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LV71081E

Bi-CMOS IC

Video/Audio Signal IO Interface of DVD Recorder

Overview

The LV71081E is for video/audio signal input/output interface of DVD recorder.

Functions

- Video audio canal SW
- S signal 3 input switch
- 6dB amplifier
- 6MHz/12MHz/27MHz-LPF / 6MHz/12MHz/27MHz low pass filter
- 6ch video driver (AV1, AV2, Line output, R•G•B output)
- Video signal detection
- Composite sync output

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|---------------|--|-------------|------------------|
| Maximum supply voltage 1 | $V_{CC\ max}$ | | 6.0 | V |
| Maximum supply voltage 2 | $V_{CC\ max}$ | | 13.0 | V |
| Allowable power dissipation | $P_d\ max$ | $T_a \leq 75^\circ\text{C}$ Mounted on a specified board * | 1200 | mW |
| Operating temperature | T_{opr} | | -20 to +75 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | | -40 to +150 | $^\circ\text{C}$ |

* Mounted on a specified board : 114.3mm × 76.1mm × 1.6mm, glass epoxy

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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Recommended Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------------------------|---------------------|------------|--------------|------|
| Recommended supply voltage 1 | V _{CC} | | 5.0 | V |
| Recommended supply voltage 2 | V _{CC} | | 12.0 | V |
| Operating supply voltage range 1 | V _{CC} opg | | 4.5 to 5.3 | V |
| Operating supply voltage range 2 | V _{CC} opg | | 11.1 to 12.5 | V |

Electrical Characteristics at Ta = 25°C, V_{CC} = 2.8V

| Parameter | Symbol | Input signal | | | Out Point | Test condition | Ratings | | | Unit |
|-------------------------------|----------------------|--------------|--------|-------|-----------|---|---------|-------|-------|------|
| | | Point | Signal | Freq | | | min | typ | max | |
| Current dissipation 1 (5V) | I _{CC1} | | | | | Pin6, 8, 25, 40 flow in current when non-signal | 97.7 | 115.0 | 132.2 | mA |
| Current dissipation 2 (ALL5V) | I _{CC2} | | | | | Pin42, 84, 94 flow in current when non-signal | 20.0 | 23.0 | 26.0 | mA |
| Current dissipation 3 (11.6V) | I _{CC3} | | | | | Pin46 flow in current when non-signal | 18.7 | 22.0 | 25.3 | mA |
| Video CANAL SW part | | | | | | | | | | |
| Output voltage 1 | VDCC | | | | 26 28 | AV1, AV2-OUT (Sync tip) | 0.3 | 0.5 | 0.7 | V |
| Voltage gain | VGC | | | 100k | 26 28 | V _{IN} = 1Vp-p, AV1, AV2-OUT | 5.5 | 6.0 | 6.5 | dB |
| Frequency characteristics | VFC | | | | 26 28 | V _{IN} = 1Vp-p, f = 10MHz/100kHz | -1.0 | 0.0 | +1.0 | dB |
| Differential gain | DGC | | | | 26 28 | V _{IN} = Video : 1Vp-p | -1 | 0 | +1 | % |
| Differential phase | DPC | | | | 26 28 | V _{IN} = Video : 1Vp-p | -1.5 | 0 | +1.5 | °C |
| Cross-talk | CTC | | | 4.43M | 26 28 | Selected input = GND Non-selected input = 1Vp-p, f = 4.43MHz | | -60 | -50 | dB |
| Picture S/N | VSNC | | | | 26 28 | V _{IN} = Video (50%White) | | -70 | -65 | dB |
| Maximum output level | V _O MAXC | | | | 26 28 | Output level at which the linearity of AV1-OUT (pin 26) and AV2-OUT (pin 28) exceeds 1%. V _{IN} = Linearity (lamp) signal Output level at linearity 1% | 2.8 | 3.0 | | Vp-p |
| Video INPUT SW part | | | | | | | | | | |
| Output voltage 1 | VDCI1 | | | | 83 | Composite (Sync-Tip) | 0.8 | 1.0 | 1.2 | V |
| Output voltage 2 | VDCI2 | | | | 83 | Y (Sync-Tip) | 0.8 | 1.0 | 1.2 | V |
| Output voltage 3 | VDCI3 | | | | 81 | Chroma (Center) | 1.8 | 2.1 | 2.4 | V |
| Voltage gain 1 | VGI1 | | | 100k | 81 83 | V _{IN} = 1Vp-p, load = 10kΩ | -0.5 | 0.0 | +0.5 | dB |
| Voltage gain 2 | VGI2 | | | 100k | 85 | V _{IN} = 1Vp-p, load = 10kΩ (SLICER output only) | 5.5 | 6.0 | 6.5 | dB |
| Frequency characteristics | VFI | | | | 81 83 | V _{IN} = 1Vp-p, f = 10MHz/100kHz | -1.0 | 0.0 | +1.0 | dB |
| Differential Gain | DGSW | | | | 83 | V _{IN} = Video :1Vp-p | -1 | 0 | +1 | % |
| Differential Phase | DPSW | | | | 83 | V _{IN} = Video :1Vp-p | -1.5 | 0 | +1.5 | °C |
| Cross-talk | CTC | | | 4.43M | 81 83 | Selected input = GND Non-selected input = 1Vp-p, f = 4.43MHz | | -60 | -50 | dB |
| Picture S/N | VSNC | | | | 83 | V _{IN} = Video (50%White) | | -66 | -60 | dB |
| Maximum output level | V _O MAXSW | | | | 83 | Output level when the linearity of pin 83 exceeds 1%. V _{IN} = Linearity (lamp) signal Output level at linearity 1% | 1.8 | 2.0 | | Vp-p |

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| Parameter | Symbol | Input signal | | | Out Point | Test condition | Ratings | | | Unit |
|-----------------------------|--------------|----------------|--------|-------|----------------|---|---------|-----|------|---------|
| | | Point | Signal | Freq | | | min | typ | max | |
| Video Driver part | | | | | | | | | | |
| Output voltage 1 | VDCD1 | 95 97 99 | | | 9 12 17 | RGB (Pedestal) | 0.3 | 0.5 | 0.7 | V |
| Output voltage 2 | VDCD2 | 93 | | | 14 23 | Y (Sync tip) | 0.5 | 0.7 | 0.9 | V |
| Voltage gain 1 | VGD | | | 100k | | $V_{IN} = 1Vp-p$, Line output : 2 drives, Scart output: DC directly-coupled single drive Note 1) | 5.5 | 6.0 | 6.5 | dB |
| Frequency characteristics 1 | VFD1 | | | | | $V_{IN} = 1Vp-p$, $f = 6MHz/100kHz$ when 6MHzLPF is selected | -1.5 | 0.0 | +1.5 | dB |
| Frequency characteristics 2 | VFD2 | | | | | $f = 27MHz/100kHz$ when 6MHzLPF is selected | | -35 | -25 | dB |
| Frequency characteristics 3 | VFD3 | | | | | $f = 12MHz/100kHz$ when 12MHzLPF is selected | -1.5 | 0.0 | +1.5 | dB |
| Frequency characteristics 4 | VFD4 | | | | | $f = 54MHz/100kHz$ when 12MHzLPF is selected | | -40 | -30 | dB |
| Group delay | VGDD1 | | | | | $f = 6MHz/100kHz$ when 6MHzLPF is selected | | 20 | 35 | ns |
| Mute attenuation | VMUD | | | | | $V_{IN} = 1Vp-p$, $f=4.43MHz$ | | -60 | -50 | dB |
| Differential Gain | DG1 | 91 93 | | | 23 | $V_{IN} = \text{Video} : 1Vp-p$ | -1 | 0 | +1 | % |
| Differential Phase | DP1 | 91 93 | | | 23 | $V_{IN} = \text{Video} : 1Vp-p$ | -1.5 | 0 | +1.5 | °C |
| Cross-talk | CTD | | | 4.43M | | $V_{IN} = 1Vp-p$, $f = 4.43MHz$, Driver output terminated with 75Ω | | -60 | -50 | dB |
| Picture S/N | VSND | | | | | $V_{IN} = \text{Video} (50\%White)$ | | -70 | -65 | dB |
| Maximum output level 1 | $V_{O}MAXD1$ | | | | 9 12 17 | Output level when the linearity of pins 9, 12, and 17 exceeds 1%. $V_{IN} = \text{Linearity (lamp) signal}$ Output level at linearity 1% | 2.8 | 3.0 | | Vp-p |
| Maximum output level 2 | $V_{O}MAXD2$ | | | | 14 19 23 | Output level when the linearity of pins 14, 19, and 23 exceeds 1%. $V_{IN} = \text{Linearity (lamp) signal}$ Output level at linearity 1% | 2.6 | 2.8 | | Vp-p |
| Maximum output level 3 | $V_{O}MAXD3$ | | | | 7 11 22 | Output level at which the linearity of pins 7, 11, and 22 exceeds 1%. $V_{IN} = \sin 10kHz$ Output level at linearity 1% | 2.0 | 2.5 | | Vp-p |
| Sync-SEP part | | | | | | | | | | |
| C.SYNC output High voltage | VCSH | | | | 86 | | 4.3 | 4.7 | 5.0 | V |
| C.SYNC output Low voltage | VCSL | | | | 86 | | 0 | 0.3 | 0.6 | V |
| C.SYNC output delay time | TDCS | | | | 86 | Note 2) | 1.0 | 1.7 | 2.4 | μs |
| C.SYNC output pulse width | TWCS | | | | 86 | Note 2) | 3.2 | 4.2 | 5.2 | μs |
| V.SYNC output High voltage | VVSH | | | | 82 | | 4.3 | 4.7 | 5.0 | V |
| V.SYNC output Low voltage | VVSL | | | | 82 | | 0 | 0.3 | 0.6 | V |

Note 1) The Line output can drive two systems through capacitive coupling while the Scart output drives only one system through DC direct coupling.

