

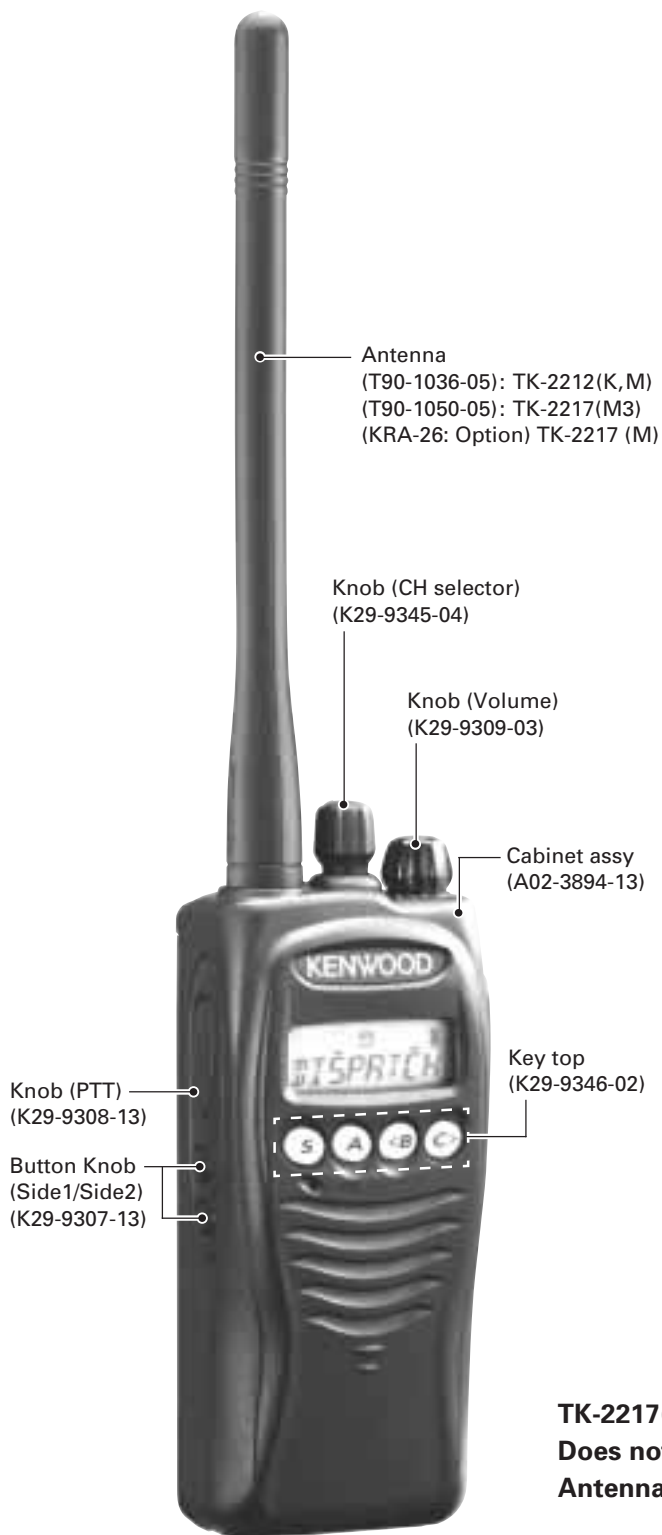


Photo is TK-2212.

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**TK-2217(M) :****Does not come with antenna.****Antenna is available as an option.**

## GENERAL / SYSTEM SET-UP

## 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.

| Unit<br>Model<br>& destination |     | TX-RX Unit  | Frequency range | Remarks                         |
|--------------------------------|-----|-------------|-----------------|---------------------------------|
| TK-2212                        | K,M | X57-7120-10 | 136~174MHz      | IF1 : 38.85MHz<br>LOC : 38.4MHz |
| TK-2217                        | M   |             |                 |                                 |
| TK-2217                        | M3  | X57-7120-21 | 216~223MHz      |                                 |

## PERSONAL SAFETY

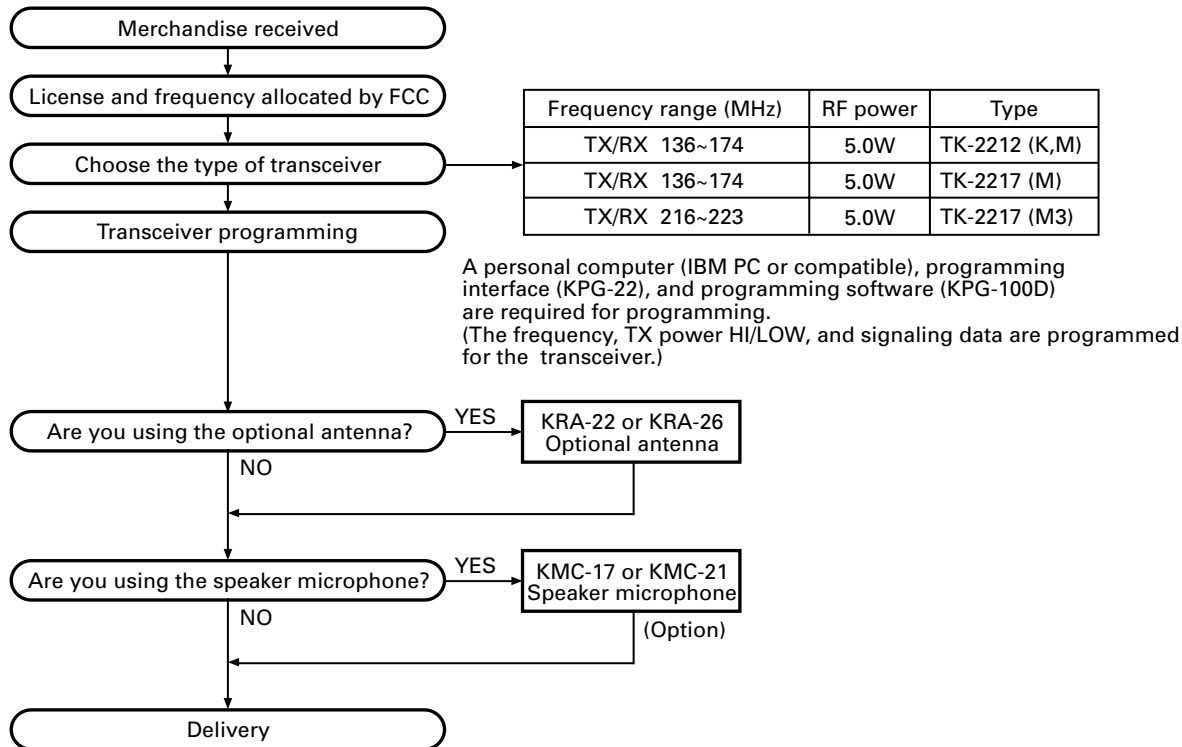
The following precautions are recommended for personal safety:

- 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.

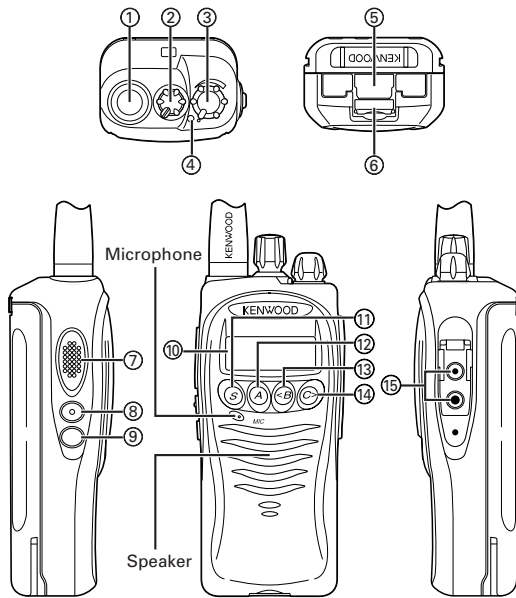
## SYSTEM SET-UP



# TK-2212/2217

## OPERATING FEATURES

### 1. Controls and Functions



- ① Antenna connector  
Connect an antenna here.
- ② Selector  
Your dealer can program the selector as either Zone Up/Down (default setting) or Channel Up/Down. Rotate the selector to select a zone or channel.
- ③ Power switch/ Volume control  
Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. Turn counterclockwise fully to switch OFF the transceiver.
- ④ Transmit/ Busy/ Call indicator  
This LED lights red while transmitting and green while receiving a call. The LED flashes orange while receiving an encoded call (i.e. Code Squelch, etc.) and red when the battery power is low while transmitting.
- ⑤ Release Latch  
Press the release latch to unlock and remove the battery pack.
- ⑥ Safety Catch  
Lock this catch to avoid accidentally pressing the release latch and removing the battery pack.
- ⑦ PTT (Push-to-Talk) switch  
Press this switch, then speak into the microphone to call a station.
- ⑧ Side 1 key  
Press to activate its programmable function. The default setting is Squelch Off Momentary.
- ⑨ Side 2 key  
Press to activate its programmable function. The default setting is Lamp.
- ⑩ Display  
Refer to the display.
- ⑪ S key  
Press to activate its programmable function. The default setting is None (no function).

- ⑫ A key  
Press to activate its programmable function. The default setting is None (no function).
- ⑬ <B key  
Press to activate its programmable function. The default setting is Channel Down.
- ⑭ C> key  
Press to activate its programmable function. The default setting is Channel Up.
- ⑮ Speaker/ Microphone jacks  
Connect an optional speaker/ microphone or headset here. Otherwise, keep the supplied cap in place.

### 2. Display

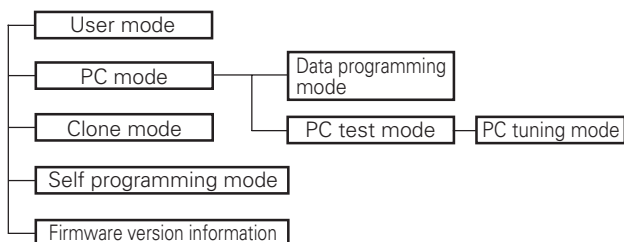


| Indicator | Description                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------|
|           | Appears when the key programmed as Monitor or Squelch Off is pressed.                                                |
|           | Appears when you receive a Code Squelch call or transmit using Code Squelch.                                         |
|           | Appears while using the Talk Around function.                                                                        |
|           | The selected zone is added to the scanning sequence.                                                                 |
|           | Appears while scanning.                                                                                              |
|           | Appears while using the VOX function                                                                                 |
|           | Appears when a message is stored in the transceiver stack memory. Appears and blinks when a new message has arrived. |
|           | The selected channel is set as a Priority channel.                                                                   |
|           | Appears while using low transmit power on the selected channel.                                                      |
|           | The selected channel is added to the scanning sequence.                                                              |
|           | Appears when the Scrambler function has been activated.                                                              |
|           | Displays the current battery status (full/ sufficient/ low/ requires charging).                                      |
|           | Displays the currently selected zone and channel number or the channel name. Also displays FleetSync messages.       |

## REALIGNMENT

## REALIGNMENT

## 1. Modes



| Mode                         | Function                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------|
| User mode                    | For normal use.                                                                          |
| PC mode                      | Used for communication between the transceiver and PC (IBM compatible).                  |
| 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.<br>This feature is included in the FPU.      |
| Clone mode                   | Used to transfer programming data from one transceiver to another.                       |
| Self programming mode        | You can program the frequency, signaling and other functions using only the transceiver. |
| Firmware version information | Used to confirm the internal firmware version.                                           |

## 2. How to Enter Each Mode

| Mode                         | Operation                              |
|------------------------------|----------------------------------------|
| User mode                    | Power ON                               |
| PC mode                      | Received commands from PC              |
| Clone mode                   | [<B]+Power ON (Two seconds)            |
| Self programming mode        | [S]+Power ON (Two seconds)             |
| Firmware version information | [Side1]+[Side2]+Power ON (Two seconds) |

## 3. PC Mode

## 3-1. Preface

The TK-2212/2217 transceivers are programmed using a personal computer, a programming interface (KPG-22) and programming software (KPG-100D).

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

## 3-2. Connection procedure

1. Connect the TK-2212/2217 to the personal computer with the interface cable.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the transceiver enters PC mode. In the PC mode, "PROGRAM" is displayed on the LCD.

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

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

## Notes:

- The data stored in the personal computer must match the model type when it is written into the EEPROM.
- Change the TK-2212/2217 to PC mode, then attach the interface cable.

## 3-3. KPG-22 description

## (PC programming interface cable: Option)

The KPG-22 is required to interface the TK-2212/2217 with the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-22 connects the SP/MIC connector of the TK-2212/2217 to the computer's RS-232C serial port.

## 3-4. Programming software description

KPG-100D is the programming software for TK-2212/2217 supplied on a CD-ROM. This software runs under Windows 98, ME, Windows 2000 or XP on an IBM-PC or compatible machine.

The data can be input to or read from TK-2212/2217 and edited on the screen. The programmed or edited data can be printed out. It is also possible to tune the transceiver.

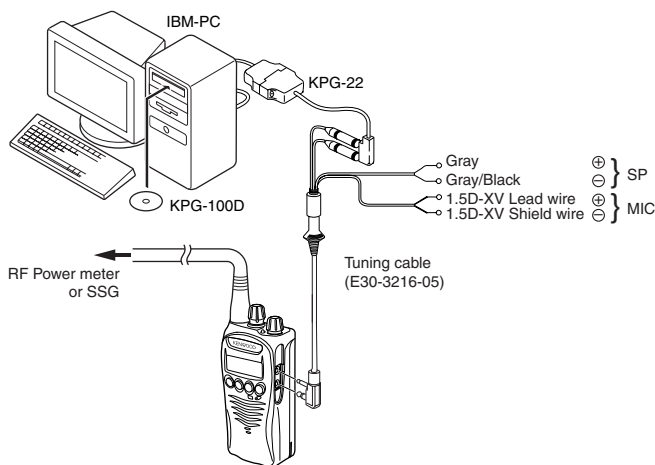


Fig. 1

## 4. Clone Mode

## 4-1. Outline

"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 master and clone slave/s must be in Clone mode.

## REALIGNMENT

### 4-3. Operation

1. To switch the clone slave/s to Clone mode, press and hold the [<B] key while turning the transceiver power ON.
2. Wait for 2 seconds. "CLONE" appears on the LCD, followed by "FRQTBL 1".
3. Select a channel table number using the [Selector] knob.
4. To switch the clone master to Clone mode, press and hold the [<B] key while turning the transceiver power ON.
5. Wait for 2 seconds. "CLONE" appears on the LCD, followed by "FRQTBL 1".
6. Select the same channel table number as the clone slave/s.
7. Press the [S] key on the clone master to begin data transmission. When the clone slave starts to receive data, the green LED will light and "CLONING" will appear on the LCD. The master unit will display "MASTER".
8. When the clone master finishes sending data, a "confirmation" tone will sound and "COMPLETE" will appear on the LCD. If data transmission failed while cloning, the Slave unit will produced an error tone and "CLONE NG" will appear on the LCD.
9. If the cloning fails, no data will be available in the Slave unit when it is returned to User mode.
10. When the cloning is successful, the Slave unit's "Scan" and "Key lock" functions will return to their default values (Scan = OFF, Key lock = OFF).
11. The master will remain in clone mode after cloning. The slave unit will return to user mode after a successful cloning.

#### Notes:

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

**Cloning Frequency Table**

| MODEL                                                    | TK-2212 | TK-2217 |         |
|----------------------------------------------------------|---------|---------|---------|
| Type                                                     | K, M    | M       | M3      |
| Operating<br>Clone Frequency<br>Frequency (MHz)<br>Table | 136~174 | 136~174 | 216~223 |
| 1                                                        | 136.000 | 136.000 | 216.000 |
| 2                                                        | 138.000 | 138.000 | 216.350 |
| 3                                                        | 140.000 | 140.000 | 216.700 |
| 4                                                        | 142.000 | 142.000 | 217.050 |
| 5                                                        | 144.000 | 144.000 | 217.400 |
| 6                                                        | 146.000 | 146.000 | 217.750 |
| 7                                                        | 148.000 | 148.000 | 218.100 |
| 8                                                        | 150.000 | 150.000 | 218.450 |
| 9                                                        | 152.000 | 152.000 | 218.800 |
| 10                                                       | 154.000 | 154.000 | 219.150 |
| 11                                                       | 156.000 | 156.000 | 219.500 |
| 12                                                       | 158.000 | 158.000 | 219.850 |
| 13                                                       | 160.000 | 160.000 | 220.200 |
| 14                                                       | 162.000 | 162.000 | 220.550 |
| 15                                                       | 164.000 | 164.000 | 220.900 |
| 16                                                       | 166.000 | 166.000 | 221.250 |
| 17                                                       | 168.000 | 168.000 | 221.600 |
| 18                                                       | 170.000 | 170.000 | 221.950 |
| 19                                                       | 172.000 | 172.000 | 222.300 |
| 20                                                       | 174.000 | 174.000 | 222.650 |

### 4-4. Adding the Data Password

If the Data password is set to the transceiver, you must enter the password to activate a clone mode. The maximum length of the password is 6 digits.

The following describes how to enter the password.

1. Press and hold the [S] key for 2 seconds while turning the transceiver power on.
2. "CLN.LOCK.R" (When the Read authorization password is set to the transceiver.) / "CLN.LOCK.W" (When the Overwrite password is set to the transceiver.) is displayed on the LCD.
3. If the [selector] knob is rotated while "CLN.LOCK.R" / "CLN.LOCK.W" is displayed, the number (0 to 9) flashes on the LCD.

When you press the [C>] key, the currently selected number is determined.

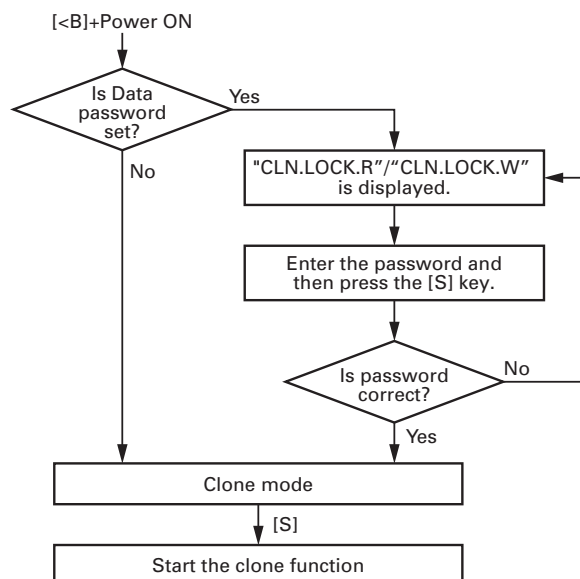
If you press the [A] key, the least digit of the password is deleted.

If you press the [S] key after entering the password in this procedure, "FRQTBL 1" is displayed if the entered password is correct.

If the password is incorrect, "CLN.LOCK.R" / "CLN.LOCK.W" is redisplayed.

## REALIGNMENT

## ■ Flow Chart (Master transceiver)



## 5. Self Programming Mode

Write mode for frequency data and signaling, etc. To be used ONLY by the authorized service person maintaining the user's equipment. After programming, reset the FPU to the "Self- Programming" disabled mode. Transceivers CANNOT be delivered to the end-user in the self-programming mode.

## 5-1. Enter to the Self Programming Mode

Press and hold the [S] key for 2 seconds while turning the transceiver power on.

When the transceiver enters in the self programming mode, "1- 1" is displayed 2 seconds after "SELF" is displayed.

**Note :**

This mode (self programming mode) cannot be set when it has been disabled with the FPU.

## 5-2. Adding the Data Password

If the Data password is set to the transceiver, you must enter the password to activate a self programming mode. The maximum length of the password is 6 digits.

The following describes how to enter the password.

1. Press and hold the [S] key for 2 seconds while turning the transceiver power on.
2. "SLF.LOCK.R"(When the Read authorization password is set to the transceiver.) / "SLF.LOCK.W" (When the Overwrite password is set to the transceiver.) is displayed on the LCD.
3. If the [selector] knob is rotated while "SLF.LOCK.R"/ "SLF.LOCK.W" is displayed, the number (0 to 9) flashes on the LCD.  
When you press the [C>] key, the currently selected number is determined.

If you press the [A] key, the least digit of the password is deleted.

If you press the [S] key after entering the password in this procedure, "SELF" is displayed if the entered password is correct.

If the password is incorrect, "SLF.LOCK.R"/ "SLF.LOCK.W" is redisplayed.

## 5-3. Channel Selection Mode

In this mode, the Zone or Channel can be selected.

Press and hold the [S] key for 2 seconds while turning the transceiver power on to enter self programming mode. When the transceiver enters in the self programming mode, the transceiver automatically enters the Channel Selection mode.

2 seconds after displaying "SELF", "1- 1" appears on the LCD.

The setup item for channel selection mode is as follows.

| Setup item   | Display   | Remarks        |
|--------------|-----------|----------------|
| Select       | *** - *** | Zone: 1~128    |
| Zone/Channel | *** - *** | Channel: 1~128 |

## Key operation

| Key        | Key Function                                                                                    |
|------------|-------------------------------------------------------------------------------------------------|
| [Selector] | Toggle between Zone selection and Channel selection.                                            |
| [Side1]    | No action                                                                                       |
| [Side2]    | No action                                                                                       |
| [S]        | Enter the Item Selection mode                                                                   |
| [A]        | Error tone sounds                                                                               |
| [<B]       | Decrement the blinking Zone/Channel number by 1.<br>Press and hold to decrement in steps of 10. |
| [C>]       | Increment the blinking Zone/Channel number by 1.<br>Press and hold to decrement in steps of 10. |

**Note :**

If a non-existing Zone-Channel is selected and the memory for all 128 channels is already filled, an error tone will sound and "MEM.FULL" will appear on the LCD for 2 seconds.

## 5-4. Item Selection Mode

In this mode, the following items can be selected.

- RX frequency
- RX signaling
- TX frequency
- TX signaling
- Wide/ Narrow
- RF power Hi/Low
- Scan Del/Add
- Beat shift on/off
- Compander on/off

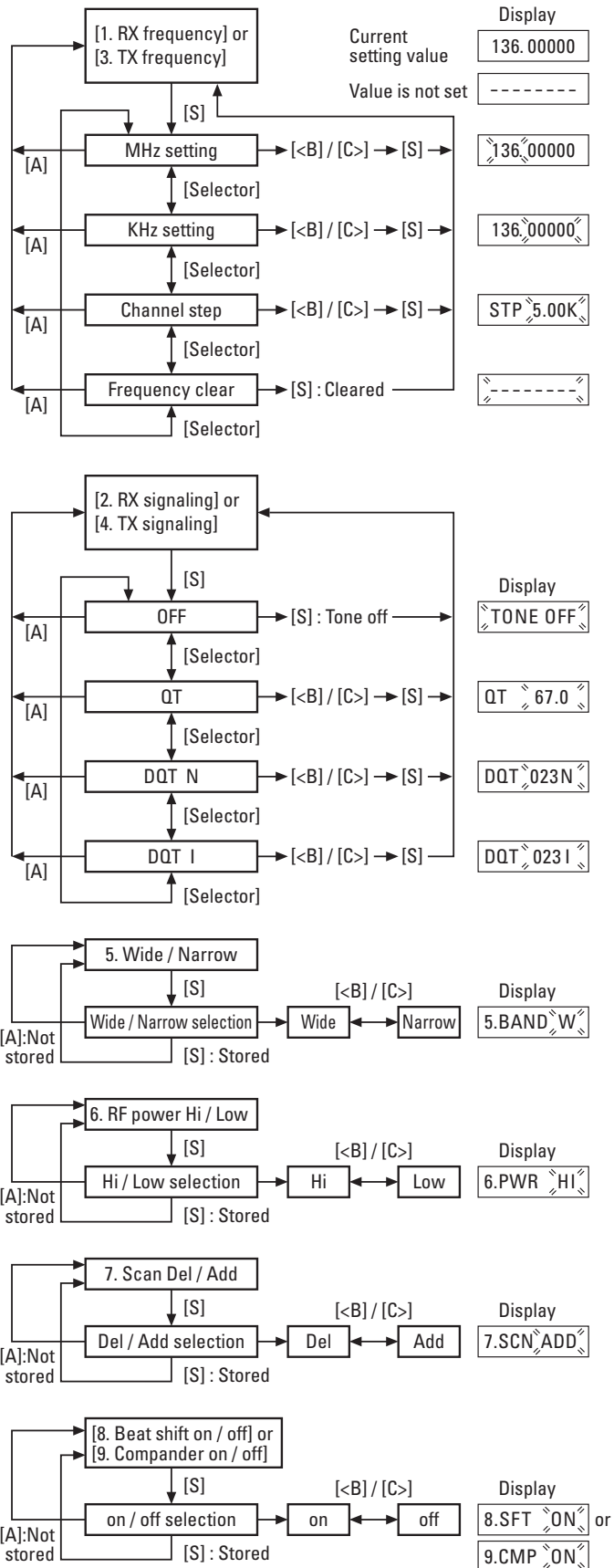
When the [S] key is pressed in the Channel Selection mode, the transceiver enters the Item Selection mode.





## REALIGNMENT

## ■ Item setting mode flow chart



## 6. Firmware Version Information

Turn the transceiver ON with the [Side1] and [Side2] keys held down. Then, the version is displayed during holding the [Side1] and [Side2] keys.

