Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Evaluation Board for CS4350

Features

♦ No High Frequency Master Clock Required

♦ Stand-Alone or PC GUI Board Control

♦ CS8416 Receives S/PDIF-Compatible Digital Audio

♦ Headers for External PCM Audio Input

♦ Demonstrates Recommended Layout and Grounding Arrangements.

♦ Requires Only a Digital Signal Source and Power Supplies for a Complete Digital-to-Analog Converter System

Description

The CDB4350 evaluation board is an excellent platform for quickly evaluating the CS4350 24-bit, 24-pin, stereo D/A converter. Evaluation requires an analog signal analyzer, a digital signal source, a PC for controlling the CS4350 (only required for Control Port Mode), and a power supply. Analog line-level outputs are provided via RCA phono jacks.

The CS8416 digital audio receiver IC provides the system timing necessary to operate the digital-to-analog converter and will accept S/PDIF-compatible audio data. The evaluation board may also be configured to accept external timing and data signals for operation in a user application during system development.

ORDERING INFORMATION

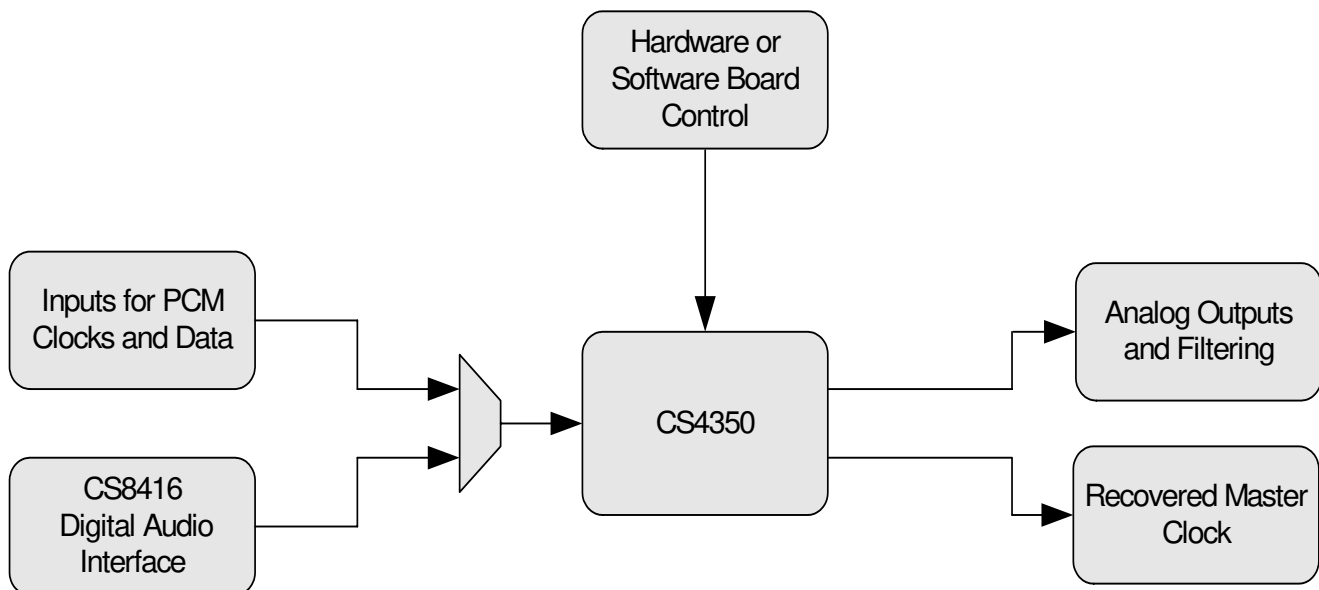CDB4350   Evaluation Board

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. CDB4350 SYSTEM OVERVIEW

The CDB4350 evaluation board is an excellent platform for quickly evaluating the CS4350. The CS8416 digital audio interface receiver provides an easy interface to digital audio signal sources including the majority of digital audio test equipment. The evaluation board also allows the user to supply external PCM clocks and data through headers for system development.

The CDB4350 schematic has been partitioned into 6 pages, shown in Figures 2 through 7. Each schematic page is represented in the system diagram shown in Figure 1. Notice that the system diagram also includes the interconnections between the partitioned schematics.

2. CS4350 DIGITAL-TO-ANALOG CONVERTER

A description of the CS4350 is included in the CS4350 datasheet, available at www.cirrus.com.

3. CS8416 DIGITAL AUDIO RECEIVER

The system receives and decodes the standard S/PDIF data format using a CS8416 digital audio receiver (Figure 5). The outputs of the CS8416 include a serial bit clock, serial data, and a left-right clock. The CS8416 data format is selected through switch S1. The operation of the CS8416 and a discussion of the digital audio interface is included in the CS8416 datasheet, available at www.cirrus.com.

The CDB4350 has been designed so that the input can be either optical or coaxial (see Figure 6). However, both inputs cannot be driven simultaneously.

After the CS8416 serial format is changed either through S1 in Stand-Alone Mode, or though the CDB4350 GUI in PC Mode, a reset is required. The CS8416 can be manually reset using 'HARDWARE RESET' (S2) in Stand-Alone Mode, or through software when operating the CDB4350 in PC Mode.

4. INPUT FOR CLOCKS AND DATA

The evaluation board has been designed to allow external PCM data input through header J10. The schematic for the clock/data input is shown in Figure 4. In Stand-Alone Mode, switch position 6 of S4 selects the source as either CS8416 (open) or header J10 (closed). In PC Mode, the PCM source is selected through software.

5. INPUT FOR CONTROL DATA

The evaluation board can be run in either a Stand-Alone Mode or with a PC. Stand-Alone Mode does not require the use of a PC, and the mode pins are configured using switch positions 1 through 5 of S4 and switch positions 1 and 2 of S1. PC Mode uses software to set up the CS4350 through I²C® or SPI™ using the PC's serial port or USB port. When the serial port (RS232) or USB is attached and the CDB4350 software is running, PC Mode is automatically selected.

