

M51565P

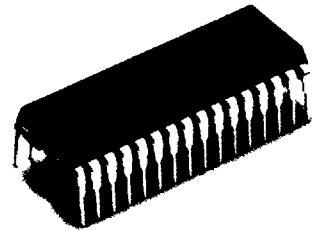
ANALOG OUTPUT AMPLIFIER FOR CD PLAYER

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

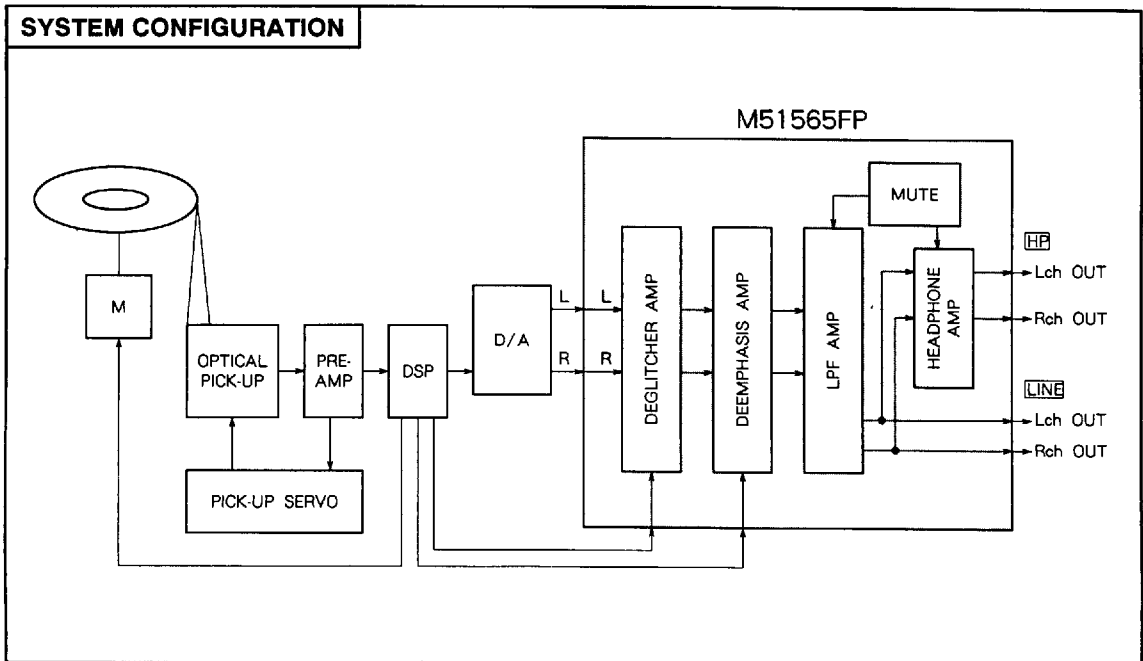


Outline 32P4B

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

RECOMMENDED OPERATING CONDITIONS

Supply voltage range..... $V_{CC}, V_{EE} = \pm 4.5 \sim \pm 5.5V$
 Rated supply voltage..... $V_{CC}, V_{EE} = \pm 5V$
 Rated power dissipation..... 215mW



