

VCR audio signal processing system

BH7775K

The BH7775K is an audio signal processing system IC that includes a peak-noise reduction (PNR) processor, an FM modulator/demodulator circuit, an input/output switcher, an automatic FM detector circuit, an FM band-pass filter, a normal-audio circuit, a regulator circuit, and automatic adjusting circuits (VCO and BPF).

●Applications

VHS Video cassette recorders

●Features

- 1) Operates off dual \pm power supply which allows a large reduction in the number of coupling capacitors required. A built-in regulator makes it easy to construct a power supply system.
- 2) A built-in 2-wire serial control decoder circuit allows serial control of the internal mode settings.
- 3) Automatic adjusting VCO and BPF circuits that use the color signal subcarrier frequency (NTSC: 3.579545MHz and PAL: 4.433619MHz) ensure stable adjustment that is not effected by stress when the chip is mounted, or variations over time.
- 4) 4-input switcher (turner, BS, and line 1 and 2).
Output switch with built-in STEREO / LEFT / RIGHT switchig, Hi-Fi / MIX / NORMAL switching, and BS monitor functions.
- 5) The PNR processor and FM modulation/demodulation circuit provide reverse characteristics at recording and playback. Also, carrier frequency adjustment and FM de-emphasis/playback level adjustment have been combined.
- 6) Built-in FM band-pass filter connects directly to the playback amplifier and excels at attenuation of the other channel. The FM recording output circuit has a high-performance high-frequency cutoff filter that produces a sine wave output.
- 7) Switching noise is reduced by a slope-control type differential compensation circuit.
- 8) Built-in envelope detector circuit and noise-detecting automatic FM detector circuit.
- 9) Built-in normal-audio signal processing circuit that allows SP/LP/EP equalizer switching. Control terminal provided for use with the BA7755AF high-voltage head switcher.

● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Applied voltage	V _{CC}	23, 55 pin 6.0	V
	V _{EE}	59 pin -6.0	V
	V _{IN}	7, 8, 22 pin 6.5	V
	V _{IN}	PIN other than above 6.0	V
Power dissipation	P _d	800 *	mW
Operating temperature	T _{opr}	-10~+70	°C
Storage temperature	T _{stg}	-55~+125	°C

* When IC is stand alone, reduced by 8.0mW for each increase in Ta of 1°C over 25°C. When mounted on 90mm x 50mm², t = 1.6mm glass epoxy PCB, Pd = 1.3W (reduced by 13.0mW for each increase in Ta of 1°C over 25°C).

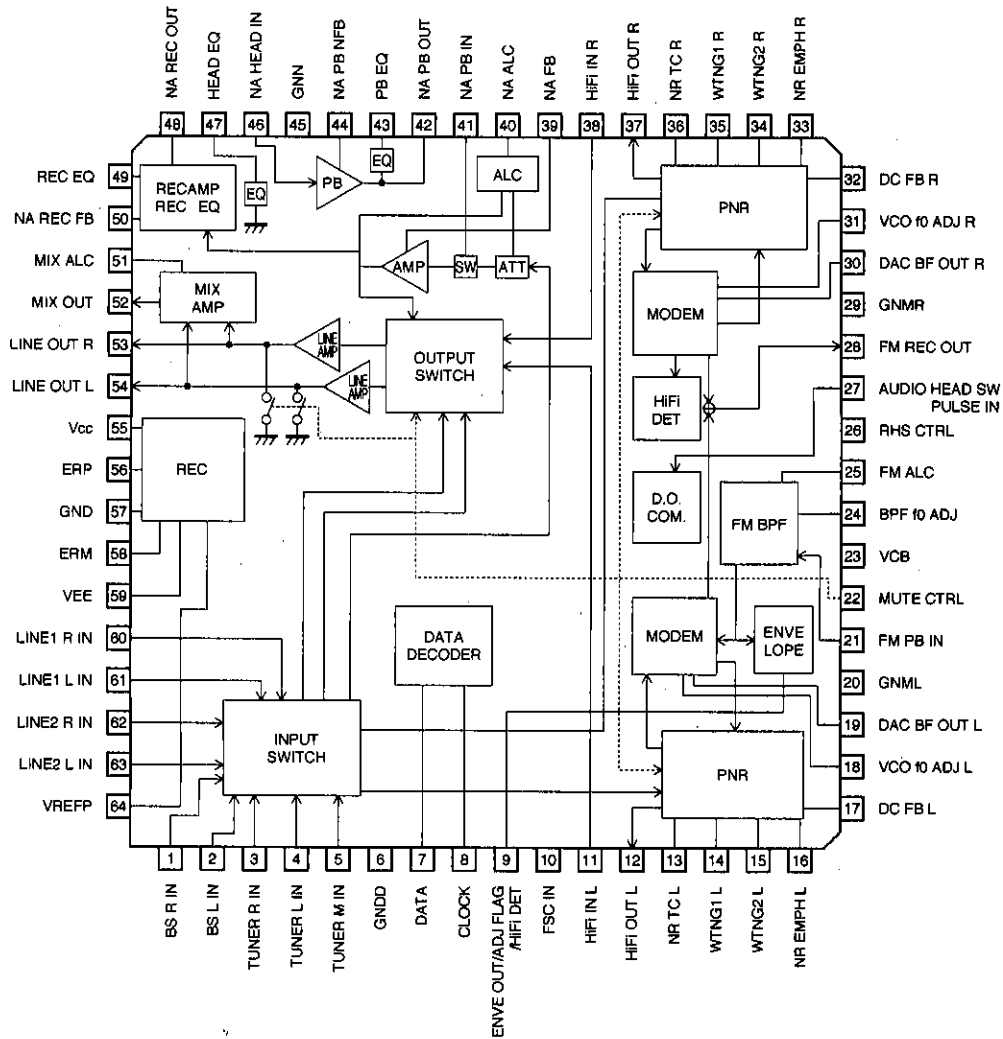
○ Not designed for radiation resistance.

● Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Range	Unit
Power supply voltage	UNREG-V _{CC}	+7.0~*	V
Power supply voltage	UNREG-V _{EE}	+7.0~*	V

* The built-in regulator in this IC outputs +5.0V from pin 55, and -5.0V from pin 59. The supply voltage range given above is the voltage to be applied to UNREG V_{CC} and UNREG V_{EE} pins in the measurement circuit to obtain regulator output. Therefore, the upper limit of the voltage range is set by the externally connected transistor that forms the regulator circuit, and not by the IC itself. Note, also, that the lower limit will change depending on the value of the resistor connected between the collector and base of the transistor.