Header J38 offers the option for external input of RST and SPI/I²C clocks and data. The board is set up from the factory to use the on-board microcontroller in conjunction with software available at www.cirrus.com. To use an external control source, remove the shunts on J38 and place a ribbon cable so the signal lines are on the center row and the grounds are on the right side. R89 and R90 should be populated with 2 kΩ resistors when using an external I²C source which does not already provide pull-ups.

6. POWER SUPPLY CIRCUITRY

Power is supplied to the evaluation board by three binding posts (GND, +12V, and -12V), as shown in Figure 7. The '+12V' and '-12V' terminals supply the active output filters. The +3.3 V and +5.0 V circuitry is powered by regulators fed by the '+12V' terminal. Headers J3, J4, and J7 allow the user to either select +3.3 V or +5.0 V supplies for the various CS4350 voltage supply pins. Alternatively, the user can remove the shunts on J3, J4, and J7, and provide an external power supply.

WARNING: Refer to the CS4350 datasheet for maximum allowable voltage levels. Operation outside of this range can cause permanent damage to the device.

7. GROUNDING AND POWER SUPPLY DECOUPLING

As with any high-performance converter, the CS4350 requires careful attention to power supply and grounding arrangements in order to optimize performance. Figure 2 details the connections to the CS4350 while Figures 8, 9, and 10 show the component placement and top and bottom layout. The decoupling capacitors are located as close to the CS4350 as possible. Extensive use of ground plane fill in the evaluation board yields large reductions in radiated noise.

8. ANALOG OUTPUT FILTERING

The analog output on the CDB4350 has been designed according to the CS4350 datasheet. This output circuit includes an active 2-pole, 50 kHz filter which utilizes the multiple-feedback topology and a passive output filter.

9. BOARD CONNECTIONS AND SETTINGS

Board connections and settings are shown in Table 1, Table 2, and Table 3.

CONNECTOR	INPUT/OUTPUT	SIGNAL PRESENT
GND	Input	Ground connection from power supply
+12V	Input	+12 V positive supply for the on-board filtering
-12V	Input	-12 V negative supply for the on-board filtering
S/PDIF IN - J1	Input	Digital audio interface input via coax
S/PDIF IN - OPT1	Input	Digital audio interface input via optical
PCM INPUT - J10	Input	Input for master, serial, left/right clocks and serial data
AOUTA, AOUTB	Output	RCA line level analog outputs from active output stage
POUTA, POUTB	Output	RCA line level analog outputs from passive output stage

Table 1. System Connections

JUMPER	PURPOSE	POSITION	FUNCTION SELECTED
J6, J21	Selects analog output	*A P	*CDB4350 outputs from AOUTA and AOUTB CDB4350 outputs from POUTA and POUTB
J3, J4, J7	Selects Supply Voltage for CS4350	+5V *+3.3V	Supplies +5.0 V to associated CS4350 supply *Supplies +3.3 V to associated CS4350 supply
J38	Selects source of control data	*PC CONTROL shunts removed	*Control from PC and on-board microcontroller External control input using center and right columns
J27	C2 micro programming	-	Reserved for factory use only

Table 2. CDB4350 Jumper Settings

*Default Factory Settings.

SWITCH (Note 1)	PURPOSE	POSITION	FUNCTION SELECTED
S2	Resets CS8416 and CS4350		The CS8416 must be reset if switch S1 is changed
S1	CS8416 Format Select SFSEL[1:0]	1,2	Default: SFSEL[1:0] = 00 (Closed). See CS8416 datasheet for details.
S4	CS4350 Format Select DIF[2:0]	1,2, 3	Default: DIF[2:0] = 000 (Closed). See CS4350 datasheet for details.
	CS4350 De-emphasis Select	4	open = De-emphasis enabled *closed = De-emphasis disabled.
	CS4350 Popguard Enable	5	open = Popguard enabled *closed = Popguard disabled.
	Selects PCM source for CS4350	6	*open = CS8416 closed = PCM Header J10

Table 3. CDB4350 Switch Settings

*Default Factory Settings.

