# M52727SP

## PAL/NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

### DESCRIPTION

The M52727SP is an $I^2C$ bus interface built-in semiconductor IC designed to process PAL/NTSC type image signals, color signals and deflection signals. Provided with a switch for both S input and AV, black extension function, etc., the M52727SP can meet a wide range of devices from diffusion machines to large screen TV sets. The addition of SECAM chroma-decoder M52325AP will enable the M52727SP to completely and automatically identify the TV systems used all over the world.

### FEATURES

- Is capable of reading/writing data with the $I^2C$ bus control circuit.
- Built-in AV-SW (with volume control) that is also available for S input
- Complete and automatic identification of color signals and vertical synchronous frequencies of a TV system
- Improvement in the synchronization separation facility at the time of synchronous compression by auto slicer
- Built-in black expansion circuit
- Built-in vertical phase adjustment function
- Built-in two SW systems (ON/OFF by bus control)

### APPLICATION

PAL/NTSC Type Color TV, Projecter

### RECOMMENDED OPERATING CONDITION

| | |
|---|---|
| Recommended supply voltage ....... | V24=5V, V9.47=8.2V, V20=9V |
| Operating supply voltage range ... | V24=4.75 to 5.25V |
| V9.47=7.6 to 8.8V | V9.47=7.6 to 8.8V |
| | V20=8.6 to 9.4V |
| Maximum Current ......................... | 5.0mA (Pin 18 current) |
| | 5.0mA (Pin 13 current) |
| | 8.0mA (RGB current) |
| | 3.0mA (AUDIO OUT current) |
| | 1.0mA (Pin 12 current) |

Note: Do not use the M52727SP when only the deflection type power supply (pin 9) is made to rise. If so, normal horizontal output pulse width cannot be obtained. Keep away 1 m or more from the IC when using a portable telephone.

### PIN CONFIGURATION (TOP VIEW)

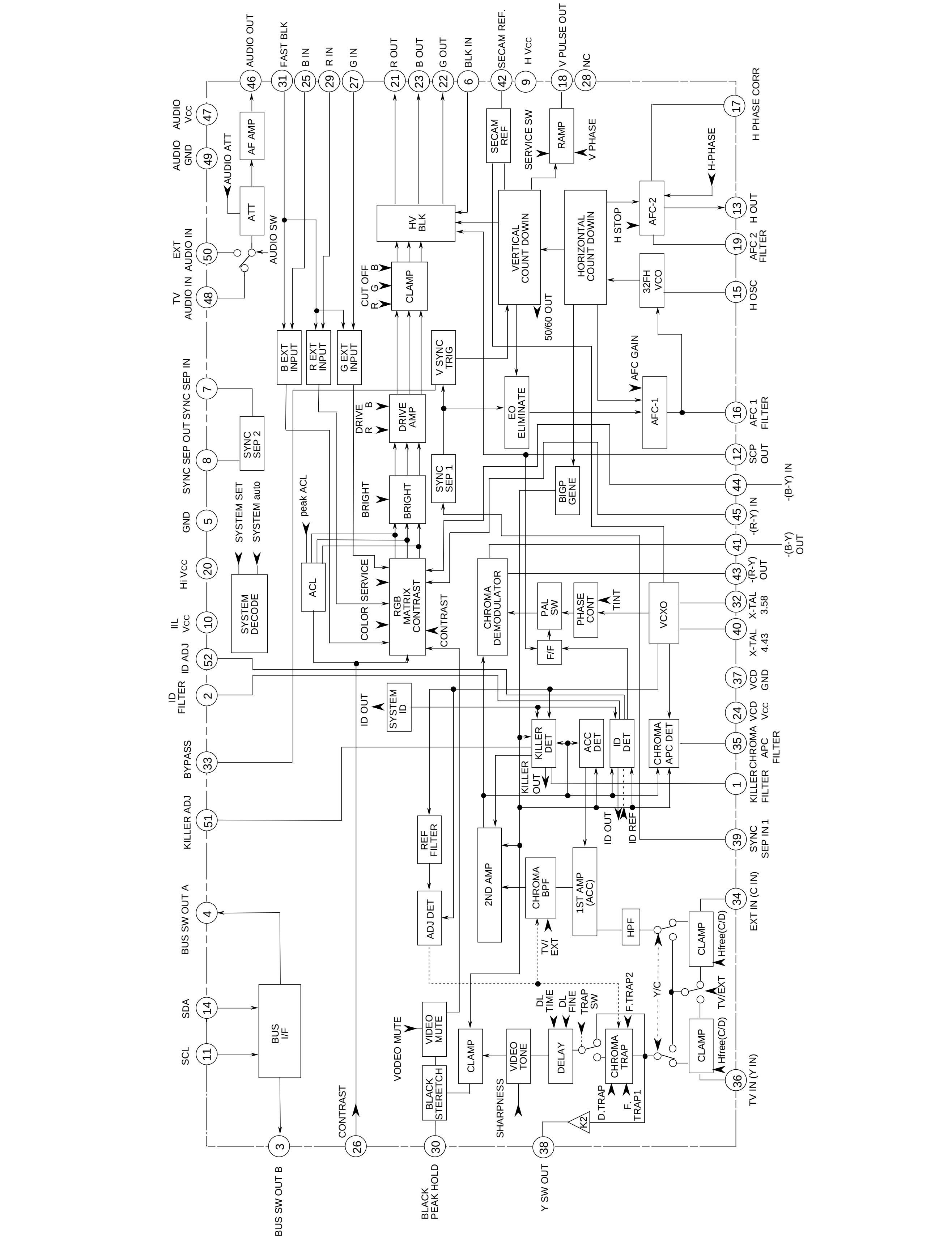
M52727SP

| Pin name | Pin | Pin | Pin name |
|---|---|---|---|
| KILLER FILTER | 1 | 52 | ID ADJ |
| ID FILTER | 2 | 51 | KILLER ADJ |
| BUS SW OUT B | 3 | 50 | EXT AUDIO IN |
| BUS SW OUT A | 4 | 49 | AUDIO GND |
| GND | 5 | 48 | TV AUDIO IN |
| BLK IN | 6 | 47 | AUDIO Vcc |
| SYNC SEP IN 2 | 7 | 46 | AUDIO OUT |
| SYNC SEP OUT | 8 | 45 | -(R-Y) IN |
| H Vcc | 9 | 44 | -(B-Y) IN |
| IIL Vcc | 10 | 43 | -(R-Y) OUT |
| SCL | 11 | 42 | SECAM REF. |
| SCP OUT | 12 | 41 | -(B-Y) OUT |
| H OUT | 13 | 40 | X-TAL 4.43 |
| SDA | 14 | 39 | SYNC SEP IN 1 |
| H OSC | 15 | 38 | Y SW OUT |
| AFC 1 FILTER | 16 | 37 | VCD GND |
| H-PHASE CORR | 17 | 36 | TV IN (Y IN) |
| V-PULSE OUT | 18 | 35 | CHROMA APC FILTER |
| AFC 2 FILTER | 19 | 34 | EXT IN (C IN) |
| Hi Vcc | 20 | 33 | BYPASS |
| R OUT | 21 | 32 | X-TAL 3.58 |
| G OUT | 22 | 31 | FAST BLK |
| B OUT | 23 | 30 | BLACK PEAK HOLD |
| VCD Vcc | 24 | 29 | R IN |
| B IN | 25 | 28 | NC |
| CONTRAST CONT. | 26 | 27 | G IN |

Outline 52P4B

NC :NO CONNECTION

## BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS** (Ta=25˚C)

| Symbol | Parameter | Ratings | Unit |
|---|---|---|---|
| $V_{CC}$ | Supply voltage | 6.0, 9.0, 10.0 | V |
| $P_d$ | Power dissipation | 1.572 | W |
| $T_{opr}$ | Operating temperature | -20 to +65 | ˚C |
| $T_{stg}$ | Storage temperature | -55 to +150 | ˚C |
| $S_{urge}$ | Electrostatic discharge | ±200 | V |

## ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S 16 / P 1 | S 44 / P 2 | S 45 / P 3 | P 4 | P 10 | P 12 | P 13 | P 16 | P 18 | P 21 | P 22 | P 23 | P 26 | P 28 | P 38 | P 39 | P 41 | P 42 | P 43 | P 46 | Vcc P 9 | Vcc P 20 | Vcc P 24 | Vcc P 47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| — | Circuit current (Typ.) | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| Icc9 | Pin 9 current | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 24.0 | 29.5 | 35.0 | mA |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | M | | | | | | | |
| Icc20 | Pin 20 current | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.4 | 8.4 | 11.4 | mA |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | M | | | | | | |
| Icc24 | Pin 24 current | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 39.5 | 62.5 | 85.5 | mA |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | M | | | | | |
| Icc47 | Pin 47 current | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.9 | 2.7 | 3.5 | mA |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | M | | | | |
| IILIcc | BUS IIL lowest operating current | — | — | SW | | | | | Iforce | | | | | | | | | | | | | | | | | | | | — | — | 11.0 | mA |
| | | | | PIN | | | | | M | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| — | AUDIO SW typical condition | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| VEA gmax | EXT AUDIO maximum gain | 50 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.5 | 5.8 | 7.3 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| ATT1 | Maximum attenuation 1 | 50 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -70 | -65 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| CTET | EXT→TV cross talk | 50 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -68 | -63 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| VTA gmax | TV AUDIO maximum gain | 48 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.5 | 5.8 | 7.3 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| ATT2 | Maximum attenuation 2 | 48 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -80 | -65 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| CTTE | TV→EXT cross talk | 48 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -65 | -60 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| OFTE | Bitween TV-EXT offset | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -50 | 10 | 70 | mV |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| VEA Typ | EXT AUDIO normal gain | 50 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | -1.9 | -0.4 | 1.1 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| VTA Typ | TV AUDIO normal gain | 48 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.9 | -0.4 | 1.1 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| VEA max | EXT AUDIO maximum output | 50 | SG1 V=3V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.3 | 6.1 | 6.8 | $V_{P-P}$ |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| VEA Imax | EXT AUDIO input D-range | 50 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.3 | 2.6 | — | $V_{P-P}$ |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 / P1 | S44 / P2 | S45 / P3 | P4 | P10 | P12 | P13 | P16 | P18 | P21 | P22 | P23 | P26 | P28 | P38 | P39 | P41 | P42 | P43 | P46 | VCC P9 | VCC P20 | VCC P24 | VCC P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VTA max | TV AUDIO maximum output | 48 | SG1 V=3V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.3 | 6.1 | 6.8 | VP-P |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| VTA Imax | TV AUDIO input D-range | 48 | SG1 | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.3 | 2.6 | — | VP-P |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| S/NT | Sound S/N TV | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 180 | 360 | uVrms |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| S/NE | Sound S/N EXT | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 180 | 360 | uVrms |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| TV OFATT | ATT max min TV offset | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -60 | 40 | 140 | mV |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| fTV | TV f specific | 48 | SG1 f variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | 100 | — | — | kHz |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| fEXT | EXT f specific | 50 | SG1 f variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | 100 | — | — | kHz |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |
| EXT OFATT | ATT max min EXT offset | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -80 | 20 | 120 | mV |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | M | | | | | | | | |

