Ordering number : EN7952A

SANYO Semiconductors
DATA SHEET

LA71750EM — Monolithic Linear IC For VHS VCR Video Audio Signal Processor (Y/C/A/HA/CCD)

Overview

The LA71750EM is a video signal-processing system IC that supports the PAL (G, B and I) 4.43 NTSC, MESECAM, and NAP (G, B, and I) formats for VHS VCRs. Chip internal trimming is used to make this IC fully adjustment free.
This IC significantly reduces the number of peripheral components required, thus providing substantial cost savings in the signal-processing board.
Additionally, this IC also supports the NAP standard (NTSC to PAL conversion) that is now common in Europe and China.

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC}	Pins 18, 24, 42, 55, 72, 91	7.0	V
Allowable power dissipation	Pd max	Ta ≤ 65°C *	1100	mW
Operating temperature	Topg		-10 to +65	°C
Storage temperature	Tstg		-40 to +150	°C

* Mounted on a board : 70× 70×1.6^{3}mm, paper phenol resin laminates.

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}	Pins 18, 24, 42, 55, 72, 91	5.0	V
Allowable operating voltage range	V_{CC} opg	Pins 18, 24, 42, 55, 72, 91	4.8 to 5.2	V

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Electrical Characteristics at Ta = 25°C, V_{CC} = 5.0V

REC Mode Y

Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
Power Save Current Dissipation(REC)	$I_{CC}RS$				T18 T55	Measure the sum of currents flowing into T18 and T55.	9.6	12	14.4	mA
Input Changeover SW1-1	VSW11	SG1 PAL	A = 300 B = 700	T48A	T58	Measure the output level (= A+B) at T58.	950	1000	1050	mVp-p
Input Changeover SW2-3	VSW23	SG1 PAL	A = 300 B = 700	T52A	T61	Measure the output level (= A+B) at T61.	1950	2050	2150	mVp-p
Input Changeover SW3-2	VSW32	SG1 PAL	A = 300 B = 700	T50A	T63	Measure the output level (= A+B) at T63.	1950	2050	2150	mVp-p
Current dissipation (REC)	$I_{CC}R$				V_{CC}	Measure the sum of currents flowing into T18, T24, T42, T55, T72 and T91.	160	200	240	mA
Output Level 1 in EE mode	$V_{EE}P1$	SG1 PAL	A = 300 B = 700	T48A	T65	Measure the output level (= A+B) at T65.	1950	2050	2150	mVp-p
Potential of Sync Tip Level in REC mode	LSYNR	SG1 PAL	A = 300 B = 700	T48A	T65	Measure the output SYNC level at T65.	0.7	0.9	1.1	V
AGC Control Characteristic 1	AGC1	SG1 PAL	A = 600 B = 1400	T48A	T65	Measure the A+C of output level at T65, ratio for $V_{EE}P1$.	-0.6	0.0	0.6	dB
AGC Control Characteristic 2	AGC2	SG1 PAL	A = 150 B = 350	T48A	T65	Measure the A+C of output level at T65, ratio for $V_{EE}P1$.	-0.6	0.0	0.6	dB
AGC Control Characteristic 3	AGC3	SG1 PAL	A = 600 B = 700	T48A	T65	Measure the A of output level at T65.	570	630	690	mVp-p
AGC Control Characteristic 4	AGC4	SG1 PAL	A = 150 B = 700	T48A	T65	Measure the A+B of output level at T65.	2000	2200	2400	mVp-p
Sync Separator Output Level in REC mode	VCSYR	SG1 PAL	A = 300 B = 700	T50A	T67	Measure the output pulse wave height (= H) at T67.	3.8	4.1	4.4	V
Sync Separator Output Pulse width in REC mode	PWCSYR	SG1 PAL	A = 300 B = 700	T50A	T67	Measure the pulse width at T68.	4	4.2	4.4	µs
Sync Separator threshold level in REC mode	THCSYR	SG1 PAL	A = 300 B = 700	T50A	T67	Gradually reduce the input level, and measure the input level at the point that the output pulse width is 1µs or more wider than PWSYR.			-15	dB
Sync Separator Output Level in REC mode	VVSYR	SG1 PAL	A = 300 B = 700	T50A	T66	Measure the output pulse wave height (= H) at T66.	4.1	4.3	4.5	V
Sync Separator Output Pulse width in REC mode	PWVSYR	SG1 PAL	A = 300 B = 700	T50A	T66	Measure the pulse width at T66.	140	160	180	µs
YNR Characteristic 1 (REC)	RYNR1	SG2 f=627kHz	A = 300 B = 350 C = 30	T48A	T74	Measure the output level (= C) at T74. (627k signal is inversion per 1H) 01 10 11	2.5	2.5 4.0 5.5	5.5	dB
Y-LPF frequency Characteristic PAL	PYLPF	SG2 f=500kHz	A = 300 B = 350 C = 700	T48A	T74	Measure the output level (= C) at T74. YNR=off	290	360	430	mVp-p
Y-LPF frequency Characteristic 1PAL	PYLPF1	SG2 f=1MHz	A = 300 B = 350 C = 700	T48A	T74	Measure the output level (= C) at T74, calculate the PYLPF1 = 20log (C/PYLPF). YNR = off	-0.6	-0.1	0.4	dB
Y-LPF frequency Characteristic 2PAL	PYLPF2	SG2 f=2MHz	A = 300 B = 350 C = 700	T48A	T74	Measure the output level (= C) at T74, calculate the PYLPF2 = 20log (C/PYLPF). YNR = off	-1.3	-0.3	0.7	dB
Y-LPF frequency Characteristic 3PAL	PYLPF3	SG2 f=3MHz	A = 300 B = 350 C = 700	T48A	T74	Measure the output level (= C) at T74, calculate the PYLPF3 = 20log (C/PYLPF). YNR = off	-4.5	-2.5	-0.5	dB
Y-LPF frequency Characteristic 4PAL	PYLPF4	SG2 f=4.43MHz	A = 300 B = 350 C = 700	T48A	T74	Measure the output level (= C) at T74, calculate the PYLPF4 = 20log (C/PYLPF). YNR=off			-25	dB

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Parameter	Symbol	Input signal		Input/Output point		Conditions		Ratings			Unit
		Signal	Level	In	Out			min	typ	max	
Emphasis Gain	VEMPH	SG2 f=10kHz SG1 PAL	A = 150 B = 175 C = 500 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the VEMPH = 20log (C/T74A's level). YTEST mode (DETAIL = off, NL = off, EMPH = off)		-0.75	-0.25	0.25	dB
Detail Enhancer 1	GENH1	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 158 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the GENH1 = 20log (C/T74A's level)-VEMPH. (NL = off, EMPH = off) : YTEST3 mode	Serial 00 01 10 11	0.5	0.5 1.0 1.5 2.0	1.5	dB
Detail Enhancer 2	GENH2	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 50 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the GENH2 = 20log (C/T74A's level)-VEMPH. (NL = off, EMPH = off) : YTEST3 mode	Serial 00 01 10 11	2.3	2.2 3.3 4.4 5.5	4.3	dB
Detail Enhancer 3	GENH3	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 15.8 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the GENH3 = 20log (C/T74A's level)-VEMPH. (NL = off, EMPH = off) : YTEST3 mode	Serial 00 01 10 11	4.5	4.5 6.0 7.0 7.5	7.5	dB
Non linear Emphasis 1	NLEMP1	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 158 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the NLEMP1 = 20log (C/T74A's level)-VEMPH. YTEST mode (DETAIL = off, EMPH = off) : YTEST2 mode	Serial 01 10 11	1	3.0 2.0 1.0	3	dB
Non linear Emphasis 2	NLEMP2	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 50 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the NLEMP2 = 20log (C/T74A's level)-VEMPH. YTEST mode (DETAIL = off, EMPH = off) : YTEST2 mode	Serial 01 10 11	2.3	5.3 3.8 2.3	5.3	dB
Non linear Emphasis 3	NLEMP3	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 15.8 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the NLEMP3 = 20log (C/T74A's level)-VEMPH. YTEST mode (DETAIL = off, EMPH = off) : YTEST2 mode	Serial 01 10 11	3	7.0 4.5 3.0	6	dB
Main Emphasis	VME	SG2 f=500kHz SG1 PAL	A = 150 B = 175 C = 50 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the VME = 20log (C/T74A's level)-VEMPH. YTEST mode (DETAIL = off, NL = off)		9	10.5	12	dB
Main Emphasis 2	VME2	SG2 f=2MHz SG1 PAL	A = 150 B = 175 C = 50 A = 300 B = 700	T74A T48A	T76	Measure the output level (=C) at T76, calculate the VME2 = 20log (C/T74A's level)-VEMPH. YTEST mode (DETAIL = off, NL = off)		12	14	16	dB
White Clipping Level 1 (185%)	LWC1	SG1 SG1 PAL	A = 150 B = 350 A = 300 B = 700	T74A T48A	T76	Measure the white clipping level at T76. (YTEST2 mode)		175	185	195	%
White Clipping Level 2 (195%)	LWC2	SG1 SG2 PAL	A = 150 B = 350 A = 300 B = 700	T74A T48A	T76	Measure the white clipping level at T76. (YTEST2 mode)		185	195	205	%
Dark Clipping Level	LDC	SG1 SG3 PAL	A = 150 B = 350 A = 300 B = 700	T74A T48A	T76	Measure the dark clipping level at T76. (YTEST2 mode)		-55	-50	-45	%

PB Mode Y

Parameter	Symbol	Input signal		Input/Output point		Conditions		Ratings			Unit
		Signal	Level	In	Out			min	typ	max	
Current Dissipation 2 (PB)	$I_{CC}P$				Sum of each V_{CC} pin	Measure the sum of currents flowing into pins 18, 24, 42, 55, 72, 91.		150	190	230	mA
4V Regulator (PB)	REG4P				T47	Measure the T47 D.C. voltage		3.9	4.1	4.3	V
Non-Linear De-Emphasis Characteristic 1	NLDEEM1	SG2 f=2MHz SG5 f=4MHz	A = 150 B = 175 C = 158 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 158mVp-p, f = 2MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the input/output response. Y-TEST2 mode (YNR, ANR and NC are off. Picture control is center.)	Serial 01 10 11	-3	-3.0 -2.0 -1.0	-1	dB
Non-Linear De-Emphasis Characteristic 2	NLDEEM2	SG2 f=2MHz SG5 f=4MHz	A = 150 B = 175 C = 50 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 50mVp-p, f=2MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the input/output response. Y-TEST2 mode (YNR, ANR and NC are off. Picture control is center.)	Serial 01 10 11	-5.5	-5.5 -3.5 -2.5	-2.0	dB
High Pass Noise Canceler 1	HPNC1	SG2 f=1.4MHz SG5 f=4MHz	A = 150 B = 175 C = 158 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 158mVp-p, f = 1.4MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the 1.4 MHz element of output level (=C) at T65. Y-TEST3 mode (YNR and NL are off. Picture control is center.)	Serial 00 01 10 11	-2.5	-1.0 -1.5 -2.0 -2.5	-0.5	dB
High Pass Noise Canceler 2	HPNC2	SG2 f=1.4MHz SG5 f=4MHz	A = 150 B = 175 C = 50 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 50mVp-p, f = 1.4MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the 1.4 MHz element of output level (=C) at T65. Y-TEST3 mode (YNR and NL are off. Picture control is center.)	Serial 00 01 10 11	-7	-3 -5 -7 -9	-3	dB
High Pass Noise Canceler 3	HPNC3	SG2 f=1.4MHz SG5 f=4MHz	A = 150 B = 175 C = 15.8 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 15.8mVp-p, f = 1.4MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the1.4MHz element of output level (=C) at T65. Y-TEST3 mode (YNR and NL are off. Picture control is center.)	Serial 00 01 10 11	-15	-7 -13 -20 -25	-20	dB
Reponse Characteristic when Picture Control Hard (+3dB)	PICHD	SG2 f=2.5MHz SG5 f=4MHz	A = 150 B = 175 C = 158 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 158mVp-p, f = 2.5MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the 2.5 MHz element of output level (=C) at T65. Picture control must be +6dB. Y-TEST2 mode (YNR, NL and NC are off.)		4.0	5.0	6.0	dB

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Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
Reponse Characteristic when Picture Control Soft (-3dB)	PICSF	SG2 f=2.5MHz SG5 f=4MHz	A = 150 B = 175 C = 158 300	T74A T79A	T65	Input Y signal (A = 150mVp-p, B = 175mVp-p, C = 158mVp-p, f = 2.5MHz) and CW signal (4MHz, 300mVp-p) to T74A and T79A respectively, and measure the 2.5 MHz element of output level (=C) at T65. Picture control must be -8dB. Y-TEST2 mode (YNR, NL and NC are off.)	-9.5	-8.5	-7.5	dB
YNR Characteristic (PB)	PYNR	SG2 f=627kHz SG5 f=4MHz	A = 150 B = 175 C = 15.8 300	T74A T79A	T65	Y-TEST2 mode NL = off, NC = off, PIC-CTL = Center Measure the output level at T65. Chroma signal (f = 627kHz) is inversion per 1H Serial 01 / 10 / 11	-8.5	-4.0 -7.0 -9.0	-5.5	dB
Sync tip lebel Pedestal level White level	LSYNP	SG6 PAL (Y-FM)	300	T79A	T65	Measure the sync tip, pedestal and white level on T76 output, and take these as LSYN, LPED, LWHT respectively.				V
Quasi-V Insertion Level (PB)	LQVP	SG6 PAL (Y-FM) DC	3.8/4.1 /4.8MHz 4.7V	T79A T62	T65	Measure the output DC voltage at T65, calculate the numerical expession to apply the measurement value. (VDP = LSYNP-M)	-50	0	50	mV
Quasi-H Insertion Level (PB)	LQHP	SG6 PAL (Y-FM) DC	3.8/4.1 /4.8MHz 3.5V	T79A T62	T65	Measure the output DC voltage at T65, calculate the numerical expession to apply the measurement value. (HDP = LPEDP-M)	0	70	140	mV
White Insertion Level (PB)	LWHP	SG6 PAL (Y-FM) DC	3.8/4.1 /4.8MHz 2.5V	T79A T62	T65	Measure the output DC voltage at T65, calculate the numerical expession to apply the measurement value. (WHP = LWHIP-M)	300	150	0	mV
Edge Insertion Level (PB)	LEGP	SG6 PAL (Y-FM) DC	3.8/4.1 /4.8MHz 1.5V	T79A T62	T65	Measure the output DC voltage at T65, calculate the numerical expession to apply the measurement value. (EDP = LWHIP-M)	0	70	140	mV
Output level of Sync Separator (PB)	VSYP	SG1 PAL SG5 f=4MHz	A = 150 B = 350 300	T74A T79A	T67	Measure the output pulse wave height (=H) at T68.	3.8	4.1	4.4	Vp-p
Output Pulse Width of Sync Separator (PB)	PWSYP	SG1 PAL SG5 f=4MHz	A = 150 B = 350 300	T74A T79A	T67	Measure the output pulse width (=W) at T67.	4	4.2	4.4	µs

