

# **DEM-DAI1770/1771 EVM**

## *User's Guide*

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## **EVM WARNINGS AND RESTRICTIONS**

It is important to operate this EVM within the input voltage range of 5 V and the output voltage range of 5 V.

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.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

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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# Description

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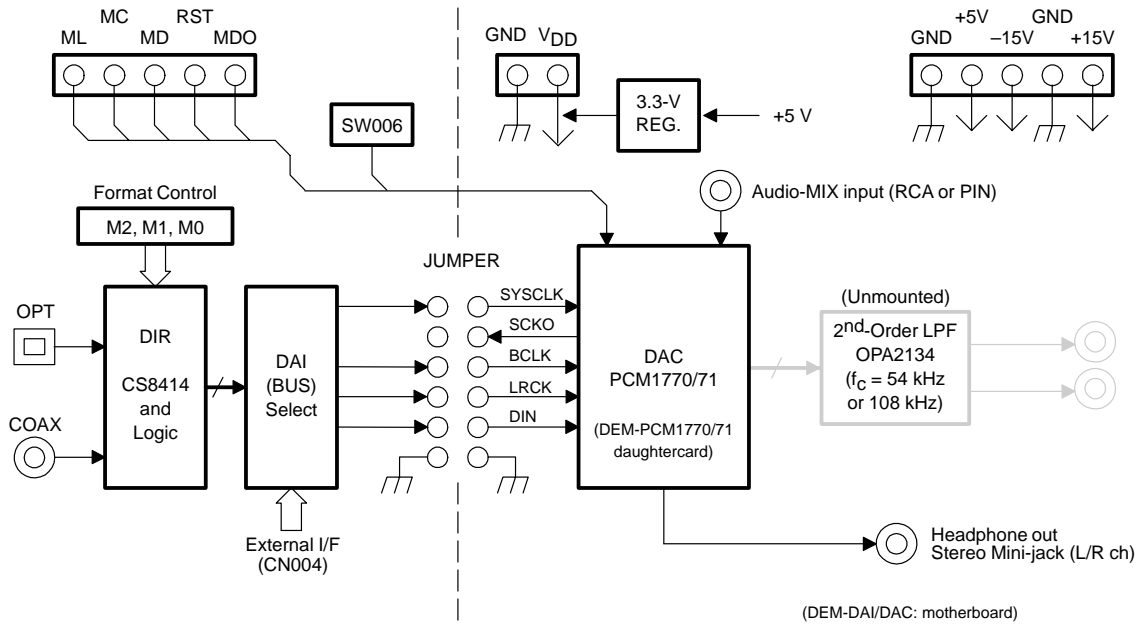
The DEM-DAI1770/1771 is an evaluation board for the PCM1770/1771, a 24-bit, 50-kHz, two-channel audio DAC with digital audio receiver, mode control switch, analog mixing input, stereo headphone output, and more.

Although the PCM1770/1771 requires a 2.5-V or 3.3-V supply, the DEM-DAI1770 operates from a 5-V analog power supply with S/PDIF input signal and has an onboard 2.5-V or 3.3-V voltage regulator. In order to control the PCM1770/1771, demonstration software (only for PCM1770) is provided. This software controls the device via a PC-compatible parallel port.

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## 1.1 Block Diagram

Figure 1–1. DEM-DAI1770/1771 Block Diagram



## 1.2 DEM-DAI1770/1771 Basic Connection and Operation

- Connect a 5-V power supply to  $V_{CC}$  and GND on connectors CN054 and CN055, respectively.
- Connect the S/PDIF signal into CN001 (COAX) or U001 (OPT).
- The system clock and other digital signals are supplied from a digital audio receiver through jumpers to the PCM1770/1771.
- Set the input data format using switches SW001–SW003 and the demonstration software (PCM1770) or switch SW006 (PCM1771).
- For the PCM1770: Set all the DIP switches in SW006 to H for software control.
- For the PCM1771: Set DIP switches in SW006 as in Table 1–2 for manual configuration control.
- Connect a mini-jack headphone or audio cables to the CN003 stereo headphone output (0.55  $V_{HP-PP}$  full scale).
- Connect an external audio RCA cable to CN002 as an analog mixing input if necessary (0.584  $V_{HP-PP}$  full scale).