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 / P1 | S44 / P2 | S45 / P3 | P4 | P8 | P12 | P13 | P16 | P18 | P21 | P22 | P23 | P26 | P28 | P38 | P39 | P41 | P42 | P43 | P44 | VCC P9 | VCC P20 | VCC P24 | VCC P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| — | Chroma (PAL) typical condition | 36 34 | SGa SS4P | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| Cn1 | Chroma normal output 1 | 36 34 | SGa SS4P | SW | | | | | | | | | | | | | | | | | | | | | | | | | 480 | 680 | 880 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | M | | | | | | | | |
| Cn2 | Chroma normal output 2 | 36 34 | SGa VS4P (+6dB) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 390 | 530 | 670 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | | | | | M | | | | | | | | | |
| ACC1 | ACC characteristics 1 | 36 34 | SGa VS4P (-20dB) | SW | | | | | | | | | | | | | | | | | | | | | | | | | -2 | 0 | 2 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| ACC2 | ACC characteristics 2 | 36 34 | SGa VS4P (+6dB) | SW | | | | | | | | | | | | | | | | | | | | | | | | | -3 | -1 | 1 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| OV | Overload characteristics | 36 34 | SGa VS4P (L variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | -2.0 | 0.5 | 2.5 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| VkP | Killer operation input level | 36 34 | SGa VS4P eb=0V | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -41 | -36 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S 16 / P 1 | S 44 / P 2 | S 45 / P 3 | P 4 | P 8 | P 12 | P 13 | P 16 | P 18 | P 21 | P 22 | P 23 | P 26 | P 28 | P 38 | P 39 | P 41 | P 42 | P 43 | P 44 | VCC P 9 | VCC P 20 | VCC P 24 | VCC P 47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kilP | Killer color residual (PAL) | 36<br>34 | SGa VS4P eb=0V | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -41 | -30 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| APC1 | APC Pull-in range 1 | 36<br>34 | SGa VS4P (variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | ±300 | ±600 | ±1500 | Hz |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| θ R-Y P | Demodulated phase angle θ R-Y | 36<br>34 | SGa VS4P (p variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 82 | 90 | 98 | deg |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | M | | | | | | | | | |
| R/BP | Demodulation ratio R-Y/B-Y | 36<br>34 | SGa VS4P ec=unity | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.45 | 0.56 | 0.68 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | M | | | | | | | | | |
| CLP | Demodulated output carrier leak | 36<br>34 | SGa SS4P | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 5 | 15 | $mV_{P-P}$ |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | 11 | 30 | |
| DDH | Demodulated output 1H level difference | 36<br>34 | SGa VS4P ec=0V | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 2 | 6 | $mV_{P-P}$ |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | M | | | | | | | | | |
| B/T | BPF/TOF switching | 36<br>34 | SGa VS4P (-25dB) | SW | | | | | | | | | | | | | | | | | | | | | | | | | -4.5 | -2.5 | -0.5 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| ACC3 | ACC characteristics 3 (EXT) | 36<br>34 | SGa VS4P (+6dB) | SW | | | | | | | | | | | | | | | | | | | | | | | | | -2 | 0 | 2 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| ACC4 | ACC characteristics 4 (EXT) | 36<br>34 | SGa VS4P (-20dB) | SW | | | | | | | | | | | | | | | | | | | | | | | | | -2 | -0.5 | 2 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| HBLK PAL | PAL with HBLK level difference | 36<br>34 | SGa VS4P ec=0mV | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 1 | 5 | mV |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| BPF C1 | BPF characteristics 1 | 36<br>34 | SGa VS4P | SW | | | | | | | | | | | | | | | | | | | | | | | | | 350 | 500 | 690 | $mV_{P-P}$ |
| | | | ec f variable | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | 260 | 420 | 580 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 220 | 370 | 530 | |
| TOF C1 | TOF characteristics 1 | 36<br>34 | SGa VS4P | SW | | | | | | | | | | | | | | | | | | | | | | | | | 350 | 500 | 690 | $mV_{P-P}$ |
| | | | ec f variable | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | 400 | 580 | 800 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 190 | 330 | 470 | |
| $D_{CIN}$ | C input D range | 36<br>34 | SGa VS4P SYNC variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | -1.0 | 0 | 1.0 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| Hold PALL | APC Hold range | 36<br>34 | SGa VS4P eb f variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | ±600 | ±1600 | Hz |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Parameter | Input signal | | | Test conditions | | | | | | | | | | | | | | | | | | | | | | | | Limits | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SW condition | S 16 | S 44 | S 45 | | | | | | | | | | | | | | | | | | | Vcc | | | | | | |
| | | SG Pin | condition | PIN condition | P 1 | P | P | P | P | P | P | P | P | P | P | P | P | P 45 | P 41 | P 42 | P 43 | P 46 | P 51 | P 52 | P 9 | P 20 | P 24 | P 47 | Min. | Typ. | Max. | |
| — | Chroma (NTSC) typical condition | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | — | — | — | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| Cn3 | Chroma normal output 3 | 36<br>34 | SGb<br>SS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | 470 | 670 | 870 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| Cn4 | Chroma normal output 4 | 36<br>34 | SGb<br>SS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | 320 | 480 | 620 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| VkN | Killer operation input level | 36<br>34 | SGb<br>VS3N<br>(L variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -45 | -38 | dB |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| kiIN | Killer color residual (NTSC) | 36<br>34 | SGb<br>VS3N<br>ec=0V | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -36 | -31 | dB |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| APC2 | APC Pull-in range 2 | 36<br>34 | SGb<br>VS3N<br>(f variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | +300 | +700 | +1500 | Hz |
| | | | | PIN | | | | | | | | | | | | | | 5V/ OPEN | M | | | | | | | | | | -300 | -1000 | -2800 | |
| θR-Y N | Demodulated phase angle θR-Y | 36<br>34 | SGb<br>VS3N<br>(p variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 87 | 97 | 107 | deg |
| | | | | PIN | | | | | | | | | | | | | | | M | | M | | | | | | | | | | | |
| R/BN | Demodulation ratio R-Y/B-Y | 36<br>34 | SGb<br>VS3N<br>ec=unity | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.48 | 0.56 | 0.65 | — |
| | | | | PIN | | | | | | | | | | | | | | | M | | M | | | | | | | | | | | |
| CLN | Demodulated output carrier leak | 36<br>34 | SGb<br>SS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 10 | 25 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | 15 | 40 | |
| T1 | TINT control characteristics 1 | 36<br>34 | SGb<br>VS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | 30 | 45 | 60 | deg |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| T2 | TINT control characteristics 2 | 36<br>34 | SGb<br>VS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | 30 | 45 | 60 | deg |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| T3 | TINT center position | 36<br>34 | SGb<br>VS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | 85 | 97 | 109 | deg |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| HBLK NT | H-BLK level difference | 36<br>34 | SGb<br>VS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 1 | 5 | mV |
| | | | | PIN | | | | | | | | | | | | | | | M | | M | | | | | | | | | | | |
| Hold NT | APC Hold range | 36<br>34 | SGb<br>VS3N | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | +710 | +1600 | Hz |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | — | -1100 | -2900 | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 / P1 | S44 / P | S45 / P | P | P | P | P | P | P | P | P | P | P | P32 | P41 | P42 | P43 | P46 | P51 | P52 | Vcc P9 | Vcc P20 | Vcc P24 | Vcc P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BPF C2 | BPF characteristics 2 | 36 34 | SGb VS3N ec f variable | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | 320 | 480 | 620 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | 8.2 | 9 | 5 | 8.2 | 250 | 400 | 570 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 190 | 320 | 470 | |
| TOF C2 | TOF characteristics 2 | 36 34 | SGb VS3N ec f variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | 300 | 480 | 670 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | 430 | 600 | 830 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 140 | 280 | 430 | |
| f free | VCXO Free run frequency condition | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -500 | 0 | 500 | Hz |
| | | | | PIN | | | | | | | | | | | | | | M | | | | | | | | | | | | | | |
| ACC5 | ACC | 36 34 | SGb SGG | SW | | | | | | | | | | | | | | | | | | | | | | | | | -3 | 0 | 3 | dB |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 / P | S44 / P | S45 / P | P | P | P | P | P | P | P | P | P | P | P | P | P42 | P43 | P46 | P51 | P52 | Vcc P9 | Vcc P20 | Vcc P24 | Vcc P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| — | Chroma (SECAM) typical condition | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | — | — | — | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| SRA | SECAM REF output AC voltage | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 230 | 400 | 500 | mVP-P |
| | | | | PIN | | | | | | | | | | | | | | | | M | | | | | | | | | | | | |
| SRDL | SECAM REF output DC voltage L | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.2 | 1.5 | 1.8 | V |
| | | | | PIN | | | | | | | | | | | | | | | | M | | | | | | | | | | | | |
| SRDH | SECAM REF output DC voltage H | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.6 | 5.0 | 5.6 | V |
| | | | | PIN | | | | | | | | | | | | | | | | M | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal | | SW condition / PIN condition | Test conditions | | | | | | | | | | | | | | | | | | | | | | | | Limits | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SG Pin | condition | | S16 / P | S44 / P | S45 / P | P | P | P | P | P | P | P | P | P | P | P | P32 | P42 | P43 | P46 | P51 | P52 | Vcc P9 | Vcc P20 | Vcc P24 | Vcc P47 | Typ. | |
| — | System distinction typical condition | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | — | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | |
| AUTO 1 | System distinction 1 4.43 PAL | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 000001 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 2 | System distinction 2 4.43 NTSC | 36 | SGb | SW | | | | | | | | | | | | | | | | | | | | | | | | | 010101 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 3 | System distinction 3 3.58 PAL | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 001001 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 4 | System distinction 4 3.58 NTSC | 36 | SGb | SW | | | | | | | | | | | | | | | | | | | | | | | | | 011101 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 5 | System distinction 5 SECAM | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 110011 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 6 | System distinction 6 white and black | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1- - -00 | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Test conditions | | | | | | | | | | | | | | | | | | | | | | | | | | | Limits | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input signal | | SW condition | S 16 | S 44 | S 45 | | | | | | | | | | | | | | | | | | | Vcc | | | Min. | Typ. | Max. | |
| | | SG Pin | condition | PIN condition | P 1 | P 2 | P 8 | P 12 | P 13 | P 16 | P 18 | P 21 | P 22 | P 23 | P 26 | P 28 | P 38 | P 39 | P 41 | P 42 | P 43 | P 46 | P 51 | P 52 | P 9 | P 20 | P 24 | P 47 | | | | |
| — | Video, interface typical condition | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | — | — | — | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| ACL1 | Peak ACL H level | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 3.0 | 3.7 | 4.8 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GY | Video normal gain | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 8.9 | 10.5 | 12.1 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| FBY | Video frequency characteristics | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | -4 | -2 | — | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| FBY RGB | Video frequency characteristics RGB difference | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0.5 | 2 | dB |
| | | | | PIN | | | | | | | | M | M | M | | | | | | | | | | | | | | | | | | |
| 2AGY | Double amplifier standard gain | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.3 | 5.5 | 6.7 | dB |
| | | | | PIN | | | | | | | | | | | | | M | | | | | | | | | | | | | | | |
| CTR1 | Chroma trap attenuation 1 | 36 | SGF | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -10 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | -18 | |
| CTR2 | Chroma trap attenuation 2 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -10 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | -18 | |
| DTR1 | D.TRAP attenuation 1 | 36 | SGF | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -24 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| DTR2 | D.TRAP attenuation 2 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -24 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| YDL1 | Y delay time 1 | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 150 | 210 | 270 | nsec |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| YDL2 | Y delay time 2 | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 110 | 170 | 240 | nsec |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| YDL3 | Y delay time 3 | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 245 | 320 | 410 | nsec |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| YDL4 | Y delay time 4 | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 330 | 420 | 540 | nsec |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| YDL5 | Y delay time 5 | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 20 | 40 | 60 | nsec |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GT nor | Video tone control characteristics 1 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.3 | 2.5 | 4.9 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GT max | Video tone control characteristics 2 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | 6.0 | 8.7 | 11.4 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GT min | Video tone control characteristics 3 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | -4.5 | -1.8 | 0.5 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GT 1M | Video tone control characteristics 4 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | -1.9 | 0.5 | 2.9 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 / P1 | S44 / P2 | S45 / P8 | P12 | P13 | P16 | P18 | P21 | P22 | P23 | P26 | P28 | P38 | P39 | P41 | P42 | P43 | P46 | P51 | P52 | VCC P9 | VCC P20 | VCC P24 | VCC P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GT 5M | Video tone control characteristics 5 | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | -3.2 | -0.6 | 2.0 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| ACL2 | Peak ACL L level | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.6 | 3.5 | 4.4 | $V_{P-P}$ |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| SSW1 | Service switch operation 1 | 36 | SGB f=5MHz | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -30 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GY1 | Contrast control characteristics 1 | 36 | SGB f=5MHz | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -30 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| GY2 | Contrast control characteristics 2 | 36 | SGB f=5MHz | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -30 | dB |
| | | | | PIN | | | | | | | | M | | | 0V | | | | | | | | | | | | | | | | | |
| Lum nor | Brightness control characteristics 1 | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.6 | 2.9 | 3.2 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| Lum max | Brightness control characteristics 2 | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.75 | 1 | 1.25 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| Lum min | Brightness control characteristics 3 | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -1.25 | -1 | -0.75 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| D(G) | Drive control characteristics G | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.0 | 6.1 | 7.6 | dB |
| | | | | PIN | | | | | | | | | M | | | | | | | | | | | | | | | | | | | |
| D(B) | Drive control characteristics B | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.0 | 6.1 | 7.6 | dB |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| EX(R) | EXT(R) normal gain | FB ER | SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | 11.0 | 13.2 | 15.2 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| EX(G) | EXT(G) normal gain | FB EG | SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | 11.0 | 13.2 | 15.2 | dB |
| | | | | PIN | | | | | | | | | M | | | | | | | | | | | | | | | | | | | |
| EX(B) | EXT(B) normal gain | FB EB | SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | 11.0 | 13.2 | 15.2 | dB |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| OF RG | R-G offset voltage | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 30 | 160 | $mV_{P-P}$ |
| | | | | PIN | | | | | | | | M | M | | | | | | | | | | | | | | | | | | | |
| OF BG | B-G offset voltage | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 30 | 160 | $mV_{P-P}$ |
| | | | | PIN | | | | | | | | M | | M | | | | | | | | | | | | | | | | | | |
| C(R) | R cut-off characteristics | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.25 | 1.5 | 1.75 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| C(G) | G cut-off characteristics | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.25 | 1.5 | 1.75 | V |
| | | | | PIN | | | | | | | | | M | | | | | | | | | | | | | | | | | | | |
| C(B) | B cut-off characteristics | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.25 | 1.5 | 1.75 | V |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| Ccon 0 | Color regulation characteristics 0 (typ) | -B | SGE V=1.3V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | 2.0 | 2.8 | 3.6 | $V_{P-P}$ |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 P1 | S44 P2 | S45 P8 | P12 | P13 | P16 | P18 | P21 | P22 | P23 | P26 | P28 | P38 | P39 | P41 | P42 | P43 | P46 | P51 | P52 | Vcc P9 | Vcc P20 | Vcc P24 | Vcc P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ccon 1 | Color regulation characteristics 1 (max) | -B | SGE V=1.3V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | 5.5 | 8.0 | 9.5 | dB |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| Ccon 2 | Color regulation characteristics 2 (min) | -B | SGE V=1.3V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | — | -40 | -35 | dB |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| VMF | Video mute operation | 36 | SGB f=5M | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -40 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| R-Y PAL | Relative amplitude R-Y PAL | -B | SGE V=1.0V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | 0.43 | 0.53 | 0.62 | — |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| R-Y NT | Relative amplitude R-Y NT | -B | SGE V=1.0V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | 0.62 | 0.75 | 0.89 | — |
| | | | | PIN | | | | | | | | | M | | | | | | | | | | | | | | | | | | | |
| G-Y A | Relative amplitude G-Y | -R | SGE V=0.56V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | 0.23 | 0.30 | 0.36 | — |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | 0.25 | 0.33 | 0.38 | |
| G-Y P | Relative phase G-Y | -R | SGE V=0.56V | SW | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | 226 | 234 | 242 | deg |
| | | | | PIN | | | | | | | | | M | | | | | | | | | | | | | | | | 231 | 239 | 247 | |
| OSD 1 | OSD speed characteristics 1 | 36 ER,EG EB,FB | SG50 SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 20 | 90 | nsec |
| | | | | PIN | | | | | | | | M | M | M | | | | | | | | | | | | | | | | | | |
| OSD 2 | OSD speed characteristics 2 | 36 ER,EG EB,FB | SG50 SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 50 | 100 | nsec |
| | | | | PIN | | | | | | | | M | M | M | | | | | | | | | | | | | | | | | | |
| CLS | Input cut switch operation | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 3.7 | 4.2 | 4.6 | V |
| | | | | PIN | | | | | | | | | | | | | M | | | | | | | | | | | | | | | |
| CLV1 | Input cramp potencial 1 | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.85 | 2.15 | 2.45 | V |
| | | | | PIN | | | | | | | | | | | | | M | | | | | | | | | | | | | | | |
| BLS1 | Black expanding operation 1 | 36 | SGC V=0.2v | SW | | | | | | | | | | | | | | | | | | | | | | | | | 100 | 450 | 800 | mV |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| BLS2 | Black expanding operation 2 | 36 | SGC V=0.4v | SW | | | | | | | | | | | | | | | | | | | | | | | | | -150 | -50 | 50 | mV |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| BLS3 | Black expanding operation 3 | 36 | SGC V=0v | SW | | | | | | | | | | | | | | | | | | | | | | | | | -50 | 0 | 50 | mV |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| S/N RGB | RGB output noise | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 2.3 | 5.0 | mVrms |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| TC RGB | Output temperature characteristics | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -1.5 | 0 | 1.5 | mV/°C |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| HBLK L | HBLK L level | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 0.1 | 0.5 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| VBLK L | VBLK L level | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 0.1 | 0.5 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| VA max | Analog RGB maximum output | 36 ER,EG EB,FB | SG50 SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.4 | 6.2 | 7.0 | $V_{P-P}$ |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal | | SW condition | Test conditions | | | | | | | | | | | | | | | | | | | | | | | | Limits | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | S 16 | S 44 | S 45 | | | | | | | | | | | | | | | | | | Vcc | | | | | | | |
| | | SG Pin | condition | PIN condition | P 1 | P 2 | P 8 | P 12 | P 13 | P 16 | P 18 | P 21 | P 22 | P 23 | P 26 | P 28 | P 38 | P 39 | P 41 | P 42 | P 43 | P 46 | P 51 | P 52 | P 9 | P 20 | P 24 | P 47 | Min. | Typ. | Max. | |
| VD RGB | Analog RGB input D range | 36 ER,EG EB,FB | SG50 SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.2 | 3.8 | — | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| RGB ON | Analog RGB ON voltage | 36 FB | SGA SGD level variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.25 | 0.4 | 0.55 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| BLK ON | BLK RGB ON voltage | 36 FB | SGA SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | 3.2 | 3.5 | 3.8 | V |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| ARGB DL | Analog RGB transmission characteristics | 36 FB | SGB SGD | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 30 | 100 | nsec |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | — | 30 | 100 | |
| CTAT | Analog RGB→TV crosstalk | 36 ER | SG50 SGB f=5M | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -40 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| CTTA | TV→Analog RGB crosstalk | 36 | SGB f=5M | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -40 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| VDY | Video input D range | 36 | SGB f=100K level variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.0 | 3.2 | — | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| VDCO | Color input D range | 36 -B | SG50 SGE (V=variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.4 | 3.3 | — | dB |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| ZCOR | Color output impedance | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1M | — | — | Ω |
| | | | | PIN | | | | | | | | | | | | | | | M | | M | | | | | | | | — | 270 | 800 | |
| Yg max | Video maximum gain | 36 | SGB (f=100K) (V=0.4V) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 14.0 | 16.5 | 19.0 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| f tone | Tone control peaking frequency | 36 | SGB f variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 2.5 | — | MHz |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| BLS start | Starting point of black expansion | 36 | SGC level variable | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 48 | — | IRE |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| BLS max | Maximum gain of black expansion amplifier | 36 | SGB | SW | | | | | | | | | | | | | 5V/ OPEN | | | | | | | | | | | | — | 4.5 | — | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| CTR3 | Chroma trap attenuation 3 | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | -18 | dB |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VY SW | Y SW OUT input D range | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.2 | 3.5 | — | dB |
| | | | | PIN | | | | | | | | | | | | | | M | | | | | | | | | | | | | | |
| DVY | Video amplitude with voltage reducing SW set to ON | 36 | SGB | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.56 | 2.06 | 2.56 | VP-P |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | 4.5V | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S 16 / P 3 | S 44 / P 4 | S 45 / P 6 | P 7 | P 8 | P 12 | P 13 | P 16 | P 17 | P 18 | P 21 | P 22 | P 23 | P 28 | P 39 | P | P | P | P | P | Vcc P 9 | Vcc P 20 | Vcc P 24 | Vcc P 47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| — | Synchronization/deflection type standard conditions | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | — | — | — | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| HAS | Auto slice slice level | 36 | SG50 V=286 mV | SW | | | | | | | | | | | | | | | | | | | | | | | | | 15 | 30 | 48 | % |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |
| ISS | Sync. separation input sensitivity current | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 0.1 | 0.2 | mA |
| | | | | PIN | | | | varia-ble | M | | | | | | | | | | | | | | | | | | | | | | | |
| BGP1 | BGP timing 1 | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.25 | 2.75 | 3.25 | µsec |
| | | | | PIN | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |
| BGP2 | BGP timing 2 | 36 | SGb | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.35 | 2.85 | 3.35 | µsec |
| | | | | PIN | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |
| BGP W | BGP pulse width | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 5.90 | 6.10 | 6.30 | µsec |
| | | | | PIN | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |
| fH | Horizontal free run frequency | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 15.45 | 15.68 | 16.0 | kHz |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| FPH1 | Horizontal pull-in range 1 | 36 | SGc (f variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | -700 | -400 | Hz |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| FPH2 | Horizontal pull-in range 2 | 36 | SGc (f variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 400 | 700 | — | Hz |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| HPT1 | Horizontal pulse timing 1 | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 7.5 | 9.0 | 10.5 | µsec |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| HPT2 | Horizontal pulse timing 2 | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | -2.4 | -1.9 | -1.4 | µsec |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| HPT3 | Horizontal pulse timing 3 | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.2 | 1.7 | 2.2 | µsec |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| HPT4 | Horizontal pulse timing 4 (PIN) | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | -1.5 | -1.1 | -0.7 | µsec |
| | | | | PIN | | | | | | | M | | 1V | | | | | | | | | | | | | | | | | | | |
| HPT5 | Horizontal pulse timing 5 (PIN) | 36 | SGa | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.5 | 0.9 | 1.4 | µsec |
| | | | | PIN | | | | | | | M | | 4V | | | | | | | | | | | | | | | | | | | |
| TH | Horizontal pulse width | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 22.5 | 25.0 | 27.5 | µsec |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| VH | Horizontal pulse amplitude | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 3.7 | 4.3 | 4.9 | V |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | | | | | | | | |
| SH | Horizontal stop operation | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.0 | 4.5 | 5.0 | V |
| | | | | PIN | | | | | | | M | | | | | | | | | | | | | | varia-ble | | | | | | | |
| AFC G | AFC again operation | 36 | SGA | SW | | | | | | | | | | | | | | | | | | | | | | | | | 3.6 | 6.6 | 9.6 | dB |
| | | | | PIN | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| FS | H-V free operation | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 0.2 | 0.5 | V |
| | | | | PIN | | | | | | | | | | | | | | | M | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 P3 | S44 P4 | S45 P6 | P7 | P8 | P12 | P13 | P16 | P17 | P18 | P21 | P22 | P23 | P28 | P39 | P | P | P | P | P | Vcc P9 | Vcc P20 | Vcc P24 | Vcc P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYSH | Sync. separation output H | SYNC SEP2 IN | SG50 | SW | | | | | | | | | | | | | | | | | | | | | | | | | 8.1 | 8.2 | 8.3 | V |
| | | | | PIN | | | | | M | | | | | | | | | | | | | | | | | | | | | | | |
| SYSL | Sync. separation output L | SYNC SEP2 IN | SG50 | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 0.1 | 0.4 | V |
| | | | | PIN | | | | | M | | | | | | | | | | | | | | | | | | | | | | | |
| HLV | Maximum sync. detection level | 36 | SG50 V=286 mV | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 7 | 18 | % |
| | | | | PIN | | | | | | | M | | | | | | | | M | | | | | | | | | | | | | |
| fV | Vertical free run frequency | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 41 | 44 | 47 | Hz |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| VVL | Vertical output minimum voltage | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0.3 | 0.7 | V |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| SSV | Service switch operation 2 | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 0 | 0.5 | V |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| FPV | Vertical pull-in range | 36 | SGd (fv variable) | SW | | | | | | | | | | | | | | | | | | | | | | | | | 65 | — | — | Hz |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| VW | Vertical output pulse width | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.35 | 0.52 | 0.65 | msec |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| VBLK W | Vertical BLK width | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.35 | 1.5 | 1.6 | msec |
| | | | | PIN | | | | | | | | | | | M | | | | | | | | | | | | | | | | | |
| BLK IN | Vertical BLK input | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | 0.5 | V |
| | | | | PIN | | | 5V | | | | | | | | M | | | | | | | | | | | | | | | | | |
| AV ER1 | 50/60 decision 1 | 36 | SGd (fv63Hz) | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 63 | — | Hz |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| AV ER2 | 50/60 decision 2 | 36 | SGd (fv57Hz) | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 57 | — | Hz |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| AV ER3 | 50/60 decision 3 | 36 | SGd (fv53Hz) | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 53 | — | Hz |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| AV ER4 | 50/60 decision 4 | 36 | SGd (fv47Hz) | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 47 | — | Hz |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| WV SS | Minimum sync. detection width | 36 | SGd (Wv variable) V=0.28V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 10 | 15 | — | µsec |
| | | | | PIN | | | | | | | | | | M | | | | | | | | | | | | | | | | | | |
| SCP G | SCP wave height value GP | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.21 | 4.5 | 6.5 | V |
| | | | | PIN | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |
| SCP H | SCP wave height value H-BLK | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.5 | 2.9 | 3.3 | V |
| | | | | PIN | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |
| SCP V | SCP wave height value V-BLK | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.35 | 1.55 | 1.80 | V |
| | | | | PIN | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Input signal SG Pin | Input signal condition | SW condition / PIN condition | S16 / P3 | S44 / P4 | S45 / P6 | P7 | P8 | P12 | P13 | P16 | P17 | P18 | P21 | P22 | P23 | P28 | P39 | P | P | P | P | P | Vcc P9 | Vcc P20 | Vcc P24 | Vcc P47 | Limits Min. | Limits Typ. | Limits Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VSH 1 | Vertical shift operation 1 | 36 | SGd (50Hz) V=0.28V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.43 | 0.58 | 0.73 | msec |
| | | | | PIN | | | | | | | | | | M | | | | | M | | | | | | | | | | | | | |
| VSH 2 | Vertical shift operation 2 | 36 | SGd (50Hz) V=0.28V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.53 | 0.68 | 0.83 | msec |
| | | | | PIN | | | | | | | | | | M | | | | | M | | | | | | | | | | | | | |
| VSH 3 | Vertical shift operation 3 | 36 | SGd (50Hz) V=0.28V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.67 | 0.82 | 0.97 | msec |
| | | | | PIN | | | | | | | | | | M | | | | | M | | | | | | | | | | | | | |
| VSH 4 | Vertical shift operation 4 | 36 | SGd (50Hz) V=0.28V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.81 | 0.96 | 1.11 | msec |
| | | | | PIN | | | | | | | | | | M | | | | | M | | | | | | | | | | | | | |
| VSH 5 | Vertical shift operation 5 | 36 | SGd (50Hz) V=0.28V | SW | | | | | | | | | | | | | | | | | | | | | | | | | 0.93 | 1.08 | 1.23 | msec |
| | | | | PIN | | | | | | | | | | M | | | | | M | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Parameter | Test conditions | | | | | | | | | | | | | | | | | | | | | | | | | | | | Limits | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input signal | | SW condition | S 16 | S 44 | S 45 | | | | | | | | | | | | | | | | | | | VCC | | | | Min. | Typ. | Max. | |
| | | SG Pin | condition | PIN condition | P 3 | P 4 | P 6 | P 7 | P 8 | P 12 | P 13 | P 16 | P 18 | P 21 | P 22 | P 23 | P 28 | P 39 | P 11 | P 14 | P 52 | P | P | P | P 9 | P 20 | P 24 | P 47 | | | | |
| — | OTHER standard | — | — | SW | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | — | — | — | — |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | 8.2 | 9 | 5 | 8.2 | | | | |
| SWA | SW A operation | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.8 | 5.0 | 5.1 | V |
| | | | | PIN | | M | | | | | | | | | | | | | | | | | | | | | | | — | 0.3 | 0.5 | |
| SWB | SW B operation | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 4.8 | 5.0 | 5.1 | V |
| | | | | PIN | M | | | | | | | | | | | | | | | | | | | | | | | | — | 0.3 | 0.5 | |
| ID ADJ1 | ID ADJ 1 "M" | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.65 | 2.05 | 2.45 | V |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| ID ADJ2 | ID ADJ 2 "H" | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.20 | 2.55 | 2.90 | V |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| ID ADJ3 | ID ADJ 3 "L" | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 1.10 | 1.45 | 1.80 | V |
| | | | | PIN | | | | | | | | | | | | | | | | | M | | | | | | | | | | | |
| I²C VOL | I²C - BUS VOL | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | — | 0.4 | V |
| | | | | PIN | | | | | | | | | | | | | | | | M | | | | | | | | | | | | |
| I²C VTH | I²C - BUS VTH | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 2.0 | 2.5 | 3.0 | V |
| | | | | PIN | | | | | | | | | | | | | | | M | M | | | | | | | | | | | | |
| CI²C | I²C - BUS Pin input capacitance | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | — | 2.0 | 7.0 | pF |
| | | | | PIN | | | | | | | | | | | | | | | M | M | | | | | | | | | | | | |
| fSCL | SCL clock maximum operation frequency | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | 100 | — | — | kHz |
| | | | | PIN | | | | | | | | | | | | | | | M | M | | | | | | | | | | | | |
| IBUS | I²C - BUS 0.4V current | — | — | SW | | | | | | | | | | | | | | | | | | | | | | | | | -10 | 3.5 | 10 | µA |
| | | | | PIN | | | | | | | | | | | | | | | 0.4V M | 0.4V M | | | | | | | | | | | | |
| ID ADJ4 | ID ADJ 4 "L" 2 | — | — | SW | | | | | | | | | | | | | | | | | M -180u | | | | | | | | 0.9 | 1.25 | 1.60 | V |
| | | | | PIN | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | A6 | | A0 | | | | | | A0 | A6 | A6 | D4 | | | | | A7 | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 1 | 0 | 64 | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| Icc9 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Icc20 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Icc24 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Icc47 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IILIcc | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | A6 | | A0 | | | | | | A0 | A6 | A6 | D4 | | | | | A7 | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 1 | 0 | 64 | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| VEA gmax | Data | | C6 | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | | | |
| ATT1 | Data | | C6 | | | | | | | | A0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| CTET | Data | | | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| VTA gmax | Data | | | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | | | |
| ATT2 | Data | | | | | | | | | | A0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| CTTE | Data | | C6 | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | | | |
| OFTE | Data | | A6/C6 | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 0/1 | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| VEA Typ | Data | | C6 | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| VTA Typ | Data | | C6 | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| VEA max | Data | | C6 | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | | | |
| VEA Imax | Data | | C6 | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | 1 | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
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| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| VTA max | Data | | | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | | | |
| VTA Imax | Data | | | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| S/NT | Data | | | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| S/NE | Data | | C6 | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | 1 | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| TV OFATT | Data | | | | | | | | | | AC/CO | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 0/127 | | | | | | | | | | | | | | | | | | | | | | | | |
| fTV | Data | | | | | | | | | | E7 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| fEXT | Data | | C6 | | | | | | | | E9 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | 1 | | | | | | | 74 | | | | | | | | | | | | | | | | | | | | | | | | |
| EXT OFATT | Data | | | | | | | | | | AC/CO | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | 0/127 | | | | | | | | | | | | | | | | | | | | | | | | |

