

ADSP-21161N EZ-KIT LITE™

Evaluation System Manual

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The ADSP-21161N EZ-KIT Lite evaluation system had been appended to the Technical Construction File referenced ‘**DSPTOOLS1**’ dated December 21, 1997 and was awarded CE Certification by an appointed European Competent Body as listed below.

Technical Certificate No: Z600ANA1.005

Issued by: Technology International (Europe) Limited
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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 used EZ-KIT Lite boards in the protective shipping package.



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1 INTRODUCTION

Thank you for purchasing the ADSP-21161N EZ-KIT Lite™ evaluation system. The evaluation board is designed to be used in conjunction with the VisualDSP++™ development environment to test the capabilities of the ADSP-21161N floating-point digital signal processor (DSP). 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-2116x assembly
- Load, run, step-in, step-out, step-over, halt, and set breakpoints in application programs
- Read and write data and program memory
- Read and write core and peripheral registers
- Plot memory

Access to the ADSP-21161N, from a PC, is achieved through a USB port or an optional JTAG emulator. The USB interface gives unrestricted access to the ADSP-21161N DSP 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/>.

Example programs are provided in the ADSP-21161N EZ-KIT Lite, which demonstrate the capabilities of the evaluation board.

Note: The VisualDSP++ license provided with this EZ-KIT Lite evaluation system limits the use of program memory to 5k words.

The board's features include:

- **Analog Devices ADSP-21161N DSP**
 - 100MHz Core Clock Speed
 - Core Clock Mode Jumper Configurable.
- **USB Debugging Interface**

- **Analog Devices AD1836 96kHz Audio Codec**
 - Jumper Selectable Line-In or Mic-In 3.5mm Stereo Jack
 - Line-Out 3.5mm Stereo Jack
 - 4 RCA Jacks for Audio Input
 - 8 RCA Jacks for Audio Output
- **Analog Devices AD1852 192kHz Auxiliary DAC**
- **Crystal Semiconductor CS8414 96kHz SPDIF Receiver**
 - Optical and Coaxial Connectors for SPDIF Input
- **Flash Memory**
 - 512K x 8
- **Interface Connectors**
 - 14-Pin Emulator Connector for JTAG Interface
 - SPORT1 and SPORT3 Connectors
 - Link Port 0 and Link Port 1
 - External Port Connectors (not populated)
- **General Purpose I/O**
 - 4 Push Button Flags
 - 3 Push Button Interrupts
 - 6 LED Outputs
- **Analog Devices ADP3338 & ADP3339 Voltage Regulators**
- **Breadboard area with typical SMT footprints**

The EZ-KIT Lite board has a flash memory device that can be used to store user specific boot code. By configuring the jumpers for EPROM boot, the board can run as a stand-alone unit, without a PC. The ADSP-21161N EZ-KIT Lite package contains a flash programmer utility, which allows you to program the flash memory. The flash programmer is described in section 3.9.

SPORT0 and SPORT2 are connected to the audio codec, allowing you to create audio signal processing applications. SPORT1 and SPORT3 are connected to off-board connectors to connect to other serial devices.

Additionally, the EZ-KIT Lite board provides un-installed expansion connector footprints that allow you to connect to the processor's External Port (EP) and Host Processor Interface (HPI).

1.1 For More Information About Analog Devices Products

Analog Devices can be accessed on the Internet at <http://www.analog.com>. You can directly access the DSP web pages at <http://www.analog.com/dsp>. This page provides access to DSP specific technical information and documentation, product overviews, and product announcements. For specific information about DSP tools, go to <http://www.analog.com/dsp/tools>.

21161N EZ-KIT LITE



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DEVICES**

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Title		21161N EZ-KIT LITE - TITLE PAGE	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-24-2001_11:13	Sheet 1 OF 24	

To view help on additional ADSP-21161N EZ-KIT Lite features, go to the windows task bar and select Start\Programs\VisualDSP\EZ-KIT Help.

The documents in the following two tables can be found through on-line help or in the Docs folder of your VisualDSP++ installation.

For more documentation, please go to http://www.analog.com/dsp/tech_doc

Table 1-1: Related DSP Documents

Document Name	Description
<i>ADSP-21161N DSP Datasheet</i>	General functional description, pinout and timing.
<i>ADSP-21161N SHARC DSP Hardware Reference</i>	Description of internal DSP architecture and all register functions.
<i>ADSP-21160 DSP Instruction Set Reference</i>	Description of all allowed DSP assembly instructions.
<i>ADSP-21161 Programmer's Quick Reference Manual</i>	Provides a summary of the ADSP-2116x instruction set, core and IOP registers, memory maps, a DEF21161.H file listing, and common VisualDSP tools commands."

Table 1-2: Related VisualDSP++ Documents

Document Name	Description
<i>VisualDSP++ Users Guide for ADSP-21xx DSPs</i>	Detailed description of VisualDSP++ features and usage.
<i>VisualDSP++ Preprocessor and Assembler Manual for ADSP-21xx DSPs</i>	Description of the assembler function and commands for ADSP-2116x family DSPs
<i>VisualDSP++ C/C++ Compiler and Library Manual for ADSP-21xx DSPs</i>	Description of the compiler function and commands for ADSP-2116x family DSPs
<i>VisualDSP++ Linker and Utilities Manual for ADSP-21xx DSPs</i>	Description of the linker function and commands for the ADSP-2116x family DSPs

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

2 GETTING STARTED

2.1 Overview

This chapter provides you with the information you need to begin using ADSP-21161N EZ-KIT Lite evaluation system. Install your software and hardware in the order presented in section 2.4 for correct operation. This chapter has the following sections:

- [Contents of your EZ-KIT Lite Package](#) (Section 2.2)
Provides a list of the components that are shipped with this EZ-KIT Lite evaluation system.
- [PC Configuration](#) (Section 2.3)
Describes the minimum requirement for the PC to work with the EZ-KIT Lite evaluation system.
- [Installation Tasks](#) (Section 2.4)
Describes the step-by-step procedure for setting up the hardware and software.

2.2 Contents of your EZ-KIT Lite Package

Your ADSP-21161N EZ-KIT Lite evaluation system package contains the following items.

- ADSP-21161N EZ-KIT Lite board
- VisualDSP++ CD w/ license.
- ADSP-21161N EZ-KIT Lite CD, containing:
 - EZ-KIT Lite specific debug software
 - USB driver files
 - Example programs
 - ADSP-21161N EZ-KIT Lite Manual (this document)
 - Flash programmer utility
- EZ-KIT Lite Quick Start Guide
- Installation Quick Reference Card for VisualDSP++
- Universal 7.5V DC power supply
- 5 meter USB type A to type B 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 used EZ-KIT Lite boards in the protective shipping package.



2.3 PC Configuration

For correct operation of the VisualDSP++ software and the EZ-KIT Lite, your computer must have the minimum configuration shown in Table 2-1.

Table 2-1: Minimum PC Configuration

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

➤ **Note: This EZ-KIT Lite does not run under Windows 95 or Windows NT**

2.4 Installation Tasks

The following tasks are provided for the safe and effective use of the ADSP-21161N EZ-KIT Lite. Follow these instructions in the order presented to ensure correct operation of your software and hardware.

1. Install VisualDSP++ software
2. Install VisualDSP++ license
3. Install EZ-KIT Lite debug software
4. Setup EZ-KIT Lite hardware
5. Install EZ-KIT Lite USB driver
6. Verify the USB driver installation
7. Start VisualDSP++

2.4.1 Install the VisualDSP++ Software

This EZ-KIT Lite comes with the latest version of VisualDSP++ for the SHARC DSP family. You must install this software before installing the EZ-KIT Lite debug software.

Insert the VisualDSP++ CD-ROM into the CD-ROM drive. If Auto Run is enabled on your PC, the home screen of the VisualDSP++ install wizard will automatically appear. If not, choose **Run** from the **Start** menu, and enter **D:\Setup.exe** in the **Open** field, where D is the name of your local CD-ROM drive. Click on the “Install VisualDSP++” option. This will launch the setup wizard. Follow the on-screen instructions.

2.4.2 Install the VisualDSP++ License

Before the VisualDSP++ software can be used, the license must be installed.

To install the VisualDSP++ license:

1. Make sure VisualDSP++ has been installed first.
2. Insert the VisualDSP++ CD-ROM into the CD-ROM drive if it is not already in the drive.
3. Once the CD-ROM browser is on the screen select the “Install License” option.
4. Follow the setup wizard instructions. (Note: You will need the serial number located on the back of the CD-ROM sleeve.)

2.4.3 Install the EZ-KIT Lite Debug Software

VisualDSP++ communicates with the EZ-KIT Lite board using the EZ-KIT Lite debug software. This software is supplied on the EZ-KIT Lite CD-ROM.

To install the EZ-KIT Lite debug software:

1. Make sure VisualDSP++ has been installed first.
2. Close all Windows applications. The install will not work correctly if any VisualDSP++ applications are running.
3. Insert the EZ-KIT Lite CD-ROM into the CD-ROM drive. If Auto Run is enabled on your PC, the home screen of the EZ-KIT Lite install wizard will automatically appear. If not, choose **Run** from the **Start** menu, and enter **D:\Setup.exe** in the **Open** field, where D is the name of you local CD-ROM drive. Click on the “Install EZ-KIT Lite Software” option. This will launch the setup wizard. Follow this wizard with the on-screen instructions.

2.4.4 Set-up the EZ-KIT Lite Hardware

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



The ADSP-21161N 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. Use the following steps to connect the EZ-KIT Lite board:

1. Remove the EZ-KIT Lite board from the package. Be careful when handling these boards to avoid the discharge of static electricity, which may damage some components.
2. [Figure 2-1](#) shows the default jumper settings, connector locations and LEDs used in installation. Confirm that your board is set up in the default configuration before continuing.

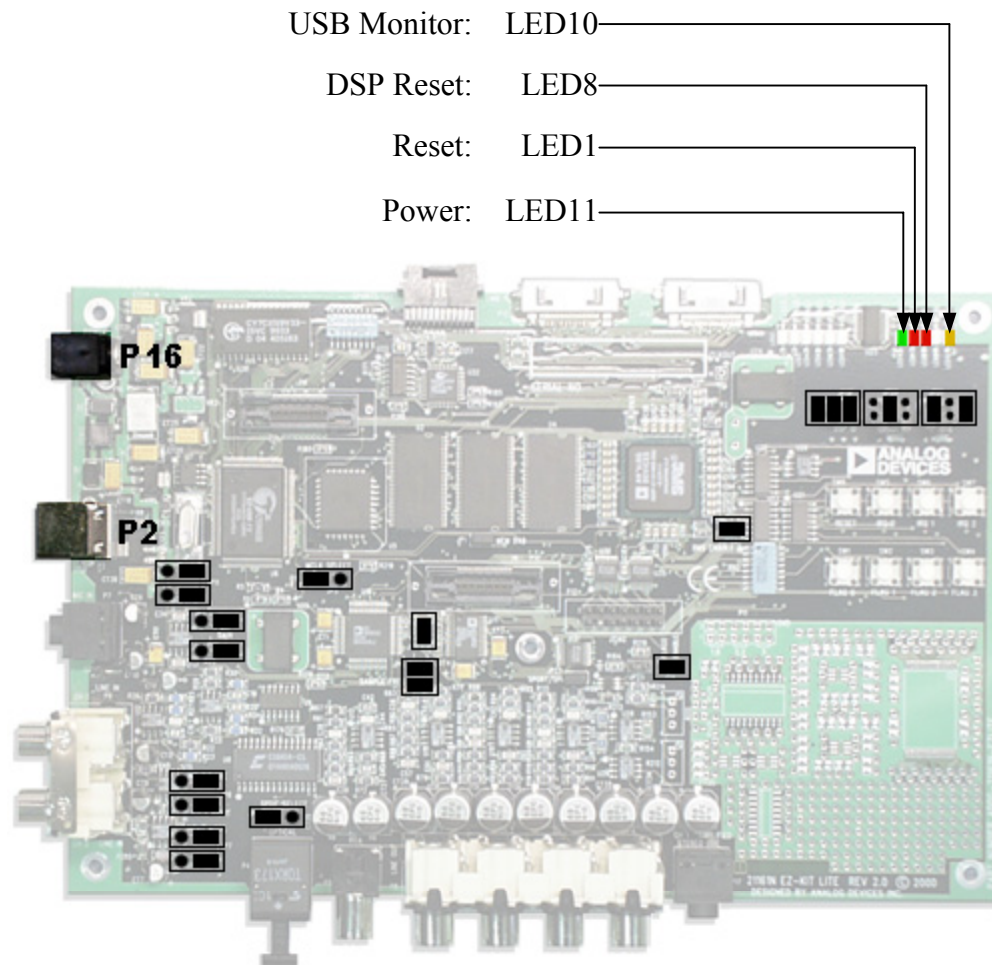


Figure 2-1: EZ-KIT Lite Hardware Setup

3. Plug the provided power supply into P16 on the EZ-KIT Lite board. Visually verify that the green power LED (LED11) is on. Also verify that the two red reset LEDs (LED1 and LED8) go on for a moment and then go off.
4. Connect the USB cable to an available full speed USB Port and to P2 on the ADSP-21161N EZ-KIT Lite board.
5. Now follow the USB driver installation instructions in section [2.4.5](#).

2.4.5 Install the EZ-KIT Lite USB Driver

The EZ-KIT Lite evaluation system can be installed on Windows 98 and Windows 2000 and requires one full-speed USB port. Section [2.4.5.1](#) describes the installation on Windows 98. Section [2.4.5.2](#) describes the installation on Windows 2000.

2.4.5.1 Windows 98 USB Driver Installation

Before using the ADSP-21161N EZ-KIT Lite for the first time, the Windows 98 USB driver must first be installed. This is accomplished as follows:

1. Insert the EZ-KIT Lite CD-ROM into the CD-ROM drive.

The connection of the device to the USB port will activate the Windows 98 “Add New Hardware Wizard” as shown in [Figure 2-2](#).



Figure 2-2: Add New Hardware Wizard Dialog Box

2. Click Next.

3. Select “Search for the best driver for your device” as shown in [Figure 2-3](#).



Figure 2-3: Search for the driver

4. Click Next.
5. Place a check in the box next to “CD-ROM drive” as shown in [Figure 2-4](#).



Figure 2-4: Search the CD-ROM

6. Click Next.

Windows 98 will locate the WmUSBEz.inf file that is on the CD-ROM as shown in [Figure 2-5](#).



Figure 2-5: The driver is located

7. Click Next.

[Figure 2-6](#) will appear.

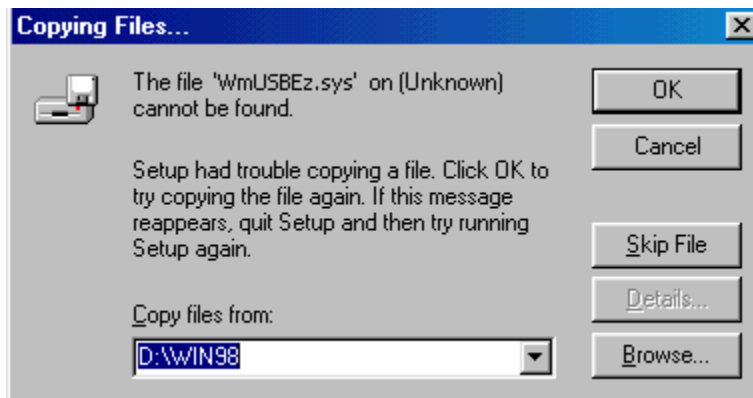


Figure 2-6: Search for .sys File Dialog Box

8. Click the Browse button.

Figure 2-7 will appear.

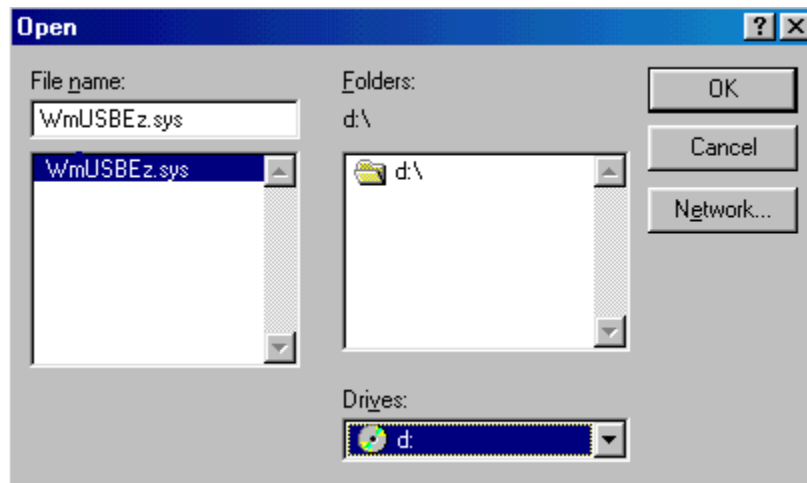


Figure 2-7: Open the .sys File

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

Figure 2-8 will appear.

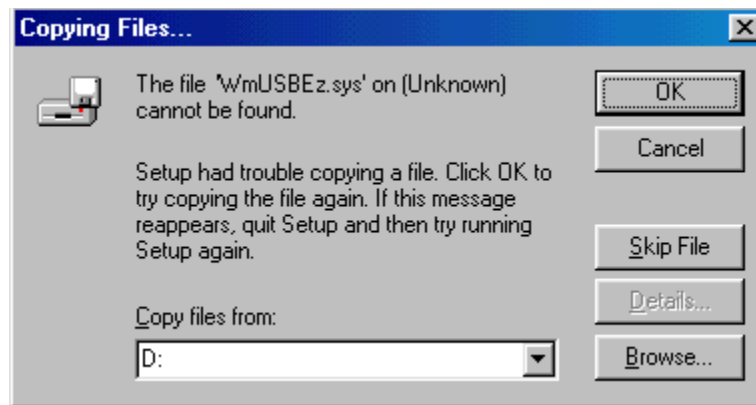


Figure 2-8: Copying Files

11. Click OK.

The driver installation is now complete as shown in [Figure 2-9](#).



Figure 2-9: Finish the Software Installation

12. Click Finish to exit the wizard.

Verify the installation by following the instructions in [section 2.4.6](#).

2.4.5.2 Windows 2000 USB Driver Installation

Before using the ADSP-21161N EZ-KIT Lite for the first time, the Windows 2000 driver must first be installed. This is accomplished as follows:

1. Insert the EZ-KIT Lite CD-ROM into the CD-ROM drive.

The connection of the device to the USB port will activate the Windows 2000 “Found New Hardware Wizard” as shown in [Figure 2-10](#).



Figure 2-10: Found New Hardware Wizard

2. Click Next.

3. Select “Search for a suitable driver for my device” as shown in [Figure 2-11](#).



Figure 2-11: Search for a Suitable Driver

4. Click Next.

5. Make sure there is a check in the box next to “CD-ROM drive” as shown in Figure 2-12.

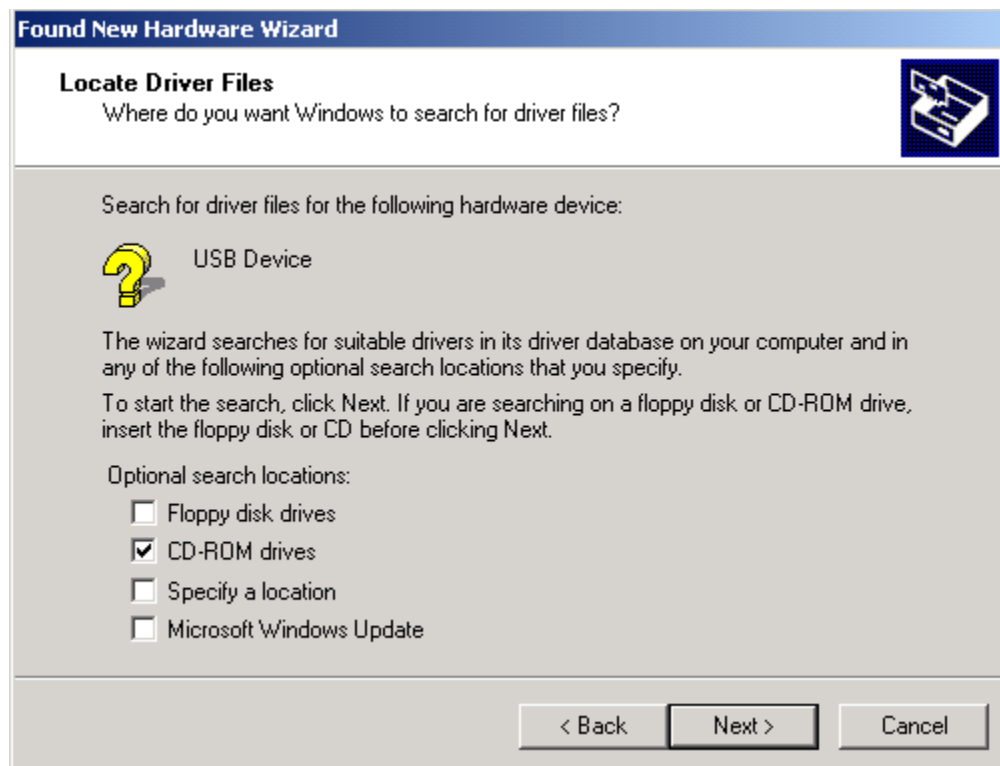


Figure 2-12: Locate Driver Files

6. Click Next.

Figure 2-13 appears.

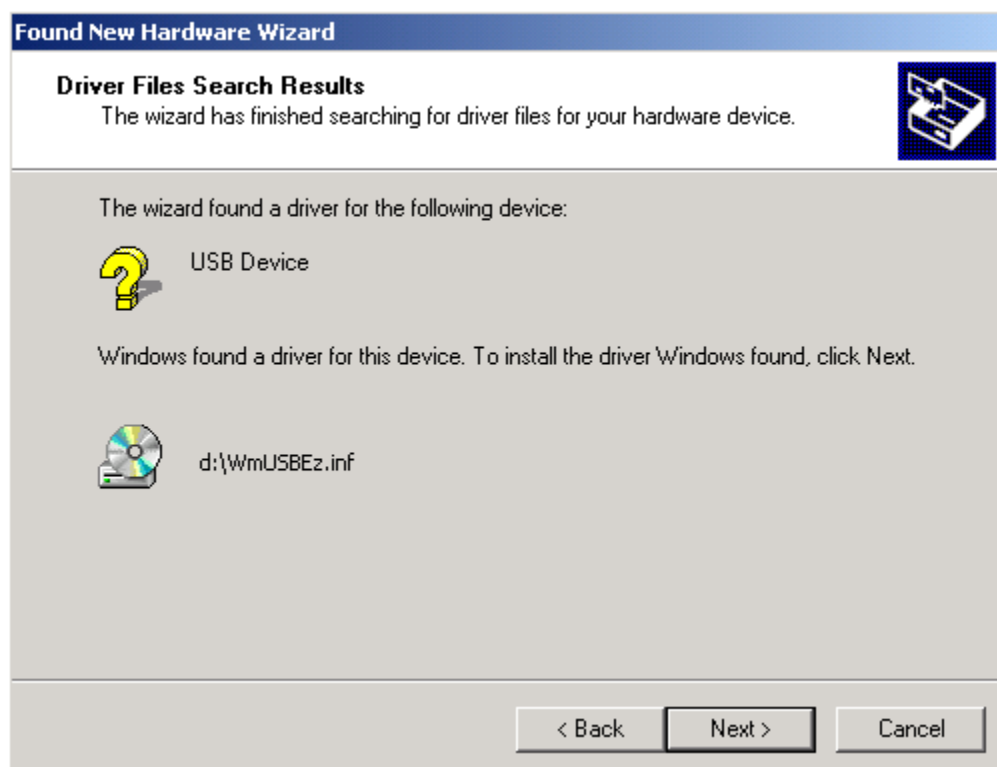


Figure 2-13: Driver File Search Results

7. Click Next.

Windows 2000 will automatically install the ADSP-21161N EZ-KIT Lite driver. The driver installation is now complete as shown in [Figure 2-14](#).

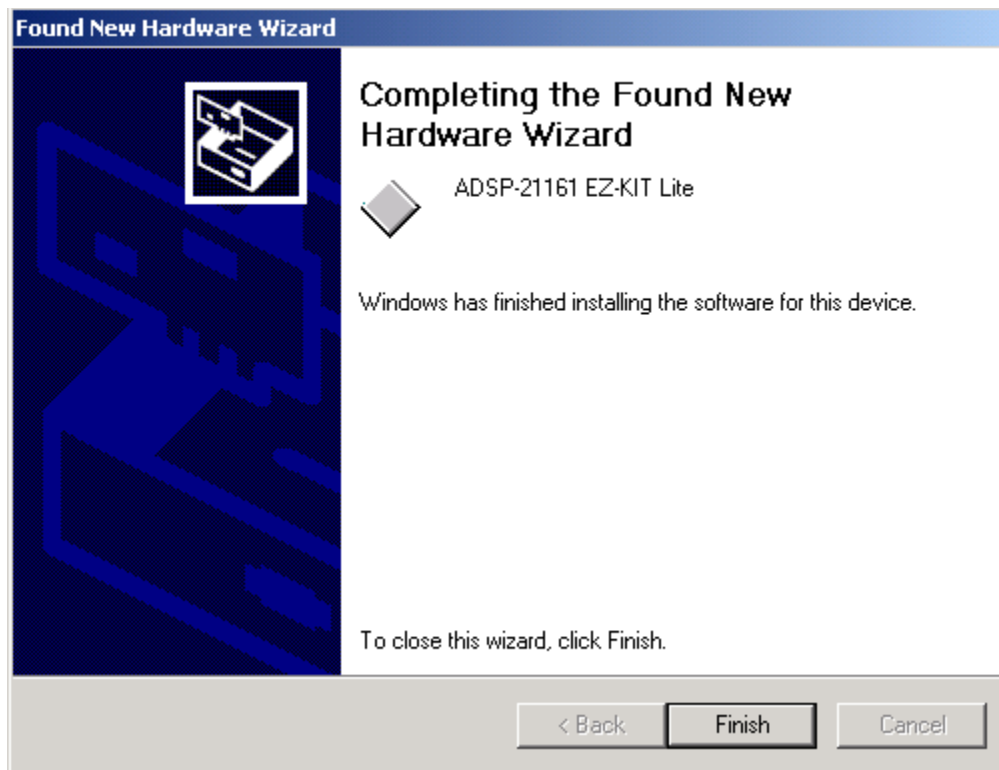


Figure 2-14: Completing Driver Installation Dialog Box

8. Click Finish to exit the wizard.

Verify the installation by following the instructions in [section 2.4.6](#).

2.4.6 Driver Installation Verification

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

1. Ensure that the USB cable is connected to the evaluation board and the PC.
2. Press and release the RESET button (SW8) on the evaluation board.
3. Verify that the red DSP RESET LED (LED8) stays lit for about 15 seconds.
4. After the DSP RESET LED (LED8) goes out, verify that the yellow USB monitor LED (LED10) is lit. This signifies that the board is communicating properly with the host PC, and is ready to run VisualDSP++.

2.4.7 Starting VisualDSP++

In order to start debugging, you must set up a session in VisualDSP++.

1. Hold down the Control (CTRL) key.
2. Select the *Start* button on the Windows taskbar, and then choose *Programs*, *VisualDSP*, *VisualDSP++*.

The *Session List* dialog box appears if you already have existing sessions. Skip to step 4 if this is the first time running VisualDSP++.

3. Click on *New Session*.
4. The *New Selection* dialog will appear as shown in [Figure 2-15](#).

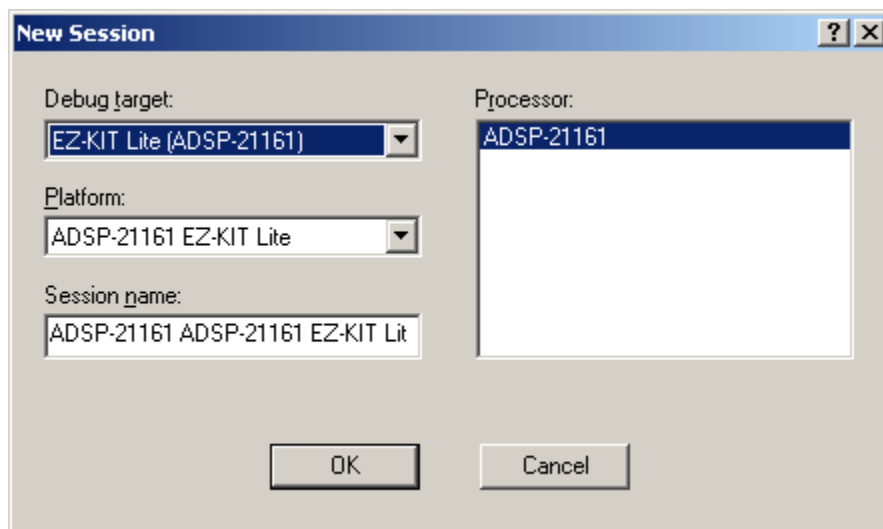


Figure 2-15: New Session Dialog Box

5. In Debug Target, choose “EZ-KIT Lite (ADSP-21161N)”.
6. Type a new target name in *Session Name* or accept the default name.
7. Click *OK* to return to the *Session List*. Highlight the new session and click *Activate*.

3 USING THE EZ-KIT LITE

3.1 Overview

This chapter provides specific information to assist you with developing programs for the ADSP-21161N EZ-KIT Lite board. This information appears in the following sections:

- [EZ-KIT Lite License Restrictions](#) (Section 3.2)
Describes the restrictions of the EZ-KIT Lite license.
- [Memory Map](#) (Section 3.3)
Defines the memory map to assist in developing programs for the EZ-KIT Lite evaluation system.
- [Using the SDRAM Interface](#) (Section 3.4)
Defines the registers necessary for configuring external memory.
- [Using the Flag Pins](#) (Section 3.5)
Describes how to use the programmable flag pins to assist in developing programs for the EZ-KIT Lite evaluation system.
- [Using the Interrupt Pins](#) (Section 3.6)
Describes how to use the interrupt pins to assist in developing programs for the EZ-KIT Lite evaluation system.
- [Using the Audio Interface](#) (Section 3.7)
Describes how to use the audio interface to assist in developing programs for the EZ-KIT Lite evaluation system.
- [Example Programs](#) (Section 3.8)
Provides information about the example programs included in the ADSP-21161N EZ-KIT Lite evaluation system.
- [Using the Flash Programmer Utility](#) (Section 3.9)
Provides information on the flash programmer utility included with VisualDSP++.

For more detailed information about programming the ADSP-21161N, see the documents referred to in section 1.6.

3.2 EZ-KIT Lite License Restrictions

The license that is shipped with the EZ-KIT Lite imposes the following restrictions:

- Program Memory (PM) space is limited to 5K words (1/4 of the ADSP-21161N PM space)
- No connections to Simulator or Emulator sessions are allowed.
- Only one EZ-KIT Lite can be connected to the host PC and debugged at a time

3.3 Memory Map

The ADSP-21161N has 1Mbit of internal SRAM that can be used for program storage or data storage. The configuration of internal SRAM is detailed in the *ADSP-21161N DSP Hardware Reference*.

The ADSP-21161N EZ-KIT Lite board contains 512K x 8-bits of external flash memory. This memory is connected to the DSP's ~MS1 and ~BMS memory select pins. The flash memory can be accessed in either the boot memory space or the external memory space. The external memory interface is also connected to 1M x 48-bit SDRAM memory. This memory is connected to the ~MS0 pin.

Table 3-1: EZ-KIT Lite Evaluation Board Memory Map

	Start Address	End Address	Content
Internal Memory	0x0000 0000	0x0001 FFFF	IOP Registers (Internal)
	0x0002 0000	0x0002 1FFF	Block 0 Long Word Addressing
	0x0002 8000	0x0002 9FFF	Block 1 Long Word Addressing
	0x0004 0000	0x0004 3FFF	Block 0 Normal Word Addressing
	0x0005 0000	0x0005 3FFF	Block 1 Normal Word Addressing
	0x0008 0000	0x0008 7FFF	Block 0 Short Word Addressing
	0x000A 0000	0x000A 7FFF	Block 1 Short Word Addressing
	0x0010 0000	0x001F FFFF	Multi-processor Memory Space
External Memory	0x0020 0000	0x002F FFFF	External Memory Space Bank 0 (SDRAM)
	0x0400 0000	0x047F FFFF	External Memory Space Bank 1 (FLASH)
	0x0800 0000	0x0BFF FFFF	External Memory Space Bank 2
	0x0C00 0000	0x0FFF FFFF	External Memory Space Bank 3

3.4 Using the SDRAM Interface

In order to use the SDRAM memory the two SDRAM control registers need to be set to the following values: SDRDIV = 0x1000 and SDCTL = 0x02014231

The SDCTL register configures the SDRAM controller for the following settings: (1/2 CCLK, no SDRAM buffering option, 2 SDRAM banks, SDRAM mapped to bank 0 only, no self-refresh, page size 256 words, SDRAM powerup mode is prechrg, 8 CRB refs, and then mode reg set cmd, tRCD = 2 cycles, tRP=2 cycles, tRAS=3 cycles, SDCL=1 cycle, and SDCLK0, SDCLK1, RAS, CAS and SDCLKE activated)

The SDRAM registers are configured automatically through the debugger. Checking the appropriate box as shown in [Figure 3-1](#) disable this setting and allows manual configuration.

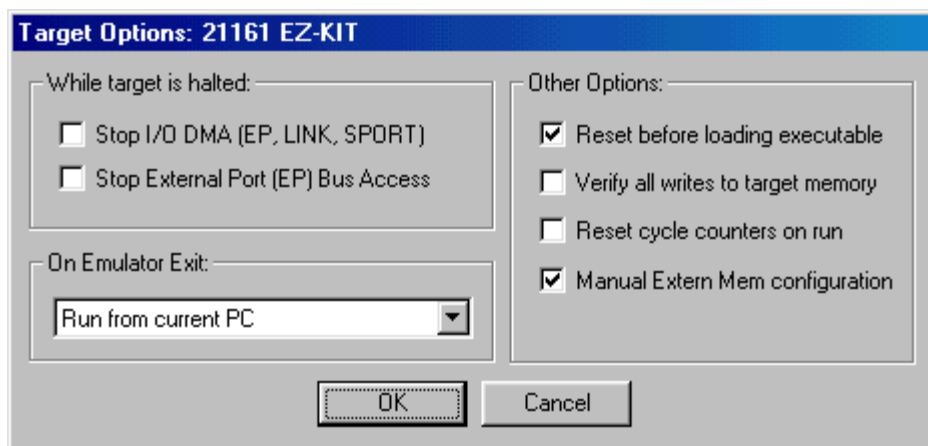


Figure 3-1 Target Options

3.5 Using the Flag Pins

The ADSP-21161N has 12 asynchronous Flags I/O pins. 10 of these pins (FLAG0-9) are available to let you interact with the running program.

After the DSP is reset, the flags are configured as inputs. The directions of the flags are configured through the MODE2 register and are set and read through the FLAGS register. For more information on configuring the flag pins, see the *ADSP-21161N DSP Hardware Reference*. Flags and their uses are described in [Table 3-2](#).

Table 3-2: Flag Pin Summary

Flag	Connected to	Use
FLAG0	SW1	FLAG0-3 are connected to the push buttons to supply feedback for program execution. For instance, you can write your code to trigger a flag when a routine is complete.
FLAG1	SW2	
FLAG2	SW3	
FLAG3	SW4	
FLAG4- FLAG9	LED2- LED7	FLAG4-9 are connected to LEDs on the EZ-KIT Lite board and are for user output.
FLAG10 & 11	Not Connected	Not Available

➤ **Note: FLAG0 – FLAG3 are available on connector P10.**

3.6 Using the Interrupt Pins

The ADSP-21161N has 3 interrupt pins (IRQ0-2) that let you interact with the running program. Each of the three external interrupts are directly accessible through the push button switches SW5 - SW7 on the EZ-KIT Lite board. . For more information on configuring the interrupt pins, see the *ADSP-21161N DSP Hardware Reference*. Interrupts and their uses are described in [Table 3-3](#).

Table 3-3: Interrupt Pin Summary

Interrupt	Connected to	Use
IRQ0	SW5	IRQ0-2 are connected 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	SW6	
IRQ2	SW7	

➤ **Note: IRQ0 – IRQ3 are available on connector P10.**

3.7 Using the Audio Interface

The audio interface on the EZ-KIT Lite board allows you to interface to the codec and digital receiver through various connectors. See section [4.5.2](#) for more information about the connectors. The audio interface consists of three main ICs, an AD1836, AD1852 and a CS8414.

The AD1836 multi-channel codec features six digital-to-analog converters (DACs) and four analog-to-digital converters (ADCs), support multiple digital stereo channels with 24-bit conversion resolution and a 96 kHz sample rate. The AD1836 features a 108 dB dynamic range for each of its six DACs, and a 104 dB dynamic range for its four ADCs.

The AD1852 is a complete 18/20/24-bit single-chip stereo digital audio playback system. It is comprised of a multibit sigma-delta modulator, digital interpolation filters, and analog output drive circuitry. Other features include an on-chip stereo attenuator and mute, programmed through an SPI-compatible serial control port. The AD1852 is fully compatible with all known DVD formats including 192kHz and 96kHz sample frequencies and 24-bits. It also is backwards compatible by supporting 50/15μs digital de-emphasis intended for "redbook" Compact Discs, as well as de-emphasis at 32kHz and 48kHz sample rate.

