

APPROVAL PETITION
承認願

No. BX-4181

TO : 納入先	LG DAV	Product Name 品名 Digital Tuner(D2A Tuner)
ITEM : 件名	New issue of Specifications of Digital Tuner	Customer Model No. 貴社品番 EBL38878101
		Our Model No. 弊社品番 115UBA00AL--F(1F)

Summary
要点

Proposal specifications of approval.

Reason 理由	Materials 資料
1. We are pleased to submit you here with our Specifications for your approval.	1. APPROVAL PETITION 2. SPEC SHEET

Space for Approval sign (If you reject, please with reason and rend this document back)
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。)

Remarks
備考

Change mark on the "LOT No." starts from "None".
変更表示は、「なし」からスタートです。

Date of Issued 作成年月日	APPROVED 承認	CHECKED 検印	CHECKED 検印	ISSUED 作成
July 12. 2007	17 Jul '07	17 Jul '07	17 Jul '07	July 16. 2007
DEPT./SECTION 発行部署	Engineering Department			
	<i>Fodera</i>	<i>F. Kakelini</i>	<i>H. Okumura</i>	<i>H.W. Chi</i>

SPECIFICATIONS

Digital Tuner

MODEL : EBL38878101

(UBA00AL)

Pb-Free

SANYO TUNER INDUSTRIES CO., LTD.

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	<table border="1"> <tr> <th>APPROVED</th> <th>CHECKED</th> <th>WRITTEN</th> </tr> <tr> <td><i>17 Jul '07</i></td> <td><i>17. Jul. '07</i></td> <td><i>July 17, 2007</i></td> </tr> <tr> <td><i>Fokura</i></td> <td><i>F. Kakeliri</i></td> <td><i>H.W. Chan</i></td> </tr> </table>	APPROVED	CHECKED	WRITTEN	<i>17 Jul '07</i>	<i>17. Jul. '07</i>	<i>July 17, 2007</i>	<i>Fokura</i>	<i>F. Kakeliri</i>	<i>H.W. Chan</i>
APPROVED	CHECKED	WRITTEN								
<i>17 Jul '07</i>	<i>17. Jul. '07</i>	<i>July 17, 2007</i>								
<i>Fokura</i>	<i>F. Kakeliri</i>	<i>H.W. Chan</i>								

1. Operation Condition and Current Consumption

NO.	Item	Specifications			
		Min	Typ	Max	Unit
1-1	+5V (RF Modulator part)	4.75	5.00	5.25	V/DC
1-2	+5V (Tuner part)	4.75	5.00	5.25	V/DC
1-3	+5V (30V DC-DC converter part)	4.75	5.00	5.25	V/DC
1-4	IF AGC	0.20		3.30	V/DC
1-5	RF modulator S/W CH. 3 CH. 4	2.50		5.25	V/DC
		0		1.50	
1-6	Temperature	0°C~65°C			
1-7	Humidity	35%~80%			
1-8	+5V (RF modulator part) current		50	70	mA
1-9	+5V (Tuner part) current		130	150	mA
1-10	+5V (30V DC-DC converter part) current		20	40	mA
1-11	Power consumption		1.0	1.365	W
1-12	Power save mode				mA
	- RF mod. part: Control pin → Low		4	7	
	- Tuner part: MOP standby mode		8	11	
	- DC-DC converter part: Enable		20	40	
1-13	Power save mode consumption		0.16	0.3	W

2. Absolute Conditions

NO.	Item	Specifications			
		Min	Typ	Max	Unit
2-1	+5V (RF modulator part)	-0.3		5.5	V/DC
2-2	+5V (Tuner part)	-0.3		5.5	V/DC
2-3	+5V (30V DC-DC converter part)			5.5	V/DC
2-4	IF AGC	-0.3		4.0	V/DC
2-5	Temperature	-10°C~70°C			
2-6	Humidity	10%~90%			

3. Test Conditions

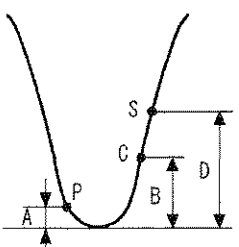
NO.	Item	Specifications			
		Min	Typ	Max	Unit
3-1	+5V (RF modulator part)	4.9	5.0	5.1	V/DC
3-2	+5V (Tuner part)	4.9	5.0	5.1	V/DC
3-3	+5V (30V DC-DC converter part)	4.9	5.0	5.1	V/DC
3-4	RF modulator S/W CH. 3 CH. 4	4.9	5.0	5.1	V/DC
		0	0	0.2	
3-5	Temperature	23°C~27°C			
3-6	Humidity	55%~60%			

4. Terminal Description

Pin NO.	Name	Description
1	AUDIO IN	Audio input pin
2	CH. SW	3/4 Channel switch
3	+5V	Modulator part power supply
4	CONTROL	Modulator On/Off switch (Active mode; 5V/DC)
5	VIDEO IN	Video input pin
6		
7	N.C	RF AGC monitoring
8	+5V	Tuner part power supply (Main 5V)
9	AS	Tuner I2C address pin
10	SCL	I2C serial clock.
11	SDA	I2C serial data.
12	IF AGC	Digital IF AGC input pin
13	IF Output 1	Digital IF output 1
14	IF Output 2	Digital IF output 2
15	GND	
16	+5V	30V DC-DC converter power supply
17	N.C	Tuning voltage monitor pin

- RF modulator CH. 3; Channel S/W → 5V or OPEN
- RF modulator CH. 4; Channel S/W → GND

5. Electrical performance

NO.	Item	Specifications			
		Min	Typ	Max	Unit
5-1	RF part specification				
5-1-1	Input frequency range	54		807	MHz
	Receiving frequency band	54 ~ 807			MHz
	-. Low band	54 ~ 89			
	-. Middle band	174 ~ 217			
-. High band	470 ~ 807				
5-1-2	Channel bandwidth	6			MHz
5-1-3	RF input connector	Type F Connector Receptacle			
5-1-4	Modulator output connector	Type F Connector Receptacle			
5-1-5	IF center frequency	44			MHz
5-1-6	IF band width		6		MHz
5-1-7	RF input impedance	75			Ohm
5-1-8	Control format	I ² C Interface			
5-1-9	V. S. W. R		2.0	7.0	
5-1-10	LO leakage at the ANT. input				dBuV
	-. 54 to 300MHz		20	34	
	-. 300MHz to 1GHz		20	46	
	-. 1GHz to 1.75GHz		30	51.8	
5-1-11	Power gain at IF output terminal		75		dB
5-1-12	Noise figure		5	10	dB
5-1-13	RF AGC reduction	35	55		dB
5-1-14	IF AGC reduction	40	55		dB
5-1-15	Image rejection ratio at max. gain				dB
	-. Low band	50	65		
	-. Mid. band	50	65		
	-. High band	45	55		
5-1-16	IF rejection ratio at max. gain	40	100		dB
5-1-17	IF response (ANT-MOP output)	 <p>All CH A : 0~3.0 dB B : 0~3.0 dB D : 0~5.0 dB</p>			
5-1-18	1% cross modulation	50	55		dBuV
5-1-19	LO phase noise (10kHz offset)		-90		dBc/Hz
5-1-20	Reference PLL X-tal frequency		4		MHz
5-1-21	Frequency accuracy	-65		65	kHz
5-1-22	Lock up time			150	msec

