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CDB30xx

Operational Amplifier Prototype Board

Features

- Prototyping Platform for CS30xx Operational Amplifiers
- Support for Differential & Single-ended Inputs/Outputs
- Includes Op-amp Samples (two each of the following)
  - CS3001
  - CS3002
  - CS3011
  - CS3012
  - CS3003
  - CS3004
  - CS3013
  - CS3014

See Table 1 on page 3.

General Description

The CDB30xx is a blank circuit board that provides a prototyping platform for the CS30xx series of operational amplifiers. The board has four different circuit sections. The board can be used intact or it can be separated into four separate smaller boards. The power supply connection and grounds are all connected between the four sections unless the board is separated into its smaller sections.

The board is provided without components but a selection of Cirrus Logic operational amplifiers are provided as samples. The samples include two each of the CS3001, CS3002, CS3011, CS3012, CS3003, CS3004, CS3013, and CS3014 devices. Refer to Table 1 on page 3 for a summary of features for the op-amps included with the CDB30xx.

ORDERING INFORMATION

CDB30xx Evaluation Board

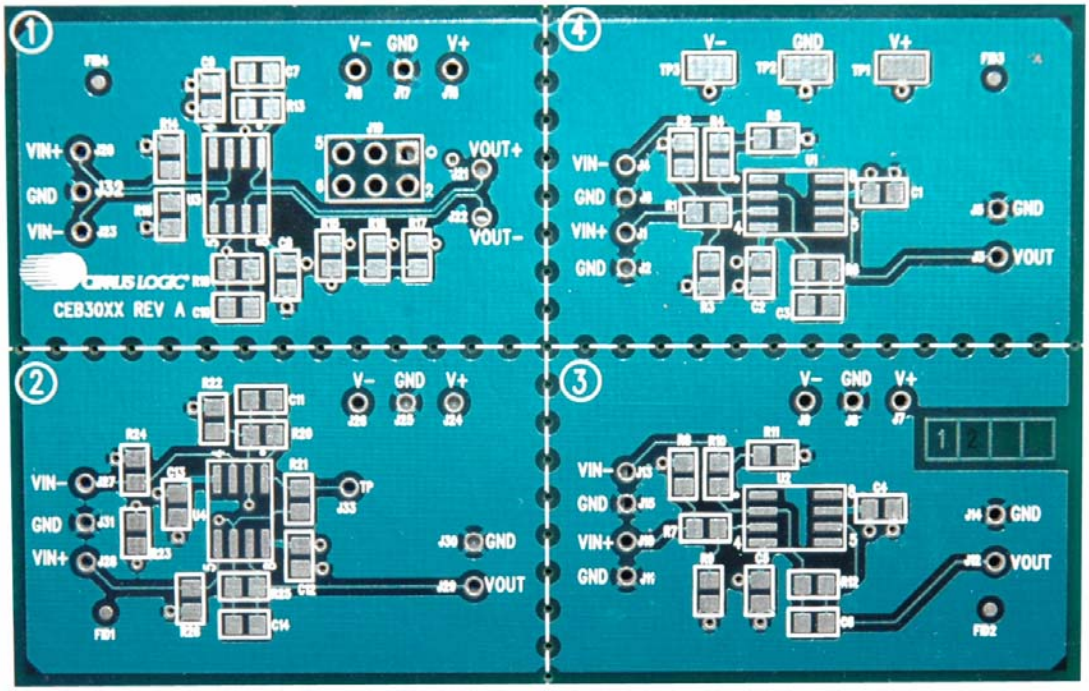

TABLE OF CONTENTS

LIST OF FIGURES

1. INTRODUCTION

There are four different sections of the board.

- Section 1 is a differential input, differential output amplifier configuration using a dual-amplifier pin out.
- Section 2 is a two op-amp, differential amplifier using a dual-amplifier pin out.
- Sections 3 and 4 are identical amplifier circuits (although they have different component designators for their components). These can be configured for either inverting gain or non-inverting gain configurations. Sections 3 and 4 use the single-amplifier pin out.

The following table provides a brief summary of features for the op-amps included with the CDB30xx board.

