ADSP-21160 EZ-KIT Lite®
Evaluation System Manual

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Analog Devices, Inc.
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Norwood, Mass. 02062-9106

ANALOG DEVICES

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Printed in the USA.

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PREFACE

Thank you for purchasing the ADSP-21160 EZ-KIT Lite®, Analog Devices (ADI) evaluation system for 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 SHARC the bandwidth for sustained high-speed computations. SHARC represents today's de facto standard for floating-point DSP targeted for 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-21160 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-21160 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-21160 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-21160 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 DSP development tools, go to `http://www.analog.com/dsp/tools/`.

ADSP-21160 EZ-KIT Lite provides example programs to demonstrate the capabilities of the evaluation board.

The VisualDSP++ license provided with this EZ-KIT Lite evaluation system limits the size of a user program's code to 21K words of the processor's program memory space.

The board features:

- Analog Devices ADSP-21160 processor
    - ADSP-21160M processor:
        - 2.5V Core Voltage
        - 80 MHz Core Clock Speed
    - ADSP-21160N processor:
        - 1.9V Core Voltage
        - 95 MHz Core Clock Speed
    - Switch-Configurable Boot Mode
- Analog Devices AD1881A 48 kHz AC'97 SoundMAX® Codec
    - Jumper Selectable Line-In or Mic-In 3.5 mm Stereo Jack
    - Line-Out 3.5 mm Stereo Jack
- USB Debugging Interface
- SBSRAM
    - 512 Kb (64K x 32-bits x 2-chips)

- Flash Memory
  - 512 Kb (512K x 8-bits)
- Interface Connectors
  - 14-Pin Emulator Connector for JTAG Interface
  - SPORT0 Connectors
  - 2 Link Port Connectors
  - Expansion Interface Connectors (not populated)
- General-Purpose IO
  - 3 Push Buttons connected to DSP IRQs
  - 3 LEDs connected to DSP FLAGs

The EZ-KIT Lite board has two types of external memory: Flash memory and SBSRAM. The Flash memory can store user-specified boot code. By configuring the boot mode switch (SW1) and programming the Flash memory, the board can run as a stand-alone unit. For information about the external memory, see section "Memory Map" on page 2-2.

SPORT0 is interfaced to an audio codec, facilitating audio signal processing applications development. SPORT0 is also attached to an off-board connector for communication with other serial devices. For information about SPORT0, see section "SPORT0 Audio Interface" on page 3-3.

Additionally, the EZ-KIT Lite board provides access to most of the processor's peripheral ports on populated expansion interface connectors. For information about the expansion interface, see "External Port" on page 3-3.

Purpose of This Manual

The *ADSP-21160 EZ-KIT Lite Evaluation System Manual* provides instructions for using the hardware and installing the software on your PC. The text includes guidelines for running your own code on the ADSP-21160 EZ-KIT Lite. The manual also describes the board's configuration and components. Finally, a schematic and a bill of materials for each board modification are provided as a reference for future ADSP-21160 board designs.

Intended Audience

This manual is a user's guide and reference to the ADSP-21160 EZ-KIT Lite evaluation system. Programmers who are familiar with the Analog Devices SHARC processor architecture, operation, and programming are the primary audience for this manual.

Programmers who are unfamiliar with Analog Devices SHARC processors can use this manual in conjunction with the *ADSP-21160 SHARC Processor Hardware Reference* and *ADSP-21160 SHARC Processor Instruction Set Reference*, which describe the processor's architecture and instruction set. 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" on page -xiv.

Manual Contents

The manual consists of:

- Chapter 1, "Getting Started" on page 1-1
  Provides software and hardware installation procedures, PC system requirements, and basic board information.
- Chapter 2, "Using EZ-KIT Lite" on page 2-1
  Provides information on the EZ-KIT Lite from a programmer's perspective and provides a simplified memory map.
- Chapter 3, "EZ-KIT Lite Hardware Reference" on page 3-1
  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 two modifications of the EZ-KIT Lite board: ADSP-21160M and ADSP-21160N.
- Appendix B, "Schematics" on page B-1
  Provides the resources to allow EZ-KIT Lite board-level debugging or to use as a reference design.
  The appendix is not part of the online Help. The online Help viewers should go the PDF version of the *ADSP-21160 EZ-KIT Lite Evaluation System Manual* located in the `Docs\EZ-KIT Lite Manuals` folder on the installation CD to see the schematics.

What's New in This Manual

This is the third edition of the *ADSP-21160 EZ-KIT Lite Evaluation System Manual*. The new edition includes the updated installation and license registration procedures.

Technical or Customer Support

You can reach DSP Tools Support in the following ways.

- Visit the DSP Development Tools website at

  `www.analog.com/technology/dsp/developmentTools/index.html`

- Email questions to

  `dsptools.support@analog.com`

- Phone questions to **1-800-ANALOGD**
- Contact your ADI 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-21160 EZ-KIT Lite evaluation system supports Analog Devices ADSP-21160 SHARC processors.

Product Information

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

Analog Devices is online at www.analog.com. Our website provides information about a broad range of products—analog integrated circuits, amplifiers, converters, and digital signal processors.

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MyAnalog.com is a free feature of the Analog Devices website that allows customization of a webpage to display only the latest information on products you are interested in. You can also choose to receive weekly email notification containing updates to the webpages that meet your interests. MyAnalog.com provides access to books, application notes, data sheets, code examples, and more.

Registration:

Visit 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 email address.

DSP Product Information

For information on digital signal processors, visit our website at www.analog.com/dsp, 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.

- Email questions or requests for information to dsp.support@analog.com
- Fax questions or requests for information to **1-781-461-3010** (North America) or **+49 (0) 89 76903-157** (Europe)

Related Documents

For information on product related development software, see the following publications.

Table 1. Related DSP Publications

Title	Description
ADSP-21160M SHARC DSP Data Sheet *ADSP-21160N DSP Microcomputer Data Sheet*	General functional description, pinout, and timing.
ADSP-21160 SHARC Processor Hardware Reference	Description of internal processor architecture, registers, and all peripheral functions.
ADSP-21160 SHARC Processor Instruction Set Reference	Description of all allowed processor assembly instructions.

Table 2. Related VisualDSP++ Publications

Title	Description
VisualDSP++ 3.5 User's Guide for 32-Bit Processors	Detailed description of VisualDSP++ 3.5 features and usage.
VisualDSP++ 3.5 Assembler and Preprocessor Manual for SHARC Processors	Description of the assembler function and commands for SHARC processors.
VisualDSP++ 3.5 C/C++ Complier and Library Manual for SHARC Processors	Description of the complier function and commands for SHARC processors
VisualDSP++ 3.5 Linker and Utilities Manual for 32-Bit Processors	Description of the linker function and commands for the 32-bit processors.
VisualDSP++ 3.5 Loader Manual for 32-Bit Processors	Description of the loader function and commands for the 32-bit processors.

The listed documents can be found through online Help or in the `Docs` folder of your VisualDSP++ installation. Most documents are available in printed form.

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

Online Documentation

Your software installation kit includes online Help as part of the Windows® interface. These help files provide information about VisualDSP++ and the ADSP-21160 EZ-KIT Lite evaluation system.

To view VisualDSP++ Help, click on the **Help** menu item or go to the Windows task bar and select **Start –>Programs –>Analog Devices–>VisualDSP++ for 32-bit Processors –>VisualDSP++ Documentation**.

To view ADSP-21160 EZ-KIT Lite Help, which now is a part of the VisualDSP++ Help system, go the **Contents** tab of the Help window and select **Manuals –> ADSP-21160 EZ-KIT Lite**.

For more documentation, please go to
`http://www.analog.com/technology/dsp/library.html`.

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

Printed copies of VisualDSP++ manuals may be purchased through Analog Devices Customer Service at **1-781-329-4700**; ask for a Customer Service representative. The manuals can be purchased only as a kit. For additional information, call **1-603-883-2430**.

If you do not have an account with Analog Devices, you will be referred to Analog Devices distributors. To get information on our distributors, log onto `www.analog.com/salesdir/continent.asp`.

Hardware Manuals

Printed copies of hardware reference and instruction set reference manuals can be ordered through the Literature Center or downloaded from the Analog Devices website. The phone number is **1-800-ANALOGD** (**1-800-262-5643**). The manuals can be ordered by a title or by product number located on the back cover of each manual.

Data Sheets

All data sheets can be downloaded from the Analog Devices website. As a general rule, printed copies of data sheets with a letter suffix (L, M, N, S) can be obtained from the Literature Center at **1-800-ANALOGD** (**1-800-262-5643**) or downloaded from the website. Data sheets without the suffix can be downloaded from the website only—no hard copies are available. You can ask for the data sheet by part name or by product number.

If you want to have a data sheet faxed to you, the phone number for that service is **1-800-446-6212**. Follow the prompts and a list of data sheet code numbers will be faxed to you. Call the Literature Center first to find out if requested data sheets are available.

Contacting DSP Publications

Please send your comments and recommendations on how to improve our manuals and online Help. You can contact us at `dsp.techpubs@analog.com`.

Notation Conventions

The following table identifies and describes text conventions used in this manual.

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

Example	Description
Close command (**File** menu) or **OK**	Text in **bold** style indicates the location of an item within the VisualDSP++ environment's and boards' menu system and user interface items.
`{this | that}`	Alternative required items in syntax descriptions appear within curly brackets separated by vertical bars; read the example as `this` or `that`.
`[this | that]`	Optional items in syntax descriptions appear within brackets and separated by vertical bars; read the example as an optional `this` or `that`.
`[this,…]`	Optional item lists in syntax descriptions appear within brackets delimited by commas and terminated with an ellipsis; read the example as an optional comma-separated list of `this`.
`PF9-0`	Registers, connectors, pins, commands, directives, keywords, code examples, and feature names are in text with `letter gothic` font.
`filename`	Non-keyword placeholders appear in text with italic style format.
	A note providing information of special interest or identifying a related topic. In the online version of this book, the word **Note** appears instead of this symbol.
	A caution providing information about critical design or programming issues that influence operation of a product. In the online version of this book, the word **Caution** appears instead of this symbol.

1 GETTING STARTED

This chapter provides information you need to begin using ADSP-21160 EZ-KIT Lite evaluation system. For correct operation, install the software and hardware in the order presented in "Installation Tasks" on page 1-3.

The chapter includes the following sections.

- "Contents of EZ-KIT Lite Package" on page 1-1
  Provides a list of the components shipped with this EZ-KIT Lite evaluation system.
- "PC Configuration" on page 1-3
  Describes the minimum requirements for the PC to work with the EZ-KIT Lite.
- "Installation Tasks" on page 1-3
  Describes the step-by-step procedures for setting up the hardware and software.

Contents of EZ-KIT Lite Package

Your ADSP-21160 EZ-KIT Lite evaluation system package contains the following items.

- ADSP-21160M or ADSP-21160N EZ-KIT Lite board
- *EZ-KIT Lite Installation Procedure*
- *VisualDSP++ 3.5 Installation Quick Reference Card*

- CD containing:
  - VisualDSP++ 3.5 for 32-bit processors with a limited license
  - ADSP-21160 EZ-KIT Lite debug software
  - USB driver files
  - Example programs
  - *ADSP-21160 EZ-KIT Lite Evaluation System Manual* (this document)
- Universal 7.5V DC power supply
- USB 2.0 type 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.

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.

PC Configuration

For correct operation of the VisualDSP++ software and the EZ-KIT Lite, your computer must have the minimum configuration:

Windows 98, Windows 2000, Windows XP
Intel (or comparable) 166MHz processor
VGA Monitor and color video card
2-button mouse
50 MB free on hard drive
32 MB RAM
Full-speed USB port
CD-ROM Drive

EZ-KIT Lite does not run under Windows 95 or Windows NT.

Installation Tasks

The following task list is provided for the safe and effective use of the ADSP-21160 EZ-KIT Lite. Follow the instructions in the presented order to ensure correct operation of your software and hardware.

1. VisualDSP++ and EZ-KIT Lite software installation
2. VisualDSP++ license installation and registration
3. EZ-KIT Lite hardware setup
4. EZ-KIT Lite USB driver installation
5. USB driver installation verification
6. VisualDSP++ startup

Installing VisualDSP++ and EZ-KIT Lite Software

This EZ-KIT Lite comes with the latest version of VisualDSP++ 3.5 for 32-bit processors. VisualDSP++ installation includes EZ-KIT Lite installations.

To install VisualDSP++ and EZ-KIT Lite software:

1. Insert the VisualDSP++ installation CD into the CD-ROM drive.
2. If Autoplay is enabled on your PC, you see the **Install Shield Wizard Welcome** screen. Otherwise, choose **Run** from the **Start** menu, and enter `D:\ADI_Setup.exe` in the **Open** field, where `D` is the name of your local CD-ROM drive.
3. Follow the on-screen instructions to continue installing the software.
4. At the **Custom Setup** screen, select your EZ-KIT Lite from the list of available systems and choose the installation directory. Click an icon in the **Feature Description** field to see the selected system's description. When you have finished, click **Next**.
5. At the **Ready to Install** screen, click **Back** to change your install options, click **Install** to install the software, or click **Cancel** to exit the install.
6. When the EZ-KIT Lite installs, the **Wizard Completed** screen appears. Click **Finish**.

Installing and Registering VisualDSP++ License

VisualDSP++ and EZ-KIT Lites are licensed products. You may run only one copy of the software for each license purchased. Once a new copy of the VisualDSP++ or EZ-KIT Lite software is installed on your PC, you must install, register, and validate your licence.

The *VisualDSP++ 3.5 Installation Quick Reference Card* included in your package will guide you through the licence installation and registration process (refer to Tasks 1, 2, and 3).

Setting Up EZ-KIT Lite Hardware

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-21160 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.

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 moving to the next step.
3. Plug the provided power supply into P4 on the EZ-KIT Lite board. Visually verify that the green power LED (LED6) is on. Also verify that the two red RESET LEDs (LED1 and LED8) go on for a moment and then go off.

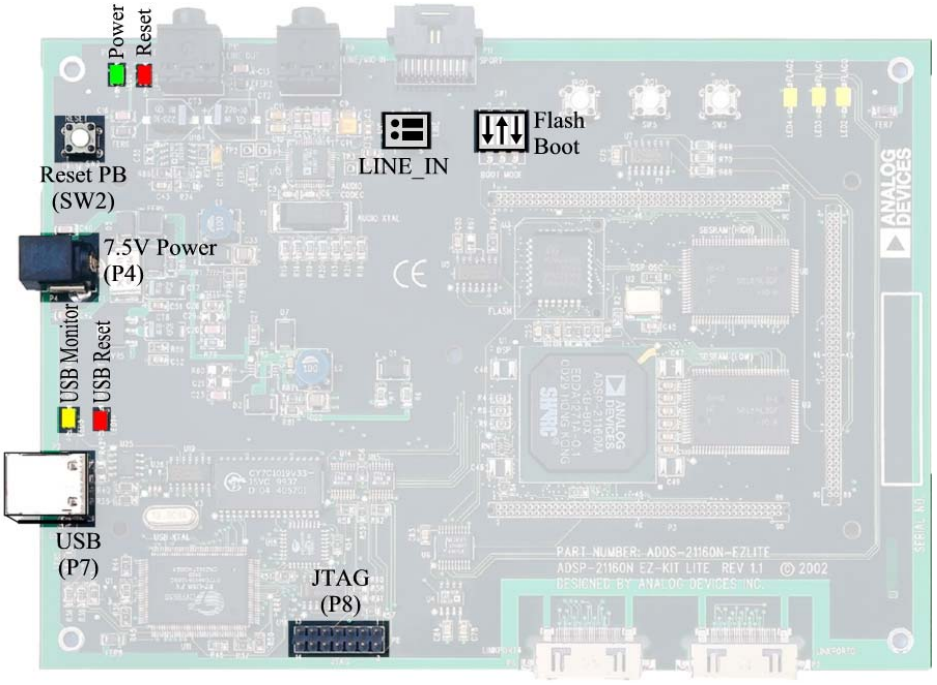


Figure 1-1. EZ-KIT Lite Hardware Setup

4. Connect one end of the USB cable to an available full-speed USB port on your PC and the other end to P7 on the ADSP-21160 EZ-KIT Lite board.

Installing EZ-KIT Lite USB Driver

The EZ-KIT Lite evaluation system installed on the following platforms requires one full-speed USB port.

- "Windows 98 USB Driver" on page 1-7 describes the installation on Windows 98.

- "Windows 2000 USB Driver" on page 1-11 describes the installation on Windows 2000.
- "Windows XP USB Driver" on page 1-12 describes the installation on Windows XP.

The USB driver used by the debug agent is not Microsoft certified because it is intended for a development or laboratory environment, not a commercial environment.

Windows 98 USB Driver

Before using the ADSP-21160 EZ-KIT Lite for the first time, the Windows 98 USB driver must first be installed.

To install the USB driver:

1. Insert the CD into the CD-ROM drive.
   The connection of the device to the USB port activates the Windows 98 **Add New Hardware Wizard** shown in Figure 1-2.