Note 2) When pin 10 is open

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| Parameter | Symbol | Input signal | | | Out Point | Test condition | Ratings | | | Unit |
|---|---------------------|--------------|--------|------|----------------|---|---------|-------|-------|------|
| | | Point | Signal | Freq | | | min | typ | max | |
| V.SYNC output delay time | TDVS | | | | 82 | Note 2) | 7 | 15 | 25 | μs |
| V.SYNC output pulse width | TWVS | | | | 82 | V _{IN} = PAL Video : 1Vp-p Note 2) | 125 | 155 | 185 | μs |
| V.DET output High voltage | VDETH | | | | 90 | | 4.3 | 4.7 | 5.0 | V |
| V.DET output Low voltage | VDETL | | | | 90 | | 0 | 0.3 | 0.6 | V |
| Audio canal switches part | | | | | | | | | | |
| Maximum output level | V _O MAXC | | | | 71 to 74 | AV1, AV2-OUT (L, R) BW = 400 to 30kHz Output level at f = 1kHz, THD = 1% | 2.2 | 2.5 | | Vrms |
| Channel balance | CVSW | | | | 71 to 74 | V _{IN} = 2Vrms, f = 1kHz Lch Gain-Rch Gain | -1.5 | 0.0 | +1.5 | dB |
| Total harmonic distortion | THDAC | | | | 71 to 74 | V _{IN} = 2Vrms, f = 1kHz, BW = 400 to 30kHz | | 0.003 | 0.01 | % |
| Output noise voltage | VNAC | | | | 71 to 74 | Rg = 0Ω, BW = JIS-A | | -100 | -80 | dBV |
| Mute attenuation | VMUAC | | | | 71 to 74 | V _{IN} = 2Vrms, f = 1kHz, BW = JIS-A 20log (V _{OUT} /V _{IN}) | | -90 | -75 | dB |
| Input impedance | Z _{IN} | | | | | | 80 | 100 | 120 | kΩ |
| Cross talk between channel and selctors | CTSW | | | | 71 to 74 | V _{IN} = 2Vrms, f = 1kHz Rg = 0Ω, BW = JIS-A | | -110 | -80 | dB |
| Tuner gain | GTU | | | | 71 to 74 | V _{IN} = 0.5Vrms | 10.0 | 12.0 | 14.0 | dB |
| Output off set voltage | V _O SET | | | | 71 to 74 | Off set voltage at the time of changeover SW. | -20 | 0 | +20 | mV |
| Audio ADC block | | | | | | | | | | |
| Voltage gain 1 | VGA1 | | | | 78 79 | V _{IN} = 1Vrms, f = 1kHz, EVR = 0dB Serial control select 6dB. | 4.5 | 6.0 | 7.5 | dB |
| Voltage gain 2 | VGA2 | | | | 78 79 | V _{IN} = 1Vrms, f = 1kHz, EVR = 0dB Serial control select 5.5dB. | 4.0 | 5.5 | 7.0 | dB |
| Voltage gain 3 | VGA3 | | | | 78 79 | V _{IN} = 1Vrms, f = 1kHz, EVR = 0dB Serial control select 5dB. | 3.5 | 5.0 | 6.5 | dB |
| Voltage gain 4 | VGA4 | | | | 78 79 | V _{IN} = 1Vrms, f = 1kHz, EVR = 0dB Serial control select 0dB. | -1.5 | 0.0 | +1.5 | dB |
| Channel balance | CVVR | | | | 78 79 | V _{IN} = 2Vrms, f = 1kHz, AMP = 5.5dB, AEVR = -12dB Lch Gain-Rch Gain | -1.5 | 0.0 | 1.5 | dB |
| Maximum output level | V _O MAXI | | | | 78 79 | ADC-OUT (L, R), AMP = 0dB, EVR = 0dB BW = 400 to 30kHz Output level at f = 1kHz, THD = 1% | 2.2 | 2.5 | | Vrms |
| Total harmonic distortion | THDAI | | | | 78 79 | V _{IN} = 2Vrms, f = 1kHz, AMP = 5.5dB, EVR = -12dB BW = 400 to 30kHz | | 0.002 | 0.005 | % |

Note 2) When pin 10 is open

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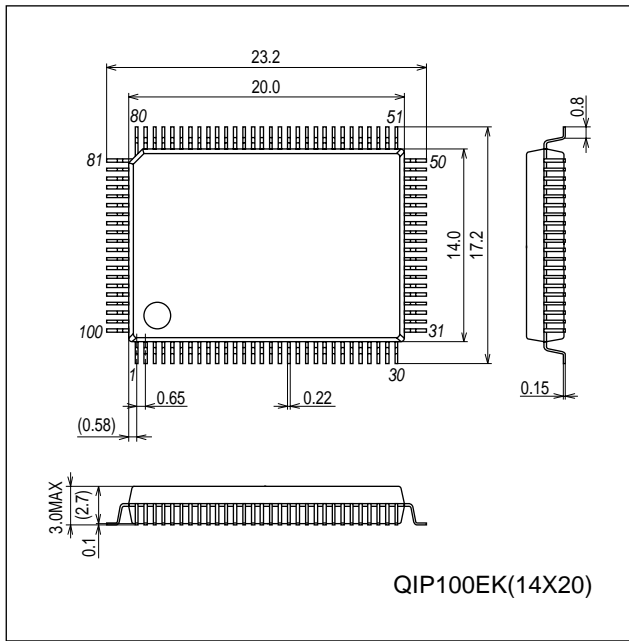
| Parameter | Symbol | Input signal | | | Out Point | Test condition | Ratings | | | Unit |
|---|-------------------|--------------|--------|------|----------------|--|---------|------|-----------------|------|
| | | Point | Signal | Freq | | | min | typ | max | |
| Output noise voltage | VNAI | | | | 78 79 | AMP = 5.5dB, EVR = -12dB Rg = 0Ω, BW = JIS-A | | -100 | -80 | dBV |
| Cross talk between channel and selctors | CTVR | | | | 78 79 | V _{IN} = 2Vrms, f = 1kHz, AMP = 5.5dB, EVR = -12dB Rg = 0Ω, BW = JIS-A | | -110 | -80 | dB |
| Max attenuation amount | VMUAI | | | | 78 79 | V _{IN} = 2Vrms, f = 1kHz, AMP = 5.5dB, BW = JIS-A EVR = mute/EVR = 0dB | | -106 | -85 | dB |
| Residual noise voltage | VNAR | | | | 78 79 | AMP = 5.5dB, EVR = mute Rg = 0Ω, BW = JIS-A | | -106 | -80 | dBV |
| External control part | | | | | | | | | | |
| I ² C-BUS High level input voltage | V _{IH} | 88 89 | | | | | 2.5 | | V _{CC} | V |
| I ² C-BUS Low level input voltage | V _{IL} | 88 89 | | | | | GND | | 0.8 | V |
| FSS output H voltage | VHFSS | | | | 27 | Serial control select FSS OUT H, load = 10kΩ external output resistor 470 recommended | 10.6 | 11.1 | 11.6 | V |
| FSS output M voltage | VMFSS | | | | 27 | Serial control select FSS OUT M, load = 10kΩ external output resistor 470 recommended | 5.5 | 6.3 | 7.0 | V |
| FSS output L voltage | VLSS | | | | 27 | Serial control select FSS OUT, load = 10kΩ | 0.0 | 0.1 | 0.5 | V |
| FSS rising time | TFSSLH | | | | 27 | | | | 1.0 | ms |
| FB output H voltage | VHFB | | | | 34 | Serial control select FB OUT H, load = 150Ω | 3.0 | 4.0 | 5.0 | V |
| FB output L voltage | VLFB | | | | 34 | Serial control select FB OUT L, load = 150Ω | 0.0 | 0.2 | 0.4 | V |
| FB external control L range | VLFBIN | 32 | | | | Pin 32 input voltage range at which the pin 34 output becomes L | 0.0 | | 0.5 | V |
| FB external control H range | VHFBIN | 32 | | | | Pin 32 input voltage range when the pin 34 output becomes H | 1.0 | | 3.0 | V |
| External control output H voltage | V _{EXTH} | | | | 10 36 38 | 2kΩ load for data 1 | 4.0 | 4.5 | 5.0 | V |
| External control output L voltage | V _{EXTL} | | | | 10 36 38 | 2kΩ load for data 0 | 0.0 | 0.3 | 1.0 | V |
| Internal reference regulator | | | | | | | | | | |
| REG2.5V | VREG25 | | | | 2 100 | Pins 2 and 100 voltage | 2.3 | 2.5 | 2.7 | V |
| REG9.0V | VREG90 | | | | 57 65 | Pins 57 and 65 voltage | 8.7 | 9.0 | 9.3 | V |
| VRE4.5 | VREG45 | | | | 49 | Pin 49 voltage | 4.3 | 4.5 | 4.7 | V |

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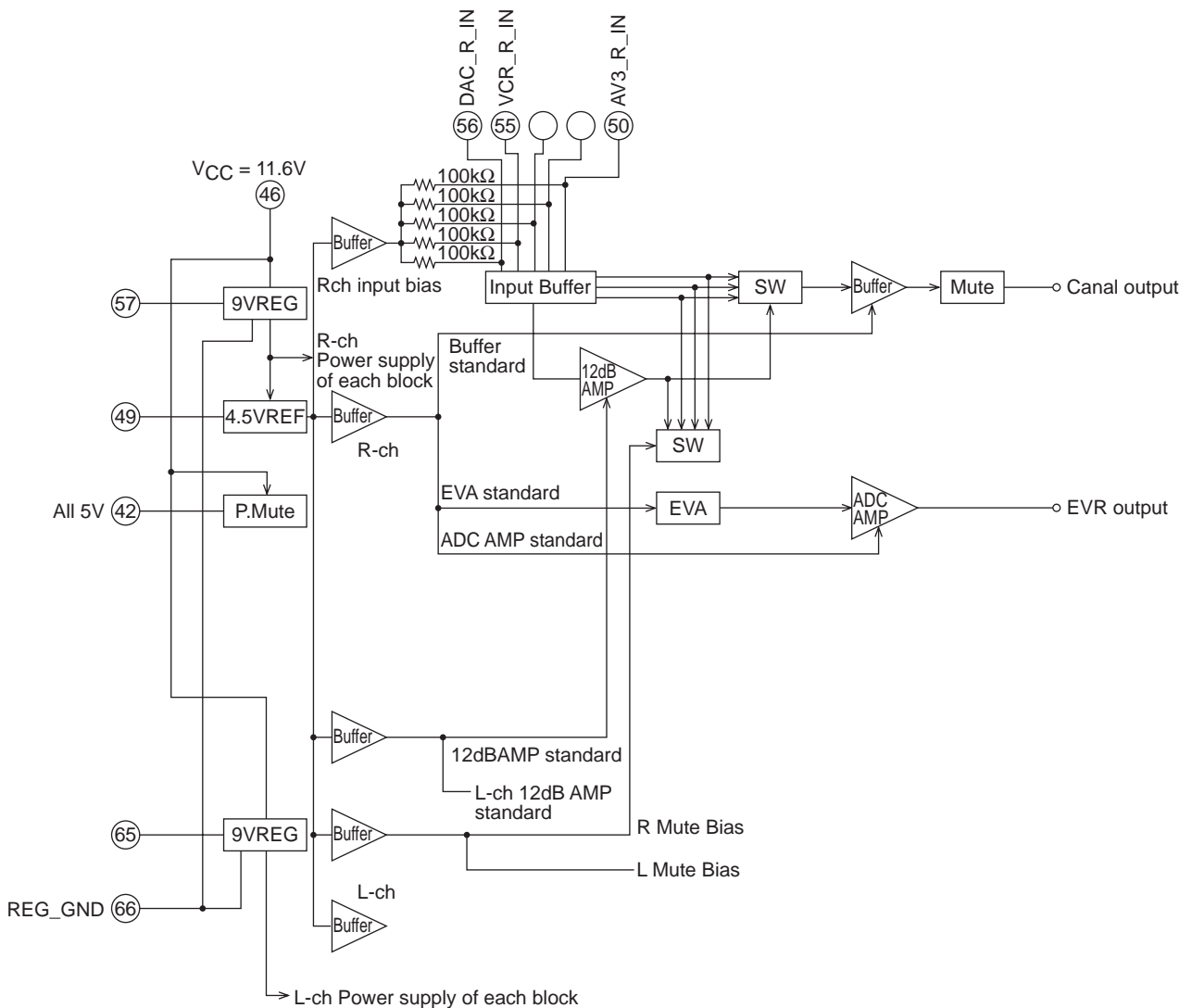
Package Dimensions