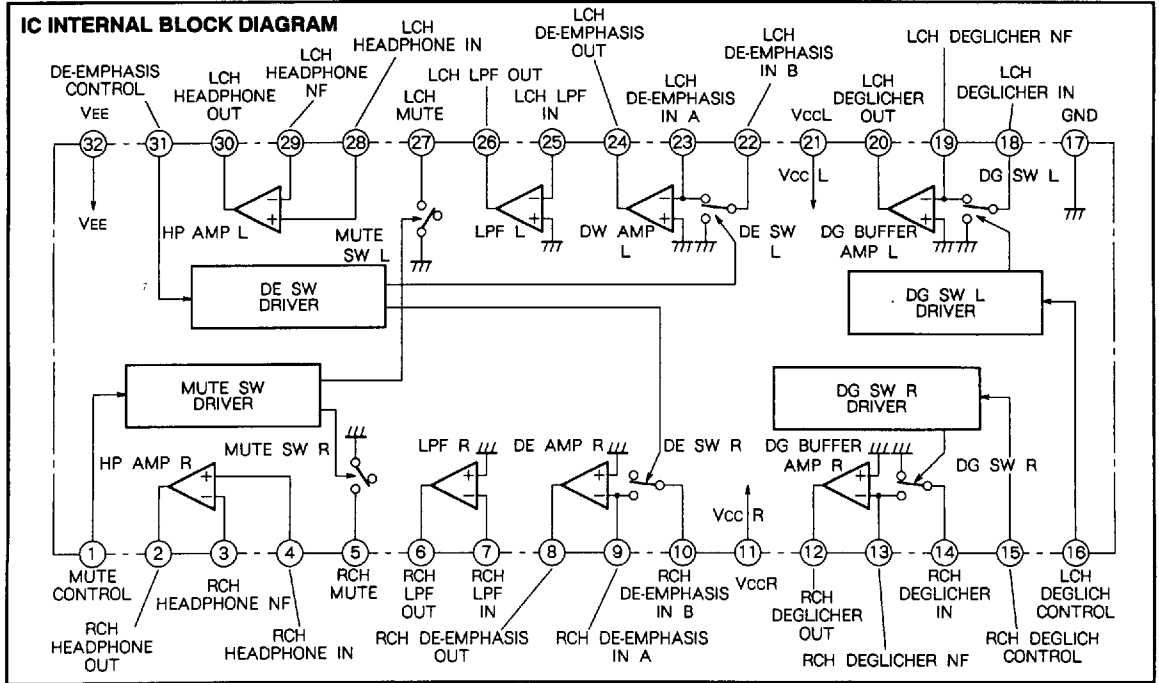
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PIN CONFIGURATION

MUTE CONTROL	1	32	VEE
RCH HEADPHONE OUT	2	31	DE-EMPHASIS CONTROL
RCH HEADPHONE NF	3	30	LCH HEADPHONE OUT
RCH HEADPHONE IN	4	29	LCH HEADPHONE NF
RCH MUTE	5	28	LCH HEADPHONE IN
RCH LPF OUT	6	27	LCH MUTE
RCH LPF IN	7	26	LCH LPF OUT
RCH DE-EMPHASIS OUT	8	25	LCH LPF IN
RCH DE-EMPHASIS IN A	9	24	LCH DE-EMPHASIS OUT
RCH DE-EMPHASIS IN B	10	23	LCH DE-EMPHASIS IN A
VccR	11	22	LCH DE-EMPHASIS IN B
RCH DEGLICHER OUT	12	21	VccL
RCH DEGLICHER NF	13	20	LCH DEGLICHER OUT
RCH DEGLICHER IN	14	19	LCH DEGLICHER NF
RCH DEGLICH CONTROL	15	18	LCH DEGLICHER IN
LCH DEGLICH CONTROL	16	17	GND

Outline 32P4B

IC INTERNAL BLOCK DIAGRAM



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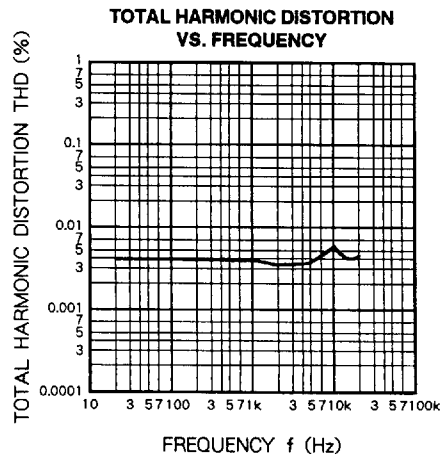
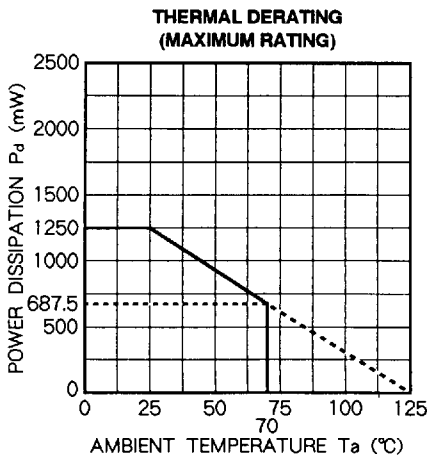
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Unit
Vcc-VEE	Supply voltage	11	V
Icc, IEE	Circuit current	100	mA
Pd	Power dissipation	1250	mW
Kθ	Thermal derating	12.5	mW/°C
Topr	Operating temperature	-20~+70	°C
Tstg	Storage temperature	-40~+125	°C