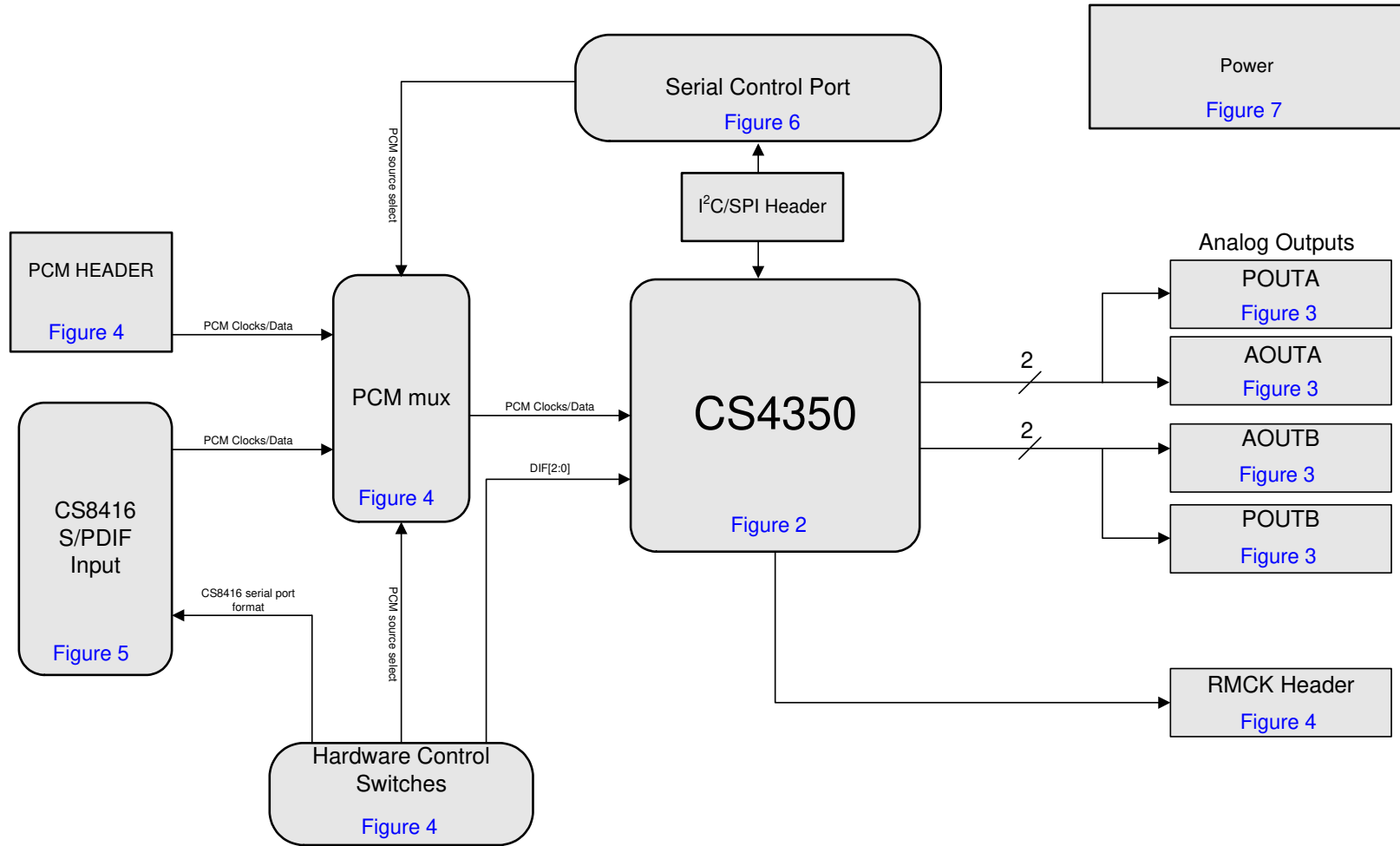**Note:**

1. Switch settings take effect in Stand-Alone Mode only.

10.SCHEMATICS

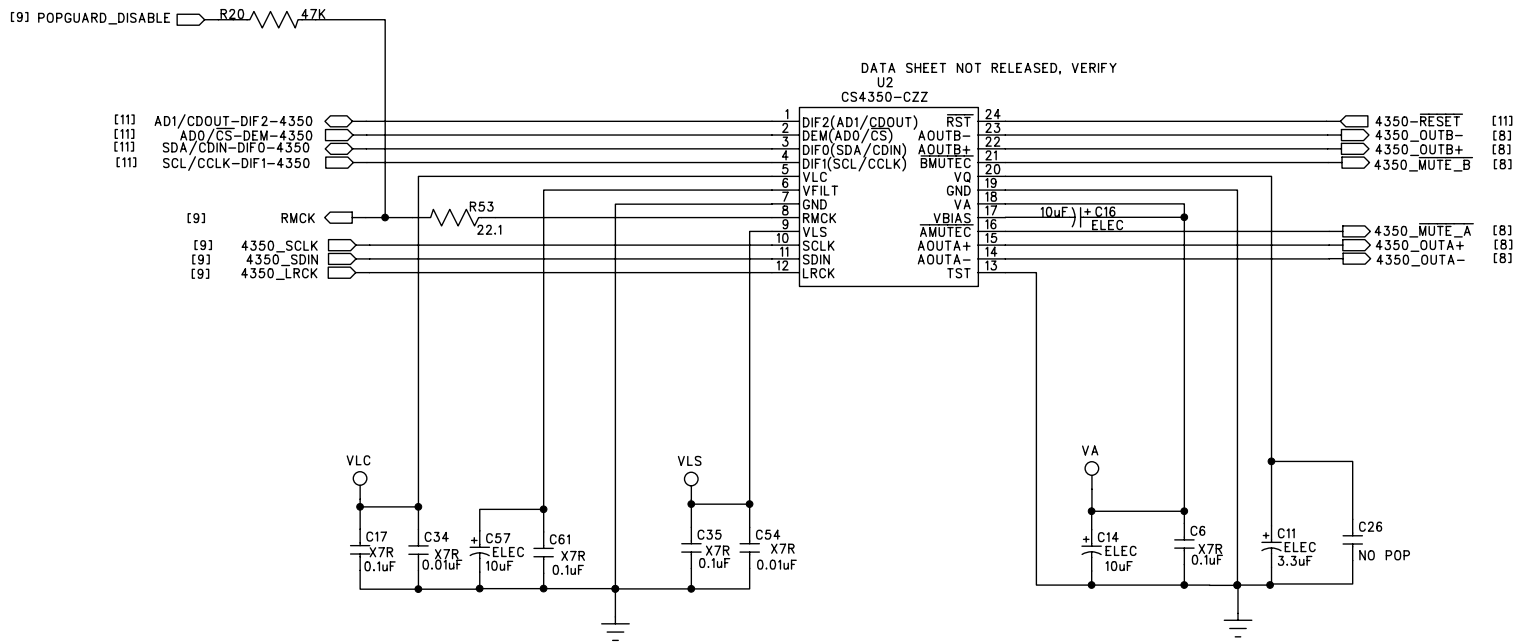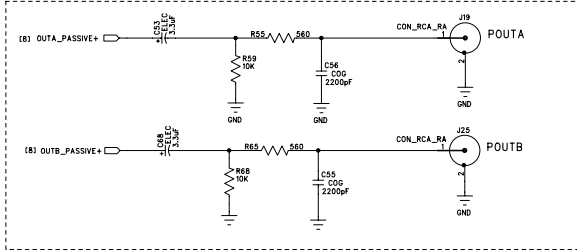**Figure 1. System Block Diagram and Signal Flow**

[9] POPGUARD_DISABLE ▭ R20 —/\/\/— 47K

DATA SHEET NOT RELEASED, VERIFY
U2
CS4350-CZZ

[11] AD1/CDOUT-DIF2-4350 ▭
[11] AD0/CS-DEM-4350 ▭
[11] SDA/CDIN-DIF0-4350 ▭
[11] SCL/CCLK-DIF1-4350 ▭

1	DIF2(AD1/CDOUT)	RST	24		4350-RESET	[11]
2	DEM(AD0/CS)	AOUTB-	23		4350_OUTB-	[8]
3	DIF0(SDA/CDIN)	AOUTB+	22		4350_OUTB+	[8]
4	DIF1(SCL/CCLK)	BMUTEC	21		4350_MUTE_B	[8]
5	VLC	VQ	20			
6	VFILT	GND	19			
7	GND	VA	18			
8	RMCK	VBIAS	17			
9	VLS	AMUTEC	16		4350_MUTE_A	[8]
10	SCLK	AOUTA+	15		4350_OUTA+	[8]
11	SDIN	AOUTA-	14		4350_OUTA-	[8]
12	LRCK	TST	13			