Y-FM

Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
FM Modulator Carrier Frequency (expect M mode)	FCARN				T78A	Measure the output frequency on T78A with no input.	3.73	3.83	3.93	MHz
FM Modulator Secondary distortion (expect M mode)	HCAR				T78A	Measure the second distortion with the above state		-40	-35	dB
1/2 f h Carrier shift	FCS	SG8	0/5V	T70A	T78A	FCARN in T70 = 5V and the difference in FCARN in T70 = 0V are found in the same measurement as FCARN.	6.5	8.2	9.5	kHz
FM modulator deviation (except M mode)	FDEVN	SG1	A : 300 B : 700	T48A	T78A	With V_{IN} a white 100% signal measure the deviation on T78A	0.95	1	1.05	MHz
FM Modulator Linearity	LMOD	SG8	2.6V 2.85V 3.1V	T74A	T78A	Let F2.85 be the output frequency when 2.85VDC is applied to T78A. $LMOD = \frac{f2.85-(f3.1+f2.6)/2}{f3.1-f2.6} \times 100$	-2	0	2	%

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Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
Total Output Level of PB-Y (expect M mode)	TGPBN	SG6	A : 300	T79A	T65	Input the PAL signal that FM modurated (DEV = 1MHz) has a white signal 100% to T79A, and measure the amplitude of T65.	1.95	2.05	2.15	Vp-p
Total Output Level of Over All Y (expect M mode)	TGRPN					TGPBN×FDEVN	1.95	2.05	2.15	Vp-p
FM Demodulator Linearity	LDEM	SG5	300	T79A	T74	Input a SIN wave (3MHz, 4.5MHz, 6MHz) from T79A. Measure the average DC electric potential of the SIN wave of T74. DC in 3MHz, DC in V3, 4.5MHz, DC in V4.5, 6MHz, as V6, $LDEM = \frac{V4.5-(V3+V6)/2}{V6-V3} \times 100$	-3.5	0	3.5	%
FM Demodurator Leakage	CL	SG5 (4MHz) DC	300 PPSLD	T79A T23	T74	Add the voltage of PPSLD that it was measured in T23, and the SIN wave of 4MHz is inputted from T79A. Measure the 4MHz element f4 of the SIN wave of T74. CL = 20log (f4/500mVp-p).			-30	dB
DOC Compensation Period	TDOC	SG1 SG6	A : 150, B : 350, A : 300→0	T74A T79A	T65	Input a white signal to T74A 100%. Cut signal course to 43 PIN from 46 PIN. The white signal of T65 measures the time until it reverts after the SIN wave of 4MHz is inputted to T79A and this SIN wave is stopped.	10.5	12.5	14.5	H
DOC Compensation Level	GDOC	SG1 SG6	A : 150, B : 350, B : 300→0	T74A T79A	T65	Measure the amplitude VAF of T65 after 5H, and calculate it at the next type in the measurement of TDOC after the amplitude VBF of T65 in front of 10H which a SIN wave is stopped at and a SIN wave are stopped. GDOC = 20log (VAF/VBF).	-1.5	0	1.5	dB

R/P-EQ

Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
REC-FM level 1 to level 4	VFM1 to VFM4	SG1	A:300mVp-p B:700mVp-p	T48A	T78A	Measure the T78A output level.	270	320 370 450 550	470	mVp-p
REC-EQ characteristics 1-1 4MHz 300mVp-p	GREQ11	SG5 SG1	f=4MHz, 300mVp-p A=300mVp-p B=700mVp-p	T81A T48A	T78A	With V_{IN} a CW 4MHz, 300mVp-p signal, measure the input/output response. T77 : DC1.6V		-7		dB
REC-EQ second distortion 4MHz 300mVp-p	HREQ	SG5 SG1	f=4MHz, 300mVp-p A=300mVp-p B=700mVp-p	T81A T48A	T78A	Measure the second distortion with the above state. T77 : DC1.6V		-40	-35	dB
REC-EQ characteristics 1-2 2MHz 300mVp-p	GREQ12	SG5 SG1	f=2MHz, 300mVp-p A=300mVp-p B=700mVp-p	T81A T48A	T78A	Measure the input/output response,and take the difference with GREQ11. T77 : DC1.6V		3		dB
REC-EQ characteristics 2-2 650KHz 300mVp-p	GREQ22	SG5 SG1	f=650kHz, 300mVp-p A=300mVp-p B=700mVp-p	T81A T48A	T78A	Measure the input/output response,and take the difference with GREQ11. T77 : DC1.6V			-20	dB
FM-AGC-LEVEL 4MHz 300mVp-p	VPFMAGC	SG1	f=4MHz, 300mVp-p A=150mVp-p B=350mVp-p	T79A T74A	T76A	Measure T76A output level (M)		300		mVp-p

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Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
PB-EQ characteristics 1-1 4MHz 300mVp-p	GREQ11	SG1	f=4MHz, 300mVp-p A=150mVp-p B=350mVp-p	T79A T74A	T76A	With V_{IN} a CW 4MHz, 300mVp-p signal, measure the input/output response. T77 : DC1.6V		-1		dB
PB-EQ second distortion 4MHz 300mVp-p	HPEQ	SG1	f=4MHz, 300mVp-p A=150mVp-p B=350mVp-p	T79A T74A	T76A	Measure the second distortion with the above state.		-40	-30	dB
PB-EQ characteristics 2-2 650kHz 300mVp-p	GPEQ22	SG1	f=650kHz, 300mVp-p A=150mVp-p B=350mVp-p	T79A T74A	T76A	Measure the input/output response,and take the difference with GPEQ1. T77 : DC1.6V			-25	dB
PB-EQ characteristics 3-1 8.5MHz TRAP	GPEQ31	SG1	f=7.5MHz, 300mVp-p A=150mVp-p B=350mVp-p	T79A T74A	T76A	Measure the input/output response,and take the difference with GPEQ1. T77 : DC1.6V			-25	dB
PB-EQ characteristics 3-2 9.5MHz TRAP	GPEQ32	SG1	f=9.5MHz, 300mVp-p A=150mVp-p B=350mVp-p	T79A T74A	T76A	Measure the input/output response,and take the difference with GPEQ1. T77 : DC1.6V			-25	dB

REC Mode Chroma

Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
REC chroma low frequency conversion output level SP MODE	PRB	SG3 (PAL)	A : 300 B : 700 C : 700 D : 300	T48A	T21	With the 100% chroma signal, measure the burst level on T21B.	190	220	250	mVp-p
REC ACC characteristics (+6dB)	RACC+	SG3 (PAL)	A : 300 B : 700 C : 700 D : 600	T48A	T21	With the 100% chroma signal, increase only the burst signal level by +6dB, measure the T21 burst level, and calculate its ratio with PRB.		0.2	0.5	dB
REC ACC characteristics (-6dB)	RACC-	SG3 (PAL)	A : 300 B : 700 C : 700 D : 150	T48A	T21	With the 100% chroma signal, decrease only the burst signal level by -6dB, measure the T21 burst level, and calculate its ratio with PRB.	-0.5	-0.1		dB
REC ACC killer-on input level	VACCK-ON	SG3 (PAL)	A : 300 B : 700 C : 700	T48A	T21	With the 100% chroma signal, decrease only the burst signal until the T21 output ceases, and measure the input burst level at the time. Calculate the ratio of this value with the standard input level.		-26		dB
REC ACC killer-on output level	VOACCK	SG3 (PAL)	A : 300 B : 700 C : 700	T48A	T21	Measure the T21 output level with a spectrum analyzer in the killer state of the above item, and calculate its ratio with PRC.		-60	-50	dB
REC ACC killer restored input level	VACCK-OFF	SG3 (PAL)	A : 300 B : 700 C : 700	T48A	T21	From the killer state of the above item, gradually increase the burst signal until the T21 output reappears, and measure the input burst level at the time. Calculate its ratio with the standard input level.		-20		dB
REC APC pull-in range (1) PAL	APC1	SG1 + SG5	A : 300 B : 700 300	T48A	T21	Input a signal consisting of a 4.4336MHz CW added to a 50% white signal. After confirming that a signal is output from T21, increase the CW frequency until T21 output ceases. Now slowly reduce the CW frequency, and let f1 be the frequency at which the T21 output reappears. Δ fAPC1 = f1 - 4433619 (Hz)	350			Hz

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Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
REC APC pull-in range (2) PAL	APC2	SG1 + SG5 4.433619	A : 300 B : 700 300	T48A	T21	As in the previous item, decrease the CW frequency until T21 output ceases. Now slowly increase the CW frequency and let f2 be the frequency at which the T21 output reappears. Δ fAPC2 = f2 - 4433619 (Hz)			-350	Hz
VXO2 oscillation level PAL	PVXO2	SG3 (PAL)	A : 300 B : 700 C : 700 D : 300	T48A	T29	With the 100% chroma signal, measure the T29 output level with an FET probe.	300	450	700	mVp-p
The ratio of the REC chroma level and FM modulator output level. PAL	YCRP	SG3 (PAL)	A : 300 B : 700 C : 700 D : 300	T48A	T21 T78	The ratio of 100% chroma level which was converted to low band and FM modulator output level * Serial Gr5 : ****-**00, Gr6 : ****-**01	-1.8	-3.1	-4.4	dB

PB Mode Chroma

Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
PB chroma video output level.	VOPPAB	SG6 DC SG4 (PAL)	300 3.5V C : 50 D : 117	T79A T21B	T65	Input a chroma signal that is a lower frequency converted chroma noise test signal (SP mode, burst 50mVp-p) to T21B. Input a FM signal 300mVp-p to T81A. Measure the burst level on T65.	520	600	680	mVp-p
PB Chroma 2'Fsc distortion.	VOPHD2C	SG6 DC SG4 (PAL)	300 3.5V C : 50 D : 117	T79A T21B	T65	With the conditions used for VOPPAB, measure the T65 with a spectrum analyzer, and calculate the ratio of the 4.43MHz component and the 8.86MHz component.			-25	dB
PAL SP PB chroma output level.	COPPABSP	SG6 DC SG4 (PAL)	300 3.5V C : 50 D : 117	T79A T21B	T25	Measure the burst level on T25 with the same conditions as those for VOPPAB.	160	190	220	mVp-p
PB main converter carrier leakage.	CLP506	SG6 DC SG4 (PAL)	300 3.5V C : 50 D : 117	T79A T21B	T25	With the conditions used for VOPPAB, measure the T25 with a spectrum analyzer, and calculate the ratio of the 4.43MHz component and the 5.06MHz carrier leakage component.		-40	-33	dB
PB ACC characteristics. (+6dB)	PACC1	SG6 DC SG4 (PAL)	300 3.5V C : 100 D : 234	T79A T21B	T25	With the conditions used for VOPPAB, increase the input chroma level by +6dB, measure the burst level on T25, and calculate the ratio with COPPABSP.		0.2	0.5	dB
PB ACC characteristics. (-6dB)	PACC2	SG6 DC SG4 (PAL)	300 3.5V C : 25 D : 58	T79A T21B	T65	With the conditions used for VOPPAB, increase the input chroma level by -6dB, measure the burst level on T25, and calculate the ratio with COPPABSP.	-0.5	-0.2		dB
PB killer-on input level.	V_IACK	SG6 SG4 (PAL)		T79A T21B	T65	With the conditions used for VOPPAB, decrease the input chroma level until output from T25 cease, and measure the input burst level at that point. Calculate the ratio with the standard input 50mVp-p signal.			-25	dB
PB killer-on chroma output level.	V_OACK	SG6 SG5 (PAL)		T79A T21B	T25	Measure the T25 chroma output with a spectrum analyzer in the killer state of the previous item. Calculate its ratio with VOPPAC.		-44	-40	dB
XO2 oscillation level PAL	PXO2				T29	In PB mode, measure the output level on T28 with an FET probe.	300	450	700	mVp-p
PB XO oscillator frequency deviation PAL MODE	ΔFXOP				T29	In PB mode, let f be the measured frequency on T29. ΔFXOP = f - 4433619 (Hz)	-9	0	9	Hz

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Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
NAP-45DEG NTSC→PAL conversion V axis Burst level.	BNAP1P	SG6 DC SG9 (NT)	300 3.5V C : 100 D : 125	T79A T21B	T25	Input a chroma signal that is a lower frequency converted chroma noise test signal (SP mode, burst 100mVp-p) to T21B. Input a FM signal 300mVp-p to T79A. Measure the T25 -45° burst level, and take the ratio with the COPPABSP.	-2	0	2	dB
NAP+45DEG NTSC→PAL conversion ratio of the Burst leve	BNAP2P	SG6 DC SG9 (NT)	300 3.5V C : 100 D : 125	T79A T21B	T25	With the same condition above, measure the burst level, and take the ratio with BNAP1P.	-2	0	2	dB

