SHARP

ELECTRONIC COMPONENTS GROUP

SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

RF UNIT FOR CORDLESS PHONE

(PORTABLE SET)

MODEL NO.   RY3G1102O

(A3RY3GIIA1O)

•1 CUSTOMER'S APPROVAL

DATE

BY

PRESENTED
BY

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ELECTRONIC COMPONENTS (ELECOM) GROUP

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RECORDS OF REVISION

MODEL No.	RY3GH020
DOC. FIRST ISSUE	10. APR. 1995
I DENT. DATA No.	(EC-95415)

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	CHECK & APPROVAL
10. APR. 1995	P16	⚠	Altered 2-4 Wrapping details Fig.4	a.Tokuda

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Description : This specification covers RF UNIT intended for use in Cordless Phone Portable unit.

[1] GENERAL SPECIFICATIONS

1- 1 Frequency range　　　　　　　Transmitting freq.

　　　　　　　　　　　　914. 0125MHz to 914. 9875MHz

　　　　　　　　　　　　Receiving freq.

　　　　　　　　　　　　959. 0125MHz to 959. 9875 MHz

1-2　Communication system　　　Duplex

1-3　Number of channel　　　　　40 ch

1-4　Nominal input and output　　50 Ω
　　　impedance

1-5　Intermediate frequency　　　1st IF 21. 7MHz

　　　　　　　　　　　　　　　2nd IF450 KHz

1-6　Modulation system　　　　　Analog FM

1-7　Operating voltage　　　　　3. 3V to 5. 0v

　　　　　　　　　　　　　(internal Regulator IC out:3.0V)

1-8　Absolute maximum supply　　6. 0V
　　　voltage (Ta=25℃)

1-9　Weight　　　　　　　　　　26g

1-10 Block diagram　　　　　　　Figure 1

【2】MECHANICAL SPECIFICATIONS

2- 1 Dimension and mounting details Figure 2

2-2　Terminal details　　　　　　Table 1

2-3　Measurement connection circuit Figure 3

2-4　Wrapping details　　　　　　Figure 4

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[3] ENVIRONMENT SPECIFICATIONS

    3- 1 Operating guarantee temperature   0℃ to 55℃

                                         (Guarantee items)

                                         ● Transmitting freq. inaccuracy

                                         ● Transmitting output power

                                         "Carrier detect time

                                         (ad jacent channel select)

                                         ● PLL lock up time

                                         (adjacent channel select)

    3-2 Efficient guarantee temperature   25℃ +15/-10℃

                                         (Guarantee items)

                                         "Except 3-1 items

    3- 3 Storage temperature   -20℃ to 70℃

    3-4 Operating humidity   Less than 85%

    3-5 Storage humidity   Less than 90%

【4】 TESTING CONDITIONS

    4- 1 Supply voltage   3. 6V ±0. 3V

    4- 2 Ambient temperature   25℃ +15/-10℃

    4-3 Ambient humidity   20%~75%

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[5] ELECTRICAL SPECIFICATIONS (Ta: 25℃ +15/-10℃)

*5-1-5-18,5-21,5-22 --- PLL IC : Normal operating mode
*5-10-5-13 — Measured at connecting circuit figure 3 (COMPANDER Recommendation G162)
*5-4, 5, 8, 10,11,12,13,15,16 --- CCITT : Measured with CCITT filter

(CCITT Recommendation P53A)