NO.	Item	Specifications			
		Min	Typ	Max	Unit
5-2	RF modulator part specification (NTSC)				
5-2-1	ANT. output V.S.W.R -. 60MHz to 72MHz		2	4	
5-2-2	Picture carrier frequency accuracy	-0.05	Fp	0.05	MHz
5-2-3	Sound carrier frequency accuracy	-0.007	Fp+4.5	0.007	MHz
5-2-4	Picture level(75Ω closed)	63	66	69	dBuV
5-2-5	P/S ratio	19	16	13	dB
5-2-6	Spurious level without pass band			36	dBuV
5-2-7	Spurious level within pass band			-65	dBc
5-2-8	920kHz beat	55	65		dB
5-2-9	Video input impedance -. 0 to 4.2MHz(unbalance)	0.7	1.0	1.3	kohm
5-2-10	Video modulation -. Video in: 1Vp-p	73	80	87	%
5-2-11	Sync ratio -. S/(V+S)	26.5	28.5	30.5	%
5-2-12	Video frequency characteristics -. 0.5 to 4.2MHz(1MHz base)	-3	-1	2	dB
5-2-13	DG -. Video in: 1Vp-p stair step chroma 20IRE		1	7	%
5-2-14	DP -. Video in: 1Vp-p stair step chroma 20IRE		1	7	deg
5-2-15	Video S/N ratio	45	48		dB
5-2-16	Maximum modulation	88	93	99	%
5-2-17	Audio input impedance -. 50Hz to 10kHz(unbalance)	10			kohm
5-2-18	Audio modulation -. Audio in: 436mVrms, 1kHz (±25kHz deviation: 100%)	64	80	96	%
5-2-19	Audio frequency characteristics -. 50Hz to 10kHz(1kHz base)	-3	-0.5	3	dB
5-2-20	Audio Distortion -. Audio in: 436mVrms, 1kHz		0.3	2	%
5-2-21	Audio S/N ratio -. Audio in: 436mVrms, 1kHz -. Video in: 1Vp-p, color bar with sync. buzz	45	48		dB
5-3	RF modulator thermal stability specification (NTSC)				
5-3-1	Video modulation *1	-10		10	%
5-3-2	Sound modulation *1	-10		10	%
5-3-3	Picture carrier frequency *1	-80		80	kHz
5-3-4	Sound carrier frequency *1	-12		12	kHz
5-3-5	Video output level *1	-2		2	dB
5-3-6	P/S ratio *1	-2.5		2	dB
5-3-7	Sync ratio *2	26.4		30.7	%
5-3-8	DG *2	-12		12	%
5-3-9	DP *2	-12		12	Deg
*1 0 to 60°C(25°C standard)					
*2 0 to 60°C(The absolute value)					

6. PLL Information

6-1. Program tuner PLL

6-1-1. Write mode

	MSB						LSB			
ADDRESS BYTE (AB)	1	1	0	0	0	MA1	MA0	R/W=0	A	
DIVIDER BYTE 1 (DB1)	0	N14	N13	N12	N11	N10	N9	N8	A	
DIVIDER BYTE 2 (DB2)	N7	N6	N5	N4	N3	N2	N1	N0	A	
CONTROL BYTE 1 (CB1)	1	0	ATP2	ATP1	ATP0	R2	R1	R0	A	
BAND SW BYTE (BB)	CP1	CP0	AISL	×	BS4	×	BS2	BS1	A	
CONTROL BYTE 2 (CB2)	1	1	ATC	STBY	0	0	ALS	0	A	

Lock frequency

$$F_{osc} = F_r \times N \quad (N = N_{14} \times 2^{14} + N_{13} \times 2^{13} + \dots + N_1 \times 2 + N_0)$$

Fr : Reference frequency (4MHz / Divider ratio)

SYMBOL	DESCRIPTION
MA0, MA1	Address set bits(see table 1)
A	Acknowledge bit
N14..N0	Programmable counter set bits : $N = N_{14} \times 2^{14} + N_{13} \times 2^{13} + \dots + N_1 \times 2 + N_0$
ATP2-ATP0	RF AGC take over point control bits (see Table 2)
R2-R0	Reference division select (see table 3)
CP1, CP0	Charge Pump Current Select (see table 4)
AISL	RF AGC detector selection bit AISL=0: IF amplifier AISL=1: Mixer output(recommend for ATSC)
BS4-BS1	Band select bits (see Table 5)
ATC	AGC current setting and time constant ATC=0:AGC current=300nA (normal mode) ATC=1:AGC current=15uA (channel search mode) During channel select and search mode it is recommend to switch the ATC bit to "1", ATC bit to "0" after FEC lock or 200msec
STBY	Power stand-by mode control bit STBY = 0 : normal operation STBY = 1 : stand-by mode / Stop MOP part and IF AMP part (XTALOUT is available even in stand-by mode)
ALS	AGC level table select (see table 2) ALS= 0 : AGC level 0 ALS= 1 : AGC level 1

× : Don't care

Voltage applied on AS input	MA1	MA0
0V to 0.1Vcc(Low)	0	0
<u>Open</u> , or 0.2Vcc to 0.3Vcc(Mid2)	<u>0</u>	<u>1</u>
0.4Vcc to 0.6Vcc(Mid1)	1	0
0.9Vcc to Vcc (High)	1	1

Table 1 - Address selection

ATP2	ATP1	ATP0	AGC Level 0 (ALS=0)	AGC Level 1 (ALS=1)
0	0	0	117dBuV	<u>112dBuV</u>
0	0	1	114dBuV	109dBuV
0	1	0	111dBuV	106dBuV
0	1	1	108dBuV	103dBuV
1	0	0	105dBuV	100dBuV
1	0	1	102dBuV	97dBuV
1	1	0	99dBuV	94dBuV
1	1	1	Disable	Disable

Table 2 – AGC programming

R2	R1	R0	Reference divider ratio	Frequency step
0	0	0	24	166.67kHz
0	0	1	28	
0	1	0	50	
<u>0</u>	<u>1</u>	<u>1</u>	<u>64</u>	<u>62.5kHz</u>
1	0	0	128	31.25kHz
1	×	1	80	50kHz

Table 3 – Reference divider ratio

CP1	CP0	Charge pump current	Comment
<u>0</u>	<u>0</u>	<u>70 μ A</u>	
0	1	140 μ A	
1	0	350 μ A	
1	1	600 μ A	

Table 4 – Charge pump current

Band selected	Digital center freq.	Charge pump current (μ A)	AISL	×	BS4	×	BS2	BS1	HEX
LOW	57MHz~162MHz	70	1	0	0	0	0	1	<u>21</u>
MID	162MHz~426MHz	70	1	0	0	0	1	0	<u>22</u>
HIGH	426MHz~864MHz	70	1	0	1	0	0	0	<u>28</u>

