

## Evaluation Board for CS5351

### Features

- Demonstrates recommended layout and grounding arrangements
- CS8406 generates S/PDIF, and EIAJ-340 compatible digital audio
- Requires only an analog signal source and power supplies for a complete Analog-to-Digital-Converter system

### Description

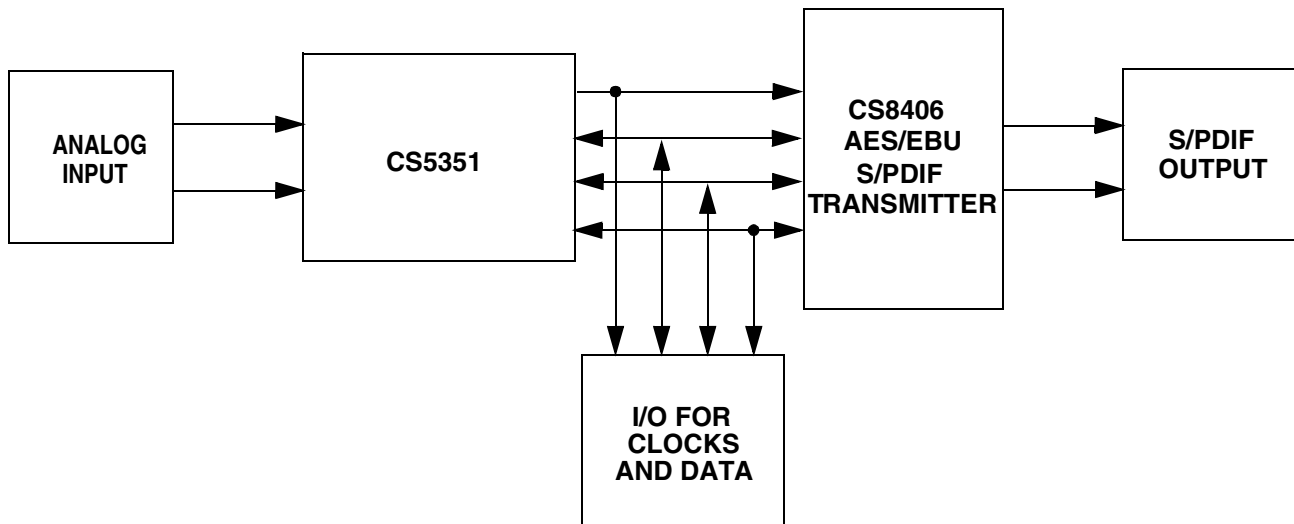
The CDB5351 evaluation board is an excellent means for quickly evaluating the CS5351 24-bit, stereo A/D converter. Evaluation requires a digital signal analyzer, an analog signal source, and a power supply.

Also included is a CS8406 digital audio interface transmitter which generates S/PDIF, and EIAJ-340 compatible audio data. The digital audio data is available via RCA phono and optical connectors.

### ORDERING INFORMATION

CDB5351

Evaluation Board



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## Contacting Cirrus Logic Support

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## 1. CDB5351 SYSTEM OVERVIEW

The CDB5351 evaluation board is an excellent means of quickly evaluating the CS5351. The CS8406 digital audio interface transmitter provides an easy interface to digital audio signal analyzers including the majority of digital audio test equipment.

The CDB5351 schematic has been partitioned into 7 schematics shown in Figure 2 through Figure 8. Each partitioned schematic is represented in the system diagram shown in Figure 1. Notice that the system diagram also includes the interconnections between the partitioned schematics.

## 2. CS8406 DIGITAL AUDIO TRANSMITTER

The system generates and encodes standard S/PDIF data using a CS8406 Digital Audio Transmitter (See Figure 6). The outputs of the CS8406 are RS422 compatible differential line drivers. The CS8406 supports both Left Justified and I<sup>2</sup>S data formats, as determined by the DIP switch, S2. A description of the CS8406 is included in the CS8406 datasheet.

## 3. INPUT/OUTPUT FOR CLOCKS AND DATA

The evaluation board has been designed to allow interfacing to external systems via the 10-pin header, J13. The schematic for the clock/data input/output is shown in Figure 5.

The CDB5351 allows some flexibility as to the generation of the clocks. When the CS5351 and CS8406 are in slave mode, the SCLK and LRCK must be provided via the header, J13. MCLK must be generated from the on board oscillator, Y1. This oscillator is socketed to allow other frequency oscillators to be used.

## 4. POWER SUPPLY CIRCUITRY

Power is supplied to the evaluation board by six binding posts (-12V, +12V, VD, VL, GND, +5 V), see Figure 8. -12V and +12V supply the input amplifiers while the VD input supplies the VD pin of the CS5351. VL supplies power to the VL pin of the CS5351 and to the level shifter circuits. The +5 V input supplies power to the +5 V digital circuitry and the VA pin of the CS5351.

## 5. GROUNDING AND POWER SUPPLY DECOUPLING

The CS5351 requires careful attention to power supply and grounding arrangements to optimize performance. Figure 3 details the power distribution used on this board. The decoupling capacitors are located as close to the CS5351 as possible. Extensive use of ground plane fill in the evaluation board yields large reductions in radiated noise.

## 6. ANALOG INPUT FILTER

The CDB5351 implements a single-ended analog input buffer, as shown in Figure 2. Note that there is no attenuation associated with the input buffer, so a 1 V<sub>rms</sub> input applied at the RCA connectors will provide a full-scale 1 V<sub>rms</sub> input to the CS5351.

