UHF FM TRANSCEIVER / UHF 调频对讲机

TK-3148

SERVICE MANUAL / 维修手册

REVISED / 修订版

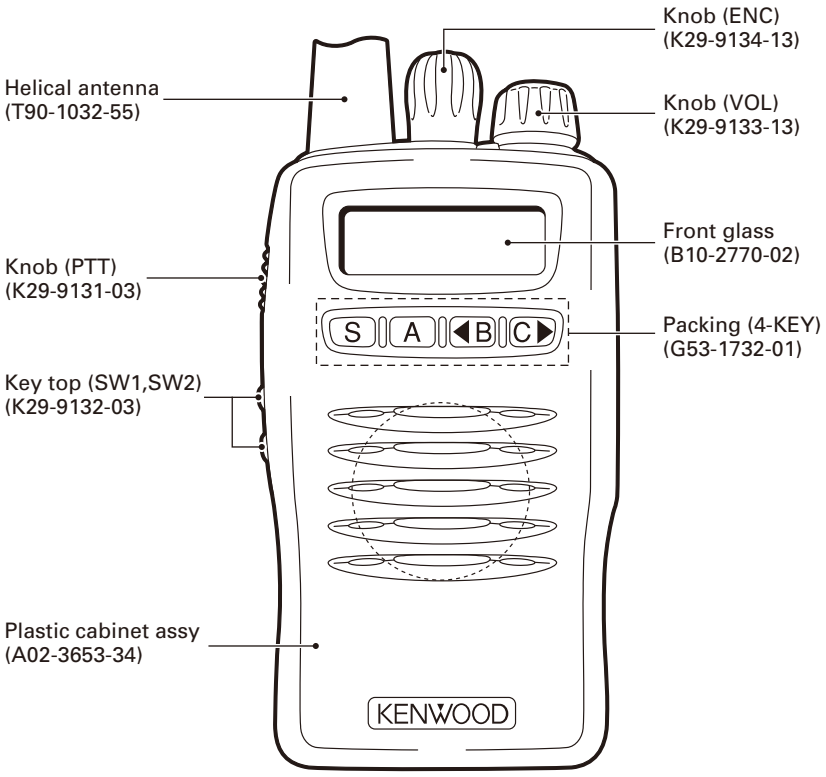
KENWOOD

Kenwood Corporation

B51-8656-10 (N) PDF

This service manual applies to products with 90600001 or subsequent serial numbers.
In terms of the products with the serial numbers earlier than 90600001, refer to the TK-3148 service manual as per part No. B51-8656-00.

本维修手册适用于 90600001 开始的序列号产品。
有关比 90600001 早的序列号产品，请参考编号为 B51-8656-00 的 TK-3148 维修手册。



无铅焊接通信产品 LF
保护环境建伍领先

⚠ 注意：本产品是无铅化焊接产品
在维修时请使用无铅焊锡
和相应的焊接工具
详细事项请访问如下网址了解:
http://www.kenwoodhk.com.hk/

This product complies with the **RoHS** directive for the European market.

LF
This product uses Lead Free solder.

CONTENTS / 目录

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

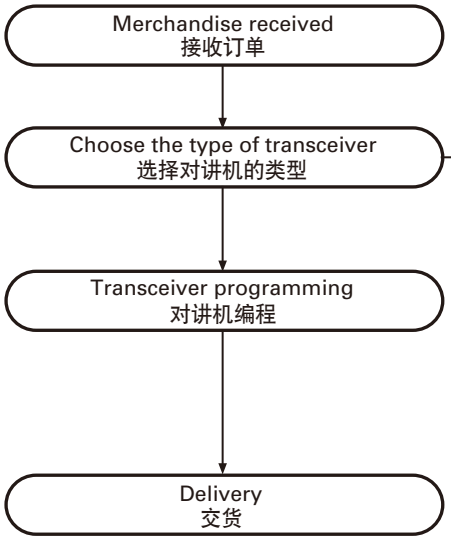
为了个人的安全，请注意下列事项：

- 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



Frequency range (MHz) 频率范围（MHz）	RF power 射频功率	Type 类型
TX/RX 350~390	4.0W	TK-3148 C

A personal computer, programming interface (KPG-36), and programming software (KPG-74D CPS) are required for programming. (The frequency, conventional system features, TX power HI/LOW, and signalling data are programmed for the transceiver.)

编程时需要个人计算机，编程接口(KPG-36)和编程软件(KPG-74D CPS)。（为对讲机设定频率，常规系统特性，TX高/低功率，以及信令数据。）

OPERATING FEATURES / 操作特性

1. Operation Features

The TK-3148 is a UHF FM Radio designed in both Trunking Mode and Conventional Mode.

1. 操作特性

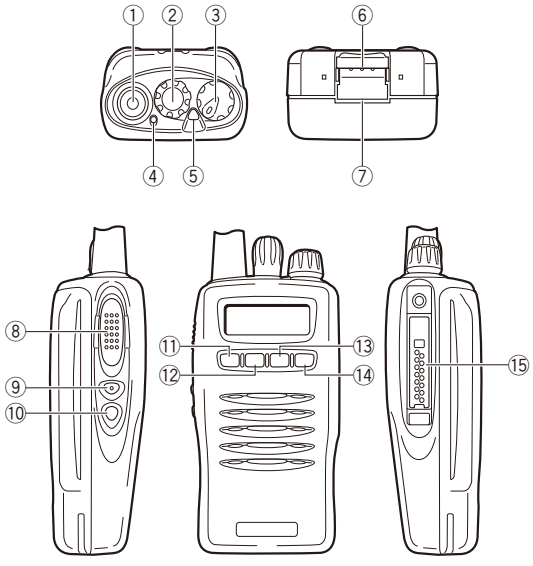
TK-3148 是具有集群和常规双模式的 UHF 调频对讲机。

2. Transceiver Controls and Indicators

2-1. Physical Layout

2. 对讲机的控制和指示

2-1. 主机外形



OPERATING FEATURES / 操作特性

2-2. Panel controls

The key on the top and front panel is momentary-type push buttons. The functions of these keys and knob are explained below.

① **Antenna connector**
Connect the antenna here.
② **Rotary encoder**
③ **POWER switch/ VOLUME control**
Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. Turn counterclockwise fully to switch OFF the transceiver.
④ **Transmit/ Receive indicator**
⑤ **Auxiliary (orange) key**
⑥ **Battery pack safety catch**
Flip this catch to prevent accidentally pressing the battery pack release latch.
⑦ **Battery pack release latch**
Pull back on this latch to release the battery pack.
⑧ **PTT (Push-To-Talk) switch**
⑨ **Side 1 key**
⑩ **Side 2 key**
⑪ **S key**
⑫ **A key**
⑬ **◀B key**
⑭ **C▶ key**
⑮ **Universal connector**
Connect the speaker/ microphone here. Otherwise, keep the supplied cover in place.

2-3. Key functions

• Trunking mode

② **Rotary encoder**
Rotate this encoder to select your desired call address (voice calls/dialing) or status (status calls).
④ **Transmit indicator**
Lights red while transmitting.
⑤ **Auxiliary (orange) key (default setting: None)**
Press to activate its auxiliary function.
⑧ **PTT (Push-To-Talk) switch**
Press to transmit. Also press to initiate a call if "PTT to Initiate Call" has been programmed.
⑨ **Side 1 key (default setting: Clear)**
Press to activate its auxiliary function.
⑩ **Side 2 key (default setting: Call)**
Press to activate its auxiliary function.
⑪ **S key (default setting: Status/ Stack)**
Press to activate its auxiliary function.
⑫ **A key (default setting: Function Menu)**
Press to activate its auxiliary function.
⑬ **◀B key (default setting: Conventional)**
Press to activate its auxiliary function. Also press to scroll left while viewing stack entries.
⑭ **C▶ key (default setting: Scan)**
Press to activate its auxiliary function. Also press to scroll right while viewing stack entries.

2-2. 控制面板

顶部和前面板上的键是触发式按键。有关这些键和旋钮的功能说明如下。

① **天线连接器**
在这里连接天线。
② **旋转编码器**
③ **电源开关 / 音量控制器**
顺时针旋转可接通对讲机电源。旋转调整音量。逆时针旋转到底可切断对讲机电源。
④ **发射 / 接收指示灯**
⑤ **辅助（橙黄色）键**
⑥ **电池组保险钩**
扳上这个保险钩以防止意外按下电池组释放栓。
⑦ **电池组释放闩锁**
按下闩锁可取下电池组。
⑧ **PTT（按讲）开关**
⑨ **侧面 1 键**
⑩ **侧面 2 键**
⑪ **S 键**
⑫ **A 键**
⑬ **◀B 键**
⑭ **C▶ 键**
⑮ **通用接口**
在这里连接扬声器 / 麦克风，否则应把附带的盖板盖上。

2-3. 键功能

• 集群模式

② **旋转编码器**
旋转本编码器选择您所需要呼叫的地址（语音呼叫 / 拨号）或者状态代码（用于状态呼叫）。
④ **发射指示灯**
在发射中点亮红色。
⑤ **辅助（橙黄色）键（初始设定 : 无）**
按下可开启该辅助功能 。
⑧ **PTT（按讲）开关**
按下可发射。当编程了"按 PTT 开始呼叫"后，也可按下开始呼叫。
⑨ **侧面 1 键（初始设定 : 清除）**
按下可开启该功能。
⑩ **侧面 2 键（初始设定 : 呼叫）**
按下可开启该功能。
⑪ **S 键（初始设定 : 状态 / 堆栈）**
按下可开启该功能。
⑫ **A 键（初始设定 : 功能选单）**
按下可开启该功能。
⑬ **◀B 键（初始设定 : 常规）**
按下可开启该功能。当观察堆栈条目时，按下可向左侧滚动。
⑭ **C▶ 键（初始设定 : 扫描）**
按下可开启该功能。当观察堆栈条目时，按下可向右侧滚动。

OPERATING FEATURES / 操作特性

• Conventional mode

② Rotary encoder
Rotate this encoder to select your desired channel.

④ Transmit/ Receive indicator
Lights green while receiving a signal. Lights red while transmitting.

⑧ PTT (Push-To-Talk) switch
Press this switch, then speak into the microphone to call a station.

⑨ Side 1 key
Press to return to Trunking mode.

⑩ Side 2 key
Press to turn the monitor function ON in order to monitor your selected channel.

⑪ S key
Press to turn the display and keypad backlight ON. The backlight remains ON for 5 seconds.

⑫ A key
Press to add/delete channel(s) to/from Scan list.

⑭ C▶ key
Press to turn Scan ON (or OFF).

• 常规模式

② 旋转编码器
旋转本编码器选择您所需要的信道。

④ 接收指示灯
在接收信号时点亮绿色。在发射中点亮红色。

⑧ PTT（按讲）开关
按下该开关，然后对着麦克风讲话呼叫其他电台。

⑨ 侧面 1 键
按下可恢复到集群模式。

⑩ 侧面 2 键
按下可接通监听功能来监听您所选择的信道。

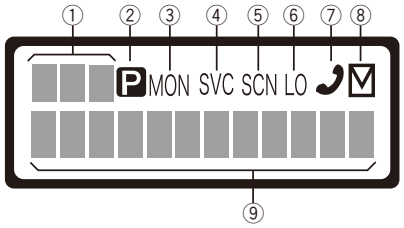
⑪ S 键
按下可开启显示屏和键盘背景照明。背景照明将保持 5 秒钟。

⑫ A 键
按此键可向扫描序列中添加信道或从扫描序列中删除信道。

⑭ C▶ 键
按下可启动扫描（或者停止扫描）。

2-4. Display

2–4. 显示



① Sub display
■■■ displays the strength of received signals.

② Programming indicator
P appears while in AUX A is being activated.

③ MON (Monitor) indicator
"MON" appears while you are monitoring a channel by pressing the Side 2 key. (Conventional Mode only)

④ SVC (Service) indicator
"SVC" appears when a control channel is found. It flashes while the transceiver is searching for a control channel.

⑤ SCN (Scan) indicator
"SCN" appears while you are scanning.

⑥ LO indicator
This icon blinks while in battery warning, if "Always" or "Always W/beep" is selected in the battery warning settings.

⑦ Handset indicator
flashes when you activate call diversion.

⑧ MAIL indicator
☑ appears while there is data in the stack. It flashes when there is new data in the stack.

⑨ Alphanumeric display
■■■■■■■■■■■ displays call addresses, the call duration timer, data messages, and the current operating status of the transceiver.

① 子显示字段
■■■显示接收到信号的强度。

② 显示图标
当 AUX A 被激活时显示P。

③ MON（监听）指示
当用户按下侧面 2 键监听某一信道时显示"MON"。（只适用于常规模式）

④ SVC（服务）指示
当找到一个控制信道时显示"SVC"。当对讲机正在搜索控制信道时，此图标闪烁。

⑤ SCN（扫描）指示
当用户正在扫描时显示"SCN"。

⑥ LO 指示
如果在电池电压告警设定中选择"连续"或"连续并有提示音"，则电池电压不足时，此图标闪烁。

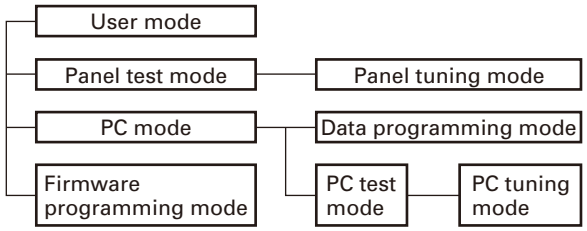
⑦ 呼叫转移指示
当对讲机处于转移状态时，此闪烁。

⑧ 信箱指示
当存储器堆栈中有接收信息时显示☑。当存储栈中有新信息时，此图标闪烁。

⑨ 字母数字显示字段
■■■■■■■■■■■显示呼叫地址，呼叫过程计时器，数据信息以及对讲机当前的操作状态等。

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 radio.
PC mode	Used for communication between the radio and PC.
Data programming mode	Used to read and write frequency data and other features to and from the radio.
PC test mode	Used to check the radio 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.

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	[S]+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

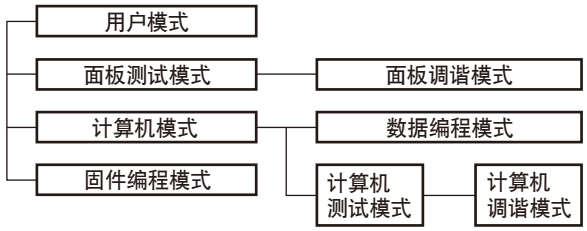
The TK-3148 transceiver is programmed by using a personal computer, programming interface (KPG-36) and programming software (KPG-74D CPS).

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

5-2. Connection procedure

1. Connect the TK-3148 to the personal computer with the interface cable.
2. When the POWER switch on, user mode can be entered immediately. When PC sends command the radio enter

1. 模式



模　式	功　能
用户模式	一般用户使用。
面板测试模式	用于经销商检查基本功能。
面板调谐模式	用于经销商调整对讲机指标。
计算机模式	用于对讲机与计算机之间的通信。
数据编程模式	用于读出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	当更新闪速存储器中的主程序时使用。

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	[S]+ 通电

3. 面板测试模式

设定方式，参见调整。

4. 面板调谐模式

设定方式，参见调整。

5. 计算机模式

5-1. 前言

TK-3148 对讲机使用计算机，编程电缆 (KPG-36) 和编程软件 (KPG-74D CPS) 进行编程。

计算机可以使用编程软件。图 1 显示计算机编程的设置。

5-2. 连接步骤

1. 使用编程电缆将 TK-3148 与计算机连接。
2. 当接通电源时，立即进入用户模式。当 PC 机发出指令使对讲机进入 PC 机模式时，“PROGRAM” 出现在显示器上。
   当对讲机发送数据时，红色指示灯闪动。

REALIGNMENT / 模式组合

PC mode, and "PROGRAM" is displayed on the LCD.
When data transmitting from transceiver, the red LED is blinking.
When data receiving to transceiver, the green LED is blinking.

当对讲机接收数据时，绿色指示灯闪动。

Note:
- The data stored in the personal computer must match model type, when it is written into the flash memory.
- Change the TK-3148 to PC mode, then attach the interface cable.

注释 :
- 储存在计算机内的数据必须与写入到闪速存储器的格式相匹配。
- 将 TK-3148 改变为计算机编程模式，然后连接编程电缆。

5-3. KPG-36 description (PC programming interface cable: Option)

The KPG-36 is required to interface the TK-3148 to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-36 connects the universal connector of the TK-3148 to the computers RS-232C serial port.

5-3. KPG-36 说明 （PC 机编程接口电缆 : 选件 ）

TK-3148 需要通过 KPG-36 接口电缆与电脑连接。此接口电缆的 D 型连接器 (25 芯) 中有一个将 RS-232C 逻辑电平转换为 TTL 电平的电路。

KPG-36 将 TK-3148 的通用接口连接到电脑的 RS-232C 串口上。

5-4. Programming software KPG-74D CPS Description

The KPG-74D CPS is the programming software for the transceiver supplied on three 3.5" floppy disks. This software runs under MS-Windows 98/Me/2000/XP 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.

We recommend that install the KPG-74D CPS for example to hard disk first then use it.

5-4. 编程软件 KPG-74D CPS 说明

KPG-74D CPS 是对讲机的编程软件，共 3 张 3.5″ 软盘。此软件的运行环境为 PC 机的 MS-Windows 98/Me/2000/XP。

数据可以被写入到对讲机或从对讲机中读取数据，并且能在屏幕上进行编辑。已被编程或编辑的数据可以打印出来。也可以调整对讲机的指标。

建议用户在使用之前将 KPG-74D CPS 安装到硬盘上。

5-5. Programming with PC

If data is transferred to the transceiver from a PC with the KPG-74D CPS, the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

The values should be modified only if necessary. Data can be programmed into the flash memory in RS-232C format via the universal connector.

5-5. 使用计算机编程

如果从使用 KPG-74D CPS 软件的计算机将数据发送到对讲机，设定的对讲机型号数据（对讲机的基本信息）均可被修改。由于设定频率范围（频率类型）时、型号数据就已被确定了，所以一般不需要修改型号数据。

只有在必要的情况下才修改型号数据。

RS-232C 格式的数据经由通用接口输入到对讲机的闪速存储器中。

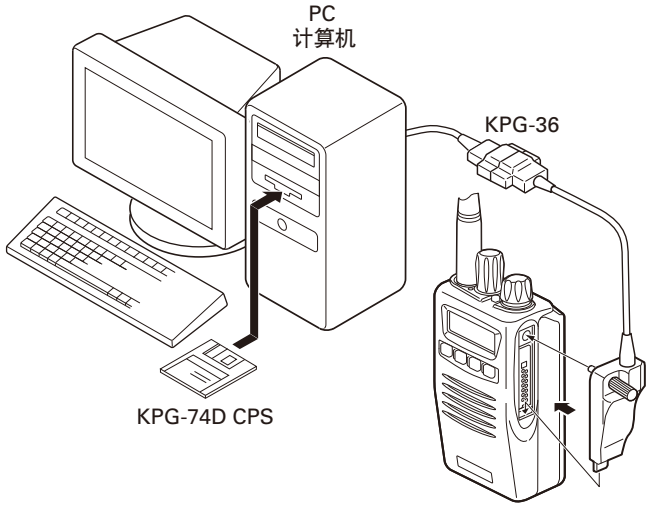


Fig. 1 / 图 1

REALIGNMENT / 模式组合

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the TK-3148. This allows the TK-3148 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 TK-3148 to the personal computer with the interface cable (KPG-36). (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, 57600 bps) and communications port in the configuration item.
3. Set the firmware to be updated by File name item.
4. Turn the TK-3148 power ON with the [S] switch held down.
   When "PROG 57600" appears, release your finger from the [S] switch.
5. Check the connection between the TK-3148 and the personal computer, and make sure that the TK-3148 is in the Program mode.
6. Press write button in the window. A window opens on the display to indicate progress of writing. When the TK-3148 starts to receive data. the P icon is blinking.
7. If writing ends successfully. the LED on the TK-3148 lights and the checksum is displayed.
8. If you want to continue programming other TK-3148 s, repeat steps 4 to 7.

Note:

- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software (KPG-74D CPS).
- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before update the radio firmware.
  Directry copying from the floppy disk to the radio may not work because the access speed is too slow.

6-4. Function

1. If you press the [Side 1] switch (top of left side) while "PROG 57600" is displayed, the check-sum is displayed.
   If you press the [Side 1] switch again while the check-sum is displayed, "PROG 57600" is redisplayed.
2. If you press the [Side 2] switch (bottom of left side) while "PROG 57600" is displayed, the display changes to "PROG 19200" to indicate that the write speed is low speed (19200 bps). If you press the [Side 2] switch again while "PROG 19200" is displayed, the display changes to "PROG 38400", and the write speed becomes the middle-speed mode (38400 bps). If you press the [Side 2] switch again while "PROG 38400" is displayed, the display returns to "PROG 57600".

Note:

Normally, write in the high-speed mode.

6. 固件编程模式

6-1. 前言

Flash Rom 被安装在 TK-3148 上。当将来出现新功能时，允许 TK-3148 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-36) 将 TK-3148 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. 启动固件编程程序 (FPRO.exe)。
2. 在配置项中设定通信速率（通常为 57600bps）和通信端口。
3. 在文件名称项中选定新固件的文件名。
4. 按住 [S] 键并接通 TK-3148 的电源。当"PROG 57600"出现时，松开 [S] 键。
5. 检查 TK-3148 与个人电脑之间的连接是否正确，并且确认 TK-3148 是否处于编程模式。
6. 点击计算机程序上的写入按钮。屏幕上开启一个窗口显示写入的进程。当 TK-3148 开始接收数据时，P 图标开始闪动。
7. 写入完成后，TK-3148 上的指示灯发光，并且显示校验码。
8. 如果用户需要继续编程其他的 TK-3148，重复步骤 4 到 7。

注释：

- 如果在编程软件 (KPG-74D CPS) 中固件编程模式设定为禁用，则不能进入此模式。
- 当进行固件编程时，在用户更新对讲机固件之前，建议从软盘向硬盘复制数据。
  由于读取速率太低，所以直接从软盘复制到对讲机可能无效。

6-4. 功能

1. 当显示"PROG 57600"时，如果用户按下侧面 1 键（位于左侧的顶部），则显示 check-sum。如果显示 check-sum 时再次按下侧面 1 键，则显示"PROG 57600"。
2. 当显示"PROG 57600"时，如果用户按下侧面 2 键（位于左侧的底部），则显示变为"PROG 19200"，表示写入速率为低速 (19200bps)。当显示"PROG 19200"时，如果用户再次按下侧面 2 键，则显示变为"PROG 38400"，表示写入速率为中速 (38400bps)。当显示"PROG 38400"时，如果用户再次按下侧面 2 键，则显示返回到"PROG 57600"。

注释：

通常在高速率模式中写入。

CIRCUIT DESCRIPTION / 电路说明

1. Overview

This transceiver is UHF/FM portable transceiver designed to operate in the frequency range of 350 to 390MHz (C).

2. Circuit Configuration by Frequency

The receiver is a double-conversion superheterodyne with a first intermediate frequency (IF) of 44.85MHz and a second IF of 455kHz. Incoming signals from the antenna are mixed with the local signal from the PLL to produce the first IF of 44.85MHz.

This is then mixed with the 44.395MHz second local oscillator output to produce the 455kHz second IF. This is detected to give the demodulated signal.

The transmit signal frequency is generated by the PLL VCO, and modulated by the signal from the microphone. It is then amplified and sent to the antenna.

1. 综述

本对讲机是在 350 到 390MHz (C) 的频率范围内工作的 UHF/FM 对讲机设备。

2. 电路的频率构成

接收部采用 44.85MHz 的第一中频和 455kHz 的第二中频的二次变频超外差方式。通过天线接收到的信号与来自于锁相环电路的本振信号混频生成 44.85MHz 的第一中频。

然后与 44.395MHz 的第二本振信号混频生成 455kHz 的第二中频。此频率被检测并产生解调信号。

锁相环压控振荡器生成发射信号频率，并且被来自于麦克风的信号调制。然后被放大并发送到天线。

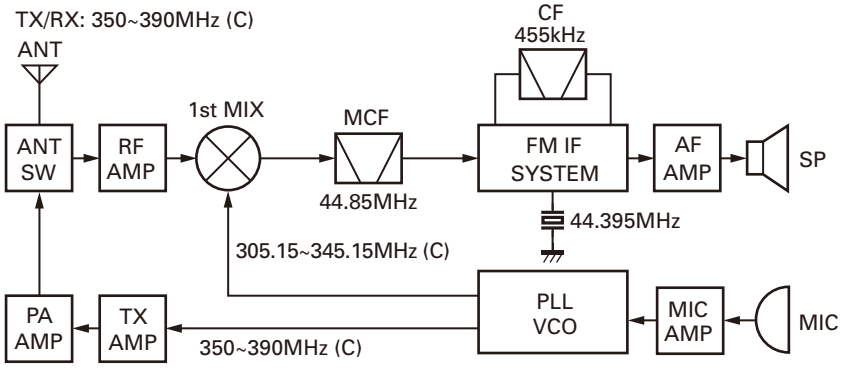


Fig. 1 Frequency configuration / 图 1 频率构成

3. Receiver System

3-1. RF unit

An incoming RF signal from the antenna terminal is passed through the antenna switch (D102, D103, D104 and D105 are off) and then the bandpass filter (L215 and L217). High pass filter HPF (L219) the 1st image response improve. And the bandpass filter is adjusted by a variable capacitor.

The input voltage to the variable capacitor is regulated by the voltage output from the D/A converter (IC307). The signal is amplified by RF amplifier Q207, and passed through the bandpass filter (L209, L210 and L211). The resulting signal is applied to the first mixer (Q206), where it is mixed with the first local oscillator signal output from the frequency synthesizer to produce the first IF (44.85MHz).

3-2. IF unit

The first IF signal is passed through a crystal filter (XF200) to remove a adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q205) and then applied to the IF system IC (IC200). 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 44.395MHz of second local oscillator output (crystal unit X200) and produces the second IF signal of 455kHz.

3. 接收部系统

3-1. 射频单元

由天线接收到的射频信号进入天线开关 (D102，D103，D104 和 D105 截止)，然后通过带通滤波器 (L215 和 L217)。高通滤波器 HPF (L219)，抑制镜像信号。带通滤波器由可变电容进行调整。

向可变电容输出的电压通过来自于数 / 模转换器 (IC307) 的电压输出进行调节。信号被射频放大器 Q207 放大，并通过带通滤波器 (L209，L210 和 L211) 生成的信号进入第一混频器 (Q206)，并且与来自于频率合成器的第一本振信号混频生成第一中频 (44.85MHz)。

3-2. 中频单元

第一中频信号通过晶体滤波器 (XF200) 消除邻道的信号。经滤波的第一中频信号被第一中频放大器 (Q205) 放大并进入中频系统芯片 (IC200)。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 44.395MHz 的第二本振信号输出 (晶体单元 X200) 进行混频，并生成 455kHz 的第二中频信号。

CIRCUIT DESCRIPTION / 电路说明

The second IF signal is passed through the ceramic filter (CF200; Wide, CF201; Narrow) to more remove the adjacent channel signal. The filtered second IF signal is amplified by the limiting amplifier and demodulated by the quadrature detector with ceramic discriminator (CD200). The demodulated signal is routed to the audio circuit.

第二中频信号通过陶瓷滤波器（CF200：宽，CF201：窄）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（CD200）的正交鉴频器进行解调。解调后的信号进入音频电路。

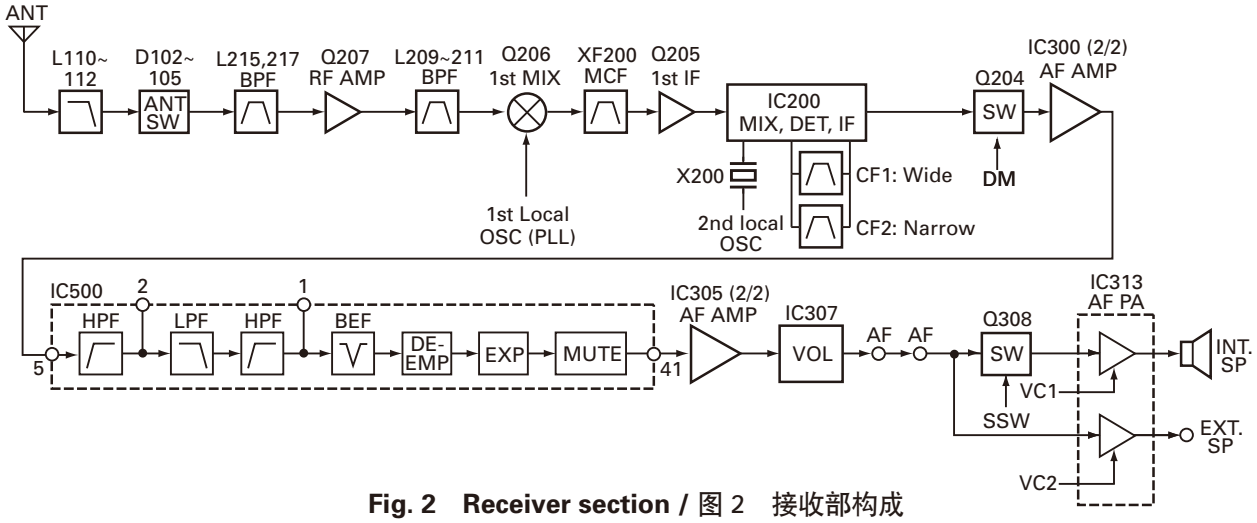


Fig. 2　Receiver section / 图 2　接收部构成

3-3. Wide/Narrow switching circuit

Narrow and Wide settings can be made for each channel by switching the ceramic filters CF200 (Wide), CF201 (Narrow).

The WIDE (high level) and NARROW (low level) data is output from IC311 pin 14.

Regardless of NARROW or WIDE band selection, signals always pass through the filter, CF200.

