TEXAS INSTRUMENTS

DEM-DAI1802 EVM

PCM1802 With Digital Audio Transmitter

User's Guide

March 2002

DAV Digital Audio/Imaging Japan (DAL)

SLEU017

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Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

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During normal operation, some circuit components may have case temperatures greater than 55°C. The EVM is designed to operate properly with certain components above 55°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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Preface

Read This First

About This Manual

This user's guide describes the construction and circuitry of the DEM-DAI1802 demonstration board. It also contains instructions for connecting and setting up the DEM-DAI1802 for operation.

How to Use This Manual

This document contains the following chapters:

Chapter 1 – *Description*

Chapter 2 – *Schematics and Printed-Circuit Board*

Related Documentation From Texas Instruments

PCM1802 Single-Ended Analog-Input 24-Bit, 96-kHz Stereo A/D Converter – Literature No. SLES023

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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Chapter 1

Description

The DEM-DAI1802 is an evaluation board for the 96-kHz 24-bit PCM audio A/D converter, PCM1802, with digital audio transmitter, mode controls switch, onboard oscillator, –6 dB amplifier, and LPF.

The DEM-DAI1802 operates from 5 V and ±15 V analog power supplies with a 1-V RMS or 2-V RMS unbalanced analog signal input.

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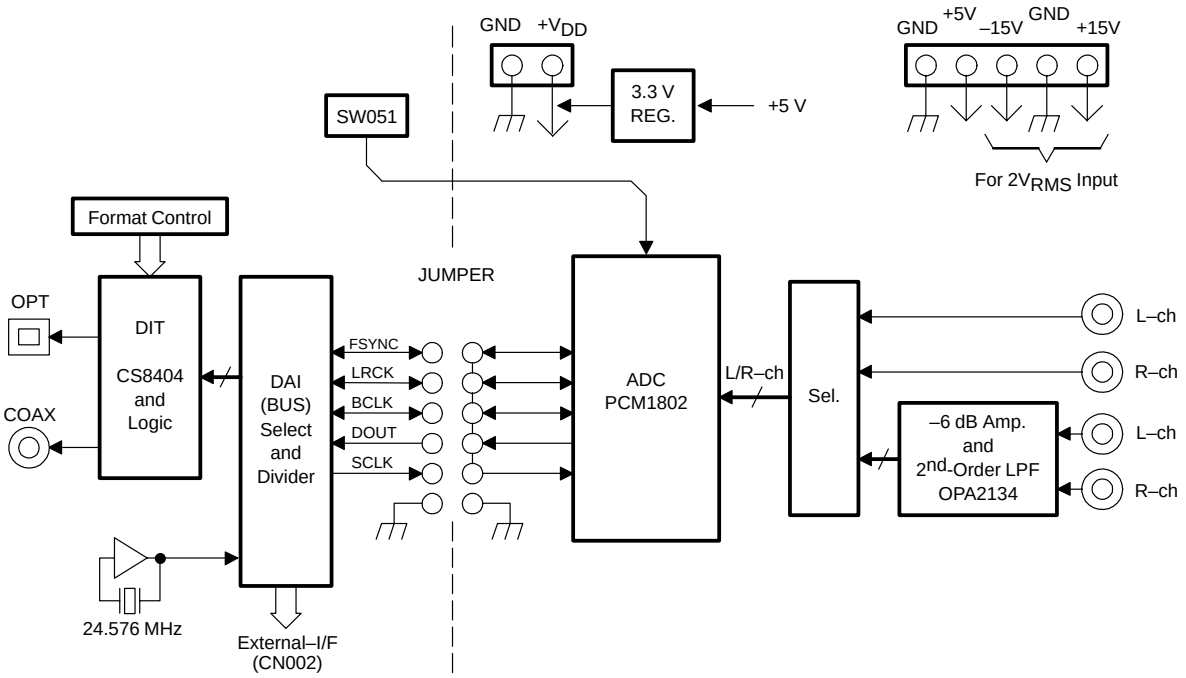
1.1 Block Diagram

