M51565P

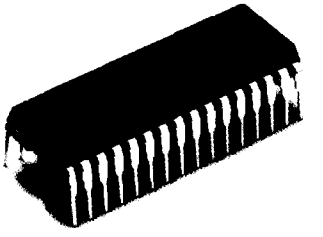
ANALOG OUTPUT AMPLIFIER FOR CD PLAYER

DESCRIPTION

The M51565FP is a semiconductor integrated circuit developed as an analog output amp for use in combination with a D/A converter for digital audio applications such as CD players.

FEATURES

- Combination with D/A converter produces analog output of low distortion
- Built-in driver circuit makes it possible to drive each switch with input of small bias current
- Includes high-speed switch driver for use at sampling frequency 88.2kHz



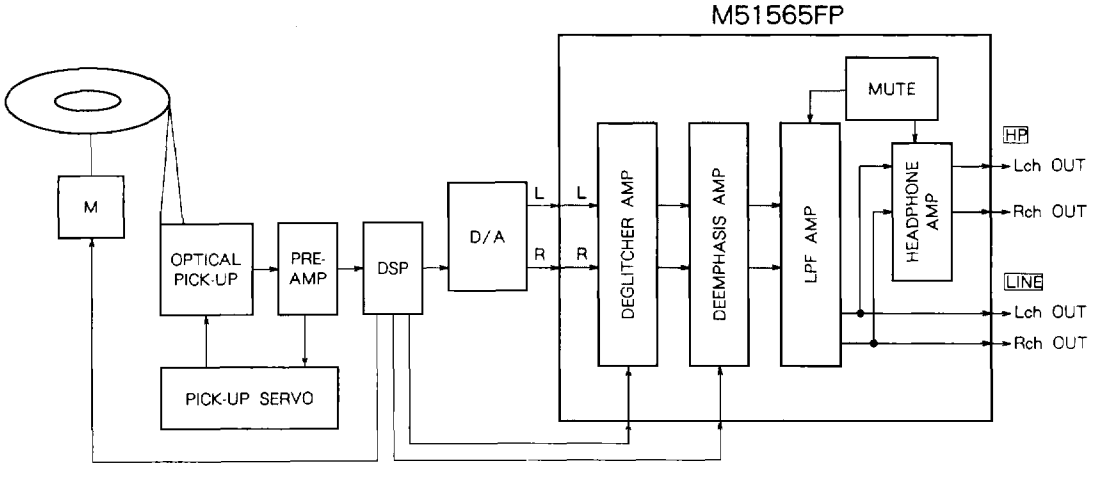
Outline 32P4B

1.778mm pitch 400mil SDIP
(8.9mm × 28.0mm × 3.8mm)

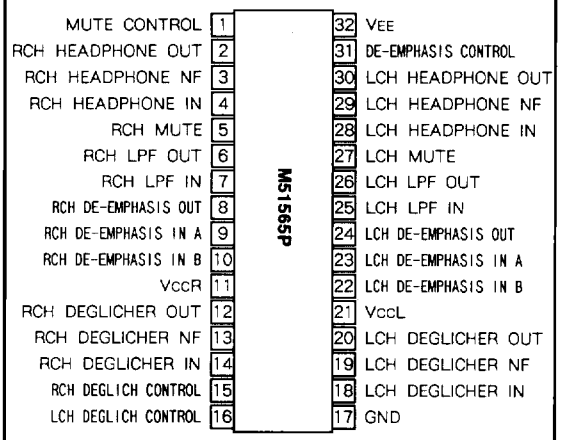
RECOMMENDED OPERATING CONDITIONS

Supply voltage range ..... V_{CC}, V_{EE} = ± 4.5 ~ ± 5.5V
Rated supply voltage ..... V_{CC}, V_{EE} = ± 5V
Rated power dissipation 215mW

