

UHF FM TRANSCEIVER

# TK-3302/3302(U)

# TK-3306

## SERVICE MANUAL

# KENWOOD

Kenwood Corporation

© 2008-9 PRINTED IN JAPAN  
B51-8840-00 (N) 672



## CONTENTS

<b>GENERAL</b> .....	<b>2</b>
<b>SYSTEM SET-UP</b> .....	<b>3</b>
<b>REALIGNMENT</b> .....	<b>3</b>
<b>DISASSEMBLY FOR REPAIR</b> .....	<b>6</b>
<b>CIRCUIT DESCRIPTION</b> .....	<b>9</b>
<b>SEMICONDUCTOR DATA</b> .....	<b>13</b>
<b>TERMINAL FUNCTION</b> .....	<b>13</b>
<b>COMPONENTS DESCRIPTION</b> .....	<b>14</b>
<b>PARTS LIST</b> .....	<b>15</b>
<b>EXPLODED VIEW</b> .....	<b>23</b>
<b>PACKING</b> .....	<b>24</b>
<b>ADJUSTMENT</b> .....	<b>26</b>
<b>PC BOARD</b>	
<b>TX-RX UNIT (X57-7580-XX)</b> .....	<b>32</b>
<b>SCHEMATIC DIAGRAM</b> .....	<b>36</b>
<b>BLOCK DIAGRAM</b> .....	<b>40</b>
<b>LEVEL DIAGRAM</b> .....	<b>42</b>
<b>SPECIFICATIONS</b> .....	<b>43</b>



## 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:

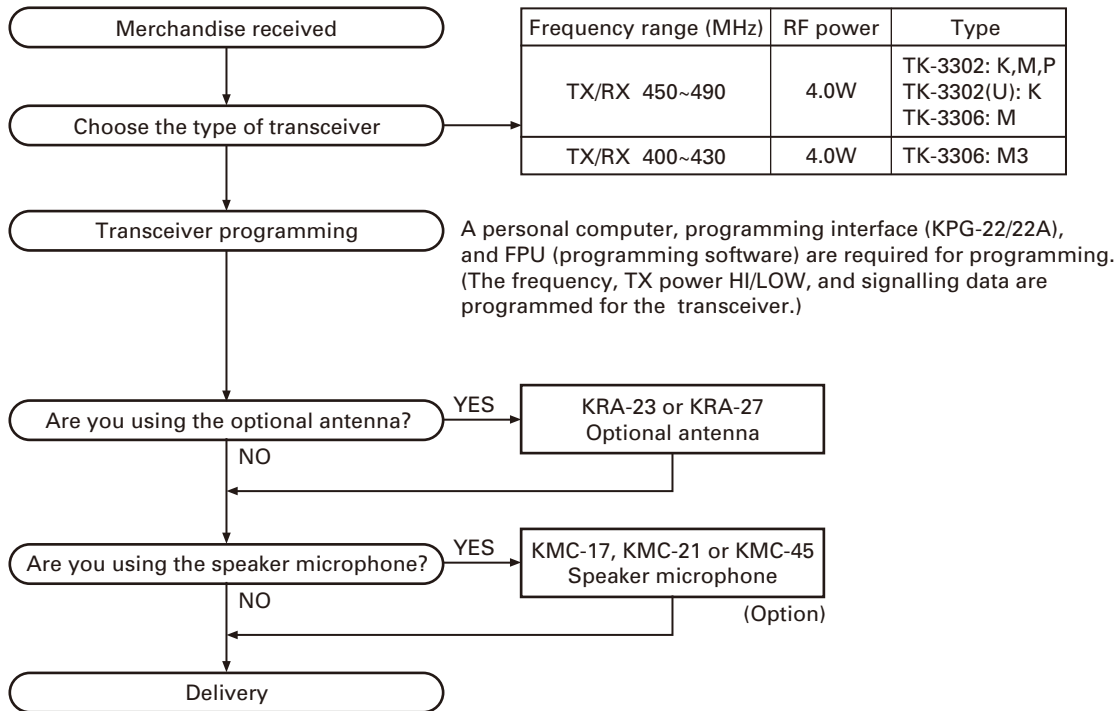
- DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- This equipment should be serviced by a qualified technician only.

## SERVICE

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

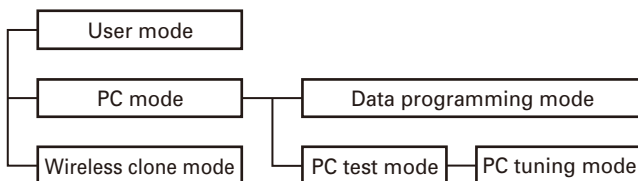
Model	Type	TX-RX unit	Frequency range	Remarks
TK-3302	K,M,P	X57-7580-20	450~490MHz	IF1: 38.85MHz LOC: 38.4MHz
TK-3302(U)	K			
TK-3306	M			
TK-3306	M3	X57-7580-23	400~430MHz	

## 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.
Wireless clone mode	Used to transfer programming data from one transceiver to another.

### 2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
PC mode	Received commands from PC
Wireless clone mode	[PTT]+[Side2]+Power ON (Two seconds)

### 3. PC Mode

#### 3-1. Preface

The transceiver is programmed by using a personal computer, a programming interface (KPG-22/22A, USB adapter (KCT-53U)) and FPU (programming software).

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

#### 3-2. 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).

## REALIGNMENT

### 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.

- 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 read from the transceiver, the red LED lights.  
When data is written to by the transceiver, the green LED lights.

### Notes :

- The data stored in the personal computer must match Model Name and Model Type when it is written into EEPROM.
- Do not press the [PTT] key during data transmission or reception.

### 3-3. 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.

### 3-4. 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.

### 3-5. FPU (Programming Software) Description

The FPU is the programming software for the transceiver supplied on a CD-ROM. The software on this disk allows a user to program the transceiver transceivers via Programming interface cable (KPG-22/22A).

### 3-6. Programming with PC

If data is transferred to the transceiver from a PC with the FPU, 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 TXD and RXD data lines respectively.

#### List of FPU for transceiver

Model	Type	FPU
TK-3302	K,M	KPG-118D(K)
TK-3302	P	KPG-119D(K)
TK-3302(U)	K	KPG-119D(K)
TK-3306	M,M3	KPG-118D(M)

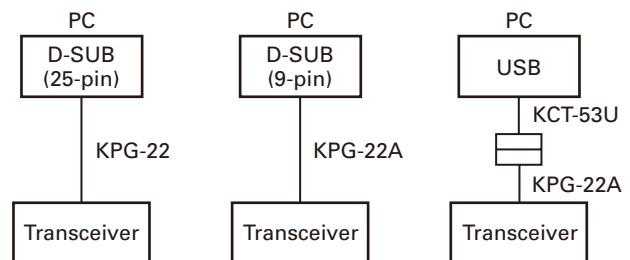
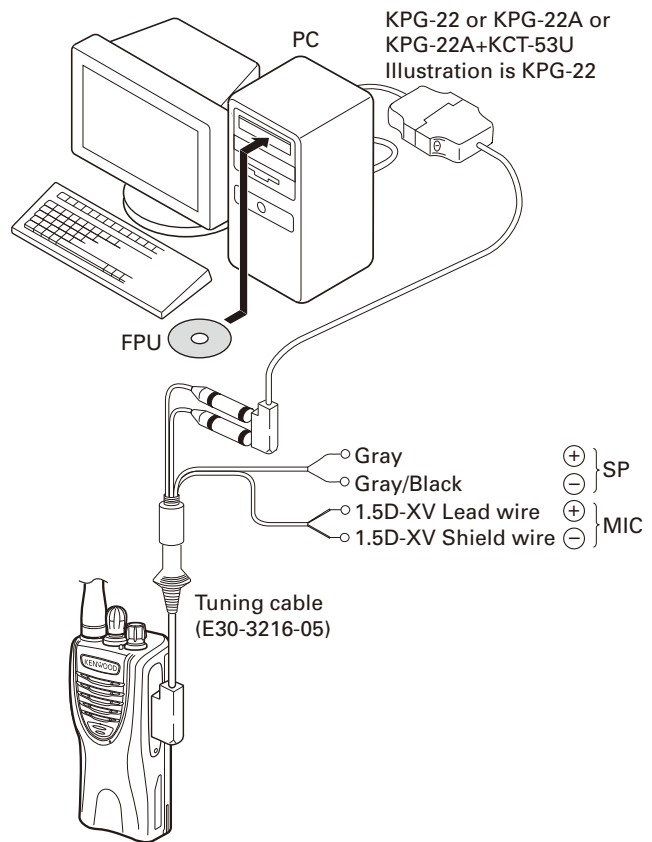


Fig. 1

## 4. Wireless Clone Mode

### 4-1. Outline

"Wireless Clone Mode" copies the transceiver data to another transceiver.

The dealer can copy the transceiver data to another transceiver even without the use of a personal computer.

### 4-2. Example

The transceiver can copy the programming data to one or more transceivers via RF communication.

The clone source and clone target/s must be in wireless clone mode.

## REALIGNMENT

### 4-3. Operation

- To switch the clone target/s to wireless clone mode, press and hold the [PTT] and [side2] keys while turning the transceiver power ON.
- Wait for 2 seconds. The LED will light orange and the transceiver will announce "Clone".
- Select a channel table number using Side1 (increment channel table) and Side2 (decrement channel table) keys.
- To switch the clone source to wireless clone mode, press and hold the [PTT] and [side2] keys while turning the transceiver power ON.
- Wait for 2 seconds. The LED will light orange and the transceiver will announce "Clone".
- Select the same channel table number as the clone target/s.
- Press [PTT] on the clone source to begin data transmission.  
When the clone target starts to receive data, the LED will light green.  
When the clone source finishes sending data, a "confirmation" tone will sound.  
If data transmission fails while cloning, an "error" tone will sound from the target unit.
- If the cloning fails, no data will be available in the target unit when it is returned to User mode.
- When the cloning is successful, the target unit's "Scan" and "Key lock" functions will return to their default values (Scan = OFF, Key lock = OFF).

#### Notes:

- The dealer can clone data to two or more transceivers by repeating the above procedures.
- If the transceivers wireless clone mode is configured as "Disabled", the transceiver cannot enter wireless clone mode.
- The table shown below will cover the frequency tables used for wireless cloning.
- Wireless clone mode cannot be entered in battery low state.
- A unit cannot be a "Source Unit" if it is unprogrammed. If [PTT] is pressed, an "error" tone will sound.
- The language used in cloning depends on the "Model type" setting, not the FPU setting.
- Once a unit is set to be the source, it cannot be a target after the data has been transmitted. This protects the data in the source unit.
- Electronic interface may cause a failure in data transfer during wireless clone, such as when waveforms or electromagnetics are being performed at the workbench.
- Wireless clone mode can be used ONLY by the authorized service personnel.**
- The wireless clone mode setting must be configured as "Disable" before being delivered to the end-user.**
- To clone, replace the antenna from both the source transceiver and the target transceiver with a dummy load.**
- The transmit output power is automatically set to Low in wireless clone mode.**

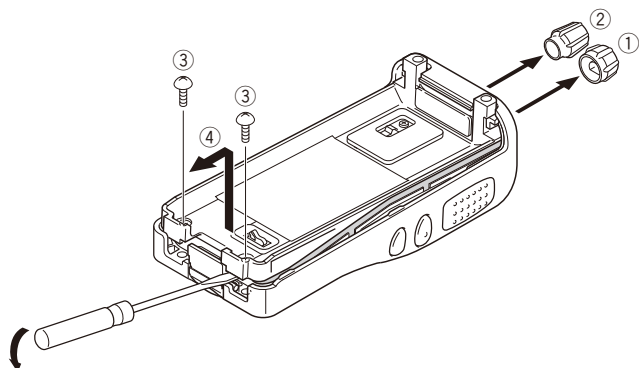
### • Clone frequency table

No.	Operating frequency (MHz)	
	TK-3302 K,M,P TK-3302(U) K TK-3306 M	TK-3306 M3
	450~490	400~430
1	450.000	400.000
2	452.000	401.000
3	454.000	402.000
4	456.000	403.000
5	458.000	404.000
6	460.000	405.000
7	462.000	406.000
8	464.000	407.000
9	466.000	408.000
10	468.000	409.000
11	470.000	410.000
12	472.000	411.000
13	474.000	412.000
14	476.000	413.000
15	478.000	414.000
16	480.000	415.000
17	482.000	416.000
18	484.000	417.000
19	486.000	418.000
20	488.000	419.000

## DISASSEMBLY FOR REPAIR

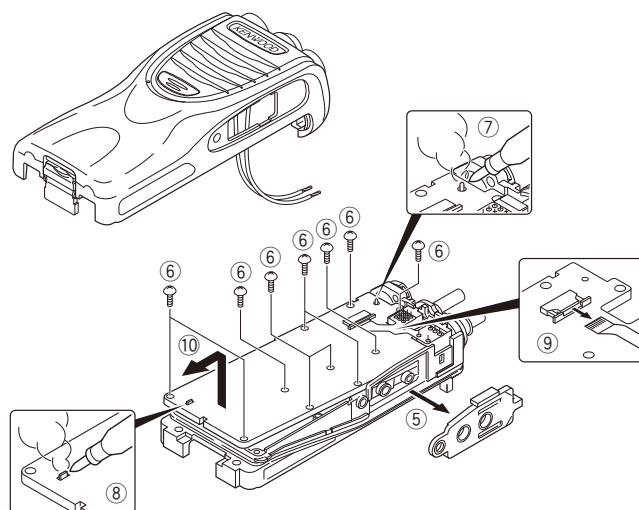
### 1. Removing the Case Assembly from the Chassis

1. Remove the volume knob ① and channel knob ②.
2. Remove the two screws ③.
3. Lift and remove the chassis from the case assembly ④.  
(Use a flat-blade screwdriver to easily lift the chassis.)



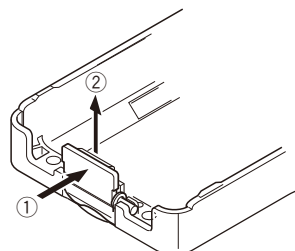
### 2. Removing the TX-RX unit from the Chassis

1. Detach the solder of speaker wire from the PCB beforehand.
2. Remove the packing ⑤ from the SP/MIC jack of the TX-RX unit.
3. Remove the ten screws ⑥ fixing the TX-RX unit.
4. Remove the solder of the antenna terminal with a soldering iron ⑦.
5. Remove the solder of the positive terminal with a soldering iron ⑧.
- Note:** You can remove the TX-RX unit from the chassis without removing the solder at the positive terminal. However, in this case, you can not attach the packing (G53-1605-03) that is on the positive terminal to the chassis in assembling. So, it is advisable to remove the solder on the positive terminal first.
6. Remove the FPC from the flat cable connector ⑨.
7. Lift and remove the TX-RX unit from the chassis ⑩.



### 3. Removing the Battery Release Lever from the Case Assembly

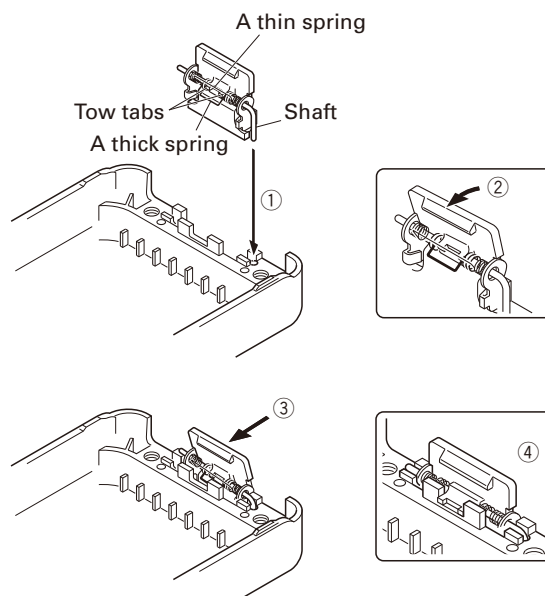
1. Press the upper part of the lever toward the inside of the case assembly. One side of the shaft will be removed ①.
2. Lift and remove the battery release lever from the case assembly ②.



### 4. Attaching the Battery Release Lever to the Case Assembly

1. Insert one side of the shaft into the hole at the lever fitting section on the case assembly ①.  
Caution: The thin spring (G01-4543-04) should be positioned above the two tabs of the lever.
2. Tilt the battery release lever slightly forward ②, so that the thick spring (G01-4542-04) is positioned below the case surface.
3. With the thick spring positioned below the case surface, attach the other side of the shaft to the case assembly by pressing the battery release lever ③ until it snaps into place ④.

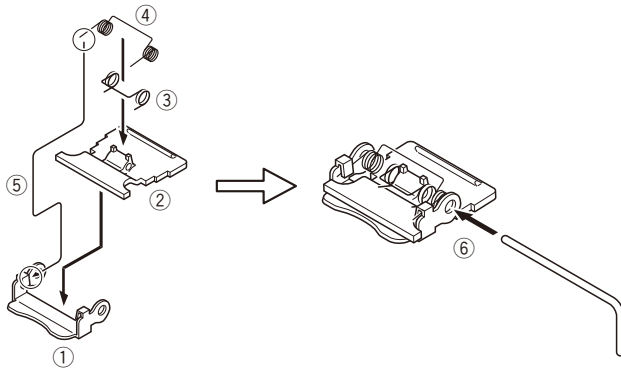
**Caution:** Be careful not to tilt the battery release lever too forward.  
If the battery release lever is pushed in this state where the two tabs come below the case surface, there is a possibility of damaging the two tabs.



## DISASSEMBLY FOR REPAIR

### 5. Assembling the Battery Release Lever

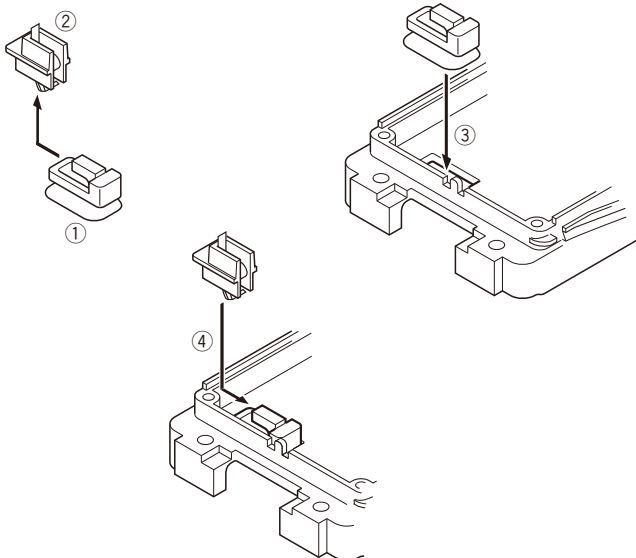
1. Place the lever ② onto the stopper ①.
2. Place the thick spring ③ onto the lever.
3. Hook the right and left ends of the thin spring ④ onto the tabs of the stopper, then place the thin spring ④ onto the lever ⑤.
4. Slide the shaft through the hole of the stopper and lever ⑥.



### 6. Attaching the Positive Terminal to the Chassis

Always attach the positive terminal to the chassis, using the following procedures, before mounting the TX-RX unit onto the chassis.

1. Remove the holder assembly ② from the packing ① of the positive terminal.
2. Mount the packing of the positive terminal into the chassis hole ③.
3. Mount the holder assembly into the packing of the positive terminal ④.

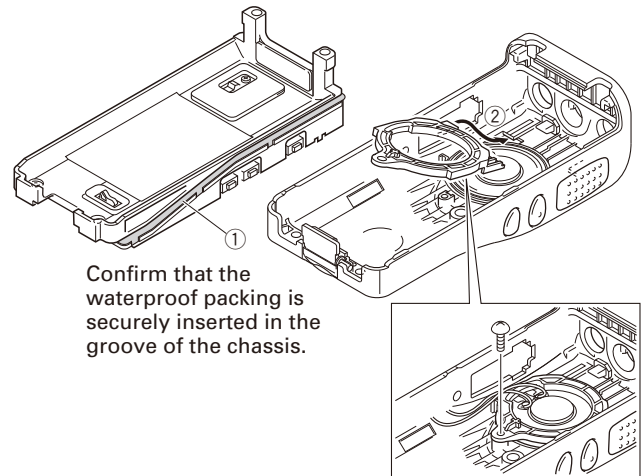


### 7. Mounting the Chassis to the Case Assembly

1. Confirm that the waterproof packing attached to the circumference of the chassis is securely inserted in the groove of the chassis ①.
2. Attach the speaker with waterproof packing to the speaker recess of the case assembly ②. Make sure the speaker clasp is securely inserted.
3. Tighten the speaker clasp into the case assembly with the screw.
4. Insert the upper part of the chassis into the case assembly ③.
5. Press the chassis ④ and the case assembly together to attach them.

**Caution:** Take care that the speaker lead wire is not caught by the microphone element.

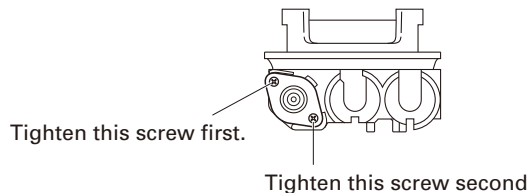
**Caution:** If the packing of the SP/MIC does not come to the correct position after attaching the chassis to the case assembly, reposition the packing with your fingers.



## DISASSEMBLY FOR REPAIR

### 8. Attaching the Antenna Receptacle to the Chassis

Screw the antenna receptacle to the chassis in the order shown in the drawing so that the antenna receptacle comes to the center of the case hole.

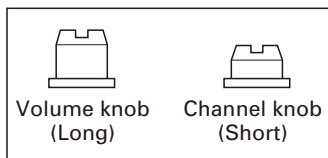


### 9. The Nuts of the Volume Knob and Channel Knob

Note that the shapes, colors and heights of nuts of the volume knob and channel knob are different from one another. (The nut of volume knob is silver, and the nut of channel knob is gold)

Use the following jig when removing the nuts of the volume knob and channel knob.

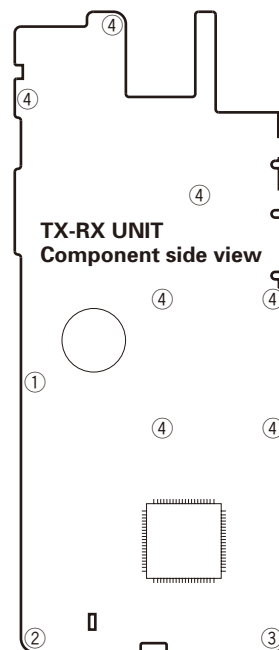
- Jig (Part No.: W05-1012-00)



### 10. Screw sequence for mounting the TX-RX unit to the chassis

Attach the TX-RX unit to the chassis using the screws in the order shown in the drawing below.

**Note:** From screw ④ onward no sequence is need.



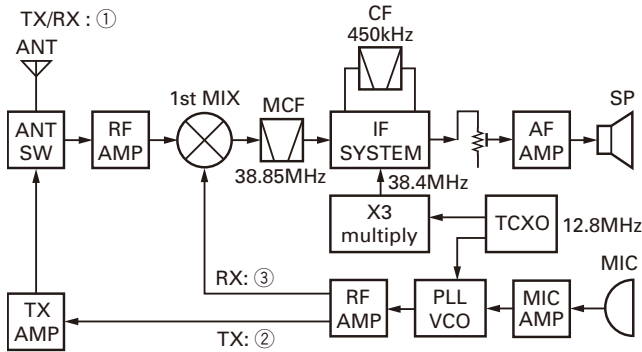


## CIRCUIT DESCRIPTION

### 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.



Model	Type	①	②	③
TK-3302	K,M,P			
TK-3302(U)	K	450~490MHz	450~490MHz	411.15~451.15MHz
TK-3306	M			
	M3	400~430MHz	400~430MHz	361.15~391.15MHz

Fig. 1 Frequency configuration

### 2. Receiver

The frequency configuration of the receiver is shown in Fig. 2.