NO.	Item	Specification				Condition
		Min.	Typ	Max.	Unit	
		TX BLOCK				
5-1	Transmitting freq. inaccuracy				kHz	
	at 24℃ ~ 26℃			±1.0		
	at 0℃ ~ 55℃			±2.5		
5-2	Transmitting output power	8.0	11	14	dBm	Ta: 0℃ to 55℃
5-3	Standard modulation level	100		240	mVrms	1kHz mod., 3kHz $_{0-p}$ dev., 600Ω term
5-4	Modulation S/N	45			dB	CCITT
5-5	Transmitting total distortion & noise	35	40		dB	CCITT
5-6	Modulation frequency response				dB	REF:1KHz
	at 300Hz	-1.0		+1.0		
	at 3KHz	-1.0		+1.0		
5-7	Spurious transmission				dBm	Point:TX output terminal
	at 0 ~ 1GHz			=54		
	at 1-- 4GHz			=36		
	at 87.5 ~ 108MHz			-77		
		(RX BLOCK)				
5-8	Receiving sensitivity			-106	dBm	CCITT at SINAD 20dB point
5-9	Radiation interference				dBm	Point:RX output terminal Transmitting-circuits OFF (TX OFF)
	at 0 ~ 1GHz			-57		
	at 1 ~ 4GHz			-47		
	at 87.5 ~ 108MH			-77		
5-10	Co-channel rejection	-14			dB	CCITT Desire input level:-102dBm fm:1kHz, dev:3kHz $_{0-p}$ Undesire input level :at SINAD 20dB point, fm:400Hz dev:3kHz $_{0-p}$ Measured at connecting circuit figure 3.
5-11	Adjacent channel selectivity	51			dB	CCITT Desire input level: -102dBm fm:1kHz, dev:3kHz $_{0-p}$ Undesire input freq :fo±25kHz, input level :at SINAD 20dB point, fm:400Hz dev:3kHz $_{0-p}$ Measured at connecting circuit figure 3.

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5-	Spurious response rejection	56		dB	CCITT
					Desire input level:-102dB
					    fm: 1kHz,
					    dev:3kHz $_{0-p}$
					Undesire input freq
					    : 30 MHz to 2GHz,
					    fm:400Hz,
					    dev:3kHz $_{0-p}$
					    input level
					    :at *SINAD* 20dB
					    point
					Measured at connecting
					circuit figure 3.

5-1	Intermodulation rejection	51		dB	CCITT
					Desire input level:-102dBm
					    fm:1kHz,
					    dev:3kHz $_{0-p}$
					Undesire 1
					    input level:at SINAD
					    20dB point,
					    input freq:fo±25kHz
					Undesire 2
					    input level:at SINAD
					    20dB point,
					    input freq:fo±50kHz,
					    fm:400Hz,
					    dev:3kHz $_{0-p}$
					Measured at connecting
					circuit figure 3.

		56			CCITT
					Desire input level:-102dBm
					    fm:1kHz
					    dev:3kHz $_{0-p}$
					Undesire 1
					    input level:at SINAD
					    20dB point
					    input freq: fo±50kHz
					Undesire 2
					    input level:at SINAD
					    20dB point
					    input freq:fo±100kHz
					    fm: 400 Hz,
					    dev:3kHz $_{0-p}$
					Measured at connecting
					circuit figure 3.

5-14	Standard demodulation level	90		170	mVrms	Input level: -53dBm, LPF:30kHz, 100kΩ term
5-15	Demodulation S/N	45			dB	Input level: -53dBm, CCITT
5-16	Receiving total distortion & noise	35	40		dB	Input level:-53dBm, CCITT
5-17	Demodulation frequency response at 500Hz	-2.0		+2.0	dB	Input level :-53dBm, LPF:30KHz REF:1KHz
	at 2.2KHz	-3.0		0		
5-18	Carrier detect level ·	-116	-114	-112	dBm	C/S:H→L (at 20ch 25℃)
	hysterisys widtl-		2	4	dB	fm:lKHz,dev:3KHz 0-ᴘ
5-19	Carrier detect time (adjacent channel select)		15	40	ms	PLL IC:High speed mode fm:lKHz, dev:3KHz 0-ᴘ Ta:0℃ to 55℃
(TOTAL BLOCK)						
5-20	PLL lock up time (adjacent channel select)		5	20	ms	PLL IC:High speed mode Ta:0℃ to 55℃
5-21	Current consumption Speech			110	mA	at PLL locked
	Stanby			60		
5-22	INPUT VSWR		1.5	2.5		impedance : 50Ω TX+B1 'OPEN" TX+B2 " L"

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[61 PLL Channel selection operating data

6-1 Input data

(1) Setting RX-PLL division data

MSB

H	L	D_{16}	D_{15}	D_{14}	D_{13}	D_{12}	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

$$N = D_{16} \times 2^{16} + D_{15} \times 2^{15} + D_{14} \times 2^{14} + \cdots\cdots + D_1 \times 2^1 + D_0 \times 2^0$$

$$= (f_{RX} + 21.7 \times 10^6) / 12.5 \times 10^3$$

$$= 78457 - 78535$$

f_{RX}: Frequency of RX --959.0125-959. 9875MHz

(2) Setting TX-PLL division data

MSB   LSB

L	H	D_{16}	D_{15}	D_{14}	D_{13}	D_{12}	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

$$N = D_{16} \times 2^{16} + D_{15} \times 2^{15} + D_{14} \times 2^{14} + \cdots\cdots + D_1 \times 2^1 + D_0 \times 2^0$$

$$= f_{TX} / 12.5 \times 10^3$$

$$= 73121 - 73199$$

f_{TX} : Frequency of TX --914.0125-914. 9875MHz

[For example]

