

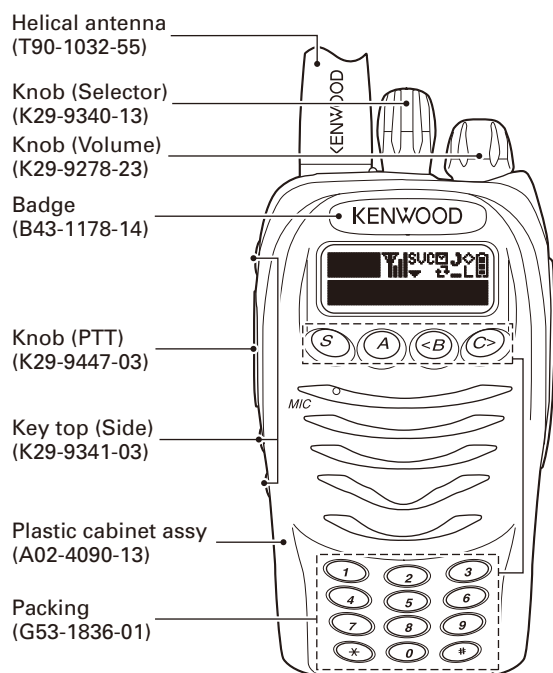
TK-3178(L)

SERVICE MANUAL / 维修手册

KENWOOD

Kenwood Corporation

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无铅焊接通信产品  
保护环境建伍领先

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GENERAL / 概述

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

PERSONAL SAFETY

The following precautions are recommended for personal safety:

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

SERVICE

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

引言

本手册的范围

本手册是提供给熟悉通信专业并且具有维修经验的技术人员使用的。它包括了维修该设备所需要的全部资料和现行出版日期。在出版后可能发生变动，如果需要，可以参照《维修通报》或《手册修订本》进行补充。

替换零件的订购

当订购替换零件或设备资料时，应注意完整的零件识别号码。所有的零件均有识别号码：元件，组件或机壳。如果不知道零件的号码，为了正确地识别，必须注明此元件所属的机壳或组件的号码，并对元件进行充分的说明。

个人安全

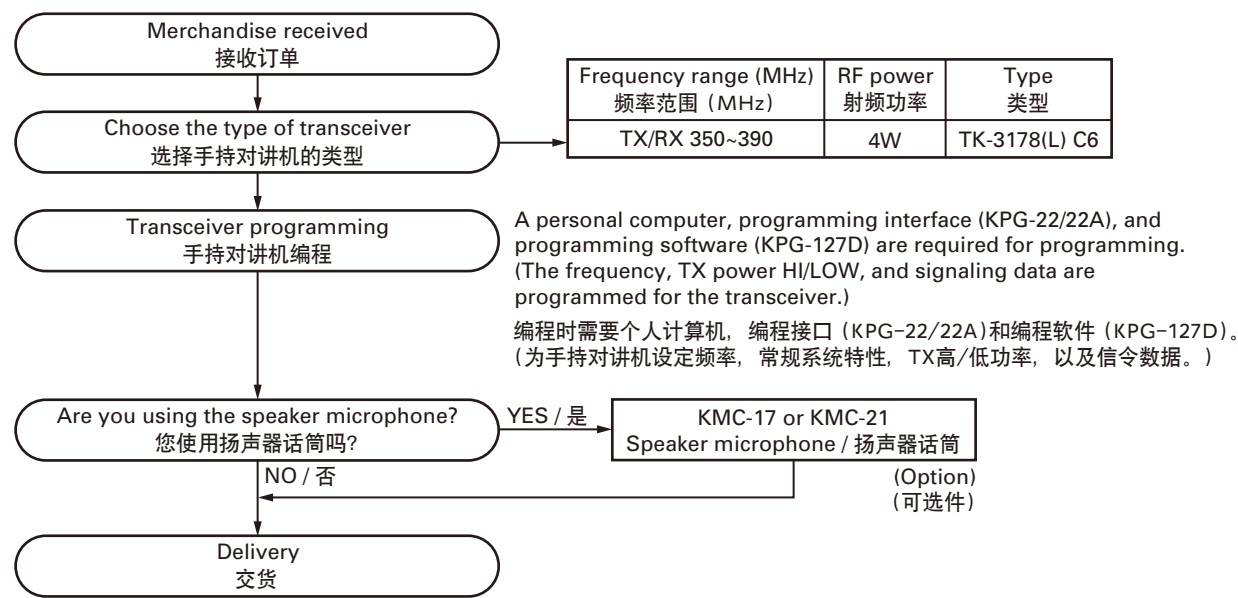
为了个人的安全，请注意下列事项：

- 在没有认真核实所有射频插头之前或有任何一个脱开的插头没有连接到相应端口上的情况下均不要发射。
- 在电爆管附近或在易燃性气体环境中，必须关闭电源，不要操作本设备。
- 本设备只应该由有资格的技术人员进行维修。

维修服务

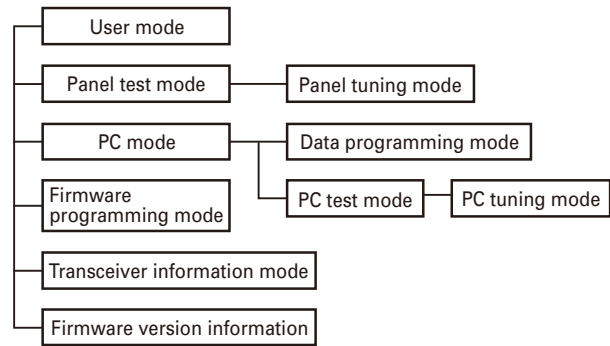
为了便于维修本设备，建立了完整的维修服务体系，提供了包括原理图，印刷电路板图和调整步骤在内的资料供参考。

SYSTEM SET-UP / 系统体系



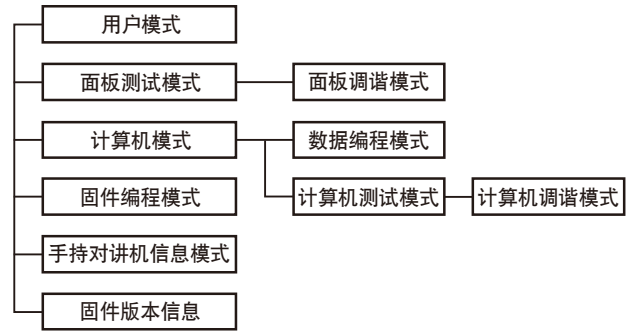
REALIGNMENT / 模式组合

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the transceiver.
PC mode	Used for communication between the transceiver and PC.
Data programming mode	Used to read and write frequency data and other features to and from the transceiver.
PC test mode	Used to check the transceiver using the PC. This feature is included in the FPU. See panel tuning.
Firmware programming mode	Used when changing the main program of the flash memory.

1. 模式



模 式	功 能
用户模式	一般使用。
面板测试模式	用于经销商检查基本功能。
面板调谐模式	用于经销商调整手持对讲机指标。
计算机模式	用于手持对讲机与计算机之间的通信。
数据编程模式	用于阅读和写入频率数据以及其他功能。
计算机测试模式	用于使用计算机检测。此特性包括在 FPU 内。参见面板调谐。
固件编程模式	当改变闪存中操作主程序时使用。

REALIGNMENT / 模式组合

Mode	Function
Transceiver information mode	Used to confirm the MPT ESN, firmware version and transceiver serial number.
Firmware version information	Used to confirm the internal firmware version.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[A] + Power ON
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode] + [S]
Firmware programming mode	[Side2] + Power ON
Transceiver information mode	[B] + Power ON
Firmware version information	[Side1] + Power ON

3. Panel Test Mode

Setting method refer to ADJUSTMENT.

4. Panel Tuning Mode

Setting method refer to ADJUSTMENT.

5. PC Mode

5-1. Preface

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

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

5-2. Connection Procedure

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

Note:

- You must install the KCT-53U driver in the computer to use the USB adapter (KCT-53U).
 - When using the USB adapter (KCT-53U) for the first time, plug the KCT-53U into a USB port on the computer with the computer power ON.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the transceiver enters PC mode.
When data is read from the transceiver, the red LED lights.
When data is written to by the transceiver, the green LED lights.

模 式	功 能
手持对讲机信息模式	用于确认 MPT ESN、固件版本和手持对讲机序列号。
固件版本信息	用于确认内部固件版本。

2. 如何进入每一种模式

模 式	操 作
用户模式	接通电源
面板测试模式	[A] + 接通电源
计算机模式	从计算机接收指令
面板调谐模式	[面板测试模式] + [S]
固件编程模式	[Side2] + 接通电源
手持对讲机信息模式	[B] + 接通电源
固件版本信息	[Side1] + 接通电源

3. 关于面板测试模式

关于设定方式，参见调整。

4. 关于面板调谐模式

关于设定方式，参见调整。

5. PC 模式

5-1. 前言

手持对讲机采用个人电脑、编程接口 (KPG-22/22A, USB 适配器 (KCT-53U)) 和 FPU (编程软件) 进行编程。

编程软件可以在 PC 或兼容的 PC 上进行使用。图 1 给出了 PC 进行编程的设置。

5-2. 连接操作

1. 使用接口电缆和 USB 适配器将手持对讲机连接到个人电脑 (接口电缆为 KPG-22A 时, 可以使用 KCT-53U)。

注意:

- 必须在电脑上安装 KCT-53U 驱动程序才能使用 USB 适配器 (KCT-53U)。
 - 首次使用 USB 适配器 (KCT-53U) 时, 请在电脑开机的情况下将 KCT-53U 插入电脑的 USB 端口。
2. 手持对讲机电源打开时, 可以立即进入用户模式。PC 发送指令时, 手持对讲机进入 PC 模式。
手持对讲机发送数据时, 红色的 LED 点亮。
手持对讲机接收数据时, 绿色的 LED 点亮。

REALIGNMENT / 模式组合

Note:

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

5-3. KPG-22/KPG-22A Description**(PC programming interface cable : Option)**

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

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

5-4. KCT-53U Description (USB adapter : Option)

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

When using the KCT-53U, install the supplied CD-ROM (with driver software) in the computer. The KCT-53U driver runs under Windows 2000, XP or Vista (32-bit).

5-5. Programming Software KPG-127D Description

The KPG-127D is the programming software for the transceiver supplied on a CD-ROM. This software runs under Windows 2000, XP or Vista (32-bit) on a PC.

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

注意:

- 个人电脑保存的数据写入 EEPROM 时，必须与机型和类型相符。
- 请勿在数据发送或接收期间按 [PTT] 键。

5-3. KPG-22/KPG-22A 说明**(PC 编程接口电缆：选购件)**

将手持对讲机与电脑相连需要 KPG-22/22A。该电缆的 D-sub 连接器 (KPG-22: 25 针, KPG-22A: 9 针) 盒具有将 RS-232C 逻辑电平转换为 TTL 电平的电路。

KPG-22/22A 将手持对讲机的 SP/MIC 连接器连接到电脑的 RS-232C 串行端口。

5-4. KCT-53U 说明 (USB 适配器：选购件)

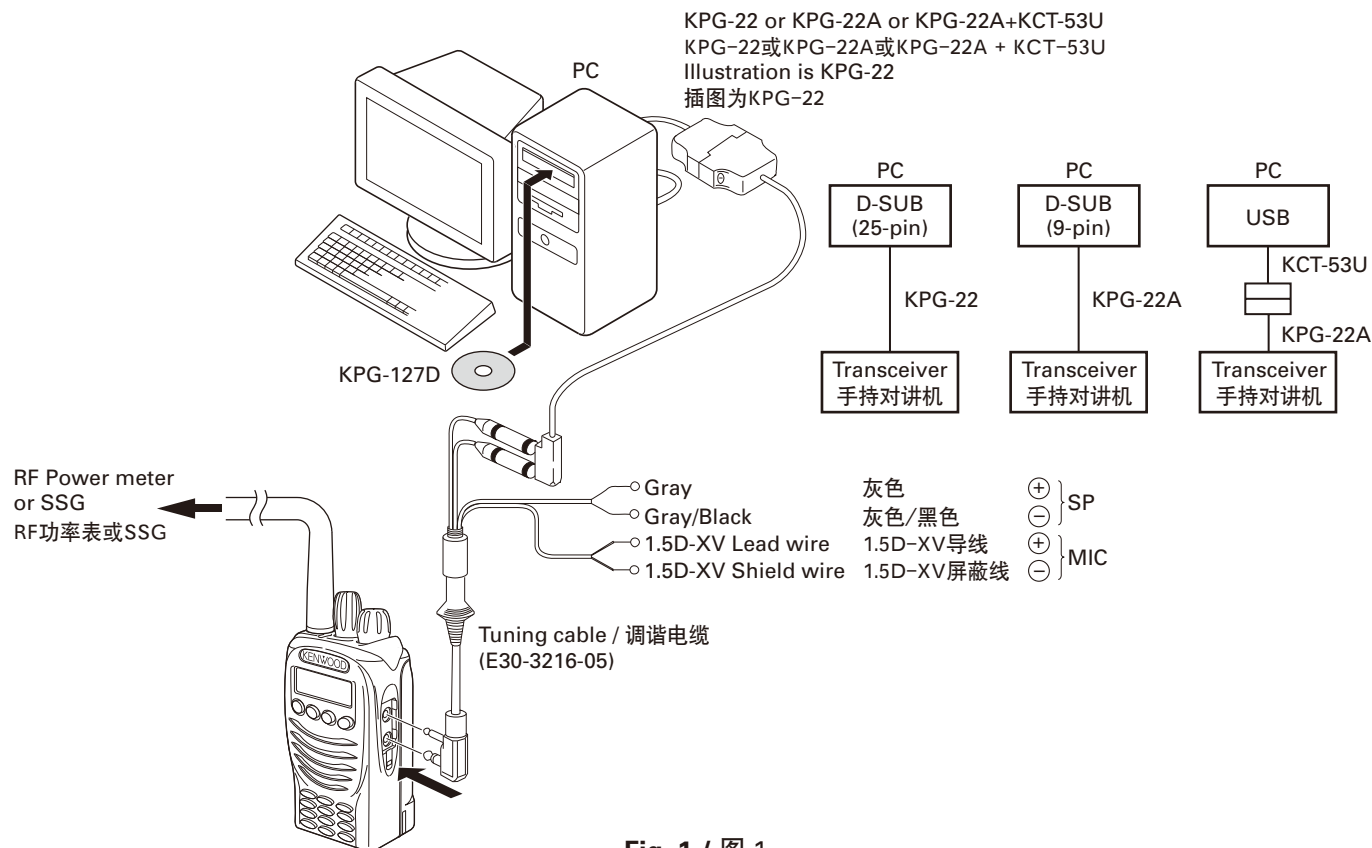
KCT-53U 是将 KPG-22A 连接到电脑 USB 端口的电缆。

使用 KCT-53U 时，请在电脑上安装附带的 CD-ROM (带有驱动程序软件)。KCT-53U 驱动程序在 Windows 2000, XP 或 Vista (32 位) 下运行。

5-5. 编程软件说明

KPG-127D 是 CD-ROM 附带的用于手持对讲机的编程软件。该软件在 PC 的 MS-Windows 2000, XP 或 Vista (32 位) 下运行。

可在手持对讲机上写入或读取数据，并可在电脑屏幕上进行编辑。可以打印编程或编辑的数据。此外，还可调谐手持对讲机。

**Fig. 1 / 图 1**

REALIGNMENT / 模式组合

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the transceiver. This allows the transceiver to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

6-2. Connection Procedure

Connect the transceiver to the personal computer with the interface cable (KPG-22/22A). (Connection is the same as in the PC Mode.)

6-3. Programming

1. Start up the firmware programming software (Fpro.exe).
2. Set the communications speed (normally, 115200 bps) and communications port in the configuration item.
3. Set the firmware to be updated by File name item.
4. Turn the transceiver power ON with the [Side2] key held down. Then, the orange LED on the transceiver lights and "PROG 115200" is displayed.
5. Check the connection between the transceiver and the personal computer, and make sure that the transceiver is in the Program mode.
6. Press write button in the window. When the transceiver starts to receive data, the "PG" display is blinking.
7. If writing ends successfully, the checksum is calculated and a result is displayed.
8. If you want to continue programming other transceivers, repeat steps 4 to 7.

Note:

This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software.

6-4. Function

1. If you press the [Side2] key while "PROG 115200" is displayed, the display changes to "PROG 19200" to indicate that the write speed is low speed (19200 bps). If you press the [Side2] key again while "PROG 19200" is displayed, the display changes to "PROG 38400". If you press the [Side2] key again while "PROG 38400" is displayed, the display changes to "PROG 57600". If you press the [Side2] key again while "PROG 57600" is displayed, the display returns to "PROG 115200".
2. If you press the [Side1] key while "PROG 115200" is displayed, the checksum is calculated, and a result is displayed. If you press the [Side1] key again while the checksum is displayed, "PROG 115200" is redisplayed.

Note:

Normally, write in the high-speed mode.

6. 固件编程模式

6-1. 前言

闪存被安装在手持对讲机上。当将来出现新功能时，允许手持对讲机升级。（要了解如何获得固件的详细情况，请与供应商联系。）

6-2. 连接步骤

使用编程电缆（KPG-22/22A）将手持对讲机与计算机连接。（与计算机编程模式中的连接方法一样。）

6-3. 编程

1. 启动固件编程软件（FPRO.exe）。
2. 在配置项中设定通信速率（通常为115200bps）和通信端口。
3. 在文件名称项中选定新固件。
4. 向下按动[Side2]键并接通手持对讲机的电源。向下按住键直到显示器出现“PROG115200”为止。然后，手持对讲机上的橙色LED点亮，并显示“PROG 115200”。
5. 检查手持对讲机与个人电脑之间的连接是否正确，并且确认手持对讲机是否处于编程模式。
6. 按窗口中的写入按钮。手持对讲机开始接收数据时，“PG”显示不断闪烁。
7. 如果写入成功结束，则计算校验和并显示结果。
8. 如果用户需要继续编程其他的手持对讲机，重复步骤4到7。

注释：

如果在编程软件（KPG-127D）中固件编程模式设定为禁用，则不能进入此模式。

6-4. 功能

1. 如果在显示“PROG 115200”时按[Side2]键，则显示变为“PROG 19200”以表示写入速度为低速（19200bps）。如果在显示“PROG 19200”时再次按[Side2]键，则显示变为“PROG 38400”。如果在显示“PROG 38400”时再次按[Side2]键，则显示变为“PROG 57600”。如果在显示“PROG 57600”时再次按[Side2]键，则显示返回到“PROG 115200”。
2. 如果在显示“PROG 115200”时按[Side1]键，则计算校验和并显示结果。如果在显示校验和时再次按[Side1]键，则重新显示“PROG 115200”。

注释：

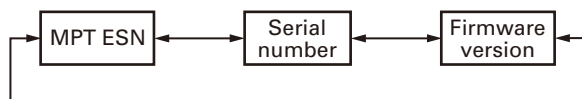
通常以高速模式写入。

REALIGNMENT / 模式组合

7. Transceiver Information Mode

Use this function to confirm the MPT ESN, the firmware version and the transceiver serial number.

1. Press and hold the [B] key for 2 seconds while turning the power ON.
2. Use the [Selector] to select the confirmation items.
3. To exit the transceiver information mode, turn the transceiver power OFF.

**8. Firmware Version Information Mode**

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

7. 手持对讲机信息模式

该功能用于确认 MPT ESN、固件版本和手持对讲机序列号。

1. 打开电源时按住 [B] 键约 2 秒钟。
2. 用 [选择器] 选择确认项目。
3. 如需退出手持对讲机信息模式，请关闭手持对讲机电源。

**8. 固件版本信息模式**

按下 [Side1] 键打开手持对讲机的电源。然后按 [Side1] 键显示版本。

DISASSEMBLY FOR REPAIR / 维修拆卸

1. Removing the FPC (J87-0033-05)

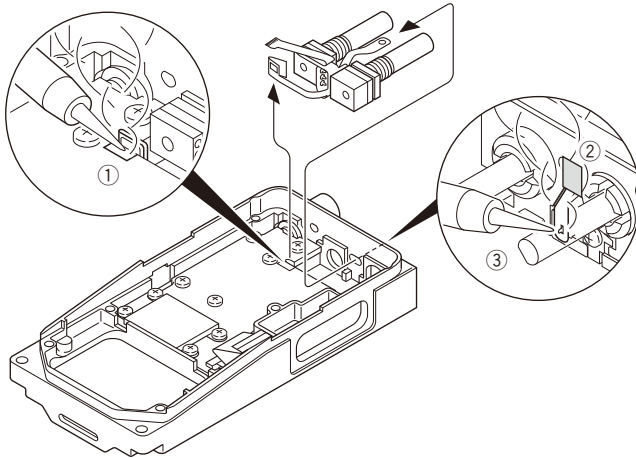
- 1) Remove the solder from the TX-RX unit using a solder iron (①).
- 2) Peel the double-sided tape (②).
- 3) Remove the solder from the battery terminal block using the solder iron (③).

Note: You must replace the FPC and the double-sided tape (4 x 7 mm) when replacing the volume or the selector.

1. 取下 FPC (J87-0033-05)

- 1) 用电烙铁从 TX-RX 单元上焊下焊锡 (①)。
- 2) 揭去双面胶带 (②)。
- 3) 用电烙铁从电池端子上焊下焊锡 (③)。

注意：更换音量开关或选择器后，必须更换 FPC 和双面胶带 (4×7mm)。

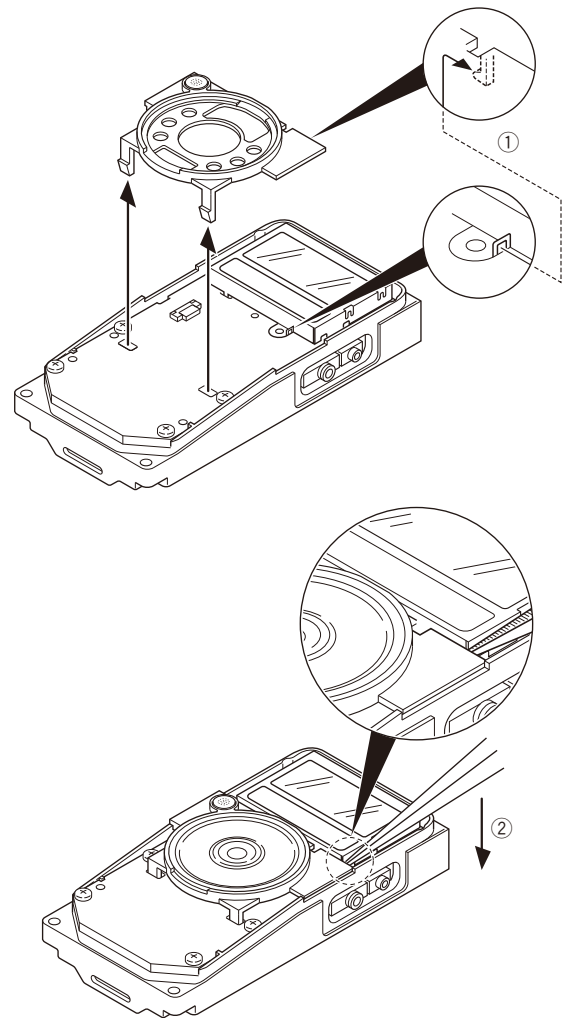


2. Separating the Speaker Holder (J19-5481-03) from the Control Unit

- 1) As shown in the figure below, the speaker holder is attached to the LCD cover with tab (①). Use a pair of tweezers or similar instrument to lift the speaker holder away from the control unit (②).

2. 从控制单元上拆下扬声器座 (J19-5481-03)

- 1) 如下图所示，扬声器座固定在带凸起的 LCD 盖上 (①)。用一对镊子或类似的工具将扬声器座从控制单元中提出来 (②)。



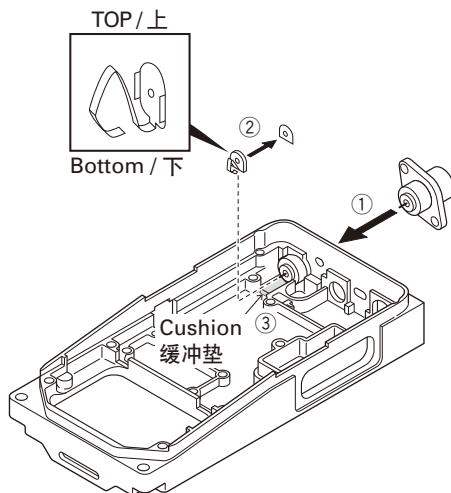
DISASSEMBLY FOR REPAIR / 维修拆卸

3. How to Assemble the Antenna Connector (E04-0467-05) and its Terminal (E23-1188-04)

The antenna connector and its terminal are supplied as separate parts.

When replacing the antenna connector and/ or terminal, assemble the parts prior to the replacement.

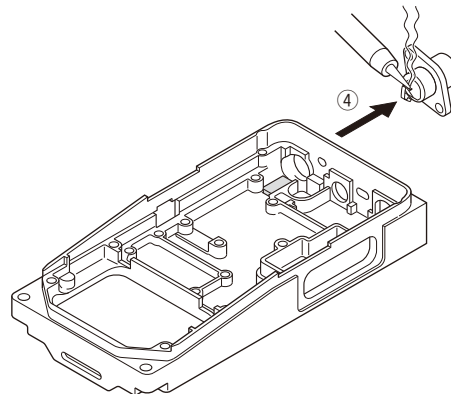
- 1) Mount the antenna connector onto the chassis (①).
Double-sided tape is attached to the terminal; peel off the tape cover (②).
Attach the terminal to the antenna connector as shown below.
Slide the antenna terminal along the adhesive cushion on the chassis so that the adhesive part on the terminal is firmly attached to the antenna connector (③).
- 2) Remove the antenna connector from the chassis with its terminal attached, then solder the center part of antenna connector to its terminal (④).
Do not use excessive solder on terminal.



3. 如何组装天线连接器 (E04-0467-05) 和它的端子 (E23-1188-04)

天线连接器和它的端子是作为单独的零件提供的。
更换天线连接器和 / 或端子时, 应在更换前组装零件。

- 1) 将天线连接器安装到底座上 (①)。
将双面胶带粘在端子上; 然后揭去胶带保护纸 (②)。
如下图所示将端子连接到天线连接器上。
沿粘性垫的方向在底座上滑动天线端子, 使端子的胶着部分牢牢地粘在天线连接器上 (③)。
- 2) 将天线连接器连同连着的端子一起从底座上取下, 然后将天线连接器的中间部焊到它的端子上 (④)。
请勿在端子上使用过多的焊料。

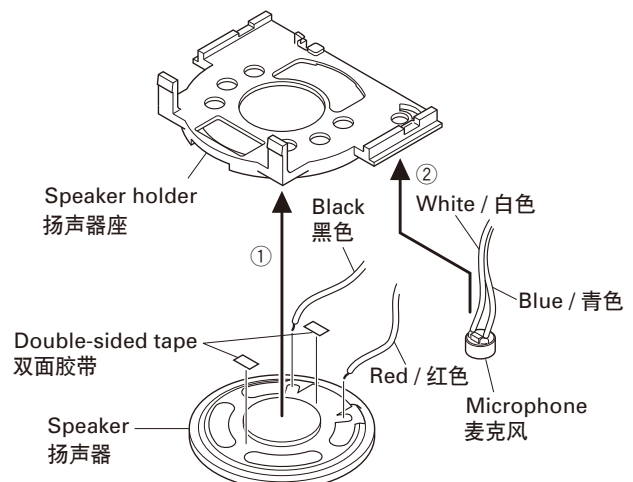


4. Replacing the Speaker and Microphone

- 1) After affixing the double-sided tape (G11-4352-04; 5.4 x 2.7 mm) to the speaker, attach the speaker to the speaker holder (①).
- 2) Insert the microphone into the hold of the holder, as shown by the diagram (②).

4. 更换扬声器和麦克风

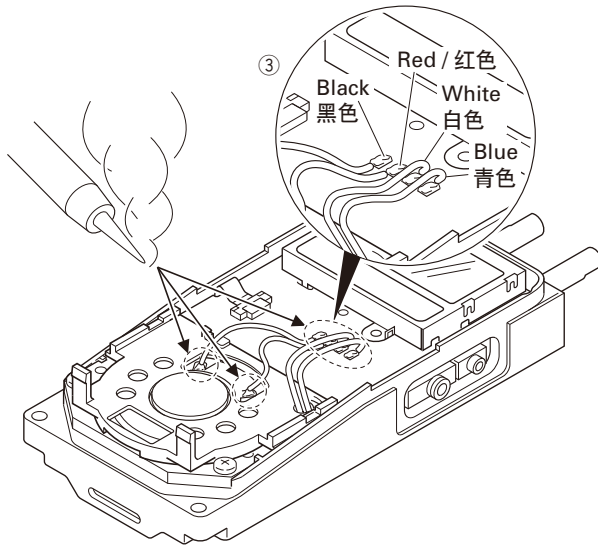
- 1) 将双面胶带 (G11-4352-04; 5.4 x 2.7mm) 粘到扬声器上后, 再将扬声器粘到扬声器座上 (①)。
- 2) 如图所示将麦克风插入座孔中 (②)。



DISASSEMBLY FOR REPAIR / 维修拆卸

3) Match the speaker and microphone lead wires with the color-code of silkscreen of the printed circuit board (③), then solder them in place.

3) 使扬声器导线和麦克风导线与印刷电路板的丝网印制的色码一致 (③)，然后焊好。



4) Lift the speaker holder (④), then flip it over to the left (⑤).

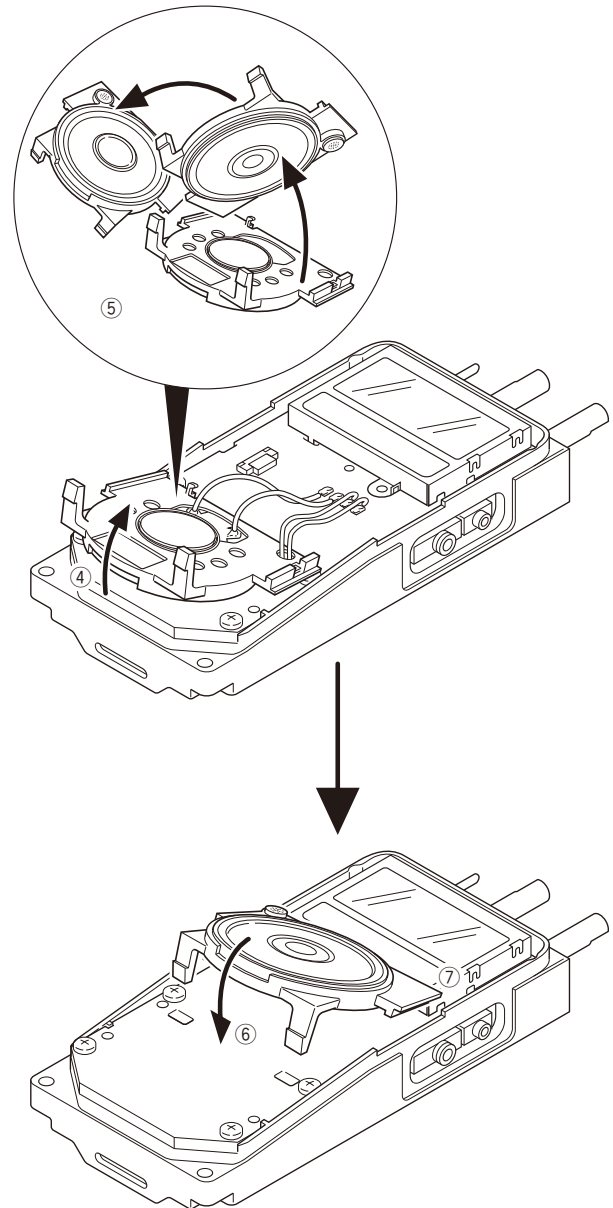
5) Insert the tabs of the speaker holder into the slots of the transceiver.

First insert the bottom tabs into the control unit (⑥), then insert the top tabs into the LCD cover (⑦).

4) 抬起扬声器座 (④)，然后将它翻到左边 (⑤)。

5) 将扬声器座的凸起插入手持对讲机的槽中。

先将底部的凸起插入控制单元 (⑥)，然后将顶部的凸起插入 LCD 盖中 (⑦)。



CIRCUIT DESCRIPTION / 电路说明

1. Frequency Configuration

The receiver utilizes double conversion. The first IF is 49.95MHz and the second IF is 450kHz. The first local oscillator signal is supplied from the PLL circuit.

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

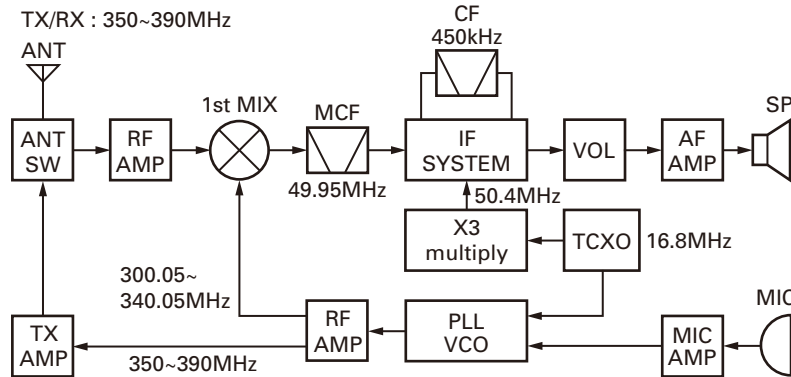


Fig. 1 Frequency configuration / 图 1 频率构成

1. 频率构成

接收部采用二次变频超外差方式。第一中频为 49.95MHz，第二中频为 450kHz。第一本振频率信号由锁相环电路提供。

发射部由锁相环电路直接产生所需要的频率。图 1 显示各种频率。

2. Receiver System

The receiver system is shown in Figure 2.

2-1. Front End (RF AMP) Circuit

The signal coming from the antenna passes through the transmit/receive switching diode circuit (D604, D605, D606 and D608), passes through a BPF (L717 and L718), and is amplified by the RF amplifier (Q705).

The resulting signal passes through a BPF (L711, L712 and L713) and goes to the mixer. These BPFs are adjusted by variable capacitors (D703, D704, D705, D706 and D707). The input voltage to the variable capacitor is regulated by voltage output from the DC amplifier (IC19).

2-2. First Mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q704 to produce a first IF frequency of 49.95MHz.

The resulting signal passes through the XF701 MCF to cut the adjacent spurious and provide the optimum characteristics, such as adjacent frequency selectivity.

2. 接收部系统

接收部系统的如图 2 所示。

2-1. 前级（射频放大器）电路

从天线接收的信号进入发送 / 接收转换开关二极管电路 (D604、D605、D606 和 D608)，然后通过 BPF (L717 和 L718)，并且被射频放大器 (Q705) 放大。

此信号通过 BPF (L711、L712 和 L713) 然后进入混频。这些 BPF 被可变电容器 (D703、D704、D705、D706 和 D707) 调整。输入可变电容器的电压被经直流放大器 (IC19) 的电压输出调整。

2-2. 第一混频器

前端的信号与 PLL 电路产生的第一本振信号在 Q704 混频，生成 49.95MHz 频率的第一中频信号。

生成的信号通过 XF701 MCF。

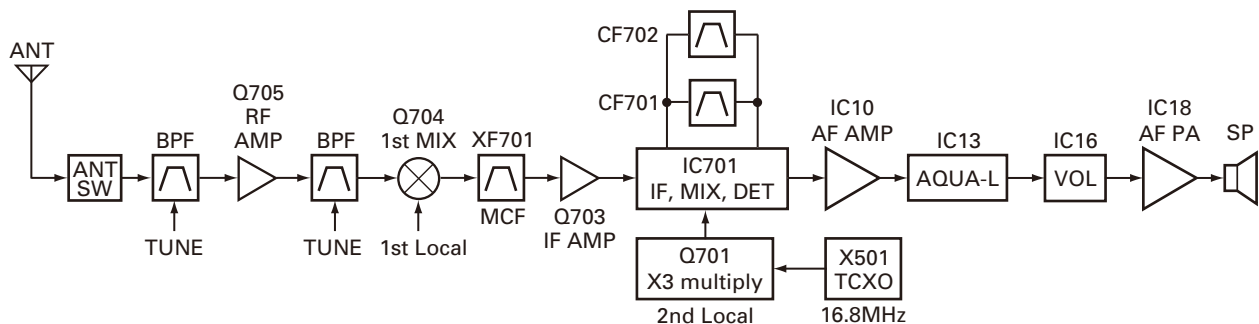


Fig. 2 Receiver system / 图 2 接收部系统

CIRCUIT DESCRIPTION / 电路说明

2-3. IF Amplifier Circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF701) to remove the adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q703) and then applied to the IF system IC (IC701). 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 50.4MHz of the second local oscillator output (TCXO X501) and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (Wide: CF701, Narrow: CF702) 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 (CD701). The demodulated signal is routed to the audio circuit.