REC/PB Mode Audio

Parameter	Symbol	Input signal		Input/Output point		Conditions	Ratings			Unit
		Signal	Level	In	Out		min	typ	max	
LINE AMP Voltage gain	VGLR1	SG5 1kHz	-28dBm	T13A T15A T17A	T11A		23.4	23.9	24.2	dB
LINE AMP Output level when ALC	V_OA	SG5 1kHz	-25dBm	T13A	T11A		-4.8	-3.8	-2.8	dBm
LINE AMP Distortion when ALC	THDA	SG5 1kHz	-25dBm	T13A	T11A		0.01	0.1	0.5	%
LINE AMP ALC effect	ALCE	SG5 1kHz	-5dBm	T13A	T11A		0.0	0.5	3.0	dB
MUTE attenuation	MEE MPB	SG5 1kHz	-5dBm	T13 /T15 T17 /T9	T11A	AD-MUTE is High	80	90	120	dB
Current dissipation (REC)	I_{CC}RA			No-Signal	T18		10	12	14	mA
REC AMP Voltage gain 1	VGR1	SG5 1kHz	-30dBm	T13A	T11A T100A	Confirm the different level between T11A and T100A	3.5	4	4.5	dB
REC AMP Distortion ratio	THDR	SG5 1kHz	-30dBm	T13A	T100A		0.01	0.1	0.5	%
REC AMP Maximum output voltage	V_OMR	SG5 1kHz	-5dBm	T13A	T100A		0.01	0.3	1	%
Voltage conversion recording bias current	VBIAS			No-Signal	T3	Each head is typical impedance.	270	300	330	mVrms
Current dissipation (PB)	I_{CC}PA			No-Signal	T18		7	9	11	mA
LINE AMP Voltage gain (PB)	VGLP	SG5 1kHz	-28dBm	T9A	T11A		22.9	23.4	23.9	dB
LINE AMP Distortion ratio (PB)	THDL	SG5 1kHz	-28dBm	T9A	T11A		0.01	0.1	0.3	%
LINE AMP Maximum output voltage (PB)	V_OML	SG5 1kHz	-23dBm	T9A	T11A	Output voltage is over 0.8V, also output distortion is under 1%	0.01	0.1	1	%
PB attenuation level (-7dB)	PBAT7	SG5 1kHz	-28dBm	T9A	T11A		-6	-7	-8	dB
LINE AMP Output noise voltage (PB)	VNOL	R = 1kΩ		T9A	T11A	Filter : DIN-AUDIO (= UNWEIGHTED)	100	200	300	μVrms
PB Input conversion noise voltage	VNIE	R = 600Ω		T5A	T11A	Filter : DIN-AUDIO (= UNWEIGHTED)	0.1	1	2	μVrms
EQ AMP open loop gain	VGSPB1	SG5 1kHz	-68dBm	T5A	T8A		58	64	70	dB

Head Amplifier

Parameter	Symbol	Input signal		Input/Output point		Conditions			Ratings			Unit
		Signal	Level	In	Out				min	typ	max	
PB mode							T70 RF	T71 HA				
Voltage gain SP-L CH1	Gvp1	SG5	38mVp-p	T96A	T79	V_{IN} = 38mVp-p	0	0	58.0	60.0	62.0	dB
SP-H CH2	Gvp2	f=4MHz		T93A		f = 4MHz	5.0	0	58.0	60.0	62.0	
EP-L CH3	Gvp3			T90A			0	5.0	58.0	60.0	62.0	
EP-H CH4	Gvp4			T87A			5.0	5.0	58.0	60.0	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
Frequency Characteristics CH1	ΔVfp1	SG5	38mVp-p	T96A	T79	The ratio of the V_{IN} = 38mVp-p,	0	0	-1	0	+1	dB
CH2	ΔVfp2	f=7MHz		T93A		f = 7MHz output and Gvp1, 2, 3, 4.	5.0	0				
CH3	ΔVfp3			T90A			0	5.0				
CH4	ΔVfp4			T87A			5.0	5.0				
Secondary harmonic distortion CH1	VHDP1	SG5	38mVp-p	T96A	T79	V_{IN} = 38mVp-p, The ratio of 8MHz	0	0			-40	dB
CH2	VHDP2	f=4MHz		T93A		(second component) of f = 4MHz	5.0	0				
CH3	VHDP3			T90A		output and 4MHz (first component).	0	5.0				
CH4	VHDP4			T87A			5.0	5.0				
Maximum output level CH1	VOMP1	SG5		T96A	T79	As f = 1MHz, the output level of which	0	0		1.2		Vp-p
CH2	VOMP2	f=1MHz		T93A		become -30dB as the ratio of output	5.0	0				
CH3	VOMP3			T90A		3MHz (third component) and 1MHz	0	5.0				
CH4	VOMP4			T87A		(first component).	5.0	5.0				
Cross talk SP-L CH1	VCR1	SG5	38mVp-p	T93A	T79	The ratio of output of V_{IN} = 38mVp-p,	0	0			-35	dB
		f=4MHz		T90A		f = 4MHz and Gvp1.						
				T87A								
Cross talk SP-H CH2	VCR2	SG5	38mVp-p	T96A	T79	The ratio of output of V_{IN} = 38mVp-p,	5.0	0			-35	dB
		f=4MHz		T90A		f = 4MHz and Gvp2.						
				T87A								
Cross talk EP-L CH3	VCR3	SG5	38mVp-p	T96A	T79	The ratio of output of V_{IN} = 38mVp-p,	0	5.0			-35	dB
		f=4MHz		T93A		f = 4MHz and Gvp3.						
				T87A								
Cross talk EP-H CH4	VCR4	SG5	38mVp-p	T96A	T79	The ratio of output of V_{IN} = 38mVp-p,	5.0	5.0			-35	dB
		f=4MHz		T93A		f = 4MHz and Gvp4.						
				T90A								
Equivalent input noise voltage CH1	VEIN1	SG5	38mVp-p	T96A	T79	The ratio of output passed through	0	0		0.6	1.2	μVrms
CH2	VEIN2	f=1MHz		T93A		1.1MHz LPF when input	5.0	0				
CH3	VEIN3			T90A		V_{IN} = 38mVp-p and f = 1MHz and	0	5.0				
CH4	VEIN4			T87A		output when no input.	5.0	5.0				
Output DC off set	ΔVODC1				T79	T82 output DC difference when no input	CH1-CH2		-150	0	+150	mV
	ΔVODC2						CH3-CH4					
	ΔVODC3						CH1-CH3					
	ΔVODC4						CH2-CH4					
	ΔVODC5						CH1-CH4					
	ΔVODC6						CH2-CH3					
Envelope detection output terminal voltage	VENV1				T84	T84 DC when no input.	0	0		0.2	1.0	V
	VENV2						5.0	0				
	VENV3						0	5.0				
	VENV4						5.0	5.0				
Envelope detection output terminal voltage SP1	VENSP1	SG5 f=4MHz	mVp-p	T96A	T84	When input f = 4MHz, T84 230mVp-p, DC diff to venv, for T82A output level.	0	0	2.0	2.5	3.0	V

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Parameter	Symbol	Input signal		Input/Output point		Conditions			Ratings			Unit
		Signal	Level	In	Out				min	typ	max	
Envelope detection output terminal voltage SP2	VENSP2	SG5 f=4MHz	mVp-p	T96A	T84	When input f = 4MHz, T84 1.0Vp-p, DC diff to venv, for T82A output level.	0	0	3.8	4.3	4.8	V
Envelope detection output terminal voltage EP1	VENEP1	SG5 f=4MHz	mVp-p	T90A	T84	When input f = 4MHz, T84 200mVp-p, DC diff to venv, for T82A output level.	0	5.0	2.0	2.5	3.0	V
Envelope detection output terminal voltage EP2	VENEP2	SG5 f=4MHz	mVp-p	T90A	T84	When input f = 4MHz, T84 600mVp-p, DC diff to venv, for T82A output level.	0	5.0	4.0	4.5	5.0	V
Comparator output voltage 1	VCOMP1	SG5 f=4MHz	38mVp-p	T96A	T83	T83 DC voltage when V_{IN} = 38mVp-p, f = 4MHz.	0	0		0.4	0.9	V
Comparator output voltage 2	VCOMP2	SG5 f=4MHz	38mVp-p	T90A	T83	T83 DC voltage when V_{IN} = 38mVp-p, f = 4MHz.	5.0	0	4.5	4.8		V

When measuring PB Mode of H.A, a video signal (0.5Vp-p) is input to T74A because HA-SW (EP/SP) change in LA71750EM is making rising of H-SYNC synchronous.

Parameter	Symbol	Input signal		Input/Output point		Conditions		Ratings			Unit
		Signal	Level	In	Out			min	typ	max	
Recording mode							T11B HA				
REC AGC Amp output current	VRSP VREP	SG5 f=4MHz	300mVp-p	T78A	T95A T89A	Output level when V_{IN} = 300mVp-p, f = 4MHz	0 5.0	12.7 12.7	13.5 13.5	14.3 14.3	mAp-p
Difference of gain between modes	ΔVR					VRSP/VREP	0 5.0	-0.5	0.0	0.5	dB
REC AGC AMP control characteristics 1	ΔVAGC1-SP ΔVAGC1-EP	SG5 f=4MHz	700mVp-p	T78A	T95A T89A	As f = 4MHz, the output level/VRSP, EP When V_{IN} = 600mVp-p.	0 5.0		0.5	1.0	dB
REC AGC AMP control characteristics 2	ΔVAGC2-SP ΔVAGC2-EP	SG5 f=4MHz	100mVp-p	T78A	T95A T89A	As f = 4MHz, the output level/VRSP, EP When V_{IN} = 100mVp-p.	0 5.0	-1.0	-0.5		dB
REC AGC AMP Frequency characteristics	ΔVFRS ΔVFRE	SG5 f=7MHz f=1MHz	300mVp-p	T78A	T95A T89A	As V_{IN} = 300mVp-p, the output ratio when f is 1M, 7MHz 7MHz/1MHz (Note 1)	0 5.0	0.0	1.0	2.0	dB
Rec AGC Amp attenuate volume of mute	ΔVHRS ΔVHRE	SG5 f=4MHz	300mVp-p	T78A	T95A T89A	Output level/VRSP, EP When V_{IN} = 300mVp-p, f = 4MHz Via pin 30	0 5.0			-45	dB
REC AGC AMP second harmonic distortion	ΔVHDRE	SG5 f=4MHz	300mVp-p	T78A	T95A T89A	The ratio of the 8M (second component) V_{IN} = 300mVp-p, f = 4MHz output and 4M (first component).	0 5.0		-40	-35	dB
REC AGC AMP maximum output level	ΔVHDRS ΔVHDRE	SG5 f=4MHz		T78A	T95A T89A	The output level which become -30dB of f = 4MHz second distortion.	0 5.0	20			mAp-p
REC AGC AMP Mixed modulation relative level	ΔVCYS ΔVCYE	SG5 f=4MHz		T78A T21A	T95A T89A	T78A : V_{IN} = 300mVp-p, f = 4MHz, T21A : V_{IN} = 1.5Vp-p, f = 629kHz (4M±629K) /4M ratio of output.	0 5.0		-40	-35	dB

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Similarly to the case of the PB mode, HA-SW (EP/SP) changeover is synchronized to rise of H-SYNC in the REC mode. Before changeover, Check by applying the video signal (1Vp-p) to T48A.

(Note1) Apply about 1.8 DC volt to the AGC detection filter pin (pin 86) to fix AGC-AMP-GAIN

Note 1. To measure REC-AGC-AMP, C-sync must be fixed to HIGH. Connect T47, T49, T52, T54, and T57 of the VIDEO input pin to ground in the REC mode

2. Use a resistor of pin 85 to ground with the accuracy of ±1.0%

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Parameter	Symbol	Input signal		Input/Output point		Conditions		Ratings			Unit
		Signal	Level	In	Out			min	typ	max	
RF thresyold level	RF1 RF2			T70			L-CH H-CH	0 2.5		1.9 5.0	V
C-ROT thresyold level	CROT1 CROT2 CROT3 CROT4			T70			L-CH H-CH L-CH H-CH	0 1.3 2.5 3.9		0.7 1.9 3.3 5.0	V
A-MUTE thresyold level	AMOF AMON			T71			MUTE-OFF MUTE-ON	0 2.5		1.9 5.0	V
HA thresyold level	HA1 HA2 HA3 HA4			T71			SP EP SP EP	0 1.3 2.5 3.9		0.7 1.9 3.3 5.0	V

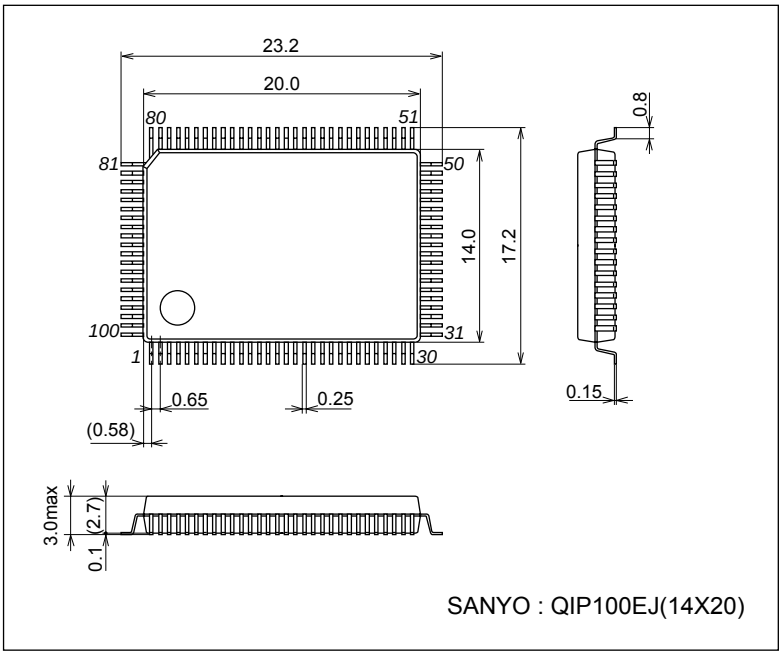
PAL/SECAM Distinction

Parameter	Symbol	Input signal		Input/Output point		Conditions		Ratings			Unit
		Signal	Level	In	Out			min	typ	max	
PAL discrimination minimum input level	VINPAL	SG3	A : 300, B : 350, C : 80, D : 35	T48A	T68A	Minimum burst level, that is input into T48A, that makes the level of the Chroma & Burst of the PAL-GBI signal decrease which will in turn prevent errors in the SECAM from occurring.	VINPAL	35			mVp-p
Discrimination small adjustment center value	VPSREF	SG3	A : 300, B : 350, C : 700, D : 300	T48A	T35	Volutage of T35 when T35 is opened	VPSREF		2.5		V
SECAM discrimination minimum input level	VINSEC	SG3	A : 300, B : 350, C : 120, D : 35	T48A	T68A	Minimum non-modulation carrier level, that is input into T48A, that makes the level of chroma & non-modulation of SECAM signal decrease which will turn prevent errors in the PAL from occurring.	VINSEC	35			mVp-p
PAL discrimination burst position	DLYPAL	SG3	A : 300, B : 350, C : 700, D : 300	T48A	T68A	The range of butst position that changes the timing of butst of PAL signal that is input to T48A and isn't distinguished from SECAM. The butst position is defined at the period from the start of input SYNC to the start of butst.	DLYPAL	5.1	5.6	6.1	μs
SECAM discrimination burst position	DLYSEC	SG3	A : 300, B : 350, C : 700, D : 208	T48A	T68A	The range of non-modulation carrier opsition that changes the timing of non-modulation carrier of SECAM signal that is input to T48A and isn't distinguished from PAL erroneously. The opsition of non-modulation carrier is defined at the period from the start of input SYNC to the start of non-modulation carrier.	DLYSEC	5.1	5.6	6.1	μs
Comparator threshold voltage when SECAM→PAL	VCOMLH	DC		T34	T68A	To apply DC voltage to T34 and lower DC from 4V. To measure the DC voltage that the serial BIT8 data becomes L→H.	VCOMLH	2.5	2.8	3.1	V
Comparator threshold voltage when PAL→SECAM	VCOMHL	DC		T34	T68A	To apply DC voltage to T34 and rise DC from 2V. To measure the DC voltage that the serial BIT8 data becomes H→L.	VCOMHL	2.8	3.1	3.4	V

