M52063SP

NTSC/QUASI PAL TRANSCODER

DESCRIPTION

The M52063SP converts NTSC signals into quasi PAL signals efficiently. It has a horizontal AFC, burst gate pulse generator, gain variable amplifier and analog switch.
With a VCR having this circuit, images recorded on NTSC soft tape can be viewed with a PAL TV set with NTSC color signals being converted into quasi PAL signals.

FEATURES

- Conversion needs only a small number of external circuits.
- Conversion is carried out in steps: –45° burst signals, chroma signals, +45° burst signals and blanking.
- Quasi PAL signals are stable because change-over signals are generated by the horizontal AFC.
- When a PAL soft tape is set, a through mode is output being amplified by 6 dB.
- Burst gate pulse position and width can be set with external constants. The burst gate pulse can be output.
- It is only AFC free run frequency that needs adjustment.

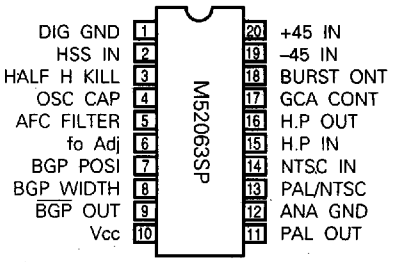
APPLICATION

VCR

RECOMMENDED OPERATING CONDITION

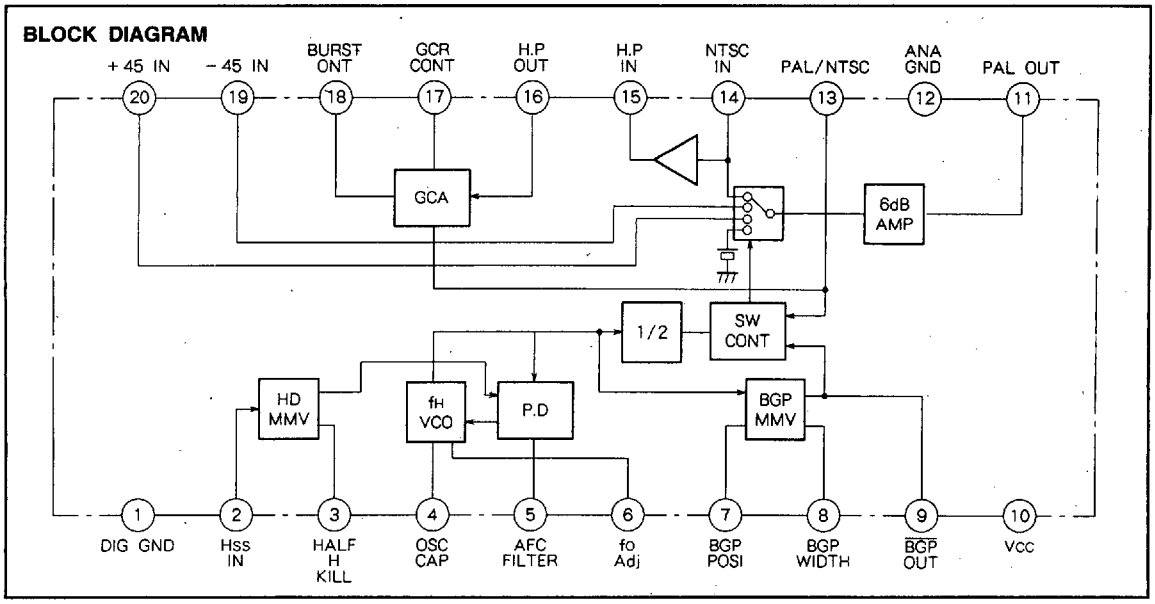
Supply voltage range ..... 4.5~5.5V
Rated supply voltage 5.0V

PIN CONFIGURATION (TOP VIEW)



Outline 20P4B

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V_{CC}	Supply voltage	6	V
P_d	Power dissipation	1000	mW
K_θ	Thermal derating	10	mW/℃
V_{surg}	Electrostatic discharge	± 200V minimum	V
T_{opr}	Operating temperature	− 20~75	℃
T_{stg}	Storage temperature	− 40~125	℃

