DATE : 2000.03.15

S P E C I F I C A T I O N

PRODUCT : RF UNIT

MODEL NAME : RU0902B14HAA

APPROVED	CHECKED	WRITTEN
3/15	3/15	3/15

SAMSUNG ELECTRO-MECHANICS CO., LTD.

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1. GENERAL DESCRIPTION

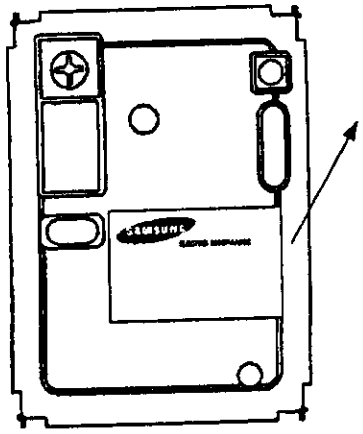
1.1 Features

This RU0902B14HAA is a RF(Radio Frequency) UNIT for 900MHz band(ISM BAND) cordless telephone . As a FULL DUPLEX system. It performes transmission and reception through the ANTENNA of the module. It has 40 channels with 50KHz channel sapcing.

1.2 General Specifications

NO	Items	Specification
1	Tx Frequency	902.80 ~ 904.75MHz
2	Rx Frequency	925.30 ~ 927.25MHz(Upper Heterodyne)
3	Channel Number Channel Seperation	40CH Full Duplex 50KHz
4	1st IF	10.7MHz
5	2nd IF	450KHz
6	2nd Local	10.25MHz
7	Modulation	FM
8	Standard Test Modulation	Modulation Frequency : 1KHz Standard Deviation : 6KHz
9	Temperature Range	Oprtating : 0℃ to +45℃ Storage : -20℃ to +70℃
10	Power Supply Current	TX and RX : 80mA RX : 50mA
11	Nominal Power Supply Voltage Power Supply Voltage Range	Base : 3.6VDC Portable : 3.6VDC Base : 3.3 to 5.0VDC Portable : 3.3 to 5.0VDC
12	Antenna Impedance	50 ohm

1.3 MARKING



SAMSUNG ELECTRO-MECHANICS

RU0902 B 18 H K B
① ② ③ ④ ⑤

DATE : 0001 BASE
⑥ ⑦

S/N : 000001 A
⑧ ⑨

① MODEL NAME
② BASE SET
③ PRODUCT SIZE (18CC)
④ A SIMPLIFIED NATION CHARACTER
⑤ SERIES TYPE
⑥ YEAR & WEEK MADE
⑦ BASE SET
⑧ SERISE No.
⑨ PRODUCT LINE

2. ELECTRICAL SPECIFICATION

※ Test with HP8920A Communication Test Set

Tx Specification

Test Condition : Room Temperature/Nominal Power Supply Voltage

NO.	Items	Specification	Condition
1	Frequency Tolerance	≤ ± 8 ppm	0 to +45℃, NO Mod.
		≤ ± 4 ppm	25 ± 3℃, NO Mod.
2	Tx Power	-1.5dBm +3/-3dB	SETTING : 20 CH, NO Mod.
3	Deviation	6KHz± 2.5KHz	Modulation Frequency : 1KHz Level : -18dBm
4	Modulation S/N	≥ 40 dB	CCITT ON
5	Spurious Emissions (Conduction Test)	≤ -58 dBm ≤ -50 dBm	1 GHz 以下 (↓) 1 GHz 以上 (↑)
6	PLL Lock Up Time	Typ: 15mS Max: 25mS	PLL IC:HIGH SPEED MODE (ADJACENT CHANNEL SELECT)

Rx Specification

Test Condition : Room Temperature/Nominal Power Supply Voltage/CCITT Filter ON

NO.	Items	Specification	Condition
1	Receiving Sensitivity	≤ -110	12dB SINAD, ※TYP 20dB SINAD
2	Demodulation S/N	≥ 43dB	6KHz Deviation RF Input Level: -60dBm
3	Distortion	≤ 3%	The Same Condition Item 2
4	Noise Detect Sensitivity	-114dBm± 6dB	
5	Audio Output Level	-12 dBm± 2dB	The Same Condition Item 2
6	Adjacent Channel Rejection	≥ 30dB	2 Signal Method UNDESIRE SIGNAL INPUT FREQ.: +50KHz (OR -50KHz)
	Image Rejection	≥ 25dB	
7	Intermodulation Rejection	≥ 40dB	3 Signal Method UNDESIRE SIGNAL INPUT FREQ.: +50KHz,+100KHz (OR -50KHz,-100KHz)
8	PLL Lock Up Time	Typ: 15mS Max: 25mS	PLL IC:HIGH SPEED MODE (ADJACENT CHANNEL SELECT)
9	Carrier Detect Time	Typ: 20mS Max: 40mS	The Same Condition Item 8

