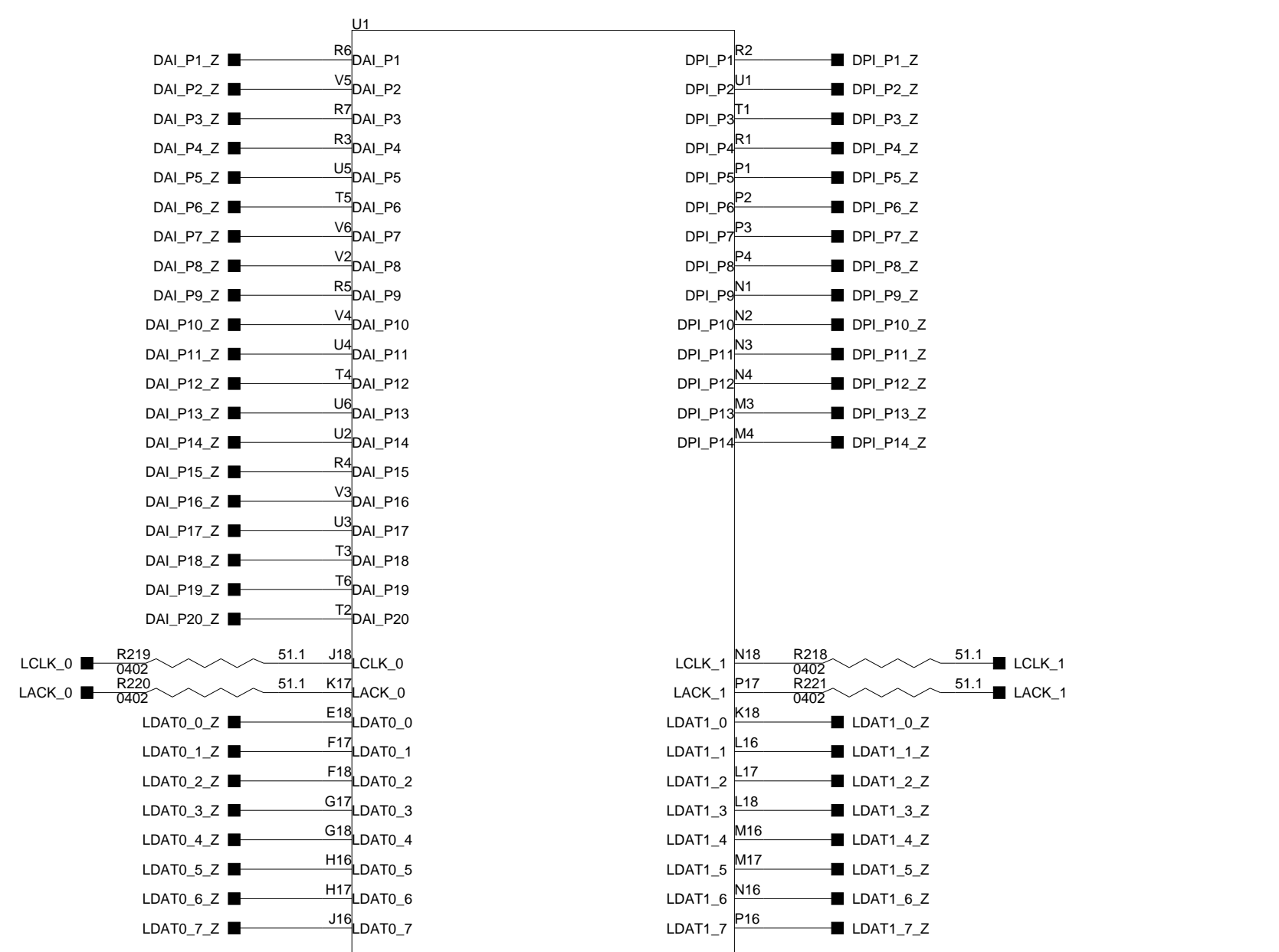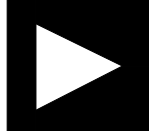
NOTE: SHUTTING OFF DIP SWITCHES SW1, SW2, SW3
SW7, OR SW14 ALLOWS A USER TO USE THESE DAI OR
DPI PINS VIA THE EXPANSION II INTERFACE.

U1
ADSP-21469
PBGA324

J3
LINKPORT_EDGE_F
ERF8_10X2_SMT

P12
LINKPORT_EDGE_M
ERM8_10X2_SMT

U40
M25P16
SO8W

RN26 RNS005 33
RN27 RNS005 33
RN28 RNS005 33
RN29 RNS005 33
RN30 RNS005 33
RN31 RNS005 33
RN32 RNS005 33
RN33 RNS005 33
RN34 RNS005 33
RN35 RNS005 51
RN36 RNS005 51
RN37 RNS005 51
RN38 RNS005 51

SW1 DIP8 SWT016
SW3 DIP8 SWT016
SW14 DIP6 SWT017
SW2 DIP8 SWT016
SW7 DIP4 SWT018

SPI_MOSI
SPI_MISO
SPI_CLK
AD1939_CS
SPI_CS
LED1
TEMP_SDA
TEMP_SCK

UART_TX
UART_RX
UART_RTS
UART_CTS
LED2
LED3

SPDIF_OUT
AD1939_SOFT_RESET
LED4
LED5
ASDATA1
ASDATA2
ABCLK
ALRCLK

DSDATA4
DSDATA3
DSDATA2
DSDATA1
DBCLK
DLRCLK
LED6
LED7

LED8
SPDIF_IN
PB3
PB4

3.3V
C50 0.01UF 0402

R219 0402 51.1
R220 0402 51.1
R218 0402 51.1
R221 0402 51.1

R463 10K 0402
R464 10K 0402
R465 10K 0402
R466 10K 0402

R222 10K 0402 DNP
R223 10K 0402 DNP
R224 10K 0402
R225 10K 0402

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PH: 1-800-ANALOGD

Title: ADSP-21469 EZ-BOARD
DSP - DAI, DPI, LINK PORT INTERFACES

Size: C
Board No.: A0221-2008
Rev: 0.2
Date: 3-31-2009_14:34
Sheet 4 of 16

VDD_DDR2  VDDINT

U1

C5 VDD_DDR2_1
C12 VDD_DDR2_2
D3 VDD_DDR2_3
D6 VDD_DDR2_4
D8 VDD_DDR2_5
D18 VDD_DDR2_6
E2 VDD_DDR2_7
E4 VDD_DDR2_8
E7 VDD_DDR2_9
E10 VDD_DDR2_10
E11 VDD_DDR2_11
E17 VDD_DDR2_12
F3 VDD_DDR2_13
F5 VDD_DDR2_14
F15 VDD_DDR2_15
G14 VDD_DDR2_16
G16 VDD_DDR2_17

VDD_INT1 D12
VDD_INT2 E6
VDD_INT3 E8
VDD_INT4 E9
VDD_INT5 E14
VDD_INT6 E15
VDD_INT7 F6
VDD_INT8 F7
VDD_INT9 F8
VDD_INT10 F9
VDD_INT11 F10
VDD_INT12 F11
VDD_INT13 F12
VDD_INT14 F13
VDD_INT15 G6
VDD_INT16 G13
VDD_INT17 H5
VDD_INT18 H6
VDD_INT19 H13
VDD_INT20 H14
VDD_INT21 J6
VDD_INT22 J13
VDD_INT23 K6
VDD_INT24 K13
VDD_INT25 L6
VDD_INT26 L13
VDD_INT27 M6
VDD_INT28 M13
VDD_INT29 N6
VDD_INT30 N7
VDD_INT31 N8
VDD_INT32 N9
VDD_INT33 N13

VDDEXT

H15 VDD_EXT1
H18 VDD_EXT2
J5 VDD_EXT3
J15 VDD_EXT4
K14 VDD_EXT5
L5 VDD_EXT6
M14 VDD_EXT7
M18 VDD_EXT8
N5 VDD_EXT9
P6 VDD_EXT10
P8 VDD_EXT11
P10 VDD_EXT12
P12 VDD_EXT13
P14 VDD_EXT14
P15 VDD_EXT15
V8 VDD_EXT16
U8 VDD_EXT17
T8 VDD_EXT18
V9 VDD_EXT19
U9 VDD_EXT20
T9 VDD_EXT21

VDD_THD N10

VDDEXT
C116 0.01UF 0402

VDDINT
FER5 600 0603
C53 0.1UF 0402
C52 0.01UF 0402
C51 1000PF 0402

H1 VDD_A
H2 VSS_A

ADSP-21469 PBGA324

U1

A1 VSS1
A18 VSS2
C4 VSS3
C6 VSS4
C8 VSS5
D5 VSS6
D7 VSS7
D9 VSS8
D10 VSS9
D17 VSS10
E3 VSS11
E5 VSS12
E12 VSS13
E13 VSS14
E16 VSS15
F2 VSS16
F4 VSS17
F14 VSS18
F16 VSS19
G7 VSS20
G8 VSS21
G9 VSS22
G10 VSS23
G11 VSS24
G12 VSS25
G15 VSS26
H4 VSS27
H7 VSS28
H8 VSS29
H9 VSS30
H10 VSS31
H11 VSS32
H12 VSS33
J1 VSS34
J7 VSS35
J8 VSS36
J9 VSS37
J10 VSS38

VSS39 J11
VSS40 J12
VSS41 J14
VSS42 J17
VSS43 K5
VSS44 K7
VSS45 K8
VSS46 K9
VSS47 K10
VSS48 K11
VSS49 K12
VSS50 L7
VSS51 L8
VSS52 L9
VSS53 L10
VSS54 L11
VSS55 L12
VSS56 L14
VSS57 M5
VSS58 M7
VSS59 M8
VSS60 M9
VSS61 M10
VSS62 M11
VSS63 M12
VSS64 N14
VSS65 N17
VSS66 P5
VSS67 P7
VSS68 P9
VSS69 P11
VSS70 P13
VSS71 V1
VSS72 V18
VSS73 F1
VSS74 G3
VSS75 G4
VSS76 G5
VSS77 R9

ADSP-21469 PBGA324

VDDINT
C87 0.01UF 0402
C86 0.01UF 0402
C71 0.01UF 0402
C70 0.01UF 0402
C69 0.01UF 0402
C68 0.01UF 0402
C67 0.01UF 0402
C66 0.01UF 0402
C65 0.01UF 0402
C72 0.01UF 0402
C102 0.01UF 0402

VDDINT
C64 0.01UF 0402
C63 0.01UF 0402
C62 0.01UF 0402
C61 0.01UF 0402
C60 0.01UF 0402
C59 0.01UF 0402
C58 0.01UF 0402
C91 0.01UF 0402
C57 0.01UF 0402
C73 0.01UF 0402
C56 0.01UF 0402

VDDINT
C88 0.01UF 0402
C55 0.01UF 0402
C54 0.01UF 0402
C96 0.01UF 0402
C90 0.01UF 0402
C89 0.01UF 0402
C94 0.01UF 0402
C95 0.01UF 0402
C93 0.01UF 0402
C92 0.01UF 0402

VDDINT
C97 10UF 0805
C98 10UF 0805

VDDEXT
C79 0.01UF 0402
C78 0.01UF 0402
C77 0.01UF 0402
C76 0.01UF 0402
C75 0.01UF 0402
C85 0.01UF 0402
C74 0.01UF 0402

VDDEXT
C99 0.01UF 0402
C84 0.01UF 0402
C83 0.01UF 0402
C82 0.01UF 0402
C81 0.01UF 0402
C80 0.01UF 0402

VDDEXT
C100 10UF 0805
C101 10UF 0805

VDD_DDR2
C113 0.01UF 0402
C114 0.01UF 0402
C115 0.01UF 0402
C105 0.01UF 0402
C111 0.01UF 0402
C112 0.01UF 0402
C107 0.01UF 0402
C106 0.01UF 0402
C108 0.01UF 0402
C109 0.01UF 0402
C110 0.01UF 0402

VDD_DDR2
C104 10UF 0805
C103 10UF 0805

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Title: ADSP-21469 EZ-BOARD
DSP - POWER

