

VHS SYSTEM VCR COLOR SIGNAL PROCESSING

DESCRIPTION

The M52366FP is a semiconductor integrated circuit equipped with all facilities for NTSC VHS method color signal recording/playback processing. It consists of a playback logical comb filter and a chroma noise reduction (CNR) circuit as well as a VHS method color signal processor.

FEATURES

- All facilities required for higher picture quality of NTSC VHS method are incorporated into a 1chip.
- Built-in logical comb filter allows dot interference-free playback output.
- Built-in CNR facility improves color noise (with EDIT facility).
- CNR non-correlative input circuit prevents color shading.
- Chroma ACC facility increases a recording level to improve a S/N ratio when recording a chroma signal with low saturation.
- Built-in REC BPF and REC LPF reduces the number of external circuits (automatic adjustment).
- Double VCO method direct conversion system reduces 4.2M BPF.
- Use of ACC for each field reduces AM noise.

APPLICATION

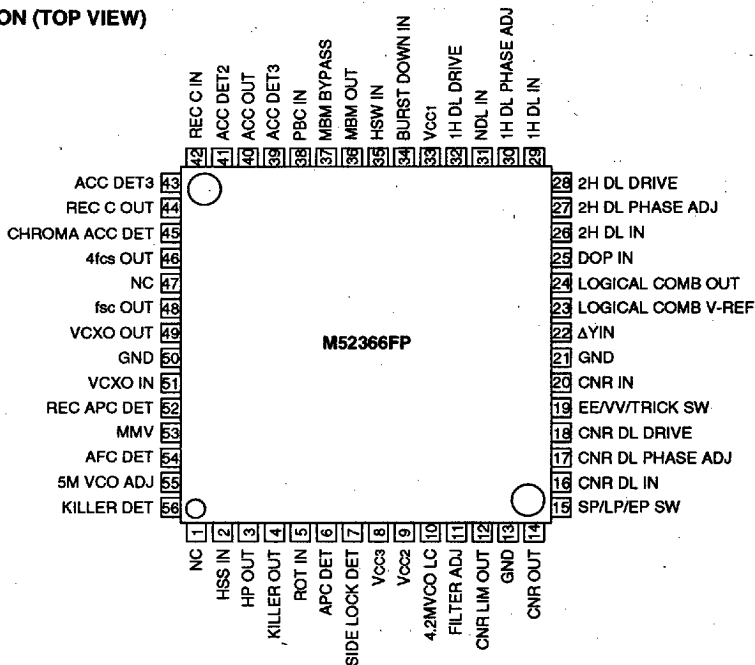
S-VHS VCR

RECOMMENDED OPERATING CONDITION

Supply voltage range 4.5~5.5V

Rated supply voltage 5.0V

PIN CONFIGURATION (TOP VIEW)