The CS8414 is a monolithic CMOS device that receives and decodes audio data up to 96kHz according to the AES/EBU, IEC958, S/PDIF, and EIAJ CP340/1201 interface standards. The CS8414 receives data from a transmission line, recovers the clock and synchronization signals, and de-multiplexes the audio and digital data. The CS8414 is setup to operate in I²S compatible mode.

The Microphone and Line-In jacks connect to the left and right ADC1 channel on the AD1836, depending on the setting of jumpers. See sections [4.3.9](#) and [4.3.8](#) for more information about configuring the jumpers. Two RCA jacks connect to ADC2 on the AD1836. This input is configured through the input mode selection jumpers see section [4.3.7](#) for more information.

The Line-Out jacks connect to the left and right DAC outputs of the AD1836 and AD1852.

The CS8414 has an error flag (VERF) that is used to indicate that the audio output may not be valid. This signal is connected to an LED (LED9) on the board. This signal may also be used by interpolation filters to provide error correction.

3.8 Example Programs

Example programs are provided with the ADSP-21161N 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\211xx\EZ-KITs\ADSP-21161N\Examples`. Please refer to the example program readme files for more information.

3.9 Using the Flash Programmer Utility

The ADSP-21161N EZ-KIT Lite evaluation system includes a flash programmer utility. The utility allows you to program the flash on the EZ-KIT Lite. This utility must be installed separately from the debug software. To install the utility, insert the EZ-KIT Lite CD-ROM and follow the steps in the installation wizard.

For more information on the flash programmer utility, from the start menu choose `Programs\VisualDSP\Flash Programmer Help`.

4 EZ-KIT LITE HARDWARE REFERENCE

4.1 Overview

This chapter describes the hardware design of the ADSP-21161N EZ-KIT Lite board. The following topics are covered:

- [System Architecture](#) (Section 4.2)
Describes the configuration of the DSP as well as a description of how all of the components on the board interface with the DSP.
- [Jumper Settings](#) (Section 4.3)
Shows the location and describes the function of all the configuration jumpers.
- [LEDs and Push Buttons](#) (Section 4.4)
Shows the location and describes the function of all the LEDs and push buttons.
- [Connectors](#) (Section 4.5)
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 part.
- [Specifications](#) (Section 4.6)
Gives the requirements for powering the board as well as the mechanical locations of some components of the board.

4.2 System Architecture

The EZ-KIT Lite has been designed to demonstrate the capabilities of the ADSP-21161N DSP. This section will describe the DSP's configuration on the EZ-KIT Lite board.

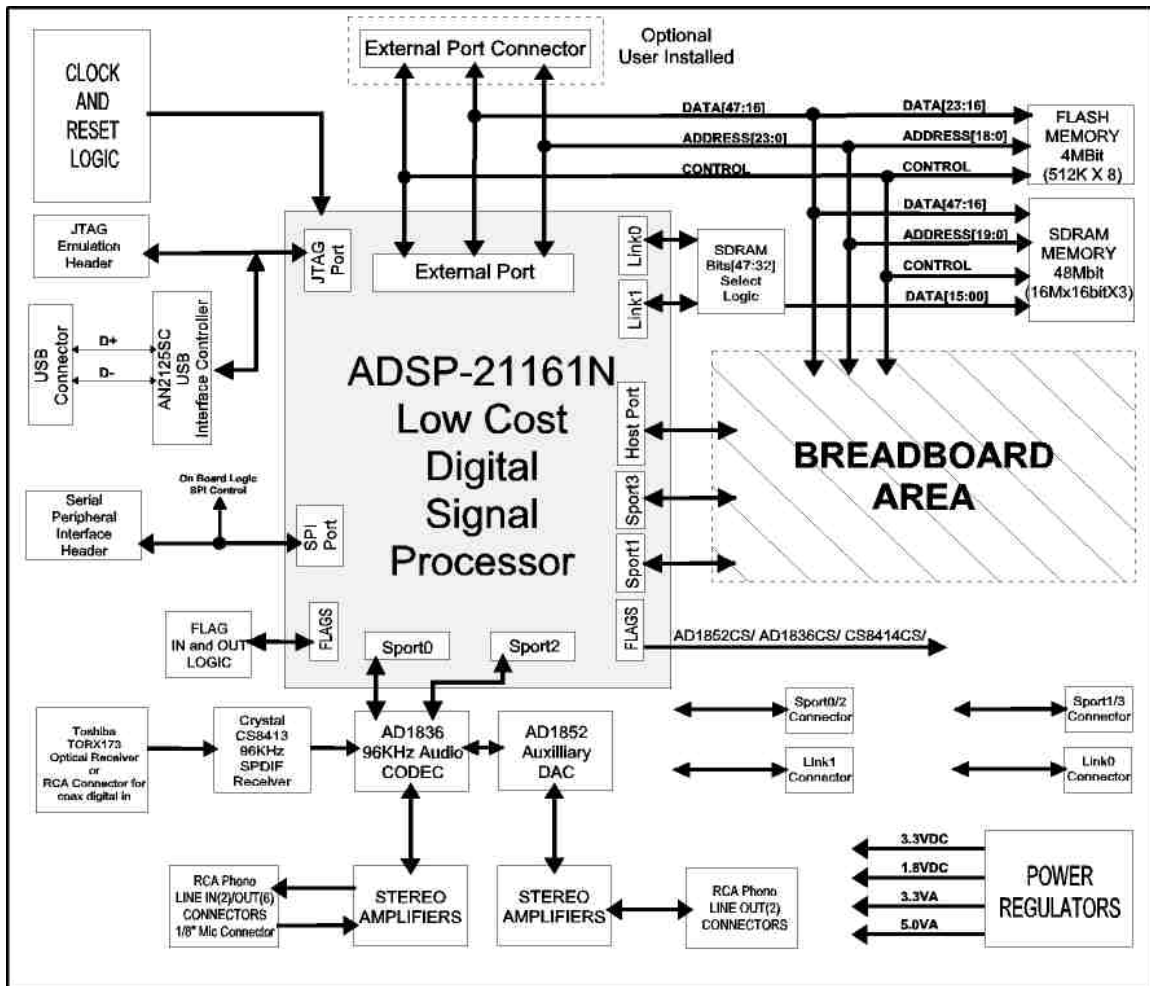


Figure 4-1: System Architecture

The DSP core voltage is 1.8V and the external interface operates at 3.3V.

A 12.5MHz through-hole oscillator supplies the input clock to the DSP. Footprints are provided on the board for a surface-mount oscillator and a through-hole crystal for alternate user installed clocks. The speed at which the core operates is determined by the location of the Clock Mode jumpers (JP21). (See section 4.3.12.) By default, the DSP core runs at 100MHz.

4.2.1 External Port

The external port is connected to a 512K x 8-bit flash memory. This memory is connected to the boot memory select (~BMS) pin and the memory select 1 (~MS1) pin, allowing the flash memory to be used to boot the DSP as well as store information during normal operation. Refer to section 3.3 for information about the location of the flash memory in the DSP's memory map.

The external memory interface is also connected to 1M x 48-bit SDRAM memory. This memory is connected to the memory select 0 (~MS0) pin. Refer to section 4.3.1 for information about configuring the width of the SDRAM. Refer to section 3.3 for information about the location of the flash memory in the DSP's memory map.

Some of the address, data, and control signals are available externally via two off-board connectors. The pinout of the EP connectors (P9 and P10) can be found in [APPENDIX B: SCHEMATIC](#).

4.2.2 Host Processor Interface (HPI)

The Host Port Interface (HPI) signals are brought to an unpopulated off board connector P9. This allows the HPI to interface to a user application. The pinout of the host port connector (P9) can be found in [APPENDIX B: SCHEMATIC](#).

4.2.3 SPORT0 and SPORT2 – Audio Interface

SPORT0 and SPORT2 are connected to the AD1836 codec (U10). A 3.5mm stereo jack and four RCA mono jacks allow audio to be input. A 3.5mm stereo jack and eight RCA mono jacks allow audio to be output.

The codec contains two input channels. One channel is connected to a 3.5mm stereo jack and two RCA jacks. The 3.5mm stereo jack can be connected to a microphone. The two RCA jacks can be connected to a line out from an audio device. You can supply an audio input to the codec microphone input channel (MIC1) or to the LINE_IN input channel. The jumper settings of JP1 determine the codec channel driven by the input jack (P3).

4.2.4 SPI - Audio Interface

The SPI is connected to the AD1836 and AD1852. This is used for writing and reading from control registers on the devices.

4.2.5 Breadboard Area

Use the breadboard area to add external circuitry.

- All board voltages and grounds
- Package Footprints
 - 1x SOIC16
 - 1x SOIC20
 - 4x SOT23-6
 - 1x PSOP44
 - 2x SOT23
 - 27x 0805

➤ **Warning:** Any circuitry added to the breadboard area is not supported.

4.2.6 JTAG Emulation Port

The JTAG emulation port allows an emulator to access the DSP's internal and external memory, as well as the special function registers through a 14-pin header. See section [4.5.5](#) for more information about the JTAG connector. To learn more about available emulators, contact Analog Devices (See section [1.1](#)).

4.3 Jumper Settings

This section describes the function of all the jumpers. The following figure shows the location of all the jumpers.

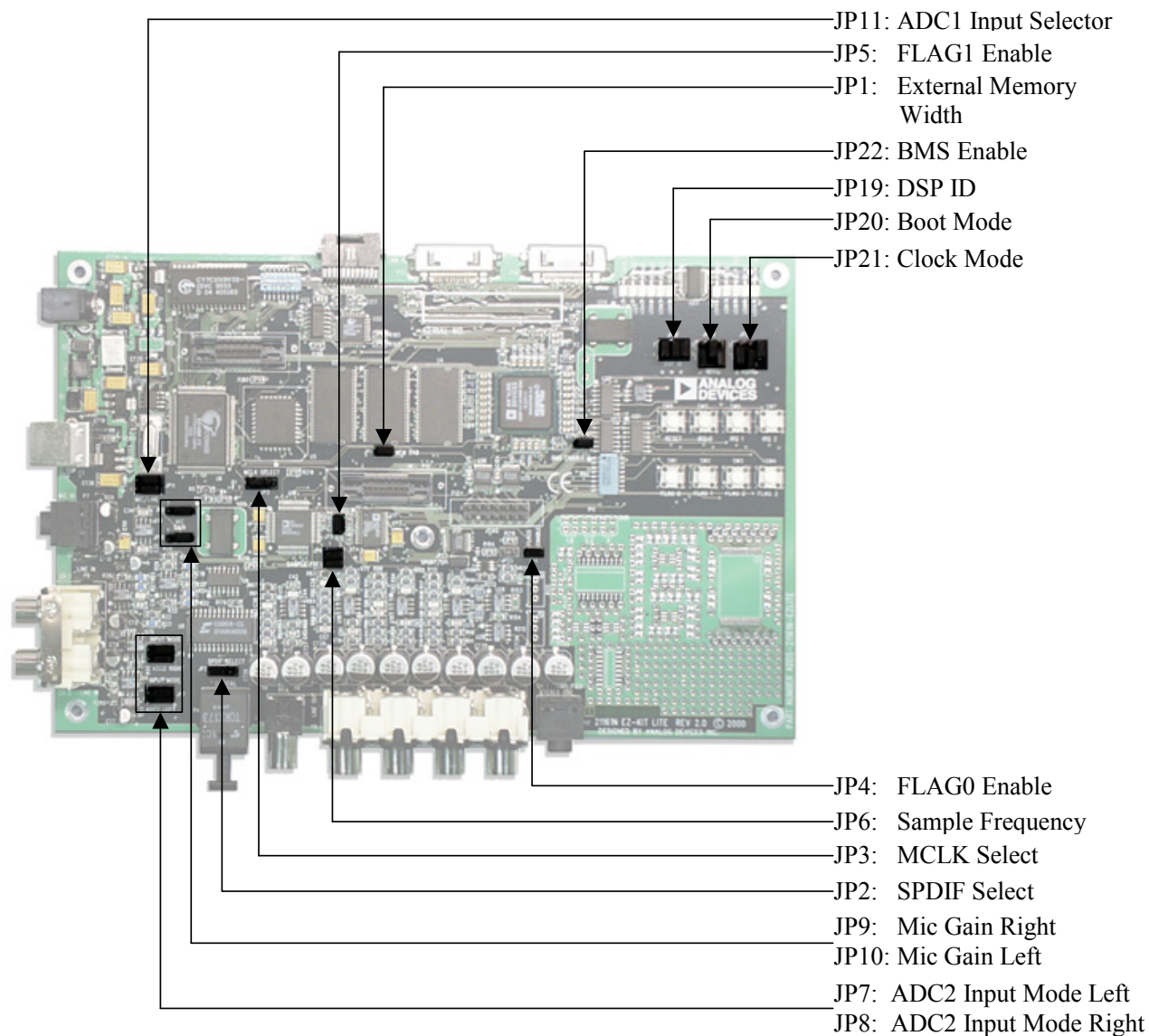


Figure 4-2: Jumper Locations

4.3.1 SDRAM Disable (JP1)

JP1 is used to enable or disable the third SDRAM device. When this jumper is installed, the ADSP-21161N can access the SDRAM as 48-bit wide external memory.

The upper 16 bits of data are multiplexed with the Link Ports and the external data bus. Therefore when the jumper is installed the Link Ports are not available. To use the Link Ports this jumper must be removed.

4.3.2 SPDIF Selection Jumper (JP2)

JP2 is used select the SPDIF input to the CS8414 Digital Audio Receiver. When the jumper is configured for an optical connection the TOSLINK optical input connector (P4) should be used. When the jumper is configured for a coax connection the RCA input connector (P5) should be used.

Table 4-1: SPDIF Modes

Jumper Location	Mode
1 & 2	Optical (factory default)
2 & 3	Coax

4.3.3 MCLK Selection Jumper (JP3)

JP3 is used to select the MCLK source for the AD1836 and AD1852.

Table 4-2: MCLK Selection

Jumper Location	MCLK Source
1 & 2	Audio Oscillator (12.288 MHz) (factory default)
2 & 3	Derived clock from SPDIF Stream

4.3.4 FLAG0 Enable (JP4)

In standard configuration, FLAG1 is connected to the AD1836 and used as a select for the SPI port. This jumper should be removed to use the push button switch or the signal on the expansion connector (P10). Once this jumper is removed the SPI can no longer communicate with the AD1836.

4.3.5 FLAG1 Enable (JP5)

In standard configuration, FLAG1 is connected to the AD1852 and used as a select for the SPI port. This jumper should be removed to use the push button switch or the signal on the expansion connector (P10). Once this jumper is removed the SPI can no longer communicate with the AD1852.

4.3.6 Sample Frequency Jumper (JP6)

JP6 is used to select the sample frequency for the AD1852. Table 4-3 shows the valid modes that may be used.

Table 4-3: Sample Frequencies

Jumper Location	Sample Frequency
None installed	Not Allowed
3 & 4	192 kHz (2x Interpolator)
1 & 2	96 kHz (4x Interpolator)
1 & 2, 3 & 4	48 kHz (8x Interpolator) (factory default)

4.3.7 ADC2 Input Mode Selection Jumper (JP7 and JP8)

JP7 and JP8 control the input mode to ADC2 on the AD1836. In high-performance mode, the signal is routed straight in to the ADC. In PGA mode, the signal goes through a multiplexer and a programmable gain amplifier inside of the codec.

Table 4-4: ADC Input Mode

Jumper Location	Input Mode
3 & 5, 4 & 6	PGA (factory default)
1 & 3, 2 & 4	High Performance

4.3.8 MIC Pre-Amp Gain Selection Jumpers (JP9 and JP10)

JP9 and JP10 are used to select the pre-amp gain for the microphone circuit. The gain for the left and right channel should be configured the same.

Table 4-5: MIC Pre Amp Gain

Jumper Position	Gain
Not Installed	0dB
1 & 2	20dB
2 & 3	40dB (factory default)

4.3.9 ADC1 Input Selector Jumper (JP11)

JP11 is used to select the input source for ADC2. If the input source for ADC2 is Line-In then the RCA connector P6 should be used. If the input source for ADC2 is a microphone then the mini stereo plug P7 should be used. If a microphone is used, the gain of the circuit may be increased as described in the section [4.3.8](#).

When the JP11 jumpers are between pins 1 and 3 and between pins 2 and 4, the connection is to P7 . When the jumpers are between pins 3 and 5 and between pins 4 and 6, P3 the connection is to P6. The jumper settings are illustrated below. (The words MIC and LINE are on the board to give a reference)

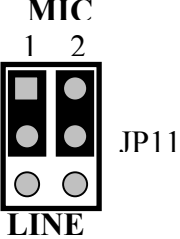
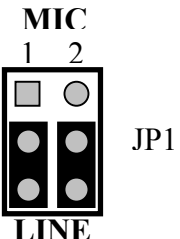
Microphone Input	Stereo LINE IN (DEFAULT)
	

Figure 4-3: Audio Input Jumper Settings

4.3.10 Processor ID Jumpers (JP19)

JP19 is used to select different a different processor ID for the DSP. During typical operation of the EZ-KIT Lite board, there is only a single DSP in the system. The jumper should be set to the single processor setting. In the case where a second processor is attached to the board though the link port these jumpers should be changed to configure one board for processor 1 and the other board for processor 2. System configuration options are shown in [Table 4-6](#).

Table 4-6: Processor ID Modes

Jumper Position	Description
1 & 2, 3 & 4, 5 & 6	Single Processor (Default)
3 & 4, 5 & 6	Processor 1
1 & 2, 5 & 6	Processor 2
Other	INVALID

4.3.11 Boot Mode Select (JP20)

JP20 determines how the DSP will boot. [Table 4-7](#) shows the jumper setting for the boot modes.

Table 4-7: Boot Mode Select Jumper (JP20) Settings

EBOOT Pins 1 & 2	LBOOT Pins 3 & 4	BMS Pins 5 & 6	Boot Mode
Not Installed	Installed	Not Installed (Output)	EPROM BOOT(DEFAULT)
Installed	Installed	Not Installed (Input)	Host Processor Boot
Installed	Not Installed	Installed (Input)	Serial Boot via SPI
Installed	Not Installed	Not Installed (Input)	Link Port Boot
Installed	Installed	Installed (Input)	No Boot
Not Installed	Not Installed	Installed (Input)	Reserved

4.3.12 Clock Mode Jumpers (JP21)

JP21 controls the speed for the core and external port of the ADSP-21161N. The frequency supplied to CLKIN of the DSP may be changed by removing the 12.5 MHz oscillator (U24) that is shipped with the board and replacing it with a different oscillator or crystal (Y2). A clock mode and frequency should be selected so that the min and max specs of the ADSP-21161N are not exceeded. For more information on clock modes, see the *ADSP-21161N DSP Hardware Reference*. [Table 4-8](#) shows the jumper setting for the clock modes.

Table 4-8: Clock Mode Selections

CLKDBL Pins 1 & 2	CLK_CFG1 Pins 3 & 4	CLK_CFG0 Pins 5 & 6	Core Clock Ratio	EP Clock Ratio
Not Installed	Installed	Installed	2:1	1x
Not Installed	Installed	Not Installed	3:1	1x
Not Installed	Not Installed	Installed	4:1	1x
Installed	Installed	Installed	4:1	2x
Installed	Installed	Not Installed	6:1	2x
Installed	Not Installed	Installed	8:1	2x (Default)

4.3.13 BMS Enable (JP22)

JP22 is used to control the routing of the Boot Memory Select (BMS) signal. When the jumper is installed the BMS signal is routed to the FLASH memory interface and can be used for reading, writing and booting. The jumper should be installed when using EPROM boot mode. This jumper should be removed when using the serial boot or no boot mode. If the jumper was left on in these modes the flash would always be selected because the BMS signal is grounded in these modes.

4.4 LEDs and Push Buttons

This section describes the function of all the LEDs and push buttons. [Figure 4-4](#) shows the location of all the LEDs and push buttons.

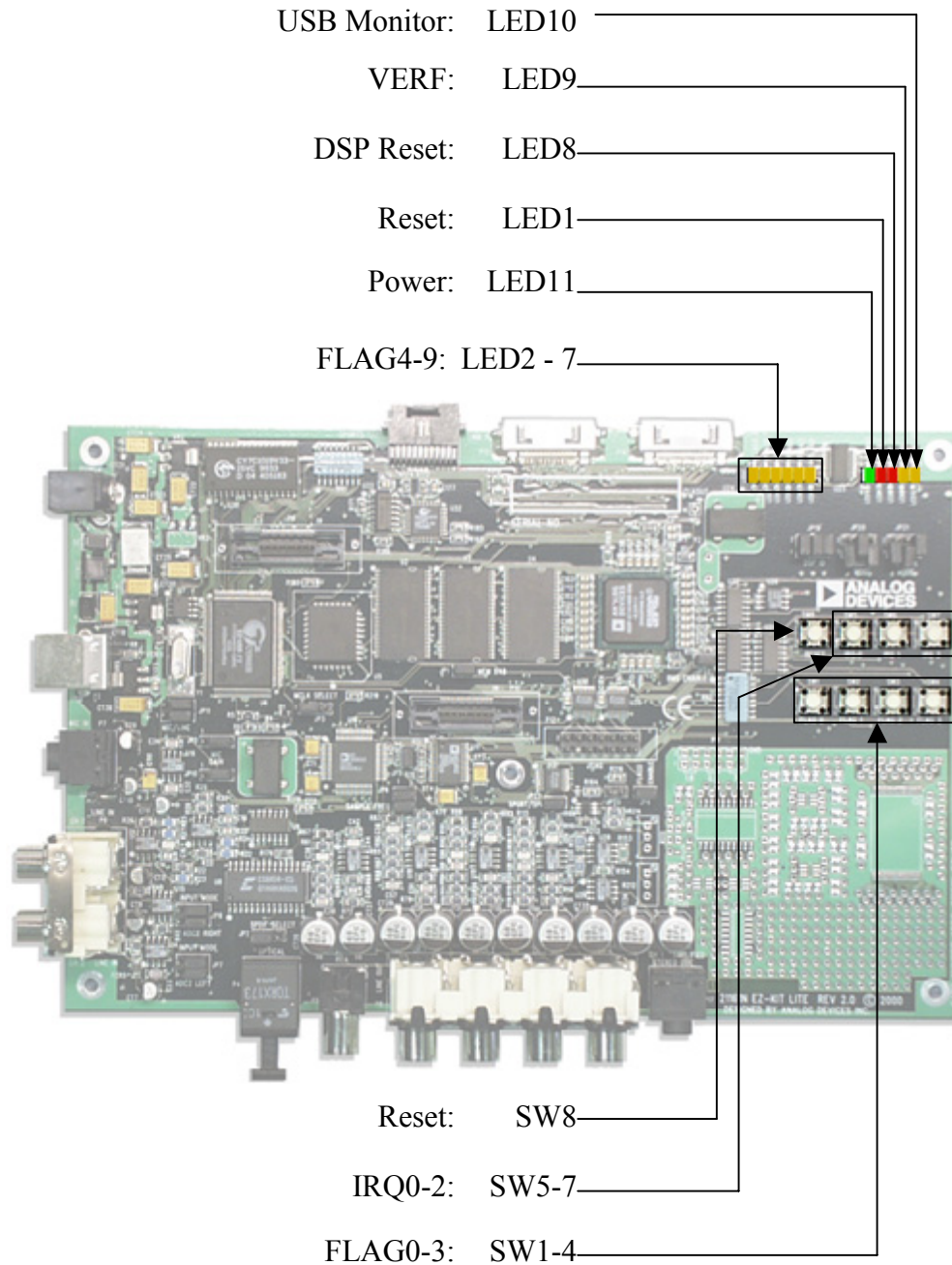


Figure 4-4: LEDs and Push Button Locations

4.4.1 Reset LEDs (LED1, LED8)

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

When LED8 is lit, the ADSP-21161N (U1) is being reset. The USB interface resets the ADSP-21161N during USB communication initialization.

4.4.2 FLAG LEDs (LED2 - LED7)

The FLAG LEDs connect to the DSP's flag pins (FLAG4-FLAG9). These LEDs are active HIGH and are lit by an output of “1” from the DSP. Refer to section [3.4](#) for more information about the use of the programmable flags when programming the DSP. [Table 4-9](#) shows the FLAG signal and the corresponding LED.

Table 4-9: FLAG LEDs

FLAG Pin	LED Reference Designator
FLAG4	LED7
FLAG5	LED6
FLAG6	LED5
FLAG7	LED4
FLAG8	LED3
FLAG9	LED2

4.4.3 VERT LED (LED9)

The VERT LED indicates that there is a possible error on the audio stream of the CS8414 digital receiver. One cause for this is that there are no digital audio cables connected to the optical or coaxial SPDIF connectors.

4.4.4 USB Monitor LED (LED10)

The USB Monitor LED indicates that USB communication has been initialized successfully and you may now connect to the DSP using VisualDSP++. If the LED is not lit, try resetting the board, and/or reinstalling the USB driver (see section [2.4.5](#)).

4.4.5 Power LED (LED11)

LED11 is a green LED that indicates that power is being properly supplied to the board.

4.4.6 Programmable Flag Push Buttons (SW1 – SW4)

Four push buttons are provided for general-purpose user input. SW1 - 4 connect to the DSP's programmable flag pins. The push buttons are active high and when pressed send a high (1) to the DSP. Refer to section 3.4 for more information about the use of the programmable flags when programming the DSP. Table 4-10 shows the FLAG signal and the corresponding switch.

Table 4-10: FLAG Switches

Flag Pin	Push Button Reference Designator
FLAG0	SW1
FLAG1	SW2
FLAG2	SW3
FLAG3	SW4

4.4.7 Interrupt Push Buttons (SW5 – SW7)

Three push buttons are provided for general-purpose user input. SW5 - 7 connect to the DSP's programmable flag pins. The push buttons are active high and when pressed send a high (1) to the DSP. Refer to section 3.4 for more information about the use of the programmable flags when programming the DSP. Table 4-11 shows the interrupt signal and the corresponding switch.

Table 4-11: Interrupt Switches

Flag Pin	Push Button Reference Designator
IRQ0	SW5
IRQ1	SW6
IRQ2	SW7

4.4.8 Reset Push Button (SW8)

The RESET push button resets all of the IC's on the board. During reset, the USB interface is automatically reinitialized.

- **Warning: Pressing the RESET push button (SW8) while VisualDSP++ is running disrupts communication and causes errors in the current debug session. VisualDSP++ must be closed and re-opened.**

4.5 Connectors

This section describes the function of the connectors and gives information about mating connectors. The following figure shows the locations of the connectors.

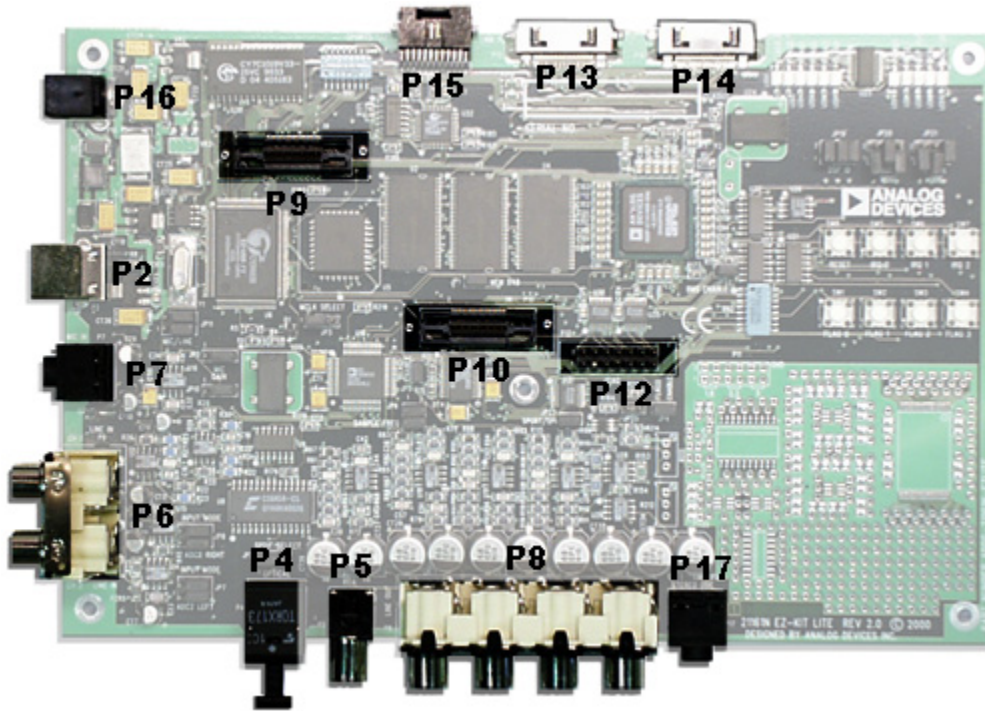


Figure 4-5: Connector Locations

4.5.1 USB (P2)

The USB connector is a standard Type B USB receptacle.

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

4.5.2 Audio (P4 – P8, P17)

There are 2 3.5mm Stereo audio jacks, 13 RCA jacks and 1 optical connector.

Part Description	Manufacturer	Part Number
3.5mm stereo jack (P7 & P16)	Shogyo	SJ-0359AM-5
RCA Jacks (P6)	SWITCHCRAFT	PJRS2X2S01
RCA Jacks (P8)	SWITCHCRAFT	PJRS4X2U01
TORX (P4)	TOSHIBA	TORX173
Coaxial (P5)	SWITCHCRAFT	PJRN1X1U01
Mating Connector		
3.5mm stereo plug to 3.5mm stereo cable (P7 & P16)	Radio Shack	L12-2397A
Two channel RCA interconnect cable (P6 & P8)	Monster Cable	BI100-1M
Digital Fiber-Optic Cable (P4)	Monster Cable	ILS100-1M
Digital Coaxial Cable (P5)	Monster Cable	IDL100-1M

4.5.3 External port and Host Processor Interface (P9, and P10)

Two MICTOR board-to-board connectors provide all of the DSP's External Port signals. Contact AMP for information about mating connectors.

Part Description	Manufacturer	Part Number
38 Position MICTOR	AMP	2-767004-2

4.5.4 JTAG (P12)

The JTAG header is the connecting point for a JTAG in-circuit emulator pod.

Note: Pin 3 is missing to provide keying. Pin 3 in the mating connector should have a plug.

When an emulator is connected to the JTAG header, the USB debug interface is disabled.

➤ **WARNING:** When using an emulator with the EZ-KIT Lite board, follow the connection instructions provided with the emulator.

4.5.5 Link Ports (P13 and P14)

Each link port is connected to a 26-pin connector. Refer to [EE-106](#) for more information about the link port connectors.

Part Description	Manufacturer	Part Number
26 position connector	Honda	RMCA-26JL-AD
Mating Connector		
Cable connector	Honda	RMCA-E26F1S-A
Shroud	Honda	RMCA-E26L1A
Coaxial cable	Gore	DXN2132

4.5.6 SPORT1 and SPORT3 (P15)

SPORT1 and SPORT3 are connected to a 20-pin connector.

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

4.5.7 Power Connector (P16)

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

Part Description	Manufacturer	Part Number
2.5mm Power Jack	Switchcraft	RAPC712
	Digi-key	SC1152-ND
Mating Power Supply (shipped with EZ-KIT Lite)		
7.5v Power Supply	GlobTek	TR9CC2000LCP-Y

4.6 Specifications

This section provides the requirements for powering the board.

4.6.1 Power Supply

The power connector supplies DC power to the EZ-KIT Lite board. [Table 4-12](#) shows the power connector pinout.

Table 4-12: Power Connector

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

4.6.2 Board Current Measurements

The ADSP-21161N EZ-KIT Lite board provides two zero-ohm resistors that may be removed to measure current draw. [Table 4-13](#) shows the resistor number, the voltage plane, and a description of the components on the plane.

Table 4-13: Current Measurement Resistors

Resistor	Voltage Plane	Description
R168	VDDINT	Core Voltage of the DSP
R169	VDDEXT	I/O Voltage of the DSP

APPENDIX A: BILL OF MATERIALS

Item	Qty	Description	Reference Designator	Manufacturer	Part Number
1	1	FLASH-512K-X-8	U5	ST MICRO	M29W040B120K6
2	2	HEX-INVER-SCHMITT-TRIGGER	U21-22	PHILIPS	74LVC14AD
3	3	1MX16-SDRAM-143MHZ	U2-4	MICRON	MT48LC1M16A1TG-7S
4	1	96KHZ-DIGITAL-AUDIO-RECVR	U8	CIRRUS LOGIC	CS8414-CS
5	1	USB-TX/RX MICROCONTROLLER	U6	CYPRESS	CY7C64603-128NC03-A
6	1	NPN TRANSISTOR 1A	Q2	FAIRCHILD	MMBT4124
7	1	NPN TRANSISTOR 200MA	Q1	FAIRCHILD	MMBT4401
8	1	CRYSTAL OSCILLATOR	Y1	DIGIKEY	SE2507CT-ND
9	2	NAND GATE	U9,U27	PHILIPS	74LVC00AD
10	1	128 BIT SERIAL EEPROM	U7	MICROCHIP	24LC00-SN
11	1	ADJ 200MA REGULATOR	VR4	ANALOG DEVICES	ADP3331ART
12	1	128K X 8 SRAM	U30	CYPRESS	CY7C1019V33-15VC
13	1	DUAL AMP 250MA	U29	ANALOG DEVICES	AD8532AR
14	1	OSCILLATOR	U25	DIG01	SG-8002DC-PCC-ND 12.288MH
15	2	SINGLE-2 INPUT-NOR	U34,U37	TI	SN74AHC1G02DBVR
16	1	8-BIT-PARALLEL-SERIAL	U33	TI	SN74LV164AD
17	1	64-BYTE-FIFO	U32	CYPRESS	CY7C4201V-15AC
18	1	12.5 MHz OSC	U24	DIGI-KEY	SG-8002DC-PCC-ND
19	2	1000 PF CAP	C85-86	AVX	12065A102JAT2A
20	8	2200 PF CAP	C40,C46,C52,C58,C64,C70,C76,C82	AVX	12065A222JAT2A
21	1	VOLTAGE-SUPERVISOR	U26	ANALOG	ADM708SAR
22	1	MULTIBIT-SIGMA-DELTA-DAC	U11	ADI	AD1852JRS
23	1	MULTI-CHANNEL-96KHZ-CODEC	U10	ADI	AD1836AS
24	1	1MM SPACING	U1	ADI	ADSP-21161N-100
25	1	3.3V-1.0AMP REGULATOR	VR2	ANALOG	ADP3338ARM-3.3
26	2	5V-1.5A REGULATOR	VR1,VR5	ANALOG	ADP3339AKC-5-REEL
27	10	DUAL AUDIO OP AMP	U12-20,U28	ANALOG	SSM2275S

Item	Qty	Description	Reference Designator	Manufacturer	Part Number
28	3	TANT CAP	CT23-25	AVX	TAJC475K025R
29	1	POWER JACK	P16	SWITCHCRAFT	SC1152-ND12
30	1	USB CONNECTOR	P2	MILL-MAX	897-30-004-90-000000
31	1	FIBER OPTIC REV MODULE	P4	TOSHIBA	TORX173
32	1	RCA 4X2	P8	SWITCHCRAFT	PJRS4X2U01
33	1	RCA 1X1	P5	SWITCHCRAFT	PJRN1X1U01
34	1	RCA 2X2	P6	SWITCHCRAFT	PJRS2X2S01
35	2	LNKPRT 12X2	P13-14	HONDA(TSUSHINK)	RMCA-EA26LMY-0M03-A
36	1	.05 10X2	P15	AMP	104069-1
37	8	6MM PUSH BUTTON	SW1-8	PANASONIC	EVQ-PAD04M
38	1	10 1/8W 5% 1206	R2	PANASONIC	P10ECT-ND
39	6	0.00 1/8W 5% 1206	R153,R154,R168-169,R217,R218	YAGEO	P0.0ETR
40	8	AMBER LED	LED2-7,LED9-10	PANASONIC	LN1461C-TR
41	8	330pF 50V 5% 805	C36,C42,C48,C54,C60,C66,C72,C78	AVX	08055A331JAT
42	80	0.01uF 100V 10% 805	C2,C6-7,C91-149,C154-155,C165-171,C184-C186,C174-179	AVX	08051C103KAT2A
43	11	0.22uF 25V 10% 805	C156-164,C172,C183	AVX	08053C224FAT
44	15	0.1uF 50V 10% 805	C1,C5,C9-11,C33,C87-90,C150-153,C173	AVX	08055C104KAT
45	8	0.001uF 50V 5% 805	C14-15,C19-20,C24-25,C29-30	AVX	08055A102JAT2A
46	5	10uF 16V 10% C	CT19-22,CT36	AVX	TAJC106K016R
47	4	33 100MW 5% 805	R1,R150,R176,R152	AVX	CR21-330JTR
48	4	4.7K 100MW 5% 805	R184,R188,R189,R191	AVX	CR21-4701F-T
49	11	680 100MW 5% 805	R137-147	AVX	CR21-6800F-T
50	1	1M 100MW 5% 805	R12	AVX	CR21-1004F-T
51	1	475 100MW 5% 805	R16	AVX	CR21-471J-T
52	1	1.5K 100MW 5% 805	R7	AVX	CR21-1501F-T
53	2	2.00K 1/8W 1% 1206	R49-50	DALE	CRCW1206-2001FRT1
54	10	49.9K 1/8W 1% 1206	R66,R74,R82,R90,R98,R106,R114,R122,R192,R206	AVX	CR32-4992F-T
55	2	2.21K 1/8W 1% 1206	R10-11	AVX	CR32-2211F-T