## 1.2.1 Configuration Controls

Table 1–1. SW001/002/003: CS8414 (Digital Audio I/F Receiver) on DEM-DAI/DAC Board

SW001 (M0)	SW002 (M1)	SW003 (M2)	Data Format Selection
L	L	L	16–24-bit left-justified, MSB-first
L	H	L	I <sup>2</sup> S
H	L	H	16-bit standard, right-justified
L	H	H	18-bit standard, right-justified

SW004: Manual reset

SW005: Digital audio interface selection

Internal – CS8414

External – (CN004)

JP001 : BCK selection

When using left-justified MSB-first data format, remove the jumper from BCK to BCK (left justified).

Table 1–2. SW006: Hardware Control (Only for the PCM1771)

Position	SW006(ML) Audio I/F Data Format	SW006(MD) De-Emphasis Selection	SW006(MC) Analog Mixing Control
L	16 to 24 bits, left-justified format	44.1-kHz de-emphasis off	Analog mixing off
H	16 to 24 bits, I <sup>2</sup> S format	44.1-kHz de-emphasis on	Analog mixing on

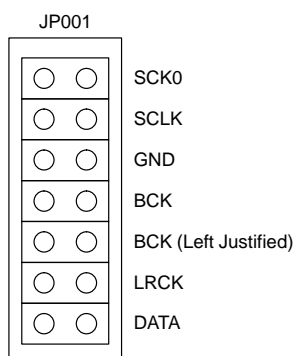
## 1.3 Jumpers

There are two jumpers onboard.

- JP001: for digital signals
- CN057: for 3.3-V power supply

### 1.3.1 JP001

The digital signals generated by the digital audio receiver are input to this jumper. For each shorted pair of pins, the corresponding digital signal is input to the PCM1770/1771.



### 1.3.2 CN057

The board has a 3.3-V voltage regulator for the digital power supply of U003/005/006. This jumper determines whether the onboard voltage regulator is used or not.

CN057 shorted

Supply 3.3 V from the onboard voltage regulator, REG1117-3.3.

CN057 open

Use an external 3.3-V power supply.

### 1.3.3 SW001 on PCM1770/1771 Daughtercard

Power-down (PD) operation can be switched by SW001 on the PCM1770/1771 daughtercard.

L: Power-down operation

H: Normal operation

## 1.4 Demonstration Software (Version 1.0) for the PCM1770

Demonstration software is provided to control the PCM1770 internal register using a PC under Microsoft Windows™ 3.1/95/98. For use of this software a printer cable is required to connect between the PC and connector CN003 of the DEM-DAI1770.

### 1.4.1 Installation

The demonstration software includes a total of five files in the DEM1770 directory (folder) on a floppy disk. These files are

Dem1770.exe

Dem1770.ini

Vbrjp200.dll

inpout.dll

Ver.dll

Copy these files to an appropriately named directory (folder) such as

C:\DEM1770. Then change the printer port address in Dem1770.ini to &H378, &H278 or &H3BC (most PCs use &H378 as the default printer port address).

## 1.4.2 Operation

After starting execution of Dem1770.exe, the following window appears on screen. This panel shows contents of internal register.



There are two menus on top of the panel.