ELECTRICAL CHARACTERISTICS (S10 = ON, S15 = S17 = OFF S35 = 1, V13 = 0V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Icc	Circuit current	No input S10 = OFF. Measure current flowing to pin ⑩.	15	20	25	mA
G_{14-11}	Through mode gain	Input SG1 to pin ⑭, V13 = 5V. Measure V_{P-P} of pin ⑪ to take the ratio with input. $G(14-11) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$	4.5	5.5	6.5	dB
B_{19-11}	− 45° gain	Input SG1 to pin ⑲. Measure V_{P-P} of pin ⑪ to take the ratio with input. $G(19-11) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$	4.0	5.0	6.0	dB
G_{20-11}	+ 45° gain	Input SG1 to pin ⑳. Measure V_{P-P} of pin ⑪ to take the ratio with input. $G(20-11) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$	4.0	5.0	6.0	dB
△G45°	+ 45° − 45° gain difference	$\lvert G(19-11) - G(20-11) \rvert$		0.0	0.5	dB
G_{14-15}	H.P DRIVE gain	Input SG1 to pin ⑭. Measure V_{P-P} of pin ⑮ to take the ratio with input. $G(14-15) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$	− 0.9	− 0.2	0.5	dB
V_{COsw}	VCO mode switchover	Input SG2 to pin ② S15=ON. Turn V15 down from 5V, and measure V15 when the frequency of pin ⑦ waveform becomes equal to SG2.	3.2	3.5	3.8	V
$G_{16-18max}$	GCA MAX gain	Input SG3 to pin ⑯, S17 = ON, V17 = 5V. Measure V_{P-P} of pin ⑱ to take the rario with input. $20\ LOG \frac{\text{Output level}}{\text{Input level}}$	6.0	7.0	8.0	dB
$G_{16-18open}$	GCA OPEN gain	Input SG3 to pin ⑯, S17 = OFF. Measure V_{P-P} of pin ⑱ to take the ratio with input. $20\ LOG \frac{\text{Output level}}{\text{Input level}}$	2.9	4.4	5.9	dB
$G_{16-18min}$	GCA MIN gain	Input SG3 to pin ⑯, S17 = ON, V17 = 0V. Measure V_{P-P} of pin ⑱ to take the ratio with input. $20\ LOG \frac{\text{Output level}}{\text{Input level}}$	− 6.5	− 5.0	− 3.5	dB
PAL1	Quasi PAL 1	Input SG4 − 1 to pins ⑭ and ⑲, and input SG4 − 2 to pin ②. Output waveform of pin ⑪ should be normal. (Note 1)				−
PAL2	Quasi PAL 2	Input SG4 − 1 to pins ⑭ and ⑳, and input SG4 − 2 to pin ②. Output waveform of pin ⑪ should be normal. (Note 2)				−
TH	GCA OFF in through	Input SG1 to pin ⑯, S13 = 5V. Ensure that the signal is not output to pin ⑱.				−
R_T	Discharge reset time	Input SG2 to pin ②. Measure discharge reset time of pin ③. (Note 2)	40	45	50	μs
HHK	Half H killer	Input SG5 to pin ②, S5=2. Increase the frequency of SG5 and measure the maximum frequency when the waveform frequency of pin ⑤ becomes equal to SG5. (HHK=1/f)	40	45	50	μs