Item	Qty	Description	Reference Designator	Manufacturer	Part Number
56	24	100pF 100V 5% 1206	C12,C16-17,C21-22,C26-27,C31,C35,C38	AVX	12061A101JAT2A
57	24	100pF 100V 5% 1206	C41,C44,C47,C50,C53,C56,C59,C62,C65,C68,	AVX	12061A101JAT2A
58	24	100pF 100V 5% 1206	C71,C74,C80,C77,	AVX	12061A101JAT2A
59	5	10uF 16V 10% B	CT1-4,CT11	AVX	TAJB106K016R
60	7	100 100MW 5% 805	R123,R125,R127,R129,R131,R133,R135	AVX	CR21-101J-T
61	8	220pf 50V 10% 1206	C39,C45,C51,C57,C63,C69,C75,C81	AVX	12061A221JAT2A
62	1	0.06 CHOKE	FER13	MURATA	PLM250S40T1
63	2	SILICON RECTIFIER	D1-2	GENERALSEMI	S2A
64	12	0.70 BEAD	FER1-12	STEWARD	HZ1206B601R
65	8	237 1/8W 1% 1206	R23,R27,R30,R34,R40-41,R47-48	KOA	RK73H2BT2370F
66	4	750K 1/8W 1% 1206	R25,R32,R38,R45	KOA	RK73H2BT7503F
67	16	5.76K 1/8W 1% 1206	R21,R22,R24,R26,R28-29,R31,R33,R35-37,R39,R42-44,R46	DALE	CRCW12065761FRT1
68	8	11.0K 1/8W 1% 1206	R59,R67,R75,R83,R91,R99,R107,R115	DALE	CRCW12061102FTR1
69	1	68NF 50V 10% 805	C8	MURRATA	GRM40X7R683K050AL
70	8	120PF 50V 5% 1206	C13,C18,C23,C28,C187-190	PHILLIPS	1206CG121J9B200
71	1	75 1/8W 5% 1206	R14	PHILIPS	9C12063A75R0JLRT/R
72	2	820PF 100V 10% 1206	C32,C34	AVX	12061A821KAT2A
73	2	30PF 100V 5% 1206	C3-4	AVX	12061A300JAT2A
74	8	680PF 50V 1% 805	C37,C43,C49,C55,C61,C67,C73,C79	AVX	08055A681FAT2A
75	8	2.74K 1/8W 1% 1206	R63,R71,R79,R87,R95,R103,R111,R119	PANASONIC	ERJ-8ENF2741V
76	16	5.49K 1/8W 1% 1206	R60,R61,R68,R69,R76,R77,R84,R85,R92,R93,R100,R101,R108,R109,R116,R117	PANASONIC	ERJ-8ENF5491V
77	8	3.32K 1/8W 1% 1206	R62,R70,R78,R86,R94,R102,R110,R118	PANASONIC	ERJ-8ENF3321V
78	2	100 1/8W 1% 1206	R54,R57	PANASONIC	ERJ-8ENF1000V
79	8	1.65K 1/8W 1% 1206	R64,R72,R80,R88,R96,R104,R112,R120	PANASONIC	ERJ-8ENF1651V
80	6	10UF 16V 20%	CT5-10	DIGI-KEY	PCE3062TR-ND
81	10	68UF 25V 20%	CT26-35	PANASONIC	EEV-FC1E680P

Item	Qty	Description	Reference Designator	Manufacturer	Part Number
82	1	365K 1/8W 1% 1206	R215	DIGI-KEY	P365KFCT-ND
83	1	634K 1/8W 1% 1206	R214	DIGI-KEY	P634KFCT-ND
84	1	2A SL22 DO-214AA	D3	GENERAL SEMI	SL22
85	2	10K 100MW 2% RNET16	RN1-2	CTS	767-161-103G
86	1	1K 1/8W 5% 1206	R5	AVX	CR32-102J-T
87	2	100K 1/8W 5% 1206	R167,R213	AVX	CR32-103J-T
88	2	1.00K 1/8W 1% 1206	R53,R56	DALE	CRCW1206-1001FRT1
89	2	20.0K 1/8W 1% 1206	R170, R173	DALE	CRCW1206-2002FRT1
90	2	22 1/8W 5% 1206	R8-9	AVX	CR32-220J-T
91	1	74FCT244AT QSOP20	U23	CYPRESS	CY74FCT244ATQC
92	4	10.0K 1/8W 1% 1206	R51-52,R55,R58	DALE	CRCW1206-1002FRT1
93	2	RED-SMT	LED1,LED8	PANASONIC	LN1261C
94	1	GREEN-SMT	LED11	PANASONIC	LN1361C
95	8	604 1/8W 1% 1206	R65,R73,R81,R89,R97,R105,R113,R121	PANASONIC	ERJ-8ENF6040V
96	7	1uF 25V 20% A	CT12-18	AVX	TAJA105K035R
97	3	QUICKSWITCH	U31.U35,U36	ANALOG DEV.	ADG774ABRQ
98	6	IDC 2X1	JP1,JP4-5,JP22-23,JP25	BERG	54101-T08-02
99	4	IDC 3X1	JP2-3,JP9-10	BERG	54101-T08-03
100	1	IDC 2X2	JP6	BERG	54102-T08-02
101	6	IDC 3X2	JP7-8,JP11,JP19-21	BERG	54102-T08-03
102	1	IDC 7X2	P12	BERG	54102-T08-07
103	1	2.5A RESETABLE FUSE	F1	RAYCHEM CORP.	SMD250-2
104	2	3.5MM STEREO_JACK	P7,P17	SHOGYO	SJ-0359AM-5

APPENDIX B: SCHEMATIC

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21161N EZ-KIT LITE

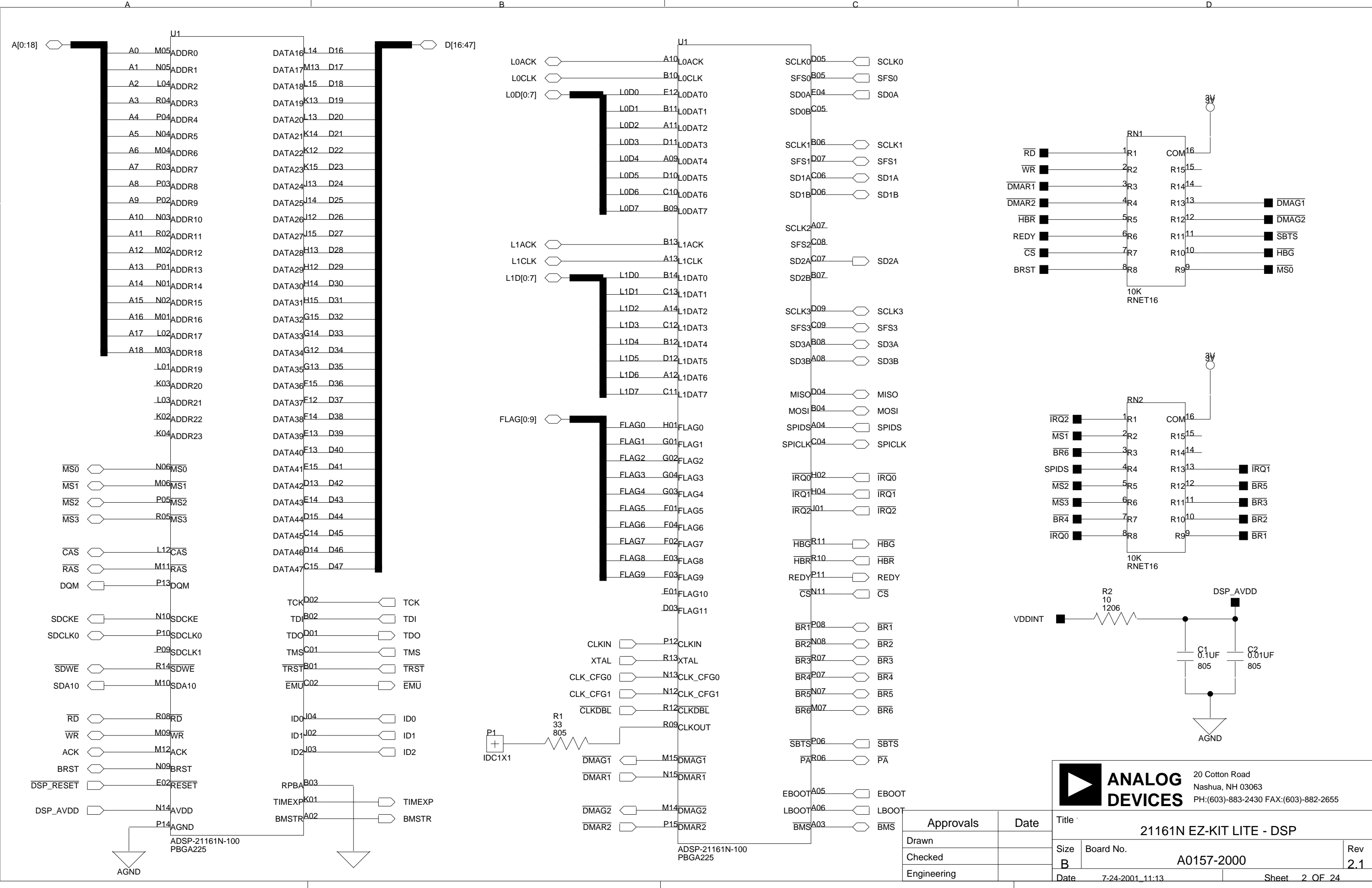



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Title 21161N EZ-KIT LITE - TITLE PAGE			
Size B	Board No. A0157-2000		Rev 2.1
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Size	Board No.	Rev	
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1

2

3

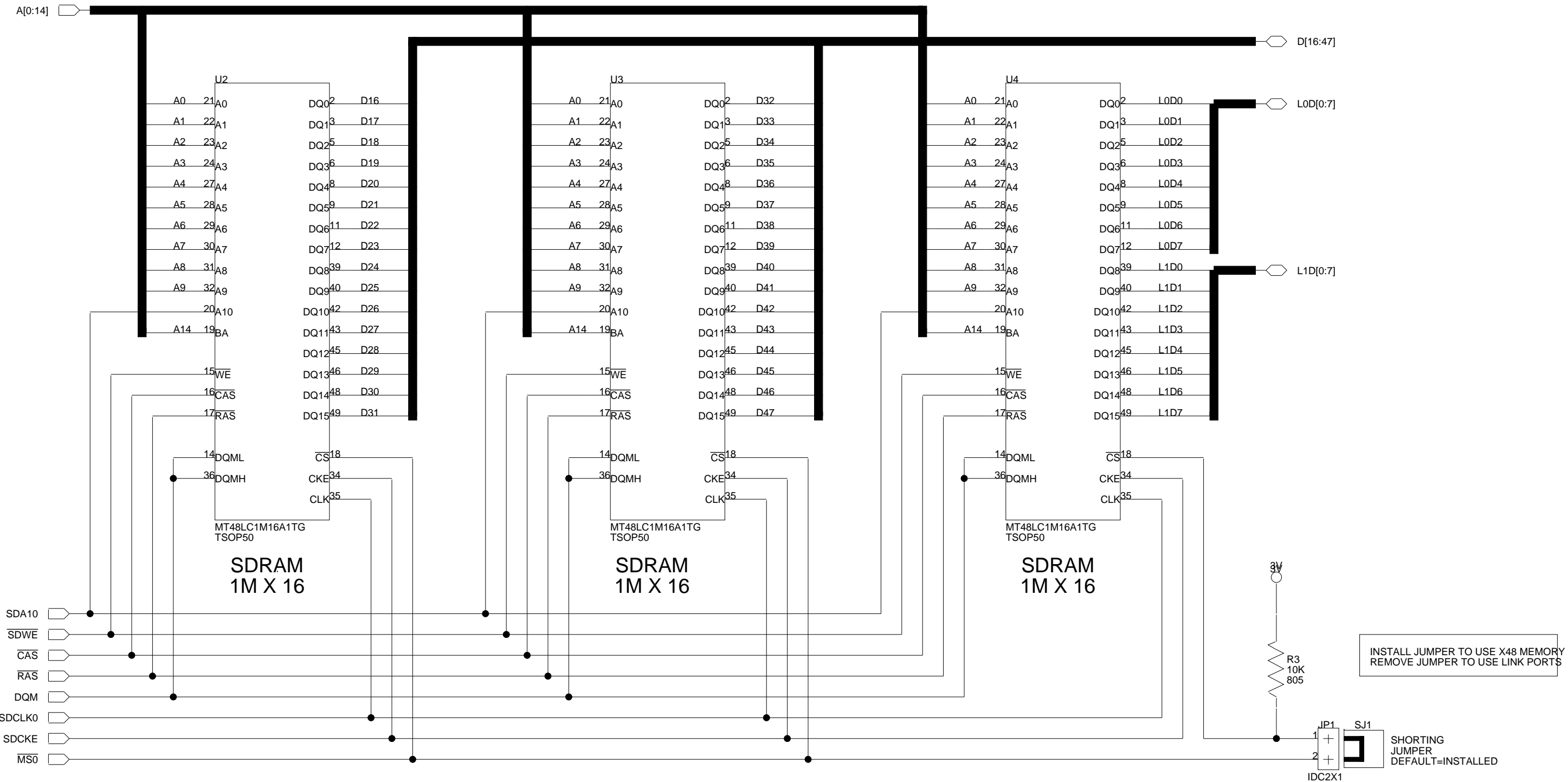
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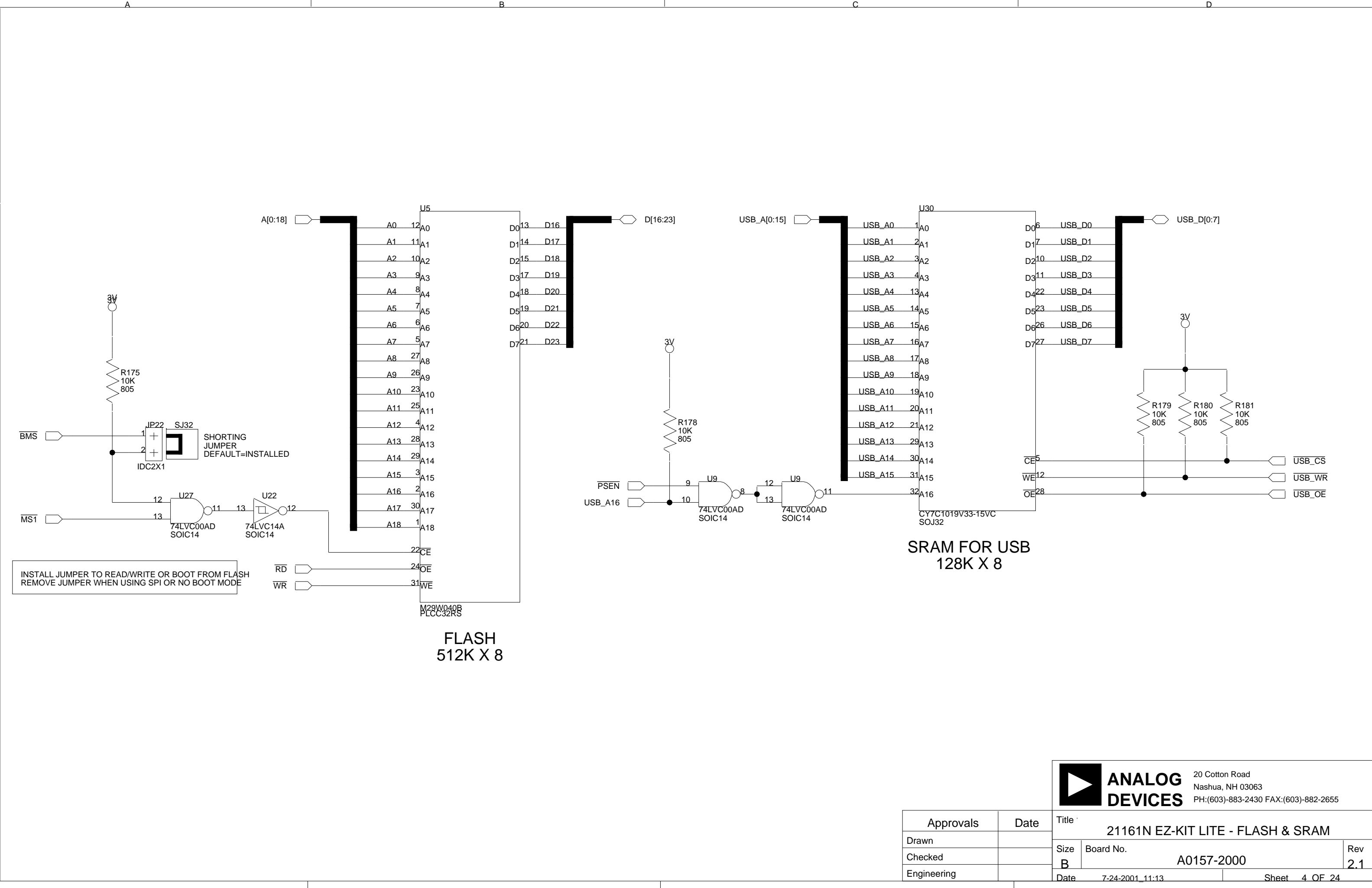
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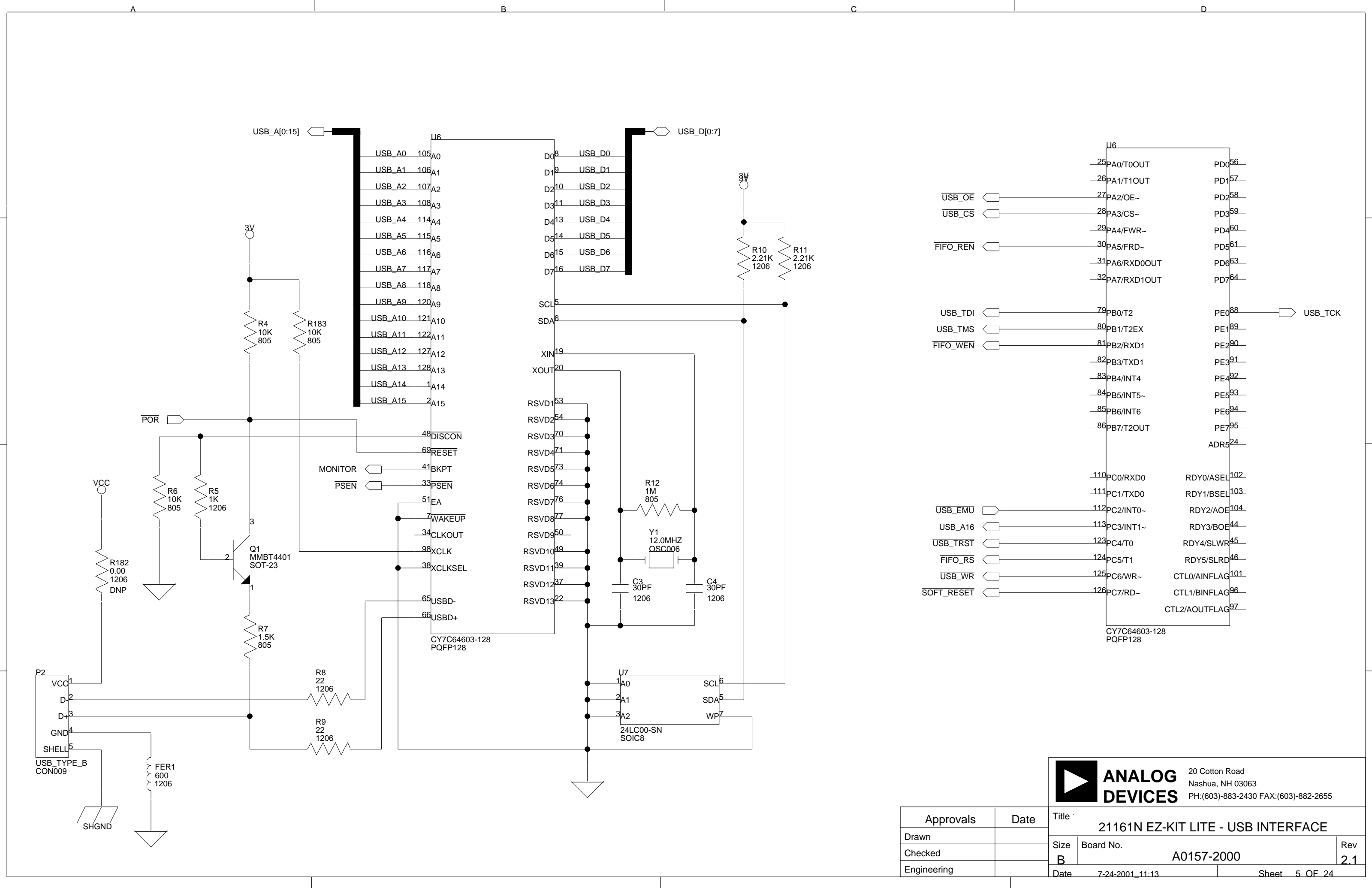
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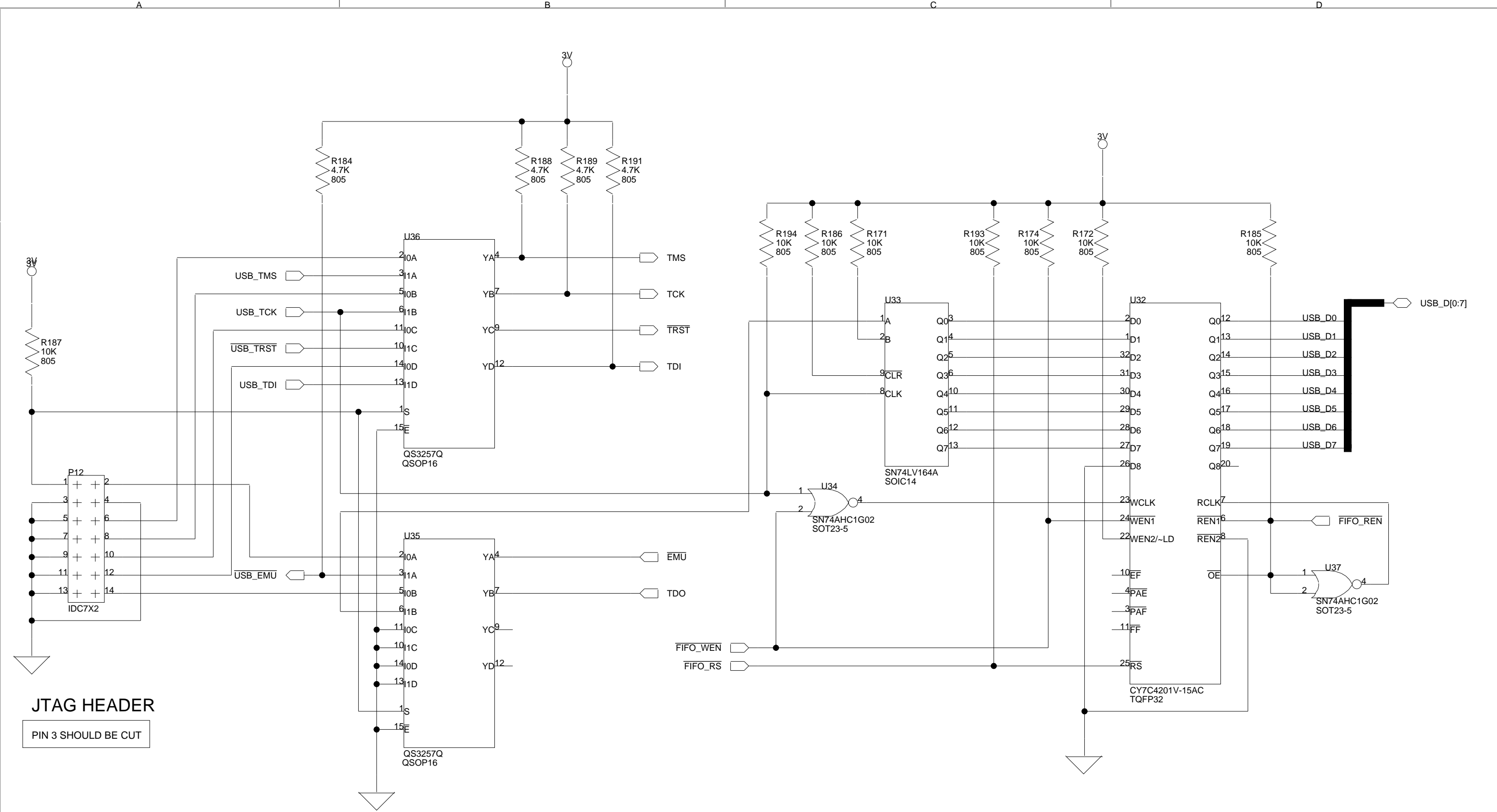


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JTAG HEADER

PIN 3 SHOULD BE CUT

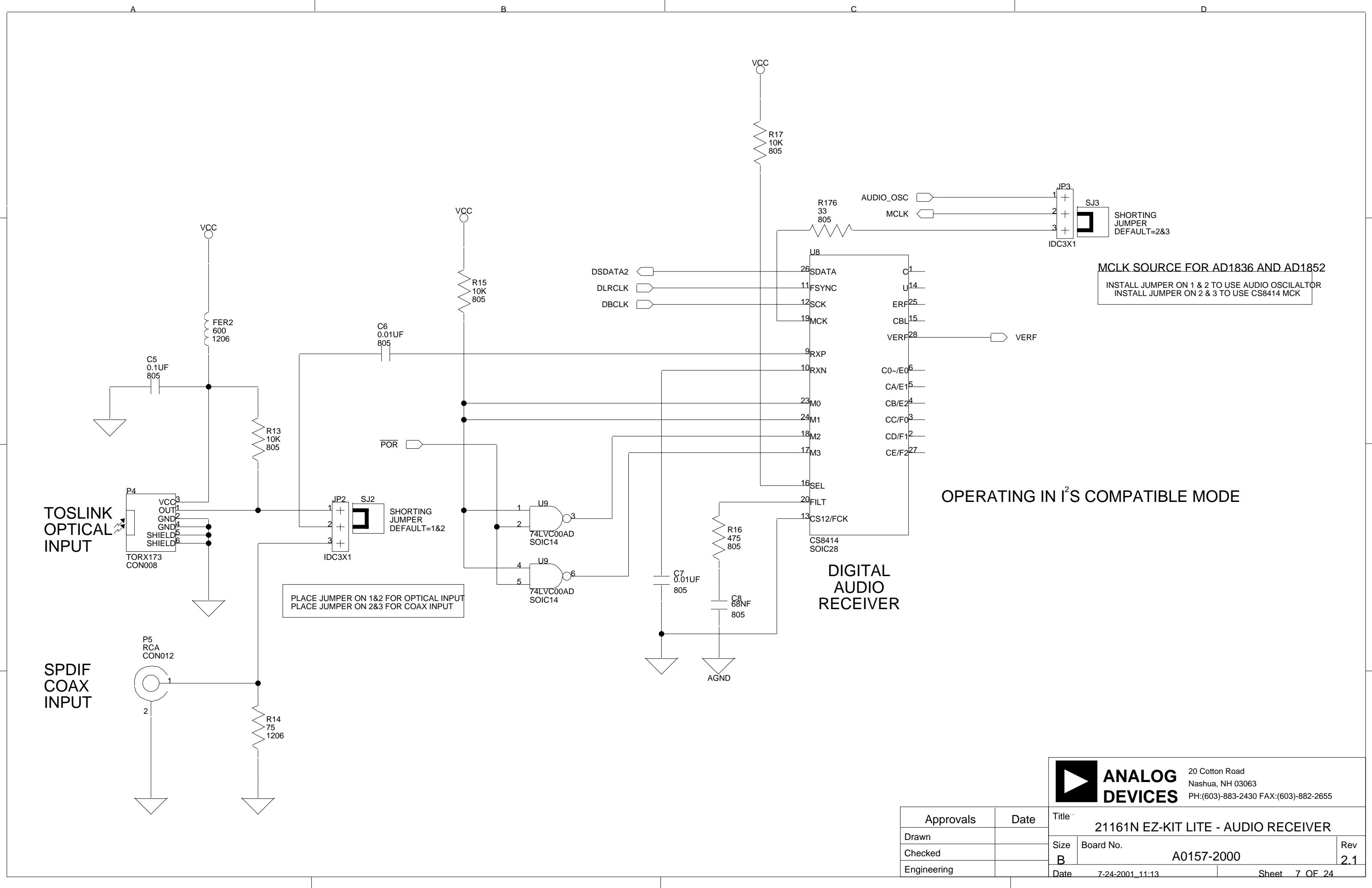


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Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	Sheet 6 OF 24		

Approvals	Date
Drawn	
Checked	
Engineering	



MCLK SOURCE FOR AD1836 AND AD1852

INSTALL JUMPER ON 1 & 2 TO USE AUDIO OSCILATOR
INSTALL JUMPER ON 2 & 3 TO USE CS8414 MCK

OPERATING IN I²S COMPATIBLE MODE

DIGITAL
AUDIO
RECEIVER



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Title 21161N EZ-KIT LITE - AUDIO RECEIVER		
Size B	Board No. A0157-2000	Rev 2.1
Date 7-24-2001_11:13	Sheet 7 OF 24	

INSTALL JUMPER TO CONNECT CODEC TO SPI PORT (JP12 & JP13 NOT INSTALLED)
REMOVE JUMPER TO USE FLAG0 FOR PUSH BUTTON OR EXPANSION HEADER

ODVDD IS CONNECTED TO 3.3V

SAMPLE FREQUENCY		1&2	3&4
NOT ALLOWED		NOT SHORTED	NOT SHORTED
192kHz (2X INTERPOLATOR)		SHORTED	NOT SHORTED
96kHz (4X INTERPOLATOR)		SHORTED	SHORTED
48kHz (8X INTERPOLATOR)		SHORTED	SHORTED

ADC1 LEFT

ADC1 RIGHT

ADC2 LEFT

ADC2 RIGHT

DAC1 LEFT

DAC1 RIGHT

DAC2 LEFT

DAC2 RIGHT

DAC3 LEFT

DAC3 RIGHT

DAC4 LEFT

DAC4 RIGHT

CODEC

AUX DAC

INSTALL JUMPER TO CONNECT DAC TO SPI PORT (JP12 & JP13 NOT INSTALLED)
REMOVE JUMPER TO USE FLAG1 FOR PUSH BUTTON OR EXPANSION HEADER

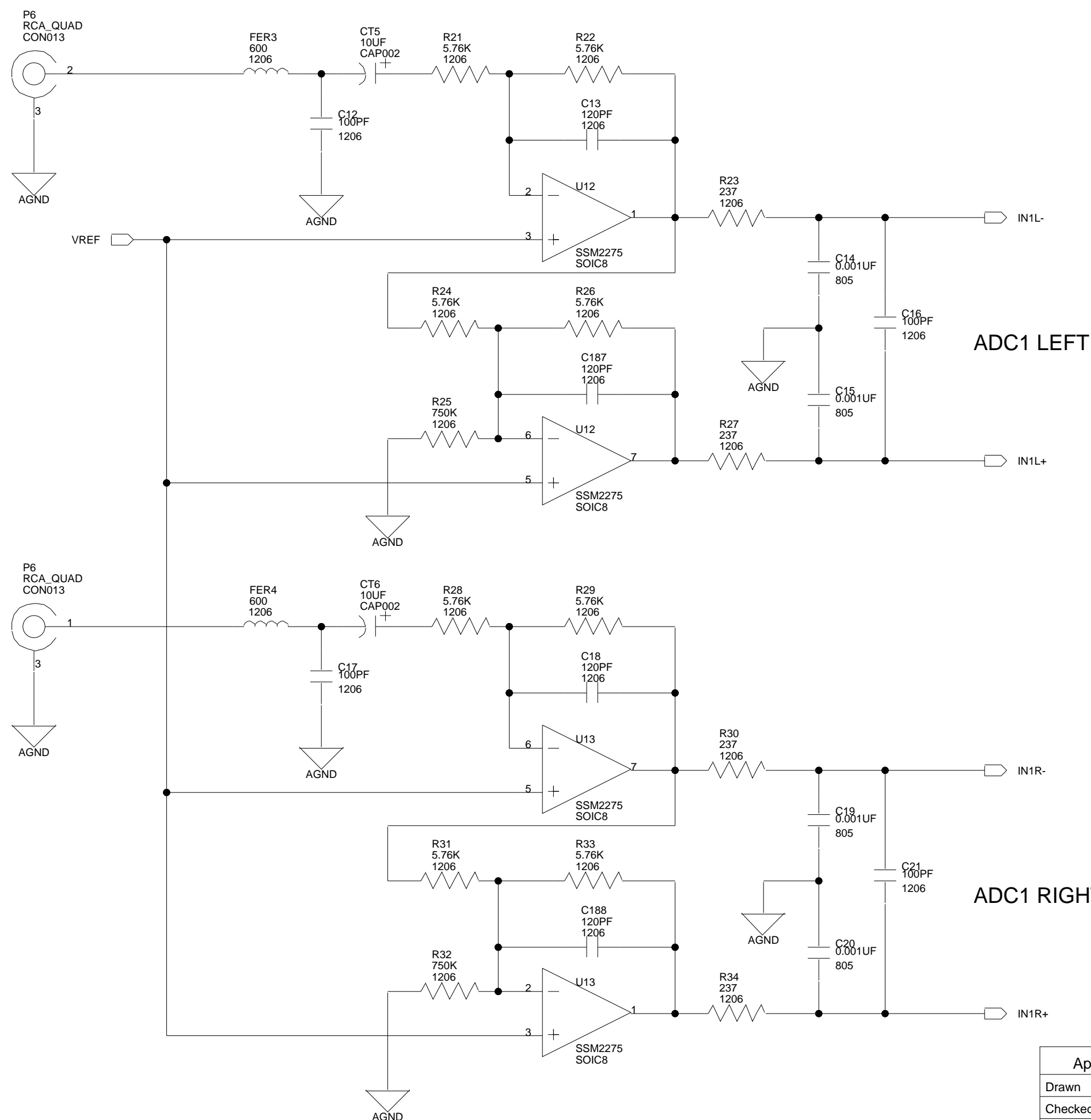


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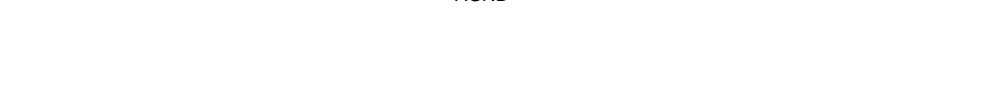
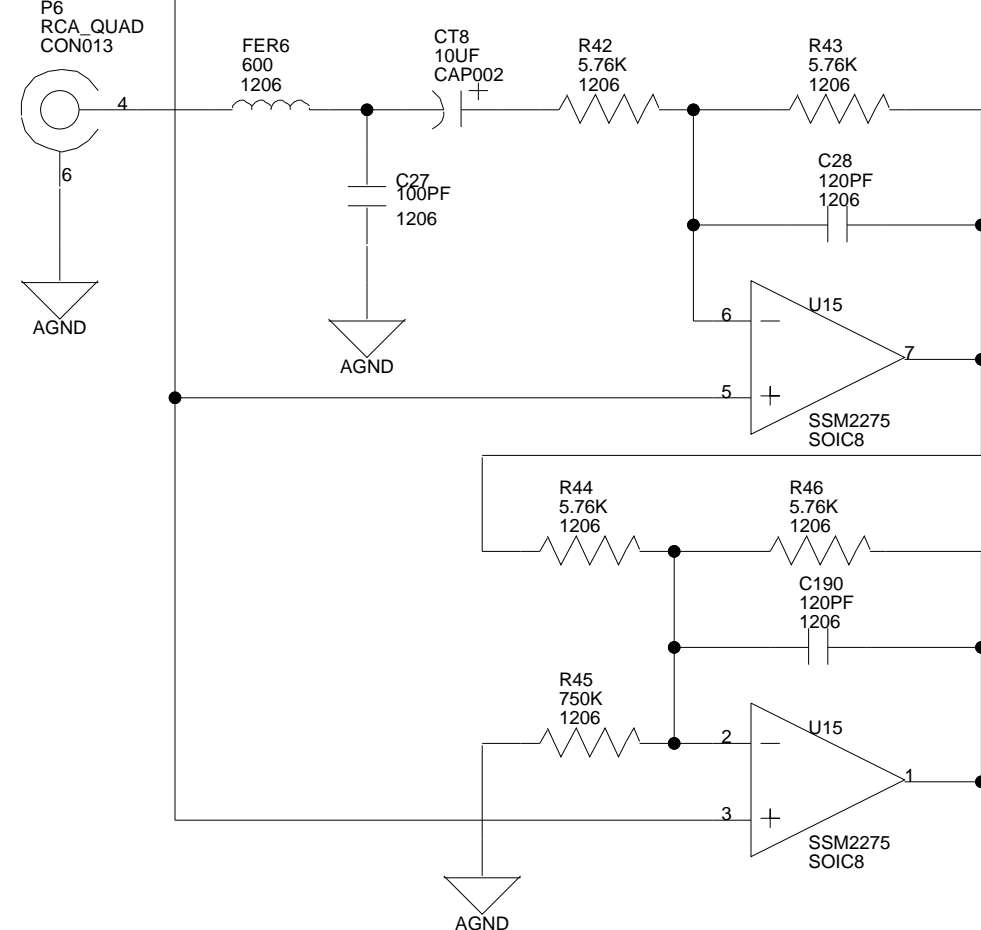
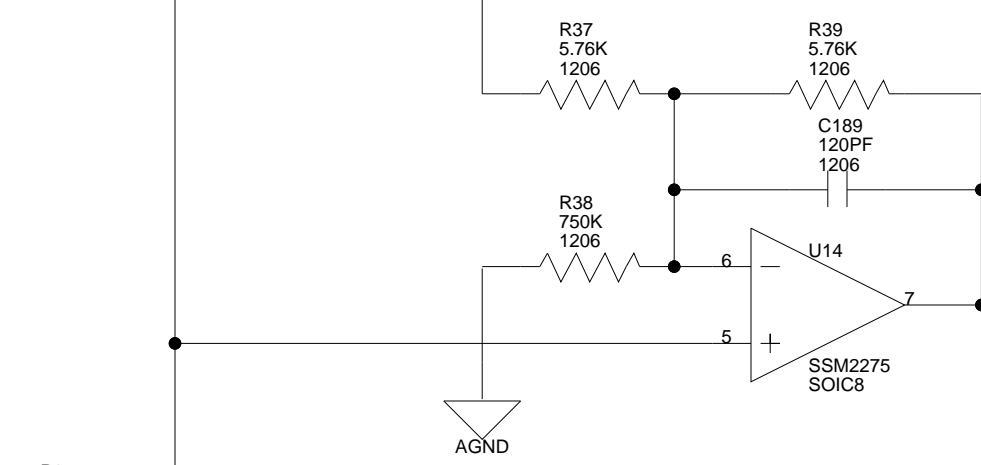
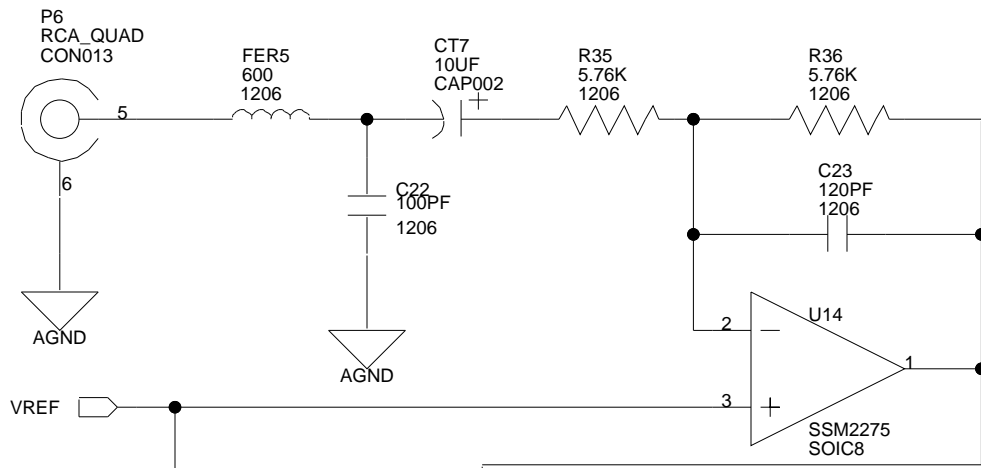
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Title		
21161N EZ-KIT LITE - CODEC & DAC		
Size	Board No.	Rev
B	A0157-2000	2.1
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		Title 21161N EZ-KIT LITE - PRIMARY INPUT	
Size B	Board No. A0157-2000		Rev 2.1
Date	7-16-2001_17:09		Sheet 9 OF 24