× : Don't care

Table 5 – Band selection and charge current setting

Control Byte 1	AGC take over point	ATP2	ATP1	ATP0	Divider ratio	STEP frequency	R2	R1	R0	ALS	Byte	HEX
<u>ATSC</u>	<u>112dBuV</u>	0	0	0	64	62.5kHz	0	1	1	—	<u>Byte4</u>	<u>83</u>
					—					1	<u>Byte6</u>	<u>E2</u>

AGC Take over point setting and ref. divider selection

6-1-2. Read mode

	MSB						LSB			
ADDRESS	1	1	0	0	0	MA1	MA0	R/W=1	A	
Status Byte	POR	FL	1	1	×	×	×	×	A	

X : Don't Care

SYMBOL	DESCRIPTION
A	Acknowledge bit
POR	Power on reset indicator POR= 0: Power on POR= 1: Power on reset (End-of-Data transmission procedure)
FL	Phase lock flag FL= 0 : Unlock FL= 1 : PLL lock

Note: Accuracy is 0.03xVcc

6-2. Example of I²C Data Write Sequences

Telegram examples

- Start → ADB → DB1 → DB2 → CB1 → BB → CB2 → Stop (Data format for channel change mode)
- Start → ADB → DB1 → DB2 → Stop
- Start → ADB → CB1 → BB → CB2 → Stop
- Start → ADB → CB1 → BB → Stop
- Start → ADB → CB2 → Stop (Data format for normal mode; ATC=0)

Abbreviations

- ADB ; Address Byte
- DB1 ; Divider Byte 1
- DB2 ; Divider Byte 2
- CB1 ; Control Byte 1
- BB ; Band Byte
- CB2 ; Control Byte 2
- Start ; Start condition
- Stop ; Stop condition

6-2-1. Examples of I²C-bus program sequences

ATSC receiving

LO frequency is 800MHz

F_{comp}=4MHz/64=62.5kHz

N=12800 dec (3200 HEX)

BS4 output port is on and all other ports are off: thus the high band is selected.

Charge pump current I_{CP}=70 μA

AGC take-over points is set to 112dBuV

Address selection is adjacent to make address C2 valid.

	MSB						LSB				HEX
ADDRESS BYTE (AB)	1	1	0	0	0	0	1	0	A	C2	
DIVIDER BYTE 1 (DB1)	0	0	1	1	0	0	1	0	A	32	
DIVIDER BYTE 2 (DB2)	0	0	0	0	0	0	0	0	A	00	
CONTROL BYTE 1 (CB1)	1	0	0	0	0	0	1	1	A	83	
BAND SW BYTE (BB)	0	0	1	0	1	0	0	0	A	28	
CONTROL BYTE 2 (CB2)	1	1	1	0	0	0	1	0	A	E2	

ATC : Speed mode



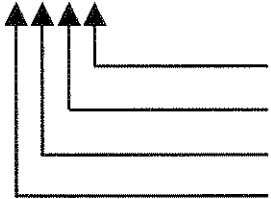
After 200msec or FEC Lock

	MSB						LSB				HEX
ADDRESS BYTE (AB)	1	1	0	0	0	0	1	0	A	C2	
CONTROL BYTE 2 (CB2)	1	1	0	0	0	0	1	0	A	C2	

ATC : Normal mode

7. Marking

UBA00AL ← Sanyo's model number
 LOT ○○○○ ○ ← Alteration mark (first change begins from letter "A")



DAY	1/A, 2/B, 3/C-----25/Y, 26/Z, 27/a, 28/b, 29/d, 30/e, 31/f		
MONTH	Jan/A	Feb/B	Nov/K Dec/L
YEAR	'07/U	'08/V	'09/W '10/X

Mark of made in CHINA (Foshan) "F"
 CHINA (Dongguan/WITTIS) "D"
 JAPAN "J"

8. DURABILITY TEST

No.	ITEM	DESCRIPTION	REQUIREMENT
8-1	Thunder surge test of antenna terminal	15kV 150pF 150Ω 10 Times	No fatal damage
8-2	ESD of each terminal	±200v 200pF 0Ω	No fatal damage
8-3	Temperature cycle test	-40°C, 85°C 100 Cycle	No fatal damage
8-4	High humidity test (bias)	60°C 90% 96 Hr.	No fatal damage
8-5	High temperature test	85°C 48 Hr.	No fatal damage
8-6	Low temperature test	-40°C 48 Hr.	No fatal damage

9. Solder Information

9-1. Solder heat resistance : Temperature 265°C MAX
 (Flow Soldering) Time 5s MAX

9-2. Solder heat resistance : Temperature 350°C MAX
 (Soldered by Hand) Time 3s MAX

