

# 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

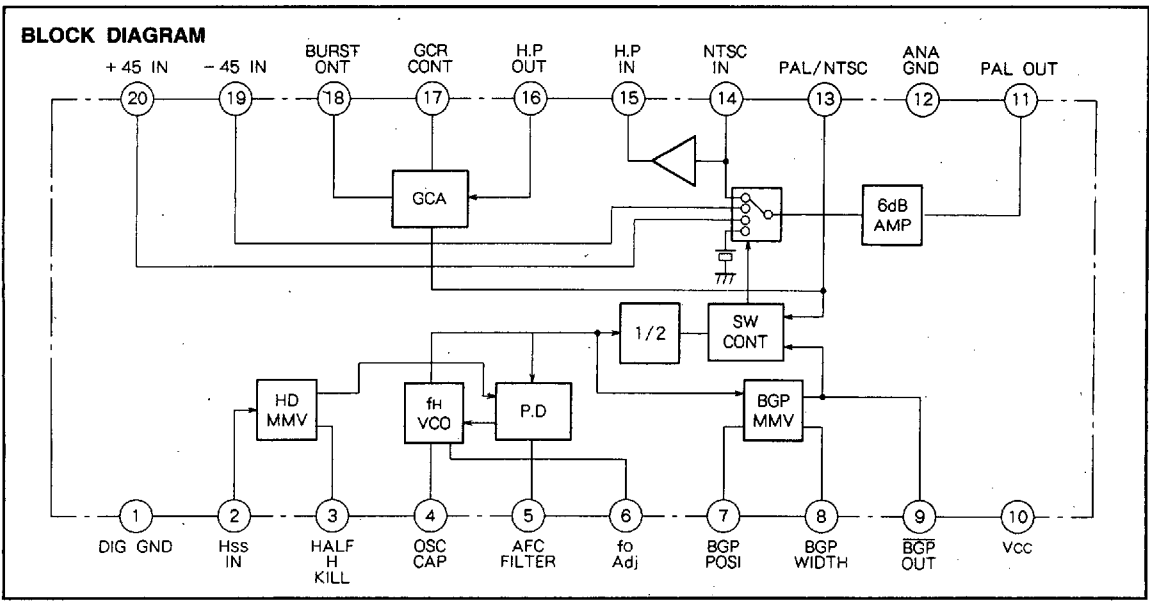
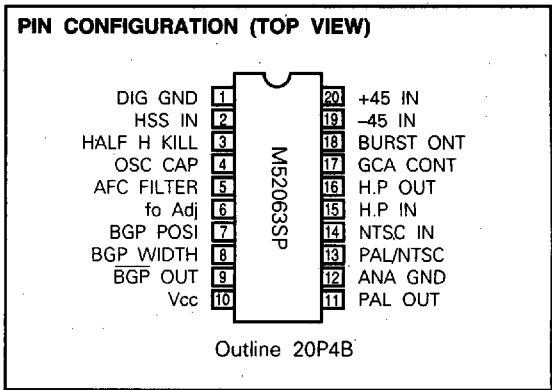
- Conversion needs only a small number of external circuits.
- Conversion is carried out in steps:  $-45^\circ$  burst signals, chroma signals,  $+45^\circ$  burst signals and blanking.
- Quasi PAL signals are stable because change-over signals are generated by the horizontal AFC.
- When a PAL soft tape 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



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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V <sub>cc</sub>	Supply voltage	6	V
P <sub>d</sub>	Power dissipation	1000	mW
K <sub>e</sub>	Thermal derating	10	mW/°C
V <sub>surg</sub>	Electrostatic discharge	± 200V minimum	V
T <sub>opr</sub>	Operating temperature	- 20~75	°C
T <sub>stg</sub>	Storage temperature	- 40~125	°C

