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SEK 40C18 Data Sheet

January 10, 2009

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Revision

Revision	Date	Comments
1.1	1-10-2009	

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1. Introduction

The purpose of the SEAforth 40C18 Evaluation Board is meant for the evaluation of the S40C18 chip. The purpose of the board is to facilitate the prototyping of applications and application code. This document covers the evaluation board only. For more information on the SEAforth 40C18 chip itself, please refer to the datasheet. This reference manual is not meant as a user guide, but to be used as a reference to specific functions of the board as needed.

2. Basic Architecture

The basic functional blocks of the Evaluation Board are illustrated below in Figure 1.

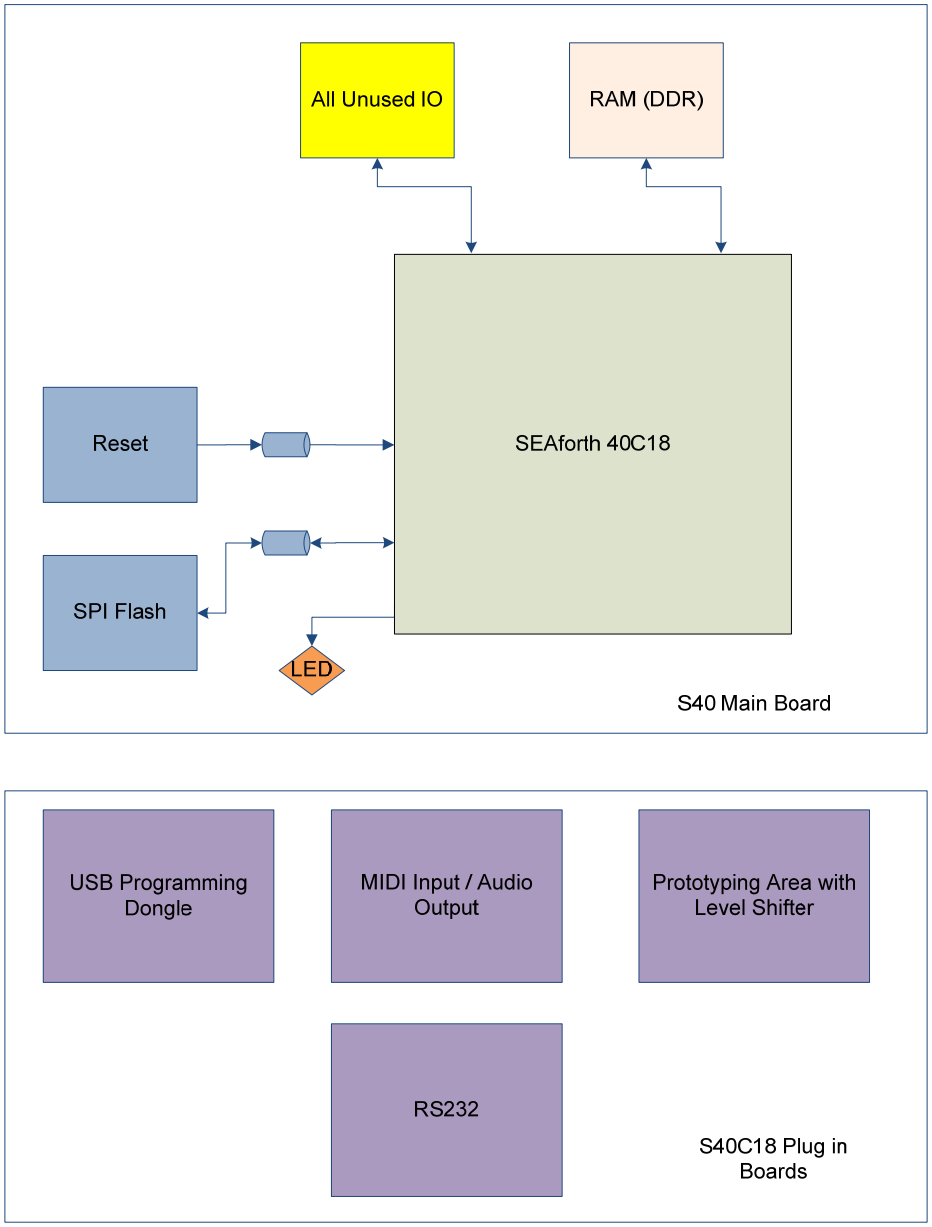

Figure 1 – S40C18 Evaluation Board Block Diagram

3. Overview

The physical PCB is pictured below in Figure 2. The basic areas are marked in this figure, and more detail will be discussed in later sections.

