

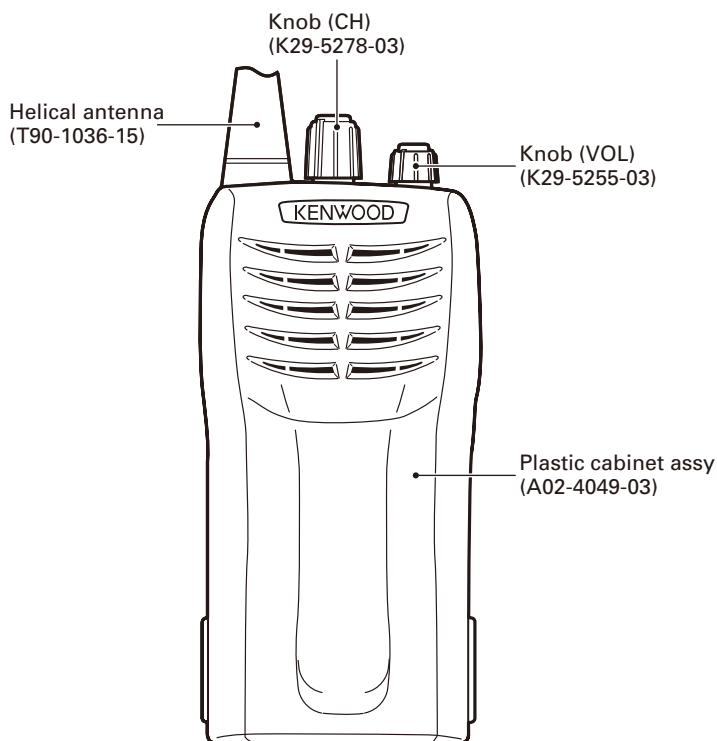
# TK-2102G

## SERVICE MANUAL

# KENWOOD

Kenwood Corporation

© 2008-8 PRINTED IN JAPAN  
B51-8841-00 (N) 554



## CONTENTS

<b>GENERAL</b> .....	<b>2</b>	<b>PC BOARD</b>	
<b>SYSTEM SET-UP</b> .....	<b>2</b>	<b>TX-RX UNIT (X57-6020-10)</b> .....	<b>26</b>
<b>REALIGNMENT</b> .....	<b>3</b>	<b>SCHEMATIC DIAGRAM</b> .....	<b>30</b>
<b>DISASSEMBLY FOR REPAIR</b> .....	<b>5</b>	<b>BLOCK DIAGRAM</b> .....	<b>34</b>
<b>CIRCUIT DESCRIPTION</b> .....	<b>6</b>	<b>LEVEL DIAGRAM</b> .....	<b>36</b>
<b>SEMICONDUCTOR DATA</b> .....	<b>10</b>	<b>OPTIONAL ACCESSORIES</b>	
<b>COMPONENTS DESCRIPTION</b> .....	<b>11</b>	<b>KNB-14 (Ni-Cd BATTERY)</b> .....	<b>37</b>
<b>PARTS LIST</b> .....	<b>12</b>	<b>KNB-15A (Ni-Cd BATTERY)</b> .....	<b>37</b>
<b>EXPLODED VIEW</b> .....	<b>19</b>	<b>KNB-20N (Ni-MH BATTERY)</b> .....	<b>37</b>
<b>PACKING</b> .....	<b>20</b>	<b>SPECIFICATIONS</b> .....	<b>BACK COVER</b>
<b>ADJUSTMENT</b> .....	<b>21</b>		

# TK-2102G

## Document Copyrights

Copyright 2008 by Kenwood Corporation. All rights reserved.

No part of this manual may be reproduced, translated, distributed, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, for any purpose without the prior written permission of Kenwood.

## Disclaimer

While every precaution has been taken in the preparation of this manual, Kenwood assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein. Kenwood reserves the right to make changes to any products herein at any time for improvement purposes.

# GENERAL

## INTRODUCTION

### SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of the publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions. These are issued as required.

### ORDERING REPLACEMENT PARTS

When ordering replacement parts or equipment information, the full part identification number should be included. This applies to all parts : components, kits, or chassis. If the part number is not known, include the chassis or kit number of which it is a part, and a sufficient description of the required component for proper identification.

## PERSONAL SAFETY

The following precautions are recommended for personal safety:

- DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- This equipment should be serviced by a qualified technician only.

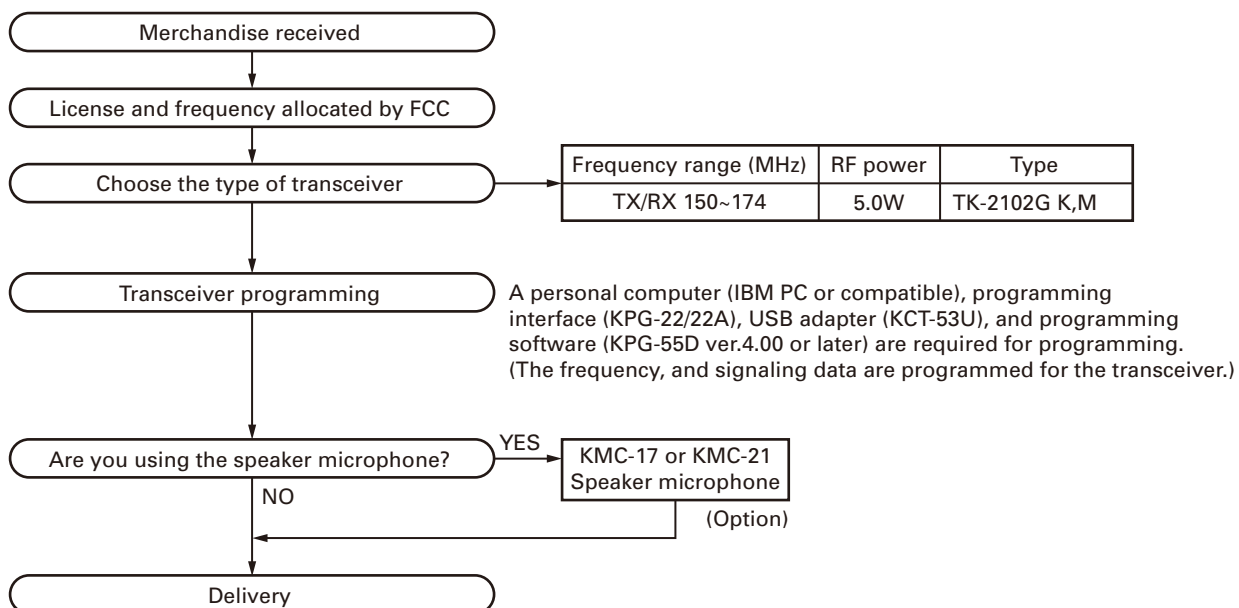
## SERVICE

This transceiver is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained within.

## NOTE

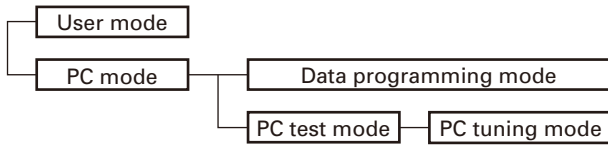
You must use KPG-55D version 4.00 or later for this transceiver. KPG-55D versions earlier than version 4.00 will not work properly.

# SYSTEM SET-UP



## REALIGNMENT

### 1. Modes

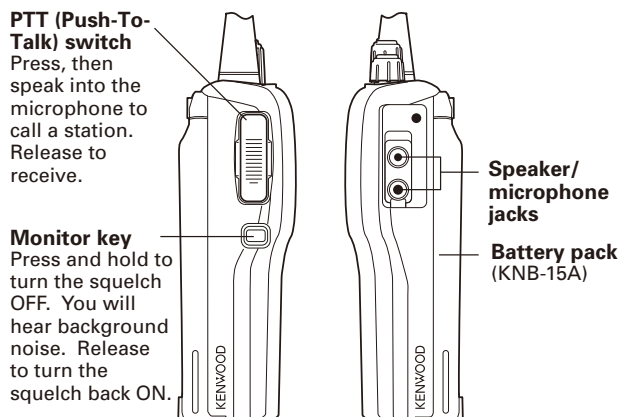
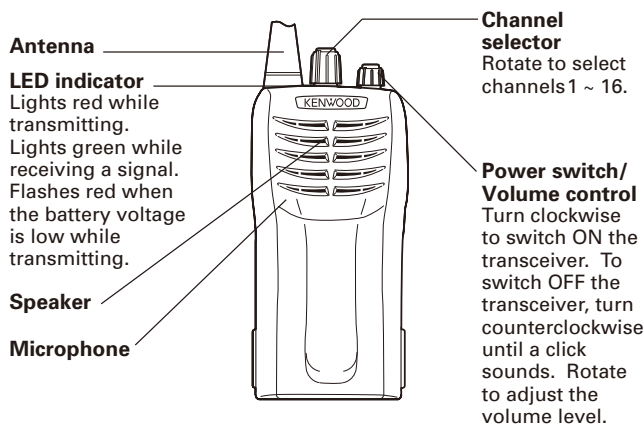


Mode	Function
User mode	For normal use.
PC mode	Used for communication between the transceiver and PC.
Data programming mode	Used to read and write frequency data and other features to and from the transceiver.
PC test mode	Used to check the transceiver using the PC. This feature is included in the FPU.

### 2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
PC mode	Received commands from PC

### 3. Getting Acquainted



### 4. PC Mode

#### 4-1. Preface

The transceiver is programmed by using a personal computer, a programming interface (KPG-22/22A), USB adapter (KCT-53U) and programming software (KPG-55D (ver.4.00 or later)).

The programming software can be used with a PC. Figure 1 shows the setup of a PC for programming.

#### 4-2. Connection Procedure

1. Connect the transceiver to the personal computer with the interface cable and USB adapter (when the interface cable is KPG-22A, the KCT-53U can be used.).

#### Notes:

- You must install the KCT-53U driver in the computer to use the USB adapter (KCT-53U).
- When using the USB adapter (KCT-53U) for the first time, plug the KCT-53U into a USB port on the computer with the computer power ON.

2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the transceiver enters PC mode.

When data is transmitting from the transceiver, the red LED lights.

When data is received by the transceiver, the green LED lights.

#### Notes :

- The data stored in the personal computer must match the Model Name when it is written into the EEPROM.
- Do not press the [PTT] key during data transmission or reception.
- Change the transceiver to PC mode, then attach the interface cable.

#### 4-3. KPG-22/KPG-22A Description

##### (PC programming interface cable : Option)

The KPG-22/22A is required to interface the transceiver with the computer. It has a circuit in its D-sub connector (KPG-22: 25-pin, KPG-22A: 9-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-22/22A connects the SP/MIC connector of the transceiver to the RS-232C serial port of the computer.

#### 4-4. KCT-53U Description (USB adapter : Option)

The KCT-53U is a cable which connects the KPG-22A to a USB port on a computer.

When using the KCT-53U, install the supplied CD-ROM (with driver software) in the computer. The KCT-53U driver runs under Windows 2000 or XP.

## REALIGNMENT

### 4-5. Programming Software Description

The KPG-55D (ver.4.00 or later) is the programming software for the transceiver supplied on a CD-ROM. This software runs under Windows 2000, XP or Vista (32-bit) on a PC.

### 4-6. Programming with PC

If data is transferred to the transceiver from a PC with the KPG-55D (ver.4.00 or later), the data for each set can be modified.

Data can be programmed into the EEPROM in RS-232C format via the SP/MIC jack.

In this mode the PTT line operate as RXD data line.

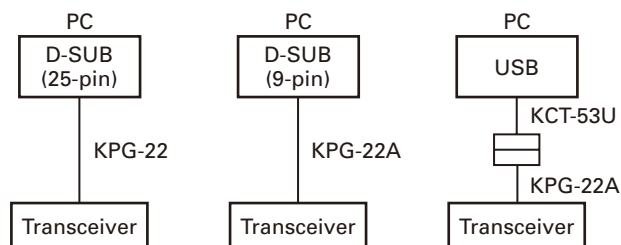
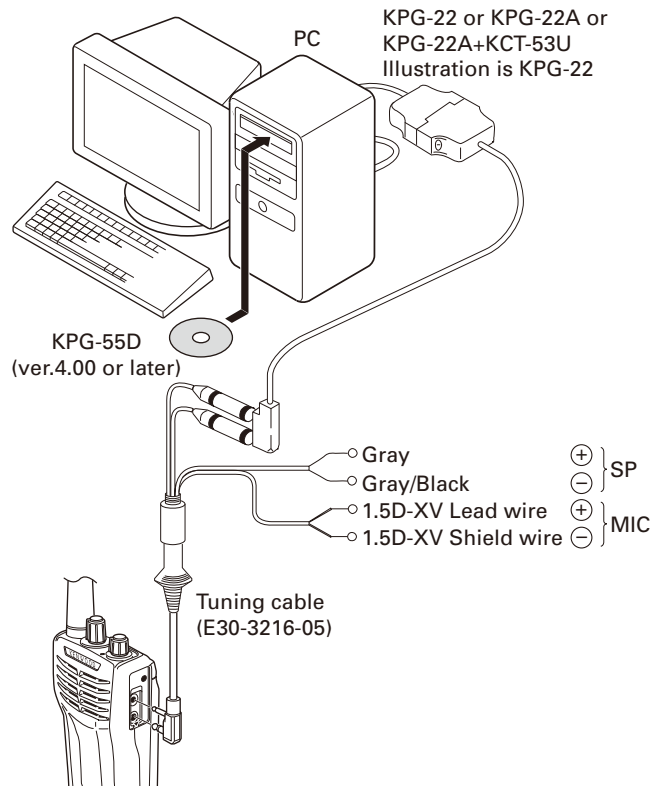
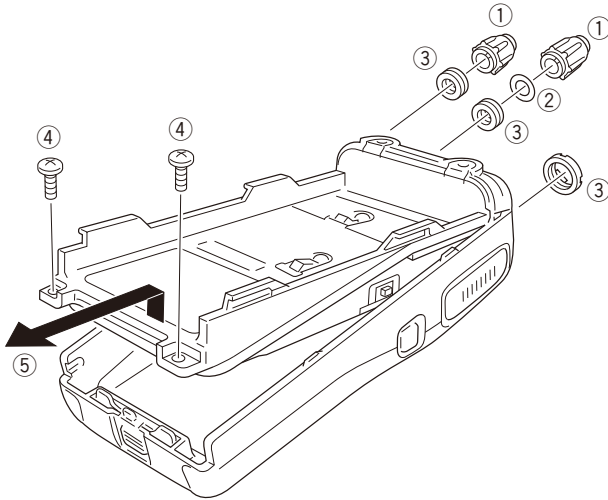


Fig. 1

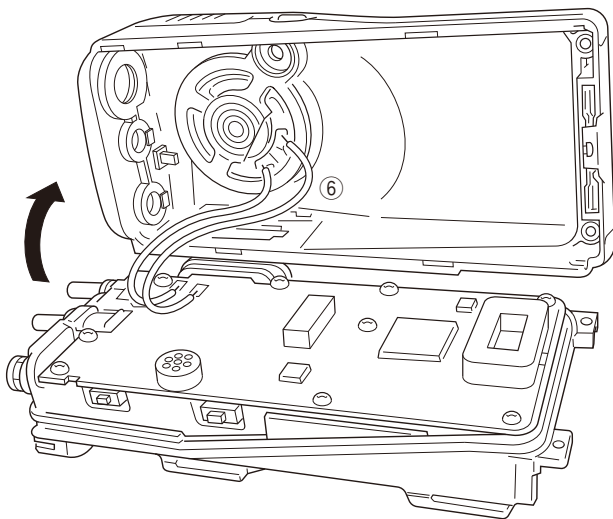
## DISASSEMBLY FOR REPAIR

### ■ Removing the case assembly from the chassis

1. Remove the two knobs ①, cushion ② and three round nuts ③.
2. Remove the two screws ④.
3. Expand the right and left sides of the bottom of the case assembly, then lift and remove the chassis from the case assembly ⑤.



4. Taking care not to cut the speaker lead ⑥, open the chassis and case assembly.

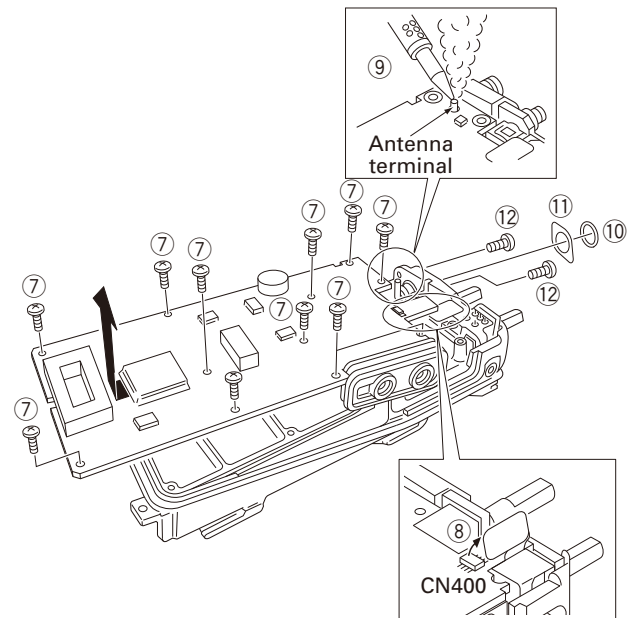


### ■ Removing the TX-RX unit from the chassis

1. Remove the eleven screws ⑦.
2. Remove the VOL/CH FPC from the TX-RX unit connector (CN400) ⑧.
3. Remove the solder from the antenna terminal using a soldering iron, then lift the unit off ⑨.
4. Remove the waterproof packing ⑩ and cushion ⑪ from the antenna connector.
5. Remove the two screws ⑫ and remove the antenna connector.

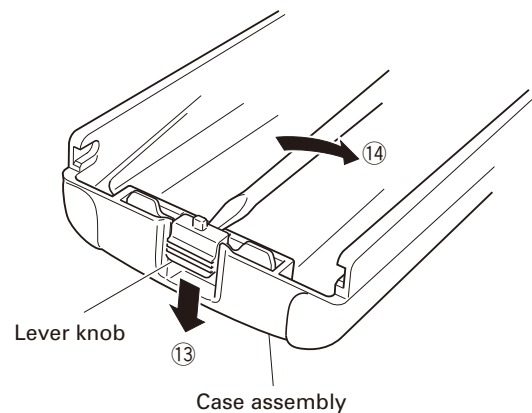
**Note:** The cushion cannot be reused. Affix a new cushion when you remove the cushion.

**Note:** When reassembling the unit in the chassis, be sure to solder the antenna terminal.



### ■ Removing the lever

1. Press down the lever on the lower case ⑬, insert a small flat-head screwdriver into the space between the case and lever, open the case carefully ⑭ and lift the lever off.
- Note:** Do not force to remove the lever from the case.