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>cc</sub>	Circuit current	No input S10 = OFF. Measure current flowing to pin ⑩.	15	20	25	mA
G <sub>14-11</sub>	Through mode gain	Input SG1 to pin ⑩, V13 = 5V. Measure V <sub>P-P</sub> of pin ⑪ to take the ratio with input. $G(14 - 11) = 20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	4.5	5.5	6.5	dB
B <sub>19-11</sub>	- 45° gain	Input SG1 to pin ⑩. Measure V <sub>P-P</sub> of pin ⑪ to take the ratio with input. $G(19 - 11) = 20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	4.0	5.0	6.0	dB
G <sub>20-11</sub>	+ 45° gain	Input SG1 to pin ⑩. Measure V <sub>P-P</sub> of pin ⑪ to take the ratio with input. $G(20 - 11) = 20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	4.0	5.0	6.0	dB
ΔG <sub>45°</sub>	+ 45° - 45° gain difference	G(19 - 11) - G(20 - 11)		0.0	0.5	dB
G <sub>14-15</sub>	H.P DRIVE gain	Input SG1 to pin ⑩. Measure V <sub>P-P</sub> of pin ⑮ to take the ratio with input. $G(14 - 15) = 20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	- 0.9	- 0.2	0.5	dB
VCO <sub>sw</sub>	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 <sub>16-18max</sub>	GCA MAX gain	Input SG3 to pin ⑥, S17 = ON, V17 = 5V. Measure V <sub>P-P</sub> of pin ⑧ to take the ratio with input. $20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	6.0	7.0	8.0	dB
G <sub>16-18open</sub>	GCA OPEN gain	Input SG3 to pin ⑥, S17 = OFF. Measure V <sub>P-P</sub> of pin ⑧ to take the ratio with input. $20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	2.9	4.4	5.9	dB
G <sub>16-18min</sub>	GCA MIN gain	Input SG3 to pin ⑥, S17 = ON, V17 = 0V. Measure V <sub>P-P</sub> of pin ⑧ to take the ratio with input. $20 \text{ LOG } \frac{\text{Output level}}{\text{Input level}}$	- 6.5	- 5.0	- 3.5	dB
PAL1	Quasi PAL 1	Input SG4 - 1 to pins ⑭ and ⑯, 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 ⑯, 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 ⑩, S13 = 5V. Ensure that the signal is not output to pin ⑩.				-
R <sub>T</sub>	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 fh 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 waveform 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
BGPP	BGP POSI	Input SG2 to pin ②. Measure the difference between fh rise time and pin ③ waveform fall time. (Note 2)	2.2	2.8	3.4	μs
BGPW	BGP WIDTH	Input SG2 to pin ②. Measure the pulse width of pin ③ waveform. (Note 2)	6.2	6.8	7.4	μs
BGPH	BGP OUT HI voltage	Input SG2 to pin ②. Measure HI voltage of pin ③ output waveform. (Note 2)	3.6	4.0		V
BGPL	BGP OUT LO voltage	Input SG2 to pin ②. Measure LO voltage of pin ③ output waveform. (Note 2)		0	0.5	V
VCCR	Operating supply voltage range	Standard application circuit operation should be normal. (Vcc voltage)	4.5	5.0	5.5	V
HsST	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

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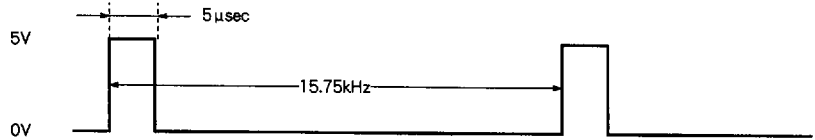
### INPUT SIGNAL

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)	

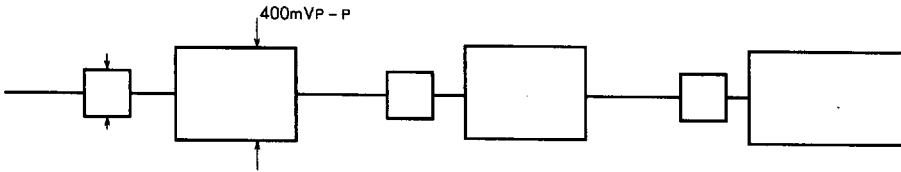
Note SG4-1 and SG4-2 should be synchronized.