※ RX TEST CONDITION of No.6 & No.7

No.6

DESIRE: INPUT LEVEL SINAD 20dB POINT, 1KHz MOD, 6KHz DEV

UNDESIRE: INPUT LEVEL SINAD 12dB POINT, 400Hz MOD, 6KHz DEV

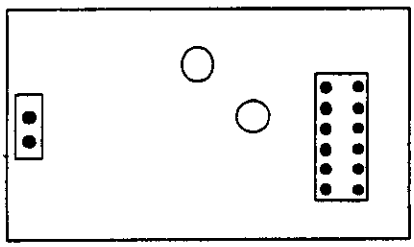
No.7

DESIRE: INPUT LEVEL SINAD 20dB POINT , 1KHz MOD, 6KHz DEV

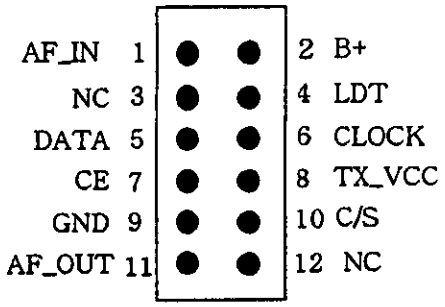
UNDESIRE 1: INPUT FREQ. +50KHz(OR -50KHz),
INPUT LEVEL SINAD 12dB POINT

UNDESIRE 2: INPUT FREQ. +100KHz(OR -100KHz),
INPUT LEVEL SINAD 12dB POINT, 400Hz MOD, 6KHz DEV

3. PIN DESCRIPTION



BOTTOM VIEW



PIN NO.	PIN NAME	I/O	NOTE
1	AF_IN	I	MODULATION VOICE INPUT
2	B+	I	OPERATING VOLTAGE INPUT
3	NC	-	NO CONNECTION
4	LDT	O	LOCK DETECTION OUTPUT, ACTIVE "H"
5	DATA	I	PLL DATA
6	CLOCK	I	PLL CLOCK
7	CE	I	PLL ENABLE
8	TX_VCC	I	TX PART CONTROL, ACTIVE "L"
9	GND	-	COMMON GND
10	C/S	O	CARRIER SENSE OUTPUT, ACTIVE "L"
11	AF_OUT	O	DEMODULATION AUDIO OUTPUT
12	NC	-	NO CONNECTION

4. FREQUENCY TABLE

CH NO	BASE			HAND		
	RX	LOCAL	TX	RX	LOCAL	TX
CH1	925.30	936.00	902.80	902.80	892.10	925.30
CH2	925.35	936.05	902.85	902.85	892.15	925.35
CH3	925.40	936.10	902.90	902.90	892.20	925.40
CH4	925.45	936.15	902.95	902.95	892.25	925.45
CH5	925.50	936.20	903.00	903.00	892.30	925.50
CH6	925.55	936.25	903.05	903.05	892.35	925.55
CH7	925.60	936.30	903.10	903.10	892.40	925.60
CH8	925.65	936.35	903.15	903.15	892.45	925.65
CH9	925.70	936.40	903.20	903.20	892.50	925.70
CH10	925.75	936.45	903.25	903.25	892.55	925.75
CH11	925.80	936.50	903.30	903.30	892.60	925.80
CH12	925.85	936.55	903.35	903.35	892.65	925.85
CH13	925.90	936.60	903.40	903.40	892.70	925.90
CH14	925.95	936.65	903.45	903.45	892.75	925.95
CH15	926.00	936.70	903.50	903.50	892.80	926.00
CH16	926.05	936.75	903.55	903.55	892.85	926.05
CH17	926.10	936.80	903.60	903.60	892.90	926.10
CH18	926.15	936.85	903.65	903.65	892.95	926.15
CH19	926.20	936.90	903.70	903.70	893.00	926.20
CH20	926.25	936.95	903.75	903.75	893.05	926.25
CH21	926.30	937.00	903.80	903.80	893.10	926.30
CH22	926.35	937.05	903.85	903.85	893.15	926.35
CH23	926.40	937.10	903.90	903.90	893.20	926.40
CH24	926.45	937.15	903.95	903.95	893.25	926.45
CH25	926.50	937.20	904.00	904.00	893.30	926.50
CH26	926.55	937.25	904.05	904.05	893.35	926.55
CH27	926.60	937.30	904.10	904.10	893.40	926.60
CH28	926.65	937.35	904.15	904.15	893.45	926.65
CH29	926.70	937.40	904.20	904.20	893.50	926.70
CH30	926.75	937.45	904.25	904.25	893.55	926.75
CH31	926.80	937.50	904.30	904.30	893.60	926.80
CH32	926.85	937.55	904.35	904.35	893.65	926.85
CH33	926.90	937.60	904.40	904.40	893.70	926.90
CH34	926.95	937.65	904.45	904.45	893.75	926.95
CH35	927.00	937.70	904.50	904.50	893.80	927.00
CH36	927.05	937.75	904.55	904.55	893.85	927.05
CH37	927.10	937.80	904.60	904.60	893.90	927.10
CH38	927.15	937.85	904.65	904.65	893.95	927.15
CH39	927.20	937.90	904.70	904.70	894.00	927.20
CH40	927.25	937.95	904.75	904.75	894.05	927.25