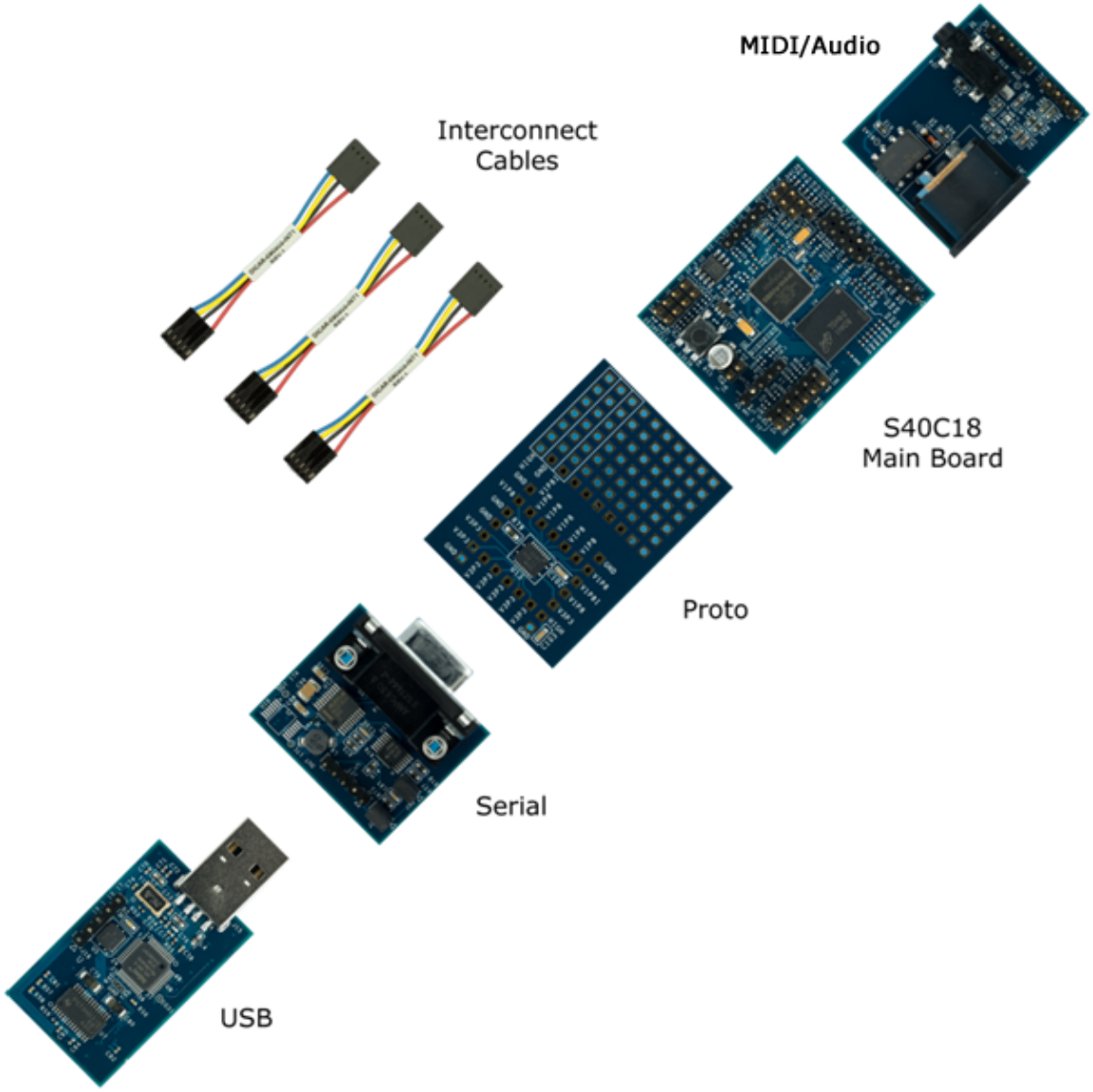

Figure 2 - S40C18 Evaluation Kit

4. USB Plug-in Board (Dongle)

The USB interface is the same as the FORTHdrive™. The board supplies communications between the S40C18 and the PC via node 19 on the chip and alternatively node 10. The PC end is controlled using the VentureForth® software included with the kit.

