

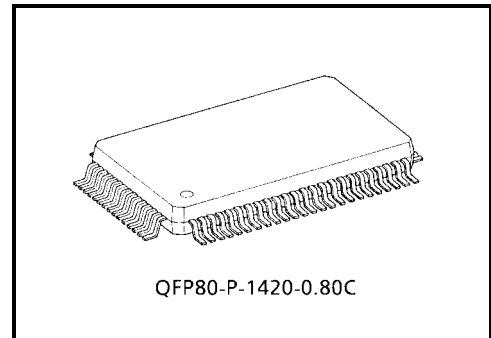
TOSHIBA BiCMOS INTEGRATED CIRCUIT, SILICON MONOLITHIC

# TB1261F/TB1262F

PAL/NTSC/SECAM 1CHIP  
(IF + VCD PROCESSOR)

The TB1261F/TB1262F are TV signal processor ICs, which contains PIF, SIF, Video, Chroma and Deflection blocks. They can be applied for worldwide Multi system TV sets.

The flexibility of this TB1261F/TB1262F contributes to reduce development costs and components in a TV set.

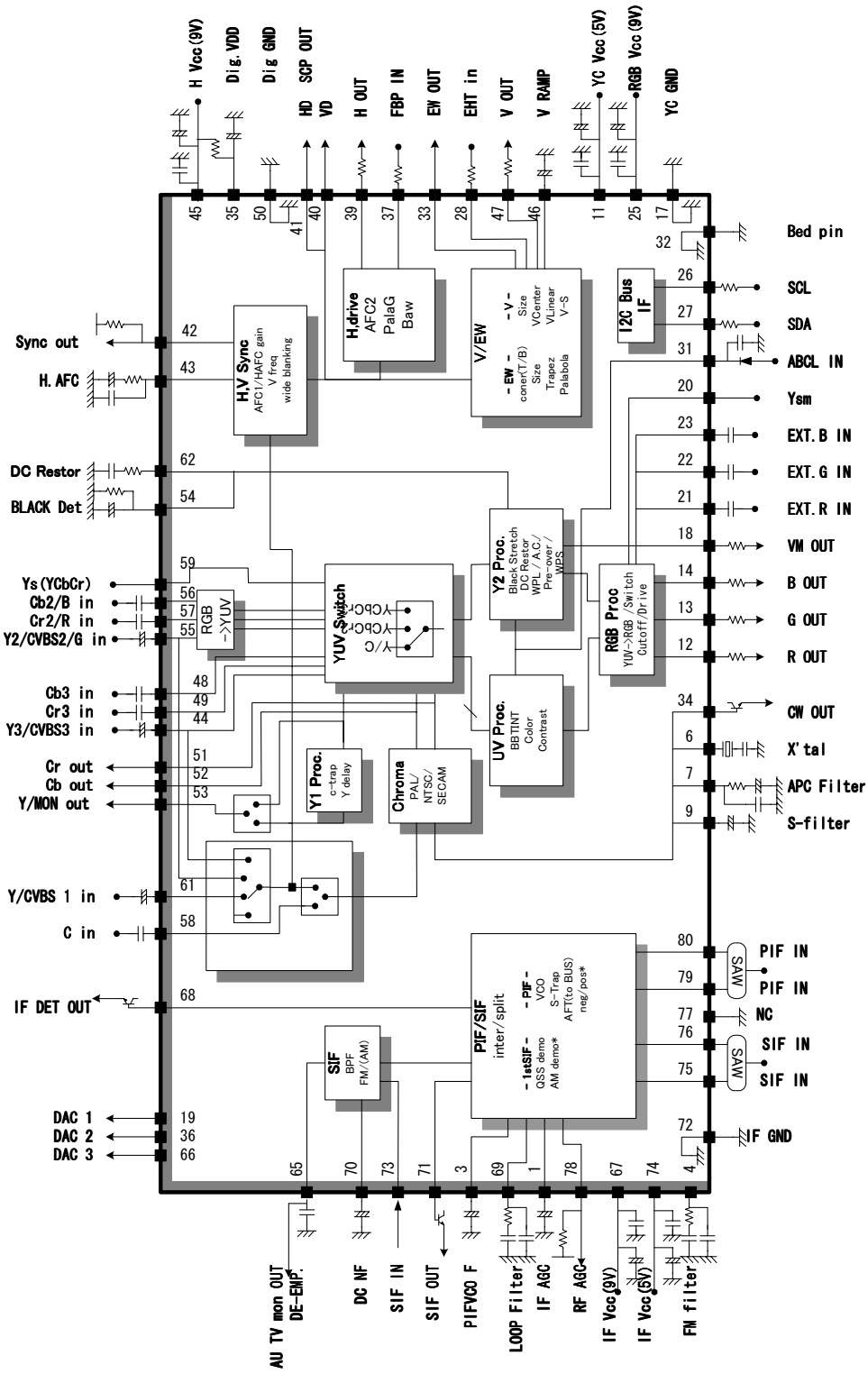


## FEATURES

- IF
    - Integrated PIF VCO, aligned automatically.
    - Inter/ split carrier input
    - SIF BPF built-in
    - SIF Trap filter built in
    - Tank-less SIF demodulator
    - Neg/pos demodulation PIF line up \*
    - AM sound demodulation line up \*
  - Video
    - Chroma trap
    - Y delay line
    - Black stretch
    - Y-gamma
    - Pre/over shoot control
    - VM signal output
  - Chroma
    - PAL/ NTSC/ SECAM demodulation with 1Xtal and Built in 1HDL system
    - External YCbCr in/out Interface
    - Base band TINT
    - SCART RGB interface
  - RGB Analog RGB interface
    - Half-tone and transparent for OSD
    - RGB cut-off/ drive controls by bus
    - ABCL (ABL and ACL combined)
  - Sync./ DEF HVCO integrated
    - V saw tooth single output
    - EW output available for flat wide TV
- \*: TB1262F only

## 1, Block diagram

TB1261F/62F BLOCK DIAGRAM



QFP 80 pin

## 2, BUS CONTROL MAP of the "TB1261F/62F"

[WRITE] Slave Address: 88H

|    | D7             | D6             | D5          | D4               | D3              | D2        | D1            | D0        |           |           |           |
|----|----------------|----------------|-------------|------------------|-----------------|-----------|---------------|-----------|-----------|-----------|-----------|
| 0  | WPS            | Contrast       |             |                  |                 |           |               |           | 0000_0000 |           |           |
| 1  | Brn on RGB     | Bright         |             |                  |                 |           |               |           | 0000_0000 |           |           |
| 2  | Col-y          | Color          |             |                  |                 |           |               |           | 0100_0000 |           |           |
| 3  | Demo-P         |                | Sharpness   |                  |                 |           |               |           |           | 0010_0000 |           |
| 4  | Y+C sw         | Tint           |             |                  |                 |           |               |           | 0100_0000 |           |           |
| 5  | ( 0 )          | Video sw       | C-in sw     | N-Comb           | CbCr sw         | Ys in     | Y/Mon out     |           | 0000_0000 |           |           |
| 6  | RGB Mute       | Color System   |             | RGB>YUV          | Blue Back       | C-Trap    | Coring        |           | 0000_0000 |           |           |
| 7  | R Cut Off      |                |             |                  |                 |           |               | 0000_0000 |           |           |           |
| 8  | G Cut Off      |                |             |                  |                 |           |               | 0000_0000 |           |           |           |
| 9  | B Cut Off      |                |             |                  |                 |           |               | 0000_0000 |           |           |           |
| 0A | Drive ref      | B Drive Gain   |             |                  |                 |           |               |           | 0100_0000 |           |           |
| 0B | BLK SW         | R/G Drive Gain |             |                  |                 |           |               |           | 0100_0000 |           |           |
| 0C | Spl/Int        | PLL S          | RF AGC      |                  |                 |           |               |           |           | 0000_0000 |           |
| 0D | PIF Freq.      |                |             | S-Trap           |                 |           | VCO-M         | SIF-in    |           | 0000_0000 |           |
| 0E | AFT-S          | Buzz-R         | Over Mod    | Au-G             | FM-Band         | SIF-Freq. |               | SIF-574   |           | 0000_0000 |           |
| 0F | S-col feint    | VM-P           | VM-G        |                  | DC-Restore      |           | Y-y Point     |           |           | 1010_0000 |           |
| 10 | Y-Mute         | Y-DL           |             |                  | ABL-SP          |           | ABL-G         |           |           | 0001_0000 |           |
| 11 | F ID           | PN ID S        | BPF/TOF     | Shoot Balance    |                 |           | Black Stretch |           |           | 0000_0000 |           |
| 12 | S GP Phase     |                | S Inhibit   | S ID Sense       | S-ID M          | HP-Boost  | L-AGC         | L-SECAM   |           | 0000_0000 |           |
| 13 | Black Adj. R-Y |                |             |                  | Black Adj. B-Y  |           |               |           |           | 1000_1000 |           |
| 14 | sync gate      | F sync         | 312/313     | H Phase          |                 |           |               |           |           |           | 0001_0000 |
| 15 | V Freq.        |                |             | V Phase          |                 |           |               |           |           |           | 0000_0000 |
| 16 | VRamp Ref      | V Size         |             |                  |                 |           |               |           | 1100_0000 |           |           |
| 17 | V Linearity    |                |             |                  | V-S Corr.       |           |               |           |           | 1000_1000 |           |
| 18 | AFC Gain       |                | V Cent.     |                  |                 |           |               |           |           | 0010_0000 |           |
| 19 | H Side BLK     | V BLK Bottom   |             |                  | V BLK Top       |           |               |           |           | 0000_0000 |           |
| 1A | RFAGC-Adj.     | LAGC lim       | PIF Det Lev |                  | Noise Det Level |           |               |           |           | 0100_1000 |           |
| 1B | V AGC          | EW Para        |             |                  |                 |           |               |           | 0100_0000 |           |           |
| 1C | dac1           | H Stop         | H Size      |                  |                 |           |               |           |           | 0010_0000 |           |
| 1D | dac2           | xxx            | EW Trape    |                  |                 |           |               |           |           | 0010_0000 |           |
| 1E | V. EHT         |                |             | EW Corner Top    |                 |           |               |           | 0001_0000 |           |           |
| 1F | H. EHT         |                |             | EW Corner Bottom |                 |           |               |           | 0001_0000 |           |           |
| 20 | dac3           | DCNF           | H. Par      |                  |                 | H. Bow    |               |           |           | 0110_0100 |           |
| 21 | TEST           |                |             |                  |                 |           |               | 0000_0000 |           |           |           |
|    | Strap-HP/LP    |                | P PLL u     | S2-Q             | Strap-GD        |           | Strap-Q       |           |           | 0000_0000 |           |

[READ]

|    | D7      | D6      | D5     | D4           | D3      | D2         | D1          | D0       |
|----|---------|---------|--------|--------------|---------|------------|-------------|----------|
| R0 | POR     | IF Lock | H Lock | Color System |         |            | AFT-C       | AFT-W    |
| R1 | V Freq. | V-STD   | Noise  | RFAGC        | C IN DC | Sound Dev. | Station Det | PVCO-Err |

### 3, Features comparizon for TB1261F and TB1262F

TB1261F and TB1262F are distinguished with their assured specifications for its IF systems. Basically, TB1261 is for Asian models and TB1262 is for Europeans. The comparisons are shown in the next table.

|            | TB1261F  | TB1262F   |
|------------|--|---|
| Picture IF | - Neg. demo  | - Neg. demo<br>- Pos. demo (L/L')                                 |
| Sound IF   | - Split/ inter carrier<br>- BG, DK, I, M (FM)<br>- BG (IGR-bilingual fm) | - Split/ inter carrier<br>- BG, DK, I (FM)<br>- L (AM sound demo) |

These difference are realized by its Bus controls. The bits marked 'n/a' in the next table should not be selected by controller micro processor , in fact they can be set but not assured.

| BUS CONTROL ITEMS   | BITS | CONTROLS                | TB1261F | TB1262F |
|---|------|-------------------------|---------|---------|
| PIF Freq. (00)<br>[ Sub: 0Dh D7~D5 3 bits ]                 | 000  | 45.75 MHz               | x       | n/a     |
|   | 001  | 39.5 MHz                | n/a     | x       |
|   | 010  | 38.9 MHz                | x       | x       |
|   | 011  | 38.0 MHz                | x       | n/a     |
|   | 100  | 34.2 MHz                | n/a     | x       |
|   | 101  | 33.9 MHz                | n/a     | x       |
| L-SECAM (0), L-AGC(0), FM Stop<br>[ Sub: 12h D1,D0 2 bits ] | 00   | not LSECAM, not FM stop | x       | x       |
|   | 01   | L-SECAM                 | n/a     | x       |
|   | 10   | L-SECAM & AGC speed up  | n/a     | x       |
|   | 11   | FM Stop                 | x       | x       |
| SIF-Freq (00)<br>[ Sub: 0Eh D1-D2 2 bits ]                  | 00   | 5.5MHz                  | x       | x       |
|   | 01   | 6.0MHz                  | x       | x       |
|   | 10   | 6.5MHz                  | x       | x       |
|   | 11   | 4.5MHz                  | x       | n/a     |
| SIF-574 (0)<br>[ Sub: 0Eh D0 1 bit ]                        | 0    | Others                  | x       | x       |
|   | 1    | 5.74MHz                 | x       | n/a     |

x ; can be selected

n/a ; the feature not guaranteed

## 4, MAXIMUM RATINGS (Ta=25°C)

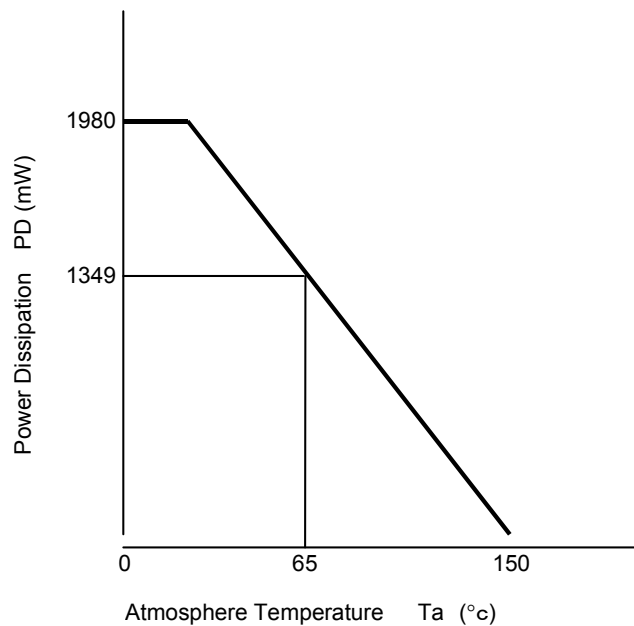
| ITEM                      | SYMBOL     | RATING                | UNIT |
|---------------------------|------------|-----------------------|------|
| Supply Voltage (9V Vcc)   | Vcc max9   | 12                    | V    |
| Supply Voltage (5V Vcc)   | Vcc max5   | 6.5                   | V    |
| Supply Voltage (3.3V Vdd) | Vdd max3.3 | 5.0                   | V    |
| Power Dissipation         | PD max     | 1980(*1)              | mW   |
| Input terminal Voltage    | V in       | GND - 0.3 ~ Vcc + 0.3 | V    |
| Operating Temperature     | Topr       | -20 ~ 65              | °C   |
| Storage Temperature       | Tstg       | -55 ~ 150             | °C   |

(\*1) When using this device at above Ta=25°C, the power dissipation decreases by 15.9mW per 1°C rise.

(\*2) This IC is weak against static electricity and surge impulse. Please take counter measure to meet, if necessary.

(\*3) This IC is not proofed enough against a strong E-M field by CRT which may cause function error and/or poor characteristics. Keeping the distance from CRT to the IC longer than 20cm, or if cannot, placing shield metal over the IC, is recommended in an application.

### Ta-PD Curve ( on a PCB)



## 5, OPERATING POWER SUPPLY VOLTAGE

| PIN NO. | PIN NAME     | MIN. | TYP. | MAX. | UNIT | NOTE  |
|---------|--------------|------|------|------|------|---|
| 74      | IF Vcc (5V)  | 4.75 | 5    | 5.25 | V    | —   |
| 67      | IF Vcc (9V)  | 8.55 | 9    | 9.45 |      |   |
| 25      | RGB VCC (9V) | 8.55 | 9    | 9.45 | V    | —   |
| 45      | H VCC (9V)   | 8.55 | 9    | 9.45 | V    | —   |
| 35      | DIGITAL VDD  | 3.1  | 3.3  | 3.5  | V    | This pin should be supplied from HVcc via 270 ohms of resistor. |
| 11      | Y/C VCC (5V) | 4.75 | 5    | 5.25 | V    |   |



Optional data transmit format : automatic increment mode



In this transmission methods, data is set on automatically incremented sub-address from the specified sub-address.

Purchase of TOSHIBA I<sup>2</sup>C components conveys a license under the Philips I<sup>2</sup>C Patent Rights to use these components in an I<sup>2</sup>C system, provided that the system conforms to the I<sup>2</sup>C Standard Specification as defined by Philips.

## 7, Terminal Descriptions

| Pin # | Description   |
|-------|---|
| 1     | <b>IF AGC;</b><br>(8) A terminal should be connected to an IF AGC filter. Connect 0.47uF of capacitor to GND. In selecting L system, the capacitor works for 1st SIF AGC.   |
| 2     | nc;   |
| 3     | <b>PIF Filter;</b><br>(9) A terminal to be connected to a filter for stabilizing the PIF VCO center frequency. Put a capacitor of 10 uF.  |
| 4     | <b>FM Filter;</b><br>(10) A terminal should be connected to an FM PLL filter. Put a lag lead CR filter.;  |
| 5     | nc;   |
| 6     | <b>Xtal (4.43MHz);</b><br>(11) A terminal should be connected with a 4.433619MHz crystal oscillator. The oscillated signal leads to the chroma demodulation, H out frequency tuning, AFT, etc.;   |
| 7     | <b>APC Filter;</b><br>(12) A terminal should be connected with an APC filter for chroma demodulation. This terminal voltage controls the frequency of VCXO.;  |
| 8     | nc;   |
| 9     | <b>SECAM Filter;</b><br>(13) The terminal should be connected a SECAM filter for holding SECAN reference frequency. Connect 0.47uF to GND, If not using SECAM decoder on TB1261, put at least 0.01uF of capacitor to GND.                                 |
| 10    | nc;   |
| 11    | <b>Y/C VCC;</b><br>(14) A Vcc terminal for Y/C circuit. Supply 5V.;   |
| 12    | <b>R OUT;</b>   |
| 13    | <b>G OUT;</b>   |
| 14    | <b>B OUT;</b><br>(15) Terminals for R/G/B signal output, should be lead to CRT driver. Connect resistances to GND, for the current source if the slew rate is not enough. Due to the source current limitation, the resistances should be 2.0kΩ or more.; |
| 15    | nc;   |
| 16    | nc;   |
| 17    | <b>Y/C GND;</b><br>(18) The GND terminal for Y/C circuit.;  |
| 18    | <b>VM OUT;</b><br>(19) The output terminal for applying veracity scanning modulation (VSM). The IIC Bus controls phase and Gain of VSM.;  |

| Pin # | Description   |
|-------|---|
| 19    | <b>DAC1;</b><br>A terminal to be output High/ Low status by an open collector interface. The pull up resistance should be fixed as a sink current is 1mA or less and the pull up voltage should be less than the voltage of RGB Vcc.  |
| 20    | <b>YS/YM SW;</b><br>(20) A terminal for switching of EXT RGB Mode and fast transparent.<br>EXT. RGB<br>2.1V -----<br>Half tone<br>0.7V -----<br>TV<br>0V -----  |
| 21    | <b>EXT. R IN;</b>   |
| 22    | <b>EXT. G IN;</b>   |
| 23    | <b>EXT. B IN;</b><br>Input terminals for EXT R/G/B signals. The signals are clamped by capacitors, therefore the input impedance should be low, 100 ohms or less is recommended. For this input, the brightness control with ABL is available.<br>ABL OFF: for small area like OSD<br>ABL ON: for large area like TELETTEXT<br>(input level 0.7Vp-p/100IRE) |
| 24    | nc;   |
| 25    | <b>RGB VCC (9V);</b><br>(24) A Vcc terminal for RGB block. Supply 9V.   |
| 26    | <b>SCL;</b><br>(25) An input terminal for IICBUS clock.;  |
| 27    | <b>SDA;</b><br>(26) An input/output terminal for IICBUS data.;  |
| 28    | <b>EHT IN;</b><br>(27) The input terminal for EHT. The ratio of EW / V is controlled by bus.;   |
| 29    | nc;   |
| 30    | nc;   |
| 31    | <b>ABCL IN;</b><br>(28) An input terminal for ABL/ACL control. Control voltage range is 5.0 - 6.0V. The ratio of ABL versus ACL can be set by bus control.;   |
| 32    | <b>Bed pin;</b><br>QFP Connect GND.<br>only The earth pattern should be recommended to be isolated from Def GND and connect IF GND.   |
| 33    | <b>EW OUT;</b><br>(29) An output terminal for E-W OUT.  |
| 34    | <b>CW OUT;</b><br>(30) An output terminal for the continuous chroma sub-carrier frequency wave, with amplitude of 0.4Vp-p (typ).  |



| Pin #          | Description  |
|----------------|--|
| 35<br>(31)     | <b>DIG. VDD ;</b><br>A Vdd terminal for of digital block. Supply HVcc voltage through 270 ohms of resistance. The coupling capacitor should be 10uF or less, in order to keep rise up time good enough. The voltage of this terminal is clipped to approximately 3.3V by the internal regulator.                         |
| 36<br>QFP only | <b>Dac2;</b><br>A terminal to be output High/ Low status by an open collector interface. The pull up resistance should be fixed as a sink current is 1mA or less and the voltage is less than the voltage of H Vcc.  |
| 37<br>(32)     | <b>FBP IN;</b><br>An input terminal for FBP. V/GP pulses are output over this FBP. The Threshold levels are;<br>1.4 V; for Blanking<br>3.7 V; for HAFC2  |
| 38             | nc;  |
| 39<br>(33)     | <b>H OUT;</b><br>An output terminal for horizontal driving pulses.;  |
| 40<br>QFP only | <b>VD OUT;</b><br>An output terminal for VD pulses. The pulses are 3V for its level.   |
| 41<br>QFP only | <b>HD OUT;</b><br>An output terminal fot HD pulses. GP Pulses are overlaid as SCP. Also BPP is overlaid to stop black stretch detecting. Those levels are<br>5V; for GP out<br>3V; for HD out<br>0.7V; for BPP in  |
| 42<br>QFP only | <b>Sync out;</b><br>An output terminal of the sliced sync pulses. Pull up this pin with 5.1kΩ of resistance.   |
| 43<br>(34)     | <b>H AFC Filter;</b><br>A terminal should be connected with H. AFC Filter. The DC voltage of this pin controls the H VCO frequency.  |
| 44<br>QFP only | <b>Y3/CVBS3 IN;</b><br>An alternative input terminal for;<br>- Y + Sync signals of Y/Cb/Cr_3<br>- Or CVBS_3<br>Those two are selected by IICBUS<br>This terminal is clamped by charging / discharging the coupling capacitors. It is recommended that input impedance is kept at or below 100Ω. Input level 1Vp-p/140IRE |
| 45<br>(35)     | <b>H VCC (9V);</b><br>A Vcc terminal for DEF circuit, HOUT, IICBUS POR, etc. Supply 9V.;   |

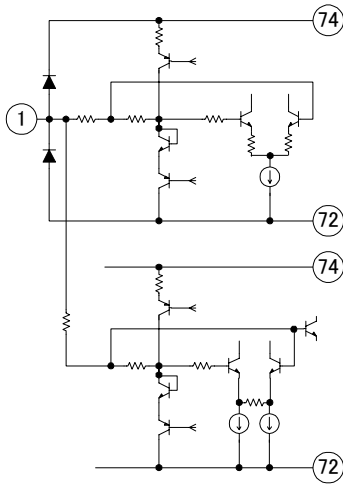
| Pin #                    | Description  |
|--------------------------|--|
| 46<br>(36)               | <b>V RAMP;</b><br>A terminal should be connected with a capacitor to generate the V.Ramp signal. Connect this pin to GND via 0.47uF. The V.Ramp amplitude is kept constant by the V.AGC.;  |
| 47<br>(37)               | <b>V OUT;</b><br>An output terminal for the vertical saw tooth wave.   |
| 48<br>49<br>QFP only     | <b>Cb3 IN;</b><br><b>Cr3 IN;</b><br>Input terminals for ;<br>- Cb and Cr signals of Y/Cb/Cr_3<br>These terminals are clamped by charging / discharging the coupling capacitors. It is recommended that input impedance is kept at or below 100Ω.   |
| 50<br>(38)               | <b>DIG GND;</b><br>A GND terminal for digital block.;  |
| 51<br>52<br>(39)<br>(40) | <b>Cr OUT;</b><br><b>Cb OUT;</b><br>Output terminals for demodulated Cb and Cr signals.  |
| 53<br>(41)               | <b>Y/Mon OUT</b><br>An alternative output terminal for;<br>- Y signal after Y1 process<br>- Or Mon out after selector<br>Those two are selected by IICBUS  |
| 54<br>(42)               | <b>BLACK DET;</b><br>A terminal should be connected with Black level detecting filter for black stretch. This terminal voltage controls the Black stretching gain. The IIC Bus controls the on/off and start point of the Black stretch. ;   |
| 55<br>(43)               | <b>Y2/CVBS2/G IN</b><br>An alternative input terminal for;<br>- Y + Sync signals of Y/Cb/Cr_2 in<br>- Or CVBS_2<br>- Or G signal of Scart Y/R/G/B in<br>Those three are selected by IICBUS.<br>These terminals are clamped by charging / discharging the coupling capacitors. It is recommended that input impedance is kept at or below 100Ω.   |
| 56<br>57<br>(44)<br>(45) | <b>Cb2/B IN;</b><br><b>Cr2/R IN;</b><br>Alternative input terminals for;<br>- Cb and Cr signals of Y/Cb/Cr_2<br>- Or R and B signal of Scart Y/R/G/B in<br>Those three are selected by IICBUS<br>These terminals are clamped by charging / discharging the coupling capacitors. It is recommended that input impedance is kept at or below 100Ω. |
| 58<br>(46)               | <b>C-IN;</b><br>An input terminal for chroma signal (standard burst amplitude level 286mVp-p). The dc level of this pin can be read by bus to detect if S port is connected or not.;   |

| Pin #      | Description  |
|------------|--|
| 59<br>(47) | <b>Ys(YCbCr)</b><br>A fast switch for selecting Y/Cb/Cr2 in (or fast blanking for scart R/G/B in).<br>Forced Y/Cb/Cr (or scart R/G/B in)<br>0.7V -----<br>Selecting by IICBUS<br>0V -----  |
| 60         | nc;  |
| 61<br>(48) | <b>Y/CVBS1 IN</b><br>An alternative input terminal for;<br>- Y + Sync signals of Y/C<br>- Or CVBS_1<br>Those two are selected by IICBUS<br>This terminal is clamped by charging / discharging the coupling capacitors. It is recommended that input impedance is kept at or below 100Ω. Input level 1Vp-p/140IRE |
| 62<br>(49) | <b>DC RESTOR;</b><br>A terminal to be connected with a capacitor to detect the average picture level for DC restoration. The ratio of the DC restoration is set by bus. Leave this terminal open if the DC restoration is not required. ;  |
| 63         | nc;  |
| 64         | nc;  |
| 65<br>(50) | <b>De-Emphasis/Mon-OUT;</b><br>A terminal to De-Emphasis Audio signal, and pick up detected Audio signal. Connect capacitor (4700pF) to GND. The time constant 50/75us is set by the IICBUS control "SIF Freq". Remove the capacitor for connecting US/JPN sound multiplex system.                               |
| 66<br>QFP  | <b>DAC 3;</b><br>A terminal to be output High/ Low status by an open collector interface. The pull up resistance should be fixed as a sink current is 1mA or less and the voltage is less than the voltage of IF Vcc.  |
| 67<br>(51) | <b>IF Vcc(9V);</b><br>A Vcc terminal for Y/C circuit. Supply 9V;   |
| 68<br>(52) | <b>IF DET OUT;</b><br>Detected PIF output terminal.(typical output level 2.2Vp-p)  |

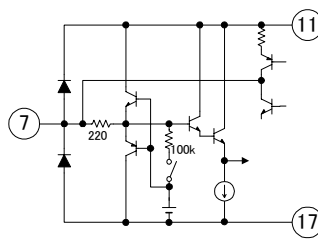
| Pin #      | Description   |
|------------|---|
| 69<br>(53) | <b>LOOP Filter;</b><br>A terminal to be connected with loop filter for PIF PLL. The terminal voltage controls the PIF VCO frequency.;   |
| 70<br>(54) | <b>DC NF;</b><br>A terminal for connecting a capacitor for DC NF. This filter is very sensitive for the Audio quality; therefore connect capacitor to a stable GND point.<br>In selecting L system, the capacitor works for PIF AGC filter. |
| 71<br>(55) | <b>SIF OUT;</b><br>An output terminal for a 2'nd SIF signal, which is mixed down by a regenerated carrier.  |
| 72<br>(56) | <b>IF GND;</b><br>The GND terminal for IF circuit.;   |
| 73<br>(1)  | <b>SIF IN / H corr.;</b><br>An input terminal for 2'nd SIF signal and H. curve correction.  |
| 74<br>(2)  | <b>IF VCC (5V);</b><br>A Vcc terminal for the IF circuit. Supply 5V.;   |
| 75<br>(3)  | <b>1'st SIF IN(1);</b><br>Input terminals for 1'st SIF signals.   |
| 76<br>(4)  | <b>1'st SIF IN(2);</b><br>If not using Split input, leave these pins open, and turn the IICBUS bit of "Spl/ Int" [s0C/d7] to "1"  |
| 77         | <b>Nc ( to GND );</b><br>Connect this pin to GND to isolate PIF and 1stSIF input.   |
| 78<br>(5)  | <b>RF AGC;</b><br>An output terminal for RF AGC. A pull up resistor is required because of its open collector output. A de-coupling capacitor should be also connected to adjust the response.  |
| 79<br>(6)  | <b>IF IN(1);</b><br>Input terminals for IF signals. Pin 6 and 7 are the both input poles of a differential amplifier.   |
| 80<br>(7)  | <b>IF IN(2);</b><br>The normal input level is 90dB(uV); input impedance is 1.5 k ohms.  |

