# 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.

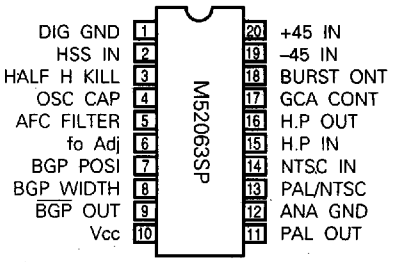
### APPLICATION

VCR

### RECOMMENDED OPERATING CONDITION

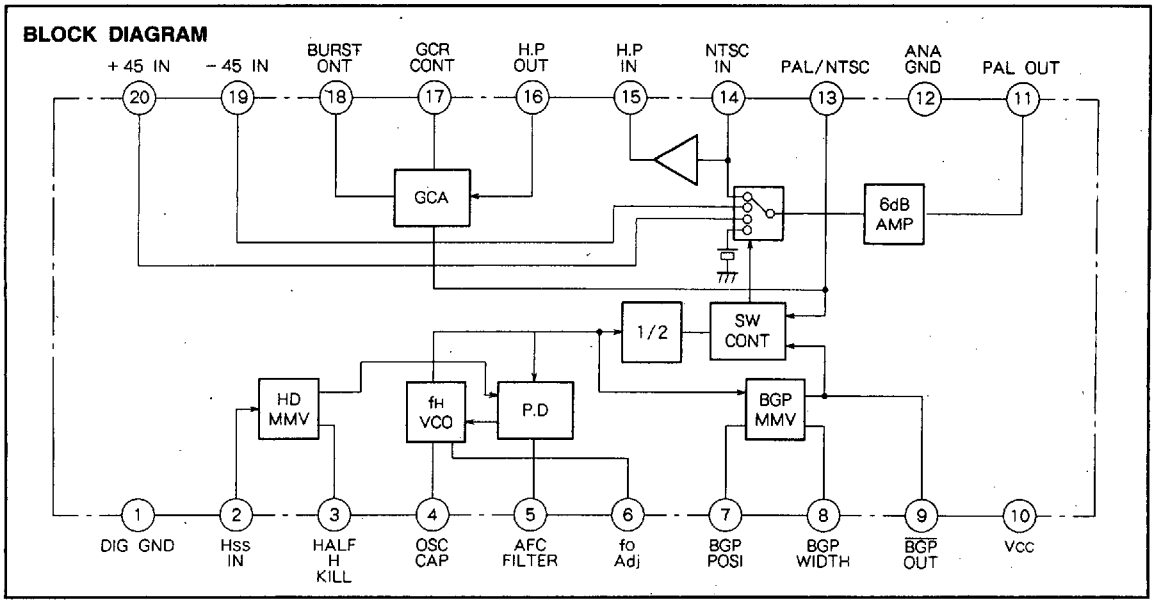
Supply voltage range ..... 4.5~5.5V
Rated supply voltage ..... 5.0V

### 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 |
| $K_\theta$ | 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.<br>Measure current flowing to pin ⑩. | 15 | 20 | 25 | mA |
| $G_{14-11}$ | Through mode gain | Input SG1 to pin ⑭, V13 = 5V.<br>Measure $V_{P-P}$ of pin ⑪ to take the ratio with input.<br>$G(14-11) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | 4.5 | 5.5 | 6.5 | dB |
| $B_{19-11}$ | − 45° gain | Input SG1 to pin ⑲.<br>Measure $V_{P-P}$ of pin ⑪ to take the ratio with input.<br>$G(19-11) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | 4.0 | 5.0 | 6.0 | dB |
| $G_{20-11}$ | + 45° gain | Input SG1 to pin ⑳.<br>Measure $V_{P-P}$ of pin ⑪ to take the ratio with input.<br>$G(20-11) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | 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.<br>Measure $V_{P-P}$ of pin ⑮ to take the ratio with input.<br>$G(14-15) = 20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | − 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.<br>Measure $V_{P-P}$ of pin ⑱ to take the rario with input.<br>$20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | 6.0 | 7.0 | 8.0 | dB |
| $G_{16-18open}$ | GCA OPEN gain | Input SG3 to pin ⑯, S17 = OFF.<br>Measure $V_{P-P}$ of pin ⑱ to take the ratio with input.<br>$20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | 2.9 | 4.4 | 5.9 | dB |
| $G_{16-18min}$ | GCA MIN gain | Input SG3 to pin ⑯, S17 = ON, V17 = 0V.<br>Measure $V_{P-P}$ of pin ⑱ to take the ratio with input.<br>$20\ LOG \frac{\text{Output level}}{\text{Input level}}$ | − 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 |