### SUPPLEMENT

1. SG2



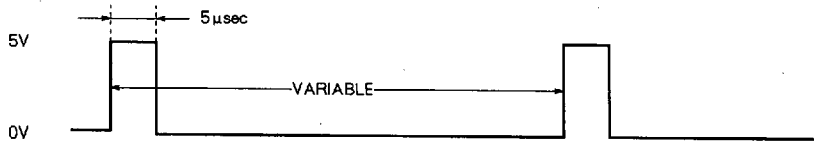
2. SG4-1



SG4-2



3. SG5



4. SG6



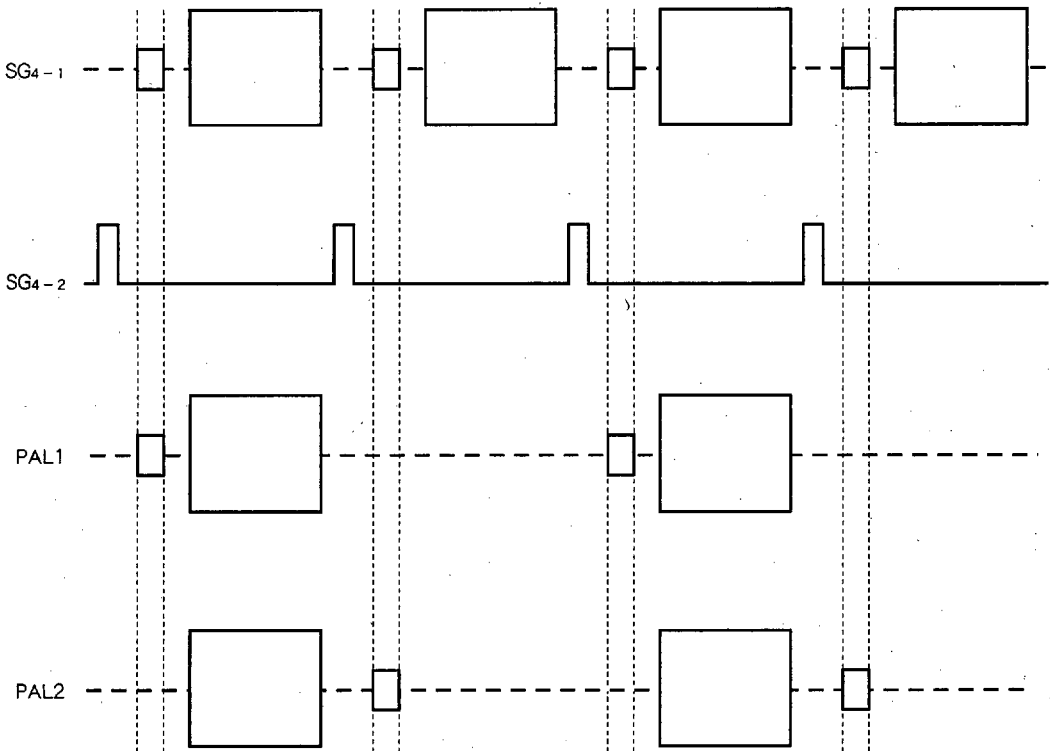