## 8, Interfaces

**1: IF AGC**

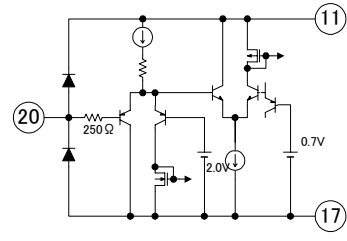


**7: APC Filter**

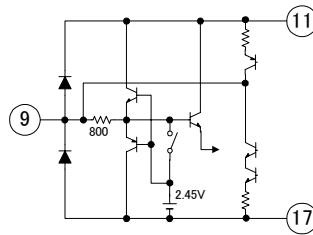


**20: Ysm**

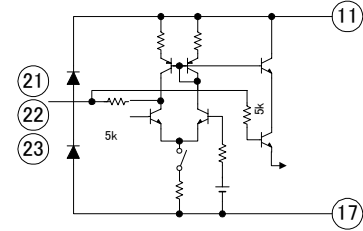
**22: EXT. G IN**



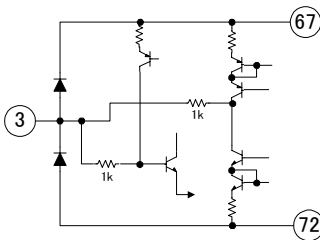
**9: S-filter**



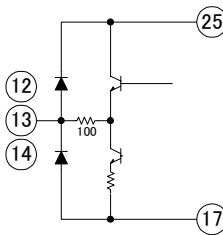
**21: EXT. R IN  
23: EXT. B IN**



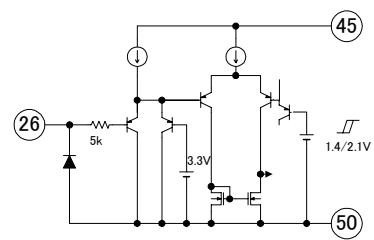
**3: PIF filter**



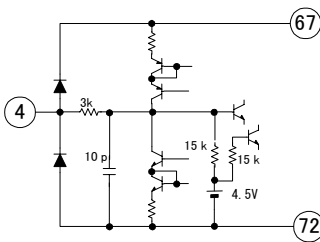
**12: R OUT 13: G OUT  
14: B OUT**



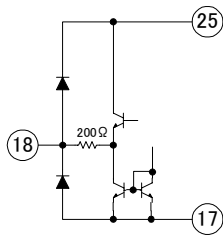
**26: SCL**



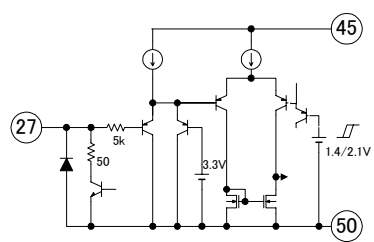
**4: FM filter**



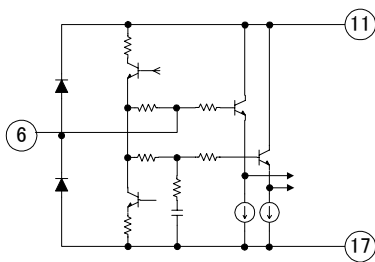
**18: VM OUT**



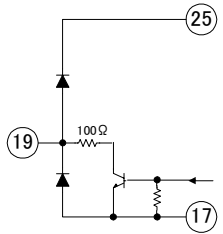
**27: SDA**



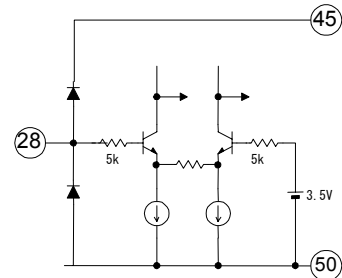
**6: X' tal**



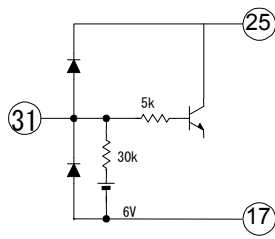
**19: DAC 1**



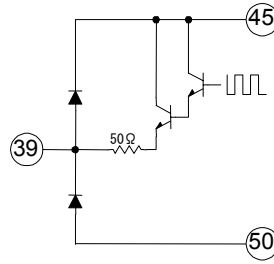
**28: EHT in**



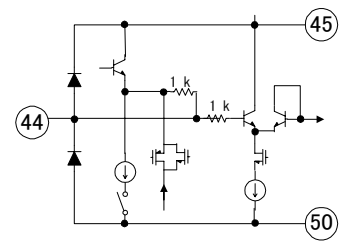
**31: ABCL IN**



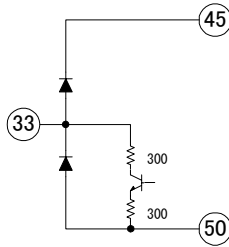
**39: H OUT**



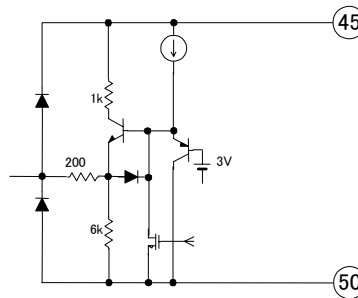
**44: Y3/CVBS3 in**



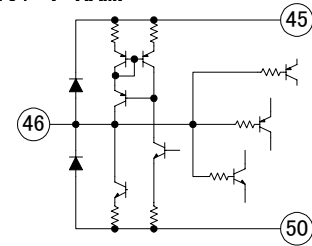
**33: EW OUT**



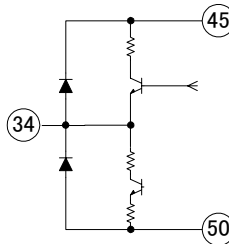
**40: VD**



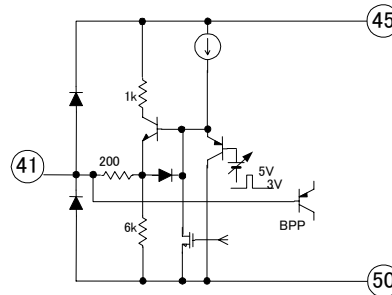
**46: V RAMP**



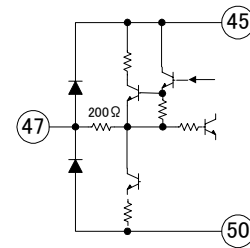
**34: CW OUT**



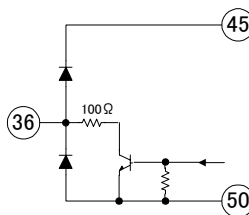
**41: HD/SCP OUT**



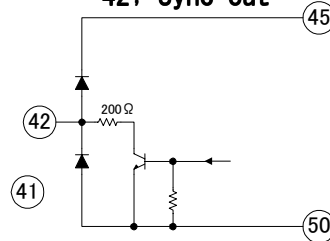
**47: V OUT**



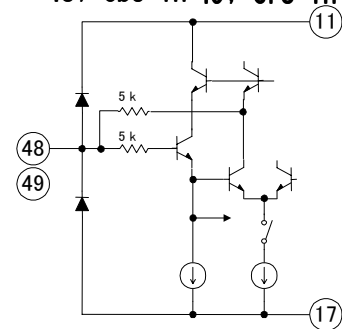
**36: DAC 2**



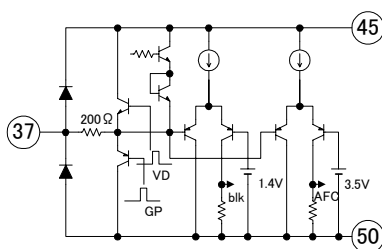
**42: Sync out**



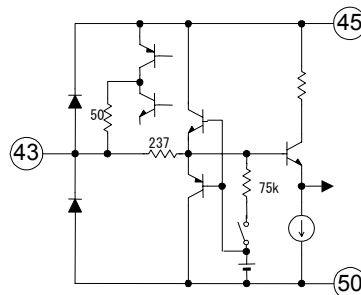
**48: Cb3 in 49: Cr3 in**



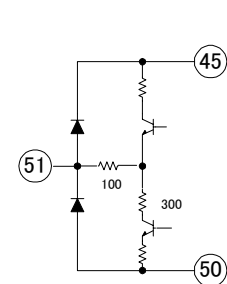
**37: FBP IN**



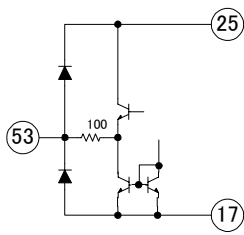
**43: H. AFC**



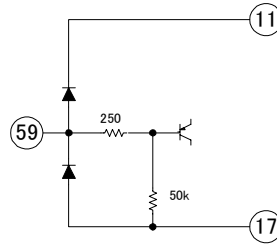
**51: Cr out 52: Cb out**



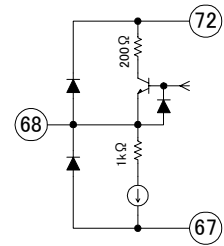
**53: Y/MON out**



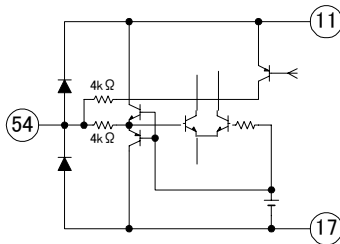
**59: Ys (YCbCr)**



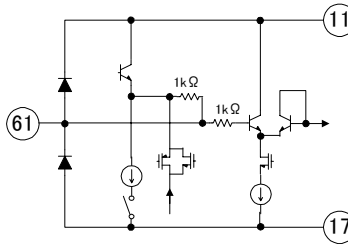
**68: IF DET OUT**



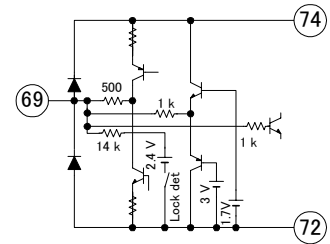
**54: BLACK Det**



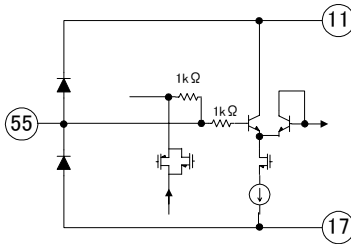
**61: Y/CVBS 1 in**



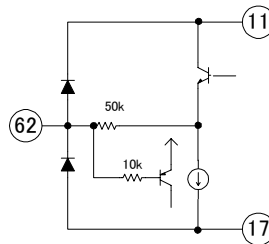
**69: LOOP Filter**



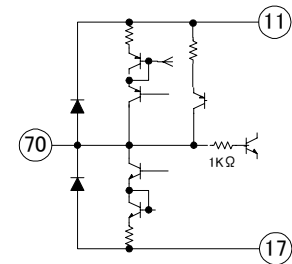
**55: Y2/CVBS2/G in**



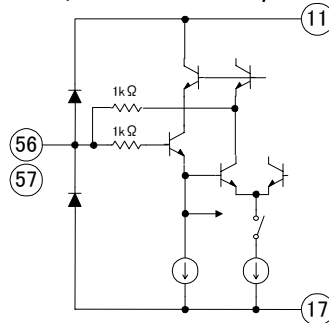
**62: DC Restor**



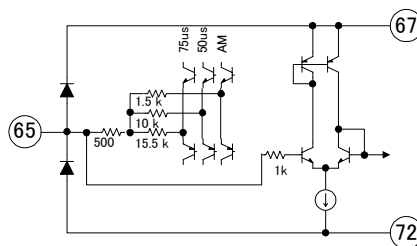
**70: DC NF/AM AGC**



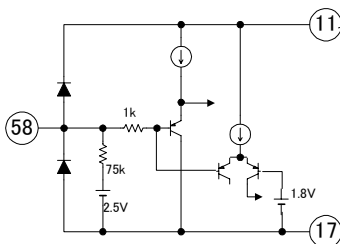
**56: Cb2/B in 57: Cr2/R in**



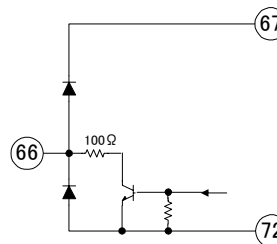
**65: DE-EMP. AUDIO OUT**



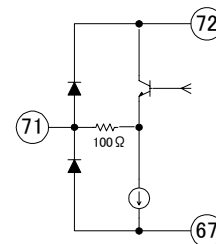
**58: C in**



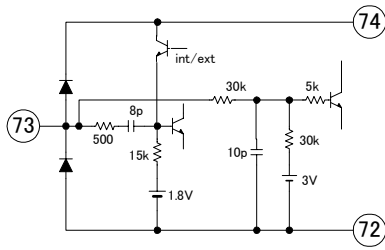
**66: DAC 3**



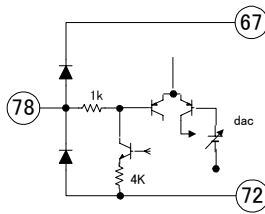
**71: SIF OUT**



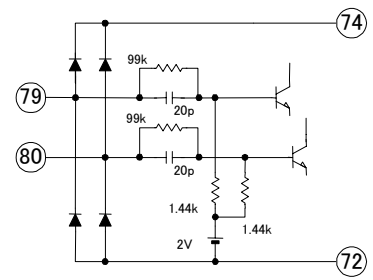
**73; SIF IN**



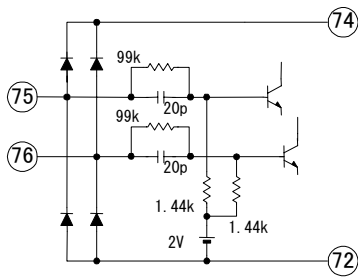
**78; RF AGC**



**79; PIF IN  
80; PIF IN**



**75; SIF IN 76; SIF IN**



## 9, BUS Description

### WRITE MODE

#### [PIF]

#### RF AGC (00) [Sub: 0Ch D5~D0 6 bits]

| Data | Descriptions               |
|------|----------------------------|
| 00   | IF mute Stops Demodulation |
| 01   | 65dB(uV)                   |
| 3F   | 105 dB(uV)                 |

RF AGC delay point (Pin6-7)

#### PIF Freq. (00) [Sub: 0Dh D7~D5 3 bits]

| Data | Descriptions |
|------|--------------|
| 000  | 45.75 MHz    |
| 001  | 39.5 MHz     |
| 010  | 38.9 MHz     |
| 011  | 38.0 MHz     |
| 100  | 34.2 MHz     |
| 101  | 33.9 MHz     |

Setting IF frequency according to tuner frequency. It fixes the VCO frequency and AFT center frequency.

#### VCO-M (0) [Sub: 0Dh D1 1 bit]

| Data | Descriptions                     |
|------|----------------------------------|
| 0    | Absolute (duration of searching) |
| 1    | Relative (normal)                |

VCO tuning mode

TB1261 has two VCO tuning mode, which are 'Absolute' and 'relative'. The 'Absolute' mode refers the crystal oscillation frequency 4.43MHz, the 'Relative' mode refers the IF input frequency, which is tuned by AFT loop.

Set 'Relative' mode in normal receiving, and 'Absolute' in channel searching. Even setting the 'Relative' mode, the VCO mode works as 'Absolute' in status of 'PIF Unlock' automatically.

#### AFT-S (0) [Sub: 0Eh D7 1 bit]

| Data | Descriptions  |
|------|---------------|
| 0    | Wide 400kHz   |
| 1    | Narrow 100kHz |

The range of the AFT-W read.

#### Over Mod (0) [Sub: 0Eh D5 1 bit]

| Data | Descriptions      |
|------|-------------------|
| 0    | Off (recommended) |
| 1    | On                |

on/off the over modulation switch

The measure circuit against over modulation stops the APC in detecting the over modulation, in order to avoid folding the detected signal. It may cause, however, malfunction against the phase modulated RF signals. So evaluate carefully in using this function.

#### PLL-S (0) [Sub: 0Ch D6 1 bit]

| Data | Descriptions         |
|------|----------------------|
| 0    | Normal (recommended) |
| 1    | speed-up (x2)        |

PLL Sensitivity. Set always '0; normal'

#### Buzz-R (0) [Sub: 0Eh D6 1 bit]

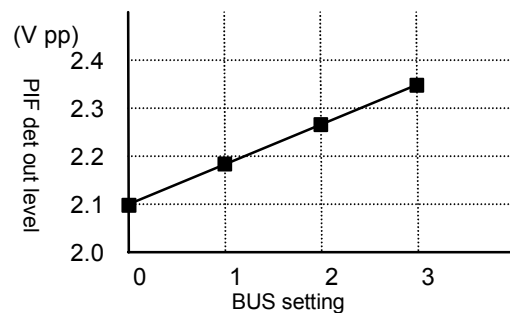
| Data | Descriptions     |
|------|------------------|
| 0    | On (recommended) |
| 1    | Off              |

Nyquist Buzz Reducer SW.

#### PIF Det lev (4) [Sub: 1Ah D5~D4 2 bits]

| Data | Descriptions |
|------|--------------|
| 0    | Min          |
| 3    | Max          |

PIF detected output level trimming



Graph PIF det out level

#### L-SECAM (0), L-AGC(0), FM Stop

[Sub: 12h D1,D0 2 bits]

| D1 | D0 | Descriptions            |
|----|----|-------------------------|
| 0  | 0  | not LSECAM, not FM stop |
| 0  | 1  | L-SECAM                 |
| 1  | 1  | L-SECAM & AGC speed up  |
| 1  | 0  | FM Stop                 |

{L-SECAM}

Selecting the IF mode to the L-system or not.

This mode is available only for the TB1262. This bit set to L-system as to:

- Turn the modulation polarity to positive
- Delay the AGC time constant (Peek AGC), with switching the IF AGC filter to the capacitor of DCNF pin (10uF) instead of IFAGC pin (0.47uF) .
- SIF AM demodulation (Split carrier only) with switching the SIF AGC filter to the capacitor of IFAGC pin (0.47uF) .

{L-SECAM AGC speed up}

Speed up the AGC response for channel search

{FM Stop}

Stopping the FM demodulator to use in NICAM demodulation.

### S-Trap(100) [ Sub: 0Dh D2-D4 3 bits ]

| Data | Descriptions  |
|------|---------------|
| 000  | S-trap Off    |
| 001  | fo tuning min |
| 111  | fo tuning max |

Trap fo tuning and on/off switch. Need to set the tuning data for each sound system.

### Strap-Q (00) [ Sub: 22h D1-D0 2 bits ]

| Data | Descriptions        |
|------|---------------------|
| 00   | Q = 3               |
| 01   | Q = 5               |
| 10   | Q = 7 (recommended) |
| 11   | Q = 9               |

Sound trap Q control. Need to set the tuning data for each sound system.

### Strap-GD (00) [ Sub: 22h D1-D0 2 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | off          |
| 01   | 60 ns        |
| 10   | 90 ns        |
| 11   | 120 ns       |

Sound trap Group delay control. Need to set the tuning data for each sound system.

### LAGC-lim [ Sub: 1Ah D6 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | on           |
| 1    | off          |

AGC limiter for L system. It works when set L system.

### PIF PLL u [ Sub: 22h D5 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | normal       |
| 1    | 1/3          |

Reduce the u of the PIF PLL

### S trap-HP LP (00) [ Sub: 22h D7-D6 2 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | off          |
| 01   | 1 dB (HPF)   |
| 10   | - 3 dB (LPF) |
| 11   | - 2 dB (LPF) |

Frequency response control. Need to set the tuning data for each sound system

### S2-Q [ Sub: 22h D4 1 bit ]

| Data | Descriptions          |
|------|-----------------------|
| 0    | normal                |
| 1    | fixed Q=3 for S2 trap |

### RFAGC-adj [ Sub: 1Ah D7 1 bit ]

| Data | Descriptions   |
|------|----------------|
| 0    | Normal         |
| 1    | adjusting mode |

RF AGC delay point adjusting mode. See \*\*\*.

### [SIF]

### SIF-Freq (00) [ Sub: 0Eh D1-D2 2 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | 5.5MHz       |
| 01   | 6.0MHz       |
| 10   | 6.5MHz       |
| 11   | 4.5MHz       |

Set the SIF frequency for BPF

Set the SIF frequency for Trap filter

Select the SIF FM demodulator band

select the de-emphasis speed

### SIF-574 (0) [ Sub: 0Eh D0 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Others       |
| 1    | 5.74MHz      |

To use this bit, an external BPF of 5.74MHz is required

### Au-G (0) [ Sub: 0Eh D4 1 bit ]

| Data | Descriptions          |
|------|-----------------------|
| 0    | 927mVrms at 25kHz/DEV |
| 1    | 500mVrms at 25kHz/DEV |

Audio Gain Switch for M system

### FM-band (0) [ Sub: 0Eh D3 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Wide         |
| 1    | Narrow       |

Select FM band width

It controls the bandwidth or pull-in range of the FM demodulator. This bit should be set depending on the region as to put wide/narrow bandwidth ceramic BPF.

### SIF-in (0) [ Sub: 0Dh D0 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Internal     |
| 1    | External     |

Select 2<sup>nd</sup> SIF limiter input path. External BPF is required in selecting 'External'.

### Sp/ Int (0) [ Sub: 0Ch D7 1 bit ]

| Data | Descriptions  |
|------|---------------|
| 0    | Split carrier |
| 1    | Inter carrier |

Split carrier / Inter carrier selecting.

### DCNF (1) [ Sub: 20h D6 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| 1    | Speed up     |

DCNF Speed. Need to set '1 speed up' at least 500ms after power on.



## [YUV, RGB]

### - Y1

#### Y-DL (001) [Sub: 10h D4-D6 3 bits]

| Data | Descriptions |
|------|--------------|
| 000  | -120ns       |
| 001  | -80ns        |
| 010  | -40ns        |
| 011  | +0ns         |
| 100  | +400ns       |
| 101  | +80ns        |
| 110  | +120ns       |
| 111  | +160ns       |

Y Delay time

#### C-Trap (0) [Sub: 06h D1 1 bit]

| Data | Descriptions                            |
|------|---|
| 0    | Off: for Y / C Separated input          |
| 1    | On: for internal C trap (-20dB or less) |

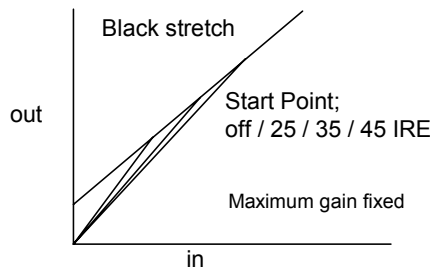
Chroma trap filter for Y input

### - Y2

#### Black Stretch (00) [Sub: 11h D0-D1 2 bits]

| Data | Descriptions |
|------|--------------|
| 00   | Off          |
| 01   | 25IRE        |
| 10   | 35IRE        |
| 11   | 45IRE        |

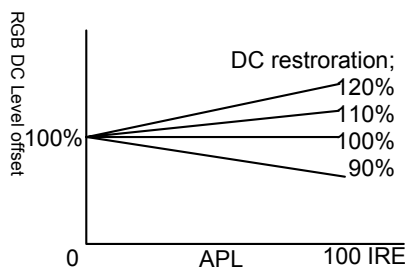
Set the black stretch start poin.



#### DC-Restor. (00) [Sub: 0Fh D2-D3 2 bits]

| Data | Descriptions |
|------|--------------|
| 00   | 120%         |
| 01   | 90%          |
| 10   | 100%         |
| 11   | 110%         |

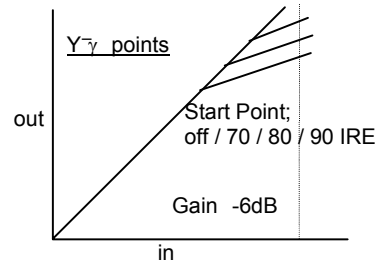
DC Restoration control



#### Y-γ point (00) [Sub: 0Fh D1-D0 2 bits]

| Data | Descriptions |
|------|--------------|
| 00   | Off          |
| 01   | 90IRE        |
| 10   | 80IRE        |
| 11   | 70IRE        |

Set the point of non linear curve for Y signal



#### Sharpness (20) [Sub: 03h D5-D0 6 bits]

| Data | Descriptions |
|------|--------------|
| 00   | -5.9dB       |
| 20   | 3.7dB        |
| 3F   | 5.0 dB       |

Sharpness control peak:4MHz

#### Shoot balance (00) [Sub: 11h D4-D2 3 bits]

| Data | Descriptions |
|------|--------------|
| 0    | pre          |
| 7    | over         |

shoot balance control

#### coring (0) [Sub: 06h D0 1 bit]

| Data | Descriptions |
|------|--------------|
| 0    | On           |
| 1    | Off          |

on/off the coring

#### WPS (0) [Sub: 00h D7 1 bit]

| Data | Descriptions |
|------|--------------|
| 0    | On           |
| 1    | Off          |

White Peak Suppressor Switch

#### VM-P (0) [Sub: 0Fh D6 1 bit]

| Data | Descriptions |
|------|--------------|
| 0    | -120ns       |
| 1    | -60ns        |

VSM output phase switching

#### VM-G (10) [Sub: 0Fh D4-D5 2 bits]

| Data | Descriptions |
|------|--------------|
| 00   | - 10dB       |
| 01   | - 3dB        |
| 10   | 0dB          |
| 11   | Off          |

VSM output gain switching

## - UV

### TINT (40) [ Sub; 04h D6-D0 7 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | -35°         |
| 7F   | 35°          |

Tint control (Base Band TINT)

### Black Adj. R-Y (4) [ Sub; 13h D7-D4 4 bits ]

### Black Adj. B-Y (4) [ Sub; 13h D3-D0 4 bits ]

| Data | Descriptions   |
|------|----------------|
| 0    | -92 mV         |
| F    | +85mV 14mV/dev |

UV Black level adjust

### Color (40) [ Sub; 02h D6-D0 7 bits ]

| Data | Descriptions   |
|------|----------------|
| 00   | -20 dB or less |
| 7F   | 6.5 dB         |

Color control

### DEMO-P (00) [ Sub; 03h D6-D7 2 bits ]

| Data | Descriptions  |
|------|---------------|
| 00   | PAL1          |
| 01   | PAL2          |
| 10   | NTSC1 (105° ) |
| 11   | NTSC2 (95° )  |

the relative phase / amplitude

The relative amplitude and phase are fixed as the following table. The setting are depend on only IICBUS command, so that a set micro computer should select DEMO-P mode on read out 'Color system' in changing the phase on received color system.

Table The relative amplitude and phase

|                |         | BUS mode           | 00<br>PAL1 | 01<br>PAL2 | 10<br>NTSC<br>1 | 11<br>NTSC<br>2 |
|----------------|---------|--------------------|------------|------------|-----------------|-----------------|
|                |         | Relative Amplitude | R-Y/B-Y    | 0.55       | 0.78            | 0.79            |
|                | G-Y/B-Y | 0.33               | 0.33       | 0.28       | 0.33            |                 |
| Relative Phase | R-Y/B-Y | 90                 | 90         | 105        | 105             |                 |
|                | G-Y/B-Y | 240                | 240        | 246        | 237             |                 |
| CbCr out       | Cr out  | 330mVpp / 90 deg   |            |            |                 |                 |
|                | Cb out  | 330mVpp / 0 deg    |            |            |                 |                 |

### Col-γ (0) [ Sub; 02h D7 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Off          |
| 1    | On           |

on/off the color γ on R

## - YUV

### Contrast (00) [ Sub; 00h D6-D0 7 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | DB           |
| 7F   | -24dB        |

contrast control

### ABL-SP (00) [ Sub; 00h D3-D2 2 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | 0V           |
| 01   | -0.20 V      |
| 10   | -0.30 V      |
| 11   | -0.50 V      |

Selecting ABL start point

### ABL-G (00) [ Sub; 00h D1-D0 2 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | -0.21 V      |
| 01   | -0.38 V      |
| 10   | -0.50 V      |
| 11   | -0.67 V      |

ABL Gain control

### Y-Mute (0) [ Sub; 10h D7 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Off          |
| 1    | On           |

on / off the Y MUTE

## RGB

### Bright (00) [ Sub; 01h D6-D0 7 bits ]

| Data | Descriptions            |
|------|-------------------------|
| 00   | 1.75 V (Pedestal Level) |
| 7F   | 3.25 V (Pedestal Level) |

Brightness control

### Brt on RGB (0) [ Sub 01h D7 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | RGB Brt on   |
| 1    | RGB Brt off  |

Brightness on RGB input

### Blue Back (0) [ Sub; 06h D2 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Off          |
| 1    | on (50 IRE ) |

Blue Back Switch

### R Cutoff (00) [ Sub; 07h D7-D0 8 bits ]

### G Cutoff (00) [ Sub; 08h D7-D0 8 bits ]

### B Cutoff (00) [ Sub; 09h D7-D0 8 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | -0.65 V      |
| FF   | 0.65 V       |

R,G,B Cutoff control

### B Drive (40) [ Sub; 0Ah D6-D0 7 bits ]

### R/G Drive (40) [ Sub; 0Bh D6-D0 7 bits ]

| Data | Descriptions |
|------|--------------|
| 00   | -5.5 dB      |
| 7F   | 3.5 dB       |

R/G, B Drive control

### Drive ref (0) [ Sub: 0Ah D7 1 bit ]

| Data | Descriptions             |
|------|--------------------------|
| 0    | R reference ( G active ) |
| 1    | G reference ( R active ) |

Drive control reference

### Blk (0) [ Sub: 0Bh D7 1 bit ]

| Data | Descriptions               |
|------|----------------------------|
| 0    | Blanking on ( normal mode) |
| 1    | Blanking off               |

Hor. And Vert. blanking for RGB outputs

### RGB-M (1) [ Sub: 06h D7 1 bit ]

| Data | Descriptions   |
|------|----------------|
| 0    | Off            |
| 1    | On ( -20 IRE ) |

on / off the RGB mute

### [CHROMA STAGE]

### Color System (000) [ Sub: 06h D6-D4 3 bits ]

| Data | Descriptions   |
|------|--|
| 000  | Auto 1 (for Eu, Asia,,,) 443PAL, 358NTSC, SECAM, 443NTSC |
| 001  | Auto 2 (for S-America) 358NTSC, M-PAL, N-PAL             |
| 010  | Fixed 358NTSC  |
| 011  | Fixed 443NTSC  |
| 100  | Fixed 443PAL   |
| 101  | Fixed SECAM  |
| 110  | Fixed M PAL  |
| 111  | Fixed N PAL  |

Color system selection

### N-Comb (0) [ Sub: 05h D3 1 bit ]

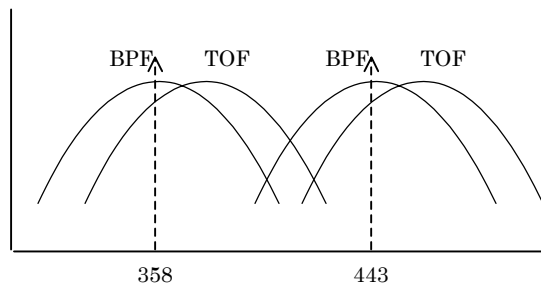
| Data | Descriptions |
|------|--------------|
| 0    | Off          |
| 1    | On           |

Comb filter for base-band color signal of NTSC

### BPF/TOF (0) [ Sub: 11h D5 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | BPF          |
| 1    | TOF          |

Select chroma BPF frequency response



### P/N ID S (0) [ Sub: 11h D6 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| 1    | Low          |

PAL / NTSC ID sensitivity for digital comb filter

### F ID (0) [ Sub: 11h D7 1 bit ]

| Data | Descriptions                             |
|------|--|
| 0    | Normal                                   |
| 1    | always color on on a fixed color systems |

Forced killer off (This function dose not work on Auto 1 and Auto 2 mode)

### SGP (00) [ Sub: 12h D7-D6 2 bits ]

| Data | Descriptions       |
|------|--------------------|
| 00   | Auto               |
| 01   | +500ns (delayed)   |
| 10   | center             |
| 11   | -500ns (forwarded) |

SECAM Gate pulse phase

### S- inhibit (0) [ Sub: 12h D5 1 bit ]

| Data | Descriptions  |
|------|---------------|
| 0    | Normal        |
| 1    | SECAM inhibit |

SECAM inhibit

### S-ID S (0) [ Sub: 12h D4 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| 1    | Low          |

SECAM ID Sensitivity

### S-ID M (0) [ Sub: 12h D3 1 bit ]

| Data | Descriptions    |
|------|-----------------|
| 0    | H * recommended |
| 1    | H+V             |

SECAM ID mode

### HP Boost (0) [ Sub: 12h D2 1 bit ]

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| 1    | Boost        |

Enhance the higher side of SECAM Bell filter, to eliminate cross color

### S-col-feint (0) [ Sub: 0Fh D7 1 bit ]

| Data | Descriptions   |
|------|----------------|
| 0    | on; for RF in  |
| 1    | off; for AV in |

On / off the SECAM color feinting feature, which decrease color gain on RF level.