SYSTEM CONFIGURATION

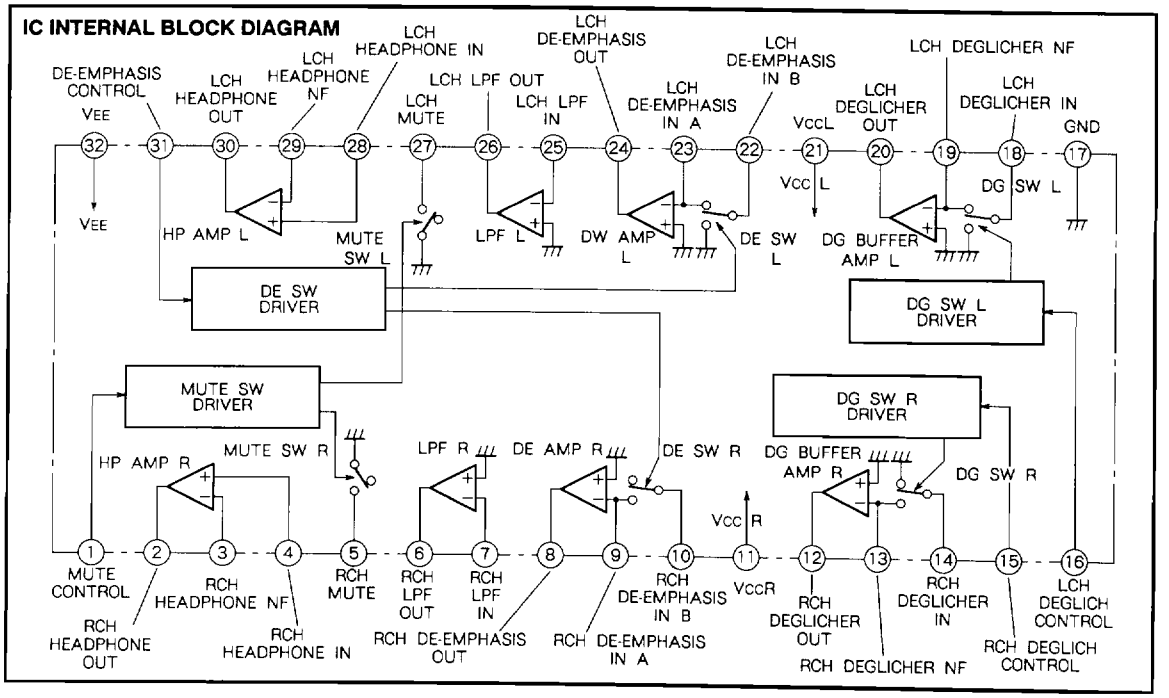


PIN CONFIGURATION



Outline 32P4B

IC INTERNAL BLOCK DIAGRAM



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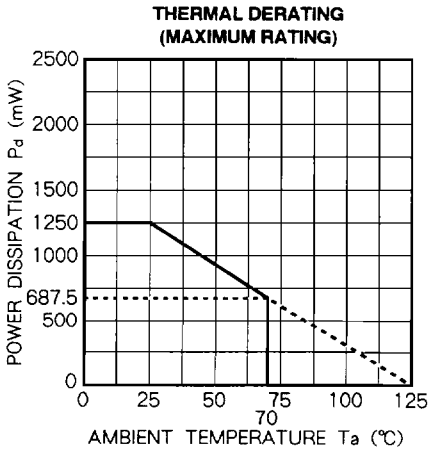
ABSOLUTE MAXIMUM RATINGS (Ta = 25℃, unless otherwise noted)

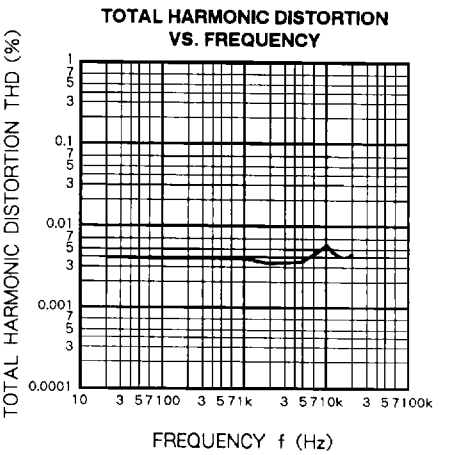
Symbol	Parameter	Ratings	Unit
V_{CC}-V_{EE}	Supply voltage	11	V
I_{CC}, I_{EE}	Circuit current	100	mA
P_d	Power dissipation	1250	mW
K_θ	Thermal derating	12.5	mW/℃
T_{opr}	Operating temperature	−20～+70	℃
T_{stg}	Storage temperature	−40～+125	℃

ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, V_{EE} = − 5V, Ta = 25℃, unless otherwise noted)

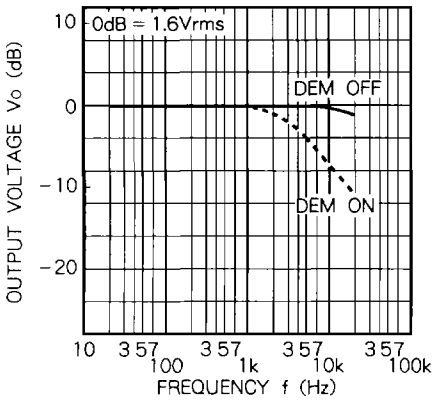
Symbol	Parameter		Test conditions	Limits			Unit
				Min	Typ	Max	
I_{CC}	Circuit current1		I_{CCL} + I_{CCR}, zero input signal	14	43	70	mA
I_{EE}	Circuit current2		zero input signal	− 65	− 40	− 12	mA
THD	Line out	Total harmonic distortion	f = 1kHz, full scale, fs = 88.2kHz	−	0.004	0.009	%
S/N	Line out	Signal/noise ratio	JIS-A, f = 1kHz, full scale, fs = 88.2kHz	85	96	−	dB
CS	Line out	Channel seperation	f = 1kHz, full scale, fs = 88.2kHz	70	83	−	dB
ATT	Line out	Mute attenuation	f = 1kHz, full scale, fs = 88.2kHz	6	18	−	dB
V_{OHPMAX}	Headphone amplifier Maximun output voltage		f=1kHz, THD=3%, R_L=30Ω, G_V=20dB, Rs(short circuit protection resistor)=150Ω	0.20	0.33	−	Vrms
I_{BDG}	DG SW bias current		Vin = 5V, pin⑮, ⑯,	−	10	50	μA
V_{IH}	High level input voltage		pin ①, ⑮, ⑯, ㉛	3	−	5	V
V_{IL}	Low level input voltage		pin ①, ⑮, ⑯, ㉛	0	−	1.5	V