2-4. Wide/Narrow Switching Circuit

Wide and Narrow settings can be made for each channel by switching the ceramic filters CF701 (Wide), CF702 (Narrow). The Wide and Narrow is output from IC4.

D701 and D702 are switched to ceramic filters when a Wide/Narrow level is selected.

Q702 turns on/off with the Narrow and the IC701 detector output level is changed to maintain a constant output level during wide or narrow signals.

2-3. 中频放大电路

第一中频信号通过晶体滤波器 (XF701) 消除相邻信道的信号。经滤波的第一中频信号被第一中频放大器 (Q703) 放大并进入中频系统芯片 (IC701)。中频系统芯片提供第二混频器、第二本振信号、限幅放大器、正交检测器和 RSSI (接收信号强度指示器)。第二混频器将第一中频信号与 50.4MHz 的第二本振信号输出 (TCXO X501) 进行混频, 并生成 450kHz 的第二中频信号。

第二中频信号通过陶瓷滤波器 (宽: CF701、窄: CF702) 继续消除相邻信道的信号。经滤波的第二中频信号被限幅放大器放大并被带有陶瓷鉴频器 (CD701) 的正交检测器解调。经解调的信号进入音频电路。

2-4. 宽 / 窄切换电路

通过切换陶瓷滤波器 CF701 (宽)、CF702 (窄) 可以对每一信道进行宽、窄设置。宽、窄控制信号从 IC4 输出。

选择宽 / 窄电平时, 将 D701 和 D702 切换到陶瓷滤波器。

在宽或窄信号期间, Q702 随窄信号打开 / 关闭, IC701 检测器输出电平变为保持恒定输出电平。

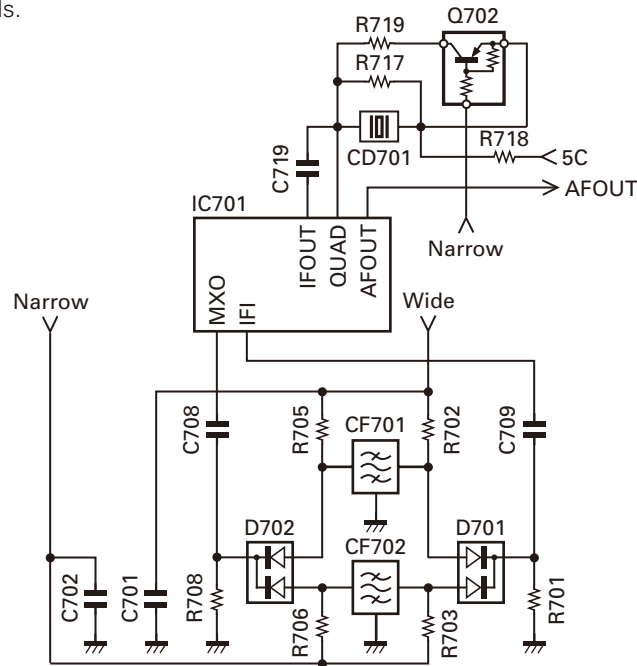


Fig. 3 Wide/Narrow switching circuit / 图 3 宽 / 窄切换电路

2-5. Audio Amplifier Circuit

The demodulated signal from IC701 is amplified by IC10, and goes to AF amplifier through IC13.

The signal then goes through a volume control (IC16), and is routed to an audio power amplifier (IC18) where it is amplified and output to the speaker.

2-5. 音频放大器电路

来自于 IC701 的解调信号被 IC10 放大, 并通过 IC13 送到 AF 放大器。

信号通过 AF 音量控制 (IC16), 在音频功率放大器 (IC18) 进行放大后输出到扬声器。

CIRCUIT DESCRIPTION / 电路说明

2-6. Squelch Circuit

Part of the AF signal from the IC enters the FM IC (IC701) 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 (IC7). IC7 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, IC7 sends a high signal to the AM2 line and IC5 sends a high signal to the AM1 line, and turns IC18 on through Q23, Q24, Q27, Q28 and Q35. (See Figure 4)

2-6. 静噪电路

FM IC (IC701) 输出的 AF 信号的一部分再进入 IC，噪声成份通过滤波器和放大器进行放大和修正，生成与噪声电平相应的 DC 电压。

DC 信号通过 FM IC 被送到微处理器的模拟端口 (IC7)。IC7 通过检测输入的电压是高于还是低于预设值来决定是否从扬声器输出声音。

由扬声器输出声音时，IC7 发送高电平信号给 AM2 线和 IC5 发送高电平信号给 AM1 线，通过 Q23、Q24、Q27、Q28 和 Q35 打开 IC18。(见图 4)。

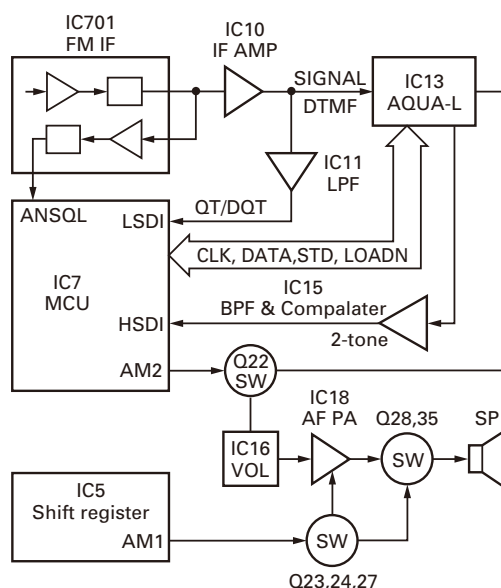


Fig. 4 Audio amplifier circuit and squelch circuit / 图 4 音频放大器电路和静噪电路

3. Transmitter System

3-1. Microphone Amplifier Circuit

The signal from microphone amplified by IC13 (1/2) and limited by AGC circuit composed of D30, D31, Q25 and Q26, and goes through mute switch (Q30). IC13 is composed of high-pass filter, low-pass filter and pre-emphasis/IDC circuit.

The signal enters the summing amplifier consisting of IC12 (2/2), and passes through the D/A converter (IC16) for the maximum deviation adjustment, and is mixed with the low speed data from the MCU (IC7).

The output signal from the D/A converter goes to the VCO modulation input. The other output signal from the D/A converter passes through the D/A converter (IC16) again for the BAL adjustment, and the buffer amplifier (IC17), and goes to the TCXO modulation input.

3. 发射机系统

3-1. 麦克风放大器电路

麦克风的信号被 IC13(1/2) 放大，并受由 D30、D31、Q25 和 Q26 组成的 AGC 电路的限幅，然后通过静音开关 (Q30)。IC13 由高通滤波器、低通滤波器和预加重 / IDC 电路组成。

信号送入由 IC12(2/2) 组成的加法放大器，通过最大频偏调节的数模转换器 (IC16)，然后与 MCU (IC7) 的低速数据混合。

数模转换器的输出信号送入 VCO 调制输入。数模转换器的其他输出信号再次通过 BAL 调节的数模转换器 (IC16) 和缓冲放大器 (IC17)，然后送入 TCXO 调制输入。

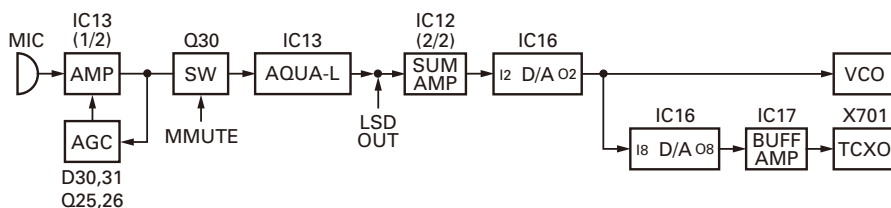


Fig. 5 Microphone amplifier circuit / 图 5 麦克风放大器电路

CIRCUIT DESCRIPTION / 电路说明

3-2. Drive and Final Amplifier Circuit

The signal from the T/R switch (D516 is on) is amplified by the pre-drive (Q602) and drive amplifier (Q603) to 50mW.

The output of the drive amplifier is amplified by the RF final amplifier (Q604) to 4.0W (1W when the power is low). The RF final amplifier consists of two MOS FET stages.

The output of the RF final amplifier is then passed through the harmonic filter (LPF) and antenna switch (D604 and D605) and applied to the antenna terminal.

3-2. 驱动器和终端放大器电路

来自于 T/R 开关 (D516 ON) 的信号被预驱动放大器 (Q602) 和驱动放大器 (Q603) 放大到 50mW。

驱动放大器的输出被 RF 功率放大器 (Q604) 放大到 4.0W (当低功率时为 1W)。RF 功率放大器由 2 个 MOS FET 构成。

RF 功率放大器的输出通过谐波滤波器 (LPF) 和天线开关 (D604 和 D605) 并且送到天线终端。

3-3. APC Circuit

The APC circuit always monitors the current flowing through the RF power amplifier (Q604) and keeps a constant current. The voltage drop at R621, R623 and R629 is caused by the current flowing through the RF final amplifier and this voltage is applied to the differential amplifier IC601 (1/2).

IC601 (2/2) compares the output voltage of IC601 (1/2) with the reference voltage from IC7. The output of IC601 (2/2) controls the VG of the RF power amplifier, drive amplifier and pre-drive amplifier to make both voltages the same.

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

3-3. 自动功率控制 (APC) 电路

APC 电路一直监视通过射频功率放大器 (Q604) 的电流并保持电流稳定。经过射频功率放大器的电流的变化会引起 R621、R623 和 R629 的电压降低, 此电压送到差分放大器 IC601 (1/2)。

IC601 (2/2) 将 IC601 (1/2) 的输出电压与来自 IC7 的参考电压进行比较。IC601 (2/2) 的输出电压控制射频功率放大器、驱动放大器、预驱动放大器的 VG, 使电压保持一致。

功率高 / 低的变化是通过变更参考电压来实现的。

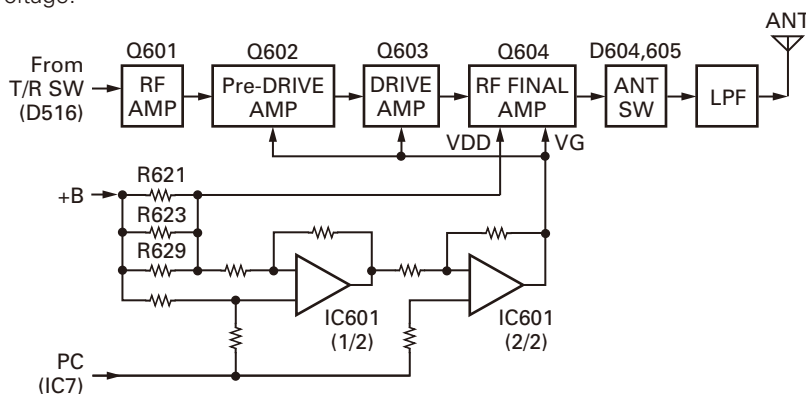


Fig. 6 Drive and final amplifier circuit and APC circuit / 图 6 驱动器和终端放大器电路和自动功率控制 (APC) 电路

4. Frequency Synthesizer Circuit

4-1. Frequency Synthesizer

The frequency synthesizer consists of the TCXO (X501), VCO, PLL IC (IC501) and buffer amplifiers.

The TCXO generates 16.8MHz. The frequency stability is 2.5ppm within the temperature range of -30 to $+60^{\circ}\text{C}$. The frequency tuning and modulation of the TCXO are done to apply a voltage to pin 1 of the TCXO. The output of the TCXO is applied to pin 8 of the PLL IC.

The VCO consists of 2VCO and covers a dual range of the 300.05~340.05MHz and the 350~390MHz. The VCO generates 300.05~340.05MHz for providing to the first local signal in receive. The operating frequency is generated by Q502 in transmit mode and Q503 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator (IC501) to the variable capacitor diodes (D505 and D507 in transmit mode and D509 and D511 in receive mode).

4. 频率合成器电路

4-1. 频率合成器

频率合成器由 TCXO (X501)、VCO、PLL IC (IC501) 和缓冲放大器组成。

TCXO 产生 16.8MHz 的频率。在温度为 $-30 \sim +60^{\circ}\text{C}$ 的范围内, 频率的稳定性为 2.5ppm。进行频率调谐和 TCXO 调制, 以便给 TCXO 的引脚 1 提供电压。TCXO 的输出加在 PLL IC 的引脚 8 上。

VCO 由 2VCO 组成, 并且覆盖了 300.05 ~ 340.05MHz 和 350 ~ 390MHz 双波段。VCO 产生 300.05 ~ 340.05MHz 的频率, 以提供接收的第一个本振信号。发射模式时, 操作频率由 Q502 产生, 而接收模式时, 操作频率由 Q503 产生。振荡频率由加在 VCO 上的控制电压控制, 控制电压从可变电容二极管 (在发射模式是 D505 和 D507, 在接收模式是 D509 和 D511) 的相位比较器 (IC501) 处获得。

CIRCUIT DESCRIPTION / 电路说明

The RX pin of IC4 goes “low” in receive mode causing Q503 and Q504 (2/2) turn on. The TX pin goes “low” in transmit mode causing Q502 and Q504 (1/2) turn on.

The outputs from Q502 and Q503 are amplified by buffer amplifier (Q506) and doubled by Q501 and then sent to PLL IC.

The PLL IC consists of a prescaler, reference divider, phase comparator, charge pump (The frequency step of the PLL circuit is 5 or 6.25kHz). The input signal from the pins 8 and 5 of the PLL IC is divided down to the 5 or 6.25kHz and compared at phase comparator. The pulsed output signal of the phase comparator is applied to the charge pump and transformed into DC signal in the loop filter (LPF). The DC signal is applied to the CV of the VCO and locked to keep the VCO frequency constant.

PLL data is output from PLLDAT (pin 18), PCK (pin 17) and PLE (pin 10) of the microprocessor (IC7). The data are input to the PLL IC when the channel is changed or when transmission is changed to reception and vice versa. A PLL lock condition is always monitored by the pin 7 (UL) of the microprocessor. When the PLL is unlocked, the UL goes low.

IC4 的 RX 针脚在接收模式时为“低”电位，使 Q503 和 Q504 (2/2) 打开。TX 针脚在发射模式时为“低”电位，使 Q502 和 Q504 (1/2) 导通。

Q502 和 Q503 的输出由缓冲放大器 (Q506) 放大，并由 Q501 倍频，然后发送到 PLL IC。

PLL IC 由预计计数器、基准除法器、相位比较器、电荷泵组成 (PLL 电路的频率步长为 5kHz 或 6.25kHz)。PLL IC 的针脚 8 和 5 的输入信号下分成 5kHz 或 6.25kHz，并在相位比较器处进行比较。相位比较器的脉冲输出信号加在电荷泵上，并转换成环路滤波器 (LPF) 的 DC 信号。DC 信号加在 VCO 的 CV 上并锁定，使 VCO 的频率恒定。

PLL 数据从微处理器 (IC7) 的 PLLDAT (针脚 18)，PCK (针脚 17) 和 PLE (针脚 10) 输出。当信道改变时，或当由发射变为接收或由接收变为发射时，数据输入 PLL IC。PLL 的锁定条件总是由微处理器的针脚 7 (UL) 监控。当 PLL 失锁时，UL 为低电位。

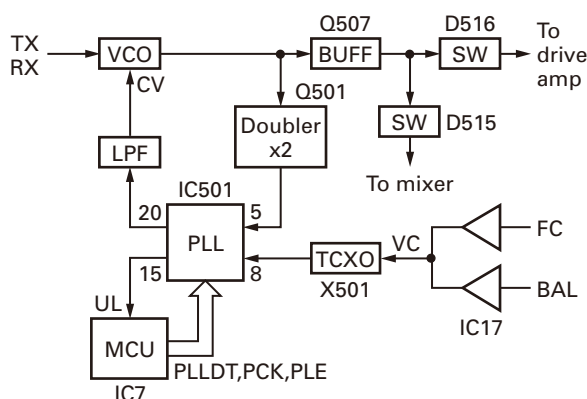


Fig. 7 PLL block diagram / 图 7 PLL 方块图

5. Control Circuit

The control circuit consists of microprocessor (IC7) and its peripheral circuits. It controls the TX-RX unit. IC7 mainly performs the following;

- 1) Switching between transmission and reception by PTT signal input.
- 2) Reading system, zone, 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 decode data input.
- 6) Transmitting tone and encode data.

5. 控制电路

控制电路是由微处理器 (IC7) 和外部电路构成。它控制 TX-RX 单元。IC7 的主要功能如下：

- 1) 根据 PTT 的输入信号来转换发射和接收状态。
- 2) 从存储电路读出系统、区域、频率以及编程数据。
- 3) 发送频率数据给 PLL。
- 4) 根据静噪电路输出的 DC 电压来控制静噪的开启和关闭。
- 5) 根据解码数据控制音频静音。
- 6) 发射 Tone 及编码数据。

CIRCUIT DESCRIPTION / 电路说明

5-1. Frequency Shift Circuit

The microprocessor (IC7) operates at a clock of 11.0592 MHz. This oscillator has a circuit that shifts the frequency by Beat shift switch (Q17, Q18).

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.

5-1. 频率偏移电路

微处理器 (IC7) 在 11.0592MHz 时钟下工作。此振荡器有可以被拍频偏移开关 (Q17, Q18) 变换频率的电路。

如果“拍频偏移”被设定为 ON，可以避免产生拍频声音。

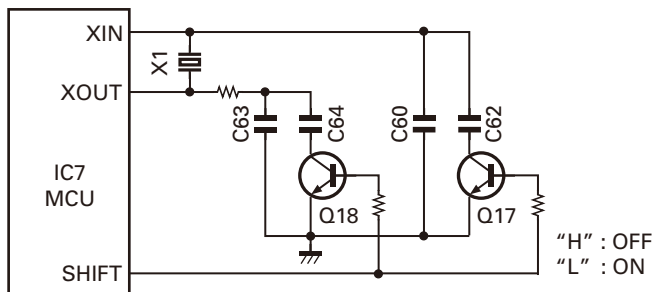


Fig. 8 Frequency shift circuit / 图 8 频率偏移电路

5-2. Memory Circuit

Memory circuit consists of the MCU (IC7) and a flash memory (IC8). A flash memory has a capacity of 16M bits and contains the transceiver control program for the MCU. It also stores the data for transceiver channels and operating parameter that are written by the FPU. This program can be easily written from an external devices.

The EEPROM (IC9) stores the last channel data, the scan on status, and other parameters.

5-2. 存储电路

存储电路由 MCU (IC7) 和闪存 (IC8) 组成。闪存的容量为 16M 位，并包括 MCU 的手持对讲机控制程序。它也保存手持对讲机信道的数据和由 FPU 写入的操作参数。此程序很容易从外部设备写入。

EEPROM (IC9) 保存最后的信道数据、扫描状态和其他参数。

■ Flash memory

Note: The flash memory stores the data that is written by the FPU (KPG-127D), and firmware program (User mode, Test mode, Tuning mode, etc.). This data must be rewritten when replacing the flash memory.

■ 闪存

注意: 闪存保存由 FPU (KPG-127D) 写入的数据和固件程序 (用户模式、测试模式、调谐模式等)。更换闪存后，此数据必须重写。

■ EEPROM

Note: The EEPROM stores tuning data (Deviation, Squelch, etc.).

Realign the transceiver after replacing the EEPROM.

■ EEPROM

注意: EEPROM 保存调谐数据 (频偏、静噪等)。更换 EEPROM 后，请重新校正手持对讲机。

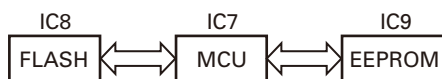


Fig. 9 Memory circuit / 图 9 存储电路

5-3. Low Battery Warning

The battery voltage is monitored by the microprocessor (IC7 pin 138: BATTTLVL). When the battery voltage falls below the voltage set by the Low Battery Warning adjustment during the transmission, the red LED blinks to notify the operator that it is time to replace the battery (When the "On TX" option (default setting) under the Battery Warning / status function in the FPU is selected.). If the battery voltage falls below 5.9V, the transceiver does not transmit and the warning tone beeps while the PTT switch is pressed.

5-3. 低电池电量警告

电池电压由微处理器 (IC7 引脚 138: BATTTLVL) 监控。发射期间，当电池电压低于低电池电量警告调节设置的电压时，红色 LED 闪烁，通知操作者应该更换电池了 (当选择了 FPU 电池告警 / 状态功能下的 "On TX (发射时)" 选项 (默认) 时)。如果电池电压低于 5.9V，按下 PTT 开关时手持对讲机不发射并响起警告音。

CIRCUIT DESCRIPTION / 电路说明

Low battery warning	Battery status
The red LED blinks during the transmission.	The battery voltage is low but the transceiver is still usable.
The red LED blinks and the warning tone beeps while the PTT switch is pressed.	The battery voltage is low and the transceiver is not usable to make calls.

低 电 池 电 量 警 告	电 池 状 态
发射期间红色 LED 闪烁。	电池电压低，但手持对讲机仍可使用。
按下 PTT 开关时，红色 LED 闪烁并响起警告音。	电池电压低，不能使用手持对讲机进行呼叫。

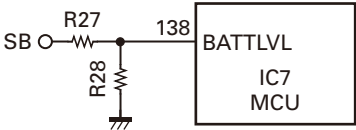


Fig. 10 Low battery warning / 图 10 低电池电量警告

5-4. Battery Type Detection

The transceiver automatically detects the battery type, measuring the resistance between the S-terminal and + terminal on the battery pack and changes the supplied voltage to the S-terminal as below. The microprocessor then detects the battery type.

Resistor value	Battery type	Input voltage of S-terminal
1.8MΩ	Li-ion	0.3~1.3V
560kΩ	Ni-Cd	1.3~2.6V
220kΩ	Ni-MH	2.6~5.0V
OPEN	Battery case	0~0.3V

5-4. 电池类型检测

手持对讲机自动地检测电池类型，测量电池组在 S 终端和 + 终端之间的电压的变化。然后微处理器检测电池类型。

阻 抗	电池类型	S 终端的输入电压
1.8MW	Li-ion	0.3~1.3V
560kW	Ni-Cd	1.3~2.6V
220kW	Ni-MH	2.6~5.0V
开放	电池盒	0~0.3V

5-5. Key Input

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

5-5. 键输入

键和信道选择电路。
如图 11 所示，键和信道选择器的信号被直接输入微处理器。

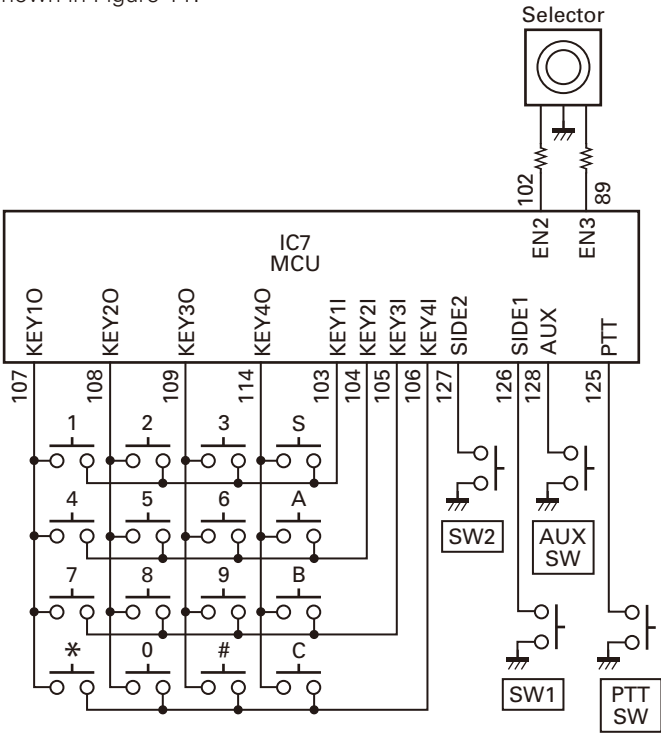


Fig. 11 Key input / 图 11 键输入

CIRCUIT DESCRIPTION / 电路说明

5-6. LCD

The LCD is controlled using the bus lines on the connector (CN82) of the TX-RX unit (B/4). It corrects the LCD contrast voltage using VR1.

6. Signaling Circuit

6-1. Encode

■ Low-speed data (QT, DQT)

Low-speed data is output from pin 33 of the MCU. The signal passes through MOD amplifier (IC12 1/2), and goes to the buffer amplifier (IC17 2/2). The signal is mixed with the audio signal and goes to the VCO and TCXO (X501) modulation input after passing through the D/A converter (IC16) for BAL adjustment.

■ High-speed data (DTMF)

High-speed data (HSD) is output from pin 4 of the MCU. The signal passes through a low-pass CR filter and provides a TX HSD tone and a RX HSD tone. TX HSD deviation making an adjustment by microprocessor is passed through the switch (IC14) and then applied to the audio processor (IC13).

The signal is mixed with the audio signal and goes to the VCO and TCXO. The RX HSD tone is passed a summing amplifier (IC18). The D/A converter (IC16) for audio control, audio power amplifier and then to the speaker.

■ MSK

MSK signal is output from pin 6 of IC13. The signal passes through the D/A converter (IC16) and is routed to the VCO. When encoding MSK, the microphone input signal is muted.

5-6. LCD

LCD 是用 TX-RX 单元 (B/4) 的接口 (CN82) 的总线来控制的。使用 VR1 校正 LCD 的对比度电压。

6. 信令电路

6-1. 编码

■ 低速数据 (QT, DQT)

低速数据从 MCU 的引脚 33 输出。信号通过 MOD 放大器 (IC12 1/2)，然后送入缓冲放大器 (IC17 2/2)。此信号与音频信号混合，通过 BAL 调节的数模转换器 (IC16) 后送入 VCO 和 TCXO (X501) 调制输入。

■ 高速数据 (DTMF)

高速数据 (HSD) 从 MCU 的引脚 4 输出。信号通过低通 CR 滤波器，并提供 TX HSD 音和 RX HSD 音。微处理器调节 TX HSD 的频偏并通过开关 (IC14)，然后加到音频处理器 (IC13) 上。

此信号与音频信号混合，然后送入 VCO 和 TCXO。RX HSD 音通过加法放大器 (IC18)。经过用于音频控制的数模转换器 (IC16)、音频功率放大器，然后到扬声器。

■ MSK

MSK 信号从 IC13 的引脚 6 输出。此信号通过数模转换器 (IC16)，然后发送给 VCO。编码 MSK 时，麦克风输入信号被静音。

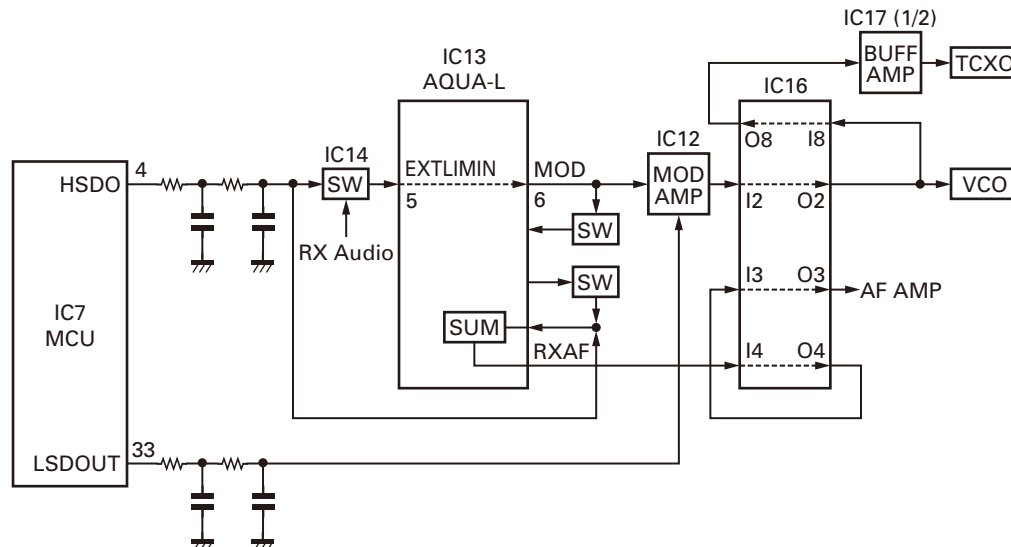


Fig. 12 Encode / 图 12 编码

CIRCUIT DESCRIPTION / 电路说明

6-2. Decode**■ QT/DQT**

The output signal from IF IC (IC701) enters the microprocessor (IC7) through IC11. IC7 determines whether the QT or DQT matches the preset value, and controls the AM1 using IC5 and the speaker output sounds according to the squelch results.

■ DTMF, MSK

The DTMF and MSK input signal from the IF IC (IC701) is amplified by IC10 and goes to IC13. The decoded information is then processed by the MCU.

7. Power Supply

There are five 5V and two 3.3V power supplies for the microprocessor: 5M, 5MS, 5C, 5R, 5T, 33M and 33MS.

5M and 33M 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.

6-2. 解码**■ QT/DQT**

IF IC (IC701) 的输出信号通过 IC11 送入微处理器 (IC7)。IC7 确认 QT 或 DQT 是否与预设值匹配，并用 IC5 控制 AM1，然后扬声器根据静噪结果输出声音。

■ DTMF, MSK

IF IC (IC701) 的 DTMF 和 MSK 输入信号由 IC10 放大，然后送入 IC13。然后由 MCU 处理解码信息。

7. 电源

微处理器有 5 个 5V 电源和 2 个 3.3V 电源。5M、5MS、5C、5R、5T、33M 和 33MS。

电源打开时，5M 和 33M 总是输出。5M 总是输出，但电源关闭时 5M 关闭，以防止微处理器出现故障。

5C 是普通的 5V 电源，它在 SAVE 没有设为 OFF 时输出。

5R 是接收用 5V 电源，它在接收期间输出。

5T 是发射用 5V 电源，它在发射期间输出。

SEMICONDUCTOR DATA / 半导体数据

MCU: 30875MHB069GP (TX-RX unit IC7)

Pin No.	Port Name	I/O	Function
1	SFTOE	O	BU4094 output enable
2	SFTSTB	O	BU4094 strobe
3	PC	O	TX APC/ VC tune
4	HSDO	O	High speed data output
5	LCONT	O	LCD contrast adjust
6	MDSW	I	Man down SW input
7	UL	I	PLL unlock detect
8	SHIFT	O	Beat shift
9	OPTDET	I	Option detection
10	PLE	O	PLL enable
11	5RC	O	5R control
12	APCSW	O	APC SW
13	DSW	O	APC voltage discharge SW
14	NC	-	NC
15	BYTE	I	8bit data bus (5V)
16	CNVSS	I	CNVss (GND)
17	PCK	O	PLL clock
18	PLLDAT	O	PLL data output
19	RESET	I	Reset
20	XOUT	O	11.0592MHz
21	DGND	I	DGND (GND)
22	XIN	I	11.0592MHz
23	VCC1	-	VCC1 (5V)
24	NMI	I	NMI
25	INT	I	Low battery voltage INT
26	BB RDF/FD	I	AQUA RDF/FD
27	TCLK/DTRDO	I	AQUA TCLK and DTR DO
28	HSDIN	I	High speed data input
29	AFDAT	O	AQUA TDATA and DTR CLK
30	AFDIO	I/O	AQUA DI/O
31	BEEP	O	Beep output
32	AFDIR	O	AQUA DIR
33	LSDOUT	O	Low speed data output
34	DTRLOAD	O	AQUA DTMF enable
35	SCLK	O	AQUA SCLK
36	AFSTD	I	AQUA STD
37	DACL	O	DAC LD
38	TXD	O	Com port 0
39	VCC1	-	VCC1 (5V)
40	RXD	I	Com port 0
41	DGND	I	DGND (GND)
42	NC	-	SCLK
43	NC	-	BUSY
44	TXD2	O	Option board

微处理器: 30875MHB069GP (TX-RX 单元 IC7)

管脚号	端口名称	输入/输出	功能
1	SFTOE	输出	BU4094BCFV 输出启动
2	SFTSTB	输出	BU4094 选通脉冲
3	PC	输出	TX APC/ VC 调谐
4	HSDO	输出	高速数据输出
5	LCONT	输出	LCD 对比度调整
6	MDSW	输入	人员事故开关输入
7	UL	输入	PLL 失锁检测
8	SHIFT	输出	拍频偏移
9	OPTDET	输入	可选检测
10	PLE	输出	PLL 启动
11	5RC	输出	5R 控制
12	APCSW	输出	APC 开关
13	DSW	输出	APC 电压放电开关
14	NC	-	NC
15	BYTE	输入	8bit 数据总线 (5V)
16	CNVSS	输入	CNVss (GND)
17	PCK	输出	PLL 时钟
18	PLLDAT	输出	PLL 数据输出
19	RESET	输入	复位
20	XOUT	输出	11.0592MHz
21	DGND	输入	DGND (GND)
22	XIN	输入	11.0592MHz
23	VCC1	-	VCC1 (5V)
24	NMI	输入	NMI
25	INT	输入	低电池电压 INT
26	BB RDF/FD	输入	AQUA RDF/FD
27	TCLK/DTRDO	输入	AQUA TCLK 和 DTR DO
28	HSDIN	输入	高速数据输入
29	AFDAT	输出	AQUA TDATA 和 DTR CLK
30	AFDIO	输入/输出	AQUA DI/O
31	BEEP	输出	提示音输出
32	AFDIR	输出	AQUA DIR
33	LSDOUT	输出	低速数据输出
34	DTRLOAD	输出	AQUA DTMF 启动
35	SCLK	输出	AQUA SCLK
36	AFSTD	输入	AQUA STD
37	DACL	输出	DAC LD
38	TXD	输出	Com 端口 0
39	VCC1	-	VCC1 (5V)
40	RXD	输入	Com 端口 0
41	DGND	输入	DGND (GND)
42	NC	-	SCLK
43	NC	-	BUSY
44	TXD2	输出	选件板

Pin No.	Port Name	I/O	Function
45	RXD2/AIMH	I	Option board
46	DACCLK	O	DAC clock
47	DACDAT	O	DAC data
48	AM2	O	Audio mute 2
49	5TC	O	5T control
50	LEDR	O	Red LED
51	LEDG	O	Green LED
52	RDY	-	RDY (3.3V)
53	NC	O	NC
54	HOLD	I	HOLD
55	NC	O	NC
56	33MSC	O	33MS control
57	VSS	I	VSS (GND)
58	NC	-	NC
59	VCC2	-	VCC2 (3.3V)
60,61	NC	-	NC
62	NC	O	NC
63	RD	O	Flash memory read
64	NC	O	NC
65	WR	O	Flash memory write
66~68	NC	-	NC
69	CS0	O	Flash memory chip select
70	NC	O	NC
71	CS2	O	LCD driver chip select
72~73	A20~A19	O	Address bus 20~19
74	VCC2	-	VCC2 (3.3V)
75	A18	O	Address bus 18
76	VSS	I	VSS (GND)
77~85	A17~A9	O	Address bus 17~9
86	FREADY	I	Flash-ROM ready status
87	NC	-	NC
88	EN4	I	Encoder 4 input
89	EN3	I	Encoder 3 input
90	EN1	I	Encoder 1 input
91	VCC2	-	VCC2 (3.3V)
92	A8	O	Address bus 8
93	DGND	I	DGND (GND)
94~101	A7~A0	O	Address bus 7~0
102	EN2	I	Encoder 2
103~106	KEY1~KEY4	I	Key matrix 1~4 input
107~109	KEY10~KEY30	O	Key matrix 1~3 output
110~113	D7~D4	I/O	Data bus 7~4
114	KEY40	O	Key matrix 4 output
115	LCDRST	O	LCD reset
116~118	NC	-	NC