CONNECTOR	INPUT/OUTPUT	SIGNAL PRESENT
-12V	Input	-12V power for the input op-amps
+12V	Input	+12V power for the input op-amps
VD	Input	+3.3V to +5V power for the CS5351
VL	Input	+2.5V to +5V power for the CS5351
GND	Input	Ground connection from power supply
+5V	Input	+ 5 Volt power
AINL	Input	Analog input left channel
AINR	Input	Analog input right channel
Optical Output	Output	Digital audio output
Coax Output	Output	Digital audio output

**Table 1. System Connections**

JUMPER/SWITCH	PURPOSE	POSITION		FUNCTION SELECTED
J7	VD Power Source	ADJ	Open *Closed	Power from the Binding Post (J3) Power from the +3.3V Regulator Power from the +5V Supply
J8	VL Power Source	ADJ	Open *Closed	Power from the Binding Post (J4) Power from the +3.3V Regulator Power from the +5V Supply
J13	Input/Output for clocks/data	-	-	-
S1	Reset for the CDB5351	-	-	-
S2	CDB5351 Configuration	M1/M0	Open *Closed	Hi Low
		ADC	*Open Closed	CS5351 in Master mode CS5351 in Slave mode
		HPF	Open *Closed	High-pass filter is disabled High-pass filter is enabled
		DIV	Open *Closed	MCLK is divided by two internally by the CS5351 MCLK is not divided internally by the CS5351
		IO_HDR	Open *Closed	Header J3 is an input for clocks Header J3 is an output for clocks and data
		DIF	Open *Closed	Digital interface format set to I <sup>2</sup> S Digital interface format set to Left Justified
		8406	Open *Closed	CS8406 in Master mode CS8406 in Slave mode