TYPICAL CHARACTERISTICS

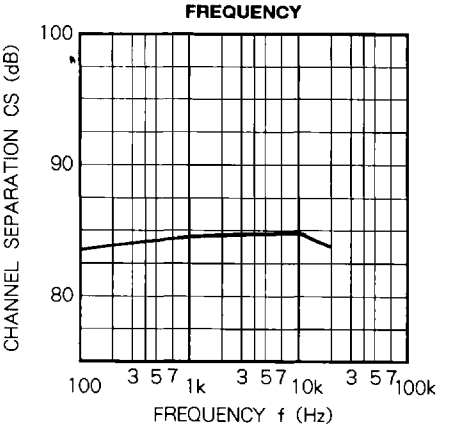




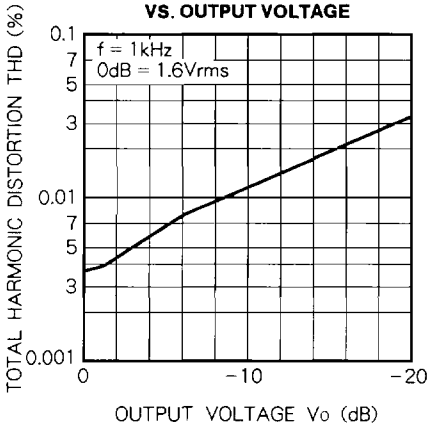
OUTPUT VOLTAGE VS. FREQUENCY



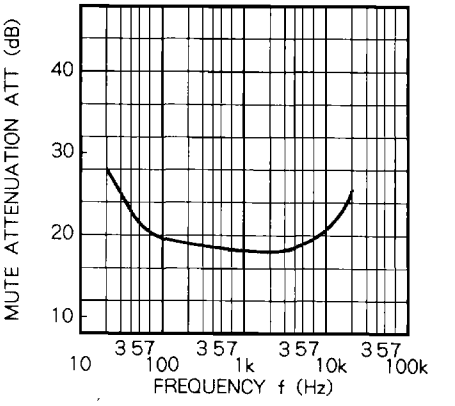
CHANNEL SEPARATION VS. FREQUENCY



TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



MUTE ATTENUATION VS. FREQUENCY

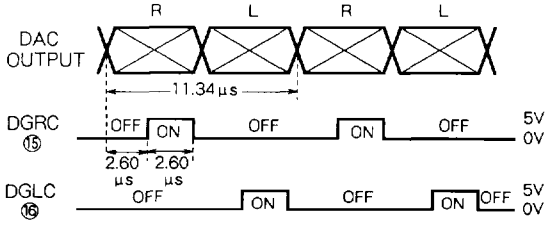


Note : DAC : PCM54
Digital filter : SM5806
Signal processing IC : CX23035
(Application Example 2)

FUNCTIONAL DESCRIPTION

1. Deglicher (DG)

The deglicher consists of analog switch, switch driver and buffer and deglich DAC output. The switch is ON when control signal of pin⑮ or ⑯.



DEGLICHER TIMING EXAMPLE (fs = 88.2kHz)

2. De-emphasis (DE)

The de-emphasis circuit consists of analog switch, switch driver and OP amp. De-emphasis characteristics on set by the external feedback impedance. The de-emphasis characteristics are changed by the switch is ON when control signal of pin㉛ is High.

3. Low pass filter (LPF)

The Active LPF consists of inverted amplifier, external resistors and external capacitors.

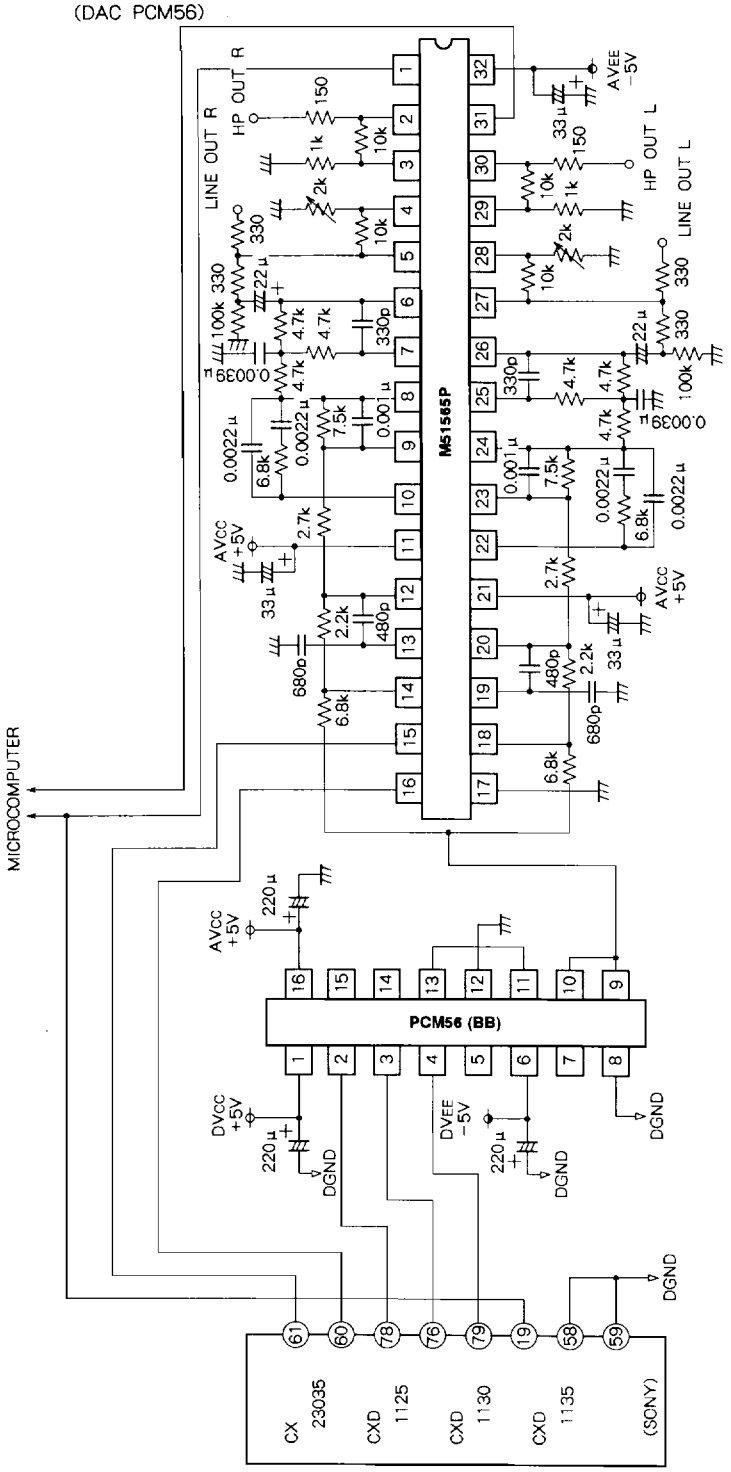
4. Output mute (MUTE)