When the WIDE band is selected, Q201 is turned ON, then D202 and D203 are turned OFF.

So, the signal does not pass through the filter CF201. When the NARROW band is selected, Q201 is turned OFF, then D202 and D203 are turned ON. So, the signal passes through the filters, CF200 and CF201.

Q202 turns on/off with the Wide/Narrow data and the IC200 detector output level is changed to maintain a constant output level during wide or narrow signals.

3-3. 宽 / 窄转换电路

可以通过开启陶瓷滤波器 CF200（宽），CF201（窄）对每一个信道进行窄宽设定。

IC311 的管脚 14 输出宽（高电平）和窄（低电平）信号。

无论选用宽还是窄带，信号都要通过滤波器 CF200。

当选用 WIDE 带宽时，D202 和 D203 关断。

因此，信号不通过滤波器 CF201。当选用 NARROW 带宽时，Q201 关断，D202 和 D203 打开。因此，信号通过滤波器 CF200 和 CF201。

Q202 伴随着宽 / 窄数据而接通 / 断开，IC200 检测器输出电平经常变化用来维持宽或窄信号过程中的恒定输出电平。

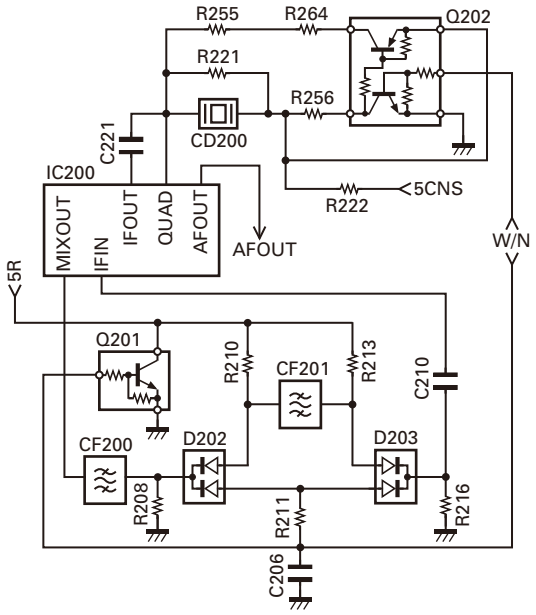


Fig. 3　Wide/Narrow switching circuit / 图 3　宽 / 窄转换电路

CIRCUIT DESCRIPTION / 电路说明

3-4. Audio amplifier circuit

The demodulated signal from IC200 goes through the mute switch (Q204) and is amplified by IC300 (2/2), high-pass filtered, low-pass filtered, high-pass filtered, band-eliminate filtered, and de-emphasized by IC500.

The signal then goes through an AF amplifier IC305 (2/2), an electronic volume control (IC307), and an AF switch (Q308 is on), and is routed to audio power amplifier (IC313), where it is amplified and output to the internal speaker.

The audio mute signal (AM1) from the shift register becomes Low in the standby and Q302 and Q305 which are power supply circuit for IC313 turn off. Also, IC500 is set to the power down mode according to data from MCU, and the AF signal is muted. When the audio is output, AM1 becomes High to turn Q302 and Q305 ON, and voltage is supplied to power terminal VP of IC313. Also, IC500 is canceled out of the power down mode.

The speaker is switched by the logic of speaker switching terminal SSW on the universal connector. When SP-MIC is not attached, the logic of SSW becomes High and SW (Q308) is turned ON, and the AF signal is input to both amplifiers of IC313.

When SP-MIC is attached, SSW is connected to GND at inside of SP-MIC. For this reason, Q308 is turned OFF, and the AF signal is input only to amplifier for EXT SP of IC313.

Change of INT/EXT SP refer to Fig. 4.

AM1	SSW	VC1	VC2	SP
H	H	H	L	INT
H	L	L	H	EXT
L	H	L	L	MUTE
L	L	L	L	MUTE

3-4. 音频放大器电路

来自于 IC200 的解调信号进入静音开关（Q204），并且被 IC300(2/2) 放大，被 IC500 高通滤波，低通滤波，高通滤波，带阻滤波和去加重。

然后信号通过音频放大器 IC305(2/2)，电子音量控制器（IC307）和音频开关（Q308 接通），并且发送到音频功率放大器（IC313），被放大后输出到内置扬声器。

来自于位移存储器的音频静音信号（AM1）待机时变为低电平，给 IC313 供电的电路 Q302 和 Q305 断开。同时，IC500 按照来自于 MCU 的数据被设定为低功率模式，音频信号处于被静音状态。当输出音频时，音频静音信号变为高电平并接通 Q302 和 Q305，并向 IC313 的功率端点 VP 提供电压。同时，IC500 取消低功率模式。

扬声器被通用接口上的扬声器开关端点 SSW 的逻辑电路开启。当扬声器 - 话筒不接上时，SSW 的逻辑电路变为高电平且 SW(Q308) 被接通，同时信号被输入到 IC313 的两个放大器。

当扬声器 - 话筒接上时，SSW 与扬声器 - 话筒内的地线连接。因此，Q308 断开，音频信号只输入到 IC31 的 EXT SP 放大器。

有关 INT/EXT SP 的变化参见图 4。

AM1	SSW	VC1	VC2	SP
H	H	H	L	INT
H	L	L	H	EXT
L	H	L	L	静音
L	L	L	L	静音

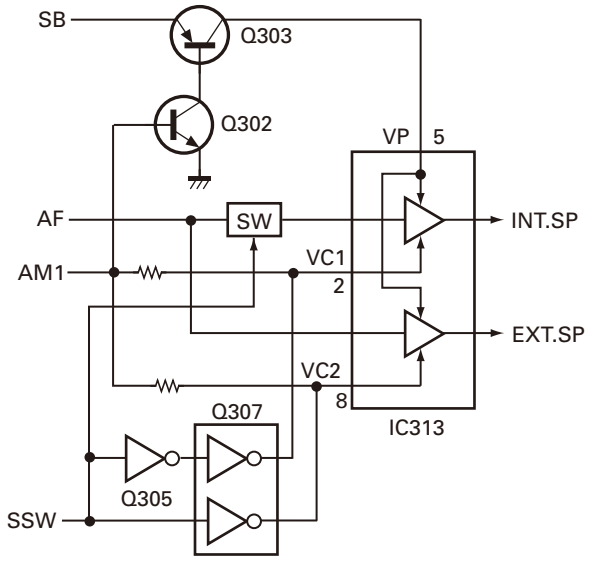


Fig. 4 Audio amplifier circuit / 图 4 音频放大器电路

CIRCUIT DESCRIPTION / 电路说明

3-5. Squelch circuit

The output from IC200 enters FM IF IC again, then passed through a band-pass filter. And passed through a band-pass filter IC201 (2/2). The modulation input. The noise component output from IC201 (2/2) is amplified by Q208 and rectified by D201 to produce a DC voltage corresponding to the noise level.

The DC voltage is sent to the analog port of the MCU (IC309). And IC200 outputs a DC voltage (RSSI) corresponding to the input of the IF amplifier. The MCU reads the RSSI signal via pin 93.

IC309 determines whether to output sounds from the speaker by comparing the input voltage of pin 91 and pin 93 with the preset value.

3-5. 静噪电路

IC200 的输出再次进入调频中频芯片，然后通过片上的带通滤波器。并通过带通滤波器 IC201(2/2)。调制输入。IC201(2/2) 输出的噪音成分被 Q208 放大并且被 D201 整流生成一个相对应于噪音电平的直流电压。

直流电压被发送到 MCU(IC309) 的模拟端口。IC200 生成一个相对应于中频放大器输入的直流电压 (RSSI)。MCU 通过管脚 93 读取 RSSI。

IC309 将管脚 91 和管脚 93 的输入电压与预设值进行比较后决定是否通过扬声器输出声音。

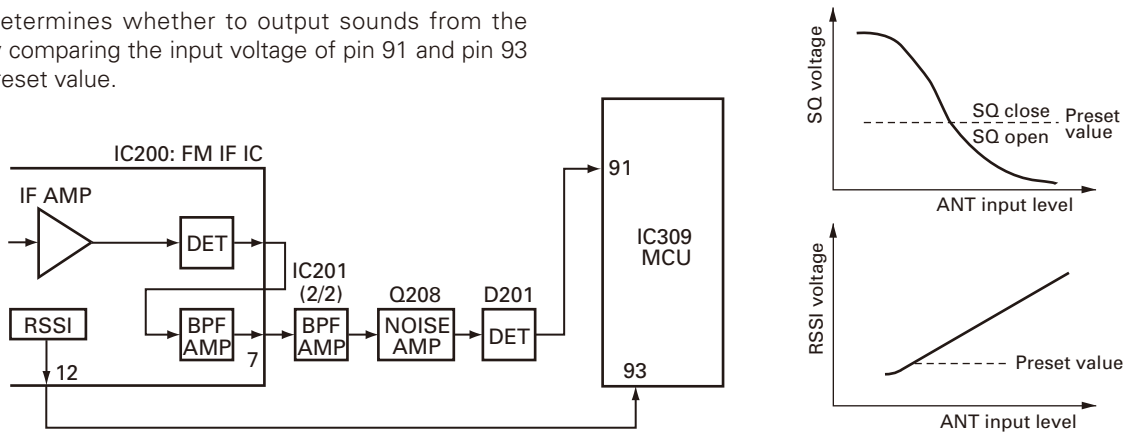


Fig. 5 Squelch and RSSI voltage vs ANT input level / 图 5 静噪和 RSSI 电压与 ANT 输入电平

4. Transmitter System

4-1. Microphone amplifier

The signal from the internal microphone goes through the mute switch (Q301).

When the SP-MIC is not attached, the microphone switching terminal (MSW) on the universal connector becomes High, and mute switch (Q301) is turned ON. When the SPMIC is attached, MSW is connected to GND at inside of SPMIC. For this reason, Q301 is turned OFF, the internal microphone is muted, and only the input of the external microphone is supplied to the microphone amplifier of the TX-RX unit.

The signal from microphone passes through the microphone mute switch (Q502 is off in TX), the limited circuit in D501 and amplified by IC501 (1/2) and passes through the high-pass filter, the ALC circuit, the low-pass filter, the high-pass filter, and preemphasis/IDC circuit in IC500 on the small board. When encoding DTMF, mute switch (Q501) is turned OFF for muting the microphone input signal.

The signal passes through the D/A converter (IC307) for the maximum deviation adjustment, and enters the summing amplifier consisting of IC305 (1/2), and is mixed with the low speed data from the MCU (IC309).

The output signal from the summing amplifier passes through the D/A converter (IC307) again and goes to the VCO modulation input.

The other output signal from the summing amplifier passes through the D/A converter (IC307) again for the BAL adjustment, and the buffer amplifier (IC302 (2/2)), and goes to the TCXO modulation input.

4. 发射部系统

4-1. 话筒放大器

来自于内置话筒的信号进入静音开关 (Q301)。

当扬声器 - 话筒不接上时，通用接口上的话筒开关端点 (MSW) 变为高电平，静音开关 (Q301) 接通。当扬声器 - 话筒接上时，MSW 与扬声器 - 话筒内的地线连接。因此，Q301 断开，内置话筒静音，并且只有外置话筒的输入提供给 TX-RX 单元的话筒放大器。

来自麦克风的信号通过麦克风静音开关 (发射时 Q502 关断)，D501 中的限幅电路，经过 IC501(1/2) 放大，并通过高通滤波器，ALC 电路，低通滤波器，高通滤波器，以及小板 IC500 上的预加重 /IDC 电路。当编码 DTMF 时，静音开关 (Q501) 关闭，以阻断麦克风输入信号。

信号通过数 / 模转换器 (IC307) 进行最大频偏调整，然后进入由 IC305(1/2) 组成的总和放大器，并且与来自于 MCU(IC309) 的低速率数据混合。

来自于加法放大器的输出信号再次通过数 / 模转换器 (IC307) 并进入 VCO 调制输入。

来自于总和放大器的其他输出信号再次通过数 / 模转换器 (IC307) 进行 BAL 调整，并通过缓冲放大器 (IC302 2/2)，然后进入 TCXO 调制输入。

CIRCUIT DESCRIPTION / 电路说明

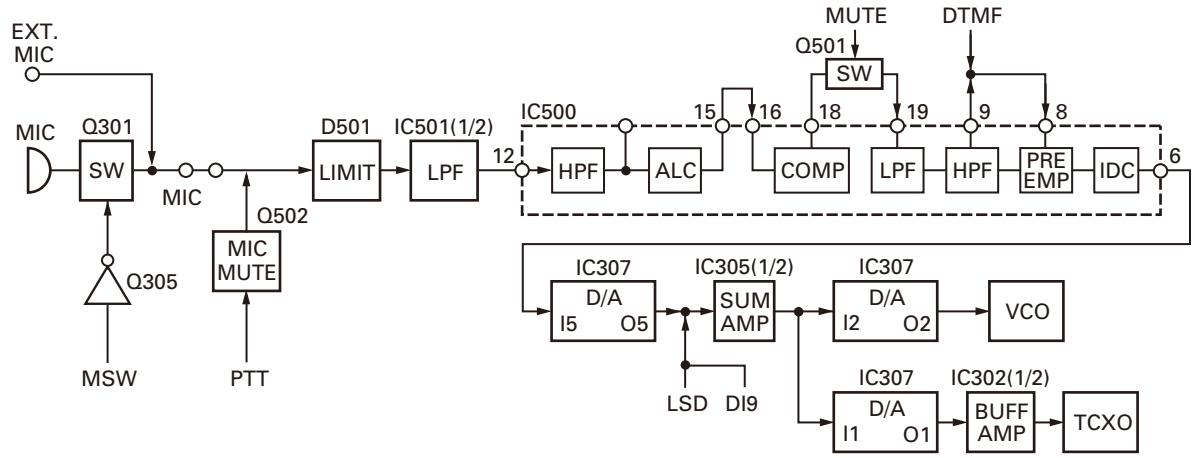


Fig. 6 Microphone amplifier / 图 6 话筒放大器

4-2. Drive and Final amplifier

The signal from the T/R switch (D101 is on) is amplified by the pre-drive (Q100 and Q101) and drive amplifier (Q103) to 50mW.

The output of the drive amplifier is amplified by the RF power amplifier (Q106) to 4.0W (1W when the power is low). The RF power amplifier is MOS FET transistor.

The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D102, D103 is on) and applied to the antenna terminal.

4-3. APC circuit

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

The voltage drop at R119, R120 and R123 are caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier (IC100 1/2).

IC100 (2/2) compares the output voltage of IC100 (1/2) with the reference voltage from IC307, and the output of IC100 (2/2) controls the VGG of the drive amplifier and the RF power amplifier to make the both voltages to same voltage.

The change of power high/low is carried out by the change of the reference voltage. Q105, Q107 and Q108 are turned on in transmit and the APC circuit is active.

4-2. 驱动和末级放大器

来自于 T/R 开关（D101 接通）的信号被前置驱动（Q100 和 Q101）和驱动放大器（Q103）放大到 50mW。

驱动放大器的输出被射频功率放大器（Q106）放大到 4.0W（当低功率时为 1W）。射频功率放大器是 MOS FET 晶体管。然后射频功率放大器的输出通过谐波滤波器（LPF）和天线开关（D102，D103 接通）提供给天线端点。

4-3. 自动功率控制电路

APC 电路保持监测通过驱动放大器（Q103）和射频功率放大器（Q106）的电流，并保持其稳定。流经射频功率放大器的电流使 R119，R120 和 R123 的电压降低并且此电压提供给差分放大器（IC100 1/2）。

IC100(2/2) 将 IC100(1/2) 的输出电压与来自于 IC307 的参考电压进行比较，IC100(2/2) 的输出控制发射驱动放大器和末级放大器的 VGG 使两种电压保持一致。

通过改变参考电压来进行高 / 低功率的修改。发送时 Q105，Q107 和 Q108 接通并且自动功率控制电路被激活。

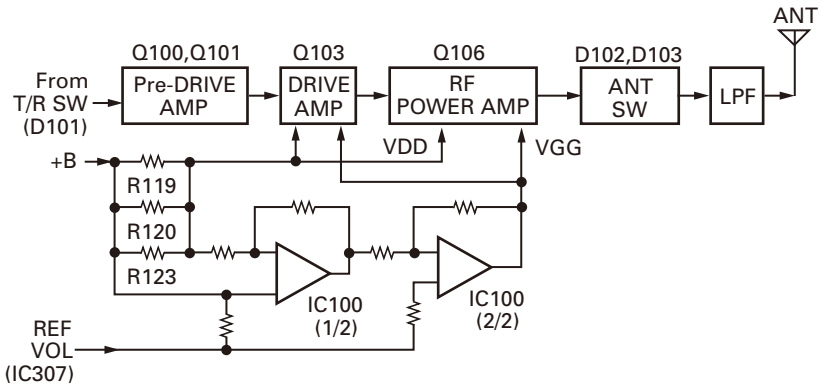


Fig. 7 Drive and Final amplifier, APC circuit / 图 7 驱动和末级放大器，自动功率控制电路

CIRCUIT DESCRIPTION / 电路说明

5. Frequency Synthesizer Circuit

The frequency synthesizer consists of the TCXO (X1), VCO, PLL IC (IC1) and buffer amplifiers.

The TCXO generates 16.8MHz. The frequency stability is 1.0ppm within the temperature range of –30 to +60°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 305.15~345.15MHz and the 350~390MHz. The VCO generates 305.15~345.15MHz for providing to the first local signal in receive. The operating frequency is generated by Q3 in transmit mode and Q2 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator (IC1) to the variable capacitor diodes (D1 and D3 in transmit mode and D2 and D4 in receive mode).

The T/R pin of IC312 goes "high" in receive mode causing Q4, Q6 and Q3 turn off, and Q2 turn on. The T/R pin goes "low" in transmit mode.

The outputs from Q2 and Q3 are amplified by buffer amplifier (Q5) and doubled by Q1 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 12.5kHz). The input signal from the pins 8 and 5 of the PLL IC is divided down to the 12.5kHz 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 DP (pin 73), CP (pin 74) and EP (pin 72) of the MCU (IC309). 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 30 (UL) of the MCU. When the PLL is unlocked, the UL goes low.

5. 频率合成器电路

频率合成器由 TCXO(X1)、VCO、PLL IC(IC1) 和缓冲放大器组成。

TCXO 产生 16.8MHz 的频率。在温度为 -30~+60℃的范围内，频率的稳定性为 1.0ppm。进行频率调谐和 TCXO 调制，以便给 TCXO 的针脚 1 提供电压。TCXO 的输出加在 PLL IC 的针脚 8 上。

VCO 由 2VCO 组成，并且覆盖了 305.15~345.05MHz 和 350~390MHz 双波段。VCO 产生 305.15~345.05MHz 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 Q3 产生，而接收模式时，操作频率由 Q2 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 D1 和 D3，在接收模式是 D2 和 D4）的相位比较器（IC1）处获得。

IC312 的 T/R 针脚在接收模式时为"高"电位，使 Q4、Q6 和 Q3 关断，Q2 打开。T/R 针脚在发射模式时为"低"电位。

Q2 和 Q3 的输出由缓冲放大器（Q5）放大，并由 Q1 倍频，然后发送到 PLL IC。

PLL IC 由预计数器、基准除法器、相位比较器、电荷泵组成（PLL 电路的频率步长为 12.5kHz）。PLL IC 的针脚 8 和 5 的输入信号下分成 12.5kHz，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 MCU(IC309) 的 DP（针脚 73），CP（针脚 74）和 EP（针脚 72）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 MCU 的针脚 30(UL) 监控。当 PLL 失锁时，UL 为低电位。

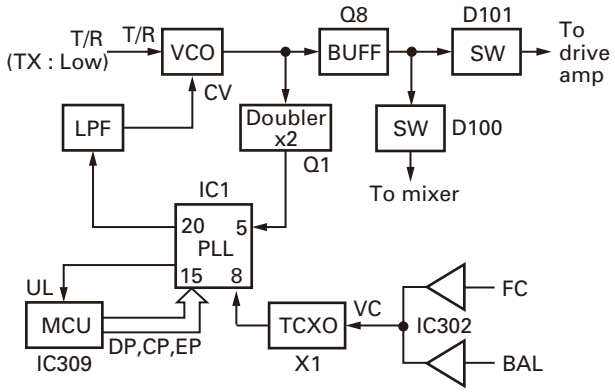


Fig. 8 PLL block diagram / 图 8 PLL 方块图

CIRCUIT DESCRIPTION / 电路说明

6. Control Circuit

The control circuit consists of MCU (IC309) and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the display unit. IC309 mainly performs the following;

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

6-1. Memory circuit

Memory circuit consists of the MCU (IC309) and a flash memory (IC308), a flash memory has a capacity of 4M bits that contains the transceiver control program for the MCU and data such as transceiver channels and operating features.

This program can be easily written from an external devices. Data. such as operating status, are programmed into the EEPROM (IC310).

• Flash Memory

Note: The flash memory stores the data containing the FPU (KPG-74D CPS) program, Security Number (MPT Serial Number) and firmware program (User mode, Test mode, Tuning mode, etc.). This data must be reinstalled when replacing the flash memory.

• EEPROM

Note: The EEPROM stores tuning data (Deviation, Squelch, etc.). Realign the transceiver after replacing the EEPROM.

6. 控制电路

控制电路由 MCU（IC309）和其外围电路组成。MCU 控制 TX-RX 单元和发送到显示单元的数据以及从显示单元发送的数据。IC309 主要执行下述功能：

1) 通过 PTT 信号输出在发射和接收之间转换。
2) 从存储器电路读取系统，组，频率和编程数据。
3) 向 PLL 发送频率编程数据。
4) 通过来自于静噪电路的直流电压控制静噪的开启 / 关闭。
5) 通过解码数据输入控制音频静音电路。
6) 发送音频和编码数据。

6-1. 存储器电路

记忆电路由 MCU（IC309）和一块闪存（IC308）组成。闪存容量 4MB，载有 MCU 所需的收发机控制程序以及收发机信道、功能设置等数据。

可以方便地使用外部设备写这个程序。工作状态等数据编写在 EEPROM（IC310）中。

• 闪存

注释：闪存保存的数据包括 FPU（KPG-74D CPS）程序，安全码（MPT 序列号）和固件编程（用户模式，测试模式，调谐模式等）。当更换闪存时，必须重新安装数据。

• EEPROM

注释：EEPROM 保存调谐数据（频偏，静噪）。更换 EEPROM 后重新调校对讲机。

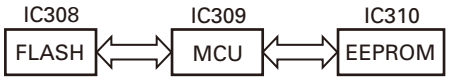


Fig. 9 Memory circuit / 图 9 存储器电路

6-2. Low battery warning

The battery voltage is monitored by the MCU (IC309). When the battery voltage falls below the voltage set by the Low Battery Warning adjustment, the red LED flashes to notify the operator that it is time to replace the battery. If the battery voltage falls even more (approx. 6.1V), a beep sounds and transmission is stopped.

Low battery warning	Battery condition
The red LED flashes during transmission	The battery voltage is low but the transceiver is still usable.
The red LED flashes and continuous beep sounds while PTT pressed	The battery voltage is low and the transceiver is not usable to make calls.

6-2. 电池低压告警

通过 MCU（IC309）监视电池电压。当电池的电压低于通过电池低压告警调整设定的电压时，红色指示灯闪烁以提示操作者更换电池。如果电池的电压继续降低（大约 6.1V），则发出 beep 音并停止发送。

电池低压告警	电池状态
发射过程中红色指示灯闪烁。	电池电压降低但仍可使用对讲机。
当按下 PTT 键时红色指示灯闪烁并且对讲机发出连续 beep 音。	电池电压降低不能使用对讲机发出呼叫。

CIRCUIT DESCRIPTION / 电路说明

7. Signaling Circuit

7-1. Encode

• Low-speed data (QT, DQT)

Low-speed data is output from pin 1 of the MCU. The signal passes through a low-pass CR filter, and goes to the summing amplifier (IC305 1/2). The signal is mixed with the audio signal and goes to the VCO and TCXO (X1) modulation input after passing through the D/A converter (IC307) for BAL adjustment.

• High-speed data (DTMF)

High-speed data is output from pin 2 of the MCU. The signal passes through a low-pass filter consisting of IC304, and provides a TX DTMF tone and a RX DTMF tone TX DTMF deviation making an adjustment by MCU is passed through the D/A convertor (IC307), and then applied to the audio processor (IC500).

The signal is mixed with the audio signal and goes to the VCO and TCXO, the RX DTMF tone is passed a summing amplifier (IC305 2/2), the D/A converter (IC307) for audio control, audio power amplifier and then to the speaker.

• FFSK

ESN utilizes 1200bps FFSK signal. FFSK signal is output from pin 6 of IC500. The signal passes through the D/A converter (IC307) for the FFSK deviation adjustment. and is routed to the VCO. When encoding FFSK, the microphone input signal is muted.

7. 信令电路

7-1. 编码

• 低速率数据（QT，DQT）

MCU 的管脚 1 输出低速率数据。信号通过低通陶瓷滤波器进入总和放大器（IC305 1/2）。此信号与音频信号混合，通过数 / 模转换器（IC307）进行 BAL 调整后进入 VCO 和 TCXO(X1) 调制输入。

• 高速率数据（DTMF）

MCU 的管脚 2 输出高速率数据。信号通过 IC304 组成的低通滤波器，并提供 TX DTMF 音频和 RX DTMF 音频。通过 MCU 调整 TX DTMF 频偏并进入数 / 模转换器（IC307），然后提供给音频处理器（IC500）。

此信号与音频信号混合后进入 VCO 和 TCXO，RX DTMF 通过总和放大器（IC305 2/2），数 / 模转换器（IC307）进行音频控制，音频功率放大器，然后进入扬声器。

• FFSK

ESN 使用 1200bps FFSK 信号。IC500 的管脚 6 输出 FFSK 信号。此信号通过数 / 模转换器（IC307）进行 FFSK 频偏调整，然后进入 VCO。当编码 FFSK 时，话筒输入信号为静音。

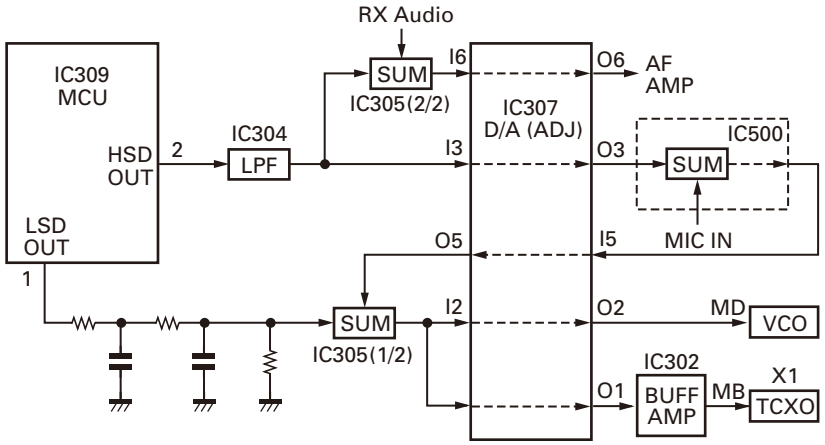


Fig. 10 Encode / 图 10 编码

7-2. Decode

• Low-speed data (QT, DQT)

The demodulated signal from the IF IC (IC200) is amplified by IC300 (2/2) and passes through a low-pass filter (IC306) to remove audio components. The signal is input to pin 95 of the MCU.

The MCU digitizes this signal, performs processing such as DC restoration, and decodes the signal.

7-2. 解码

• 低速率数据（QT，DQT）

来自于中频芯片（IC200）的已解调的信号被 IC300(2/2) 放大，然后通过低通滤波器（IC306）消除音频成分。此信号被输入到 MCU 的管脚 95。

MCU 使信号数字化，执行诸如直流恢复和解码信号这样的步骤。

CIRCUIT DESCRIPTION / 电路说明

• FFSK

The FFSK input signal from the IF IC is amplified by IC300 (1/2) and goes to pin 5 of IC500. The signal is demodulated by FFSK demodulator in IC500. The demodulated data goes to the MCU for processing.

• FFSK

来自于中频芯片的 FFSK 输入信号被 IC300(1/2) 放大，然后进入 IC500 的管脚 5。此信号被 IC500 中的 FFSK 解调器解调。已解调的数据进入 MCU 执行操作。

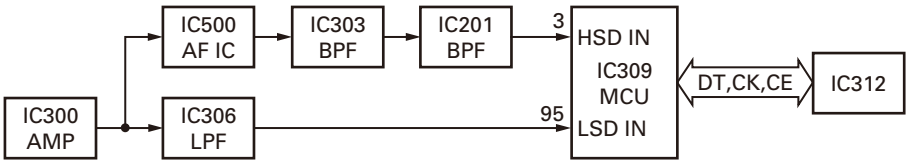


Fig. 11 Decode / 图 11 解码

8. Power Supply Circuit

Battery +B is supplied via a 3A fuse from the battery terminal connected to the TX-RX unit. After passing through the power switch, power supply (SB) is applied to the three AVRs. IC401 supplies 5V (5M) to the control circuit, and IC403 supplies 5V (5C) to common circuits. IC402 supplies to the TX circuit, the RX circuit and common circuits of needless save mode. During transmission, 5TC becomes Low and Q405 is turned ON to supply 5V (5T) to the TX circuit. During reception, 5RC becomes Low and Q404 is turned ON to supply 5V (5R) to the RX Circuit.

The power supply voltage monitor IC (IC404) monitors power supply voltage (SB). If the voltage falls (less than 5V), the VOUT port goes "LOW" level, the MCU INT port also goes "LOW" level, and the MCU stops.