[9] RMCK ▭ —/\/\/— R53 22.1

[9] 4350_SCLK ▭
[9] 4350_SDIN ▭
[9] 4350_LRCK ▭

10uF |+ C16
ELEC

VLC

C17   C34   C57   C61
X7R   X7R   + ELEC   X7R
0.1uF 0.01uF   10uF   0.1uF

VLS

C35   C54
X7R   X7R
0.1uF 0.01uF

VA

C14   C6   C11   C26
+ ELEC   X7R   + ELEC
10uF   0.1uF   3.3uF   NO POP

Figure 2. CS4350

Diff-to-Single Active Output

Passive Single-Ended Output

Active/Passive Output Select
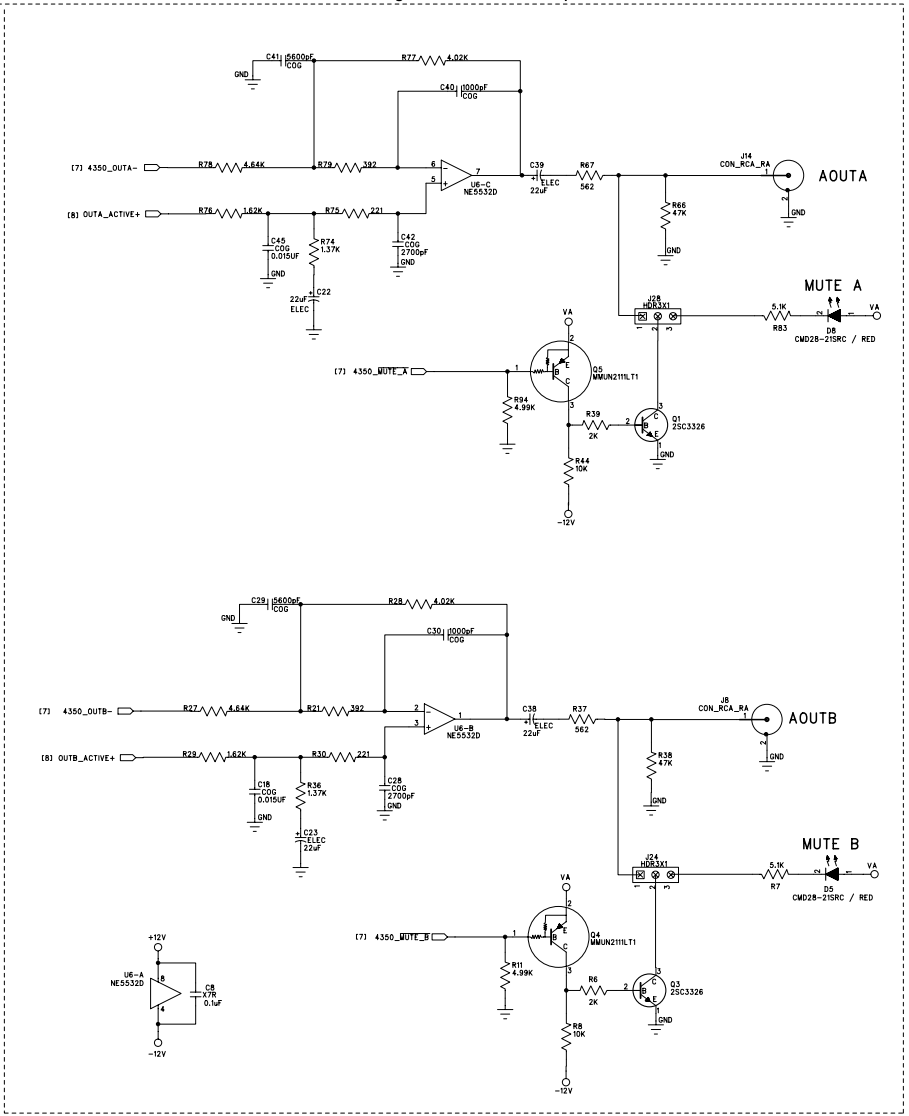
Figure 3. Analog Outputs