ADC2 LEFT INPUT MODE
PGA MODE 3-5 & 4-6
HIGH PERFORMANCE MODE 1-3 & 2-4

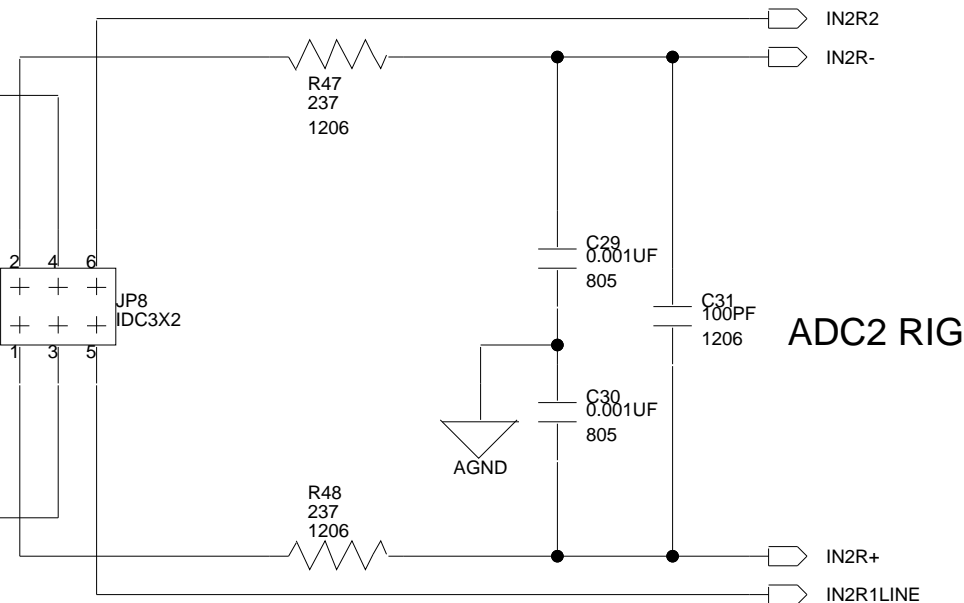
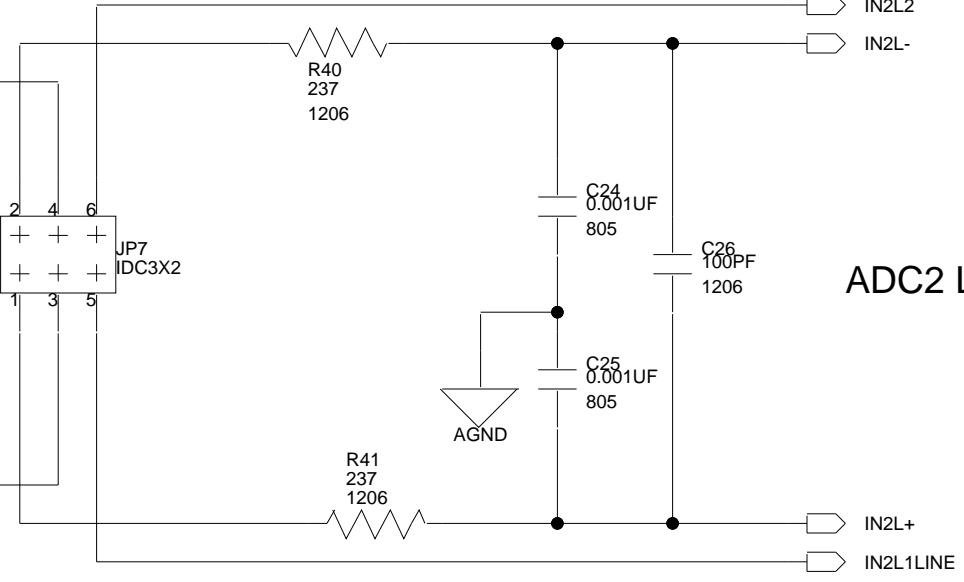
ADC2 RIGHT INPUT MODE
PGA MODE 3-5 & 4-6
HIGH PERFORMANCE MODE 1-3 & 2-4

SJ8
SHORTING
JUMPER
DEFAULT=1&3

SJ9
SHORTING
JUMPER
DEFAULT=2&4

SJ10
SHORTING
JUMPER
DEFAULT=1&3

SJ11
SHORTING
JUMPER
DEFAULT=2&4



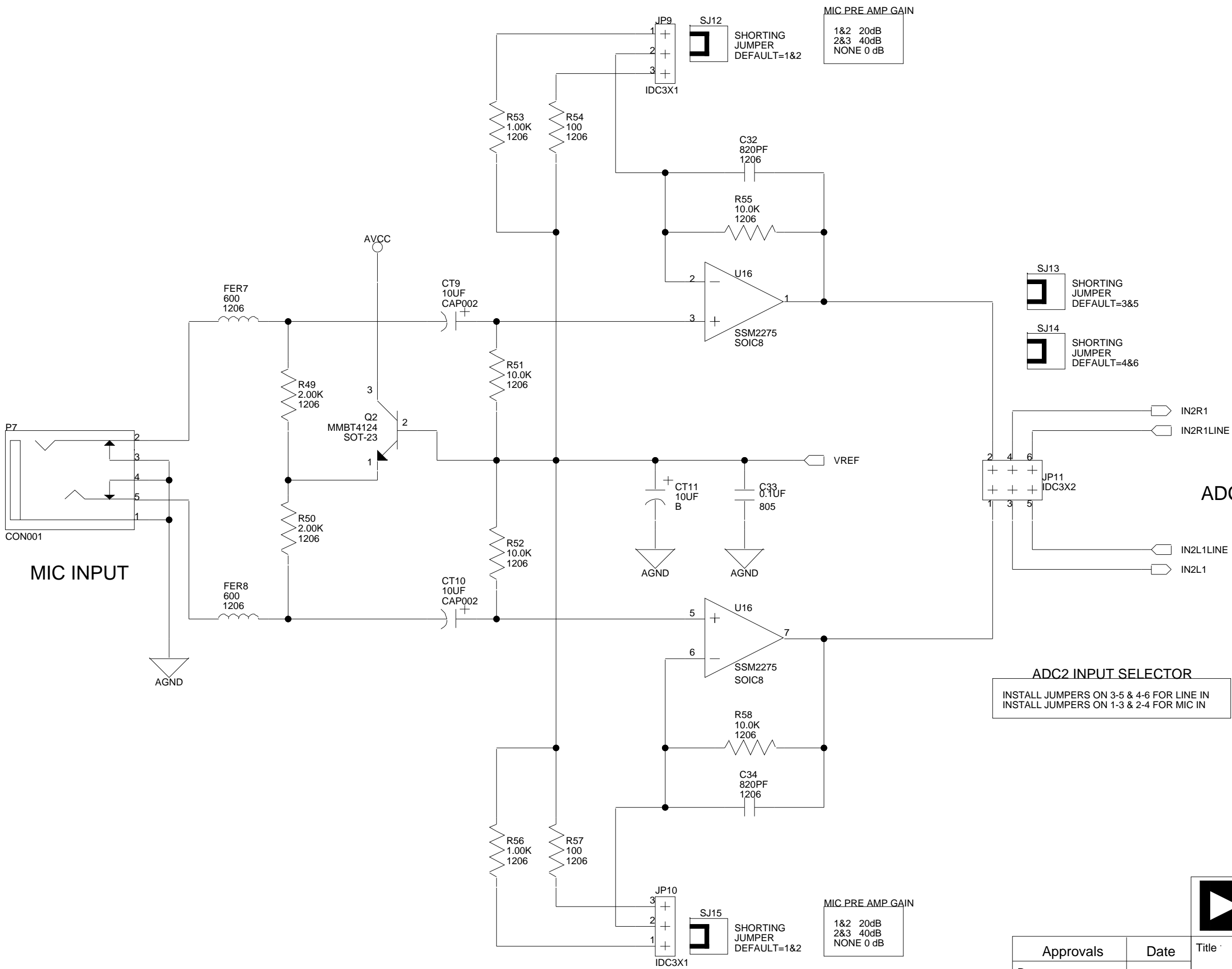
ADC2 LEFT

ADC2 RIGHT

JP11 (ON SHEET 10) SHOULD BE IN LINE IN
POSITION TO USE EITHER OF THESE MODES

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - SECONDARY INPUT	
Size		Board No.	
B		A0157-2000	
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Approvals	Date
Drawn	
Checked	
Engineering	



ADC2 RIGHT/LEFT

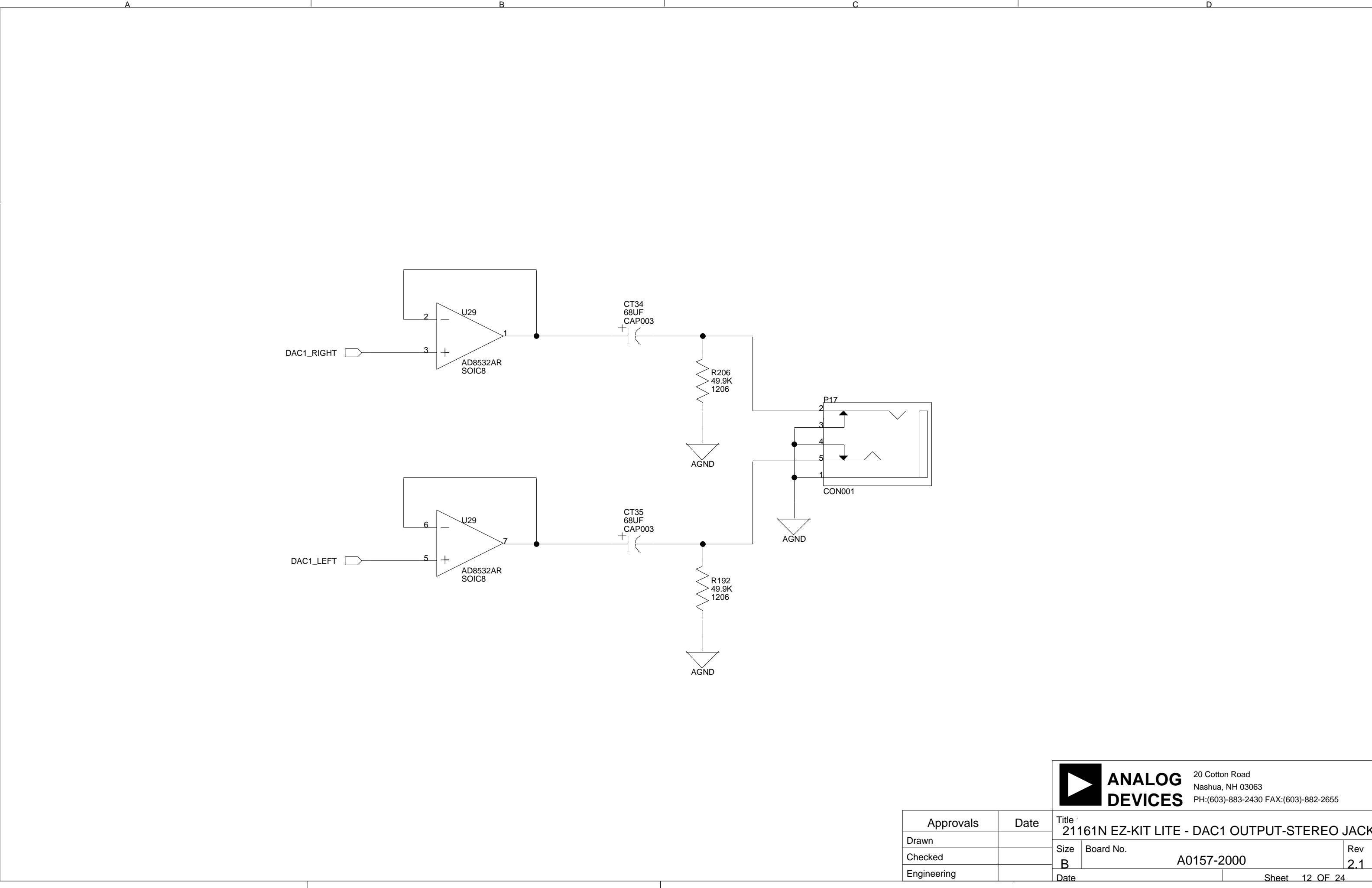
ADC2 INPUT SELECTOR


INSTALL JUMPERS ON 3-5 & 4-6 FOR LINE IN
INSTALL JUMPERS ON 1-3 & 2-4 FOR MIC IN

**ANALOG
DEVICES**

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Approvals		Date		Title		
Drawn				21161N EZ-KIT LITE - MIC INPUT		
Checked				Size	Board No.	Rev
Engineering				B	A0157-2000	2.1
		Date			7-16-2001_17:09	
					Sheet 11 OF 24	





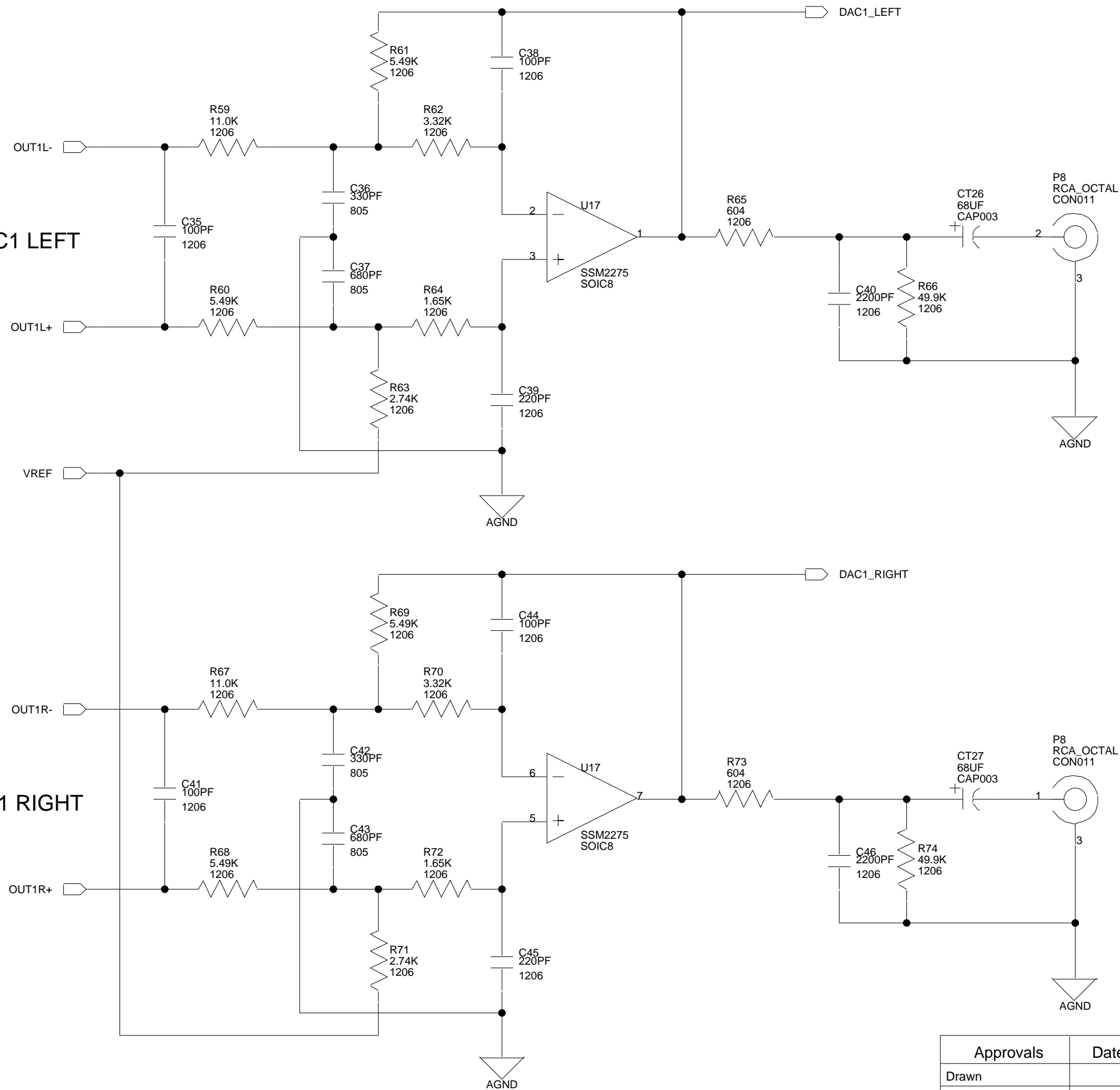
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DEVICES**

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Approvals		Date	Title : 21161N EZ-KIT LITE - DAC1 OUTPUT-STEREO JACK		
Drawn			Size	Board No.	Rev
Checked			B	A0157-2000	2.1
Engineering			Date		Sheet 12 OF 24

DAC1 LEFT

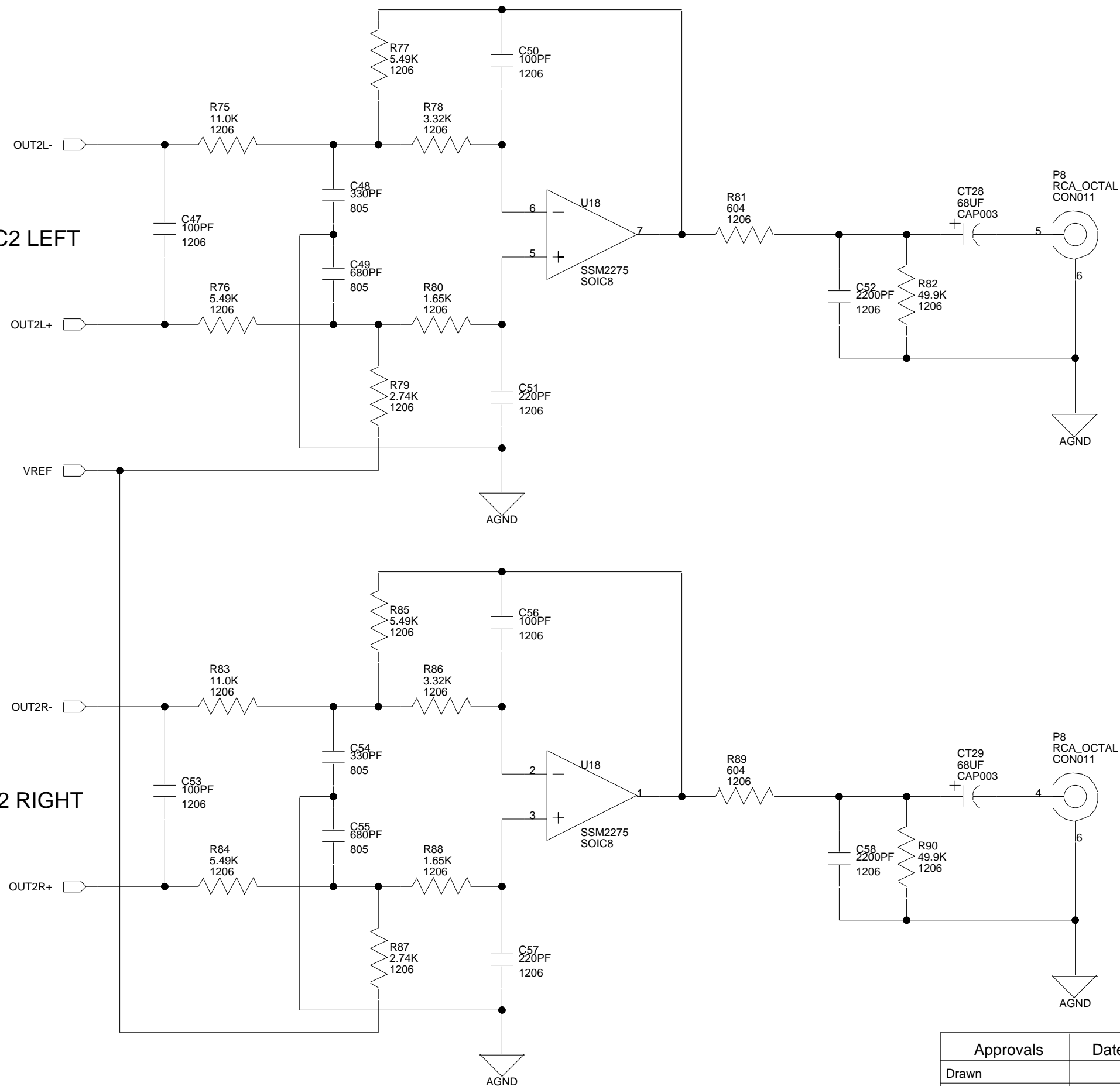
DAC1 RIGHT



 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
		Title: 21161N EZ-KIT LITE - DAC1 OUTPUT	
Drawn		Size B	Board No. A0157-2000
Checked		Date 7-16-2001_17:09	Rev 2.1
Engineering		Sheet 13 OF 24	

DAC2 LEFT

DAC2 RIGHT

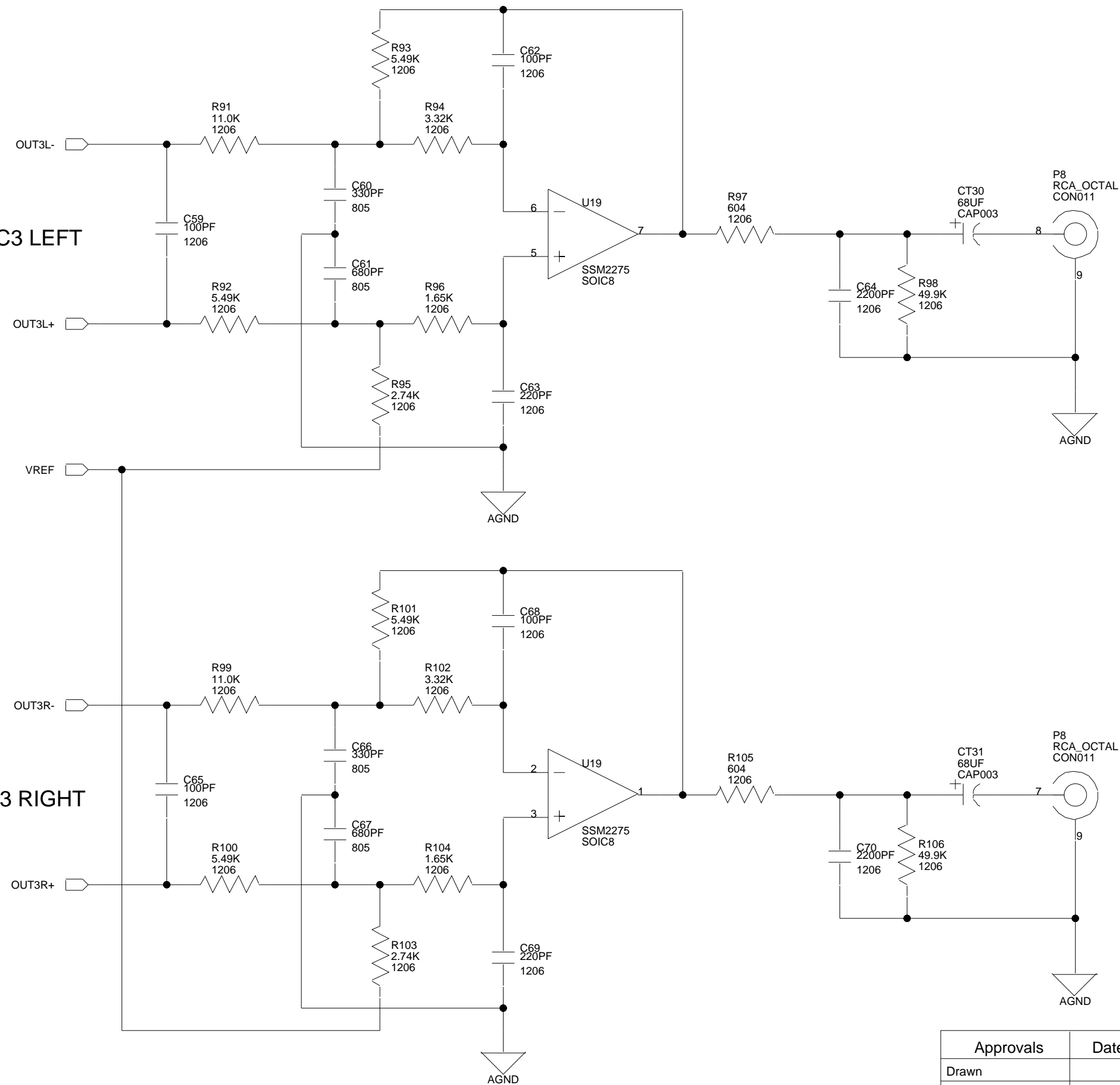


		ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - DAC2 OUTPUT			
Size	Board No.	A0157-2000		Rev	2.1
Date	7-16-2001_17:09		Sheet 14 OF 24		

Approvals	Date
Drawn	
Checked	
Engineering	

DAC3 LEFT

DAC3 RIGHT

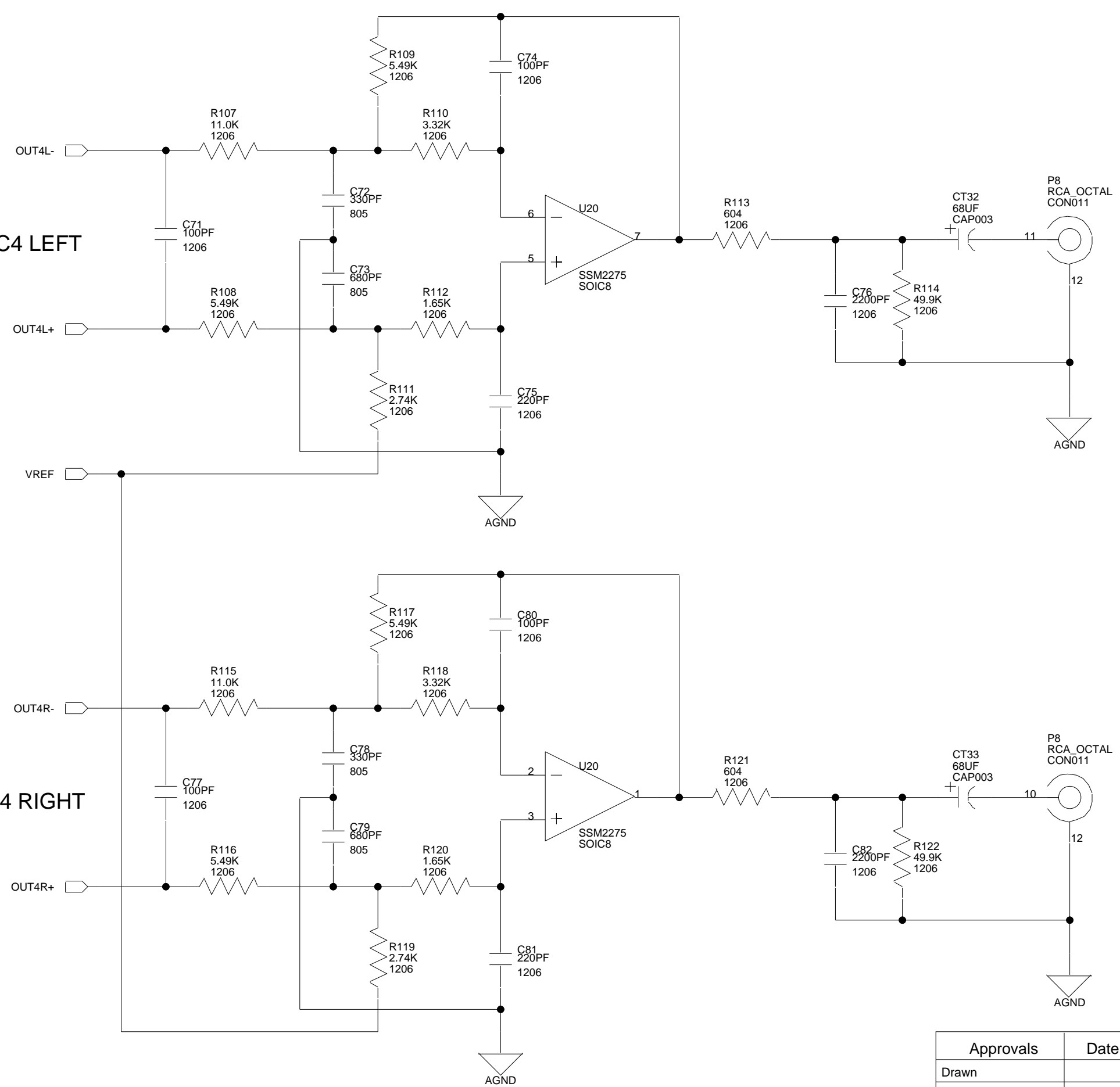


		ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title 21161N EZ-KIT LITE - DAC3 OUTPUT					
Size B	Board No. A0157-2000				Rev 2.1
Date	7-17-2001 10:28			Sheet	15 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	

DAC4 LEFT

DAC4 RIGHT



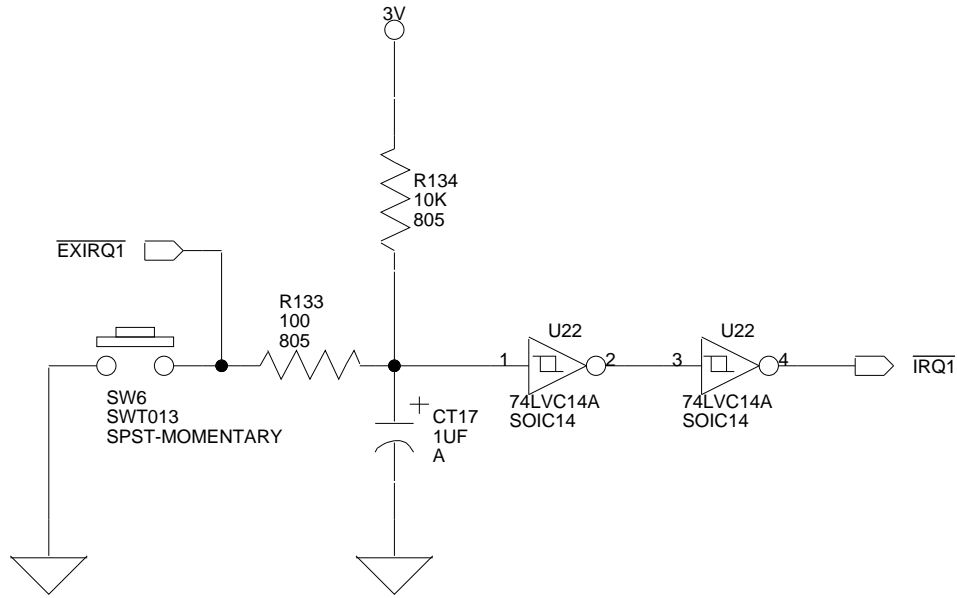
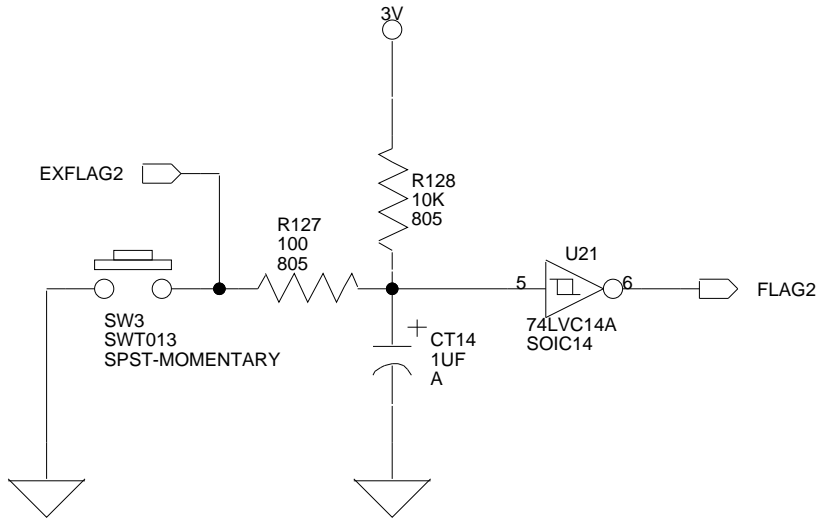
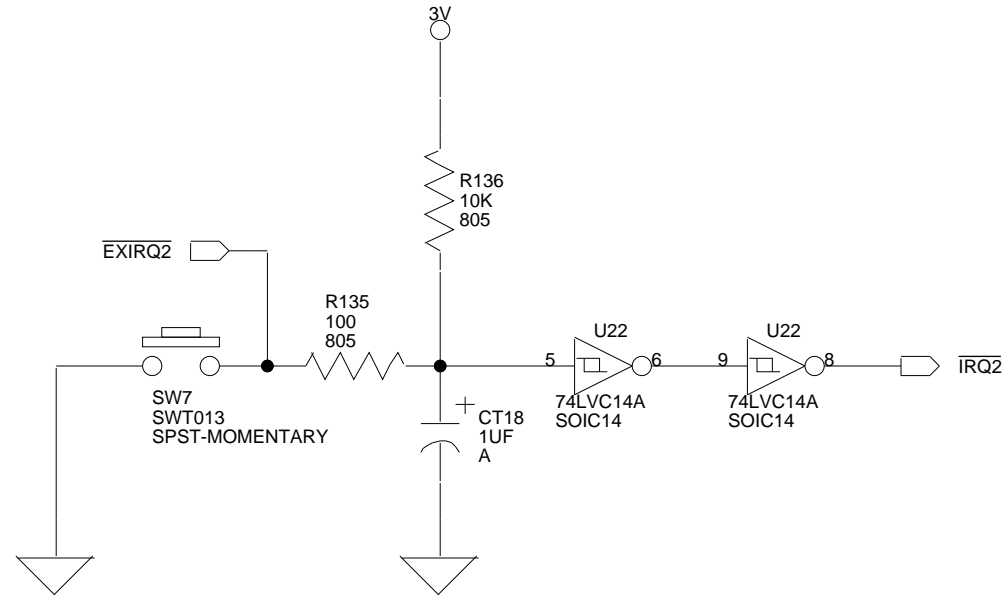
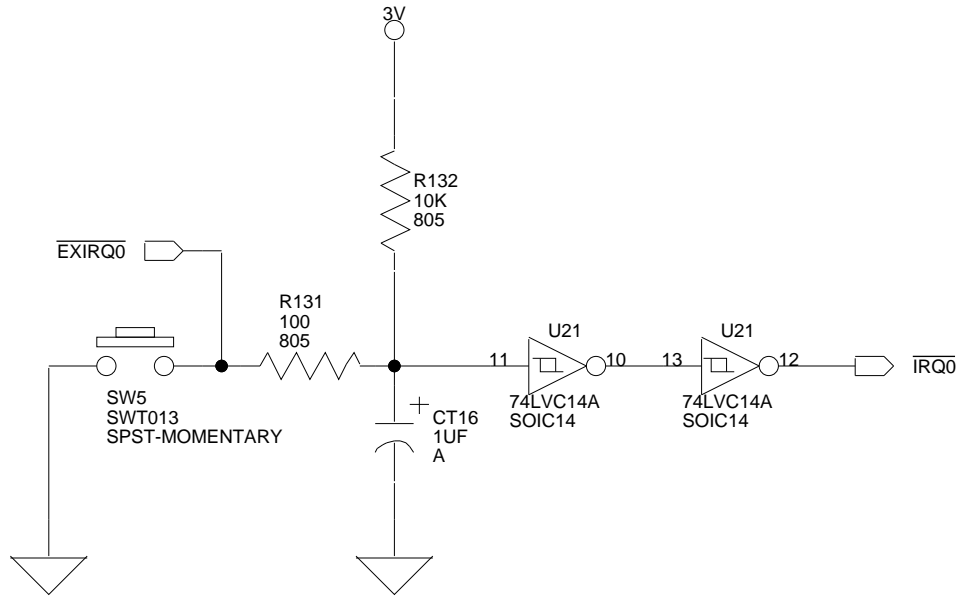
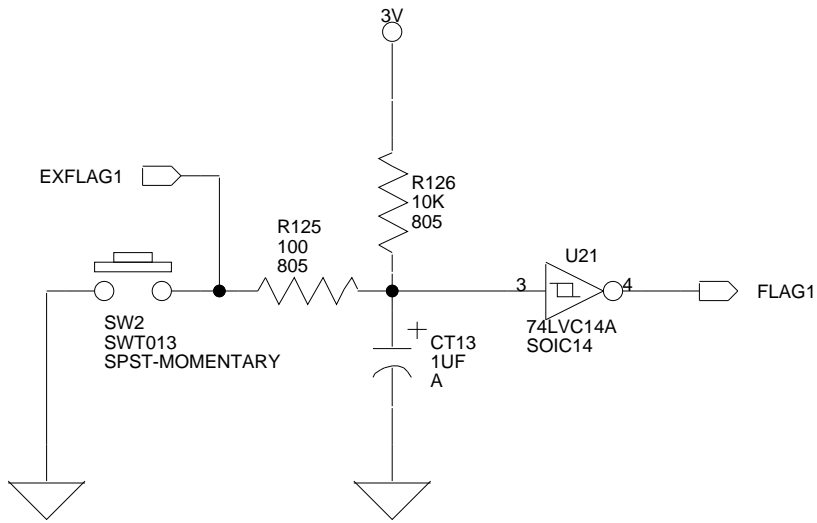
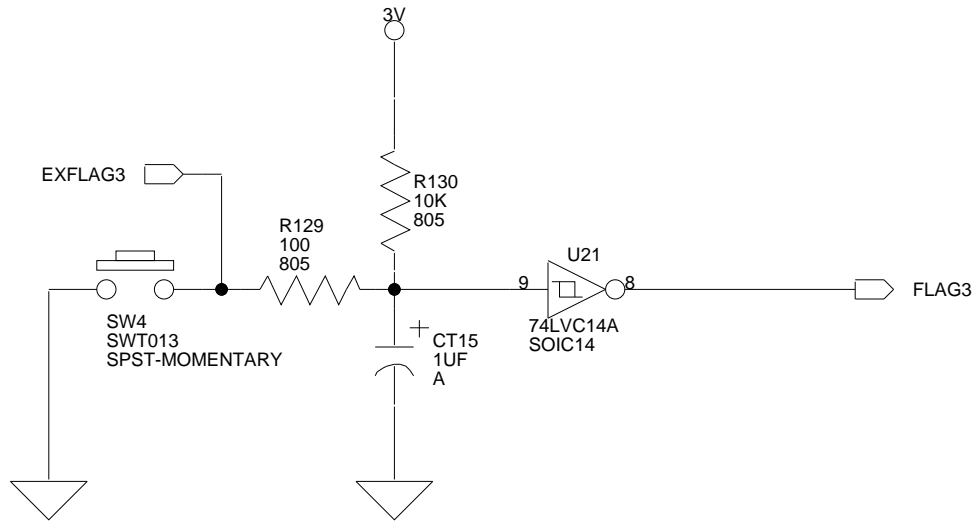
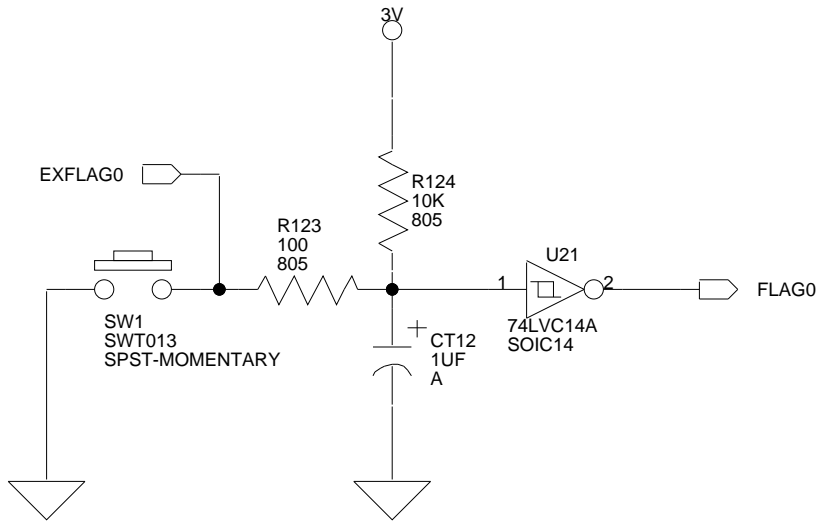