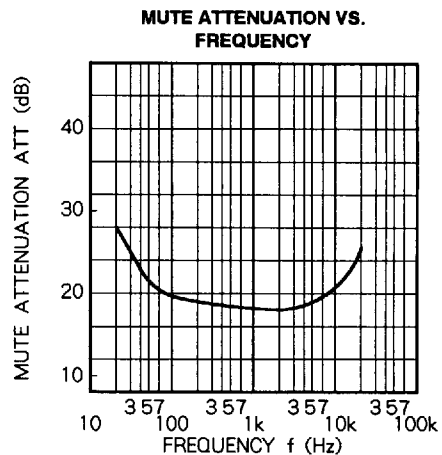
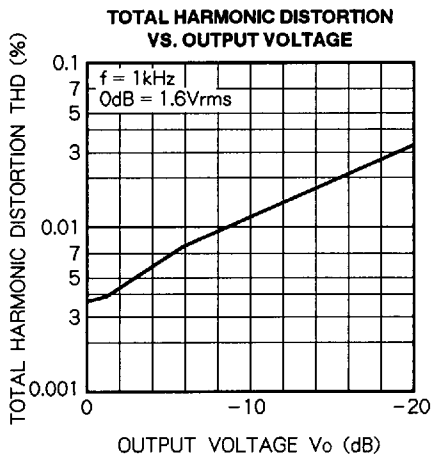
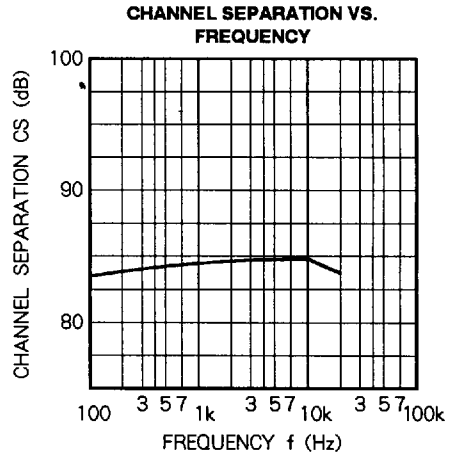
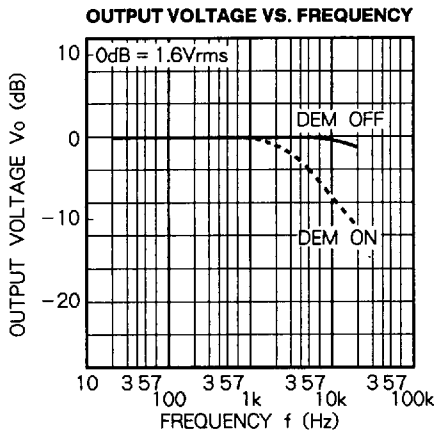
ELECTRICAL CHARACTERISTICS (Vcc = 5V, VEE = -5V, Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit	
			Min	Typ	Max		
Icc	Circuit current1	Iccl + Iccr, zero input signal	14	43	70	mA	
IEE	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		Signal/noise ratio	JIS-A, f = 1kHz, full scale, fs = 88.2kHz	85	96	-	dB
CS		Channel separation	f = 1kHz, full scale, fs = 88.2kHz	70	83	-	dB
ATT		Mute attenuation	f = 1kHz, full scale, fs = 88.2kHz	6	18	-	dB
VOHPMAX	Headphone amplifier Maximum output voltage	f = 1kHz, THD = 3%, RL = 30Ω, Gv = 20dB, Rs (short circuit protection resistor) = 150Ω	0.20	0.33	-	Vrms	
Ibdg	DG SW bias current	Vin = 5V, pin ⑬, ⑭	-	10	50	μA	
VIH	High level input voltage	pin ①, ⑱, ⑲, ⑳	3	-	5	V	
VIL	Low level input voltage	pin ①, ⑱, ⑲, ⑳	0	-	1.5	V	

