DEM-DAI1680 PCI1680 Evaluation Board

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1 Description

DEM-DAI1680 is an evaluation board for 24-bit, 192-kHz, 8-channel audio DAC, PCM1680 with digital audio receiver, mode control switch, 8-channel second-order post filter, etc.

DEM-DAI1680 operates at +5-V, ±15-V analog power supply with SPDIF input signal.

1.1 Block Diagram

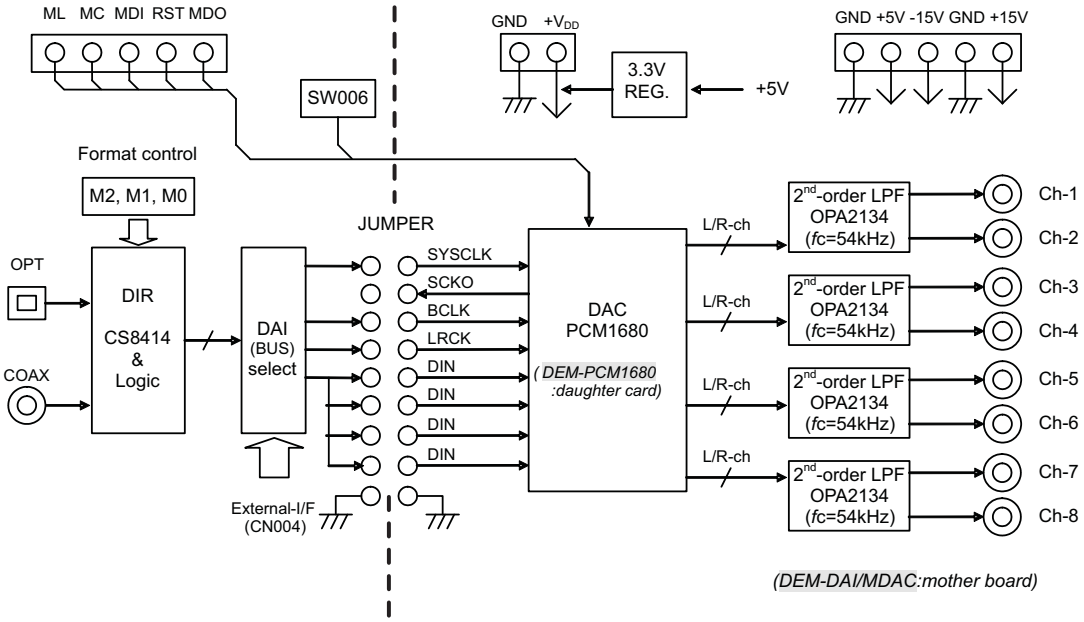


Figure 1. DEM-DAI1680 Block Diagram

1.2 DEM-DAI1680 Basic Connection and Operation

- Connect +5-V, ±15-V power supplies to +VCC, +AVCC, –AVCC, and GND on connectors CN051-055.
- Connect SPDIF signal into CN001 (COAX) or U001 (OPT).
- System clock and other digital signals are supplied from digital audio receiver through jumper to PCM1680.
- Set input data format by SW001-003 and demonstration software.

1.2.1 Configuration Controls

Table 1. SW006 for PCM1680: Data Format Selection

FMT1 (as MDI)	FMT0 (as RST)	Data Format Selection
L	L	24-bit I^2S
L	H	TDM
H	L	16-bit standard, right-justified
L	H	24-bit left-justified, MSB-first

Table 2. SW006 for PCM1680: De-emphasis Selection

FMT1 (as ML)	FMT0 (as MC)	De-emphasis Selection
L	L	OFF
L	H	48 kHz
H	L	44.1 kHz
L	H	32 kHz

Table 3. SW001/002/003: For CS8414 (Digital Audio I/F Receiver)

SW001 (M0)	SW002 (M1)	SW003 (M2)	Data Format Selection
L	L	L	16–24-Bit left-justified, MSB-first
L	H	L	I^2S
H	L	H	16-Bit standard, right-justified
L	H	H	24-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).

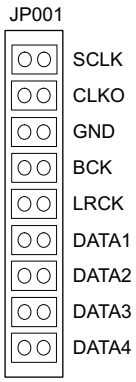
1.3 Jumpers

The following jumpers are on board:

JP001	For digital signal
CN057	For 3.3-V power supply
JP101–106	For fc of second-order post filter

1.3.1 JP001

This jumper receives the digital signal generated by digital audio receiver. If each pin is shorted, the digital signal is applied to the PCM1680.



1.3.2 JP101–106 (Six Pieces)

These jumpers determine the fc of the second-order post filter.

Short JP101–106
fc = 54 kHz
Open JP101–106
fc = 108 kHz

1.3.3 SW001 on PCM1680 Daughter Board

Position of SW001 must be R/S-16 for operation of PCM1680.

2 Schematic and Printed-Circuit Board

This section presents the DEM-DAI/MDAC and the DEM-PCM1680 printed-circuit boards and schematics.