Execute (E):

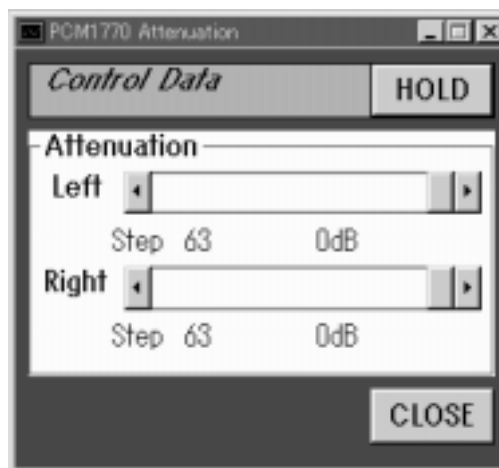
Initialize (I): Initialize all internal registers

Reset (R) : Reset all selected data to PCM1770

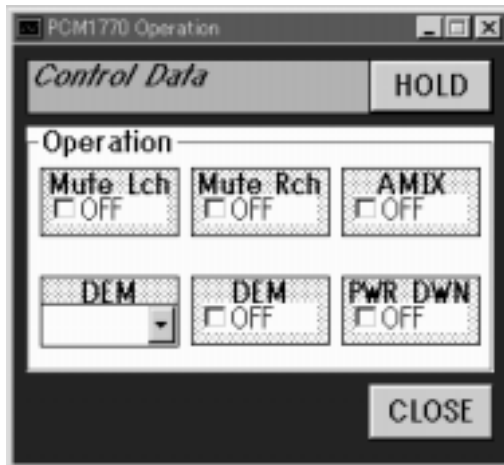
Exit (X) : Exit this program

Window (W):

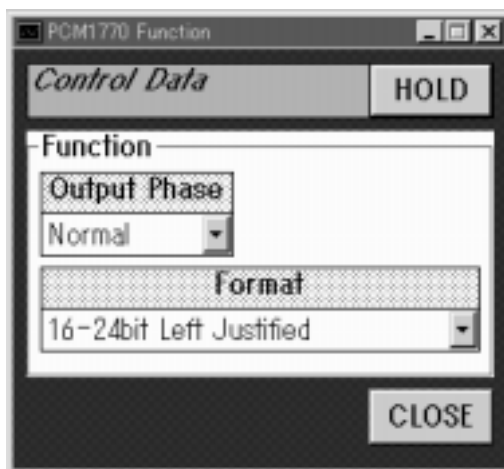
Attenuation (A) : This panel controls the attenuation function of the PCM1770.



Operational control (O): This panel controls mute, DAC operation, de-emphasis, analog mixing, and the power-down function.



Functional control (F) : This panel controls the clock format and output phase functions.



# Schematics and Printed-Circuit Boards

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This chapter presents the DEM-DAI/DAC and the DEM-PCM1770/1771 printed-circuit boards and schematic diagrams.

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## 2.1 DEM-DAI/DAC Printed-Circuit Board

