

SHARC® USB EZ-Extender® Manual

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Regulatory Compliance

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

The SHARC USB EZ-Extender has been certified to comply with the essential requirements of the European EMC directive 89/336/EEC (inclusive 93/68/EEC) and, therefore, carries the “CE” mark.

The SHARC USB EZ-Extender had been appended to Analog Devices, Inc. EMC Technical File (EMC TF) referenced “DSPTOOLS1” dated December 21, 1997 and was declared CE compliant by an appointed Notified Body (No.0673) as listed below.

Notified Body Statement of Compliance: Z600ANA1.026



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Shrivenham, Swindon, SN6 8TY, UK

The SHARC USB EZ-Extender 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 extender boards in the protective shipping package.



CONTENTS

PREFACE

Product Overview	viii
Purpose of This Manual	ix
Intended Audience	ix
Manual Contents	ix
What's New in This Manual	x
Technical Support	x
Supported Products	xi
Product Information	xii
Analog Devices Web Site	xii
EngineerZone	xii
Related Documents	xiii

USB EZ-EXTENDER INTERFACE

USB EZ-Extender Setup	1-1
USB Software Documentation	1-2
USB 2.0 Interface	1-2

Contents

USB EZ-EXTENDER HARDWARE REFERENCE

System Architecture	2-1
Processor Select Jumper (JP1)	2-2

USB EZ-EXTENDER BILL OF MATERIALS

USB EZ-EXTENDER SCHEMATIC

INDEX

PREFACE

Thank you for purchasing the SHARC[®] USB EZ-Extender[®], Analog Devices, Inc. extension board to the EZ-KIT Lite[®] evaluation systems for ADSP-21262, ADSP-21364, and ADSP-21369 SHARC processors.

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

The EZ-KIT Lites and SHARC USB EZ-Extender are designed to be used in conjunction with the CrossCore[®] Embedded Studio (CCES) and VisualDSP++[®] software development environments. The development environment facilitates advanced application code development and debug, such as:

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

Product Overview

To learn more about Analog Devices development software, go to <http://www.analog.com/dsp/tools>.

Product Overview

The SHARC USB EZ-Extender is a separately sold extension board that plugs onto the expansion interface of the ADSP-21262, ADSP-21364, or ADSP-21369 EZ-KIT Lite evaluation system. The extension board aids the design and prototyping phases of ADSP-21262, ADSP-21364, or ADSP-21369 processor targeted applications.

The board extends the capabilities of the evaluation system by providing a connection between the parallel port or asynchronous memory bus of the SHARC processor and a USB 2.0 device.

- USB 2.0 interface
 - PLX Technology's NetChip 2272 device
 - USB driver and application code
 - USB logo certified
- No power supply required
 - Derives power from EZ-KIT Lite
- CE certified
- Dimensions
 - 3.13 in (H) x 3.6 in (W)

Before using any of the interfaces, follow the setup procedure in “[USB EZ-Extender Setup](#)” on page 1-1.

Example programs are available to demonstrate the capabilities of the SHARC USB EZ-Extender board.

Purpose of This Manual

The *SHARC USB EZ-Extender Manual* describes the operation and configuration of the components on the extension board. A schematic and a bill of materials are provided as a reference for future SHARC processor board designs.

Intended Audience

This manual is a user's guide and reference to the SHARC USB EZ-Extender. Programmers who are familiar with the Analog Devices SHARC processor architecture, operation, and development tools are the primary audience for this manual.

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

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

Manual Contents

The manual consists of:

- Chapter 1, [“USB EZ-Extender Interface”](#) on page 1-1
Provides basic board information.
- Chapter 2, [“USB EZ-Extender Hardware Reference”](#) on page 2-1
Provides information on the hardware aspects of the board.

What's New in This Manual

- Appendix A, “[USB EZ-Extender Bill of Materials](#)” on page A-1
Provides a list of components used to manufacture the EZ-Extender board.
- Appendix B, “[USB EZ-Extender Schematic](#)” on page B-1
Provides the resources to allow EZ-KIT Lite board-level debugging or to use as a reference design. Appendix B is part of the online help.