If setting TX-PLL division data at 914. 0125MHz

$914.0125 \times 10^6 / 12.5 \times 10^3 = (73121)_{10} = (10001110110100001)_2$

L	H	D_{16}	D_{15}	D_{14}	D_{13}	D_{12}	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D4	D3	D_2	D]	D_0
L	H	H	L	L	L	H	H	H	L	H	H	L	H	L	L	L	L	H

(3) Setting Reference division data

MSB   LSB

H	H	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

$$N = D_{11} \times 2^{11} + D_{10} \times 2^{10} + D_9 \times 2^9 + \cdots\cdots + D_1 \times 2^1 + D_0 \times 2^0$$

$$= 3400 \text{ (Fixed)}$$

[Setting]

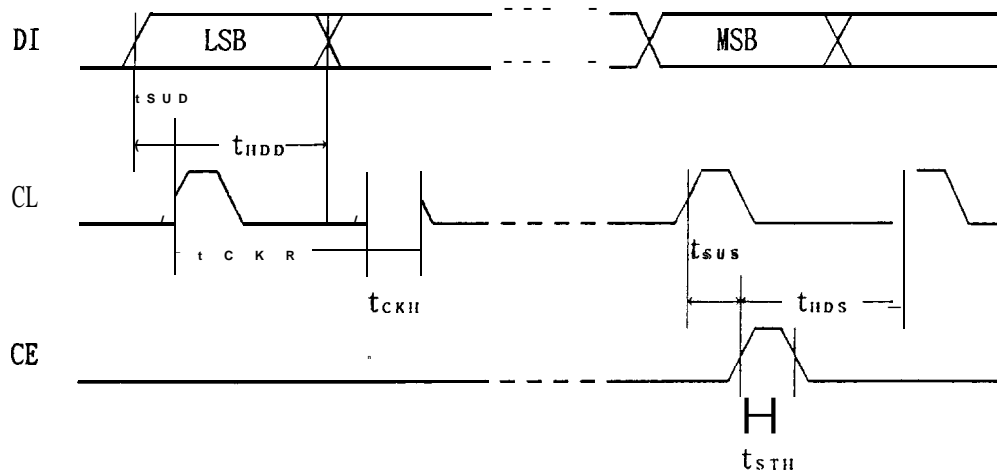$N = (3400)_{10} = (110101001000)_2$

H	H	D_{11}	D_{10}	D_9	D8	D_7	D_6	D5	D4	D3	D2	D_1	D0
H	H	H	H	L	H	L	H	L	L	H	L	L	L

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(4) Setting options

MSB

L	L	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

D_2, D_3, D_5, D_6 : Charge pump drive bits

D_6	D_5	RX-PLL Charge pump drive	D_3	D_2	TX-PLL Charge pump drive
L	L	$\pm 100 \mu A$	L	L	$\pm 100 \mu A$
H	L	$\pm 200 \mu A$	H	L	$\pm 200 \mu A$
L	H	$\pm 400 \mu A$	L	H	$\pm 400 \mu A$
H	H	$\pm 800 \mu A$	H	H	$\pm 800 \mu A$

D_{11} : RX loop filter control bit

D_{11}	Loop filter at RX
L	For high speed
H	For normal operating

*CAUTION : Setting options in the electrical specifications

Operating mode	D_{11}	D_6	D_5	D_3	D_2
High speed mode	L	H	H	H	H
Others	H	L	L	L	L

D_4, D_7, D_8 : Operating control bits

D_8	D_7	D_4	Reference	RX-PLL	TX-PLL
X	L	L	ON	ON	ON
X	L	H	ON	ON	STAND-BY
X	H	L	ON	STAND-BY	ON
L	H	H	ON	STAND-BY	STAND-BY
H	H	H	STAND-BY	STAND-BY	STAND-BY