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
H.DP	H.D POSI	Input SG2 to pin ②, S5 = 2. Measure the time difference between f_H rise time and pin ⑤ waveform fall time. (Note 2)	0	0.2	0.5	µs
HDW	H.D WIDTH	Input SG2 to pin ②, S5 = 2. Measure the pulse width of pin ⑤ waveform. (Note 2)	3.9	4.4	4.9	µs
HSSH	Input synchronous detection peak value	Input SG6 to pin ②. Increase the pulse height of SG6 and measure the pulse height when the frequency of pin ⑦ wave-form becomes equal to SG6.	3.6		5.0	V
β	VCO β	No input, S5 = 3, S15 = ON, V15 = 5V. Change V5 to from 3V to 4V and measure the output frequency change of pin ⑦. The maximum ramp is expressed by character β.	6	9	12	Hz/mV
CLW	Capture range width	Input SG2 to pin ②. Increase or decrease the frequency from a distance and measure the frequency when the waveform of pin ⑤ is locked. (Note 2)	2.0	2.6		kHz
RLW	Lock range width	Input SG2 to pin ②. Increase and decrease the frequency, and measure it when the waveform of pin ⑤ comes out of the locked state. (Note 2)	3.0	3.7		kHz
P/N	Quasi PAL/normal switchover voltage	Input SG4 – 1 to pin ⑭. Input SG4 – 2 to pin ②, turn V13 down from 5V and measure the voltage when the chroma of pin ⑪ goes off at every 1H.	1.9	2.2	2.5	V
B_{GPP}	BGP POSI	Input SG2 to pin ②. Measure the difference between f_H rise time and pin ⑨ waveform fall time. (Note 2)	2.2	2.8	3.4	µs
B_{GPW}	BGP WIDTH	Input SG2 to pin ②. Measure the pulse width of pin ⑨ waveform. (Note 2)	6.2	6.8	7.4	µs
B_{GPH}	BGP OUT HI voltage	Input SG2 to pin ②. Measure HI voltage of pin ⑨ output waveform. (Note 2)	3.6	4.0		V
B_{GPL}	BGP OUT LO voltage	Input SG2 to pin ②. Measure LO voltage of pin ⑨ output waveform. (Note 2)		0	0.5	V
V_{CCR}	Operating supply voltage range	Standard application circuit operation should be normal. (V_{CC} voltage)	4.5	5.0	5.5	V
H_{SST}	Input synchronous detection rise time	Input SG7 to pin ②. Lengthen rise time gradually and measure the rise time (HSST) just before the charge and discharge waveform of pin ③ disappears. (Note 2)			1.5	µs

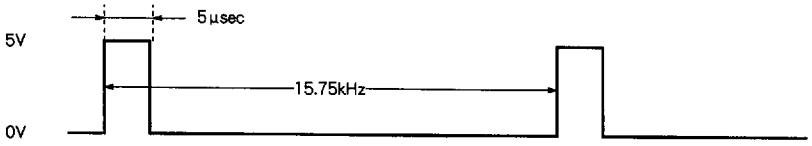
INPUT SIGNAL

SG NO.		Signals (50Ω termination)
SG1		f = 4.43MHz 0.25VP-P CW
SG2		f = 15.75kHz Pulse
SG3		f = 4.43MHz 50mVP-P CW
SG4	1	f = 4.43MHz Chroma signal
	2	f = 15.75kHz Pulse
SG5		f = 15.75kHz Pulse (Frequency variable)
SG6		f = 15.75kHz Pulse (Peak value variable)

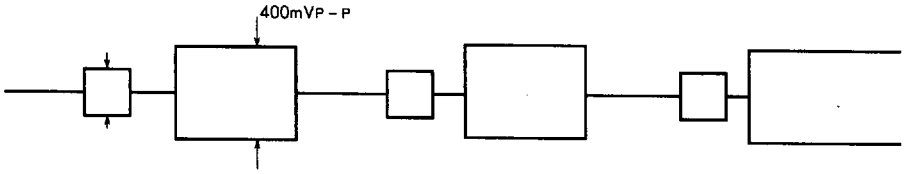
Note SG4 – 1 and SG4 – 2 should be synchronized.