Figure 1–1. DEM-DAI1802 Block Diagram



1.2 DEM-DAI1802 Basic Connection and Operation

- ❏ Connect the 5.0-V and ±15-V power supplies to the V_{CC}, AV_{CC}, $–AV_{CC}$, and GND on connectors CN051–CN055. The ±15-V supplies are required only for 2-V RMS input.
- ❏ Connect the S/PDIF output to CN003 (COAX) or U001 (OPT).
- ❏ Ensure the presence of a system clock, supplied from the onboard oscillator or external input clock connector (CN001) through switch/jumper to PCM1802.
- ❏ Set the data format using SW001, JP003, and SW051.
- ❏ Select the master or slave mode using SW002, SW051, JP002, JP004, and JP052.

1.2.1 Configuration Controls

Table 1–1. Analog Input Selection (JP101/102)—CN101/102 for 2 V RMS, CN103/104 for 1 V RMS

Input	Jumper-Pin Position
1-V RMS	Direct-IN
2-V RMS	–6dB/LPF

Table 1–2. PCM1802: HPF Bypass Control (SW051)

HPF Bypass	BYPAS (SW051)
Enable	H
Disable	L

Table 1–3. PCM1802: Oversampling Control (SW051)—64 f_S or 128 f_S

Oversampling	OSR (SW051)
×128 f_S	H
×64 f_S	L

Table 1–4. PCM1802: Master/Slave and Oversampling Rate Selection (JP002/004/052 and SW002/051)

MODE	SYSCLK	MODE1 (SW051)	MODE0 (SW051)	M/S select (SW002)	BCK sel (JP002)	LRCK sel (JP004)	FSYNC (JP052)
Master mode	512 f_S	L	H	Master	Remove jumper-pin	Remove jumper-pin	Remove jumper-pins
	384 f_S	H	L				
	256 f_S	H	H				
Slave mode	Auto-detect	L	L	Slave	Select /2, /4, or /8 (See Table 1–6)	Select /128, /256, or /512 (See Table 1–7)	Install SLAVE jumper-pin

Table 1–5. System-Clock Dividing Ratio for MCK: 128 f_S-CS8404 (JP001)

Dividing Ratio	Jumper-Pin Position	MCK Value (24.576 MHz oscillator: default)
1/1	/1	—
1/2	/2	12.288 MHz (128 f_S for f_S = 96 kHz)
1/4	/4	6.144 MHz (128 f_S for f_S = 48 kHz)

Table 1–6. Bit-Clock Dividing Ratio (JP002)

Dividing Ratio	Jumper-Pin Position	BCK Value (24.576 MHz oscillator: default)
1/2 (Slave)	/2	12.288 MHz (64 f_S for f_S = 192 kHz)
1/4 (Slave)	/4	6.144 MHz (64 f_S for f_S = 96 kHz)
1/8 (Slave)	/8	3.072 MHz (64 f_S for f_S = 48 kHz)
– (Master)	Remove	—

Table 1–7. LR-Clock Dividing Ratio (JP004)

Dividing Ratio	Jumper-Pin Position	MCK Value (24.576 MHz oscillator: default)
1/128 (Slave)	/128	192 kHz
1/256 (Slave)	/256	96 kHz
1/512 (Slave)	/512	48 kHz
– (Master)	Remove	—

Table 1–8. Data Format Selection (JP003 and SW051)

Data Format	JP003	FMT1	FMT0
PCM, left justified, 24 bit	L/J 24	L	L
PCM, I^2S, 24 bit	I^2S	L	H

Table 1–9. System Clock Source Selection (JP005)—Internal Clock: X001/24.576 MHz, External Clock Input: CN001

Clock Source	Jumper-Pin Position
Internal	INT
External	EXT

Table 1–10. Manual Reset (SW003)

Reset switch for CS8404

Figure 1–2. Digital Signal I/F to PCM1802 (JP052)

The digital signals generated by the internal oscillator, divider, and PCM1802 are input to this jumper. For each shorted pin the corresponding digital signal is input to the PCM1802 and CS8404.