Control Signal Mux and Switch

CS4350 DIF[2:0]	
000	Left Justified
001	I2S
010	Right Justified 16-bit
011	Right Justified 24-bit
100	TDM slot 1
101	TDM slot 2
110	TDM slot 3
111	TDM slot 4
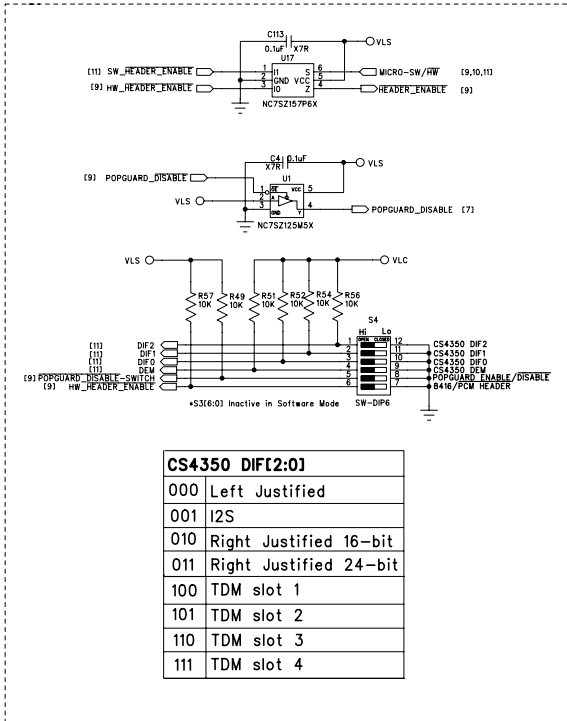
PCM Input Header Clock/Data Mux and Level Shift
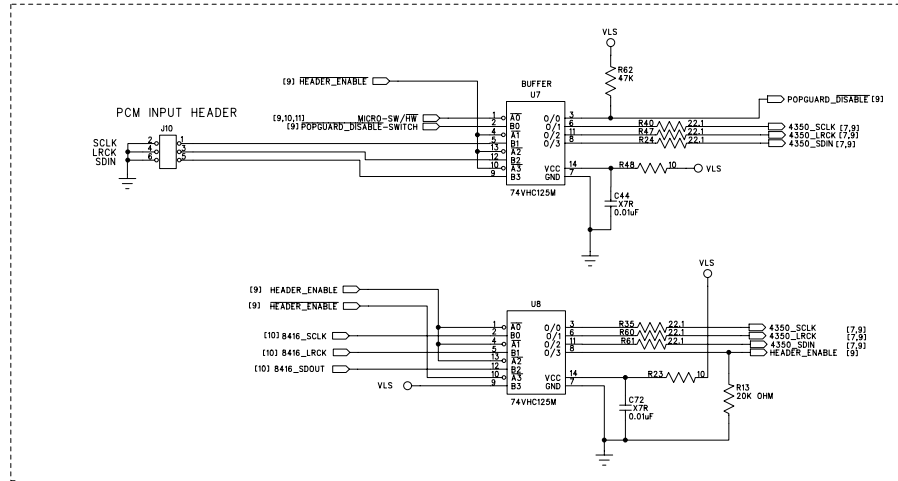
RMCK Output Header
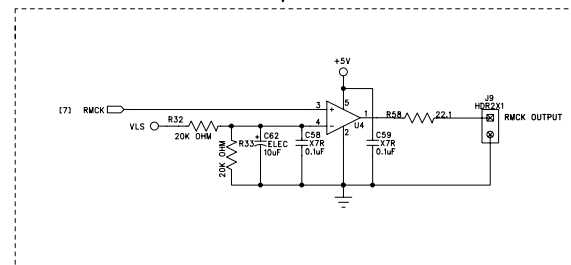
Figure 4. PCM Input Header and Hardware Control
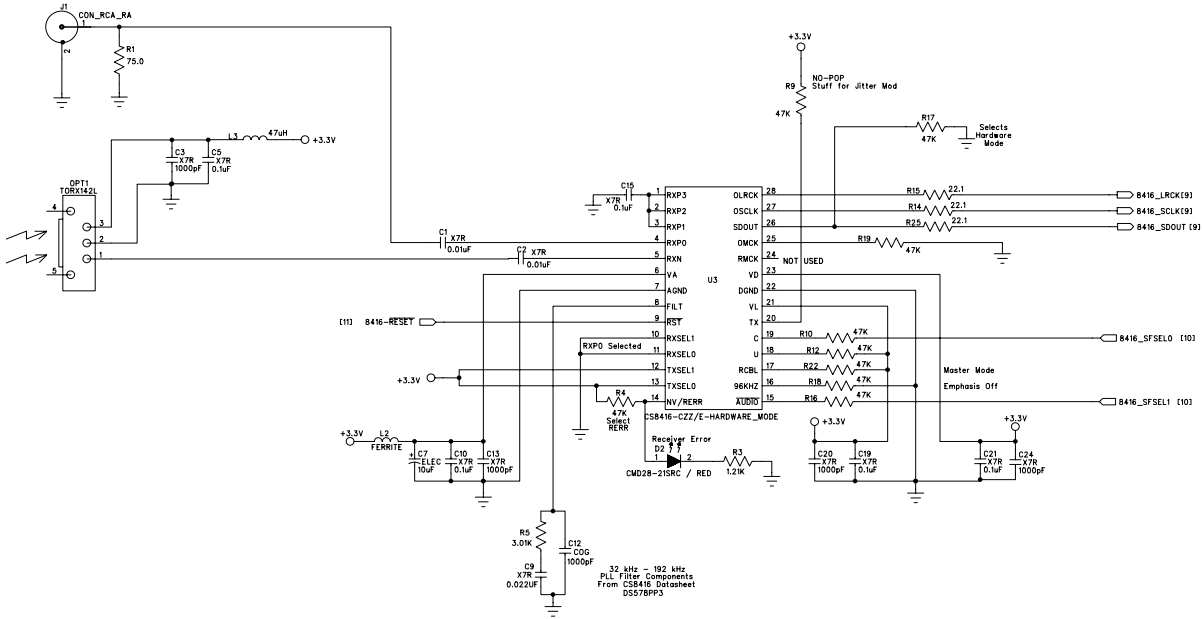
CS8416 Serial Format Control