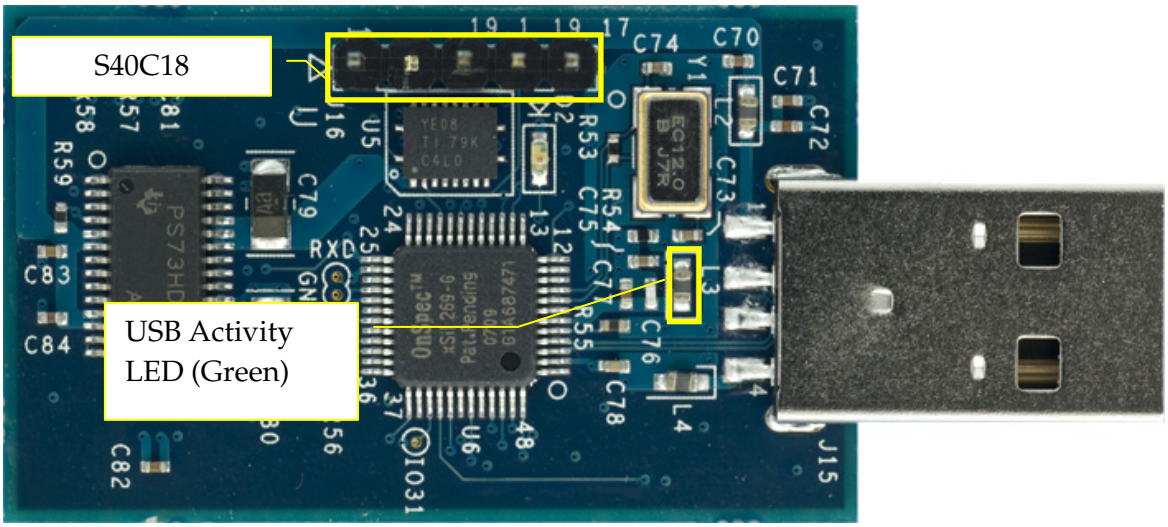

Figure 3 - USB Plug-in Board

a. *Software Interface*

The USB interface is identical to that of the 24 node FORTHdrive. The software interface is also identical. Please reference the software manual for more information.

b. *Flash Drive Functionality*

The USB interface also gives the test board the facility to operate as a typical 1GB capacity USB Mass Storage Device (Flash Drive). A new drive letter with the name "SEAforth" will appear on windows systems when connected via USB.

c. Activity LED

The green activity LED is normally on, indicating that the USB dongle has power and is connected to a USB master. The LED blinks when the NAND flash is being accessed.

d. S40C18 Connector

The USB board has a five pin connector that is used to connect to the S40C18 board J12. It can also be connected to J7 to allow booting from node 10. The signals are to be connected to the corresponding signals on the SEAforth 40C18 board. The pins are as follows:

Pin Number	Signal Name
1	1.8V Out
2	NC
3	GND
4	SIO19.17 Clock
5	S1019.1 Data

5. SEAforth 40C18 Board

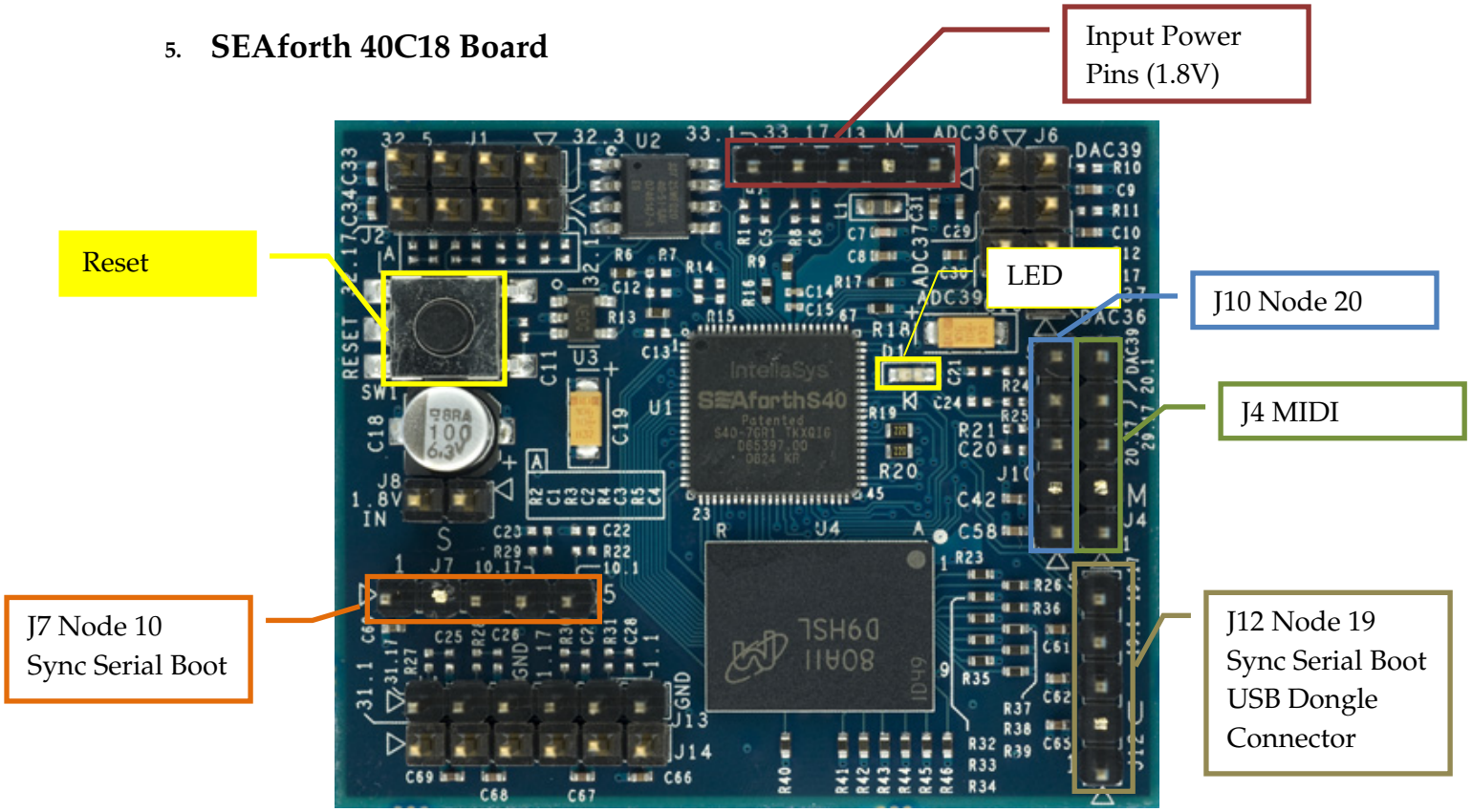

Figure 4 – SEAforth 40C18 Board

a. Reset Circuit

The reset on board is handled by a reset chip with a manual input switch. The default delay for reset is released 20µs after 1.8V I/O is stable.

b. Power Using the USB Dongle

The USB dongle can also be used to supply power to the board, but only in low load situations. The purpose of the power from the USB dongle is to facilitate quick loading of new code without having to manually power cycle the board. If it is desired to always use a separate 1.8v power source, please use the USB dongle cable without the power wires (Gnd and pin 3).

c. SPI Boot Control

If the flash has not been programmed, node 32 will see this as invalid and not attempting to boot from the flash. If the flash has been programmed, after rest node 32 will always attempt to boot from the flash unless S1032_17_sf is pulled high. This can be accomplished by placing a jumper with a resistance of 3.3k

between J2-4 and J1-3. This will allow you to regain control of node 32 so the program in the flash can be changed or allow other nodes to be booted from without interference from, the program saved in the serial flash.

d. LED

There is an amber LED connected to the S40C18 on Node29 bit 1. This can be used at the programmer's discretion. The LED is synced by the SEAforth. This means a low voltage on the pin illuminates the LED, and a high voltage deactivates the LED.

e. I/O Pins

All IO Pins are clearly marked on the silkscreen of the board. Please see appendix for list of signals and associated connectors

6. RS232 Dongle

A RS-232 dongle has also been included in the kit as a serial communications option.