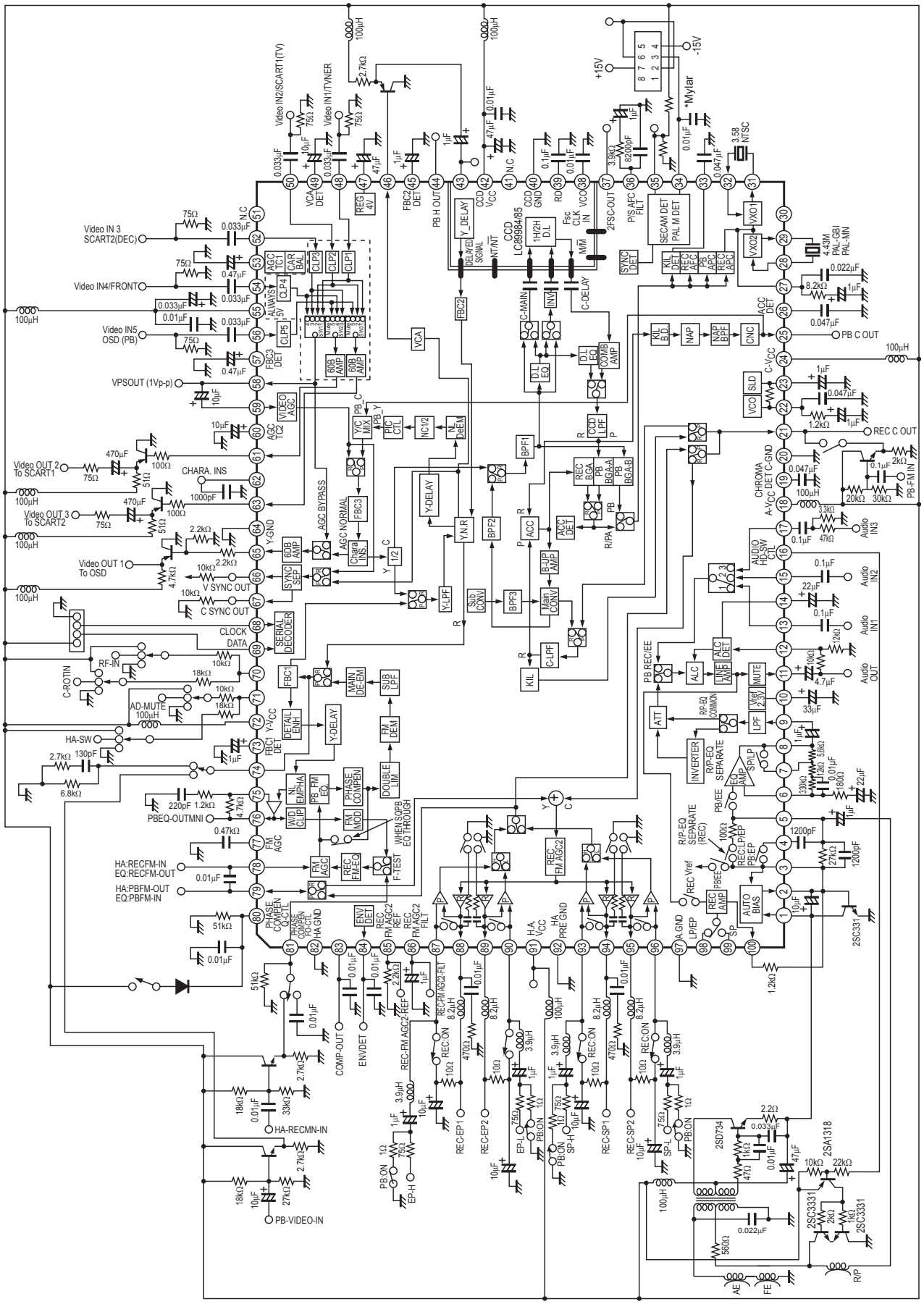
Package Dimensions

unit : mm (typ)

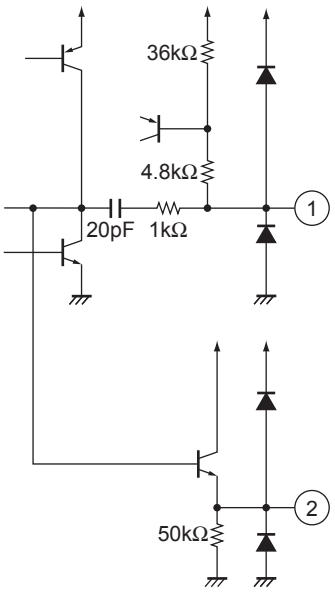
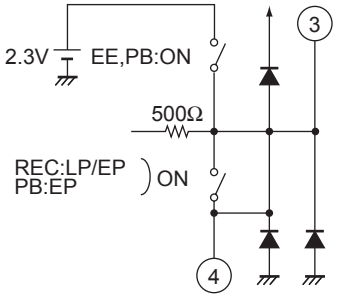
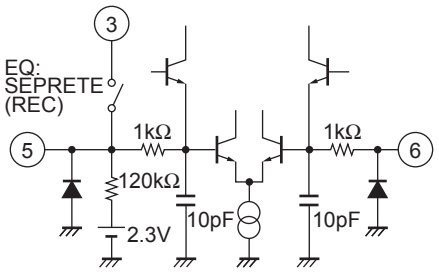
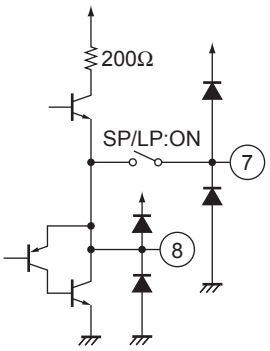
3252A



Block Diagram and Test Circuits



Pin Functions

Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
1	AUTO-BIAS-OUT	REC	DC control voltage (1.0V to 3.0V)	
		PB : 5.0V	DC	
2	AUTO-BIAS	REC : 0.7V	DC	
		PB : 0V	DC	
3	AUTO-BIAS-IN	REC : 2.5V	CW : 2.0Vp-p +70kHz 300mVp-p	
		PB : 2.3V	DC	
4	EQ-SW1	REC : SP : 0V EP/LP : 2.5V	CW : 2.0Vp-p +70kHz 300mVp-p	
		PB:	SP : 0V(CW : 1mVp-p) EP/LP : 2.3V (* NTSC LP : 0V)	
5	EQ-IN	REC : 2.5V	DC	
		PB : 2.5V	CW : 1mVp-p	
6	EQ-NFB	REC : 2.3V	DC	
		PB : 2.3V	CW: 1mVp-p	
7	EQ-SW2	REC : 2.3V	DC	
		PB : 2.3V	CW : 90mVp-p	
8	EQAMP-OUT	REC : 2.3V	DC	
		PB : 2.3V	CW : 90mVp-p	

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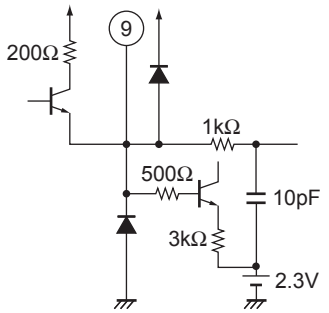
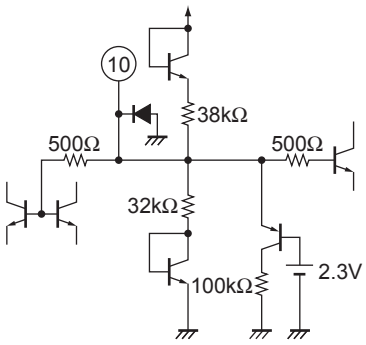
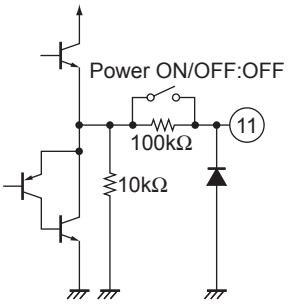
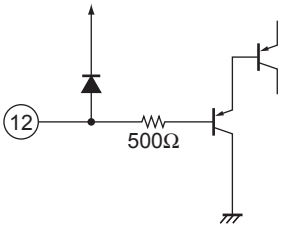
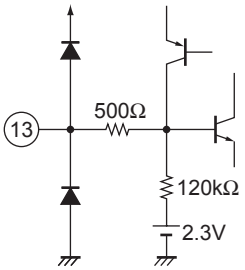
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
9	AUDIO-PB-IN	REC : 3.1V	Half-wave rectified waveform +3.1V.	
		PB : 2.3V	CW : 90mVp-p	
10	VREF	REC : 2.3V	DC	
		PB : 2.3V	DC	
11	LINE-AMP-OUT	REC : 2.5V	CW : 1.4Vp-p	
		PB : 2.5V	CW : 1.4Vp-p	
12	ALC-DET-IN	REC : 0V	CW : 775mVp-p	
		PB : 0V		
13	N-AUDIO-IN1	REC : 2.3V	CW : 90mVp-p	
		PB : 2.3V		

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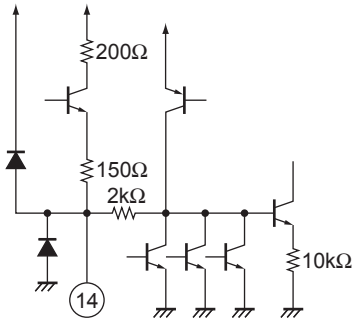
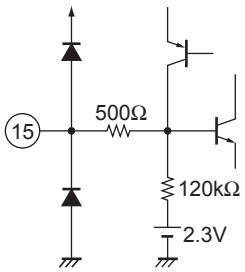
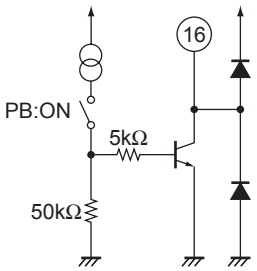
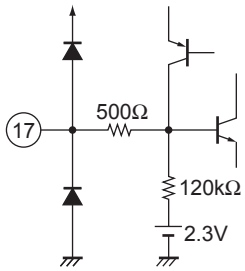
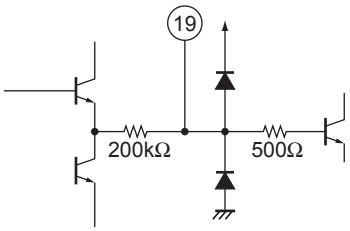
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
14	ALC-DET	REC :	Detected DC voltage.	
		PB : 0V		
15	N-AUDIO-IN2	REC : 2.3V	CW : 90mVp-p	
		PB : 2.3V		
16	AUDIO-HA-SW-CTL	REC : OPEN		
		PB : 0V		
17	N-AUDIO-IN3	REC : 2.3V	CW : 90mVp-p	
		PB: 2.3V		
18	AUDIO-V_{CC}	5V		
19	C-DET			
20	C-GND			

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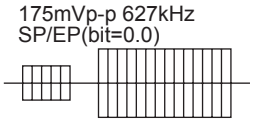
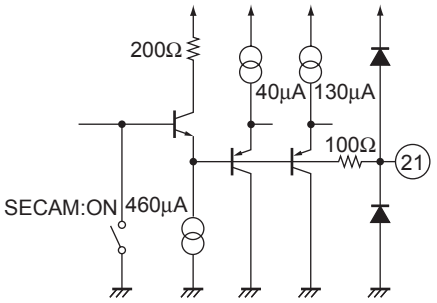
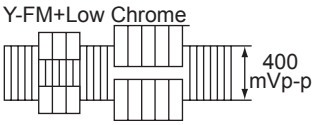
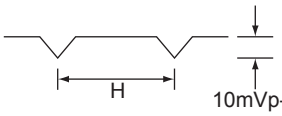
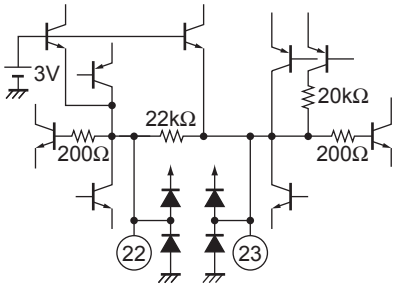
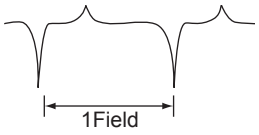
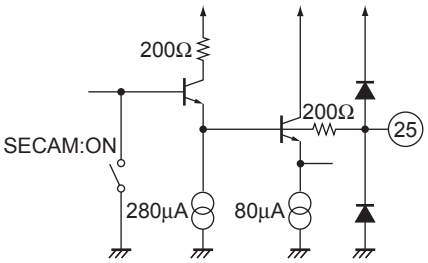
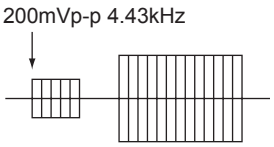
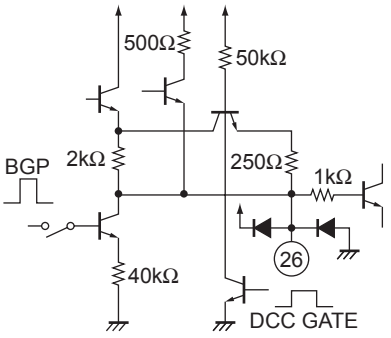
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
21	LOW-C-IN/OUT	REC : 3.2V SECAM : 0.3V		
		PB : 2.0V		
22	AFC/APC-FILT	REC : 3.5V		
		PB : 3.5V		
23	SLD-FILT	REC : 3.5V	DC	
		PB : 3.5V	DC	
24	C-V_{CC}	5V		
25	PB-CHROMA IN/OUT	REC : open		
		PB : 3.3 SECAM : 0.3V		
26	A_{CC}-FILT	REC : 1.6V	DC	
		PB : 1.8V	DC	