管脚号	端口名称	输入 / 输出	功 能
45	RXD2/AIMH	输入	选件板
46	DACCLK	输出	DAC 时钟
47	DACDAT	输出	DAC 数据
48	AM2	输出	音频静音 2
49	5TC	输出	5T 控制
50	LEDR	输出	红色 LED
51	LEDG	输出	绿色 LED
52	RDY	-	RDY (3. 3V)
53	NC	输出	NC
54	HOLD	输入	HOLD
55	NC	输出	NC
56	33MSC	输出	33MS 控制
57	VSS	输入	VSS (GND)
58	NC	-	NC
59	VCC2	-	VCC2 (3. 3V)
60, 61	NC	-	NC
62	NC	输出	NC
63	RD	输出	闪存读出
64	NC	输出	NC
65	WR	输出	闪存写入
66~68	NC	-	NC
69	CS0	输出	闪存芯片选择
70	NC	输出	NC
71	CS2	输出	LCD 驱动器芯片选择
72~73	A20~A19	输出	地址总线 20~19
74	VCC2	-	VCC2 (3. 3V)
75	A18	输出	地址总线 18
76	VSS	输入	VSS (GND)
77~85	A17~A9	输出	地址总线 17~9
86	FREADY	输入	闪存就绪状态
87	NC	-	NC
88	EN4	输入	选择器 4 输入
89	EN3	输入	选择器 3 输入
90	EN1	输入	选择器 1 输入
91	VCC2	-	VCC2 (3. 3V)
92	A8	输出	地址总线 8
93	DGND	输入	DGND (GND)
94~101	A7~A0	输出	地址总线 7~0
102	EN2	输入	选择器 2
103~106	KEY1~KEY4	输入	键矩阵 1~4 输入
107~109	KEY10~KEY30	输出	键矩阵 1~3 输出
110~113	D7~D4	输入 / 输出	数据总线 7~4
114	KEY40	输出	键矩阵 4 输出
115	LCDRST	输出	LCD 复位
116~118	NC	-	NC

SEMICONDUCTOR DATA / 半导体数据

Pin No.	Port Name	I/O	Function
119~122	D3~D0	I/O	Data bus 3~0
123	AUX1	O	Option board
124	EEPDAT	I/O	EEPROM data
125	PTT	I	PTT SW
126	SIDE1	I	Side key 1
127	SIDE2	I	Side key 2
128	AUXK	I	AUX key input
129	EEPCL	O	EEPROM clock
130	VSS	I	VSS (GND)
131	BATTSEL	I	Battery select detect
132	VCC1	-	VCC1 (5V)
133	THP	I	TX thermal input
134	VOL IN	I	Volume level input
135	VOX	I	VOX level input
136	ASQ	I	RX analog squelch input
137	RSSI	I	RSSI level input
138	BATTLVL	I	Battery voltage input
139	LSDIN	I	Low speed data input
140	AGND	I	AVSS (GND)
141	CLK	O	Serial clock
142	VREF	-	VREF (5V)
143	AVCC	-	AVCC (5V)
144	DT	I/O	Serial data

管脚号	端口名称	输入/输出	功 能
119~122	D3~D0	输入 / 输出	数据总线 3~0
123	AUX1	输出	选件板
124	EEPDAT	输入 / 输出	EEPROM 数据
125	PTT	输入	PTT 开关
126	SIDE1	输入	Side1 键
127	SIDE2	输入	Side2 键
128	AUXK	输入	AUX 键输入
129	EEPCL	输出	EEPROM 时钟
130	VSS	输入	VSS (GND)
131	BATTSEL	输入	电池选择检测
132	VCC1	-	VCC1 (5V)
133	THP	输入	TX 热感输入
134	VOL IN	输入	音量电平输入
135	VOX	输入	VOX 电平输入
136	ASQ	输入	RX 模拟静噪输入
137	RSSI	输入	RSSI 电平输入
138	BATTLVL	输入	电池电压输入
139	LSDIN	输入	低速数据输入
140	AGND	输入	AVSS (GND)
141	CLK	输出	串行时钟
142	VREF	-	VREF (5V)
143	AVCC	-	AVCC (5V)
144	DT	输入 / 输出	串行数据

COMPONENTS DESCRIPTION / 元件说明

TX-RX unit (X57-7013-06)

Ref. No.	Part Name	Description
IC1	IC	Voltage detector / INT
IC2	IC	Voltage regulator / 5V
IC3	IC	Voltage detector / RESET
IC4,5	IC	Shift register
IC7	IC	MCU
IC8	IC	Flash memory
IC9	IC	EEPROM
IC10	IC	DET amplifier / VREF
IC11	IC	LSD filter
IC12	IC	TX SUM amplifier
IC13	IC	Audio processor
IC14	IC	AF switch
IC15	IC	RX HSD filter
IC16	IC	D/A converter
IC17	IC	TCXO buffer amplifier
IC18	IC	AF amplifier
IC19	IC	RX BPF tune voltage amplifier
IC24	IC	Volatge doubling inverter
IC25	IC	Bus switch
IC26	IC	Voltage regulator / 3.3V
IC27	IC	LCD contrast
IC28	IC	Bus switch
IC501	IC	PLL system
IC601	IC	Comparator (APC)
IC701	IC	FM IF system
Q1	Transistor	5T voltage control
Q4 (1/2)	Transistor	AVR / 5C
Q4 (2/2)	Transistor	AVR / 5T
Q5 (1/2)	FET	5TC switch
Q5 (2/2)	FET	SAVE switch
Q6	Transistor	5C voltage control
Q7	FET	TX/RX indicator control
Q8	Transistor	5R control switch
Q9	FET	5MS control switch
Q12	Transistor	Back light control
Q13	Transistor	Back light DC supply
Q14	FET	RX AF mute
Q15	FET	SSB DC supply control switch
Q16	Transistor	SSB DC supply switch
Q17,18	Transistor	MCU clock shift switch
Q19	FET	VOX level detector control switch
Q21	Transistor	AF switch
Q22	FET	AF mute switch
Q23	Transistor	AF amplifier DC supply control switch

TX-RX 单元 (X57-7013-06)

有关号码	零件名称	说 明
IC1	IC	电压检测器 / INT
IC2	IC	电压调节器 / 5V
IC3	IC	电压检测器 / 复位
IC4, 5	IC	位移寄存器
IC7	IC	微处理器
IC8	IC	闪存
IC9	IC	EEPROM
IC10	IC	DET 放大器 / VREF
IC11	IC	LSD 滤波器
IC12	IC	TX SUM 放大器
IC13	IC	音频处理器
IC14	IC	AF 开关
IC15	IC	RX HSD 滤波器
IC16	IC	数 / 模转换器
IC17	IC	TCXO 缓冲放大器
IC18	IC	AF 放大器
IC19	IC	RX BPF 调谐电压放大器
IC24	IC	倍压变换器
IC25	IC	总线开关
IC26	IC	电压调节器 / 3.3V
IC27	IC	LCD 对比度
IC28	IC	总线开关
IC501	IC	PLL 系统
IC601	IC	比较器 (APC)
IC701	IC	FM IF 系统
Q1	晶体管	5T 电压控制
Q4 (1/2)	晶体管	AVR/5C
Q4 (2/2)	晶体管	AVR/5T
Q5 (1/2)	场效应管	5TC 开关
Q5 (2/2)	场效应管	节电开关
Q6	晶体管	5C 电压控制
Q7	场效应管	TX/RX 指示灯控制
Q8	晶体管	5R 控制开关
Q9	场效应管	5MS 控制开关
Q12	晶体管	背光控制
Q13	晶体管	背光直流电源
Q14	场效应管	RX AF 静音
Q15	场效应管	SSB 直流电源控制开关
Q16	晶体管	SSB 直流电源开关
Q17, 18	晶体管	MCU 时钟位移开关
Q19	场效应管	VOX 电平检测器控制开关
Q21	晶体管	AF 开关
Q22	场效应管	AF 静音开关
Q23	晶体管	AF 放大器直流电源控制开关

COMPONENTS DESCRIPTION / 元件说明

Ref. No.	Part Name	Description
Q24	FET	AF amplifier DC supply switch
Q25,26	FET	MIC ALC
Q27	Transistor	AF mute control switch
Q28	FET	AF mute switch
Q29	FET	Logic inverter
Q30	FET	MIC mute switch
Q31,32	Transistor	Audio processor clock shift switch
Q33	FET	TX HSD side tone mute
Q34	FET	Ext. alert input ATT switch
Q35	FET	AF mute switch
Q37	FET	33MS control switch
Q501	Transistor	F-IN amplifier
Q502	FET	TX VCO oscillator
Q503	FET	RX VCO oscillator
Q504	FET	TX/RX VCO DC switch
Q505	Transistor	Ripple filter
Q506	Transistor	RF buffer amplifier
Q507	Transistor	RF amplifier (Common)
Q601	FET	RF amplifier
Q602	FET	Pre-drive amplifier
Q603	FET	TX drive amplifier
Q604	FET	RF final amplifier
Q605	Transistor	APC voltage switch
Q606	FET	APC voltage switch
Q607	Transistor	APC DC switch
Q608	Transistor	APC mute switch
Q609	FET	APC mute switch
Q701	Transistor	2nd local tripler
Q702	Transistor	W/N switch / RX
Q703	Transistor	IF amplifier
Q704	FET	Mixer
Q705	FET	RF amplifier
D1	Diode	5M protect
D2	LED	TX/RX indicator
D4	Diode	Back light current control
D5	LED	LCD back light
D7	LED	LCD back light
D8,9	LED	10 key back light
D12,13	LED	10 key back light
D17	Diode	RX DET mute control voltage discharge
D24~27	Diode	Key input detect
D28	Diode	AF reference voltage bias supply
D29	Diode	VOX level detector
D30,31	Diode	MIC input level detector
D32	Diode	VOX amplifier gain limiter

有关号码	零件名称	说 明
Q24	场效应管	AF 放大器直流电源开关
Q25, 26	场效应管	麦克风 ALC
Q27	晶体管	AF 静音控制开关
Q28	场效应管	AF 静音开关
Q29	场效应管	逻辑变换器
Q30	场效应管	麦克风静音开关
Q31, 32	晶体管	音频处理器时钟变换开关
Q33	场效应管	TX HSD 侧音静音
Q34	场效应管	外部提示音输入 ATT 开关
Q35	场效应管	AF 静音开关
Q37	场效应管	33MS 控制开关
Q501	晶体管	F-IN 放大器
Q502	场效应管	TX VCO 振荡器
Q503	场效应管	RX VCO 振荡器
Q504	场效应管	TX/RX VCO 直流开关
Q505	晶体管	纹波滤波器
Q506	晶体管	射频缓冲放大器
Q507	晶体管	RF 放大器（公用）
Q601	场效应管	RF 放大器
Q602	场效应管	预驱动放大器
Q603	场效应管	TX 驱动放大器
Q604	场效应管	RF 末级放大器
Q605	晶体管	自动功率控制电压开关
Q606	场效应管	自动功率控制电压开关
Q607	晶体管	自动功率控制直流开关
Q608	晶体管	自动功率控制静音开关
Q609	场效应管	自动功率控制静音开关
Q701	晶体管	第二本地三倍频器
Q702	晶体管	W/N 开关 /RX
Q703	晶体管	IF 放大器
Q704	场效应管	混频器
Q705	场效应管	RF 放大器
D1	二极管	5M 保护
D2	LED	TX/RX 指示灯
D4	二极管	背光电流控制
D5	LED	LCD 背光
D7	LED	LCD 背光
D8, 9	LED	10 键背光
D12, 13	LED	10 键背光
D17	二极管	RX DET 静音控制电压放电
D24~27	二极管	键输入检测
D28	二极管	AF 基准电压偏置电源
D29	二极管	VOX 电平检测器
D30, 31	二极管	麦克风输入电平检测器
D32	二极管	VOX 放大器增益限幅器

COMPONENTS DESCRIPTION / 元件说明

Ref. No.	Part Name	Description
D33~37	Varistor	Surge absorber
D501	Diode	Fast lock up diode
D502,503	Diode	F-IN filter shift switch
D505	Variable capacitance diode	Frequency control / TX VCO
D507	Variable capacitance diode	Frequency control / TX VCO
D509	Variable capacitance diode	Frequency control / RX VCO
D511	Variable capacitance diode	Frequency control / RX VCO
D513	Variable capacitance diode	TX VCO modulator
D514	Diode	Ripple filter stabilization diode
D515	Diode	RX local switch
D516	Diode	TX RF switch
D517	Diode	Fast lock up diode
D601	Zener diode	APC voltage limiter
D604~606	Diode	ANT switch
D608	Diode	ANT switch
D701,702	Diode	Ceramic filter W/N switch
D703~708	Variable capacitance diode	RX BPF tuning
D901	Diode	Voltage limiter

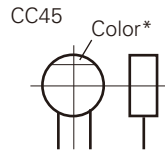
有关号码	零件名称	说 明
D33~37	变阻器	电涌吸收器
D501	二极管	快速锁定二极管
D502, 503	二极管	F-IN 滤波器位移开关
D505	可变电容二极管	频率控制 /TX VCO
D507	可变电容二极管	频率控制 /TX VCO
D509	可变电容二极管	频率控制 /RX VCO
D511	可变电容二极管	频率控制 /RX VCO
D513	可变电容二极管	TX VCO 调制器二极管
D514	二极管	纹波滤波器稳定二极管
D515	二极管	RX 本地开关
D516	二极管	TX RF 开关
D517	二极管	快速锁定二极管
D601	稳压二极管	APC 电压限幅器
D604~606	二极管	天线开关
D608	二极管	天线开关
D701, 702	二极管	陶瓷滤波器 W/N 开关
D703~708	可变电容二极管	RX BPF 调谐
D901	二极管	电压限幅器

PARTS LIST / 零件表

CAPACITORS

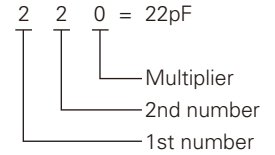
CC 45 TH 1H 220 J
1 2 3 4 5 6

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



• Capacitor value

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



• Temperature coefficient

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

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

Example : CC45TH = -470±60ppm/°C

• Tolerance (More than 10pF)

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

(Less than 10pF)

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

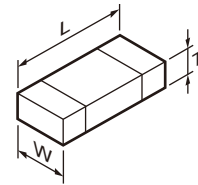
• Voltage rating

2nd word 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	-

• Chip capacitors

- (EX) CC 73 F SL 1H 000 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)
- (EX) CK 73 F F 1H 000 Z
1 2 3 4 5 6 7
(Chip) (B, F)
- Refer to the table above.
1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance

• Dimension



Chip capacitor

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

Chip resistor

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

RESISTORS

• Chip resistor (Carbon)

- (EX) RD 73 E B 2B 000 J
1 2 3 4 5 6 7
(Chip) (B, F)

• Carbon resistor (Normal type)

- (EX) RD 14 B B 2C 000 J
1 2 3 4 5 6 7

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

• Rating wattage

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

TK-3178(L)

PARTS LIST / 零件表

* New Parts. △ indicates safety critical components.

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

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

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

L : Scandinavia

Y : PX (Far East, Hawaii)

C : China

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

TK-3178(L)

TX-RX UNIT (X57-7013-06)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-3178(L)					
2	1B	*	A02-4090-13	PLASTIC CABINET ASSY (16KEYS)	
3	3A	*	A10-4136-03	CHASSIS	
5	3A		B01-0694-13	ESCUTCHEON	
6	2D		B09-0686-03	CAP ACCESSORY	
8	2A		B11-1827-04	ILLUMINATION GUIDE (TX-RX)	
9	2B		B11-1828-04	FILTER (LCD)	
10	2B	*	B11-1870-13	ILLUMINATION GUIDE (LCD)	
12	2B	*	B38-0932-05	LCD ASSY	
13	1B		B43-1178-14	BADGE	
14	1C	*	B62-2202-00	INSTRUCTION MANUAL	
16	2A		E04-0467-05	RF COAXIAL RECEPTACLE (SMA)	
17	2A		E23-1188-04	TERMINAL (ANT)	
18	3A		E23-1189-14	TERMINAL (GND)	
19	2B		E29-1211-04	INTER CONNECTOR (4KEYS PCB)	
20	3A		E72-0421-03	TERMINAL BLOCK	
22	3A		F07-1890-04	COVER (OP BOAD)	
24	1B		G10-1304-04	FIBROUS SHEET (CABINET)	
25	2B	*	G10-1804-04	FIBROUS SHEET (LCD DRIVER)	
26	3A		G11-4315-14	SHEET (COOLING)	
27	2A		G11-4316-04	SHEET (PTT)	
28	1B		G11-4351-04	SHEET (CABINET)	
30	2B		G11-4352-04	SHEET (SP)	
31	2A		G11-4480-04	SHEET (VCO)	
32	2B	*	G11-4498-04	SHEET (LCD)	
33	1B		G11-4522-04	SHEET (LCD)	
34	1B		G11-4523-04	SHEET (TX-RX D/4)	
36	2B		G11-4524-04	SHEET (TX-RX B/4)	
37	2A		G13-1885-04	CUSHION (CHASSIS,ANT)	
38	2A		G53-1603-04	PACKING (ANT)	
39	2B		G53-1650-12	PACKING (TOP)	
40	2B		G53-1653-03	PACKING (JACK)	
43	3A		G53-1654-04	PACKING (TERMINAL)	
44	3A		G53-1655-04	PACKING (OP BOAD)	
45	1B	*	G53-1836-01	PACKING (16KEYS)	
47	2D		H25-0029-04	PROTECTION BAG (60/110/0.07)	
50	2B		J19-5481-03	HOLDER (SP)	
51	2D		J19-5483-23	HOLDER ACCESSORY	
52	1B	*	J21-8617-13	MOUNTING HARDWARE (LCD)	
53	2C		J29-0701-15	HOOK ACCESSORY	
54	2C		J69-0366-15	HANDSTRAP ACCESSORY	
56	2A	*	J87-0027-05	FPC (LEAD FREE) (PTT)	
57	3A	*	J87-0033-05	FPC (LEAD FREE) (VOL/SELECTOR)	
58	2A		J99-0399-04	ADHESIVE SHEET (FPC TOP)	
59	2B		J99-0714-04	ADHESIVE SHEET (LCD)	
60	2B		J99-0757-04	ADHESIVE SHEET (LCD)	
62	1B		K29-9278-23	KNOB (VOL)	
63	1B		K29-9340-13	KNOB (SELECTOR)	
64	1B		K29-9341-03	KEY TOP (SIDE)	
65	1B		K29-9447-03	KNOB (PTT)	
A	2A,3A		N09-2438-05	BINDING HEAD SCREW	
B	3A		N09-6571-05	PAN HEAD SCREW	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C	3B		N14-0805-04	CIRCULAR NUT (VOL)	
D	2A		N14-0833-04	CIRCULAR NUT (SELECTOR)	
E	3A		N30-3006-43	PAN HEAD MACHINE SCREW	
F	3A		N79-2030-48	PAN HEAD TAPTITE SCREW	
G	2A,2B		N83-2005-48	PAN HEAD TAPTITE SCREW	
67	3A		R31-0665-05	VARIABLE RESISTOR (VOL)	
69	1B		T07-0369-15	SPEAKER	
70	2C		T90-1032-55	HELICAL ANTENNA	
71	2B		T91-0650-05	MIC ELEMENT	
73	2A		W02-3711-05	ENCODER	
TX-RX UNIT (X57-7013-06)					
D2			B30-2278-05	LED (RED/YELLOW)	
D5			B30-2210-05	LED (TLY)	
D7			B30-2210-05	LED (TLY)	
D8,9			B30-2050-05	LED	
D12,13			B30-2050-05	LED	
C2			CK73HB1H471K	CHIP C 470PF K	
C3			CK73FB1A475K	CHIP C 4.7UF K	
C4			CK73GB1E105K	CHIP C 1.0UF K	
C5,6			CK73HB1H471K	CHIP C 470PF K	
C7			CK73HB1A104K	CHIP C 0.10UF K	
C9			CK73GB1E105K	CHIP C 1.0UF K	
C11			CK73FB1A225K	CHIP C 2.2UF K	
C13			CK73HB1H471K	CHIP C 470PF K	
C14,15			CK73HB1E472K	CHIP C 4700PF K	
C16,17			CK73HB1H471K	CHIP C 470PF K	
C18			CK73HB1A104K	CHIP C 0.10UF K	
C19			CK73HB1H471K	CHIP C 470PF K	
C20			CK73HB1E472K	CHIP C 4700PF K	
C21			CK73HB1H471K	CHIP C 470PF K	
C22			CK73HB1E472K	CHIP C 4700PF K	
C23,24			CK73GB1E105K	CHIP C 1.0UF K	
C25			CK73HB1E472K	CHIP C 4700PF K	
C26			CK73HB1H471K	CHIP C 470PF K	
C27			CS77AA0J220M	CHIP TNTL 22UF 6.3WV	
C28-31			CK73HB1H471K	CHIP C 470PF K	
C32,33			CK73HB1A104K	CHIP C 0.10UF K	
C34			CK73HB1H471K	CHIP C 470PF K	
C35			CK73HB1A104K	CHIP C 0.10UF K	
C42			CK73HB1A104K	CHIP C 0.10UF K	
C43,44			CK73HB1C103K	CHIP C 0.010UF K	
C45			CS77AA0J220M	CHIP TNTL 22UF 6.3WV	
C46			CK73HB1A104K	CHIP C 0.10UF K	
C47			CK73GB1E105K	CHIP C 1.0UF K	
C48			CK73GB1C104K	CHIP C 0.10UF K	
C49			CK73HB1H471K	CHIP C 470PF K	
C50			CK73HB1A104K	CHIP C 0.10UF K	
C51			CK73HB1H471K	CHIP C 470PF K	
C52,53			CK73HB1A104K	CHIP C 0.10UF K	
C55			CK73GB1E105K	CHIP C 1.0UF K	
C56			CK73HB1A104K	CHIP C 0.10UF K	

PARTS LIST / 零件表

TX-RX UNIT (X57-7013-06)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C57			CS77AA0J150M	CHIP TNTL 15UF 6.3WV		C134			CK73HB1A473K	CHIP C 0.047UF K	
C58			CK73HB1A104K	CHIP C 0.10UF K		C135			CK73GB1E105K	CHIP C 1.0UF K	
C59			CC73HCH1H220J	CHIP C 22PF J		C136			CK73HB1H561K	CHIP C 560PF K	
C60			CC73HCH1H030B	CHIP C 3.0PF B		C137			CK73HB1H471K	CHIP C 470PF K	
C61			CK73HB1A104K	CHIP C 0.10UF K		C138			CK73HB1A104K	CHIP C 0.10UF K	
C62			CC73HCH1H120J	CHIP C 12PF J		C140			CK73HB1A104K	CHIP C 0.10UF K	
C63			CC73HCH1H030B	CHIP C 3.0PF B		C142,143			CK73GB1E105K	CHIP C 1.0UF K	
C64			CC73HCH1H120J	CHIP C 12PF J		C145-148			CK73HB1H471K	CHIP C 470PF K	
C65			CK73HB1A104K	CHIP C 0.10UF K		C149			CK73HB1H221K	CHIP C 220PF K	
C66			CK73HB1C103K	CHIP C 0.010UF K		C150,151			CK73FB1A225K	CHIP C 2.2UF K	
C67			CS77AA1A2R2M	CHIP TNTL 2.2UF 10WV		C153			CK73GB1E105K	CHIP C 1.0UF K	
C68			CK73HB1H471K	CHIP C 470PF K		C154,155			CK73HB1H471K	CHIP C 470PF K	
C69			CS77AA0J100M	CHIP TNTL 10UF 6.3WV		C157			CK73GB1A224K	CHIP C 0.22UF K	
C70			CK73HB1E682K	CHIP C 6800PF K		C158			CK73HB1A104K	CHIP C 0.10UF K	
C71			CK73HB1H392K	CHIP C 3900PF K		C159			CC73HCH1H101J	CHIP C 100PF J	
C72			CK73HB1H122K	CHIP C 1200PF K		C161			CC73HCH1H101J	CHIP C 100PF J	
C73			CC73HCH1H470J	CHIP C 47PF J		C162			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C74			CK73HB1H122K	CHIP C 1200PF K		C166			CK73HB1H471K	CHIP C 470PF K	
C75			CK73HB1C153K	CHIP C 0.015UF K		C168,169			CK73HB1A393K	CHIP C 0.039UF K	
C76			CK73HB1H332K	CHIP C 3300PF K		C170			CK73HB1H471K	CHIP C 470PF K	
C77			CK73HB1C153K	CHIP C 0.015UF K		C171			CS77AA0J100M	CHIP TNTL 10UF 6.3WV	
C78			CK73HB1H221K	CHIP C 220PF K		C172			CS77CC0J101M	CHIP TNTL 100UF 6.3WV	
C79			CK73HB1H222K	CHIP C 2200PF K		C173			CK73HB1H221K	CHIP C 220PF K	
C81			CK73HB1A104K	CHIP C 0.10UF K		C174			CK73HB1H471K	CHIP C 470PF K	
C82			CC73HCH1H101J	CHIP C 100PF J		C175			CK73HB1C103K	CHIP C 0.010UF K	
C84			CK73HB1H471K	CHIP C 470PF K		C176			CK73HB1A224K	CHIP C 0.22UF K	
C85			CK73HB1C123K	CHIP C 0.012UF K		C177			CK73HB1A104K	CHIP C 0.10UF K	
C87			CK73HB1A104K	CHIP C 0.10UF K		C178			CK73GB1E105K	CHIP C 1.0UF K	
C88,89			CC73HCH1H010B	CHIP C 1.0PF B		C181			CK73GB0J475K	CHIP C 4.7UF K	
C93			CK73GB1E105K	CHIP C 1.0UF K		C182			CK73HB1H681K	CHIP C 680PF K	
C95			CK73HB1A224K	CHIP C 0.22UF K		C183			CK73HB1H471K	CHIP C 470PF K	
C97			CC73HCH1H151J	CHIP C 150PF J		C184			CK73HB1H222K	CHIP C 2200PF K	
C98			CK73HB1A683K	CHIP C 0.068UF K		C185			CK73HB1C103K	CHIP C 0.010UF K	
C99,100			CK73FB1A475K	CHIP C 4.7UF K		C186			CC73HCH1H270J	CHIP C 27PF J	
C102			CK73HB1C103K	CHIP C 0.010UF K		C187			CK73HB1C103K	CHIP C 0.010UF K	
C106			CK73HB1H471K	CHIP C 470PF K		C188			CC73HCH1H270J	CHIP C 27PF J	
C107			CK73HB1A104K	CHIP C 0.10UF K		C190,191			CK73HB1H471K	CHIP C 470PF K	
C108			CK73GB1E105K	CHIP C 1.0UF K		C192			CK73HB1H102K	CHIP C 1000PF K	
C109			CC73HCH1H100D	CHIP C 10PF D		C196			CK73HB1C473K	CHIP C 0.047UF K	
C110			CK73HB1H471K	CHIP C 470PF K		C197,198			CK73HB1H471K	CHIP C 470PF K	
C111			CK73HB1C103K	CHIP C 0.010UF K		C199,200			CK73HB1A104K	CHIP C 0.10UF K	
C112			CC73HCH1H680J	CHIP C 68PF J		C201			CK73HB1A224K	CHIP C 0.22UF K	
C113,114			CK73HB1A104K	CHIP C 0.10UF K		C202			CK73GB1E105K	CHIP C 1.0UF K	
C116			CC73HCH1H220J	CHIP C 22PF J		C203			CK73HB0J105K	CHIP C 1.0UF K	
C117			CK73GB1E105K	CHIP C 1.0UF K		C205			CK73HB0J105K	CHIP C 1.0UF K	
C118			CK73HB1A104K	CHIP C 0.10UF K		C206			CK73GB1E105K	CHIP C 1.0UF K	
C119			CK73HB1C103K	CHIP C 0.010UF K		C207			CK73HB1H471K	CHIP C 470PF K	
C120			CK73GB1C225K	CHIP C 2.2UF K		C208			CC73HCH1H101J	CHIP C 100PF J	
C121			CK73HB1A393K	CHIP C 0.039UF K		C209			CK73HB1A104K	CHIP C 0.10UF K	
C122			CK73HB1H471K	CHIP C 470PF K		C210			CC73HCH1H101J	CHIP C 100PF J	
C123			CC73HCH1H680J	CHIP C 68PF J		C212,213			CS77AP1C2R2M	CHIP TNTL 2.2UF 16WV	
C125			CK73HB1A104K	CHIP C 0.10UF K		C214,215			CK73HB1H102K	CHIP C 1000PF K	
C126			CC73HCH1H470J	CHIP C 47PF J		C216			CK73HB0J105K	CHIP C 1.0UF K	
C127			CC73HCH1H181J	CHIP C 180PF J		C217			CK73HB1A104K	CHIP C 0.10UF K	
C128			CK73HB1H471K	CHIP C 470PF K		C220			CK73HB1A104K	CHIP C 0.10UF K	
C129			CK73GB1E105K	CHIP C 1.0UF K		C221			CC73HCH1H221J	CHIP C 220PF J	
C130			CK73HB1A104K	CHIP C 0.10UF K		C223			CK73HB1A104K	CHIP C 0.10UF K	
C131			CK73HB1H821K	CHIP C 820PF K		C251-254			CK73GB1E105K	CHIP C 1.0UF K	
C132			CK73HB1A104K	CHIP C 0.10UF K		C289			CK73GB1E105K	CHIP C 1.0UF K	
C133			CK73GB0J475K	CHIP C 4.7UF K		C290			CS77AP1C2R2M	CHIP TNTL 2.2UF 16WV	

PARTS LIST / 零件表

TX-RX UNIT (X57-7013-06)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C291			CK73HB1A104K	CHIP C 0.10UF K		C583			CK73HB1A104K	CHIP C 0.10UF K	
C294-296			CK73HB1A104K	CHIP C 0.10UF K		C584			CC73HCH1H060B	CHIP C 6.0PF B	
C423			CK73FB1A475K	CHIP C 4.7UF K		C601			CK73HB1H471K	CHIP C 470PF K	
C501			CK73HB1C103K	CHIP C 0.010UF K		C604			CK73HB1A224K	CHIP C 0.22UF K	
C502			CC73HCH1H470J	CHIP C 47PF J		C606			CK73HB1H471K	CHIP C 470PF K	
C503			CC73HCH1H101J	CHIP C 100PF J		C608			CK73HB1H471K	CHIP C 470PF K	
C505			CC73HCH1H101J	CHIP C 100PF J		C609			CC73HCH1H050C	CHIP C 5.0PF C	
C506			CK73HB1C103K	CHIP C 0.010UF K		C611-613			CK73HB1H471K	CHIP C 470PF K	
C507,508			CC73HCH1H101J	CHIP C 100PF J		C615			CK73HB1H471K	CHIP C 470PF K	
C509			CC73HCH1H150J	CHIP C 15PF J		C617			CC73HCH1H080D	CHIP C 8.0PF D	
C512			CK73HB1C103K	CHIP C 0.010UF K		C619			CC73HCH1H150J	CHIP C 15PF J	
C513			CK73HB1H471K	CHIP C 470PF K		C622			CC73HCH1H101J	CHIP C 100PF J	
C514			CC73HCH1H101J	CHIP C 100PF J		C623			CK73HB1H102K	CHIP C 1000PF K	
C515			CK73HB1H471K	CHIP C 470PF K		C625			CC73HCH1H070D	CHIP C 7.0PF D	
C517			CK73HB1H471K	CHIP C 470PF K		C626			CC73HCH1H101J	CHIP C 100PF J	
C519			CC73GCH1H471J	CHIP C 470PF J		C627			CC73HCH1H330J	CHIP C 33PF J	
C520			CK73GB1E105K	CHIP C 1.0UF K		C629			CC73HCH1H220J	CHIP C 22PF J	
C522			CC73HCH1H050C	CHIP C 5.0PF C		C631			CC73HCH1H180J	CHIP C 18PF J	
C523			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV		C632			CS77AA1A2R2M	CHIP TNTL 2.2UF 10WV	
C524			CC73HCH1H101J	CHIP C 100PF J		C633			CK73HB1H471K	CHIP C 470PF K	
C525			CS77AA1E010M	CHIP TNTL 1.0UF 25WV		C635			CC73HCH1H101J	CHIP C 100PF J	
C526			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV		C636			CC73HCH1H220J	CHIP C 22PF J	
C527			CC73HCH1H050C	CHIP C 5.0PF C		C637			CK73HB1H102K	CHIP C 1000PF K	
C529			CC73HCH1H030C	CHIP C 3.0PF C		C638,639			CK73HB1H471K	CHIP C 470PF K	
C530			CC73HCH1H101J	CHIP C 100PF J		C641			CC73HCH1H101J	CHIP C 100PF J	
C533			CC73HCH1H030C	CHIP C 3.0PF C		C643			CK73HB1C103K	CHIP C 0.010UF K	
C536			CC73HCH1H040C	CHIP C 4.0PF C		C645			CC73GCH1H270J	CHIP C 27PF J	
C537			CC73HCH1H050C	CHIP C 5.0PF C		C646			CK73HB1H471K	CHIP C 470PF K	
C538			CC73HCH1H101J	CHIP C 100PF J		C648			CK73HB1H471K	CHIP C 470PF K	
C539			CC73HCH1H1R5B	CHIP C 1.5PF B		C651			CK73HB1A104K	CHIP C 0.10UF K	
C540			CC73HCH1H020B	CHIP C 2.0PF B		C655			CC73GCH1H220J	CHIP C 22PF J	
C541			CC73HCH1H330J	CHIP C 33PF J		C658			CK73HB1H471K	CHIP C 470PF K	
C542			CC73HCH1H020C	CHIP C 2.0PF C		C659			CC73GCH1H150J	CHIP C 15PF J	
C544			CC73HCH1H1R5C	CHIP C 1.5PF C		C662			CC73GCH1H090B	CHIP C 9.0PF B	
C545			CC73HCH1H150J	CHIP C 15PF J		C665			CK73HB1A104K	CHIP C 0.10UF K	
C546			CC73HCH1H1R5C	CHIP C 1.5PF C		C667			CC73GCH1H090B	CHIP C 9.0PF B	
C548			CC73HCH1H680J	CHIP C 68PF J		C669			CC73GCH1H060B	CHIP C 6.0PF B	
C549			CC73HCH1H180J	CHIP C 18PF J		C670			CC73GCH1H330J	CHIP C 33PF J	
C551			CC73HCH1H0R5B	CHIP C 0.5PF B		C673			CK73HB1H471K	CHIP C 470PF K	
C552			CC73HCH1H101J	CHIP C 100PF J		C675			CC73GCH1H040B	CHIP C 4.0PF B	
C553,554			CC73HCH1H060B	CHIP C 6.0PF B		C676			CC73GCH1H101J	CHIP C 100PF J	
C555,556			CC73HCH1H040B	CHIP C 4.0PF B		C677			CC73GCH1H050B	CHIP C 5.0PF B	
C558			CC73HCH1H050B	CHIP C 5.0PF B		C678			CC73GCH1H090B	CHIP C 9.0PF B	
C559			CC73HCH1H070B	CHIP C 7.0PF B		C679			CC73GCH1H030B	CHIP C 3.0PF B	
C560			CC73HCH1H101J	CHIP C 100PF J		C680			CC73GCH1H080B	CHIP C 8.0PF B	
C562,563			CK73HB1H471K	CHIP C 470PF K		C681			CC73GCH1H030B	CHIP C 3.0PF B	
C564,565			CK73HB1A104K	CHIP C 0.10UF K		C682			CC73GCH1H070B	CHIP C 7.0PF B	
C566,567			CC73HCH1H0R5B	CHIP C 0.5PF B		C683			CC73GCH1H030B	CHIP C 3.0PF B	
C568			CK73HB1C103K	CHIP C 0.010UF K		C684			CC73GCH1H020B	CHIP C 2.0PF B	
C569			CK73HB1H471K	CHIP C 470PF K		C701,702			CK73HB1A104K	CHIP C 0.10UF K	
C570			CK73HB1C103K	CHIP C 0.010UF K		C703			CC73HCH1H330J	CHIP C 33PF J	
C571			CK73HB1H471K	CHIP C 470PF K		C704			CK73HB1C103K	CHIP C 0.010UF K	
C572			CS77AA1A100M	CHIP TNTL 10UF 10WV		C705			CC73HCH1H220J	CHIP C 22PF J	
C573			CK73HB1H471K	CHIP C 470PF K		C706			CC73HCH1H820J	CHIP C 82PF J	
C574			CC73HCH1H100D	CHIP C 10PF D		C707			CK73HB1H331K	CHIP C 330PF K	
C575			CC73HCH1H060B	CHIP C 6.0PF B		C708,709			CK73HB1A104K	CHIP C 0.10UF K	
C577,578			CK73HB1H471K	CHIP C 470PF K		C710			CC73HCH1H390J	CHIP C 39PF J	
C579			CC73HCH1H040B	CHIP C 4.0PF B		C711			CC73HCH1H820J	CHIP C 82PF J	
C580,581			CK73HB1H471K	CHIP C 470PF K		C712			CK73HB1H331K	CHIP C 330PF K	
C582			CC73HCH1H020B	CHIP C 2.0PF B		C713			CK73HB1A104K	CHIP C 0.10UF K	