Table 1. Typical Specifications for Cirrus Logic Chopper-stabilized Amplifiers

Device	Channels	GBW	Voltage Noise	0.1 to 10 Hz Noise	Supply Range	R-to-R Input	R-to-R Output
3001	1	4 MHz	6nV/√Hz @ 0.5 Hz	125nV p-p @ 10 Hz	2.7 to 6.7	N	Y
3002	2	4 MHz	6nV/√Hz @ 0.5 Hz	125nV p-p @ 10 Hz	2.7 to 6.7	N	Y
3003	1	2 MHz	17nV/√Hz @ 1 Hz	350nV p-p @ 10 Hz	2.7 to 5.5	Y	Y
3004	2	2 MHz	17nV/√Hz @ 0.5 Hz	350nV p-p @ 10 Hz	2.7 to 5.5	Y	Y
3011	1	2 MHz	12nV/√Hz @ 0.5 Hz	250nV p-p @ 10 Hz	2.7 to 6.7	N	Y
3012	2	2 MHz	12nV/√Hz @ 0.5 Hz	250nV p-p @ 10 Hz	2.7 to 6.7	N	Y
3013	1	1 MHz	22nV/√Hz @ 0.5 Hz	460nV p-p @ 10 Hz	2.7 to 5.5	Y	Y
3014	2	1 MHz	22nV/√Hz @ 0.5 Hz	460nV p-p @ 10 Hz	2.7 to 5.5	Y	Y

For detailed information on the CS30xx ADCs, go to www.cirrus.com.

2. CIRCUIT 1 - DIFFERENTIAL INPUT / DIFFERENTIAL OUTPUT

Circuit 1 is a differential input / differential output amplifier. This circuit is commonly used to amplify the differential signal from a bridge transducer, such as a load cell. The amplified differential output signal is then input into an A/D converter that has a fully differential input.

For narrowband signals below 2 kHz, the CS3002 dual amplifier is a good choice for this amplifier configuration because it provides low noise and can be configured for gains as high as 2000X. Gain is set by the equation,

$$V_{OUT} = \left((VIN+) - (VIN-) \right) \left(1 + \frac{R13+R19}{Rx} \right)$$

where Rx is R15, R16, or R17, selected by a jumper connection.

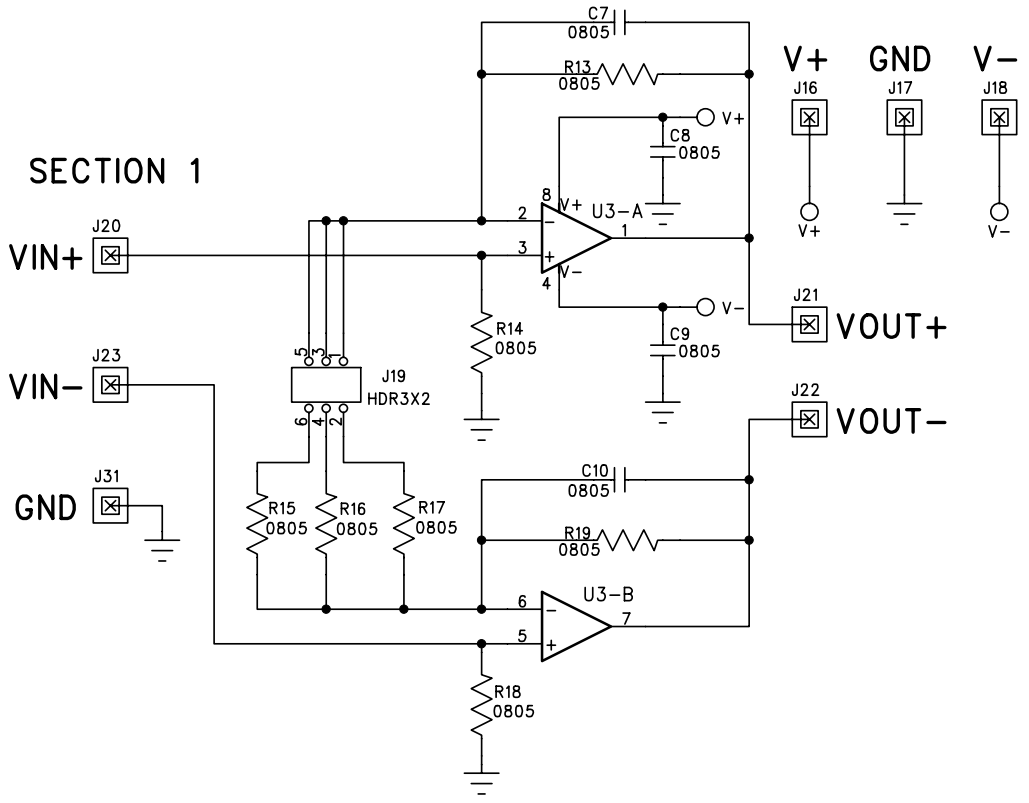

Figure 1. Section 1 Schematic, Differential Input / Differential Output

3. CIRCUIT 2 - DIFFERENTIAL INPUT / SINGLE-ENDED OUTPUT

Circuit 2 is a differential amplifier that uses two op-amps. The board accepts a dual amplifier for this function. This circuit accepts a differential input signal, amplifies it, and converts the signal to a ground-referenced, single-ended output signal. Gain is set by the equation,

$$V_{OUT} = \left((VIN+)-(VIN-)\right)\left(1 + \frac{R25}{R21} + \frac{2 \cdot R25}{R23}\right)$$