8. 电源电路

经由来自于连接到 TX-RX 单元的电池端点的 3A 保险丝提供电池＋ B。通过电源开关后，电源 (SB) 向 3 个 AVRs 提供电压。IC401 向控制电路提供 5V(5M) 电压，IC403 向共用电路提供 5V(5C) 电压。IC402 向 TX 电路，RX 电路和共用电路的保存模式提供电压。在发送过程中，5TC 变为低电平，且 Q405 接通并向 TX 电路提供 5V(5T) 电压。在接收过程中，5RC 变为低电平，且 Q404 接通并向 RX 电路提供 5V(5R) 电压。

电源电压监测 IC(IC404) 监测电源电压 (SB)。如果电压下降 (低于 5V)，则 VOUT 端口变为“低”电平，MCU INT 端口也变为“低”电平，MCU 停止运行。

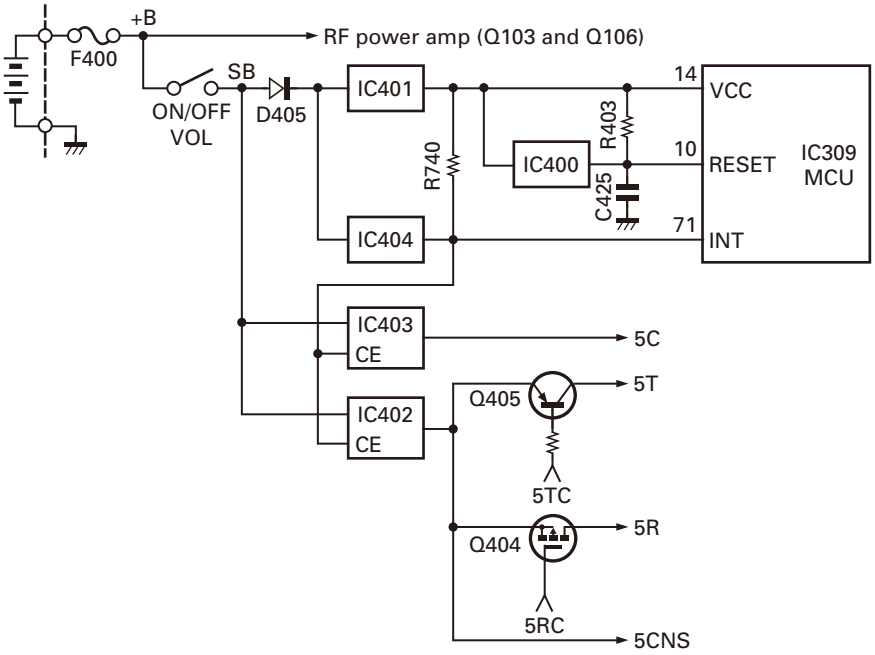


Fig. 12 Power supply circuit / 图 12 电源电路

SEMICONDUCTOR DATA / 半导体数据

MCU: 30622MEP526GU (TX-RX unit IC309)

Pin No.	Port Name	I/O	Function
1	LSDO	O	Low speed data output.
2	HSDO	O	High speed data output.
3	HSDI	I	High speed data input.
4	DSTB	O	D/A converter data strobe output.
5	5RC	O	RX power control. H: TX, L: RX
6	BYTE	-	+5V.
7	CNVSS	-	GND.
8	AFDAT	O	MODEM MSK encode data output.
9	AFRDT	I	MODEM MSK decode data input.
10	RESET	-	Key scan IC reset output.
11	XOUT	-	MCU clock.
12	VSS	-	GND.
13	XIN	-	MCU clock.
14	VCC	-	+5V.
15,16	-	-	NC (Non connect).
17	AFTRD	I	FFSK modulation data output timing pulse input.
18	AFRTM	I	FFSK demodulation data input timing pulse input.
19	EEPDAT	I/O	EEPROM data output.
20	BEEP	O	Beep data output.
21	SKEY	I	[S] key input.
22	AKEY	I	[A] key input.
23	BKEY	I	[B] key input.
24	CKEY	I	[C] key input.
25	AUX	I	[AUX] key input.
26	PTT	I	[PTT] key input.
27	SIDE2	I	[SIDE2] key input.
28	SIDE1	I	[SIDE1] key input.
29	AUXTXD	I	NC (Non connect).
30	UL	I	PLL unlock detect input.
31	DTMDAT	I	DTMF decode IC data detect input.
32	PLLTYP	I/O	PLL type detection.
33	TXD	O	External serial interface (COM0) TXD0 (To microphone connector).
34	RXD	I	External serial interface (COM0) RXD0 (To microphone connector).
35	DAT	O	Common data output
36	CLK	O	Common clock output.
37	RDY	-	Not used.
38	ALE	-	Not used.
39	HOLD	-	Not used.
40	HLDA	-	Not used.
41	BLCK	-	Not used.
42	RD	O	Flash memory RD bus.

MCU: 30622MEP526GU(TX-RX 单元 IC309)

管脚号	端口名称	输入/输出	管 脚 功 能
1	LSDO	输出	低速率数据输出。
2	HSDO	输出	高速率数据输出。
3	HSDI	输入	高速率数据输入。
4	DSTB	输出	D/A 转换器数据选通输出。
5	5RC	输出	接收供电控制。H: 发射 , L: 接收
6	BYTE	–	+5V。
7	CNVSS	–	接地。
8	AFDAT	输出	MODEM MSK 编码数据输出。
9	AFRDT	输入	MODEM MSK 译码数据输入。
10	RESET	–	按键扫描 IC 复位输出。
11	XOUT	–	CPU 时钟。
12	VSS	–	接地。
13	XIN	–	CPU 时钟。
14	VCC	–	+5V。
15, 16	–	–	NC(无连接)。
17	AFTRD	输入	FFSK 调制数据输出计时脉冲输入。
18	AFRTM	输入	FFSK 调制数据输入计时脉冲输入。
19	EEPDAT	输入/输出	EEPROM 数据输出。
20	BEEP	输出	Beep 数据输出。
21	SKEY	输入	[S] 按键输入。
22	AKEY	输入	[A] 按键输入。
23	BKEY	输入	[B] 按键输入。
24	CKEY	输入	[C] 按键输入。
25	AUX	输入	[AUX] 按键输入。
26	PTT	输入	[PTT] 按键输入。
27	SIDE2	输入	[侧面 2] 按键输入。
28	SIDE1	输入	[侧面 1] 按键输入。
29	AUXTXD	输入	NC(无连接)。
30	UL	输入	PLL 失锁检测输入。
31	DTMDAT	输入	DTMF 解码 IC 数据检测输入。
32	PLLTYP	输入/输出	PLL 类型检测。
33	TXD	输出	外部串行接口 (COM0)TXD0 (麦克风接口)。
34	RXD	输入	外部串行接口 (COM0)RXD0 (麦克风接口)。
35	DAT	输出	公共数据输出。
36	CLK	输出	共用时钟输出。
37	RDY	–	不使用。
38	ALE	–	不使用。
39	HOLD	–	不使用。
40	HLDA	–	不使用。
41	BLCK	–	不使用。
42	RD	输出	闪速存储器 RD 总线。

SEMICONDUCTOR DATA / 半导体数据

Pin No.	Port Name	I/O	Function
43	BHE	-	Not used.
44	WR	O	Flash memory WR bus.
45	SAVE	O	Battery save output.
46	SELF	I	NC (Non connect).
47	CS/MODE	O	LCD driver chip select output.
48	CS0	O	Flash memory chip enable.
49	A19	-	Not used.
50~59	A18~A9	-	Flash memory address bus.
60	Vcc	-	+5V.
61	A8	O	Flash memory address bus.
62	VSS	-	GND.
63~70	A7~A0	O	Flash memory address bus.
71	INT	I	Voltage detect input.
72	EP	O	PLL IC data strobe output.
73	DP	O	PLL IC data output.
74	CP	O	PLL IC clock output.
75~78	EN4~1	I	Rotary SW input 4~1.
79~86	D7~D0	I	Flash memory data bus.
87	PF	I	SP-MIC PF switch input.
88	VOL	I	Volume level input.
89	BATT2	I	Battery distinction input.
90	BATT1	I	Battery voltage input.
91	ASQL	I	Squelch level input.
92	TEMP	I	Thermistor input.
93	RSSI	I	Received signal strength indicator input (RSSI).
94	AVSS	-	GND.
95	LSDI	I	Low speed data input.
96	VREF	-	+5V.
97	AVCC	-	+5V.
98	SFTSTB1	O	Shift register data strobe output.
99	OE	O	Shift register output enable output.
100	AFSTB	O	MODEM data strobe output.

管脚号	端口名称	输入/输出	管 脚 功 能
43	BHE	–	不使用。
44	WR	输出	闪速存储器 WR 总线。
45	SAVE	输出	电池省电模式输出。
46	SELF	输入	NC(无连接)。
47	CS/MODE	输出	LCD 驱动程序芯片选择输出。
48	CS0	输出	闪存芯片有效。
49	A19	–	不使用。
50~59	A18~A9	–	闪存地址总线。
60	Vcc	–	+5V。
61	A8	输出	闪存地址总线。
62	VSS	–	接地。
63~70	A7~A0	输出	闪存地址总线。
71	INT	输入	电压检测输入。
72	EP	输出	PLL 芯片数据选通输出。
73	DP	输出	PLL IC 数据输出。
74	CP	输出	PLL IC 时钟输出。
75~78	EN4~1	输入	旋转开关输入 4~1。
79~86	D7~D0	输入	闪存数据总线。
87	PF	输入	扬声器－麦克风编程功能开关输入。
88	VOL	输入	音量电平输入。
89	BATT2	输入	电池差异输入。
90	BATT1	输入	电池电压输入。
91	ASQL	输入	静噪电路电平输入。
92	TEMP	输入	热敏电阻输入。
93	RSSI	输入	接收到的信号强度指示输入(RSSI)。
94	AVSS	–	接地。
95	LSDI	输入	低速率数据输入。
96	VREF	–	+5V。
97	AVCC	–	+5V。
98	SFTSTB1	输出	位移寄存器数据选通输出。
99	OE	输出	移位寄存器输出启用输出。
100	AFSTB	输出	MODEM 数据选通输出。

COMPONENTS DESCRIPTION / 元件说明

TX-RX UNIT (X57-6413-01)

Ref. No.	Use / Function	Operation / Condition
IC1	IC	PLL IC
IC100	IC	APC AMP
IC200	IC	IF IC
IC201	IC	AF AMP filter
IC300	IC	AF AMP filter
IC302~306	IC	AF AMP filter
IC307	IC	Potential meter
IC308	IC	Flash memory
IC309	IC	MCU
IC310	IC	EEPROM
IC311,312	IC	Shift register
IC313	IC	AF power AMP
IC400	IC	Detector
IC401	IC	5M AVR (Automatic Voltage Regulator)
IC402	IC	5CNS AVR (Automatic Voltage Regulator)
IC403	IC	5C AVR (Automatic Voltage Regulator)
IC404	IC	Detector
IC500	IC	Base band
IC501	IC	AF AMP filter
Q1	Transistor	Doubler
Q2	FET	RX VCO oscillation
Q3	FET	TX VCO oscillation
Q4	FET	VCO switch
Q5	Transistor	Buffer AMP
Q6	Transistor	VCO switch
Q7	Transistor	Ripple filter
Q8	Transistor	TX/RX common RF AMP
Q100,101	Transistor	Pre-drive AMP
Q103	FET	TX drive AMP
Q104,105	Transistor	APC switch
Q106	FET	TX final AMP
Q107	FET	APC switch
Q108	Transistor	APC switch
Q201,202	Transistor	W/N switch
Q203	FET	AF detect switch
Q204	FET	DM switch
Q205	Transistor	IF AMP
Q206	FET	Front-end 1st mixer
Q207	FET	Front-end RF AMP
Q208	Transistor	Noise AMP
Q300	Transistor	Beet shift switch
Q301	FET	MIC mute
Q302	Transistor	AF AMP AVR switch
Q303	Transistor	AF AMP AVR
Q304	Transistor	LCD AVR
Q305	FET	Internal/External switch

TX-RX 单元 (X57-6413-01)

编　号	使用 / 功能	操　作 / 状　态
IC1	IC	PLL IC
IC100	IC	自动功率控制放大器
IC200	IC	中频 IC
IC201	IC	音频放大器滤波器
IC300	IC	音频放大器滤波器
IC302~306	IC	音频放大器滤波器
IC307	IC	电位计
IC308	IC	闪速存储器
IC309	IC	MCU
IC310	IC	EEPROM
IC311, 312	IC	移位寄存器
IC313	IC	音频功率放大器
IC400	IC	探测器
IC401	IC	5M 自动调压器
IC402	IC	5CNS 自动调压器
IC403	IC	5C 自动调压器
IC404	IC	探测器
IC500	IC	基带 IC
IC501	IC	音频放大器滤波器
Q1	晶体管	倍频放大器
Q2	场效应管	接收 VCO 振荡
Q3	场效应管	发射 VCO 振荡
Q4	场效应管	VCO 开关
Q5	晶体管	缓冲放大器
Q6	晶体管	VCO 开关
Q7	晶体管	脉动滤波器
Q8	晶体管	发射 / 接收公用射频放大
Q100, 101	晶体管	前驱动放大器
Q103	场效应管	发射驱动放大器
Q104, 105	晶体管	自动功率控制开关
Q106	场效应管	发射最终放大器
Q107	场效应管	自动功率控制开关
Q108	晶体管	自动功率控制开关
Q201, 202	晶体管	宽 / 窄开关
Q203	场效应管	音频检测开关
Q204	场效应管	DM 开关
Q205	晶体管	中频放大器
Q206	场效应管	前端第一混频器
Q207	场效应管	前端射频放大
Q208	晶体管	噪音放大器
Q300	晶体管	Beet 偏移开关
Q301	场效应管	麦克风静音
Q302	晶体管	音频放大自动调压器开关
Q303	晶体管	音频放大自动调压器
Q304	晶体管	LCD 自动调压器
Q305	场效应管	内 / 外开关

COMPONENTS DESCRIPTION / 元件说明

Ref. No.	Use / Function	Operation / Condition
Q306	Transistor	TX LED switch
Q307,308	FET	Internal/External switch
Q309	Transistor	BUSY LED switch
Q310	Transistor	LCD LED AVR switch
Q311	Transistor	LCD LED AVR
Q312	Transistor	PLL selector
Q400,401	FET	5MS switch
Q403	Transistor	5R switch
Q404	FET	5R switch
Q405	Transistor	5T switch
Q406	FET	SAVE switch
Q500	Transistor	RX AF mute
Q501	FET	TX AF mute
Q502	FET	MIC mutte
D1	Variable capacitance diode	TX VCO
D2	Variable capacitance diode	RX VCO
D3	Variable capacitance diode	TX VCO
D4	Variable capacitance diode	RX VCO
D5	Variable capacitance diode	TX VCO modulation
D6	Diode	Ripple filter switch
D11,12	Diode	PLL lock speed up
D13,14	Diode	F-in filter shift switch
D100,101	Diode	TX/RX RF switch
D102~105	Diode	ANT switch
D106	Zener diode	APC protect
D200	Diode	SQL (Squelch) voltage charge
D201	Diode	SQL rectification
D202,203	Diode	W/N Switch
D204~207	Variable capacitance diode	BPF (Band pass filter) tuning
D209	Diode	DM charge/discharge switch
D301	Diode	AF AMP protect
D302	Diode	Surge absorption
D303,304	Zener diode	Protect
D305	Zener diode	AF AMP AVR
D306	Diode	Surge absorption
D307	Zener diode	Protect
D308	Zener diode	MIC input protect
D309	LED	TX red LED
D310	LED	RX green LED
D402	Diode	Surge absorption
D403	Diode	5MS protect switch
D405	Diode	5M protect
D501	Diode	MIC input protect

编　号	使用 / 功能	操　作 / 状　态
Q306	晶体管	发射发光二极管开关
Q307, 308	场效应管	内 / 外开关
Q309	晶体管	BUSY LED 开关
Q310	晶体管	LCD LED AVR 开关
Q311	晶体管	LCD LED AVR
Q312	晶体管	PLL 类型选择器
Q400, 401	场效应管	5MS 开关
Q403	晶体管	5R 开关
Q404	场效应管	5R 开关
Q405	晶体管	5T 开关
Q406	场效应管	SAVE 开关
Q500	晶体管	接收音频静音开关
Q501	场效应管	发射音频静音开关
Q502	场效应管	麦克风静音
D1	可变电容二极管	发射 VCO
D2	可变电容二极管	接收 VCO
D3	可变电容二极管	发射 VCO
D4	可变电容二极管	接收 VCO
D5	可变电容二极管	发射 VCO 调制
D6	二极管	脉动滤波器开关
D11, 12	二极管	PLL 锁加速
D13, 14	二极管	F-in 滤波器转移开关
D100, 101	二极管	发射 / 接收射频开关
D102~105	二极管	天线开关
D106	齐纳二极管	自动功率控制保护
D200	二极管	SQL（抑制）电压充电
D201	二极管	SQL 整流
D202, 203	二极管	宽 / 窄开关
D204~207	可变电容二极管	BPF（带通滤波器）调谐
D209	二极管	DM 充电 / 放电开关
D301	二极管	音频放大器保护
D302	二极管	浪涌吸收
D303, 304	齐纳二极管	保护
D305	齐纳二极管	音频放大自动调压器
D306	二极管	浪涌吸收
D307	齐纳二极管	保护
D308	齐纳二极管	麦克风输入保护
D309	发光二极管	发射红发光二极管
D310	发光二极管	接收绿发光二极管
D402	二极管	浪涌吸收
D403	二极管	5MS 保护开关
D405	二极管	5M 保护
D501	二极管	麦克风输入保护

PARTS LIST / 零件表

✻ New Parts. ⚠indicates safety critical components.
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia **K** : USA **P** : Canada
Y : PX (Far East, Hawaii) **T** : England **E** : Europe
Y : AAFES (Europe) **X** : Australia **M** : Other Areas

TK-3148 (Y50-5643-01)
TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-3148					
1	1B		A02-3653-34	PLASTIC CABINET ASSY	
2	3A	✻	A10-4063-21	CHASSIS	
3	2B		A22-2519-02	SUB PANEL	
5	3B	✻	B01-0694-13	ESCUTCHEON (BELT HOOK)	
6	2C		B09-0625-03	CAP ACCESSORY	
7	3B		B10-2770-02	FRONT GLASS	
8	1A		B38-0890-15	LCD ASSY	
9	1C		B62-1756-00	INSTRUCTION MANUAL	
11	3B		E04-0467-05	RF COAXIAL RECEPTACLE (SMA)	
12	3B		E23-1188-04	TERMINAL (ANTENNA)	
13	3A		E23-1189-14	TERMINAL (BATT-)	
14	2A,3A		E37-0978-05	LEAD WIRE WITH CONNECTOR (SW2)	
15	3A		E37-1007-05	LEAD WIRE WITH CONNECTOR (PTT)	
16	3B		E58-0440-15	RECTANGULAR RECEPTACLE	
17	3A		E72-0413-03	TERMINAL BLOCK (BATT TERMINAL)	
19	2A		F10-2415-04	SHIELDING PLATE (MCU)	
20	1A		F10-2416-13	SHIELDING PLATE (LCD)	
21	2A		F10-2444-04	SHIELDING PLATE (SPEAKER)	
22	2A	✻	F10-2463-04	SHIELDING COVER (AUDIO AMP)	
23	3A,3B		F15-1006-04	SHADE (CHASSIS)	
24	1A		F20-1192-04	INSULATING SHEET (LCD)	
25	3A	✻	F20-3307-14	INSULATING SHEET	
27	1B		G10-1304-04	FIBROUS SHEET (CABINET)	
28	2A		G10-1324-04	FIBROUS SHEET (LCD)	
29	3A		G10-1377-04	FIBROUS SHEET (PTT PCB)	
30	3A		G11-2622-04	SHEET (CHASSIS)	
31	3A		G11-4046-14	SHEET (PTT)	
32	3A	✻	G11-4090-14	SHEET (FINAL FET)	
33	1A		G11-4174-04	SHEET (LCD)	
70	1A		G11-4189-04	SHEET (CABINET)	
71	1B		G11-4190-04	SHEET (CABINET)	
34	1A		G11-4297-14	SHEET (CABINET)	
35	1A		G11-4388-04	SHEET (LCD)	
36	3A		G13-1885-04	CUSHION (CHASSIS)	
37	2B		G13-2010-04	CUSHION (ECM)	
38	3A		G53-1547-04	PACKING (TERMINAL BLOCK)	
39	3A		G53-1620-04	PACKING (ANTENNA)	
40	2B		G53-1710-02	PACKING (TOP)	
41	2B		G53-1732-01	PACKING (4-KEY)	
43	1D		H52-2007-02	ITEM CARTON CASE	
45	2A		J19-5430-03	HOLDER (VOL/ENC)	
46	2A		J21-8424-04	MOUNTING HARDWARE	
47	2C		J29-0701-15	BELT HOOK ACCESSORY	
48	1B		J30-1269-04	SPACER (VOLUME)	
49	2B	✻	J82-0078-15	FPC (VOL/ENC)	
50	3B		J82-0079-05	FPC (UNIVERSAL)	
52	1B		K29-9131-03	KNOB (PTT)	
53	1A		K29-9132-03	KEY TOP (SW1,SW2)	
54	1B		K29-9133-13	KNOB (VOLUME)L	
55	1B		K29-9134-13	KNOB (ENC)	

Ref. No.	Address	New parts	Parts No.	Description	Destination
A	2C		N08-0548-24	DRESSED SCREW ACCESSORY	
B	3A		N09-6565-05	PAN HEAD SCREW	
C	3B		N14-0834-04	CIRCULAR NUT (VOL/ENC)	
D	3B		N30-2604-48	PAN HEAD MACHINE SCREW (ANT)	
E	3B		N30-3006-43	PAN HEAD MACHINE SCREW	
F	3B		N79-2035-48	PAN HEAD TAPTITE SCREW	
G	1A,2A		N83-2005-48	PAN HEAD TAPTITE SCREW	
57	2B		R31-0617-05	VARIABLE RESISTOR	
59	2B		S60-0415-05	ROTARY SWITCH	
61	2B		T07-0732-25	SPEAKER	
62	2D	✻	T90-1032-55	HELICAL ANTENNA	
63	2B		T91-0630-05	MIC ELEMENT	
TX-RX UNIT (X57-6413-01)					
D309			B30-2156-05	LED (RED)	
D310			B30-2157-05	LED (YELLOW)	
C1			CK73HB1H471K	CHIP C 470PF K	
C2			CK73HB1H102K	CHIP C 1000PF K	
C4			CC73HCH1H100D	CHIP C 10PF D	
C5			CK73HB1H471K	CHIP C 470PF K	
C8			CK73HB1C103K	CHIP C 0.010UF K	
C9			CC73HCH1H100D	CHIP C 10PF D	
C10			CK73HB1C103K	CHIP C 0.010UF K	
C11			CC73HCH1H101J	CHIP C 100PF J	
C13			CC73HCH1H101J	CHIP C 100PF J	
C14			CK73HB1H471K	CHIP C 470PF K	
C15			CC73HCH1H050C	CHIP C 5.0PF C	
C16			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV	
C17			CC73HCH1H050C	CHIP C 5.0PF C	
C18			CC73HCH1H030C	CHIP C 3.0PF C	
C19			CC73HCH1H101J	CHIP C 100PF J	
C20			CC73HCH1H030C	CHIP C 3.0PF C	
C21			CC73HCH1H040C	CHIP C 4.0PF C	
C22			CC73HCH1H050C	CHIP C 5.0PF C	
C24			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV	
C25			CC73HCH1H1R5C	CHIP C 1.5PF C	
C27,28			CC73HCH1H101J	CHIP C 100PF J	
C29			CK73HB1H102K	CHIP C 1000PF K	
C30			CC73HCH1H101J	CHIP C 100PF J	
C31			CC73HCH1H090B	CHIP C 9.0PF B	
C32			CC73HCH1H080B	CHIP C 8.0PF B	
C33			CC73HCH1H220J	CHIP C 22PF J	
C34			CC73HCH1H090D	CHIP C 9.0PF D	
C35			CC73HCH1H010B	CHIP C 1.0PF B	
C36			CC73GCH1H040B	CHIP C 4.0PF B	
C37			CC73GCH1H010B	CHIP C 1.0PF B	
C38			CC73GCH1H030B	CHIP C 3.0PF B	
C39			CK73HB1H471K	CHIP C 470PF K	
C40			CC73GCH1H020B	CHIP C 2.0PF B	
C41			CC73GCH1H030B	CHIP C 3.0PF B	

PARTS LIST / 零件表

TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C42			CC73GCH1H040B	CHIP C	4.0PF	B	
C43			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C44			CC73GCH1H030B	CHIP C	3.0PF	B	
C45			CK73HB1H471K	CHIP C	470PF	K	
C46			CC73HCH1H101J	CHIP C	100PF	J	
C47			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C48,49			CK73HB1H102K	CHIP C	1000PF	K	
C50			CS77CA1A100M	CHIP TNTL	10UF	10WV	
C51			CC73HCH1H090D	CHIP C	9.0PF	D	
C52			CK73HB1H102K	CHIP C	1000PF	K	
C53			CC73HCH1H050B	CHIP C	5.0PF	B	
C54-56			CK73HB1H471K	CHIP C	470PF	K	
C57			CC73HCH1H1R5B	CHIP C	1.5PF	B	
C58			CC73GCH1H010B	CHIP C	1.0PF	B	
C60			CC73HCH1H100D	CHIP C	10PF	D	
C63,64			CC73HCH1H101J	CHIP C	100PF	J	
C66			CC73HCH1H0R5C	CHIP C	0.5PF	C	
C67			CS77BA1E010M	CHIP TNTL	1.0UF	25WV	
C68			CS77CP1A4R7M	CHIP TNTL	4.7UF	10WV	
C69			CK73HB1C103K	CHIP C	0.010UF	K	
C70-72			CC73HCH1H101J	CHIP C	100PF	J	
C73			CK73HB1C223K	CHIP C	0.022UF	K	
C100-102			CK73HB1H471K	CHIP C	470PF	K	
C103			CC73HCH1H080D	CHIP C	8.0PF	D	
C104,105			CK73HB1H471K	CHIP C	470PF	K	
C106			CC73HCH1H080D	CHIP C	8.0PF	D	
C108			CK73HB1A104K	CHIP C	0.10UF	K	
C109			CC73HCH1H080D	CHIP C	8.0PF	D	
C110			CC73HCH1H130J	CHIP C	13PF	J	
C111			CK73HB1H471K	CHIP C	470PF	K	
C115			CK73HB1H471K	CHIP C	470PF	K	
C116			CC73HCH1H330J	CHIP C	33PF	J	
C119			CC73GCH1H300G	CHIP C	30PF	G	
C121			CC73GCH1H360G	CHIP C	36PF	G	
C122			CK73HB1H471K	CHIP C	470PF	K	
C123		✻	CS77CA1A6R8M	CHIP TNTL	6.8UF	10WV	
C124			CK73GB0J105K	CHIP C	1.0UF	K	
C125			CK73HB1H102K	CHIP C	1000PF	K	
C126,127			CK73HB1H471K	CHIP C	470PF	K	
C128			CC73HCH1H101J	CHIP C	100PF	J	
C129,130			CK73HB1H471K	CHIP C	470PF	K	
C131			CC73GCH1H270G	CHIP C	27PF	G	
C132			CK73HB1C103K	CHIP C	0.010UF	K	
C133		✻	CK73GB1A105K	CHIP C	1.0UF	K	
C134			CK73HB1A104K	CHIP C	0.10UF	K	
C135			CC73GCH1H200G	CHIP C	20PF	G	
C136			CK73HB1H471K	CHIP C	470PF	K	
C137			CK73HB1C103K	CHIP C	0.010UF	K	
C139			CK73HB1H471K	CHIP C	470PF	K	
C141			CC73GCH1H240G	CHIP C	24PF	G	
C144			CC73GCH1H100C	CHIP C	10PF	C	
C146			CC73GCH1H390J	CHIP C	39PF	J	
C147			CK73HB1H471K	CHIP C	470PF	K	
C148			CC73HCH1H050C	CHIP C	5.0PF	C	
C149			CK73HB1H471K	CHIP C	470PF	K	
C150			CC73HCH1H010C	CHIP C	1.0PF	C	
C151			CC73HCH1H020C	CHIP C	2.0PF	C	
C152			CC73HCH1H100D	CHIP C	10PF	D	
C153			CC73HCH1H030C	CHIP C	3.0PF	C	
C154			CC73HCH1H120J	CHIP C	12PF	J	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C155			CC73HCH1H100D	CHIP C	10PF	D	
C156,157			CC73HCH1H040C	CHIP C	4.0PF	C	
C158			CC73HCH1H100C	CHIP C	10PF	C	
C160			CK73HB1H102K	CHIP C	1000PF	K	
C164			CC73GCH1H330G	CHIP C	33PF	G	
C200			CK73GB1A224K	CHIP C	0.22UF	K	
C201			CK73HB1A104K	CHIP C	0.10UF	K	
C202			CC73HCH1H121J	CHIP C	120PF	J	
C203-205			CK73HB1A104K	CHIP C	0.10UF	K	
C206			CK73HB1C103K	CHIP C	0.010UF	K	
C207			CK73HB1H471K	CHIP C	470PF	K	
C208,209			CC73HCH1H121J	CHIP C	120PF	J	
C210			CK73HB1A104K	CHIP C	0.10UF	K	
C211			CK73HB1H102K	CHIP C	1000PF	K	
C212			CC73HCH1H220J	CHIP C	22PF	J	
C213			CC73HCH1H100D	CHIP C	10PF	D	
C214			CK73HB1A104K	CHIP C	0.10UF	K	
C215		✻	CS77BP1A100M	CHIP TNTL	10UF	4.0WV	
C216			CK73HB1A104K	CHIP C	0.10UF	K	
C217			CC73HCH1H121J	CHIP C	120PF	J	
C218			CK73HB1A104K	CHIP C	0.10UF	K	
C219			CK73HB1A333K	CHIP C	0.033UF	K	
C220			CK73HB1A104K	CHIP C	0.10UF	K	
C221			CC73HCH1H680J	CHIP C	68PF	J	
C222			CK73HB1A104K	CHIP C	0.10UF	K	
C223			CK73HB1C103K	CHIP C	0.010UF	K	
C224		✻	CS77CP1A100M	CHIP TNTL	10UF	10WV	
C225			CK73HB1C103K	CHIP C	0.010UF	K	
C227			CK73HB1A104K	CHIP C	0.10UF	K	
C228,229			CK73HB1C103K	CHIP C	0.010UF	K	
C230			CC73HCH1H100D	CHIP C	10PF	D	
C231			CK73HB1C103K	CHIP C	0.010UF	K	
C232			CK73HB1H471K	CHIP C	470PF	K	
C233			CK73HB1C103K	CHIP C	0.010UF	K	
C234			CK73HB1H471K	CHIP C	470PF	K	
C235			CC73HCH1H080D	CHIP C	8.0PF	D	
C236			CC73HCH1H020C	CHIP C	2.0PF	C	
C237			CC73HCH1H180J	CHIP C	18PF	J	
C238			CC73HCH1H120J	CHIP C	12PF	J	
C239			CK73HB1H471K	CHIP C	470PF	K	
C240			CC73HCH1H010C	CHIP C	1.0PF	C	
C241			CC73HCH1H080D	CHIP C	8.0PF	D	
C242			CK73HB1A104K	CHIP C	0.10UF	K	
C243			CK73HB1H102K	CHIP C	1000PF	K	
C244			CC73GCH1H040B	CHIP C	4.0PF	B	
C245			CK73HB1H471K	CHIP C	470PF	K	
C246			CK73HB1A104K	CHIP C	0.10UF	K	
C248			CC73HCH1H330J	CHIP C	33PF	J	
C249			CC73HCH1H020C	CHIP C	2.0PF	C	
C250			CK73HB1H471K	CHIP C	470PF	K	
C251			CC73GCH1H020B	CHIP C	2.0PF	B	
C252			CC73HCH1H101J	CHIP C	100PF	J	
C253-255			CK73HB1A104K	CHIP C	0.10UF	K	
C256			CC73HCH1H101J	CHIP C	100PF	J	
C257-260			CK73HB1H471K	CHIP C	470PF	K	
C261			CC73GCH1H120G	CHIP C	12PF	G	
C262			CK73HB1A104K	CHIP C	0.10UF	K	
C263			CC73HCH1H180J	CHIP C	18PF	J	
C264			CK73HB1H471K	CHIP C	470PF	K	
C265			CK73HB1A104K	CHIP C	0.10UF	K	