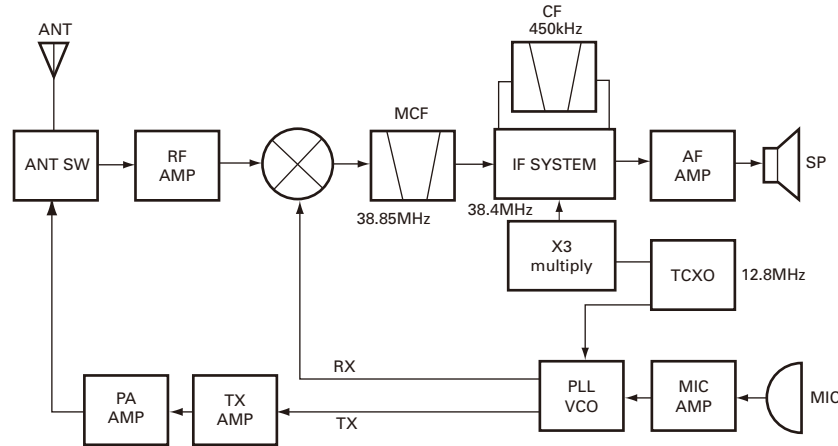


## CIRCUIT DESCRIPTION

### 1. Frequency Configuration

The receiver utilizes double conversion. The first IF is 38.85MHz and the second IF is 450kHz. The first local oscillator signal is supplied from the PLL circuit.

The PLL circuit in the transmitter generates the necessary frequencies. Fig. 1 shows the frequencies.



**Fig. 1 Frequency configuration**

### 2. Receiver

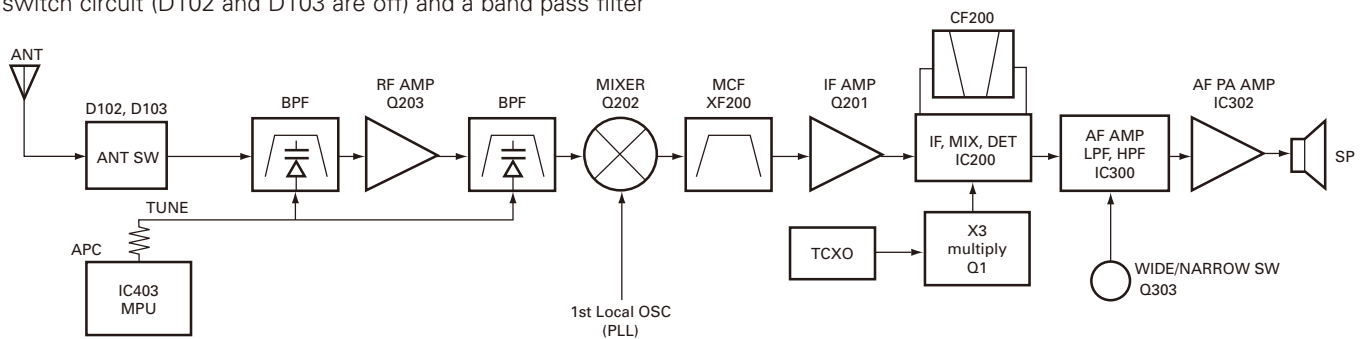
The receiver is double conversion superheterodyne, designed to operate in the frequency range of 150 to 174MHz. The frequency configuration is shown in Fig. 1.

#### 1) Front-end RF Amplifier

An incoming signal from the antenna is applied to an RF amplifier (Q203) after passing through a transmit/receive switch circuit (D102 and D103 are off) and a band pass filter

(L208, L209 and L210). After the signal is amplified (Q203), the signal is filtered through a band pass filter (L203 and L214) to eliminate unwanted signals before it is passed to the first mixer. Band pass filters (L208, L209, L210, L203 and L214) have varactor diodes (D203, D204, D205, D202 and D201).

The voltage of these diodes are controlled by to track the MPU (IC403) center frequency of the band pass filter. (See Fig. 2)



**Fig. 2 Receiver section configuration**

#### 2) First Mixer

The signal from the RF amplifier is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer (Q202) to create a 38.85MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through two monolithic crystal filters (MCFs : XF200) to further remove spurious signals.

through a 450kHz ceramic filter (CF200) to further eliminate unwanted signals before it is amplified and FM detected in IC200.

#### 3) IF Amplifier

The first IF signal is amplified by Q201, and then enters IC200 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within IC200 to create a 450kHz second IF signal. The second IF signal is then fed

#### 4) AF Amplifier

The recovered AF signal obtained from IC200 is amplified by IC300 (1/4), filtered by the IC300 low-pass filter (2/4) and IC300 high-pass filter (3/4) and (4/4), and de-emphasized by R303 and C306. The AF signal is then passed through a WIDE/NARROW switch (Q303). The processed AF signal passes through an AF volume control and is amplified to a sufficient level to drive a loud speaker by an AF power amplifier (IC302).

## CIRCUIT DESCRIPTION

### XF200:L71-0522-05

Item	Rating
Nominal center frequency	38.850MHz
Pass band width	±5.0kHz or more at 3dB
40dB stop band width	±20.0kHz or less
Ripple	1.0dB or less
Insertion loss	4.0dB or less
Guaranteed attenuation	80dB or more at fo -910kHz
Terminal impedance	610Ω /3PF

### CF200:L72-0958-05

Item	Rating
Nominal center frequency	450kHz
6dB band width	±6.0kHz or more
50dB band width	±12.5kHz or less
Ripple	2.0dB or less at fo ±4kHz
Insertion loss	6.0dB or less
Guaranteed attenuation	35.0dB or more at fo ±100kHz
Terminal impedance	2.0kΩ

### 5) Squelch

Part of the AF signal from the IC enters the FM IC again, and the noise component is amplified and rectified by a filter and an amplifier to produce a DC voltage corresponding to the noise level.

The DC signal from the FM IC goes to the analog port of

the microprocessor (IC403). IC403 determines whether to output sounds from the speaker by checking whether the input voltage is higher or lower than the preset value.

To output sounds from the speaker, IC403 sends a high signal to the MUTE and AFCO lines and turns IC302 on through Q302, Q304, Q305, Q306 and Q307. (See Fig. 3)

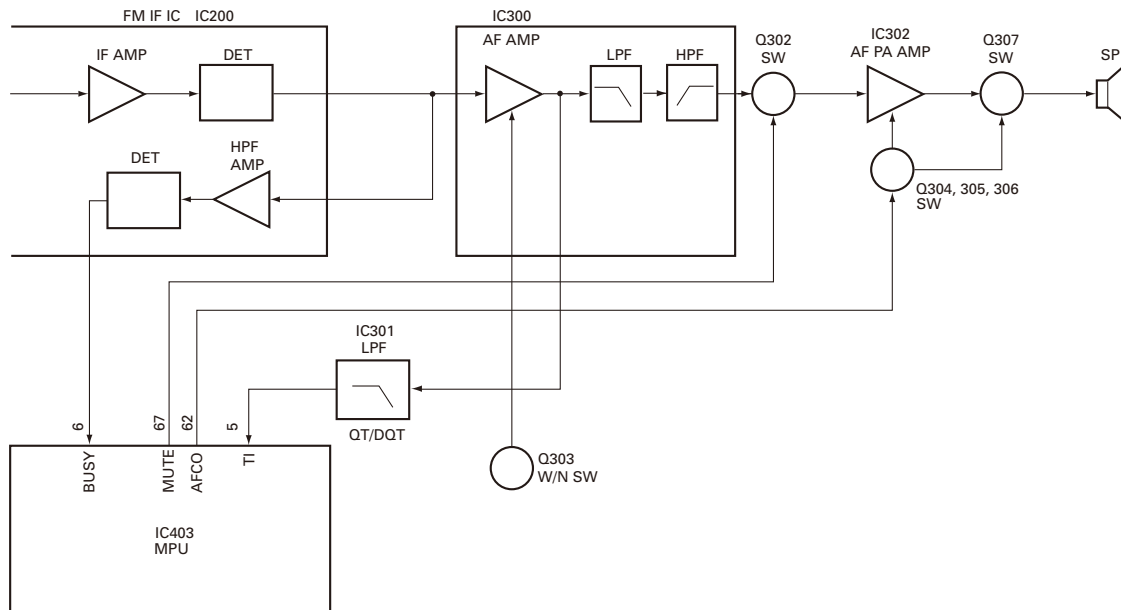


Fig. 3 AF amplifier and squelch

### 6) Receive Signaling

#### QT/DQT

300 Hz and higher audio frequencies of the output signal from IF IC are cut by a low-pass filter (IC301). The resulting signal enters the microprocessor (IC403). IC403 determines whether the QT or DQT matches the preset value, and controls the MUTE and AFCO and the speaker output sounds according to the squelch results.

### 3. PLL Frequency Synthesizer

The PLL circuit generates the first local oscillator signal for reception and the RF signal for transmission.

#### 1) PLL

The frequency step of the PLL circuit is 5 or 6.25kHz.

A 12.8MHz reference oscillator signal is divided at IC1 by a fixed counter to produce the 5 or 6.25kHz reference frequency. The voltage controlled oscillator (VCO) output signal is buffer amplified by Q6, then divided in IC1 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal in the phase comparator in IC1. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency. (See Fig.4)

## CIRCUIT DESCRIPTION

### 2) VCO

The operating frequency is generated by Q4 in transmit mode and Q3 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D1 and

D2 in transmit mode and D3 and D4 in receive mode). The T/R pin is set high in receive mode causing Q5 and Q7 to turn Q4 off, and turn Q3 on. The T/R pin is set low in transmit mode. The outputs from Q3 and Q4 are amplified by Q6 and sent to the buffer amplifiers.

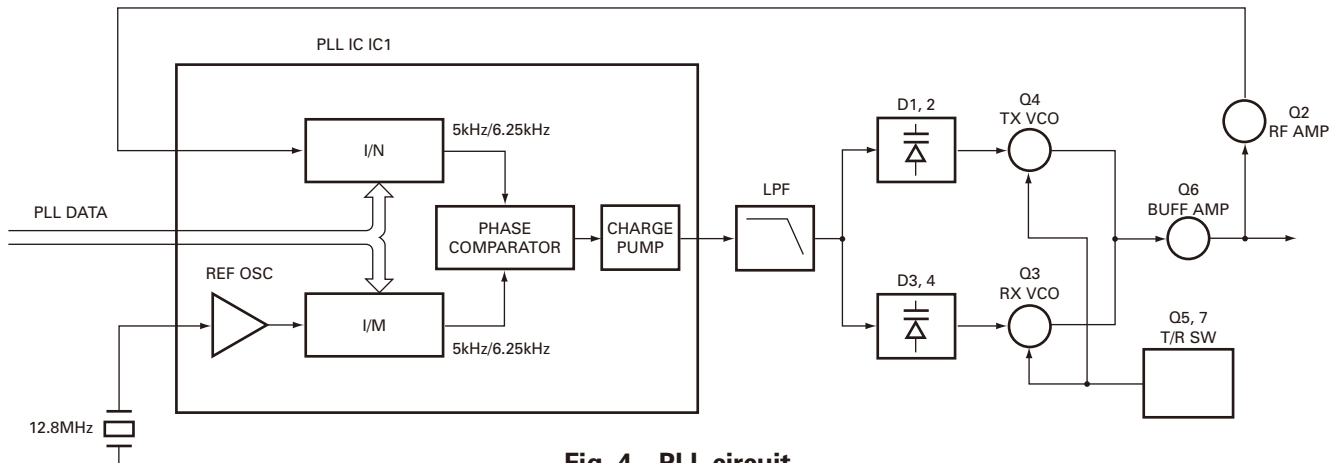


Fig. 4 PLL circuit

### 3) Unlock Detector

If a pulse signal appears at the LD pin of IC1, an unlock condition occurs, and the DC voltage obtained from D7, R1, and C1 causes the voltage applied to the UL pin of the microprocessor to go low. When the microprocessor detects this condition, the transmitter is disabled, ignoring the push-to-talk switch input signal. (See Fig.5)

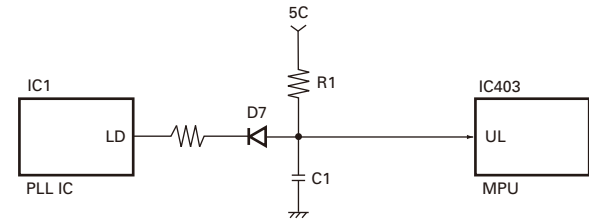


Fig. 5 Unlock detector circuit

## 4. Transmitter

### 1) Transmit Audio

The modulation signal from the microphone is amplified by IC500 (1/2), passes through a pre-emphasis circuit, and amplified by the other IC500 (1/2) to perform IDC operation. The signal then passes through a low-pass filter (splatter filter) (Q501 and Q502) and cuts 3kHz and higher frequencies. The resulting signal goes to the VCO through the VCO modulation terminal for direct FM modulation. (See Fig. 6)

### 2) QT/DQT Encoder

A necessary signal for QT/DQT encoding is generated by IC403 and FM-modulated to the PLL reference signal. Since the reference OSC does not modulate the loop characteristic frequency or higher, modulation is performed at the VCO side by adjusting the balance. (See Fig. 6)

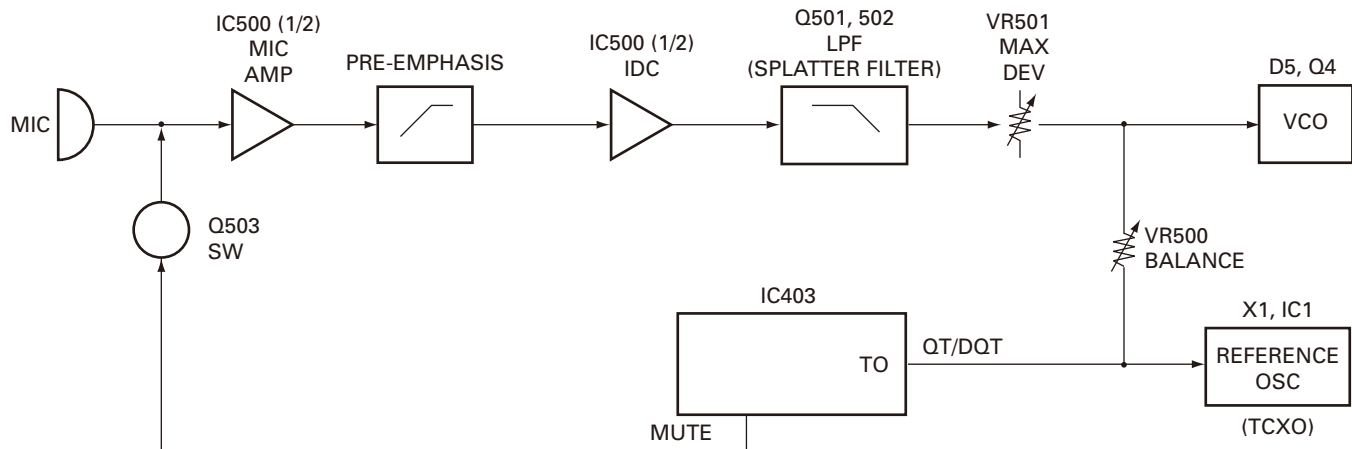


Fig. 6 Transmit audio and QT/DQT encoder



## CIRCUIT DESCRIPTION

### 3) VCO and RF Amplifier

The transmit signal obtained from the VCO buffer amplifier Q100, is amplified by Q101. This amplified signal is passed to the power amplifier, Q102 and Q105, which consists of a 2-stage FET amplifier and is capable of producing up to 5W of RF power. (See Fig.7)

### 4) ANT Switch and LPF

The RF amplifier output signal is passed through a low-pass filter network and a transmit/receive switching circuit before it is passed to the antenna terminal. The transmit/receive switching circuit is comprised of D101, D102, D103 and D104. D102 and D103 turned on (conductive) in transmit mode and off (isolated) in receive mode.

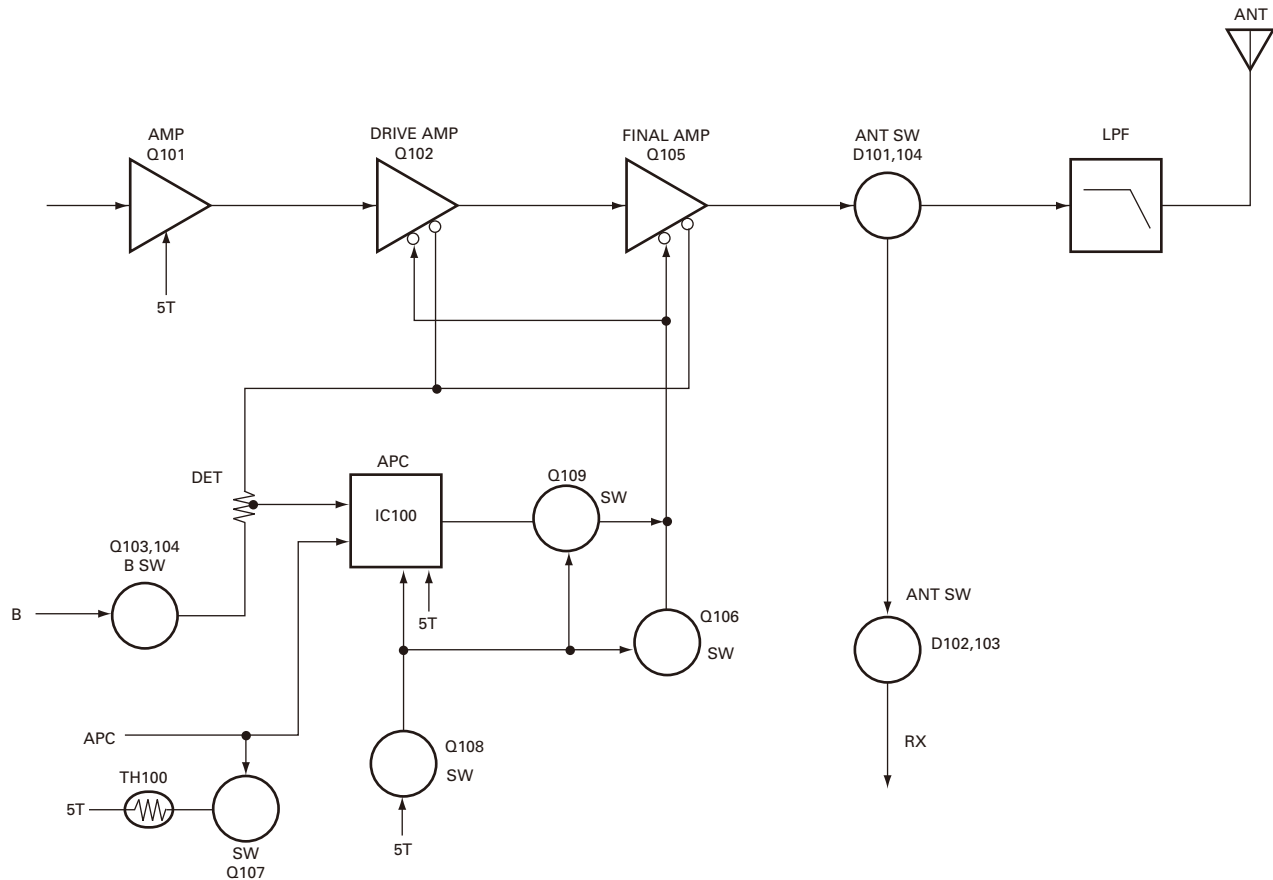


Fig. 7 APC system

### 5) APC

The automatic power control (APC) circuit stabilizes the transmitter output power at a predetermined level by sensing the drain current of the final amplifier Field Effect Transistor (FET). The voltage comparator, IC100 (2/2), compares the voltage obtained from the above drain current with a reference voltage which is set using the microprocessor. An APC voltage proportional to the difference between the sensed voltage and the reference voltage appears at the output of IC100 (1/2). This output voltage controls the gate of the FET power amplifier, which keeps the transmitter output power constant. The transmitter output power can be varied by the microprocessor which in turn changes the reference voltage and hence, the output power.