**Table 2. CDB5351 Jumper and Switch Settings**

\* denotes default factory settings

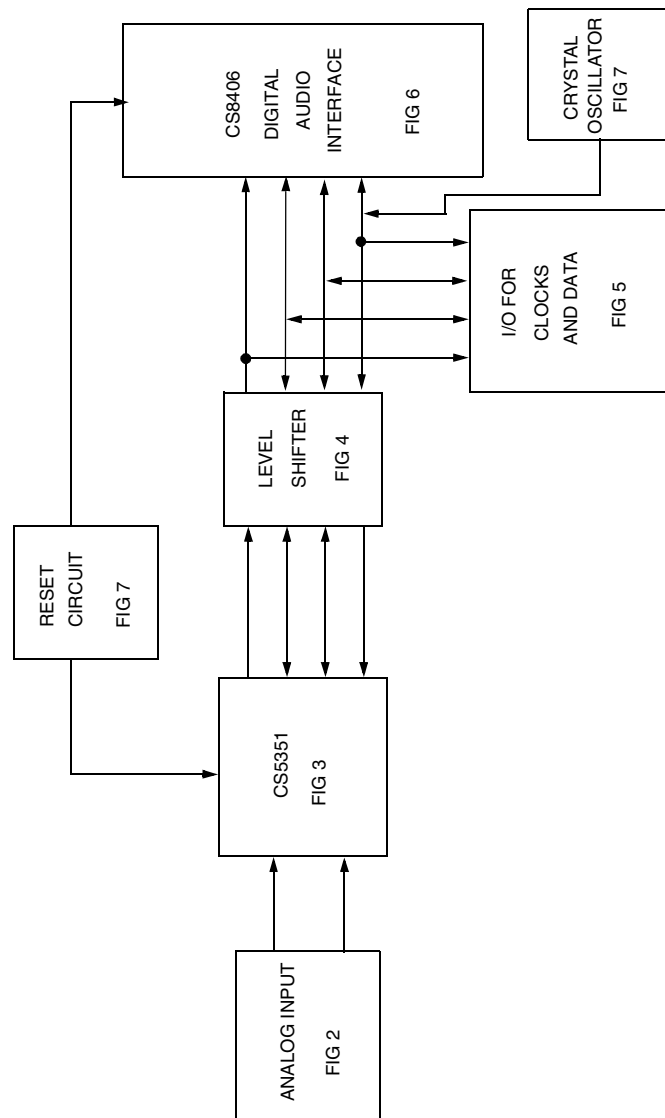
