

# 承認願

No. BX-3873

|                                                                                                                    |               |      |                    |          |    |
|--------------------------------------------------------------------------------------------------------------------|---------------|------|--------------------|----------|----|
| 納入先                                                                                                                | 三星電子(株) DVS 殿 | 適用機種 | 品名 TUNER, RF/TU/IF |          |    |
| 件名                                                                                                                 | 新規承認願いの件      | 品番   | 貴社                 |          |    |
|                                                                                                                    |               |      | 弊社                 | VHA35ASE |    |
| <p>要点</p> <p>3in1 TM BLOCK VHA35ASE において、<br/>新規に仕様を発行しますので、ご承認下さるようお願い申し上げます。</p> <p>・Pb-Free</p> <p>・VE type</p> |               |      |                    |          |    |
| 理由                                                                                                                 |               |      | 資料                 |          |    |
| 1. 新規にご採用願うため                                                                                                      |               |      | 1. 承認願             |          |    |
|                                                                                                                    |               |      | 2. 製品仕様書           |          |    |
| 承認印 (不承認の場合は理由をご記入の上御返却願います)                                                                                       |               |      |                    |          |    |
| 備考                                                                                                                 |               |      |                    |          |    |
| 作成年月日                                                                                                              |               |      | 承認                 | 検印       | 検印 |
| 2004年 1月 9日                                                                                                        |               |      |                    |          |    |
| 発行部署                                                                                                               |               |      | 係                  |          |    |
| 三洋電波工業(株) TUNER技術部                                                                                                 |               |      | 松川                 |          |    |

# SPECIFICATIONS

3 IN 1 MODULATOR, TUNER, IF BLOCK

**MODEL :** \_\_\_\_\_

(VHA35ASE)

**Pb-Free**

SANYO TUNER INDUSTRIES CO., LTD.

TUNER ENGINEERING SECTION

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APPROVED

CHECKED

WRITTEN

Jan. 09. '04

Jan. 9. '04

Jan. 9. '04

X. Johra

M. Katay

A. Ahi

## 変更経歴書 History of Revise

| MK                                                       | Date     | Spec. No. | Subject(Outline)           | Reason     | Rev. Page                         | Indi                 | Receipt                   | Schedule                 | OP |
|----------------------------------------------------------|----------|-----------|----------------------------|------------|-----------------------------------|----------------------|---------------------------|--------------------------|----|
| 記号                                                       | 年月日      | 仕様書No.    | 件名 (変更内容)                  | 変更理由       | 変更頁                               | 変更表示                 | 受領年月日<br>Rec't No<br>受領番号 | 納入予定日<br>Delive'd<br>納入日 | 担当 |
| /                                                        | 04.01.09 | BX-3873   | APPROVAL PETITION<br>新規受領願 |            | /                                 | なし                   | . . .                     | . . .                    | 青地 |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
|                                                          | . . .    |           |                            |            |                                   |                      | . . .                     | . . .                    |    |
| Product Name<br>品 名<br>3 IN 1 MODULATOR, TUNER, IF BLOCK |          |           |                            | Code<br>品番 | Customer<br>ユーザ<br>Our Co.<br>弊 社 | 1 1 5 VHA 3 5 A SME○ |                           |                          |    |

## 1. GENERAL

### 1-1 Summary

This unit has RF modulator, tuner and VIF circuits in a case.

### 1-2 Receiving channels and system

USA 181 channels

|               |              |
|---------------|--------------|
| System        | NTSC-M       |
| VHF Low Band  | 2 ~ B CH     |
| VHF High Band | C ~ W+11 CH  |
| UHF Band      | W+12 ~ 69 CH |

### 1-3 Modulator output channels

|            |      |
|------------|------|
| CH SW Open | 3 CH |
| CH SW GND  | 4 CH |

### 1-4 Input, output impedance

|                      |                        |
|----------------------|------------------------|
| ANT input impedance  | 75 $\Omega$ unbalanced |
| ANT output impedance | 75 $\Omega$ unbalanced |

### 1-5 Permissible maximum voltage

|             |         |
|-------------|---------|
| +B, CONTROL | + 5.5 V |
| BT          | +31.0 V |

### 1-6 Normal voltage

|             |                 |
|-------------|-----------------|
| +B, CONTROL | + 5 V $\pm$ 5 % |
| BT          | +30 V $\pm$ 5 % |

### 1-7 Voltage for guaranteeing electrical specification

|             |                   |
|-------------|-------------------|
| +B, CONTROL | + 5 V $\pm$ 0.1 V |
| BT          | +30 V $\pm$ 0.1 V |

### 1-8 Temperature

|                       |               |
|-----------------------|---------------|
| Operating temperature | - 5 to +60 °C |
| Storage temperature   | -20 to +70 °C |

### 1-9 Humidity

|                    |               |
|--------------------|---------------|
| Operating humidity | 35 to 80 % RH |
| Storage humidity   | 10 to 90 % RH |

### 1-10 Intermediate frequencies

|                 |           |
|-----------------|-----------|
| Picture carrier | 45.75 MHz |
| Sound carrier   | 41.25 MHz |

### 1-11 Current consumption

|         | TYP         | MAX         |
|---------|-------------|-------------|
| +B      | 170 mA      | 230 mA      |
| CONTROL | 350 $\mu$ A | 700 $\mu$ A |
| BT      | 2.0 mA      | 5.0 mA      |