### 6) Thermal Protection Circuit

When the thermistor (TH100) reaches about 80°C, the protection circuit turns on Q107 to protect transmitting final amplifier (Q105) from the over heating.

### 5. Power Supply

A 5V reference power supply [5M] for the control circuit is derived from an internal battery. This reference is used to provide a 5V supply in transmit mode [5T], a 5V supply in receive mode [5R], and a 5V supply common in both modes [5C] based on the control signal sent from the microprocessor.

### 6. Control System

The IC403 MPU operates at 7.37MHz. This oscillator has a circuit that shifts the frequency according to the EEPROM data.

## SEMICONDUCTOR DATA

## Microprocessor: 38268MCA060GU (TX-RX unit IC403)

Pin No.	Port Name	I/O	Function
1,2	VC1,VC2	O	Variable capacity tune control
3	NC	I	NC
4	TIBI	I	QT/DQT external circuit center point input
5	TI	I	QT/DQT signal input
6	BUSY	I	Busy input
7	BATT	I	Battery voltage detection
8	NC	I	NC
9	VCCN	O	Frequency regulation output
10	APC	O	TX : Auto power control D/A output RX : BPF tuning D/A output
11~14	NC	I	NC
15	BEEP	O	Beep output
16	TO	O	QT/DQT output
17	NC	I	NC
18	PTT	I	[PTT] key input connected to RXD
19	TXD	O	RS-232C output connected to SP/ MIC test (REM)
20	RXD	I	RS-232C input connected to [PTT] line
21	NC	I	NC
22	SELF	I	Self program L : disable
23	MONI	I	[MONI] key input
24~27	NC	I	NC
28~31	ENC3~ENC0	I	Encode input (channel select)
32	INT0	I	Power detection control
33	RST	I	Reset input
34	NC	I	NC
35	NC	O	NC
36	XIN	I	7.3728MHz oscillator
37	XOUT	O	7.3728MHz oscillator
38	VSS	I	GND
39	SHIFT	O	Beat shift H : shift on
40	PABC	O	Final supply H : on
41	WNRC	O	Audio reference sensitivity L : narrow
42	WNTE	O	MAX Dev. control Narrow: H
43~46	NC	I	NC
47	SDA	I/O	EEPROM data line
48	SCL	O	EEPROM clock line
49	UL	I	PLL unlock detection pin L : unlock
50~54	NC	I	NC
55	DT	O	Common data output
56	CK	O	Common clock output
57	NC	O	NC
58	LE	O	PLL IC enable H : latches
59,60	NC	O	NC

Pin No.	Port Name	I/O	Function
61	5MC	O	Control of power supply (5M) for everything except the microprocessor and EEPROM L : Power supply ON
62	AFCO	O	AF amp power supply H : ON
63	RX	O	TX/RX VCO select H : RX
64	GLD	O	Green LED control H : Lit
65	RLED	O	Red LED control H : Lit
66	SAVE	O	Save control H : Save off
67	MUTE	O	Mute control H : MIC mute, L : AF mute
68	5RC	O	Reception power supply control L : on
69	5TC	O	Transmission power supply control H : on
70~88	NC	O	NC
89	VCC	I	Microprocessor power supply, 5V input
90	VREF	I	A/D conversion reference voltage ; connected to Vcc
91	AVSS	I	A/D converter power supply ; con- nected to Vss
92~95	NC	O	NC
96~100	NC	I	NC

## FET : 2SK2596-E (Q102)

Absolute Maximum Ratings (Ta=25°C)						
Item	V <sub>DSS</sub>	V <sub>GSS</sub>	I <sub>D</sub>	Pch*	Tch	Tstg
Rating	17V	±10V	0.4A	3W	150°C	-45~+150°C
				*Tc=25°C		

## FET : 2SK2595-E (Q105)

Absolute Maximum Ratings (Ta=25°C)						
Item	V <sub>DSS</sub>	V <sub>GSS</sub>	I <sub>D</sub>	Pch*	Tch	Tstg
Rating	17V	±10V	1.1A	20W	150°C	-45~+150°C
				*Tc=25°C		

## COMPONENTS DESCRIPTION

### TX-RX unit (X57-6020-10)

Ref. No.	Part Name	Description
IC1	IC	Phase locked loop system
IC100	IC	Automatic power control
IC200	IC	IF system
IC300	IC	Audio amp active filter
IC301	IC	Active filter
IC302	IC	Audio power AMP
IC400	IC	Reset switch
IC401	IC	EEPROM
IC402	IC	Voltage detect
IC403	IC	Microprocessor
IC404	IC	Voltage regulator
IC500	IC	MIC AMP/Limiter
Q1	Transistor	Tripler
Q2	Transistor	RF AMP
Q3	FET	VCO RX
Q4	FET	VCO TX
Q5	FET	DC switch
Q6	Transistor	RF buffer AMP
Q7	Transistor	DC switch
Q8	Transistor	Ripple filter
Q100	Transistor	RF AMP
Q101	Transistor	TX pre-drive
Q102	FET	TX drive
Q103	FET	DC switch
Q104	Transistor	DC switch
Q105	FET	TX final
Q106	FET	DC switch
Q107	Transistor	Temperature protection switch
Q108,109	Transistor	DC switch
Q200	Transistor	DC switch
Q201	Transistor	IF AMP
Q202	FET	Mixer
Q203	FET	Mixer RF AMP
Q300	Transistor	Active filter
Q302	FET	Audio mute switch
Q303~306	Transistor	DC switch
Q307	FET	Audio mute switch
Q400~402	Transistor	DC switch
Q403	Transistor	Beat shift switch
Q404	Transistor	DC switch
Q405	FET	DC switch
Q406~408	Transistor	DC switch
Q500	FET	DC switch
Q501,502	Transistor	Active filter

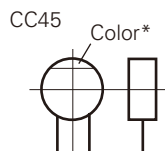
Ref. No.	Part Name	Description
Q503	Transistor	MIC mute/ AGC
Q504	Transistor	DC switch
D1~4	Variable capacitance diode	Frequency control
D5	Variable capacitance diode	TX modulation
D6	Diode	Current steering
D7	Diode	Unlock detect
D100	Diode	RF switch
D101~104	Diode	Antenna switch
D200	Diode	RF switch
D201~205	Variable capacitance diode	BPF tuning
D300	Diode	Limiter
D400	LED	TX
D401	LED	Busy
D500	Diode	AGC detect
D501	Diode	MIC mute/AGC switch
D502	Diode	Reverse protection
D505	Zener diode	APC voltage limiter

## PARTS LIST

### CAPACITORS

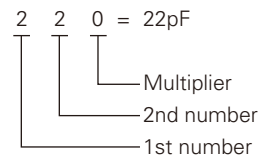
$\frac{C}{1} \frac{C}{2} \frac{45}{3} \frac{TH}{4} \frac{1H}{5} \frac{220}{6} \frac{J}{7}$

- 1 = Type ... ceramic, electrolytic, etc.
- 2 = Shape ... round, square, etc.
- 3 = Temp. coefficient
- 4 = Voltage rating
- 5 = Value
- 6 = Tolerance



#### • Capacitor value

- 010 = 1pF
- 100 = 10pF
- 101 = 100pF
- 102 = 1000pF = 0.001μF
- 103 = 0.01μF



#### • Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = -470±60ppm/°C

#### • Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10μF : -10~+50 Less than 4.7μF : -10~+75

#### (Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

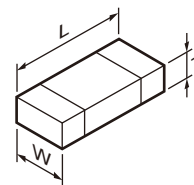
#### • Voltage rating

2nd word \ 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	2150	4000	5000	6300	8000	-

#### • Chip capacitors

- (EX)  $\frac{C}{1} \frac{C}{2} \frac{73}{3} \frac{F}{4} \frac{SL}{5} \frac{1H}{6} \frac{000}{7} \frac{J}{8}$  → Refer to the table above.
- (Chip) (CH, RH, UJ, SL)
- (EX)  $\frac{C}{1} \frac{K}{2} \frac{73}{3} \frac{F}{4} \frac{F}{5} \frac{1H}{6} \frac{000}{7} \frac{Z}{8}$
- (Chip) (B, F)
- 1 = Type
  - 2 = Shape
  - 3 = Dimension
  - 4 = Temp. coefficient
  - 5 = Voltage rating
  - 6 = Value
  - 7 = Tolerance

#### • Dimension



#### Chip capacitor

Code	L	W	T
Empty	5.6±0.5	5.0±0.5	Less than 2.0
A	4.5±0.5	3.2±0.4	Less than 2.0
B	4.5±0.5	2.0±0.3	Less than 2.0
C	4.5±0.5	1.25±0.2	Less than 1.25
D	3.2±0.4	2.5±0.3	Less than 1.5
E	3.2±0.2	1.6±0.2	Less than 1.25
F	2.0±0.3	1.25±0.2	Less than 1.25
G	1.6±0.2	0.8±0.2	Less than 1.0
H	1.0±0.05	0.5±0.05	0.5±0.05

#### Chip resistor

Code	L	W	T
E	3.2±0.2	1.6±0.2	1.0
F	2.0±0.3	1.25±0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1
H	1.0±0.05	0.5±0.05	0.35±0.05

### RESISTORS

#### • Chip resistor (Carbon)

- (EX)  $\frac{R}{1} \frac{D}{2} \frac{73}{3} \frac{E}{4} \frac{B}{5} \frac{2B}{6} \frac{000}{7} \frac{J}{8}$
- (Chip) (B, F)

#### • Carbon resistor (Normal type)

- (EX)  $\frac{R}{1} \frac{D}{2} \frac{14}{3} \frac{B}{4} \frac{B}{5} \frac{2C}{6} \frac{000}{7} \frac{J}{8}$

- 1 = Type
- 2 = Shape
- 3 = Dimension
- 4 = Temp. coefficient
- 5 = Rating wattage
- 6 = Value
- 7 = Tolerance

#### • Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

## PARTS LIST

\* New Parts. Δ indicates safety critical components.

Parts without **Parts No.** are not supplied.

Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.

Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia

Y : PX (Far East, Hawaii)

Y : AAFES (Europe)

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

TK-2102G (Y50-6410-XX)  
TX-RX UNIT (X57-6020-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
<b>TK-2102G</b>					
1	1A	*	A02-4049-03	PLASTIC CABINET ASSY	
2	3B		A82-0034-03	REAR PANEL	
4	2D		B09-0351-03	CAP (SP/MIC) ACCESSORY	
5	1D	*	B62-2103-00	INSTRUCTION MANUAL	
7	2B		E04-0449-05	RF COAXIAL RECEPTACLE(SMA)	
8	3B		E23-1183-04	RELAY TERMINAL (BATT-)	
9	1A		G01-0881-04	COIL SPRING (BATT RELEASE)	
10	3B		G10-1288-04	FIBROUS SHEET (CHASSIS)	
11	-		G11-2583-04	SHEET (HOLDER)	
12	3B	*	G11-2588-14	RUBBER SHEET (CHASSIS)	
13	1B	*	G11-4478-04	SHEET (CH)	
15	3B		G13-1709-04	CUSHION(VOL)	
16	3B		G13-1763-04	CUSHION (TERMINAL BATT+)	
17	3B		G13-1867-14	CUSHION (TERMINAL BATT-)	
18	2B		G13-1959-04	CUSHION (RECEPTACLE)	
19	2A		G13-1985-04	CUSHION (X400)	
21	2B		G13-1986-04	CUSHION (VR501)	
22	3B		G13-2069-24	CUSHION (HOLDER)	
23	2B		G53-0791-03	PACKING (SP/MIC)	
24	2A		G53-0842-13	PACKING (SP)	
25	2B		G53-0860-04	PACKING (CHASSIS)	
27	2B		G53-1528-04	PACKING (SMA)	
30	1D		H25-0085-04	PROTECTION BAG (100/200/0.07)	
31	2D		H25-2012-04	PROTECTION BAG (75/100/0.08)	
33	1A		J19-1572-04	HOLDER (BATT RELEASE)	
34	2B		J19-5344-13	HOLDER (VOL/CH)	
35	2D		J21-4493-04	SP/MIC HOLDER ACCESSORY	
36	2D		J29-0734-05	BELT CLIP ACCESSORY	
37	1B		J69-0345-04	RING (VOL,CH)	
39	2B		J82-0059-15	FPC	
41	1B		K29-5255-03	KNOB (VOL)	
42	1A		K29-5274-03	BUTTON KNOB (MONI)	
43	1A		K29-5275-23	BUTTON KNOB (PTT)	
44	1B		K29-5278-03	KNOB (CH)	
45	1A		K29-5337-03	LEVER KNOB (BATT RELEASE)	
A	2B		N09-2438-05	BINDING HEAD SCREW (SMA)	
B	1B	*	N14-0581-44	CIRCULAR NUT (VOL,CH)	
C	1B	*	N14-0804-24	CIRCULAR NUT (SMA)	
D	3A		N30-2606-48	PAN HEAD MACHINE SCREW	
E	3B		N79-2030-48	PAN HEAD TAPTITE SCREW	
F	2A,2B		N83-2005-48	PAN HEAD TAPTITE SCREW	
47	2D		N99-0396-15	SCREW SET ACCESSORY	
49	2B		R31-0647-05	VARIABLE RESISTOR	
51	2B		S60-0424-25	ROTARY SWITCH	
53	1A		T07-0369-15	SPEAKER	
54	2D		T90-1036-15	HELICAL ANTENNA ACCESSORY	
56	1C	*	W08-0479-25	AC ADAPTER (AC 120V) ACCESSORY	K
58	1C		W08-0558-35	AC ADAPTER (AC 230V) ACCESSORY	M
<b>TX-RX UNIT (X57-6020-10)</b>					
59	1C	*	W08-0598-15	CHARGER ACCESSORY	
60	2C		W09-0940-25	BATTERY ASSY ACCESSORY	
D400			B30-2156-05	LED (RED)	
D401			B30-2157-05	LED (YELLOW)	
C1			CK73GB1C104K	CHIP C 0.10UF	K
C2,3			CC73GCH1H101J	CHIP C 100PF	J
C4			CK73GB1C104K	CHIP C 0.10UF	K
C5			CS77AA0J4R7M	CHIP TNTL 4.7UF	6.3VW
C6			CC73GCH1H101J	CHIP C 100PF	J
C7			CK73GB1H102K	CHIP C 1000PF	K
C8			CK73FB1C224K	CHIP C 0.22UF	K
C9			CC73GCH1H130J	CHIP C 13PF	J
C10			CC73GCH1H470J	CHIP C 47PF	J
C12			CK73FB1C224K	CHIP C 0.22UF	K
C14			CC73GCH1H130J	CHIP C 13PF	J
C15			CS77AA1A6R8M	CHIP TNTL 6.8UF	10VW
C16			CC73GCH1H680J	CHIP C 68PF	J
C17			CK73GB1H331K	CHIP C 330PF	K
C18			CS77AA1DR68M	CHIP TNTL 0.68UF	20VW
C19,20			CK73GB1H103K	CHIP C 0.010UF	K
C23			CS77AA0J100M	CHIP TNTL 10UF	6.3VW
C24			CK73GB1H681K	CHIP C 680PF	K
C25			CK73GB1H471K	CHIP C 470PF	K
C26			CC73GCH1H121J	CHIP C 120PF	J
C27			CK73GB1H102K	CHIP C 1000PF	K
C28			CC73GCH1H330J	CHIP C 33PF	J
C29-31			CK73GB1H102K	CHIP C 1000PF	K
C32			CC73GCH1H101J	CHIP C 100PF	J
C33			CC73GCH1H390J	CHIP C 39PF	J
C34			CC73GCH1HR75B	CHIP C 0.75PF	B
C35			CC73GCH1H060D	CHIP C 6.0PF	D
C36			CC73GCH1H180J	CHIP C 18PF	J
C37			CC73GCH1H050B	CHIP C 5.0PF	B
C38			CC73GCH1H180J	CHIP C 18PF	J
C39			CK73GB1H103K	CHIP C 0.010UF	K
C40,41			CK73GB1H102K	CHIP C 1000PF	K
C42			CK73GB1H103K	CHIP C 0.010UF	K
C43,44			CC73GCH1H0R5B	CHIP C 0.5PF	B
C45,46			CK73GB1H102K	CHIP C 1000PF	K
C47			CC73GCH1H330J	CHIP C 33PF	J
C48			CC73GCH1H100D	CHIP C 10PF	D
C49			CK73GB1H102K	CHIP C 1000PF	K
C50			CS77AA0J4R7M	CHIP TNTL 4.7UF	6.3VW
C51			CC73GCH1H680J	CHIP C 68PF	J
C100			CC73GCH1H150J	CHIP C 15PF	J
C101,102			CK73GB1H102K	CHIP C 1000PF	K
C103			CC73GCH1H220J	CHIP C 22PF	J
C104-107			CK73GB1H102K	CHIP C 1000PF	K
C108			CC73GCH1H120J	CHIP C 12PF	J
C109			CK73GB1H102K	CHIP C 1000PF	K