SUPPLEMENT

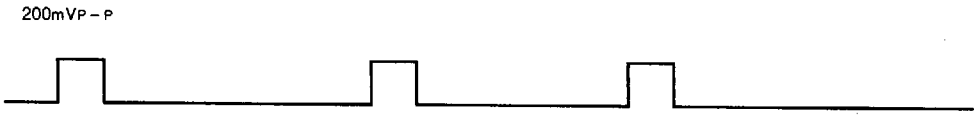
1. SG2



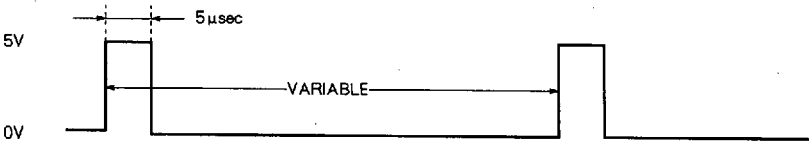
2. SG4 – 1



SG4 – 2



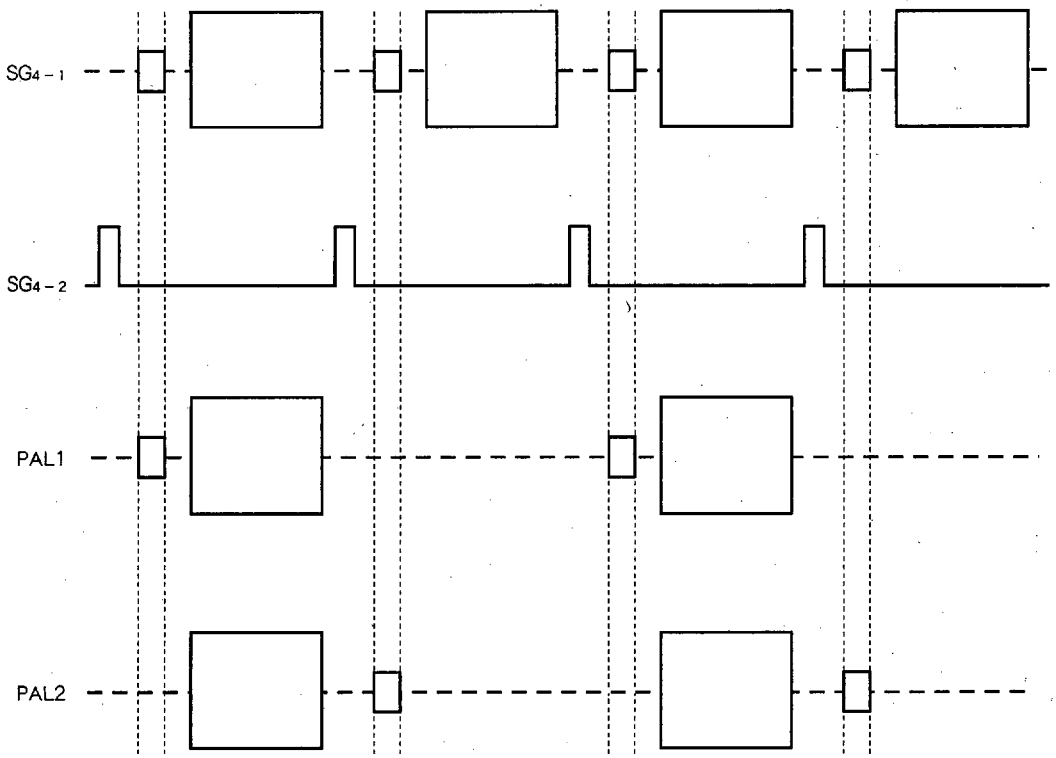
3. SG5



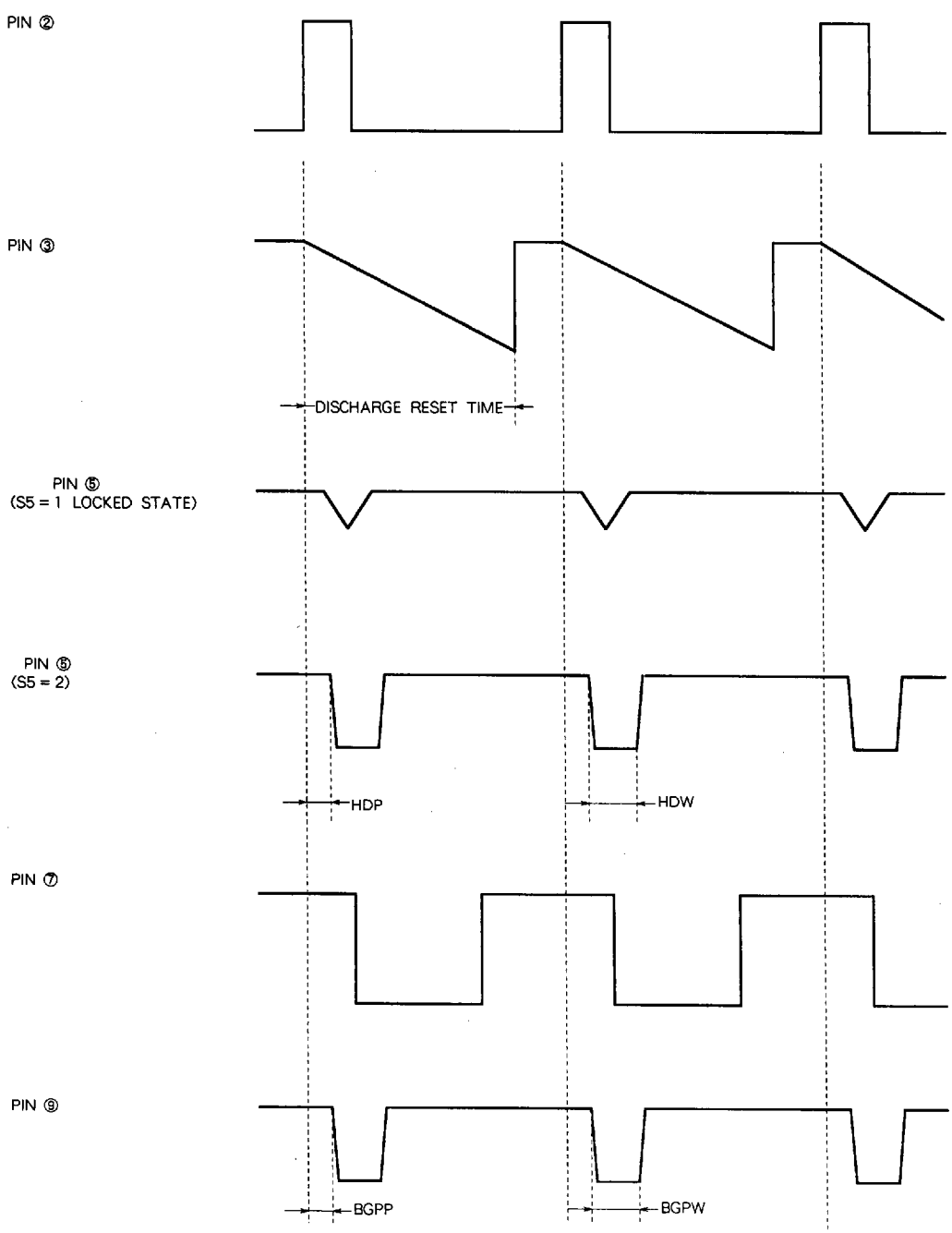