PARTS LIST / 零件表

TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C267			CC73GCH1H060B	CHIP C	6.0PF	B	
C269			CC73GCH1H040B	CHIP C	4.0PF	B	
C270			CC73HCH1H030C	CHIP C	3.0PF	C	
C275			CC73HCH1H101J	CHIP C	100PF	J	
C276			CK73HB1H471K	CHIP C	470PF	K	
C277			CC73GCH1H020B	CHIP C	2.0PF	B	
C278-280			CK73HB1A104K	CHIP C	0.10UF	K	
C281			CK73HB1H471K	CHIP C	470PF	K	
C282			CK73HB1H102K	CHIP C	1000PF	K	
C283,284			CK73HB1A104K	CHIP C	0.10UF	K	
C285			CC73GCH1H050B	CHIP C	5.0PF	B	
C286			CC73GCH1H070B	CHIP C	7.0PF	B	
C288			CK73HB1H471K	CHIP C	470PF	K	
C289			CC73GCH1H010B	CHIP C	1.0PF	B	
C290			CC73GCH1H050B	CHIP C	5.0PF	B	
C292			CC73HCH1H020C	CHIP C	2.0PF	C	
C293			CC73GCH1H010B	CHIP C	1.0PF	B	
C294			CC73GCH1H560J	CHIP C	56PF	J	
C295			CK73HB1H471K	CHIP C	470PF	K	
C298			CK73HB1H471K	CHIP C	470PF	K	
C300		✻	CS77CP1A100M	CHIP TNTL	10UF	10WV	
C301			CK73HB1H471K	CHIP C	470PF	K	
C302			CK73HB1A104K	CHIP C	0.10UF	K	
C304			CC73HCH1H330J	CHIP C	33PF	J	
C306			CK73HB1A104K	CHIP C	0.10UF	K	
C308			CK73HB1A104K	CHIP C	0.10UF	K	
C309			CC73HCH1H101J	CHIP C	100PF	J	
C310			CK73HB1C103K	CHIP C	0.010UF	K	
C311			CC73HCH1H101J	CHIP C	100PF	J	
C312		✻	CS77CP1A100M	CHIP TNTL	10UF	10WV	
C313			CC73HCH1H101J	CHIP C	100PF	J	
C314			CK73HB1H471K	CHIP C	470PF	K	
C315		✻	CS77CP1A100M	CHIP TNTL	10UF	10WV	
C316			CK73HB1A333K	CHIP C	0.033UF	K	
C318			CK73HB1H221K	CHIP C	220PF	K	
C319			CC73HCH1H121J	CHIP C	120PF	J	
C320			CK73HB1A104K	CHIP C	0.10UF	K	
C321			CK73HB1H271K	CHIP C	270PF	K	
C322			CK73HB1C103K	CHIP C	0.010UF	K	
C323			CK73HB1H222K	CHIP C	2200PF	K	
C324			CK73HB1A104K	CHIP C	0.10UF	K	
C325			CK73HB1C123K	CHIP C	0.012UF	K	
C327			CK73GB1H103K	CHIP C	0.010UF	K	
C328			CK73GB1C683K	CHIP C	0.068UF	K	
C329			CK73GB0J105K	CHIP C	1.0UF	K	
C330			CK73HB1A104K	CHIP C	0.10UF	K	
C331			CK73HB1C223K	CHIP C	0.022UF	K	
C332-335			CK73HB1C103K	CHIP C	0.010UF	K	
C336,337			CC73HCH1H330J	CHIP C	33PF	J	
C338			CC73HCH1H120J	CHIP C	12PF	J	
C339-342			CK73HB1C103K	CHIP C	0.010UF	K	
C344		✻	CS77CP1A100M	CHIP TNTL	10UF	10WV	
C345			CK73GB1A474K	CHIP C	0.47UF	K	
C346			CC73HCH1H470J	CHIP C	47PF	J	
C347			CK73HB1C103K	CHIP C	0.010UF	K	
C348			CK73GB1A474K	CHIP C	0.47UF	K	
C349			CK73HB1C153K	CHIP C	0.015UF	K	
C350		✻	CS77CP0G3R3M	CHIP TNTL	3.3UF	4.0WV	
C351			CK73HB1C103K	CHIP C	0.010UF	K	
C352-354			CK73HB1A104K	CHIP C	0.10UF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C355			CS77CA1A100M	CHIP TNTL	10UF	10WV	
C356			CC73HCH1H470J	CHIP C	47PF	J	
C357,358			CS77CA1A100M	CHIP TNTL	10UF	10WV	
C359			CC73HCH1H470J	CHIP C	47PF	J	
C362			CC73HCH1H470J	CHIP C	47PF	J	
C364			CC73HCH1H470J	CHIP C	47PF	J	
C369			CC73HCH1H101J	CHIP C	100PF	J	
C371			CC73HCH1H470J	CHIP C	47PF	J	
C375			CC73HCH1H470J	CHIP C	47PF	J	
C382			CK73HB1A104K	CHIP C	0.10UF	K	
C383,384			CK73HB1H102K	CHIP C	1000PF	K	
C386			CC73HCH1H470J	CHIP C	47PF	J	
C387			CC73HCH1H100D	CHIP C	10PF	D	
C388			CK73HB1H102K	CHIP C	1000PF	K	
C389			CC73HCH1H470J	CHIP C	47PF	J	
C390			CK73HB1A104K	CHIP C	0.10UF	K	
C391,392			CK73HB1C103K	CHIP C	0.010UF	K	
C394-398			CK73HB1A104K	CHIP C	0.10UF	K	
C399			CK73HB1C103K	CHIP C	0.010UF	K	
C400			CK73HB1H471K	CHIP C	470PF	K	
C402-405			CK73HB1H102K	CHIP C	1000PF	K	
C408			CK73HB1H102K	CHIP C	1000PF	K	
C410			CK73FB1A475K	CHIP C	4.7UF	K	
C411		✻	CK73GB1A105K	CHIP C	1.0UF	K	
C413			CK73FB1A106K	CHIP C	10UF	K	
C415			CC73HCH1H101J	CHIP C	100PF	J	
C416			CK73FB1A106K	CHIP C	10UF	K	
C417			CK73GB0J105K	CHIP C	1.0UF	K	
C419			CK73HB1H102K	CHIP C	1000PF	K	
C420			CC73HCH1H101J	CHIP C	100PF	J	
C421		✻	CK73GB1A105K	CHIP C	1.0UF	K	
C422			CK73FB1A475K	CHIP C	4.7UF	K	
C423			CK73FB0J106K	CHIP C	10UF	K	
C424			CC73HCH1H101J	CHIP C	100PF	J	
C425			CK73HB1A104K	CHIP C	0.10UF	K	
C426			CC73HCH1H101J	CHIP C	100PF	J	
C500			CK73GB1H122K	CHIP C	1200PF	K	
C501,502			CK73HB1A104K	CHIP C	0.10UF	K	
C503,504			CK73HB1C103K	CHIP C	0.010UF	K	
C506			CK73HB1A104K	CHIP C	0.10UF	K	
C507			CK73HB1C103K	CHIP C	0.010UF	K	
C508			CK73HB1A104K	CHIP C	0.10UF	K	
C509-511			CK73GB1H562J	CHIP C	5600PF	J	
C512,513			CK73GB1H332J	CHIP C	3300PF	J	
C514			CK73GB1H272J	CHIP C	2700PF	J	
C515			CC73HCH1H030C	CHIP C	3.0PF	C	
C516			CC73HCH1H151J	CHIP C	150PF	J	
C517			CK73HB1A104K	CHIP C	0.10UF	K	
C518			CK73HB1A333K	CHIP C	0.033UF	K	
C519			CC73HCH1H030C	CHIP C	3.0PF	C	
C520			CK73GB1H152J	CHIP C	1500PF	J	
C521		✻	CS77CP1A100M	CHIP TNTL	10UF	10WV	
C522			CK73HB1A104K	CHIP C	0.10UF	K	
C523,524			CK73HB1H102K	CHIP C	1000PF	K	
C525			CK73HB1A104K	CHIP C	0.10UF	K	
C526			CK73GB1H562J	CHIP C	5600PF	J	
C527,528			CK73HB1A104K	CHIP C	0.10UF	K	
C529			CK73GB1H562J	CHIP C	5600PF	J	
C530			CK73FB0J475K	CHIP C	4.7UF	K	
C531			CK73HB1C153K	CHIP C	0.015UF	K	

PARTS LIST / 零件表

TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C532			CK73HB1H561K	CHIP C 560PF K	
C533			CK73HB1H102K	CHIP C 1000PF K	
C534			CC73HCH1H560J	CHIP C 56PF J	
C535			CK73HB1A104K	CHIP C 0.10UF K	
C536,537			CK73FB0J475K	CHIP C 4.7UF K	
C538			CK73HB1H471K	CHIP C 470PF K	
C539,540			CK73HB1H102K	CHIP C 1000PF K	
C541			CK73GB1C563K	CHIP C 0.056UF K	
C542,543			CK73HB1H102K	CHIP C 1000PF K	
C554-557			CK73HB1H102K	CHIP C 1000PF K	
C700			CC73GCH1H1R5B	CHIP C 1.5PF B	
C702			CK73HB1H471K	CHIP C 470PF K	
C720			CS77CP1A4R7M	CHIP TNTL 4.7UF 10WV	
C730		*	CS77CP1C2R2M	CHIP TNTL 2.2UF 16WV	
C731			CC73HCH1H101J	CHIP C 100PF	
C740			CK73HB1A104K	CHIP C 0.10UF K	
C910,911			CK73HB1H102K	CHIP C 1000PF K	
TC1,2			C05-0384-05	CERAMIC TRIMMER CAP (10PF)	
CN300			E40-6178-15	SOCKET FOR PIN ASSY (30P)	
CN301,302			E40-6453-05	FLAT CABLE CONNECTOR (14P)	
CN303-306			E40-6092-05	PIN ASSY (2P)	
CN400			E40-6453-05	FLAT CABLE CONNECTOR (14P)	
CN500		*	E40-6179-15	PIN ASSY (30P)	
F400			F53-0324-05	FUSE (2.5A)	
-			G11-4050-04	SHEET	
CD200			L79-1834-05	TUNING COIL	
CF200		*	L72-1031-05	CERAMIC FILTER	
CF201			L72-0934-05	CERAMIC FILTER	
L1			L41-4795-39	SMALL FIXED INDUCTOR (4.7UH)	
L2,3		*	L40-4763-57	SMALL FIXED INDUCTOR (4.7NH)	
L6			L40-2275-57	SMALL FIXED INDUCTOR (22.0NH)	
L7			L92-0163-05	BEADS CORE	
L8			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
L9			L92-0163-05	BEADS CORE	
L10-12			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
L15			L41-3975-43	SMALL FIXED INDUCTOR (39NH)	
L16			L40-4778-67	SMALL FIXED INDUCTOR (47NH)	
L17,18			L41-2285-03	SMALL FIXED INDUCTOR (220NH)	
L19,20			L40-3391-86	SMALL FIXED INDUCTOR (3.3UH)	
L21			L40-2775-92	SMALL FIXED INDUCTOR (27NH)	
L22			L92-0163-05	BEADS CORE	
L23			L40-8275-92	SMALL FIXED INDUCTOR (82NH)	
L100			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	
L101			L40-3375-92	SMALL FIXED INDUCTOR (33NH)	
L102			L92-0162-05	BEADS CORE	
L103			L41-1575-43	SMALL FIXED INDUCTOR (15NH)	
L104			L92-0149-05	CHIP FERRITE	
L106			L34-4603-15	AIR-CORE COIL	
L107			L92-0149-05	CHIP FERRITE	
L108			L41-2285-43	SMALL FIXED INDUCTOR (220NH)	
L109			L34-4574-05	AIR-CORE COIL	
L110-112			L34-4564-05	AIR-CORE COIL	
L113			L41-1092-44	SMALL FIXED INDUCTOR (1UH)	
L114,115			L40-8265-57	SMALL FIXED INDUCTOR (8.2NH)	
L116			L40-1863-92	SMALL FIXED INDUCTOR (1.8NH)	
L199			L41-2769-16	SMALL FIXED INDUCTOR (2.7NH)	
L201,202			L40-1091-86	SMALL FIXED INDUCTOR (1.0UH)	
L203			L92-0163-05	BEADS CORE	

Ref. No.	Address	New parts	Parts No.	Description	Destination
L204			L41-5685-39	SMALL FIXED INDUCTOR (0.56UH)	
L205,206			L40-2275-57	SMALL FIXED INDUCTOR (22.0NH)	
L207			L40-3375-92	SMALL FIXED INDUCTOR (33NH)	
L209			L41-1578-14	SMALL FIXED INDUCTOR (15NH)	
L210,211			L41-1278-14	SMALL FIXED INDUCTOR (12NH)	
L212			L92-0163-05	BEADS CORE	
L213			L41-2285-03	SMALL FIXED INDUCTOR (220NH)	
L215			L41-1578-14	SMALL FIXED INDUCTOR (15NH)	
L217			L41-1278-14	SMALL FIXED INDUCTOR (12NH)	
L219			L41-3978-03	SMALL FIXED INDUCTOR (39NH)	
L300-313			L92-0163-05	BEADS CORE	
L314-317			L92-0408-05	CHIP FERRITE	
L320			L92-0163-05	BEADS CORE	
L400			L92-0149-05	CHIP FERRITE	
L500			L92-0163-05	BEADS CORE	
L701			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
L710			L41-6869-16	SMALL FIXED INDUCTOR (6.8NH)	
L730			L92-0163-05	BEADS CORE	
L904			L92-0419-15	CHIP FERRITE	
X1		*	L77-3028-05	TCXO (16.8MHZ)	
X200			L77-1760-15	CRYSTAL RESONATOR (44.395MHZ)	
X300			L77-1810-05	CRYSTAL RESONATOR (9.8304MHZ)	
X500			L77-1708-15	CRYSTAL RESONATOR (3.579545MHZ)	
XF200			L71-0530-05	MCF (44.85MHZ)	
CP300-313			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP314			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP315			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP316			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP317-320			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP322			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP323,324			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP326,327			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP400,401			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP500,501			RK75HA1J472J	CHIP-COM 4.7K J 1/16W	
R1			RK73HB1J101J	CHIP R 100 J 1/16W	
R3			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R4			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R5			RK73HB1J330J	CHIP R 33 J 1/16W	
R6			RK73HB1J470J	CHIP R 47 J 1/16W	
R7			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R8			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R9			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R11			RK73HB1J104J	CHIP R 100K J 1/16W	
R12			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R13-15			RK73HB1J473J	CHIP R 47K J 1/16W	
R16			RK73HB1J181J	CHIP R 180 J 1/16W	
R17			RK73HB1J101J	CHIP R 100 J 1/16W	
R18			RK73HB1J151J	CHIP R 150 J 1/16W	
R19			RK73HB1J101J	CHIP R 100 J 1/16W	
R20			RK73HB1J104J	CHIP R 100K J 1/16W	
R21			RK73HB1J154J	CHIP R 150K J 1/16W	
R22			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R23			RK73HB1J101J	CHIP R 100 J 1/16W	
R24			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R25			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R26			RK73HB1J103J	CHIP R 10K J 1/16W	
R27			RK73HB1J331J	CHIP R 330 J 1/16W	
R28			RK73HH1J333D	CHIP R 33K D 1/16W	
R29			RK73HH1J104D	CHIP R 100K D 1/16W	

PARTS LIST / 零件表

TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description			Destination
R31			RK73HB1J470J	CHIP R	47	J 1/16W	
R32			RK73HB1J101J	CHIP R	100	J 1/16W	
R33			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R34			RK73HB1J272J	CHIP R	2.7K	J 1/16W	
R35			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R36			RK73HB1J102J	CHIP R	1.0K	J 1/16W	
R38			RK73HB1J470J	CHIP R	47	J 1/16W	
R39			RK73HB1J103J	CHIP R	10K	J 1/16W	
R40			RK73HB1J154J	CHIP R	150K	J 1/16W	
R41			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R42,43			RK73HB1J103J	CHIP R	10K	J 1/16W	
R44,45			RK73HB1J101J	CHIP R	100	J 1/16W	
R46			RK73HB1J103J	CHIP R	10K	J 1/16W	
R47			RK73HB1J101J	CHIP R	100	J 1/16W	
R48			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R100,101			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R102			RK73HB1J473J	CHIP R	47K	J 1/16W	
R103			RK73HB1J331J	CHIP R	330	J 1/16W	
R104			RK73HB1J220J	CHIP R	22	J 1/16W	
R105			RK73HB1J681J	CHIP R	680	J 1/16W	
R106			RK73HB1J152J	CHIP R	1.5K	J 1/16W	
R107			RK73HB1J390J	CHIP R	39	J 1/16W	
R108,109			RK73HB1J331J	CHIP R	330	J 1/16W	
R111			RK73HB1J180J	CHIP R	18	J 1/16W	
R112			RK73HB1J331J	CHIP R	330	J 1/16W	
R114			RK73HB1J104J	CHIP R	100K	J 1/16W	
R115			RK73HB1J473J	CHIP R	47K	J 1/16W	
R116			RK73HB1J220J	CHIP R	22	J 1/16W	
R119,120			RK73EB2ER39K	CHIP R	0.39	K 1/4W	
R121			RK73HB1J223J	CHIP R	22K	J 1/16W	
R123			RK73EB2ER39K	CHIP R	0.39	K 1/4W	
R124			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R125			RK73GB2A101J	CHIP R	100	J 1/10W	
R126			RK73HB1J473J	CHIP R	47K	J 1/16W	
R127-129			RK73HH1J154D	CHIP R	150K	D 1/16W	
R131-133			RK73HH1J154D	CHIP R	150K	D 1/16W	
R134			RK73HB1J103J	CHIP R	10K	J 1/16W	
R136			RK73HB1J473J	CHIP R	47K	J 1/16W	
R138			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R139			RK73HH1J105D	CHIP R	1.0M	D 1/16W	
R140			RK73HB1J102J	CHIP R	1.0K	J 1/16W	
R142,143			RK73HB1J104J	CHIP R	100K	J 1/16W	
R145,146			RK73HB1J271J	CHIP R	270	J 1/16W	
R147			RK73GB2A000J	CHIP R	0.0	J 1/10W	
R149			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R151,152			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R200			RK73HB1J224J	CHIP R	220K	J 1/16W	
R201			RK73HB1J104J	CHIP R	100K	J 1/16W	
R202			RK73HB1J153J	CHIP R	15K	J 1/16W	
R203			RK73HH1J224D	CHIP R	220K	D 1/16W	
R204			RK73HH1J824D	CHIP R	820K	D 1/16W	
R205			RK73HB1J564J	CHIP R	560K	J 1/16W	
R206			RK73HB1J823J	CHIP R	82K	J 1/16W	
R207			RK73HB1J154J	CHIP R	150K	J 1/16W	
R208			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R209			RK73HB1J103J	CHIP R	10K	J 1/16W	
R210			RK73HB1J123J	CHIP R	12K	J 1/16W	
R211			RK73HB1J223J	CHIP R	22K	J 1/16W	
R212			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R213			RK73HB1J123J	CHIP R	12K	J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description			Destination
R214			RK73HB1J823J	CHIP R	82K	J 1/16W	
R215			RK73HB1J222J	CHIP R	2.2K	J 1/16W	
R216			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R217			RK73HB1J564J	CHIP R	560K	J 1/16W	
R218			RK73HB1J123J	CHIP R	12K	J 1/16W	
R219			RK73HB1J224J	CHIP R	220K	J 1/16W	
R220			RK73HB1J222J	CHIP R	2.2K	J 1/16W	
R221		*	RK73HH1J332D	CHIP R	3.3K	D 1/16W	
R222			RK73HB1J220J	CHIP R	22	J 1/16W	
R223			RK73HB1J184J	CHIP R	180K	J 1/16W	
R226			RK73HB1J221J	CHIP R	220	J 1/16W	
R227,228			RK73HB1J331J	CHIP R	330	J 1/16W	
R229			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R230			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R232			RK73HB1J102J	CHIP R	1.0K	J 1/16W	
R233			RK73HB1J151J	CHIP R	150	J 1/16W	
R234			RK73HB1J104J	CHIP R	100K	J 1/16W	
R235			RK73HB1J563J	CHIP R	56K	J 1/16W	
R236			RK73HB1J104J	CHIP R	100K	J 1/16W	
R237			RK73HB1J563J	CHIP R	56K	J 1/16W	
R238			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R239-241			RK73HB1J105J	CHIP R	1.0M	J 1/16W	
R243			RK73HB1J221J	CHIP R	220	J 1/16W	
R244			RK73HB1J104J	CHIP R	100K	J 1/16W	
R246			RK73HB1J104J	CHIP R	100K	J 1/16W	
R247			RK73HB1J683J	CHIP R	68K	J 1/16W	
R248			RK73HB1J105J	CHIP R	1.0M	J 1/16W	
R250			RK73HB1J102J	CHIP R	1.0K	J 1/16W	
R252			RK73HB1J470J	CHIP R	47	J 1/16W	
R253			RK73GB2A000J	CHIP R	0.0	J 1/10W	
R254			RK73HB1J470J	CHIP R	47	J 1/16W	
R255			RK73HH1J272D	CHIP R	2.7K	D 1/16W	
R256			RK73HB1J473J	CHIP R	47K	J 1/16W	
R259			RK73HB1J473J	CHIP R	47K	J 1/16W	
R260			RK73HB1J223J	CHIP R	22K	J 1/16W	
R264			RK73HB1J181J	CHIP R	180	J 1/16W	
R265			RK73HB1J334J	CHIP R	330K	J 1/16W	
R266			RK73HB1J272J	CHIP R	2.7K	J 1/16W	
R267			RK73HB1J334J	CHIP R	330K	J 1/16W	
R268			RK73HB1J221J	CHIP R	220	J 1/16W	
R270			RK73FB2B000J	CHIP R	0.0	J 1/8W	
R273			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R276			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R300			RK73HB1J154J	CHIP R	150K	J 1/16W	
R301			RK73HB1J104J	CHIP R	100K	J 1/16W	
R303			RK73HB1J474J	CHIP R	470K	J 1/16W	
R304			RK73HB1J394J	CHIP R	390K	J 1/16W	
R308			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R309			RK73HB1J000J	CHIP R	0.0	J 1/16W	
R310			RK73HB1J473J	CHIP R	47K	J 1/16W	
R311			RK73HB1J154J	CHIP R	150K	J 1/16W	
R312			RK73HB1J104J	CHIP R	100K	J 1/16W	
R313			RK73HB1J103J	CHIP R	10K	J 1/16W	
R314			RK73HB1J474J	CHIP R	470K	J 1/16W	
R315			RK73HB1J472J	CHIP R	4.7K	J 1/16W	
R316			RK73HB1J104J	CHIP R	100K	J 1/16W	
R317			RK73HB1J184J	CHIP R	180K	J 1/16W	
R318			RK73HB1J104J	CHIP R	100K	J 1/16W	
R319			RK73HB1J473J	CHIP R	47K	J 1/16W	
R320			RK73HB1J563J	CHIP R	56K	J 1/16W	

PARTS LIST / 零件表

TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R321			RK73HB1J823J	CHIP R 82K J 1/16W	
R322			RK73HB1J154J	CHIP R 150K J 1/16W	
R323			RK73HB1J823J	CHIP R 82K J 1/16W	
R324,325			RK73HB1J334J	CHIP R 330K J 1/16W	
R326			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R327			RK73HB1J473J	CHIP R 47K J 1/16W	
R328			RK73HB1J104J	CHIP R 100K J 1/16W	
R329			RK73HB1J274J	CHIP R 270K J 1/16W	
R330			RK73HB1J184J	CHIP R 180K J 1/16W	
R331			RK73HB1J124J	CHIP R 120K J 1/16W	
R332			RK73HB1J474J	CHIP R 470K J 1/16W	
R333			RK73HB1J473J	CHIP R 47K J 1/16W	
R334			RK73HB1J184J	CHIP R 180K J 1/16W	
R336-338			RK73HB1J223J	CHIP R 22K J 1/16W	
R339-341			RK73HB1J103J	CHIP R 10K J 1/16W	
R342			RK73HB1J223J	CHIP R 22K J 1/16W	
R343			RK73HB1J103J	CHIP R 10K J 1/16W	
R344,345			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R346			RK73HB1J473J	CHIP R 47K J 1/16W	
R347			RK73HB1J561J	CHIP R 560 J 1/16W	
R348			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R349,350			RK73HB1J473J	CHIP R 47K J 1/16W	
R352			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R354			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R356			RK73HB1J473J	CHIP R 47K J 1/16W	
R357			RK73HB1J471J	CHIP R 470 J 1/16W	
R359			RK73HB1J153J	CHIP R 15K J 1/16W	
R360			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R361			RK73GB2A102J	CHIP R 1.0K J 1/10W	
R362			RK73HB1J473J	CHIP R 47K J 1/16W	
R363			RK73HB1J124J	CHIP R 120K J 1/16W	
R364			RK73HB1J104J	CHIP R 100K J 1/16W	
R365			RK73HB1J473J	CHIP R 47K J 1/16W	
R366			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R367			RK73HB1J123J	CHIP R 12K J 1/16W	
R368			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R369			RK73HB1J563J	CHIP R 56K J 1/16W	
R370			RK73HB1J104J	CHIP R 100K J 1/16W	
R371			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R372			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R373			RK73HB1J124J	CHIP R 120K J 1/16W	
R374			RK73HB1J104J	CHIP R 100K J 1/16W	
R376			RK73HB1J103J	CHIP R 10K J 1/16W	
R377			RK73HB1J104J	CHIP R 100K J 1/16W	
R378			RK73HB1J101J	CHIP R 100 J 1/16W	
R379			RK73HB1J821J	CHIP R 820 J 1/16W	
R380,381			RK73HB1J101J	CHIP R 100 J 1/16W	
R382			RK73HB1J103J	CHIP R 10K J 1/16W	
R383			RK73HB1J101J	CHIP R 100 J 1/16W	
R384			RK73HB1J331J	CHIP R 330 J 1/16W	
R385			RK73HB1J470J	CHIP R 47 J 1/16W	
R386			RK73HB1J331J	CHIP R 330 J 1/16W	
R388			RK73HB1J474J	CHIP R 470K J 1/16W	
R389			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R390			RK73HB1J821J	CHIP R 820 J 1/16W	
R391,392			RK73HB1J331J	CHIP R 330 J 1/16W	
R393			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R397,398			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R400			RK73HB1J103J	CHIP R 10K J 1/16W	
R401,402			RK73HH1J474D	CHIP R 470K D 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R403			RK73HB1J334J	CHIP R 330K J 1/16W	
R404			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R405			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R406			RK73HB1J103J	CHIP R 10K J 1/16W	
R407			RK73HB1J224J	CHIP R 220K J 1/16W	
R408			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R409			RK73HB1J473J	CHIP R 47K J 1/16W	
R410			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R411			RK73HB1J471J	CHIP R 470 J 1/16W	
R413			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R414			RK73HB1J103J	CHIP R 10K J 1/16W	
R500			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R501			RK73HH1J913D	CHIP R 91K D 1/16W	
R502			RK73HH1J683D	CHIP R 68K D 1/16W	
R503			RK73HH1J333D	CHIP R 33K D 1/16W	
R504			RK73HH1J913D	CHIP R 91K D 1/16W	
R505			RK73HB1J564J	CHIP R 560K J 1/16W	
R506			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R507			RK73HH1J274D	CHIP R 270K D 1/16W	
R508			RK73HH1J913D	CHIP R 91K D 1/16W	
R509			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R510			RK73HH1J682D	CHIP R 6.8K D 1/16W	
R511			RK73GB2A155J	CHIP R 1.5M J 1/10W	
R512			RK73HH1J683D	CHIP R 68K D 1/16W	
R513			RK73HB1J474J	CHIP R 470K J 1/16W	
R514			RK73HH1J682D	CHIP R 6.8K D 1/16W	
R515			RK73HB1J101J	CHIP R 100 J 1/16W	
R516			RK73HB1J184J	CHIP R 180K J 1/16W	
R517			RK73HB1J103J	CHIP R 10K J 1/16W	
R518			RK73HB1J223J	CHIP R 22K J 1/16W	
R519			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R520			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R521			RK73HB1J474J	CHIP R 470K J 1/16W	
R522			RK73HB1J273J	CHIP R 27K J 1/16W	
R523			RK73HB1J470J	CHIP R 47 J 1/16W	
R524			RK73HB1J224J	CHIP R 220K J 1/16W	
R525			RK73HB1J184J	CHIP R 180K J 1/16W	
R526			RK73HB1J394J	CHIP R 390K J 1/16W	
R527			RK73HB1J224J	CHIP R 220K J 1/16W	
R528			RK73HB1J220J	CHIP R 22 J 1/16W	
R529			RK73HB1J473J	CHIP R 47K J 1/16W	
R530			RK73HB1J474J	CHIP R 470K J 1/16W	
R531			RK73HB1J184J	CHIP R 180K J 1/16W	
R532,533			RK73HB1J104J	CHIP R 100K J 1/16W	
R537			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R603-611			RK73HB1J471J	CHIP R 470 J 1/16W	
R612,613			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R614,615			RK73HB1J473J	CHIP R 47K J 1/16W	
R617,618			RK73HB1J473J	CHIP R 47K J 1/16W	
R620			RK73HB1J473J	CHIP R 47K J 1/16W	
R621			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R623			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R740			RK73HB1J473J	CHIP R 47K J 1/16W	
R741			RK73GB2A000J	CHIP R 0.0 J 1/10W	
S600-602			S70-0457-05	TACT SWITCH	
D1-4			1SV325F	VARIABLE CAPACITANCE DIODE	
D5			1SV278F	VARIABLE CAPACITANCE DIODE	
D6			MA2S111-F	DIODE	
D11,12			MA2S077-F	DIODE	