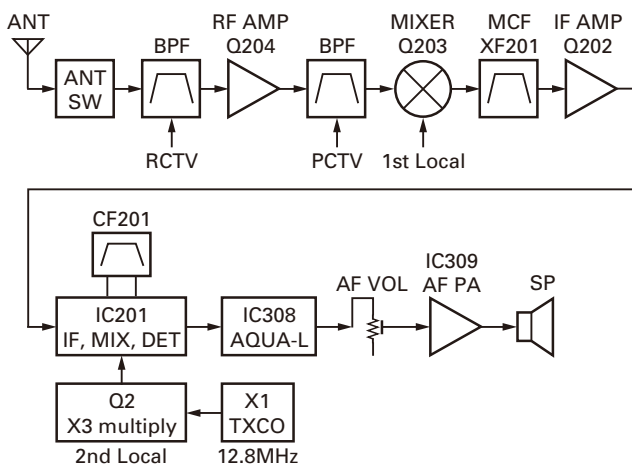


Fig. 2 Receiver section

#### ■ Front End (RF AMP)

The signal coming from the antenna passes through the transmit/receive switching diode circuit, (D103, D104 and D105) passes through a BPF (L213 and L212), and is ampli-

fied by the RF amplifier (Q204).

The resulting signal passes through a BPF (L209, L207 and L206) and goes to the mixer. These BPFs are adjusted by variable capacitors (D201, D202, D203, D204 and D205). The input voltage to the variable capacitor is regulated by voltage output from the MCU (IC306).

#### ■ First Mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q203 to produce a first IF frequency of 38.85MHz.

The resulting signal passes through the XF201 MCF to cut the adjacent spurious and provide the optimum characteristics, such as adjacent frequency selectivity.

#### ■ IF Amplifier Circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF201) to remove the adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q202) and then applied to the IF system IC (IC201). The IF system IC provides a second mixer, limiting amplifier, quadrature detector and RSSI (Received Signal Strength Indicator). The second mixer mixes the first IF signal with the 38.4MHz of the second local oscillator output (TCXO X1 and Q2) and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF201) to remove the adjacent channel signal. The filtered second IF signal is amplified by the limiting amplifier and demodulated by the quadrature detector with the ceramic discriminator (CD201). The demodulated signal is routed to the audio circuit.

#### ■ Wide/Narrow Switching Circuit

Narrow and Wide settings can be made for each channel by switching the demodulation level.

The WIDE (low level) and NARROW (high level) data is output from IC306, pin 5. When a WIDE (low level) data is received, Q201 turn on. When a NARROW (high level) data is received, Q201 turn off.

Q201 turns on/off with the Wide/Narrow data and the IC201 detector output level is switched to maintain a constant output level during wide or narrow signals.

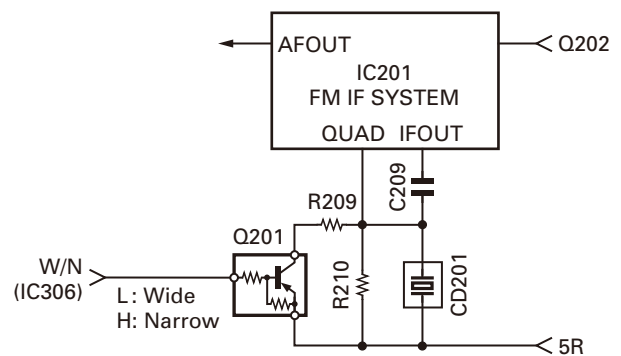


Fig. 3 Wide/Narrow switching circuit

## CIRCUIT DESCRIPTION

### ■ Audio Amplifier Circuit

The demodulated signal from IC201 goes to AF amplifier through IC308.

The signal then goes through an AF volume control, and is routed to an audio power amplifier (IC309) where it is amplified and output to the speaker.

### ■ Squelch

Part of the AF signal from the IC enters the FM IC (IC201) 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 MCU (IC306). IC306 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, IC306 sends a high signal to the AF\_CONT line and turns IC309 on through Q312, Q313, Q314, Q315 and Q316. (See Fig. 4)

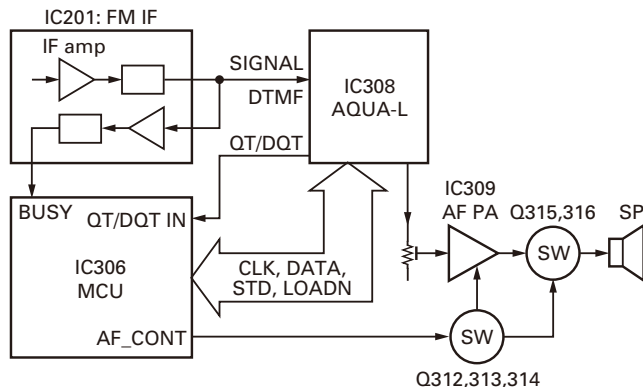


Fig. 4 AF amplifier and squelch

### ■ Receive Signaling

#### • QT/DQT

The output signal from FM IC (IC201) enters the MCU (IC306) through IC308. IC306 determines whether the QT or DQT matches the preset value, and controls the SP MUTE and the speaker output sounds according to the squelch results.

#### • MSK (Fleet Sync)

The MSK input signal from the FM IC goes to pin 31 of IC 308. The signal is demodulated by MSK demodulator in IC 308. The demodulated data goes to the MCU for processing.

#### • DTMF

The DTMF input signal from the FM IC (IC201) goes to IC308. The decoded information is then processed by the MCU.

### 3. PLL Frequency Synthesizer

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

#### ■ 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 an oscillator (VCO) output signal which is buffer amplified by Q3 then divided in IC1 by a programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal from 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. 5)

#### ■ VCO

The operating frequency is generated by Q5 in transmit mode and Q4 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D4 and D8 in transmit mode and D3 and D6 in receive mode).

The RX\_SW pin is set high in receive mode causing Q7 turn on. The TX\_SW pin is set high in transmit mode. The outputs from Q4 and Q5 are amplified by Q9 and sent to the RF amplifiers.

#### ■ Unlock Detector

If a pulse signal appears at the LD pin of IC1, an unlock condition occurs, and the DC voltage obtained from C4 and Q1 causes the voltage applied to the MCU to go low. When the MCU detects this condition, the transmitter is disabled, ignoring the push-to-talk switch input signal.

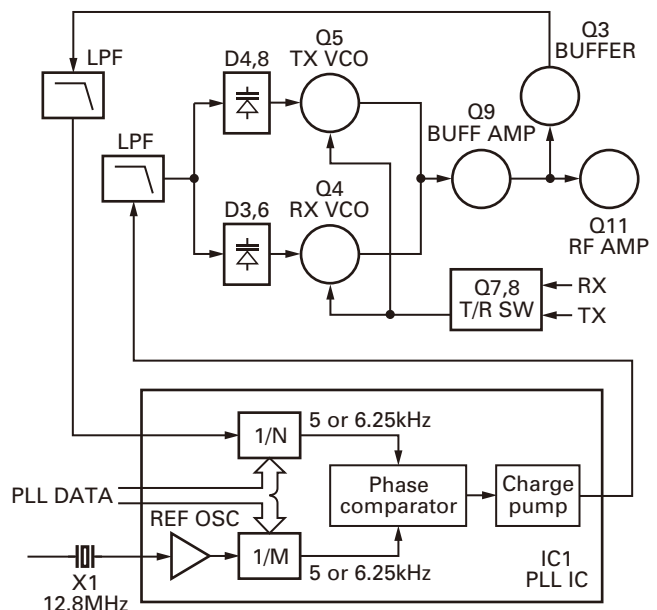


Fig. 5 PLL circuit

## CIRCUIT DESCRIPTION

### 4. Transmitter System

#### ■ Microphone Amplifier

The signal from the microphone passes through the IC308. When encoding DTMF, it is turned OFF for muting the microphone input signal by IC308.

The signal passes through the Audio processor (IC308) for the maximum deviation adjustment, and goes to the VCO modulation input.

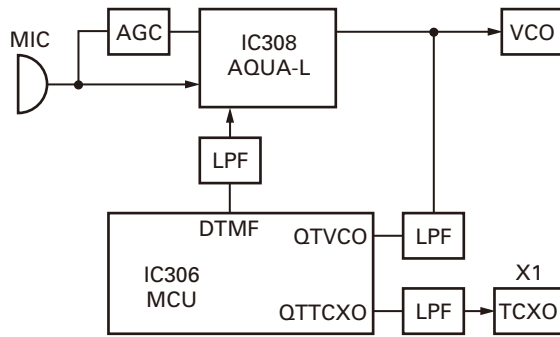


Fig. 6 Microphone amplifier

#### ■ Drive and Final Amplifier

The signal from the T/R switch (D10 is on) is amplified by the pre-drive (Q101 and Q102) and the drive amplifier (Q103) to 500mW.

The output of the drive amplifier is amplified by the RF power amplifier (Q106) to 4.0W (1W when the power is low). The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D103) and applied to the antenna terminal.

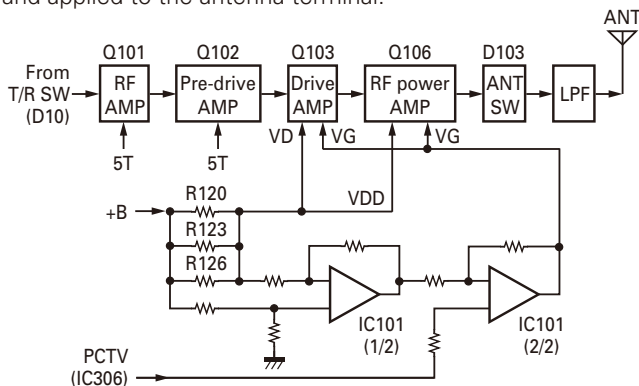


Fig. 7 Drive and final amplifier and APC circuit

#### ■ APC Circuit

The APC circuit always monitors the current flowing through the drive amplifier and RF power amplifier (Q103 and Q106) and keeps a constant current.

The voltage drop at R120, R123 and R126 is caused by the current flowing through the RF power amplifier and drive amplifier, and this voltage is applied to the differential amplifier IC101 (1/2).

IC101 (2/2) compares the output voltage of IC101 (1/2) with the reference voltage from IC306. The output of IC101 (2/2) controls the VG of the RF power amplifier and drive amplifier to make both voltages the same.

The change of power high/low is carried out by the change of the reference voltage.

#### ■ Encode Signaling

##### • QT/DQT

QT/DQT data of the QTTCXO Line is output from pin 14 of the MCU. The signal passes through a low-pass CR filter and goes to the TCXO (X1).

The QT/DQT data of the QTVCO Line is output from pin 15 of the MCU. The signal passes through a low pass CR filter, mixes with the audio signal, and goes to the VCO modulation input. TX deviation is adjusted by the MCU.

##### • DTMF

High-speed data is output from pin 74 of the MCU. The signal passes through a low-pass CR filter, and provides a TX and SP out tone, and is then applied to the audio processor (IC308). The signal is mixed with the audio signal and goes to the VCO.

TX deviation is adjusted by the MCU.

##### • MSK (Fleet Sync)

Fleet Sync utilizes 1200bps and 2400bps MSK signal is output from pin 6 of IC308. And is routed to the VCO. When encoding MSK, the microphone input signal is muted.

### 5. Power Supply

There are four 5V power supplies in the transceiver: 5M, 5C, 5R, and 5T. 5M for MCU is always output while the power is on. 5M is always output, but turns off when the power is turned off to prevent malfunction of the MCU.

5C is a common 5V and is output when SAVE is not set to OFF.

5R is 5V for reception and output during reception.

5T is 5V for transmission and output during transmission.

### 6. Control Circuit

The control circuit consists of a MCU (IC306) and its peripheral circuits. It controls the TX-RX unit. IC306 mainly performs the following:

- 1) Switching between transmission and reception by the PTT signal input.
- 2) Reading system, group, frequency, and program data from the memory circuit.
- 3) Sending frequency program data to the PLL.
- 4) Controlling squelch on/off by the DC voltage from the squelch circuit.
- 5) Controlling the audio mute circuit by the decode data input.
- 6) Transmitting tone and encode data.

## CIRCUIT DESCRIPTION

### ■ Frequency Shift Circuit

The MCU (IC306) operates at a clock of 14.746 MHz. This oscillator has a circuit that shifts the frequency by BEAT SHIFT SW (Q305, Q306).

A beat sound may be able to be evaded from generation if "Beat Shift" is set to ON when it is generated in the internal spurious transmission modulated sound of a transceiver.

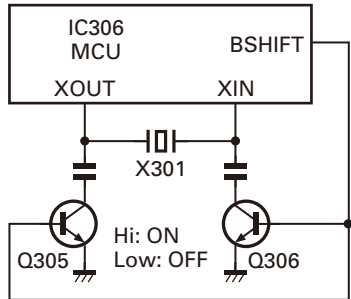


Fig. 8 Frequency shift circuit

### ■ Memory Circuit

Memory circuit consists of the MCU (IC306) and an EEPROM (IC305). An EEPROM has a capacity of 16k bits that contains the transceiver control program for the MCU and data such as transceiver channels and operating features.



Fig. 9 Memory circuit

### ■ Low Battery Warning

The battery voltage is checked using by the MCU. The transceiver generates a warning tone when it falls below the warning voltage shown in the table.

1) The red LED blinks when the battery voltage falls below the voltage (1) shown in the table during transmission.

**Note:** The transceiver checks the battery voltage during reception even when, in the FPU, the Battery Warning status function is set to "On TX" (default setting).

However, the LED does not blink during reception. During transmission, the LED blinks to generate the warning tone of a low battery voltage.

2) The transceiver immediately stops transmission when the battery voltage falls below the voltage (2) shown in the table. A message tone beeps while the PTT switch is released.

	Ni-Cd Battery	Ni-MH Battery	Li-ion Battery
(1)	6.2V	6.2V	6.2V
(2)	5.9V	5.9V	5.9V

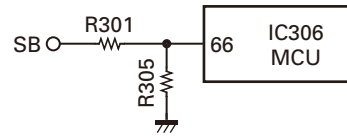


Fig. 10 Low battery warning

## 7. Control System

Keys and channel selector circuit. The signal from the keys and channel selector are directly input to the MCU, as shown in Fig. 11.

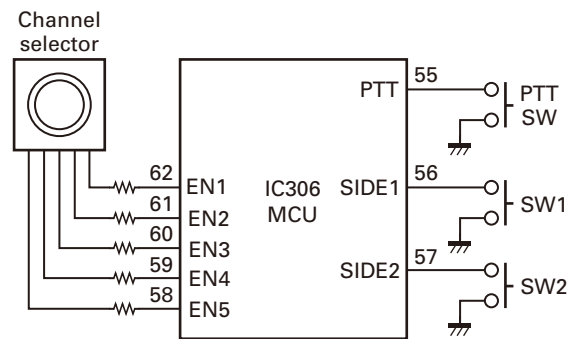


Fig. 11 Control system

## SEMICONDUCTOR DATA

## MCU: R5F212CCKCMB (TX-RX unit IC306)

Pin No.	Signal Name	I/O	Function
1	5T_C	O	5T control
2	PLL_STB	O	PLL strobe
3	5C_C	O	5C control
4	5R_C	O	5R control
5	W/N	O	Wide/Narrow switch
6	MODE	I	No function
7	AF_CONT	O	Speaker mute
8	BSHIFT	O	Beat shift control
9	RESET	I	MCU reset
10	XOUT	O	MCU clock (14.746MHz)
11	VSS	-	GND
12	XIN	I	MCU clock (14.746MHz)
13	VCC	I	Power supply input
14	QTTCXO	O	QT/DQT output
15	QTVCO	O	QT/DQT output
16~21	AUX6~AUX1	I/O	No function
22	MIC_MUTE	O	MIC mute
23	AF_MUTE	O	No function
24~32	N.C	O	No function
33	RXDATA	I	No function
34	TXDATA	O	No function
35	OPTDET	I	Headset detect
36	TX_SW	O	TX VCO switch
37	RX_SW	O	RX VCO switch
38	LEDRX	O	Green LED control
39	LEDTX	O	Red LED control
40	APC_SW	O	APC switch
41	DC_SW	O	APC discharge switch
42	STD	I	Baseband IC data input
43	1/2 OSC	O	Baseband IC clock (3.6864MHz)
44	INT	I	No function
45	TXD	O	Serial data output

Pin No.	Signal Name	I/O	Function
46	RXD	I	Serial data input
47	DIR	O	Baseband IC data output
48	DI/O	I/O	Baseband IC data input / output
49	DTRLOADN	O	Baseband IC data output
50	TDATA/DTRCLK	O	Baseband IC data output
51	SCLK	O	Serial clock for baseband IC
52	TCLK/DTRDO	I	Baseband IC data input
53	RDF/FD	I	Baseband IC data input
54	MDSW	I	No function
55	PTT	I	PTT switch input
56	SIDE1	I	Side1 key input
57	SIDE2	I	Side2 key input
58~62	EN5~EN1	I	Channel selector input
63	DIST1	I	No function
64	DIST2	I	No function
65	PLL_UL	I	PLL unlock signal input
66	BATT	I	Battery voltage detect
67	RSSI	I	RSSI input
68	BUSY	I	Busy signal input
69	VOX	I	VOX signal detect
70	QT/DQT_IN	I	QT/DQT signal input
71	EEPCLK	O	EEPROM clock
72	EEPDAT	I/O	EEPROM data input / output
73	TH_DET	I	Temperature detect
74	DTMF	I	DTMF/BEEP output
75	AVSS	-	GND
76	PCTV	I	APC/BPF control voltage
77	VREF	I	Reference voltage input
78	AVCC	I	Power supply input
79	PLL_DAT	O	PLL data output
80	PLL_CLK	O	PLL clock output

## TERMINAL FUNCTION

## TX-RX unit (X57-7580-XX)

Pin No.	Name	I/O	Function
<b>CN301</b>			
1	B	I	B (Battery Voltage)
2	SB	O	Switched B
3	AFVOL_IN	I	Audio input
4	AFVOL_OUT	O	Audio output
5	AFVOL_GND	-	GND

Pin No.	Name	I/O	Function
6	EN1	I	Encoder pulse input
7	EN2	I	Encoder pulse input
8	GND	-	GND
9	EN3	I	Encoder pulse input
10	EN4	I	Encoder pulse input
11	EN5	I	Encoder pulse input

## COMPONENTS DESCRIPTION

## TX-RX unit (X57-7580-XX)

Ref. No.	Part Name	Description
IC1	IC	PLL system IC
IC101	IC	APC
IC201	IC	FM system IC
IC301	IC	Voltage detector/ Reset
IC303,304	IC	Voltage regulator/ 5V
IC305	IC	EEPROM
IC306	IC	MCU
IC308	IC	Audio processor
IC309	IC	Audio amplifier
Q1	Transistor	Rectification
Q2	Transistor	Tripler
Q3	Transistor	RF amplifier
Q4	FET	VCO/ RX
Q5	FET	VCO/ TX
Q6	Transistor	Rectification
Q7	Transistor	DC switch/ RX VCO
Q8	Transistor	DC switch/ TX VCO
Q9	Transistor	RF amplifier
Q10	Transistor	Ripple filter
Q11	Transistor	RF amplifier
Q101,102	Transistor	RF amplifier
Q103	FET	TX drive amplifier
Q104	Transistor	Discharge switch
Q106	FET	TX final amplifier
Q107	Transistor	DC switch
Q108	FET	DC switch
Q109	Transistor	DC switch
Q201	Transistor	Wide/Narrow switch/ RX
Q202	Transistor	IF amplifier
Q203	FET	Mixer
Q204	FET	Low noise amplifier
Q301	Transistor	DC switch/ Red color LED

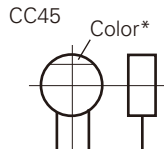
Ref. No.	Part Name	Description
Q302	Transistor	DC switch/ Green color LED
Q303	Transistor	DC switch/ 5R
Q304	Transistor	DC switch/ 5T
Q305,306	Transistor	Beat shift switch
Q307	Transistor	Wide/Narrow switch/ TX
Q308	Transistor	Rectification
Q310,311	Transistor	MIC mute
Q312,313	Transistor	DC switch
Q314	Transistor	Mute switch
Q315,316	FET	Mute switch
D3	Variable Capacitance Diode	Frequency control/ RX VCO
D4	Variable Capacitance Diode	Frequency control/ TX VCO
D6	Variable Capacitance Diode	Frequency control/ RX VCO
D8	Variable Capacitance Diode	Frequency control/ TX VCO
D9	Variable Capacitance Diode	Modulator
D10	Diode	TX/RX RF switch
D101	Zener diode	Voltage protection
D103~105	Diode	ANT switch
D201~205	Variable Capacitance Diode	RF BPF tuning
D301	Diode	Reverse voltage protection
D302	Diode	Rectification
D303	LED	Red color LED
D304	LED	Green color LED
D306	Diode	Rectification
D307	Diode	Limiter
D308,309	Diode	Rectification

## PARTS LIST

### CAPACITORS

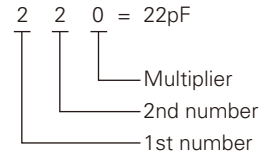
$\frac{C}{1} \frac{C}{2} \frac{45}{3} \frac{TH}{4} \frac{1H}{5} \frac{220}{6} \frac{J}{7}$

- 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

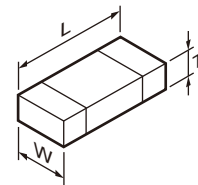
#### • Voltage rating

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)
- 1 = Type
  - 2 = Shape
  - 3 = Dimension
  - 4 = Temp. coefficient
  - 5 = Voltage rating
  - 6 = Value
  - 7 = Tolerance
- (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)

#### • 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

#### • 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		

### 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

# TK-3302/3302(U)/3306

## 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

K : USA

P : Canada

Y : PX (Far East, Hawaii)

T : England

E : Europe

Y : AAFES (Europe)

X : Australia

M : Other Areas

**TK-3302/3302(U)/3306 (Y50-635X-XX)**

**TX-RX UNIT (X57-7580-XX)**

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
<b>TK-3302/3302(U)/3306</b>					
1	1A	*	A02-4040-03	PLASTIC CABINET ASSY	
2	3A	*	A10-4124-01	CHASSIS	
4	2C,2E	*	B09-0725-03	CAP ACCESSORY	
7	1C	*	B62-2109-00	INSTRUCTION MANUAL	AK,AM
7	1C	*	B62-2111-00	INSTRUCTION MANUAL	BM,BM3
7	1C,1E	*	B62-2139-00	INSTRUCTION MANUAL	AP,UK
9	1A		D10-0649-03	LEVER	
10	1A		D21-0863-04	SHAFT	
11	1A		D32-0441-13	STOPPER	
13	2B		E04-0477-05	ANTENNA CONNECTOR (SMA)	
14	3A		E23-1253-04	TERMINAL (BATT-)	
15	2A		E23-1254-04	TERMINAL (BATT+)	
16	2B	*	E37-1175-15	SP WIRE LEAD (BROWN)	
17	2B	*	E37-1176-15	SP WIRE LEAD (GREEN)	
19	3A		F20-3353-14	INSULATING SHEET (CHASSIS BATT+)	
21	1A		G01-4542-04	COIL SPRING (LEVER)	
22	1A		G01-4543-14	COIL SPRING (STOPPER)	
23	2A		G10-1330-04	FIBROUS SHEET (AUDIO IC)	
24	2A	*	G11-4465-04	RUBBER SHEET (FINAL FET)	
25	3B		G13-2009-04	CUSHION (CHASSIS)	
26	3A		G13-2033-04	CUSHION (BATT-)	
27	3A		G13-2034-14	CUSHION (CHASSIS-)	
28	3A		G13-2038-24	CUSHION (CHASSIS-CERAMIC FILTER)	
29	2A		G13-2039-14	CUSHION (PCB-CERAMIC FILTER)	
30	3A		G53-1604-03	PACKING (CHASSIS)	
31	2A		G53-1605-03	PACKING (BATT+)	
32	2A		G53-1609-14	PACKING (ECM)	
33	2B	*	G53-1799-03	PACKING (VOLUME/SELECTOR)	
34	1B	*	G53-1800-03	PACKING (SP/MIC)	
35	1B	*	G53-1801-03	PACKING (SPEAKER)	
36	2B	*	G53-1802-04	PACKING (SMA)	
38	2E	*	H12-4250-05	PACKING FIXTURE	AP
39	2D	*	H12-4251-05	PACKING FIXTURE	AK,UK,BM
39	2D	*	H12-4251-05	PACKING FIXTURE	BM3,AM
40	1F		H13-2109-03	CARTON BOARD	AP
42	3D	*	H52-2300-03	ITEM CARTON CASE	AK,UK,BM
42	3D	*	H52-2300-03	ITEM CARTON CASE	BM3,AM
43	3F	*	H52-2301-13	ITEM CARTON CASE	AP
46	2A		J19-5463-03	HOLDER (BATT+)	
47	2A		J19-5473-03	HOLDER ASSY (BATT+)	
48	2C,2E	*	J19-5521-03	HOLDER (SP/MIC) ACCESSORY	
49	2B	*	J19-5522-03	SPEAKER CLASP	
50	2C,1E		J29-0734-05	BELT HOOK ACCESSORY	
51	2A	*	J82-0121-05	FPC	
52	1A	*	J99-0737-04	ADHESIVE SHEET (PTT)	
54	1B	*	K29-9309-13	KNOB (VOLUME)	
55	1A	*	K29-9425-03	BUTTON KNOB (PTT)	
56	1A	*	K29-9426-03	BUTTON KNOB (MON/PF)	
57	1B	*	K29-9427-03	KNOB (SELECTOR)	
A	3B	*	N14-0848-05	CIRCULAR NUT (SELECTOR)	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
B	3B	*	N14-0849-05	CIRCULAR NUT (VOLUME)	
C	2B		N30-2604-48	PAN HEAD MACHINE SCREW (SMA)	
D	3A		N30-2606-48	PAN HEAD MACHINE SCREW	
E	2A,3A,2B		N83-2005-48	PAN HEAD TAPTITE SCREW	
61	2C,2E		N99-2046-05	SCREW SET ACCESSORY	
63	2A	*	R31-0670-15	VARIABLE RESISTOR	
65	2A	*	S60-0440-05	ROTARY SWITCH	
67	1B		T07-0369-15	SPEAKER	
68	2D,2E		T90-1039-25	WHIP ANTENNA	AK,AP,UK
68	2D		T90-1039-25	WHIP ANTENNA	BM,AM
68	2D		T90-1041-25	WHIP ANTENNA	BM3
70	1F		W08-0970-35	AC ADAPTER (TRANSFORMER)	AP
71	1C		W08-0988-05	CHARGER (KSC-35)	AK,UK,AM
72	1D		W08-0989-15	AC ADAPTER (SWITCHING)	AK,UK
73	1D		W08-0992-05	AC ADAPTER (SWITCHING)	AM
74	1C,2F	*	W08-1067-05	CHARGER (KSC-31)	AP,BM,BM3
75	1D	*	W08-1075-05	AC ADAPTER (SWITCHING)	BM,BM3