unit : mm (typ)

3349



Graphical View of Audio Block Power Supply

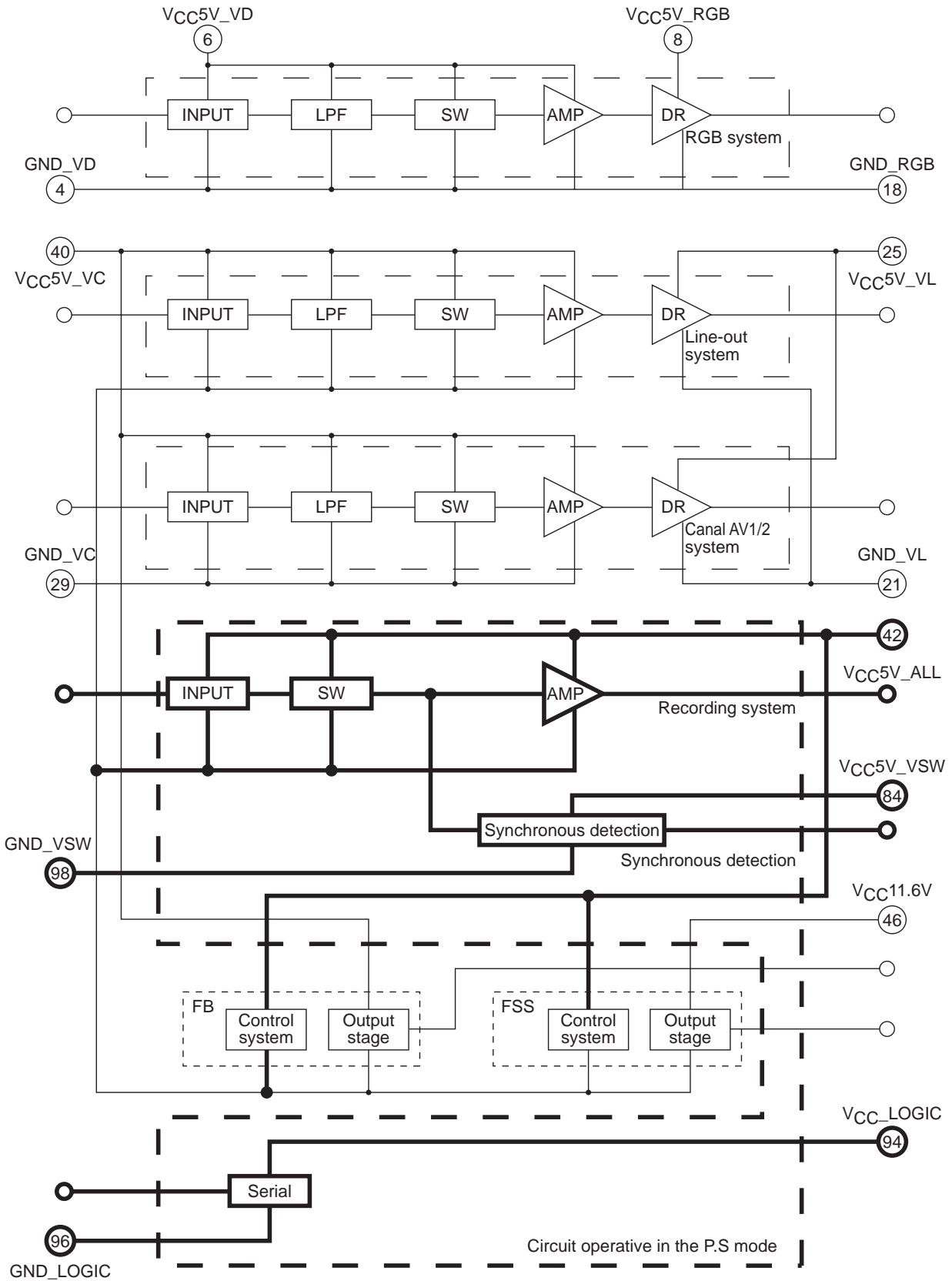


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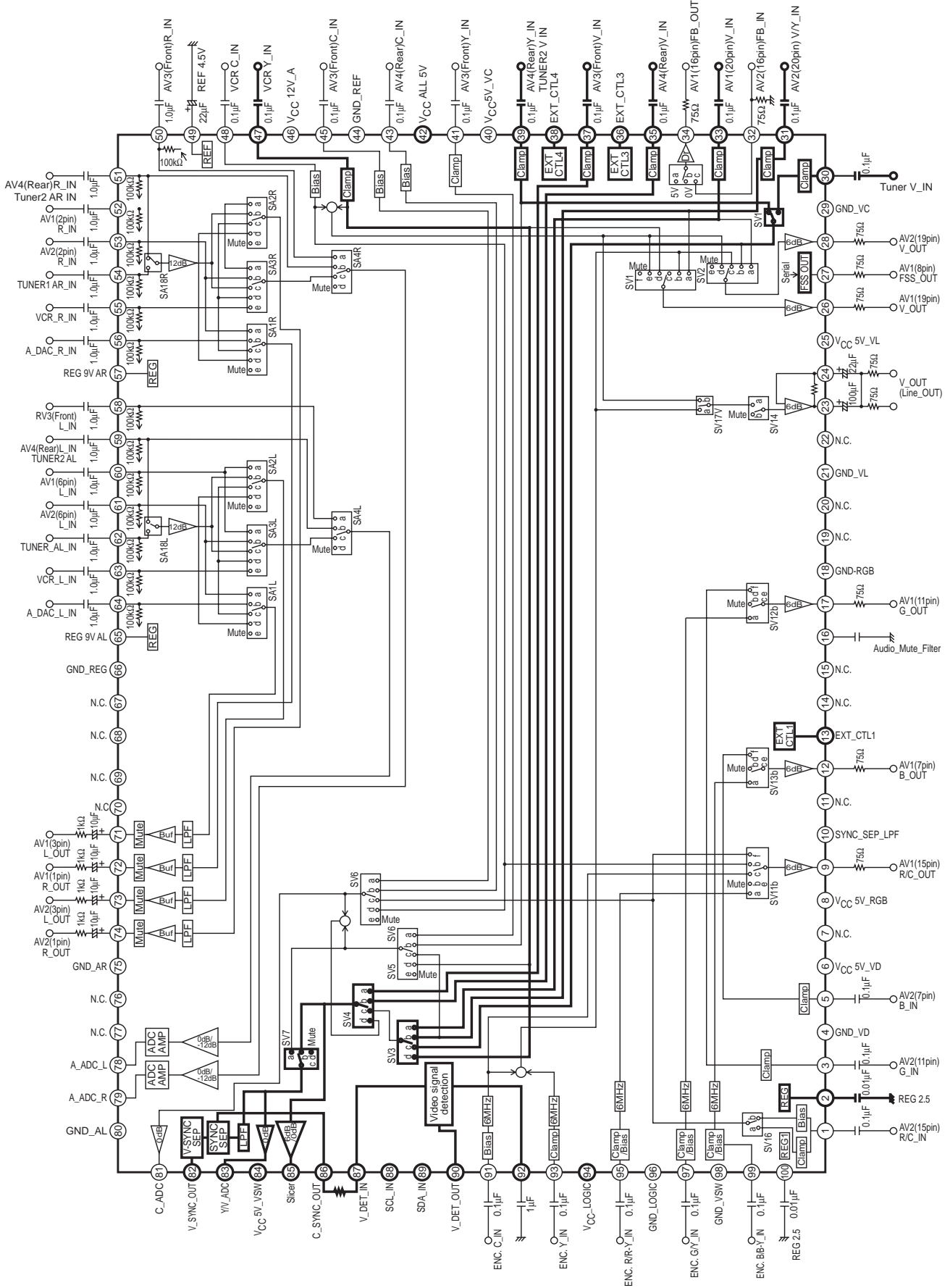
Graphical View of The Video Block Power Supply

* The thick line indicates the circuit operative in the power save mode.