## PARTS LIST

## TX-RX UNIT (X57-6020-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C110			CK73GB1C104K	CHIP C 0.10UF K		C241			CC73GCH1H040B	CHIP C 4.0PF B	
C111,112			CK73GB1H102K	CHIP C 1000PF K		C243			CC73GCH1H020C	CHIP C 2.0PF C	
C113			CC73GCH1H200J	CHIP C 20PF J		C245,246			CK73GB1H102K	CHIP C 1000PF K	
C114-116			CK73GB1H102K	CHIP C 1000PF K		C247			CC73GCH1H200J	CHIP C 20PF J	
C118-120			CK73GB1H102K	CHIP C 1000PF K		C248			CC73GCH1H080D	CHIP C 8.0PF D	
C121			CK73EB1C105K	CHIP C 1.0UF K		C249-251			CK73GB1H102K	CHIP C 1000PF K	
C123			CK73GB1H103K	CHIP C 0.010UF K		C252			CC73HCH1H180J	CHIP C 18PF J	
C124			CK73GB1H102K	CHIP C 1000PF K		C253			CK73HB1H102K	CHIP C 1000PF K	
C125			CK73GB1C104K	CHIP C 0.10UF K		C254			CC73GCH1H1R5C	CHIP C 1.5PF C	
C126			CC73GCH1H560J	CHIP C 56PF J		C255			CC73GCH1H160J	CHIP C 16PF J	
C127			CS77AA1A6R8M	CHIP TNTL 6.8UF 10WV		C256			CK73GB1H102K	CHIP C 1000PF K	
C128			CC73GCH1H150G	CHIP C 15PF G		C257			CC73GCH1H1R5C	CHIP C 1.5PF C	
C129			CC73GCH1H100C	CHIP C 10PF C		C259			CC73GCH1H200J	CHIP C 20PF J	
C130,131			CK73GB1H102K	CHIP C 1000PF K		C260			CK73GB1H102K	CHIP C 1000PF K	
C132			CK73GB1H471K	CHIP C 470PF K		C261			CC73GCH1H150J	CHIP C 15PF J	
C133			CK73GB1H102K	CHIP C 1000PF K		C262-264			CK73HB1H102K	CHIP C 1000PF K	
C134			CC73GCH1H101J	CHIP C 100PF J		C266			CK73HB1A104K	CHIP C 0.10UF K	
C135			CC73GCH1H270J	CHIP C 27PF J		C267			CK73GB1C104K	CHIP C 0.10UF K	
C136			CC73GCH1H390J	CHIP C 39PF J		C300			CK73GB1H822K	CHIP C 8200PF K	
C137			CK73GB1H102K	CHIP C 1000PF K		C301			CK73GB1E183K	CHIP C 0.018UF K	
C138			CC73GCH1H100D	CHIP C 10PF D		C302,303			CK73GB1C104K	CHIP C 0.10UF K	
C139			CK73GB1H102K	CHIP C 1000PF K		C304			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C140			CC73GCH1H100D	CHIP C 10PF D		C305			CK73GB1H103J	CHIP C 0.010UF J	
C141			CK73GB1H471K	CHIP C 470PF K		C306			CK73GB1C473K	CHIP C 0.047UF K	
C142			CC73GCH1H220J	CHIP C 22PF J		C307			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C143			CC73GCH1H080D	CHIP C 8.0PF D		C308			CK73GB1H562K	CHIP C 5600PF K	
C144			CC73GCH1H090D	CHIP C 9.0PF D		C309			CK73GB1H103J	CHIP C 0.010UF J	
C146			CC73GCH1H200J	CHIP C 20PF J		C311			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C147			CC73GCH1H100D	CHIP C 10PF D		C312			CK73GB1H103J	CHIP C 0.010UF J	
C200			CS77AA0J100M	CHIP TNTL 10UF 6.3WV		C313			CK73FB1A105K	CHIP C 1.0UF K	
C201			CK73GB1H103K	CHIP C 0.010UF K		C314			CK73GB1H102K	CHIP C 1000PF K	
C202			CC73GCH1H270J	CHIP C 27PF J		C316			CK73GB1H103J	CHIP C 0.010UF J	
C203			CK73GB1H471K	CHIP C 470PF K		C318			CK73GB1C333K	CHIP C 0.033UF K	
C204			CK73GB1H472K	CHIP C 4700PF K		C319			CK73GB1C473K	CHIP C 0.047UF K	
C205,206			CC73GCH1H391J	CHIP C 390PF J		C320,321			CK73GB1C333J	CHIP C 0.033UF J	
C207			CK73GB1C104K	CHIP C 0.10UF K		C322			CK73FB1E104K	CHIP C 0.10UF K	
C208			CC73GCH1H270J	CHIP C 27PF J		C327			CK73GB1C104K	CHIP C 0.10UF K	
C209			CK73GB1C104K	CHIP C 0.10UF K		C330			CC73GCH1H101J	CHIP C 100PF J	
C210			CK73GB1H103K	CHIP C 0.010UF K		C331			CK73FB1C474K	CHIP C 0.47UF K	
C211			CK73GB1C104K	CHIP C 0.10UF K		C332			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C212			CC73GCH1H150J	CHIP C 15PF J		C333			CK73GB1A474K	CHIP C 0.47UF K	
C213			CK73GB1C104K	CHIP C 0.10UF K		C334			CC73GCH1H221J	CHIP C 220PF J	
C214			CK73GB1H103K	CHIP C 0.010UF K		C335			CK73GB1C473K	CHIP C 0.047UF K	
C215			CC73GCH1H100D	CHIP C 10PF D		C336			CK73GB1H103K	CHIP C 0.010UF K	
C216			CC73GCH1H020C	CHIP C 2.0PF C		C337			CS77CC0J101M	CHIP TNTL 100UF 6.3WV	
C217			CK73GB1H103K	CHIP C 0.010UF K		C338			CC73GCH1H560J	CHIP C 56PF J	
C218			CK73GB1H102K	CHIP C 1000PF K		C400			CK73GB1C104K	CHIP C 0.10UF K	
C219			CC73GCH1H100C	CHIP C 10PF C		C402-404			CK73GB1H102K	CHIP C 1000PF K	
C220			CK73HB1H102K	CHIP C 1000PF K		C406,407			CK73GB1H102K	CHIP C 1000PF K	
C221			CK73GB1H103K	CHIP C 0.010UF K		C408			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C222			CC73HCH1H050B	CHIP C 5.0PF B		C409			CC73GCH1H030C	CHIP C 3.0PF C	
C223			CC73GCH1H020C	CHIP C 2.0PF C		C410			CK73GB1H102K	CHIP C 1000PF K	
C224,225			CK73GB1C104K	CHIP C 0.10UF K		C411			CK73GB1H471K	CHIP C 470PF K	
C233			CC73HCH1H080B	CHIP C 8.0PF B		C412			CC73GCH1H100D	CHIP C 10PF D	
C234			CC73HCH1H300J	CHIP C 30PF J		C413,414			CK73GB1H102K	CHIP C 1000PF K	
C235			CK73GB1C104K	CHIP C 0.10UF K		C415			CC73GCH1H100D	CHIP C 10PF D	
C236			CK73HB1H102K	CHIP C 1000PF K		C416			CK73GB1H102K	CHIP C 1000PF K	
C237			CC73GCH1H060B	CHIP C 6.0PF B		C417			CK73EF1C105Z	CHIP C 1.0UF Z	
C238			CC73GCH1H200J	CHIP C 20PF J		C418			CK73GB1H103K	CHIP C 0.010UF K	
C239			CK73GB1H102K	CHIP C 1000PF K		C420,421			CK73GB1H103K	CHIP C 0.010UF K	

## PARTS LIST

TX-RX UNIT (X57-6020-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C422			CK73HB1E103K	CHIP C 0.010UF K		L8,9			L40-6891-86	SMALL FIXED INDUCTOR (6.8UH)	
C423			CK73GB1H102K	CHIP C 1000PF K		L10			L33-0744-05	SMALL FIXED INDUCTOR	
C424			CK73FB1A105K	CHIP C 1.0UF K		L11			L33-0745-05	SMALL FIXED INDUCTOR	
C425			CK73HB1E103K	CHIP C 0.010UF K		L12			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
C427			CK73GB1H102K	CHIP C 1000PF K		L13			L40-4775-92	SMALL FIXED INDUCTOR (47NH)	
C429,430			CK73FB1A105K	CHIP C 1.0UF K		L14			L92-0140-05	CHIP FERRITE	
C500,501			CK73GB1C273K	CHIP C 0.027UF K		L15			L40-6891-86	SMALL FIXED INDUCTOR (6.8UH)	
C502			CK73GB1H392K	CHIP C 3900PF K		L16,17			L40-2285-38	SMALL FIXED INDUCTOR (220NH)	
C503			CK73GB1C333K	CHIP C 0.033UF K		L100			L40-8275-92	SMALL FIXED INDUCTOR (82NH)	
C504			CS77AA0J4R7M	CHIP TMTL 4.7UF 6.3WV		L101			L40-6875-92	SMALL FIXED INDUCTOR (68NH)	
C505			CK73FB1A105K	CHIP C 1.0UF K		L102			L92-0140-05	CHIP FERRITE	
C506			CK73GB1H471K	CHIP C 470PF K		L103			L40-2775-92	SMALL FIXED INDUCTOR (27NH)	
C507			CS77CP0G2R2M	CHIP TMTL 2.2UF 4WV		L104			L41-1098-40	SMALL FIXED INDUCTOR (1000NH)	
C508			CK73GB1H103K	CHIP C 0.010UF K		L105			L92-0149-05	CHIP FERRITE	
C509			CK73GB1H332K	CHIP C 3300PF K		L107			L40-3375-54	SMALL FIXED INDUCTOR (33NH)	
C510			CC73GCH1E821J	CHIP C 820PF J		L108			L34-4548-05	AIR-CORE COIL	
C511			CK73GB1C473K	CHIP C 0.047UF K		L109			L92-0149-05	CHIP FERRITE	
C512			CK73GB1H332K	CHIP C 3300PF K		L110			L34-4594-05	AIR-CORE COIL	
C513			CC73GCH1E681J	CHIP C 680PF J		L111			L34-4547-05	AIR-CORE COIL	
C514			CK73GB1C473K	CHIP C 0.047UF K		L112			L41-2295-39	SMALL FIXED INDUCTOR (2.2UH)	
C515			CK73GB1H103K	CHIP C 0.010UF K		L113			L34-4550-05	AIR-CORE COIL	
C516			CC73GCH1H100D	CHIP C 10PF D		L114			L34-4548-05	AIR-CORE COIL	
C517			CK73GB1H102K	CHIP C 1000PF K		L115			L34-4549-05	AIR-CORE COIL	
C518			CK73GB1E223J	CHIP C 0.022UF J		L117			L34-4548-05	AIR-CORE COIL	
C519			CS77AA0J4R7M	CHIP TMTL 4.7UF 6.3WV		L118			L41-1092-44	SMALL FIXED INDUCTOR (1UH)	
C520			CK73GB1E223J	CHIP C 0.022UF J		L200			L41-5685-39	SMALL FIXED INDUCTOR (0.56UH)	
C521			CK73GB1H102K	CHIP C 1000PF K		L201			L41-8285-39	SMALL FIXED INDUCTOR (0.82UH)	
C522			CK73FB1E104K	CHIP C 0.10UF K		L202		*	L40-1285-38	SMALL FIXED INDUCTOR (120NH)	
C523			CS77CP0G2R2M	CHIP TMTL 2.2UF 4WV		L203			L41-5678-03	SMALL FIXED INDUCTOR (56NH)	
C524			CK73GB1C273K	CHIP C 0.027UF K		L204		*	L41-7588-40	SMALL FIXED INDUCTOR (750NH)	
C525			CK73GB1C104K	CHIP C 0.10UF K		L208,209			L41-5678-03	SMALL FIXED INDUCTOR (56NH)	
C526			CK73GB1H471K	CHIP C 470PF K		L210		*	L41-4778-03	SMALL FIXED INDUCTOR (47NH)	
C527			CS77AA0J100M	CHIP TMTL 10UF 6.3WV		L211			L40-3375-92	SMALL FIXED INDUCTOR (33NH)	
C528			CK73GB1H102K	CHIP C 1000PF K		L212			L34-4554-05	COIL	
C529			CK73FB1H102K	CHIP C 1000PF K		L212		*	L34-4850-15	COIL	
C530			CC73HCH1H221J	CHIP C 220PF J		L214			L41-5678-03	SMALL FIXED INDUCTOR (56NH)	
C531			CC73GCH1H221J	CHIP C 220PF J		L215			L41-5685-39	SMALL FIXED INDUCTOR (0.56UH)	
C532			CK73GB1H471K	CHIP C 470PF K		L400			L40-2281-86	SMALL FIXED INDUCTOR (0.22UH)	
C533			CK73GB1C104K	CHIP C 0.10UF K		L401			L92-0140-05	CHIP FERRITE	
						L402,403			L40-2281-86	SMALL FIXED INDUCTOR (0.22UH)	
TC1			C05-0384-05	CERAMIC TRIMMER CAPACITOR (10PF)		L500			L92-0140-05	CHIP FERRITE	
TC2			C05-0383-05	CERAMIC TRIMMER CAPACITOR (6PF)		L501,502			L92-0149-05	CHIP FERRITE	
TC201			C05-0371-05	CERAMIC TRIMMER CAPACITOR (10PF)		X1			L77-1877-15	TCXO	
101	2B	*	E23-1182-04	RELAY TERMINAL (BATT+)		X400		*	L77-1761-15	CRYSTAL RESONATOR (7.3728MHZ)	
CN400			E40-5998-15	PIN ASSY		XF200			L71-0522-05	MCF (38.85MHZ)	
J500			E11-0703-05	PHONE JACK (2.5/3.5)							
F500			F53-0130-05	FUSE (3A)		106	2B	*	N78-2640-48	PAN HEAD TAPTITE SCREW	
F500			F53-0392-05	FUSE (3A)							
102	2B		G13-1867-14	CUSHION (TERMINAL BATT+)		CP1			RK75GB1J102J	CHIP-COM 1.0K J 1/16W	
103	2B		G53-0862-04	PACKING (TERMINAL BATT+)		R1			RK73GB2A154J	CHIP R 150K J 1/10W	
						R2			RK73GB2A102J	CHIP R 1.0K J 1/10W	
						R3			RK73GB2A100J	CHIP R 10 J 1/10W	
104	2B		J19-1571-04	HOLDER (TERMINAL BATT+)		R4			RK73GB2A472J	CHIP R 4.7K J 1/10W	
105	2B		J30-1249-04	SPACER (TERMINAL BATT+)							
CF200			L72-0958-05	CERAMIC FILTER		R5			RK73GB2A000J	CHIP R 0.0 J 1/10W	
L1			L92-0140-05	CHIP FERRITE		R6			RK73GB2A102J	CHIP R 1.0K J 1/10W	
L2		*	L41-8295-39	SMALL FIXED INDUCTOR (8.2UH)		R7			RK73GB2A000J	CHIP R 0.0 J 1/10W	
L4			L40-4781-86	SMALL FIXED INDUCTOR (0.47UH)		R8			RK73GB2A334J	CHIP R 330K J 1/10W	
L5			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)		R9			RK73GB2A681J	CHIP R 680 J 1/10W	
L6			L40-6891-86	SMALL FIXED INDUCTOR (6.8UH)		R10			RK73GB2A151J	CHIP R 150 J 1/10W	
L7			L92-0140-05	CHIP FERRITE		R11			RK73GB2A473J	CHIP R 47K J 1/10W	
						R12			RK73GB2A274J	CHIP R 270K J 1/10W	



## PARTS LIST

## TX-RX UNIT (X57-6020-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R13			RK73GB2A151J	CHIP R 150 J 1/10W		R212			RK73GB2A330J	CHIP R 33 J 1/10W	
R14			RK73GB2A101J	CHIP R 100 J 1/10W		R213			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R15			RK73GB2A103J	CHIP R 10K J 1/10W		R214			RK73GB2A103J	CHIP R 10K J 1/10W	
R16			RK73GB2A683J	CHIP R 68K J 1/10W		R215			RK73GB2A271J	CHIP R 270 J 1/10W	
R17			RK73GB2A104J	CHIP R 100K J 1/10W		R216			RK73HB1J104J	CHIP R 100K J 1/16W	
R18			RK73GB2A271J	CHIP R 270 J 1/10W		R217			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R19			RK73GB2A473J	CHIP R 47K J 1/10W		R220			RK73GB2A561J	CHIP R 560 J 1/10W	
R20			RK73GB2A102J	CHIP R 1.0K J 1/10W		R222			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R21			RK73GB2A104J	CHIP R 100K J 1/10W		R223			RK73HB1J101J	CHIP R 100 J 1/16W	
R22			RK73GB2A271J	CHIP R 270 J 1/10W		R225			RK73GB2A102J	CHIP R 1.0K J 1/10W	
R23			RK73GB2A124J	CHIP R 120K J 1/10W		R226			RK73GB2A104J	CHIP R 100K J 1/10W	
R24			RK73GB2A104J	CHIP R 100K J 1/10W		R228			RK73GB2A470J	CHIP R 47 J 1/10W	
R25			RK73GB2A681J	CHIP R 680 J 1/10W		R229			RK73GB2A471J	CHIP R 470 J 1/10W	
R26			RK73GB2A472J	CHIP R 4.7K J 1/10W		R230			RK73GB2A104J	CHIP R 100K J 1/10W	
R27			RK73GB2A102J	CHIP R 1.0K J 1/10W		R231			RK73GB2A151J	CHIP R 150 J 1/10W	
R28,29			RK73GB2A000J	CHIP R 0.0 J 1/10W		R232			RK73GB2A470J	CHIP R 47 J 1/10W	
R100			RK73GB2A332J	CHIP R 3.3K J 1/10W		R233			RK73HB1J104J	CHIP R 100K J 1/16W	
R101			RK73GB2A103J	CHIP R 10K J 1/10W		R237			RK73HB1J104J	CHIP R 100K J 1/16W	
R102			RK73GB2A221J	CHIP R 220 J 1/10W		R238,239			RK73GB2A104J	CHIP R 100K J 1/10W	
R103			RK73GB2A102J	CHIP R 1.0K J 1/10W		R240			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R104			RK73GB2A101J	CHIP R 100 J 1/10W		R241			RK73GB2A154J	CHIP R 150K J 1/10W	
R105,106			RK73GB2A332J	CHIP R 3.3K J 1/10W		R242			RK73HB1J104J	CHIP R 100K J 1/16W	
R107			RK73GB2A392J	CHIP R 3.9K J 1/10W		R243			RK73HB1J683J	CHIP R 68K J 1/16W	
R108			RK73GB2A152J	CHIP R 1.5K J 1/10W		R244			RK73GB2A104J	CHIP R 100K J 1/10W	
R109			RK73GB2A100J	CHIP R 10 J 1/10W		R245			RK73HB1J104J	CHIP R 100K J 1/16W	
R110			RK73GB2A331J	CHIP R 330 J 1/10W		R300			RK73GH2A913D	CHIP R 91K D 1/10W	
R112			RK73GB2A180J	CHIP R 18 J 1/10W		R301,302			RK73GB2A562J	CHIP R 5.6K J 1/10W	
R114			RK73GB2A154J	CHIP R 150K J 1/10W		R303			RK73GB2A332J	CHIP R 3.3K J 1/10W	
R115			RK73GB2A473J	CHIP R 47K J 1/10W		R304			RK73GB2A105J	CHIP R 1.0M J 1/10W	
R116,117			RK73GB2A470J	CHIP R 47 J 1/10W		R305			RK73GB2A183J	CHIP R 18K J 1/10W	
R118			RK73GB2A000J	CHIP R 0.0 J 1/10W		R306			RK73GB2A124J	CHIP R 120K J 1/10W	
R119			RK73GB2A472J	CHIP R 4.7K J 1/10W		R307			RK73GB2A473J	CHIP R 47K J 1/10W	
R120			RK73GB2A332J	CHIP R 3.3K J 1/10W		R308			RK73GB2A103J	CHIP R 10K J 1/10W	
R121			RK73GB2A473J	CHIP R 47K J 1/10W		R309			RK73GB2A474J	CHIP R 470K J 1/10W	
R122			RK73GB2A681J	CHIP R 680 J 1/10W		R311			RK73FB2B000J	CHIP R 0.0 J 1/8W	
R123			RK73GB2A000J	CHIP R 0.0 J 1/10W		R312			RK73GB2A123J	CHIP R 12K J 1/10W	
R124			RK73GB2A561J	CHIP R 560 J 1/10W		R313			RK73GB2A104J	CHIP R 100K J 1/10W	
R125			RK73GB2A332J	CHIP R 3.3K J 1/10W		R314			RK73GH2A474D	CHIP R 470K D 1/10W	
R126			RK73GB2A681J	CHIP R 680 J 1/10W		R315			RK73GH2A394D	CHIP R 390K D 1/10W	
R127,128			RK73GB2A271J	CHIP R 270 J 1/10W		R316			RK73GB2A274J	CHIP R 270K J 1/10W	
R130-132			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R317			RK73GH2A274D	CHIP R 270K D 1/10W	
R133-138			RK73GH2A154D	CHIP R 150K D 1/10W		R318			RK73GB2A184J	CHIP R 180K J 1/10W	
R140			RK73GB2A103J	CHIP R 10K J 1/10W		R320			RK73GB2A473J	CHIP R 47K J 1/10W	
R141			RK73GB2A473J	CHIP R 47K J 1/10W		R321			RK73GB2A223J	CHIP R 22K J 1/10W	
R142			RK73GB2A105J	CHIP R 1.0M J 1/10W		R322			RK73GH2A224D	CHIP R 220K D 1/10W	
R143			RK73GB2A000J	CHIP R 0.0 J 1/10W		R323			RK73GB2A104J	CHIP R 100K J 1/10W	
R144			RK73GB2A331J	CHIP R 330 J 1/10W		R324			RK73GB2A562J	CHIP R 5.6K J 1/10W	
R145			RK73GB2A184J	CHIP R 180K J 1/10W		R325			RK73GB2A104J	CHIP R 100K J 1/10W	
R146			RK73GB2A104J	CHIP R 100K J 1/10W		R326			RK73GH2A562D	CHIP R 5.6K D 1/10W	
R147,148			RK73GB2A331J	CHIP R 330 J 1/10W		R327			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R200			RK73GB2A100J	CHIP R 10 J 1/10W		R328			RK73GB2A102J	CHIP R 1.0K J 1/10W	
R201			RK73GB2A102J	CHIP R 1.0K J 1/10W		R329			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R202			RK73GB2A394J	CHIP R 390K J 1/10W		R330			RK73GB2A473J	CHIP R 47K J 1/10W	
R203,204			RK73GB2A332J	CHIP R 3.3K J 1/10W		R331			RK73GB2A222J	CHIP R 2.2K J 1/10W	
R205			RK73GB2A153J	CHIP R 15K J 1/10W		R332			RK73GB2A151J	CHIP R 150 J 1/10W	
R206			RK73GB2A474J	CHIP R 470K J 1/10W		R333			RK73GB2A474J	CHIP R 470K J 1/10W	
R207			RK73GB2A104J	CHIP R 100K J 1/10W		R334			RK73GB2A100J	CHIP R 10 J 1/10W	
R208			RK73GB2A684J	CHIP R 680K J 1/10W		R335			RK73GB2A563J	CHIP R 56K J 1/10W	
R209			RK73GB2A272J	CHIP R 2.7K J 1/10W		R336			RK73GB2A333J	CHIP R 33K J 1/10W	
R210,211			RK73GB2A471J	CHIP R 470 J 1/10W		R338			RK73GB2A473J	CHIP R 47K J 1/10W	



