

ADSP-21369 EZ-KIT Lite® Evaluation System Manual

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The ADSP-21369 EZ-KIT Lite evaluation system has been certified to comply with the essential requirements of the European EMC directive 89/336/EEC (inclusive 93/68/EEC) and, therefore, carries the “CE” mark.

The ADSP-21369 EZ-KIT Lite evaluation system had been appended to Analog Devices Development Tools Technical Construction File referenced “DSPTOOLS1” dated December 21, 1997 and was awarded CE Certification by an appointed European Competent Body and is on file.



The EZ-KIT Lite 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-KIT Lite boards in the protective shipping package.



CONTENTS

PREFACE

Purpose of This Manual	xiii
Intended Audience	xiii
Manual Contents	xiii
What's New in This Manual	xiv
Technical or Customer Support	xiv
Supported Processors	xv
Product Information	xv
MyAnalog.com	xvi
Processor Product Information	xvi
Related Documents	xvii
Online Technical Documentation	xviii
Accessing Documentation From VisualDSP++	xix
Accessing Documentation From Windows	xix
Accessing Documentation From Web	xix
Printed Manuals	xx
VisualDSP++ Documentation Set	xx
Hardware Tools Manuals	xx
Processor Manuals	xx

CONTENTS

Data Sheets	xxi
Notation Conventions	xxii

USING EZ-KIT LITE

Package Contents	1-2
Default Configuration	1-3
Installation and Session Startup	1-4
Evaluation License Restrictions	1-6
External Memory	1-7
ELVIS Interface	1-8
Analog Audio	1-9
LEDs and Push Buttons	1-10
Example Programs	1-12
Background Telemetry Channel	1-12

EZ-KIT LITE HARDWARE REFERENCE

System Architecture	2-2
External Port	2-3
DAI Interface	2-4
DPI Interface	2-5
FLAG Pins	2-6
External PLL	2-7
Expansion Interface	2-7
JTAG Emulation Port	2-8
Switch Settings	2-8

Boot Mode and Clock Ratio Select Switch (SW2)	2-8
Codec Setup Switch (SW3)	2-10
Electret Microphone Select Switch (SW4)	2-11
UART Enable Switch (SW5)	2-11
Loop-Back Test Switches (SW6 and SW14)	2-12
Push Button Enable Switch (SW7)	2-12
ELVIS Oscilloscope Configuration Switch (SW1)	2-13
ELVIS Function Generator Configuration Switch (SW13)	2-13
LEDs and Push Buttons	2-14
General Purpose LEDs (LED1–8)	2-14
Power LED (LED9)	2-14
Reset LEDs (LED10 and LED12)	2-15
USB Monitor LED (LED11)	2-16
Push Buttons (SW8–11)	2-16
Board Reset Push Button (SW12)	2-17
Jumpers	2-17
VCO Select Jumper (JP1)	2-17
ELVIS Select Jumper (JP2)	2-19
ELVIS Voltage Selection Jumper (JP3)	2-19
ELVIS Programmable Flag Jumper (JP4)	2-20
Connectors	2-20
Expansion Interface Connectors (J1–J3)	2-20
Audio In RCA Connector (P10)	2-22
Audio Out RCA Connector (J5)	2-22

CONTENTS

Headphone Out Jack (P7)	2-22
Power Jack (J4)	2-22
RS-232 Connector (P1)	2-23
SPDIF Coax Connectors (P8 and P9)	2-23
DPI Header (P3)	2-24
DAI Header (P4)	2-24
USB Connector (P5)	2-24
JTAG Header (P2)	2-25

BILL OF MATERIALS

SCHEMATICS

INDEX

PREFACE


Thank you for purchasing the ADSP-21369 EZ-KIT Lite[®], Analog Devices, Inc. evaluation system for ADSP-21369 SHARC[®] processors.

The 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 system is designed to be used in conjunction with the VisualDSP++[®] development environment to test the capabilities of the ADSP-21369 SHARC processors. The VisualDSP++ development environment gives you the ability to perform advanced application code development and debug, such as:

- Create, compile, assemble, and link application programs written in C++, C, and ADSP-21369 assembly
- Load, run, step, halt, and set breakpoints in application program
- Read and write data and program memory
- Read and write core and peripheral registers
- Plot memory

Access to the ADSP-21369 processor from a personal computer (PC) is achieved through a USB port or an optional JTAG emulator. The USB interface gives unrestricted access to the ADSP-21369 processor and the evaluation board peripherals. Analog Devices JTAG emulators offer faster communication between the host PC and target hardware. Analog Devices carries a wide range of in-circuit emulation products. To learn more about Analog Devices emulators and processor development tools, go to <http://www.analog.com/dsp/tools/>.

 The ADSP-21369 EZ-KIT Lite installation is part of the VisualDSP++ installation. The EZ-KIT Lite is a licensed product that offers an unrestricted evaluation license for the first 90 days. For details about evaluation license restrictions after the 90 days, refer “[Evaluation License Restrictions](#)” on page 1-6.

ADSP-21369 EZ-KIT Lite provides example programs to demonstrate the capabilities of the evaluation board.

The board features:

- Analog Devices ADSP-21369 processor
 - ✓ 256-pin SBGA package
 - ✓ 400 MHz core clock speed
- Synchronous dynamic random access memory (SDRAM)
 - ✓ 1M x 32-bit x 4 Banks
- Synchronous random access memory (SRAM)
 - ✓ 512 Kbit x 8-bit
- Flash memory
 - ✓ 1M x 8-bit

- Serial peripheral interconnect (SPI) flash memory
 - ✓ 2 Mbit
- Analog audio interface
 - ✓ AD1835A codec
 - ✓ 4x2 RCA phono jack for 4 channels of stereo output
 - ✓ 2x1 RCA phono jack for 1 channel of stereo input
 - ✓ 3.5 mm headphone jack for 1 channel stereo output
- Digital audio interface
 - ✓ RCA phono jack output
 - ✓ RCA phono jack input
- Universal asynchronous receiver/transmitter (UART)
 - ✓ ADM3202 RS-232 driver/receiver
 - ✓ DB9 female connector
- National Instruments Educational Laboratory Virtual Instrumentation Suite (ELVIS) Interface
 - ✓ LabVIEW™-based virtual instruments
 - ✓ Multifunction data acquisition device
 - ✓ Bench-top workstation and prototype board
- LEDs
 - ✓ 12 LEDs: 1 power (green), 1 board reset (red), 1 USB reset (red), 1 USB monitor (amber), and 8 general purpose (amber)
- Push buttons
 - ✓ 5 push buttons: 1 reset, 2 connected to DAI, 2 connected to the FLAG pins of the processor

- Expansion interface (Type A)
 - ✓ Parallel Port, FLAG pins, DPI, DAI
- Other features
 - ✓ JTAG ICE 14-pin header
 - ✓ Test points for processor current measurement
 - ✓ DPI header
 - ✓ DAI header

The EZ-KIT Lite board has a total of 1 MB of parallel flash memory and 2 Mbit of SPI flash memory. The flash memories can store user-specific boot code, allowing the board to run as a stand-alone unit. For more information, see [“External Memory” on page 1-7](#) and [“Boot Mode and Clock Ratio Select Switch \(SW2\)” on page 2-8](#). The board also has 512 KB of SRAM and 16 MB of SDRAM, which can be used at runtime.

The DAI port of the processor connects to the AD1835A audio codec, an external phase lock loop (PLL), and the SPDIF interface. The DAI interface facilitates development of digital and analog audio signal-processing applications. See [“Analog Audio” on page 1-9](#) and [“SPDIF Coax Connectors \(P8 and P9\)” on page 2-23](#) for more information.

The DPI port of the processor connects to the UART interface and the SPI interface. The UART interface can connect to a standard RS-232 connection, while the SPI connects to the 2 Mbit of serial flash memory.

Additionally, the EZ-KIT Lite board provides access to all of the processor’s peripheral ports. Access is provided in the form of a three-connector expansion interface. See [“Expansion Interface” on page 2-7](#) for details.

Purpose of This Manual

The *ADSP-21369 EZ-KIT Lite Evaluation System Manual* provides instructions for installing the product hardware (board) and describes the operation and configuration of the board components. The product software component is detailed in the *VisualDSP++ Installation Quick Reference Card*. The manual provides guidelines for running your own code on the ADSP-21369 EZ-KIT Lite. Finally, a schematic and a bill of materials are provided as a reference for future designs.

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 (such as the *ADSP-2136x SHARC Processor Programming Reference* and *ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors*) that describe your target architecture.

Programmers who are unfamiliar with VisualDSP++ should refer to the VisualDSP++ online Help and the VisualDSP++ user's or getting started guides. For the locations of these documents, see [“Related Documents”](#).

Manual Contents

The manual consists of:

- Chapter 1, [“Using EZ-KIT Lite” on page 1-1](#)
Provides information on the EZ-KIT Lite from a programmer's perspective and provides an easy-to-access memory map.

What's New in This Manual

- Chapter 2, “EZ-KIT Lite Hardware Reference” on page 2-1
Provides information on the hardware aspects of the evaluation system.
- Appendix A, “Bill Of Materials” on page A-1
Provides a list of components used to manufacture the EZ-KIT Lite board.
- Appendix B, “Schematics” on page B-1
Provides the resources to allow modifications to the EZ-KIT Lite or to use as a reference design.



This appendix is not part of the online Help. The online Help viewers should go to the PDF version of the *ADSP-21369 EZ-KIT Lite Evaluation System Manual* located in the Docs\EZ-KIT Lite Manuals folder on the installation CD to see the schematics. Alternatively, the schematics can be found on the Analog Devices Web site at <http://www.analog.com/processors>.

What's New in This Manual

This is the first revision of the *ADSP-21369 EZ-KIT Lite Evaluation System Manual*.

Technical or Customer Support

You can reach Analog Devices, Inc. Customer Support in the following ways:

- Visit the Embedded Processing and DSP products Web site at <http://www.analog.com/processors/technicalSupport>
- E-mail tools questions to processor.tools.support@analog.com

- E-mail processor questions to
processor.support@analog.com (World wide support)
processor.europe@analog.com (Europe support)
processor.china@analog.com (China support)
- Phone questions to 1-800-ANALOGD
- Contact your Analog Devices, Inc. local sales office or authorized distributor
- Send questions by mail to:
Analog Devices, Inc.
One Technology Way
P.O. Box 9106
Norwood, MA 02062-9106
USA

Supported Processors

The ADSP-21369 EZ-KIT Lite evaluation system supports the Analog Devices ADSP-21369 SHARC processors.

Product Information

You can obtain product information from the Analog Devices Web site, from the product CD-ROM, or from the printed publications (manuals).

Analog Devices is online at <http://www.analog.com>. Our Web site provides information about a broad range of products— analog integrated circuits, amplifiers, converters, and digital signal processors.

Product Information

MyAnalog.com

MyAnalog.com is a free feature of the Analog Devices Web site that allows customization of a Web page to display only the latest information on products you are interested in. You can also choose to receive weekly e-mail notifications containing updates to the Web pages that meet your interests. MyAnalog.com provides access to books, application notes, data sheets, code examples, and more.

Registration:

Visit <http://www.myanalog.com> to sign up. Click **Register** to use MyAnalog.com. Registration takes about five minutes and serves as means for you to select the information you want to receive.

If you are already a registered user, just log on. Your user name is your e-mail address.

Processor Product Information

For information on embedded processors and DSPs, visit our Web site at <http://www.analog.com/processors>, which provides access to technical publications, data sheets, application notes, product overviews, and product announcements.

You may also obtain additional information about Analog Devices and its products in any of the following ways.

- E-mail questions or requests for information to
processor.support@analog.com (World wide support)
processor.europe@analog.com (Europe support)
processor.china@analog.com (China support)
- Fax questions or requests for information to
1-781-461-3010 (North America)
+49-89-76903-157 (Europe)

Related Documents

For information on product related development software and hardware, see these publications:

Table 1. Related Processor Publications

Title	Description
<i>ADSP-21369 SHARC Processor Datasheet</i>	General functional description, pinout, and timing
<i>ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors</i>	Description of internal processor architecture, registers, and all peripheral functions
<i>ADSP-2136x SHARC Processor Programming Reference</i>	Description of all allowed processor assembly instructions

Table 2. Related VisualDSP++ Publications

<i>VisualDSP++ User's Guide</i>	Detailed description of VisualDSP++ features and usage
<i>VisualDSP++ Assembler and Preprocessor Manual</i>	Description of the assembler function and commands
<i>VisualDSP++ C/C++ Compiler and Library Manual for SHARC Processors</i>	Description of the compiler function and commands for SHARC processors
<i>VisualDSP++ Linker and Utilities Manual</i>	Description of the linker function and commands
<i>VisualDSP++ Loader Manual</i>	Description of the loader function and commands

Product Information



If you plan to use the EZ-KIT Lite board in conjunction with a JTAG emulator, also refer to the documentation that accompanies the emulator.

All documentation is available online. Most documentation is available in printed form.

Visit the Technical Library Web site to access all processor and tools manuals and data sheets:

<http://www.analog.com/processors/resources/technicalLibrary>.

Online Technical Documentation

Online documentation comprises the VisualDSP++ Help system, software tools manuals, hardware tools manuals, processor manuals, the Dinkum Abridged C++ library, and Flexible License Manager (FlexLM) network license manager software documentation. You can easily search across the entire VisualDSP++ documentation set for any topic of interest. For easy printing, supplementary .PDF files of most manuals are provided in the Docs folder on the VisualDSP++ installation CD.

Each documentation file type is described as follows.

File	Description
.CHM	Help system files and manuals in Help format
.HTM or .HTML	Dinkum Abridged C++ library and FlexLM network license manager software documentation. Viewing and printing the .HTML files requires a browser, such as Internet Explorer 4.0 (or higher).
.PDF	VisualDSP++ and processor manuals in Portable Documentation Format (PDF). Viewing and printing the .PDF files requires a PDF reader, such as Adobe Acrobat Reader (4.0 or higher).

If documentation is not installed on your system as part of the software installation, you can add it from the VisualDSP++ CD at any time by running the Tools installation. Access the online documentation from the VisualDSP++ environment, Windows[®] Explorer, or the Analog Devices Web site.

Accessing Documentation From VisualDSP++

To view VisualDSP++ Help, click on the **Help** menu item or go to the Windows task bar and navigate to the VisualDSP++ documentation via the **Start** menu.

To view ADSP-21369 EZ-KIT Lite Help, which is part of the VisualDSP++ Help system, use the **Contents** or **Search** tab of the Help window.

Accessing Documentation From Windows

In addition to any shortcuts you may have constructed, there are many ways to open VisualDSP++ online Help or the supplementary documentation from Windows.

Help system files (.CHM) are located in the `Help` folder, and .PDF files are located in the `Docs` folder of your VisualDSP++ installation CD-ROM. The `Docs` folder also contains the Dinkum Abridged C++ library and the FlexLM network license manager software documentation.

Your software installation kit includes online Help as part of the Windows[®] interface. These help files provide information about VisualDSP++ and the ADSP-21369 EZ-KIT Lite evaluation system.

Accessing Documentation From Web

Download manuals at the following Web site:

<http://www.analog.com/processors/resources/technicalLibrary/manuals>.

Product Information

Select a processor family and book title. Download archive (.ZIP) files, one for each manual. Use any archive management software, such as WinZip, to decompress downloaded files.

Printed Manuals

For general questions regarding literature ordering, call the Literature Center at 1-800-ANALOGD (1-800-262-5643) and follow the prompts.

VisualDSP++ Documentation Set

To purchase VisualDSP++ manuals, call 1-603-883-2430. The manuals may be purchased only as a kit.

If you do not have an account with Analog Devices, you are referred to Analog Devices distributors. For information on our distributors, log onto <http://www.analog.com/salesdir/continent.asp>.

Hardware Tools Manuals

To purchase EZ-KIT Lite and In-Circuit Emulator (ICE) manuals, call 1-603-883-2430. The manuals may be ordered by title or by product number located on the back cover of each manual.

Processor Manuals

Hardware reference and instruction set reference manuals may be ordered through the Literature Center at 1-800-ANALOGD (1-800-262-5643), or downloaded from the Analog Devices Web site. Manuals may be ordered by title or by product number located on the back cover of each manual.




Data Sheets


All data sheets (preliminary and production) may be downloaded from the Analog Devices Web site. Only production (final) data sheets (Rev. 0, A, B, C, and so on) can be obtained from the Literature Center at **1-800-ANALOGD (1-800-262-5643)**; they also can be downloaded from the Web site.

To have a data sheet faxed to you, call the Analog Devices Faxback System at **1-800-446-6212**. Follow the prompts and a list of data sheet code numbers will be faxed to you. If the data sheet you want is not listed, check for it on the Web site.

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 VisualDSP++ 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 <i>this</i> or <i>that</i> . 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 <i>this</i> or <i>that</i> .
[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 <i>this</i> .
.SECTION	Commands, directives, keywords, and feature names are in text with letter gothic font.
<i>filename</i>	Non-keyword placeholders appear in text with italic style format.
	Note: For correct operation, ... 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 ... Caution: Device damage may result if ... 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 ... 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.

 Additional conventions, which apply only to specific chapters, may appear throughout this document.

Notation Conventions

1 USING EZ-KIT LITE

This chapter provides specific information to assist you with development of programs for the ADSP-21369 EZ-KIT Lite evaluation system.

The information appears in the following sections.

- [“Package Contents” on page 1-2](#)
Lists the items contained in your ADSP-21369 EZ-KIT Lite package.
- [“Default Configuration” on page 1-3](#)
Shows the default configuration of the ADSP-21369 EZ-KIT Lite.
- [“Installation and Session Startup” on page 1-4](#)
Instructs how to start a new or open an existing ADSP-21369 EZ-KIT Lite session using VisualDSP++.
- [“Evaluation License Restrictions” on page 1-6](#)
Describes the restrictions of the VisualDSP++ license shipped with the EZ-KIT Lite.
- [“External Memory” on page 1-7](#)
Describes how to access external memory and defines the memory map of the EZ-KIT Lite.
- [“ELVIS Interface” on page 1-8](#)
Describes the on-board National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) interface.

Package Contents

- [“Analog Audio” on page 1-9.](#)
Describes how to set up and communicate with the on-board audio codec.
- [“LEDs and Push Buttons” on page 1-10](#)
Describes the board’s general-purpose IO pins and buttons.
- [“Example Programs” on page 1-12](#)
Provides information about the example programs included in the ADSP-21369 EZ-KIT Lite evaluation system.
- [“Background Telemetry Channel” on page 1-12](#)
Highlights the advantages of the Background Telemetry Channel feature of VisualDSP++.

For information on the graphical user interface, including the boot loading, target options, and other facilities of the EZ-KIT Lite system, refer to the online Help.

For detailed information on how to program the ADSP-21369 SHARC processor, refer to the documents referenced in [“Related Documents” on page xvii.](#)

Package Contents

Your ADSP-21369 EZ-KIT Lite evaluation system package contains the following items.

- ADSP-21369 EZ-KIT Lite board
- *VisualDSP++ Installation Quick Reference Card*
- CD containing:
 - ✓ VisualDSP++ software
 - ✓ ADSP-21369 EZ-KIT Lite debug software

- ✓ USB driver files
 - ✓ Example programs
 - ✓ ADSP-21369 EZ-KIT Lite Evaluation System Manual (this document)
- Universal 7V DC power supply
 - USB 2.0 cable
 - 3.5 mm stereo headphones
 - 6-foot RCA audio cable
 - 6-foot 3.5 mm/RCA x 2 Y-cable
 - Registration card (please fill out and return)

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

Default Configuration

The EZ-KIT Lite 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-KIT Lite boards in the protective shipping package.



The ADSP-21369 EZ-KIT Lite board is designed to run outside your personal computer as a stand-alone unit. You do not have to open your computer case.

Installation and Session Startup

When removing the EZ-KIT Lite board from the package, handle the board carefully to avoid the discharge of static electricity, which may damage some components.

To connect the EZ-KIT Lite board:

1. Remove the EZ-KIT Lite board from the package. Be careful when handling the board to avoid the discharge of static electricity, which may damage some components.
2. [Figure 1-1](#) shows the default jumper settings, DIP switch, connector locations, and LEDs used in installation. Confirm that your board is set up in the default configuration before continuing.
3. Plug the provided power supply into J4 on the EZ-KIT Lite board. Visually verify that the green power LED (LED9) is on. Also verify that the two red reset LEDs (LED10 and LED12) go on for a moment and then go off, and, finally, LED1 through LED8 are sequentially blinking.
4. Connect one end of the USB cable to an available full speed USB port on your PC and the other end to P5 on the ADSP-21369 EZ-KIT Lite board.

Installation and Session Startup



For correct operation, install the software and hardware in the order presented in the *VisualDSP++ Installation Quick Reference Card*.

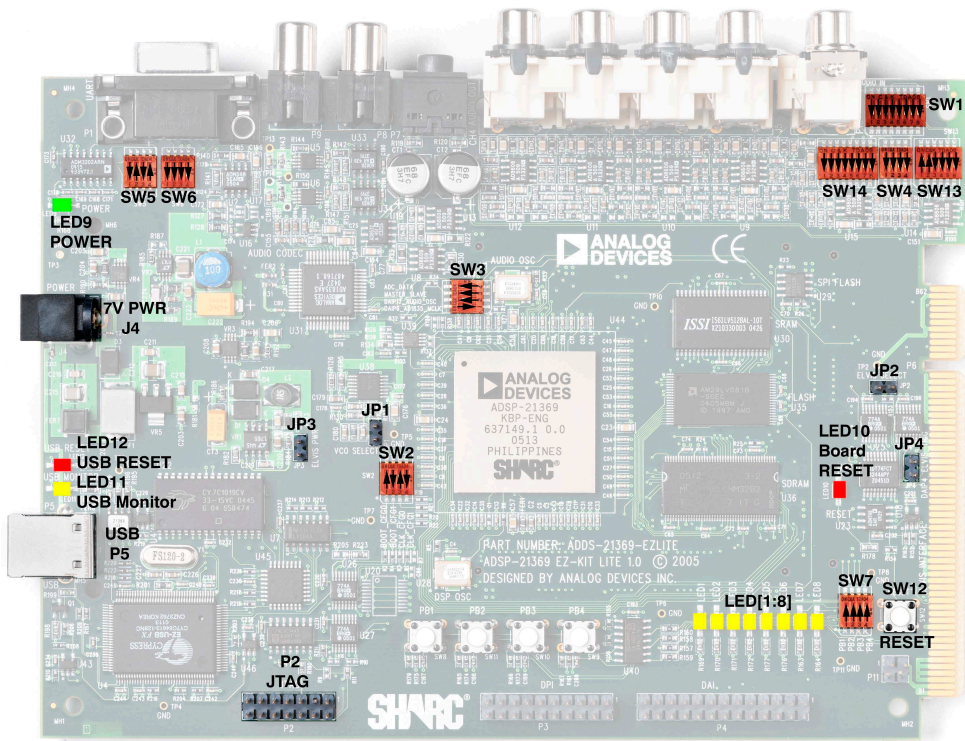


Figure 1-1. EZ-KIT Lite Hardware Setup

To start up an EZ-KIT Lite session in VisualDSP++:

1. Verify that the yellow USB monitor LED (LED11, located near the USB connector) is lit. This signifies that the board is communicating properly with the host PC and is ready to run VisualDSP++.
2. From the **Start** menu, navigate to the VisualDSP++ environment via the **Programs** menu.

If you are running VisualDSP++ for the first time, the **New Session**

Evaluation License Restrictions

dialog box appears on the screen (skip the rest of the procedure and go to step 3).

If you have run VisualDSP++ previously, the last opened session appears on the screen.

To switch to another session, via the **Session List** dialog box, hold down the **Ctrl** key while starting VisualDSP++ (go to step 5).

3. In **Debug target**, select **SHARC Emulators/EZKIT Lites**.
In **Platform**, select **ADSP-21369 EZ-KIT Lite via Debug Agent**.
In **Processor**, choose the appropriate processor, **ADSP-21369**.
In **Session** name, type a new name or accept the default.
4. Click **OK** to return to the **Session List**.
5. Highlight the session and click **Activate**.

Evaluation License Restrictions

The ADSP-21369 EZ-KIT Lite installation is part of the VisualDSP++ installation. The EZ-KIT Lite is a licensed product that offers an unrestricted evaluation license for the first 90 days. Once the initial unrestricted 90-day evaluation license expires:

1. VisualDSP++ allows a connection to the ADSP-21369 EZ-KIT Lite via the USB Debug Agent interface only. Connections to simulators and emulation products are no longer allowed.
2. The linker restricts a users program to 10922 words of internal memory for code space with no restrictions for data space.

Refer to the *VisualDSP++ Installation Quick Reference Card* for details.

External Memory

The EZ-KIT Lite contains four types of memory: parallel flash (1 MB), SPI flash (2 Mbit), SRAM (512 Kbit), and SDRAM (128 Mbit). The flash memories can store user-specific boot code, allowing the board run as a stand-alone unit. For more information about selecting the boot device for the processor, see [“Boot Mode and Clock Ratio Select Switch \(SW2\)” on page 2-8](#).

[Table 1-1](#) provides start and end addresses of the board’s external memories.

Table 1-1. EZ-KIT Lite Evaluation Board External Memory

Start Address	End Address	Content
0x0020 0000	0x0027 FFFF	SRAM memory (~MS0)
0x0400 0000	0x040F FFFF	Flash memory (~MS1)
0x0800 0000	0x08FF 0000	SDRAM memory (~MS2)
0x0C00 0000	0x0CFF FFFF	Unused chip select (~MS3), for non-SDRAM addresses
0x0C00 0000	0x0FFF FFFF	Unused chip select (~MS3), for SDRAM addresses

The parallel flash memory, SDRAM, and SRAM memory connect to the external memory of the processor. To access the SRAM and flash memories, use memory addressing via the respective memory bank or use the DMA controller.

The SDRAM memory connects to the SDRAM controller of the processor. A set of programmable timing parameters is available to configure the SDRAM banks to support slower memory accesses. Care must be taken when configuring the SDRAM control registers. For more information regarding the setup of the SDRAM controller, please refer to the *ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors*. An example program is included in the EZ-KIT Lite installation directory to demonstrate how to set up the SDRAM interface.

ELVIS Interface

The SPI flash memory connects to the SPI port of the processor and designates:

- DPI pin 5 (DPI5) as a chip select
- DPI pin 3 (DPI3) as the SPI clock
- DPI pin 1 (DPI1) as the MOSI
- DPI pin 2 (DPI2) as the MISO.

By default, the DPI is setup for the SPI flash, and any required changes to the SPI flash can be made by modifying the DPI of the processor. An example program is included in the EZ-KIT Lite installation directory to demonstrate how to read and write to the SPI flash memory.

The asynchronous SRAM memory and the parallel flash memory connect to the asynchronous memory controller of the processor. Each of their respective memory banks can be independently programmed with different timing parameters. For more information on changing wait states to speed up or slow down the asynchronous controller and other setup information, refer to the *ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors*. Example programs are included in the EZ-KIT Lite installation directory to demonstrate how to read and write to the SRAM or flash memory.

ELVIS Interface

The ADSP-21369 EZ-KIT Lite board contains the National Instruments Educational Laboratory Virtual Instrumentation Suite interface. The interface features the DC voltage and current measurement modules, oscilloscope and bode analyzer modules, function generator, arbitrary waveform generator, and digital IO.

The ELVIS interface is a LabVIEW-based design and prototype environment for university science and engineering laboratories. The ELVIS interface consists of LabVIEW-based virtual instruments, a multifunction data acquisition (DAQ) device, and a custom-designed bench-top workstation and prototype board. This combination provides a ready-to-use suite of instruments found in most educational laboratories. Because the interface is based on LabVIEW and provides complete data acquisition and prototyping capabilities, the system is ideal for academic coursework that range from lower-division classes to advanced project-based curriculums.

For more information on ELVIS and example demonstration programs, visit National Instruments Web site at www.ni.com.

Analog Audio

The AD1835A is a high-performance, single-chip codec featuring four stereo digital-to-analog converters (DAC) for audio output and one stereo analog-to-digital converters (ADC) for audio input. The codec can input and output data with a sample rate of up to 96 kHz on all channels. A 192 kHz sample rate can be used with the one of the DAC channels.

The processor is interfaced with the AD1835A via the DAI port. The DAI interface pins can be configured to transfer serial data from the AD1835A codec in either time-division multiplexed (TDM) or two-wire interface mode (TWI). For more information on the AD1835A connection to the DAI, see [“DAI Interface” on page 2-4](#).

The master input clock (MCLK) for the AD1835A can be generated by the on-board 12.288 MHz oscillator or can be supplied by one of the DAI pins of the processor. Using one of the pins to generate the MCLK, as opposed to the on-board oscillator, allows synchronization of multiple devices in the system. This is done on the EZ-KIT Lite when data is coming from the SPDIF receiver and being output through the audio codec. The SPDIF MCLK is routed to the AD1835A MCLK in the processor's signal

LEDs and Push Buttons

routing unit (SRU). It is also necessary to disable the on-board audio oscillator from driving the audio codec and the processor's input pin. For instructions on how to configure the clock, refer to [“Codec Setup Switch \(SW3\)” on page 2-10](#).

The AD1835A codec can be configured as a master or as a slave, depending on the DIP switch settings. In master mode, the AD1835A drives the serial port clock and frame sync signals to the processor. In slave mode, the processor must generate and drive all of the serial port clock and frame sync signals. For information on how to set the mode, refer to [“Codec Setup Switch \(SW3\)” on page 2-10](#).

The AD1835A audio codec's internal configuration registers are configured using the SPI port of the processor. The DPI pin 4 (DPI4 register) is used as the select for the device. For information on how to configure the multichannel codec, refer to the codec's datasheet, which can be found at <http://www.analog.com/en/prod/0,2877,AD1835A,00.html>.

The RCA connector (P10) is used to input analog audio. When using an electret microphone on this connector, configure the SW4 switch according to the instructions in [“Electret Microphone Select Switch \(SW4\)” on page 2-11](#). The four output channels connect to the RCA connector J5. Channel 4 of the codec connects to the headphone jack P7. For more information about the connectors see [“Connectors” on page 2-20](#).

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

LEDs and Push Buttons

The EZ-KIT Lite has eight general-purpose user LEDs and four general-purpose push buttons.

Two of the 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 connect to the processor through a DIP switch. The DIP switch allows processor pins, which connect to the push buttons, to be disconnected. See “[Push Button Enable Switch \(SW7\)](#)” on page 2-12 for instructions on how to disable the push buttons from driving the corresponding processor pin.

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 1-2](#) shows how each push button connects to the processor. Refer to the related example program shipped with the EZ-KIT Lite for more information.

Table 1-2. Push Button Connections

Push Button Label	Push Button Reference Designator	Processor Pin
PB1	SW8	FLAG1/~IRQ1
PB2	SW11	FLAG0/~IRQ0
PB3	SW10	DAI19
PB4	SW9	DAI20

[Table 1-3](#) summarizes the LED connections to the processor. In order to use the LEDs connected to the DAI or DPI, the respective registers inside the processor must be correctly configured. For more information on how to program the pins, refer to the *ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors*.



An example program is included in the EZ-KIT Lite installation directory to demonstrate the functionality of the LEDs and push buttons.

Example Programs

Table 1-3. LED Connections

LED Reference Designator	Processor Pin
LED1	DPI6
LED2	DPI7
LED3	DPI8
LED4	DPI13
LED5	DPI14
LED6	DAI15
LED7	DAI16
LED8	FLAG3/~MS3/~IRQ3

Example Programs

Example programs are provided with the ADSP-21369 EZ-KIT Lite to demonstrate various capabilities of the evaluation board. These programs are installed with the EZ-KIT Lite software and can be found in the `...\213xx\EZ-KITs\ADSP-21369\Examples` subdirectory of the VisualDSP++ installation directory. Please refer to the readme file provided with each example for more information.

Background Telemetry Channel

The ADSP-21369 USB debug agent supports the background telemetry channel (BTC), which facilitates data exchange between VisualDSP++ and the processor without interrupting processor execution.

The BTC allows the user to view a variable as it is updated or changed, all while the processor continues to execute. For increased performance of the BTC, including faster reading and writing, please check out our latest line of processor emulators at <http://www.analog.com/proces->

[sors/resources/crosscore/emulators/index.html](https://www.analog.com/resources/crosscore/emulators/index.html). For more information about the background telemetry channel, see the *VisualDSP++ User's Guide* or online Help.

Background Telemetry Channel

2 EZ-KIT LITE HARDWARE REFERENCE

This chapter describes the hardware design of the ADSP-21369 EZ-KIT Lite board. The following topics are covered.