TYPICAL CHARACTERISTICS



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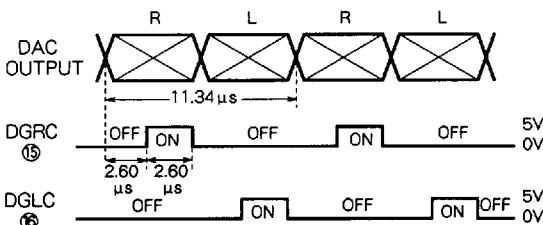


Note : DAC : PCM54
 Digital filter : SM5806
 Signal processing IC : CX23035
 (Application Example 2)

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 pin ⑮ 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 pin ⑰ 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 ⑰ is High.

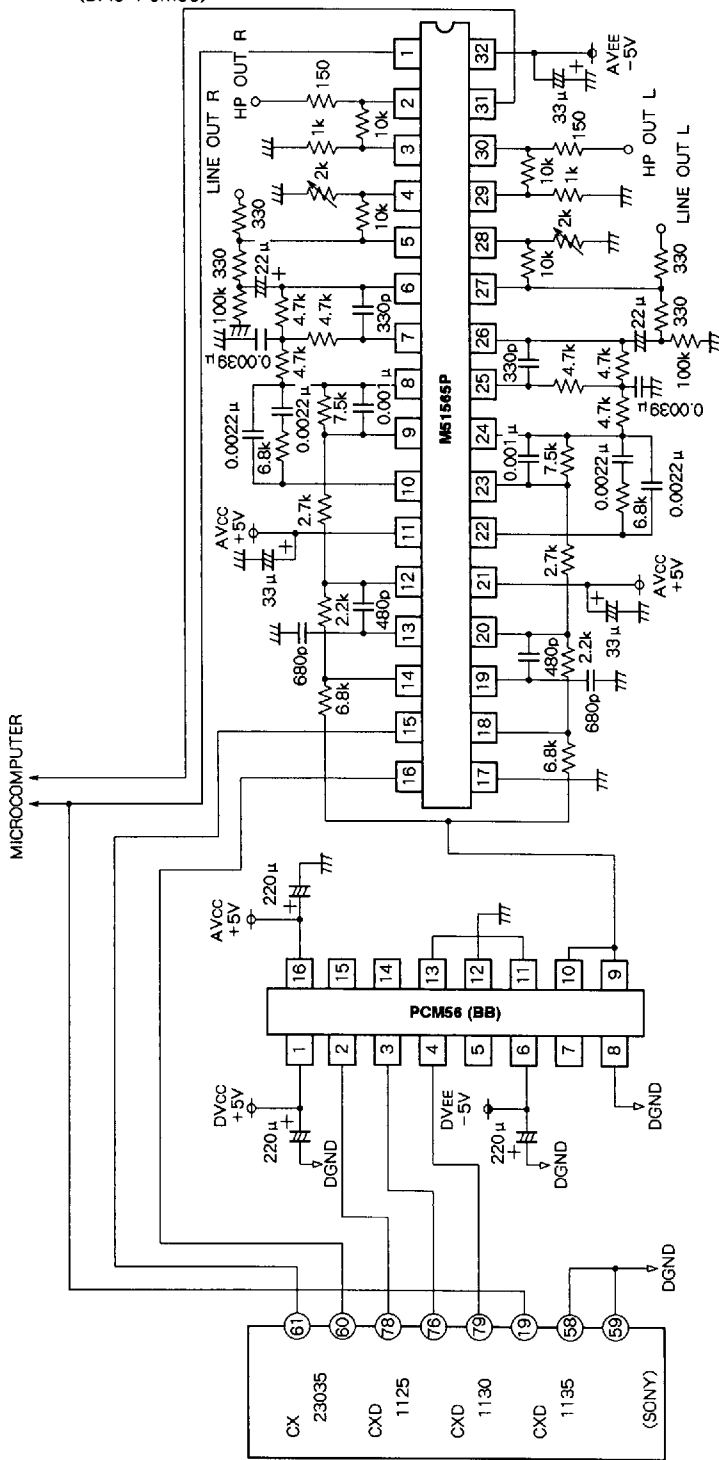
5. Headphone amplifier (HP)