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | D4 | | A0 | | | | | | A0 | A6 | A6 | D4 | | | | | A7 | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 1 | 0 | 64 | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| Cn1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cn2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACC1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACC2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OV | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VkP | Data | | | | | | | | | | | | | F2 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | |
| kilP | Data | | | | | | | | | | | | | F2 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | |
| APC1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| θR-Y P | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
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| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| R/BP | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CLP | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DDH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B/T | Data | | | | | | | | | | | | | | | D4/F3 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | 0/1 | | | | | | | | | | | | | | | | | | | |
| ACC3 | Data | | | | | | | | | | | | | | | F3 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| ACC4 | Data | | | | | | | | | | | | | | | F3 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| HBLK PAL | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BPF C1 | Data | | | | | | | | | | | | | | | F3 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| TOF C1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCIN | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hold PALL | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
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| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | D4 | | A0 | | | | | | A0 | A6 | A6 | D4 | | | | | A7 | A0 | E3 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 1 | 0 | 64 | 0 | 6 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| Cn3 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cn4 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VkN | Data | | | | | | | | | | | | | | | F2 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | |
| kiIN | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| APC2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| θR-Y N | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R/BN | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CLN | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T1 | Data | | | | | | | | | | | | | | | | | | A0 | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | | | | |
| T2 | Data | | | | | | | | | | | | | | | | | | C0 | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | 127 | | | | | | | | | | | | | | | | |
| T3 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HBLK NT | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hold NT | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BPF C2 | Data | | | | | | | | | | | | | | | F3 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| TOF C2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f free | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACC5 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
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| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | D4 | | A0 | | | | | | A0 | A6 | A6 | F2 | | | | | A7 | A0 | B4 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 1 | 0 | 1 | 0 | 64 | 0 | 1 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| SRA | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SRDL | Data | | | | | | | | | | | | | | | | | | | | A7 | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | 0 | 8 | | | | | | | | | | | | | |
| SRDH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
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| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | D4 | | A0 | | | | | | A0 | A6 | A6 | F2 | | | | | A7 | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 1 | 0 | 64 | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| AUTO 1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 3 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 4 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 5 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUTO 6 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | A6 | | A3 | | | | | | A0 | A0 | A7 | D4 | | | | | A7 | A0 | A7 | | A5 | A6 | | A6 | A5 | A5 | A5 | A6 | | A0 | | | |
| | Function | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 2 | 0 | 0 | 1 | 0 | 64 | 0 | 0 | 8 | 16 | 32 | 0 | 32 | 16 | 16 | 16 | 1 | 0 | 0 | 0 | 0 | 0 |
| ACL1 | Data | | | | | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | |
| GY | Data | | | | | | | | | | | | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | | | | | | | | | | | | | | | | |
| FBY | Data | | | | | | | | | | | D5 | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 57 | | | | | | | | | | | | | | | | | | | | | | |
| FBY RGB | Data | | | | | | | | | | | D5 | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 57 | | | | | | | | | | | | | | | | | | | | | | |
| 2AGY | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CTR1 | Data | | | | | A3/C3/D9/E8 | | | | | | D5 | F1 | | | | | | | | F3 | | | | | | | | | A6/A0 | | | | | |
| | Function | | | | | 1/0 | | 1/0 | | | | 20 | 57 | | | | | | | | 6 | | | | | | | | | 1/0 | | | | | |
| CTR2 | Data | | | | | A3/C3/D9/E8 | | | | | | D5 | F1 | | | | | | | | | | | | | | | | | A6/A0 | | | | | |
| | Function | | | | | 1/0 | | 1/0 | | | | 20 | 57 | | | | | | | | | | | | | | | | | 1/0 | | | | | |
| DTR1 | Data | | | | | F4/D5/C9/D2 | | | | | | D5 | F1 | | | | | | | | F3 | | | | | | | | | A6/A0 | | | | | |
| | Function | | | | | 1/0 | 1 | 1/0 | | | | 20 | 57 | | | | | | | | 6 | | | | | | | | | 1/0 | | | | | |
| DTR2 | Data | | | | | F4/D5/C9/D2 | | | | | | D5 | F1 | | | | | | | | | | | | | | | | | A6/A0 | | | | | |
| | Function | | | | | 1/0 | 1 | 1/0 | | | | 20 | 57 | | | | | | | | | | | | | | | | | 1/0 | | | | | |
| YDL1 | Data | | | | | | | | | | | A6 | | A4 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 32 | | 0 | | | | | | | | | | | | | | | | | | | | | |
| YDL2 | Data | | | | | | | | | | | A6 | | B1 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 32 | | 1 | | | | | | | | | | | | | | | | | | | | | |
| YDL3 | Data | | | | | | | | | | | A6 | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 32 | | | | | | | | | | | | | | | | | | | | | | | |
| YDL4 | Data | | | | | | | | | | | A6 | | F5 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 32 | | 3 | | | | | | | | | | | | | | | | | | | | | |
| YDL5 | Data | | | | C2 | | | | | | | A6 | | F5 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | 1 | | 32 | | 3 | | | | | | | | | | | | | | | | | | | | | |
| GT nor | Data | | | | | | | | | | | D5 | E5 | | | | | | | | | | A7 | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 50 | | | | | | | | | | 64 | | | | | | | | | | | | |
| GT max | Data | | | | | | | | | | | B9 | E5 | | | | | | | | | | A7 | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 63 | 50 | | | | | | | | | | 64 | | | | | | | | | | | | |
| GT min | Data | | | | | | | | | | | A0 | E5 | | | | | | | | | | A7 | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 0 | 50 | | | | | | | | | | 64 | | | | | | | | | | | | |
| GT 1M | Data | | | | | | | | | | | D5 | E5 | | | | | | | | | | A7 | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 50 | | | | | | | | | | 64 | | | | | | | | | | | | |
| GT 5M | Data | | | | | | | | | | | D5 | E5 | | | | | | | | | | A7 | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 50 | | | | | | | | | | 64 | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| ACL2 | Data | | | | A0 | | | | | | | D5 | C0 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | 0 | | | 20 | 127 | | | | | | | | | | | | | | | | | | | | | | |
| SSW1 | Data | | | | | | | | | | | D5 | F1 | A4 | | | | | | | | | | | | | | | | | | A0/A4 | | | |
| | Function | | | | | | | | | | | 20 | 57 | 0 | | | | | | | | | | | | | | | | | | 0/1 | | | |
| GY1 | Data | | | | | | | | | | | D5 | A0 | A4 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | |
| GY2 | Data | | | | | | | | | | | D5 | F1 | A4 | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 57 | 0 | | | | | | | | | | | | | | | | | | | | | |
| Lum nor | Data | | | | | | | | | | | | | | | | | | | | | | A7 | | | | A8 | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | | | | 128 | | | | | | | | |
| Lum max | Data | | | | | | | | | | | | | | | | | | | | | | C0 | | | | A8 | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 127 | | | | 128 | | | | | | | | |
| Lum min | Data | | | | | | | | | | | | | | | | | | | | | | A0 | | | | A8 | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 0 | | | | 128 | | | | | | | | |
| D(G) | Data | | | | | | | | | | | | | | | | | | | | | | A7 | A0/B9 | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | 0/63 | | | | | | | | | | | |
| D(B) | Data | | | | | | | | | | | | | | | | | | | | | | A7 | | | A0/B9 | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | | | 0/63 | | | | | | | | | |
| EX(R) | Data | | | | | | | | | | | | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | | | | | | | | | | | | | | | | |
| EX(G) | Data | | | | | | | | | | | | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | | | | | | | | | | | | | | | | |
| EX(B) | Data | | | | | | | | | | | | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | | | | | | | | | | | | | | | | |
| OF RG | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OF BR | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C(R) | Data | | | | | | | | | | | | | | | | | | | | | | A7 | | | | A0/C1 | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | | | | 0/255 | | | | | | | | |
| C(G) | Data | | | | | | | | | | | | | | | | | | | | | | A7 | | | | | A0/C1 | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | | | | | 0/255 | | | | | | | |
| C(B) | Data | | | | | | | | | | | | | | | | | | | | | | A7 | | | | | | A0/C1 | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | | | | | | 0/255 | | | | | | |
| Ccon 0 | Data | | | | | | | | | | | | F1 | | | | | | | C5 | | | C0 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 48 | | | 127 | | | | 128 | 128 | 128 | | | | | | |
| Ccon 1 | Data | | | | | | | | | | | | F1 | | | | | | | C0 | | | C0 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 127 | | | 127 | | | | 128 | 128 | 128 | | | | | | |
| Ccon 2 | Data | | | | | | | | | | | | F1 | | | | | | | A0 | | | C0 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 0 | | | 127 | | | | 128 | 128 | 128 | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| VMF | Data | | | | | | | | | | | D5 | F1 | | | A4 | | | | | | | | C6 | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | 20 | 57 | 0 | | | | | | | | | | | 1 | | 128 | 128 | 128 | | | | | | |
| R-Y PAL | Data | | | | | | | | | | | | F1 | | | | | | | C5 | | | C0 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 48 | | | 127 | | | | 128 | 128 | 128 | | | | | | |
| R-Y NT | Data | | | | | | | | | | | | F1 | | | | | | | C5 | | | C0 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 48 | | | 127 | | | | 128 | 128 | 128 | | | | | | |
| G-Y A | Data | | | | | | | | | | | | F1 | | | | | | | C5 | A7/E3 | | C0 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 48 | 0/6 | | 127 | | | | 128 | 128 | 128 | | | | | | |
| G-Y P | Data | | | | | | | | | | | | F1 | | | | | | | C5 | | | C0 | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | 48 | | | 127 | | | | | | | | | | | | |
| OSD 1 | Data | | | | | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | |
| OSD 2 | Data | | | | | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | |
| CLS | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A7 | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| CLV1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BLS1 | Data | | | | | | | | | | | | C0 | | | D4/C4 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | 1 | 0/1 | | | | | | | | | | | | | | | | | |
| BLS2 | Data | | | | | | | | | | | | C0 | | | D4/C4 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | 1 | 0/1 | | | | | | | | | | | | | | | | | |
| BLS3 | Data | | | | | | | | | | | | C0 | | | D4/C4 | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | 1 | 0/1 | | | | | | | | | | | | | | | | | |
| S/N RGB | Data | | | | | | | | | | | D5 | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | 20 | 57 | | | | | | | | | | | | | | | | | | | | | | |
| TC RGB | Data | | | | | | | | | | | | | | | | | | | | | | A7 | | | | A8 | A8 | A8 | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | 64 | | | | 128 | 128 | 128 | | | | | | |
| HBLK L | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VBLK L | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VA max | Data | | | | | | | | | | | | C0 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 127 | | | | | | | | | | | | | | | | | | | | | | |
| VD RGB | Data | | | | | | | | | | | | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | | | | | | | | | | | | | | | | |
| RGB ON | Data | | | | | | | | | | | | F1 | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | 57 | | | | | | | | | | | | | | | | | | | | | | |
| BLK ON | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | A6 | | A0 | | | | | | A0 | A6 | A6 | A2 | | | | | A7 | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 0 | 0 | 64 | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| HAS | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ISS | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BGP1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A6 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| BGP2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A6 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| BGP W | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| fH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FPH1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A6 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| FPH2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A6 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| HPT1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HPT2 | Data | | | | | | | | | | | | | | | | | | | | | A0 | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | 0 | | | | | | | | | | | | | |
| HPT3 | Data | | | | | | | | | | | | | | | | | | | | | C9 | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | 15 | | | | | | | | | | | | | |
| HPT4 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HPT5 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AFC G | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A0/A6 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0/1 | |
| FS | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A0/A5 | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0/1 | | |
| SYSH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**ELECTRICAL CHARACTERISTICS (cont.)**

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| SYSL | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HLV | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| fV | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VVL | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SSV | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A0/A4 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0/1 | | | |
| FPV | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VW | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VBLK W | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BLK IN | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AV ER1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AV ER2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AV ER3 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AV ER4 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WV SS | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SCP G | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SCP H | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SCP V | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VSH 1 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | A6 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 0 |
| VSH 2 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | B4 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| VSH 3 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | E1 | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 |

## ELECTRICAL CHARACTERISTICS (cont.)

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| VSH 4 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | E2 | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3 |
| VSH 5 | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D9 | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 4 |

| Symbol | Sub-address | 00H | 01H | | 02H | | | | | | 03H | 04H | 05H | 06H | | | | | 07H | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH | 10H | | 13H | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | SWB | IDADJ | AUDsw | SWA | TRAP | D TRAP | F TRAP2 | ACL | DLFA | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB | FTR1 | CLOFF | SESW | Hfr | AFCG | V-SIFT |
| — | Data | A6 | A6 | | A0 | | | | | | A0 | A6 | A6 | A2 | | | | | A7 | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 | A6 | | A0 | | | |
| | Function | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 | 2 | 0 | 0 | 0 | 0 | 64 | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 | 1 | 0 | 0 | 0 | 0 | 0 |
| SWA | Data | | | | A0/A7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | 0/1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SWB | Data | A6/C6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | 0/1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ID ADJ1 | Data | | A6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ID ADJ2 | Data | | B9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ID ADJ3 | Data | | A0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $I^2C$ VOL | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $I^2C$ VTH | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $C_{I^2C}$ | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $f_{SCL}$ | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $I_{BUS}$ | Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ID ADJ4 | Data | | A0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Function | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## ELECTRICAL CHARACTERISTICS TEST METHOD

ICC** Circuit Current

1. Test each pin current, and make it ICC**
2. Standard

   ICC** Expressed as (mA)

IILICC BUS IIL Lowest Operation Current

1. Gradually reduce the current from 13.6 mA at pin ⑩ , measure the current that causes malfunction to occur at BUS, and specify the value as IILIcc.
2. Standard

   IILICC** Expressed as (mA)

VEAgmax EXT AUDIO Maximum Gain

1. Input SG1 into pin ㊿ and test P-P value of pin ㊻ output signal, and make it VA1.
2. $$VEAgmax=20\log\frac{VA1}{VIN}\ (dB)$$

ATT1 Maximum Attenuation 1

1. Input SG1 into pin ㊿ and test P-P value of pin ㊻ output signal.
2. $$ATT1=20\log\frac{\text{Test value }(mV_{P-P})}{VA\ 1(mV_{P-P})}\ (dB)$$

CTET EXT→T V Cross Talk

1. Input SG1 into pin ㊿ and test P-P value of pin ㊻ output signal.
2. $$CTET=20\log\frac{\text{Test value }(mV_{P-P})}{VA\ 1(mV_{P-P})}\ (dB)$$

VTAgmax TV AUDIO Maximum Gain

1. Input SG1 into pin ㊽ and test P-P value of pin ㊻ output signal, and make it VA4.
2. $$VTAgmax=20\log\frac{VA4}{VIN}\ (dB)$$

ATT2 Maximum Attenuation 2

1. Input SG1 into pin ㊽ and test P-P value of pin ㊻ output signal.
2. $$ATT1=20\log\frac{\text{Test value }(mV_{P-P})}{VA\ 4(mV_{P-P})}\ (dB)$$

CTTE TV→EXT Cross Talk

1. Input SG1 into pin ㊽ and test rms value of pin ㊻ output signal.
2. $$CTTE=20\log\frac{\text{Test value }(mV_{P-P})}{VA\ 4(mV_{P-P})}\ (dB)$$

OFTE TV EXT Offset

1. Test output voltage difference of pin ㊻ without input.

VEATyp EXT AUDIO Normal Gain

1. Input SG1 (Typ) into pin ㊿ and test P-P value of pin ㊻ output signal, and make it VA8.
2. $$VEATyp=20\log\frac{VA8}{VIN}\ (dB)$$

VTATyp TV AUDIO Normal Gain

1. Input SG1 (Typ) into pin ㊽ and test P-P value of pin ㊻ output signal, and make it VA9.
2. $$VTATyp=20\log\frac{VA9}{VIN}\ (dB)$$

VEAmax EXT AUDIO Maximum Output

1. Input SG1 (V=3VP-P) into pin ㊿ and test P-P value of pin ㊻ output signal.

VEAImax EXT AUDIO Input D Range

1. Input SG1 (level variable) into pin ㊿ and then measure the distortion factor of the output signal at pin ㊻ .
2. Gradually increase the input and measure the input level when the distortion factor is 1%.