- [“System Architecture” on page 2-2](#)
Describes the configuration of the ADSP-21369 board and explains how the board components interface with the processor.
- [“Switch Settings” on page 2-8](#)
Shows the location and describes the function of the board switches.
- [“LEDs and Push Buttons” on page 2-14](#)
Shows the location and describes the function of the board LEDs and push buttons.
- [“Jumpers” on page 2-17](#)
Shows the location and describes the function of the board jumpers.
- [“Connectors” on page 2-20](#)
Shows the location and gives the part number for all of the connectors on the board. Also, the manufacturer and part number information is given for the mating parts.

System Architecture

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

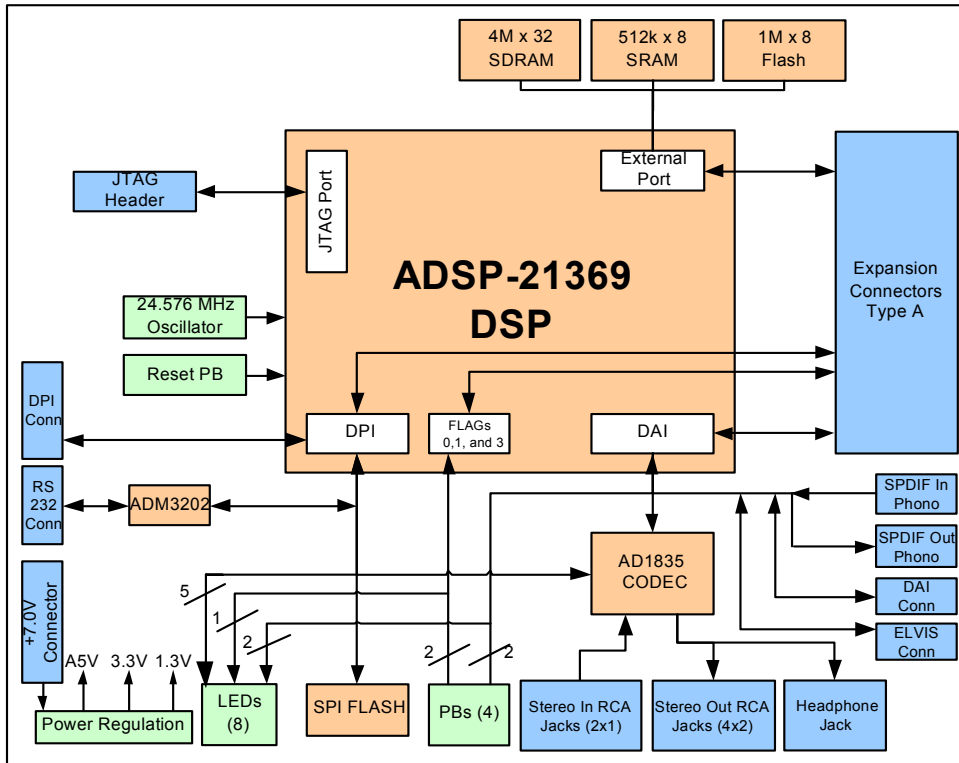


Figure 2-1. System Architecture Block Diagram

The EZ-KIT Lite has been designed to demonstrate the capabilities of the ADSP-21369 processor. The processor core is powered at 1.3V, and the IO is powered at 3.3V.

The CLKIN pin of the processor connects to a 24.576 MHz oscillator. The core frequency of the processor is derived by multiplying the frequency at the CLKIN pin by a value determined by the state of the processor pins CLKCFG1 and CLKCFG0. The value at these pins is determined by the state of the SW2 switch (see [“Boot Mode and Clock Ratio Select Switch \(SW2\)” on page 2-8](#)). By default, the EZ-KIT Lite gives a core frequency of 393.216 MHz. It is possible to change the speed of the processor by changing the value of the PMCTL register.

The SW2 switch also configures the boot mode of the processor. The EZ-KIT Lite is capable of EPROM/flash boot and SPI boot. By default, the EZ-KIT Lite boots from the flash memory. For information about configuring the boot modes, see [“Boot Mode and Clock Ratio Select Switch \(SW2\)” on page 2-8](#).

External Port

The external port of the ADSP-21369 processor consists of a 24-bit address bus, 32-bit data memory bus, and control lines. The control lines are used to select, read, and write to external memory devices.

The external port connects to an 8-bit parallel flash memory, an 8-bit SRAM memory, and a 32-bit SDRAM memory. See [“External Memory” on page 1-7](#) for more information about accessing the flash and SDRAM memories.

All of the external port signals are available externally via the expansion interface connectors (J3-1). The pinout of the connectors can be found in [“Schematics” on page B-1](#).

DAI Interface

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

The DAI pins connect to the AD1835A audio codec, a 26-pin header, two RCA connectors, the audio oscillator output, an external phase lock loop (PLL) circuit, two LEDs, and two push buttons. [Figure 2-2](#) illustrates the EZ-KIT Lite's connections to the DAI.

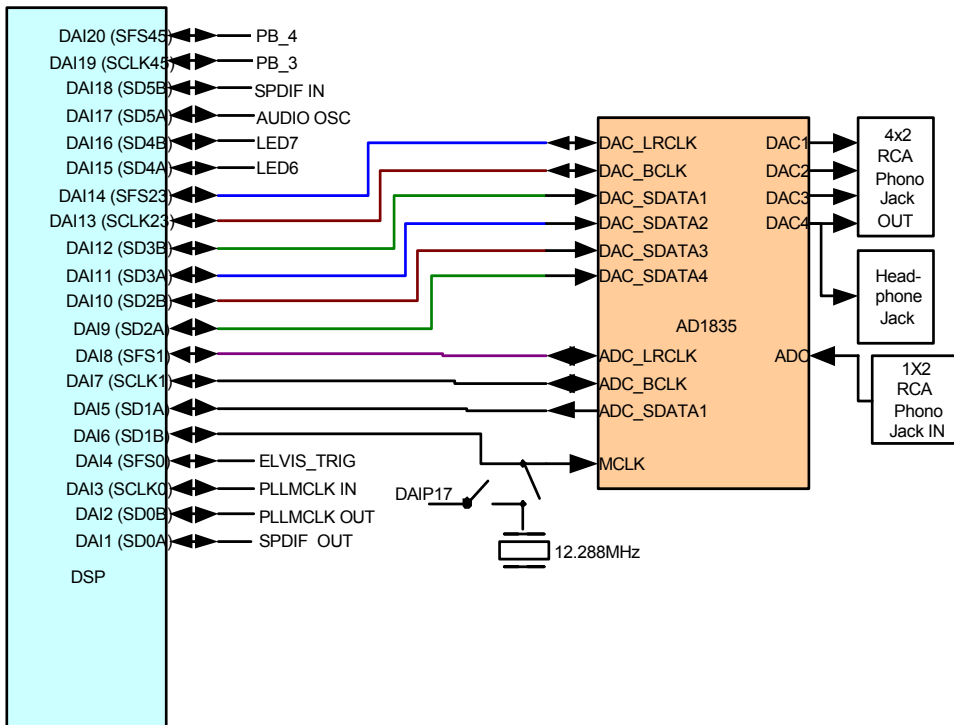


Figure 2-2. DAI Connections Block Diagram

To use the DAI for a different purpose, disable any signal driving the DAI pins with a switch (see “[Codec Setup Switch \(SW3\)](#)” on page 2-10). In addition, the SW3 switch allows flexible routing of the 12.288 MHz audio oscillator’s output signal. By default, this signal is used as the master clock (MCLK) for the AD1835A codec.

All of the DAI signals are available externally via the expansion interface connectors (J3-1), as well as the 0.1” spaced header P4. The pinout of these connectors can be found in “[Schematics](#)” on page B-1.

DPI Interface

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

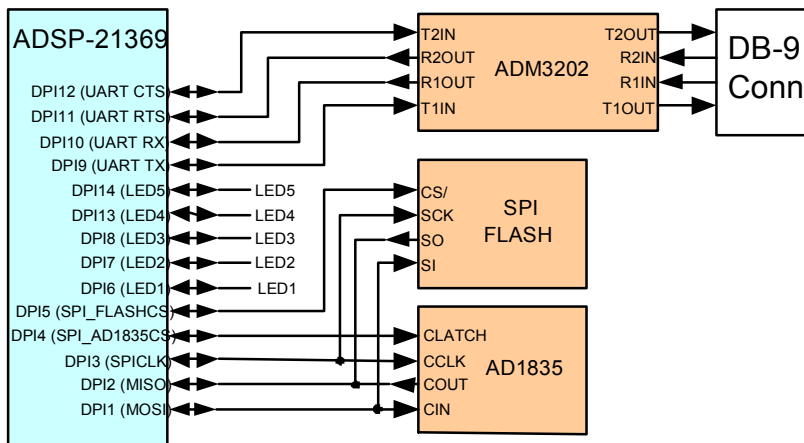


Figure 2-3. DPI Connections Block Diagram

System Architecture

Figure 2-3 illustrates the EZ-KIT Lite’s connections to the DPI. The DPI pins connect to the SPI flash memory, the SPI interface of the AD1835A codec, a UART, a 20-pin header, and five LEDs.

To use the DPI for a different purpose, disable any signal driving the DPI pins with a switch (see “[UART Enable Switch \(SW5\)](#)” on page 2-11). Any DPI pin connected to an LED can be used without having to disconnect the pin. You can, however, see the respective LED turn ON and OFF when using the signal for other purposes.

All of the DPI signals are available externally via the expansion interface connectors (J3-1), as well as the 0.1” spaced header P3. The pinout of these connectors can be found in “[Schematics](#)” on page B-1.

FLAG Pins

The processor has four general-purpose IO flag pins. [Table 2-1](#) describes the flag connections.

Table 2-1. IO FLAG Pins

FLAG Pin	EZ-KIT Lite Function
FLAG0	Push button (SW2) input
FLAG1	Push button (SW2) input
FLAG2	SDRAM chip select
FLAG3	LED8

For information on how to disable the push buttons from driving the corresponding processor flag pin, see “[Push Button Enable Switch \(SW7\)](#)” on page 2-12.

The FLAG signals are available externally via the expansion interface connectors (J3-1). The pinout of these connectors can be found in “[Schematics](#)” on page B-1.

External PLL

The ADSP-21369 EZ-KIT Lite contains an external phase lock loop to help generate a faster and more stable master input clock $MCLK$. The PLL uses DAI pin 3 as an input clock from the ADSP-21369 processor. The new clock generated by PLL connects to the processor via DAI pin 2.

Example programs are included in the EZ-KIT Lite installation directory to demonstrate how to configure and use the board's external PLL.

Expansion Interface

The expansion interface consists of the three 90-pin connectors. [Table 2-2](#) shows the interfaces each connector provides. For the exact pinout of these connectors, refer to [“Schematics” on page B-1](#). The mechanical dimensions of the connectors can be obtained from [Technical or Customer Support](#).

Table 2-2. Expansion Interface Connectors

Connector	Interfaces
J1	5V, ADDR[23-0], DATA[31-0]
J2	3.3V, FLAG[3-0], DAIP[20-1], DPI[14-1], SDRAM control signals
J3	5V, 3.3V, reset, parallel port control signals

Limits to the current and to the interface speed must be taken into consideration when using the expansion interface. The maximum current limit is dependent on the capabilities of the used regulator. Additional circuitry can also add extra loading to signals, decreasing their maximum effective speed.



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

Switch Settings

JTAG Emulation Port

The JTAG emulation port allows an emulator to access the internal and external memory of the processor through a 6-pin interface. The JTAG emulation port of the processor also connects to the USB debugging interface. When an emulator connects to the board at P2, the USB debugging interface is disabled. This is not the standard connection of the JTAG interface.

For information about the standard connection of the interface, see *EE-68* published on the Analog Devices Web site. For more information about the JTAG connector, see “[JTAG Header \(P2\)](#)” on page 2-25. To learn more about available emulators, go to Analog Devices Web site:

<http://www.analog.com/processors/resources/crosscore/emulators/index.html>.

Switch Settings

This section describes the function of the EZ-KIT Lite switches. [Figure 2-4](#) shows the switch locations and default settings.

Boot Mode and Clock Ratio Select Switch (SW2)

The SW2 switch sets the boot mode and clock multiplier ratio. [Table 2-3](#) shows how to set up the boot mode using positions 1 and 2. By default, the EZ-KIT Lite boots in external port mode from flash memory.

[Table 2-4](#) shows how to set up the clock multiply ratio using positions 3 and 4. By default, the processor increases the clock multiply ratio by sixteen, setting the core clock to 393.216 MHz.

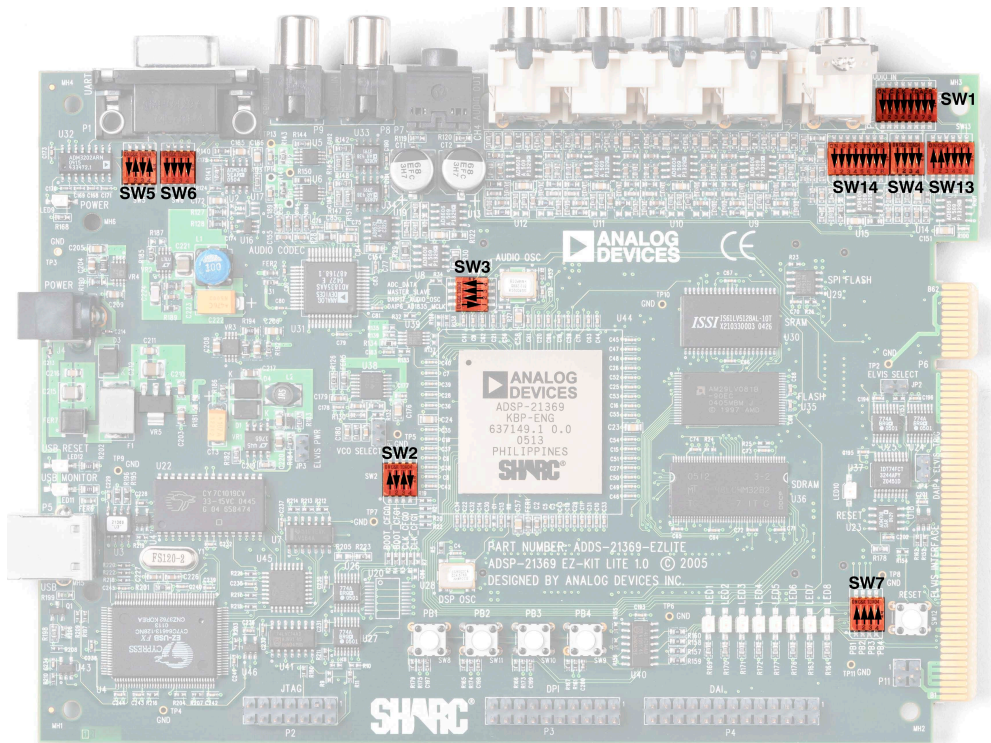


Figure 2-4. Switch Locations and Default Settings

Table 2-3. Boot Mode Configuration Switch (SW2)

BOOTCFG1 Pin (Position 1)	BOOTCFG0 Pin (Position 2)	Boot Mode
ON	ON	SPI Slave Boot
ON	OFF	Flash Boot¹
OFF	ON	SPI Master Boot
OFF	OFF	Reserved

¹ Bold typeface denotes the default setting.

Switch Settings

Table 2-4. Core Clock Rate Configuration

CLKCFG1 (Position 3)	CLKCFG0 (Position 4)	Core to CLKIN Ratio
ON	ON	6:1
ON	OFF	16:1¹
OFF	ON	32:1
OFF	OFF	Reserved

¹ Bold typeface denotes the default ratio.

The core clock frequency can be increased or decreased via software by writing to the `PMCTL` register. For more information on changing core clock frequency and other setup information, refer to the *ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors*.

Codec Setup Switch (SW3)

The codec setup switch (SW3) can be used to change the routing of some of the signals going to the AD1835A codec and to setup the communication protocol of the codec.

Positions 1 and 2 determine the clock routing for the audio oscillator to the codec and to the processor. [Figure 2-5](#) illustrates how the switch positions 1 and 2 connect on the board. In the default position, route the `DAI_P17` pin to `DAI_P6` (in software) to clock the AD1835A.

Position 3 of the SW3 switch determines if the AD1835A device is a master or is a slave. If the AD1835A is a master, the device's serial interface generates the frame sync and clock signals necessary to transfer data. When the device is a slave, the processor must generate the frame sync and clock signals. By default, position 3 is ON, and the AD1835A generates the control signals.

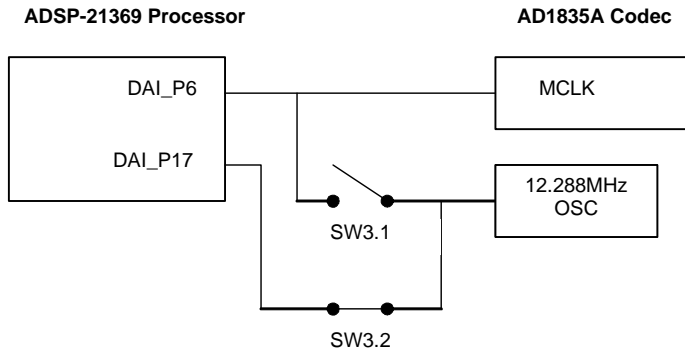


Figure 2-5. Audio Clock Routing

Position 4 of SW3 disconnects the AD1835A's ADC_DATA pin from the DAI interface. This is useful when the DAI interface connects to another device.

Electret Microphone Select Switch (SW4)

To connect an electret microphone to the audio input, place all positions of the SW4 switch ON. The default position of the switch is all OFF. When all of the positions are in the ON position, a DC offset of 2.5V is added to the signal, and gain of the input amplifiers is changed from 1x to 10x.

UART Enable Switch (SW5)

The UART enable switch (SW5) disconnects UART signals from the DPI pins of the processor. When the switch is in the OFF position, the associated DPI signal (see [Table 2-5](#)) can be used on the expansion interface.

Switch Settings

Table 2-5. UART Enable Switch (SW5)

Switch Position	EZ-KIT Lite Signal	Processor Signal
1 (OFF ¹)	CTS	DPI12
2 (ON)	RX	DPI10
3 (OFF)	RTS	DP11
4 (ON)	T2IN tied to R2OUT	N/A

1 Bold typeface denotes the default setting.

Loop-Back Test Switches (SW6 and SW14)

The loop-back test switch SW6 is located at the top left side of the board. The second loop-back test switch, SW14, is located at the top right side of the board. These switches are used only for testing; all switch positions should be OFF.

Push Button Enable Switch (SW7)

The push button enable switch (SW7) disconnects the push buttons from the corresponding processor pins. This allows the signals to be used for another purpose. [Table 2-6](#) shows the SW7 connections. By default, all position of the SW7 switch are ON, allowing the push buttons to function as designed.

Table 2-6. Push Button Enable Switch (SW7)

Switch Position	Push Button Label	Push Button Reference Designator	Processor Pin
1	PB1	SW8	FLAG1/~IRQ
2	PB2	SW11	FLAG0/~IRQ0
3	PB3	SW10	DAI19
4	PB4	SW9	DAI20

ELVIS Oscilloscope Configuration Switch (SW1)

The oscilloscope configuration switch (SW1) determines which audio circuit signals connect to channels A and B of the oscilloscope. The switch is used only when the board connects to the Educational Laboratory Virtual Instrumentation Suite (ELVIS) station (see [“ELVIS Interface” on page 1-8](#)). Each channel must have only one signal selected at a time, as described in [Table 2-7](#).

Table 2-7. Oscilloscope Configuration Switch (SW1)

Channel	Switch Position	Audio Circuit Signal
A	1 (OFF ¹)	AMP_LEFT_IN
A	2 (OFF)	AMP_RIGHT_IN
A	3 (OFF)	LEFT_OUT
A	4 (OFF)	RIGHT_OUT
B	5 (OFF)	AMP_LEFT_IN
B	6 (OFF)	AMP_RIGHT_IN
B	7 (OFF)	LEFT_OUT
B	8 (OFF)	RIGHT_OUT

¹ Bold typeface denotes the default settings.

ELVIS Function Generator Configuration Switch (SW13)

The function generator configuration switch (SW13) controls which signals connect to the left and right input signals of the audio interface. The SW13 switch is used only when the board connects to the ELVIS station (see [“ELVIS Interface” on page 1-8](#)). Each channel must have only one signal selected at a time, as described in [Table 2-8](#).

LEDs and Push Buttons

Table 2-8. ELVIS Function Generator Configuration Switch (SW13)

Channel	Switch Position	Audio Signal
AMP_LEFT_IN	1 (ON ¹)	LEFT_IN
AMP_RIGHT_IN	2 (ON)	RIGHT_IN
AMP_LEFT_IN	3 (OFF)	DAC0
AMP_RIGHT_IN	4 (OFF)	DAC1
AMP_LEFT_IN	5 (OFF)	FUNCT_OUT
AMP_RIGHT_IN	6 (OFF)	FUNCT_OUT

1 Bold typeface denotes the default settings.

LEDs and Push Buttons

This section describes the functionality of the LEDs and push buttons. [Figure 2-6](#) shows the LED and push button locations.

General Purpose LEDs (LED1–8)

There are eight general-purpose LEDs on the board. Five LEDs connect to the DPI interface, two LEDs connect to the DAI interface, and one LED connects to FLAG3 of the processor. [“LEDs and Push Buttons” on page 1-10](#) summarizes the LED connections. In order to use the LEDs connected to the DAI or DPI, the respective registers inside the processor must be correctly configured. For more information on how to program the pins, refer to the *ADSP-2136x SHARC Processor Hardware Reference for ADSP-21367/8/9 Processors*.

Power LED (LED9)

When LED9 is lit (green), it indicates that power is being properly supplied to the board.

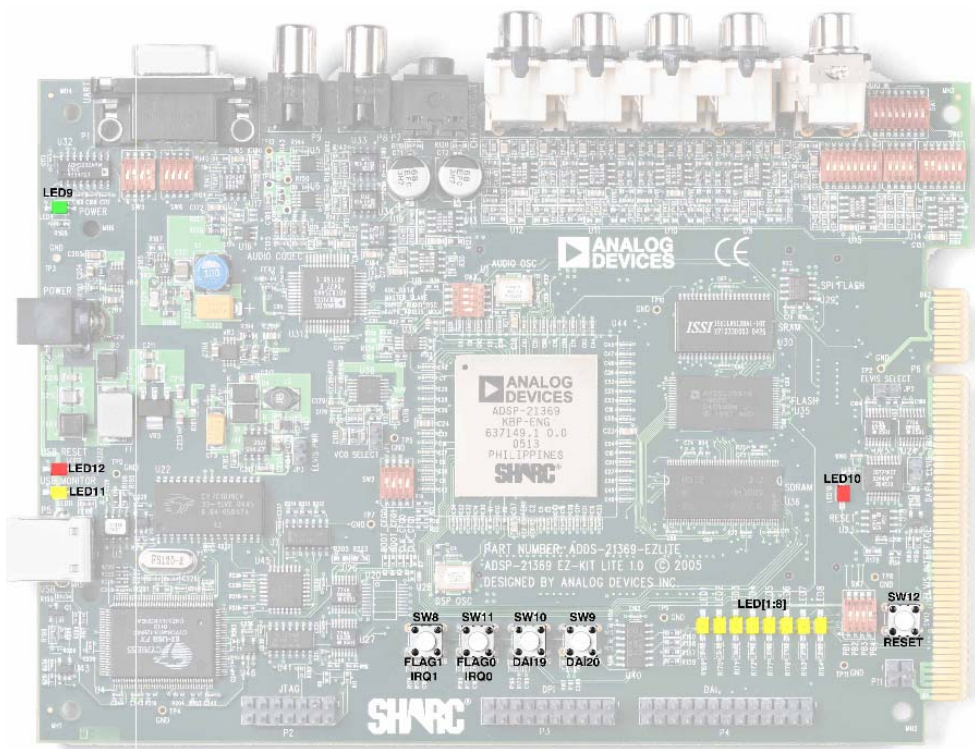



Figure 2-6. LED and Push Button Locations

Reset LEDs (LED10 and LED12)

When LED10 is lit (red), the master reset of all the major ICs is active. When LED12 is lit (red), the USB interface chip (U4) is being reset. The USB chip is reset only on power-up, or if USB communication has not been initialized.

USB Monitor LED (LED11)

The USB monitor LED (LED11) indicates that USB communication has been initialized successfully, and you can connect to the processor using a VisualDSP++ EZ-KIT Lite session. Once the USB cable is plugged into the board, it takes approximately 15 seconds for the USB monitor LED to light. If the LED does not light, try cycling power on the board and/or reinstalling the USB driver (see the *VisualDSP++ Installation Quick Reference Card*).

 When VisualDSP++ is actively communicating with the EZ-KIT Lite target board, the LED can flicker, indicating communications handshake.

Push Buttons (SW8–11)

Four push buttons (SW8-11) are provided for general-purpose user input. Two of the push buttons connect to the FLAG pins of the processor. The other two connect to the DAI of the processor. The push buttons are active HIGH and, when pressed, send a High (1) to the processor. Refer to [“LEDs and Push Buttons” on page 1-10](#) for more information. The push button enable switch (SW7) is capable of disconnecting the push buttons from the corresponding processor pin (refer to [“Push Button Enable Switch \(SW7\)” on page 2-12](#) for more information).

The push buttons and corresponding processor signals summarized in [Table 2-9](#).

Table 2-9. Push Button Connections

Push Button Label	Push Button Reference Designator	Processor Pin
PB1	SW8	FLAG1/~IRQ
PB2	SW11	FLAG0/~IRQ0

Table 2-9. Push Button Connections (Cont'd)

Push Button Label	Push Button Reference Designator	Processor Pin
PB3	SW10	DAI19
PB4	SW9	DAI20

Board Reset Push Button (SW12)

The RESET push button (SW12) resets all of the ICs on the board. The only exception is the USB interface chip (U4). The chip is not being reset when the push button is pressed after the USB cable has been plugged in and communication correctly initialized with the PC. After USB communication has been initialized, the only way to reset the USB is by powering down the board.

Jumpers

[Figure 2-7](#) shows the locations and default settings of the EZ-KIT Lite jumpers.

VCO Select Jumper (JP1)

The voltage controlled oscillator (VCO) select jumper (JP1) configures the frequency selection of the on-board external PLL (U39). When JP1 is installed, the VCO output frequency is multiplied by a factor of 1.0. Conversely, when uninstalled, the VCO output frequency is multiplied by a factor of 0.5 or divided in half. The jumper settings are shown in [Table 2-10](#).

Jumpers

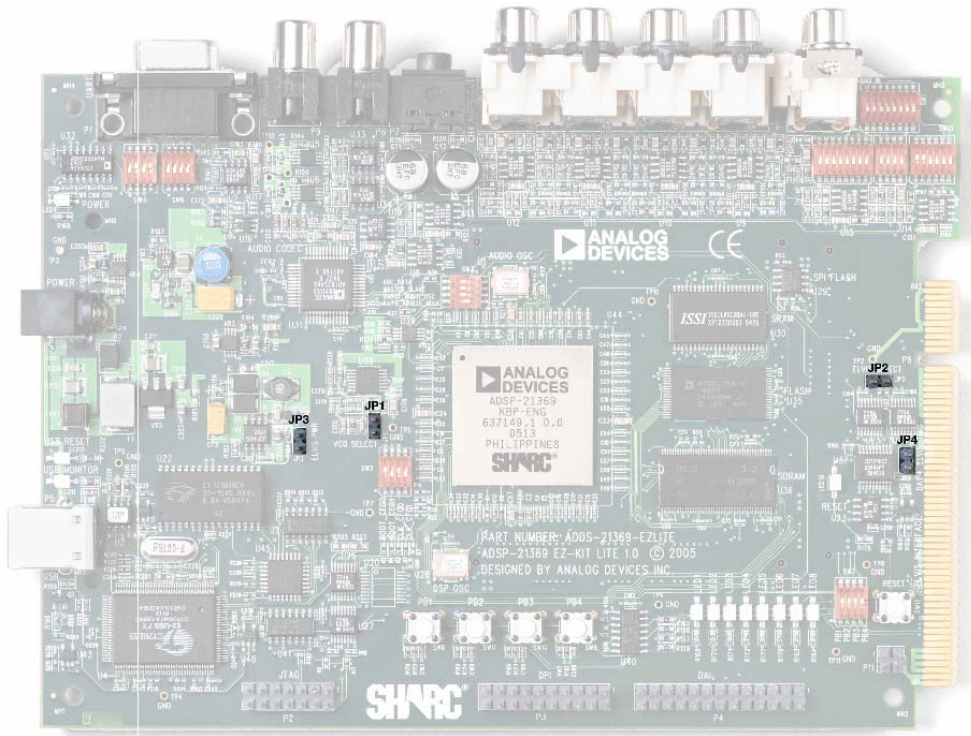


Figure 2-7. Jumper Locations

Table 2-10. VCO Select Jumper (JP1)

JP1 Setting	Mode
OFF	VCO Output frequency x 1/2 (default)
ON	VCO output frequency x 1.0

ELVIS Select Jumper (JP2)

The ELVIS select jumper (JP2) configures the EZ-KIT Lite's connection to an ELVIS station (see “[ELVIS Interface](#)” on page 1-8). When JP2 is installed, the connections to the push buttons and LED are re-directed to the ELVIS station, instead of the processor. The jumper settings are shown in [Table 2-11](#).

Table 2-11. ELVIS Select Jumper (JP2)

JP2 Setting	Mode
OFF	Not connected to ELVIS (default)
ON	Connected to ELVIS

ELVIS Voltage Selection Jumper (JP3)

The ELVIS voltage selection jumper (JP3) is used to select the power source for the EZ-KIT Lite. In a standard mode of operation, the board receives its power from an external power supply. When JP3 is installed, the board is powered from an ELVIS station and no external power supply is required. The jumper settings are shown in [Table 2-12](#).

Table 2-12. ELVIS Voltage Selection Jumper (JP3)

JP3 Setting	Mode
OFF	Powered from an external power supply (default)
ON	Powered from ELVIS



The external power supply must be disconnected from the board when JP3 is installed. In this case, the power supply may cause damage to the EZ-KIT Lite board and ELVIS unit.

Connectors

ELVIS Programmable Flag Jumper (JP4)

The ELVIS programmable flag jumper (JP4) connects the ADSP-21369 processor's DAI4 pin to the ELVIS trigger pin. When JP4 is installed, DAI4 is directly connected to the ELVIS TRIG1_2 pin. Conversely, when JP4 is uninstalled, the DAI4 pin is disconnected and can be used for other non-ELVIS functionality. The jumper settings are shown in [Table 2-13](#).

Table 2-13. ELVIS Select Jumper (JP4)

JP4 Setting	Mode
OFF	DAI4 disconnected from ELVIS TRIG pin (default)
ON	DAI4 connected to ELVIS TRIG pin

Connectors

This section describes the connector functionality and provides information about mating connectors. [Figure 2-8](#) shows the connector locations.

Expansion Interface Connectors (J1–J3)

Three board-to-board connectors (J1-3) provide signals for most of the processor's peripheral interfaces. The connectors are located at the bottom of the board. For more information about the expansion interface, see [“Expansion Interface” on page 2-7](#). For the J1-3 connectors' availability and pricing, contact Samtec.