[DEF]

**V Phase (00h) [ Sub: 15h D4-D0 5 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | (0H)         |
| 31   | (31H)        |

Vertical Position control by delaying the V-ramp timing

**H Phase (10h) [ Sub: 14h D4-D0 5 bits ]**

| Data | Descriptions |
|------|--------------|
| 00   | -3us         |
| 1F   | 3us          |

Horizontal Position control

**V-Freq (000) [ Sub: 15h D7-D5 3 bits ]**

| Data | Descriptions                       |
|------|------------------------------------|
| 000  | Auto                               |
| 001  | 50 Hz                              |
| 010  | 60 Hz                              |
| 011  | 50Hz in no input                   |
| 100  | Forced 312.5 H , stopped V pull-in |
| 101  | Forced 262.5 H , stopped V pull-in |
| 110  | Forced 313 H , stopped V pull-in   |
| 111  | Forced 263 H , stopped V pull-in   |

Vertical frequency pull-in mode selection

**AFC Gain (00) [ Sub: 18h D7-D6 2 bits ]**

| Data | Descriptions               |
|------|----------------------------|
| 00   | Normal                     |
| 01   | 1 / 3 sensitivity          |
| 10   | X 3 at V blanking duration |
| 11   | AFC OFF                    |

AFC gain

**Sync gate (0) [ Sub: 14h D7 1 bit ]**

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| 1    | Gated        |

**F sync (0) [ Sub: 14h D6 1 bit ]**

| Data | Descriptions                          |
|------|---------------------------------------|
| 0    | Normal ; for input from RF            |
| 1    | F sync ; for input from AV equipments |

Forced sync

**H STOP (0) [ Sub: 1Ch D6 1 bit ]**

| Data | Descriptions                |
|------|-----------------------------|
| 0    | Normal                      |
| 1    | & Y-mute & RGB mute; H STOP |

H OUT stop

**312/313 (0) [ Sub: 14h D5 1 bit ]**

| Data | Descriptions     |
|------|------------------|
| 0    | Normal           |
| 1    | TELETXT(312/313) |

(This function makes V-scanning non-interlace for teletext)

**V-AGC (1) [ Sub: 1Bh D7 1 bit ]**

| Data | Descriptions  |
|------|---------------|
| 0    | Normal        |
| 1    | Speed up (x3) |

**V Size (40h) [ Sub: 16h D6-D0 7 bits ]**

| Data | Descriptions |
|------|--------------|
| 00   | V Stop       |
| 01   | -47 %        |
| 7F   | 47 %         |

Vertical size alignment / Vstop

**V Linearity (4h) [ Sub: 17h D7-D4 4 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | -12 %        |
| F    | 12 %         |

V linearity alignment

**V cent. (10h) [ Sub: 18h D5-D0 6 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | -12 %        |
| 3F   | 12 %         |

V centering

**V-S Corr (4h) [ Sub: 17h D3-D0 4 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | 20 %         |
| F    | -12 %        |

**V Ramp Ref. (0) [ Sub: 16h D7 1 bit ]**

| Data | Descriptions      |
|------|-------------------|
| 0    | External (YC Vcc) |
| 1    | Internal          |

Select the reference voltage

**V.EHT (0h) [ Sub: 1Eh D7-D5 3 bits ]**

| Data | Descriptions    |
|------|-----------------|
| 0    | Min ( 0 %)      |
| 7    | Max gain (-9 %) |

Adjust the sensitivity for V

**H Size (10) [ Sub: 1Ch D5-D0 5 bits ]**

| Data | Descriptions    |
|------|-----------------|
| 00   | 700 uA          |
| 3F   | 0 uA ( at top ) |

Adjust the H size by biasing the EW DC voltage

**EW Para (40) [ Sub: 1Bh D6-D0 7 bits ]**

| Data | Descriptions |
|------|--------------|
| 00   | 0 uA(p-p)    |
| 7F   | 440 uA(p-p)  |

Adjust the EW Parabola amplitude

**EW Corner Top (10) [ Sub: 1Eh D4-D0 5 bits ]**

| Data | Descriptions       |
|------|--------------------|
| 00   | 720 $\mu$ A (-36%) |
| 1F   | 160 $\mu$ A (36%)  |

Adjust upper EW corner

**EW Corner Bottom (19) [ Sub: 1Fh D4-D0 5 bits ]**

| Data | Descriptions       |
|------|--------------------|
| 00   | 720 $\mu$ A (-36%) |
| 1F   | 160 $\mu$ A (36%)  |

**EW Trape (20) [ Sub: 1Dh D5-D0 6 bits ]**

| Data | Descriptions |
|------|--------------|
| 00   | - 6.5 %      |
| 1F   | 6.5 %        |

Adjusting EW trapezium

**V BLK Bottom (0h) [ Sub: 19h D6-D4 3 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| 7    | 80 %         |

Lower V Blanking for RGB outs

**V BLK top (0h) [ Sub: 19h D3-D0 4 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | Normal       |
| F    | 85 %         |

Upper V Blanking for RGB outs

**H Side BLK (0) [ Sub: 19h D7 1 bit ]**

| Data | Descriptions |
|------|--------------|
| 0    | Off          |
| 1    | on (92%)     |

H side Blanking

**H bow (4) [ Sub: 20h D2-D0 3 bits ]**

| Data | Descriptions    |
|------|-----------------|
| 0    | ) ) - 1 $\mu$ S |
| 7    | ( ( + 1 $\mu$ S |

H Bow curve correction

**H Par (4) [ Sub: 20h D5-D3 3 bits ]**

| Data | Descriptions      |
|------|-------------------|
| 0    | \ \ -/+ 2 $\mu$ S |
| 7    | / / +/- 2 $\mu$ S |

H Parallelogram correction

**H.EHT (0) [ Sub: 1Fh D7-D5 3 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    | Min (0 %)    |
| 7    | Max          |

Adjust the sensitivity for H EHT

**[OTHERS]**

**noise det (4) [ Sub: 1Ah D3-D0 4 bits ]**

| Data | Descriptions |
|------|--------------|
| 0    |              |
| F    |              |

Noise det level setting

**Dac 1 (0) [ Sub: 1Ch D7 1 bit ]**

**Dac 2 (0) [ Sub: 1Dh D7 1 bit ]**

**Dac 3 (0) [ Sub: 20h D7 1 bit ]**

| Data | Descriptions   |
|------|----------------|
| 0    | High impedance |
| 1    | Low            |

**TEST (00) [ Sub: 21h D7-D0 8 bits ]**

| Data   | Descriptions   |
|--------|----------------|
| 00     | Normal         |
| others | For testing IC |

Leave these bits preset data ; 0000 0000 0

## IO selection

### switch [A]

Video sw (00) [Sub; 05h D6-D5 2 bits]  
 Y/mon out (0) [Sub; 05h D0 1 bit]

| Data      |          | Descriptions |
|-----------|----------|--------------|
| Y/mon out | Video sw |              |
| 1         | 00       | V1           |
|           | 01       | V2           |
|           | 10       | V3           |
|           | 11       | inhibit      |
| 0         | **       | V1           |

V2 cannot select in using RGB>YUV mode

V3 is available only for QFP version

### switch [B]

C in sw (0) [Sub; 05h D4 1 bit]

| Data | Descriptions        |
|------|---------------------|
| 0    | Vsw out for CVBS in |
| 1    | C-in for Y/C in     |

### switch [C]

Y+C sw (0) [Sub; 04h D7 1 bit]

| Data | Descriptions |
|------|--------------|
| 0    | Through      |
| 1    | Y+C          |

### switch [D]

Y/mon out (0) [Sub; 05h D0 1 bit]

| Data | Descriptions |
|------|--------------|
| 0    | Y out        |
| 1    | Mon out      |

### switch [E]

CbCr sw (0) [Sub; 05h D2 1 bit]

Video sw (00) [Sub; 05h D6-D5 2 bits]

Ys(CbCr) Pin# 59

| Data |       |      | Descriptions |
|------|-------|------|--------------|
| CbCr | Video | Ys   |              |
| 0    | *     | Low  | YUV 1        |
| 1    | 00/01 | Low  | YUB 2        |
| 1    | 10/11 | Low  | YUV 3        |
| *    | **    | High | YUV 2        |

### switch [F]

RGB->YUV (0) [Sub; 06h D3 1 bit]

| Data | Descriptions              |
|------|---------------------------|
| 0    | RGB in (RGB->YCbCr sw on) |
| 1    | YCbCr in                  |

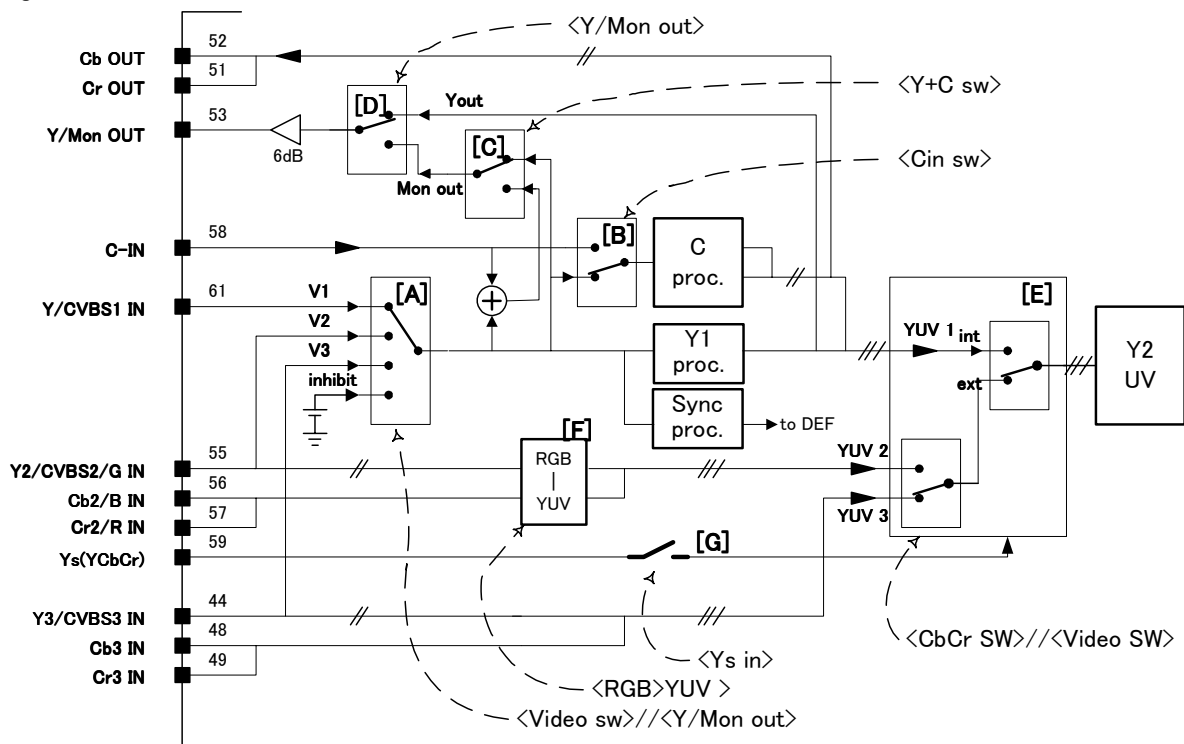
RGB->YCbCr sw

### switch [G]

Ys in (0) [Sub; 05h D1 1 bit]

| Data | Descriptions |
|------|--------------|
| 0    | Activate     |
| 1    | Prohibited   |

Fig. TB1261F Switch box



## READ MODE

### ! General warning

The read bus flags indicate that a certain signal is detected at the moment. But reliability of detection result is not so accurate if checking only one flag, that confirming several flags, which means similar result by each other, at the same time is recommended.

### POR

| Data | Descriptions                           |
|------|--|
| 0    | After the first bus accessed, always 0 |
| 1    | A reset condition occurred just before |

### IF Lock

| Data | Descriptions                      |
|------|-----------------------------------|
| 0    | IF PLL lock detection, locked out |
| 1    | Locked in                         |

This bit shows the locked/unlocked status of PIF PLL.

### H Lock

| Data | Descriptions                             |
|------|--|
| 0    | Horizontal sync lock detection, Lock out |
| 1    | Lock in                                  |

The 'H Lock' indicates whether H sync pulses are within the certain windows which generated by H counter.

### Color System

| Data  | Descriptions |
|-------|--------------|
| 0 0 0 | No color     |
| 0 0 1 | 4.43 PAL     |
| 0 1 0 | M-PAL        |
| 0 1 1 | N-PAL        |
| 1 0 0 | 358 NTSC     |
| 1 0 1 | 443 NTSC     |
| 1 1 0 | SECAM        |
| 1 1 1 | N/A          |

### AFT-W

| Data | Descriptions          |
|------|-----------------------|
| 0    | Out of the AFT window |
| 1    | In the AFT window     |

### AFT-C

| Data | Descriptions    |
|------|-----------------|
| 0    | Upper frequency |
| 1    | Lower frequency |

### V Freq

| Data | Descriptions |
|------|--------------|
| 0    | 50 Hz        |
| 1    | 60 Hz        |

Vertical oscillation frequency.

### V-STD

| Data | Descriptions                    |
|------|---------------------------------|
| 0    | Non standard vertical frequency |
| 1    | Standard vertical frequency     |

Vertical synchronization pulse is within the window of 0.625H from 312.5/262.5, or not.

### Noise

| Data | Descriptions                             |
|------|--|
| 0    | Lower noise level than reference voltage |
| 1    | Larger                                   |

It shows the noise level on H sync pulse. The slice level is set by 'Noise det' of IICBUS.

The detected result is hold one H period after every H sync periods. Decide the result with the majority of several readings.

### RF AGC 1

| Data | Descriptions |
|------|--------------|
| 0    | High         |
| 1    | Low          |

This bit can show the DC voltage for RF AGC pin.

### C-in DC

| Data | Descriptions        |
|------|---------------------|
| 0    | Cin voltage not GND |
| 1    | GND                 |

The DC voltage on C-in terminal. It is to detect S-jack switch status with external circuit.

### Sound dev

| Data | Descriptions                 |
|------|------------------------------|
| 0    | within the range ( of 300% ) |
| 1    | out of range                 |

'Sound dev' detects over deviation of the SIF, which set to '1' in detecting the frequency offset of more than 157kHz, or 300%.

The detected result is hold until the first 'read' is commanded by means of S/R latch, and reset to '0' after that. Decide the result with the majority of several readings.

### Station det

| Data | Descriptions |
|------|--------------|
| 0    | No-Signal    |
| 1    | Tuned        |

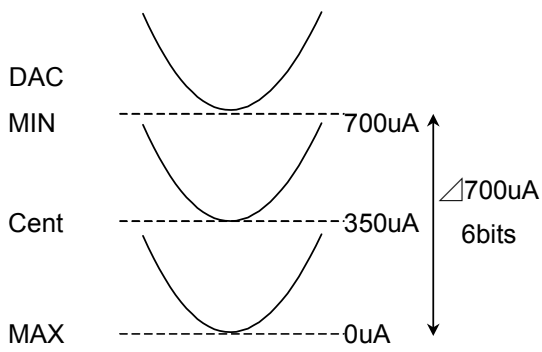
This bit shows the status whether the FM PLL is locked or unlocked. However it may not work so accurate for field signal, that use other parameters to control sound system.

### P VCO err

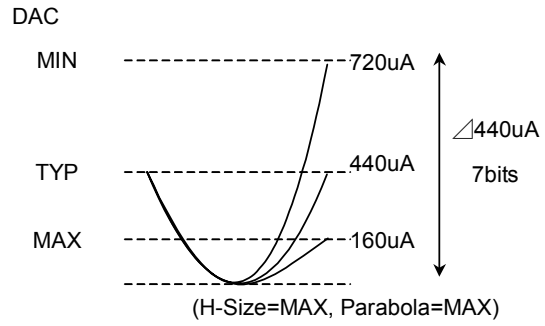
| Data | Descriptions |
|------|--------------|
| 0    | Ok           |
| 1    | error detect |

This bit is only for evaluation.

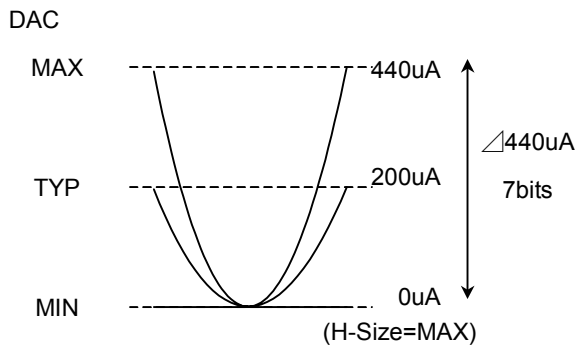
EW control



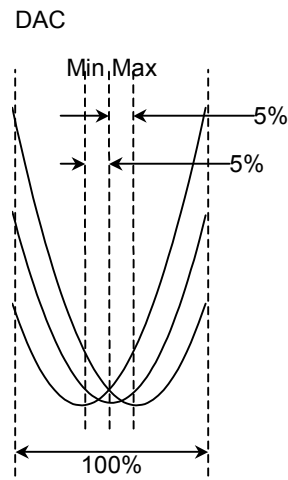
**H Size**



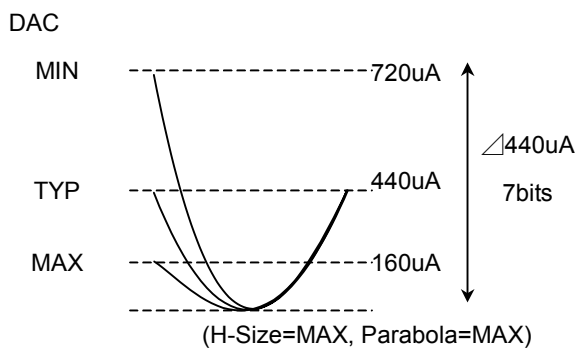
**Coner (bottom)**



**Parabola**



**Trapezium**

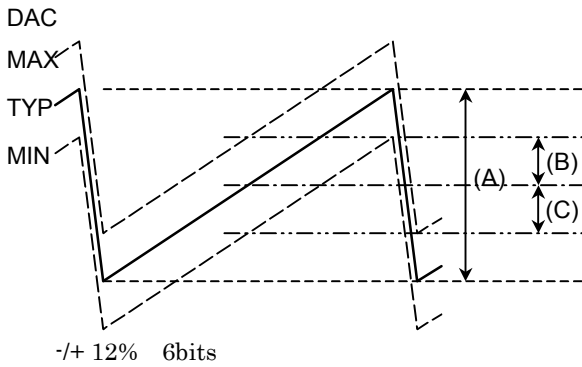


**Coner (Top)**



## Vertical control

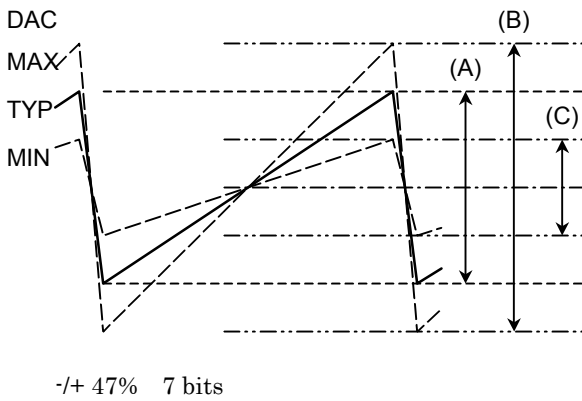
### V-centering



$$V-CENT(+) = B / A \times 100\%$$

$$V-CENT(-) = C / A \times 100\%$$

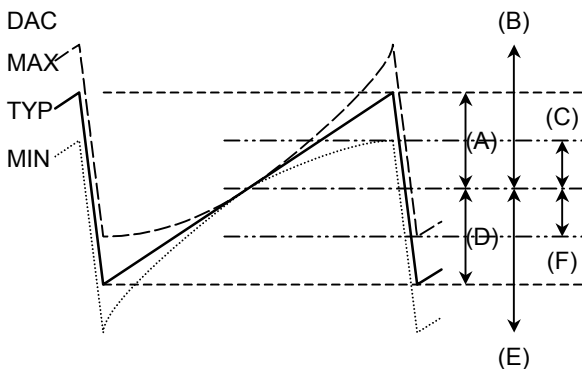
### V-Size



$$V-Size(max) = (B - A) / A \times 100\%$$

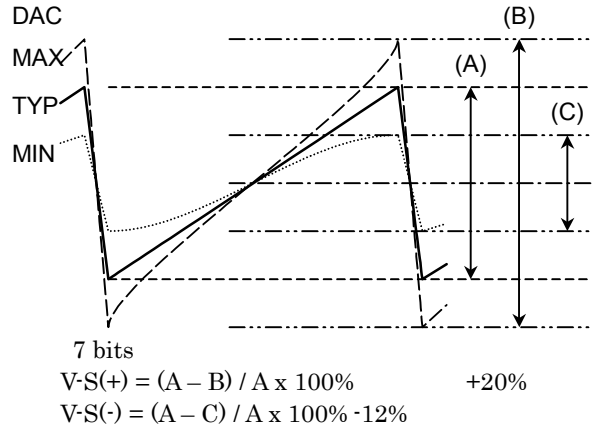
$$V-Size(min) = (C - A) / A \times 100\%$$

### V-Linearity

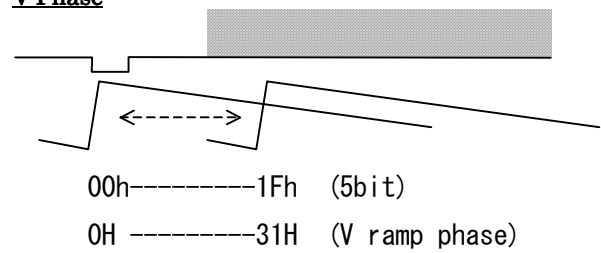


$$V-Lin = \{ (B - C) + (E - F) \} / \{ 2 \times (A + D) \} \times 100\%$$

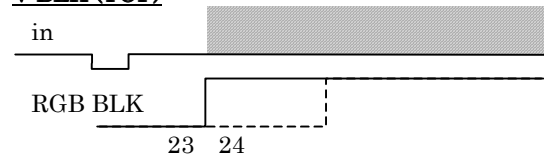
### V-S



### V-Phase



### V-BLK (TOP)

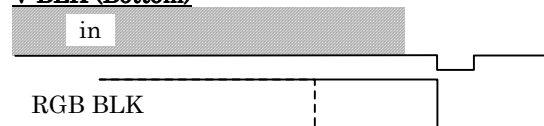


### Blanking

|      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|
|      | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    |
| 50Hz | 23H  | 25H  | 27H  | 29H  | 31H  | 33H  | 35H  | 37H  |
|      | 335H | 337H | 339H | 341H | 343H | 345H | 347H | 349H |
| 60Hz | 22H  | 24H  | 26H  | 28H  | 30H  | 32H  | 34H  | 36H  |
|      | 284H | 286H | 288H | 290H | 292H | 294H | 296H | 298H |

|      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|
|      | 8    | 9    | A    | B    | C    | D    | E    | F    |
| 50Hz | 39H  | 41H  | 43H  | 45H  | 47H  | 49H  | 51H  | 53H  |
|      | 351H | 353H | 355H | 357H | 359H | 361H | 363H | 365H |
| 60Hz | 38H  | 40H  | 42H  | 44H  | 46H  | 48H  | 50H  | 52H  |
|      | 300H | 302H | 304H | 306H | 308H | 310H | 312H | 314H |

### V-BLK (Bottom)



|      |      |     |     |     |     |     |     |     |
|------|------|-----|-----|-----|-----|-----|-----|-----|
|      | 0    | 1   | 2   | 3   | 4   | 5   | 6   | 7   |
| 50Hz | 312H | 306 | 302 | 298 | 294 | 290 | 286 | 282 |
|      | 625H | 621 | 617 | 613 | 609 | 605 | 601 | 597 |
| 60Hz | 263H | 259 | 255 | 251 | 247 | 243 | 239 | 235 |
|      | 1H   | 522 | 518 | 514 | 510 | 506 | 502 | 498 |

## 10, Electrical Characteristics

(unless otherwise specified, Ta = 25°C, VCC = 5.0 and 9.0 V for each appropriate)

### DC CHARACTERISTIC CURRENT CONSUMPTION

| Characteristics            | Symbol  | Test Circuit | Test Condition            | Min  | Typ. | Max  | Unit |
|----------------------------|---------|--------------|---------------------------|------|------|------|------|
| IF Vcc (5V)                | IccIF5  |              | Supply 5.0 V              | 24   | 30   | 38   | mA   |
| IF Vcc (9V)                | IccIF9  |              | Supply 9.0 V              | 10   | 13   | 16.5 | mA   |
| RGB VCC (9V)               | IccRGB9 |              | Supply 9.0 V              | 10.5 | 14   | 17.5 | mA   |
| H VCC (9V)                 | IccHVcc |              | Supply 9.0 V              | 13.5 | 18   | 22.5 | mA   |
| DIGITAL VDD ( around 3.3V) | Idd     |              | Supply 9.0 V via 270 ohms | 16   | 20   | 24   | mA   |
| Y/C VCC (5V)               | IccYC5  |              | Supply 5.0 V              | 58   | 78   | 98   | mA   |

### PIN VOLTAGE

| Characteristics |               | Symbol | Test Circuit | Test Condition   | Min | Typ.       | Max  | Unit |
|-----------------|---------------|--------|--------------|--|-----|------------|------|------|
| 4               | FM Filter     | V4     |              |  | 2.5 | 4.5        | 6.5  | V    |
| 6               | X'TAL         | V6     |              |  | 2.6 | 3.6        | 4.6  | V    |
| 7               | APC FILTER    | V7     |              |  | 2.0 | 3.0        | 4.0  | V    |
| 9               | SECAM Filter  | V9     |              |  | 1.6 | 2.6        | 3.6  | V    |
| 18              | VSM OUT       | V18    |              |  | 2.2 | 3.2        | 4.2  | V    |
| 20              | YS/YM SW      | V20    |              |  |     | 0.0        | 0.25 | V    |
| 21              | EXT. R IN     | V21    |              |  | 2.0 | 3.3        | 4.5  | V    |
| 22              | EXT. G IN     | V22    |              |  | 2.0 | 3.3        | 4.5  | V    |
| 23              | EXT. B IN     | V23    |              |  | 2.0 | 3.3        | 4.5  | V    |
| 31              | ABCL IN       | V31    |              |  | 4.0 | 6.0        | 7.0  | V    |
| 34              | CW OUT        | V34    |              |  | 2.0 | 2.7        | 3.5  | V    |
| 43              | H AFC FILTER  | V43    |              |  | 6.0 | 7.0        | 8.0  | V    |
| 44              | Y3/CVBS3 in   | V44    |              | at sync tip in non-selected<br>at 35%of sync in selected |     | 1.8<br>2.2 |      | V    |
| 47              | V OUT         | V47    |              | Average DC voltage                                       | 4.5 | 5.0        | 5.5  | V    |
| 48              | Cr3 in        | V48    |              |  | 2.2 | 3.2        | 4.2  | V    |
| 49              | Cb3 in        | V49    |              |  | 2.2 | 3.2        | 4.2  | V    |
| 51              | Cr OUT        | V51    |              |  | 1.5 | 2.5        | 3.5  | V    |
| 52              | Cb OUT        | V52    |              |  | 1.5 | 2.5        | 3.5  | V    |
| 54              | BLACK DET     | V54    |              |  | 1.0 | 1.6        | 3.5  | V    |
| 55              | Y2/CVBS2/G in | V55    |              | at sync tip in non-selected<br>at 35%of sync in selected |     | 1.8<br>2.2 |      | V    |
| 56              | Cb2/B in      | V56    |              |  | 2.0 | 3.0        | 4.0  | V    |

| Characteristics |                  | Symbol | Test Circuit | Test Condition  | Min | Typ.       | Max  | Unit |
|-----------------|------------------|--------|--------------|---|-----|------------|------|------|
| 57              | Cr2/R in         | V57    |              |   | 2.0 | 3.0        | 4.0  | V    |
| 58              | C1 in            | V58    |              |   | 1.5 | 2.5        | 3.5  | V    |
| 59              | YS               | V59    |              |   |     | 0          | 0.25 | V    |
| 61              | Y1/CVBS1 in      | V61    |              | at sync tip in non-selected<br>at 35% of sync in selected |     | 1.8<br>2.2 |      | V    |
| 62              | DC RESTORE       | V62    |              | on input 50IRE Y signal                                   | 1.5 | 2.5        | 3.5  | V    |
| 65              | De-Emp/Mon OUT   | V65    |              |   | 1   | 4.1        | 8    | V    |
| 69              | LOOP FILTER      | V69    |              |   | 1.2 | 2.2        | 3.2  | V    |
| 71              | SIF OUT          | V71    |              |   | 1.0 | 2.0        | 3.0  | V    |
| 73              | SIF in / H corr. | V73    |              |   |     | 3.0        |      | V    |
| 75              | SIF in(1)        | V75    |              |   | 1.0 | 2.0        | 3.0  | V    |
| 76              | SIF in(2)        | V76    |              |   | 1.0 | 2.0        | 3.0  | V    |
| 79              | PIF in(1)        | V79    |              |   | 1.0 | 2.0        | 3.0  | V    |
| 80              | PIF in(2)        | V80    |              |   | 1.0 | 2.0        | 3.0  | V    |

## AC CHARACTERISTIC

### PIF STAGE

| ITEM                          |        | SYMBOL     | TEST CIRCUIT               | TEST COND ITON | MIN | TYP  | MAX  | UNIT   |
|-------------------------------|--------|------------|----------------------------|----------------|-----|------|------|--------|
| <b>PIF STAGE</b>              |        |            |                            |                |     |      |      |        |
| Video output signal amplitude | Nega   | V Det (p)n | in: #79,80<br>out: #68     | P1             | 2.0 | 2.2  | 2.4  | V      |
|                               | Posi   | V Det (p)p |                            |                | 2.0 | 2.2  | 2.4  |        |
| PIF input sensitivity         |        | vin min(p) |                            | P2             | -   | 42   | 47   | dB(uV) |
| PIF maximum input signal      |        | vin max(p) |                            |                | 100 | 105  | -    |        |
| PIF gain control range        |        | RAGC(p)    |                            |                | 53  | 63   | -    | dB     |
| Synchronous signal level      | Nega   | Vsync n    |                            | P3             | 2.6 | 2.8  | 3.0  | V      |
|                               | Posi   | Vsync p    |                            |                | 2.6 | 2.8  | 3.0  |        |
| Differential gain             |        | DG         |                            | P4             | -   | 2    | 5    | %      |
| Differential phase            |        | DP         |                            |                | -   | 2    | 5    |        |
| Video bandwidth (-3dB)        |        | fDet(p)    |                            | P5             | 6   | 8    | -    | MHz    |
| Video output S/N              |        | S/N(p)     |                            | P6             | 54  | 60   | -    | dB     |
| Inter Modulation              |        | I M        |                            | P7             | 34  | 40   | -    | dB     |
| PIF input resistance (*)      |        | Zin R(p)   | in: #79,80<br>out: #79,80  | P8             | -   | 3    | -    | kΩ     |
| PIF input capacitance (*)     |        | Zin C(p)   | in: #79,80<br>out: #78     |                | -   | -    | -    | pF     |
| RF AGC output voltage         | max    | VAGC max   | in: #79,80<br>out: #78     | P9             | -   | 9.0  | -    | V      |
|                               | min    | VAGC min   |                            |                | -   | -    | 0.3  |        |
| RF AGC delay point            | min    | v Dly min  | in: #79,80<br>out: #68     | P10            | -   | 70   | 80   | dB(uV) |
|                               | max    | v Dly max  |                            |                | 100 | 110  | -    |        |
| Capture range of the PLL      | Upper  | fpH(p)     | in: #79,80<br>out: #68     | P11            | 1.4 | 1.7  | -    | MHz    |
|                               | Lower  | fpL(p)     |                            |                | -   | -1.7 | -1.4 |        |
| Hold range of the PLL         | Upper  | fhH(p)     |                            |                | 1.4 | 1.7  | -    |        |
|                               | Lower  | fhL(p)     |                            |                | -   | -1.7 | -1.4 |        |
| Control steepness of the VCO  |        | $\beta$    | in: #79,80<br>out: #69     | P12            | -   | 3.0  | -    | MHz/V  |
| AFT Center turn Frequency     |        | fAFTC      | in: #79,80<br>out: BUS (r) | P13            |     | 0    |      | MHz    |
| AFT window                    | narrow | fAFTW(n)L  | in: #79,80<br>out: BUS (r) | P14            |     | -50  |      | kHz    |
|                               |        | fAFTW(n)H  |                            |                |     | 50   |      |        |
|                               | Wide   | fAFTW(w)L  |                            |                |     | -200 |      |        |
|                               |        | fAFTW(w)H  |                            |                |     | 200  |      |        |
| S-trap reduction              |        |            | in: #79,80<br>out: #68     | P15            |     | -30  | -24  |        |

| ITEM   | SYMBOL   | TEST CIRCUIT      | TEST COND ITON | MIN | TYP  | MAX  | UNIT   |
|--|--|-------------------|----------------|-----|------|------|--------|
| <b>1ST SIF STAGE</b>   |  |                   |                |     |      |      |        |
| SIF maximum input signal   | vin max(s)1  | in: #75,76        | S1             | 100 | 110  | -    | dB(uV) |
| SIF minimum input signal   | vin min(s)1  | in(uc): #79,80    |                | -   | 40   | 50   | dB(uV) |
| SIF gain control range   | RAGC(s)1   | out: #71          |                | 50  | 70   | -    | dB     |
| 2nd SIF output level   | vSIF1  |                   |                | 100 | 103  | 106  | dB(uV) |
| SIF input resistance(*)  | Zin R(s)   | in: #75,76        | S2             | -   | 10   | -    | kΩ     |
| SIF input capacitance(*)   | Zin C(s)   | out: #75,76       |                | -   | 5    | -    | pF     |
| <b>AM sound</b>  |  |                   |                |     |      |      |        |
| AM input sensitivity   | vin minAM  | in: #75,76        | S3             | -   | 40   | 50   | dB(uV) |
| AM maximum input level   | vin maxAM  | in(uc): #79,80    |                | 100 | 110  | -    |        |
| 2nd SIF output level (L)   | vSIF L   |                   |                | 100 | 103  | 106  | dB(uV) |
| AF output signal amplitude (AM)  | vDet(s)AM  | out: #65          | S4             | 375 | 500  | 665  | mVrms  |
| AF output S/N (AM)   | S/N(s)AM   |                   |                | 48  | 54   | -    | dB     |
| Total harmonics distortion (AM)  | THDAM  |                   |                | -   | 0.7  | 3.0  | %      |
| <b>2nd SIF stage</b>   |  |                   |                |     |      |      |        |
| AF output signal amplitude(5.5MHz)   | vDet(s)5.5M  | in: 73<br>out: 71 | S5             | 695 | 927  | 1236 | mVrms  |
| AF output S/N (5.5MHz)   | S/N(s)5.5M   |                   |                | 55  | 60   | -    | dB     |
| Total harmonics distortion (5.5MHz)  | THD5.5M  |                   |                | -   | 0.3  | 1.0  | %      |
| AF output signal amplitude (6.0MHz)  | vDet(s)6.0M  |                   | S6             | 695 | 927  | 1236 | mVrms  |
| AF output S/N (6.0MHz)   | S/N(s)6.0M   |                   |                | 55  | 60   | -    | dB     |
| Total harmonics distortion (6.0MHz)  | THD6.0M  |                   |                | -   | 0.3  | 1.0  | %      |
| AF output signal amplitude (6.5MHz)  | vDet(s)6.5M  |                   | S7             | 695 | 927  | 1236 | mVrms  |
| AF output S/N (6.5MHz)   | S/N(s)6.5M   |                   |                | 55  | 60   | -    | dB     |
| Total harmonics distortion (6.5MHz)  | THD6.5M  |                   |                | -   | 0.3  | 1.0  | %      |
| AF output signal amplitude (4.5MHz Low)  | vDet(s)4.5M L  |                   | S8             | 350 | 500  | 710  | mVrms  |
| AF output S/N (4.5MHz Low)   | S/N(s)4.5ML  |                   |                | 52  | 58   | -    | dB     |
| Total harmonics distortion (4.5MHz Low)  | THD4.5ML   |                   |                | -   | 0.3  | 1.0  | %      |
| AF output signal amplitude (4.5MHz High)   | vDet(s)4.5M H  |                   | S9             | 649 | 927  | 1324 | mVrms  |
| AF output S/N (4.5MHz High)  | S/N(s)4.5M H   |                   |                | 52  | 58   | -    | dB     |
| Total harmonics distortion (4.5MHz High)   | THD4.5MH   |                   |                | -   | 0.3  | 1.0  | %      |
| Limiting sensitivity (4.5MHz Low)<br>(4.5MHz High)<br>(5.5MHz)<br>(6.0MHz)<br>(6.5MHz) | lim(s)4.5ML  |                   | S10            | -   | 40   | 45   | dB(uV) |
|  | im(s)4.5MH   |                   |                | -   | 45   | 50   |        |
|  | lim(s)5.5M   |                   |                | -   | 40   | 45   |        |
|  | lim(s)6.0M   |                   |                | -   | 45   | 50   |        |
| AM reduction ratio (4.5MHz High)<br>(4.5MHz Low)<br>(5.5MHz)<br>(6.0MHz)<br>(6.5MHz)   | AMR4.5MH   |                   | S11            | 50  | 55   | -    | dB     |
|  | AMR 4.5ML  |                   |                | 50  | 55   | -    | dB     |
|  | AMR5.5M  |                   |                | 50  | 60   | -    | dB     |
|  | AMR6.0M  |                   |                | 50  | 60   | -    | dB     |
| Demodulation band width of the FM demodulator (Upper 1)                                | fpH(s)1  |                   | S12            |     | 130  | -    | kHz    |
|  | Demodulation band width of the FM demodulator (Lower1) | fpL(s)1           |                |     | -    | -130 |        |
| <b>VIDEO STAGE</b>   |  |                   |                |     |      |      |        |
| Y Input Dynamic Range  | Y1 in  | in: #61           | V1             | 0.9 | 1.0  | -    | V(p-p) |
| Y Delay time (PAL NTSC)<br>(SECAM)   | tyDELP   | out: #53          | V2             | 350 | 440  | 530  | ns     |
|  | tyDELS   |                   |                | 570 | 680  | 790  |        |
|  | (000)  |                   | tyDEL-120      | -80 | -120 | -160 | ns     |
|  | (111)  |                   | tyDEL160       | 120 | 160  | 200  |        |
|  | 1step  | tyDEL_step        |                | 30  | 40   | 50   |        |
| Chroma Trap Gain   | 3.58MHz  | GTRAP358          | V3             | -   | -27  | -23  | dB     |
|  | 4.43MHz  | GTRAP443          |                | -   | -27  | -23  |        |
| Y gain (Y)   | G Y1   |                   | V4             | 5.0 | 5.5  | 6.0  | dB     |
| Y frequency response   | FR <sub>Y</sub>  |                   | V5             | 5.5 | 8.0  | -    | MHz    |
| Mon out gain (MON)   | (Y1/CVBS1)   | G <sub>TV1</sub>  | V6             | 5.5 | 6    | 6.5  | dB     |
|  | (Y2/CVBS2)   | G <sub>TV2</sub>  |                | 5.5 | 6    | 6.5  | dB     |
|  | (Y3/CVBS3)   | G <sub>TV3</sub>  |                | 5.5 | 6    | 6.5  | dB     |
| Y frequency response   | FR <sub>Y</sub>  | in:#61 / out:#53  | V7             | 5.5 | 8.0  | -    | MHz    |