Size: C
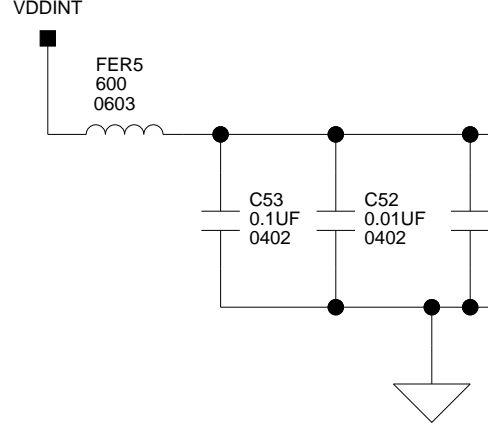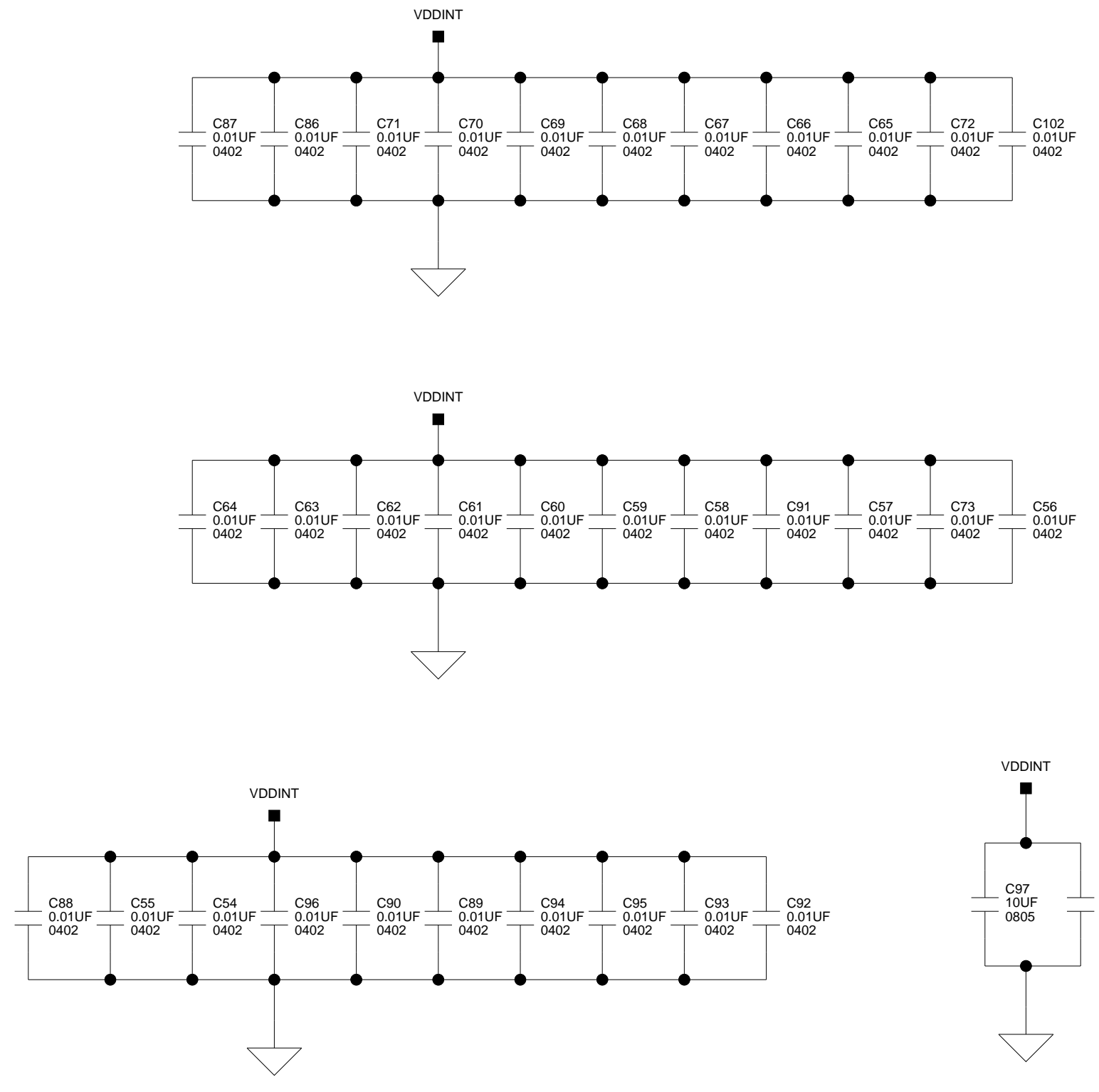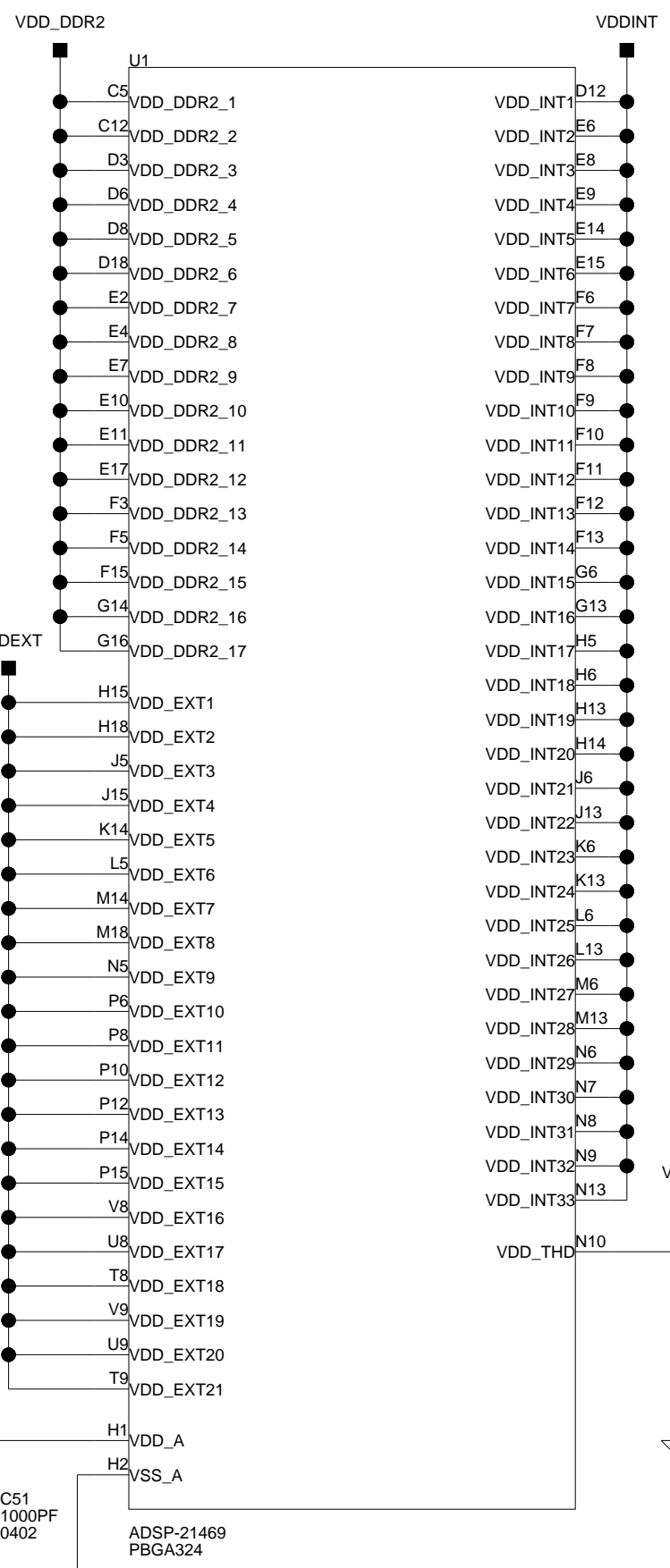Board No.: A0221-2008
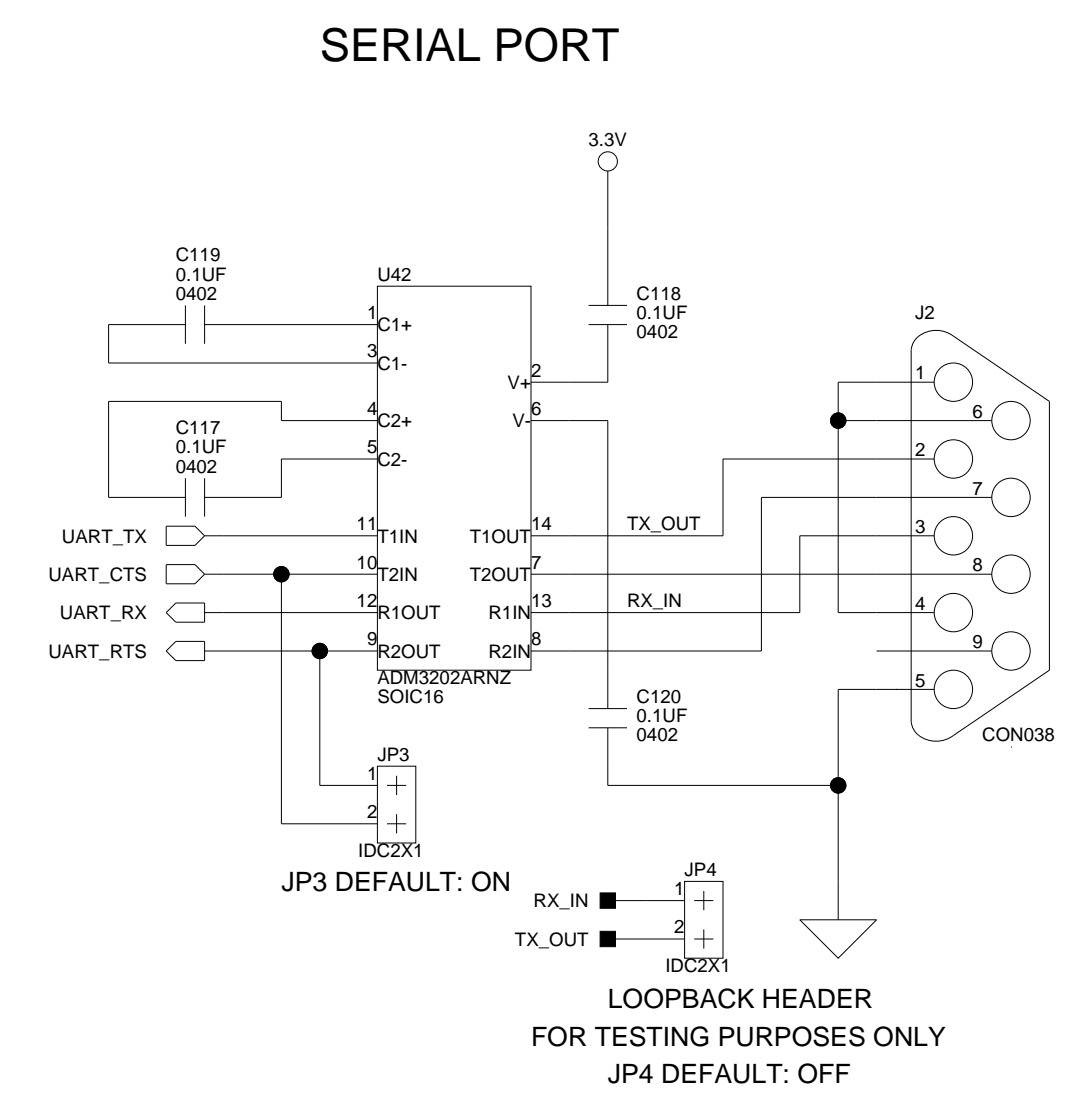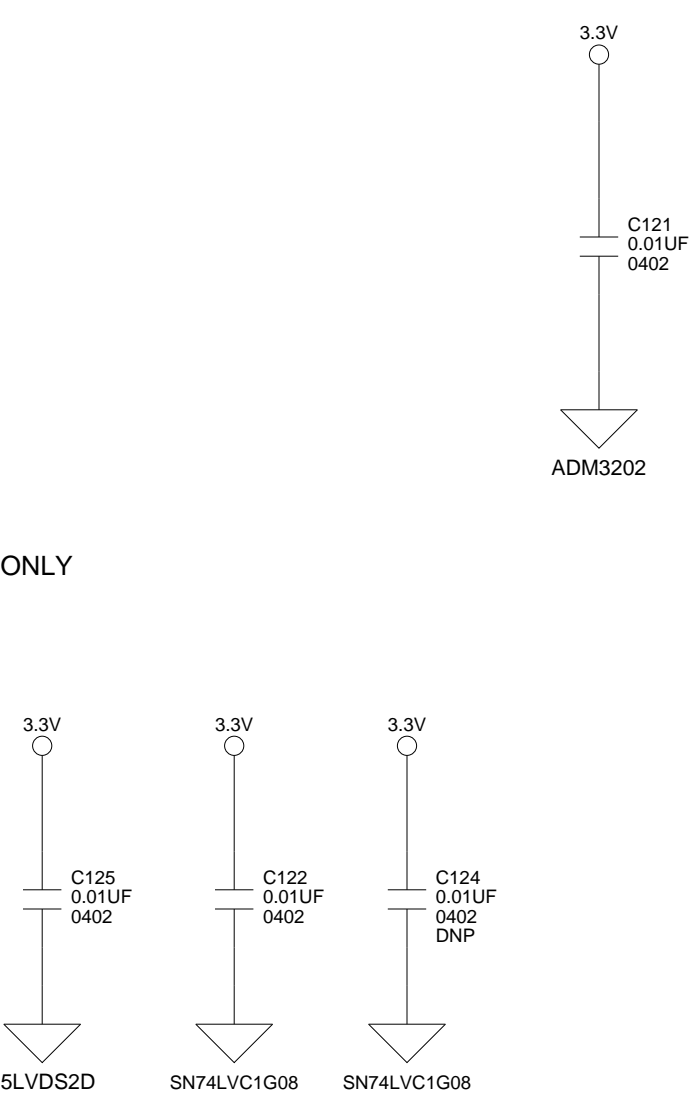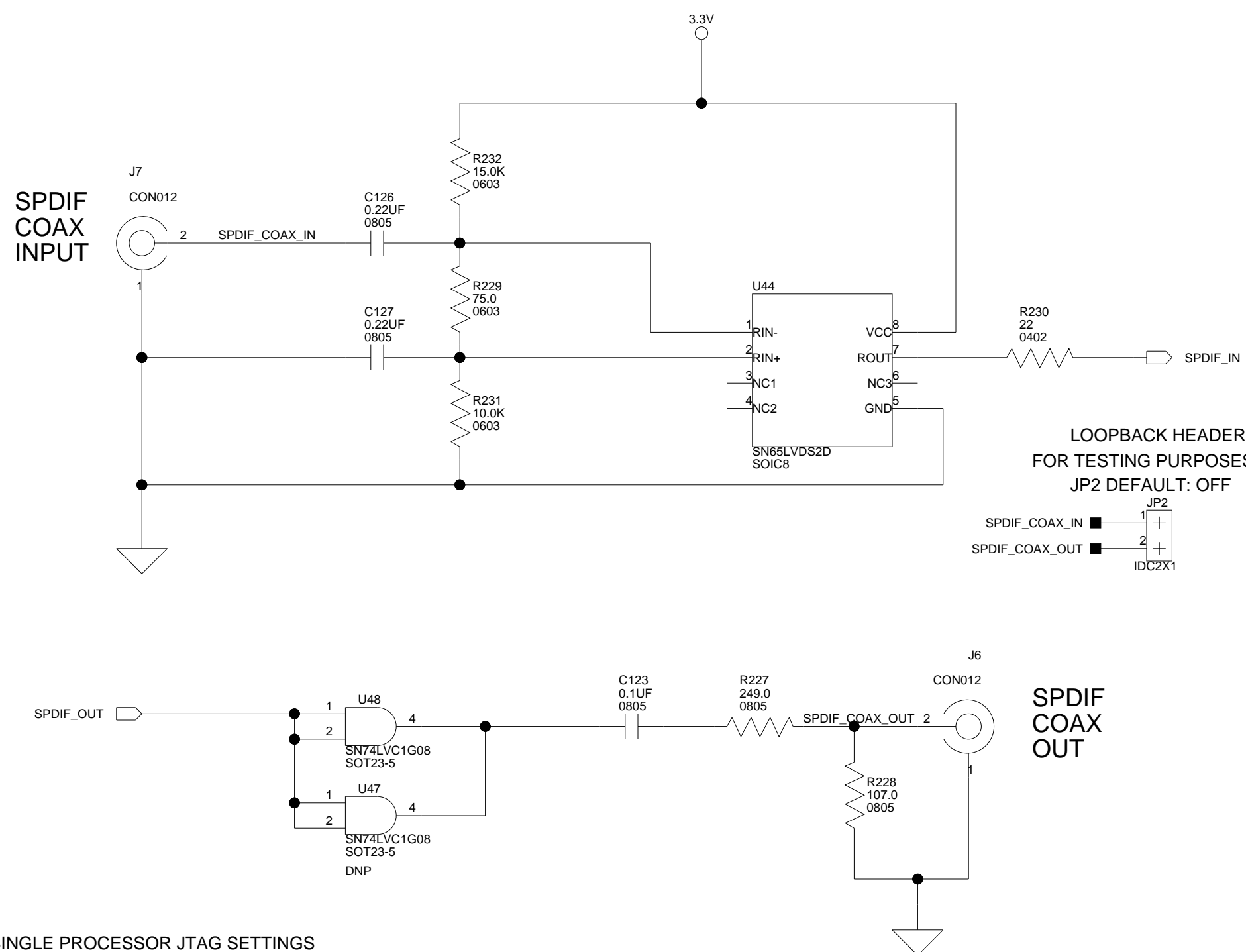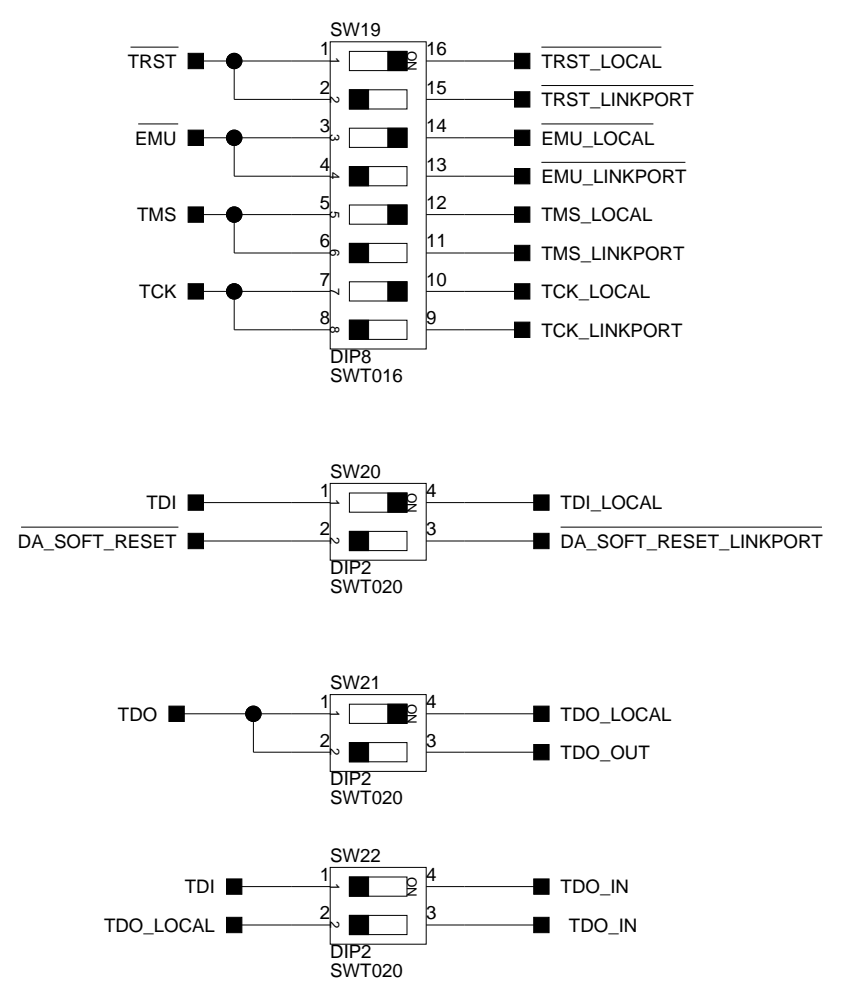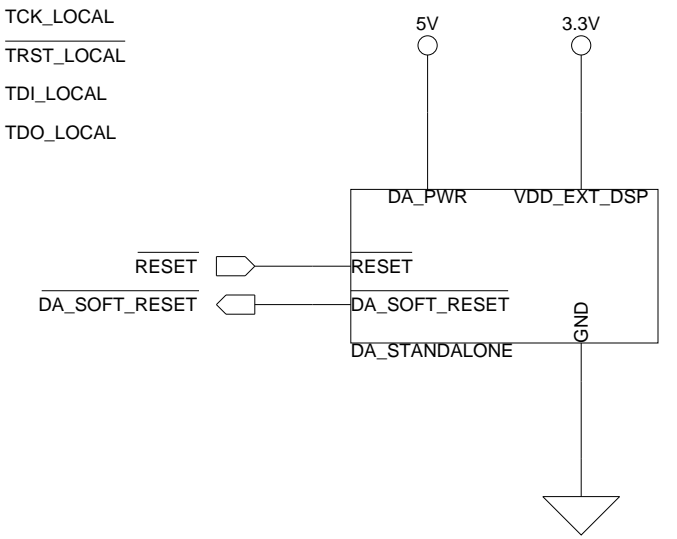Rev: 0.2
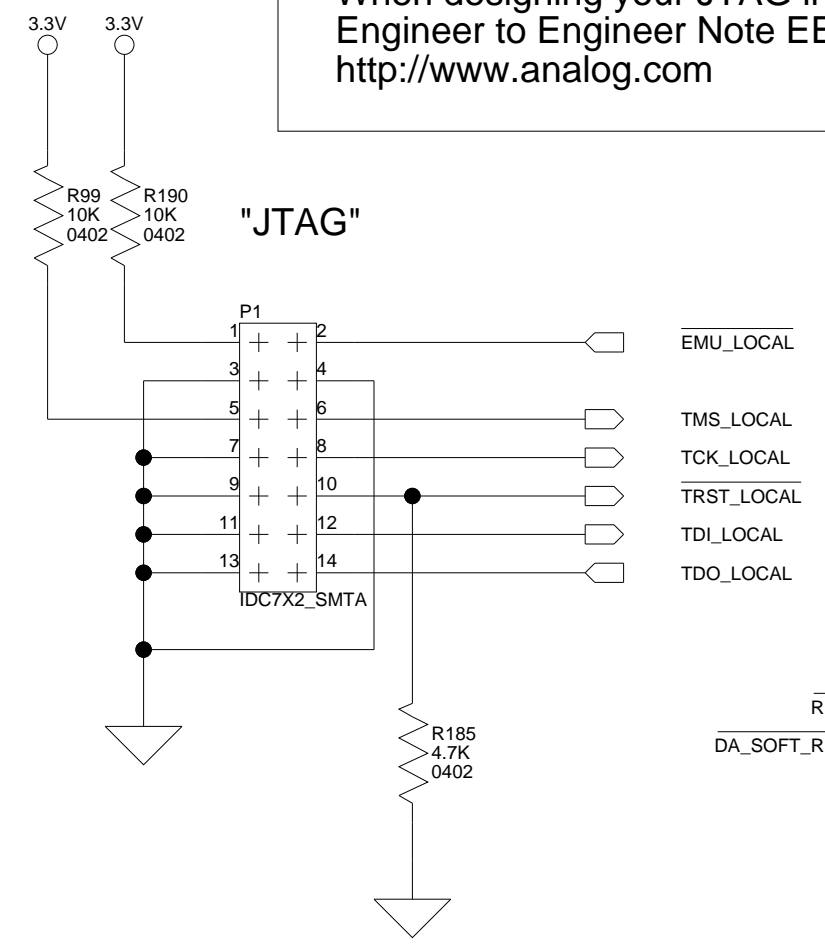
Date: 3-19-2009_12:57
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SPDIF COAX INPUT