## 1-12 Applied safety and regulation standards

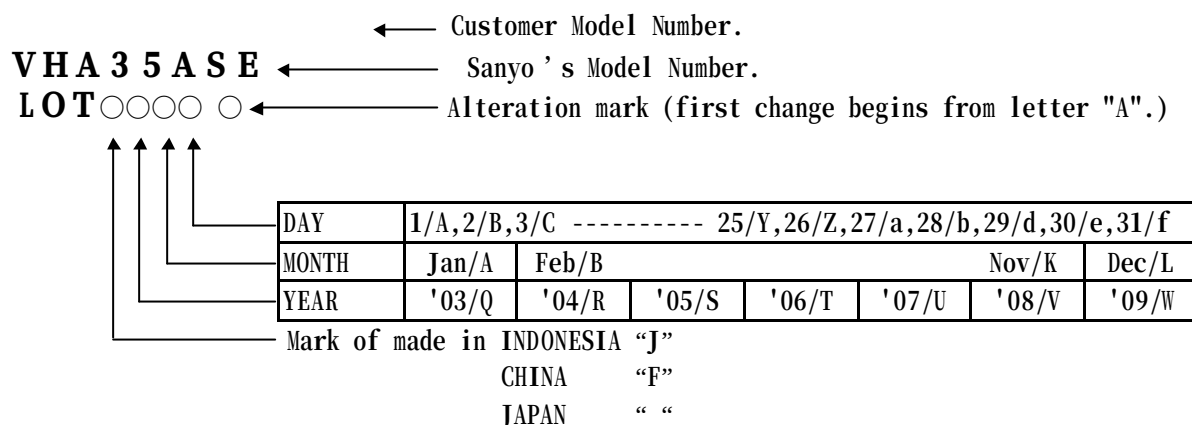
UL1492

FCC Part 15

CSA C22.2 No.1

IC BETS-7

## 1-13 Marking



## 1-14 Terminals

| Number | Terminal  | Function                  |
|--------|-----------|---------------------------|
| 1      | AUDIO IN  | MOD AUDIO INPUT           |
| 2      | CH.SW     | CHANNEL SWITCH (OPEN/GND) |
| 3      | +B        | +B (+5V)                  |
| 4      | CONTROL   | MOD OUTPUT ON/OFF(+5V/0V) |
| 5      | VIDEO IN  | MOD VIDEO INPUT           |
| 6      |           |                           |
| 7      | N.C.      | (RF AGC TP)               |
| 8      | X'TAL     | 3.58MHz INPUT             |
| 9      | N.C.      | - - -                     |
| 10     | CLOCK     | CLOCK SIGNAL INPUT        |
| 11     | DATA      | DATA SIGNAL INPUT         |
| 12     | AFT OUT   | AFT OUTPUT                |
| 13     | AUDIO OUT | AUDIO OUTPUT              |
| 14     | SIF OUT   | SIF OUTPUT                |
| 15     | BT        | TUNING(+31V)              |
| 16     | IF OUT    | IF OUTPUT                 |
| 17     | VIDEO OUT | VIDEO OUTPUT              |

## (RF MODULATOR SECTION)

### 2. RF MODULATOR OUTPUT CHARACTERISTICS

|     | ITEMS                               | SPECIFICATION |        |       |                | MEASUREMENT TERMS                                                     |
|-----|-------------------------------------|---------------|--------|-------|----------------|-----------------------------------------------------------------------|
|     |                                     | MIN           | TYP    | MAX   | UNIT           |                                                                       |
| 2-1 | V.S.W.R.                            |               | 2      | 3     |                | ANT out (MOD.ON) 60 ~ 72 MHz                                          |
| 2-2 | Picture carrier frequency           | -50           | fp     | 50    | KHz            |                                                                       |
| 2-3 | Sound carrier frequency             | -0.007        | fp+4.5 | 0.007 | MHz            |                                                                       |
| 2-4 | Picture level                       | 63.5          | 66.5   | 69.5  | dBμ<br>(close) |                                                                       |
| 2-5 | P/S ratio                           | 19            | 16     | 13    | dB             | 0 ~ (fp-4.6) MHz,<br>(fp+7.4) ~ 1000 MHz                              |
| 2-6 | Spurious level without<br>pass band |               |        | 36    | dBμ<br>(close) |                                                                       |
| 2-7 | Spurious level within<br>pass band  |               |        | -65   | dB             | fp ~ (fp+4.5) MHz<br>Video in : None                                  |
| 2-8 | 920 KHz beat                        |               | -65    | -55   | dB             | Video in : 3.58 MHz, 0.4 Vp-p<br>Measure the level of<br>fp + 920 KHz |

### 3. RF MODULATOR VIDEO CHARACTERISTICS

|     | ITEMS                              | SPECIFICATION |      |     |      | MEASUREMENT TERMS                                                                     |
|-----|------------------------------------|---------------|------|-----|------|---------------------------------------------------------------------------------------|
|     |                                    | MIN           | TYP  | MAX | UNIT |                                                                                       |
| 3-1 | Video in impedance                 | 0.7           | 1.0  | 1.3 | KΩ   | 0 ~ 4.2 MHz (unbalance)<br>Video in : 1 Vp-p<br>S/(V+S)<br>0.5 ~ 4.2 MHz (1 MHz base) |
| 3-2 | Video modulation                   | 71            | 78   | 85  | %    |                                                                                       |
| 3-3 | Sync ratio                         | 26.5          | 28.5 | 30  | %    |                                                                                       |
| 3-4 | Video frequency<br>characteristics | -3            | -1   | 2   | dB   |                                                                                       |
| 3-5 | DG                                 |               | 1    | 7   | %    | Video in : 1 Vp-p,<br>stair step chroma 20 IRE                                        |
| 3-6 | DP                                 |               | 1    | 7   | deg  |                                                                                       |
| 3-7 | Video S/N ratio                    | 45            | 48   |     | dB   |                                                                                       |
| 3-8 | Maximum modulation                 | 88            | 94   | 99  | %    |                                                                                       |