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Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C714			CC73HCH1H390J	CHIP C 39PF J		C904			CK73HB1H471K	CHIP C 470PF K	
C715			CK73HB1H471K	CHIP C 470PF K		C906			CK73HB1C103K	CHIP C 0.010UF K	
C716			CK73HB1H182K	CHIP C 1800PF K		C917			CK73HB1A104K	CHIP C 0.10UF K	
C717			CK73GB1E105K	CHIP C 1.0UF K		C921			CK73HB1C223K	CHIP C 0.022UF K	
C718			CS77AA0J220M	CHIP TNL 22UF 6.3WV		C923-926			CK73HB1H471K	CHIP C 470PF K	
C719			CC73HCH1H820J	CHIP C 82PF J		TC501,502			C05-0384-05	CERAMIC TRIMMER (10PF)	
C720			CK73HB1C103K	CHIP C 0.010UF K		101	2A		E37-1141-15	FLAT CABLE	
C721			CK73HB1H471K	CHIP C 470PF K		CN1		*	E40-6863-05	FLAT CABLE CONNECTOR	
C722			CK73HB1A104K	CHIP C 0.10UF K		CN8			E40-6568-05	FLAT CABLE CONNECTOR	
C723			CK73HB1A333K	CHIP C 0.033UF K		CN18			E40-6456-05	FLAT CABLE CONNECTOR	
C724			CC73HCH1H330J	CHIP C 33PF J		CN71			E40-6568-05	FLAT CABLE CONNECTOR	
C725			CK73HB1A104K	CHIP C 0.10UF K		CN82		*	E40-6862-05	FLAT CABLE CONNECTOR	
C726			CK73HB1C103K	CHIP C 0.010UF K		CN901			E40-6456-05	FLAT CABLE CONNECTOR	
C727			CK73HB1H471K	CHIP C 470PF K		J1			E11-0703-05	PHONE JACK (2.5/3.5)	
C728			CK73HB1C103K	CHIP C 0.010UF K		F901		*	F53-0324-15	FUSE (2.5A)	
C730			CC73HCH1H080B	CHIP C 8.0PF B		102	3B		G11-4427-04	SHEET (PHONE JACK)	
C732,733			CK73HB1C103K	CHIP C 0.010UF K		CD701			L79-1474-05	TUNING COIL	
C734,735			CK73HB1H471K	CHIP C 470PF K		CF701			L72-1010-05	CERAMIC FILTER	
C736			CK73HB1C103K	CHIP C 0.010UF K		CF702			L72-1012-05	CERAMIC FILTER	
C737			CC73HCH1H040B	CHIP C 4.0PF B		L1			L92-0140-05	CHIP FERRITE	
C738			CC73HCH1H120J	CHIP C 12PF J		L2-5			L92-0138-05	CHIP FERRITE	
C739			CC73HCH1H020B	CHIP C 2.0PF B		L8			L92-0138-05	CHIP FERRITE	
C740			CC73HCH1H150J	CHIP C 15PF J		L10			L92-0140-05	CHIP FERRITE	
C741			CK73HB1C103K	CHIP C 0.010UF K		L11			L92-0149-05	CHIP FERRITE	
C742			CC73HCH1H040B	CHIP C 4.0PF B		L12,13			L92-0419-15	CHIP FERRITE	
C743			CC73HCH1H010B	CHIP C 1.0PF B		L14			L92-0138-05	CHIP FERRITE	
C744,745			CK73HB1H471K	CHIP C 470PF K		L16			L92-0467-05	CHIP FERRITE	
C746			CC73HCH1H100B	CHIP C 10PF B		L17			L92-0162-05	BEADS CORE	
C747,748			CK73HB1H471K	CHIP C 470PF K		L18			L92-0140-05	CHIP FERRITE	
C749			CC73HCH1H030B	CHIP C 3.0PF B		L19,20			L92-0162-05	BEADS CORE	
C750			CC73HCH1H180J	CHIP C 18PF J		L501			L41-4795-39	SMALL FIXED INDUCTOR (4.7UH)	
C752			CC73HCH1H020B	CHIP C 2.0PF B		L502			L40-4763-57	SMALL FIXED INDUCTOR (4.7NH)	
C754			CC73HCH1H020B	CHIP C 2.0PF B		L503			L92-0138-05	CHIP FERRITE	
C755			CC73HCH1H180J	CHIP C 18PF J		L505			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
C756,757			CC73HCH1H020B	CHIP C 2.0PF B		L506			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
C758			CK73HB1H471K	CHIP C 470PF K		L507			L40-4763-57	SMALL FIXED INDUCTOR (4.7NH)	
C759			CC73HCH1H030B	CHIP C 3.0PF B		L508			L40-8275-92	SMALL FIXED INDUCTOR (82NH)	
C760			CK73HB1H471K	CHIP C 470PF K		L509			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
C761			CC73HCH1H180J	CHIP C 18PF J		L511			L40-2275-57	SMALL FIXED INDUCTOR (22.0NH)	
C762			CC73HCH1H040B	CHIP C 4.0PF B		L512			L41-2775-43	SMALL FIXED INDUCTOR (27NH)	
C763			CK73HB1H471K	CHIP C 470PF K		L513			L41-3378-14	SMALL FIXED INDUCTOR (33NH)	
C765			CK73HB1H471K	CHIP C 470PF K		L514,515			L41-2785-45	SMALL FIXED INDUCTOR (270NH)	
C767			CK73HB1H471K	CHIP C 470PF K		L517			L41-2785-45	SMALL FIXED INDUCTOR (270NH)	
C769			CK73HB1H471K	CHIP C 470PF K		L518			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
C771			CK73HB1A104K	CHIP C 0.10UF K		L519			L92-0138-05	CHIP FERRITE	
C772			CK73HB1H471K	CHIP C 470PF K		L521			L40-3375-57	SMALL FIXED INDUCTOR (33.0NH)	
C773			CC73HCH1H2R5B	CHIP C 2.5PF B		L524			L40-3375-57	SMALL FIXED INDUCTOR (33.0NH)	
C774			CC73HCH1H180J	CHIP C 18PF J		L601			L40-2275-57	SMALL FIXED INDUCTOR (22.0NH)	
C776			CC73HCH1H030B	CHIP C 3.0PF B		L602			L40-1875-57	SMALL FIXED INDUCTOR (18.0NH)	
C777			CK73HB1H471K	CHIP C 470PF K		L603			L92-0138-05	CHIP FERRITE	
C778			CC73HCH1H020B	CHIP C 2.0PF B		L605			L40-6865-57	SMALL FIXED INDUCTOR (6.8NH)	
C779			CC73HCH1H180J	CHIP C 18PF J		L606			L41-1575-45	SMALL FIXED INDUCTOR (15NH)	
C780			CC73HCH1H020B	CHIP C 2.0PF B		L607			L92-0149-05	CHIP FERRITE	
C781			CK73HB1H471K	CHIP C 470PF K		L608			L40-2763-92	SMALL FIXED INDUCTOR (2.7NH)	
C782			CC73HCH1H330J	CHIP C 33PF J		L610			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	
C783			CC73HCH1H110J	CHIP C 11PF J		L611			L34-4576-05	AIR-CORE COIL	
C784			CC73HCH1H080B	CHIP C 8.0PF B		L612			L92-0149-05	CHIP FERRITE	
C787			CC73HCH1H020B	CHIP C 2.0PF B							
C789			CC73HCH1H020B	CHIP C 2.0PF B							
C901			CK73HB1H471K	CHIP C 470PF K							

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Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L613			L41-8268-14	SMALL FIXED INDUCTOR (8.2NH)		R37			RK73HB1J103J	CHIP R 10K J 1/16W	
L614			L41-2285-45	SMALL FIXED INDUCTOR (220NH)		R39,40			RK73HB1J473J	CHIP R 47K J 1/16W	
L615-618			L34-4564-05	AIR-CORE COIL		R45-47			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L619			L41-1092-44	SMALL FIXED INDUCTOR (1UH)		R48			RK73GB2A000J	CHIP R 0.0 J 1/10W	
L701			L40-1885-92	SMALL FIXED INDUCTOR (180NH)		R49,50			RK73HB1J473J	CHIP R 47K J 1/16W	
L702			L40-1085-57	SMALL FIXED INDUCTOR (100NH)		R52			RK73HB1J473J	CHIP R 47K J 1/16W	
L703			L40-1591-86	SMALL FIXED INDUCTOR (1.5UH)		R54			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L704			L92-0138-05	CHIP FERRITE		R55,56			RK73HB1J104J	CHIP R 100K J 1/16W	
L705			L41-5685-39	SMALL FIXED INDUCTOR (0.56UH)		R57			RK73HB1J103J	CHIP R 10K J 1/16W	
L706			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		R58,59			RK73HB1J473J	CHIP R 47K J 1/16W	
L707,708			L40-1875-57	SMALL FIXED INDUCTOR (18.0NH)		R61			RK73HB1J331J	CHIP R 330 J 1/16W	
L709			L40-3375-57	SMALL FIXED INDUCTOR (33.0NH)		R62			RK73HB1J103J	CHIP R 10K J 1/16W	
L711-713			L41-1278-14	SMALL FIXED INDUCTOR (12NH)		R63			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L714			L92-0138-05	CHIP FERRITE		R65			RK73HB1J473J	CHIP R 47K J 1/16W	
L715			L41-2785-45	SMALL FIXED INDUCTOR (270NH)		R66			RK73HB1J104J	CHIP R 100K J 1/16W	
L717,718			L41-1278-14	SMALL FIXED INDUCTOR (12NH)		R67			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L719			L41-5675-45	SMALL FIXED INDUCTOR (56NH)		R68			RK73GB2A181J	CHIP R 180 J 1/10W	
L901			L92-0149-05	CHIP FERRITE		R69			RK73HB1J102J	CHIP R 1.0K J 1/16W	
X1			L77-1950-05	CRYSTAL RESONATOR (11.0592MHZ)		R72			RK73GB2A181J	CHIP R 180 J 1/10W	
X2			L77-1976-05	CRYSTAL RESONATOR (3.6864MHZ)		R75			RK73GB2A391J	CHIP R 390 J 1/10W	
X501			L77-1971-05	TCXO (16.8MHZ)		R76			RK73HB1J102J	CHIP R 1.0K J 1/16W	
XF701			L71-0617-25	MCF (49.95MHZ)		R77			RK73HB1J473J	CHIP R 47K J 1/16W	
CP1			RK74HB1J473J	CHIP-COM 47K J 1/16W		R80			RK73HB1J102J	CHIP R 1.0K J 1/16W	
CP3,4			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R82			RK73GB2A391J	CHIP R 390 J 1/10W	
CP5			RK74HB1J102J	CHIP-COM 1.0K J 1/16W		R83			RK73GB2A000J	CHIP R 0.0 J 1/10W	
CP7,8			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R84			RK73HB1J184J	CHIP R 180K J 1/16W	
CP19			RK75HA1J473J	CHIP-COM 47K J 1/16W		R87			RK73HB1J000J	CHIP R 0.0 J 1/16W	
CP22			RK74HB1J102J	CHIP-COM 1.0K J 1/16W		R88			RK73HB1J393J	CHIP R 39K J 1/16W	
CP28			RK74HB1J102J	CHIP-COM 1.0K J 1/16W		R89			RK73HB1J102J	CHIP R 1.0K J 1/16W	
CP30			RK74HB1J102J	CHIP-COM 1.0K J 1/16W		R90			RK73HB1J394J	CHIP R 390K J 1/16W	
CP39			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R91			RK73HB1J332J	CHIP R 3.3K J 1/16W	
CP40			RK74HB1J102J	CHIP-COM 1.0K J 1/16W		R92			RK73HB1J473J	CHIP R 47K J 1/16W	
CP41			RK75HA1J474J	CHIP-COM 470K J 1/16W		R93			RK73HB1J393J	CHIP R 39K J 1/16W	
CP42,43			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R94			RK73HB1J684J	CHIP R 680K J 1/16W	
CP44			RK75HA1J474J	CHIP-COM 470K J 1/16W		R95			RK73HB1J102J	CHIP R 1.0K J 1/16W	
CP46			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R96			RK73HB1J393J	CHIP R 39K J 1/16W	
CP47-49			RK74HB1J102J	CHIP-COM 1.0K J 1/16W		R98,99			RK73HB1J473J	CHIP R 47K J 1/16W	
CP54			RK75HA1J473J	CHIP-COM 47K J 1/16W		R100			RK73HB1J223J	CHIP R 22K J 1/16W	
R1			RK73GB2A000J	CHIP R 0.0 J 1/10W		R101			RK73HB1J103J	CHIP R 10K J 1/16W	
R5,6			RK73GB2A000J	CHIP R 0.0 J 1/10W		R102			RK73HB1J473J	CHIP R 47K J 1/16W	
R7			RK73HB1J102J	CHIP R 1.0K J 1/16W		R103			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R8			RK73HB1J272J	CHIP R 2.7K J 1/16W		R104			RK73HB1J103J	CHIP R 10K J 1/16W	
R9			RK73HB1J332J	CHIP R 3.3K J 1/16W		R105			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R11			RK73HB1J473J	CHIP R 47K J 1/16W		R106			RK73HB1J473J	CHIP R 47K J 1/16W	
R12			RK73HB1J334J	CHIP R 330K J 1/16W		R107			RK73HB1J564J	CHIP R 560K J 1/16W	
R13			RK73HB1J332J	CHIP R 3.3K J 1/16W		R108			RK73HB1J334J	CHIP R 330K J 1/16W	
R14			RK73HB1J102J	CHIP R 1.0K J 1/16W		R109			RK73HB1J684J	CHIP R 680K J 1/16W	
R15			RK73HB1J272J	CHIP R 2.7K J 1/16W		R111			RK73HB1J564J	CHIP R 560K J 1/16W	
R16			RK73HB1J331J	CHIP R 330 J 1/16W		R112			RK73HB1J334J	CHIP R 330K J 1/16W	
R17			RK73HB1J821J	CHIP R 820 J 1/16W		R113			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R18			RK73GB2A100J	CHIP R 10 J 1/10W		R114			RK73HB1J184J	CHIP R 180K J 1/16W	
R20			RK73HB1J103J	CHIP R 10K J 1/16W		R116			RK73HB1J393J	CHIP R 39K J 1/16W	
R21			RK73HB1J821J	CHIP R 820 J 1/16W		R117			RK73HB1J683J	CHIP R 68K J 1/16W	
R22,23			RK73HB1J000J	CHIP R 0.0 J 1/16W		R119			RK73HB1J101J	CHIP R 100 J 1/16W	
R24			RK73HB1J224J	CHIP R 220K J 1/16W		R121			RK73HB1J184J	CHIP R 180K J 1/16W	
R25			RK73HB1J153J	CHIP R 15K J 1/16W		R122			RK73HB1J154J	CHIP R 150K J 1/16W	
R26			RK73HB1J000J	CHIP R 0.0 J 1/16W		R129			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R27,28			RK73HH1J474D	CHIP R 470K D 1/16W		R130			RK73HB1J474J	CHIP R 470K J 1/16W	
R31			RK73HB1J103J	CHIP R 10K J 1/16W		R131,132			RK73HB1J000J	CHIP R 0.0 J 1/16W	
						R134			RK73HB1J104J	CHIP R 100K J 1/16W	

PARTS LIST / 零件表

TX-RX UNIT (X57-7013-06)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R135			RK73HB1J000J	CHIP R 0.0 J 1/16W		R215			RK73HB1J334J	CHIP R 330K J 1/16W	
R137			RK73HB1J223J	CHIP R 22K J 1/16W		R216			RK73HB1J274J	CHIP R 270K J 1/16W	
R139			RK73HB1J103J	CHIP R 10K J 1/16W		R218			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R140			RK73HB1J102J	CHIP R 1.0K J 1/16W		R220			RK73GB2A102J	CHIP R 1.0K J 1/10W	
R141			RK73HB1J105J	CHIP R 1.0M J 1/16W		R221			RK73HB1J473J	CHIP R 47K J 1/16W	
R142			RK73HB1J223J	CHIP R 22K J 1/16W		R222,223			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R143			RK73HB1J473J	CHIP R 47K J 1/16W		R224			RK73HB1J104J	CHIP R 100K J 1/16W	
R144			RK73HB1J472J	CHIP R 4.7K J 1/16W		R225			RK73HB1J154J	CHIP R 150K J 1/16W	
R145			RK73HB1J154J	CHIP R 150K J 1/16W		R226			RK73HB1J184J	CHIP R 180K J 1/16W	
R146			RK73HB1J105J	CHIP R 1.0M J 1/16W		R227,228			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R147			RK73HB1J103J	CHIP R 10K J 1/16W		R229			RK73HB1J473J	CHIP R 47K J 1/16W	
R149			RK73HB1J105J	CHIP R 1.0M J 1/16W		R230			RK73HB1J123J	CHIP R 12K J 1/16W	
R150			RK73HB1J153J	CHIP R 15K J 1/16W		R231			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R151			RK73HB1J183J	CHIP R 18K J 1/16W		R232			RK73HB1J823J	CHIP R 82K J 1/16W	
R152			RK73HB1J105J	CHIP R 1.0M J 1/16W		R233			RK73HB1J473J	CHIP R 47K J 1/16W	
R153			RK73HB1J332J	CHIP R 3.3K J 1/16W		R236			RK73HB1J124J	CHIP R 120K J 1/16W	
R155			RK73HB1J223J	CHIP R 22K J 1/16W		R238			RK73HB1J474J	CHIP R 470K J 1/16W	
R156,157			RK73HB1J304J	CHIP R 300K J 1/16W		R239			RK73HB1J104J	CHIP R 100K J 1/16W	
R158			RK73HB1J334J	CHIP R 330K J 1/16W		R240			RK73HB1J474J	CHIP R 470K J 1/16W	
R159			RK73HB1J474J	CHIP R 470K J 1/16W		R241			RK73HB1J473J	CHIP R 47K J 1/16W	
R160			RK73HB1J224J	CHIP R 220K J 1/16W		R242			RK73HB1J104J	CHIP R 100K J 1/16W	
R161,162			RK73HB1J124J	CHIP R 120K J 1/16W		R243			RK73HB1J474J	CHIP R 470K J 1/16W	
R163			RK73HB1J393J	CHIP R 39K J 1/16W		R244			RK73HB1J473J	CHIP R 47K J 1/16W	
R164			RK73HB1J184J	CHIP R 180K J 1/16W		R245			RK73HB1J103J	CHIP R 10K J 1/16W	
R165			RK73HB1J154J	CHIP R 150K J 1/16W		R246			RK73HB1J223J	CHIP R 22K J 1/16W	
R166			RK73HB1J103J	CHIP R 10K J 1/16W		R248			RK73GB2A220J	CHIP R 22 J 1/10W	
R167			RK73GB2A000J	CHIP R 0.0 J 1/10W		R250			RK73GB2A220J	CHIP R 22 J 1/10W	
R168			RK73HB1J474J	CHIP R 470K J 1/16W		R251			RK73HB1J474J	CHIP R 470K J 1/16W	
R170			RK73GB2A000J	CHIP R 0.0 J 1/10W		R254,255			RK73HB1J474J	CHIP R 470K J 1/16W	
R171			RK73HB1J000J	CHIP R 0.0 J 1/16W		R256-258			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R172			RK73HB1J684J	CHIP R 680K J 1/16W		R259			RK73HB1J103J	CHIP R 10K J 1/16W	
R173			RK73HB1J184J	CHIP R 180K J 1/16W		R261			RK73HB1J103J	CHIP R 10K J 1/16W	
R174			RK73HB1J123J	CHIP R 12K J 1/16W		R262			RK73HB1J473J	CHIP R 47K J 1/16W	
R175			RK73HB1J103J	CHIP R 10K J 1/16W		R263			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R176			RK73HB1J683J	CHIP R 68K J 1/16W		R264			RK73HB1J473J	CHIP R 47K J 1/16W	
R177			RK73HB1J000J	CHIP R 0.0 J 1/16W		R265			RK73HB1J394J	CHIP R 390K J 1/16W	
R178			RK73HB1J102J	CHIP R 1.0K J 1/16W		R266			RK73HB1J100J	CHIP R 10 J 1/16W	
R180			RK73HB1J103J	CHIP R 10K J 1/16W		R267			RK73HB1J683J	CHIP R 68K J 1/16W	
R181			RK73HB1J000J	CHIP R 0.0 J 1/16W		R268			RK73HB1J123J	CHIP R 12K J 1/16W	
R183			RK73HB1J103J	CHIP R 10K J 1/16W		R269			RK73HB1J470J	CHIP R 47 J 1/16W	
R184			RK73HB1J000J	CHIP R 0.0 J 1/16W		R271			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R187			RK73HB1J000J	CHIP R 0.0 J 1/16W		R272			RK73HB1J101J	CHIP R 100 J 1/16W	
R191			RK73HB1J000J	CHIP R 0.0 J 1/16W		R274			RK73HB1J273J	CHIP R 27K J 1/16W	
R192,193			RK73HB1J104J	CHIP R 100K J 1/16W		R276,277			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R194,195			RK73HB1J102J	CHIP R 1.0K J 1/16W		R278			RK73HB1J104J	CHIP R 100K J 1/16W	
R196			RK73HB1J151J	CHIP R 150 J 1/16W		R282			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R198			RK73GB2A000J	CHIP R 0.0 J 1/10W		R284,285			RK73HB1J103J	CHIP R 10K J 1/16W	
R199			RK73HB1J472J	CHIP R 4.7K J 1/16W		R287			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R200			RK73HB1J473J	CHIP R 47K J 1/16W		R288			RK73HB1J473J	CHIP R 47K J 1/16W	
R202			RK73HB1J102J	CHIP R 1.0K J 1/16W		R289			RK73HB1J121J	CHIP R 120 J 1/16W	
R203			RK73HB1J222J	CHIP R 2.2K J 1/16W		R290-297			RK73HB1J103J	CHIP R 10K J 1/16W	
R204			RK73HB1J104J	CHIP R 100K J 1/16W		R298			RK73FB2B000J	CHIP R 0.0 J 1/8W	
R205			RK73HB1J105J	CHIP R 1.0M J 1/16W		R301			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R206			RK73HB1J000J	CHIP R 0.0 J 1/16W		R302-304			RK73HB1J473J	CHIP R 47K J 1/16W	
R207			RK73HB1J154J	CHIP R 150K J 1/16W		R305			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R210			RK73HB1J471J	CHIP R 470 J 1/16W		R501,502			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R211			RK73HB1J474J	CHIP R 470K J 1/16W		R503			RK73HB1J470J	CHIP R 47 J 1/16W	
R212			RK73GB2A101J	CHIP R 100 J 1/10W		R504			RK73HB1J103J	CHIP R 10K J 1/16W	
R213			RK73HB1J101J	CHIP R 100 J 1/16W		R505			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R214			RK73HB1J182J	CHIP R 1.8K J 1/16W		R506			RK73HB1J154J	CHIP R 150K J 1/16W	

PARTS LIST / 零件表

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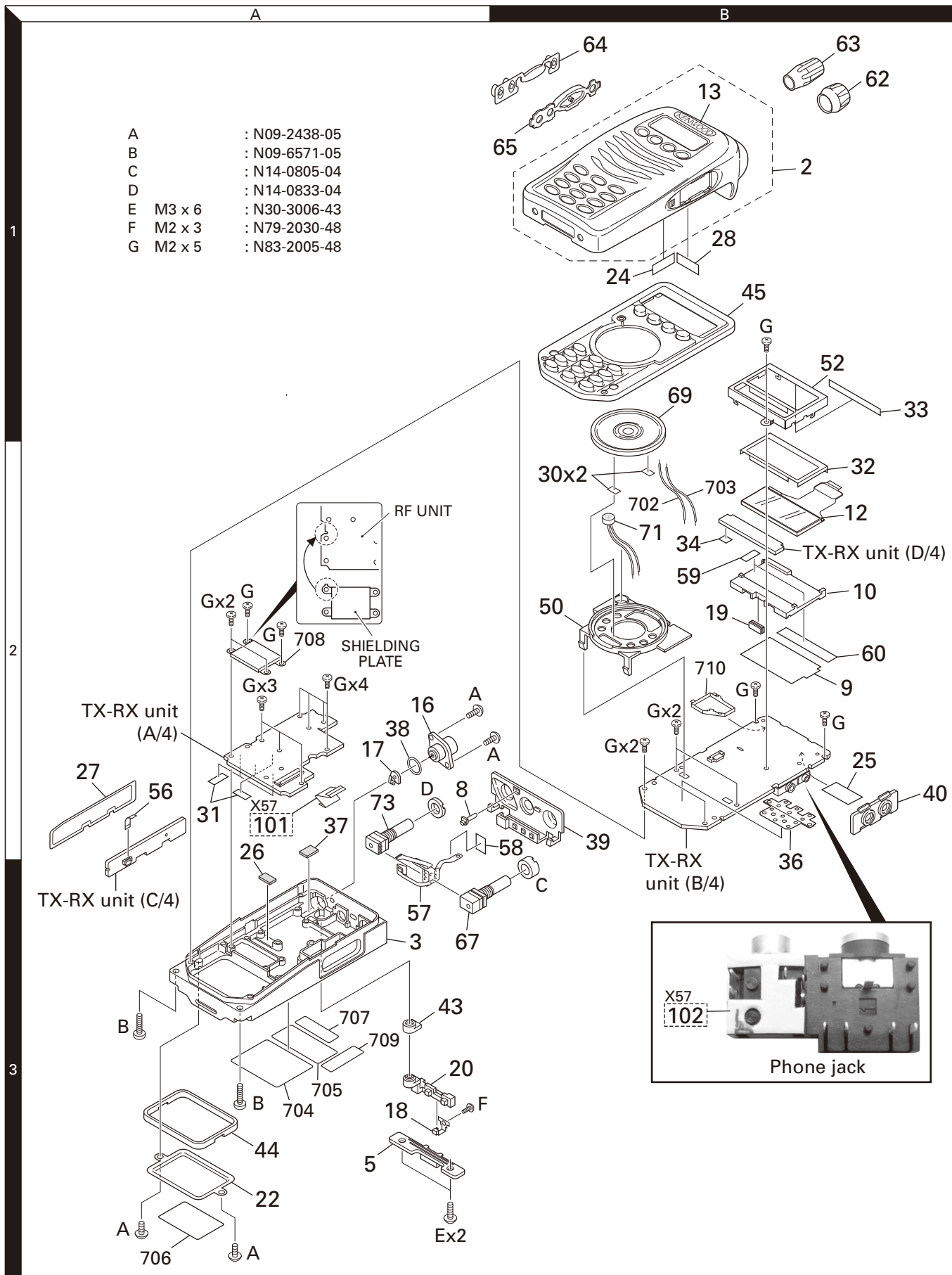
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R507			RK73HB1J101J	CHIP R 100 J 1/16W		R634			RK73HB1J103J	CHIP R 10K J 1/16W	
R508			RK73HB1J330J	CHIP R 33 J 1/16W		R635			RK73HB1J473J	CHIP R 47K J 1/16W	
R509			RK73HB1J272J	CHIP R 2.7K J 1/16W		R636			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R510-512			RK73HB1J000J	CHIP R 0.0 J 1/16W		R637			RK73HB1J223J	CHIP R 22K J 1/16W	
R513			RK73HB1J470J	CHIP R 47 J 1/16W		R638			RK73HB1J474J	CHIP R 470K J 1/16W	
R514			RK73HB1J681J	CHIP R 680 J 1/16W		R639			RK73HB1J184J	CHIP R 180K J 1/16W	
R515			RK73HB1J561J	CHIP R 560 J 1/16W		R640			RK73HB1J474J	CHIP R 470K J 1/16W	
R516			RK73HB1J000J	CHIP R 0.0 J 1/16W		R641			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R517			RK73HB1J103J	CHIP R 10K J 1/16W		R642			RK73HB1J150J	CHIP R 15 J 1/16W	
R518			RK73HB1J101J	CHIP R 100 J 1/16W		R643			RK73HB1J683J	CHIP R 68K J 1/16W	
R519,520			RK73HB1J103J	CHIP R 10K J 1/16W		R645,646			RK73GB2A271J	CHIP R 270 J 1/10W	
R521,522			RK73HB1J101J	CHIP R 100 J 1/16W		R647			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R523			RK73HB1J473J	CHIP R 47K J 1/16W		R648			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R525			RK73HB1J331J	CHIP R 330 J 1/16W		R701			RK73HB1J103J	CHIP R 10K J 1/16W	
R527			RK73HB1J103J	CHIP R 10K J 1/16W		R702,703			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R529			RK73HB1J151J	CHIP R 150 J 1/16W		R704			RK73HB1J224J	CHIP R 220K J 1/16W	
R530			RK73HB1J181J	CHIP R 180 J 1/16W		R705,706			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R531,532			RK73HB1J220J	CHIP R 22 J 1/16W		R707			RK73HB1J101J	CHIP R 100 J 1/16W	
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R534			RK73HB1J154J	CHIP R 150K J 1/16W		R710			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R535			RK73HB1J101J	CHIP R 100 J 1/16W		R711			RK73HB1J474J	CHIP R 470K J 1/16W	
R541			RK73HB1J103J	CHIP R 10K J 1/16W		R713			RK73HB1J334J	CHIP R 330K J 1/16W	
R542			RK73HB1J331J	CHIP R 330 J 1/16W		R715,716			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R544			RK73HB1J101J	CHIP R 100 J 1/16W		R717			RK73HB1J272J	CHIP R 2.7K J 1/16W	
R545			RK73HB1J333D	CHIP R 33K D 1/16W		R718			RK73HB1J100J	CHIP R 10 J 1/16W	
R546			RK73HB1J104D	CHIP R 100K D 1/16W		R719			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R547			RK73HB1J472J	CHIP R 4.7K J 1/16W		R721			RK73HB1J224J	CHIP R 220K J 1/16W	
R548			RK73HB1J220J	CHIP R 22 J 1/16W		R722			RK73HB1J101J	CHIP R 100 J 1/16W	
R550			RK73GB2A000J	CHIP R 0.0 J 1/10W		R726			RK73HB1J474J	CHIP R 470K J 1/16W	
R551,552			RK73HB1J000J	CHIP R 0.0 J 1/16W		R727			RK73HB1J681J	CHIP R 680 J 1/16W	
R555			RK73HB1J682J	CHIP R 6.8K J 1/16W		R728			RK73HB1J101J	CHIP R 100 J 1/16W	
R556			RK73HB1J000J	CHIP R 0.0 J 1/16W		R729			RK73HB1J470J	CHIP R 47 J 1/16W	
R557			RK73HB1J682J	CHIP R 6.8K J 1/16W		R730			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R558			RK73HB1J000J	CHIP R 0.0 J 1/16W		R731			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R601			RK73HB1J472J	CHIP R 4.7K J 1/16W		R732			RK73HB1J331J	CHIP R 330 J 1/16W	
R602			RK73HB1J000J	CHIP R 0.0 J 1/16W		R734			RK73HB1J104J	CHIP R 100K J 1/16W	
R603			RK73HB1J102J	CHIP R 1.0K J 1/16W		R735			RK73HB1J184J	CHIP R 180K J 1/16W	
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R607			RK73HB1J220J	CHIP R 22 J 1/16W		R738			RK73HB1J100J	CHIP R 10 J 1/16W	
R608			RK73HB1J331J	CHIP R 330 J 1/16W		R739-741			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R609			RK73HB1J180J	CHIP R 18 J 1/16W		R742			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R610			RK73HB1J331J	CHIP R 330 J 1/16W		R743			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R611			RK73HB1J823J	CHIP R 82K J 1/16W		R744			RK73HB1J331J	CHIP R 330 J 1/16W	
R612			RK73HB1J560J	CHIP R 56 J 1/16W		R747			RK73HB1J104J	CHIP R 100K J 1/16W	
R613			RK73HB1J563J	CHIP R 56K J 1/16W		R748			RK73HB1J824J	CHIP R 820K J 1/16W	
R614			RK73HB1J471J	CHIP R 470 J 1/16W		R750,751			RK73HB1J104J	CHIP R 100K J 1/16W	
R618			RK73HB1J000J	CHIP R 0.0 J 1/16W		R752			RK73HB1J100J	CHIP R 10 J 1/16W	
R619			RK73HB1J103J	CHIP R 10K J 1/16W		R753			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R620			RK73HB1J000J	CHIP R 0.0 J 1/16W		R754,755			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R621			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R756			RK73FB2B000J	CHIP R 0.0 J 1/8W	
R622			RK73HB1J220J	CHIP R 22 J 1/16W		R757			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R623			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R758			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R624			RK73HB1J104J	CHIP R 100K J 1/16W		R759			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R625			RK73HB1J680J	CHIP R 68 J 1/16W		R760			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R627			RK73HB1J223J	CHIP R 22K J 1/16W		R903			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R628			RK73HB1J562J	CHIP R 5.6K J 1/16W		R913-916			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R629			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R923			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R630,631			RK73HB1J154D	CHIP R 150K D 1/16W		VR1			R32-0684-05	SEMI FIXED VARIABLE RESISTOR	
R632,633			RK73HB1J334D	CHIP R 330K D 1/16W							

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TX-RX UNIT (X57-7013-06)