What's New in This Manual

This is revision 2.1 of the *SHARC USB EZ-Extender Manual*. The manual has been updated to include CCES information. In addition, modifications and corrections based on errata reports against the previous manual revision have been made.

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

Technical Support

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

- Post your questions in the processors and DSP support community at EngineerZone®:
<http://ez.analog.com/community/dsp>
- Submit your questions to technical support directly at:
<http://www.analog.com/support>

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

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

- E-mail your questions about processors and processor applications to:
processor.support@analog.com or
processor.china@analog.com (Greater China support)
- In the **USA only**, call **1-800-ANALOGD** (1-800-262-5643)
- Contact your Analog Devices sales office or authorized distributor. Locate one at:
www.analog.com/adi-sales
- Send questions by mail to:
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Analog Devices, Inc.
Three Technology Way
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USA

Supported Products

The SHARC USB EZ-Extender is designed as an extension board to the ADSP-21262, ADSP-21364, and ADSP-21369 EZ-KIT Lite evaluation systems.

Product Information

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

Analog Devices Web Site

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

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

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

Visit [myAnalog](#) to sign up. If you are a registered user, just log on. Your user name is your e-mail address.

EngineerZone

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

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

Related Documents

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

Table 1. Related Processor Publications

Title	Description
<ul style="list-style-type: none"> • <i>ADSP-21261/ADSP-21262/ADSP-21266 SHARC Processor Data Sheet</i> • <i>ADSP-21362/ADSP-21363/ADSP-21364/ADSP-21365/ADSP-21366 SHARC Processor Data Sheet</i> • <i>ADSP-21367/ADSP-21368/ADSP-21369 SHARC Processor Data Sheet</i> 	General functional description, pinout, and timing of the processor
<ul style="list-style-type: none"> • <i>ADSP-2126x SHARC Processor Hardware Reference</i> • <i>ADSP-2136x SHARC Processor Hardware Reference (Includes ADSP-21364)</i> • <i>ADSP-2137x SHARC Processor Hardware Reference (Includes ADSP-21369)</i> 	Description of the internal processor architecture and all register functions
<ul style="list-style-type: none"> • <i>ADSP-21160 SHARC DSP Instruction Set Reference</i> • <i>SHARC Processor Programming Reference</i> 	Description of all allowed processor assembly instructions

Related Documents

1 USB EZ-EXTENDER INTERFACE

This chapter provides the setup procedures for both the SHARC USB EZ-Extender and EZ-KIT Lite (ADSP-21262, ADSP-21364, or ADSP-21369) and describes the USB interface the extender supports.

USB EZ-Extender Setup

It is very important to set up all of the components of the system containing the USB EZ-Extender before applying power to that system. The following procedure is recommended for the correct setup.

Power your system when these steps are completed:

1. Read the applicable design interface section in this chapter—the text provides an overview of the capabilities of the interface.
2. Read [“System Architecture” on page 2-1](#) to understand the physical connections of the extension board. For detailed information, refer to [“USB EZ-Extender Schematic” on page B-1](#).
3. Remove any rubber feet that may be attached to the EZ-KIT Lite. In place of these rubber feet, install the four nylon feet and screws provided with the USB EZ-Extender. Install the nylon feet in the mounting holes of the EZ-KIT Lite’s printed circuit board (PCB). Flip the EZ-KIT Lite upside down so that the three expansion headers (J1-3) are facing up.

USB 2.0 Interface

4. Set the jumper on the USB EZ-Extender board. Use the block diagram in [Figure 2-1](#) in conjunction with “[Processor Select Jumper \(JP1\)](#)” on [page 2-2](#).
5. Set the switches on the EZ-KIT Lite board. If not already, familiarize yourself with the documentation and schematics of the EZ-KIT Lite (see “[Related Documents](#)”). Compare the expansion interface signals of the USB EZ-Extender board with the signals of the EZ-KIT Lite board to ensure there is no contention. For example, it may be necessary to disable other devices connected to the expansion interface of the processor and disable the push buttons on the EZ-KIT Lite.
6. Install the USB EZ-Extender on the EZ-KIT Lite via the three-connector expansion interface.

USB Software Documentation

For information on the USB software (host-side and device-side), refer to the readme text files in the `Examples` folder of the installation directory.