Figure 2–1. DEM-DAI/DAC Silkscreen

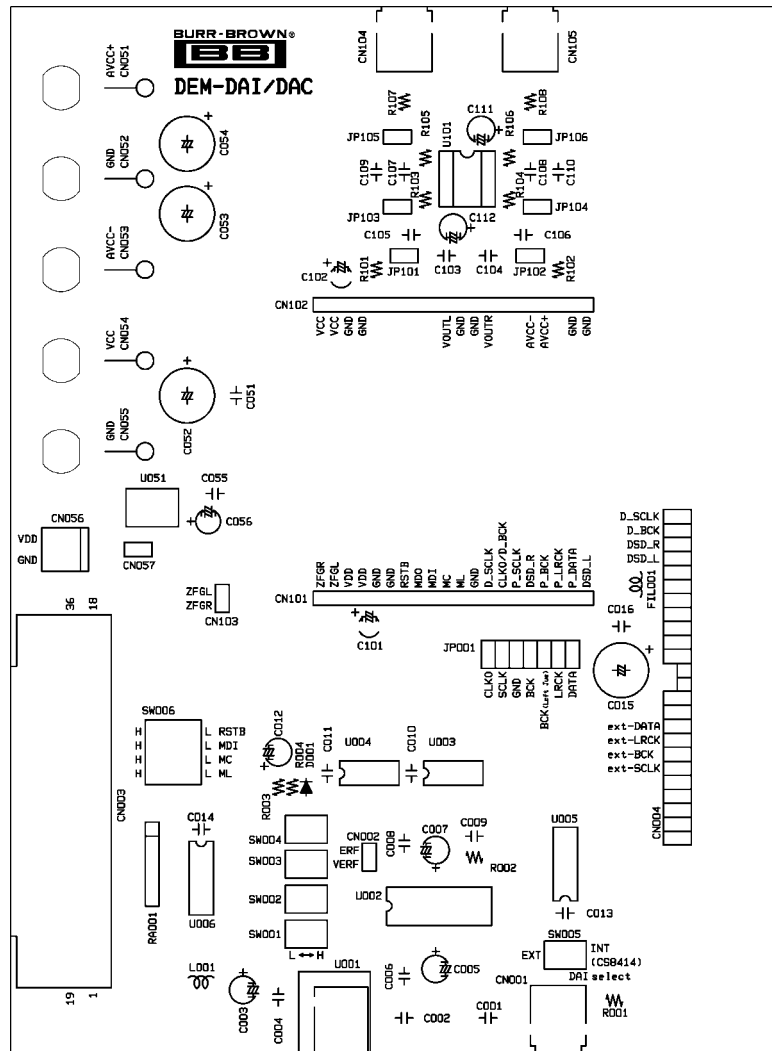


Figure 2-2. DEM-DAI/DAC Top View