2.1 DEM-DAI/MDAC Schematics

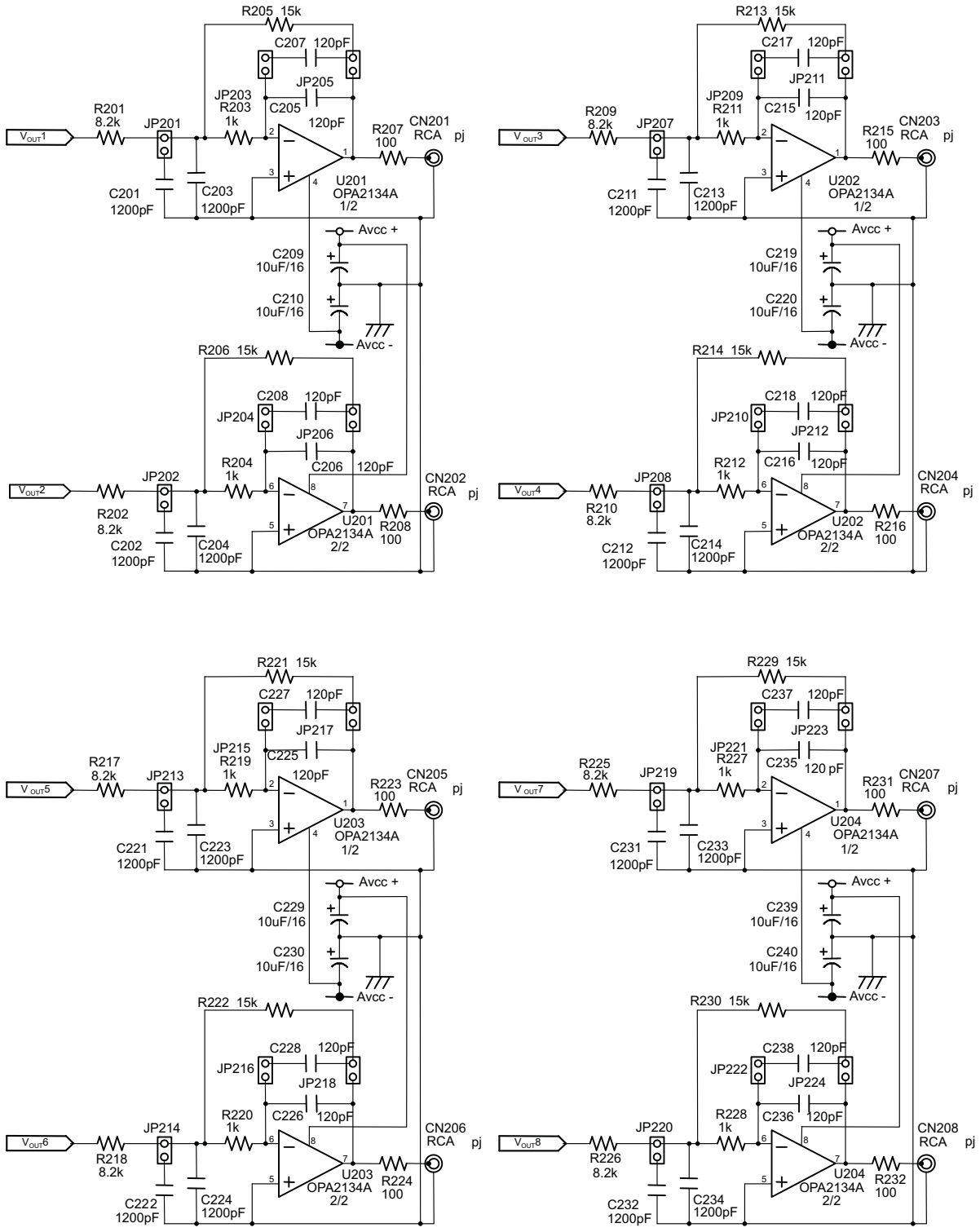


Figure 2. DEM-DAI/MDAC Low-Pass Filter

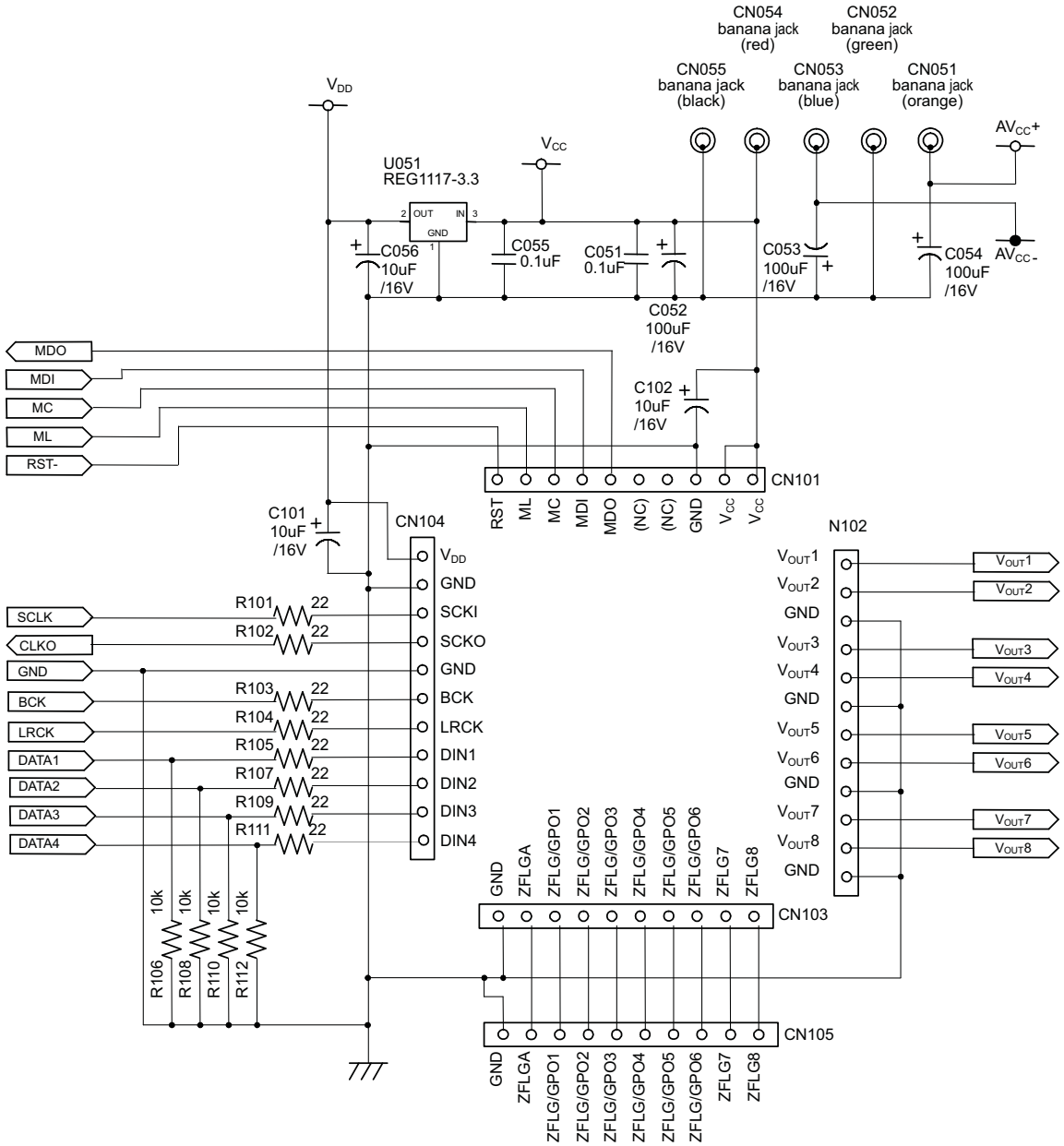


Figure 3. DEM-DAI/MDAC Daughtercard Sockets, Connector, and Regulator

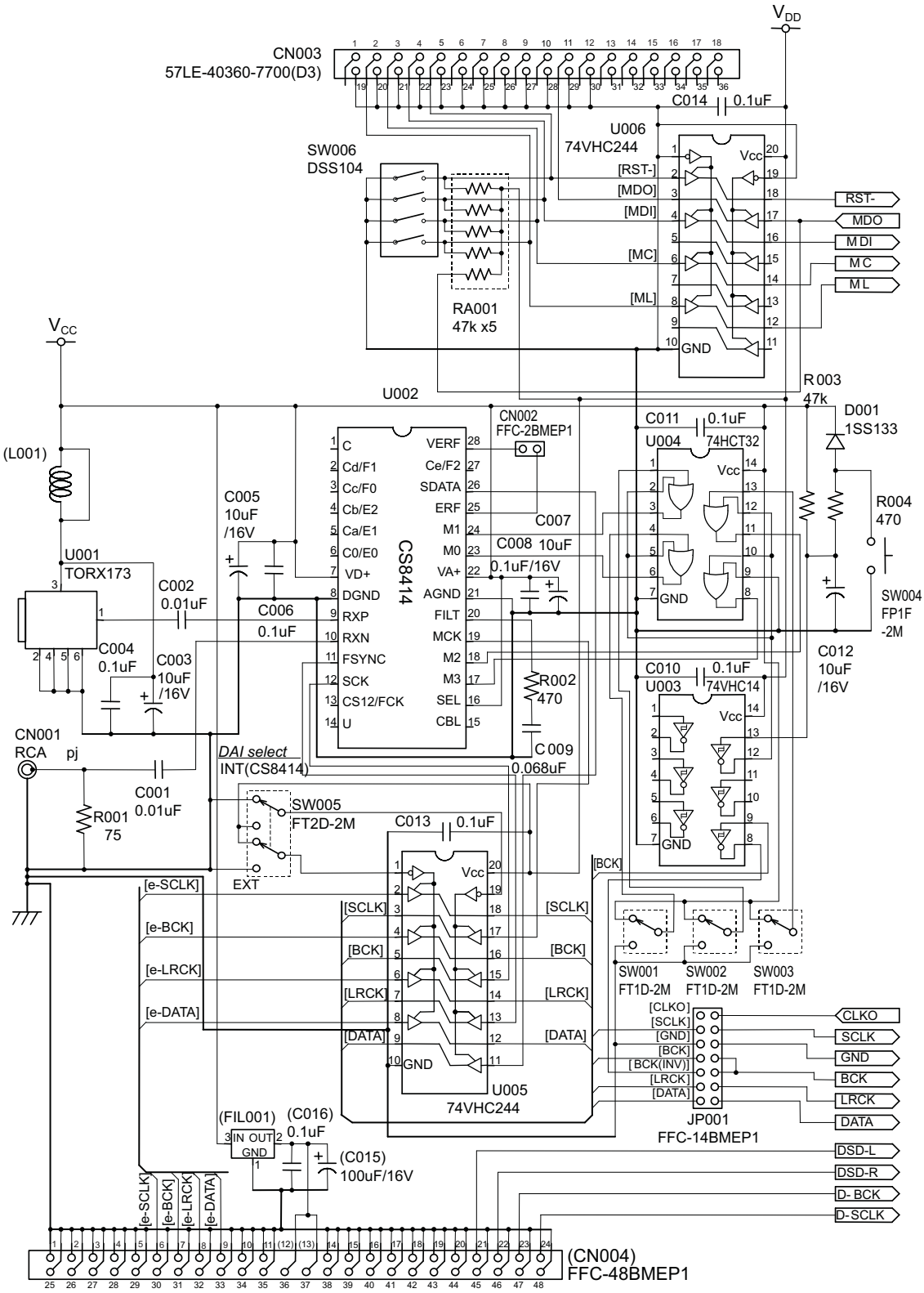


Figure 4. DEM-DAI/MDAC Digital Audio Interface Diagram

2.2 DEM-PCM1680 Schematics

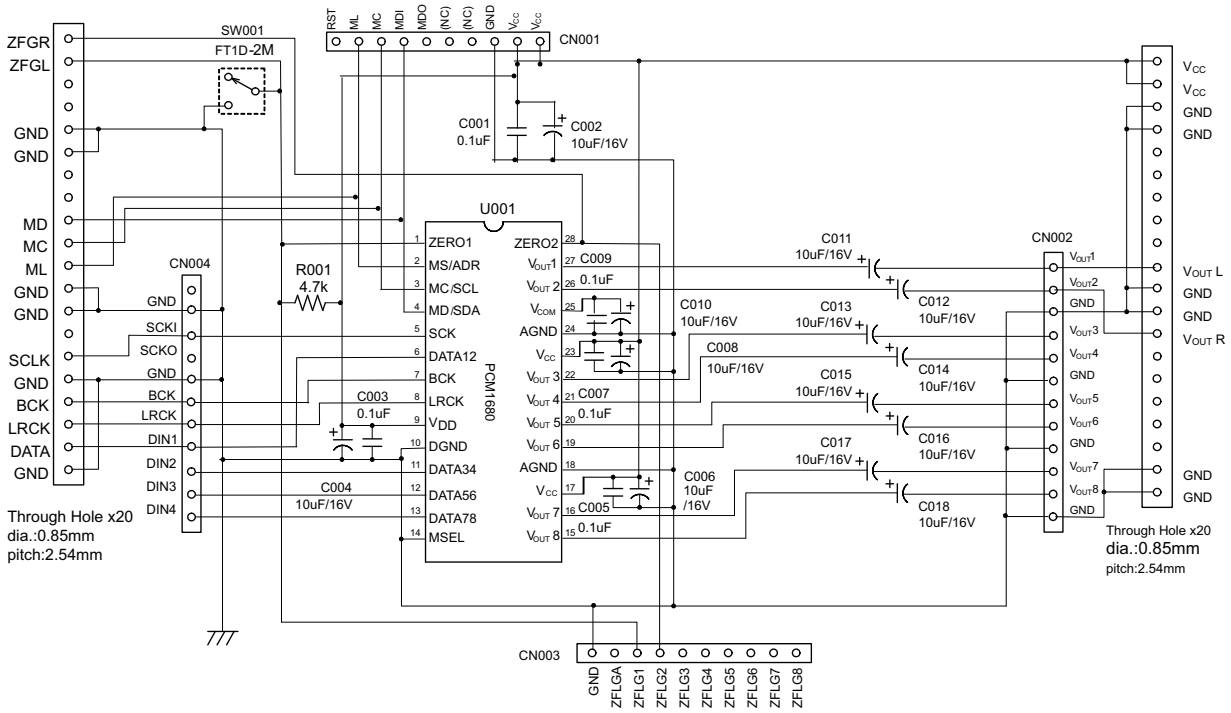


Figure 5. DEM-PCM1680

2.3 DEM-DAI/MDAC Parts List

Qty	Ref. No.	Type	Model	Value	Manufacturer
2	C001,C002	Polyester Film Capacitor	AMFF0050J103	0.01 µF	NISSEI
4	C004, C006, C008, C016,C051	Polyester Film Capacitor	AMFF0050J104	0.1 µF	NISSEI
1	C009	Polyester Film Capacitor	AMFF0050J683	0.068 µF	NISSEI
5	C010, C011, C013, C014,C055	Ceramic Capacitor	D55Y5V1H104Z51	0.1 µF	NEC
13	C003,C005,C007,C101,C102 ,C209,C210,C219,C220,C22 9,C230,C239,C240	AL EL Capacitor	ROA-16V100M	10 µF/16V	ELNA