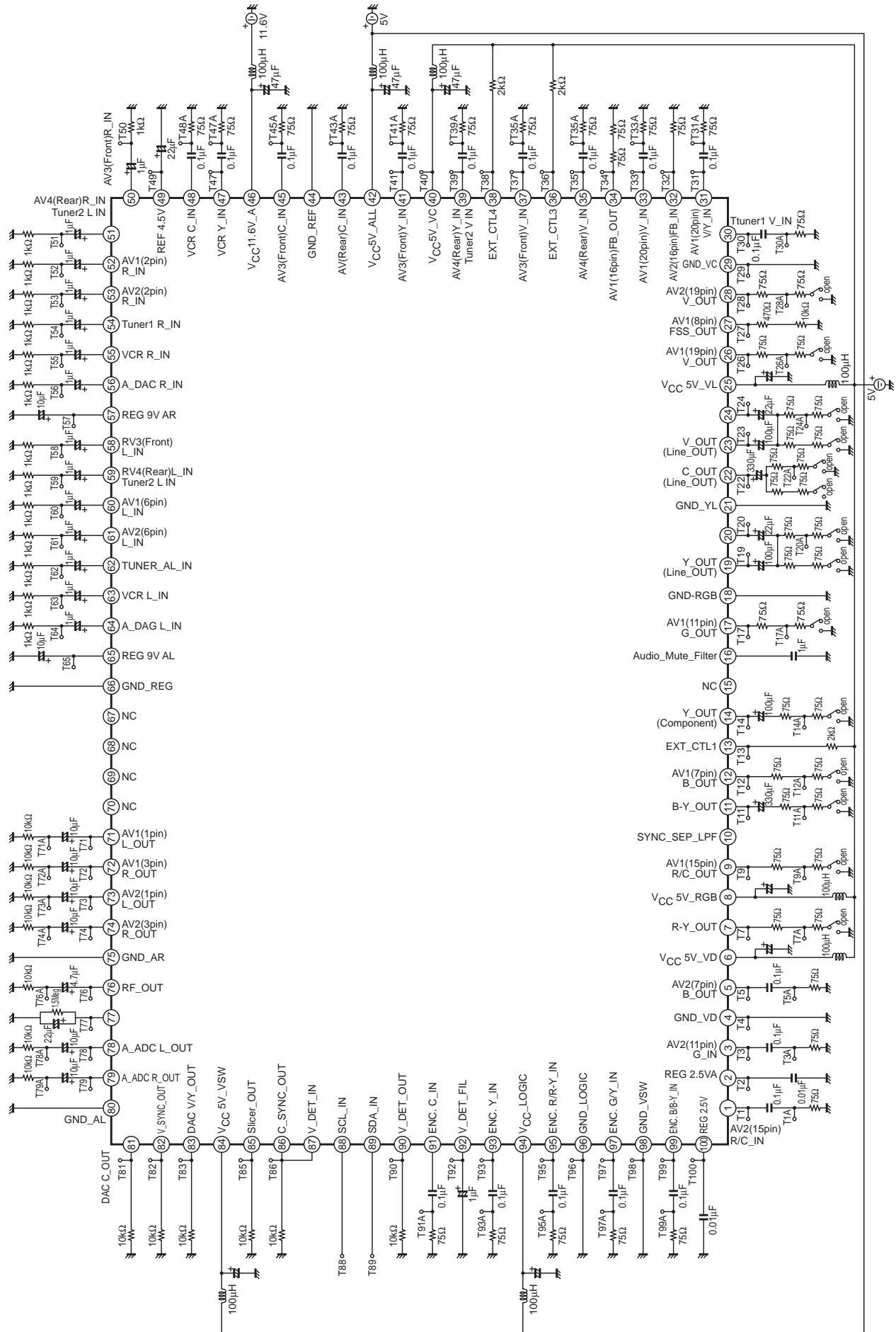
In the power save mode, 5V is applied to Pin 42 (V_{CC5_All}), pin 84 (V_{CC5V_VSW}), and pin 94 (V_{CC_LOGIC}) only.



Block Diagram



Test Circuit



Cautions for Use

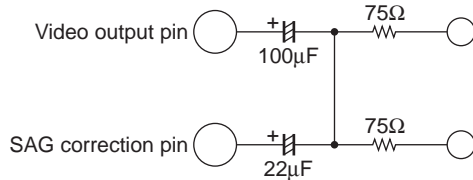
1. Drive capacity of video driver

Line and component outputs can drive two system through capacitive coupling.
Scart output can drive one system only through DC coupling.

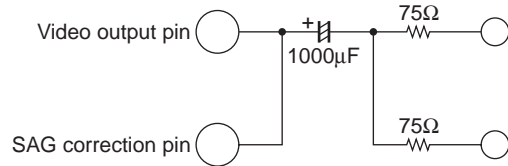
2. Application not using the SAG correction function in the video driver with SAG correction

When the SAG correction function is not to be used in the video driver with SAG correction, short-circuit output and correction pins for output through capacitive coupling.

Application using SAG correction function



Application without using SAG correction function



3. Treatment of the pin when Audio RF_MOD output is not used

When RF MOD OUT (Pin76) is not used, it is recommended to pull up the ALC filter pin (pin77) to V_{CC} (11.6V).

4. Audio Mute

This IC incorporates a mute transistor to reduce the POP noise of audio output when power is turned ON/OFF.
Mute control can be made by serial control.

5. Resistor to limit the Audio input

When the large signal is input in the input pin with power OFF, cross-talk between input and output occurs through the protective diode and parasitic elements. Because of the structure of LSI, such cross-talk is difficult to avoid. If cross-talk at a time of power OFF presents a problem, the cross-talk amount can be reduced by inserting the limiting resistor in the input. In this case, the input signal level changes depending on the resistance value. Determine the constant while taking both the cross-talk amount and input level into account.

6. Pin treatment when external control is not to be used

When external control pins (Pins 13, 36, and 38) are not used, pull-down to GND is recommended.

7. Pin treatment of N.C pin

It is recommended to connect N.C. pins (Pins 67, 68, 69, and 70) directly to the GND.

8. Audio 9V_REG pin external capacitance

Use the Audio 9V_REG pins (pins 57 and 66) external capacitance of 10µF or more and with the equivalent series resistance component of 7Ω or less.

9. Power application and disconnection sequences

The recommended power application sequence to this IC is V_{CC}ALL5V (Pin42) → V_{CC}5V (Pins 6, 8, 25, 40, 84 and 94), V_{CC}11.6V (Pin46).

(No particular order is established between V_{CC}5V and V_{CC}11.6V.) It is recommended to reverse the above sequence when power supply is turned OFF.

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Serial Control Table

* indicates initial.

| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | | |
|---|-----|-----|---|---|---|---|---|---|---|---|--|---------------|---------------|--------------------|----------|
| Group 1 00000001 VIDEO CANAL-SW VIDEO | SV1 | | | | | | | | | | | SV1 | | | |
| | | | | | | | | 0 | 0 | 0 | | V (AV2) | | * | |
| | | | | | | | | 0 | 0 | 1 | | Y+C MIX (ENC) | | PB | |
| | | | | | | | | 0 | 1 | 0 | | Y (ENC) | | PB (SCART Y/C) | |
| | | | | | | | | 0 | 1 | 1 | | Y (VCR) | | PB (VCR SCART Y/C) | |
| | | | | | | | | 1 | 0 | 0 | | CV (VCR) | | PB (VCR) | |
| | | | | | | | | 1 | 0 | 1 | | MUTE | | | |
| | | | | | | | | 1 | 1 | * | | PROHIBIT | | | |
| | | SV2 | | | | | | | | | | | SV2 | | |
| | | | | | 0 | 0 | 0 | | | | | | V (AV1) | | * |
| | | | | | 0 | 0 | 1 | | | | | | V (TU) | | |
| | | | | | 0 | 1 | 0 | | | | | | Y+C MIX (ENC) | | PB |
| | | | | | 0 | 1 | 1 | | | | | | CV (VCR) | | PB (VCR) |
| | | | | | 1 | 0 | 0 | | | | | | MUTE | | |
| | | | | | 1 | 0 | 1 | | | | | and after | PROHIBIT | | |
| | | SV3 | | | | | | | | | | | SV3 | | |
| | | | 0 | 0 | | | | | | | | | V (AV1) | | |
| | | | 0 | 1 | | | | | | | | | V (AV2) | | * |
| | | | 1 | 0 | | | | | | | | | V (TU) | | |
| | | | 1 | 1 | | | | | | | | | Y (VCR) | | PB |

| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | | |
|--|-----|-----------------|---|---|---|---|---|---|---|---|---|-----------|-------------------|----------|----------|
| Group 2 00000010 VIDEO INPUT-SW | SV4 | | | | | | | | | | | SV4 | | | |
| | | | | | | | | | 0 | 0 | | V (AV3) | | | |
| | | | | | | | | | | 0 | 1 | | V (AV4) | | |
| | | | | | | | | | | 1 | 0 | | SV3-OUT | | * |
| | | | | | | | | | | 1 | 1 | | SV5/6 MIX | | |
| | | SV5/6 | | | | | | | | | | | SV5 | SV6 | |
| | | | | | 0 | 0 | 0 | | | | | | Y (AV3) | C (AV3) | FRONT |
| | | | | | 0 | 0 | 1 | | | | | | Y (AV4) | C (AV4) | REAR |
| | | | | | 0 | 1 | 0 | | | | | | Y (AV2) | C (AV2) | SCART-YC |
| | | | | | 0 | 1 | 1 | | | | | | Y (VCR) | C (VCR) | |
| | | | | | 1 | 0 | 0 | | | | | | MUTE | MUTE | * |
| | | | | | 1 | 0 | 1 | | | | | and after | PROHIBIT | PROHIBIT | |
| | | SV7 | | | | | | | | | | | SV7 | | |
| | | | 0 | 0 | | | | | | | | | Y | | |
| | | | 0 | 1 | | | | | | | | | CV | | |
| | | | 1 | 0 | | | | | | | | | MUTE | | * |
| | | | 1 | 1 | | | | | | | | | MUTE | | |
| | | SV16 Note 1) | | | | | | | | | | | SV16 | | |
| | | | 0 | | | | | | | | | | THROUGH | | * |
| | | | 1 | | | | | | | | | | CLAMP input fixed | | |

Note 1) G2D8/G3D8 = "11" is prohibited. Follow the AV2 (16) FB_IN (Pin32) control in case of THROUGH.