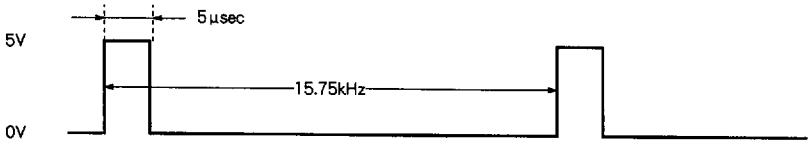
## INPUT SIGNAL

| 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) |

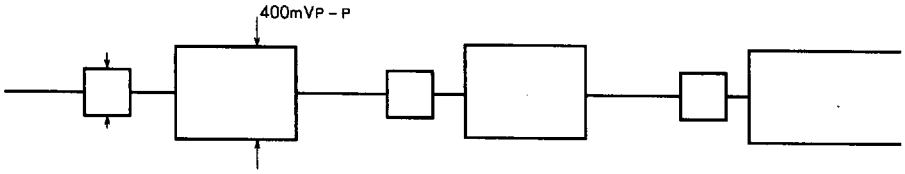
Note SG4 – 1 and SG4 – 2 should be synchronized.

## SUPPLEMENT

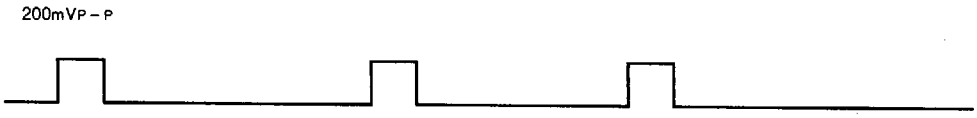
1. SG2



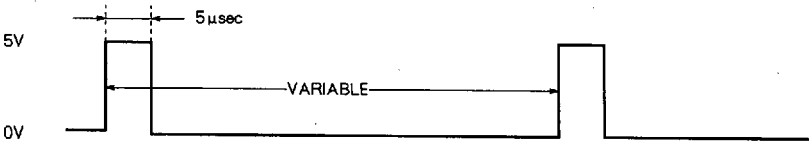

2. SG4 – 1




SG4 – 2



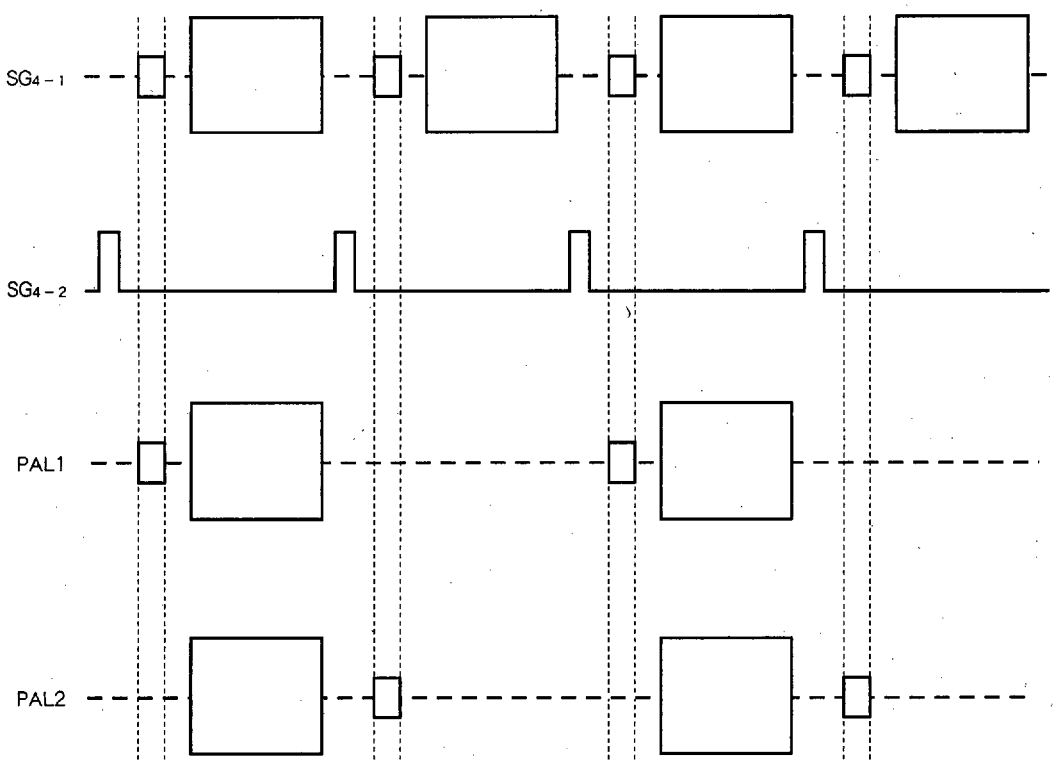

3. SG5



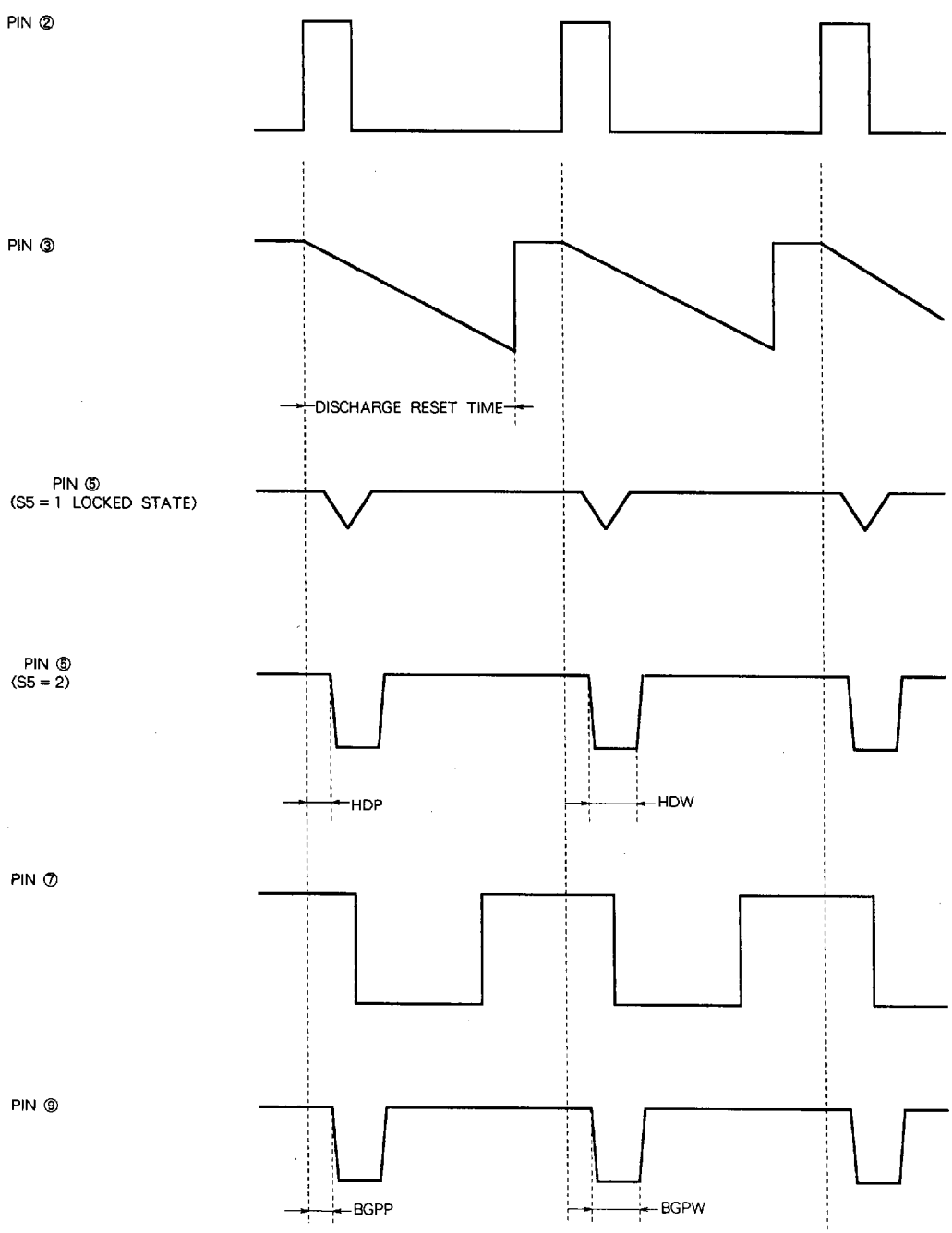

4. SG6


5. SG7