## PARTS LIST

TX-RX UNIT (X57-6020-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R339			RK73GB2A822J	CHIP R 8.2K J 1/10W		R527			RK73GH2A163D	CHIP R 16K D 1/10W	
R340			RK73GH2A124D	CHIP R 120K D 1/10W		R528			RK73GB2A754J	CHIP R 750K J 1/10W	
R341			RK73GB2A104J	CHIP R 100K J 1/10W		R529			RK73GB2A183J	CHIP R 18K J 1/10W	
R400			RK73GB2A334J	CHIP R 330K J 1/10W		R530			RK73GB2A101J	CHIP R 100 J 1/10W	
R401			RK73GB2A104J	CHIP R 100K J 1/10W		R531			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R402			RK73GB2A221J	CHIP R 220 J J 1/10W		R532			RK73GB2A821J	CHIP R 820 J 1/10W	
R403			RK73GB2A181J	CHIP R 180 J 1/10W		R533			RK73GB2A104J	CHIP R 100K J 1/10W	
R404			RK73GB2A000J	CHIP R 0.0 J 1/10W		R534			RK73GB2A182J	CHIP R 1.8K J 1/10W	
R405			RK73GB2A102J	CHIP R 1.0K J 1/10W		R535			RK73GB2A471J	CHIP R 470 J 1/10W	
R406			RK73GB2A222J	CHIP R 2.2K J 1/10W		R536			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R407			RK73GB2A102J	CHIP R 1.0K J 1/10W		R537			RK73HB1J101J	CHIP R 100 J 1/16W	
R408			RK73GB2A104J	CHIP R 100K J 1/10W		R538			RK73GB2A101J	CHIP R 100 J 1/10W	
R409			RK73GB2A102J	CHIP R 1.0K J 1/10W		R539			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R410			RK73GB2A822J	CHIP R 8.2K J 1/10W		R540			RK73FB2B000J	CHIP R 0.0 J 1/8W	
R411			RK73GB2A224J	CHIP R 220K J 1/10W		R541			RK73GB2A472J	CHIP R 4.7K J 1/10W	
R412			RK73GB2A100J	CHIP R 10 J J 1/10W		R542			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R413			RK73GB2A102J	CHIP R 1.0K J 1/10W		R548			RK73GB2A332J	CHIP R 3.3K J 1/10W	
R414,415			RK73GB2A473J	CHIP R 47K J 1/10W		VR1			R32-0736-05	SEMI FIXED VARIABLE RESISTOR	
R416			RK73GB2A472J	CHIP R 4.7K J 1/10W		VR500			R32-0736-05	SEMI FIXED VARIABLE RESISTOR	
R417			RK73GB2A100J	CHIP R 10 J 1/10W		VR501			R32-0732-05	SEMI FIXED VARIABLE RESISTOR	
R418			RK73GB2A222J	CHIP R 2.2K J 1/10W		S402,403			S70-0414-05	TACT SWITCH	
R419			RK73GB2A000J	CHIP R 0.0 J 1/10W		MIC500			T91-0651-15	MIC ELEMENT	
R420			RK73GB2A102J	CHIP R 1.0K J 1/10W		D1-4			1SV283F	VARIABLE CAPACITANCE DIODE	
R421			RK73HB1J473J	CHIP R 47K J 1/16W		D5			1SV214-F	VARIABLE CAPACITANCE DIODE	
R422			RK73GB2A272J	CHIP R 2.7K J 1/10W		D6,7			MA2S111-F	DIODE	
R423			RK73HB1J473J	CHIP R 47K J 1/16W		D100-104			HSC277	DIODE	
R424,425			RK73GB2A332J	CHIP R 3.3K J 1/10W		D200			HSC277	DIODE	
R426			RK73GB2A822J	CHIP R 8.2K J 1/10W		D201-205			HVC350B	VARIABLE CAPACITANCE DIODE	
R427			RK73GB2A102J	CHIP R 1.0K J 1/10W		D300			DA221	DIODE	
R428			RK73GB2A272J	CHIP R 2.7K J 1/10W		D500			1SS372F	DIODE	
R429			RK73GB2A821J	CHIP R 820 J 1/10W		D501			DAN222	DIODE	
R430			RK73GB2A101J	CHIP R 100 J 1/10W		D502			1SR154-400	DIODE	
R431			RK73GB2A000J	CHIP R 0.0 J 1/10W		D505			UDZW4.7(B)	ZENER DIODE	
R432			RK73GB2A103J	CHIP R 10K J 1/10W		IC1			MB15A02PFV2E1	MOS-IC	
R433,434			RK73GB2A153J	CHIP R 15K J 1/10W		IC100			NJM2904V-ZB	MOS-IC	
R435			RK73GB2A103J	CHIP R 10K J 1/10W		IC200			TA31136FNG	MOS-IC	
R500,501			RK73GB2A472J	CHIP R 4.7K J 1/10W		IC300			NJM2902V-ZB	MOS-IC	
R502			RK73GB2A823J	CHIP R 82K J 1/10W		IC301			NJM2904V-ZB	MOS-IC	
R503			RK73GB2A682J	CHIP R 6.8K J 1/10W		IC302			TA7368FG	MOS-IC	
R504			RK73GB2A223J	CHIP R 22K J 1/10W		IC400	*		BD4840G-TR	MOS-IC	
R505			RK73GB2A682J	CHIP R 6.8K J 1/10W		IC401			AT24C08A10SU18	ROM IC	
R506			RK73GB2A821J	CHIP R 820 J 1/10W		IC401			CAT24WC08J118	ROM IC	
R507			RK73GB2A472J	CHIP R 4.7K J 1/10W		IC402			R3111N451C-F	MOS-IC	
R508			RK73GB2A102J	CHIP R 1.0K J 1/10W		IC403	*		38268MCA060GU	MICROPROCESSOR IC	
R509			RK73GB2A124J	CHIP R 120K J 1/10W		IC404			XC6201P502PR	MOS-IC	
R510			RK73GB2A332J	CHIP R 3.3K J 1/10W		IC500			NJM2100V-ZB	MOS-IC	
R511			RK73GB2A103J	CHIP R 10K J 1/10W		Q1			2SC4649(N,P)	TRANSISTOR	
R512			RK73GB2A185J	CHIP R 1.8M J 1/10W		Q2			2SC5108(Y)F	TRANSISTOR	
R513			RK73GB2A153J	CHIP R 15K J 1/10W		Q3,4	*		2SK1875-F(V)	FET	
R514,515			RK73GB2A333J	CHIP R 33K J 1/10W		Q5			2SJ243-A	FET	
R516			RK73GB2A103J	CHIP R 10K J 1/10W		Q6			2SC5108(Y)F	TRANSISTOR	
R517			RK73GB2A185J	CHIP R 1.8M J 1/10W		Q7			UMC4N	TRANSISTOR	
R518			RK73GB2A154J	CHIP R 150K J 1/10W		Q8			2SC4617(S)	TRANSISTOR	
R519,520			RK73GB2A333J	CHIP R 33K J 1/10W		Q100			2SC5108(Y)F	TRANSISTOR	
R521			RK73GB2A332J	CHIP R 3.3K J 1/10W		Q101	*		2SC498B-E	TRANSISTOR	
R522			RK73GB2A182J	CHIP R 1.8K J 1/10W		Q102			2SK2596-E	FET	
R523			RK73GB2A682J	CHIP R 6.8K J 1/10W		Q103			2SK1824-A	FET	
R524			RK73GB2A513J	CHIP R 51K J 1/10W		Q104			UFMMT717	TRANSISTOR	
R525			RK73GB2A152J	CHIP R 1.5K J 1/10W							
R526			RK73GH2A153D	CHIP R 15K D 1/10W							

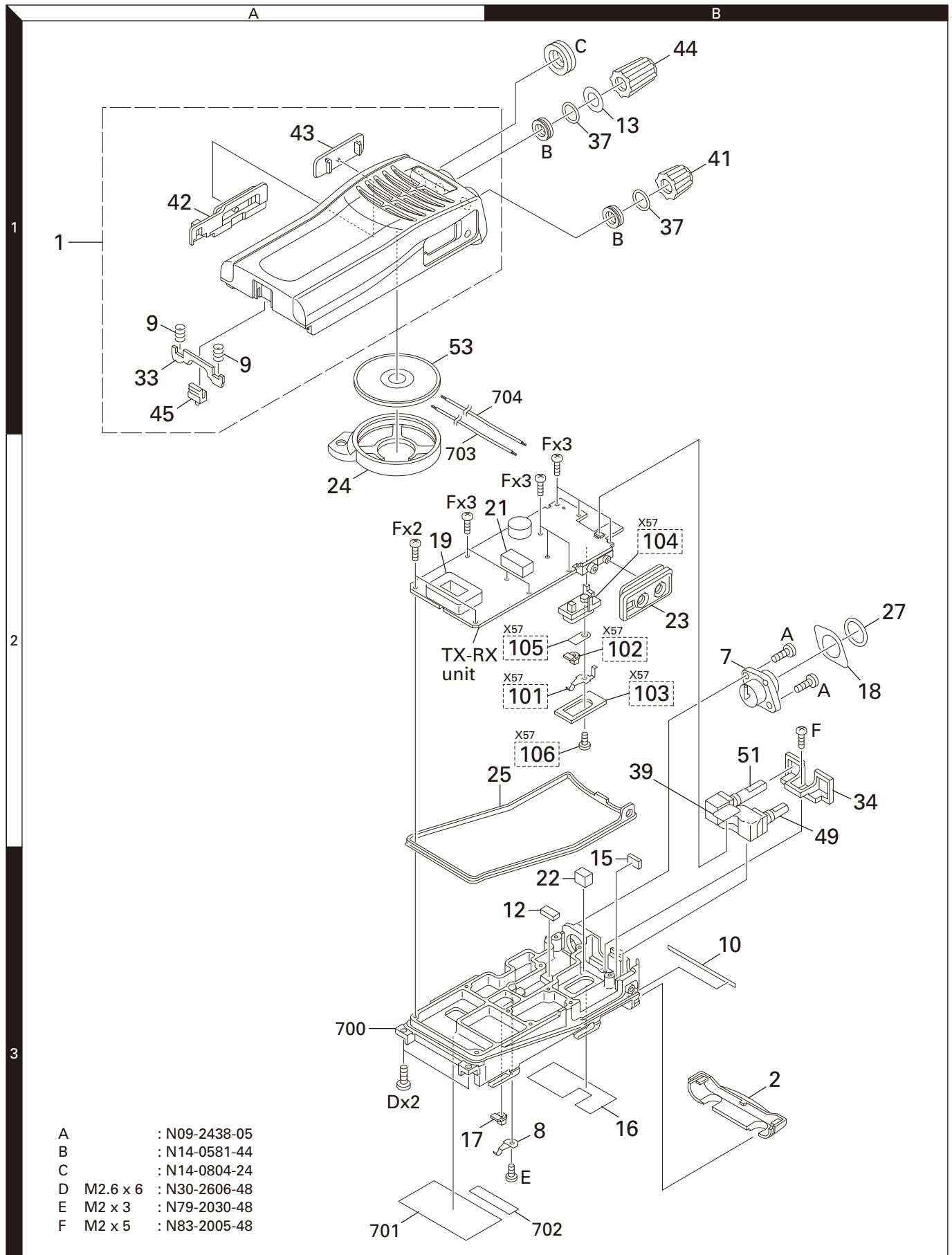
# TK-2102G

## PARTS LIST

### TX-RX UNIT (X57-6020-10)

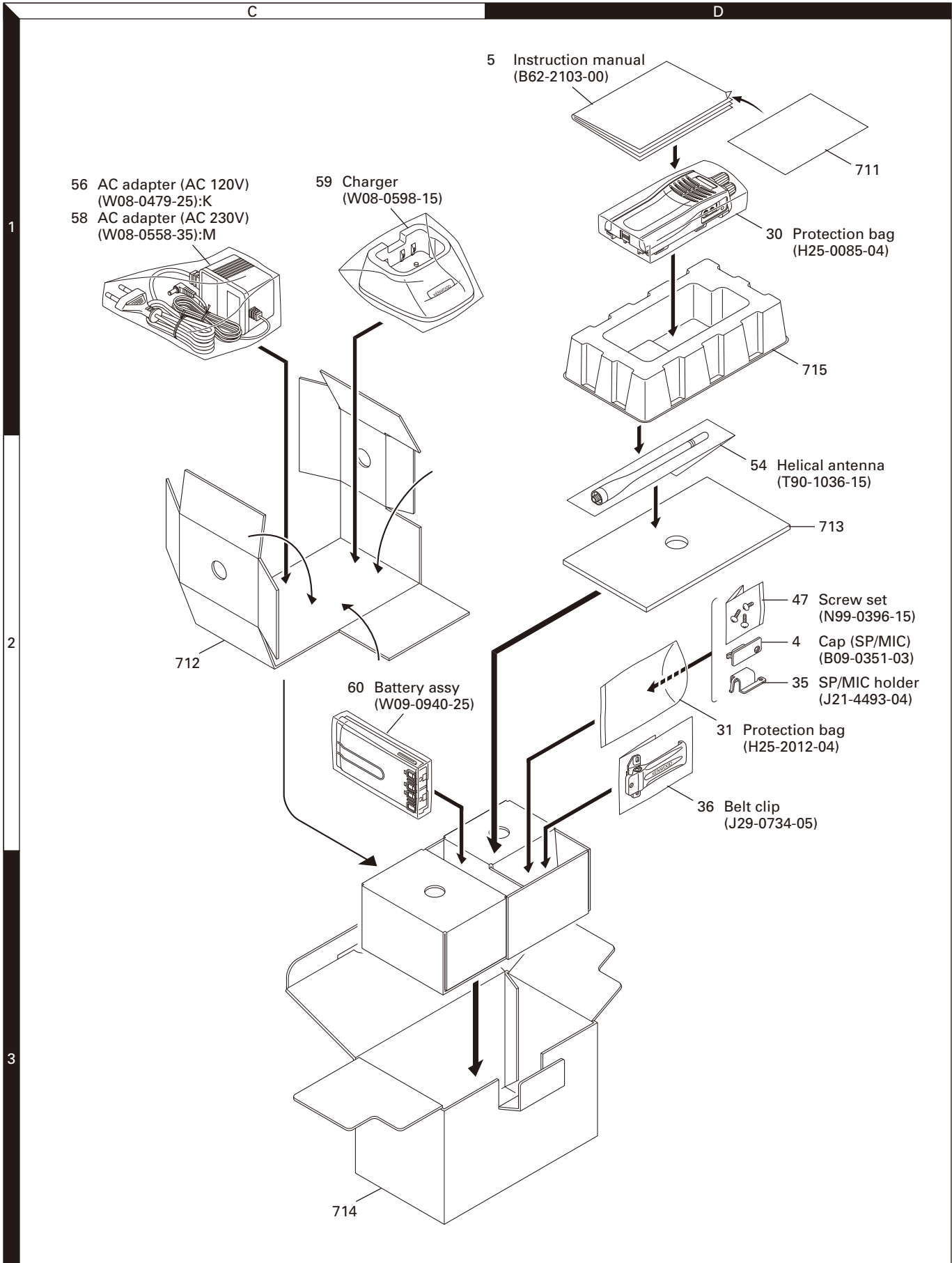
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
Q105			2SK2595-E	FET							
Q106			2SK1824-A	FET							
Q107			DTC114TE	DIGITAL TRANSISTOR							
Q108			DTC114EE	DIGITAL TRANSISTOR							
Q109			DTA144EE	DIGITAL TRANSISTOR							
Q200			DTA114EE	DIGITAL TRANSISTOR							
Q201			2SC4649(N,P)	TRANSISTOR							
Q202,203			3SK318	FET							
Q300			2SC4617(S)	TRANSISTOR							
Q302			2SK1824-A	FET							
Q303			DTA144EE	DIGITAL TRANSISTOR							
Q304			DTC144EE	DIGITAL TRANSISTOR							
Q305			2SA1362-F(GR)	TRANSISTOR							
Q306			DTC144EE	DIGITAL TRANSISTOR							
Q307			2SK1588-AZ	FET							
Q400,401			DTC114EE	DIGITAL TRANSISTOR							
Q402			DTA114YE	DIGITAL TRANSISTOR							
Q403			DTC144EE	DIGITAL TRANSISTOR							
Q404			UMG3N	TRANSISTOR							
Q405			UPA672T-A	FET							
Q406			FP210	TRANSISTOR							
Q407			UMG3N	TRANSISTOR							
Q408			DTA123JE	DIGITAL TRANSISTOR							
Q500			2SK1824-A	FET							
Q501,502			2SC4617(S)	TRANSISTOR							
Q503			2SC4919	TRANSISTOR							
Q504			DTA143ZE	DIGITAL TRANSISTOR							
TH100			157-503-65001	THERMISTOR							
TH500			157-302-65801	THERMISTOR							

## EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

## PACKING



Parts with the exploded numbers larger than 700 are not supplied.

