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SANYO Semiconductors
DATA SHEET

LA71076SM — Monolithic Linear IC For VHS VTR Video Signal Processor (Y/C/A single-chip)

Overview

The LA71076SM is a video signal processing system IC that handles VHS VCR format. In addition to conventional video signal processing circuits, it integrates normal audio processing and record/playback FM-EQ circuits on a chip. The LA71076SM is combined with a CCD to create a 2-chip-1-package semiconductor device. Chip internal trimming is used to make this IC adjustment free, further the automatically adjustable comb filter makes the IC fully adjustment free. These features significantly reduces the number of external components, thus streamlining the design of the signal processing board and reducing in the production cost.

Functions

- Fully adjustment free.
- Built-in normal audio processing.
- Built-in and record/playback FM-EQ circuits.
- Built-in NTSC delay-line (LC89961 equivalent).

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		7.0	V
Allowable power dissipation	Pd max	Ta≤75°C *	1040	mW
Operating temperature	Topg		-10 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

*: When mounted on a 114.3×76.1×1.6mm^3,glass epoxy board.

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		5.0	V
Allowable operating voltage range	V_{CC} op		4.8 to 5.2	V

SANYO Semiconductor Co., Ltd.
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Electrical Characteristics at Ta = 25°C

Recording mode Head Amplifier (T87:5.0V T11:5.0V)

Parameter	Symbol	In	Out	Conditions	T13	T15	Ratings min	Ratings typ	Ratings max	Unit
Rec AGC Amp output level	V_RSP V_REP	T66A	T83A T89A	Output level when V_{IN} = 300mVp-p, f = 4MHz Enter by applying DC 3.5V or more to pin 66.		0 5.0	127 104	135 111	143 119	mVp-p
Difference of gain between mode	ΔGVR			V_RSP/V_REP			1.40	1.7	2.00	dB
REC AGC AMP control characteristics 1	ΔV_{AGC}1-SP ΔV_{AGC}1-EP	T66A	T83A T89A	Output level/V_RSP, EP with f = 4MHz and V_{IN} = 700mVp-p		0 5.0		0.5	1.0	dB
REC AGC AMP control characteristics 2	ΔV_{AGC}2-SP ΔV_{AGC}2-EP	T66A	T83A T89A	Output level/VRSP, EP with f = 4MHz and V_{IN} = 100mVp-p.		0 5.0	-1.0	-0.5		dB
REC AGC AMP frequency characteristics	ΔV_FRS ΔV_FRE	T66A	T83A T89A	The output ratio when f is 1M, 7MHz as V_{IN} = 300mVp-p. 7MHz/1MHz (Note 1)		0 5.0	-1.0	0.0	+1.0	dB
REC AGC AMP second harmonic distortion	ΔV_{HD}RS ΔV_{HD}RE	T13A	T83A T89A	The ratio of the 8Mz (second component) and 4Mz (first component) of the output with V_{IN} = 300mVp-p and f = 4MHz		0 5.0		-45	-40	dB
REC AGC AMP maximum output level	ΔV_{HD}RS ΔV_{HD}RE	T66A	T83A T89A	The output level at which the second distortion with f = 4MHz is -35dB.		0 5.0	20	22		mVp-p
REC AGC AMP attenuate volume of mute	ΔV_MRS ΔV_MRE	T66A	T83A T89A	Output level/VRSP, EP with V_{IN} = 300mVp-p and f = 4MHz		0 5.0		-45	-40	dB
REC AGC AMP mixed modulation relative level	ΔVCYS ΔVCYE	T66A	T83A T89A	Vin1 = 300mVp-p, f = 4MHz, Vin2 = 300Vp-p, f = 629kHz (4M±629k)/4M ratio of output		0 5.0		-45	-40	dB

Note1: Apply DC of about 1.6V to AGC detection filter terminal (Pin92), and fix the AGC amplifier gain.
Use a resistor with a tolerance of ±1.0% between Pin 93and GND.

PB mode Head Amplifier (T87 = 5.0V T11 = 0V)

Parameter			Symbol	In	Out	Conditions	T13	T15	Ratings min	Ratings typ	Ratings max	Unit
Voltage gain	SP-H	CH1	Gvp1	T82A	T74	V_{IN} = 38mVp-p, f = 1MHz	0	0	56.0	59.0	62.0	dB
	SP-H	CH2	Gvp2	T85A			5.0	0	56.0	59.0	62.0	
	EP-L	CH3	Gvp3	T88A			0	5.0	56.0	59.0	62.0	
	EP-H	CH4	Gvp4	T91A			5.0	5.0	56.0	59.0	62.0	
Difference of voltage gain 1			ΔGvp1			Gvp1 - Gvp2			-1	0	+1	dB
Difference of voltage gain 2			ΔGvp2			Gvp3 - Gvp4			-1	0	+1	dB
Difference of gain between mode			ΔGvp3			Gvp3 - Gvp1			-1	0	+1	dB
Input calculation noise voltage		CH1	V_NIN1	T82A	T74	The ratio of the output which has passed the 1.1MHz LPF and the output without input under the same input conditions as the voltage gain.	0	0		0.7	1.0	µVrms
		CH2	V_NIN2	T85A			5.0	0				
		CH3	V_NIN3	T88A			0	5.0				
		CH4	V_NIN4	T91A			5.0	5.0				
Frequency characteristics		CH1	ΔVfp1	T82A	T74	The ratio of the V_{IN} = 38mVp-p, f = 7MHz output and Gvp1, 2, 3, 4.	0	0	-2.5	0		dB
		CH2	ΔVfp2	T85A			5.0	0				
		CH3	ΔVfp3	T88A			0	5.0				
		CH4	ΔVfp4	T91A			5.0	5.0				
Secondary harmonic distortion		CH1	V_HDP1	T82A	T74	The ratio of 8MHz (second component) and 4MHz (first component) of output with V_{IN} = 38mVp-p and f = 4 MHz.	0	0		-40	-35	dB
		CH2	V_HDP2	T85A			5.0	0				
		CH3	V_HDP3	T88A			0	5.0				
		CH4	V_HDP4	T91A			5.0	5.0				
Maximum output level		CH1	V_OMP1	T82A	T74	The output level at which the ratio of 3MHz (third component) and 1MHz (first component) of the output with f = 1MHz.	0	0	1.0	1.2		Vp-p
		CH2	V_OMP2	T85A			5.0	0				
		CH3	V_OMP3	T88A			0	5.0				
		CH4	V_OMP4	T91A			5.0	5.0				

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Parameter	Symbol	In	Out	Conditions	T13	T15	Ratings			Unit
							min	typ	max	
Cross talk SP1 CH1	$V_{CR}1$	T85A T88A T91A	T74	The ratio of output of V_{IN} = 38mVp-p, f = 4MHz and Gvp1.	0	0		-40	-35	dB
Cross talk SP2 CH2	$V_{CR}2$	T82A T88A T91A	T74	The ratio of output of V_{IN} = 38mVp-p, f = 4MHz and Gvp2.	5.0	0		-40	-35	dB
Cross talk EP1 CH3	$V_{CR}3$	T82A T85A T88A	T74	The ratio of output of V_{IN} = 38mVp-p, f = 4MHz and Gvp3.	0	5.0		-40	-35	dB
Cross talk EP2 CH4	$V_{CR}4$	T82A T85A T91A	T74	The ratio of output of V_{IN} = 38mVp-p, f = 4MHz and Gvp4.	5.0	5.0		-40	-35	dB
Output DC offset	$\Delta V_O DC1$ $\Delta V_O DC2$ $\Delta V_O DC3$ $\Delta V_O DC4$ $\Delta V_O DC5$ $\Delta V_O DC6$		T74	CH1- CH2 CH3- CH4 CH1- CH3 CH2- CH4 CH1- CH4 CH2- CH3	0 5.0 0 5.0 0 0 5.0 5.0 0 5.0 0 5.0	0 0 5.0 5.0 0 5.0 0 5.0 0 5.0 0 5.0	-150	0	+150	mV
Envelope detection output terminal voltage	V_{ENV}		T93	T93DC when no input is provided.	0 5.0 0 5.0	0 0 5.0 5.0	0	0.8	1.3	V
Envelope detection output terminal voltage SP1	$V_{ENV}SP1$	T82A	T93	When input f = 4MHz, T93 DC as becomes 175mVp-p, for T74 output level.	0	0	2.0	2.5	3.0	V
Envelope detection output terminal voltage SP2	$V_{ENV}SP2$	T82A	T93	When input f = 4MHz, T93 DC as becomes 400mVp-p, for T74 output level.	0	0	4.0	4.5	5.0	V
Envelope detection output terminal voltage EP1	$V_{ENV}EP1$	T89A	T93	When input f = 4MHz, T93 DC as becomes 125mVp-p, for T74 output level.	0	5.0	2.0	2.5	3.0	V
Envelope detection output terminal voltage EP2	$V_{ENV}EP2$	T89A	T93	When input f = 4MHz, T93 DC as becomes 300mVp-p, for T74 output level.	0	5.0	4.0	4.5	5.0	V
Comparator output voltage 1	$V_{COMP}1$	T82A	T94	T94 DC voltage when V_{IN} = 38mVp-p, f = 4MHz.	0	0		0.4	0.7	V
Comparator output voltage 2	$V_{COMP}2$	T89A	T94	T94 DC voltage when V_{IN} = 38mVp-p, f = 4MHz.	5.0	0	4.5	4.8		V