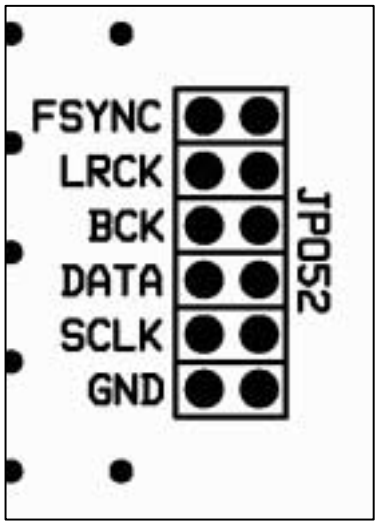


Table 1–11. S/PDIF Transmitter Format: CS8404 Configuration (SW004)

Professional Mode			**Consumer Mode**		
Switch	**L=0, H=1**		**Switch**	**L=0, H=1**	
PRO	0	Professional mode	PRO	1	Consumer mode
C9		C8,C9,C10,C11 – Channel mode (1 of 4)	C15		Generation status
	1	0000 – Not indicated (default: 2-ch)		1	0 – (see the S/PDIF standard)
	0	0100 – Stereophonic		0	1 – (see the S/PDIF standard)
EM1,EM0		C2,C3,C4 – Emphasis (2 of 3)	C8,C9		C8–C14 – Category code (2 of 7)
	1 1	Not indicated (default: none)		1 1	0000 0000 – General
	1 0	No emphasis		1 0	0100 0000 – PCM encoder/decoder
	0 1	50/15Us		0 1	1000 0000 – CD
	0 0	CCITT J.17		0 0	1100 0000 – DAT
C6,C7		C6,C7 – Sample frequency	C3		C3,C4,C5 – Emphasis (1 of 3)
	1 1	Not indicated (default: 48 kHz)		1	000 – None
	1 0	48 kHz		0	100 – 50/15Us
	0 1	44.1 kHz	C2		C2 – Copy/copyright
	0 0	32 kHz		1	0 – Copy inhibited/copyright asserted
C1		C1 – Audio		0	1 – Copy permitted/copyright not asserted
	1	0 – Normal audio	FC1, FC0		C24,C25,C26,C27 – Sample frequency
	0	1 – Nonaudio		1 1	44.1 kHz
TRNPT		Transparent mode		1 0	48 kHz
	0	0 – Normal operation		0 1	32 kHz
	1	1 – Transparent mode		0 0	44.1 kHz, CD mode

Chapter 2

Schematics and Printed-Circuit Board

This chapter presents the DEM-DAI1802 printed-circuit board and the DEM-DAI1802 schematics.

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2.1 DEM-DAI1802 Printed-Circuit Board