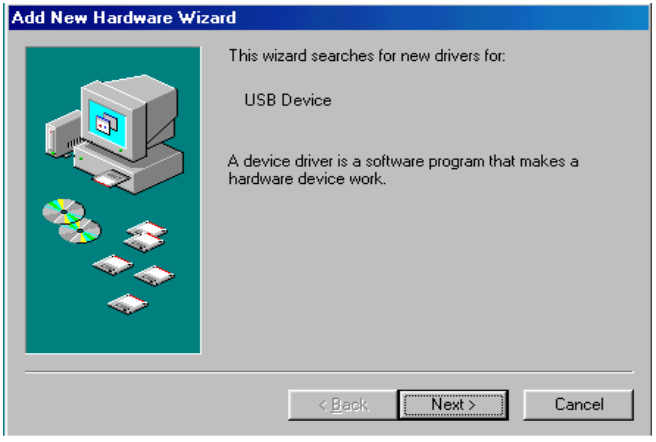


Figure 1-2. Windows 98 – Add New Hardware Wizard

2. Click **Next**.

3. Select **Search for the best driver for your device**, as shown in Figure 1-3.

Figure 1-3. Windows 98 – Searching for Driver

4. Click **Next**.
5. Select **CD-ROM drive**, as shown in Figure 1-4.

Figure 1-4. Windows 98 – Searching for CD-ROM

6. Click **Next**.
   Windows 98 locates the `WmUSBEz.inf` file on the installation CD, as shown in Figure 1-5.

Figure 1-5. Windows 98 – Locating Driver

7. Click **Next**.
   The **Coping Files** dialog box appears (Figure 1-6).

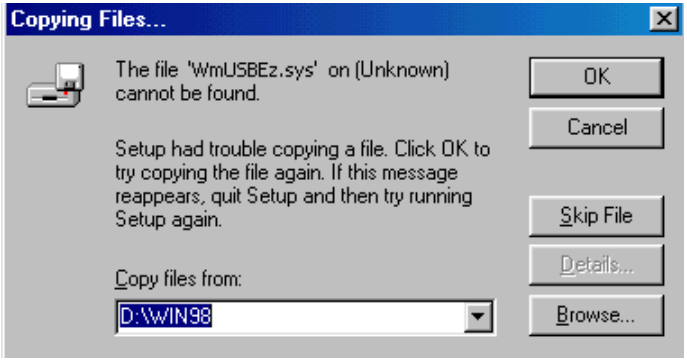


Figure 1-6. Windows 98 – Searching for .SYS File

8. Click **Browse**.
   The **Open** dialog box, shown in Figure 1-7, appears on the screen.

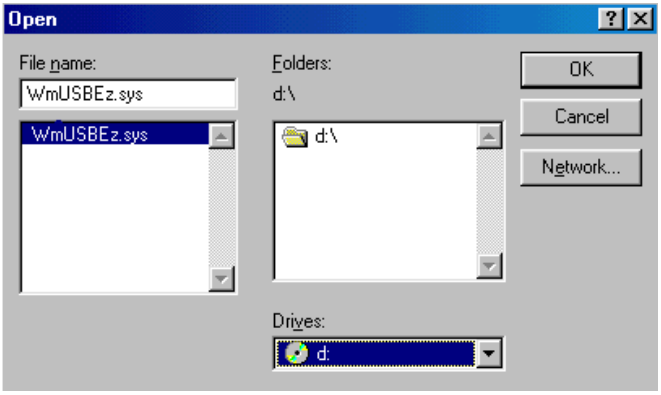


Figure 1-7. Windows 98 – Opening .SYS File

9. In **Drives**, select your CD-ROM drive.
10. Click **OK**.

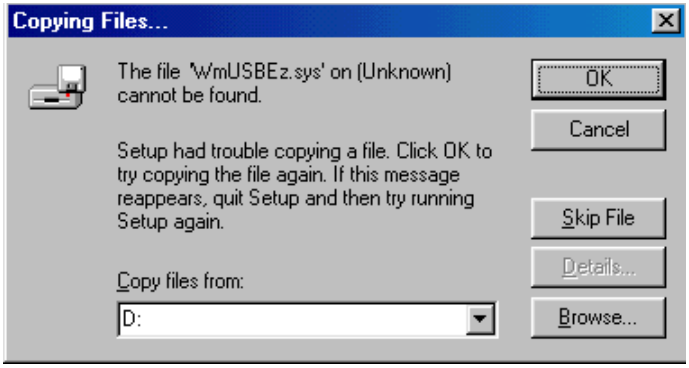


Figure 1-8. Windows 98 – Copying .SYS File

The **Copying Files** dialog box (Figure 1-8) appears.

11. Click **OK**.
    The driver installation is now complete, as shown in Figure 1-9.

Figure 1-9. Windows 98 – Completing Software Installation

12. Click **Finish** to exit the wizard.
13. Verify the installation by following the instructions in "Verifying Driver Installation" on page 1-14.

Windows 2000 USB Driver

VisualDSP++ 3.5 installation software pre-installs the necessary drivers for the selected EZ-KIT Lite. The install also upgrades an older driver if such is detected in the system.

Prior to running the VisualDSP++ 3.5 installer, ensure there are no other Hardware Wizard windows running in the background. If there are any wizard windows running, close them before starting the installer.

To install the USB driver:

1. If VisualDSP++ 3.5 is already installed on your system, go to step 2. Otherwise, run VisualDSP++ 3.5 installation. Refer to the *VisualDSP++ 3.5 Installation Quick Reference Card* for a detailed installation description. When installing VisualDSP++ 3.5 on Windows 2000, make sure the appropriate EZ-KIT Lite component is selected for the installation.
2. Connect the EZ-KIT Lite device to your PC's USB port. Windows 2000 automatically detects an EZ-KIT device and automatically installs the appropriate driver for the selected device (see step 1).
3. Verify the installation by following the instructions in "Verifying Driver Installation" on page 1-14.

Windows XP USB Driver

VisualDSP++ 3.5 installation software pre-installs the necessary drivers for the selected EZ-KIT Lite. The install also upgrades an older driver if such is detected in the system.

Prior to running the VisualDSP++ 3.5 installer, ensure there are no other Hardware Wizard windows running in the background. If there are any wizard windows running, close them before starting the installer.

To install the USB driver:

1. If VisualDSP++ 3.5 is already installed on your system, go to step 2. Otherwise, run VisualDSP++ 3.5 installation. Refer to the *VisualDSP++ 3.5 Installation Quick Reference Card* for a detailed

installation description. When installing VisualDSP++ 3.5 on Windows XP, make sure the appropriate EZ-KIT Lite component is selected for the installation.

2. Connect the EZ-KIT Lite device to your PC's USB port. By connecting the device to the USB port you activate the Windows XP **Found New Hardware Wizard**, shown in Figure 1-10.

Figure 1-10. Windows XP – Found New Hardware Wizard

3. Select **Install the software automatically** (**Recommended**) and click **Next**.

When Windows XP completes the driver installation for the selected device (see step 1), a window shown in Figure 1-11 appears on the screen.

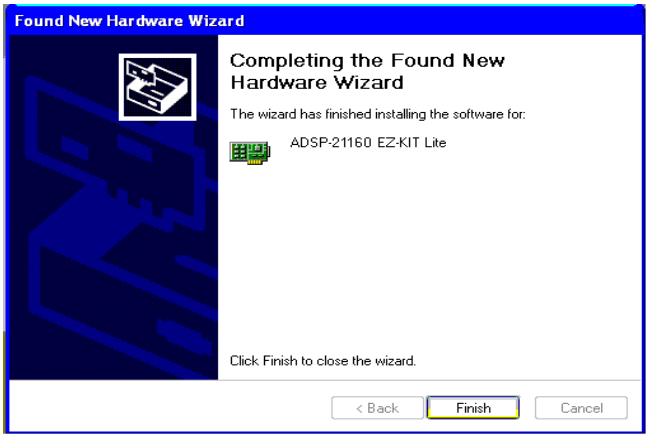


Figure 1-11. Windows XP – Completing Driver Installation

4. Verify the installation by following the instructions in "Verifying Driver Installation".

Verifying Driver Installation

Before launching the EZ-KIT Lite evaluation system, verify that the USB driver software is installed properly:

1. Ensure that the USB cable connects to the evaluation board and the PC.
2. Verify that the yellow USB monitor LED (LED5) is lit. This signifies the board is communicating properly with the host PC and is ready to run VisualDSP++.

3. Verify that the USB driver software is installed properly. Open Windows **Device Manager** and verify that **ADSP-21160 EZ-KIT Lite** shows under **ADI Development Tools** with no exclamation point, as in Figure 1-12.

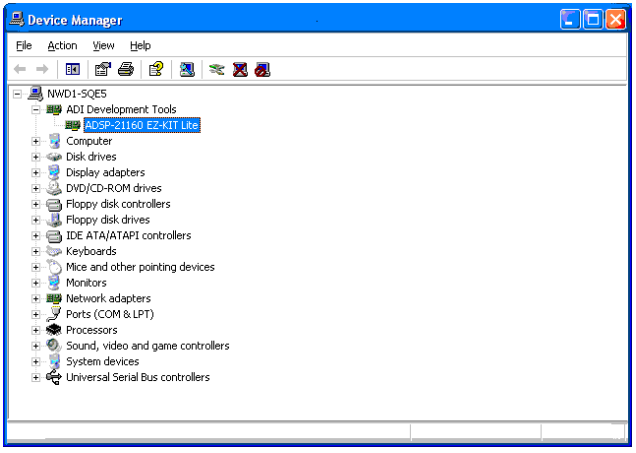


Figure 1-12. Device Manager Window

If using an EZ-KIT Lite on Windows 98, disconnect the USB cable from the board before booting the PC. When Windows 98 is booted and you are logged on, re-connect the USB cable to the board. The operation should continue normally from this point.

Starting VisualDSP++

To set up a session in VisualDSP++:

1. Verify that the yellow USB monitor LED (`LED5`, 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. Press and hold down the **Control** (CTRL) key.

3. Select the **Start** button on the Windows taskbar, then choose **Programs–>Analog Devices–>VisualDSP++ for 32-bit Processors–>VisualDSP++ Environment**.
   If you are running VisualDSP++ for the first time, go to step 4. If you already have existing sessions, the **Session List** dialog box appears on the screen.
4. Click **New Session**.
5. The **New Session** dialog box, shown in Figure 1-13, appears on the screen.

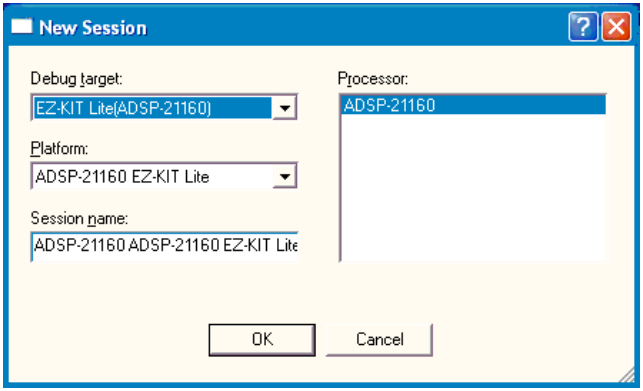


Figure 1-13. New Session Dialog Box

6. In **Debug Target**, choose **EZ-KIT Lite (ADSP-21160)**.
7. In **Processor**, choose the appropriate processor, **ADSP-21160**.
8. Type a new target name in **Session Name** or accept the default name.
9. Click **OK** to return to the **Session List**. Highlight the new session and click **Activate**.

2 USING EZ-KIT LITE

This chapter provides specific information to assist you with developing programs for the ADSP-21160 EZ-KIT Lite evaluation system. This information appears in the following sections.

- "EZ-KIT Lite License Restrictions" on page 2-2
  Describes the restrictions of the VisualDSP++ license shipped with the EZ-KIT Lite.
- "Memory Map" on page 2-2
  Defines the ADSP-21160 EZ-KIT Lite's memory map.
- "Using FLAG Pins" on page 2-4
  Describes the board's FLAG pins.
- "Using Interrupt Pins" on page 2-4
  Describes the board's interrupt pins.
- "Example Programs" on page 2-5
  Provides information about example programs included in the ADSP-21160 EZ-KIT Lite.
- "Using Flash Programmer Utility" on page 2-5
  Provides information on the Flash Programmer utility included with the EZ-KIT Lite software.
- "Using EZ-KIT Lite VisualDSP++ Interface" on page 2-6
  Describes the trace, performance monitoring, boot loading, context switching, and target options facilities of the EZ-KIT Lite system.

For detailed information on how to program the ADSP-21160 SHARC processor, refer to the documents referenced in "Related Documents".

EZ-KIT Lite License Restrictions

The license shipped with the EZ-KIT Lite imposes the following restrictions.

- The size of a user program's code is limited to 21K words of the ADSP-21160 processor program memory space.
- No connections to simulator or emulator sessions are allowed.
- The EZ-KIT Lite hardware must be connected and powered up in order to use VisualDSP++ with a kit license.

Memory Map

The ADSP-21160 processors includes internal SRAM for instruction storage or data storage. The configuration of internal SRAM is detailed in the *ADSP-21160 SHARC Processor Hardware Reference*.

The External Port (EP) of the ADSP-21160 processor connects to the Flash memory and SBSRAM. ADSP-21160 EZ-KIT Lite board contains 512 Kb x 8-bits of external Flash memory. The Flash memory connects to the processors's `~MS0` and `~BMS` memory select pins.

SBSRAM is 512 Kb (64K x 32-bit x 2-chips). The SBSRAM memory connects to the `~MS1` memory select pin. This memory is flow-through SBSRAM, capable of burst reads and writes. For information on how to set up burst moves, refer to the *ADSP-21160 SHARC Processor Hardware Reference*.

The memory map in Figure 2-1 is dependant on the value of the `MSIZE` bits in the `SYSCON` register. The memory maps shows `MSIZE` set to `1100b`.

Table 2-1. EZ-KIT Lite Evaluation Board Memory Map

	Start Address	End Address	Content
Internal Memory	0x0000 0000	0x0000 FFFF	IOP Registers
	0x0002 0000	0x0003 FFFF	Long Word Addressing
	0x0004 0000	0x0007 FFFF	Normal Word Addressing
	0x0008 0000	0x000F FFFF	Short Word Addressing
Multiprocessor Space	0x0010 0000	0x001F FFFF	ID = 001 Internal Memory
	0x0020 0000	0x002F FFFF	ID = 010 Internal Memory
	0x0030 0000	0x003F FFFF	ID = 011 Internal Memory
	0x0040 0000	0x004F FFFF	ID = 100 Internal Memory
	0x0050 0000	0x005F FFFF	ID = 101 Internal Memory
	0x0060 0000	0x006F FFFF	ID = 110 Internal Memory
	0x0070 0000	0x007F FFFF	ID = 111 Internal Memory
External Memory	0x0080 0000	0x0087 FFFF	MSO and BMS (Flash memory[1])
	0x0280 0000	0x0281 FFFF	MS1 (SBRAM)
	All other locations		Not Used

1 When viewing external memory with VisualDSP++, ensure that MSIZE is set to 0xC.

Using FLAG Pins

The ADSP-21160 processor holds four general-purpose FLAG IO pins. The FLAG pins can be used as inputs or output depending on how they are configured in the MODE2 system register. The state of a FLAG can be written to and read from the FLAGFLAGS system register. When the FLAG pins are input, their current state can be found by reading the FLAGS system register. FLAG pins set as outputs are driven to the value written to the FLAGS system register.

The location of the signals can be found in Appendix B, "Schematics". The FLAG pins are summarized in Table 2-2. For more information on FLAGs, refer to the *ADSP-21160 SHARC Processor Hardware Reference*

Table 2-2. FLAG Pin Summary

FLAG[1] Pin	Connects To	Description
FLAG0	LED3	FLAG2-0 connect to the LEDs. These can be used, for example, to light a LED when a routine completes.
FLAG1	LED2	
FLAG2	LED1	
FLAG3	AD1881A Reset	FLAG3 connects directly to the reset pin of the AD1881A audio codec. To reset the AD1881A, drive this signal low.

1 FLAG0-3 are available on connector P2.

Using Interrupt Pins

The ADSP-21160 holds three interrupt request (~IRQ) pins that let you interact with the running program. The ~IRQ pins can be used only as inputs. To use these pins, you must enable the specific IRQ interrupt, as well as enable global interrupts. You also need to write a special interrupt service routine to handle the interrupts when they occur.

The location of the signals can be found in Appendix B, "Schematics". Interrupt pins are summarized in Table 2-3. For more information on configuring the ~IRQ pins, see the *ADSP-21160 SHARC Processor Hardware Reference*.

Table 2-3. Interrupt Pin Summary

Interrupt[1]	Connects To	Description
IRQ0	SW3	IRQ0-2 connect to the push buttons and supply feedback for program execution. For instance, you can write your code to trigger a FLAG when a routine is complete.
IRQ1	SW4	
IRQ2	SW5	

1 IRQ0-2 are available on connector P2.

Example Programs

Example programs are provided with the ADSP-21160 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 \…\VisualDSP 3.5 32-Bit\211xx\EZ-KITs\ADSP-21160\Examples. Please refer to the readme file provided with each example for more information.

Using Flash Programmer Utility

The ADSP-21160 EZ-KIT Lite evaluation system includes a Flash Programmer utility. The utility allows you to program the Flash memory on the EZ-KIT Lite. The Flash Programmer is installed with VisualDSP++. Once the utility is installed, it is accessible from the **Tools** pull-down menu.

For more information on the Flash Programmer utility, select **Start** and choose **Programs–>Analog Devices–>VisualDSP++ 3.5 for 32-bit Processors–>VisualDSP++ Documentation**.