**Note 1. QUASI PAL OPERATING WAVEFORM TIMING**



**Note 2. EACH WAVEFORM TIMING**

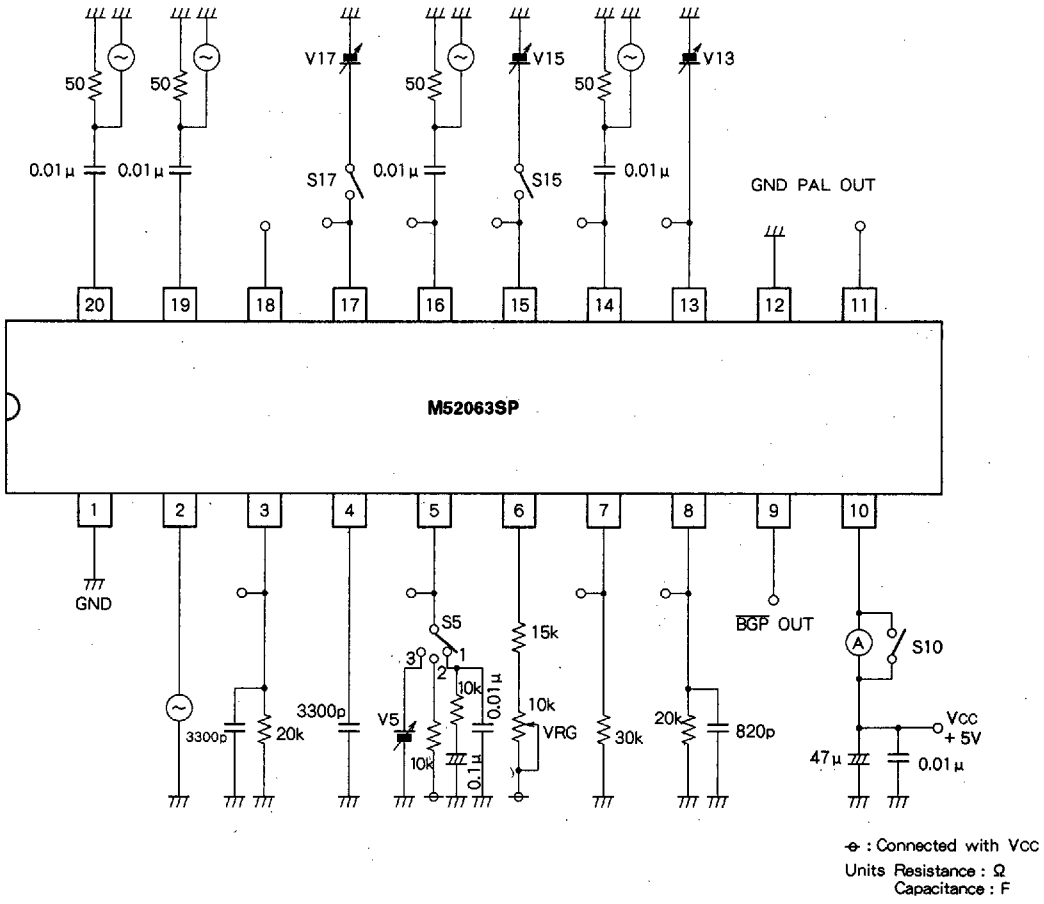



VR6 Adjusting Procedure Before Measurement

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.