VTAmax TV AUDIO Maximum Output

1. Input SG1 (V=3VP-P) into pin ㊽ and test P-P value of pin ㊻ output signal.

VTAImax TV AUDIO Input D Range

1. Input SG1 (level variable) into pin ㊽ and then measure the distortion factor of the output signal at pin ㊻ .
2. Gradually increase the input and measure the input level when the distortion factor is 1%.

S/NT Sound S/N TV

1. Test the noise level of pin ㊻ .

S/NE Sound S/N EXT

1. Test the noise level of pin ㊻ .

TV OFATT ATT max min Offset TV
1. Test DC offset of pin 46 at ATT max min.
2. TV OFATT=ATTmin - ATTmax

fTV TV f Specific
1. Input SG1(f specific) into pin 48.
2. Measure the frequency whose amplitude takes -3dB of VA8 at pin 46.

fEXT EXT f Specific
1. Input SG1(f variable) into pin 50.
2. Measure the frequency whose amplitude takes -3dB of VA9 at pin 46.

EXT OFATT ATT max min Offset EXT
1. Test DC offset of pin 46 at ATT max min.
2. EXT OFATT=ATTmin - ATTmax

Cn1 Chroma Normal Output 1 (PAL)
Cn2 Chroma Normal Output 2 (PAL)
1. Input SS4P into pin 34, SG.A into pin 36.
2. Test the output amplitude of pin 41, 43 and make Cn1,Cn2.
3. At the same time, test the output amplitude of pin 44 and make it Vcn1.

ACC1 ACC Characteristics 1
1. Input VS4P(eb=570mV: Input level+6dB) into pin 34, SG.A into pin 36.
2. Test the output amplitude of pin 41.
3. $$ACC1 = 20 \log \frac{\text{Test value}(V_{P\text{-}P})}{\text{Cn1 }(V_{P\text{-}P})} \text{ (dB)}$$

ACC2 ACC Characteristics 2
1. Input VS4P(Input level -20dB) into pin 34, SG.A into pin 36.
2. Test the output amplitude of pin 41.
3. $$ACC2 = 20 \log \frac{\text{Test value}(V_{P\text{-}P})}{\text{Cn1 }(V_{P\text{-}P})} \text{ (dB)}$$

OV Overload Characteristics
1. Input VS4P (ec=800mV$_{P\text{-}P}$: Croma +3dB) into pin 34, SG.A into pin 36.
2. Test the output amplitude of pin 41.
3. $$OL = 20 \log \frac{\text{Test value}(V_{P\text{-}P})}{\text{Cn1 }(V_{P\text{-}P})} \text{ (dB)}$$

VikP Killer Operation Input Level (PAL)
1. Input VS4P (level variable) into pin 34 with level 0 dB and input SG.A into pin 36.
2. Lower the input level while monitoring the output amplitude at pin 41, and then measure the input level when no output amplitude is generated.

KilP Killer Color Residual (PAL)
1. Input VS4P(eb=0V) into pin 34, SG.A into pin 36.
2. Test the output amplitude of pin 41.

Note.) Take measurements in the auto color mode. KILLER malfunction may occur in the forced color mode.

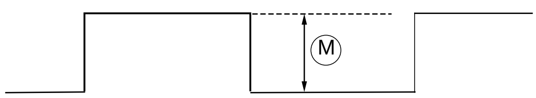
APC1 APC Pull-in Range 1
1. Input VS4P (f=eb=ec=variable) into pin 34, SG.a into pin 36.
2. Change the input signal frequency and measure the frequency range when the output signal at pin 41 comes into existence (is placed in the pull-in status). The basic value shall be 4.433619 MHz.

θR-Y P Demodulated Phase Angle θP-Y
1. Input VS4P (ec=Single Chroma, phase variable) into pin 34, SG.a into pin 36.
2. Measure the output at pin 43 make the ec phase variable and specify 0 deg for the phase where the output is zero.
3. Measure the output at pin 41, advance the ec phase, and measure the phase where the output becomes zero.

R//BP Demodulated Ratio R-Y/B-Y
1. Input VS4P (ec=Single Chroma=eb+50kHz) into pin 34, SG.a into pin 36.
2. Test the output amplitude of pin 41 and make it V41.
3. Test the output amplitude of pin 43 and make it V43.
4. $$R/BP = 20 \log \frac{\text{V43 }(V_{P\text{-}P})}{\text{V41 }(V_{P\text{-}P})} \text{ (dB)}$$

CLP Demodulated Output Carrier Leak
1. Input SS4P into pin 34, SG.a into pin 36.
2. Measure each of 4.43MHz element and 8.86MHz element of demodulation output at pin 41.

DDH Demodulated Output 1H Level Difference
1. Input VS4P(ec=0V) into pin 34, SG.a into pin 36.
2. Measure the 1H level difference at pins 41 and 43.



B/T BPF/TOP Switching

1. Input VS4P(input level-25dB) into pin 34 , SG.a into pin 36.
2. Test the output amplitude of pin 41 on TV, EXT.
3. $$B/T = 20\log\frac{EXT\ (V_{P\text{-}P})}{TV\ (V_{P\text{-}P})}\ (dB)$$

ACC3 ACC Characteristics 3 (EXT)

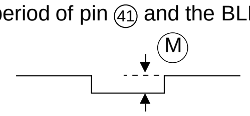
1. Input VS4P(input level+6dB) into pin 34 , SG.a into pin 36.
2. Test the output amplitude of pin 41.
3. $$ACC3 = 20\log\frac{Test\ value(V_{P\text{-}P})}{Cn1}\ (dB)$$

ACC4 ACC Characteristics 4 (EXT)

1. Input VS4P(input level-20dB) into pin 34 , SG.a into pin 36.
2. Test the output amplitude of pin 41 .
3. $$ACC4 = 20\log\frac{Test\ value(V_{P\text{-}P})}{Cn1}\ (dB)$$

HBLK PAL HBLK. Level Difference PAL

1. Input VS4P(ec=0mV)into pin 34, SG.a into pin 36.
2. Measure the level difference between the output color pattern period of pin 41 and the BLK period.




BPFC1 BPF Characteristics 1

1. Input VS4P (ec single frequency, 0.3 $V_{P\text{-}P}$, _f variable) and SG.a into pins 34 and 36, respectively.
2. Measure the output amplitude at pin 41 with ec=fsc+10kHz, +800 kHz, or -800 kHz.

TOFC1 TOF Characteristics 1

1. Input VS4P (ec single frequency, 0.3 $V_{P\text{-}P}$, _f variable) and SG.a into pins 34 and 36, respectively.
2. Measure the output amplitude at pin 41 with ec=fsc+10kHz, +800 kHz, or -800 kHz.

DCIN C Input D Range

1. Input VS4P (SYNC 1V) into pin 34, SG.a into pin 36 .
2. $$DCIN = 20\log\frac{Test\ value}{Cn1}\ (dB)$$

Hold PALL APC Hold Range

1. Input VS4P (f=eb=ec=variable) into pin 34, SG.a into pin 36 .
2. Change the input signal frequency range and then measure the frequency range when the output signal at pin 41 comes into existence (is placed in the pull-in status).

Cn3 Chroma Normal Output 3 (NTSC)
Cn4 Chroma Normal Output 4 (NTSC)

1. Input SS3N into pin 34 , SG.b into pin 36.
2. Test the output amplitude of pin 41, 43 and make Cn3,Cn4.

VikN Killer Operation Input Level (NTSC)

1. Input VS3N (level variable) into pin 34 with the input level of 0 dB and input SG.b into pin 36 .
2. Lower the input level while monitoring the output amplitude at pin 41, and then measure the input level when no output amplitude is generated.

KilN Killer Color Residual (NTSC)

1. Input VS3N (eb=0V) into pin 34, SG.b into pin 36.
2. Test the output amplitude of pin 41.

APC2 APC Pull-in Range 2

1. Input VS3N (f=eb=ec=variable) into pin 34, SG.b into pin 36 .
2. Change the input signal frequency and measure the frequency range when the output signal at pin 41 comes into existence (is placed in the pull-in status). The basic value shall be 3.579545 MHz.

Note: When measuring 3.58 MHz APC pull-in, set the APC pin to high-level, supply the signal to the pin, and then take measurements with the APC pin OPEN.
When the APC pin is set to high-level, oscillation of 3.58 MHz may stop. Use the above conditions for the measurement to check that this status is not held.

$\theta$R-Y N Demodulated Phase Angle $\theta$R-Y N

1. Input VS3N (eb=unity Chroma, phase variable) into pin 34 , SG.b into pin 36 .
2. Measure the output at pin 43 , make the ec phase variable, and specify 0 deg for the phase where the output is zero.
3. Observe the output at pin 41, advance the ec phase and measure the position where the output is 0.

R/BN Demodulated Ratio R-Y/B-Y

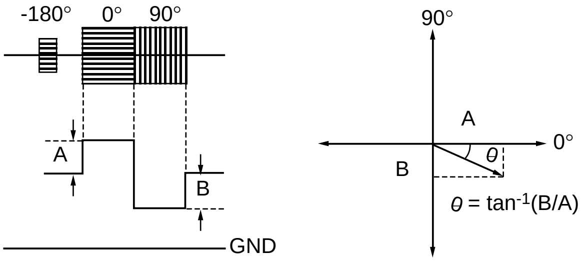
1. Input VS3N(ec=unity Chroma=eb+50kHz) and SG.b into pin 34 .
2. Test the output amplitude of pin 41 and make V41.
3. Test the output amplitude of pin 43 and make V43.
4. $$R/BN = 20\log\frac{V43(V_{P\text{-}P})}{V41(V_{P\text{-}P})}(dB)$$

CLN Demodulated Output Carrier Leak

1. Input SS3N into pin 34, SG.b into pin 36 .
2. Measure each of 3.58MHz element and 7.16MHz element of demodulation output at pin 41

T1 TINT Control Characteristics 1
T2 TINT Control Characteristics 2

1. Input VS3N (see the diagram below) and SG.b into pins 34 and 36, respectively.




Find the absolute angle from the output at pin 41 according to the diagram above.

2. Assuming the TINT DATA center (64) as the basic angle (TC), find the angle for TINT DATA MAX and MIN and express with the difference in angle between them. (MAX = TCMAX, MIN = TCMIN)
3. TC1=TCMAX-TC (deg)
   TC2=TC-TCMIN (deg)

T3 TINT Center Position

1. Shall be the basic angle for the TINT data center.
2. T3=TC

HBLK NT H-BLK Level Difference

1. Input VS3N(ec=0mV) into pin 34 , SG.b into pin 36 .
2. Measure the level difference between the output pattern period and the BLK period at pin 41 .

Hold NT APC Hold Range

1. Input VS3N(.f=eb=ec=variable) into pin 34 , SG.b into pin 36.
2. Change the input signal frequency and measure the frequency range when the output signal at pin 41 comes into existence (is placed in the pull-in status). The basic value shall be 3.579545 MHz.

BPFC2 BPF Characteristics 2

1. Input VS3N (ec single frequency, 0.3 VP-P, _f variable) and SG.a into pins 34 and 36, respectively.
2. Measure the output amplitude at pin 41 with ec=fsc+10 kHz, +800 kHz, or -800 kHz.

TOFC2 TOF Characteristics 2

1. Input VS3N (ec single frequency, 0.3 VP-P, _f variable) and SG.a into pins 34 and 36, respectively.
2. Measure the output amplitude at pin 41 with ec=fsc+10 kHz, +800 kHz, or -800 kHz.

f free VCXO Free Run Frequency

1. Test the oscillate frequency of pin 32 and make f CN16.
2. f free = f CN16-3579545 (Hz)

ACC5 ACC Lock

1. Input SG.G(f=3.579545MHz,V variable) into pin 34, SG.b into pin 36.
2. When the amplitude of SG.G is switched to 0.5 VP-P or 2.0 VP-P, the output at pin 41 shall be Vcn17a or Vcn17b, respectively.
3. $$ACC5 = 20 \log \frac{Vcn\ 17b}{Vcn\ 17a} \ (dB)$$

SRA SECAM REF Output AC Voltage

1. Measure the amplitude (SRA) of 4.43 MHz element of the output at pin 42.

SRDL SECAM REF Output DC voltage L

1. Test the output DC voltage of pin 42.

SRDH SECAM REF Output DC voltage H

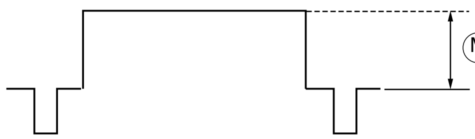
1. Test the output DC voltage of pin 42.

AUTO1~6 System Distinction 1~6

1. Place the IC in the AUTO mode and then check that BUS reads input signals appropriately.

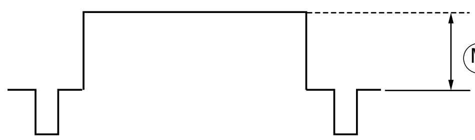
ACL1 Peak ACL "H" Level

1. Input SGA into pin 36.
2. Measure the amplitude (P-P) except for the blanking block of the output at pin 21




GY Video Normal Gain

1. Input SGA into pin 36.
2. Measure the amplitude (P-P) except for the blanking block of the output at pin 21.




3. $$GY=20 \log \frac{Test\ value}{VIN(0.714V)} (dB)$$

FBY Video Frequency Characteristics

1. Input SGB (5MHz, 0.714VP-P) into pin 36.
2. Measure the amplitude (P-P) except for the blanking block of the output at pin 21.
3. $$FBY=20 \log \frac{Test\ value\ (V_{P-P})}{GY\ (V_{P-P})} (dB)$$

FBYRGB Video Frequency Characteristics RGB Difference

1. Input SGB (5MHz, 0.4$V_{P-P}$) into pin 36.
2. Measure the amplitude (P-P) except for the blanking block of the output at pins 21, 22 and 23.
3. The maximum test value and the minimum test value are assumed to be MRGB and SRGB, respectively.
4. $$\text{FBYRGB}=20\log\frac{\text{SRGB }(V_{P-P})}{\text{MRGB }(V_{P-P})}\ \text{(dB)}$$

2AGY Double Amplifier Standard Output

1. Input SGA into pin 36.
2. Test the output amplitude (P-P) of pin 38 .
3. $$\text{2AGY}=20\log\frac{\text{Test value}}{\text{VIN }(1V_{P-P})}\ \text{(dB)}$$

CTR1 Chroma Trap Attenuation 1 (pin 21 output)

1. Input SGF (f = 3.58 MHz) into pin 36, measure the output amplitude at pin 21 wit TRAP DATA 0, and specify the value as $V_{Y60OFF}$.
2. Set TRAP DATA to 1, switch f TRAP1/f TRAP2 to 0/1, and then measure the respective output amplitude values at pin 21 .

| fTRAP1 | fTRAP2 | | |
|---|---|---|---|
| 0 | 0 | → | $V_{f00}$ |
| 0 | 1 | → | $V_{f01}$ |
| 1 | 0 | → | $V_{f10}$ |
| 1 | 1 | → | $V_{f11}$ |

3. TRAP00,01,10,11=
$$20\log\frac{V_{f00},V_{f01},V_{f10},V_{f11}(mV_{P-P})}{V_{Y6OFF}\ (mV_{P-P})}\ \text{(dB)}$$
4. Specify TRAP01 as the attenuation for fixing.
5. Of the values from TRAP00 to TRAP11, the maximum attenuation value shall be specified as the attenuation for arrangement.

CTR2 Chroma Trap Attenuation 2 (pin 21 output)

1. Input SGF (f = 4.43 MHz) into pin 36, measure the output amplitude at pin 21 with TRAP DATA 0, and specify the value as $V_{Y7OFF}$.
2. Set TRAP DATA to 1, switch f TRAP1 and f TRAP2 to 0/1, and then measure the respective output amplitude values at pin 21 .

| fTRAP1 | fTRAP2 | | |
|---|---|---|---|
| 0 | 0 | → | $V_{f00}$ |
| 0 | 1 | → | $V_{f01}$ |
| 1 | 0 | → | $V_{f10}$ |
| 1 | 1 | → | $V_{f11}$ |

3. TRAP400,401,410,411=
$$20\log\frac{V_{f00},V_{f01},V_{f10},V_{f11}(mV_{P-P})}{V_{Y7OFF}\ (mV_{P-P})}\ \text{(dB)}$$
4. Specify TRAP401 as the attenuation for fixing.
5. Of the values from TRAP400 to TRAP411, the maximum attenuation value shall be specified as the attenuation for arrangement.

DTR1 D. TRAP Attenuation 1 (pin 21 output)

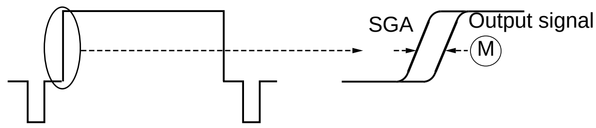
1. Set D.TRAP DATA to 1, and take measurement as in the case of CTR1.

DTR2 D. TRAP Attenuation 2 (pin 21 output)

1. Set D.TRAP DATA to 1, and take measurement as in the case of CTR2.

YDL1 Y delay time 1

1. Input SGA into pin 36 .
2. Measure the delay time of output from pin 21 against input signal.




Measure the delay time at the center of the rising portion.

YDL2~4 Y delay time 2 to 4

1. Input SGA into pin 36 .
2. Measure the delay time between the signal output from pin 21 and Y10 YDL1.

YDL5 Y delay time 5

1. Input SGA into pin 36 .
2. Measure the absolute value of difference in time between the output signal at pin 21 and Y13YDL4.