3	C015, C052–C054	AL EL Capacitor	ROA-16V101M	100 µF/16 V	ELNA
16	C201–C204, C211–C214, C221–C224, C231–C234	Polypropylene Capacitor	APSF0100J122	1200pF	NISSEI
16	C205–C208, C215–C218, C225–C228, C235–C238	Polypropylene Capacitor	APSF0100J121	120pF	NISSEI
1	C012	AL EL Capacitor	SME16VB10M	10 µF/16 V	Nippon Chemi Con
1	C056	Tantalum Capacitor	DN1C100M1S	10 µF/16V	NEC
1	CN002	2 pin Connector	FFC-2BMEP1		HONDA TSUSHIN
1	CN003	Centronics	57LE40360-7700(D3)		DAIICHI DENSHI
2	CN101,CN103	10 pin Connector	Z-220-10FD		HONDA TSUSHIN
1	CN102	12 pin Connector	Z-220-12FD		HONDA TSUSHIN
1	CN104	11 pin Connector	Z-220-11FD		HONDA TSUSHIN
1	CN105	10 pin Connector	FFC-10AMEP1		HONDA TSUSHIN
4	CN202,CN204, CN206, CN208	RCA Connector (red)	LPR6520-0802		SMK

Qty	Ref. No.	Type	Model	Value	Manufacturer