J7
CON012

C126 0.22UF 0805
C127 0.22UF 0805

R232 15.0K 0603
R229 75.0 0603
R231 10.0K 0603

3.3V

U44
1 RIN- VCC 8
2 RIN+ ROUT 7
3 NC1 NC3 6
4 NC2 GND 5
SN65LVDS2D SOIC8

R230 22 0402

SPDIF_IN

LOOPBACK HEADER
FOR TESTING PURPOSES ONLY
JP2 DEFAULT: OFF

JP2
SPDIF_COAX_IN
SPDIF_COAX_OUT
IDC2X1

3.3V
C121 0.01UF 0402
ADM3202

SERIAL PORT

3.3V

C119 0.1UF 0402
C117 0.1UF 0402

U42
1 C1+
3 C1-
4 C2+
5 C2-
V+ 2
V- 6
11 T1IN T1OUT 14
10 T2IN T2OUT 7
12 R1OUT R1IN 13
9 R2OUT R2IN 8
ADM3202ARNZ SOIC16

C118 0.1UF 0402

UART_TX
UART_CTS
UART_RX
UART_RTS

TX_OUT
RX_IN

C120 0.1UF 0402

J2
1
6
2
7
3
8
4
9
5
CON038

JP3
IDC2X1
JP3 DEFAULT: ON

JP4
RX_IN
TX_OUT
IDC2X1

LOOPBACK HEADER
FOR TESTING PURPOSES ONLY
JP4 DEFAULT: OFF

SPDIF_OUT

U48
1
2
4
SN74LVC1G08 SOT23-5

U47
1
2
4
SN74LVC1G08 SOT23-5
DNP

C123 0.1UF 0805
R227 249.0 0805

SPDIF_COAX_OUT
J6
CON012
SPDIF COAX OUT

R228 107.0 0805

3.3V
C125 0.01UF 0402
65LVDS2D

3.3V
C122 0.01UF 0402
SN74LVC1G08

3.3V
C124 0.01UF 0402 DNP
SN74LVC1G08

SINGLE PROCESSOR JTAG SETTINGS
VIA HP-USB EMUALTOR OR DEBUG AGENT (DEFAULT)

| SWITCH | BOARD ATTACHED TO EMULATOR |
|---|---|
| SW19.1 | ON |
| SW19.2 | OFF |
| SW19.3 | ON |
| SW19.4 | OFF |
| SW19.5 | ON |
| SW19.6 | OFF |
| SW19.7 | ON |
| SW19.8 | OFF |
| SW20.1 | ON |
| SW20.2 | OFF |
| SW21.1 | ON |
| SW21.2 | OFF |
| SW22.1 | OFF |
| SW22.2 | OFF |

MULTI PROCESSOR JTAG SETTINGS VIA HP-USB EMUALTOR
USING TWO OR MORE EZ-BOARDS (LINK PORT CABLES
REQUIRED FOR MORE THAN TWO BOARDS)

| SWITCH | BOARD ATTACHED TO EMULATOR | BOARD(S) NOT ATTACHED TO EMULATOR |
|---|---|---|
| SW19.1 | ON | OFF |
| SW19.2 | ON | ON |
| SW19.3 | ON | OFF |
| SW19.4 | ON | ON |
| SW19.5 | ON | OFF |
| SW19.6 | ON | ON |
| SW19.7 | ON | OFF |
| SW19.8 | ON | ON |
| SW20.1 | ON | OFF |
| SW20.2 | OFF | OFF |
| SW21.1 | OFF | OFF |
| SW21.2 | ON | ON |
| SW22.1 | OFF | ON |
| SW22.2 | ON | OFF |

JTAG SWITCHES

SW19
TRST
TRST_LOCAL
TRST_LINKPORT
EMU
EMU_LOCAL
EMU_LINKPORT
TMS
TMS_LOCAL
TMS_LINKPORT
TCK
TCK_LOCAL
TCK_LINKPORT
DIP8 SWT016

SW20
TDI
TDI_LOCAL
DA_SOFT_RESET
DA_SOFT_RESET_LINKPORT
DIP2 SWT020

SW21
TDO
TDO_LOCAL
TDO_OUT
DIP2 SWT020

SW22
TDI
TDO_IN
TDO_LOCAL
TDO_IN
DIP2 SWT020

All USB interface circuitry is considered proprietary and has been omitted from this schematic.

When designing your JTAG interface please refer to the Engineer to Engineer Note EE-68 which can be found at http://www.analog.com

3.3V  3.3V
R99 10K 0402
R190 10K 0402

"JTAG"

P1
1 2
3 4
5 6
7 8
9 10
11 12
13 14
IDC7X2_SMTA

EMU_LOCAL
TMS_LOCAL
TCK_LOCAL
TRST_LOCAL
TDI_LOCAL
TDO_LOCAL

R185 4.7K 0402

5V  3.3V

DA_PWR  VDD_EXT_DSP
RESET
RESET
DA_SOFT_RESET
DA_SOFT_RESET
DA_STANDALONE
GND

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Title: ADSP-21469 EZ-BOARD
SPDIF, RS-232, JTAG INTERFACES