REC Mode Y

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
Current dissipation (REC)	$I_{CC}R$			Measure the sum of currents flowing into pins 21, 54, 56, 57, 75, 87.	135	160	185	mA
EE output level 2	$V_{EE}2$	T42A	T35	With V_{IN} being a 1Vp-p video signal (PAL), measure the output level on T35.	2.00	2.10	2.20	Vp-p
AGC characteristics 1	AGC1	T42A	T35	With V_{IN} being a 2.0Vp-p video signal, measure the ratio of the output level on T35 and $V_{EE}1$.	0	0.6	1.2	dB
AGC characteristics 2	AGC2	T42A	T35	With V_{IN} being a 0.5Vp-p video signal, measure the ratio of the output level on T35 and $V_{EE}1$.	-1.2	-0.2	0.0	dB
AGC characteristics 3	AGC3	T42A	T35	With V_{IN} being a 700mVp-p luminance, 600mVp-p sync, measure the sync level on T35.	550	650	750	mVp-p
AGC characteristics 4	AGC4	T42A	T35	With V_{IN} being a 700mVp-p luminance, 150mVp-p sync, measure the sync level on T35.	330	380	430	mVp-p
Sync separator output level	V_{SYR}	T42A	T34	With V_{IN} being a 1.0Vp-p video signal, measure the output pulse wave height on T34.	4.0	4.2	4.4	Vp-p
Sync separator output pulse width	PW_{SYR}	T42A	T34	With V_{IN} being a 1.0Vp-p video signal, measure the output pulse width on T34.	4.1	4.4	4.7	µs
Sync separator threshold level	TH_{SYR}	T42A	T34	Gradually reduce the input level, and measure the input level at which the output pulse width is 1µs or more wider than PWSYR.		-20	-15	dB
H-Sync output level	VH_{SYR}	T42A	T33	With V_{IN} being a 1.0Vp-p video signal, measure the output pulse wave height on T33.	4.0	4.2	4.4	Vp-p
H-Sync output pulse width	PWH_{SYR}	T42A	T33	V_{IN} = 1.0Vp-p video signal, Measure the output pulse on T33.	4.4	4.7	5.0	µs
Sync tip level Pedestal level White level	LVOR	T42A	T35	With V_{IN} being a 1.0Vp-p video signal, measure the sync tip and pedestal and white level on T35 video output, and take these as LSYN LPED LWHT, respectively.				
Quasi-V insertion level	ΔVDR	T42A	T35	Measure the T35 DC voltage with 4.0V applied to T31, and take this as LVDR, and calculate the difference from LSYN measured above. ΔWHR = LSYN-LVDR	-100	0	100	mV
Quasi-V insertion level	ΔHDR	T42A	T35	Measure the T35 DC voltage with 3.0V applied T31, and takes this as LHDP, and calculates the difference from LSYN measured above. ΔHDR = LPED-LHDR	-500	-400	-300	mV
White insertion level	ΔWHR	T42A	T35	Measure the T35 DC voltage with 2.0V applied to T31. and take this as LWHP, and calculate the difference from LWHT measured above. ΔWHR = LWHT-LWHR	500	600	700	mV
Edge insertion level	ΔEGR	T42A	T35	Measure the T35 DC voltage with 1.2V applied toT31.and take this as LWHP, and calculate the difference from LPED measured above. ΔWHR = LPED-LEGR	-500	-400	-300	mV
Y LPF frequency characteristics (1)	$Y_{LPF}1$	T42A	T26	With V_{IN} being a standard multi-burst signal (1Vp-p), measure the 1MHz response to a 500kHz signal on T26.	-0.6	-0.1	0.4	dB
Y LPF frequency characteristics (2)	$Y_{LPF}2$	T42A	T26	With V_{IN} being a standard multi-burst signal (1Vp-p), measure the 2MHz response to a 500kHz signal on T26.	-1.3	-0.3	0.7	dB
Y LPF frequency characteristics (3)	$Y_{LPF}3$	T42A	T26	With V_{IN} being a standard multi-burst signal (1Vp-p), measure the 3MHz response to a 500kHz signal on T26.	-8.0	-6.0	-4.0	dB
Y LPF frequency characteristics (5)	$Y_{LPF}5$	T42A	T26	With V_{IN} being a standard multi-burst signal (1Vp-p), measure the 3.58MHz response to a 500kHz signal on T26			-25	dB

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Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
REC-FM modulator output level	V_{FM}		T66	Measure the T66 output level with no input.	220	300	360	mVp-p
Carrier frequency	$F_{FM}2$		T66	Measure the output frequency on T66 with no input.	3.36	3.46	3.56	MHz
REC-FM output second distortion	HMOD		T66	Measure the second distortion with the above state.		-40	-35	dB
Deviation 2	DEV2	T42A	T66	With V_{IN} being a 100% white 1Vp-p signal, measure the deviation on T66.	0.95	1.00	1.05	MHz
FM modulator linearity	LMOD	T25	T66	Assume that f2.85 is the output frequency when 3.85VDC is applied to T25. $LMOD = \frac{f2.85-(f3.1+f2.6)/2}{f3.1-f2.6} \times 100$	-2	0	2	%
1/2 fH carrier shift	CS	T13	T66	The output frequency change	6.5	8.2	9.5	kHz
Emphasis gain	GEMP	T25A	T23	With V_{IN} being a 500mVp-p 10kHz sine wave, measure the ratio of the levels on T25A and T23.	-0.75	-0.25	0.25	dB
Detail enhancer characteristics (1)	$G_{ENH}1$	T25A	T23	With V_{IN} being a 158mVp-p 2MHz sine wave, measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	1.5	2.0	2.5	dB
Detail enhancer characteristics (2)	$G_{ENH}2$	T25A	T23	With V_{IN} being a 50mVp-p 2MHz sine wave, measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	3.5	4.5	5.5	dB
Detail enhancer characteristics (3)	$G_{ENH}3$	T25A	T23	With V_{IN} being a 15.8mVp-p 2MHz sine wave, measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	4.3	5.8	7.3	dB
Nonlinear emphasis characteristics (1)	$G_{NL}EMP1$	T25A	T23	With V_{IN} being a 500mVp-p 2MHz signal measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	-3.0	-2.0	-1.0	dB
Nonlinear emphasis characteristics (2)	$G_{NL}EMP2$	T25A	T23	With V_{IN} being a 158mVp-p 2MHz signal measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	2.5	4.0	5.5	dB
Nonlinear emphasis characteristics (3)	$G_{NL}EMP3$	T25A	T23	With V_{IN} being a 50mVp-p 2MHz signal measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	5.0	6.5	8.0	dB
Main linear emphasis characteristics (1)	$G_{M}E1$	T25A	T23	With V_{IN} being a 50mVp-p 500kHz sine wave, measure the ratio of the levels on T25 and T23, and calculate the difference from GEMP.	10.0	11.5	12.0	dB
Main linear emphasis characteristics (2)	$G_{M}E2$	T25A	T23	With V_{IN} being a 50mVp-p 2MHz signal measure the ratio of the levels on T25A and T23, and calculate the difference from GEMP.	17.0	18.5	20.0	dB
White clipping level	L_{WC}	T42A	T23	With V_{IN} being a 1.0Vp-p 100% white video signal, measure the white clipping level on T23.	180	190	200	%
Dark clipping level	L_{DC}	T42A	T23	With V_{IN} being a 1.0Vp-p 100% white video signal, measure the dark clipping level on T23.	-52	-50	-47	%

REC Mode EQ

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
REC EQ characteristics 1	$G_{REQ}1$	T36A	T66	With V_{IN} being a CW 2MHz, 400mVp-p signal, measure the input/output response.	-5.7	-4.5	-3.3	dB
REC EQ characteristics 2	$G_{REQ}2$	T36A	T66	With V_{IN} being a CW 4MHz, 400mVp-p signal, measure the input/output response.	-4.0	-2.7	-1.4	dB
REC EQ characteristics 3	$G_{REQ}3$	T36A	T66	With V_{IN} being a CW 750kHz, 400mVp-p signal, measure the input/output response.			-20	dB
REC EQ 2'nd distortion	H_{REQ}	T36A	T66	Measure the second harmonic in the above conditions.		-40	-15	dB

PB Mode Y

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
Current dissipation (PB)	$I_{CC}P$			Measure the sum of the currents flowing into pins 21, 54, 56, 57, 75, and 87.	160	170	180	mA
Dropout compensation Period 1H for one horizontal synchronization period	TDOC	T74A T25A	T35	T74A: 4MHz 300mVp-p sine wave +3VDC T25A: 0.5Vp-p video signal The I/O response 5H after the T74A input is set to 0.	10.0	13.0	15.0	H
DOC characteristics	GDOC	T74A T25A	T35	T74A: 4MHz 300mVp-p sine wave +3VDC T25A: 0.5Vp-p video signal The time from the instant when the T74A input level is set to 0 to the time point when the T35 output is restored.	-1.5	0	1.5	dB
PB Y level	V-YOUT	T74A	T35	DEV = 1.0MHz PB Y level when input FM signal is input.	2.00	2.10	2.20	Vp-p
Self R/P, PB-Y level	R/P-OUT	T74A	T35	Self R/P-Y, PB-Y level	1.93	2.10	2.27	Vp-p
FM demodulator linearity	LDEM	T74A	T26	$LEDM = \frac{VDEM4 - (VDEM3 + VDEM5)/2}{VDEM5 - VDEM3} \times 100$ *VDEM4 = DC: T26 (Input 4MHz, 300mVp-p)	-3.5	0	+3.5	%
Carrier leakage	CL	T74	T26	Measure the ratio of the 4MHz component on T26 and SDEM.			-35	dB
PB YNR characteristics	P_{YNR}	T25A	T35	Measure the ratio of 32fH component and 32.5fH.	-8.5	-7.5	-6.5	dB
Nonlinear de-emphasis characteristics (1) *Serial-control	$G_{NL}DE1$	T25A	T35	With V_{IN} being a 50% white video f = 2MHz, 158mVp-p sine wave, measure the I/O response.	-3.5	-2.5	-1.5	dB
Nonlinear de-emphasis characteristics (2)	$G_{NL}DE2$	T25A	T35	f = 2MHz, 50mVp-p	-6.0	-4.5	-3.0	dB
Double noisecanceller characteristics (1)	$G_{WNC}1$	T25A	T35	f = 1.4MHz, 158mVp-p	3.5	-2.5	-1.5	dB
Double noisecanceller characteristics (2)	$G_{WNC}2$	T25A	T35	f = 1.4MHz, 50mVp-p	-12	-10	-8	dB
Double noisecanceller characteristics (3)	$G_{WNC}3$	T25A	T35	f = 1.4MHz, 15.8mVp-p	-15	-13	-11	dB
Sync separator output level	V_{SYP}	T25A	T34	With V_{IN} being a 0.5Vp-p video signal, measure the output pulse wave height on T34.	4.0	4.2	4.4	Vp-p
Sync separator output pulse width	PW_{SYP}	T25A	T34	With V_{IN} being a 0.5Vp-p video signal, measure the output pulse width on T34.	4.1	4.4	4.7	µs
H-Sync output level	VH_{SYP}	T25A	T33	With V_{IN} being a 0.5Vp-p video signal, measure the output pulse wave height on T33.	4.0	4.2	4.4	Vp-p
H-Sync output pulse width	PWH_{SYP}	T41	T33	With V_{IN} being a 0.5Vp-p video signal, measure the output pulse width on T33.	4.4	4.7	5.0	µs
Sync tip level Pedestal level White level	LVOR	T25A	T35	With V_{IN} being a 100% white 0.5 Vp-p signal, measure the sync tip and pedestal and white levels on T35 video output, and take these as LSYN, LPED, and LWHT, respectively.				
Quasi-V insertion level	ΔVDP	T25A	T35	Measure the T35 DC voltage with 4.0V applied to T31, and take this as LVDP, and calculate the difference from LSYN measured above. ΔVDP = LSYN-LVDP	-100	0	100	mV
Quasi-H insertion level	ΔHDP	T25A	T35	Measure the T35 DC voltage with 3.0V applied to T31, and take this as LHDP, and calculate the difference from LPED measured above. ΔHDP = LPED-LHDP	-500	-400	-300	mV
White insertion level	ΔWHP	T25A	T35	Measure the T35 DC voltage with 2.0V applied to T31, and take this as LWHP, and calculate the difference from LWHT measured above. ΔWHP = LWHT-LWHP	500	600	700	mV
Edge insertion level	ΔEGP	T25A	T35	Measure the T35 DC voltage with 1.2V applied to T31, and take this as LEGP, and calculate the difference from LPED measured above. ΔWHP = LPED-LEGP	-500	-400	-300	mV
4V regulator	V_{REG}		T65	Measure the T65 DC level.	3.9	4.0	4.3	V