CS8416 SF[1:0]	
00	Left Justified
01	I2S
10	Right Justified 24 Bit
11	Invalid
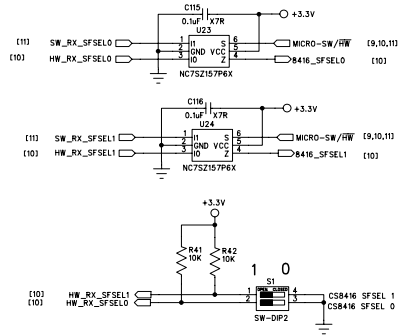
Figure 5. CS8416 S/PDIF Input
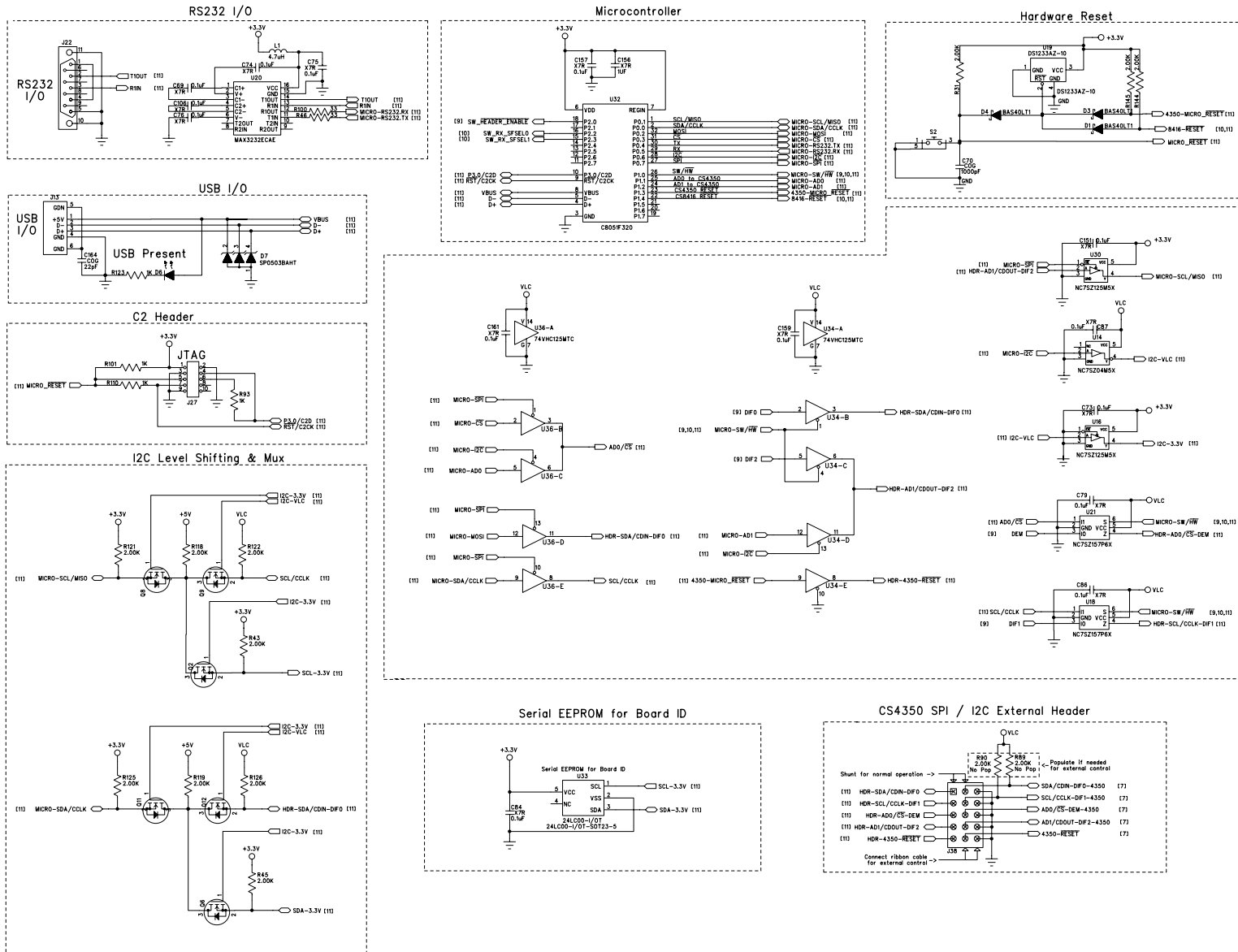
Figure 6. Control Port
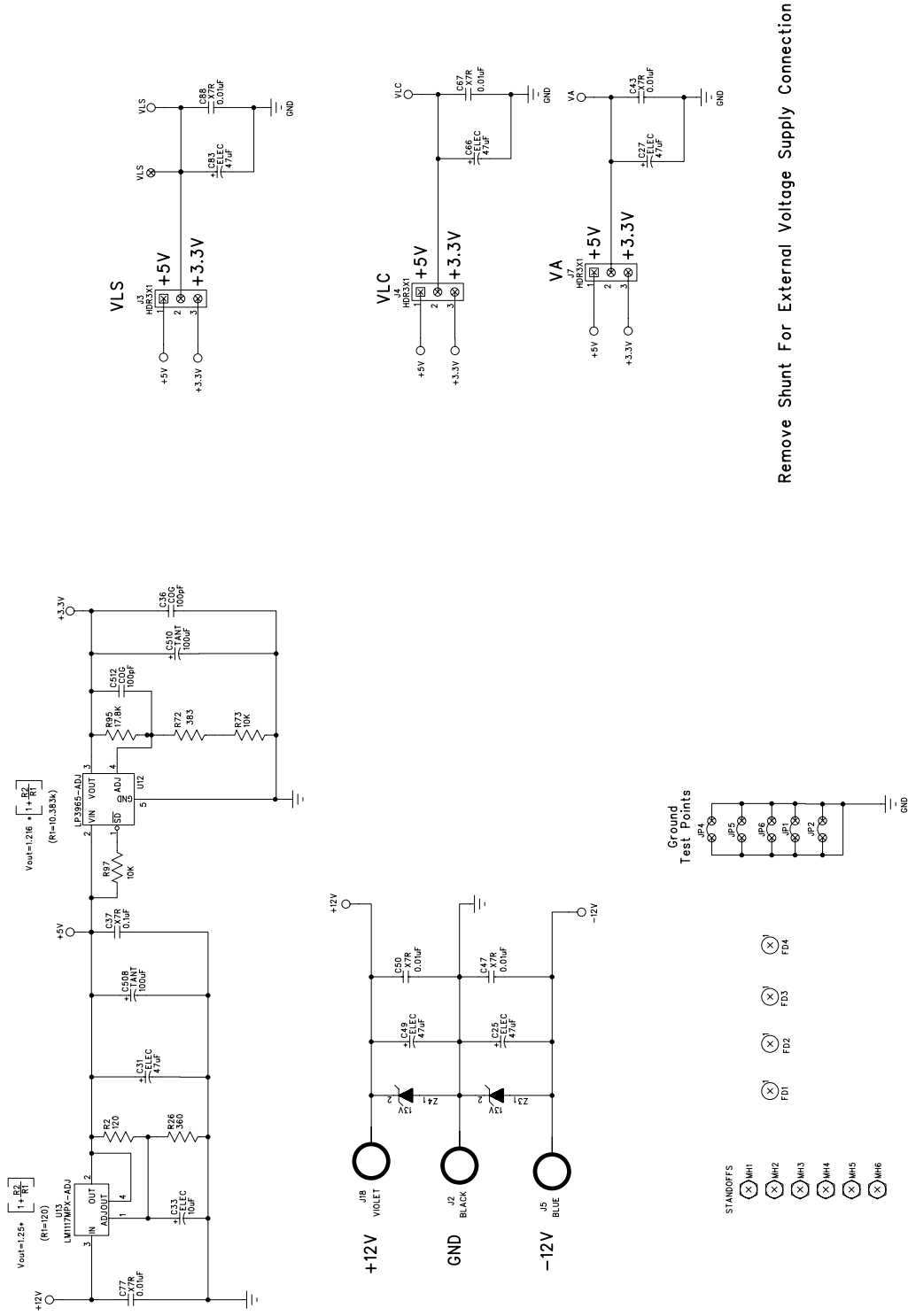
Figure 7. Power

