

# M52358VP

PAL JOG

## DESCRIPTION

The M52358VP was developed for use with PAL-system VCRs. It processes variable speed playback signals.

This circuit has all signal processing circuits which are necessary to compensate color alignment during a variable speed playback using PAL-system VCRs.

This circuit consists of V-I converting circuit, TH/DL APC, 2-fsc PLL, color alignment detector, replacement burst circuit, AFC(f<sub>H</sub>), BPF, timing pulse generator and fsc phase converter.

## FEATURES

- The color alignment compensation system needs no 1 H delay line.
- No adjustment is necessary for AFC (f<sub>H</sub>), TH/DL APC and 2-fsc PLL.
- The BPF has 2-fsc and 3-fsc traps. (fo: Adjusted automatically)
- A fsc phase converting circuit is built in. It is controlled by applying a voltage to pin 24 from an external source.
- Tuner system: PAL-M (3.58MHz) and 4.43-MHz NTSC-PAL

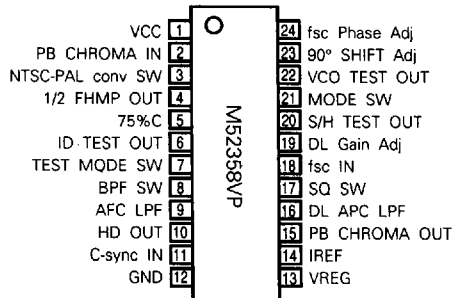
## APPLICATION

PAL-system VCRs

## RECOMMENDED OPERATING CONDITION

Operating Supply Voltage .....4.5 ~ 5.0V  
 Recommended Supply Voltage .....4.75V

## PIN CONFIGURATION (TOP VIEW)

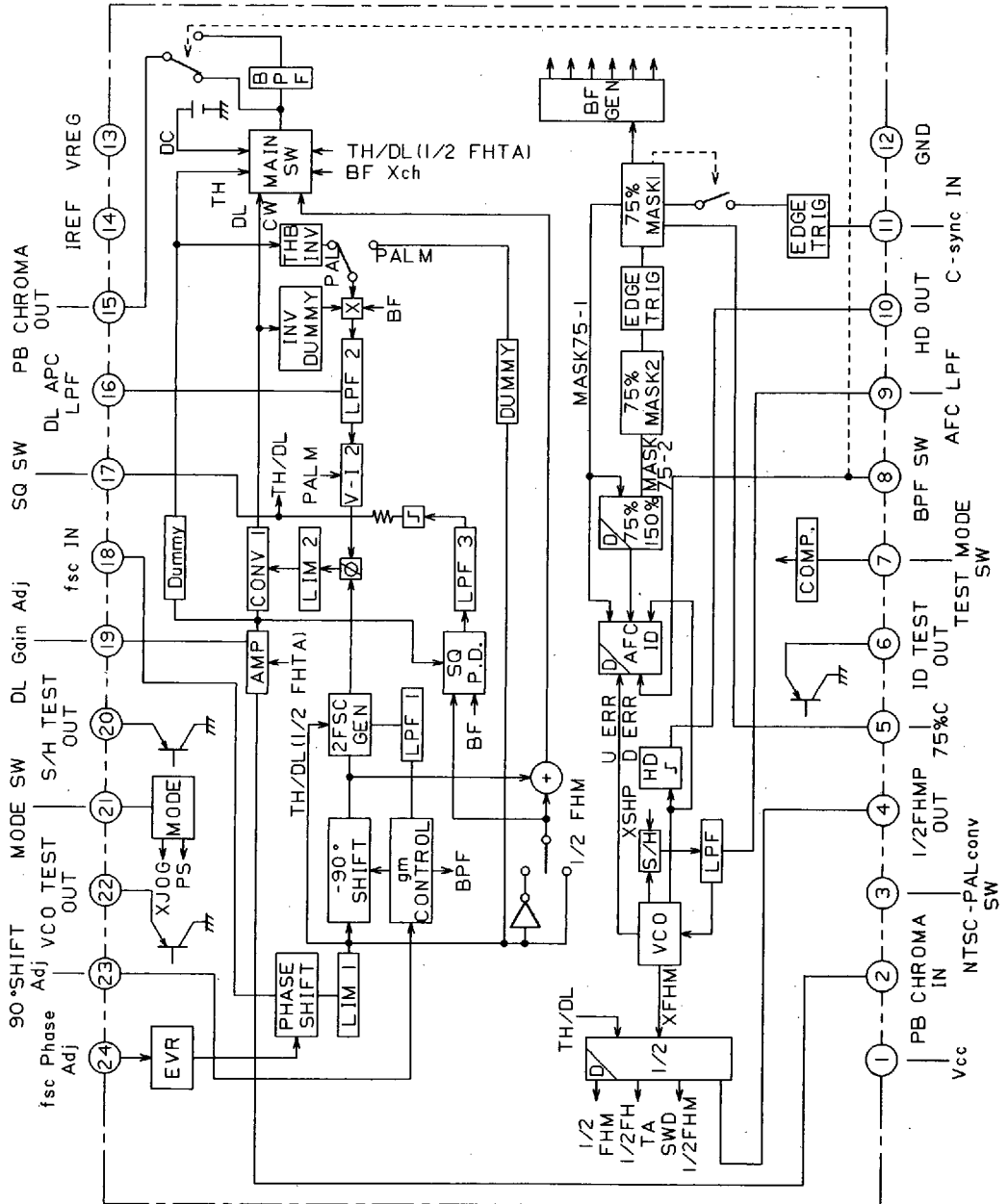


Outline 24P2E-A

M52358VP

PAL JOG

BLOCK DIAGRAM



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**ABSOLUTE MAXIMUM RATINGS**

| Symbol           | Parameter                               | Rated     | Unit  |
|------------------|---|-----------|-------|
| V <sub>CC</sub>  | Supply voltage                          | 6         | V     |
| P <sub>d</sub>   | Power dissipation                       | 400 (500) | mW    |
| T <sub>opr</sub> | Operating temperature                   | -20~75    | °C    |
| T <sub>stg</sub> | Storage temperature                     | -40~125   | °C    |
| K <sub>e</sub>   | Thermal derating (T <sub>a</sub> ≥25°C) | 4.0 (5.0) | mW/°C |

Values in parentheses should apply when the IC is attached to a standard board.