● Block diagram



Single-chip Hi-Fi audio signal processors

VCR components

● Pin descriptions

Pin function—1 / 2

Pin No.	Pin Name	Function	Pin Voltage	I/O Circuit
2, 1	BS IN L, R	BS input (L and R).	0.0V	69.8k Ω
4, 3, 5	TUNER IN L, R, M	TUNER input (L, R, and M).	0.0V	47.0k Ω
6	GNDD	Serial control GND.	0.0V	—
7	DATA IN	Serial control data input.	—	B(PNP)
8	CLOCK IN	Serial control clock input.	—	B(PNP)
9	ENVE OUT/HIFI DET /ADJ FLAG	FM input Lch signal component envelope output. HiFi DET output for FM input. ADJ FLAG output for ADJ.	EE : 0.8V PB : 1.0V	EE : 50k Ω PB, ADJ : EF (NPN)
10	FSC IN	fsc input terminal for VCO and BPF adjustment.	0.0V	200k Ω
11, 38	HIFI IN L, R	HiFi input for output switcher.	0.0V	47k Ω
12, 37	HIFI OUT L, R	PNR audio output.	0.0V	EF : (P-P)
13, 36	NR TC L, R	PNR attack and recovery time setting. Attack R: 530 Ω , recovery R: 6.5k Ω .	-5.0V	—
14, 35	WTNG1 L, R	Waiting characteristic low-frequency time constant setting	0.0V	10k Ω
15, 34	WTNG2 L, R	Waiting characteristic high-frequency time constant setting	0.0V	1.1k Ω
16, 33	NR EMPH L, R	NR emphasis time constant setting. (external C = 0.01 μ F)	0.0V	—
17, 32	DC FB L, R	PNR operating reference potential.	0.0V	11.5k Ω
18, 31	VCO IO ADJ L, R	VCO control current setting terminal.	2.5V	EF (NPN)
19, 30	VCO DAC BF OUT L, R	VCO control DAC voltage output terminal.	1.4V	EF (NPN)
20, 29	GND(GNM)L, R	PNR, MODEM and BPF GND. L and R unconnected.	0.0V	—
21	FM PB IN	Playback FM input. 660mV _{P-P} Typ. No input coupling capacitor (GND to VCC).	0.0V	50k Ω
22	MUTE CTRL	Line output mute control input.	—	3k Ω (2.5V Min.)
23	VCB	MODEM and BPF V _{cc} .	5.0V	—
24	BPF IO ADJ	FM BPF center frequency adjustment.	1.9V	EF (NPN) ~200 Ω
25	FM ALC	FM ALC time constant setting.	0.0V	EF (NPN) ~2.5k Ω
26	RHS CTRL	High-voltage head switch (BA7755) control terminal.	—	C (NPN)
27	AHSWP IN	Audio head switching pulse input.	—	B (PNP)
28	FM REC OUT	EE: recording FM output. Sine wave output. PB: BPF output monitor terminal.	EE : 3.3V PB : 3.3V	EF (NPN) ~200 Ω

* I/O circuit; EF: emitter follower, P-P: push pull, B: base, and C: collector.
All numerical values are standardized values.

Pin function—2 / 2

Pin No.	Pin Name	Function	Pin Voltage	I/O Circuit
39	NA FB	Normal line amplifier feedback.	0.0V	800 Ω
40	NA ALC	Normal line amplifier ALC time constant setting (attack and recovery time).	0.0V	EF (NPN) ~500 Ω
41	NA PB IN	Normal line amplifier playback input.	0.0V	105.2k Ω
42	NA PB OUT	Normal PB amplifier output.	0.0V	EF (P-P) ~50 Ω
43	PB EQ	Normal PB amplifier equalizer switch.	0.0V	OPEN/25 Ω
44	NA PB NFB	Normal PB amplifier feedback.	0.0V	B (NPN)
45	GNN	Normal audio GND.	0.0V	—
46	NA HEAD IN	Normal audio playback input.	0.0V	REC : B (NPN) REC : EF (P-P)
47	HEAD EQ	Head resonance equalizer switch terminal.	0.0V	300k Ω/29 Ω
48	NA REC OUT	Normal REC amplifier output.	0.0V	EF : (P-P)
49	REC EQ	Recording equalizer setting resistor terminal.	0.0V	1k Ω
50	NA REC FB	Normal REC amplifier feedback terminal.	0.0V	B (NPN)
51	MIX ALC	ALC time constant setting for mixer amplifier (attack and recovery time).	-5.0V	EF (NPN) ~500 Ω
52	MIX OUT	Mixer amplifier output for RF converter.	0.0V	EF (NPN)
54, 53	LINE OUT L, R	Line output	0.0V	330 Ω
55	VCC	VCC regulator.	5.0V	—
56	ERP	VCC regulator error output.	5.0V	C (NPN)
57	GND	Output switch, regulator GND.	0.0V	—
58	ERM	VEE regulator error output.	-5.0V	C (PNP)
59	VEE	VEE regulator	-5.0V	—
61, 60	LINE1 IN L, R	LINE 1 input (L and R).	0.0V	90.2k Ω
63, 61	LINE2 IN L, R	LINE 2 input (L and R).	0.0V	90.2k Ω
64	VREFP	VCC/2 reference voltage. With power on detect and precharge function.	2.5V	10k Ω