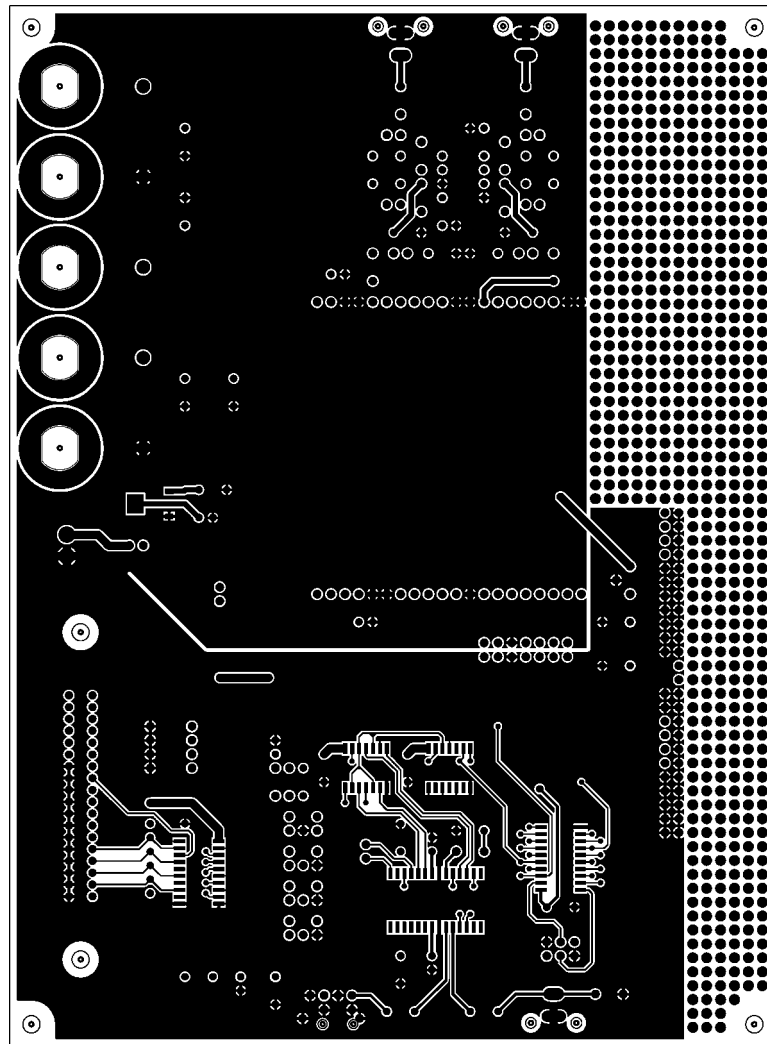
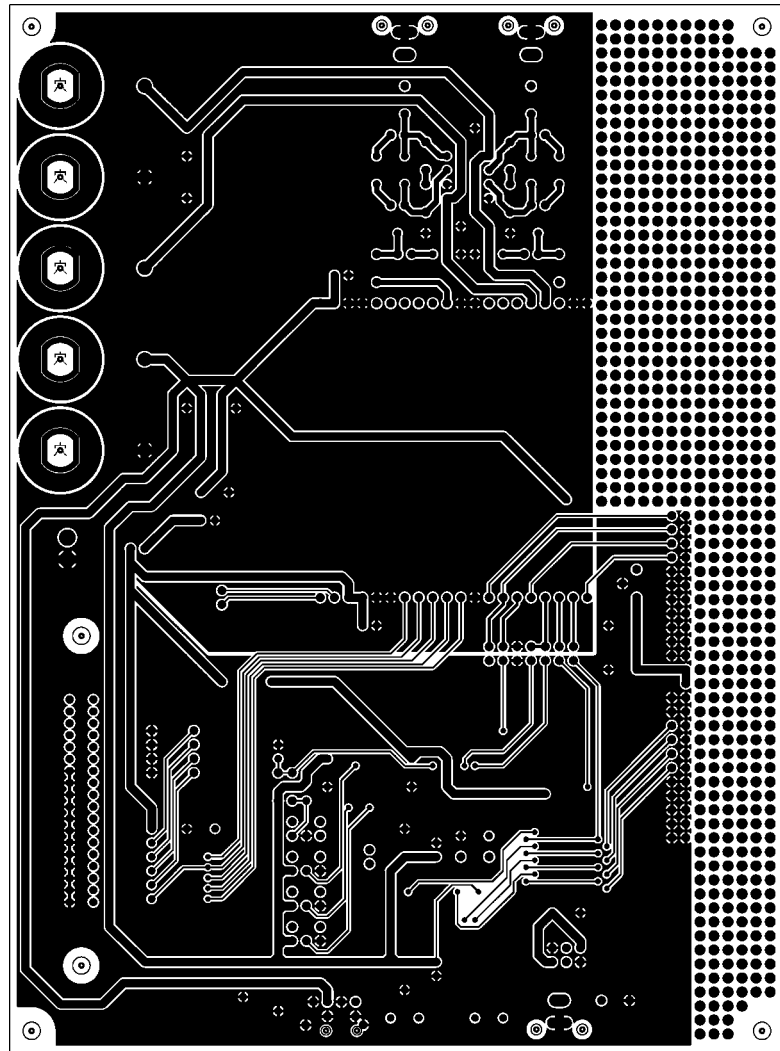