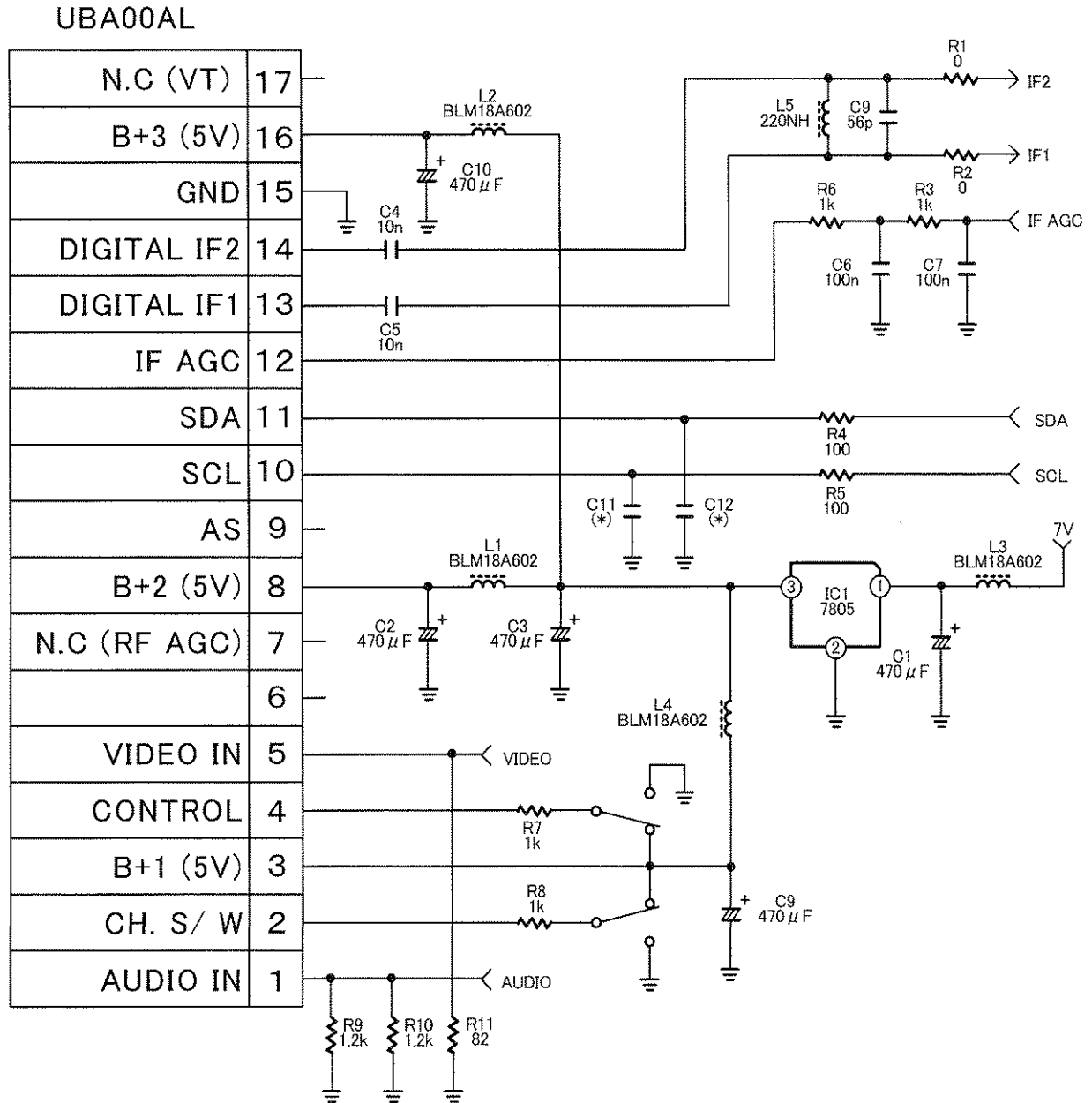
10. Country origin

SANYO Tuner Industries Co., Ltd. (Japan)
 Foshan Nationstar Optoelectronics Co., Ltd. (China)
 WITTIS ELECTRONICS Co., Ltd. (China)