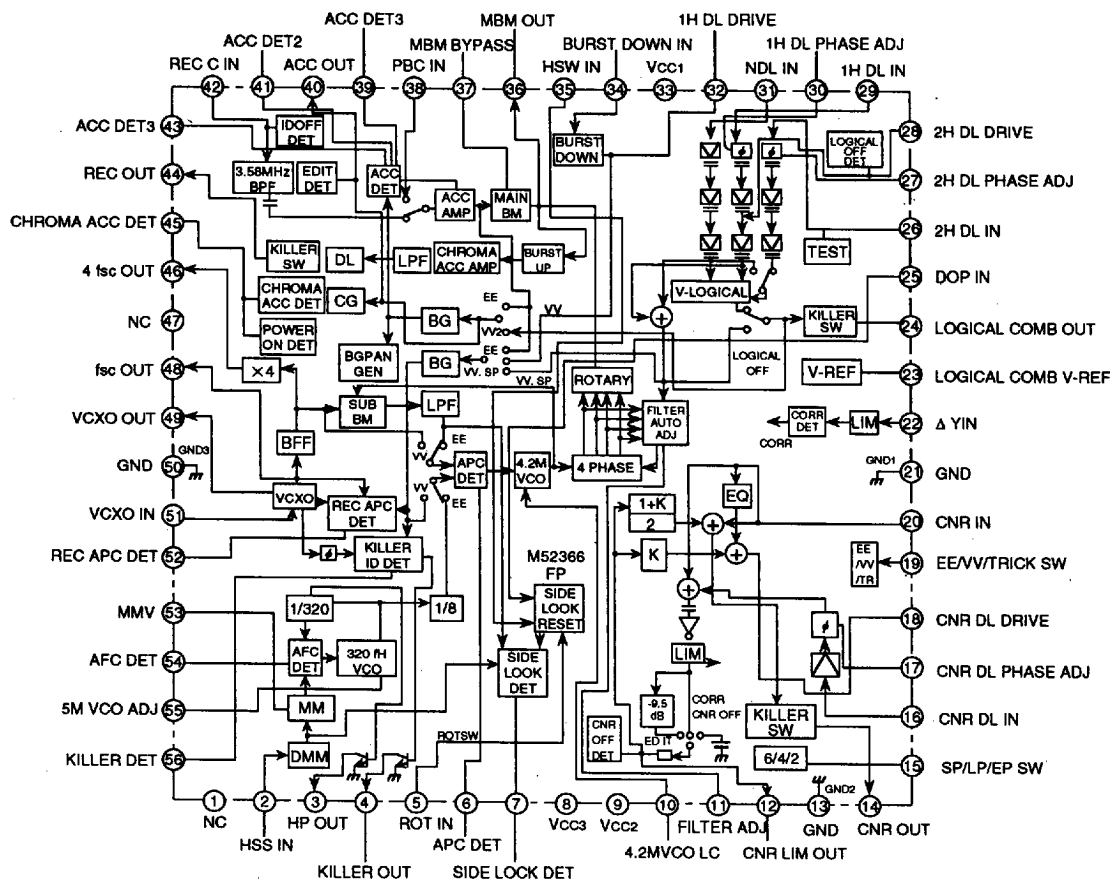
Outline 56P6N-A

NC: NO CONNECTION

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BLOCK DIAGRAM



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VHS SYSTEM VCR COLOR SIGNAL PROCESSING

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

Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	6	V
Pd	Power dissipation	0.82	W
Topr	Operating temperature	-20~+75	°C
Tstg	Storage temperature	-40~+125	°C
Ke	Thermal derating (Ta≥25°C)	8.2	mW/°C