Size C
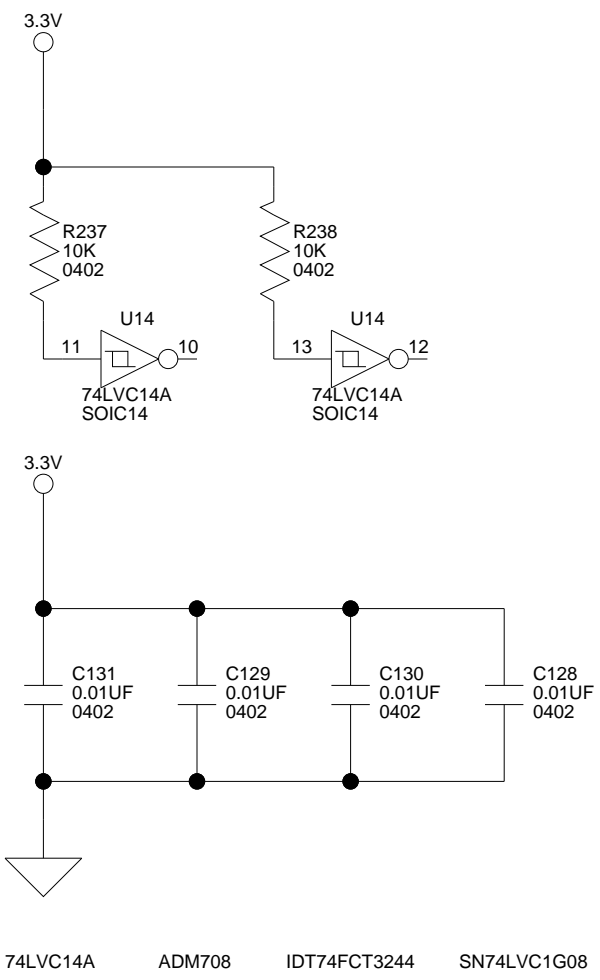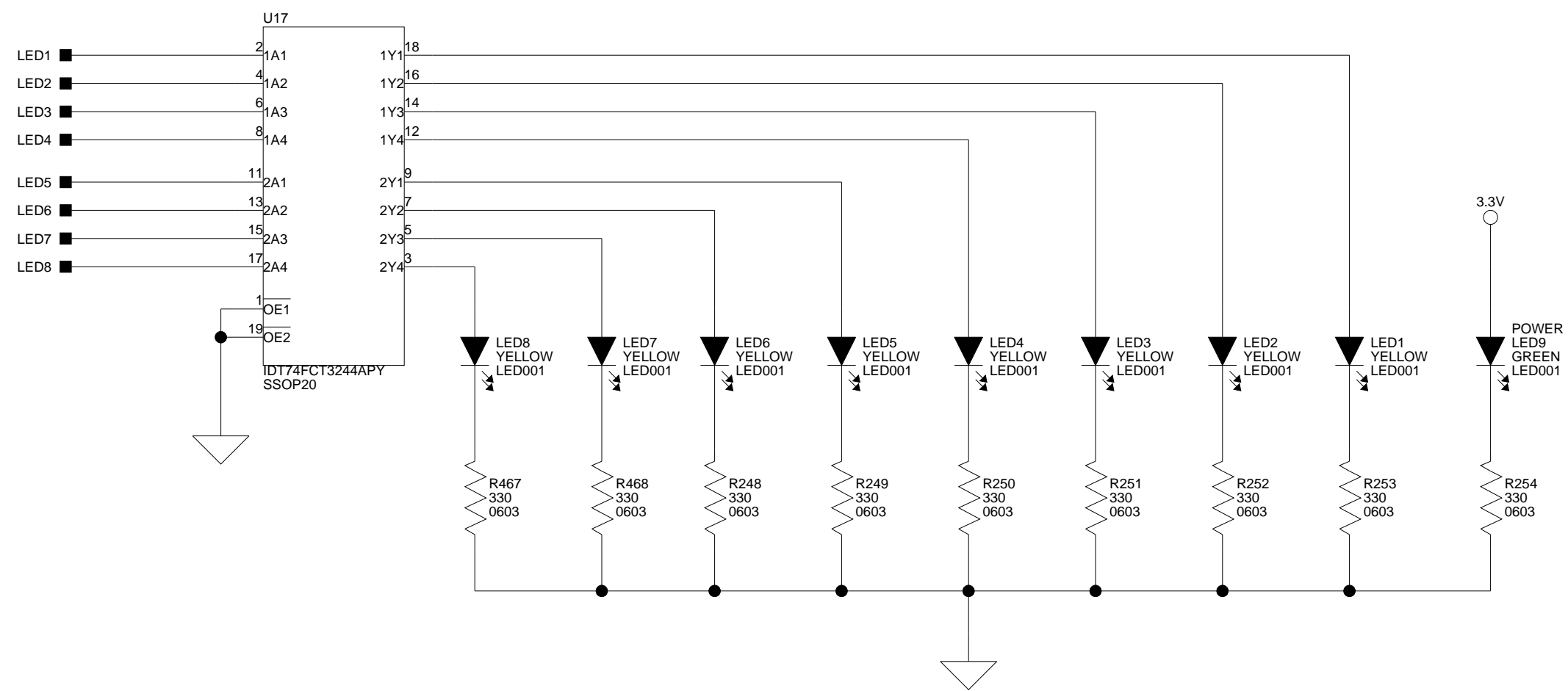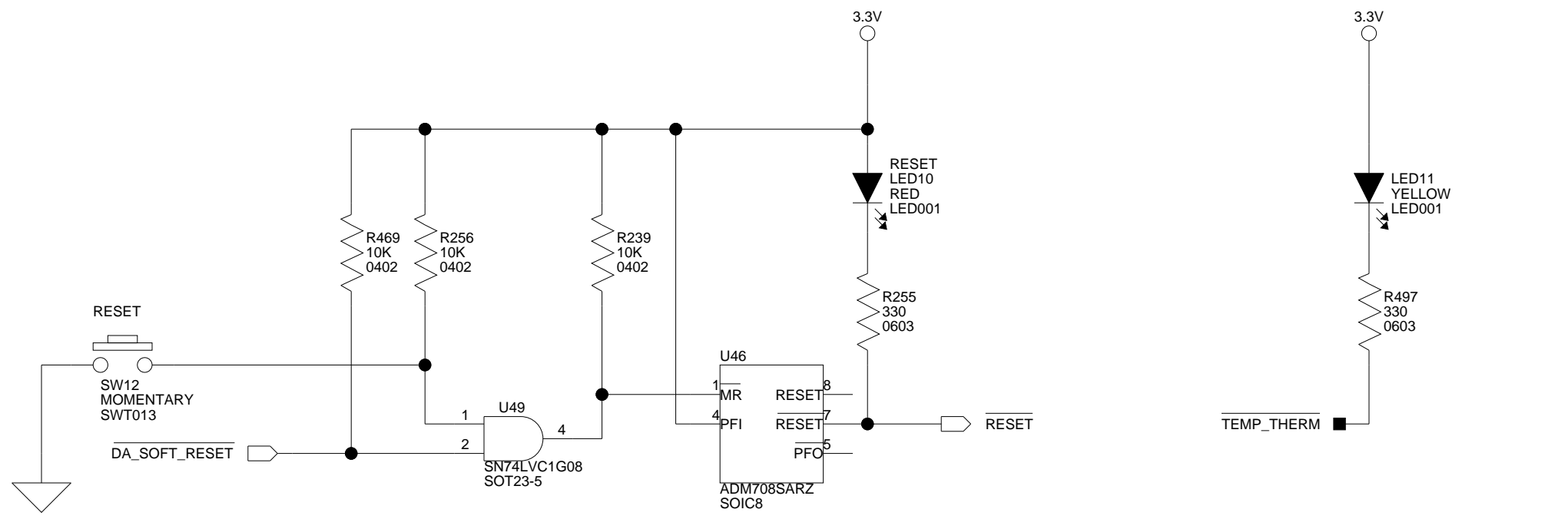Board No. A0221-2008
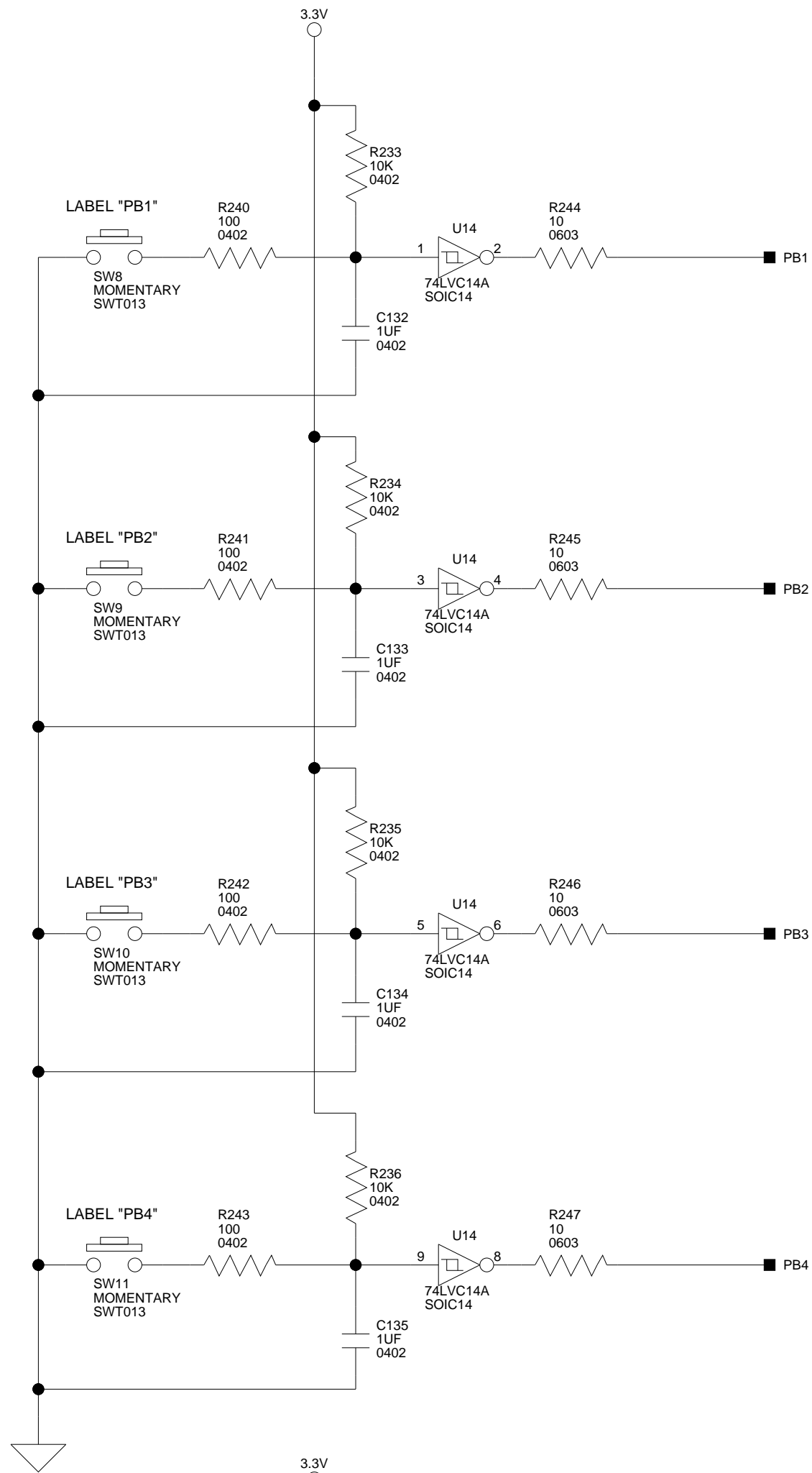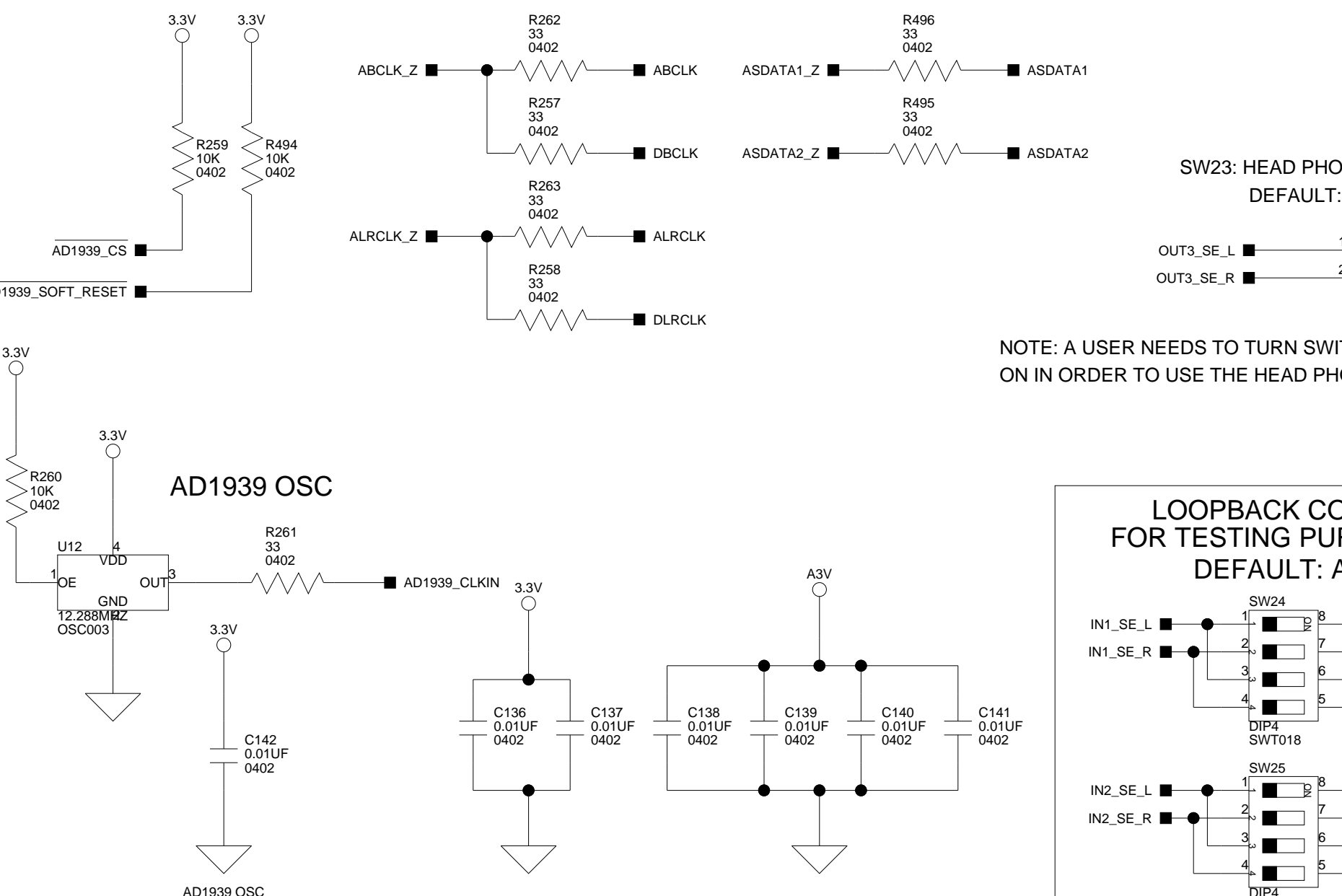Rev 0.2
Date 4-1-2009_17:04
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| COMPONENT | DSP PIN CONNECTED TO | CONNECTED VIA SWITCH |
|---|---|---|
| PB1 | FLAG1/IRQ1 | SW13.4 |
| PB2 | FLAG2/IRQ2/MS2 | SW13.5 |
| PB3 | DAI_P19 | SW7.3 |
| PB4 | DAI_P20 | SW7.4 |
| LED1 | DPI_P6 | SW3.6 |
| LED2 | DPI_P13 | SW14.5 |
| LED3 | DPI_P14 | SW14.6 |
| LED4 | DAI_P3 | SW1.3 |
| LED5 | DAI_P4 | SW1.4 |
| LED6 | DAI_P15 | SW2.7 |
| LED7 | DAI_P16 | SW2.8 |
| LED8 | DAI_P17 | SW7.1 |

LABEL "PB1"
R240 100 0402
R233 10K 0402
U14 74LVC14A SOIC14
R244 10 0603
PB1
SW8 MOMENTARY SWT013
C132 1UF 0402
3.3V

LABEL "PB2"
R241 100 0402
R234 10K 0402
U14 74LVC14A SOIC14
R245 10 0603
PB2
SW9 MOMENTARY SWT013
C133 1UF 0402

LABEL "PB3"
R242 100 0402
R235 10K 0402
U14 74LVC14A SOIC14
R246 10 0603
PB3
SW10 MOMENTARY SWT013
C134 1UF 0402

LABEL "PB4"
R243 100 0402
R236 10K 0402
U14 74LVC14A SOIC14
R247 10 0603
PB4
SW11 MOMENTARY SWT013
C135 1UF 0402

3.3V
R237 10K 0402
R238 10K 0402
U14 74LVC14A SOIC14
U14 74LVC14A SOIC14

3.3V
C131 0.01UF 0402
C129 0.01UF 0402
C130 0.01UF 0402
C128 0.01UF 0402

74LVC14A    ADM708    IDT74FCT3244    SN74LVC1G08

3.3V
R469 10K 0402
R256 10K 0402
R239 10K 0402
RESET LED10 RED LED001
R255 330 0603
RESET
SW12 MOMENTARY SWT013
DA_SOFT_RESET
U49 SN74LVC1G08 SOT23-5
U46 ADM708SARZ SOIC8
MR
PFI
RESET
RESET
PFO
RESET

3.3V
LED11 YELLOW LED001
R497 330 0603
TEMP_THERM

U17
LED1 — 2 1A1 — 18 1Y1
LED2 — 4 1A2 — 16 1Y2
LED3 — 6 1A3 — 14 1Y3
LED4 — 8 1A4 — 12 1Y4
LED5 — 11 2A1 — 9 2Y1
LED6 — 13 2A2 — 7 2Y2
LED7 — 15 2A3 — 5 2Y3
LED8 — 17 2A4 — 3 2Y4
1 OE1
19 OE2
IDT74FCT3244APY SSOP20

LED8 YELLOW LED001
LED7 YELLOW LED001
LED6 YELLOW LED001
LED5 YELLOW LED001
LED4 YELLOW LED001
LED3 YELLOW LED001
LED2 YELLOW LED001
LED1 YELLOW LED001
POWER LED9 GREEN LED001
3.3V

R467 330 0603
R468 330 0603
R248 330 0603
R249 330 0603
R250 330 0603
R251 330 0603
R252 330 0603
R253 330 0603
R254 330 0603

| Title | ADSP-21469 EZ-BOARD RESET CIRCUIT, PUSHBUTTONS, LEDS | | |
|---|---|---|---|
| Size C | Board No. | A0221-2008 | Rev 0.2 |
| Date | 3-31-2009_14:34 | Sheet 7 of 16 | |

J4
WHITE (LEFT)  RED (RIGHT)

| OUT3 (L) | OUT3 (R) |
| 9 | 10 |
| OUT1 (L) | OUT1 (R) |
| 4 | 6 |
| IN1 (L) | IN1 (R) |
| 3 | 5 |

J5
WHITE (LEFT)  RED (RIGHT)

| OUT4 (L) | OUT4 (R) |
| 9 | 10 |
| OUT2 (L) | OUT2 (R) |
| 4 | 6 |
| IN2 (L) | IN2 (R) |
| 3 | 5 |

NOTE: THE NUMBER INSIDE EACH OF THE CIRCLES IS THE ACTUAL
PIN NUMBER FOR THE RESPECTIVE CONNECTOR.

DB25 Female Connectors for Conversion to XLR Connectors

P8
DB25F

P9
DB25F

U45
AD1939
LQFP64

3.3V  A3V

ABCLK_Z    28  ABCLK        54  ADC1LN
ALRCLK_Z   29  ALRCLK       53  ADC1LP
ASDATA1_Z  27  ASDATA1      56  ADC1RN
ASDATA2_Z  26  ASDATA2      55  ADC1RP
                            58  ADC2LN
DBCLK      21  DBCLK        57  ADC2LP
DLRCLK     22  DLRCLK       60  ADC2RN
DSDATA1    20  DSDATA1      59  ADC2RP
DSDATA2    19  DSDATA2
DSDATA3    18  DSDATA3      37  OL1N
DSDATA4    15  DSDATA4      36  OL1P
                           39  OR1N
SPI_CLK    34  CCLK        38  OR1P
SPI_MOSI   30  CIN         41  OL2N
SPI_MISO   31  COUT        40  OL2P
AD1939_CS  35  CLATCH      43  OR2N
                           42  OR2P
AD1939_CLKIN  2 MCLKI_XI    7  OL3N
           3  MCLKO_XO      6  OL3P
                            9  OR3N
RESET      14  RESET        8  OR3P
                           11  OL4N
           49  NC1         10  OL4P
           50  NC2         13  OR4N
           63  NC3         12  OR4P
           64  NC4         61  LF
           23  VSUPPLY     52  CM
           24  VSENSE      47  FILTR
           25  VDRIVE

ADC1LN
ADC1LP
ADC2LN
ADC2LP
ADC3LN
ADC3LP
ADC4LN
ADC4LP
DAC1N
DAC1P
DAC2N
DAC2P
DAC3N
DAC3P
DAC4N
DAC4P
DAC5N
DAC5P
DAC6N
DAC6P
DAC7N
DAC7P
DAC8N
DAC8P

AD1939_LF
AD1939_CM

R461 562.0 0603
C258 390PF 0603
C259 5600PF 0805
C257 10UF 0805
C256 0.1UF 0603
C254 10UF 0805
C255 0.1UF 0603

U50 SN74LVC1G08 SOT23-5
AD1939_SOFT_RESET
TP9

C266 0.01UF 0402

AD1939 OSC
U12 OSC003 12.288MHZ
R261 33 0402
AD1939_CLKIN
C142 0.01UF 0402

R259 10K 0402
R494 10K 0402
R260 10K 0402

R262 33 0402  ABCLK_Z  ABCLK
R257 33 0402  DBCLK
R263 33 0402  ALRCLK_Z  ALRCLK
R258 33 0402  DLRCLK
R496 33 0402  ASDATA1_Z  ASDATA1
R495 33 0402  ASDATA2_Z  ASDATA2

C136 0.01UF 0402
C137 0.01UF 0402
C138 0.01UF 0402
C139 0.01UF 0402
C140 0.01UF 0402
C141 0.01UF 0402

SW23: HEAD PHONE ENABLE
DEFAULT: ALL OFF
OUT3_SE_L
OUT3_SE_R
SW23 DIP2 SWT020

NOTE: A USER NEEDS TO TURN SWITCH SW23
ON IN ORDER TO USE THE HEAD PHONE CONNECTOR.