D_0, D_1, D_9, D_{10} : Fixed bits

D_{10}	D_9	D_1	D_0
L	H	L	L

[For example]

If setting options for normal oprating mode

L	L	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D4	D_3	D_2	D_1	D_0
L	L	H	L	H	L	L	L	L	L	L	L	L	L

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6-2 Timing chart

Items	Symbols	'Electronic characteristics
Set up time of "DI"	t_{SUD}	$t_{SUD} \geqq 0.1 \ \mu s$
Hold time of "DI"	t_{HDD}	$t_{HDD} \geqq 1.0 \ \mu s$
Rateof "CL"	t_{CKR}	$t_{CKR} \geqq 5.0 \ \mu s$
High level timeof "CL"	t_{CKH}	$t_{CKH} \geqq 1.0 \ \mu s$
Set up time of "CE"	t_{SUS}	$t_{SUS} \geqq 0.1 \ \mu s$
Hold time of "CE"	t_{HDS}	$t_{HDS} \geqq 1.0 \ \mu s$
High level time of "CE"	t_{STH}	$t_{STH} \geqq 1.0 \ \mu s$

6-3 Input voltage(DI, CL, CE)

Input	min.	max.
"H" level	2.5V	3.1V
"L" level	-0.2V	0.5V

SHARP 【7】RELIABILITY TEST SPECIFICATIONS

7-1 Vibration test

This test is proceed on at least one hour in shelf after vibration test loaded one minute of 1.5mm amplitude toward X, Y and Z direction for two hours of one ❏ inute of 10 to 55 / one minute cycle of vibration.

After above testing, samples are left at normal temperature and humidity for 24hours. And then, they should be kept the normal operations according to the standard values of judgement (B) on Table 7

7-2 Drop test

This test is dropping from 1.0m high on wood board of 3cm in thick of 20 x 20cm, but not applied for the lead wire and also the drop from the box surface.

After above testing, samples are left at normal temperature and humidity for 24hours. And then, they should be kept the normal operations according to the standard values of judgement (B) on Table 7.

		(A)	(B)
(1)	Transmitting frequency inaccuracy	±2.5kHz	±5.0kHz
(2)	Transmitting output power	11±3.0dBm	11±5.0dBm
(3)	Receiving sensitivity	---------	(initial value) ±10dB
(4)	Carrier detect time	40ms MAX.	(initial value) ±20ms
(5)	PLL lock up time	20ms MAX.	(initial value) ±20ms