GTnor Video Tone 1

1. Input SGB (f=100kHz, 0.4$V_{P-P}$, 3MHz) into pin 36.
   Test the output amplitude of each pin 21 and make VY100K, VY3M.
2. $$\text{GTnor} = 20\log\frac{\text{VY3M}}{\text{VY100K}}\ \text{(dB)}$$

GTmax Video Tone 2

1. Input SGB (f= 3MHz, 0.4$V_{P-P}$) into pin 36.
2. Test the output amplitude of pin 21.
3. $$\text{GTmax} = 20\log\frac{\text{Test value }(V_{P-P})}{\text{VY100K}}\ \text{(dB)}$$

GTmin Video Tone 3

1. Input SGB (f= 3MHz, 0.4$V_{P-P}$) into pin 36 .
2. Test the output amplitude of pin 21 .
3. $$\text{GTmin} = 20\log\frac{\text{Test value }(V_{P-P})}{\text{VY100K}}\ \text{(dB)}$$

GT1M Video Tone 4

1. Input SGB (f= 1MHz, 0.4$V_{P-P}$) into pin 36 .
2. Test the output amplitude of pin 21 .
3. $$\text{GT1M} = 20\log\frac{\text{Test value }(V_{P-P})}{\text{VY100K}}\ \text{(dB)}$$

GT5M Video Tone 5

1. Input SGB (f= 5MHz, 0.4$V_{P-P}$) into pin 36 .
2. Test the output amplitude of pin 21.
3. $GT5M = 20 \log \dfrac{\text{Test value } (V_{P-P})}{VY100K}$ (dB)

ACL2 Peak ACL "L" Level

1. Input SGA into pin 36.
2. Test the output amplitude of pin 21.

SSW1 Service Switch Operation 1

1. Input SGB (f= 5MHz) into pin 36 .
2. Measure the output amplitude at pin 21 with the service SW set to OFF.
3. Measure the output amplitude at pin 21 with the service SW set to ON.
4. $GY1 = 20 \log \dfrac{\text{Test value}}{VY21}$ (dB)

GY1 Contrast Control Characteristics 1

1. Input SGB (f= 5MHz) into pin 36 .
2. Test the output amplitude of pin 21.
3. $GY1 = 20 \log \dfrac{\text{Test value}}{VY21}$ (dB)

GY2 Contrast Control Characteristics 2

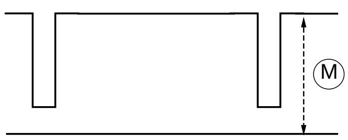
1. Input SGB (f= 5MHz) into pin 36.
2. Measure the output amplitude at pin 21 when 0V is applied to pin 26 from outside.
3. $GY2 = 20 \log \dfrac{\text{Test value}}{VY21}$ (dB)

Lum nor Brightness Control Characteristics 1

Lum max Brightness Control Characteristics 2

Lum min Brightness Control Characteristics 3

1. No input.
2. Test the output DC voltage of pin 21 except blanking part.
3. Lum max=Test value-Lum nor




D(G) Drive Control Characteristics G

1. Input SGA into pin 36.
2. Measure the output amplitude at pin 22 with D(G) DATA min and max. Specify the measured values as Dgmin and Dgmax, respectively.
3. $D(G) = 20 \log \dfrac{DGmax(V_{P-P})}{DGmin\ (V_{P-P})}$ (dB)

D(B) Drive Control Characteristics B

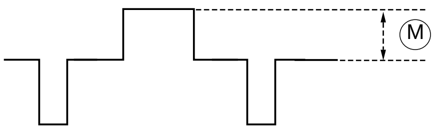
1. Input SGA into pin 36 .
2. Measure the output amplitude at pin 23 with D(B) DATA min and max. Specify the measured values as DBmin and DBmax, respectively.
3. $D(B) = 20 \log \dfrac{DBmax(V_{P-P})}{DBmin\ (V_{P-P})}$ (dB)

EX(R) EXT(R) Normal Gain

EX(G) EXT(G) Normal Gain

EX(B) EXT(B) Normal Gain

1. Input SG50 and SGD (V=0.7V) into pin 36 and FB, respectively. Input SGD (V=0.35V) into each of ER, EG and EB.
2. Measure the amplitude over the pedestal level except for the blanking block of the outputs at pins 21 , 22 and 23. Specify the respective values as VY31R, VY31G and VY31B.




3. $EXT(R), EXT(G), EXT(B) = 20 \log \dfrac{\text{Test value}}{0.35}$ (dB)

OFRG R-G Offset Voltage

OFBG B-G Offset Voltage

1. Test the output DC voltage of pin 21, 22, 23 except blanking part.
2. OFRG=(pin 21 Test voltage)-(pin 22 Test voltage)(mV)
   OFBG=(pin 23 Test voltage)-(pin 22 Test voltage)(mV)

C(R) R Cut-off Characteristics

C(G) G Cut-off Characteristics

C(B) B Cut-off Characteristics

1. Test the output DC voltage of pin 21 , 22 , 23 except blanking part when each of C(R), C(G), C(B) DATA is max, min.
2. C(R),C(G),C(B)
   =(DATAmax voltage)-(DATAmin voltage) (V)

Ccon0 Color Regulation Characteristics 0

1. Input SGE (V=1.3V) into -B IN (pin 44 ).
2. Test the output amplitude of pin 23 and make VY37.

Ccon1 Color Regulation Characteristics 1

Ccon2 Color Regulation Characteristics 2

1. Input SGE into -B IN (pin 44).
2. Test the output amplitude of pin 23 and make VY38, VY39.
3. $Ccon1, Ccon2 = 20 \log \dfrac{VY38, VY39}{VY37}$ (dB)

VMF Video Mute Characteristics

1. Input SGB(f=5MHz) into pin ㊱ .
2. Test the output amplitude of pin ㉑ .
3. $$\text{VMF} = 20\log\frac{\text{Test value}}{\text{VY21}}\ \text{(dB)}$$

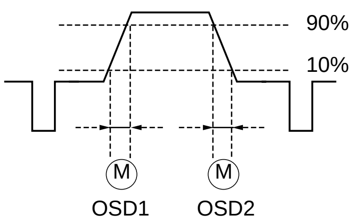
R-Y PAL R-Y/B-Y PAL Relative Amplitude
R-Y NTSC R-Y/B-Y PAL Relative Amplitude
G-Y /B-Y R-Y/B-Y PAL Relative Amplitude
<G-Y <G-Y Relative Phase

1. Input SGE(V=1$V_{P-P}$)into -B IN (pin ㊹ ).
2. Test the output amplitude of pin ㉒ , ㉓ .
   (and make B-Y, G-Y← B)
3. Input SGE(V=0.56V) into -R IN (pin ㊺ ).
4. Test the output amplitude of pin ㉑ , ㉒ .
   (and make R-Y, G-Y← R)
5. Change into NTSC mode and test the output amplitude of pin ㉑ . (and make R-Y n)
6. $$\text{R-Y PAL} = \frac{\text{R-Y}_P}{\text{B-Y}}\ (\text{-})$$
   $$\text{R-Y NTSC} = \frac{\text{R-Y N}}{\text{B-Y}}\ (\text{-})$$
7. $\text{G-Y}\leftarrow\text{RNT} = \text{G-Y}\leftarrow\text{R X COS7}^\circ$
   $\text{G-Y}\leftarrow\text{BNT} = \text{G-Y}\leftarrow\text{B-G-Y}\leftarrow\text{R X SIN7}^\circ$
8. $$\text{PAL G-Y/B-Y} = \frac{\sqrt{(\text{G-Y}\leftarrow\text{R})^2+(\text{G-Y}\leftarrow\text{B})^2}}{\text{B-Y}}\ (\text{-})$$
   $$\text{NTSC G-Y/B-Y} = \frac{\sqrt{(\text{G-Y}\leftarrow\text{RNT})^2+(\text{G-Y}\leftarrow\text{BNT})^2}}{\text{B-Y}}\ (\text{-})$$
   $$\text{PAL<G-Y} = \text{Tan}^{-1}\frac{\text{G-Y}\leftarrow\text{R}}{\text{G-Y}\leftarrow\text{B}}\ \text{(deg)}$$
   $$\text{NTSC<G-Y} = \text{Tan}^{-1}\frac{\text{G-Y}\leftarrow\text{RNT}}{\text{G-Y}\leftarrow\text{BNT}}\ \text{(deg)}$$

OSD1 OSD Speed Characteristics 1
OSD2 OSD Speed Characteristics 2

1. Input SG50 into pin ㊱ . Input SGD into each of FB, ER, EG and EB.
2. Measure the signal rising/falling time above the pedestal level except for the blanking block of the output at pins ㉑ , ㉒ and ㉓ .

PIN ㉑, ㉒ , ㉓ OUTPUT WAVEFORM




CLS Input Cut Switch Operation

1. Test the output DC of pin ㊳.

CLV1 Input Cramp Potencial 1

1. Test the output DC of pin ㊳ .

BLS1 Black Expanding Operation 1
BLS2 Black Expanding Operation 2
BLS3 Black Expanding Operation 3

1. Input SGC (Y49 0.2V, Y50 0.4V, Y51 0V) into pin ㊱ .
2. Specify DC except for BLK of BLS 0 (OFF) as BLS off.
3. Specify DC except for BLK of BLS 1 (ON) as BLS on.
4. BLS1, 2, 3=BLS off-BLS on

S/N RGB RGB Output Noise

1. Test the output noise level of pin ㉑ except BLK part.

Tc RGB RGB Output Temperature Characteristics

1. Measure the voltage except for BLK block of the output at pin ㉑ when the ambient temperature is -20˚C and specify the value as $V_{-20^\circ C}$.
2. Measure the voltage except for BLK block of the output at pin ㉑ when the ambient temperature is 65˚C and specify the value as $V_{-65^\circ C}$.
3. $$\text{TcRGB} = \frac{(V_{65^\circ C}) - (V_{-20^\circ C})}{85^\circ C}\ (\text{mV}/^\circ\text{C})$$

HBLKL HBLK "L" Level
VBLKL VBLK "L" Level

1. Test the output voltage of pin ㉑ on the term of HBLK, VBLK.

$V_A$max Analog RGB Maximum Output

1. Input SG50 into pin ㊱. Input SGD into each of ER, EG, EB and FB.
2. Test the output amplitude of pin ㉑,㉒,㉓except BLK part.

$V_{DRGB}$ Analog RGB Input D Range

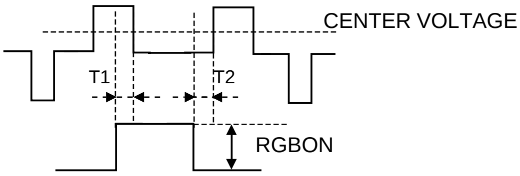
1. Input SG50 into pin ㊱. Input SGD (level 0.5V, 1.0V) into each of ER, EG, EB and FB.
2. Test of the output aplitude of pin ㉑, ㉒, ㉓ and make $V_{Y57RT}$, $V_{Y57GT}$, $V_{Y57BT}$, $V_{Y57RH}$, $V_{Y57GH}$, $V_{Y57BH}$ .
3. $$V_{DRGB} = 20\log\left(\frac{V_{Y57RH},\ V_{Y57GH},\ V_{Y57BH}}{V_{Y57RT},\ V_{Y57GT},\ V_{Y57BT}}\right)\ \text{(dB)}$$

RGBON Analog RGB ON Voltage

RGBON BLK RGB ON Voltage

ARGB DL Analog RGB Transmission Characteristics

1. Input SGA into pin 21 and SGD(level variable) into FB.
2. Observing the output at pin 21, measure the SGD level that keeps pedestal electric potential for the period of SGD "H".
3. At the same time, measure the delay time between SGD and pin 21 .
4. Increasing SGD, measure the SGD level where BLK of SGD "H" period takes place.




CTAT Analog RGB → TV Crosstalk

1. Input SG50 into pin 36 and SGB (f=5MHz) into ER.
2. When the voltages of 0V and 0.7V are applied to FB, the amplitude except for BLK portion of the output at pin 21 are specified as $V_{0V}$ and $V_{0.7V}$, respectively.
3. $\mathrm{CTAT}=20\log\frac{V_{0V}}{V_{0.7V}}$ (dB)

CTTA TV → Analog RGB Crosstalk

1. Input SGB(f=5MHz) into pin 36.
2. When the voltages of 0V and 0.7V are applied to FB, the amplitude except for BLK portion of the output at pin 21 are specified as $V_{Y0V}$ and $V_{Y0.7V}$, respectively.
3. $\mathrm{CTTA}=20\log\frac{V_{Y0V}}{V_{Y0.7V}}$ (dB)

VDY Video Input D Range

1. Input SGB(f=100kHz, level variable Lumi:0.714,1.428V) into pin 36.
2. Test the output amplitude of pin 21 except BLK part, and make $V_{Y63T}$, $V_{Y63H}$.
3. $\mathrm{VDY}=20\log\left(\frac{V_{Y63H}}{V_{Y63T}}\right)$ (dB)

VDCO Color Input D Range

1. Input SGE(1.0$V_{P-P}$, 2.0$V_{P-P}$) into -B.
2. Test the output amplitude of pin 21 except BLK part.
3. $\mathrm{VDCO}=20\log\left(\frac{V_{Y64H}}{V_{Y64T}\times V_{YCN}1}\right)$ (dB)

Zcor Color Output Impedance

1. Test the output impedance of pin 41 and 43 as SECAM, NO SECAM.

Ygmax Video Maximum Gain

1. Input SGB(f=100kHz, V=0.4$V_{P-P}$) into p36 .
2. Test the output amplitude into pin 21 except BLK part.
3. $\mathrm{Ygmax}=20\log\frac{\text{Test value}}{0.4V_{P-P}}$ (dB)

f tone Tone Control Peaking Frequency

1. Input SGB (0.714V f variable) into pin 36 .
2. Varying the frequency of SGB, find the frequency where output amplitude takes a maximum value at pin 21 .

BLS start Black Expansion Start Point

1. Input SGC (level variable) into pin 36 .
2. Make VY68A the output amplitude when SGC level is 0.
3. Gradually changing the SGC level largely, measure the amplitude at which the output at pin 21 does not change with the black expansion is turned on/off (specified to be VY68).
4. Measure the output at pin 21 when the SGC level set to 0.714 (specified to be VY68 TYP).
5. $\text{BLS start}=\frac{\text{VY68-VY68A}}{\text{VY68TYP-VY68A}}\times 100$ (IRE)

BLS max Maximum Gain of Black Expansion Amplifier

1. Input SGB (level 0.3$V_{P-P}$) into pin 36.
2. When 5V and OPEN are applied to pin 30, the output at pin 21 is specified to be VY69 5V and VY69 OPEN, respectively.
3. $\text{BLS max}=20\log\frac{\text{VY69 5V}}{\text{VY69 OPEN}}$ (dB)

CTR3 Chroma Trap Attenuation 3

1. Perform TRAP CONT. of trap data for the attenuation when adjustments are made at Y7.
2. Standard CTR3 shall be specified to be a value given in (dB) when TRAP CONT. is performed on the trap data at Y6.

VYSW Y SW OUT Input D Range

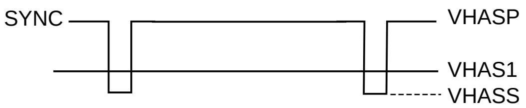
1. Input SGB(f=100kHz level variable Lumi:0.714, 1.428V) into pin 36.
2. Test the output Lumi level of pin 38 and make $V_{Y71T}$, $V_{Y71H}$.
3. $\mathrm{VYSW}=20\log\frac{V_{Y71H}}{V_{Y71T}}$ (dB)

DVY Video Amplitude with Voltage Reducing SW Set to ON

1. Input SGB(f=100kHz Lumi:0.714) into pin 36
2. For standard DVY, switch the voltage at pin 24 to 0V and 4.5V, measure the output at pin 21, and then give the value in ($V_{P-P}$).

HAS Auto Slice Slice Level

1. Test the output voltage of pin 39 as no input and make VHAS1.
2. Input SG50(V=286mV$_{P-P}$) into 36.
3. Test the sink-chip and pedestal potencial of pin 39 and make VHASS, VHASP.
4. $$HAS = \frac{(VHAS1-VHASS)}{(VHASP-VHASS)} * 100\ (\%)$$



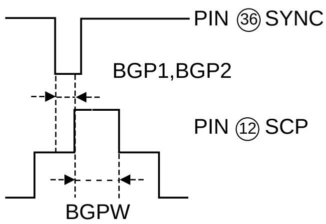

ISS Sync. Separation Input Sensitivity Current

Supply current from pin 7, then measure the flow current when the voltage at pin 8 is 0.5 VDC or less.

BGP1 BGP Timing 1

BGP2 BGP Timing 2

BGPW BGP Pulse Width




FH Horizontal Freerun Frequency

Test the output frequency of pin 13 as no input.

FPH1 Horizontal Pull-in Range 1

FPH2 Horizontal Pull-in Range 2

Change the SGc frequency and then calculate the difference in test value from 15.625 kHz of the frequency range pull in by output signal at pin 13 and input signal at pin 36.

15.625kHz - Test value (Hz)

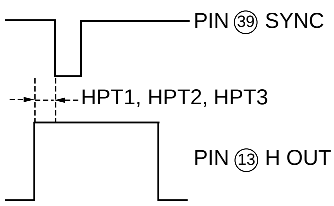
HPT1 Horizontal Pulse Timing 1

HPT2 Horizontal Pulse Timing 2 HPT2-HPT1

HPT3 Horizontal Pulse Timing 3 HPT3-HPT1

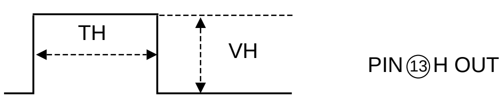
HPT4 Horizontal Pulse Timing 4 HPT4-HPT1

HPT5 Horizontal Pulse Timing 5 HPT5-HPT1




TH Horizontal Pulse Width

VH Horizontal Pulse Amplitude




SH Horizontal Stop Operation

When lowering the voltage at pin 9, measure the voltage at which H.OUT output stops.

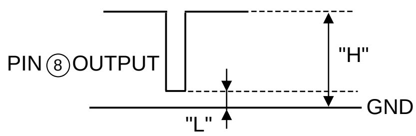
AFCG AFC Gain Operation

1. Test the output amplitude of pin 16 when AFC Gain Switch is changed and make AFCon when SW is ON and AFCoff when SW is OFF.
2. $$AFCG = 20 \log \frac{AFCon\ (V_{P-P})}{AFCoff\ (V_{P-P})}\ (dB)$$

FS H-V Free Operation

Test the voltage difference of pin 39 when H.FREE SW is ON and OFF.

SYSH SYNC SEP Output "H"
SYSL SYNC SEP Output "L"



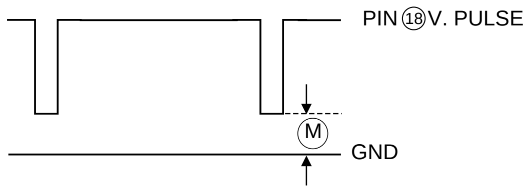

HLV Minimum Sync. Detection Level

1. Input SG50 (V=variable) into pin 36 .
2. Gradually reduce the SG50 amplitude from 286 mV$_{P-P}$, measure the amplitude where the horizontal synchronization is put out of the range and specify the value to be HLV1.
3. $$HLV = \frac{HLV1}{286} * 100\ (\%)$$

FV Vertical Free-run Frequency

Test the output frequency of pin 18 as no input.

VVL Vertical Output Minimum Voltage



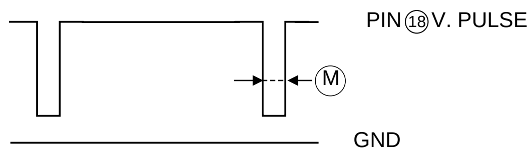

SW Service Switch Operation 2

Test the output DC voltage of pin 18 when the service switch DATA ON.

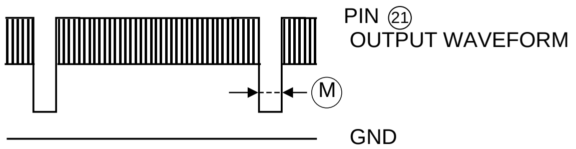
FPV Vertical Pull-in Range

Lower frequencies of SG.d at pin 39 from higher frequency and then measure the frequency when the output waveform at pin 18 is pulled in.

VW Vertical Output Pulse Width



VBLKW Vertical BLK Width




BLK IN Vertical BLK Input

Apply 5V to BLK IN and test the output DC voltage into pin 21.

AVER1 50/60 Decision 1
AVER2 50/60 Decision 2
AVER3 50/60 Decision 3
AVER4 50/60 Decision 4

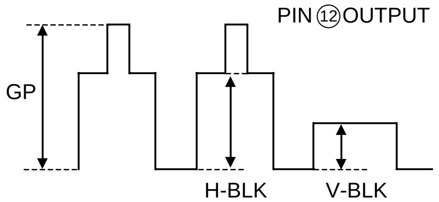
For input frequencies, check that the output frequencies at pin 18 are the same (put in the same pull-in status).
At the same time, check the status of BUS write mode (D7).