The output mute circuit operates when the line connected to the output of LPF is grounded by the internal switch. The output mute circuit is ON when control signal of pin ① is High.

5. Headphone amplifier (HP)

The amplifier is for the headphone use and gain is adjustable by the external circuit.

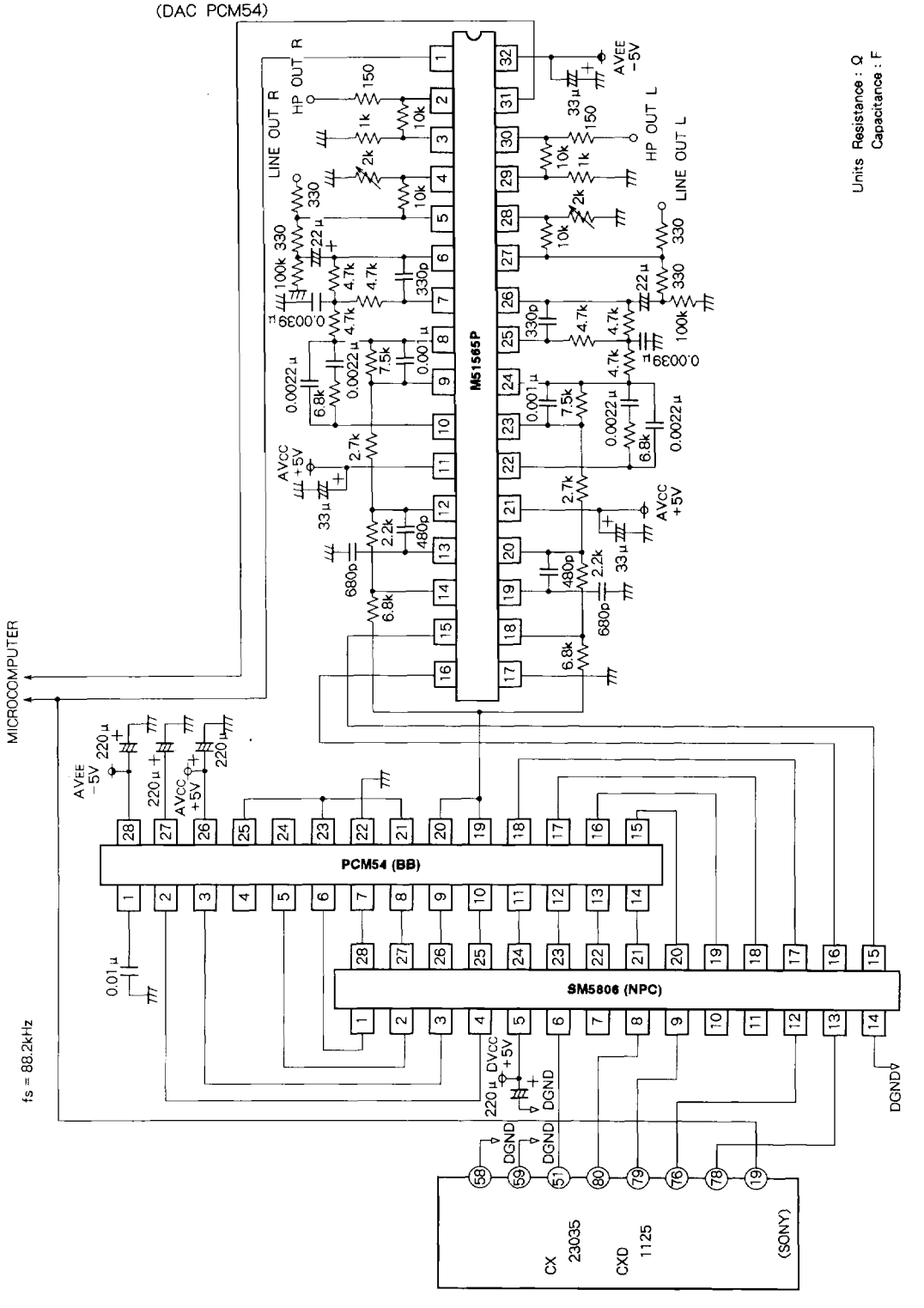
APPLICATION EXAMPLE 1 (Signal Processing IC CX23035/CXD1125/CXD1130/CXD1135)
(DAC PCM56)