11. Part List

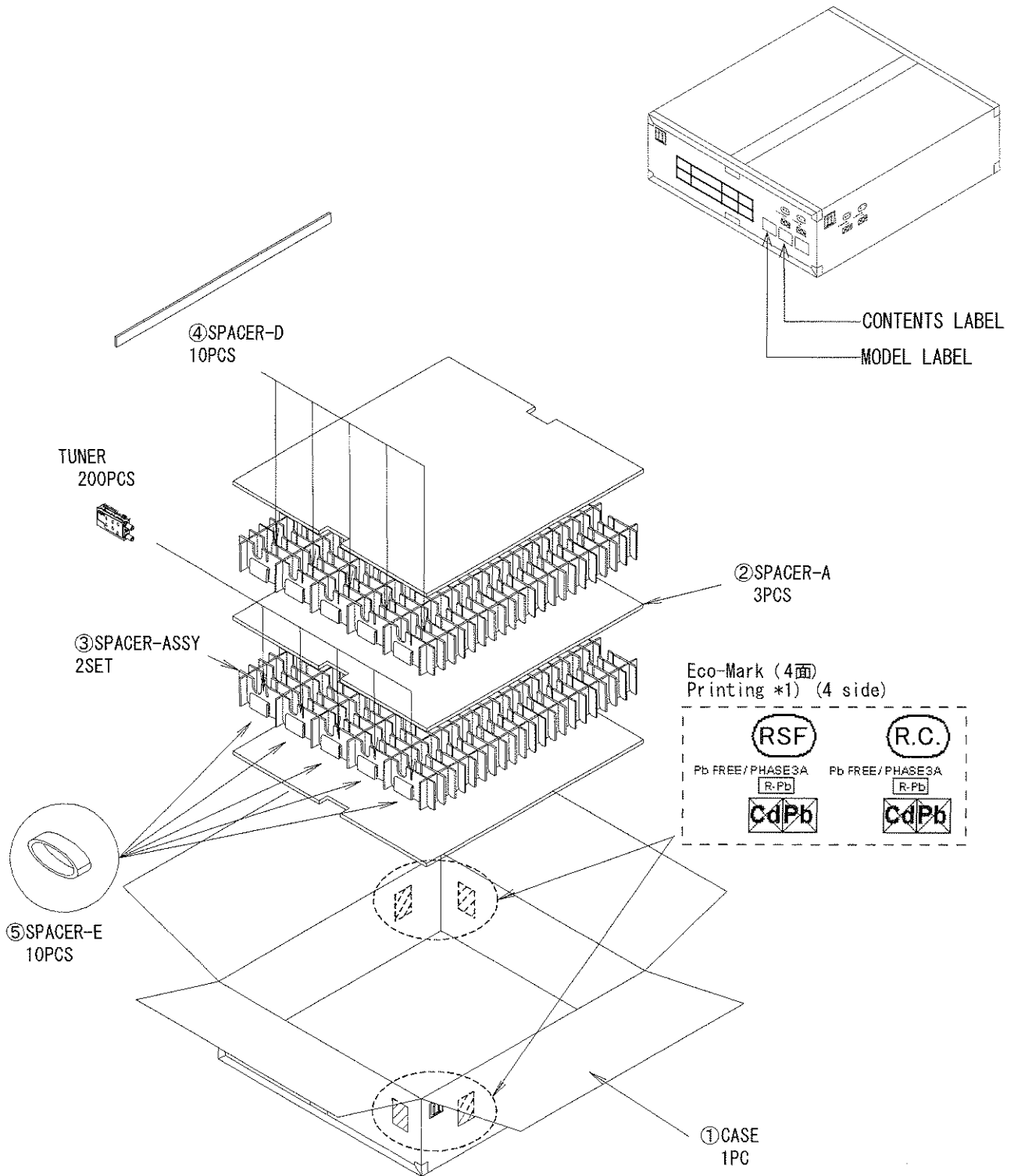
ITEM	SIZE	MAKER	ITEM	SIZE	MAKER
IC SN761668	SSOP 44	TI	CAPACITOR 3300P	CHIP 1005 Type MLCC	TAIYO MURATA
IC TA1372FNG	SSOP 16	TOSHIBA	CAPACITOR 4700P	CHIP 1005 Type MLCC	
FET TBB1005EM	6T CHIP	RENESAS	CAPACITOR 0.047uF	CHIP 1608 Type MLCC	
FET BB505CES	4T CHIP		CHIP RESISTOR 1K	CHIP 1608	
TR KTC4075V		KEC	CHIP RESISTOR 1K	CHIP 1005	ROHM PANASONIC SAMSUNG TAIYO
DIODE 1W402A	VVC 2T CHIP SS	PEC	CHIP RESISTOR 10K	CHIP 1608	
DIODE 1W404A	VVC 2T CHIP SS		CHIP RESISTOR 10K	CHIP 1005	
DIODE MA2S357	VVC 2T CHIP SS	PANASONIC	CHIP RESISTOR 100K	CHIP 1608	
DIODE MA2S372	VVC 2T CHIP SS		CHIP RESISTOR 10	CHIP 1005	
DIODE MA2S077	SWITCHING 2T CHIP SS		CHIP RESISTOR 120	CHIP 1005	
DIODE MAZS3300L	ZENER 2T CHIP		CHIP RESISTOR 12K	CHIP 1608	
SAW FILTER X6764X	F0:44.0 BW 6.0	EPCOS	CHIP RESISTOR 150	CHIP 1005	
SAW FILTER SA5482F3	F0:44.0 BW 6.0	SANYO	CHIP RESISTOR 15K	CHIP 1005	
SAW FILTER SA5482F5	F0:44.0 BW 6.0		CHIP RESISTOR 15	CHIP 1005	
FILTER COIL			CHIP RESISTOR 16K	CHIP 1005	
AXIAL INDUCTOR	2.2UH K LAL02 TP-52	TAIYO	CHIP RESISTOR 1.8K	CHIP 1005	
AXIAL INDUCTOR	1000UH K LAL03 TP-52		CHIP RESISTOR 200	CHIP 1608	
PCB	FR-1 T1.0	PANASONIC	CHIP RESISTOR 2.2K	CHIP 1005	
X-TAL	HC-49US 4MHZ C=16PF	JYEG	CHIP RESISTOR 22K	CHIP 1608	
0.22UH	LK1608 R22K	TAIYO MURATA	CHIP RESISTOR 22K	CHIP 1005	
0.88UH	LK1608 R68K		CHIP RESISTOR 22	CHIP 1005	
CAPACITOR 10P	CHIP 1005 Type MLCC		CHIP RESISTOR 240K	CHIP 1005	
CAPACITOR 100P	CHIP 1005 Type MLCC		CHIP RESISTOR 2.2	CHIP 1005	
CAPACITOR 12P	CHIP 1005 Type MLCC		CHIP RESISTOR 330	CHIP 1608	
CAPACITOR 15P	CHIP 1005 Type MLCC		CHIP RESISTOR 3.3K	CHIP 1005	
CAPACITOR 150P	CHIP 1005 Type MLCC		CHIP RESISTOR 33K	CHIP 1608	
CAPACITOR 18P	CHIP 1005 Type MLCC		CHIP RESISTOR 33K	CHIP 1005	
CAPACITOR 180P	CHIP 1005 Type MLCC		CHIP RESISTOR 33	CHIP 1608	
CAPACITOR 1P	CHIP 1005 Type MLCC		CHIP RESISTOR 33	CHIP 1005	
CAPACITOR 1.5P	CHIP 1005 Type MLCC		CHIP RESISTOR 39	CHIP 1005	
CAPACITOR 20P	CHIP 1005 Type MLCC		CHIP RESISTOR 470	CHIP 1608	
CAPACITOR 220P	CHIP 1005 Type MLCC		CHIP RESISTOR 4.7K	CHIP 1005	
CAPACITOR 27P	CHIP 1005 Type MLCC		CHIP RESISTOR 47K	CHIP 1005	
CAPACITOR 2P	CHIP 1005 Type MLCC		CHIP RESISTOR 510	CHIP 1005	
CAPACITOR 2.5P	CHIP 1005 Type MLCC		CHIP RESISTOR 75K	CHIP 1005	
CAPACITOR 33P	CHIP 1005 Type MLCC		CHIP RESISTOR 75	CHIP 1608	
CAPACITOR 330P	CHIP 1005 Type MLCC		CHIP RESISTOR 820	CHIP 1005	
CAPACITOR 39P	CHIP 1608 Type MLCC		CHIP RESISTOR 82	CHIP 1005	
CAPACITOR 390P	CHIP 1005 Type MLCC		CHIP RESISTOR 0.000	CHIP 1608	
CAPACITOR 0.039uF	CHIP 2125 Type MLCC		CHIP RESISTOR 0.000	CHIP 1005	
CAPACITOR 3P	CHIP 1005 Type MLCC		CHASSIS	SPT0 T0.6 #50	LDEC
CAPACITOR 47P	CHIP 1005 Type MLCC		COVER-A	SPT0 T0.3 #25	
CAPACITOR 4P	CHIP 1005 Type MLCC		COVER-B	SPT0 T0.3 #25	
CAPACITOR 56P	CHIP 1005 Type MLCC		ROSIN SOLDER 0.6	YS-RMA NP103	NGMN
CAPACITOR 5P	CHIP 1005 Type MLCC	ROSIN SOLDER 0.6	DHB-RMA3 NP303		
CAPACITOR 68P	CHIP 1005 Type MLCC	ROSIN SOLDER 0.3	DHB-RMA3 NP303	TAMR	
CAPACITOR 8P	CHIP 1005 Type MLCC	SOLDER CREAM	TLF-204-93K	NGNM	
CAPACITOR 0.3P	CHIP 1005 Type MLCC	SOLDER CREAM	NP303-GM855-GQ-2	ZXEC	
CAPACITOR 0.5P	CHIP 1005 Type MLCC	TERMINAL-16P	MOLD-0.55-16P(NI+SN)		
CAPACITOR 2.2uF	CHIP 1608 Type MLCC	F-SOCKET	L=14.2(90)X9.2 PBF	TKYM	
CAPACITOR 0.1uF	CHIP 1005 Type MLCC	CLEANING SOLVENT	TH-10A 18L TKYM		
CAPACITOR 1uF	CHIP 2125 Type MLCC	CLEANING SOLVENT	IPA 18L TKYM	NGNM	
CAPACITOR 1uF	CHIP 1608 Type MLCC	ROSIN SOLDER 1.2	YS-RMA NP103		
CAPACITOR 0.022uF	CHIP 1005 Type MLCC	ROSIN SOLDER 0.6	YS-RMA NP103		
CAPACITOR 0.47uF	CHIP 1608 Type MLCC	ROSIN SOLDER 1.2	DHB-RMA3 NP303		
CAPACITOR 0.01uF	CHIP 1005 Type MLCC	ROSIN SOLDER 0.6	DHB-RMA3 NP303		
CAPACITOR 1000P	CHIP 1005 Type MLCC	ROSIN SOLDER 0.4	DHB-RMA3 NP303		
CAPACITOR 0.01uF	CHIP 1608 Type MLCC	SOLDER CREAM	NP601-ZP369-GK		
CAPACITOR 0.01uF	CHIP 1005 Type MLCC	CREAM SOLDER	TLF-702-21		TAMR
CAPACITOR 2200P	CHIP 1005 Type MLCC	WAX	BW-185		NKMKL
CAPACITOR 0.022uF	CHIP 1608 Type MLCC				