WVSS Minimum Sync. Detection Width

Narrowing the width of SG.d signal at pin 36, measure the input signal width when the output at pin 16 becomes out of synchronization.

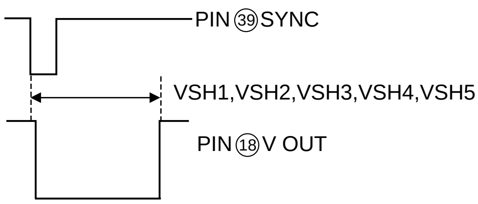
SCPG SCP Wave Height Value GP
SCPH SCP Wave Height Value H-BLK
SCPV SCP Wave Height Value V-BLK

Test the output waveform of pin 12 as no input.




VSH1 Vertical Shift Operation 1
VSH2 Vertical Shift Operation 2
VSH3 Vertical Shift Operation 3
VSH4 Vertical Shift Operation 4
VSH5 Vertical Shift Operation 5

1. Input SG.d(f=50Hz,V=285$mV_{P-P}$) into pin 36.
2. Measure the delay time from signal input at the center point of falling portion at pin 39 to signal output at the center point of rising portion at pin 18.
3. Make VSH1,VSH2,VSH3,VSH4 and VSH5(nsec) each value.




SWA SW A

Test the voltage of pin 4 when SW A is DATA ON and OFF at no input.

SWB SW B

Test the voltage of pin 4 when SW B is DATA ON and OFF at no input.

IDADJ1 ID ADJ 1 "M"

Test the output DC voltage of pin 52.

IDADJ2 ID ADJ 2 "H"

1. Test the output DC voltage of pin 52.

IDADJ3 ID ADJ 3 "L"

1. Test the output DC voltage of pin 52.

ICVOL IC BUS VOL

Supply a current of 3 mA to pin 14 and then measure the voltage of acknowledge bit.

$I^2CV_{TH}$ $I^2C$ BUS $V_{TH}$

Lowering the "H" voltage of SDA/SCL input, measure the voltage at which BUS does not operate.

$CI^2C$ $I^2C$ BUS Pin Input Capacity

Test the capacity of pin 11 and 14 on OPEN.

fSCL SCL Clock Maximum Operation Frequency

Test the SCL maximum operation frequency BUS reacted.

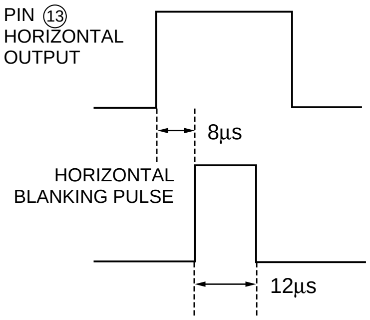
IBUS IC BUS 0.4V Current

Test the current of pin 11 and 14 when 0.4V is applied.

IDADJ4 ID ADJ 4 "L" 2

Measure the voltage when a current of 180µA flows from pin 52.

Note 1. Adjust the one-shot multivibrator's potentiometer so that the timing of the horizontal blanking pulse and pulse width are as shown in the figure below.




Set 8µs via the pin 15 potentiometer of TTL IC, M74LS221P, and set 12µs via the pin 7 potentiometer.

About Input Signal Parameter Including Color Signal

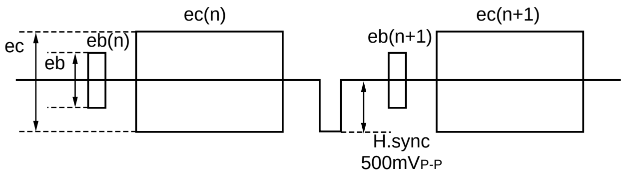
1. The name of input signal is made of 4 alphanumeric characters.

Note) | S | S | 4 | P | Standard Signal 4.43MHz PAL system

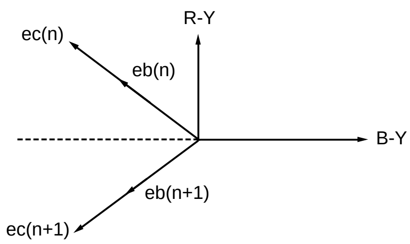
4th characters
3rd characters
2nd characters
1st characters

1st Characters : Standard=S , No standard=V (however, the part of change is specified.)
2nd Characters : Meanings of signal
3rd Characters : Expressed as burst and chroma frequency.
4(4.433619MHz), 3(3.579545MHz) (however, this is treated the same as SECAM standard signal in case of "S")
4th Characters : Expressed as color system.
N(NTSC), P(PAL)

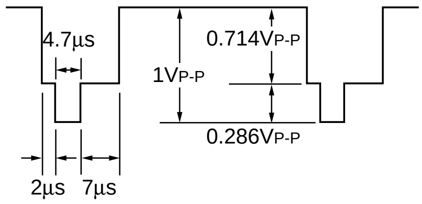
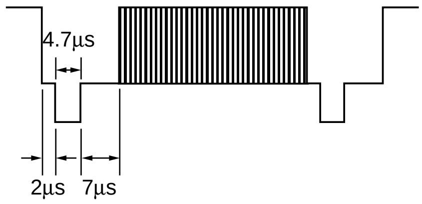
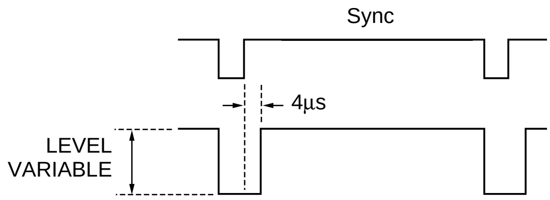
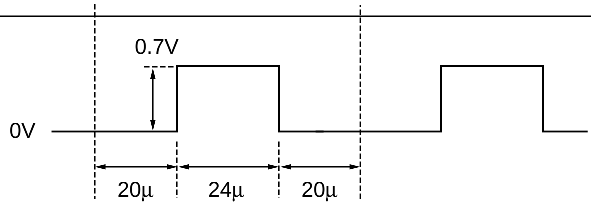
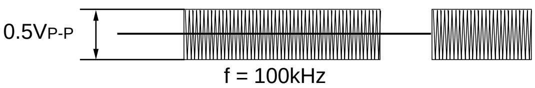
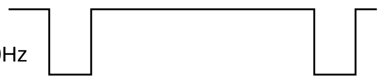
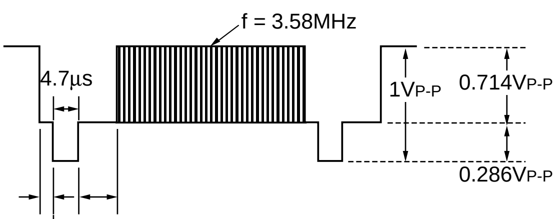
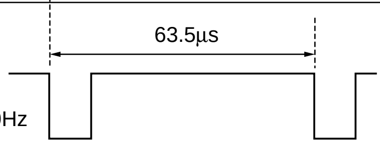
2. Configuration of input color signal.
Configurations of color signal are shown in the figure below.

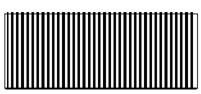



1. If the first character of a signal name is S (standard), the signal conforms to the standard color bar signal in types. However, H.sync is to be added for input clamp. (The frequency of H.sync conforms to the 4th character. P: 50 Hz, N: 60 Hz)
2. The amplitude of burst and the frequency are given in eb. If they are standardized, the amplitude is 285 mVP-P and the frequency conforms to the 3rd character of the signal name.
3. The amplitude of chroma and the frequency are given in ec. If they are standardized, the amplitude is 570 mVP-P and the frequency conforms to the 3rd character of the signal name.
4. The phase correlation on the PAL type signal is shown in the figure below.



**Video/Interface**

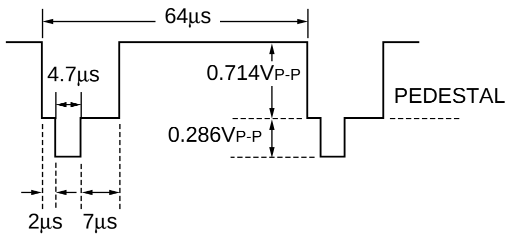
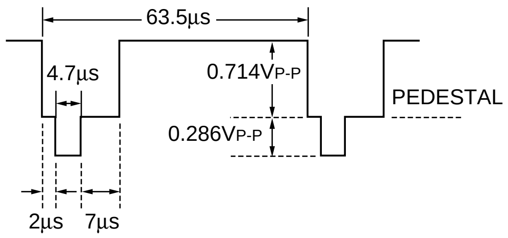
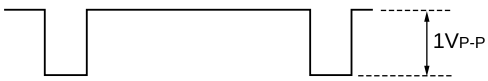
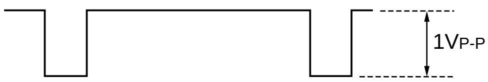
<table>
<tr><th>SG. No.</th><th>Signals (50Ω termination)</th></tr>
<tr><td>SG. A</td><td>PAL type<br>Make input for sync separation PAL type APL 100% normal video signal shown in the figure on the right. Vertical must be inter laced at 50Hz.<br>
</td></tr>
<tr><td>SG. B</td><td>On the SGA signal, Lumi. signal frequency and amplitude are variable.<br>However, standard amplitude is 0.714 VP-P<br>
</td></tr>
<tr><td>SG. C</td><td>
</td></tr>
<tr><td>SG. D</td><td>
</td></tr>
<tr><td>SG. E</td><td>
</td></tr>
<tr><td>SG. 50</td><td>Level variable<br>typ = 0.3VP-P<br>H = 15.625kHz, V = 50Hz<br><br>STANDARD PAL SYNC</td></tr>
<tr><td>SG. F</td><td>NTSC type<br>
</td></tr>
<tr><td>SG. 60</td><td>Level variable<br>typ = 0.3VP-P<br>H = 15.734kHz, V = 60Hz<br>

STANDARD NTSC SYNC</td></tr>
<tr><td>SG. G</td><td>Level variable<br>CW<br><br>f = 3.579545MHz</td></tr>
</table>

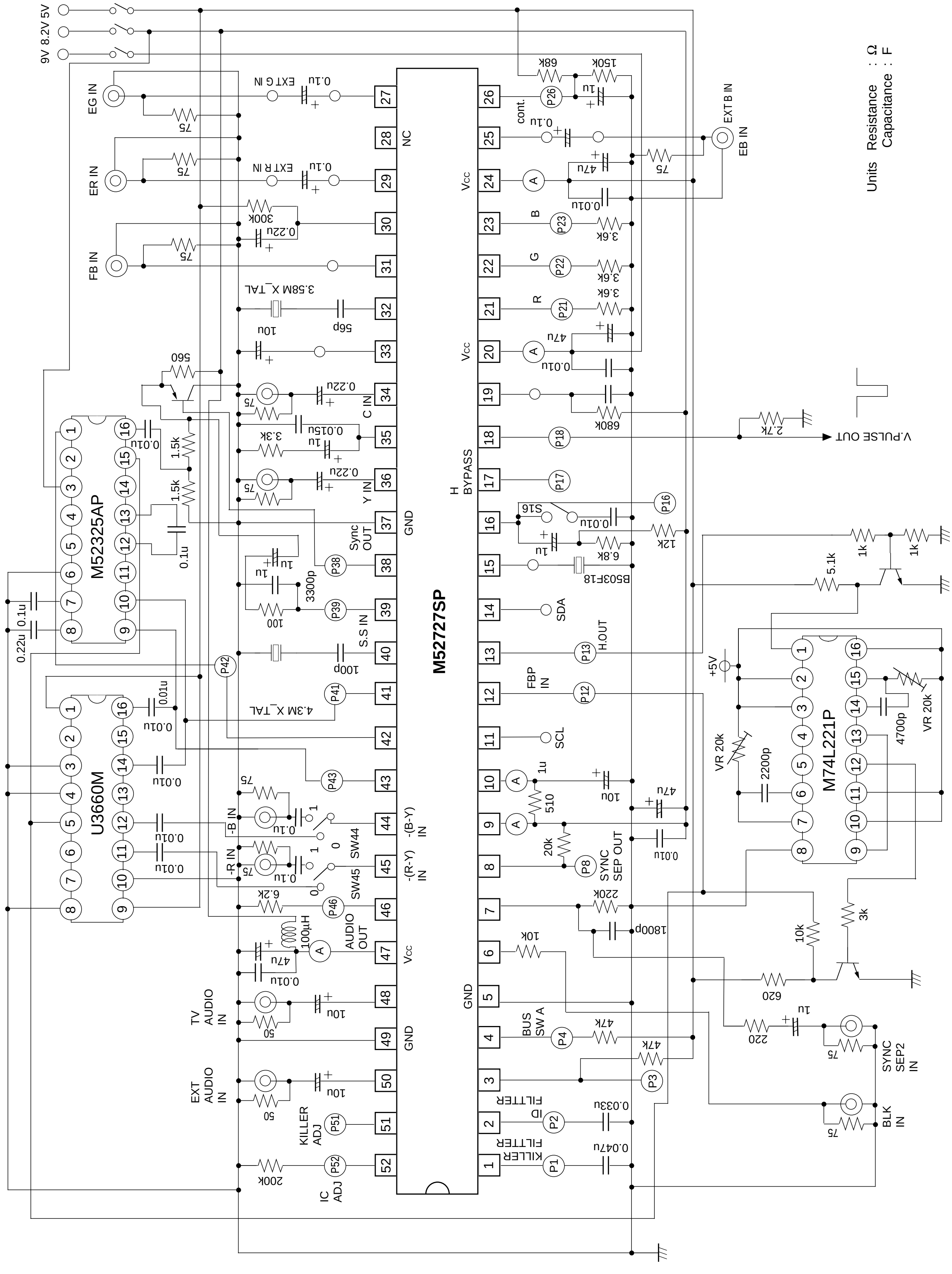
## AUDIO

| SG. No. | Signals (50Ω termination) |
|---|---|
| SG. 1 | f=1kHz, $1V_{P-P}$, CW 50Ωtermination<br>f variable Level variable (TYP f=1kHz, $1V_{P-P}$) |

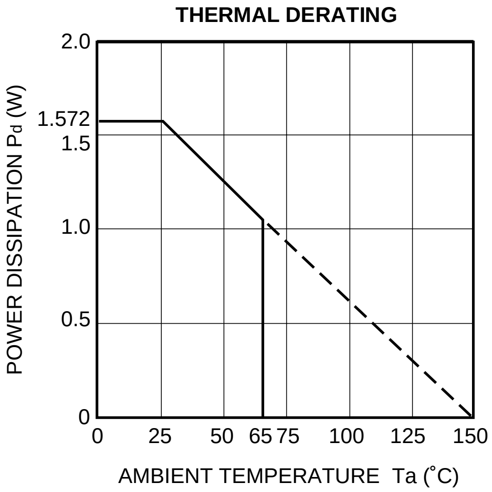
## TENDENCY

| SG. No. | Signals (50Ω termination) |
|---|---|
| SG. a | Make SG.a PAL type APL variable video signal.<br>Vertical must be interlaced at 50Hz.<br> |
| SG. b | Make SG.b NTSC type APL variable video signal.<br>Vertical must be interlaced at 50Hz.<br> |
| SG. c | Duty 90% Frequency variable Level variable (standard $1V_{P-P}$)<br> |
| SG. d | Duty 95% Frequency variable Level variable (standard $1V_{P-P}$) Duty variable (standard : 95%)<br> |

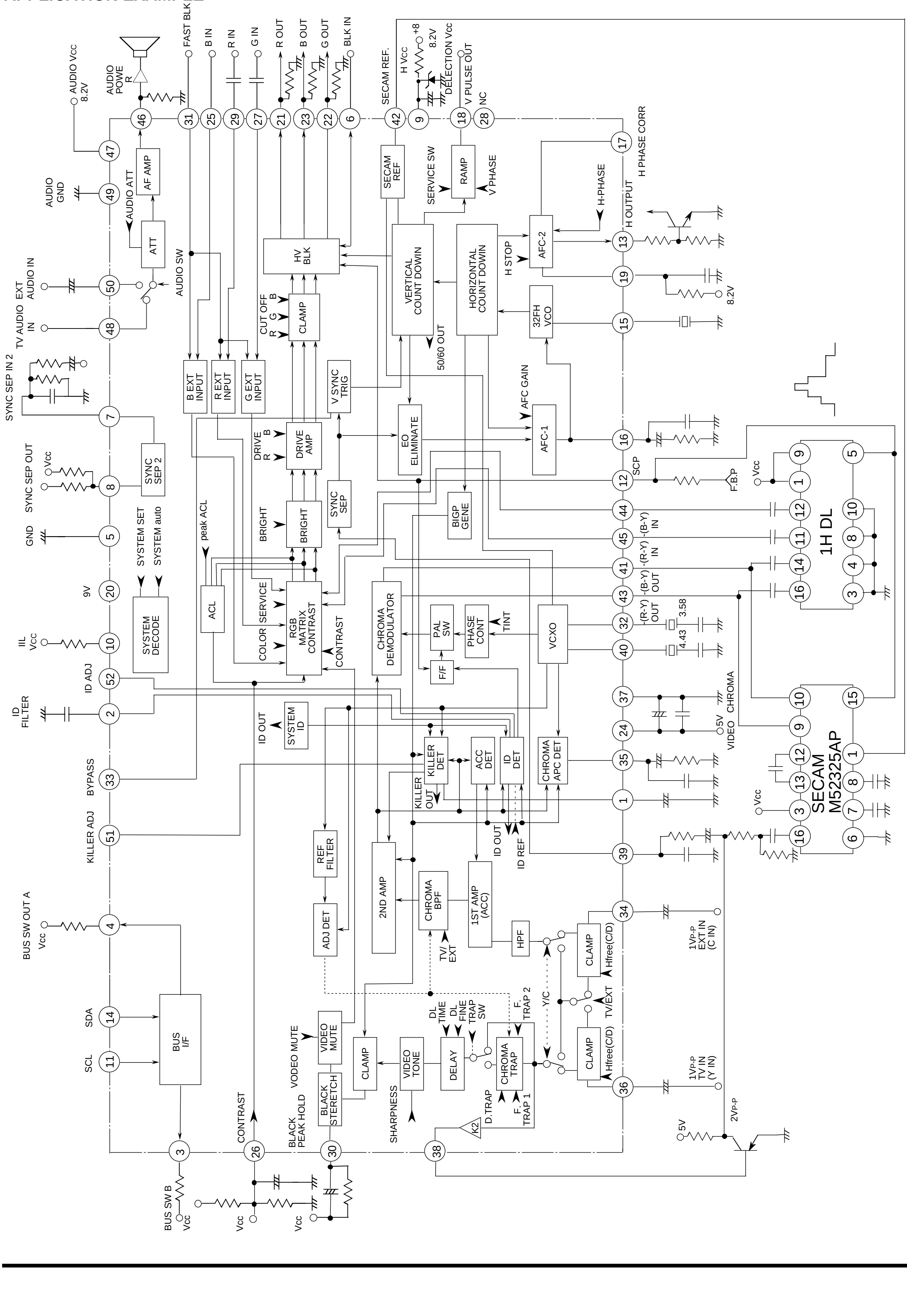
## TEST CIRCUIT DIAGRAM



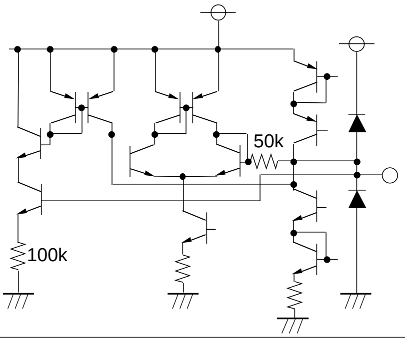
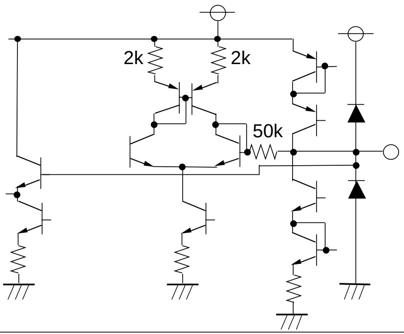
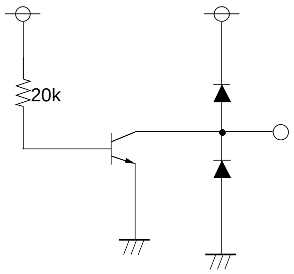
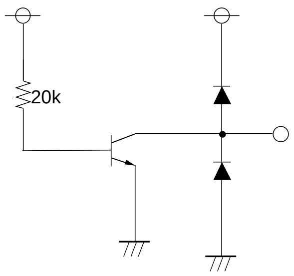
## TYPICAL CHARACTERISTICS