### 4. RF MODULATOR AUDIO CHARACTERISTICS

|     | ITEMS                              | SPECIFICATION |      |     |      | MEASUREMENT TERMS                                                                        |
|-----|------------------------------------|---------------|------|-----|------|------------------------------------------------------------------------------------------|
|     |                                    | MIN           | TYP  | MAX | UNIT |                                                                                          |
| 4-1 | Audio in impedance                 | 10            |      |     | KΩ   | 50 Hz ~ 10 KHz (unbalance)<br>Audio in : -3.8 dBs, 1 KHz<br>(±25 KHz deviation : 100 %)  |
| 4-2 | Modulation                         | 80            | 100  | 120 | %    |                                                                                          |
| 4-3 | Audio frequency<br>characteristics | -3            | -0.5 | 3   | dB   | 50 Hz ~ 10 KHz (1 KHz base)                                                              |
| 4-4 | Distortion                         |               | 0.3  | 1   | %    | Audio in : -3.8 dBs, 1 KHz<br>Audio in : -3.8 dBs, 1 KHz<br>Video in : 2 Vp-p, color bar |
| 4-5 | Audio S/N ratio                    | 45            | 50   |     | dB   |                                                                                          |

### 5. SW CIRCUITS CHARACTERISTICS

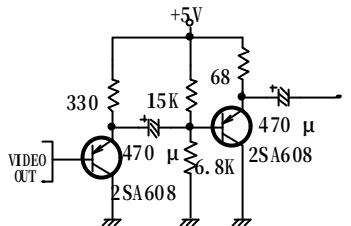
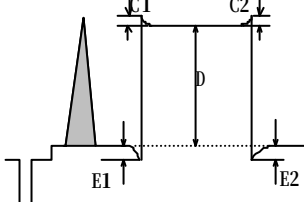
|     | ITEMS                              | SPECIFICATION |     |     |                | MEASUREMENT TERMS                          |
|-----|------------------------------------|---------------|-----|-----|----------------|--------------------------------------------|
|     |                                    | MIN           | TYP | MAX | UNIT           |                                            |
| 5-1 | V.S.W.R.                           |               |     | 3   |                | ANT out<br>(MOD.OFF) 54 ~ 810 MHz          |
| 5-2 | Insertion loss                     |               |     | 6   | dB             | ANT in - ANT out<br>(MOD.OFF) 54 ~ 810 MHz |
| 5-3 | Separation                         | 60            | 65  |     | dB             | ANT in - ANT out<br>(MOD.ON) 60 ~ 72 MHz   |
| 5-4 | ANT in terminal leakage<br>voltage |               | 0   | 9.5 | dBμ<br>(close) |                                            |

### 6. RF MODULATOR THERMAL STABILITY CHARACTERISTICS

|     | ITEMS                     | SPECIFICATION |     |     |      | MEASUREMENT TERMS         |
|-----|---------------------------|---------------|-----|-----|------|---------------------------|
|     |                           | MIN           | TYP | MAX | UNIT |                           |
| 6-1 | Video modulation          | -10           |     | 10  | %    | 0 ~ 60 °C(25 °C standard) |
| 6-2 | Sound modulation          | -10           |     | 10  | %    |                           |
| 6-3 | Picture carrier frequency | -80           |     | 80  | KHz  |                           |
| 6-4 | Sound carrier frequency   | -12           |     | 12  | KHz  |                           |
| 6-5 | Video output level        | -2            |     | 2   | dB   |                           |
| 6-6 | P/S ratio                 | -2.5          |     | 2.5 | dB   |                           |

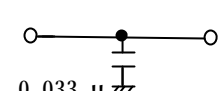
( I F S E C T I O N )

7. IF OUT CHARACTERISTICS

|      | ITEMS                              |                         | SPECIFICATION      |              |               |                     | MEASUREMENT TERMS                                                                                                                                                                    |
|------|------------------------------------|-------------------------|--------------------|--------------|---------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                    |                         | MIN                | TYP          | MAX           | UNIT                |                                                                                                                                                                                      |
| 7-1  | Sensitivity                        | VHF<br>CATV,UHF         |                    | 34<br>34     | 38<br>38      | dB $\mu$<br>(close) | B.P.F (100 KHz ~ 4.2 MHz)<br>Except sync. and chroma<br>signal S/N=20 dB                                                                                                             |
| 7-2  | Video S/N ratio                    | VHF<br>CATV,UHF         | 45<br>45           | 47<br>46     |               | dB                  | Note : In case of item 1,2,5,<br>6,7,8 and 9, the following<br>additional circuit is to be<br>connected between video out<br>terminal and the measuring<br>instrument.<br>See Fig. 1 |
| 7-3  | Maximum input                      | VHF<br>CATV,UHF         | 100<br>90          |              |               | dB $\mu$<br>(open)  |                                                                                                   |
| 7-4  | Video output level                 |                         | 0.8                | 1            | 1.2           | Vp-p                |                                                                                                                                                                                      |
| 7-5  | Sync ratio                         |                         | 26                 | 29           | 32            | %                   | Sync ratio 28.57 % standard                                                                                                                                                          |
| 7-6  | burst ratio                        |                         | 16                 | 25           | 36            | %                   | burst ratio 28.57 % standard                                                                                                                                                         |
| 7-7  | Video frequency<br>characteristics | 1 MHz<br>2 MHz<br>3 MHz | -1.5<br>-2<br>-3.5 | 0<br>0<br>-1 | 1.5<br>3<br>3 | dB                  | JIS C-6101(500 KHz standard)                                                                                                                                                         |
| 7-8  | DP                                 |                         |                    |              | 8             | deg                 | 10 steps staircase signal<br>87.5 % MOD. burst standard<br>(Except 10th step)                                                                                                        |
| 7-9  | DG                                 |                         |                    |              | 8             | %                   | As the above.                                                                                                                                                                        |
| 7-10 | C/L delay                          |                         | -150               | 0            | 150           | nsec                | Group delay 0.5 MHz versus<br>3.58 $\pm$ 0.5 MHz                                                                                                                                     |
| 7-11 | AGC flatness                       |                         | -1                 | 0            | 1             | dB                  | Sensitivity level to<br>maximum input level                                                                                                                                          |
| 7-12 | Bar pulse response                 |                         |                    | 5            | 13            | %                   | C1/D<br>C2/D<br>E1/D<br>E2/D<br>                                                                |