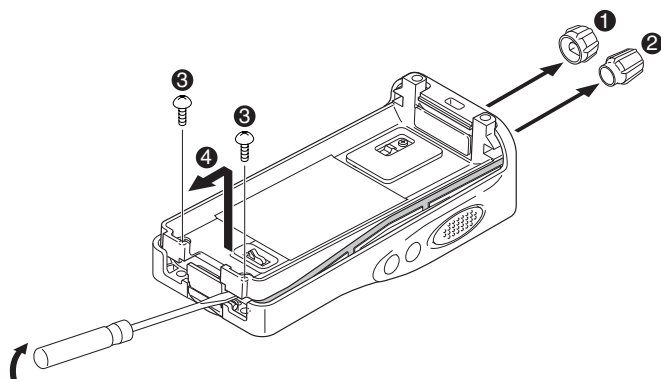


# DISASSEMBLY FOR REPAIR

## Disassembly Procedure

### ■ 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.)

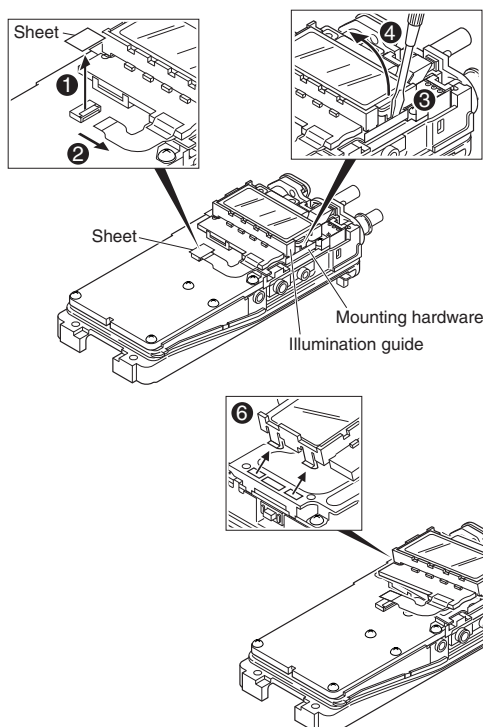


### ■ Removing the LCD ASSY from the mounting hardware

1. Remove the sheet attached to the flat cable connector ①.
2. Remove the FPC from the flat cable connector ②.

**Note:** Be careful not to forget to attach the sheet after the LCD ASSY is reassembled.

3. Insert a flat-head screwdriver on the right side of the illumination guide ③, then lever the screwdriver to remove the right side of the illumination guide from the mounting hardware ④.
4. Slide the LCD ASSY ⑤ to the right so that the two tabs on the left side of the illumination guide are removed from the mounting hardware ⑥.

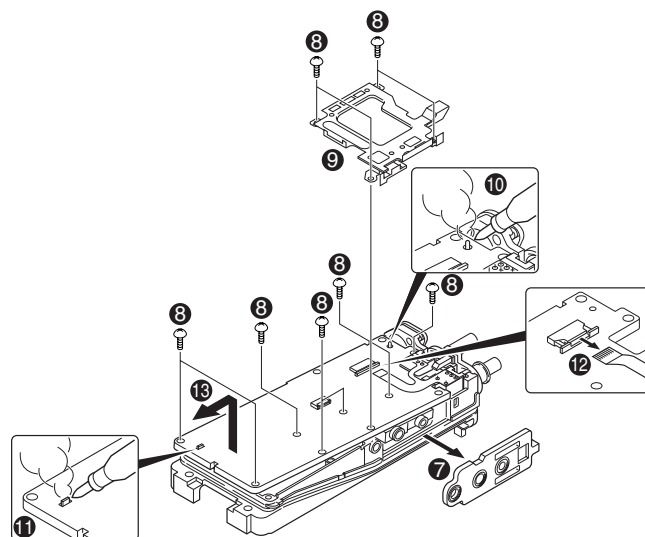


### ■ Removing the TX-RX unit from the chassis.

1. Remove the packing ⑦ from the SP / MIC jack of the TX-RX unit.
2. Remove the eleven screws ⑧ fixing the TX-RX unit.
3. Remove the mounting hardware ⑨ of the SP / MIC.
4. Remove the solder of the antenna terminal with a soldering iron ⑩.
5. Remove the solder of the positive terminal with a soldering iron ⑪.

**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 ⑫.
7. Lift and remove the TX-RX unit from the chassis ⑬.

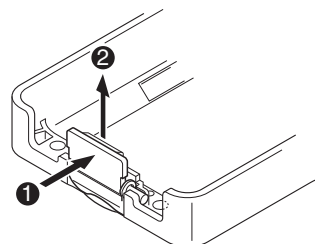


### ■ Removing the battery release lever from the case assembly.

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.

**Note:** Scratch and widen the glue hole if there is difficulty in removing the other end of the shaft.

No glue is required when you reassemble the battery release lever.



## DISASSEMBLY FOR REPAIR

### Precautions for Reassembly

#### ■ 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.

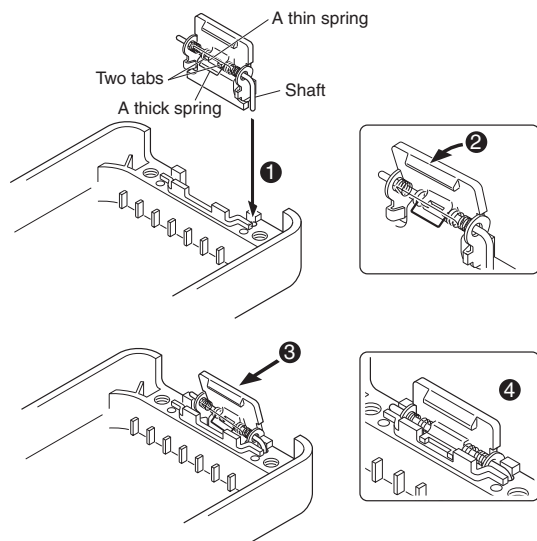
**Note:** The thin spring (G01-4543-04) should be positioned above the two tabs of the lever.

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.

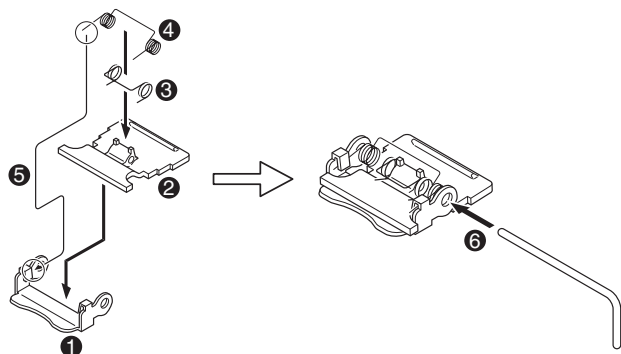
**Note:** Be careful not to tilt the battery release lever too forward.

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.



#### ■ Assembling the battery release lever

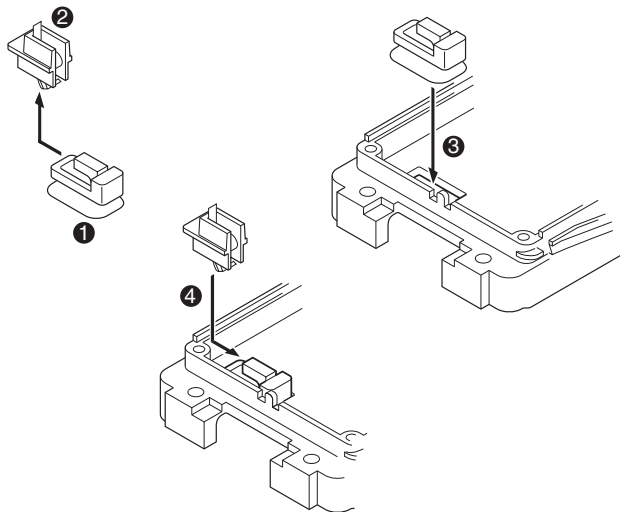
1. Place the lever ② onto the stopper ①.
2. Place the thick spring ③ onto the lever.
3. Hook the right and left ends of the thin spring ④ onto the tabs of the stopper, then place the thin spring onto the lever ⑤.
4. Slide the shaft through the hole of the stopper and lever ⑥.



#### ■ Attaching the positive terminal to the chassis.

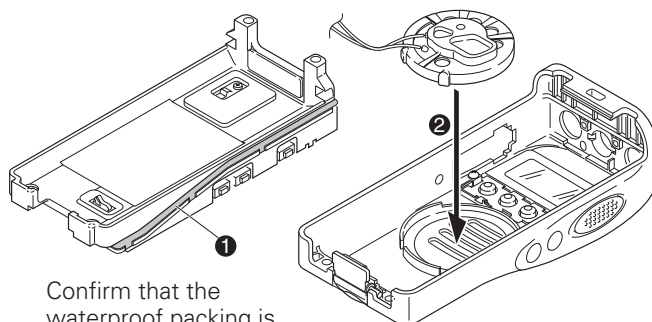
Always attach the positive terminal to the chassis, using the following procedures, before mounting the TX-RX unit onto the chassis.

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.



#### ■ 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 to the speaker recess of the case assembly ②. Make sure the speaker is securely inserted.



Confirm that the waterproof packing is securely inserted in the groove of the chassis.

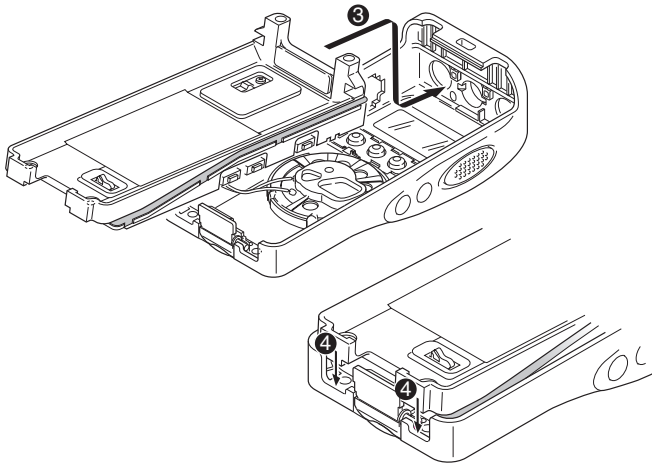
3. Insert the upper part of the chassis into the case assembly ③.

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

4. Press the chassis ④ and the case assembly together to attach them.

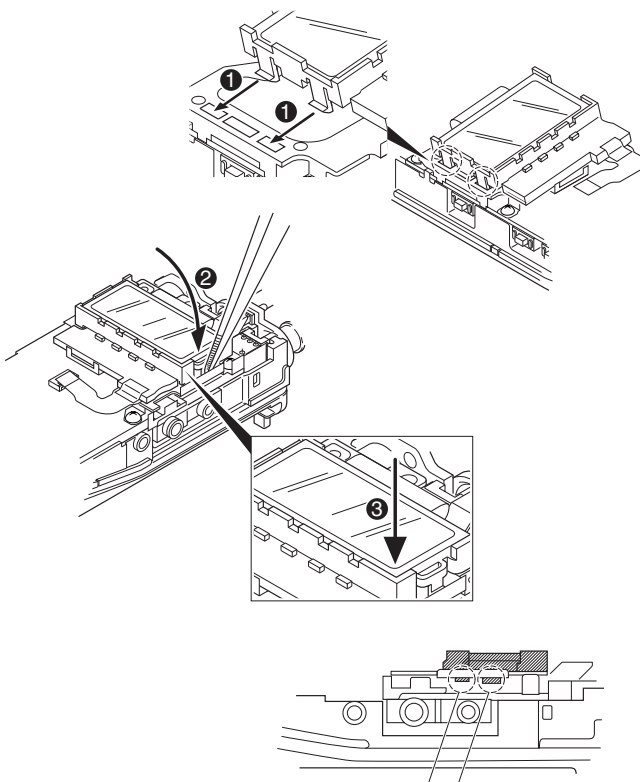
## DISASSEMBLY FOR REPAIR

**Note:** 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.



### ■ LCD ASSY Installation Procedure

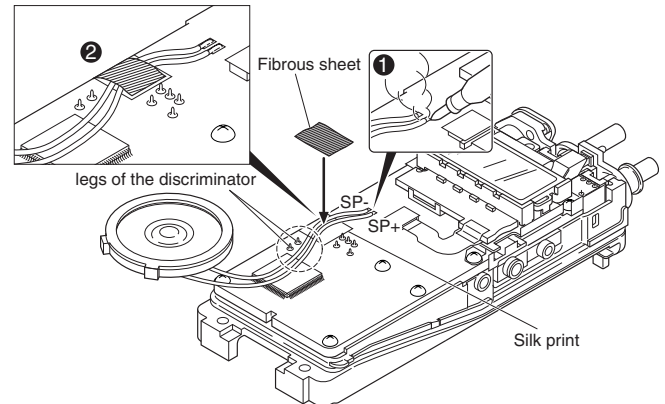
1. Insert the two tabs on the left side of the illumination guide into the matching slots of the mounting hardware ①.
2. Insert the tab on the right side of the illumination guide into the mounting hardware using a pair of tweezers ②, then press the illumination guide down until it snaps into place ③.
3. Ensure that the tab of the illumination guide is fully inserted into the mounting hardware.



Ensure that the tab of the illumination guide is fully inserted into the mounting hardware.

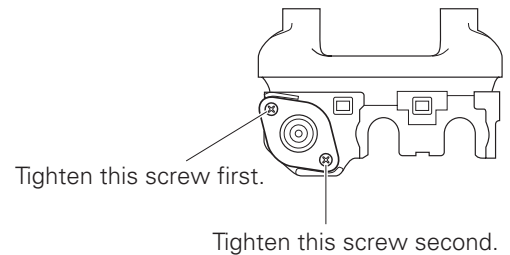
### ■ Connecting the speaker wires to the TX-RX unit

1. To connect the speaker wires, solder them to the speaker terminals of the TX-RX unit ①.
2. Align the speaker wires as shown in figure, making sure to avoid the legs of the discriminator.
3. Attach the fibrous sheet to the speaker wires as shown by the silk print on the TX-RX unit ②.



### ■ 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.

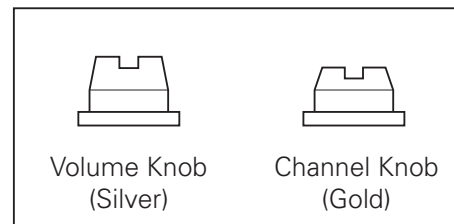


### ■ The nuts of the volume knob and channel knob

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)

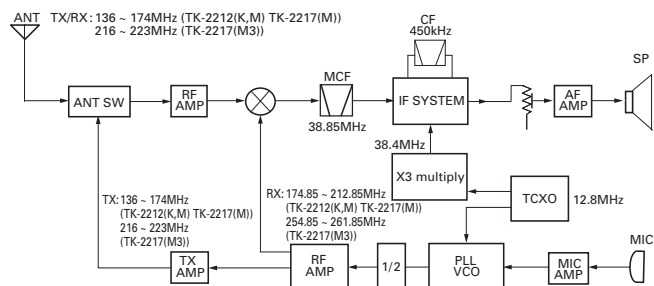


## CIRCUIT DESCRIPTION

## 1. Frequency Configuration

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

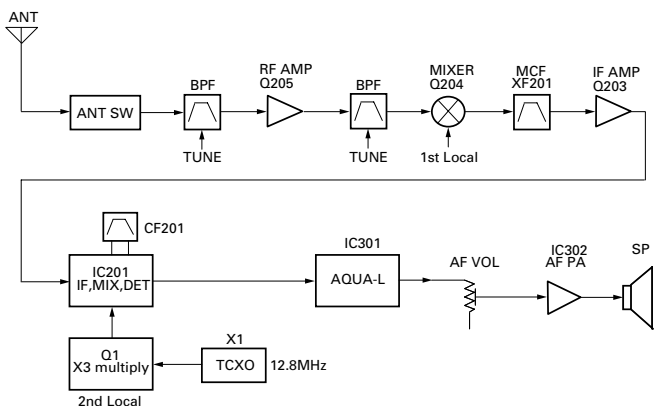
The PLL circuit in the transmitter generates the necessary frequencies. Fig. 1 shows the frequencies.



**Fig. 1 Frequency configuration**

## 2. Receiver

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



### Fig. 2 Receiver section

### 1) Front End (RF AMP)

The signal coming from the antenna passes through the transmit/receive switching diode circuit, (D103,D104,D105 and D106) passes through a BPF (L214 and L213), and is amplified by the RF amplifier (Q205).

The resulting signal passes through a BPF (L209 and L211) and goes to the mixer. These BPFs are adjusted by variable capacitors (D203, D204, D205 and D206). The input voltage to the variable capacitor is regulated by voltage output from the microprocessor (IC405).

## 2) First Mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q1 to produce a first IF frequency of 38.85 MHz.

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

### 3) 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 (Q203) and then applied to the IF system IC (IC201). The IF system IC provides a second mixer, second local oscillator, 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 produces the second IF signal of 450kHz.

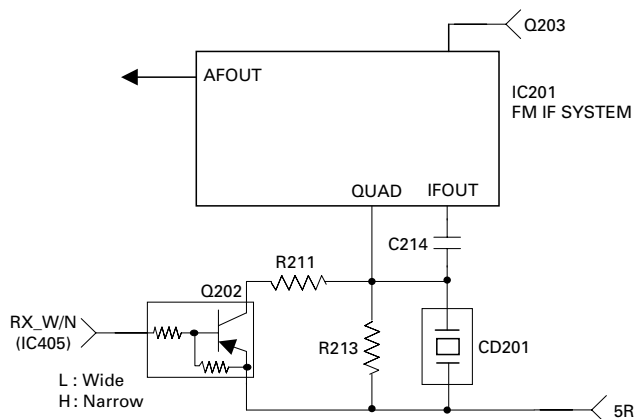
The second IF signal is passed through the ceramic filter (CF201) to remove the adjacent channel signal. The filtered second IF signal is amplified by the limiting amplifier and demodulated by the quadrature detector with the ceramic discriminator (CD201). The demodulated signal is routed to the audio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

#### 4) 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 IC405, pin 45.

When a WIDE (low level) data is received, Q202 turn on.  
When a NARROW (high level) data is received, Q202 turn off.  
Q202 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**

### 5) Audio Amplifier Circuit

The demodulated signal from IC201 goes to AF amplifier through IC301.

The signal then goes through an AF volume control , and is routed to an audio power amplifier (IC302) where it is amplified and output to the speaker.

## CIRCUIT DESCRIPTION

### 6) 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 microprocessor (IC405). IC405 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, IC405 sends a high signal to the SP MUTE line and turns IC302 on through Q303, Q304, Q305, Q306 and Q316. (See Fig. 4)

### 7) Receive Signaling

#### (1) QT/DQT

The output signal from FM IC (IC201) enters the microprocessor (IC405) through IC301. IC405 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.

#### (2) MSK (Fleet Sync)

The MSK input signal from the FM IC goes to pin 31 of IC 301. The signal is demodulated by MSK demodulator in IC 301. The demodulated data goes to the CPU for processing.

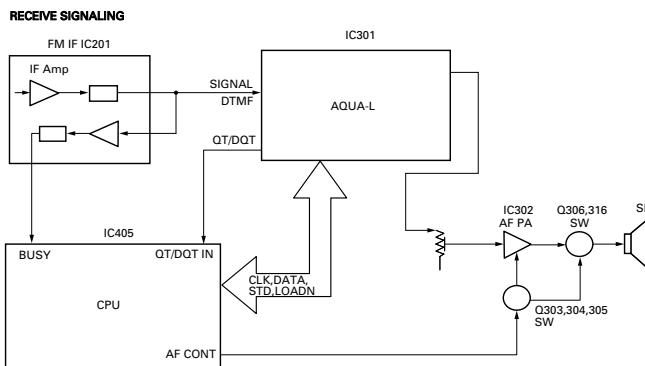


Fig. 4 AF amplifier and squelch

#### (3) DTMF

The DTMF input signal from the FM IC (IC201) goes to IC301. The decoded information is then processed by the CPU.

## 3. PLL Frequency Synthesizer

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

### 1) PLL

The frequency step of the PLL circuit is K, M: 2.5, 5, 6.25 or 7.5kHz, M3: 2.5 or 5kHz.

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 Q2 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)

### 2) VCO

The operating frequency is generated by Q4 in transmit mode and Q3 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D4 and D7 in transmit mode and D5 and D9 in receive mode). The RX pin is set high in receive mode causing Q5 turn on.

The TX pin is set high in transmit mode. The outputs from Q3 and Q4 are amplified by Q6 and sent to the RF amplifiers.

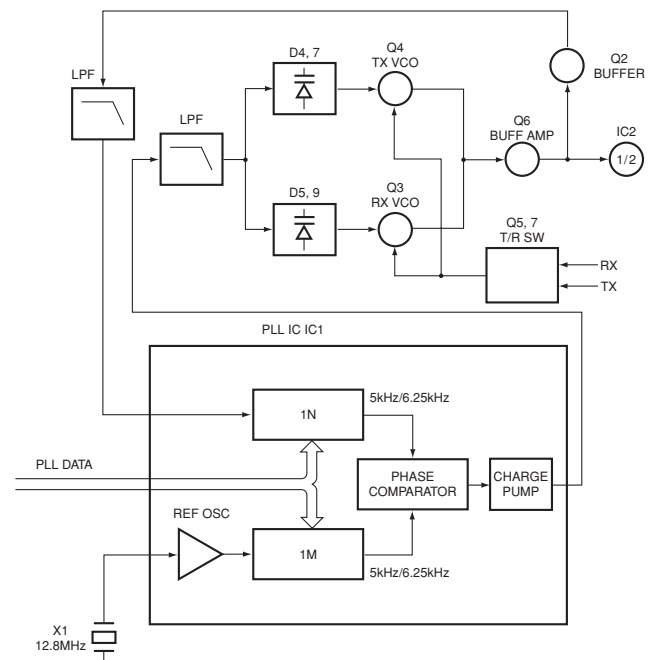


Fig. 5 PLL circuit

### 3) Unlock Detector

If a pulse signal appears at the LD pin of IC1, an unlock condition occurs, and the DC voltage obtained from C4, R5 and D1 causes the voltage applied to the microprocessor to go low. When the microprocessor detects this condition, the transmitter is disabled, ignoring the push-to-talk switch input signal.

## 4. Transmitter System

### 1) Microphone Amplifier

The signal from the microphone passes through the IC301. When encoding DTMF, it is turned OFF for muting the microphone input signal by IC301.

The signal passes through the Audio processor (IC301) for the maximum deviation adjustment, and goes to the VCO modulation input.



## CIRCUIT DESCRIPTION

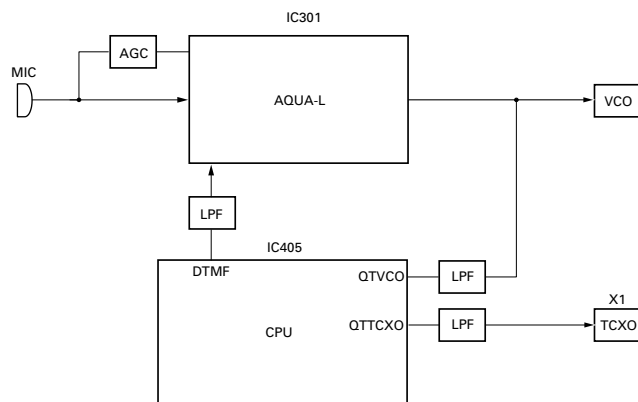


Fig. 6 Microphone amplifier

## 2) Drive and Final Amplifier

The signal from the T/R switch (D101 is on) is amplified by the pre-drive (Q102) and the drive amplifier (Q103) to 50mW. The output of the drive amplifier is amplified by the RF power amplifier (Q106) to 5.0W (1W when the power is low). The RF power amplifier consists of two MOS FET stages. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D103 and D104) and applied to the antenna terminal.

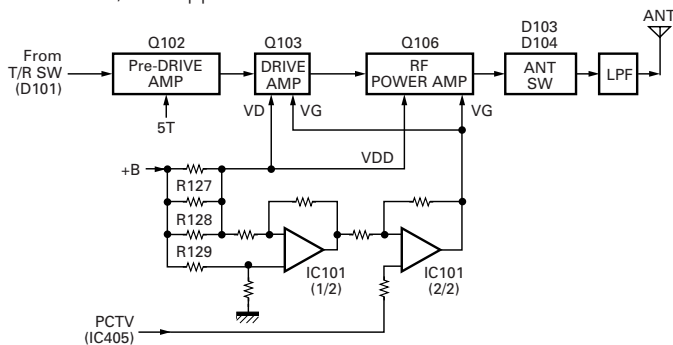


Fig. 7 Drive and final amplifier and APC circuit

## 3) APC Circuit

The APC circuit always monitors the current flowing through the RF power amplifier (Q106) and keeps a constant current. The voltage drop at R127, R128 and R129 is caused by the current flowing through the RF power 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 IC405. 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.

## 4) Encode Signaling

## (1) QT/DQT

QT,DQT data of the QTTCXO Line is output from pin 28 of the CPU. 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 24 of the CPU. 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 CPU.

## (2) DTMF

High-speed data is output from pin 2 of the CPU. 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 (IC301). The signal is mixed with the audio signal and goes to the VCO.

TX deviation is adjusted by the CPU.

## (3) MSK (Fleet Sync)

Fleet Sync utilizes 1200bps and 2400bps MSK signal is output from pin 6 of IC301. And is routed to the VCO. When encoding MSK, the microphone input signal is muted.

## 5. Power Supply

There are four 5V power supplies 5M,5C,5R, and 5T. 5M for microprocessor 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 microprocessor.

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 microprocessor (IC405) and its peripheral circuits. It controls the TX-RX unit and transfers data to the Display unit. IC405 mainly performs the following:

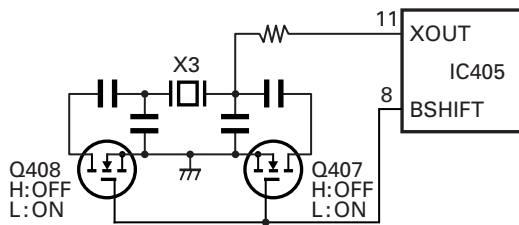
- (1) Switching between transmission and reception by the PTT signal input.
- (2) Reading system, group, frequency, and program data from the memory circuit.
- (3) Sending frequency program data to the PLL.
- (4) Controlling squelch on/off by the DC voltage from the squelch circuit.
- (5) Controlling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

## 1) Frequency Shift Circuit

The microprocessor (IC405) operates at a clock of 7.3728MHz. This oscillator has a circuit that shifts the frequency by BEAT SHIFT SW (Q407,Q408).

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.