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

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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

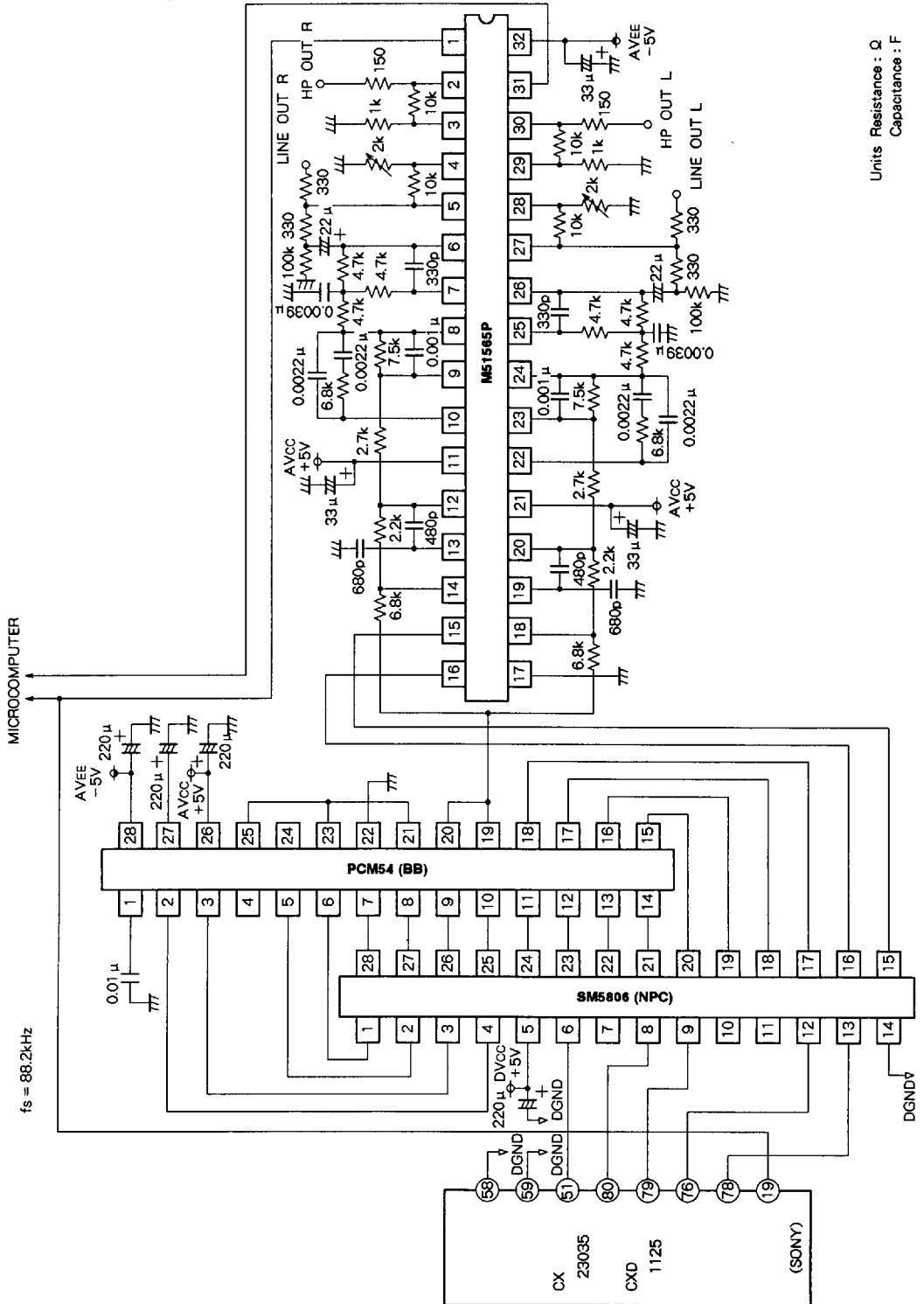
fs = 44.1kHz ("H" at pin ⑤)