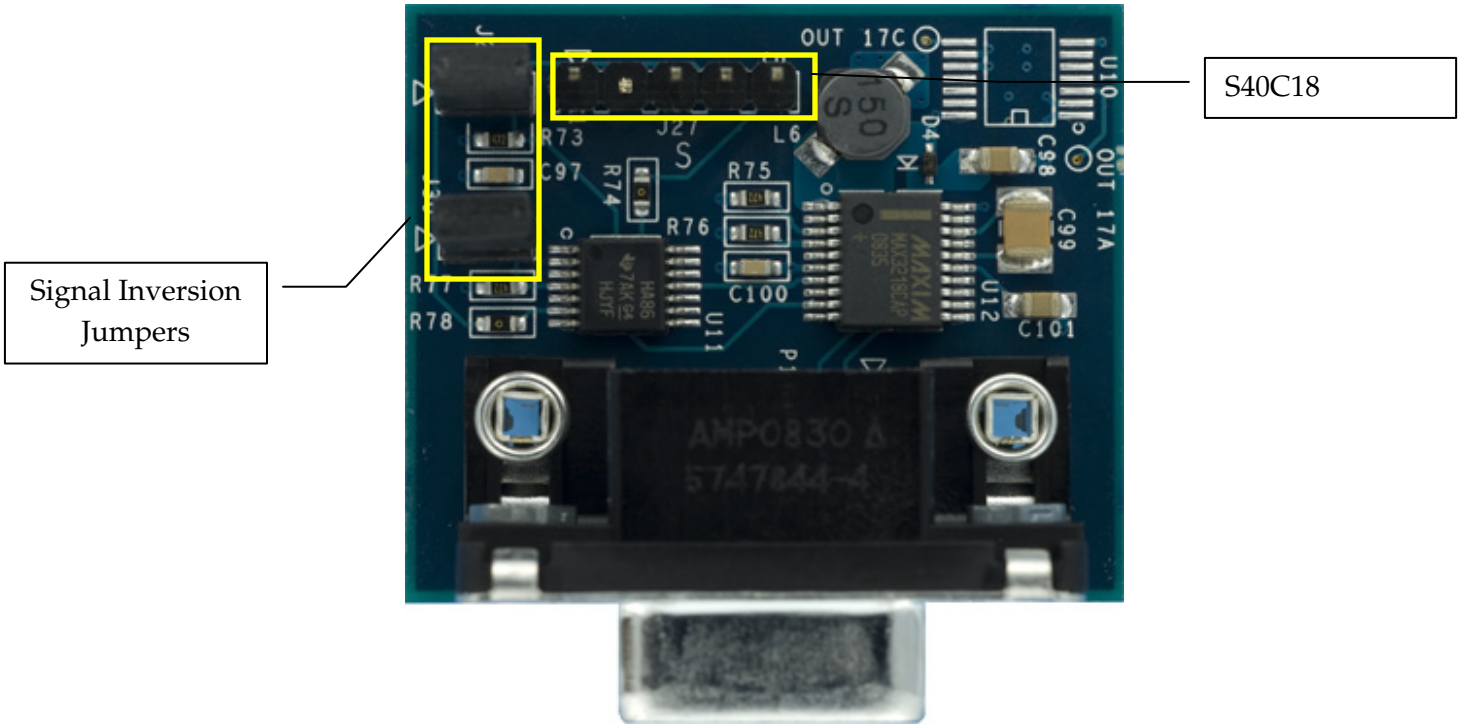

Figure 5 - RS232 Dongle

Connection to SEAforth S40C18 Board

a. *The RS232 board connects to the SEAforth 40C18 board via a 5 pin connector. The pinout is as follows:*

Pin Number	Signal Name
1	1.8V in
2	NC
3	GND
4	Receive (from PC point of view)
5	Transmit (from PC point of view)

This can be connected to J7 on the main board, which is the connector currently most often for serial I/O. This directs the serial I/O through node 10. This can also be connected to the J3, J10, or J12. If you are using J12 for serial I/O, the SEAforth will need to boot from either node 10, 32 or 33.

b. Signal Inversion

Jumpers J26 (receive) and J30 (transmit) supply optional inversion of the signals depending on the orientation of the host system. By default, the jumpers are closed.

7. Prototyping Area and Level Shifter Board

The prototyping area provides an area for extra components for customer use. The on-board bi-directional level shifter provides the shifting of signals from high as 5V down to the S40C18's native 1.8V signal levels and visa versa.