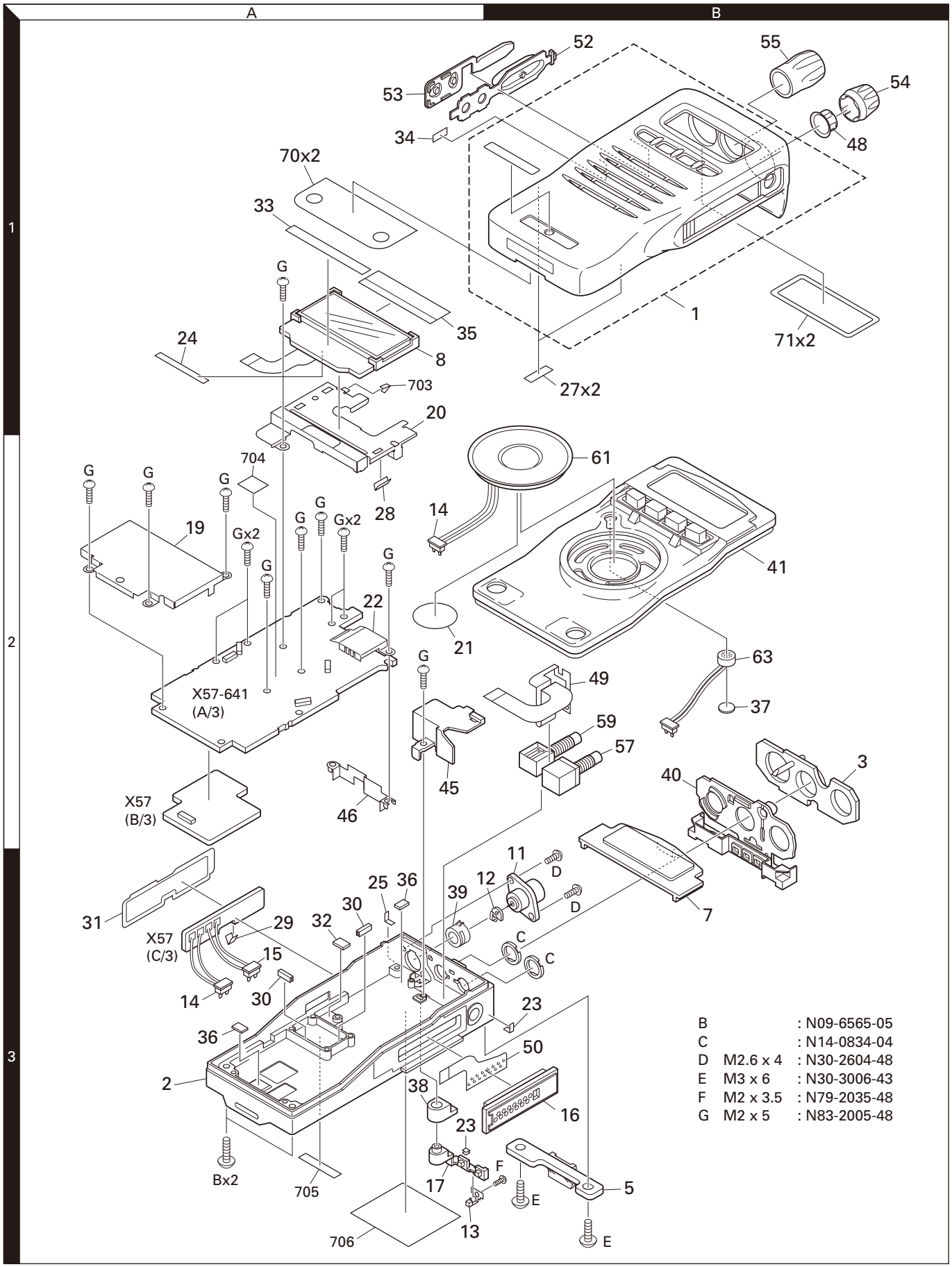
PARTS LIST / 零件表

TX-RX UNIT (X57-6413-01)

Ref. No.	Address	New parts	Parts No.	Description	Destination
D13,14			HSC277	DIODE	
D100,101			HSC277	DIODE	
D102,103			HVC131	DIODE	
D104,105		✻	HVC133-E	DIODE	
D106			HZU5CLL	ZENER DIODE	
D200			HVC131	DIODE	
D201			RB706F-40	DIODE	
D202,203			DAN235E	DIODE	
D204-207			HVC355B	VARIABLE CAPACITANCE DIODE	
D209			MA2S111-F	DIODE	
D301		✻	KDR367E-P	DIODE	
D302			DA221	DIODE	
D303,304			015AZ6.8F	ZENER DIODE	
D305			015AZ2.4(X)F	ZENER DIODE	
D306			DA221	DIODE	
D307			015AZ6.8F	ZENER DIODE	
D308			NNCD6.8G-A	ZENER DIODE	
D402			GN1G	DIODE	
D403			MA2S111-F	DIODE	
D405			RB521S-30	DIODE	
D501			RB706F-40	DIODE	
IC1			ADF4111BCP7	MOS-IC	
IC100			TA75W01FUF	MOS-IC	
IC200			TA31136FNG	MOS-IC	
IC201			TC75W51FK(F)	MOS-IC	
IC300			TK62012F	MOS-IC	
IC302,303			TK62012F	MOS-IC	
IC304			TC75S51FE(F)	MOS-IC	
IC305,306			TK62012F	MOS-IC	
IC307			M62364FP-F	MOS-IC	
IC308			AT29C040A-90TU	ROM IC	
IC309		✻	30622MEP526GU	MICRO CONTROL UNIT	
IC310			CAT24C16WI-G	ROM IC	
IC311,312			BU4094BCFV	MOS-IC	
IC313			TDA7053AT	BI-POLAR IC	
IC400			XC61CN4202NR	MOS-IC	
IC401		✻	XC6204B502MR	MOS-IC	
IC402			XC62GR5012PR	MOS-IC	
IC403		✻	XC6204B502MR	MOS-IC	
IC404			XC61CN5002NR	MOS-IC	
IC500			TC35453FG6	MOS-IC	
IC501			TK62012F	MOS-IC	
Q1			2SC5488A-H	TRANSISTOR	
Q2,3			2SK508NV(K52)	FET	
Q4			2SJ347F	FET	
Q5			2SC5108(Y)F	TRANSISTOR	
Q6			RN47A4-F	TRANSISTOR	
Q7			2SC4617(S)	TRANSISTOR	
Q8			2SC5108(Y)F	TRANSISTOR	
Q100			2SC5108(Y)F	TRANSISTOR	
Q101		✻	2SC5191-A	TRANSISTOR	
Q103			2SK2596-E	FET	
Q104,105			DTC114EE	DIGITAL TRANSISTOR	
Q106			2SK3476-F	FET	
Q107			2SK1824-A	FET	
Q108			DTA144EE	DIGITAL TRANSISTOR	
Q201			DTC144EE	DIGITAL TRANSISTOR	
Q202			RN47A4-F	TRANSISTOR	
Q203			2SK1824-A	FET	
Q204			2SK1830F	FET	

Ref. No.	Address	New parts	Parts No.	Description	Destination
Q205			2SC4649(N,P)	TRANSISTOR	
Q206,207			3SK318	FET	
Q208			2SC4617(S)	TRANSISTOR	
Q300			2SC4649(N,P)	TRANSISTOR	
Q301			2SJ347F	FET	
Q302			2SC4617(S)	TRANSISTOR	
Q303			2SB1132(Q,R)	TRANSISTOR	
Q304			2SC4617(S)	TRANSISTOR	
Q305			UPA672T-A	FET	
Q306			2SC4617(S)	TRANSISTOR	
Q307			UPA672T-A	FET	
Q308			2SK1824-A	FET	
Q309,310			2SC4617(S)	TRANSISTOR	
Q311		✻	2SA1362-F(Y)	TRANSISTOR	
Q312			DTC144EE	DIGITAL TRANSISTOR	
Q400			2SJ347F	FET	
Q401			2SK1830F	FET	
Q403			DTC144EE	DIGITAL TRANSISTOR	
Q404			2SJ347F	FET	
Q405			KTA2015(Y)	TRANSISTOR	
Q406			2SJ347F	FET	
Q500			DTC144EE	DIGITAL TRANSISTOR	
Q501			UPA672T-A	FET	
Q502			2SK1830F	FET	
TH1			ERTJ0EV104H	THERMISTOR	
TH200			ERTJ0EV104H	THERMISTOR	
TH300			TN10-3S154JT	THERMISTOR	

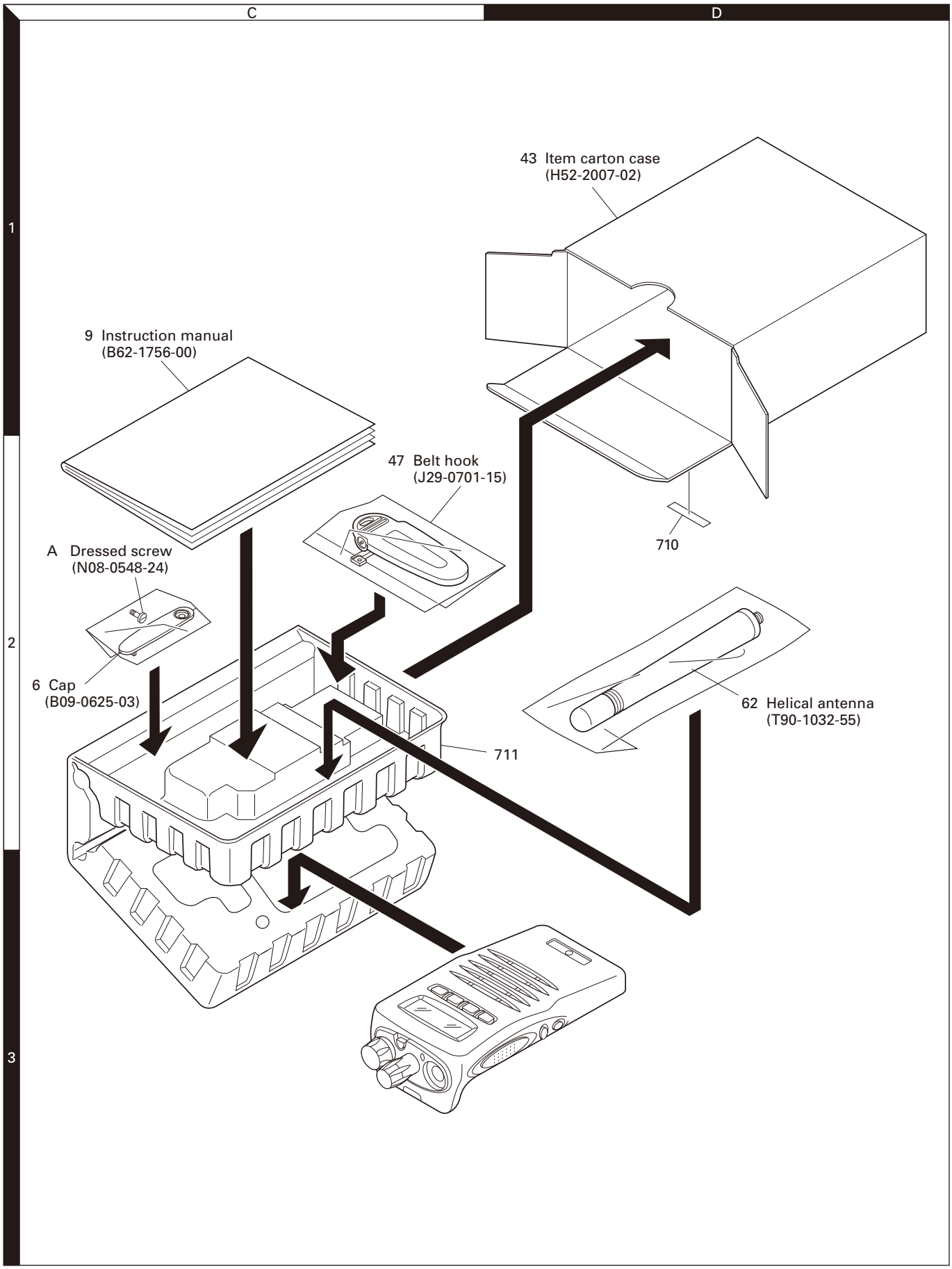
EXPLODED VIEW / 部件分解图



B		: N09-6565-05
C		: N14-0834-04
D	M2.6 x 4	: N30-2604-48
E	M3 x 6	: N30-3006-43
F	M2 x 3.5	: N79-2035-48
G	M2 x 5	: N83-2005-48

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 / 调整

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	350 to 400MHz Frequency modulation and external modulation –127dBm/0.1μV to greater than –47dBm/1mV
2. Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω 350 to 400MHz or more Vicinity of 10W
3. Deviation Meter	Frequency Range	350 to 400MHz
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		5A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center frequency Output Voltage	50kHz to 600MHz 100mV or more
13. 16Ω Dummy Load		Approx. 16Ω, 3W
14. Regulated Power Supply		5V to 10V, approx. 5A Useful if ammeter equipped

所需的用于调整的测试设备

测 试 设 备	主 要 规 格	
1. 标准信号发生器 (SSG)	频率范围 调制 输出	350 到 400MHz 调频和外部调制 -127dBm/0.1μV 到大于 -47dBm/1mV
2. 功率计	输入阻抗 操作频率 测量范围	50Ω 350 到 400MHz 或更高 10W 左右
3. 频偏仪	频率范围	350 到 400MHz
4. 数字电压表 (DVM)	测量范围 输入阻抗	直流 10mV 到 10V 为最小电路负载高输入阻抗
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	能力 输入电平	在 1kHz 时 3%或更低 50mV 到 10Vrms
11. 频谱分析仪	测量范围	直流到 1GHz 或更高
12. 轨迹发生器	中心频率 输出电压	50kHz 到 600MHz 100mV 或更高
13. 16Ω 假负载		大约 16Ω，3W
14. 可调电源		5V 到 10V，大约 5A 配备了电流表时更好

ADJUSTMENT / 调整

■ Antenna connector adapter

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

Note:

When the antenna connector adapter touches the knob, draw out the knob to mount the connector.

■ Universal connector

Use the interface cable (KPG-36) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the radio and tighten the screw.

The lead wire with plug (E30-3287-28) and screw (N08-0535-08) terminals are as follows. Numbers are universal connector terminal numbers.

Caution:

1. When connecting the plug to the universal connector of the radio, a short circuit may occur. To prevent this, be sure to turn the radio POWER switch off.
2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the figure.
3. Do not connct an instrument between red or black and GND.

■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)] 进行转换。(转换头不作为可选件提供，因此请购买商用转换头。)

注释 :

当天线接口转换头接触到其他旋钮时，拔出该旋钮并安装转换头。

■通用接口

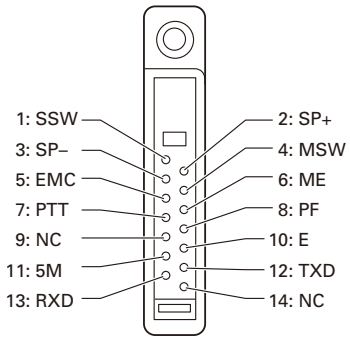
使用接口电缆 (KPG-36) 进行 PC 机调谐或使用带有插头 (E30-3287-28) 和螺钉 (N08-0535-08) 的引线进行面板调谐。

带有插头 (E30-3287-28) 和螺钉 (N08-0535-08) 的引线端点如下所示。号码是通用接口端子号码。

注意事项 :

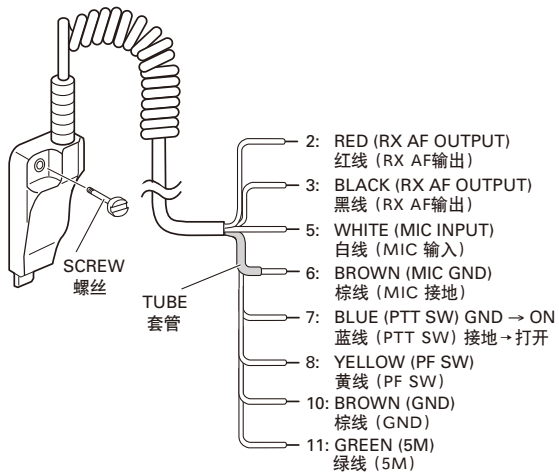
1. 将插头与对讲机通用接口连接时，可能发生短路。为了避免出现这种情况，一定要关闭对讲机的电源开关。
2. 由于 RX 音频输出是 BTL 输出，所以有一个直流分量。如图所示，用电容或变压器将其隔离。
3. 在红色或黑色与接地之间不要连接仪器设备。

• Universal connector

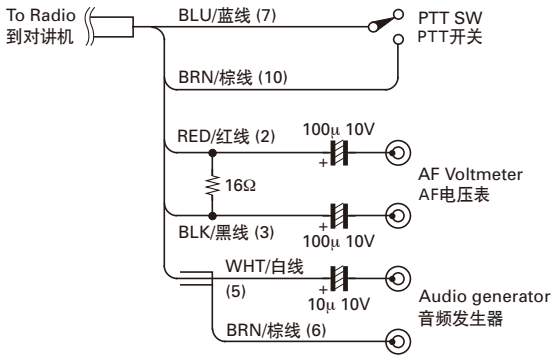


• 通用接口

• Panel tuning



• 面板调谐



ADJUSTMENT / 调整

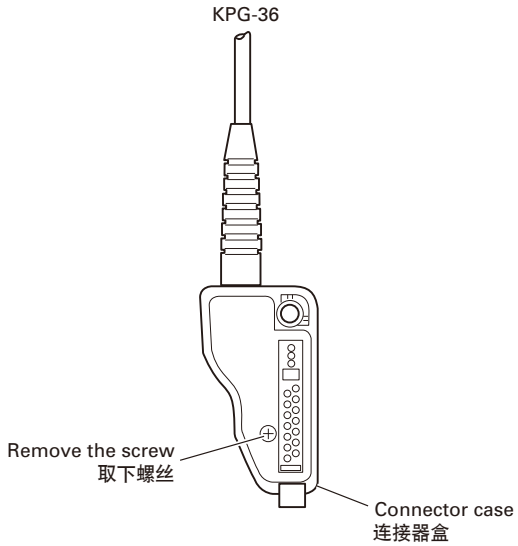
• PC tuning

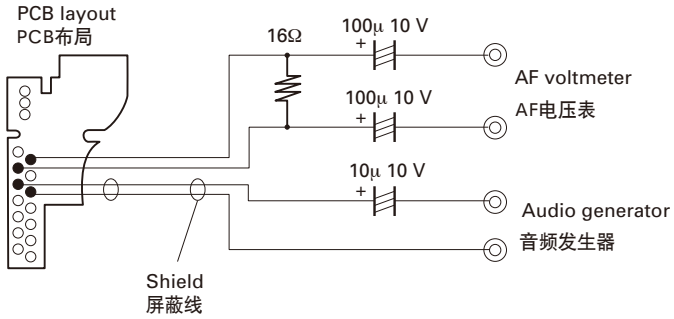
Connect the wires to the PCB in the connector case of interface cable.

For output the wires out of the connector case, need to process the connector case.

• PC 机调谐

将电线连接到接口电缆连接器的 PCB 板上。
要从连接器上拉出电线，需要取下连接器盒。





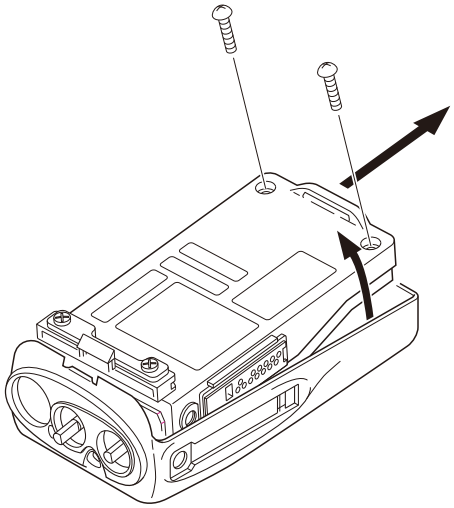
■ Removing the front panel

After removing the battery pack, knobs, and antenna, remove the 2 screws from the back of the transceiver.

Lift the chassis away from the bottom part gently, then pull out the chassis as shown below.

■拆下前面板

拆下电池组、旋钮、天线之后，拆下收发机背面的两个螺钉。
轻轻从底部抬起底盘，然后按下图所示拔出底盘。



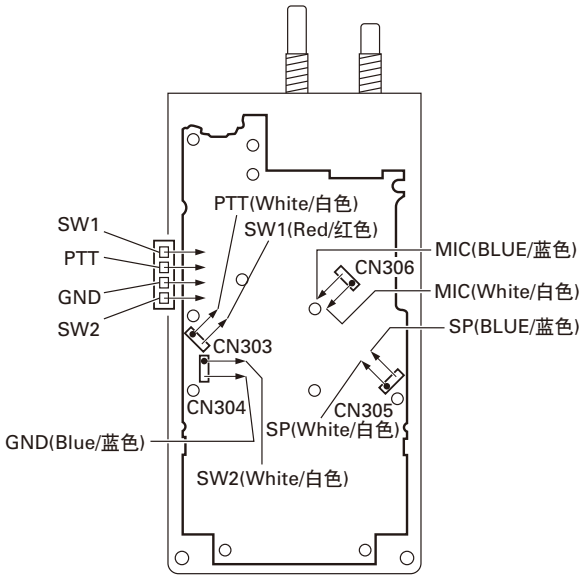
ADJUSTMENT / 调整

■ Connecting the PTT, MIC, SP, and SW2 cables

When connecting the PTT, MIC, SP and SW2 2-wire cables, ensure that the color of each cable mates as shown in the following diagram.

■连接 PTT、MIC、SP 和 SW2 电缆

在连接 PTT、MIC、SP 和 SW2 双线电缆时，确保各电缆的颜色匹配如下图所示。



■ How to assemble the antenna connector and its terminal

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

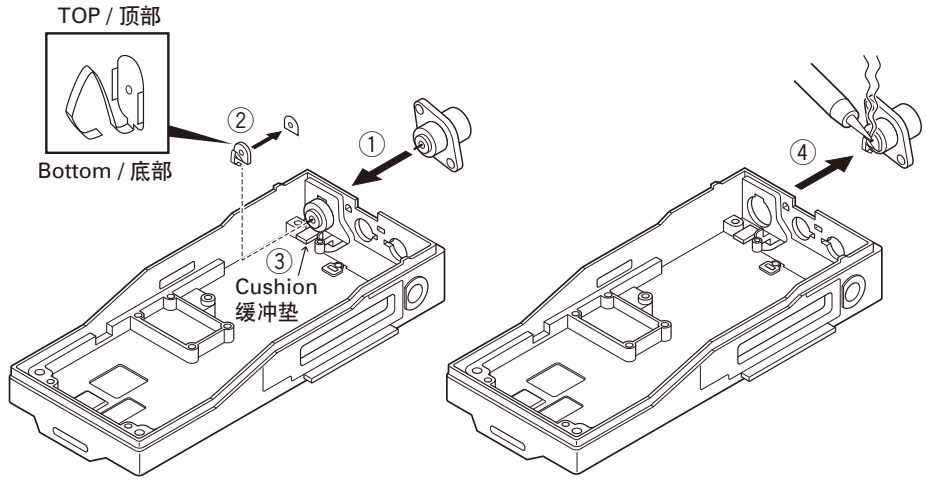
When replacing the antenna connector and/ or terminal, assemble the parts prior to the replacement.

1. Mount the antenna connector onto the chassis ①.
   - Double-sided adhesive 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.

■如何组装天线连接器及其端子

天线连接器及其端子是单独提供的部件。当更换天线连接器和 / 或端子时，在换上前先将其组装起来。

1. 把天线连接器安装到底盘 ① 上。
   - 在端子上贴上双面胶，揭掉双面胶覆层 ②。
   - 按下图所示把端子安装到天线连接器上。
   - 延底盘上的胶粘垫滑动天线端子，使端子上的胶粘部分牢固地与天线连接器 ③ 粘接在一起。
2. 把天线连同连接在上面的端子从底盘上拆下，然后把天线连接器的中心部分焊接到端子 ④ 上。
   注意端子上不要使用过多焊料。



ADJUSTMENT / 调整

■ Repair jig (Chassis)

Use jig (part No.: A10-4060-04) for repairing the TK-3148. Place the TX-RX unit on the jig and fit it with screws.

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

■ 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.

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.

■维修机架（机壳）

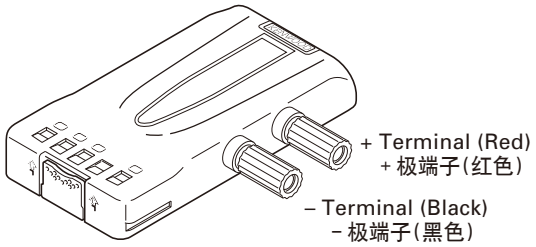
使用机壳（A10-4060-04）维修 TK-3148。将 TX-RX 单元放置在机壳上，并且拧上螺钉。

在维修过程中，当需要在 TX-RX 单元的电路板上检测到电压时，机壳可以方便地进行电压检测，并且保护模块。

■电池夹具（W05-0909-00）

在安装了电池夹具的无线电收发机和电源之间连接电源电缆，并确认输出电压和两极接通后电源是否确实接通，否则过高电压和电极连接颠倒都有可能损坏无线电收发机或电源或都被损坏。

注：当使用电池夹具时，你必须测试电池夹具的两个电极的电压。否则当无线电收发机收发信时，在电源和电池夹具之间的电缆线上会发生微小的电压降。

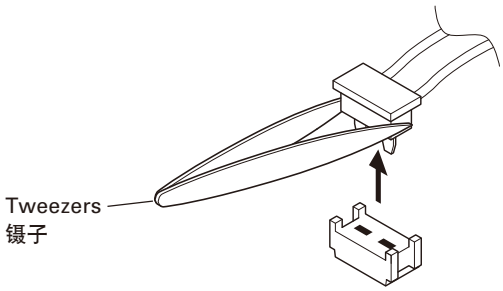


■ How to remove the cable

1. Gently draw out both sides of the connector lever uniformly in the direction of the arrow with tweezers. (CN303, CN304, CN305, CN306)

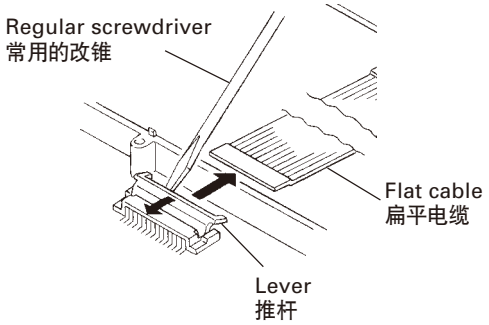
■如何取下电缆

1. 按照箭头所示的方向，用镊子均匀地将连接器推杆的两侧橇开。（CN303, CN304, CN305, CN306）



2. Gently rise up the connector lever in the direction of the arrow with a fine regular screwdriver or tweezers. (CN301, CN302, CN400)

2. 使用常用的小型改锥，按照箭头所示的方向小心地抬起连接器的推杆。（CN301, CN302, CN400）



ADJUSTMENT / 调整

Panel Test Mode

■ Test mode operating features

This transceiver has a test mode. ***To enter test mode, press [A] key and turn power on. Hold [A] key until test channel No. and test signaling No. 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.