PB mode EQ T72 = 5V

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
PB EQ characteristics 1 *Serial-control	G_PEQ1	T28A	T23	With V_{IN} being a CW 4MHz, 300mVp-p signal, measure the input / output response.	1.5	3.0	4.5	dB
PB EQ 2'nd distortion	H_PEQ	T28A	T23	Measure the second harmonic in the above condition.		-40	-30	dB
PB EQ characteristics 2	G_PEQ2	T28A	T23	With V_{IN} being a CW 4MHz, 300mVp-p signal, measure the input / output response			-30	Vp-p
PB EQ Trap characteristics	f_PEQ	T28A	T23	With V_{IN} being a 300mVp-p signal, measure high-band trap frequency and gain. (Using network analyzer)			-25	dB

PB mode S discrimination

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
Output voltage when normal VHS	$VN_{DET}N$	T74	T32	V_{IN} = 300mVp-p f:4MHz +3VDC	0	0.2	0.5	V
Output voltage when S-VHS	$VS_{DET}S$	T74	T32	V_{IN} = 300mVp-p f:6MHz +3VDC	4.4	4.7	5.0	V
S-discrimination input level	VS_{DET}	T74	T32	Input level at which no mis-discrmination occurs while changing T74 input level.	50			mVp-p
Normal-discrimination input level	VN_{DET}	T74	T32	Input level at which no mis-discrmination occurs while changing T74 input level.	50			mVp-p
Normal → S-discrimination threshold level	$FS_{DET}NS$	T74	T32	The frequency at which T32 becomes H when the sine wave input to T74 is increased from f = 4MHz.	5.5	6.0	6.5	MHz
S → normal discrimination threshold level	$FS_{DET}SN$	T74	T32	The frequency at which T32 becomes L when the sine wave input to T74 is increased from f = 5MHz.	5.0	5.5	6.0	MHz

REC mode chroma T16 = 5V, T11 = 5V, T55 = 0V, T59 = 0V, T72 = 5V

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
REC chroma low frequency conversion output level	VOR-66	T42A	T66	With V_{IN} being the standard color bar signal (1Vp-p), measure the burst level on T66.	600	750	900	mVp-p
Burst emphasis	GBE	T42A	T66	With V_{IN} being the standard color bar signal (1Vp-p) calculate the ratio of the T66 burst levels for SP/EP(T59 = 0V/5V) and LP(T59 = 2.5V) modes.	5.5	6.0	6.5	dB
VXO oscillation level	V_{VXO}-RN	T42A	T62	With V_{IN} being the standard color bar signal (1Vp-p), measure the T62 output amplitude with an FET probe.	290	430	690	mVp-p
REC ACC characteristics (1)	ACC_R1	T42A	T66	With V_{IN} being the standard color bar signal (1Vp-p), increase only the chroma signal level by +6dB, measure the T66 burst level, and calculate its ratio with VOR-66.		+0.2	+0.5	dB
REC ACC characteristics (2)	ACC_R2	T42A	T66	With V_{IN} being the standard color bar signal (1Vp-p), decrease only the chroma signal level by -6dB, measure the T66 burst level, and calculate its ratio with VOR-66.	-0.5	-0.1		dB
REC ACC killer-on input level	V_{ACCK}-ON	T42A	T66	With V_{IN} being the standard color bar signal (1Vp-p), decrease the chroma signal and measure the input burst level at which T66 output ceases. Calculate the ratio of this value with the standard input level.		-26		dB
REC ACC killer-on output level	V_0ACCK	T42A	T66	Measure the T66 output level with a spectrum analyzer in the killer state of the above item and calculate its ratio with VOR-66.		-60	-50	dB
REC ACC killer restored input level	V_{ACCK}-OFF	T42A	T66	From the killer state of the above item gradually increase the input chroma level and measure the input burst level at which T66 output reappears. Calculate its ratio with the standard input level.		-20		dB
REC APC pull-in range (1)	$\Delta f_{APC}1$	T42A	T66	Input a signal consisting of a 3.5795MHz 300mVp-p CW added to a 50% white signal. After confirming that a signal is output from T66, increase the CW frequency until T66 output ceases. Now slowly reduce the CW frequency, and determine f1 frequency at which T66 output reappears. $\Delta f_{APC}1$ = f1-3579545 (Hz)	350			Hz
REC APC pull-in range (2)	$\Delta f_{APC}2$	T42A	T66	As in the previous item, decrease the CW frequency until T66 output ceases. Now slowly increase the CW frequency and determine f2 frequency at which T66 output reappears. $\Delta f_{APC}2$ = f2-3579545 (Hz)			-350	Hz
REC AFC pull-in range (1)	$\Delta f_{AFC}1$	T42A	T60	Input a 300mVp-p, 15.7kHz, 5μs width pulse train (negative polarity). After increasing the pulse train frequency until the T60 wave form is disrupted, decrease the frequency to determine the f1 pulse train frequency at which the T60 wave form returns to normal. ΔfAFC1 = f1-15.734 (kHz)	1.0			kHz
REC AFC pull-in range (2)	$\Delta f_{AFC}2$	T42A	T60	As in the previous item, decrease the pulse train frequency until the T60 wave form is disrupted, then increase the frequency to determine the f2 pulse train frequency at which the T60 wave form returns to normal. $\Delta f_{AFC}2$ = f2-15.734 (kHz)			-1.0	kHz
The ratio of the REC chroma level and FM modulator output level	C/FM2	T42	T66	The ratio of 100% chroma's level which was converted to low band and FM modulator output level. T72 = 0V / T68 = 0V		8.0		dB
				T68 = 2.5V		6.7		dB
				T68 = 5V		5.3		dB

PB mode chroma T16 = 0V, T11 = 0V, T55 = 0V, T59 = 0V, SW25 = 2

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
PB chroma video output level	NVop-35	T74A T25A	T35	Apply a mixture of the SP mode chroma signal (SP mode, burst 100mVp-p) that was obtained by converting the T74A NTSC chroma noise test signal to the low band and the 4 MHz, 300 mVp-p sine wave to T74 through 3 V bias. Apply the 50% white signal (321.5mVp-p) from T25A. Measure the T35A burst level.	510	600	690	mVp-p
PB chroma pin 72 output level	Vop-72	T74A T25A	T72	Measure the burst level with the same conditions as those for NVop-35.		200		mVp-p
PB ACC characteristics (1)	ACC_P1	T74A T41A	T72	With the conditions used for NVop-35, increase the input chroma level by +6dB, measure the burst level on T72, and calculate the ratio with Vop-72.		+0.5	+0.8	dB
PB ACC characteristics (2)	ACC_P2	T74A T25A	T72	With the conditions used for NVop-35, decrease the input chroma level by -6dB, measure the burst level on T72, and calculate the ratio with Vop-72.	-0.5	-0.2		dB
PB killer-on input level	V_{ACK}-P	T74A T25A	T72	With the conditions used for NVop-35, the input chroma level until output from T72 cease and measure the input burst level at that point. (Calculate the ratio with the standard input 100mVp-p signal)			-25	dB
PB killer-on chroma output level	V_OACK-P	T74A T25A	T35	Measure the T35A chroma output with a spectrum analyzer in the killer state of the previous item. Calculate its ratio with NVop-35.		-44	-40	dB
PB main converter carrier leakage	CLP	T74A T25A	T35	With the conditions used for NVop-35, measure the T58A with a spectrum analyzer, and calculate the ratio of the 3.58MHz component and the 4.21MHz carrier leakage component.		-40	-33	dB
Burst de-emphasis	GBD	T74A T25A	T72	Apply the mixture of the low-band chroma signal of 629kHz, burst 100mVp-p, and chroma 125mVp-p and the sine wave of 4MHz and 300mVp-p. Apply the 50% white signal from T25A. Measure burst and chroma amplitudes of T72 and accume them as B and C respectively. GBD = 20LOG(125×B)/(100×C)	-5.25	-5.00	-4.75	dB
PB XO output level	V_{XO}-PN		T62	Measure the output level on T62 with an FET probe.	230	380	600	mVp-p
PB XO oscillator frequency deviation	$\Delta f_{XO}N$		T62	In PB mode, let f be the measured frequency on T62. $\Delta f_{XO}N$ = f-3579545(Hz)	-7	0	+7	Hz
PB Chroma 2'Fsc distortion	$P_{THD}2$	T74A T25A	T35	With the conditions used for NVOP-35, measure the T35 with a spectrum analyzer, and calculate the ratio of the 3.58MHz component and the 7.16MHz component.			-25	dB

AUDIO REC mode T55 = 0V, T59 = 0V, T17 = 5V

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
Voltage gain	V_{GR}	T98	T7	V_{IN} = -20dBV	13.5	14.0	14.5	dB
Distortion ratio	THD_R	T98	T7	V_{IN} = -20dBV	0.01	0.1	0.4	%
Maximum output voltage	V_OMR	T98	T7		0.8	1.0	1.1	Vrms
Voltage conversion recording bias current	V_{BIAS}		T6	SW99 = ON	270	300	330	mVrms
Recording bias current control voltage	V_{CTL}		T6	SW99 = ON	2.9	3.2	3.5	V

AUDIO PB/EE mode T55 = 0V, T59 = 0V, T17 = 2.5V

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
LINE AMP Voltage gain (PB)	V_{GLP}	T100A	T96A	V_{IN} = -30dBV T12 = 0V, T17 = 0V	22.5	23.0	23.5	dB
LINE AMP Voltage gain (A1)	V_{GLR}	T76A	T96A	V_{IN} = -30dBV T12 = 0V, T17 = 2.5V	22.5	23.0	23.5	dB
LINE AMP Distortion ratio (PB)	THD_L	T100A	T96A	V_{IN} = -30dBV = 0V, T17 = 0V	0.01	0.1	0.4	%
LINE AMP Output noise voltage	V_NOL		T96A	Rg = 1KΩ, DIN Audio filter T12 = 0V, T17 = 0V SW76 = 2	-80.0	-74.0	-70.5	dBV
LINE AMP Maximum output voltage	V_OML	T100A	T96A	THD = 1% T12 = 0V, T17 = 0V	0.8	1.0	1.1	dBV
LINE AMP Output voltage when ALC	V_0A	T76A	T96A	T76A = -28dBV T12 = 0V, T17 = 2.5V	-7.0	-6.0	-5.0	dBV
LINE AMP Effect of ALC	ALC	T76A	T96A	T76A = -28 to -8dBV T12 = 0V, T17 = 2.5V	0.0	1.0	3.0	dB
LINE AMP Distortion ratio of when ALC	THD_A	T76A	T96A	T76A = -28dBV T12 = 0V, T17 = 2.5V	0.01	0.1	0.5	%
MUTE attenuation (PB, A1, A2, A3)	M_{PB}	T100A	T96A	T100A = -10dBV T12 = 5V, T17 = 0V	80	90	120	dB
	M_{A1}	T76A		T76A = -10dBV T12 = 5V, T17 = 2.5V	80	90	120	dB
EQ AMP Open loop voltage gain	VG_{OE}	T4A	T1	V_{IN} = -66dBV T12 = 0V, T17 = 0V, SW3 = ON	58.0	64.0	70.0	dB
EQ AMP Input conversion noise voltage	V_{NIE}		T1	Rg = 620Ω, DIN Audio filter T12 = 0V, T17 = 0V	0.1	1.0	1.8	μVrms