**ELECTRICAL CHARACTERISTICS** (T<sub>a</sub>=25°C, unless otherwise noted)

| Symbol                     | Parameter                                  | Test point | Mode                       | Measuring procedure              | Test conditions |       |                 |                |                |                |                |                 | Limits          |                 |       | Unit  |       |      |
|----------------------------|--|------------|----------------------------|----------------------------------|-----------------|-------|-----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-------|-------|-------|------|
|                            |  |            |                            |                                  | SW 5            | SW 17 | V <sub>CC</sub> | V <sub>2</sub> | V <sub>3</sub> | V <sub>5</sub> | V <sub>7</sub> | V <sub>17</sub> | V <sub>21</sub> | V <sub>24</sub> | Min.  |       | Typ.  | Max. |
| I <sub>CC</sub> (PB)       | Circuit current (PAL PB BPF)               | 1          | PAL PB BPF <sub>ON</sub>   | Measure DC amperage.             |                 |       | 4.75 V          | 2.5 V          | 1.5 V          |                |                |                 | 1.2 V           | 0V              | 25.0  | 32.0  | 40.0  | mA   |
| I <sub>CC</sub> (PS)       | Circuit current (PS mode)                  | 1          | PAL PS BPF <sub>ON</sub>   | Measure DC amperage.             |                 |       | 4.75 V          | 2.5 V          | 1.5 V          |                |                |                 | 0.8 V           | 0V              | 2.0   | 2.5   | 3.5   | mA   |
| V <sub>REG</sub> (4.75)    | V <sub>REG</sub> (4.75V)                   | 13         | PAL PB BPF <sub>ON</sub>   | Measure DC voltage.              |                 |       | 4.75 V          | 2.5 V          | 1.5 V          |                |                |                 | 1.2 V           | 0V              | 4.05  | 4.11  | 4.25  | V    |
| V <sub>REG</sub> (4.5)     | V <sub>REG</sub> (4.5V)                    | 13         | PAL PB BPF <sub>ON</sub>   | Measure DC voltage.              |                 |       | 4.5 V           | 2.5 V          | 1.5 V          |                |                |                 | 1.2 V           | 0V              | 4.05  | 4.11  | 4.25  | V    |
| V <sub>REG</sub> (5.0)     | V <sub>REG</sub> (5.0V)                    | 13         | PAL PB BPF <sub>ON</sub>   | Measure DC voltage.              |                 |       | 5.0 V           | 2.5 V          | 1.5 V          |                |                |                 | 1.2 V           | 0V              | 4.05  | 4.11  | 4.25  | V    |
| V <sub>IREF</sub>          | V (IREF)                                   | 14         | PAL PB BPF <sub>ON</sub>   | Measure DC voltage.              |                 |       | 4.75 V          | 2.5 V          | 1.5 V          |                |                |                 | 1.2 V           | 0V              | 2.20  | 2.27  | 2.35  | V    |
| G <sub>BPF</sub> (PAL)     | TH BPF Gain (PAL)                          | 15         | PAL PB BPF <sub>ON</sub>   | Measure output level. (4.43 MHz) | ○               | ○     | 4.75 V          | 2.5 V          | 1.5 V          | 3.4 V          |                | 3.0 V           | 1.9 V           | 0V              | -1.5  | 0.2   | 2.0   | dB   |
| G <sub>TRAP2</sub> (PAL)   | 2fsc TRAP Gain (PAL)                       | 15         | PAL PB BPF <sub>ON</sub>   | Measure output level. (8.86 MHz) | ○               | ○     | 4.75 V          | 2.5 V          | 1.5 V          | 3.4 V          |                | 3.0 V           | 1.9 V           | 0V              | -35   | -27   | -20   | dB   |
| G <sub>TRAP3</sub> (PAL)   | 3fsc TRAP Gain (PAL)                       | 15         | PAL PB BPF <sub>ON</sub>   | Measure output level. (13.3 MHz) | ○               | ○     | 4.75 V          | 2.5 V          | 1.5 V          | 3.4 V          |                | 3.0 V           | 1.9 V           | 0V              | -40   | -32   | -20   | dB   |
| G <sub>BPF</sub> (PAL-M)   | TH BPF Gain (PAL-M)                        | 15         | PAL-M PB BPF <sub>ON</sub> | Measure output level. (3.58 MHz) | ○               | ○     | 4.75 V          | 2.5 V          | 1.5 V          | 3.4 V          | 0.5 V          | 3.0 V           | 1.9 V           | 0V              | -1.5  | 0.2   | 2.0   | dB   |
| G <sub>TRAP2</sub> (PAL-M) | 2fsc TRAP Gain (PAL-M)                     | 15         | PAL-M PB BPF <sub>ON</sub> | Measure output level. (7.16 MHz) | ○               | ○     | 4.75 V          | 2.5 V          | 1.5 V          | 3.4 V          | 0.5 V          | 3.0 V           | 1.9 V           | 0V              | -35   | -28   | -20   | dB   |
| G <sub>TRAP3</sub> (PAL-M) | 3fsc TRAP Gain (PAL-M)                     | 15         | PAL-M PB BPF <sub>ON</sub> | Measure output level. (10.7 MHz) | ○               | ○     | 4.75 V          | 2.5 V          | 1.5 V          | 3.4 V          | 0.5 V          | 3.0 V           | 1.9 V           | 0V              | -40   | -32   | -20   | dB   |
| ΔG <sub>THDL</sub>         | TH/DL Gain ratio (PAL BPF)                 | 15         | PAL PB BPF                 | Measure output level.            |                 | ○     | 4.75 V          | 2.5 V          | 1.5 V          |                |                | 2.0 V           | 1.9 V           | 0V              | -0.7  | -0.2  | 0.3   | dB   |
| Δθ <sub>DL</sub> (PAL)     | TH/DL phase difference (PAL BPF)           | 15         | PAL PB BPF                 | Measure phase.                   |                 | ○     | 4.75 V          | 2.5 V          | 1.5 V          |                |                | 2.0 V           | 1.9 V           | 0V              | 70    | 90    | 110   | deg  |
| V <sub>AB</sub> (PAL)      | TH/replacement burst level ratio (PAL BPF) | 15         | PAL JOG BPF                | Measure output level.            |                 | ○     | 4.75 V          | 2.5 V          | 1.5 V          |                |                | 3.0 V           | 2.3 V           | 0V              | -13.3 | -11.8 | -10.3 | dB   |
| ΔV <sub>AB</sub> (PAL)     | Replacement burst level ratio (PAL BPF)    | 15         | PAL JOG BPF                | Measure output level.            |                 | ○     | 4.75 V          | 2.5 V          | 1.5 V          |                |                | 3.0 V           | 2.3 V           | 0V              | -1.0  | 0     | 1.0   | dB   |