LOOPBACK CONNECTOR
FOR TESTING PURPOSES ONLY
DEFAULT: ALL OFF

SW24 DIP4 SWT018
IN1_SE_L   OUT1_SE_L
IN1_SE_R   OUT1_SE_R
           OUT3_SE_L
           OUT3_SE_R

SW25 DIP4 SWT018
IN2_SE_L   OUT2_SE_L
IN2_SE_R   OUT2_SE_R
           OUT4_SE_L
           OUT4_SE_R

HEADPHONE OUT (SHARED WITH OUT3/DAC5&6)

C262 22PF 0805
R486 10.0K 0402
CT59 10UF CAP002
R488 10.0K 0402
R493 5K RES_POT_DUAL
U51 AD8397 SOIC_N8_EP
R489 100.0 0402
AD1939_VREF
R485 0 0402
CT58 47UF ELEC_6MM

C263 22PF 0805
R487 10.0K 0402
CT60 10UF CAP002
R491 10.0K 0402
R493 5K RES_POT_DUAL
U51 AD8397 SOIC_N8_EP
R490 100.0 0402
AD1939_VREF
R492 0 0402
CT57 47UF ELEC_6MM

R484 100K 0402
R483 100K 0402

J8 CON001

AD1939_VREF  5V  5V
C271 0.1UF 0402
C264 0.1UF 0402
C265 10UF 0805

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Title: ADSP-21469 EZ-BOARD AUDIO PAGE 1
Size C
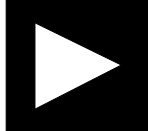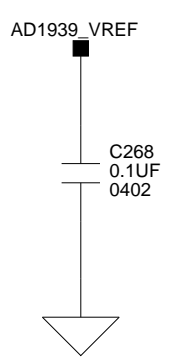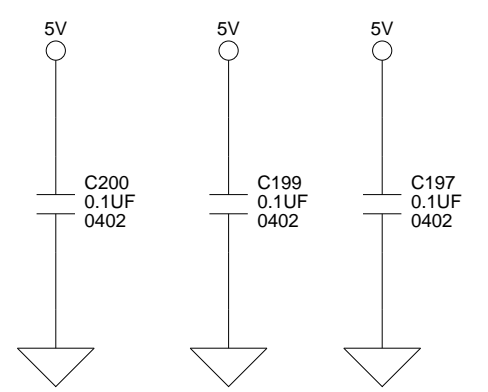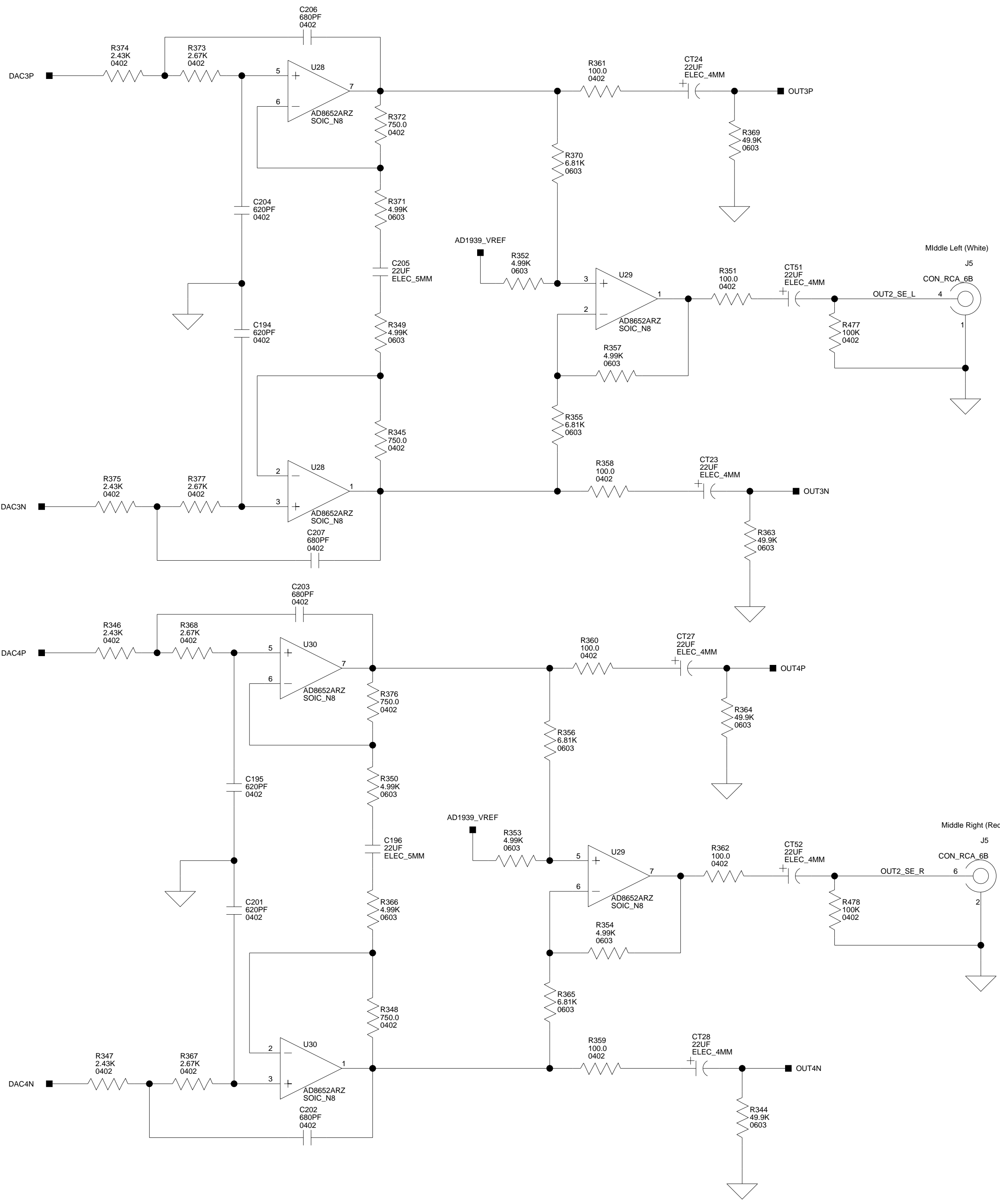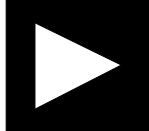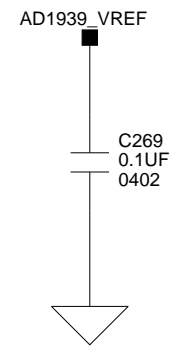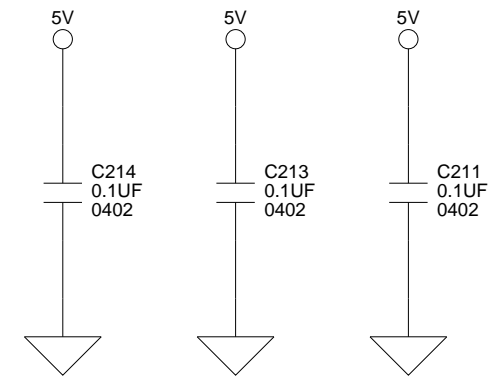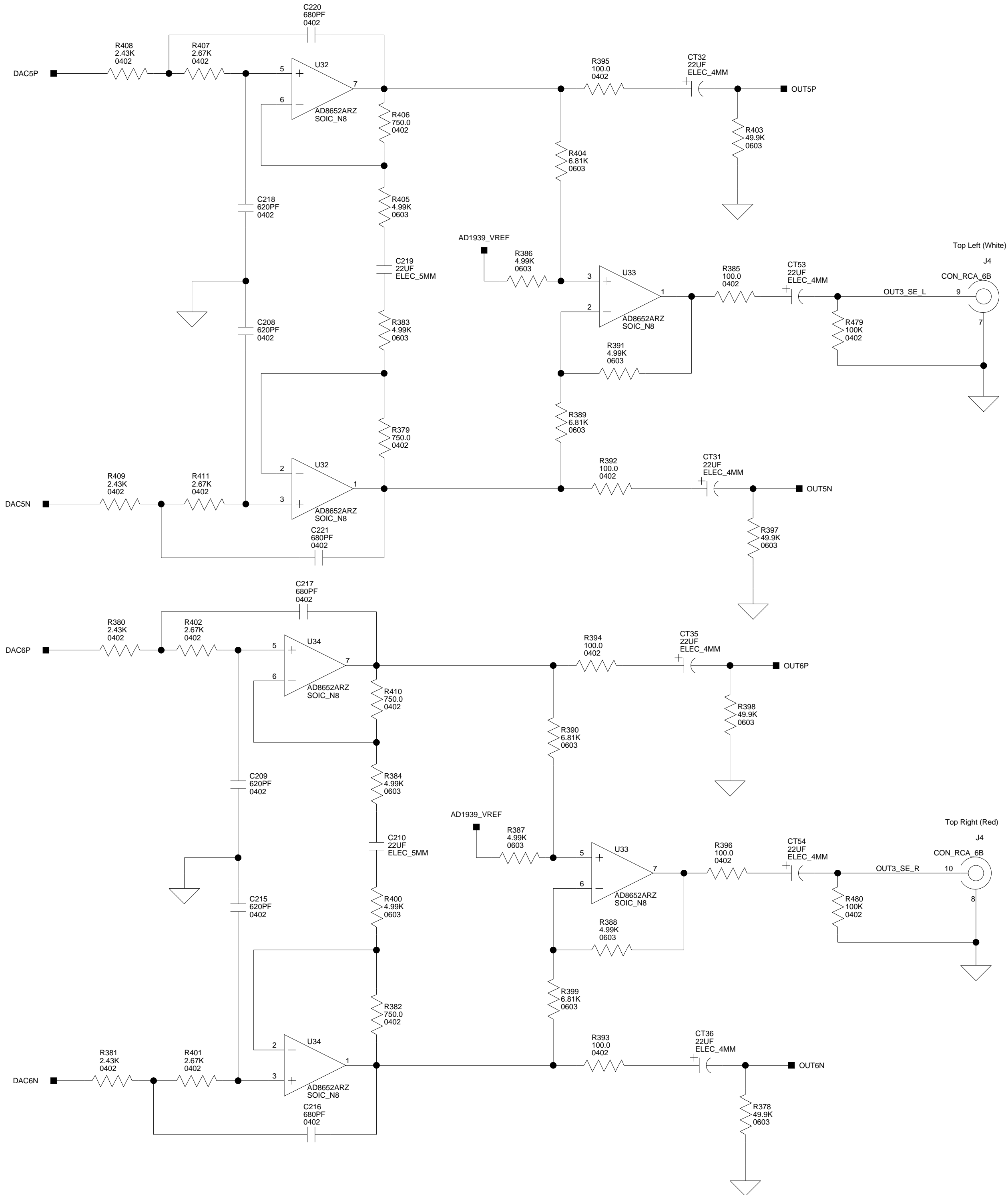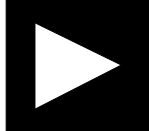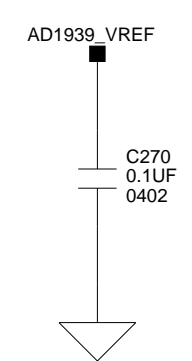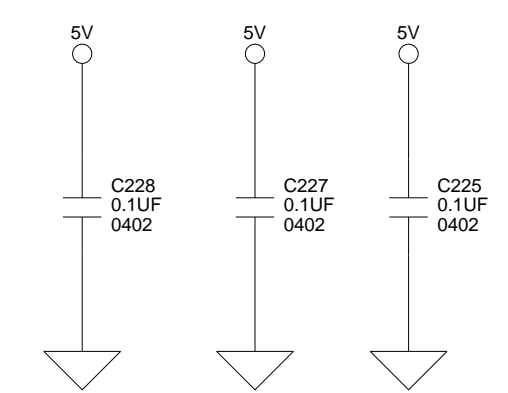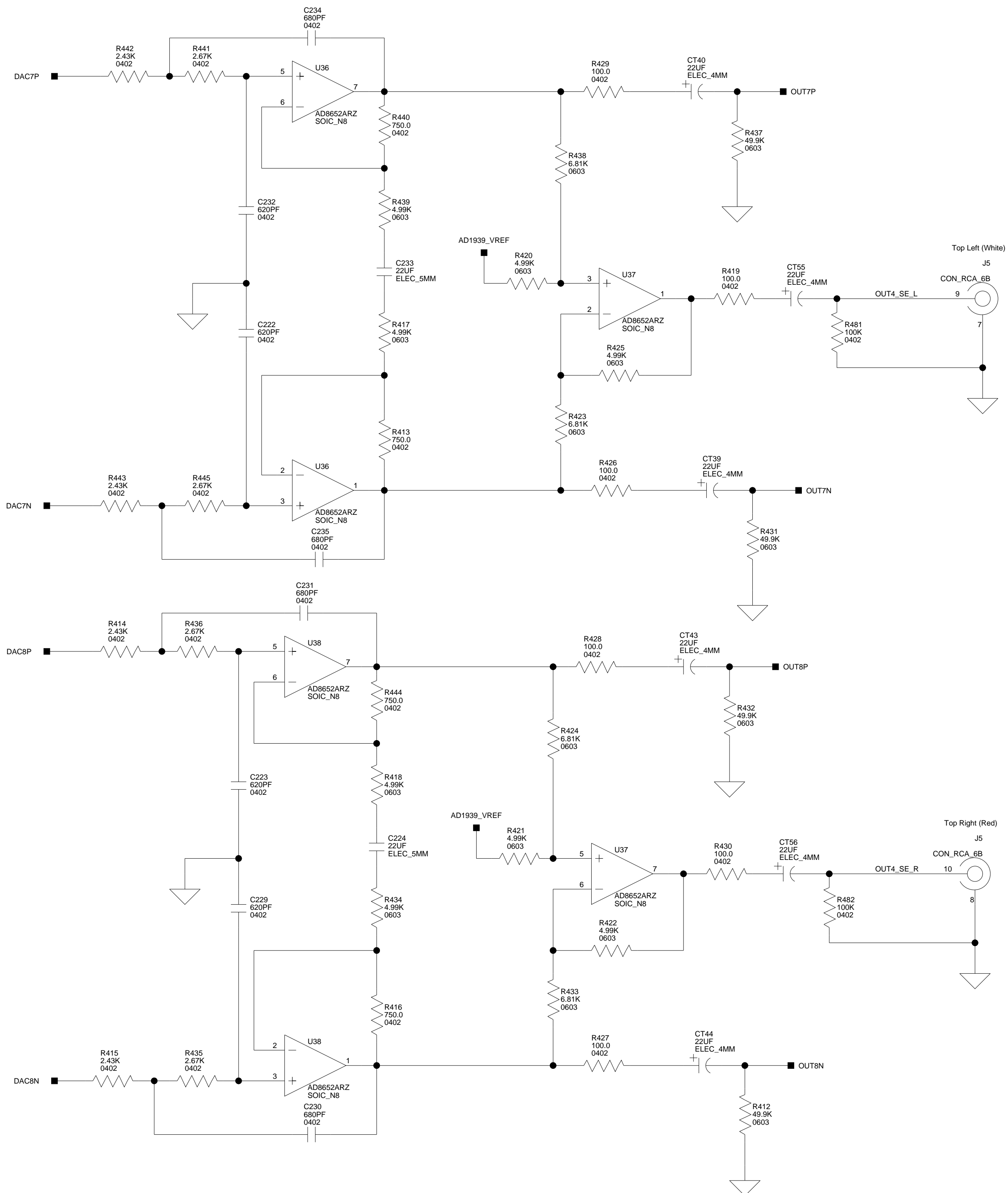Board No. A0221-2008
Rev 0.2
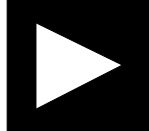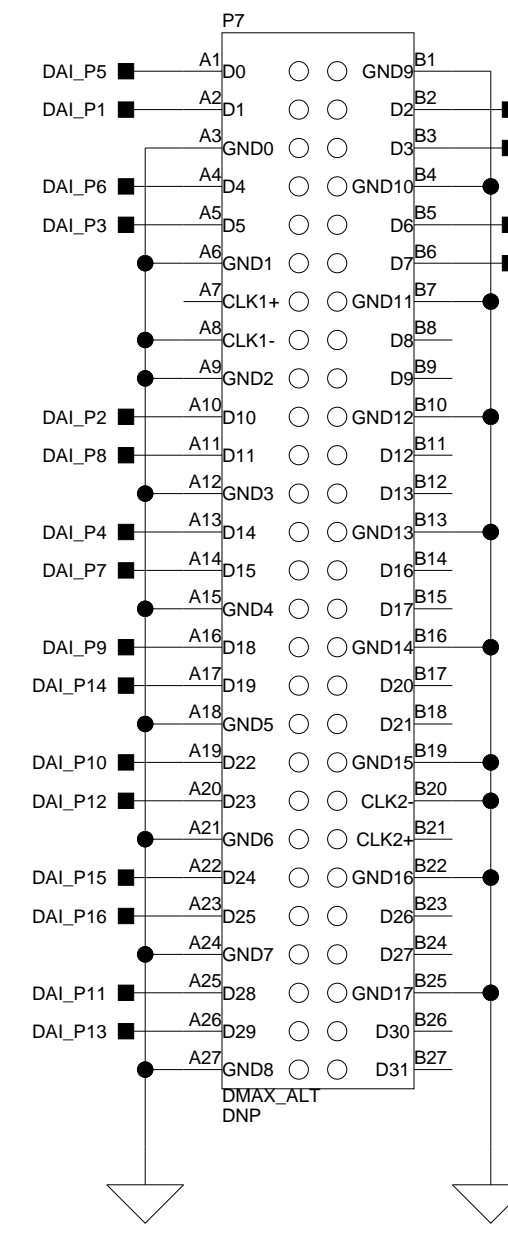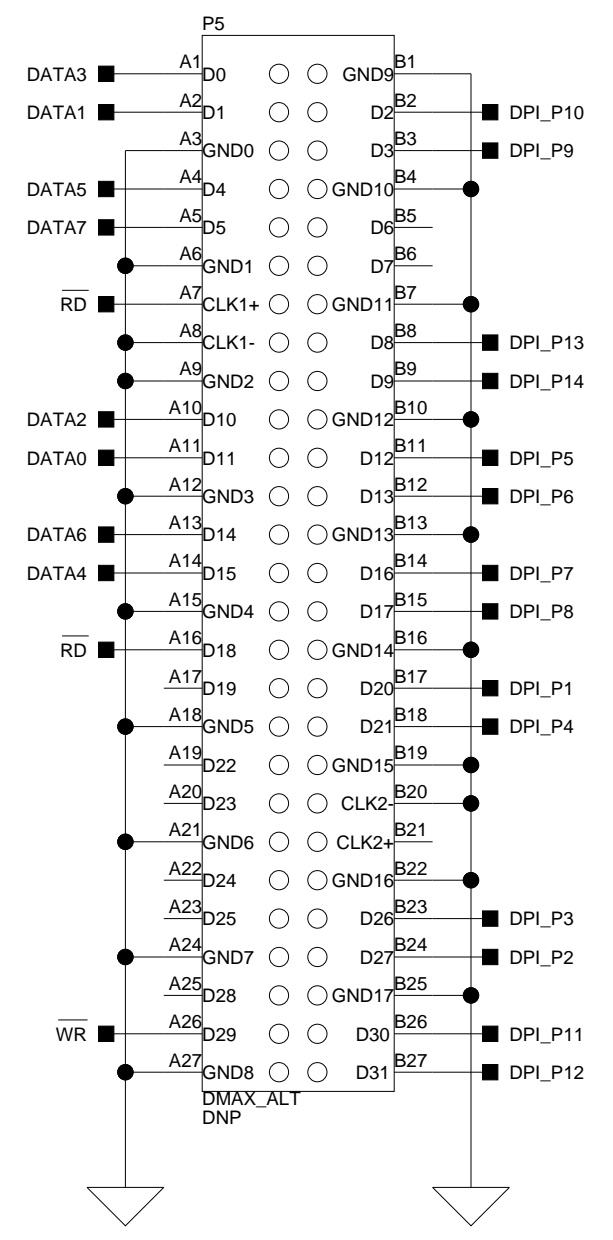Date 3-31-2009_14:45
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# IN1