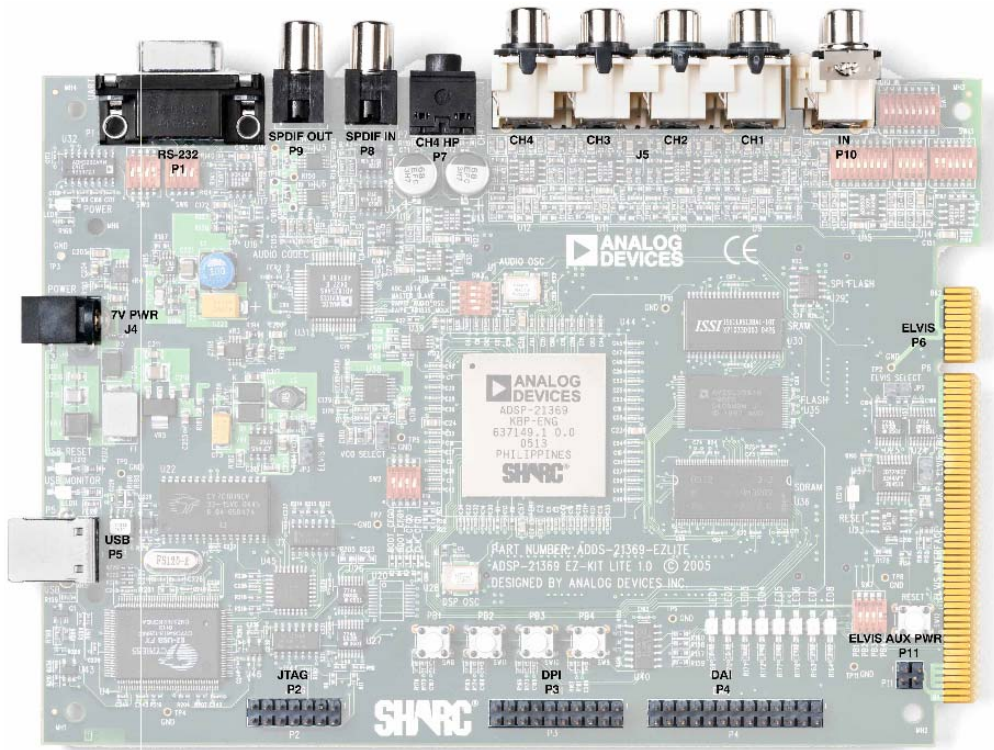


Figure 2-8. Connector Locations

Part Description	Manufacturer	Part Number
90 Position 0.05" Spacing, SMT	Samtec	SFC-145-T2-F-D-A
Mating Connector		
90 Position 0.05" Spacing (Through Hole)	Samtec	TFM-145-x1 Series

Connectors

Part Description	Manufacturer	Part Number
90 Position 0.05" Spacing (Surface Mount)	Samtec	TFM-145-x2 Series
90 Position 0.05" Spacing (Low Cost)	Samtec	TFC-145 Series

Audio In RCA Connector (P10)

Part Description	Manufacturer	Part Number
Two channel right angle RCA jack	Switchcraft	PJRAS1X2S02
Mating Cable		
Two channel RCA interconnect cable	Monster Cable	BI100-1M

Audio Out RCA Connector (J5)

Part Description	Manufacturer	Part Number
Six channel right angle RCA jack	Switchcraft	PJRAS2X2S01
Mating Cable		
Two channel RCA interconnect cable	Monster Cable	BI100-1M

Headphone Out Jack (P7)

Part Description	Manufacturer	Part Number
3.5mm stereo jack	Shogyo	SJ-0359AM-5

Power Jack (J4)

The power connector (J4) provides all of the power necessary to operate the EZ-KIT Lite board.

Part Description	Manufacturer	Part Number
2.5 mm Power Jack	Switchcraft Digi-Key	RAPC712 SC1152-ND
Mating Power Supply (shipped with EZ-KIT Lite)		
7V Power Supply	CUI Inc.	DMS070214-P6P-SZ

The power connector supplies DC power to the EZ-KIT Lite board. [Table 2-14](#) shows the power supply specifications.

Table 2-14. Power Supply Specifications

Terminal	Connection
Center pin	+7 VDC@2.14A
Outer Ring	GND

RS-232 Connector (P1)

Part Description	Manufacturer	Part Number
DB9, Female, Right Angle	Digi-Key	A2100-ND
Mating Cable		
Cable DB9M to DB9F 6 feet	Digi-Key	45-0308-0000-ND

SPDIF Coax Connectors (P8 and P9)

Part Description	Manufacturer	Part Number
Coaxial	Switchcraft	PJРАН1X1U01
Mating Cable		
Two channel RCA interconnect cable	Monster Cable	BI100-1M

Connectors

DPI Header (P3)

The DPI connector (P3) provides access to all of the DPI signals in the form of a .1" spacing header. When using the header to access the DPI pins of the processor, ensure that signals, which normally drive the DPI pins, are disabled. For more information, see [“DPI Interface” on page 2-5](#).

Part Description	Manufacturer	Part Number
20-pin IDC Header	Sullins	S2012-10

DAI Header (P4)

The DAI connector (P4) provides access to all of the DAI signals in the form of a .1" spacing header. When using the header to access the DAI pins of the processor, ensure that signals, which normally drive the DAI pins, are disabled. Refer to [“Codec Setup Switch \(SW3\)” on page 2-10](#) for more information on how to disable signals already being driven from elsewhere on the EZ-KIT Lite.

Part Description	Manufacturer	Part Number
26-pin IDC Header	Berg	54102-T08-13



USB Connector (P5)

The USB connector (P5) allows to configure and program the processor.

Part Description	Manufacturer	Part Number
Type B USB receptacle	Mill-Max Digi-Key	897-30-004-90-000 ED90003-ND

JTAG Header (P2)

The JTAG header (P2) is the connecting point for a JTAG in-circuit emulator pod. When an emulator is connected to the JTAG header, the USB debug interface is disabled.

-  Pin 3 is missing to provide keying. Pin 3 in the mating connector should have a plug.
-  When using an emulator with the EZ-KIT Lite board, follow the connection instructions provided with the emulator.

Part Description	Manufacturer	Part Number
14-pin IDC Header	Berg	54102-T08-07

Connectors

A BILL OF MATERIALS

The bill of materials corresponds to the board schematics on page B-1. Please check the latest schematics on the Analog Devices website, <http://www.analog.com/Processors/Processors/DevelopmentTools/technicalLibrary/manuals/DevToolsIndex.html#Evaluation%20Kit%20Manuals>.

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
1	2	74LVC14A SOIC14 HEX-INVER-SCHMITT-TRIGGER	U40-41	TI	74LVC14AD
2	1	IDT74FCT3244APY SSOP20 3.3V-OCTAL-BUFFER	U37	IDT	IDT74FCT3244APY
3	1	CY7C64603-128 PQFP128 USB-TX/RX MICROCONTROL- LER	U4	CYPRESS	CY7C64603-128NC
4	1	MMBT4401 SOT-23 NPN TRANSISTOR 200MA	Q1	FAIRCHILD	MMBT4401
5	1	CY7C1019BV33-15VC SOJ32 128K X 8 SRAM	U22	CYPRESS	CY7C1019BV33-12VC
6	1	AD8532AR SOIC8 DUAL AMP 250MA	U19	ADI	AD8532AR
7	1	SN74AHC1G02 SOT23-5 SINGLE-2 INPUT-NOR	U46	TI	SN74AHC1G02DBVR
8	1	SN74LV164A SOIC14 8-BIT-PARALLEL-SERIAL	U7	TI	SN74LV164AD
9	1	CY7C4201V-15AC TQFP32 64-BYTE-FIFO	U45	CYPRESS	CY7C4201V-15AC
10	1	12.0MHZ THR OSC006 CRYSTAL	Y1	DIG01	300-6027-ND
11	2	SN74AHC1G00 SOT23-5 SINGLE-2-INPUT-NAND	U42-43	TI	SN74AHC1G00DBVR
12	1	12.288MHZ SMT OSC003 TS201/21262	U1	DIG01	SG-8002CA-PCC-ND

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
13	1	LT1765 SO-8 ADJUSTABLE-3A-SWITCH-REG	VR1	LINEAR TECH	LT1765ES8
14	1	MT48LC4M32B2 TSOP86 4MX32-SDRAM-166MHZ	U36	MICROM	557-1096-1-ND
15	1	GTL2002 TSSOP8 LOW-VOLTAGE-TRANSLATOR	U39	PHILIPS	GTL2002DP
16	1	IS61LV5128AL TSOP44 512KX8-SRAM	U30	ISSI	IS61LV5128AL-10T
17	1	ATF2048 SOIC8 SPI-FLASH-2MB	U29	ATMEL	AT25F512N-10SI-2.7
18	1	LTC1877 MSOP8 600MA ADJ SWITCHING REG	VR2	LINEAR TECH	LTC1877EMS8
19	2	SN74LVC1G08 SOT23-5 SINGLE-2-INPUT-AND-GATE	U16,U18	TI	SN74LVC1G08DBVR
20	1	TLC2932 TSSOP14 HP PHASE LOCK LOOP	U38	TI	TLC2932IPW
21	1	24.576MHZ SMT OSC003	U28	DIGI-KEY	SG-8002CA-PCC-ND
22	1	21369 24LC00 "U3"	U3	MICROCHIP	24LC00-SN
23	1	21369 AM29LV081B "U35"	U35	AMD	AM29LV081B-120EC
24	1	SN65LVDS2D SOIC8 3.3V LVDS RECEIVER	U2	NATIONAL	DS90LV018ATM
25	1	ADM708SAR SOIC8 VOLTAGE-SUPERVISOR	U23	ADI	ADM708SAR

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
26	1	ADP3339AKC-33 SOT-223 3.3V 1.5A REGULATOR	VR5	ADI	ADP3339AKC-3.3-RL
27	2	ADP3336ARM MSOP8 ADJ 500MA REGULATOR	VR3-4	ADI	ADP3336ARM-REEL
28	1	ADM3202ARN SOIC16 RS232-TXRX	U32	ADI	ADM3202ARN
29	8	AD8606AR SOIC8 OPAMP	U8-15	ADI	AD8606AR
30	1	AD1835AAS MQFP52 2IN-8OUT-96KHZ-CODEC	U31	ADI	AD1835AAS
31	2	AD623 USOIC8 Instrumentation-amp	U5-6	ADI	AD623ARM-REEL
32	2	AD820 SOIC8 OP-amp	U33-34	ADI	AD820AR
33	1	ADSP-21369 SBGA256 SHARC	U44	ADI	ADSP-21369KBP-ENG
34	5	RUBBER FEET BLACK	MH1-5	MOUSER	517-SJ-5018BK
35	1	PWR 2.5MM_JACK CON005 RA	J4	SWITCHCRAFT	SC1152-ND12
36	1	USB 4PIN CON009 USB	P5	MILL-MAX	897-30-004-90-000000
37	1	RCA 4X2 CON011 RA	J5	SWITCHCRAFT	PJRS4X2U01

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
38	2	RCA 1X1 CON012 BLK	P8-9	SWTCHCRAFT	PJRX1X1U01
39	5	SPST-MOMENTARY SWT013 6MM	SW8-12	PANASONIC	EVQ-PAD04M
40	3	0.05 45X2 CON019 SMT SOCKET	J1-3	SAMTEC	SFC-145-T2-F-D-A
41	2	DIP8 SWT016	SW1,SW14	C&K	CKN1365-ND
42	1	DIP6 SWT017	SW13	DIG01	CKN1364-ND
43	6	DIP4 SWT018 4PIN-SMT-SWT	SW2-7	DIG01	CKN1363-ND
44	1	DB9 9PIN DB9F RIGHT ANGLE FEMALE	P1	AMPIKEY	745781-4
45	1	RCA RCA_1X2 CON031 RA	P10	SWTCHCRAFT	PJRX1X2S02
46	9	AMBER-SMT LED001 GULL-WING	LED1-8,LED11	PANASONIC	LN1461C-TR
47	10	0.22UF 25V 10% 805 CERM	C77,C91-92,C118-119, C152-154,C185-186	AVX	08053C224FAT
48	4	0.1uF 50V 10% 805 CERM	C172,C210-211,C216	AVX	08055C104KAT
49	1	220PF 50V 10% 1206 NPO	C224	AVX	12061A221JAT2A
50	6	600 100MHZ 200MA 603 0.50 BEAD	FER1-6	MURATA	BLM11A601SPT

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
51	2	2A S2A_RECT DO-214AA SILICON RECTIFIER	D3-4	VISHAY	S2A/52
52	5	1UF 16V 10% 805 X7R	C203-204,C207-209	KEMET	C0805C105K4RACTU
53	1	124K 1/10W 1% 805	R188	DALE	CRCW0805-1243FT
54	3	10uF 25V +80-20% 1210 Y5V	C212,C215,C221	MURATA	GRM235Y.5V106Z025
55	2	68UF 25V 20% CAP003 ELEC	CT1-2	PANASONIC	EEV-FC1E680P
56	1	2A SL22 DO-214AA SCHOTTKY	D1	GENERAL SEMI	SL22
57	1	10UH 47 +/-20 IND001	L1	DIG01	445-1202-2-ND
58	2	270 1/10W 5% 805	R200,R202	PHYCOMP	9C08052A2700JLHFT
59	1	190 100MHZ 5A FER002	FER7	MURATA	DLW5BSN191SQ2
60	21	10UF 6.3V 10% 805	C23-24,C57-58,C84-85, C111-114,C144-147, C151,C162-163,C176, C205-206,C223	AVX	080560106KAT2A
61	3	6.04K 100MW 1% 805	R28-30	DIGI-KEY	311-6.04KCCT-ND
62	7	0.1UF 10V 10% 402	C3,C75-76,C168-171	AVX	0402ZD104KAT2A

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
63	107	0.01UF 16V 10% 402	C4-22,C25-56,C59-74, C78-83,C173-175, C177-178,C183,C188, C190-196,C201-202, C228-245	AVX	0402YC103KAT2A
64	41	10K 1/16W 5% 402	R1-3,R5,R19-23,R25-26, R32-34,R132,R152-156, R161-162,R173-175, R206-208,R210-222	DALE	CRCW0402103JRT7
65	3	4.7K 1/16W 5% 402	R4,R180,R203	PANASONIC	ERJ-2GEJ472X
66	4	0 1/16W 5% 402	R11,R107,R121,R138	PANASONIC	ERJ-2GE0R00X
67	4	22 1/16W 5% 402	R124,R133,R197,R209	PANASONIC	ERJ-2GEJ220X
68	3	33 1/16W 5% 402	R6,R27,R204	PANASONIC	ERJ-2GEJ330X
69	1	1.5UH 45MOHM 20% IND003 2.8A	L2	TYCO	DS6630-1R5M
70	1	100MA CMDSH-3 SOD-323 SUPERMINI SCHOTTKY	D2	CENTRAL SEMI	CMDSH-3
71	1	47uF 16V 10% D TANT-LOW-ESR	C222	AVX	TPSD476K016R0080
72	1	0.18uF 25V 10% 805 CERM	C218	AVX	08053C184KAT2A
73	1	100UF 10V 10% C TANT-LOW-ESR	CT3	AVX	TPSC107K010R0075
74	2	1000PF 50V 5% 402 CERM	C213-214	AVX	04025C102JAT2A

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
75	2	64.9K 1/10W 1% 805	R190,R194	VISHAY	CRCW08056492FRT1
76	2	210K 1/4W 1% 805	R191,R193	VISHAY	CRCW08052103FRT1
77	1	1.5K 1/10W 5% 603	R199	DIGI-KEY	P1.5KCFCT-ND
78	1	107 1/10W 1% 805	R128	YAGEO	9C08052A1070FKHFT
79	1	249 1/10W 1% 805	R127	YAGEO	9C08052A2490FKHFT
80	2	0.1UF 16V 10% 603	C187,C189	AVX	0603YC104KAT2A
81	1	1UF 16V 10% 0603	C179	PANASONIC	ECJ-1VB1C105K
82	2	4.7UF 25V 20% 0805	C217,C220	PANASONIC	ECJ-2FB1E475M
83	8	330PF 50V 5% 0603	C95,C101,C107,C116, C123,C129,C134,C142	AVX	06035A331JAT2A
84	10	330 1/10W 5% 0603	R163-164,R168-172, R176-178	VISHAY	CRCW0603331JRT1
85	1	1M 1/10W 5% 0603	R201	VISHAY	CRCW0603105JRT1
86	8	0 1/10W 5% 0603	R31,R126,R181, R184-186,R192,R223	PHYCOMP	9C06031A0R00JLHFT
87	4	10 1/10W 5% 0603	R157-160	DALE	CRCW0603100JRT1
88	3	10K 1/16W 1% 0603	R125,R142,R148	PHYCOMP	9C06031A1002FKHFT
89	1	75K 1/16W 1% 0603	R131	DALE	CRCW06037502FRT1
90	2	200K 1/16W 1% 0603	R134,R189	VISHAY	CRCW06032003FRT1
91	1	25.5K 1/16W 1% 0603	R150	YAGEO	9C06031A2552FKHFT

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
92	1	1K 1/10W 5% 0603	R198	YAGEO	9C06031A1001JLHFT
93	4	237 1/10W 1% 0603	R108-109,R122-123	DIGI-KEY	311-237HTR-ND
94	2	750K 1/10W 1% 0603	R110,R116	DIGI-KEY	311-750KHTR-ND
95	11	11K 1/10W 1% 0603	R39-40,R50,R58,R73, R81,R86,R97,R102, R115,R144	DIGI-KEY	311-11.0KHTR-ND
96	20	5.49K 1/10W 1% 0603	R37,R41-42,R48,R51, R56,R59,R67,R72,R75, R80,R83-84,R87,R96, R99,R103-104,R113-114	DIGI-KEY	311-5.49KHTR-ND
97	9	3.32K 1/10W 1% 0603	R36,R43,R49,R57,R74, R82,R85,R94,R130	DIGI-KEY	311-3.32KHTR-ND
98	8	1.65K 1/10W 1% 0603	R44,R52,R60,R64,R71, R79,R88,R95	DIGI-KEY	311-1.65KHTR-ND
99	10	49.9K 1/10W 1% 0603	R46,R55,R63,R66,R68, R76,R91-92,R119-120	DIGI-KEY	311-49.9KHTR-ND
100	8	604 1/10W 1% 0603	R45,R54,R62,R65,R69, R77,R90,R93	DIGI-KEY	311-604HTR-ND
101	2	90.9K 1/10W 1% 0603	R146,R151	DIGI-KEY	311-90KHTR-ND
102	2	0.1 1/10W 1% 0603	R143,R149	YAGEO	ERJ-3RSFR10V
103	3	10K 1/10W 1% 0603	R145,R147,R182	DIGI-KEY	311-10.0KHTR-ND
104	4	5.76K 1/10W 1% 0603	R111-112,R117-118	DIGI-KEY	311-5.76KHTR-ND

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
105	12	100PF 50V 5% 0603	C94,C99,C105,C117, C125,C131-132,C140, C155,C161,C166-167	PANASONIC	ECJ-1VC1H101J
106	5	0.001UF 50V 5% 0603	C2,C156-157,C164-165	PANASONIC	ECJ-1VC1H102J
107	3	33PF 50V 5% 0603	C225-227	PANASONIC	ECJ-1VC1H300J
108	2	2.21K 1/10W 1% 0603	R195-196	DIGI-KEY	311-2.21KHTR-ND
109	1	47.5K 1/10W 1% 0603	R183	DIGI-KEY	11-47.5KHTR-ND
110	8	220PF 50V 5% 0603	C89,C97,C103,C109, C121,C127,C136,C139	PANASONIC	ECJ-1VC1H221J
111	12	680pF 50V 5% 0603	C96,C102,C108,C115, C122,C128,C135, C141,C148-149,C158,C 160	PANASONIC	ECJ-1VC1H681J
112	9	2200PF 50V 5% 0603	C88,C98,C104,C110, C120,C126,C137-138, C219	PANASONIC	ECJ-1VB1H222K
113	8	2.74K 1/10W 1% 0603	R38,R47,R53,R61,R70, R78,R89,R98	DIGI-KEY	311-2.74KHTR-ND
114	1	75.0 1/10W 1% 0603	R141	DIGI-KEY	9T06031A75R0FBHF T
115	4	1.0UF 6.3V 20% 402	C197-200	PANASONIC	ECJ-0EB0J105M
116	4	100 1/16W 5% 402	R165-167,R179	DIGI-KEY	311-100JTR-ND
117	1	0.027uF 25V 5% 0603	C181	AVX	06033C273JAT2A

Ref.	#	Description	Reference Designator	Manufacturer	Part Number
118	2	0.27UF 16V +80/-20% 0603	C180,C182	AVX	0603YG274ZAT2A
119	2	2.05K 1/16W 1% 402	R100-101	YAGEO	9C04021A2051FLHF3
120	1	15K 1/16W 1% 0603	R140	YAGEO	9C06031A1502FKHFT
121	1	232 1/16W 1% 0603	R129	YAGEO	9C06031A2320FKHFT
122	2	301 1/16W 1% 0603	R105-106	YAGEO	9C06031A3010FKHFT
123	1	511 1/16W 1% 402	R135	DIGI-KEY	311-511LCT-ND
124	2	RED-SMT LED001 GULL-WING	LED10,LED12	PANASONIC	LN1261C
125	1	GREEN-SMT LED001 GULL-WING	LED9	PANASONIC	LN1361C
126	4	ADG774A QSOP16 QUICKSWITCH-257	U24-27	ADI	ADG774ABRQ
127	4	IDC 2X1 IDC2X1 2X1 TIN	JP1-4	BERG	54101-T08-02
128	1	IDC 2X2 IDC2X2 0.1x0.1	P11	BERG	54102-T08-02
129	1	IDC 7X2 IDC7X2 HEADER	P2	BERG	54102-T08-07
130	1	IDC 10X2 IDC10X2	P3	BERG	54102-T08-10
131	1	IDC 13X2 IDC13X2	P4	BERG	54102-T08-13
132	1	2.5A RESETTABLE FUS001	F1	RAYCHEM	SMD250-2
133	1	3.5MM STEREO JACKCON001	P7	SHOGYO	SJ-0359AM-5

A

B

C

D

1

1

2

2

3

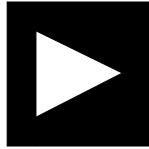
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4

4

ADSP-21369 EZ-KIT Lite Schematic

DNP = Do Not Populate

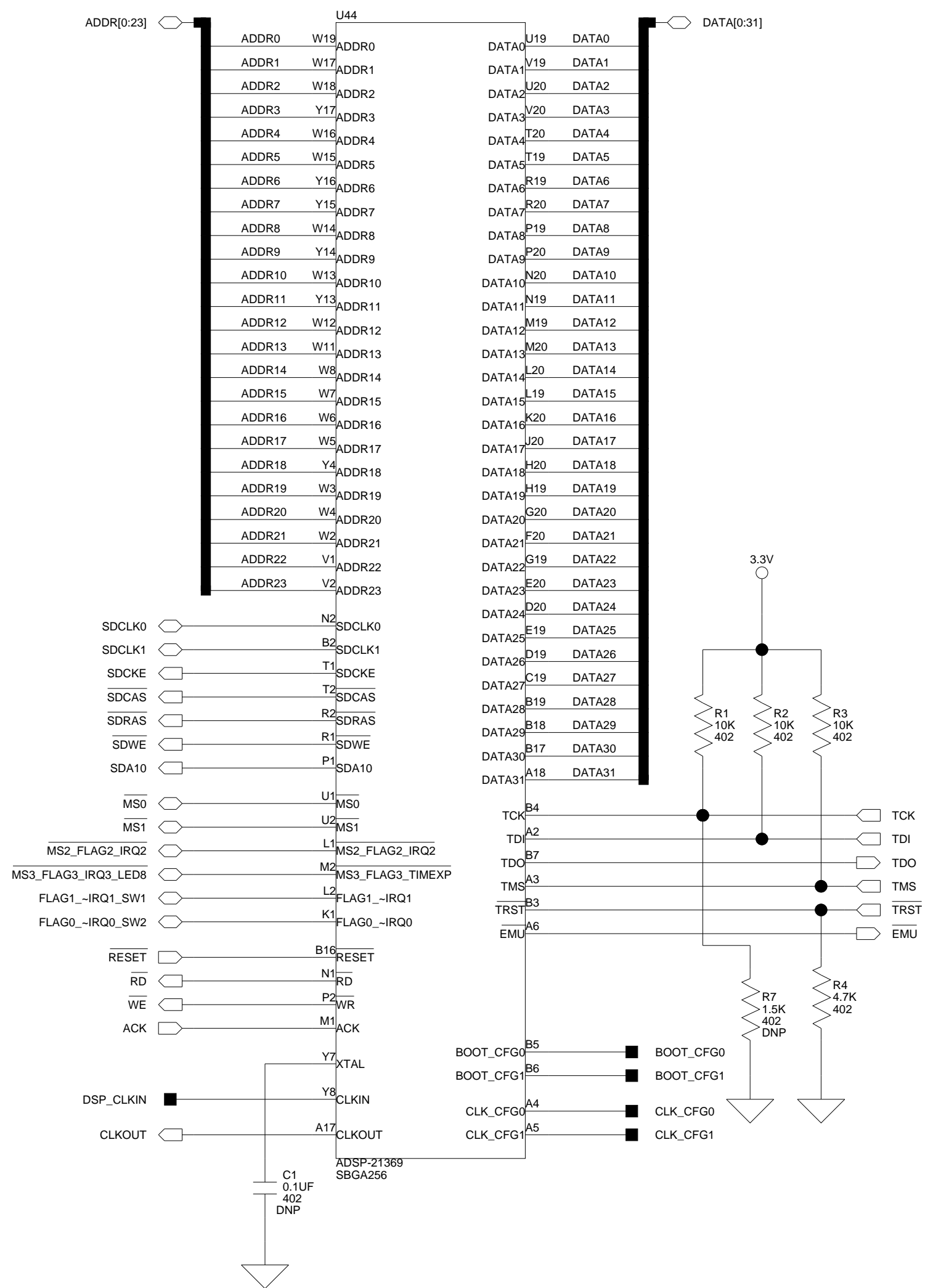
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Title		ADSP-21369 EZ-KIT Lite TITLE	
Size C	Board No.	A0196-2005	Rev 1.1
Date	8-2-2005_13:45	Sheet	1 of 13

A

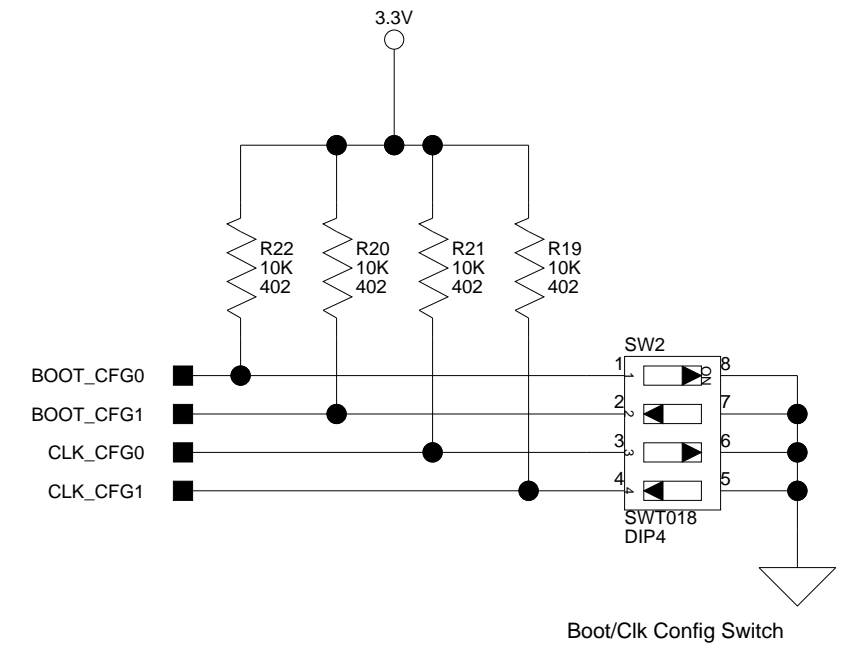
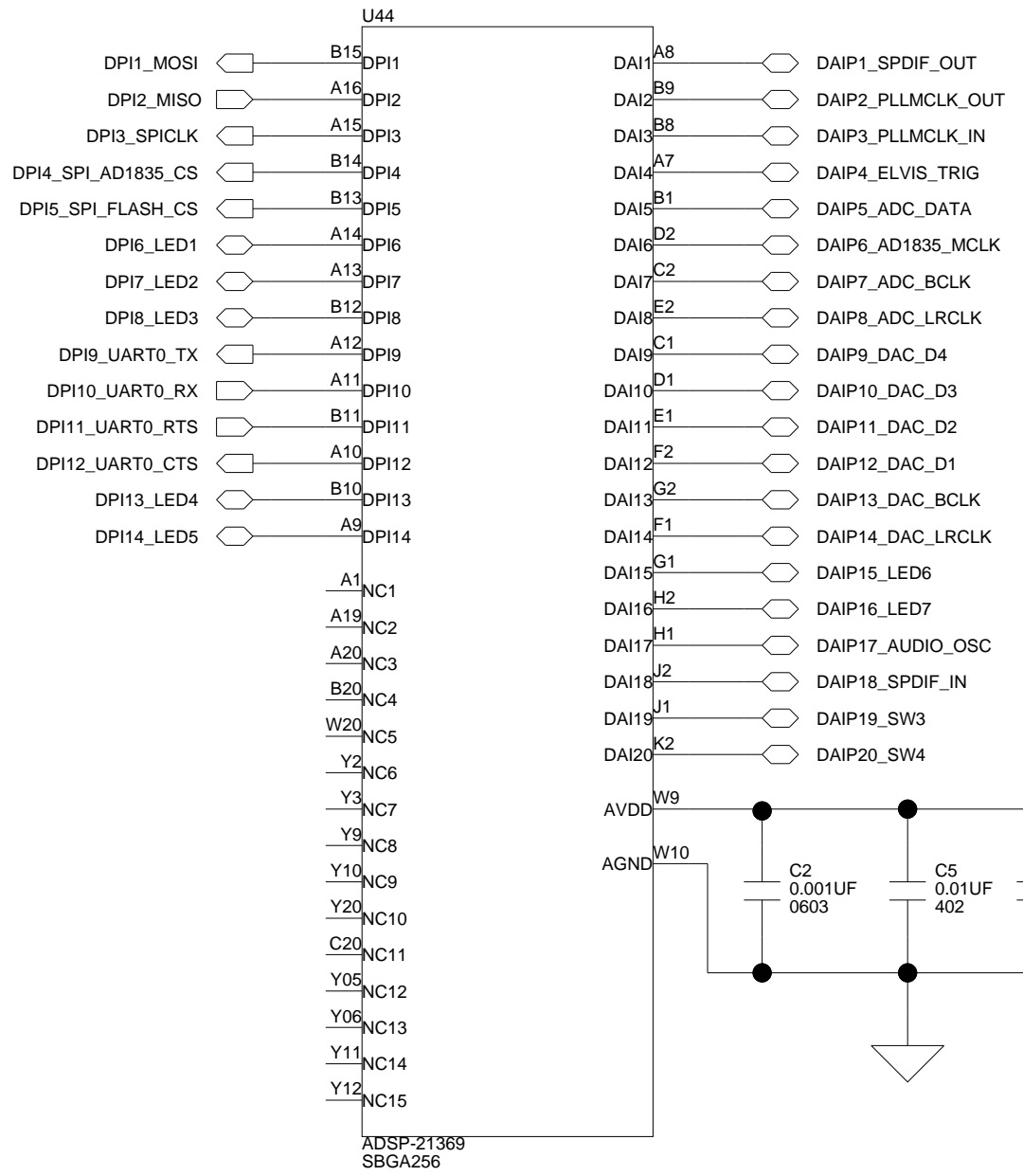
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C

D



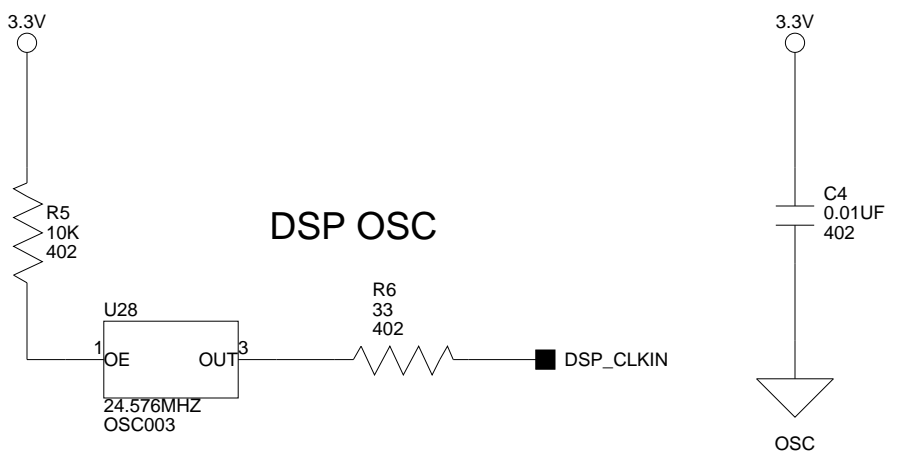
When designing your JTAG interface please refer to the Engineer to Engineer Note EE-68 which can be found at <http://www.analog.com>



SW2: BOOT/CLOCK RATIO SELECT
(Default: 1=ON, 2=OFF, 3=ON, 4=OFF)

1	2	BOOTMODE	
BOOTCFG0 ON	BOOTCFG1 ON	SPI SLAVE BOOT	DEFAULT
BOOTCFG0 ON	BOOTCFG1 OFF	EPROM/FLASH BOOT	
BOOTCFG0 OFF	BOOTCFG1 ON	SPI MASTER BOOT	
BOOTCFG0 OFF	BOOTCFG1 OFF	RESERVED	
3	4	CLOCK RATIO	
CLKCFG0 ON	CLKCFG1 ON	CORE:CLKIN	DEFAULT
CLKCFG0 ON	CLKCFG1 OFF	6:1	
CLKCFG0 OFF	CLKCFG1 ON	16:1	
CLKCFG0 OFF	CLKCFG1 OFF	32:1	
		RESERVED	

NOTE: EZ-KITs with Engineering Grade 21369 silicon may be set to a CLK RATIO of 6:1.