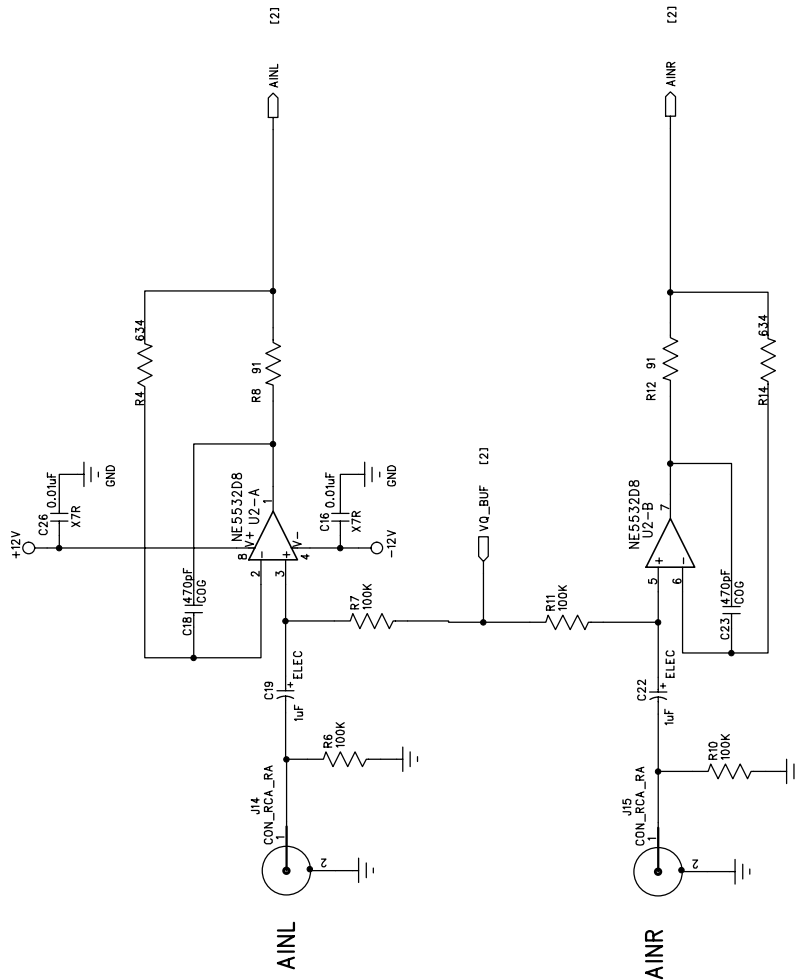
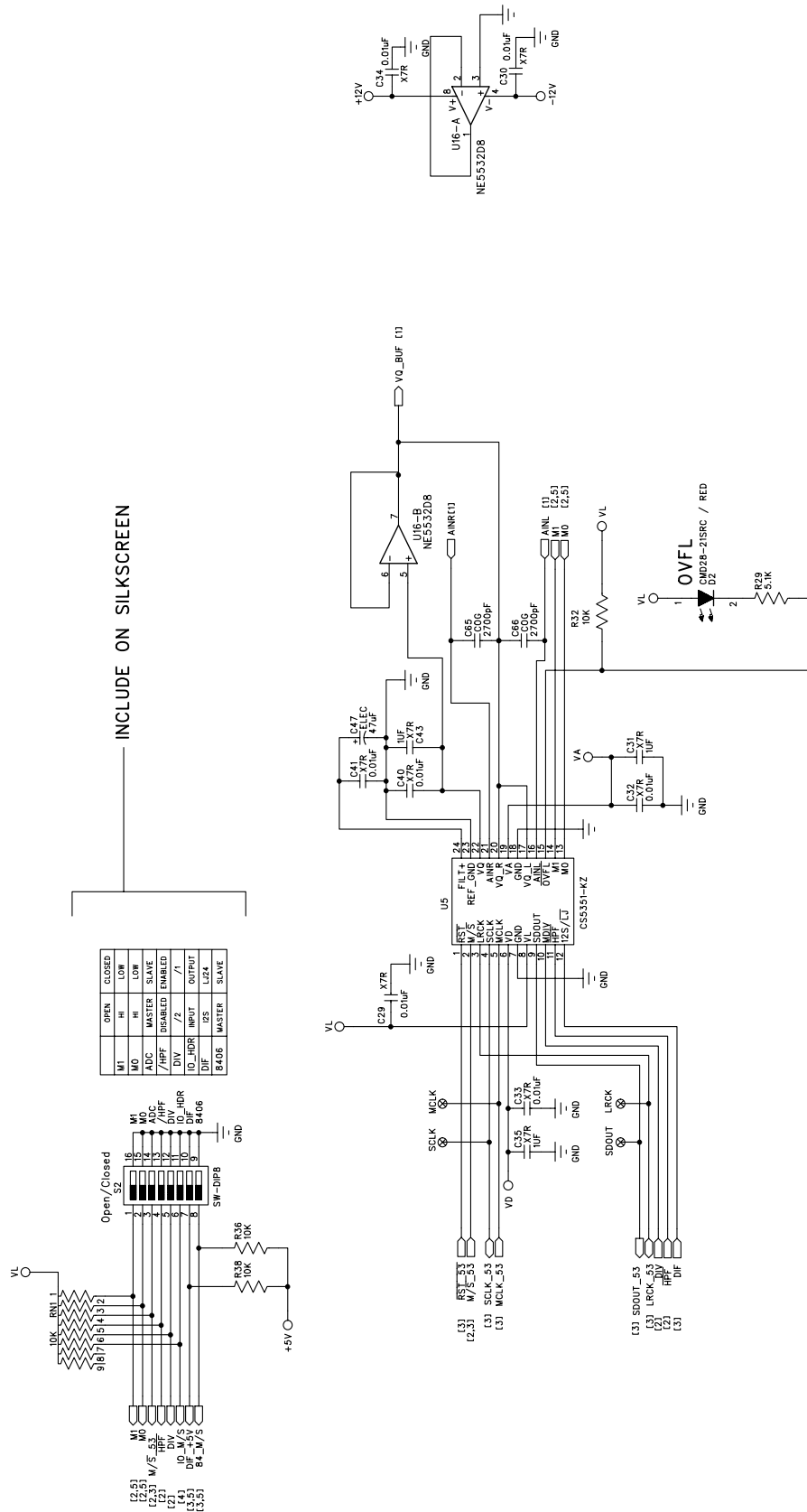
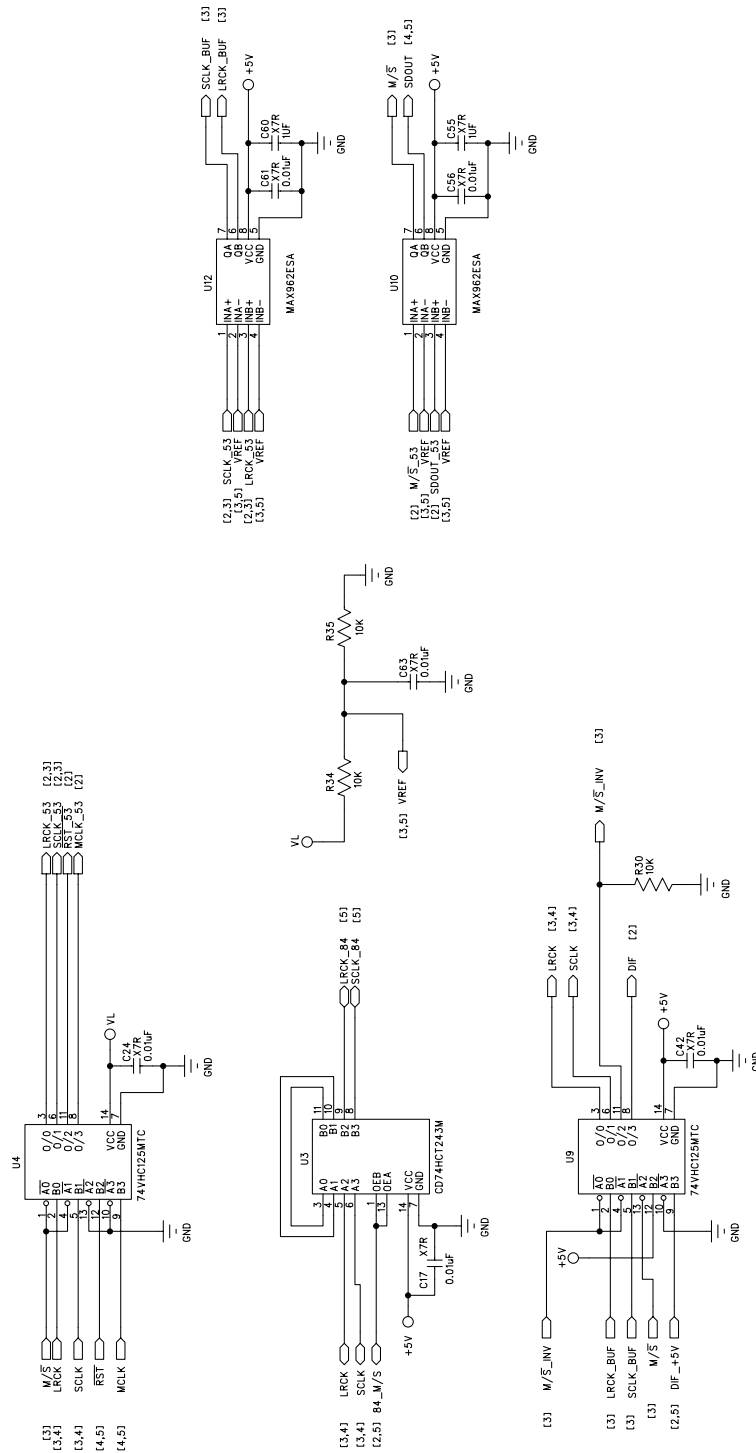