4	CN201,CN203, CN205, CN207	RCA Connector (white)	LPR6520-0803		SMK
1	CN001	RCA Connector (yellow)	LPR6520-0804		SMK
1	CN051	Banana Jack (orange)	T-45		SATO PARTS
1	CN052	Banana Jack (green)	T-45		SATO PARTS
1	CN053	Banana Jack (blue)	T-45		SATO PARTS
1	CN054	Banana Jack (red)	T-45		SATO PARTS
1	CN055	Banana Jack (black)	T-45		SATO PARTS
1	D001	Diode	1SS133		ROHM
1	JP001	20 pin Connector	FFC-20BMEP1		HONDA TSUSHIN
24	JP201–JP224	2 pin Connector	FFC-2BMEP1		HONDA TSUSHIN
1	R001	1/4W Resistor	SN14C2C	75[Ω], F, 1/4W	KOA
8	R207,R208,R215,R216,R223,R224,R231,R232	1/4W Resistor	SN14C2C	100[Ω], F, 1/4W	KOA
2	R002, R004	1/4W Resistor	SN14C2C	470[Ω], F, 1/4W	KOA
8	R203,R204,R211,R212,R219,R220,R227,R228	1/4W Resistor	SN14C2C	1k[Ω], F, 1/4W	KOA
4	R106,R108,R110,R112	1/4W Resistor	SN14C2C	10k[Ω], F, 1/4W	KOA