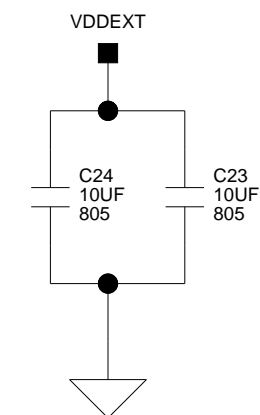
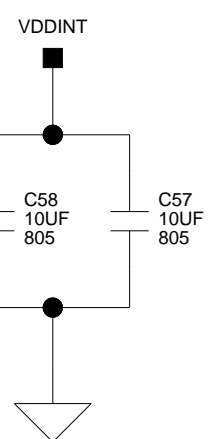
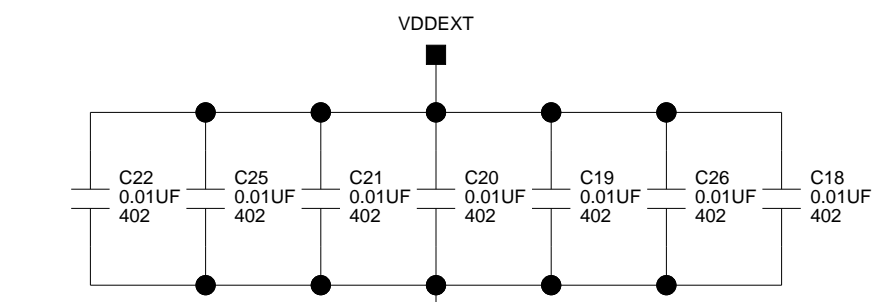
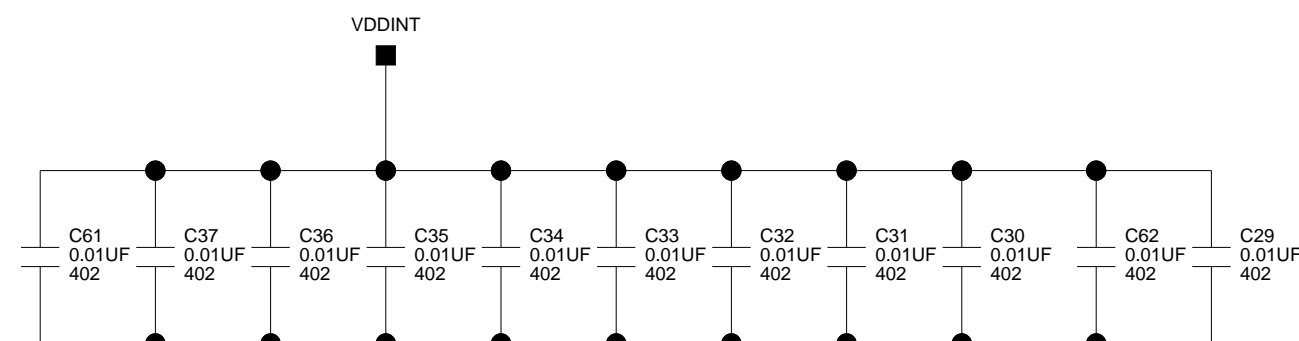
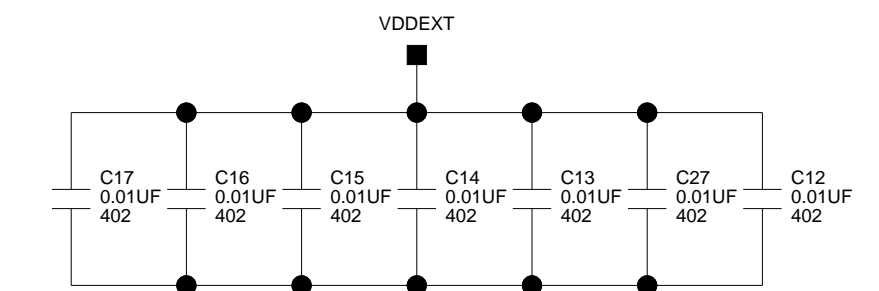
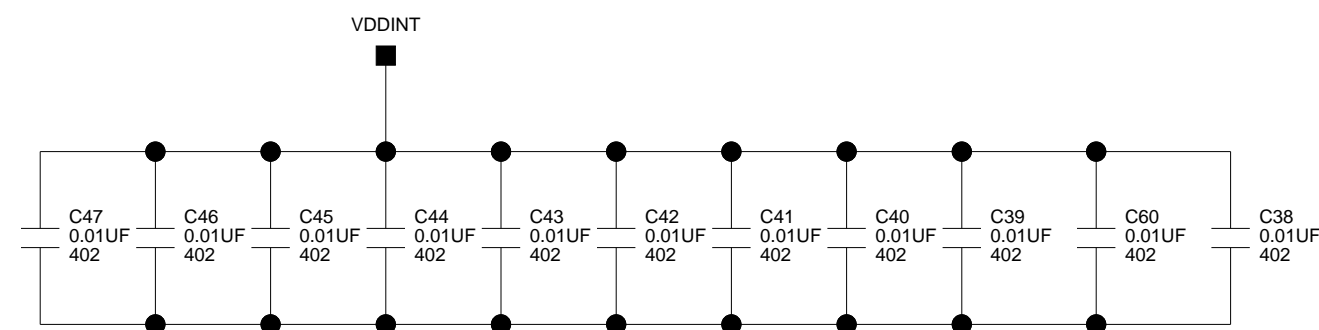
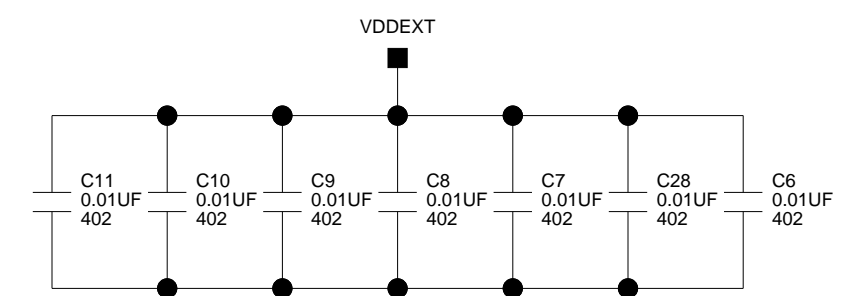
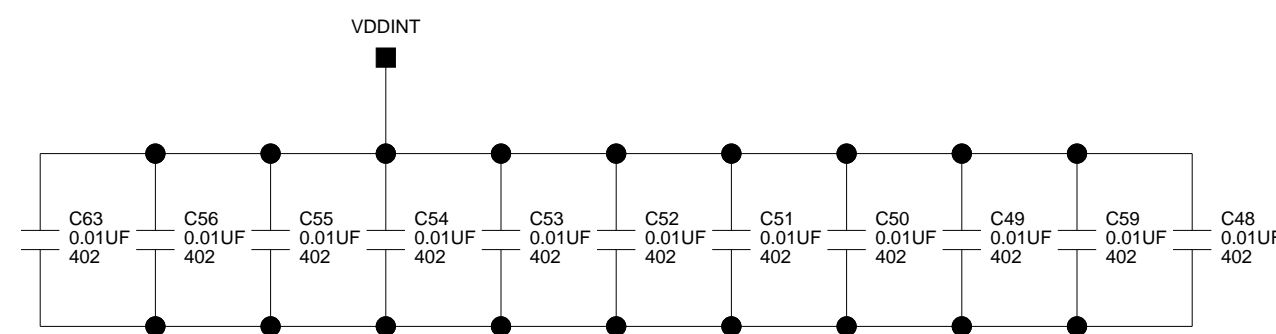
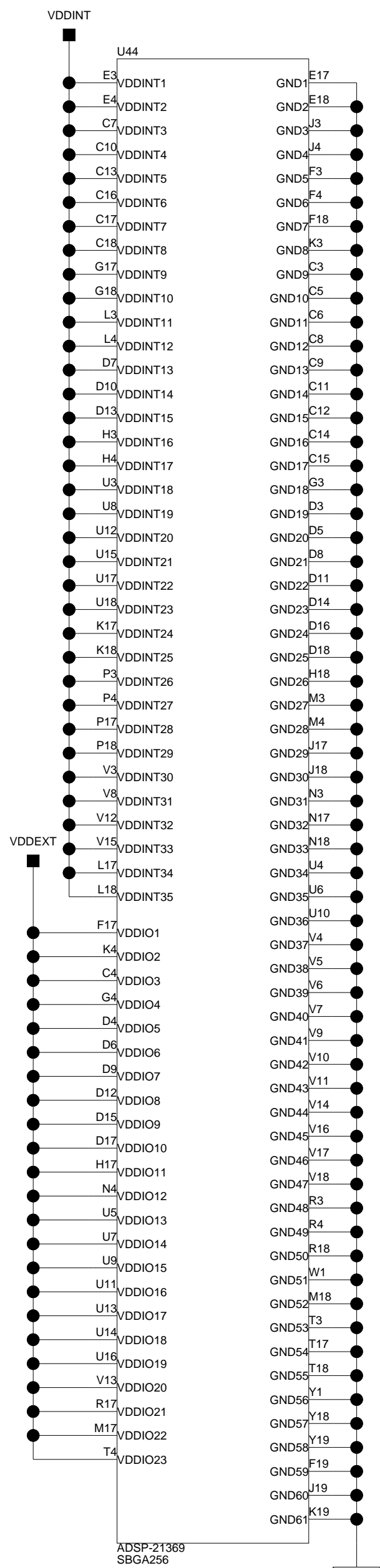


DNP = Do Not Populate

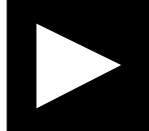
ANALOG DEVICES

20 Cotton Road
Nashua, NH 03063
PH: 1-800-ANALOGD

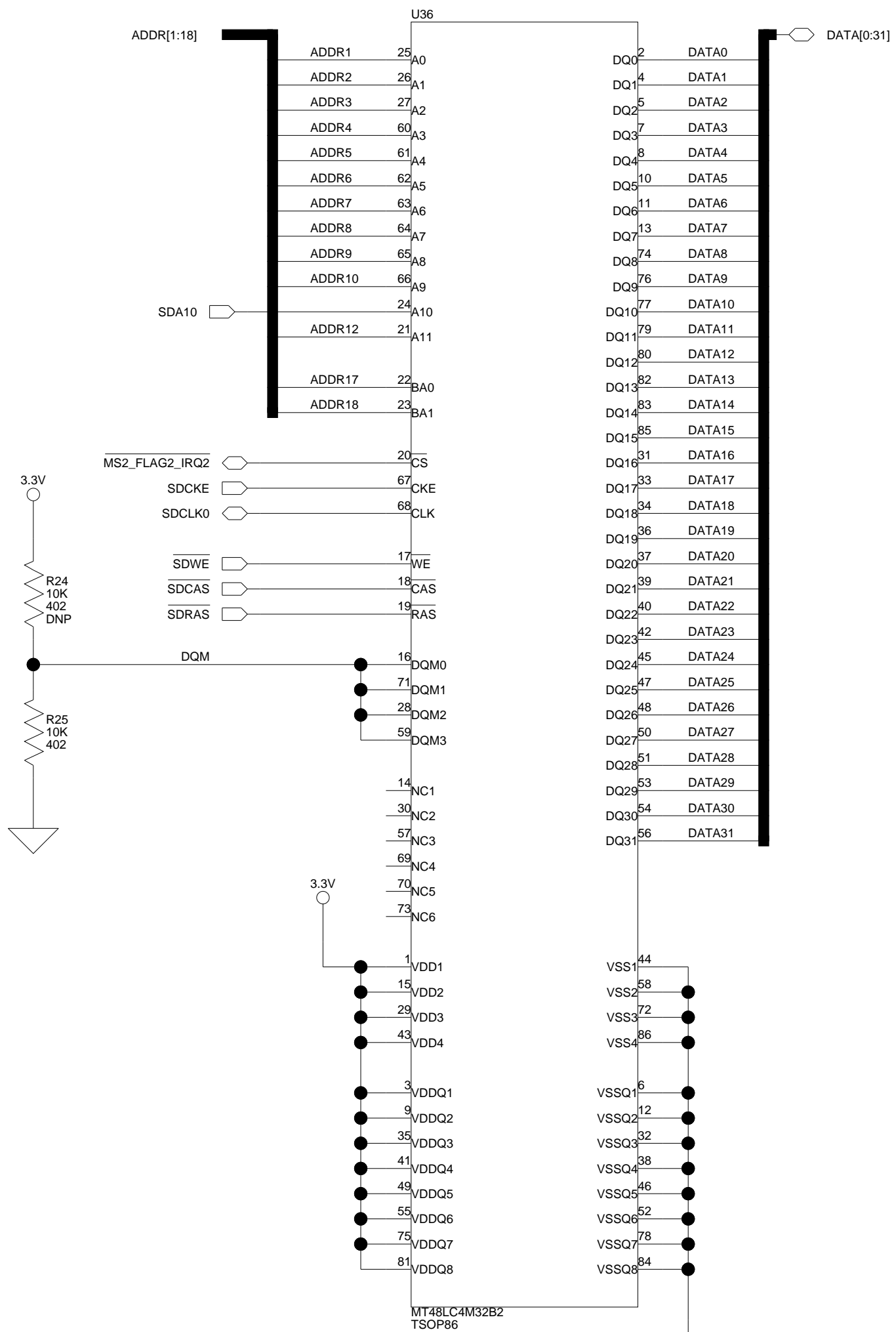
Title ADSP-21369 EZ-KIT Lite DSP		
Size C	Board No. A0196-2005	Rev 1.1
Date 8-19-2005_14:37	Sheet 2 of 13	



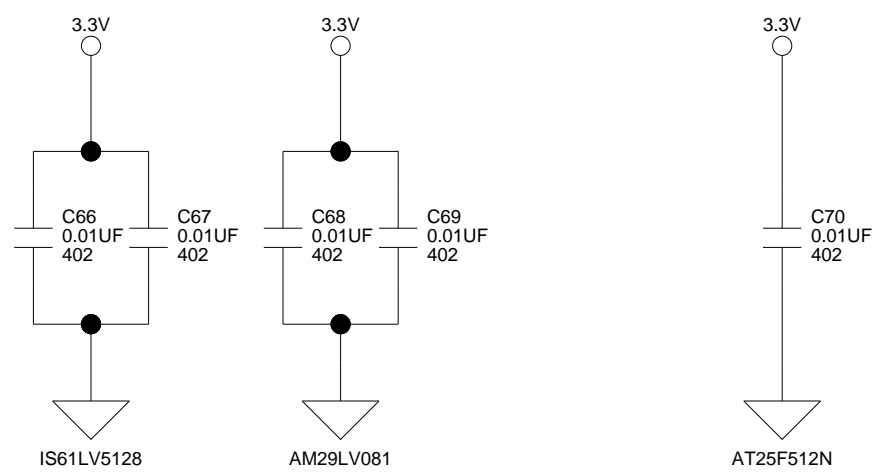
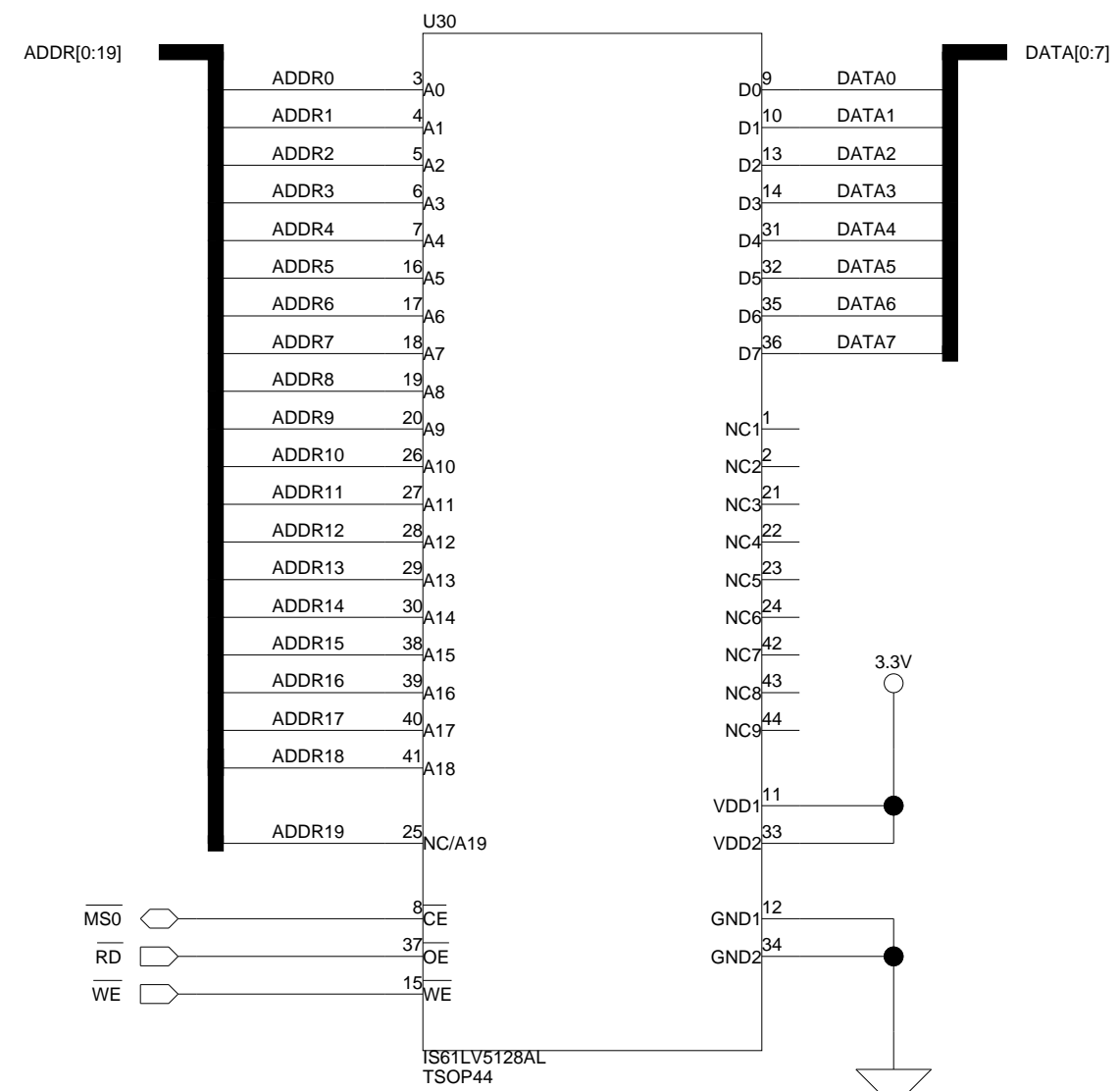
DNP = Do Not Populate

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite DSP 2	
Size C	Board No. A0196-2005	Rev 1.1	
Date 8-2-2005_13:45	Sheet 3 of 13		

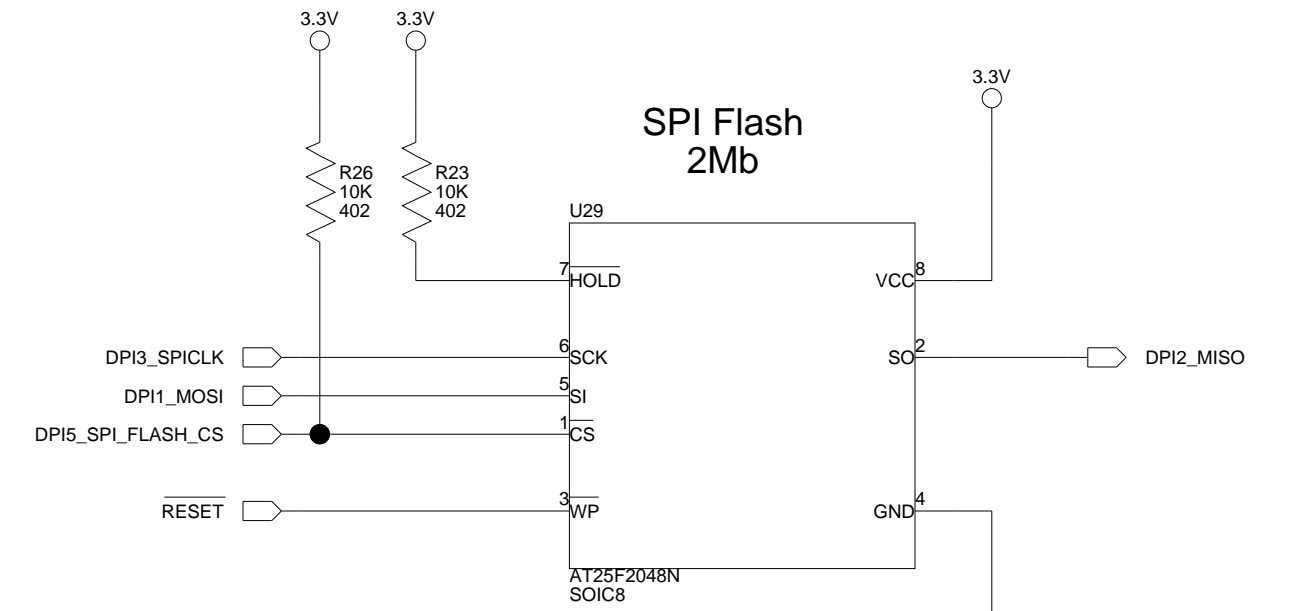
SDRAM
128Mb (1M x 32-bit x 4 Banks)



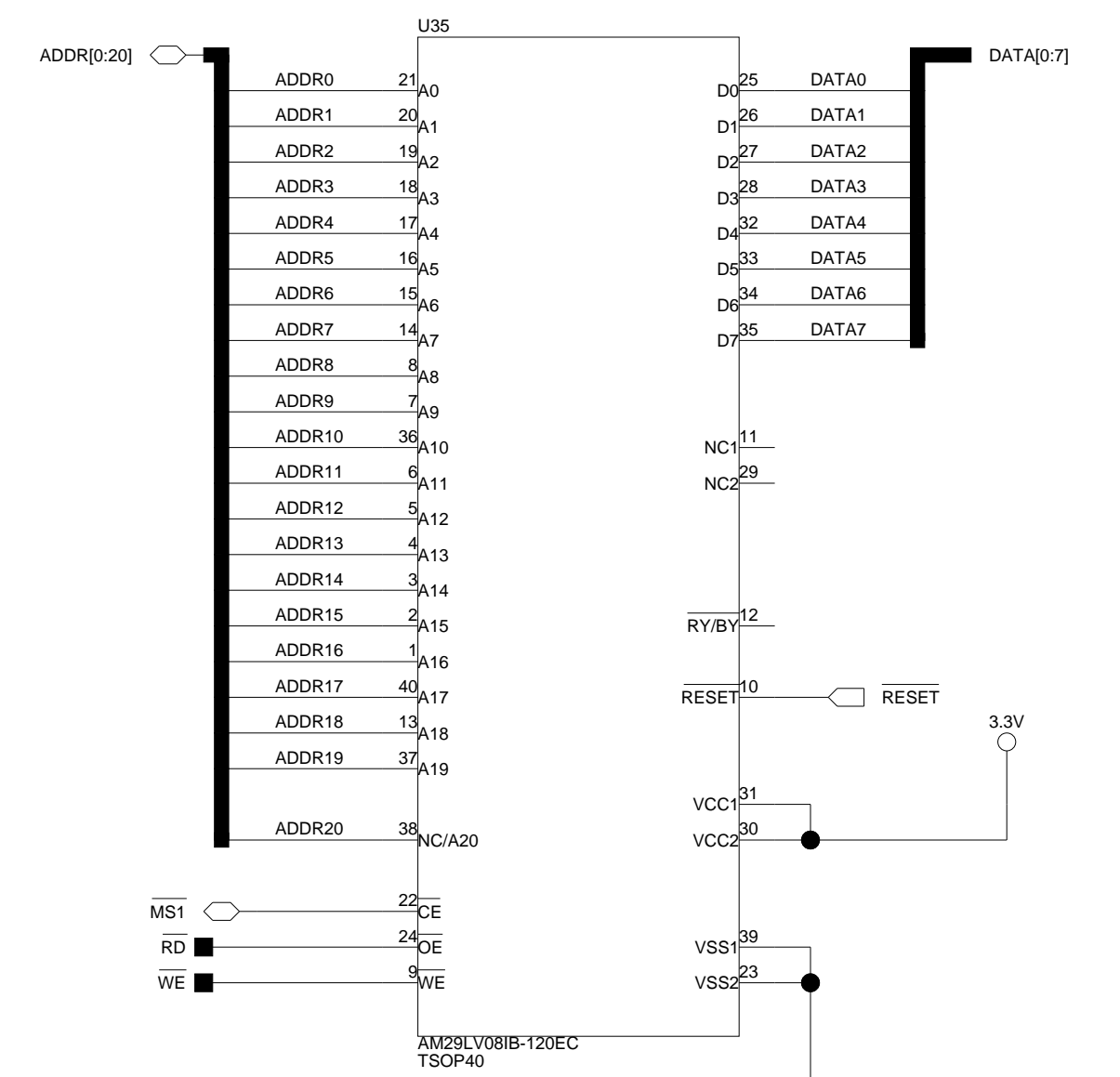
Asynchronous SRAM
4Mb (512K x 8-bit)



SPI Flash
2Mb

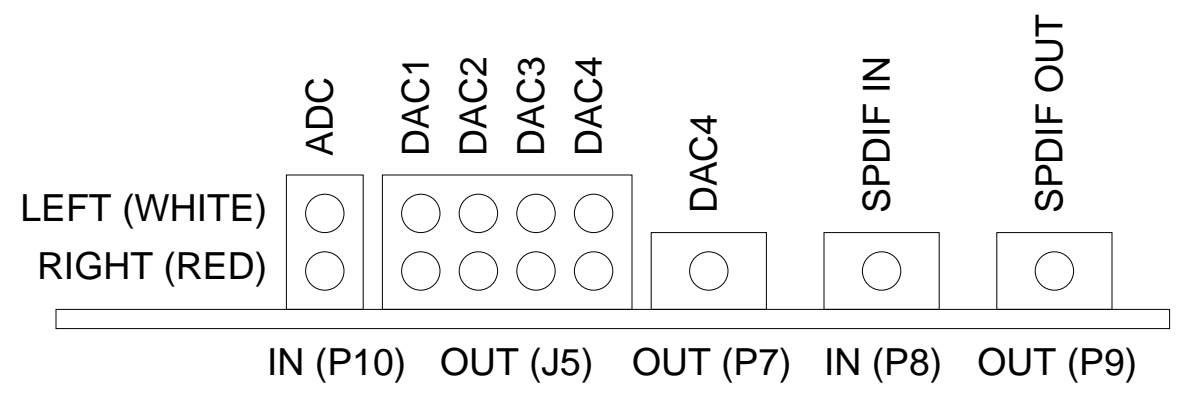


Flash
8Mb (1M x 8-bit)

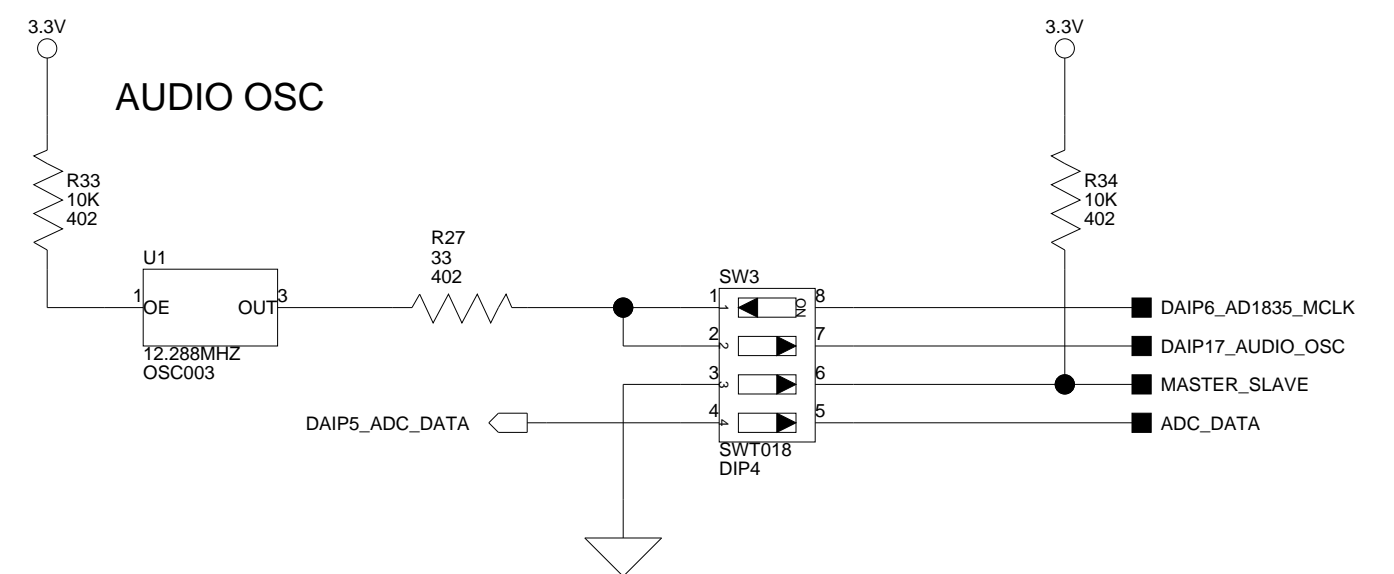
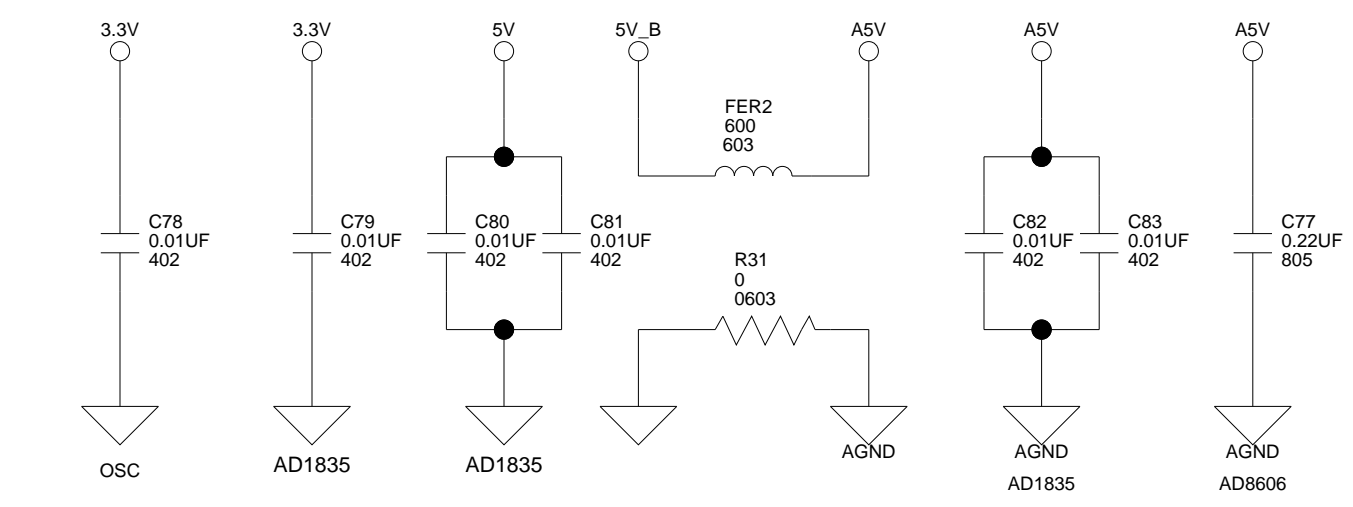
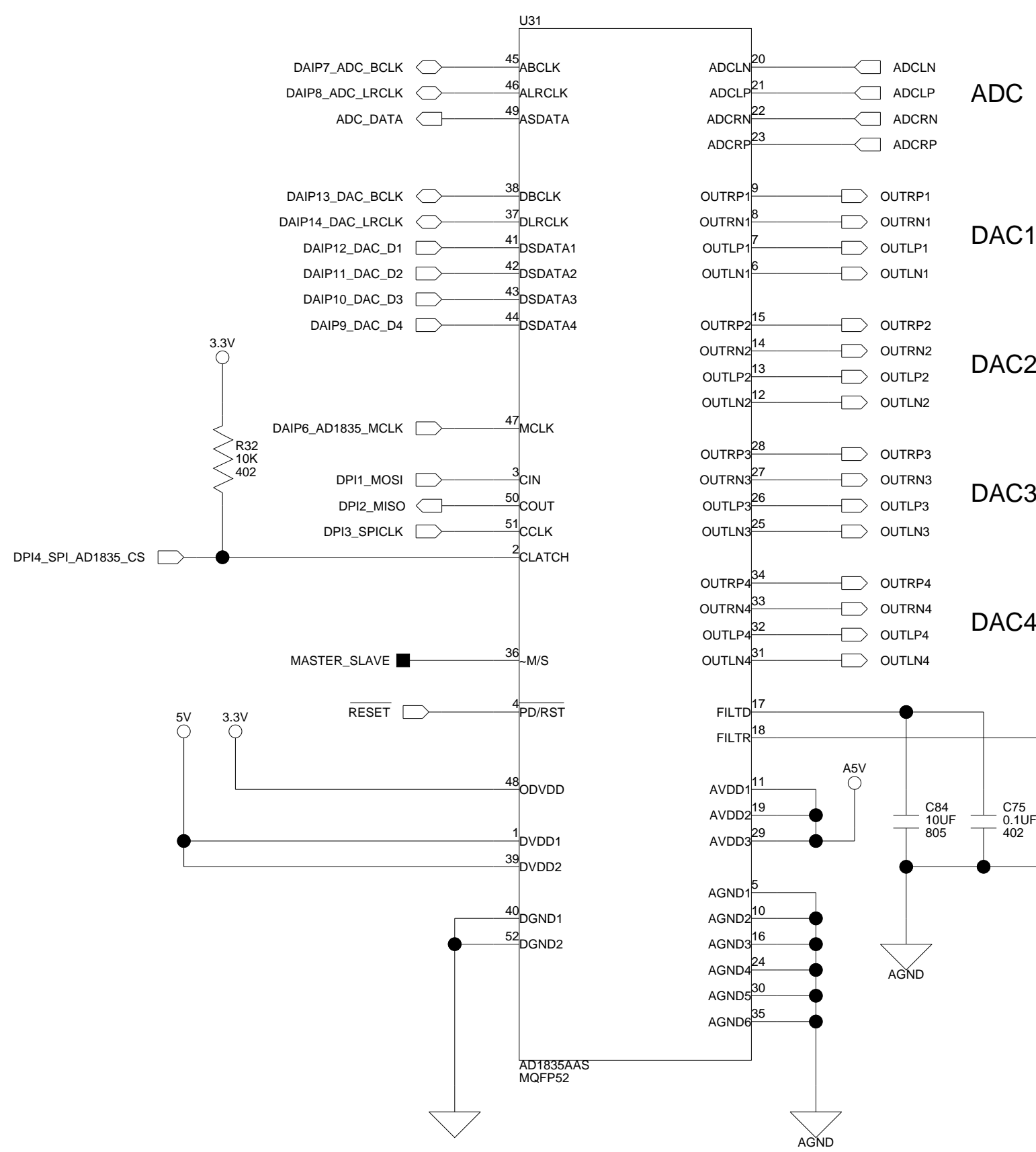