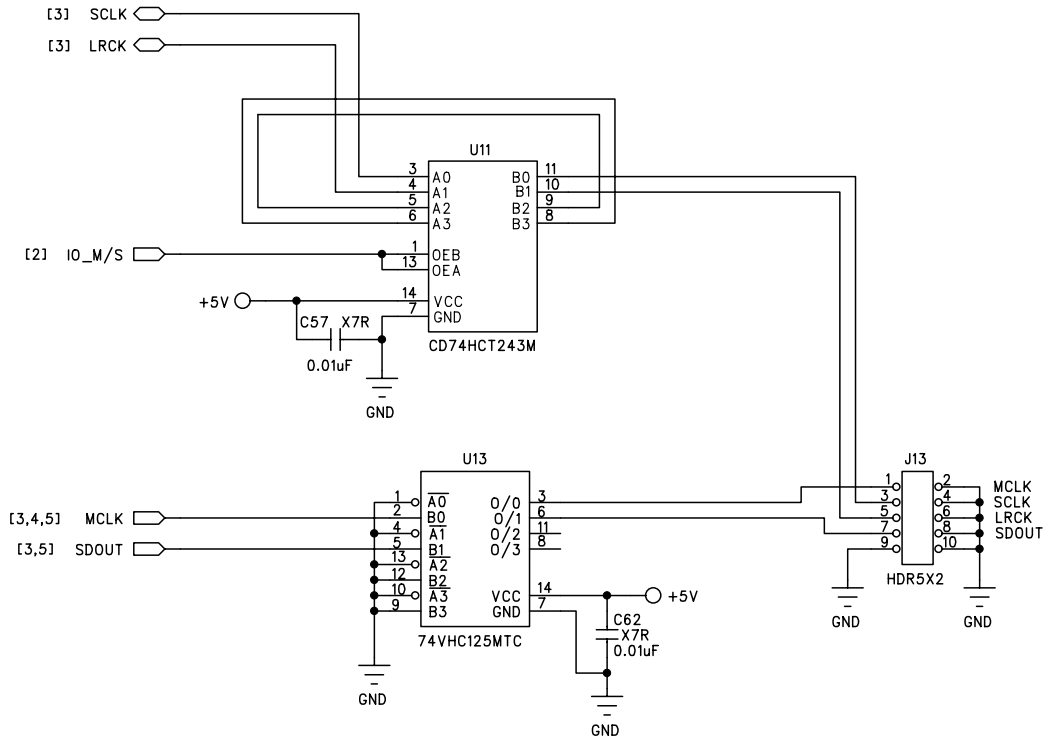
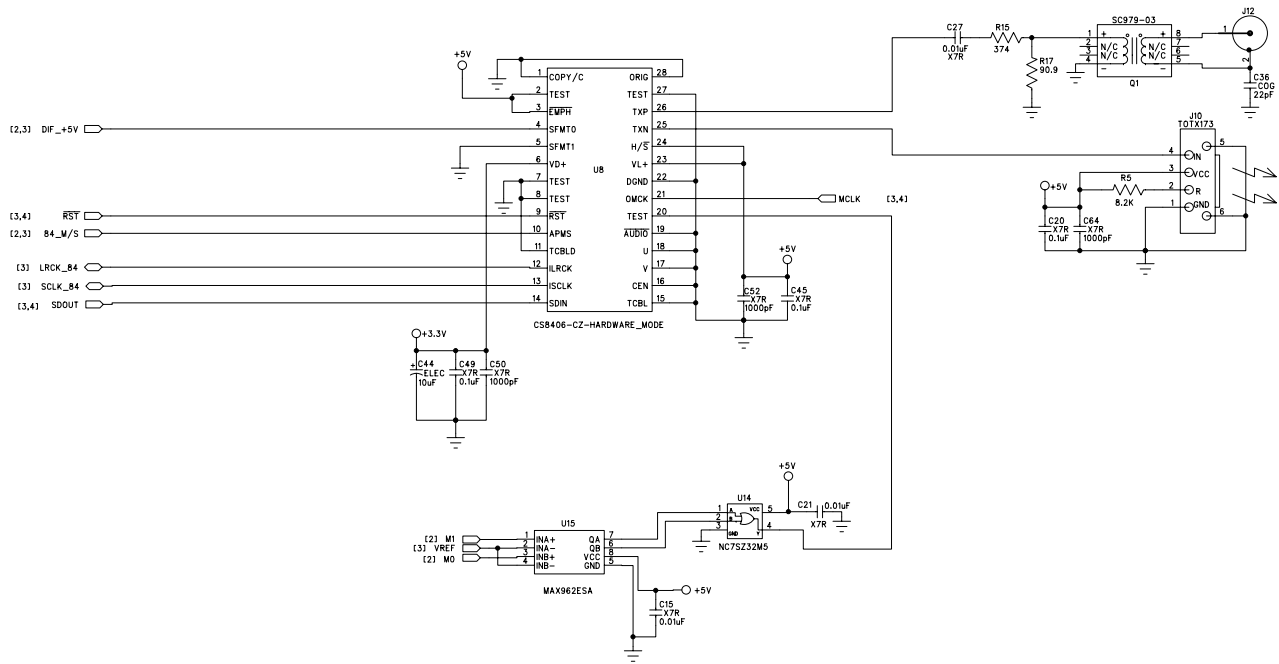
Figure 1. System Block Diagram and Signal Flow