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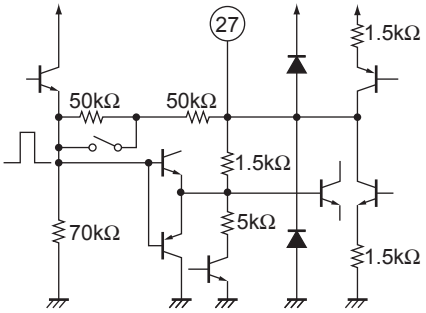
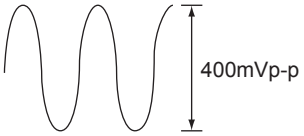
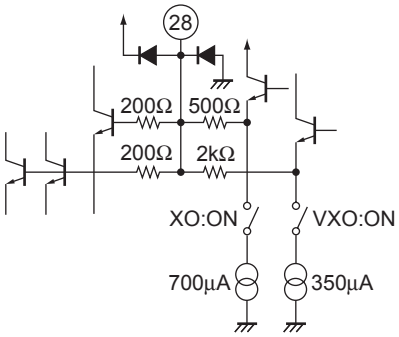
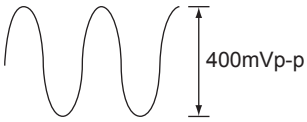
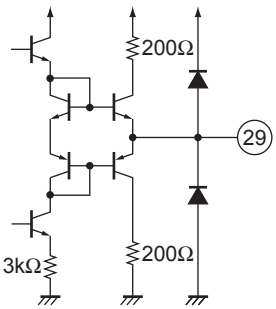
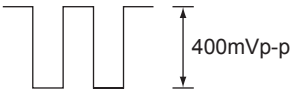
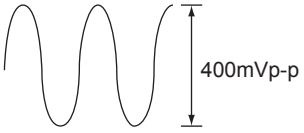
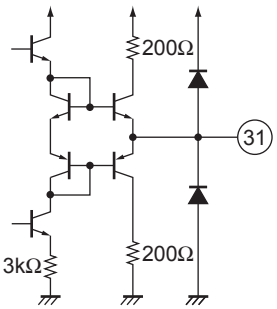
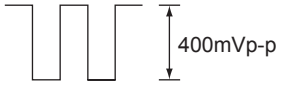
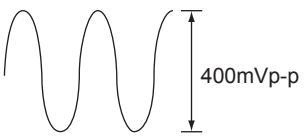
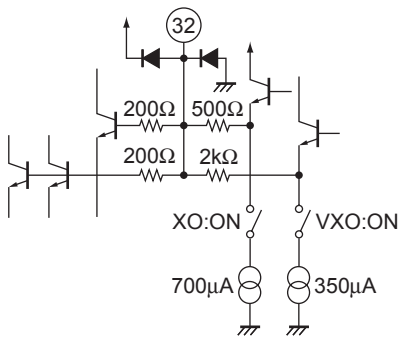
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
27	REC APC-FILT	REC : 2.2V	DC	
		PB : 2.2V	DC	
28	VXO/XO2-IN PAL/BGI. M.N	REC : 3.9V		
		PB : 3.9V		
29	VXO/XO2-OUT	REC : 2.6V		
		PB : 2.6V		
30	GND (SUB)		GND (SUB)	
31	VXO/XO1-OUT	REC : 2.6V		
		PB : 2.6V		
32	VXO/XO1-IN	REC : 3.9V		
		PB : 3.9V		

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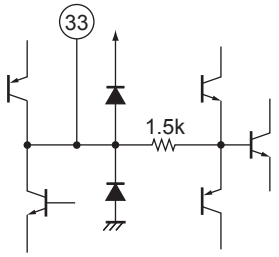
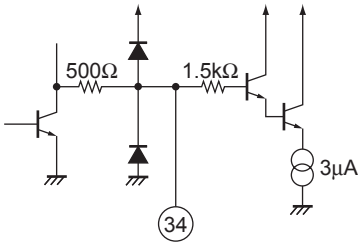
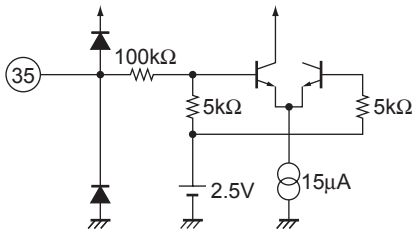
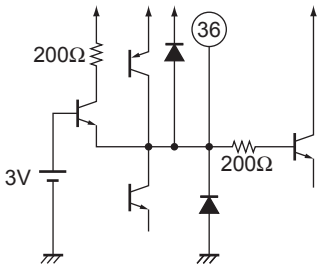
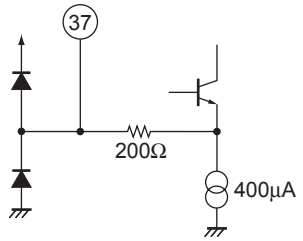
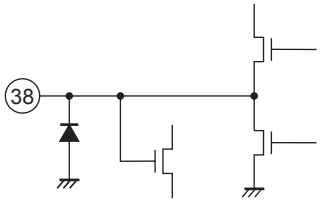
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
33	KIL-DET	REC/PB Color : 2.0V Killer : 3.0V		
34	PAL/MESEC-DET-FILT	REC		
		PB		
35	PAL/MESEC-DET-FILT-CTL	REC : 2.5V		
		PB : 2.5V		
36	AFC2-FILT	REC : 3.5V		
		PB : 3.5V		
37	2FSC-OUT	REC : 0V		
		PB : 0V		
38	CCD-VCO-FILT	REC : 2.0V	DC	
		PB : 2.0V	DC	

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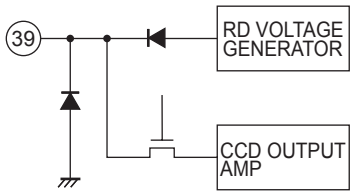
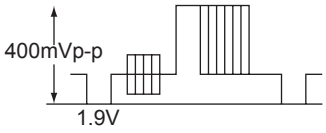
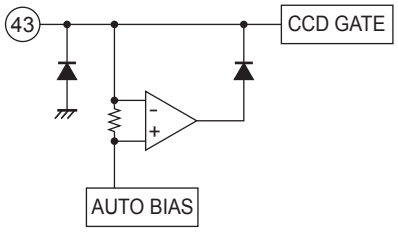
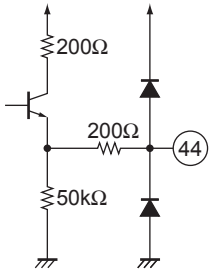
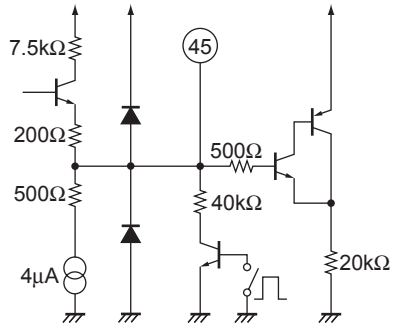
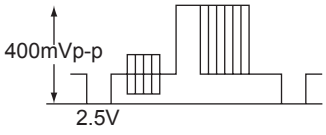
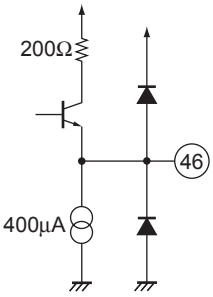
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
39	RD	REC : 9.3V	DC	
		PB : 9.3V	DC	
40	CCD-GND			
41	GND (SUB)		GND (SUB)	
42	CCD-V_{CC}-5V	5V		
43	CCD-Y-IN	REC : 1.9V		
		PB : 1.9V		
44	PB-H-OUT	REC : 0.0V		
		PB : 4.1V		
45	FBC2-FILT	REC : 2.2V		
		PB : 2.2V		
46	VCA-OUT	REC : 2.5V		
		PB : 2.5V		

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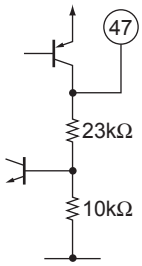
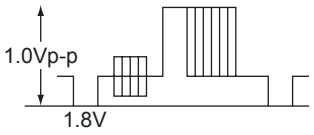
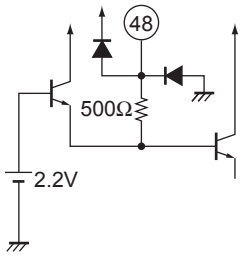
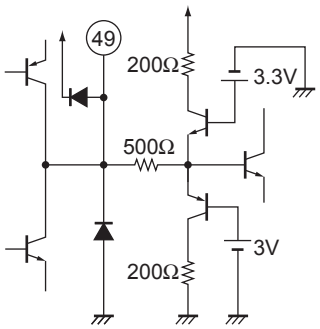
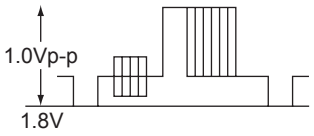
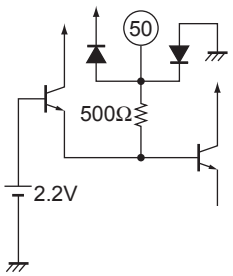
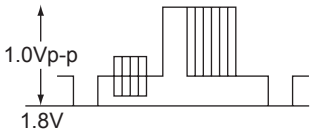
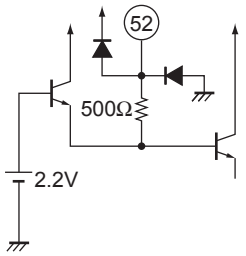
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
47	REG4.0	REC : 4.0V	DC	
		PB : 4.0V	DC	
48	VIDEO-IN1	REC : 1.8V		
		PB : 1.8V		
49	VCA-FILT	REC : 3.1V	DC	
		PB : 3.1V	DC	
50	VIDEO-IN2	REC : 1.8V		
		PB : 1.8V		
51	GND (SUB)		GND (SUB)	
52	VIDEO-IN3	REC : 1.8V		
		PB : 1.8V		

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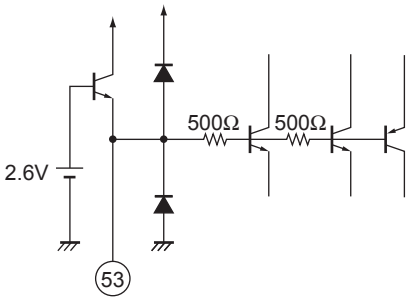
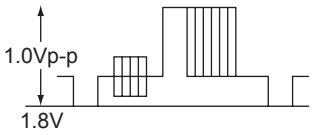
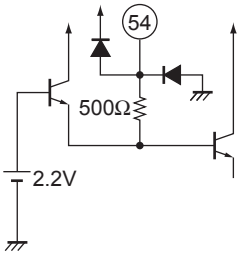
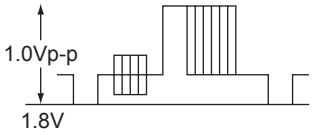
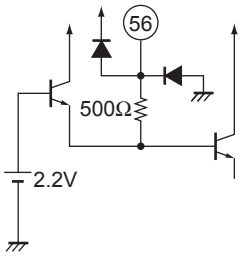
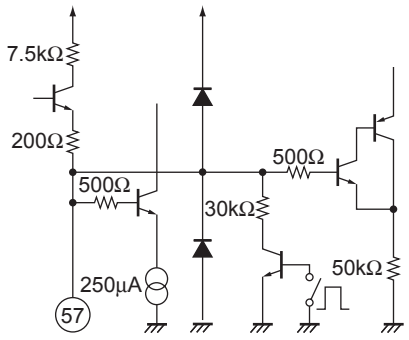
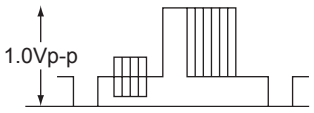
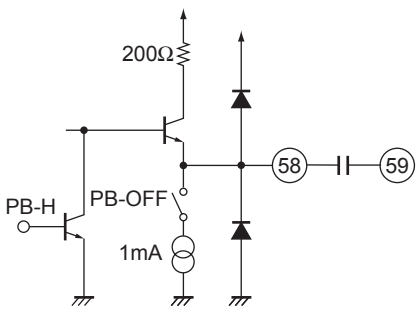
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
53	AGC1-TC1	REC : 2.2V		
		PB : 2.2V		
54	VIDEO-IN4	REC : 1.8V		
		PB : 1.8V		
55	ALWAYS-5V	5V		
56	VIDEO-IN5	REC : 1.8V		
		PB : 1.8V		
57	FBC-FILT	REC : 2.4V	DC	
		PB : 2.4V	DC	
58	VPS-OUT	REC : 2.45V		
		PB : OPEN		