DNP = Do Not Populate

		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite MEMORY	
Size C	Board No. A0196-2005	Rev 1.1	
Date 8-19-2005_14:34	Sheet 4 of 13		

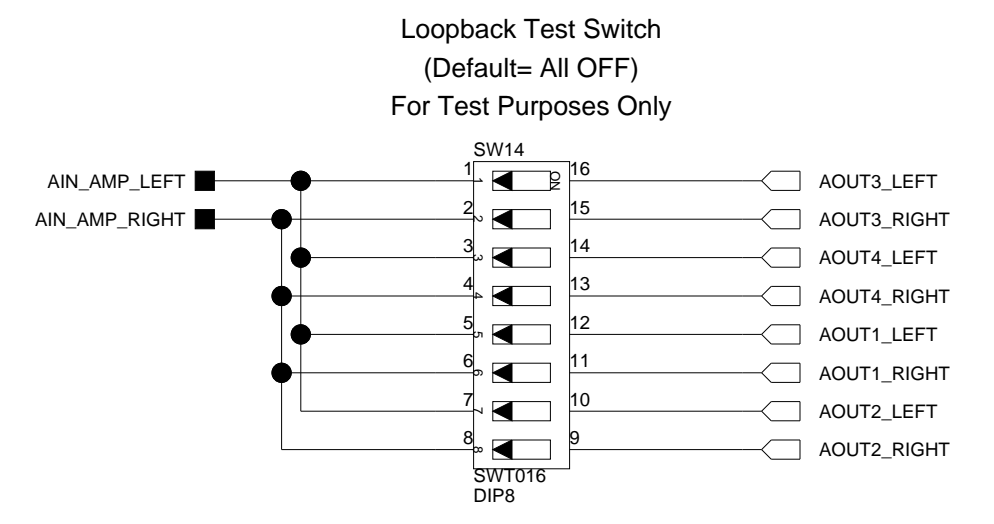
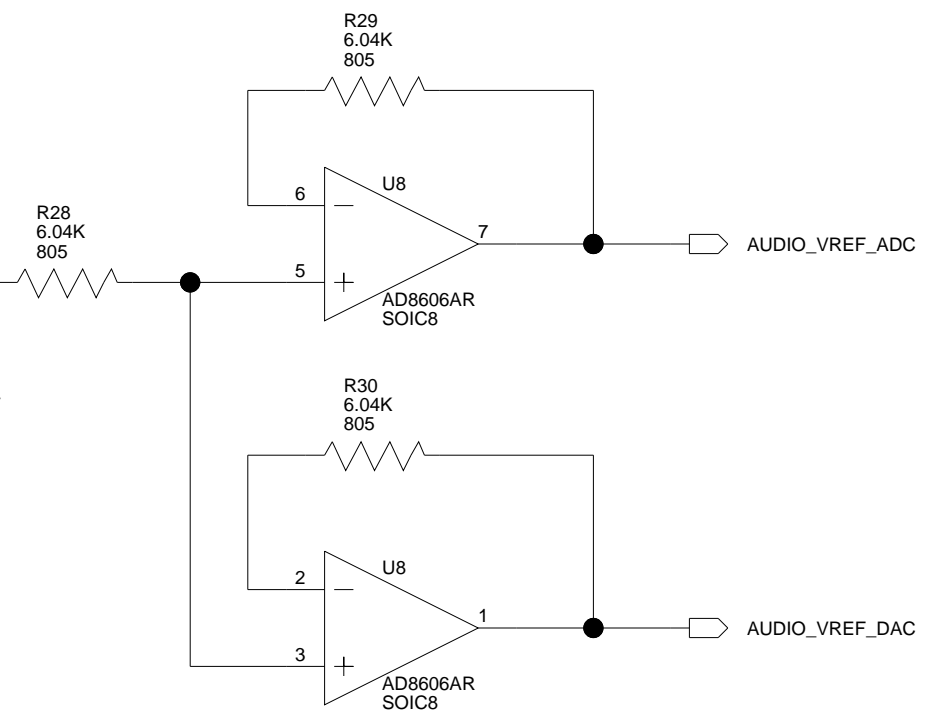


AD1835 AUDIO CODEC



SW3: CODEC SETUP SWITCH
(Default: 1=OFF, 2=ON, 3=ON, 4=ON)

1-2	Connects or disconnects the audio oscillator depending on how the system is setup. See users manual for more information.
3	OFF = AD1835 is SLAVE ON = AD1835 is MASTER
4	Disconnects ADC_DATA signal from driving the corresponding DAI signal. Useful if using this DAI pin for another purpose.

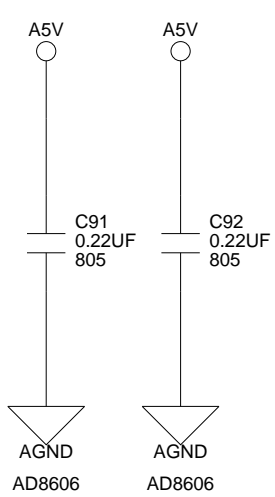
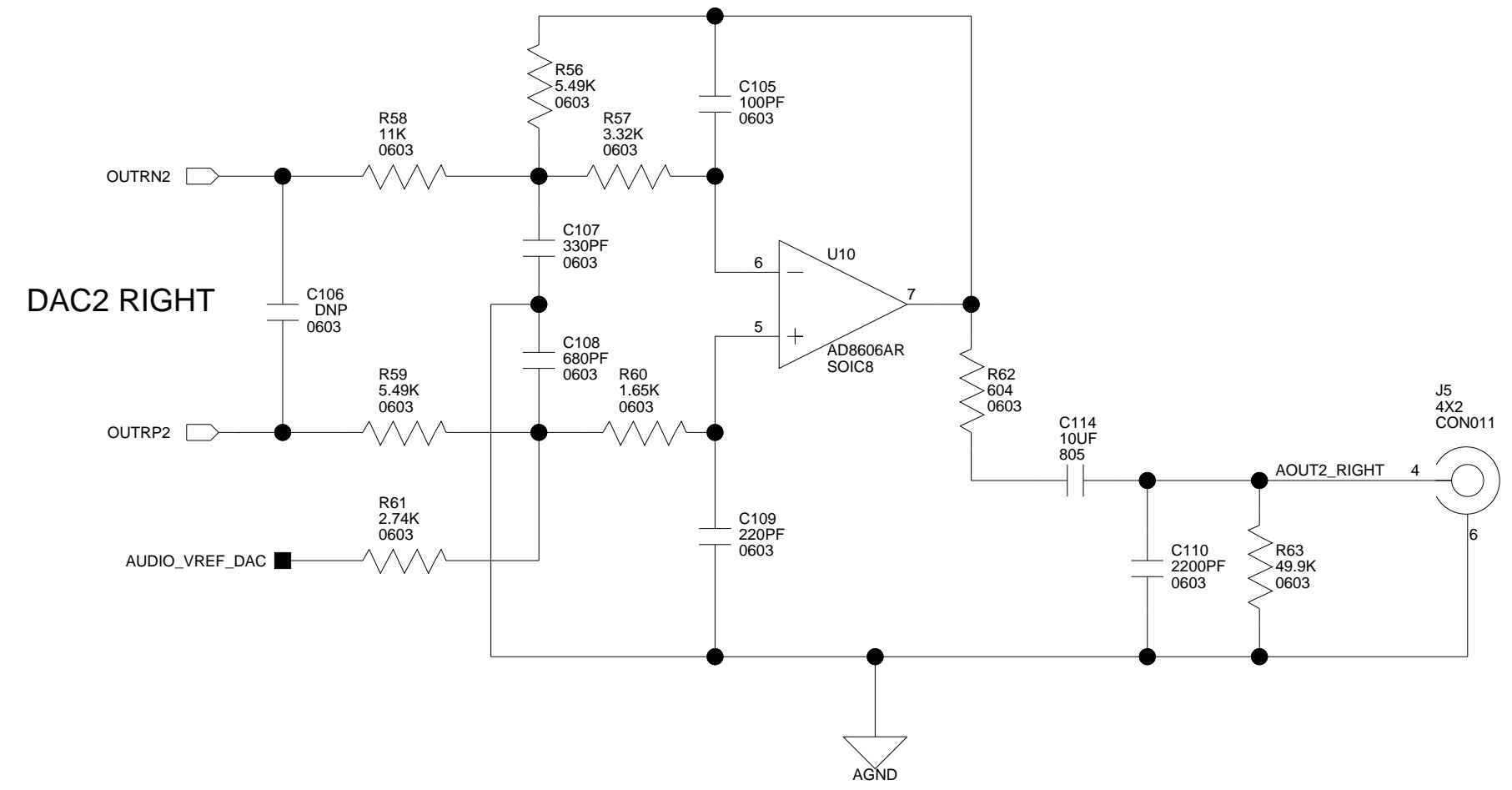
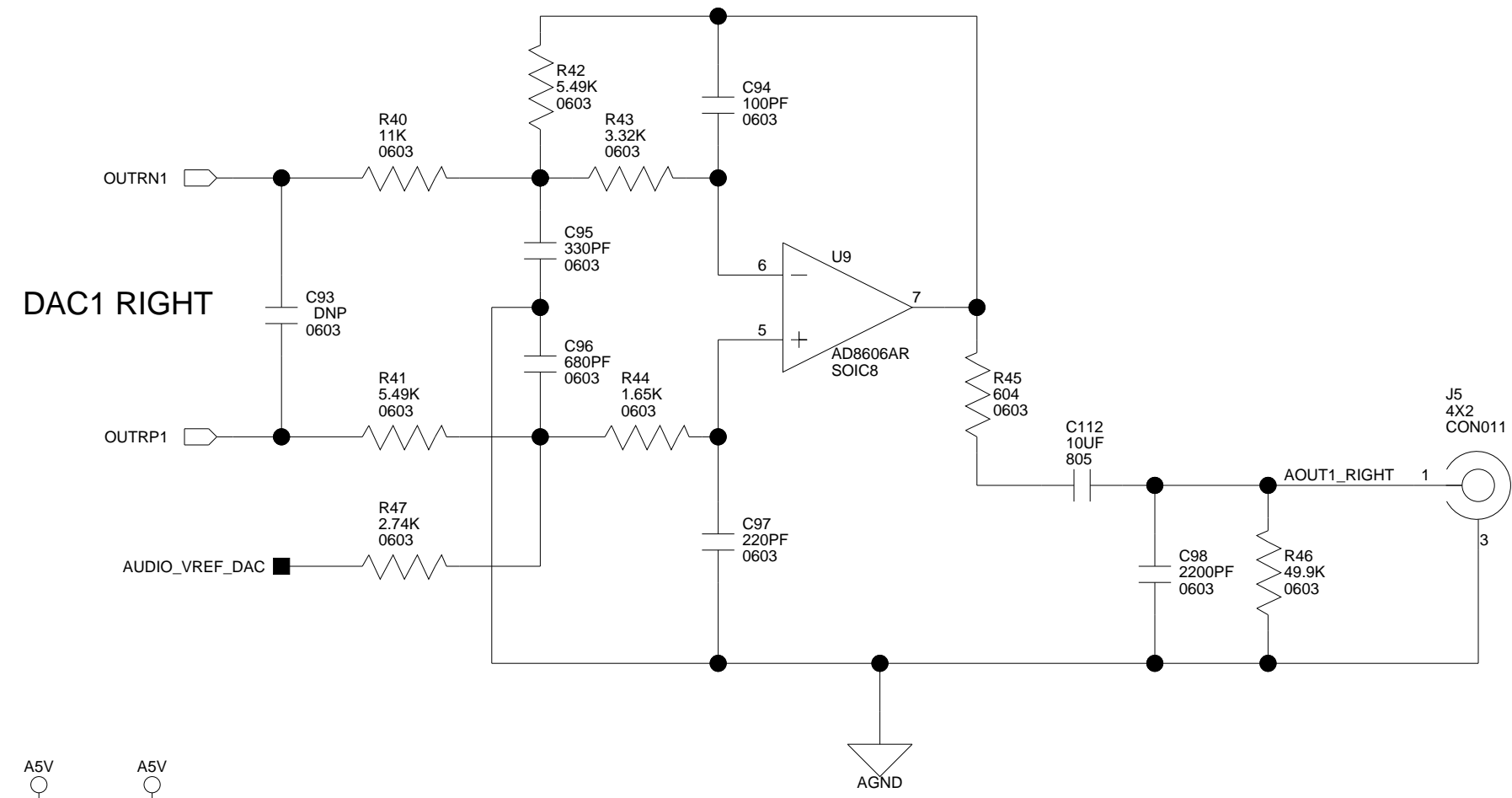
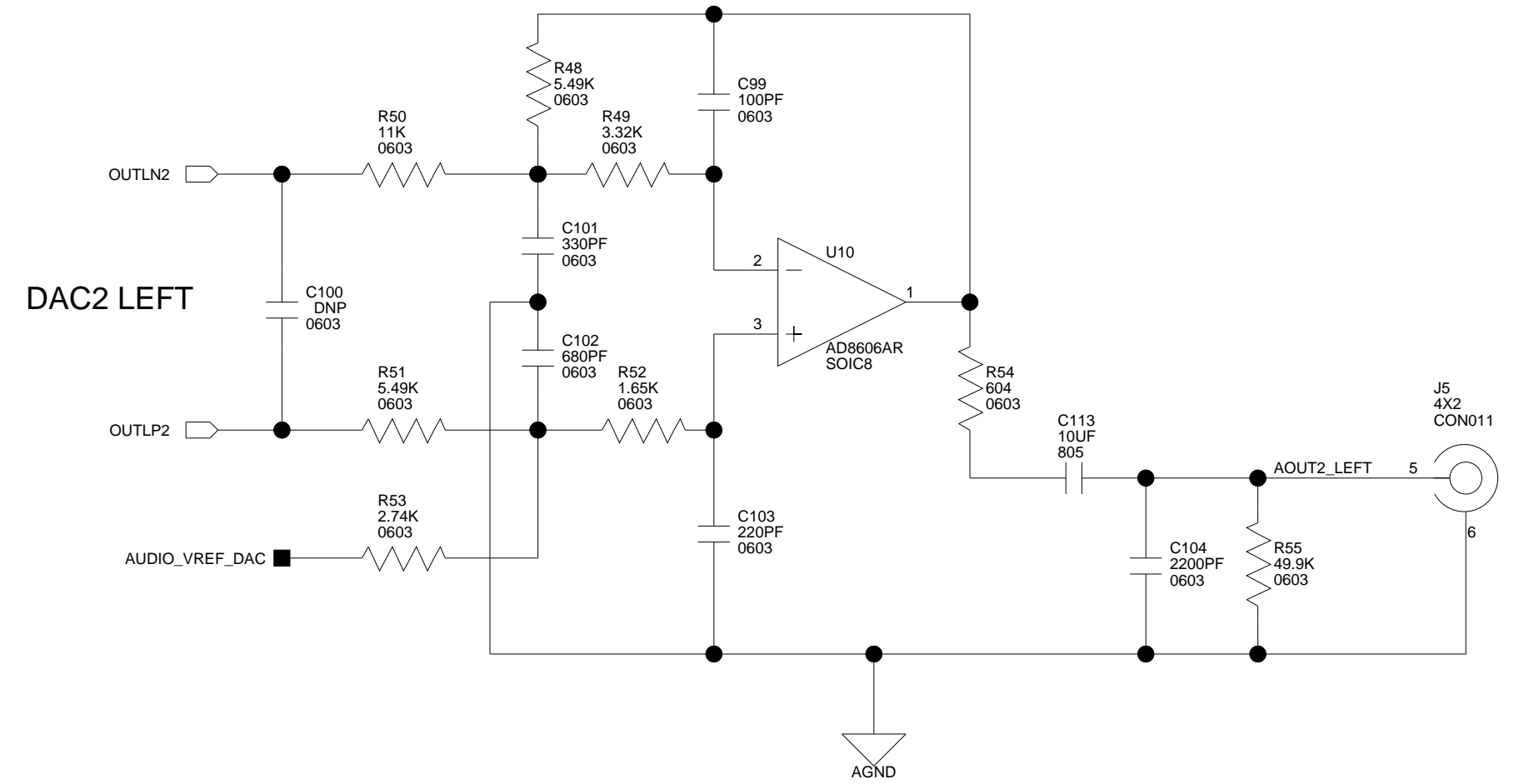
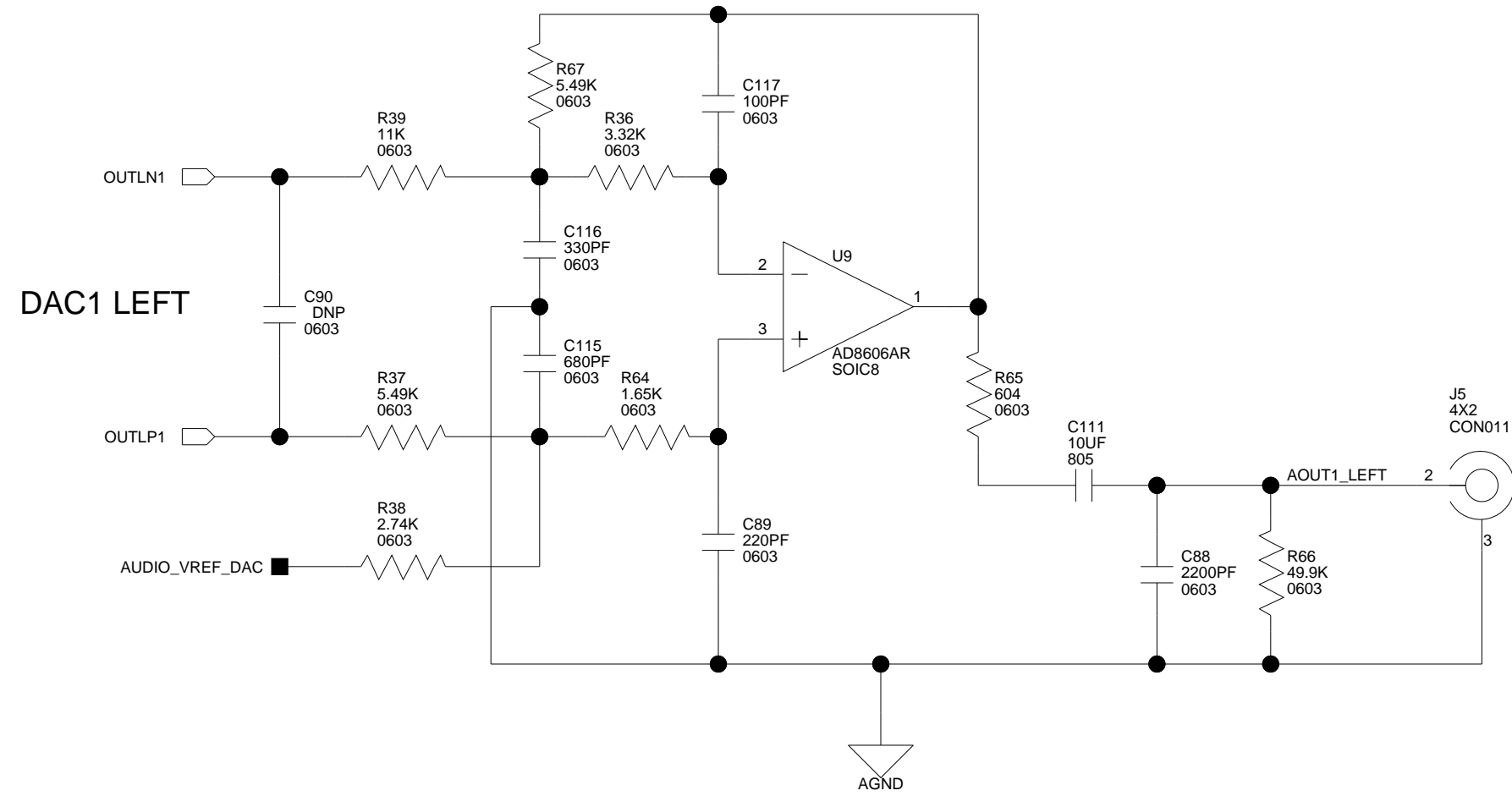


DNP = Do Not Populate

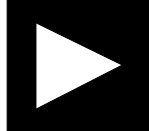
ANALOG DEVICES

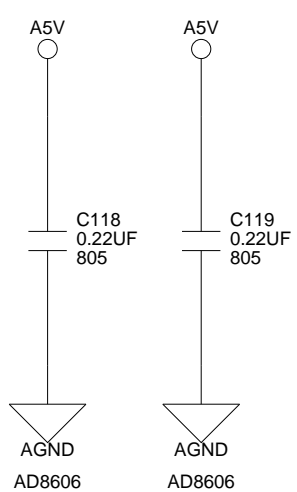
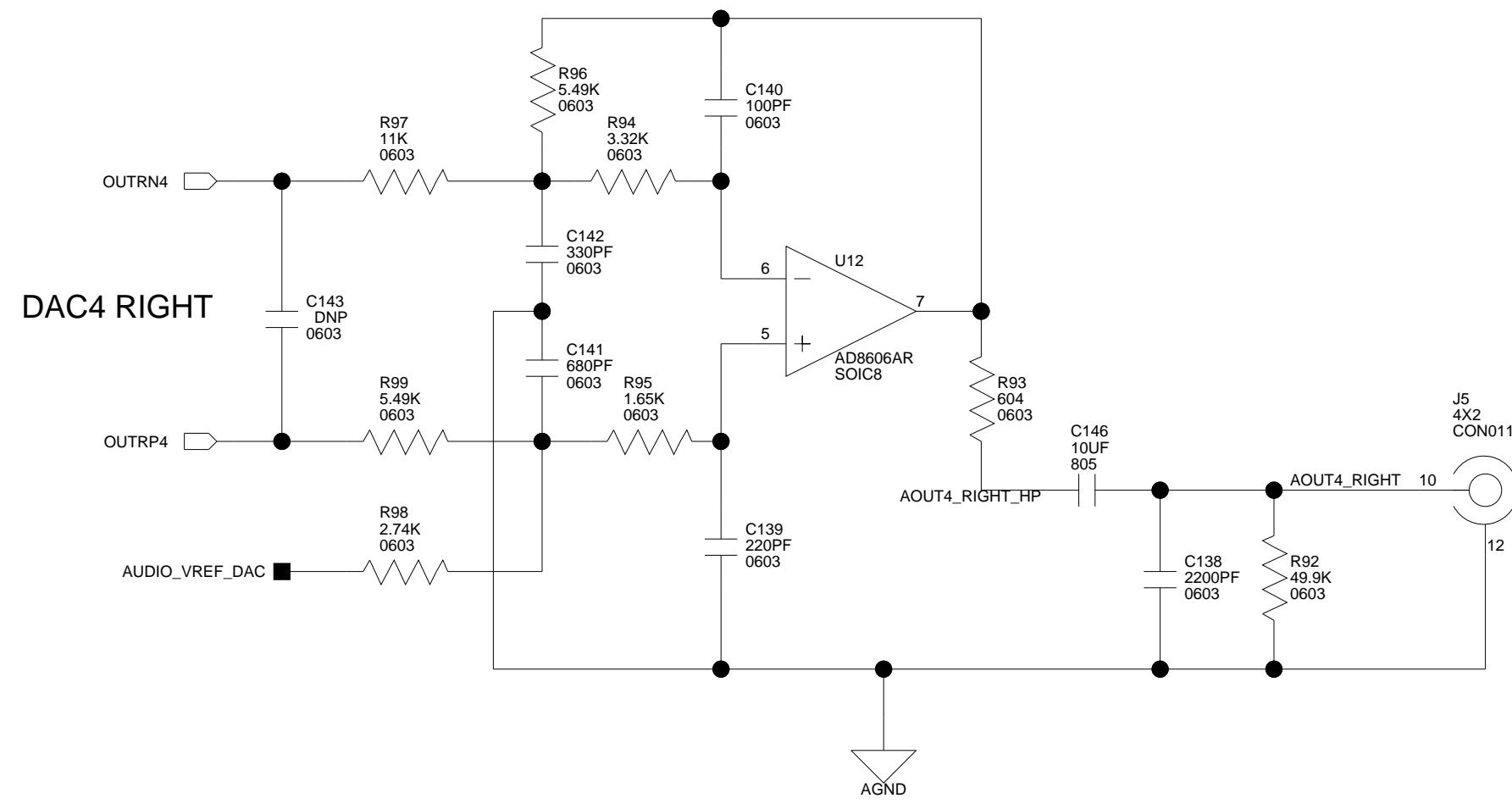
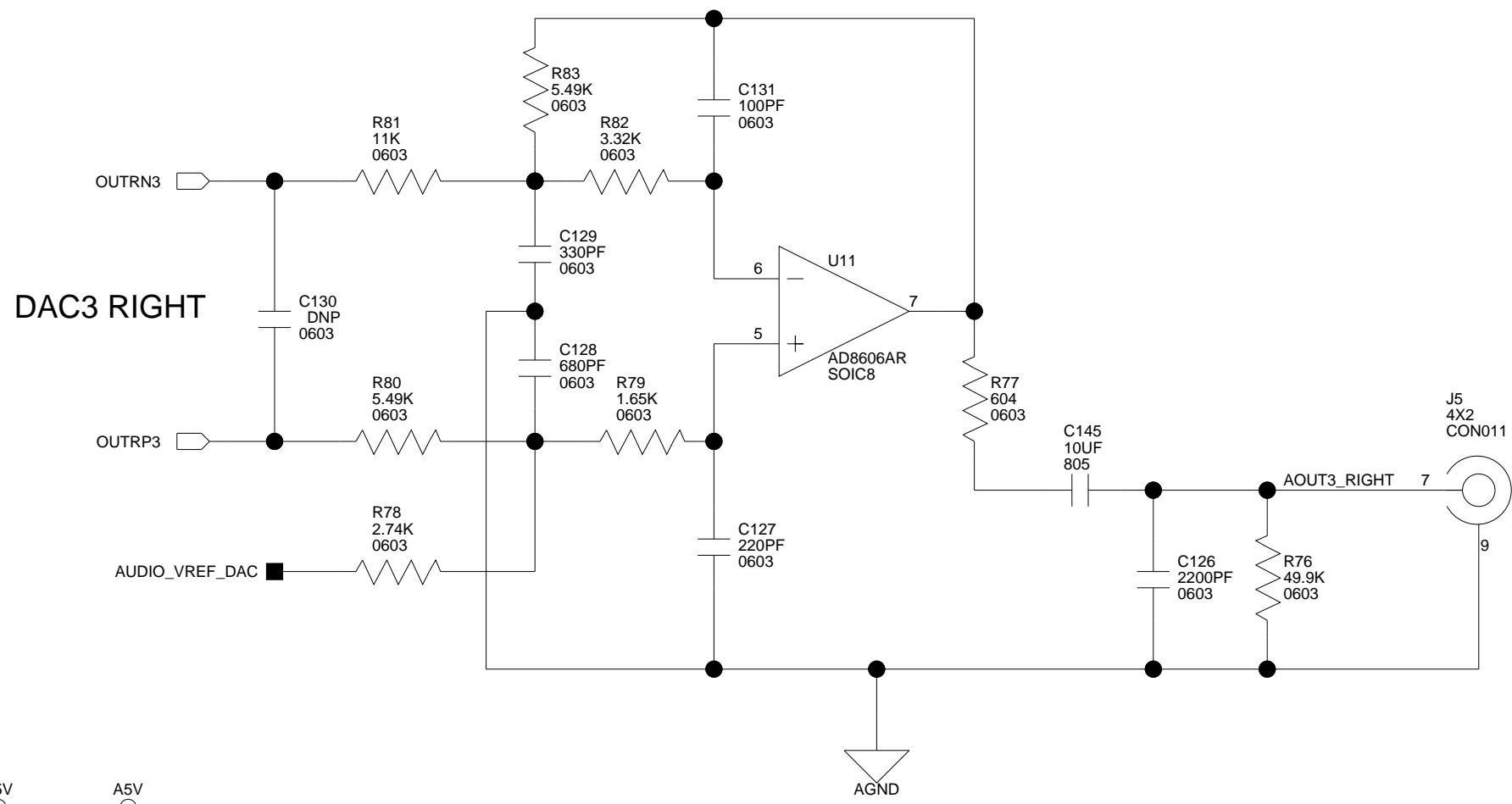
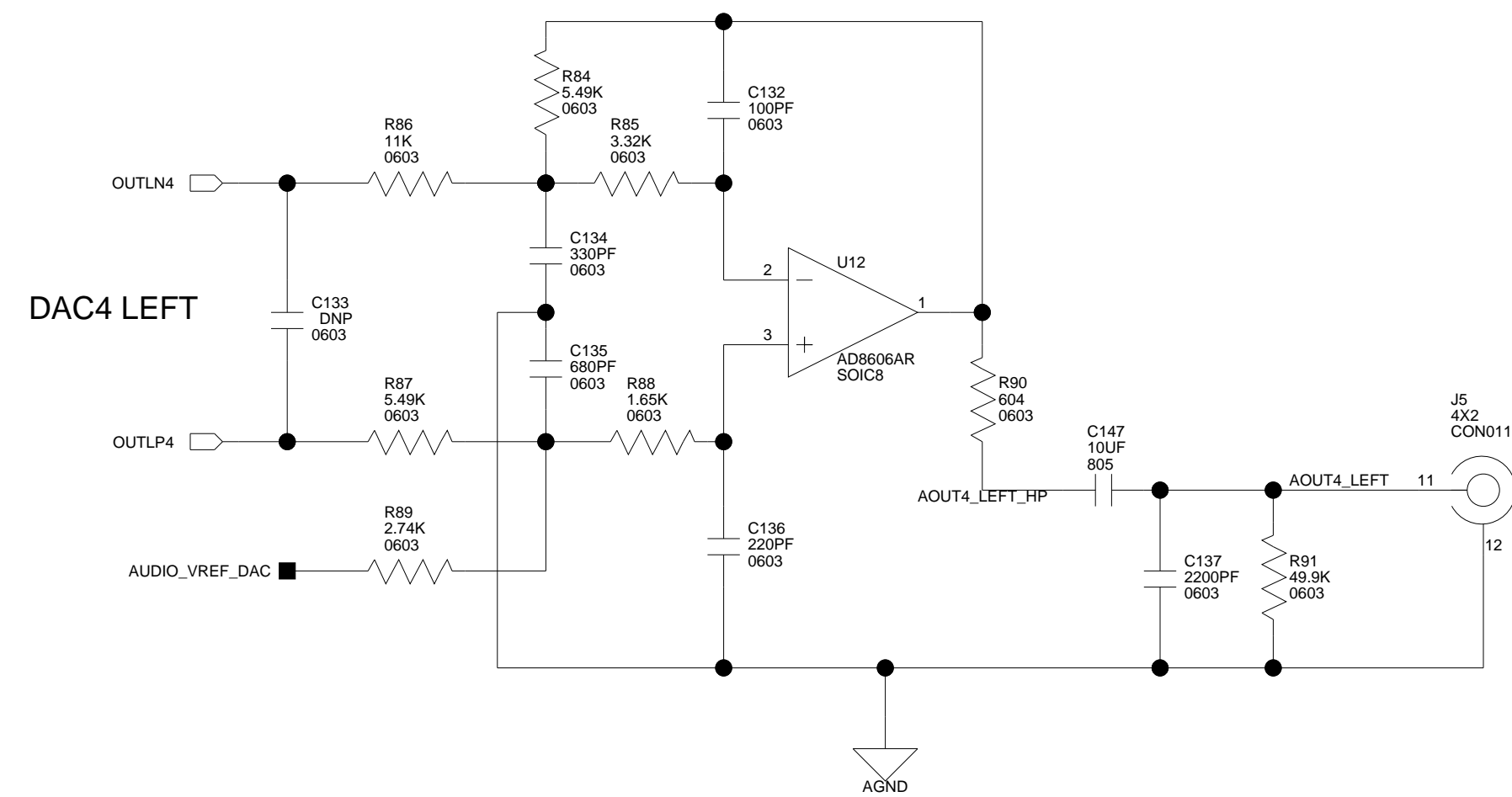
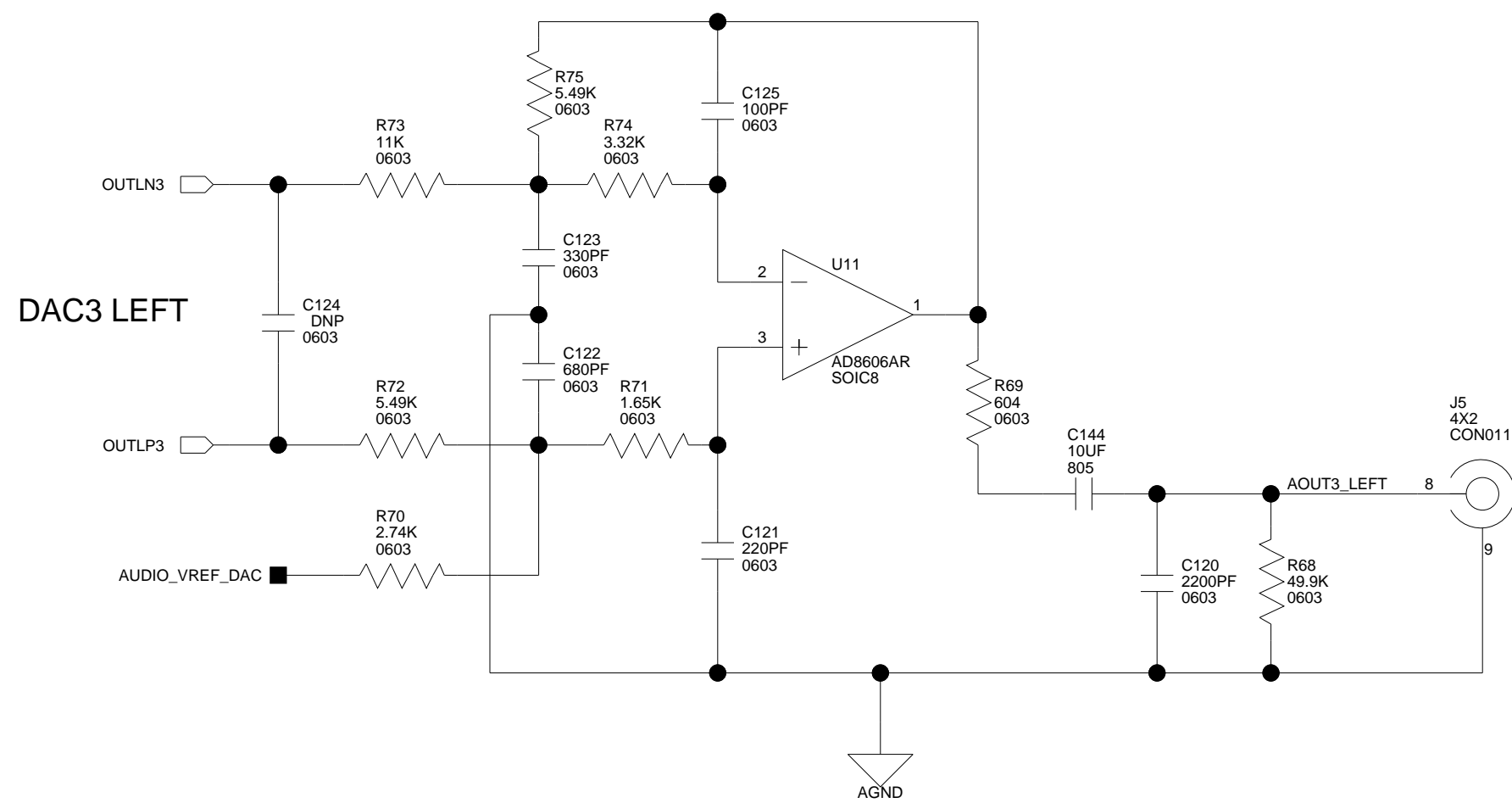
20 Cotton Road
Nashua, NH 03063
PH: 1-800-ANALOGD