fs = 88.2kHz ("L" at pin ⑤)

2. L/R of DG control signal are inverted.

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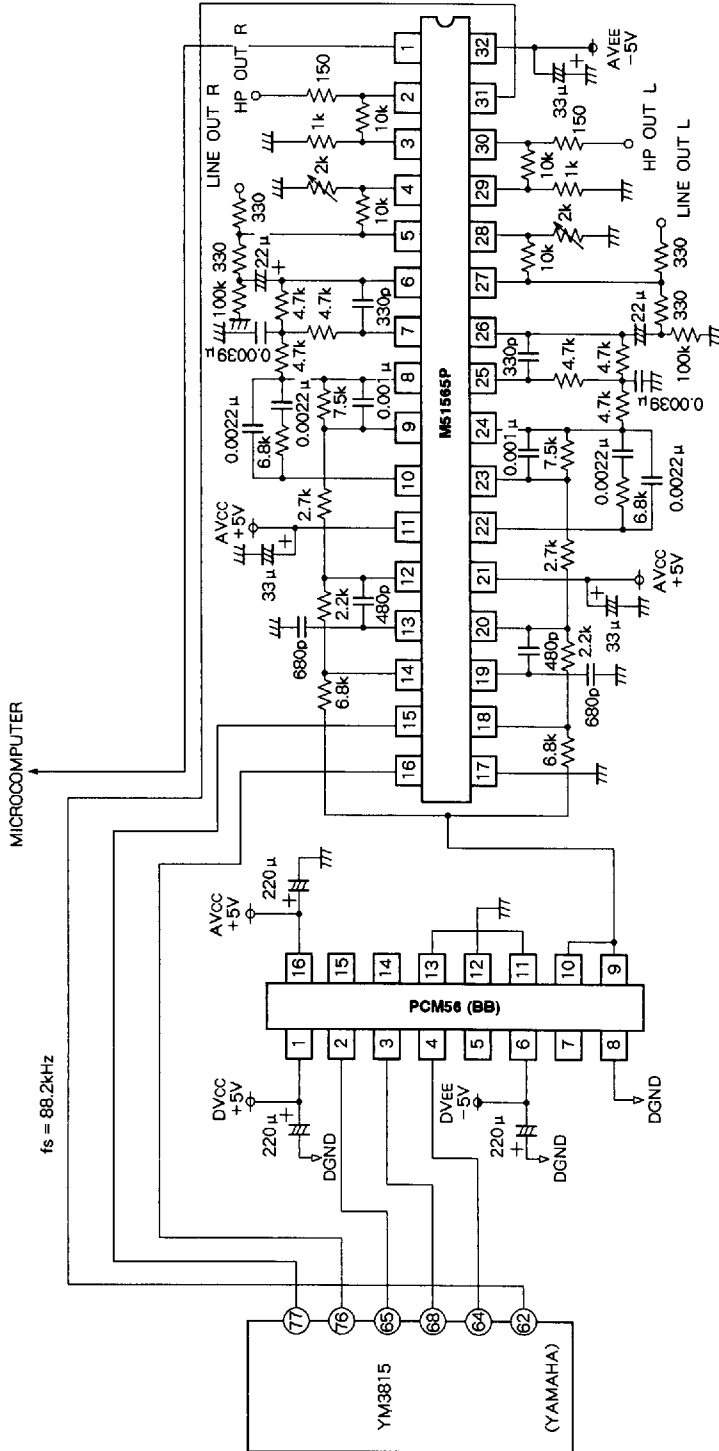
APPLICATION EXAMPLE 2 (Signal Processing IC CX23035 CXD1125, Digital filter SM5806)
(DAC PCM54)