8	R201,R202,R209,R210,R217,R218,R225,R226	1/4W Resistor	SN14C2C	8.2k[Ω], F, 1/4W	KOA
8	R205,R206,R213,R214,R221,R222,R229,R230	1/4W Resistor	SN14C2C	15k[Ω], F, 1/4W	KOA
1	R003	1/4W Resistor	SN14C2C	47k[Ω], F, 1/4W	KOA
8	R101–R105,R107,R109,R111	1/4W Resistor	SN14C2C	22[Ω], F, 1/4W	KOA
1	RA001	Resistor Array	M6-1-473J	47k[Ω] x5	BI
1	U001	TOSLINK Optical Connector	TORX179P		TOSHIBA
1	U002	Digital Audio I/F Receiver IC	CS8414-CS		CIRRUS
1	U003	Logic IC	TC74VHC14AF		TOSHIBA
1	U004	Logic IC	TC74HCT32AF		TOSHIBA
2	U005, U006	Logic IC	TC74VHC244F		TOSHIBA
1	U051	Regulator IC	REG1117-3.3		Burr-Brown
4	U201–U204	IC Socket DIP 8 pin	100-008-000		3M
3	SW001–SW003	DIP Switch	FT1D-2M		FUJISOKU
1	SW004	Push Switch	FP1F-2M		FUJISOKU
1	SW005	DIP Switch	FT2D-2M		FUJISOKU
1	SW006	DIP Switch	DSS104		FUJISOKU
4		Spacer	AR-325B		HIROSUGI KEIKI