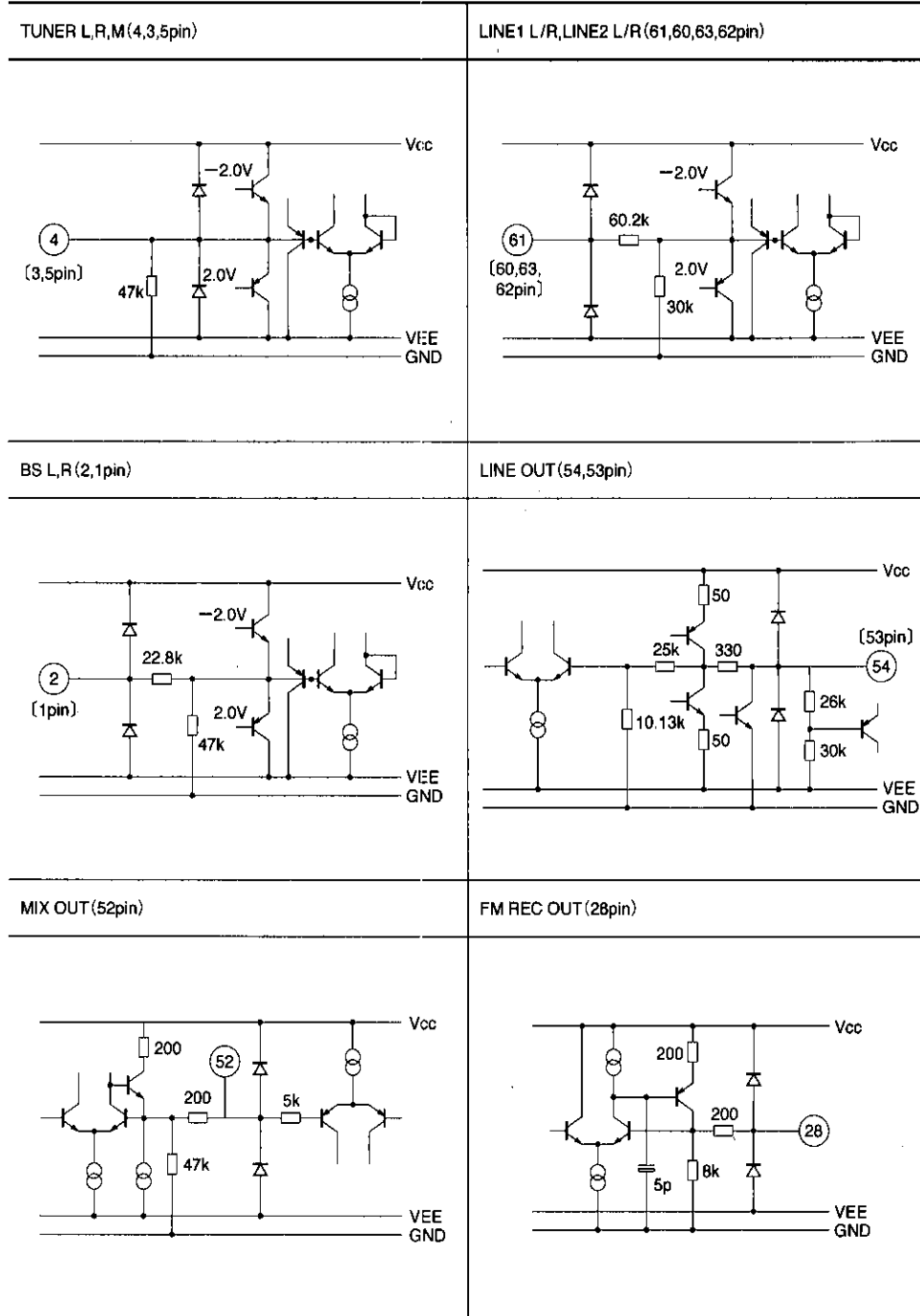
* I/O circuit; EF: emitter follower, P-P: push pull, B: base, and C: collector.
All numerical values are standardized values.

Single-chip Hi-Fi audio signal processors

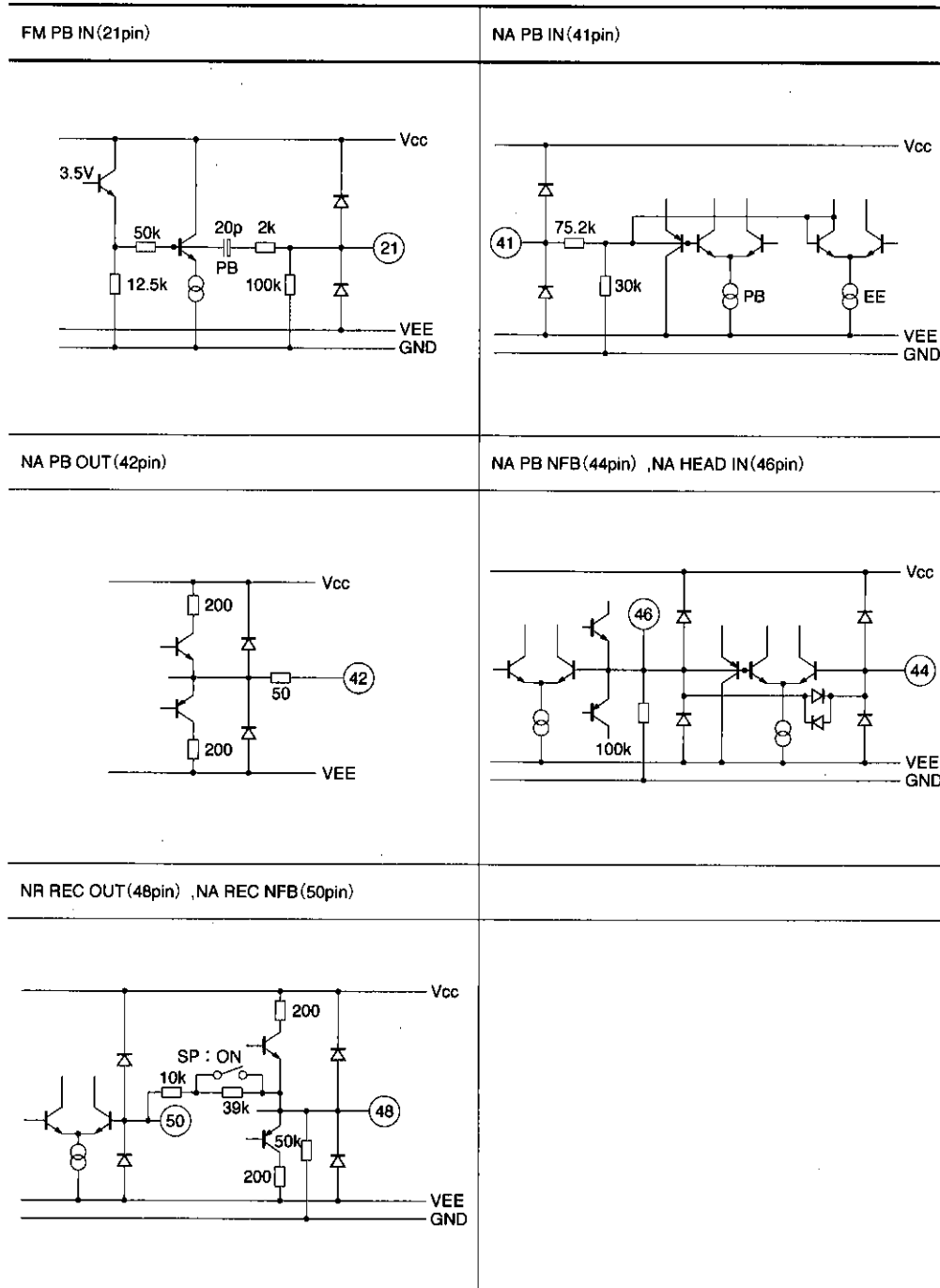
VCR components

● Input/output circuits

Equivalent circuits for the control and input/output circuits - (1)