$R20 = R21$
$R22 = R25$

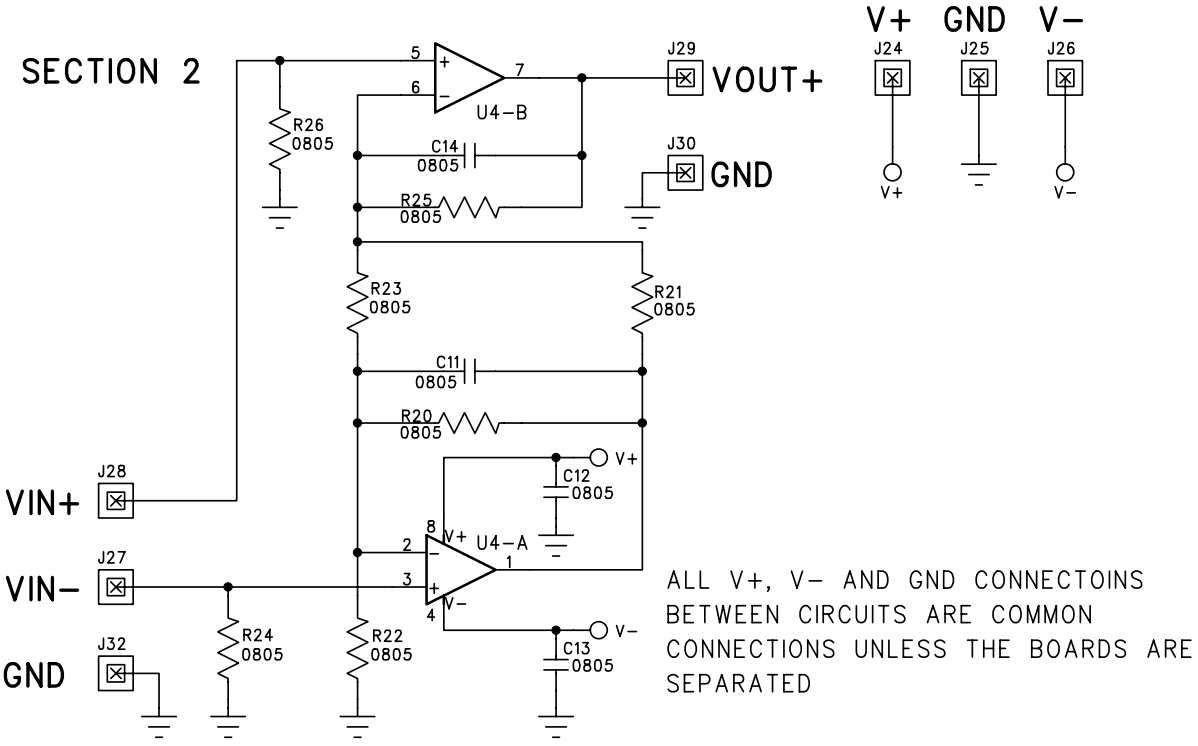

Figure 2. Section 2 Schematic, Dual Op-amp Instrumentation Amplifier

4. CIRCUIT 3 & 4 - INVERTING / NON-INVERTING GAIN

Circuit 3 and Circuit 4 are identical, single-amplifier circuits that, according to component placement, can be configured for either inverting or non-inverting gain. Although the two schematics are identical in function, the circuits do have unique component designators.