Figure 2–3. DEM-DAI/DAC Bottom View





## 2.2 DEM-PCM1770/1771 Daughtercard Printed-Circuit Board

Figure 2–4. DEM-PCM1770/1771 Silkscreen

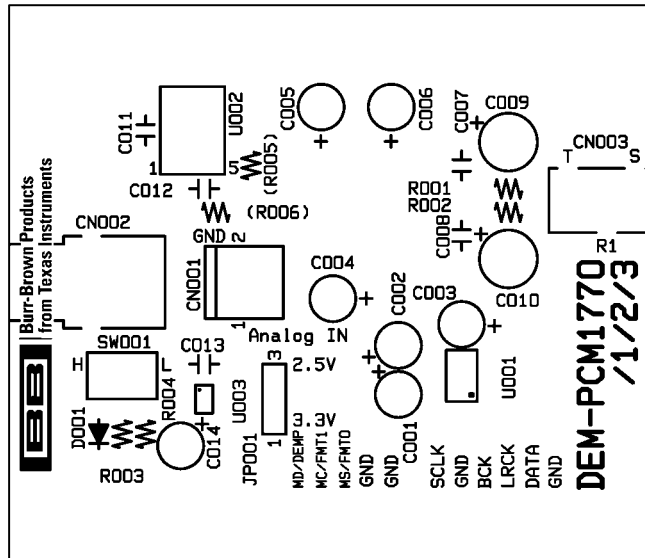


Figure 2–5. DEM-PCM1770/1771 Top View

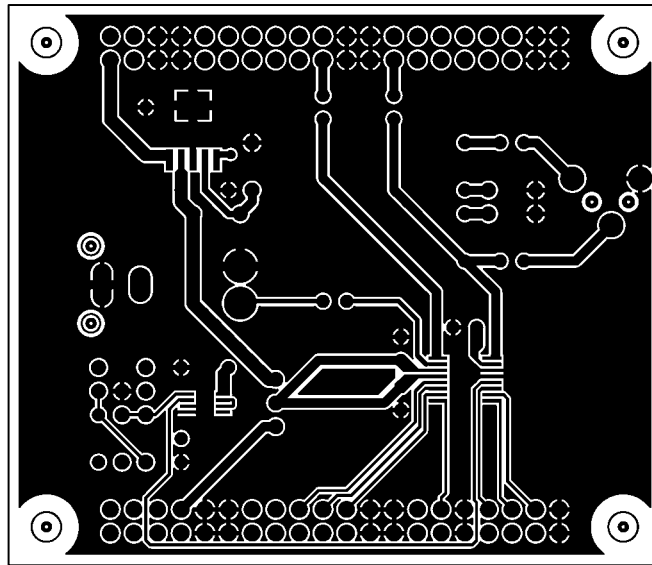
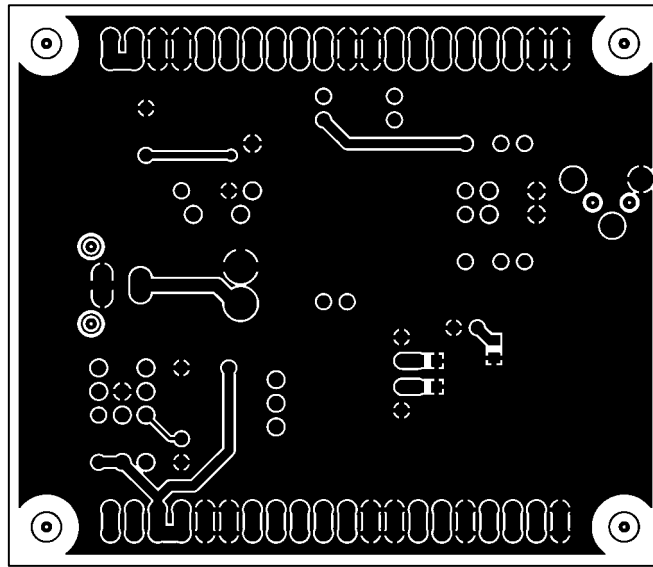