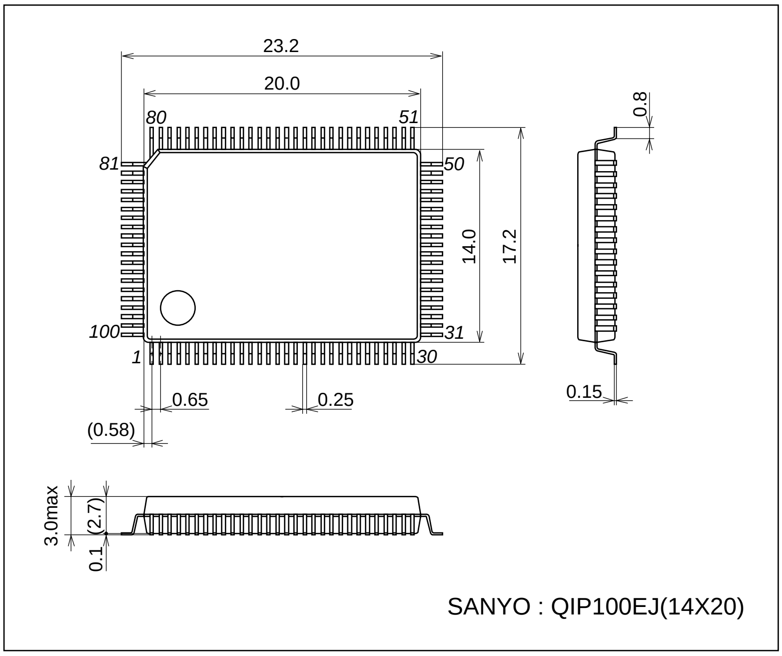
CCD block SW47 = 2, SW49 = 2

Parameter	Symbol	In	Out	Conditions	Ratings			Unit
					min	typ	max	
Voltage Gain	Gv	T49	T49A	T47:200kHz, 500mVp-p SW49B=ON Ratio of level of T49A relative to T47A.	-1.5	0.5	2.5	dB
Frequency Response	Gf	T47 T47B	T49A	T47B: Adding 250mV higher bias than pin 47 clamp level. Ratio of 3.58MHz component toward to T49A 200kHz.	-2	-1	0	dB
Deferential Gain	DG	T47	T49B	T47: Stair step signal (500mVp-p)	0	5	8	%
Deferential Phase	DP	T47	T49B	T47: Stair step signal (500mVp-p)	0	5	8	deg
Linearity	LS	T47	T49B	T47: Stair step signal only for Y (500mVp-p) V/S Ratio of T49B.	37	40	43	%
Clock leakage	Lck		T49A	SW49B:ON 4fsc component of T49A.		10	50	mVrms
Noise	N_O		T49A	SW49B:ON Measure T49A using a Video noise meter. Filter condition: HPF = 200kHz, LPF = 4.2MHz, TRAP = 3.58MHz		1	2	mVrms
Output Impedance	Z_O	T47	T49A	T47:200kHz,500mVp-p, Assuming that the T49A amplitude under conditions of SW49B = ON/OFF is T49A (ON) and T49A (OFF) respectively, and calculate as follows: Z0 = {{ T49A(OFF)-T49A(ON) } / T49A(ON) }× 500.	80	230	480	Ω
Delay time	TD	T47	T49B	T47:100% white (500mVp-p) Calculate T49B delay time toward to T47 input. * Except for reversing Amp and delay time		63.35		µs

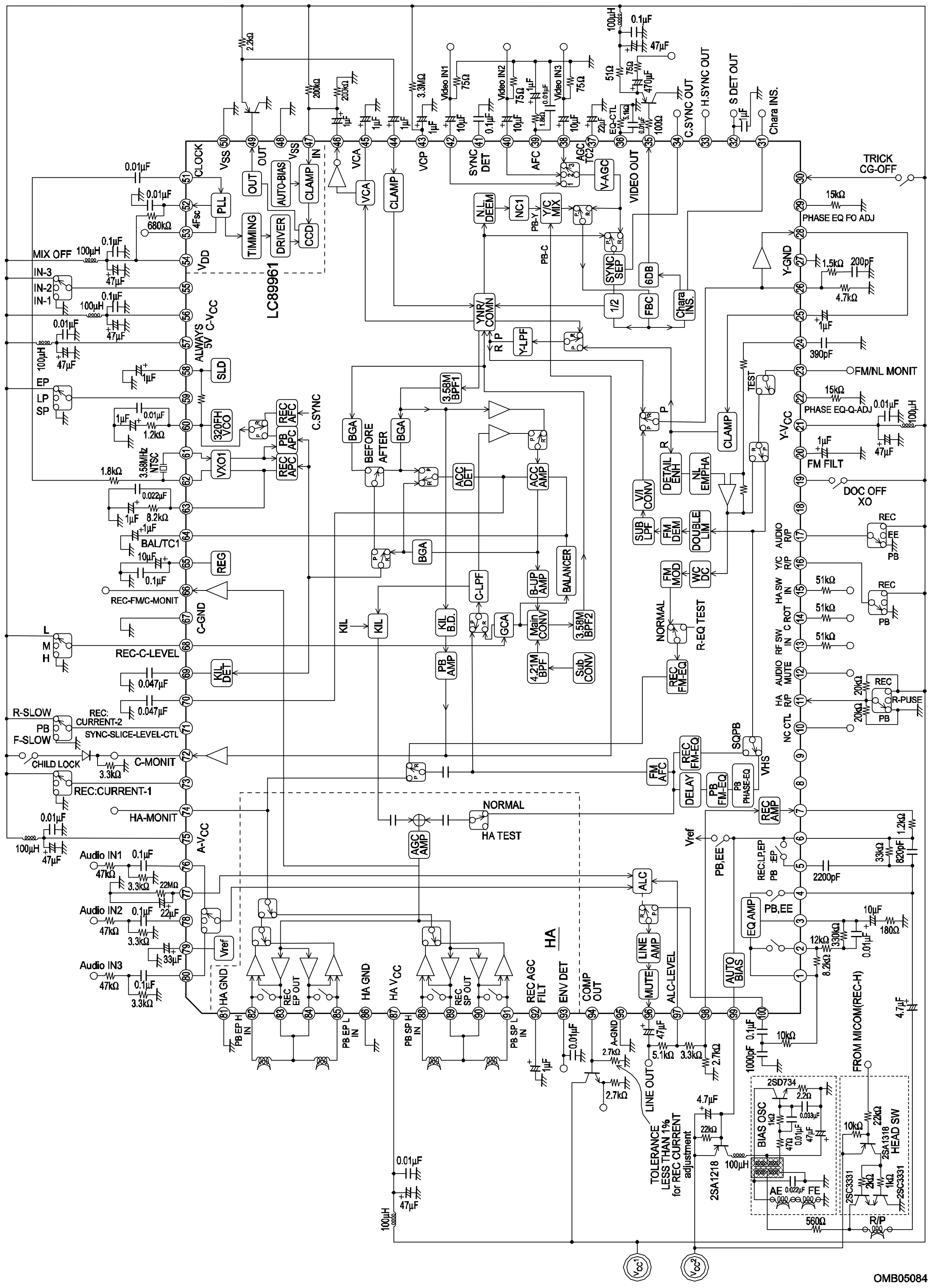
Package Dimensions

unit : mm

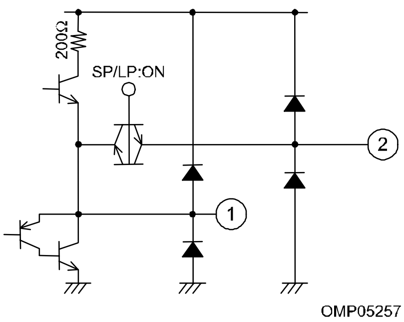
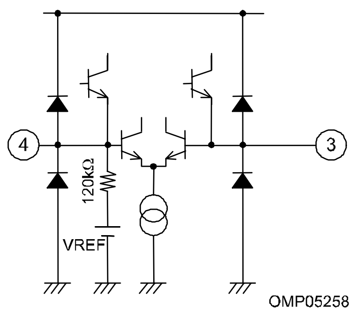
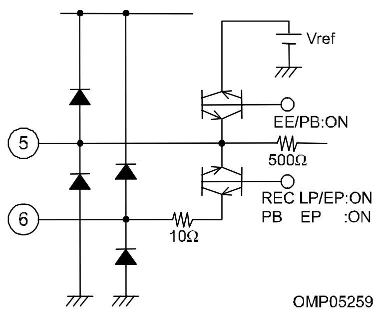
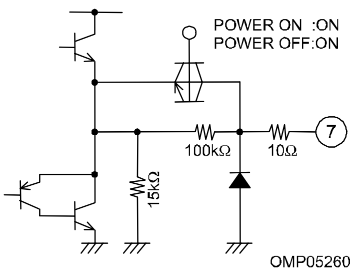
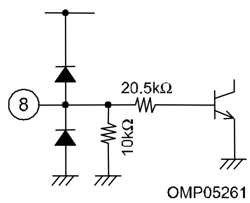
3252A



Block Diagram and Sample Application Circuit



Pin Functions

Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
1	EQ-OUT	REC: 2.3V	DC	
		PB: 2.3V	CW 95mVp-p	
2	EQ-SW2	REC: 2.3V	DC	
		PB: 2.3V	CW 95mVp-p	
3	EQ-NFB	REC: 2.3V	DC	
		PB: 2.3V	CW 1mVp-p	
4	EQ-IN	REC: 2.3V	DC	
		PB: 2.3V	CW 1mVpp	
5	EQ-SW1	REC: 2.3V	DC	
		PB: 2.3V	SP/LP: AC GND EP: CW 1mVp-p	
6	AUTO BIAS-IN	REC: 2.3V	CW 1.4Vp-p +70KHz 850mVp-p	
		PB: 2.3V	DC	
7	AUDIO- REC-OUT	REC: 2.3V	CW 1.4Vp-p	
		PB: 2.3V	DC	
8	HA REC CTL	REC:	DC	
		PB:	DC	
9	NC			