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions				Limits			Unit	Remark
		Input	Test	SW (SW1) unless otherwise noted	Mode	Min.	Typ.	Max.		
ADvco	320 FHVC0 adjustment		TP4	SW2 ③	EE SP	—	15.73	—	kHz	Adjust VR55.
ADic1	LOGICAL COMB adjustment 1	31 3.58MHz 0.8Vp-p	TP24	SW32 ② SW26 ③	VV SP	—	—	—	—	Adjust VR29,30 so as to minimize 24 output.
ADic2	LOGICAL COMB adjustment 2	31 3.58MHz 0.8Vp-p	TP24	SW31 ② SW32 ②	VV SP	—	—	—	—	Adjust VR26,27 so as to minimize 24 output.
ADcnr	CNR adjustment	20 3.579545MHz 0.5Vp-p	TP12	SW20 ②	VV SP	—	—	—	—	Adjust VR16,17 so as to minimize 12 output.
Icc	Circuit current		A1		VV SP	64.0	80.0	96.0	mA	Measure current which flows into 8 9 33.
Gbpf	Band pass filter gain	42 3.58MHz sine wave0.5Vp-p			EE SP	-10	-6.0	-2.0	dB	Reference value
Fbpf	Band pass filter frequency characteristic	42 1MHz sine wave0.5Vp-p			EE SP	—	-30	-20	dB	Reference value
Gmbm	MAIN BM gain	37 629kHz sine wave0.5Vp-p	TP36	SW37 38 39 ②	VV SP	5.0	6.0	7.0	dB	I/O amplitude ratio. Apply same voltage as ACCON to V39.
CLmbm	MAIN BM carrier leak	37 629kHz sine wave0.5Vp-p	TP36	SW37 38 39 ②	VV SP	—	-45	-35	dB	Measure 4.21MHz component to 3.58MHz component.
SPmbm	MAIN BM spurious	37 629kHz sine wave0.5Vp-p	TP36	SW37 38 39 ②	VV SP	—	-45	-35	dB	Measure 2.96MHz component to 3.58MHz.
Gbd	BURSTDOWN gain	34 3.58MHz sine wave0.5Vp-p	TP32	SW34 ②	VV SP	6.0	8.0	10.0	dB	I/O amplitude ratio.
Gro	RECOUTAMP gain	37 3.58MHz sine wave0.5Vp-p	TP44	SW37 38 39 ②	EE SP	-6.0	-2.0	0.0	dB	I/O amplitude ratio.
GUlep	LP,EP gain increase	37 3.58MHz sine wave0.5Vp-p	TP44	SW37 38 39 ②	EE EP	1.0	1.5	2.0	dB	
Fipf	Low pass filter frequency characteristic	37 2.21MHz sine wave0.5Vp-p	TP44	SW37 38 39 ②	EE SP	1.0	-1.0	-3.0	dB	I/O amplitude ratio.
Fbef	Low pass filter fsc notch characteristic	37 629kHz sine wave0.5Vp-p	TP44	SW37 38 39 ②	EE SP	—	-35	-30	dB	I/O amplitude ratio.
Vracc	RECACC output amplitude	42 standard chroma input	TP40	SW42 ③	EE SP	0.4	0.5	0.6	Vp-p	Amplitude.
Cracc1	RECACC control range 1	42 standard chroma input(+6dB)	TP40	SW42 ③	EE SP	0.0	—	3.0	dB	Ratio to amplitude measured in test12.
Cracc2	RECACC control range 2	42 standard chroma input(-16dB)	TP40	SW42 ③	EE SP	-3.0	—	0.0	dB	Ratio to amplitude measured in test12.
Vpacc	PBACC output amplitude	38 low chroma input	TP40		VV SP	0.4	0.5	0.6	Vp-p	Amplitude.
Cpacc1	PBACC control range 1	38low chroma input(+6dB)	TP40		VV SP	0.0	—	3.0	dB	Ratio to amplitude measured in test15.
Cpacc2	PBACC control range 2	38low chroma input(-18dB)	TP40		VV SP	-3.0	—	0.0	dB	Ratio to amplitude measured in test15.
DGbu	BURST increase	37 3.58MHz sine wave0.5Vp-p	TP36	SW37 38 39 ②	EE SP	5.0	6.0	7.0	dB	Gain ratio of chroma to burst.
DGbd	BURST decrease	34 3.58MHz sine wave0.2V	TP32	SW34 ②	VV SP	-6.5	-5.5	-4.5	dB	Gain ratio of chroma to burst.