AV2_16pin SV16

H a : Clamp input (RGB)

L b : Bias input (COMPONENT)

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| ADDRESS | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | |
|---|---|---|---|---|---|---|---|-----------|---------------------------------|----------|----------|------------------------|---|
| 12/27MHz LPF SW | | | | | | | | | | | | | |
| | | | | | | | | 0 | | | | x = 12MHz | * |
| | | | | | | | | 1 | | | | x = 27MHz | |
| RGB output | | | | | | | | | SV11b | SV12b | SV13b | | |
| | | | | | | | 0 | | According to G3D3/D4/D5 control | | | | |
| | | | | | | | 1 | | AV2_R | AV2_G | AV2_B | f : AV2_RGB (EXTERNAL) | * |
| N/A | | | | | | | | | | | | | |
| | | | | 0 | 0 | 0 | | | N/A | N/A | N/A | | * |
| | | | | 0 | 0 | 1 | | | N/A | N/A | N/A | | |
| | | | | 0 | 1 | 0 | | | N/A | N/A | N/A | | |
| | | | | 0 | 1 | 1 | | | N/A | N/A | N/A | | |
| | | | | 1 | 0 | 0 | | | N/A | N/A | N/A | | |
| | | | | 1 | 0 | 1 | | | N/A | N/A | N/A | | |
| | | | | 1 | 1 | 0 | | and after | PROHIBIT | PROHIBIT | PROHIBIT | | |
| SV11b SV12b SV13b * effective at G3D2 = "0" | | | | | | | | | SV11b | SV12b | SV13b | | |
| | | | | 0 | 0 | 0 | | | ENC_R | ENC_G | ENC_B | a : ENC_RGB (6MLPF) | * |
| | | | | 0 | 0 | 1 | | | MUTE | MUTE | MUTE | b : mute | |
| | | | | 0 | 1 | 0 | | | ENC_C | MUTE | MUTE | c : ENC_C | |
| | | | | 0 | 1 | 1 | | | VCR_C | MUTE | MUTE | d : VCR_C | |
| | | | | 1 | 0 | 0 | | | MUTE | MUTE | MUTE | e : mute | |
| | | | | 1 | 0 | 1 | | | AV2_R | AV2_G | AV2_B | f : AV2_RGB (EXTERNAL) | |
| | | | | 1 | 1 | 0 | | and after | PROHIBIT | PROHIBIT | PROHIBIT | | |
| SV14 | | | | | | | | | SV14 | | | | |
| | | | 0 | | | | | | CV (PB) | | | PB | |
| | | | 1 | | | | | | MUTE | | | | * |
| N/A | | | | | | | | | | | | | |
| | | 0 | | | | | | | N/A | N/A | | | |
| | 1 | | | | | | | | MUTE | MUTE | | | * |
| SV16 Note 1) | | | | | | | | | SV16 | | | | |
| | 0 | | | | | | | | THROUGH | | | | |
| | 1 | | | | | | | | BIAS input fixed | | | | * |

Note 1) G2D8/G3D8 = "11" is prohibited. Follow the AV2 (16) FB_IN (Pin32) control in case of THROUGH.

AV2_16pin SV16

H a : Clamp input (RGB)

L b : Bias input (COMPONENT)

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| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | |
|---|---------------------|---|---|---|---|---|---|---|---------|------------------|-------------|---------------------------|----------|---|
| Group 4 00000100 VIDEO & AUDIO OTHER-1 | SV17 | | | | | | | | | SV17 (V/C/Y) | SA17 (L/R) | | | |
| | DVD/VCR Note 2) | | | | | | | | 0 | Y+C MIX (ENC) | AUDIO (DAC) | | PB (DVD) | * |
| | | | | | | | | | 1 | Y+C MIX (VCR) | AUDIO (VCR) | | PB (VCR) | |
| | SV18 | | | | | | | | | SV18 | SA18 (L/R) | | | |
| | TUNER1/2 Note 2) | | | | | | | | 0 | Tuner1 | Tuner1 | | | * |
| | | | | | | | | | 1 | Tuner2 | Tuner2 | | | |
| | FB | | | | | | | | | SWF | | | | |
| | AV1 (16) | | | | | 0 | 0 | | | 0 | | | | |
| | | | | | | 0 | 1 | | | 5V | | | | |
| | | | | | | 1 | 0 | | | THROUGH | | | | * |
| | | | | | | 1 | 1 | | | THROUGH | | | | |
| | FSS | | | | | | | | | FSS-OUT | | | | |
| | AV1 (8) Note 3) | | | 0 | 0 | | | | | LOW (0.5V) | | | | * |
| | | | | 0 | 1 | | | | | MID (6.0V) | | | | |
| | | | | 1 | 0 | | | | | HIGH (11.0V) | | | | |
| | | | | 1 | 1 | | | | | HIGH (11.0V) | | | | |
| | SLICE AMP | | | | | | | | | SLICE AMP gain | | | | |
| | | | 0 | | | | | | | 0dB | | | | * |
| | | | 1 | | | | | | | 6dB | | | | |
| | A-MUTE Note 4) | | | | | | | | | All MUTE (Audio) | | | | |
| | | 0 | | | | | | | THROUGH | | | | | |
| | | 1 | | | | | | | MUTE | | | Pins 71 to 74 output MUTE | * | |

Note 2) Operates in VIDEO/AUDIO interlock.

Note 3) Same polarity as the AV2 (16) FB_IN (Pin32) control in case of THROUGH.

Note 4) AUDIO MUTE control

RF_MOD output : Serial control MUTE, Power-ON_MUTE

CANAL output : Serial control MUTE, Power-ON_MUTE

| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | |
|--|--------|---|---|---|---|---|---|---|------|-----------|----------|--|----------|---|
| Group 5 00000101 AUDIO CANAL-SW | SA1L/R | | | | | | | | | SA1L | SA1R | | | |
| | | | | | | | 0 | 0 | 0 | L (AV2) | R (AV2) | | | * |
| | | | | | | | 0 | 0 | 1 | L (DAC) | R (DAC) | | PB (DAC) | |
| | | | | | | | 0 | 1 | 0 | L (DAC) | R (DAC) | | PB (DAC) | |
| | | | | | | | 0 | 1 | 1 | L (VCR) | R (VCR) | | PB (VCR) | |
| | | | | | | | 1 | 0 | 0 | MUTE | MUTE | | | |
| | | | | | | | 1 | 0 | 1 | PROHIBIT | PROHIBIT | | | |
| | | | | | | | | | | and after | | | | |
| | SA2L/R | | | | | | | | | SA2L | SA2R | | | |
| | | | | 0 | 0 | 0 | | | | L (AV1) | R (AV1) | | | * |
| | | | | 0 | 0 | 1 | | | | L (TU) | R (TU) | | | |
| | | | | 0 | 1 | 0 | | | | L (DAC) | R (DAC) | | PB | |
| | | | | 0 | 1 | 1 | | | | L (VCR) | R (VCR) | | PB | |
| | | | | 1 | 0 | 0 | | | | MUTE | MUTE | | | |
| | | | | 1 | 0 | 1 | | | | PROHIBIT | PROHIBIT | | | |
| | | | | | | | | | | and after | | | | |
| | SA4L/R | | | | | | | | | SA4L | SA4R | | | |
| | | | 0 | 0 | | | | | | L (AV3) | R (AV3) | | | |
| | | | 0 | 1 | | | | | | L (AV4) | R (AV4) | | | |
| | | | 1 | 0 | | | | | | SL3 out | SR3 out | | | * |
| | | 1 | 1 | | | | | | MUTE | MUTE | | | | |

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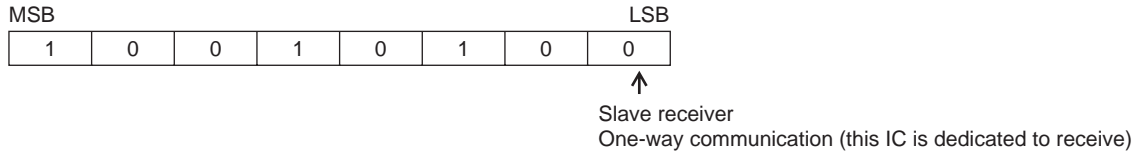
| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks |
|--|---------|---|---|---|---|-----------|---|---|---|----------|--------------|--|---------|
| Group 6 00000110 AUDIO INPUT-SW MUTE | SA3L/R | | | | | | | | | SA3L | SA3R | | |
| | | | | | | | 0 | 0 | 0 | L (AV1) | R (AV1) | | |
| | | | | | | | 0 | 0 | 1 | L (AV2) | R (AV2) | | * |
| | | | | | | | 0 | 1 | 0 | L (TU) | R (TU) | | |
| | | | | | | | 0 | 1 | 1 | L (DAC) | R (DAC) | | PB |
| | | | | | | | 1 | 0 | 0 | L (VCR) | R (VCR) | | |
| | | | | | | and after | 1 | 0 | 1 | PROHIBIT | PROHIBIT | | |
| | N/A | | | | | 0 | | | | N/A | | | |
| | | | | | | 1 | | | | N/A | | | * |
| | N/A | | | | 0 | 0 | | | | | N/A | | |
| | | | | | 0 | 1 | | | | | N/A | | * |
| | | | | | 1 | 0 | | | | | N/A | | |
| | | | | | 1 | 1 | | | | | PROHIBIT | | |
| | ADC-AMP | | | | | | | | | | ADC-AMP-gain | | |
| | | 0 | 0 | | | | | | | | 6.0dB | | |
| | | 0 | 1 | | | | | | | | 5.5dB | | * |
| 1 | | 0 | | | | | | | | 5.0dB | | | |
| | | | | | | | | | | PROHIBIT | | | |

| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | |
|---------------------|--|---|---|---|---|---|---|---|---|------------------|---------------------|-------------------|----------------------|------------------|
| Group 7 00000111 | AUDIO EVR-L | | | | | | | | | Audio EVR (L) | | | | |
| | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0dB | | | | |
| | | | | 0 | 0 | 1 | 1 | 0 | 0 | -12dB | | | | |
| | | | | 1 | 1 | 1 | 1 | 1 | 1 | Mute | | | Pin 78 output MUTE | * |
| | | | | | | | | | | Other than above | PROHIBIT | | | |
| | General purpose 1 | | | | | | | | | | EXT_CTL1 (Pin13) | | | |
| | | 0 | | | | | | | | | L | | General purpose OUT1 | |
| | | | 1 | | | | | | | | H | | | * |
| | Changeover of VIDEO input BIAS/CLAMP | | | | | | | | | | R/R-Y_IN (Pin95) | G/Y_IN (Pin97) | B/B-Y_IN (Pin99) | Input changeover |
| | | 0 | | | | | | | | | BIAS input | CLAMP input | BIAS input | Component |
| | | 1 | | | | | | | | CLAMP input | CLAMP input | CLAMP input | RGB | * |

| ADDRESS | | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | Remarks | |
|---------------------|----------------------|---|---|---|---|---|---|---|---|------------------|------------------|--|----------------------|---|
| Group 8 00001000 | AUDIO EVR-R | | | | | | | | | Audio EVR (R) | | | | |
| | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0dB | | | | |
| | | | | 0 | 0 | 1 | 1 | 0 | 0 | -12dB | | | | |
| | | | | 1 | 1 | 1 | 1 | 1 | 1 | Mute | | | Pin 79 output MUTE | * |
| | | | | | | | | | | Other than above | PROHIBIT | | | |
| | General purpose 3 | | | | | | | | | | EXT_CTL3 (Pin36) | | | |
| | | 0 | | | | | | | | | L | | General purpose OUT3 | * |
| | | | 1 | | | | | | | | H | | | |
| | General purpose 4 | | | | | | | | | | EXT_CTL4 (Pin38) | | | |
| | | 0 | | | | | | | | | L | | General purpose OUT4 | * |
| | | 1 | | | | | | | | H | | | | |