※ ANT In input level 79 dB $\mu$  (75 $\Omega$  OPEN) except 7-1,7-3,7-11, P/S=10 dB

## 8. IF AUDIO OUT CHARACTERISTICS

|     | ITEMS                                            | SPECIFICATION |          |           |                     | MEASUREMENT TERMS                                                                                                                                  |
|-----|--------------------------------------------------|---------------|----------|-----------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                  | MIN           | TYP      | MAX       | UNIT                |                                                                                                                                                    |
| 8-1 | Audio output level                               | 100           | 140      | 173       | mVrms               | 400 Hz 30 % MOD.<br>47 K $\Omega$ load under the black burst.                                                                                      |
| 8-2 | Audio frequency characteristics<br>20 Hz~ 12 KHz | -3            | 0        | +3        | dB                  |                                                                                                                                                    |
| 8-3 | Audio distortion                                 |               | 0.5      | 2         | %                   | 400 Hz 30 % MOD.<br>Under the black burst.<br><br>0.033 $\mu$ F |
| 8-4 | Audio S/N                                        | 48            | 52       |           | dB                  | 1 KHz 100 % MOD.<br>Under the black burst.                                                                                                         |
| 8-5 | Audio sensitivity VHF<br>CATV,UHF                |               | 24<br>24 | 30<br>34  | dB $\mu$<br>(close) | Black burst,1kHz,30 % MOD.<br>H.P.F:400Hz<br>S/N 30 dB                                                                                             |
| 8-6 | Buzz Color bar<br>Sweep                          |               | 10<br>50 | 50<br>100 | mVp-p               | Split color bar signal P/S<br>10 dB Video sweep 0.5~4 MHz<br>(Audio non MOD.)                                                                      |
| 8-7 | SIF output level                                 | 93            | 100      | 110       | dB $\mu$<br>(open)  | US 11CH,79 dB $\mu$ (open),<br>P/S 10dB, Audio non Mod.<br>Use FET probe                                                                           |

※ ANT In input level 66 dB $\mu$  (75  $\Omega$  open) except 8-5. P/S=-7 dB

## 9. AFT CHARACTERISTICS

|     | ITEMS                             | SPECIFICATION |     |     |      | MEASUREMENT TERMS              |
|-----|-----------------------------------|---------------|-----|-----|------|--------------------------------|
|     |                                   | MIN           | TYP | MAX | UNIT |                                |
| 9-1 | AFT center frequency              | 2.0           | 3.0 | 4.0 | V    | 10 steps staircase at US 12 CH |
| 9-2 | AFT output voltage MIN V<br>MAX V | 4.0           |     | 1.0 | V    |                                |

## 10. IF THERMAL CHARACTERISTICS

|      | ITEMS              | SPECIFICATION |     |     |      | MEASUREMENT TERMS                                                                                                                    |
|------|--------------------|---------------|-----|-----|------|--------------------------------------------------------------------------------------------------------------------------------------|
|      |                    | MIN           | TYP | MAX | UNIT |                                                                                                                                      |
| 10-1 | Video output level | -10           |     | 10  | %    | Difference between the measurement value in the standard condition and the value measured in the temperature range of -5 °C to 60 °C |
| 10-2 | Burst ratio        | -10           |     | 10  | %    |                                                                                                                                      |
| 10-3 | Sync ratio         | -10           |     | 10  | %    |                                                                                                                                      |
| 10-4 | Video S/N          | -3            |     | 3   | dB   |                                                                                                                                      |
| 10-5 | Video sensitivity  | -4            |     | 4   | dB   |                                                                                                                                      |
| 10-6 | Audio output level | -2            |     | 2   | dB   |                                                                                                                                      |
| 10-7 | Audio S/N          | -3            |     | 3   | dB   |                                                                                                                                      |
| 10-8 | Audio sensitivity  | -4            |     | 4   | dB   |                                                                                                                                      |
| 10-9 | AFT center voltage | -2            |     | 2   | V    |                                                                                                                                      |