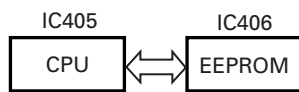
## CIRCUIT DESCRIPTION



**Fig. 8 Frequency shift circuit**

### 2) Memory Circuit

Memory circuit consists of the CPU (IC405) and an EEPROM (IC406). An EEPROM has a capacity of 64k bits that contains the transceiver control program for the CPU and data such as transceiver channels and operating features.



**Fig. 9 Memory circuit**

### 3) Low Battery Warning

The battery voltage is checked by the microprocessor.

The transceiver generates a warning tone when the battery voltage falls below the warning voltage (2) shown in the table.

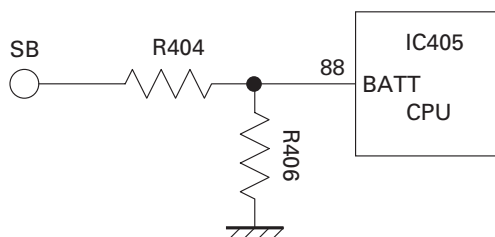
- (1) The red LED blinks when the battery voltage falls below the voltage (1) shown in the table during transmission. Transmission is still allowed.

**Note:**

The transceiver checks the battery voltage during reception even when, in the FPU, the Battery Warning status function is set to "While Transmitting" (default setting). However, the LED does not blink during reception. The red LED blinks during transmission. The transceiver is still usable.

- (2) The transceiver immediately stops transmission when the battery voltage falls below the voltage (2) shown in the table. A warning tone sounds while the PTT switch is pressed.

|     | Ni-MH Battery |
|-----|---------------|
| (1) | 6.2[V]        |
| (2) | 5.8[V]        |

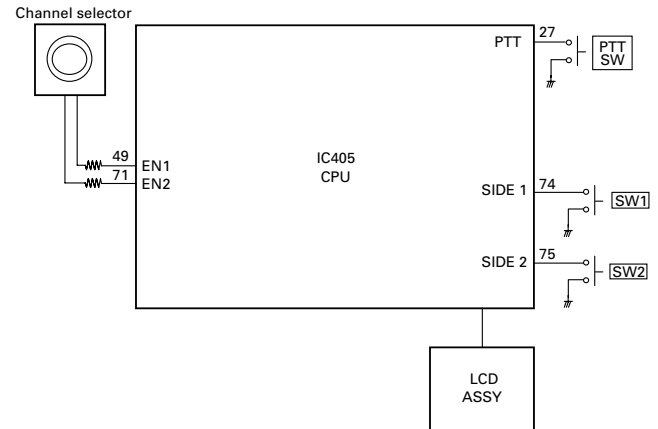


**Fig. 10 Low battery warning**

### 7. Control System

LCD, Keys and channel selector circuit.

The signal from the keys and channel selector are directly input to the microprocessor, as shown in fig. 11.



**Fig. 11 Control system**



## SEMICONDUCTOR DATA

## Microprocessor : 30620MCP-A00GP (TX-RX UNIT : IC405)

## ■ Pin function

| Pin No. | Port Name    | I/O | Function                         |
|---------|--------------|-----|----------------------------------|
| 1       | PCTV         | O   | APC/BPF control data output      |
| 2       | DTMF         | O   | DTMF/ Beep output                |
| 3       | NC           | -   | NC                               |
| 4       | EEPDAT       | I/O | EEPROM data input/output         |
| 5       | EEPCLK       | O   | EEPROM clock output              |
| 6       | BYTE         | -   | GND                              |
| 7       | GND          | -   | GND                              |
| 8       | BSHIFT       | O   | Beat shift switch                |
| 9       | NC           | -   | NC                               |
| 10      | RESET        | I   | CPU reset                        |
| 11      | XOUT         | O   | CPU clock (7.3728MHz)            |
| 12      | VSS          | -   | GND                              |
| 13      | XIN          | I   | CPU clock (7.3728MHz)            |
| 14-15   | VCC          | -   | +5V                              |
| 16      | INT          | I   | Battery voltage monitor input    |
| 17      | TCLK/DTRDO   | I   | Base band IC data input          |
| 18      | RDF/FD       | I   | Base band IC data input          |
| 19      | SCLK         | O   | Base band IC clock output        |
| 20      | D I/O        | I/O | Base band IC data input / output |
| 21      | TDATA/DTRCLK | O   | Base band IC data output         |
| 22      | DIR          | O   | Base band IC data output         |
| 23      | STD          | I   | Base band IC data input          |
| 24      | QT VCO       | O   | QT/DQT output                    |
| 25      | DTRLOADN     | O   | Base band IC data output         |
| 26      | NC           | -   | NC                               |
| 27      | PTT          | I   | PTT switch input                 |
| 28      | QT TCXO      | O   | QT/DQT output                    |
| 29      | TXD          | O   | Serial data (FPU/FLASH)          |
| 30      | RXD          | I   | Serial data (FPU/FLASH)          |
| 31      | GND          | -   | GND                              |
| 32      | APCSW        | O   | APC switch                       |
| 33-34   | NC           | -   | NC                               |
| 35      | DCSW         | O   | APC voltage discharge switch     |
| 36      | TX_W/N       | O   | TX Wide/Narrow switch            |
| 37      | RX_SW        | O   | RX VCO switch                    |
| 38      | TX_SW        | O   | TX VCO switch                    |
| 39      | GND          | -   | GND                              |
| 40      | PLL_UL       | I   | PLL unlock detect input          |
| 41      | PLL_STB      | O   | PLL strobe output                |
| 42      | PLL_DAT      | O   | PLL data output                  |
| 43      | PLL_CLK      | O   | PLL clock output                 |
| 44      | VCC          | -   | +5V                              |
| 45      | RX_W/N       | O   | RX Wide/Narrow switch            |

| Pin No. | Port Name | I/O | Function                                 |
|---------|-----------|-----|------------------------------------------|
| 46-48   | NC        | -   | NC                                       |
| 49      | EN1       | I   | Channel selector input                   |
| 50      | NC        | -   | NC                                       |
| 51      | OPTDET    | I   | Headset input detect                     |
| 52      | AF_CONT   | O   | Speaker mute                             |
| 53      | DO        | O   | LCD driver                               |
| 54      | CE        | O   | LCD driver                               |
| 55      | CL        | O   | LCD driver                               |
| 56      | DI        | I   | LCD driver                               |
| 57-59   | NC        | -   | NC                                       |
| 60      | VCC       | -   | +5V                                      |
| 61      | NC        | -   | NC                                       |
| 62      | VSS       | -   | GND                                      |
| 63-64   | GND       | -   | GND                                      |
| 65-68   | NC        | -   | NC                                       |
| 69      | AUX       | O   | Reserved                                 |
| 70      | NC        | -   | NC                                       |
| 71      | EN2       | I   | Channel selector input                   |
| 72      | LEDTX     | O   | Red LED lights control output            |
| 73      | LEDRX     | O   | Green LED lights control output          |
| 74      | PF1       | I   | SIDE1 key input                          |
| 75      | PF2       | I   | SIDE2 key input                          |
| 76      | SIM1      | -   | GND                                      |
| 77      | SIM2      | -   | GND                                      |
| 78-79   | NC        | -   | NC                                       |
| 80      | 5T_C      | O   | 5T control output                        |
| 81      | 5R_C      | O   | 5R control output                        |
| 82      | 5C_C      | O   | 5C control output                        |
| 83-87   | NC        | -   | NC                                       |
| 88      | BATT      | I   | Battery voltage input                    |
| 89      | RSSI      | I   | Received Signal Strength Indicator input |
| 90      | BUSY      | I   | Busy level input                         |
| 91      | VOX       | I   | VOX level input                          |
| 92      | QT/DQT_IN | I   | QT/DQT input                             |
| 93      | TH_DET    | I   | Thermistor input                         |
| 94      | AVSS      | -   | GND                                      |
| 95      | NC        | -   | NC                                       |
| 96      | VREF      | -   | +5V                                      |
| 97      | AVCC      | -   | +5V                                      |
| 98      | NC        | -   | NC                                       |
| 99      | MIC_MUTE  | O   | MIC mute                                 |
| 100     | NC        | -   | NC                                       |

# TK-2212/2217

## COMPONENTS DESCRIPTION / TERMINAL FUNCTION

### TX-RX UNIT (X57-7120-XX)

| Ref. No.  | Part name  | Description                |
|-----------|------------|----------------------------|
| IC1       | IC         | PLL system                 |
| IC2       | IC         | VCO 1/2 divider            |
| IC101     | IC         | Comparator (APC)           |
| IC201     | IC         | FM IF system               |
| IC301     | IC         | Audio processor            |
| IC302     | IC         | AF AMP                     |
| IC401,402 | IC         | Voltage regulator/ 5V      |
| IC403     | IC         | Voltage detector / Reset   |
| IC404     | IC         | Voltage detector / INT     |
| IC405     | IC         | Microprocessor             |
| IC406     | IC         | EEPROM                     |
| IC407     | IC         | Frequency divider          |
| Q1        | Transistor | Tripler                    |
| Q2        | Transistor | PLL IC f <sub>in</sub> AMP |
| Q3        | FET        | VCO / RX                   |
| Q4        | FET        | VCO / TX                   |
| Q5        | Transistor | DC switch / TX VCO         |
| Q6        | Transistor | RF buffer AMP              |
| Q7        | Transistor | DC switch / RX VCO         |
| Q8        | Transistor | Ripple filter              |
| Q9        | Transistor | RF AMP                     |
| Q102      | Transistor | RF AMP                     |
| Q103      | FET        | TX drive AMP               |
| Q104      | Transistor | APC switch                 |
| Q105      | FET        | APC switch                 |
| Q106      | FET        | TX final AMP               |
| Q107      | Transistor | APC switch                 |
| Q108      | FET        | APC switch                 |
| Q109      | Transistor | APC switch                 |
| Q202      | Transistor | W/N switch / RX            |
| Q203      | Transistor | IF AMP                     |
| Q204      | FET        | Mixer                      |
| Q205      | FET        | RF AMP                     |
| Q301      | Transistor | W/N switch / TX            |
| Q302      | Transistor | MIC AGC                    |
| Q303      | Transistor | DC switch / SP mute        |
| Q304      | Transistor | DC switch                  |
| Q305      | Transistor | DC switch / SP mute        |
| Q306      | FET        | SP mute switch             |
| Q316      | FET        | SP mute switch             |
| Q401      | Transistor | LED switch / Red           |
| Q402      | Transistor | LED switch / Green         |
| Q403      | FET        | 5T switch                  |
| Q404      | Transistor | 5R switch                  |
| Q405      | Transistor | 5C switch                  |
| Q407,408  | FET        | Beat shift switch          |
| Q901      | FET        | W/N switch / TX            |

| Ref. No. | Part name   | Description                |
|----------|-------------|----------------------------|
| D1       | Diode       | Ripple filter              |
| D4       | Varicap     | Frequency control / TX VCO |
| D5       | Varicap     | Frequency control / RX VCO |
| D7       | Varicap     | Frequency control / TX VCO |
| D9       | Varicap     | Frequency control / RX VCO |
| D10      | Varicap     | Modulator                  |
| D11      | Diode       | Current steering           |
| D101     | Diode       | TX/RX RF switch            |
| D102     | Zener diode | APC protect                |
| D103-107 | Diode       | ANT switch                 |
| D202     | Diode       | TX/RX RF switch            |
| D203-206 | Varicap     | RF BPF tuning              |
| D301,302 | Diode       | Detector                   |
| D303     | Diode       | Isolation                  |
| D401     | Diode       | 5V protection              |
| D402     | Diode       | Reverse protection         |
| D403     | LED         | LED/ Red                   |
| D404     | LED         | LED/ Green                 |

### TERMINAL FUNCTION

#### ■ CN401

| Pin No. | Name | I/O | Function            |
|---------|------|-----|---------------------|
| 1       | B    | I   | B (Battery Voltage) |
| 2       | SB   | O   | Switched B          |
| 3       | AFI  | I   | Audio input         |
| 4       | AFO  | O   | Audio output        |
| 5       | GND  | -   | GND                 |
| 6       | UP   | I   | Encoder pulse input |
| 7       | DOWN | I   | Encoder pulse input |
| 8       | GND  | -   | GND                 |

#### ■ CN402

| Pin No. | Name | I/O | Function              |
|---------|------|-----|-----------------------|
| 1       | GND  | -   | GND                   |
| 2       | NC   | -   | No connection         |
| 3       | SB   | O   | Switched B            |
| 4       | 5M   | -   | Power supply          |
| 5       | GND  | -   | GND                   |
| 6       | DI   | I   | Transfer data         |
| 7       | CL   | I   | Synchronization clock |
| 8       | CE   | I   | Chip enable           |
| 9       | DO   | O   | Output data           |
| 10      | GND  | -   | GND                   |

# TK-2212/2217

## PARTS LIST

\* New Parts.   △ indicates safety critical components.  
 Parts without **Parts No.** are not supplied.  
 Les articles non mentionnes 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-2212/2217 (Y50-5970-XX)**  
**TX-RX UNIT (X57-7120-XX)**

| Ref. No.     | Address | New parts | Parts No.   | Description                                   | Destination     |
|--------------|---------|-----------|-------------|-----------------------------------------------|-----------------|
| TK-2212/2217 |         |           |             |                                               |                 |
| 1            | 1B      | *         | A02-3894-13 | PLASTIC CABINET ASSY                          | AK,AM<br>BM,BM3 |
| 2            | 3A      | *         | A10-4078-31 | CHASSIS                                       |                 |
| 3            | 2C      |           | B09-0680-03 | CAP(SP/MIC)                      ACCESSORY    |                 |
| 4            | 2B      |           | B11-1817-04 | ILLUMINATION GUIDE(TX/RX)                     |                 |
| 5            | 1A      | *         | B11-1830-03 | ILLUMINATION GUIDE(LCD)                       |                 |
| 6            | 1A      | *         | B38-0906-15 | LCD ASSY                                      |                 |
| 7            | 1C      | *         | B62-1817-00 | INSTRUCTION MANUAL(ENG/SPA/FR)                |                 |
| 7            | 1C      | *         | B62-1818-00 | INSTRUCTION MANUAL(KOREAN)                    |                 |
| 9            | 1B      |           | D10-0649-03 | LEVER                                         |                 |
| 10           | 1B      |           | D21-0863-04 | SHAFT                                         |                 |
| 11           | 1B      |           | D32-0441-03 | STOPPER                                       | AK,AM<br>BM3    |
| 12           | 2A      |           | E04-0451-05 | RF COAXIAL RECEPTACLE(SMA)                    |                 |
| 13           | 3A      |           | E23-1253-04 | TERMINAL(BATT-)                               |                 |
| -            |         |           | E37-0781-05 | PROCESSED LEAD WIRE(PCB)                      |                 |
| 14           | 2B      |           | E37-1158-05 | PROCESSED LEAD WIRE(SP+)                      |                 |
| 15           | 2B      |           | E37-1176-05 | PROCESSED LEAD WIRE(SP-)                      |                 |
| 16           | 3A      |           | F20-3353-14 | INSULATING SHEET(CHASSIS BATT+)               |                 |
| 17           | 2B      |           | G01-4542-04 | COIL SPRING(LEVER)                            |                 |
| 18           | 2B      |           | G01-4543-04 | COIL SPRING(STOPPER)                          |                 |
| 19           | 2A      |           | G10-1330-04 | FIBROUS SHEET(IC302:AUDIO IC)                 |                 |
| 21           | 2A      | *         | G10-1348-04 | FIBROUS SHEET(SP WIRE)                        | AK,AM<br>BM,BM3 |
| 22           | 3A      |           | G11-4283-04 | RUBBER SHEET(Q106:FINAL FET)                  |                 |
| 23           | 2A      | *         | G11-4359-04 | SHEET(FPC CONNECTOR)                          |                 |
| 24           | 3A      |           | G13-2033-04 | CUSHION(TERMINAL BATT-)                       |                 |
| 25           | 3A      |           | G13-2034-14 | CUSHION(TERMINAL BATT-)                       |                 |
| 27           | 3A      |           | G13-2038-14 | CUSHION(CHASSIS-CERAMIC FILTER)               |                 |
| 28           | 2A      |           | G13-2039-04 | CUSHION(PCB-CERAMIC FILTER)                   |                 |
| 29           | 3A      |           | G13-2045-04 | CUSHION(CHASSIS)                              |                 |
| 30           | 2A      | *         | G13-2053-04 | CUSHION(CHASSIS,ENC)                          |                 |
| 31           | 2A      | *         | G13-2074-04 | CUSHION(PCB)                                  |                 |
| 32           | 3A      | *         | G13-2088-04 | CUSHION(CHASSIS,VOL)                          | AK,AM<br>BM,BM3 |
| 33           | 2A      | *         | G13-2107-04 | CUSHION(MOUNTING HARDWARE)                    |                 |
| 34           | 3A      |           | G53-1604-03 | PACKING(CHASSIS)                              |                 |
| 35           | 3A      |           | G53-1605-03 | PACKING(TERMINAL BATT+)                       |                 |
| 36           | 2B      |           | G53-1606-13 | PACKING(VOL/ENC/LED)                          |                 |
| 38           | 2A      |           | G53-1610-04 | PACKING(SMA)                                  |                 |
| 39           | 2B      | *         | G53-1660-03 | PACKING(SP)                                   |                 |
| 40           | 2A      | *         | G53-1661-03 | PACKING(SP/MIC)                               |                 |
| 41           | 2C      | *         | H12-3179-05 | PACKING FIXTURE                               |                 |
| 42           | 1D      |           | H13-2109-03 | CARTON BOARD                                  |                 |
| 43           | 1C      |           | H25-0085-04 | PROTECTION BAG (100/200/0.07)                 | AK,AM<br>BM,BM3 |
| 44           | 3C      | *         | H52-2079-02 | ITEM CARTON CASE                              |                 |
| 44           | 3C      | *         | H52-2080-02 | ITEM CARTON CASE                              |                 |
| 46           | 2C      |           | J19-5472-03 | HOLDER(SP/MIC)                      ACCESSORY |                 |
| 50           | 2A      |           | J19-5473-03 | HOLDER ASSY(TERMINAL BATT+)                   |                 |
| 51           | 2B      |           | J21-8477-04 | MOUNTING HARDWARE(VOL/ENC)                    |                 |
| 52           | 1A      | *         | J21-8496-02 | MOUNTING HARDWARE(LCD)                        |                 |
| 53           | 2B      | *         | J21-8497-03 | MOUNTING HARDWARE(4 KEY)                      |                 |
| 54           | 2C      |           | J29-0713-05 | BELT CLIP                      ACCESSORY      |                 |
| 55           | 1C      |           | J69-0352-05 | HANDSTRAP                      ACCESSORY      |                 |
| 56           | 2A      | *         | J82-0107-05 | FPC                                           | BM,BM3          |
| 57           | 1A      | *         | J99-0385-04 | ADHESIVE SHEET(LCD)                           |                 |
| 58           | 1B      |           | K29-9307-13 | BUTTON KNOB(SIDE1/SIDE2)                      |                 |

| Ref. No.                                                                  | Address        | New parts | Parts No.     | Description                                  | Destination  |           |
|---------------------------------------------------------------------------|----------------|-----------|---------------|----------------------------------------------|--------------|-----------|
| 59                                                                        | 1B             | *         | K29-9308-13   | BUTTON KNOB(PTT)                             |              |           |
| 60                                                                        | 1B             |           | K29-9309-03   | KNOB(VOL)                                    |              |           |
| 61                                                                        | 1B             |           | K29-9345-04   | KNOB(ENC)                                    |              |           |
| 62                                                                        | 2B             |           | K29-9346-02   | KEY TOP                                      |              |           |
| A                                                                         | 2B             |           | N14-0819-04   | CIRCULAR NUT(VOL KNOB)                       |              |           |
| B                                                                         | 2B             |           | N14-0820-04   | CIRCULAR NUT(CH KNOB)                        |              |           |
| C                                                                         | 2A             |           | N30-2604-46   | PAN HEAD MACHINE SCREW(SMA)                  |              |           |
| D                                                                         | 3A             |           | N30-2606-46   | PAN HEAD MACHINE SCREW(CHASSIS)              |              |           |
| E                                                                         | 1A, 2A, 2B, 3A |           | N83-2005-46   | PAN HEAD TAPTITE SCREW(PCB)                  |              |           |
| 65                                                                        | 1C             | *         | N99-2043-05   | SCREW SET                                    | AK,AM<br>BM3 |           |
| 66                                                                        | 2A             |           | R31-0653-05   | ACCESSORY<br>VARIABLE RESISTOR(POWER SW/VOL) |              |           |
| 67                                                                        | 1B             |           | T07-0369-05   | SPEAKER                                      |              |           |
| 68                                                                        | 1C             |           | T90-1036-05   | HELICAL ANTENNA                              |              | ACCESSORY |
| 68                                                                        | 1C             |           | T90-1050-05   | HELICAL ANTENNA                              |              | ACCESSORY |
| 71                                                                        | 2A             | *         | W02-3684-05   | ENCODER                                      | AK<br>AM     |           |
| 72                                                                        | 2D             |           | W08-0969-05   | CHARGER                                      |              | ACCESSORY |
| 73                                                                        | 1D             |           | W08-0970-05   | AC ADAPTER(AC120V)                           |              | ACCESSORY |
| 73                                                                        | 1D             |           | W08-0971-05   | AC ADAPTER(AC230V)                           |              | ACCESSORY |
| TX-RX UNIT (X57-7120-XX)<br>-10: TK-2212(K,M) TK-2217(M) -21: TK-2217(M3) |                |           |               |                                              |              |           |
| D403                                                                      |                |           | B30-2156-05   | LED(RED)                                     |              |           |
| D404                                                                      |                |           | B30-2157-05   | LED(YELLOW)                                  |              |           |
| C1                                                                        |                |           | CK73HB1H332K  | CHIP C 3300PF K                              |              |           |
| C2                                                                        |                |           | CK73HB1C682K  | CHIP C 6800PF K                              |              |           |
| C3                                                                        |                |           | CK73GB1A105K  | CHIP C 1.0UF K                               |              |           |
| C4                                                                        |                |           | CK73HB1C103K  | CHIP C 0.010UF K                             |              |           |
| C5                                                                        |                |           | CK73HB1H102K  | CHIP C 1000PF K                              |              |           |
| C6                                                                        |                |           | CK73HB1A104K  | CHIP C 0.10UF K                              |              |           |
| C7 ,8                                                                     |                |           | CC73HCH1H101J | CHIP C 100PF J                               |              |           |
| C9                                                                        |                |           | CC73HCH1H100D | CHIP C 10PF D                                |              |           |
| C10                                                                       |                |           | C92-0560-05   | CHIP-TAN 10UF 6.3WV                          |              |           |
| C11                                                                       |                |           | CC73HCH1H101J | CHIP C 100PF J                               |              |           |
| C12                                                                       |                |           | CK73HB1H102K  | CHIP C 1000PF K                              |              |           |
| C13                                                                       |                |           | CK73HB1A104K  | CHIP C 0.10UF K                              |              |           |
| C14                                                                       |                |           | CK73HB1C103K  | CHIP C 0.010UF K                             |              |           |
| C15                                                                       |                |           | CC73HCH1H100D | CHIP C 10PF D                                |              |           |
| C16                                                                       |                |           | CK73HB1H102K  | CHIP C 1000PF K                              |              |           |
| C17                                                                       |                |           | CC73HCH1H470J | CHIP C 47PF J                                |              |           |
| C18                                                                       |                |           | CC73HCH1H180J | CHIP C 18PF J                                |              |           |
| C19                                                                       |                |           | CK73HB1A104K  | CHIP C 0.10UF K                              |              |           |
| C21                                                                       |                |           | C92-0560-05   | CHIP-TAN 10UF 6.3WV                          |              |           |
| C22                                                                       |                |           | C92-0502-05   | CHIP-TAN 0.33UF 35WV                         |              |           |
| C24                                                                       |                |           | CK73HB1H102K  | CHIP C 1000PF K                              |              |           |
| C25                                                                       |                |           | CC73HCH1H020B | CHIP C 2.0PF B                               |              |           |
| C26                                                                       |                |           | CC73HCH1H300J | CHIP C 30PF J                                |              |           |
| C27                                                                       |                |           | C92-0697-05   | CHIP-TAN 3.3UF 16WV                          |              |           |
| C29                                                                       |                |           | CK73HB1H471K  | CHIP C 470PF K                               |              |           |
| C32                                                                       |                |           | C92-0001-05   | CHIP-TAN 0.1UF 35WV                          |              |           |
| C33 ,34                                                                   |                |           | CK73HB1H102K  | CHIP C 1000PF K                              |              |           |
| C35                                                                       |                |           | CC73HCH1H270J | CHIP C 27PF J                                |              |           |
| C38                                                                       |                |           | CC73HCH1H060B | CHIP C 6.0PF B                               |              |           |
| C39                                                                       |                |           | CK73GB1H332K  | CHIP C 3300PF K                              |              |           |