Title		ADSP-21369 EZ-KIT Lite ANALOG AUDIO	
Size C	Board No.	A0196-2005	Rev
Date	8-2-2005_13:45	Sheet	5 of 13

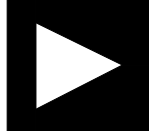


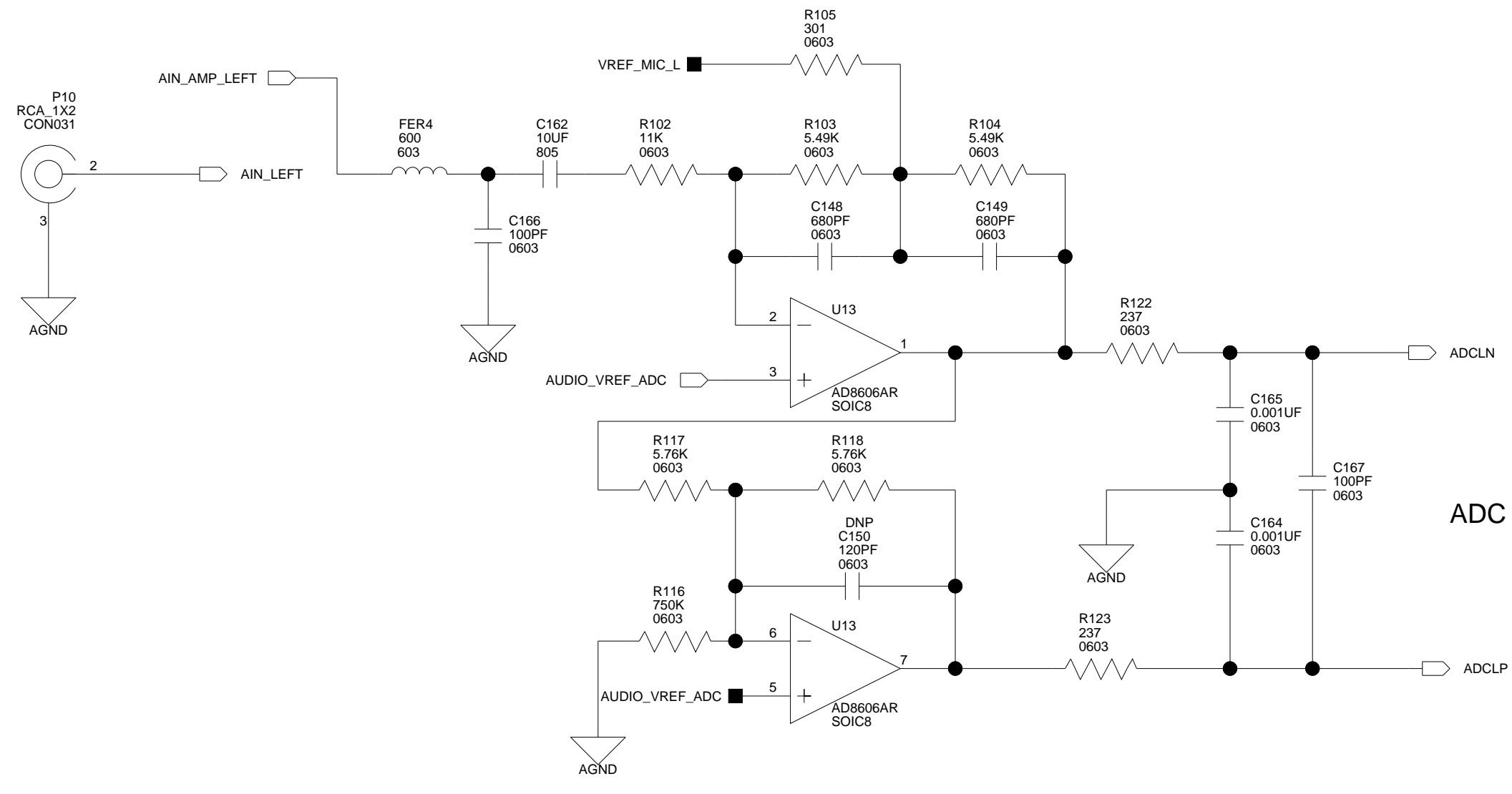
DNP = Do Not Populate

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite AUDIO OUT 1	
Size C	Board No. A0196-2005	Rev 1.1	
Date 8-2-2005_13:45	Sheet 6 of 13		



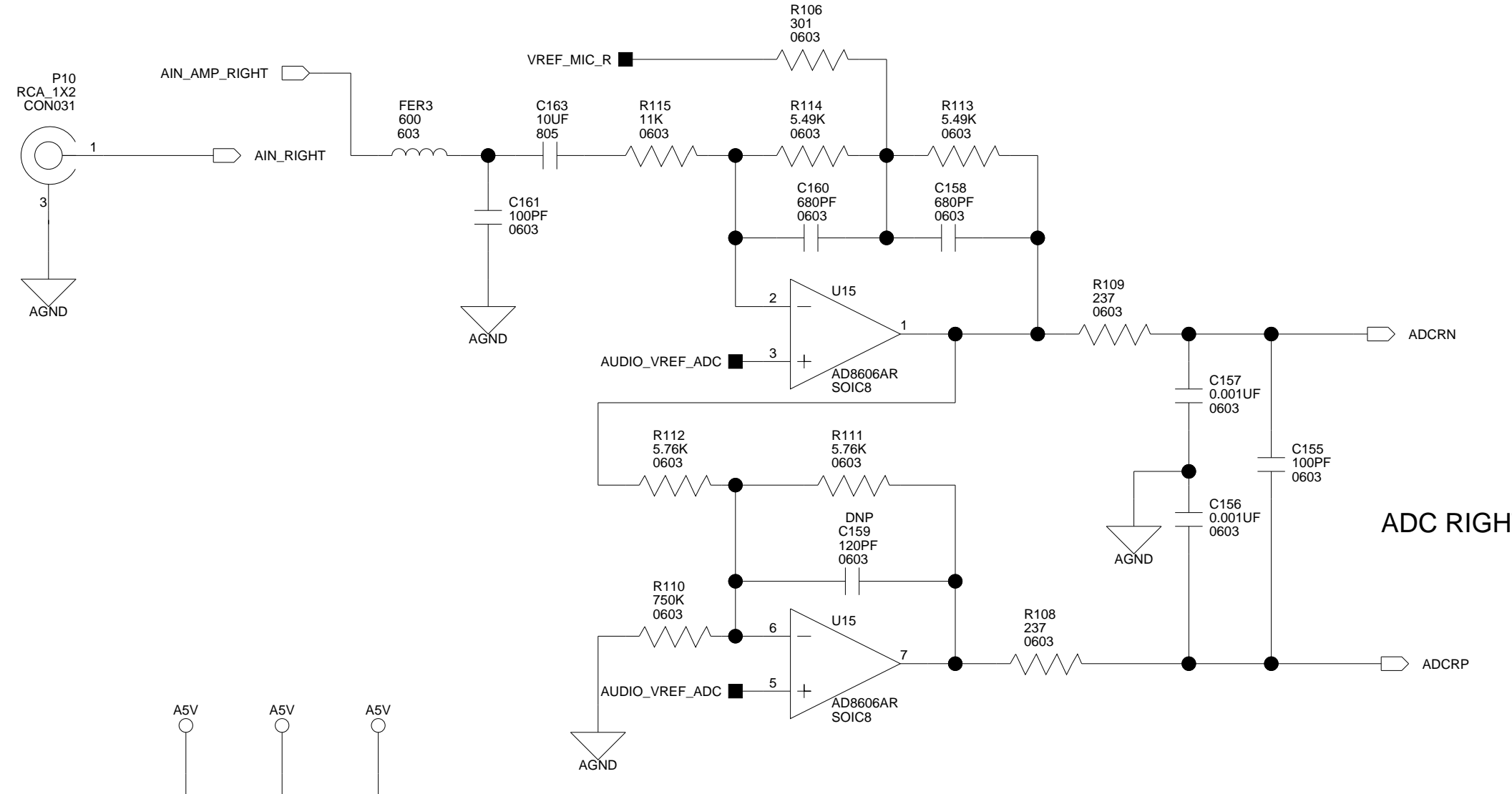
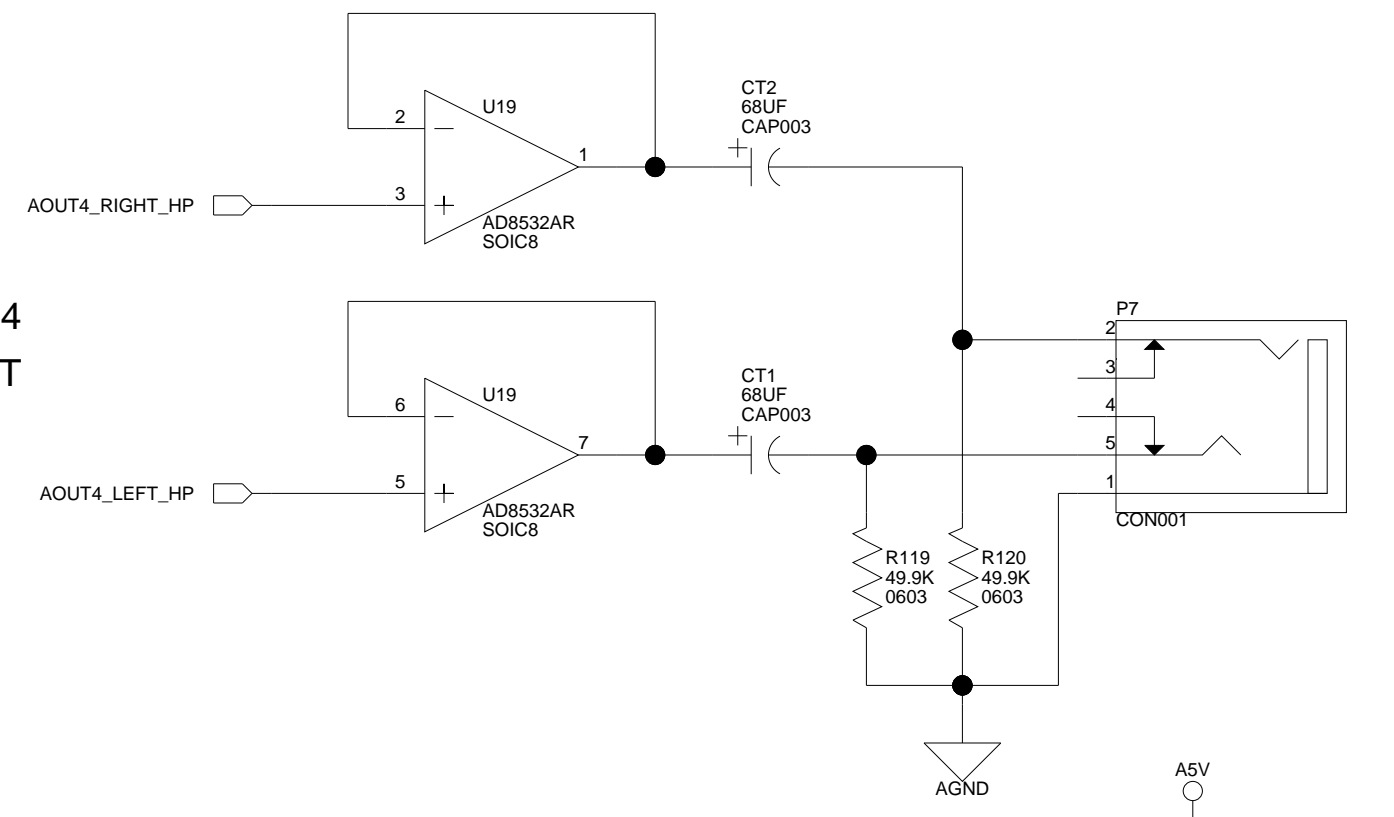
DNP = Do Not Populate

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite AUDIO OUT 2	
Size C	Board No. A0196-2005	Rev 1.1	
Date 8-2-2005_13:45	Sheet 7 of 13		Rev 1.1

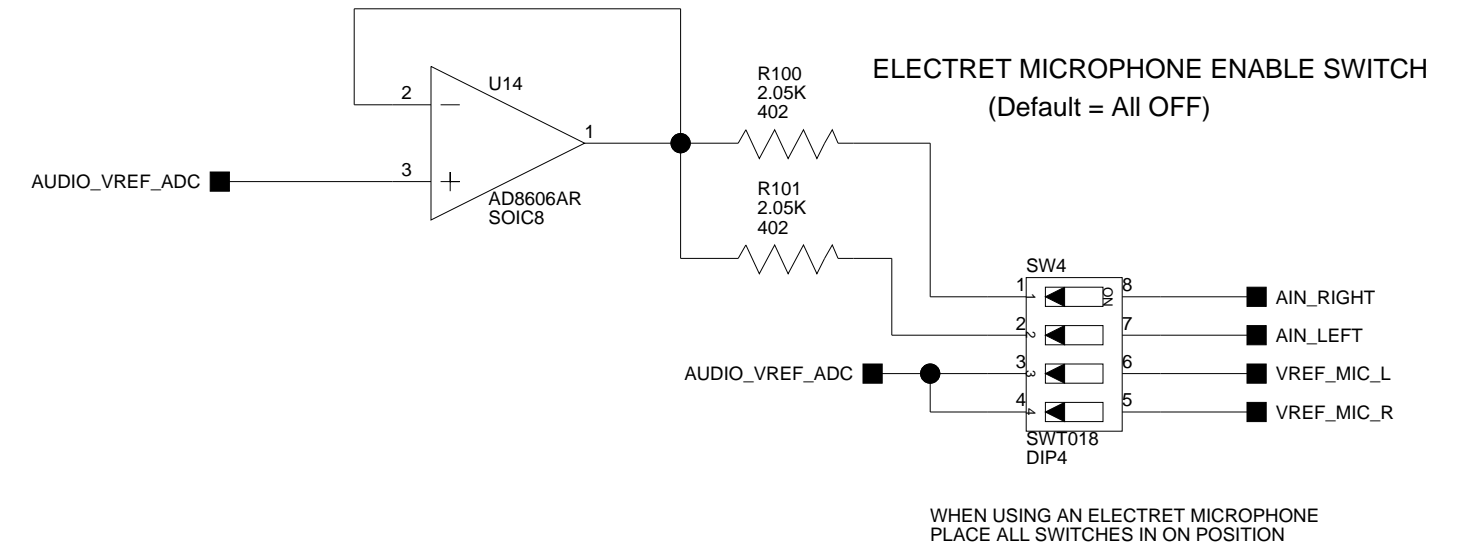


ADC LEFT

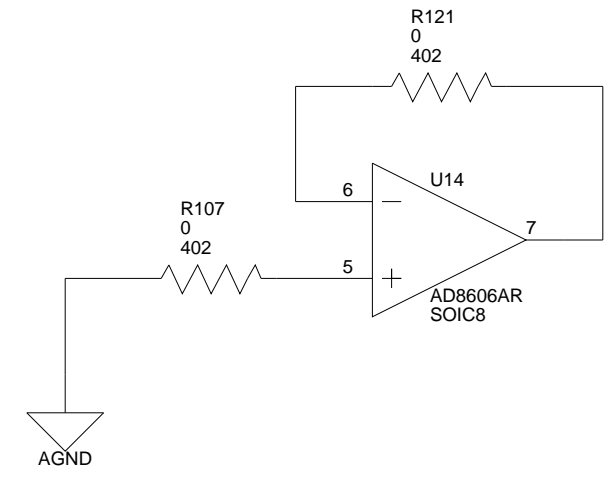
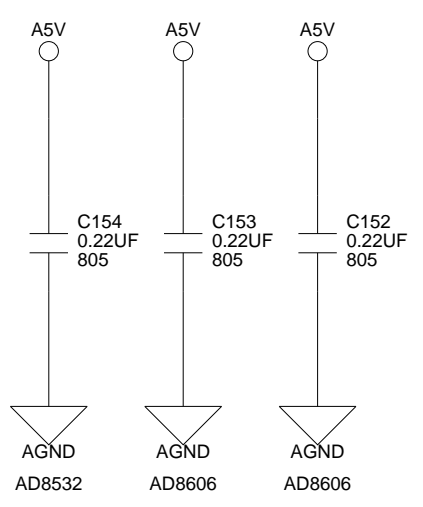
DAC4 HEADPHONE OUT



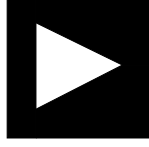
ADC RIGHT



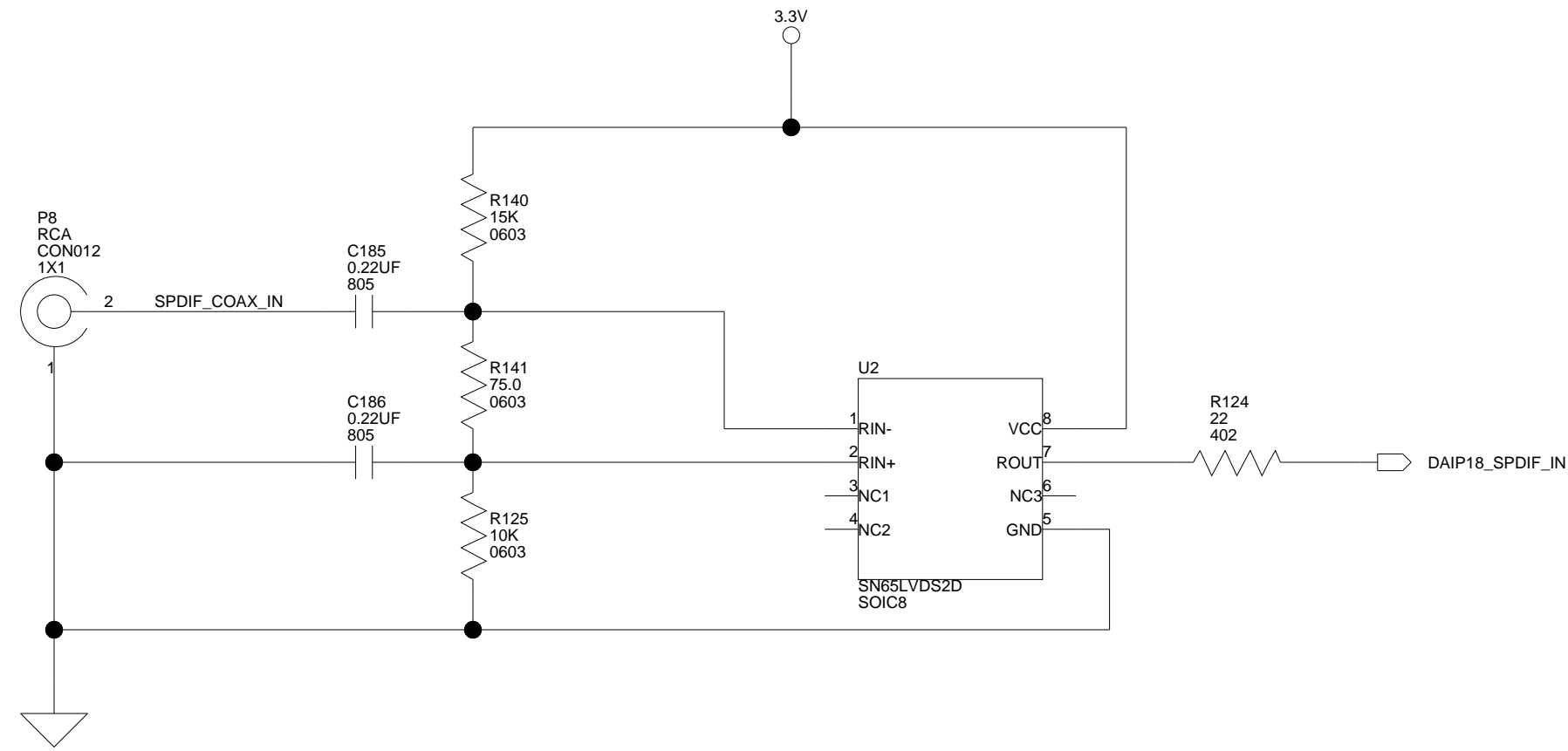
ELECTRET MICROPHONE ENABLE SWITCH (Default = All OFF)



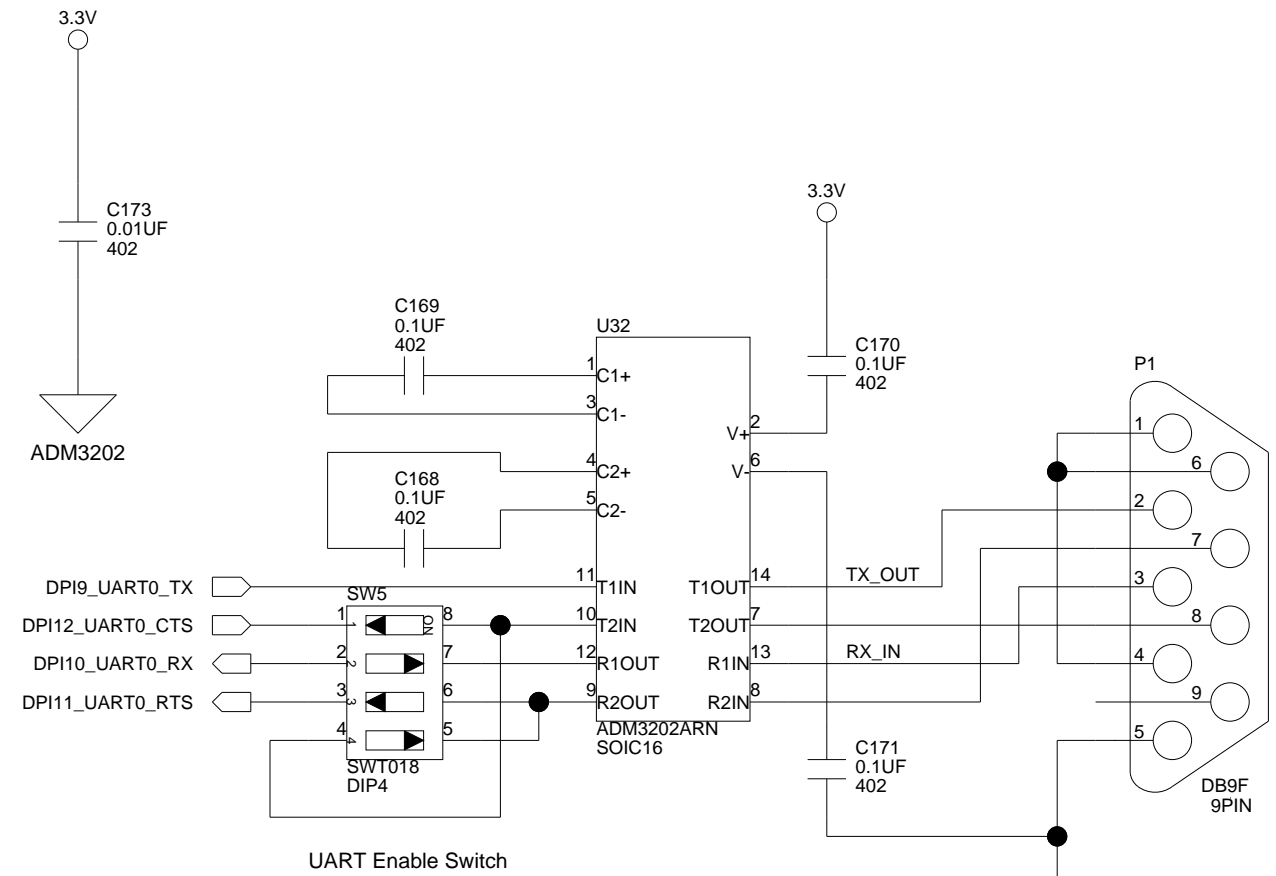
DNP = Do Not Populate

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite AUDIO IN & HEADPHONE OUT	
Size C	Board No. A0196-2005	Rev 1.1	
Date 8-2-2005_13:45	Sheet 8 of 13		Rev 1.1

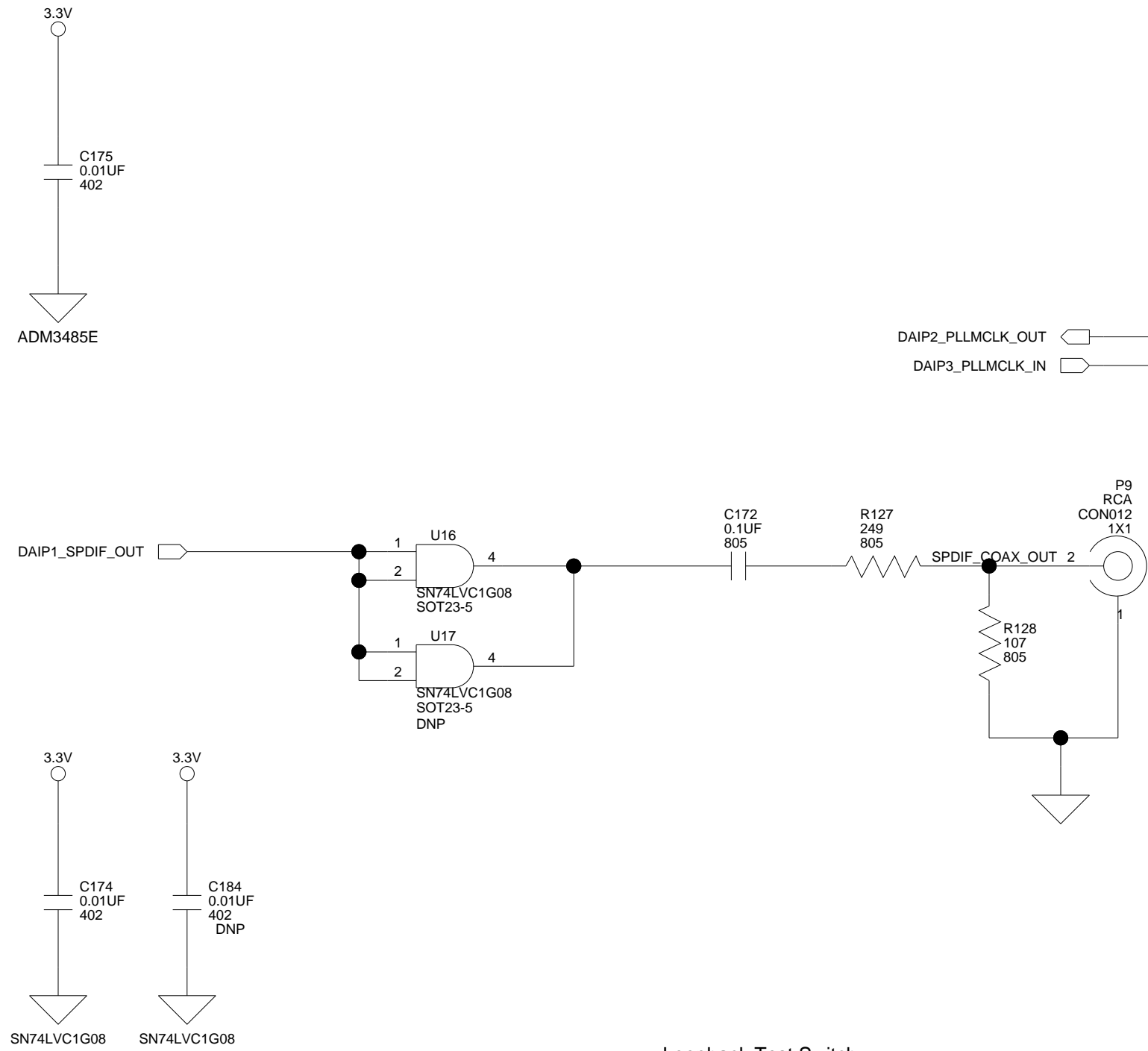
SPDIF COAX INPUT



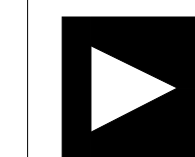
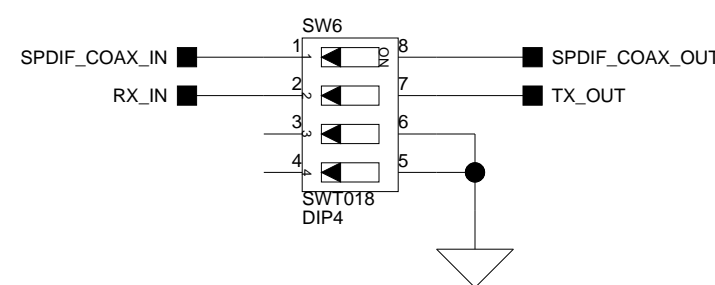
SERIAL PORT (UART 0)