Figure 2–1. DEM-DAI1802 Silkscreen

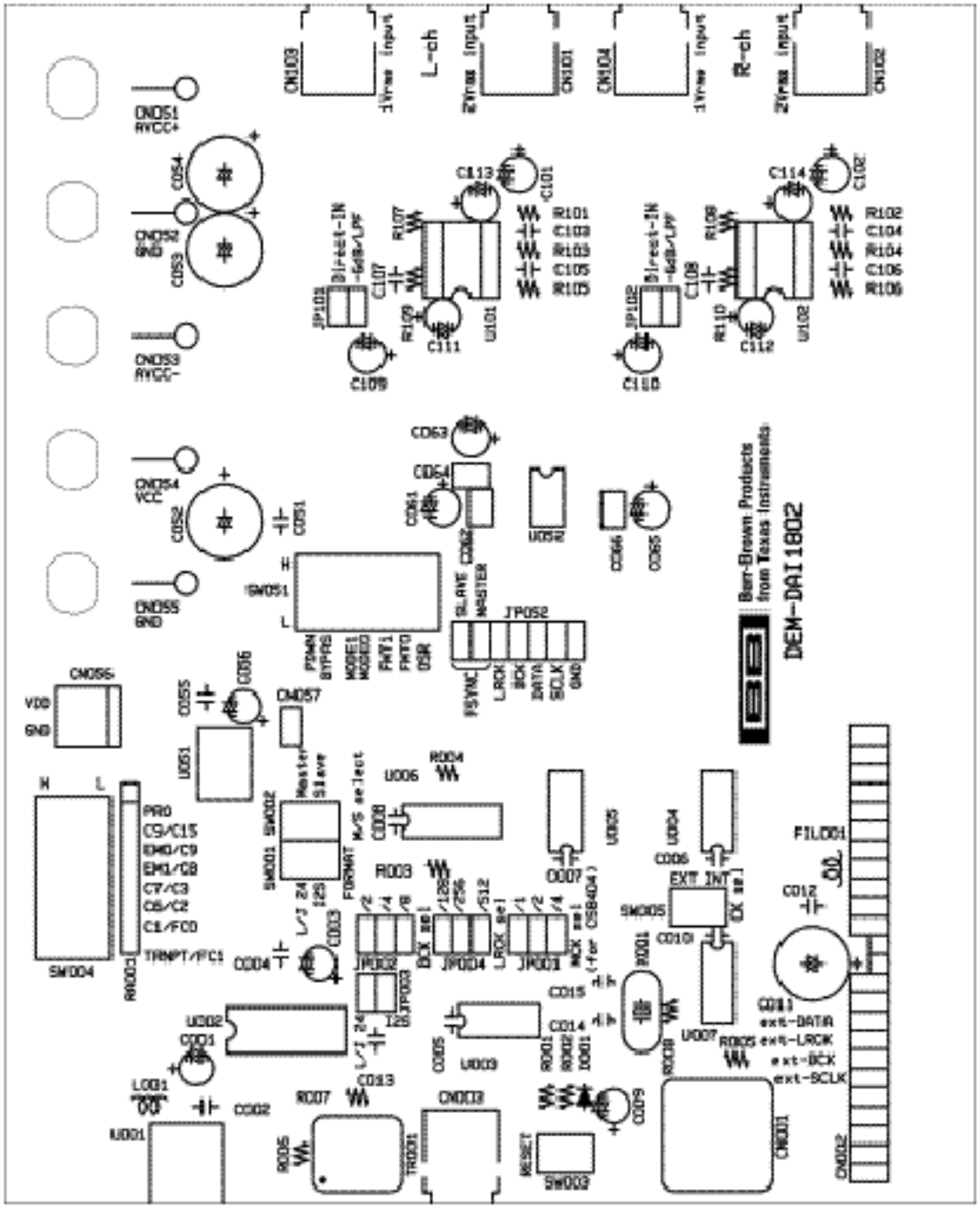