4. SG6

5. SG7

Note 1. QUASI PAL OPERATING WAVEFORM TIMING



Note 2. EACH WAVEFORM TIMING

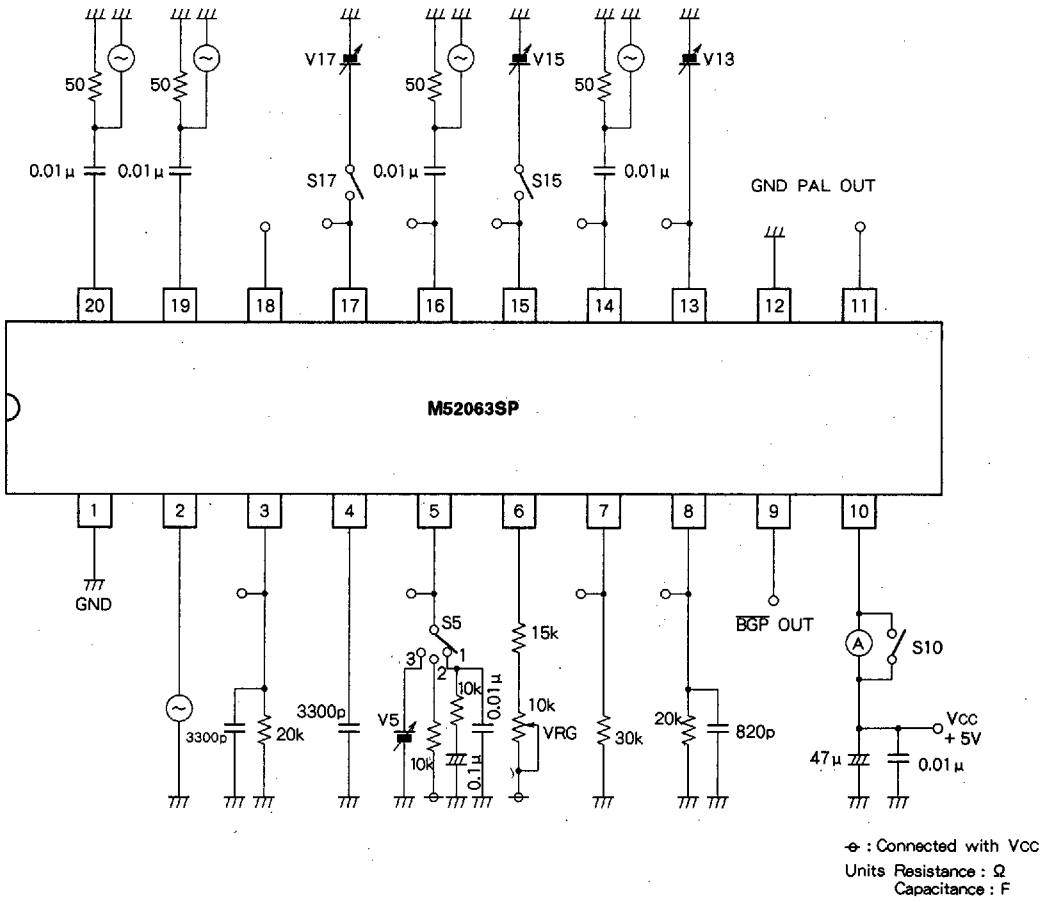


VR6 Adjusting Procedure Before Measurement

o Free run frequency adjustment

Input SG5 (f = 20kHz) to pin ② in the measuring circuit. Turn S15 ON and set V15 to 5V (free run mode). Adjust VR6 such that the frequency of pin ⑦ waveform becomes 15.625kHz.