SPDIF COAX OUT



Loopback Test Switch
(Default= All OFF)
For Test Purposes Only



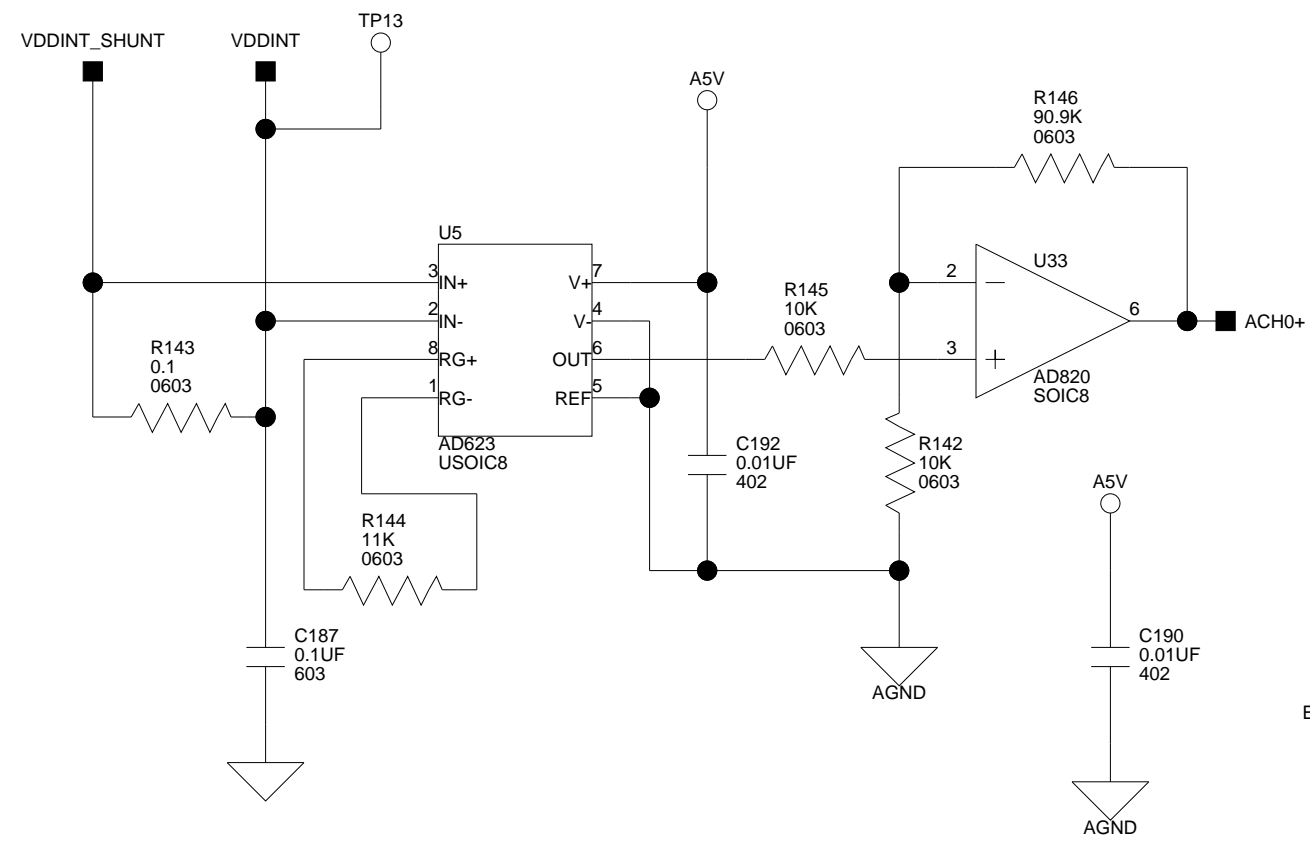
ANALOG DEVICES

20 Cotton Road
Nashua, NH 03063
PH: 1-800-ANALOGD

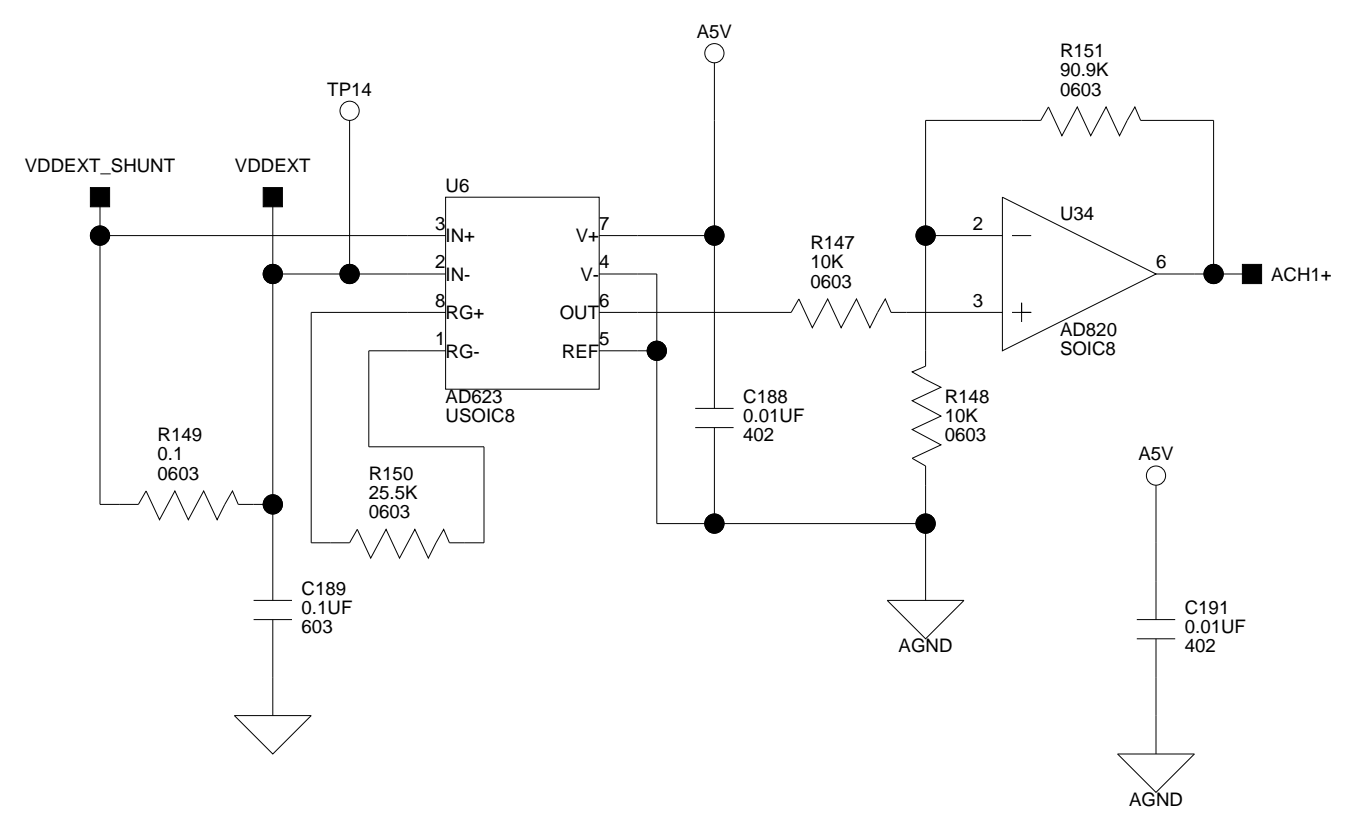
Title **ADSP-21369 EZ-KIT Lite**
EXTERNAL PLL, SPDIF, & RS-232

Size C	Board No. A0196-2005	Rev 1.1
Date	8-2-2005_13:45	Sheet 9 of 13

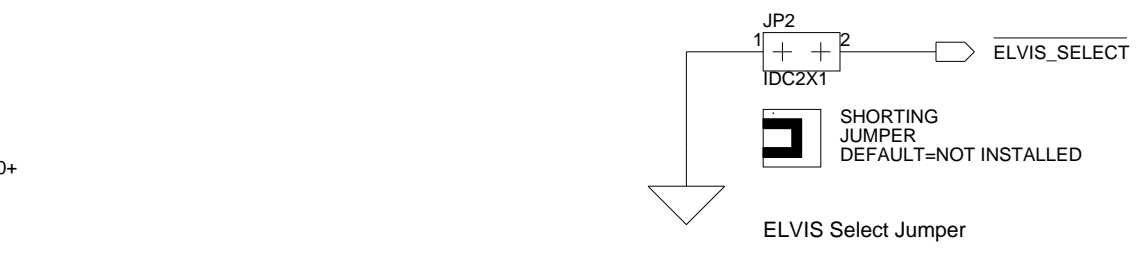
DNP = Do Not Populate



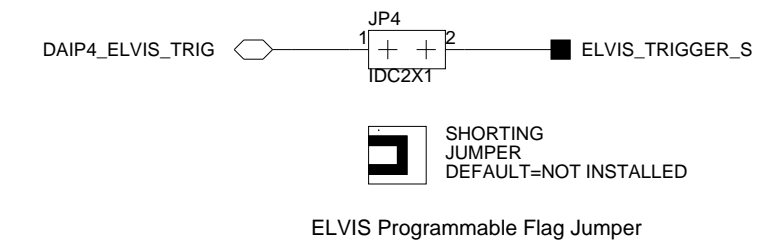
DSP CORE CURRENT



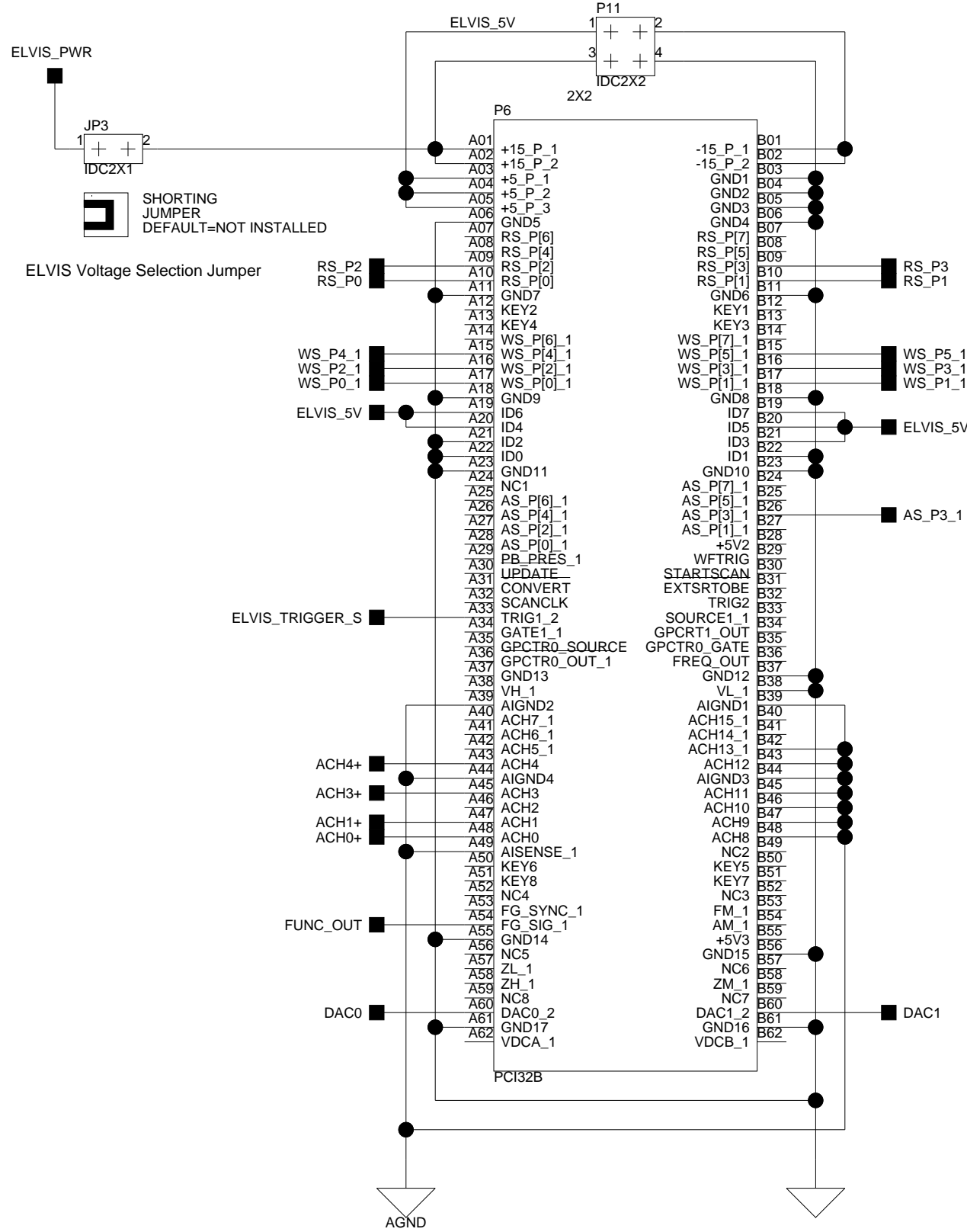
DSP IO CURRENT



ELVIS Select Jumper

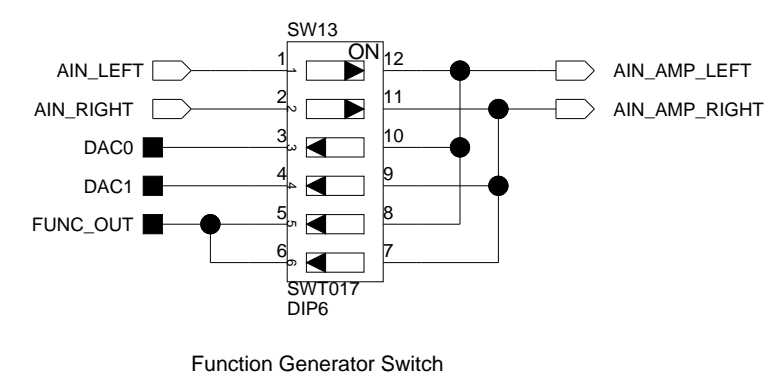


ELVIS Programmable Flag Jumper

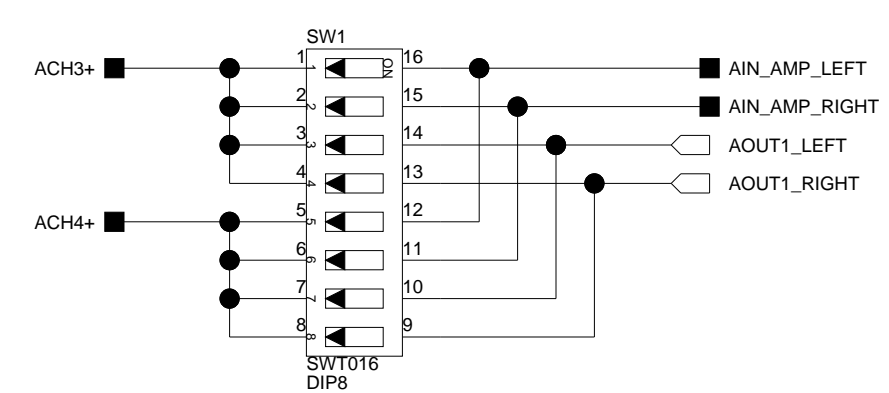


ELVIS CONNECTOR

NI ELVIS ID 31 (0001 1111)

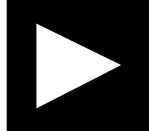


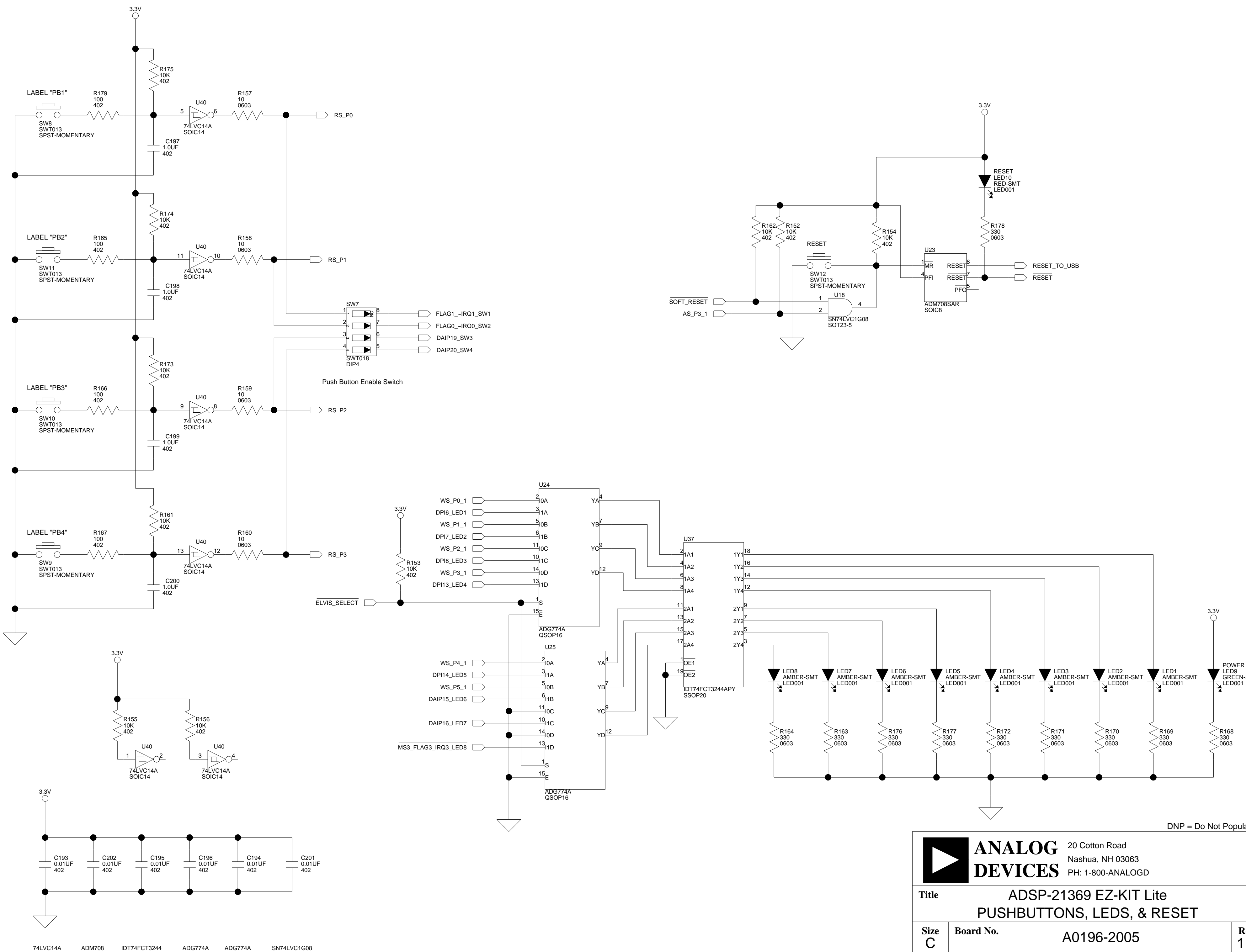
Function Generator Switch



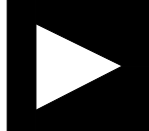
Oscilloscope Select Switch

DNP = Do Not Populate

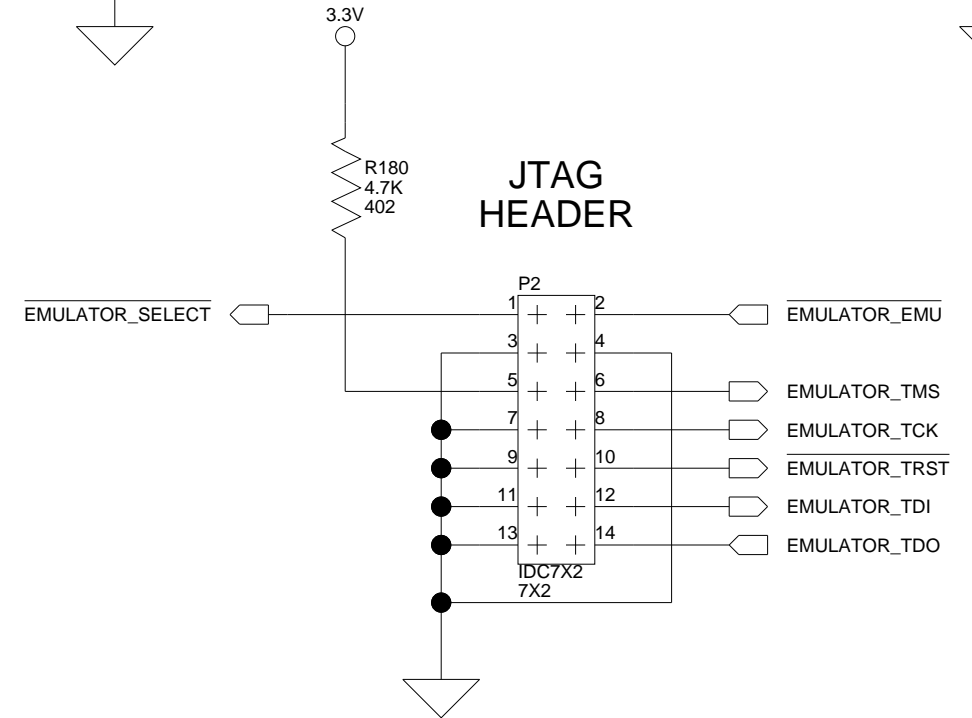
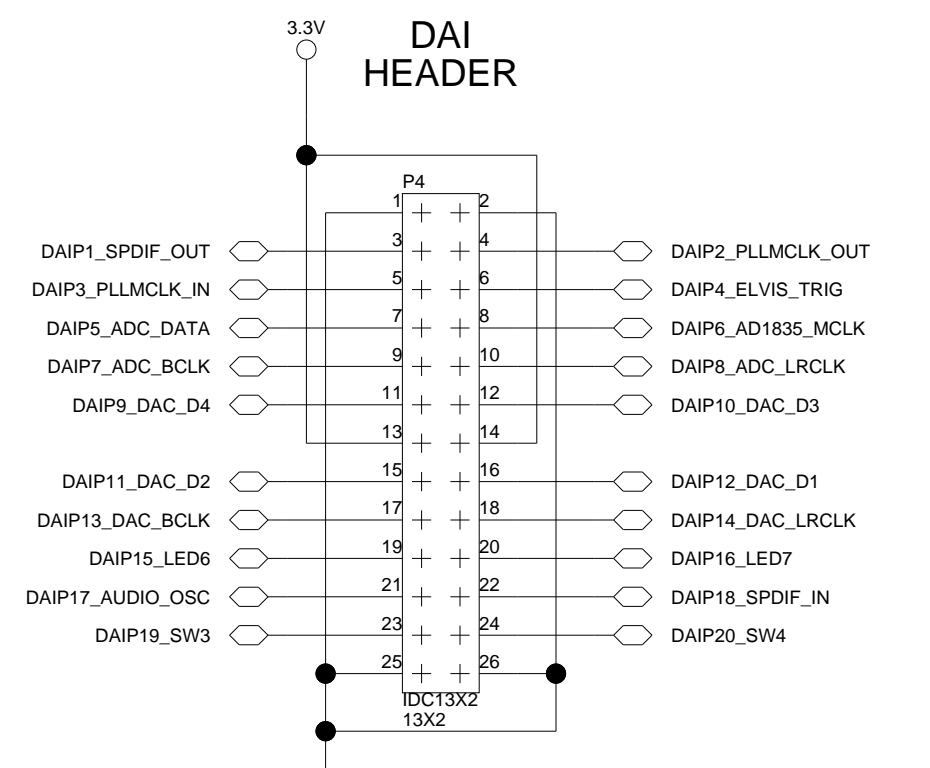
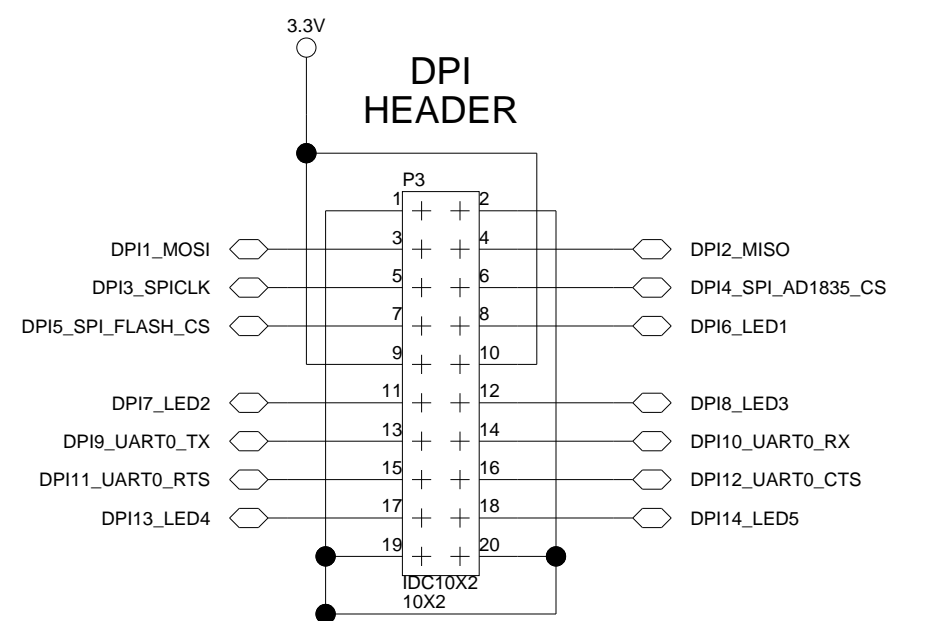
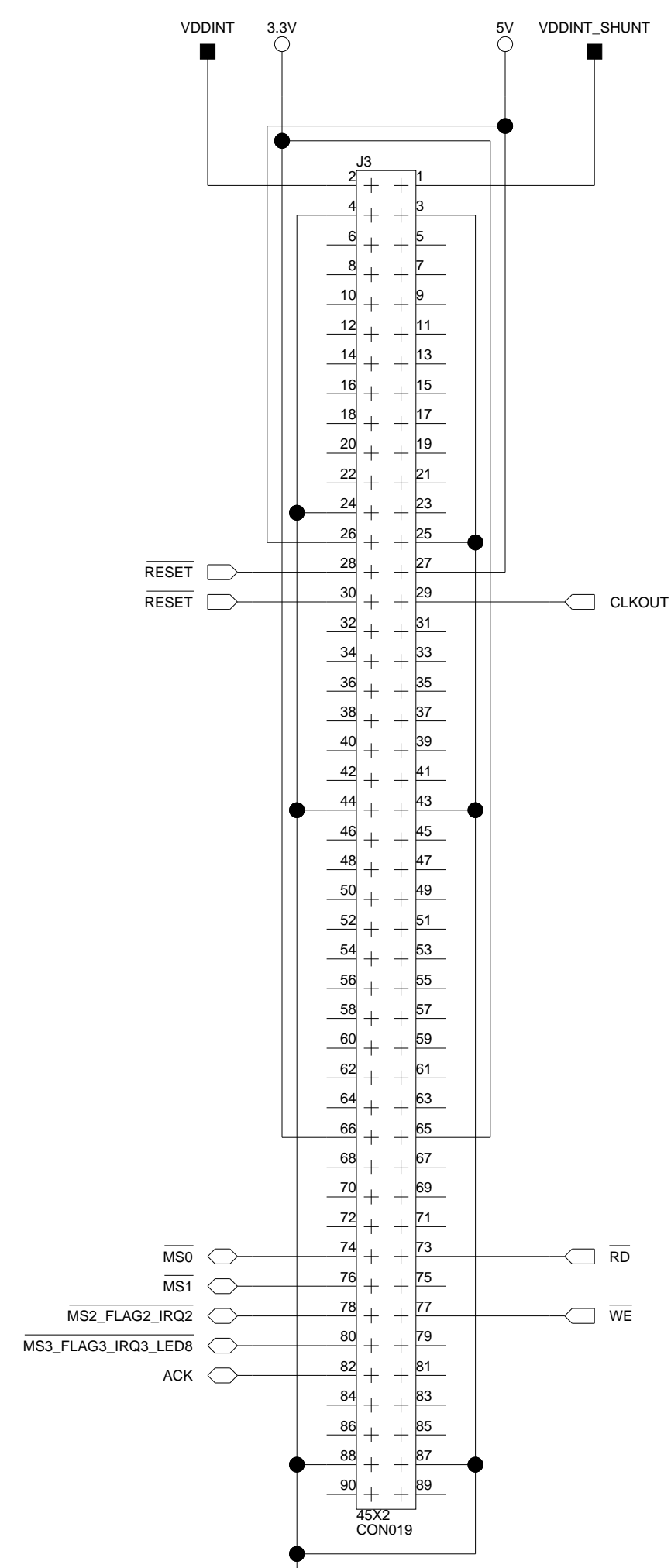
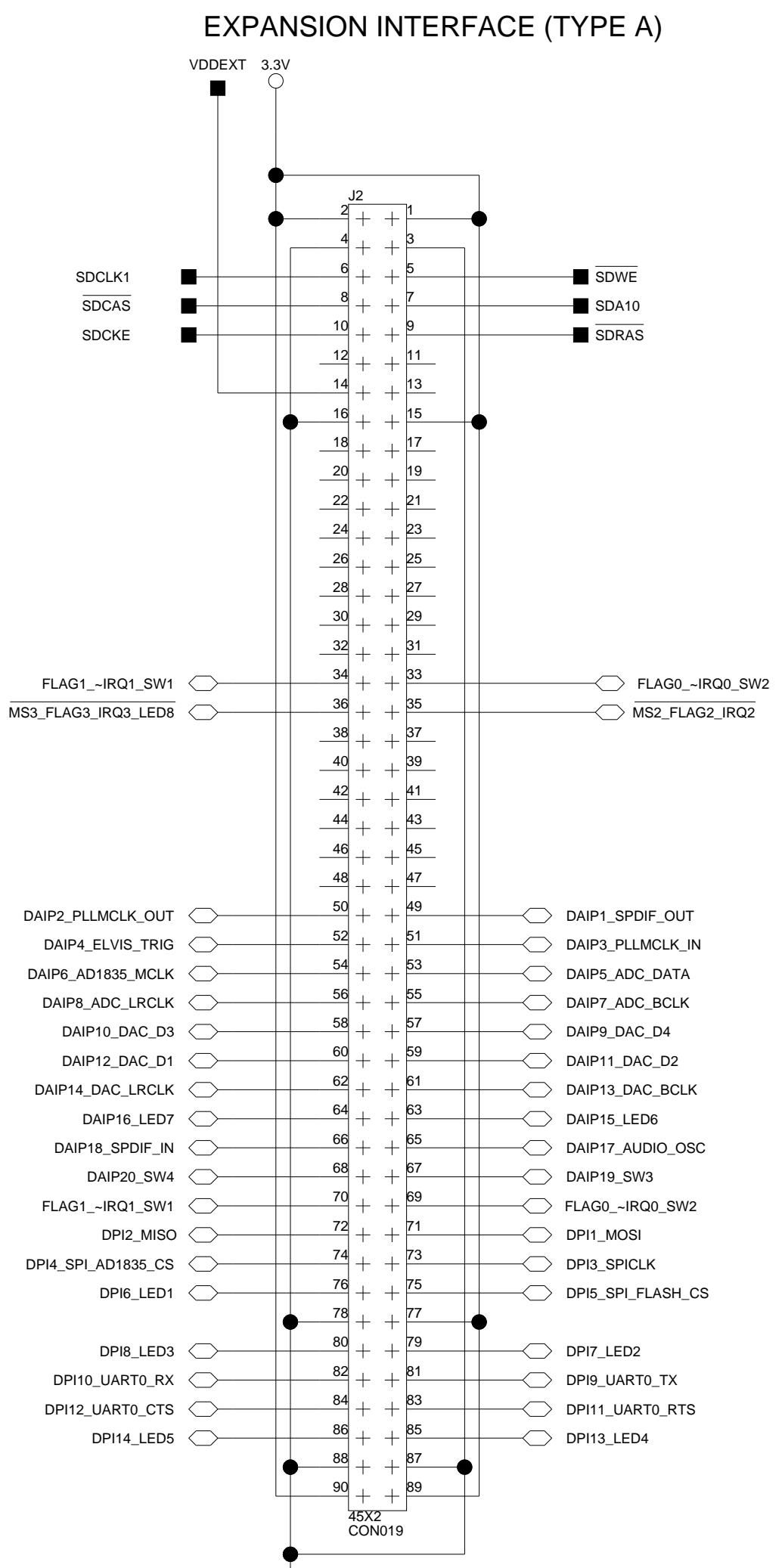
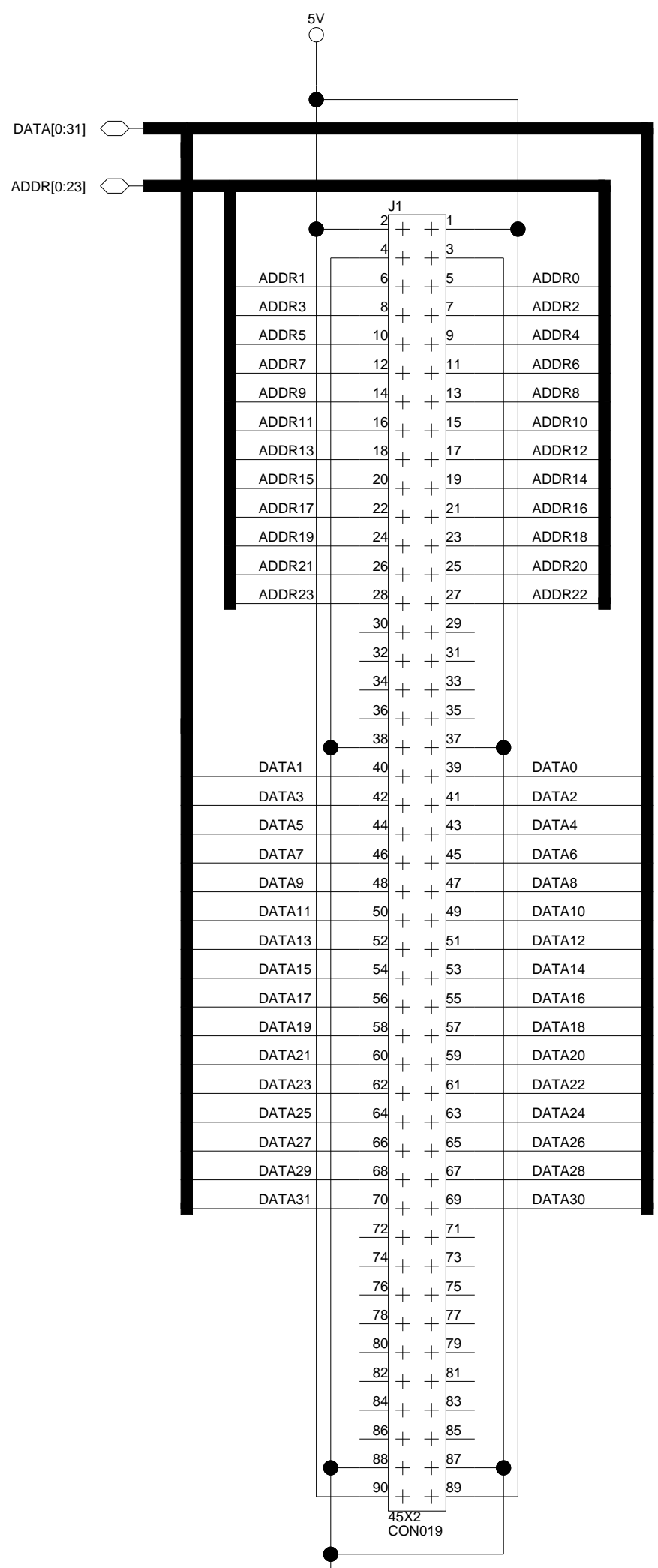
 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite ELVIS INTERFACE	
Size C	Board No.	Rev	
C	A0196-2005	1.1	
Date	8-2-2005_13:45	Sheet	10 of 13