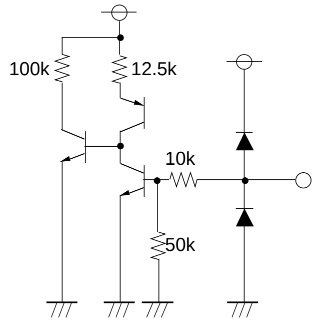
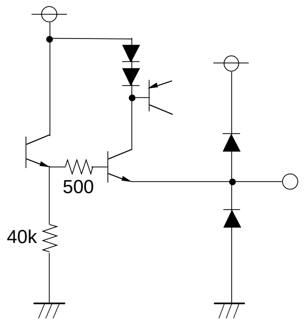
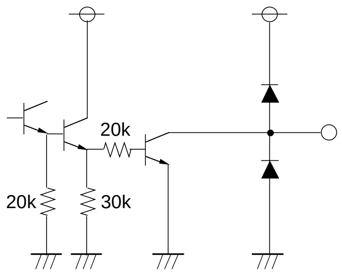
## APPLICATION EXAMPLE



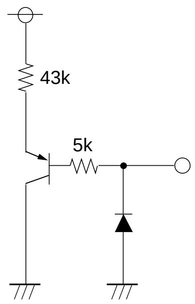
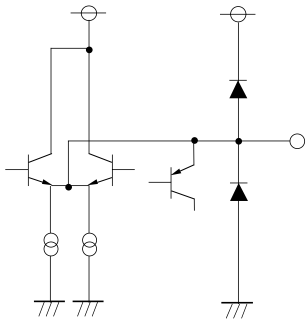
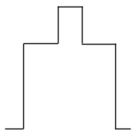
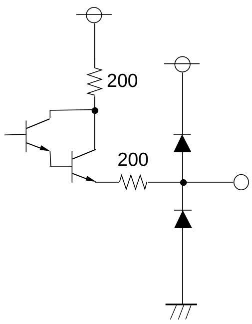
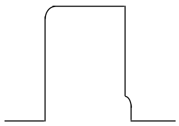
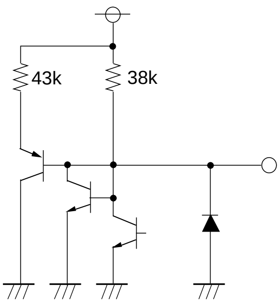
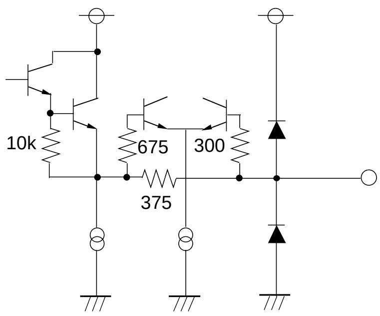
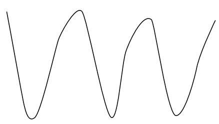
## DESCRIPTION OF PIN

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 1 | KILLER FILTER |  | — | Min. | 1.90 | |
| | | | | Typ. | 2.40 | |
| | | | | Max. | 2.90 | |
| 2 | ID FILTER |  | — | Min. | 2.20 | |
| | | | | Typ. | 2.70 | |
| | | | | Max. | 3.20 | |
| 3 | SUB SWB |  | — | Min. | 4.80 | BUS SW B H |
| | | | | | 0 | BUS SW B L |
| | | | | Typ. | 5.00 | BUS SW B H |
| | | | | | 0.30 | BUS SW B L |
| | | | | Max. | 5.10 | BUS SW B H |
| | | | | | 0.50 | BUS SW B L |
| 4 | BUS SWA |  | — | Min. | 4.80 | BUS SW A H |
| | | | | | 0 | BUS SW A L |
| | | | | Typ. | 5.00 | BUS SW A H |
| | | | | | 0.30 | BUS SW A L |
| | | | | Max. | 5.10 | BUS SW A H |
| | | | | | 0.50 | BUS SW A L |
| 5 | GND | — | — | Min. | — | |
| | | | | Typ. | 0 | |
| | | | | Max. | — | |

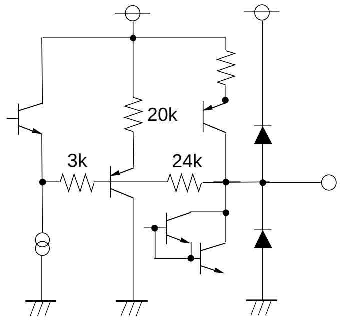
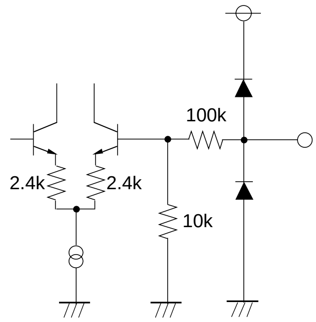
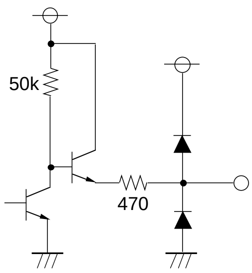
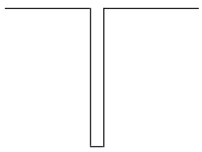
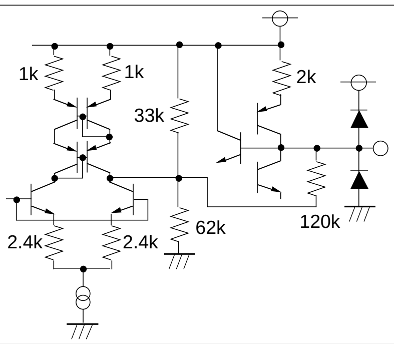
## DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 6 | BLK IN |   | — | Min. | 0 | |
| | | | | Typ. | 0 | |
| | | | | Max. | 0.3 | |
| 7 | SYNC SEP 2 IN |   | — | Min. | 5.50 | |
| | | | | Typ. | 6.10 | |
| | | | | Max. | 6.70 | |
| 8 | SYNC SEP OUT |   | — | Min. | 8.00 | |
| | | | | Typ. | 8.20 | |
| | | | | Max. | 8.40 | |
| 9 | H Vcc | — | — | Min. | — | |
| | | | | Typ. | 8.20 | |
| | | | | Max. | — | |
| 10 | IIL Vcc | — | — | Min. | 1.10 | |
| | | | | Typ. | 1.40 | |
| | | | | Max. | 1.70 | |

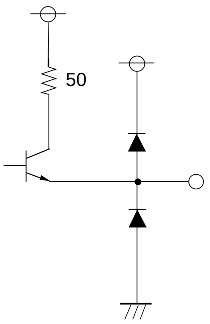
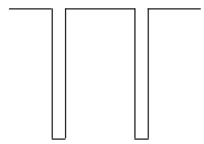
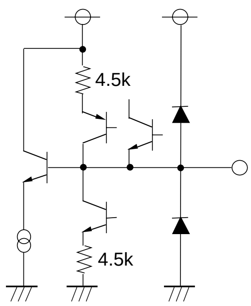
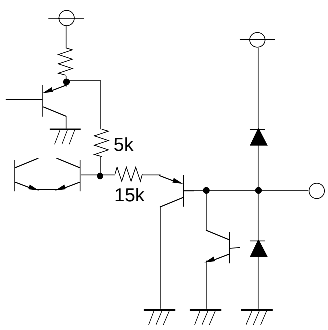
**DESCRIPTION OF PIN (cont.)**

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 11 | SCL |  | | Min. | — | |
| | | | | Typ. | — | |
| | | | | Max. | — | |
| 12 | SCP OUT |  |  | Min. | 4.21 | BGP |
| | | | | | 2.50 | HBLK |
| | | | | | 1.35 | VBLK |
| | | | | Typ. | 5.00 | BGP |
| | | | | | 2.90 | HBLK |
| | | | | | 1.55 | VBLK |
| | | | | Max. | 6.50 | BGP |
| | | | | | 3.30 | HBLK |
| | | | | | 1.80 | VBLK |
| 13 | H OUT |  |  | Min. | 3.90 | H |
| | | | | | 0 | L |
| | | | | Typ. | 4.40 | H |
| | | | | | 0.30 | L |
| | | | | Max. | — | H |
| | | | | | 0.50 | L |
| 14 | SDA |  | | Min. | — | |
| | | | | Typ. | — | |
| | | | | Max. | — | |
| 15 | H OSC |  |  | Min. | 4.80 | |
| | | | | Typ. | 5.4 | |
| | | | | Max. | 5.9 | |

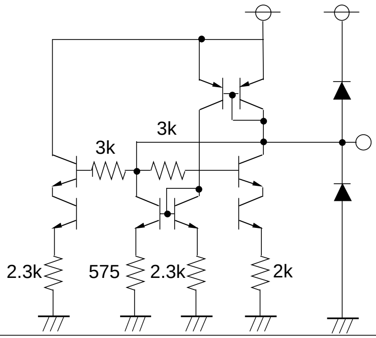
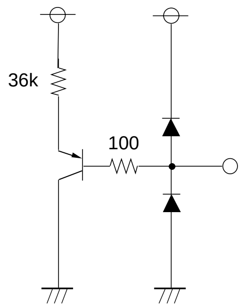
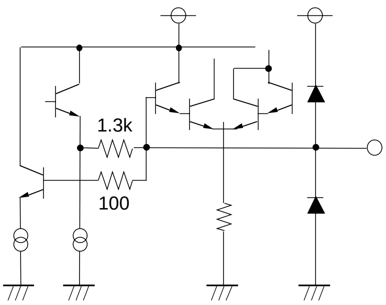
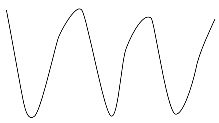
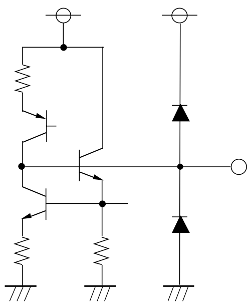
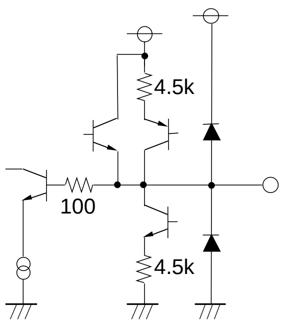
## DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 16 | AFC 1 AILTER |  | — | Min. | 4.80 | |
| | | | | Typ. | 5.50 | |
| | | | | Max. | 6.20 | |
| 17 | H PHASE CORR |  | — | Min. | 2.20 | |
| | | | | Typ. | 2.70 | |
| | | | | Max. | 3.20 | |
| 18 | V.PULSE OUT |  |  | Min. | 5.20 | H |
| | | | | | — | L |
| | | | | Typ. | 5.80 | H |
| | | | | | 0 | L |
| | | | | Max. | 6.40 | H |
| | | | | | 0.50 | L |
| 19 | AFC2 FILTER |  | — | Min. | 3.60 | |
| | | | | Typ. | 4.20 | |
| | | | | Max. | 4.80 | |
| 20 | HI Vcc | — | — | Min. | — | |
| | | | | Typ. | 9.00 | |
| | | | | Max. | — | |

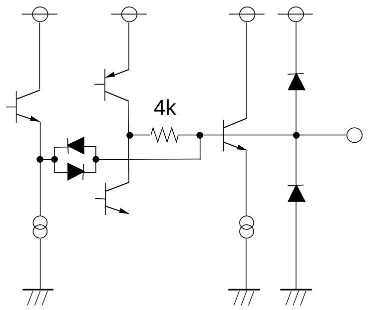
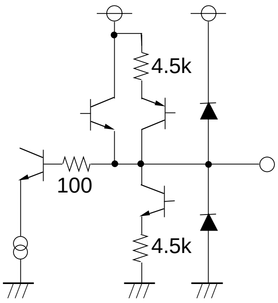
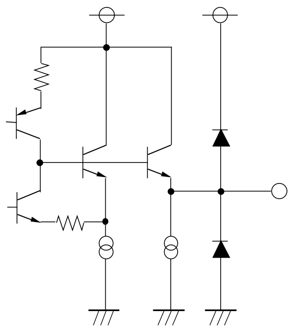
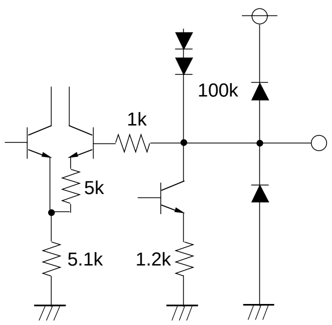
## DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 21<br>22<br>23 | R OUT<br>G OUT<br>B OUT |  |  | Min. | 1.75 | H |
| | | | | | — | L |
| | | | | Typ. | 2.25 | H |
| | | | | | 0.10 | L |
| | | | | Max. | 2.75 | H |
| | | | | | 0.50 | L |
| 24 | VCD Vcc | — | — | Min. | — | |
| | | | | Typ. | 5.00 | |
| | | | | Max. | — | |
| 25<br>27<br>29 | B IN<br>G IN<br>R IN |  | — | Min. | 2.20 | |
| | | | | Typ. | 2.80 | |
| | | | | Max. | 3.40 | |
| 26 | CONTRAST CONT |  | — | Min. | 2.90 | |
| | | | | Typ. | 3.40 | |
| | | | | Max. | 3.90 | |
| 28 | N.C | — | — | Min. | — | |
| | | | | Typ. | — | |
| | | | | Max. | — | |

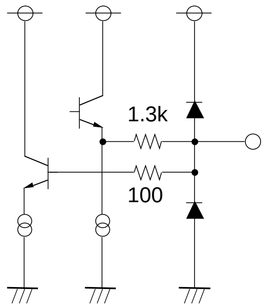
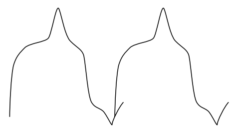
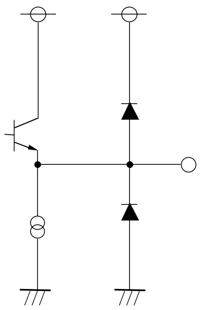
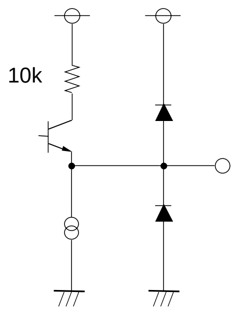
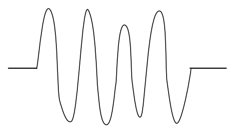
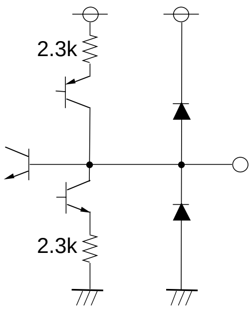
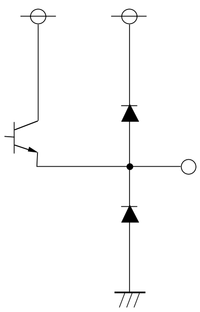
## DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 30 | BLACK PEAK FILTER |  | | Min. | 2.40 | |
| | | | | Typ. | 3.10 | |
| | | | | Max. | 3.80 | |
| 31 | FAST BLK |  | | Min. | — | |
| | | | | Typ. | — | |
| | | | | Max. | — | |
| 32 | X-ral 3.58MHz |  |  | Min. | 2.80 | |
| | | | | Typ. | 3.10 | |
| | | | | Max. | 3.60 | |
| 33 | BYPASS |  | | Min. | 1.50 | |
| | | | | Typ. | 2.00 | |
| | | | | Max. | 2.50 | |
| 34 | EXT IN (C IN) |  | | Min. | 1.35 | |
| | | | | Typ. | 1.85 | |
| | | | | Max. | 2.35 | |

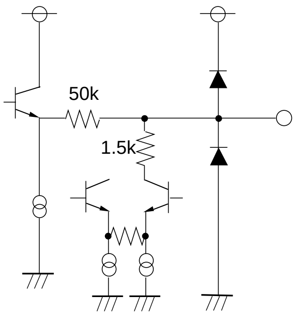
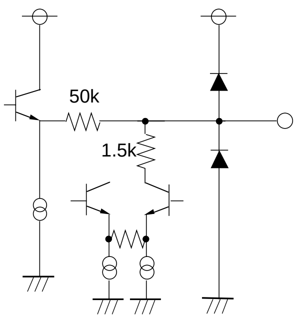
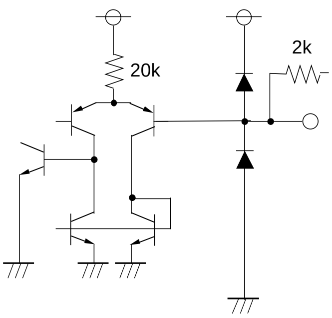
## DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 35 | CHTROMA APC FILTER |   | — | Min. | 2.55 | |
| | | | | Typ. | 3.05 | |
| | | | | Max. | 3.55 | |
| 36 | TV IN (Y IN) |   | — | Min. | 1.50 | |
| | | | | | 3.90 | |
| | | | | Typ. | 2.40 | |
| | | | | | 4.50 | |
| | | | | Max. | 2.90 | |
| | | | | | 5.00 | |
| 37 | VCD GND | — | — | Min. | — | |
| | | | | Typ. | 0 | |
| | | | | Max. | — | |
| 33 | V(Y)SW OUT |  | — | Min. | 1.85 | |
| | | | | Typ. | 2.15 | |
| | | | | Max. | 2.45 | |
| 39 | SYNC SEP 1 IN |   | — | Min. | 1.65 | |
| | | | | Typ. | 2.10 | |
| | | | | Max. | 2.55 | |

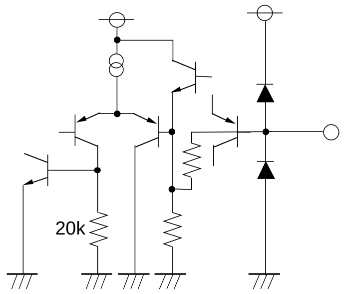
## DESCRIPTION OF PIN (cont.)