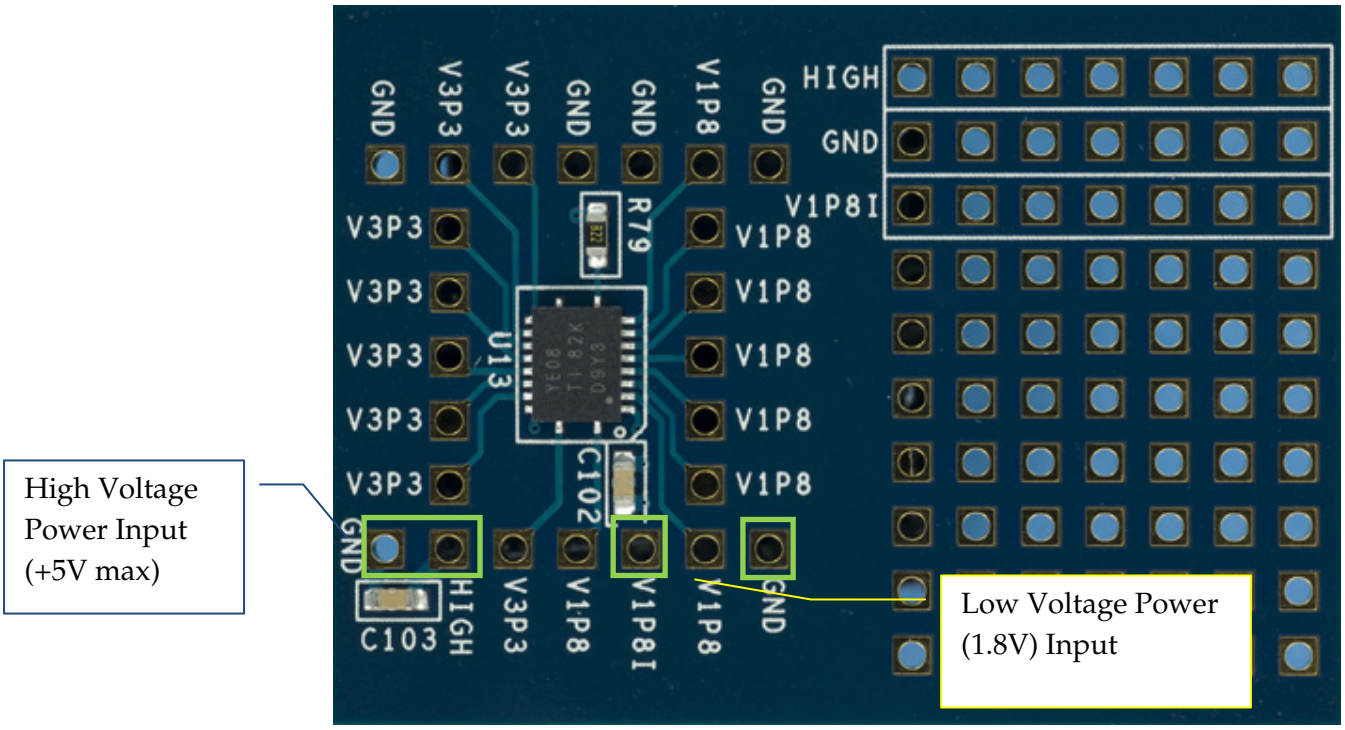

Figure 6 - Prototyping Board

8. MIDI Input and Audio Board

The midi board has the 75Ω load resistors required for the DAC already installed on board. The default wiring scheme has the S40C18 directly driving the user supplied speaker or amplifier plugged into the 3.5 mm audio jack. A footprint is supplied for the installation of an optional headphone driver IC.