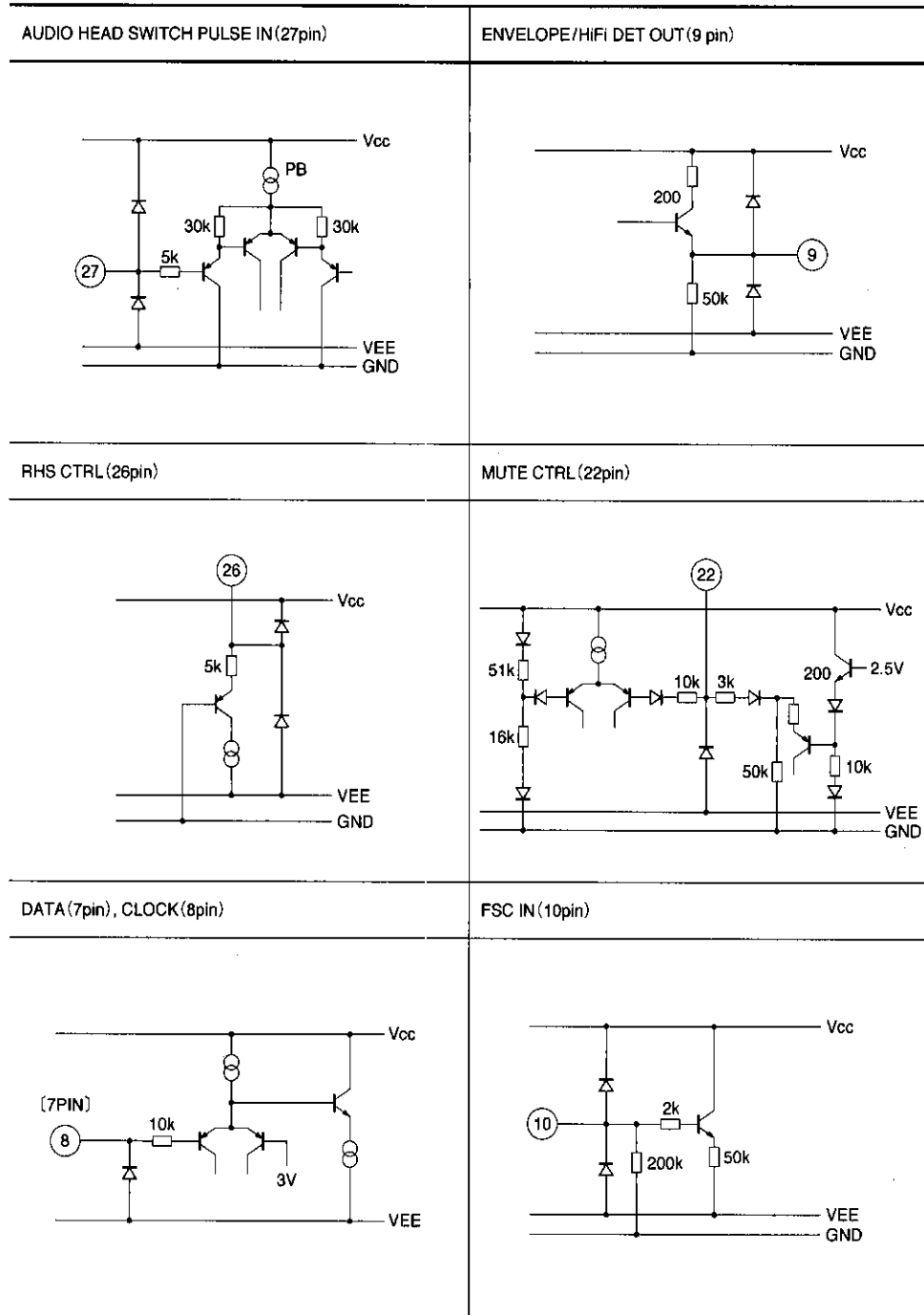
Equivalent circuits for the control and input/output circuits - (2)



Single-chip Hi-Fi audio signal processors

VCR components

Equivalent circuits for the control and input/output circuits - (3)



●Electrical characteristics

·Unless otherwise specified, the following measurement conditions apply:

UNREG - $V_{CC}=+10V$

UNREG - $V_{EE}=-10V$

$T_a=25^{\circ}C$

※With regard to the control voltages, refer to the mode holding voltage range given in p.141.

Output switch control (W1 bit 4, W1 bit 3 and W1 bit 2):	STEREO
BS Through control (W1 bit 1)	: OFF
LINE AMP gain (W3 bit 4 and W3 bit 3)	: Standard (+10.6dB)
FM output control (W2 bit 5)	: FM output on
FM OUT switch control (W2 bit 4, W2 bit 3 and W2 bit 2)	: FM REC output MIX ration (-10.0dB)
NTSC/PAL control (W2 bit 0)	: NTSC
Recording MUTE (W2 bit 1)	: Recording MUTE
SP/EP control (W1 bit 5)	: SP
FM detector level control (W4 bit 7, W4 bit 6)	: Standard
ENVE characteristic control (W4 bit 5, W4 bit 4)	: FNORM detector, no ENVE output
MUTE CTRL (pin 22)	: L (MUTE)
LINE MUTE (W1 bit 0)	: L (MUTE)

MODEM carrier frequency	NTSC L channel	1.30MHz,	PAL Lch	1.4MHz
MODEM carrier frequency	NTSC R channel	1.70MHz,	PAL Rch	1.8MHz
Color signal subcarrier frequency	NTSC	3.579545MHz,	PAL	4.433619MHz

Signal frequency $f=1kHz$

- Input condition 1 TU input $V_{IN}=-20.0dBV$, LINE1/LINE2 input $V_{IN}=-10.0dBV$, BS input $V_{IN}=-16.0dB$
- Input condition 2 TU input $V_{IN}=-10.6dBV$, LINE1/LINE2 input $V_{IN}=-0.6dBV$, BS input $V_{IN}=-6.6dB$
- Input condition 3 TU input $V_{IN}=-15.0dBV$, LINE1/LINE2 input $V_{IN}=-5.0dBV$, BS input $V_{IN}=-11.0dB$
- Input condition 4 TU input $V_{IN}=-5.0dBV$, LINE1/LINE2 input $V_{IN}=+5.0dBV$, BS input $V_{IN}=-1.0dB$