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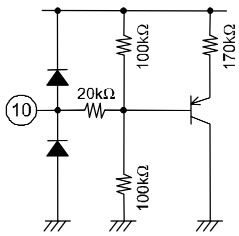
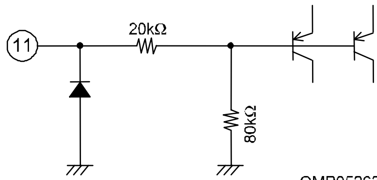
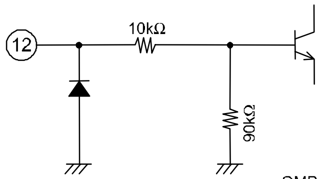
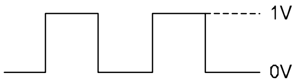
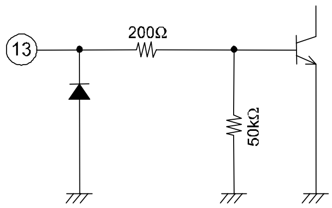
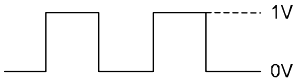
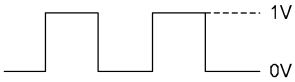
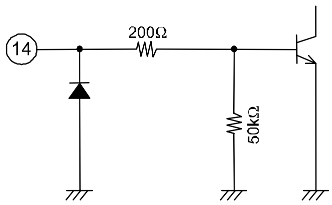
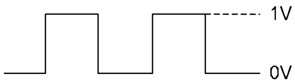
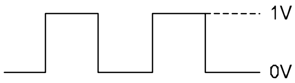
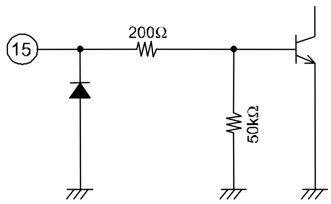
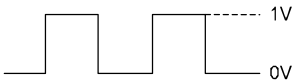
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
10	NC CTL	REC: 2.5V	DC	 OMP05262
		PB: 2.5V	DC	
11	HA R/P CTL	REC: 1 to 5V	5V: REC 2.5V: R-MUTE 0: PB	 OMP05263
		PB: 0 to 1V		
12	AUDIO MUTE CTL	REC: 0/5V	MUTE = 5V	 OMP05264
		PB: 0/5V		
13	RF_SW_IN	REC: 0/1V		 OMP05266
		PB: 0/1V		
14	C-ROT IN	REC: 0/1V		 OMP05267
		PB: 0/1V		
15	HA SW IN	REC: 0/1V		 OMP05268
		PB: 0/1V		

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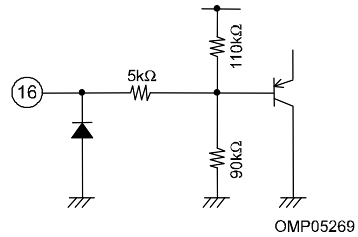
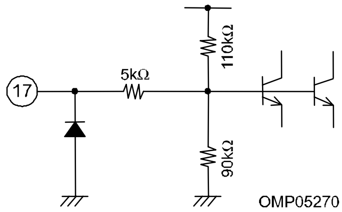
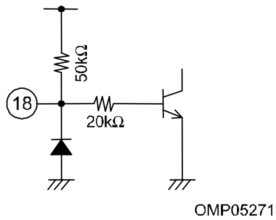
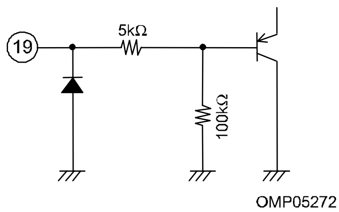
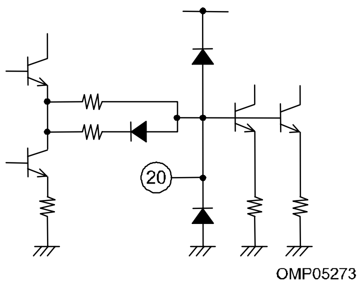
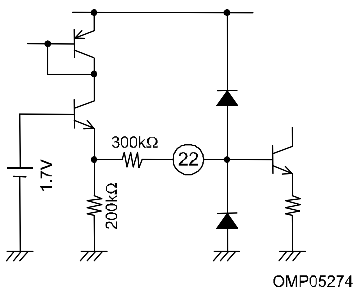
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
16	YC R/P CTL	REC: 5V	5V: REC 0V: PB	
		PB: 0V		
17	AUDIO R/P CTL	REC: 5V	5V: REC 2.5V: EE 0V: PB	
		PB: 0V		
18	COMB THROUGH CTL	REC: 1.7V		
		PB: 1.7V		
19	DOC/XO CTL	REC: 0V/5V	5V: XO MODE 0V: NORMAL	
		PB: 0V/5V	5V: DOC OFF 0V: DOC AUTO	
20	FM FILT	REC: 1.8V	DC	
		PB: 1.8V	DC	
21	Y-V_{CC}	5V	V_{CC}	
22	PHASE EQ Q-CTL	REC: 1.0V	DC	
		PB: 1.0V	DC	

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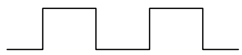
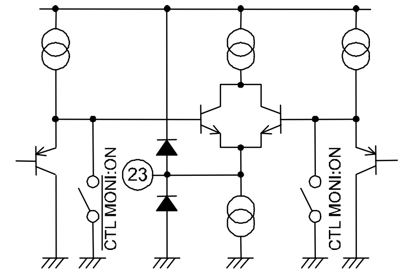
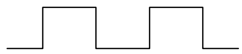
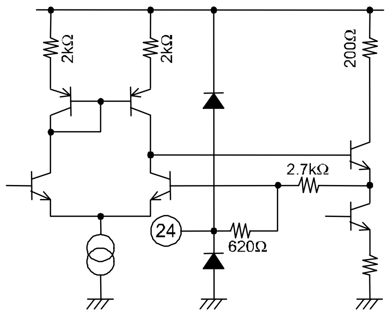
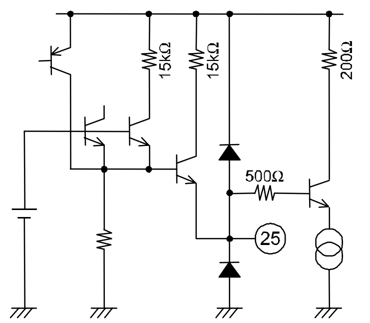
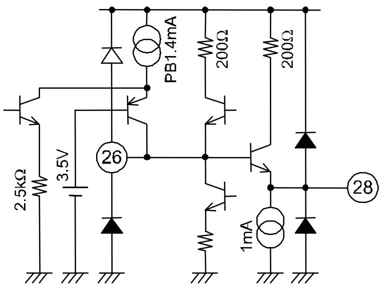
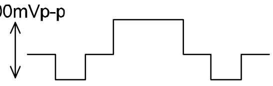
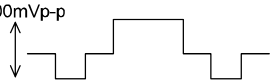
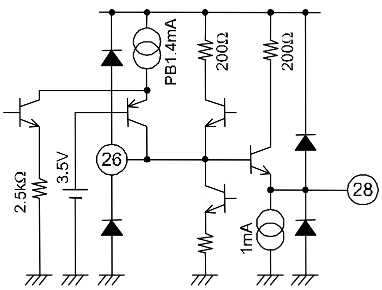
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
23	CTL-AMP OUT	REC: 2.5V		 OMP05276
		PB: 2.5V		
24	MAIN-EMPHA FILT	REC: 2.1V		 OMP05278
		PB: 2.1V		
25	CLAMP-IN	REC: 2 .8V		 OMP05280
		PB: 2.8V		
26	MAIN DEEMPHA -OUT1	REC: 2.1V		 OMP05281
		PB: 2.1V		
27	Y-GND	0V	GND	
28	MAIN DEEMPHA -OUT2	REC: 2.1V		 OMP05281
		PB: 2.1V		

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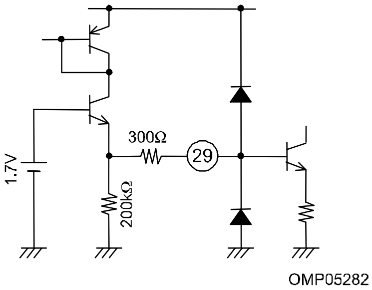
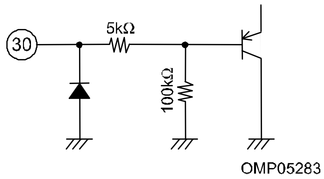
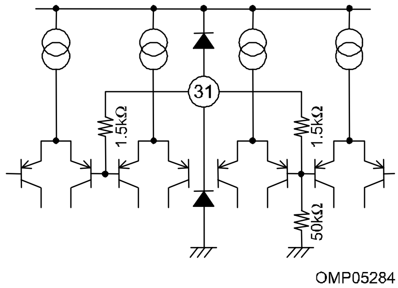
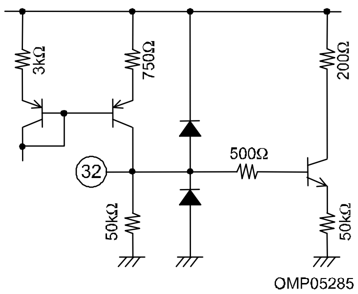
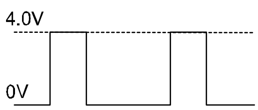
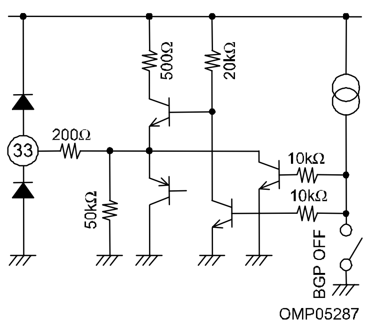
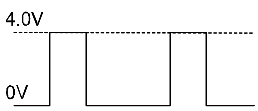
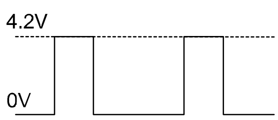
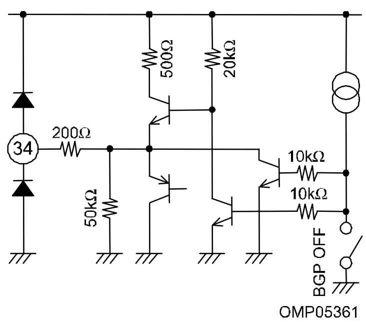
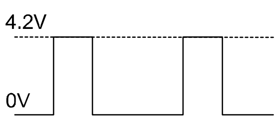
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
29	PHASE EQ F_0 CTL	REC: 1.0V	DC	
		PB: 1.0V	DC	
30	TRICK /CG CTL	REC	5V: CG OFF 0V: CG ON	
		PB	5V: TRICK 0V: NORMAL PB	
31	QV/QH-INS	REC: 0 to 5V	0V : Through 1.0V: 20IRE INS 2.0V: 60IRE INS 3.0V: QH INS V_{CC}: QV INS	
		PB: 0 to 5V		
32	S-DET OUT	REC: 0V	DC	
		PB: 4.2/0.2V	DC SVHS: 4.2V VHS: 0.2V	
33	H-SYNC OUT	REC: 0V		
		PB: 0V		
34	C.SYNC OUT	REC:		
		PB:		