Using EZ-KIT Lite VisualDSP++ Interface

This section provides information about the following parts of the VisualDSP++ graphical user interface:

Boot Load

Choosing **Boot Load** from the **Settings** menu runs the processor and performs a hard reset on the board. This command saves you from having to shut down VisualDSP++, reset the EZ-KIT Lite board, and bring up VisualDSP++ again when you want to perform a hard reset.

Use this feature when loading debug boot code from an external part or when you want to put the device into a known state.

Target Options

Choosing **Target Options** from the **Settings** menu opens the **Target Options** dialog box (Figure 2-1). Use target options to control certain aspects of the processor on the ADSP-21160 EZ-KIT Lite evaluation system.

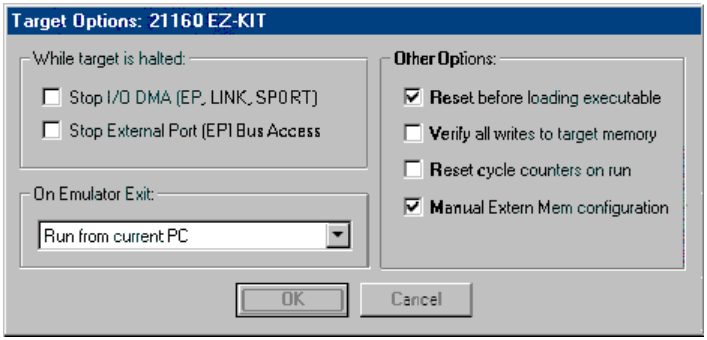


Figure 2-1. Target Options Dialog Box

While Target is Halted and On Emulator Exit Options

This target option controls the processor's behavior when VisualDSP++ relinquishes DSP control (for example, when exiting VisualDSP++). The options are detailed in Table 2-4 and Table 2-5.

Table 2-4. While Target is Halted Options

Option	Description
Stop I/O DMA	Stops I/O DMAs in emulator space. This option disables DMA requests when the emulator has control of the DSP. Data in the **EP**, **LINK**, or **SPORT DMA** buffers are held there unless the internal **DMA** request was already granted. This option holds off incoming data and ceases outgoing data. Because SPORT-receive data cannot be held off, it is lost, and the overrun bit is set. The direct write buffer (internal memory write) and the EP pad buffer are allowed to flush any remaining data to internal memory.

Other Options

Table 2-6 describes other available target options.

Table 2-5. On Emulator Exit Options

Option	Description
On Emulator Exit	Determines the state the DSP is left in when the emulator relinquishes control of the DSP: **Reset DSP and Run** causes the DSP to reset and begin execution from its reset vector location. **Run from current PC** causes the DSP to begin running from its current location.

Table 2-6. Other Target Options

Option	Description
Reset before loading executable	Resets registers before loading a DSP executable. Clear this option when DSP registers must not change to their reset values when a file load occurs.
Verify all writes to target memory	Validates all memory writes to the DSP. After each write, a read is performed and the values are checked for a matching condition. Enable this option during initial program development to locate and fix initial build problems (such as attempting to load data into non-existent memory). Clear this option to increase performance while loading executable files since VisualDSP++ does not perform the extra reads that are required to verify each write.
Reset cycle counters on run	Resets the cycle count registers to zero before a **Run** command is issued. Select this option to count the number of cycles executed between breakpoints in a program.
Manual Extern Mem configuration	Disables the automatic configuration of the SDRAM registers (done through the debugger).

Core Hang Conditions

Certain peripheral devices, such as host ports, DMA, and link ports, can hold off the execution of processor instructions. This is known as a hung condition and commonly occurs when reading from an empty port or writing to a full port. If an attempt to halt the processor is made during one of these conditions, the EZ-KIT Lite may encounter a core hang.

Normally, a core hang can be cleared by the board using a special clear/abort bit. However, there are cases in which it is desirable or possible not to clear the core hang. Sometimes it is desirable to wait for the core hang to clear itself, such as when waiting for a host processor to read or write data. In other cases, it is not possible to clear the core hang, and a DSP reset must occur to continue the debugging session.

Table 2-7 describes the EZ-KIT Lite's core hang operations.

Table 2-7. Core Hang Operations

Option	Description
Abort	Abort the hung operation. This causes the offending instruction to be aborted in the pipeline.
Retry	Allows you to remedy the hung operation. For example, if a host processor is holding off the DSP, you can cause the host to clear the hung condition.
Ignore	Performs a software reset on the target board.
Clear	Aborts the hung operation. This causes the offending instruction to be aborted in the pipeline.
Acknowledge	Allows you to remedy the hung operation. For example, if a host processor is holding off the DSP, you can cause the host to clear the hung condition.
Reset	Performs a software reset on the target board.

Hardware Breakpoints

Hardware breakpoints work similarly to watchpoints. Set hardware breakpoints on:

- Data transfers within a user-defined memory range
- Instructions
- Register reads and writes

To enable hardware breakpoints for ADSP-21160 DSPs:

1. From the **Settings** menu, choose **Hardware Breakpoints**.
2. The **Hardware Breakpoints** dialog box appears. The dialog box has three tabbed pages: **Data**, **Instruction**, and **Other** (Figure 2-2).

Figure 2-2. Hardware Breakpoints Dialog Box

Refer to the following sections for information about hardware breakpoints.

- "Common Hardware Breakpoint Attributes" on page 2-10
- "Global Hardware Breakpoint Options" on page 2-10
- "Data Hardware Breakpoints" on page 2-12
- "Instruction Hardware Breakpoints" on page 2-13
- "Other Breakpoints" on page 2-14
- "Tips and Tricks Using Hardware Breakpoints" on page 2-15

Common Hardware Breakpoint Attributes

Each of the three tabs in the **Hardware Breakpoints** dialog box has common attributes. The common attributes are described in Table 2-8.

Global Hardware Breakpoint Options

For ADSP-21160 DSPs, the options listed in Table 2-9 apply to all hardware breakpoints, regardless of their type.

Table 2-8. Common Hardware Breakpoint Attributes

Attribute	Description
Enable	Enables each individual breakpoint.
Start Address **End Address**	Specify inclusive start and end addresses. Each pair of addresses sets up an address range for the particular breakpoint.
Exclusive	Enables breaks outside of the specified (inclusive) address range.
Mode	**Data** page and **Other** page only. This option specifies the modes that trigger hardware breakpoints. The available choices are: **Disabled**—disables the breakpoint **On Write**—triggers the breakpoint on any write operation to the specified address range **On Read**—triggers the breakpoint on any read operation from the specified address range **Any Access**—triggers the breakpoint on any read or write access to the specified address range.

Table 2-9. Global Hardware Breakpoint Options

Option	Description
Skip N Breakpoint Events	Specifies the number of breakpoint events to be ignored before stopping the processor. Each time a hardware breakpoint condition occurs, the count decrements. When the count reaches zero (0), the DSP processes the hardware break. Use this option to count the number of times a break operation occurs. Breakpoints within the group are ORed together to create this condition.
Restore Skip Count on Break	Enables skip-count decrement as specified in **Skip N Breakpoint Events**.
Restore Skip Count on Break	Causes the emulator to restore the Skip Count to the value at program RESTART. Otherwise, the Skip Count remains at its current value.
AND All Breakpoints	ANDs the interrupts to form the composite interrupt. Normally, the group interrupts are ORed to create a composite interrupt.

Data Hardware Breakpoints

For ADSP-21160 DSPs, use data breakpoints to break on accesses to internal memory, IOP registers, the external port (EP), and multiprocessor memory space (MMS).

The following actions trigger a data breakpoint:

- `DAG1` access
- `DM()` modifier access

The two data breakpoints are ORed to generate a single data breakpoint condition.

The **Data** page of the **Hardware Breakpoints** dialog box, which permits the specification of two data breakpoints, is shown in Figure 2-3.

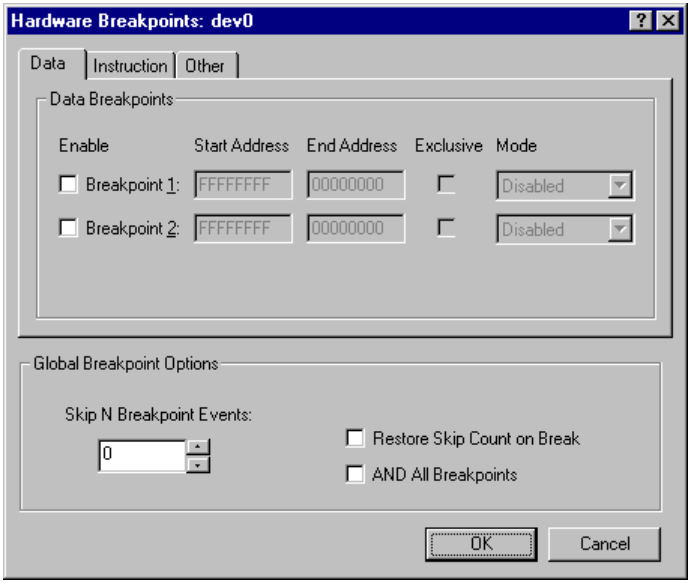


Figure 2-3. Data Page of Hardware Breakpoints Dialog Box

Instruction Hardware Breakpoints

For ADSP-21160 DSPs, an instruction breakpoint occurs when an instruction is executed within one of the specified address ranges. The four individual instruction breakpoints are ORed to generate a single instruction breakpoint condition.

Shown below is the **Instruction** page of the **Hardware Breakpoints** dialog box, which permits the specification of four individual instruction breakpoints.

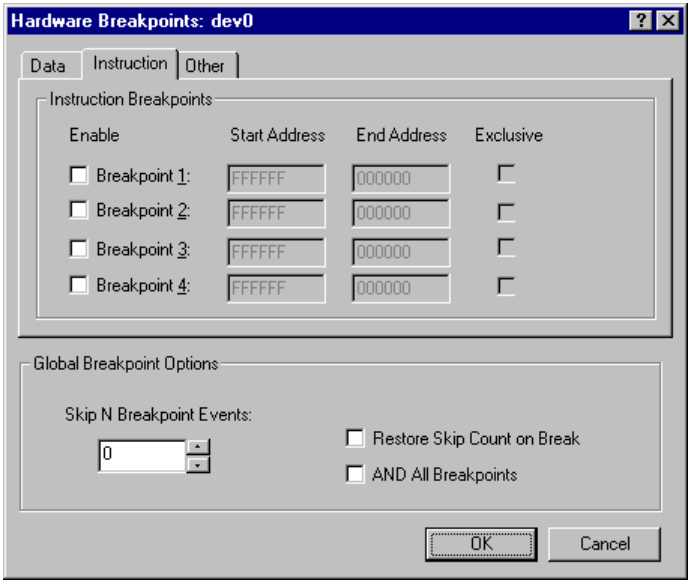


Figure 2-4. Instruction Page of Hardware Breakpoints Dialog Box

Other Breakpoints

For SHARC DSPs, the **Other** page of the **Data Breakpoints** dialog box permits the specification of hardware breakpoints triggered by access to PM data, I/O, or the external port.

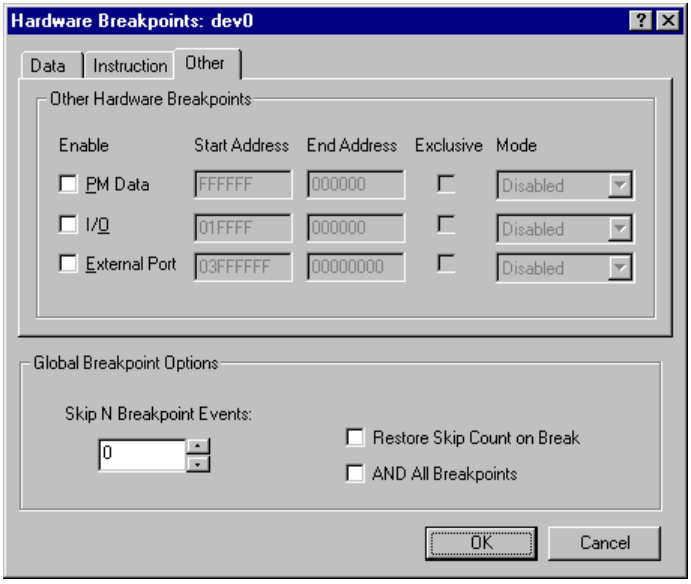


Figure 2-5. Other Page of Hardware Breakpoints Dialog Box

Table 2-10. Other Hardware Breakpoint Options

Option	Description
PM DataEvents	Enables PM data breakpoints. PM data breakpoints are similar to data breakpoints (Data page), except accesses that trigger a PM breakpoint are made by DAG2 or the PM() modifier. Like data breakpoints, PM data breakpoints cause a break on accesses to internal memory, IOP registers, the external port (EP), and multiprocessor memory space (MMS).
I/O	Enables I/O breakpoints. I/O breakpoints are triggered by accesses made on the I/O Address Bus. Use an I/O breakpoint to break on accesses made during DMA transfers, MMS accesses, and Host accesses.

Table 2-10. Other Hardware Breakpoint Options (Cont'd)

Option	Description
External Port	Enables external port breakpoints.External port (EP) breakpoints are triggered by accesses made through the External Port. Use an EP breakpoint to break on accesses made to any external device that may be tied to the EP, such as external memory.
AND All Breakpoints	ANDs the interrupts to form the composite interrupt. Normally, the group interrupts are ORed to create a composite interrupt.

Tips and Tricks Using Hardware Breakpoints

Be aware of the following tips and tricks when using hardware breakpoints on ADSP-21160 processors.

Latency

For SHARC processors, hardware breakpoints do not assert until two (2) instruction cycles after the actual break condition occurs

Restrictions

When using hardware breakpoints, do not place breaks at any address where a `JUMP`, `CALL`, or `IDLE` instruction would be illegal.

Do not place breaks in the last few instructions of a `DO LOOP` or in the delay slots of a delayed branch. For more information on these illegal locations, refer to your DSP's Hardware Reference.

Setting a Breakpoint on a Single Address

To set a breakpoint on a single address, set the **Start Address** equal to the **End Address**.

Restricted Software Breakpoints

The EZ-KIT Lite development system restricts breakpoint placement when certain conditions are met. That is, under some conditions, breakpoints cannot be placed effectively. Such conditions depend on bus architecture, pipeline depth, and ordering of the EZ-KIT Lite and its target processor.

3 EZ-KIT LITE HARDWARE REFERENCE

This chapter describes the hardware design of the ADSP-21160 EZ-KIT Lite board. The following topics are covered.

- "System Architecture" on page 3-2
  Describes the configuration of the ADSP-21160 EZ-KIT Lite board and explains how the board components interface with the processor.
- "Jumper and DIP Switch" on page 3-5
  Shows the location and describes the function of the on-board jumper and DIP switch.
- "LEDs and Push Buttons" on page 3-7
  Shows the location and describes the function of the LEDs and push buttons.
- "Connectors" on page 3-9
  Shows the location and gives the part number for the on-board connectors. Also, the manufacturer and part number information is given for the mating parts.
- "Specifications" on page 3-14
  Provides the board's measurements and power supply specifications.

System Architecture

This section describes the processor's configuration on the EZ-KIT Lite board.

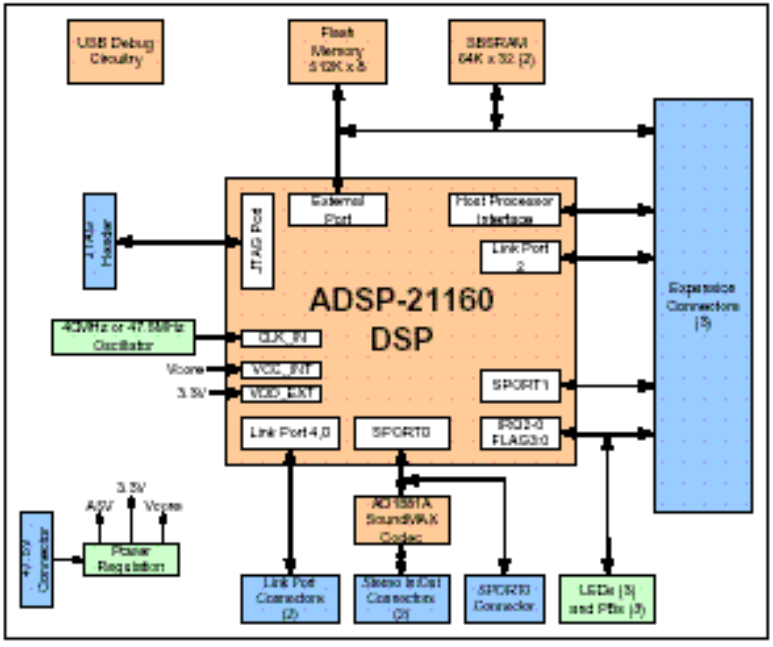


Figure 3-1. System Architecture Block Diagram

The ADSP-21160N processor's core voltage is 1.9V, and ADSP-21160M processor's core voltage is 2.5V. The voltage of the processors' peripheral interface is 3.3V.

The core frequency of the processor is configured by multiplying the external oscillator by 2x. If there is a ADSP-21160M processor on the board, the external oscillator is 40 MHz. If there is a ADSP-21160N processor on the board, the external oscillator is 47.5 MHz.