5. SG7



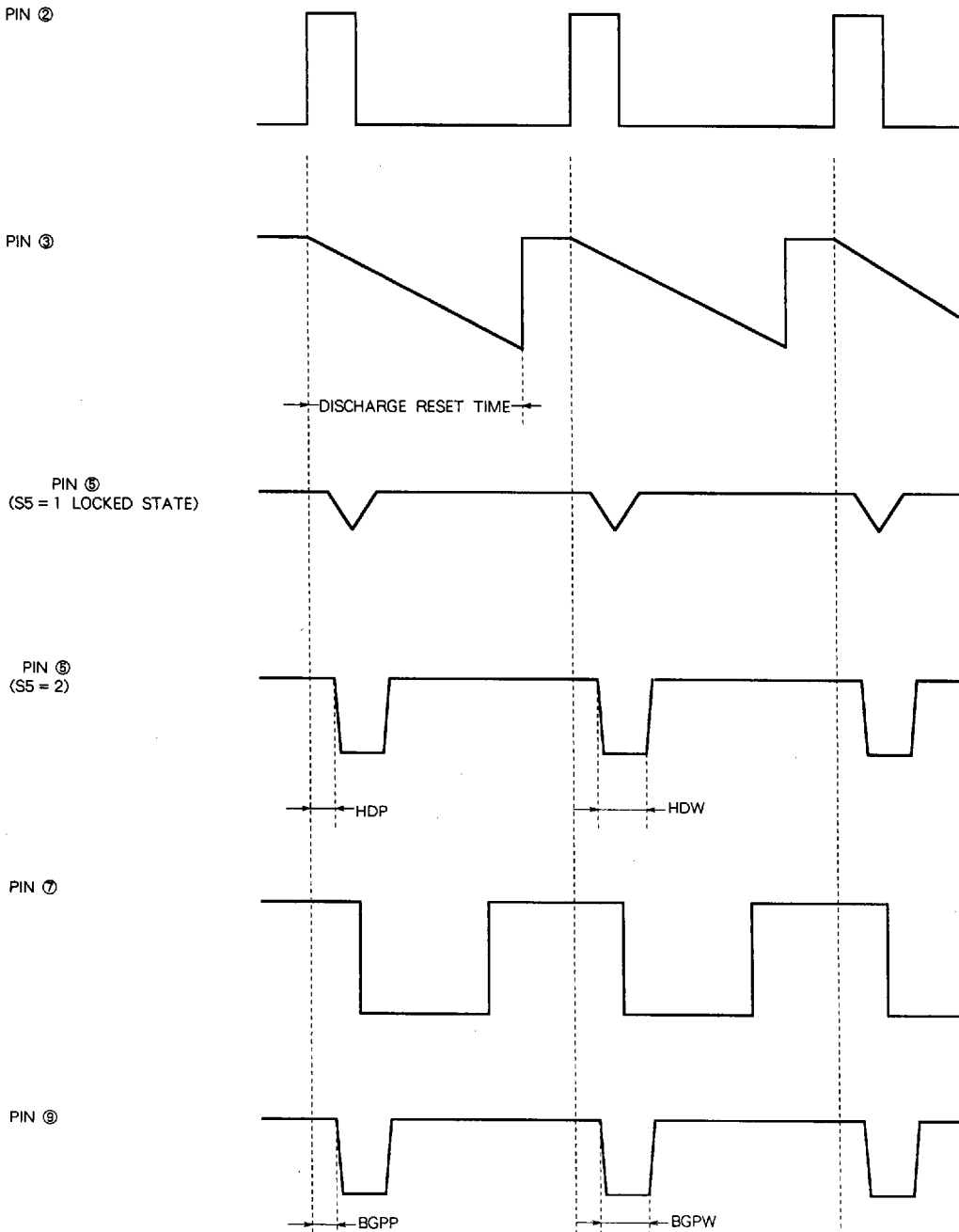
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## NTSC/QUASI PAL TRANSCODER