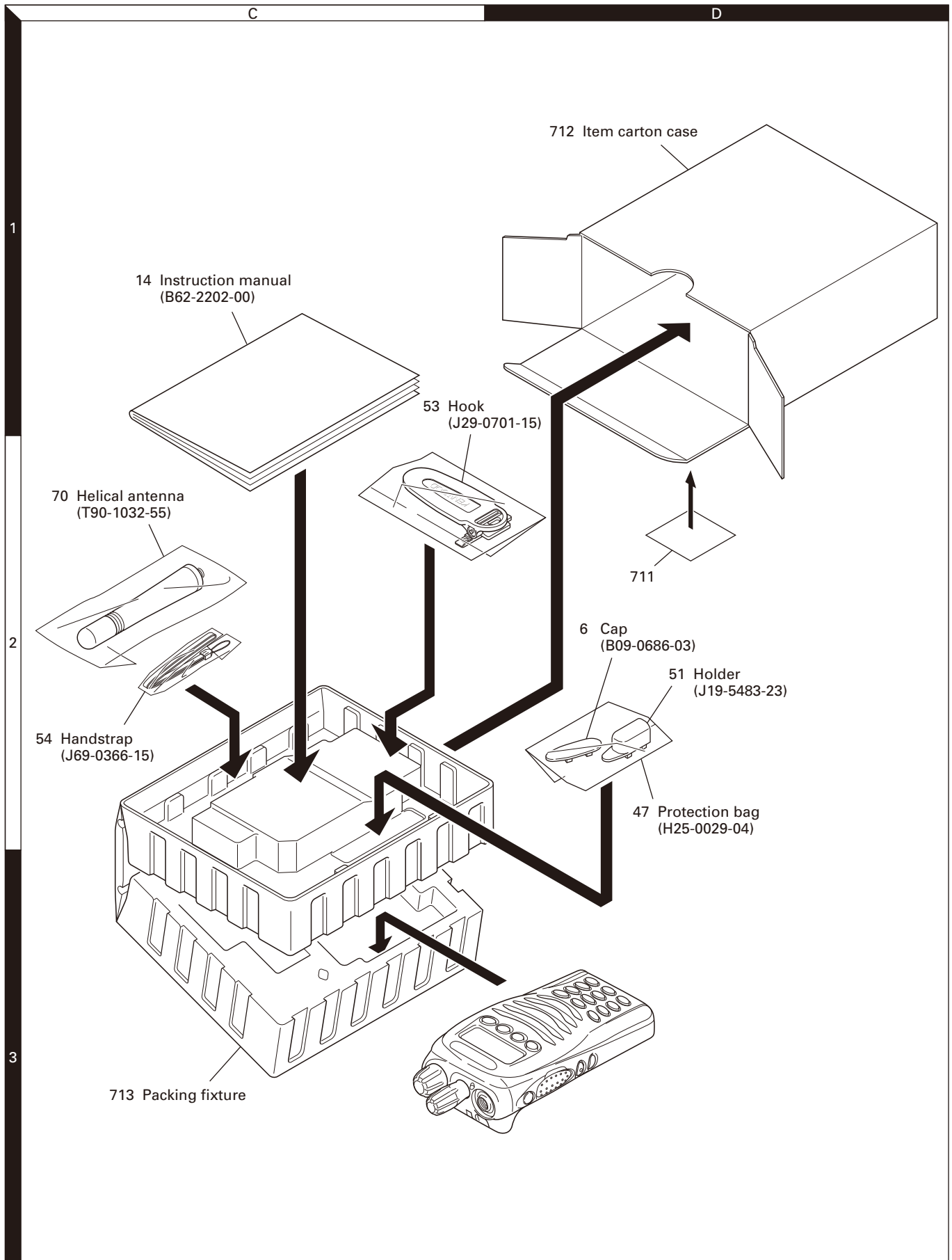
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S2			S70-0457-05	TACT SWITCH		Q19			SSM3K15TE(F)	FET	
S3,4			S70-0424-05	TACT SWITCH		Q21			RN4910(F)	TRANSISTOR	
						Q22			SSM3K15TE(F)	FET	
D1			RB521S-30	DIODE		Q23			RT1N441U-T111	DIGITAL TRANSISTOR	
D4			MA2S111-F	DIODE							
D17			MA2S111-F	DIODE		Q24			SSM6J08FU(F)	FET	
D24-27			MA2S111-F	DIODE		Q25			2SK1830F	FET	
D28-31			RB706F-40	DIODE		Q26			2SJ347F	FET	
						Q27			RT1N441U-T111	DIGITAL TRANSISTOR	
D32			DA221	DIODE		Q28			SSM3K01T(F)	FET	
D33			AVRM16270MABB	VARIATOR							
D34-37			AVRM16080MAAB	VARIATOR		Q29			SSM3K15TE(F)	FET	
D501			MA2S077G	DIODE		Q30			2SJ243-A	FET	
D502,503			HSC277	DIODE		Q31,32			2SC4649(N,P)	TRANSISTOR	
						Q33			2SJ347F	FET	
D505			1SV325F	VARIABLE CAPACITANCE DIODE		Q34			SSM3K15TE(F)	FET	
D507			1SV325F	VARIABLE CAPACITANCE DIODE							
D509			1SV325F	VARIABLE CAPACITANCE DIODE		Q35			SSM3K01T(F)	FET	
D511			1SV325F	VARIABLE CAPACITANCE DIODE		Q37			SSM3J05FU-F	FET	
D513			1SV278F	VARIABLE CAPACITANCE DIODE		Q501			2SC5488A-H	TRANSISTOR	
						Q502,503			2SK508NV(K52)	FET	
D514-516			HSC277	DIODE		Q504			SSM6P05FU(F)	FET	
D517			MA2S077G	DIODE							
D601			UDZW4.7(B)	ZENER DIODE		Q505			2SC4617(S)	TRANSISTOR	
D604-608			HVC131	DIODE		Q506,507			2SC5488A-H	TRANSISTOR	
D701,702			DAN235E	DIODE		Q601			2SC5488A-H	TRANSISTOR	
						Q602			2SK3077F	FET	
D703-708			HVC350B	VARIABLE CAPACITANCE DIODE		Q603			RD01MUS1-T113	FET	
D901			GN1G	DIODE							
IC1			XC61CC5002NR	MOS-IC		Q604			2SK3476-F	FET	
IC2			XC6209B502PR	MOS-IC		Q605			RT1N141U-T111	DIGITAL TRANSISTOR	
IC3			XC61CN3402NR	MOS-IC		Q606			2SK879(GR)F	FET	
						Q607			RT1N141U-T111	DIGITAL TRANSISTOR	
IC4,5			BU4094BCFV	MOS-IC		Q608			RT1P441U-T111	DIGITAL TRANSISTOR	
IC7	*		30875MHB069GP	MCU							
IC8	*		E29LV16BT7TIP	ROM IC		Q609			SSM3K15TE(F)	FET	
IC9			CAT24C64WI-G	ROM IC		Q701			2SC4649(N,P)	TRANSISTOR	
IC10-12			TK62012F	MOS-IC		Q702			RT1P441U-T111	DIGITAL TRANSISTOR	
						Q703			2SC4649(N,P)	TRANSISTOR	
IC13			AQUA-L	MOS-IC		Q704,705			3SK318	FET	
IC14			TC7W53FK(F)	MOS-IC							
IC15			TK62012F	MOS-IC		TH1			ERTJ0EV104H	THERMISTOR	
IC16			M62364FP-F	MOS-IC		TH501			B57331V2104J	THERMISTOR	
IC17			TK62012F	MOS-IC		TH701,702			B57331V2104J	THERMISTOR	
IC18			TA7368FG	MOS-IC							
IC19			TC75S51FE(F)	MOS-IC							
IC24			LM2682MMX	MOS-IC							
IC25			TC7WZ245FK-F	MOS-IC							
IC26			XC6204B332P1	ANALOGUE IC							
IC27			NJM2130F3-ZB	BI-POLAR IC							
IC28			TC74LCX245FK	MOS-IC							
IC501			ADF4111BCP7	MOS-IC							
IC601			TA75W01FUF	MOS-IC							
IC701			TA31136FNG	MOS-IC							
Q1			UMG3N	TRANSISTOR							
Q4			FP210	TRANSISTOR							
Q5			UPA672T-A	FET							
Q6			UMG3N	TRANSISTOR							
Q7			UPA672T-A	FET							
Q8			RT1P141U-T111	DIGITAL TRANSISTOR							
Q9			SSM6J08FU(F)	FET							
Q12			2SC4617(S)	TRANSISTOR							
Q13			2SB1132(Q,R)	TRANSISTOR							
Q14,15			SSM3K15TE(F)	FET							
Q16			2SA1774(S)	TRANSISTOR							

EXPLODED VIEW / 部件分解图



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

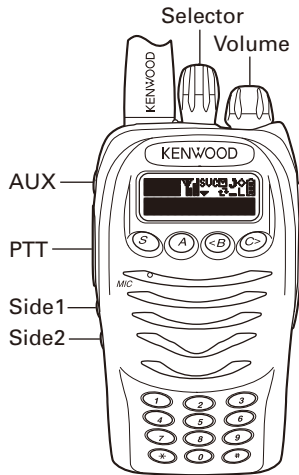
PACKING / 包装



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

ADJUSTMENT

Controls



Panel Test Mode

■ Test mode operation features

This transceiver has a test mode. **To enter test mode, press [A] key and turn power on. Hold [A] key until frequency version appears on LCD.** Test mode can be inhibited by programming. To exit test mode, switch the power on again. The following functions are available in test mode.

■ Key operation

Key	“FNC” not appears	
	Function	Display
[S]	Shifts to Panel tuning mode	-
[A]	Function on	“FNC” appears
[B]	MSK 1200bps and 2400bps	2400bps: icon appears
[C]	Test signaling CH up	Signaling No.
[Selector]	Test frequency CH up/down	Channel No.
[Side1]	Squelch on/off	
[Side2]	Narrow/Wide	Narrow: “n”, Wide: “w”
[PTT]	Transmit	-
[0] to [9] and [#],[*]	Use as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was presses is sent.	-
[AUX]	-	-

Key	“FNC” appears	
	Function	Display
[S]	High power / Low power	Low: icon appears
[A]	Function off	-
[B]	Compander on/off	On: icon appears
[C]	Beat shift on/off	On: icon appears
[Selector]	Test frequency CH up/down	-
[Side1]	Squelch level 0	On: icon appears
[Side2]	LCD all lights	LCD all point appears
[PTT]	Transmit	-
[0] to [9] and [#],[*]	Function off	-

Note:

- If a [S], [A], [B], [C] key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent.

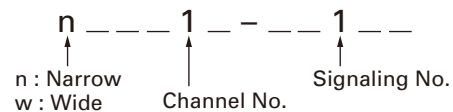
• LED indicator

- Red LED Lights during transmission. Blinks at the low battery voltage warning.
- Green LED Lights when there is carrier.

• Sub LCD indicator

- “FNC” Appears at function on.

• LCD display in panel test mode



■ Frequency and Signaling

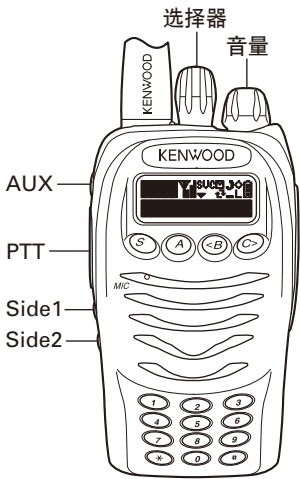
The set has been adjusted for the frequencies shown in the following table. When required, readjust them following the adjustment procedure to obtain the frequencies you want in actual operation.

• Test frequency

CH	RX (MHz)	TX (MHz)
1	370.05000	370.10000
2	350.05000	350.10000
3	389.95000	389.90000
4	370.00000	370.00000
5	370.20000	370.20000
6	370.40000	370.40000
7~16	-	-

调整

控制



面板测试模式

■测试模式操作功能

本对讲机有测试模式。**要进入测试模式，请按 [A] 键打开电源。按住 [A] 键，直到频率版本出现在 LCD 上为止。**可以通过编程禁用测试模式。要退出测试模式，请再次打开电源。在测试模式可以使用下列功能。

■键操作

键	“FNC” 不出现	
	功 能	显 示
[S]	换到面板调谐模式	-
[A]	功能开	显示 “FNC”
[B]	MSK 1200bps 和 2400bps	2400bps: 图标出现
[C]	测试信令 CH 上调	信令号
[选择器]	测试频率 CH 上调 / 下调	信道号
[Side1]	静噪打开 / 关闭	
[Side2]	窄 / 宽	窄: “n”，宽: “w”
[PTT]	发射	-
[0] 到 [9]、 [#]、[*]	用作 DTMF 键盘。 如果在发射时按下某个键，则发送与按下的键对应的 DTMF。	-
[AUX]	-	-

键	“FNC” 出现	
	功 能	显 示
[S]	高功率 / 低功率	低功率: 图标出现
[A]	功能关	-
[B]	压缩扩展器打开 / 关闭	打开: 图标出现
[C]	拍频偏移打开 / 关闭	打开: 图标出现
[选择器]	测试频率 CH 上调 / 下调	-
[Side1]	静噪电平 0	打开: 图标出现
[Side2]	LCD 全亮	LCD 全点显示
[PTT]	发射	-
[0] 到 [9]、 [#]、[*]	功能关	-

注意:
• 如果在发射时按下 [S]、[A]、[B]、[C] 键，则发送与按下的键对应的 DTMF。

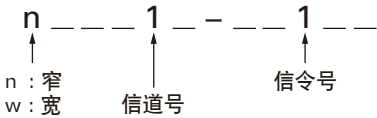
● LED 指示灯

红色 LED 发射时点亮。低电池电压警告时闪烁。
绿色 LED 有载波时点亮。

●副 LCD 指示灯

“FNC” 功能关时出现。

●面板测试模式时的 LCD 显示



■频率和信令

已经根据下表所示的频率调整了设置。需要时，按调整步骤重新调整，以获得实际操作时想要的频率。

●测试频率

信 道	接收 (MHz)	发射 (MHz)
1	370.05000	370.10000
2	350.05000	350.10000
3	389.95000	389.90000
4	370.00000	370.00000
5	370.20000	370.20000
6	370.40000	370.40000
7 ~ 16	-	-

ADJUSTMENT

• Test signaling

No.	RX	TX
1	None	None
2	None	100Hz Square Wave
4	QT: 67.0Hz	QT: 67.0Hz
5	QT: 151.4Hz	QT: 151.4Hz
6	QT: 210.7Hz	QT: 210.7Hz
7	QT: 254.1Hz	QT: 254.1Hz
8	DQT: 023N	DQT: 023N
9	DQT: 754I	DQT: 754I
10	DTMF: 159D	DTMF: 159D
11	None	DTMF Code 9
12	Skip	Skip
13	Skip	Skip
14	None	Single Tone: 1000Hz
15	Skip	Skip
16	None	MSK
17	MSK: Preamble: 0xAAAA Sync: 0x23EB Data: 0x230960C6AAAA CRC: 0xC4D7	MSK: Preamble: 0xAAAA Sync: 0x23EB Data: 0x230960C6AAAA CRC: 0xC4D7

■ Key operation

Key	Function	
	Push	Hold (1 second)
[S]	End of panel tuning mode	-
[A]	To enter 3 or 5 reference level adjustments	-
[B]	Writes the adjustment value	-
[C]	Go to next adjustment item	Back to last adjustment item
[Selector]	Adjustment value up/down	
[Volume]	Volume level up/down	
[Side1]	Squelch on/off	-
[Side2]	Selects Narrow, Wide	-
[AUX]	-	-

■ 3 or 5 reference level adjustments frequency

Tuning point	RX (MHz)	TX (MHz)
Low (L)	350.05000	350.10000
Low' (L')	360.05000	360.10000
Center (C)	370.05000	370.10000
High' (H')	380.05000	380.10000
High (H)	389.95000	389.90000

Panel Tuning Mode

■ Preparations for tuning the transceiver

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

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

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

■ Transceiver tuning

(To place transceiver in tuning mode)

Press [S] key, now in tuning mode. Use [B] key to write tuning data through tuning modes, and [Selector] to adjust tuning requirements (1 to 256 appears on LCD).

Use [C] key to select the adjustment item through tuning modes. Use [A] key to adjust 3 or 5 reference level adjustments, and use [Side2] key to switch between Wide/Narrow.

Channel appears on LCD. Set channel according to tuning requirements.

• LCD display in panel tuning mode

n _ _ B A L _ _ _ 2 5 6

n : Narrow
w : Wide Adjustment item Adjustment value (1~256)

■ Adjustment item and Display
(*** : 1~256, MSK only : 1~64)

Order	Adjustment item	Display
1	Frequency Adjustment	F R E Q _ _ ***
2	High Transmit Power	H P W R _ _ ***
3	Low Transmit Power	L P W R _ _ ***
4	DQT Balance	B A L _ _ _ ***
5	Maximum Deviation	D E V _ _ _ ***
6	QT Fine Deviation	Q T _ _ _ _ ***
7	DQT Fine Deviation	D Q T _ _ _ ***
8	DTMF Fine Deviation	D T M F _ _ ***
9	MSK Deviation	M S K _ _ _ _ **
10	Single Tone Deviation	T O N E _ _ ***
11	Sensitivity	S E N S _ _ ***
12	Squelch Open	S Q L _ _ _ ***
13	Low RSSI	L R S S I _ ***
14	Squelch Tight	S Q L T _ _ ***
15	High RSSI	H R S S I _ ***
16	Battery Warning Level	B A T T _ _ ***

调 整

●测试信令

号	接 收	发 射
1	无	无
2	无	100Hz 方波
4	QT:67.0Hz	QT:67.0Hz
5	QT:151.4Hz	QT:151.4Hz
6	QT:210.7Hz	QT:210.7Hz
7	QT:254.1Hz	QT:254.1Hz
8	DQT:023N	DQT:023N
9	DQT:754I	DQT:754I
10	DTMF:159D	DTMF:159D
11	无	DTMF 代码 9
12	跳跃	跳跃
13	跳跃	跳跃
14	无	单音 :1000Hz
15	跳跃	跳跃
16	无	MSK
17	MSK: 前同步码 :0xAAAA 同步 :0x23EB 数据 :0x230960C6AAAA CRC:0xC4D7	MSK: 前同步码 :0xAAAA 同步 :0x23EB 数据 :0x230960C6AAAA CRC:0xC4D7

■键操作

键	功 能	
	按 下	按住 (1 秒钟)
[S]	结束面板调谐模式	—
[A]	进入 3 或 5 点基准电平调节	—
[B]	写入调整值	—
[C]	转到下一调整项目	返回到最后调整的项目
[选择器]	调整值增大 / 减小	
[音量]	音量升高 / 降低	
[Side1]	静噪打开 / 关闭	—
[Side2]	选择窄、宽	—
[AUX]	—	—

■ 3 或 5 点基准电平调节频率

调 谐 点	接收 (MHz)	发射 (MHz)
低 (L)	350.05000	350.10000
低' (L')	360.05000	360.10000
中心 (C)	370.05000	370.10000
高' (H')	380.05000	380.10000
高 (H)	389.95000	389.90000

面板调谐模式

■调谐对讲机的准备

在尝试调谐对讲机前，请将对讲机连接到合适的电源上。
发射打开时，对讲机必须连接到合适的等效负载上（如功率表）。
扬声器输出连接器必须端接 8Ω 的等效负载，调谐期间，必须始终连接到交流电压表和音频失真仪或 SINAD 测量仪表上。

■对讲机调谐

（要使对讲机进入调谐模式）

按 [S] 键，现在处于调谐模式。用 [B] 键写入调谐模式的调谐数据，用 [选择器] 调整调谐要求（1 ~ 256 出现在 LCD 上）。
用 [C] 键选择调谐模式的调整项目。用 [A] 键调整 3 或 5 点基准电平调节，然后用 [Side2] 键切换宽 / 窄。
信道出现在 LCD 上。根据调谐要求设置信道。

●面板调谐模式时的 LCD 显示

n _ _ B A L _ _ _ 2 5 6
↑ ↑ ↑
n : 窄 调整项目 调整值 (1~256)
w : 宽

■调整项目和显示

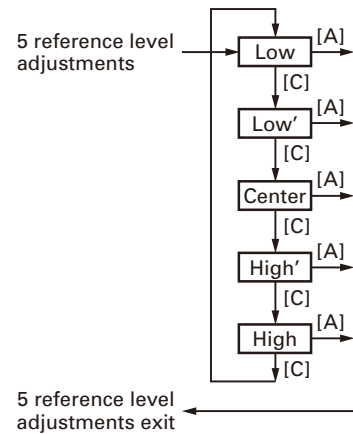
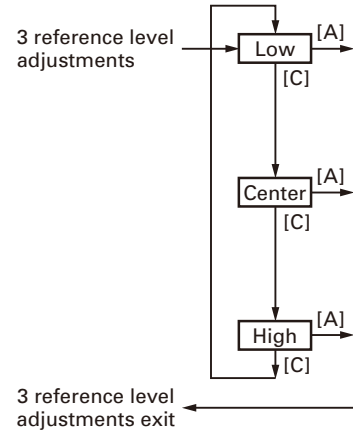
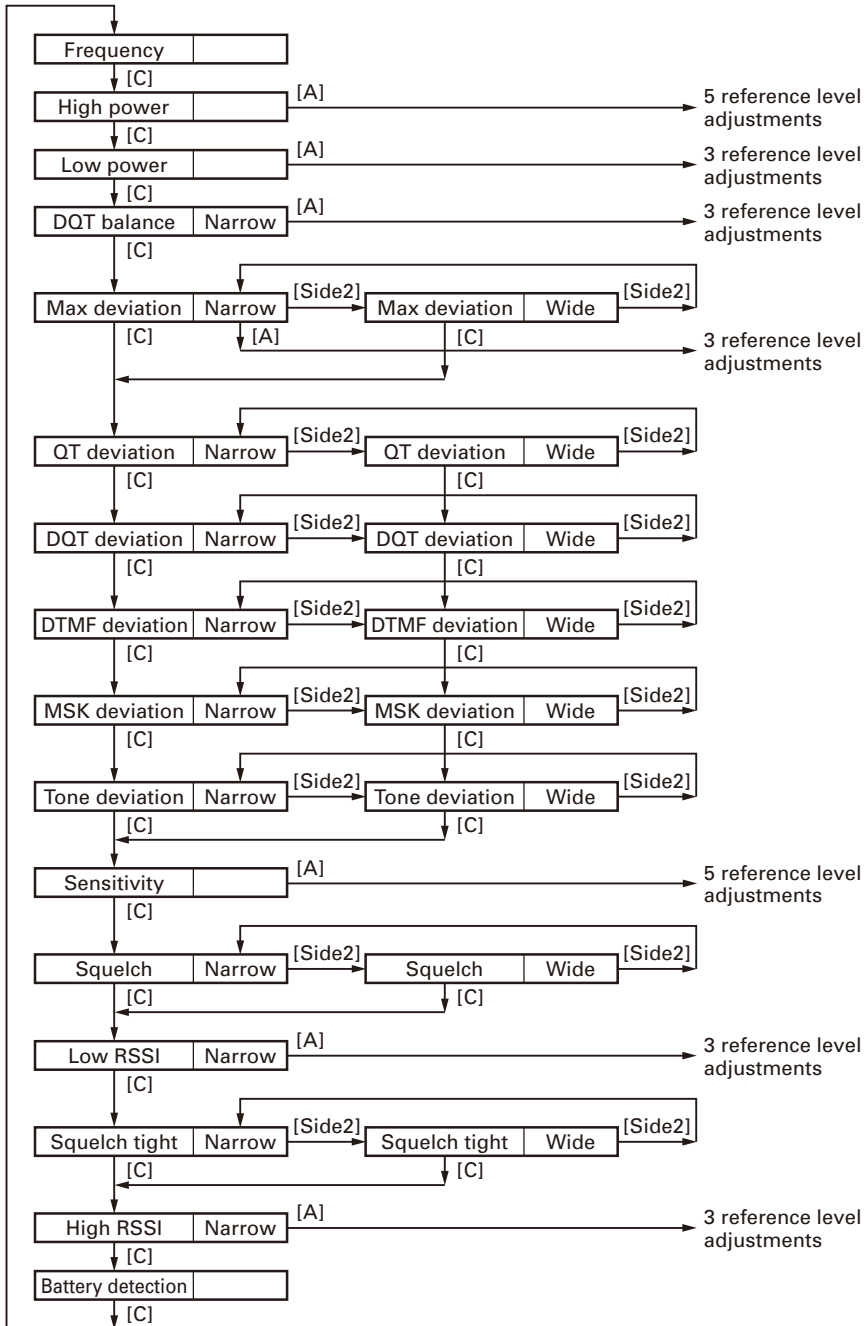
(***: 1 ~ 256, 仅 MSK : 1 ~ 64)

顺序	调 整 项 目	显 示
1	频率调整	F R E Q _ _ ***
2	高发射功率	H P W R _ _ ***
3	低发射功率	L P W R _ _ ***
4	DQT 平衡	B A L _ _ _ ***
5	最大频偏	D E V _ _ _ ***
6	QT 细频偏	Q T _ _ _ _ ***
7	DQT 细频偏	D Q T _ _ _ ***
8	DTMF 细频偏	D T M F _ _ ***
9	MSK 频偏	M S K _ _ _ **
10	单音频偏	T O N E _ _ ***
11	灵敏度	S E N S _ _ ***
12	打开静噪	S Q L _ _ _ ***
13	低 RSSI	L R S S I _ ***
14	深静噪	S Q L T _ _ ***
15	高 RSSI	H R S S I _ ***
16	电池警告电平	B A T T _ _ ***

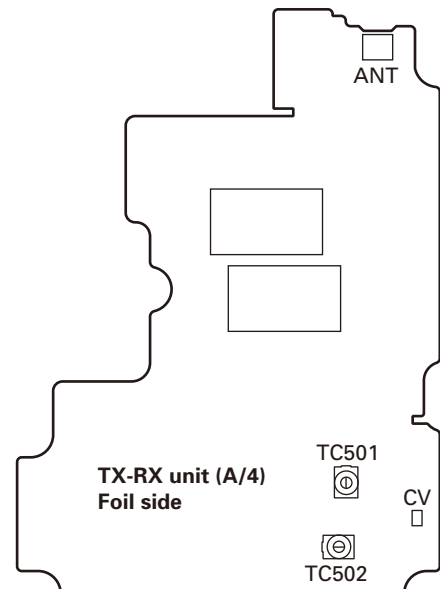
ADJUSTMENT

■ Panel tuning mode flow chart

Note: In this Panel tuning mode flow chart, the Adjustment item name is modified.



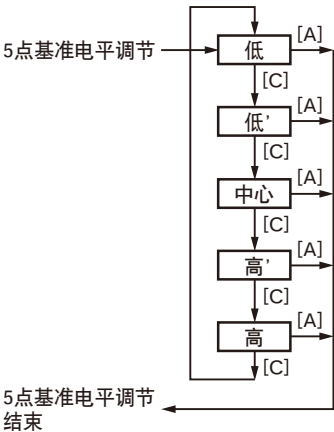
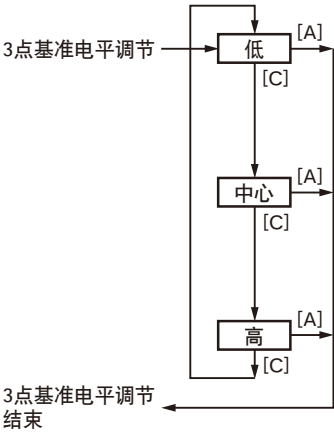
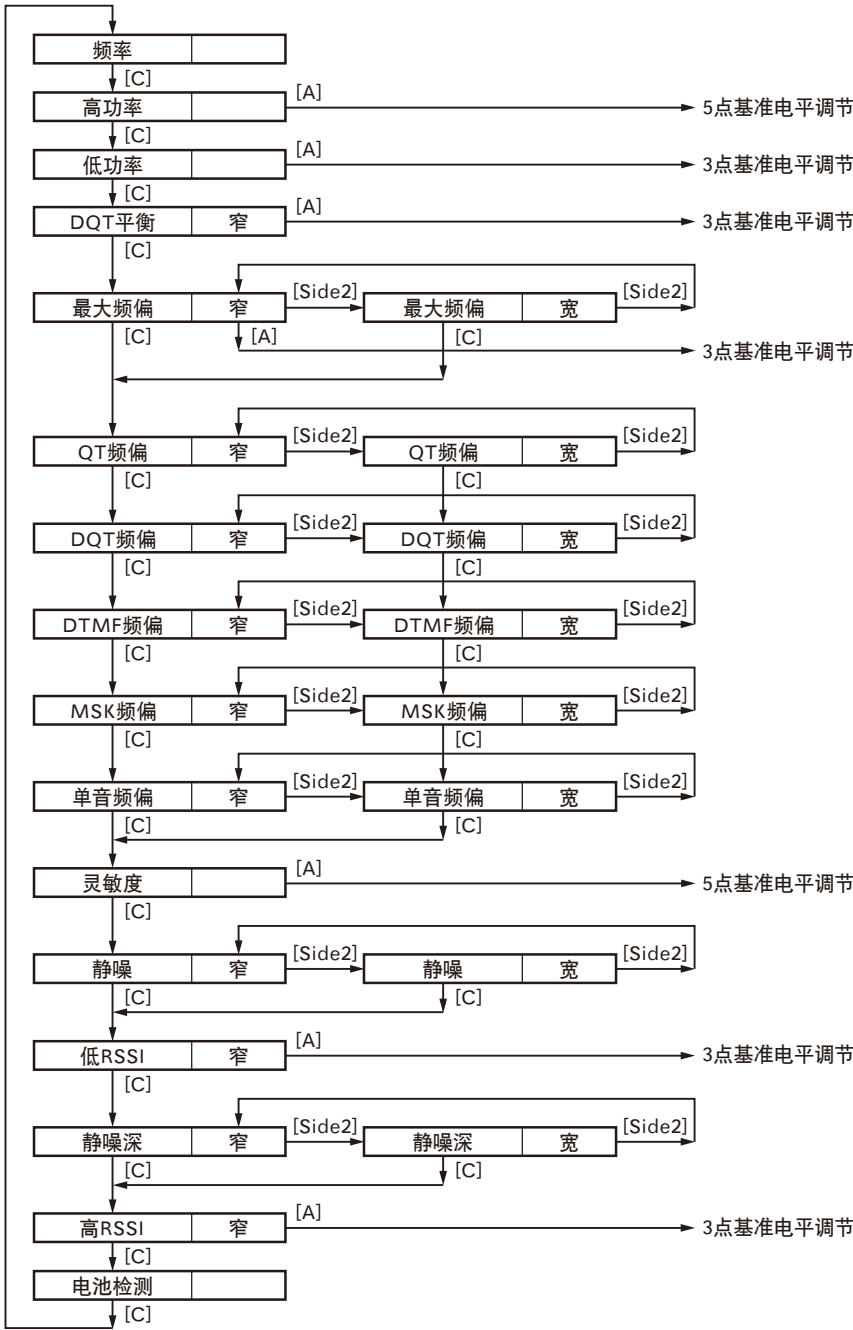
Adjustment Points



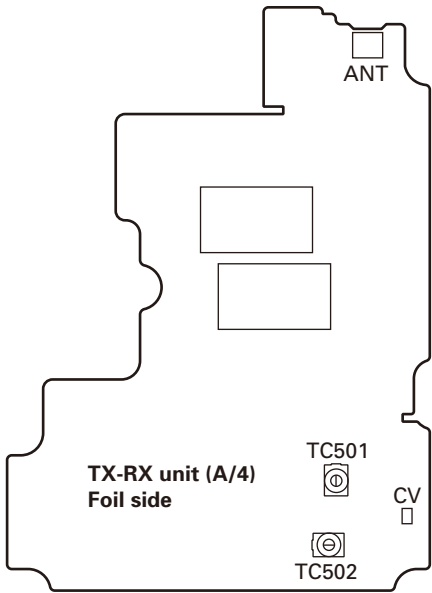
调 整

■ 面板调谐模式流程图

注意：在此面板调谐模式流程图中，调整项目的名称作了修改。



调 整 点



ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	350 to 390MHz Frequency modulation and external modulation -127dBm/0.1μV to greater than -47dBm/1mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 350 to 390MHz or more Vicinity of 10W
3. Deviation Meter	Frequency Range	350 to 390MHz
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		5A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. 8Ω Dummy Load		Approx. 8Ω, 3W
12. Regulated Power Supply		5V to 10V, approx. 5A Useful if ammeter equipped

■ Antenna Connector Adapter

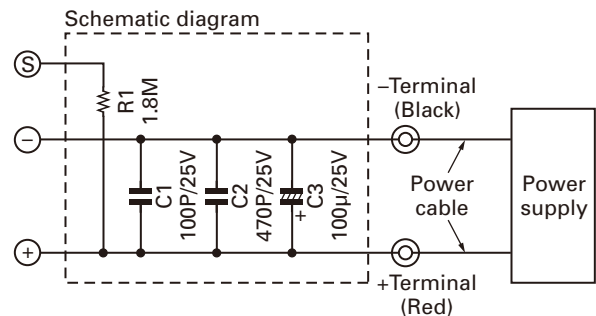
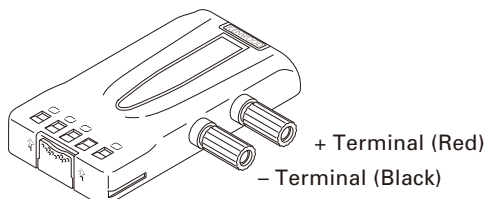
The antenna connector of this transceiver uses an SMA terminal. Use an antenna connector adapter [SMA(f) – BNC(f) or SMA(f) – N(f)] for adjustment. (The adapter is not provided as an option, so buy a commercially-available one.)

■ Battery Jig (W05-0909-00)

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.

When using the battery jig in user mode, the transceiver assumes that a lithium-ion battery pack is attached to the transceiver. In adjustment mode, battery type detection is not performed.

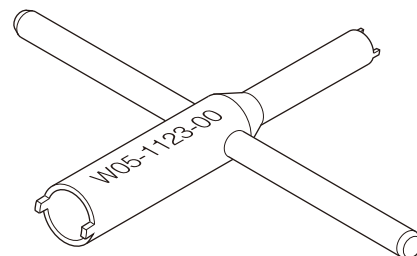
Note: When using the battery jig, you must measure the voltage at the terminals of the battery jig. Otherwise, a slight voltage drop may occur within the power cable, between the power supply and the battery jig, especially while the transceiver transmits.



■ Nut wrench

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

KENWOOD part No.: W05-1123-00



调 整

所需的用于调整的测试设备

测 试 设 备	主 要 特 性	
1. 标准信号发生器 (SSG)	频率范围 调制 输出	350 到 390MHz 调频和外部调制 -127dBm/0.1μV 到大于 -47dBm/1mV
2. 功率计	输入阻抗 工作频率 测量范围	50 Ω 350 到 390MHz 或更高 10W 左右
3. 频偏仪	频率范围	350 到 390MHz
4. 数字电压表 (DVM)	测量范围 输入阻抗	直流 10mV 到 10V 最小电路负载时为高输入阻抗
5. 示波器		直流到 30MHz
6. 高灵敏度频率计数器	频率范围 频率稳定性	10Hz 到 1000MHz 0.2ppm 或更低
7. 电流表		5A
8. 音频电压表 (AF VTVM)	频率范围 电压范围	50Hz 到 10kHz 1mV 到 10V
9. 音频发生器 (AG)	频率范围 输出	50Hz 到 5kHz 或更高 0 到 1V
10. 失真测试仪	测量能力 输入电平	在 1kHz 时 3%或更低 50mV 到 10Vrms
11. 8 Ω 假负载		大约 8 Ω, 3W
12. 可调电源		5V 到 10V, 大约 5A 最好具备电流表

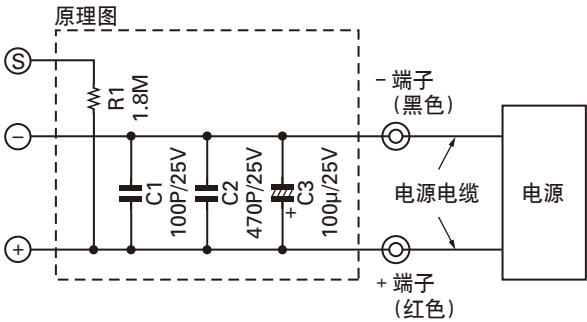
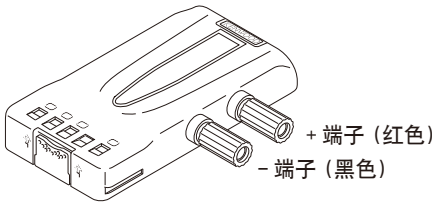
■天线接口转换头

此对讲机的天线接口使用 SMA 终端。使用天线接口转换头 [SMA(f) — BNC(f) 或 SMA(f) — N(f)] 进行调整。(转换头不作为可选件提供, 因此请购买商用转换头。)

■电池夹具 (W05-0909-00)

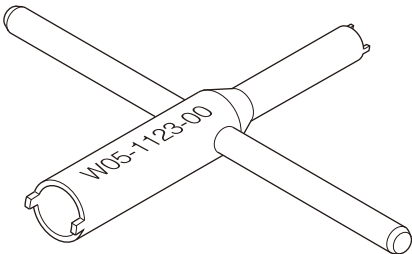
在通过对讲机电池夹具和电源之间连接适当的电源电缆, 确认了输出电压之后接通电源开关, 电压超过或极性颠倒都有可能损坏对讲机。
当在用户模式使用电池夹具时, 对讲机假定安装的是锂离子电池。在调整模式, 请确认电池类型。

注： 当使用电池夹具时, 你必须测定电池夹具的终端电压。因为, 电源和电池夹具之间会有一些的电压下降, 尤其在对讲机发射的时候。



■螺母扳手

为了转动音量螺母和信道选择螺母, 请使用推荐的工具。
KENWOOD 零件号: W05-1123-00



ADJUSTMENT

Common Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) BATT terminal voltage: 7.5V 2) SSG standard modulation [Wide] MOD: 1kHz, DEV: 3kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz							
2. VCO lock voltage • RX	[Panel test mode] 1) CH-Sig: 3-1	Power meter	Panel	ANT	TX-RX (A/4)	TC502	3.8V	±0.1V
	2) CH-Sig: 2-1	DVM	TX-RX (A/4)	CV			Check	0.6V or more
	• TX [Panel tuning mode] LPWR* 3) CH-Sig: 3-1 PTT: ON				TX-RX (A/4)	TC501	3.8V	±0.1V
	4) CH-Sig: 2-1 PTT: ON						Check	0.6V or more
3. LCD contrast		DVM	TX-RX (B/4)	LCD	TX-RX (B/4)	VR1	Adjust the VR1 to obtain the specified voltage.	0.97~1.00V This item is needed when the TX-RX unit (B/4) or LCD assy (B38-0932-05) is replaced.

TX-RX UNIT (X57-7013-06) (B/4)
Component side

CN81 LCD
VR1

* TX can be continued on unlock condition in panel tuning mode.