5. PLL CHANNEL SELECTION OPERATING DATA

5.1 Input data

(1)Setting RX-PLL division data

MSB LSB

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

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

$=((f_{RX}+10.7)*10^6)/12.5*10^3$

$=74880 \sim 75036$

f_{RX}:Frequency of RX — 925.3000~927.2500MHz

(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

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

$=f_{TX}/12.5*10^3$

$=72224 \sim 72380$

f_{TX}:Frequency of TX — 902.8000~904.7500MHz

【For example】

IF setting TX-PLL division data 902.8000MHz

$902.1000*10^6/12.5*10^3=(72224)_{10}=(1000110100010000)_2$

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	D_4	D_3	D_2	D_1	D_0
L	H	H	L	L	L	H	H	L	H	L	L	L	H	L	L	L	L	L

(3)Setting Reference division data

MSB

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

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

$= 1640$ (Fixed)

【Setting】

$N=(1640)_{10}=(011001101000)_2$

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
H	H	L	H	H	L	L	H	H	L	H	L	L	L

(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
L	L	± 100㎂
H	L	± 200㎂
L	H	± 400㎂
H	H	± 800㎂

D_3	D_2	TX-PLL Charge pump drive
L	L	± 100㎂
H	L	± 200㎂
L	H	± 400㎂
H	H	± 800㎂

D_{11}:RX loop filter control bit

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

*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

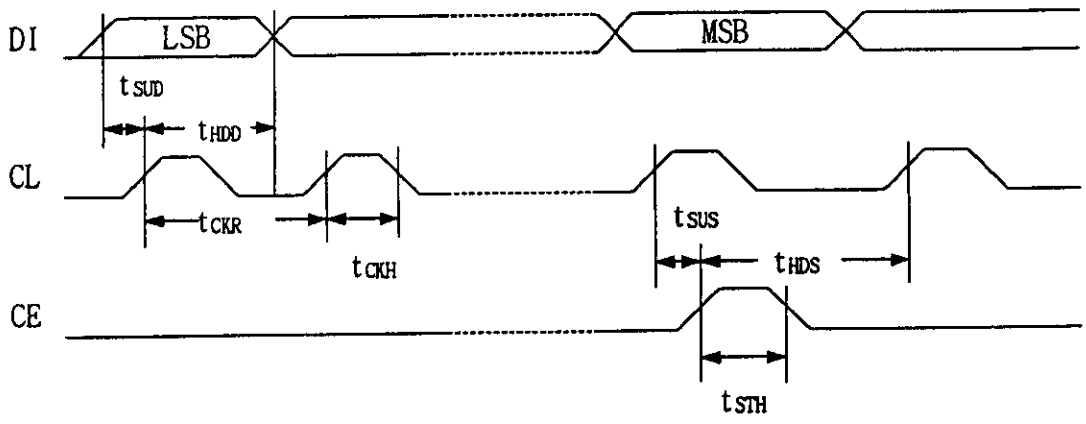
D_{10}	D_9	D_1	D_0
L	H	L	L

【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	D_4	D_3	D_2	D_1	D_0
L	L	H	L	H	L	L	L	L	L	L	L	L	L