Figure 2–2. DEM-DAI1802 Top VIew

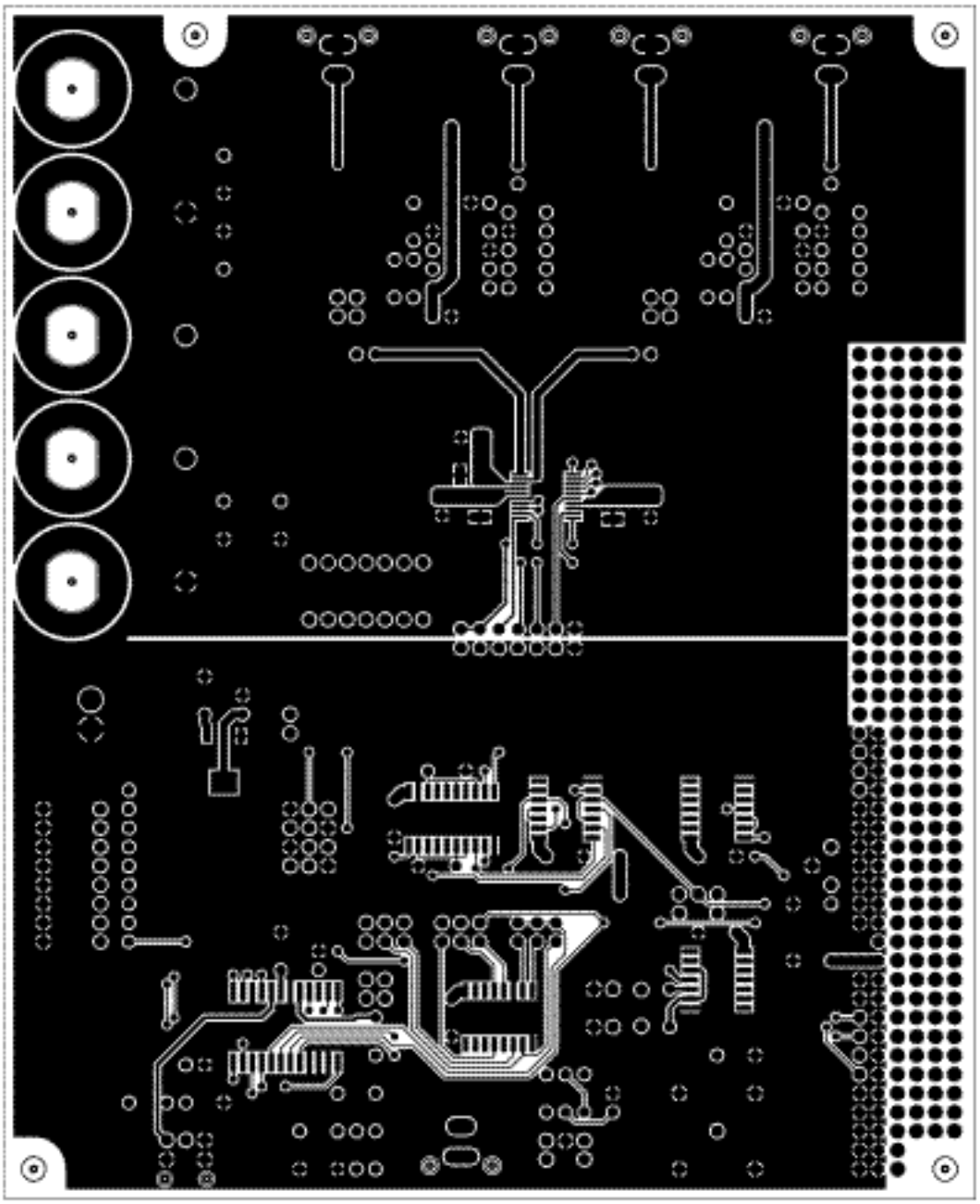
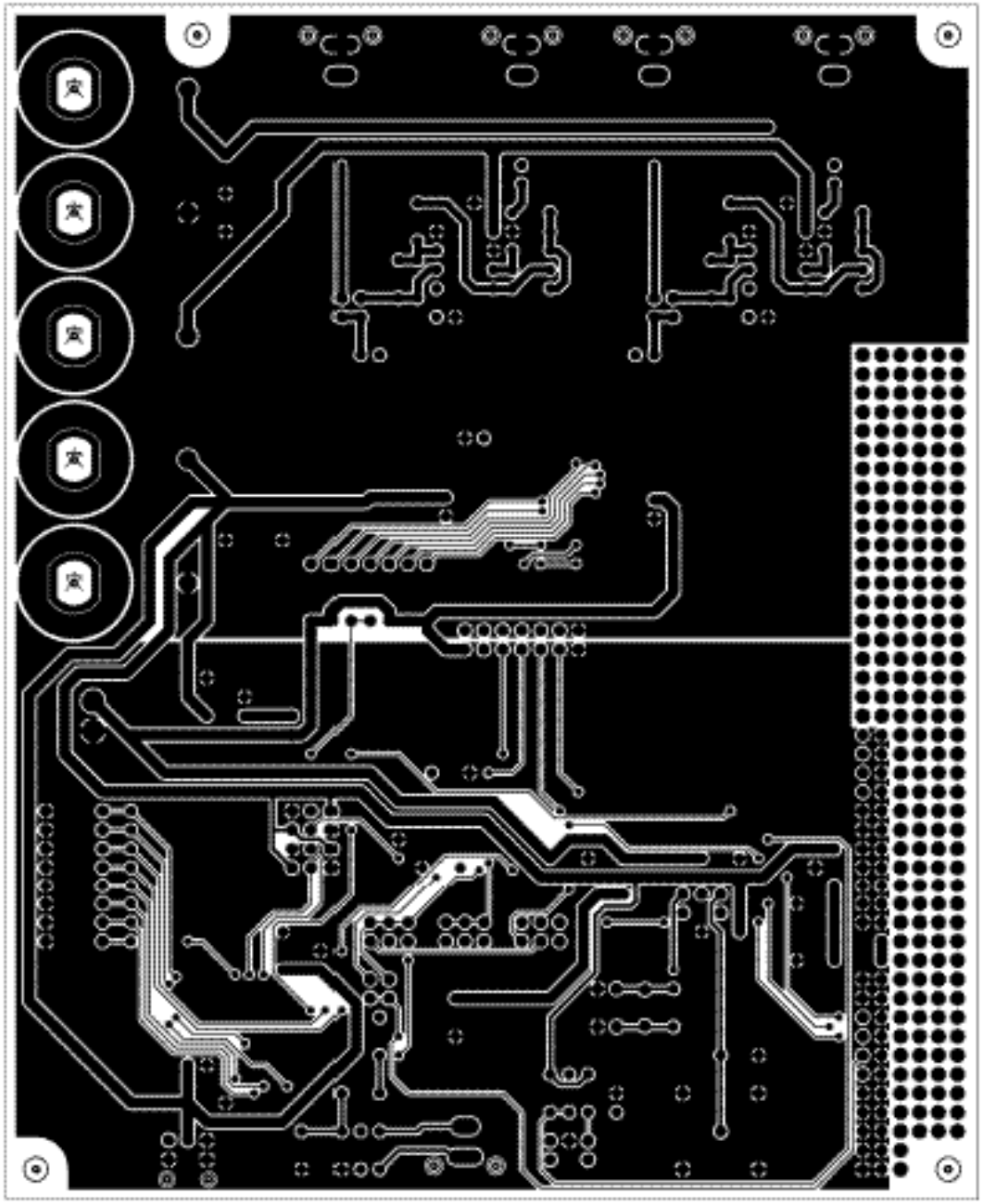