**TX-RX UNIT (X57-7580-XX) -20: AK,AP,UK,AM,BM -23: BM3**

D303		*	B30-2315-05	LED (RED)	
D304		*	B30-2314-05	LED (GREEN)	
C1			CK73HB1H332K	CHIP C 3300PF	K
C2			CK73HB1C682K	CHIP C 6800PF	K
C3			CK73GB1A105K	CHIP C 1.0UF	K
C4			CK73HB1A104K	CHIP C 0.10UF	K
C5			CK73HB1H471K	CHIP C 470PF	K
C6			CK73HB1E103K	CHIP C 0.010UF	K
C6			CK73HB1E103K	CHIP C 0.010UF	K
C6			CK73HB1H471K	CHIP C 470PF	K
C7			CC73HCH1H100D	CHIP C 10PF	D
C8-10			CC73HCH1H101J	CHIP C 100PF	J
C11			CK73FB0J106K	CHIP C 10UF	K
C11			CK73FB0J106K	CHIP C 10UF	K
C11			CK73FB1H471K	CHIP C 470PF	K
C12			CK73HB1H471K	CHIP C 470PF	K
C13			CC73HCH1H100D	CHIP C 10PF	D
C14			CK73HB1E103K	CHIP C 0.010UF	K
C14,15			CK73HB1E103K	CHIP C 0.010UF	K
C14,15			CK73HB1E103K	CHIP C 0.010UF	K
C15			CK73HB1H471K	CHIP C 470PF	K
C16			CC73HCH1H470J	CHIP C 47PF	J
C17			CK73HB1E103K	CHIP C 0.010UF	K
C18			CC73HCH1H180J	CHIP C 18PF	J
C21			CK73HB1E103K	CHIP C 0.010UF	K
C22			CK73FB0J106K	CHIP C 10UF	K
C23			CK73HB1E103K	CHIP C 0.010UF	K
C25			CC73HCH1H300J	CHIP C 30PF	J
C26			CC73HCH1H020B	CHIP C 2.0PF	B
C27			CS77AA1VR33M	CHIP TINTL 0.33UF	35WV
C29			CC73HCH1H270J	CHIP C 27PF	J
C30			CK73HB1H471K	CHIP C 470PF	K



## PARTS LIST

TX-RX UNIT (X57-7580-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C31			CK73HB1E103K	CHIP C 0.010UF K		C72,73			CK73HB1A104K	CHIP C 0.10UF K	
C32			CS77CA1C3R3M	CHIP TNTL 3.3UF 16WV		C74,75			CK73HB1H471K	CHIP C 470PF K	
C33			CK73HB1H471K	CHIP C 470PF K		C76			CS77CP0J100M	CHIP TNTL 10UF 6.3WV	
C35			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV	AK,AP,UK	C77			CK73HB1H471K	CHIP C 470PF K	
C35			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV	BM,AM	C78			CC73HCH1H300J	CHIP C 30PF J	BM3
C35			C92-0863-05	CHIP TNTL 0.047UF 35WV	BM3	C78			CC73HCH1H330J	CHIP C 33PF J	AK,AP,UK
C36			CK73HB1H332K	CHIP C 3300PF K		C78			CC73HCH1H330J	CHIP C 33PF J	BM,AM
C38			CK73HB1H471K	CHIP C 470PF K	BM3	C79,80			CK73HB1H471K	CHIP C 470PF K	
C39			CK73HB1C682K	CHIP C 6800PF K		C81			CC73HCH1H150J	CHIP C 15PF J	
C40			CC73HCH1H050B	CHIP C 5.0PF B		C83-85			CK73HB1H471K	CHIP C 470PF K	
C41			CC73HCH1H030B	CHIP C 3.0PF B		C86			CC73HCH1H100B	CHIP C 10PF B	
C42			CC73HCH1H050B	CHIP C 5.0PF B		C101,102			CK73HB1H471K	CHIP C 470PF K	
C43			CC73HCH1H101J	CHIP C 100PF J	BM3	C103			CC73HCH1H120J	CHIP C 12PF J	BM3
C44,45			CK73GB1A105K	CHIP C 1.0UF K		C103			CC73HCH1H300J	CHIP C 30PF J	AK,AP,UK
C47			CC73HCH1H100C	CHIP C 10PF C		C103			CC73HCH1H300J	CHIP C 30PF J	BM,AM
C50			CK73HB1H471K	CHIP C 470PF K	AK,AP,UK	C104			CC73HCH1H040B	CHIP C 4.0PF B	AK,AP,UK
C50			CK73HB1H471K	CHIP C 470PF K	BM,AM	C104			CC73HCH1H040B	CHIP C 4.0PF B	BM,AM
C51			CC73HCH1H030B	CHIP C 3.0PF B	BM3	C104			CC73HCH1H160J	CHIP C 16PF J	BM3
C51			CC73HCH1H100D	CHIP C 10PF D	AK,AP,UK	C106			CK73GB1A105K	CHIP C 1.0UF K	
C51			CC73HCH1H100D	CHIP C 10PF D	BM,AM	C107			CK73HB1H471K	CHIP C 470PF K	
C52			CC73HCH1H090B	CHIP C 9.0PF B	AK,AP,UK	C108			CK73GB1A105K	CHIP C 1.0UF K	
C52			CC73HCH1H090B	CHIP C 9.0PF B	BM,AM	C109			CC73HCH1H060B	CHIP C 6.0PF B	AK,AP,UK
C52			CC73HCH1H200J	CHIP C 20PF J	BM3	C109			CC73HCH1H060B	CHIP C 6.0PF B	BM,AM
C53			CC73HCH1H090B	CHIP C 9.0PF B	BM3	C109			CC73HCH1H150J	CHIP C 15PF J	BM3
C53			CC73HCH1H110J	CHIP C 11PF J	AK,AP,UK	C111			CK73GB1A105K	CHIP C 1.0UF K	
C53			CC73HCH1H110J	CHIP C 11PF J	BM,AM	C112,113			CK73HB1H471K	CHIP C 470PF K	
C56			CC73HCH1H080B	CHIP C 8.0PF B	BM3	C114			CK73HB1A104K	CHIP C 0.10UF K	
C56			CC73HCH1H120J	CHIP C 12PF J	AK,AP,UK	C115			CC73HCH1H050B	CHIP C 5.0PF B	BM3
C56			CC73HCH1H120J	CHIP C 12PF J	BM,AM	C115			CC73HCH1H110J	CHIP C 11PF J	AK,AP,UK
C57			CC73HCH1H080B	CHIP C 8.0PF B	AK,AP,UK	C115			CC73HCH1H110J	CHIP C 11PF J	BM,AM
C57			CC73HCH1H080B	CHIP C 8.0PF B	BM,AM	C117			CC73HCH1H110J	CHIP C 11PF J	AK,AP,UK
C57			CC73HCH1H120J	CHIP C 12PF J	BM3	C117			CC73HCH1H110J	CHIP C 11PF J	BM,AM
C58,59			CC73HCH1H010B	CHIP C 1.0PF B	AK,AP,UK	C118			CC73HCH1H090B	CHIP C 9.0PF B	BM3
C58,59			CC73HCH1H010B	CHIP C 1.0PF B	BM,AM	C120			CK73HB1H471K	CHIP C 470PF K	
C58,59			CC73HCH1H1R5B	CHIP C 1.5PF B	BM3	C122			CK73HB0J105K	CHIP C 1.0UF K	BM3
C60			CC73HCH1H020B	CHIP C 2.0PF B	AK,AP,UK	C123			CC73HCH1H0R5B	CHIP C 0.5PF B	BM3
C60			CC73HCH1H020B	CHIP C 2.0PF B	BM,AM	C124			CK73HB1H471K	CHIP C 470PF K	
C60			CC73HCH1H040B	CHIP C 4.0PF B	BM3	C125			CC73HCH1H100B	CHIP C 10PF B	AK,AP,UK
C61			CC73HCH1H030B	CHIP C 3.0PF B	AK,AP,UK	C125			CC73HCH1H100B	CHIP C 10PF B	BM,AM
C61			CC73HCH1H030B	CHIP C 3.0PF B	BM,AM	C125			CC73HCH1H150J	CHIP C 15PF J	BM3
C61			CC73HCH1H070B	CHIP C 7.0PF B	BM3	C126			CC73HCH1H110J	CHIP C 11PF J	AK,AP,UK
C62			CK73HB1H471K	CHIP C 470PF K		C126			CC73HCH1H110J	CHIP C 11PF J	BM,AM
C63			CC73HCH1H060B	CHIP C 6.0PF B		C127			CC73HCH1H160J	CHIP C 16PF J	AK,AP,UK
C64			CC73HCH1H050B	CHIP C 5.0PF B	AK,AP,UK	C127			CC73HCH1H160J	CHIP C 16PF J	BM,AM
C64			CC73HCH1H050B	CHIP C 5.0PF B	BM,AM	C127			CC73HCH1H470J	CHIP C 47PF J	BM3
C64			CC73HCH1H3R5B	CHIP C 3.5PF B	BM3	C128,129			CK73HB1H471K	CHIP C 470PF K	
C65			CC73HCH1H040B	CHIP C 4.0PF B	BM3	C130			CK73GB1A105K	CHIP C 1.0UF K	
C65			CC73HCH1H060B	CHIP C 6.0PF B	AK,AP,UK	C131			CK73HB1E103K	CHIP C 0.010UF K	
C65			CC73HCH1H060B	CHIP C 6.0PF B	BM,AM	C133			CK73GB1A105K	CHIP C 1.0UF K	
C66			CK73HB1H471K	CHIP C 470PF K		C135,136			CK73HB1H471K	CHIP C 470PF K	
C67			CC73HCH1H040B	CHIP C 4.0PF B	BM3	C137			CC73HCH1H101J	CHIP C 100PF J	
C67			CC73HCH1H050B	CHIP C 5.0PF B	AK,AP,UK	C140			CK73HB1H471K	CHIP C 470PF K	
C67			CC73HCH1H050B	CHIP C 5.0PF B	BM,AM	C141			CK73HB1A104K	CHIP C 0.10UF K	
C68			CK73HB1H471K	CHIP C 470PF K		C142			CC73GCH1H390J	CHIP C 39PF J	BM3
C69			CK73HB1H471K	CHIP C 470PF K	AK,AP,UK	C142			CC73GCH1H430J	CHIP C 43PF J	AK,AP,UK
C69			CK73HB1H471K	CHIP C 470PF K	BM,AM	C142			CC73GCH1H430J	CHIP C 43PF J	BM,AM
C70			CC73HCH1H0R5B	CHIP C 0.5PF B	BM3	C144			CK73HB1H471K	CHIP C 470PF K	
C70,71			CC73HCH1H0R5B	CHIP C 0.5PF B	AK,AP,UK	C145			CC73GCH1H360J	CHIP C 36PF J	BM3
C70,71			CC73HCH1H0R5B	CHIP C 0.5PF B	BM,AM	C146			CC73GCH1H120J	CHIP C 12PF J	AK,AP,UK
C71			CC73HCH1H0R3B	CHIP C 0.3PF B	BM3	C146			CC73GCH1H120J	CHIP C 12PF J	BM,AM

AK: TK-3302 K AP: TK-3302 P UK: TK-3302(U) K  
 AM: TK-3302 M BM: TK-3306 M BM3: TK-3306 M3

## PARTS LIST

## TX-RX UNIT (X57-7580-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C154			CK73HB1H471K	CHIP C 470PF K		C235			CC73HCH1H75B	CHIP C 0.75PF B	BM3
C155			CC73GCH1H0R3B	CHIP C 0.3PF B	BM3	C236			CC73GCH1H040B	CHIP C 4.0PF B	AK,AP,UK
C161			CC73GCH1H010B	CHIP C 1.0PF B	AK,AP,UK	C236			CC73GCH1H040B	CHIP C 4.0PF B	BM,AM
C161			CC73GCH1H010B	CHIP C 1.0PF B	BM,AM	C236			CC73GCH1H070B	CHIP C 7.0PF B	BM3
C161			CC73GCH1H1R5B	CHIP C 1.5PF B	BM3	C237			CC73HCH1H220J	CHIP C 22PF J	AK,AP,UK
C162			CC73GCH1H020B	CHIP C 2.0PF B	AK,AP,UK	C237			CC73HCH1H220J	CHIP C 22PF J	BM,AM
C162			CC73GCH1H020B	CHIP C 2.0PF B	BM,AM	C237			CC73HCH1H270J	CHIP C 27PF J	BM3
C164			CC73GCH1H030B	CHIP C 3.0PF B	BM3	C238			CC73HCH1H010B	CHIP C 1.0PF B	
C166			CC73GCH1H060B	CHIP C 6.0PF B	AK,AP,UK	C239			CK73HB1H471K	CHIP C 470PF K	
C166			CC73GCH1H060B	CHIP C 6.0PF B	BM,AM	C240			CC73HCH1H020B	CHIP C 2.0PF B	AK,AP,UK
C166			CC73GCH1H070B	CHIP C 7.0PF B	BM3	C240			CC73HCH1H020B	CHIP C 2.0PF B	BM,AM
C167			CK73HB1H471K	CHIP C 470PF K		C240			CC73HCH1H040B	CHIP C 4.0PF B	BM3
C168			CC73GCH1H040B	CHIP C 4.0PF B		C241			CK73FB0J106K	CHIP C 10UF K	
C169			CC73GCH1H2R5B	CHIP C 2.5PF B		C242			CC73HCH1H060B	CHIP C 6.0PF B	AK,AP,UK
C170			CC73GCH1H101J	CHIP C 100PF J		C242			CC73HCH1H060B	CHIP C 6.0PF B	BM,AM
C172			CC73GCH1H010B	CHIP C 1.0PF B	BM3	C242			CC73HCH1H080B	CHIP C 8.0PF B	BM3
C172			CC73GCH1H030B	CHIP C 3.0PF B	AK,AP,UK	C243			CK73HB1H471K	CHIP C 470PF K	
C172			CC73GCH1H030B	CHIP C 3.0PF B	BM,AM	C244			CC73HCH1H220J	CHIP C 22PF J	AK,AP,UK
C173			CC73GCH1H0R5B	CHIP C 0.5PF B		C244			CC73HCH1H220J	CHIP C 22PF J	BM,AM
C174			CC73GCH1H050B	CHIP C 5.0PF B	AK,AP,UK	C244			CC73HCH1H270J	CHIP C 27PF J	BM3
C174			CC73GCH1H050B	CHIP C 5.0PF B	BM,AM	C245			CC73HCH1H010B	CHIP C 1.0PF B	
C174			CC73GCH1H100C	CHIP C 10PF C	BM3	C246			CK73HB1H471K	CHIP C 470PF K	
C175			CC73GCH1H020B	CHIP C 2.0PF B	AK,AP,UK	C247			CC73HCH1H020B	CHIP C 2.0PF B	AK,AP,UK
C175			CC73GCH1H020B	CHIP C 2.0PF B	BM,AM	C247			CC73HCH1H020B	CHIP C 2.0PF B	BM,AM
C176			CC73GCH1H050B	CHIP C 5.0PF B	AK,AP,UK	C247			CC73HCH1H040B	CHIP C 4.0PF B	BM3
C176			CC73GCH1H050B	CHIP C 5.0PF B	BM,AM	C248			CC73HCH1H220J	CHIP C 22PF J	AK,AP,UK
C176			CC73GCH1H100C	CHIP C 10PF C	BM3	C248			CC73HCH1H220J	CHIP C 22PF J	BM,AM
C177			CC73GCH1H0R3B	CHIP C 0.3PF B	BM3	C248			CC73HCH1H270J	CHIP C 27PF J	BM3
C177			CC73GCH1H020B	CHIP C 2.0PF B	AK,AP,UK	C249			CC73GCH1H040B	CHIP C 4.0PF B	AK,AP,UK
C177			CC73GCH1H020B	CHIP C 2.0PF B	BM,AM	C249			CC73GCH1H040B	CHIP C 4.0PF B	BM,AM
C178			CC73GCH1H030B	CHIP C 3.0PF B	AK,AP,UK	C249			CC73GCH1H080B	CHIP C 8.0PF B	BM3
C178			CC73GCH1H030B	CHIP C 3.0PF B	BM,AM	C250			CK73HB1H471K	CHIP C 470PF K	
C178			CC73GCH1H060B	CHIP C 6.0PF B	BM3	C252-254			CK73HB1H471K	CHIP C 470PF K	
C201			CK73GB1C224K	CHIP C 0.22UF K		C256			CK73HB1H471K	CHIP C 470PF K	
C202			CK73FB0J106K	CHIP C 10UF K		C257			CC73HCH1H080B	CHIP C 8.0PF B	BM3
C203			CK73HB1E103K	CHIP C 0.010UF K		C257			CC73HCH1H3R5B	CHIP C 3.5PF B	AK,AP,UK
C204			CK73HB1H102K	CHIP C 1000PF K		C257			CC73HCH1H3R5B	CHIP C 3.5PF B	BM,AM
C205			CK73HB1H182K	CHIP C 1800PF K		C258			CC73HCH1H220J	CHIP C 22PF J	
C206,207			CK73HB1H561K	CHIP C 560PF K		C259			CC73HCH1H020B	CHIP C 2.0PF B	AK,AP,UK
C208			CK73HB1A104K	CHIP C 0.10UF K		C259			CC73HCH1H020B	CHIP C 2.0PF B	BM,AM
C209			CC73HCH1H680J	CHIP C 68PF J		C259			CC73HCH1H1R5B	CHIP C 1.5PF B	BM3
C210-213			CK73HB1A104K	CHIP C 0.10UF K		C260			CK73HB1H471K	CHIP C 470PF K	
C214			CC73HCH1H020B	CHIP C 2.0PF B		C261			CC73HCH1H020B	CHIP C 2.0PF B	BM3
C215,216			CK73HB1E103K	CHIP C 0.010UF K		C261			CC73HCH1H030B	CHIP C 3.0PF B	AK,AP,UK
C219			CC73HCH1H010B	CHIP C 1.0PF B		C261			CC73HCH1H030B	CHIP C 3.0PF B	BM,AM
C220			CC73HCH1H180J	CHIP C 18PF J		C262			CC73HCH1H220J	CHIP C 22PF J	
C222			CK73HB1H471K	CHIP C 470PF K		C263			CC73HCH1H010B	CHIP C 1.0PF B	AK,AP,UK
C223			CK73HB1E103K	CHIP C 0.010UF K		C263			CC73HCH1H010B	CHIP C 1.0PF B	BM,AM
C224			CK73HB1A104K	CHIP C 0.10UF K		C263			CC73HCH1H060B	CHIP C 6.0PF B	BM3
C225			CK73HB1E103K	CHIP C 0.010UF K		C264			CC73HCH1H020B	CHIP C 2.0PF B	BM3
C226			CK73HB1H471K	CHIP C 470PF K		C264			CC73HCH1H3R5B	CHIP C 3.5PF B	AK,AP,UK
C227			CC73HCH1H180J	CHIP C 18PF J		C264			CC73HCH1H3R5B	CHIP C 3.5PF B	BM,AM
C228			CK73HB1H471K	CHIP C 470PF K		C265			CC73HCH1H030B	CHIP C 3.0PF B	AK,AP,UK
C230			CK73HB1E103K	CHIP C 0.010UF K		C265			CC73HCH1H030B	CHIP C 3.0PF B	BM,AM
C231			CK73HB1H102K	CHIP C 1000PF K	BM3	C265			CC73HCH1H050B	CHIP C 5.0PF B	BM3
C231			CK73HB1H471K	CHIP C 470PF K	AK,AP,UK	C266			CC73HCH1H050B	CHIP C 5.0PF B	AK,AP,UK
C231			CK73HB1H471K	CHIP C 470PF K	BM,AM	C266			CC73HCH1H050B	CHIP C 5.0PF B	BM,AM
C232			CC73HCH1H3R5B	CHIP C 3.5PF B		C266			CC73HCH1H070B	CHIP C 7.0PF B	BM3
C233			CC73HCH1H060B	CHIP C 6.0PF B		C290			CC73HCH1H020B	CHIP C 2.0PF B	
C234			CK73HB1H471K	CHIP C 470PF K		C291			CC73HCH1H060B	CHIP C 6.0PF B	