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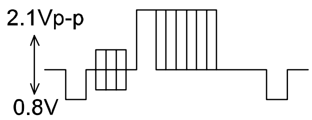
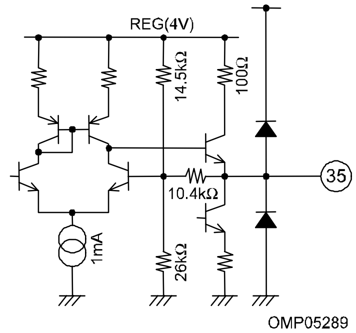
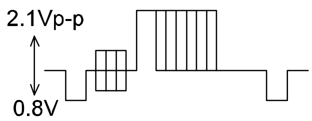
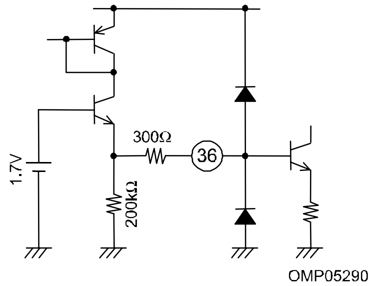
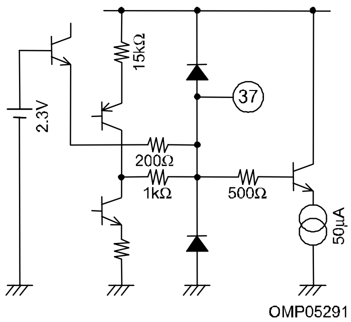
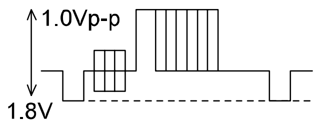
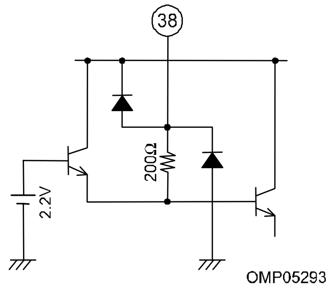
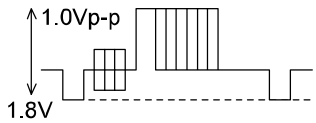
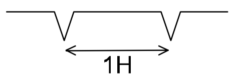
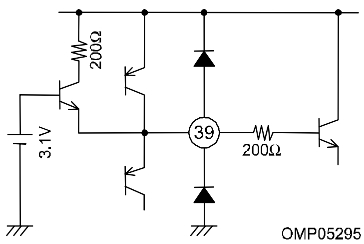
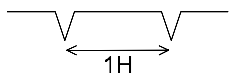
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
35	VIDEO-OUT	REC: 0.8V		
		PB: 0.8V		
36	EQ CTL	REC: 1.0V	DC	
		PB: 1.0V	DC	
37	AGC TC2	REC: 2.0V	DC	
		PB: 2.0V	DC	
38	VIDEO-IN3	REC: 1.8V		
		PB: 1.8V		
39	AFC2-FILT	REC: 3.5V		
		PB: 3.5V		

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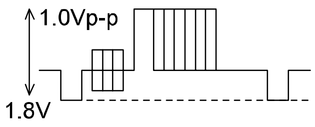
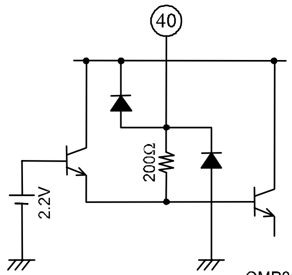
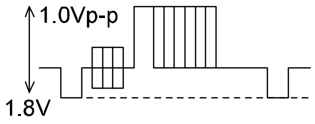
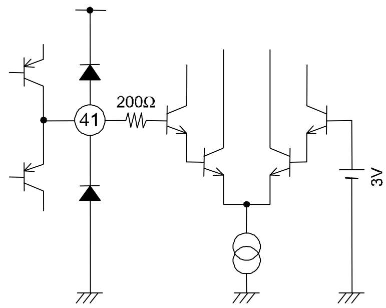
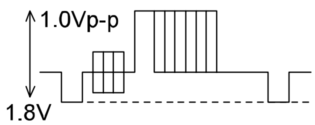
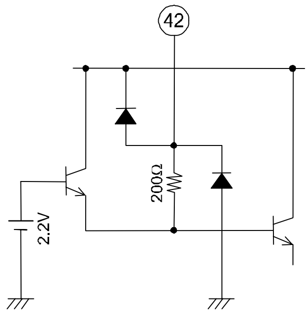
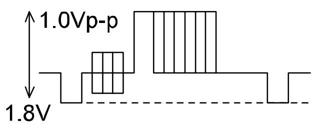
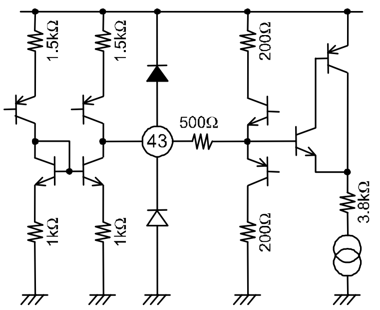
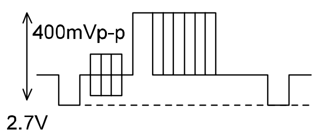
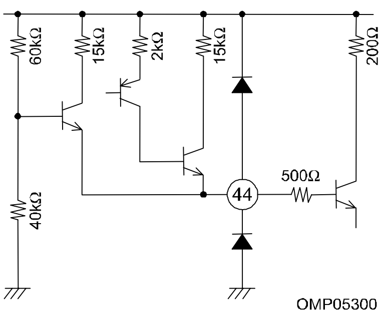
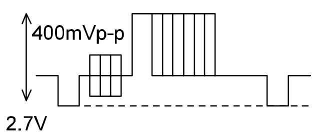
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
P40	VIDEO-IN2	REC: 1.8V		 OMP05296
		PB: 1.8V		
P41	SYNC DET FILT	REC 4.9V NO-SIG: 0.3V	DC	 OMP05297
		PB: 4.9V NO-SIG: 0.3V		
P42	VIDEO-IN1	REC: 1.8V		 OMP05298
		PB: 1.8V		
P43	VCA-FILT (Phase)	REC: 2.8V	DC	 OMP05299
		PB : 2.8V	DC	
P44	VCA-IN	REC: 2.7V		 OMP05300
		PB: 2.7V		

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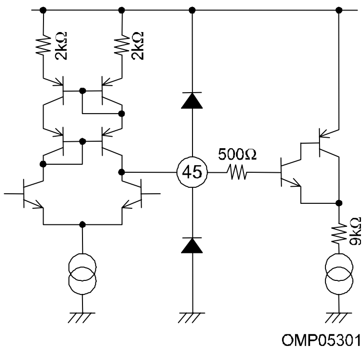
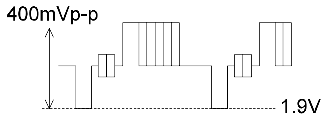
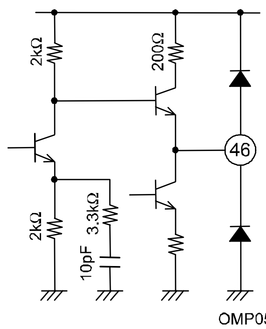
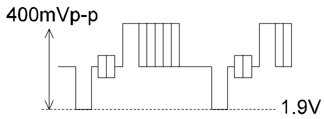
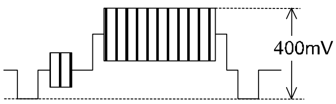
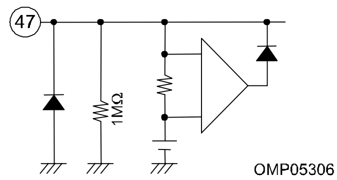
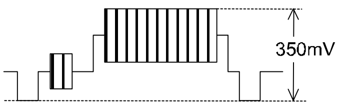
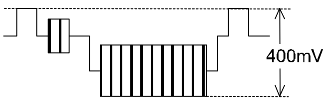
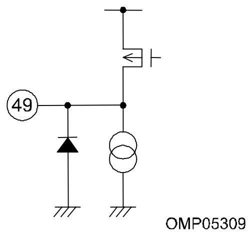
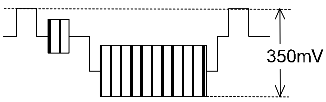
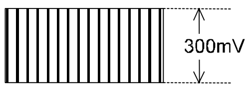
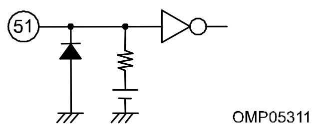
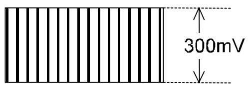
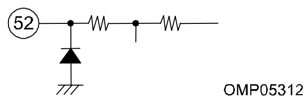
<table>
<tr><th>Pin No.</th><th>Pin name</th><th>DC voltage</th><th>Signal wave form</th><th>Input/Output form</th></tr>
<tr><td rowspan="2">45</td><td rowspan="2">VCA-FILT(Gain)</td><td>REC: 2.9V</td><td>DC</td><td rowspan="2"></td></tr>
<tr><td>PB: 2.9V</td><td>DC</td></tr>
<tr><td rowspan="2">46</td><td rowspan="2">CCD-DRIVE</td><td>REC: 1.9V</td><td></td><td rowspan="2"></td></tr>
<tr><td>PB: 1.9V</td><td></td></tr>
<tr><td rowspan="2">47</td><td rowspan="2">CCD INPUT</td><td>REC:</td><td></td><td rowspan="2"></td></tr>
<tr><td>PB :</td><td></td></tr>
<tr><td>48</td><td>CCD-V_{SS}</td><td>0V</td><td>V_{SS}</td><td></td></tr>
<tr><td rowspan="2">49</td><td rowspan="2">DELEY OUT</td><td>REC:</td><td></td><td rowspan="2"></td></tr>
<tr><td>PB:</td><td></td></tr>
<tr><td>50</td><td>CCD-V_{SS}</td><td>0V</td><td>V_{SS}</td><td></td></tr>
<tr><td rowspan="2">51</td><td rowspan="2">CLOCK IN</td><td>REC:</td><td></td><td rowspan="2"></td></tr>
<tr><td>PB:</td><td></td></tr>
<tr><td rowspan="2">52</td><td rowspan="2">VCO FILT</td><td>REC: 2.5V</td><td>DC</td><td rowspan="2"></td></tr>
<tr><td>PB: 2.5V</td><td>DC</td></tr>
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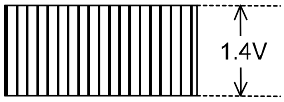
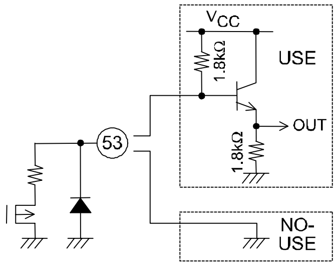
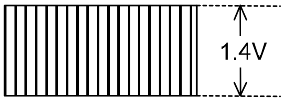
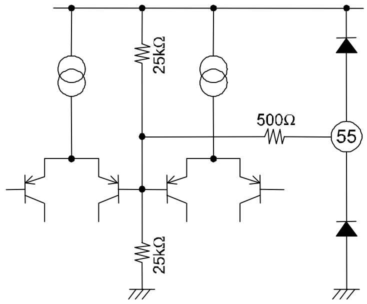
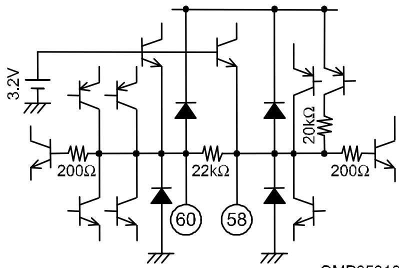
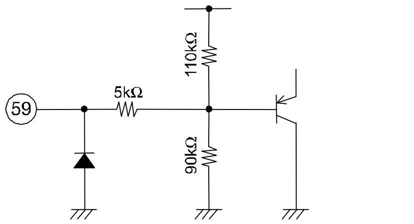
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
53	4FSC OUT	REC: 1.5V		 OMP05314
		PB: 1.5V		
54	CCD-V_{DD}	5V	V_{DD}	
55	VIDEO INPUT CTL	REC: 2.5V	0 to 1V: VIDEO1 2 to 3V: VIDEO2 4 to V_{CC}: VIDEO3	 OMP05315
		PB: 2.5V		
56	C-V_{CC}	5V	V_{CC}	
57	ALWAYS V_{CC}	5V	V_{CC}	
58	SLD-FILT	REC:	DC	 OMP05316
		PB:	DC	
59	SP/LP/EP	REC: 5V: EP OPEN: LP 0V: SP		 OMP05317
		PB : 5V: EP OPEN: LP 0V: SP		