The EZ-KIT Lite board can be configured to boot in all of the possible ADSP-21160 processor boot modes. The default boot mode is from the external 8-bit Flash memory. For information about configuring the boot mode, see "Boot Mode Select Switch (SW1)" on page 3-6.

External Port

The External Port (EP) of the processor connects to a 512 Kb (64K x 32-bits x 2-chips) SBSRAM. The SBSRAM connects to the memory select pin (~MS1), providing a 64-bit memory interface.

The EP also connects to a 512 Kb (512K x 8-bits) Flash memory. The Flash memory connects to both the ~BMS and ~MS0 memory select pins. The connection allows the processor to boot from the Flash memory using ~BMS and program it using ~MS0.

All of the address, data, and control signals are available externally via the expansion connectors (P1-3). The pinout of these connectors can be found in Appendix B, "Schematics".

SPORT0 Audio Interface

SPORT0 connects to the AD1881A SoundMAX codec (U13). Two 3.5 mm stereo jacks (P9, P10) allow audio to be input and output. You can supply an audio input to the codec microphone input channel (MIC1) or to the stereo input channel (LINE_IN). The jumper settings of JP1 determine the codec channel driven by the input jack (P9). For information about configuring JP1, see "Audio Input Selection Jumper (JP1)" on page 3-6.

SPORT0 is also routed to an off-board connector (P11). When using the off-board connector, the codec must be held in reset, so it does not drive any of the SPORT0 signals. The codec can be held in reset by driving FLAG3 "low" (0). The processor must drive FLAG3 "high" (1) to start the codec.

The TCLK0 and RCLK0 pins are shorted together using R19 and R20.

Expansion Interface

The expansion interface consists of three unpopulated connectors. Table 3-1 shows the interfaces each connector provides. For the exact pinout of these connectors, refer to Appendix B, "Schematics". Analog Devices does not populate these connectors or provide any additional support for this interface. The mechanical dimensions of the connectors can be found in "Board Current Measurements" on page 3-14.

Table 3-1. Expansion Interface Connectors

Connector	Interfaces
P1	5V, GND, Address[31–0], Data[47–0]
P2	3.3V, GND, FLAG[3–0], SPORT1, ~IRQ[2–0], TIMEXP
P3	GND, Reset, LINKPORT2, memory control signals, D[63-–8]

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 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.

JTAG Emulation Port

The JTAG emulation port allows an emulator to access the processor's internal and external memory, as well as the special function registers, through a 14-pin interface. When an emulator connects to the board at P8, the USB debugging interface is disabled.

For a detailed description of the interface's connectors, see *EE-68* published on the Analog Devices website. For more information, see "JTAG Connector (P8)" on page 3-12. For more information about available emulators, contact Analog Devices (see "Product Information").

Jumper and DIP Switch

This section describes the function of the jumper and DIP switch. Figure 3-2 shows the jumper and switch locations.

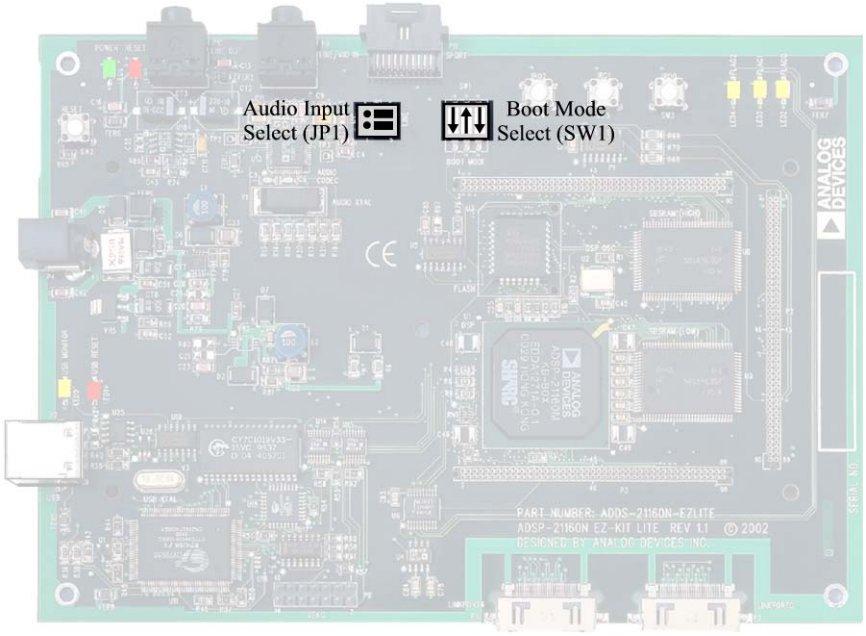
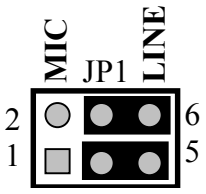
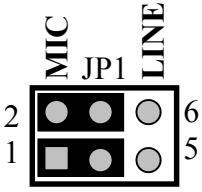


Figure 3-2. Jumper and Switch Locations

Audio Input Selection Jumper (JP1)

The audio input jack (P9) can connect to the MIC1 or LINE_IN input channel of the AD1881A codec (U13). When the JP1 jumper connects pins 1 and 3 and pins 2 and 4, P3 connects to the mono MIC1 channel. When the jumper connects pins 3 and 5 and pins 4 and 6, P9 connects to the stereo LINE_IN channel of the AD1881A codec. These jumper settings are illustrated in Table 3-2. (The labels MIC and LINE appear on the board as a reference).

Table 3-2. Audio Input Jumper Settings (JP1)

Stereo LINE_IN (Default)	Mono MIC1
	

Boot Mode Select Switch (SW1)

The boot mode select switch (SW1) determines how the ADSP-21160 processor boots. Table 3-3 shows the switch settings for the boot modes.

Table 3-3. Boot Mode Select Jumper (SW1) Settings

~BMS Pin 1	LBOOT Pins 2	EBOOT Pins 3	Boot Mode
Off (output[1])	**On**	**Off**	**Boot from 8-bit Flash memory**
Off (input)	On	On	Boot from Host
Off (input)	Off	On	Booting from Link Port
On (input)	On	On	No Boot (execute from external memory)

Table 3-3. Boot Mode Select Jumper (SW1) Settings (Cont'd)

~BMS Pin 1	LBOOT Pins 2	EBOOT Pins 3	Boot Mode
On (input)	Off	On	Reserved
X (input)	Off	Off	Reserved

1 Default mode

LEDs and Push Buttons

This section describes the functionality of the LEDs and push buttons. Figure 3-3 shows the locations of the LEDs and push buttons.

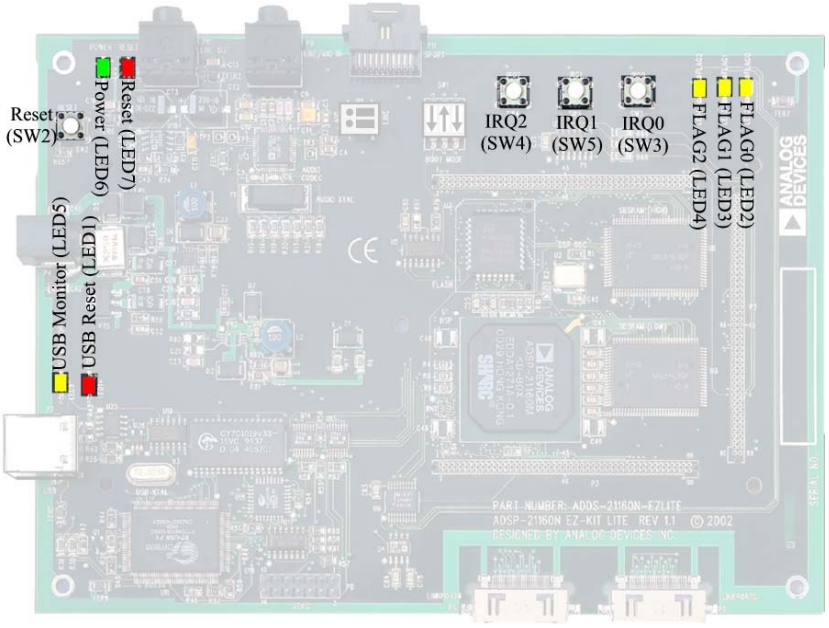


Figure 3-3. LED and Push Button Locations

Reset LEDs (LED1 and LED7)

When LED1 is lit, the master reset of all the major ICs is active.

When LED7 is lit, the USB interface chip (U11) is being reset. The USB interface resets on power-up or when USB communication has not been initialized.

FLAG LEDs (LED2–4)

The FLAG LEDs connect to the processor's FLAG pins (FLAG0-2). The LEDs are active HIGH and are lit by an output of "1" from the processor. Refer to "LEDs and Push Buttons" on page 3-7 for more information on how to program the processor using FLAGs. Table 3-4 shows the FLAG signals and the corresponding LEDs.

Table 3-4. FLAG LEDs

FLAG Pin	LED Reference Designator
FLAG0	LED2
FLAG1	LED3
FLAG2	LED4

USB Monitor LED (LED5)

The USB monitor LED (LED5) indicates that USB communication has been initialized successfully, and you may connect to the processor using a VisualDSP++ EZ-KIT Lite session. If the LED does not light in approximately 15 second after the USB cable connects the board, try cycling power on the board and/or reinstalling the USB driver (see "Installing EZ-KIT Lite USB Driver" on page 1-6).

Power LED (LED6)

When LED6 is lit (green), it indicates that power is being properly supplied to the board.

Board Reset Push Button (SW2)

The RESET push button (SW2) resets all of the ICs on the board. This reset does not affect the USB interface chip (U11) unless communication has not been initialized with a PC. After USB communication has been initialized, the only way to reset the USB is by powering down the board.

Interrupt Push Buttons (SW3–5)

Three push buttons connect to the three processor ~IRQ pins. The pins are always input and, when asserted (0) and when interrupts are enabled, the processor goes to the corresponding interrupt vector. Refer to "Using Interrupt Pins" on page 2-4 for more information about the use of the IRQs when programming the processor. The push button reference designators and corresponding interrupt signals are summarized in Table 3-5.

Table 3-5. Interrupt Switches

Interrupt Signal	Push Button Reference Designator
IRQ0	SW3
IRQ1	SW4
IRQ2	SW5

Connectors

This section describes the connector functionality and provides information about mating connectors. Figure 3-4 shows the connector locations.

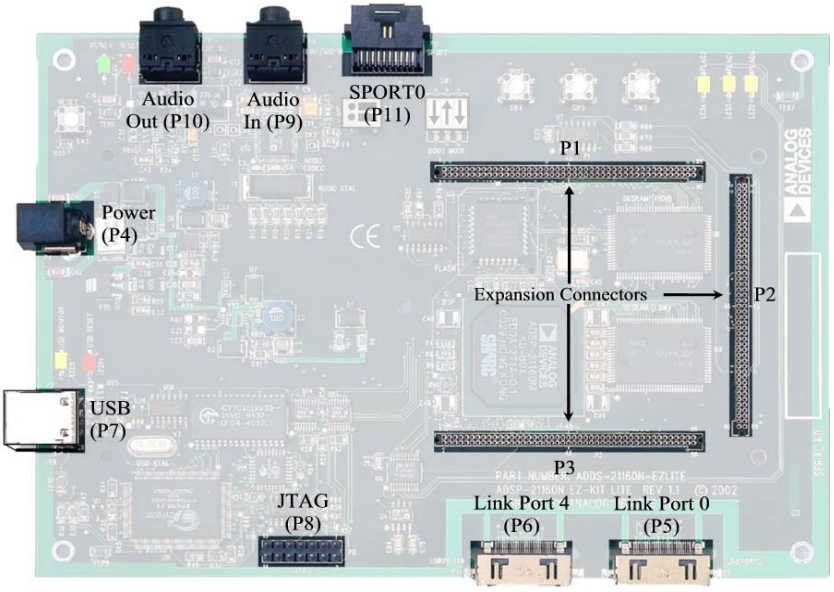


Figure 3-4. Connector Locations

Expansion Connectors (P1–3)

Three board-to-board connectors provide signals for most of the processor's peripheral interfaces. Analog Devices does not populate the expansion connectors or provide any additional support for the interface. See "Expansion Interface" on page 3-4 for more information on the expansion interface. Contact Samtec for the availability and pricing of the connectors. For the exact pinout of the connectors, refer to Appendix B, "Schematics".

Table 3-6. P1, P2, P3 Part Number Information

Part Description	Manufacturer	Part Number
90-Position 0.05” Spacing (P1, P2, P3)	Samtec	SFM-145-01-S-D
Mating Connector		
90-Position 0.05” Spacing (Through Hole)	Samtec	TFM-145-x1 Series
90 Position 0.05” Spacing (Surface Mount)	Samtec	TFM-145-x2 Series
90-Position 0.05” Spacing (Low Cost)	Samtec	TFC-145 Series

Power Connector (P4)

The power connector (P4) provides all of the power necessary to operate the EZ-KIT Lite board.

Table 3-7. P4 Part Number Information

Part Description	Manufacturer	Part Number
2.5 mm Power Jack (P4)	SWITCHCRAFT	RAPC712
	Digi-Key	SC1152-ND
Mating Power Supply (shipped with EZ-KIT Lite)		
7.5V Power Supply	GlobTek	TR9CC2000LCP-Y

Link Port Connectors (P5–6)

Each link port links to a 26-pin connector. Refer to *EE-106* found on the ADI website at http://www.analog.com for more information about the link port connectors.

Table 3-8. P5, P6 Part Number Information

Part Description	Manufacturer	Part Number
26-position connector (P5, P6)	Honda	RMCA-26JL-AD
Mating Connector		
Cable Assembly (30 cm)	Analog Devices	ADDS-LPCAB-30
Cable connector	Honda	RMCA-E26F1S-A
Shroud	Honda	RMCA-E26L1A
Coaxial cable	Gore	DXN2132

USB Connector (P7)

The USB connector (P7) is a standard Type B USB receptacle. The USB connector is used to debug the processor. The connectors does not link to the processor's USB interface.

Table 3-9. P7 Part Number Information

Part Description	Manufacturer	Part Number
Type B USB receptacle	Mill-Max	897-30-004-90-000
	Digi-Key	ED90003-ND
Mating Connector (provided with the EZ-KIT Lite)		
USB cable	Assmann	AK672-5
	Digi-Key	AK672-5ND

JTAG Connector (P8)

The JTAG header (P8) 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.

Table 3-10. P8 Part Number Information

Part Description	Manufacturer	Part Number
14-pin IDC Header (P8)	Berg	54102-T08-07

Audio Connectors (P9–10)

There are two 3.5 mm stereo audio jacks: one input and one output.

Table 3-11. P9, P10 Part Number Information

Part Description	Manufacturer	Part Number
3.5 mm stereo jack (P9 and P10)	Shogyo	SJ-0359AM-5
Mating Connectors		
3.5mm stereo plug to 3.5mm stereo cable	Radio Shack	42-2387A

SPORT0 Connector (P11)

SPORT0 links to a 20-pin connector. The pinout for this connector can be found in Appendix B, "Schematics".

Table 3-12. P11 Part Number Information

Part Description	Manufacturer	Part Number
20-position AMPMODU system 50 receptacle (P11)	AMP	104069-1
Mating Connector		

Table 3-12. P11 Part Number Information (Cont'd)

Part Description	Manufacturer	Part Number
20-position AMPMODU system 20 connector	AMP	2-487937-0
20-position AMPMODU system 20 connector (w/o lock)	AMP	2-487938-0
Flexible film contacts (20 per connector)	AMP	487547-1
Mating Assemblys		
Straight-through assembly with locking connector on each end	Gopher Electronics	DRFFC10X7RHU-RHU5

Specifications

This section provides the requirements for the power supply as well as the mechanical dimensions of the board.

Power Supply

The power connector supplies DC power to the EZ-KIT Lite board. Table 3-13 shows the power supply specifications.

Table 3-13. Power Supply Specifications

Terminal	Connection
Center pin	+7.5V@2 amps
Outer Ring	GND

Board Current Measurements

Figure 3-5 shows the location of the mounting holes as well as pin 1 of each of the expansion connectors.