| ITEM   | SYMBOL                                     | TEST CIRCUIT                            | TEST CONDITION | MIN            | TYP          | MAX          | UNIT        |     |
|--|--|---|----------------|----------------|--------------|--------------|-------------|-----|
| V switch cross-talk (CVBS1-CVBS2)<br>(CVBS1-CVBS3)<br>(CVBS2-CVBS1)<br>(CVBS2-CVBS3)<br>(CVBS3-CVBS1)<br>(CVBS3-CVBS2) | CT <sub>V1,2</sub>                         | in: #61, 55 or 44<br>out: #53           | V8             |                |              | -55          | dB          |     |
|  | CT <sub>CVBS1,3</sub>                      |   |                |                |              | -55          |             |     |
|  | CT <sub>CVBS2,1</sub>                      |   |                |                |              | -55          |             |     |
|  | CT <sub>CVBS2,3</sub>                      |   |                |                |              | -55          |             |     |
|  | CT <sub>CVBS3,1</sub>                      |   |                |                |              | -55          |             |     |
|  | CT <sub>CVBS3,2</sub>                      |   |                |                |              | -55          |             |     |
| RGB input D-range  |  |   |                | 0.9            | 1.0          | —            | V (p-p)     |     |
| Ys Mode Switching Level  |  |   |                | 0.5            | 0.7          | 0.9          |             |     |
| <b>CHROMA STAGE</b>  |  |   |                |                |              |              |             |     |
| ACC Characteristic   | V <sub>ACCL</sub>                          |   | C1             | —              | 25           | 40           | mV(p-p)     |     |
|  | V <sub>ACCH</sub>                          |   |                | 600            | 1000         | —            |             |     |
| TOF Characteristic.(4.43)  | f <sub>o</sub><br>Q                        | F <sub>OT443</sub><br>Q <sub>T443</sub> | (*) test mode  | C2             | 4.87<br>1.6  | 5.07<br>1.8  | 5.27<br>2.0 | MHz |
| BPF Characteristic. (4.43)   | f <sub>o</sub><br>Q                        | F <sub>OB443</sub><br>Q <sub>B443</sub> |                |                | 4.26<br>1.6  | 4.46<br>1.8  | 4.66<br>2.0 |     |
| TOF Characteristic. (3.58)   | f <sub>o</sub><br>Q                        | F <sub>OT358</sub><br>Q <sub>T358</sub> |                | C2             | 4.05<br>1.6  | 4.25<br>1.8  | 4.46<br>2.0 | MHz |
| BPF Characteristic. (3.58)   | f <sub>o</sub><br>Q                        | F <sub>OB358</sub><br>Q <sub>B358</sub> |                |                | 3.43<br>1.6  | 3.63<br>1.8  | 3.83<br>2.0 |     |
| C Delay Time (PAL)<br>(NTSC)<br>(SECAM)  | t <sub>CDELN</sub>                         |   | C3             | 595            | 700          | 805          | ns          |     |
|  | t <sub>CDELP</sub>                         |   |                | 510            | 600          | 690          |             |     |
|  | t <sub>CDELS</sub>                         |   |                | 765            | 900          | 1035         |             |     |
| APC Pull- In Range (4.43MHz)   | F <sub>4APCP+</sub><br>F <sub>4APCP-</sub> | in: #58<br>uc_in ; #61<br>out: #51, 52  | C4             | 350            | 450          | —            | Hz          |     |
| APC Hold Range (4.43MHz)   | F <sub>4APCH+</sub><br>F <sub>4APCH-</sub> |   |                | -1500<br>-2000 | -600<br>-600 | -450<br>-450 |             |     |
| APC Pull-In Range (3.58MHz)  | F <sub>3APCP+</sub><br>F <sub>3APCP-</sub> |   | C4             | 350            | 450          | —            | Hz          |     |
| APC Hold Range (3.58MHz)   | F <sub>3APCH+</sub><br>F <sub>3APCH-</sub> |   |                | -1500<br>-2000 | -600<br>-600 | -450<br>-450 |             |     |
| APC Control Sensitivity (4.43MHz)  | β <sub>443</sub>                           | in:#58 (#61)<br>out: #7                 | C5             | 0.6            | 1.1          | 1.6          | Hz/mV       |     |
| APC Control Sensitivity (3.58MHz)  | β <sub>358</sub>                           |   |                | 0.4            | 0.9          | 1.4          |             |     |
| PAL ID Sensitivity (Normal Mode)   | V <sub>PIDON</sub>                         | in: #58<br>in ; #61<br>out: #51, 52     | C6             | 0.8            | 1.6          | 3.2          | mV(p-p)     |     |
|  | V <sub>PIDOFF</sub>                        |   |                | 0.9            | 1.8          | 3.6          |             |     |
| PAL ID Sensitivity (Low Mode)  | V <sub>PIDLON</sub>                        |   | C6             | 1.2            | 2.5          | 5.0          | mV(p-p)     |     |
|  | V <sub>PIDLOFF</sub>                       |   |                | 1.6            | 3.2          | 6.4          |             |     |
| NTSC ID Sensitivity (Normal Mode)  | V <sub>NIDON</sub>                         |   | C6             | 0.8            | 1.6          | 3.2          | mV(p-p)     |     |
|  | V <sub>NIDOFF</sub>                        |   |                | 1.0            | 2.0          | 4.0          |             |     |
| NTSC ID Sensitivity (Low Mode)   | V <sub>NIDLON</sub>                        |   | C6             | 1.4            | 2.8          | 5.6          | mV(p-p)     |     |
|  | V <sub>NIDLOFF</sub>                       |   |                | 1.8            | 3.6          | 7.2          |             |     |
| black adjustment (internal)  | V <sub>B INT MAX</sub>                     |   | C7             | 27.5           | 35.5         | 43.5         | mV          |     |
|  | V <sub>R INT MAX</sub>                     |   |                | 18.0           | 24.0         | 30.0         | mV          |     |
|  | V <sub>B INT MIN</sub>                     |   |                | -39.5          | -31.5        | -30.7        | mV          |     |
|  | V <sub>R INT MIN</sub>                     |   |                | -28.5          | -22.5        | -16.5        | mV          |     |
| Black adjustment sensitivity (internal)  | ΔV <sub>B INT</sub>                        |   | C7             | 3.5            | 4.5          | 5.5          | mV          |     |
|  | ΔV <sub>R INT</sub>                        |   |                | 2.1            | 3.1          | 4.1          | mV          |     |
| black adjustment (external)  | V <sub>B EXT MAX</sub>                     |   | C7             | 345            | 425          | 505          | mV          |     |
|  | V <sub>R EXT MAX</sub>                     |   |                | 190            | 230          | 290          | mV          |     |
|  | V <sub>B EXT MIN</sub>                     |   |                | -585           | -505         | -425         | mV          |     |
|  | V <sub>R EXT MIN</sub>                     |   |                | -355           | -295         | -235         | mV          |     |
| Black adjustment sensitivity (external)  | ΔV <sub>B EXT</sub>                        |   | C7             | 49             | 62           | 75           | mV          |     |
|  | ΔV <sub>R EXT</sub>                        |   | C7             | 27             | 35           | 43           | mV          |     |
| CWOUT Amplitude 4.43M<br>3.58M   | V <sub>CW</sub>                            |   | C8             | 0.40           | 0.55         | 0.70         | V(p-p)      |     |
|  |  |   |                | 0.60           | 0.75         | 0.90         |             |     |
| CbCr out amplitude Cr PAL<br>Cb PAL<br>Cr NTSC<br>Cb NTSC  |  | color bar (75%)                         | C8             | 0.38           | 0.53         | 0.68         | V(p-p)      |     |
|  |  |   |                | 0.38           | 0.55         | 0.68         |             |     |
|  |  |   |                | 0.38           | 0.55         | 0.68         |             |     |
|  |  |   |                | 0.38           | 0.57         | 0.68         |             |     |
| <b>SECAM STAGE</b>   |  |   |                |                |              |              |             |     |
| SECAM CbCr Output Amplitude  | V <sub>B S</sub>                           | in:#58<br>(Color bar 75%)               | C9             | 0.37           | 0.52         | 0.67         | V(p-p)      |     |
|  | V <sub>R S</sub>                           |   |                | 0.39           | 0.54         | 0.69         |             |     |
| SECAM CbCr out Relative Amplitude  | R/B-S                                      |   | C10            | 0.90           | 1.05         | 1.20         |             |     |

| ITEM   | SYMBOL                               | TEST CIRCUIT                | TEST COND ITON | MIN                    | TYP   | MAX   | UNIT      |            |              |
|--|--------------------------------------|-----------------------------|----------------|------------------------|-------|-------|-----------|------------|--------------|
| SECAM CbCr out S/N Ratio   | SNB-S                                | uc_in ; #61<br>out; #51, 52 | C11            | -                      | -44.  | -28   | dB        |            |              |
|  | SBR-S                                |                             |                | -                      | -45.  | -32   |           |            |              |
| SECAM Linearity  | LinB                                 |                             | C12            | 83                     | 100   | 117   | %         |            |              |
|  | LinR                                 |                             |                | 83                     | 90    | 117   | %         |            |              |
| SECAM Rising-Fall Time   | trfB                                 |                             | C13            | -                      | 0.70  | 1.5   | us        |            |              |
|  | trfR                                 |                             |                | -                      | 0.90  | 1.5   |           |            |              |
| SECAM ID Sensitivity<br>(Normal Mode)                                    | H                                    |                             | C14            | V <sub>SIDHON</sub>    | 1.2   | 2.5   | 5.0       | mV(p-p)    |              |
|  | H+V                                  |                             |                | V <sub>SIDHOFF</sub>   | 1.4   | 2.8   | 5.6       | mV(p-p)    |              |
|  |                                      |                             |                | V <sub>SIDHVON</sub>   | 0.4   | 0.8   | 1.6       | mV(p-p)    |              |
|  |                                      |                             |                | V <sub>SIDHVOFF</sub>  | 0.9   | 1.8   | 3.6       | mV(p-p)    |              |
| SECAM ID Sensitivity<br>(Low Mode)                                       | H                                    |                             |                | V <sub>SIDLHON</sub>   | 1.3   | 2.6   | 5.2       | mV(p-p)    |              |
|  | H+V                                  |                             |                | V <sub>SIDLHOFF</sub>  | 1.6   | 3.2   | 6.4       | mV(p-p)    |              |
|  |                                      |                             |                | V <sub>SIDLHVON</sub>  | 0.4   | 0.8   | 1.6       | mV(p-p)    |              |
|  |                                      |                             |                | V <sub>SIDLHVOFF</sub> | 1.0   | 2.0   | 4.0       | mV(p-p)    |              |
| <b>YUV (Y)</b>   |                                      |                             |                |                        |       |       |           |            |              |
| Brightness Control Characteristics                                       | V <sub>BRTMAX</sub>                  | in; #61<br>out; #14(B)      | Y1             | 2.95                   | 3.40  | 3.80  | V (dc)    |            |              |
|  | V <sub>BRTCEN</sub>                  |                             |                | 1.95                   | 2.40  | 2.85  |           |            |              |
|  | V <sub>BRTMIN</sub>                  |                             |                | 0.95                   | 1.40  | 1.85  |           |            |              |
| Brightness Control resolution  | $\Delta V_{BRT}$                     |                             |                | 13.2                   | 15.3  | 17.3  | mV/(step) |            |              |
| Contrast Control for Y   | G <sub>UCYMAX</sub>                  |                             | Y2             | 13.0                   | 14.7  | 16.3  | dB        |            |              |
|  | G <sub>UCYCEN</sub>                  |                             |                | 8.2                    | 9.8   | 11.4  |           |            |              |
|  | G <sub>UCYMIN</sub>                  |                             |                | -4.4                   | -2.8  | -1.2  |           |            |              |
| Sharpness Control  | G <sub>SHMAX</sub>                   |                             | Y3             | 6.0                    | 9.0   | 12.0  | dB        |            |              |
|  | G <sub>SHCEN</sub>                   |                             |                | 3.5                    | 4.5   | 5.5   |           |            |              |
|  | G <sub>SHMIN</sub>                   |                             |                | -16.0                  | -13.0 | -10.0 |           |            |              |
| Sharpness Peaking Frequency  | F <sub>SHP</sub>                     |                             | Y4             | 2.7                    | 3.7   | 4.7   | MHz       |            |              |
| Sharpness Coring   | G <sub>COR</sub>                     |                             |                | -0.9                   | -0.7  | -0.5  | dB        |            |              |
| Y $\gamma$ correction start point  | V <sub>Y<math>\gamma</math> 70</sub> |                             | Y5             | 67                     | 70    | 73    | (IRE)     |            |              |
|  | V <sub>Y<math>\gamma</math> 80</sub> |                             |                | 74                     | 77    | 80    |           |            |              |
|  | V <sub>Y<math>\gamma</math> 90</sub> |                             |                | 82                     | 85    | 88    |           |            |              |
| Y $\gamma$ correction curve  | G <sub>Y<math>\gamma</math></sub>    |                             |                | -6                     | -5    | -4    | dB        |            |              |
| Black stretch AMP Gain   | G <sub>BLEX</sub>                    |                             | Y6             | 1.15                   | 1.3   | 1.55  |           |            |              |
| Black stretch Start Point  | V <sub>BLEX 25IRE</sub>              |                             |                | 21                     | 25    | 29    | V         |            |              |
|  | V <sub>BLEX 35IRE</sub>              |                             |                | 30                     | 34    | 38    |           |            |              |
|  | V <sub>BLEX 45IRE</sub>              |                             |                | 39                     | 43    | 47    |           |            |              |
| DC restoration gain  | V <sub>dcrest90</sub>                |                             | Y7             | 85                     | 90    | 95    | (IRE)     |            |              |
|  | V <sub>dcrest110</sub>               |                             |                | 103                    | 108   | 113   |           |            |              |
|  | V <sub>dcrest120</sub>               |                             |                | 110                    | 115   | 120   |           |            |              |
|  | V <sub>dcrest step</sub>             |                             |                | 5                      | 8     | 11    |           |            |              |
| WPS Level  | V <sub>WPS</sub>                     |                             | Y8             | 3.94                   | 4.24  | 4.54  | V(p)      |            |              |
| VSM Peak Frequency   | F <sub>VSM</sub>                     | in; #61                     | Y9             | 2.5                    | 3.5   | 4.5   | MHz       |            |              |
| VSM Gain (VM-G = 0dB)<br>(VM-G = -3dB)<br>(VM-G = -10dB)<br>(VM-G = off) | G <sub>VSM 0</sub>                   | out; #18                    | Y10            | -0.7                   | 0.50  | 1.70  | dB        |            |              |
|  | G <sub>VSM-3</sub>                   |                             |                | 2.7                    | 4     | 5.    |           |            |              |
|  | G <sub>VSM-10</sub>                  |                             |                | 8.                     | 9.    | 10.5  |           |            |              |
|  | G <sub>VSM OFF</sub>                 |                             |                | -                      | -22.5 | -18.5 |           |            |              |
| VSM Phase 2T Pulse (0)<br>2T Pulse (1)<br>BUS (1)-(0)                    | T <sub>VMET (0)</sub>                |                             | Y11            | -190                   | -150  | -110  | ns        |            |              |
|  | T <sub>VMET (1)</sub>                |                             |                | -120                   | -90   | -60   |           |            |              |
|  | T <sub>VMBUS</sub>                   |                             |                | 45                     | 60    | 75    |           |            |              |
| VSM Mute Threshold Level on Ys   | V <sub>VMBLK</sub>                   |                             | V18            | 0.5                    | 0.7   | 0.9   | V         |            |              |
| <b>YUV (UV)</b>  |                                      |                             |                |                        |       |       |           |            |              |
| TINT control range   | MAX                                  | in; #58<br>uc_in ; #61      | UV1            | $\Delta \theta_{MAX}$  | 28    | 35    | 43        | deg        |              |
|  | MIN                                  |                             |                | $\Delta \theta_{MIN}$  | -28   | -35   | -43       |            |              |
| Color Control  | MAX                                  | out; #12, 13, 14            | UV2            | G <sub>COLMAX</sub>    | 4.7   | 6.2   | 7.7       | dB         |              |
|  | MIN                                  |                             |                | G <sub>COLMIN</sub>    | -     | -     | -25       |            |              |
| Contrast Control for UV  | Min                                  |                             | UV3            | G <sub>UCCMIN</sub>    | -15.0 | -13.0 | -11.0     | $\pm 2$ dB |              |
|  | Center                               |                             |                | G <sub>UCCEN</sub>     | -     | 0     | -         |            |              |
|  | Max                                  |                             |                | G <sub>UCCMAX</sub>    | 3.0   | 5.00  | 7.0       |            | $\pm 2$ dB   |
|  |                                      |                             |                | G <sub>UCC</sub>       | 14.5  | 18.00 | 21.5      |            | $\pm 3.5$ dB |
| Relative Amplitude (PAL1)  | R/B                                  |                             | UV4            | V <sub>P1R/B</sub>     | 0.45  | 0.55  | 0.65      |            |              |
|  | G/B                                  |                             |                | V <sub>P1G/B</sub>     | 0.27  | 0.33  | 0.39      |            |              |

| ITEM  | SYMBOL           | TEST CIRCUIT                         | TEST CONDITION | MIN              | TYP    | MAX    | UNIT |        |     |     |
|---|------------------|--------------------------------------|----------------|------------------|--------|--------|------|--------|-----|-----|
| Relative Amplitude (PAL2)                       | R/B              |                                      |                | 0.68             | 0.78   | 0.88   |      |        |     |     |
|   | G/B              |                                      |                | $V_{P2R/B}$      | 0.27   | 0.33   |      | 0.39   |     |     |
| Relative Amplitude (NTSC1)                      | R/B              |                                      |                | $V_{N1R/B}$      | 0.69   | 0.79   |      | 0.89   |     |     |
|   | G/B              |                                      |                | $V_{N1G/B}$      | 0.22   | 0.28   |      | 0.34   |     |     |
| Relative Amplitude (NTSC2)                      | R/B              |                                      |                | $V_{N2R/B}$      | 0.68   | 0.78   |      | 0.88   |     |     |
|   | G/B              |                                      |                | $V_{N2G/B}$      | 0.27   | 0.33   |      | 0.39   |     |     |
| Relative Phase (PAL1)                           | R-B              |                                      |                | $\theta_{P1R-B}$ | UV5    | 85     |      | 90     | 95  | deg |
|   | G-B              |                                      |                | $\theta_{P1G-B}$ |        | 235    |      | 240    | 245 |     |
| Relative Phase (PAL2)                           | R-B              |                                      |                | $\theta_{P2R-B}$ |        | 85     |      | 90     | 95  |     |
|   | G-B              |                                      |                | $\theta_{P2G-B}$ |        | 235    |      | 240    | 245 |     |
| Relative Phase (NTSC1)                          | R-B              |                                      |                | $\theta_{N1R-B}$ |        | 100    |      | 105    | 110 |     |
|   | G-B              |                                      |                | $\theta_{N1G-B}$ |        | 241    |      | 246    | 251 |     |
| Relative Phase (NTSC2)                          | R-B              |                                      |                | $\theta_{N2R-B}$ |        | 99     |      | 104    | 109 |     |
|   | G-B              |                                      |                | $\theta_{N2G-B}$ |        | 232    |      | 237    | 242 |     |
| Half Tone reduction. for UV                     | $G_{HTC}$        |                                      | UV6            | -7               |        | -6     | -5   | dB     |     |     |
| Half Tone reduction for Y                       | $G_{HTY}$        |                                      | UV7            | -7               |        | -6     | -5   | dB     |     |     |
| <b>RGB STAGE</b>                                |                  |                                      |                |                  |        |        |      |        |     |     |
| V-BLK Pulse Output Level                        | $V_{VBLK}$       | in: #61<br>out: #12                  | T1             | 0.1              |        | 0.6    | 1.1  | V(p)   |     |     |
| H-BLK Pulse Output Level                        | $V_{HBLK}$       |                                      |                | 0.1              |        | 0.6    | 1.1  |        |     |     |
| RGB Output Black Level (OIRE DC)                | $V_{BLACK}$      |                                      | T2             | 2.25             |        | 2.5    | 2.75 | V      |     |     |
| RGB Output White Level(100IRE AC)               | $V_{WHITE}$      |                                      | T3             | 3.3              | 3.7    | 4.1    | V(p) |        |     |     |
| Cut-Off Voltage Variable Range                  | $V_{CUT+}$       |                                      | T4             | 0.6              | 0.65   | 0.7    | V    |        |     |     |
|   | $V_{CUT-}$       |                                      |                | -0.7             | -0.65  | -0.6   | V    |        |     |     |
| Drive Control Variable Range                    | $G_{DR+}$        |                                      | T5             | 3.0              | 4.0    | 5.0    | dB   |        |     |     |
|   | $G_{DR-}$        |                                      |                | -7.5             | -6.5   | -5.5   | dB   |        |     |     |
| ABCL Control Voltage Range                      | $V_{ABCLH}$      |                                      | T6             | 5.6              | 5.9    | 6.2    | V    |        |     |     |
|   | $V_{ABCLL}$      |                                      |                | 4.2              | 4.5    | 4.8    | V    |        |     |     |
| ACL Gain  | $G_{ACL}$        |                                      |                | -19.5            | -17.5  | -15.5  | dB   |        |     |     |
| ABL Point                                       | $V_{ABLP1}$      |                                      | T7             | -0.1             | 0      | 0.1    | V    |        |     |     |
|   | $V_{ABLP2}$      |                                      |                | -0.26            | -0.16  | -0.06  |      |        |     |     |
|   | $V_{ABLP3}$      |                                      |                | -0.33            | -0.23  | -0.13  |      |        |     |     |
|   | $V_{ABLP4}$      |                                      |                | -0.36            | -0.26  | -0.16  |      |        |     |     |
| ABL Gain  | $V_{ABLG1}$      |                                      | T8             | -0.32            | -0.22  | -0.12  | V    |        |     |     |
|   | $V_{ABLG2}$      |                                      |                | -0.45            | -0.35  | -0.25  |      |        |     |     |
|   | $V_{ABLG3}$      |                                      |                | -0.62            | -0.52  | -0.42  |      |        |     |     |
|   | $V_{ABLG4}$      |                                      |                | -0.10            | 0      | +0.10  |      |        |     |     |
| Analog RGB Gain                                 |                  | in: #20,21,22,23<br>out: #12, 13, 14 |                | 11.40            | 12.20  | 13.00  | dB   |        |     |     |
| Analog RGB reduction on Ym                      |                  |                                      |                |                  | -6     |        |      |        |     |     |
| Analog RGB Dynamic Range                        | $DR_{TX}$        |                                      |                | T9               | 0.7    | 1.0    | -    | V(p-p) |     |     |
| Analog RGB Brightness Control Characteristic    | MAX.             |                                      | $V_{TXBRMAX}$  | T11              | 2.9    | 3.3    | 3.7  | V      |     |     |
|   | CEN.             |                                      | $V_{TXBRCEN}$  |                  | 1.9    | 2.3    | 2.7  | V      |     |     |
|   | MIN.             |                                      | $V_{TXBRMIN}$  |                  | 0.9    | 1.3    | 1.7  | V      |     |     |
| YsYm Mode Switching Level                       | $V_{YSANA}$      |                                      |                | T12              | 0.52   | 0.72   | 0.92 | V      |     |     |
|   | $V_{YSBLK}$      |                                      |                |                  | 1.82   | 2.02   | 2.22 |        |     |     |
| Analog RGB Mode Transfer Characteristic         | $\tau R_{YS}$    |                                      |                | T13              | —      | 40     | 100  | ns     |     |     |
|   | $tPR_{YS}$       |                                      |                |                  | —      | 40     | 100  |        |     |     |
|   | $\tau F_{YS}$    |                                      | —              |                  | 40     | 100    |      |        |     |     |
|   | $tPF_{YS}$       |                                      | —              |                  | 40     | 100    |      |        |     |     |
| Cross Talk from Analog RGB toTV                 | $CT_{TX-TV}$     |                                      | T14            | —                | -55    | -40    | dB   |        |     |     |
| Cross Talk from TV to Analog RGB                | $CT_{TV-TX}$     |                                      | T15            | —                | -46    | -40    | dB   |        |     |     |
| Analog RGB / RGB Output Voltage Axes Difference | $\Delta V_{R-G}$ |                                      | T17            | -50              | -      | 50     | mV   |        |     |     |
|   | $\Delta V_{G-B}$ |                                      |                | -50              | -      | 50     |      |        |     |     |
|   | $\Delta V_{B-R}$ |                                      |                | -50              | -      | 50     |      |        |     |     |
| RGB Mute DC level                               | $V_{RGBMR}$      |                                      | T18            | 1.7              | 1.9    | 2.1    | V    |        |     |     |
| Blue Back level                                 | $V_{BB}$         |                                      |                | 3.84             | 4.14   | 4.44   | V    |        |     |     |
| <b>DEF STAGE</b>                                |                  |                                      |                |                  |        |        |      |        |     |     |
| AFC Inactive Period                             | 50Hz             | $T_{50AFCOFF}$                       | D1             | —                | 309-7  | —      | (H)  |        |     |     |
|   | 60Hz             | $T_{60AFCOFF}$                       |                | —                | 262-10 | —      |      |        |     |     |
| H-OUT Start Voltage                             |                  | $V_{HON}$                            | D2             | 4.4              | 4.7    | 5.0    | V    |        |     |     |
| H-OUT Pulse Duty                                |                  | $WH_{OUT}$                           | D3             | 38.5             | 40.5   | 42.5   | %    |        |     |     |
| H-OUT Freq. On AFC Stop Mode                    |                  | $F_{HAFCOFF}$                        | D4             | 15.38            | 15.39  | 15.40  | kHz  |        |     |     |
| Horizontal Free-Run Frequency                   | 50Hz             | $F_{H50FR}$                          | D5             | 15.475           | 15.625 | 15.775 | kHz  |        |     |     |

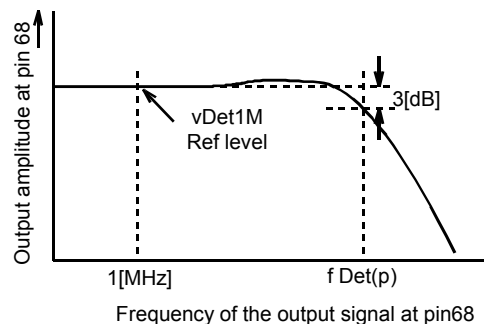
| ITEM  | SYMBOL   | TEST CIRCUIT | TEST CONDITION | MIN  | TYP    | MAX    | UNIT   |        |
|---|--|--------------|----------------|--|--------|--------|--------|--------|
| 60Hz  | F <sub>H60FR</sub>                             |              |                | 15.585   | 15.734 | 15.885 | kHz    |        |
| Horizontal Freq. Variable Range               | MAX. F <sub>HMAX</sub>                         |              | D6             | 16.200   | 16.400 | 16.600 | kHz    |        |
|   | MIN. F <sub>HMIN</sub>                         |              |                | 14.600   | 14.900 | 15.200 |        |        |
| Horizontal Freq. Control Sensitivity          | $\beta$ <sub>H AFC</sub>                       |              | D7             | 2.4  | 2.9    | 3.4    | Hz/mV  |        |
| Horizontal Pull-In Range                      | F <sub>H PH</sub>                              |              | D8             | 500  | —      | —      | Hz     |        |
|   | F <sub>H PL</sub>                              |              |                | 500  | —      | —      |        |        |
| H-OUT Voltage                                 | V <sub>HOUTH</sub>                             |              | D9             | 4.2  | 4.6    | 5.0    | V      |        |
|   | V <sub>HOUT</sub>                              |              |                | —  | 0.15   | 0.30   |        |        |
| Horizontal Freq. Dependence on Vcc            | $\Delta$ F <sub>HVCC</sub>                     |              | D10            | -20  | 0      | 20     | Hz/V   |        |
| FBP Phase                                     | PH <sub>F BP</sub>                             |              | D11            | 2.7  | 3.2    | 3.7    | us     |        |
| H-Sync. Phase                                 | PH <sub>H SYNC</sub>                           |              |                | 0.2  | 0.3    | 0.4    |        |        |
| Horizontal Position Variable Range            | $\Delta$ PH <sub>H POS</sub>                   |              | D12            | 6.3  | 6.8    | 7.3    | us     |        |
| H correction control range                    | (+) $\Delta$ PH <sub>H COR+</sub>              |              |                | 1.0  | 1.2    | 1.4    |        | us     |
|   | (-) $\Delta$ PH <sub>H COR-</sub>              |              |                | -1.4   | -1.2   | -1.0   |        |        |
| AFC-2 Pulse Threshold Level                   | V <sub>AFC2</sub>                              |              | D13            | 3.2  | 3.5    | 3.8    | V      |        |
| H-BLK Pulse Threshold Level                   | V <sub>H BLK</sub>                             |              | D14            | 0.8  | 1.3    | 1.6    | V      |        |
| Wide H blank ratio                            | 50Hz Left side $\Delta$ W <sub>WHBLK50L</sub>  |              |                | 91   | 92     | 93     |        | %      |
|   | 50Hz Right side $\Delta$ W <sub>WHBLK50R</sub> |              |                | 88   | 89     | 90     |        |        |
| 60Hz Left side $\Delta$ W <sub>WHBLK60L</sub> |  |              |                | 91   | 92     | 93     |        | %      |
|   |  |              |                | 60Hz Right side $\Delta$ W <sub>WHBLK60R</sub> | 91.5   | 92.5   |        |        |
| BLACK Peak Det. Stop Period (H)               | PHBPDET  |              | D15            | 8.5  | 9.0    | 9.5    | us     |        |
|   | WBPDET   |              |                | 14.5   | 15.0   | 15.5   |        |        |
| Gate Pulse Start Phase                        | PH <sub>GP</sub>                               |              | D16            | 2.8  | 3.0    | 3.2    | us     |        |
| Gate Pulse Width                              | W <sub>GP</sub>                                |              |                | 2.0  | 2.2    | 2.4    |        |        |
| Vertical Free-Run Frequency                   | Auto <sub>50</sub> F <sub>VAUFR50</sub>        |              | D18            | 45   | 50     | 55     | Hz     |        |
|   | Auto <sub>60</sub> F <sub>VAUFR60</sub>        |              |                | 55   | 60     | 65     |        |        |
|   | 50Hz F <sub>V50FR</sub>                        |              |                | 45   | 50     | 55     |        |        |
|   | 60Hz F <sub>V60FR</sub>                        |              |                | 55   | 60     | 65     |        |        |
| Gate Pulse V-Masking Period                   | 50Hz T <sub>50GPM</sub>                        |              | D19            | —  | 308.7  | —      | (H)    |        |
|   | 60Hz T <sub>60GPM</sub>                        |              |                | —  | 261.10 | —      |        |        |
| V.Ramp DC on Service Mode                     | V <sub>NOVRAMP</sub>                           |              | D20            | 3.1  | 3.3    | 3.5    | V      |        |
| Vertical Pull-In Range (Auto)                 | F <sub>VPAUL</sub>                             |              | D21            | —  | 224.5  | —      | (H)    |        |
|   | F <sub>VPAUH</sub>                             |              |                | —  | 344.5  | —      |        |        |
| Vertical Pull-In Range (50Hz)                 | F <sub>VP50L</sub>                             |              |                | —  | 274.5  | —      |        |        |
|   | F <sub>VP50H</sub>                             |              |                | —  | 344.5  | —      |        |        |
| Vertical Pull-In Range (60Hz)                 | F <sub>VP60L</sub>                             |              |                | —  | 224.5  | —      |        |        |
|   | F <sub>VP60H</sub>                             |              |                | —  | 294.5  | —      |        |        |
| Vertical Period on Fixed Mode                 | T <sub>V312.5</sub>                            |              |                | D22  | —      | 312.5  |        | —      |
|   | T <sub>V262.5</sub>                            |              | —              |  | 262.5  | —      |        |        |
|   | T <sub>V313</sub>                              |              | —              |  | 313    | —      |        |        |
|   | T <sub>V263</sub>                              |              | —              |  | 263    | —      |        |        |
| VD Start Phase                                | 50Hz PH <sub>50VD</sub>                        |              | D23            | 27   | 29     | 31     | us     |        |
|   | 60Hz PH <sub>60VD</sub>                        |              |                | 27   | 29     | 31     |        |        |
| VD Width                                      | 50Hz W <sub>50VD</sub>                         |              |                | —  | 12     | —      | (H)    |        |
|   | 60Hz W <sub>60VD</sub>                         |              |                | —  | 12     | —      |        |        |
| V-BLK Start Phase                             | 50Hz PH <sub>50VBLK</sub>                      |              | D24            | 27   | 29     | 31     | us     |        |
|   | 60Hz PH <sub>60VBLK</sub>                      |              |                | 27   | 29     | 31     |        |        |
| V-BLK Width                                   | 50Hz W <sub>50VBLK</sub>                       |              |                | —  | 22     | —      | (H)    |        |
|   | 60Hz W <sub>60VBLK</sub>                       |              |                | —  | 18     | —      |        |        |
| Sand Castle Pulse Level                       | V <sub>SCPH</sub>                              |              | D25            | 6.70   | 7.00   | 7.30   | V      |        |
|   | V <sub>SCPM</sub>                              |              |                | 4.60   | 4.90   | 5.20   |        |        |
|   | V <sub>SCPL</sub>                              |              |                | 1.55   | 1.85   | 2.15   |        |        |
| HD pulse level                                | GP   |              |                | 4.5  | 5      | 5.5    | V      |        |
|   | HD   |              |                | 2.5  | 3      | 3.5    |        | V      |
| VD pulse level                                | Low  |              |                | —  | 0      | 0.1    | V      |        |
|   | High   |              |                | 2.5  | 3      | 3.5    |        | V      |
| V-Ramp Amplitude                              | Low  |              |                | —  | 0      | 0.1    | V      |        |
|   | V <sub>VRAMP</sub>                             |              |                | 1.50   | 1.67   | 1.84   |        | V(p-p) |
| Vertical out Amplitude                        | Cen V <sub>VOUT</sub>                          |              | D26            | 1.8  | 2.0    | 2.2    | V(p-p) |        |
|   | Max R <sub>VOUT MAX</sub>                      |              |                | +48  | +52    | +56    |        | %      |
|   | Min R <sub>VOUT MIN</sub>                      |              |                | -51  | -47    | -43    |        |        |
| Vertical center voltage                       | V <sub>OUTDC</sub>                             |              |                | 4.8  | 5      | 5.2    | V      |        |