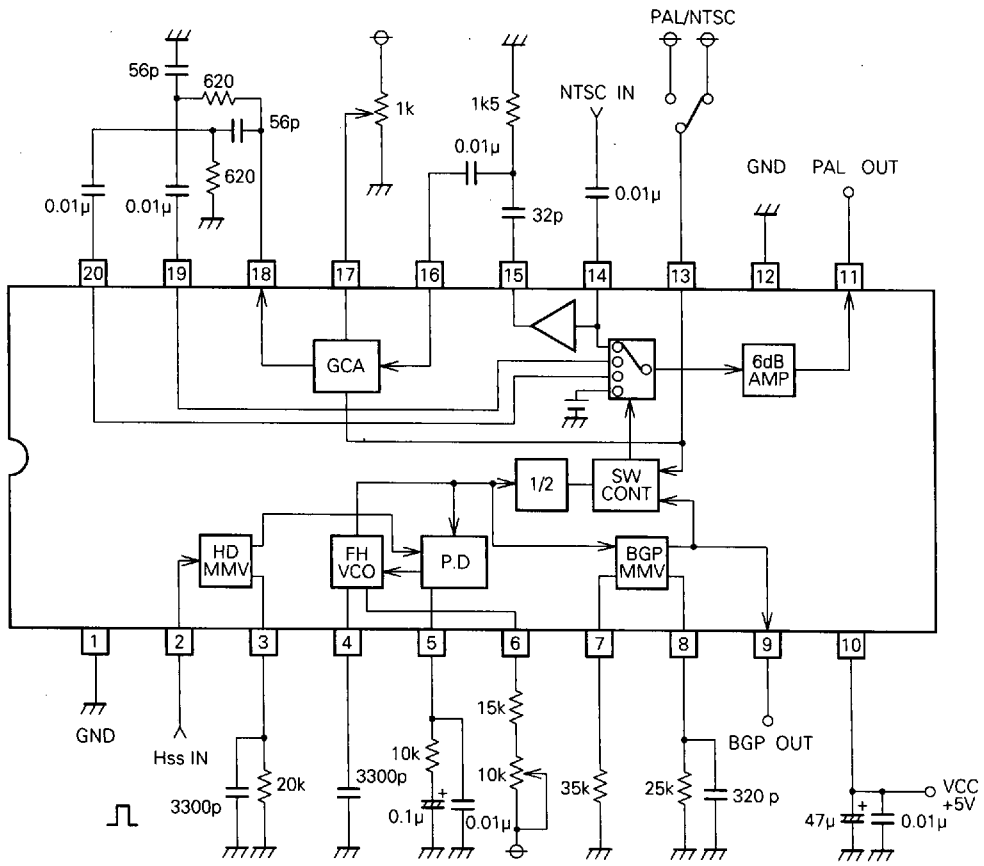
## TEST CIRCUIT




⊖ : Connected with Vcc

Units Resistance : Ω
Capacitance : F

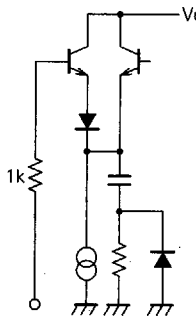
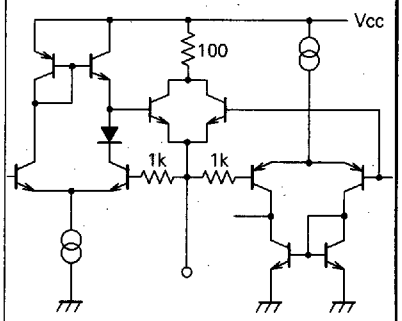
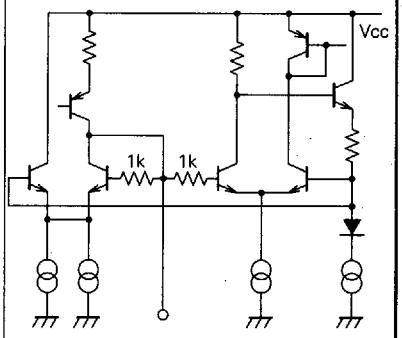
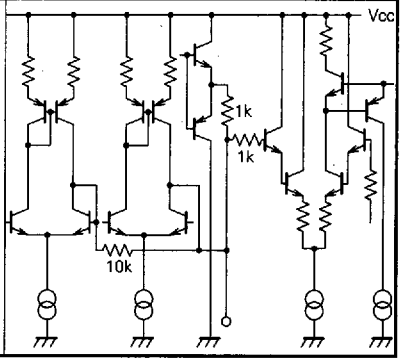
## APPLICATION EXAMPLE



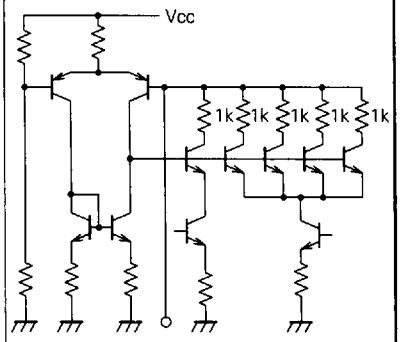
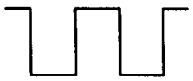
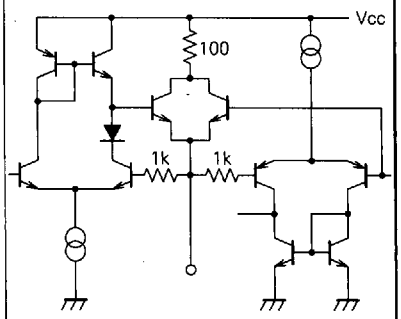
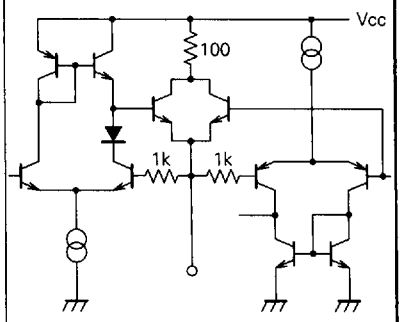
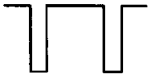
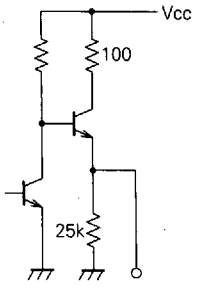