## (TUNER SECTION)

### 11. TUNER CHARACTERISTICS

#### 11-1 Tuning voltage range

VHF 0.5 to 30 V

UHF 0.5 to 30 V

Frequency synthesizer minimum voltage 0.5 V

#### 11-2 Power gain

VHF MIN 25 dB

UHF MIN 24 dB

#### 11-3 Power gain deviation between channels

VHF 12 dB MAX, TYP 6 dB

UHF 14 dB MAX, TYP 6 dB

#### 11-4 Noise figure

VHF 14 dB MAX

CATV,UHF 14 dB MAX

#### 11-5 Image rejection ratio

CH 2 ~ 13 50(40) dB MIN

CH J ~ W+11 50(40) dB MIN

CH W+12 ~ 69 50(40) dB MIN

( ) ; AGC Range 0 ~ -30 dB

#### 11-6 IF rejection ratio

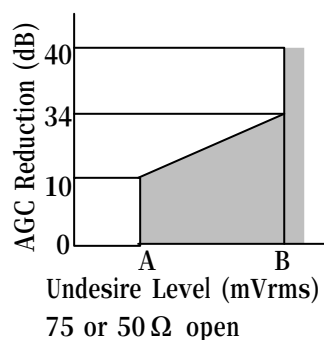
CH 2 ~ B 50(45) dB MIN

CH C ~ W+11 60(50) dB MIN

CH W+12 ~ 69 70(40) dB MIN

( ) ; AGC Range 0 ~ -30 dB

#### 11-7 1% cross modulation



VHF A : 5 mV

B : 70 mV

CATV A : 3 mV

B : 70 mV

UHF A : 5 mV

B : 50 mV

#### 11-8 FM rejection ratio

CH 7 ~ 13 60 dB MIN

CH 5 40 dB MIN (\*1)

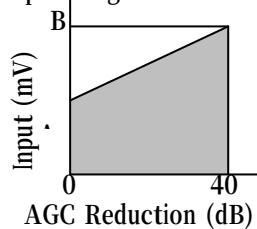
\*1. Des : 5 CH (77.25 MHz) 60 dB  $\mu$  75  $\Omega$  open

Und : 89.1 MHz

s/i = 30 dB

Rej = s/i + (-D/U)

### 11-9 Input signal level at 10 % distortion



|                |            |
|----------------|------------|
| VHF            | A : 3 mV   |
| (75Ω open rms) | B : 300 mV |
| UHF            | A : 3 mV   |
| (50Ω open rms) | B : 300 mV |

### 11-10 VHF,UHF rejection ratio

|     |           |
|-----|-----------|
| VHF | 70 dB MIN |
| UHF | 50 dB MIN |

### 11-11 1/2 IF harmonic rejection ratio

|     |           |
|-----|-----------|
| UHF | 45 dB MIN |
|-----|-----------|

### 11-12 Inter modulation

|     |           |
|-----|-----------|
| VHF | 45 dB MIN |
|-----|-----------|

### 11-13 Drift of oscillation frequency

By  $\pm 1\%$  change of +B voltage

|     |                   |
|-----|-------------------|
| VHF | $\pm 250$ KHz MAX |
| UHF | $\pm 250$ KHz MAX |

By  $\pm 25\text{ }^{\circ}\text{C}$  change from  $25\text{ }^{\circ}\text{C}$

|                         |                    |
|-------------------------|--------------------|
| CH 2 $\sim 13$          | $\pm 2000$ KHz MAX |
| CH J $\sim \text{W}+11$ | $\pm 4000$ KHz MAX |
| CH W+12 $\sim 69$       | $\pm 4000$ KHz MAX |

### 11-14 Local oscillator voltage on the aerial input terminals

|                      |                     |
|----------------------|---------------------|
| 300 MHz MAX          | 34 dB $\mu$ V MAX   |
| 300 $\sim$ 1000 MHz  | 50 dB $\mu$ V MAX   |
| 1000 $\sim$ 1694 MHz | 51.7 dB $\mu$ V MAX |

### 11-15 CH 6 Beat

40 dB $\mu$  MIN

### 11-16 CH A-5 Beat

40 dB $\mu$  MIN

## 1 3. Country origin

SANYO Tuner Industries Co., LTD.(JAPAN)

GuangDong Foshan Optoelectronic Equip.Corp.(CHINA)

SANYO Jaya Components Indonesia (INDONESIA)

## USA CHANNEL FREQUENCY TABLE(181CH)

P IF=45.75MHz

C IF=42.17MHz

S IF=41.25MHz

UNIT:MHz

|             | CHANNEL | P CARRIER | S CARRIER | LOCAL |
|-------------|---------|-----------|-----------|-------|
| VHF<br>Low  | 2       | 55.25     | 59.75     | 101   |
|             | 3       | 61.25     | 65.75     | 107   |
|             | 4       | 67.25     | 71.75     | 113   |
|             | 5       | 77.25     | 81.75     | 123   |
|             | 6       | 83.25     | 87.75     | 129   |
|             | A-6     | 85.25     | 89.75     | 131   |
|             | A-5     | 91.25     | 95.75     | 137   |
|             | A-4     | 97.25     | 101.75    | 143   |
|             | A-3     | 103.25    | 107.75    | 149   |
|             | A-2     | 109.25    | 113.75    | 155   |
|             | A-1     | 115.25    | 119.75    | 161   |
|             | A       | 121.25    | 125.75    | 167   |
|             | B       | 127.25    | 131.75    | 173   |
| VHF<br>High | C       | 133.25    | 137.75    | 179   |
|             | D       | 139.25    | 143.75    | 185   |
|             | E       | 145.25    | 149.75    | 191   |
|             | F       | 151.25    | 155.75    | 197   |
|             | G       | 157.25    | 161.75    | 203   |
|             | H       | 163.25    | 167.75    | 209   |
|             | I       | 169.25    | 173.75    | 215   |
|             | 7       | 175.25    | 179.75    | 221   |
|             | 8       | 181.25    | 185.75    | 227   |
|             | 9       | 187.25    | 191.75    | 233   |
|             | 10      | 193.25    | 197.75    | 239   |
|             | 11      | 199.25    | 203.75    | 245   |
|             | 12      | 205.25    | 209.75    | 251   |
|             | 13      | 211.25    | 215.75    | 257   |
|             | J       | 217.25    | 221.75    | 263   |
|             | K       | 223.25    | 227.75    | 269   |
|             | L       | 229.25    | 233.75    | 275   |
|             | M       | 235.25    | 239.75    | 281   |
|             | N       | 241.25    | 245.75    | 287   |
|             | O       | 247.25    | 251.75    | 293   |
|             | P       | 253.25    | 257.75    | 299   |
|             | Q       | 259.25    | 263.75    | 305   |
|             | R       | 265.25    | 269.75    | 311   |
|             | S       | 271.25    | 275.75    | 317   |
|             | T       | 277.25    | 281.75    | 323   |
|             | U       | 283.25    | 287.75    | 329   |
|             | V       | 289.25    | 293.75    | 335   |
|             | W       | 295.25    | 299.75    | 341   |
|             | W+1     | 301.25    | 305.75    | 347   |
|             | W+2     | 307.25    | 311.75    | 353   |
|             | W+3     | 313.25    | 317.75    | 359   |
|             | W+4     | 319.25    | 323.75    | 365   |
|             | W+5     | 325.25    | 329.75    | 371   |
|             | W+6     | 331.25    | 335.75    | 377   |
|             | W+7     | 337.25    | 341.75    | 383   |
|             | W+8     | 343.25    | 347.75    | 389   |
|             | W+9     | 349.25    | 353.75    | 395   |
|             | W+10    | 355.25    | 359.75    | 401   |