LGDT 3304 MATCHING CIRCUIT



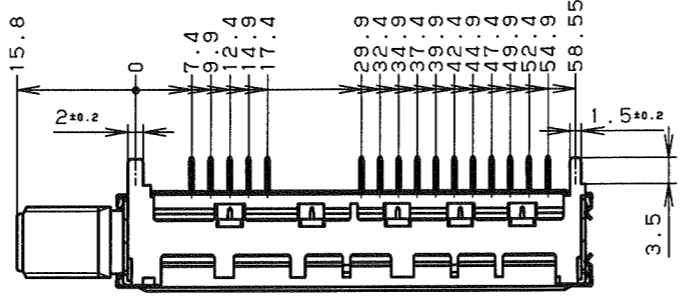
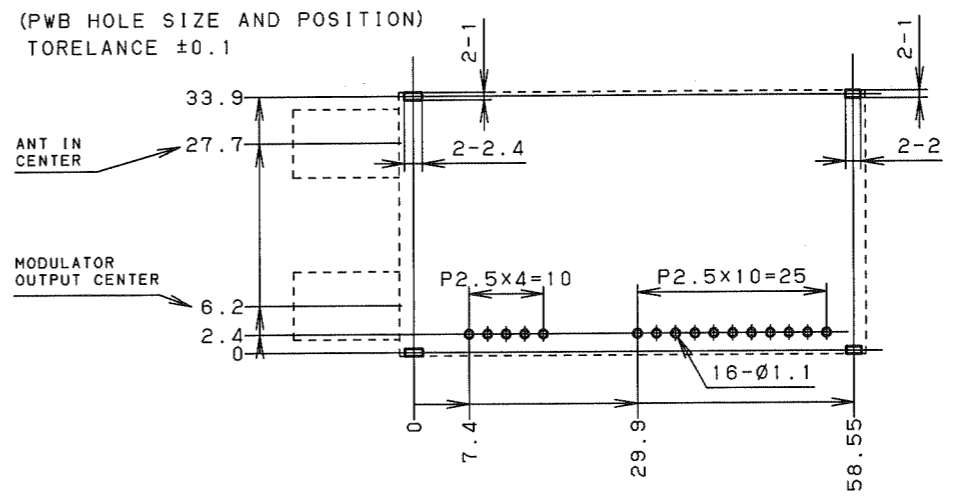
13. Packing Information

- 13-1. Size of packing case
513mm(W) × 468mm(D) × 155mm(H)
- 13-2. The quantity of Tuner in packing case
200pcs(5-lines × 20pcs × 2-layer)
- 13-3. Material of packing case
Mixed both sides cardboard(WF) t=7
- 13-4. Figure of Packing

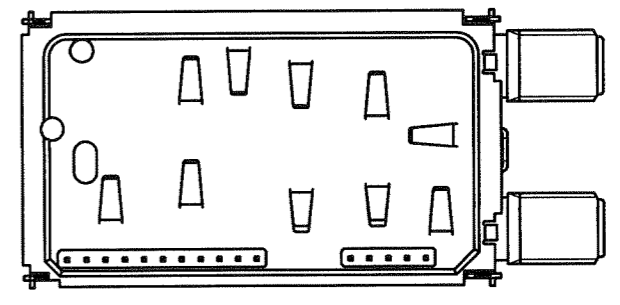
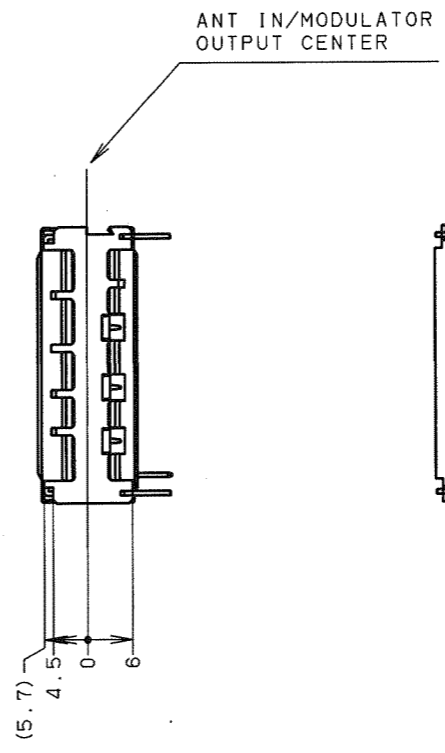
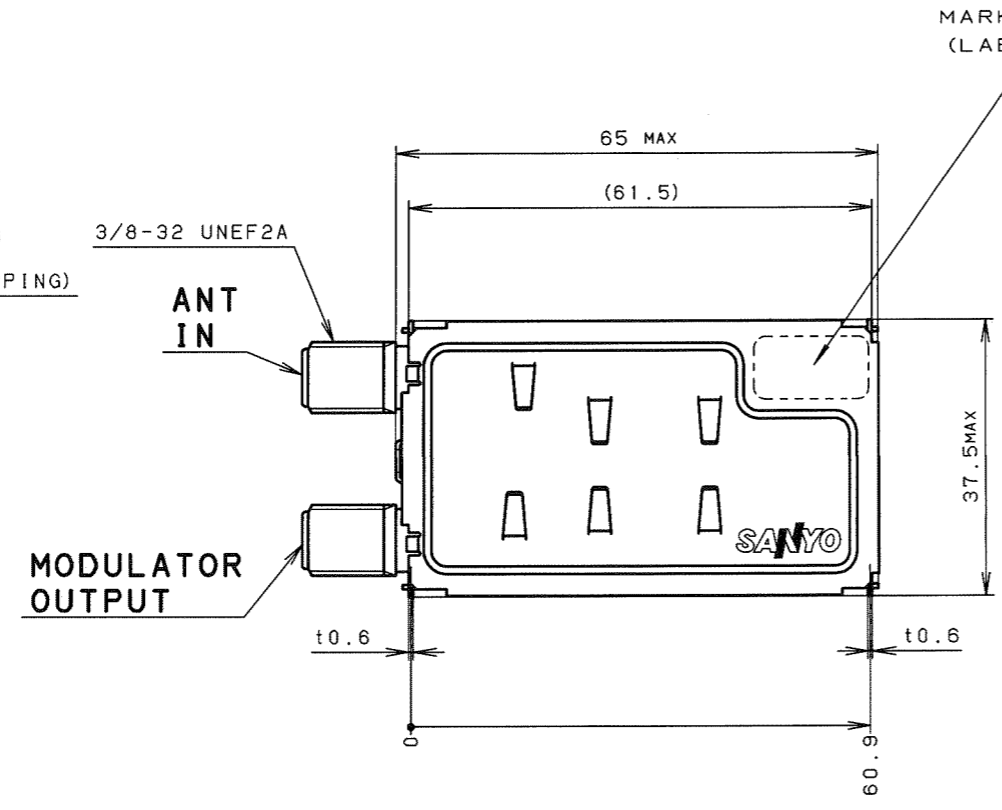
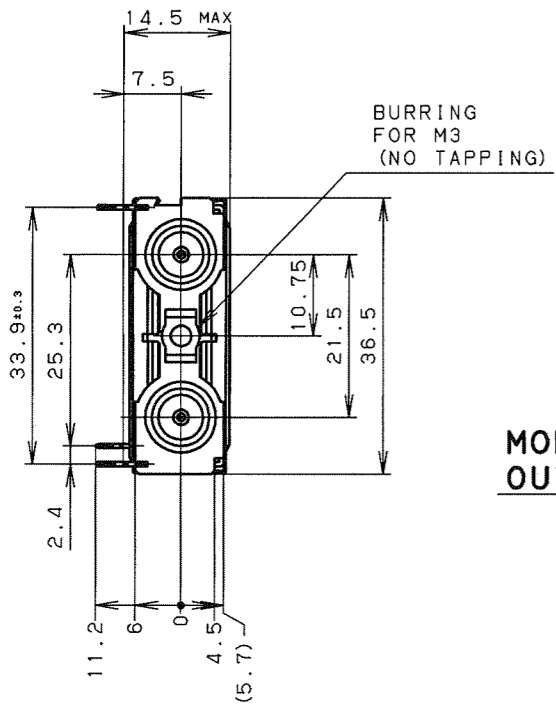