Serial Control Specification

1. Slave address



2. DATA TRANSFER MANUAL : [1] is High level. [0] is Low level.

I²C-BUS control system is adopted in SW LSI. SW LSI is controlled by SCL (Serial Clock) and SDA (Serial Data) At first, please set up the START condition^{*1} by these two terminals (SCL and SDA). And next, please input the 8bits data, which should be synchronized with SCL into SDA terminal. Still more, please give priority to high rank bit at data transfer order (MSB→LSB). The 9th bit is called as ACK (Acknowledge), SW LSI sends [0] to the SDA terminal during SCL [1] period. So, please open the port of microprocessor during this period. LV71081E adopt auto-increment, so you input only first group-address and you can transfer data in order. As thus the Data transfer Stop condition^{*2} is finished.

^{*1} SDA rise up during SCI is [1]

^{*2} SDA fall down during SCL is [1]

3. TRANSFER DATA FORMAT

The transfer data is composed by START condition, Slave address, Group address^{*1}, data, and STOP condition.

After setting up the START condition, please transfer the Slave Address (regulated as “1001000” in SW LSI). Group and next control data^{*2} (Please see the Fig.1)

Slave Address is composed by 7bits, and this bit 8th bit^{*3} should be set as [0].

The both of Group address and control data are composed by 8bits, and the one control action is defined with combination of these two data. And if you want to control 2 or more groups at the same mode, you can realize it by sending some control data together.

The data makes meaning with all bits, so you cannot stop the sending until all data transfer is over.

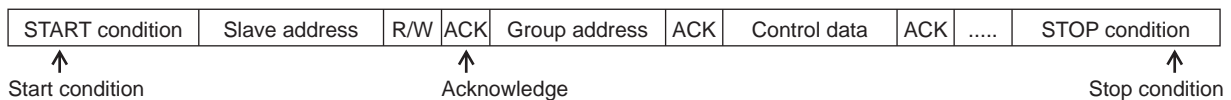
But LV71081E adopt auto-increment, for example you can stop to transfer STOP condition after group 2 data.

If you want to stop transfer action, please transfer the STOP condition without fail.

^{*1/2} There are 8 control groups.

^{*3} This 8th bit called as R/W bit, and this bit shows the data transmission direction. [0] means send mode (accept mode with SW LSI) and [1] means accept mode (send mode with SW LSI) fundamentally. But SW LSI is not equipped with such a data out function, please keep this bit as [0].

Fig. 1 DATA STRUCTURE



LV71081E

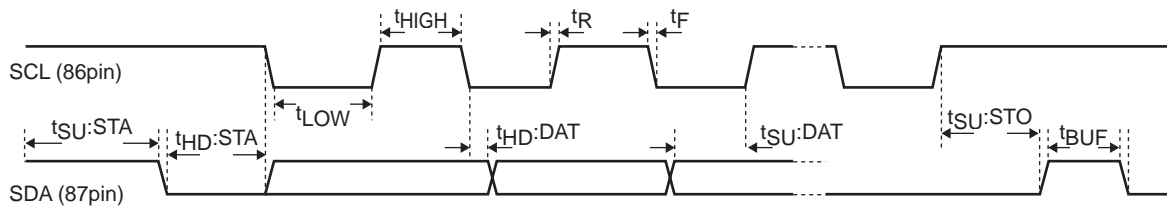
4. INITIALIZE AND OTHERS

SW LSI is initialized as the following mode for circuit protection. Please see “SERIAL CONTROL TABLE”.

Characteristics of the SDA and SCL I/O stages for SW LSI

| Parameter | Symbol | Min | Max | Unit |
|---|--------------|-----|-----|---------|
| LOW level input voltage | V_{IL} | 0 | 0.8 | V |
| HIGH level input voltage | V_{IH} | 3.0 | 5.0 | V |
| LOW level output current | I_{OL} | | 3.0 | mA |
| SCL clock frequency | f_{SCL} | | 400 | kHz |
| Set-up time for a repeated START condition | $t_{SU:STA}$ | 0.6 | | μs |
| Hold time START condition. After this period, the first clock pulse is generated. | $t_{HD:STA}$ | 0.6 | | μs |
| LOW period of the SCL clock | t_{LOW} | 1.3 | | μs |
| Rise time of both SDA and SDL signals | t_R | 0 | 0.3 | μs |
| HIGH period of the SCL clock | t_{HIGH} | 0.6 | | μs |
| Fall time of both SDA and SDL signals | t_F | 0 | 0.3 | μs |
| Data hold time: | $t_{HD:DAT}$ | 0 | 0.9 | μs |
| Data set-up time | $t_{SU:DAT}$ | 100 | | ns |
| Set-up time for STOP condition | $t_{SU:STO}$ | 0.6 | | μs |
| BUS fredd time between a STOP and START condition | t_{BUF} | 1.3 | | μs |

Fig.2 Definition of timing.



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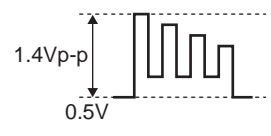
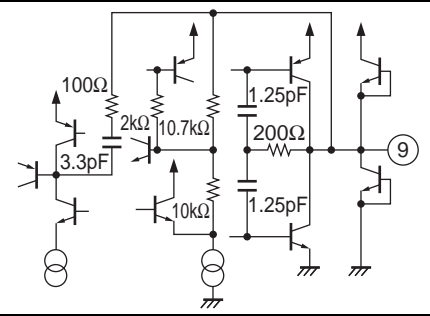
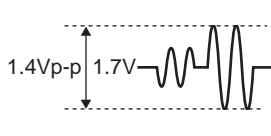
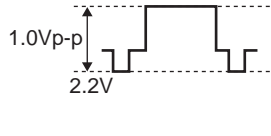
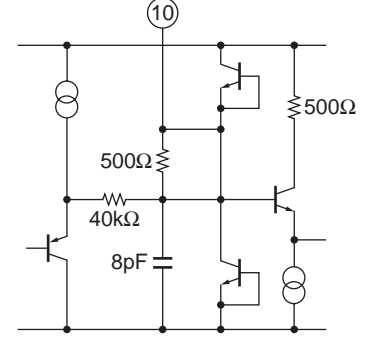
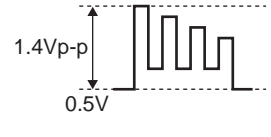
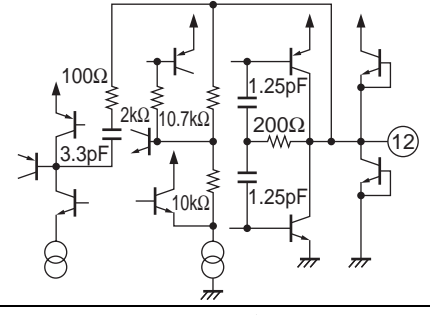
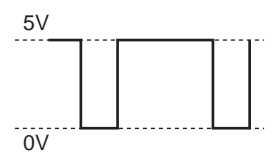
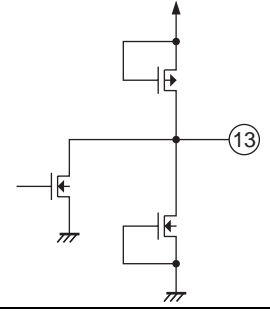
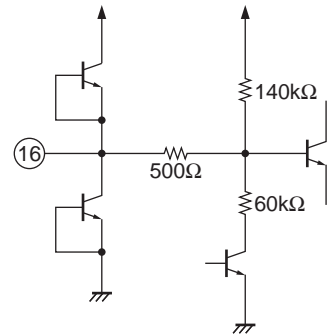
Pin Function

| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|------------------------|-------------|------------------|---------------------|
| P1 | AV2R/C_IN | 1.6V R | | |
| | | 2.1V Chroma | | |
| P2 | REG 2.5VA | 2.5V | DC | |
| P3 | AV2 G_IN | 1.6V G | | |
| P4 | GND_VD | | | |
| P5 | AV2 B_IN | 1.6V B | | |
| P6 | V _{CC} 5V_VD | | | |
| P7 | N.C. | | | |
| P8 | V _{CC} 5V_RGB | | | |