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions				Limits			Unit	Remark
		Input	Test	SW (SW1 unless otherwise noted)	Mode	Min.	Typ.	Max.		
Glc1	LOGICAL COMB gain	32 3.579545MHz sine wave0.8Vp-P	TP24	SW32 ②	VV SP	-2.0	0.0	2.0	dB	I/O amplitude ratio.
Nlc1	LOGICAL COMB comb depth	32 3.571678MHz sine wave0.8Vp-P	TP24	SW32 ②	VV SP	—	-50	-30	dB	Ratio to amplitude measured in test20.
Glc2	LOGICAL COMB simple comb gain	32 3.579545MHz sine wave0.8Vp-P	TP24	SW32 ②	VV SP	-2.0	0.0	2.0	dB	I/O amplitude ratio.
Nlc2	LOGICAL COMB simple comb depth	32 3.571678MHz sine wave0.8Vp-P	TP24	SW32 ②	VV SP	—	-50	-30	dB	Ratio to amplitude measured in test22.
Vlc2d	LOGICAL COMB 2DL DRIVE amplitude	32 3.579545MHz sine wave0.8Vp-P	TP28	SW32 ②	VV SP	0.5	0.8	1.1	Vp-P	Output amplitude.
Gcncr	CNR gain	20 3.579545MHz sine wave0.5Vp-P	TP14	SW20 ②	VV SP	2.0	4.0	8.0	dB	I/O amplitude ratio.
Ncncr1	CNR comb depth 1	20 3.571678MHz sine wave0.05Vp-P	TP14	SW20 ②	VV SP	—	-50	-30	dB	Ratio to amplitude measured in test25.
Ncncr2	CNR comb depth 2	20 3.571678MHz sinewave0.2Vp-P	TP14	SW20 ②	VV SP	-25	-20	-15	dB	Ratio to amplitude measured in test25.
Ncnre1	CNR (EDIT) comb depth 1	20 3.571678MHz sine wave0.05Vp-P	TP14	SW20 ②	VV SP	-25	-20	-15	dB	Ratio to amplitude measured in test25.
Ncnre2	CNR (EDIT) comb depth 2	20 3.587412MHz sine wave0.2Vp-P	TP14	SW20 ②	VV SP	-15	-10	-5	dB	Ratio to amplitude measured in test25.
Ncnrof	CNR (OFF) comb depth	20 3.571678MHz sine wave0.05Vp-P	TP14	SW20 ②	VV SP	-5.0	—	0.0	dB	Ratio to amplitude measured in test25.
Vlim	CNR limiter output amplitude	20 3.579545MHz sine wave0.5Vp-P	TP12	SW20 ②	VV SP	0.2	0.4	0.6	Vp-P	Output amplitude.
Vcnrd1	CNR DL DRIVE gain	20 3.579545MHz sine wave0.5Vp-P	TP28	SW20 ②	VV SP	2.0	4.0	6.0	dB	I/O amplitude ratio.
THkilp	PB killer threshold	38 lowchroma input,Inputvariable.	TP11	SW56 ②	VV SP	-22	-28	-34	dB	Obtain 38 input attenuation when TP11 changes from "L" to "H".
Hkilp	PB killer hysteresis	38 lowchroma input,Inputvariable.	TP11	SW56 ②	VV SP	1	2	3	dB	Obtain 38 input attenuation when TP11 changes from "H" to "L".
THkilr	REC killer threshold	42 lowchroma input,Inputvariable.	TP11	SW56 ② SW42 ③	EE SP	-22	-28	-34	dB	Obtain 42 input attenuation when TP11 changes from "L" to "H".
Hkilr	REC killer hysteresis	42 lowchroma input,Inputvariable.	TP11	SW56 ② SW42 ③	EE SP	1	2	3	dB	Obtain 42 input attenuation when TP11 changes from "H" to "L".
β_{vco1}	320fHVCO β	54 DCvariable	TP3	SW54 ②	VV SP	2.5	3.2	3.9	kHz/mV	Frequency variance when 54DC is varied.
Plafc1	AFC pull-in range1(top)	2Pulse/frequencyvariable 15.734kHz+1.2kHz	TP3	SW2 ②	VV SP	0.5	1.2	—	kHz	Frequency range in which 2 input is synchronized with 3 output by varying 2 input frequency.
Plafc2	AFC pull-in range1(bottom)	2Pulse/frequencyvariable 15.734kHz-1.2kHz	TP3	SW2 ②	VV SP	—	-1.2	-0.5	kHz	Frequency range in which 2 input is synchronized with 3 output by varying 2 input frequency.
Vvxo	VCXO output level		TP48		VV SP	0.3	0.5	0.7	Vp-P	Obtain 48 output amplitude.
DFvxo	VCXO free run frequency difference		TP48	SW42 ③	EE EP	-100	0	100	Hz	Frequency difference from test 40 condition at no input of 42
β_{vxo}	VCXO β	52 DCvariable	TP48	SW52 ②	EE SP	8.2	10.3	12.4	Hz/mV	48 frequency variance when 52 DC is varied.
V4fsc	4fSC output level		TP46		VV SP	0.2	0.6	1.0	Vp-P	46 output amplitude
μ_{rapc}	RECAPC μ	42 (0.2Vp-P)(0.5Vp-P) 3.58MHz/phasevariable	TP48	SW42 ④ SW51 ③	EE SP	19.0	25.0	31.0	mV/deg	48 DC variance when 42, 51 input phase is varied.
Prapc1	RECAPC pull-in range 1	42 (0.2Vp-P) Frequency variable 3.57954MHz+1kHz	TP48	SW2 ②	EE SP	0.5	1.0	—	kHz	Frequency range in which 42 input is syn- chronized with 48 output by varying 42 input frequency.
Prapc2	RECAPC pull-in range 2	42 (0.2Vp-P) Frequencyvariable	TP48	SW2 ④	EE SP	—	-1.0	-0.5	kHz	Frequency range in which 42 input is syn- chronized with 48 output by varying 42 input frequency.
β_{vco2}	4.2MVCO β	6 DCvariableVP-P	TP36	SW6 ②	VV SP	370	500	630	Hz/mV	52 frequency variance when 6DC is varied.