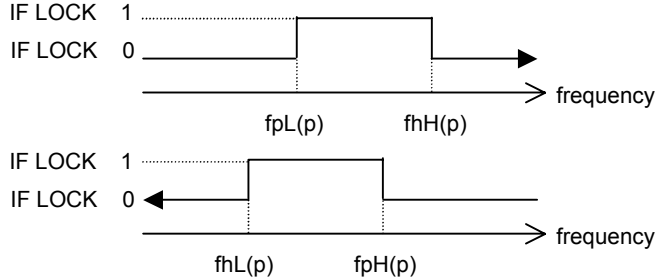


| ITEM                                 |            | SYMBOL                | TEST CIRCUIT | TEST COND ITON | MIN   | TYP   | MAX   | UNIT     |
|--------------------------------------|------------|-----------------------|--------------|----------------|-------|-------|-------|----------|
| Vertical center                      | Max        | V <sub>CENT MAX</sub> |              |                | +10   | +12   | +14   | %        |
|                                      | Min        | V <sub>CENT MIN</sub> |              |                | -14   | -12   | -10   |          |
| Vertical Linearity Variable Range    |            | V <sub>LIN</sub>      |              | D27            | ±10.5 | ±12.5 | ±14.5 | %        |
| Vertical S Correction Variable Range | Max        | V <sub>S(+)</sub>     |              | D28            | +21   | +23   | +25   | %        |
|                                      | Min        | V <sub>S(-)</sub>     |              |                | -19   | -17   | -15   |          |
| Vertical Amplitude EHT Correction    |            | ΔV <sub>EHT</sub>     |              | D29            | 8.0   | 9.0   | 10.0  | %        |
| E-W H size                           | Max        | V <sub>EWDCMAX</sub>  |              | D30            | 550   | 700   | 850   | uA       |
|                                      | Min        | V <sub>EWDCMIN</sub>  |              |                | —     | 0     | 60    |          |
| E-W Parabola                         | Max        | V <sub>EWPFMAX</sub>  |              | D35            | 360   | 480   | 600   | uA (p-p) |
|                                      | Min        | V <sub>EWPFMIN</sub>  |              |                | —     | 0     | 10    |          |
| E-W Conner top                       | Max        | V <sub>EWCTMAX</sub>  |              | D35            | 590   | 720   | 850   | uA (p-p) |
|                                      | Min        | V <sub>EWCTMIN</sub>  |              |                | 60    | 130   | 200   |          |
| E-W Conner bottom                    | Max        | V <sub>EWCBMAX</sub>  |              | D36            | 590   | 720   | 850   | uA (p-p) |
|                                      | Min        | V <sub>EWCBMIN</sub>  |              |                | 60    | 130   | 200   |          |
| E-W Trapezium Correction             | Max        | V <sub>TRMAX</sub>    |              | D37            | 1     | 3     | 5     | %        |
|                                      | Min        | V <sub>TRMIN</sub>    |              |                | -9    | -7    | -5    |          |
| E-W DC EHT Correction                |            | V <sub>EWDC EHT</sub> |              | D38            | 110   | 170   | 230   | uA       |
| H-Bow Correction                     | Max        | T <sub>HBOWMAX</sub>  |              | D39            | +300  | +400  | +500  | us       |
|                                      | Min        | T <sub>HBOWMIN</sub>  |              |                | -650  | -550  | -450  | us       |
| H-Parallelogram Correction           | Max        | T <sub>HPARAMAX</sub> |              |                | ±100  | ±200  | ±300  | us       |
|                                      | Min        | T <sub>HPARAMIN</sub> | ±150         |                | ±250  | ±350  | us    |          |
| NoiseDet level                       | BUS(0011)  | V <sub>NDET3</sub>    | D40          | 10             | 25    | 40    | mVpp  |          |
|                                      | BUS (1111) | V <sub>NDET15</sub>   |              | 265            | 280   | 295   | mVpp  |          |
|                                      |            |                       |              |                |       |       |       |          |

## TEST CONDITION PIF STAGE

| Note | Items/Symbols  | Bus conditions  | Measurement methods   |
|------|--|---|---|
| P1   | Video output signal amplitude<br>/ vDet(p)n<br>/ vDet(p)p  | RF AGC:except 0<br>PIF Freq. :<br>38.9MHz<br>PIF det lev:01(b)<br>L-SECAM MODE<br>:0/1<br>Others : Preset | <ol style="list-style-type: none"> <li>Input a signal that 38.9[MHz], 90[dB(μV)], and 87.5 [%] negative modulated by 100% white video signal at pin 79.</li> <li>Set the bit of "L-SECAM MODE" to "00".</li> <li>Measure the amplitude of the pin 68 output signal (vDet(p)n[V(p-p)]).</li> <li>Input a signal that 38.9[MHz], 90[dB(μV)], and 97 [%] positive modulated by 100% white video signal at pin 6.</li> <li>Set the bit of "L-SECAM MODE" to "01".</li> <li>Measure the amplitude of the pin 68 output signal (vDet(p)p[V(p-p)]).</li> </ol>   |
| P2   | PIF Input Sensitivity<br>/ vin min(p)<br>PIF maximum input signal<br>/ vin max(p)<br>PIF gain control range<br>/ RAGC(p) | RF AGC:except 0<br>PIF<br>Freq.:38.9MHz<br>Others : Preset  | <ol style="list-style-type: none"> <li>Input a signal that 38.9[MHz], 90[dB(μV)], and 30 [%] modulated by 15 [kHz] sine wave at pin 79..</li> <li>Measure the amplitude at Pin 68(vo#68 [V(p-p)]).</li> <li>Decreasing the IF input level, measure the input level at which the output amplitude at pin 68 turns to be -3dB against "vo#68" (vin min(p)[dB(μV)]).</li> <li>Increasing the IF input level, measure the input level at which the output amplitude at pin 54 turns to be -1dB against "vo#68" (vin min(p)[dB(μV)]).</li> <li><math>RAGC(p)[dB] = vin\ max(p) - vin\ min(p)</math></li> </ol> |
| P3   | Synchronous signal level<br>/ Vsync n<br>/ Vsync p   | RF AGC:except 0<br>PIF Freq. :<br>38.9MHz<br>L-SECAM<br>MODE<br>:0/1<br>Others : Preset                   | <ol style="list-style-type: none"> <li>Input a signal that 38.9[MHz], 90[dB(μV)], 87.5[%] negative modulated by 100% white signal at pin 79.</li> <li>Set the bit of "L-SECAM MODE" to "00".</li> <li>Measure the voltage of the sync. tip at pin 68 (Vsync n[V]).</li> <li>Input a signal that 38.9[MHz], 90[dB(μV)], and 97 [%] positive modulated by 100% white video signal at pin 79.</li> <li>Set the bit of "L-SECAM MODE" to "01".</li> <li>Measure the voltage of the sync. tip at pin 68 (Vsync p[V]).</li> </ol>   |
| P4   | Differential Gain<br>/ DG  | RF AGC:except 0<br>PIF Freq.:<br>38.9MHz<br>Vi Pol:0/1<br>Others : Preset                                 | <ol style="list-style-type: none"> <li>Input a signal that 38.9[MHz], 90[dB(μV)], and 87.5 [%] modulated by 10 stair video signal at pin 79.</li> <li>Measure "DG[%]" and "DP[°]" for Pin54 output.</li> </ol>  |
|      | Differential Phase<br>/ DP   |   |   |
| P5   | Video bandwidth (-3dB)<br>/ fDet(p)  | RF AGC:except 0<br>PIF Freq.:<br>38.9MHz<br>L-SECAM<br>MODE<br>:0/1<br>Others : Preset                    | <ol style="list-style-type: none"> <li>Input the mixture of 2 signals (signal1 : 38.9[MHz] / 82[dB(μV)], signal 2 : 38.8[MHz] / 69[dB(μV)]) to pin 79.</li> <li>Measure the minimum voltage of the output signal at pin 68 (Vo#68).</li> <li>Apply the DC voltage to pin 1 and adjust it so that the minimum voltage of the output signal at pin 68 is equal to Vo#68.</li> <li>Decrease frequency of the input signal 2 at pin 79, and measure amplitude of the output signal at pin 68.</li> <li>Measure fDet(p) shown as below.</li> </ol>   |



| Note | Items/Symbols   | Bus conditions   | Measurement methods   |
|------|---|--|---|
| P6   | Video output S/N<br>/ S/N(p)  | RF AGC:except 0<br>PIF Freq. :<br>38.9MHz<br>Others : Preset                   | (1) Input a signal that 38.9[MHz], 90[dB(μV)], and 87.5 [%] modulated by black video signal at pin 6.<br>(2) Measure the video S/N for pin 68 output (HPF : 100[kHz], LPF : 5[MHz], CCIR weighted) (S/N(p)[dB]).  |
| P7   | Intermodulation<br>/ IM   | RF AGC:except 0<br>PIF Freq. :<br>38.9MHz<br>Others : Preset                   | (1) Input a signal composed of following 3 signals at pin 79;<br>38.90[MHz]/90[dB(μV)],<br>34.47[MHz]/80dB(μV)<br>33.40[MHz]/80[dB(μV)]<br>(2) Adjust pin 1 voltage so that the bottom of pin 68 output is equal to sync. tip level.<br>(3) Measure the 1.07[MHz] level against the 4.43[MHz] level(=0[dB]) (IM[dB]).   |
| P8   | PIF input resistance<br>/ Zin R(p)<br>PIF input<br>capacitance<br>/ Zin C(p)                            | Preset   | (1) Remove all connection from pin 79 and pin 80.<br>(2) Measure the resistance (Zin R(p)[kΩ]) and capacitance (Zin C(p)[pF]) of pin 79 and pin 80 by the impedance meter.  |
| P9   | RF AGC output<br>voltage<br>/ VAGC max<br>/ VAGC min  | RF AGC:Adjust<br>PIF Freq. :<br>38.9MHz<br>Others : Preset                     | (1) Input a 38.9[MHz], 90[dB(μV)] signal at pin 79.<br>(2) Adjust RF AGC so that the pin 78 voltage is 4.5V.<br>(3) Increase the IF input level to 107dB(uV).<br>(4) Measure the pin 78 voltage (VAGC min[V]).<br>(5) Connect pin 79 and pin 80 to GND.<br>(6) Measure the pin 78 voltage (VAGC max[V]).  |
| P10  | RF delay point<br>/ v Dly min<br>/ v Dly max  | RF AGC :<br>Adjust<br>PIF Freq.<br>38.9MHz<br>RF AGC: 01/3F<br>Others : Preset | (1) Input a 38.9[MHz], 90[dB(μV)] signal at pin 79.<br>(2) Set the data of "RF AGC" to 01(h).<br>(3) Decrease the IF input level, measure the input level at which the voltage at pin 78 turn to be 4.5[V] (v Dly min[dB(μV)]).<br>(4) Set the data of "RF AGC" to 3F(h).<br>(5) Increase the IF input level, measure the input level at which the voltage at pin 78 turn to be 4.5[V] (v Dly max[dB(μV)]).   |
| P11  | Capture range of the<br>PLL<br>/ fpH(p)<br>/ fpL(p)<br>Hold range of the<br>PLL<br>/ fhH(p)<br>/ fhL(p) | RF AGC : except<br>0<br>PIF Freq. :<br>38.9MHz<br>Others : Preset              | (1) Set the bit of "PIF Freq." to "(0,1,1), 38.9MHz".<br>(2) Input a signal that f0=38.9[MHz], 60[dB(□V)] at pin 79.<br>(3) As read the bit of "IF lock", sweep up/down the input signal frequency.<br>(4) Measure fsuL, fsuH, fsdH, fsdL shown as below.<br>fpH(p) = fsdH - f0<br>fpL(p) = fsuL - f0<br>fhH(p) = fsuH - f0<br>fhL(p) = fsdL - f0<br><br>[Read BUS DATA] The bit of "IF lock"<br>                               |
| P12  | Control steepness of<br>the VCO<br>/ β  | PIF Freq. :<br>38.9MHz<br>Others : Preset                                      | (1) Set the bit of "VCO Adj. Req." to "1", and set the bit of "VCO Adj. Req." to "0".<br>(2) Set the FET probe which connected to the spectrum analyzer near by pin 50 or pin 51 (Don't touch the probe directly to pin 50 or to pin 51).<br>(3) Apply 2.3[V] to pin 47, and measure frequency of the VCO oscillation by the spectrum analyzer (fLVCO[MHz]).<br>(4) Apply 2.7[V] to pin 47, and measure frequency of the VCO oscillation by the spectrum analyzer (fHVCO[MHz]).<br>(5) β[MHz/V] = (fHVCO-fLVCO)/0.4 |

| Note | Items/Symbols   | Bus conditions                         | Measurement methods   |
|------|---|--|---|
| P13  | AFT Center turn Frequency / fAFTC                                 | PIF Freq. : 38.9MHz<br>Others : Preset | <p>(1) Input a signal that <math>f_0=38.9[\text{MHz}]</math>, <math>60[\text{dB}(\square\text{V})]</math> at pin 79.</p> <p>(2) As read the bit of "AFT center", sweep up the input signal frequency.</p> <p>(3) Measure the lowest frequency that the bit of "AFT center" is "0", shown as below. That is fAFTC</p> <p>[Read BUS DATA] The bit of "AFT center"</p> <p style="text-align: center;">fAFTcxxx f0</p>  |
| P14  | AFT window narrow / fAFTW(n)L / fAFTW(n)H / fAFTW(w)L / fAFTW(w)H | PIF Freq. : 38.9MHz<br>Others : Preset | <p>(1) Input a signal that <math>f_0=38.9[\text{MHz}]</math>, <math>60[\text{dB}(\square\text{V})]</math> at pin 41.</p> <p>(2) Set the bit of "AFT window" to "(0), narrow".</p> <p>(3) As read the bit of "AFT window", sweep up the input signal frequency.</p> <p>(4) Measure the highest frequency but lower than <math>f_0</math> (38.9MHz) that the bit of "AFT window" is "0", shown as below. That is fAFTw(n)L.</p> <p>(5) Measure the lowest frequency but higher than <math>f_0</math> (38.9MHz) that the bit of "AFT window" is "0", shown as below. That is fAFTw(n)H.</p> <p>(6) Set the bit of "AFT window" to "(1), wide".</p> <p>(7) Measure as (3) ~ (5), that is fAFTw(w)L, fAFTw(w)H.</p> <p>[Read BUS DATA] The bit of "AFT window"</p> <p style="text-align: center;">fAFTwL f0 fAFTwH</p> |
| P15  | S-trap reduction  |  | <p>(1) Input a signal composed of following 3 signals at pin 79;<br/>38.90[MHz]/90[dB(<math>\mu\text{V}</math>)],<br/>33.40[MHz]/80[dB(<math>\mu\text{V}</math>)]</p> <p>(2) Set the "Strap" of IICBUS to "0(h) off"</p> <p>(3) measure the output level of 5.5MHz component for pin #68 by spectrum analyzer. -&gt; V68 (strap off)</p> <p>(4) Set the "Strap" of IICBUS to "4(h)"</p> <p>(5) measure the output level of 5.5MHz component for pin #68 by spectrum analyzer -&gt; V68 (strap on)</p> <p>(6) Calc the result of reduction<br/>Strap = V68 (strap off) - V68 (strap on)</p>  |

## SIF STAGE

| Note | Items/Symbols  | Bus conditions  | Measurement methods   |
|------|--|---|---|
| S1   | SIF maximum input signal / vin max(s)1   | RF AGC :<br>except 0<br>PIF Freq. :<br>38.9MHz<br>Others : Preset   | (1) Input a 38.9[MHz], 90[dB(μV)] signal at pin 79.<br>(2) Input a 33.4[MHz], 90[dB(μV)] signal at pin 75.<br>(3) Measure the amplitude at pin 71 (vSIF1[dB(μV)]).<br>(4) Decreasing the 33.4[MHz] signal level, measure the 33.4[MHz] signal level at which the amplitude at pin 3 turns to be -3[dB] against "vSIF1" (vin min(s)1[dB(μV)]).<br>(5) Increasing the 33.4[MHz] signal level, measure the 33.4[MHz] signal level at which the amplitude at pin 3 turns to be +3[dB] against "vSIF1" (vin max(s)1[dB(μV)]).<br>(6) R AGC[dB] = vin max1(s) - vin min1(s) |
|      | SIF minimum input signal / vin min(s)1   |   |   |
|      | SIF gain control range / R AGC(s)1   |   |   |
|      | 2nd SIF output level / vSIF1   |   |   |
| S2   | SIF input resistance / Zin R(s)  | Preset  | (1) Remove all connection from pin 75 and 76..<br>(2) Measure the resistance (Zin R(s)[kΩ]) and capacitance (Zin C(s)[pF]) of pin 75 and 76 by the impedance meter.   |
|      | SIF input capacitance / Zin C(s)   |   |   |
| S3   | AM demodulation sensitivity / vin minAM<br>AM demodulation maximum input level / vin maxAM                     | RF AGC:<br>except0<br>PIF Freq. :<br>38.9MHz<br>SIF Freq. :<br>6.5MHz<br>L-SECAM<br>MODE : 1<br>Others : Preset | (1) Input a 38.9[MHz], 90[dB(μV)] signal at pin 79.<br>(2) Input a signal that 32.4[MHz], 80[dB(μV)] and 54[%] modulated by 400[Hz] sine wave at pin 75.<br>(3) Measure the amplitude at pin 71 (v#71[mVrms]).<br>(4) Decrease the 32.4[MHz] signal level, measure the 32.4[MHz] signal level at which the amplitude at pin 71 turns to be -3[dB] against "v#71" (vin minAM[dB(μV)]).<br>(5) Increase the 32.4[MHz] signal level, measure the 32.4[MHz] signal level at which the amplitude at pin 71 turns to be -3[dB] against "v#71" (vin maxAM[dB(μV)]).          |
| S4   | AF output signal amplitude / vDet(s)AM<br>AF output S/N / S/N(s)AM<br>Total harmonics distortion / THDAM       | SIF-Freq. : 6.5M<br>L SECAM<br>mode : L<br>SECAM<br>Others : Preset   | (1) Input a 38.9[MHz], 90[dB(μV)] signal at pin 79.<br>(2) Input a signal that 32.4[MHz], 80[dB(μV)] and 54[%] modulated by 400[Hz] sine wave at pin 75<br>(3) Measure the amplitude at pin 65 (vDet(s)AM[mVrms]).<br>(4) Measure the total harmonics distortion at pin 65 (THDAM[%]).<br>(5) Input a signal that 32.4[MHz], 80[dB(μV)] at pin 75<br>(6) Measure the amplitude at pin 65 (vn(s)[mVrms]).<br>(7) S/N AM[dB] = 20log(vDet(s)/vn(s))   |
| S5   | AF output signal amplitude / vDet(s)5.5M<br>AF output S/N / S/N(s)5.5M<br>Total harmonics distortion / THD5.5M | SIF-Freq. : 5.5M<br>Others : Preset   | (1) Input a signal that 5.5[MHz], 100[dB(μV)], 50[kHz] deviated by 400[Hz] sine wave at pin 73.<br>(8) Measure the amplitude at pin 65 (vDet(s)5.5MH[mVrms]).<br>(9) Measure the total harmonics distortion at pin 65 (THD5.5MH[%]).<br>(2) Input a 5.5[MHz], 100[dB(μV)] signal at pin 73.<br>(3) Measure the amplitude at pin 65 (vn(s)[mVrms]).<br>(4) (6)S/N4.5MH[dB] = 20log(vDet(s)/vn(s))  |
| S6   | AF output signal amplitude / vDet(s)6.0M<br>AF output S/N / S/N(s)6.0M<br>Total harmonics distortion / THD6.0M | SIF-Freq. : 6.0M<br>AUDIO ATT :<br>127<br>Others : Preset   | (1) Input a signal that 6.0[MHz], 100[dB(μV)], 50[kHz] deviated by 400[Hz] sine wave at pin 73.<br>(2) Do same measuring as vDet(s)5.5M et al. (vDet(s)6.0M, S/N(s)6.5M, THD6.0M).  |

| Note | Items/Symbols  | Bus conditions   | Measurement methods   |
|------|--|--|---|
| S7   | AF output signal amplitude<br>/ vDet(s)6.5M<br>AF output S/N<br>/ S/N(s)6.5M<br>Total harmonics distortion<br>/ THD6.5M    | SIF-Freq. : 6.5M<br>AUDIO ATT : 127<br>Others : Preset                                 | (1) Input a signal that 6.5[MHz], 100[dB(μV)], 50[kHz] deviated by 400[Hz] sine wave at pin 73.<br>(2) Do same measuring as vDet(s)5.5M et al. (vDet(s)6.5M, S/N(s)6.5M, THD6.5M).  |
| S8   | AF output signal amplitude<br>/ vDet(s)4.5ML<br>AF output S/N<br>/ S/N(s)4.5ML<br>Total harmonics distortion<br>/ THD4.5ML | SIF-Freq. : 4.5M<br>Au Gain : 1<br>AUDIO ATT : 127<br>Others : Preset                  | (1) Input a signal that 4.5[MHz], 100[dB(μV)], 25[kHz] deviated by 400[kHz] sine wave at pin 73.<br>(2) Do same measuring as vDet(s)5.5MH et al. (vDet(s)4.5ML, S/N(s)4.5ML, THD4.5ML).   |
| S9   | AF output signal amplitude<br>/ vDet(s)4.5MH<br>AF output S/N<br>/ S/N(s)4.5MH<br>Total harmonics distortion<br>/ THD4.5MH | SIF-Freq. : 4.5M<br>Au Gain : 0<br>AUDIO ATT : 127<br>Others : Preset                  | (1) Input a signal that 4.5[MHz], 100[dB(μV)], 25[kHz] deviated by 400[Hz] sine wave at pin 73.<br>(2) Do same measuring as vDet(s)5.5M et al. (vDet(s)4.5MGH, S/N(s)4.5ML, THD4.5MH).  |
| S10  | Limiting sensitivity<br>/ vin lim(s)4.5MH<br>/ vin lim(s)4.5ML<br>/ vin lim(s)5.5M<br>/ vin lim(s)6.0M<br>/ vin lim(s)6.5M | SIF-Freq. : 4.5M/5.5M/6.0M/6.5M<br>AUDIO ATT : 127<br>Au Gain : 0/1<br>Others : Preset | (1) Set the bits of "SIF-Freq." to "11", "Au Gain" to "0".<br>(2) Input a signal that 4.5[MHz], 100[dB(μV)], 25[kHz] deviated by 400[Hz] sine wave at pin 73.<br>(3) Measure the amplitude at pin 65 (vo#65[mVrms]).<br>(4) Decreasing the 4.5[MHz] signal level, measure the 4.5[MHz] signal level at which the amplitude at pin 65 turns to be -3[dB] against "vo#4" (vin lim(s)4.5MH[dB(μV)]).<br>(5) Input a signal that 4.5[MHz], 100[dB(μV)], 25[kHz] deviated by 400[Hz] sine wave at pin 73.<br>(6) Set the bits of "Au Gain" to "1".<br>(7) Do same measuring as above (3)~(4) (vin lim(s)4.5ML).<br>(8) Set the bits of "SIF-Freq." to "00".<br>(9) Change the frequency of the input signal to 5.5MHz, and change the deviation of the input signal to 50[kHz].<br>(10) Do same measuring as above (3)~(4) (vin lim(s)5.5M).<br>(11) Set the bits of "SIF-Freq." to "01".<br>(12) Change the frequency of the input signal to 6.0MHz, and do same measuring as above (3)~(4) (vin lim(s)6.0M).<br>(13) Set the bits of "SIF-Freq." to "10".<br>(14) Change the frequency of the input signal to 6.5MHz, and do same measuring as above (3)~(4) (vin lim(s)6.5M). |

| Note | Items/Symbols   | Bus conditions   | Measurement methods   |
|------|---|--|---|
| S11  | AM reduction ratio<br>/ AMR4.5MH<br>/ AMR4.5ML<br>/ AMR5.5M<br>/ AMR6.0M<br>/ AMR6.5M | SIF-Freq. :<br>4.5M/5.5M/6.0M/<br>6.5M<br>AUDIO ATT :<br>127<br>Au Gain : 0/1<br>Others : Preset | <ol style="list-style-type: none"> <li>(1) Set the bits of "SIF-Freq." to "11", "Au Gain" to "0".</li> <li>(2) Input a signal that 4.5[MHz], 100[dB(μV)], 25[kHz] deviated by 400[Hz] sine wave at pin 73.</li> <li>(3) Measure the amplitude at pin 65 (vo#65[mVrms]).</li> <li>(4) Input a signal that 4.5[MHz], 100[dB(μV)], and 30 [%] modulated by 400 [Hz] sine wave at pin 73.</li> <li>(5) Measure the amplitude at pin 65 (v#65[mVrms]).</li> <li>(6) <math>AMR4.5H[dB] = 20\log(v\#65/ vo\#65)</math></li> <li>(7) Input a signal that 4.5[MHz], 100[dB(μV)], 25[kHz] deviated by 400[Hz] sine wave at pin 73.</li> <li>(8) Set the bits of "Au Gain" to "1".</li> <li>(9) Do same measuring as above (3)~(6) (AMR4.5ML).</li> <li>(10) Set the bits of "SIF-Freq." to "00".</li> <li>(11) Change the frequency of the input signals to 5.5MHz, and change the deviation of the input signal to 50[kHz].</li> <li>(12) Do same measuring as above (3)~(6) (AMR5.5M).</li> <li>(13) Set the bits of "SIF-Freq." to "01".</li> <li>(14) Change the frequency of the input signals to 6.0MHz, and do same measuring as above (3)~(6) (AMR6.0M).</li> <li>(15) Set the bits of "SIF-Freq." to "10".</li> <li>(16) Change the frequency of the input signals to 6.5MHz, and do same measuring as above (3)~(6) (AMR6.5M).</li> </ol> |
| S12  | Demodulation band width of the FM demodulator<br>/ fpH(s)1<br>/ fpL(s)1               | SIF-Freq. : 4.5M<br>AUDIO ATT :<br>127<br>Others : Preset  | <ol style="list-style-type: none"> <li>(1) Input a signal that 4.5[MHz], 100[dB(□V)], 25[kHz] deviated by 400[Hz] sine wave at pin 73.</li> <li>(2) Measure the amplitude at pin 65(vo#65 [V(p-p)]).</li> <li>(3) Increase the input signal frequency, measure the input signal frequency at which the output amplitude at pin 65 turn to be -3[dB] against "vo#65" (fpH(s)1[MHz])</li> <li>(4) Decrease the input signal frequency, measure the input signal frequency at which the output amplitude at pin 65 turn to be -3[dB] against "vo#65" (fpL(s)1[MHz])</li> </ol>   |

**VIDEO stage** (RGB Mute:0 / R cut off:128 / DC rest.:2(100%) / WPS:1(OFF))

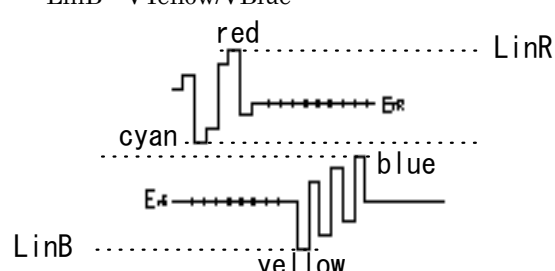
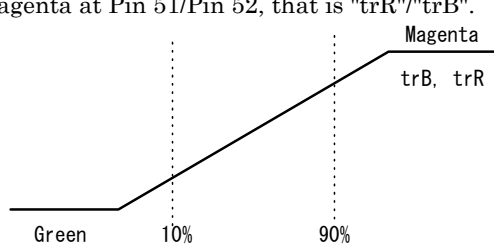
| Note | Items/Symbols   | Bus conditions  | Measurement methods   |
|------|---|---|---|
| V1   | Y Input Dynamic Range<br>/ DR <sub>Y</sub>  | Y/Monout=0<br>ctrp = off<br>Ydl=011(b)<br>Others: Preset      | (1) Input a white signal with sync into Pin61.<br>(2) Increasing the Pin61 input amplitude, measure the amplitude at which the Pin53 output is clipped, that is "DR <sub>Y</sub> ".   |
| V2   | Y Delay Time<br>/ t <sub>YDEL</sub> P<br>/ t <sub>YDELS</sub><br>/ Δ t <sub>YDEL-120</sub><br>/ Δ t <sub>YDEL+160</sub><br>/ Δ t <sub>YDEL</sub> step   | Y/Monout=0<br>ctrp = off<br>Ydl=parametric<br>Others: Preset  | (1) Input a 2T pulse with sync and PAL burst into Pin61.<br>(2) Set the BUS data so that Y DL is 0ns(011).Observe the Pin53 output, measure the delay time between Pin61 and Pin53, that is "t <sub>YDEL</sub> P".<br>(3) Set the BUS data so that Y DL is -120ns(000). Observe the Pin53 output, measure the delay time between Pin61 and Pin53 that is t <sub>YDEL-120</sub> .<br>(4) Set the BUS data so that Y DL is +160ns(111). Observe the Pin53 output, measure the delay time between Pin61 and Pin53 that is t <sub>YDEL+160</sub> .<br>(5) Calculate, "Δ t <sub>YDEL-120</sub> "= t <sub>YDEL-120</sub> - "t <sub>YDEL</sub> "<br>1. "Δ t <sub>YDEL+160</sub> "= t <sub>YDEL+160</sub> - "t <sub>YDEL</sub> "<br>2. "Δ t <sub>YDEL</sub> "= ("Δ t <sub>YDEL+160</sub> " - "Δ t <sub>YDEL-120</sub> ")/7<br>(6) Input a 2T pulse with sync and SECAM ID into Pin61.<br>(7) Set the BUS data so that Y DL is 0ns(011).Observe the Pin53 output, measure the delay time between Pin61 and Pin53, that is "t <sub>YDELS</sub> ". |
| V3   | Chroma Trap Gain<br>/ G <sub>TRAP</sub>   | Y/Monout=0<br>ctrp=parametric<br>Ydl=011(b)<br>Others: Preset | (1) Input a 0.5V(p-p), 4.43MHz signal with sync into Pin61.<br>(2) Measure the 4.43MHz amplitude at Pin53 for Chroma Trap:1/0, that is V <sub>TRAPON</sub> / V <sub>TRAPOFF</sub> .<br>(3) Calculate:"G <sub>TRAP443</sub> "=20*log(V <sub>TRAPON</sub> /V <sub>TRAPOFF</sub> )<br>(4) Input a 0.5V(p-p), 3.58MHz signal with sync into Pin61.<br>(5) Measure the 3.58MHz amplitude at Pin53 for Chroma Trap:1/0, that is V <sub>TRAPON</sub> / V <sub>TRAPOFF</sub> .<br>(6) Calculate:"G <sub>TRAP358</sub> "=20*log(V <sub>TRAPON</sub> /V <sub>TRAPOFF</sub> )  |
| V4   | Y gain  |   | (1) Input 1Vp-p white signal with sync into pin #61<br>(2) Measure the gain between pin#61 and pin #53 for its picture (without sync) level. Gy1  |
| V5   | Y Frequency Response<br>/ FR <sub>Y</sub>   | Y/Monout=0<br>ctrp = off<br>Ydl=011(b)<br>Others: Preset      | (1) Input a 0.5V(p-p) sweep signal with sync into Pin61.<br>(2) Measure the frequency at which the output amplitude is 3dB down against the level of 100Hz, which is "FR <sub>Y</sub> ".  |
| V6   | Mon out gain (MON)<br>(Y1/CVBS1) G <sub>TV1</sub><br>(Y2/CVBS2) G <sub>TV2</sub><br>(Y3/CVBS3) G <sub>TV3</sub>   | Y/Monout=1<br>videosw=parametric<br>Others: Preset            | (1) Input 1Vp-p white signal with sync into pin #61, #55, and #44<br>(2) Measure the gain from pin#61, #55 and #44 to pin #53 in switching the ICBUS of 'video sw'.   |
| V7   | Y frequency response<br>FR <sub>Y</sub>   | Y/Mon out = 1<br>video sw = 00<br>Others: Preset              | (1) Input a 0.5V(p-p) sweep signal with sync into Pin61.<br>(2) Measure the frequency at which the output amplitude is 3dB down against the level of 100Hz, which is "FR <sub>Y</sub> ".  |
|      | V switch cross-talk<br>(CVBS1-CVBS2)<br>CT <sub>CVBS1_2</sub><br>(CVBS1-CVBS3)<br>CT <sub>CVBS1_3</sub><br>(CVBS2-CVBS1)<br>CT <sub>CVBS2_1</sub><br>(CVBS2-CVBS3)<br>CT <sub>CVBS2_3</sub><br>(CVBS3-CVBS1)<br>CT <sub>CVBS3_1</sub><br>(CVBS3-CVBS2)<br>CT <sub>CVBS3_2</sub> | Y/Monout=1<br>videosw=parametric<br>Others: Preset            | (1) Input a sine wave signal (CVBS, V0=0.5Vp-p, f0=4MHz) into pin 61, connect pin 55 and 44 to GND through 0.1μF capacitor.<br>(2) Set the bit of "Video SW" to "01, V2", and measure the amplitude of 4MHz signal at pin 53, that is V1-2.<br>(3) Set the bit of "Video SW" to "00, V1" and measure the amplitude of 4MHz signal at pin 53, that is V1.<br>(4) "C CVBS1_2" = 20*log (V1-2 / V1)<br><br>(5) Measure the same way as (1)-(4) for others with the combination of desired and undesired inputs,  |