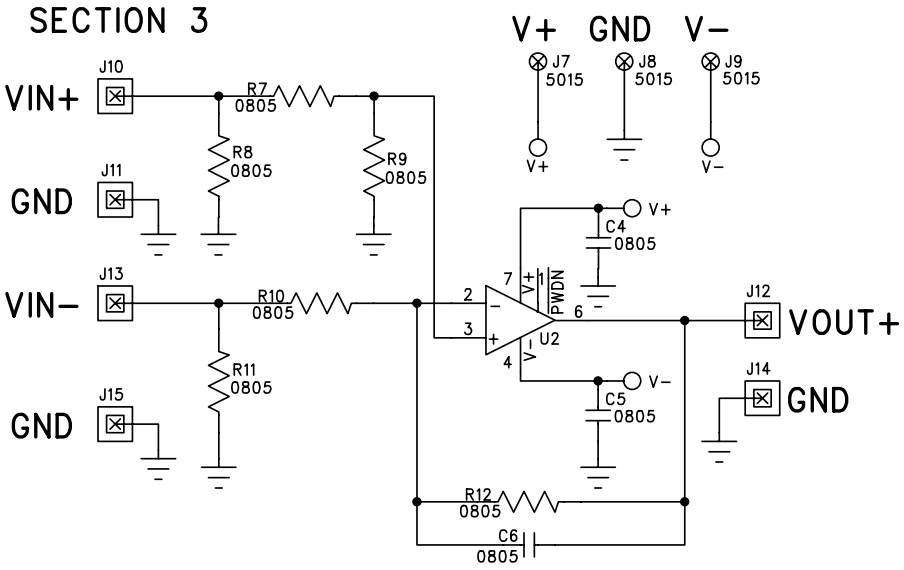

Figure 3. Section 3 Schematic, Inverting or Non-inverting Amplifier

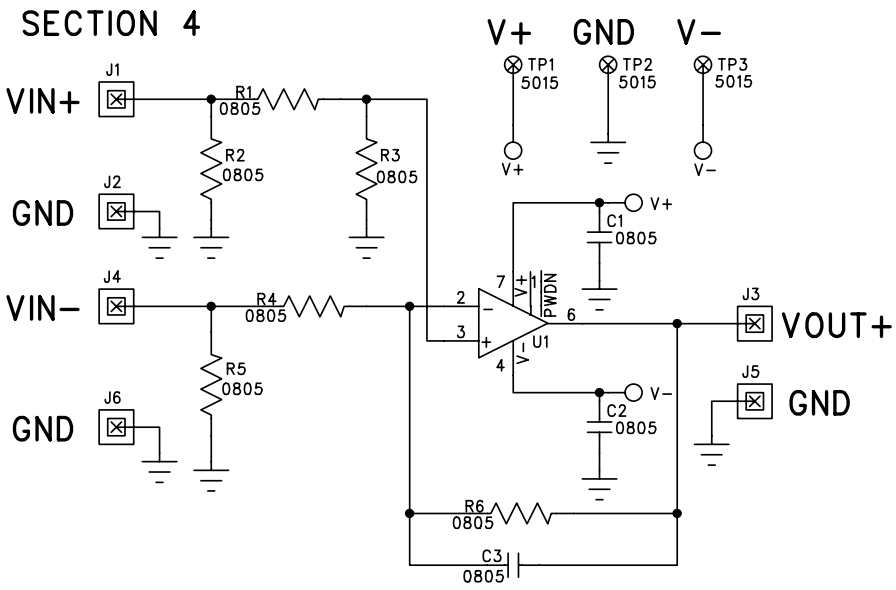

Figure 4. Section 4 Schematic, Inverting