CDB4350
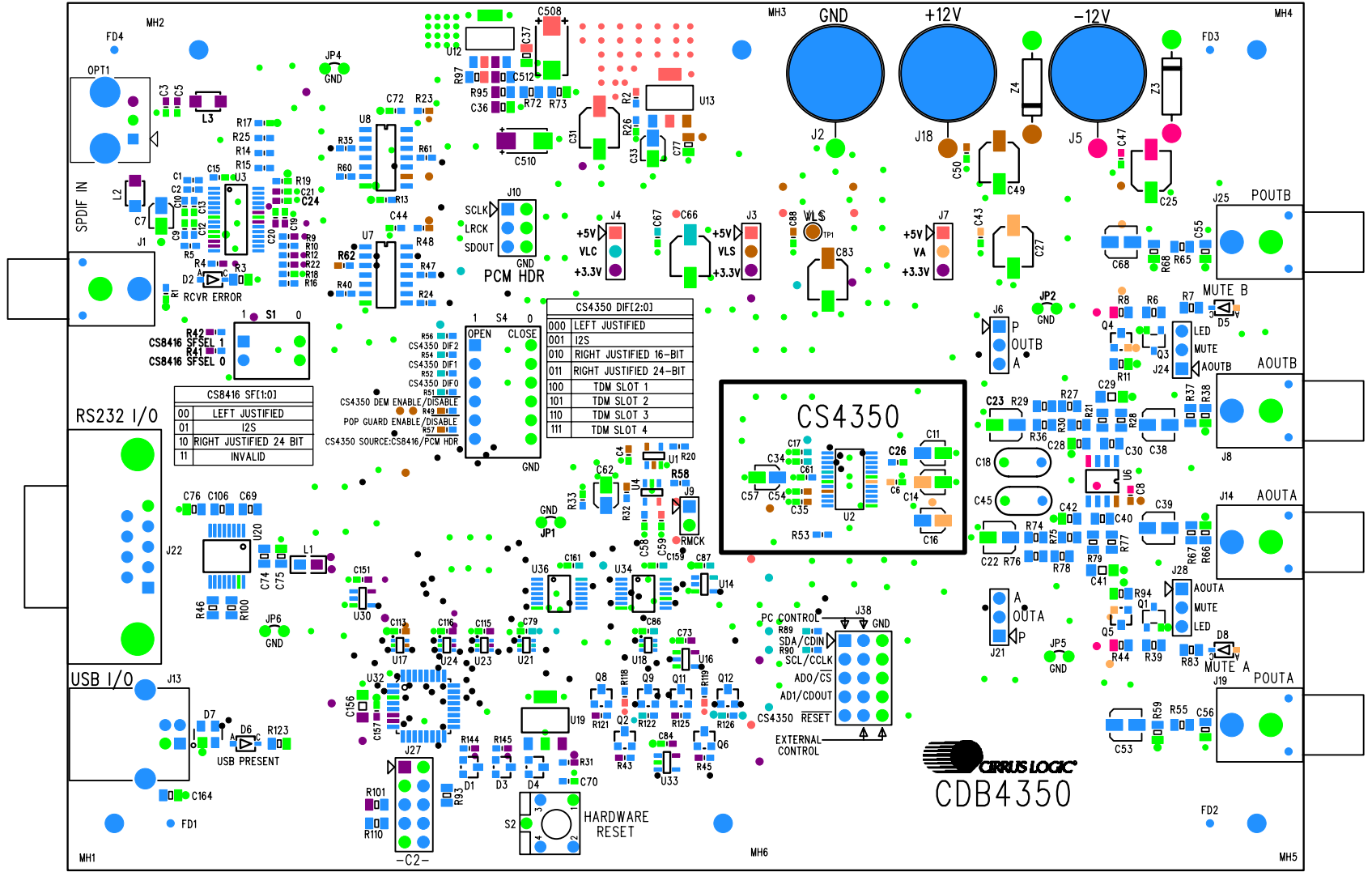
CIRRUS LOGIC

Figure 8. Silkscreen Top

CDB4350
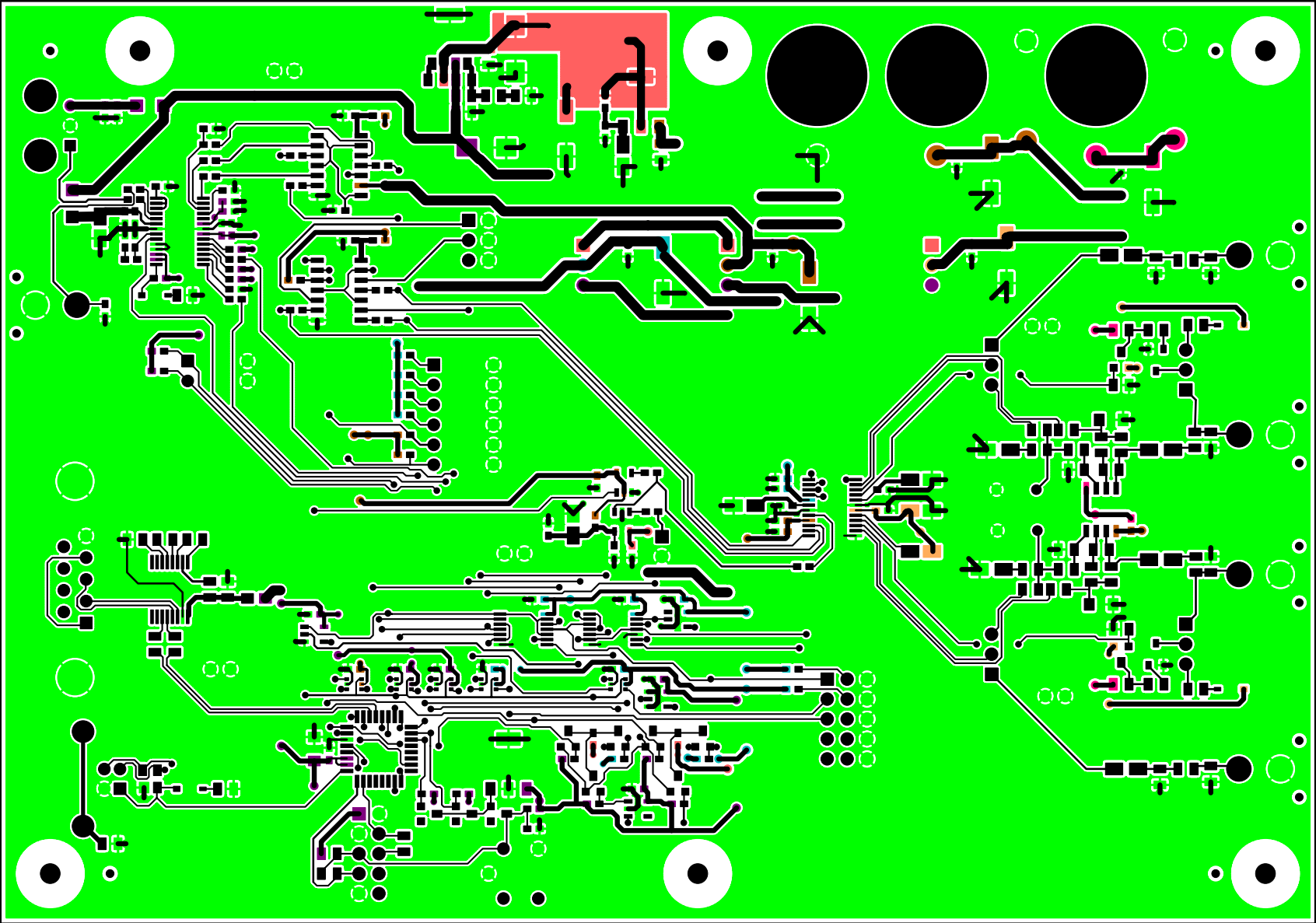
Figure 9. Top Side
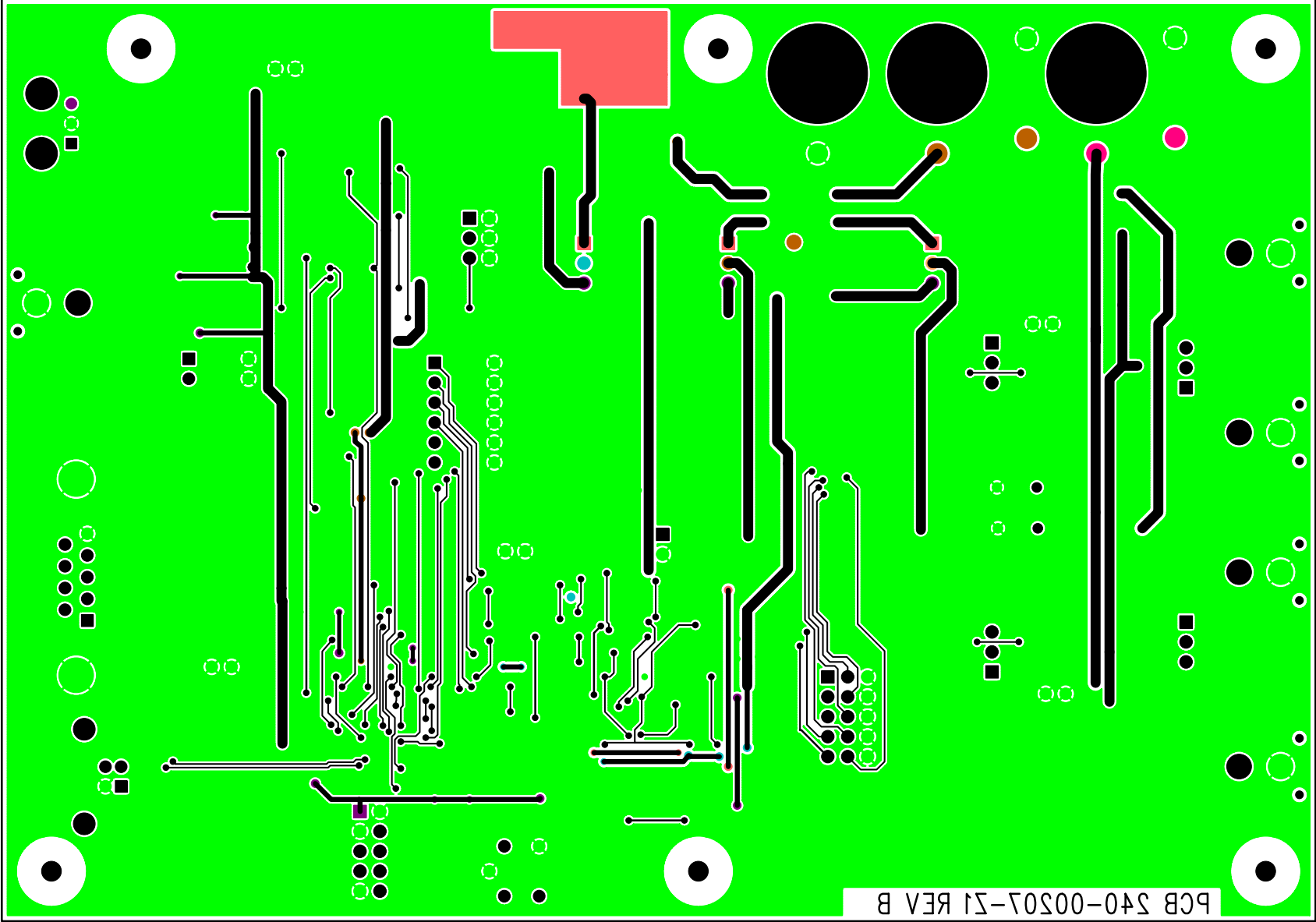
Figure 10. Bottom Side

PCB 240-00207-Z1 REV B

12.REVISION HISTORY

Release	Date	Changes
DB1	April 2006	Initial Evaluation Board Datasheet Release

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**