USB 2.0 Interface

The USB EZ-Extender allows you to connect a USB 2.0 chip to a SHARC processor without any other programmable logic. PLX Technology’s NetChip 2272 device ties directly to the parallel port or asynchronous memory bank of the SHARC processor. You can read from and write to the USB 2.0 controller by directly addressing the named memory bank.

You can reset the NetChip 2272 device by asserting `LOW` these flag pins:

- `FLAG2` on the ADSP-21262 and ADSP-21364 processors
- `FLAG0` on the ADSP-21369 processor

The USB interrupt request pin (IRQ) line of the extender connects to FLAG1 on the ADSP-21262, ADSP-21364, and ADSP-21369 processors. This flag pin may be used for push buttons or LEDs on the respective EZ-KIT Lites; consequently, the user must make the proper changes to that EZ-KIT Lite.

When writing to and reading from the USB device using the EZ-KIT Lites, use memory addresses listed in [Table 1-1](#).

Table 1-1. USB Device Memory

EZ-KIT Lite	Starting Address	Ending Address
ADSP-21262	0x0100 6C00	0x0100 6FE0
ADSP-21364	0x0100 6C00	0x0100 6FE0
ADSP-21369	0x0C00 0000	0x0C00 03E0

USB 2.0 Interface

2 USB EZ-EXTENDER HARDWARE REFERENCE

This chapter describes the hardware design of the USB EZ-Extender. The following topics are covered.

- “System Architecture” on page 2-1
Describes the extension board’s configuration.
- “Processor Select Jumper (JP1)” on page 2-2
Describes the configuration jumper’s functionality.

System Architecture

A block diagram of the SHARC USB EZ-Extender is shown in [Figure 2-1](#).

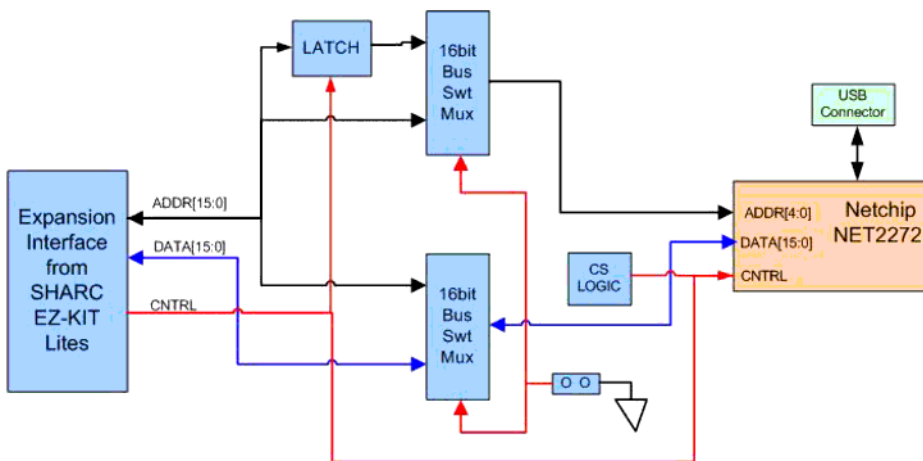


Figure 2-1. Block Diagram

Processor Select Jumper (JP1)

Before using the SHARC USB EZ-Extender, follow the steps in “[USB EZ-Extender Setup](#)” on page 1-1.

Figure 2-2 shows the location of the processor select jumper JP1. A two-pin jumper can be placed on the respective jumper header for different functionality.