**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

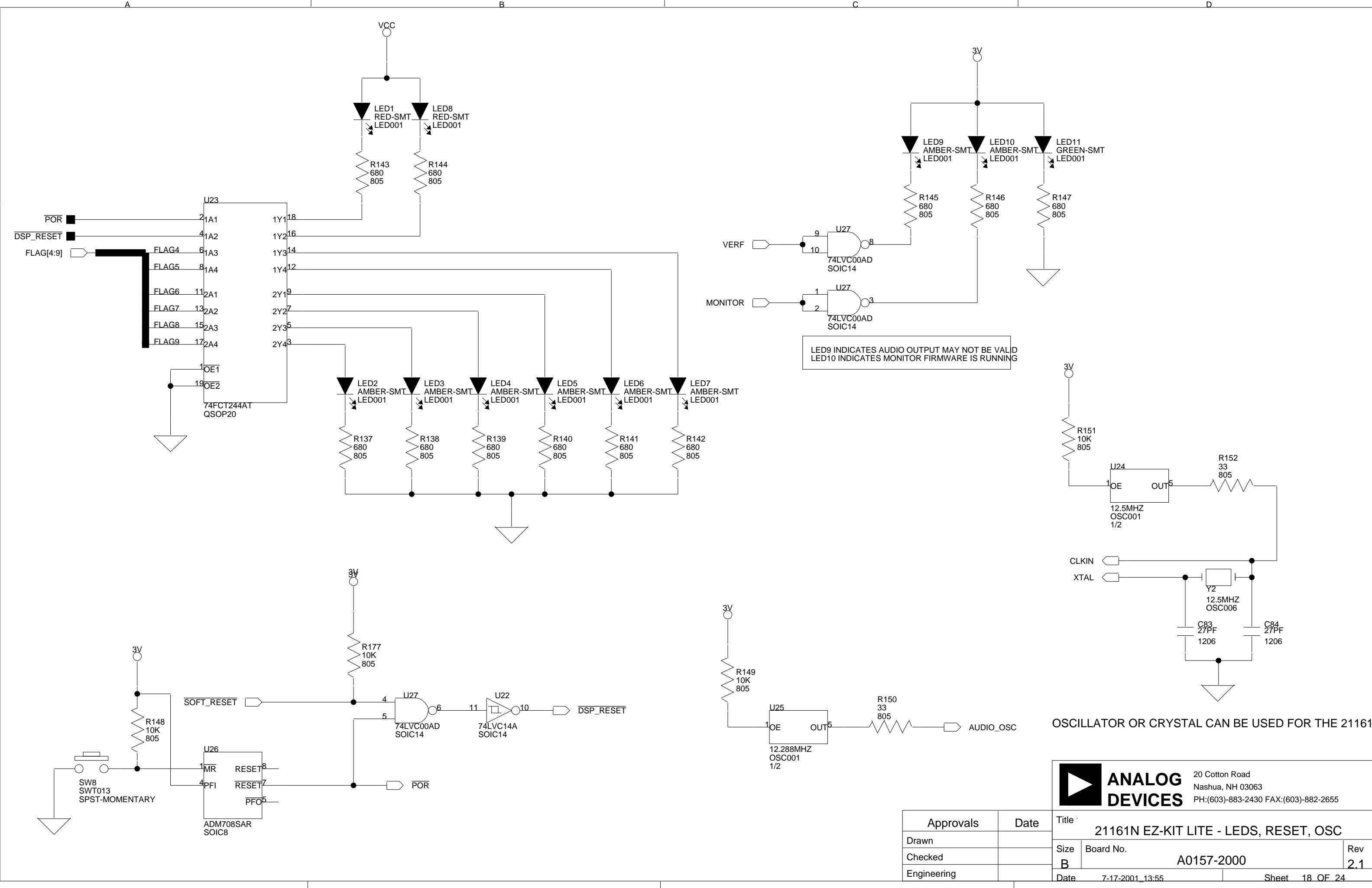
Title		21161N EZ-KIT LITE - DAC4 OUTPUT	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-16-2001_17:09	Sheet	16 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	



		ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - PUSHBUTTONS			
Size		Board No.		Rev	
B		A0157-2000		2.1	
Date		7-16-2001_17:09		Sheet 17 OF 24	

Approvals	Date
Drawn	
Checked	
Engineering	



 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - LEDS, RESET, OSC	
Size		Board No.	Rev
B		A0157-2000	2.1
Date		7-17-2001_13:55	
Sheet		18 OF 24	

Approvals	Date
Drawn	
Checked	
Engineering	

1

2

3

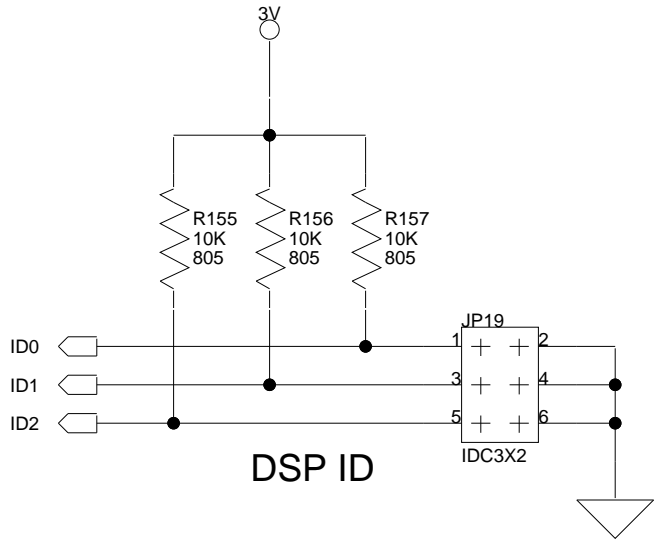
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
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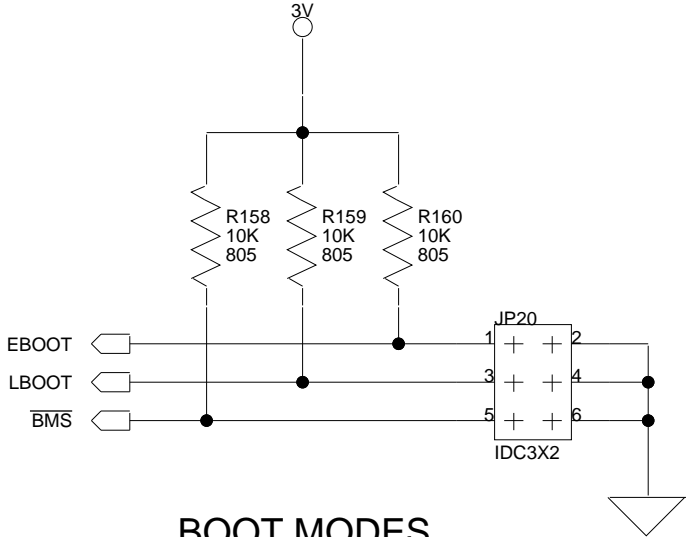
2

3

4






-  **SJ23**
SHORTING
JUMPER
DEFAULT=1 & 2
-  **SJ24**
SHORTING
JUMPER
DEFAULT=3 & 4
-  **SJ25**
SHORTING
JUMPER
DEFAULT=5 & 6



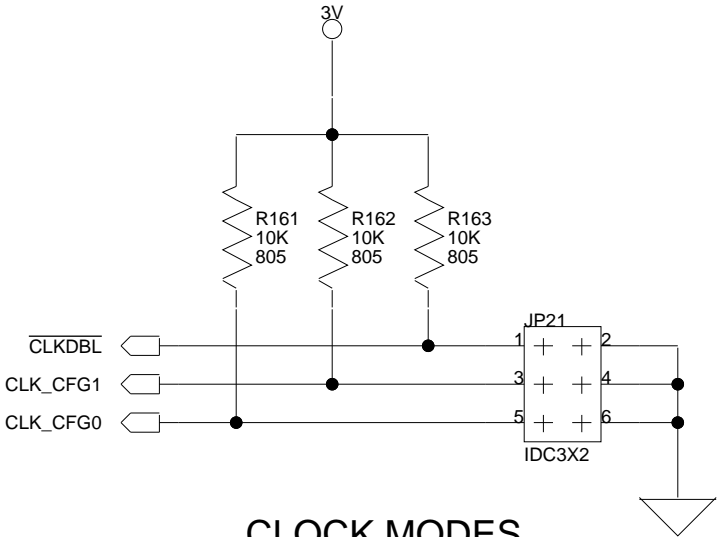
BOOT MODES

EBOOT	LBOOT	BMS	Booting Mode
* 1	0	Output	EPROM
0	0	1 (Input)	Host Processor
0	1	0 (Input)	Serial Boot via SPI
0	1	1 (Input)	Link Port
0	0	0 (Input)	No Booting
1	1	x (Input)	Reserved

* DENOTES FACTORY DEFAULT

-  **SJ26**
SHORTING
JUMPER
DEFAULT=3 & 4
-  **SJ27**
SHORTING
JUMPER
DEFAULT=NOT INSTALLED
-  **SJ28**
SHORTING
JUMPER
DEFAULT=NOT INSTALLED




REMOVE JP22 WHEN USING SPI OR NO BOOT MODES (REFER TO SHEET 4)



CLOCK MODES

CLKDBL	CLK_CFG1	CLK_CFG0	Core Clock Ratio	EP Clock Ratio
1	0	0	2:1	1x
1	0	1	3:1	1x
* 1	1	0	4:1	1x
0	0	0	4:1	2x
0	0	1	6:1	2x
0	1	0	8:1	2x

* DENOTES FACTORY DEFAULT

-  **SJ29**
SHORTING
JUMPER
DEFAULT=NOT INSTALLED
-  **SJ30**
SHORTING
JUMPER
DEFAULT=NOT INSTALLED
-  **SJ31**
SHORTING
JUMPER
DEFAULT=5 & 6

 **ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Approvals	Date	Title 21161N EZ-KIT LITE - CONFIGURATION		
Drawn		Size B	Board No. A0157-2000	Rev 2.1
Checked		Date 7-16-2001 17:09		Sheet 19 OF 24
Engineering				

1

1

2

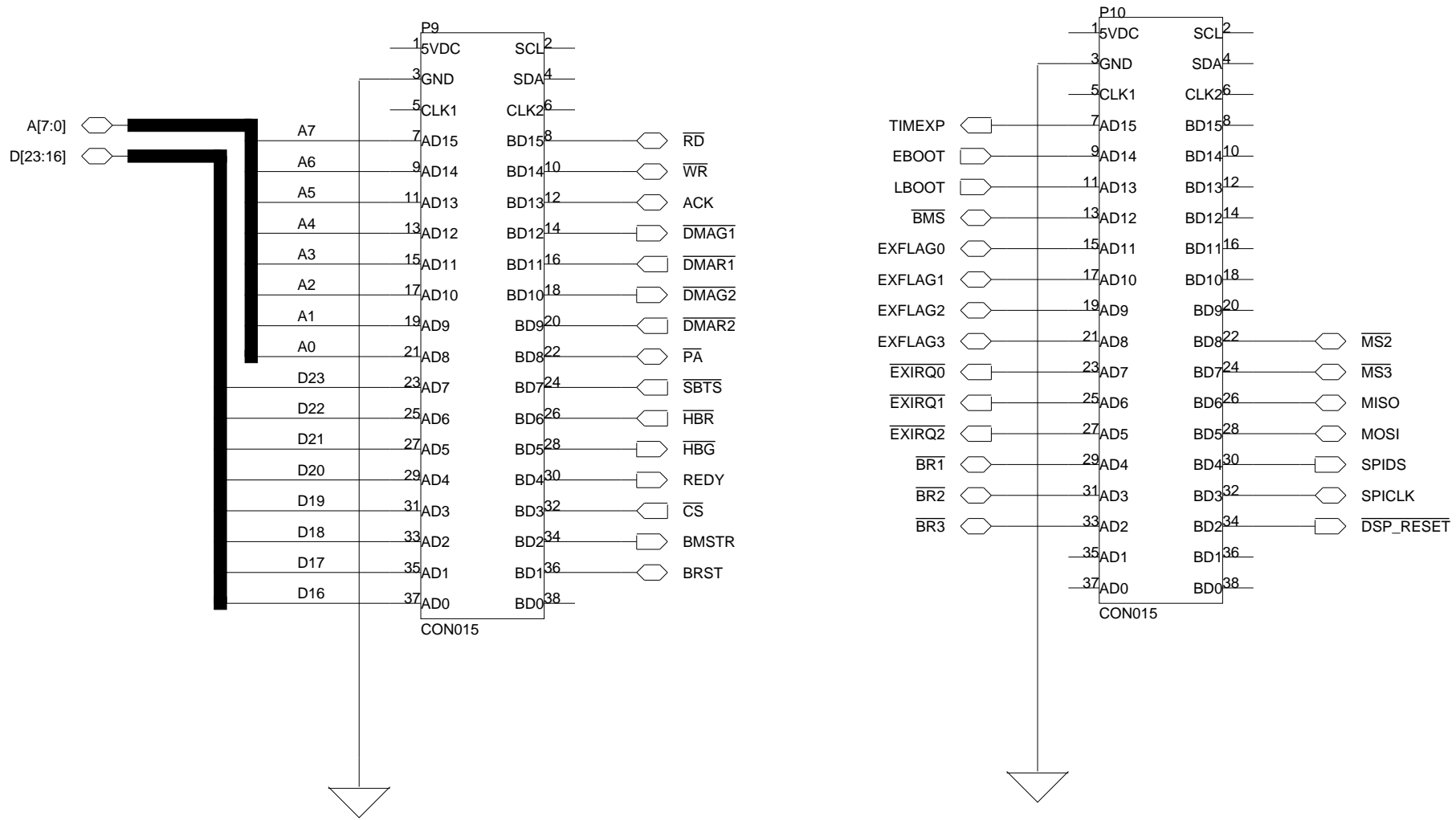
2


3

3

4

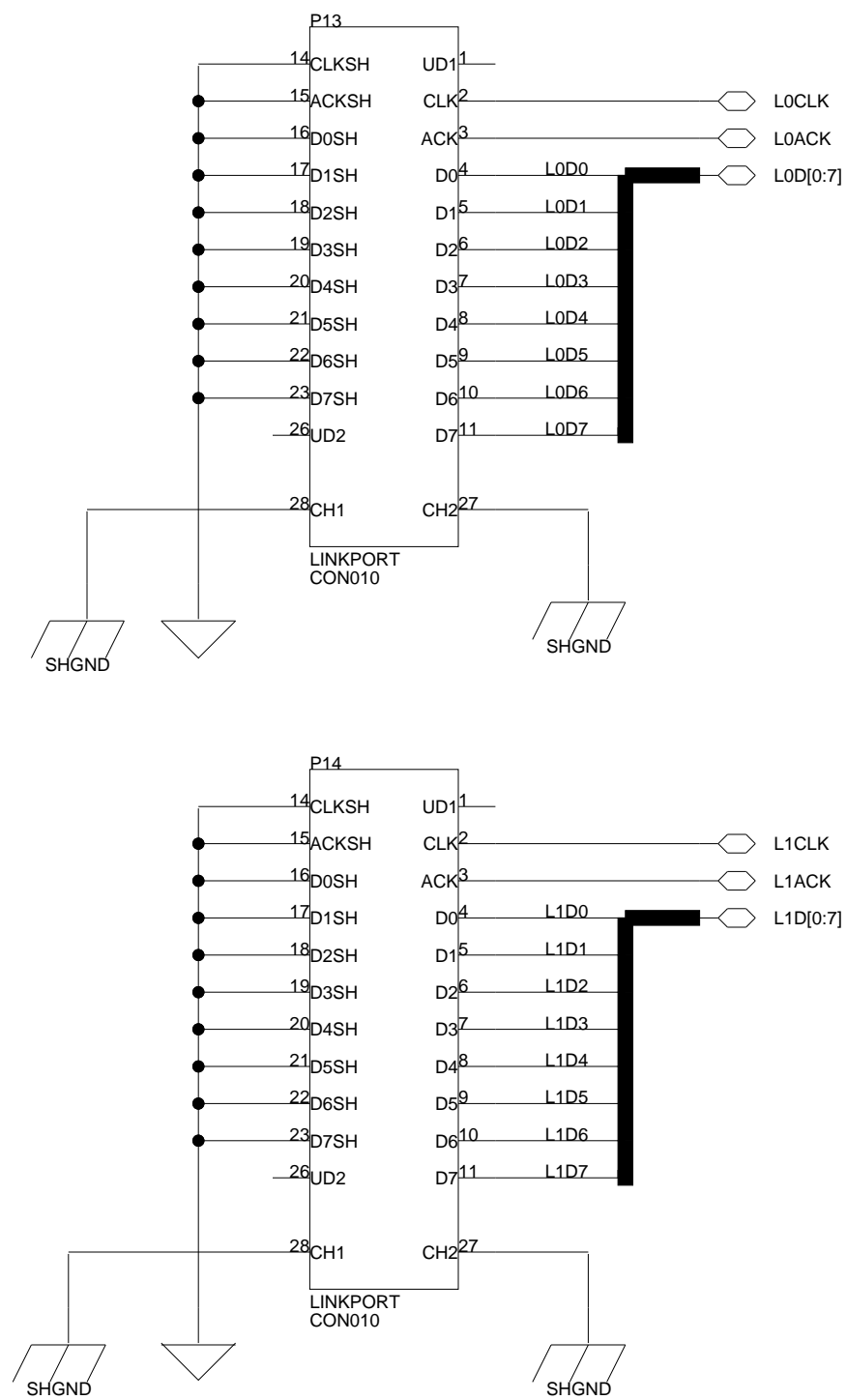
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 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - EXPANSION HEADERS	
Size		Board No.	
B		A0157-2000	
Date		7-16-2001_17:09	
Sheet		20 OF 24	

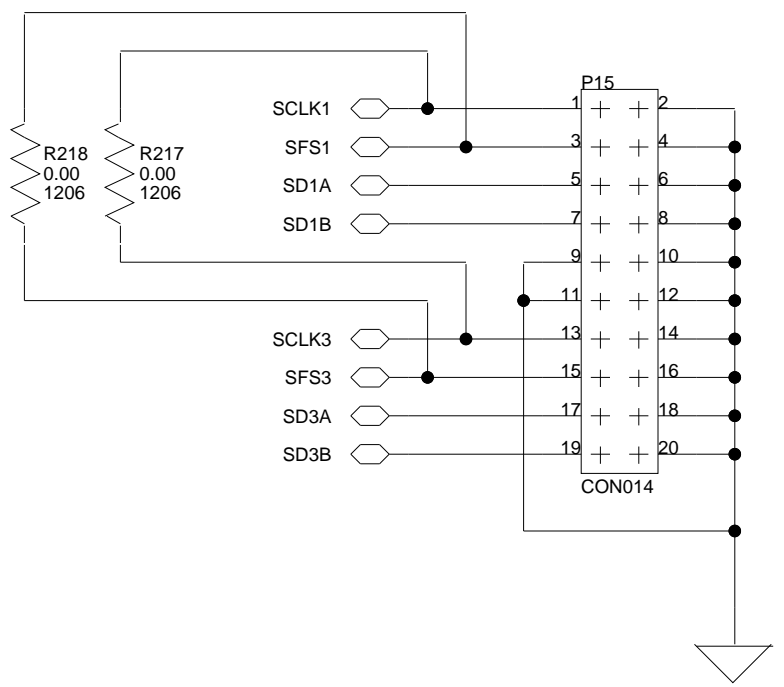
Approvals	Date
Drawn	
Checked	
Engineering	

LINK PORT CONNECTORS



JP1 SHOULD NOT BE INSTALLED WHEN USING THE LINK PORT

SERIAL PORT CONENCTOR



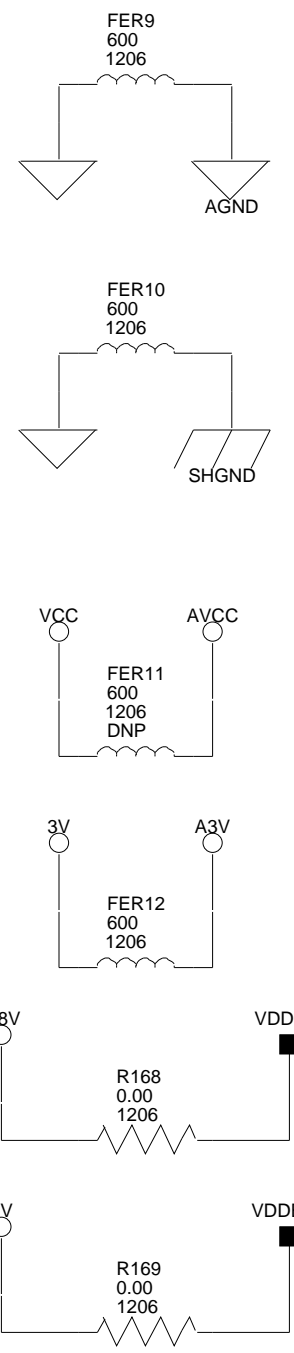
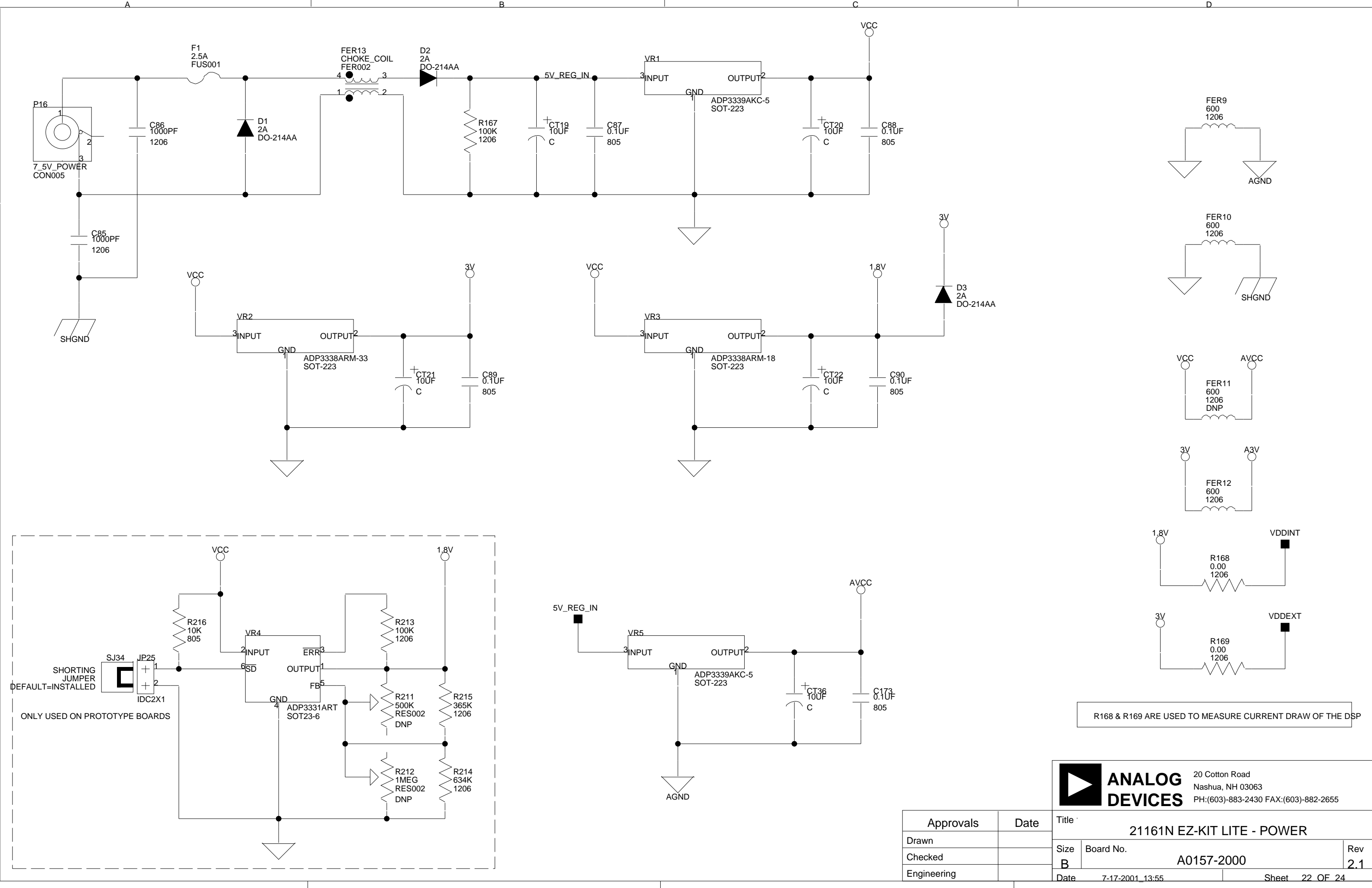


**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - LINK PORTS & SPORTS	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-16-2001_17:09	Sheet	21 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	



R168 & R169 ARE USED TO MEASURE CURRENT DRAW OF THE DSP

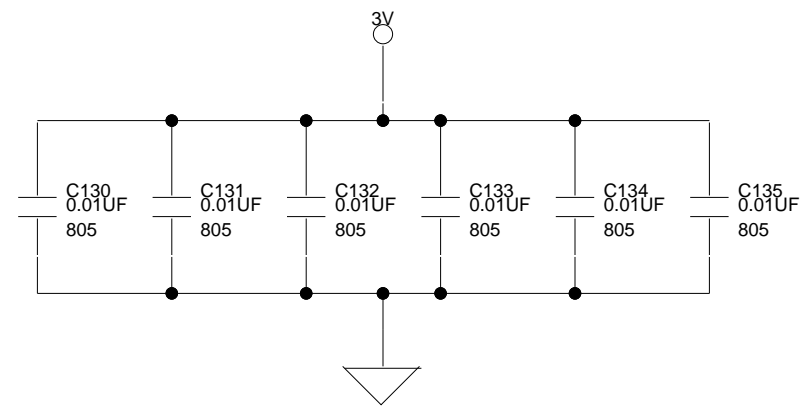
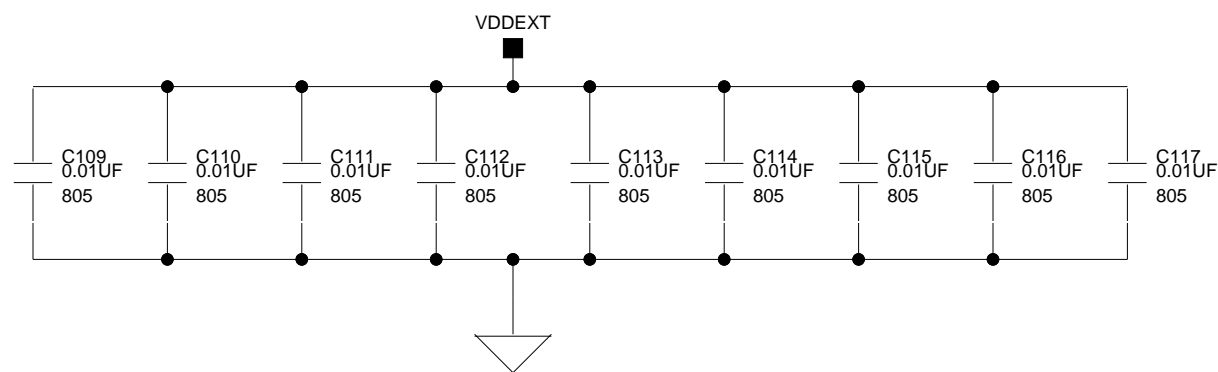
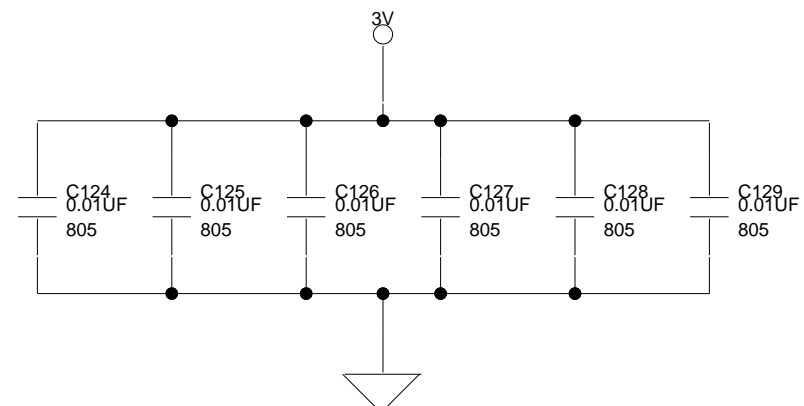
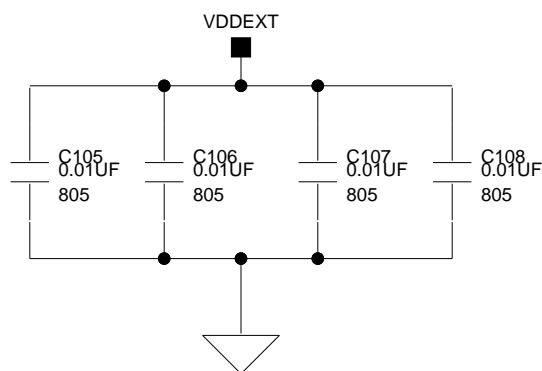
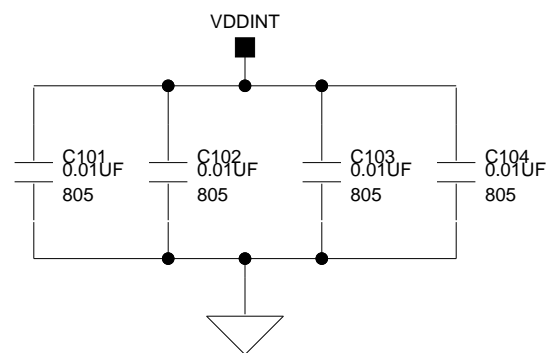
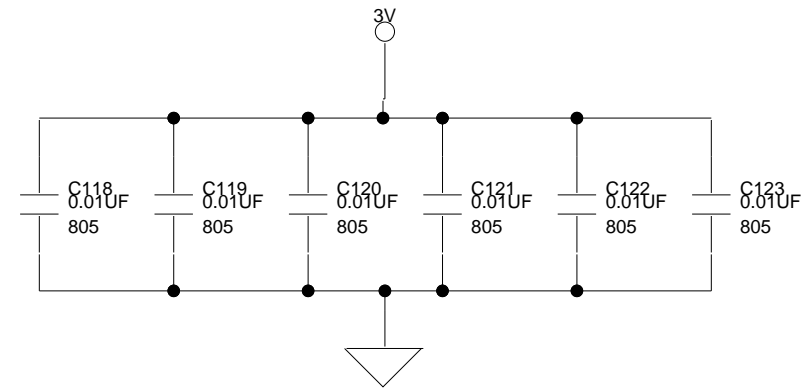
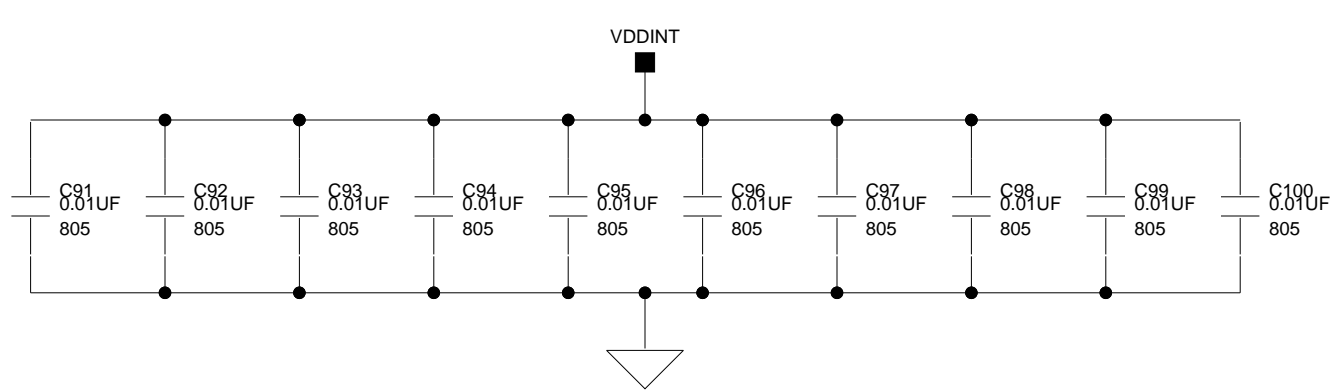