## PARTS LIST

TX-RX UNIT (X57-7120-XX)

| Ref. No. | Address | New parts | Parts No.     | Description         | Destination | Ref. No. | Address | New parts | Parts No.     | Description         | Destination |
|----------|---------|-----------|---------------|---------------------|-------------|----------|---------|-----------|---------------|---------------------|-------------|
| C40      |         |           | CC73HCH1H040B | CHIP C 4.0PF B      |             | C120     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C41      |         |           | CK73GB1H682K  | CHIP C 6800PF K     |             | C121     |         |           | CC73GCH1H100D | CHIP C 10PF D       |             |
| C42      |         |           | CC73HCH1H060B | CHIP C 6.0PF B      |             | C123     |         |           | CK73GB1A105K  | CHIP C 1.0UF K      |             |
| C43      |         |           | CC73HCH1H150J | CHIP C 15PF J       |             | C124,125 |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             |
| C44      |         |           | CK73HB1H471K  | CHIP C 470PF K      |             | C126     |         |           | C92-0565-05   | CHIP-TAN 6.8UF 10WV |             |
| C45      |         |           | CK73GB1A105K  | CHIP C 1.0UF K      |             | C128     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             |
| C47      |         |           | CC73HCH1H101J | CHIP C 100PF J      |             | C130     |         |           | CC73GCH1H100D | CHIP C 10PF D       | AK,AM,BM    |
| C48      |         |           | CK73HB1H471K  | CHIP C 470PF K      |             | C132     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             |
| C49      |         |           | CC73HCH1H101J | CHIP C 100PF J      |             | C133     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C50      |         |           | CC73HCH1H100D | CHIP C 10PF D       |             | C134     |         |           | CK73GB1C104K  | CHIP C 0.10UF K     |             |
| C51      |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C135     |         |           | CK73GB1A105K  | CHIP C 1.0UF K      |             |
| C52      |         |           | CC73HCH1H120J | CHIP C 12PF J       | BM3         | C136     |         |           | CC73GCH1H120J | CHIP C 12PF J       | BM3         |
| C52      |         |           | CC73HCH1H181J | CHIP C 180PF J      | AK,AM,BM    | C136     |         |           | CC73GCH1H270J | CHIP C 27PF J       | AK,AM,BM    |
| C53      |         |           | CC73HCH1H0R5B | CHIP C 0.5PF B      |             | C137     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C54      |         |           | CC73HCH1H040B | CHIP C 4.0PF B      | AK,AM,BM    | C138     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C54      |         |           | CC73HCH1H090B | CHIP C 9.0PF B      | BM3         | C139     |         |           | CC73GCH1H360J | CHIP C 36PF J       | BM3         |
| C55      |         |           | CC73HCH1H110J | CHIP C 11PF J       | BM3         | C139     |         |           | CC73GCH1H680J | CHIP C 68PF J       | AK,AM,BM    |
| C55      |         |           | CC73HCH1H121J | CHIP C 120PF J      | AK,AM,BM    | C140     |         |           | CC73GCH1H101J | CHIP C 100PF J      |             |
| C57      |         |           | CC73HCH1H1R5B | CHIP C 1.5PF B      | AK,AM,BM    | C141     |         |           | CC73GCH1H220J | CHIP C 22PF J       | AK,AM,BM    |
| C58      |         |           | CC73HCH1H060B | CHIP C 6.0PF B      | AK,AM,BM    | C142     |         |           | CC73GCH1H120J | CHIP C 12PF J       | BM3         |
| C58      |         |           | CC73HCH1H100D | CHIP C 10PF D       | BM3         | C142     |         |           | CC73GCH1H150J | CHIP C 15PF J       | AK,AM,BM    |
| C59      |         |           | CC73HCH1H1R5B | CHIP C 1.5PF B      | AK,AM,BM    | C143     |         |           | CC73GCH1H100D | CHIP C 10PF D       |             |
| C59      |         |           | CC73HCH1HR75B | CHIP C 0.75PF B     | BM3         | C144     |         |           | CC73GCH1H151J | CHIP C 150PF J      | BM3         |
| C60      |         |           | CC73HCH1H010B | CHIP C 1.0PF B      |             | C144     |         |           | CC73GCH1H820J | CHIP C 82PF J       | AK,AM,BM    |
| C61      |         |           | CC73HCH1H020B | CHIP C 2.0PF B      | BM3         | C146     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C61      |         |           | CC73HCH1H040B | CHIP C 4.0PF B      | AK,AM,BM    | C147     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             |
| C62      |         |           | CC73HCH1H030B | CHIP C 3.0PF B      | BM3         | C148     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C62      |         |           | CC73HCH1H050B | CHIP C 5.0PF B      | AK,AM,BM    | C149     |         |           | CC73GCH1H110J | CHIP C 11PF J       | BM3         |
| C63      |         |           | CC73HCH1H101J | CHIP C 100PF J      |             | C149     |         |           | CC73GCH1H220G | CHIP C 22PF G       | AK,AM,BM    |
| C64      |         |           | CC73HCH1H040B | CHIP C 4.0PF B      | AK,AM,BM    | C150     |         |           | CC73GCH1H100C | CHIP C 10PF C       | BM3         |
| C64 -67  |         |           | CC73HCH1H050B | CHIP C 5.0PF B      | BM3         | C150     |         |           | CC73GCH1H220J | CHIP C 22PF J       | AK,AM,BM    |
| C65 -67  |         |           | CC73HCH1H050B | CHIP C 5.0PF B      | AK,AM,BM    | C151     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C68 -70  |         |           | CK73HB1H471K  | CHIP C 470PF K      |             | C153     |         |           | CC73GCH1H080D | CHIP C 8.0PF D      | BM3         |
| C71 ,72  |         |           | CK73HB1A104K  | CHIP C 0.10UF K     |             | C153     |         |           | CC73GCH1H100C | CHIP C 10PF C       | AK,AM,BM    |
| C73 ,74  |         |           | CC73HCH1H0R5B | CHIP C 0.5PF B      |             | C154     |         |           | CC73GCH1H050B | CHIP C 5.0PF B      | BM3         |
| C75 ,76  |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C154     |         |           | CC73GCH1H100D | CHIP C 10PF D       | AK,AM,BM    |
| C77      |         |           | CK73HB1H471K  | CHIP C 470PF K      |             | C155     |         |           | CC73GCH1H130J | CHIP C 13PF J       | BM3         |
| C78      |         |           | CC73HCH1H070B | CHIP C 7.0PF B      | AK,AM,BM    | C155     |         |           | CC73GCH1H180J | CHIP C 18PF J       | AK,AM,BM    |
| C78      |         |           | CC73HCH1H330J | CHIP C 33PF J       | BM3         | C156     |         |           | CC73GCH1H060B | CHIP C 6.0PF B      |             |
| C79      |         |           | C92-0713-05   | CHIP-TAN 10UF 6.3WV |             | C156     |         |           | CC73GCH1H120J | CHIP C 12PF J       | AK,AM,BM    |
| C80      |         |           | CK73HB1H471K  | CHIP C 470PF K      |             | C157     |         |           | CC73GCH1H130J | CHIP C 13PF J       | BM3         |
| C81      |         |           | CC73HCH1H150J | CHIP C 15PF J       |             | C157     |         |           | CC73GCH1H150J | CHIP C 15PF J       | AK,AM,BM    |
| C82      |         |           | CK73HB1H102K  | CHIP C 1000PF K     | AK,AM,BM    | C158     |         |           | CC73GCH1H100C | CHIP C 10PF C       | BM3         |
| C82 -86  |         |           | CK73HB1H102K  | CHIP C 1000PF K     | BM3         | C158     |         |           | CC73GCH1H220J | CHIP C 22PF J       | AK,AM,BM    |
| C83      |         |           | CC73HCH1H330J | CHIP C 33PF J       | AK,AM,BM    | C159     |         |           | CC73GCH1H070D | CHIP C 7.0PF D      | AK,AM,BM    |
| C84 -86  |         |           | CK73HB1H102K  | CHIP C 1000PF K     | AK,AM,BM    | C159     |         |           | CC73GCH1H3R5B | CHIP C 3.5PF B      | BM3         |
| C87      |         |           | CC73HCH1H100D | CHIP C 10PF D       |             | C160     |         |           | CC73GCH1H330J | CHIP C 33PF J       |             |
| C90      |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C161     |         |           | CC73GCH1H040B | CHIP C 4.0PF B      | BM3         |
| C101     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C201     |         |           | CK73GB1A224K  | CHIP C 0.22UF K     |             |
| C104     |         |           | CC73GCH1H390J | CHIP C 39PF J       |             | C206     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             |
| C105     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C207     |         |           | CK73HB1H182K  | CHIP C 1800PF K     |             |
| C107     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C208     |         |           | CK73HB1H471K  | CHIP C 470PF K      |             |
| C108     |         |           | CC73GCH1H390J | CHIP C 39PF J       |             | C209     |         |           | C92-0713-05   | CHIP-TAN 10UF 6.3WV |             |
| C109     |         |           | CK73GB1C104K  | CHIP C 0.10UF K     |             | C210     |         |           | CK73HB1H471K  | CHIP C 470PF K      |             |
| C110,111 |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C211     |         |           | CK73HB1C103K  | CHIP C 0.010UF K    |             |
| C115     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             | C213     |         |           | CK73HB1A104K  | CHIP C 0.10UF K     |             |
| C116     |         |           | CC73GCH1H220J | CHIP C 22PF J       |             | C214     |         |           | CC73HCH1H680J | CHIP C 68PF J       |             |
| C117     |         |           | CC73GCH1H100D | CHIP C 10PF D       |             | C215     |         |           | CK73HB1H102K  | CHIP C 1000PF K     |             |
| C118     |         |           | CC73GCH1H101J | CHIP C 100PF J      |             | C216     |         |           | CK73GB1C104K  | CHIP C 0.10UF K     |             |
| C119     |         |           | CC73GCH1H270J | CHIP C 27PF J       | AK,AM,BM    | C217     |         |           | CK73HB1A104K  | CHIP C 0.10UF K     |             |

AK : TK-2212 (K) AM : TK-2212 (M) BM : TK-2217 (M) BM3 : TK-2217 (M3)

## PARTS LIST

## TX-RX UNIT (X57-7120-XX)

| Ref. No. | Address | New parts | Parts No.     | Description          | Destination | Ref. No. | Address | New parts | Parts No.     | Description          | Destination |
|----------|---------|-----------|---------------|----------------------|-------------|----------|---------|-----------|---------------|----------------------|-------------|
| C218     |         |           | CK73GB1C104K  | CHIP C 0.10UF K      |             | C304     |         |           | CK73GB1A224K  | CHIP C 0.22UF K      |             |
| C219     |         |           | CC73HCH1H330J | CHIP C 33PF J        |             | C306     |         |           | C92-0507-05   | CHIP-TAN 4.7UF 6.3WV |             |
| C220     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C307,308 |         |           | CK73HB1A104K  | CHIP C 0.10UF K      |             |
| C221     |         |           | CK73GB1C104K  | CHIP C 0.10UF K      |             | C309     |         |           | CC73GCH1H820J | CHIP C 82PF J        |             |
| C222     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C310     |         |           | CK73HB1A683K  | CHIP C 0.068UF K     |             |
| C224,225 |         |           | CK73HB1C103K  | CHIP C 0.010UF K     |             | C311     |         |           | CK73GB1A105K  | CHIP C 1.0UF K       |             |
| C227     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C312     |         |           | CC73GCH1H120J | CHIP C 12PF J        |             |
| C228     |         |           | CC73GCH1H100C | CHIP C 10PF C        |             | C313     |         |           | CC73GCH1H121J | CHIP C 120PF J       |             |
| C230     |         |           | CC73HCH1H030B | CHIP C 3.0PF B       | BM3         | C314     |         |           | CK73HB1A104K  | CHIP C 0.10UF K      |             |
| C230     |         |           | CC73HCH1H080B | CHIP C 8.0PF B       | AK,AM,BM    | C315     |         |           | CK73GB1A105K  | CHIP C 1.0UF K       |             |
| C231,232 |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             | C316     |         |           | CK73GB1C104K  | CHIP C 0.10UF K      | BM3         |
| C233     |         |           | CC73HCH1H020B | CHIP C 2.0PF B       |             | C316     |         |           | CK73GB1C473K  | CHIP C 0.047UF K     | AK,AM,BM    |
| C234     |         |           | CK73HB1C103K  | CHIP C 0.010UF K     |             | C317     |         |           | CK73HB1A104K  | CHIP C 0.10UF K      |             |
| C235     |         |           | CC73HCH1H020B | CHIP C 2.0PF B       | BM3         | C318     |         |           | C92-0507-05   | CHIP-TAN 4.7UF 6.3WV |             |
| C235     |         |           | CC73HCH1H090B | CHIP C 9.0PF B       | AK,AM,BM    | C319     |         |           | CC73GCH1H271J | CHIP C 270PF J       |             |
| C236     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | C320     |         |           | CK73HB1C103K  | CHIP C 0.010UF K     |             |
| C237     |         |           | CC73HCH1H030B | CHIP C 3.0PF B       | BM3         | C321     |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             |
| C237     |         |           | CC73HCH1H050B | CHIP C 5.0PF B       | AK,AM,BM    | C322     |         |           | CK73HB1C153K  | CHIP C 0.015UF K     |             |
| C238     |         |           | CC73GCH1H120J | CHIP C 12PF J        |             | C323     |         |           | CC73GCH1H820J | CHIP C 82PF J        |             |
| C239     |         |           | CC73HCH1H060B | CHIP C 6.0PF B       |             | C324     |         |           | CC73HCH1H820J | CHIP C 82PF J        |             |
| C241     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C325     |         |           | CK73HB1A104K  | CHIP C 0.10UF K      |             |
| C242     |         |           | CK73GB1C104K  | CHIP C 0.10UF K      |             | C326     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |
| C243     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C327     |         |           | CC73HCH1H101J | CHIP C 100PF J       |             |
| C244     |         |           | CC73HCH1H020B | CHIP C 2.0PF B       | BM3         | C328     |         |           | CK73HB1H391K  | CHIP C 390PF K       |             |
| C244     |         |           | CC73HCH1H040B | CHIP C 4.0PF B       | AK,AM,BM    | C329,330 |         |           | CK73GB1A105K  | CHIP C 1.0UF K       |             |
| C245     |         |           | CK73HB1H471K  | CHIP C 470PF K       |             | C331     |         |           | CK73HB1A104K  | CHIP C 0.10UF K      |             |
| C247     |         |           | CC73GCH1H010B | CHIP C 1.0PF B       | BM3         | C332     |         |           | CK73HB1H471K  | CHIP C 470PF K       |             |
| C247     |         |           | CC73GCH1H040B | CHIP C 4.0PF B       | AK,AM,BM    | C333,334 |         |           | CK73GB1C104K  | CHIP C 0.10UF K      |             |
| C248     |         |           | CC73GCH1H270J | CHIP C 27PF J        | AK,AM,BM    | C335     |         |           | CC73GCH1H221J | CHIP C 220PF J       |             |
| C248     |         |           | CC73GCH1H300J | CHIP C 30PF J        | BM3         | C336     |         |           | CK73FB1C474K  | CHIP C 0.47UF K      |             |
| C249     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C338     |         |           | CC73GCH1H101J | CHIP C 100PF J       |             |
| C250     |         |           | CC73GCH1H020B | CHIP C 2.0PF B       | BM3         | C339     |         |           | C92-0560-05   | CHIP-TAN 10UF 6.3WV  |             |
| C250     |         |           | CC73GCH1H040B | CHIP C 4.0PF B       | AK,AM,BM    | C340     |         |           | CK73GB1C104K  | CHIP C 0.10UF K      |             |
| C251     |         |           | C92-0714-05   | CHIP-TAN 4.7UF 6.3WV |             | C341     |         |           | CK73GB1C473K  | CHIP C 0.047UF K     |             |
| C252     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C342     |         |           | C92-0560-05   | CHIP-TAN 10UF 6.3WV  |             |
| C253     |         |           | CC73GCH1H1R5B | CHIP C 1.5PF B       | BM3         | C343     |         |           | CK73GB1C473K  | CHIP C 0.047UF K     |             |
| C253     |         |           | CC73GCH1H4R5B | CHIP C 4.5PF B       | AK,AM,BM    | C344     |         |           | CC73GCH1H221J | CHIP C 220PF J       |             |
| C254     |         |           | CC73GCH1H270J | CHIP C 27PF J        | AK,AM,BM    | C345     |         |           | C92-0786-05   | TANTAL 100UF 6.3WV   |             |
| C254     |         |           | CC73GCH1H330J | CHIP C 30PF J        | BM3         | C346     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             |
| C255     |         |           | CC73GCH1H0R5B | CHIP C 0.5PF B       | BM3         | C348     |         |           | CK73HB1H471K  | CHIP C 470PF K       |             |
| C255     |         |           | CC73GCH1H4R5B | CHIP C 4.5PF B       | AK,AM,BM    | C350     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |
| C256     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C351,352 |         |           | CK73HB1C103K  | CHIP C 0.010UF K     |             |
| C258     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C354     |         |           | CK73HB1A104K  | CHIP C 0.10UF K      |             |
| C260     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C356     |         |           | CK73HB1A333K  | CHIP C 0.033UF K     |             |
| C262     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C357     |         |           | CK73HB1E472K  | CHIP C 4700PF K      |             |
| C263     |         |           | CC73GCH1H100C | CHIP C 10PF C        |             | C401     |         |           | CC73GCH1H471J | CHIP C 470PF J       |             |
| C264     |         |           | CC73GCH1H030B | CHIP C 3.0PF B       | BM3         | C402     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |
| C264     |         |           | CC73GCH1H040B | CHIP C 4.0PF B       | AK,AM,BM    | C403     |         |           | CK73GB1C104K  | CHIP C 0.10UF K      |             |
| C265     |         |           | CC73GCH1H330J | CHIP C 33PF J        |             | C405     |         |           | CC73GCH1H101J | CHIP C 100PF J       |             |
| C266     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C406     |         |           | CK73HB1E472K  | CHIP C 4700PF K      |             |
| C267     |         |           | CC73GCH1H1R5B | CHIP C 1.5PF B       | BM3         | C407     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |
| C267,268 |         |           | CC73GCH1H030B | CHIP C 3.0PF B       | AK,AM,BM    | C408     |         |           | CK73HB1E472K  | CHIP C 4700PF K      |             |
| C268     |         |           | CC73GCH1H020B | CHIP C 2.0PF B       | BM3         | C409,410 |         |           | CK73GB1A105K  | CHIP C 1.0UF K       |             |
| C269     |         |           | CC73GCH1H330J | CHIP C 33PF J        |             | C411     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |
| C270     |         |           | CC73GCH1H010B | CHIP C 1.0PF B       | BM3         | C415     |         |           | CK73HB1H471K  | CHIP C 470PF K       |             |
| C270     |         |           | CC73GCH1H040B | CHIP C 4.0PF B       | AK,AM,BM    | C417     |         |           | CK73GB1A105K  | CHIP C 1.0UF K       |             |
| C271     |         |           | CC73GCH1H110J | CHIP C 11PF J        |             | C418     |         |           | CK73HB1E562K  | CHIP C 5600PF K      |             |
| C272     |         |           | CC73GCH1H070D | CHIP C 7.0PF D       | BM3         | C419     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |
| C280     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             | C421     |         |           | CK73GB1A105K  | CHIP C 1.0UF K       |             |
| C302     |         |           | CK73HB1C103K  | CHIP C 0.010UF K     |             | C424     |         |           | CK73HB1H102K  | CHIP C 1000PF K      |             |

## PARTS LIST

## TX-RX UNIT (X57-7120-XX)

| Ref. No. | Address | New parts | Parts No.     | Description                     | Destination | Ref. No.  | Address | New parts | Parts No.    | Description                   | Destination |
|----------|---------|-----------|---------------|---------------------------------|-------------|-----------|---------|-----------|--------------|-------------------------------|-------------|
| C426,427 |         |           | CK73GB1A105K  | CHIP C 1.0UF K                  |             | L116      |         |           | L34-4576-05  | AIR-CORE COIL                 | AK,AM,BM    |
| C428,429 |         |           | CK73HB1H102K  | CHIP C 1000PF K                 |             | L117      |         |           | L34-4575-05  | AIR-CORE COIL                 | AK,AM,BM    |
| C430     |         |           | CK73GB1H103K  | CHIP C 0.010UF K                |             | L118      |         |           | L34-4567-05  | AIR-CORE COIL                 | AK,AM,BM    |
| C431     |         |           | CK73HB1C103K  | CHIP C 0.010UF K                |             | L119      |         |           | L34-4566-05  | AIR-CORE COIL                 |             |
| C432     |         |           | CC73HCH1H050B | CHIP C 5.0PF B                  |             | L121      |         |           | L34-4563-05  | AIR-CORE COIL                 | BM3         |
| C433,434 |         |           | CC73HCH1H030B | CHIP C 3.0PF B                  |             | L122,123  |         |           | L34-4574-05  | AIR-CORE COIL                 | BM3         |
| C435     |         |           | CC73HCH1H050B | CHIP C 5.0PF B                  |             | L124      |         |           | L34-4566-05  | AIR-CORE COIL                 | BM3         |
| C440     |         |           | CC73GCH1H1R5B | CHIP C 1.5PF B                  |             | L201      |         |           | L40-1091-37  | SMALL FIXED INDUCTOR(1.000UH) |             |
| C443     |         |           | CK73GB1A474K  | CHIP C 0.47UF K                 |             | L202      |         |           | L41-2775-38  | SMALL FIXED INDUCTOR(27NH)    | BM3         |
| C450,451 |         |           | CK73HB1C103K  | CHIP C 0.010UF K                |             | L202      |         |           | L41-3975-38  | SMALL FIXED INDUCTOR(39NH)    | AK,AM,BM    |
| C452     |         |           | CK73HB1H102K  | CHIP C 1000PF K                 |             | L203      |         |           | L92-0138-05  | CHIP FERRITE                  |             |
| C456     |         |           | CK73GB1C104K  | CHIP C 0.10UF K                 |             | L204      |         |           | L40-5685-85  | SMALL FIXED INDUCTOR(0.56UH)  |             |
| C901,902 |         |           | CK73GB1A105K  | CHIP C 1.0UF K                  |             | L205      |         |           | L41-4775-38  | SMALL FIXED INDUCTOR(47NH)    | BM3         |
| TC1_2    |         |           | C05-0245-05   | CERAMIC TRIMMER CAPACITOR(10PF) |             | L205      |         |           | L41-6875-38  | SMALL FIXED INDUCTOR(68NH)    | AK,AM,BM    |
| CN201    |         |           | E23-1081-05   | TERMINAL                        |             | L206      |         |           | L41-1885-38  | SMALL FIXED INDUCTOR(180NH)   |             |
| CN401    |         | *         | E40-6363-05   | FLAT CABLE CONNECTOR            |             | L207      |         |           | L41-1085-38  | SMALL FIXED INDUCTOR(100NH)   | BM3         |
| CN402    |         | *         | E40-6430-05   | FLAT CABLE CONNECTOR            |             | L207      |         |           | L41-1585-38  | SMALL FIXED INDUCTOR(150NH)   | AK,AM,BM    |
| J301     |         |           | E11-0457-05   | PHONE JACK(2.5/3.5)             |             | L209      |         |           | L41-3378-14  | SMALL FIXED INDUCTOR(33NH)    | BM3         |
| F401     |         | *         | F53-0324-05   | FUSE(2.5A)                      |             | L209      |         |           | L41-5678-14  | SMALL FIXED INDUCTOR(56NH)    | AK,AM,BM    |
| 101      | 2A      | *         | J30-1288-14   | SPACER                          |             | L210      |         |           | L92-0138-05  | CHIP FERRITE                  |             |
| CD201    |         |           | L79-1582-05   | TUNING COIL                     |             | L211      |         |           | L41-3978-14  | SMALL FIXED INDUCTOR(39NH)    | BM3         |
| CF201    | 2A      |           | L72-0973-05   | CERAMIC FILTER                  |             | L211      |         |           | L41-5678-14  | SMALL FIXED INDUCTOR(56NH)    | AK,AM,BM    |
| L1       |         |           | L40-4791-37   | SMALL FIXED INDUCTOR(4.700UH)   |             | L213      |         |           | L41-3378-14  | SMALL FIXED INDUCTOR(33NH)    | BM3         |
| L3       |         |           | L40-5681-86   | SMALL FIXED INDUCTOR(0.56UH)    |             | L213      |         |           | L41-5678-14  | SMALL FIXED INDUCTOR(56NH)    | AK,AM,BM    |
| L5       |         |           | L40-5681-86   | SMALL FIXED INDUCTOR(0.56UH)    |             | L214      |         |           | L41-2778-14  | SMALL FIXED INDUCTOR(27NH)    | BM3         |
| L6_7     |         |           | L92-0138-05   | CHIP FERRITE                    |             | L214      |         |           | L41-4778-14  | SMALL FIXED INDUCTOR(47NH)    | AK,AM,BM    |
| L8       |         |           | L41-1275-38   | SMALL FIXED INDUCTOR(12NH)      | BM3         | L255      |         |           | L41-3975-38  | SMALL FIXED INDUCTOR(39NH)    | BM3         |
| L8       |         |           | L41-1875-38   | SMALL FIXED INDUCTOR(18NH)      | AK,AM,BM    | L301      |         |           | L92-0140-05  | CHIP FERRITE                  |             |
| L9       |         |           | L41-3375-38   | SMALL FIXED INDUCTOR(33NH)      |             | L302      |         |           | L92-0149-05  | CHIP FERRITE                  |             |
| L10      |         |           | L41-1885-38   | SMALL FIXED INDUCTOR(180NH)     |             | L401      |         |           | L92-0149-05  | CHIP FERRITE                  |             |
| L11      |         |           | L41-1085-38   | SMALL FIXED INDUCTOR(100NH)     |             | L402-404  |         |           | L92-0138-05  | CHIP FERRITE                  |             |
| L12      |         |           | L92-0138-05   | CHIP FERRITE                    |             | X1        |         |           | L77-1931-05  | TCXO(12.8MHZ)                 |             |
| L13_14   |         |           | L41-2285-38   | SMALL FIXED INDUCTOR(220NH)     |             | X3        |         |           | L77-1633-05  | CRYSTAL RESONATOR(7.3728MHZ)  |             |
| L16      |         |           | L40-2278-67   | SMALL FIXED INDUCTOR(22NH)      | BM3         | XF201     |         |           | L71-0619-05  | MCF(38.85MHZ)                 |             |
| L16      |         |           | L40-3978-67   | SMALL FIXED INDUCTOR(39NH)      | AK,AM,BM    | CP404     |         |           | RK75HA1J473J | CHIP-COM 47K J 1/16W          |             |
| L17      |         |           | L40-1878-67   | SMALL FIXED INDUCTOR(18NH)      | BM3         | CP405-407 |         |           | RK75HA1J102J | CHIP-COM 1.0K J 1/16W         |             |
| L17      |         |           | L40-2778-67   | SMALL FIXED INDUCTOR(27NH)      | AK,AM,BM    | R1        |         |           | RK73HB1J223J | CHIP R 22K J 1/16W            |             |
| L18_19   |         |           | L41-2285-03   | SMALL FIXED INDUCTOR(220NH)     |             | R2        |         |           | RK73HB1J103J | CHIP R 10K J 1/16W            |             |
| L20_21   |         |           | L40-3391-86   | SMALL FIXED INDUCTOR(3.3UH)     |             | R3        |         |           | RK73HB1J333J | CHIP R 33K J 1/16W            |             |
| L22      |         |           | L92-0138-05   | CHIP FERRITE                    |             | R4        |         |           | RK73HB1J563J | CHIP R 56K J 1/16W            |             |
| L23      |         |           | L41-3975-38   | SMALL FIXED INDUCTOR(39NH)      |             | R5        |         |           | RK73HB1J104J | CHIP R 100K J 1/16W           |             |
| L24      |         |           | L92-0141-05   | CHIP FERRITE                    |             | R6        |         |           | RK73HB1J823J | CHIP R 82K J 1/16W            |             |
| L25      |         |           | L41-8275-38   | SMALL FIXED INDUCTOR(82NH)      |             | R7        |         |           | RK73HB1J101J | CHIP R 100 J 1/16W            |             |
| L50      |         |           | L92-0138-05   | CHIP FERRITE                    |             | R8 -11    |         |           | R92-1368-05  | CHIP R 0 OHM                  |             |
| L102     |         |           | L41-1085-38   | SMALL FIXED INDUCTOR(100NH)     |             | R12       |         |           | RK73HB1J222J | CHIP R 2.2K J 1/16W           |             |
| L103     |         |           | L92-0138-05   | CHIP FERRITE                    |             | R13       |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W          |             |
| L104     |         |           | L41-2775-38   | SMALL FIXED INDUCTOR(27NH)      |             | R14       |         |           | RK73HB1J334J | CHIP R 330K J 1/16W           |             |
| L105     |         |           | L40-1585-54   | SMALL FIXED INDUCTOR(150NH)     |             | R15       |         |           | RK73GB1J221J | CHIP R 220 J 1/16W            |             |
| L106     |         |           | L92-0149-05   | CHIP FERRITE                    |             | R16       |         |           | RK73GB1J561J | CHIP R 560 J 1/16W            |             |
| L107     |         |           | L40-2275-54   | SMALL FIXED INDUCTOR(22NH)      | BM3         | R17       |         |           | RK73HB1J101J | CHIP R 100 J 1/16W            |             |
| L107     |         |           | L40-2775-54   | SMALL FIXED INDUCTOR(27NH)      | AK,AM,BM    | R18       |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W          |             |
| L108     |         |           | L92-0149-05   | CHIP FERRITE                    |             | R19       |         |           | RK73GB1J152J | CHIP R 1.5K J 1/16W           |             |
| L109     |         |           | L40-2295-85   | SMALL FIXED INDUCTOR(2.2UH)     |             | R20       |         |           | RK73HB1J100J | CHIP R 10 J 1/16W             |             |
| L110     |         |           | L41-3975-38   | SMALL FIXED INDUCTOR(39NH)      | BM3         | R21       |         |           | RK73GB1J681J | CHIP R 680 J 1/16W            |             |
| L110     |         |           | L41-5675-38   | SMALL FIXED INDUCTOR(56NH)      | AK,AM,BM    | R22       |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W          |             |
| L111     |         |           | L40-1092-81   | SMALL FIXED INDUCTOR            |             | R23       |         |           | RK73GB1J103J | CHIP R 10K J 1/16W            |             |
| L112     |         |           | L34-4577-05   | AIR-CORE COIL                   |             | R25       |         |           | RK73HB1J223J | CHIP R 22K J 1/16W            |             |
| L113     |         |           | L34-4563-05   | AIR-CORE COIL                   |             | R26       |         |           | RK73HB1J103J | CHIP R 10K J 1/16W            |             |
| L114,115 |         |           | L34-4573-05   | AIR-CORE COIL                   | AK,AM,BM    | R27       |         |           | RK73HB1J220J | CHIP R 22 J 1/16W             |             |
| L115     |         |           | L34-4574-05   | AIR-CORE COIL                   | BM3         | R30       |         |           | RK73HB1J123J | CHIP R 12K J 1/16W            |             |