Table 7 Standard values of judgement

Standard (A) is only applied to measurement of characteristics with temperature change. (operating range : 0~55℃)
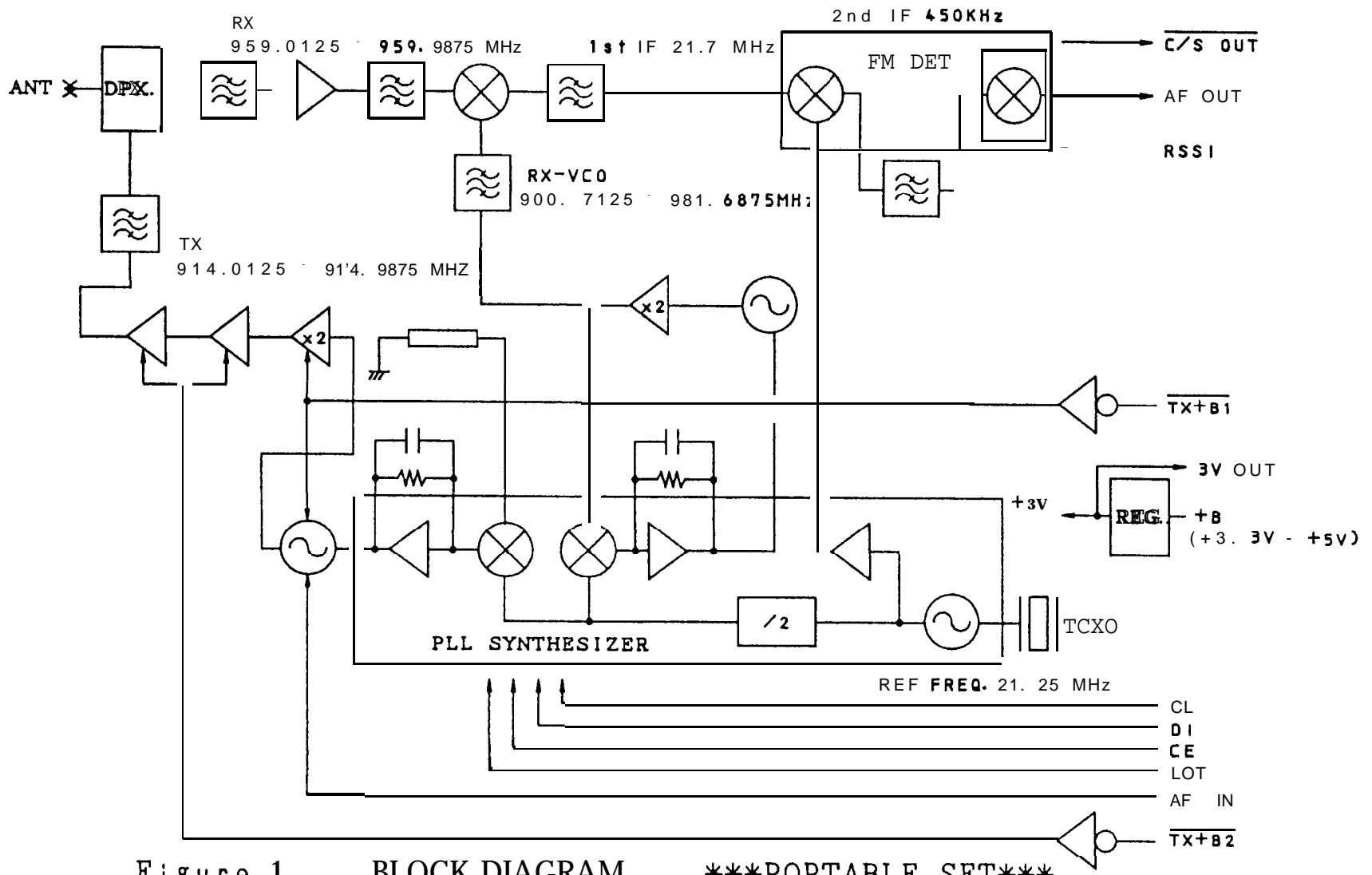
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2nd IF 450KHz

RX
959.0125   959. 9875 MHz   1st IF 21.7 MHz   FM DET   C/S OUT

ANT ✕ DPX.   AF OUT

                                                                                        RSSI

                          RX-VCO
                          900. 7125   981. 6875MHz

TX
914.0125   91'4. 9875 MHZ

×2   ×2

                                                                                        TX+B1

                                                                              3V OUT

                                                                    +3V   REG. +B
                                                                              (+3. 3V - +5V)

/2   TCXO

PLL SYNTHESIZER

                                              REF FREQ. 21. 25 MHz

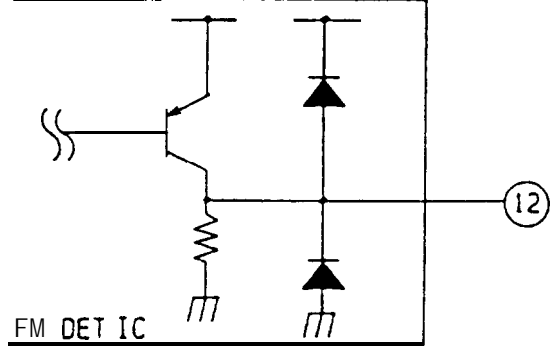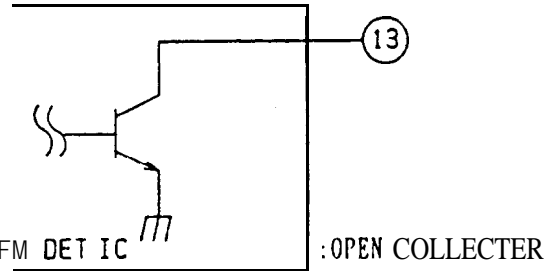   CL
                                                                    DI
                                                                    CE
                                                                    LOT
                                                                    AF IN