Figure 2–6. DEM-PCM1770/1771 Bottom View



### 2.3 DEM-DAI/DAC Schematics

Figure 2-7. DEM-DAI/DAC Daughtercard Sockets

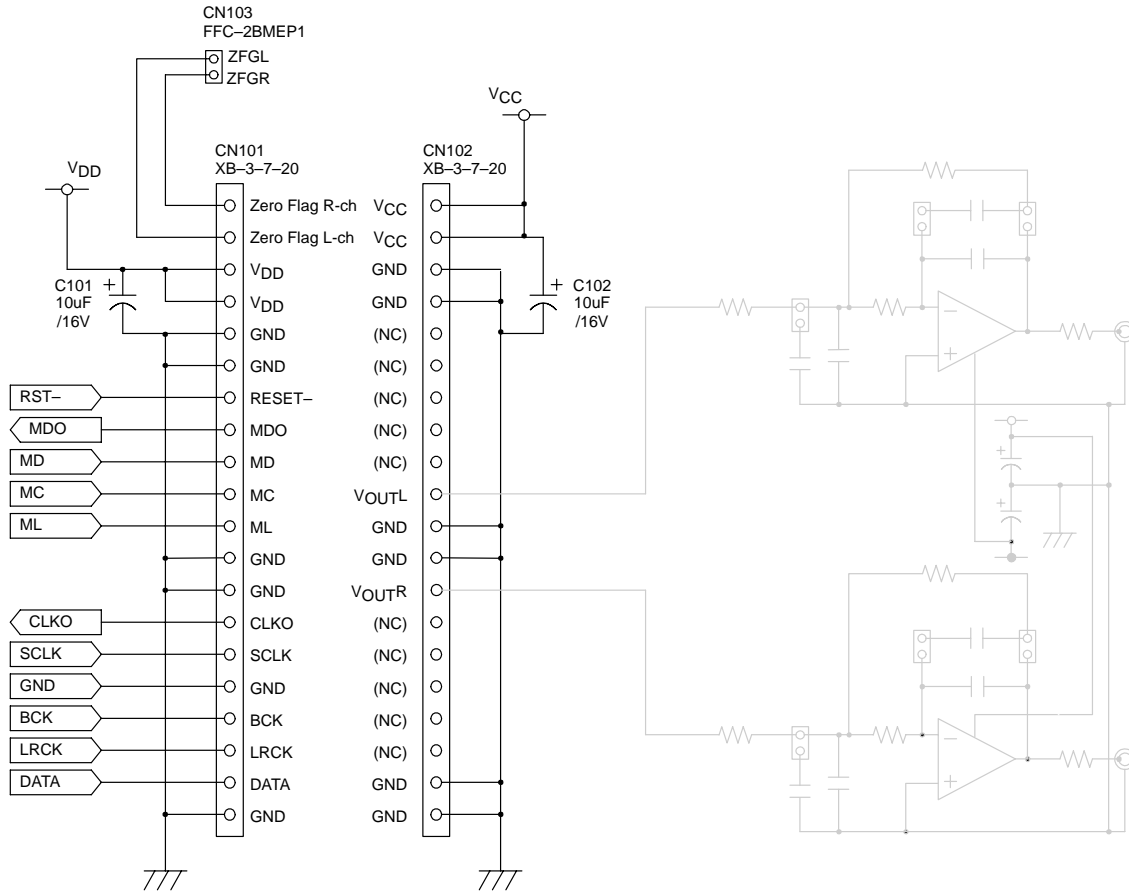


Figure 2-8. DEM-DAI/DAC Connector and Regulator