<table>
<tr><th>Pin No.</th><th>Name</th><th>Peripheral circuit of pins</th><th>Pin waveform</th><th colspan="2">DC voltage (V)</th><th>Note</th></tr>
<tr><td rowspan="3">40</td><td rowspan="3">X-TAL<br>4.03MHz</td><td rowspan="3"></td><td rowspan="3"></td><td>Min.</td><td>2.70</td><td rowspan="3"></td></tr>
<tr><td>Typ.</td><td>3.20</td></tr>
<tr><td>Max.</td><td>3.70</td></tr>
<tr><td rowspan="3">41<br>43</td><td rowspan="3">-(B-Y) OUT<br>-(R-Y) OUT</td><td rowspan="3"></td><td rowspan="3"></td><td>Min.</td><td>2.45</td><td rowspan="3"></td></tr>
<tr><td>Typ.</td><td>2.95</td></tr>
<tr><td>Max.</td><td>3.45</td></tr>
<tr><td rowspan="3">42</td><td rowspan="3">SECAM<br>REF</td><td rowspan="3"></td><td rowspan="3"></td><td>Min.</td><td>1.10</td><td rowspan="3"></td></tr>
<tr><td>Typ.</td><td>1.50</td></tr>
<tr><td>Max.</td><td>1.90</td></tr>
<tr><td rowspan="3">44<br>45</td><td rowspan="3">-(B-Y) IN<br>-(R-Y) IN</td><td rowspan="3"></td><td rowspan="3"></td><td>Min.</td><td>2.50</td><td rowspan="3"></td></tr>
<tr><td>Typ.</td><td>3.00</td></tr>
<tr><td>Max.</td><td>3.50</td></tr>
<tr><td rowspan="3">46</td><td rowspan="3">AUDIO<br>OUT</td><td rowspan="3"></td><td rowspan="3"></td><td>Min.</td><td>2.90</td><td rowspan="3"></td></tr>
<tr><td>Typ.</td><td>3.30</td></tr>
<tr><td>Max.</td><td>3.90</td></tr>
</table>

**DESCRIPTION OF PIN (cont.)**

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 47 | AUDIO Vcc | — | — | Min. | — | |
| | | | | Typ. | 8.20 | |
| | | | | Max. | — | |
| 48 | TV AUSIO IN |   | — | Min. | 2.50 | |
| | | | | Typ. | 3.00 | |
| | | | | Max. | 3.50 | |
| 49 | AUDIO GND | — | — | Min. | — | |
| | | | | Typ. | 0 | |
| | | | | Max. | — | |
| 50 | EXT AUDIO IN |   | — | Min. | 2.50 | |
| | | | | Typ. | 3.00 | |
| | | | | Max. | 3.50 | |
| 51 | KILLER ADJ |   | — | Min. | 1.35 | |
| | | | | Typ. | 1.80 | |
| | | | | Max. | 2.35 | |

## DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin waveform | DC voltage (V) | | Note |
|---|---|---|---|---|---|---|
| 52 | ID ADJ |  | | Min. | 1.55 | |
| | | | | Typ. | 2.0 | |
| | | | | Max. | 2.45 | |

PIN VOLTAGE STANDARD CONDITION

| Sub address | 00H | 01H | | 02H | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Function | SWB | IDADJ | AUDsw | SWA | TRAP | D. TRAP | F. TRAP2 | ACL | DLFA | SWK |
| DATA | A0 | A6 | | A3 | | | | | | |
| Function | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Sub address | 03H | 04H | 05H | 06H | | | | | 07H |
|---|---|---|---|---|---|---|---|---|---|
| Function | ATT | SHARP | CONT | DLTA | AUTO | TVEXT | Y/C | BLACK | TINT |
| DATA | A0 | A0 | A6 | A2 | | | | | A7 |
| Function | 0 | 0 | 32 | 2 | 0 | 0 | 0 | 0 | 64 |

| Sub address | 08H | 09H | | 0AH | 0BH | | 0CH | 0DH | 0EH | 0FH |
|---|---|---|---|---|---|---|---|---|---|---|
| Function | COLOR | SET | HP | BRI | DG | MUTE | DB | CR | CG | CB |
| DATA | A0 | A7 | | A6 | A6 | | A6 | A8 | A8 | A8 |
| Function | 0 | 0 | 8 | 32 | 32 | 0 | 32 | 128 | 128 | 128 |

| Sub address | 10H | | 13H | | | |
|---|---|---|---|---|---|---|
| Function | FTR1 | CLOFF | SESW | Hfr | AFCG | V Phase |
| DATA | A6 | | A0 | | | |
| Function | 1 | 0 | 0 | 0 | 0 | 0 |

**[DATA LIST]**

| Data No. | Data | | | | | | | | | Data No. | Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | 10 Decimal | | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | 10 Decimal |
| A0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C3 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 12 |
| A1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | C4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 24 |
| A2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | C5 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 48 |
| A3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | C6 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 96 |
| A4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | C7 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 14 |
| A5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 16 | C8 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 28 |
| A6 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 32 | C9 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 56 |
| A7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | D0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 112 |
| A8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | D1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 30 |
| A9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | D2 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 60 |
| B0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 | D3 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 120 |
| B1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 9 | D4 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 10 |
| B2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 17 | D5 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 20 |
| B3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 33 | D6 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 40 |
| B4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 65 | D7 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 80 |
| B5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 129 | D8 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 18 |
| B6 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 7 | D9 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 36 |
| B7 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 15 | E0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 38 |
| B8 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 31 | E1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 34 |
| B9 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 63 | E2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 35 |
| C0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 127 | E3 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 69 |
| C1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 255 | E4 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 51 |
| C2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 6 | E5 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 50 |
| E7 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 54 | E6 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 68 |
| E8 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 44 | E9 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 74 |
| F1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 57 | F2 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 42 |
| F3 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 46 | F4 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 52 |
| F5 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 11 | | | | | | | | | | |

## INITIAL CONDITION

: No Function

| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | DATA |
|---|---|---|---|---|---|---|---|---|---|
| | | SW B | | | | | | | |
| 00H | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | A UD SW | ID ADJ | | | | | | |
| 01H | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | SWA | TRAP | DBF | F TRAP2 | ACL | DFA | | |
| 02H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A0 |
| | | AUDIO ATT | | | | | | | |
| 03H | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | A7 |
| | | | SHARPNESS | | | | | | |
| 04H | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | CONTRAST | | | | | | | |
| 05H | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | | AUTO | BLACK | Y/C | TV/EXT | DL TIME | | |
| 06H | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | A2 |
| | | TINT | | | | | | | |
| 07H | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | A7 |
| | | COLOR | | | | | | | |
| 08H | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | HPHASE | | | | 3.58 | NTSC | SECAM | |
| 09H | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | A7 |
| | | BRIGHT | | | | | | | |
| 0AH | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | MUTE | DRIVE G | | | | | | |
| 0BH | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | | | DRIVE B | | | | | | |
| 0CH | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | A6 |
| | CUT OFF R | | | | | | | | |
| 0DH | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A8 |
| | CUT OFF G | | | | | | | | |
| 0EH | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A8 |
| | CUT OFF B | | | | | | | | |
| 0FH | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A8 |
| | | C OFF | F TRAP | | | | | | |
| 10H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A0 |
| | | | AFCG | H Free | SERSW | V Phase | V Phase | V Phase | |
| 13H | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A0 |

## M52727SP I²C - BUS Format

Sub address byte and data byte format :

read

* SW

| | No. | Functions | | BIT | SUB ADD | Data byte D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | 1 | | | | | | | | | | | | |
| | 2 | BUS SWB* | | 1 | 00H | | SWB | | | | | | |
| | 3 | IDADJ | | 6 | 01H | 0 | – | A15 | A14 | A13 | A12 | A11 | A10 |
| | 4 | AUDIO SW* | | 1 | 01H | | AUDIO SW | | | | | | |
| | 5 | | | | | | | | | | | | |
| | 6 | | | | | | | | | | | | |
| | 7 | AUDIO ATT | | 7 | 03H | 0 | A36 | A35 | A34 | A33 | A32 | A31 | A30 |
| VIDEO | 8 | sharpness | | 6 | 04H | 0 | – | A45 | A44 | A43 | A42 | A41 | A40 |
| | 9 | contrast cont | | 7 | 05H | 0 | A56 | A55 | A54 | A53 | A52 | A51 | A50 |
| | 10 | DL time ADJ* | | 2 | 06H | 0 | – | – | – | – | – | A61 | A60 |
| | 11 | TV/EXT* | | 1 | 06H | | | | | | TV/EXT | | |
| | 12 | Y/C IN* | | 1 | 06H | | | | | Y/C | | | |
| | 13 | black stretch* | | 1 | 06H | | | | black | | | | |
| CHROMA | 14 | TORAP SW* | | 1 | 02H | | | TRAP | | | | | |
| | 15 | tint cont | | 7 | 07H | 0 | A76 | A75 | A74 | A73 | A72 | A71 | A70 |
| | 16 | color cont | | 7 | 08H | 0 | A86 | A85 | A84 | A83 | A82 | A81 | A80 |
| | 17 | SYSTEM auto* | | 1 | 06H | | | auto | | | | | |
| | 18 | SYSTEM SET* | | 3 | 09H | 0 | – | – | – | – | 3.58 | NTSC | SECAM |
| INTER FACE | 19 | bright cont | | 7 | 0AH | 0 | AA6 | AA5 | AA4 | AA3 | AA2 | AA1 | AA0 |
| | 20 | drive ( R ) | | 6 | 0BH | 0 | 0 | AB5 | AB4 | AB3 | AB2 | AB1 | AB0 |
| | 21 | drive ( B ) | | 6 | 0CH | 0 | 0 | AC5 | AC4 | AC3 | AC2 | AC1 | AC0 |
| | 22 | cut off ( R ) | | 8 | 0DH | AD7 | AD6 | AD5 | AD4 | AD3 | AD2 | AD1 | AD0 |
| | 23 | cut off ( G ) | | 8 | 0EH | AE7 | AE6 | AE5 | AE4 | AE3 | AE2 | AE1 | AE0 |
| | 24 | cut off ( B ) | | 8 | 0FH | AF7 | AF6 | AF5 | AF4 | AF3 | AF2 | AF1 | AF0 |
| | 25 | DL fine ADJ | +40ns | 1 | 02H | | | | | | | 0 | |
| | | | 0ns | | | | | | | | | 1 | |
| | 26 | peak ACL | Lo | 1 | 02H | | | | | | 0 | | |
| | | | Hi | | | | | | | | 1 | | |
| DEFLE CTION | 27 | AFC-2 H phase | | 4 | 09H | 0 | A96 | A95 | A94 | A93 | – | – | |
| | 28 | | | | | | | | | | | | |
| | 29 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 31 | V phase | | 3 | 13H | | | | | | AG2 | AG1 | AG0 |
| | 32 | | | | | | | | | | | | |
| | 33 | Service SW* | | 1 | 13H | | | | | Service SW | | | |
| | 34 | H free* | | 1 | 13H | | | | H free | | | | |
| | 35 | AFC GAIN* | | 1 | 13H | | | AFC GAIN | | | | | |
| | 36 | | | | | | | | | | | | |
| OTHER | 37 | VIDEO MUTE* | | 1 | 0BH | | MUTE | | | | | | |
| | 38 | DOUBLE TRAP* | | 1 | 02H | | | | D.TRAP | | | | |
| | 39 | TRAP fine ADJ1* | | 1 | 10H | | | F.TRAP1 | | | | | |
| | 40 | BUS SWA* | | 1 | 02H | | SWA | | | | | | |
| | 41 | TRAP fine ADJ2* | | 1 | 02H | | | | | F.TRAP2 | | | |
| | 42 | CLAMP OFF* | | 1 | 10H | | CLAMP | | | | | | |

write

| Data byte D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|
| 50/60 | ——— | KILLER | ID | 3.58 | NTSC | SECAM | CONDITION |

**Initial Data byte Conditions at Power-ON M52727SP**

| | Functions | Data | | Condition | Initial condition |
|---|---|---|---|---|---|
| OTHER | BUS SWA | SWA | 0 | H | H |
| | | | 1 | L | |
| | AUDIO SW | AUDIO SW | 0 | TV | TV |
| | | | 1 | EXT | |
| | BUS SWB | SWB | 0 | H | H |
| | | | 1 | L | |
| | | | | | |
| | | | | | |
| VIDEO | DL TIME ADJ | A71 , A70 | 0 0 | 170nsec | 330nsec |
| | | | 0 1 | 200nsec | |
| | | | 1 0 | 330nsec | |
| | | | 1 1 | 430nsec | |
| | TV/EXT | TV/EXT | 0 | TV | TV |
| | | | 1 | EXT | |
| | Y/C IN | Y/C IN | | | |
| | | | | | |
| | black stretch | black | 0 | OFF | OFF |
| | | | 1 | ON | |
| | TRAP SW | TRAP | 0 | OFF | OFF |
| | | | 1 | ON | |
| INTER FACE | DL fine ADJ | DLf | 0 | +40nsec | +40nsec |
| | | | 1 | 0nsec | |
| | peak ACL | ACL | 0 | Lo | Hi |
| | | | 1 | Hi | |
| CHROMA | SYSTEM auto | auto | 0 | manual | manual |
| | | | 1 | auto | |
| | SYSTEM SET | 3.58,NTSC,SECAM | 0 0 0 | 4.43 PAL | 4.43 PAL |
| | | | 1 0 0 | 3.58 PAL | |
| | | | 1 1 0 | 3.58 NTSC | |
| | | | 0 1 0 | 4.43 NTSC | |
| | | | 0 0 1 | SECAM | |
| DEFLE CTION | Service SW | Service SW | 0 | OFF | OFF |
| | | | 1 | ON | |
| | H free | H free | 0 | OFF | OFF |
| | | | 1 | ON | |
| | AFC GAIN | AFC GAIN | 0 | NORMAL | NORMAL |
| | | | 1 | HIGH | |
| OTHER | clamp off | clamp | 0 | OFF | OFF |
| | | | 1 | ON | |
| | Video mute | mute | 0 | OFF | OFF |
| | | | 1 | ON | |
| | double trap | d.trap | 0 | single | single |
| | | | 1 | double | |
| | trap fine adj1 | f.trap1 | 0 | low | high |
| | | | 1 | high | |
| | trap fine adj2 | f.trap2 | 0 | low | low |
| | | | 1 | high | |

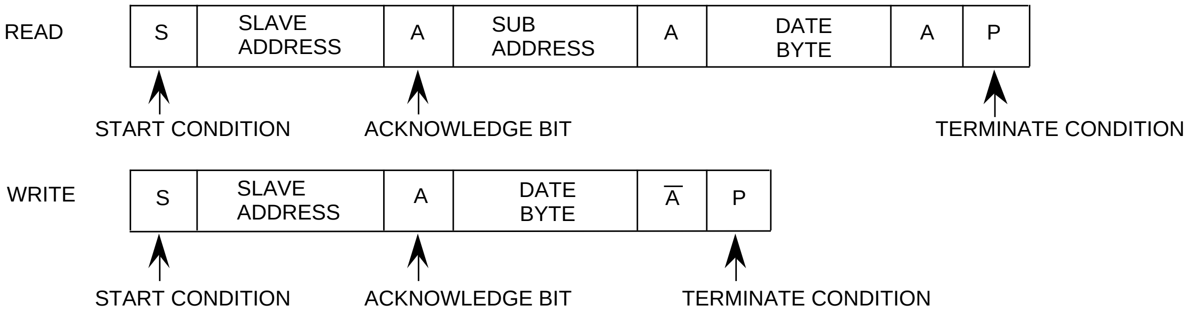
**Data byte Conditions at D/A**

| | Functions | BIT | Data | Condition | Initial condition |
|---|---|---|---|---|---|
| OTHER | IDADJ | 6 | 0 ~ 63 | 0 → 63 DC Lo → Hi | 32 |
| | AUDIO ATT | 7 | 0 ~ 127 | 0 → 127 Gain min → max | 0 |
| VIDEO | sharpness | 6 | 0 ~ 63 | 0 → 63 f soft → sharp | 0 |
| | contrast cont | 7 | 0 ~ 127 | 0 → 127 Gain min → max | 32 |
| CHROMA | tint cont | 7 | 0 ~ 127 | 0 → 127 Phase Red → Green | 64 |
| | color cont | 7 | 0 ~ 127 | 0 → 127 Gain min → max | 0 |
| INTER FACE | bright cont | 7 | 0 ~ 127 | 0 → 127 DC Lo → Hi | 32 |
| | drive ( R ) | 6 | 0 ~ 63 | 0 → 63 Gain min → max | 32 |
| | drive ( B ) | 6 | 0 ~ 63 | 0 → 63 Gain min → max | 32 |
| | cut off ( R ) | 8 | 0 ~ 255 | 0 → 255 DC min → max | 128 |
| | cut off ( G ) | 8 | 0 ~ 255 | 0 → 255 DC min → max | 128 |
| | cut off ( B ) | 8 | 0 ~ 255 | 0 → 255 DC min → max | 128 |
| DEFLE CTION | AFC-2 H phase | 4 | 0 ~ 15 | 0 → 15 delay min → max | 8 |
| | V phase | 3 | 0 ~ 7 | 0 → 4 delay min → max | 0 |
| | | | | | |

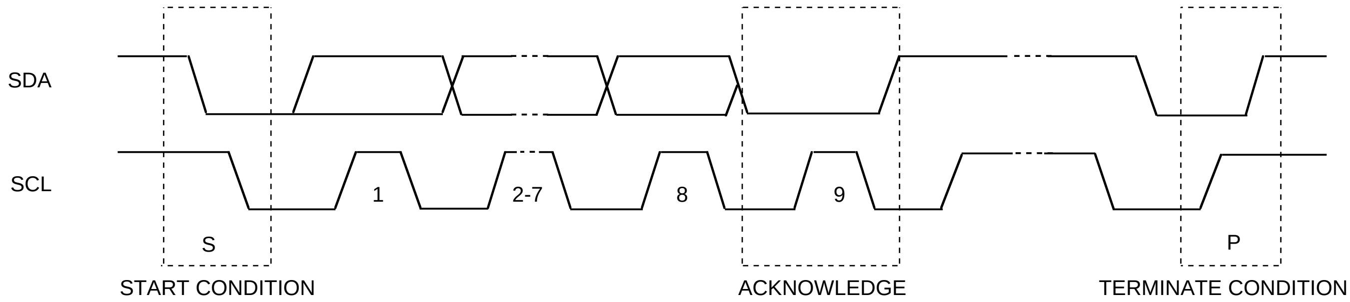
Slave Address

| A6 | A5 | A4 | A3 | A2 | A1 | A0 | R / W | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | ( = B A H ) | READ |
| | | | | | | | 1 | ( = B B H ) | WRITE |

DATA Format




Information consists of 8-bit bytes. Each byte is followed by Acknowledge.




NORMAL Condition

Both SDA and SCL are set to HIGH when $I^2C$ bus is not used.

Start Condition

Is defiled at the falling edge of SDA when SCL is set to HIGH.

Terminate Condition

Is defined at the rising edge of SDA when SCL is set to HIGH.

(Caution)

Except for start condition and termination condition, the SDA level must not change when SCL is set to HIGH.

DATA Transfer

The DATA line level must not be changed during data transfer or when the CLOCK line is set to HIGH. Data is effective only when the clock pulse is set to HIGH (including rising and falling edges to cover areas that are not clear).

Acknowledge

Sending device sends HIGH for the portion of the 9th clock pulse of each byte. In the WRITE operation, this IC pulls down the DATA line for the portion of the 9th clock pulse to keep acknowledging.

READ

The READ status allows data to be input into this IC. In this status, pull-down of Acknowledge bits to this IC keeps the bits LOW.

WRITE

The WRITE status allows data to be output from this IC. In this status, pull-down of Acknowledge bits after data byte to the microcomputer keeps the bits LOW. (The output of the M52727SP is set to HIGH.)

## Cautions for applications

- When using the IC, keep setting the ID filter at pin 2 to 0.033μF or less.
- For output of color difference, add low pass filter, if necessary.
- The constant of the XTAL (4.43M/3.58M) circumference differs depending on the characteristics of XTAL in use.