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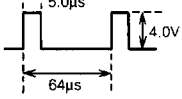
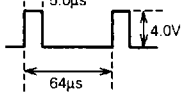
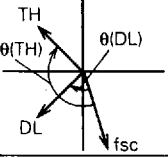
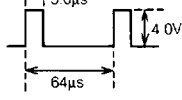
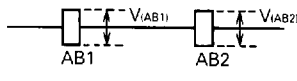
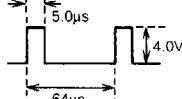
ELECTRICAL CHARACTERISTICS (cont.)

| Symbol                      | Parameter                                      | Test point | Mode          | Measuring procedure   | Test conditions |       |        |        |       |       |       |       |       |        | Limits |       |       | Unit |
|-----------------------------|--|------------|---------------|-----------------------|-----------------|-------|--------|--------|-------|-------|-------|-------|-------|--------|--------|-------|-------|------|
|                             |  |            |               |                       | SW 5            | SW 17 | Vcc    | V2     | V3    | V7    | V8    | V17   | V21   | V24    | Min.   | Typ.  | Max.  |      |
| $\Delta\theta_{AB}$ (PAL)   | Replacement burst phase difference (PAL BPF)   | 15         | PAL JOG BPF   | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       |       | 3.0 V | 2.3 V | 0V     | 85     | 90    | 95    | deg  |
| $\Delta\theta_{DL}$ (PAL-M) | TH/DL phase difference (PAL-M BPF)             | 15         | PAL-M PB BPF  | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V | 0.5 V |       | 3.0 V | 1.9 V | 0V     | -20    | 0     | 20    | deg  |
| V <sub>AB</sub> (PAL-M)     | TH/replacement burst level ratio (PAL-M BPF)   | 15         | PAL-M JOG BPF | Measure output level. |                 | ○     | 4.75 V | 2.5 V  | 1.5 V | 0.5 V |       | 3.0 V | 2.3 V | 0V     | -13.3  | -11.8 | -10.3 | dB   |
| $\Delta V_{AB}$ (PAL-M)     | Replacement burst level ratio (PAL-M BPF)      | 15         | PAL-M JOG BPF | Measure output level. |                 | ○     | 4.75 V | 2.5 V  | 1.5 V | 0.5 V |       | 3.0 V | 2.3 V | 0V     | -1.0   | 0     | 1.0   | dB   |
| $\Delta\theta_{AB}$ (PAL-M) | Replacement burst phase difference (PAL-M BPF) | 15         | PAL-M JOG BPF | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V | 0.5 V |       | 3.0 V | 2.3 V | 0V     | 85     | 90    | 95    | deg  |
| SQ+V                        | SQ DET +V detection                            | 17         | PAL PB BPF    | Measure DC voltage.   |                 |       | 4.75 V | 2.5 V  | 1.5 V | 3.8 V |       |       | 1.9 V | 0V     | 100    |       | 130   | deg  |
| SQ-V                        | SQ DET -V detection                            | 17         | PAL PB BPF    | Measure DC voltage.   |                 |       | 4.75 V | 2.5 V  | 1.5 V | 3.8 V |       |       | 1.9 V | 0V     | 45     |       | 75    | deg  |
| CT <sub>TH</sub>            | Main SW crosstalk (Replacement burst → TH)     | 15         | PAL PB BPF    | Measure output level. |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       |       | 3.0 V | 1.9 V | 0V     |        | -45   | -40   | dB   |
| NT-PAL                      | 4.43-MHz NTSC-PAL conversion check             | 15         | NT-PAL PB BPF | Measure phase.        |                 |       | 4.75 V | 2.5 V  | 2.5 V |       |       |       | 1.9 V | 0V     | -20    | 0     | 20    | deg  |
| $\theta_{fsc1}$ (PAL)       | fsc Phase Shift Phase variance 1 (PAL)         | 15         | PAL JOG       | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       |       | 3.0 V | 2.3 V | 4.75 V | -21    | -16   | -11   | deg  |
| $\theta_{fsc2}$ (PAL)       | fsc Phase Shift Phase variance 2 (PAL)         | 15         | PAL JOG       | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       |       | 3.0 V | 2.3 V | 1.8 V  | 12     | 17    | 22    | deg  |
| $\theta_{fsc1}$ (PAL-M)     | fsc Phase Shift Phase variance 1 (PAL-M)       | 15         | PAL JOG       | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       |       | 3.0 V | 2.3 V | 4.75 V | -22    | -17   | -12   | deg  |
| $\theta_{fsc2}$ (PAL-M)     | fsc Phase Shift Phase variance 2 (PAL-M)       | 15         | PAL JOG       | Measure phase.        |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       |       | 3.0 V | 2.3 V | 1.8 V  | 15     | 20    | 25    | deg  |
| T <sub>ABD</sub>            | TIMING Replacement burst delay                 | 15         | PAL JOG       | Measure time.         |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       | 2.2 V | 3.0 V | 2.3 V | 0V     | 4.3    | 5.0   | 5.4   | μs   |
| T <sub>ABW</sub>            | TIMING Replacement burst width                 | 15         | PAL JOG       | Measure time.         |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       | 2.2 V | 3.0 V | 2.3 V | 0V     | 2.9    | 3.2   | 3.6   | μs   |
| T <sub>CLD</sub>            | TIMING Burst cleaning delay                    | 15         | PAL PB        | Measure time.         |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       | 2.2 V | 3.0 V | 1.9 V | 0V     | 7.5    | 8.2   | 8.7   | μs   |
| T <sub>CLW</sub>            | TIMING Burst cleaning width                    | 15         | PAL PB        | Measure time.         |                 | ○     | 4.75 V | 2.5 V  | 1.5 V |       | 2.2 V | 3.0 V | 1.9 V | 0V     | 1.5    | 2.0   | 2.5   | μs   |
| T <sub>HDD</sub>            | AFC HD pulse delay                             | 10         | PAL PB        | Measure time.         |                 |       | 4.75 V | 2.5 V  | 1.5 V |       |       |       | 1.9 V | 0V     | -2.2   | -1.2  | -0.2  | μs   |
| T <sub>HDW</sub>            | AFC HD pulse width                             | 10         | PAL PB        | Measure time.         |                 |       | 4.75 V | 2.5 V  | 1.5 V |       |       |       | 1.9 V | 0V     | 4.5    | 5.8   | 6.8   | μs   |
| LOCK <sub>D</sub>           | AFC LOCK Range (lower side)                    | 10         | PAL PB        | Measure time.         |                 |       | 4.75 V | 2.5 V  | 1.5 V |       |       |       | 1.9 V | 0V     | -50    | 0     | 50    | Hz   |
| LOCK <sub>U</sub>           | AFC LOCK Range (upper side)                    | 10         | PAL PB        | Measure time.         |                 |       | 4.75 V | 2.5 V  | 1.5 V |       |       |       | 1.9 V | 0V     | -50    | 0     | 50    | Hz   |
| ACK                         | ACK Check                                      | 15         | PAL PB BPF    | Measure output level. |                 | ○     | 4.75 V | 0.25 V | 1.5 V |       |       | 3.0 V | 1.9 V | 0V     |        | -45   | -40   | dB   |