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions				Limits			Unit	Remark
		Input	Test	SW (SW1 unless otherwise noted)	Mode	Min.	Typ.	Max.		
μ_{apc1}	APC PB μ 1	34 3.58MHz, 0.1VP-P 51 3.57MHz, 0.5VP-P	TP36	SW34 ② SW51 ③	VV SP	0.15	0.20	0.25	VP-P	6 output amplitude when 34.51 input frequency difference is 1KHz.
μ_{apc2}	APC PB μ 2	31 3.58MHz, 0.1VP-P 51 3.57MHz, 0.5VP-P	TP36	SW32 ② SW51 ③	VV EP	0.07	0.10	0.13	VP-P	6 output amplitude when 31.51 input frequency difference is 1KHz.
μ_{apcr}	APC REC μ	51 630KHz, 0.5VP-P 630KHz+2KHz	TP36	SW10 51 ③	EE SP	0.07	0.10	0.13	VP-P	6 output amplitude when 51 input frequency is 630KHz.
Plapcr	APC REC pull-in range	51 0.5VP-P Frequency variable	TP36	SW42 ③	EE SP	1.0	2.0	—	KHz	Frequency range in which 51 input is synchronized with 36 output by varying 51 input frequency.
T _{hp}	HP pulse timing		TP3		VV SP	-3.0	0.0	3.0	μ s	Time from input SYNC to beginning of HP pulse.
W _{hp}	HP pulse width		TP3		VV SP	3.7	4.0	4.3	μ s	HP pulse width.
W _{mmv}	MMV pulse width		TP54		VV SP	3.0	4.0	5.0	μ s	AFC pulse width. 
Idmmv	MMV inhibit during DOP	35 DC 0V	TP53		VV SP	—	0.0	0.0	KHz	MMV pulse frequency (check that no output is sent).
FD _{sid1}	SIDE LOCK DET blind sector 1	55 1VP-P Frequency variable 5.03MHz $\pm$ 1KHz	TP7	SW55 7 ②	VV SP	-1.0	—	1.0	KHz	Frequency when 7 output is not sent by varying 55 input frequency.
FD _{sid2}	SIDE LOCK DET blind sector 2	55 1VP-P Frequency variable 5.03MHz $\pm$ 20KHz	TP7	SW55 7 ②	VV SP	—	600	620	KHz	Frequency when 7 output is not sent by varying 55 input frequency.
FD _{sid3}	SIDE LOCK DET blind sector 3	55 1VP-P Frequency variable 5.03MHz $\pm$ 20KHz	TP7	SW55 7 ②	VV SP	-620	-600	—	KHz	Frequency when 7 output is not sent by varying 55 input frequency.
Idopsid	SLIDE LOCK inhibit during DOP	55 1VP-P 5.2MHz 25 0VDC applied	TP7	SW55 7 ②	VV SP	—	0.0	0.0	KHz	Check that 7 output is not sent.
T _{bgp1}	BGP1 timing	37 3.58MHz 0.5VP-P Sine wave	TP32	SW34 ②	VV SP	3.1	3.6	4.1	μ s	Time from input SYNC to beginning of burst increase.
W _{bgp1}	BGP1 width	37 3.58MHz 0.5VP-P Sine wave	TP32	SW34 ②	VV SP	3.5	4.0	4.5	μ s	Width of burst increase period.
T _{bgp2}	BGP2 timing	34 3.58MHz 0.5VP-P Sine wave	TP38	SW37 38 39 ②	EE SP	2.8	3.3	3.8	μ s	Time from input SYNC to beginning of burst increase.
W _{bgp2}	BGP2 width	34 3.58MHz 0.5VP-P Sine wave	TP38	SW37 38 39 ②	EE SP	3.5	4.0	4.5	μ s	Width of burst increase period.
TH _{ev1}	EE/VV/TRICK threshold 1	19 DC variable	TP6		— SP	0.8	1.3	1.8	V	Voltage at which BGPAN goes to BGPON.
TH _{ev2}	EE/VV/TRICK threshold 2	19 DC variable	TP44		— SP	3.1	3.6	4.1	V	REC output voltage.
TH _{slp1}	SP/LP/EP threshold 1	15 DC variable	TP44		VV —	0.8	1.3	1.8	V	Voltage at which burst increase changes from ON to OFF.
TH _{slp2}	SP/LP/EP threshold 2	15 DC variable	TP44		VV —	3.1	3.6	4.1	V	Voltage at which burst increase changes from OFF to ON.
TH _{dop}	DOP threshold	35 DC variable 55 1VP-P 5.02MHz	TP7	SW55 7 ②	VV SP	2.0	2.5	3.0	V	Voltage at which SIDE LOCK DET is not sent.
TH _{cnot}	CNR OFF threshold	40 DC variable	TP14	SW40 ②	VV SP	3.5	4.0	4.3	V	Voltage at which CNR changes from ON to OFF.
TH _{edit}	CNR EDIT threshold	12 DC variable	TP12	SW12 ②	VV SP	3.5	4.0	4.3	V	Voltage at which CNR/ON changes to EDIT mode.
TH _{lct1}	LOGICAL TEST1 threshold	26 DC variable 31 3.58MHz 0.8VP-P	TP24	SW26 ④ SW32 ②	VV SP	0.5	1.0	1.5	V	Voltage at which LOGICAL COMB changes to TEST mode.
TH _{lcof}	LOGICAL OFF threshold	28 DC variable 31 3.58MHz 0.8VP-P	TP24	SW28 ② SW32 ②	VV SP	3.5	4.0	4.3	V	Voltage at which LOGICAL COMB changes to simple COMB.
V _{dsw}	Non-correlation SW input sensitivity	22 20KHz Input variable 20 3.58MHz 0.5VP-P	TP12	SW22 ② SW20 ②	VV SP	30.0	50.0	70.0	mVP-P	22 input amplitude when LIMOUT output is not sent.
F _{dsw}	Non-correlation SW frequency characteristic	22 200KHz Input variable 20 3.58MHz 0.5VP-P	TP12	SW22 ② SW20 ②	VV SP	40.0	70.0	100	mVP-P	22 input amplitude when LIMOUT output is not sent.