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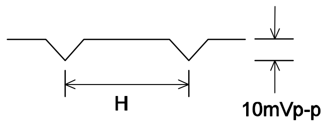
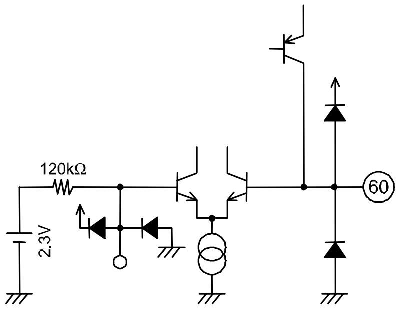
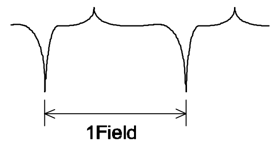
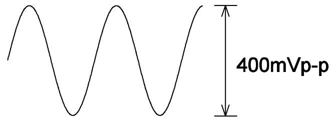
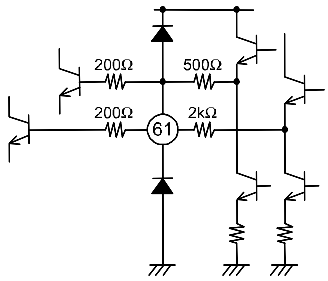
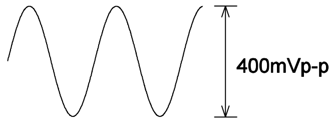
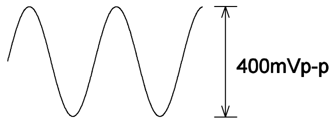
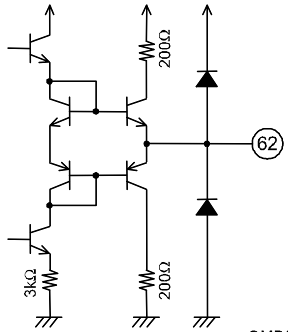
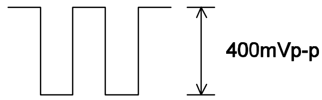
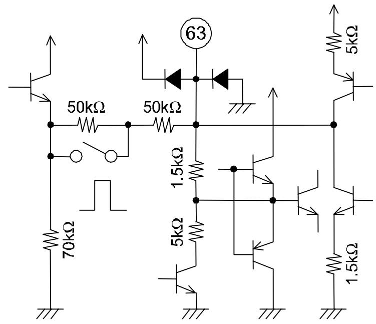
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
60	AFC/APC-FILT	REC:		 OMP05320
		PB:		
61	XO IN	REC: 4.0V		 OMP05323
		PB: 4.0V		
62	XO OUT	REC: 2.5V		 OMP05325
		PB: 2.5V		
63	REC APC-FILT	REC: 1.8V	DC	 OMP05326
		PB: 1.8V	DC	

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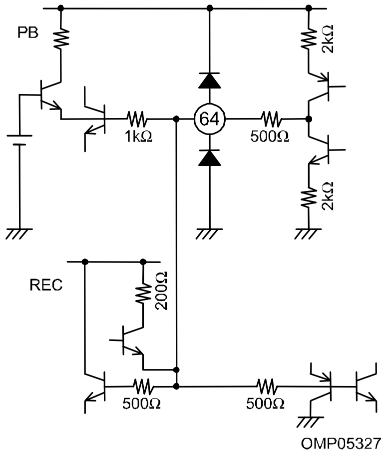
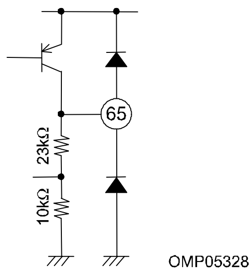
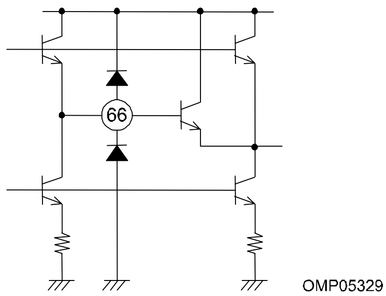
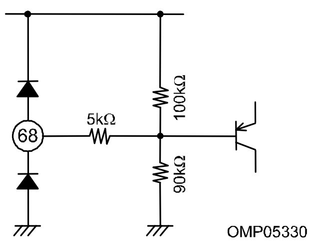
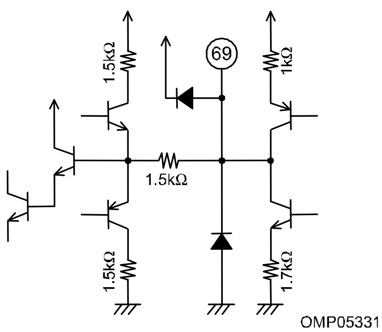
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
64	AGC-TC1 /BALANCER	REC: 1.9V	DC	
		PB: 2.3V	DC	
65	REG4.0V	REC: 4.0V		
		PB: 4.0V		
66	REQ monitor	REC: 1.7V	300mVp-p	
		PB :	DC	
67	C-GND	0V	GND	
68	REC-C-CTL	REC: 2.3V	REC-C-LEVEL 0 to 1.0V :270mVp-p 1.8 to 2.7V:320mVp-p 3.5 to 5.0V:380mVp-p	
		PB: 2.3V		
69	KIL FILT	REC:		
		PB: 1.8V		

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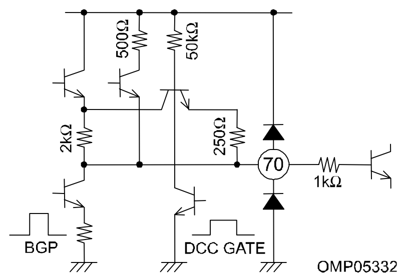
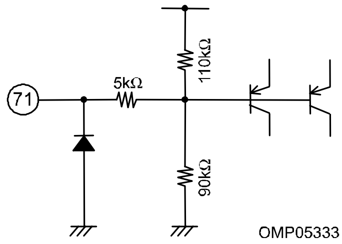
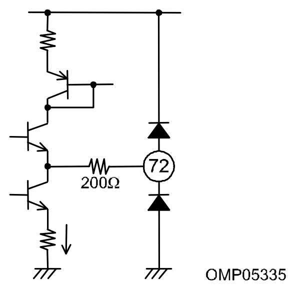
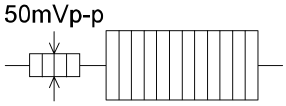
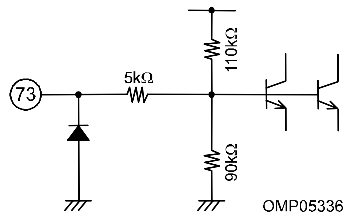
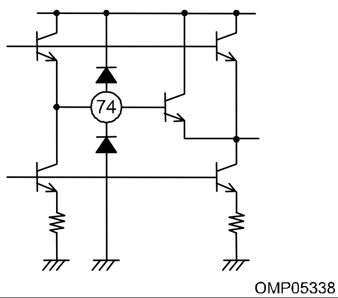
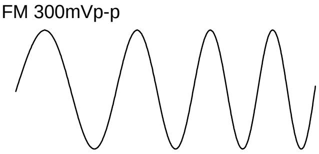
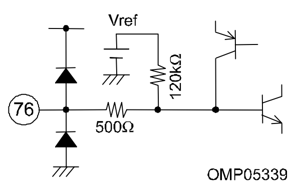
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
70	ACC FILT	REC: 1.8V	DC	
		PB: 1.8V	DC	
71	REC CURRENT-2	REC: 2.25	DC	
		PB: 2.25	DC	
72	PB C MONI	REC: 2.5V		
		PB: 2.5V	150mVp-p 	
73	REC CURRENT-1	REC: 2.25	DC	
		PB: 2.25	DC	
74	HA monitor	REC: -		
		PB: 2.0V	FM 300mVp-p 	
75	AUDIO V_{CC}	5.0V	V_{CC}	
76	AUDIO IN-1	REC: 3V	CW 95mVp-p	
		PB: 3V	CW 95mVp-p	

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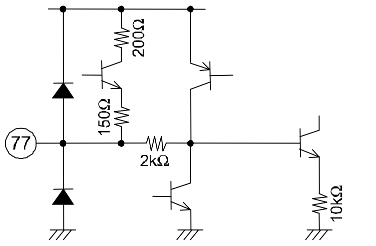
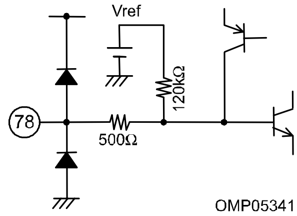
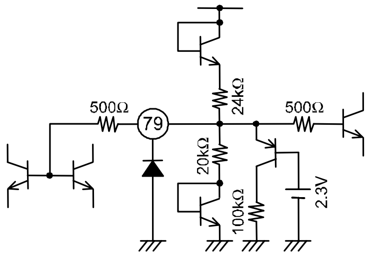
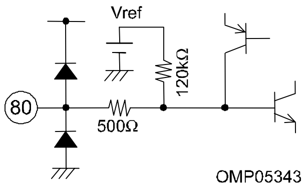
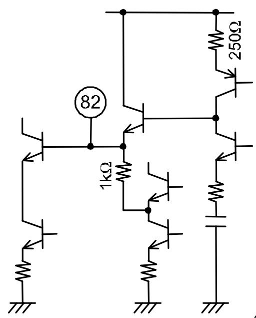
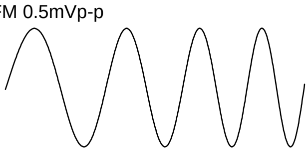
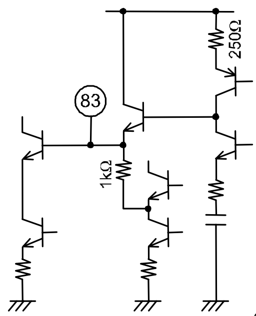
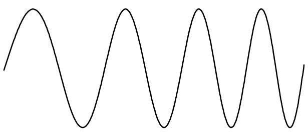
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
77	ALC DET	REC	DC	 OMP05340
		PB: 0V	DC	
78	AUDIO IN-2	REC: 3V	CW 95mVp-p	 OMP05341
		PB: 3V		
79	VREF	REC: 2.3V	DC	 OMP05342
		PB: 2.3V	DC	
80	AUDIO IN-3	REC: 3V	CW 95mVp-p	 OMP05343
		PB: 3V		
81	HEAD AMP GND	0V	GND	
82	PBEPL+	REC: 4.1V		 OMP05345
		PB: 1.8V	FM 0.5mVp-p 	
83	PBEPL-	REC: 4.1V	SP 13mAp-p EP 10mAp-p	 OMP05346
		PB: 1.8V	FM 0.5mVp-p 	