2.4 DEM-PCM1680 Parts List

Qty	Ref. No.	Type	Model	Value	Manufacture
5	C001,C003,C005,C007,C009	Chip Ceramic Capacitor(2125)	GRM40F104Z50PT	0.1 μF	MURATA
13	C002,C004,C006,C008,C010 –C018	AL EL Capacitor	R3A-16V100M	10 μF/16V	ELNA
1	R001	1/4W Resistor	SN14C2C-4.7kΩF	4.7kΩ	KOA
2	CN001,CN003	10 pin Connector	FFC-10AMEP1		HONDA TSUSHIN
1	CN002	12 pin Connector	FFC-12AMEP1		HONDA TSUSHIN
1	CN004	11 pin Connector	FFC-11AMEP1		HONDA TSUSHIN
1	SW001	DIP Switch	FT1D-2M		FUJISOKU
1	U001	Logic IC	PCM1680		TI

2.5 DEM-DAI/MDAC Printed-Circuit Board

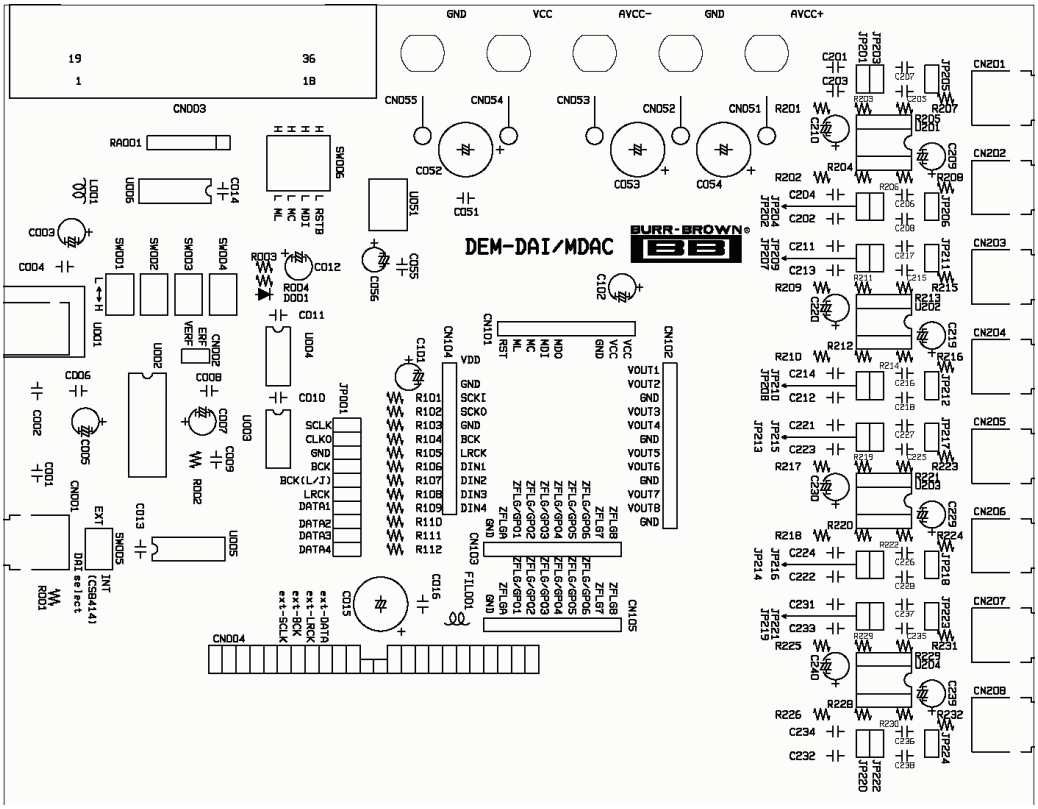


Figure 6. DEM-DAI/MDAC Silkscreen

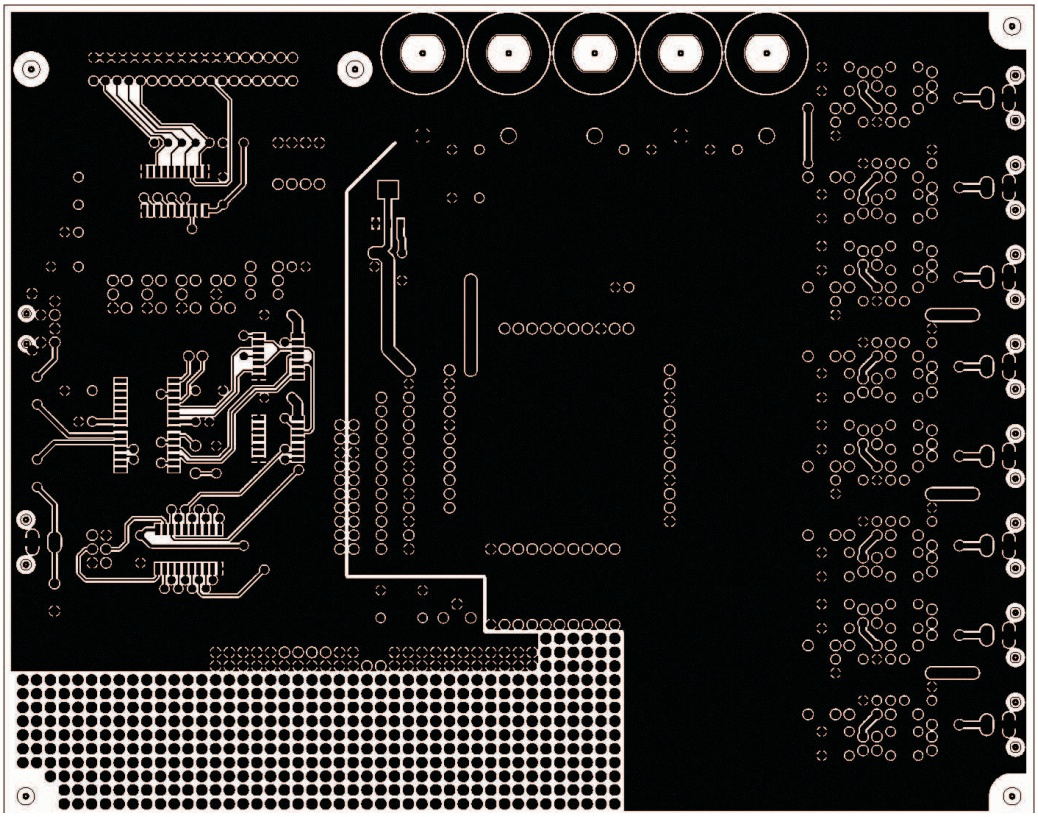


Figure 7. DEM-DAI/MDAC Top View

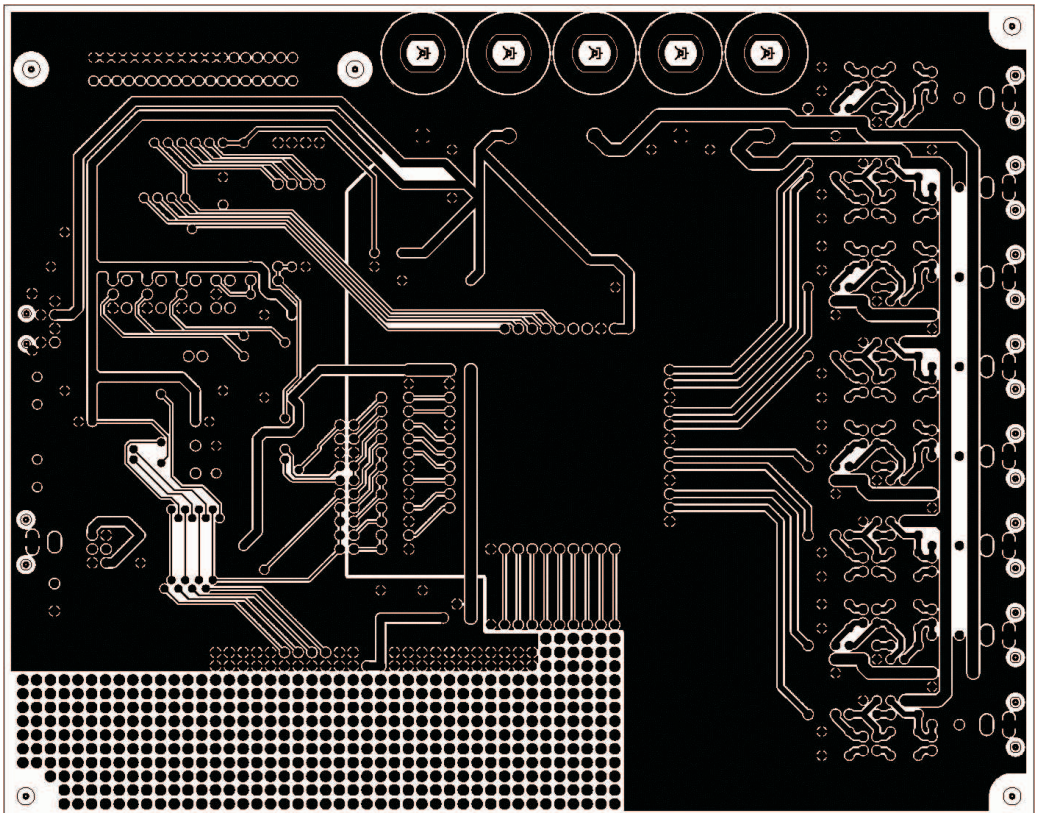


Figure 8. DEM-DAI/MDAC Bottom View

2.6 DEM-PCM1680 Printed-Circuit Board

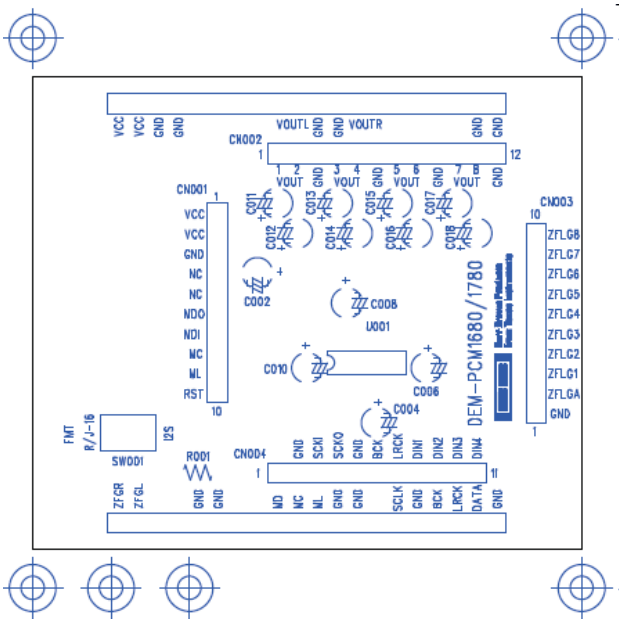


Figure 9. DEM-PCM1680 Silkscreen

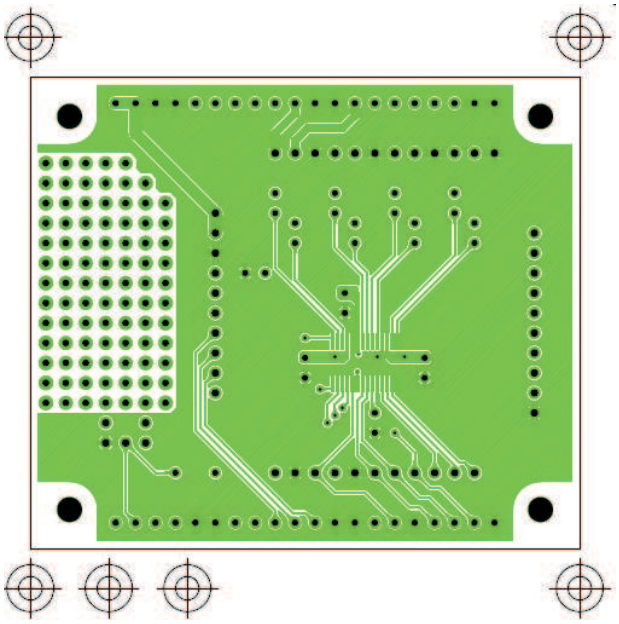


Figure 10. DEM-PCM1680 Top View

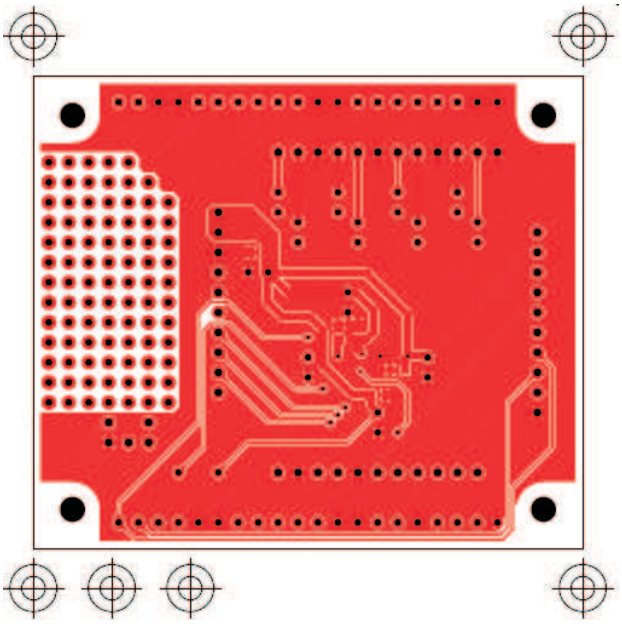


Figure 11. DEM-PCM1680 Bottom View

3 Demonstration Software