                                                                              TX+B2

Figure 1   BLOCK DIAGRAM   ***PORTABLE SET***
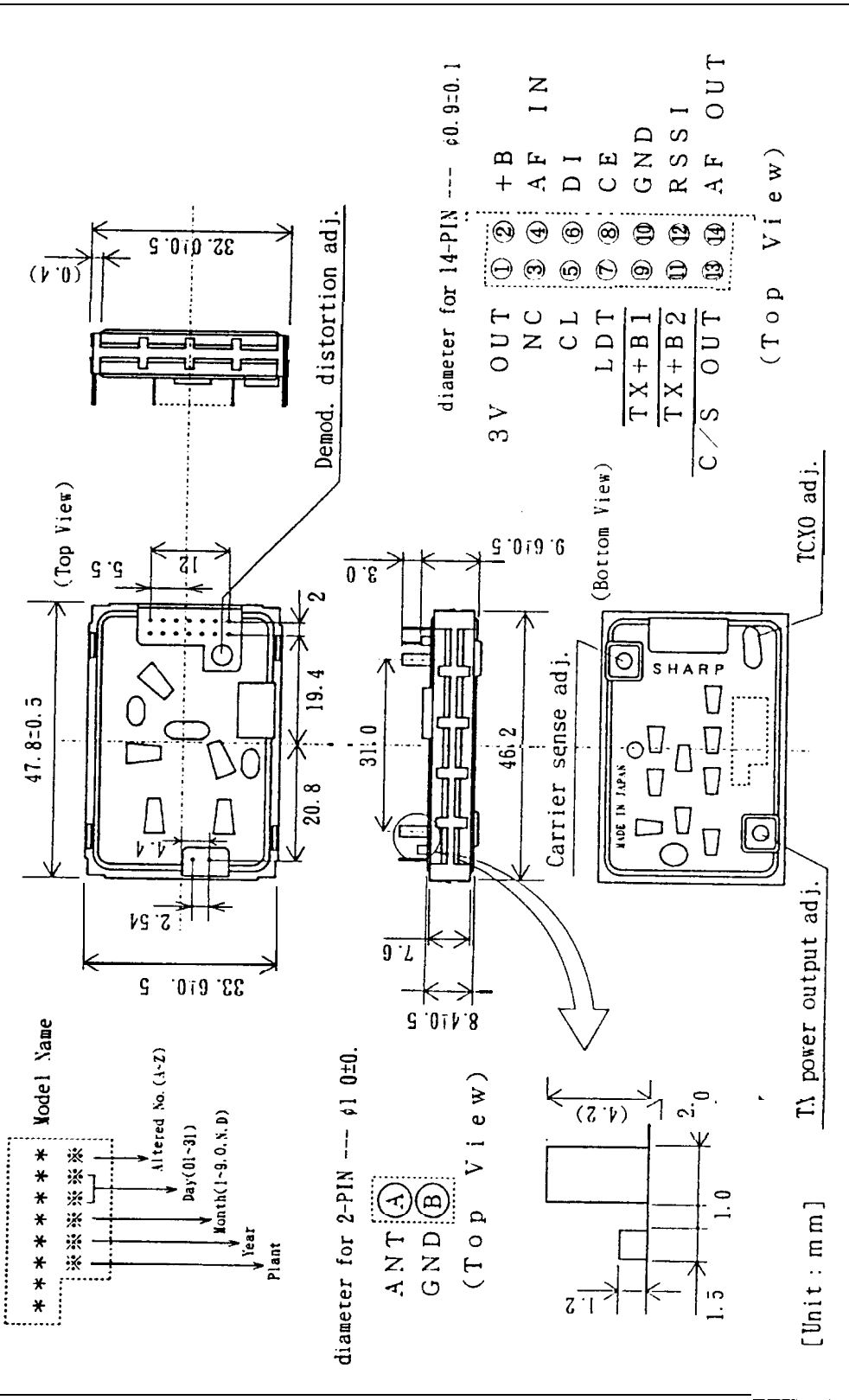
《Outline drawing》

(Top View)

(0.4)

32.0±0.5

Demod. distortion adj.

5.5

12

2

19.4

47.8±0.5

20.8

2.54

4.4

33.6±0.5

3.0

9.6±0.5

31.0

46.2

7.6

8.4±0.5

(Bottom View)

Carrier sense adj.

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TCXO adj.

TX power output adj.

diameter for 14-PIN --- φ0.9±0.1

3V OUT	①	②	+B
NC	③	④	AF IN
CL	⑤	⑥	DI
LDT	⑦	⑧	CE
TX+B1	⑨	⑩	GND
TX+B2	⑪	⑫	RSSI
C/S OUT	⑬	⑭	AF OUT

(Top View)

diameter for 2-PIN --- φ1 0±0.