**ANALOG
DEVICES**

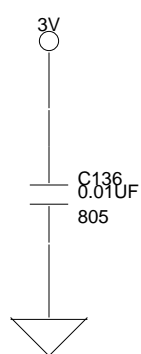
20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title 21161N EZ-KIT LITE - POWER		
Size B	Board No. A0157-2000	Rev 2.1
Date 7-17-2001_13:55	Sheet 22 OF 24	

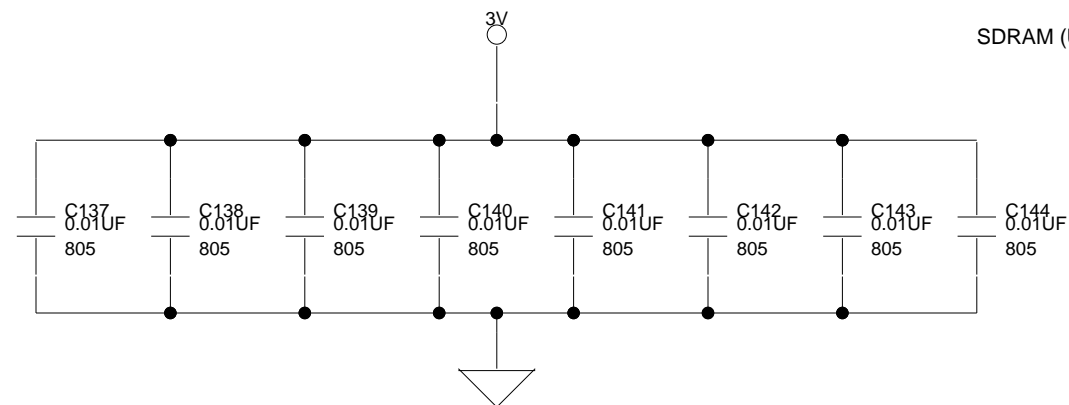
Approvals	Date
Drawn	
Checked	
Engineering	



DSP (U1)



FLASH (U5)



USB INTERFACE (U6)

SDRAM (U2, U3, U4)

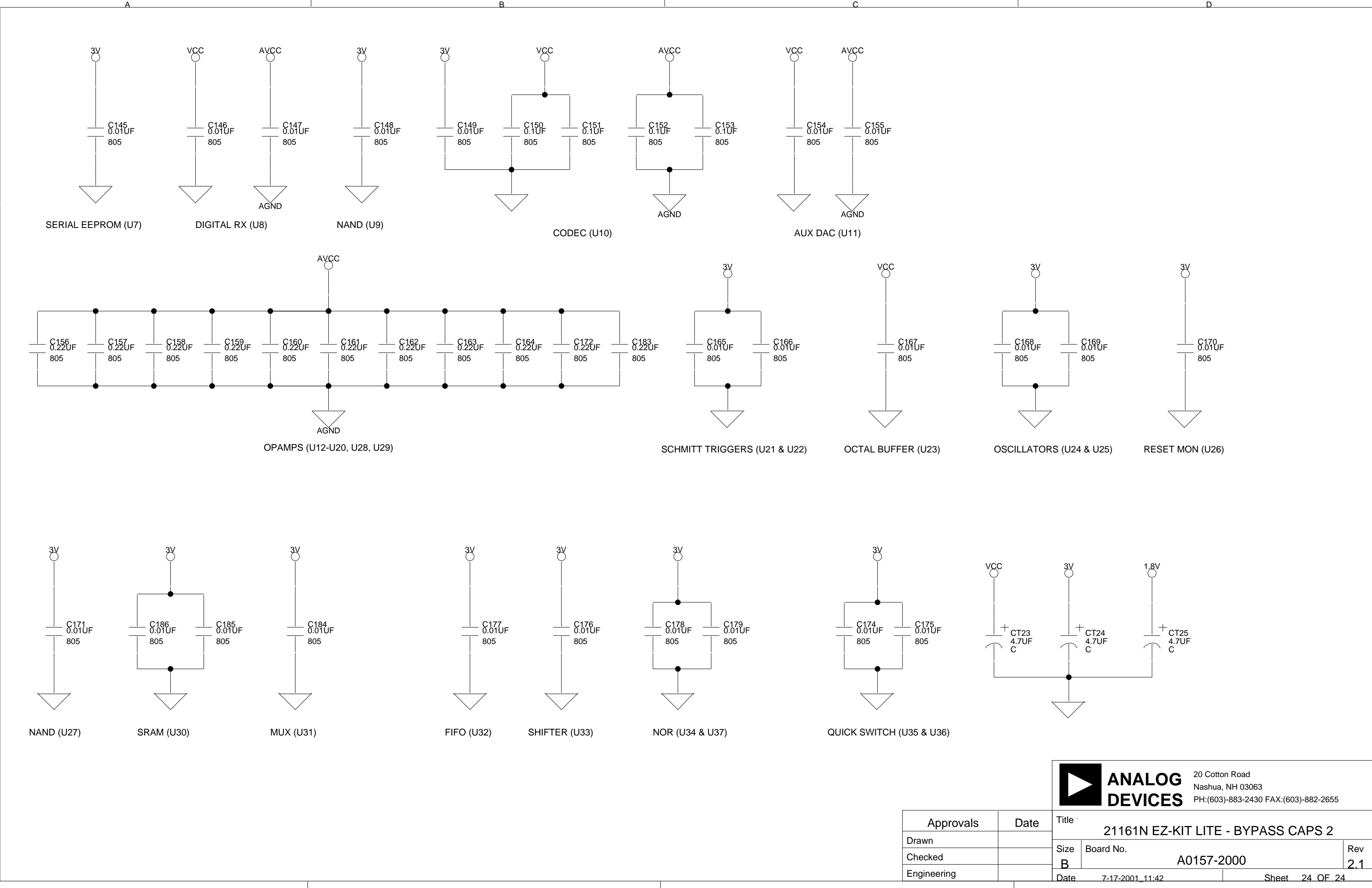


**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Approvals	Date
Drawn	
Checked	
Engineering	

Title 21161N EZ-KIT LITE - BYPASS CAPS 1		
Size B	Board No. A0157-2000	Rev 2.1
Date 7-16-2001_17:09	Sheet 23 OF 24	





**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - BYPASS CAPS 2	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-17-2001_11:42	Sheet	24 OF 24

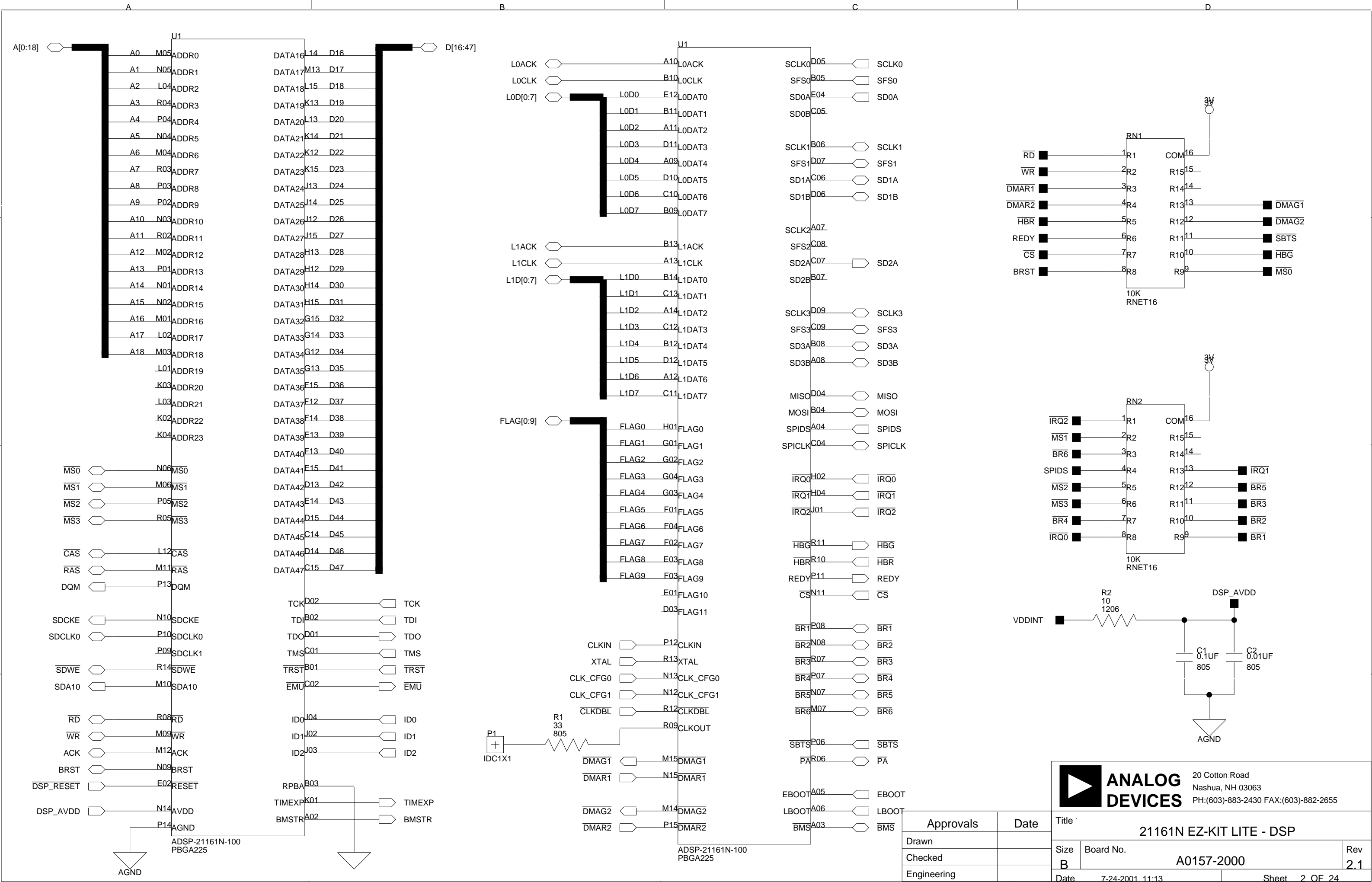
21161N EZ-KIT LITE



**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH: (603)-883-2430 FAX: (603)-882-2655

Title		21161N EZ-KIT LITE - TITLE PAGE	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-24-2001_11:13	Sheet 1 OF 24	



Approvals	Date	Title		
Drawn		21161N EZ-KIT LITE - DSP		
Checked		Size	Board No.	Rev
Engineering		B	A0157-2000	2.1
		Date	7-24-2001 11:13	Sheet 2 OF 24

1

2

3

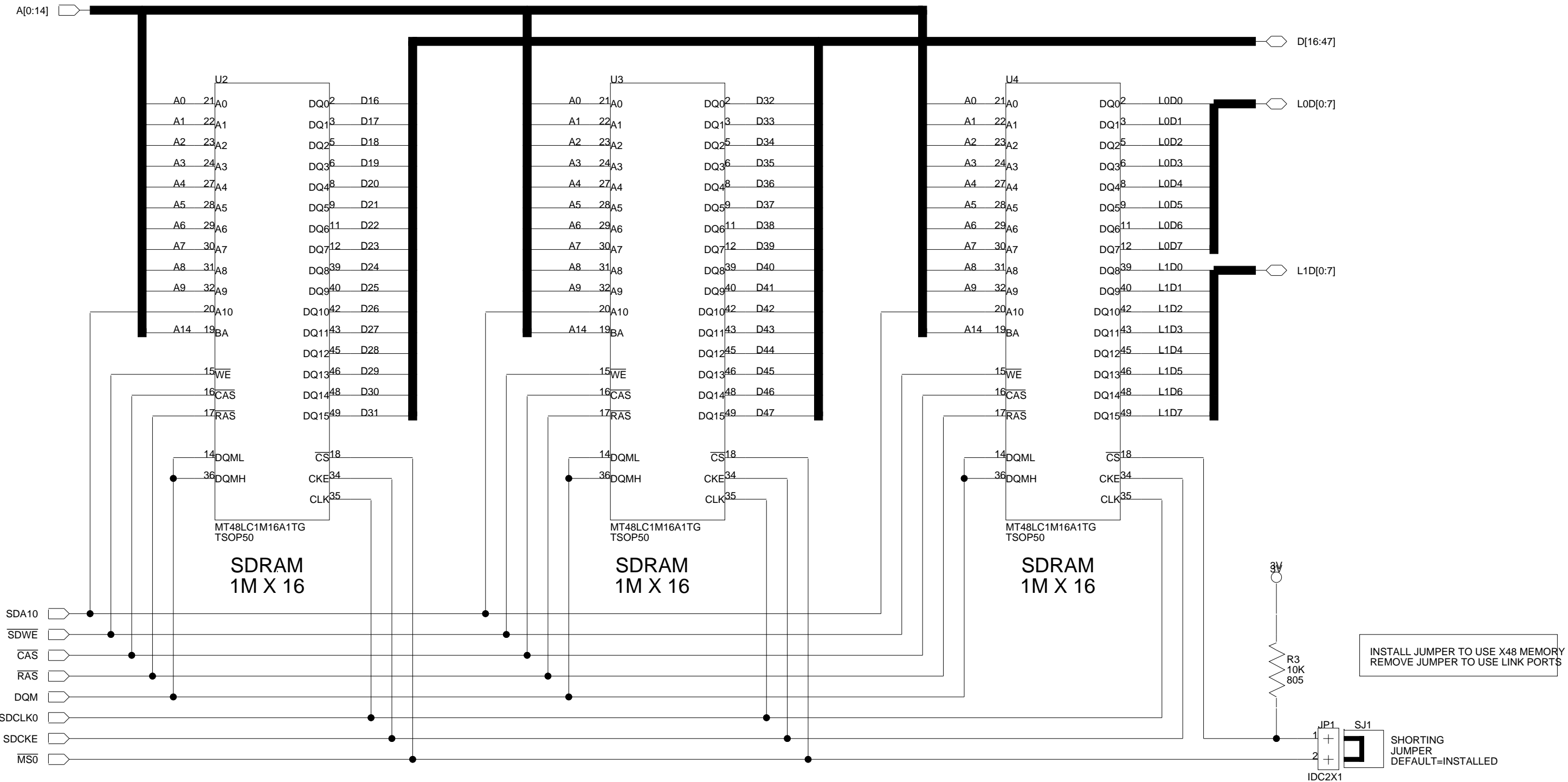
4

1

2

3

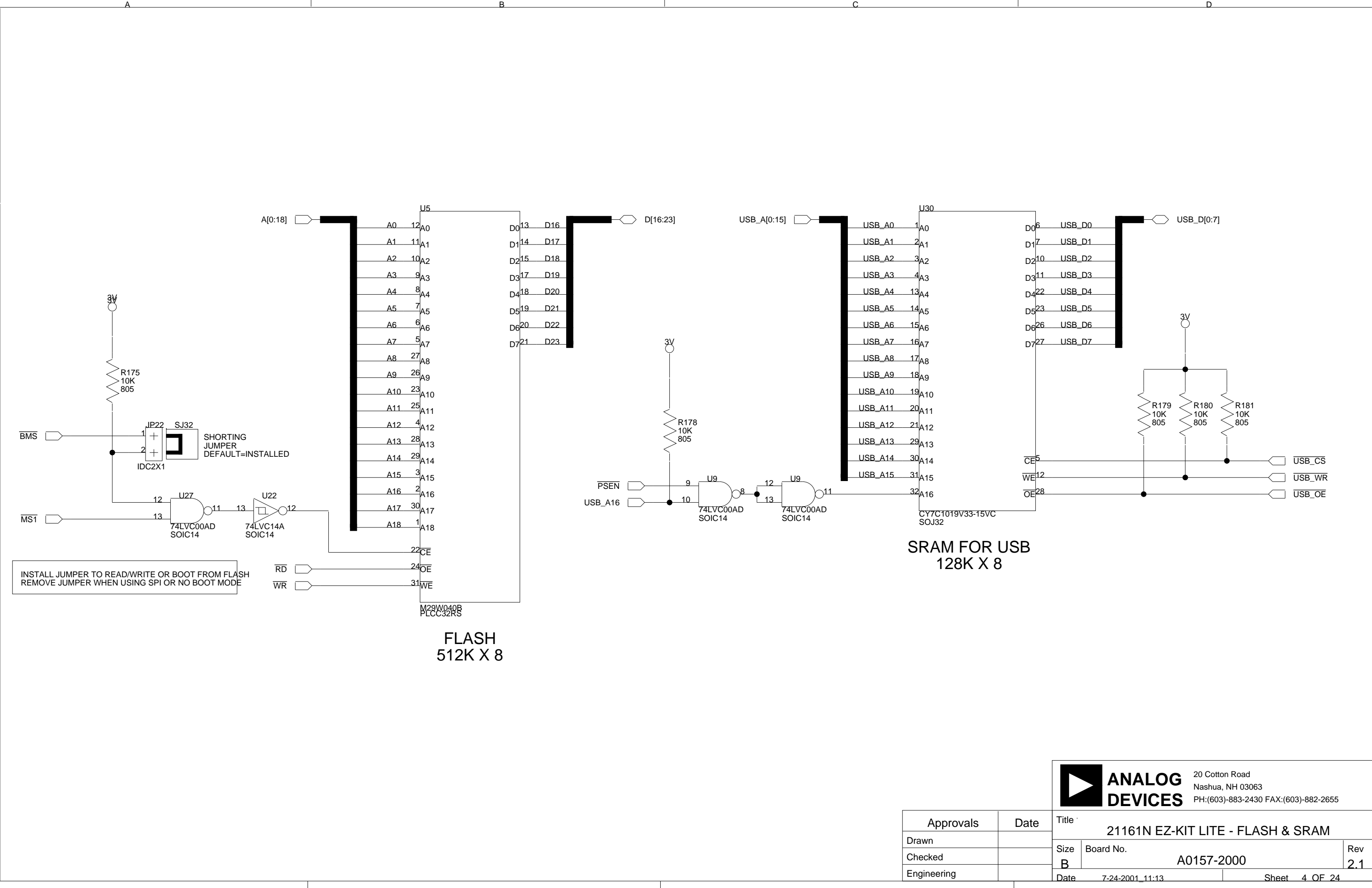
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**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Approvals		Date		Title		
Drawn				21161N EZ-KIT LITE - SDRAM		
Checked				Size	Board No.	Rev
Engineering				B	A0157-2000	2.1
				Date	7-24-2001_11:13	Sheet 3 OF 24



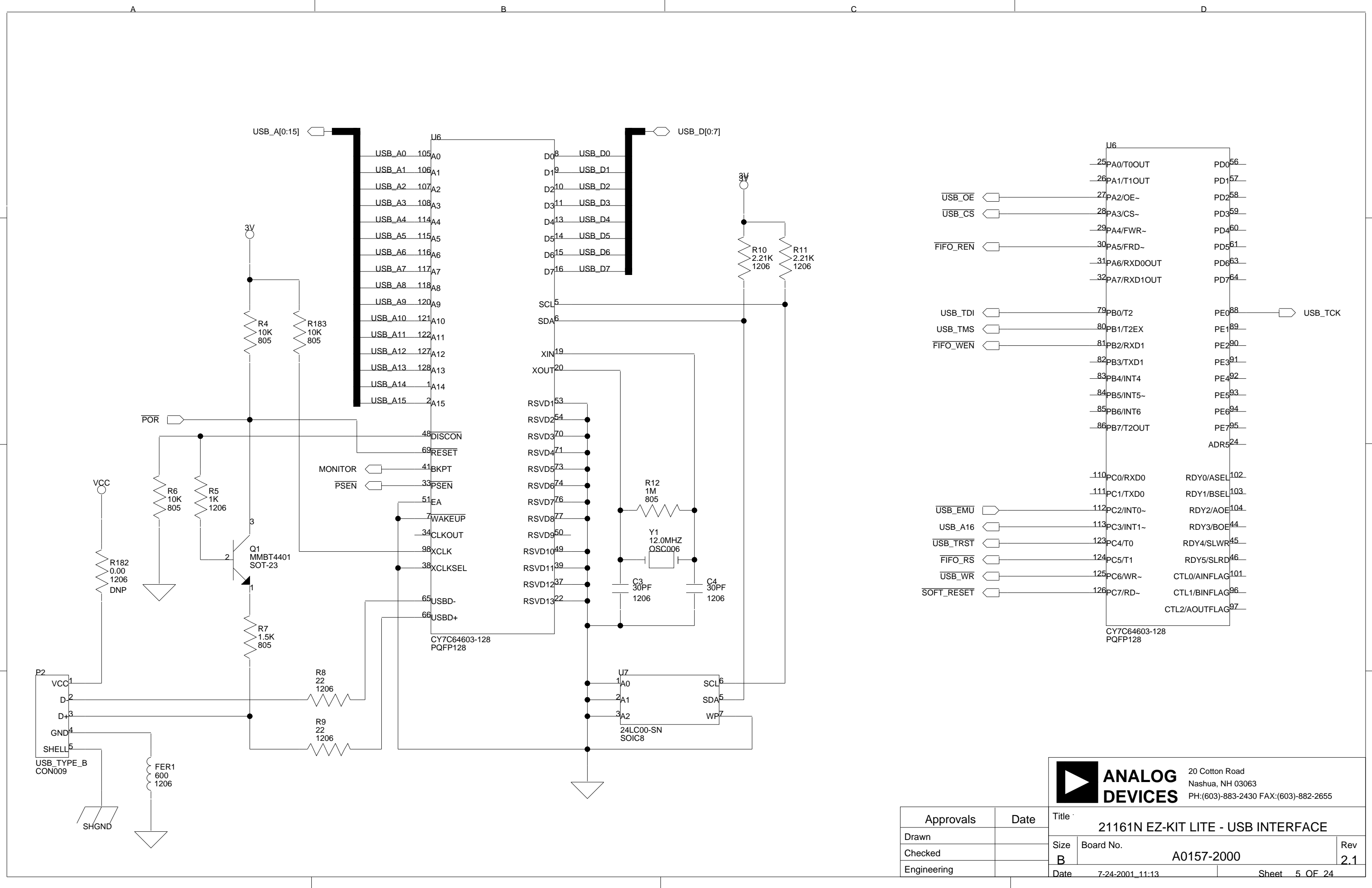


**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - FLASH & SRAM	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-24-2001_11:13	Sheet	4 OF 24

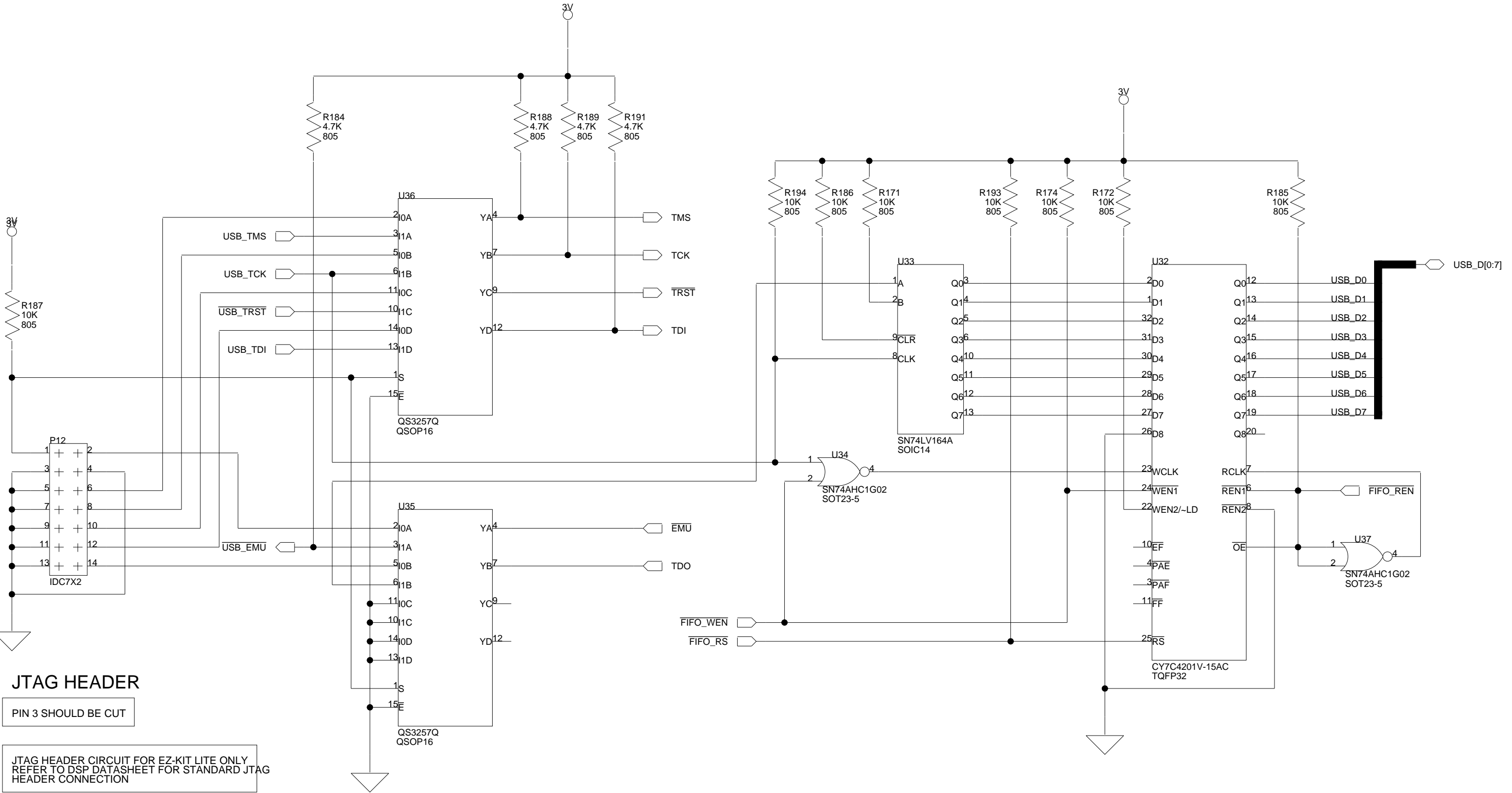
Approvals	Date
Drawn	
Checked	
Engineering	



**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH: (603)-883-2430 FAX: (603)-882-2655


Approvals		Date	Title		
Drawn			21161N EZ-KIT LITE - USB INTERFACE		
Checked			Size	Board No.	Rev
Engineering			B	A0157-2000	2.1
			Date	7-24-2001_11:13	Sheet 5 OF 24



JTAG HEADER

PIN 3 SHOULD BE CUT

JTAG HEADER CIRCUIT FOR EZ-KIT LITE ONLY
REFER TO DSP DATASHEET FOR STANDARD JTAG
HEADER CONNECTION

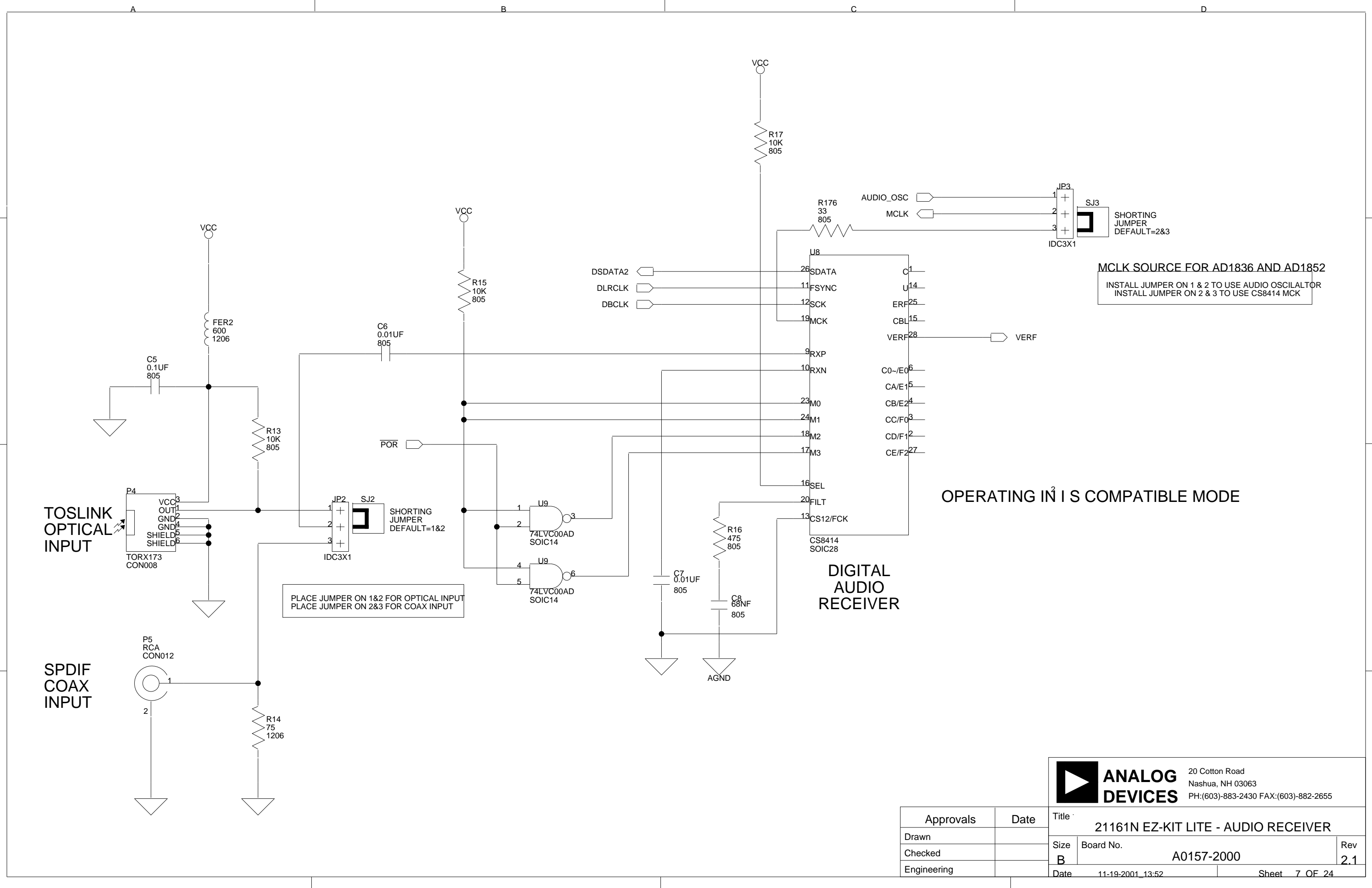


**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - JTAG INTERFACE	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date		Sheet 6 OF 24	

Approvals	Date
Drawn	
Checked	
Engineering	





**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH: (603)-883-2430 FAX: (603)-882-2655

Title		21161N EZ-KIT LITE - AUDIO RECEIVER	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	11-19-2001_13:52	Sheet	7 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	

INSTALL JUMPER TO CONNECT CODEC TO SPI PORT (JP12 & JP13 NOT INSTALLED)
REMOVE JUMPER TO USE FLAG0 FOR PUSH BUTTON OR EXPANSION HEADER

ODVDD IS CONNECTED TO 3.3V

1

2

3

4

1

2

3

4

ADC1 LEFT

ADC1 RIGHT

ADC2 LEFT

ADC2 RIGHT

CODEC

AUX
DAC

DAC1 LEFT

DAC1 RIGHT

DAC2 LEFT

DAC2 RIGHT

DAC3 LEFT

DAC3 RIGHT

DAC4 LEFT

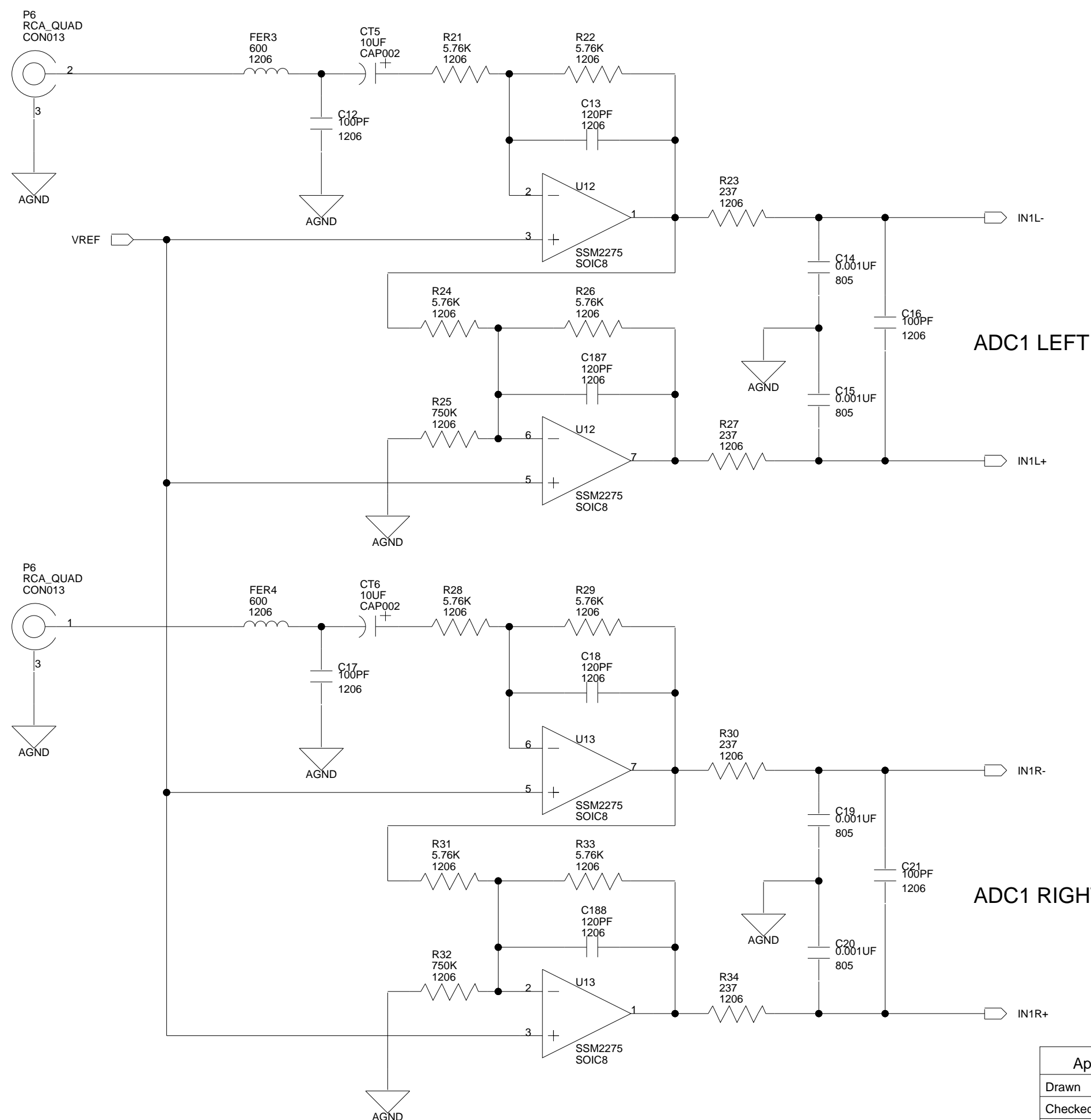
DAC4 RIGHT

SAMPLE FREQUENCY		1&2	3&4
NOT ALLOWED		NOT SHORTED	NOT SHORTED
192kHz (2X INTERPOLATOR)		SHORTED	NOT SHORTED
96kHz (4X INTERPOLATOR)		SHORTED	SHORTED
48kHz (8X INTERPOLATOR)		SHORTED	SHORTED

INSTALL JUMPER TO CONNECT DAC TO SPI PORT (JP12 & JP13 NOT INSTALLED)
REMOVE JUMPER TO USE FLAG1 FOR PUSH BUTTON OR EXPANSION HEADER

Approvals	Date
Drawn	
Checked	
Engineering	

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title 21161N EZ-KIT LITE - CODEC & DAC			
Size B	Board No. A0157-2000		Rev 2.1
Date 7-24-2001 11:28	Sheet 8 OF 24		