or Non-inverting Amplifier

APPENDIX A. PCB LAYER PLOTS

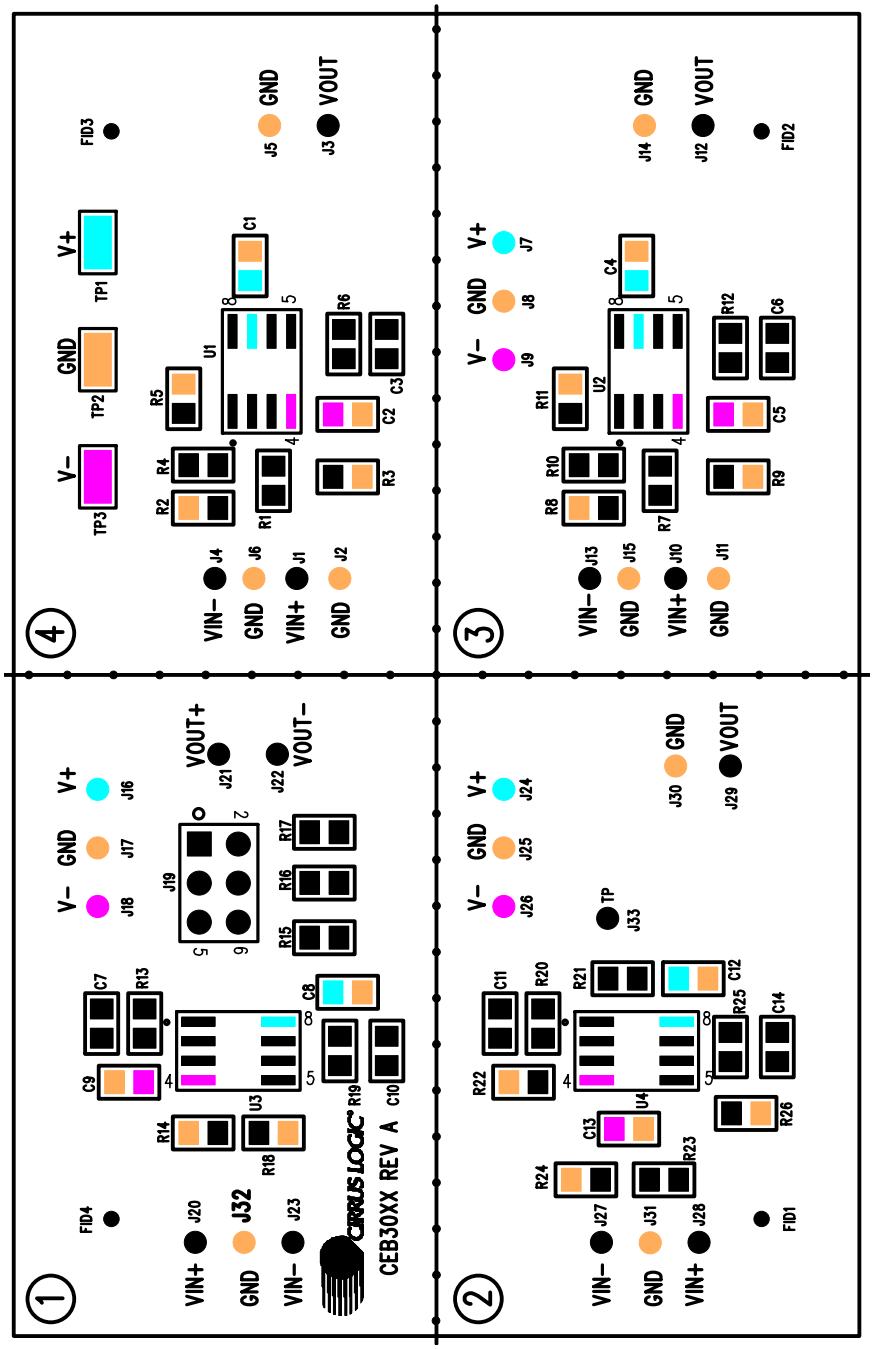

Figure 5. Silkscreen

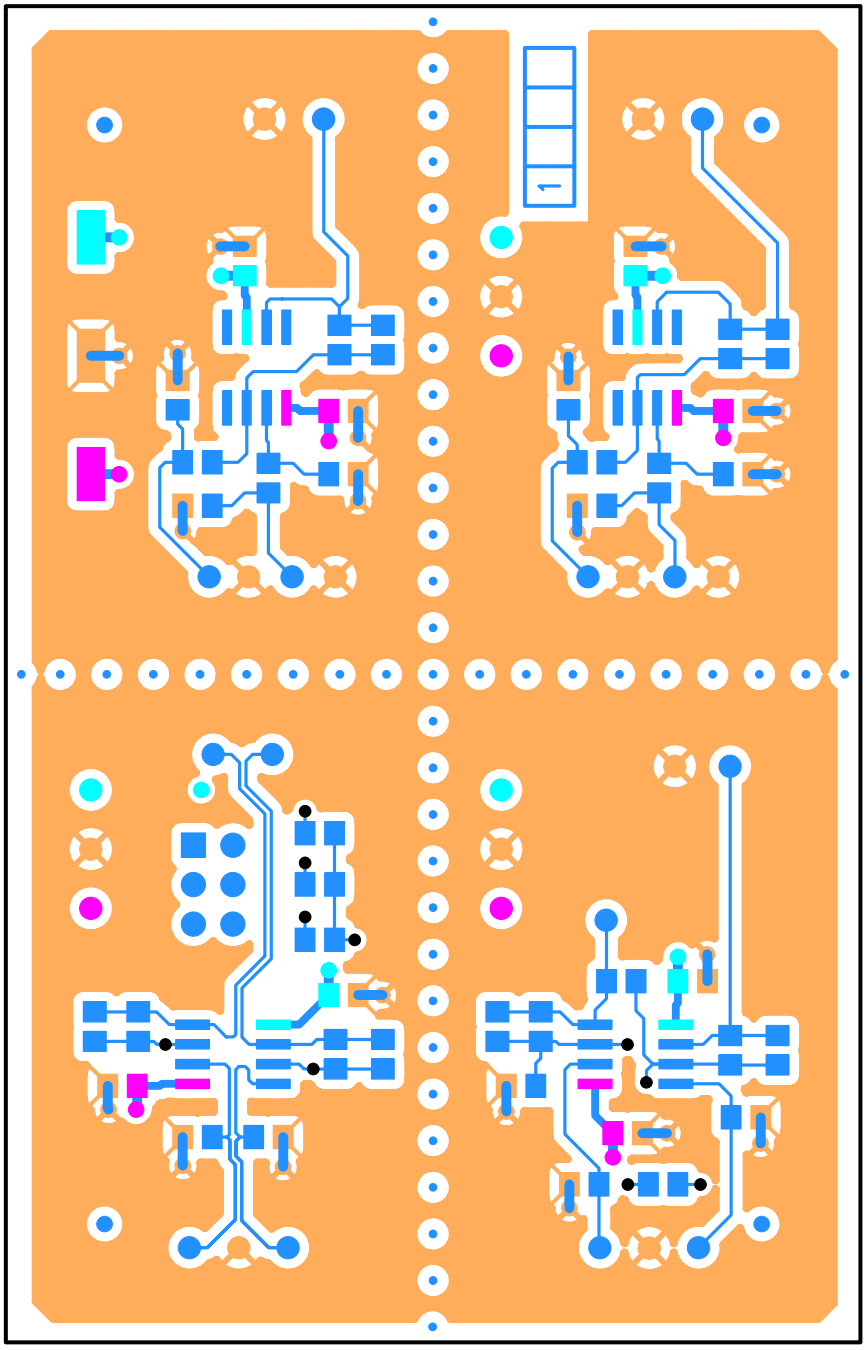

Figure 6. Component Side Routing