Bottom Left (White)
J4
CON_RCA_6B
3  IN1_SE_L

IN1P

IN1N

SW15
DIP6
SWT017
1 / 12
2 / 11
3 / 10 — IN1_R
4 / 9 — IN1_C
5 / 8 — ADC1_DIFF-
6 / 7

CT1 22UF ELEC_4MM
R266 5.76K 0603
R264 4.99K 0603
C143 300PF 0603
R265 49.9K 0603

U20 AD8652ARZ SOIC_N8
2 / 3 → 1 ADC1_DIFF-

R267 237.0 0603
CT62 22UF ELEC_4MM → ADC1LN
C144 1000PF 0402
C147 100PF 0402

R268 37.4K 0402   IN1_R
R269 5.76K 0603
R273 4.99K 0603
R272 237.0 0603
CT63 22UF ELEC_4MM → ADC1LP
IN1_C  C145 300PF 0603
C150 1000PF 0402

CT3 22UF ELEC_4MM
R271 49.9K 0603

R274 100.0 0402
AD1939_VREF
U20 AD8652ARZ SOIC_N8
6 / 5 → 7
C148 0.1UF 0402
5V  C151 0.1UF 0402

Bottom Right (Red)
J4
CON_RCA_6B
5  IN1_SE_R

IN2P

IN2N

SW16
DIP6
SWT017
1 / 12
2 / 11
3 / 10 — IN2_R
4 / 9 — IN2_C
5 / 8 — ADC2_DIFF-
6 / 7

CT5 22UF ELEC_4MM
R281 5.76K 0603
R279 4.99K 0603
C157 300PF 0603
R282 49.9K 0603

U21 AD8652ARZ SOIC_N8
2 / 3 → 1 ADC2_DIFF-

R280 237.0 0603
CT65 22UF ELEC_4MM → ADC2LN
C154 1000PF 0402
C155 100PF 0402

R276 37.4K 0402   IN2_R
R277 5.76K 0603
R278 4.99K 0603
R285 237.0 0603
CT64 22UF ELEC_4MM → ADC2LP
IN2_C  C153 300PF 0603
C159 1000PF 0402

CT6 22UF ELEC_4MM
R284 49.9K 0603

R275 100.0 0402
AD1939_VREF
U21 AD8652ARZ SOIC_N8
6 / 5 → 7
C152 0.1UF 0402
5V  C160 0.1UF 0402

5V
R286 806 0402
AD1939_VREF
R287 1.0K 0402
C161 10UF 0805
CT61 100UF C

## IN1 (LEFT) SETTINGS

| SWITCH | SINGLE ENDED USE RCA IN (DEFAULT) | DIFFERENTIAL USE DB25 IN (P8) |
|---|---|---|
| SW15.1 | ON | OFF |
| SW15.2 | OFF | ON |
| SW15.3 | ON | OFF |
| SW15.4 | OFF | ON |
| SW15.5 | ON | OFF |
| SW15.6 | OFF | ON |

NOTE: DIFFERENTIAL USE REQUIRES A DB25 TO XLR CABLE.

## IN1 (RIGHT) SETTINGS

| SWITCH | SINGLE ENDED USE RCA IN (DEFAULT) | DIFFERENTIAL USE DB25 IN (P8) |
|---|---|---|
| SW16.1 | ON | OFF |
| SW16.2 | OFF | ON |
| SW16.3 | ON | OFF |
| SW16.4 | OFF | ON |
| SW16.5 | ON | OFF |
| SW16.6 | OFF | ON |

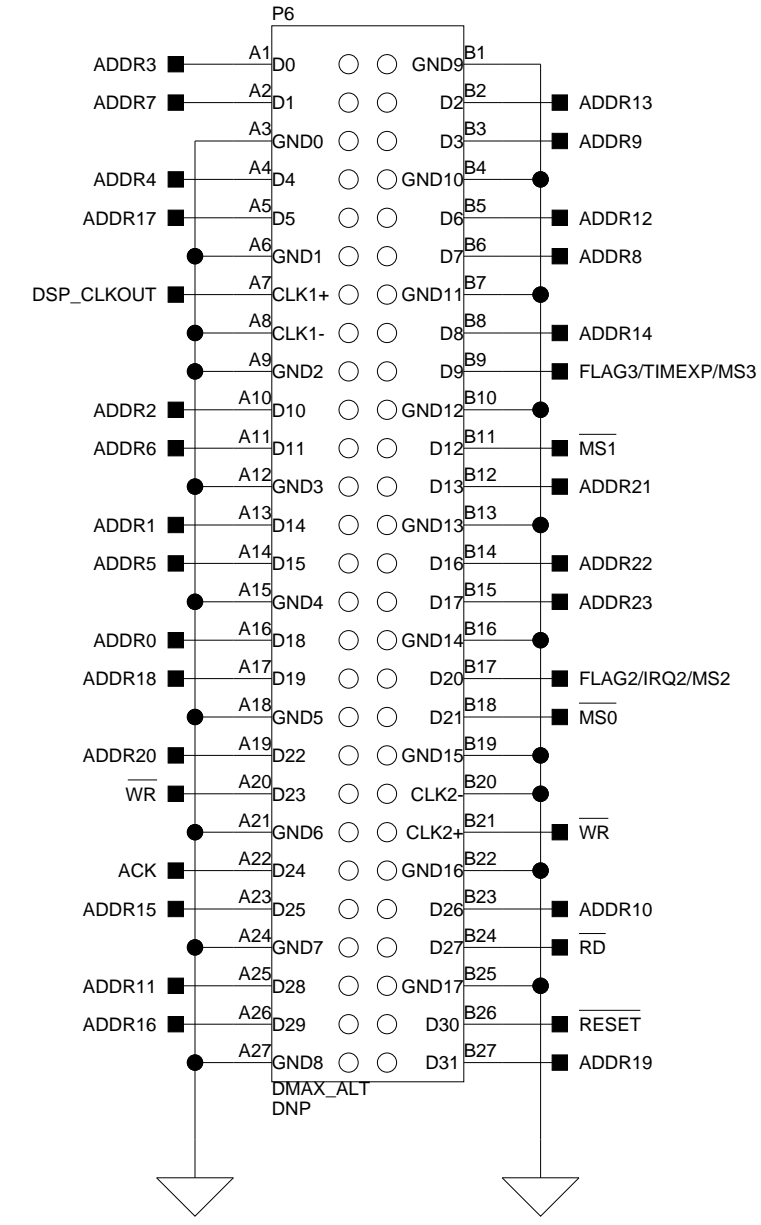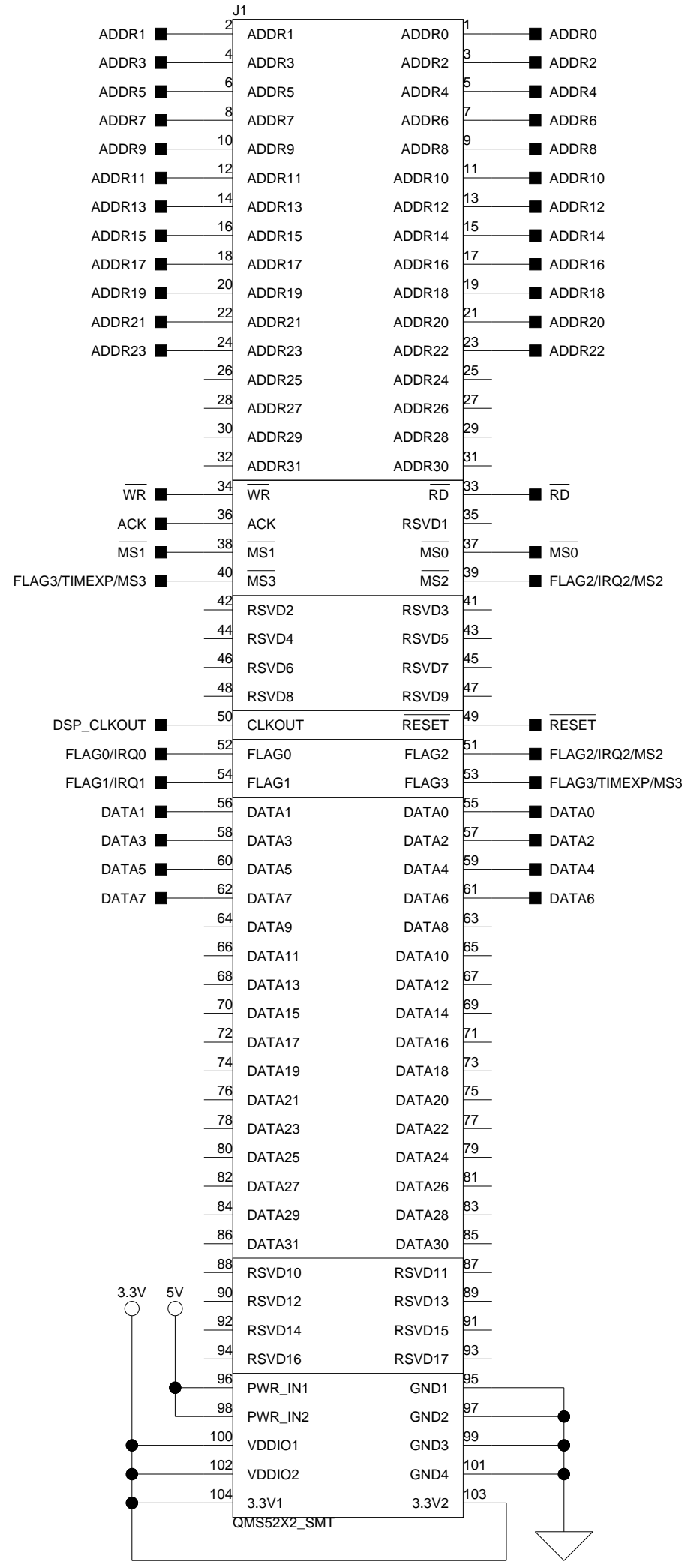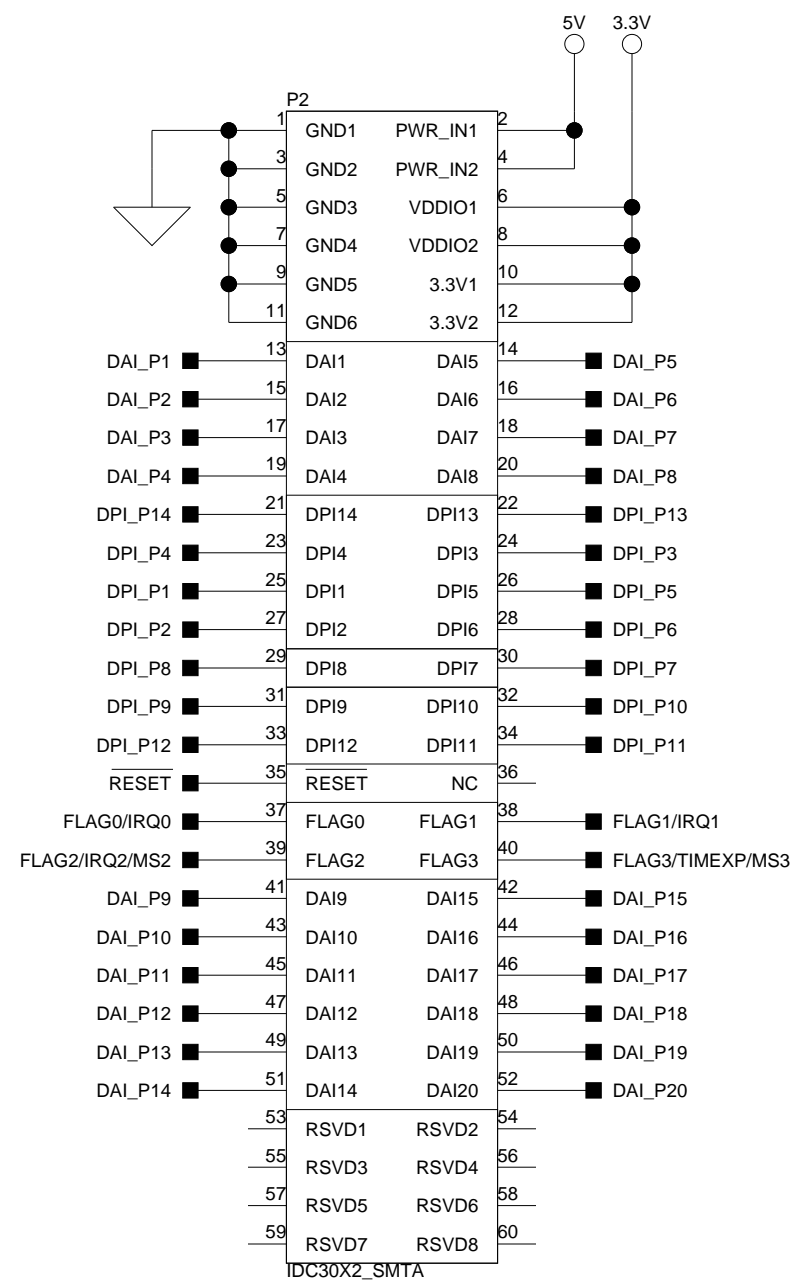NOTE: DIFFERENTIAL USE REQUIRES A DB25 TO XLR CABLE.