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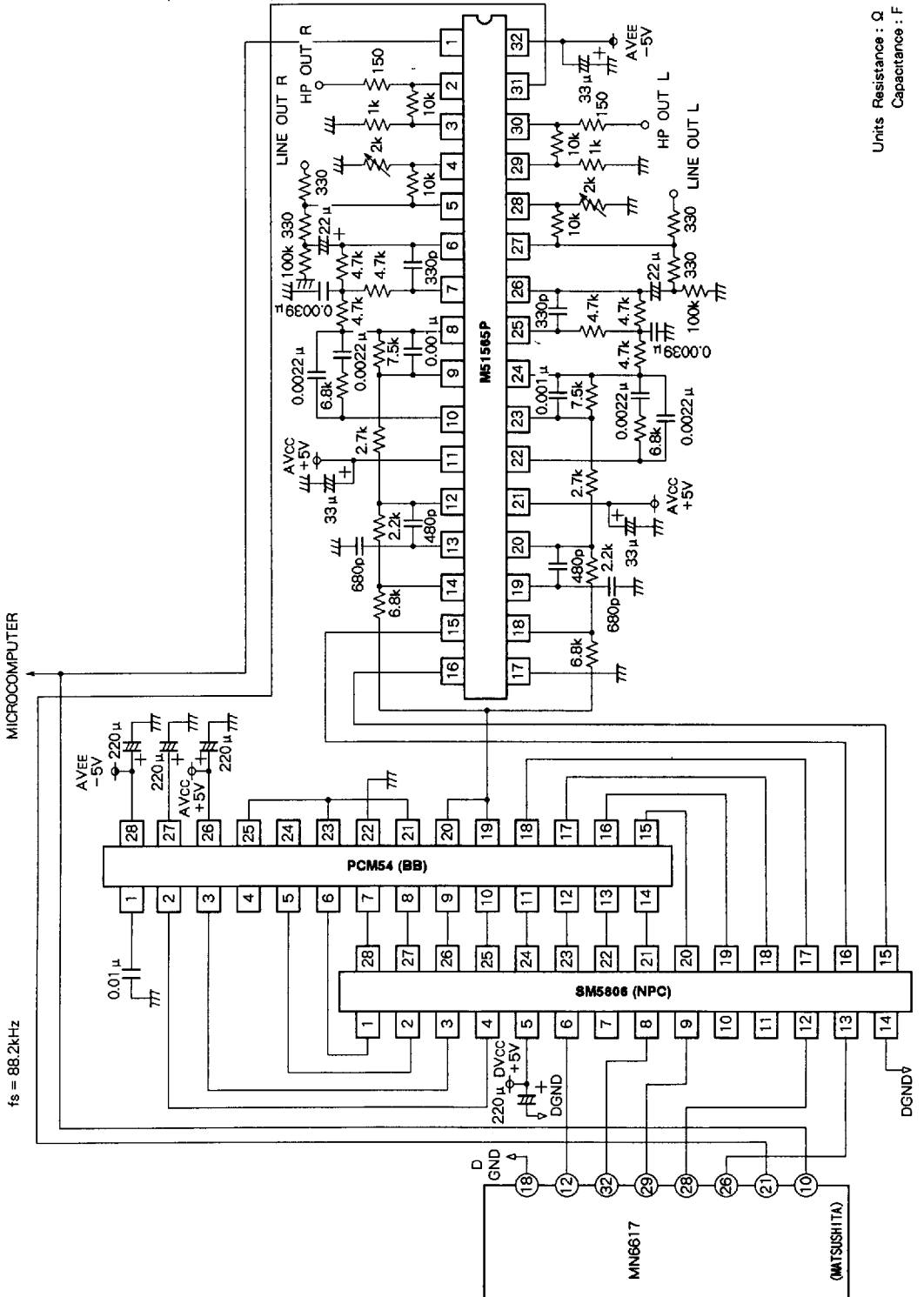
APPLICATION EXAMPLE 3 (Signal Processing IC YM3815)
(DAC PCM56)