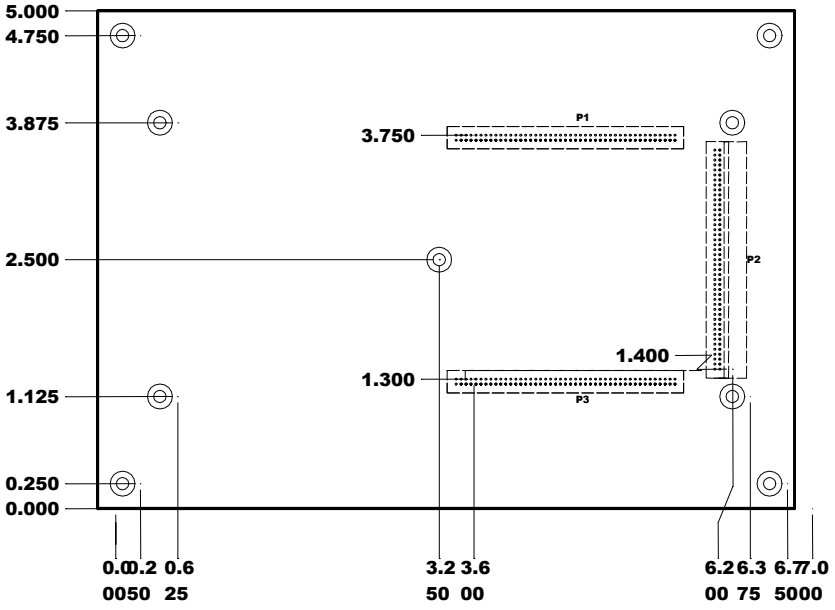


Figure 3-5. Mechanical Drawing

A BILL OF MATERIALS

The two bills of materials are for the 2.5V and 1.9V versions of the EZ-KIT Lite evaluation system, featuring the ADSP-21160M and ADDS-21160N processor, respectively:

ADSP-21160M EZ-KIT LITE

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
1	1	M29W040 PLCC32 FLASH-512K-X-8-3V	U3	ST MICRO	M29W040B120K6
2	2	74LVC14A SOIC14 HEX-INVER-SCHMITT-TRIGGER	U7, U19	TI	74LVC14AD
3	1	IDT74FCT3244APY SSOP20 3.3V-OCTAL-BUFFER	U6	IDT	IDT74FCT3244APY
4	1	24.576MHZ SMT OSC005 CRYSTAL	Y1	EPSON	MA505 24.576M-C2
5	1	CY7C64603-128 PQFP128 USB-TX/RX MICROCONTROLLER	U11	CYPRESS	CY7C64603-128NC

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
6	1	MMBT4401 SOT-23 NPN TRANSISTOR 200MA	Q1	FAIR-CHILD	MMBT4401
7	1	74LVC00AD SOIC14	U5	PHILIPS	74LVC00AD
8	1	24LC00-SN SOIC8 128 BIT SERIAL EEPROM	U25	MICRO-CHIP	24LC00-SN
9	1	CY7C1019BV33-15VC SOJ32 128K X 8 SRAM	U12	CYPRESS	CY7C1019BV33-12VC
10	1	AD8532AR SOIC8 DUAL AMP 250MA	U10	ANALOG DEVICES	AD8532AR
11	1	SN74AHC1G02 SOT23-5 SINGLE-2 INPUT-NOR	U16	TI	SN74AHC1G02DBVR
12	1	SN74LV164A SOIC14 8-BIT-PARALLEL-SERIAL	U17	TI	SN74LV164AD
13	1	CY7C4201V-15AC TQFP32 64-BYTE-FIFO	U18	CYPRESS	CY7C4201V-15AC
14	1	12.0MHZ THR OSC006 CRYSTAL	Y3	DIG01	300-6027-ND
15	1	SN74AHC1G00 SOT23-5 SINGLE-2-INPUT-NAND	U26	TI	SN74AHC1G00DBVR
16	2	MT58L64L32 TQFP100_B 64KX32-SBSRAM	U8–9	MICRON	MT58L64L32FT-10
17	1	LT1765 SO-8 ADJUST- ABLE-3A-SWITCH-REG	VR3	LINEAR TECH	LT1765ES8
18	1	40MHZ SMT OSC003	U2	DIGIKEY	SG-8002CA-PCC-ND40.0 MHZ
19	2	1000pF 50V 5% 1206 CERM	C40, C42	AVX	12065A102JAT2A

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
20	1	2200pF 50V 5% 1206 NPO	C23		
21	2	0.1uF 50V 10% 1206 CERM	C9–10	PHILIPS	12062R104K9BB2
22	1	ADSP-21160MKB-80X	U1	ANALOG DEVICES	ADSP-21160MKB-80
23	1	AD1881AJST LQFP48 SOUNDMAX-CODEC	U13	ANALOG DEVICES	AD1881AJST
24	1	ADM708SAR SOIC8 VOLTAGE-SUPERVISOR	U4	ANALOG DEVICES	ADM708SAR
25	1	ADP3339AKC-5 SOT-223 5V-1.5A REGULATOR	VR5	ANALOG DEVICES	ADP3339AKC-5-REEL
26	1	ADP3088 MSOP8 500MA-BUCK-REGULATOR	VR1	ANALOG DEVICES	ADP3088ARM-REEL
27	5	RUBBER FEET BLACK	MH1–5	MOUSER	517-SJ-5018BK
28	1	PWR 2.5MM_JACK CON005 RA	P4	SWITCH-CRAFT	SC1152-ND12
29	1	USB 4PIN CON009 USB	P7	MILL-MAX	897-30-004-90-000000
30	2	LNKPRT 12X2 CON010	P5–6	HONDA(TSUSHINK)	RMCA-EA26LMY-0M03-A
31	1	.05 10X2 CON014 RA	P11	AMP	104069-1
32	4	SPST-MOMENTARY SWT013 6MM	SW2–5	PANA-SONIC	EVQ-PAD04M
33	1	DIP3 SWT015	SW1	DIGI-KEY	CKN3055-ND
34	10	0.00 1/8W 5% 1206	R6–7, R17–20, R28, R68–70	YAGEO	0.0ECT-ND

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
35	2	220uF 10V 20% E ELEC	CT2–3	SPRAGUE	293D227X9010E2T
36	4	AMBER-SMT LED001 GULL-WING	LED2–5	PANA-SONIC	LN1461C-TR
37	2	22pF 50V 5% 805 CERM	C5–6	AVX	08055A220JAT
38	40	0.01uF 100V 10% 805 CERM	C25, C30–32, C38–39, C44, C53–54, C58, C61–62, C64–65, C70, C74–75, C77–78, C82–87, C89, C91, C94, C96–97, C99–100, C103–109, C116	AVX	08051C103KAT2A
39	1	0.22uF 25V 10% 805 CERM	C3	AVX	08053C224FAT
40	25	0.1uF 50V 10% 805 CERM	C24, C26, C34, C45, C51–52, C55–57, C59–60, C63, C66–69, C71–73, C88, C90, C92–93, C95, C98	AVX	08055C104KAT
41	2	10uF 16V 10% C TANT	CT7–8	SPRAGUE	293D106X9025C2T
42	24	10K 100MW 5% 805	R1, R5, R37, R44–45, R47–54, R57, R59–61, R65–67, R72, R74, R76, R84	AVX	CR21-103J-T
43	3	33 100MW 5% 805	R2–3, R46	AVX	CR21-330JTR

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
44	5	4.7K 100MW 5% 805	R55–56, R58, R62, R92	AVX	CR21-4701F-T
45	1	1M 100MW 5% 805	R41	AVX	CR21-1004F-T
46	1	1.5K 100MW 5% 805	R43	AVX	CR21-1501F-T
47	1	10.5K 1/8W 1% 1206	R81	BECKMAN	BCR1/81052FT
48	3	2.21K 1/8W 1% 1206	R29, R35, R40	AVX	CR32-2211F-T
49	4	10uF 16V 10% B TANT	CT1, CT9–10, CT21	AVX	TAJB106K016R
50	2	1A HSM160J DO-214AA SCHOTTKY	D6–7	MICRO-SEMI	HSM160J
51	8	22K 100MW 5% 805	R16, R24, R27, R85–87, R90–91	AVX	CR21-223J-T
52	3	100 100MW 5% 805	R64, R71, R75	AVX	CR21-101J-T
53	1	1000 100MHZ 1.5A FER002 0.06 CHOKE	FER9	MURATA	PLM250S40T1
54	4	2A S2A_RECT DO-214AA SILICON RECTIFIER	D1–2, D4–5	GENER-ALSEMI	S2A
55	8	600 100MHZ 500MA 1206 0.70 BEAD	FER1–8	DIGIKEY	240-1019-1-ND
56	1	0.047UF 16V 10% 1206	C11	AVX	12065C473JATME
57	2	270PF 50V 10% 805	C12, C19	KEMET	C1206C271J5GAC210
58	9	1UF 16V 10% 805 X7R	C1–2, C4, C7, C27–28, C37, C41, C43	MURATA	GRM40X7R105K016AL
59	5	470PF 100V 10% 1206 CERM	C13–16, C20	AVX	12061A471JAT2A
60	2	30PF 100V 5% 1206	C17–18	AVX	12061A300JAT2A

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
61	1	10 100MW 5% 805	R83	DALE	CRCW0805-10R0FRT1
62	6	10UF 25V +80-20% 1210 Y5V	C22, C33, C46–49	MURATA	GRM235Y.5V106Z025
63	1	53.6K 1/10W 1% 805	R78	PHILIPS	9C08052A5362FKRT/R
64	2	10UH 47+/-20 IND001	L1–2	TDK	SLF7045T-100M1R1-2
65	1	10K 31MW 5% RNET8	RN1	CTS	746X101103J
66	7	0.00 100MW 5% 805	R4, R8–12, R89	PAN	ERJ-6GE10R00V
67	1	11.3K 1/10W 1% 805	R82	PHILIPS	9C08052A1132FKRT/R
68	1	32.4K 1/10W 1% 805	R77	PHILIPS	9C08052A3242FKRT/R
69	1	1K 1/8W 5% 1206	R38	AVX	CR32-102J-T
70	4	10K 1/8W 5% 1206	R13–15, R21	DALE	CRCW1206-1002FRT1
71	1	100K 1/8W 5% 1206	R88		CR1206-1003FTR1
72	1	20.0K 1/8W 1% 1206	R79		
73	2	22 1/8W 5% 1206	R36, R39		
74	6	270 1/8W 5% 1206	R30–32, R34, R63, R73	AVX	CR32-271J-T
75	4	4.7K 1/8W 5% 1206	R22–23, R25–26	AVX	CR32-472J-T
76	1	680 1/8W 5% 1206	R33	AVX	CR32-681J-T
77	2	RED-SMT LED001 GULL-WING	LED1, LED7	PANA-SONIC	LN1261C
78	1	GREEN-SMT LED001 GULL-WING	LED6	PANA-SONIC	LN1361C
79	4	1uF 25V 20% A TANT -55+125	CT4–6, CT11	PANA-SONIC	ECS-T1EY105R
80	2	QS3257Q QSOP16 QUICKSWITCH-257	U14–15	ANALOG DEVICES	ADG774ABRQ

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
81	1	IDC 3X2 IDC3X2	JP1	BERG	54102-T08-03
82	1	IDC 7X2 IDC7X2	P8	BERG	54102-T08-07
83	2	IDC 2PIN_JUMPER 0.1	SJ1–2	MOLEX	15-38-1024
84	1	2.5A RESETABLE FUS001	F1	RAYCHEM CORP.	SMD250-2
85	2	3.5MM STEREO_JACK CON001	P9–10		

ADSP-21160N EZ-KIT Lite

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
1	1	M29W040 PLCC32 FLASH-512K-X-8-3V	U3	ST MICRO	M29W040B120K6
2	2	74LVC14A SOIC14 HEX-INVER-SCHMITT-TRIGGER	U7, U19	TI	74LVC14AD
3	1	IDT74FCT3244APY SSOP20 3.3V-OCTAL-BUFFER	U6	IDT	IDT74FCT3244APY
4	1	24.576MHZ SMT OSC005 CRYSTAL	Y1	EPSON	MA505 24.576M-C2
5	1	CY7C64603-128 PQFP128 USB-TX/RX MICROCONTROLLER	U11	CYPRESS	CY7C64603-128NC

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
6	1	MMBT4401 SOT-23 NPN TRANSISTOR 200MA	Q1	FAIRCHILD	MMBT4401
7	1	74LVC00AD SOIC14	U5	PHILIPS	74LVC00AD
8	1	24LC00-SN SOIC8 128 BIT SERIAL EEPROM	U25	MICROCHIP	24LC00-SN
9	1	CY7C1019BV33-15VC SOJ32 128K X 8 SRAM	U12	CYPRESS	CY7C1019BV33-12VC
10	1	AD8532AR SOIC8 DUAL AMP 250MA	U10	ANALOG DEVICES	AD8532AR
11	1	SN74AHC1G02 SOT23-5 SINGLE-2 INPUT-NOR	U16	TI	SN74AHC1G02DBVR
12	1	SN74LV164A SOIC14 8-BIT-PARALLEL-SERIAL	U17	TI	SN74LV164AD
13	1	CY7C4201V-15AC TQFP32 64-BYTE-FIFO	U18	CYPRESS	CY7C4201V-15AC
14	1	12.0MHZ THR OSC006 CRYSTAL	Y3	DIG01	300-6027-ND
15	1	SN74AHC1G00 SOT23-5 SINGLE-2-INPUT-NAND	U26	TI	SN74AHC1G00DBVR
16	2	MT58L64L32 TQFP100_B 64KX32-SBSRAM	U8–9	MICRON	MT58L64L32FT-10
17	1	47.5MHZ SMT OSC003	U2	DIGIKEY	SG-8002CA-PCC-ND47.5 MHZ
18	2	1000pF 50V 5% 1206 CERM	C40, C42	AVX	12065A102JAT2A
19	2	0.1uF 50V 10% 1206 CERM	C9–10	PHILIPS	12062R104K9BB2

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
20	1	AD1881AJST LQFP48 SOUNDMAX-CODEC	U13	ANALOG DEVICES	AD1881AJST
21	1	ADM708SAR SOIC8 VOLTAGE-SUPERVISOR	U4	ANALOG DEVICES	ADM708SAR
22	1	ADP3339AKC-5 SOT-223 5V-1.5A REGULATOR	VR5	ANALOG DEVICES	ADP3339AKC-5-REEL
23	2	ADP3088 MSOP8 500MA-BUCK-REGULATOR	VR1, VR2	ANALOG DEVICES	ADP3088ARM-REEL
24	1	ADSP-21160N PBGA400 4MBIT-1.9V	U1	ANALOG DEVICES	ADSP-21160NKB-95
25	5	RUBBER FEET BLACK	MH1–5	MOUSER	517-SJ-5018BK
26	1	PWR 2.5MM_JACK CON005 RA	P4	SWITCH-CRAFT	SC1152-ND12
27	1	USB 4PIN CON009 USB	P7	MILL-MAX	897-30-004-90-000000
28	2	LNKPRT 12X2 CON010	P5–6	HONDA (TSUSHINK)	RMCA-EA26LMY-0M03-A
29	1	.05 10X2 CON014 RA	P11	AMP	104069-1
30	4	SPST-MOMENTARY SWT013 6MM	SW2–5	PANASONIC	EVQ-PAD04M
31	1	DIP3 SWT015	SW1	DIGI-KEY	CKN3055-ND
32	10	0.00 1/8W 5% 1206	R6–7, R17–20, R28, R68–70	YAGEO	0.0ECT-ND
33	2	220uF 10V 20% E ELEC	CT2–3	SPRAGUE	293D227X9010E2T
34	4	AMBER-SMT LED001 GULL-WING	LED2–5	PANASONIC	LN1461C-TR

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
35	2	22pF 50V 5% 805 CERM	C5–6	AVX	08055A220JAT
36	40	0.01uF 100V 10% 805 CERM	C25, C30–32, C38–39, C44, C53–54, C58, C61–62, C64–65, C70, C74–75, C77–78, C82–87, C89, C91, C94, C96–97, C99–100, C103–109, C116	AVX	08051C103KAT2A
37	1	0.22uF 25V 10% 805 CERM	C3	AVX	08053C224FAT
38	25	0.1uF 50V 10% 805 CERM	C24, C26, C34, C45, C51–52, C55–57, C59–60, C63, C66–69, C71–73, C88, C90, C92–93, C95, C98	AVX	08055C104KAT
39	2	10uF 16V 10% C TANT	CT7–8	SPRAGUE	293D106X9025C2T
40	24	10K 100MW 5% 805	R1, R5, R37, R44–45, R47–54, R57, R59–61, R65–67, R72, R74, R76, R84		
41	3	33 100MW 5% 805	R2–3, R46	AVX	CR21-330JTR
42	5	4.7K 100MW 5% 805	R55–56, R58, R62, R92	AVX	CR21–4701F-T
43	1	1M 100MW 5% 805	R41	AVX	CR21-1004F-T

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
44	1	1.5K 100MW 5% 805	R43	AVX	CR21-1501F-T
45	3	2.21K 1/8W 1% 1206	R29, R35, R40	AVX	CR32-2211F-T
46	4	10uF 16V 10% B TANT	CT1, CT9–10, CT21	AVX	TAJB106K016R
47	2	1A HSM160J DO-214AA SCHOTTKY	D6–7	MICRO-SEMI	HSM160J
48	8	22K 100MW 5% 805	R16, R24, R27, R85–87, R90–91	AVX	CR21-223J-T
49	3	100 100MW 5% 805	R64, R71, R75	AVX	CR21-101J-T
50	1	1000 100MHZ 1.5A FER002 0.06 CHOKE	FER9	MURATA	PLM250S40T1
51	3	2A S2A_RECT DO-214AA SILICON RECTIFIER	D1, D4–5	GENER-ALSEMI	S2A
52	8	600 100MHZ 500MA 1206 0.70 BEAD	FER1–8	DIGIKEY	240-1019-1-ND
53	1	0.047UF 16V 10% 1206	C11	AVX	12065C473JATME
54	2	270PF 50V 10% 805	C12, C19	KEMET	C1206C271J5GAC210
55	9	1UF 16V 10% 805 X7R	C1–2, C4, C7, C27–28, C37, C41, C43	MURATA	GRM40X7R105K016AL
56	6	470PF 100V 10% 1206 CERM	C13–16, C20, C23	AVX	12061A471JAT2A
57	2	30PF 100V 5% 1206	C17–18	AVX	12061A300JAT2A
58	1	10 100MW 5% 805	R83	DALE	CRCW0805–10R0FRT1
59	6	10UF 25V +80-20% 1210 Y5V	C22, C33, C46–49	MURATA	GRM235Y.5V106Z025