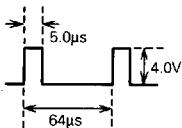
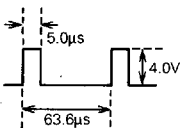
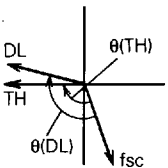
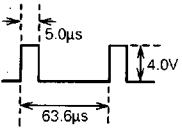
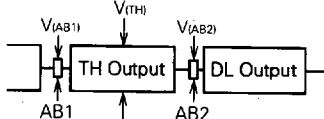
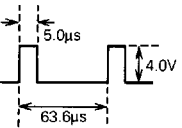
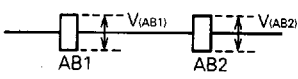
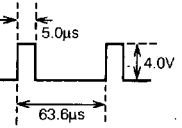
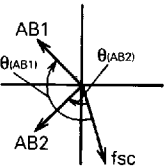
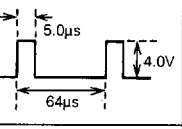
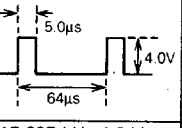
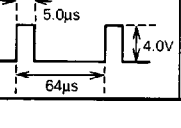
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**ELECTRICAL CHARACTERISTICS** (Ta=25°C, unless otherwise noted)

| Parameter                                   | Input signals           |   |   | Measuring procedure  |
|---|-------------------------|---|---|--|
|   | SG2                     | SG11  | SG18  |  |
| Circuit current (PAL PB BPF)                |                         |   |   |  |
| Circuit current (PS)                        |                         |   |   |  |
| VREG (4.75V)                                |                         |   |   | Measure pin 13 DC voltage.   |
| VREG (4.5V)                                 |                         |   |   | Measure pin 13 DC voltage.   |
| VREG (5.0V)                                 |                         |   |   | Measure pin 13 DC voltage.   |
| V (IREF)                                    |                         |   |   | Measure pin 14 DC voltage.   |
| TH BPF Gain (PAL)                           | 4.43 MHz CW<br>350 mVPP |   | 4.43 MHz CW<br>350 mVPP   | $20 \log \frac{\text{(pin 15 output 4.43-MHz element)}}{V_{SG2}}$  |
| 2fsc TRAP Gain (PAL)                        | 8.86 MHz CW<br>350 mVPP |   | 4.43 MHz CW<br>350 mVPP   | $20 \log \frac{\text{(pin 15 output 8.86-MHz element)}}{V_{SG2}}$  |
| 3fsc TRAP Gain (PAL)                        | 13.3 MHz CW<br>350 mVPP |   | 4.43 MHz CW<br>350 mVPP   | $20 \log \frac{\text{(pin 15 output 13.3-MHz element)}}{V_{SG2}}$  |
| TH BPF Gain (PAL-M)                         | 3.58 MHz CW<br>350 mVPP |   | 3.58 MHz CW<br>350 mVPP   | $20 \log \frac{\text{(pin 15 output 3.58-MHz element)}}{V_{SG2}}$  |
| 2fsc TRAP Gain (PAL-M)                      | 7.16 MHz CW<br>350 mVPP |   | 3.58 MHz CW<br>350 mVPP   | $20 \log \frac{\text{(pin 15 output 7.16-MHz element)}}{V_{SG2}}$  |
| 3fsc TRAP Gain (PAL-M)                      | 10.7 MHz CW<br>350 mVPP |   | 3.58 MHz CW<br>350 mVPP   | $20 \log \frac{\text{(pin 15 output 10.7-MHz element)}}{V_{SG2}}$  |
| TH/DL gain ratio (PAL BPF)                  | 4.43 MHz CW<br>150 mVPP | 15.625 kHz 4.0 Vop<br> | 4.43 MHz CW<br>350 mVPP<br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of 0° and 90° to that of output TH signals.) | $20 \log \frac{\text{(pin 15 DL mode output amplitude)}}{\text{(pin 15 TH mode output amplitude)}}$  |
| TH/DL phase difference (PAL BPF)            | 4.43 MHz CW<br>150 mVPP | 15.625 kHz 4.0 Vop<br> | 4.43 MHz CW<br>350 mVPP<br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of 0° and 90° to that of output TH signals.) | $\Delta\theta(DL) =  \theta(TH) - \theta(DL) $<br>(Measure TH and DL phases relative to the input fsc phase.)<br> |
| TH/replacement burst level ratio (PAL, BPF) |                         | 15.625 kHz 4.0 Vop<br> | 4.43 MHz CW<br>350 mVPP<br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of 0° and 90° to that of output TH signals.) | <br>$20 \log \frac{V_{(AB1)} + V_{(AB2)}}{2 \times 350} - T7$  |
| Replacement burst level ratio (PAL BPF)     |                         | 15.625 kHz 4.0 Vop<br> | 4.43 MHz CW<br>350 mVPP<br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of 0° and 90° to that of output TH signals.) | $\Delta V_{(AB)} = 20 \log \frac{V_{(AB2)}}{V_{(AB1)}}$  |