• Controls

Controls	"FCN" appears	"FCN" not appears
[Side 1]	Release FCN	Monitor ON and OFF
[Side 2]	Lamp ON/OFF	Wide/Narrow
[S]	FFSK 1200bps and 2400bps	Sets to the Tuning mode
[A]	Release FCN	FCN ON
[B]	Compander function ON and OFF	RF power HIGH and LOW
[C]	Beat shift ON and OFF	Changes signaling
[ENCODER]	Release FCN	Changes channel

• LCD indicator

"SCN" Unused
"☎" Lights at Compander ON.
"LO" Lights at RF Power Low.
"P" Unused
"MON" Lights at moniter ON.
"SVC" Unlock
"☑" Lights at FFSK 2400bps.
"W" Wide/Narrow

• LED indicator

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

• Sub LCD indicator

"FCN" Appears at Function ON.

■ Frequency and signaling

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

• Frequency

Channel No.	RX (MHz)	TX (MHz)
1	370.05	370.10
2	350.05	350.10
3	389.95	389.90
4	370.00	370.00
5	370.20	370.20
6	370.40	370.40
7~16	–	–

Note:

You must adjust the frequencies in all channels as shown above, even though the channel frequencies in the 3 row are below the specifications of the TK-3148.

面板测试模式

■测试模式操作特性

对讲机具有测试模式。***要进入测试模式，需要按 [A] 健，然后接通电源开关。按住 [A] 键直到测试信道号码和信令号码出现在显示器上为止。***测试模式可以通过编程禁止使用。要退出测试模式，需要再次接通电源开关。下述功能在测试模式中有效。

• 控制

控　制	显示 "FCN"	不显示 "FCN"
[侧面 1]	释放 FCN	开启和关闭监听
[侧面 2]	开启 / 关闭指示灯	宽 / 窄
[S]	FFSK 1200bps 和 2400bps	设定为调谐模式
[A]	释放 FCN	开启 FCN
[B]	开启和关闭语音压扩器	射频功率高和低
[C]	开启和关闭 Beat shift	改变信令
[ENCODER]	释放 FCN	改变信道

• LCD 显示

"SCN" 不用
"☎" 语音压扩器开启时点亮
"LO" 射频功率为低时点亮
"P" 不用
"MON" 开启监听时点亮
"SVC" 失锁
"☑" FFSK 为 2400bps 时点亮
"W" 宽 / 窄带

• 发光二极管指示灯

红色发光二极管 发射时发光。电池低压告警时闪动。
绿色发光二极管 有载波时发光。

• 子显示器指示灯

"FCN" 开启功能时显示。

■频率和信令

下述表格中频率的设定可以被调整。需要时，可以按照调整步骤重新设定这些频率，从而获得用户实际操作需要的频率。

• 频率

信道号码	RX(MHz)	TX(MHz)
1	370.05	370.10
2	350.05	350.10
3	389.95	389.90
4	370.00	370.00
5	370.20	370.20
6	370.40	370.40
7~16	–	–

注释：

用户必须调整上述所有信道中的频率，即使第 3 行的信道频率低于 TK-3148 的规格。

ADJUSTMENT / 调整

• Signaling

Signaling No.	RX	TX
1	None	None
2	None	200Hz Square wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 250.3Hz	QT 250.3Hz
7	DQT 023N	DQT 023N
8	DQT 754I	DQT 754I
9	None	DTMF tone 9
10	None	Single Tone 1200Hz (HSD OUT)
11	None	Single Tone 1200Hz (MODEM OUT)
12	None	Single Tone 1800Hz (MODEM OUT)
13	None	FFSK (PN pattern)
14	FFSK (CODE)	FFSK (CODE)

• 信令

信令号码	RX	TX
1	无	无
2	无	200Hz 方形波
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 250.3Hz	QT 250.3Hz
7	DQT 023N	DQT 023N
8	DQT 754I	DQT 754I
9	无	DTMF 音频 9
10	无	单音 1200Hz(HSD 输出)
11	无	单音 1200Hz(调制解调器输出)
12	无	单音 1800Hz(调制解调器输出)
13	无	FFSK(PN 形式)
14	FFSK(代码)	FFSK(代码)

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 16Ω 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)

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

• LCD display (Test mode)

Press [S], now in tuning mode. Use [◀B] button to write tuning data through tuning modes, and channel selector knob to adjust tuning requirements (1 to 256 appears on LCD).

Use [C▶] button to select the adjustment item through tuning modes. Use [A] button to adjust 3 or 5 reference level adjustment. And use [Side 2] button to switch between Wide/Narrow.

• LCD display (Tuning mode)

面板调谐模式

■调整对讲机的准备

在进行调整对讲机之前，将主机与电源连接。

无论何时调整发射部分，主机必须连接到合适的假负载（或功率仪）。

在整个调整过程中，扬声器输出必须经过 16Ω 假负载并被连接到一个交流电压表和一个音频失真测试仪或一个 SINAD 测量仪。

■对讲机调整
（将对讲机置于调整模式）

信道显示在 LCD 上。按照调整所需设定信道。

• LCD 显示（测试模式）

按［S］键进入调谐模式。使用［◀B］键通过调谐模式写入调谐数据，信道选择器按钮调整调谐要求（1 到 256 出现在显示器上）。

使用［C▶］键通过调谐模式选择调整的项目。使用［A］键调整 3 或 5 点基准电平调节。并使用［侧面 2］按钮在宽 / 窄之间切换。

• LCD 显示（调谐模式）

ADJUSTMENT / 调整

■ Panel tuning mode frequency

Tuning point	RX (MHz)	TX (MHz)
L	350.05	350.1
L2	360.05	360.1
C	370.05	370.1
H2	380.05	380.1
H	389.95	389.9

Note:

You must adjust the frequencies in all test channels as shown above, even though the test channel frequencies in the H row are below the specifications of the TK-3148.

• 面板调谐模式频率

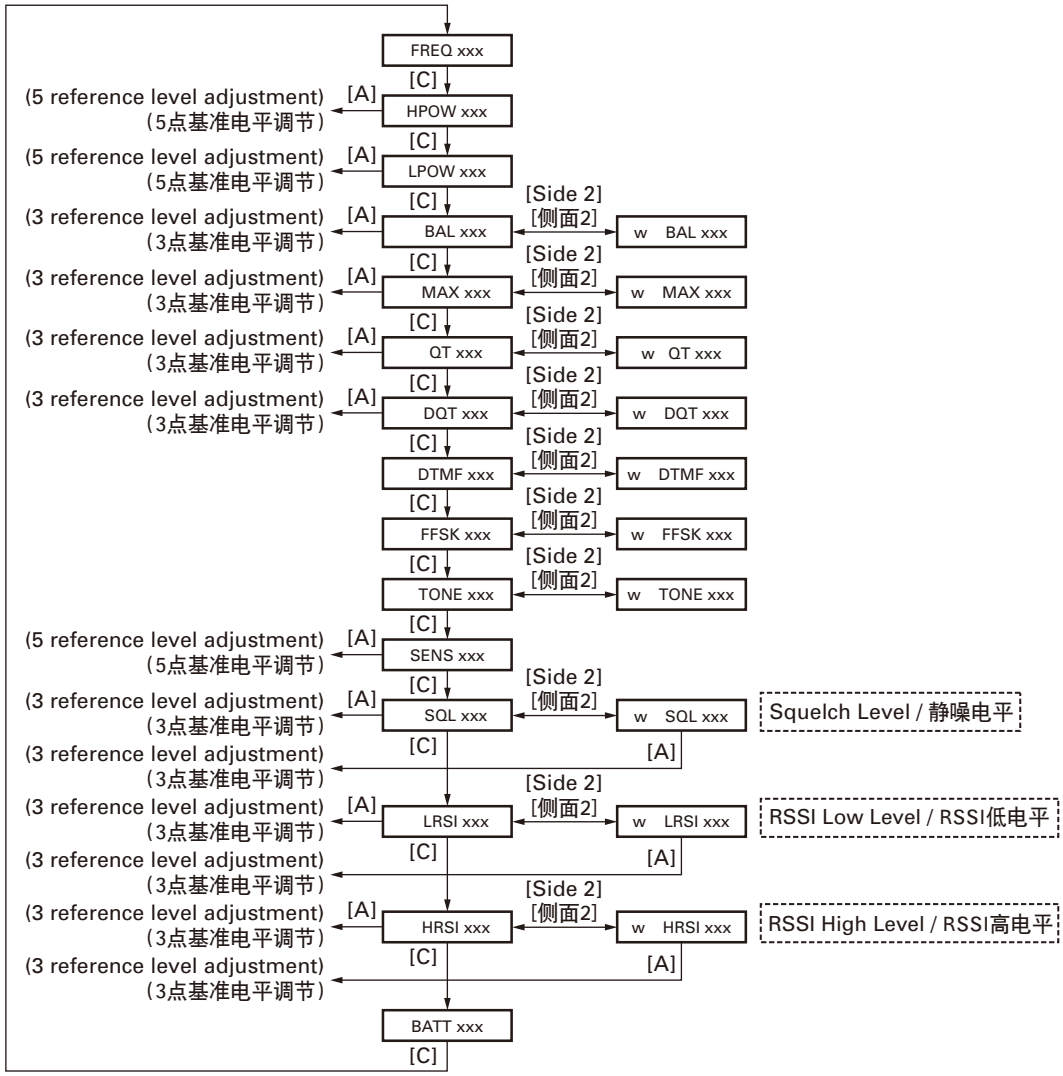
调谐点	RX(MHz)	TX(MHz)
L	350.05	350.1
L2	360.05	360.1
C	370.05	370.1
H2	380.05	380.1
H	389.95	389.9

注释：

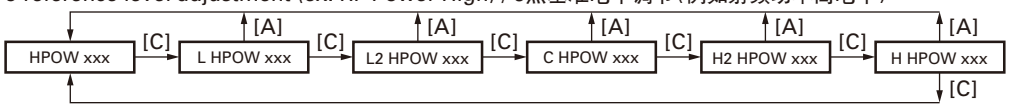
用户必须调整上述所有测试信道中的频率，即使第 H 行的测试信道频率超出 TK-3148 的规格。

■ Flow chart

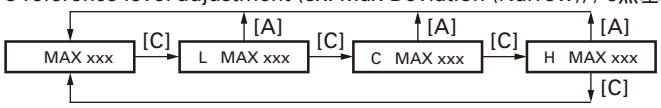
■流程图



5 reference level adjustment (ex. RF Power High) / 5点基准电平调节(例如射频功率高电平)



3 reference level adjustment (ex. Max Deviation (Narrow)) / 3点基准电平调节(例如最大偏差(窄))



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 DVM	Panel TX-RX	ANT CV	TX-RX	TC2	4.0V	±0.1V
	2) CH-Sig: 2-1						Check	0.6V or more
• TX	3) CH-Sig: 3-1 PTT: ON				TX-RX	TC1	4.0V	±0.1V
	4) CH-Sig: 2-1 PTT: ON						Check	0.6V or more

Transmitter Section (Panel tuning mode except when Panel test mode is specified)

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency Adjust	1) Adj item [FREQ] Adjust [***] PTT: ON	f. counter Power meter Ammeter	Panel	ANT	Panel	Encoder knob	Center frequency ± 100Hz	**Note:** After replacing the TCXO (X1), align using KPG-74D CPS.
2. Hight Power Adjust	1) Adj item [HPOW] Adjust [***] 2) Adj item [L HPOW] → [L2 HPOW] → [C HPOW] → [H2 HPOW] → [H HPOW] Adjust [***] PTT: ON						4.0W	±0.1W 1.9A or less
3. Hight Power Check	**[Panel Test Mode]** 1) CH-Sig: 1-1 PTT: ON						Check	3.7~4.3W 1.9A or less
	2) CH-Sig: 2-1 PTT: ON							
	3) CH-Sig: 3-1 PTT: ON							
4. Low Power Adjust	1) Adj item [LPOW] Adjust [***] 2) Adj item [L LPOW] → [L2 LPOW] → [C LPOW] → [H2 LPOW] → [H LPOW] Adjust [***] PTT: ON				Panel	Encoder knob	1.0W	±0.05W 1.0A or less
5. Low Power Check	**[Panel Test Mode]** 1) CH-Sig: 1-1 Set low power (Push [C]) PTT: ON						Check	0.5~1.5W 1.0A 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) 电池终端电压 :7.5V 2) SSG 标准调制 [宽带] MOD:1kHz, DEV:3kHz [窄带] MOD:1kHz, DEV:1.5kHz							
2. 压控振荡器电压 • RX	**[面板测试模式]** 1) CH-Sig:3-1	功率仪 DVM	面板 TX-RX	ANT CV	TX-RX	TC2	4.0V	±0.1V
	2) CH-Sig:2-1						检查	0.6V 或更高
• TX	3) CH-Sig:3-1 PTT: 开启				TX-RX	TC1	4.0V	±0.1V
	4) CH-Sig:2-1 PTT: 开启						检查	0.6V 或更高

发射部分（面板调谐模式除非面板测试模式已被指定）

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 [***] PTT: 开启	频率计 功率仪 电流表	面板	ANT	面板	编码旋钮	中心频率 ±100Hz	**注释**: 更换 TCXO(X1) 之后，使用 KPG-74D CPS 进行调整。
2. 高功率调整	1) 调整项目 [HPOW] 调整 [***] 2) 调整项目 [L HPOW] → [L2 HPOW] → [C HPOW] → [H2 HPOW] → [H HPOW] 调整 [***] PTT: 开启						4.0W	±0.1W 1.9A 或更低
3. 高功率检查	**[面板测试模式]** 1) CH-Sig:1-1 PTT: 开启						检查	3.7 ～ 4.3W 1.9A 或更低
	2) CH-Sig:2-1 PTT: 开启							
	3) CH-Sig:3-1 PTT: 开启							
4. 低功率调整	1) 调整项目 [LPOW] 调整 [***] 2) 调整项目 [L LPOW] → [L2 LPOW] → [C LPOW] → [H2 LPOW] → [H LPOW] 调整 [***] PTT: 开启				面板	编码旋钮	1.0W	±0.05W 1.0A 或更低
5. 低功率检查	**[面板测试模式]** 1) CH-Sig:1-1 设定低功率 (按 [C] 键) PTT: 开启						检查	0.5 ～ 1.5W 1.0A 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	
6. DQT Balance Adjust [Narrow]	1) Adj item [BAL] Adjust [***] Deviation meter filter LPF: 3kHz HPF: OFF 2) Adj item [L BAL] → [C BAL] → [H BAL] Adjust [***] PTT: ON	Power meter Deviation meter Oscilloscope AG AF VTVM	Panel	ANT Universal connector	Panel	Encoder knob	Make the demodulation waves into square waves	
[Wide]	3) Adj item [w BAL] Adjust [***] PTT: ON							
7. Max DEV Adjust [Narrow]	1) Adj item [MAX] Adjust [***] AG: 1kHz/150mV Deviation meter filter LPF: 15kHz HPF: OFF 2) Adj item [L MAX] → [C MAX] → [H MAX] Adjust [***] PTT: ON						1.85kHz (According to the larger+,-)	±50Hz
[Wide]	3) Adj item [w MAX] Adjust [***] PTT: ON						4.20kHz (According to the larger+,-)	
8. MIC Sensitivity Check	**[Panel Test Mode]** 1) CH-Sig: 1-1 AG: 1kHz/Narrow 15mV Wide 12mV Deviation meter filter LPF: 15kHz PTT: ON						Check	Narrow 1.0~2.2kHz Wide 2.4~3.6kHz
9. QT Deviation Adjust [Narrow]	1) Adj item [QT] Adjust [***] Deviation meter filter LPF: 3kHz HPF: OFF 2) Adj item [L QT] → [C QT] → [H QT] Adjust [***] PTT: ON				Panel	Encoder knob	0.35kHz	±50Hz
[Wide]	3) Adj item [w QT] Adjust [***] PTT: ON						0.75kHz	
10. DQT Devition Adjust [Narrow]	1) Adj item [DQT] Adjust [***] Deviation meter filter LPF: 3kHz HPF: OFF 2) Adj item [L DQT] → [C DQT] → [H DQT] Adjust [***] PTT:ON						0.35kHz	
[Wide]	3) Adj item [w DQT] Adjust [***] PTT: ON						0.75kHz	

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	
6. DQT 平衡调整 [窄]	1) 调整项目 [BAL] 调整 [***] 频偏仪滤波器 LPF: 3kHz HPF: 关闭 2) 调整项目 [L BAL] → [C BAL] → [H BAL] 调整 [***] PTT: 开启	功率仪 偏差仪 示波器 AG AF VTVM	面板	ANT 通用接口	面板	编码旋钮	使调整波形为方形波。	
[宽]	3) 调整项目 [w BAL] 调整 [***] PTT: 开启							
7. 最大 DEV 调整 [窄]	1) 调整项目 [MAX] 调整 [***] AG: 1kHz/150mV 频偏仪滤波器 LPF: 15kHz HPF: 关闭 2) 调整项目 [L MAX] → [C MAX] → [H MAX] 调整 [***] PTT: 开启						1.85kHz (按照较大 +,-)	±50Hz
[宽]	3) 调整项目 [w MAX] 调整 [***] PTT: 开启						4.20kHz (按照较大 +,-)	
8. 话筒灵敏度检查	**[面板测试模式]** 1) CH-Sig: 1-1 AG: 1kHz/ 窄 15mV, 宽 12mV 频偏仪滤波器 LPF: 15kHz PTT: 开启						检查	窄 1.0 ～ 2.2kHz 宽 2.4 ～ 3.6kHz
9. QT 频偏调整 [窄]	1) 调整项目 [QT] 调整 [***] 频偏仪滤波器 LPF: 3kHz HPF: 关闭 2) 调整项目 [L QT] → [C QT] → [H QT] 调整 [***] PTT: 开启				面板	编码旋钮	0.35kHz	±50Hz
[宽]	3) 调整项目 [w QT] 调整 [***] PTT: 开启						0.75kHz	
10. DQT 频偏调整 [窄]	1) 调整项目 [DQT] 调整 [***] 频偏仪滤波器 LPF: 3kHz HPF: 关闭 2) 调整项目 [L DQT] → [C DQT] → [H DQT] 调整 [***] PTT: 开启						0.35kHz	
[宽]	3) 调整项目 [w DQT] 调整 [***] PTT: 开启						0.75kHz	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
11. DTMF Deviation Adjust [Narrow]	1) Adj item [DTMF] Adjust [***] Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON	Power meter Deviation meter Oscilloscope AG AF VTVM	Panel	ANT Universal connector	Panel	Encoder knob	1.25kHz	±0.1kHz
[Wide]	2) Adj item [w DTMF] Adjust [***] PTT: ON						2.5kHz	±0.1kHz
12. FFSK Deviation Adjust [Narrow]	1) Adj item [FFSK] Adjust [***] Deviation meter filter LPF: 15kHz HPF: OFF PTT: ON						1.5kHz	±0.1kHz
[Wide]	2) Adj item [w FFSK] Adjust [***] PTT: ON						3.0kHz	±0.1kHz
13. TONE Deviation Adjust [Narrow]	1) Adj item [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 Detection Writing	1) Adj item [BATT] Adjust [***] PTT: ON	Power meter DVM		ANT BATT terminal			After pressing the PTT switch, confirm that one predetermined numeric in the range of 1 to 256 appears and then press the [B] key. That number will be stored in memory	BATT terminal voltage: 6.2V
15. BATT Detection Check	**[Panel Test Mode]** 1) CH-Sig: 1-1 BATT terminal voltage: 6.8V Use the battery jig (W05-0909-00) PTT: ON						Check	No blinking of LED
	2) BATT terminal voltage: 6.0V Use the battery jig (W05-0909-00) PTT: ON							Blinking of LED

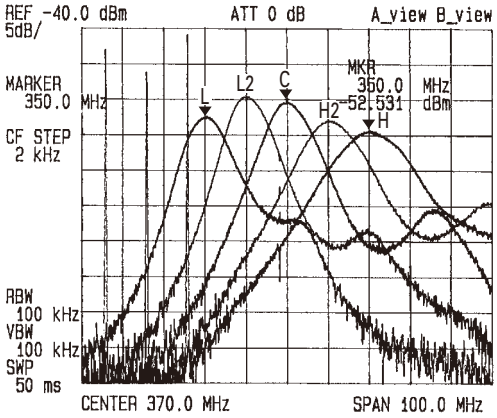
调　整

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	
11. DTMF 频偏调整 [窄]	1) 调整项目 [DTMF] 调整 [***] 频偏仪滤波器 LPF:15kHz HPF: 关闭 PTT: 开启	功率仪 偏差仪 示波器 AG AF VTVM	面板	ANT 通用接口	面板	编码旋钮	1.25kHz	±0.1kHz
[宽]	2) 调整项目 [w DTMF] 调整 [***] PTT: 开启						2.5kHz	±0.1kHz
12. FFSK 频偏调整 [窄]	1) 调整项目 [FFSK] 调整 [***] 频偏仪滤波器 LPF:15kHz HPF: 关闭 PTT: 开启						1.5kHz	±0.1kHz
[宽]	2) 调整项目 [w FFSK] 调整 [***] PTT: 开启						3.0kHz	±0.1kHz
13. TONE 频偏调整 [窄]	1) 调整项目 [TONE] 调整 [***] 频偏仪滤波器 LPF:15kHz HPF: 关闭 PTT: 开启						1.5kHz	±0.1kHz
[宽]	2) 调整项目 [w TONE] 调整 [***] PTT: 开启						3.0kHz	±0.1kHz
14. 电池检测写入	1) 调整项目 [BATT] 调整 [***] PTT: 开启	功率仪 DVM		ANT 电池终端			按下 PTT 开关后，确认一个 1 到 256 内的预定数字出现，然后按 [B] 键。 此数字将储存在存储器中。	电池终端电压 :6.2V
15. 电池检测检查	**[面板测试模式]** 1) CH-Sig:1-1 电池终端电压 :6.8V 使用电池夹具 (W05-0909-00) PTT: 开启						检查	LED 不闪烁
	2) 电池终端电压 :6.0V 使用电池夹具 (W05-0909-00) PTT: 开启							LED 闪烁

ADJUSTMENT

Receiver Section (Panel tuning mode except when Panel test mode is specified)

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity Adjust (BPF characteristic)	1) Adj item [SENS] Adjust [***] 2) Low-edge frequency Adj item [L SENS] → [L2 SENS] → [C SENS] → [H2 SENS] → [H SENS] Spe-Ana setting Center f: 370MHz Span: 100MHz RBW: 100kHz VBW: 1kHz REF level: –40dBm ATT: 0dB Tra-G setting Input level: –40dBm	Tracking generator Specturm analyzer	Panel TX-RX	ANT BPF Need couple capacitor (1000PF)	Panel	Encoder knob	**Adjustment** fo=fL, fL2, fC, fH2, fH Adjust point frequency. Refer to the Panel tuning mode frequency table on page 39.	
2. Sensitivity Check	**[Panel Test Mode]** 1) CH-Sig: 1-1 SSG output Wide: –117dBm (0.28µV) (MOD: 1kHz/±3kHz) Narrow: –116dBm (0.316µV) (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector			Check	12dB SINAD or more
3. Squelch (Preset) Adjust [Narrow]	1) Adj item [SQL] Adjust [***] SSG output : 12dB SINAD level 2) Adj item [L SQL] → [C SQL] → [H SQL] Adjust [***]				Panel	Encoder knob Squelch	Adjust to point of opening	
[Wide]	3) Adj item [w SQL] Adjust [***] SSG output : 12dB SINAD level 4) Adj item [wL SQL] → [wC SQL] → [wH SQL] Adjust [***]							

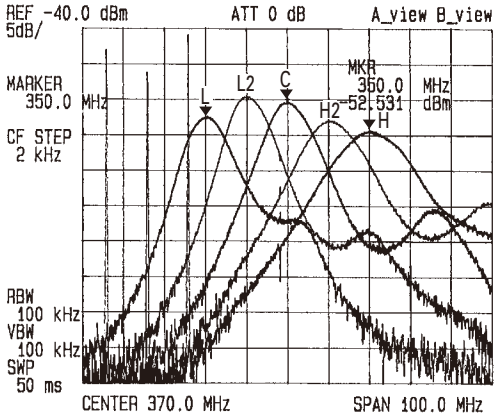


Band Pass Filter Characteristic (C)

调　整

接收部分（面板调谐模式除非面板测试模式已被指定）

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 (BPF 特性)	1) 调整项目 [SENS] 调整 [***] 2) 低边频率 调整项目 [L SENS] → [L2 SENS] → [C SENS] → [H2 SENS] → [H SENS] Spe-Ana 设定 Center-f:370MHz Span:100MHz RBW:100kHz VBW:1kHz REF 电平：-40dBm ATT:0dB Tra-G 设定 Input 电平：-40dBm	轨迹发生器 频谱分析仪	面板 TX-RX	ANT BPF 需要耦合电容 (1000PF)	面板	编码旋钮	**调整** fo=fL, fL2, fC, fH2, fH 调整点频率。 参阅第 39 页上的面板调谐模式频率表。	
2. 灵敏度检查	**[面板测试模式]** 1) CH-Sig:1-1 标准信号发生器输出 宽：-117dBm(0.28μV) (MOD:1kHz/±3kHz) 窄：-116dBm(0.316μV) (MOD:1kHz/±1.5kHz)	SSG AF VTVM 示波器	面板	ANT 通用接口			检查	12dB SINAD 或更高
3. 静噪抑制电路 (Preset) 调整 [窄]	1) 调整项目 [SQL] 调整 [***] 标准信号发生器输出 :12dB SINAD 电平 2) 调整项目 [L SQL] → [C SQL] → [H SQL] 调整 [***]				面板	编码旋钮	调整到打开噪音抑制电路点。	
[宽]	3) 调整项目 [w SQL] 调整 [***] 标准信号发生器输出 :12dB SINAD 电平 4) 调整项目 [wL SQL] → [wC SQL] → [wH SQL] 调整 [***]							



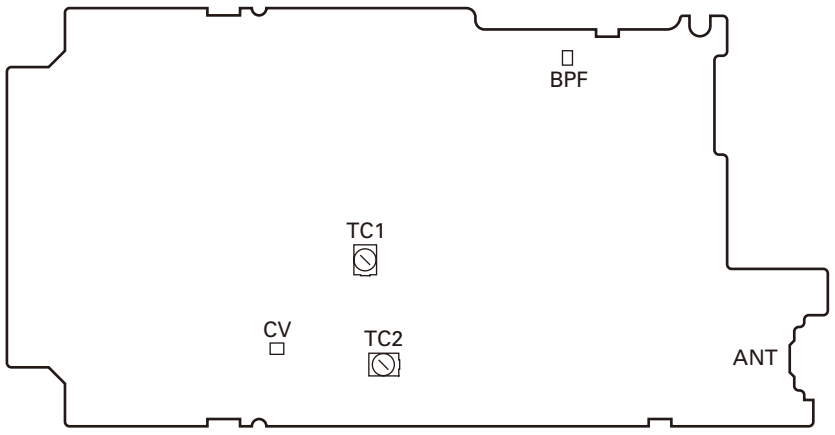
带电滤波器特性(C)

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. RSSI (Low) Adjust [Narrow]	1) Adj item [LRSI] Adjust [∗∗∗] SSG output : 12dB SINAD level	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel	Encoder knob Squelch	After input signal from SSG, press [B] key. That numeric will be stored in memory	
	2) Adj item [L LRSI] → [C LRSI] → [H LRSI] Adjust [∗∗∗]							
[Wide]	3) Adj item [w LRSI] Adjust [∗∗∗] SSG output : 12dB SINAD level							
	4) Adj item [wL LRSI] → [wC LRSI] → [wH LRSI] Adjust [∗∗∗]							
5. Squelch (Preset) Check	**[Panel Test Mode]** 1) CH-Sig: 1-1 SSG output : 12dB SINAD level						Check	Squelch must be opened.
	2) SSG output: OFF							Squelch must be closed.
6. RSSI (High) Adjust [Narrow]	1) Adj item [HRSI] Adjust [∗∗∗] SSG output: –70dBm (70.7µV)				Panel	Encoder knob Squelch	After input signal from SSG, press [B] key. That numeric be stored in memory	
	2) Adj item [L HRSL] → [C HRSL] → [H HRSL] Adjust [∗∗∗]							
[Wide]	3) Adj item [wL HRSL] → [wC HRSL] → [wH HRSL] Adjust [∗∗∗]							

Adjustment points

TX-RX unit (X57-6413-01) (A/3)
Foil side view

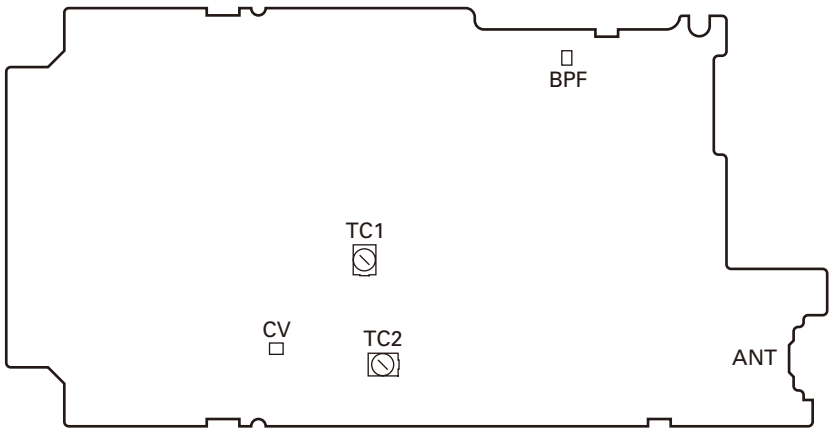


调　整

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. RSSI（低）调整 [窄]	1) 调整项目 [LRSI] 调整 [***] 标准信号发生器输出 :12dB SINAD 电平	SSG AF VTVM 示波器	面板	ANT 通用接口	面板	编码旋钮	从 SSG 输入信号后，按 [B] 键，此数值将被保存在存储器中。	
	2) 调整项目 [L LRSI] → [C LRSI] → [H LRSI] 调整 [***]							
[宽]	3) 调整项目 [w LRSI] 调整 [***] 标准信号发生器输出 :12dB SINAD 电平							
	4) 调整项目 [wL LRSI] → [wC LRSI] → [wH LRSI] 调整 [***]							
5. 静噪抑制电路 (Preset) 检查	**[面板测试模式]** 1) CH-Sig:1-1 标准信号发生器输出 :12dB SINAD 电平						检查	静噪必须被打开。
	2) 标准信号发生器输出：关闭							静噪必须被关闭。
6. RSSI（高）调整 [窄]	1) 调整项目 [HRSI] 调整 [***] 标准信号发生器输出 :-70dBm(70.7μV)				面板	编码旋钮	从 SSG 输入信号后，按 [B] 键，此数值将被保存在存储器中。	
	2) 调整项目 [L HRSL] → [C HRSL] → [H HRSL] 调整 [***]							
[宽]	3) 调整项目 [wL HRSL] → [wC HRSL] → [wH HRSL] 调整 [***]							