AK : TK-2212 (K) AM : TK-2212 (M) BM : TK-2217 (M) BM3 : TK-2217 (M3)



## PARTS LIST

## TX-RX UNIT (X57-7120-XX)

| Ref. No. | Address | New parts | Parts No.    | Description          | Destination | Ref. No. | Address | New parts | Parts No.    | Description          | Destination                        |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|----------------------|------------------------------------|
| R31      |         |           | RK73HB1J564J | CHIP R 560K J 1/16W  |             | R216     |         |           | RK73HB1J124J | CHIP R 120K J 1/16W  |                                    |
| R32      |         |           | RK73HB1J102J | CHIP R 1.0K J 1/16W  |             | R217     |         |           | RK73HB1J472J | CHIP R 4.7K J 1/16W  |                                    |
| R33      |         |           | RK73HB1J154J | CHIP R 150K J 1/16W  |             | R218     |         |           | RK73HB1J561J | CHIP R 560 J 1/16W   |                                    |
| R34      |         |           | RK73HB1J472J | CHIP R 4.7K J 1/16W  |             | R219,220 |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |                                    |
| R35 ,36  |         |           | RK73HB1J274J | CHIP R 270K J 1/16W  |             | R221     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |                                    |
| R37      |         |           | RK73HB1J101J | CHIP R 100 J 1/16W   |             | R222     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |                                    |
| R38      |         |           | RK73HB1J181J | CHIP R 180 J 1/16W   |             | R223-226 |         |           | RK73HB1J823J | CHIP R 82K J 1/16W   |                                    |
| R39      |         |           | RK73HB1J151J | CHIP R 150 J 1/16W   |             | R227     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |                                    |
| R40      |         |           | RK73HB1J101J | CHIP R 100 J 1/16W   |             | R228,229 |         |           | RK73HB1J105J | CHIP R 1.0M J 1/16W  |                                    |
| R41      |         |           | RK73HB1J154J | CHIP R 150K J 1/16W  |             | R230     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |                                    |
| R42      |         |           | RK73HB1J472J | CHIP R 4.7K J 1/16W  |             | R231     |         |           | RK73GB1J470J | CHIP R 47 J 1/16W    |                                    |
| R43      |         |           | RK73HB1J101J | CHIP R 100 J 1/16W   |             | R233     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |                                    |
| R44      |         |           | RK73HB1J102J | CHIP R 1.0K J 1/16W  |             | R234     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |                                    |
| R45 ,46  |         |           | RK73HB1J332J | CHIP R 3.3K J 1/16W  |             | R237     |         |           | RK73GB1J184J | CHIP R 180K J 1/16W  |                                    |
| R47      |         |           | RK73HB1J470J | CHIP R 47 J 1/16W    |             | R238     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |                                    |
| R48      |         |           | RK73HB1J331J | CHIP R 330 J 1/16W   |             | R239     |         |           | RK73GB1J470J | CHIP R 47 J 1/16W    | AK,AM,BM<br>BM3<br>AK,AM,BM        |
| R49      |         |           | RK73HB1J222J | CHIP R 2.2K J 1/16W  |             | R239,240 |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |                                    |
| R50      |         |           | RK73HB1J472J | CHIP R 4.7K J 1/16W  |             | R240     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |                                    |
| R51      |         |           | RK73HB1J100J | CHIP R 10 J 1/16W    |             | R241,242 |         |           | RK73HB1J105J | CHIP R 1.0M J 1/16W  |                                    |
| R101     |         |           | RK73HB1J123J | CHIP R 12K J 1/16W   |             | R243     |         |           | R92-0670-05  | CHIP R 0 OHM         |                                    |
| R103     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R291     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |                                    |
| R107     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             | R301     |         |           | RK73HB1J473J | CHIP R 47K J 1/16W   |                                    |
| R108     |         |           | RK73GB1J152J | CHIP R 1.5K J 1/16W  |             | R304     |         |           | RK73HB1J564J | CHIP R 560K J 1/16W  |                                    |
| R109     |         |           | RK73GB1J150J | CHIP R 15 J 1/16W    |             | R305     |         |           | RK73HB1J104J | CHIP R 100K J 1/16W  |                                    |
| R110     |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   | BM3         | R306     |         |           | RK73HB1J102J | CHIP R 1.0K J 1/16W  |                                    |
| R110,111 |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   | AK,AM,BM    | R307     |         |           | R92-1368-05  | CHIP R 0 OHM         | AK,AM,BM<br>BM3<br>AK,AM,BM<br>BM3 |
| R111     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   | BM3         | R310     |         |           | RK73GB1J394J | CHIP R 390K J 1/16W  |                                    |
| R112     |         |           | RK73GB1J180J | CHIP R 18 J 1/16W    | AK,AM,BM    | R311     |         |           | RK73HB1J123J | CHIP R 12K J 1/16W   |                                    |
| R112     |         |           | RK73GB1J220J | CHIP R 22 J 1/16W    | BM3         | R312     |         |           | RK73GB1J334J | CHIP R 330K J 1/16W  |                                    |
| R113     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   | BM3         | R313     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |                                    |
| R113     |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   | AK,AM,BM    | R314     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |                                    |
| R114     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             | R315     |         |           | RK73GB1J334J | CHIP R 330K J 1/16W  |                                    |
| R115     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R316     |         |           | RK73GB1J124J | CHIP R 120K J 1/16W  |                                    |
| R116     |         |           | RK73GB1J150J | CHIP R 15 J 1/16W    |             | R317     |         |           | RK73GB1J474J | CHIP R 470K J 1/16W  |                                    |
| R117     |         |           | RK73GB1J683J | CHIP R 68K J 1/16W   |             | R318     |         |           | RK73GB1J122J | CHIP R 1.2K J 1/16W  |                                    |
| R119     |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   |             | R319     |         |           | RK73HB1J563J | CHIP R 56K J 1/16W   |                                    |
| R120     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R320     |         |           | RK73HB1J332J | CHIP R 3.3K J 1/16W  |                                    |
| R121     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             | R321     |         |           | RK73HB1J224J | CHIP R 220K J 1/16W  |                                    |
| R122     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             | R322     |         |           | RK73HB1J184J | CHIP R 180K J 1/16W  |                                    |
| R123     |         |           | RK73GB1J820J | CHIP R 82 J 1/16W    |             | R323     |         |           | RK73HB1J563J | CHIP R 56K J 1/16W   |                                    |
| R124     |         |           | RK73GB1J123J | CHIP R 12K J 1/16W   |             | R324,325 |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |                                    |
| R126     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             | R326     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |                                    |
| R127-129 |         |           | RK73EB2ER39K | CHIP R 0.39 K 1/4W   |             | R327     |         |           | RK73GB1J184J | CHIP R 180K J 1/16W  |                                    |
| R130-135 |         |           | RK73GH1J154D | CHIP R 150K D 1/16W  |             | R328     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |                                    |
| R136,137 |         |           | RK73GB1J271J | CHIP R 270 J 1/16W   |             | R329     |         |           | RK73GB1J823J | CHIP R 82K J 1/16W   |                                    |
| R138     |         |           | RK73GB1J105J | CHIP R 1.0M J 1/16W  |             | R330     |         |           | RK73HB1J332J | CHIP R 3.3K J 1/16W  |                                    |
| R139     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             | R331     |         |           | RK73GB1J393J | CHIP R 39K J 1/16W   |                                    |
| R140     |         |           | RK73GB1J563J | CHIP R 56K J 1/16W   |             | R332     |         |           | RK73GB1J153J | CHIP R 15K J 1/16W   |                                    |
| R141     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             | R334     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |                                    |
| R142     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R335     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |                                    |
| R143     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             | R336     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |                                    |
| R203     |         |           | RK73HB1J184J | CHIP R 180K J 1/16W  |             | R337     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |                                    |
| R206     |         |           | RK73GB1J100J | CHIP R 10 J 1/16W    |             | R338     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |                                    |
| R207     |         |           | RK73HB1J472J | CHIP R 4.7K J 1/16W  |             | R339     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |                                    |
| R208     |         |           | RK73HB1J823J | CHIP R 82K J 1/16W   |             | R340     |         |           | RK73GB1J182J | CHIP R 1.8K J 1/16W  |                                    |
| R209     |         |           | RK73HB1J272J | CHIP R 2.7K J 1/16W  |             | R341     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |                                    |
| R210,211 |         |           | RK73HB1J332J | CHIP R 3.3K J 1/16W  |             | R342     |         |           | RK73GB1J100J | CHIP R 10 J 1/16W    |                                    |
| R212     |         |           | RK73HB1J823J | CHIP R 82K J 1/16W   |             | R343     |         |           | RK73GB1J474J | CHIP R 470K J 1/16W  |                                    |
| R213     |         |           | RK73HB1J392J | CHIP R 3.9K J 1/16W  |             | R344     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |                                    |
| R215     |         |           | RK73HB1J101J | CHIP R 100 J 1/16W   |             | R345,346 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |                                    |

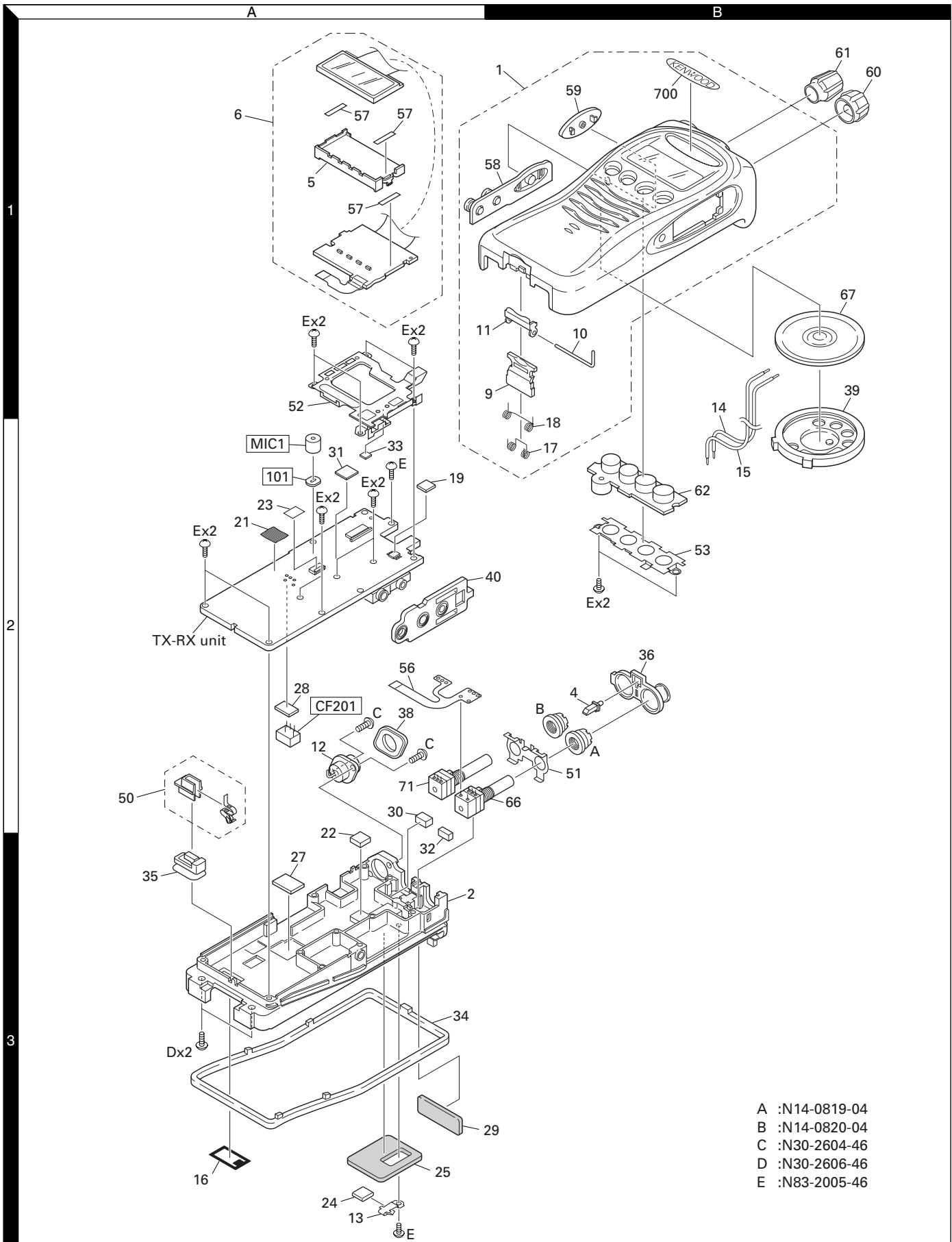
## PARTS LIST

TX-RX UNIT (X57-7120-XX)

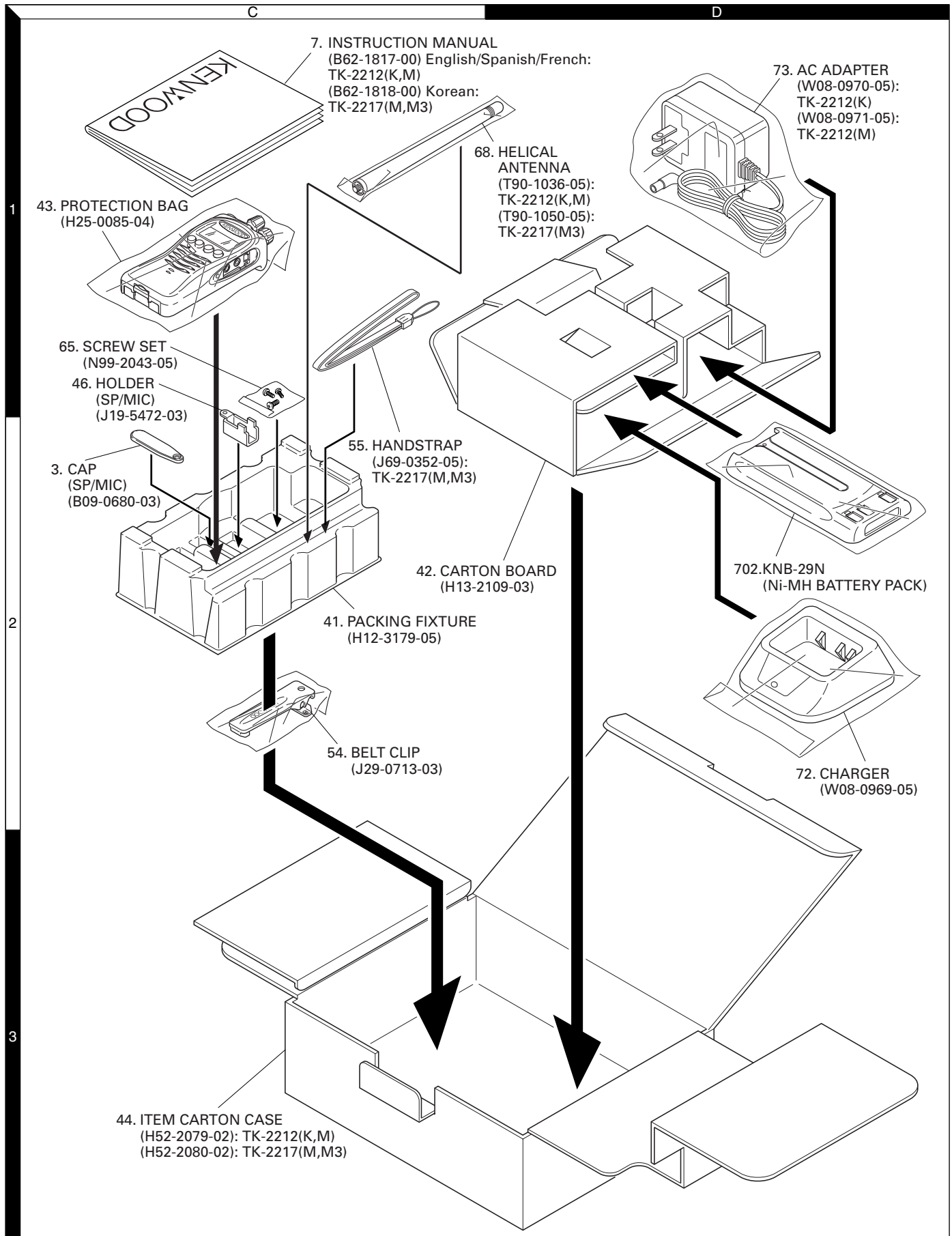
| Ref. No.  | Address | New parts | Parts No.      | Description                | Destination | Ref. No. | Address | New parts | Parts No.     | Description | Destination |
|-----------|---------|-----------|----------------|----------------------------|-------------|----------|---------|-----------|---------------|-------------|-------------|
| R347      |         |           | RK73GB1J104J   | CHIP R 100K J 1/16W        |             | IC407    |         |           | TC7W74FU      | MOS-IC      |             |
| R348      |         |           | RK73GB1J563J   | CHIP R 56K J 1/16W         |             | Q1       |         |           | KTC4082       | TRANSISTOR  |             |
| R349      |         |           | RK73GB1J333J   | CHIP R 33K J 1/16W         |             | Q2       |         |           | 2SC5108(Y)    | TRANSISTOR  |             |
| R350      |         |           | RK73HB1J102J   | CHIP R 1.0K J 1/16W        |             | Q3 ,4    |         |           | 2SK508NV(K52) | FET         |             |
| R352      |         |           | RK73HB1J104J   | CHIP R 100K J 1/16W        |             | Q5       |         |           | RT1P430U      | TRANSISTOR  |             |
| R353      |         |           | R92-1368-05    | CHIP R 0 OHM               |             | Q6       |         |           | 2SC5108(Y)    | TRANSISTOR  |             |
| R354,355  |         |           | RK73HB1J103J   | CHIP R 10K J 1/16W         |             | Q7       |         |           | RT1P430U      | TRANSISTOR  |             |
| R365      |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q8       |         |           | 2SC5383       | TRANSISTOR  |             |
| R403      |         |           | RK73GB1J101J   | CHIP R 100 J 1/16W         |             | Q9       |         |           | 2SC5108(Y)    | TRANSISTOR  |             |
| R404      |         |           | RK73HH1J474D   | CHIP R 470K D 1/16W        |             | Q102     |         |           | 2SC4926YD     | TRANSISTOR  |             |
| R405      |         |           | RK73GB1J334J   | CHIP R 330K J 1/16W        |             | Q103     |         |           | 2SK2596       | FET         |             |
| R406      |         |           | RK73HH1J474D   | CHIP R 470K D 1/16W        |             | Q104     |         |           | RT1N141U      | TRANSISTOR  |             |
| R407      |         |           | RK73HB1J334J   | CHIP R 330K J 1/16W        |             | Q105     |         |           | 2SK879(Y)     | FET         |             |
| R408      |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q106     |         |           | 2SK2595       | FET         |             |
| R409,410  |         |           | R92-1368-05    | CHIP R 0 OHM               |             | Q107     |         |           | RT1N141U      | TRANSISTOR  |             |
| R412      |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q108     |         |           | 2SK1824       | FET         |             |
| R413,414  |         |           | RK73GB1J331J   | CHIP R 330 J 1/16W         |             | Q109     |         |           | RT1P441U      | TRANSISTOR  |             |
| R415,416  |         |           | RK73GB1J473J   | CHIP R 47K J 1/16W         |             | Q202     |         |           | RT1P441U      | TRANSISTOR  |             |
| R417-420  |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q203     |         |           | 2SC4649(N,P)  | TRANSISTOR  |             |
| R421,422  |         |           | RK73HB1J102J   | CHIP R 1.0K J 1/16W        |             | Q204,205 |         |           | 3SK318        | FET         |             |
| R423      |         |           | R92-1368-05    | CHIP R 0 OHM               |             | Q301     |         |           | RT1P141U      | TRANSISTOR  |             |
| R424,425  |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q302     |         |           | 2SC4919       | TRANSISTOR  |             |
| R435      |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q303     |         |           | RT1N441U      | TRANSISTOR  |             |
| R436      |         |           | R92-1252-05    | CHIP R 0 OHM J 1/16W       |             | Q304     |         |           | 2SA1362(GR)   | TRANSISTOR  |             |
| R437,438  |         |           | RK73HB1J473J   | CHIP R 47K J 1/16W         |             | Q305     |         |           | RT1N441U      | TRANSISTOR  |             |
| R447      |         |           | RK73HB1J472J   | CHIP R 4.7K J 1/16W        |             | Q306     |         |           | CPH3413       | FET         |             |
| R450      |         |           | RK73HB1J680J   | CHIP R 68 J 1/16W          |             | Q316     |         |           | CPH3413       | FET         |             |
| R470      |         |           | RK73HB1J102J   | CHIP R 1.0K J 1/16W        |             | Q401,402 |         |           | RT1N141U      | TRANSISTOR  |             |
| R901,902  |         |           | RK73GB1J472J   | CHIP R 4.7K J 1/16W        |             | Q403     |         |           | CPH3317       | FET         |             |
| VR1       |         |           | R12-7491-05    | TRIMMING POT.(68K)         |             | Q404,405 |         |           | RT1P237U      | TRANSISTOR  |             |
| S1 -3     | 2A      | *         | S70-0414-05    | TACT SWITCH                |             | Q407,408 |         |           | 2SK1830       | FET         |             |
| MIC1      |         |           | T91-0648-05    | MIC ELEMENT                |             | Q901     |         |           | 2SK1824       | FET         |             |
| D1        |         |           | MA2S111        | DIODE                      |             | TH101    |         |           | B57331V2104J  | THERMISTOR  |             |
| D4 ,5     |         |           | 1SV325         | VARIABLE CAPACITANCE DIODE |             | TH203    |         |           | B57331V2104J  | THERMISTOR  |             |
| D7        |         |           | 1SV325         | VARIABLE CAPACITANCE DIODE |             |          |         |           |               |             |             |
| D9        |         |           | 1SV325         | VARIABLE CAPACITANCE DIODE |             |          |         |           |               |             |             |
| D10       |         |           | 1SV278         | VARIABLE CAPACITANCE DIODE |             |          |         |           |               |             |             |
| D11       |         |           | MA2S111        | DIODE                      |             |          |         |           |               |             |             |
| D101      |         |           | HSC277         | DIODE                      |             |          |         |           |               |             |             |
| D102      |         |           | HZU5CCL        | ZENER DIODE                |             |          |         |           |               |             |             |
| D103,104  |         |           | HVC131         | DIODE                      |             |          |         |           |               |             |             |
| D105-107  |         |           | HSC277         | DIODE                      |             |          |         |           |               |             |             |
| D202      |         |           | HSC277         | DIODE                      |             |          |         |           |               |             |             |
| D203-206  |         |           | HVC350B        | VARIABLE CAPACITANCE DIODE | BM3         |          |         |           |               |             |             |
| D203-206  |         |           | 1SV305         | VARIABLE CAPACITANCE DIODE | AK,AM,BM    |          |         |           |               |             |             |
| D301,302  |         |           | RB706F-40      | DIODE                      |             |          |         |           |               |             |             |
| D303      |         |           | MC2858         | DIODE                      |             |          |         |           |               |             |             |
| D401      |         |           | RB521S-30      | DIODE                      |             |          |         |           |               |             |             |
| D402      |         |           | 1SR154-400     | DIODE                      |             |          |         |           |               |             |             |
| IC1       |         |           | MB15A02        | MOS-IC                     |             |          |         |           |               |             |             |
| IC2       |         |           | UPB1509GV      | BI-POLAR IC                |             |          |         |           |               |             |             |
| IC101     |         |           | TA75W01FU      | MOS-IC                     |             |          |         |           |               |             |             |
| IC201     |         |           | TA31136FN      | MOS-IC                     |             |          |         |           |               |             |             |
| IC301     |         |           | AQUA-L         | MOS-IC                     |             |          |         |           |               |             |             |
| IC302     |         |           | TA7368F        | MOS-IC                     |             |          |         |           |               |             |             |
| IC401,402 |         |           | XC6204B502MR   | MOS-IC                     |             |          |         |           |               |             |             |
| IC403     |         |           | BD4840FVE      | MOS-IC                     |             |          |         |           |               |             |             |
| IC404     |         |           | BD4845FVE      | MOS-IC                     |             |          |         |           |               |             |             |
| IC405     |         | *         | 30620MCP-A00GP | MICROPROCESSOR IC          |             |          |         |           |               |             |             |
| IC406     |         |           | AT24128N10SI27 | ROM IC                     |             |          |         |           |               |             |             |