Units Resistance : Ω
Capacitance : F

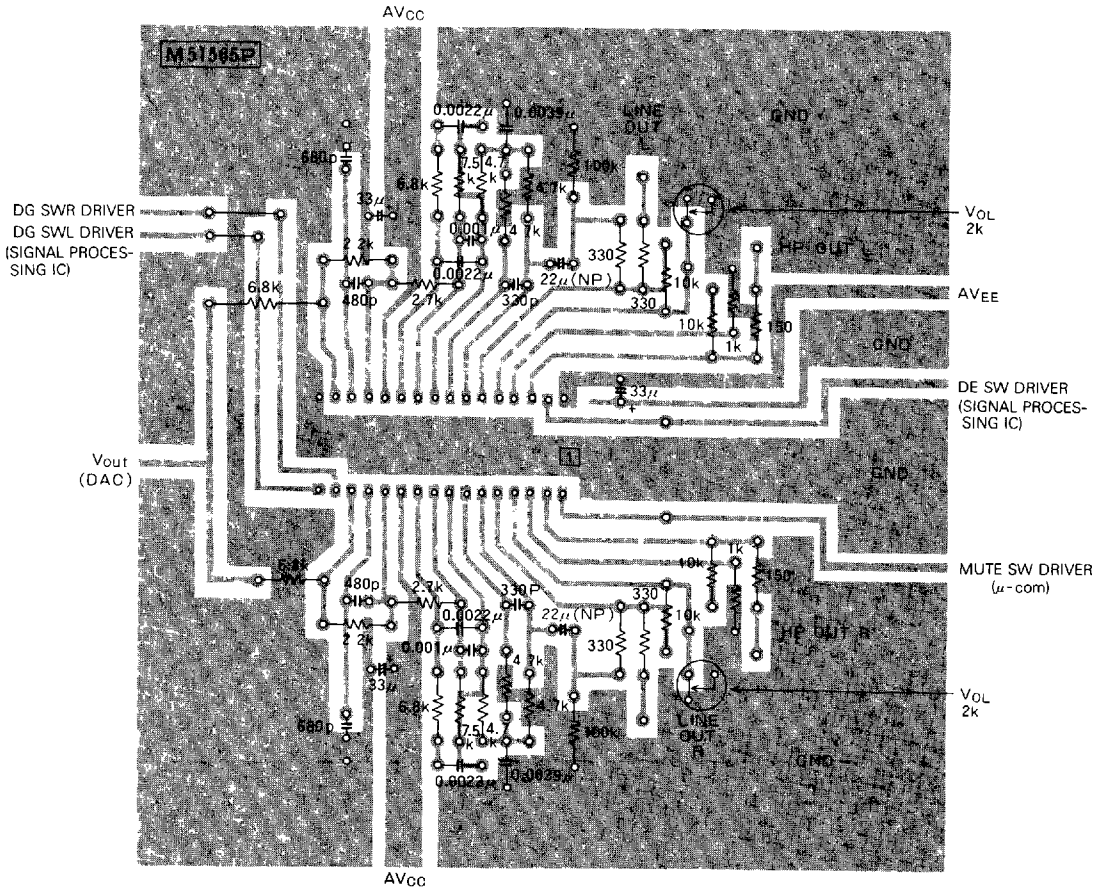
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APPLICATION EXAMPLE 4 (Signal Processing IC MN6617 Digital filter SM5806)
(DAC PCM54)



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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