APPEARANCE & DIMENSIONS

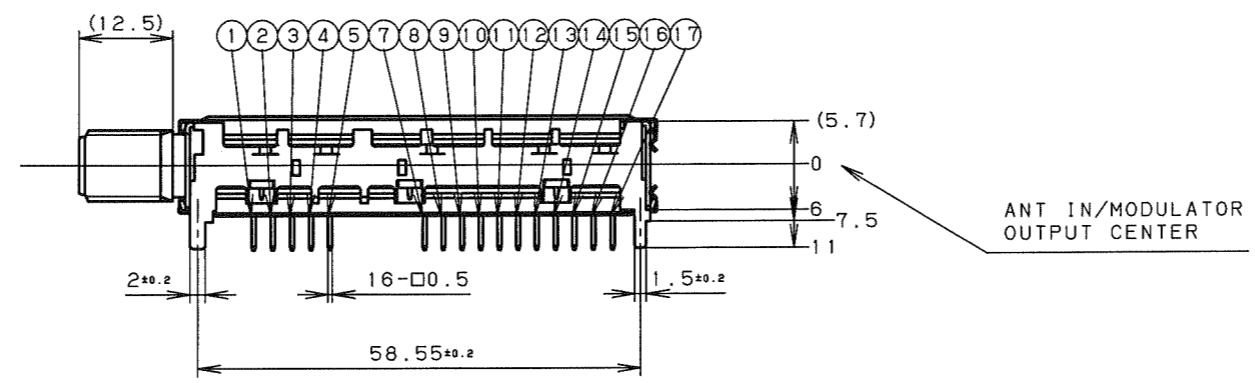
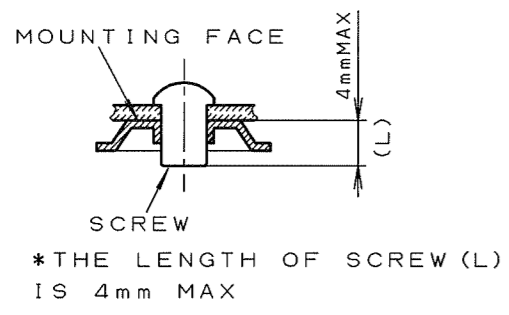
TERMINALS LAYOUT	
1	AUDIO IN
2	CH. SW
3	+5V (RF MODULATOR)
4	CONTROL
5	VIDEO IN
6	
7	N. C (RF AGC-TP)
8	+5V (MAIN)
9	AS
10	SCL
11	SDA
12	IF AGC
13	DIGITAL IF1
14	DIGITAL IF2
15	GND
16	+5V (DC-DC CONVERTER)
17	N. C (VT)



NOTE: DO NOT SCALE



22 Jun 87
APPROVED
Tokuwa
22 Jun 07
CHECKED
F. Kabehi
22 Jun 07
CHECKED
S. Masuda
07.05.11
DESIGNED
H. W. CHOI
07.05.11
DRAWN
M. FUJITA