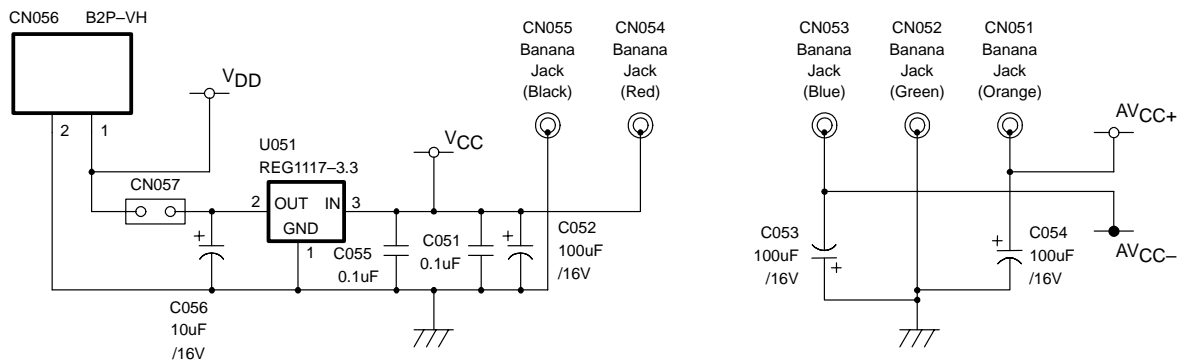
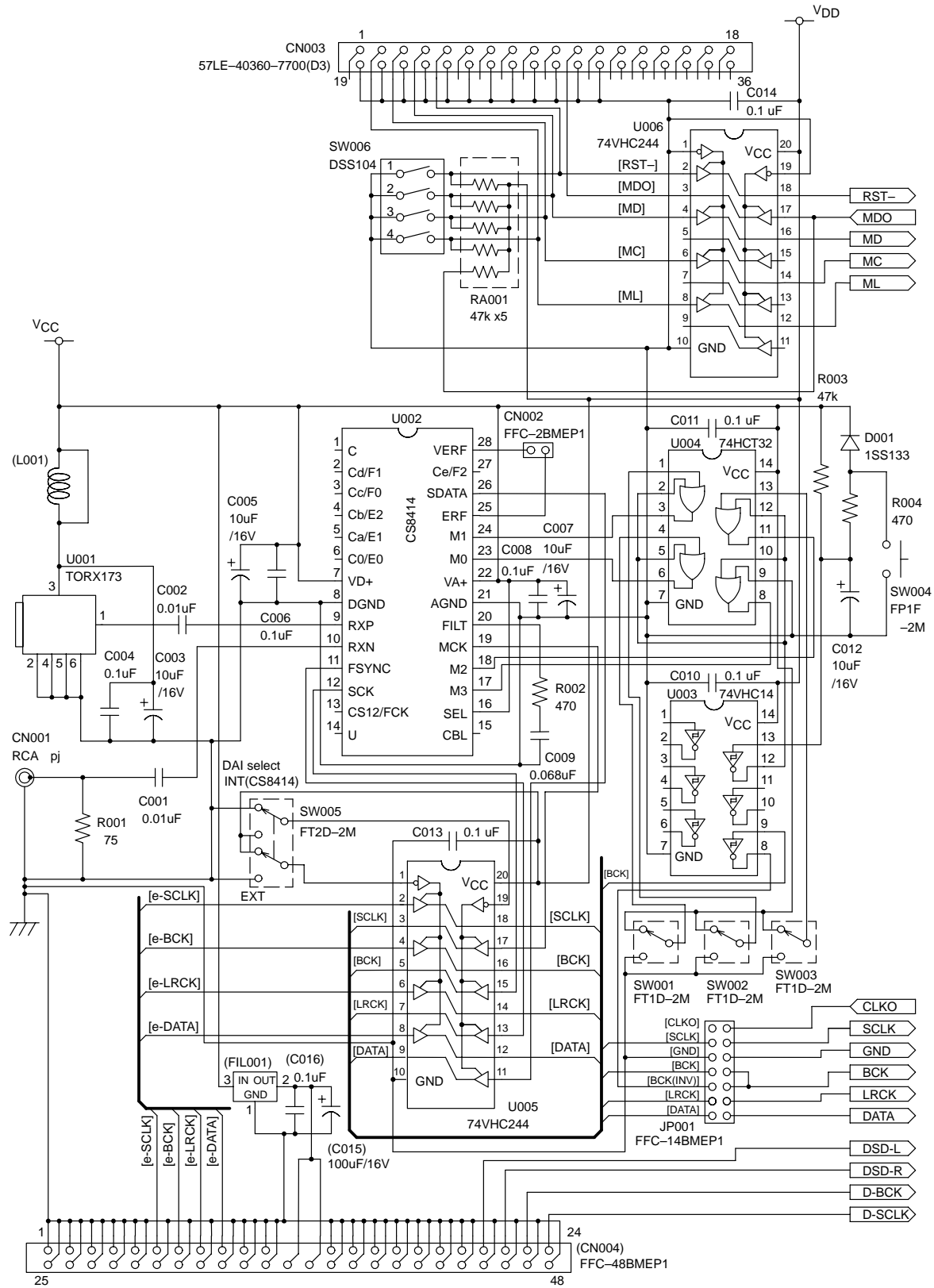


Figure 2–9. DEM-DAI/DAC Digital Audio Interface



## 2.4 DEM-PCM1770/1771 Daughtercard Schematics

Figure 2-10. DEM-PCM1770/1771