## PARTS LIST

TX-RX UNIT (X57-7580-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C303			CC73HCH1H101J	CHIP C 100PF J		C399			CC73HCH1H101J	CHIP C 100PF J	
C304			CK73HB1A104K	CHIP C 0.10UF K		C400			CK73FB0J106K	CHIP C 10UF K	
C305			CC73HCH1H101J	CHIP C 100PF J		C402			CK73HB1A104K	CHIP C 0.10UF K	
C306			CK73GB1A105K	CHIP C 1.0UF K		C403			CK73HB1A473J	CHIP C 0.047UF J	
C307			CC73HCH1H101J	CHIP C 100PF J		C404			CS77CC0J101M	CHIP TNL 100UF 6.3VW	
C310			CK73GB1A105K	CHIP C 1.0UF K		C405			CC73HCH1H221J	CHIP C 220PF J	
C311			CC73HCH1H101J	CHIP C 100PF J		C408,409			CK73HB1H471K	CHIP C 470PF K	AK,AP,UK
C312			CK73HB1H471K	CHIP C 470PF K		C411			CK73HB1H471K	CHIP C 470PF K	BM,AM
C313			CC73HCH1H101J	CHIP C 100PF J		C411			CK73HB1H471K	CHIP C 470PF K	
C315			CC73HCH1H101J	CHIP C 100PF J		C413-415			CK73HB1H471K	CHIP C 470PF K	
C316			CK73HB1H471K	CHIP C 470PF K		TC1,2			C05-0384-05	CERAMIC TRIMMER CAP (10PF)	
C318			CK73HB1E103K	CHIP C 0.010UF K		CN301			E40-6573-05	FLAT CABLE CONNECTOR	
C319			CK73HB1H102K	CHIP C 1000PF K		J301			E11-0703-05	PHONE JACK (2.5/3.5)	
C320			CC73HCH1H101J	CHIP C 100PF J		F301			F53-0324-05	FUSE (2.5A)	
C321			CK73GB1A105K	CHIP C 1.0UF K		101	2A		J30-1282-14	SPACER	
C322			CC73HCH1H101J	CHIP C 100PF J		CD201			L79-1866-05	TUNING COIL	
C323			CK73GB1A105K	CHIP C 1.0UF K		CF201	2A		L72-0973-05	CERAMIC FILTER	
C325			CC73HCH1H101J	CHIP C 100PF J		L1			L92-0138-05	CHIP FERRITE	
C327			CK73HB1H471K	CHIP C 470PF K		L2			L40-4791-86	SMALL FIXED INDUCTOR (4.7UH)	
C331			CK73HB1A104K	CHIP C 0.10UF K		L4			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)	
C332			CC73HCH1H050B	CHIP C 5.0PF B		L6			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)	
C334			CK73HB1E103K	CHIP C 0.010UF K		L7			L92-0138-05	CHIP FERRITE	
C335			CK73FB0J106K	CHIP C 10UF K		L8			L40-1875-71	SMALL FIXED INDUCTOR (18NH)	
C337			CC73HCH1H050B	CHIP C 5.0PF B		L9			L92-0470-05	CHIP FERRITE	
C339			CK73GB1A105K	CHIP C 1.0UF K		L10,11			L40-1885-92	SMALL FIXED INDUCTOR (180NH)	
C341			CK73HB1H471K	CHIP C 470PF K		L12			L40-1875-71	SMALL FIXED INDUCTOR (18NH)	
C353,354			CK73HB1E103K	CHIP C 0.010UF K		L13,14			L40-1885-92	SMALL FIXED INDUCTOR (180NH)	
C355			CK73HB1E103K	CHIP C 0.010UF K		L15			L40-2778-67	SMALL FIXED INDUCTOR (27NH)	
C356			CK73HB1H102K	CHIP C 1000PF K		L16			L40-1878-67	SMALL FIXED INDUCTOR (18NH)	AK,AP,UK
C358			CK73GB1C224K	CHIP C 0.22UF K		L16			L40-1878-67	SMALL FIXED INDUCTOR (18NH)	BM,AM
C359			CK73FB0J106K	CHIP C 10UF K		L16			L40-2278-67	SMALL FIXED INDUCTOR (22NH)	BM3
C360			CK73HB1A104K	CHIP C 0.10UF K		L17,18			L41-2785-45	SMALL FIXED INDUCTOR (270NH)	
C361			CK73GB1A105K	CHIP C 1.0UF K		L19,20			L40-1885-92	SMALL FIXED INDUCTOR (180NH)	
C362			CK73HB1H471K	CHIP C 470PF K		L21			L92-0138-05	CHIP FERRITE	
C363			CC73HCH1H820J	CHIP C 82PF J		L22,23			L40-2275-71	SMALL FIXED INDUCTOR (22NH)	
C364			CC73HCH1H120J	CHIP C 12PF J		L101			L40-1875-71	SMALL FIXED INDUCTOR (18NH)	
C365			CC73HCH1H820J	CHIP C 82PF J		L102			L40-2775-71	SMALL FIXED INDUCTOR (27NH)	BM3
C366			CK73HB1A104K	CHIP C 0.10UF K		L102			L40-3975-71	SMALL FIXED INDUCTOR (39NH)	AK,AP,UK
C367			CK73GB1A105K	CHIP C 1.0UF K		L102			L40-3975-71	SMALL FIXED INDUCTOR (39NH)	BM,AM
C368			CK73HB1H271K	CHIP C 270PF K		L103			L40-1575-71	SMALL FIXED INDUCTOR (15NH)	AK,AP,UK
C369,370			CK73HB1A104K	CHIP C 0.10UF K		L103			L40-1875-71	SMALL FIXED INDUCTOR (18NH)	BM,AM
C371			CK73FB0J106K	CHIP C 10UF K		L104			L40-8265-71	SMALL FIXED INDUCTOR (8.2NH)	BM3
C372			CK73HB1H471K	CHIP C 470PF K		L105	*		L41-2278-45	SMALL FIXED INDUCTOR (22NH)	AK,AP,UK
C373			CC73HCH1H121J	CHIP C 120PF J		L105	*		L41-2278-45	SMALL FIXED INDUCTOR (22NH)	BM,AM
C374			CK73HB1H102K	CHIP C 1000PF K		L105			L41-4765-45	SMALL FIXED INDUCTOR (4.7NH)	BM3
C375,376			CK73HB1H471K	CHIP C 470PF K		L106	*		L92-0472-05	CHIP FERRITE	BM3
C377			CK73HB1A683K	CHIP C 0.068UF K		L107			L40-2263-92	SMALL FIXED INDUCTOR (2.2NH)	BM3
C378			CC73HCH1H820J	CHIP C 82PF J		L107			L40-2763-92	SMALL FIXED INDUCTOR (2.7NH)	AK,AP,UK
C379,380			CK73GB1A105K	CHIP C 1.0UF K		L107			L40-2763-92	SMALL FIXED INDUCTOR (2.7NH)	BM,AM
C381			CK73HB1H391K	CHIP C 390PF K		L108			L34-4603-15	AIR-CORE COIL	
C382			CK73HB1C153K	CHIP C 0.015UF K		L109	*		L92-0472-05	CHIP FERRITE	
C383-385			CK73HB1A104K	CHIP C 0.10UF K		L111			L41-2785-45	SMALL FIXED INDUCTOR (270NH)	
C386			CK73HB1E103K	CHIP C 0.010UF K		L112			L34-4572-05	AIR-CORE COIL	
C388,389			CK73HB1H471K	CHIP C 470PF K		L113-115			L34-4564-05	AIR-CORE COIL	
C390,391			CK73GB1A105K	CHIP C 1.0UF K		L116			L41-1092-44	SMALL FIXED INDUCTOR (1UH)	
C392			CK73HB1A473K	CHIP C 0.047UF K		L201			L40-1091-86	SMALL FIXED INDUCTOR (1.0UH)	
C393			CK73FB0J106K	CHIP C 10UF K							
C395			CC73HCH1H221J	CHIP C 220PF J							
C396			CK73HB1A104K	CHIP C 0.10UF K							
C397			CK73GB1C474K	CHIP C 0.47UF K							

AK: TK-3302 K AP: TK-3302 P UK: TK-3302(U) K  
 AM: TK-3302 M BM: TK-3306 M BM3: TK-3306 M3

If a part reference number is listed in a shaded box, that part does not come with the PCB.

## PARTS LIST

## TX-RX UNIT (X57-7580-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L202			L92-0138-05	CHIP FERRITE		R32			RK73HB1J394J	CHIP R 390K J 1/16W	BM3
L203			L41-5685-39	SMALL FIXED INDUCTOR (0.56UH)		R32			RK73HB1J474J	CHIP R 470K J 1/16W	AK,AP,UK
L204			L40-1885-92	SMALL FIXED INDUCTOR (180NH)		R32			RK73HB1J474J	CHIP R 470K J 1/16W	BM,AM
L205			L40-2775-71	SMALL FIXED INDUCTOR (27NH)	AK,AP,UK	R33			RK73HB1J100J	CHIP R 10 J 1/16W	BM3
L205			L40-2775-71	SMALL FIXED INDUCTOR (27NH)	BM,AM	R33			RK73HB1J101J	CHIP R 100 J 1/16W	AK,AP,UK
L205			L40-3375-71	SMALL FIXED INDUCTOR (33NH)	BM3	R33			RK73HB1J101J	CHIP R 100 J 1/16W	BM,AM
L206,207			L41-8268-14	SMALL FIXED INDUCTOR (8.2NH)		R34			RK73HB1J181J	CHIP R 180 J 1/16W	
L208			L92-0138-05	CHIP FERRITE		R35,36			RK73HB1J101J	CHIP R 100 J 1/16W	
L209			L41-8268-14	SMALL FIXED INDUCTOR (8.2NH)		R37			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L210			L41-2785-45	SMALL FIXED INDUCTOR (270NH)		R38			RK73HB1J154J	CHIP R 150K J 1/16W	
L212,213			L41-8268-14	SMALL FIXED INDUCTOR (8.2NH)		R39			RK73HB1J101J	CHIP R 100 J 1/16W	
L214			L41-4775-45	SMALL FIXED INDUCTOR (47NH)		R40			RK73HB1J472J	CHIP R 4.7K J 1/16W	AK,AP,UK
L250			L40-1875-71	SMALL FIXED INDUCTOR (18NH)		R40			RK73HB1J472J	CHIP R 4.7K J 1/16W	BM,AM
L301		*	L92-0472-05	CHIP FERRITE		R41			RK73HB1J562J	CHIP R 5.6K J 1/16W	
L302-304			L92-0138-05	CHIP FERRITE		R42			RK73HB1J220J	CHIP R 22 J 1/16W	
L305			L92-0140-05	CHIP FERRITE		R43			RK73HB1J471J	CHIP R 470 J 1/16W	
X1		*	L77-3042-05	TCXO (12.8MHZ)		R45			RK73HB1J562J	CHIP R 5.6K J 1/16W	
X301		*	L78-1433-05	RESONATOR (14.746MHZ)		R101			RK73HB1J332J	CHIP R 3.3K J 1/16W	
XF201			L71-0619-05	MCF (38.85MHZ/6.5KH)		R102			RK73HB1J273J	CHIP R 27K J 1/16W	
						R103			RK73HB1J331J	CHIP R 330 J 1/16W	
CP1			RK75HA1J101J	CHIP-COM 100 J 1/16W		R104			RK73HB1J390J	CHIP R 39 J 1/16W	BM3
CP201			RK75HA1J104J	CHIP-COM 100K J 1/16W		R104			RK73HB1J470J	CHIP R 47 J 1/16W	AK,AP,UK
CP202			RK75HA1J474J	CHIP-COM 470K J 1/16W		R104			RK73HB1J470J	CHIP R 47 J 1/16W	BM,AM
CP203			RK75HA1J104J	CHIP-COM 100K J 1/16W		R105			RK73HB1J183J	CHIP R 18K J 1/16W	BM3
CP204			RK75HA1J474J	CHIP-COM 470K J 1/16W		R105			RK73HB1J273J	CHIP R 27K J 1/16W	BM,AM
CP301,302			RK75HA1J473J	CHIP-COM 47K J 1/16W		R105			RK73HB1J333J	CHIP R 33K J 1/16W	AK,AP,UK
CP303,304			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R106			RK73HB1J331J	CHIP R 330 J 1/16W	
R1			RK73HB1J223J	CHIP R 22K J 1/16W		R106			RK73HB1J331J	CHIP R 330 J 1/16W	
R2			RK73HB1J103J	CHIP R 10K J 1/16W		R107			RK73HB1J390J	CHIP R 39 J 1/16W	BM3
R3			RK73HB1J154J	CHIP R 150K J 1/16W	BM3	R107			RK73HB1J560J	CHIP R 56 J 1/16W	AK,AP,UK
						R107			RK73HB1J560J	CHIP R 56 J 1/16W	BM,AM
R3			RK73HB1J184J	CHIP R 180K J 1/16W	AK,AP,UK	R109			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R3			RK73HB1J184J	CHIP R 180K J 1/16W	BM,AM	R111			RK73HB1J393J	CHIP R 39K J 1/16W	AK,AP,UK
R4			RK73HB1J563J	CHIP R 56K J 1/16W		R111			RK73HB1J393J	CHIP R 39K J 1/16W	BM,AM
R5			RK73HB1J104J	CHIP R 100K J 1/16W		R111			RK73HB1J473J	CHIP R 47K J 1/16W	BM3
R7			RK73HB1J000J	CHIP R 0.0 J 1/16W		R112			RK73HB1J220J	CHIP R 22 J 1/16W	
R8			RK73HB1J101J	CHIP R 100 J 1/16W		R113			RK73HB1J104J	CHIP R 100K J 1/16W	
R9			RK73HB1J821J	CHIP R 820 J 1/16W		R114			RK73HB1J822J	CHIP R 8.2K J 1/16W	
R10			RK73HB1J000J	CHIP R 0.0 J 1/16W		R116			RK73HB1J331J	CHIP R 330 J 1/16W	AK,AP,UK
R11			RK73HB1J274J	CHIP R 270K J 1/16W		R116			RK73HB1J331J	CHIP R 330 J 1/16W	BM,AM
R12			RK73HB1J221J	CHIP R 220 J 1/16W		R118			RK73HB1J331J	CHIP R 330 J 1/16W	BM3
R13			RK73HB1J101J	CHIP R 100 J 1/16W		R119			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R14			RK73HB1J100J	CHIP R 10 J 1/16W		R120			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R15			RK73HB1J561J	CHIP R 560 J 1/16W		R121			RK73HB1J103J	CHIP R 10K J 1/16W	AK,AP,UK
R16			RK73HB1J000J	CHIP R 0.0 J 1/16W	AK,AP,UK	R121			RK73HB1J103J	CHIP R 10K J 1/16W	BM,AM
R16			RK73HB1J000J	CHIP R 0.0 J 1/16W	BM,AM	R121			RK73HB1J153J	CHIP R 15K J 1/16W	BM3
R16			RK73HB1J181J	CHIP R 180 J 1/16W	BM3	R122			RK73HB1J273J	CHIP R 27K J 1/16W	AK,AP,UK
R17			RK73HB1J122J	CHIP R 1.2K J 1/16W	BM3	R122			RK73HB1J273J	CHIP R 27K J 1/16W	BM,AM
R17			RK73HB1J182J	CHIP R 1.8K J 1/16W	AK,AP,UK	R122			RK73HB1J683J	CHIP R 68K J 1/16W	BM3
R17			RK73HB1J182J	CHIP R 1.8K J 1/16W	BM,AM	R123			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R18			RK73HB1J681J	CHIP R 680 J 1/16W		R124			RK73HB1J101J	CHIP R 100 J 1/16W	BM3
R19			RK73HB1J223J	CHIP R 22K J 1/16W		R124			RK73HB1J220J	CHIP R 22 J 1/16W	AK,AP,UK
R20			RK73HB1J000J	CHIP R 0.0 J 1/16W		R124			RK73HB1J220J	CHIP R 22 J 1/16W	BM,AM
R21,22			RK73HB1J103J	CHIP R 10K J 1/16W		R125			RK73HB1J683J	CHIP R 68K J 1/16W	
R23			RK73HB1J470J	CHIP R 47 J 1/16W	BM3	R126			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R26			RK73HB1J333J	CHIP R 33K J 1/16W		R127,128			RK73GH2A154D	CHIP R 150K D 1/10W	
R27			RK73HB1J684J	CHIP R 680K J 1/16W		R129,130			RK73GH2A334D	CHIP R 330K D 1/10W	
R28			RK73HB1J102J	CHIP R 1.0K J 1/16W		R131			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R29			RK73HB1J154J	CHIP R 150K J 1/16W		R132			RK73HB1J473J	CHIP R 47K J 1/16W	
R30			RK73HB1J273J	CHIP R 27K J 1/16W		R133			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R31			RK73HB1J274J	CHIP R 270K J 1/16W		R134			RK73HB1J563J	CHIP R 56K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-7580-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R135			RK73HB1J104J	CHIP R 100K J 1/16W	BM3	R321			RK73HB1J103J	CHIP R 10K J 1/16W	
R135			RK73HB1J184J	CHIP R 180K J 1/16W	AK,AP,UK	R322,323			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R135			RK73HB1J184J	CHIP R 180K J 1/16W	BM,AM	R324,325			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R136			RK73HB1J474J	CHIP R 470K J 1/16W		R340-342			RK73HB1J103J	CHIP R 10K J 1/16W	
R137			RK73FB2B000J	CHIP R 0.0 J 1/8W		R344			RK73HB1J474J	CHIP R 470K J 1/16W	
R138			RK73GB2A151J	CHIP R 150 J 1/10W		R345			RK73HB1J273J	CHIP R 27K J 1/16W	
R140			RK73GB2A000J	CHIP R 0.0 J 1/10W		R347			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R141			RK73HB1J000J	CHIP R 0.0 J 1/16W		R348			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R201			RK73HB1J184J	CHIP R 180K J 1/16W	BM3	R349			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R201			RK73HB1J823J	CHIP R 82K J 1/16W	AK,AP,UK	R350			RK73HB1J124J	CHIP R 120K J 1/16W	
R201			RK73HB1J823J	CHIP R 82K J 1/16W	BM,AM	R351			RK73HB1J334J	CHIP R 330K J 1/16W	
R203			RK73HB1J472J	CHIP R 4.7K J 1/16W		R352			RK73HB1J154J	CHIP R 150K J 1/16W	
R204			RK73HB1J100J	CHIP R 10 J 1/16W		R353			RK73HB1J123J	CHIP R 12K J 1/16W	
R205			RK73HB1J823J	CHIP R 82K J 1/16W		R354			RK73HB1J334J	CHIP R 330K J 1/16W	
R206			RK73HB1J272J	CHIP R 2.7K J 1/16W		R355			RK73HB1J124J	CHIP R 120K J 1/16W	
R207			RK73HB1J332J	CHIP R 3.3K J 1/16W		R356			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R208			RK73HB1J823J	CHIP R 82K J 1/16W		R357			RK73HB1J563J	CHIP R 56K J 1/16W	
R209			RK73HB1J332J	CHIP R 3.3K J 1/16W		R358			RK73HB1J474J	CHIP R 470K J 1/16W	
R210			RK73HB1J392J	CHIP R 3.9K J 1/16W	AK,AP,UK	R359			RK73HB1J473J	CHIP R 47K J 1/16W	
R210			RK73HB1J392J	CHIP R 3.9K J 1/16W	BM,AM	R360			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R210			RK73HB1J472J	CHIP R 4.7K J 1/16W	BM3	R361			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R211			RK73HB1J101J	CHIP R 100 J 1/16W		R362			RK73HB1J184J	CHIP R 180K J 1/16W	
R212			RK73HB1J224J	CHIP R 220K J 1/16W		R363,364			RK73HB1J104J	CHIP R 100K J 1/16W	
R213			RK73HB1J391J	CHIP R 390 J 1/16W		R365			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R214			RK73HB1J331J	CHIP R 330 J 1/16W		R366			RK73HB1J154J	CHIP R 150K J 1/16W	
R215			RK73HB1J222J	CHIP R 2.2K J 1/16W		R367			RK73HB1J393J	CHIP R 39K J 1/16W	
R216			RK73HB1J151J	CHIP R 150 J 1/16W		R368			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R217			RK73HB1J332J	CHIP R 3.3K J 1/16W		R369			RK73HB1J823J	CHIP R 82K J 1/16W	
R218			RK73HB1J823J	CHIP R 82K J 1/16W	BM3	R370			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R218,219			RK73HB1J563J	CHIP R 56K J 1/16W	AK,AP,UK	R371			RK73HB1J272J	CHIP R 2.7K J 1/16W	
R218,219			RK73HB1J563J	CHIP R 56K J 1/16W	BM,AM	R372			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R219			RK73HB1J563J	CHIP R 56K J 1/16W	BM3	R373			RK73HB1J224J	CHIP R 220K J 1/16W	
R220			RK73HB1J000J	CHIP R 0.0 J 1/16W		R374			RK73HB1J153J	CHIP R 15K J 1/16W	
R221			RK73HB1J105J	CHIP R 1.0M J 1/16W		R375			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R222			RK73HB1J150J	CHIP R 15 J 1/16W	BM3	R376			RK73HB1J471J	CHIP R 470 J 1/16W	
R222			RK73HB1J220J	CHIP R 22 J 1/16W	AK,AP,UK	R377			RK73HB1J473J	CHIP R 47K J 1/16W	
R222			RK73HB1J220J	CHIP R 22 J 1/16W	BM,AM	R378			RK73HB1J561J	CHIP R 560 J 1/16W	
R223			RK73HB1J121J	CHIP R 120 J 1/16W	BM3	R379			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R223			RK73HB1J221J	CHIP R 220 J 1/16W	AK,AP,UK	R380			RK73HB1J474J	CHIP R 470K J 1/16W	
R223			RK73HB1J221J	CHIP R 220 J 1/16W	BM,AM	R381			RK73HB1J151J	CHIP R 150 J 1/16W	
R225			RK73HB1J683J	CHIP R 68K J 1/16W		R383			RK73HB1J563J	CHIP R 56K J 1/16W	
R226			RK73HB1J000J	CHIP R 0.0 J 1/16W		R384			RK73HB1J333J	CHIP R 33K J 1/16W	
R227			RK73FB2B000J	CHIP R 0.0 J 1/8W		R385			RK73GB2A101J	CHIP R 100 J 1/10W	
R228			RK73HB1J102J	CHIP R 1.0K J 1/16W		R387			RK73HB1J104J	CHIP R 100K J 1/16W	
R301			RK73HH1J474D	CHIP R 470K D 1/16W		R388			RK73HB1J101J	CHIP R 100 J 1/16W	
R302			RK73GB2A000J	CHIP R 0.0 J 1/10W		R389			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R303			RK73HB1J101J	CHIP R 100 J 1/16W		R390			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R304			RK73HB1J334J	CHIP R 330K J 1/16W		R391			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R305			RK73HH1J474D	CHIP R 470K D 1/16W		R393			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R306			RK73HB1J184J	CHIP R 180K J 1/16W		R394			RK73HB1J473J	CHIP R 47K J 1/16W	
R307			RK73GB2A271J	CHIP R 270 J 1/10W		R398			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R308			RK73GB2A221J	CHIP R 220 J 1/10W		VR1			R32-0736-05	SEMI FIXED VARIABLE RESISTOR	
R309,310			RK73GB2A000J	CHIP R 0.0 J 1/10W		S1-S3			S70-0414-05	TACT SWITCH	
R313			RK73HB1J102J	CHIP R 1.0K J 1/16W		MIC301	2A		T91-0651-15	MIC ELEMENT (ECM)	
R314,315			RK73HB1J103J	CHIP R 10K J 1/16W		D3,4			1SV325F	VARIABLE CAPACITANCE DIODE	
R316			RK73HB1J222J	CHIP R 2.2K J 1/16W		D6			1SV325F	VARIABLE CAPACITANCE DIODE	
R317			RK73HB1J472J	CHIP R 4.7K J 1/16W		D8			1SV325F	VARIABLE CAPACITANCE DIODE	
R318			RK73HB1J182J	CHIP R 1.8K J 1/16W		D9			KDV214E-P	DIODE	
R319			RK73HB1J000J	CHIP R 0.0 J 1/16W							
R320			RK73HB1J123J	CHIP R 12K J 1/16W							