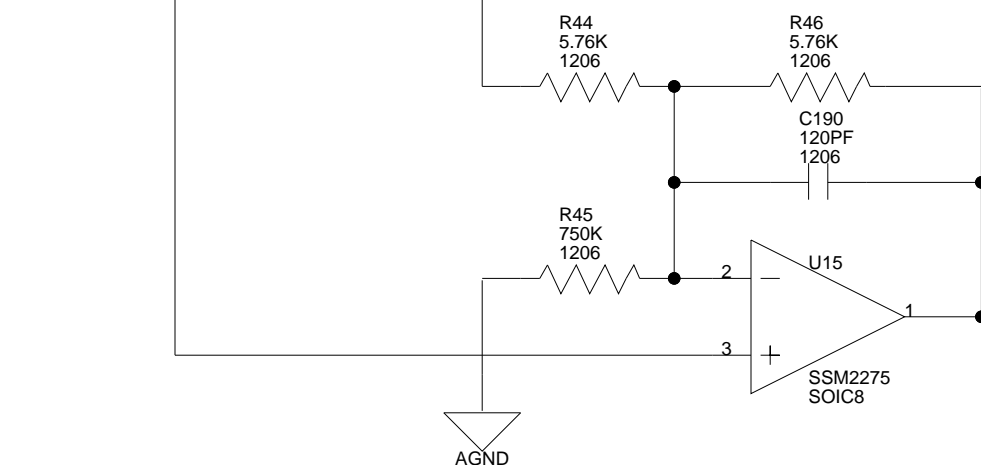
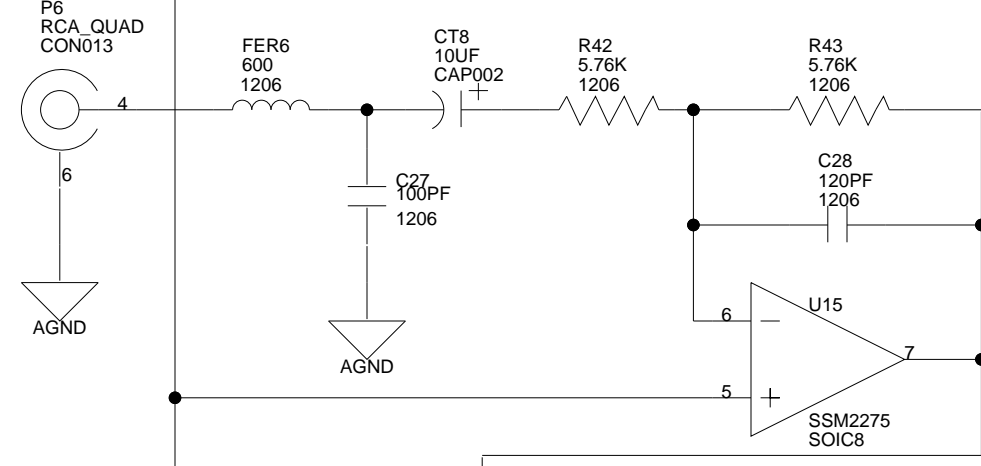
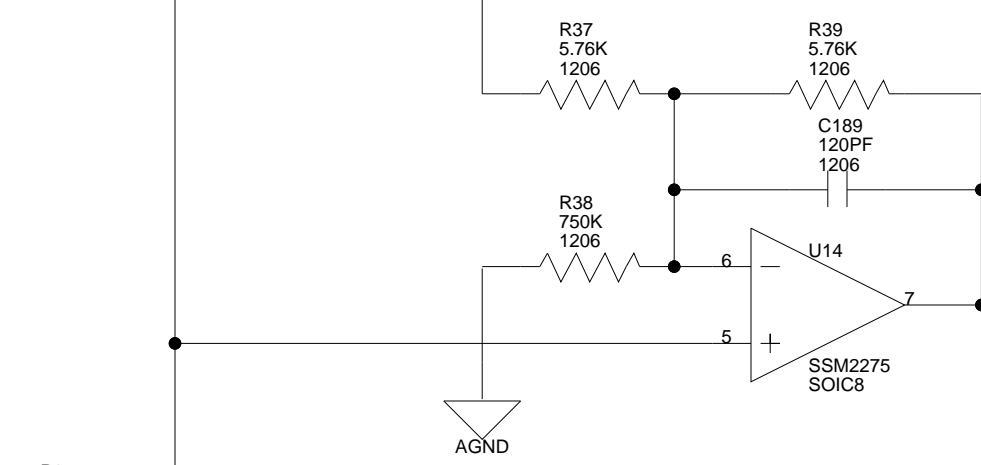
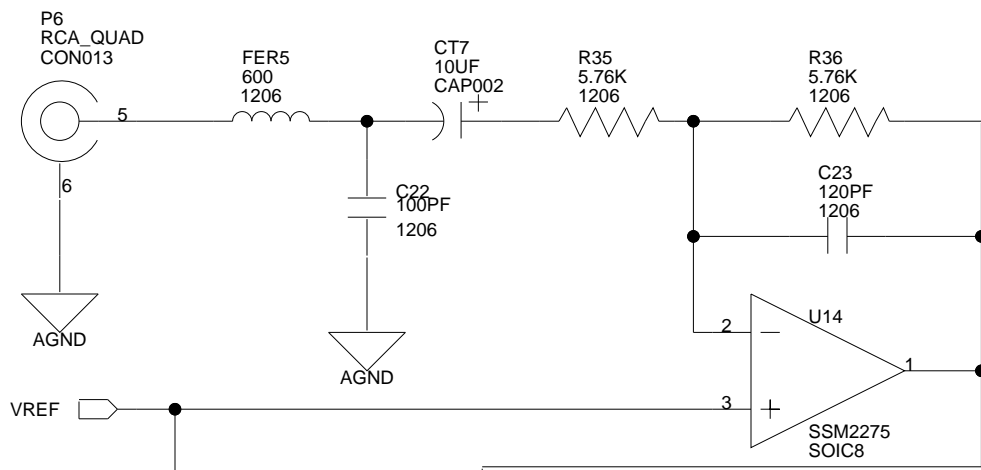


**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - PRIMARY INPUT	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-16-2001_17:09	Sheet	9 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	



ADC2 LEFT INPUT MODE
PGA MODE 3-5 & 4-6
HIGH PERFORMANCE MODE 1-3 & 2-4

ADC2 RIGHT INPUT MODE
PGA MODE 3-5 & 4-6
HIGH PERFORMANCE MODE 1-3 & 2-4

SJ8
SHORTING
JUMPER
DEFAULT=1&3

SJ9
SHORTING
JUMPER
DEFAULT=2&4

SJ10
SHORTING
JUMPER
DEFAULT=1&3

SJ11
SHORTING
JUMPER
DEFAULT=2&4

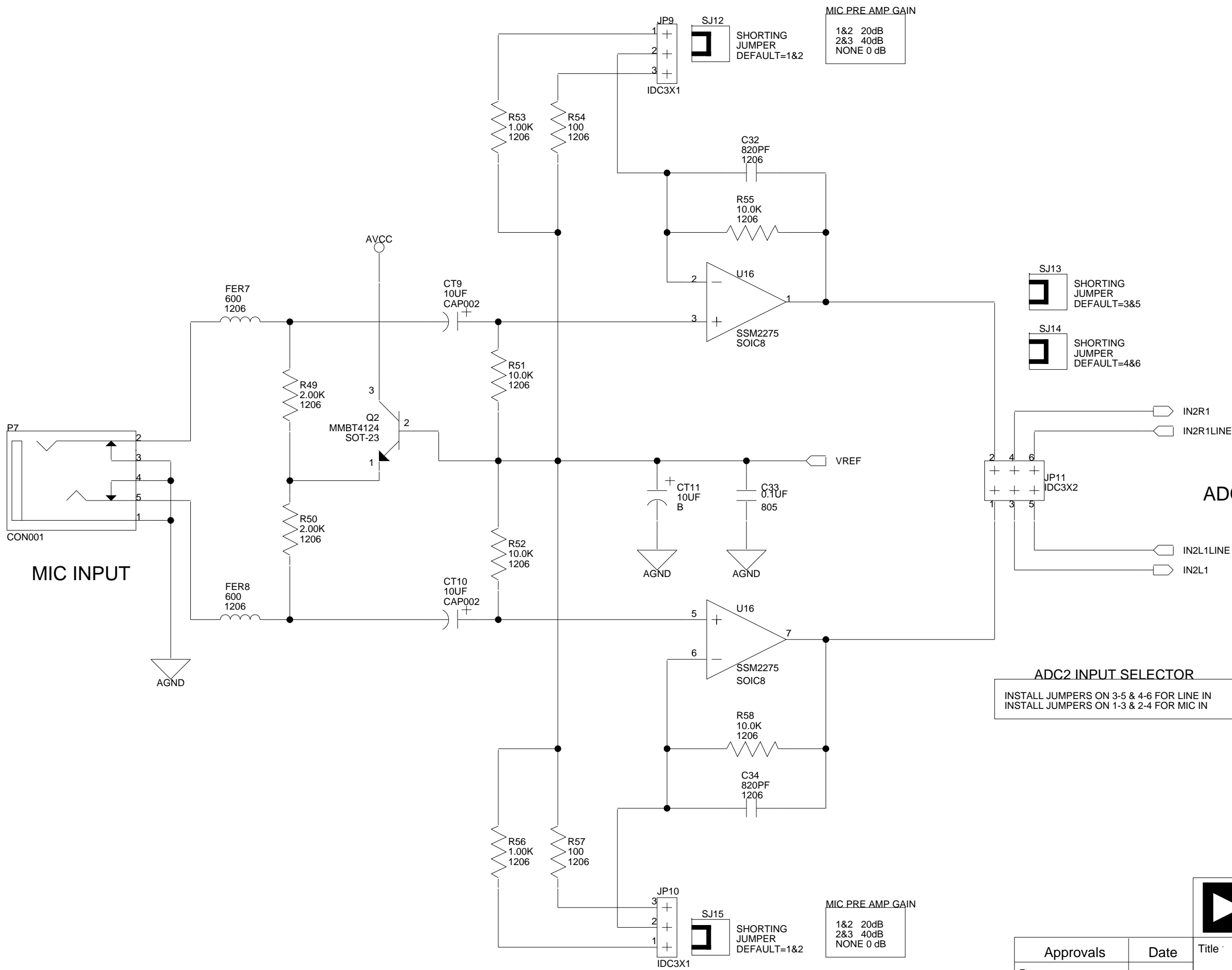
ADC2 LEFT

JP11 (ON SHEET 10) SHOULD BE IN LINE IN
POSITION TO USE EITHER OF THESE MODES

ADC2 RIGHT

 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - SECONDARY INPUT	
Size		Board No.	
B		A0157-2000	
Date		7-17-2001_13:56	
Sheet		10 OF 24	

Approvals	Date
Drawn	
Checked	
Engineering	



ADC2 RIGHT/LEFT

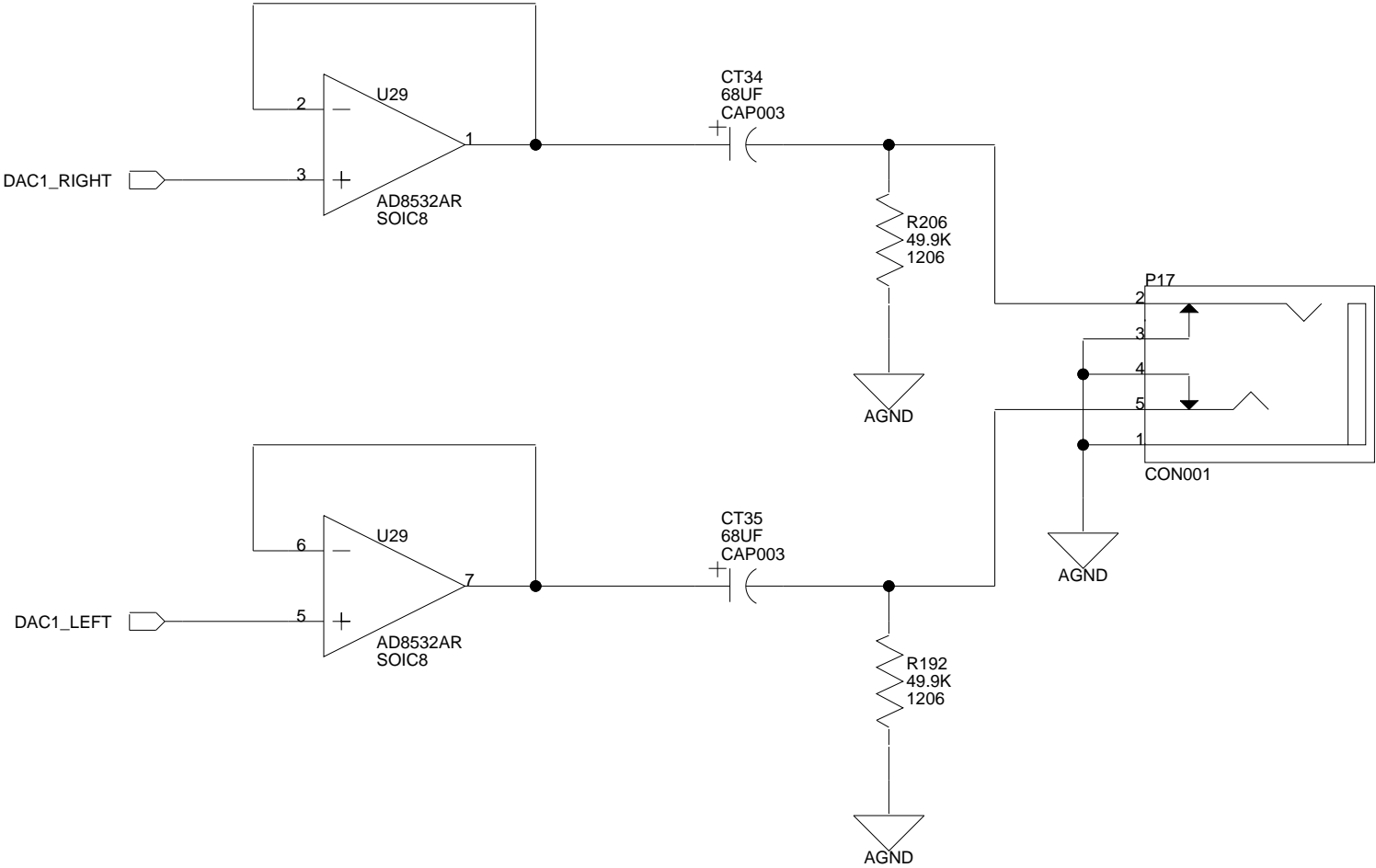
ADC2 INPUT SELECTOR


INSTALL JUMPERS ON 3-5 & 4-6 FOR LINE IN
INSTALL JUMPERS ON 1-3 & 2-4 FOR MIC IN

**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Approvals		Date	Title		
Drawn			21161N EZ-KIT LITE - MIC INPUT		
Checked			Size	Board No.	Rev
Engineering			B	A0157-2000	2.1
			Date	7-16-2001_17:09	Sheet 11 OF 24





**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

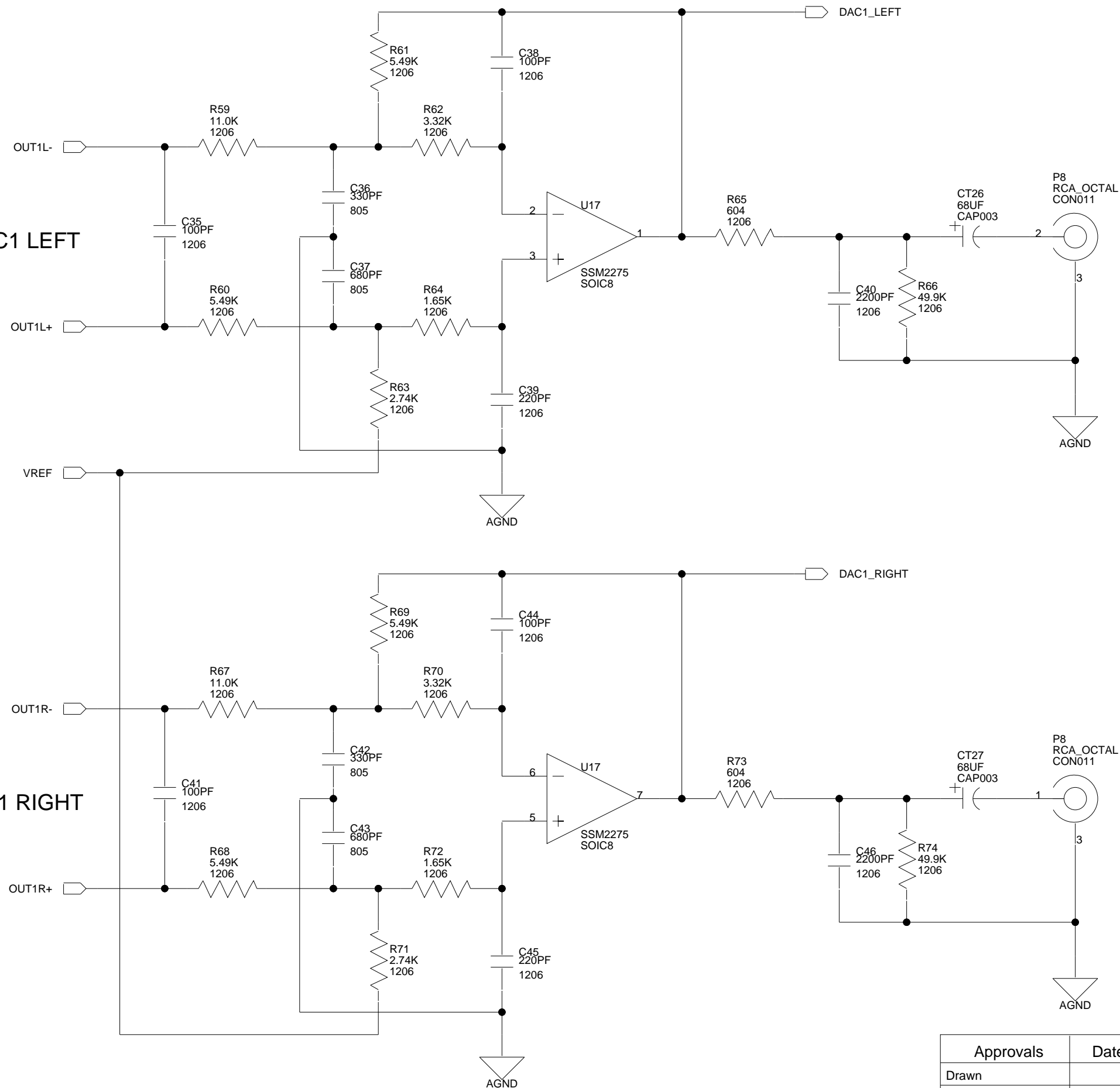
Title : 21161N EZ-KIT LITE - DAC1 OUTPUT-STEREO JACK	
Size B	Board No. A0157-2000
Date	Rev 2.1

Sheet 12 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	

DAC1 LEFT

DAC1 RIGHT

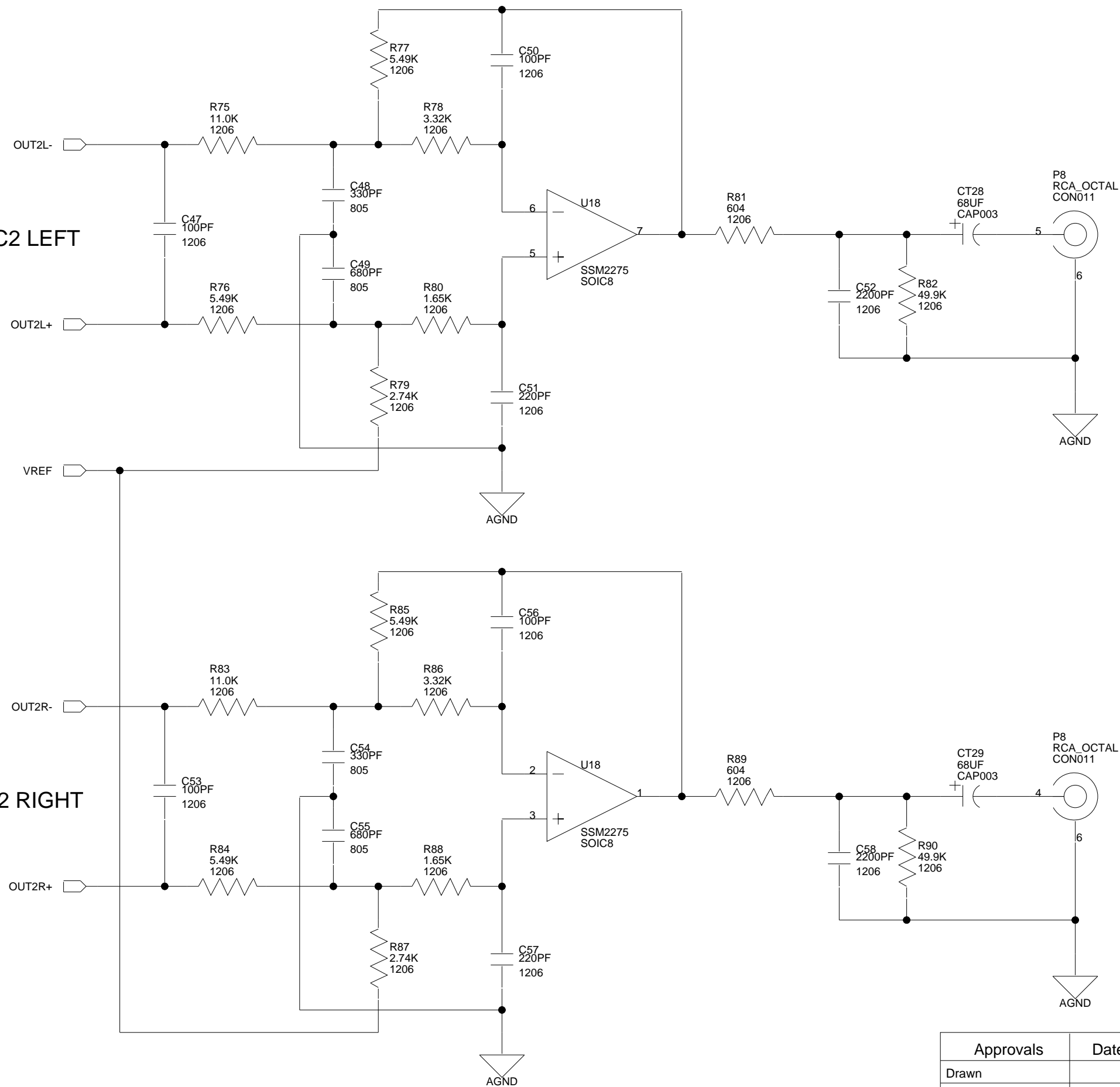


 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - DAC1 OUTPUT	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-16-2001_17:09	Sheet	13 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	

DAC2 LEFT

DAC2 RIGHT

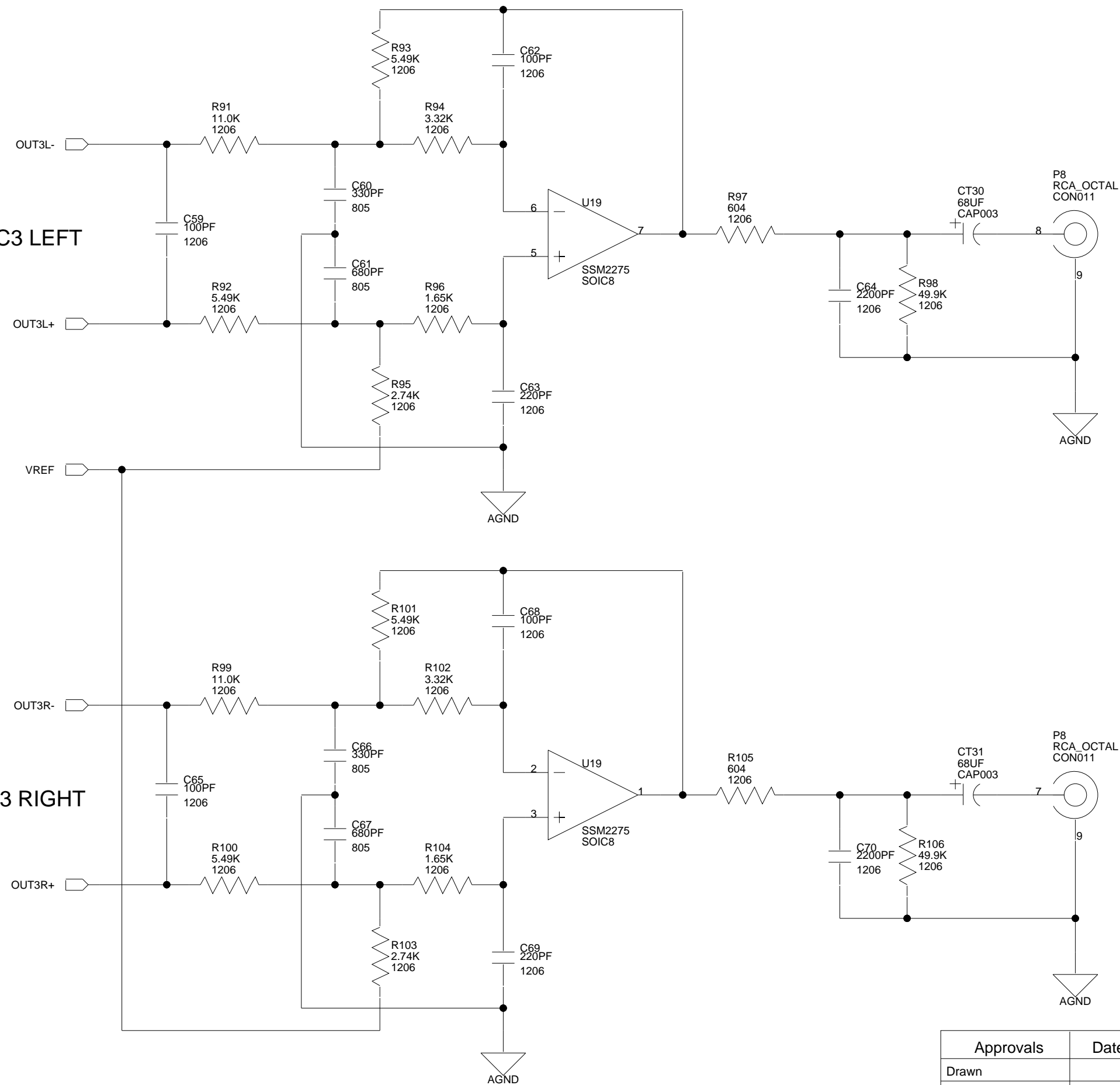


 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - DAC2 OUTPUT	
Size	Board No.	Rev	
B	A0157-2000	2.1	
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Checked	
Engineering	

DAC3 LEFT

DAC3 RIGHT

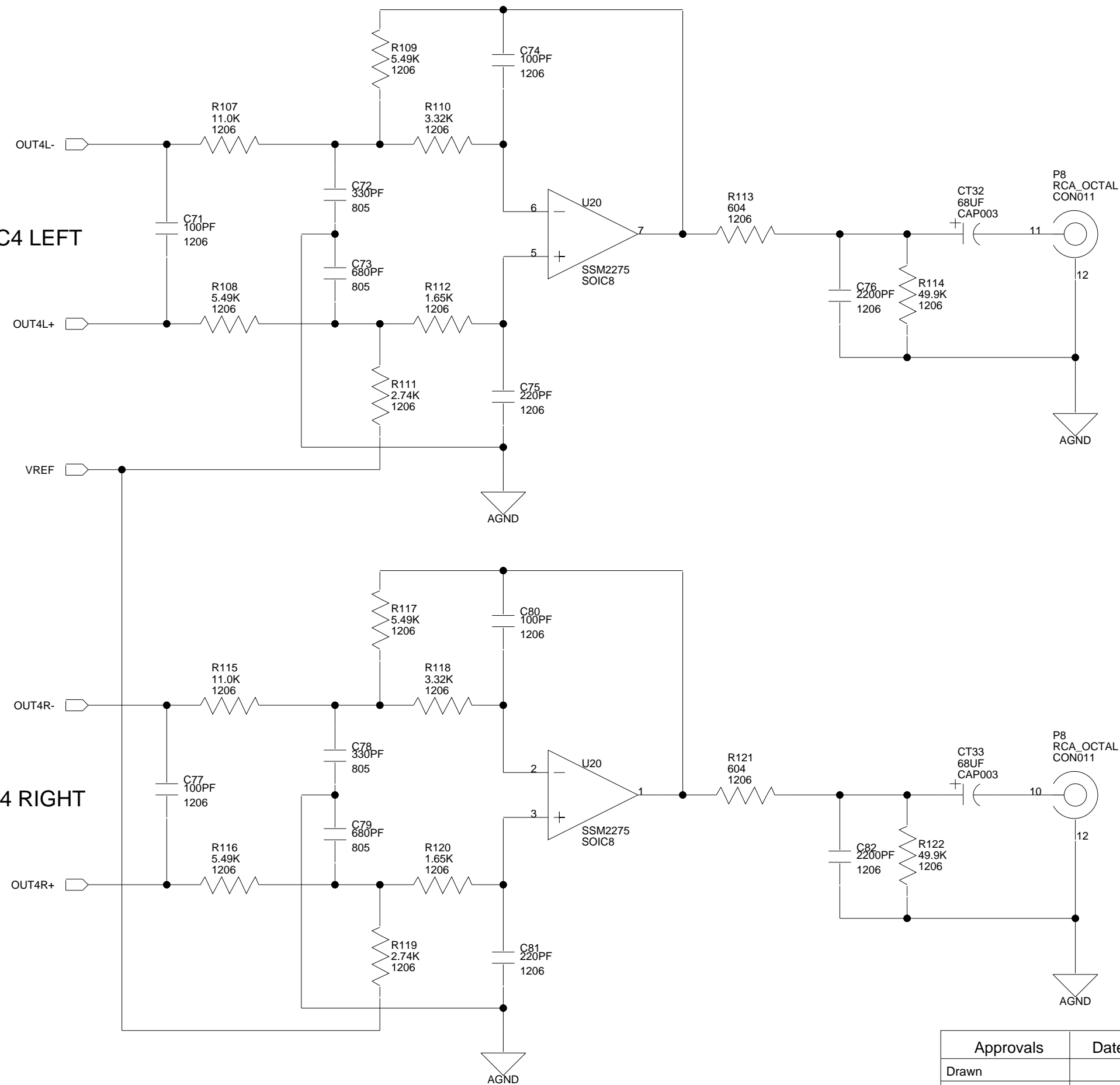


 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
		Title 21161N EZ-KIT LITE - DAC3 OUTPUT	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-17-2001_10:28	Sheet	15 OF 24

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Drawn	
Checked	
Engineering	

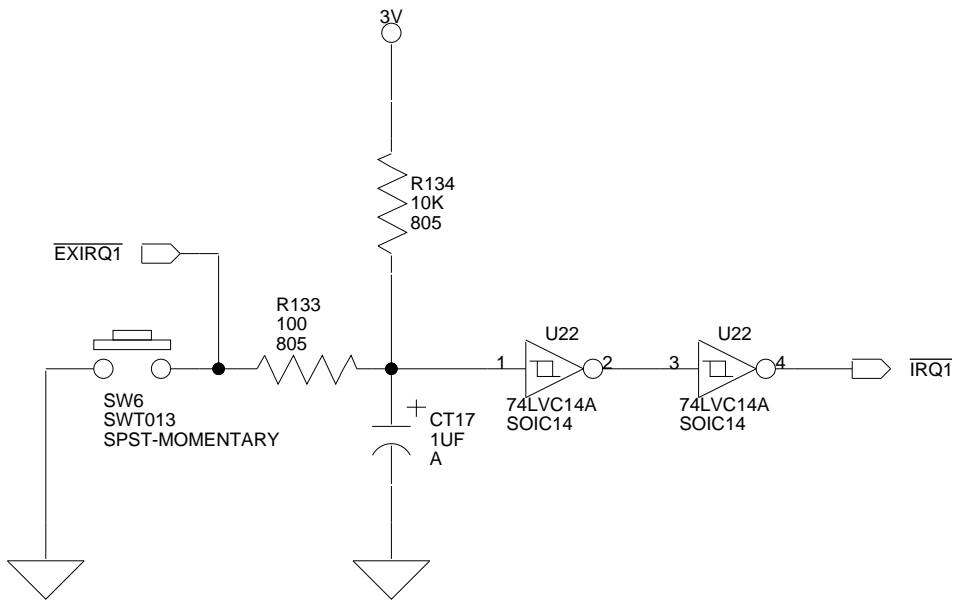
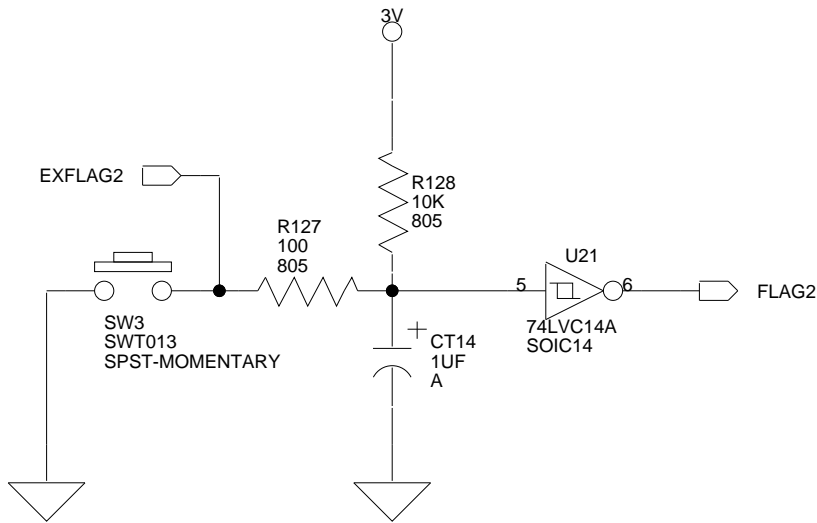
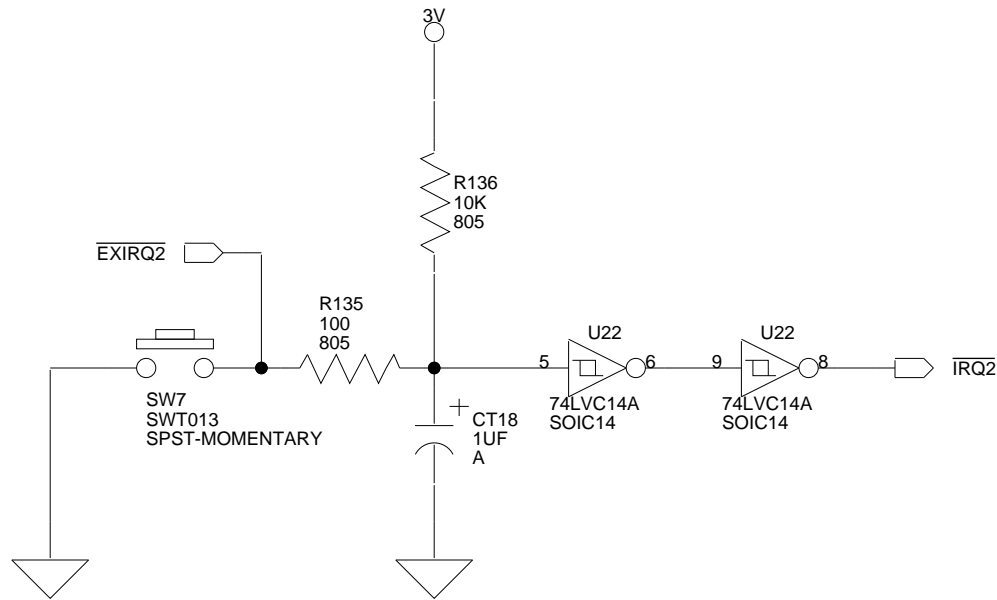
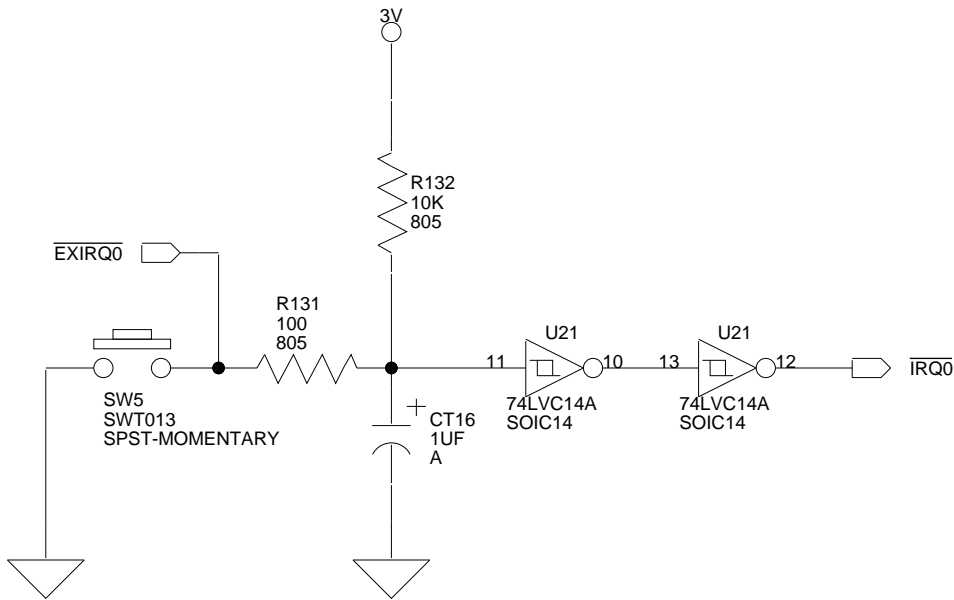
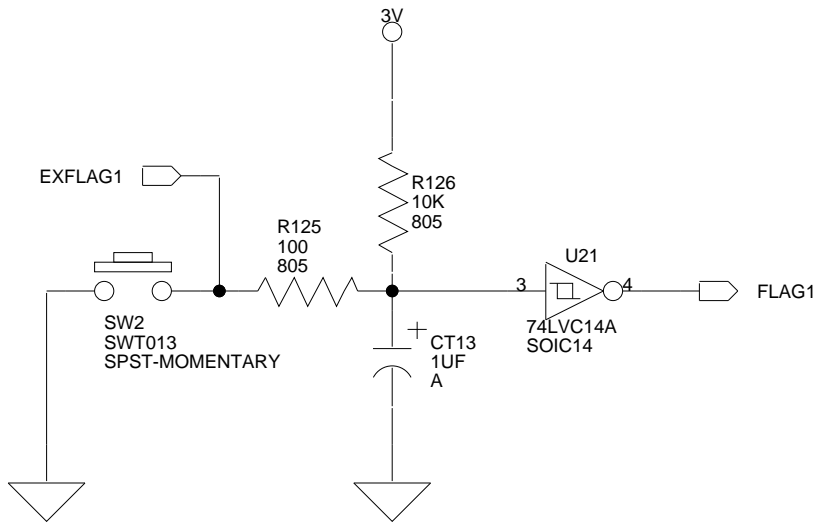
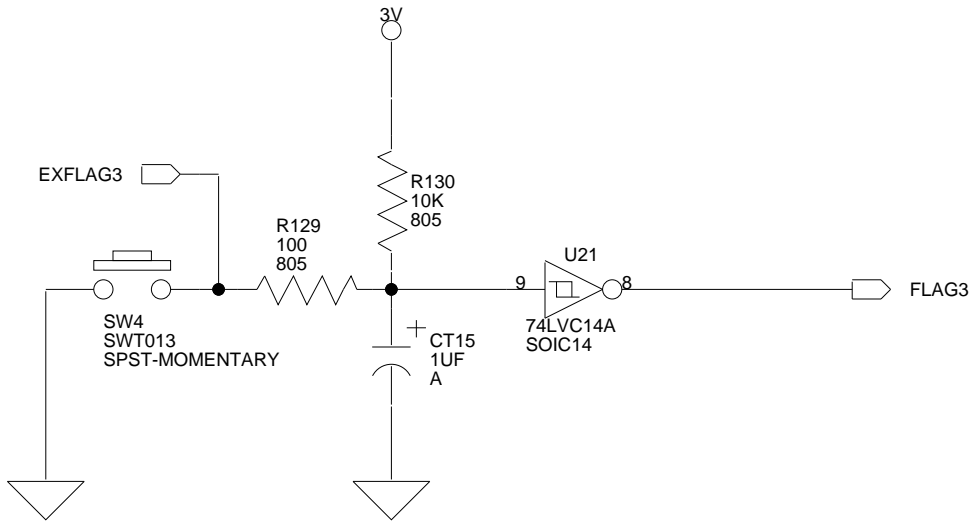
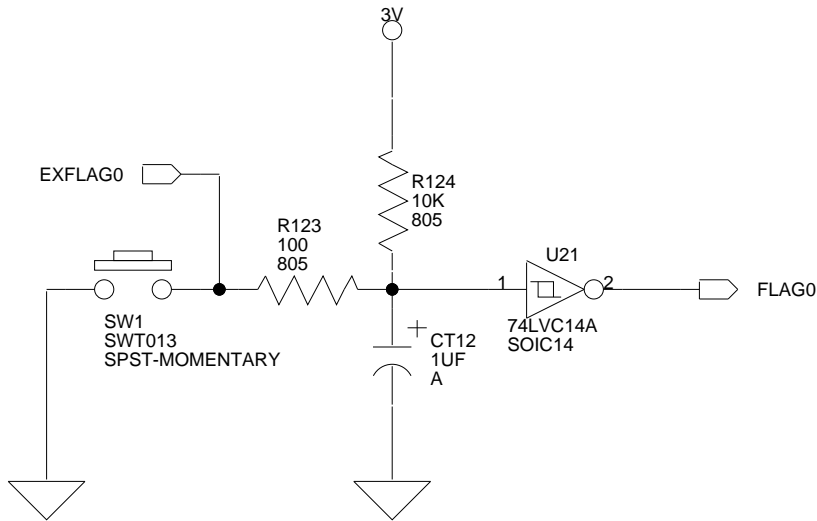
DAC4 LEFT