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
60	2	53.6K 1/10W 1% 805	R78, R82	PHILIPS	9C08052A5362FKRT/R
61	2	10UH 47+/-20 IND001	L1–2	TDK	SLF7045T-100M1R1-2
62	1	10K 31MW 5% RNET8	RN1	CTS	746X101103J
63	7	0.00 100MW 5% 805	R4, R8–12, R89	PAN	ERJ-6GE10R00V
64	1	32.4K 1/10W 1% 805	R77	PHILIPS	9C08052A3242FKRT/R
65	1	102K 1/8W 1% 1206	R81	PHILIPS	9C12063A1023FKRT/R
66	1	1K 1/8W 5% 1206	R38	AVX	CR32-102J-T
67	4	10K 1/8W 5% 1206	R13–15, R21	DALE	CRCW1206-1002FRT1
68	1	100K 1/8W 5% 1206	R88		CR1206-1003FTR1
69	1	20.0K 1/8W 1% 1206	R79		
70	2	22 1/8W 5% 1206	R36, R39		
71	6	270 1/8W 5% 1206	R30–32, R34, R63, R73	AVX	CR32-271J-T
72	4	4.7K 1/8W 5% 1206	R22–23, R25–26,	AVX	CR32-472J-T
73	1	680 1/8W 5% 1206	R33	AVX	CR32-681J-T
74	2	RED-SMT LED001 GULL-WING	LED1, LED7	PANASONIC	LN1261C
75	1	GREEN-SMT LED001 GULL-WING	LED6	PANASONIC	LN1361C
76	4	1uF 25V 20% A TANT -55+125	CT4–6, CT11	PANASONIC	ECS-T1EY105R
77	2	QS3257Q QSOP16 QUICKSWITCH-257	U14–15	ANALOG DEVICES	ADG774ABRQ
78	1	IDC 3X2 IDC3X2	JP1	BERG	54102-T08-03
79	1	IDC 7X2 IDC7X2	P8	BERG	54102-T08-07

Reference	Quantity	Description	Reference Design	Manufacturer	Part Number
80	2	IDC 2PIN_JUMPER 0.1	SJ1–2	MOLEX	15-38-1024
81	1	2.5A RESETABLE FUS001	F1	RAYCHEM CORP.	SMD250-2
82	2	3.5MM STEREO_JACK CON001	P9–10		

ADSP-21160 EZ-KIT Lite

Component Population Differences

Part Number	ADDS-21160-EZ-LITE	ADDS-21160N-EZ-LITE
Core Voltage	2.5V	1.9V
Core Clock	80MHz	95MHz
U1	ADSP-21160M	ADSP-21160N
U2	40MHz	47.5MHz
VR3	POPULATE	DNP
D2	POPULATE	DNP
VR2	DNP	POPULATE
R82	11.3K	53.6K
R81	10.5K	102K
C23	2.2nF	470PF

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Title	ADSP-21160 EZ-KIT LITE - TITLE		
Size C	Board No. A0164-2001		Rev 1.2
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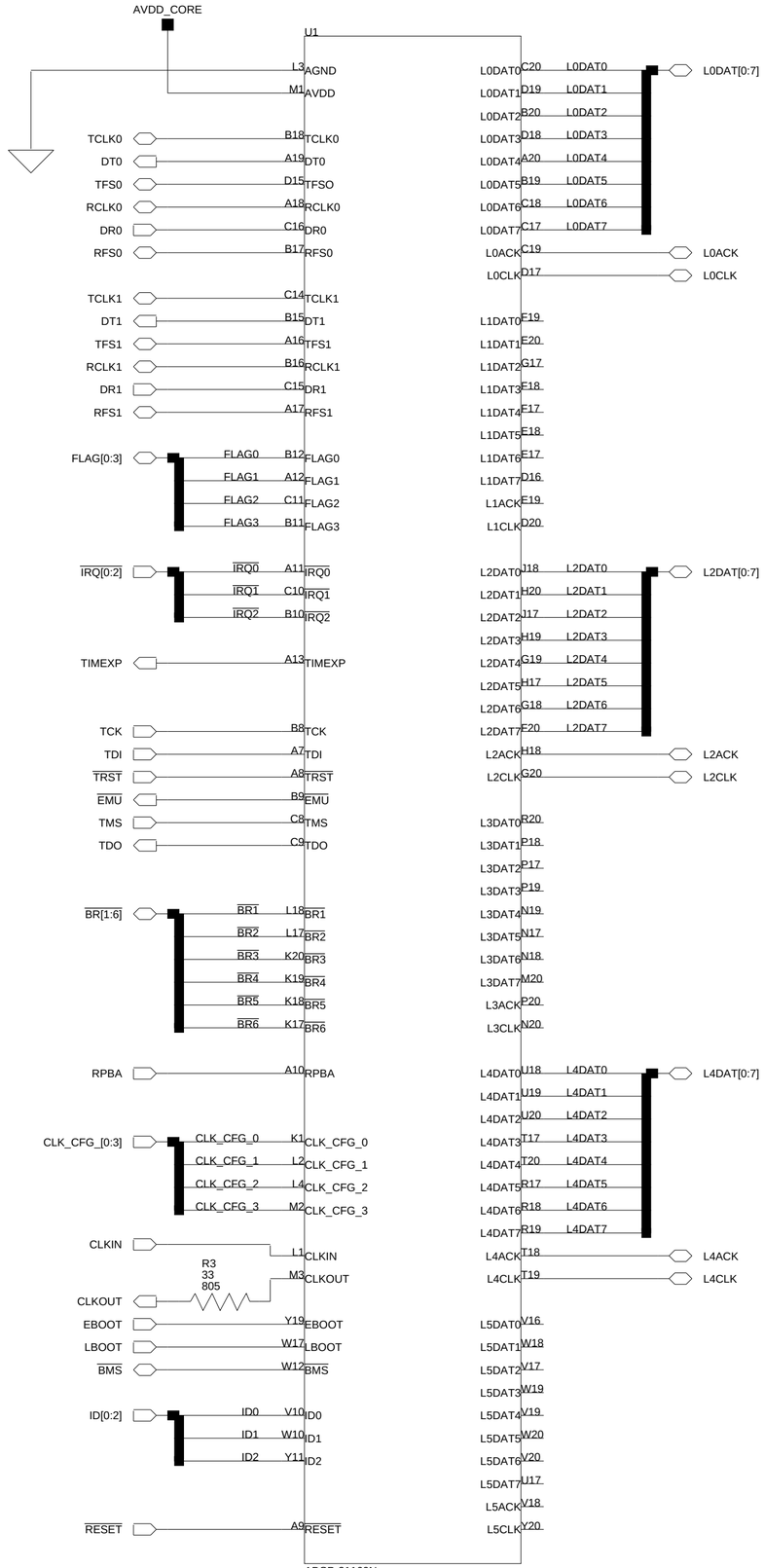
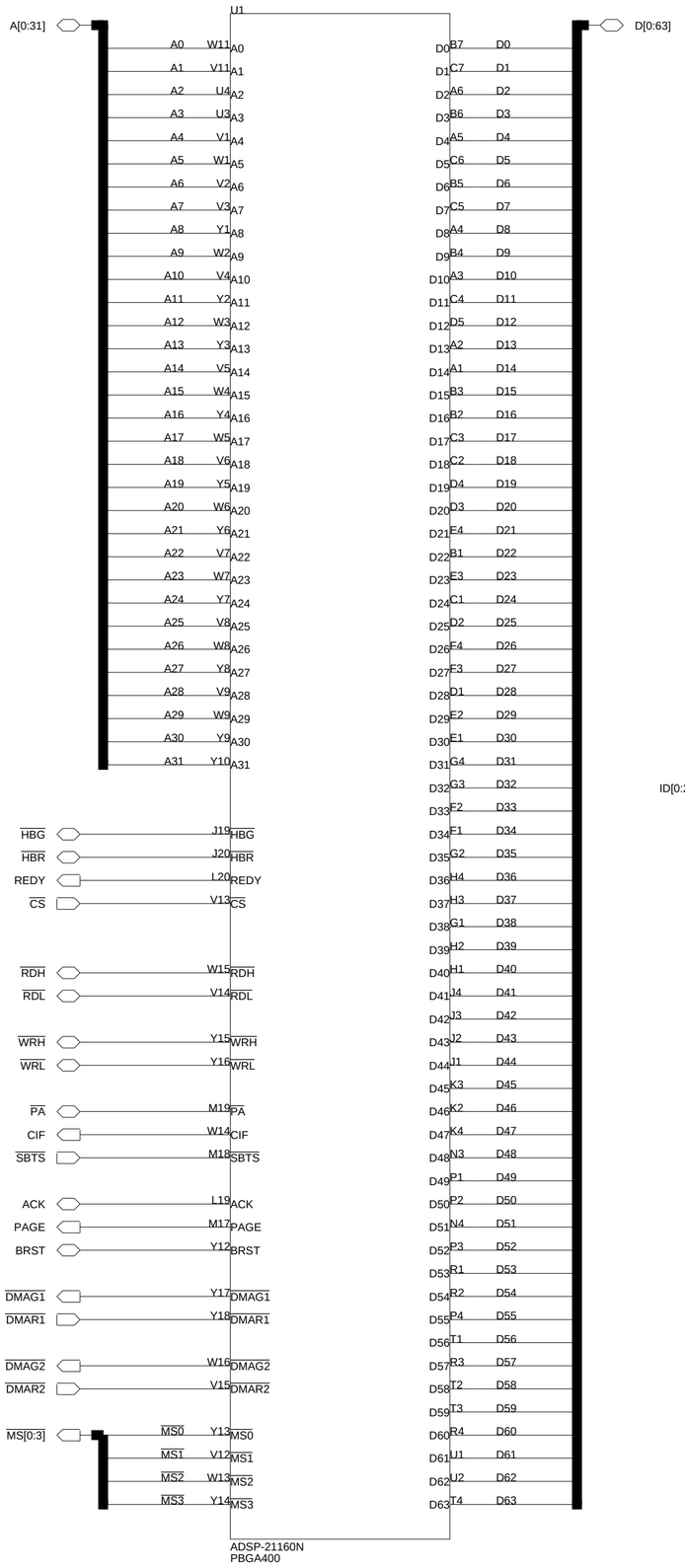
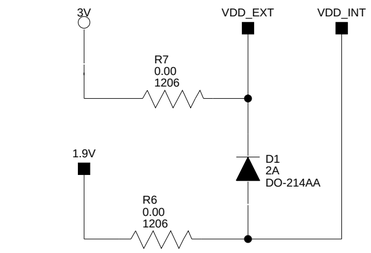
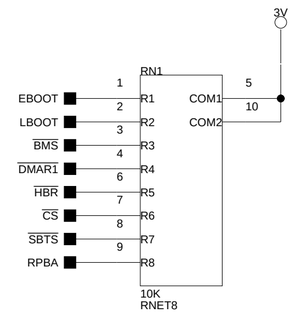
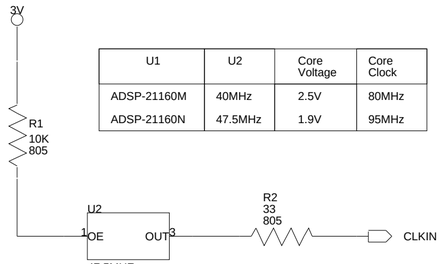


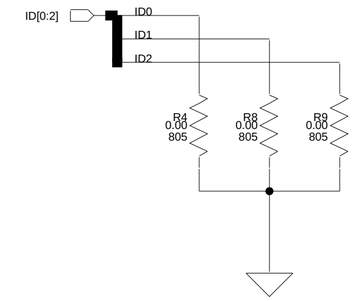




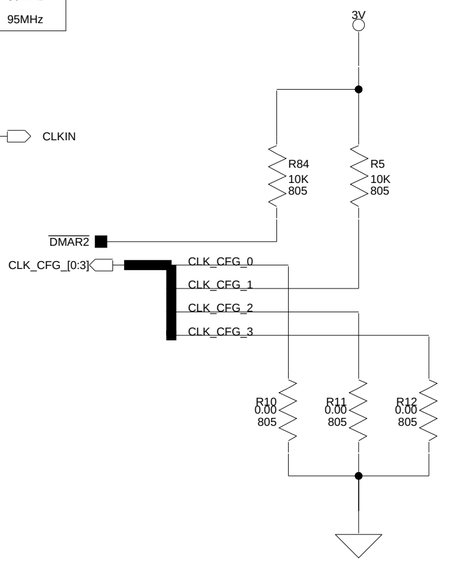




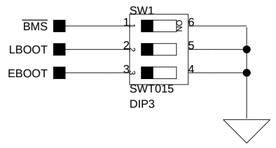
U1	U2	Core Voltage	Core Clock
ADSP-21160M	40MHz	2.5V	80MHz
ADSP-21160N	47.5MHz	1.9V	95MHz



ID = 0 (single processor)



Core Clock = 2x Input Clock



SW1 SETTINGS: BOOT MODE SELECTION

	EBOOT	LBOOT	~BMS	BOOT MODE
*	OFF	ON	OFF (OUTPUT)	FLASH (BMS OUTPUT TO FLASH CE)
	ON	ON	OFF (INPUT)	HOST PROCESSOR
	ON	OFF	OFF (INPUT)	LINK PORT
	ON	ON	ON (INPUT)	NO BOOT
	ON	OFF	ON (INPUT)	RESERVED
	OFF	OFF	X (INPUT)	RESERVED

* = DEFAULT

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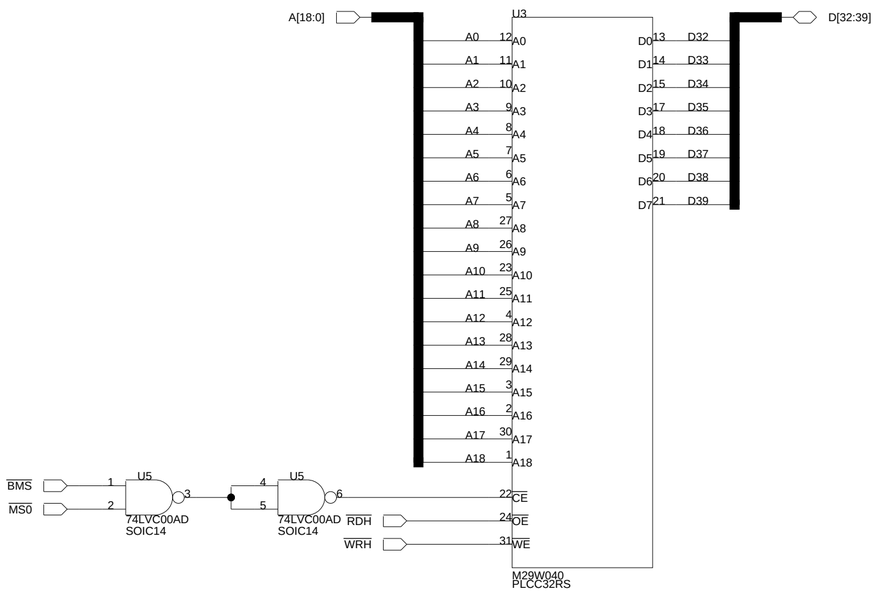
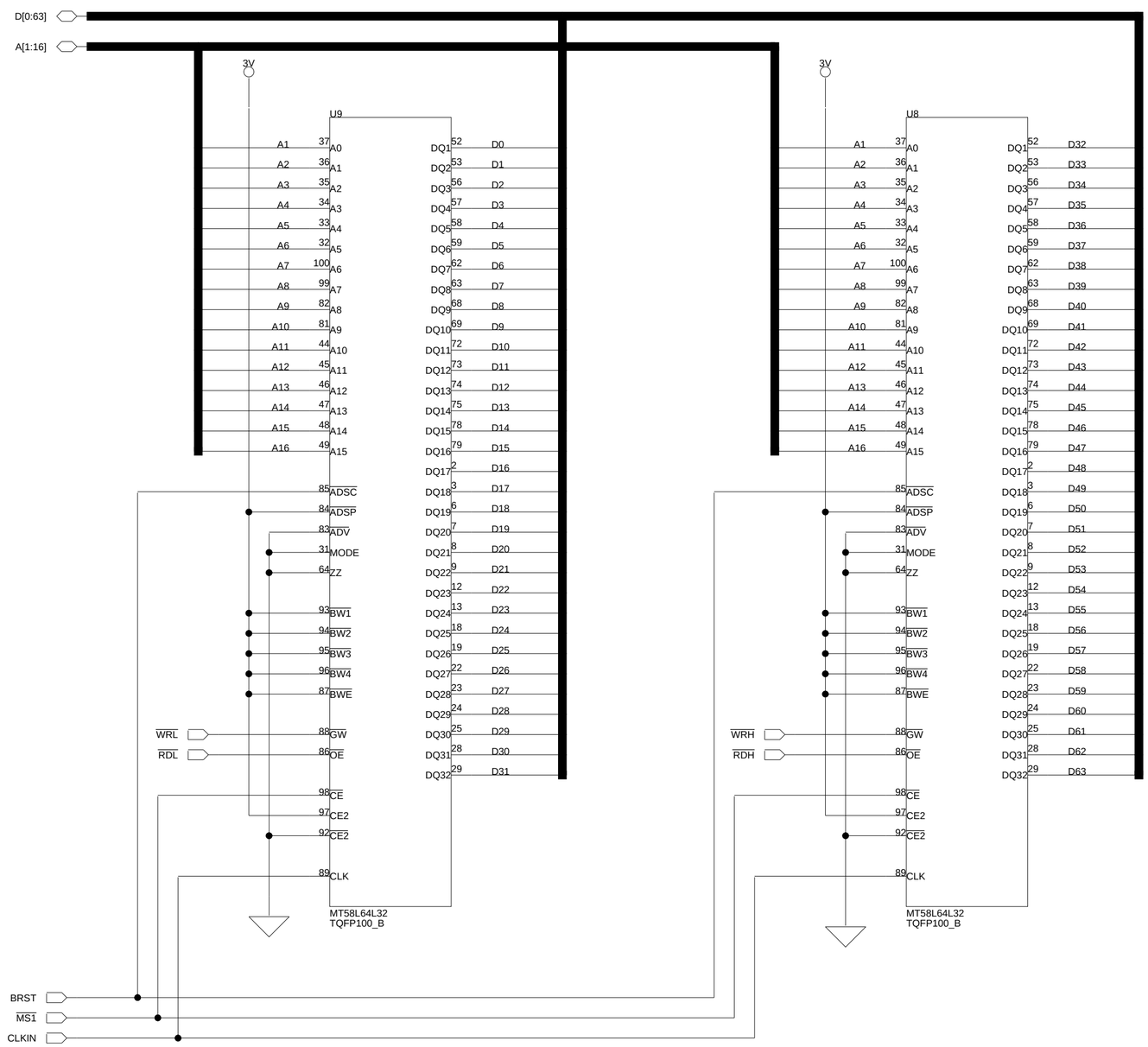
FLASH
512K X 8-BIT