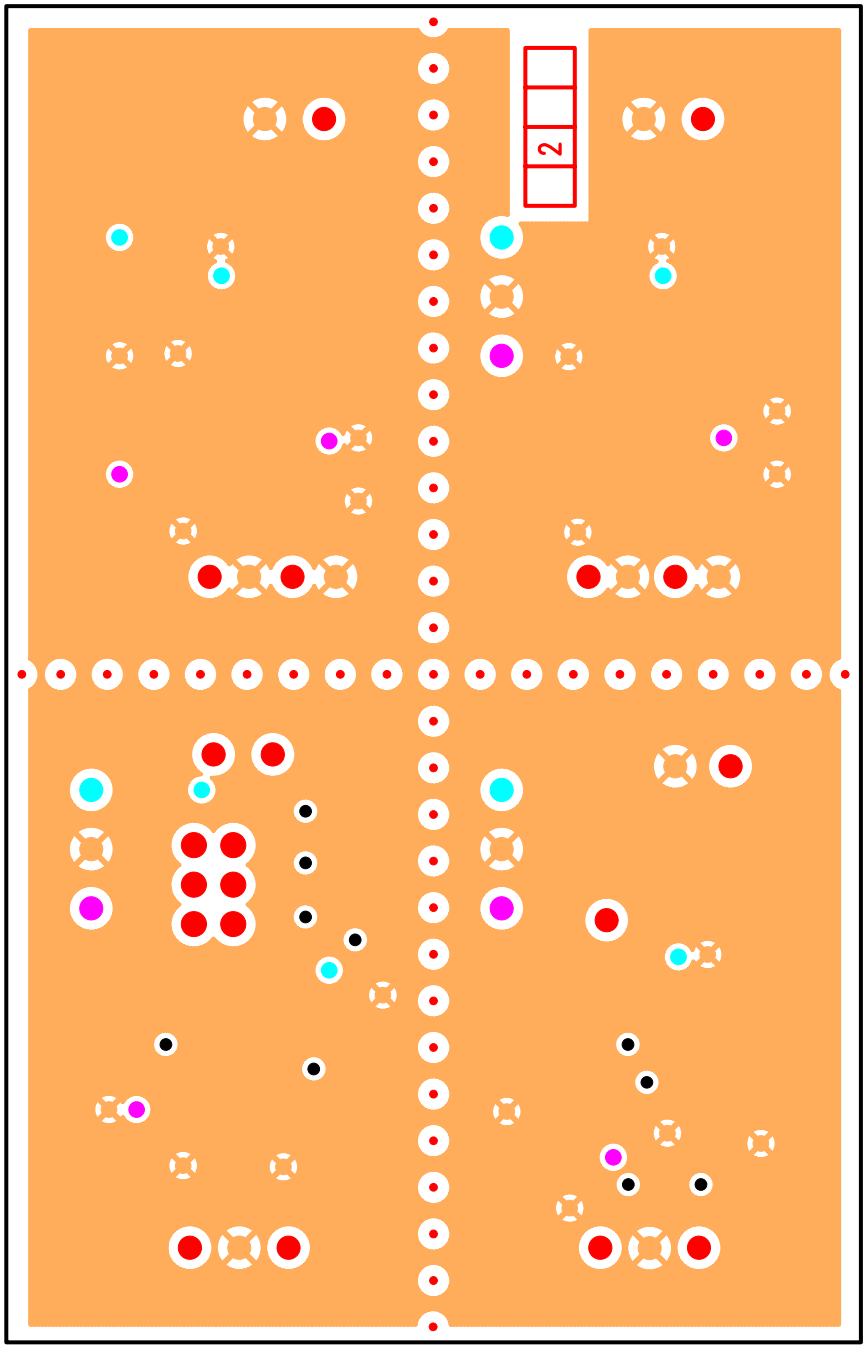

Figure 7. Ground Plane

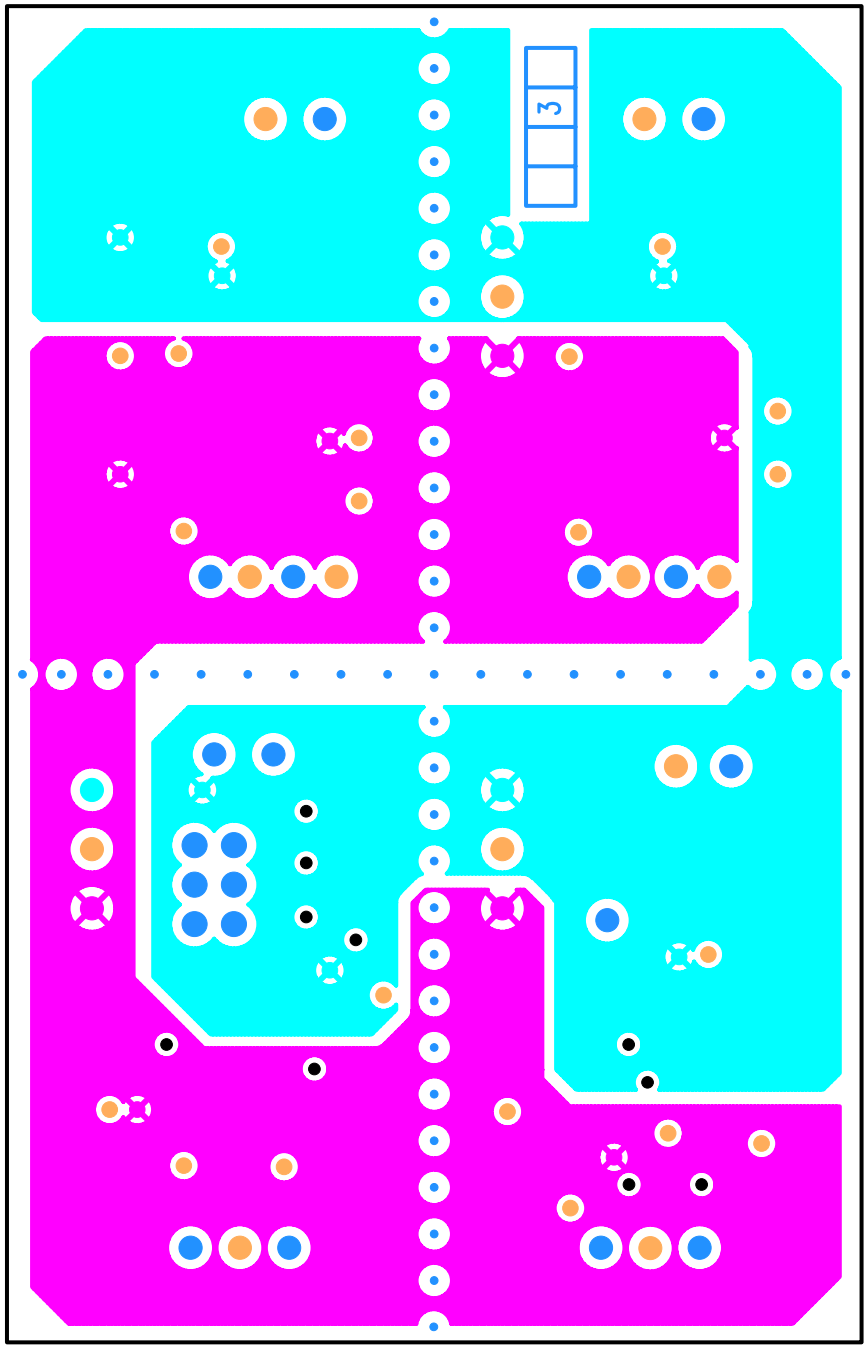

Figure 8. Power Plane

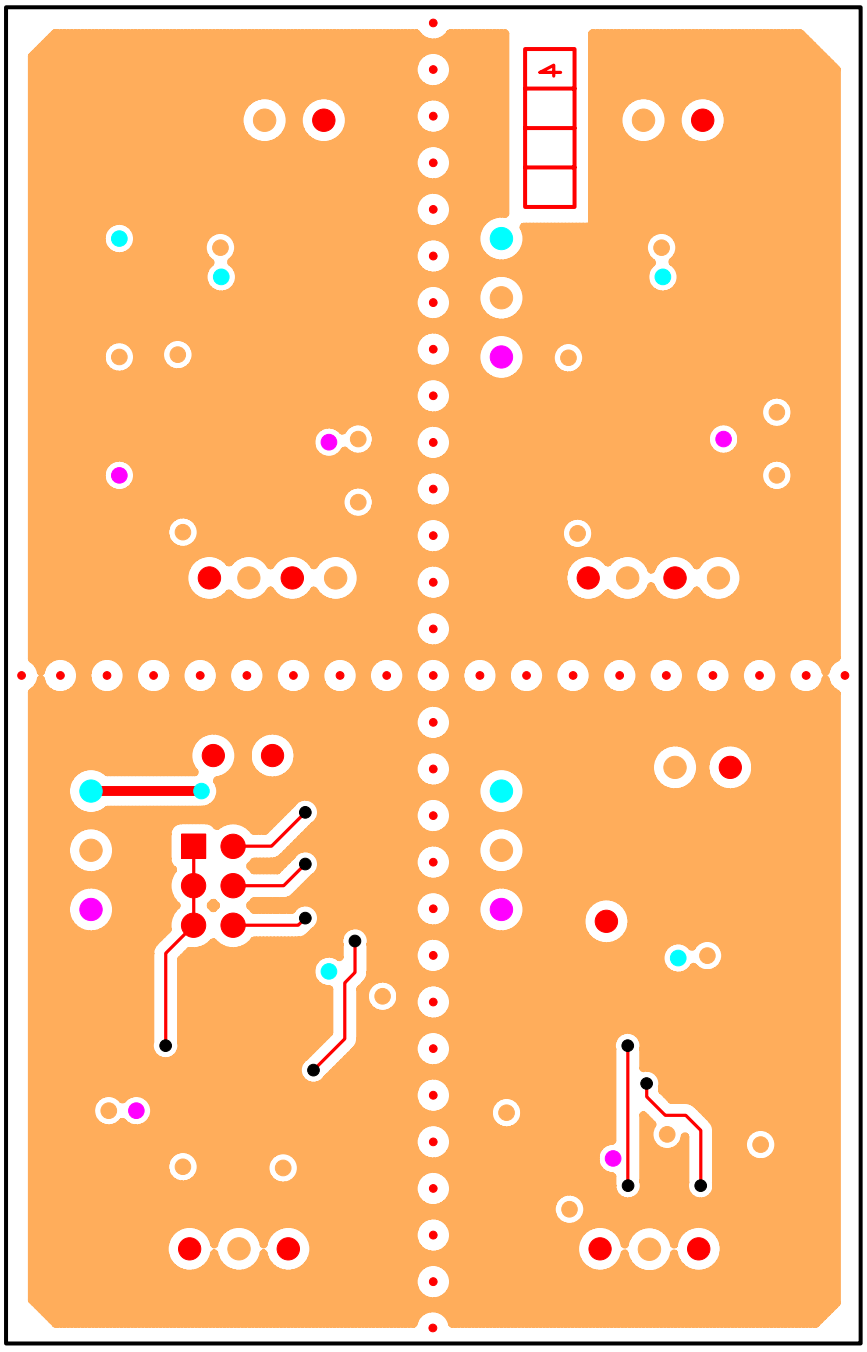

Figure 9. Bottom Side Routing

REVISION HISTORY

Revision	Date	Changes
DB1	JUN 2007	Initial Release.
DB2	JUN 2007	Added photo of board to front page. Changed text to reflect board is shipped with op-amp samples.

Contacting Cirrus Logic Support

For all product questions and inquiries contact a Cirrus Logic Sales Representative.

To find the one nearest to you go to www.cirrus.com

NOTES