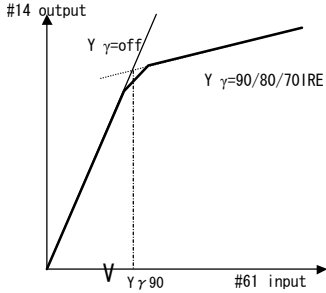
## CHROMA STAGE (RGB Mute:0 / RGB cut off:128 / DC rest.:2(100%))

| Note | Items/Symbols  | Bus conditions   | Measurement methods  |
|------|--|--|--|
| C1   | ACC Characteristics<br>/ $V_{ACCH}$<br>/ $V_{ACCL}$  | RGB Mute:0<br>Y Mute:1<br>Uni-Color:127<br>Others: Preset  | (1) Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61.<br>(2) Changing the amplitude of burst and chroma, measure the input amplitude at which Pin51 output amplitude is +1dB/-1dB against the one for 300mVp-p input, that is " $V_{ACCH}$ "/" $V_{ACCL}$ ".   |
| C2   | TOF Characteristics<br>(4.43MHz)<br>/ $F_{0T443}$ / $Q_{T443}$<br>BPF Characteristics<br>(4.43MHz)<br>/ $F_{0B443}$ / $Q_{B443}$<br>TOF Characteristics<br>(3.58MHz)<br>/ $F_{0T358}$ / $Q_{T358}$<br>BPF Characteristics<br>(3.58MHz)<br>/ $F_{0B358}$ / $Q_{B358}$   | Measure on test mode<br>s:21,d:00010000<br>s:1A,d:xx00xxxx<br><br>BPF/TOF :0/1<br>Color System:<br>2/4<br>F-ID =1<br>C-in sw= 1 (c in)<br>Others: Preset | (1) Set "BPF/TOF" to 1, "Color System" to 4(443PAL).<br>(2) Input a sweep signal into Pin #61 and #58.<br>(3) Observe the frequency response at Pin34 and measure the Peaking Frequency / Q of chroma filter, that is " $F_{0T443}$ " / " $Q_{T443}$ ".<br>(4) Set BPF/TOF to 0 and Color System to 4(443PAL) and repeat (2)&(3), that is " $F_{0B443}$ " / " $Q_{B443}$ ".<br>(5) Set BPF/TOF to 1 and Color System to 2(358NTSC) and repeat (2)&(3), that is " $F_{0T358}$ " / " $Q_{T358}$ ".<br>(6) Set BPF/TOF to 0 and Color System to 2(358NTSC) and repeat (2)&(3), that is " $F_{0B358}$ " / " $Q_{B358}$ ".  |
| C3   | C Delay Time<br>/ $t_{CDEL}$<br>Delay Time Difference<br>between Y/C<br>/ $\Delta t_{Y/C}$   | Others: Preset   | (1) Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61.<br>(2) Observe the Pin51 output, measure the delay time between Pin61 and Pin51 that is " $t_{CDEL}$ ".<br>(3) Calculate;" $\Delta t_{Y/C}$ "= $t_{YDEL}$ - $t_{CDEL}$   |
| C4   | APC Pull-in Range<br>(4.43MHz)<br>/ $\Delta F_{4APCP+}$<br>/ $\Delta F_{4APCP-}$<br>APC Hold Range<br>(4.43MHz)<br>/ $\Delta F_{4APCH+}$<br>/ $\Delta F_{4APCH-}$<br>APC Pull-in Range<br>(3.58MHz)<br>/ $\Delta F_{3APCP+}$<br>/ $\Delta F_{3APCP-}$<br>APC Hold Range<br>(3.58MHz)<br>/ $\Delta F_{3APCH+}$<br>/ $\Delta F_{3APCH-}$ | Color System:<br>4/2<br>Others: Preset   | (1) Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61.<br>(2) Set Color System to 4(443PAL).<br>(3) For higher frequency than 4.43MHz, measure the burst frequency at which PLL pulls-in / locks out that is $F_{4APCP+}$ / $F_{4APCH+}$ .<br>(4) For lower frequency than 4.43MHz, repeat (2), that is $F_{4APCP-}$ / $F_{4APCH-}$ .<br>(5) Calculate:<br>" $\Delta F_{4APCP+}$ "= $F_{4APCP+}$ - 4433619<br>" $\Delta F_{4APCP-}$ "= $F_{4APCP-}$ - 4433619<br>" $\Delta F_{4APCH+}$ "= $F_{4APCH+}$ -4433619<br>" $\Delta F_{4APCH-}$ "= $F_{4APCH-}$ - 4433619<br>(6) Input a 3.58MHz NTSC rainbow color-bar (286mV(p-p), burst:chroma=1:1) with sync into Pin61 and 58.<br>(7) Set Color System to 2(358NTSC).<br>(8) For higher frequency than 3.58MHz, repeat (2), that is $F_{3APCP+}$ / $F_{3APCH+}$ .<br>(9) For lower frequency than 3.58MHz, repeat (2), that is $F_{3APCP-}$ / $F_{3APCH-}$ .<br>(10) Calculate:<br>" $\Delta F_{3APCP+}$ "= $F_{3APCP+}$ -3579545<br>" $\Delta F_{3APCP-}$ "= $3579545$ - $F_{3APCP-}$<br>" $\Delta F_{3APCH+}$ "= $F_{3APCH+}$ -3579545<br>" $\Delta F_{3APCH-}$ "= $3579545$ - $F_{3APCH-}$ |

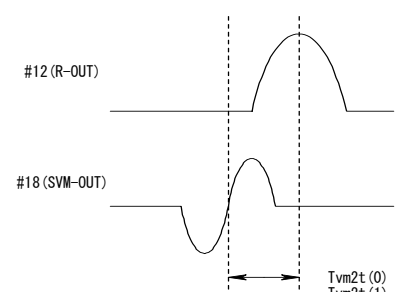
| Note | Items/Symbols  | Bus conditions  | Measurement methods   |
|------|--|---|---|
| C5   | APC Control Sensitivity (4.43MHz)<br>/ $\beta_{443}$<br>APC Control Sensitivity (3.58MHz)<br>/ $\beta_{358}$   | Color System: 4/2<br>Others: Preset   | (1) Connect Pin61 to GND via a 1uF capacitor.<br>(2) Set Color System to 4(443PAL).<br>(3) Adjust Pin7 voltage so that the Pin34 output frequency is 4.433619MHz that is $V_{4APCCEN}$ .<br>(4) Measure the Pin34 output frequency when Pin7 voltage is $V_{4APCCEN}+200mV / V_{4APCCENT}$ , that is $F_{4APC+} / F_{4APC-}$ .<br>(5) Calculate: " $\beta_{443}$ "= $(F_{4APC+}-F_{4APC-})/200$<br>(6) Set Color System to 2 (358NTSC).<br>(7) Adjust Pin7 voltage so that the Pin34 output frequency is 3.579545MHz that is $V_{3APCCEN}$ .<br>(8) Measure the Pin34 output frequency when Pin7 voltage is $V_{3APCCEN}+200mV / V_{3APCCEN}$ , that is $F_{3APC+} / F_{3APC-}$ .<br>(9) Calculate:<br>" $\beta_{358}$ "= $(F_{3APC+}-F_{3APC-})/200$ |
| C6   | PAL ID Sensitivity (Normal Mode)<br>/ $V_{PALIDON}$<br>/ $V_{PALIDOFF}$<br>PAL ID Sensitivity (Low Mode)<br>/ $V_{PALIDLON}$<br>/ $V_{PALIDLOFF}$<br>NTSC ID Sensitivity (Normal Mode)<br>/ $V_{NTIDON}$<br>/ $V_{NTIDOFF}$<br>NTSC ID Sensitivity (Low Mode)<br>/ $V_{NTIDLON}$<br>/ $V_{NTIDLOFF}$ | P/N ID Sens:0/1<br>Color System: 4/2<br>Y Mute:01<br>Uni-Color:127<br>RGB Mute:0<br>BPF/TOF:0 BPF<br>Others: Preset           | (1) Set P/N ID Sens. to 0.<br>(2) Set Color System to 4(443PAL).<br>(3) Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into pin#61 and 58.<br>(4) Measure the burst amplitude at which Pin13 DC level changes from high to low / from low to high, that is " $V_{PALIDON}$ " / " $V_{PALIDOFF}$ ".<br>(5) Set Color System to 2(358NTSC).<br>(6) Input a 3.58MHz NTSC rainbow color-bar (286mV(p-p), burst:chroma=1:1) with sync into pin#61 and 58, and repeat (3), that is " $V_{NTIDON}$ " / " $V_{NTIDOFF}$ ".<br>(7) Set P/N ID Sens.to 1, repeat (2) ~ (6) that are "VPALIDLON", "VPALIDLOFF", VNTIDLON and VNTIDLOFF.   |
| C7   | Black adjustment (internal)<br>/ $V_{BINTMAX}$<br>/ $V_{RINTMAX}$<br>/ $V_{RINTMIN}$<br>/ $V_{RINTMIN}$<br>Black adjustment sensitivity (Internal)<br>/ $\Delta V_{BINT}$<br>/ $\Delta V_{RINT}$   | B-Y black Adj.: 0/15<br>R-Y black Adj.: 0/15<br>Others: Preset  | (1) For B-Y/R-Y Black Adj.:8, measure the DC level of picture period at Pin51,52 that is $V_{SBCEN} / V_{SRCEN}$ .<br>(2) For B-Y Black Adj.:0 /15, measure the DC level change of picture period against $V_{SBCEN}$ at Pin52, that is " $V_{BINTMIN}$ " / " $V_{BINTMAX}$ ".<br>(3) For R-Y Black Adj.:0/15, measure the DC level change of picture period against $V_{SRCEN}$ at Pin51, that is " $V_{RINTMIN}$ " / " $V_{RINTMAX}$ ".<br>(4) Calculate:<br>" $\Delta V_{BINT}$ "= $(V_{SBMAX}-V_{SBMIN})/15$<br>" $\Delta V_{RINT}$ "= $(V_{SRMAX} - V_{SRMIN})/15$   |
|      | Black adjustment (External)<br>/ $V_{BINTMAX}$<br>/ $V_{RINTMAX}$<br>/ $V_{RINTMIN}$<br>/ $V_{RINTMIN}$<br>Black adjustment sensitivity External<br>/ $\Delta V_{BINT}$<br>/ $\Delta V_{RINT}$   | B-Y black Adj.: 0/15<br>R-Y black Adj.: 0/15<br>DemoP; 00<br>Cont; 7F<br>Color; 40<br>Ymute; 1<br>CbCrSW; 1<br>Others: Preset | (1) For B-Y/R-Y Black Adj.:8, measure the DC level of picture period at Pin12,14 that is $V_{SBCEN} / V_{SRCEN}$ .<br>(2) For B-Y Black Adj.:0 /15, measure the DC level change of picture period against $V_{SBCEN}$ at Pin14, that is " $V_{BEXTMIN}$ " / " $V_{BEXTMAX}$ ".<br>(3) For R-Y Black Adj.:0/15, measure the DC level change of picture period against $V_{SRCEN}$ at Pin12, that is " $V_{REXTMIN}$ " / " $V_{REXTMAX}$ ".<br>(4) Calculate:<br>" $\Delta V_{BINT}$ "= $(V_{BEXTMAX} - V_{BEXTMIN}) / 15$<br>" $\Delta V_{RINT}$ "= $(V_{REXTMAX} - V_{REXTMIN}) / 15$   |
| C8   | fsc Continuous Wave Output Level<br>/ $V_{CW}$   | Others: Preset  | (1) Input a 4.43MHz PAL rainbow color-bar (300mV(p-p), burst:chroma=1:1) with sync into Pin61.<br>(2) Measure the amplitude of Pin34 output that is " $V_{CW}$ ".   |
| C9   | SECAM CbCr output amplitude<br>/ VBS<br>/ VRS  | RGB Mute:0<br>Color System:5<br>Uni-Color:64<br>Y Mute:1<br>Others: preset  | (1)Input a 75% color bar(200mV(p-p) at R ID) into Pin61..<br>(2) Measure the R-Y output amplitude at Pin51, that is "VRS".<br>(3) Measure the B-Y output amplitude at Pin52, that is "VBS".   |

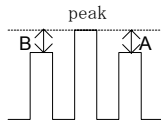
| Note | Items/Symbols   | Bus conditions   | Measurement methods   |
|------|---|--|---|
| C10  | SECAM CbCr out<br>Relative Amplitude<br>/ R/B-S   |  | (1) Calculate : "R/B-S"=VRS/VBS   |
| C11  | Color Difference S/N<br>Ratio<br>/ SNB-S<br>/ SBR-S   | RGB Mute:0<br>Color System:5<br>Uni-Color:64<br>Y Mute:1<br>Others: preset | (1) Input a 200mV(p-p) non-modulated chroma signal into Pin61.<br>(2) Measure the amplitude of noise on Pin51, that is nR.<br>(3) Measure the amplitude of noise on Pin52, that is nB.<br>(4) Calculate : "SNB-S" $=20\log(2\sqrt{2VBS/nB})$<br>"SNR-S" $=20\log(2\sqrt{2VRS/nR})$  |
| C12  | SECAM Linearity<br>/ LinB<br>/ LinR   | Color System:5<br>Others: preset   | (1) Input a 75% color bar(200mV(p-p) at R ID) into Pin61.<br>(2) Measure the amplitude between Black and Cyan/Red, that is VCyan/VRed for pin #51.<br>(3) Measure the amplitude between Black and Yellow/Blue, that is VYellow/VBlue for pin #52.<br>(4) Calculate :<br>"LinR" $=VCync/Vred$<br>"LinB" $=VYellow/VBlue$<br>   |
| C13  | Rising-Fall Time<br>/ trfB<br>/ trfR  | Color System:5<br>Others: preset   | (1) Input a 75% color bar(200mV(p-p) at R ID) into Pin61.<br>(2) Measure the rising time(from 10% to 90%) between Green and Magenta at Pin 51/Pin 52, that is "trR"/"trB".<br>  |
| C14  | SECAM ID<br>Sensitivity (Normal<br>Mode)<br>/ VSIDHON<br>/ VSIDHOFF<br>/ VSIDHVON<br>/ VSIDHVOFF<br>SECAM ID<br>Sensitivity (Low<br>Mode)<br>/ VSIDLHON<br>/ VSIDLHOFF<br>/ VSIDLHVON<br>/ VSIDLHVOFF | S ID Sens:0/1<br>S ID Mode:0/1<br>Color System:5<br>Others: Preset         | (1) Input a 75% color bar(200mV(p-p) at R ID) into Pin61..<br>(2) Set BUS data so that "S ID Sens" is Normal, "S ID Mode" is H.<br>(3) Measure the burst amplitude at which color killer turns on and off, that is "VSIDHON" / "VSIDHOFF".<br>(4) Set BUS data so that "S ID Mode" is H+V.<br>(5) Repeat (3), that is "VSIDHVON" / "VSIDHVOFF".<br>(6) Set BUS data so that "S ID Sens" is Low, "S ID Mode" is H.<br>(7) Repeat (3), that is "VSIDLHON" / "VSIDLHOFF".<br>(8) Set BUS data so that "S ID Mode" is H+V.<br>(9) Repeat (3), that is "VSIDLHVON" / "VSIDLHVOFF". |

### YUV STAGE (RGB Mute:0 / RGB cut off:128 / DC rest.:2(100%))

| Note | Items/Symbols   | Bus conditions   | Measurement methods  |
|------|---|--|--|
| Y1   | Brightness Control<br>/ V <sub>BRTMAX</sub><br>/ V <sub>BRTCEN</sub><br>/ V <sub>BRTMIN</sub><br><br>Brightness Control resolution<br>/ ΔV <sub>BRT</sub> | Brightness: 0/64/127<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>Others: Preset                           | (1) Input a 0(IRE) black signal with sync into Pin61.<br>(2) Measure the DC level of picture period at Pin14 for Brightness:127/64/0, that is "VBRTMAX" / "VBRTCEN" / "VBRTMIN".<br>(3) Calculate: "ΔV <sub>BRT</sub> "=(V <sub>BRTMAX</sub> -V <sub>BRTMIN</sub> )/127  |
| Y2   | Contrast Control for Y<br>/ G <sub>UCYMAX</sub><br>/ G <sub>UCYCEN</sub><br>/ G <sub>UCYMIN</sub>   | Uni-Color:0/64/127<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>WPS:1(OFF)<br>Others: Preset               | (1)Input a PAL color bar (75%) signal with sync into Pin61.<br>(2)Measure the output picture amplitude at Pin14 for contrast:127/64/0, that is V <sub>UCYMAX</sub> / V <sub>UCYCEN</sub> / V <sub>UCYMIN</sub> .<br>(3)Calculate: "G <sub>UCYMAX</sub> "=20*log(V <sub>UCYMAX</sub> /0.35)<br>"G <sub>UCYCEN</sub> "=20*log(V <sub>UCYCEN</sub> /0.35)<br>"G <sub>UCYMIN</sub> "=20*log(V <sub>UCYMIN</sub> /0.35)   |
| Y3   | Sharpness Control<br>/ G <sub>SHMAX</sub><br>/ G <sub>SHCEN</sub><br>/ G <sub>SHMIN</sub>   | Sharpness:0/32/63<br>Uni-Color:64<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>Others: Preset              | (1)Input a 0.5V(p-p) sweep signal with sync into Pin61.<br>(2)Measure the output picture amplitude for 100kHz at Pin14 that is V <sub>SH100k</sub> .<br>(3)Measure the output picture amplitude for FSHP when Sharpness is max.,center and min. that are V <sub>SHMAX</sub> , V <sub>SHCEN</sub> and V <sub>SHMIN</sub> .<br>(4)Calculate: "G <sub>SHMAX</sub> "=20*log(V <sub>SHMAX</sub> /V <sub>SH100k</sub> )<br>"G <sub>SHCEN</sub> "=20*log(V <sub>SHCEN</sub> /V <sub>SH100k</sub> )<br>"G <sub>SHMIN</sub> "=20*log(V <sub>SHMIN</sub> /V <sub>SH100k</sub> )                        |
| Y4   | Sharpness Peaking<br>Frequency<br>/ F <sub>SHP</sub>  | Sharpness:63<br>Uni-Color:63<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>Coring=0/1<br>Others: Preset     | (1) Input a 0.5V(p-p) sweep signal with sync into Pin61.<br>(2) Set the IICBUS switch of coring to 1<br>(3) Measure the frequency at which the Pin14 output amplitude is Max. that is "FSHP".<br>(4) Set the IICBUS switch of coring to 0<br>(5) Measure the frequency at which the Pin14 output amplitude is Max. that is "FSHPoff".<br>G <sub>COR</sub> =20*log( FSHPoff / FSHP )  |
| Y5   | Y γ correction start point<br>/ V <sub>Y γ 70</sub><br>/ V <sub>Y γ 80</sub><br>/ V <sub>Y γ 90</sub><br><br>Y γ correction curve<br>/ G <sub>Y γ</sub>   | Uni-Color:127<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>γ point:0/1/2/3<br>WPS:1(OFF)<br>Others: Preset | (1) Input a gray raster with sync to Pin61.<br>(2) Set BUS data so that γ point is 90IRE.<br>(3) Increasing a video amplitude of input from 50(IRE), measure a video amplitude as the figure below, that is "VY γ 90"<br>(4) Set BUS data so that γ point is 80IRE.And repeat (3), that is "VY γ 80".<br>(5) Set BUS data so that γ point is 70IRE.And repeat (3), that is "VY γ 70".<br>(6) From the measurement in the above, find gain of the portion that the γ correction has an effect on.<br><br> |

| Note | Items/Symbols   | Bus conditions   | Measurement methods   |
|------|---|--|---|
| Y6   | Black Expansion<br>Start Point<br>/ $V_{BLEX25}$<br>/ $V_{BLEX35}$<br>/ $V_{BLEX45}$<br><br>Black Expansion<br>AMP Gain<br>/ $G_{BLEX}$ | Uni-Color:127<br>Color:0<br>Black stretch:<br>0/1/2/3<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>Others: Preset | (1)Input a gray raster with sync to Pin61.<br>(2)Set black stretch to 25(IRE).<br>(3)Decreasing Y amplitude of input from 50(IRE), measure a Y amplitude as the figure below, that is " $V_{BLEX25}$ "<br>(4)Set black stretch to 35(IRE)/45(IRE).<br>(5)Repeat (3), that is " $V_{BLEX35}$ ", " $V_{BLEX45}$ ".<br>(6)Find gain of the portion that the black stretch has an effect on. <div style="text-align: center;"> </div>   |
| Y7   | DC Restoration<br>Gain<br>/ $V_{Dcrest120}$<br>/ $V_{Dcrest90}$<br>/ $V_{Dcrest\ step}$   | Uni-Color:127<br>Color:0<br>DC rest.: 0/1/2/3<br>RGB Mute:0<br>R cut off:128<br>Others: Preset                             | (1) Input a 100(IRE)(=0.7Vp-p) white signal with sync into Pin38&39.<br>(2) Set DC rest. to 10.<br>(3) Measure a Y amplitude of pin20 output that is $V_{100}$ .<br>(4) Set DC rest to 00.<br>(5) Measure a Y amplitude of pin20 output that is $V_{120}$ .<br>(6) Calculate, " $V_{dcrest120} = (V_{120}/V_{100}) \times 100$ "<br>(7) Set DC rest to 11.<br>(8) Repeat (5)&(6), that is " $V_{dcrest90}$ ".<br>(9) Calculate, " $V_{dcrest\ step} = (V_{dcrest120} - V_{dcrest90})/4$ " |
| Y8   | WPS Level<br>/ $V_{WPS}$  | Uni-Color:127<br>Brightness:63<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>WPS:0/1<br>Others: Preset  | (1) Input a 120(IRE) ramp signal with sync into Pin61.<br>(2) Measure the DC voltage from cut-off level to peak(at which output signal is clipped) that is " $V_{WPS}$ ".   |
| Y9   | VSM Peak<br>Frequency<br>/ $F_{VSM}$  | RGB Mute:0<br>VSM gain:3<br>Others: Preset   | (1) Input 100mV(p-p) sweep signal to pin61(Y in).<br>(2) Measure the peak point frequency " $F_{VSM}$ " at pin18(VSM OUT) by using a spectrum analyzer.   |
| Y10  | VSM Gain<br>/ $G_{VSM0}$<br>/ $G_{VSM-3}$<br>/ $G_{VSM-10}$<br>/ $G_{VSMOFF}$   | RGB Mute:0<br>c-trap=off<br>VSM gain:<br>0/1/2/3<br>Others: Preset   | (1) Input 100mV(p-p) FVSM sine wave signal (see Y9) to pin61(Y in).<br>(2) Set VSM Gain (0/1/2/3) and measure the amplitude at pin18(VM OUT),that is " $V_{VM0}$ " / " $V_{VM-3}$ " / " $V_{VM-10}$ " / " $V_{VM-OFF}$ ".<br>(3) Calculate, $G_{VSM0} = 20 * \log(V_{VM0}/0.1)$ $G_{VSM-3} = 20 * \log(V_{VM-3}/0.1)$ $G_{VSM-10} = 20 * \log(V_{VM-10}/0.1)$ $G_{VSMOFF} = 20 * \log(V_{VM-off}/0.1)$  |

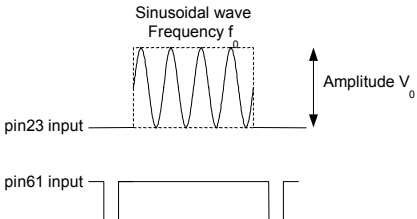
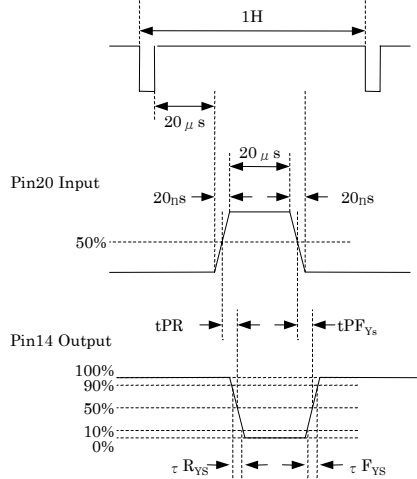
| Note | Items/Symbols  | Bus conditions   | Measurement methods   |
|------|--|--|---|
| Y11  | VSM Phase<br>/ $T_{VMFP}$<br>/ $T_{VM2T}$  | RGB Mute:0<br>VSM gain:7<br>Ysm Mode:0<br>Uni-color : 127<br>Sharpness :<br>Variable<br>Others: Preset | <ol style="list-style-type: none"> <li>Input 700mV(p-p) FVSM 2T pulse to pin61 (Y in).</li> <li>Set the BUS data of contrast to the maximum and increase the BUS data of Sharpness from the minimum to a value where pin14 (B OUT) waveform is not distorted.</li> <li>Measure the phase difference between the timing at the center level of pin18(B OUT) and the timing at peak level of pin18(VSM OUT) which responds the pin61 input., that is TVMFP.</li> <li>In case that pin61 input signal is 2T pulse, the phase difference is <math>T_{VM2T}</math></li> </ol>    |
| Y12  | VSM Ys Mute<br>Threshold Voltage<br>/ $V_{VMMLK}$  | RGB Mute:0<br>VSM gain:3<br>Others: Preset   | <ol style="list-style-type: none"> <li>Input 100mV(p-p) <math>F_{VSM}</math> sine wave signal (see Y9) to pin61(Y in).</li> <li>Apply dc voltage for pin15(Ysm) and increase the voltage from 0V. Measure the power supply voltage when pin18(VSM OUT) output disappears, that is <math>V_{VMMLK}</math>.</li> </ol>  |
| UV1  | Tint control range<br>/ $\Delta \theta_{MAX}$<br>/ $\Delta \theta_{MIN}$   | RGB Mute:0<br>Tint:0/64/127<br>Y Mute:1<br>contrast:127<br>Others: Preset                              | <ol style="list-style-type: none"> <li>Input a 4.43MHz PAL rainbow color-bar (burst:chroma=1:1) with sync into Pin61</li> <li>Set Tint to 64 and adjust the burst phase so that the 6th bar of Pin14 output is maximum, that is <math>\theta_{CEN}</math>.</li> <li>Change Tint to 127/0 and adjust the burst phase so that the 6th bar of Pin20 output is maximum, that is <math>\theta_{MAX} / \theta_{MIN}</math>.</li> <li>Calculate: "<math>\Delta \theta_{MAX}</math>"=<math>-(\theta_{443MAX} - \theta_{CEN})</math><br/>"<math>\Delta \theta_{MIN}</math>"=<math>-(\theta_{443MIN} - \theta_{CEN})</math></li> </ol>  |
| UV2  | Color Control<br>/ $G_{COLMAX}$<br>/ $G_{COLMIN}$  | RGB Mute:0<br>Color:0/64/127<br>Y Mute:1<br>Uni-Color:127<br>Others: Preset                            | <ol style="list-style-type: none"> <li>Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61.</li> <li>Measure the Pin14 amplitude for Color 127/64/0, that is <math>V_{COLMAX} / V_{COLCEN} / V_{COLMIN}</math>.</li> <li>Calculate: "<math>G_{COLMAX}</math>"=<math>20 * \log(V_{COLMAX} / V_{COLCEN})</math><br/>"<math>G_{COLMIN}</math>"=<math>20 * \log(V_{COLMIN} / V_{COLCEN})</math></li> </ol>   |
| UV3  | contrast control for UV<br>/ $G_{UCC}$   | RGB Mute:0<br>Uni-Color:0/127<br>Y Mute:1 Others:<br>Preset  | <ol style="list-style-type: none"> <li>Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin38&amp;43.</li> <li>Measure the Pin20 amplitude for Uni-Color 127/0 that is <math>V_{UCCMAX}</math>, and <math>V_{UCCMIN}</math>.</li> <li>Calculate:"<math>G_{UCC}</math>"=<math>20 * \log(V_{UCCMIN} / V_{UCCMAX})</math></li> </ol>   |
| UV4  | Relative Amplitude (PAL1)<br>/ $V_{P1R/B}$<br>/ $V_{P1G/B}$<br>Relative Amplitude (PAL2)<br>/ $V_{P2R/B}$<br>/ $V_{P2G/B}$<br>Relative Amplitude (NtsC1)<br>/ $V_{N1R/B}$<br>/ $V_{N1G/B}$<br>Relative Amplitude (NTSC2)<br>/ $V_{N2R/B}$<br>/ $V_{N2G/B}$ | RGB Mute:0<br>Y Mute:0/1<br>Uni-Color:127<br>Others: Preset  | <ol style="list-style-type: none"> <li>Input a 100IRE signal with sync into pin61.</li> <li>Adjust G/B drive so that each amplitude of pin12/13/14 output are equal.</li> <li>Set Y Mute to 1.</li> <li>Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61.</li> <li>Measure the amplitude of Pin12/13/14 output, that is "VPROUT"/ "VPGOUT" / "VPBOUT"</li> <li>Calculate;<br/>"<math>V_{P1R/B}</math>"=<math>V_{PROUT} / V_{PBOUT}</math><br/>"<math>V_{P1G/B}</math>"=<math>V_{PGOUT} / V_{PBOUT}</math></li> <li>Set 'Demo P' to PAL2/NTSC1/NTSC2.</li> <li>Repeat (6)&amp;(7), that is "<math>V_{P2R/B}</math>" / "<math>V_{P2G/B}</math>" / "<math>V_{N1R/B}</math>" / "<math>V_{N1G/B}</math>" / "<math>V_{N2R/B}</math>" / "<math>V_{N2G/B}</math>".</li> </ol> |

| Note | Items/Symbols  | Bus conditions   | Measurement methods   |
|------|--|--|---|
| UV5  | Relative Phase (PAL1)<br>/ $\theta_{PR-B}$<br>/ $\theta_{PG-B}$<br>Relative Phase (PAL2)<br>/ $\theta_{N1R-B}$<br>/ $\theta_{N1G-B}$<br>Relative Phase (NTSC1)<br>/ $\theta_{N2R-B}$<br>/ $\theta_{N2G-B}$<br>Relative Phase (NTSC2)<br>/ $\theta_{DR-B}$<br>/ $\theta_{DG-B}$ | RGB Mute:0<br>Y Mute:1<br>Uni-Color:127<br>NTSC Phase: 0/1/2<br>Others: Preset | (1) Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61.<br>(2) Observe the Pin12/13/14 output, measure the R/G/B modulation angle ( $\theta_{PR}/\theta_{PG}/\theta_{PB}$ ) according following figure and formula.<br>$\theta_{p*} = \{\theta_{o*} - \text{Arctag}(1/(2A/B + \sqrt{3})) - 15\}$  <p>For <math>\theta_{P1R}</math> ; Peak:3rd bar, <math>\theta_{OR}=90</math><br/>                     For <math>\theta_{P1G}</math> ; Peak(negative):4th bar, <math>\theta_{OG}=240</math><br/>                     For <math>\theta_{P1B}</math> ; Peak:6th bar, <math>\theta_{OB}=0</math></p> Calculate;<br>$" \theta_{P1R-B} " = \theta_{P1R} - \theta_{P1B}$ $" \theta_{P1G-B} " = \theta_{P1G} - \theta_{P1B}$ (3) Set ' Demo-P' to 01, 10 and 11, and acquire each PAL2, NTSC1 and NTSC2 results with the same measurements. |