AK : TK-2212 (K) AM : TK-2212 (M) BM : TK-2217 (M) BM3 : TK-2217 (M3)

## EXPLODED VIEW



## PACKING



## ADJUSTMENT

## Test Equipment Required for Alignment

| Test Equipment                        | Major Specifications                                        |                                                                                                           |
|---------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 1. Standard Signal Generator (SSG)    | Frequency Range<br>Modulation<br>Output                     | 136 to 223MHz<br>Frequency modulation and external modulation<br>-127dBm/0.1μV to greater than -47dBm/1mV |
| 2. Power Meter                        | Input Impedance<br>Operation Frequency<br>Measurement Range | 50Ω<br>136 to 223MHz<br>Vicinity of 10W                                                                   |
| 3. Deviation Meter                    | Frequency Range                                             | 136 to 223MHz                                                                                             |
| 4. Digital Volt Meter (DVM)           | Measuring Range<br>Input Impedance                          | 10mV to 10V DC<br>High input impedance for minimum circuit loading                                        |
| 5. Oscilloscope                       |                                                             | DC through 30MHz                                                                                          |
| 6. High Sensitivity Frequency Counter | Frequency Range<br>Frequency Stability                      | 10Hz to 1000MHz<br>0.2ppm or less                                                                         |
| 7. Ammeter                            |                                                             | 5A                                                                                                        |
| 8. AF Volt Meter (AF VTVM)            | Frequency Range<br>Voltage Range                            | 50Hz to 10kHz<br>1mV to 10V                                                                               |
| 9. Audio Generator (AG)               | Frequency Range<br>Output                                   | 50Hz to 5kHz or more<br>0 to 1V                                                                           |
| 10. Distortion Meter                  | Capability<br>Input Level                                   | 3% or less at 1kHz<br>50mV to 10Vrms                                                                      |
| 11. Spectrum Analyzer                 | Measuring Range                                             | DC to 1GHz or more                                                                                        |
| 12. Tracking Generator                | Center frequency<br>Output Voltage                          | 50kHz to 600MHz<br>100mV or more                                                                          |
| 13. 8Ω Dummy Load                     |                                                             | Approx. 8Ω, 3W                                                                                            |
| 14. Regulated Power Supply            |                                                             | 5V to 10V, approx. 3A<br>Useful if ammeter equipped                                                       |

## ■ The following parts are required for adjustment

### 1. 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.)

### 2. Repair Jig (Chassis)

Use jig (part No.: A10-4086-03) for repairing the TK-2212/2217. Place the TX-RX unit on the jig and fit it with screws.

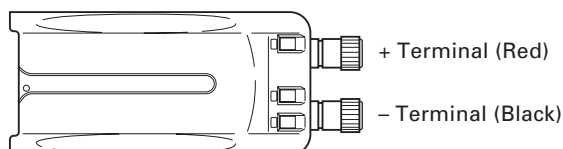
The jig facilitates the voltage check and protects the final amplifier FET when the voltage on the flow side of the TX-RX unit is checked during repairs.

### 3. Nut wrench

In order to turn the volume nut and the channel selector nut, use a recommendation tool.

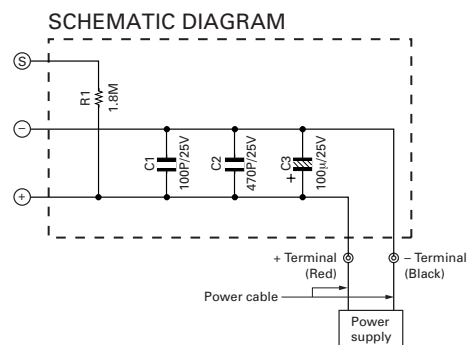
KENWOOD part No. : W05-1012-00

### 4. Battery Jig (W05-1011-00)



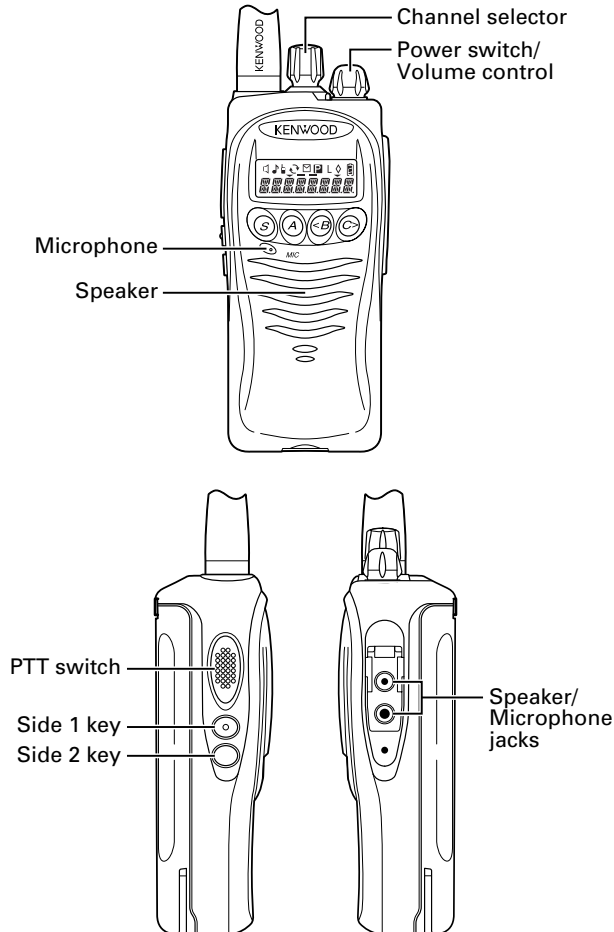
Connect the power cable properly between the battery jig installed in the transceiver and the power supply, and be sure output voltage and the power supply polarity prior to switching the power supply ON, otherwise over voltage and reverse connection may damage the transceiver, or the power supply or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

## Controls



## ■ Frequency and signaling

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

**Frequency (MHz) K, M type (TK-2212) M type (TK-2217)**

| Channel No. | RX Frequency | TX Frequency |
|-------------|--------------|--------------|
| 1           | 155.050      | 155.100      |
| 2           | 136.050      | 136.100      |
| 3           | 173.950      | 173.900      |
| 4           | 155.000      | 155.000      |
| 5           | 155.200      | 155.200      |
| 6           | 155.400      | 155.400      |

**Frequency (MHz) M3 type (TK-2217)**

| Channel No. | RX Frequency | TX Frequency |
|-------------|--------------|--------------|
| 1           | 220.050      | 220.100      |
| 2           | 216.050      | 216.100      |
| 3           | 222.950      | 222.900      |
| 4           | 220.000      | 220.000      |
| 5           | 220.200      | 220.200      |
| 6           | 220.400      | 220.400      |

## 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 159D  | DTMF 159D         |
| 9             | None       | DTMF tone 9       |
| 10            | None       | MSK               |

## ■ 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  $8\Omega$  dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

## Adjustment Frequency

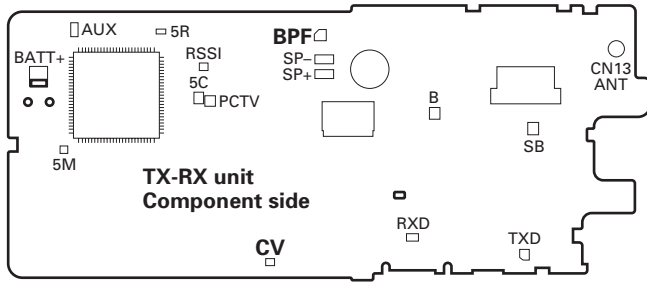
| TEST CH | K, M type (TK-2212) M type (TK-2217) |              |
|---------|--------------------------------------|--------------|
|         | RX Frequency                         | TX Frequency |
| Center  | 155.050MHz                           | 155.100MHz   |
| Low     | 136.050MHz                           | 136.100MHz   |
| High    | 173.950MHz                           | 173.900MHz   |
| Low'    | 145.550MHz                           | 145.600MHz   |
| High'   | 164.550MHz                           | 164.600MHz   |

| TEST CH | M3 type (TK-2217) |              |
|---------|-------------------|--------------|
|         | RX Frequency      | TX Frequency |
| Center  | 220.050MHz        | 220.100MHz   |
| Low     | 216.050MHz        | 216.100MHz   |
| High    | 222.950MHz        | 222.900MHz   |
| Low'    | 218.050MHz        | 218.100MHz   |
| High'   | 221.050MHz        | 221.100MHz   |

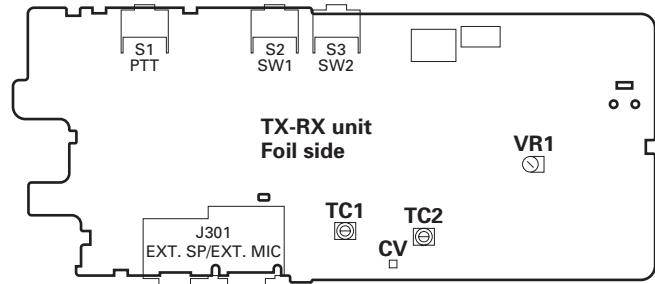


## ADJUSTMENT

## Adjustment Points



BPF : Band-pass wave form test point  
CV : VCO lock voltage adjustment terminal



VR1 : Frequency adjustment  
TC1 : Transmit VCO lock voltage adjustment  
TC2 : Receive VCO lock voltage adjustment  
CV : VCO lock voltage adjustment terminal

## Common Section

| Item                     | Condition                                                                                                              | Measurement        |           | Adjustment |                                                        | Specifications/<br>Remarks |
|--------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|------------|--------------------------------------------------------|----------------------------|
|                          |                                                                                                                        | Test equipment     | Terminal  | Parts      | Method                                                 |                            |
| 1.Setting                | 1) BATT terminal votage:7.5V<br>2) SSG standard modulation<br>[Wide] MOD:1kHz,DEV:3kHz<br>[Narrow] MOD:1kHz,DEV:1.5kHz |                    |           |            |                                                        |                            |
| 2.VCO lock voltage<br>RX | 1) CH:High                                                                                                             | Power meter<br>DVM | ANT<br>CV | TC2        | 3.8V(TK-2212(K,M))<br>TK-2217(M))<br>3.0V(TK-2217(M3)) | ±0.1V                      |
|                          | 2) CH:Low                                                                                                              |                    |           |            | Check                                                  | 0.6V or more               |
| 3.VCO lock voltage<br>TX | 3) CH:High<br>PTT:ON                                                                                                   |                    |           | TC1        | 4.2V(TK-2212(K,M))<br>TK-2217(M))<br>2.5V(TK-2217(M3)) | ±0.1V                      |
|                          | 4) CH:Low<br>PTT:ON                                                                                                    |                    |           |            | Check                                                  | 0.6V or more               |

## Transmitter Section

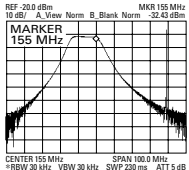
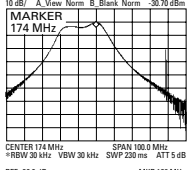
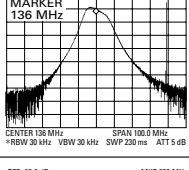
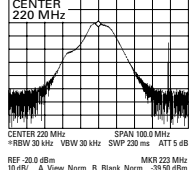
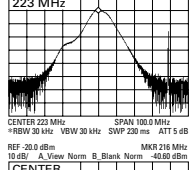
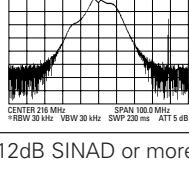
| Item                   | Condition                                                                                             | Measurement            |          | Adjustment                       |                         | Specifications/<br>Remarks                                       |
|------------------------|-------------------------------------------------------------------------------------------------------|------------------------|----------|----------------------------------|-------------------------|------------------------------------------------------------------|
|                        |                                                                                                       | Test equipment         | Terminal | Parts                            | Method                  |                                                                  |
| 1.Frequency<br>Adjust  | 1) CH:High<br>2) PTT:ON                                                                               | Frequency counter      | ANT      | VR1                              | High frequency<br>±50Hz | <b>Note:</b> After replacing<br>the TCXO(X1) align<br>frequency. |
| 2.High power<br>Adjust | TEST CH: Low<br>Low'<br>Center<br>High'<br>High<br>(5 points)<br>BATT terminal voltage:7.5V<br>PTT:ON | Power meter<br>Ammeter |          | Programming<br>Software:KPG-100D | 5.0W                    | ±0.1W<br>1.9 A or less                                           |
| 3.Low power<br>Adjust  | TEST CH: Low<br>Low'<br>Center<br>High'<br>High<br>(5 points)<br>BATT terminal voltage:7.5V<br>PTT:ON |                        |          |                                  | 1.05W                   | ±0.1W<br>0.9 A or less                                           |

## ADJUSTMENT

| Item                                   | Condition                                                                                                                 | Measurement                                                     |                         | Adjustment                       |                                                       | Specifications/<br>Remarks                                                          |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------|----------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                        |                                                                                                                           | Test equipment                                                  | Terminal                | Parts                            | Method                                                |                                                                                     |
| 4. Max deviation<br>Adjust<br>[Wide]   | TEST CH: Center<br>Low<br>High<br>(3 points)<br>AG:1kHz/150mV<br>Deviation meter filter<br>LPF:15kHz<br>HPF:OFF<br>PTT:ON | Power meter<br>Deviation meter<br>Oscilloscope<br>AG<br>AF VTVM | ANT<br>SP/MIC connector | Programming<br>Software:KPG-100D | 4.2kHz<br>(According to<br>the lager +,-)             | ±80Hz                                                                               |
|                                        | [Narrow]                                                                                                                  |                                                                 |                         |                                  | 2.2kHz<br>(According to<br>the lager +,-)             | ±80Hz                                                                               |
| 5. VOX 1<br>Writing                    | TEST CH:Center<br>AG:1KHz/45mV                                                                                            |                                                                 |                         |                                  |                                                       |                                                                                     |
| 6. VOX 10<br>Writing                   | TEST CH:Center<br>AG:1kHz/3.0mV                                                                                           |                                                                 |                         |                                  |                                                       |                                                                                     |
| 7. DQT<br>Balance Adjust<br>[Wide]     | TEST CH: Center<br>Low<br>High<br>(3 points)<br>LPF:3kHz<br>HPF:OFF<br>PTT:ON                                             |                                                                 | ANT                     | Programming<br>Software:KPG-100D | Make the<br>demodulation<br>wave into<br>square waves |  |
|                                        | [Narrow]                                                                                                                  |                                                                 |                         |                                  |                                                       |                                                                                     |
| 8. QT Deviation<br>Adjust<br>[Wide]    | TEST CH: Center<br>Low<br>High<br>(3 points)<br>LPF:3kHz<br>HPF:OFF<br>PTT:ON                                             |                                                                 |                         |                                  | 0.75kHz                                               | ±40Hz                                                                               |
|                                        | [Narrow]                                                                                                                  |                                                                 |                         |                                  | 0.35kHz                                               | ±40Hz                                                                               |
| 9. DQT Deviation<br>Adjust<br>[Wide]   | TEST CH: Center<br>Low<br>High<br>(3 points)<br>LPF:3kHz<br>HPF:OFF<br>PTT:ON                                             |                                                                 |                         |                                  | 0.75kHz                                               | ±40Hz                                                                               |
|                                        | [Narrow]                                                                                                                  |                                                                 |                         |                                  | 0.35kHz                                               | ±40Hz                                                                               |
| 10. DTMF Deviation<br>Adjust<br>[Wide] | TEST CH:Center<br>LPF:15kHz<br>HPF:OFF<br>PTT:ON                                                                          |                                                                 |                         |                                  | 3.0kHz                                                | ±100Hz                                                                              |
|                                        | [Narrow]                                                                                                                  |                                                                 |                         |                                  | 1.5kHz                                                | ±100Hz                                                                              |
| 11. MSK Deviation<br>Adjust<br>[Wide]  | TEST CH: Center<br>Low<br>High<br>(3 points)<br>LPF:15kHz<br>HPF:OFF<br>PTT:ON                                            |                                                                 |                         |                                  | 3.1kHz                                                | ±100Hz                                                                              |
|                                        | [Narrow]                                                                                                                  |                                                                 |                         |                                  | 1.5kHz                                                | ±100Hz                                                                              |

## ADJUSTMENT

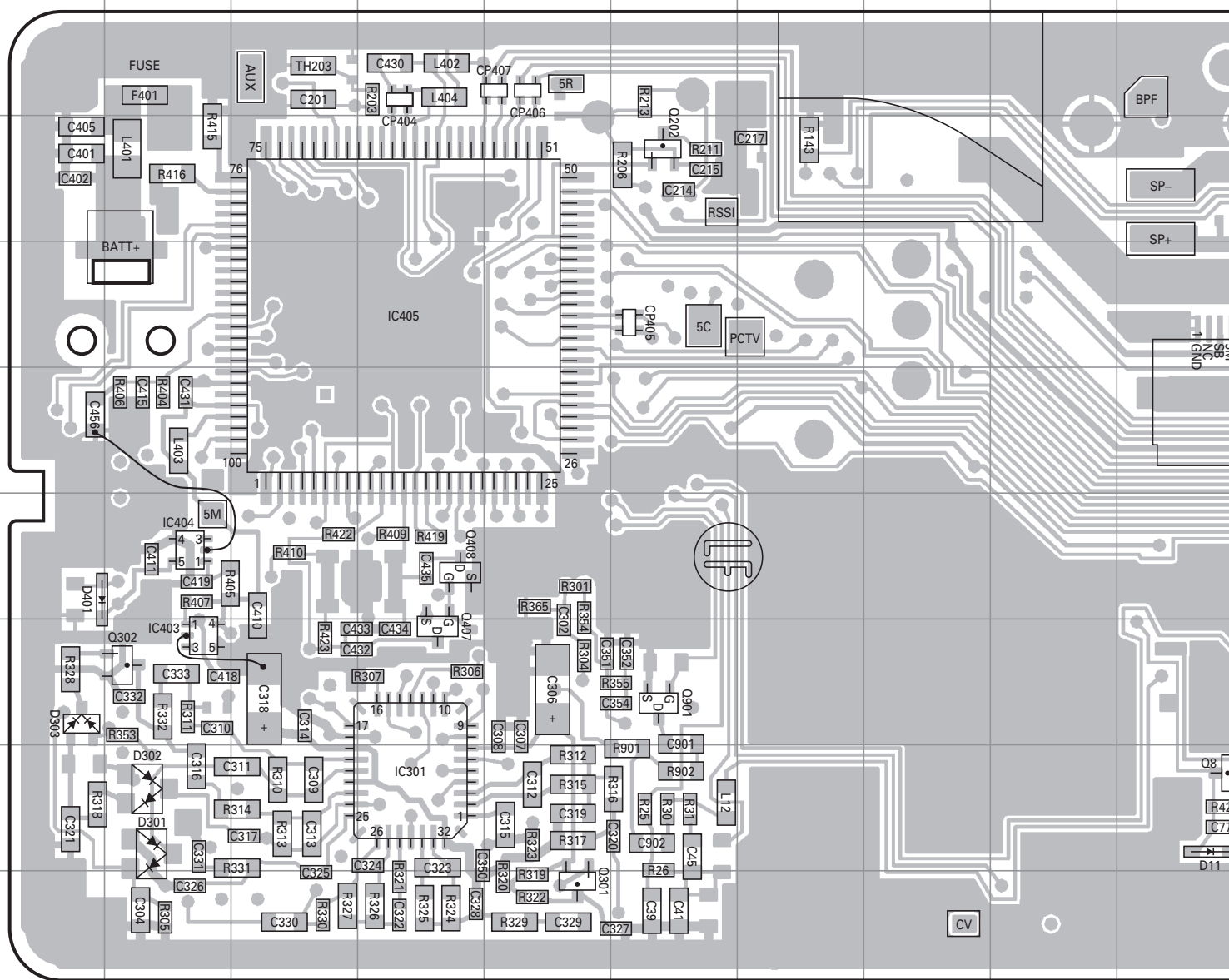
## Receiver Section

| Item                                                            | Condition                                                                                                                                                                                                                                                                                           | Measurement                           |            | Adjustment                           |                                            | Specifications/<br>Remarks                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------|--------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                 |                                                                                                                                                                                                                                                                                                     | Test equipment                        | Terminal   | Parts                                | Method                                     |                                                                                                                                                                                                                                                                  |
| 1. BPF Wave<br>Adjust<br><br>TK-2212<br>(K,M)<br>TK-2217<br>(M) | (1) Center frequency<br>Spectrum analyzer setting<br>Center-f : 155MHz<br>Span : 100MHz<br>RBW : 30kHz<br>VBW : 30kHz<br>ATT : 5dB<br><br>(2) High-edge frequency<br>Spectrum analyzer setting<br>Center-f : 174MHz<br><br>(3) Low-edge frequency<br>Spectrum analyzer setting<br>Center-f : 136MHz | Spectrum analyzer                     | ANT<br>BPF | Programming<br>Software:<br>KPG-100D | Adjust the waveform as shown to the right. |         |
| TK-2217<br>(M3)                                                 | (1) Center frequency<br>Spectrum analyzer setting<br>Center-f : 220MHz<br>Span : 100MHz<br>RBW : 30kHz<br>VBW : 30kHz<br>ATT : 5dB<br><br>(2) High-edge frequency<br>Spectrum analyzer setting<br>Center-f : 223MHz<br><br>(3) Low-edge frequency<br>Spectrum analyzer setting<br>Center-f : 216MHz |                                       |            |                                      |                                            |    |
| 2. Sensitivity<br>check<br>[Wide]                               | TEST CH: Low<br>Center<br>High<br>SSG output: -117 dBm(0.3μV)<br>SSG MOD: 3.0kHz                                                                                                                                                                                                                    | SSG<br>DVM<br>Oscilloscope<br>AF VTVM | ANT        |                                      | Check                                      | 12dB SINAD or more                                                                                                                                                                                                                                               |
| [Narrow]                                                        | TEST CH: Center<br>SSG output: -115 dBm(0.4μV)<br>SSG MOD: 1.5kHz                                                                                                                                                                                                                                   |                                       |            |                                      |                                            |                                                                                                                                                                                                                                                                  |
| 3. SQL1<br>(Threshold)<br>writing<br>[Wide]                     | TEST CH: Center<br>Low<br>High<br>SSG output: -123 dBm(0.16μV)<br>SSG MOD: 3.0kHz                                                                                                                                                                                                                   |                                       |            |                                      |                                            |                                                                                                                                                                                                                                                                  |
| [Narrow]                                                        | TEST CH: Center<br>SSG output: -122 dBm(0.18μV)<br>SSG MOD: 1.5kHz                                                                                                                                                                                                                                  |                                       |            |                                      |                                            |                                                                                                                                                                                                                                                                  |
|                                                                 |                                                                                                                                                                                                                                                                                                     |                                       |            | Programming<br>Software:<br>KPG-100D | Write                                      | Squelch open                                                                                                                                                                                                                                                     |

| Item                                   | Condition                                                                     | Measurement                           |                      | Adjustment                           |        | Specifications/<br>Remarks     |
|----------------------------------------|-------------------------------------------------------------------------------|---------------------------------------|----------------------|--------------------------------------|--------|--------------------------------|
|                                        |                                                                               | Test equipment                        | Terminal             | Parts                                | Method |                                |
| 4.SQL9<br>(Tight)<br>writing<br>[Wide] | TEST CH:Center<br>Low<br>High<br>SSG otuput:-117 dBm(0.3μV)<br>SSG MOD:3.0kHz | SSG<br>DVM<br>Oscilloscope<br>AF VTVM | ANT                  | Programming<br>Software:<br>KPG-100D | Write  | Squelch open                   |
|                                        | [Narrow]<br>TEST CH:Center<br>SSG otuput:-116 dBm(0.35μV)<br>SSG MOD:1.5kHz   |                                       |                      |                                      |        |                                |
| 5.BATT<br>Detection<br>Writing         | BATT terminal voltage:5.75V                                                   | DVM                                   | ANT<br>BATT terminal |                                      | Write  | BATT terminal<br>voltage:5.75V |