# ADJUSTMENT

## Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	150 to 174MHz Frequency modulation and external modulation -127dBm/0.1μV to greater than -47dBm/1mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 150 to 174MHz or more Vicinity of 10W
3. Deviation Meter	Frequency Range	150 to 174MHz
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		5A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center Frequency Output Voltage	50kHz to 600MHz 100mV or more
13. 8Ω Dummy Load		Approx. 8Ω, 3W
14. Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped

The following parts are required for adjustment

### 1. Antenna connector adapter

The antenna connector of this radio uses an SMA terminal.

Use an antenna connector adapter [SMA(f) – BNC(f) or SMA(f) – N(f)] for adjustment. (The adapter is not provided as an option, so buy a commercially-available one.)

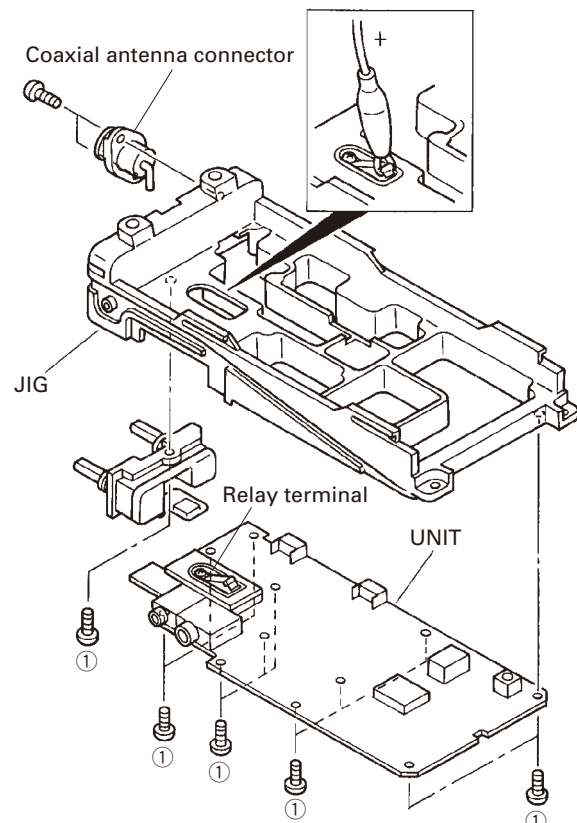
### 2. Jig (chassis) for adjustment(part number A10-1392-03)

#### ■ Use the jig as follows:

1. Insert the coaxial antenna connector into the jig.
2. Place the unit on the jig and fix it with 12 screws ①.
3. Solder the antenna terminal to the terminal of the unit.

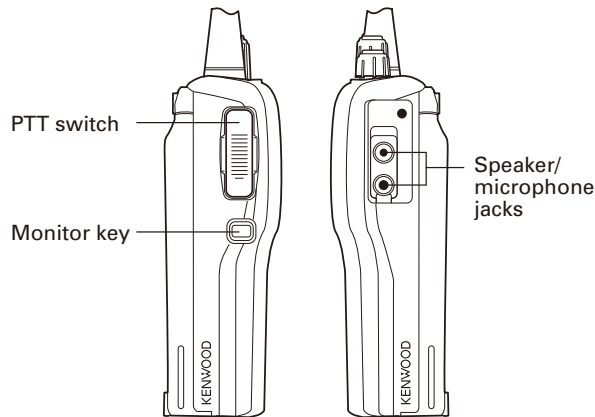
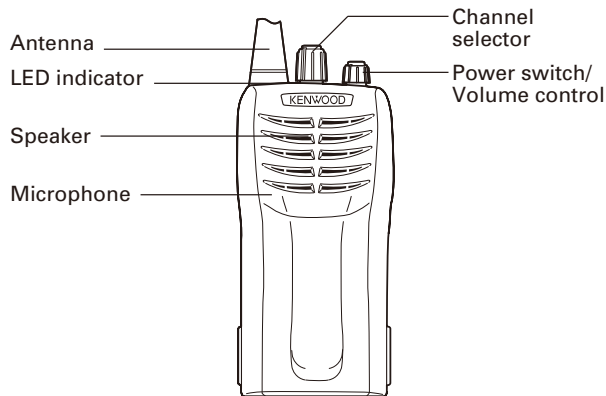
**Note:** Supply power from an external power supply.

( Relay terminal : + )  
( Jig (chassis) : - )



## ADJUSTMENT

### Controls



### Frequency

The set has been adjusted for the frequencies shown in the following table. When required, re-adjust them following the adjustment procedure to obtain the frequencies you want in actual operation.

#### ■ Frequency

CH	RX (MHz)	TX (MHz)
1	162.10000	162.00000
2	150.10000	150.00000
3	173.90000	173.97500
4	162.50000	162.50000
5	162.55000	162.55000
6	162.60000	162.60000
7	162.55000	162.55000
8	162.65000	162.65000
9~16	-	-

### Preparations for tuning the transceiver

Before attempting to tune the transceiver, connect the unit to a suitable power supply.

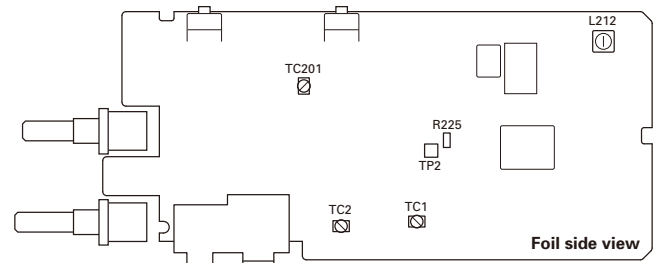
Whenever the transmitter is tuned, the unit must be connected to a suitable dummy load (i.e. power meter).

The speaker output connector must be terminated with a 8Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

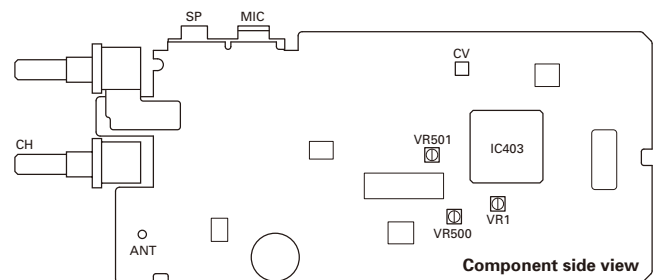
#### ■ Adjustment Frequency

TEST CH	K,M	
	RX (MHz)	TX (MHz)
Low	150.10000	150.00000
Center	162.10000	162.00000
High	173.90000	173.97500

### Adjustment Points



- TC201: Band-pass filter waveform adjustment
- L212: AF level adjustment
- TC1: Transmit VCO lock voltage adjustment
- TC2: Receive VCO lock voltage adjustment
- TP2: Band-pass filter test point



- ANT: Antenna connector
- CH: Channel selector
- SP: Speaker jack
- MIC: Microphone jack
- CV: VCO lock voltage adjustment terminal
- VR500: DQT waveform adjustment
- VR501: MAX DEV adjustment

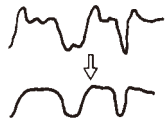
**Note:** To fine tune the frequency when not using a computer, adjust VR1.

## ADJUSTMENT

## Common Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) BATT terminal voltage: 7.5V 2) SSG standard modulation [Wide] MOD: 1kHz, DEV: 3kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz							
2. VCO lock voltage RX	1) TEST CH: High	Power meter DVM	TX-RX	ANT CV	TX-RX	TC2	3.8V	±0.1V
	2) TEST CH: Low						Check	0.7V or more
3. VCO lock voltage TX	1) TEST CH: High PTT: ON				TX-RX	TC1	3.8V	±0.1V
	2) TEST CH: Low PTT: ON						Check	0.7V or more

## Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency adjust	1) TEST CH: Center PTT: ON	Frequency counter	TX-RX	ANT		Program- ming software: KPG-55D (Windows version: ver.4.00 or later)	Center frequency ±50Hz	Note: After replacing the TCXO (X1) align frequency.
2. DQT/QT Balance	1) TEST CH: Center PTT: ON	Power meter Deviation meter Oscillo- scope			TX-RX	VR500	Adjust the demodu- lation wave into a square wave.	
3. RF Power	1) TEST CH: Low BATT terminal voltage: 7.5V PTT: ON	Power meter Ammeter				Program- ming software: KPG-55D (Windows version: ver.4.00 or later)	5.1W	±0.1W 1.6A or less
4. Max Deviation [Wide]	1) TEST CH: Center AG: 1kHz/120mV Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscillo- scope AG AF VTVM		ANT SP/MIC connec- tor	TX-RX	VR501	4.2kHz (According to the larger +,-)	±0.1kHz
	[Narrow]				2) TEST CH: Center PTT: ON			Check

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. MIC Sensitivity  [Wide]	1) TEST CH: Center AG: 1kHz/12mV PTT: ON	Power meter Deviation meter Oscilloscope AG AF VTVM	TX-RX	ANT SP/MIC connector			Check	±2.2kHz~3.8kHz
	[Narrow]							2) TEST CH: Center PTT: ON
6. QT Deviation  [Wide]	1) TEST CH: High QT: 67.0Hz LPF: 3kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscilloscope AG AF VTVM		ANT		Program- ming software: KPG-55D (Windows version: ver.4.00 or later)	0.90kHz	±0.03kHz
	[Narrow]						2) TEST CH: High PTT: ON	0.43kHz
7. DQT Deviation  [Wide]	1) TEST CH: High DQT: D023N LPF: 3kHz HPF: OFF PTT: ON						0.85kHz	±0.03kHz
	[Narrow]						2) TEST CH: High PTT: ON	0.40kHz
8. Battery Warning Level	1) BATT terminal voltage: 5.8V	DVM		ANT BATT terminal			Adjust the adjustment value until the LED starts to blink.	The LED must blink.



## ADJUSTMENT

### Receiver Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. BPF wave adjust	1) TEST CH: Center Spectrum analyzer setting Center frequency: 160MHz Span: 100MHz RBW: 100kHz VBW: 10kHz ATT: 0dB REF: -20dBm TG level: -40dBm	Spectrum analyzer Tracking generator	TX-RX	ANT TP2	TX-RX	TC201	Adjust the waveform as shown in Fig.1.	
2. AF Level [Wide]	1) TEST CH: Center SSG output: -53dBm (501μV) SSG MOD: 3kHz	SSG Oscilloscope AF VTVM Distortion meter		ANT SP/MIC connector		L212	Adjust to the maximum AF level.	
[Narrow]	2) TEST CH: Center SSG output: -53dBm (501μV) SSG MOD: 1.5kHz							
3. Sensitivity [Wide]	1) TEST CH: Low, Center, High SSG output: -116dBm (0.35μV) SSG MOD: 3kHz						Check	12dB SINAD or more
[Narrow]	2) TEST CH: Center SSG output: -116dBm (0.35μV) SSG MOD: 1.5kHz							
4. Squelch Tight	1) TEST CH: Center MONI: ON					Programming software: KPG-55D (Windows version: ver.4.00 or later)	Adjust the adjustment value until the squelch closes.	The squelch must close.
	2) Level 9 SSG output: -116dBm (0.35μV) SSG MOD: 3.0kHz							
5. Squelch Open	1) TEST CH: Center MONI: ON							
	2) Level 3 SSG output: -123dBm (0.158μV) SSG MOD: 3.0kHz							

### BPF-Wave

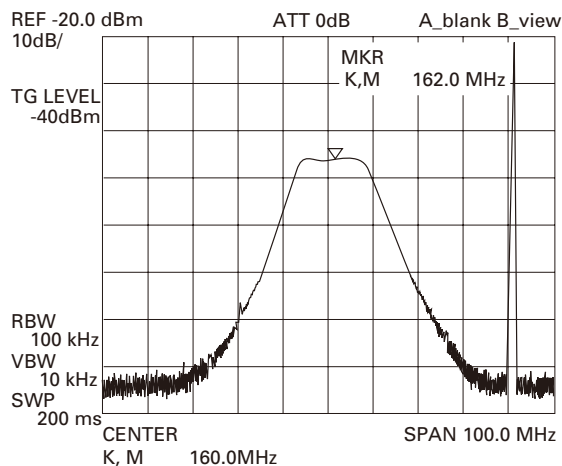
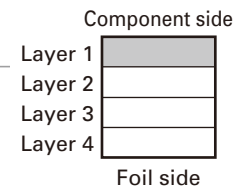
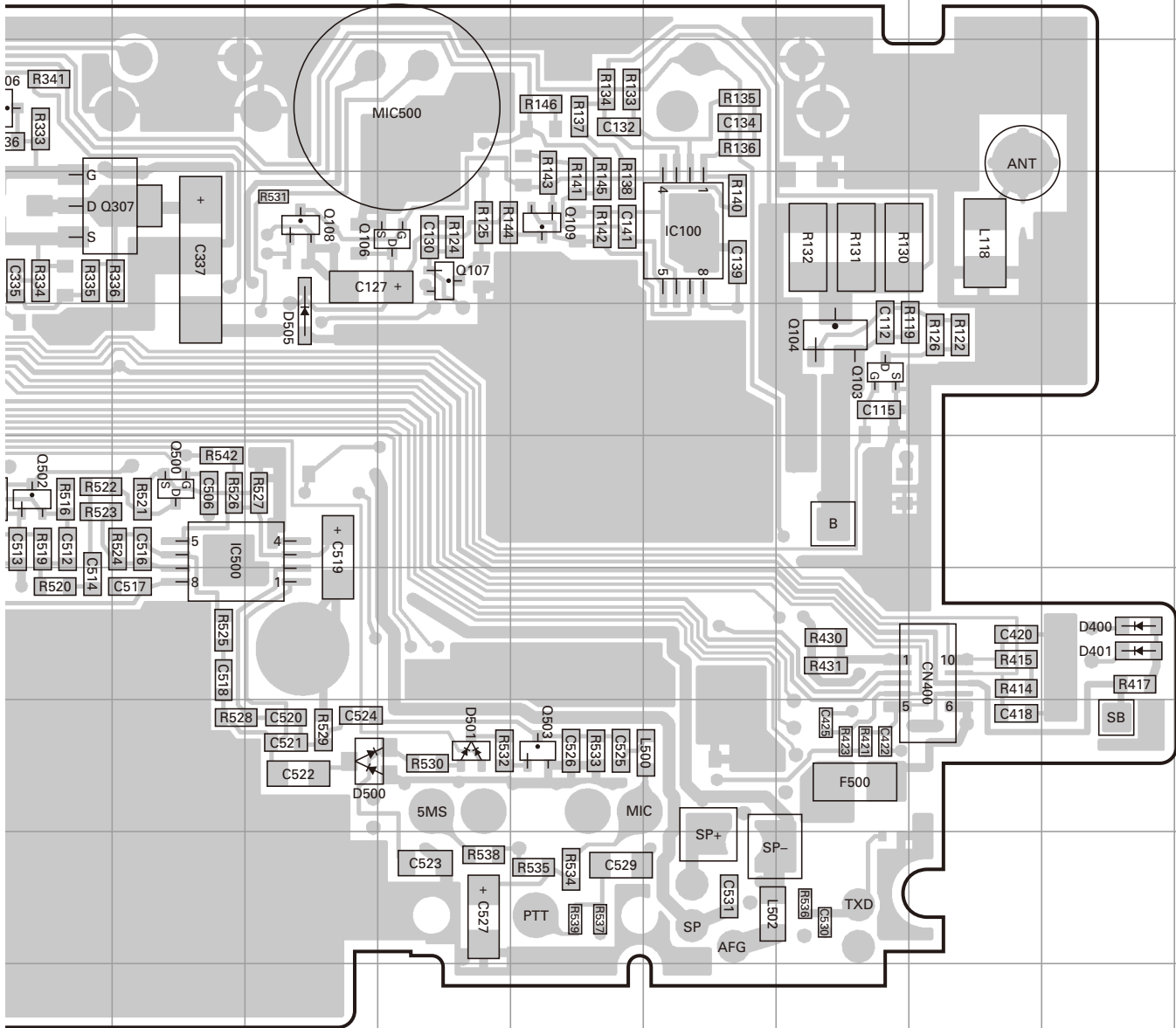