**Figure 2. Differential Analog Audio Input**


**Figure 3. CS5351**


**Figure 4. Level Shifters**




**Figure 5. I/O for Clocks/Data**

**Figure 6. CS8406 Digital Audio Interface**

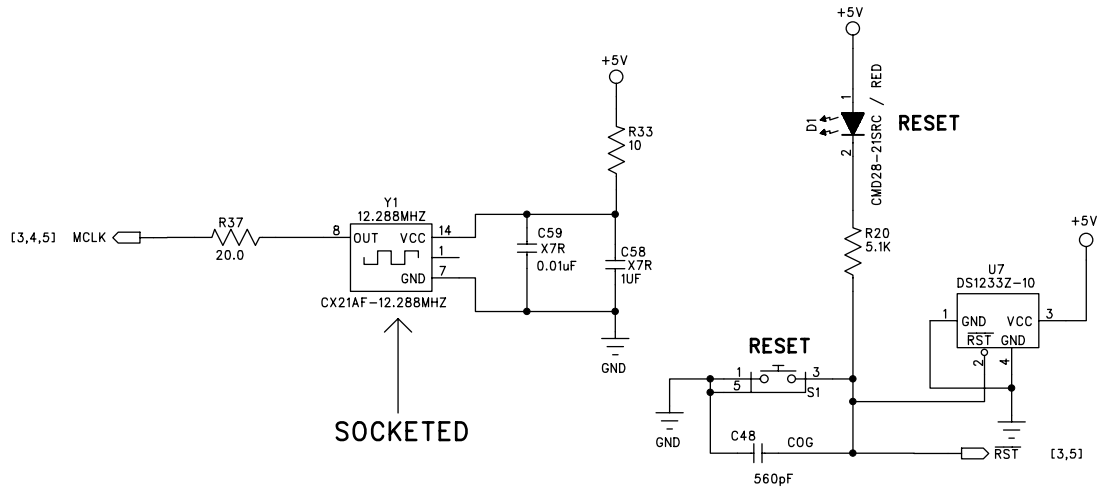
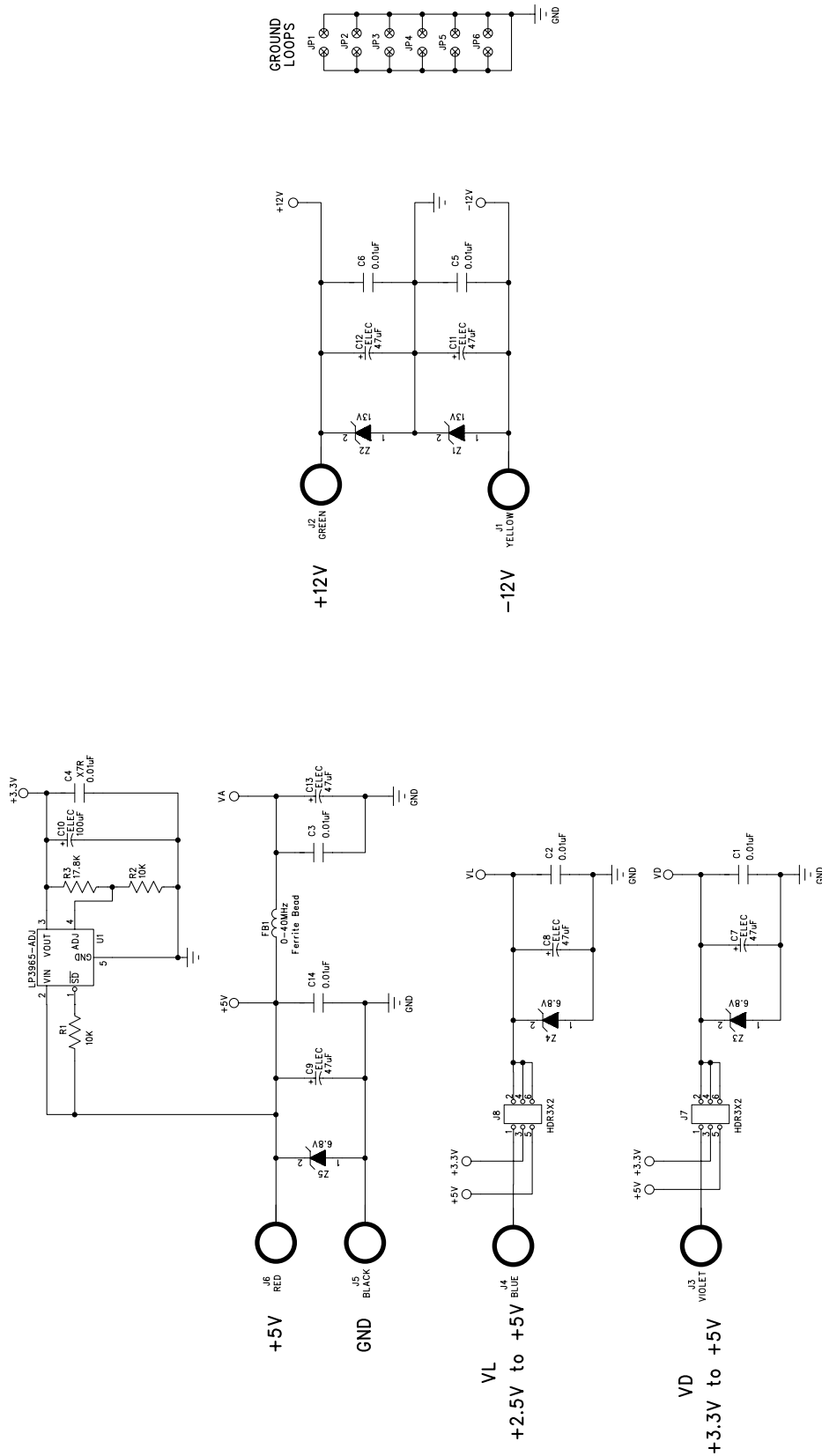
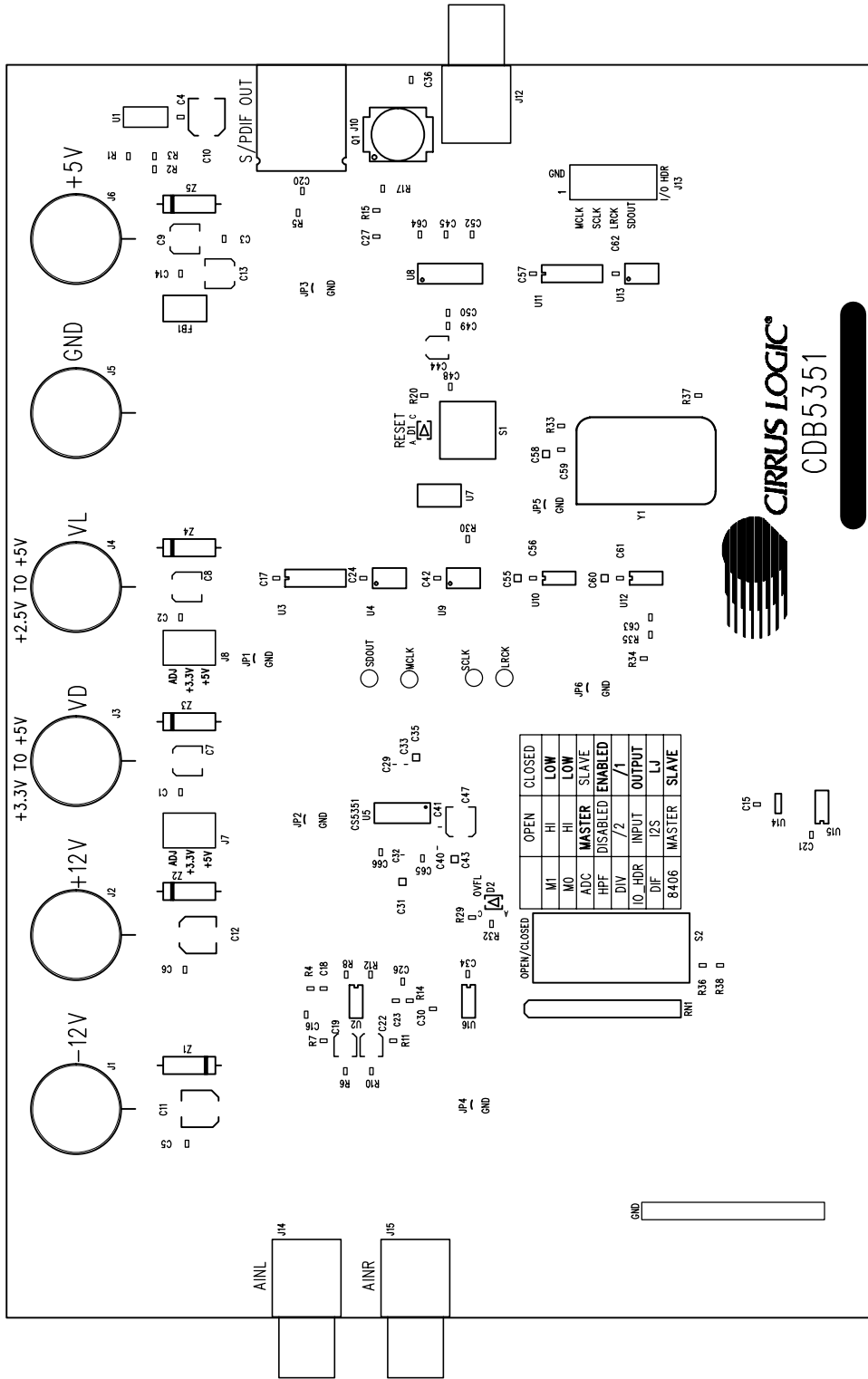