Units Resistance : Ω

Capacitance : F

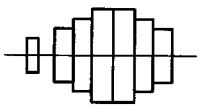
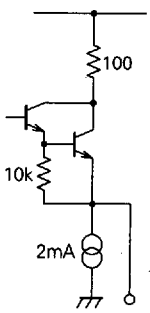
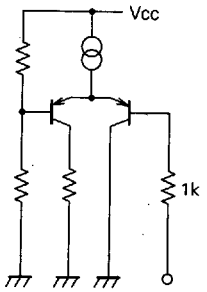
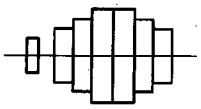
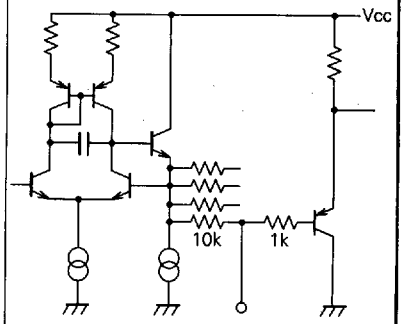
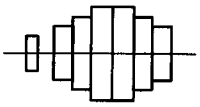
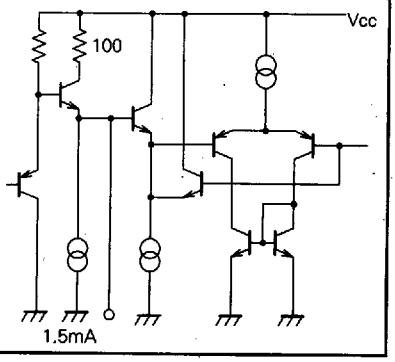
**DESCRIPTION OF PIN**

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

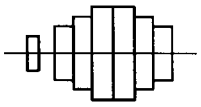
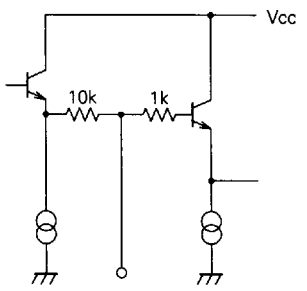
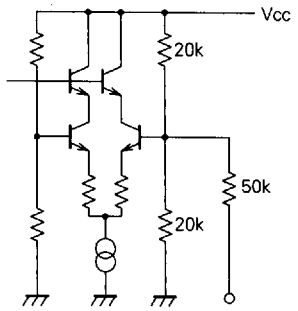
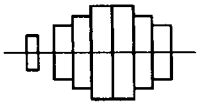
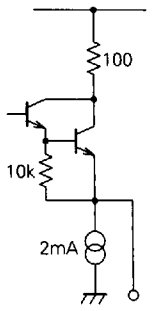
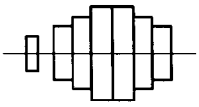
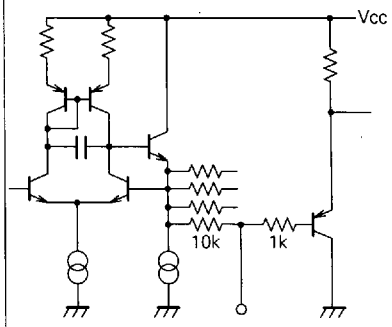
**DESCRIPTION OF PIN** (cont.)

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

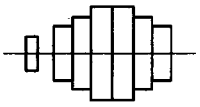
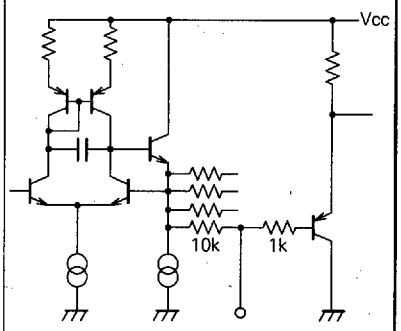
**DESCRIPTION OF PIN** (cont.)

| 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  |   |