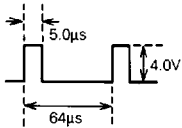
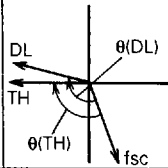
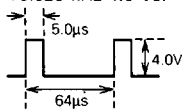
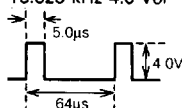
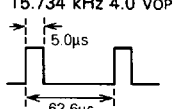
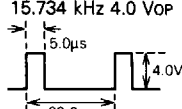
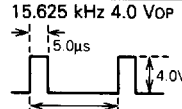
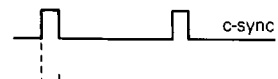
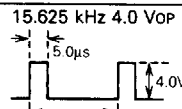
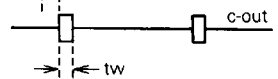
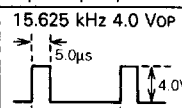

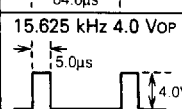

**ELECTRICAL CHARACTERISTICS (cont.)**

| Parameter                                      | Input signals   |   |   | Measuring procedure   |
|--|---|---|---|---|
|  | SG2   | SG11  | SG18  |   |
| Replacement burst phase difference (PAL BPF)   |   | 15.625 kHz 4.0 V <sub>OP</sub><br>   | 4.43 MHz CW<br>350 mV <sub>PP</sub><br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of 0° and 90° to that of output TH signals.) | $\Delta\theta(AB) =  \theta(AB1) - \theta(AB2) $<br>(Measure the AB1 and AB2 phases relative to the input fsc phase.)   |
| TH/DL phase difference (PAL-M, BPF)            | 3.58 MHz CW<br>150 mV <sub>PP</sub>                                     | 15.734 kHz 4.0 V <sub>OP</sub><br>   | 3.58 MHz CW<br>350 mV <sub>PP</sub><br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of ±45° to that of output TH signals.)       | $\Delta\theta(DL) =  \theta(DL) - \theta(TH) $<br>(Measure TH and DL phases relative to the input fsc phase.)<br>           |
| TH/replacement burst level ratio (PAL-M BPF)   | 3.58 MHz CW<br>150 mV <sub>PP</sub>                                     | 15.734 kHz 4.0 V <sub>OP</sub><br>   | 3.58 MHz CW<br>350 mV <sub>PP</sub><br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of ±45° to that of output TH signals.)       | <br>$20 \log \frac{V(AB1) + V(AB2)}{2 \times V(TH)}$  |
| Replacement burst level ratio (PAL-M BPF)      |   | 15.734 kHz 4.0 V <sub>OP</sub><br>  | 3.58 MHz CW<br>350 mV <sub>PP</sub><br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of ±45° to that of output TH signals.)       | <br>$\Delta V(AB) = 20 \log \frac{V(AB2)}{V(AB1)}$   |
| Replacement burst phase difference (PAL-M BPF) |   | 15.734 kHz 4.0 V <sub>OP</sub><br> | 3.58 MHz CW<br>350 mV <sub>PP</sub><br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of ±45° to that of output TH signals.)       | $\Delta\theta(AB) =  \theta(AB1) - \theta(AB2) $<br>(Measure the AB1 and AB2 phases relative to the input fsc phase.)<br> |
| SQ DET +V detection                            | 4.43 MHz CW<br>150 mV <sub>PP</sub><br>Delay the phase relative to fsc. | 15.625 kHz 4.0 V <sub>OP</sub><br> | 4.43 MHz CW<br>350 mV <sub>PP</sub>   | Measure the SG2 signal phase relative to fsc when pin 17 DC voltage changes from L to H (4.0 V).  |
| SQ DET -V detection                            | 4.43 MHz CW<br>150 mV <sub>PP</sub><br>Delay the phase relative to fsc. | 15.625 kHz 4.0 V <sub>OP</sub><br> | 4.43 MHz CW<br>350 mV <sub>PP</sub>   | Measure the SG2 signal phase relative to fsc when pin 17 DC voltage changes from H to L (0 V).  |
| Main SW crosstalk (Replacement burst → TH)     |   | 15.625 kHz 4.0 V <sub>OP</sub><br> | 4.43 MHz CW<br>350 mV <sub>PP</sub>   | Measure the crosstalk with reference to the TH signal output timing.  |

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ELECTRICAL CHARACTERISTICS (cont.)