SBSRAM
4Mb (64K x 32-BIT x 2-CHIPS)



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Title: ADSP-21160 EZ-KIT LITE - MEMORY

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AUDIO CODEC AD1881A

SJ2
SHORTING JUMPER
DEFAULT=4 & 6

SJ1
SHORTING JUMPER
DEFAULT=3 & 5

JP1 SETTINGS

	SJ1	SJ2	INPUT SOURCE
*	1 & 3	2 & 4	MIC IN
	3 & 5	4 & 6	LINE IN

* Denotes Default Setting

POPULATE TO COMPLY WITH PC99

R28 0.00 1206 ALT_VAL=1K
C3 0.22UF 805
C8 0.01UF 1206 DNP
AGND

CT1 10UF B
C9 0.1UF 1206
C12 270PF 805
C19 270PF 805
C1 1UF 805
C7 1UF 805
C11 0.047UF 1206
C10 0.1UF 1206
TP3
AGND

A5V
3V

U13
Analog Signals
Digital Signals

25	AVDD1	VDD1	1
38	AVDD2	VDD2	9
26	AVSS1	VSS1	4
42	AVSS2	VSS2	7
		XTAL_IN	2
		XTL_OUT	3
27	VREF	SDATA_IN	8
28	VREFOUT	SDATA_OUT	5
		BIT_CLK	6
		SYNC	10
		RESET	11
		CS1	46
		CS0	45
		MODE	48
		EAPD/CHAIN_IN	47
30	AFILT2		
29	AFILT1		
32	FILT_L		
31	FILT_R		
33	RX3D		
34	CX3D		
22	MIC2		
21	MIC1		
24	LINE_IN_R		
23	LINE_IN_L		
36	LINE_OUT_R		
35	LINE_OUT_L		
37	MONO_OUT		
41	LNLVL_OUT_R		
39	LNLVL_OUT_L		
		PC_BEEP	12
		PHONE_IN	13
		AUX_L	14
		AUX_R	15
		VIDEO_L	16
		VIDEO_R	17
		CD_L	18
		CD_R	20
		CD_GND_REF	19

AD1881AJST
LQFP48

DR0
DT0
RFS0
TCLK0
RCLK0
FLAG3

R20 0.00 1206
R19 0.00 1206
R18 0.00 1206

Y1 24.576MHZ OSC005
C6 22PF 805
C5 22PF 805

R14 10K 1206
R13 10K 1206
R21 10K 1206
R15 10K 1206

TP1 TP2

LINE IN/MIC
P9
CON001
FER3 600 1206
FER4 600 1206
C15 470PF 1206
C14 470PF 1206
JP1
R26 4.7K 1206
R23 4.7K 1206
R25 4.7K 1206
R22 4.7K 1206
C2 1UF 805
C4 1UF 805
R29 2.21K 1206
AGND

LINE OUT
P10
CON001
FER2 600 1206
FER6 600 1206
C13 470PF 1206
C16 470PF 1206
CT2 220UF E
CT3 220UF E
U10 AD8532AR SOIC8
R91 22K 805
C36 DNP 805
R90 22K 805
R87 22K 805
C37 1UF 805
R86 22K 805
R85 22K 805
C41 1UF 805
R16 22K 805
C35 DNP 805
R24 22K 805
R27 22K 805
C43 1UF 805
A5V
AGND

5V
A5V
FER1 600 1206
R17 0.00 1206
AGND

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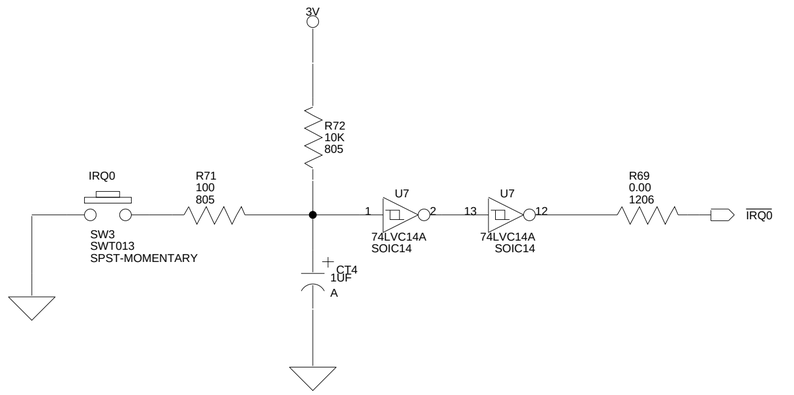

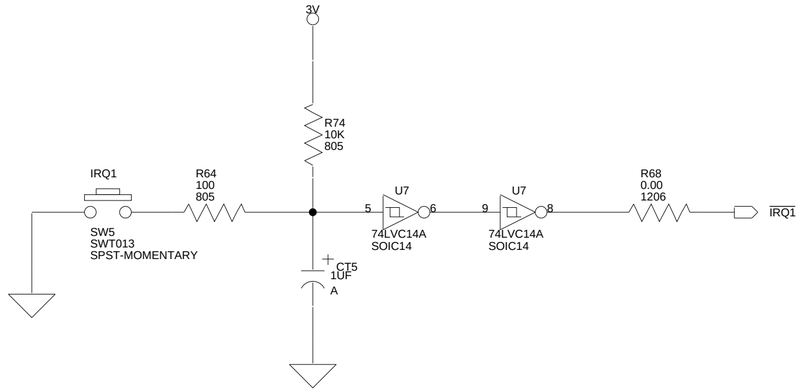

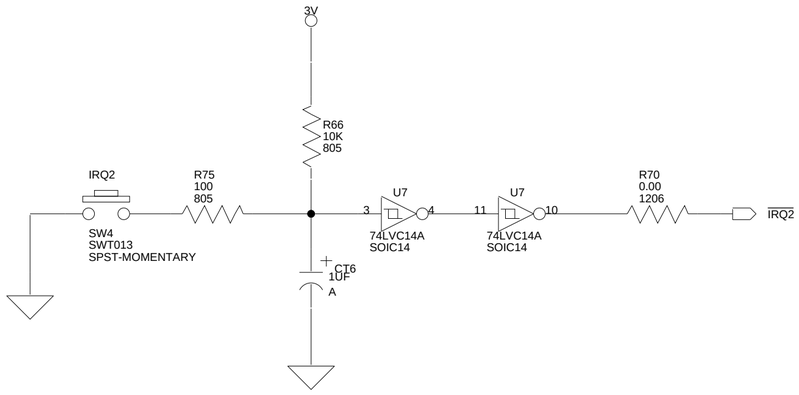

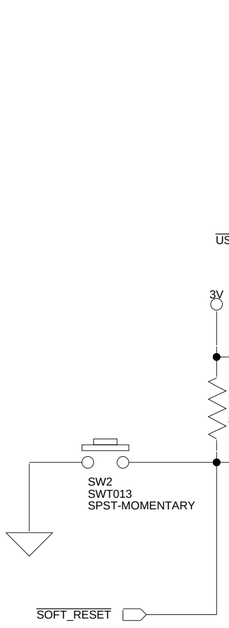

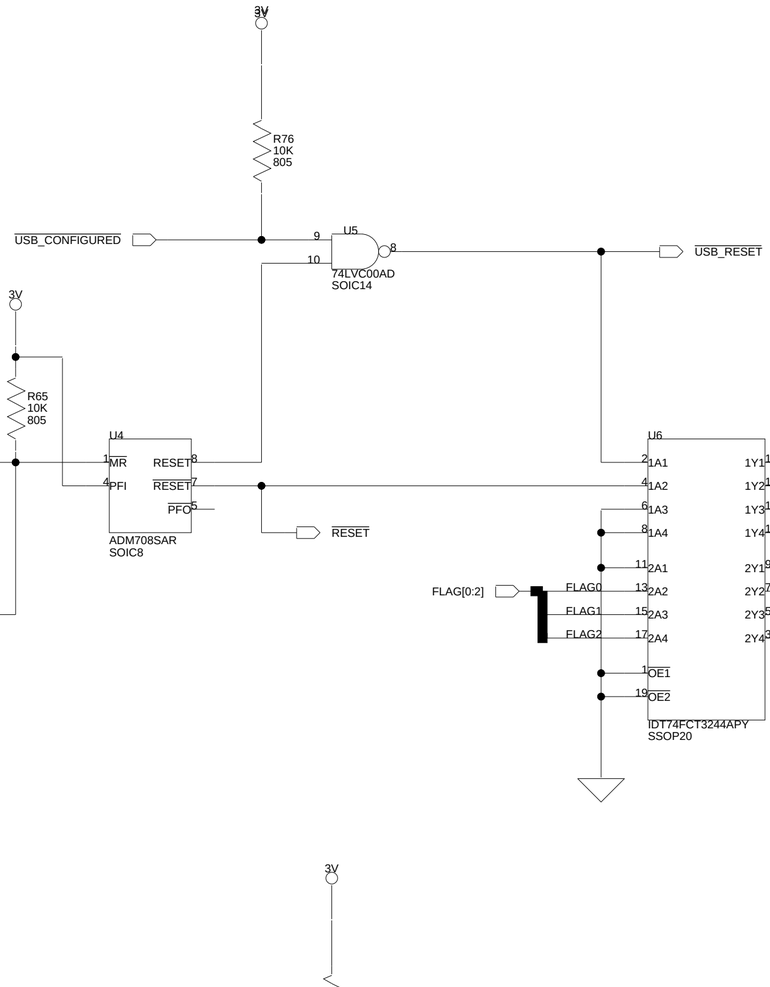

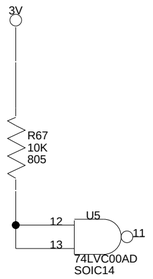

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Title: ADSP-21160 EZ-KIT LITE - PB/LED

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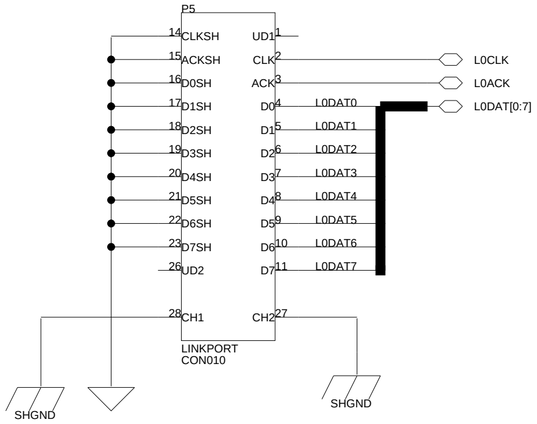
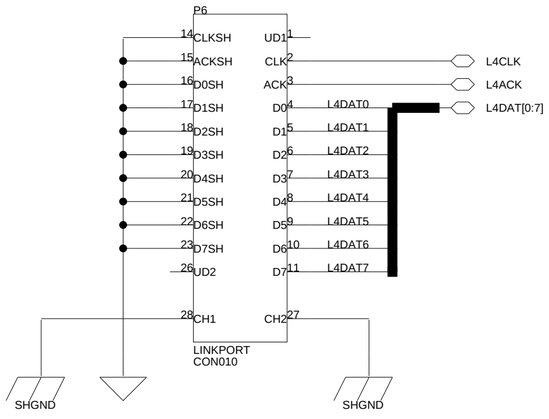
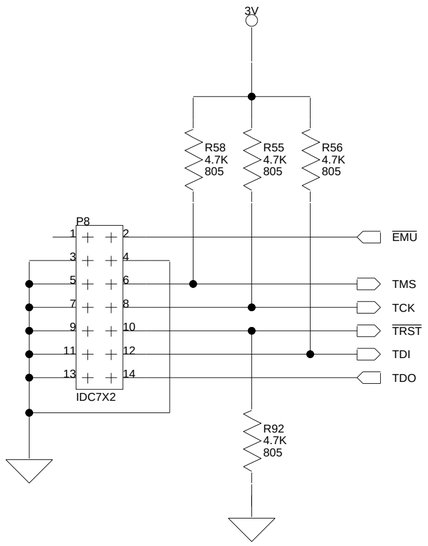
LINK PORT CONNECTORS