ANALOG DEVICES
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# IN2

Bottom Left (White)

J5
CON_RCA_6B
3  IN2_SE_L

1

SW18
1
2
3  IN3_R
4  IN3_C
5  ADC3_DIFF-
6
DIP6
SWT017
12
11
10
9
8
7

IN3P

IN3N

CT10
22UF
ELEC_4MM

R300
49.9K
0603

R302
49.9K
0603

CT11
22UF
ELEC_4MM

R303
5.76K
0603

R305
4.99K
0603

C173
300PF
0603

U22
AD8652ARZ
SOIC_N8
2
3
1
ADC3_DIFF-

R304
237.0
0603

C176
1000PF
0402

C175
100PF
0402

CT66
22UF
ELEC_4MM
ADC3LN

R308
37.4K
0402

IN3_R

IN3_C

C177
300PF
0603

R307
5.76K
0603

R306
4.99K
0603

R299
237.0
0603

CT67
22UF
ELEC_4MM
ADC3LP

C171
1000PF
0402

R309
100.0
0402

U22
AD8652ARZ
SOIC_N8
6
5
7

AD1939_VREF

C178
0.1UF
0402

5V

C170
0.1UF
0402

## IN2 (LEFT) SETTINGS

| SWITCH | SINGLE ENDED USE RCA IN (DEFAULT) | DIFFERENTIAL USE DB25 IN (P8) |
|---|---|---|
| SW18.1 | ON | OFF |
| SW18.2 | OFF | ON |
| SW18.3 | ON | OFF |
| SW18.4 | OFF | ON |
| SW18.5 | ON | OFF |
| SW18.6 | OFF | ON |

NOTE: DIFFERENTIAL USE REQUIRES A DB25 TO XLR CABLE.
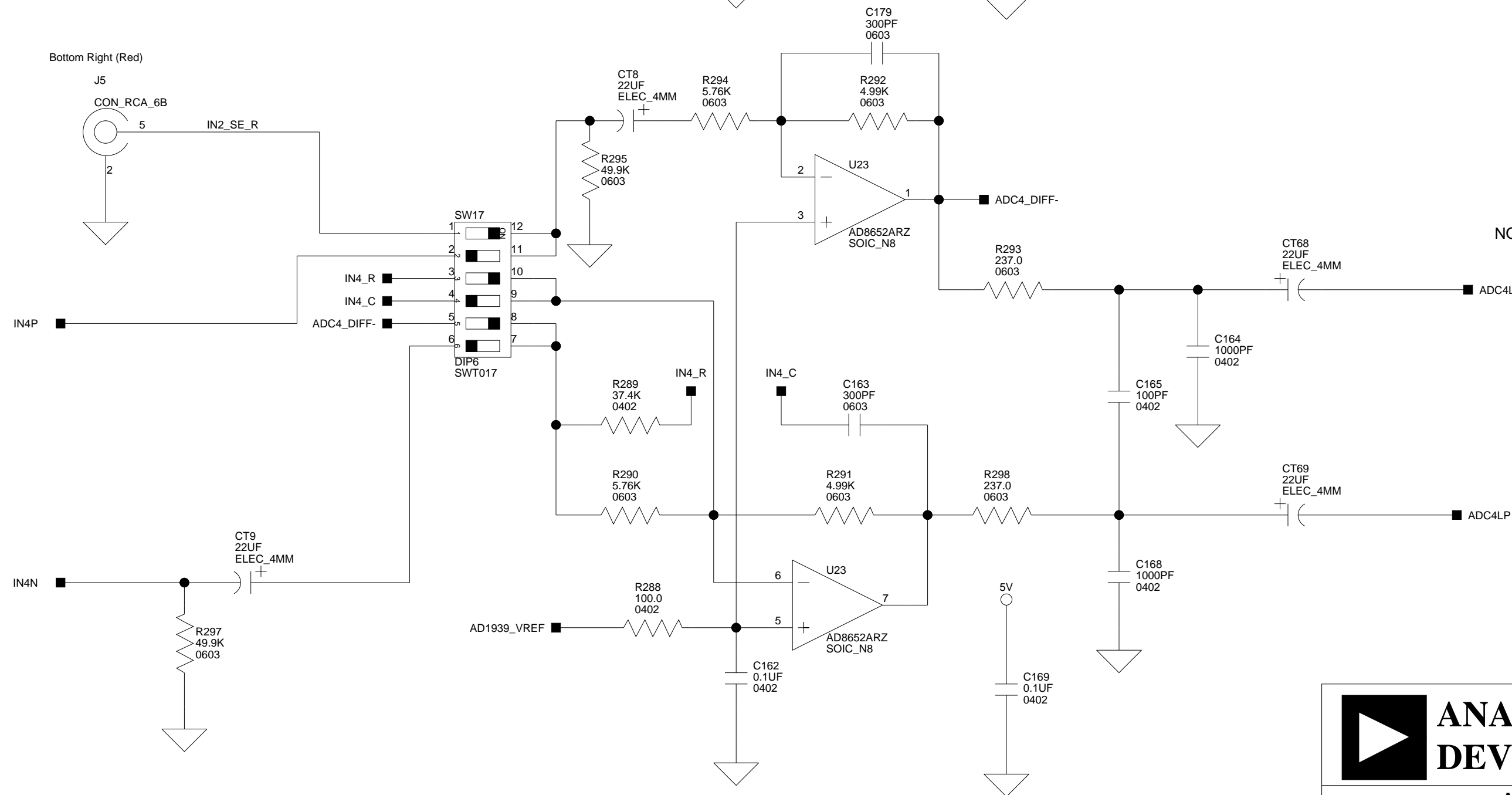
## IN2 (RIGHT) SETTINGS

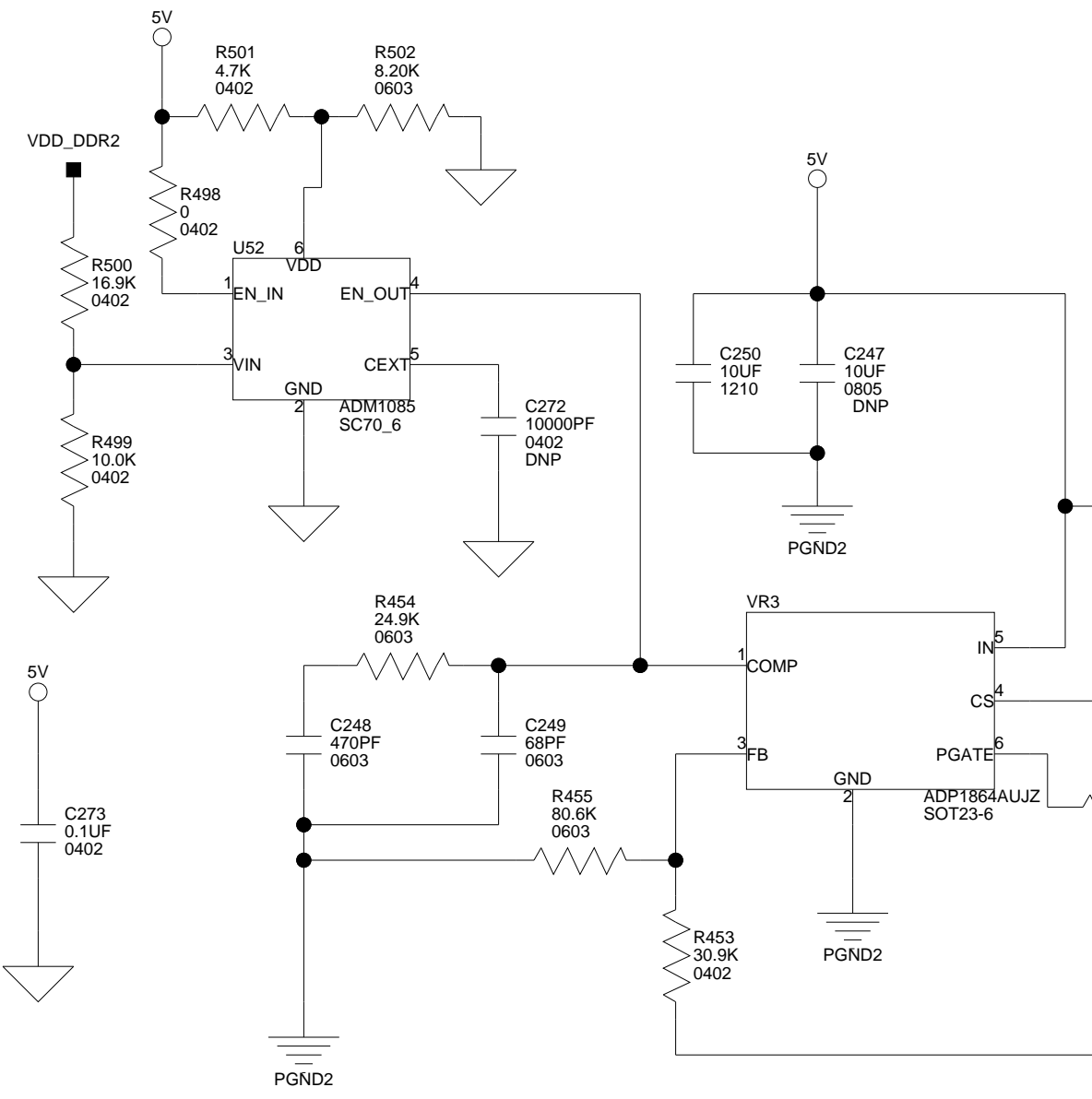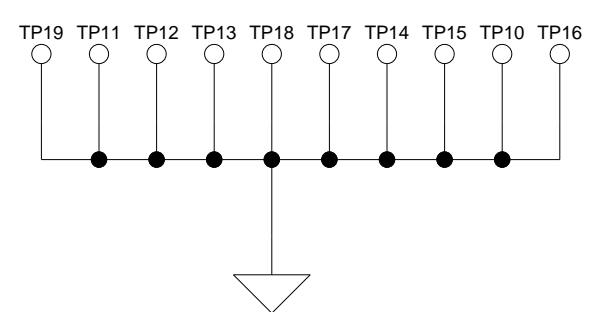| SWITCH | SINGLE ENDED USE RCA IN (DEFAULT) | DIFFERENTIAL USE DB25 IN (P8) |
|---|---|---|
| SW17.1 | ON | OFF |
| SW17.2 | OFF | ON |
| SW17.3 | ON | OFF |
| SW17.4 | OFF | ON |
| SW17.5 | ON | OFF |
| SW17.6 | OFF | ON |

NOTE: DIFFERENTIAL USE REQUIRES A DB25 TO XLR CABLE.

Bottom Right (Red)

J5
CON_RCA_6B
5  IN2_SE_R

2

SW17
1
2
3  IN4_R
4  IN4_C
5  ADC4_DIFF-
6
DIP6
SWT017
12
11
10
9
8
7

IN4P

IN4N

CT9
22UF
ELEC_4MM

R297
49.9K
0603

R295
49.9K
0603

CT8
22UF
ELEC_4MM

R294
5.76K
0603

R292
4.99K
0603

C179
300PF
0603

U23
AD8652ARZ
SOIC_N8
2
3
1
ADC4_DIFF-

R293
237.0
0603

C164
1000PF
0402

C165
100PF
0402

CT68
22UF
ELEC_4MM
ADC4LN

R289
37.4K
0402

IN4_R

IN4_C

C163
300PF
0603

R290
5.76K
0603

R291
4.99K
0603

R298
237.0
0603

CT69
22UF
ELEC_4MM
ADC4LP

C168
1000PF
0402

R288
100.0
0402

U23
AD8652ARZ
SOIC_N8
6
5
7

AD1939_VREF

C162
0.1UF
0402

5V

C169
0.1UF
0402

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|---|---|---|
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# OUT1

DAC1P

R325
2.43K
0402

R338
2.67K
0402

C193
680PF
0402

U24
5
6
7
AD8652ARZ
SOIC_N8

R340
100.0
0402

CT19
22UF
ELEC_4MM

OUT1P

R343
49.9K
0603

R341
750.0
0402

R312
6.81K
0603

C192
620PF
0402

R313
4.99K
0603

AD1939_VREF

R311
4.99K
0603

U25
3
2
1
AD8652ARZ
SOIC_N8

R335
100.0
0402

CT49
22UF
ELEC_4MM

OUT1_SE_L

Middle Left (White)
J4
CON_RCA_6B
4
1

C184
22UF
ELEC_5MM

R475
100K
0402

C181
620PF
0402

R314
4.99K
0603

R342
4.99K
0603

R317
750.0
0402

R339
6.81K
0603

R315
2.43K
0402

R316
2.67K
0402

U24
2
3
1
AD8652ARZ
SOIC_N8

R331
100.0
0402

CT18
22UF
ELEC_4MM

OUT1N

DAC1N

C182
680PF
0402

R310
49.9K
0603

C183
680PF
0402

DAC2P

R319
2.43K
0402

R318
2.67K
0402

U26
5
6
7
AD8652ARZ
SOIC_N8

R332
100.0
0402

CT14
22UF
ELEC_4MM

OUT2P

R336
49.9K
0603

R320
750.0
0402

R329
6.81K
0603

C186
620PF
0402

R324
4.99K
0603

AD1939_VREF

R328
4.99K
0603

U25
5
6
7
AD8652ARZ
SOIC_N8

R334
100.0
0402

CT50
22UF
ELEC_4MM

OUT1_SE_R

Middle Right (Red)
J4
CON_RCA_6B
6
2

C180
22UF
ELEC_5MM

R476
100K
0402

C187
620PF
0402

R326
4.99K
0603

R327
4.99K
0603

R321
750.0
0402

R330
6.81K
0603

R323
2.43K
0402

R322
2.67K
0402

U26
2
3
1
AD8652ARZ
SOIC_N8

R333
100.0
0402

CT16
22UF
ELEC_4MM

OUT2N

DAC2N

C185
680PF
0402

R337
49.9K
0603

5V
C188
0.1UF
0402

5V
C189
0.1UF
0402

5V
C191
0.1UF
0402

AD1939_VREF
C267
0.1UF
0402

**ANALOG DEVICES**
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# OUT2

DAC3P

R374 2.43K 0402
R373 2.67K 0402
C206 680PF 0402
U28 AD8652ARZ SOIC_N8
5
6
7
R372 750.0 0402
R371 4.99K 0603
C204 620PF 0402
C205 22UF ELEC_5MM
C194 620PF 0402
R349 4.99K 0603
R345 750.0 0402