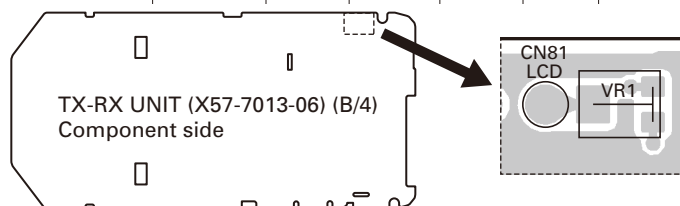
Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency Adjustment	1) Adj item: [FREQ] Adjust: [***] CH-Sig: 3-1 PTT: ON	f. counter	Panel	ANT	Panel	Selector knob	High frequency ±50Hz	Note: After replacing the TCXO (X501) align frequency.
2. High Transmit Power adjust	1) Adj item: [HPWR] Adjust: [***] 2) Adj item: [L HPWR] → [L' HPWR] → [C HPWR] → [H' HPWR] → [H HPWR] Adjust: [***] PTT: ON	Power meter Ammeter					4.0W	±0.1W 1.8A or less
3. High Transmit Power check	[Panel test mode] 1) CH-Sig: 1-1 PTT: ON						Check	3.5~4.5W 1.9A or less
	2) CH-Sig: 2-1 PTT: ON							
	3) CH-Sig: 3-1 PTT: ON							

调 整

公用部分

项 目	条 件	测 量			调 整			规 格 / 备 注
		测量装置	单元	端子	单元	部件	方 法	
1. 设定	1) BATT 端子电压 : 7.5V 2) 标准信号发生器调制 [宽] 调制 : 1kHz, 频偏 : 3kHz [窄] 调制 : 1kHz, 频偏 : 1.5kHz							
2. 压控振荡器 锁定电压 • 接收	[面板测试模式] 1) CH-Sig:3-1	功率计	面板	天线	TX-RX (A/4)	TC502	3.8V	±0.1V
	2) CH-Sig:2-1	DVM	TX-RX (A/4)	CV			检查	0.6V 或更高
	• 发射							
	[面板调谐模式] LPWR* 3) CH-Sig:3-1 PTT: 开启				TX-RX (A/4)	TC501	3.8V	±0.1V
	4) CH-Sig:2-1 PTT: 开启						检查	0.6V 或更高
3. LCD 对比度		DVM	TX-RX (B/4)	LCD	TX-RX (B/4)	VR1	为了得到被指定了的电压, 请调节整 VR1。	0.97 ~ 1.00V 当更换 TX-RX 单元 (B/4) 或 LCD 组件 (B38-0932-05) 时, 需调整此项。



* 面板调谐模式中失锁条件下 TX 可持续。

发射部分

项 目	条 件	测 量			调 整			规 格 / 备 注
		测量装置	单元	端子	单元	部件	方 法	
1. 频率调整	1) 调整项目 : [FREQ] 调整 : [***] CH-Sig:3-1 PTT: 开启	频率计数器	面板	天线	面板	选择器	高频率 ±50Hz	注意: 更换 TCX0 (X501) 后, 请调整频率。
2. 高发射功率 调整	1) 调整项目 : [HPWR] 调整 : [***] 2) 调整项目 : [L HPWR] → [L' HPWR] → [C HPWR] → [H' HPWR] → [H HPWR] 调整 : [***] PTT: 开启	功率计 电流表					4.0W	±0.1W 1.8A 或更低
3. 高发射功率 检查	[面板测试模式] 1) CH-Sig:1-1 PTT: 开启						检查	3.5 ~ 4.5W 1.9A 或更低
	2) CH-Sig:2-1 PTT: 开启							
	3) CH-Sig:3-1 PTT: 开启							

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. Low Transmit Power adjust	1) Adj item: [LPWR] Adjust: [***] 2) Adj item: [L LPWR] → [C LPWR] → [H LPWR] Adjust: [***] PTT: ON	Power meter Ammeter	Panel	ANT	Panel	Selector knob	1.0W	±0.1W 0.9A or less
5. Low Transmit Power check	[Panel test mode] 1) CH-Sig: 1-1 Set low power (Push [S]) PTT: ON						Check	0.7~1.4W 0.9A or less
	2) CH-Sig: 2-1 PTT: ON							
	3) CH-Sig: 3-1 PTT: ON							
6. DQT Balance adjust • Narrow	1) Adj item: [n BAL] Adjust: [***] Deviation meter filter LPF: 3kHz HPF: OFF 2) Adj item: [nL BAL] → [nC BAL] → [nH BAL] Adjust: [***] PTT: ON	Deviation meter Oscilloscope AG AF VTVM	Panel	ANT SP/MIC	Panel	Selector knob	Make the demodulation waves into square waves.	These 2 peaks to the same level 
7. Maximum Deviation adjust • Narrow	1) Adj item: [n DEV] Adjust: [***] AG: 1kHz/150mV at MIC terminal Deviation meter filter LPF: 15kHz HPF: OFF 2) Adj item: [nL DEV] → [nC DEV] → [nH DEV] Adjust: [***] PTT: ON						2.15kHz (According to the larger +, -)	
• Wide	3) Adj item: [w DEV] Adjust: [***] PTT: ON						4.35kHz (According to the larger +, -)	±100Hz
8. MIC sensitivity check	[Panel test mode] 1) CH-Sig: 1-1 AG: 1kHz/15.0mV at MIC terminal PTT: ON						Check	1.3~1.9kHz (Narrow) 2.5~3.7kHz (Wide)
9. QT Fine Deviation adjust • Narrow	1) Remove the panel tuning cable assembly from the universal connector. Adj item: [n QT] Adjust: [***] Deviation meter filter LPF: 3kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscilloscope AG AF VTVM			Panel	Selector knob	0.35kHz	±40Hz
• Wide	2) Adj item: [w QT] Adjust: [***] PTT: ON						0.75kHz	±40Hz

调 整

项 目	条 件	测 量			调 整			规 格 / 备 注
		测量装置	单元	端子	单元	部件	方 法	
4. 低发射功率调整	1) 调整项目:[LPWR] 调整:[***] 2) 调整项目:[L LPWR]→ [C LPWR]→[H LPWR] 调整:[***] PTT: 开启	功率计 电流表	面板	天线	面板	选择器	1. 0W	±0.1W 0.9A 或更低
5. 低发射功率检查	[面板测试模式] 1) CH-Sig:1-1 设为低功率 (按 [S] 键) PTT: 开启						检查	0.7 ~ 1.4W 0.9A 或更低
	2) CH-Sig:2-1 PTT: 开启							
	3) CH-Sig:3-1 PTT: 开启							
6. DQT 平衡调整 • 窄	1) 调整项目:[n BAL] 调整:[***] 频偏仪滤波器 LPF:3kHz HPF:OFF 2) 调整项目:[nL BAL]→ [nC BAL]→[nH BAL] 调整:[***] PTT: 开启	频偏仪 示波器 AG AF VTVM	面板	天线 SP/MIC	面板	选择器	使解调波形为方形波	两个尖峰具有同样电平 
7. 最大频偏调整 • 窄	1) 调整项目:[n DEV] 调整:[***] AG:1kHz/150mV (MIC 端子) 频偏仪滤波器 LPF:15kHz HPF:OFF 2) 调整项目:[nL DEV]→ [nC DEV]→[nH DEV] 调整:[***] PTT: 开启						2. 15kHz (按照较大+, -)	±100Hz
• 宽	3) 调整项目:[w DEV] 调整:[***] PTT: 开启						4. 35kHz (按照较大+, -)	±100Hz
8. MIC 灵敏度检查	[面板测试模式] 1) CH-Sig:1-1 AG:1kHz/15.0mV (MIC 端子) PTT: 开启						检查	1.3 ~ 1.9kHz (窄) 2.5 ~ 3.7kHz (宽)
9. QT 细频偏调整 • 窄	1) 从通用连接器上拆下面板调谐电缆组件。 调整项目:[n QT] 调整:[***] 频偏仪滤波器 LPF:3kHz HPF:OFF PTT: 开启	功率计 频偏仪 示波器 AG AF VTVM			面板	选择器	0.35kHz	±40Hz
• 宽	2) 调整项目:[w QT] 调整:[***] PTT: 开启						0.75kHz	±40Hz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
10. DQT Fine Deviation adjust • Narrow	1) Adj item: [n DQT] Adjust: [****] Deviation meter filter LPF: 3kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscilloscope AG AF VTVM	Panel	ANT SP/MIC	Panel	Selector knob	0.35kHz	±40Hz
	• Wide 2) Adj item: [w DQT] Adjust: [****] PTT: ON						0.75kHz	±40Hz
11. DTMF Fine Deviation adjust • Narrow	1) Adj item: [n DTMF] Adjust: [****] Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON						1.25kHz	±0.1kHz
	• Wide 2) Adj item: [w DTMF] Adjust: [****] PTT: ON						2.5kHz	±0.1kHz
12. MSK Deviation adjust • Narrow	1) Adj item: [n MSK] Adjust: [***] Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON						1.5kHz	±0.1kHz
	• Wide 2) Adj item: [w MSK] Adjust: [***] PTT: ON						3.0kHz	±0.1kHz
13. Single Tone Deviation adjust • Narrow	1) Adj item: [n TONE] Adjust: [****] Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON						1.5kHz	±0.1kHz
	• Wide 2) Adj item: [w TONE] Adjust: [****] PTT: ON						3.0kHz	±0.1kHz
14. BATT Warning Level writing	1) Adj item: [BATT] Adjust: [****] PTT: ON	Power meter DVM	Panel	ANT BATT terminal	Panel		After pressing the PTT switch, confirm that one predetermined numeric in the range 1 to 256 appears and then press [B] key. That numeric will be stored in memory.	BATT terminal voltage: 5.9V
15. BATT Warning Level check	[Panel test mode] 1) CH-Sig: 1-1 BATT terminal voltage: 7.5V PTT: ON						Check	The transceiver can transmit without causing the LED to blink.
	2) BATT terminal voltage: 5.7V PTT: ON							The transceiver should not transmit and LED blinking.

调 整

项 目	条 件	测 量			调 整			规 格 / 备 注
		测量装置	单元	端子	单元	部件	方 法	
10. DQT 细频偏调整 • 窄	1) 调整项目 : [n DQT] 调整 : [***] 频偏仪滤波器 LPF: 3kHz HPF: OFF PTT: 开启	功率计 频偏仪 示波器 AG AF VTVM	面板	天线 SP/MIC	面板	选择器	0. 35kHz	± 40Hz
	• 宽						0. 75kHz	± 40Hz
11. DTMF 细频偏调整 • 窄	1) 调整项目 : [n DTMF] 调整 : [***] 频偏仪滤波器 LPF: 15kHz HPF: OFF PTT: 开启						1. 25kHz	± 0. 1kHz
	• 宽						2. 5kHz	± 0. 1kHz
12. MSK 频偏调整 • 窄	1) 调整项目 : [n MSK] 调整 : [**] 频偏仪滤波器 LPF: 15kHz HPF: OFF PTT: 开启						1. 5kHz	± 0. 1kHz
	• 宽						3. 0kHz	± 0. 1kHz
13. 单音 频偏调整 • 窄	1) 调整项目 : [n TONE] 调整 : [***] 频偏仪滤波器 LPF: 15kHz HPF: OFF PTT: 开启						1. 5kHz	± 0. 1kHz
	• 宽						3. 0kHz	± 0. 1kHz
14. 电池警告 电平写入	1) 调整项目 : [BATT] 调整 : [***] PTT: 开启	功率计 DVM	面板	天线 BATT 端子	面板		按 PTT 开关后, 确 认在 1 ~ 256 范围 内的预定数字是否 出现, 然后按 [B] 键。 数字将保存在存储 器中。	BATT 端子电压 : 5. 9V
15. 电池警告 电平检查	[面板测试模式] 1) CH-Sig: 1-1 BATT 端子电压 : 7. 5V PTT: 开启						检查	对讲机可以发射, 不会引起 LED 闪烁。
	2) BATT 端子电压 : 5. 7V PTT: 开启							对讲机不能发射, LED 闪烁。

ADJUSTMENT

Receiver Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity adjust	1) Adj item: [SENS] Adjust: [***] 2) Adj item: [L SENS] → [L' SENS] → [C SENS] → [H' SENS] → [H SENS] Adjust: [***] SSG output : -70dBm (70.8μV) (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscope	Panel	ANT SP/MIC	Panel	Selector knob	Adjust for RSSI MAX	Rotate the selector knob and increase the adjustment value starting from "1" to obtain RSSI MAX.
2. Sensitivity check	[Panel test mode] 1) CH-Sig: 1-1 SSG output Wide: -117dBm (0.32μV) (MOD: 1kHz/±3kHz) Narrow: -116dBm (0.35μV) (MOD: 1kHz/±1.5kHz)						Check	
3. Squelch Open adjust • Narrow	1) Adj item: [n SQL] Adjust: [***] SSG output : -119dBm (0.25μV) (MOD: 1kHz/±1.5kHz)				Panel	Selector knob	After input signal from SSG, press [B] key. That numeric will be stored in memory.	After adjusting SQL, check SQL open/close. SSG -117dBm (0.32μV): Open SSG OFF: Close
	• Wide 2) Adj item: [w SQL] Adjust: [***] SSG output : -119dBm (0.25μV) (MOD: 1kHz/±3.0kHz)							
4. Low RSSI adjust • Narrow	1) Adj item: [n LRSSI] Adjust: [***] SSG output : -118dBm (0.28μV) (MOD: 1kHz/±1.5kHz)						After input signal from SSG, press [B] key. That numeric will be stored in memory.	
	2) Adj item: [nL LRSSI] → [nC LRSSI] → [nH LRSSI] Adjust: [***]							
5. Squelch Tight adjust • Narrow	1) Adj item: [n SOLT] Adjust: [***] SSG output : -114dBm (0.45μV) (MOD: 1kHz/±1.5kHz)						After input signal from SSG, press [B] key. That numeric will be stored in memory.	After adjusting SQL, check SQL open/close. SSG -112dBm (0.56μV): Open SSG OFF: Close
	• Wide 2) Adj item: [w SOLT] Adjust: [***] SSG output : -115dBm (0.4μV) (MOD: 1kHz/±3.0kHz)							
6. High RSSI adjust • Narrow	1) Adj item: [n HRSSI] Adjust: [***] SSG output : -70dBm (70.8μV) (MOD: 1kHz/±1.5kHz)						After input signal from SSG, press [B] key. That numeric will be stored in memory.	
	2) Adj item: [nL HRSSI] → [nC HRSSI] → [nH HRSSI] Adjust: [***]							

调 整

接收部分

项 目	条 件	测 量			调 整			规 格 / 备 注
		测量装置	单元	端子	单元	部件	方 法	
1. 灵敏度调整	1) 调整项目 : [SENS] 调整 : [***] 2) 调整项目 : [L SENS]→ [L' SENS]→[C SENS]→ [H' SENS]→[H SENS] 调整 : [***] SSG 输出 : -70dBm (70.8μV) (调制 : 1kHz/±1.5kHz)	SSG AF VTVM 示波器	面板	天线 SP/MIC	面板	选择器	RSSI MAX 调节	转动选择旋钮, 从“1”开始 增大调整值, 直到获得 RSSI MAX。
2. 灵敏度检查	[面板测试模式] 1) CH-Sig: 1-1 SSG 输出 宽 : -117dBm (0.32μV) (调制 : 1kHz/±3kHz) 窄 : -116dBm (0.35μV) (调制 : 1kHz/±1.5kHz)						检查	13dB SINAD 或更高
3. 打开静噪 调整 • 窄 • 宽	1) 调整项目 : [n SQL] 调整 : [***] SSG 输出 : -119dBm (0.25μV) (调制 : 1kHz/±1.5kHz) 2) 调整项目 : [w SQL] 调整 : [***] SSG 输出 : -119dBm (0.25μV) (调制 : 1kHz/±3.0kHz)				面板	选择器	从 SSG 输入信号后 按 [B] 键。数字将 保存在存储器中。	调节静噪后, 检查静噪的打 开 / 关闭。 SSG -117dBm (0.32μV) : 打开 SSG OFF: 关闭
4. 低 RSSI 调整 • 窄	1) 调整项目 : [n LRSSI] 调整 : [***] SSG 输出 : -118dBm (0.28μV) (调制 : 1kHz/±1.5kHz) 2) 调整项目 : [nL LRSSI]→ [nC LRSSI]→[nH LRSSI] 调整 : [***]						从 SSG 输入信号后 按 [B] 键。数字将 保存在存储器中。	
5. 深静噪调整 • 窄 • 宽	1) 调整项目 : [n SQLT] 调整 : [***] SSG 输出 : -114dBm (0.45μV) (调制 : 1kHz/±1.5kHz) 2) 调整项目 : [w SQLT] 调整 : [***] SSG 输出 : -115dBm (0.4μV) (调制 : 1kHz/±3.0kHz)						从 SSG 输入信号后 按 [B] 键。数字将 保存在存储器中。	调节静噪后, 检查静噪的打 开 / 关闭。 SSG -112dBm (0.56μV) : 打开 SSG OFF: 关闭
6. 高 RSSI 调整 • 窄	1) 调整项目 : [n HRSSI] 调整 : [***] SSG 输出 : -70dBm (70.8μV) (调制 : 1kHz/±1.5kHz) 2) 调整项目 : [nL HRSSI]→ [nC HRSSI]→[nH HRSSI] 调整 : [***]						从 SSG 输入信号后 按 [B] 键。数字将 保存在存储器中。	

TERMINAL FUNCTION

■ CN18 and CN901

CN18		CN901		Terminal name	Terminal function
Pin No	I/O	Pin No.	I/O		
1	-	26	-	GND	GND
2	O	25	I	PC	Transmitter Power control voltage
3	O	24	I	DSW	Power discharge switch
4	O	23	I	APCSW	APC control switch
5	O	22	I	5T	5V Power supply for TX
6	O	21	I	5T	5V Power supply for TX
7	O	20	I	5C	5V Power supply for common
8	O	19	I	5C	5V Power supply for common
9	O	18	I	5R	5V Power supply for RX
10	O	17	I	NARROW	Narrow control
11	O	16	I	WIDE	Wide control
12	I	15	O	DETAF	RX audio signal line
13	I	14	O	RSSI	RSSI voltage
14	I	13	O	ASQL	SQL voltage
15	O	12	I	BPF	BPF tuning voltage control
16	I	11	O	THM	Thermo-protection
17	O	10	I	PLE	PLL enable
18	O	9	I	PDATA	PLL data
19	O	8	I	PCLK	PLL clock
20	I	7	O	UL	UNLOCK detect
21	O	6	I	5MS	5V Power supply for main
22	O	5	I	TCXO	TCXO control
23	O	4	I	MOD	Modulation signal line
24	O	3	I	TX	TX control
25	O	2	I	RX	RX control
26	-	1	-	GND	GND

■ CN82

Pin No.	I/O	Terminal name	Terminal function
1	O	V5	LCD Driving voltage output
2	O	V4	LCD Driving voltage output
3	O	V3	LCD Driving voltage output
4	O	V2	LCD Driving voltage output
5	O	V1	LCD Driving voltage output
6	O	VDD	Power supply
7	-	VSS	GND
8	O	VDD	Power supply
9	O	D7	Data bus
10	O	D6	Data bus
11	O	D5	Data bus
12	O	D4	Data bus
13	O	D3	Data bus
14	O	D2	Data bus
15	O	D1	Data bus
16	O	D0	Data bus
17	O	/WR	Write signal
18	O	A0	Display/Instruction data
19	O	/RES	Reset
20	O	/CS	Chip Select

■ Solder Point Connection

Designation	Function	Condition / Value
RXD	RXD	Load >100k Ω (Low) Vss~0.4V, (High) Vdd~0.8V~Vdd
TXD	TXD	Load >100k Ω (Low) Vss~0.4V, (High) Vdd~0.8V~Vdd
MDSW	Mandown SW input	Load >100k Ω (Low) Vss~0.4V, (High) Vdd~0.8V~Vdd
A1	AUX1	Load >100k Ω (Low) Vss~0.4V, (High) Vdd~0.8V~Vdd
SB	Switched B	Output voltage / 7mA load DC (Battery terminal) $\pm 0.5V$ / 150mA max
G	GND	Vss

端子功能

■ CN18 和 CN901

CN18		CN901		名 称	功 能
号码	I/O	号码	I/O		
1	–	26	–	GND	接地
2	0	25	I	PC	发射功率控制电压
3	0	24	I	DSW	电源放电开关
4	0	23	I	APCSW	APC 控制开关
5	0	22	I	5T	TX 的 5V 电源
6	0	21	I	5T	TX 的 5V 电源
7	0	20	I	5C	公共的 5V 电源
8	0	19	I	5C	公共的 5V 电源
9	0	18	I	5R	RX 的 5V 电源
10	0	17	I	NARROW	窄控制
11	0	16	I	WIDE	宽控制
12	I	15	0	DETAF	RX 音频信号线路
13	I	14	0	RSSI	RSSI 电压
14	I	13	0	ASQL	SQL 电压
15	0	12	I	BPF	BPF 调谐电压控制
16	I	11	0	THM	热敏电阻保护
17	0	10	I	PLE	PLL 启用
18	0	9	I	PDATA	PLL 数据
19	0	8	I	PCLK	PLL 时钟
20	I	7	0	UL	失锁检测
21	0	6	I	5MS	主的 5V 电源
22	0	5	I	TCXO	TCXO 控制
23	0	4	I	MOD	调制信号线路
24	0	3	I	TX	TX 控制
25	0	2	I	RX	RX 控制
26	–	1	–	GND	接地

■ CN82

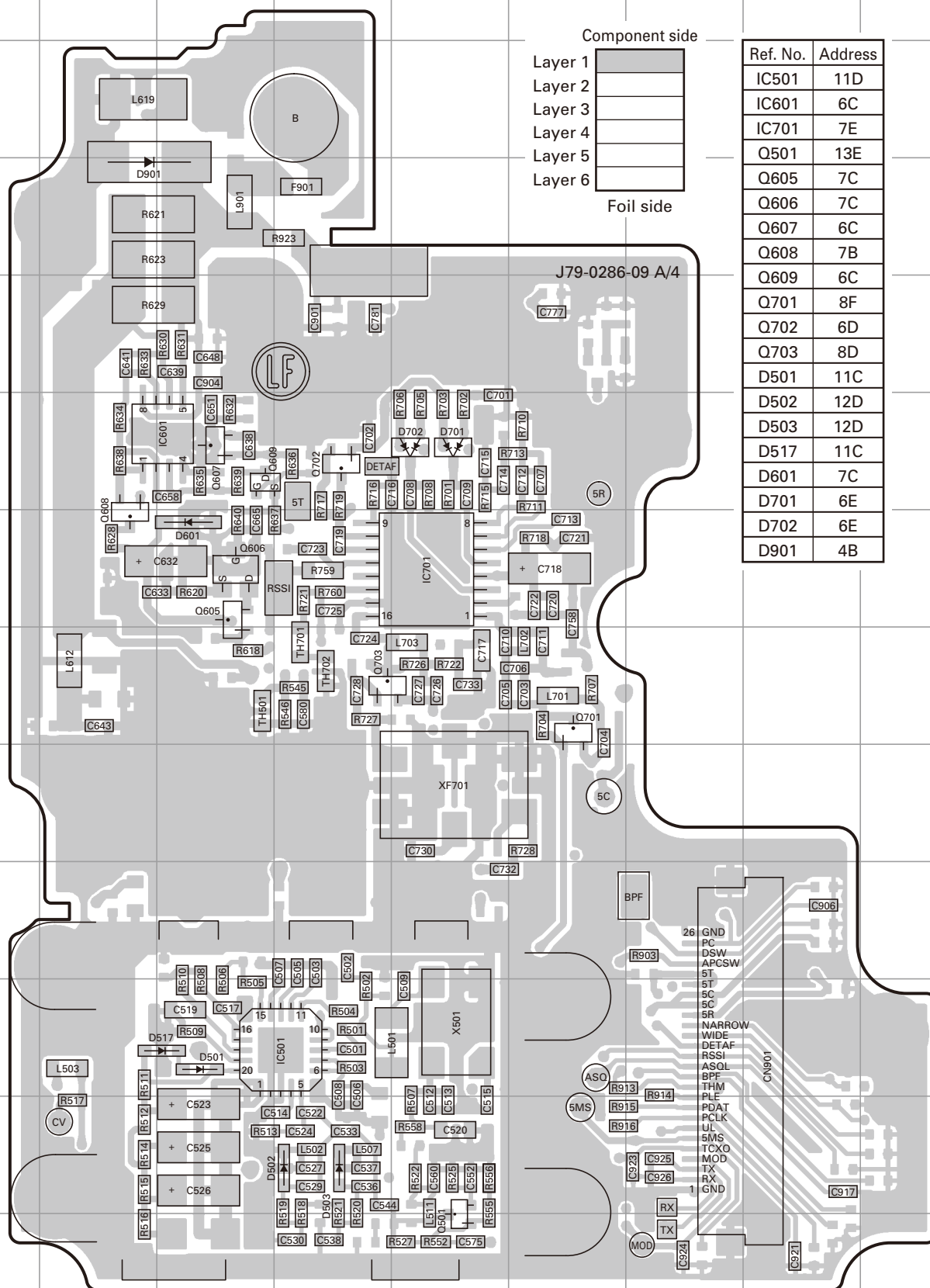
号 码	I/O	名 称	功 能
1	0	V5	LCD 驱动电压输出
2	0	V4	LCD 驱动电压输出
3	0	V3	LCD 驱动电压输出
4	0	V2	LCD 驱动电压输出
5	0	V1	LCD 驱动电压输出
6	0	VDD	电源
7	–	VSS	接地
8	0	VDD	电源
9	0	D7	数据总线
10	0	D6	数据总线
11	0	D5	数据总线
12	0	D4	数据总线
13	0	D3	数据总线
14	0	D2	数据总线
15	0	D1	数据总线
16	0	D0	数据总线
17	0	/WR	写入信号
18	0	A0	显示 / 说明数据
19	0	/RES	复位
20	0	/CS	芯片选择

■ 焊点连接

规 定	功 能	条 件 / 值
RXD	RXD	负载 >100k Ω (低)Vss~0. 4V, (高)Vdd-0. 8V~Vdd
TXD	TXD	负载 >100k Ω (低)Vss~0. 4V, (高)Vdd-0. 8V~Vdd
MDSW	人员事故 开关输入	负载 >100k Ω (低)Vss~0. 4V, (高)Vdd-0. 8V~Vdd
A1	AUX1	负载 >100k Ω (低)Vss~0. 4V, (高)Vdd-0. 8V~Vdd
SB	开关 B	输出电压 /7mA 负载 直流 (电池端子) ±0. 5V/ 最大 150mA
G	GND	Vss

TK-3178(L) PC BOARD / PC板

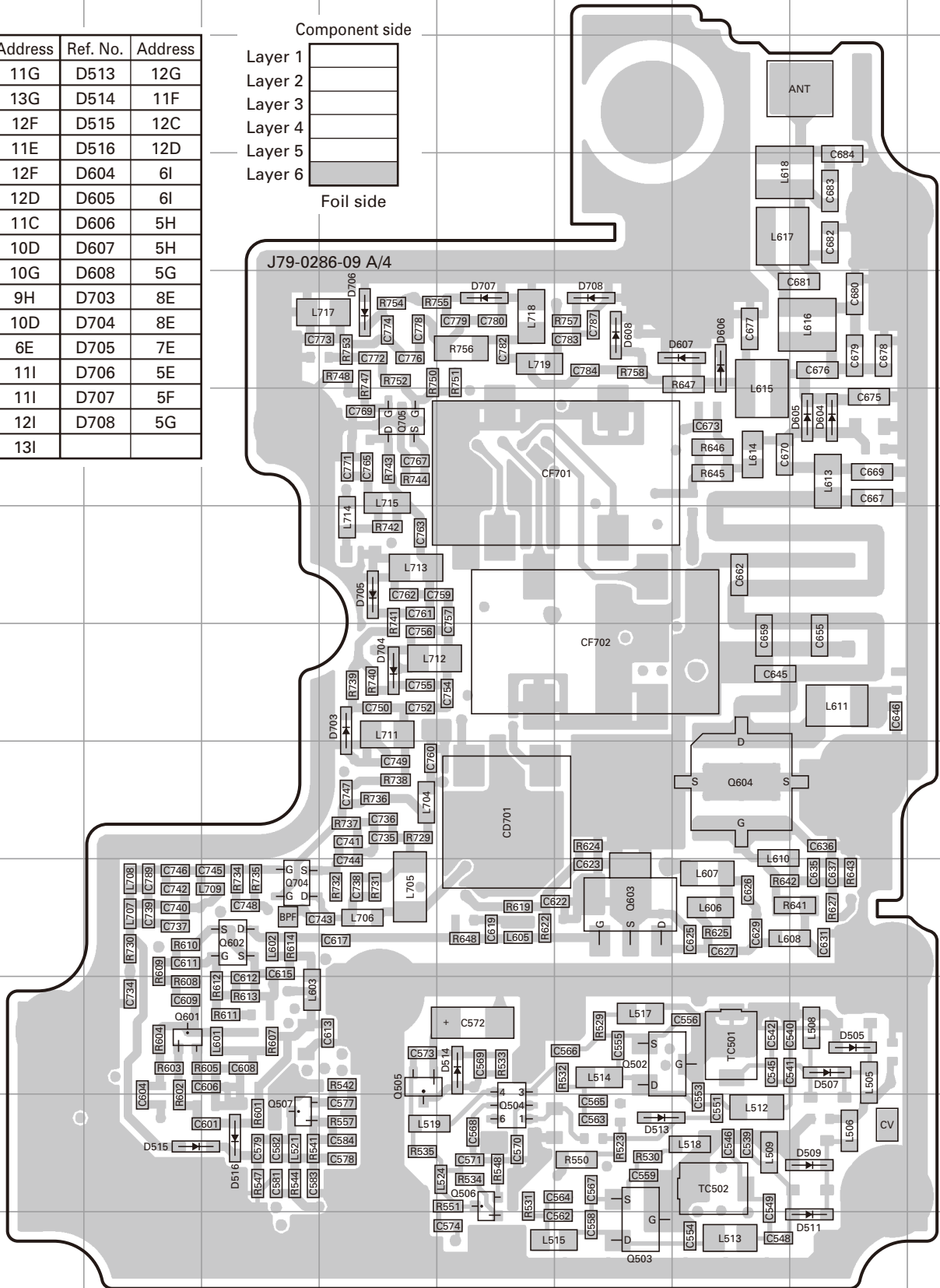
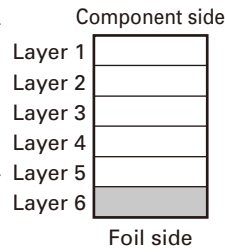
TX-RX UNIT (X57-7013-06) (A/4) Component side view (J79-0286-09 A/4)



PC BOARD / PC板 TK-3178(L)

TX-RX UNIT (X57-7013-06) (A/4) Foil side view (J79-0286-09 A/4)

Ref. No.	Address	Ref. No.	Address
Q502	11G	D513	12G
Q503	13G	D514	11F
Q504	12F	D515	12C
Q505	11E	D516	12D
Q506	12F	D604	6I
Q507	12D	D605	6I
Q601	11C	D606	5H
Q602	10D	D607	5H
Q603	10G	D608	5G
Q604	9H	D703	8E
Q704	10D	D704	8E
Q705	6E	D705	7E
D505	11I	D706	5E
D507	11I	D707	5F
D509	12I	D708	5G
D511	13I		



TK-3178(L) PC BOARD / PC板

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC4	6M	IC17	13K	Q23	8N	Q32	10G	D12	8D
IC5	6J	IC18	8M	Q24	7M	Q33	7J	D13	10D
IC11	8K	IC19	13G	Q25	12K	Q35	9M	D29	11H
IC12	7J	Q12	7I	Q26	12K	D4	7I	D30	11K
IC13	9J	Q13	6I	Q27	10M	D5	8N	D31	11J
IC14	9K	Q19	10H	Q28	10N	D7	10N	D32	11I
IC15	8H	Q21	10K	Q30	11J	D8	8F	D33	12N
IC16	12I	Q22	11I	Q31	8G	D9	10F		

Component side

Layer 1

Layer 2

Layer 3

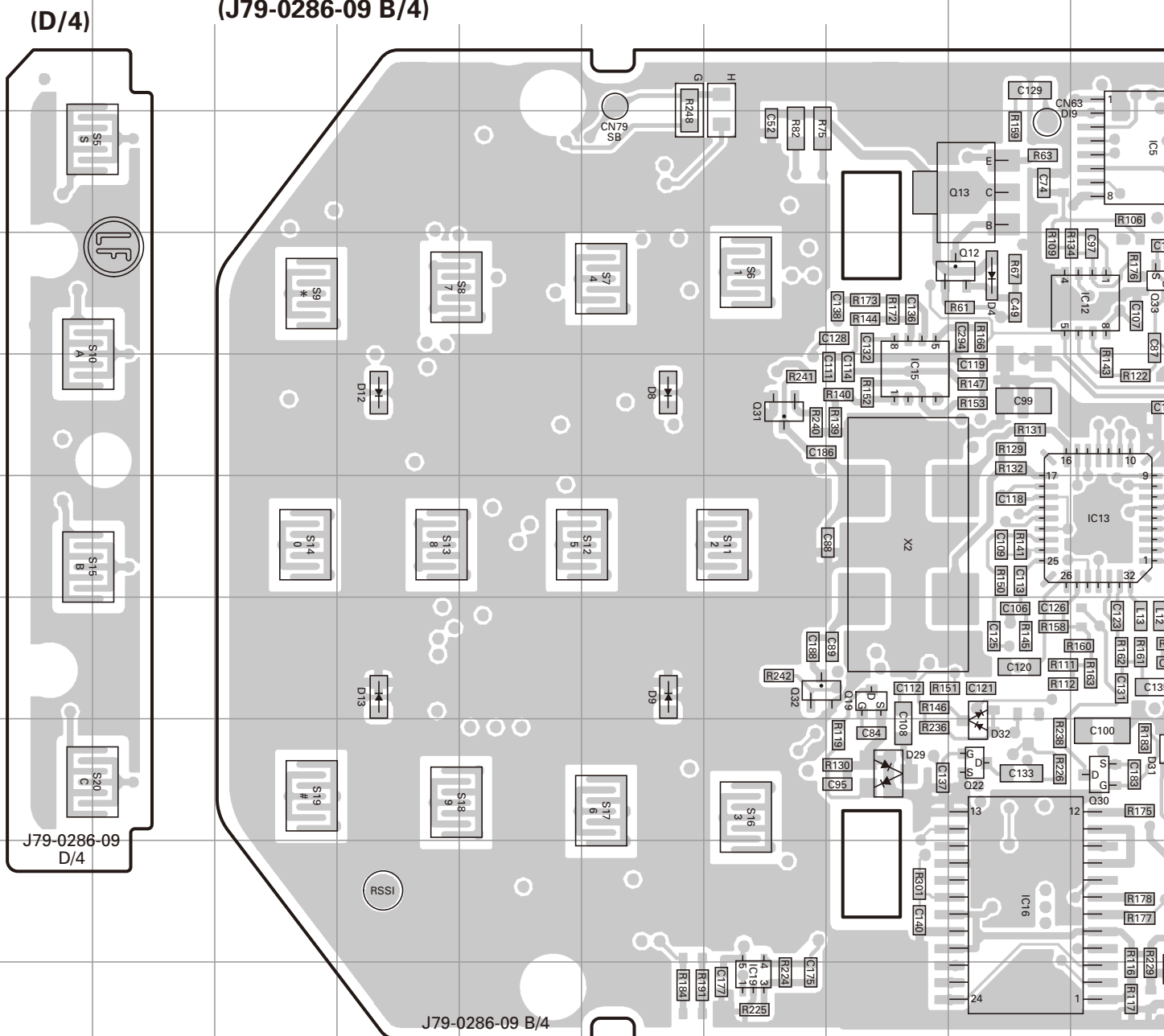
Layer 4

Layer 5

Layer 6

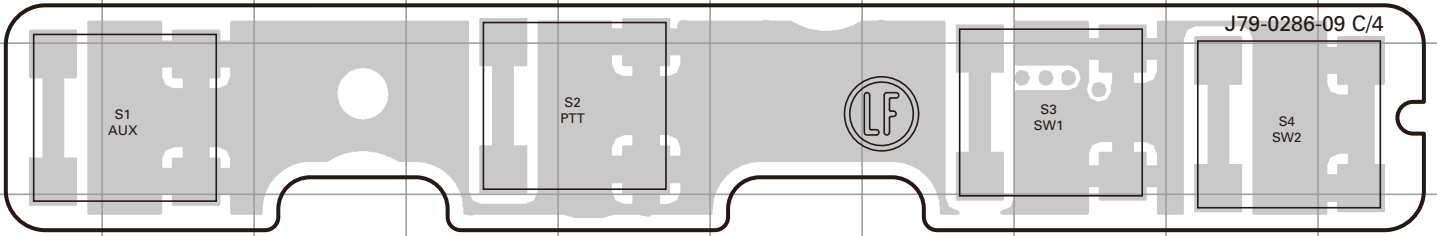
Foil side

**TX-RX UNIT (X57-7013-06) (B/4) Component side view
(J79-0286-09 B/4)**

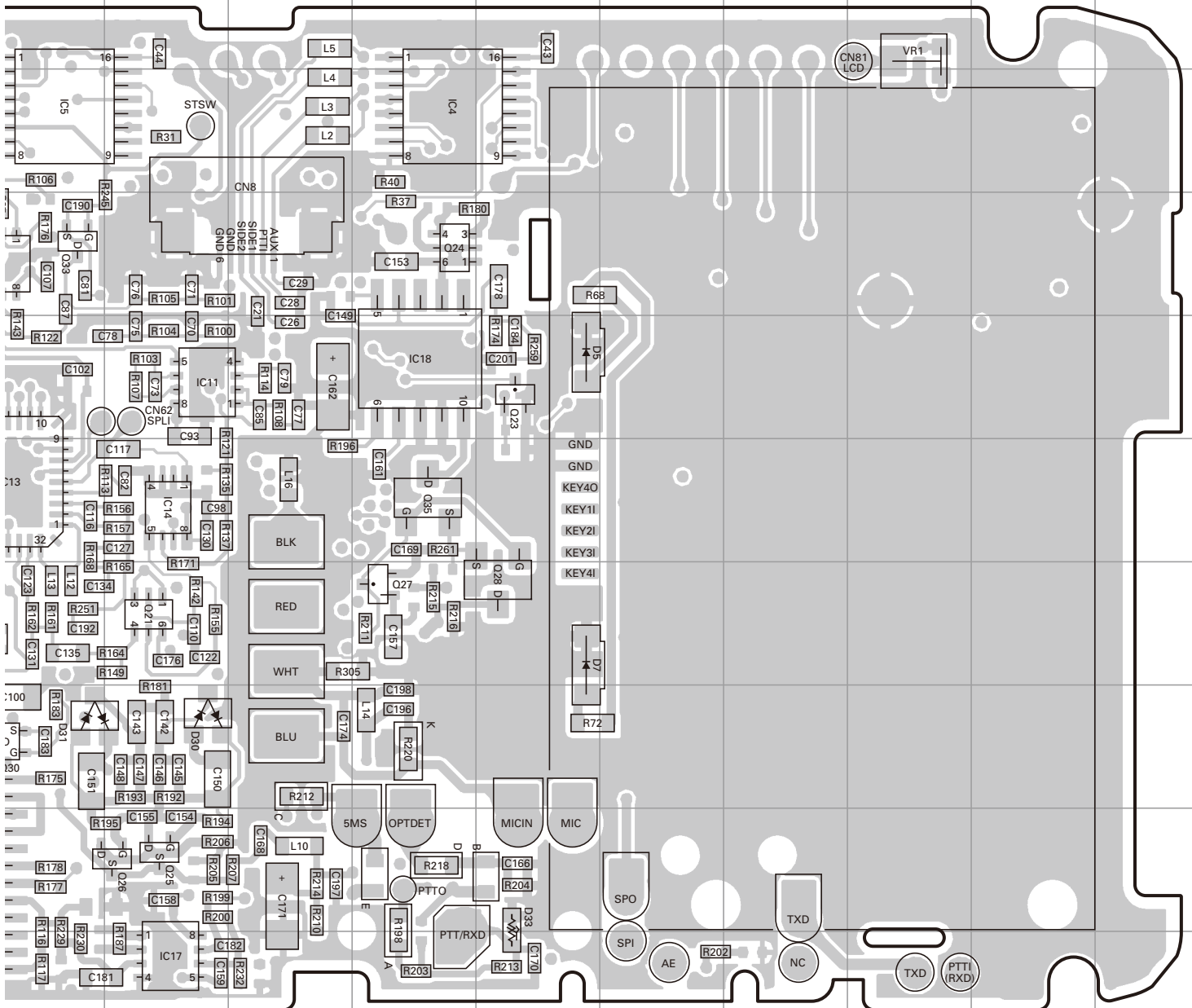


PC BOARD / PC板 TK-3178(L)