| BAND | CHANNEL | P CARRIER | S CARRIER | LOCAL |
|------|---------|-----------|-----------|-------|
| UHF  | W+11    | 361.25    | 365.75    | 407   |
|      | W+12    | 367.25    | 371.75    | 413   |
|      | W+13    | 373.25    | 377.75    | 419   |
|      | W+14    | 379.25    | 383.75    | 425   |
|      | W+15    | 385.25    | 389.75    | 431   |
|      | W+16    | 391.25    | 395.75    | 437   |
|      | W+17    | 397.25    | 401.75    | 443   |
|      | W+18    | 403.25    | 407.75    | 449   |
|      | W+19    | 409.25    | 413.75    | 455   |
|      | W+20    | 415.25    | 419.75    | 461   |
|      | W+21    | 421.25    | 425.75    | 467   |
|      | W+22    | 427.25    | 431.75    | 473   |
|      | W+23    | 433.25    | 437.75    | 479   |
|      | W+24    | 439.25    | 443.75    | 485   |
|      | W+25    | 445.25    | 449.75    | 491   |
|      | W+26    | 451.25    | 455.75    | 497   |
|      | W+27    | 457.25    | 461.75    | 503   |
|      | W+28    | 463.25    | 467.75    | 509   |
|      | W+29    | 469.25    | 473.75    | 515   |
|      | 14      | 471.25    | 475.75    | 517   |
|      | 15      | 477.25    | 481.75    | 523   |
|      | 16      | 483.25    | 487.75    | 529   |
|      | 17      | 489.25    | 493.75    | 535   |
|      | 18      | 495.25    | 499.75    | 541   |
|      | 19      | 501.25    | 505.75    | 547   |
|      | 20      | 507.25    | 511.75    | 553   |
|      | 21      | 513.25    | 517.75    | 559   |
|      | 22      | 519.25    | 523.75    | 565   |
|      | 23      | 525.25    | 529.75    | 571   |
|      | 24      | 531.25    | 535.75    | 577   |
|      | 25      | 537.25    | 541.75    | 583   |
|      | 26      | 543.25    | 547.75    | 589   |
|      | 27      | 549.25    | 553.75    | 595   |
|      | 28      | 555.25    | 559.75    | 601   |
|      | 29      | 561.25    | 565.75    | 607   |
|      | 30      | 567.25    | 571.75    | 613   |
|      | 31      | 573.25    | 577.75    | 619   |
|      | 32      | 579.25    | 583.75    | 625   |
|      | 33      | 585.25    | 589.75    | 631   |
|      | 34      | 591.25    | 595.75    | 637   |
|      | 35      | 597.25    | 601.75    | 643   |
|      | 36      | 603.25    | 607.75    | 649   |
|      | 37      | 609.25    | 613.75    | 655   |
|      | 38      | 615.25    | 619.75    | 661   |
|      | 39      | 621.25    | 625.75    | 667   |
|      | 40      | 627.25    | 631.75    | 673   |
|      | 41      | 633.25    | 637.75    | 679   |
|      | 42      | 639.25    | 643.75    | 685   |
|      | 43      | 645.25    | 649.75    | 691   |
|      | 44      | 651.25    | 655.75    | 697   |
|      | 45      | 657.25    | 661.75    | 703   |