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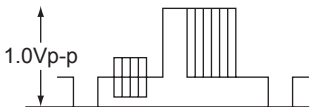
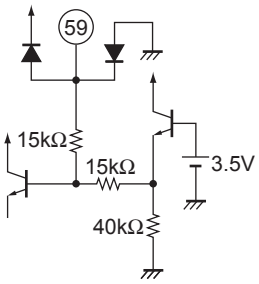
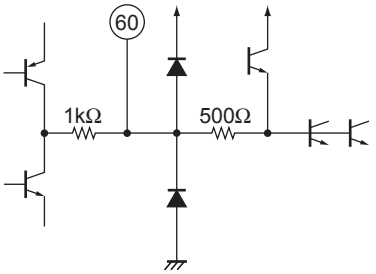
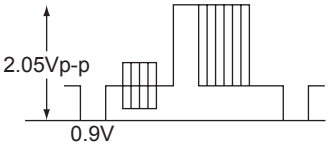
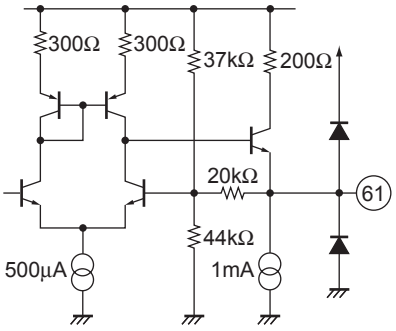
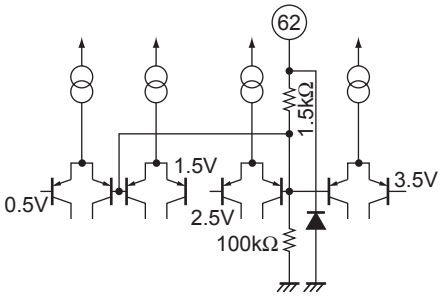
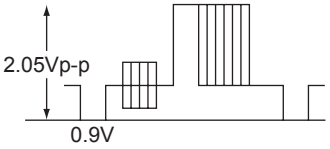
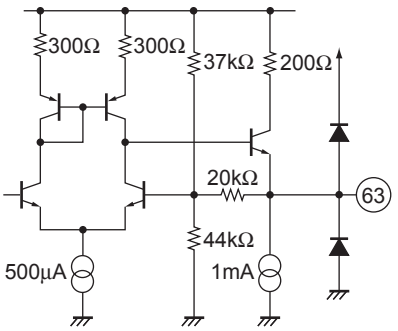
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
59	VIDEO-AGC-IN	REC : 2.3V PB : 2.8V		
60	AGC1-TC2	REC : 1.5V PB : 1.5V	DC DC	
61	LINE-OUT	REC : SYNC 0.9V PB : SYNC 0.9V		
62	QV/QH-INS	REC : 0.2V PB : 0.2V	0 to 0.3V : THROUGH 0.7 to 1.3V : PED INS 1.7 to 2.3V : WHITE INS 2.7 to 3.3V : PED INS 3.7 to V_{CC} : SYNC INS	
63	CANAL-OUT	REC : SYNC 0.9V PB : SYNC 0.9V		
64	Y-GND			

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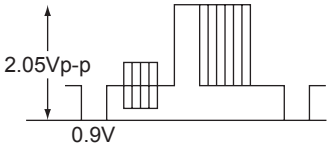
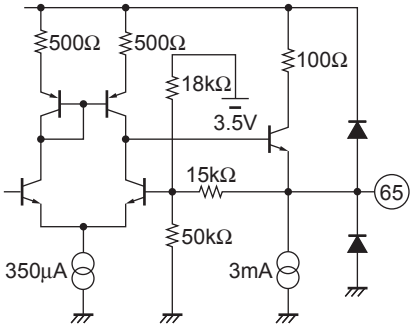
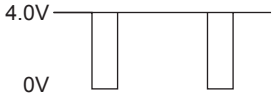
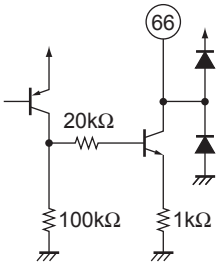
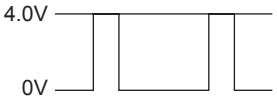
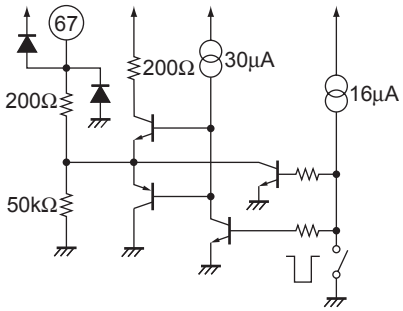
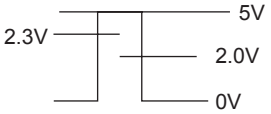
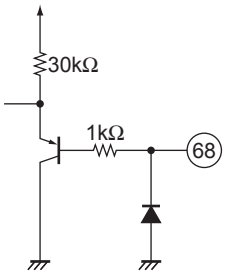
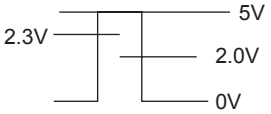
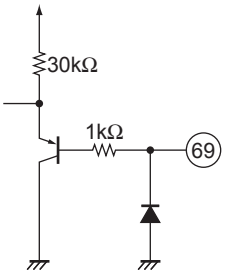
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
65	VIDEO-OUT	REC : SYNC 0.9V PB : SYNC 0.9V		
66	V.SYNC-OUT			
67	C.SYNC-OUT	REC : PB :		
68	SERIAL CLOCK-IN	REC : PB :		
69	SERIAL DATA-IN	REC : PB :		

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Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
70	RF-SW/ C-ROT PULSE-IN	REC : PB :	70PIN-DC RF-H / ROT-H → 3.6 RF-H / ROT-L → 2.1 RF-L / ROT-H → 1.0 RF-L / ROT-L	RF-SW, 10kΩ, 20kΩ, C-ROT, 200Ω, 3.6V, 2.1V, 1.0V
71	AUD-MUTE/ HA-SW PULSE-IN	REC : PB :	71PIN-DC MUTE ON / HA-H → 3.6 MUTE ON / HA-L → 2.1 MUTE ON / HA-H → 1.0 MUTE ON / HA-L	A-MUTE, 10kΩ, 20kΩ, HA-SW, 200Ω, 3.6V, 2.1V, 1.0V
72	Y-V_{CC}-5V			
73	FBC1-FILT	REC : 2.2V PB : 2.2V		7.5kΩ, 200Ω, 500Ω, 4μA, 40kΩ, 20kΩ, 73
74	MAIN -DEEMPHA -OUT	REC : 2.1V PB : 2.1V	500mVp-p 2.1V	PB, REC, PB:1mA, 200Ω, 3.5V, 3.6kΩ, REC:300μA, 74
75	MAIN-EMPHA FILT	REC : 2.1V PB : OPEN		200Ω, 75

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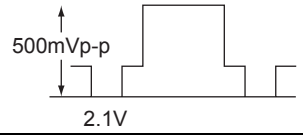
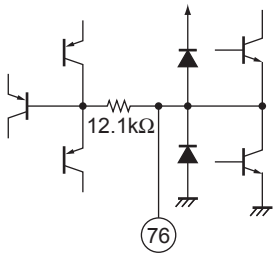
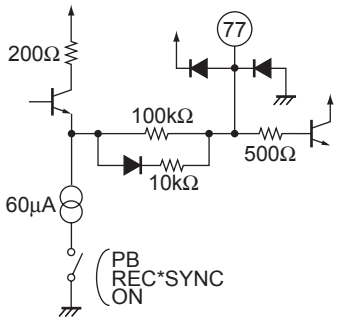
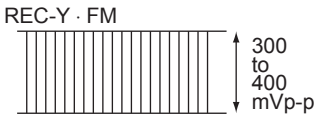
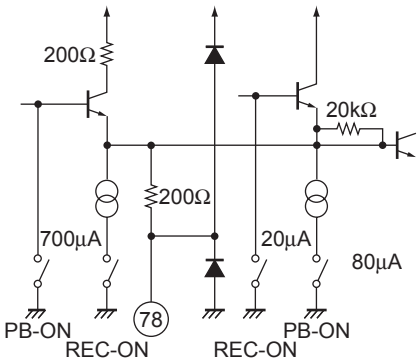
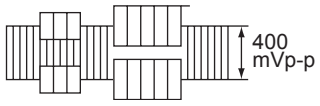
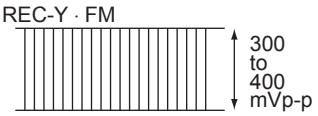
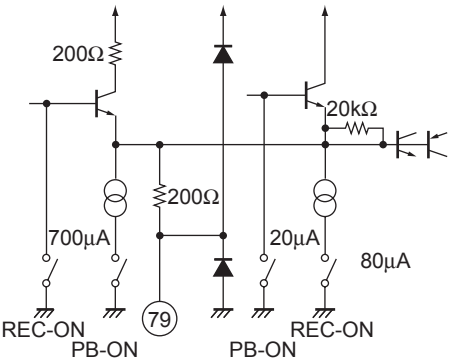
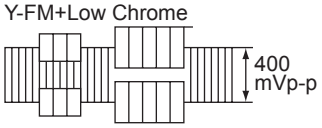
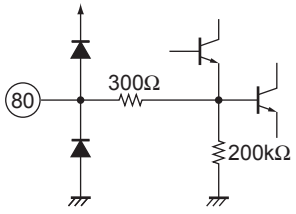
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
76	MAIN- EMPHA-OUT	REC : 2.1V		
		PB : 0V		
77	FM-AGC-FILT	REC : 1.7V	DC	
		PB : 1.7V	DC	
78	REC-EQ-OUT PB-EQ-IN	REC : 2.5V		
		PB : 3.2V		
79	REC-HA-IN PB-HA-OUT	REC : 2.5V		
		PB : 2.0V		
80	PB-EQ-Q-CTL HA- REC-MUTE ON/OFF	PB : 1.0V	DC	
		REC	OPEN : MUTE-ON PULL-UP : MUTE-OFF	

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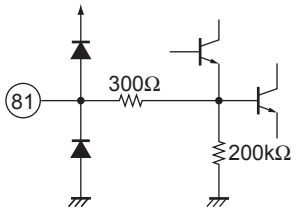
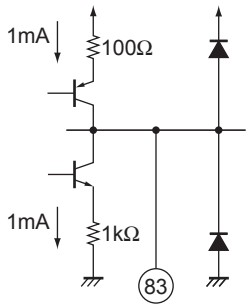
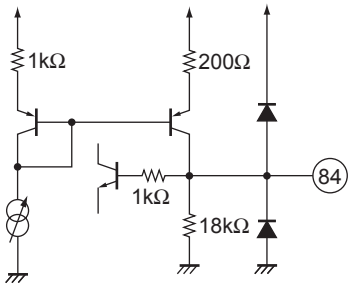
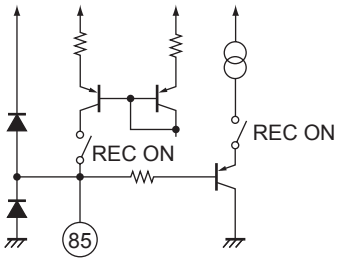
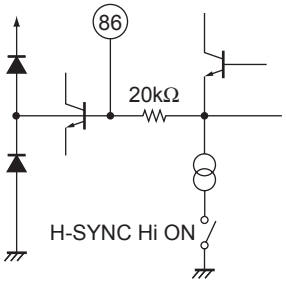
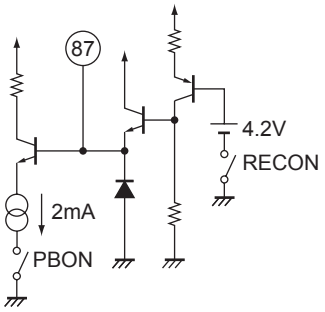
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
81	PB-EQ F0-CTL REC-EQ TEST-IN	PB : 1.0V	DC	
		REC	ADD DC 3.6V RECEQ TEST IN	
82	H.A GND			
83	POCOMP	REC : OPEN		
		PB :	NORMAL : OPEN When TRIC is L : 1.0V or lower When TRICK is H : 4.5V or higher	
84	POENVDET	REC :		
		PB : 0.5 to 4.9V	DC	
85	PIRADJI	REC : 0.7V	FM 500mVp-p	
		PB : 0.0V		
86	PHRDTFL	REC : 1.6V	DC	
87	PIPBEPH+	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	

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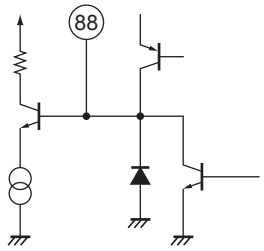
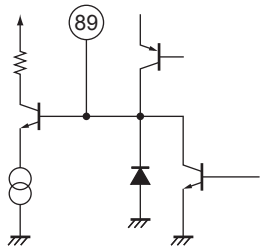
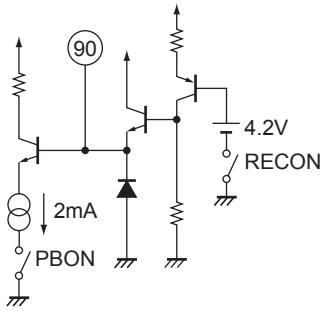
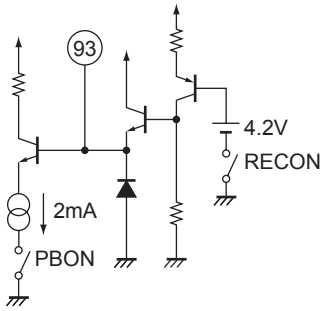
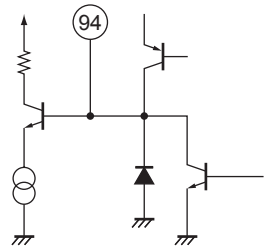
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
88	PIPBEPH$^-$	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	
89	PIPBEPL$^+$	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	
90	PIPBEPL$^+$	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	
91	H.A. V_{CC}	5.0V	DC	
92	H.A. PRE			
93	PIPBSPH$^+$	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	
94	PIPBSPH$^-$	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	

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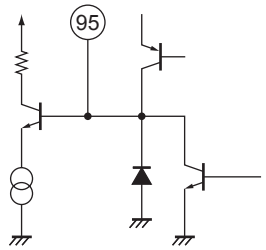
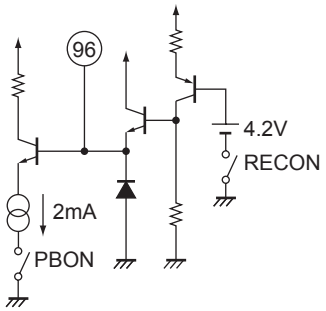
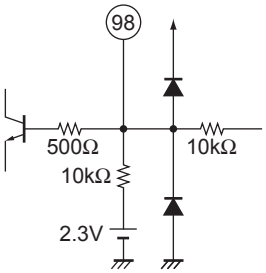
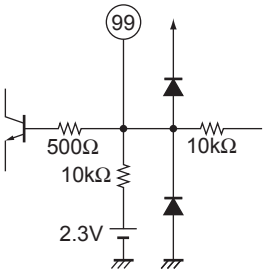
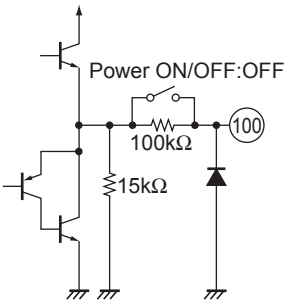
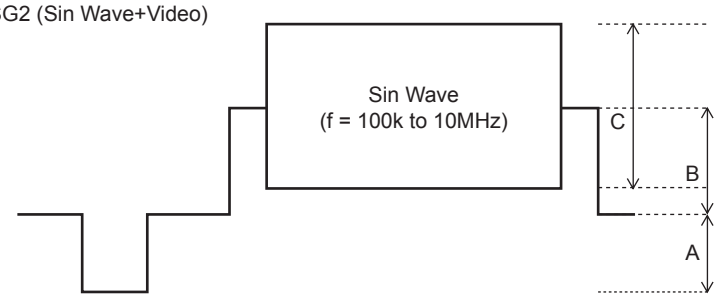
Pin No.	Pin name	DC voltage	Signal wave form	Equivalent circuit
95	PIPBSPL+	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	
96	PIPBSPL+	REC : 4.1V	MAX : 22mAp-p	
		PB : 1.8V	0.5mAp-p	
97	AUDIO-GND			
98	PINFBLE	REC : 2.5V	CW : 1.1Vp-p	
		PB : 2.5V	DC	
99	PIRNFBS	REC : 2.5V	CW : 1.1Vp-p	
		PB : 2.5V	DC	
100	REC-AMP -OUT	REC : 2.5V	CW : 2.0Vp-p	
		PB : 2.5V	DC	