调整点

TX-RX 单元 (X57-6413-01)(A/3)
箔面视图



TERMINAL FUNCTION / 端子功能

TX-RX UNIT (X57-6413-01): TX-RX section

Pin No.	Name	I/O	Function
		CN301	
1	NC	-	Not used
2	RXD	I	Serial data input
3	TXD	O	Serial data output
4	5M	O	5V output
5	E	-	GND
6	NC	-	Not used
7	PF	I	Programmable function key input
8	PTT	I	External PTT input
9	ME	-	External microphone ground
10	ENC	I	External microphone input
11	MSW	I	EXT/INT MIC switch input
12	SP–	O	BTL output – for external
13	SP+	O	BTL output + for external
14	SSW	I	EXT/INT speaker switch input
		CN302	
1	NC	-	Not used
2	LEDK	I	Backlight LED control
3	LEDA	O	Backlight LED control
4	CKEY	I	C key input
5	BKEY	I	B key input
6	AKEY	I	A key input
7	SKEY	I	S key input
8	VEE	-	GND
9	SDO	O	Serial data outpuut for LCD driver
10	SID	I	Serial data input for LCD driver
11	SCLK	O	Clock data output for LCD driver
12	CS	O	LCD driver chip select output
13	VCC	-	5V
14	GND	-	GND
		CN303	
	PTT	I	PTT key input
	LAMP	I	Side 1 key input
		CN304	
	MON	I	Side 2 key input
	GND	-	GND
		CN305	
	SP+	O	BTL output + for internal
	SP–	O	BTL output – for internal
		CN306	
	EMC+	O	Internal microphone input
	EMC–	-	Internal microphone ground
		CN400	
1	S_DET	I	Battery detect input

TX-RX 单元 (X57-6413-01):TX-RX 部分

管脚号码	名 称	输入/输出	功　　能
		CN301	
1	NC	–	不使用
2	RXD	输入	串行数据输入
3	TXD	输出	串行数据输出
4	5M	输出	5V 输出
5	E	–	接地
6	NC	–	不使用
7	PF	输入	可编程功能键输入
8	PTT	输入	外置 PTT 输入
9	ME	–	外置麦克风信号地
10	ENC	输入	外置麦克风输入
11	MSW	输入	外置 / 内置麦克风开关输入
12	SP–	输出	用于外置的 BTL 输出 –
13	SP+	输出	用于外置的 BTL 输出 +
14	SSW	输入	外置 / 内置扬声器开关输入
		CN302	
1	NC	–	不使用
2	LEDK	输入	背景灯光 LED 控制
3	LEDA	输出	背景灯光 LED 控制
4	CKEY	输入	C 按键输入
5	BKEY	输入	B 按键输入
6	AKEY	输入	A 按键输入
7	SKEY	输入	S 按键输入
8	VEE	–	接地
9	SDO	输出	显示器驱动器的串行数据输出
10	SID	输入	显示器驱动器的串行数据输入
11	SCLK	输出	显示器驱动器的时钟数据输出
12	CS	输出	显示器驱动器芯片选择输出
13	VCC	–	5V
14	GND	–	接地
		CN303	
	PTT	输入	PTT 按键输入
	LAMP	输入	侧面 1 按键输入
		CN304	
	MON	输入	侧面 2 按键输入
	GND	–	接地
		CN305	
	SP+	输出	用于内置的 BTL 输出 +
	SP–	输出	用于内置的 BTL 输出 –
		CN306	
	EMC+	输出	内部麦克风输入。
	EMC–	–	内部麦克风接地
		CN400	
1	S_DET	输入	电池检测输入

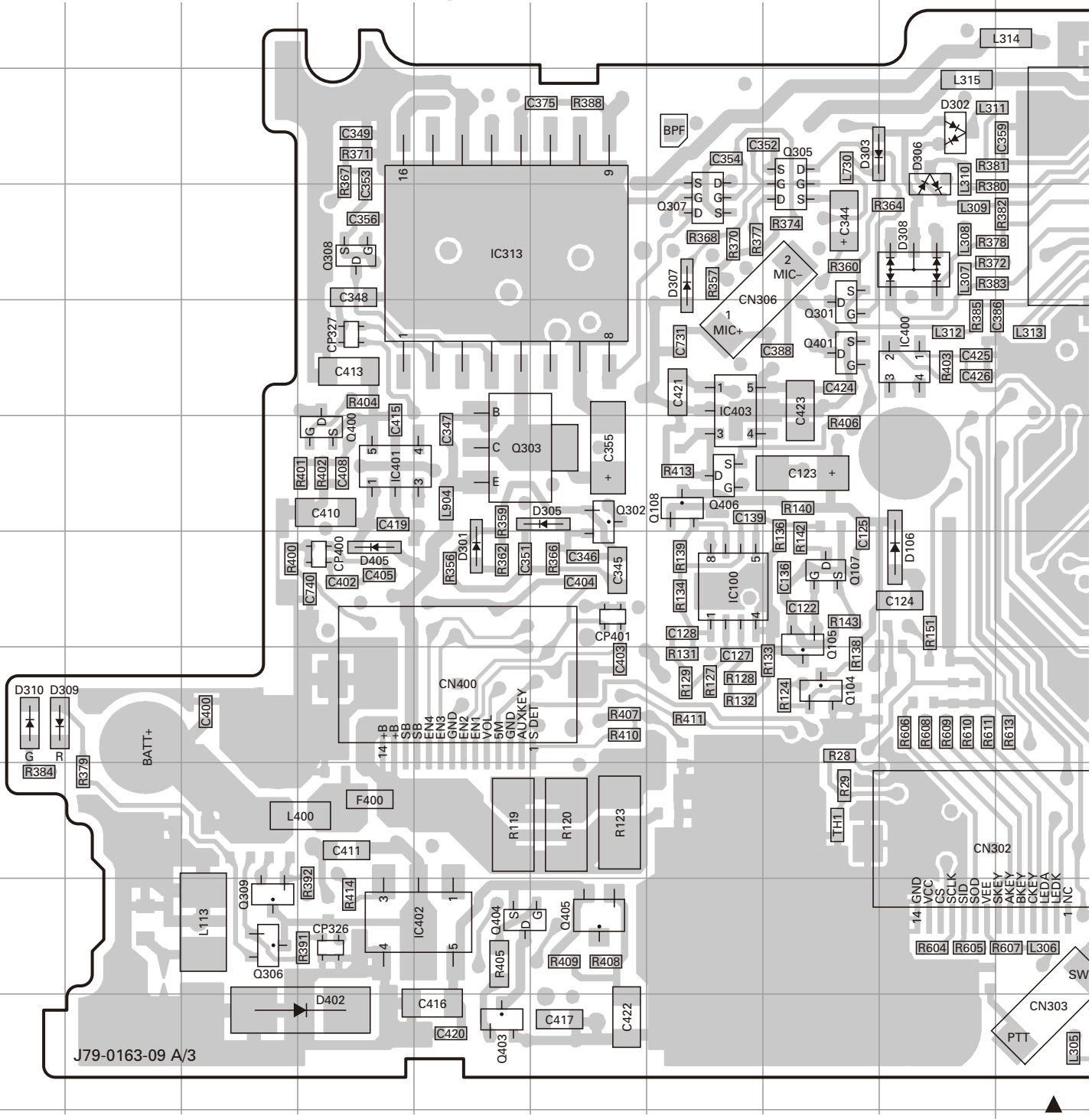
TERMINAL FUNCTION / 端子功能

Pin No.	Name	I/O	Function
2	AUXKEY	I	AUX key input
3	GND	-	GND
4	5M	-	5V
5	VOL	I	Volume level input for audio control
6	CH1	I	Encoder pulse input
7	CH2	I	Encoder pulse input
8	GND	-	GND
9	CH3	I	Encoder pulse input
10	CH4	I	Encoder pulse input
11	SB	I	Power input after passing through the fuse
12	SB	I	Power input after passing through the fuse
13	+B	O	Power output after power switch
14	+B	O	Power output after power switch
CN300, CN500			
1	XOUT	O	3.589545MHz output
2	GND	-	GND
3	AFCLR	O	FFSK flame reset output
4	AFRDT	O	FFSK modulation data output timing pulse input
5	AFRTM	O	FFSK demodulation data output timing pulse input
6	AFTRD	O	FFSK demodulation data input
7	AFMSKE	O	FFSK modulation enable
8	CLK	I	Clock data input
9	AFDAT	O	FFSK data output
10	AFREG2	O	AF IC register switching data output 2
11	AFREG1	O	AF IC register switching data output 1
12	AFSTB	O	AF IC data strobe output
13	5CNS	-	5V
14	MMUTE	O	MIC mute
15	5TC	-	5T control
16	5C	-	5V
17	GND	-	GND
18	MICI	I	MIC signal input
19	PTT	I	PTT key input
20	ME	-	MIC ground
21	ME	-	MIC ground
22	TXHSD	O	HSD output (TX)
23	GND	-	GND
24	TXAF	O	Audio output (TX)
25	RXAF1	I	Audio input (TX)
26	5RC	-	5R control
27	HSDIN	O	HSD output (RX)
28	RXAFO	O	Audio output (RX)
29	GND	-	GND
30	GND	-	GND

管脚号码	名 称	输入/输出	功　能
2	AUXKEY	输入	AUX 按键输入
3	GND	–	接地
4	5M	–	5V
5	VOL	输入	用于音频控制的音量电平输入
6	CH1	输入	编码器脉冲输入
7	CH2	输入	编码器脉冲输入
8	GND	–	接地
9	CH3	输入	编码器脉冲输入
10	CH4	输入	编码器脉冲输入
11	SB	输入	通过保险丝后输入电源
12	SB	输入	通过保险丝后输入电源
13	+B	输出	接通电源开关后输出电源
14	+B	输出	接通电源开关后输出电源
CN300, CN500			
1	XOUT	输出	3.589545MHz 输出
2	GND	–	接地
3	AFCLR	输出	FFSK 火焰复位输出
4	AFRDT	输出	FFSK 调制数据输出计时脉冲输入
5	AFRTM	输出	FFSK 调制数据输出计时脉冲输入
6	AFTRD	输出	FFSK 解调数据输入
7	AFMSKE	输出	FFSK 调制启用
8	CLK	输入	时钟数据输入
9	AFDAT	输出	FFSK 数据输出
10	AFREG2	输出	AF IC 寄存器交换数据输出 2
11	AFREG1	输出	AF IC 寄存器交换数据输出 1
12	AFSTB	输出	AF IC 数据选通输出
13	5CNS	–	5V
14	MMUTE	输出	麦克风静音
15	5TC	–	5T 控制
16	5C	–	5V
17	GND	–	接地
18	MICI	输入	麦克风信号输入
19	PTT	输入	PTT 按键输入
20	ME	–	麦克风信号地
21	ME	–	麦克风信号地
22	TXHSD	输出	HSD 输出（发射）
23	GND	–	接地
24	TXAF	输出	音频输出（发射）
25	RXAF1	输入	音频输入（发射）
26	5RC	–	5R 控制
27	HSDIN	输出	HSD 输出（接收）
28	RXAFO	输出	音频输出（接收）
29	GND	–	接地
30	GND	–	接地

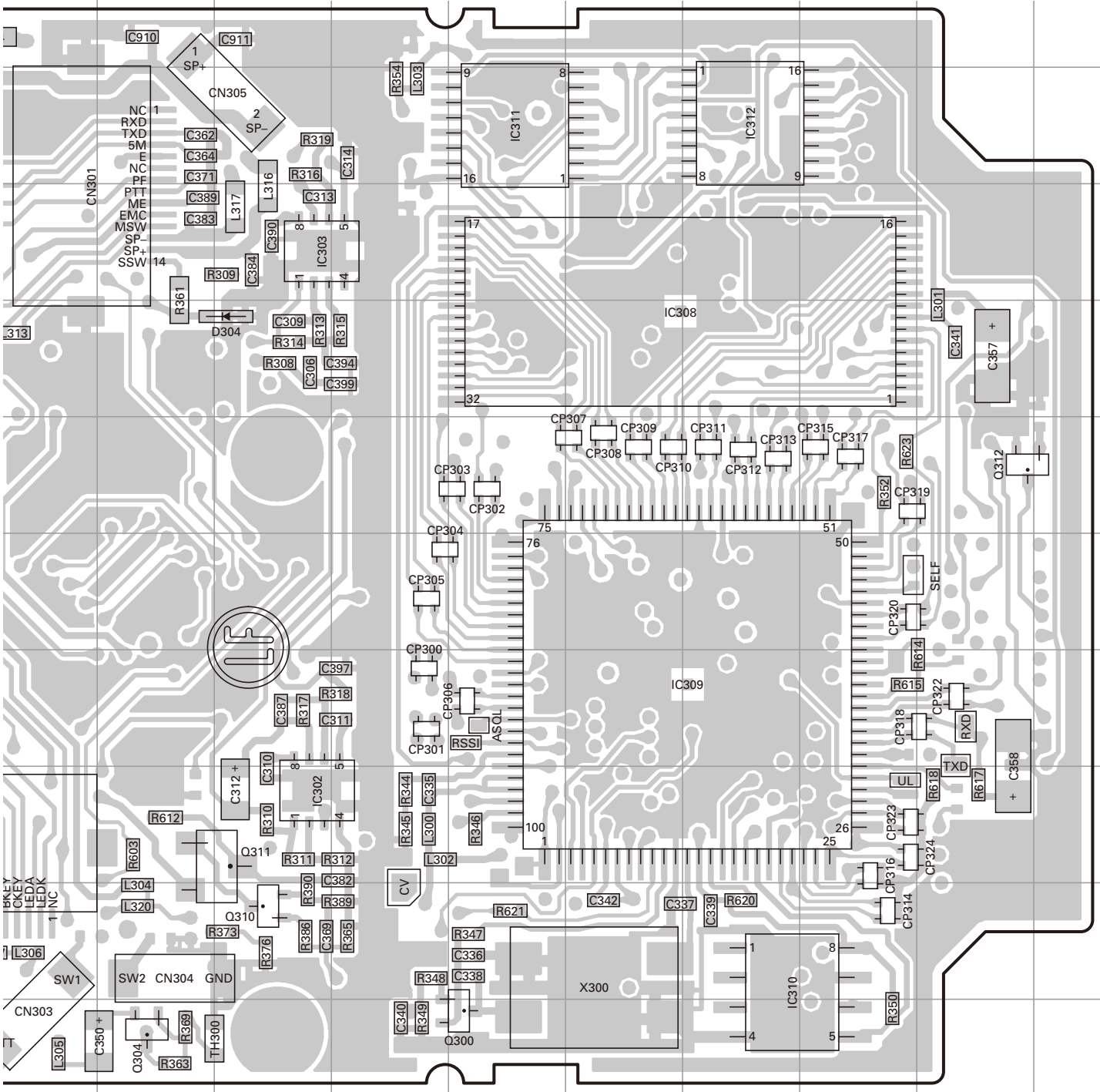
TK-3148 PC BOARD / PC板

TX-RX UNIT (X57-6413-01) (A/3) Component side view (J79-0163-09 A/3)



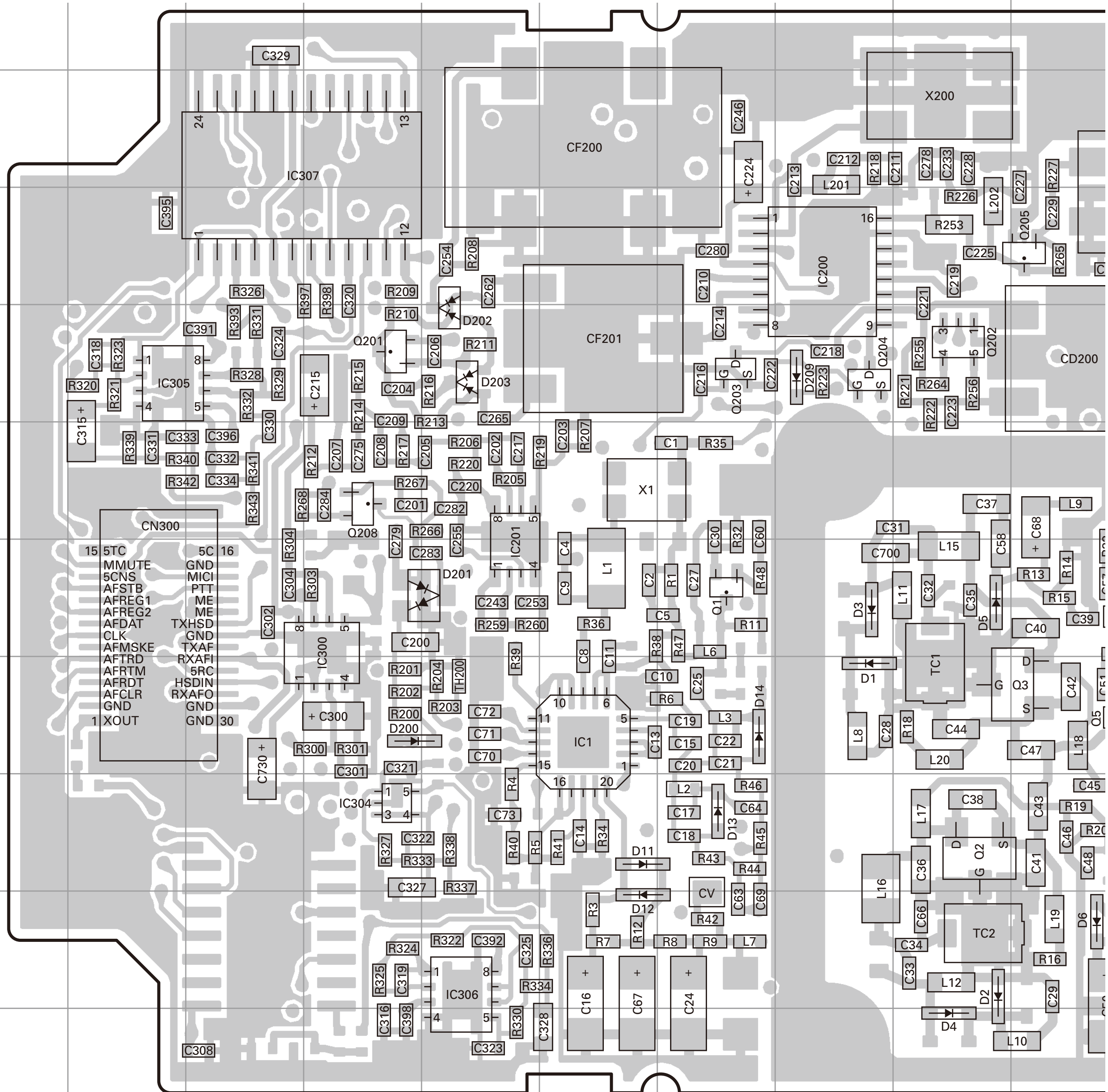
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC100	7G	IC312	3P	Q105	7H	Q304	11K	Q311	9L	Q406	6G	D306	3I
IC302	9L	IC313	4E	Q107	7H	Q305	3H	Q312	6R	D106	7I	D307	4G
IC303	4L	IC400	5I	Q108	6G	Q306	10C	Q400	6D	D301	7E	D308	4I
IC308	5O	IC401	6D	Q300	11N	Q307	4G	Q401	5H	D302	3I	D309	8A
IC309	8P	IC402	10E	Q301	5H	Q308	4D	Q403	11E	D303	3H	D310	8A
IC310	10P	IC403	5G	Q302	6F	Q309	10C	Q404	10E	D304	5L	D402	11D
IC311	3N	Q104	8H	Q303	6E	Q310	10L	Q405	10F	D305	6F	D405	7D

TX-RX UNIT (X57-6413-01) (A/3) Component side view (J79-0163-09 A/3)



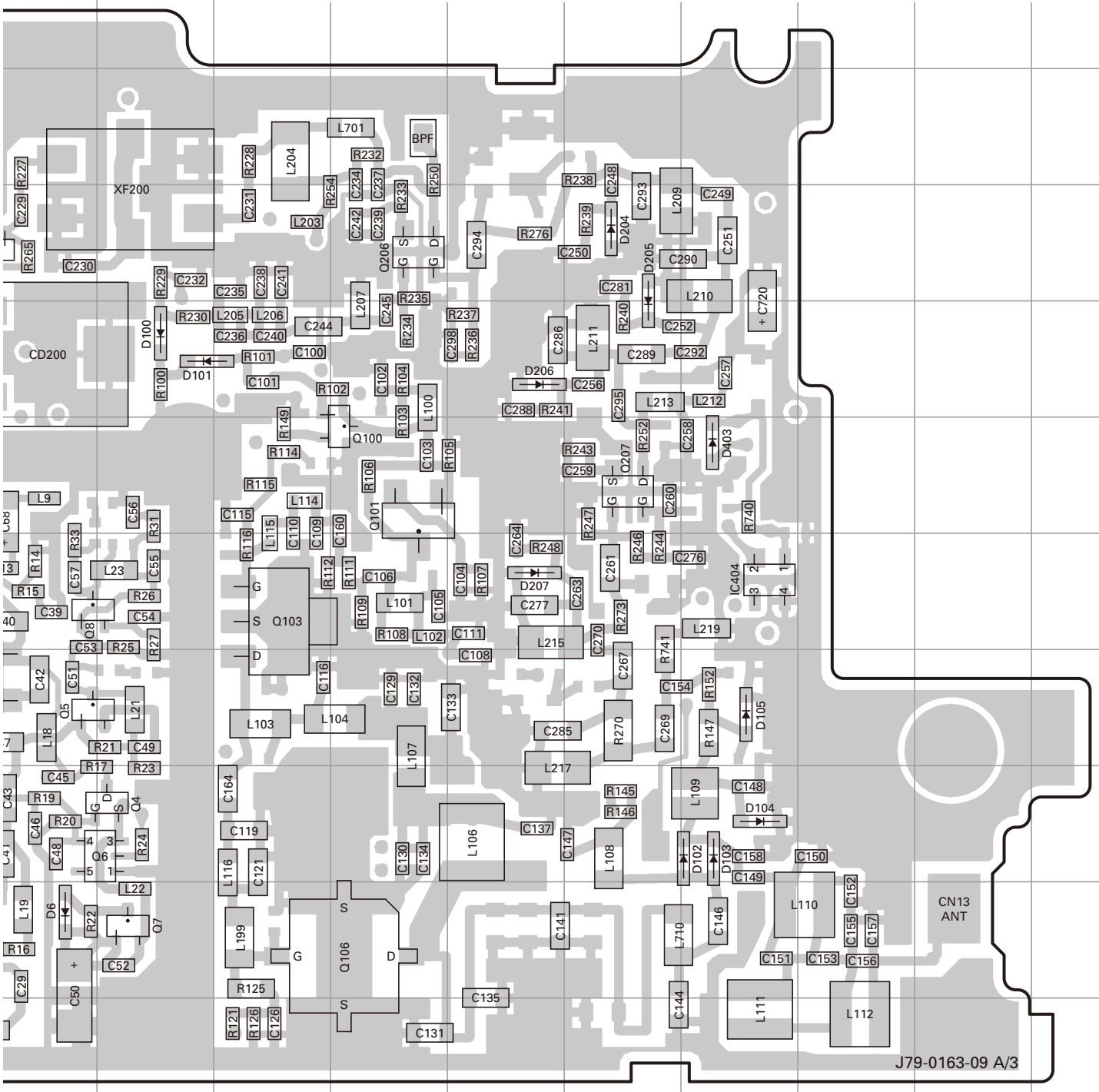
TK-3148 PC BOARD / PC板

TX-RX UNIT (X57-6413-01) (A/3) Foil side view (J79-0163-09 A/3)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	8F	IC404	7P	Q8	7J	Q204	5H	D4	11I	D101	5K	D203	5E
IC200	4H	Q1	7G	Q100	6M	Q205	4J	D5	7I	D102	9P	D204	4O
IC201	7E	Q2	9I	Q101	6M	Q206	4M	D6	10J	D103	9P	D205	4O
IC300	7D	Q3	8J	Q103	7L	Q207	6O	D11	9F	D104	9P	D206	5N
IC304	9D	Q4	9K	Q106	10M	Q208	6D	D12	10F	D105	8P	D207	7N
IC305	5B	Q5	8J	Q201	5D	D1	8H	D13	9G	D200	8D	D209	5H
IC306	10E	Q6	9K	Q202	5I	D2	10I	D14	8G	D201	7E	D403	6P
IC307	3C	Q7	10K	Q203	5G	D3	7H	D100	5K	D202	5E		

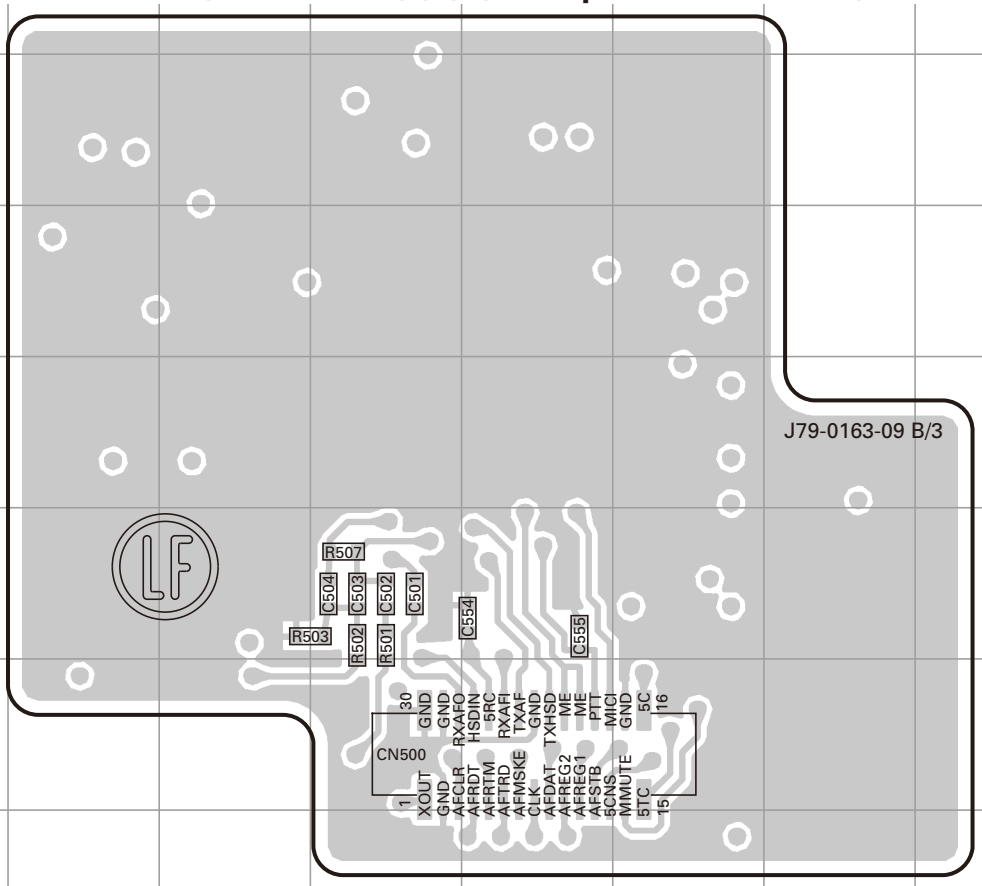
TX-RX UNIT (X57-6413-01) (A/3) Foil side view (J79-0163-09 A/3)



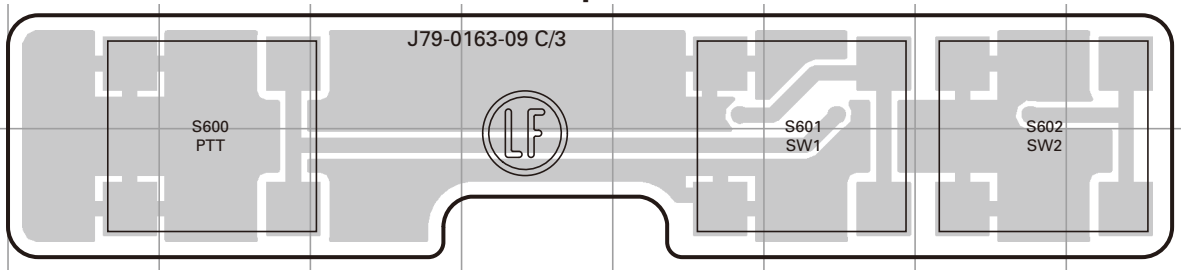
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

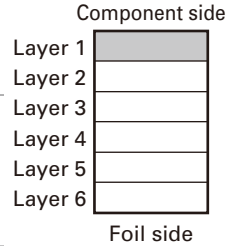
TK-3148 PC BOARD / PC板

TX-RX UNIT (X57-6413-01) (B/3) Component side view (J79-0163-09 B/3)