*1 B.W.=0.4 to 30kHz *2 DIN AUDIO

※Refer to Fig. 1 for the measurement circuit.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(REGULATOR)						
Circuit current (+ supply) EE	$I_{QP EE}$	29.0	38.6	51.3	mA	EE mode, no input, after carrier frequency adjustment.
Circuit current (+ supply) PB	$I_{QP PB}$	40.3	53.7	71.4	mA	PB mode, no input, FNORM, BPF, after carrier frequency adjustment.
Circuit current (- supply) EE	$I_{QM EE}$	-22.1	-16.6	-12.5	mA	EE mode, no input, after carrier frequency adjustment.
Circuit current (- supply) PB	$I_{QM PB}$	-23.9	-18.0	-13.5	mA	PB mode, no input, FNORM, BPF, after carrier frequency adjustment.
Regulator pin voltage (+)	V_{CC}	4.69	5.04	5.39	V	
Regulator pin voltage (-)	V_{EE}	-5.37	-5.02	-4.67	V	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(HiFi EE THROUGH) (INPUT : TU IN L / R, LINE1 IN L / R, LINE2 IN L / R, BS IN L / R OUTPUT : LINE OUT L / R)						
〈MANUAL MODE〉						
Line output level	V _{OE}	-10.6	-9.4	-8.2	dBV	Input condition 1
Channel balance (L/R)	CB _{EE}	-0.8	0.0	0.8	dB	Input condition 1
Distortion	THD _{EE}	—	0.017	0.10	%	Input condition 1* ¹
Maximum output level	V _{OMEE}	9.0	10.7	—	dBV	THD=1%,* ¹
Output residual noise	V _{ONEE}	—	-93.0	-86.0	dBV	Relevant input shorted to GND,* ²
Crosstalk	CT _{EE}	—	—	-75.0	dBV	Relevant input : shorted to GND Non-relevant input : Input condition2,* ²
Muting level	MTE _E	—	-105	-95	dBV	Input condition 2* ²
Switching DC offset	ΔV_{MODE}	—	8.0	22	mV	(LINE OUT) STL/R/N, MIX ON/OFF Mode switching operating point voltage difference.
(BS THROUGH) (INPUT : BS IN L / R OUTPUT : LINE OUT L / R)						
Output level	V _{OBS}	-10.5	-9.3	-8.1	dBV	V _{IN} = -16.0dBV
Distortion	THD _{BS}	—	0.006	0.08	%	V _{IN} = -16.0dBV,* ¹
Output residual noise	V _{ONBS}	—	-96.0	-86.0	dBV	* ² , Connect BS IN to GND.
(LINE AMP) (INPUT : HiFi IN L / R OUTPUT : LINE OUT L / R)						
Line amp gain 1	V _{OLINE1}	+10.0	+10.6	+11.2	dB	V _{IN} = -20.0dBV
Line amp gain 2	V _{OLINE2}	+11.2	+11.8	+12.4	dB	V _{IN} = -20.0dBV
Line amp gain 3	V _{OLINE3}	+13.1	+13.7	+14.3	dB	V _{IN} = -20.0dBV
(MIX AMP) (INPUT : TU IN L / R, LINE1 IN L / R, LINE2 IN L / R, BS IN L / R OUTPUT : MIX OUT)						
Output level	V _{OMIX}	-10.6	-9.4	-8.2	dBV	Input condition 1, simultaneous L & R input
Distortion	THD _{MIX}	—	0.08	0.50	%	Input condition 1, simultaneous L & R input* ¹
MIX ALC level	V _{ALCMIX}	-4.4	-2.9	-1.4	dBV	Input condition 2, simultaneous L & R input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(NORMAL EE THROUGH)						
(INPUT : TU IN M, TU IN L/R, LINE1 IN L/R, LINE2 IN L/R, BS IN L/R OUTPUT : LINE OUT L/R)						
Output voltage level	V _{OE}	-11.6	-10.4	-9.2	dBV	Input condition 1
Distortion	THD _{EE}	—	0.039	0.10	%	Input condition 1,* ¹
Output residual noise	V _{ONEEN}	—	-81.5	-71.3	dBV	R _g =1kΩ,* ²
ALC level 1	V _{ALCN1}	-8.9	-7.4	-5.9	dBV	Input condition 4
ALC distortion	THD _{ALCN}	—	0.045	0.15	%	Input condition 4,* ¹
(NORMAL REC AMP)						
(INPUT : TU IN M, TU IN L/R, LINE1 IN L/R, LINE2 IN L/R, BS IN L/R OUTPUT : NA REC OUT)						
Output voltage level	V _{ORECN}	-9.6	-8.1	-6.6	dBV	Input condition 1
Distortion	THD _{RECN}	—	0.079	0.20	%	Input condition 1,* ¹
Maximum output level	V _{OMRCN}	7.0	9.2	—	dBV	THD=1%,* ¹ , ALC OFF
Output level for EE	MT _{RECN}	—	-94.0	-70.0	dBV	Input condition 2,* ² , EE MODE, ALC OFF
(NORMAL PB AMP)						
(INPUT : NA HEAD IN, OUTPUT : LINE OUT)						
Output voltage level	V _{OPSN}	-13.4	-11.6	-9.8	dB	V _{IN} =-70dBV
Distortion	THD _{PBN}	—	0.19	0.40	%	V _{IN} =-70dBV,* ¹
Output residual noise	V _{ONPBN}	—	63.6	-55.0	dBV	R _g =1kΩ,* ²
Open loop gain (PB PRE AMP)	G _{V_{PBNOR}}	58.0	66.7	—	dB	V _{IN} =-70dBV OUTPUT : NA PB OUT
(EQ SWITCH)						
REC FB resistance SP	R _{REC SP}	8.3	10.0	11.7	kΩ	SP MODE
REC FB resistance EP	R _{REC EP}	40.7	49.0	57.3	kΩ	EP MODE
REC EQ resistance	R _{REC EQ}	0.83	1.00	1.17	kΩ	Resistor connected between pin 49 and GND.
PB EQ SW impedance	R _{EQ PB}	—	25	50	Ω	SP MODE
HEAD EQ SW impedance	R _{EQ HEAD}	—	29	50	Ω	EP MODE