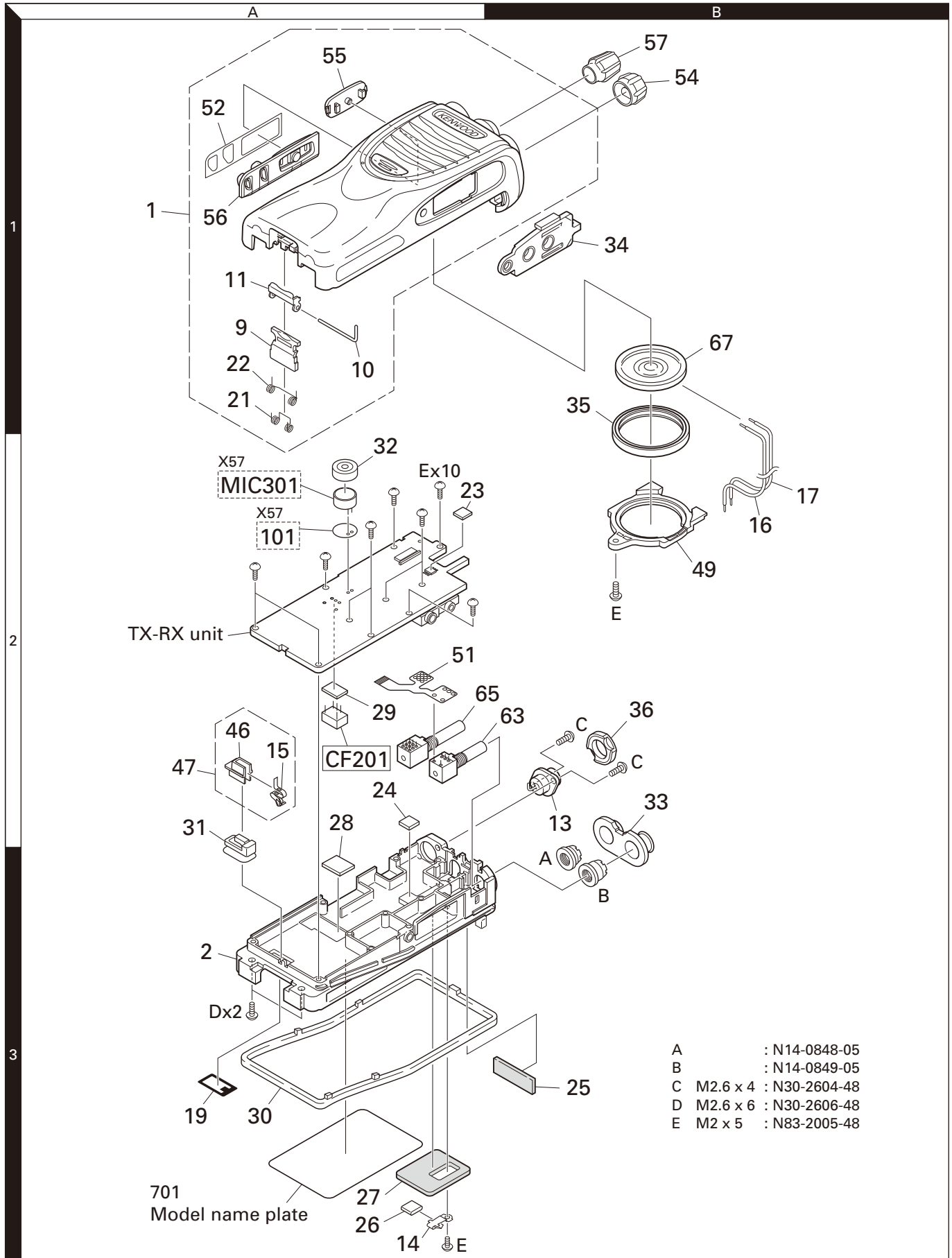
AK: TK-3302 K AP: TK-3302 P UK: TK-3302(U) K  
 AM: TK-3302 M BM: TK-3306 M BM3: TK-3306 M3

## PARTS LIST

## TX-RX UNIT (X57-7580-XX)

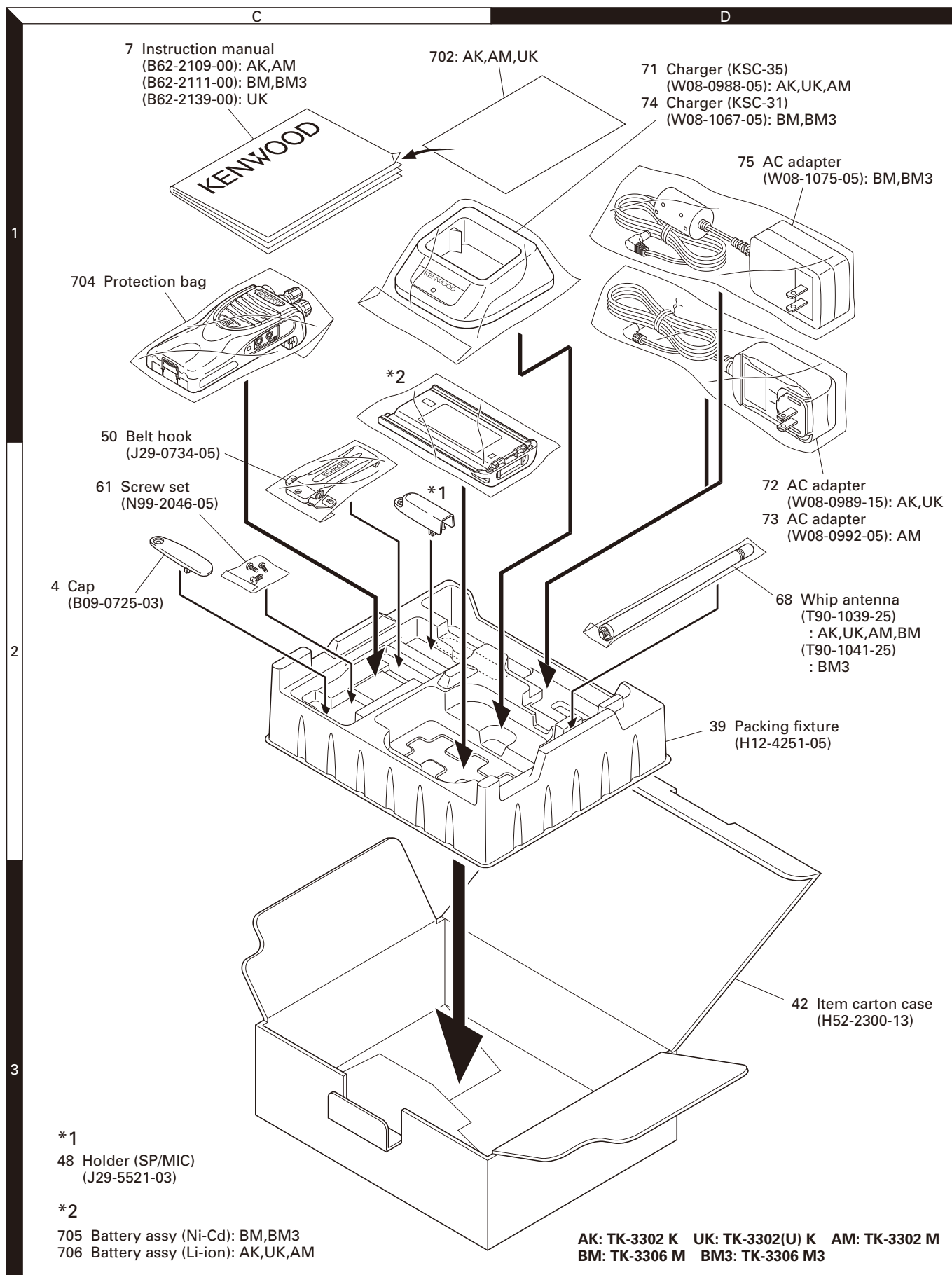
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
D10			MC2858	DIODE							
D101			UDZW5.1(B)	ZENER DIODE							
D103			HSC277	DIODE							
D104,105			HVC131	DIODE							
D201-205			HVC355B	VARIABLE CAPACITANCE DIODE							
D301			GN1G	DIODE							
D302		*	HRC0203C	DIODE							
D306		*	KDR731	DIODE							
D307			MC2850	DIODE							
D308,309		*	KDR731	DIODE							
IC1			MB15A02PFV2E1	MOS-IC							
IC101		*	BA2904FVM	MOS-IC							
IC201			TA31136FNG	MOS-IC							
IC301			BD4840FVE	MOS-IC							
IC303			XC6209B502PR	MOS-IC							
IC304		*	XC6209B502MR	MOS-IC							
IC305			BR24L16F-W	ROM IC							
IC306		*	R5F212CCKCMB	MICRO CONTROL UNIT							
IC308			AQUA-L	MOS-IC							
IC309			TA7368FG	MOS-IC							
Q1		*	KTC4075E(Y,GR)	TRANSISTOR							
Q2		*	2SC4774	TRANSISTOR							
Q3			2SC5636	TRANSISTOR							
Q4,5			2SK1875-F(V)	FET							
Q6		*	KTC4075E(Y,GR)	TRANSISTOR							
Q7,8			RT1P430U	TRANSISTOR							
Q9			2SC5636	TRANSISTOR							
Q10		*	KTC4075E(Y,GR)	TRANSISTOR							
Q11			2SC5636	TRANSISTOR							
Q101			2SC5636	TRANSISTOR							
Q102			2SC4926YD	TRANSISTOR							
Q103			RQA0004PXDQS	FET							
Q104			RT1N441U	TRANSISTOR	BM3						
Q106			RD07MVS1BT122	FET							
Q107			RT1N441U	TRANSISTOR							
Q108			2SK1824-A	FET							
Q109			RT1P441U	TRANSISTOR							
Q201			RT1P441U	TRANSISTOR							
Q202		*	2SC4774	TRANSISTOR							
Q203,204			3SK318	FET							
Q301,302			RT1N441U	TRANSISTOR							
Q303			RT1P141U	TRANSISTOR							
Q304		*	DTB723YE	DIGITAL TRANSISTOR							
Q305,306			2SC4919	TRANSISTOR							
Q307			RT1N441U	TRANSISTOR							
Q308		*	KTC4075E(Y,GR)	TRANSISTOR							
Q310			2SC4116(GR)F	TRANSISTOR							
Q311			2SA1586(Y,GR)F	TRANSISTOR							
Q312			RT1N441U	TRANSISTOR							
Q313		*	2SB1694	TRANSISTOR							
Q314			RT1N441U	TRANSISTOR							
Q315,316			2SK3577-A	FET							
TH101			B57331V2104J	THERMISTOR							
TH201			B57331V2104J	THERMISTOR							

## EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.  
 If a part reference number is listed in a box on the exploded view of the PCB, that part does not come with the PCB.  
 These parts must be ordered separately.

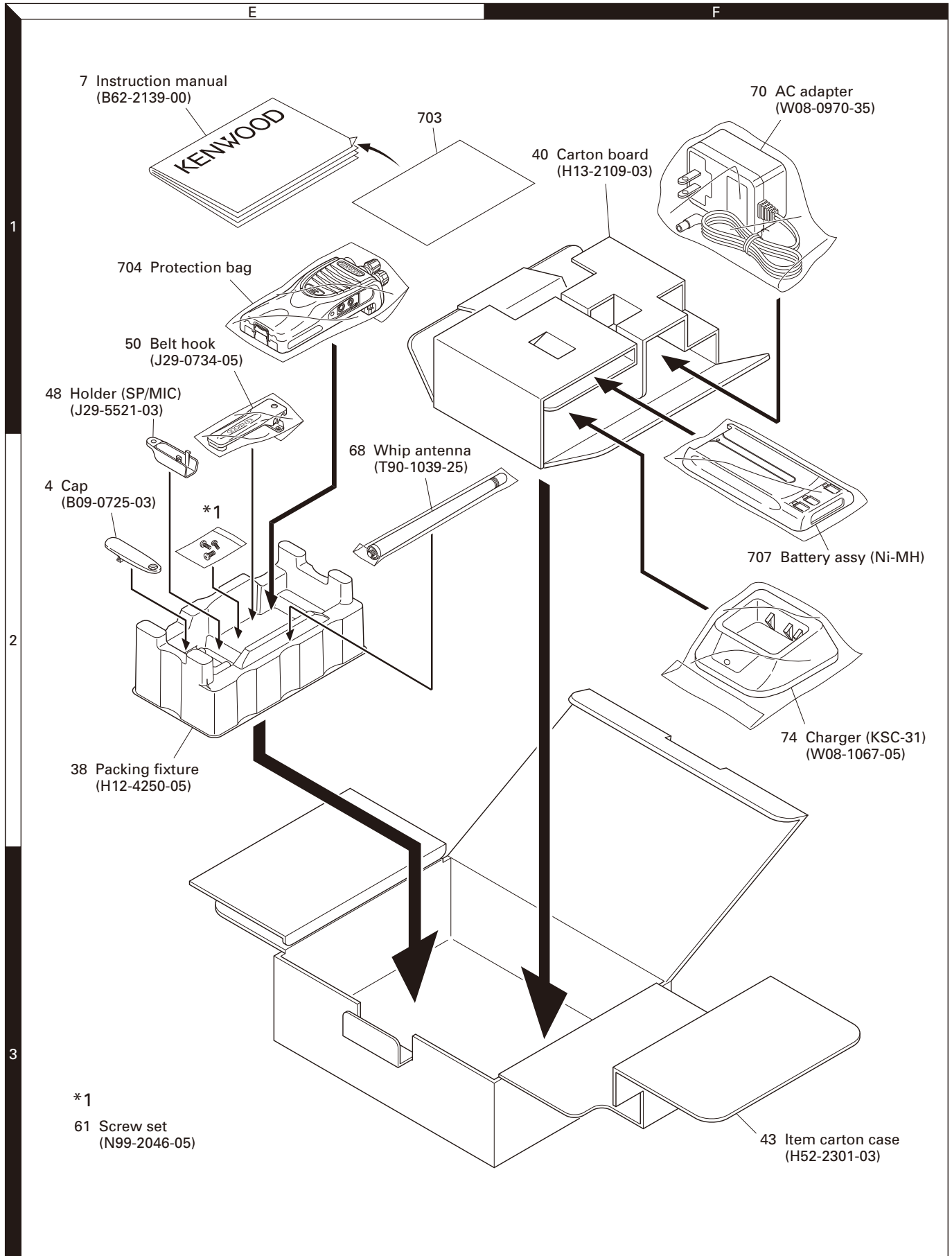
## PACKING (K,M TYPE)



AK: TK-3302 K UK: TK-3302(U) K AM: TK-3302 M  
BM: TK-3306 M BM3: TK-3306 M3



## PACKING (P TYPE)



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	Operational frequency range of the transceiver Frequency modulation and external modulation -127dBm/0.1 $\mu$ V to greater than -47dBm/1mV
2. RF Power Meter	Input Impedance Operation Frequency Measurement Range	50 $\Omega$ Operational frequency range of the transceiver Vicinity of 10W
3. Deviation Meter	Frequency Range	Operational frequency range of the transceiver
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. DC 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. 4 $\Omega$ Dummy Load		Approx. 4 $\Omega$ , 3W
14. Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped

#### ■ Antenna connector adapter

The antenna connector of this transceiver 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.)

#### ■ Repair Jig (Chassis)

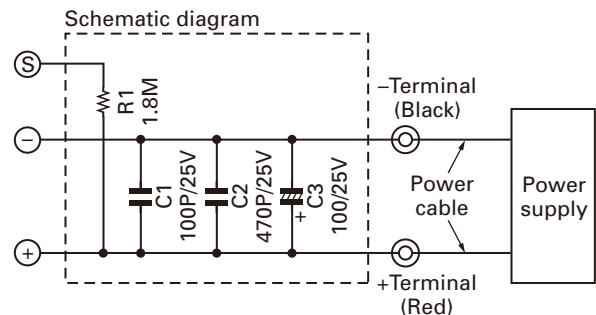
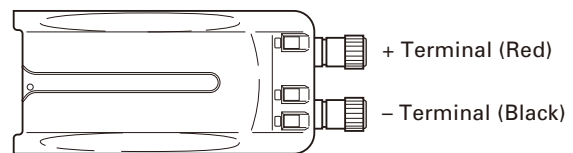
Use jig (part No.: A10-4215-03) for repairing the transceiver. Place the TX-RX unit on the jig and fit it with screws.

The jig facilitates the voltage check and protects the final amplifier FET when the voltage on the flow side of the TX-RX unit is checked during repairs.

#### ■ Battery Jig (W05-1011-00)

Connect the power cable properly between the battery jig installed in the transceiver and the power supply, and be sure output voltage and the power supply polarity prior to switching the power supply ON, otherwise over voltage and reverse connection may damage the transceiver, or the power supply or both.

**Note:** When using the battery jig, you must measure the voltage at the terminals of the battery jig. Otherwise, a slight voltage drop may occur within the power cable, between the power supply and the battery jig, especially while the transceiver transmits.



# ADJUSTMENT

## Frequency and Signaling

The transceiver 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 (MHz)

#### • TK-3302 K,M,P TK-3302(U) K TK-3306 M

Channel No.	RX Frequency	TX Frequency
1	470.050	470.100
2	450.050	450.100
3	489.950	489.900
4	470.000	470.000
5	470.200	470.200
6	470.400	470.400
7~16	-	-

#### • TK-3306 M3

Channel No.	RX Frequency	TX Frequency
1	415.050	415.100
2	400.050	400.100
3	429.950	429.900
4	415.000	415.000
5	415.200	415.200
6	415.400	415.400
7~16	-	-

### ■ Signaling

Signaling No.	RX	TX
1	None	None
2	None	100Hz Square Wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 250.3Hz	QT 250.3Hz
6	DQT D023N	DQT D023N
7	DQT D754I	DQT D754I
8	DTMF Decode [159D]	DTMF Encode [159D]
9	None	DTMF Tone 9

## 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	TK-3302 K,M,P	TK-3302(U) K	TK-3306 M
	RX		TX
Center	470.050MHz	470.100MHz	
Low	450.050MHz	450.100MHz	
High	489.950MHz	489.900MHz	
Low'	460.050MHz	460.100MHz	
High'	480.050MHz	480.100MHz	

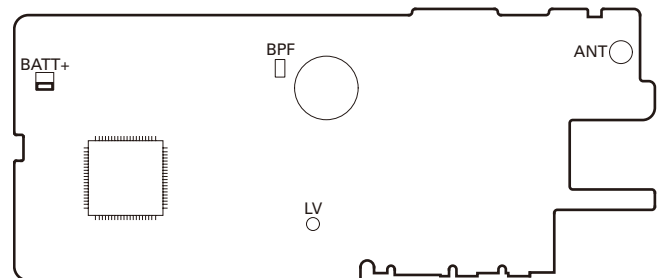
TEST CH	TK-3306 M3	
	RX	TX
Center	415.050MHz	415.100MHz
Low	400.050MHz	400.100MHz
High	429.950MHz	429.900MHz
Low'	407.550MHz	407.600MHz
High'	422.550MHz	422.600MHz

### ■ List of FPU for transceiver

Model	Type	FPU
TK-3302	K,M	KPG-118D(K)
TK-3302	P	KPG-119D(K)
TK-3302(U)	K	KPG-119D(K)
TK-3306	M,M3	KPG-118D(M)

## Adjustment Points

### ■ Component side view

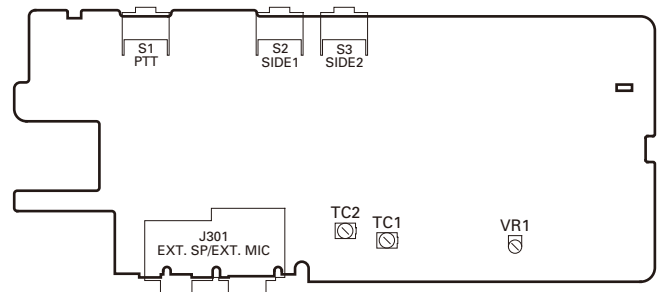


BPF: BPF Wave Adjust

LV (CV): VCO lock voltage

BATT+: Battery Warning Level

### ■ Foil side view

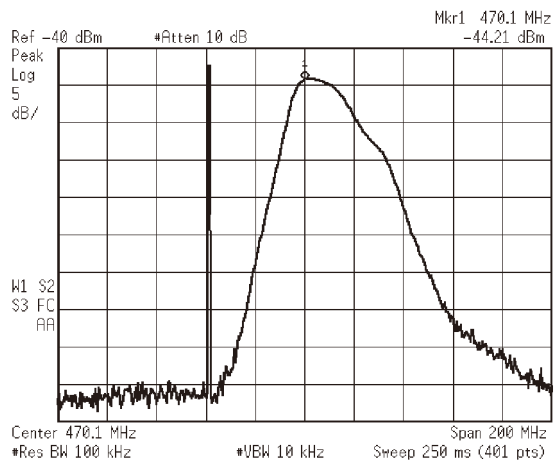


TC1 : VCO lock voltage (RX)

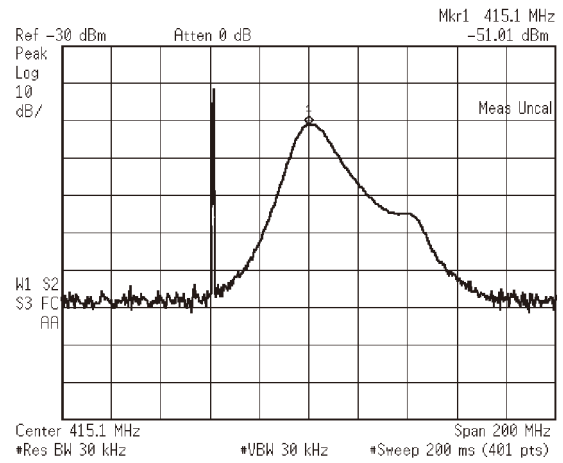
TC2 : VCO lock voltage (TX)

VR1 : Frequency adjustment

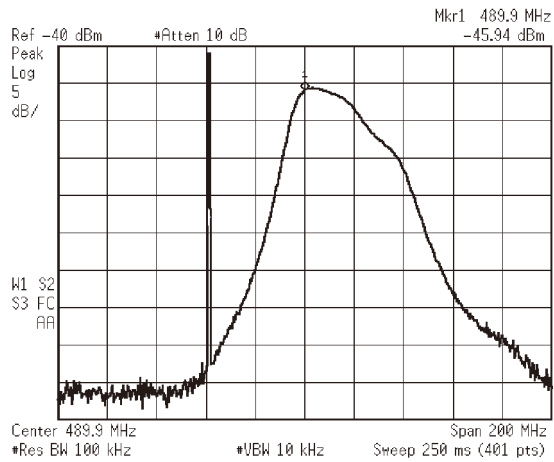
## ADJUSTMENT



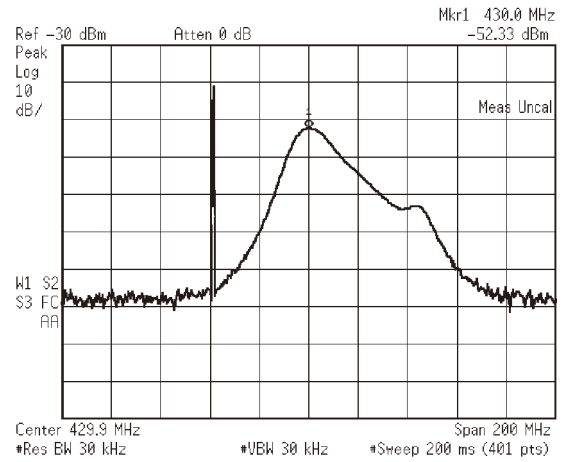
**Fig. 1 Center frequency: AK,AP,UK,AM,BM**



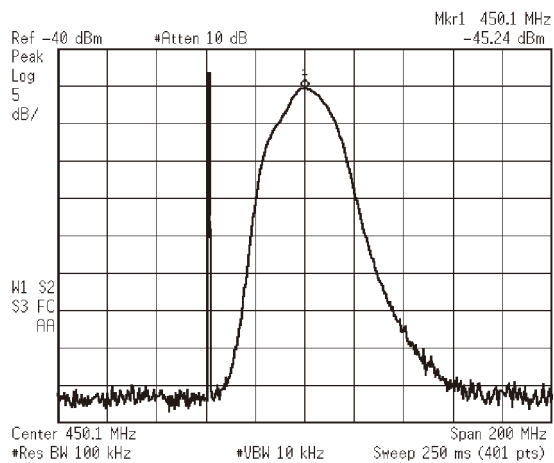
**Fig. 4 Center frequency: BM3**



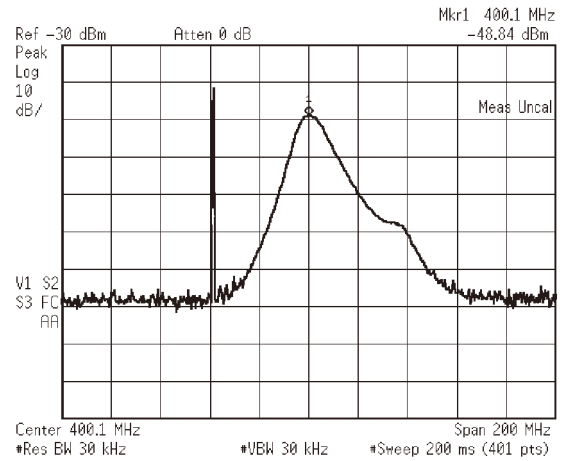
**Fig. 2 High-edge frequency: AK,AP,UK,AM,BM**



**Fig. 5 High-edge frequency: BM3**



**Fig. 3 Low-edge frequency: AK,AP,UK,AM,BM**



**Fig. 6 Low-edge frequency: BM3**


## ADJUSTMENT

## Common Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) BATT terminal vorage: 7.5V 2) SSG standard modulation [Wide] MOD: 1kHz, DEV: 3kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz							
2. VCO lock voltage RX	1) CH: High	Power meter DVM	TX-RX	ANT LV (CV)	TX-RX	TC1	3.4V <b>AK,AP,UK,AM, BM</b> 3.0V <b>BM3</b>	±0.1V
	2) CH: Low						Check	0.6V or more
3. VCO lock voltage TX	3) CH: High PTT: ON				TX-RX	TC2	3.1V <b>AK,AP,UK,AM, BM</b> 3.0V <b>BM3</b>	±0.1V
	4) CH: Low PTT: ON			Check			0.6V or more	

AK: TK-3302 K AP: TK-3302 P UK: TK-3302(U) K  
AM: TK-3302 M BM: TK-3306 M BM3: TK-3306 M3

## Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks	
		Test-equipment	Unit	Terminal	Unit	Parts	Method		
1. Frequency Adjust	1) CH: High PTT: ON	f. counter		ANT	TX-RX	VR1	High frequency	±50Hz	
2. High Transmit Power	1) TEST CH: Low, Low', Center, High', High (5 points) BATT terminal voltage: 7.5V PTT: ON	Power meter Ammeter				FPU		4.0W±0.1W 2.0A or less	
3. Low Transmit Power	1) TEST CH: Low, Low', Center, High', High (5 points) BATT terminal voltage: 7.5V PTT: ON							1.0W±0.1W 1.0A or less	
4. Maximum Deviation [Wide]	1) TEST CH: Center, Low, High (3 points) AG: 1kHz/150mV Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscilloscope  AG AF VTVM		ANT				4.4kHz (According to the lager +, -)	±80Hz
	[Narrow]			2) TEST CH: Center PTT: ON				SP/MIC connector	2.2kHz (According to the lager +, -)
5. DQT Balance [Wide]	1) TEST CH: Center, Low, High (3 points) Deviation meter filter LPF: 3kHz HPF: OFF PTT: ON							Make the demodulation wave into square waves.	
	[Narrow]							2) TEST CH: Center PTT: ON	

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. QT Fine Deviation [Wide]	1) TEST CH: Center, Low, High (3 points) Deviation meter filter LPF: 3kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscilloscope  AG AF VTVM		ANT		FPU	0.75kHz	±40Hz
	[Narrow]			2) TEST CH: Center PTT: ON			SP/MIC connector	
7. DQT Fine Deviation [Wide]	1) TEST CH: Center, Low, High (3 points) Deviation meter filter LPF: 3kHz HPF: OFF PTT: ON						0.75kHz	±40Hz
	[Narrow]						2) TEST CH: Center PTT: ON	
8. DTMF Fine Deviation [Wide]	1) TEST CH: Center Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON						3.0kHz	±100Hz
	[Narrow]						2) TEST CH: Center PTT: ON	
9. MSK Fine Deviation [Wide]	1) TEST CH: Center Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON						3.0kHz	±100Hz
	[Narrow]						2) TEST CH: Center PTT: ON	

## Receiver Section

AK: TK-3302 K AP: TK-3302 P UK: TK-3302(U) K  
AM: TK-3302 M BM: TK-3306 M BM3: TK-3306 M3

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. BPF Wave Adjust <b>AK,AP,UK,AM,BM</b>	1) Center frequency Spectrum analyzer setting Center-f: 470MHz Span: 200MHz RBW: 100kHz VBW: 10kHz ATT: 10dB 2) High-edge frequency Spectrum analyzer setting Center-f: 490MHz 3) Low-edge frequency Spectrum analyzer setting Center-f: 450MHz	S5G  Spectrum analyzer	TX-RX	ANT  BPF		FPU	Adjust the waveform as shown to the Fig. 1~3.	