**TEXT STAGE** (RGB Mute:0 / RGB cut off:128 / DC rest.:2(100%) / WPS:1(off))

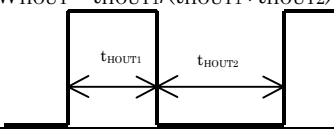
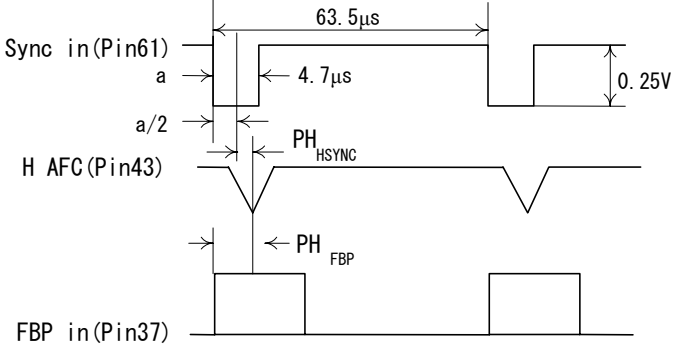
| Note | Items/Symbols   | Bus conditions   | Measurement methods  |
|------|---|--|--|
| T1   | V-BLK Pulse Output Level<br>/ V <sub>VBLK</sub><br>H-BLK Pulse Output Level<br>/ V <sub>HBLK</sub>              | All: Preset  | (1) Input a composite sync signal into Pin61.<br>(2) Measure the DC level of V/H blanking period at Pin14, that is<br>"V <sub>VBLK</sub> " / "V <sub>HBLK</sub> ".   |
| T2   | RGB Output Black Level (0IRE DC)<br>/ V <sub>BLACK</sub>  | RGB Mute:0<br>Color:0<br>B cut off:128<br>DC rest.:2(100%)<br>Others: Preset   | (1) Input a 0(IRE) Y signal with sync into Pin61.<br>(2) Measure the DC level of picture period at Pin14, that is<br>"V <sub>BLACK</sub> ".  |
| T3   | RGB Output White Level(100 IRE AC)<br>/ V <sub>WHITE</sub>  | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>Uni-Color:127<br>Color:0<br>WPS:1(off)<br>Others: Preset  | (1) Input a 100(IRE)(=0.7Vp-p) Y signal with sync into Pin61.<br>(2) Measure the amplitude from 0 to 100IRE at Pin14, that is<br>"V <sub>WHITE</sub> ".  |
| T4   | Cut-off Voltage Variable Range<br>/ Δ V <sub>CUT+</sub><br>/ Δ V <sub>CUT-</sub>                                | RGB Mute:0<br>DC rest.:2(100%)<br>B Cut Off:0/255<br>Color:64 Brt: 64<br>Others: Preset  | (1) Input a 0(IRE) Y signal with sync into Pin61.<br>(2) Measure the DC level of picture period at Pin14 for B Cut-off:255/0, that is V <sub>CUTMAX</sub> / V <sub>CUTMIN</sub> .<br>(3) Calculate; " Δ V <sub>CUT+</sub> "=V <sub>CUTMAX</sub> -V <sub>BLACK</sub> " Δ V <sub>CUT-</sub> "=V <sub>CUTMIN</sub> -V <sub>BLACK</sub>  |
| T5   | Drive Control Variable Range<br>/ G <sub>DR+</sub><br>/ G <sub>DR-</sub>  | RGB Mute:0<br>DC rest.:2(100%)<br>B Drive:0/127<br>Uni-Color:127<br>Color:0<br>WPS:1(OFF)<br>Others: Preset  | (1) Input a 100(IRE) (=0.7Vp-p) Y signal with sync into Pin61.<br>(2) Measure the amplitude from 0 to 100IRE at Pin14 for B drive127/0, that is V <sub>DRMAX</sub> / V <sub>DRMIN</sub> .<br>(3) Calculate; "G <sub>DR+</sub> "=20*log(V <sub>DRMAX</sub> /V <sub>WHITE</sub> )<br>"G <sub>DR-</sub> "=20*log(V <sub>DRMIN</sub> /V <sub>WHITE</sub> )   |
| T6   | ABCL Control Voltage Range<br>/ V <sub>ABCLH</sub><br>/ V <sub>ABCLL</sub><br>ACL Gain<br>/ G <sub>ACL</sub>    | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>ABL Gain:3<br>Uni-Color:127<br>Color:0<br>WPS:1(OFF)<br>Others: Preset                                | (1) Input a 100(IRE) (=0.7Vp-p) Y signal with sync into Pin61.<br>(2) Decreasing the Pin31 voltage, measure the voltage at which Pin14 output begins/stops decreasing, that is "V <sub>ABCLH</sub> " / "V <sub>ABCLL</sub> ".<br>(3) Measure the minimum amplitude of Pin14 output, that is V <sub>ACLMIN</sub> .<br>(4) Calculate; "G <sub>ACL</sub> "=20*log(V <sub>ACLMIN</sub> /V <sub>WHITE</sub> )   |
| T7   | ABL Start Point<br>/ V <sub>ABLP0</sub><br>/ V <sub>ABLP1</sub><br>/ V <sub>ABLP2</sub><br>/ V <sub>ABLP3</sub> | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>ABL Start Point:<br>0/1/2/3<br>ABL Gain:3<br>Uni-Color:127<br>Color:0<br>WPS:1(OFF)<br>Others: Preset | (1) Input a 0(IRE) Y signal with sync into Pin61.<br>(2) For ABL Point 0/1/2/3, decreasing the Pin31 voltage, measure the voltage at which Pin14 output begins decreasing, that is V <sub>ABL1</sub> /V <sub>ABL2</sub> /V <sub>ABL3</sub> /V <sub>ABL4</sub> .<br>(3) Calculate; "V <sub>ABLP0</sub> "=V <sub>ABL1</sub> -V <sub>ABCLH</sub><br>"V <sub>ABLP1</sub> "=V <sub>ABL2</sub> -V <sub>ABCLH</sub><br>"V <sub>ABLP2</sub> "=V <sub>ABL3</sub> -V <sub>ABCLH</sub><br>"V <sub>ABLP3</sub> "=V <sub>ABL4</sub> -V <sub>ABCLH</sub> |
| T8   | ABL Gain<br>/ V <sub>ABLG0</sub><br>/ V <sub>ABLG1</sub><br>/ V <sub>ABLG2</sub><br>/ V <sub>ABLG3</sub>        | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>ABL Gain:<br>00/01/10/11<br>Uni-Color:127<br>Color:0<br>WPS:1(OFF)<br>Others: Preset                  | (1) Input a 0(IRE) Y signal with sync into Pin61.<br>(2) For ABL Gain 0/1/2/3, measure the DC level of picture period at Pin14 when Pin31 voltage is V <sub>ABCLL</sub> , that is V <sub>ABL5</sub> /V <sub>ABL6</sub> /V <sub>ABL7</sub> /V <sub>ABL8</sub> .<br>(3) Calculate; "V <sub>ABLG0</sub> "=V <sub>ABL5</sub> -V <sub>BLACK</sub><br>"V <sub>ABLG1</sub> "=V <sub>ABL6</sub> -V <sub>BLACK</sub><br>"V <sub>ABLG2</sub> "=V <sub>ABL7</sub> -V <sub>BLACK</sub><br>"V <sub>ABLG3</sub> "=V <sub>ABL8</sub> -V <sub>BLACK</sub>  |



| Note | Items/Symbols   | Bus conditions  | Measurement methods   |
|------|---|---|---|
| T9   | Analog RGB<br>Dynamic Range<br>/ DR <sub>TX</sub>   | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>RGB<br>Contrast:32<br>Ysm Mode:1<br>Others: Preset | <ol style="list-style-type: none"> <li>Input a composite sync signal into Pin61.</li> <li>Supply 2.5V to Pin20.</li> <li>Input a signal of following figure into Pin23.</li> <li>Increasing the amplitude of Pin23 input, measure the amplitude at which the Pin14 amplitude stops increasing, that is "DR<sub>TX</sub>".</li> </ol>    |
| T11  | Analog RGB<br>Brightness Control<br>Characteristic<br>/ V <sub>TXBRMAX</sub><br>/ V <sub>TXBRCEN</sub><br>/ V <sub>TXBRMIN</sub>        | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>Brightness:<br>0/64/127 Others:<br>Preset          | <ol style="list-style-type: none"> <li>Supply 3V to Pin15.</li> <li>Connect Pin21, 22 and 23 to GND via a 0.1uF of capacitor.</li> <li>For Brightness 127/64/0, measure the DC level of picture period at Pin14, that is "V<sub>TXBRMAX</sub>" / "V<sub>TXBRCEN</sub>" / "V<sub>TXBRMIN</sub>".</li> </ol>  |
| T12  | Ysm Mode Switching<br>Level<br>/ V <sub>YSANA</sub><br>/ V <sub>YSBLK</sub>   | RGB Mute:0<br>Others: Preset  | <ol style="list-style-type: none"> <li>Input a composite sync signal into Pin61.</li> <li>Input a signal of NOTE:T9 figure into Pin23.</li> <li>More Increasing the Pin23 voltage, measure the voltage at which the signal inputted into Pin23 appears at Pin14, that is "V<sub>YSANA</sub>".</li> <li>Increasing the Pin23 voltage, measure the voltage at which the signal disappear at Pin14, that is "V<sub>YSBLK</sub>".</li> </ol>  |
| T13  | Analog RGB Mode<br>Transfer<br>Characteristic<br>/ τ <sub>RYS</sub><br>/ t <sub>PRYS</sub><br>/ τ <sub>FYS</sub><br>/ t <sub>PFYS</sub> | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>Others: Preset                                     | <ol style="list-style-type: none"> <li>Input a 50(IRE) (=0.35Vp-p) Y signal with sync into Pin61.</li> <li>Connect Pin21, 22 and 23 to GND via a 0.1uF capacitor.</li> <li>Measure the Analog RGB Mode Transfer time, according to following figure,</li> </ol>   |
| T14  | Cross Talk from<br>Analog RGB to TV<br>/ CT <sub>TX-TV</sub>  | RGB Mute:0<br>B cut off:128<br>DC rest.:2(100%)<br>contrast:127<br>Others: Preset                     | <ol style="list-style-type: none"> <li>Input a composite sync signal into Pin61.</li> <li>Connect Pin61 to GND via a 1uF capacitor.</li> <li>Input a sine wave signal (f=4MHz, Video amplitude=0.5V(p-p)) into Pin23.</li> <li>Supply 0V to Pin20.</li> <li>Measure the amplitude at Pin14, that is V<sub>TV</sub>.</li> <li>Supply 2.5V to Pin20.</li> <li>Measure the amplitude of 4MHz signal at Pin14, that is V<sub>TX</sub>.</li> <li>Calculate: "CT<sub>TX-TV</sub>"=20*log(V<sub>TV</sub>/ V<sub>TX</sub>)</li> </ol> |

| Note | Items/Symbols  | Bus conditions   | Measurement methods   |
|------|--|--|---|
| T15  | Cross Talk from TV to Analog RGB / CT <sub>TV-TX</sub>   | RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>Ysm Mode:1<br>Uni-color:127<br>RGB contrast:63<br>Others: Preset  | (1) Input a sine wave signal (f=4MHz, Video amplitude=0.5V(p-p)) with sync into Pin61.<br>(2) Connect Pin21, 22 and 23 to GND via a 0.1uF capacitor.<br>(3) Supply 2.5V to Pin20.<br>(4) Measure the amplitude at Pin14, that is V <sub>TX</sub> .<br>(5) Supply 0V to Pin20.<br>(6) Measure the amplitude of 4MHz signal at Pin14, that is V <sub>TV</sub> .<br>(7) Calculate: "CT <sub>TV-TX</sub> "=20*log(V <sub>TX</sub> / V <sub>TV</sub> )   |
| T17  | Analog RGB/RGB Output Voltage Axes Difference<br>/ ΔV <sub>R-G</sub><br>/ ΔV <sub>G-B</sub><br>/ ΔV <sub>B-R</sub> | RGB Mute:0<br>R/G/B cut off:128<br>Brightness:63<br>DC rest.:2(100%)<br>Color:0<br>Uni-color:127<br>Others: Preset   | (1)Input a 0IRE signal with sync into Pin61.<br>(2)Connect Pin21, 22 and 23 to GND via 0.01 μ F.<br>(3)Measure the DC level of picture period at Pin12, 13 and 14, that is R <sub>Y</sub> /G <sub>Y</sub> /B <sub>Y</sub> .<br>(4)Supply Pin15 to 2.5V.<br>(5) Measure the DC level of picture period at Pin12, 13 and 14, that is R <sub>T</sub> /G <sub>T</sub> /B <sub>T</sub> .<br>(6)Calculate:<br>$\Delta R = R_T - R_Y$ $\Delta G = G_T - G_Y$ $\Delta B = B_T - B_Y$ $\text{"}\Delta V_{R-G}\text{"} = \Delta R - \Delta G$ $\text{"}\Delta V_{G-B}\text{"} = \Delta G - \Delta B$ $\text{"}\Delta V_{B-R}\text{"} = \Delta B - \Delta R$ |
| T18  | RGB Mute DC level V <sub>RGBMUTE</sub>   | RGB Mute:0/1<br>R/G/B cut off:128<br>Brightness:63<br>DC rest.:2(100%)<br>Color:0<br>Uni-color:127<br>Others: Preset | (1)Input a 0IRE signal with sync into Pin61.<br>(2)Set the IICBUS switch of RGBMUTE to 1<br>(3)Connect Pin21, 22 and 23 to GND via 0.01 μ F.<br>(4)Measure the DC level of picture period at Pin 14, that is V <sub>RGBMUTE</sub><br>(5)Reset RGBMUTE to 0 and set Blueback to 1<br>(6)Measure the DC level of picture period at Pin 14, that is V <sub>BB</sub>  |
| UV6  | Half Tone Characteristics for Y / G <sub>HTY</sub>   | Ysm Mode:0<br>Uni-Color:127<br>Color:0<br>RGB Mute:0<br>R cut off:128<br>DC rest.:2(100%)<br>Others: Preset          | (1) Input a 100(IRE) (=0.7Vp-p) white signal with sync into Pin61.<br>(2) Measure the output picture amplitude at Pin14 that is V <sub>HTYOFF</sub> .<br>(3) Supply Pin20 1.5V.<br>(4) Measure the output picture amplitude at Pin14 that is V <sub>HTYON</sub> .<br>Calculate:"G <sub>HTY</sub> "=20*log(V <sub>HTYON</sub> /V <sub>HTYOFF</sub> )   |
| UV7  | Half Tone Characteristics for C / G <sub>HTC</sub>   | RGB Mute:0<br>Y Mute:1<br>Uni-Color:127<br>Others: Preset  | (1) Input a 4.43MHz PAL rainbow color-bar(300mV(p-p), burst:chroma=1:1) with sync into Pin61. .<br>(2) Supply Pin15 1.5V and measure the amplitude of Pin14 output, that is V <sub>PBHTC</sub> .<br>(3) Calculate: (V <sub>PBOUT</sub> :see C7)<br>"G <sub>HTC</sub> "=20*log(V <sub>PBHTC</sub> /V <sub>PBOUT</sub> )  |

## DEF STAGE

| Note | Items/Symbols  | Bus conditions                      | Measurement methods  |
|------|--|-------------------------------------|--|
| D1   | AFC Inactive Period<br>/ $T_{50AFCOFF}$<br>/ $T_{60AFCOFF}$          | All: Preset                         | (1) Input a 50Hz/60Hz composite sync signal into Pin61.<br>(2) Measure " $T_{50AFCOFF}$ " / " $T_{60AFCOFF}$ " at Pin43. (cf. Fig.D1)  |
| D2   | H-OUT Start Voltage<br>/ $V_{HON}$                                   | All: Preset                         | (1) Let Pin11, 25, 67and 74 be open.<br>(2) Increasing Pin45 voltage, measure the voltage at which H OUT pulse appears at Pin39, that is " $V_{HON}$ ".  |
| D3   | H-OUT Pulse Duty<br>/ $W_{HOUT}$                                     | All: Preset<br>command IIC read     | (1) Measure $t_{HOUT1}$ & $t_{HOUT2}$ at Pin39.<br>(2) Calculate ; " $W_{HOUT} = t_{HOUT1} / (t_{HOUT1} + t_{HOUT2}) * 100$ "<br>  |
| D4   | H-OUT Freq. on AFC Stop Mode<br>/ $F_{HAFCOFF}$                      | AFC Gain:11 (OFF)<br>Others: Preset | (1) Input a 50Hz composite sync signal into Pin61.<br>(2) Measure the H OUT frequency at Pin32, that is " $F_{HAFCOFF}$ ".   |
| D5   | Horizontal Free-run Frequency<br>/ $F_{HFR}$                         | V-Freq:001/010<br>Others: Preset    | (1) Measure the H OUT frequency at Pin61, that is " $F_{H50FR}$ " / " $F_{H60FR}$ ".   |
| D6   | Horizontal Freq. Variable Range<br>/ $F_{HMAX}$<br>/ $F_{HMIN}$      | All: Preset                         | (1) Connect Pin43 to Vcc via a 10k $\Omega$ and measure the H OUT frequency at Pin39, that is " $F_{HMIN}$ ".<br>(2) Connect Pin43 to GND via a 68k $\Omega$ and measure the H OUT frequency at Pin39, that is " $F_{HMAX}$ ".   |
| D7   | Horizontal Freq. Control Sensitivity<br>/ $\beta_{HAFC}$             | All: Preset                         | (1) Measure the Pin39 voltage at which H OUT frequency is 15.734kHz, that is $V_{H15734}$ .<br>(2) Measure the H OUT frequency when Pin43 voltage is $V_{H15734} + 50mV / V_{H15734} - 50mV$ , that is $F_{HLOW} / F_{HHIGH}$ .<br>(3) Calculate; " $\beta_{HAFC} = (F_{HHIGH} - F_{HLOW}) / 100$ "  |
| D8   | Horizontal Pull-in Range<br>/ $\Delta F_{HPH}$<br>/ $\Delta F_{HPL}$ | All: Preset                         | (1) Input a composite sync signal into Pin61.<br>(2) Decreasing the horizontal frequency from 17kHz, measure the frequency at which H OUT synchronized with Sync in(Pin61), that is $F_{HPH}$ .<br>(3) Increasing the horizontal frequency from 14kHz, measure the frequency at which H OUT synchronized with Sync in(Pin61), that is $F_{HPL}$ .<br>(4) Calculate; " $\Delta F_{HPH} = F_{HPH} - 15734$ "<br>" $\Delta F_{HPL} = 15625 - F_{HPL}$ " |
| D9   | H-OUT Voltage<br>/ $V_{HOUTH}$<br>/ $V_{HOUTL}$                      | All: Preset                         | (1) Measure the high level of H OUT at Pin39, that is " $V_{HOUTH}$ ".<br>(2) Measure the low level of H OUT at Pin39, that is " $V_{HOUTL}$ ".  |
| D10  | Horizontal Freq. Dependence on Vcc<br>/ $\Delta F_{HVCC}$            | All: Preset                         | (1) Measure the H OUT frequency when H Vcc(Pin45) is 8.5V/9.5V, that is $F_{HVCCH} / F_{HVCCL}$ .<br>(2) Calculate; " $\Delta F_{HVCC} = (F_{HVCCH} - F_{HVCCL}) / 1$ "  |
| D11  | FBP Phase<br>/ $PH_{FBP}$<br>H-Sync. Phase<br>/ $PH_{HSYNC}$         | All: Preset                         | (1) Input a composite sync signal into Pin61.<br>(2) According to the following figure, measure " $PH_{FBP}$ " & " $PH_{HSYNC}$ ".<br>   |

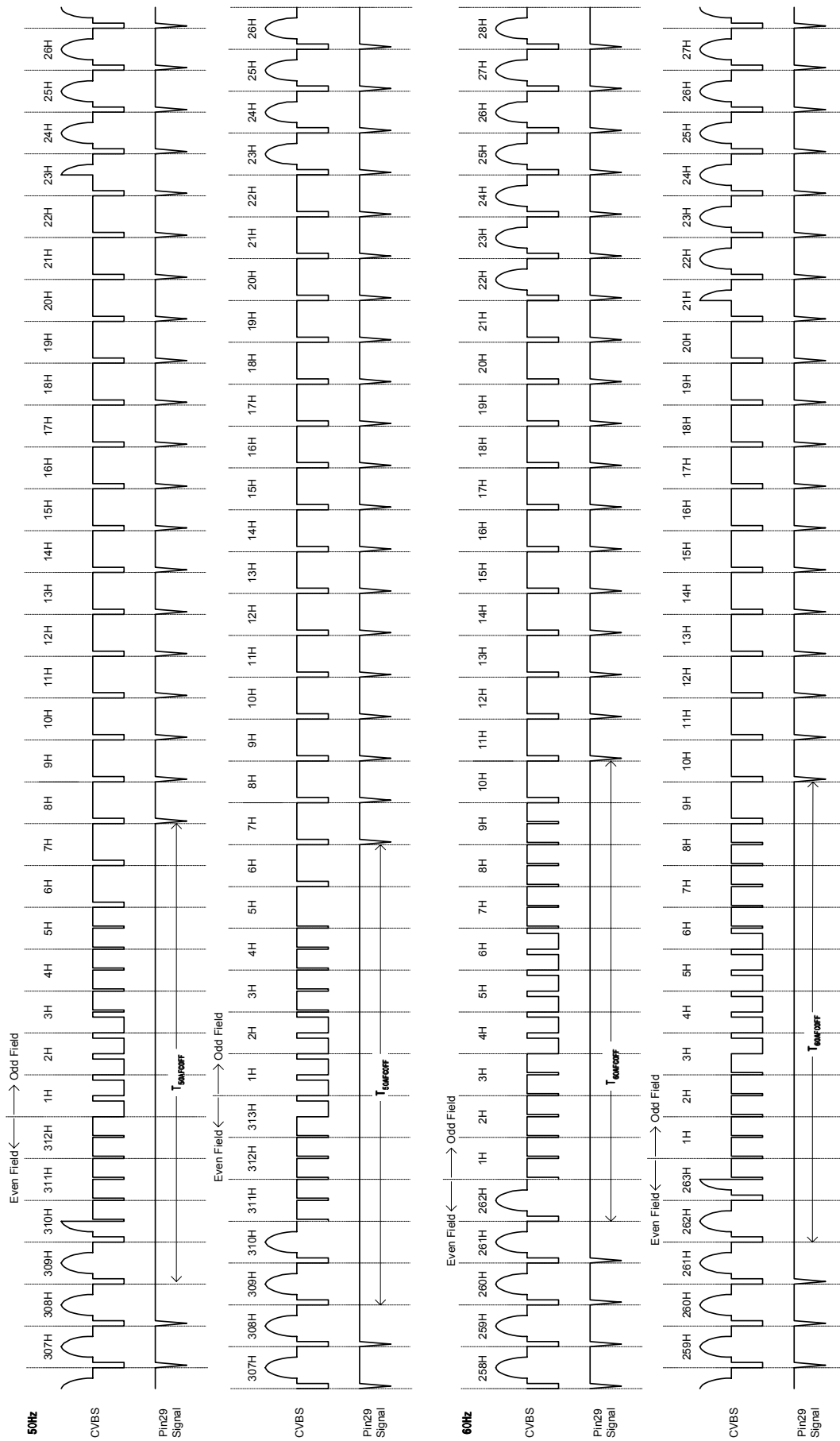
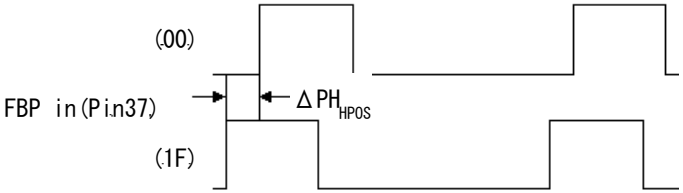
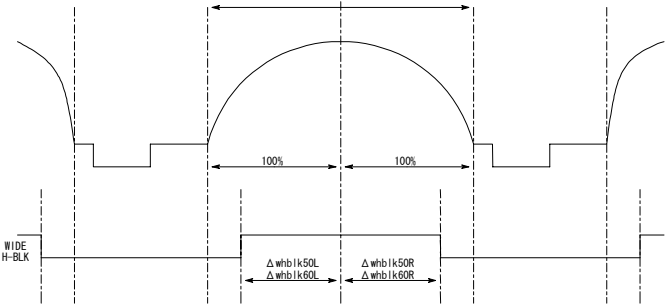
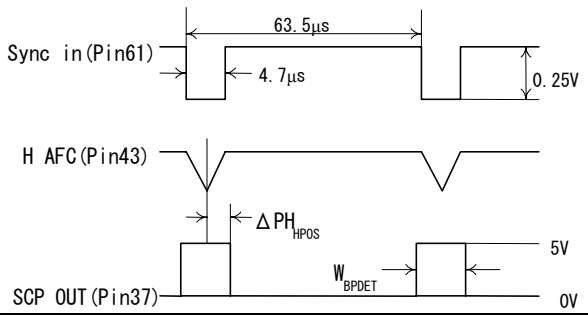


Fig. D1

| Note | Items/Symbols   | Bus conditions                                      | Measurement methods  |
|------|---|---|--|
| D12  | Horizontal Position Variable Range<br>/ $\Delta PH_{HPOS}$<br><br>/ $\Delta PH_{HPOS+}$<br>/ $\Delta PH_{HPOS-}$                                    | H Position:0/31<br>Others: Preset                   | <p>(1) Input a composite sync signal into Pin61.<br/>                     (2) Changing BUS data of "Horizontal Position" from 0 to 31, measure "<math>\Delta PH_{HPOS}</math>" according to the following figure.</p>  <p>(3) Measure the H phase where the pin #73 (Hcorr) is opened and the HPOS is 16<br/>                     (4) Measure the H phase shift from (3) when supply 5.5V for pin #73, that is <math>\Delta PH_{HPOS+}</math>.<br/>                     (5) Measure the H phase shift from (3) when supply 0.5V for pin #73, that is <math>\Delta PH_{HPOS-}</math>.</p> |
| D13  | AFC-2 Pulse Threshold Level<br>/ $V_{AFC2}$   | All: Preset   | <p>(1) Input a composite sync signal into Pin61.<br/>                     (2) Decreasing the FBP high level, measure the DC level at which H OUT phase changes against Sync in(Pin61) phase, that is "<math>V_{AFC2}</math>".</p>  |
| D14  | H-BLK Pulse Threshold Level<br>/ $V_{HBLK}$<br><br>$\Delta W_{WHBLK50L}$<br>$\Delta W_{WHBLK50R}$<br>$\Delta W_{WHBLK60L}$<br>$\Delta W_{WHBLK60R}$ | RGB Mute:0<br>contrast:127<br>Others: Preset        | <p>(1) Input a composite sync signal into Pin61.<br/>                     (2) Increasing the FBP high level, measure the DC level at which H blanking begins to work, that is "<math>V_{HBLK}</math>".<br/>                     (3) Measure as the figure below when the IICBUS of 'W-HBLK=1' and when input 50/60Hz of V freq.</p>    |
| D15  | Black Peak Det. Stop Period (H)<br>/ $PH_{BPDET}$<br>/ $W_{BPDET}$  | TEST:00001000<br>Black Stretch:01<br>Others: Preset | <p>(1) Input a composite sync signal into Pin61.<br/>                     (2) According to the following figure, measure "<math>PH_{BPDET}</math>" &amp; "<math>W_{BPDET}</math>".</p>   |

| Note | Items/Symbols   | Bus conditions                     | Measurement methods  |
|------|---|------------------------------------|--|
| D16  | Gate Pulse Start Phase<br>/ PH <sub>GP</sub><br>Gate Pulse Width<br>/ W <sub>GP</sub>   | All: Preset                        | <p>(1) Input a composite sync signal into Pin61.<br/>(2) According to the following figure, measure "PH<sub>GP</sub>" &amp; "W<sub>GP</sub>".</p> <p>Sync in (Pin61) — 63.5 μs — 4.7 μs — 0.25V</p> <p>H AFC (Pin43) — PH<sub>GP</sub> — W<sub>GP</sub> — 5V — 0V</p> <p>SCP OUT (Pin37)</p>   |
| D18  | Vertical Free-run Frequency<br>/ F <sub>VAUFR50</sub><br>/ F <sub>VAUFR60</sub><br>/ F <sub>V50FR</sub><br>/ F <sub>V60FR</sub> | V-Freq:<br>0/1/2<br>Others: Preset | <p>(1) Input a 50Hz composite sync signal into Pin61.<br/>(2) Set V-Freq to 0.<br/>(3) For no input, measure the frequency of V Ramp at Pin46, that is "F<sub>VAUFR50</sub>".<br/>(4) Input a 60Hz composite sync signal into Pin61.<br/>(5) Repeat (2)&amp;(3), that is "F<sub>VAUFR60</sub>".<br/>(6) Set V-Freq. To 1/2, repeat (2), that is "F<sub>V50FR</sub>" / "F<sub>V60FR</sub>".</p> |
| D19  | Gate Pulse V-Masking Period<br>/ T <sub>50GPM</sub><br>/ T <sub>60GPM</sub>   | All: Preset                        | <p>(1) Input a 50Hz/60Hz composite sync signal into Pin61.<br/>(2) Measure "T<sub>50GPM</sub>" / "T<sub>60GPM</sub>" at Pin37. (cf. Fig.D19)</p>   |

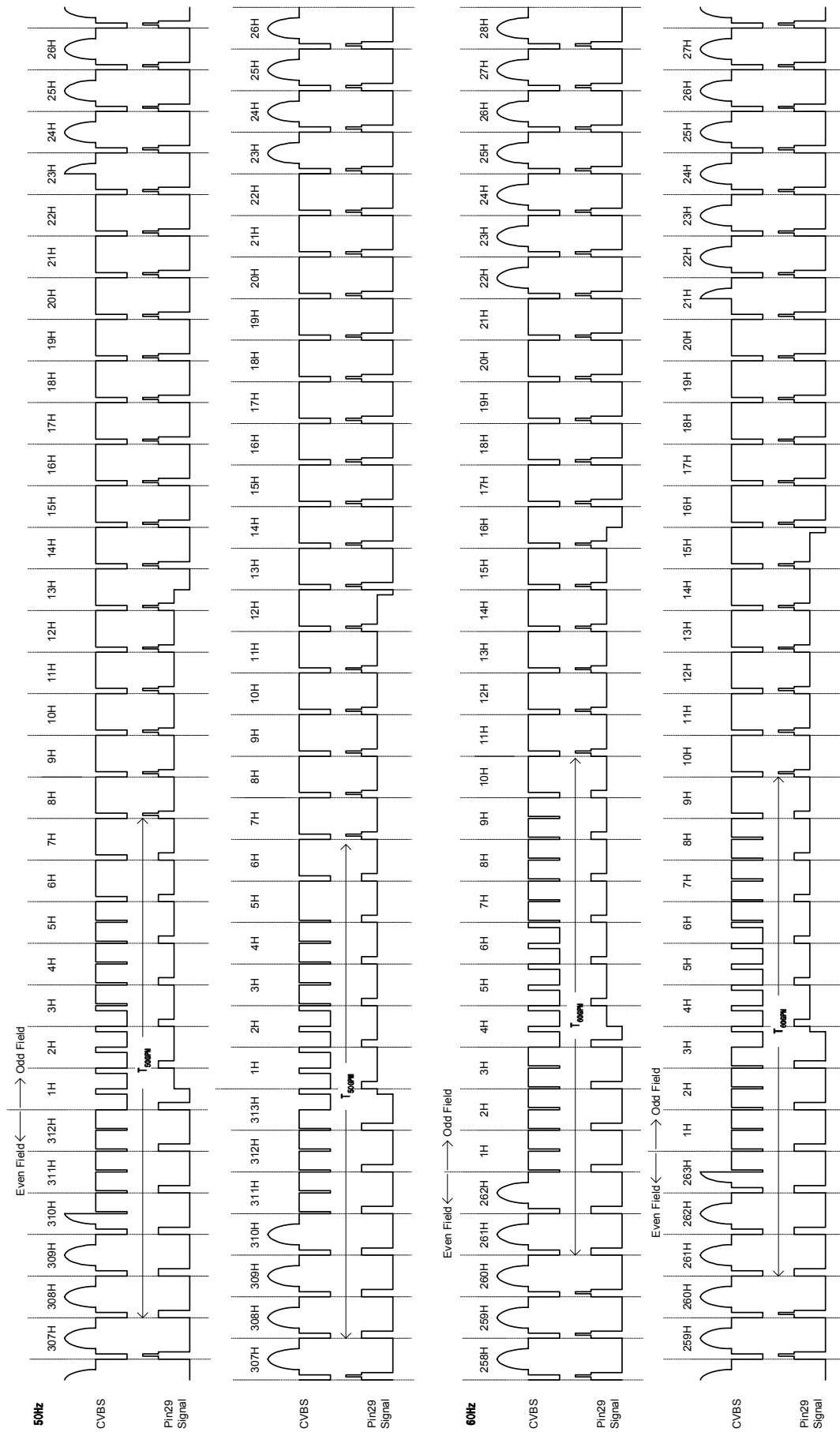
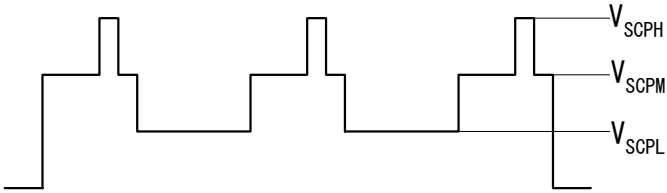