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions				Limits			Unit	Remark
		Input	Test	SW (SW① unless otherwise noted)	Mode	Min.	Typ.	Max.		
TH _{has}	HSS input threshold	2 pulse input	TP53	SW2 ②	VV SP	2.0	2.5	3.0	V	2 input pulse DC level at MMV output.
TH _{rot}	ROTSW threshold	5 DC variable	TP36	SW5 ② SW37 ③	VV SP	2.0	2.5	3.0	V	5 voltage when 354.2M output phase changes from advance to lag.
V _{hph}	HP "H" voltage		TP3		VV SP	4.5	5.0	—	V	
V _{hpl}	HP "L" voltage		TP3		VV SP	—	0.0	0.3	V	
V _{kilh}	KILER "H" voltage		TP4	SW56 ③	VV SP	4.5	5.0	—	V	
V _{kil1}	KILER "L" voltage		TP4		VV SP	—	0.0	0.3	V	
f _{cnr}	CNR frequency characteristic	20 20MHz, 0.5V _{P-P}	TP14	SW20 ②	VV SP	−4.0	−1.0	2.0	dB	I/O amplitude ratio.
D _{cnr}	CNR second distortion	20 20MHz, 0.5V _{P-P}	TP14	SW20 ②	VV SP	—	−35	−30	dB	Level ratio of 3.58MHz to 7.16MHz
D _{log}	LOGICAL COMB second distortion	20 20MHz, 0.8V _{P-P}	TP14	SW32 ②	VV SP	—	−35	−30	dB	Level ratio of 3.58MHz to 7.16MHz