Figure 7. Reset Circuit


**Figure 8. Power Circuit**


**Figure 9. Top Layer Silkscreen**

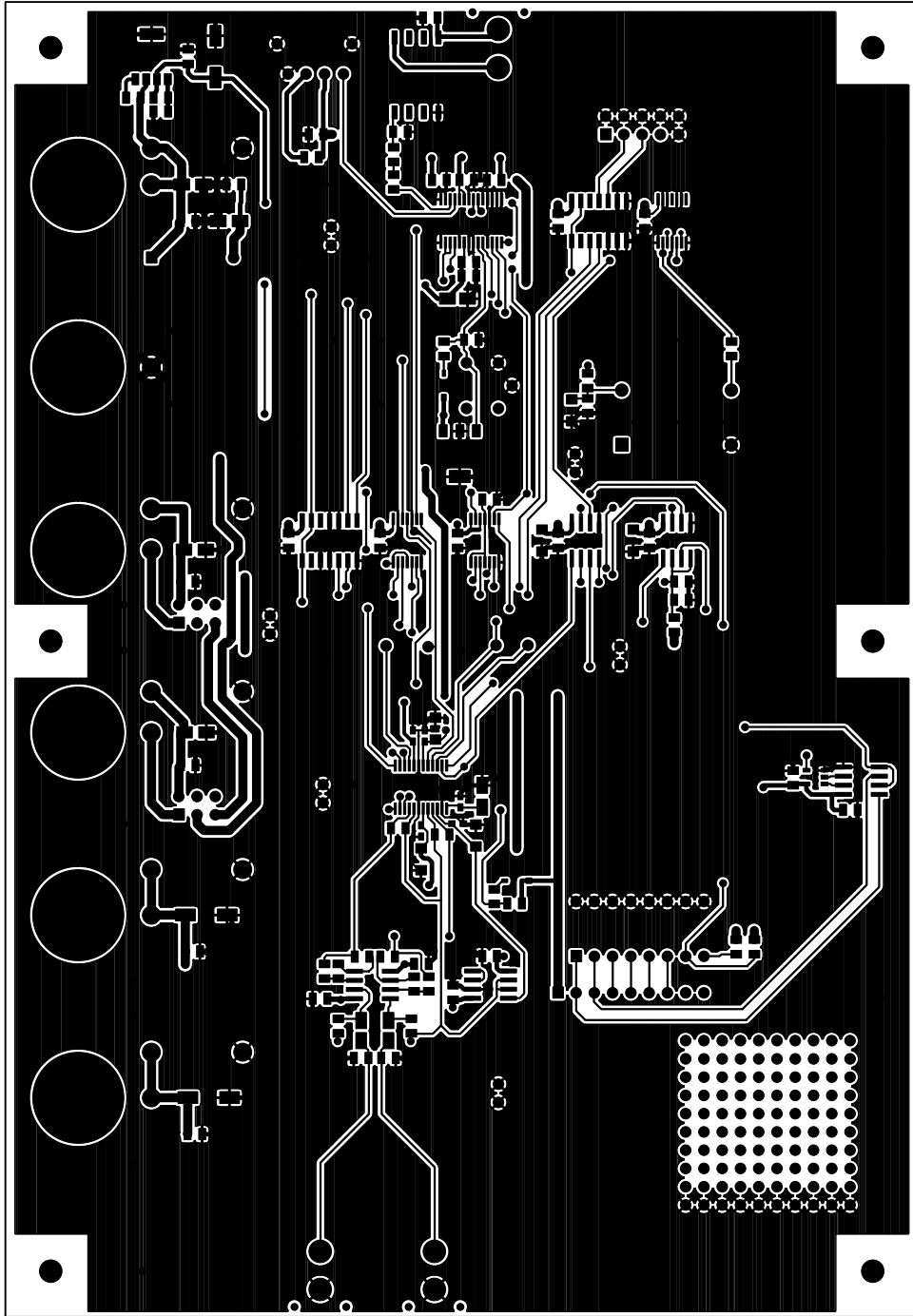


Figure 10. Top Layer

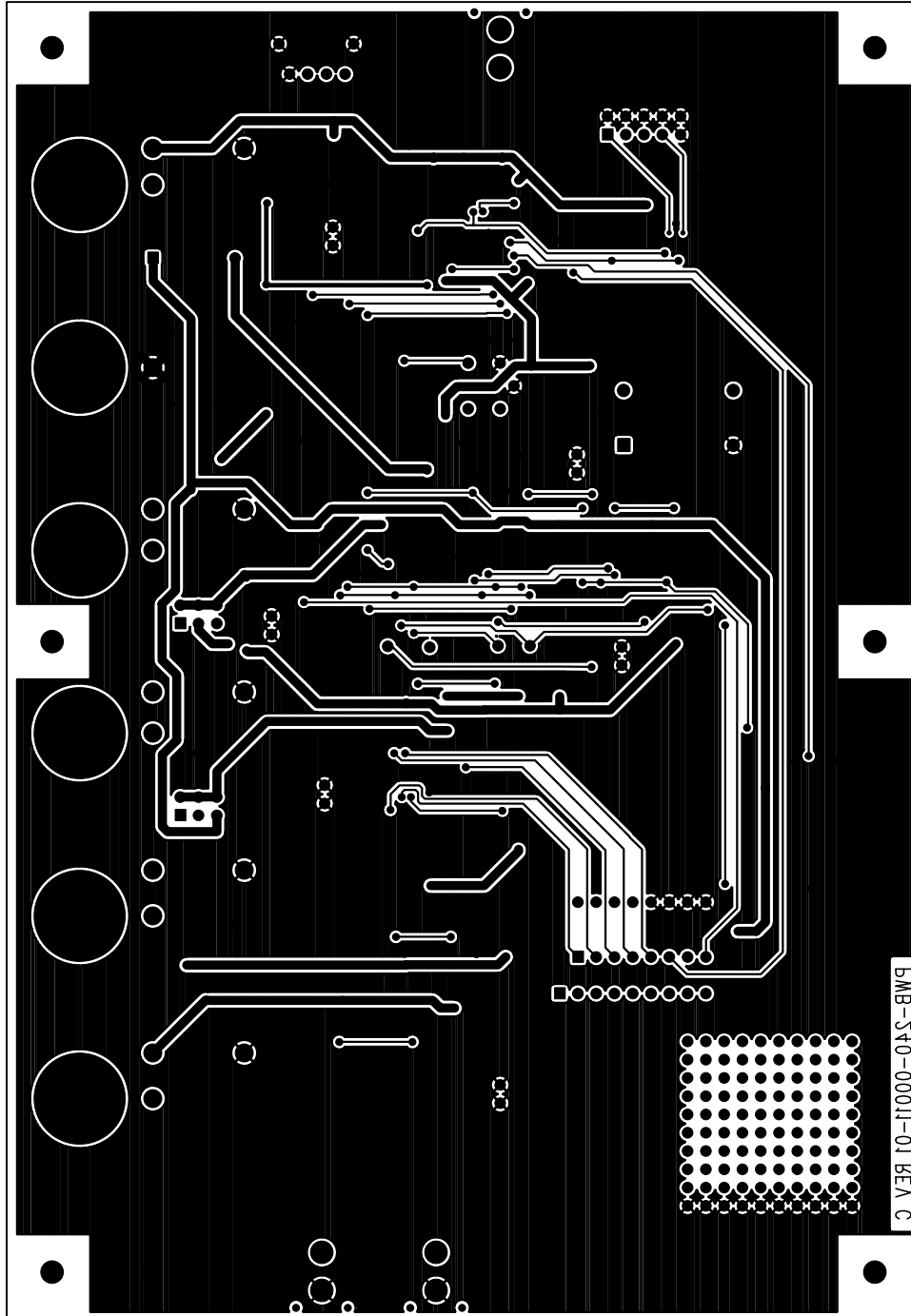


Figure 11. Bottom Layer

• **Notes** •

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