(RHS CONTROL)						
RHS control current	I _{IN RHS}	98	118	140	μA	
RHS control leakage current	I _{L RHS}	—	—	1	μA	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(PNR ENCODE MODE)						
Encoder output level	V _{OENC}	-17.0	-15.7	-14.4	dBV	Input condition 1
Compression characteristics	CMP	-26.4	-24.7	-23.0	dB	TU input V _{IN} = -20dBV → -70dBV output level difference.
Encoder distortion	THD _{END}	-	0.17	0.37	%	Input condition 1,* ¹
Output residual noise	V _{ONEC}	-	-56.5	-51.5	dBV	Connect the pertinent input to GND.* ²
(PNR DECODE MODE)						
Output voltage level	V _{ODEC}	-11.2	-9.4	-7.6	dBV	V _{IN} = -15.7dBV
Expand characteristics	EXP	-52.4	-50.2	-48.0	dB	V _{IN} = -15.7dBV → -40.7dBV output level difference.
Time constant setting resistor	R _{DET}	5.10	6.15	7.20	kΩ	Resistance value connected between pins 13 and 36 and VEE. (when V _{CCS} and V _{EE5} applied)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
(MODEM REC MODE)							
(INPUT : TUNER IN L / R, LINE1 IN L / R, LINE2 IN L / R, BS IN L / R, OUTPUT : FM REC OUT L / R)							
Carrier frequency NTSC	Lch	f_{NOL}	1.2950	1.3000	1.3050	MHz	No input, VCC stable, after automatic adjustment $f_{sc}=3.579545\text{MHz}$ $V_{IN}=150\sim 500\text{mV}_{P-P}$
	Rch	f_{NOR}	1.6950	1.7000	1.7050	MHz	
Carrier frequency PAL	Lch	f_{POL}	1.3945	1.4000	1.4055	MHz	No input, VCC stable, after automatic adjustment $f_{sc}=4.433619\text{MHz}$ $V_{IN}=150\sim 500\text{mV}_{P-P}$
	Rch	f_{POR}	1.7935	1.7990	1.8045	MHz	
Frequency deviation	Lch	DEV_L	45.5	51.5	57.5	$\pm\text{kHz}$	Input condition 1
	Rch	DEV_R	45.0	51.0	57.0	$\pm\text{kHz}$	
Maximum frequency deviation	Lch	DEV_{MAXL}	116	138	160	$\pm\text{kHz}$	Input condition 4 ($f=10\text{kHz}$)
	Rch	DEV_{MAXR}	116	138	160	$\pm\text{kHz}$	
FM output level	Lch	V_{OFML}	320	365	420	mV_{PP}	FM OUT SW:FM L mode
	Rch	V_{OFMR}	325	370	425	mV_{PP}	FM OUT SW:FM R mode
Carrier 2nd stage harmonics	Lch	f_{2L}	—	-53.0	-40.0	dB	2nd stage harmonics and fundamental harmonics spectral ratio Lch: FM L mode, Rch: FM R mode
	Rch	f_{2R}	—	-48.0	-40.0	dB	
Carrier 3rd stage harmonics	Lch	f_{3L}	—	-52.0	-40.0	dB	3rd stage harmonics and fundamental harmonics spectral ratio Lch: FM L mode, Rch: FM R mode
	Rch	f_{3R}	—	-55.0	-42.0	dB	
FM MIX ratio (FM MIX1 mode)		f_{LR}	-12.0	-10.2	-8.4	dB	1.3MHz/1.7MHz spectrum ratio.
(MODEM PB MODE)							
(INPUT : FM PB IN, OUTPUT : LINE OUT L / R)							
Carrier frequency, after BPF to adjustment, $V_{IN}=660\text{mV}_{P-P}$, 1.30MHz, 1.70MHz MIX IN							
Demodulation output level	Lch	V_{ODL}	-11.5	-9.3	-7.1	dBV	$DEV_L=\pm 50.0\text{kHz}$, $f=1\text{kHz}$
	Rch	V_{ODR}	-11.5	-9.3	-7.1	dBV	$DEV_R=\pm 50.0\text{kHz}$, $f=1\text{kHz}$
Demodulated output level 2	Lch	V_{ODL2}	V_{ODL} -10.0	V_{ODL} -7.5	V_{ODL} -5.0	dBV	$DEV_L=\pm 50.0\text{kHz}$, $f=10\text{kHz}$
	Rch	V_{ODR2}	V_{ODR} -10.0	V_{ODR} -7.5	V_{ODR} -5.0	dBV	$DEV_R=\pm 50.0\text{kHz}$, $f=10\text{kHz}$
Demodulated distortion	Lch	THD_{DL}	—	0.12	0.35	%	$DEV_L=\pm 50.0\text{kHz}$, $f=1\text{kHz}$, *1
	Rch	THD_{DR}	—	0.13	0.35	%	$DEV_R=\pm 50.0\text{kHz}$, $f=1\text{kHz}$, *1
Demodulated SW noise level	Lch	V_{ODSWL}	—	—	—	dBV	$f=10\text{kHz}$, AUDIO H. SW. P=-Hz 5V _{P-P} rectangular-waveform input. After 10kHz TRAP passes $DEV_L=\pm 25.0\text{kHz}$ *2
	Rch	V_{ODSWR}	—	—	—	dBV	
Demodulated noise level	Lch	V_{ONDL}	—	-95.0	-85.0	dBV	Unmodulated *2
	Rch	V_{ONDR}	—	-95.0	-85.0	dBV	
(Recording → playback total characteristics)							
(EE . . . INPUT : LINE IN L / R, OUTPUT : LINE OUT L / R)							
(PB . . . INPUT : FM PB IN, OUTPUT : LINE OUT L / R)							
Line output recording/ playback level difference	Lch	V_{RPL}	-1.2	0.0	+1.2	dB	EE mode: $V_{IN}=-10.0\text{dBV}$ after carrier frequency adjustment.
	Rch	V_{RPR}	-1.2	0.0	+1.2	dB	
PB mode: Input FM PB IN = 660mV _{P-P} , $f=1.30\text{MHz}$, 1.70MHz 1:1 MIX, after BPF center frequency adjustment. Input DEV = DEV _{L,R} (frequency deviation given above). EE/PB line out level difference.							