## ADJUSTMENT

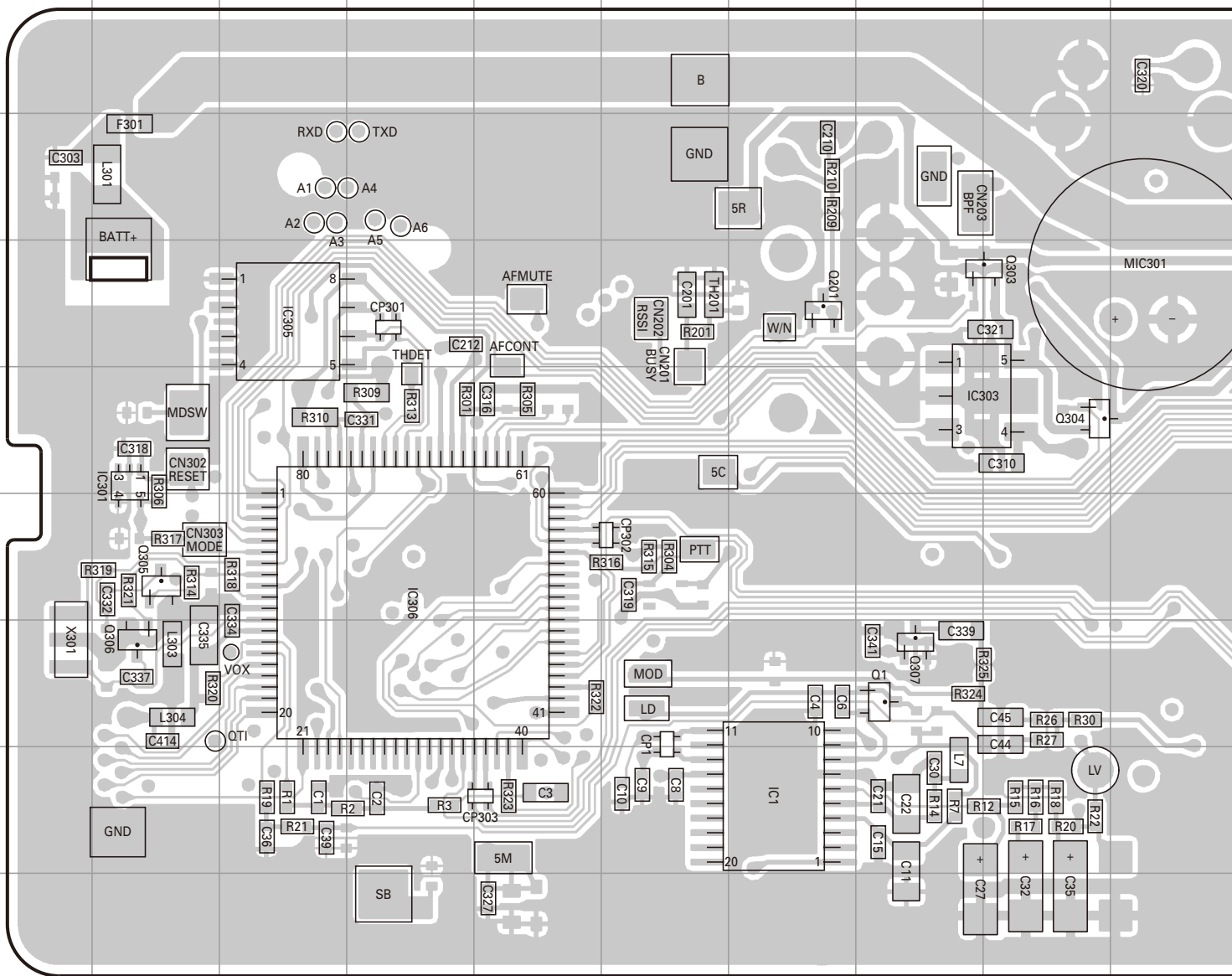
Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
<b>BM3</b>	1) Center frequency Spectrum analyzer setting Center-f: 415MHz Span: 200MHz RBW: 30kHz VBW: 30kHz ATT: 0dB 2) High-edge frequency Spectrum analyzer setting Center-f: 430MHz 3) Low-edge frequency Spectrum analyzer setting Center-f: 400MHz	SSG  Spectrum analyzer	TX-RX	ANT  BPF		FPU	Adjust the waveform as shown to the Fig. 4~6.	
2. Sensitivity [Wide]	1) TEST CH: Low, Center, High (3 points) SSG output : -117dBm (0.3μV) SSG MOD: 3.0kHz	SSG  DVM Oscilloscope AF VTVM		ANT  SP/MIC connector			Check	12dB SINAD or more
[Narrow]	2) TEST CH: Center SSG output : -115dBm (0.4μV) SSG MOD: 1.5kHz							
3. Squelch Open [Wide]	1) TEST CH: Center, Low, High (3 points) SSG output : -123dBm (0.16μV) SSG MOD: 3.0kHz					FPU	Write	
[Narrow]	2) TEST CH: Center SSG output : -122dBm (0.18μV) SSG MOD: 1.5kHz							
4. Squelch Tight [Wide]	1) TEST CH: Center, Low, High (3 points) SSG output : -117dBm (0.3μV) SSG MOD: 3.0kHz							
[Narrow]	2) TEST CH: Center SSG output : -116dBm (0.35μV) SSG MOD: 1.5kHz							
5. Battery Warning Level	1) BATT terminal voltage: 5.9V	SSG DVM	TX-RX	ANT BATT terminal			Write	BATT terminal voltage: 5.9V

# TK-3302/3302(U)/3306 PC BOARD

TX-RX UNIT (X57-7580-XX)

-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3

Component side view (J79-0187-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	9G	Q104	4M	Q304	6I	Q316	8O
IC101	4N	Q107	3M	Q305	7B	D101	4M
IC301	6B	Q108	3M	Q306	8B	D303	8S
IC303	6H	Q109	4M	Q307	8H	D304	8S
IC305	5C	Q201	5G	Q312	8P		
IC306	7D	Q301	6P	Q313	7P		
IC309	7O	Q302	6P	Q314	8O		
Q1	8H	Q303	5I	Q315	8O		

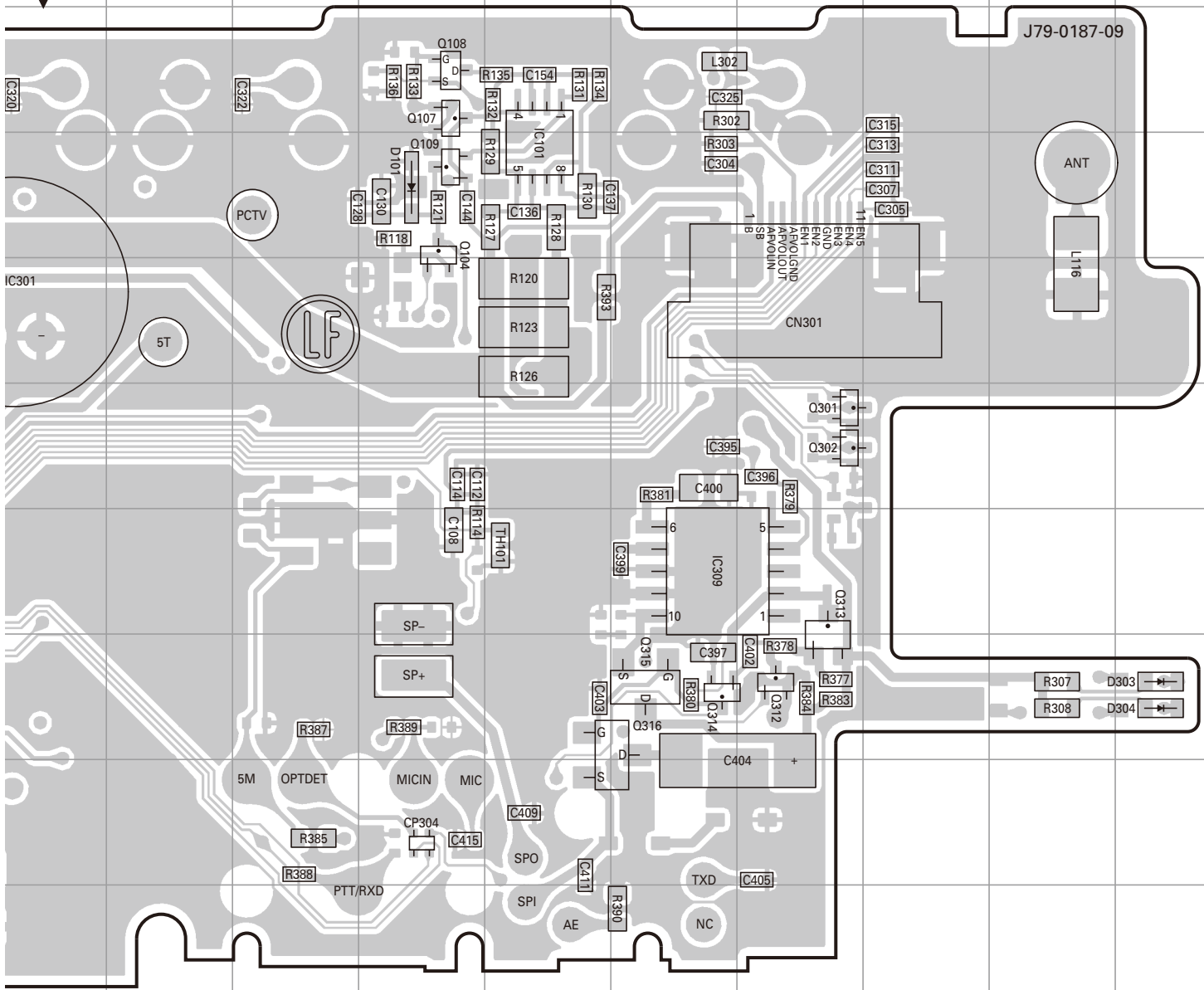


# PC BOARD TK-3302/3302(U)/3306

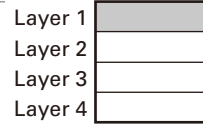
## TX-RX UNIT (X57-7580-XX)

-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3

### Component side view (J79-0187-09)



Component side



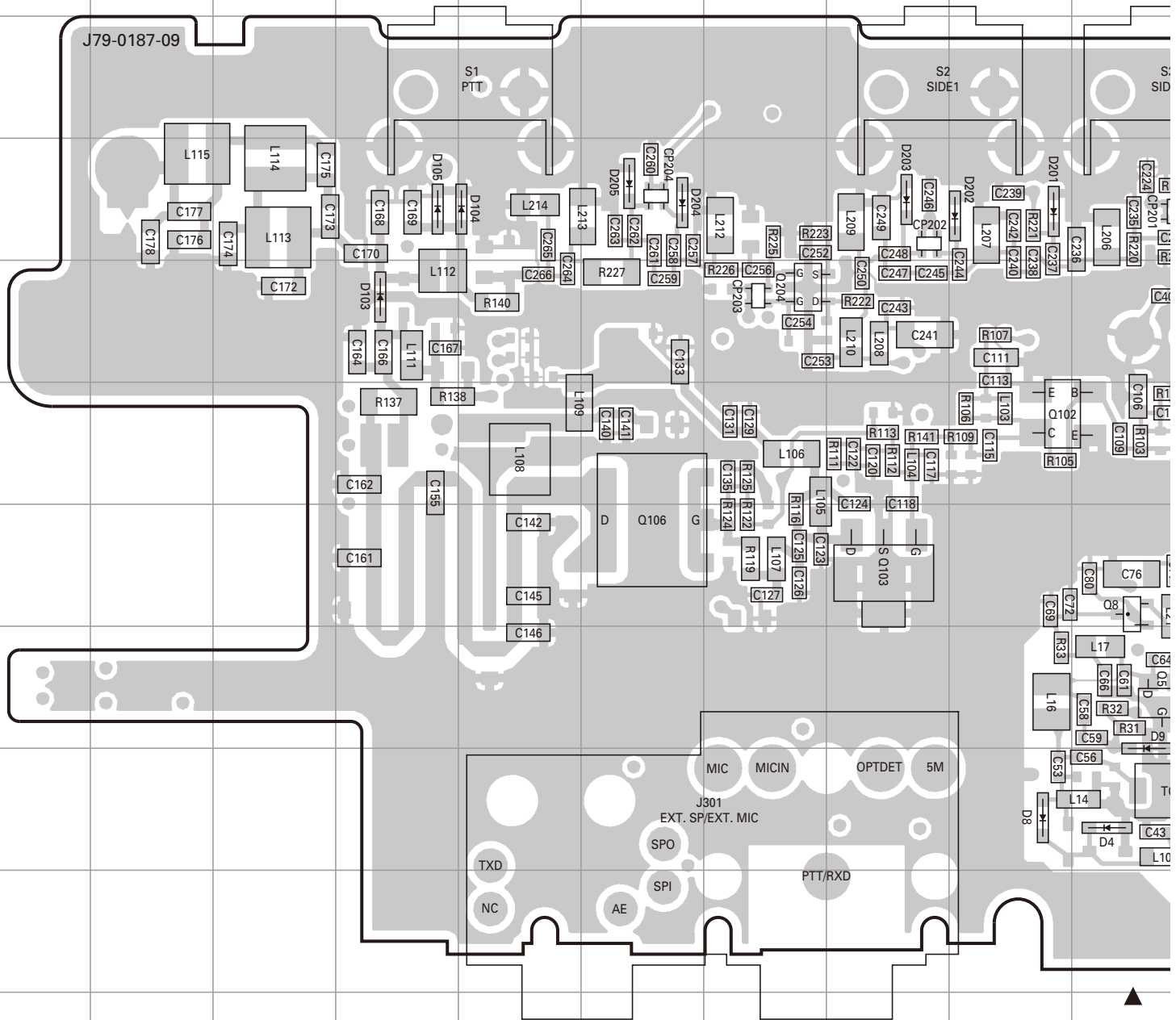
Foil side

# TK-3302/3302(U)/3306 PC BOARD

## TX-RX UNIT (X57-7580-XX)

-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3

Foil side view (J79-0187-09)



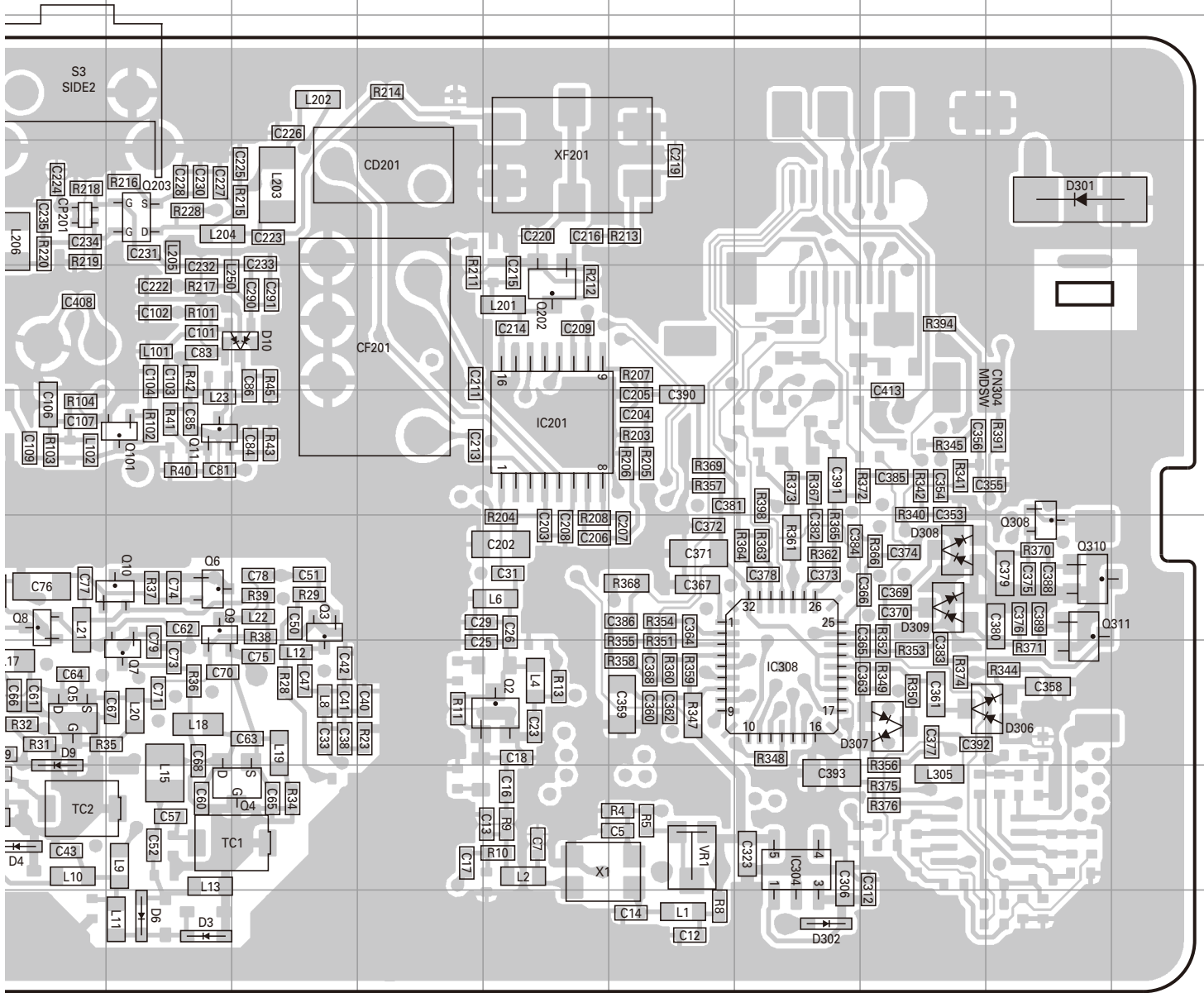
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC201	6N	Q8	7J	Q203	4K	D9	8J	D205	4F
IC304	9P	Q9	7K	Q204	5G	D10	5L	D301	4R
IC308	8P	Q10	7K	Q308	7R	D103	5D	D302	10P
Q2	8N	Q11	6K	Q310	7R	D104	4E	D306	8R
Q3	7L	Q101	6K	Q311	7R	D105	4D	D307	8Q
Q4	9L	Q102	6I	D3	10K	D201	4I	D308	7Q
Q5	8J	Q103	7H	D4	9J	D202	4I	D309	7Q
Q6	7K	Q106	7F	D6	10K	D203	4H		
Q7	8K	Q202	5N	D8	9I	D204	4F		

# PC BOARD TK-3302/3302(U)/3306

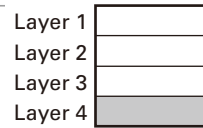
TX-RX UNIT (X57-7580-XX)

-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3

Foil side view (J79-0187-09)