DAC4 RIGHT



 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
Title		21161N EZ-KIT LITE - DAC4 OUTPUT	
Size	Board No.	Rev	
B	A0157-2000	2.1	
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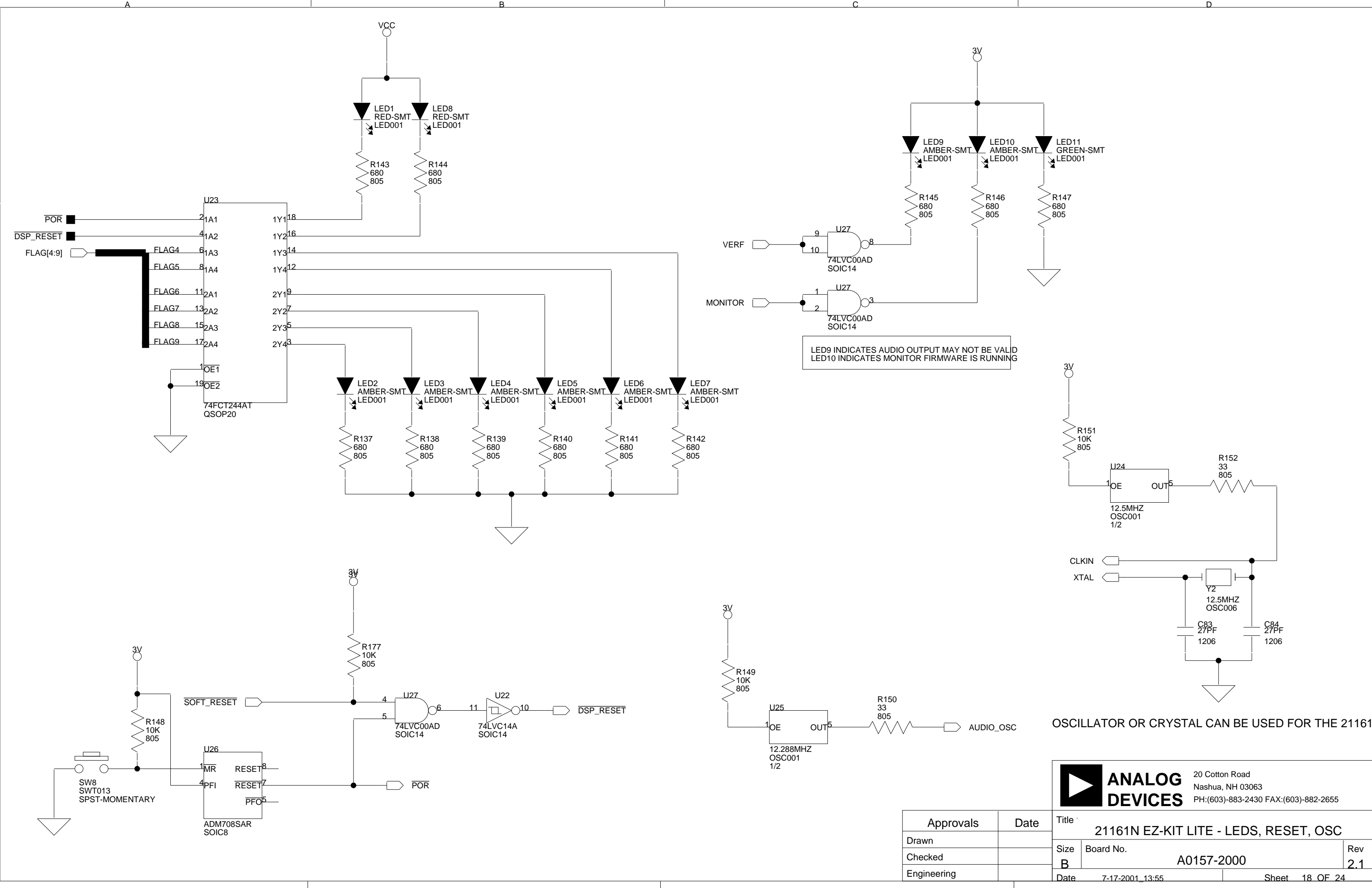
Approvals	Date
Drawn	
Checked	
Engineering	



**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Approvals		Date	Title		
Drawn			21161N EZ-KIT LITE - PUSHBUTTONS		
Checked			Size	Board No.	Rev
Engineering			B	A0157-2000	2.1
			Date	7-16-2001_17:09	Sheet 17 OF 24





**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - LEDS, RESET, OSC	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-17-2001_13:55	Sheet	18 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	

1

2

3

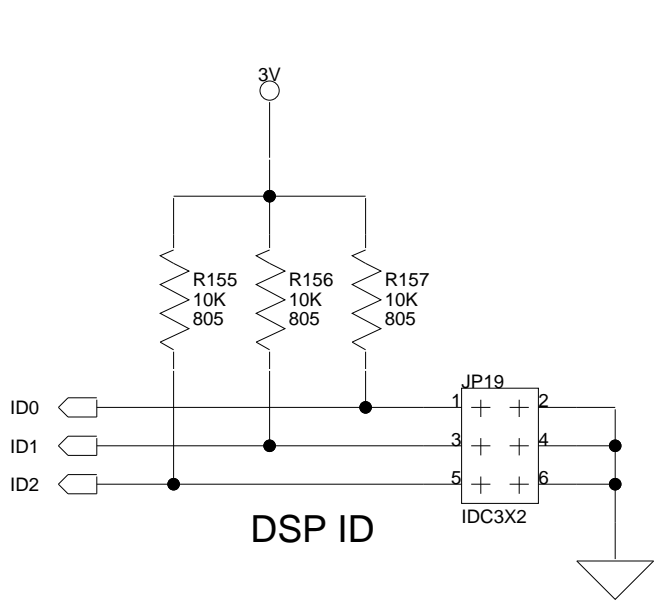
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
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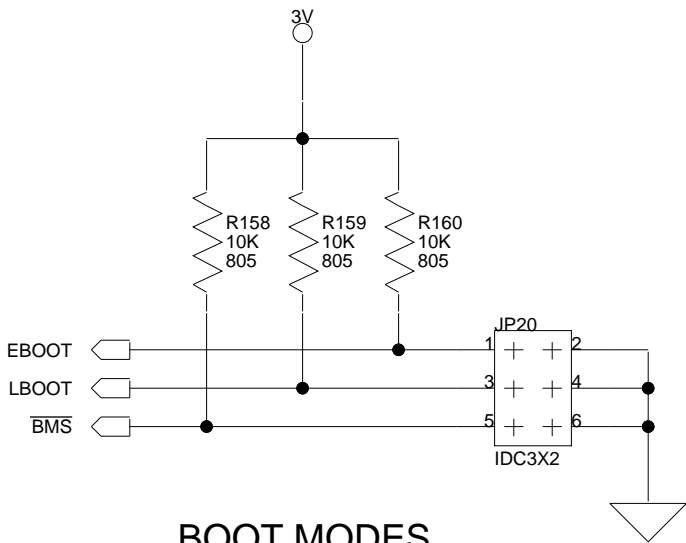
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3

4






-  **SJ23**
SHORTING JUMPER
DEFAULT=1 & 2
-  **SJ24**
SHORTING JUMPER
DEFAULT=3 & 4
-  **SJ25**
SHORTING JUMPER
DEFAULT=5 & 6



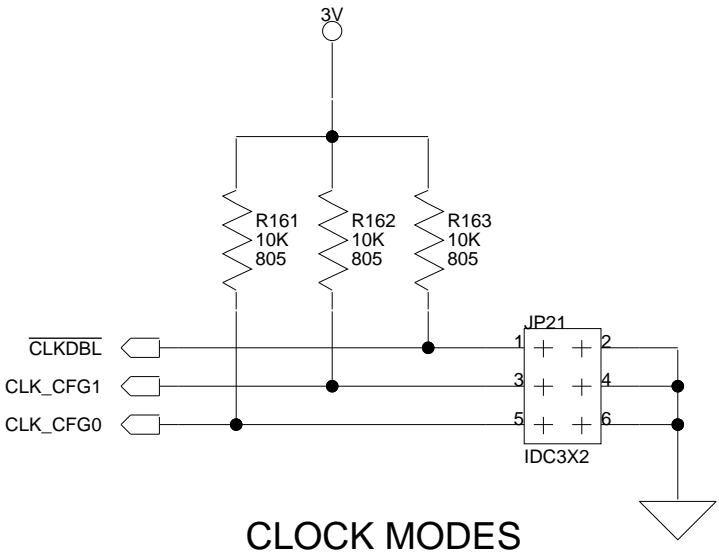
BOOT MODES

EBOOT	LBOOT	BMS	Booting Mode
* 1	0	Output	EPROM
0	0	1 (Input)	Host Processor
0	1	0 (Input)	Serial Boot via SPI
0	1	1 (Input)	Link Port
0	0	0 (Input)	No Booting
1	1	x (Input)	Reserved

* DENOTES FACTORY DEFAULT

-  **SJ26**
SHORTING JUMPER
DEFAULT=3 & 4
-  **SJ27**
SHORTING JUMPER
DEFAULT=NOT INSTALLED
-  **SJ28**
SHORTING JUMPER
DEFAULT=NOT INSTALLED




REMOVE JP22 WHEN USING SPI OR NO BOOT MODES (REFER TO SHEET 4)




CLOCK MODES

CLKDBL	CLK_CFG1	CLK_CFG0	Core Clock Ratio	EP Clock Ratio
1	0	0	2:1	1x
1	0	1	3:1	1x
* 1	1	0	4:1	1x
0	0	0	4:1	2x
0	0	1	6:1	2x
0	1	0	8:1	2x

* DENOTES FACTORY DEFAULT

-  **SJ29**
SHORTING JUMPER
DEFAULT=NOT INSTALLED
-  **SJ30**
SHORTING JUMPER
DEFAULT=NOT INSTALLED
-  **SJ31**
SHORTING JUMPER
DEFAULT=5 & 6

**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Approvals	Date	Title 21161N EZ-KIT LITE - CONFIGURATION	
Drawn		Size B	Board No. A0157-2000
Checked		Date 7-16-2001_17:09	Rev 2.1
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1

1

2

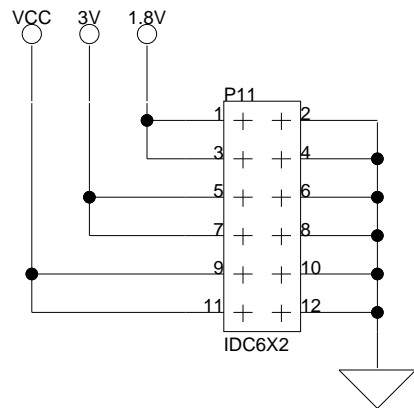
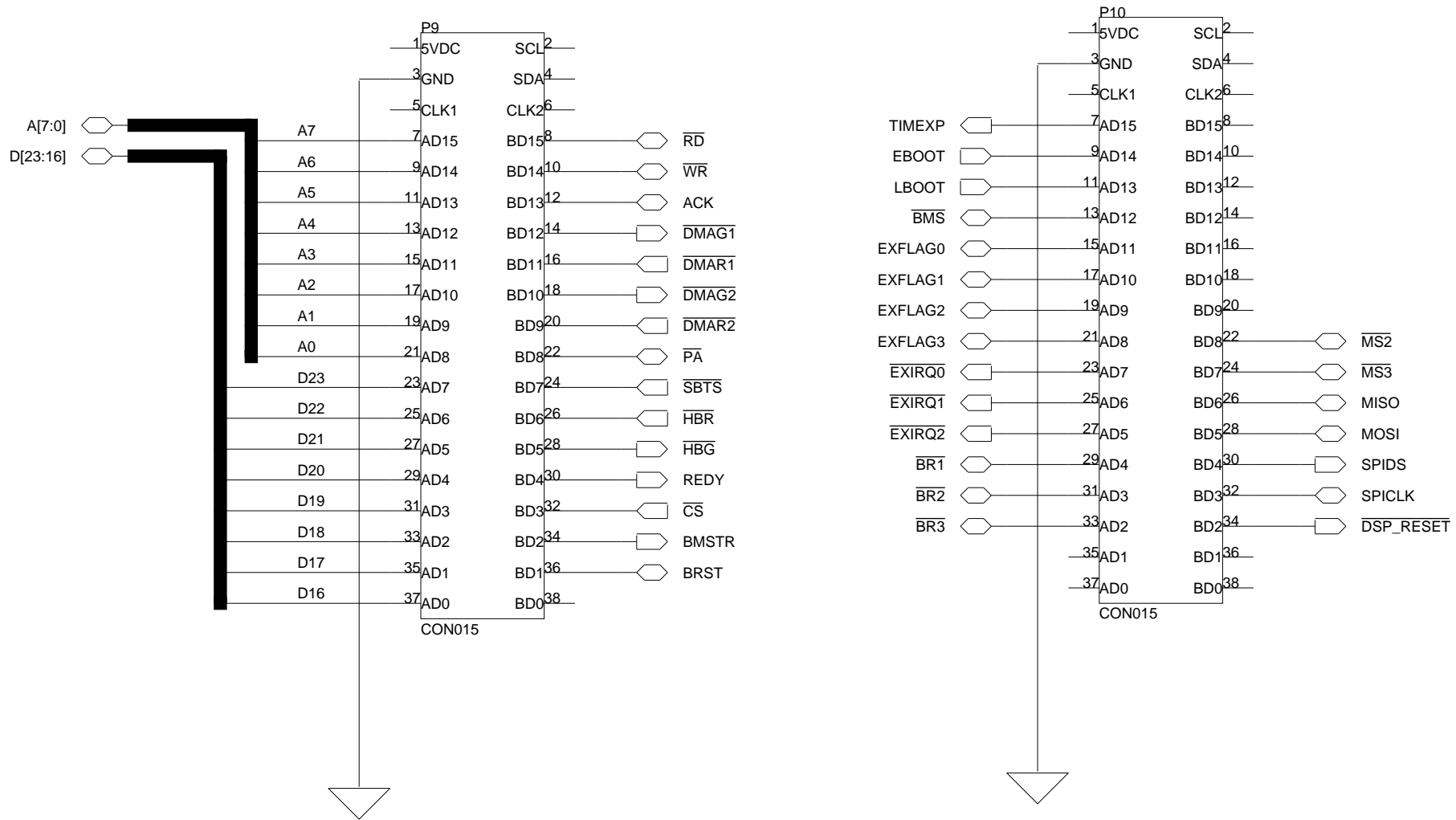
2

3

3

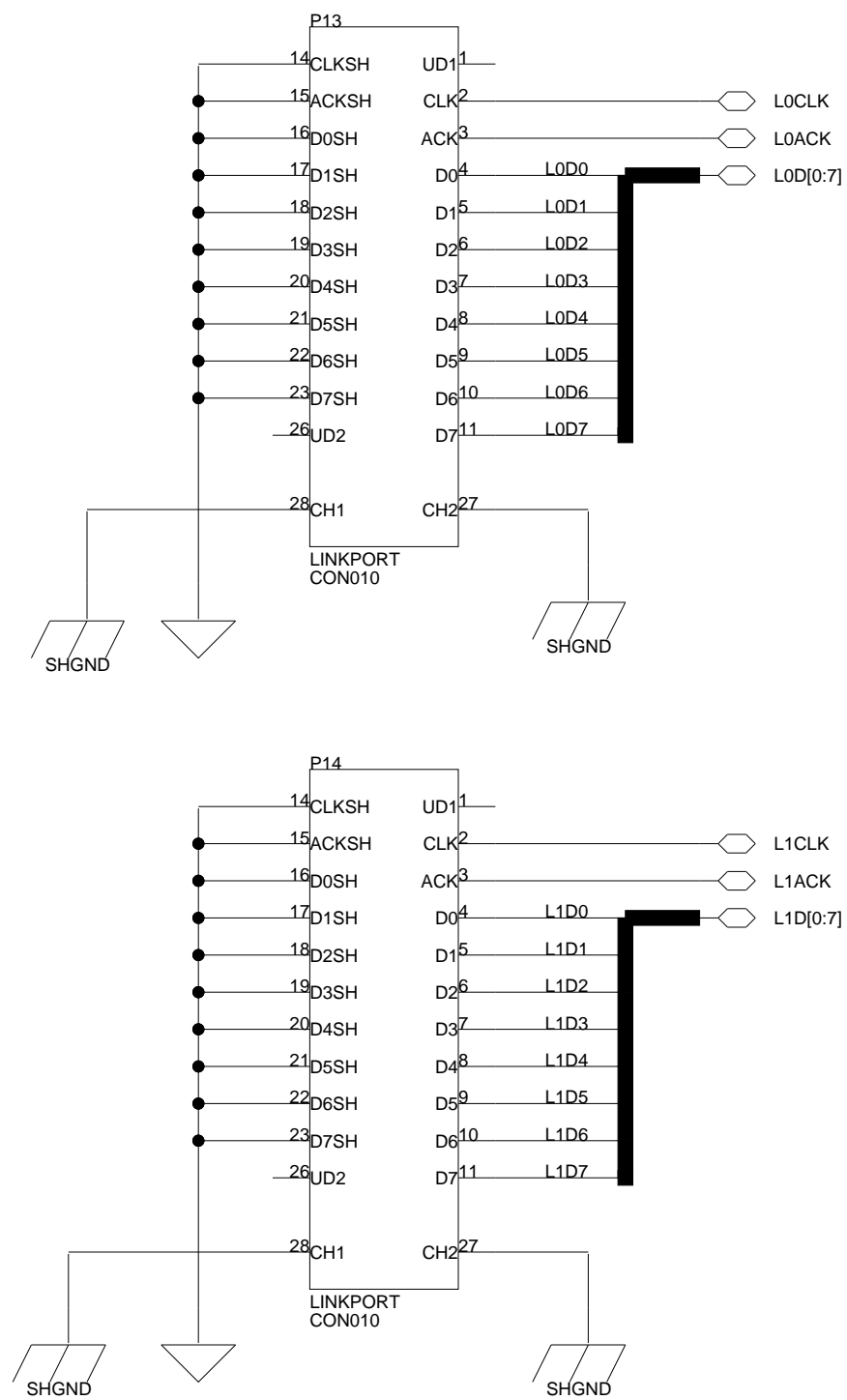
4

4



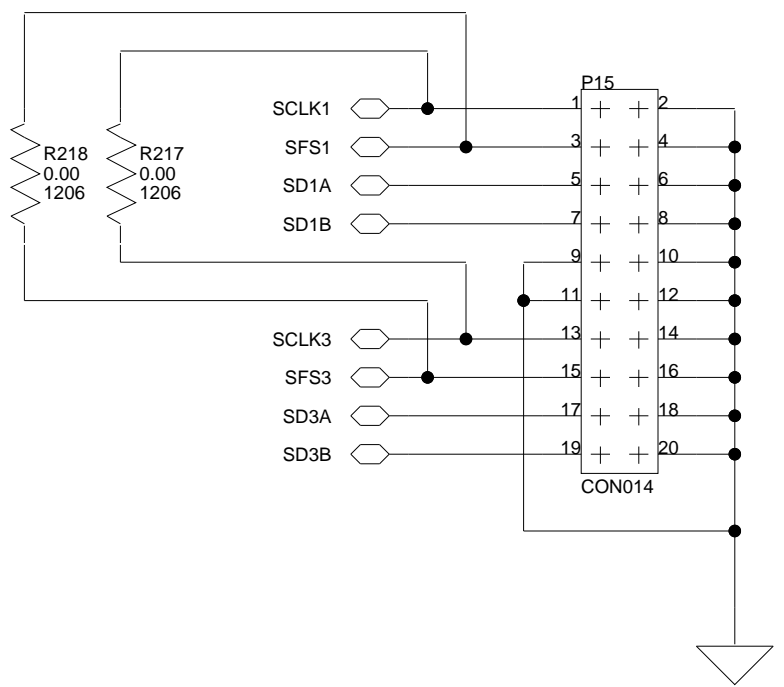
<div><div></div><div>ANALOG DEVICES</div></div>		20 Cotton Road Nashua, NH 03063 PH:(603)-883-2430 FAX:(603)-882-2655	
		Title : 21161N EZ-KIT LITE - EXPANSION HEADERS	
		Size B	Board No. A0157-2000
		Rev 2.1	
Approvals	Date	Date 7-16-2001 17:09	Sheet 20 OF 24
Drawn			
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Engineering			


LINK PORT CONNECTORS



JP1 SHOULD NOT BE INSTALLED WHEN USING THE LINK PORT

SERIAL PORT CONENCTOR



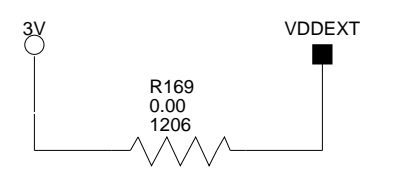
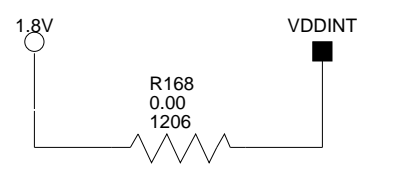
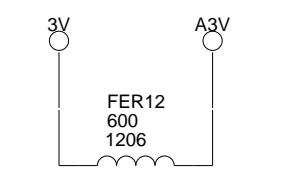
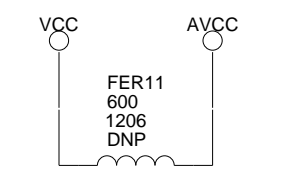
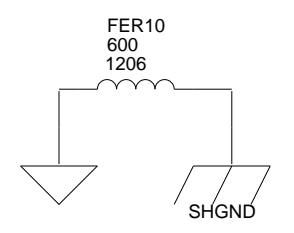
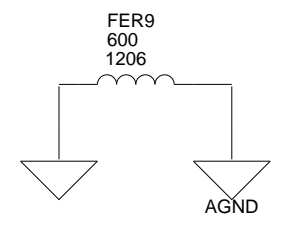
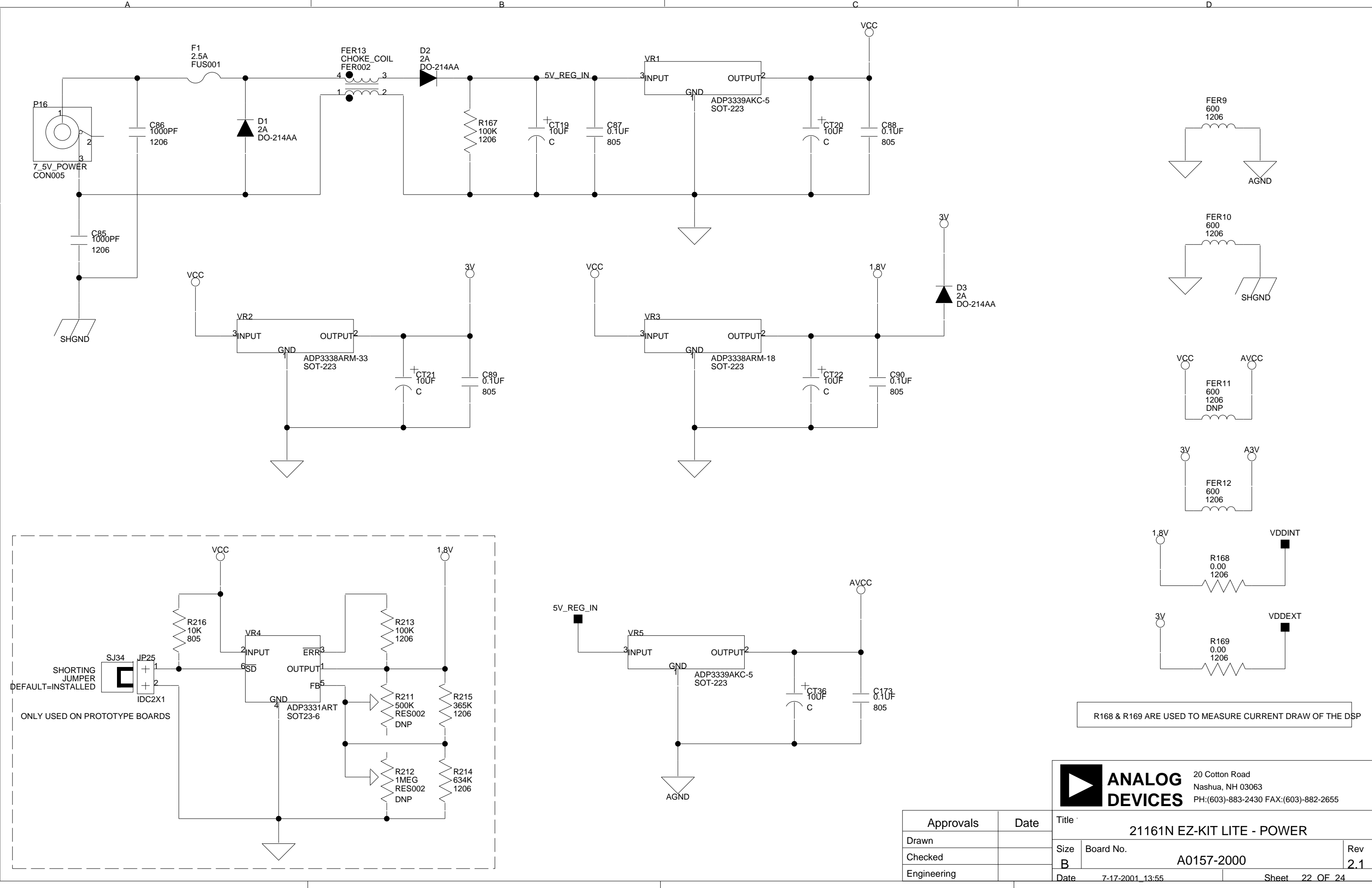


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DEVICES**

20 Cotton Road
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Title		21161N EZ-KIT LITE - LINK PORTS & SPORTS	
Size	Board No.	Rev	
B	A0157-2000	2.1	
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R168 & R169 ARE USED TO MEASURE CURRENT DRAW OF THE DSP

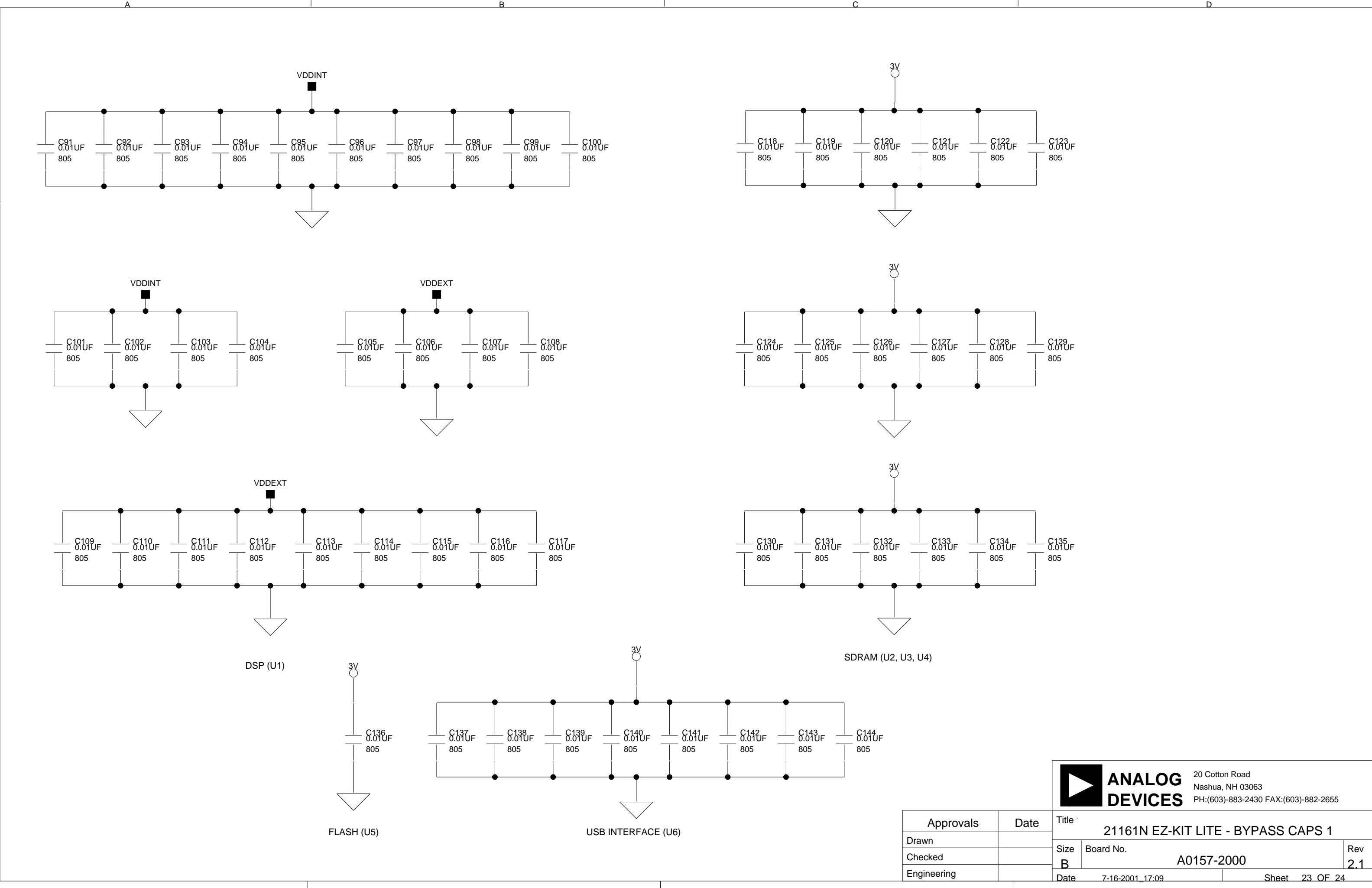


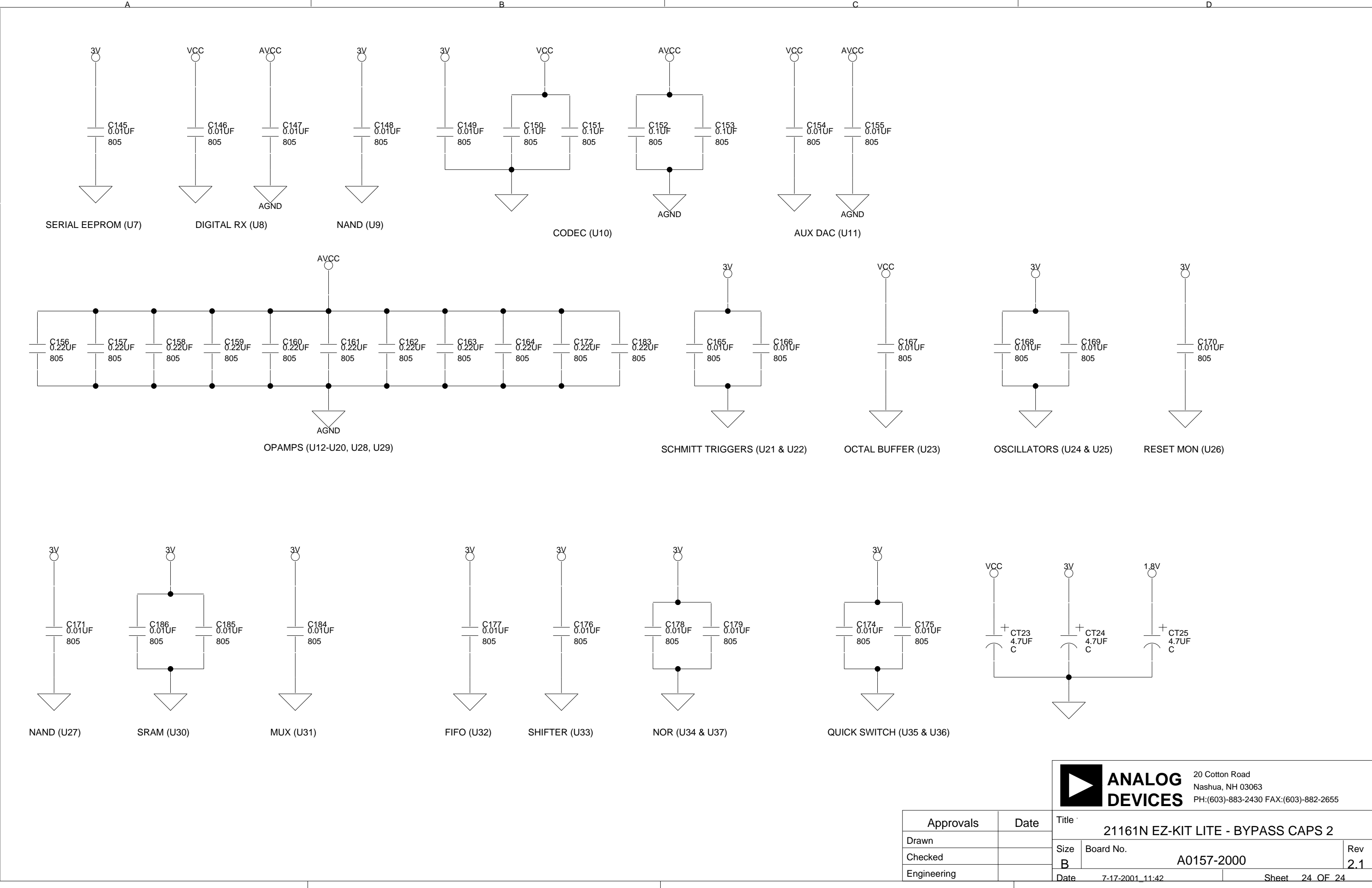
**ANALOG
DEVICES**

20 Cotton Road
Nashua, NH 03063
PH:(603)-883-2430 FAX:(603)-882-2655

Title 21161N EZ-KIT LITE - POWER		
Size B	Board No. A0157-2000	Rev 2.1
Date 7-17-2001_13:55	Sheet 22 OF 24	

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Engineering	







**ANALOG
DEVICES**

20 Cotton Road
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PH:(603)-883-2430 FAX:(603)-882-2655

Title		21161N EZ-KIT LITE - BYPASS CAPS 2	
Size	Board No.	Rev	
B	A0157-2000	2.1	
Date	7-17-2001_11:42	Sheet	24 OF 24

Approvals	Date
Drawn	
Checked	
Engineering	