Single-chip Hi-Fi audio signal processors

VCR components

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(FM BPF) (INPUT : FMPB IN, OUTPUT : BPF MONITOR L/R) VCC stable, after automatic adjustment						
BPF L/R level difference NTSC	ΔV_{BPFN}	-5.0	0.0	5.0	dB	$f=1.505\text{MHz}$, $V_{IN}=200\text{mV}_{P-P}$
BPF L/R level difference PAL	ΔV_{BFPF}	-5.0	0.0	5.0	dB	$f=1.605\text{MHz}$, $V_{IN}=200\text{mV}_{P-P}$
Lch, Rch mix input signal, 660mV _{P-P} (RATIO 1:1), FM ALC ON						
NTSC Lch						
1.30MHz insertion loss	ATT _{NLC}	-14.2	-11.1	-8.1	dB	1.30MHz+1.70MHz
1.15MHz attenuation	ATT _{NLC} 1.15	ATT _{NLC} -9.5	ATT _{NLC} -5.0	ATT _{NLC} -2.0	dB	1.15MHz+1.70MHz
1.45MHz attenuation	ATT _{NLC} 1.45	ATT _{NLC} -8.6	ATT _{NLC} -5.0	ATT _{NLC} -2.0	dB	1.45MHz+1.70MHz
1.70MHz attenuation	ATT _{NLC} 1.70	-	-	ATT _{NLC} -30.0	dB	1.30MHz+1.70MHz
NTSC Rch						
1.70MHz insertion loss	ATT _{NRC}	-15.5	-12.3	-9.3	dB	1.30MHz+1.70MHz
1.55MHz attenuation	ATT _{NRC} 1.55	ATT _{NRC} -8.3	ATT _{NRC} -4.7	ATT _{NRC} -1.9	dB	1.55MHz+1.30MHz
1.85MHz attenuation	ATT _{NRC} 1.85	ATT _{NRC} -10.6	ATT _{NRC} -5.4	ATT _{NRC} -1.6	dB	1.85MHz+1.30MHz
1.30MHz attenuation	ATT _{NRC} 1.30	-	-	ATT _{NRC} -30.0	dB	1.30MHz+1.70MHz
PAL Lch						
1.40MHz insertion loss	ATT _{PLC}	-1.28	-9.7	-6.7	dB	1.40MHz+1.80MHz
1.25MHz attenuation	ATT _{PL} 1.25	-	ATT _{PLC} -5.0	-	dB	1.25MHz+1.80MHz
1.55MHz attenuation	ATT _{PL} 1.55	-	ATT _{PLC} -5.2	-	dB	1.55MHz+1.80MHz
1.80MHz attenuation	ATT _{PL} 1.80	-	-	ATT _{PLC} -30.0	dB	1.40MHz+1.80MHz
PAL Rch						
1.80MHz insertion loss	ATT _{PRC}	-14.8	-11.6	-8.6	dB	1.40MHz+1.80MHz
1.65MHz attenuation	ATT _{PR} 1.65	-	ATT _{PRC} -4.6	-	dB	1.65MHz+1.40MHz
1.95MHz attenuation	ATT _{PR} 1.95	-	ATT _{PRC} -5.3	-	dB	1.95MHz+1.40MHz
1.40MHz attenuation	ATT _{PR} 1.40	-	-	ATT _{PRC} -30.0	dB	1.40MHz+1.80MHz

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(DO detect circuit)						
DO detector level	V _{DDO}	77.0	83.0	89.0	dB μ	Input level to give DO due to attenuation.
(FNORM to HiFi return delay circuit)						
Return delay time	t _{FNDLY}	110	125	140	mS	FM PB IN (1.3MHz, 1.7MHz, 1:1 MIX) time from 660mVp-p input to ENVE OUT rise. Audio head pulse in: f = 30Hz, 5Vp-p rectangular waveform.
(Envelope output circuit) (INPUT : FM PB IN, OUTPUT : ENVE OUT) 0dB=660mVp-p, 1.3MHz & 1.7MHz MIX入力						
Envelope output level SP0	V _{ENVSP0}	—	0	100	mV	No signal, SP MODE
Envelope output level SP1	V _{ENVSP1}	2.22	2.72	3.22	V	V _{IN} =0dB, SP MODE
Envelope output level SP2	V _{ENVSP2}	3.70	3.95	4.20	V	V _{IN} =+10dB, SP MODE
Envelope output level EP1	V _{ENVEP1}	2.18	2.68	3.18	V	V _{IN} =-4dB, EP MODE
HiFi DET output DC FNORMAL	V _{HDETL}	—	0	100	mV	No signal
HiFi DET output DC HiFi	V _{HDETH}	3.50	4.00	—	V	V _{IN} =0dB
(Hold pulse circuit)						
Audio head switch pulse threshold voltage	V _{THHOLD}	1.66	2.66	3.66	V	Hysteresis (0.5V)
Hold pulse width	Δt HOLD	6.47	7.77	9.07	μ S	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
(Voltage for preserving the control system mode)						
CLOCK IN						
L mode holding voltage	V _{HBL}	0.0	—	0.5	V	
H mode holding voltage	V _{HBH}	2.5	—	V _{CC}	V	
DATA IN						
L mode holding voltage	V _{H7L}	0.0	—	0.5	V	
H mode holding voltage	V _{H7H}	2.5	—	V _{CC}	V	
MUTE CTRL						
MUTE holding voltage	V _{H2L}	0.0	—	1.0	V	
DC MUTE holding voltage	V _{H2H}	3.9	—	V _{CC}	V	