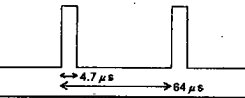
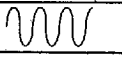
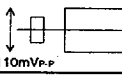
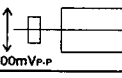
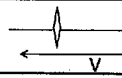
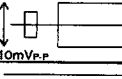
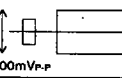
Note) Mode switching should be as follows: Pin 19 voltage (V19) EE = Vcc W = 1/2Vcc TRICK = GND Pin 15 voltage (V15)SP = GND EP = 1/2 Vcc LP = Vcc.

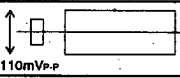
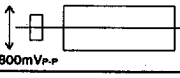
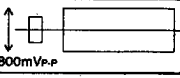
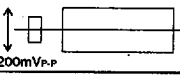
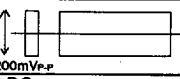
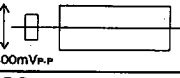
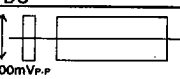
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VHS SYSTEM VCR COLOR SIGNAL PROCESSING

INPUT SIGNALS

No.	Pin name	DC voltage	Waveform
②	HSS IN (Input)		
⑤	ROT IN (Input)		
⑧	Vcc3	Vcc=5V	
⑨	Vcc2	Vcc=5V	
⑩	4.2MVCO LC	DC 5V	
⑪	FILTER ADJ	DC3.5V	REC, P.B.
⑬	GND	0V	
⑮	EP/LP/SP SW (Input)	EP 5.0V LP 2.5V SP 0V	
⑯	CNR DL IN (Input)	P.B 3.8V REC 3.4V	
⑰	CNR DL PHASE ADJ	P.B 2.0V REC 2.2V	DC
⑲	EE/VV/TRICK SW (Input)	EP 5.0V VV 2.5V TRICK 0V	
⑳	CNR IN (Input)	P.B 3.8V REC 3.4V	
㉑	ΔYIN (Input)	P.B 4.0V REC 4.2V	
㉒	LOGICAL COMB V-REF	P.B 3.5V REC 3.0V	DC
㉔	DOP IN (Input)	DOP "L"	
㉖	2HDL IN (Input)	P.B 3.5V REC 3.0V	
㉗	2HDL PHASE ADJ	P.B 2.0V REC 2.2V	DC
㉘	2HDL DRIVE	P.B 2.6V REC 3.9V	

No.	Pin name	DC voltage	Waveform
㉚	1H DL IN	P.B 3.5V REC 3.0V	
㉛	1H DL PHASE ADJ	P.B 2.0V REC 2.2V	DC
㉜	NDL IN	P.B 3.5V REC 3.0V	
㉝	1H DL DRIVE	P.B 3.5V REC 3.5V	
㉞	Vcc1	Vcc=5V	
㉟	BURST DOWN IN	P.B 3.8V REC 3.8V	
㊱	HSW(30Hz) IN (Input)		
㊲	MBM BYPASS	P.B 2.8V REC 2.8V	DC
㊳	P.B C IN (Input)	P.B 3.5V REC 3.5V	
㊴	ACC DET3	3.8V	DC
㊵	ACC DET2	3.8V	DC
㊶	REC C IN (Input)	P.B 3.0V REC 3.0V	
㊷	ACC DET1	3.8V	DC
㊸	REC C OUT (Output)	P.B 2.3V REC 2.3V	
㊹	CHROMA ACC DET	3.3V	DC
㊺	VCxo IN	DC3.5V	
㊻	5MVCO ADJ	DC 3.3V	DC
㊼	KILLER DET	DC3.3V	DC

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THERMAL DERATING

[illegible]

Units Resistance: Ω
Capacitance: F

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