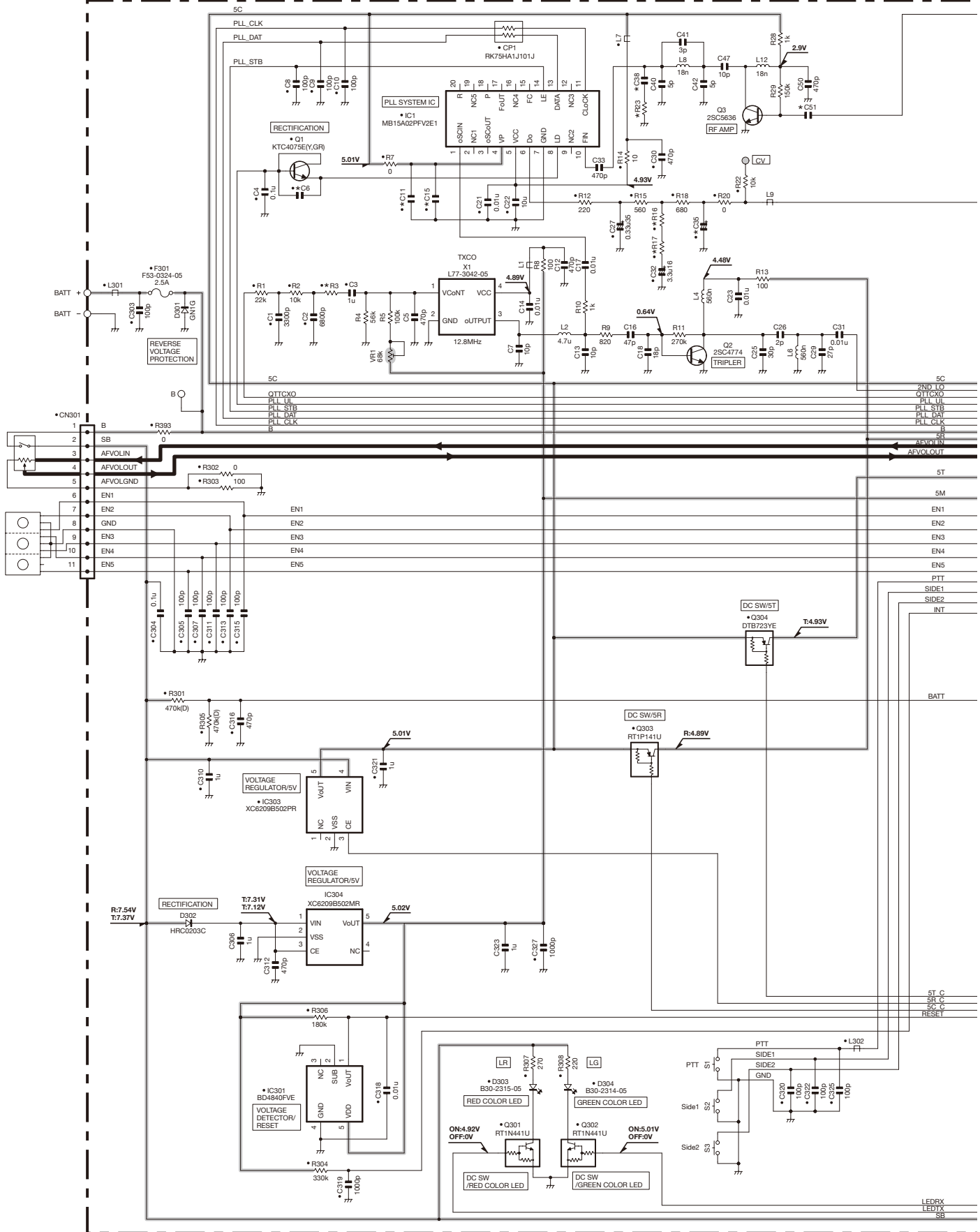
Component side



Foil side

# TK-3302/3302(U)/3306 SCHEMATIC DIAGRAM

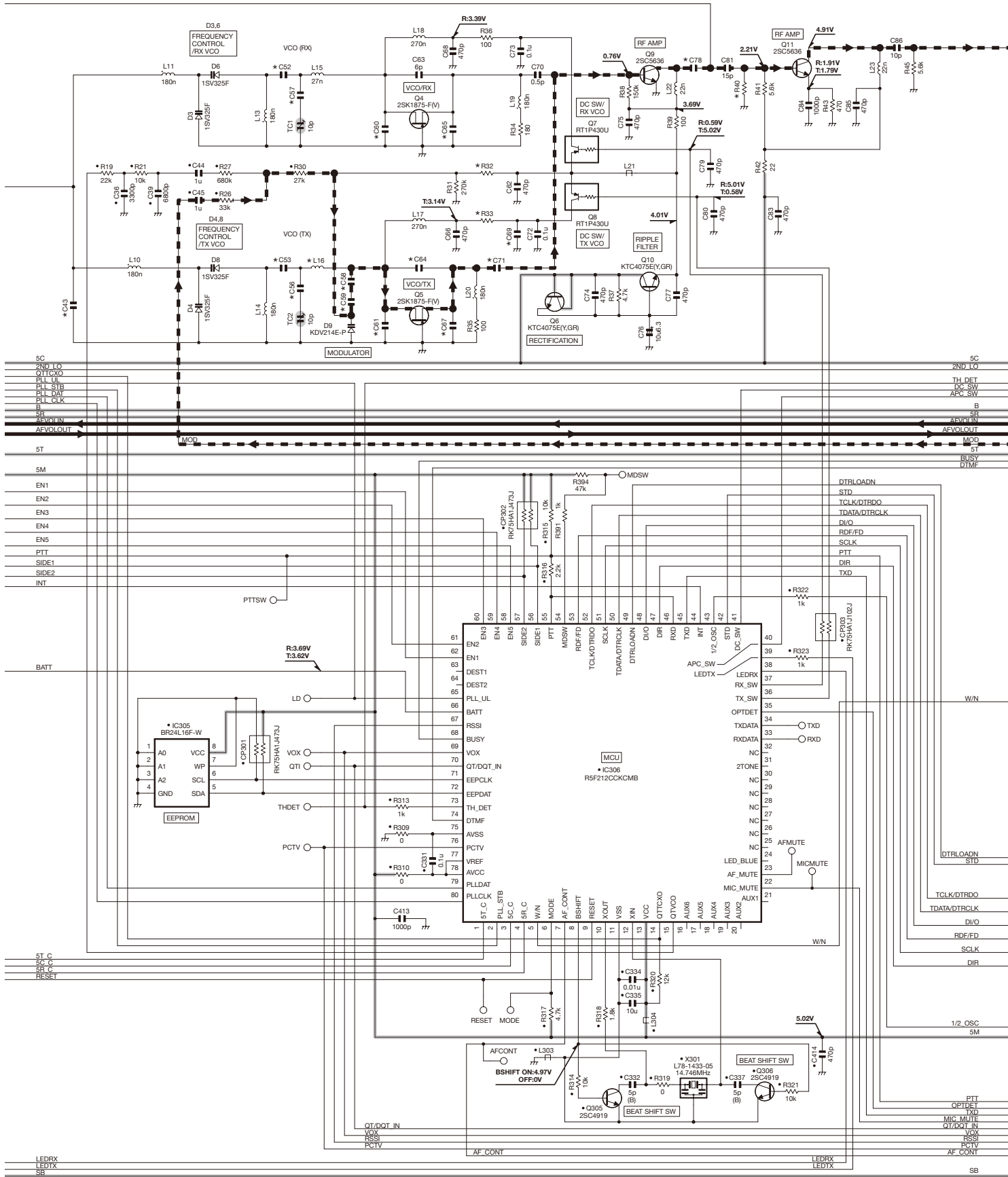
TX-RX UNIT (X57-7580-XX)



	X57-7580-XX	R3	R16	R17	R23	C6	C11	C15	C35	C38	C51	
-20	TK-3302 TK-3306	K,P(U,K,M M	180k	0	1.8k	NO	0.01u	10u	0.01u	0.1u/35	NO	10p
-23	TK-3306	M3	150k	180	1.2k	47	470p	470p	0.047u35	470p	3p	

# SCHEMATIC DIAGRAM TK-3302/3302(U)/3306

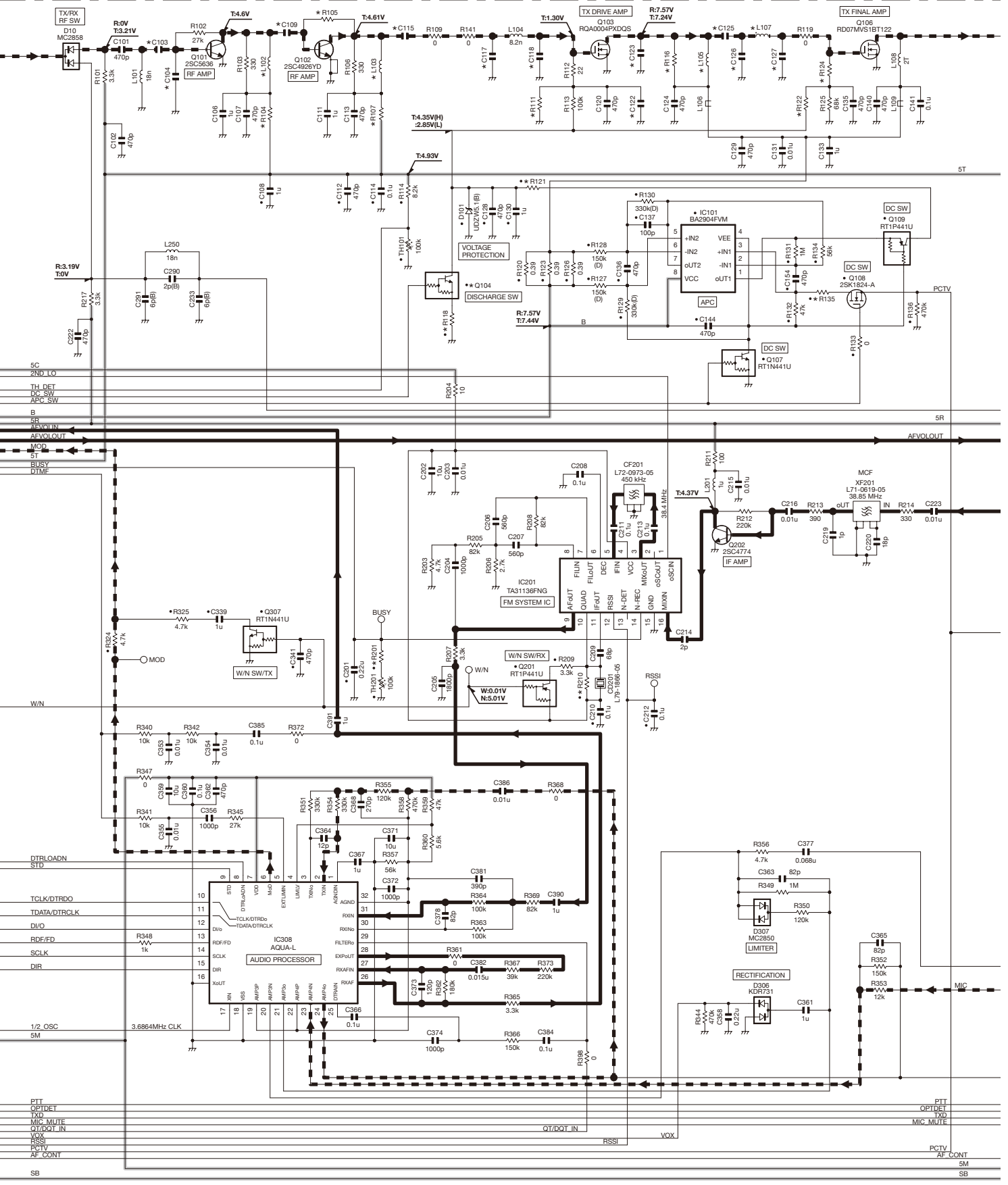
TX-RX UNIT (X57-7580-XX)



	X57-7580-XX	L16	R32	R33	R40	C43	C52	C53	C56	C57	C58	C59	C60	C61	C64	C65	C67	C69	C71	C78	
-20	TK-3302 TK-3306	K,P(U),K,M M	18n	470k	100	4.7k	NO	9p	11p	12p	8p	1p	1p	2p	3p	5p	6p	5p	470p	0.5p	33p
-23	TK-3306	M3	22n	390k	10	NO	100p	20p	9p	8p	12p	1.5p	1.5p	4p	7p	3.5p	4p	4p	NO	0.3p	30p

# TK-3302/3302(U)/3306 SCHEMATIC DIAGRAM

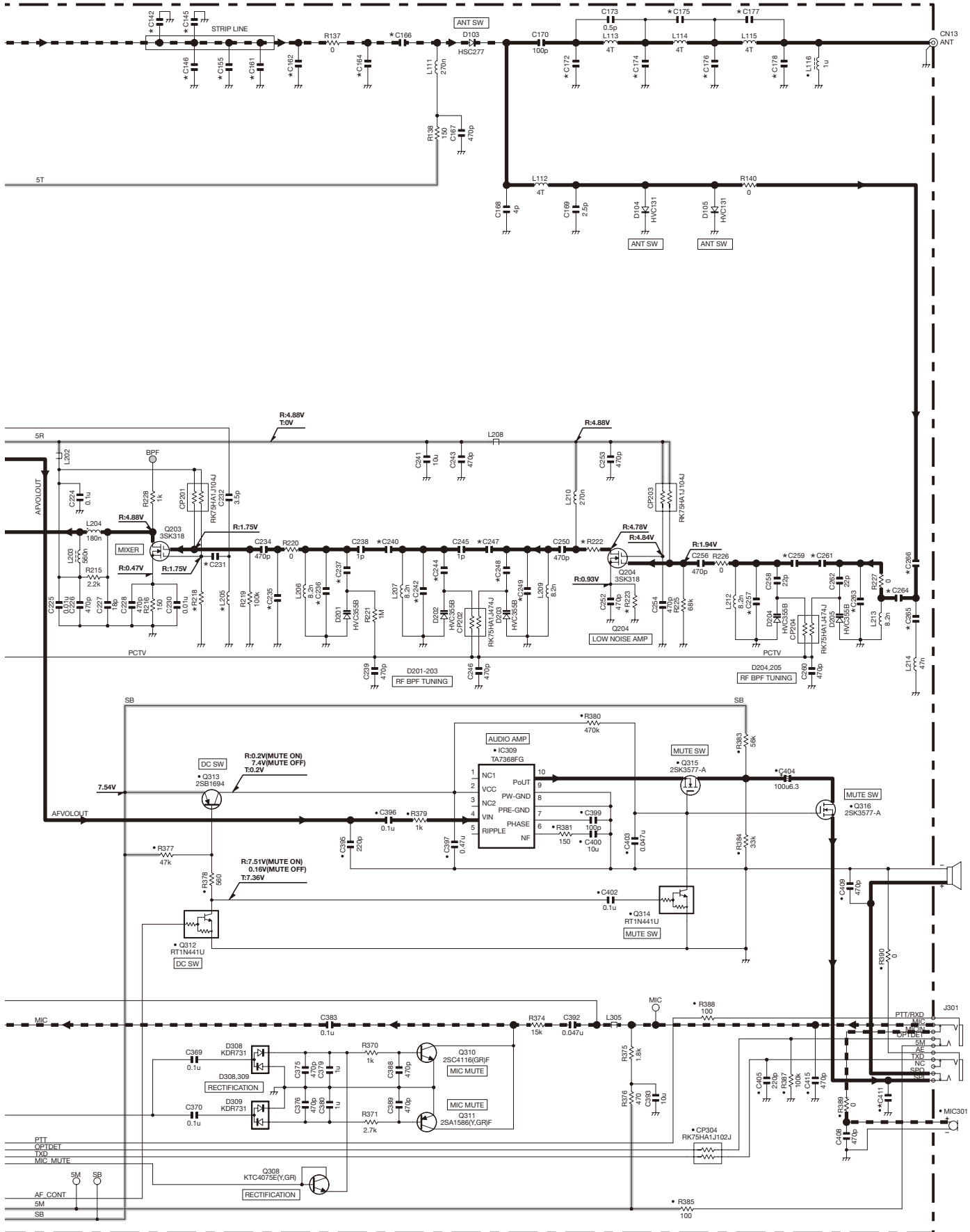
TX-RX UNIT (X57-7580-XX)



	X57-7580-XX	Q104	L102	L103	L105	L107	R104	R105	R107	R111	R116	R118	R121	R122	R124	R135	R201	R210	C103	C104	C109	C115	C117	C118	C122	C123	C125	C126	C127	
-20	TK-3302 TK-3306	K,P(U)K,M M	NO	39n	15n	22n	2.7n	47	27k	56	39k	330	NO	10k	27k	22	180k	82k	3.9k	30p	4p	6p	11p	11p	NO	NO	NO	10p	11p	16p
-23	TK-3306	M3	RT1N441U	27n	18n	4.7n	2.2n	39	18k	39	47k	NO	330	15k	68k	100	100k	180k	4.7k	12p	16p	15p	5p	NO	9p	1u	0.5p	15p	NO	47p

# SCHEMATIC DIAGRAM TK-3302/3302(U)/3306

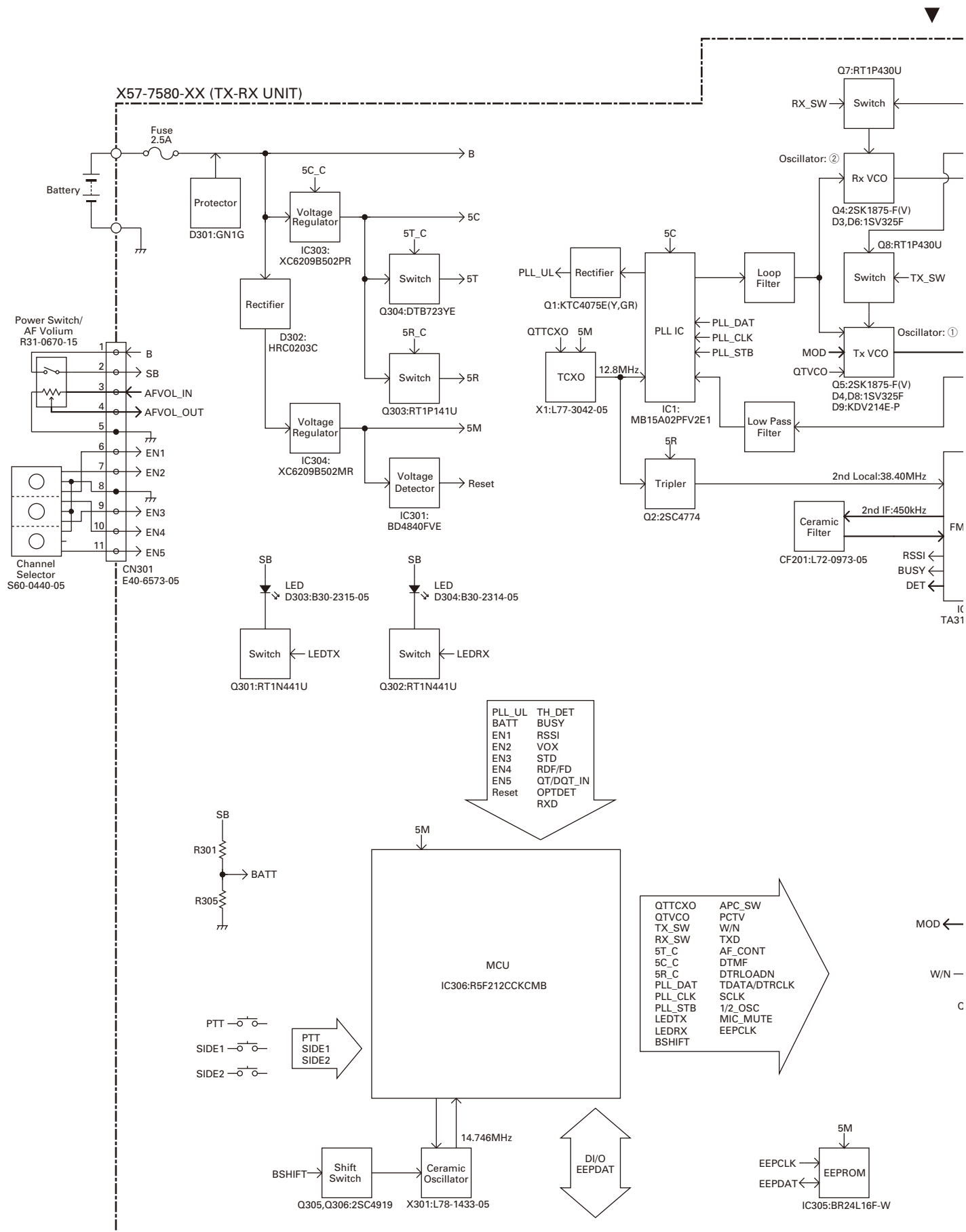
TX-RX UNIT (X57-7580-XX)



	X57-7580-XX	L205	R218	R222	R223	C142	C145	C146	C155	C161	C162	C164	C166	C172	C174	C175	C176	C177	C178	C231	C235	C236	C237	C240	C242	C244	C247	C248	C249	C257	C259	C261	C263	C264	C265	C266	C411	
-20	TK-3302 TK-3306	K,P,UJK,M M	27n	56k	22	220	43p	NO	12p	NO	1p	2p	NO	6p	3p	5p	2p	5p	2p	3p	470p	NO	4p	22p	2p	6p	22p	2p	22p	4p	3.5p	2p	3p	1p	3.5p	3p	5p	470p
-23	TK-3306	M3	33n	82k	15	120	39p	36p	NO	0.3p	1.5p	NO	3p	7p	1p	10p	NO	10p	0.3p	6p	1000p	0.75p	7p	27p	4p	8p	27p	4p	27p	8p	8p	1.5p	2p	6p	2p	5p	7p	NO

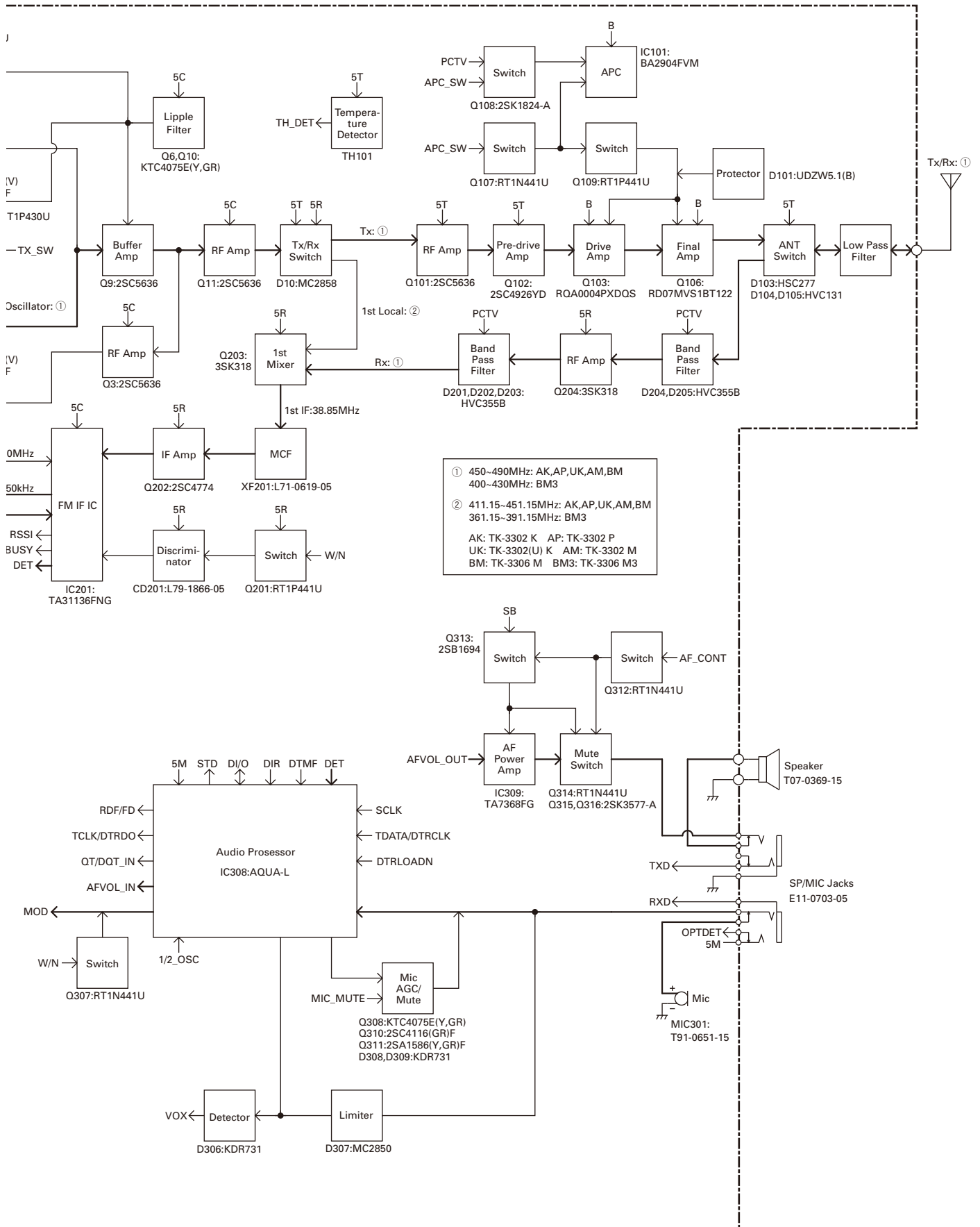
Note : The components marked with a dot (•) are parts of layer 1.