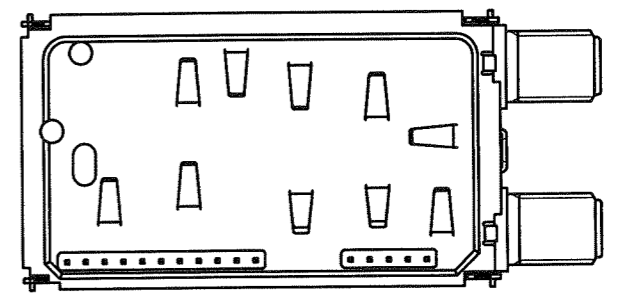
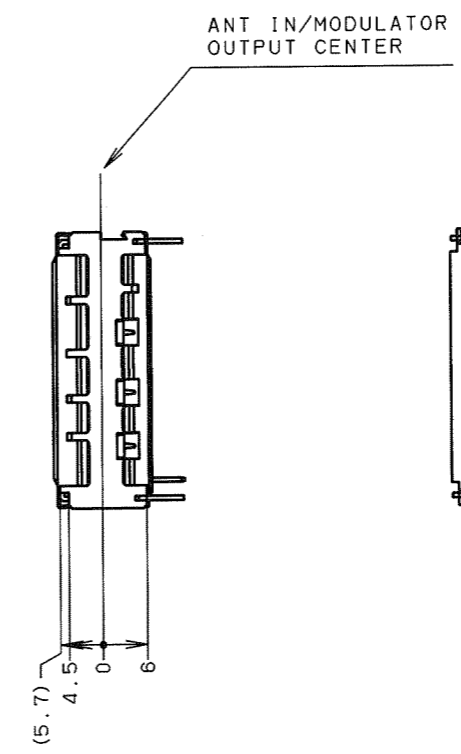
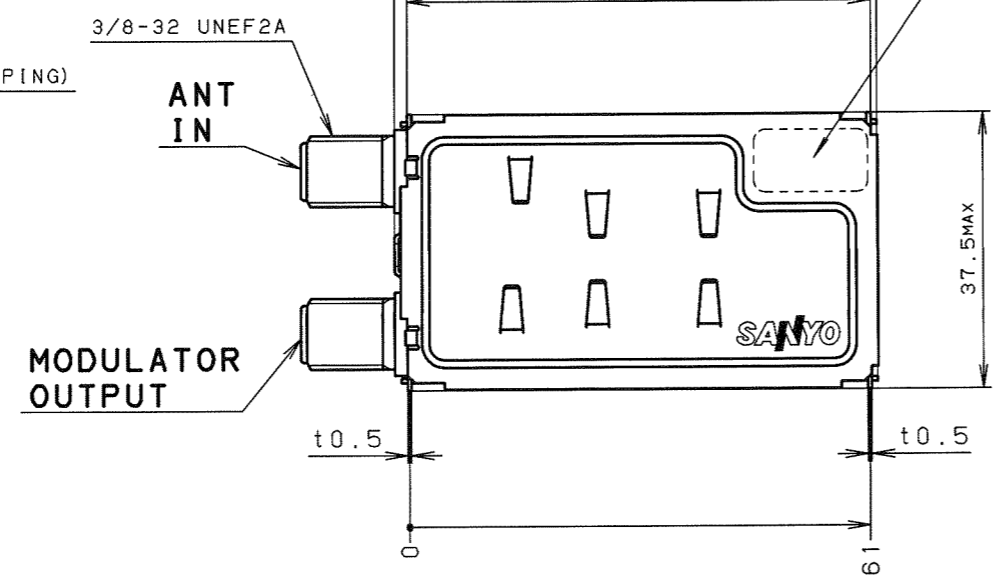
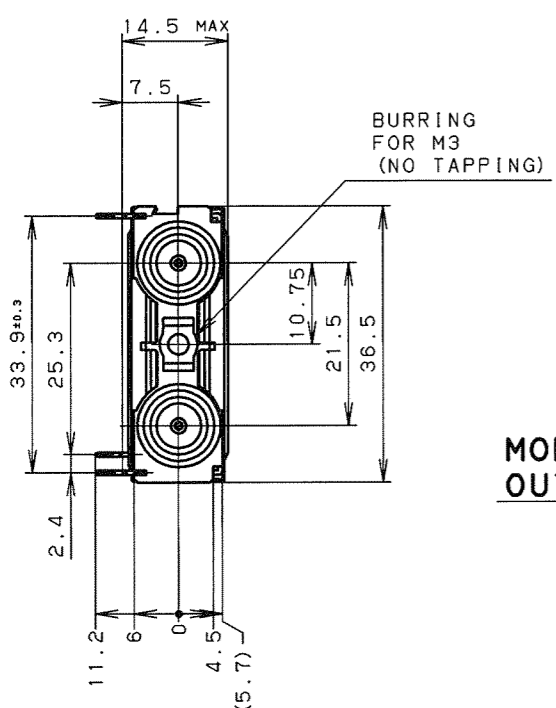
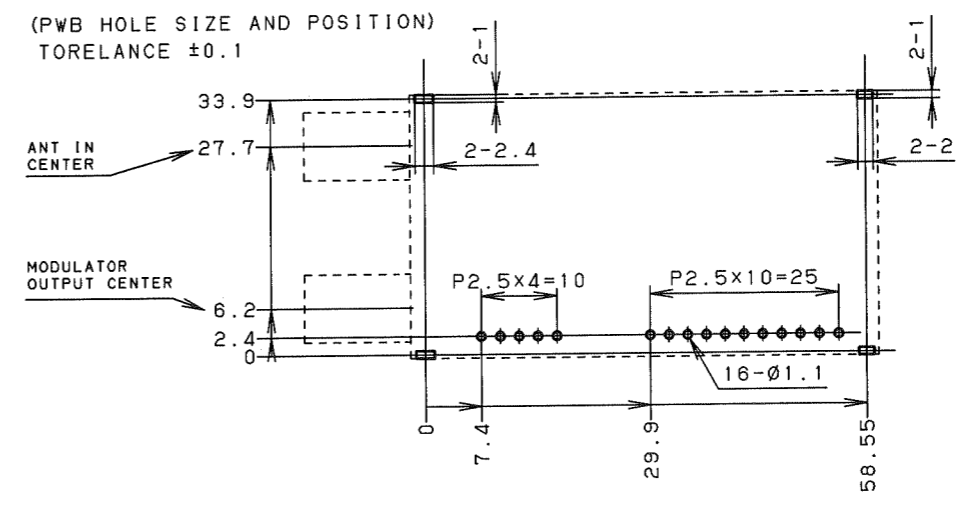
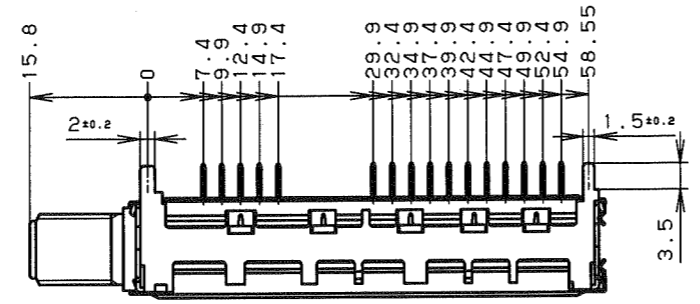


MK	DATE	REVISION
SCALE	UNIT	CUST.'S PART NO.
1:1	mm	EBL38878101
TOLERANCE		SANYO'S MODEL NO.
ANGLE	OVR ±	(UBA00AL)
HOLE	~ ±	NAME
	100 UND ±0.5	DIGITAL TUNER
DRAW. ID/FILE		PLOT DATE
ASN, UBA00AL--F.		07.05.11

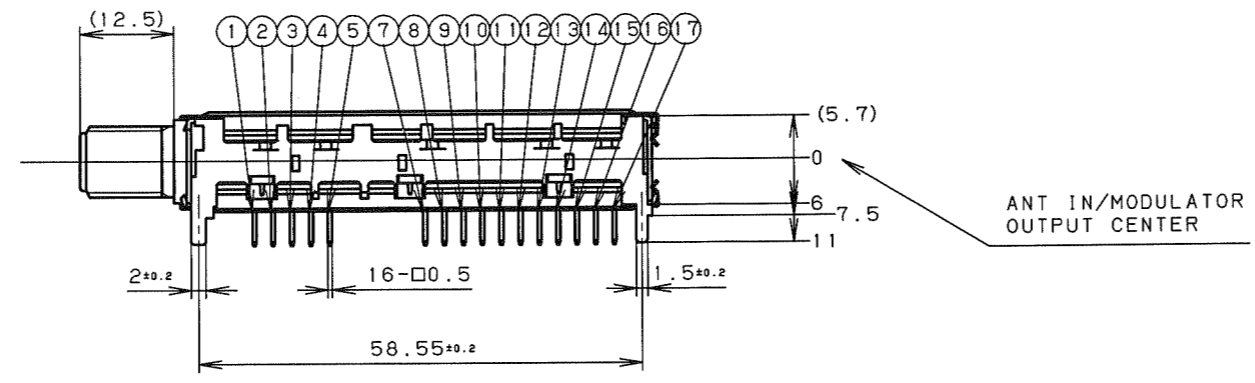
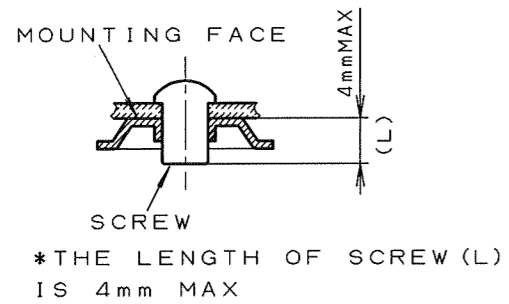
APPEARANCE & DIMENSIONS

TERMINALS LAYOUT	
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11	SDA
12	IF AGC
13	DIGITAL IF1
14	DIGITAL IF2
15	GND
16	+5V (DC-DC CONVERTER)
17	N. C (VT)

2-ASN. CACOMCC3802L
3-ASN. CECOMCC3901L. B
4-ASN. UBA00AL--F. NVAKU
NOTE: DO NOT SCALE



22 Jun 07
APPROVED
T. Kabele
22 Jun 07
CHECKED
F. Kabele
22 Jun 07
CHECKED
A. Masuda
07.05.11
DESIGNED
H. W. CHOI
07.05.11
DRAWN
M. FUJITA



MK	DATE	REVISION
SCALE	UNIT	CUST.'S PART NO.
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DRAW. ID/FILE		PLOT DATE
ASN. UBA00AL--F.		07.05.11