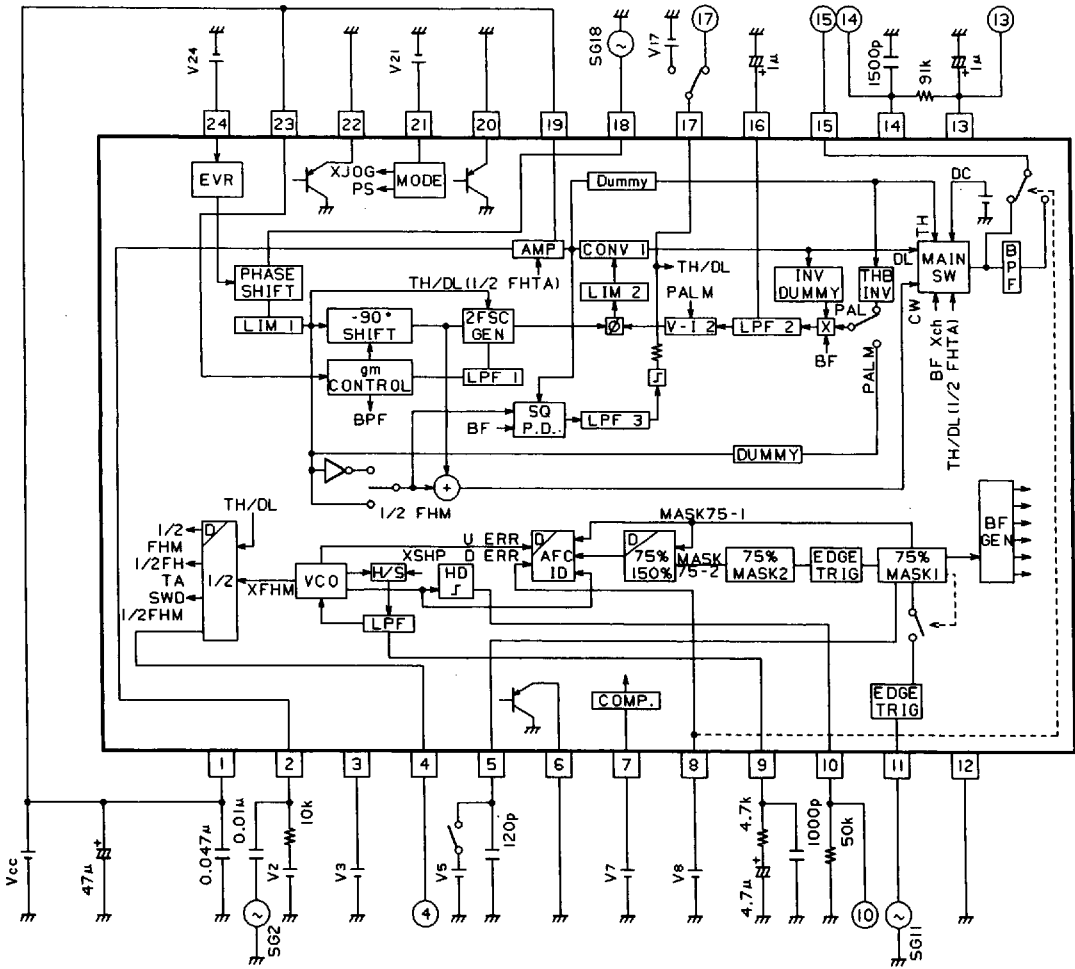
| Parameter  | Input signals           |   |   | Measuring procedure  |
|--|-------------------------|---|---|--|
|  | SG2                     | SG11  | SG18  |  |
| 4.43 MHz NTSC-PAL conversion check               | 4.43 MHz CW<br>150 mVPP | 15.625 kHz 4.0 VOP<br>   | 4.43 MHz CW<br>350 mVPP<br>(Adjust the input fsc phase such that the replacement burst phase will be at angles of ±45° to that of output TH signals.) | $\Delta\theta(DL) = \theta(DL) - \theta(TH)$<br>(Measure TH and DL phases relative to the input fsc phase.)<br>             |
| fsc Phase Shift<br>Phase variance 1 (PAL mode)   |                         | 15.625 kHz 4.0 Vop<br>   | 4.43 MHz CW<br>350 mVPP   | $\theta(AB) - \theta(fix)$<br>( Measure replacement burst phase $\theta(1)$ relative to the input fsc phase. The fixed phase is expressed by $\theta (fix)$ . )  |
| fsc Phase Shift<br>Phase variance 2 (PAL mode)   |                         | 15.625 kHz 4.0 Vop<br>   | 4.43 MHz CW<br>350 mVPP   | $\theta(AB) - \theta(fix)$<br>( Measure replacement burst phase $\theta(1)$ relative to the input fsc phase. The fixed phase is expressed by $\theta (fix)$ . )  |
| fsc Phase Shift<br>Phase variance 1 (PAL-M mode) |                         | 15.734 kHz 4.0 VOP<br>   | 3.58 MHz CW<br>350 mVPP   | $\theta(AB1) - \theta(fix)$<br>( Measure replacement burst phase $\theta(1)$ relative to the input fsc phase when pin 4 output DC voltage is "H" (4.0 V). The fixed phase is expressed by $\theta (fix)$ . ) |
| fsc Phase Shift<br>Phase variance 2 (PAL-M mode) |                         | 15.734 kHz 4.0 Vop<br>  | 3.58 MHz CW<br>350 mVPP   | $\theta(AB1) - \theta(fix1)$<br>( Measure replacement burst phase $\theta(1)$ relative to the input fsc phase when pin 4 output DC voltage is "H". The fixed phase is expressed by $\theta (fix)$ . )        |
| TIMING replacement burst delay                   |                         | 15.625 kHz 4.0 VOP<br> | 4.43 MHz CW<br>350 mVPP   | td<br>   |
| TIMING replacement burst width                   |                         | 15.625 kHz 4.0 VOP<br> | 4.43 MHz CW<br>350 mVPP   | tw<br>   |
| TIMING burst cleaning delay                      | 4.43 MHz CW<br>350 mVPP | 15.625 kHz 4.0 VOP<br> |   | td<br>   |
| TIMING burst cleaning width                      | 4.43 MHz CW<br>350 mVPP | 15.625 kHz 4.0 VOP<br> |   | tw<br>   |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Parameter                   | Input signals              |                        |      | Measuring procedure  |
|-----------------------------|----------------------------|------------------------|------|--|
|                             | SG2                        | SG11                   | SG18 |  |
| AFC HD pulse delay          |                            | 15.625 kHz 4.0 Vop<br> |      | td<br>   |
| AFC HD pulse width          |                            | 15.625 kHz 4.0 Vop<br> |      | tw<br>   |
| AFC lock range (lower side) |                            | 11.0 kHz 4.0 Vop<br>   |      | <br>(SG11 input frequency) - $\frac{1}{t}$                 |
| AFC lock range (upper side) |                            | 18.0 kHz 4.0 Vop<br>   |      | <br>(SG11 input frequency) - $\frac{1}{t}$                 |
| ACK Check                   | 4.43 MHz<br>CW<br>350 mVpp | 18.0 kHz 4.0 Vop<br>   |      | $20 \log \frac{\text{(pin 15 output amplitude)}}{V_{SG2}}$ |