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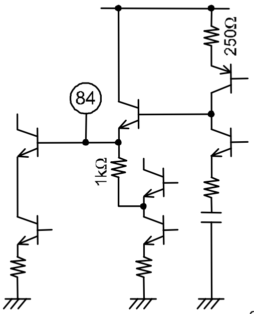
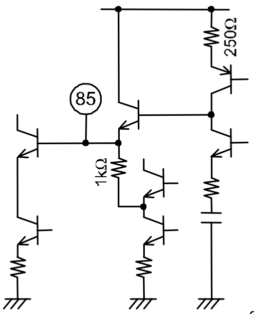
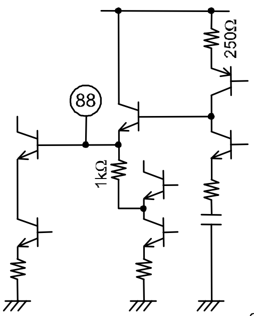
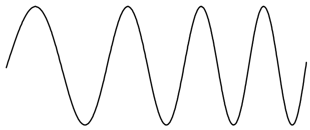
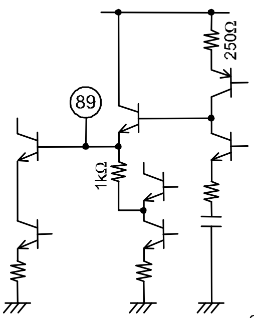
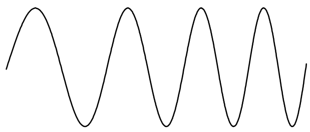
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
84	PBEPH-	REC: 4.1V	SP 13mAp-p EP 10mAp-p	 OMP05347
		PB: 1.8V	FM 0.5mVp-p	
85	PBEPH+	REC: 4.1V		 OMP05348
		PB: 1.8V	FM 0.5mVp-p	
86	HEAD AMP GND	0V	GND	
87	HEAD AMP V_{CC}	5V	V_{CC}	
88	PBSPL+	REC: 4.1V		 OMP05349
		PB: 1.8V	FM 0.5mVp-p 	
89	PBSPL-	REC	SP 13mAp-p EP 10mAp-p	 OMP05350
		PB:	FM 0.5mVp-p 	

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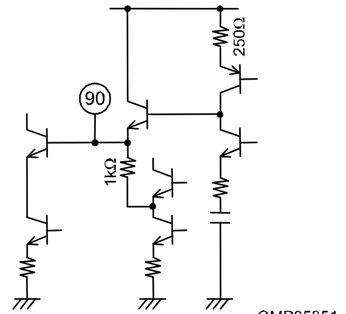
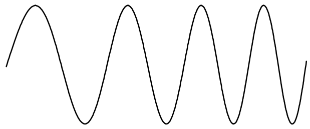
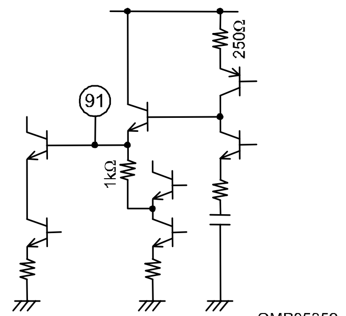
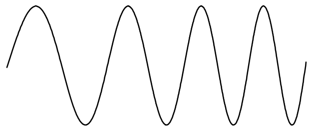
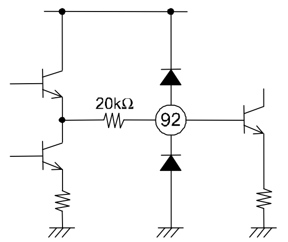
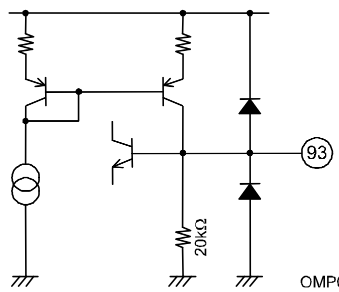
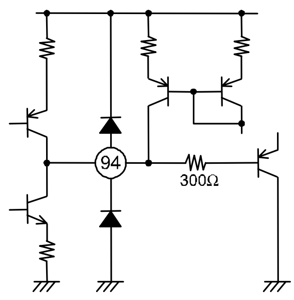
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
90	PBSPH-	REC	SP 13mAp-p EP 10mAp-p	 OMP05351
		PB:	FM 0.5mVp-p 	
91	PBSPH+	REC: 4.1V		 OMP05352
		PB: 1.8V	FM 0.5mVp-p 	
92	AGC FILT	REC: 1.6V	DC	 OMP05353
		PB: -		
93	ENV DET OUT	REC		 OMP05354
		PB 0.5 to 4.8V	DC	
94	COMP OUT	REC: 0.7V	DC	 OMP05355
		PB: - TRICK PB: 0.5V/4.5V	TRICK MODE HA SW OUT	

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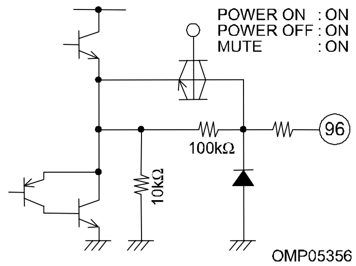
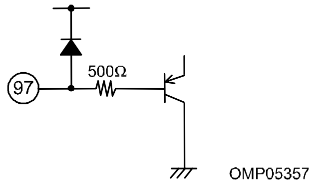
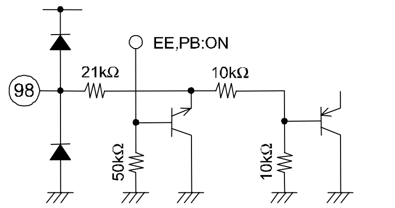
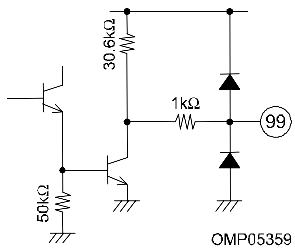
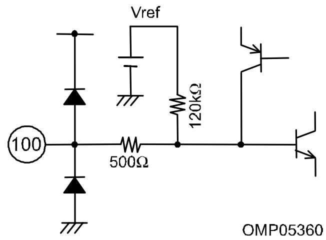
Pin No.	Pin name	DC voltage	Signal wave form	Input/Output form
95	AUDIO GND	0V	GND	
96	AUDIO LINE OUT	REC: 2.3V	CW 1.4Vp-p	 OMP05356
		PB: 2.3V	CW 1.4Vpp	
97	ALC DET IN	REC: 0V	CW 600mVp-p	 OMP05357
		PB: 0V	GND	
98	AUDIO REC IN	REC: 0V	CW 280mVp-p	 OMP05358
		PB: 0V	GND	
99	AUTO BIAS OUT	REC: 4.3V	DC	 OMP05359
		PB: 5V	DC	
100	AUDIO PB IN	REC: 2.3V	Half-wave rectified wave form (70kHz)	 OMP05360
		PB: 2.3V	CW 95mVp-p	

Function Control Table

Pin No.	Function	L (to 0.5V)	H (4.0V to)
12	AUDIO MUTE	OFF	ON
19	REC: XO MODE	NORMAL	XO MODE
	PB: DOC OFF	DOC AUTO	DOC OFF
30	PB: TRICK	NORMAL	TRICK
	REC: COPY GUARD	ON	OFF

Pin No.	Function	L (to 0.5V)	H (1.0V to)
13	RF SW PULSE	L	H
14	C ROT PULSE	L	H
15	HA PULSE	L	H

Pin No.	Function	to 0.7V	1.1V to 3.3V	1.7V to 2.3V	2.7V to 3.3V	3.7V to
31	CHARACTER INSERT	THROUGH	EDGH 25IRE	CHARA 40IRE	QH 25IRE	QV SYNC

Pin No.	Function	L (to 0.5V)	M (2.0 to 2.8V OR OPEN)	H (3.6V to)
16	REC/EE/PB (Y/C)	PB	REC	
17	REC/EE/PB (Audio)	PB	EE	REC
55	INPUT SELECT	IN-1	IN-2	IN-3
59	TAPE SPEED	SP	LP	EP
68	REC C-LEVEL	+1.5dB	STANDARD	-1.5dB
71	REC: REC-CURRENT-2	LOW	STANDARD	MAX
73	REC: REC-CURRENT-1	LOW	STANDARD	MAX
10	NC CTL	MAX	STANDARD	LOW

Pin No.	Function	L (to 0.5V)	OPEN OR H (4.0V to)
18	COMB THROUGH CONTROL	KIL+SP-REC-NO-CORR	KIL+SP-REC

Pin No.	Function	L (to 0.5V)	H (4.0V to)
8	REC-I ARRANGEMENT	SP-CURRENT MORE	SP/EP SAME CURRENT

Pin No.	Function	L (to 0.5V)	M (2.5V)	H (4.0V to)
11	REC/PAUSE/PB (Head Amp)	PB	REC PAUSE	REC

Test Mode Control

Pin No.	Function	Contents
22	Phase EQ Q adjust/Y-test	PULL-UP = Y-test
23	EQ monitor/R-EQ slope control	PULL-UP = REC EQ slope is changes to slant
29	Phase EQ F0 adjust/F-test	PULL-UP = F-test
36	PB EQ Low side band CTL/REC EQ in	REC EQ external signal: input with bias (3.5V)
66	REC ENV monitor/Head Amp in	Head Amp external signal: input with bias (3.5V)
72	PB-C monitor/FM Mute & Child Lock /Sync Slice Level	PULL-UP = REC: FM mute at pin66 R/P pin23 changes to TEST mode Child Lock mode
		additional resistor to GND: Sync Slice Level changes to Pedestal side.
74	PB Head Amp monitor/ENV in	External ENV signal: input with bias (3.5V)

Test Circuits