DNP = Do Not Populate

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite PUSHBUTTONS, LEDS, & RESET	
Size C	Board No. A0196-2005	Rev 1.1	
Date 8-2-2005_13:45	Sheet 11 of 13		

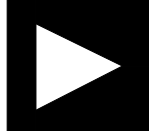
74LVC14A ADM708 IDT74FCT3244 ADG774A ADG774A SN74LVC1G08



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>

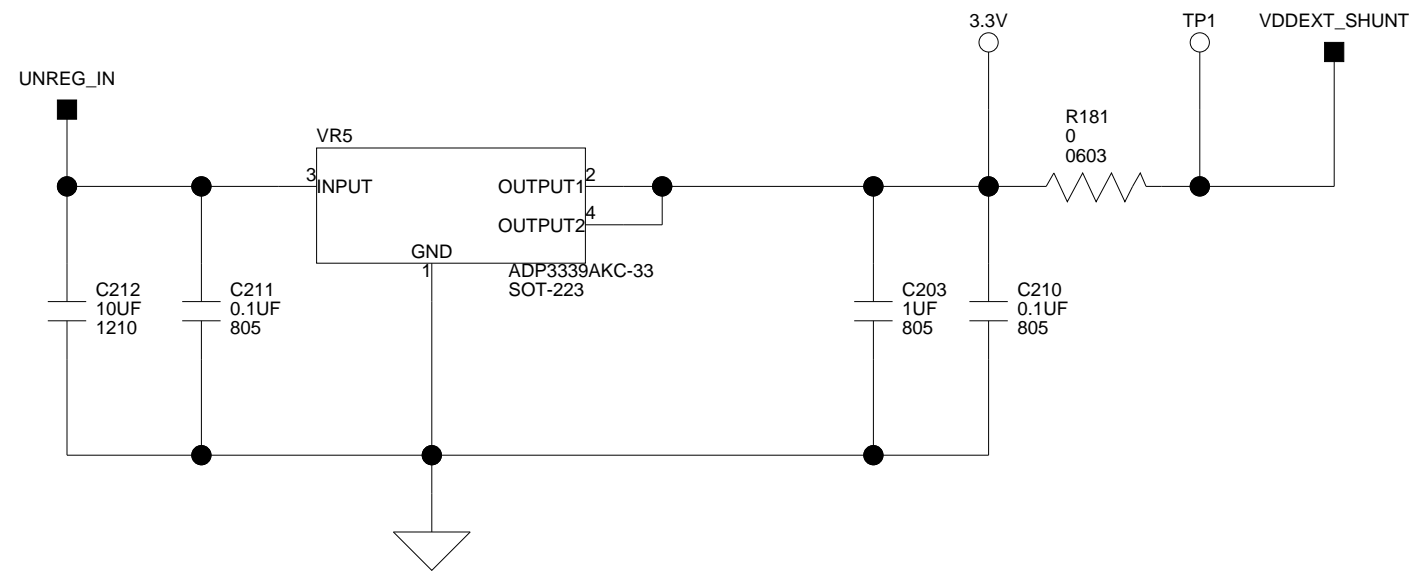
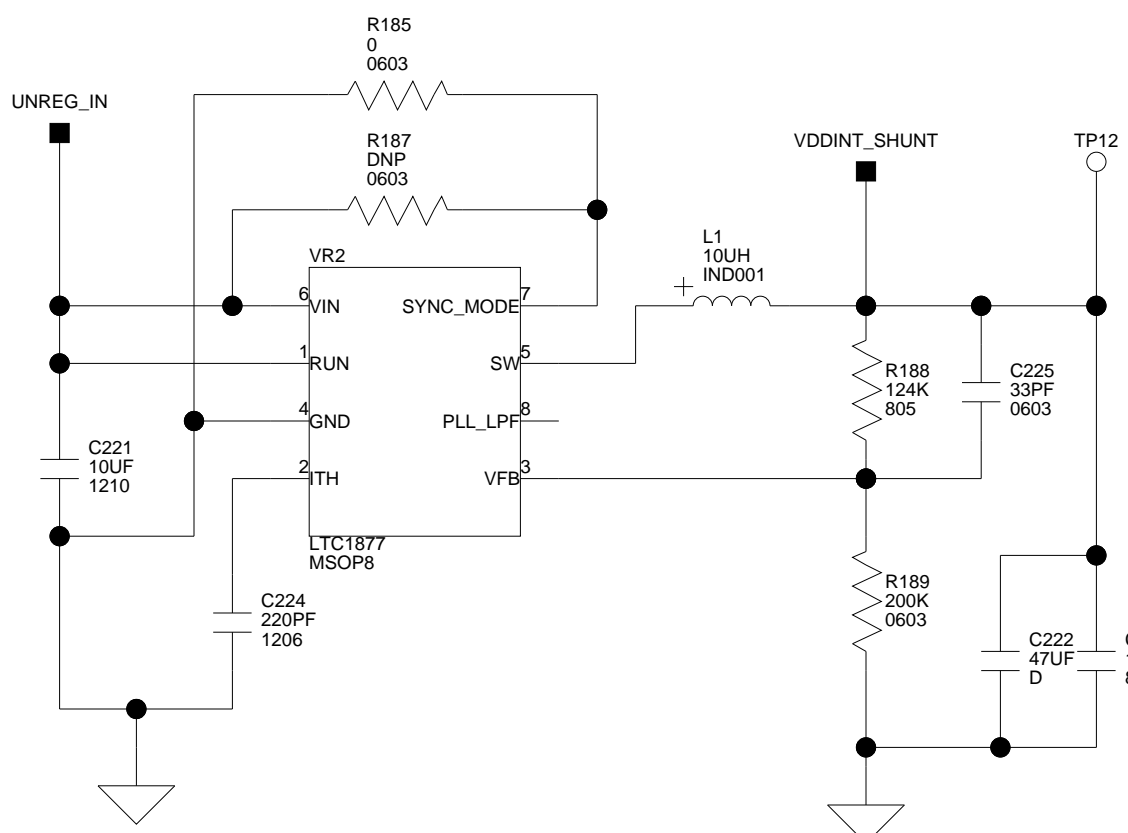
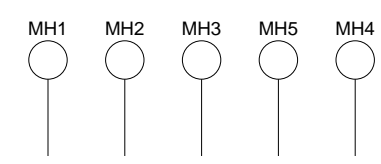
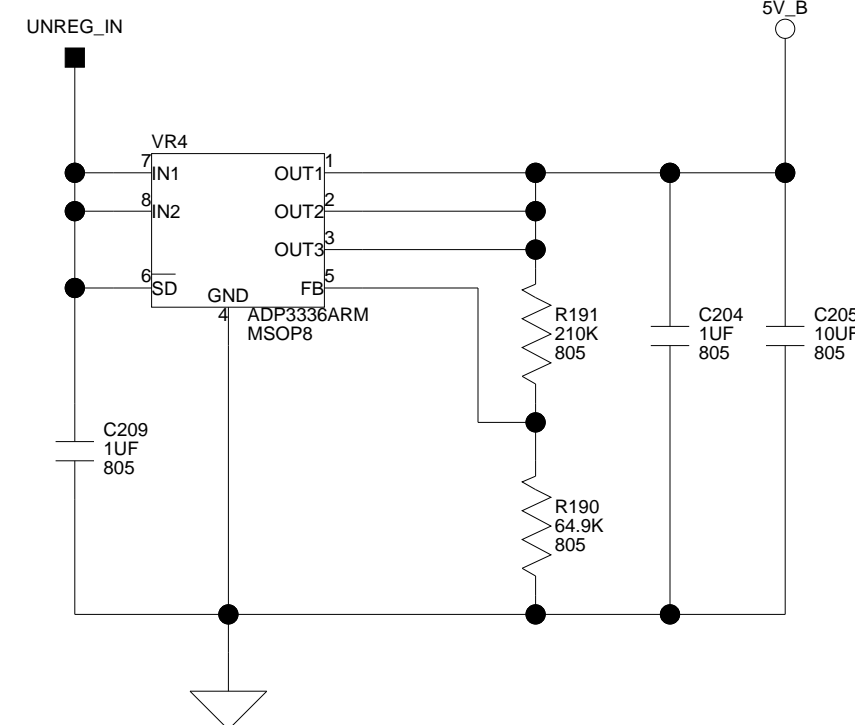
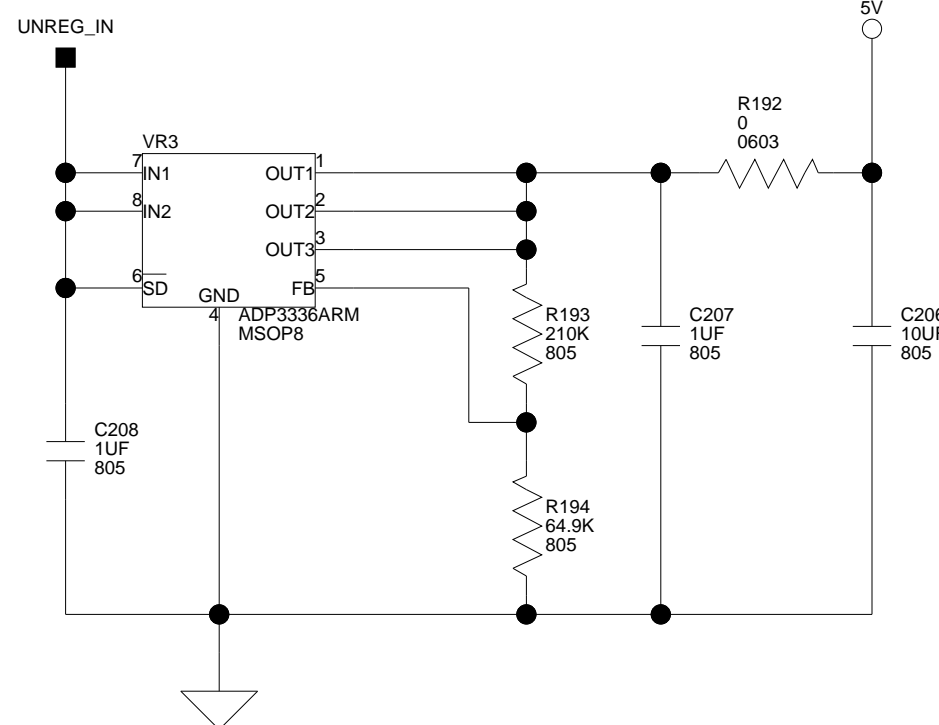
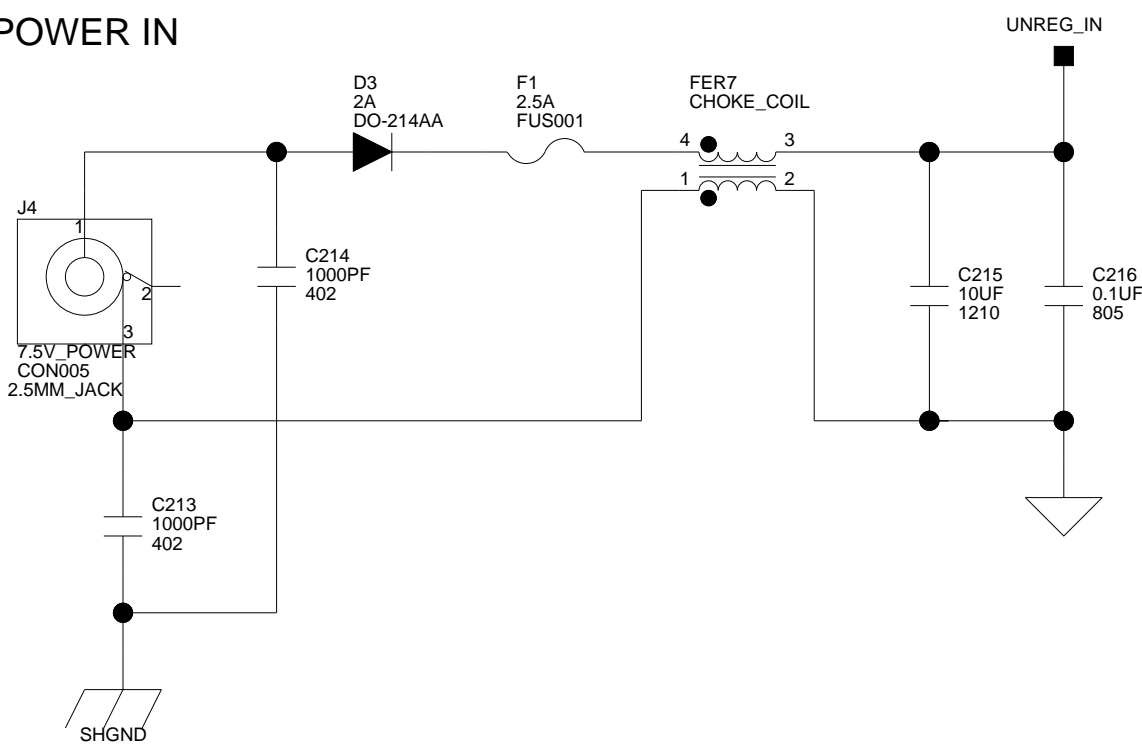
DNP = Do Not Populate



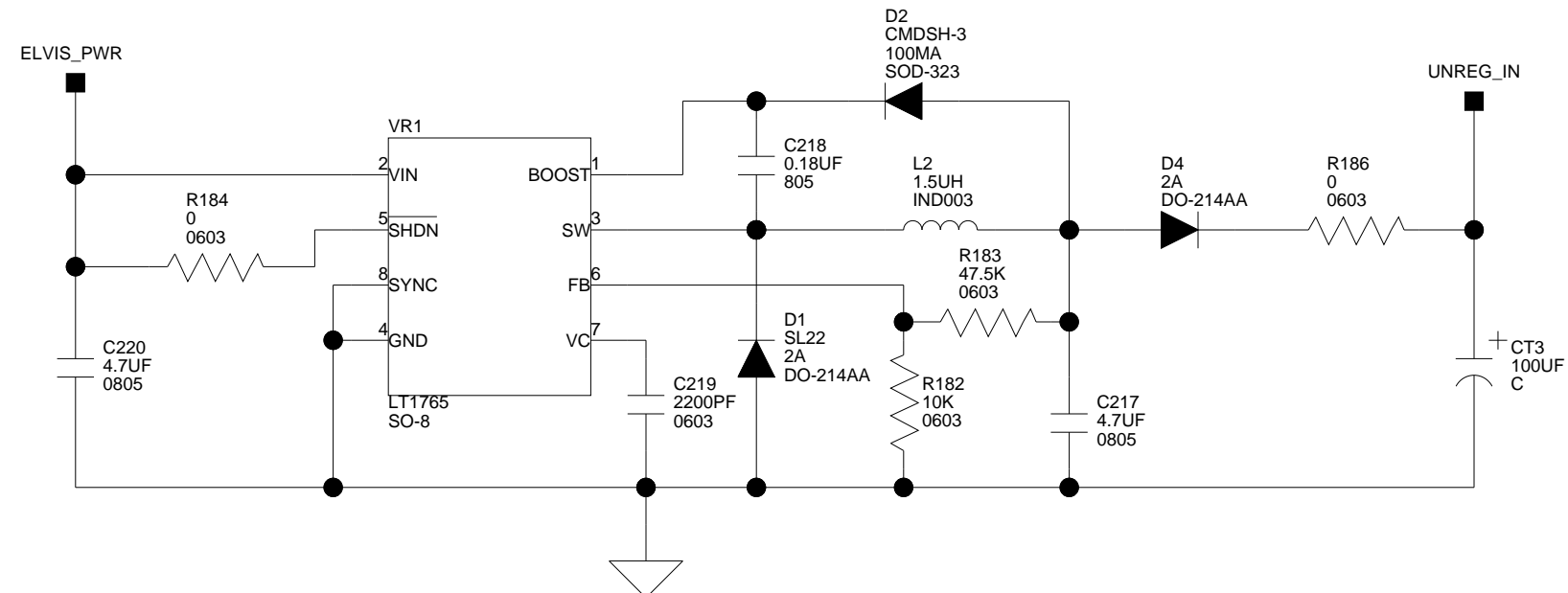
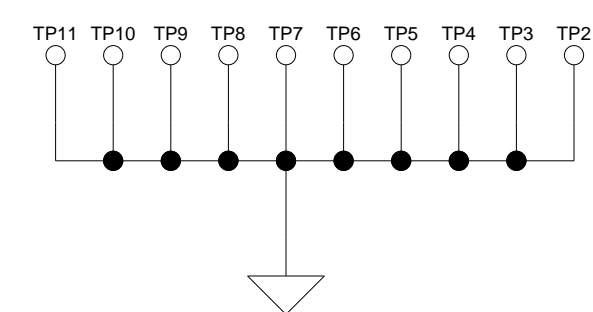
ANALOG DEVICES 20 Cotton Road
Nashua, NH 03063
PH: 1-800-ANALOGD

Title			ADSP-21369 EZ-KIT Lite EXPANSION INTERFACE		
Size C	Board No.	A0196-2005			Rev 1.1
Date	8-2-2005_13:45	Sheet	12 of	13	

POWER IN



GND Test Points are scattered on PCB for Test Measurement Purposes.
LABEL "GND" ON ALL TPs



DNP = Do Not Populate

		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title ADSP-21369 EZ-KIT Lite POWER	
Size C	Board No.	A0196-2005	Rev
Date	8-2-2005_13:45	Sheet	13 of 13

I INDEX

A

- AD1835A, CAD and DAC
 - ADC_DATA pin, [2-11](#)
 - configuration registers, [1-10](#)
 - master clock (MCLK), [2-5](#), [2-10](#)
 - master/slave modes, [1-10](#), [2-10](#)
 - setup switch (SW3), [2-10](#)
 - SPI interface, [2-6](#)
- ADSP-21369 processors
 - ADDRx pins, [2-7](#)
 - async memory controller, [1-8](#)
 - CLKCFGx pins, [2-3](#)
 - core clock, [2-8](#)
 - core frequency, [2-3](#)
 - core voltage, [2-2](#)
 - DAIPx/DATAx pins, [2-7](#)
 - DAIx pins, [1-12](#), [2-12](#), [2-17](#), [2-20](#), [2-24](#)
 - DPIx pins, [1-12](#), [2-7](#), [2-12](#)
 - external port, [2-3](#), [2-8](#)
 - FLAGx/-IRQx pins, [1-11](#), [1-12](#), [2-7](#), [2-12](#), [2-14](#), [2-16](#)
 - IO voltage, [2-2](#)
 - peripheral ports, [xiii](#)
 - SDRAM controller, [1-7](#)
 - signal routing units (SRUs), [1-9](#)
 - SPI port, [1-8](#), [1-10](#)
- analog audio interface, [xi](#), [1-9](#)
- analog-to-digital converter (ADC), *See* AD1854A
- architecture, of this EZ-KIT Lite, [2-2](#)

audio

- codecs, *See* AD1835A, CAD and DAC
- in RCA connector (P10), [2-22](#)
- interface, *See* analog audio interface
- oscillator, [2-4](#), [2-10](#)
- out RCA connector (J5), [2-22](#)

audio signals

- AMP_LEFT_IN, [2-13](#)
- AMP_RIGHT_IN, [2-13](#)
- DAC1-0, [2-14](#)
- FUNCT_OUT, [2-14](#)
- LEFT_IN, [2-14](#)
- LEFT_OUT, [2-13](#)
- RIGHT_IN, [2-14](#)
- RIGHT_OUT, [2-13](#)

B

- background telemetry channel (BTC), [1-12](#)
- bill of materials, [A-1](#)
- boot
 - code, [1-7](#)
 - configuration pins (BOOTCFG1-0), [2-9](#)
 - modes, [2-3](#), [2-8](#)

C

- CLKCFG1-0 pins, [2-10](#)
- CLKIN pin, [2-3](#)
- clock
 - multiplier ratio, [2-8](#)
 - routing signals, [2-10](#)
- codec setup switch (SW7), [2-10](#)

INDEX

configuration, of this EZ-KIT Lite, 1-4

connectors

diagram of locations, 2-20

J1-3 (expansion), 2-3, 2-5, 2-6, 2-7, 2-20

J4 (power), 1-4, 2-22

J5 (audio out RCA), 1-10, 2-22

P10 (audio in RCA), 1-10, 2-22

P1 (RS-232), xi, 2-23

P2 (JTAG), 2-8, 2-25

P3 (DPI header), 2-24

P4 (DAI header), 2-24

P5 (USB), 1-4, 2-24

P7 (headphone out), 1-10, 2-22

P8-9 (SPDIF coax), 2-23

contents, of EZ-KIT Lite package, 1-2

core

frequency, 2-3

to CLKIN ratio, 2-10

current limit, 2-7

customer support, xiv

D

DAI, *See* digital audio interface

data acquisition (DAQ) device, 1-9

data IO rate, 1-9

DB9 (female) connector, xi, 2-23

default configuration, of this EZ-KIT Lite, 1-3

digital audio interface (DAI)

connectors, 1-11, 1-12, 2-4, 2-14

disabling, 2-5, 2-11

header (P4), xii, 2-4, 2-24

transferring data from codec, 1-9

digital peripheral interface (DPI)

connectors, 1-12, 2-5, 2-14

disabling, 2-6

DPI2-1 (MOSI-0) pins, 1-8

DPI3 (SPI clock) pin, 1-8

DPI4 (SPI select) pin, 1-10

DPI5 (chip select) pin, 1-8

header (P3), xii, 2-6, 2-24

digital-to-analog converter (DAC), *See*

AD1835A, CAD and DAC

DIP switch (SW7), 1-4, 1-11, 2-12, 2-16

DMA controller, 1-7

E

electret microphone, 1-10, 2-11

ELVIS (Educational Laboratory Virtual Instrumentation Suite)

interface, xi, 1-8

programmable flag jumper (JP4), 2-20

select jumper (JP2), 2-19

trigger pins, 2-20

voltage select jumper (JP3), 2-19

EPROM/flash boot mode, 2-3

example programs, 1-12

expansion interface, xii, 2-3, 2-5, 2-6, 2-7, 2-20

external

memory, 1-7

PLL, *See* phase lock loop

port, ADSP-21369 processors, 2-3, 2-8

F

features, of this EZ-KIT Lite, x

FLAG

See also ADSP-21369 processors

pins, 2-6

register, 1-11

flash memory

boot mode (default), 2-8, 2-9

start/end addresses, 1-7

via external port, 1-7, 2-3

frame sync signals, 1-10, 2-10

frequency, *See* core frequency

G

general-purpose input/output, 1-10, 2-6, 2-14, 2-16

H

headphone out jack (P7), [xi](#), [2-22](#)
 Help, online, [xix](#)

I

installation, of this EZ-KIT Lite, [1-4](#)
 interrupts, configuring push buttons as, [1-11](#)
 IO voltage, [2-2](#)

J**JTAG**

emulation port, [2-8](#)
 header (P2), [xii](#), [2-25](#)

jumpers

diagram of locations, [2-17](#)
 JP1 (VCO select), [2-17](#)
 JP2 (ELVIS select), [2-19](#)
 JP3 (voltage select), [2-19](#)
 JP4 (ELVIS programmable flag), [2-20](#)
 JP6 (ELVIS voltage), [2-19](#)

L

LabVIEW virtual instruments, [xi](#), [1-9](#)

LEDs

connections, [1-11](#)
 diagram of locations, [2-14](#)
 LED10 (reset), [1-4](#), [2-15](#)
 LED11 (USB monitor), [1-5](#), [2-16](#)
 LED12 (USB reset), [1-4](#), [2-15](#)
 LED1-7 (FLAGx IO), [1-12](#), [2-14](#)
 LED8 (FLAG3), [1-12](#), [2-6](#), [2-14](#)
 LED9 (power), [1-4](#), [2-14](#)

license restrictions, [1-6](#)

loop-back test switches (SW6, SW14), [2-12](#)

M

master clock (MCLK), [1-9](#)

master input clock (MCLK), [1-9](#)

-MS2-0, memory select pins, [1-7](#)

-MS3, memory select pin, [1-7](#), [1-12](#)

N

notation conventions, [xxii](#)

O

oscilloscope config switch (SW1), [2-13](#)

P

package contents, [1-2](#)

parallel flash memory, *See* flash memory

parallel port (PP) control signals, [2-7](#)

phase lock loop (PLL), [xii](#), [2-4](#), [2-17](#)

PMCTLx register, [2-3](#)

power

connector (J4), [2-22](#)

LED (LED9), [2-14](#)

specifications, [2-23](#)

supply, [2-19](#), [2-23](#)

push buttons

connections, [1-11](#)

diagram of locations, [2-14](#)

enable switch (SW7), [1-4](#), [1-11](#), [2-12](#), [2-16](#)

reference designators, *See* switches by name (SWx)

R**RCA**

cables, [1-3](#)

connectors, [xi](#), [1-10](#), [2-4](#)

registration, of this product, [1-3](#)

reset

processor, [2-15](#)

push button (SW12), [2-17](#)

restrictions, license, [1-6](#)

RS-232 connector (P1), [xi](#), [2-23](#)

INDEX

S

SDRAM

- chip select pin (FLAG8), 2-6
 - configuration, 1-7
 - control signals, 2-7
 - via external port, 2-3
- serial peripheral interconnect (SPI)
- flash memory, xi, xii, 1-7, 1-8, 2-6
 - master/slave boot modes, 2-3, 2-9

session startup, 1-4

signal routing units

- SRU2 (DPI interface), 2-5
- SRU (DAI interface), 2-4

spacing headers, 2-24

SPDIF

- input/output, xii
- receiver, 1-9

SPI

- master/slave boot modes, 2-9

SRAM

- async memory controller, 1-8
- configuration, 1-7
- via external port, 2-3

stereo IO, xi

SW12 (reset) push button, 2-17

SW13 (ELVIS station) switch, 2-13

SW14 (test) switch, 2-12

SW1 (oscilloscope) switch, 2-13

SW2 (boot mode select) switch, 2-3, 2-6, 2-8

SW3 (AD1835A codec) switch, 2-5, 2-10

SW4 (microphone) switch, 1-10, 2-11

SW6 (test) switch, 2-12

SW7 (push buttons enable) DIP switch, 1-4, 1-11, 2-12, 2-16

SW8-11 (general input) push buttons, 2-16

synchronous dynamic random access memory,
See SDRAM

synchronous random access memory, *See* SRAM

system architecture, of this EZ-KIT Lite, 2-2

T

technical/customer support, xiv

test switches (SW6, SW14), 2-12

time-division multiplexed (TDM), 1-9

two-wire interface (TWI), 1-9

U

universal asynchronous receiver/transmitter
(UART)

enable switch (SW5), 2-11

interface, xi, 2-6

USB

cable, 1-3, 2-16, 2-17

connector (P5), 2-24

debug interface, 2-8, 2-25

interface chip (U34), 2-15, 2-17

monitor LED (LED11), 1-5

V

VisualDSP++

documentation, xx

online Help, xix

voltage, 2-17

voltage controlled oscillator (VCO) select
jumper (JP1), 2-17