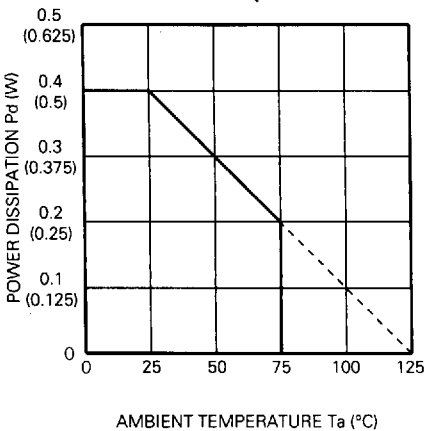
TEST CIRCUIT



TYPICAL CHARACTERISTICS

Units Resistance:  $\Omega$   
Capacitance: F

THERMAL DERATING (MAXIMUM RATING)



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DESCRIPTION OF PIN

| Pin No. | Name            | Voltage and wave information     |   | Peripheral circuit of pins | Description of pin   |
|---------|-----------------|----------------------------------|---|----------------------------|--|
|         |                 | DC                               | AC  |                            |  |
| ①       | V <sub>cc</sub> | 4.75V<br>(reference)             | —   | —                          | <ul style="list-style-type: none"> <li>Supply voltage is applied to this pin.</li> </ul>   |
| ②       | PB C<br>IN      | —                                | 350mV <sub>P-P</sub><br>150mV <sub>P-P</sub><br>(burst) |                            | <ul style="list-style-type: none"> <li>PB chroma signals are input to this pin.</li> <li>The chroma ACK is activated when the pin 2 DC bias is 0.7V or less. Pin ⑮ output is turned OFF.</li> </ul>  |
| ③       | NTSC-PAL<br>SW  | —                                | —   |                            | <ul style="list-style-type: none"> <li>The mode switches depending on a DC voltage supplied externally.<br/>PAL mode: 0V ~ 1.8V<br/>NTSC-PAL conversion: 2.2V ~ 4.75V</li> <li>The NTSC-PAL conversion mode automatically switches to the JOG mode and DL mode.</li> </ul> |
| ④       | 1/2 FHMP        | —                                |   |                            | <ul style="list-style-type: none"> <li>Pulses which are produced by dividing AFC (f<sub>H</sub>-PLL) output by two are output.</li> </ul>  |
| ⑤       | 75% C           | —                                |   |                            | <ul style="list-style-type: none"> <li>This pin leads charge/discharge capacitance that produces a triangular wave synchronous with C-sync. All timing pulses used in the IC are generated from this wave.</li> </ul>  |
| ⑥       | AFC<br>ID OUT   | 3.5V (H)<br>3.0V (M)<br>2.5V (L) | —   |                            | <ul style="list-style-type: none"> <li>AFC ID is output in the TEST mode.</li> </ul>   |

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DESCRIPTION OF PIN (cont.)

| Pin No. | Name         | Voltage and wave information |    | Peripheral circuit of pins | Description of pin  |
|---------|--------------|------------------------------|----|----------------------------|---|
|         |              | DC                           | AC |                            |   |
| ⑦       | TEST MODE SW | —                            | —  |                            | <ul style="list-style-type: none"> <li>The mode switches depending on a DC voltage applied to this pin externally.<br/>                     PAL-M: 0 ~ 0.5V<br/>                     PAL : open<br/>                     RESET: 3.6 ~ 4.1V<br/>                     TEST : 4.3 ~ 4.75V</li> </ul> |
| ⑧       | BPF SW       | —                            | —  |                            | <ul style="list-style-type: none"> <li>The mode switches depending on a DC voltage applied to this pin externally.<br/>                     BPF ON : 2.6 ~ 4.75V<br/>                     BPF OFF: 0 ~ 2.2V</li> <li>TEST VCOP is input in the TEST mode.</li> </ul>                              |
| ⑨       | AFC LPF      | 2.0V                         | —  |                            | <ul style="list-style-type: none"> <li>This pin leads the constant in AFC (fH-PLL) LPF.</li> </ul>  |
| ⑩       | HD           | —                            |    |                            | <ul style="list-style-type: none"> <li>HD pulses generated in AFC (fH-PLL) are output.</li> </ul>   |
| ⑪       | C Sync       | —                            |    |                            | <ul style="list-style-type: none"> <li>The composite sync is input. The external threshold is 2.0V. The polarity is "active High."</li> </ul>   |

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DESCRIPTION OF PIN (cont.)

| Pin No. | Name       | Voltage and wave information |   | Peripheral circuit of pins | Description of pin  |
|---------|------------|------------------------------|---|----------------------------|---|
|         |            | DC                           | AC  |                            |   |
| ⑫       | GND        | —                            | —   | —                          | <ul style="list-style-type: none"> <li>This pin is used for grounding.</li> </ul>   |
| ⑬       | VREG       | 4.11V                        | —   |                            | <ul style="list-style-type: none"> <li>The IC reference voltage source (4.11V) is output.</li> </ul>  |
| ⑭       | IREF       | 2.27V                        | —   |                            | <ul style="list-style-type: none"> <li>This pin leads reference resistance that generates IC reference current source.</li> </ul>   |
| ⑮       | C OUT      | 2.5V                         | 350mV <sub>P-P</sub><br>150mV <sub>P-P</sub><br>(burst) |                            | <ul style="list-style-type: none"> <li>PAL PB signals (TH/DL replacement burst) and PAL-M signals output.</li> </ul>  |
| ⑯       | DL APC LPF | 1.8V                         | —   |                            | <ul style="list-style-type: none"> <li>This circuit leads the constant in TH/DL APC loop LPF.</li> <li>The TH/DL lock phase is changed by applying an external DC current to this pin.</li> </ul> |