Note 1. QUASI PAL OPERATING WAVEFORM TIMING



Note 2. EACH WAVEFORM TIMING



VR6 Adjusting Procedure Before Measurement

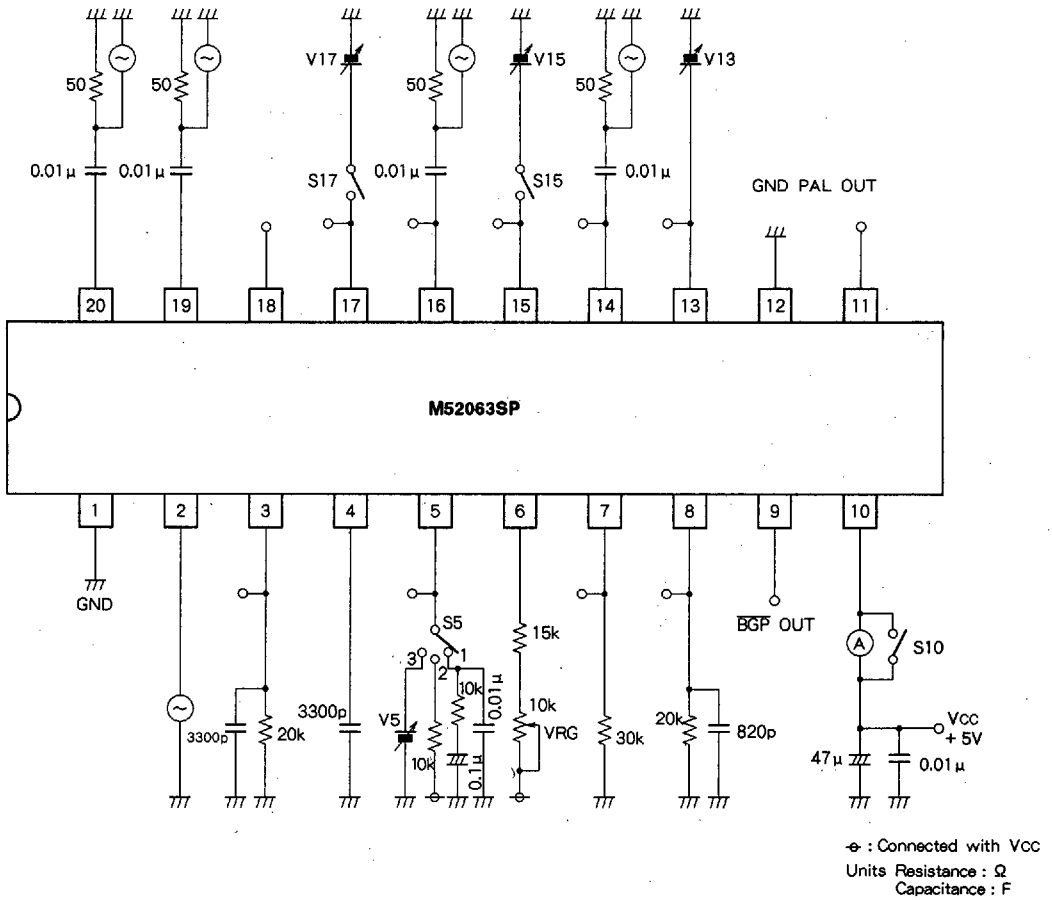
- o Free run frequency adjustment

Input SG5 ( $f = 20\text{kHz}$ ) 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.

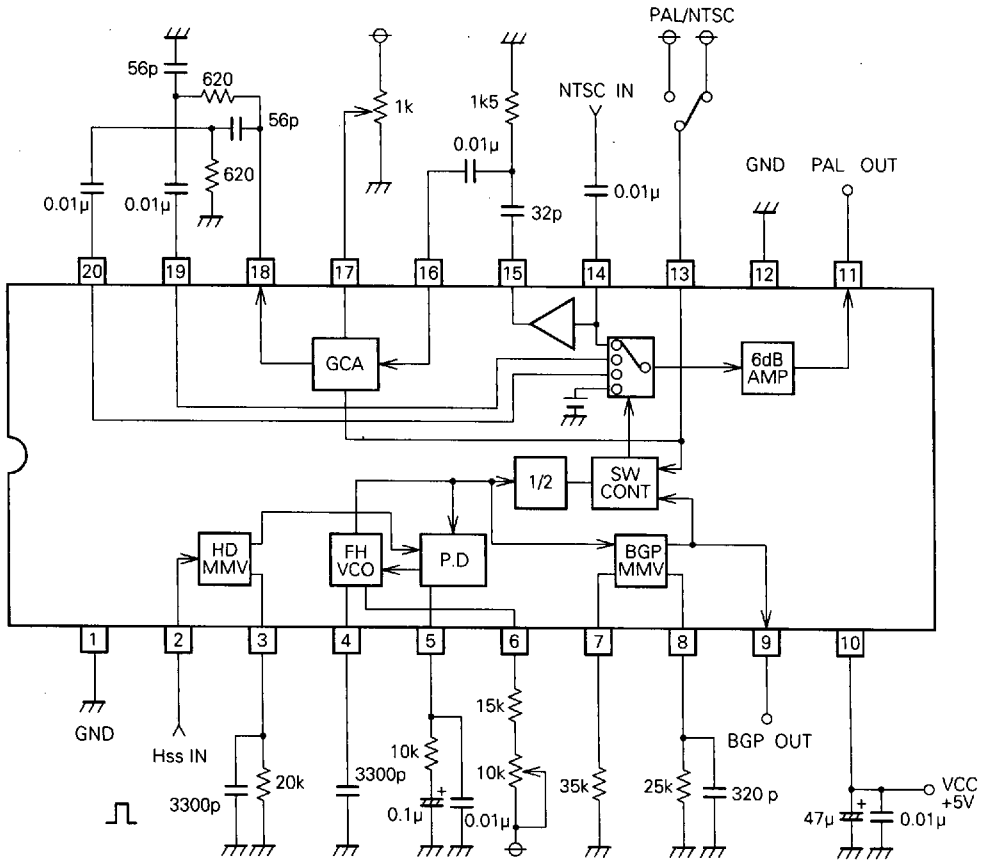
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### TEST CIRCUIT