# TK-2212/2217 PC BOARD

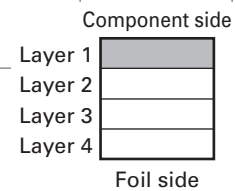
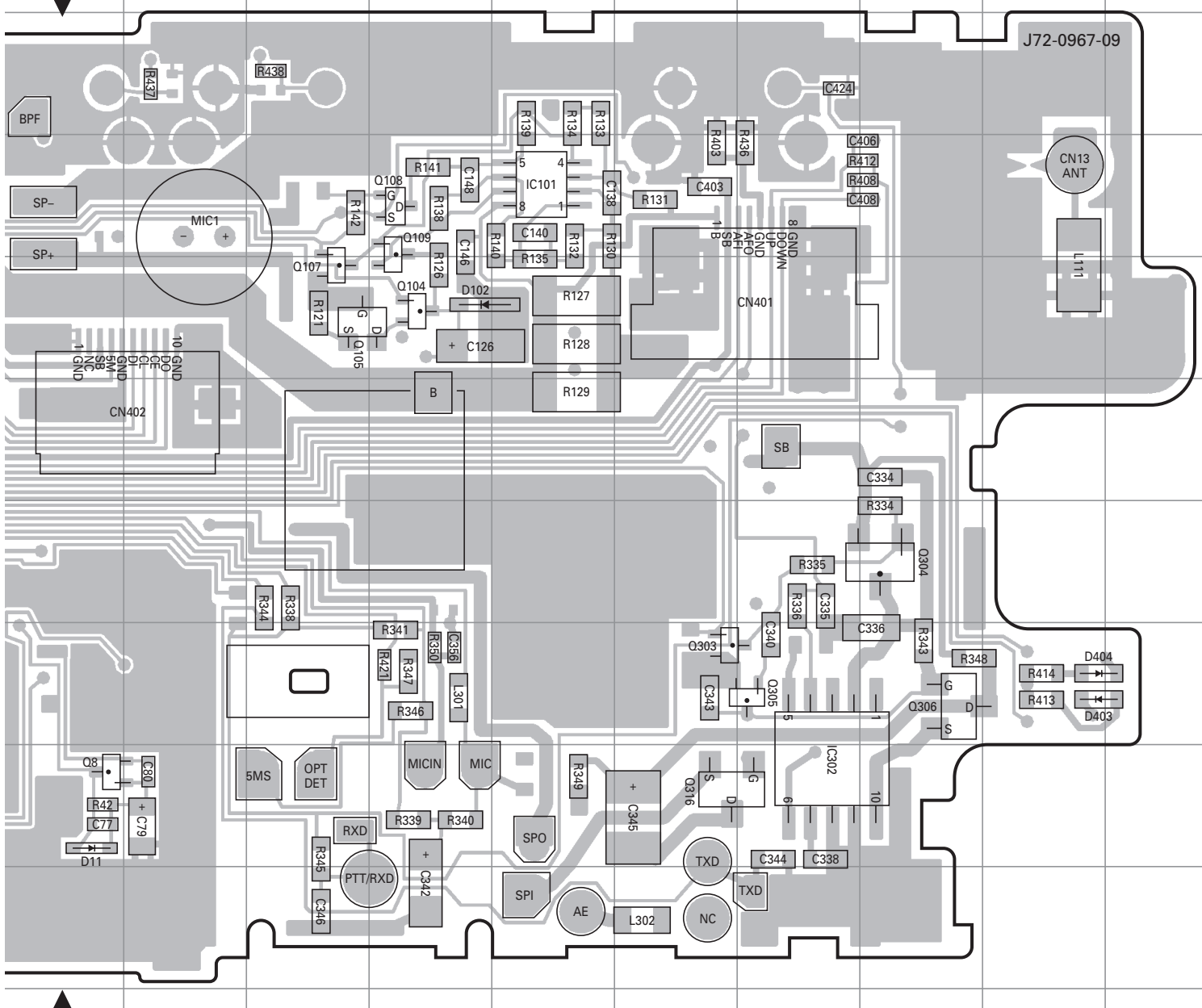
**TX-RX UNIT (X57-7120-XX) Component side view (J72-0967-09)**  
**-10 : TK-2212 (K,M), TK-2217 (M)    -21 : TK-2217 (M3)**



| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|----------|---------|
| IC101    | 4N      | Q105     | 5L      | Q304     | 7Q      | D102     | 5M      |
| IC301    | 9D      | Q107     | 5L      | Q305     | 8P      | D301     | 9B      |
| IC302    | 9P      | Q108     | 4M      | Q306     | 8Q      | D302     | 9B      |
| IC403    | 8B      | Q109     | 4M      | Q316     | 9O      | D303     | 8A      |
| IC404    | 7B      | Q202     | 4F      | Q407     | 8D      | D401     | 7A      |
| IC405    | 5D      | Q301     | 10E     | Q408     | 7D      | D403     | 8R      |
| Q8       | 9J      | Q302     | 8B      | Q901     | 8F      | D404     | 8R      |
| Q104     | 5M      | Q303     | 8O      | D11      | 9J      |          |         |

# PC BOARD TK-2212/2217

**TX-RX UNIT (X57-7120-XX) Component side view (J72-0967-09)**  
**-10 : TK-2212 (K,M), TK-2217 (M) -21 : TK-2217 (M3)**



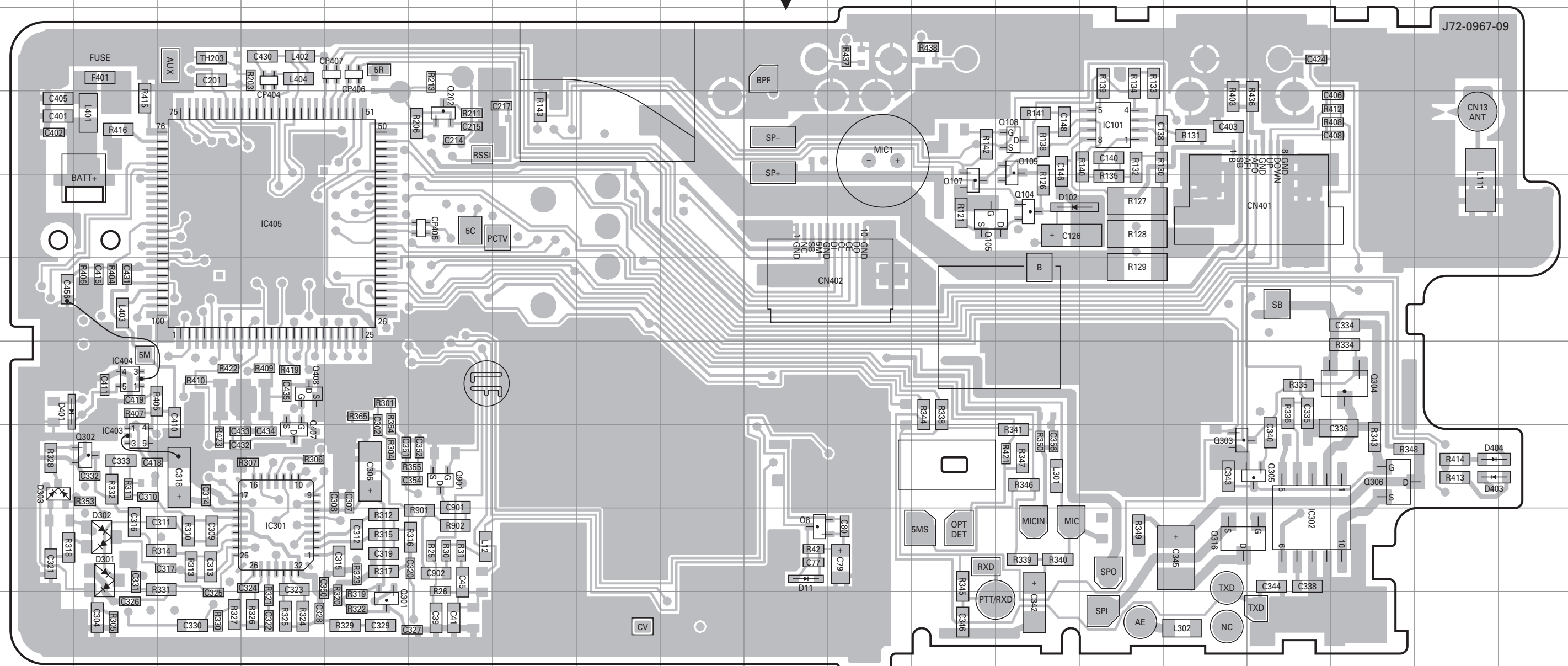


# TK-2212/2217 PC BOARD

## PC BOARD TK-2212/2217

**TX-RX UNIT (X57-7120-XX) Component side view (J72-0967-09)**  
**-10 : TK-2212 (K,M), TK-2217 (M)    -21 : TK-2217 (M3)**

**TX-RX UNIT (X57-7120-XX) Component side view (J72-0967-09)**  
**-10 : TK-2212 (K,M), TK-2217 (M)    -21 : TK-2217 (M3)**



| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|----------|---------|
| IC101    | 4N      | Q105     | 5L      | Q304     | 7Q      | D102     | 5M      |
| IC301    | 9D      | Q107     | 5L      | Q305     | 8P      | D301     | 9B      |
| IC302    | 9P      | Q108     | 4M      | Q306     | 8Q      | D302     | 9B      |
| IC403    | 8B      | Q109     | 4M      | Q316     | 9O      | D303     | 8A      |
| IC404    | 7B      | Q202     | 4F      | Q407     | 8D      | D401     | 7A      |
| IC405    | 5D      | Q301     | 10E     | Q408     | 7D      | D403     | 8R      |
| Q8       | 9J      | Q302     | 8B      | Q901     | 8F      | D404     | 8R      |
| Q104     | 5M      | Q303     | 8O      | D11      | 9J      |          |         |

Component side

Layer 1

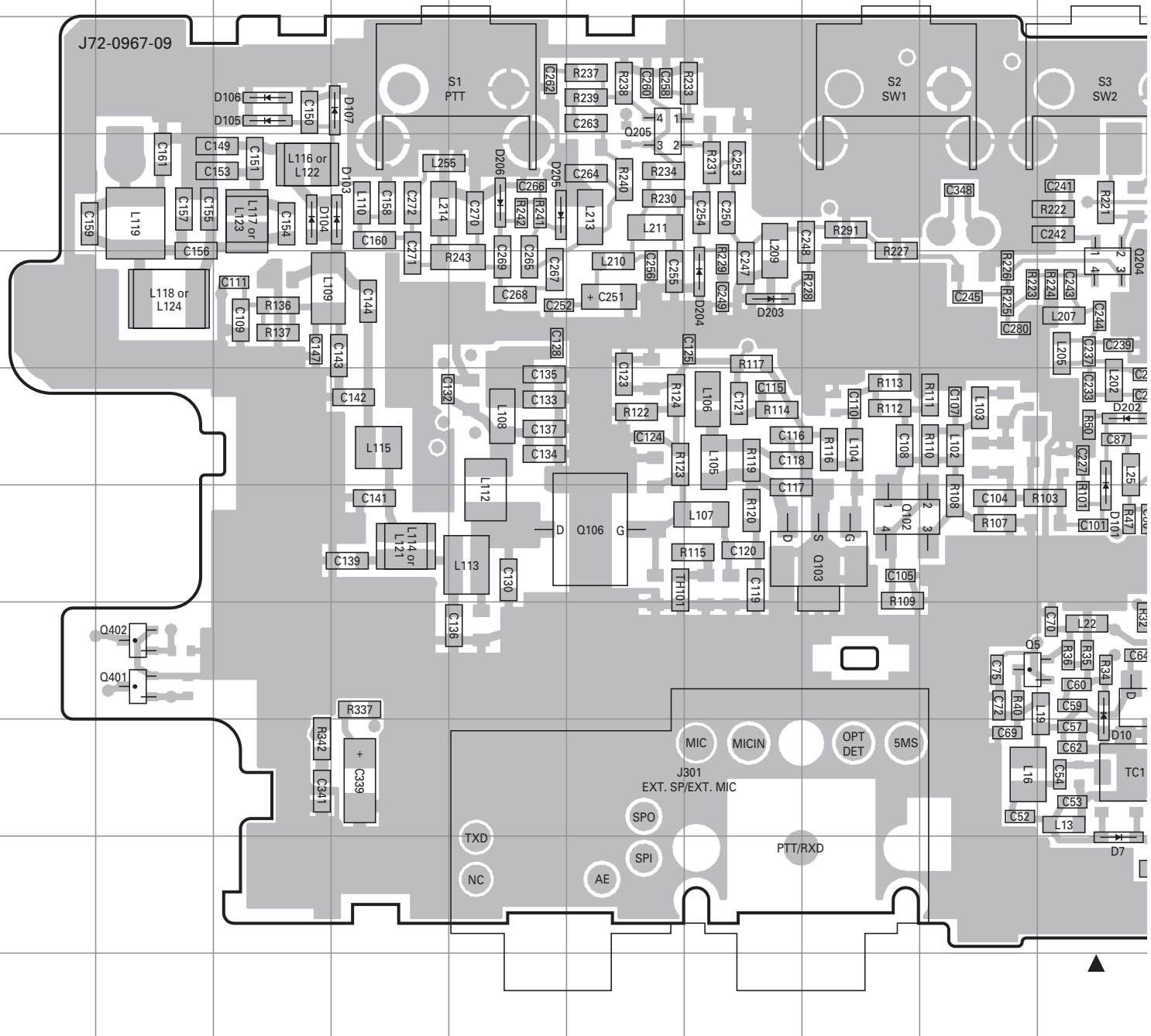
Layer 2

Layer 3

Foil side

# TK-2212/2217 PC BOARD

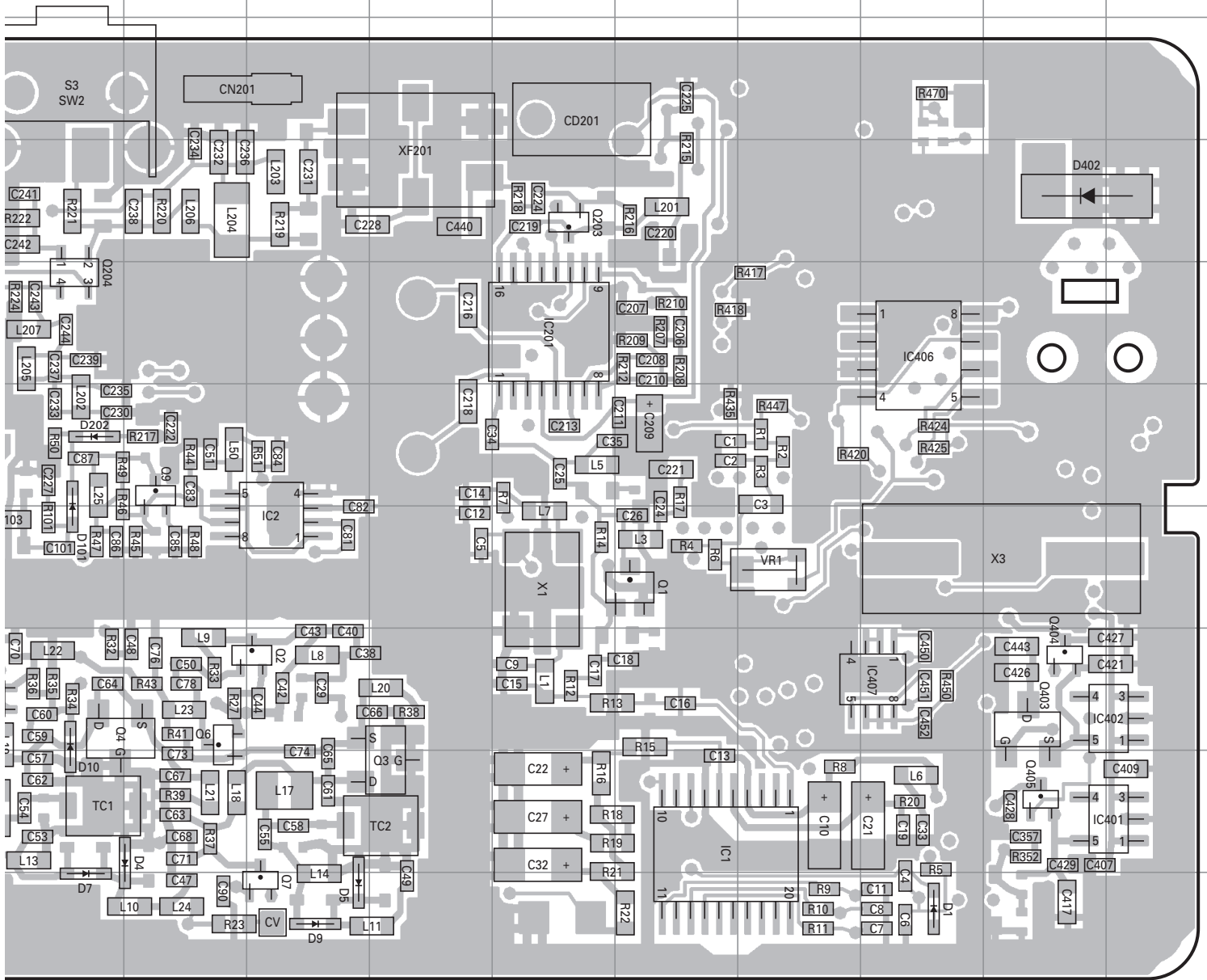
**TX-RX UNIT (X57-7120-XX) Foil side view (J72-0967-09)**  
**-10 : TK-2212 (K,M), TK-2217 (M) -21 : TK-2217 (M3)**



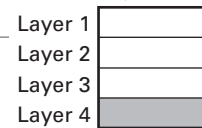
| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|
| IC1      | 9O      | Q3       | 9M      | Q203     | 4N      | D4       | 9K      | D106     | 3C      |
| IC2      | 7L      | Q4       | 8J      | Q204     | 5J      | D5       | 10L     | D107     | 3D      |
| IC201    | 5N      | Q5       | 8I      | Q205     | 3F      | D7       | 10J     | D202     | 6J      |
| IC401    | 9S      | Q6       | 8K      | Q401     | 8B      | D9       | 10L     | D203     | 5G      |
| IC402    | 8S      | Q7       | 10L     | Q402     | 8B      | D10      | 8J      | D204     | 5G      |
| IC406    | 5Q      | Q9       | 6K      | Q403     | 8R      | D101     | 7J      | D205     | 4E      |
| IC407    | 8Q      | Q102     | 7H      | Q404     | 8R      | D103     | 4D      | D206     | 4E      |
| Q1       | 7O      | Q103     | 7H      | Q405     | 9R      | D104     | 4C      | D402     | 4R      |
| Q2       | 8L      | Q106     | 7F      | D1       | 10Q     | D105     | 3C      |          |         |

# PC BOARD TK-2212/2217

TX-RX UNIT (X57-7120-XX) Foil side view (J72-0967-09)  
 -10 : TK-2212 (K,M), TK-2217 (M) -21 : TK-2217 (M3)



Component side



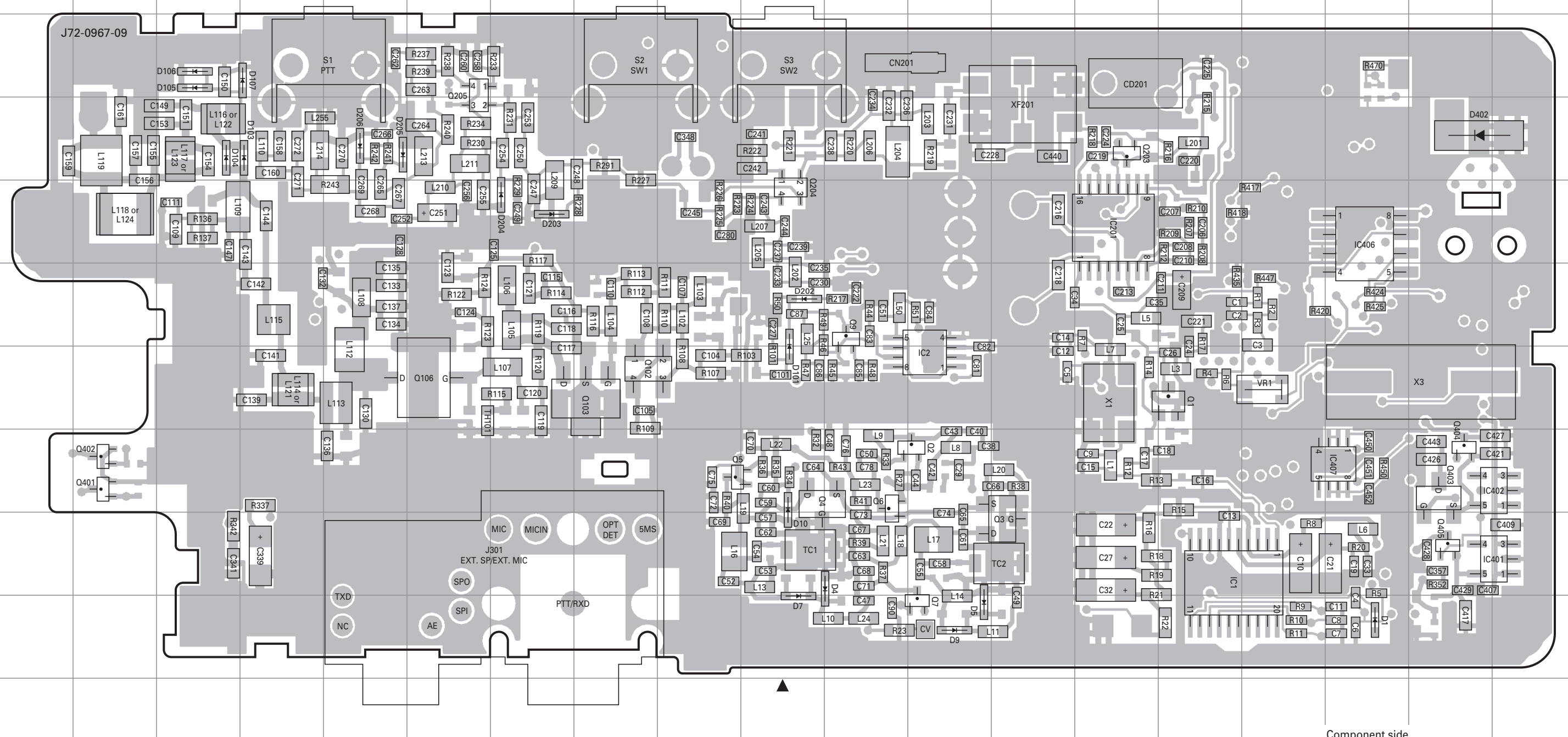
Foil side

# TK-2212/2217 PC BOARD

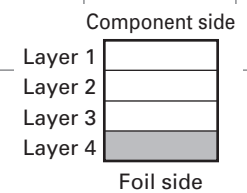
# PC BOARD TK-2212/2217

TX-RX UNIT (X57-7120-XX) Foil side view (J72-0967-09)  
-10 : TK-2212 (K,M), TK-2217 (M) -21 : TK-2217 (M3)

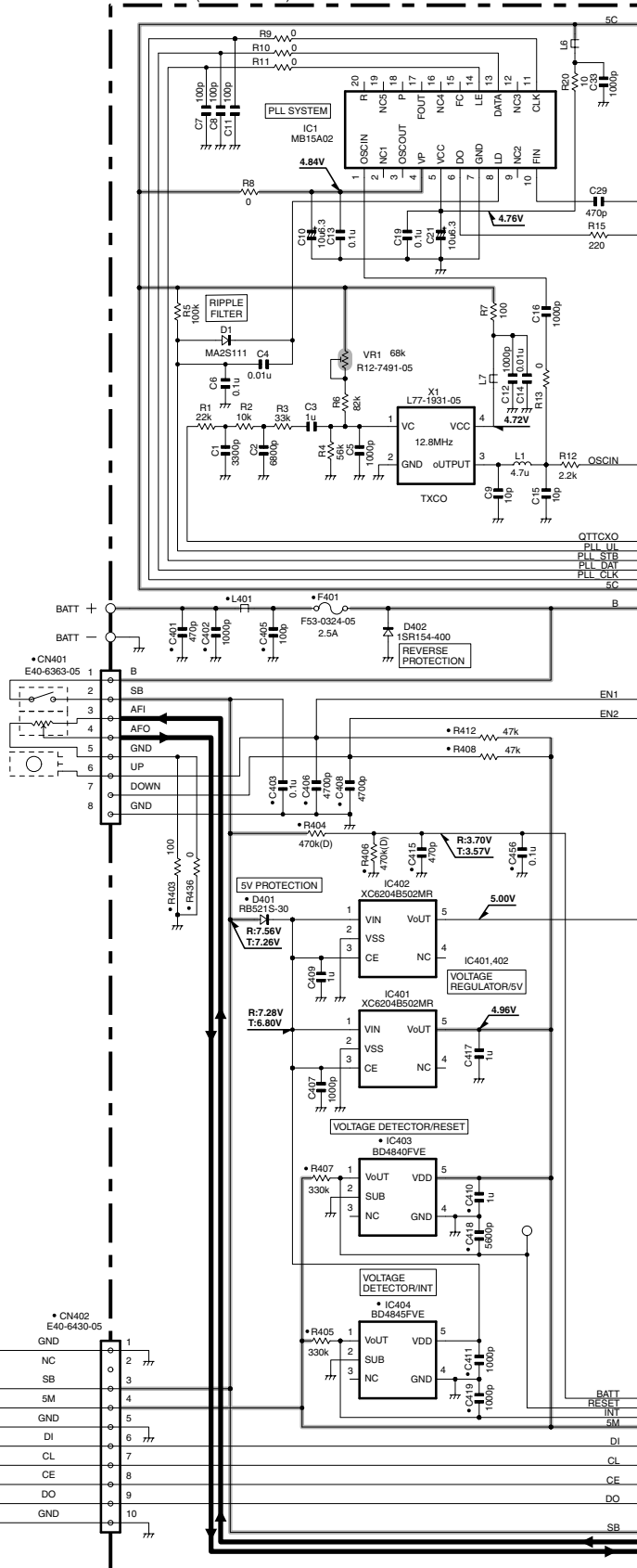
TX-RX UNIT (X57-7120-XX) Foil side view (J72-0967-09)  
-10 : TK-2212 (K,M), TK-2217 (M) -21 : TK-2217 (M3)



| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|
| IC1      | 9O      | Q3       | 9M      | Q203     | 4N      | D4       | 9K      | D106     | 3C      |
| IC2      | 7L      | Q4       | 8J      | Q204     | 5J      | D5       | 10L     | D107     | 3D      |
| IC201    | 5N      | Q5       | 8I      | Q205     | 3F      | D7       | 10J     | D202     | 6J      |
| IC401    | 9S      | Q6       | 8K      | Q401     | 8B      | D9       | 10L     | D203     | 5G      |
| IC402    | 8S      | Q7       | 10L     | Q402     | 8B      | D10      | 8J      | D204     | 5G      |
| IC406    | 5Q      | Q9       | 6K      | Q403     | 8R      | D101     | 7J      | D205     | 4E      |
| IC407    | 8Q      | Q102     | 7H      | Q404     | 8R      | D103     | 4D      | D206     | 4E      |
| Q1       | 7O      | Q103     | 7H      | Q405     | 9R      | D104     | 4C      | D402     | 4R      |
| Q2       | 8L      | Q106     | 7F      | D1       | 10Q     | D105     | 3C      |          |         |