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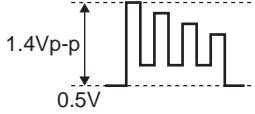
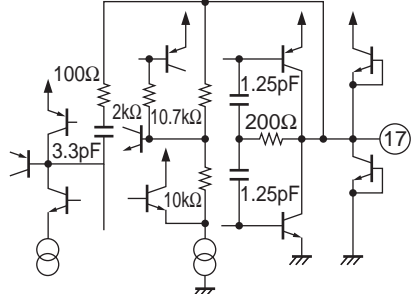
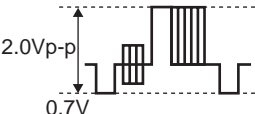
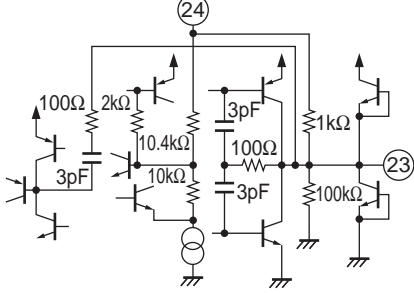
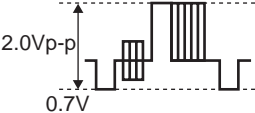
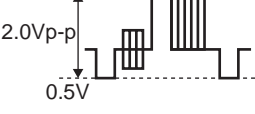
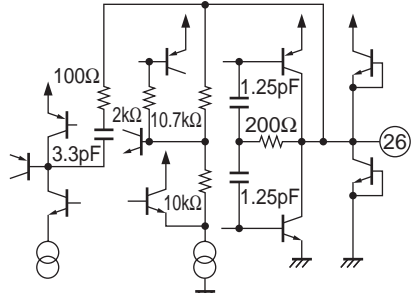
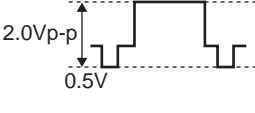
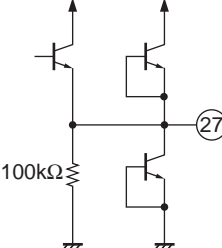
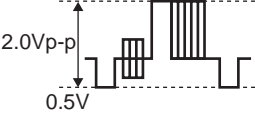
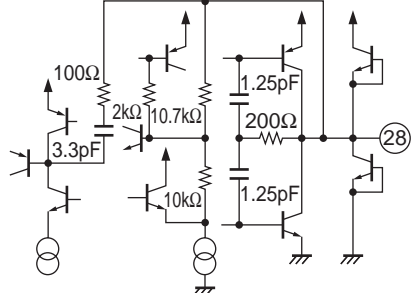
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-------------------|-------------|---|---|
| P9 | AV1 R/C_OUT | 0.5V R |  |  |
| | | 1.7V Chroma |  | |
| P10 | SYNC_SEP_LPF | 1.0V Y |  |  |
| P11 | N.C. | | | |
| P12 | AV1 B_OUT | 0.5V B |  |  |
| P13 | EXT_CTL1 | |  |  |
| P14 | N.C. | | | |
| P15 | N.C. | | | |
| P16 | Audio_Mute_Filter | | |  |

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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|------------------------|--|---|---|
| P17 | AV1 G_OUT | 0.5V G |  |  |
| P18 | GND_RGB | | | |
| P19 | N.C. | | | |
| P20 | N.C. | | | |
| P21 | GND_VL | | | |
| P22 | N.C. | | | |
| P23 | V_OUT (Line_OUT) | 0.7V Video |  |  |
| P24 | V_SAG_IN (Line_OUT) | 0.7V Video |  | |
| P25 | V _{CC} 5V_VL | | | |
| P26 | AV1 V_OUT | 0.5V Video |  |  |
| | | 0.5V Y |  | |
| P27 | AV1 FSS_OUT | Low : 0.5V Midol : 6.0V High : 11.1V | DC |  |
| P28 | AV2 V_OUT | 0.5V Video |  |  |
| P29 | GND_VC | | | |

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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-------------|--|------------------|---------------------|
| P30 | Tuner1 V_IN | 1.6V Video | | |
| P31 | AV2 V/Y_IN | 1.6V Video | | |
| | | 1.6V Y | | |
| P32 | AV2 FB_IN | | | |
| P33 | AV1 V_IN | 1.6V Video | | |
| P34 | AV1 FB_OUT | L : 0V H : 3.8V Through : 0/3.8V | | |

Continued on next page.

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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|--------------------------|------------|------------------|---------------------|
| P35 | AV4 V_IN | 1.6V Video | | |
| P36 | EXT_CTL3 | | | |
| P37 | AV3 V_IN | 1.6V Video | | |
| P38 | EXT_CTL4 | | | |
| P39 | AV4 Y_IN/ Tuner2 V_IN | 1.6V Y | | |
| | | 1.6V Video | | |
| P40 | VCC 5V_VC | | | |

Continued on next page.

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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-------------------------|-------------|------------------|---------------------|
| P41 | AV3 Y_IN | 1.6V Y | | |
| P42 | V _{CC} 5V_ALL | 5V | DC | |
| P43 | AV4 C_IN | 2.1V Chroma | | |
| P44 | GND_REF | 0V | DC | |
| P45 | AV3 C_IN | 2.1V Chroma | | |
| P46 | V _{CC} 11.6V_A | 11.6V | DC | |
| P47 | VCR Y_IN | 1.6V Y | | |
| P48 | VCR C_IN | 2.1V Chroma | | |

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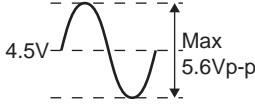
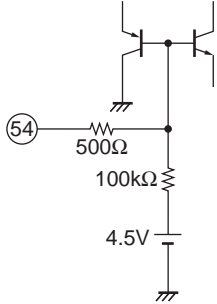
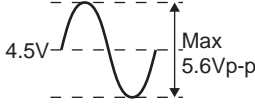
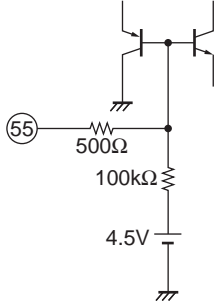
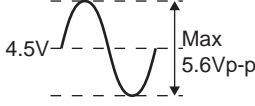
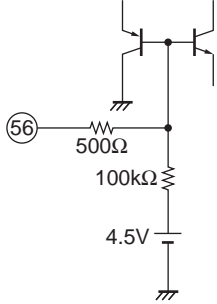
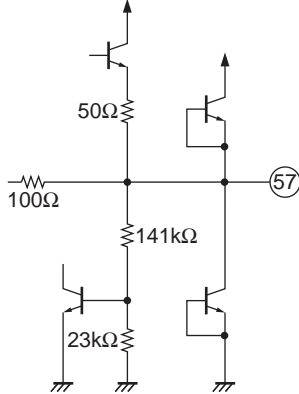
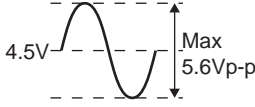
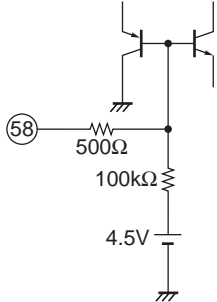
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|--------------------------|------------|------------------|---------------------|
| P49 | REF 4.5V | 4.5V | | |
| P50 | AV3 R_IN | 4.5V | | |
| P51 | AV4 R_IN/ Tuner2 R_IN | 4.5V | | |
| P52 | AV1 R_IN | 4.5V | | |
| P53 | AV2 R_IN | 4.5V | | |

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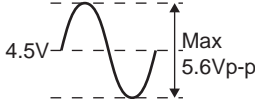
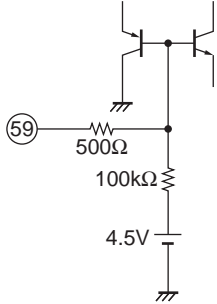
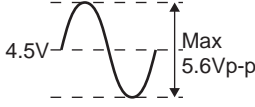
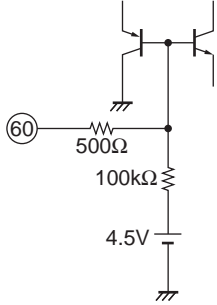
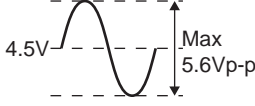
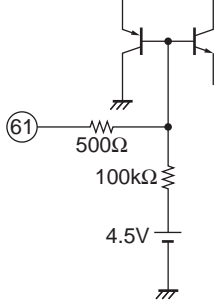
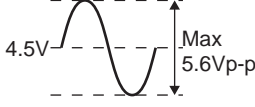
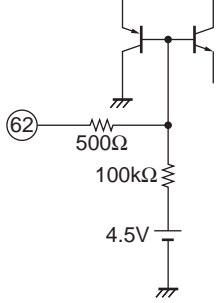
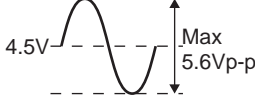
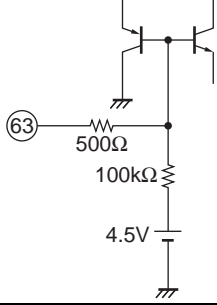
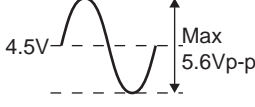
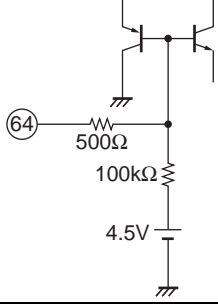
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-------------|------------|---|---|
| P54 | Tuner1 R_IN | 4.5V |  |  |
| P55 | VCR R_IN | 4.5V |  |  |
| P56 | A_DAC R_IN | 4.5V |  |  |
| P57 | REG 9V AR | 9V | DC |  |
| P58 | AV3 L_IN | 4.5V |  |  |

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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|--------------------------|------------|---|---|
| P59 | AV4 L_IN/ Tuner2 L_IN | 4.5V |  |  |
| P60 | AV1 L_IN | 4.5V |  |  |
| P61 | AV2 L_IN | 4.5V |  |  |
| P62 | Tuner1 L_IN | 4.5V |  |  |
| P63 | VCR L_IN | 4.5V |  |  |
| P64 | A_DAC L_IN | 4.5V |  |  |

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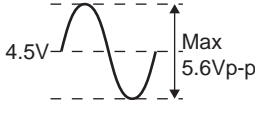
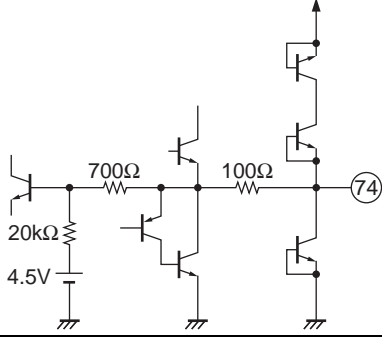
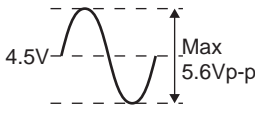
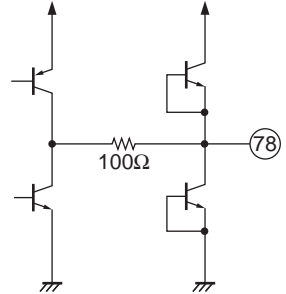
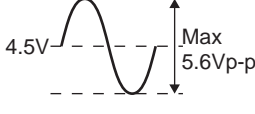
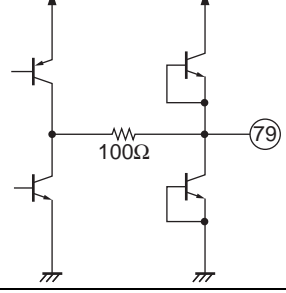
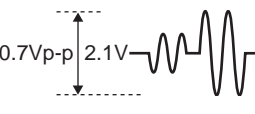
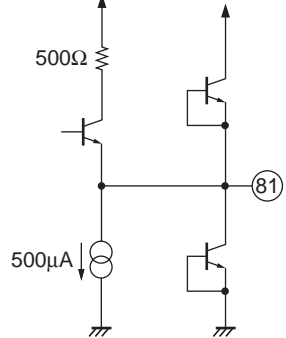
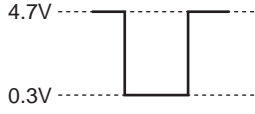
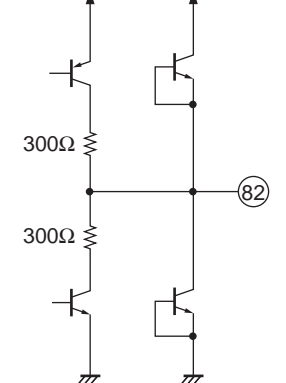
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-----------|------------|------------------|---------------------|
| P65 | REG 9V AL | 9V | DC | |
| P66 | GND_REG | 0V | DC | |
| P67 | N.C. | | | |
| P68 | N.C. | | | |
| P69 | N.C. | | | |
| P70 | N.C. | | | |
| P71 | AV1 L_OUT | 4.5V | | |
| P72 | AV1 R_OUT | 4.5V | | |
| P73 | AV2 L_OUT | 4.5V | | |