## USA CHANNEL FREQUENCY TABLE(181CH)

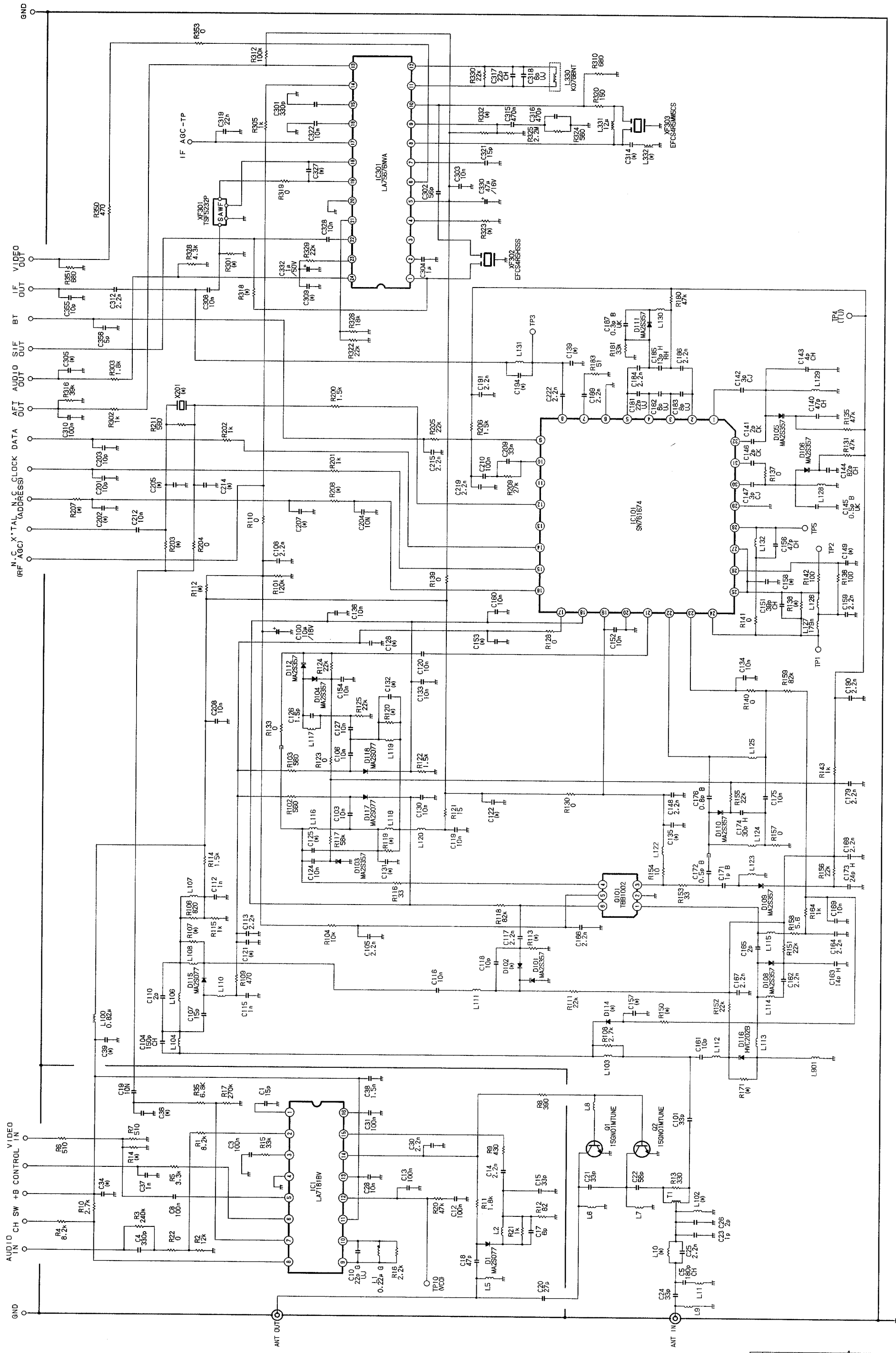
P IF=45.75MHz

C IF=42.17MHz

S IF=41.25MHz

UNIT:MHz

|     | CHANNEL | P CARRIER | S CARRIER | LOCAL |
|-----|---------|-----------|-----------|-------|
| UHF | 46      | 663.25    | 667.75    | 709   |
|     | 47      | 669.25    | 673.75    | 715   |
|     | 48      | 675.25    | 679.75    | 721   |
|     | 49      | 681.25    | 685.75    | 727   |
|     | 50      | 687.25    | 691.75    | 733   |
|     | 51      | 693.25    | 697.75    | 739   |
|     | 52      | 699.25    | 703.75    | 745   |
|     | 53      | 705.25    | 709.75    | 751   |
|     | 54      | 711.25    | 715.75    | 757   |
|     | 55      | 717.25    | 721.75    | 763   |
|     | 56      | 723.25    | 727.75    | 769   |
|     | 57      | 729.25    | 733.75    | 775   |
|     | 58      | 735.25    | 739.75    | 781   |
|     | 59      | 741.25    | 745.75    | 787   |
|     | 60      | 747.25    | 751.75    | 793   |
|     | 61      | 753.25    | 757.75    | 799   |
|     | 62      | 759.25    | 763.75    | 805   |
|     | 63      | 765.25    | 769.75    | 811   |
|     | 64      | 771.25    | 775.75    | 817   |
|     | 65      | 777.25    | 781.75    | 823   |
|     | 66      | 783.25    | 787.75    | 829   |
|     | 67      | 789.25    | 793.75    | 835   |
|     | 68      | 795.25    | 799.75    | 841   |
|     | 69      | 801.25    | 805.75    | 847   |