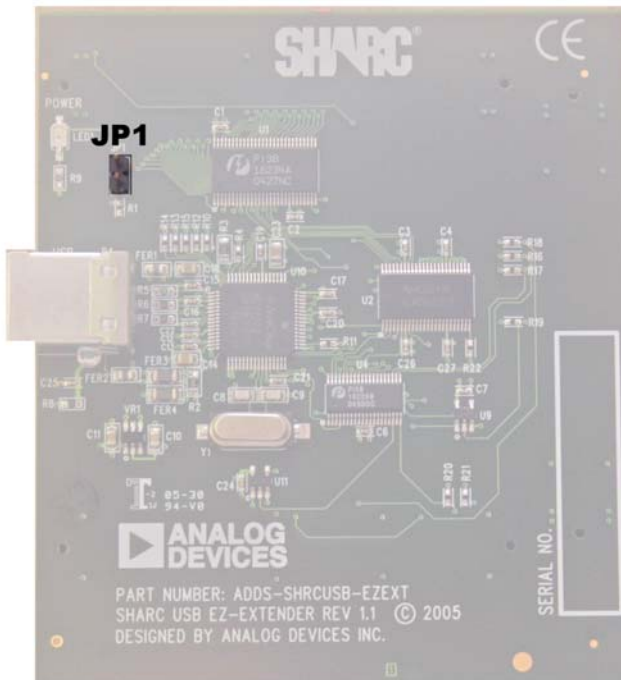



Figure 2-2. JP1 Jumper Settings

Table 2-1 describes the jumper settings and functionality. The jumper, by default, must have no jumpers on any of its pins.

Table 2-1. JP1 Settings

EZ-KIT Lite	JP1 Setting
ADSP-21262/ADSP-21364	No jumpers (default)
ADSP-21369	Installed

-  When using the extender with an ADSP-21262 or ADSP-21364 EZ-KIT Lite, you must not place any jumpers on JP1. Placing a jumper on JP1 can damage the extender card and/or the EZ-KIT Lite. When using the extender with an ADSP-21369 EZ-KIT Lite, you must place the jumper on JP1.

Processor Select Jumper (JP1)

A USB EZ-EXTENDER BILL OF MATERIALS

The bill of materials corresponds to “[USB EZ-Extender Schematic](#)” on [page B-1](#).

Ref.	Qty.	Description	Reference Designators	Manufacturer	Part Number
1	1	SN74LVC1G32 SOT23-5	U9	TI	SN74LVC1G32DBVRE4
2	1	SN74LVC1G08 SOT23-5	U11	TI	SN74LVC1G08DBVR
3	1	NET2272TQFP64	U10	NET CHIP	NET2272REV1A-LF
4	1	PI3B16234 TSSOP56	U1	PERICOM SEMI	PI3B16234AE
5	1	30MHZOSC010	Y1	ECLIPTEK	E2SAA10-30.000M
6	1	PI3B16226 BQSOP40	U4	PERICOM SEMI	PI3B16226BE
7	1	SN74ALVCH16373 TSSOP48	U2	TI	SN74ALVCH16373DGGRG4
8	1	ADP3330ARTZ-25 SOT23-6	VR1	ANALOG DEVICES	ADP3330ARTZ-2.5-R7
9	1	USB 4PIN CON009	P4	MILL MAX	897-43-004-90-000 000
10	3	0.0545x2CON018	P1-3	SAMTEC	TFC-145-32-F-D
11	1	IDC2X1IDC2X1	JP1	FCI	90726-402HLF
12	2	600 100MHZ 500MA 1206	FER3-4	STEWART	HZ1206B601R-10

Ref.	Qty.	Description	Reference Designators	Manufacturer	Part Number
13	1	47.0K 1/10W 1% 0805	R3	VISHAY	CRCW080547K0FKEA
14	2	42 100MHZ 4A 0805	FER1-2	TAIYO YUDEN	FBMJ2125HS420-T
15	2	0.47UF 16V 10% 0805	C10-11	AVX	0805YC474KAT2A
16	3	10UF 6.3V 10% 0805	C14,C18,C23	AVX	080560106KAT2A
17	19	0.01UF 16V 10% 0402	C1-4,C6-7, C12-13, C15-17, C19-22, C24-27	AVX	0402YC103KAT2A
18	15	10K 1/16W 5% 0402	R1,R4,R10-22	VISHAY	CRCW040210K0FKED
19	2	10PF 50V 5% 0805	C8-9	AVX	08055A100JAT2A
20	1	1.5K 1/10W 5% 0603	R5	PANASONIC	ERAV15J152V
21	2	39.0 1/10W 1% 0603	R6-7	VISHAY	CRCW-060339R0FKEA
22	1	2.43K 1/10W 1% 0805	R2	DIGI-KEY	311-2.43KCRTR-ND
23	1	330 1/10W 5% 0603	R9	VISHAY	CRCW0603330RJNEA
24	1	1M 1/10W 5% 0603	R8	VISHAY	CRCW06031M00FNEA
25	1	GREEN-SMT LED001	LED1	PANASONIC	LN1361CTR