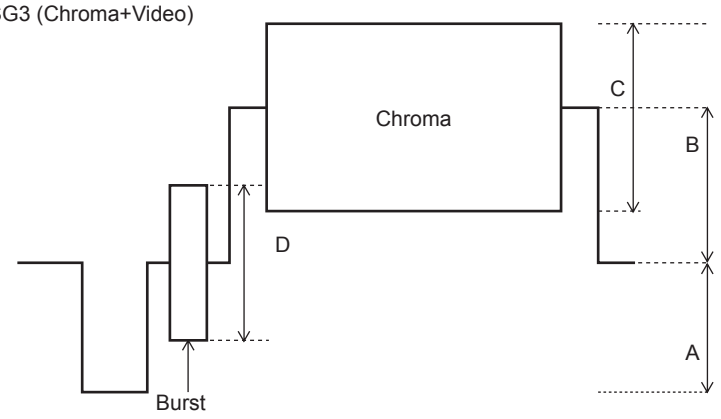
Test Signals

SG1 (White 100% Video)

SG2 (Sin Wave+Video)



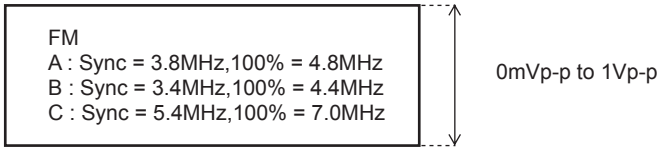
SG3 (Chroma+Video)



SG4 (Low-Chroma)

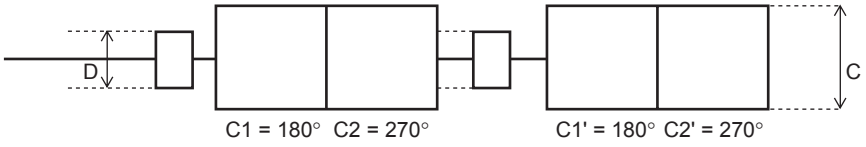
SG5 (Sin Wave)

SG6 (FM)



SG8 (PULSE)

SG9 (Low-Chroma)

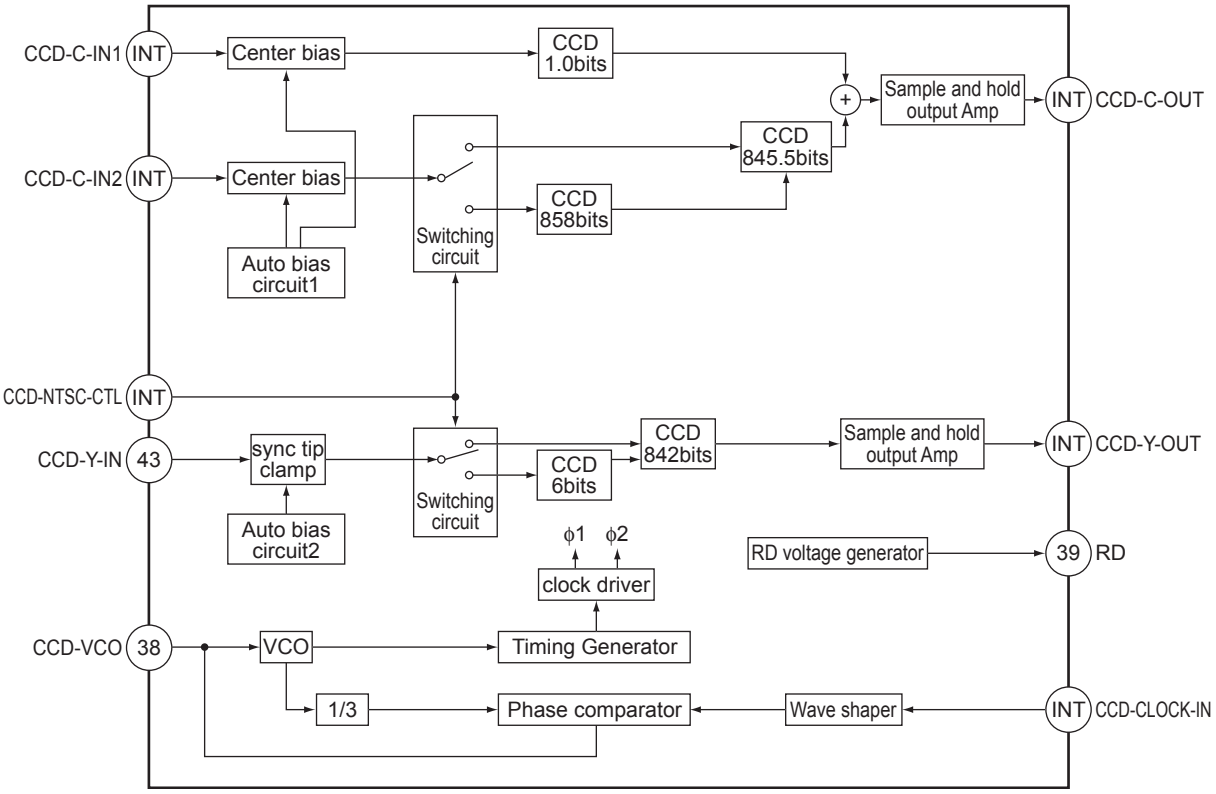


CCD block

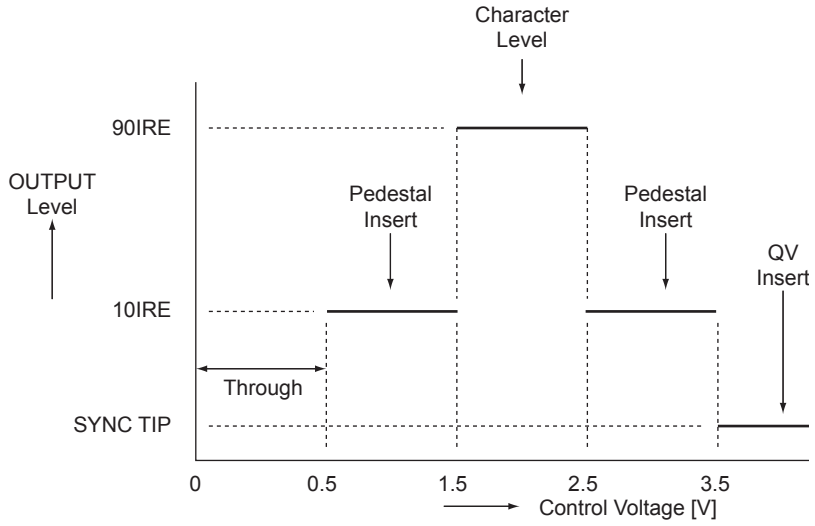
Delay time (CCD bits)

System	Chrominance signal delay time (CCD bits)	Luminance signal delay time (CCD bits)
PAL/GBIN	2H (1703.5) +0H (1.0)	1H (848)
443 NTSC	1H (845.5) +0H (1.0)	1H (842)

Block Diagram



QV/QH/CHARACTER Insertion Control



SERIAL Control Table

ADDRESS	8	7	6	5	4	3	2	1		
							0	0	VIDEO SW1 INPUT 1 / AUDIO SW1 INPUT 1	*
							0	1	VIDEO SW1 INPUT 2 / AUDIO SW1 INPUT 2	
							1	0	VIDEO SW1 INPUT 3 / AUDIO SW1 INPUT 3	
							1	1	VIDEO SW1 INPUT 4 / AUDIO SW1 INPUT 3	
Group 1					0	0			VIDEO SW2 INPUT3	*
					0	1			VIDEO SW2 INPUT4	
					1	0			VIDEO SW2 OSD	
ALLWAYS					1	1			VIDEO SW2 MUTE	
			0	0					VIDEO SW3 INPUT1	
			0	1					VIDEO SW3 INPUT2	*
			1	0					VIDEO SW3 OSD	
			1	1					VIDEO SW3 MUTE	
		0							AUDIO REC-EQ/PB-EQ COMMON	*
		1							AUDIO REC = EQ/PB-EQ SEPARATE	
	0								AUDIO REC AMP GAIN = 4.0dB	*
	1								AUDIO REC AMP GAIN = 6.0dB	

ADDRESS	8	7	6	5	4	3	2	1		
								0	VIDEO REC/EE	*
								1	VIDEO PB	
							0		HEAD AMP PB/EE * 3	*
							1		HEAD AMP REC * 3	
Group 2					0	0			AUDIO EE	*
					0	1			AUDIO PB	
					1	0			AUDIO REC	
SYSTEM					1	1			PROHIBIT (INJ DOWN)	
			0	0					SP (VIDEO/AUDIO) & CARRIER SHIFT OFF	*
			0	1					LP (VIDEO/AUDIO)	
			1	0					EP (VIDEO/AUDIO)	
			1	1					SP (VIDEO/AUDIO) & CARRIER SHIFT ON	
	0	0							NL OFF	*
	0	1							NL STRONG	
	1	0							NL MIDIUM	
	1	1							NL WEAK	

ADDRESS	8	7	6	5	4	3	2	1		
							0	0	NTSC	
							0	1	PAL-BGI, N	*
							1	0	PAL-M	
							1	1	SECAM/MESECAM * 1	
Group 3						0			Y/C-3.58MHz	
						1			Y/C-4.43MHz	*
					0				MULTI SET MODE	*
SYSTEM					1				PAL ONLY SET MODE (4.43 ONLY)	
			0	0					AUTO KILLER	*
			0	1					FORCED COLOR / MESECAM SELECT * 1	
			1	0					FORCED KILLER / SECAM SELECT * 1	
			1	1					PROHIBIT (INJ UP)	
		0							REC : CHROMA DET OFF	*
		1							REC : CHROMA DET ON	
	0								REC : NORMAL VXO CONTROL / PB : DOC AUTO	*
	1								REC : FORCED XO / PB : DOC OFF	

ADDRESS	8	7	6	5	4	3	2	1		
							0	0	YNR / LNC OFF * 2	*
							0	1	YNR / LNC STANDARD * 2	
							1	0	YNR / LNC MIDIUM * 2	
							1	1	YNR / LNC STRONG * 2	
Group 4						0			YNR MODE (PB ONLY) * 2	*
						1			LNC MODE (PB ONLY) * 2	
				0	0				NC1 CTL/DETAIL CTL-1 LIM = MIN	*
NR				0	1				NC1 CTL/DETAIL CTL-2	
				1	0				NC1 CTL/DETAIL CTL-3	
				1	1				NC1 CTL/DETAIL CTL-4 LIM = MAX	
		0	0						Y DELAY (REC : 0N / PB : -80N)	*
		0	1						Y DELAY (REC : 160N / PB : 0N)	
		1	0						Y DELAY (REC : 240N / PB : 80N)	
		1	1						Y DELAY (REC : 320N / PB : 160N)	
	0								CG NORMAL / PB BURST DE-EM -5.0dB	*
	1								CG STOP / PB BURST DE-EM -5.5dB	

ADDRESS	8	7	6	5	4	3	2	1		
							0	0	REC : CHROMA LEVEL = 0.0dB / PB : PB NORMAL	*
							0	1	REC : CHROMA LEVEL = -1.5dB / PB : PB NAP	
							1	0	REC : CHROMA LEVEL = -3.0dB / PB : PB BALA-MOD	
							1	1	REC : CHROMA LEVEL = -4.5dB / PB : PROHIBIT	
Group 5					0	0			REC/PB EQ TRAP : 500k+650k	
					0	1			REC/PB EQ TRAP : 500k+800k	*
					1	0			REC/PB EQ TRAP : 500k+1.1M	
EQ					1	1			REC/PB EQ TRAP : 800k	
V-LATCHED			0	0					PB EQ PEAK-Narrow/REC EQ SLOPE-GENTLE	
			0	1					PB EQ PEAK-2 / REC EQ SLOPE-2	
			1	0					PB EQ PEAK-3 / REC EQ SLOPE-3	*
			1	1					PB EQ PEAK-Wide / REC EQ SLOPE-STEEP	
		0							PB EQ H-TRAP 8.0MHz/REC EQ H-TRAP 8.0MHz	
		1							PB EQ H-TRAP 9.0MHz/REC EQ H-TRAP 9.0MHz	*
	0								PB EQ FO : 5.2M	*
	1								PB EQ FO : 4.7M	

ADDRESS	8	7	6	5	4	3	2	1		
								0	ANR OFF	*
								1	ANR ON	
							0		PHASE ALTERNATOR ON (ONLY PAL)	*
							1		PHASE ALTERNATOR OFF (ONLY PAL)	
Group 6-1						0			NORMAL PB	*
						1			TRICK PB	
					0				APC LOOP BEFORE	*
at PB					1				APC LOOP AFTER	
V-LATCHED		0	0	0					PIC CTL -8dB (SOFT)	
		0	0	1					PIC CTL -6dB	
		0	1	0					PIC CTL -4dB	
		0	1	1					PIC CTL -2dB	
		1	0	0					PIC CTL 0dB	*
		1	0	1					PIC CTL +2dB	
		1	1	0					PIC CTL +4dB	
		1	1	1					PIC CTL +6dB (SHARPNESS)	
	0								PB Y/C MIX ON (COMPOSITE)	
	1								PB Y/C MIX OFF	*