ANT Ⓐ
GND Ⓑ
(Top View)

(4.2)

2.0

1.0

1.2

1.5

[Unit : mm]

Model Name

＊＊＊＊＊ ＊ ＊ ＊ ＊
   ※ ※ ※ ※
   ※ ※ ※ ※
   ※ ※ ※ ※

Altered No. (A~Z)
Day(01~31)
Month(1~9,O,N,D)
Year
Plant

Figure 2

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{Terminal details)

No.	Terminal Name	I/O	Note
1	3. 0V OUT	o	Regulator +3. 0V output
2	+B	I	Operating voltage input
3	NC	-	No connection
4	AF IN	I	Modulation voice input
5	CL	I	PLL control input (CLOCK)
6	DI	I	PLL control input (DATA)
7	LDT	o	TX lock detect output, active"H"
8	CE	I	PLL control input (ENABLE)
9	TX+B1	I	TX-VCO control input, active"L"
10	GND	-	COMMON GND
11	TX+B2	I	TX-Buffer Amp. control input, active"L"
12	RSSI	o	Receiving signal level detect output
13	C/S OUT	o	Carrier sense output, active"L"
14	AF OUT	o	Demodulation voice output

Table 1
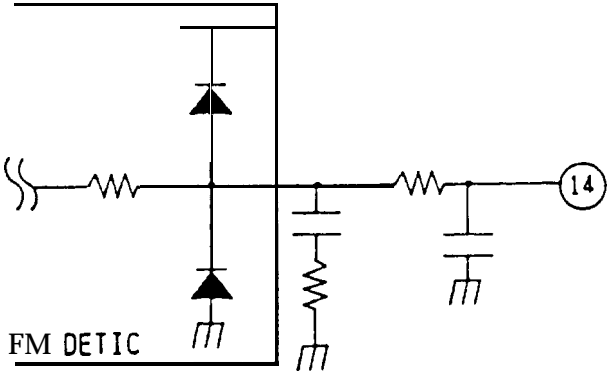
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(Terminal interface references)

No.	Terminal Name	1/0	Interface
1.	3V OUT	0	+B ──[REG. IC]── ① : MAX OUTPUT CURRENT 5mA
2.	+B	I	← ──[REG. IC]── ②
4.	AF IN	I	Vt ──/\/\── ... ──④
5. 6. 8.	CL DI CE	I	PLL IC ... ⑤ or ⑥ or ⑧
7.	LDT	0	PLL IC ... 7 ⁰ : OPEN DRAIN
9. 11.	T̄X̄+B̄1̄ T̄X̄+B̄2̄	I	← ... ⑨ or ⑪

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12.	RSSI	o	
13.	C/S OUT	o	
14.	AF OUT	o	

FM DET IC

FM DET IC : OPEN COLLECTER

FM DETIC

＊ Depend on "No." SHARP RF UNIT SPECIFICATION page 10 "Terminal details",

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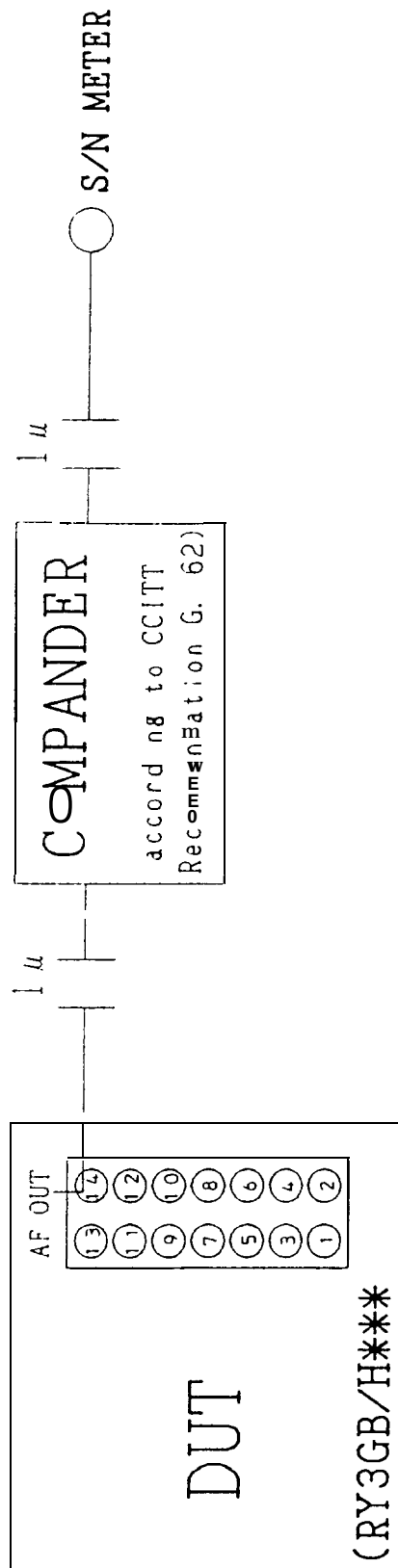
Figure 3 Connection circuit