A

B

C

D

1

1

2

2

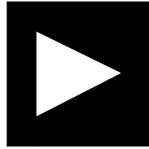
3

3

4

4

SHARC USB EZ-EXTENDER Schematic

		ANALOG DEVICES	20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD
Title		SHARC USB EZ-EXTENDER TITLE	
Size C	Board No.	A0197-2005	Rev 1.1B
Date	4-24-2006_10:01	Sheet	1 of 4

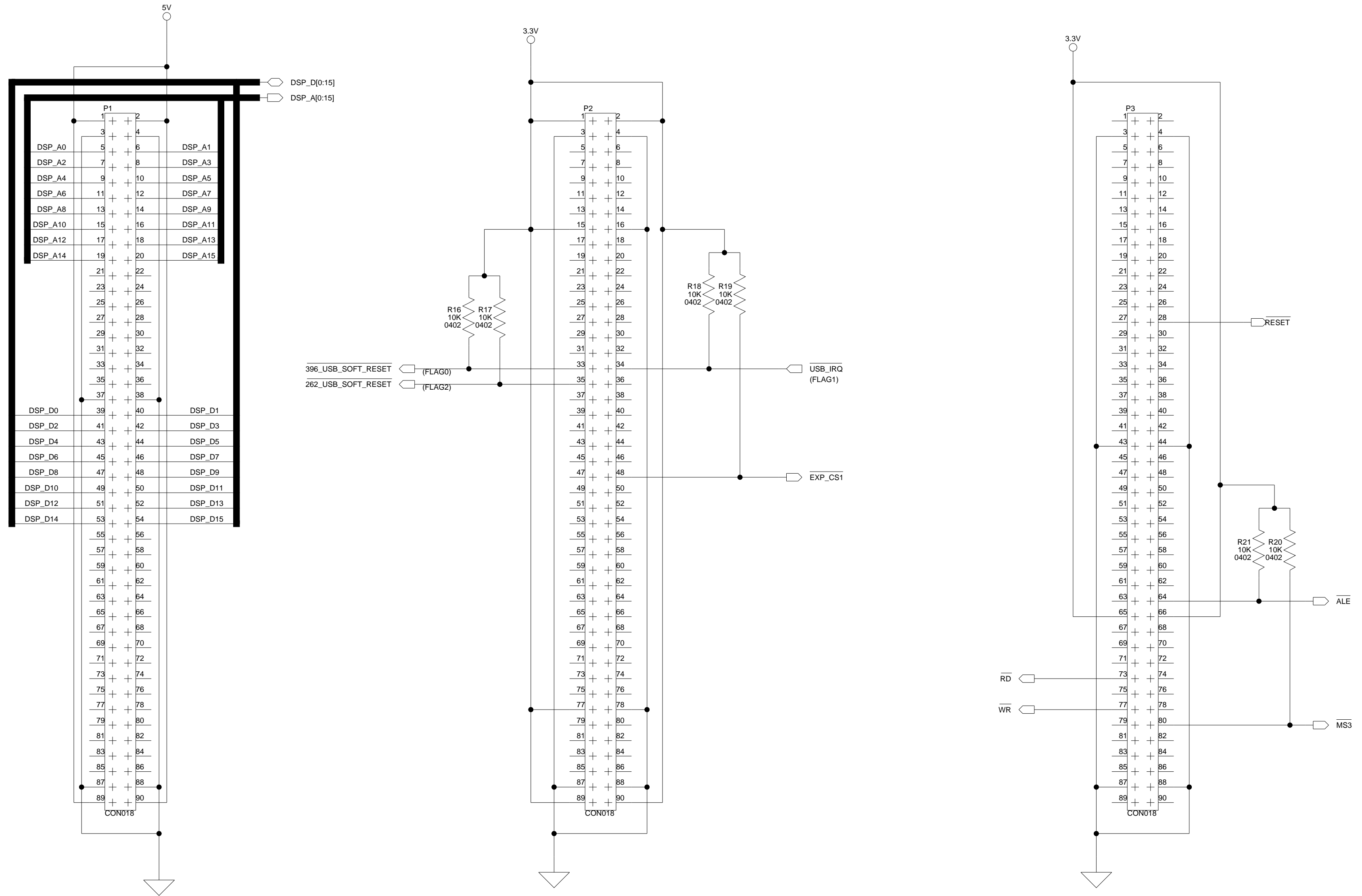
A

B

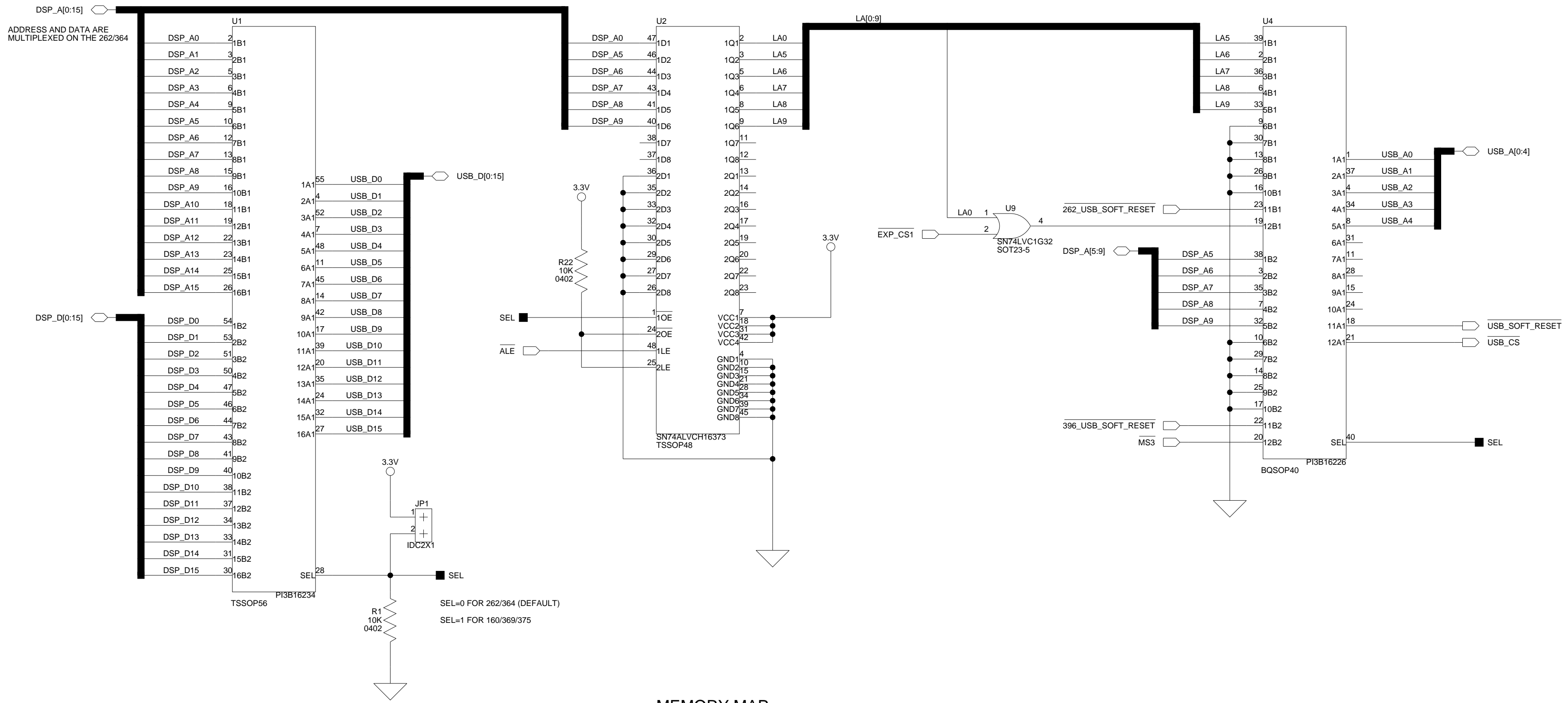
C

D

EXPANSION INTERFACE (TYPE A)