Software is provided with the EVM board to allow programming of the PCM1680 internal registers. The software operates on computers running Microsoft Windows™ 3.1, 95, 98, 2000, or XP.

The demonstration software requires connection of the PC printer port to CN-2 of the EVM board using a standard printer cable.

3.1 Installation

The demonstration software is distributed on a CD-ROM.

To install the software on your PC computer, first create a new folder on your hard drive with an appropriate name (such as DEM1680). Then, open the DEMxxxx folder on the installation CD-ROM, and copy all its files to your new folder.

Open the configuration setting file named # DEMxxxx using a text editor, such as Notepad. After the File opens, search for the following line:

PCMIFADR = &h378

The &h378 indicates the printer port address that the demonstration software uses to communicate with the EVM board.

This address must be set to %h378, &h278, or &h3BC. Most PCs use &h378 as the default printer port address. If your printer port is not located at &h378, edit the address to match your computer's port address.

3.2 Using the Demonstration Software

Double-click on the application file named DEMxxxx. A window appears on your screen with two menu selections (Execute and Window) near the top of the window.

The Execute menu includes three selections: Initialize, Reset, and Exit. Selecting Initialize instructs the program to write all of the PCMDAC internal registers with the default values.

Reset instructs the program to rewrite the PCMDAC internal registers with the data currently elected in the application windows. Exit closes the application.

3.3 HOLD and PASS

Each window has a button near the top which is labeled either HOLD or PASS. The current setting is toggled by clicking on this button. When set to HOLD, the settings in a window can be changed, but are not written to the register(s) until the OK button (which appears at the bottom of the window) is pressed.

When set to PASS, any setting changes made in a window are immediately written to the corresponding register(s).

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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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