## BLOCK DIAGRAM



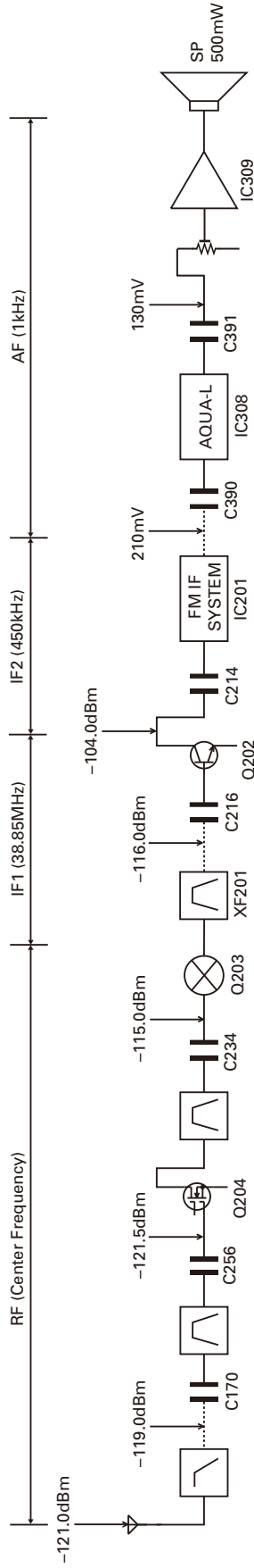


## BLOCK DIAGRAM



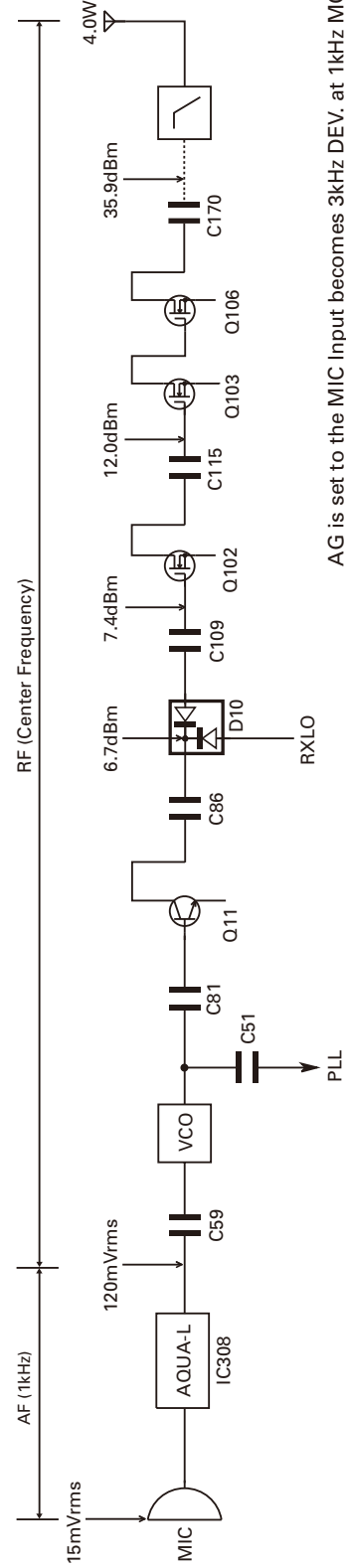
## LEVEL DIAGRAM

### Receiver Section



To make measurements in the AF section, connect the AC level meter. (ANT input: -53dBm, 1kHz FM, 3kHz DEV (WIDE).)  
 In the RF section, use 470pF coupling capacitor.  
 (The display shows the SSG input value required to obtain 12dB SINAD without Local Level.)

### Transmitter Section



AG is set to the MIC Input becomes 3kHz DEV. at 1kHz MOD. (WIDE).  
 To make measurements in the AF section, connect the AC level meter.  
 In the RF section, use 470pF coupling capacitor.

## SPECIFICATIONS

### General

Frequency Range.....	450~490MHz (TK-3302 K,M,P TK-3302(U) K TK-3306 M) 400~430MHz (TK-3306 M3)
Number of channels .....	Max. 16
Channel Spacing .....	25kHz (Wide) / 12.5kHz (Narrow)
PLL Channel Stepping .....	5kHz, 6.25kHz
Operating Voltage.....	7.5 V DC±20%
Battery Life .....	More than 18 hours at 4 watts (5-5-90 duty cycle with KNB-45L battery)
Operating Temperature range .....	-30°C to +60°C (-22°F to +140°F)
Frequency Stability .....	±2.5ppm (-30°C to +60°C)
Channel Frequency Spread.....	40MHz (TK-3302 K,M,P TK-3302(U) K TK-3306 M) 30MHz (TK-3306 M3)
Dimensions and Weight (Dimensions not including protrusions)	
Radio Only .....	160g (5.6oz)
With KNB-45L (2000mAh battery).....	54 (2.13) W x 122 (4.8) H x 33.8 (1.33) D mm (inches) 280g (9.9oz)

### Receiver (Measurements made per TIA/EIA-603)

Sensitivity	
EIA 12dB SINAD.....	0.25µV (Wide) / 0.28µV (Narrow)
Selectivity .....	70dB (Wide) / 60dB (Narrow)
Intermodulation .....	65dB (Wide) / 60dB (Narrow)
Spurious response.....	60dB
Audio Power Output.....	500mW at 4Ω less than 10% distortion

### Transmitter (Measurements made per TIA/EIA-603)

RF Power Output.....	4W/1W
Spurious and Harmonics.....	65dB
Modulation.....	16K0F3E (Wide) / 11K0F3E (Narrow)
FM Noise .....	45dB (Wide) / 40dB (Narrow)
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



# TK-3302/3302(U)/3306 PC BOARD

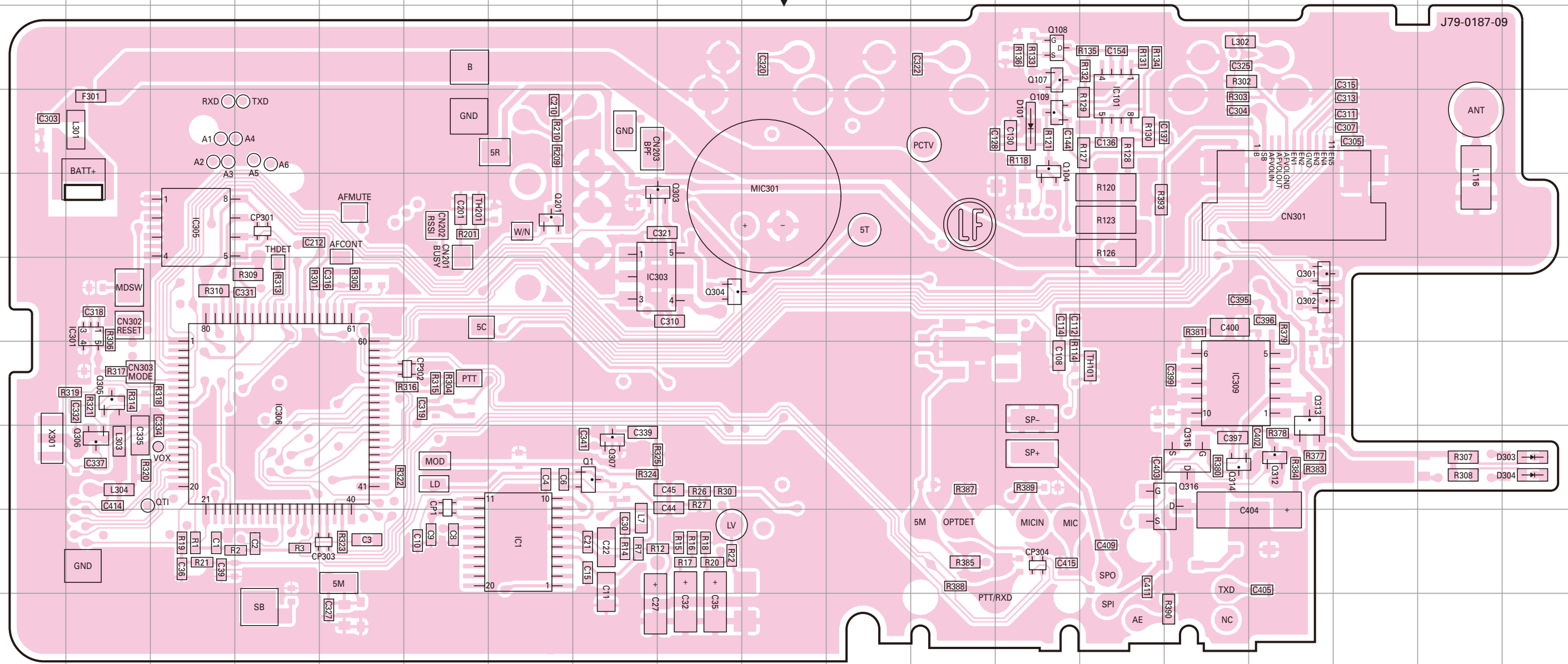
# PC BOARD TK-3302/3302(U)/3306

**TX-RX UNIT (X57-7580-XX)**

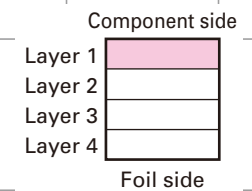
**-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3**  
**Component side view (J79-0187-09)**

**TX-RX UNIT (X57-7580-XX)**

**-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3**  
**Component side view (J79-0187-09)**



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	9G	Q104	4M	Q304	6I	Q316	8O
IC101	4N	Q107	3M	Q305	7B	D101	4M
IC301	6B	Q108	3M	Q306	8B	D303	8S
IC303	6H	Q109	4M	Q307	8H	D304	8S
IC305	5C	Q201	5G	Q312	8P		
IC306	7D	Q301	6P	Q313	7P		
IC309	7O	Q302	6P	Q314	8O		
Q1	8H	Q303	5I	Q315	8O		



# TK-3302/3302(U)/3306 PC BOARD

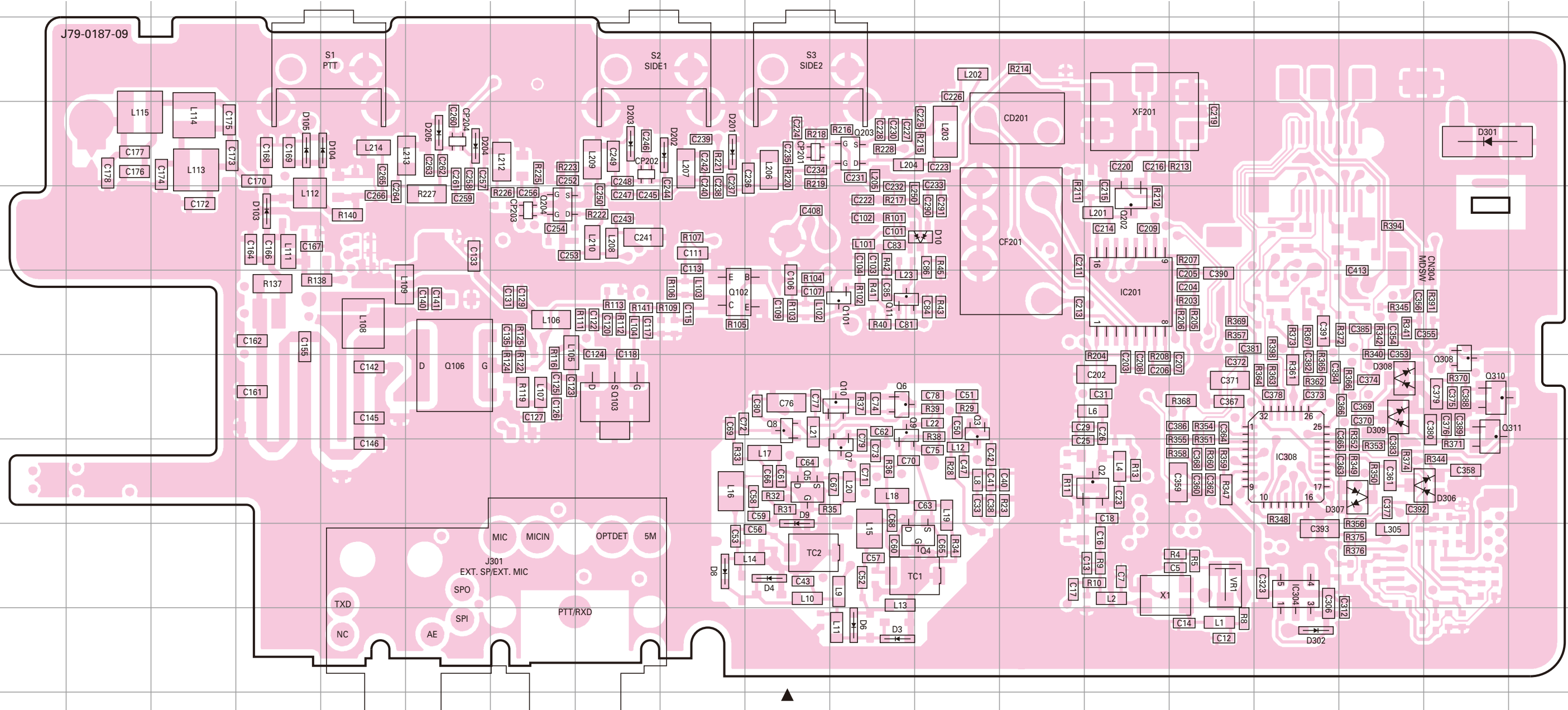
# PC BOARD TK-3302/3302(U)/3306

**TX-RX UNIT (X57-7580-XX)**

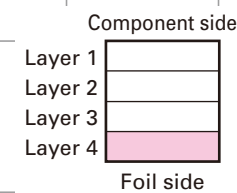
**-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3**  
**Foil side view (J79-0187-09)**

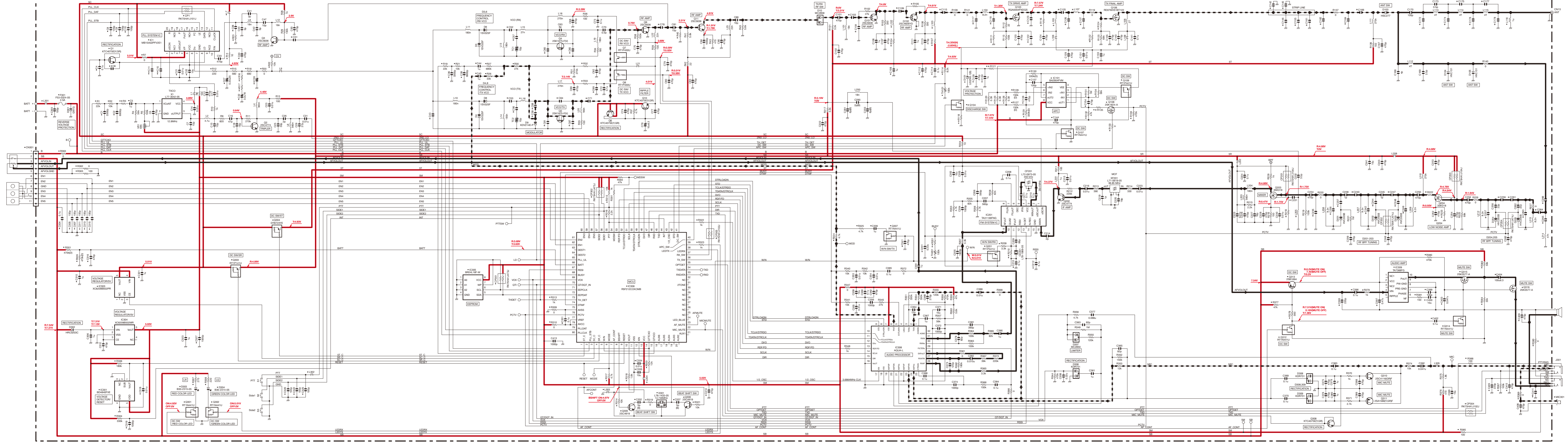
**TX-RX UNIT (X57-7580-XX)**

**-20: TK-3302 K,M,P TK-3302(U) K TK-3306 M -23: TK-3306 M3**  
**Foil side view (J79-0187-09)**



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC201	6N	Q8	7J	Q203	4K	D9	8J	D205	4F
IC304	9P	Q9	7K	Q204	5G	D10	5L	D301	4R
IC308	8P	Q10	7K	Q308	7R	D103	5D	D302	10P
Q2	8N	Q11	6K	Q310	7R	D104	4E	D306	8R
Q3	7L	Q101	6K	Q311	7R	D105	4D	D307	8Q
Q4	9L	Q102	6I	D3	10K	D201	4I	D308	7Q
Q5	8J	Q103	7H	D4	9J	D202	4I	D309	7Q
Q6	7K	Q106	7F	D6	10K	D203	4H		
Q7	8K	Q202	5N	D8	9I	D204	4F		



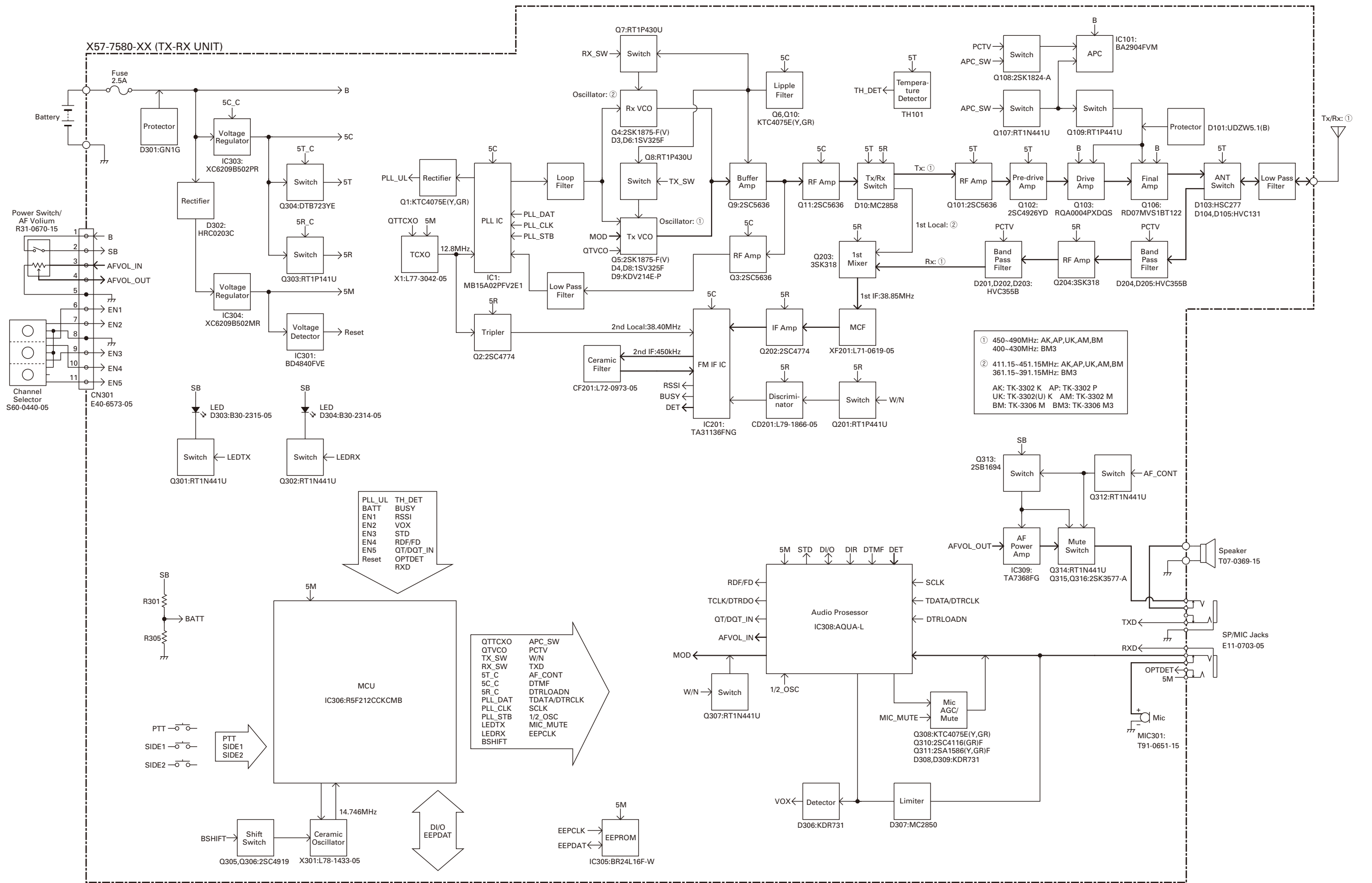


X57-7580-XX	R3	R16	R17	R23	C6	C11	C15	C35	C38	C51	
-20 TK-3302 TK-3306	K/PJK/M	180k	0	1.8k	NO	0.01u	10u	0.01u	0.1u5	NO	10p
-23 TK-3306	M	150k	180	1.2k	47	470p	470p	0.047u5	470p	3p	

X57-7580-XX	L16	R32	R33	R40	C43	C52	C53	C56	C57	C58	C59	C60	C61	C64	C65	C67	C69	C71	C78	
-20 TK-3302 TK-3306	K/PJK/M	180	470k	100	4.7k	NO	10p	11p	12p	8p	1p	1p	2p	3p	5p	6p	5p	470p	0.5p	30p
-23 TK-3306	M	22k	300k	10	NO	100p	20p	8p	8p	12p	1.5p	1.5p	4p	7p	3.5p	4p	4p	NO	0.5p	30p

X57-7580-XX	Q104	L102	L103	L105	L107	R104	R105	R107	R111	R116	R118	R121	R122	R124	R135	R201	R210	C103	C104	C109	C115	C117	C118	C122	C123	C125	C126	C127	
-20 TK-3302 TK-3306	K/PJK/M	NO	39k	15n	22n	2.7k	47	27k	56	30k	330	NO	10k	27k	22	180k	82k	3.9k	30p	4p	5p	11p	11p	NO	NO	NO	10p	11p	16p
-23 TK-3306	M	RT1N441U	27k	18k	4.7k	2.7k	39	18k	39	47k	NO	330	15k	68k	100	100k	180k	4.7k	12p	16p	15p	5p	NO	9p	1p	0.5p	15p	NO	47p

X57-7580-XX	L305	R216	R222	R223	C142	C145	C146	C155	C161	C162	C164	C166	C172	C174	C175	C176	C178	C231	C235	C237	C240	C242	C244	C247	C248	C249	C257	C259	C261	C263	C264	C265	C266	C411
-20 TK-3302 TK-3306	K/PJK/M	27k	56k	22	220	43k	NO	12p	NO	1p	2p	NO	6p	5p	2p	3p	3p	470p	NO	4p	25p	2p	5p	25p	4p	3.5p	3p	3p	1p	3.5p	3p	5p	470p	
-23 TK-3306	M	33k	82k	15	100	39k	36p	NO	0.5p	1.5p	NO	3p	7p	1p	10p	NO	0.5p	6p	1000p	0.75p	7p	27p	4p	8p	27p	8p	8p	1.5p	2p	5p	7p	NO		



- ① 450~490MHz: AK,AP,UK,AM,BM  
400~430MHz: BM3
- ② 411.15~451.15MHz: AK,AP,UK,AM,BM  
361.15~391.15MHz: BM3
- AK: TK-3302 K AP: TK-3302 P  
UK: TK-3302(U) K AM: TK-3302 M  
BM: TK-3306 M BM3: TK-3306 M3

PLL\_UL TH\_DET  
BATT BUSY  
EN1 RSSI  
EN2 VOX  
EN3 STD  
EN4 RDF/FD  
EN5 QT/DQT\_IN  
Reset OPTDET  
RXD

QTTCXO APC\_SW  
QTVCO PCTV  
TX\_SW W/N  
RX\_SW TXD  
5T\_C AF\_CONT  
5C\_C DTMF  
5R\_C DTRLOADN  
PLL\_DAT TDATA/DTRCLK  
PLL\_CLK SCLK  
PLL\_STB 1/2\_OSC  
LEDTX MIC\_MUTE  
LEDRX EEPCLK  
BSHIFT

SB  
R301  
R305  
BATT

PTT  
SIDE1  
SIDE2

BSHIFT → Shift Switch (Q305, Q306:2SC4919)  
Ceramic Oscillator (X301:L78-1433-05) 14.746MHz  
D/I/O EEPDAT

EEPCLK  
EEPDAT  
EEPROM (IC305:BR24L16F-W)

AFVOL\_OUT → AF Power Amp (IC309:TA7368FG)  
Mute Switch (Q314:RT1N441U, Q315, Q316:2SK3577-A)  
Speaker (T07-0369-15)  
SP/MIC Jacks (E11-0703-05)  
TXD  
RXD  
OPTDET (5M)  
Mic (MIC301:T91-0651-15)

Audio Processor (IC308:AQUA-L)  
SCLK  
TDATA/DTRCLK  
DTRLOADN  
AFVOL\_IN  
1/2\_OSC  
MIC\_MUTE  
MIC AGC/Mute (Q308:KTC4075E(Y,GR), Q310:2SC4116(GR)F, Q311:2SA1586(Y,GR)F, D308, D309:KDR731)  
VOX → Detector (D306:KDR731)  
Limiter (D307:MC2850)