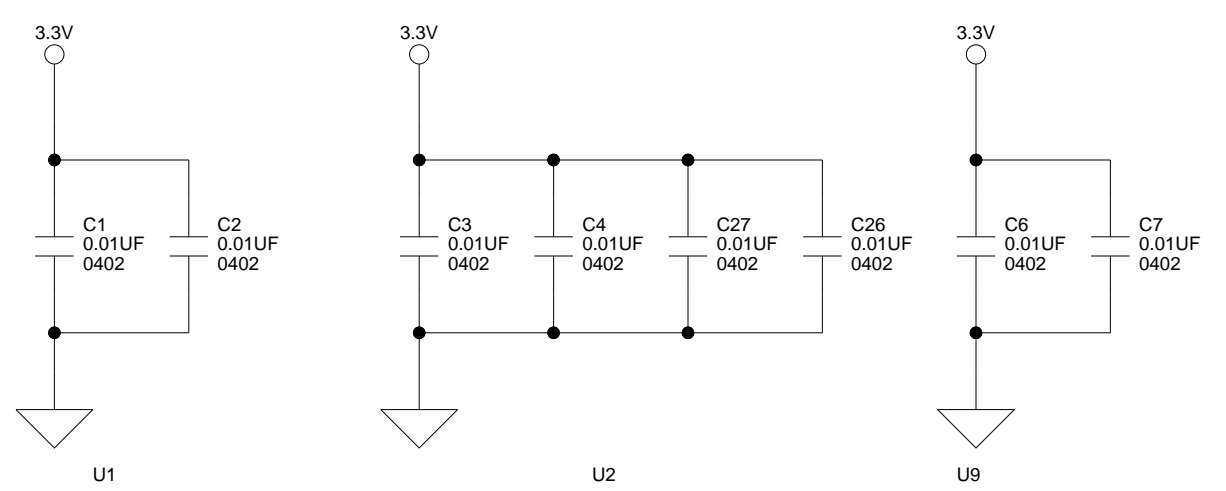


 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title SHARC USB EZ-EXTENDER EXPANSION INTERFACE	
Size C	Board No. A0197-2005	Rev 1.1B	
Date 4-24-2006_10:01	Sheet 2 of 4		