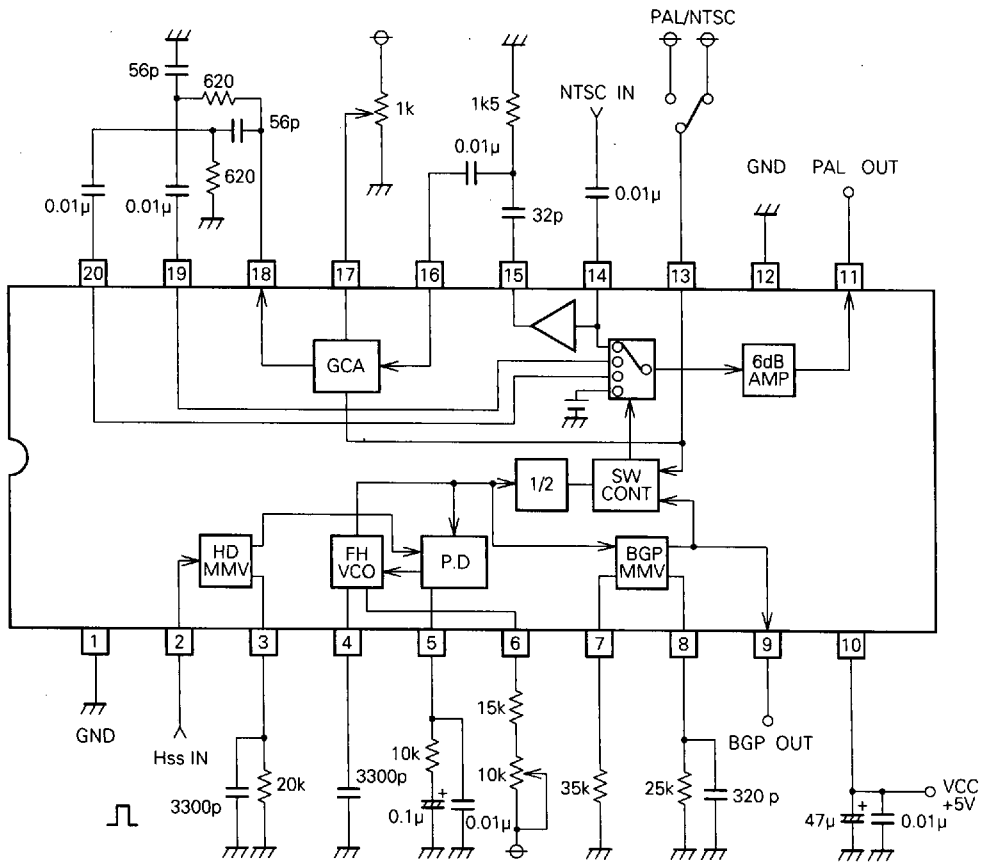
TEST CIRCUIT



⊖ : Connected with Vcc

Units Resistance : Ω
Capacitance : F

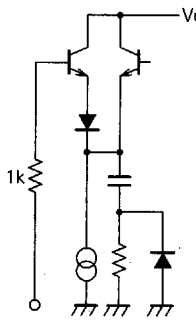
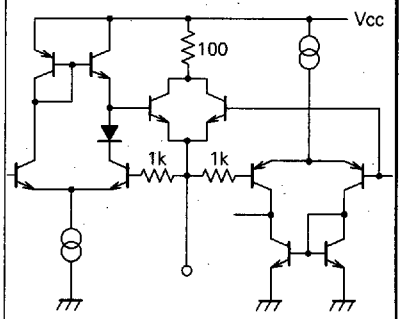
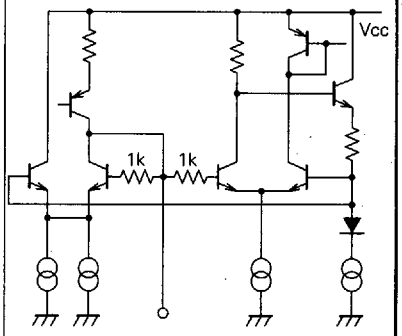
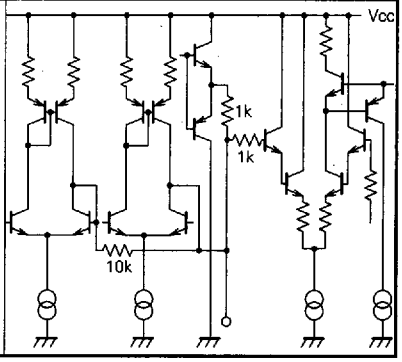
APPLICATION EXAMPLE



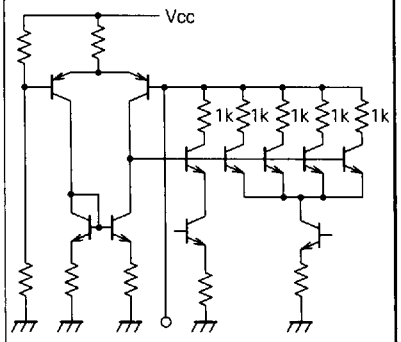
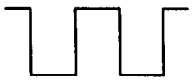
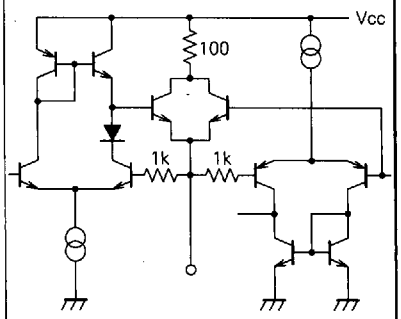
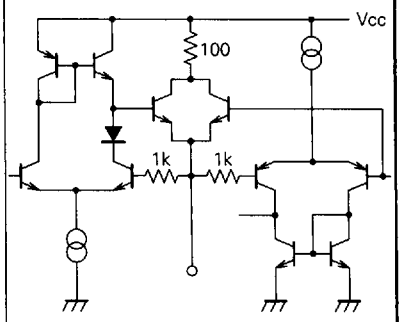
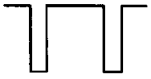
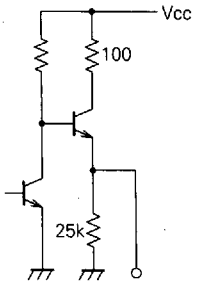
Units Resistance : Ω