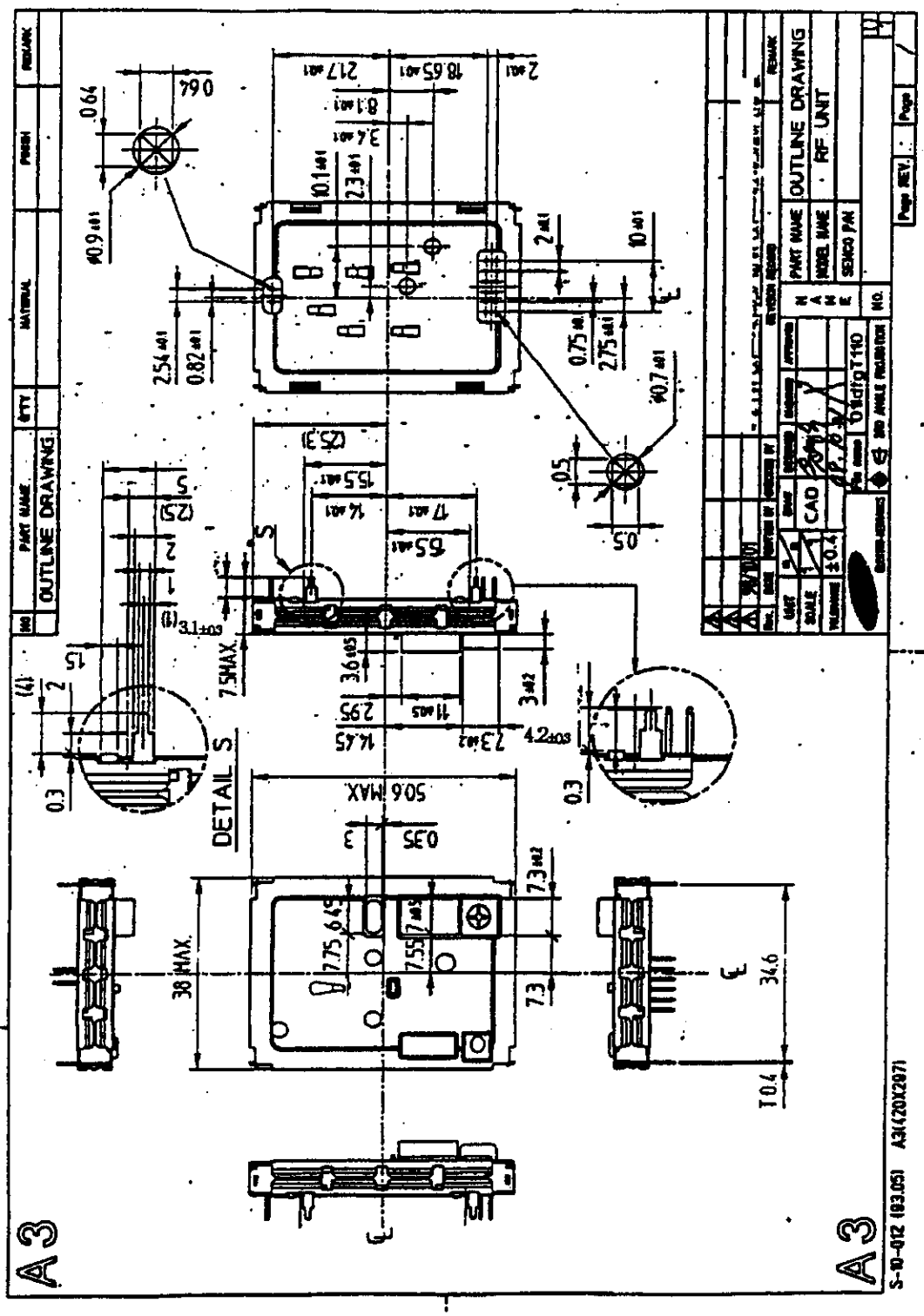
5.2 Timing chart



Items	Symbols	Eelectronic characteristics
Set up time of "DI"	t_{SUD}	$t_{SUD} \geq 0.1\mu s$
Hold time of "DI"	t_{HDD}	$t_{HDD} \geq 0.2\mu s$
Rate of "CL"	t_{CKR}	$t_{CKR} \geq 1.0\mu s$
High level time of "CL"	t_{CKH}	$t_{CKH} \geq 0.2\mu s$
Set up time of "CE"	t_{SUS}	$t_{SUS} \geq 0.1\mu s$
Hole time of "CE"	t_{HDS}	$t_{HDS} \geq 0.4\mu s$
High level time of "CE"	t_{STH}	$t_{STH} \geq 0.2\mu s$

5.3 Input voltage(DI, CL, CE)

Input	min.	max.
"H"level	2.5V	5.7V
"L"level	-0.2V	0.5V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