R361 100.0 0402
CT24 22UF ELEC_4MM
OUT3P
R369 49.9K 0603
R370 6.81K 0603

AD1939_VREF
R352 4.99K 0603
U29 AD8652ARZ SOIC_N8
3
2
1
R351 100.0 0402
CT51 22UF ELEC_4MM
OUT2_SE_L
R477 100K 0402
R357 4.99K 0603
R355 6.81K 0603

MIddle Left (White)
J5 CON_RCA_6B
4
1

5V  C200 0.1UF 0402
5V  C199 0.1UF 0402
5V  C197 0.1UF 0402

DAC3N

R375 2.43K 0402
R377 2.67K 0402
U28 AD8652ARZ SOIC_N8
2
3
1
C207 680PF 0402

R358 100.0 0402
CT23 22UF ELEC_4MM
OUT3N
R363 49.9K 0603

AD1939_VREF
C268 0.1UF 0402

DAC4P

R346 2.43K 0402
R368 2.67K 0402
C203 680PF 0402
U30 AD8652ARZ SOIC_N8
5
6
7
R376 750.0 0402
R350 4.99K 0603
C195 620PF 0402
C196 22UF ELEC_5MM
C201 620PF 0402
R366 4.99K 0603
R348 750.0 0402

R360 100.0 0402
CT27 22UF ELEC_4MM
OUT4P
R364 49.9K 0603
R356 6.81K 0603

AD1939_VREF
R353 4.99K 0603
U29 AD8652ARZ SOIC_N8
5
6
7
R362 100.0 0402
CT52 22UF ELEC_4MM
OUT2_SE_R
R478 100K 0402
R354 4.99K 0603
R365 6.81K 0603

Middle Right (Red)
J5 CON_RCA_6B
6
2

DAC4N

R347 2.43K 0402
R367 2.67K 0402
U30 AD8652ARZ SOIC_N8
2
3
1
C202 680PF 0402

R359 100.0 0402
CT28 22UF ELEC_4MM
OUT4N
R344 49.9K 0603

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# OUT3

DAC5P

R408 2.43K 0402
R407 2.67K 0402
C220 680PF 0402
U32 AD8652ARZ SOIC_N8
C218 620PF 0402
C208 620PF 0402
C219 22UF ELEC_5MM
R406 750.0 0402
R405 4.99K 0603
R404 6.81K 0603
R395 100.0 0402
CT32 22UF ELEC_4MM
OUT5P
R403 49.9K 0603

AD1939_VREF
R386 4.99K 0603
U33 AD8652ARZ SOIC_N8
R385 100.0 0402
CT53 22UF ELEC_4MM
OUT3_SE_L
Top Left (White)
J4 CON_RCA_6B
R479 100K 0402
R391 4.99K 0603
R383 4.99K 0603
R389 6.81K 0603
R379 750.0 0402

DAC5N
R409 2.43K 0402
R411 2.67K 0402
U32 AD8652ARZ SOIC_N8
C221 680PF 0402
R392 100.0 0402
CT31 22UF ELEC_4MM
OUT5N
R397 49.9K 0603

AD1939_VREF
C269 0.1UF 0402

5V  C214 0.1UF 0402
5V  C213 0.1UF 0402
5V  C211 0.1UF 0402

DAC6P
R380 2.43K 0402
R402 2.67K 0402
C217 680PF 0402
U34 AD8652ARZ SOIC_N8
C209 620PF 0402
C215 620PF 0402
C210 22UF ELEC_5MM
R410 750.0 0402
R384 4.99K 0603
R390 6.81K 0603
R394 100.0 0402
CT35 22UF ELEC_4MM
OUT6P
R398 49.9K 0603

AD1939_VREF
R387 4.99K 0603
U33 AD8652ARZ SOIC_N8
R396 100.0 0402
CT54 22UF ELEC_4MM
OUT3_SE_R
Top Right (Red)
J4 CON_RCA_6B
R480 100K 0402
R400 4.99K 0603
R388 4.99K 0603
R382 750.0 0402
R399 6.81K 0603

DAC6N
R381 2.43K 0402
R401 2.67K 0402
U34 AD8652ARZ SOIC_N8
C216 680PF 0402
R393 100.0 0402
CT36 22UF ELEC_4MM
OUT6N
R378 49.9K 0603

**ANALOG DEVICES**
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# OUT4

DAC7P

R442 2.43K 0402
R441 2.67K 0402
C234 680PF 0402
U36 AD8652ARZ SOIC_N8
R440 750.0 0402
C232 620PF 0402
R439 4.99K 0603
C233 22UF ELEC_5MM
C222 620PF 0402
R417 4.99K 0603
R429 100.0 0402
CT40 22UF ELEC_4MM
OUT7P
R437 49.9K 0603
R438 6.81K 0603

AD1939_VREF
R420 4.99K 0603
U37 AD8652ARZ SOIC_N8
R419 100.0 0402
CT55 22UF ELEC_4MM
OUT4_SE_L
R425 4.99K 0603
R481 100K 0402

Top Left (White)
J5 CON_RCA_6B
9
7

DAC7N
R443 2.43K 0402
R445 2.67K 0402
R413 750.0 0402
U36 AD8652ARZ SOIC_N8
C235 680PF 0402
R423 6.81K 0603
R426 100.0 0402
CT39 22UF ELEC_4MM
OUT7N
R431 49.9K 0603

DAC8P
R414 2.43K 0402
R436 2.67K 0402
C231 680PF 0402
U38 AD8652ARZ SOIC_N8
R444 750.0 0402
C223 620PF 0402
R418 4.99K 0603
C224 22UF ELEC_5MM
C229 620PF 0402
R434 4.99K 0603
R428 100.0 0402
CT43 22UF ELEC_4MM
OUT8P
R432 49.9K 0603
R424 6.81K 0603

AD1939_VREF
R421 4.99K 0603
U37 AD8652ARZ SOIC_N8
R430 100.0 0402
CT56 22UF ELEC_4MM
OUT4_SE_R
R422 4.99K 0603
R482 100K 0402

Top Right (Red)
J5 CON_RCA_6B
10
8

DAC8N
R415 2.43K 0402
R435 2.67K 0402
R416 750.0 0402
U38 AD8652ARZ SOIC_N8
C230 680PF 0402
R433 6.81K 0603
R427 100.0 0402
CT44 22UF ELEC_4MM
OUT8N
R412 49.9K 0603

5V  5V  5V
C228 0.1UF 0402
C227 0.1UF 0402
C225 0.1UF 0402

AD1939_VREF
C270 0.1UF 0402

ANALOG DEVICES
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**Table (P2 / DAI connector)**

| DSP PIN NAME | PERIPHERAL NET CONNECTED TO | CONNECTED VIA SWITCH | SWITCH DEFAULT |
|---|---|---|---|
| DAI_P1 | SPDIF_OUT | SW1.1 | ON |
| DAI_P2 | AD1939_SOFT_RESET | SW1.2 | ON |
| DAI_P3 | LED4 | SW1.3 | ON |
| DAI_P4 | LED5 | SW1.4 | ON |
| DAI_P5 | ASDATA1 | SW1.5 | ON |
| DAI_P6 | ASDATA2 | SW1.6 | ON |
| DAI_P7 | ABCLK | SW1.7 | ON |
| DAI_P8 | ALRCLK | SW1.8 | ON |
| DAI_P9 | DSDATA4 | SW2.1 | ON |
| DAI_P10 | DSDATA3 | SW2.2 | ON |
| DAI_P11 | DSDATA2 | SW2.3 | ON |
| DAI_P12 | DSDATA1 | SW2.4 | ON |
| DAI_P13 | DBCLK | SW2.5 | OFF |
| DAI_P14 | DLRCLK | SW2.6 | OFF |
| DAI_P15 | LED6 | SW2.7 | ON |
| DAI_P16 | LED7 | SW2.8 | ON |
| DAI_P17 | LED8 | SW7.1 | ON |
| DAI_P18 | SPDIF_IN | SW7.2 | ON |
| DAI_P19 | PB3 | SW7.3 | ON |
| DAI_P20 | PB4 | SW7.4 | ON |

NOTE: SHUTTING OFF ANY OF THE SWITCHES FOR EXPANSION USE WILL CAUSE LOSS OF FUNCTIONALITY TO THE RESPECTIVE PERIPHERAL ON THE EZ-BOARD.

| DSP PIN NAME | PERIPHERAL NET CONNECTED TO | CONNECTED VIA SWITCH | SWITCH DEFAULT |
|---|---|---|---|
| DPI_P1 | SPI_MOSI | SW3.1 | ON |
| DPI_P2 | SPI_MISO | SW3.2 | ON |
| DPI_P3 | SPI_CLK | SW3.3 | ON |
| DPI_P4 | AD1939_CS | SW3.4 | ON |
| DPI_P5 | SPI_CS | SW3.5 | ON |
| DPI_P6 | LED1 | SW3.6 | ON |
| DPI_P7 | TEMP_SDA | SW3.7 | ON |
| DPI_P8 | TEMP_SCK | SW3.8 | ON |
| DPI_P9 | UART_TX | SW14.1 | ON |
| DPI_P10 | UART_RX | SW14.2 | ON |
| DPI_P11 | UART_RTS | SW14.3 | OFF |
| DPI_P12 | UART_CTS | SW14.4 | OFF |
| DPI_P13 | LED2 | SW14.5 | ON |
| DPI_P14 | LED3 | SW14.6 | ON |

NOTE: SHUTTING OFF ANY OF THE SWITCHES FOR EXPANSION USE WILL CAUSE LOSS OF FUNCTIONALITY TO THE RESPECTIVE PERIPHERAL ON THE EZ-BOARD.

| DSP PIN NAME | PERIPHERAL NET CONNECTED TO | CONNECTED VIA SWITCH | SWITCH DEFAULT |
|---|---|---|---|
| MS0 | FLASH_CS | SW13.1 | OFF |
| MS1 | FLASH_CS | SW13.2 | ON |
| FLAG0/IRQ0 | TEMP_THERM | SW13.3 | OFF |
| FLAG1/IRQ1 | PB1 | SW13.4 | ON |
| FLAG2/IRQ2/MS2 | PB2 | SW13.5 | ON |
| FLAG3/TIMEXP/MS3 | TEMP_IRQ | SW13.6 | OFF |

NOTE: SHUTTING OFF ANY OF THE SWITCHES FOR EXPANSION USE WILL CAUSE LOSS OF FUNCTIONALITY TO THE RESPECTIVE PERIPHERAL ON THE EZ-BOARD.

ANALOG AUDIO (AD1939) POWER

Remove P14 when measuring VDDINT

1.1V @ 2A

SJ2 SHORTING JUMPER DEFAULT=INSTALLLED

"5V"

GND Test Points are scattered on PCB for Test Measurement Purposes.

LABEL "GND" ON ALL TPs

"VDD_DDR2"

1.8V @ 500mA

Remove P13 when measuring VDD_DDR2

SJ1 SHORTING JUMPER DEFAULT=INSTALLLED
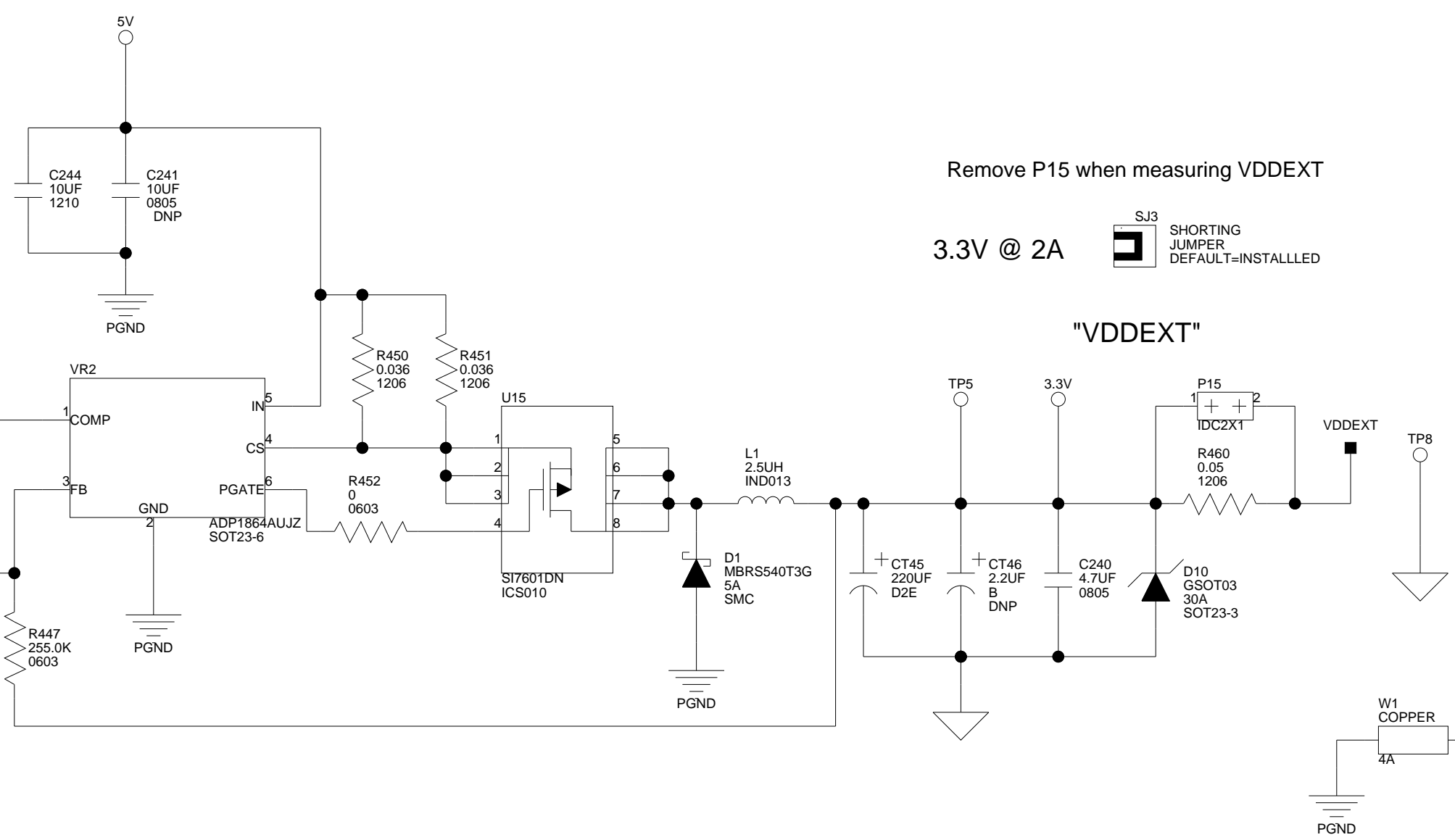
Remove P15 when measuring VDDEXT

3.3V @ 2A

SJ3 SHORTING JUMPER DEFAULT=INSTALLLED

"VDDEXT"

ANALOG
DEVICES

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Nashua, NH 03063
PH: 1-800-ANALOGD

| Title | ADSP-21469 EZ-BOARD POWER | |
|---|---|---|
| Size C | Board No. A0221-2008 | Rev 0.2 |
| Date 3-31-2009_14:34 | Sheet 16 of 16 | |

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