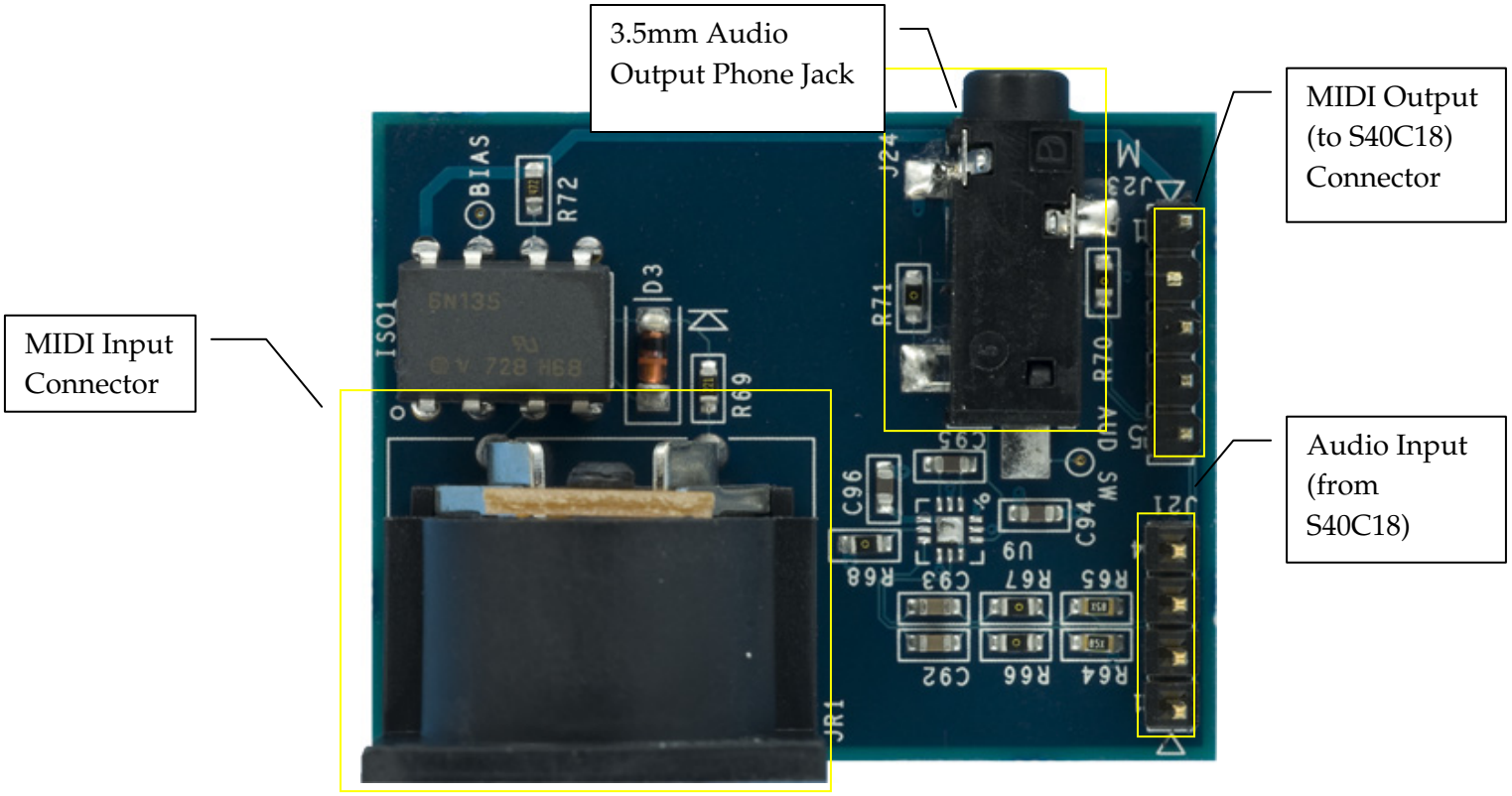

Figure 7 – Midi Input and Audio Board

Midi output (to S40C18) Connector

Pin Number	Signal Name
1	1.8V In
2	NC
3	GND
4	MIDI
5	RIGHT

Audio Input (to S40C18) Connector

Pin Number	Signal Name
1	3.3V In (Optional for Headphone Amp)
2	LEFT
3	RIGHT
4	AGND

Note: A jumper can be placed across Pin 2 and Pin 3 to connect both the left and right out to DAC39.

Appendix A – SEAforth 40C18 Signals and Corresponding Headers

Category	SEAforth 40C18 Signal	Header/Connector
ADC36	ADC36_sf	J5-1
ADC37	ADC37_sf	J5-2
ADC39	ADC39_sf	J5-3
DAC36	DAC36_sf	J6-2
DAC37	DAC37_sf	J6-3
DAC39	DAC39_sf	J6-4
1_1	S101_1_sf	J13-5
1_17	S101_17_sf	J13-4
10_1	S1010_1_sf	J7-5
10_17	S1010_17_sf	J7-4
19_1	S1019_1_sf	J12-5
19_17	S1019_17_sf	J12-4
20_1	S1020_1_sf	J10-5
20_17	S1020_17_sf	J10-4
29_1	S1029_1_sf	LED
29_17	S1029_17_sf	J4-4
31_1	S1031_1_sf	J13-2
31_17	S1031_17_sf	J13-1
32_1	S1032_1_sf (SPI_en)	J2-1
32_3	S1032_3_sf (SPI_en)	J2-2
32_5	S1032_5_sf (SPI_do)	J2-3
32_17	S1032_17_sf (SPI_di)	J2-4
33_1	S1033_1_sf	J3-5
33_17	S1033_17_sf	J3-4
38_17	S1038_17_sf	J6-1

Note: For the DAC outputs to be properly observed, they will need to be connected to a 75 OHM resistor to ground. This load resistor is included on the MIDI board. When not using the MIDI module, an external resistor needs to be used for each DAC used.