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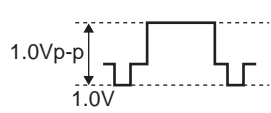
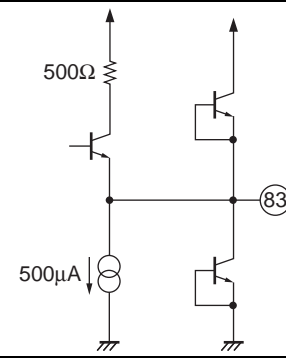
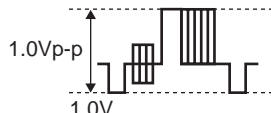
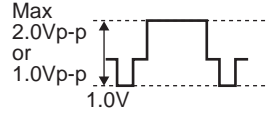
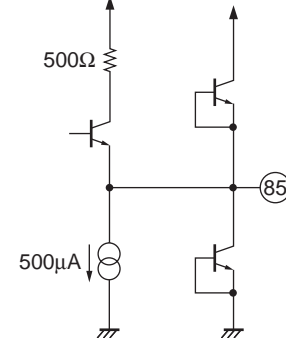
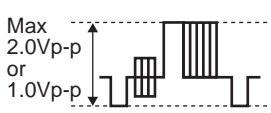
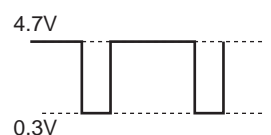
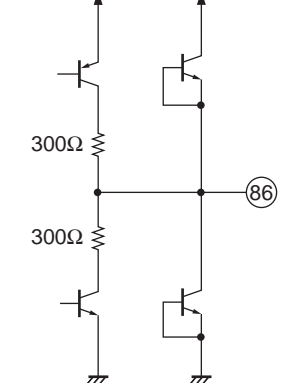
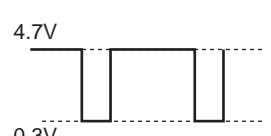
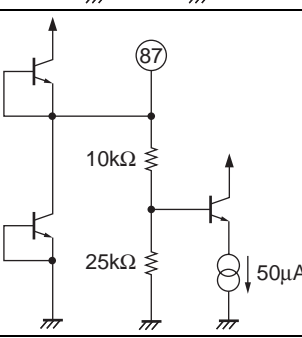
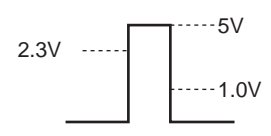
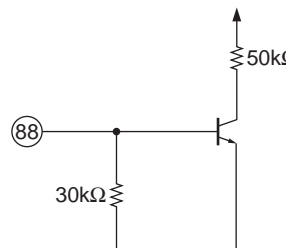
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-------------|------------|---|---|
| P74 | AV2 R_OUT | 4.5V |  |  |
| P75 | GND_AR | 0V | DC | |
| P76 | N.C. | | | |
| P77 | N.C. | | | |
| P78 | A_DAC L_OUT | 4.5V |  |  |
| P79 | A_DAC R_OUT | 4.5V |  |  |
| P80 | GND_AL | | | |
| P81 | DAC C_OUT | 2.1V |  |  |
| P82 | V_SYNC_OUT | |  |  |

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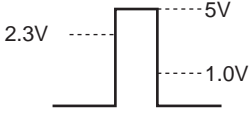
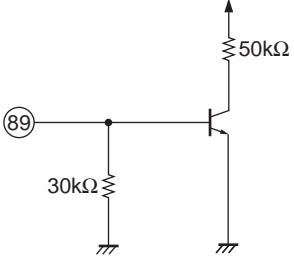
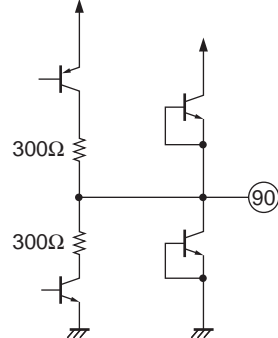
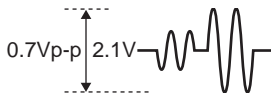
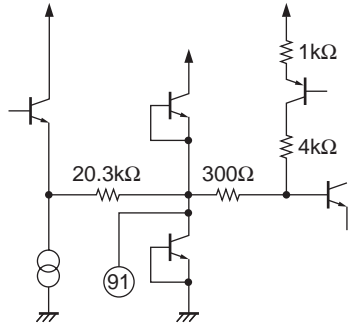
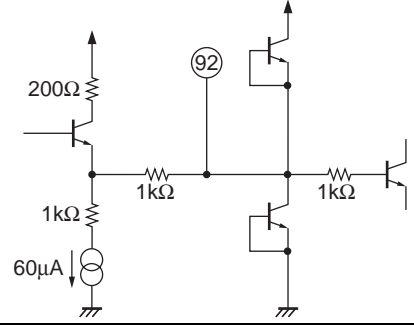
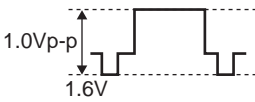
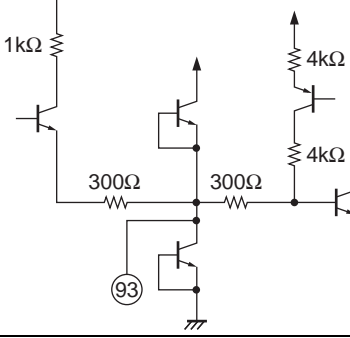
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|------------------------|------------|---|---|
| P83 | DAC V/Y_OUT | 1.0V Y |  |  |
| | | 1.0V Video |  | |
| P84 | V _{CC} 5V_VSW | | | |
| P85 | Slicer_OUT | 1.0V Y |  |  |
| | | 1.0V Video |  | |
| P86 | C_CYNC_OUT | |  |  |
| P87 | V_DET_IN | |  |  |
| P88 | SCL_IN | |  |  |

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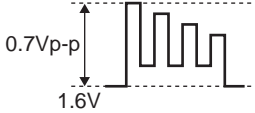
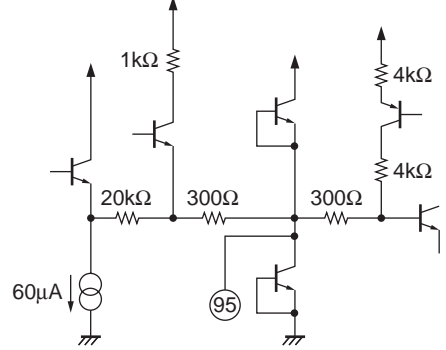


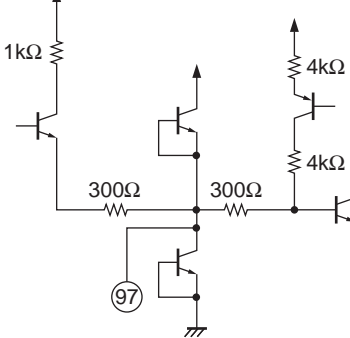
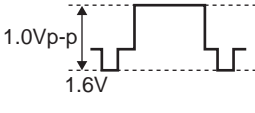

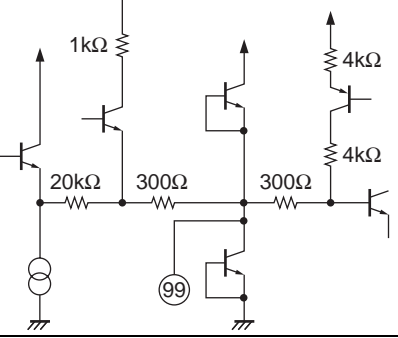

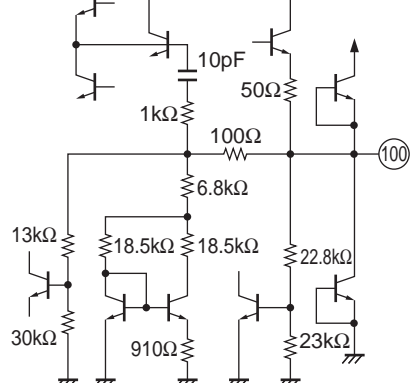
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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|------------------------|---------------------------------------|---|---|
| P89 | SDL_IN | |  |  |
| P90 | V_DET_OUT | 4.7V with signal 0V without signal | DC |  |
| P91 | ENC. C_IN | 2.1V Chroma |  |  |
| P92 | V_DET_FIL | | DC |  |
| P93 | ENC. Y_IN | 1.6V Y |  |  |
| P94 | V _{CC} _LOGIC | | | |

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| Pin No. | Pin name | DC voltage | Signal wave form | In put/Out put form |
|---------|-------------------|------------|---|--|
| P95 | ENC. R/ R-Y_IN | 1.6V R |  |  |
| | | 2.1V R-Y |  | |
| P96 | GND_LOGIC | | | |
| P97 | ENC. G/Y_IN | 1.6V G |  |  |
| | | 1.6V Y |  | |
| P98 | GND_VSW | | | |
| P99 | ENC. B/ B-Y_IN | 1.6V B |  |  |
| | | 2.1V B-Y |  | |
| P100 | REG 2.5V | 2.5V | DC |  |

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