Fig. 1



# PC BOARD TK-2102G

## TX-RX UNIT (X57-6020-10) Component side view (J79-0166-09)



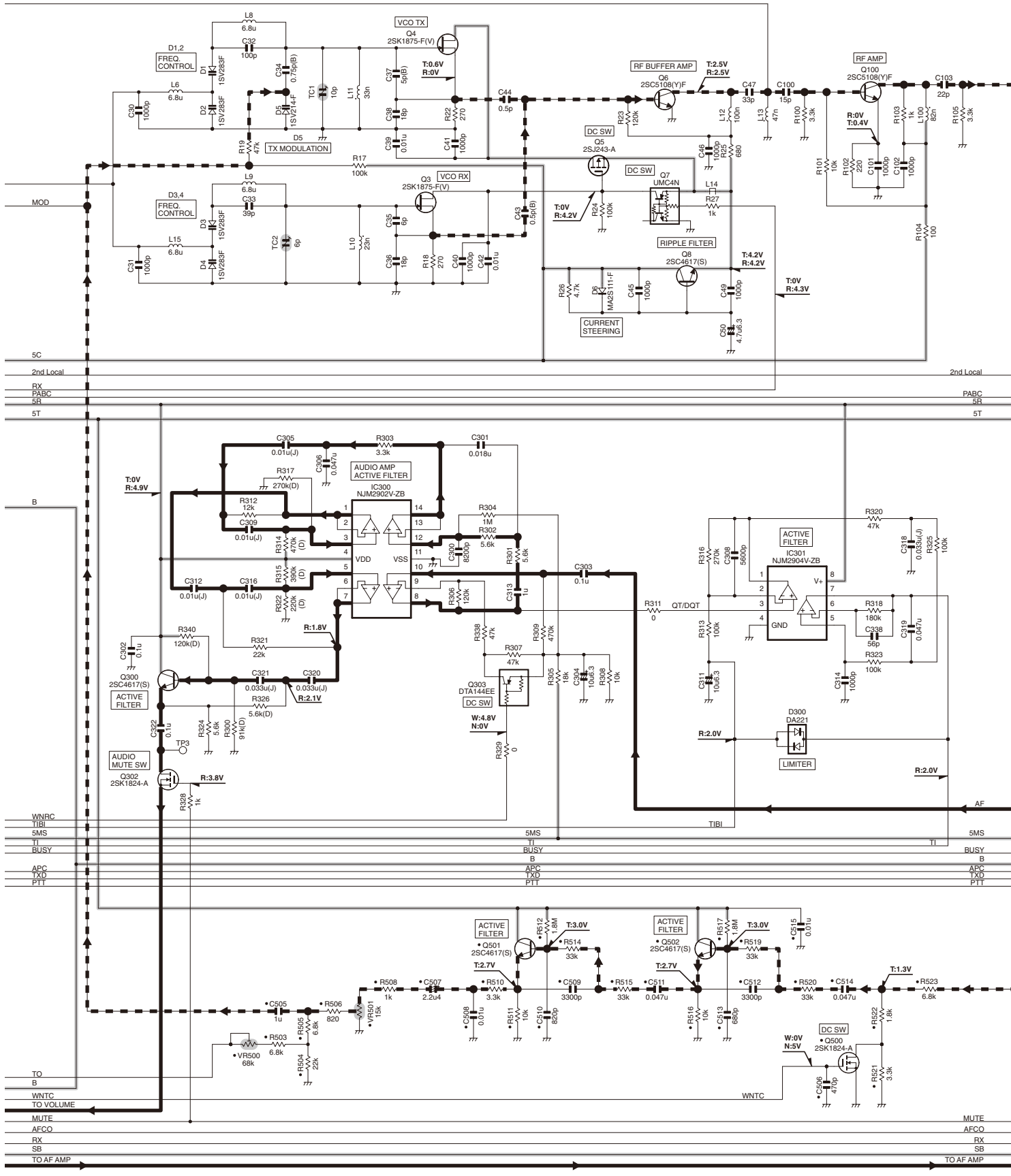






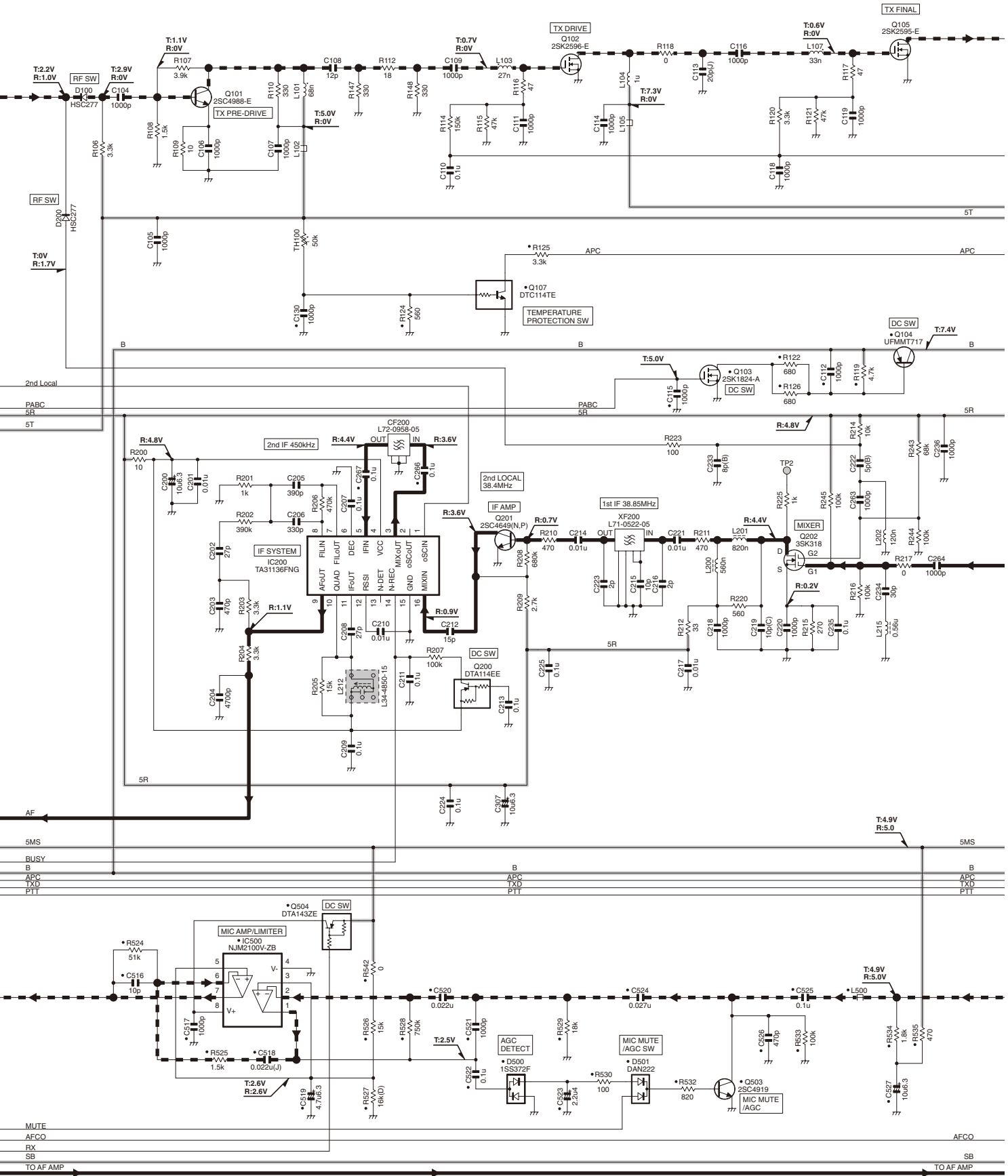
# SCHEMATIC DIAGRAM TK-2102G

TX-RX UNIT(X57-6020-10)



# TK-2102G SCHEMATIC DIAGRAM

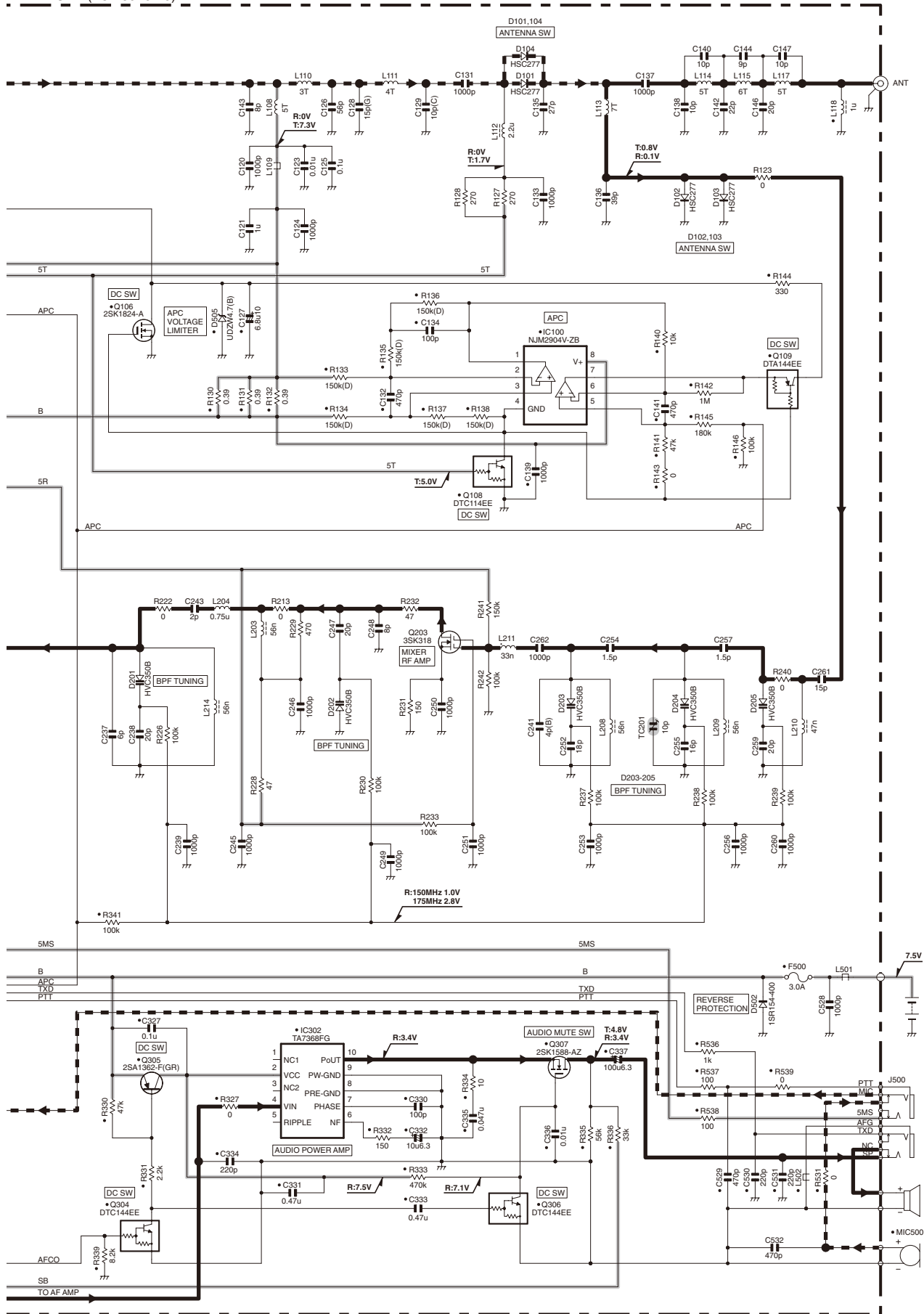
TX-RX UNIT(X57-6020-10)



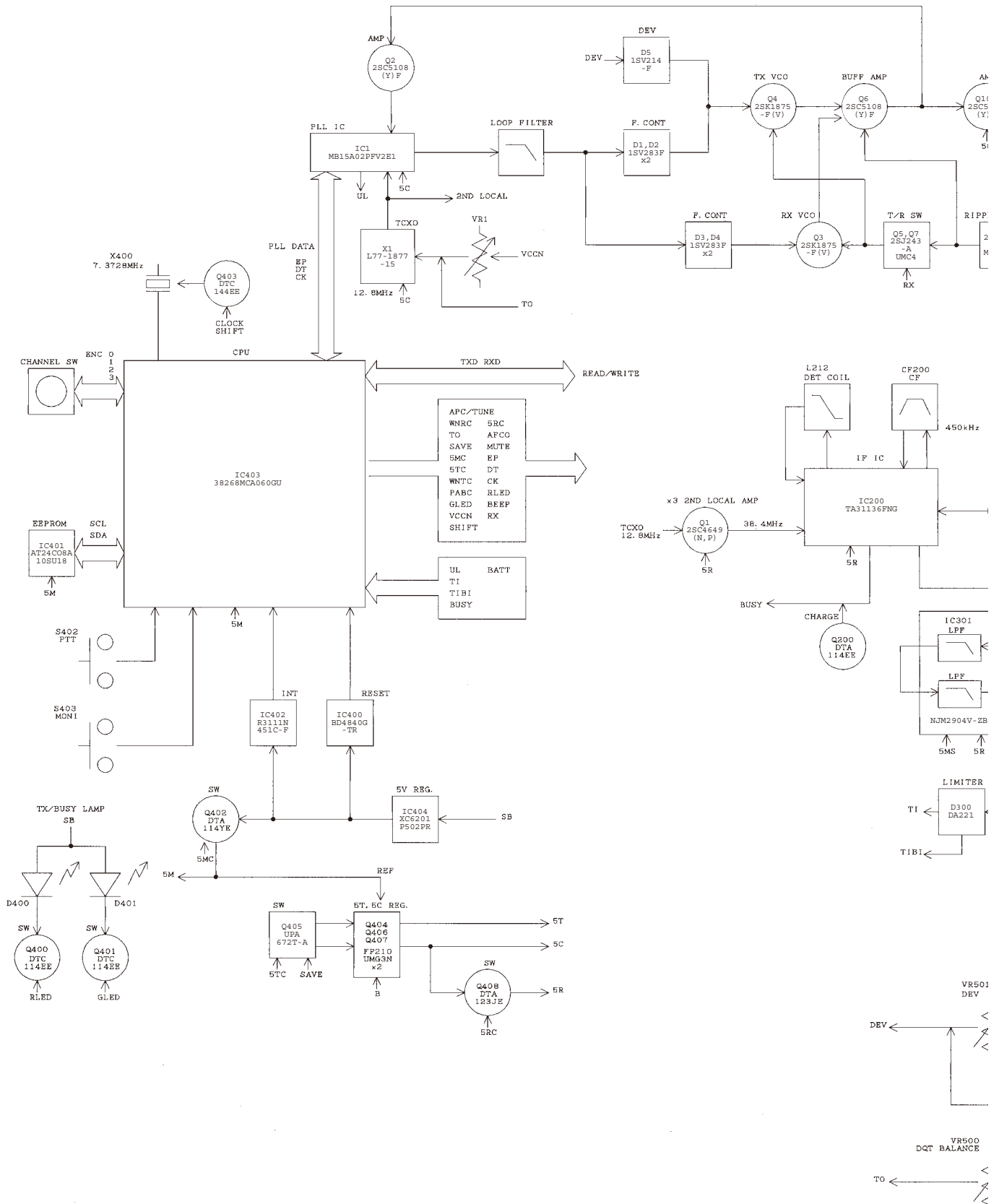


# SCHEMATIC DIAGRAM TK-2102G

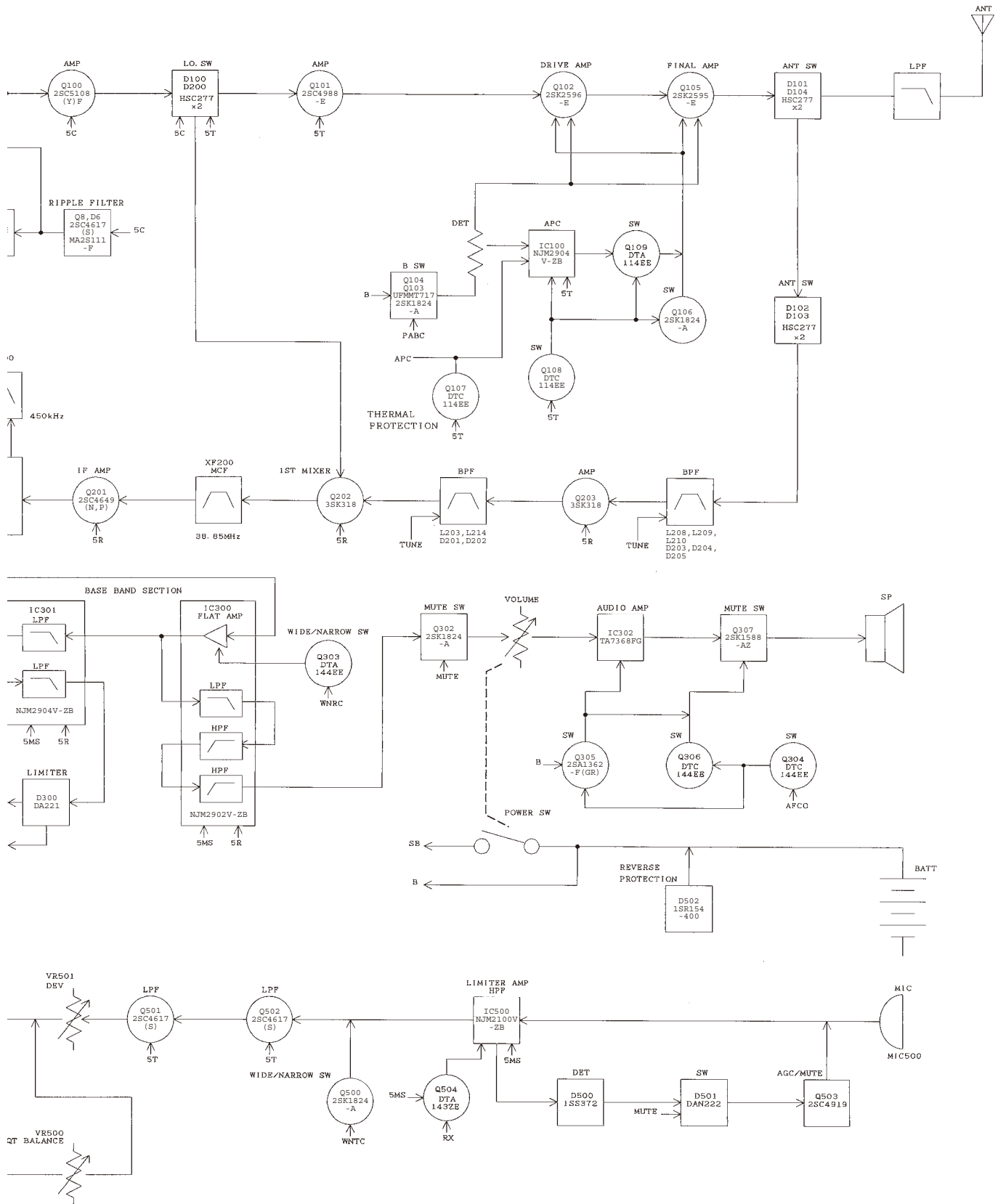
TX-RX UNIT(X57-6020-10)