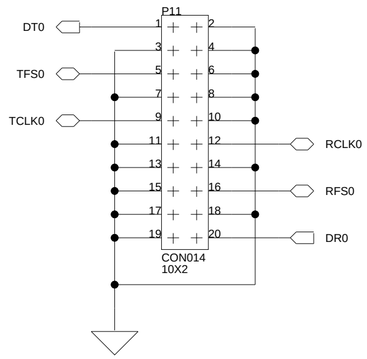


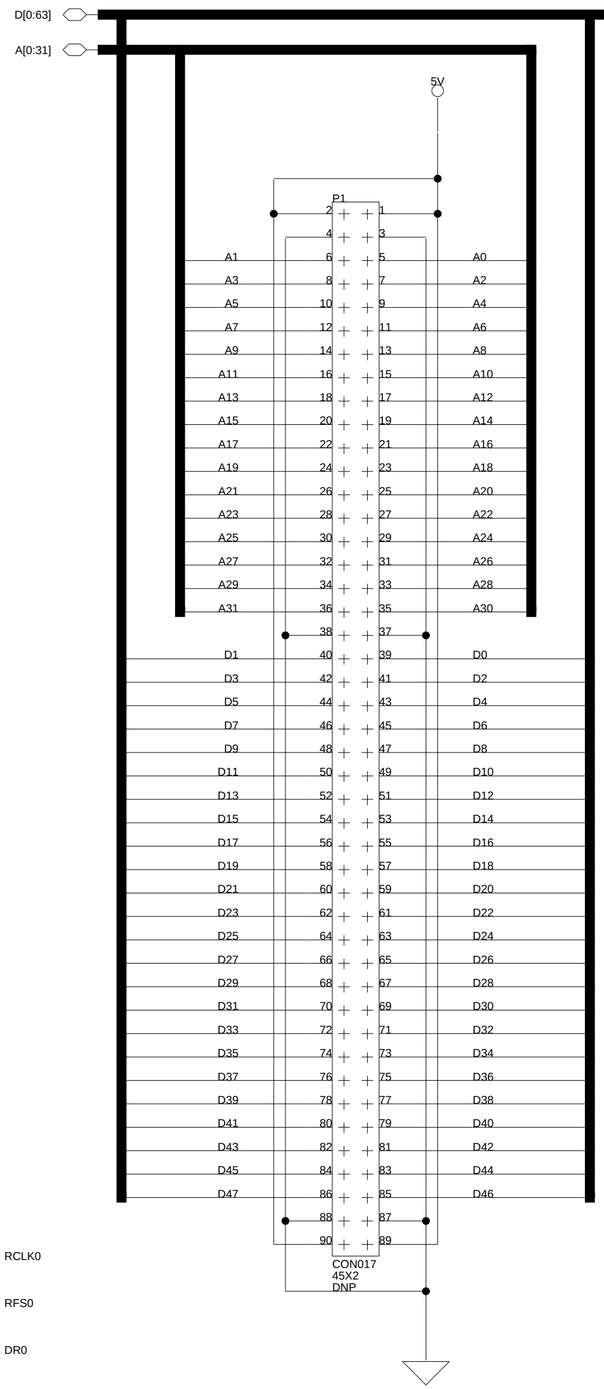


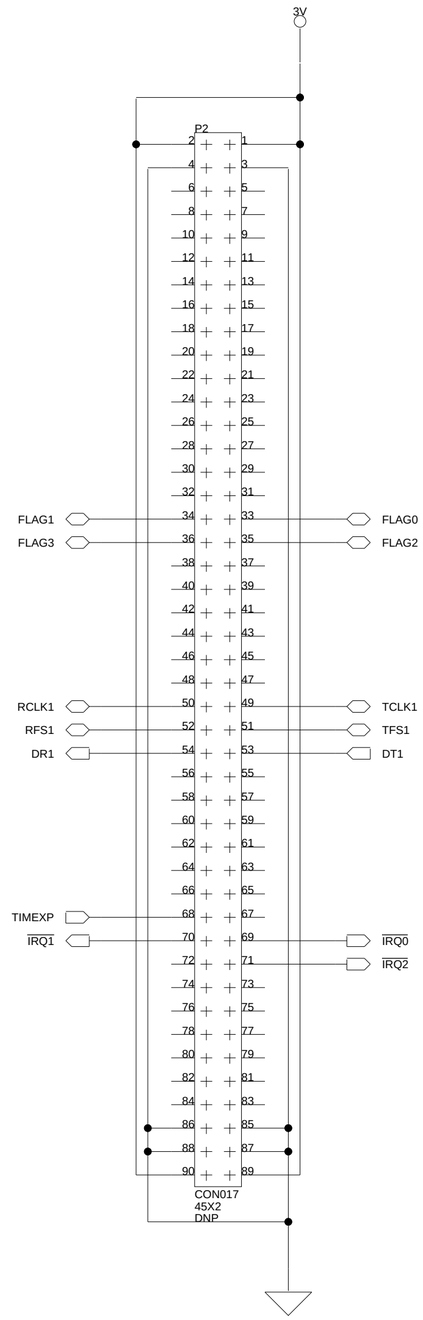
DSP JTAG HEADER

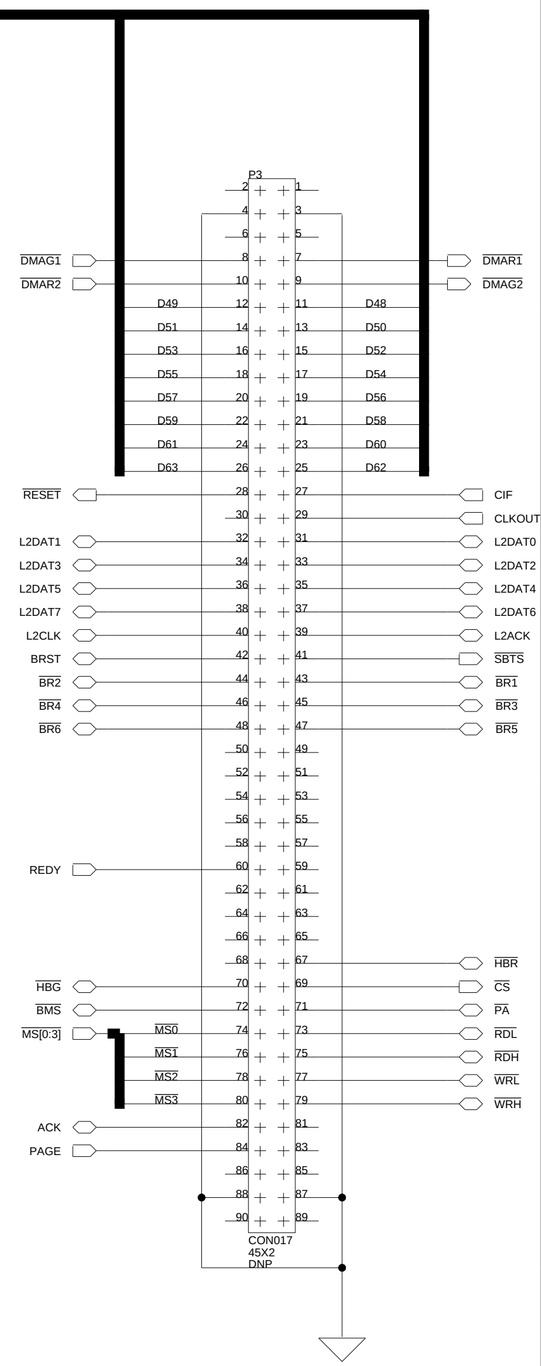


SPORT0









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Title	ADSP-21160 EZ-KIT LITE - CONNECTORS	
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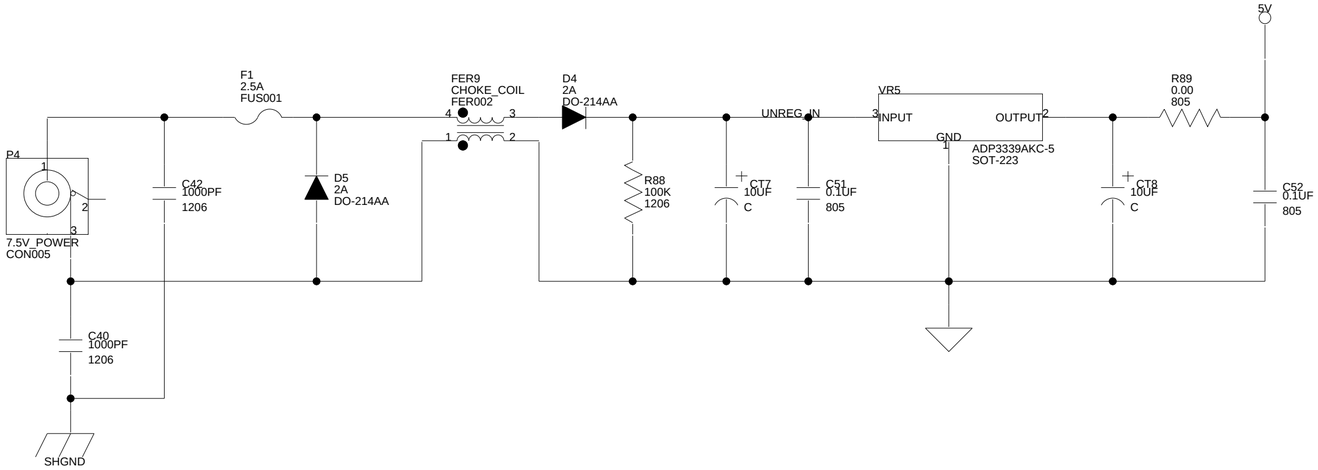

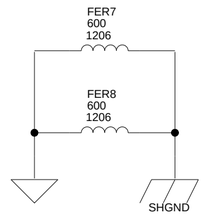

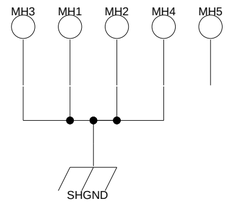

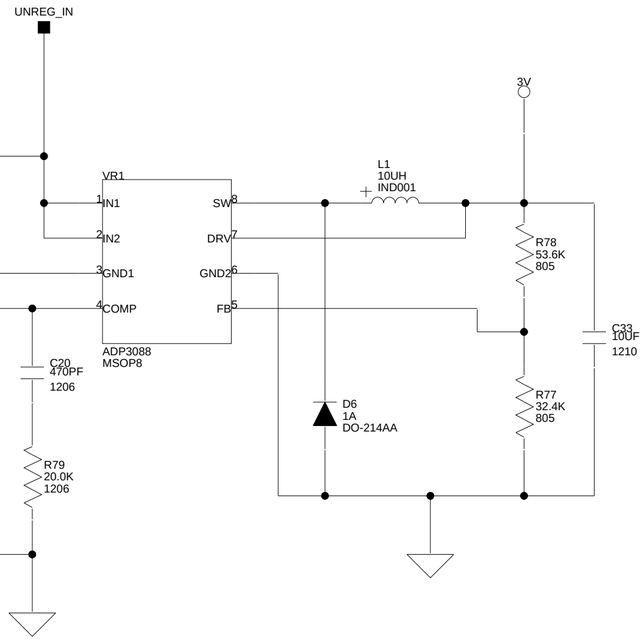

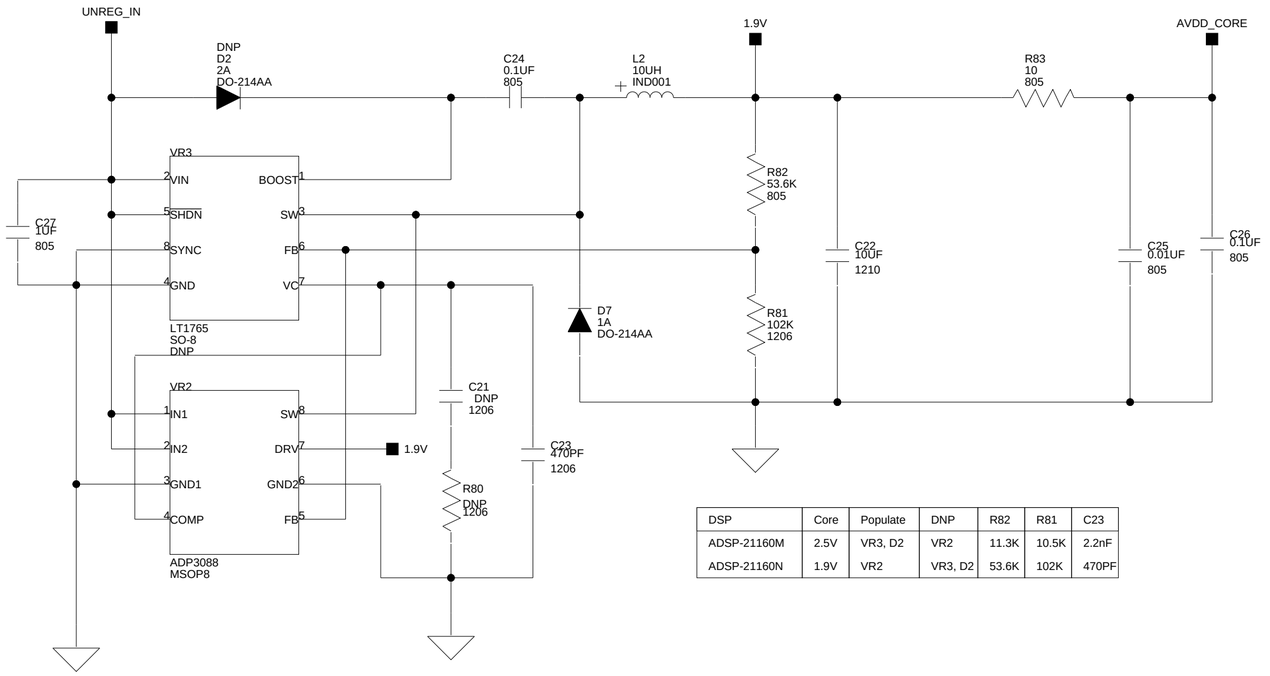

DSP	Core	Populate	DNP	R82	R81	C23
ADSP-21160M	2.5V	VR3, D2	VR2	11.3K	10.5K	2.2nF
ADSP-21160N	1.9V	VR2	VR3, D2	53.6K	102K	470PF

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Title: ADSP-21160 EZ-KIT LITE - POWER

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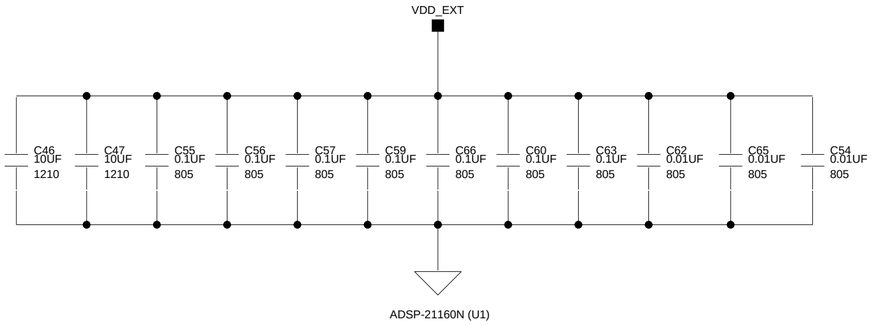
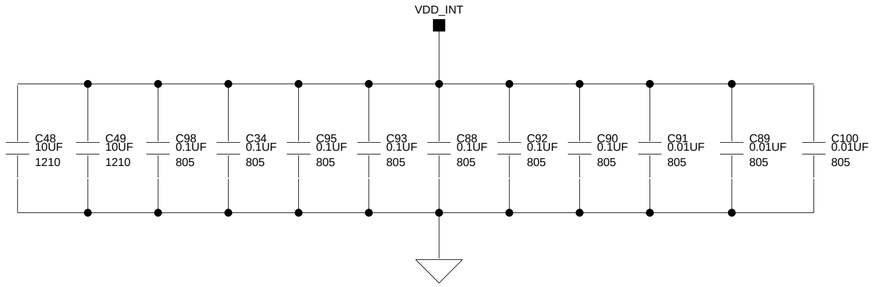
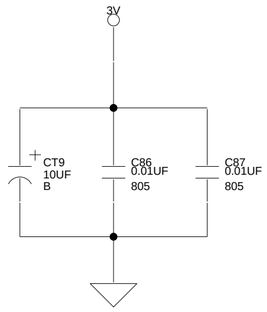


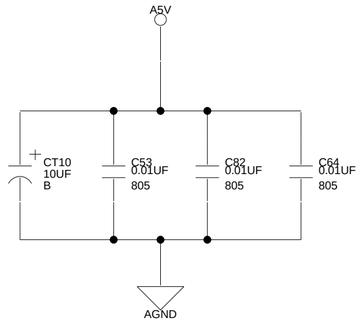
ADSP-21160N (U1)



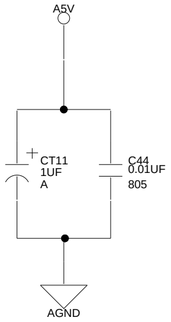
ADSP-21160N (U1)



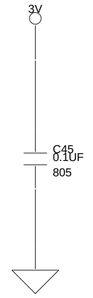
AD1885JST DIGITAL (U10)



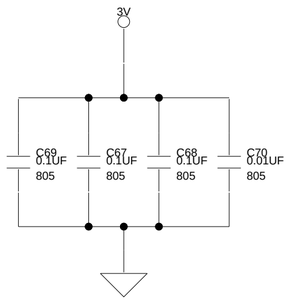
AD1885JST ANALOG (U10)



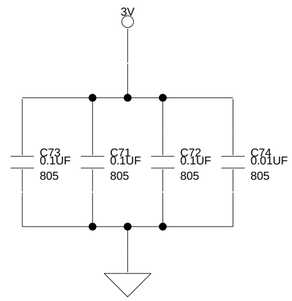
SSM2135 (U?)



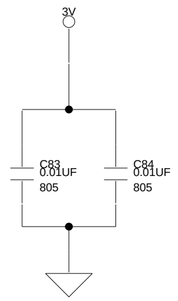
OSC (U2)



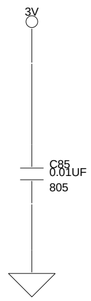
MT58L64L32 (U8)



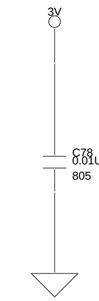
MT58L64L32 (U9)



IDT74FCT3244APY (U6)

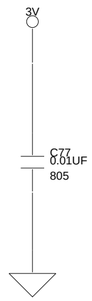


74LVC00AD (U5)

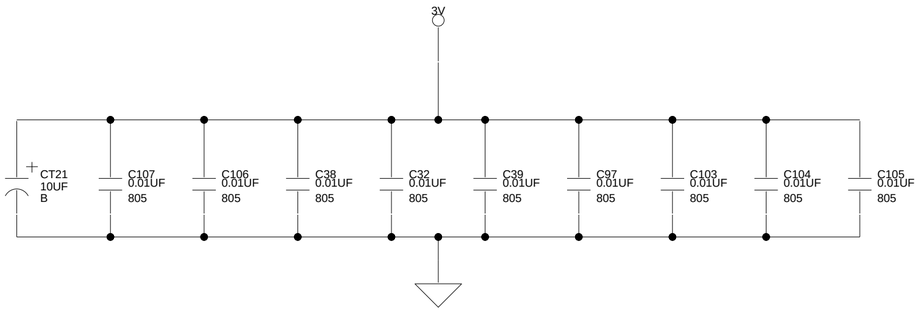


ADM708SAR (U4)

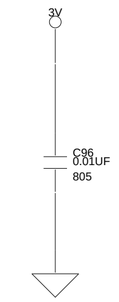
74LVC14A (U7)



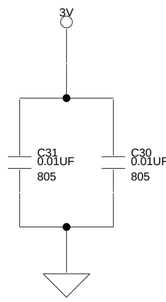
AT49BV040 (U7)



CYC64603-128 (U11)



SN74LV164A (U17)



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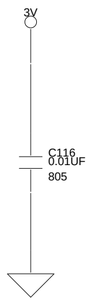

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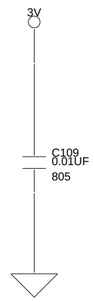

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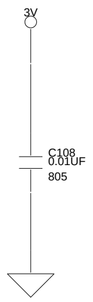

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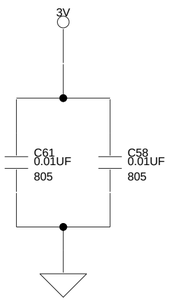

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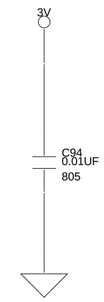

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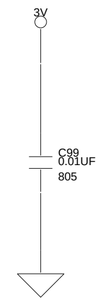

24LC00-SN (U25)

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

Approvals	Date
Drawn	
Checked	
Engineering	

Title: ADSP-21160 EZ-KIT LITE - BYPASS CAPS

Size	Board No.	Rev
C	A0164-2001	1.2

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