Capacitance : F

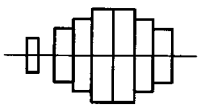
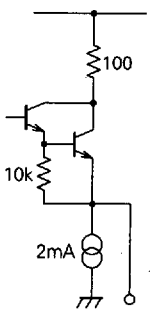
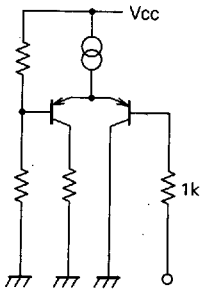
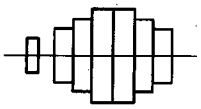
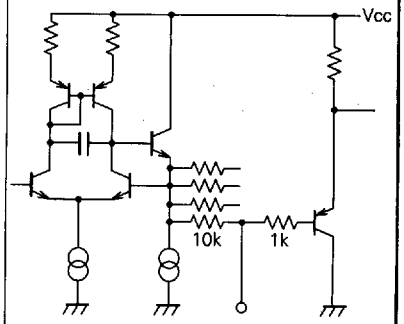
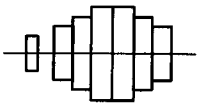
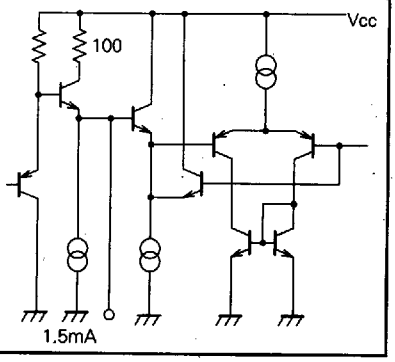
DESCRIPTION OF PIN

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
①	DIG GND	———	———
②	Hss IN	5.0VDC 0.0VDC	
③	HALF H KILL	about3.0VDC about1.5VDC (2 pin Hss input)	
④	OSC CAP	about3.5VDC about3.2VDC	
⑤	AFC FILTER	about3.0VDC (2 pin Hss input)	

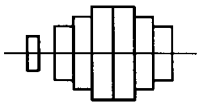
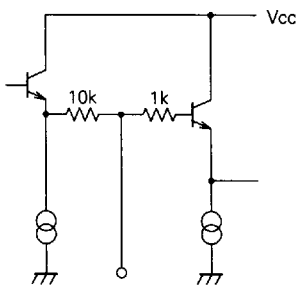
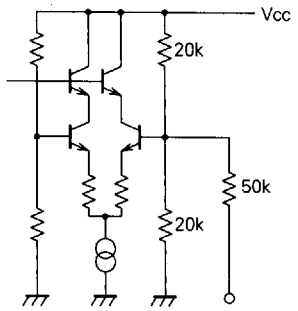
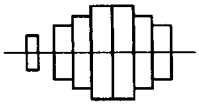
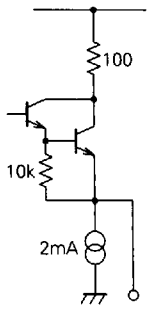
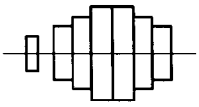
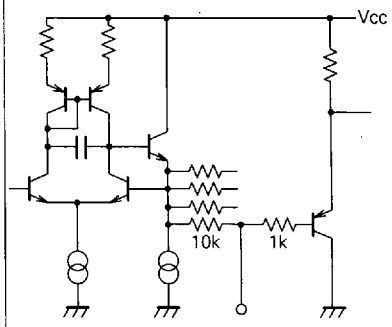
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑥	for Adj	about 3.0VDC	
⑦	BGP POSI	about 3.0VDC  about 1.5VDC	
⑧	BGP WIDTH	about 3.0VDC  about 2.0VDC	
⑨	BGP OUT	about 4.2VDC  about 0.0VDC	
⑩	Vcc	5.0VDC	—

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑪	PAL OUT	about 2.4VDC 	
⑫	ANA GND	——	——
⑬	PAL/NTSC	——	
⑭	NTSC IN	about 2.3VDC 	
⑮	H.P IN	about 2.3VDC 	

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑯	H.P OUT	about 2.9VDC 	
⑰	GCA CONT	about 2.5VDC	
⑱	Burst OUT	about 2.5VDC 	
⑲	− 45 IN	about 2.3VDC 	

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑳	+ 45 IN	about 2.3VDC