## BLOCK DIAGRAM

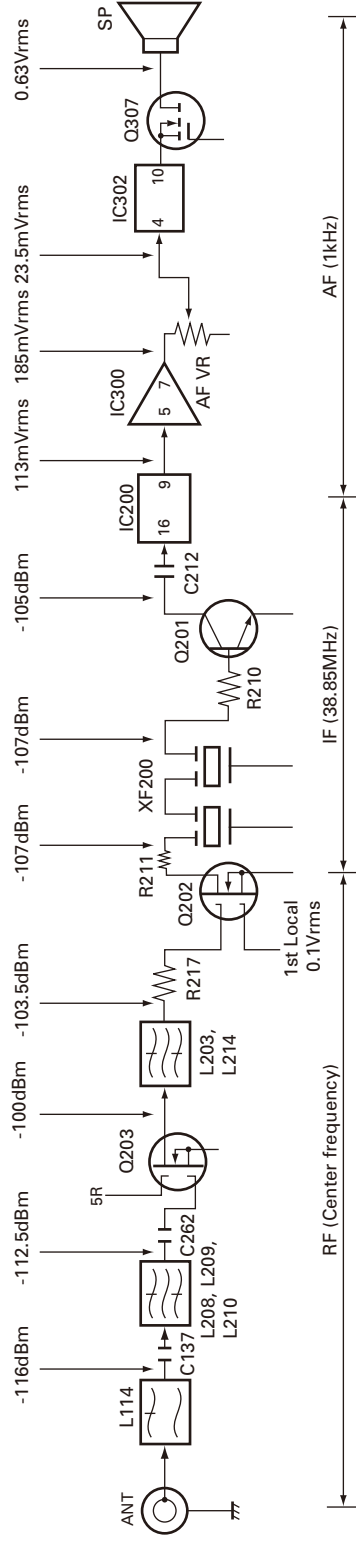


## BLOCK DIAGRAM



## LEVEL DIAGRAM

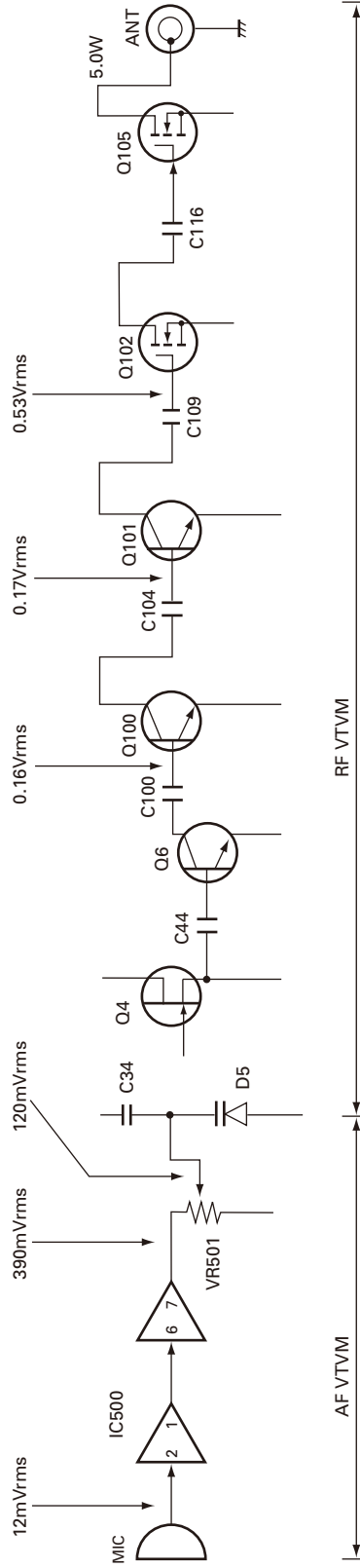
### Receiver Section



SG output level for obtaining 12dB / SINAD when injected to each point through a 470pF coupling capacitor. Measure the 1st Local on a RF VTVM.

Modulate the AF level with a frequency of 1kHz and deviation of 1.5kHz (Narrow), 3kHz (Wide). Then take the signal from the signal generator output when set to -53dBm and obtain the level shown on an AF VTVM when the AF output has been adjusted to 0.63Vrms with the AF vol.

### Transmitter Section



Measure the audio frequency on an AF VTVM and radio frequency on a RF VTVM at high impedance. Set the MIC input obtain a modulation factor of 60% with the transmit frequency at center and a modulation frequency of 1kHz.

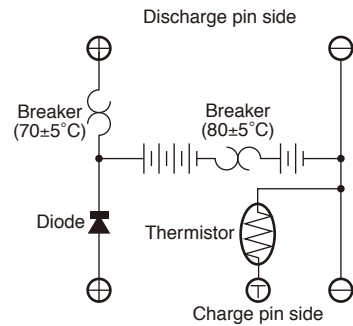
## OPTIONAL ACCESSORIES

### KNB-14 (Ni-Cd BATTERY)

#### ■ External View



#### ■ Schematic Diagram



#### ■ Specifications

Voltage : 7.2V (1.2V x 6)  
 Capacity : 600mAh  
 Dimensions : 60.8W x 110.8H x 17.3D (mm)  
 (projections included)

#### Charger and charging time:

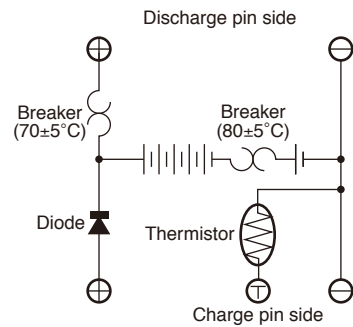
KSC-15 (normal charger), approximately 8 hours  
 KSC-16 (rapid charger), approximately 1 hour  
 KSC-24 (rapid charger), approximately 40 minutes  
 Weight : 165g

### KNB-15A (Ni-Cd BATTERY)

#### ■ External View



#### ■ Schematic Diagram



#### ■ Specifications

Voltage : 7.2V (1.2V x 6)  
 Capacity : 1100mAh  
 Dimensions : 60.8W x 110.8H x 20.3D (mm)  
 (projections included)

#### Charger and charging time:

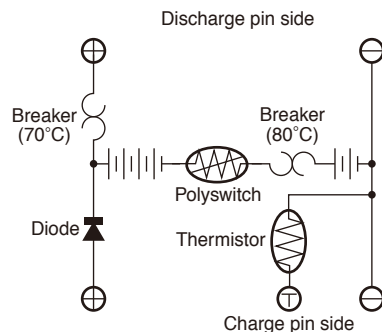
KSC-15 (normal charger), approximately 8 hours  
 KSC-16 (rapid charger), approximately 2 hours  
 KSC-24 (rapid charger), approximately 1 hour  
 Weight : 210g

### KNB-20N (Ni-MH BATTERY)

#### ■ External View



#### ■ Schematic Diagram



#### ■ Specifications

Voltage : 7.2V (1.2V x 6)  
 Capacity : 1600mAh  
 Dimensions : 63.8W x 110.8H x 17.2D (mm)  
 (projections included)

#### Charger and charging time:

KSC-24 (rapid charger), approximately 80 minutes  
 Weight : 210g

# TK-2102G

## SPECIFICATIONS

### GENERAL

Frequency range.....	150~174MHz
Channels.....	16 channels
Channel spacing.....	Wide: 25kHz Narrow: 12.5kHz
PLL channel stepping.....	5kHz, 6.25kHz
Battery voltage.....	7.5V DC $\pm 20\%$
Battery life (5-5-90 duty cycle) with KNB-15A (1100mAh battery).....	More than 8 hours
Operating temperature range.....	$-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ( $-22^{\circ}\text{F} \sim +140^{\circ}\text{F}$ )
Frequency stability.....	$\pm 0.0005\%$ ( $-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$ )
Antenna impedance.....	50 $\Omega$
Channel frequency spread.....	24MHz
Dimensions (W x H x D) (Projections not included) with KNB-15A (1100mAh battery).....	58 x 126.2 x 34.6 mm (2.28 x 4.97 x 1.36 inches)
Weight (net).....	380g (13.4 oz) with battery (KNB-15A), antenna and belt clip

### RECEIVER

Sensitivity (12dB SINAD).....	Wide: 0.25 $\mu\text{V}$ Narrow: 0.28 $\mu\text{V}$
Selectivity.....	Wide: 70dB Narrow: 60dB
Intermodulation distortion.....	Wide: 65dB Narrow: 60dB
Spurious response.....	65dB
Audio output.....	500mW with less than 10% distortion

### TRANSMITTER

RF power output.....	5W
Spurious response.....	65dB
Modulation.....	Wide: 16K0F3E Narrow: 11K0F3E
FM noise.....	Wide: 45dB Narrow: 40dB
Audio distortion.....	Less than 5%

## Kenwood Corporation

2967-3, Ishikawa-machi, Hachioji-shi, Tokyo, 192-8525 Japan

### Kenwood U.S.A. Corporation

P.O. BOX 22745, 2201 East Dominguez Street, Long Beach,  
CA 90801-5745, U.S.A.

### Kenwood Electronics Canada Inc.

6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

### Kenwood Electronics Deutschland GmbH

Rembrücker Str. 15, 63150 Heusenstamm, Germany

### Kenwood Electronics Belgium N.V.

Leuvensesteenweg 248 J, 1800 Vilvoorde, Belgium

### Kenwood Electronics France S.A.

L'Etoile Paris Nord 2, 50 Allée des Impressionnistes,  
Bp 58416 Villepinte, 95944 Roissy Ch De Gaulle Cedex

### Kenwood Electronics UK Limited

KENWOOD House, Dwight Road, Watford, Herts.,  
WD18 9EB United Kingdom

### Kenwood Electronics Europe B.V.

Amsterdamseweg 37, 1422 AC Uithoorn, The Netherlands

### Kenwood Electronics Italia S.p.A.

Via G. Sirtori, 7/9 20129 Milano, Italy

### Kenwood Ibérica, S.A.

Bolivia, 239-08020 Barcelona, Spain

### Kenwood Electronics Australia Pty. Ltd.

(A.C.N. 001 499 074)

16 Giffnock Avenue, Centrecourt Estate, North Ryde, N.S.W. 2113 Australia

### Kenwood Electronics (Hong Kong) Ltd.

Unit 3712-3724, Level 37, Tower one Metroplaza, 223 Hing Fong Road,  
Kwai Fong, N.T., Hong Kong

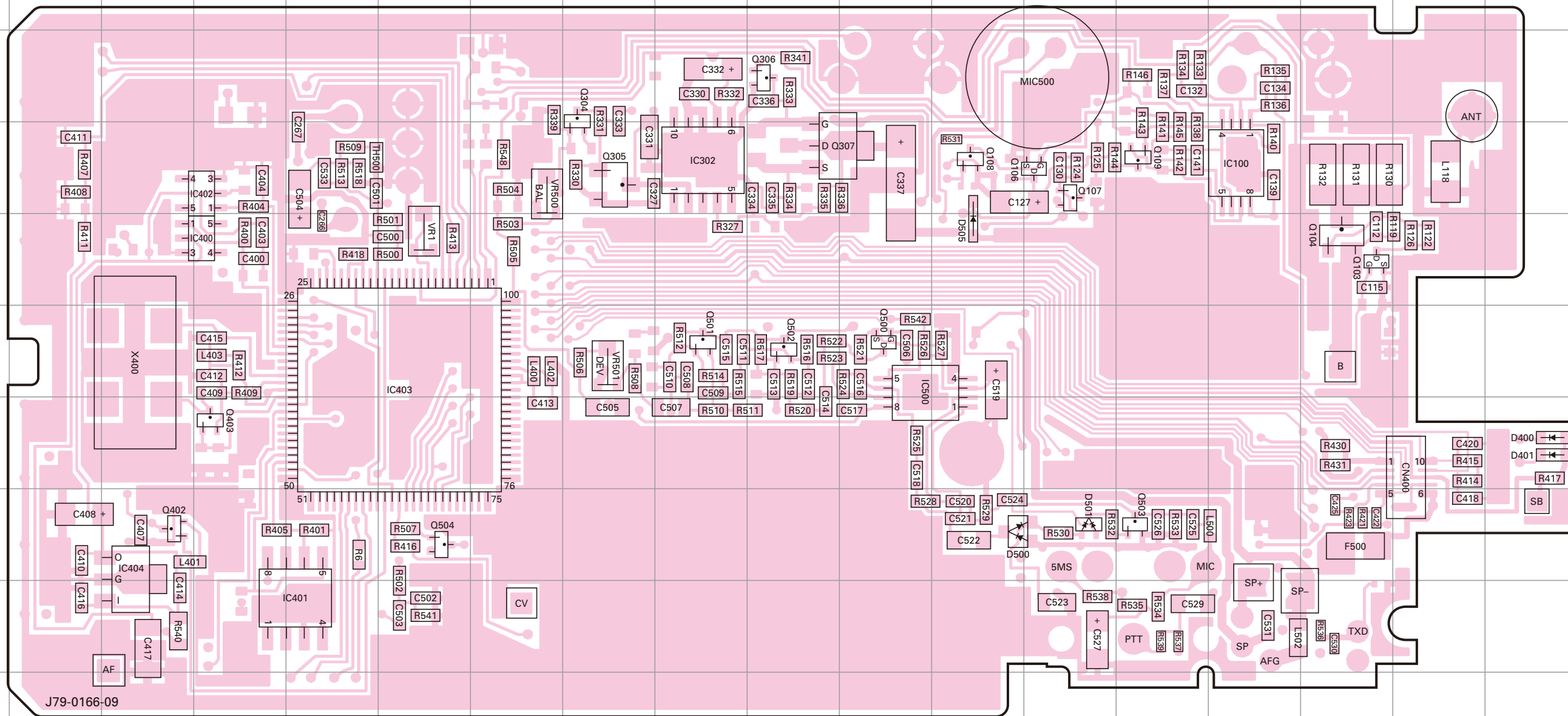
### Kenwood Electronics Singapore Pte Ltd

1 Ang Mo Kio Street 63, Singapore 569110

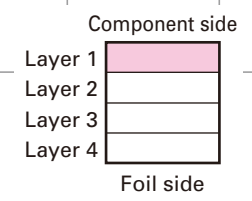


TX-RX UNIT (X57-6020-10) Component side view (J79-0166-09)

TX-RX UNIT (X57-6020-10) Component side view (J79-0166-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC100	4O	Q106	4M	Q500	6K
IC302	4I	Q107	4M	Q501	6I
IC400	5D	Q108	4L	Q502	6J
IC401	9E	Q109	4N	Q503	8N
IC402	4D	Q304	3H	Q504	8F
IC403	6F	Q305	4H	D400	7R
IC404	8C	Q306	3J	D401	7R
IC500	6K	Q307	4K	D500	8L
Q103	5P	Q402	8C	D501	8M
Q104	5P	Q403	7D	D505	5L



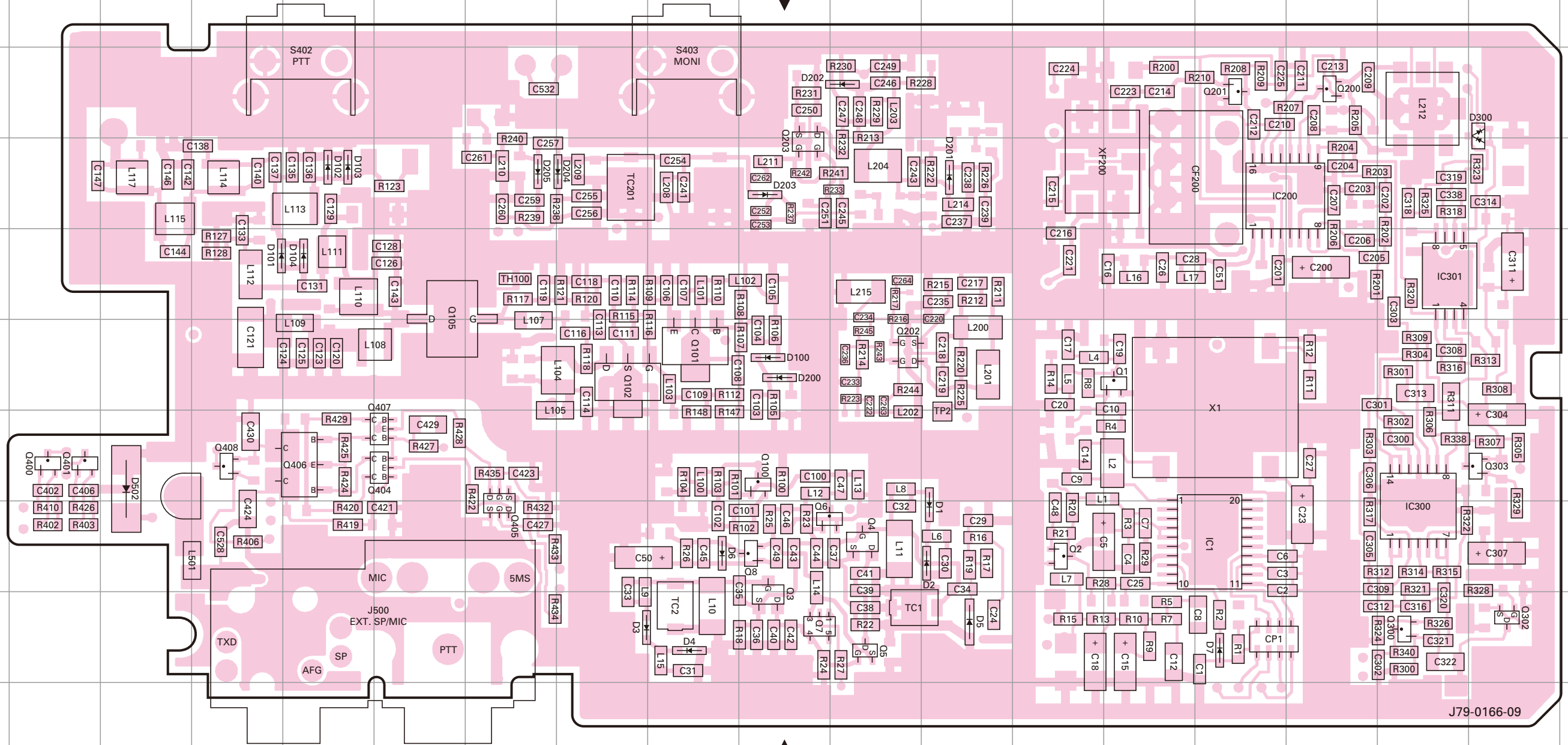


# TK-2102G PC BOARD

# PC BOARD TK-2102G

TX-RX UNIT (X57-6020-10) Foil side view (J79-0166-09)

TX-RX UNIT (X57-6020-10) Foil side view (J79-0166-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	8O	Q7	9J	Q300	9Q	D1	8L	D103	4E
IC200	4O	Q8	8J	Q302	9R	D2	8L	D104	5E
IC300	8Q	Q100	7J	Q303	7R	D3	9H	D200	6J
IC301	5Q	Q101	6I	Q400	7B	D4	9I	D201	4L
Q1	6N	Q102	6H	Q401	7B	D5	9L	D202	3K
Q2	8M	Q105	5F	Q404	7F	D6	8I	D203	4J
Q3	9J	Q200	3P	Q405	8G	D7	9O	D204	4H
Q4	8K	Q201	3O	Q406	7E	D100	6J	D205	4G
Q5	9K	Q202	6K	Q407	7F	D101	5D	D300	3R
Q6	8J	Q203	4J	Q408	7D	D102	4E	D502	7C