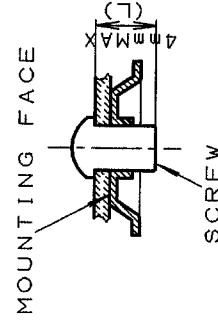
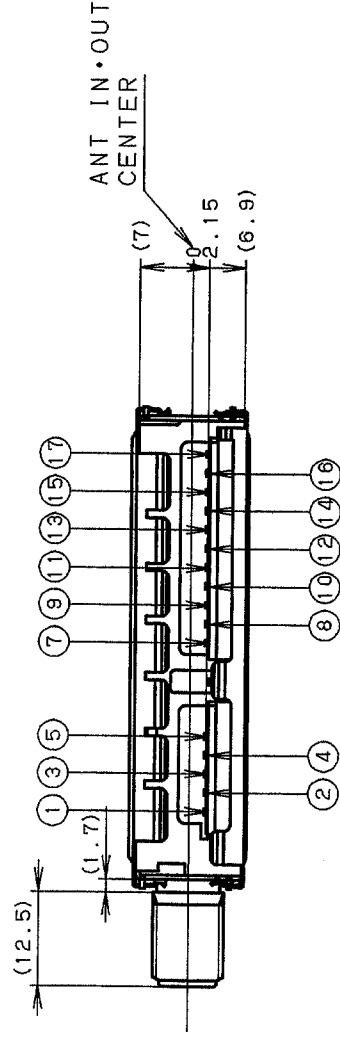
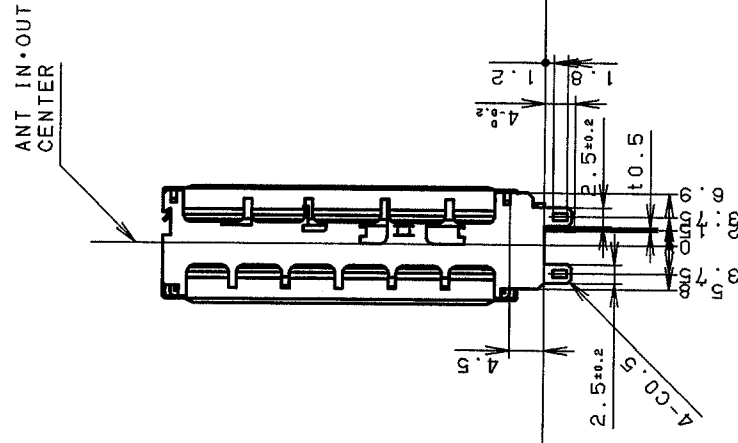
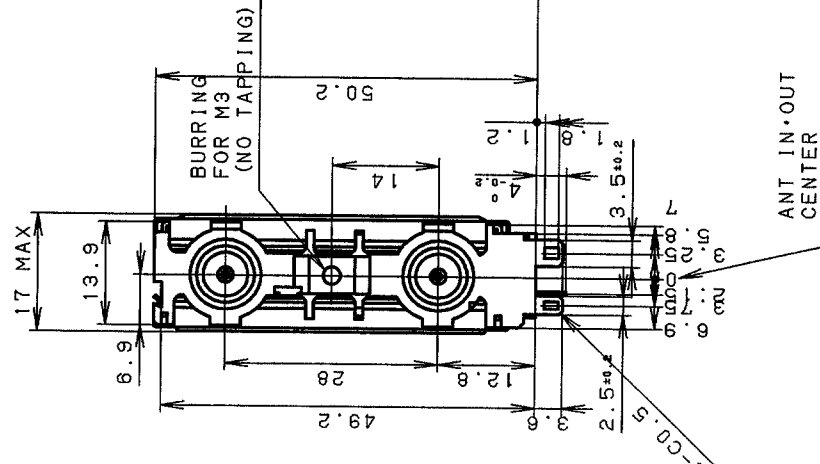
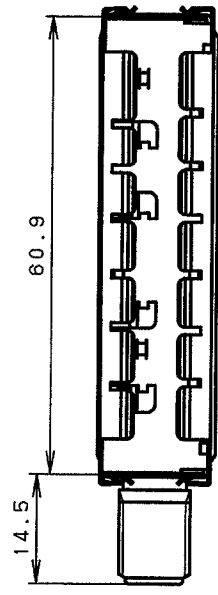


|                    |          |  |
|--------------------|----------|--|
| <i>Jan. 9, '04</i> | APPROVED |  |
| <i>M. Kately</i>   |          |  |
| CHKD               |          |  |
| <i>Jan. 9, '04</i> |          |  |
| CHKD               |          |  |
| <i>[Signature]</i> |          |  |
| 2003.12.19         | DESIGNED |  |
| T.M.A.A.Y.T        |          |  |
| 2004.01.07         | DRAWN    |  |
| Y.ABE              |          |  |
| 2004.01.07         | DRAWN    |  |
| VHA35ASEF          |          |  |

## APPEARANCE & DIMENSIONS

## TERMINALS LAYOUT

|    |                  |
|----|------------------|
| 1  | N. C             |
| 2  | N. C             |
| 3  | +B               |
| 4  | N. C             |
| 5  | N. C             |
| 6  |                  |
| 7  | N. C (RF AGC-TP) |
| 8  | X' TAL           |
| 9  | N. C (ADDRESS)   |
| 10 | CLOCK            |
| 11 | DATA             |
| 12 | AFT OUT          |
| 13 | AUDIO OUT        |
| 14 | SIF OUT          |
| 15 | BT               |
| 16 | IF OUT           |
| 17 | VIDEO OUT        |



|              |             |
|--------------|-------------|
| APPROVED     |             |
| CHECKED      | Jan. 9, '07 |
| CHECKED      | 04.1.8      |
| DESIGNED     | 04.01.08    |
| A. AOCHI     | 04.01.08    |
| DRAWN        |             |
| M. YOSHIMURA |             |

|           |      |                                                                                     |                  |
|-----------|------|-------------------------------------------------------------------------------------|------------------|
| MK        | DATE | REVISION                                                                            |                  |
| SCALE     |      | UNIT                                                                                | CUST.'S PART NO. |
| 1:1       |      | mm                                                                                  |                  |
|           |      |  |                  |
| TOLERANCE |      | SANYO'S MODEL NO.                                                                   |                  |
| ANGLE     |      | OVR                                                                                 | ±                |
|           |      | ~                                                                                   | ±                |
| HOLE      |      | 100 UN                                                                              | ±0.5             |