ADDRESS	8	7	6	5	4	3	2	1		
							0	0	REC FM LEVEL -1.5dB	
							0	1	REC FM LEVEL 0.0dB	*
							1	0	REC FM LEVEL +1.5dB	
							1	1	REC FM LEVEL +3.0dB	
						0			WHITE CLIP = 185%	*
Group 6-2						1			WHITE CLIP = 195%	
					0				NORMAL MODE	*
at REC					1				SYNC CARRIER OUT MODE	
V-LATCHED		0	0	0					REC CURRENT-1 (MINIMUM)	
		0	0	1					REC CURRENT-2	
		0	1	0					REC CURRENT-3	
		0	1	1					REC CURRENT-4	
		1	0	0					REC CURRENT-5 (TYPICAL)	*
		1	0	1					REC CURRENT-6	
		1	1	0					REC CURRENT-7	
		1	1	1					REC CURRENT-8 (MAXIMUM)	
	0								AGC NORMAL * 4	
	1								AGC BYPASS * 4	*

ADDRESS	8	7	6	5	4	3	2	1		
						0	0	0	AUDIO PB ATTENUATION LEVEL-1 (0dB)	*
						0	0	1	AUDIO PB ATTENUATION LEVEL-2	
						0	1	0	AUDIO PB ATTENUATION LEVEL-3	
						0	1	1	AUDIO PB ATTENUATION LEVEL-4	
Group 7						1	0	0	AUDIO PB ATTENUATION LEVEL-5	
						1	0	1	AUDIO PB ATTENUATION LEVEL-6	
						1	1	0	AUDIO PB ATTENUATION LEVEL-7	
						1	1	1	AUDIO PB ATTENUATION LEVEL-8 (-7dB)	
OTHERS					0				NORMAL VHS	*
					1				SQPB	
				0					COMPOSITE SYNC (within CLEAR V.SYNC)	*
				1					H-PLL + CLEAR V.SYNC	
			0						NORMAL	*
			1						SIMULCAST MODE * 5	
		0								
	0									

ADDRESS	8	7	6	5	4	3	2	1		
Group 8 TESTS					0	0	0	0	NORMAL	*
					0	0	0	1	F TEST-1	
					0	0	1	0	F TEST-2	
					0	0	1	1	F TEST-3 (B TEST-3)	
					0	1	0	0	F TEST-4 (B TEST-4)	
					0	1	0	1	F TEST-5 (B TEST-5)	
					0	1	1	0	F TEST-6 (B TEST-6)	
					0	1	1	1	F TEST-7 (B TEST-7)	
					1	0	0	0	P TEST-1	
					1	0	0	1	P TEST-2	
					1	0	1	0	P TEST-3	
					1	0	1	1	P TEST-4	
					1	1	0	0	Y TEST	
					1	1	0	1	Y TEST-1	
					1	1	1	0	Y TEST-2	
					1	1	1	1	Y TEST-3	
				0						
			0							
		0								
	0									

Contents ;

- (*) mark shows initial condition.
- SDA OUT DATA (BIT-8, 7, 6, 5, 4) : PAL/MESEC DET, SYNC DET, PAL M DET, ACC+APC KILLER, ACC KILLER
- This IC is controlled by presetable auto address increment mode.
- This IC has V-latch system.
- Usually, transfer serial data till Group-7, group-8 is automatically set to NORMAL mode. (group-8 use for test mode only.)

*1 BIT 6,5,2,1 = 0,1,1,1 (MESECAM MODE : system change as following)
⇒ KIL/ID DET STOP & ACK OUT=[L] FIX & FORCED COLOR MODE & FORCED XO & AFC MODE

*1 BIT 6,5,2,1 = 1,0,1,1 (SECAM MODE : system change as following)
⇒ KIL DET ACTIVE & LOW CHROMA STOP

*2 In REC mode, there are decided vertical emphasis of non-round type.

*3 REC MUTE of HEAD AMP is controlled by pin 80.

*4 Without V-Latch system.

*5 Audio input switcher is fixing on IN3.

Mode Table

REC-Y

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
Power Save Current Dissipation (REC)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Input Changeover SW1-1	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Input Changeover SW2-3	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Input Changeover SW3-2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0001 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Current Dissipation (REC)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Output Level 1 in EE mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Potential of Sync Tip Level in REC mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
AGC Control Characteristic 1	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
AGC Control Characteristic 2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
AGC Control Characteristic 3	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
AGC Control Characteristic 4	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Sync Separator Output Level in REC mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0001	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Sync Separator Output Pulse width in REC mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0001	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Sync Separator threshold level in REC mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0001	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Sync Separator Output Level in REC mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0001	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Sync Separator Output Pulse width in REC mode	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0001	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
YNR Characteristic 1 (REC)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 00**	0110 0100	0100 0001	0000 0000	0000 0000
Y-LPF frequency Characteristic PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Y-LPF frequency Characteristic 1PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Y-LPF frequency Characteristic 2PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Y-LPF frequency Characteristic 3PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Y-LPF frequency Characteristic 4PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Emphasis Gain	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
Detail Enhancer 1	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	000* *000	0110 0100	0100 0001	0000 0000	0000 1111
Detail Enhancer 2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	000* *000	0110 0100	0100 0001	0000 0000	0000 1111
Detail Enhancer 3	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	000* *000	0110 0100	0100 0001	0000 0000	0000 1111
Non linear Emphasis 1	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	**00 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
Non linear Emphasis 2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	**00 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
Non linear Emphasis 3	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	**00 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
Main Emphasis	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
Main Emphasis 2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
White Clipping Level 1 (185%)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110
White Clipping Level 2 (195%)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0101	0000 0000	0000 1110
Dark Clipping Level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 1110

PB-Y

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
Current dissipation 2 (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
4V Regulator (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0110	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Non-Linear De-Emphasis Characteristic 1	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	**00 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1110
Non-Linear De-Emphasis Characteristic 2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	**00 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1110
High Pass Noise Canceler 1	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	000* *000	0110 0100	0100 0000	0000 0000	0000 1111
High Pass Noise Canceler 2	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	000* *000	0110 0100	0100 0000	0000 0000	0000 1111
High Pass Noise Canceler 3	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	000* *000	0110 0100	0100 0000	0000 0000	0000 1111
Reponse Characteristic when Picture Control Hard (+3dB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0111 0000	0000 0000	0000 1110
Reponse Characteristic when Picture Control Soft (-3dB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0000 0000	0000 0000	0000 1110
YNR Characteristic (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 00**	0110 0100	0100 0000	0000 0000	0000 1110
Sync tip lebel Pedestal level White level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Quasi-V Insertion Level (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Quasi-H Insertion Level (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
White Insertion Level (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Edge Insertion Level (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Output level of Sync Separator (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Output Pulse Width of Sync Separator (PB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000

Y-FM

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
FM Modulator Carrier Frequency (expect M mode)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
FM Modulator Secondary distortion (expect M mode)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
1/2 f h Carrier shift	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0001 0010	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
FM Modulator Deviation (expect M mode)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
FM Modulator Linearity	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
Total Output Level of PB-Y (expect M mode)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0001	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
Total Output Level of Over All Y (expect M mode)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0001	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
FM Demodulator Linearity	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0001	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
FM Demodurator Leakage	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0001	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
DOC Compensation Period	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0001	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000
DOC Compensation Level	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0001	0000 0101	0000 0000	0110 0010	0000 0001	0000 0000	0000 0000

REC/PB-EQ

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
REC-FM level 1 to level 4	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	2	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 1010	0000 0101	0000 0000	0110 0100	0100 00**	0000 0000	0000 0110
REC-EQ characteristics 1-1 4 MHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	2	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 1010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0110
REC-EQ second distortion 4Mhz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	2	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 1010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0110
REC-EQ characteristics 1-2 2MHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	2	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 1010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0110
REC-EQ characteristics 2-2 650kHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	1	ON	ON	2	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 1010	0000 0101	0000 0000	0110 0000	0100 0001	0000 0000	0000 0110
FM-AGC-LEVEL 4MHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0001
PB-EQ characteristics 1-1 4MHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0110
PB-EQ second distortion 4MHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0110
PB-EQ characteristics 2-2 650kHz 300mVp-p	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0000	0100 0000	0000 0000	0000 0110
PB-EQ characteristics 3-1 8.5MHz TRAP	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0010 0100	0100 0000	0000 0000	0000 0110
PB-EQ characteristics 3-2 9.5MHz TRAP	2	OFF	3	1	OFF	2	OFF	OFF	1	1	ON	1	2	ON	OFF	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0110

REC-C

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
REC chroma low frequency conversion output level SP MODE	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC ACC characteristics (+6dB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC ACC characteristics (-6dB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC ACC killer-on input level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC ACC killer-on output level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC ACC killer restored input level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC APC pull-in range (1) PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
REC APC pull-in range (2) PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
VXO2 oscillation level PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
The ratio of the REC chroma level and FM modulator output level. PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	1100 1001	0000 0000	0000 0000

PB-C

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
PB chroma video output level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB Chroma 2'Fsc distortion	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PAL SP PB chroma output level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB main converter carrier leakage	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB ACC characteristics (+6dB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB ACC characteristics (-6dB)	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB killer-on input level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB killer-on chroma output level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
XO2 oscillation level PAL	2	OFF	3	1	OFF	1	OFF	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PB XO oscillator frequency deviation PAL MODE	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
NAP-45DEG NTSC→PAL conversion V axis Burst level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0100	0000 0000	0110 0101	0100 0000	0000 0000	0000 0000
NAP+45DEG NTSC→PAL conversion ratio of the Burst level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0100	0000 0000	0110 0101	0100 0000	0000 0000	0000 0000

REC/PB Audio

Parameter	SW Conditions																								Serial Conditions							
	99	1	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
LINE AMP Voltage gain	2	OFF	2	OFF	2	2																					0000 0000	0000 0000					0000 0000	
LINE AMP Output level when ALC	2	OFF	2	OFF	2	1																					0000 0000	0000 0000					0000 0000	
LINE AMP Distortion when ALC	2	OFF	2	OFF	2	1																					0000 0000	0000 0000					0000 0000	
LINE AMP ALC effect	2	OFF	2	OFF	2	1																					0000 0000	0000 0000					0000 0000	
MUTE attenuation	2	OFF	2	OFF	2	1																					0000 0000	0000 0000					0000 0000	
Current dissipation (REC)	2	OFF	2	OFF	3	1																					0000 0000	0000 1000					0000 0000	
REC AMP Voltage gain 1	2	OFF	2	OFF	2	2																					0000 0000	0000 1000					0000 0000	
REC AMP Distortion ratio	2	OFF	2	OFF	2	2																					0000 0000	0000 1000					0000 0000	
REC AMP Maximum output voltage	2	OFF	2	OFF	2	1																					1000 0000	0000 1000					0000 0000	
Voltage conversion recording bias current	2	OFF	2	OFF	3	2																					0000 0000	0000 1000					0000 0000	
Current dissipation (PB)	2	OFF	2	OFF	3	1																					0000 0000	0000 0100					0000 0000	
LINE AMP Voltage gain (PB)	2	OFF	2	OFF	1	1																					0000 0000	0000 0100					0000 0000	
LINE AMP Distortion ratio (PB)	2	OFF	2	OFF	1	1																					0000 0000	0000 0100					0000 0000	
LINE AMP Maximum output voltage (PB)	2	OFF	2	OFF	1	1																					0000 0000	0000 0100					0000 0000	
PB attenuation level (-7dB)	2	OFF	2	OFF	1	1																					0000 0000	0000 0100					0000 0111	
LINE AMP Output noise voltage (PB)	2	OFF	2	OFF	2	1																					0000 0000	0000 0100					0000 0000	
PB Input conversion noise voltage	2	OFF	3	OFF	3	1																					0000 0000	0000 0100					0000 0000	
EQ AMP open loop gain	2	OFF	1	ON	2	1																					0000 0000	0000 0100					0000 0000	

Head Amp MODE TABLE
PB

Parameter	SW Conditions																								Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
Voltage gain	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Difference of voltage gain 1	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Difference of voltage gain 2	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Difference of gein between mode	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Frequency character	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Secondary harmonic distortion	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Maximum output level	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Cross talk SP-L CH1	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Cross talk SP-H CH2	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Cross talk EP-L CH3	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Cross talk EP-H CH4	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Equivalent input noise voltage	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Output DC offset	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Envelope detection output terminal voltage	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Envelope detection output terminal voltage SP1	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Envelope detection output terminal voltage SP2	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Envelope detection output terminal voltage EP1	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Envelope detection output terminal voltage EP2	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 1100
Comparator output voltage 1	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0100	0000 0000	0000 1100
Comparator output voltage 2	1	ON	3	1	OFF	2	ON	OFF	1	1	ON	1	2	ON	ON	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	1	0000 0000	0000 0101	0000 0101	0000 0000	0110 0100	0100 0100	0000 0000	0000 1100

REC

Parameter	SW Conditions																								Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
Rec AGC Amp output current	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Difference of gain between modes	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Rec AGC Amp control characteristics1	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Rec AGC Amp control characteristics2	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Rec AGC Amp Frequency characteristics	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Rec AGC Amp attenuate volume of mute	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Rec AGC Amp second harmonic distortion	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
Rec AGC Amp maximum output level	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
REC AGC AMP Mixed modulation relrative level	1	ON	3	1	ON	2	ON	OFF	1	1	ON	1	2	OFF	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0010	0000 0101	0000 0000	0110 0100	0100 0001	0000 0000	0000 0000
RF thresyold level																																	
C-ROT thresyold level																																	
A-MUTE thresyold level																																	
HA thresyold level																																	

REC/PB PAL/SEC

Parameter	SW Conditions																									Serial Conditions							
	5	6	9	14	21	22	23	25	28	32	46	68	74	78	79	81	87A	87B	90A	90B	93A	93B	96A	96B	99	Gr.1	Gr.2	Gr.3	Gr.4	Gr.5	Gr.6	Gr.7	Gr.8
PAL discrimination minimum input level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0010 0111	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Discrimination small adjustment center value	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0010 0111	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
SECAM discrimination minimum input level	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
PAL discrimination burst position	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0010 0111	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
SECAM discrimination burst position	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Comparator threshold voltage when SECAM→PAL	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000
Comparator threshold voltage when PAL→SECAM	2	OFF	3	1	OFF	2	ON	OFF	1	1	ON	1	1	ON	ON	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	1	0000 0000	0000 0000	0000 0101	0000 0000	0110 0100	0100 0000	0000 0000	0000 0000

Sample Application