MEMORY MAP

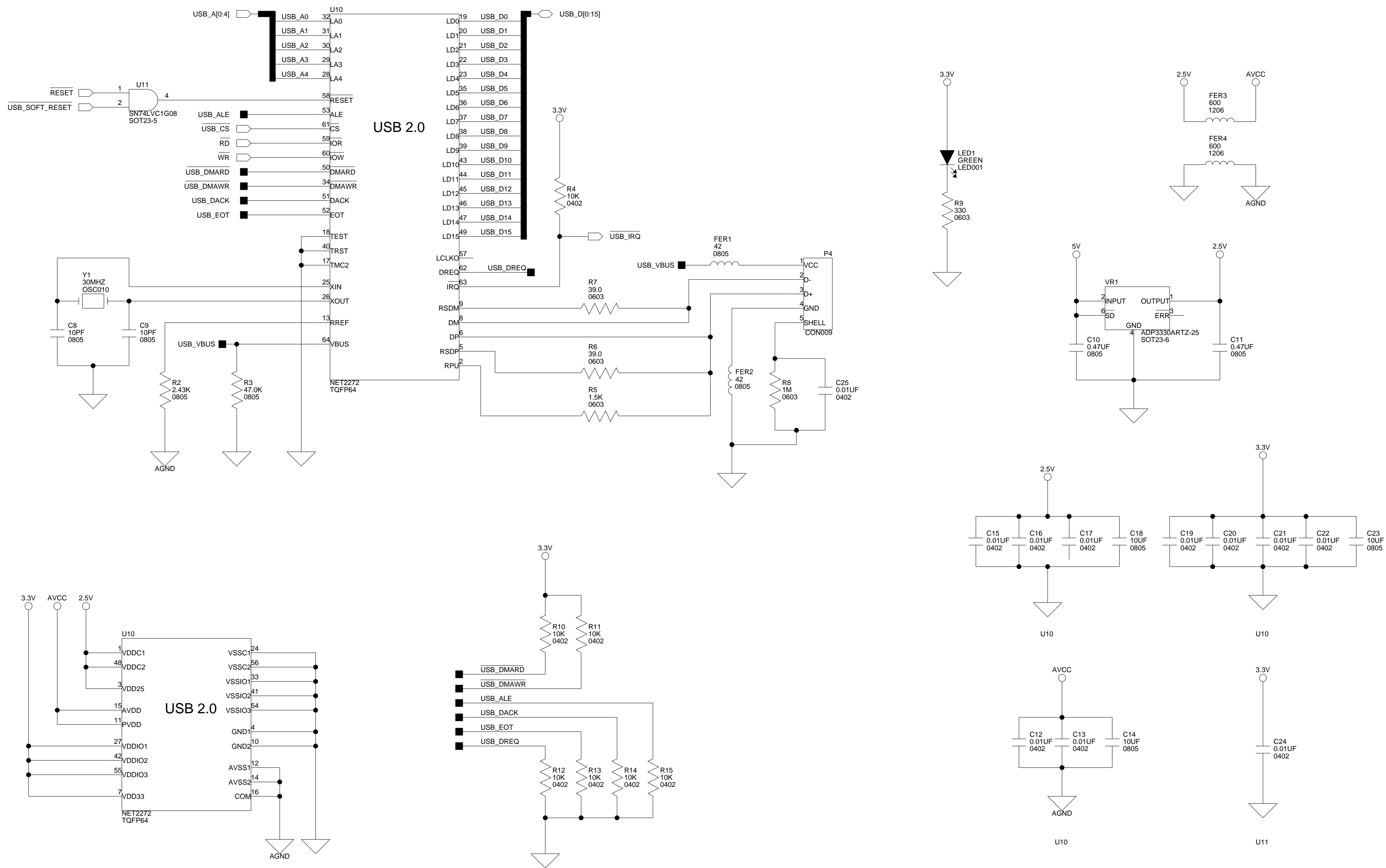
PROCESSOR	MODE	ADDRESS RANGE	OFFSET	DEVICE
262/364	16-bit	0x0100 6C00 - 0x0100 6FE0	0x0020	NETCHIP
369/375	16-bit	0x0C00 0000 - 0x0C00 03E0	0x0020	NETCHIP

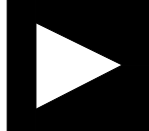


ANALOG DEVICES

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

Title			SHARC USB EZ-EXTENDER BUS SWITCHES		
Size C	Board No.	A0197-2005		Rev	1.1B
Date	4-24-2006_10:01	Sheet	3	of	4



 ANALOG DEVICES		20 Cotton Road Nashua, NH 03063 PH: 1-800-ANALOGD	
		Title SHARC USB EZ-EXTENDER USB INTERFACE	
Size C	Board No. A0197-2005	Rev 1.1B	
Date 4-24-2006_10:01	Sheet 4 of 4		

I INDEX

A

architecture, of this EZ-Extender, [2-1](#)

B

bill of materials, [A-1](#)

board schematic, [B-1](#)

C

connectors, J1-3 (expansion), [1-1](#)

D

dimensions, of this EZ-Extender, [viii](#)

E

expansion interface, [1-1](#), [1-2](#)

F

FLAG0 (USB reset) pin, ADSP-21369
processors, [1-2](#)

FLAG1 (USB IRQ) pin,
ADSP-21262/364/369 processors,
[1-3](#)

FLAG2 (USB reset) pin, ADSP-21262/364
processors, [1-2](#)

I

interrupt request line (IRQ), [1-3](#)

J

JP1 (processor select) jumper, [1-2](#), [2-2](#)

P

parallel port, ADSP-21262/364/369
processors, [1-2](#)

printed circuit boards (PCBs), [1-1](#)

processor select jumper (JP1), [1-2](#), [2-2](#)

product overview, [viii](#)

S

schematic, of this EZ-Extender, [B-1](#)

setup procedure, of this EZ-Extender, [1-1](#)

system architecture, [2-1](#)

T

technical support, [x](#)

U

USB

controller, [1-2](#)

device memory map, [1-3](#)

documentation, [1-2](#)

IRQ line, [1-3](#)

reset, [1-2](#)

Index