Figure 2–3. DEM-DAI1802 Bottom View



2.2 DEM-DAI1802 Schematics

Figure 2–4. DEM-DAI1802 Analog Section Schematic Diagram

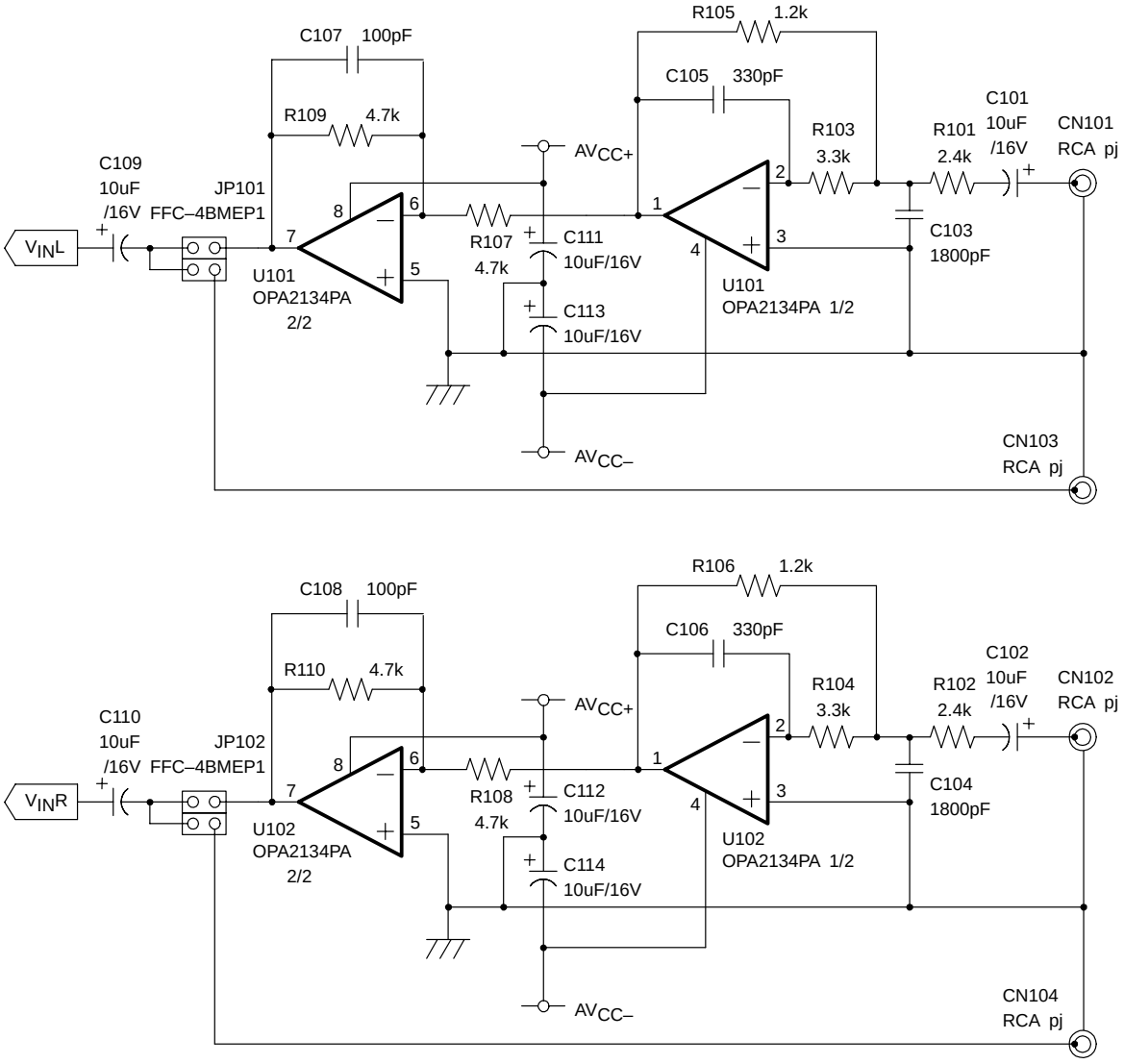


Figure 2–5. DEM-DAI1802 A/D Converter Section Schematic Diagram