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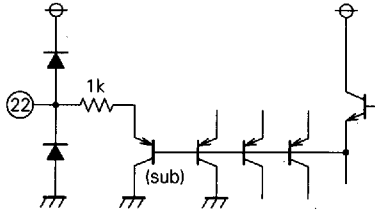
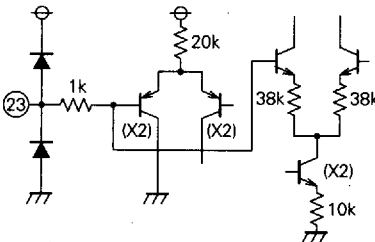
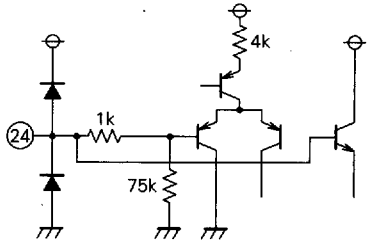


DESCRIPTION OF PIN (cont.)

| Pin No. | Name        | Voltage and wave information |          | Peripheral circuit of pins | Description of pin   |
|---------|-------------|------------------------------|----------|----------------------------|--|
|         |             | DC                           | AC       |                            |  |
| ⑰       | SQ ID       | 4.0V (H)<br>0V (L)           | —        |                            | <ul style="list-style-type: none"> <li>• The SQ detector is output.</li> <li>• Pin ⑰ output signals are automatically switched to TH or DL by applying an external DC voltage to this pin.<br/>DL: 0 ~ 2.0V<br/>TH: 3.0 ~ 4.75V</li> </ul> |
| ⑱       | fsc IN      | —                            | 350mVp-p |                            | <ul style="list-style-type: none"> <li>• "fsc" (color sub-carrier wave) is input.</li> </ul>   |
| ⑲       | DL GAIN ADJ | 4.75V (reference)            | —        |                            | <ul style="list-style-type: none"> <li>• This pin is used to adjust DL signal gain. The gain is varied depending on a DC voltage applied to this pin. The gain is fixed internally with a voltage of 4.75V.</li> </ul>                     |
| ⑳       | S/H OUT     | —                            |          |                            | <ul style="list-style-type: none"> <li>• The S/H circuit is output in the TEST mode.</li> </ul>  |
| ㉑       | MODE        | —                            | —        |                            | <ul style="list-style-type: none"> <li>• The mode is switched depending on a DC voltage applied to this pin externally.<br/>PS: 0 ~ 0.8V<br/>PB: 1.2 ~ 1.8V<br/>JOG: 2.3 ~ 4.75V</li> </ul>  |

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DESCRIPTION OF PIN (cont.)

| Pin No. | Name             | Voltage and wave information |   | Peripheral circuit of pins   | Description of pin  |
|---------|------------------|------------------------------|---|--|---|
|         |                  | DC                           | AC  |  |   |
| 22      | VCO OUT          | —                            |  |   | <ul style="list-style-type: none"> <li>VCO is output in the TEST mode.</li> </ul>   |
| 23      | $\phi$ ADJ       | 4.75V<br>(reference)         | —   |   | <ul style="list-style-type: none"> <li>This pin is used to adjust the replacement burst phase. The phase is varied depending on a DC voltage applied to this pin externally. It is fixed internally with a voltage of 4.75V.</li> </ul> |
| 24      | fsc<br>PHASE ADJ | 0V<br>(reference)            | —   |  | <ul style="list-style-type: none"> <li>This pin is used to adjust the externally-input fsc phase. The phase is varied depending on a DC voltage applied to this pin externally. It is fixed internally with a voltage of 0V.</li> </ul> |

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**M52358VP**

**PAL JOG**

**DESCRIPTION OF MODES**

| Mode                | Control pin | Voltage   | Description   |
|---------------------|-------------|-----------|---|
| —                   | Pin 3       | 0~1.5V    | Used in the PAL mode.   |
| NTSC-PAL conversion |             | 2.5~4.75V | When NTSC signals (3.58 MHz or 4.43 MHz) are input to pin 2, conversion PAL signals are output to pin 15. The mode is switched to JOG and DL automatically. |
| PAL-M               | Pin 7       | 0~0.5V    | The mode is fixed to PAL-M.<br>When pin 3 is set to "H," or the mode is DL or JOG, the mode is switched to the NTSC (3.58 MHz)-PAL conversion.              |
| PAL                 |             | Open      | The mode is fixed to PAL.<br>When pin 3 is set to "H," the mode is switched to the NTSC (4.43 MHz)-PAL conversion.  |
| RESET               |             | 3.6~4.0V  | The AFC (fH-PLL) logic section (AFC ID, 150% mask, 1/2 divider) is turned OFF.  |
| TEST                | Pin 8       | 4.4~4.75V | Checks the operation of AFC (fH-PLL) AFC ID, VCO and S/H block.   |
| BPF OFF             |             | 0~2.2V    | The internal BPF is turned OFF. Signals that are not through it are output to pin 15.   |
| BPF ON              |             | Open      | Pin 15 outputs signals that are through the internal BPF.   |
| DL                  | Pin 17      | 0~2.0V    | Pin 15 outputs DL signals.  |
| AUTO                |             | Open      | Pin 15 outputs TH or DL signals depending on judgment by the SQ detector.   |
| TH                  |             | 3.0~4.75V | Pin 15 outputs TH signals.  |
| PS                  | Pin 21      | 0~0.8V    | The REC power save is turned on.  |
| PB                  |             | 1.2~1.8V  | PB mode   |
| JOG                 |             | 2.3~4.75V | Replacement burst signals are inserted to a real burst signal section during PAL playback.  |