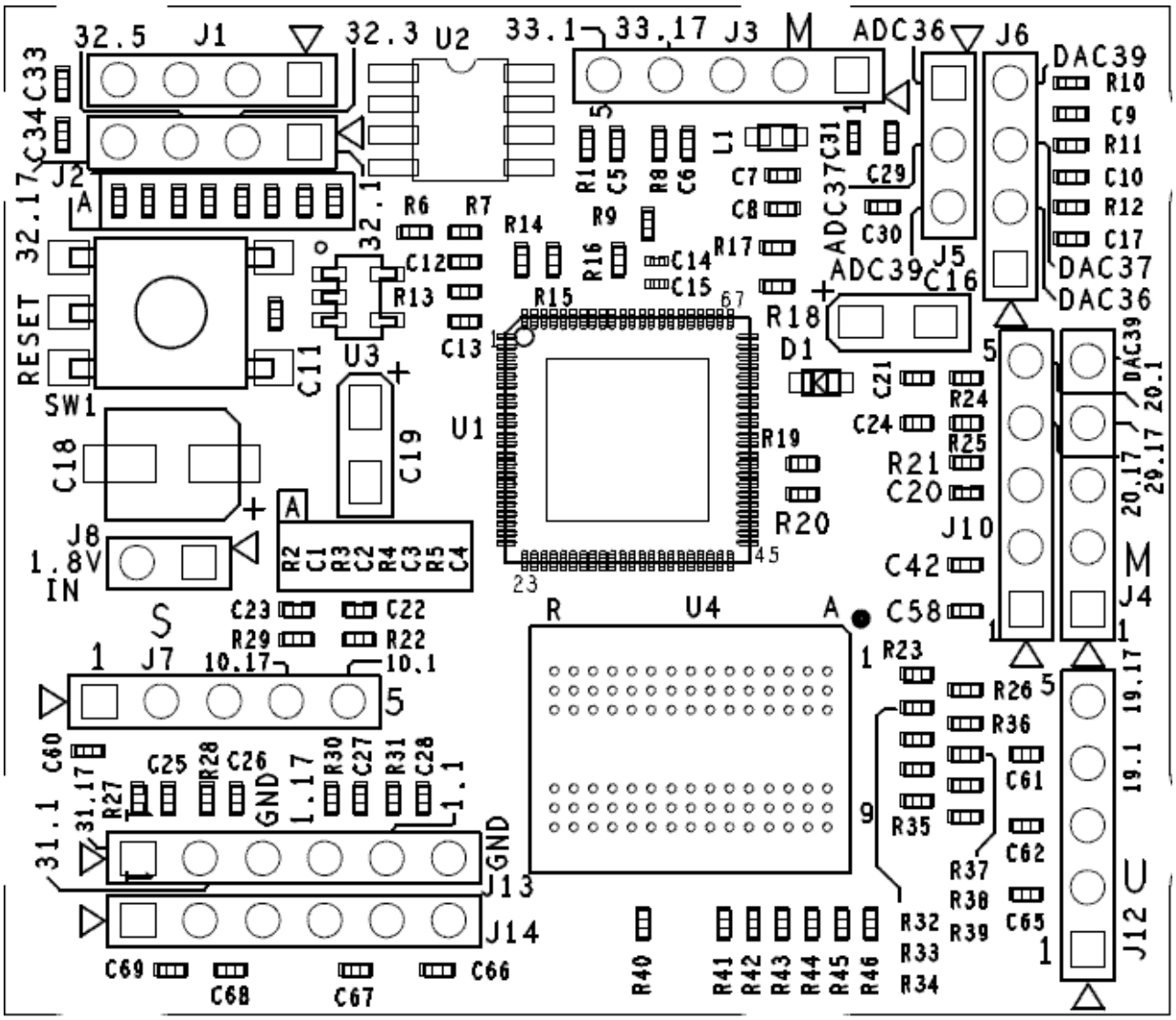

Figure 8 – SEK 40C18 Board Layout

Connector Pinouts

J7

PIN	Signal
1	V1P8
2	NC
3	GND
4	SIO10_17
5	SIO10_1

J6

PIN	Signal
1	SIO38_17
2	DAC36
3	DAC37
4	DAC39

J5

PIN	Signal
1	ADC36
2	ADC37
3	ADC39

J8

PIN	Signal
1	V1P8
2	GND

J13

PIN	Signal
1	SIO31_17
2	SIO31_1
3	GND
4	SIO1_17
5	SIO1_1
6	GND

J14

PIN	Signal
1	GND
2	V1P8
3	GND
4	GND
5	V1P8
6	V1P8

J3

PIN	Signal
1	V1P8
2	NC
3	GND
4	SIO33_17
5	SIO33_1

J10

PIN	Signal
1	V1P8
2	NC
3	GND
4	SIO20_17
5	SIO20_1

J4

PIN	Signal
1	V1P8
2	NC
3	GND
4	SIO29_17
5	SIO29_1

J12

PIN	Signal
1	V1P8
2	NC
3	GND
4	SIO19_17
5	SIO19_1

J1

PIN	Signal
1	V1P8
2	GND
3	V1P8
4	GND

J2

PIN	Signal
1	SIO32_1
2	SIO32_3
3	SIO32_5
4	SIO32_17

Appendix B – Board Errata

Board Version 0.01 – Last Updated 03/05/2008

Description	Symptoms	Workaround	Severity