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⚠ **2-4** Wrapping details

① **Wrapping**
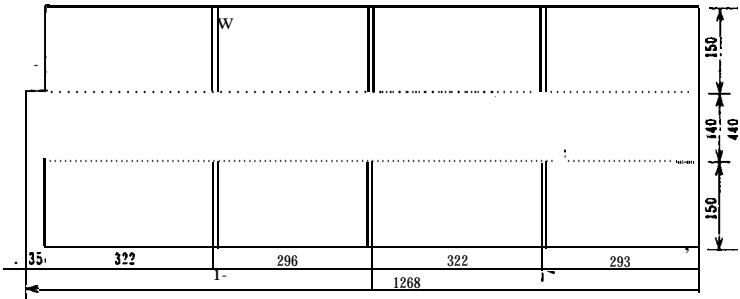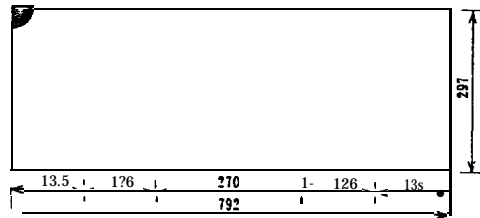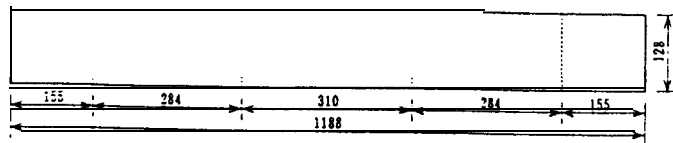
② paste board×1

Tray×6

③ Frame×1
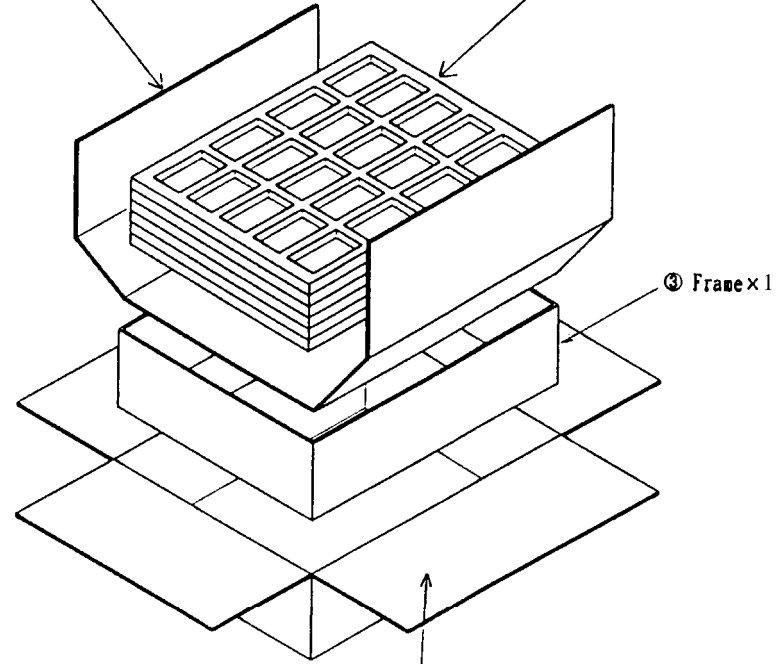
① Wrapping×1

: 100pcs./ carton
:top of tray is empty

② paste board

③ Frame

Figure 4

(Unit : mm)