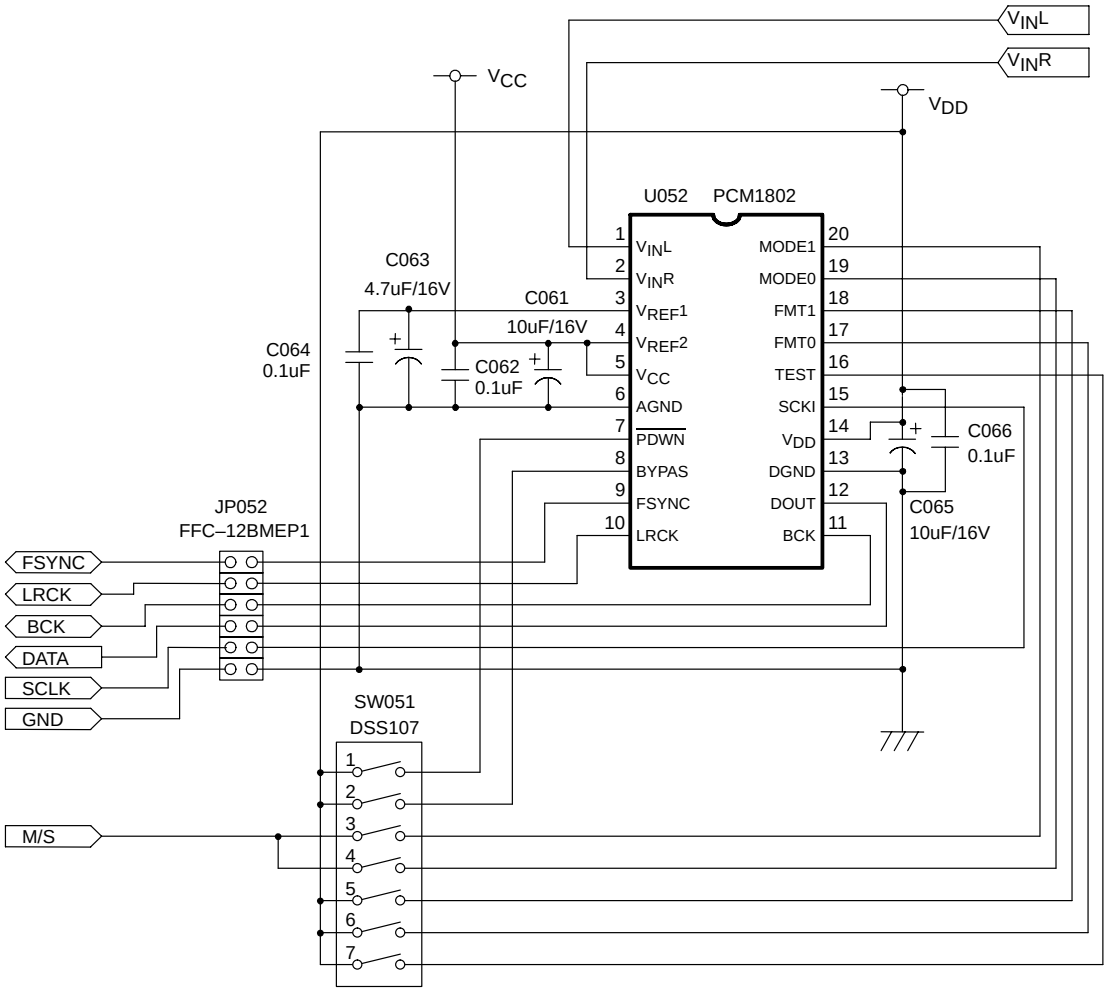


Figure 2–6. DEM-DAI1802 Regulator and Connector Schematic Diagram

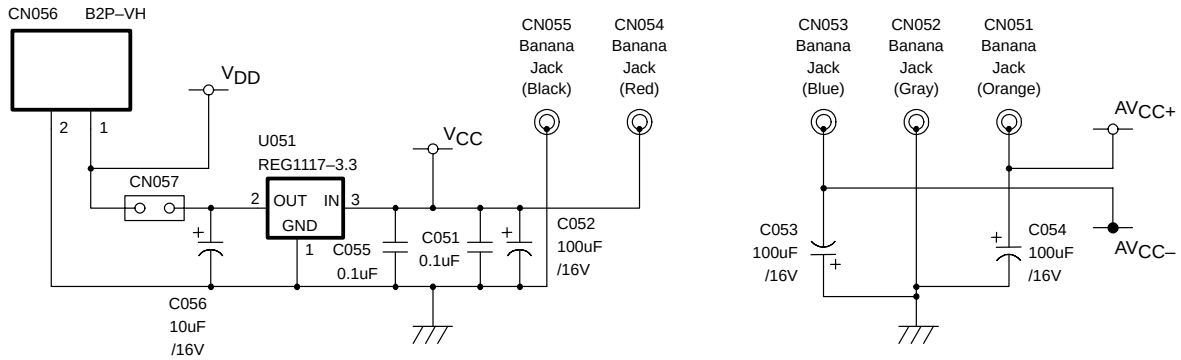


Figure 2–7. DEM-DAI1802 Digital Section (Digital Audio Interface)Schematic Diagram