APPLICATION EXAMPLE



Units Resistance : Ω  
Capacitance : F



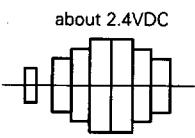
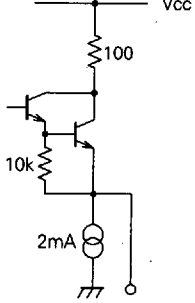
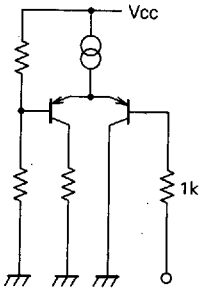
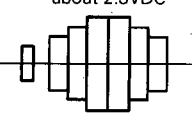
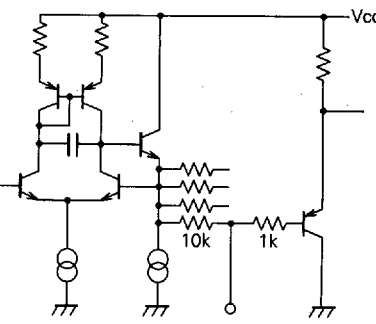
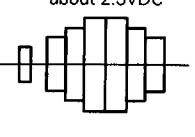
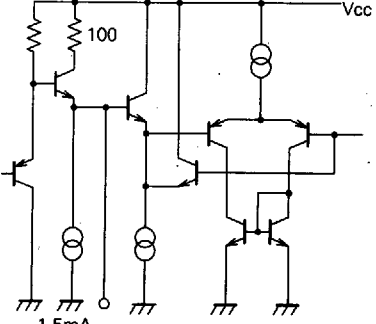
DESCRIPTION OF PIN

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
①	DIG GND	—	—
②	Hss IN	<p>5.0VDC 0.0VDC</p>	
③	HALF H KILL	<p>about 3.0VDC about 1.5VDC (2 pin Hss input)</p>	
④	OSC CAP	<p>about 3.5VDC about 3.2VDC</p>	
⑤	AFC FILTER	<p>about 3.0VDC (2 pin Hss input)</p>	

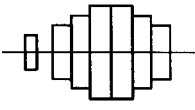
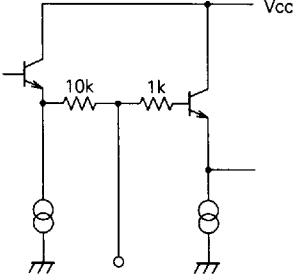
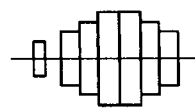
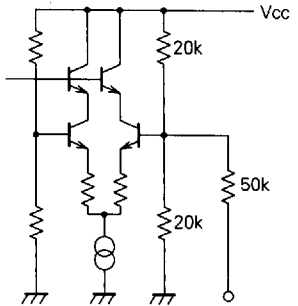
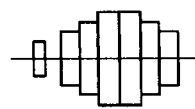
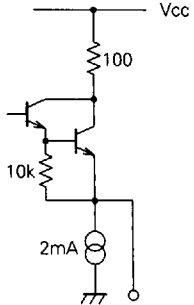
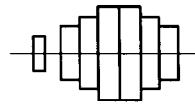
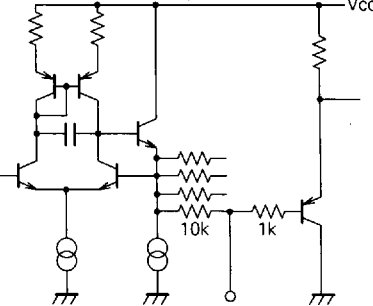
DESCRIPTION OF PIN (cont.)

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

DESCRIPTION OF PIN (cont.)

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

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	<p>about 2.3VDC</p> 