Fig. D19

| Note | Items/Symbols   | Bus conditions                   | Measurement methods   |
|------|---|----------------------------------|---|
| D20  | V. Ramp DC on Service Mode<br>/ V <sub>NOVRAMP</sub>  | V STOP:1 Others: Preset          | (1) Set V STOP to 1.<br>(2) Measure the DC level of Pin47, that is "V <sub>NOVRAMP</sub> ".   |
| D21  | Vertical Pull-in Range (Auto)<br>/ F <sub>VPAUL</sub><br>/ F <sub>VPAUH</sub><br>Vertical Pull-in Range (50Hz)<br>/ F <sub>VP50L</sub><br>/ F <sub>VP50H</sub><br>Vertical Pull-in Range (60Hz)<br>/ F <sub>VP60L</sub><br>/ F <sub>VP60H</sub> | V-Freq:0/1/2<br>Others: Preset   | (1) Input a composite sync signal into Pin61.<br>(2) For V-Freq 0/1/2, increasing the input vertical period from 220H by 0.5H step, measure the period at which input signal synchronized with V Ramp(Pin46), that is "F <sub>VPAUL</sub> " / "F <sub>VP50L</sub> " / "F <sub>VP60L</sub> ".<br>(3) For V-Freq 0/1/2, decreasing the input vertical period from 360H by 0.5H step, measure the period at which input signal synchronized with V Ramp, that is "F <sub>VPAUH</sub> " / "F <sub>VP50H</sub> " / "F <sub>VP60H</sub> ".  |
| D22  | Vertical Period on Fixed Mode<br>/ T <sub>V3125</sub><br>/ T <sub>V2625</sub><br>/ T <sub>V313</sub><br>/ T <sub>V263</sub>   | V-Freq:4/5/6/7<br>Others: Preset | (1) For V-Freq 4/5/6/7, measure the vertical period at SCP out (Pin37), that is "T <sub>V312.5</sub> " / "T <sub>V262.5</sub> " / "T <sub>V313</sub> " / "T <sub>V263</sub> ".  |
| D23  | VD Start Phase<br>/ PH <sub>50VD</sub><br>/ PH <sub>60VD</sub><br>VD Width<br>/ W <sub>50VD</sub><br>/ W <sub>60D</sub>   | All: Preset                      | (1) Input a 50Hz/60Hz composite sync signal into Pin61.<br>(2) Measure "PH <sub>50VD</sub> " / "W <sub>50VD</sub> " and "PH <sub>60VD</sub> " / "W <sub>60VD</sub> " at Pin40. (cf. Fig.D23)  |
| D24  | V-BLK Start Phase<br>/ PH <sub>50VBLK</sub><br>/ PH <sub>60VBLK</sub><br>V-BLK Width<br>/ W <sub>50VBLK</sub><br>/ W <sub>60VBLK</sub>  | All: Preset                      | (1) Input a 50Hz/60Hz composite sync signal into Pin61.<br>(2) Measure "PH <sub>50VBLK</sub> " / "W <sub>50VBLK</sub> " and "PH <sub>60VBLK</sub> " / "W <sub>60VBLK</sub> " at Pin14.  |
| D25  | Sand Castle Pulse Level<br>/ V <sub>SCPH</sub><br>/ V <sub>SCPM</sub><br>/ V <sub>SCPL</sub>  | All: Preset                      | (1) Measure "V <sub>SCPH</sub> " / "V <sub>SCPM</sub> " / "V <sub>SCPL</sub> " at Pin37.<br>  |
| D26  | V Ramp Amplitude<br>/ V <sub>VRAMP</sub><br>/ V <sub>VOUT</sub><br>/ V <sub>VOUT MAX</sub><br>/ V <sub>VOUT MIN</sub><br>/ V <sub>OUTDC</sub>   | All: Preset                      | (1) Measure the V Ramp amplitude at Pin46, that is "V <sub>VRAMP</sub> ".<br>(2) Measure the V Ramp amplitude at pin #47, that is "V <sub>OUT</sub> ".<br>(3) Measure the V Ramp increasing ratio at pin #47 at when 'V Size' = Max, that is "R <sub>VOUT MAX</sub> ".<br>(4) Measure the V Ramp decreasing ratio at pin #47 at when 'V Size' = 01, that is "R <sub>VOUT MIN</sub> ".<br>(5) Measure the V Ramp dc voltage at pin #47 at when 'V Size' = 00, that is "V <sub>OUTDC</sub> ".<br>(6) Measure the V Ramp dc voltage at pin #47 at when 'V Size' = 00 and 'V cent'=MAX, let it 'V <sub>MAXDC</sub> '<br>"V <sub>CENT MAX</sub> " = ( 'V <sub>MAXDC</sub> ' - "V <sub>OUTDC</sub> " ) / "V <sub>OUT</sub> "<br>(7) Measure the V Ramp dc voltage at pin #47 at when 'V Size' = 00 and 'V cent'=Min, let it 'V <sub>MINDC</sub> '<br>"V <sub>CENT MAX</sub> " = ( 'V <sub>MINDC</sub> ' - "V <sub>OUTDC</sub> " ) / "V <sub>OUT</sub> " |



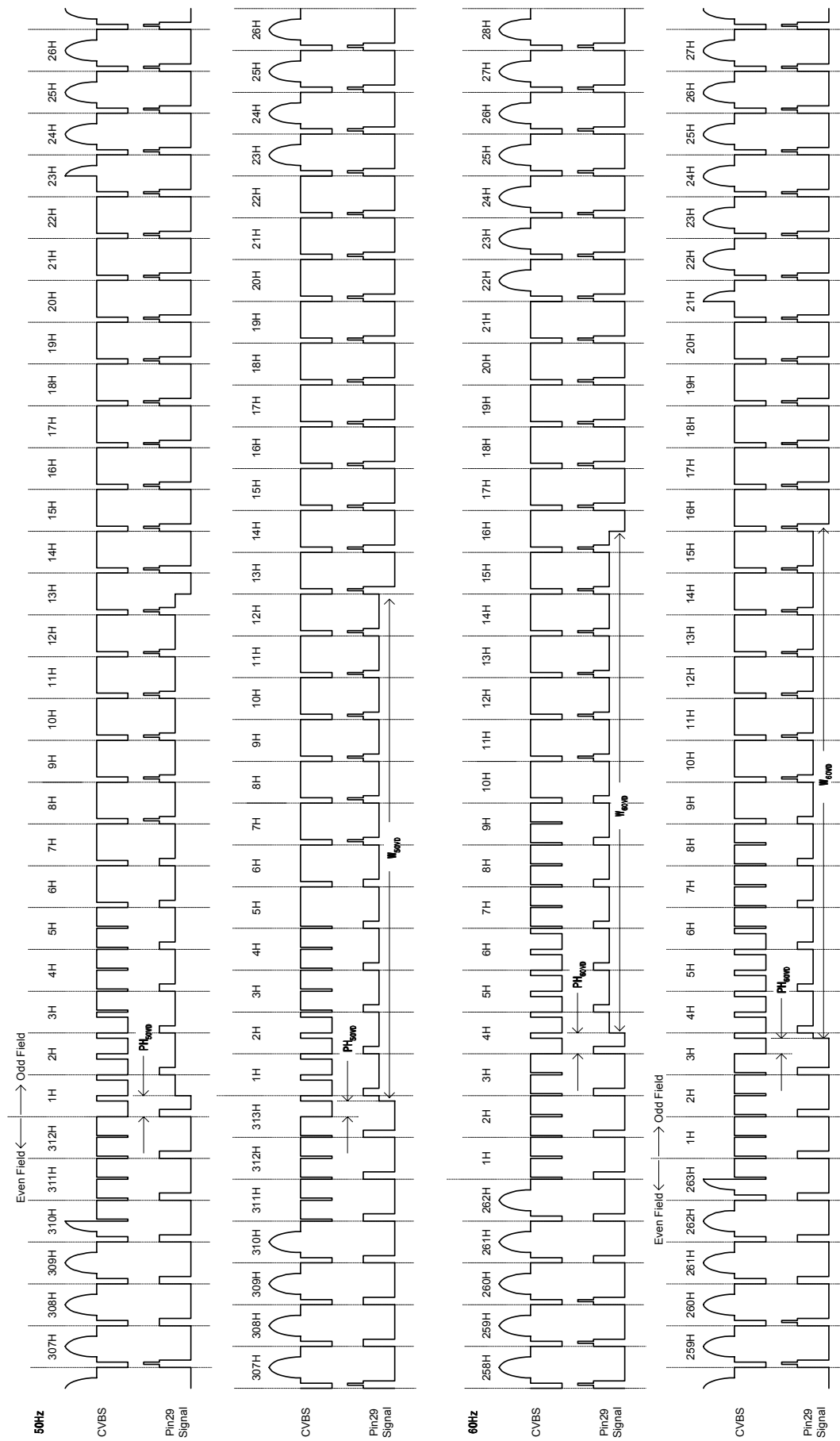
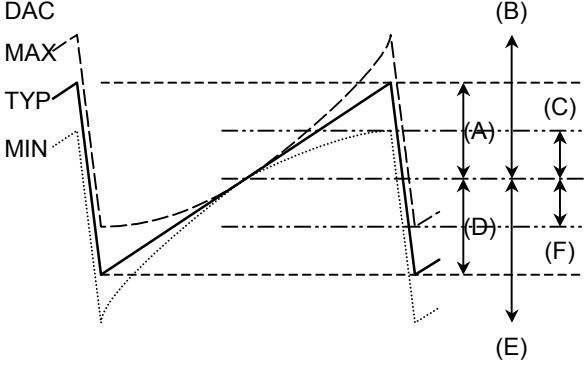
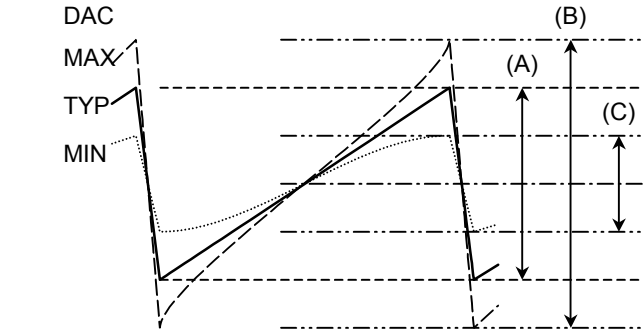
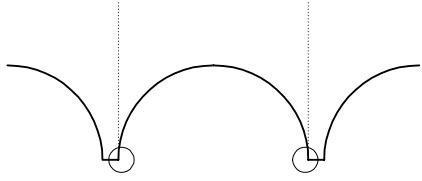
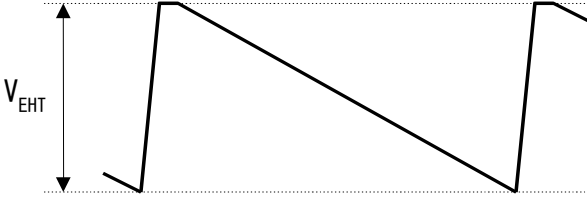
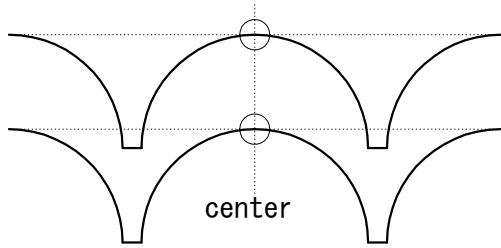
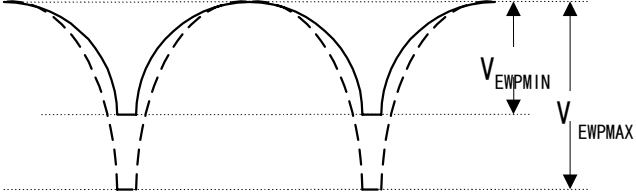
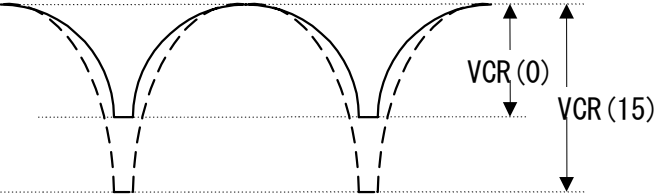
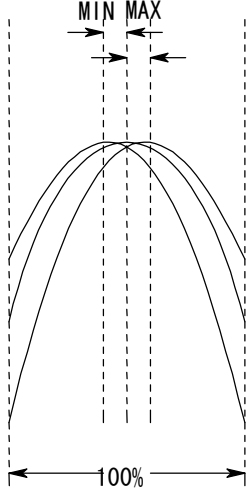
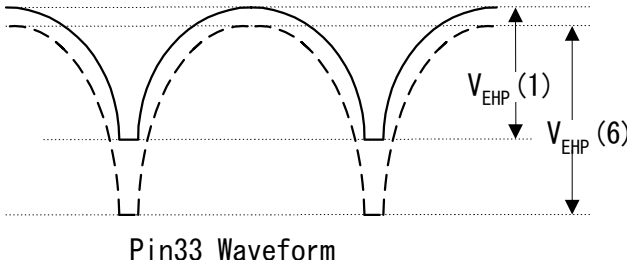


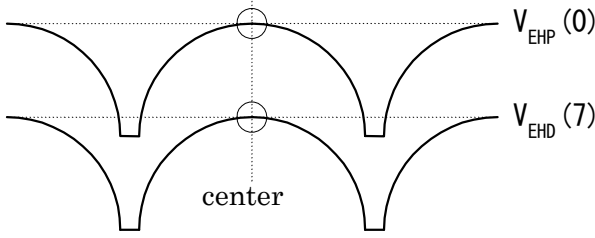
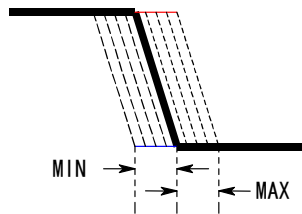
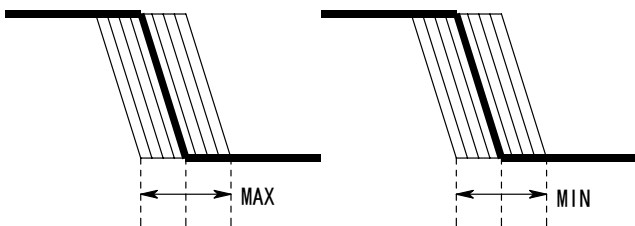
Fig. D23

| Note | Items/Symbols   | Bus conditions                       | Measurement methods  |
|------|---|--------------------------------------|--|
| D27  | Vertical Linearity<br>Variable Range<br>/ $\Delta V_{LIN}$                            | V Linearity:0/8/15<br>Others: Preset | <p>(1) Supply 6V into pin28(EHT in).</p> <p>(2) Measure the levels of the A - F in the following figure in setting the V-Lin for each.</p> <p>(3) Calc the "V-LIN" with this formula.<br/> <math display="block">V-Lin = \{ ( B - C ) + ( E - F ) \} / \{ 2 \times ( A + D ) \} \times 100\%</math></p>  <p>The graph shows a DAC output waveform with three levels: MAX, TYP, and MIN. A solid line represents the ideal linear response, while a dashed line shows the actual measured response. Six horizontal dashed lines are drawn across the waveform, labeled (A) through (F) on the right. (A) and (D) are the vertical distances between the MAX and TYP levels, and between the TYP and MIN levels, respectively. (B) and (E) are the vertical distances between the MAX and (A) levels, and between the (F) and MIN levels, respectively. (C) and (F) are the vertical distances between the (A) and (F) levels.</p> |
| D28  | Vertical S Correction<br>Variable Range<br>/ $\Delta V_{S(+)}$<br>/ $\Delta V_{S(-)}$ | V S Corr.:0/8/15<br>Others: Preset   | <p>(1) Supply 6V into pin28(EHT in).</p> <p>(2) Measure the levels of the A - F in the following figure in setting the V-S for each.</p> <p>(3) Calc the "V-LIN" with this formula.<br/> <math display="block">V-S(+) = ( A - B ) / A \times 100\%</math> <math display="block">V-S(-) = ( A - C ) / A \times 100\%</math></p>  <p>The graph shows a DAC output waveform with three levels: MAX, TYP, and MIN. A solid line represents the ideal linear response, while a dashed line shows the actual measured response. Three horizontal dashed lines are drawn across the waveform, labeled (A) through (C) on the right. (A) is the vertical distance between the MAX and TYP levels. (B) is the vertical distance between the MAX and (A) levels. (C) is the vertical distance between the (A) and TYP levels.</p>  |

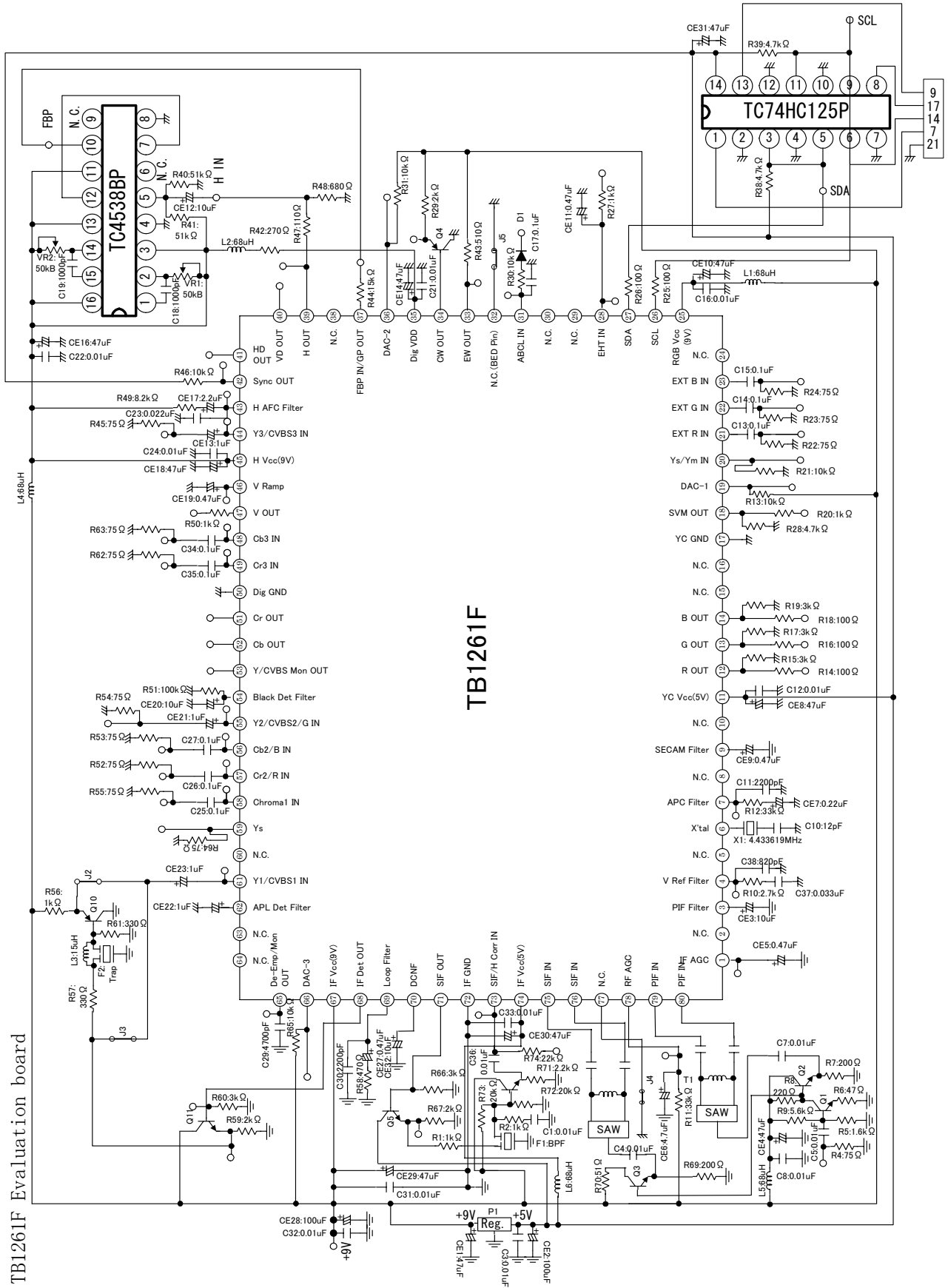
| Note | Items/Symbols  | Bus conditions  | Measurement methods   |
|------|--|---|---|
| D29  | Vertical Amplitude<br>EHT Correction<br>/ $\Delta V_{EHT}$ | Parabola<br>correction:<br>32/63<br>Trapezium<br>correction:<br>0~31<br>V.EHT:0/7<br>Others: Preset               | <p>(1) Set the BUS data of Parabola correction to 0(MAX),and change the BUS data of Trapezium correction so that the parabola waveform at pin41(EW OUT) is symmetrical.</p>  <p>(2) Set the BUS data of Parabola correction to 32(CEN).<br/>           (3) Supply 1V into pin28(EHT in).<br/>           (4) Set the BUS data of V.EHT to 0(MIN).<br/>           (5) Measure the amplitude of waveform at pin47(V out),that is <math>V_{EHT}(00)</math>.<br/>           (6) Set the BUS data of V.EHT to 7(MAX).<br/>           (7) Measure the amplitude of waveform at pin47(V out),that is <math>V_{EHT}(07)</math>.<br/>           (8) <math>\Delta V_{EHT} = (V_{EHT}(00) - V_{EHT}(07)) / V_{EHT}(00) \times 100\%</math></p>  <p style="text-align: center;">Pin47 Waveform</p> |
| D30  | E-W H Size<br>/ $V_{EWDCMAX}$<br>/ $V_{EWDCMIN}$           | Parabola<br>correction:<br>32/63<br>Trapezium<br>correction:<br>0~31<br>Horizontal<br>size:0/63<br>Others: Preset | <p>(1) Set the BUS data of Parabola correction to 0(MAX),and change the BUS data of Trapezium correction so that the parabola waveform at pin33(EW OUT) is symmetrical.<br/>           (2) Set the BUS data of Parabola correction to 32(CEN).<br/>           (3) Supply 6V into pin28(EHT in).<br/>           (4) Set the BUS data of Horizontal size to 0(MAX). Measure the voltage at pin33(EW OUT),that is "<math>V_{EWDCMAX}</math>".<br/>           (5) Set the BUS data of Horizontal size to 63(MIN). Measure the voltage at pin33(EW OUT),that is "<math>V_{EWDCMIN}</math>".</p>  <p style="text-align: center;">Pin41 Waveform</p>   |

| Note | Items/Symbols  | Bus conditions  | Measurement methods   |
|------|--|---|---|
| D35  | E-W Parabolic<br>/ $V_{EWPMAX}$<br>/ $V_{EWPMIN}$                                      | Parabola correction: 0/63<br>Trapezium correction: 0~31<br>Horizontal size:32<br>Others: Preset | <ol style="list-style-type: none"> <li>(1) Set the BUS data of Parabola correction to 0(MAX),and change the BUS data of Trapezium correction so that the parabola waveform at pin33(EW OUT) is symmetrical.</li> <li>(2) Set the BUS data of Horizontal size to 32(CEN).</li> <li>(3) Supply 6V into pin28(EHT in).</li> <li>(4) Set the BUS data of Parabola correction to 0(MAX). Measure the amplitude of waveform at pin33(EW OUT),that is "<math>V_{EWPMAX}</math>".</li> <li>(5) Set the BUS data of Parabola correction to 63(MIN). Measure the amplitude of waveform at pin33(EW OUT),that is "<math>V_{EWPMIN}</math>".</li> </ol>  <p style="text-align: center;">Pin33 Waveform</p>  |
| D36  | E-W Corner<br>/ $V_{EWCTMAX}$<br>/ $V_{EWCTMIN}$<br>/ $V_{EWCBMAX}$<br>/ $V_{EWCBMIN}$ | Parabola correction:0<br>Trapezium correction:0~31<br>Corner correction: 0/15<br>Others: Preset | <ol style="list-style-type: none"> <li>(1) Set the BUS data of Parabola correction to 0(MAX),and change the BUS data of Trapezium correction so that the parabola waveform at pin33(EW OUT) is symmetrical.</li> <li>(2) Set the BUS data of Parabola correction to 0(MAX).</li> <li>(3) Supply 6V into pin28(EHT in).</li> <li>(4) Set the BUS data of Corner correction to 0.</li> <li>(5) Measure the amplitude of waveform at pin33(EW OUT),that is <math>V_{CR}(0)</math>.</li> <li>(6) Set the BUS data of Corner correction to 15.</li> <li>(7) Measure the amplitude of waveform at pin33(EW OUT),that is <math>V_{CR}(15)</math>.</li> <li>(8) <math>V_{COR} = V_{CR}(15) - V_{CR}(0)</math></li> </ol>  <p style="text-align: center;">Pin33 Waveform</p> |

| Note | Items/Symbols  | Bus conditions   | Measurement methods  |
|------|--|--|--|
| D37  | E-W Trapezium Correction<br>/ $V_{TRMAX}$<br>/ $V_{TRMIN}$ | Trapezium correction:<br>0/31<br>Others: Preset        | <p>(1) Set the BUS data of 'EW Trape' so as to hit the peak at the center of the V period.</p> <p>(2) Set the BUS data of Trapezium correction to 0.</p> <p>(3) Measure the % of the shifts.</p> <p>(4) Set the BUS data of Trapezium correction to 63.</p> <p>(5) Measure the % of the shifts.</p>    |
| D38  | E-W Parabolic EHT Correction<br>/ $\Delta V_{EWP EHT}$     | Trapezium correction:0~31<br>H.EHT:7<br>Others: Preset | <p>(1) Set the BUS data of Parabola correction to 0(MAX),and change the BUS data of Trapezium correction so that the parabola waveform at pin33(EW OUT) is symmetrical.</p> <p>(2) Set the BUS data of H.EHT to 7.</p> <p>(3) Supply 6V into pin28(EHT in).</p> <p>(4) Measure the amplitude of waveform at pin34(EW OUT),that is <math>V_{EHP}(6)</math>.</p> <p>(5) Supply 1V into pin28(EHT in).</p> <p>(6) Measure the amplitude of waveform at pin33(EW OUT),that is <math>V_{EHP}(1)</math>.</p> <p>(7) <math>\Delta V_{EWP EHT} = (V_{EHP}(6) - V_{EHP}(1)) / V_{EHP}(6) \times 100\%</math></p>  |

| Note | Items/Symbols  | Bus conditions   | Measurement methods  |
|------|--|--|--|
| D39  | E-W DC EHT Correction<br>/ $V_{EWDCEHT}$   | Trapezium correction:<br>0~31<br>H.EHT:0/7<br>Others: Preset | <ol style="list-style-type: none"> <li>(1) Set the BUS data of Parabola correction to 0(MAX),and change the BUS data of Trapezium correction so that the parabola waveform at pin33(EW OUT) is symmetrical.</li> <li>(2) Supply 1V into pin28(EHT in).</li> <li>(3) Set the BUS data of H.EHT to 0.</li> <li>(4) Measure the vertical phase center voltage of waveform at pin33(EW OUT),that is <math>V_{EHD}(0)</math>.</li> <li>(5) Set the BUS data of H.EHT to 7.</li> <li>(6) Measure the vertical phase center voltage of waveform at pin33(EW OUT),that is <math>V_{EHD}(7)</math>.</li> <li>(7) <math>V_{EWDCEHT} = V_{EHD}(0) - V_{EHD}(7)</math></li> </ol>  <p style="text-align: center;">Pin33 Waveform</p> |
| D40  | H-Bow Correction<br>H-Parallelogram Correction<br>/ $T_{HBOWMAX}$<br>/ $T_{HBOWMIN}$<br>/ $T_{HPARAMAX}$<br>/ $T_{HPARAMIN}$ |  | <ol style="list-style-type: none"> <li>(1) Let the phase of the HOUT falling edge by to the H sync is Origin when HBAW = 4 (cent).</li> <li>(2) Measure the phase shifting when H BAW= 0 and 7, that is <math>T_{HBOWMAX} / T_{HBOWMIN}</math>.</li> <li>(3) Measure the phase shifting when H PARA= 0 and 7, that is <math>T_{HPARAMAX} / T_{HPARAMIN}</math></li> </ol>  <p style="text-align: center;">H-Bow Correction</p>  <p style="text-align: center;">H-Parallelogram Correction</p>  |
| D41  | Noise Det level<br>$V_{NDET3}$<br>$V_{NDET15}$   |  | <ol style="list-style-type: none"> <li>(1) Input CVBS signals with 10MHz of sin wave for #61(CVBS1in)</li> <li>(2) Set the IICBUS of 'Nose Det Level' to 3</li> <li>(3) Measure the input sin wave amplitude at the level which the Read bus of NOISE det turned to 1, that is <math>1V_{NDET3}</math>.</li> <li>(4) Set the IICBUS of 'Nose Det Level' to 15</li> <li>(5) Measure the same way as (3), that is <math>1V_{NDET3}</math>.</li> </ol>  |

11, Evaluation board shema



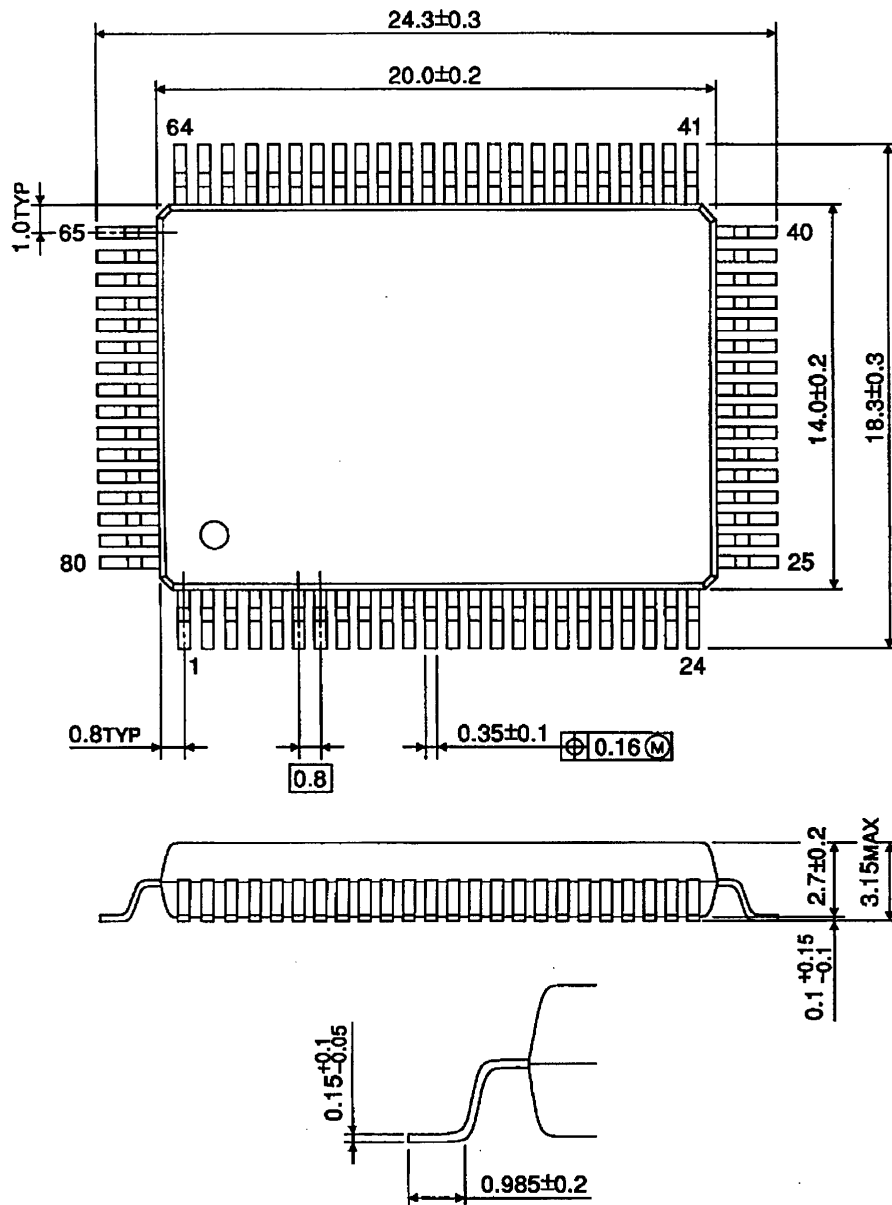




## 13, OUTLINE DRAWING

QFP80-P-1420-0.80C

Unit : mm



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000707EBA1

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