TX-RX UNIT (X57-7013-06) (C/4) Component side view
(J79-0286-09 C/4)

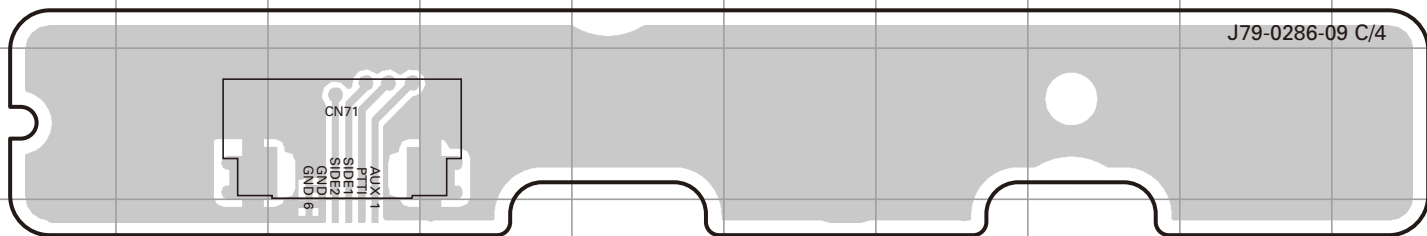


TX-RX UNIT (X57-7013-06) (B/4) Component side view
(J79-0286-09 B/4)

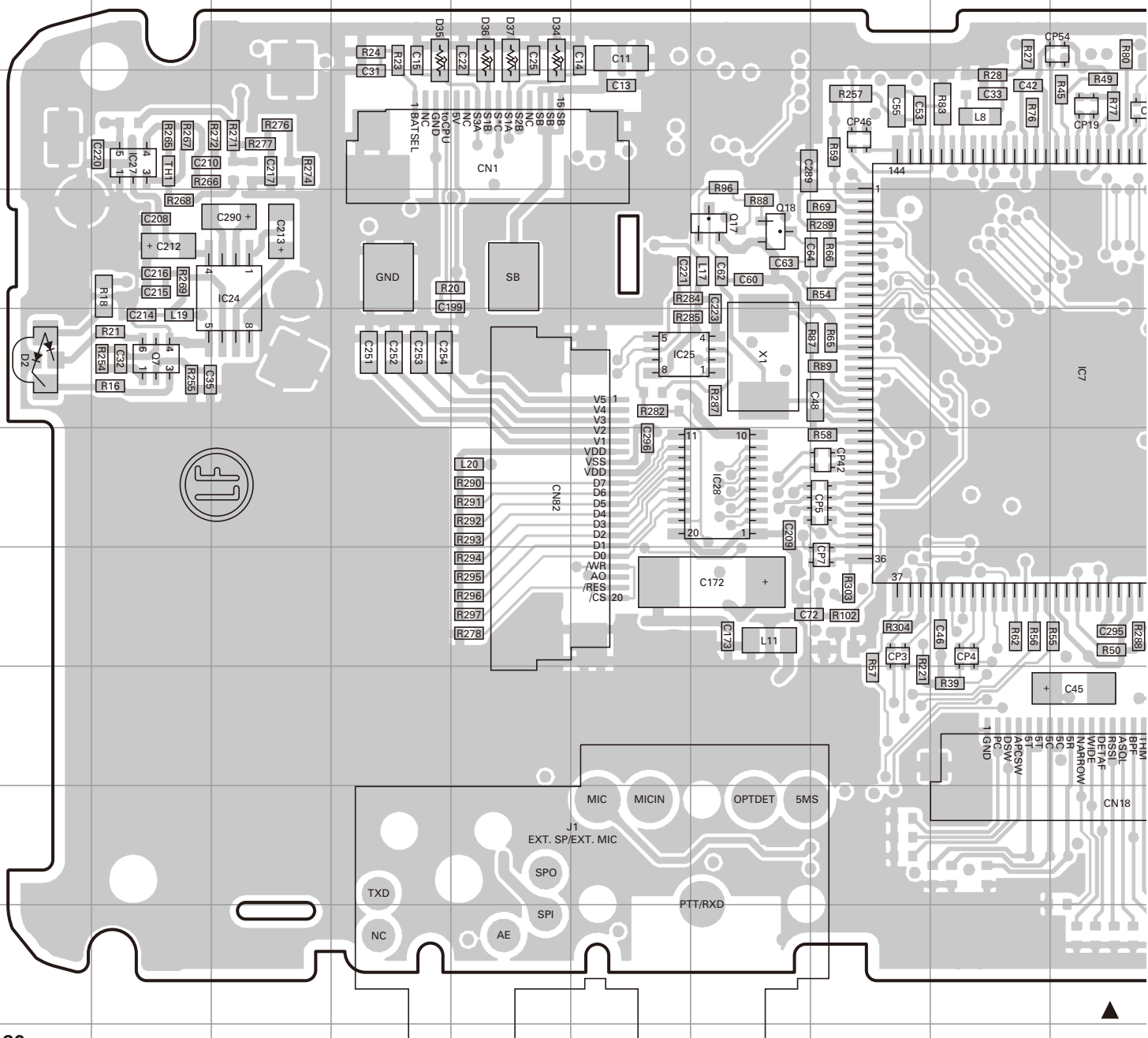


TK-3178(L) PC BOARD / PC板

**TX-RX UNIT (X57-7013-06) (C/4) Foil side view
(J79-0286-09 C/4)**



TX-RX UNIT (X57-7013-06) (B/4) Foil side view
(J79-0286-09 B/4)



PC BOARD / PC板 TK-3178(L)

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	6P	IC25	8F	Q7	8B	Q29	6P	D26	11O
IC2	6M	IC26	6O	Q8	8O	Q34	11K	D27	10O
IC3	7P	IC27	6B	Q9	6N	Q37	6O	D28	12M
IC7	8J	IC28	9G	Q14	13N	D1	6M	D34	5E
IC8	9N	Q1	9P	Q15	7P	D2	8A	D35	5D
IC9	12N	Q4	9O	Q16	7P	D17	13N	D36	5E
IC10	12M	Q5	8O	Q17	7G	D24	11O	D37	5E
IC24	7C	Q6	8O	Q18	7G	D25	11O		

Component side

Layer 1

Layer 2

Layer 3

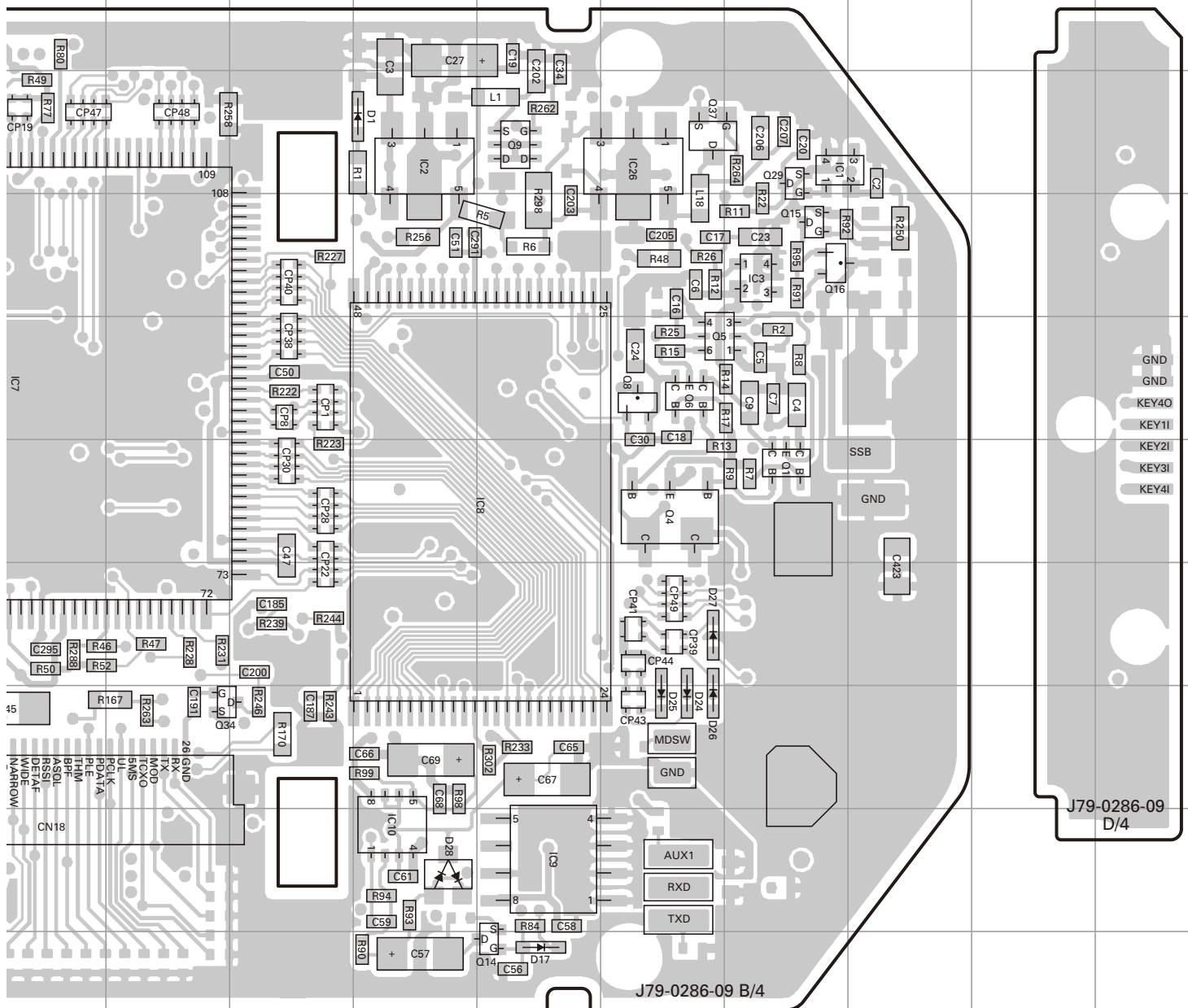
Layer 4

Layer 5

Layer 6

Foil side

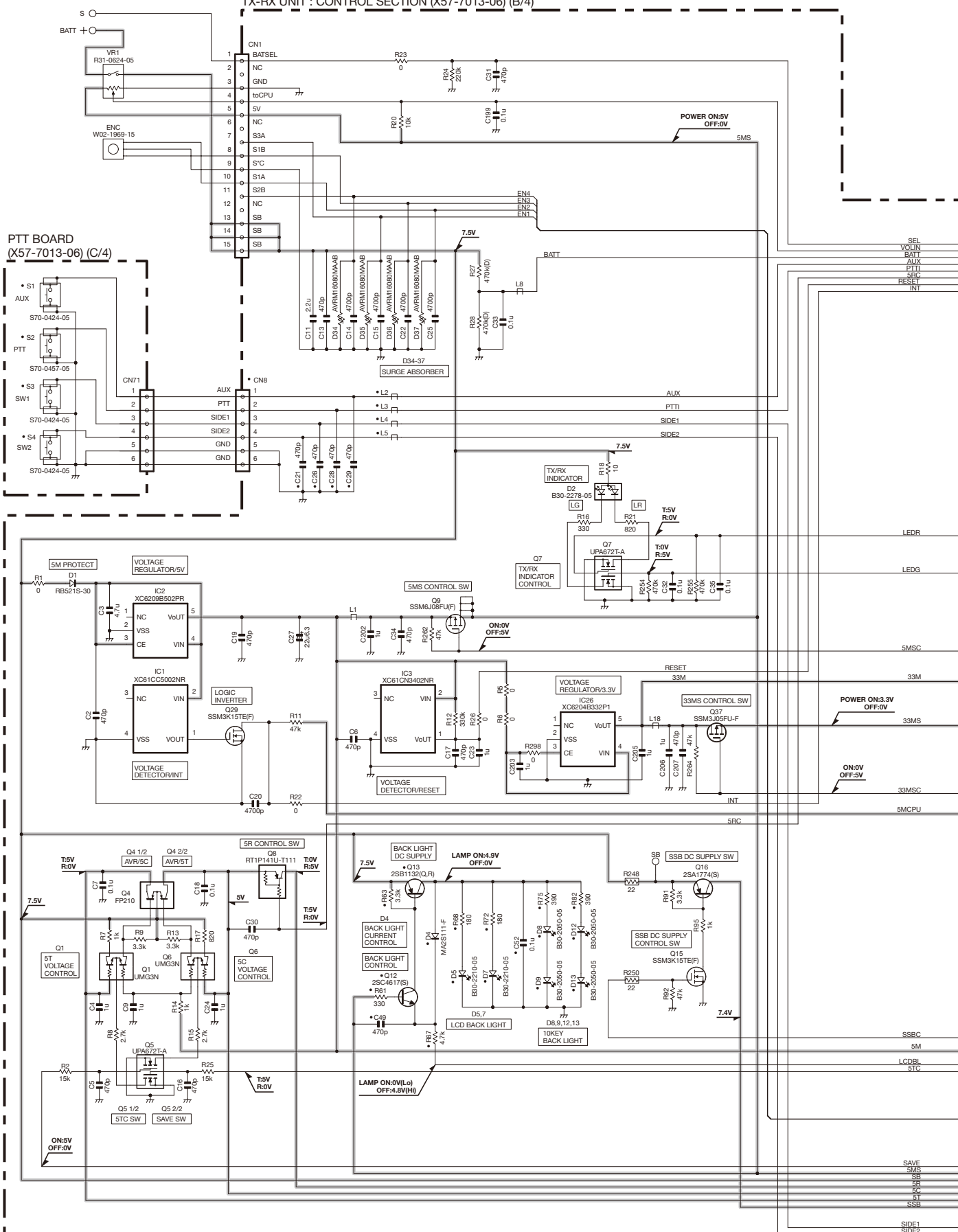
TX-RX UNIT (X57-7013-06) (B/4) Foil side view
(J79-0286-09 B/4)



TK-3178(L) SCHEMATIC DIAGRAM / 原理图

TX-RX UNIT : CONTROL SECTION (X57-7013-06) (B/4)

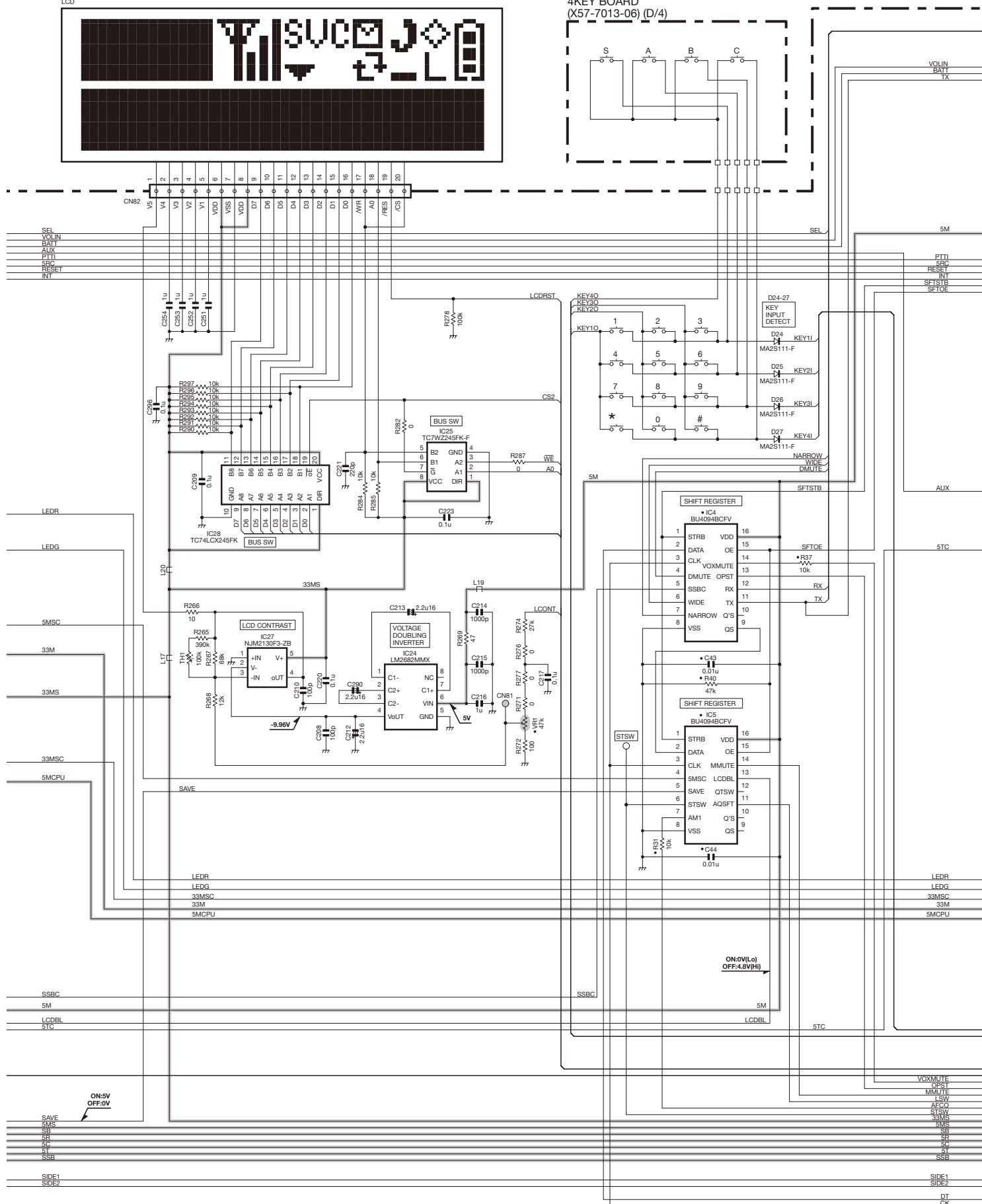
PTT BOARD
(X57-7013-06) (C/4)



SCHEMATIC DIAGRAM / 原理图

TX-RX UNIT (X57-7013-06) (B/4)

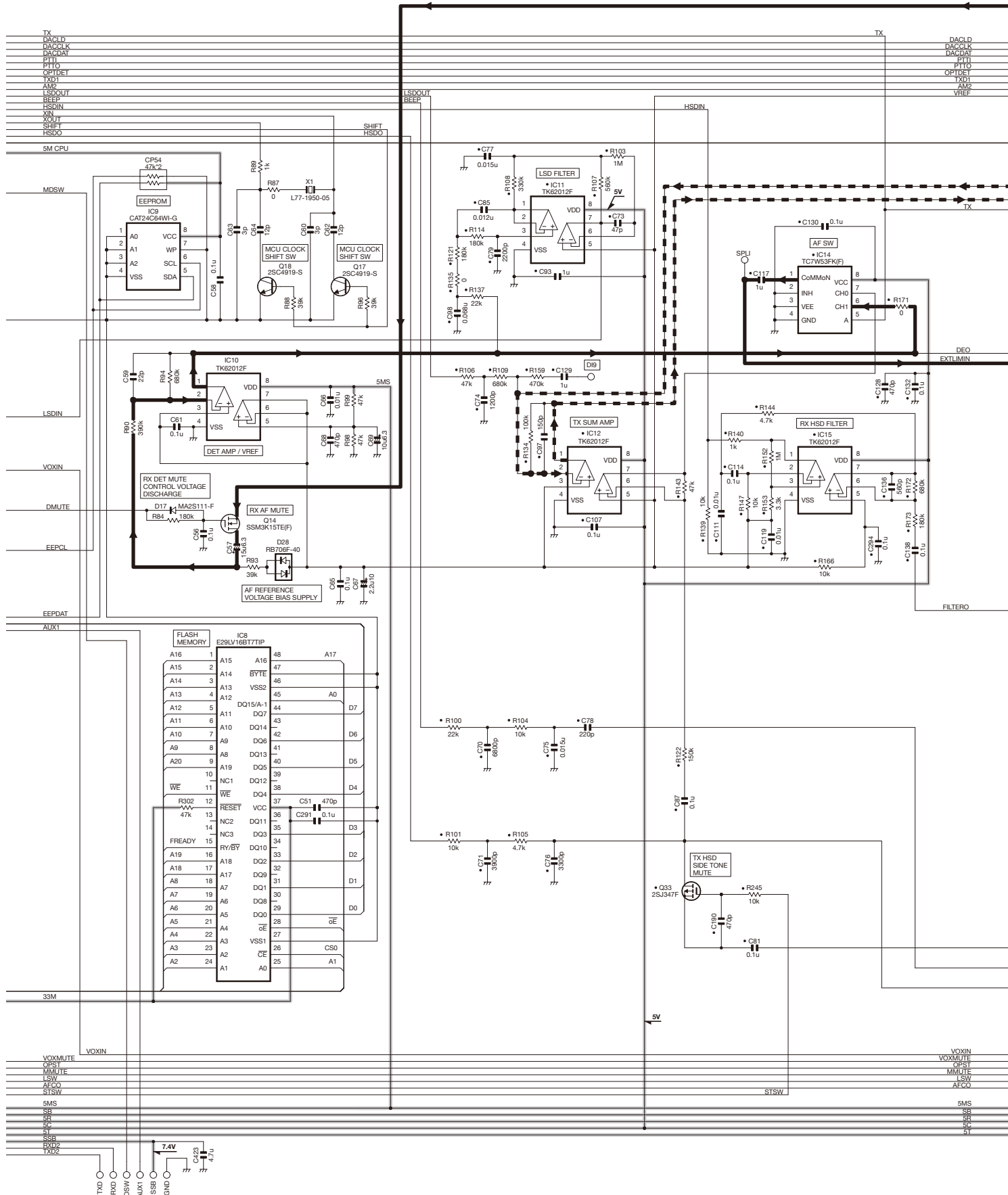
4KEY BOARD
(X57-7013-06) (D/4)

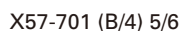




SCHEMATIC DIAGRAM / 原理图 TK-3178(L)

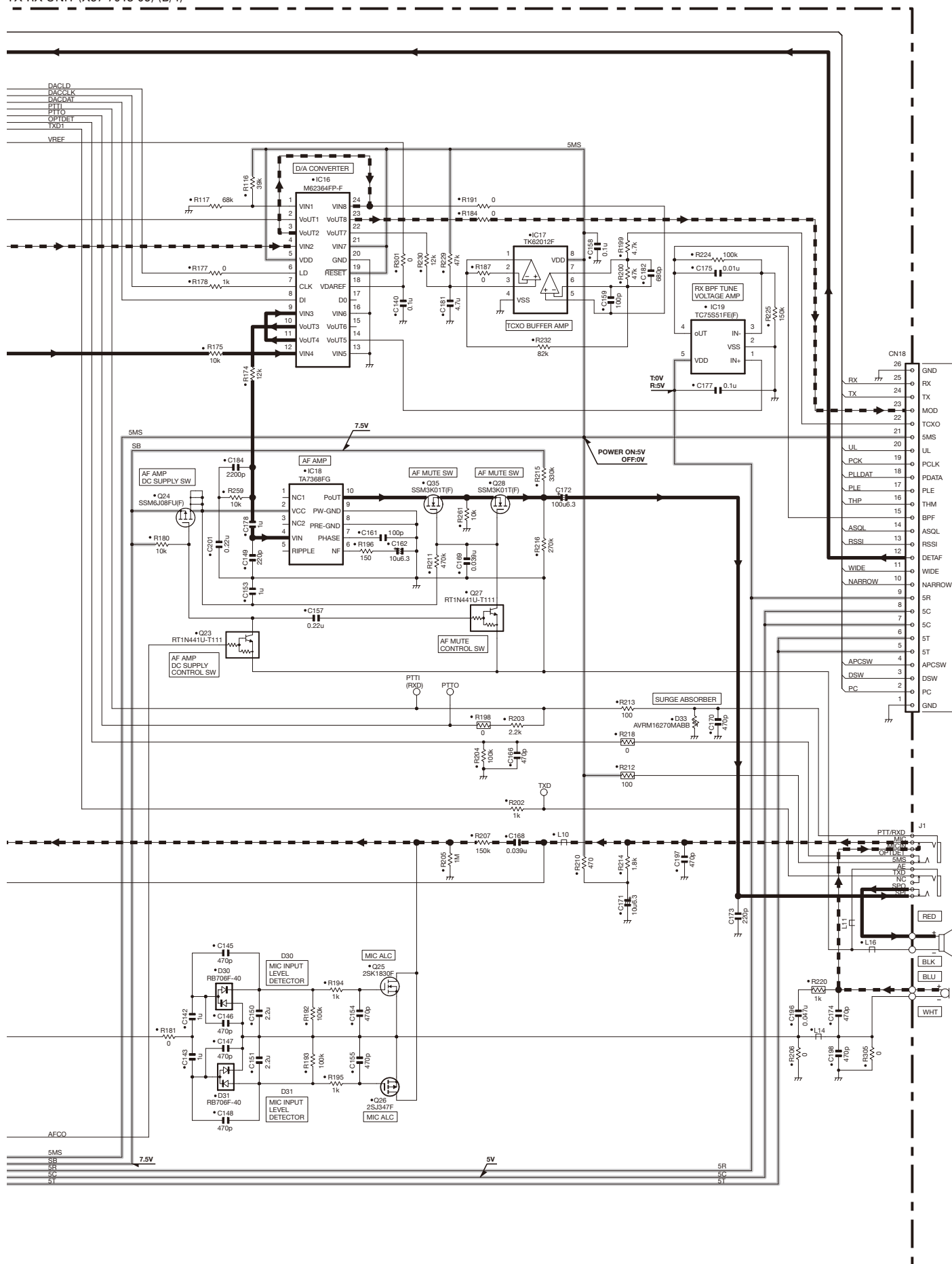
TX-RX UNIT (X57-7013-06) (B/4)



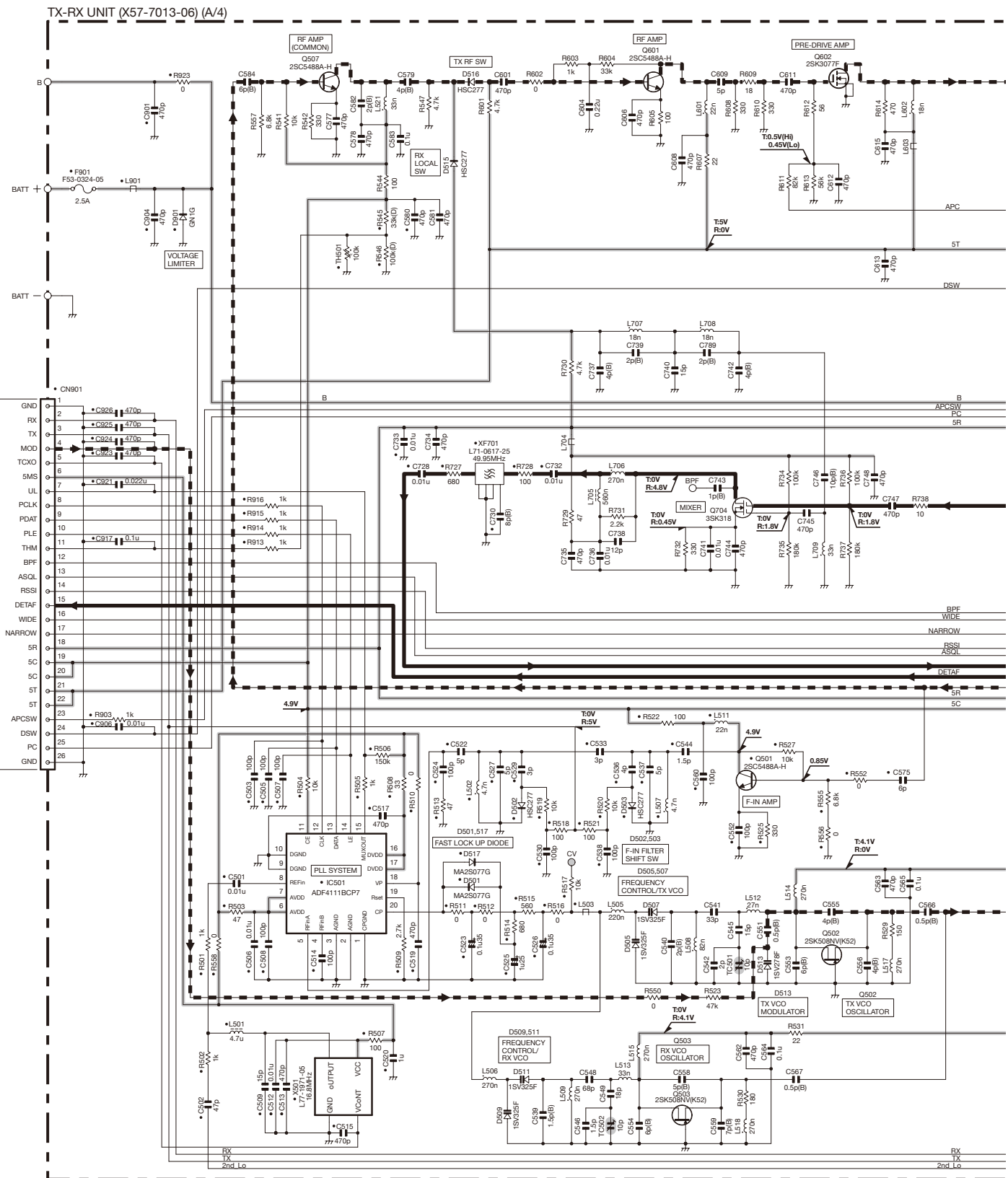


SCHEMATIC DIAGRAM / 原理图 TK-3178(L)

TX-RX UNIT (X57-7013-06) (B/4)



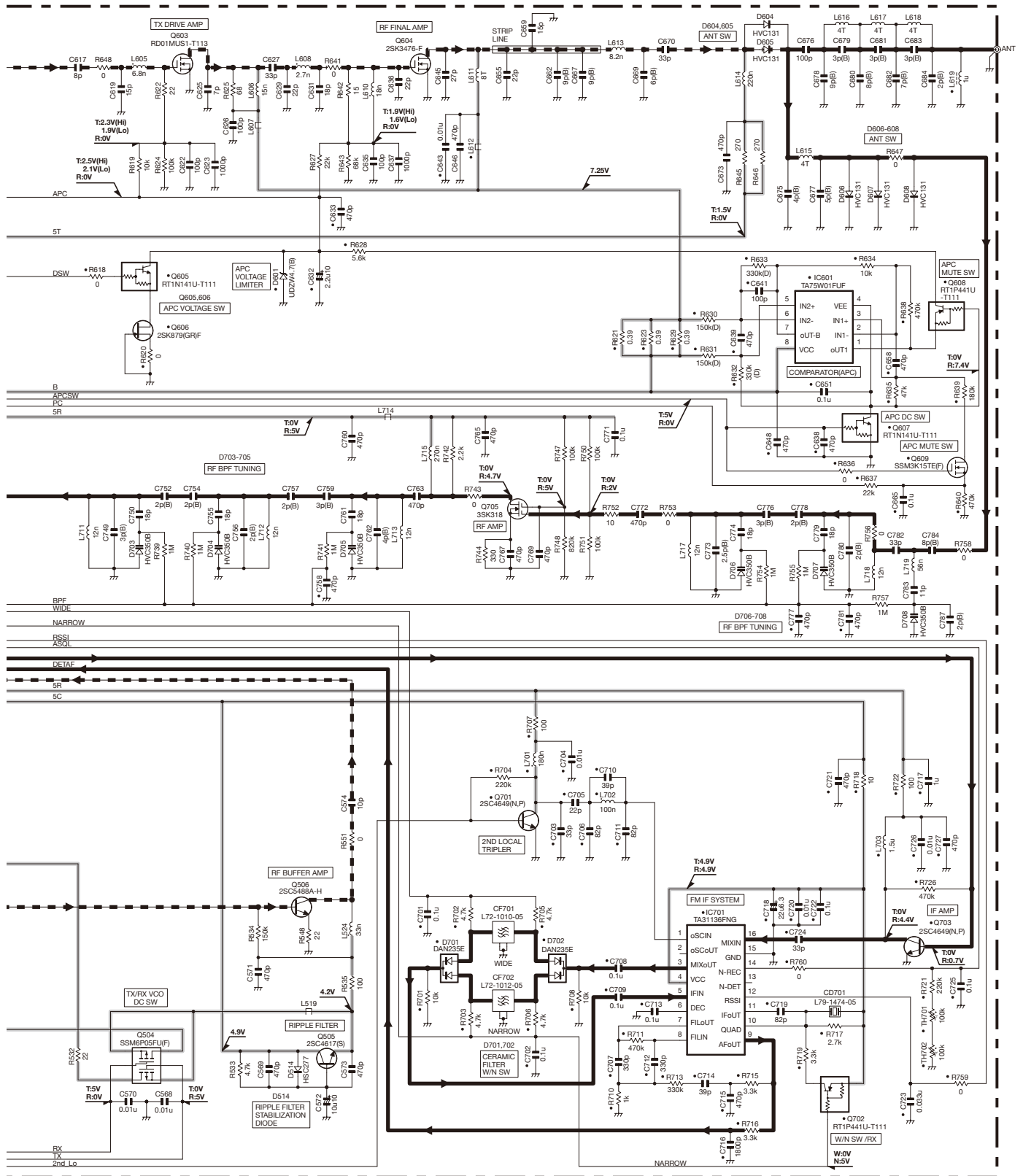
TK-3178(L) SCHEMATIC DIAGRAM / 原理图



SCHEMATIC DIAGRAM / 原理图

TK-3178(L)

TX-RX UNIT (X57-7013-06) (A/4)

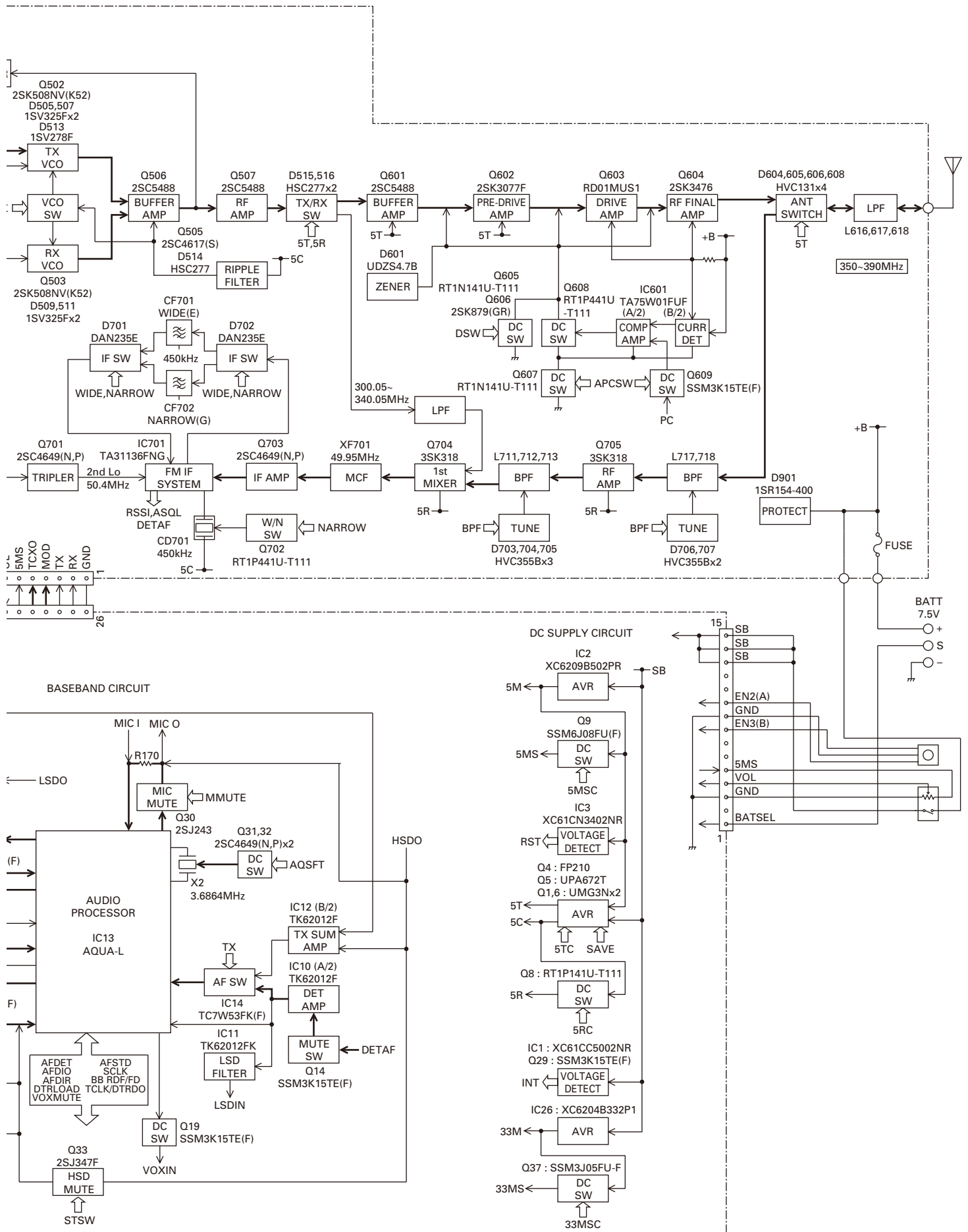


Note : The components marked with a dot (•) are parts of layer 1.