● Measurement circuit

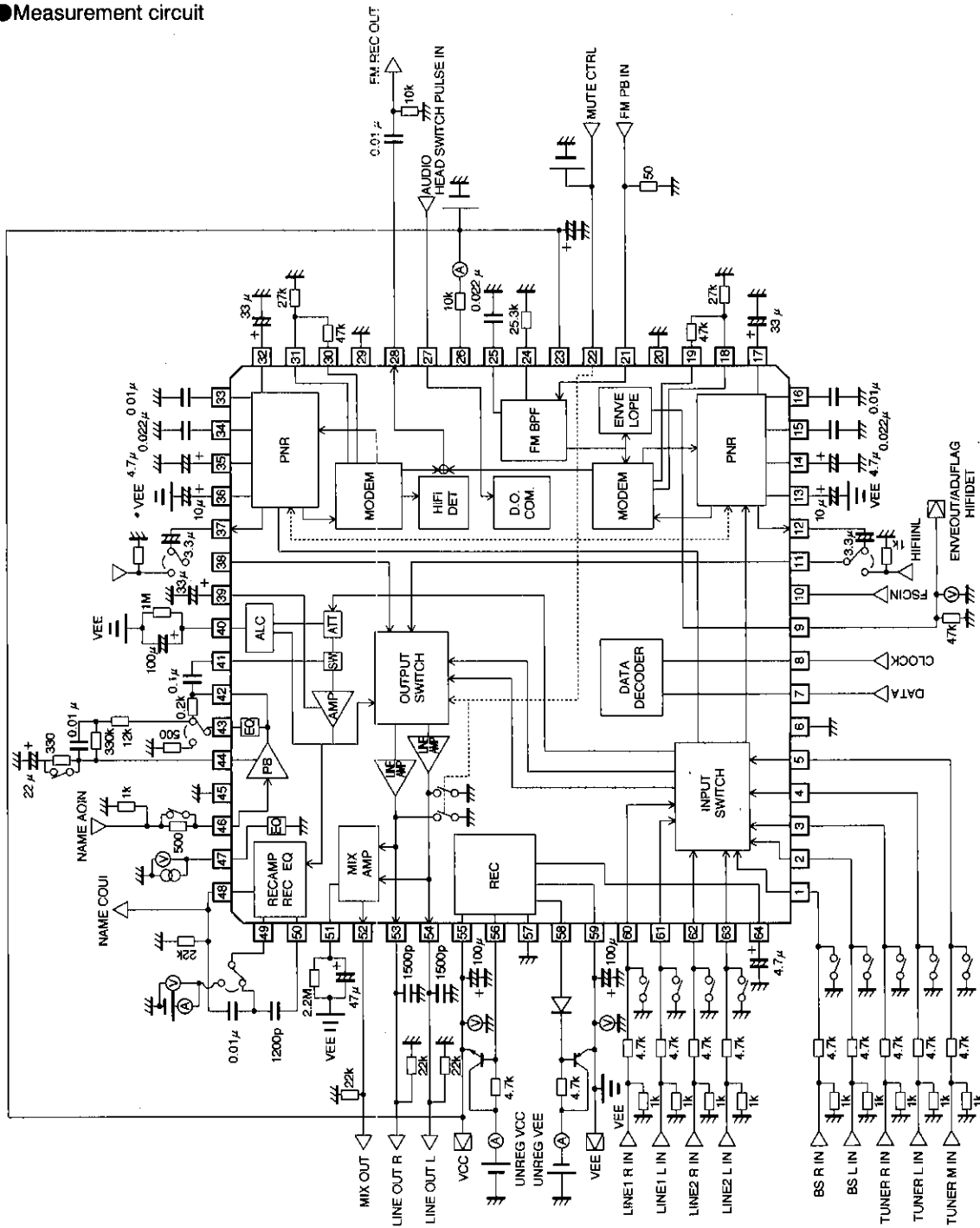


Fig.1 Measurement circuit

● Application example

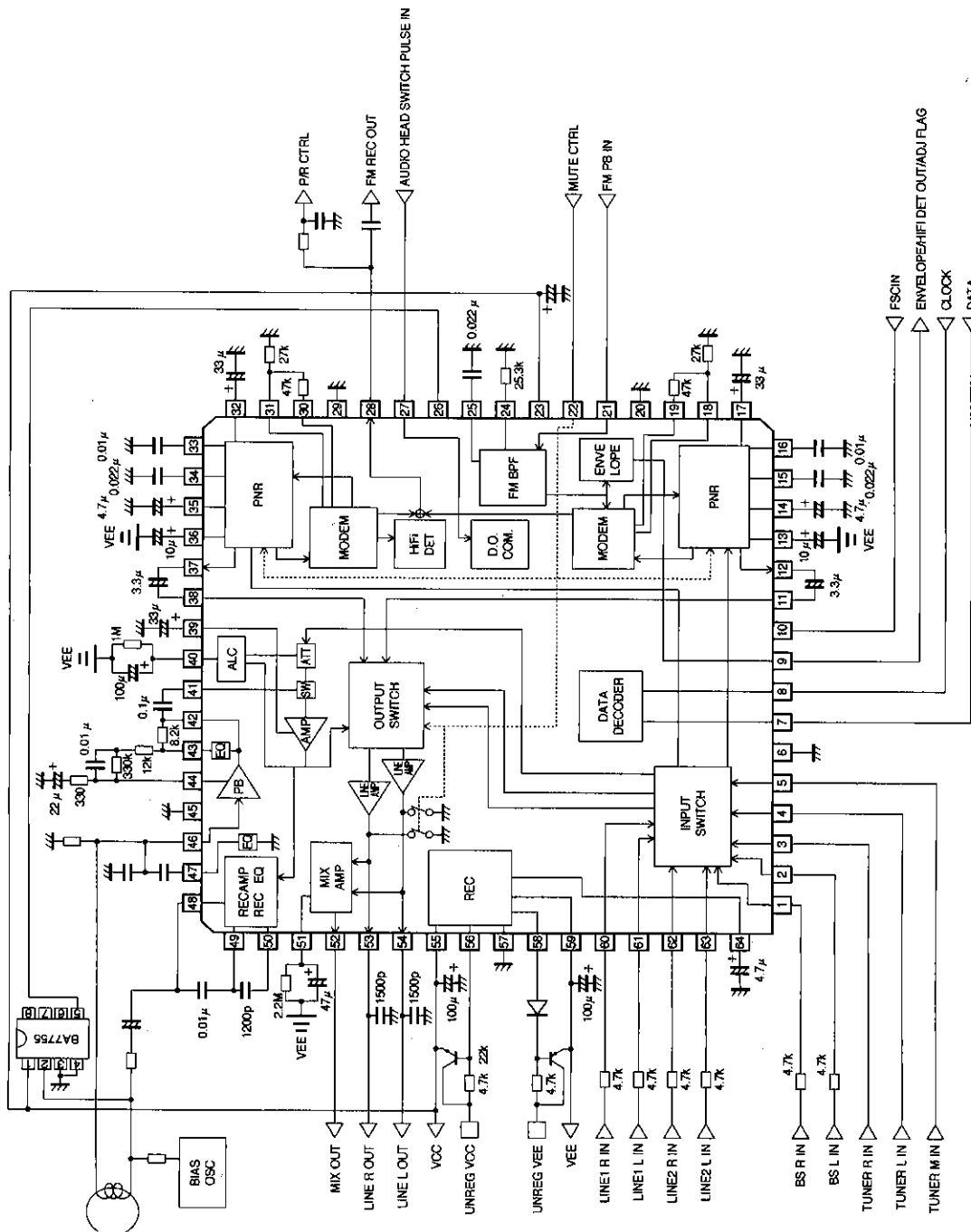


Fig.2 Application example circuit

VCR components Single-chip Hi-Fi audio signal processors

●Electrical characteristic curve

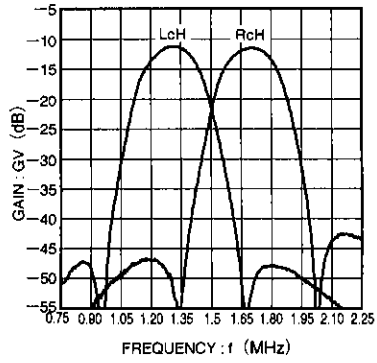
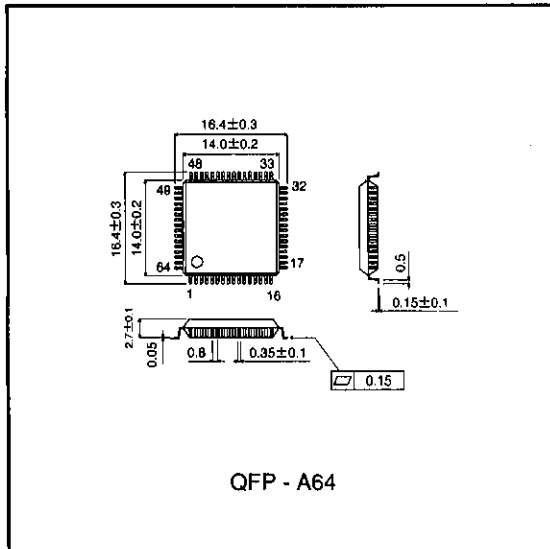


Fig. 3 FM BPF frequency characteristic (NTSC)

●External dimensions (Units: mm)



Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representative in advance.

- Note when exporting
 - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
 - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.