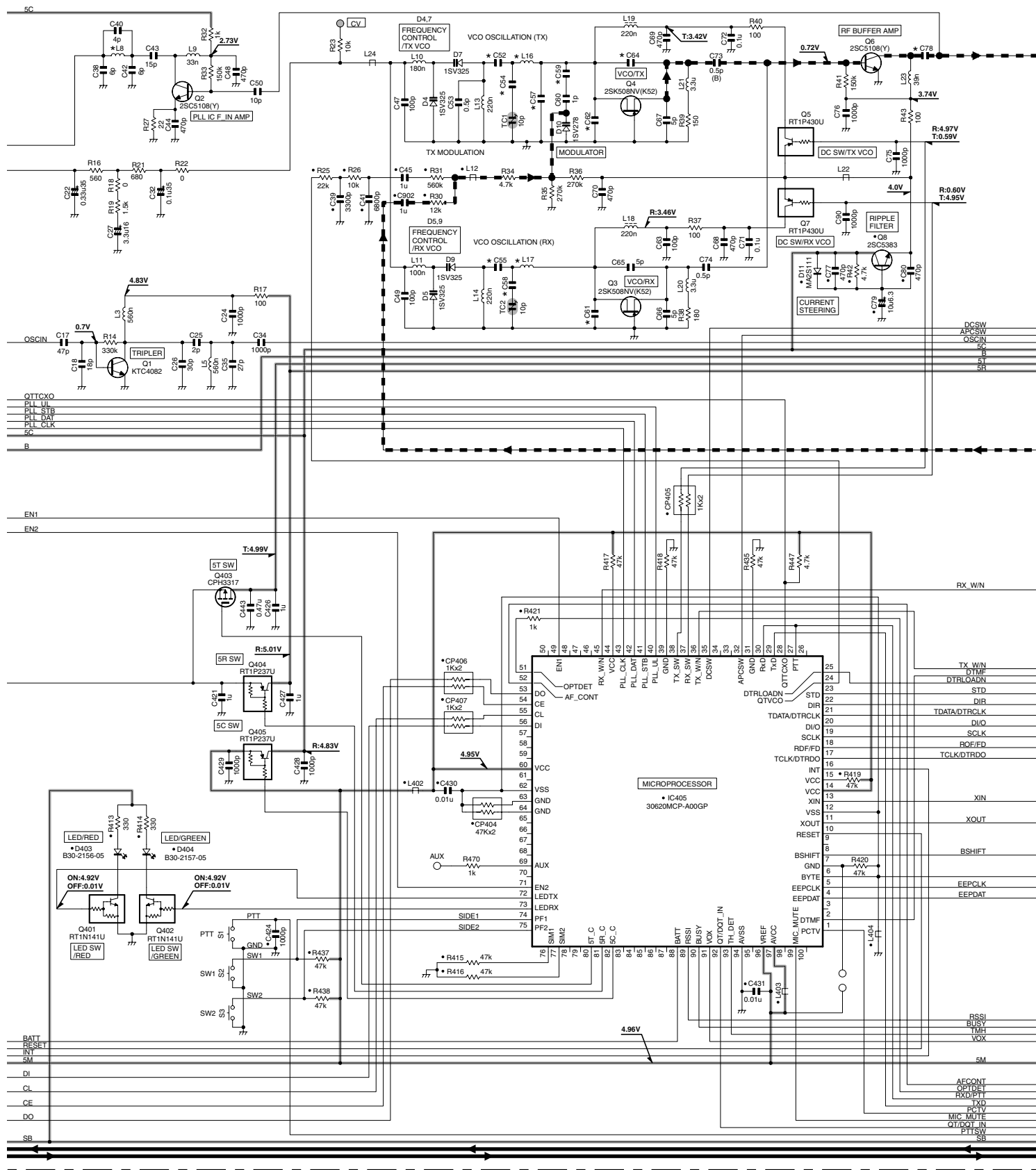


## 7



# SCHEMATIC DIAGRAM TK-2212/2217

TX-RX UNIT (X57-7120-XX)

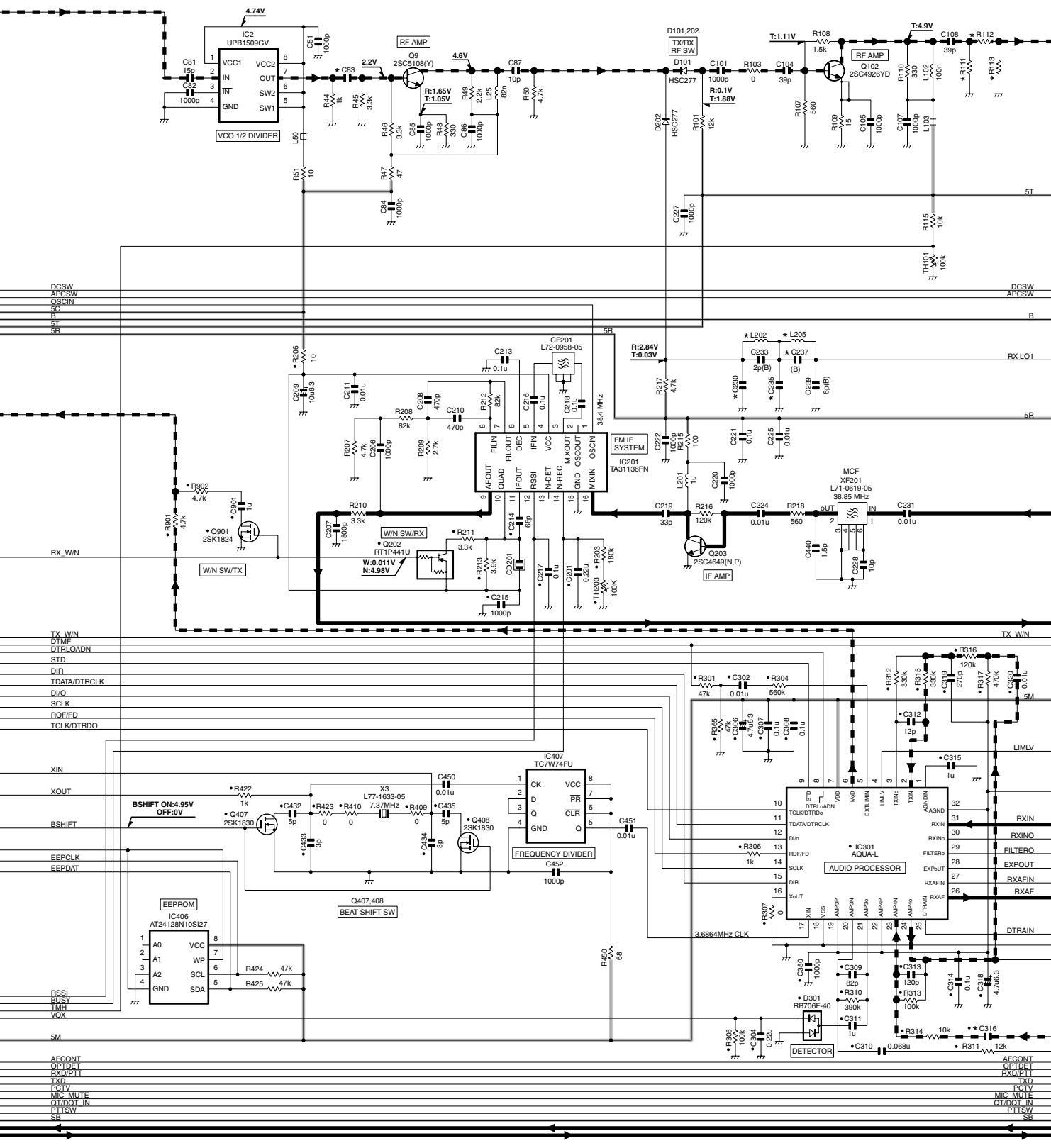


| X57-7120-XX |                    | L8       | L16 | L17 | C52 | C54  | C55 | C57  | C58  | C59 | C61   | C62 | C64 | C78 |     |
|-------------|--------------------|----------|-----|-----|-----|------|-----|------|------|-----|-------|-----|-----|-----|-----|
| -10         | TK-2212<br>TK-2217 | K,M<br>M | 18n | 39n | 27n | 180p | 4p  | 120p | 1.5p | 6p  | 1.5p  | 4p  | 5p  | 4p  | 7p  |
| -21         | TK-2217            | M3       | 12n | 22n | 18n | 12p  | 9p  | 11p  | NO   | 10p | 0.75p | 2p  | 3p  | 5p  | 33p |



# TK-2212/2217 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-7120-XX)

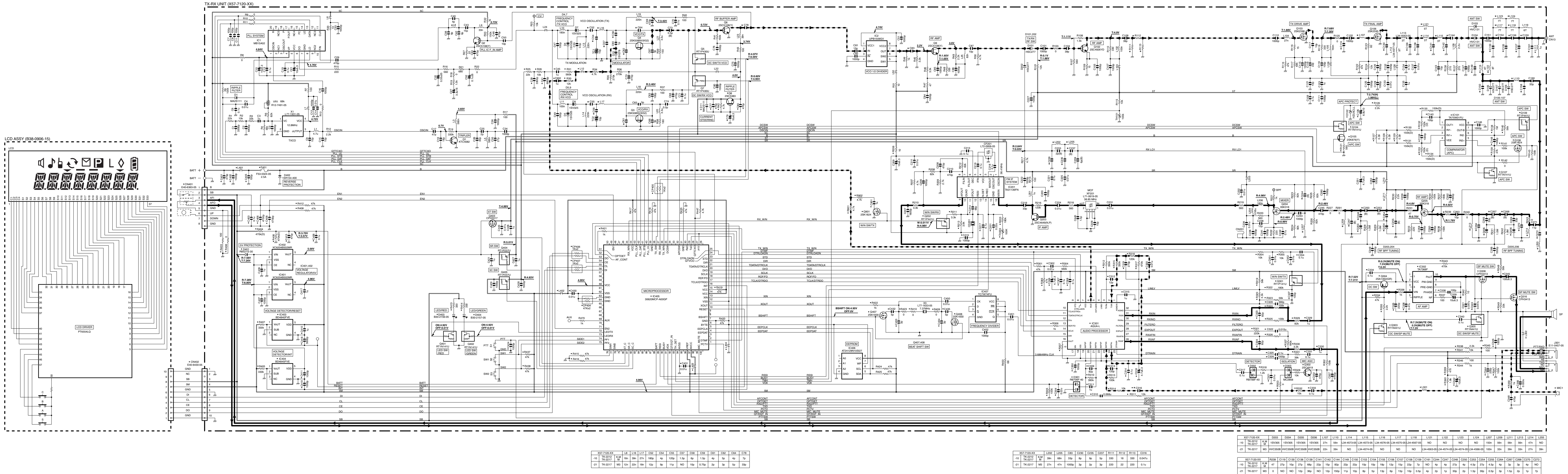




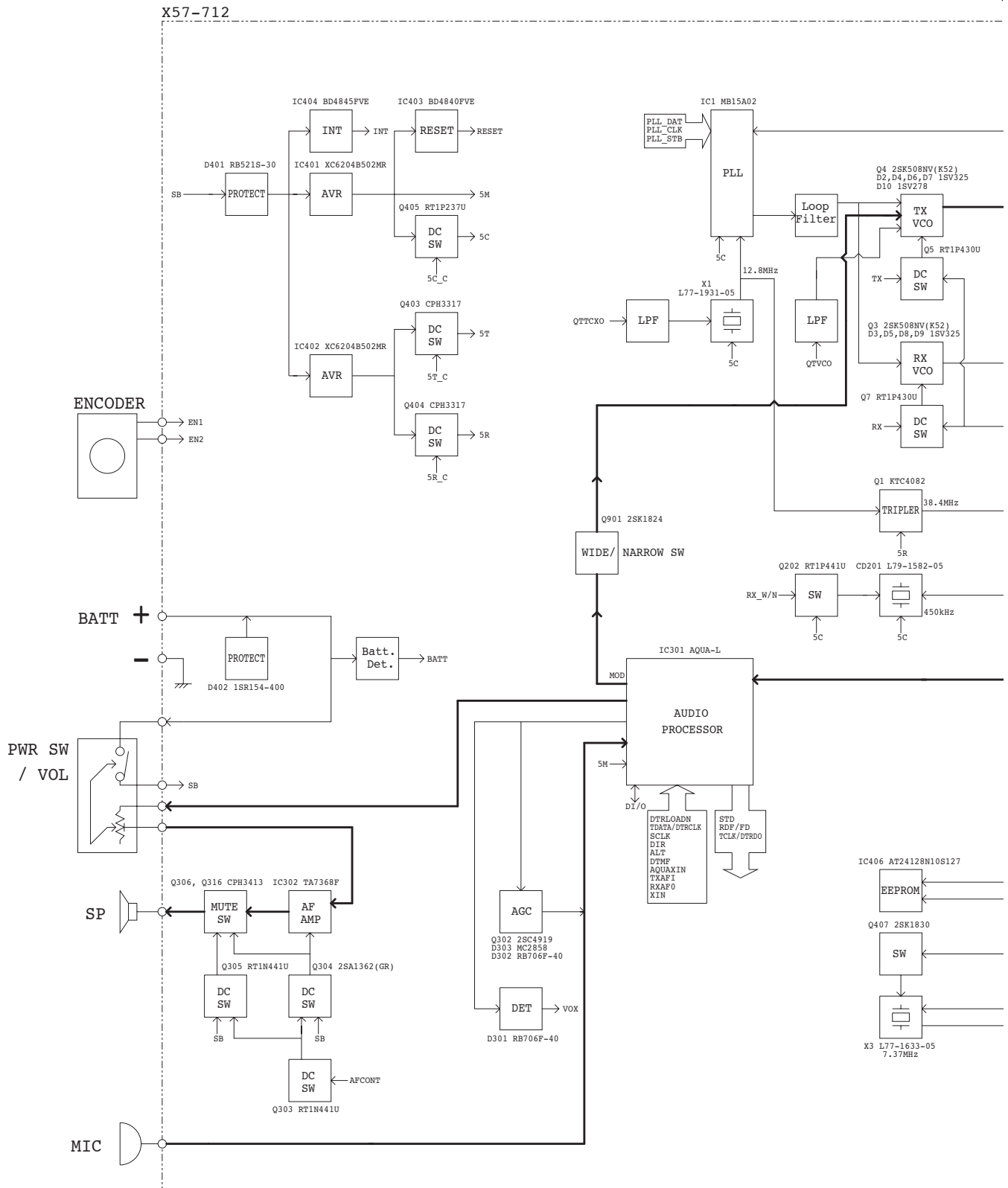


## TK-2212/2217 SCHEMATIC DIAGRAM

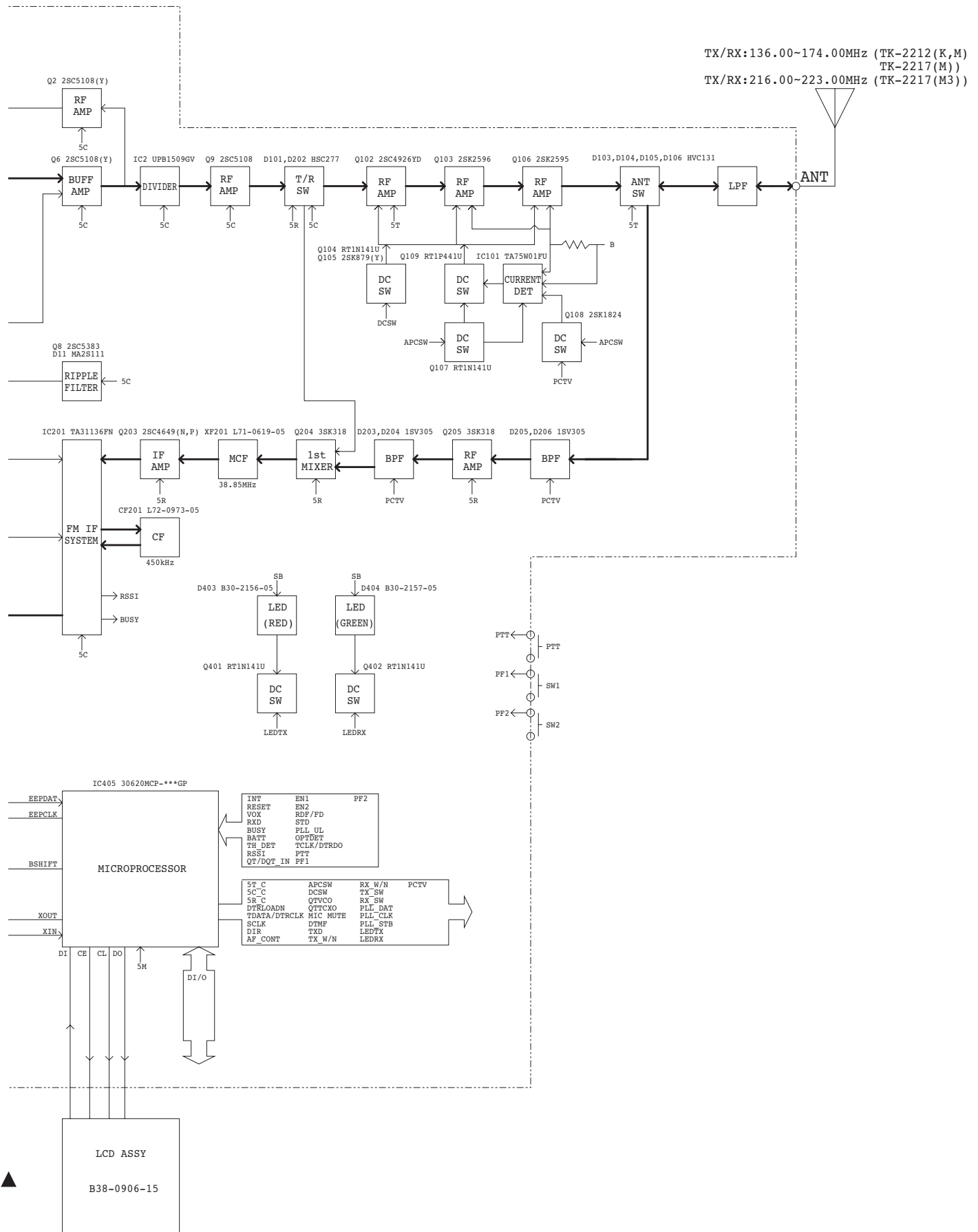
Note :The components marked with a dot (●) are parts of layer1.



## BLOCK DIAGRAM

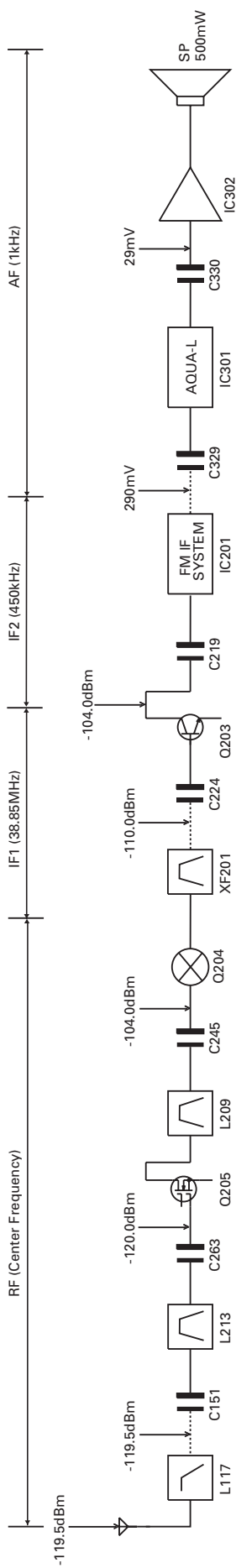


## BLOCK DIAGRAM



LEVEL DIAGRAM

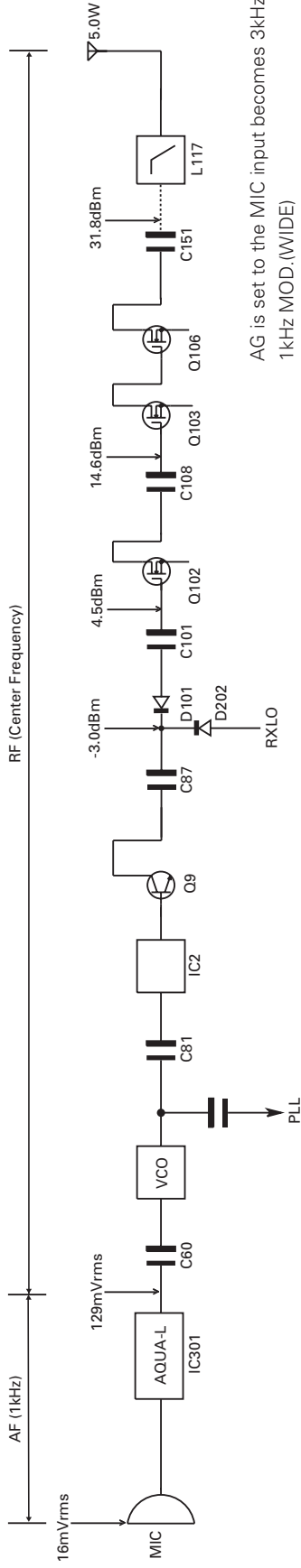
Receiver Section



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 1000pF 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 1000pF coupling capacitor.

# KSC-31 / KNB-29N / KBH-10



# TK-2212/2217

## SPECIFICATIONS

### General

|                                                                               |                                                                                                       |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Frequency Range .....                                                         | 136~174MHz (TK-2212(K, M) TK-2217(M))<br>216~223MHz (TK-2217(M3))                                     |
| Number of Channels .....                                                      | Zone : Max.128 per Radio Channel : Max.128 per Zone                                                   |
| Channel Spacing .....                                                         | 25kHz, 30kHz (Wide) 12.5kHz, 15kHz (Narrow)                                                           |
| Battery Voltage .....                                                         | 7.5 V DC±20%                                                                                          |
| Battery Life<br>(5-5-90 duty cycle, during high power, Battery Saver off) ... | KNB-29N(1500mAh) : Approx.10 hours                                                                    |
| Operating Temperature Range .....                                             | -22°F to +140°F (-30°C to +60°C)<br>(+14°F to +140°F (-10°C to +60°C) when KNB-29N in use)            |
| Frequency Stability .....                                                     | ±2.5ppm (-22°F to +140°F / -30°C to +60°C)                                                            |
| Antenna Impedance .....                                                       | 50Ω                                                                                                   |
| Channel Frequency Spread .....                                                | 38MHz (TK-2212(K,M) TK-2217(M))<br>7MHz (TK-2217(M3))                                                 |
| Dimensions (W x H x D)<br>(Projections not included, Min/Max)                 |                                                                                                       |
| Radio Only .....                                                              | 54 x 122 x 21.1 mm / 57 x 124.5 x 30.1 mm<br>2-1/8 x 4-13/16 x 13/16 in. / 2-1/4 x 4-7/8 x 1-3/16 in. |
| With KNB-29N (1500mAh battery) .....                                          | 54 x 122 x 33 mm / 57 x 124.5 x 42 mm<br>2-1/8 x 4-13/16 x 1-5/16 in. / 2-1/4 x 4-7/8 x 1-5/8 in.     |
| Weight (net)                                                                  |                                                                                                       |
| Radio Only .....                                                              | 6.3 oz (180g)                                                                                         |
| With KNB-29N (1500mAh battery) .....                                          | 13.4 oz (380g)                                                                                        |

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

|                                  |                                     |
|----------------------------------|-------------------------------------|
| Selectivity (12dB SINAD) .....   | 0.25μV (Wide)/0.28μV (Narrow)       |
| Selectivity .....                | 70dB (Wide)/60dB (Narrow)           |
| Intermodulation Distortion ..... | 65dB (Wide)/60dB (Narrow)           |
| Spurious Response .....          | 65dB                                |
| Audio Output (8Ω) .....          | 500mW with less than 10% distortion |

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

|                         |                                 |
|-------------------------|---------------------------------|
| RF Output Power .....   | 5W/1W                           |
| Spurious Response ..... | 65dB                            |
| Type of Emission .....  | 16K0F3E (Wide)/11K0F3E (Narrow) |
| FM Hum and Noise .....  | 45dB (Wide)/40dB (Narrow)       |
| Audio Distortion .....  | Less than 5%                    |

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