Units Resistance : Ω
Capacitance : F

Note 1. CX23035, CXD1125, fs = 44.1kHz, only
C CXD1130 CXD1135
fs = 44.1kHz ("H" at pin ㉜)
fs = 88.2kHz ("L" at pin ㉜)
2. L/R of DG control signal are inverted.

APPLICATION EXAMPLE 2 (Signal Processing IC CX23035 CXD1125, Digital filter SM5806) (DAC PCM54)



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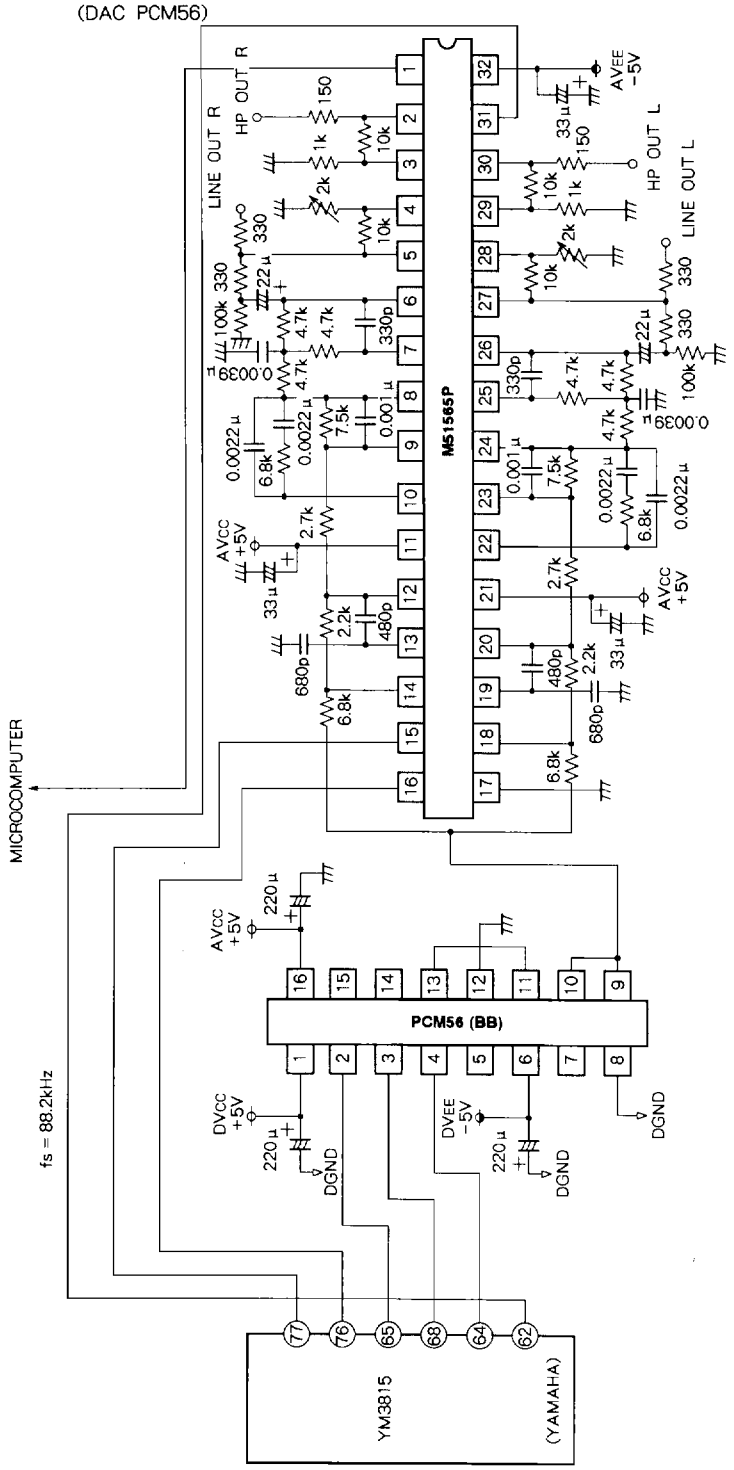
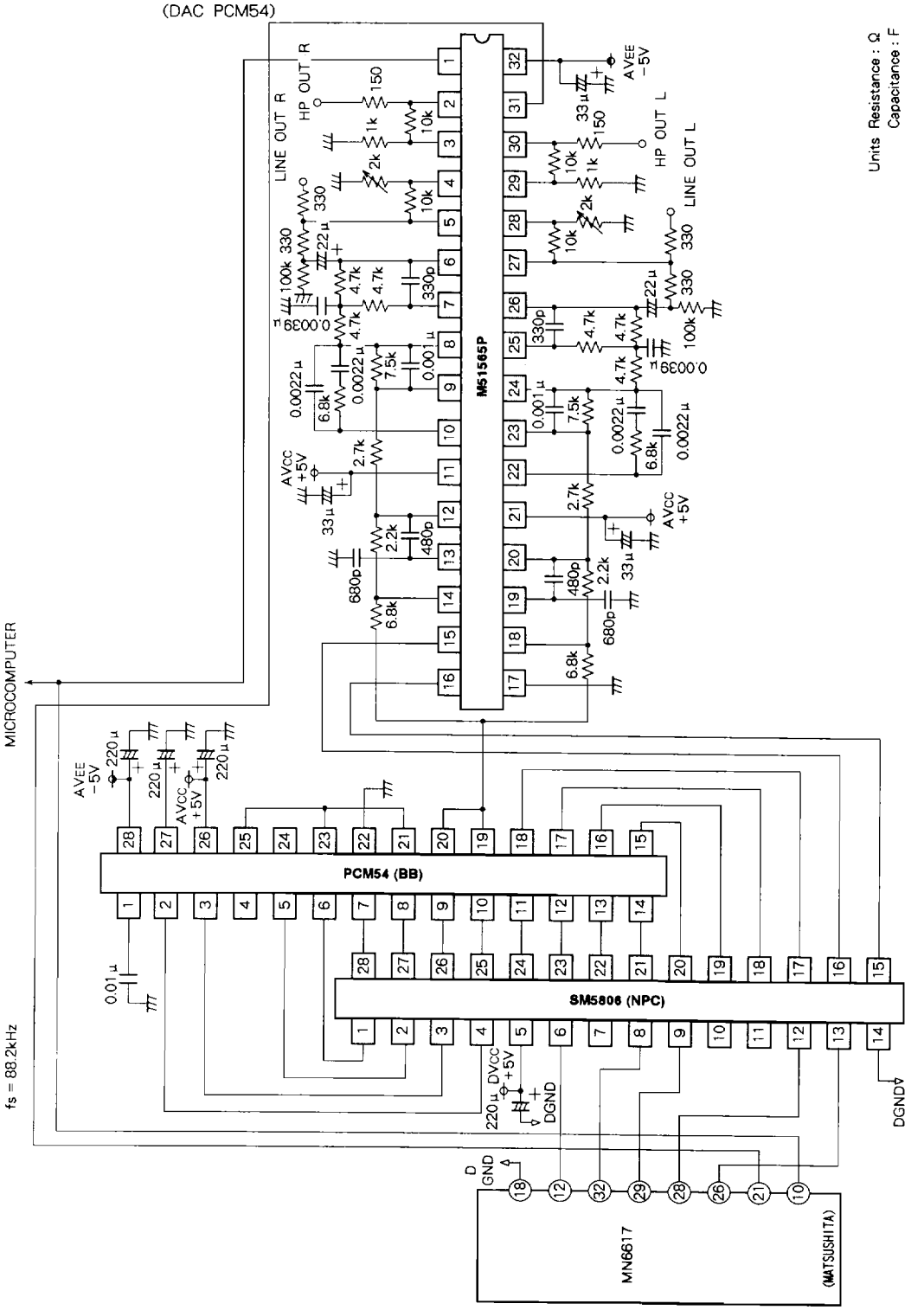
APPLICATION EXAMPLE 3 (Signal Processing IC YM3815)
(DAC PCM56)