▼

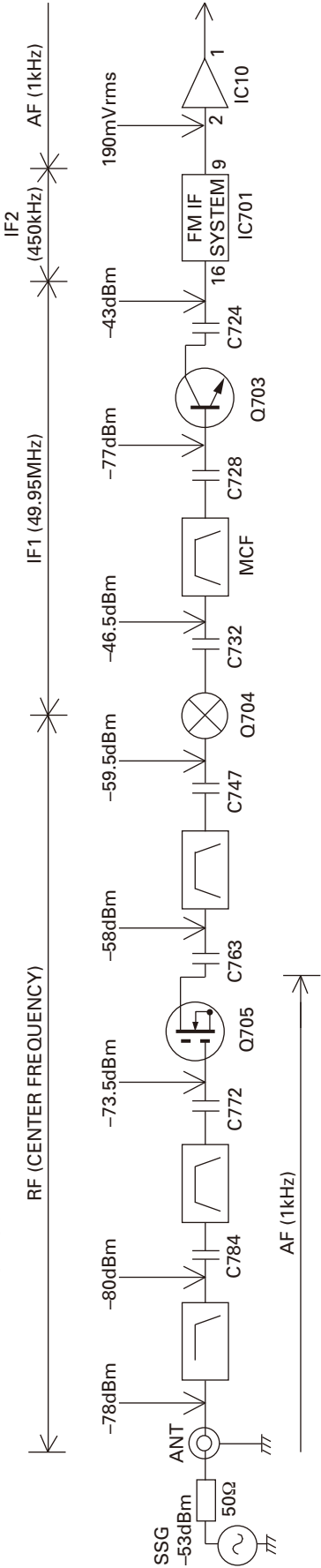


BLOCK DIAGRAM / 方块图 TK-3178(L)

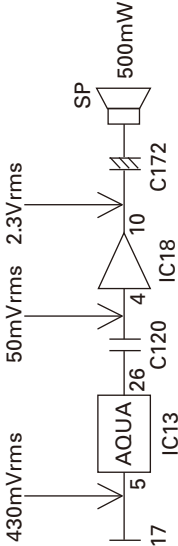


LEVEL DIAGRAM / 电平图

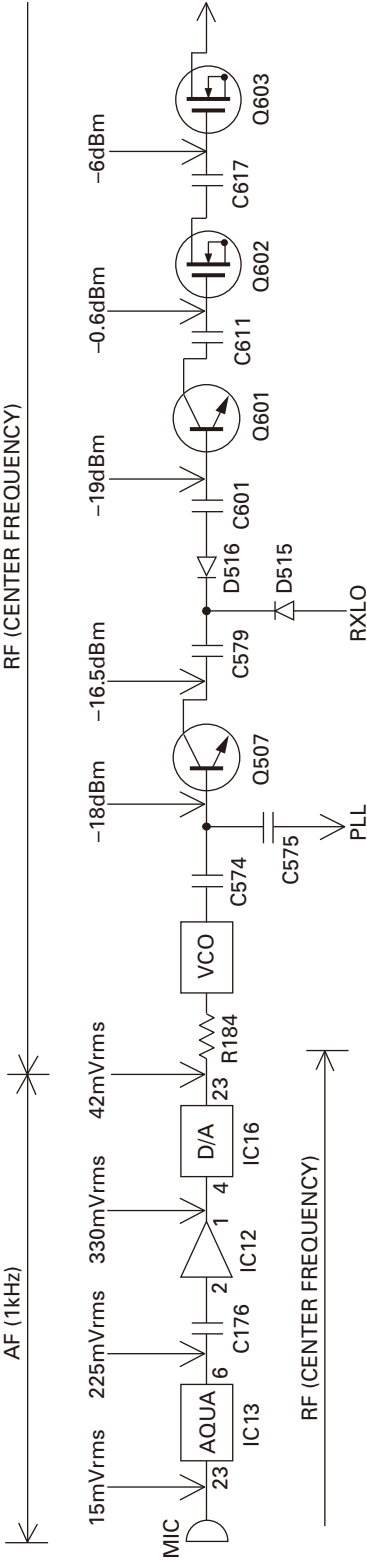
Receiver Section / 接收部分



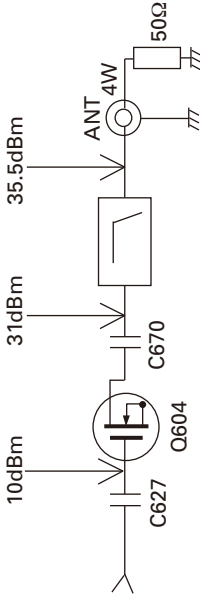
To make measurements in the AF section, connect the AC level meter.
(ANT input : -53dBm, 1kHz FM, 3kHz DEV (WIDE).)
In the RF section, use a high impedance probe. (ANT input : -53dBm, MOD off.)
要在AF段进行测量, 请连接交流电表。
(ANT输入 : -53dBm, 1kHz FM, 3kHz DEV (宽).)
在RF段, 请使用高阻抗探针。(ANT输入 : -53dBm, MOD关。)



Transmitter Section / 发射部分



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 a 1000pF coupling capacitor
AG被设为麦克风输入, 为3kHz频偏。在1kHz调制。(宽)
要在AF段进行测量, 请连接交流电表。
在RF段, 请使用1000pF耦合电容。



SPECIFICATIONS

GENERAL

Frequency range.....	350~390MHz
Channel spacing	Wide : 25kHz Narrow : 12.5kHz
Battery voltage	7.5V DC $\pm$ 20%
Battery life (5-5-90 duty cycle)/Approx. hours	
KNB-26N (2000mAh).....	12
KNB-35L (1950mAh)	11
Operating temperature range	-22°F~+140°F (-30°C~+60°C)
Frequency stability.....	$\pm$ 0.00025% (-22°F~+140°F)
Antenna impedance.....	50 Ω
Channel frequency spread.....	40MHz
Dimensions (W x H x D)	2-7/32 x 4-9/32 x 1-1/4 in. (56 x 109 x 31.7 mm) with KNB-35L battery
(Projections not included)	2-7/32 x 4-9/32 x 1-1/2 in. (56 x 109 x 37.9 mm) with KNB-26N battery
Weight (net).....	12.0 oz. (340 g) with battery (KNB-35L), supplied antenna and belt clip

RECEIVER (Measurements made per EIA/TIA-603)

Sensitivity (12dB SINAD)	Wide : 0.25 μ V Narrow : 0.28 μ V
Selectivity	Wide : 70dB Narrow : 65dB
Intermodulation distortion	Wide : 65dB Narrow : 60dB
Spurious response.....	65dB
Audio output (8 Ω impedance).....	500mW with less than 10% distortion

TRANSMITTER (Measurements made per EIA/TIA-603)

RF power output.....	HI : 4W LO : 1W
Spurious response.....	70dB
Modulation.....	Wide : 16K0F3E Narrow : 11K0F3E
FM hum & noise.....	Wide : 45dB Narrow : 43dB
Audio distortion	W/N : Less than 5%

规 格

概 述

频率范围.....	350 ~ 390MHz
信道间距.....	宽：25kHz 窄：12.5kHz
电池电压.....	7.5V DC±20%
电池寿命（5-5-90 工作周期）	
KNB-26N(2000mAh).....	约 12 时间
KNB-35L(1950mAh).....	约 11 时间
温度范围.....	-30℃到 +60℃
频率稳定性.....	±0.00025%(-30℃到 +60℃)
阻 抗.....	50 Ω
信道频率扩展.....	40MHz
尺寸（宽 × 高 × 长）	
带有 KNB-35L.....	56×109×31.7 mm
带有 KNB-26N.....	56×109×37.9 mm
重量（带有电池 KNB-35L, 附属天线和皮带夹）.....	340g

接收部（根据 EIA 标准 EIA/TIA-603 测定）

灵敏度 (EIA 12dB SINAD).....	宽：0.25mV 窄：0.28mV
选 择 性.....	宽：70dB 窄：65dB
互 调.....	宽：65dB 窄：60dB
杂散响应抗扰性.....	65dB
音频功率输出.....	8W 时 500mW, 失真低于 10%

发射部（根据 EIA 标准 EIA/TIA-603 测定）

射频功率输出.....	高：4W 低：1W
杂散发射分量.....	70dB
调 制.....	宽：16K0F3E 窄：11K0F3E
FM 噪音.....	宽：45dB 窄：43dB
音频失真.....	低于 5%

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WD18 9EB United Kingdom

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Kenwood Ibérica, S.A.

Bolivia, 239-08020 Barcelona, Spain

Kenwood Electronics Australia Pty. Ltd.

(A.C.N. 001 499 074)

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

Kenwood Electronics (Hong Kong) Ltd.

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

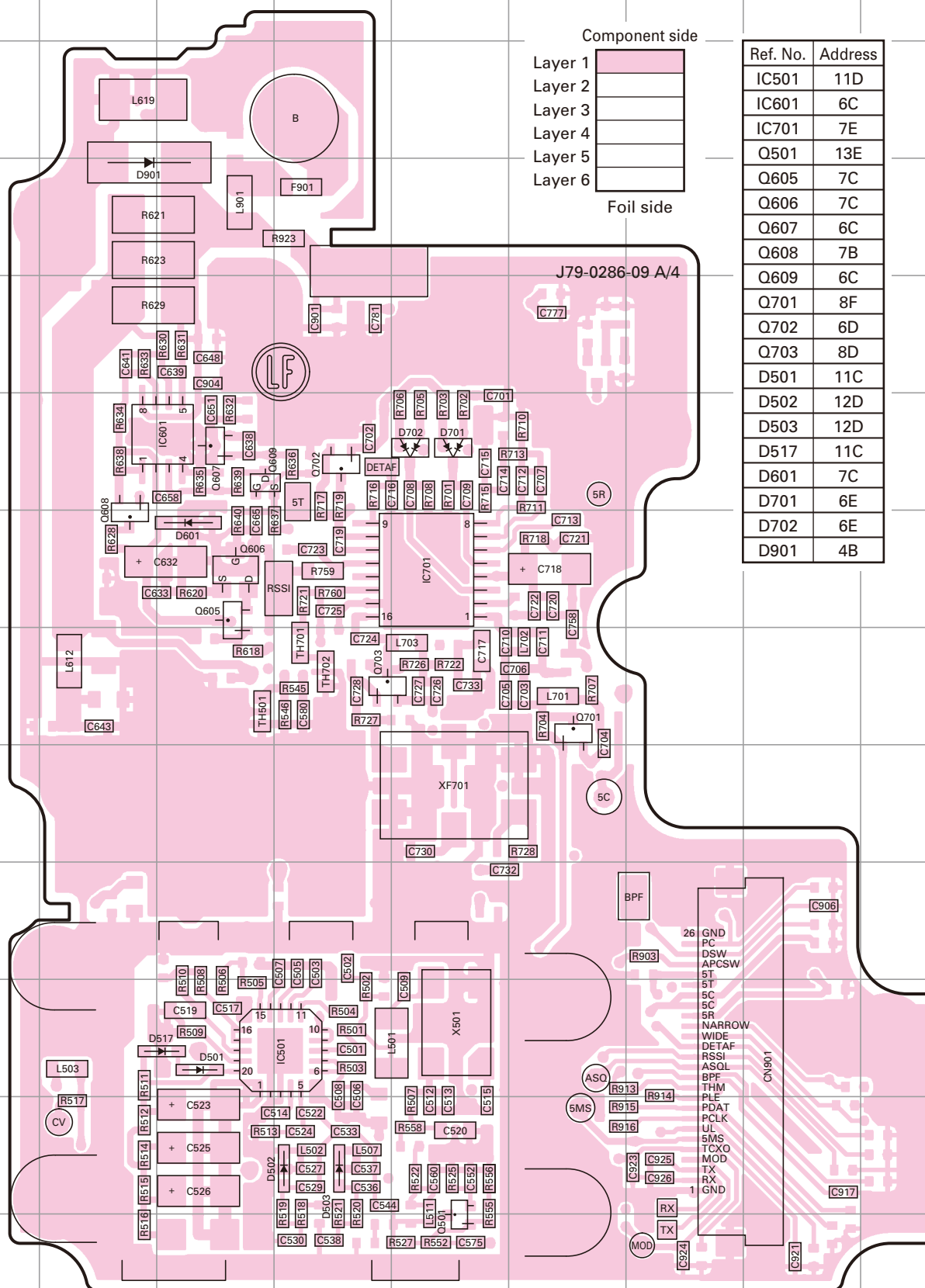
Kenwood Electronics Singapore Pte Ltd

1 Ang Mo Kio Street 63, Singapore 569110



TK-3178(L) PC BOARD / PC板

**TX-RX UNIT (X57-7013-06) (A/4) Component side view
(J79-0286-09 A/4)**



Ref. No.	Address
IC501	11D
IC601	6C
IC701	7E
Q501	13E
Q605	7C
Q606	7C
Q607	6C
Q608	7B
Q609	6C
Q701	8F
Q702	6D
Q703	8D
D501	11C
D502	12D
D503	12D
D517	11C
D601	7C
D701	6E
D702	6E
D901	4B

PC BOARD / PC板 TK-3178(L)

TX-RX UNIT (X57-7013-06) (A/4) Foil side view (J79-0286-09 A/4)

Ref. No.	Address	Ref. No.	Address
Q502	11G	D513	12G
Q503	13G	D514	11F
Q504	12F	D515	12C
Q505	11E	D516	12D
Q506	12F	D604	6I
Q507	12D	D605	6I
Q601	11C	D606	5H
Q602	10D	D607	5H
Q603	10G	D608	5G
Q604	9H	D703	8E
Q704	10D	D704	8E
Q705	6E	D705	7E
D505	11I	D706	5E
D507	11I	D707	5F
D509	12I	D708	5G
D511	13I		

Component side

Layer 1

Layer 2

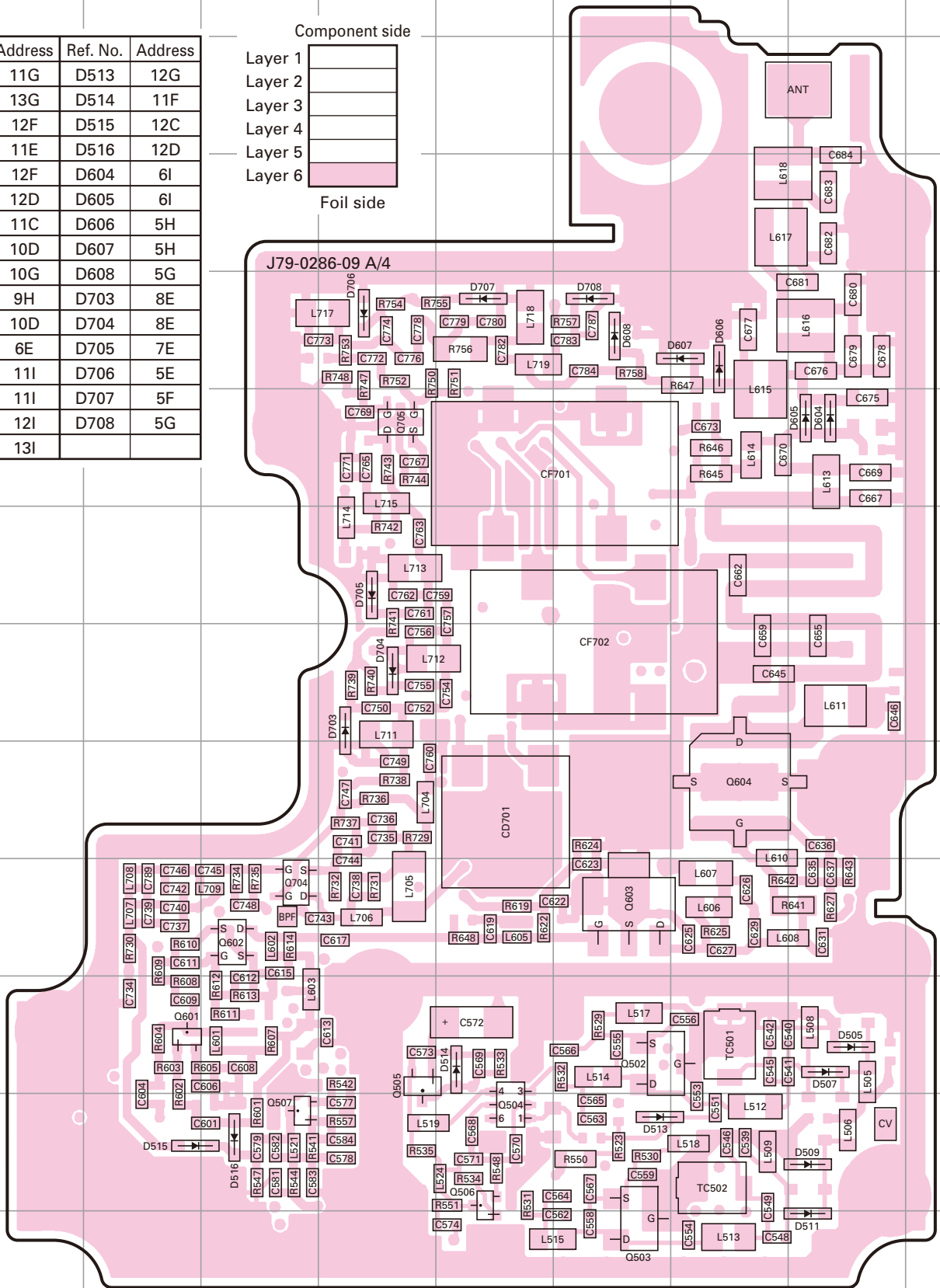
Layer 3

Layer 4

Layer 5

Layer 6

Foil side



TK-3178(L) PC BOARD / PC板

PC BOARD / PC板 TK-3178(L)

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC4	6M	IC17	13K	Q23	8N	Q32	10G	D12	8D
IC5	6J	IC18	8M	Q24	7M	Q33	7J	D13	10D
IC11	8K	IC19	13G	Q25	12K	Q35	9M	D29	11H
IC12	7J	Q12	7I	Q26	12K	D4	7I	D30	11K
IC13	9J	Q13	6I	Q27	10M	D5	8N	D31	11J
IC14	9K	Q19	10H	Q28	10N	D7	10N	D32	11I
IC15	8H	Q21	10K	Q30	11J	D8	8F	D33	12N
IC16	12I	Q22	11I	Q31	8G	D9	10F		

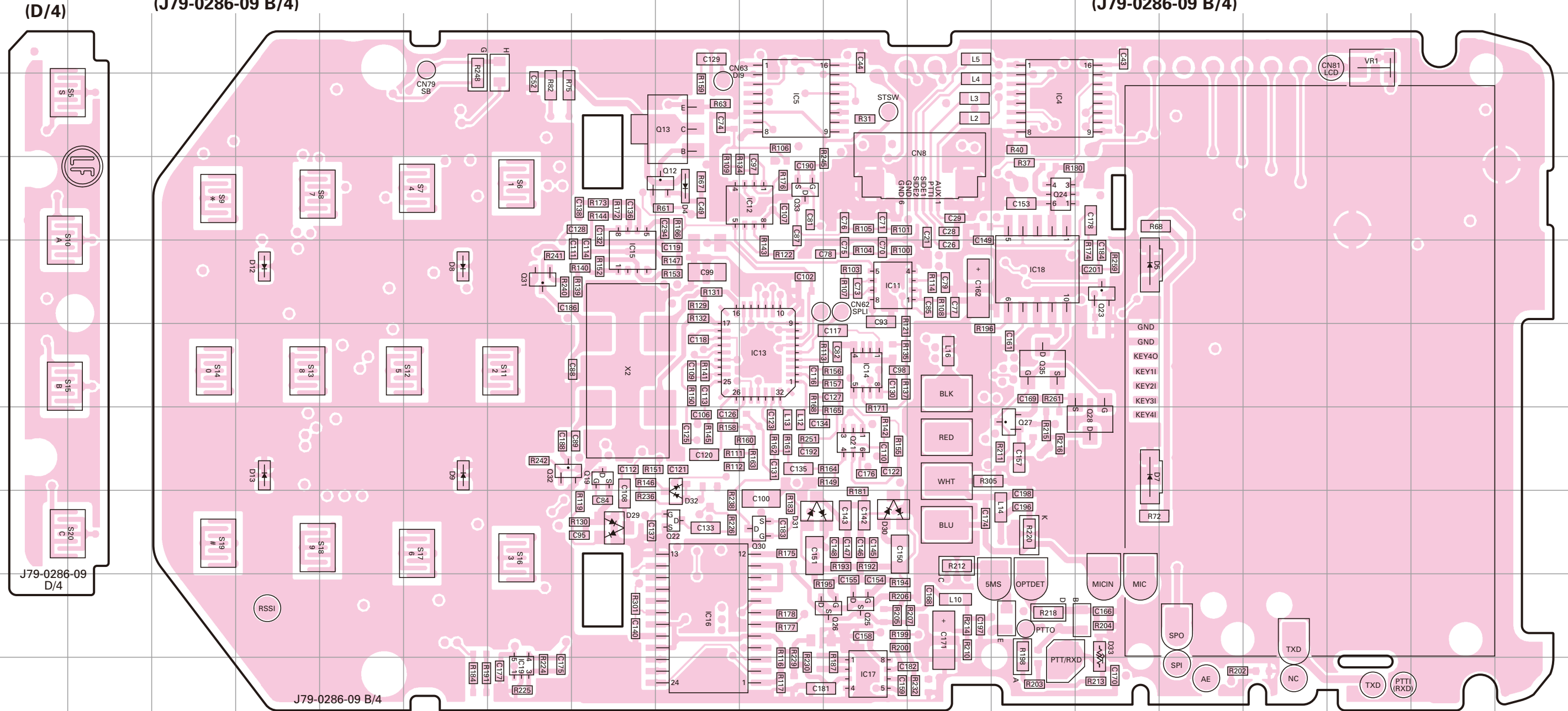
Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	

Foil side

**TX-RX UNIT (X57-7013-06) (B/4) Component side view
(J79-0286-09 B/4)**

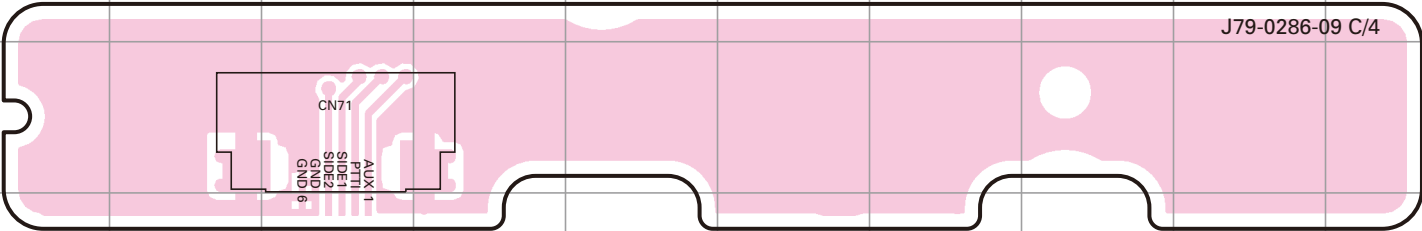
**TX-RX UNIT (X57-7013-06) (C/4) Component side view
(J79-0286-09 C/4)**



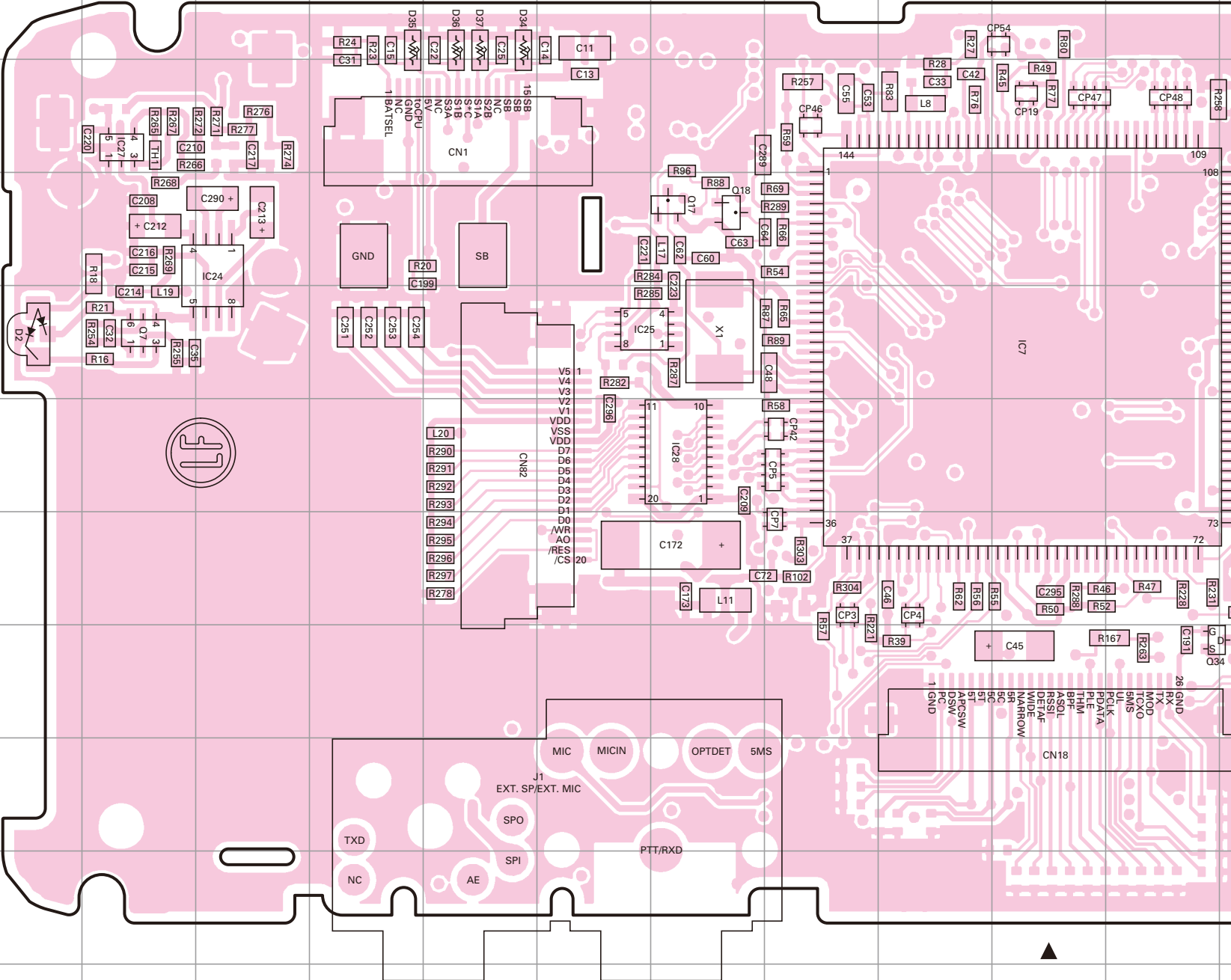
TK-3178(L) PC BOARD / PC板

PC BOARD / PC板 TK-3178(L)

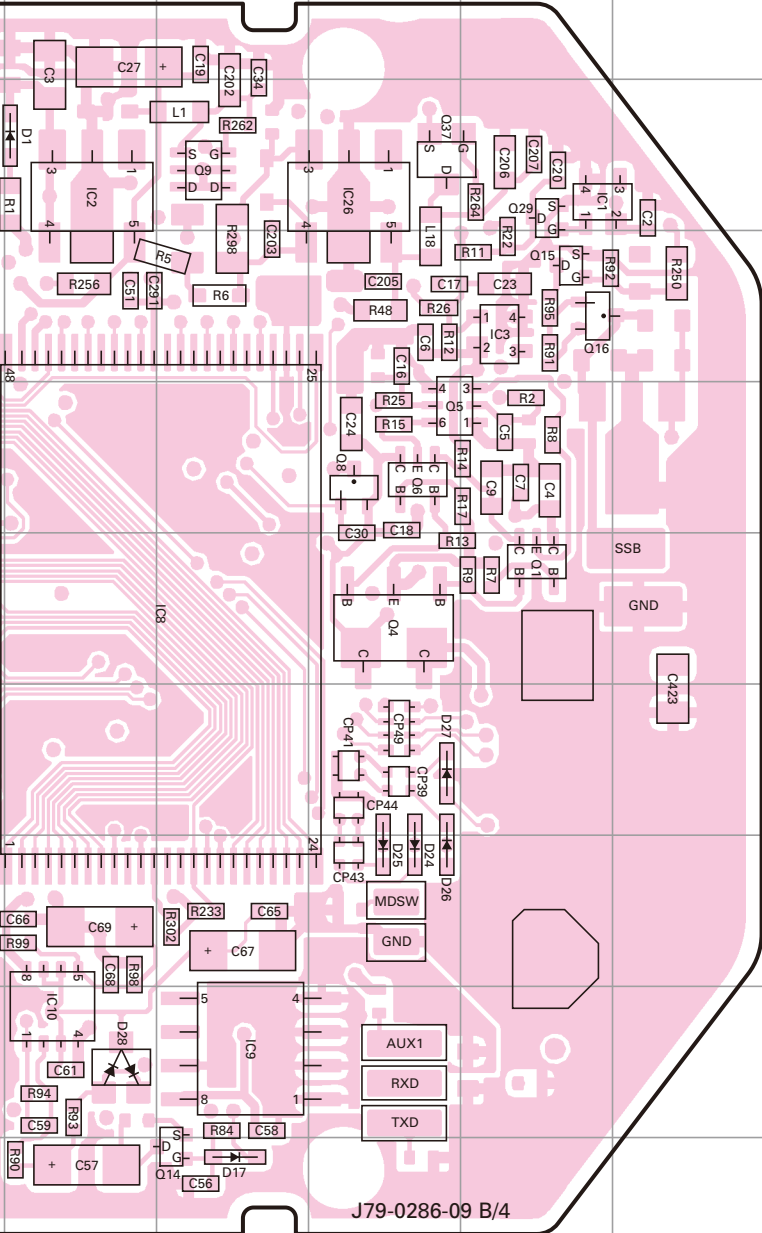
TX-RX UNIT (X57-7013-06) (C/4) Foil side view
(J79-0286-09 C/4)



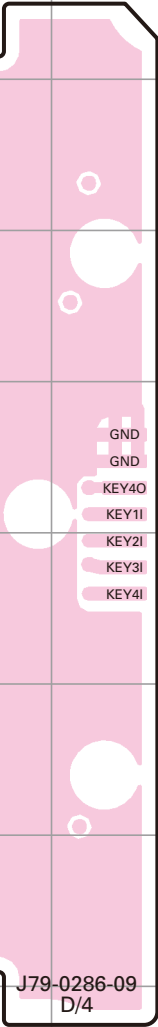
TX-RX UNIT (X57-7013-06) (B/4) Foil side view
(J79-0286-09 B/4)



TX-RX UNIT (X57-7013-06) (B/4) Foil side view
(J79-0286-09 B/4)



(D/4)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	6P	IC25	8F	Q7	8B	Q29	6P	D26	11O
IC2	6M	IC26	6O	Q8	8O	Q34	11K	D27	10O
IC3	7P	IC27	6B	Q9	6N	Q37	6O	D28	12M
IC7	8J	IC28	9G	Q14	13N	D1	6M	D34	5E
IC8	9N	Q1	9P	Q15	7P	D2	8A	D35	5D
IC9	12N	Q4	9O	Q16	7P	D17	13N	D36	5E
IC10	12M	Q5	8O	Q17	7G	D24	11O	D37	5E
IC24	7C	Q6	8O	Q18	7G	D25	11O		