APPLICATION EXAMPLE 4 (Signal Processing IC MN6617 Digital filter SM5806)
(DAC PCM54)



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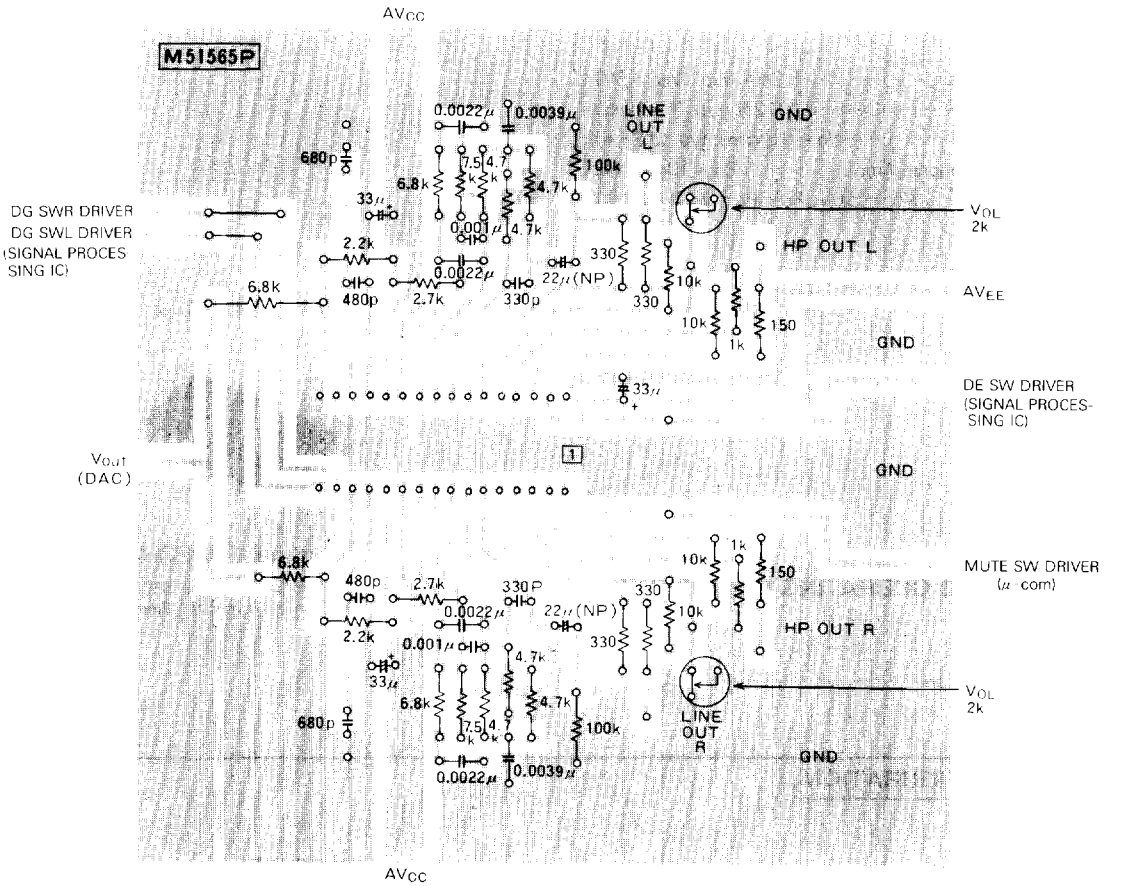
PRINTED CIRCUIT BOARD LAYOUT : (Foil side)



Note) ● M51565P and DAC are placed nearly as possible.
● Control line pattern of DG SW driver is shielded from other analog system by the ground.

Units Resistance : Ω
Capacitance : F