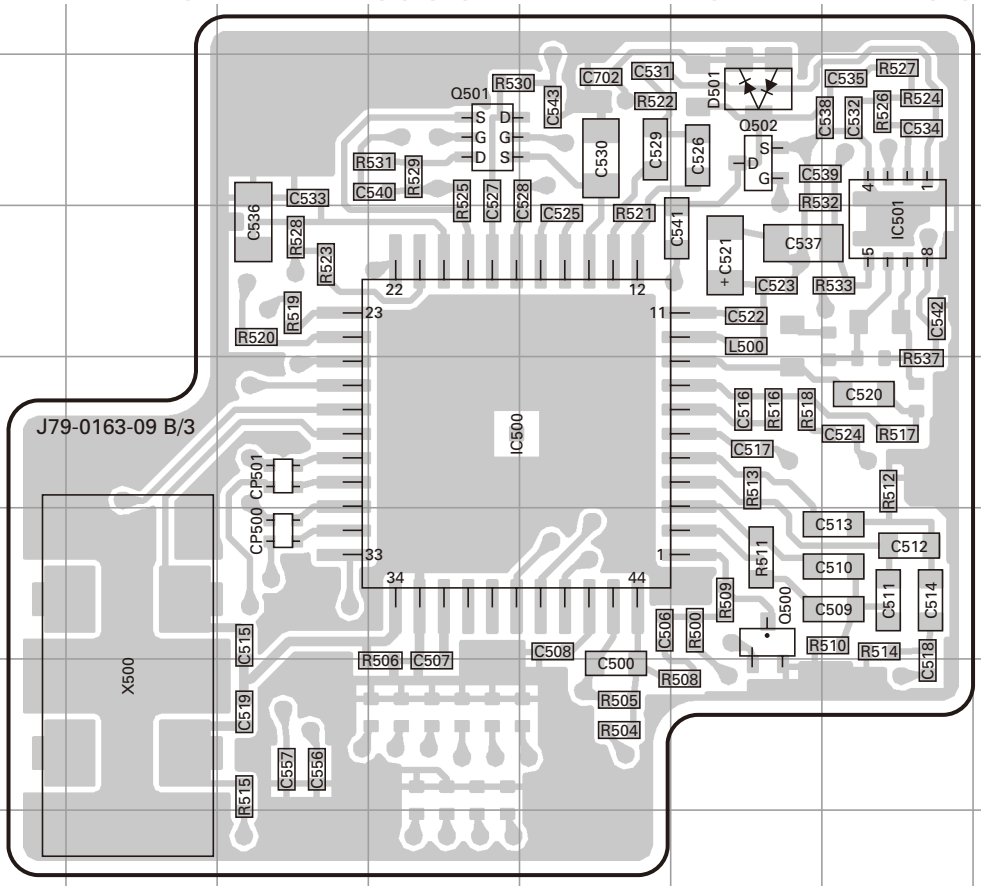


TX-RX UNIT (X57-6413-01) (C/3) Component side view (J79-0163-09 C/3)



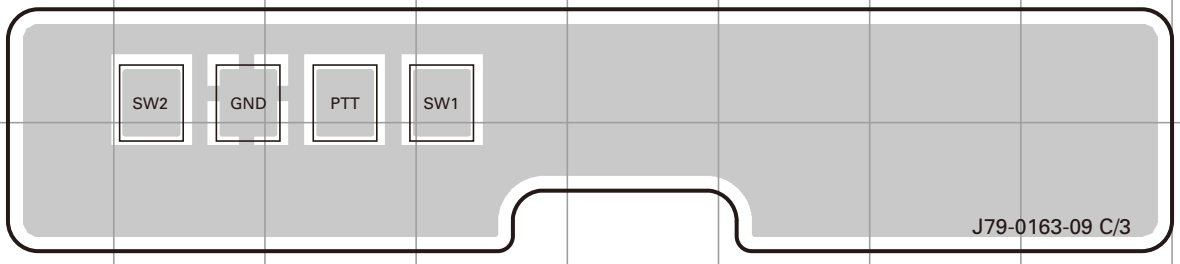


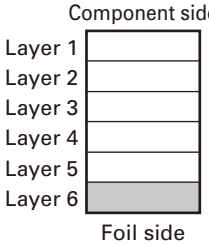
TX-RX UNIT (X57-6413-01) (B/3) Foil side view (J79-0163-09 B/3)



Ref. No.	Address
IC500	5F
IC501	4I
Q500	6H
Q501	3F
Q502	3H
D501	3H

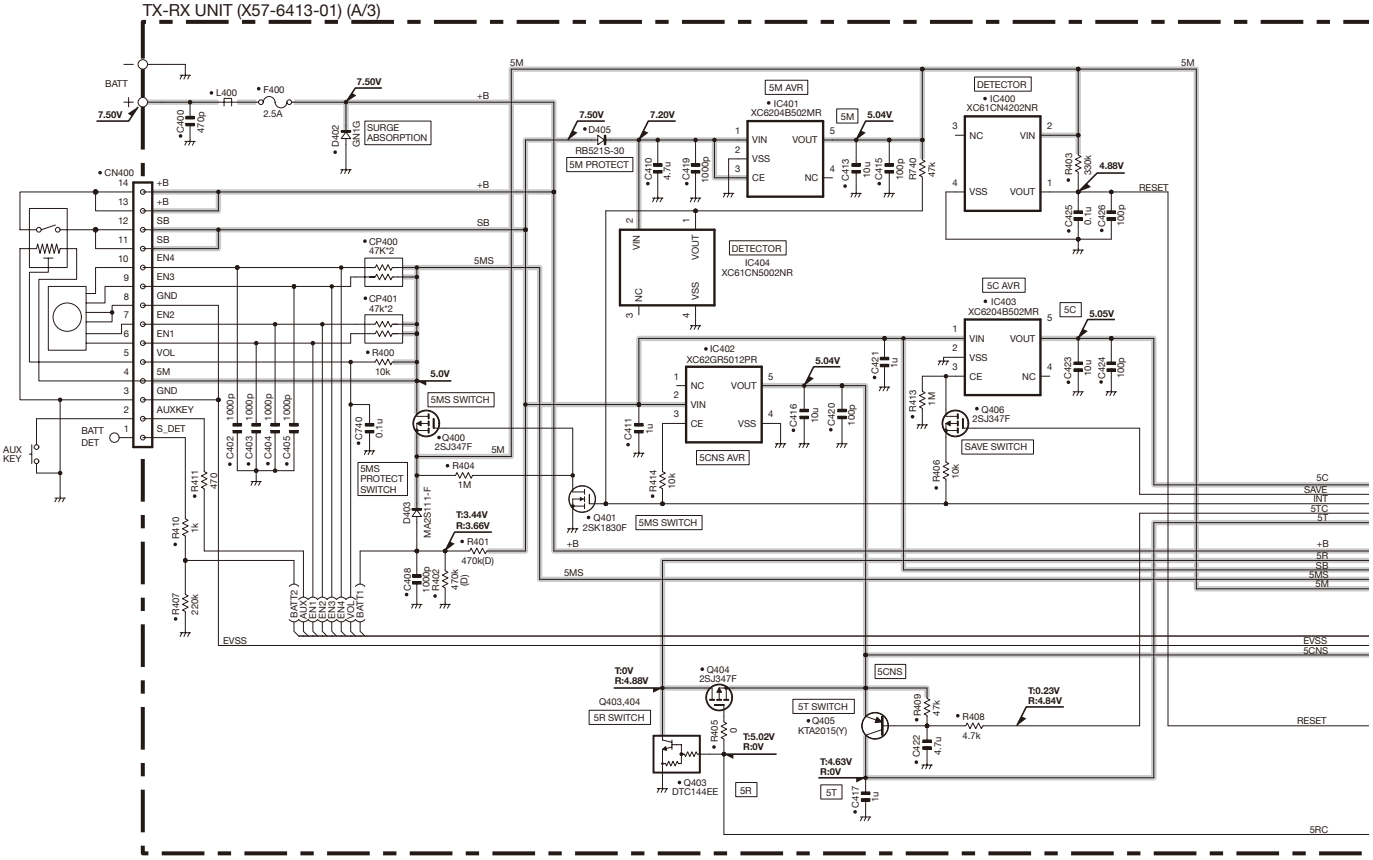
TX-RX UNIT (X57-6413-01) (C/3) Foil side view (J79-0163-09 C/3)



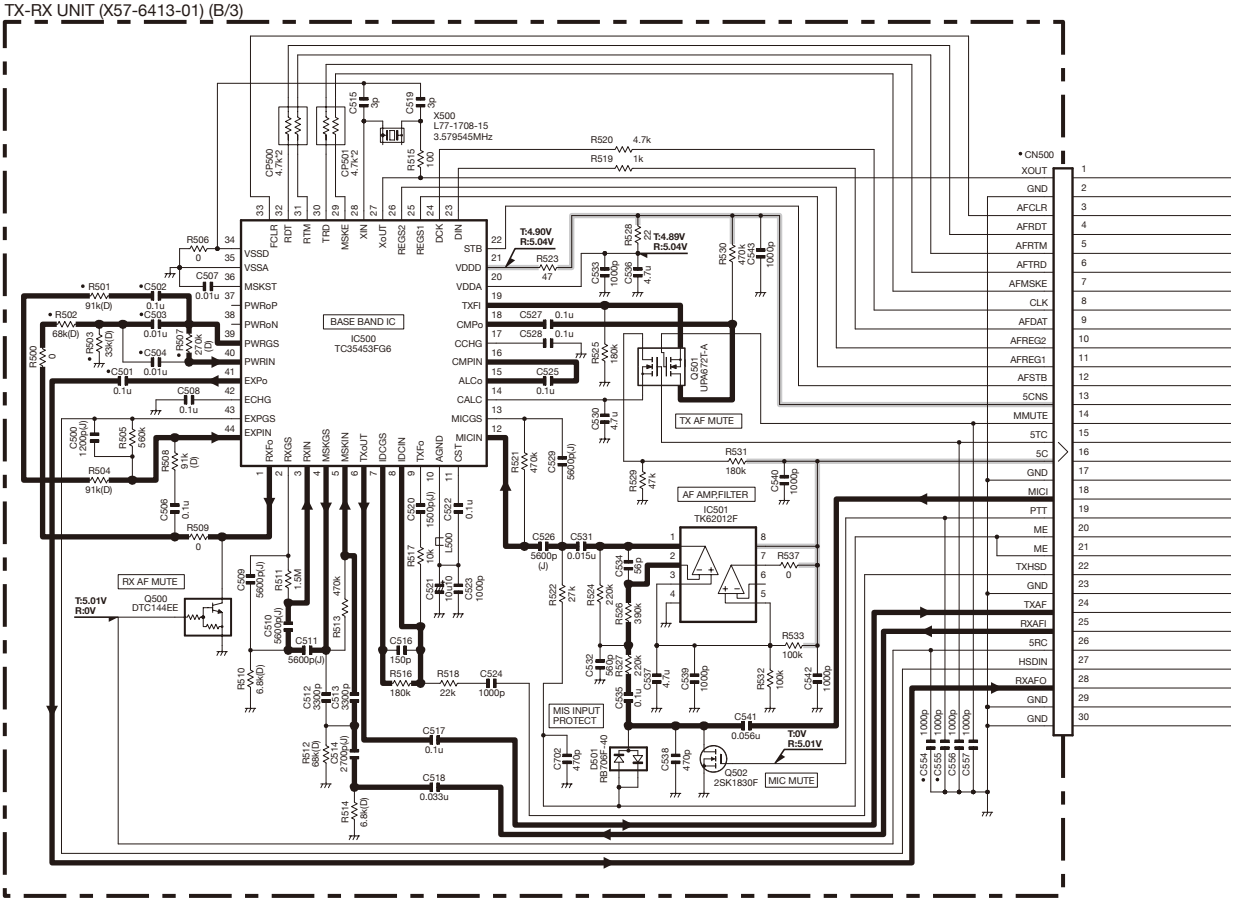


TK-3148 SCHEMATIC DIAGRAM / 原理图

TX-RX UNIT (X57-6413-01) (A/3)

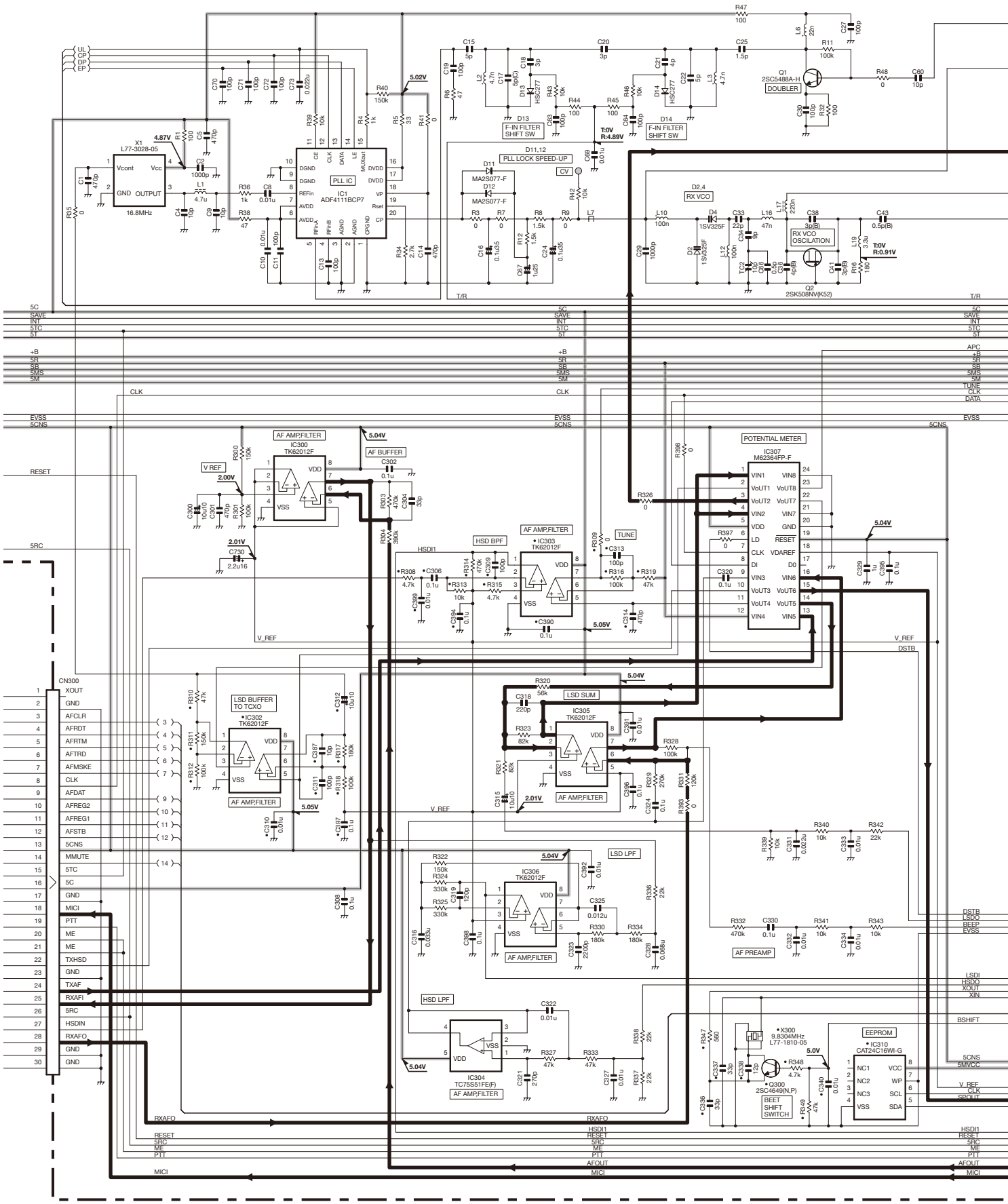


TX-RX UNIT (X57-6413-01) (B/3)



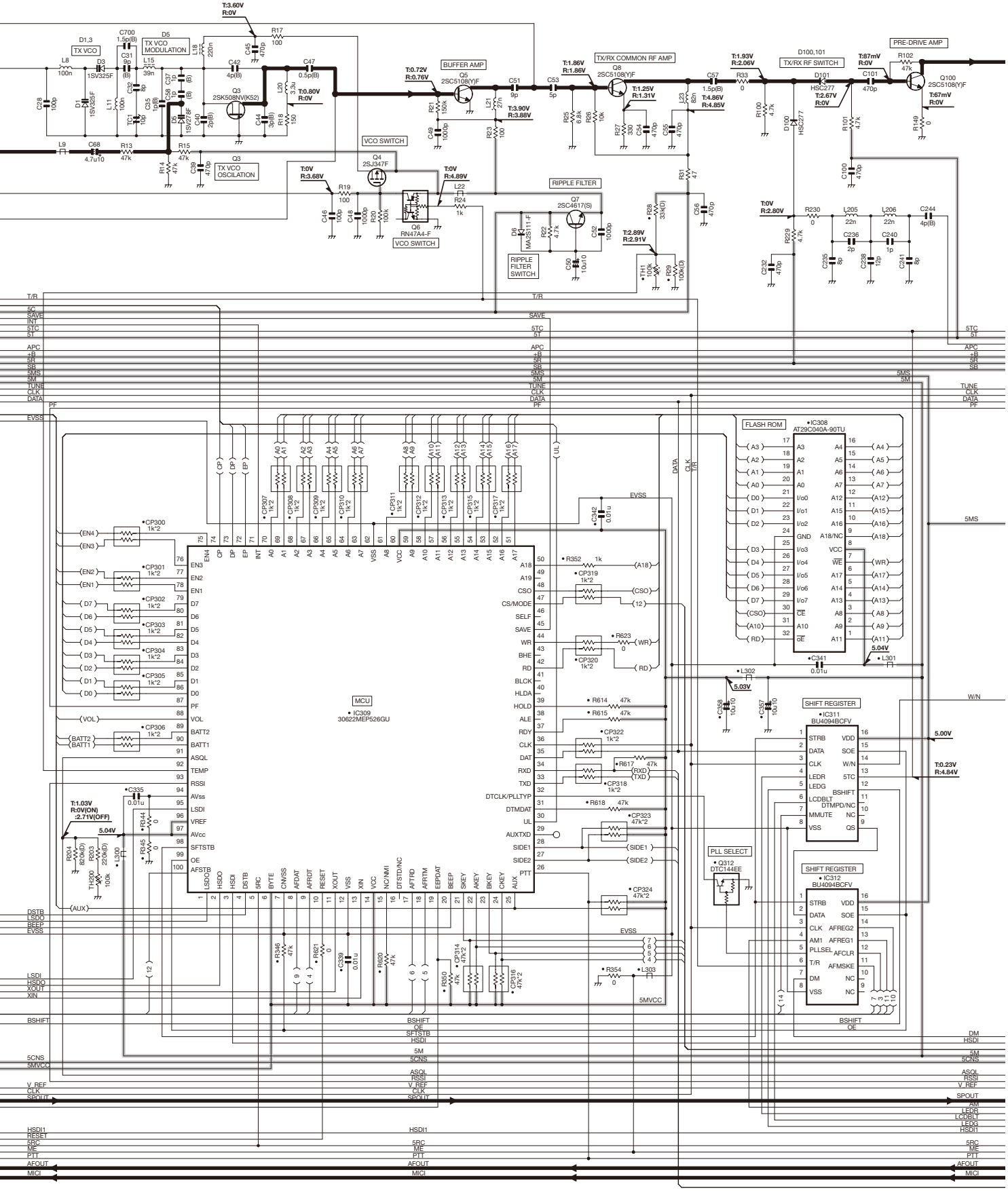
SCHEMATIC DIAGRAM / 原理图 TK-3148

TX-RX UNIT (X57-6413-01) (A/3)



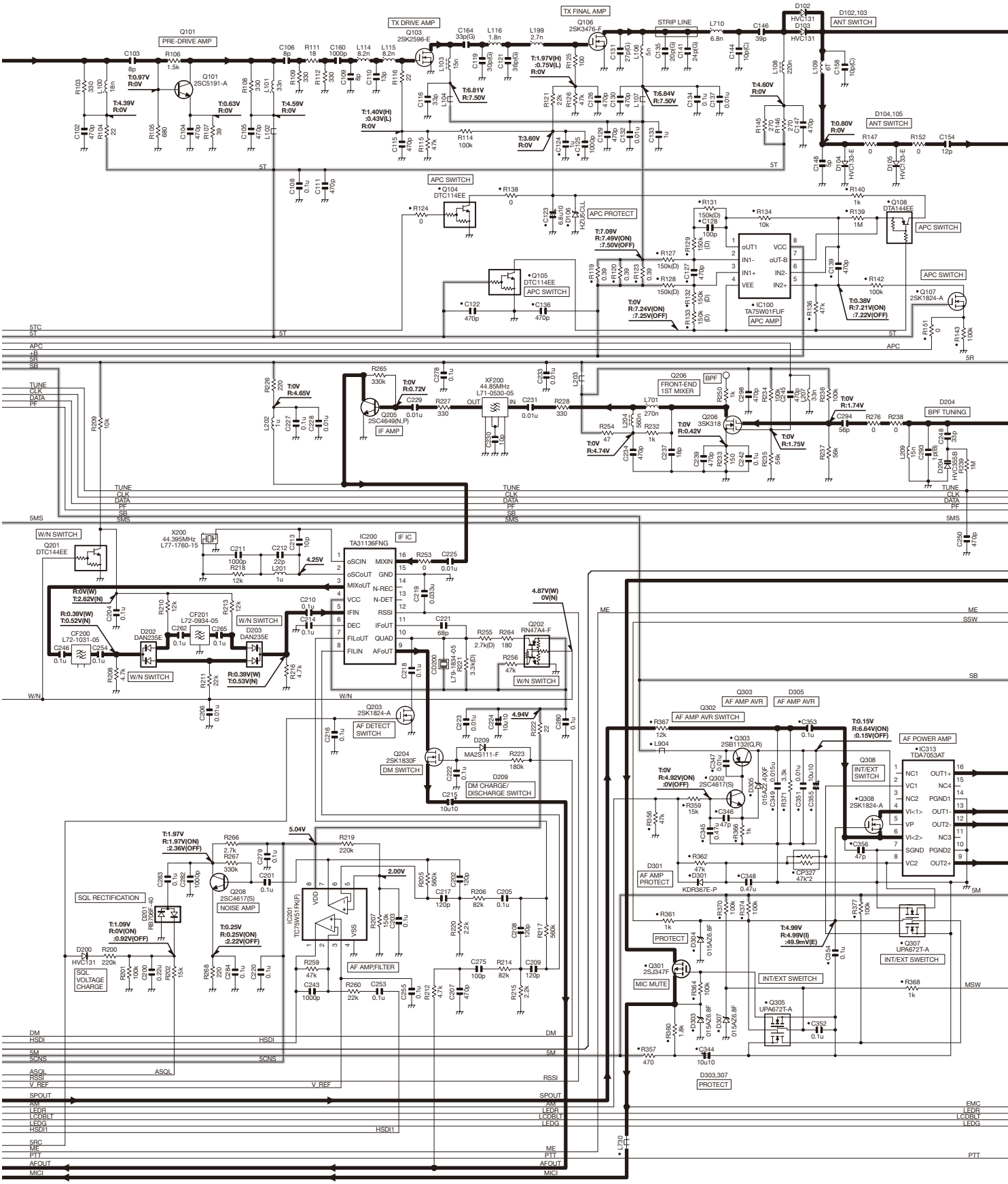
TK-3148 SCHEMATIC DIAGRAM / 原理图

TX-RX UNIT (X57-6413-01) (A/3)

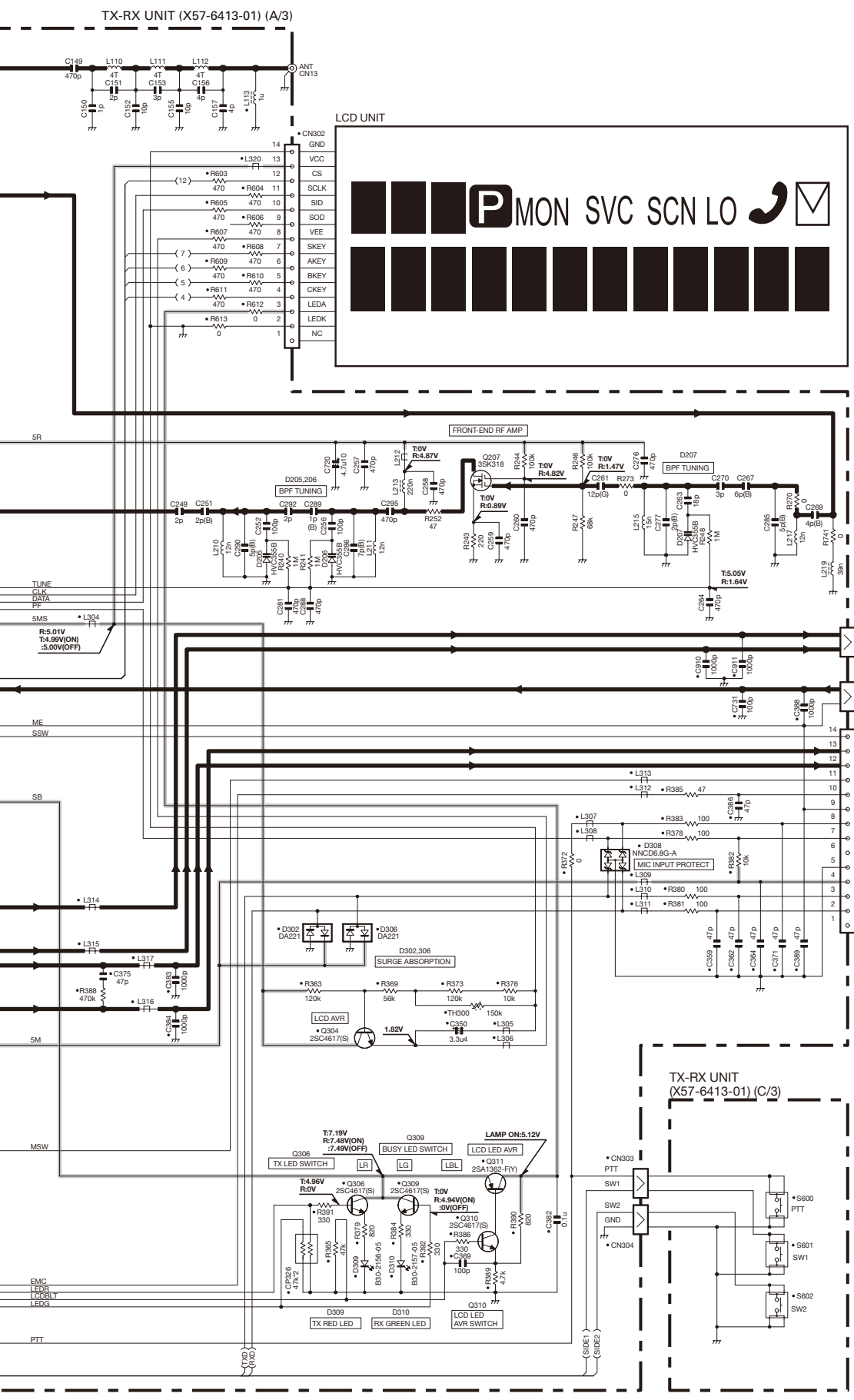


SCHEMATIC DIAGRAM / 原理图 TK-3148

TX-RX UNIT (X57-6413-01) (A/3)

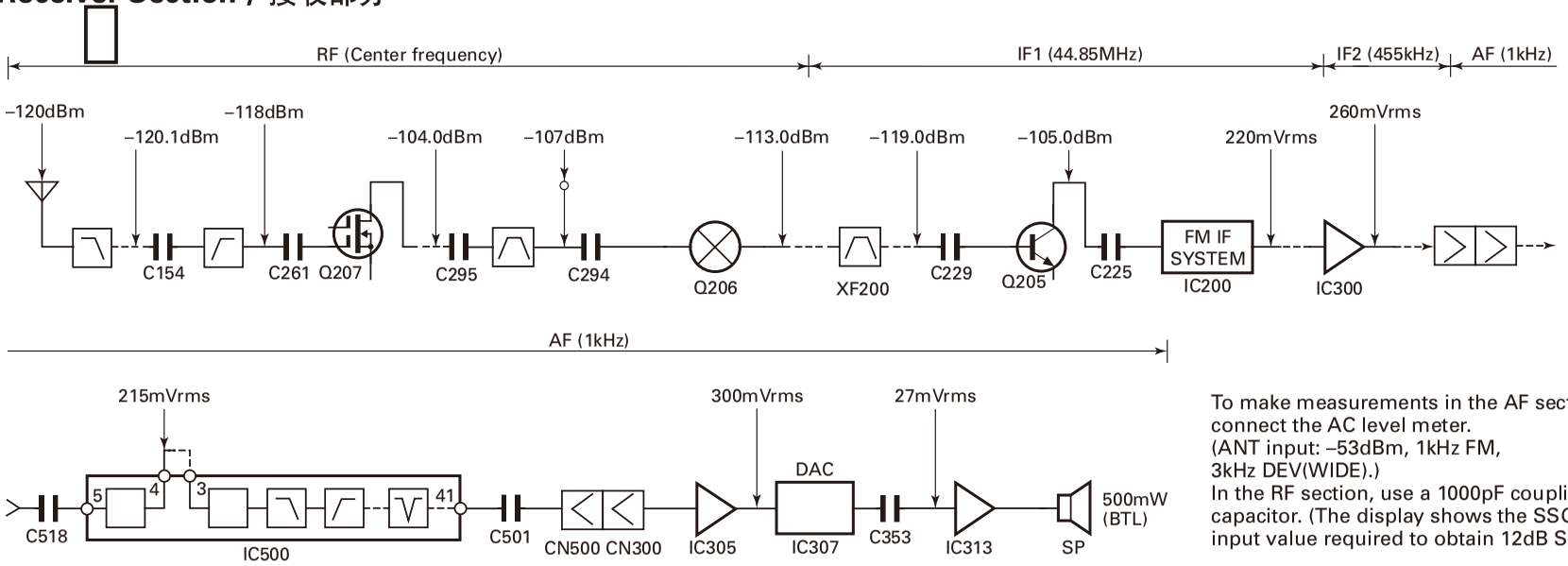


TK-3148 SCHEMATIC DIAGRAM / 原理图



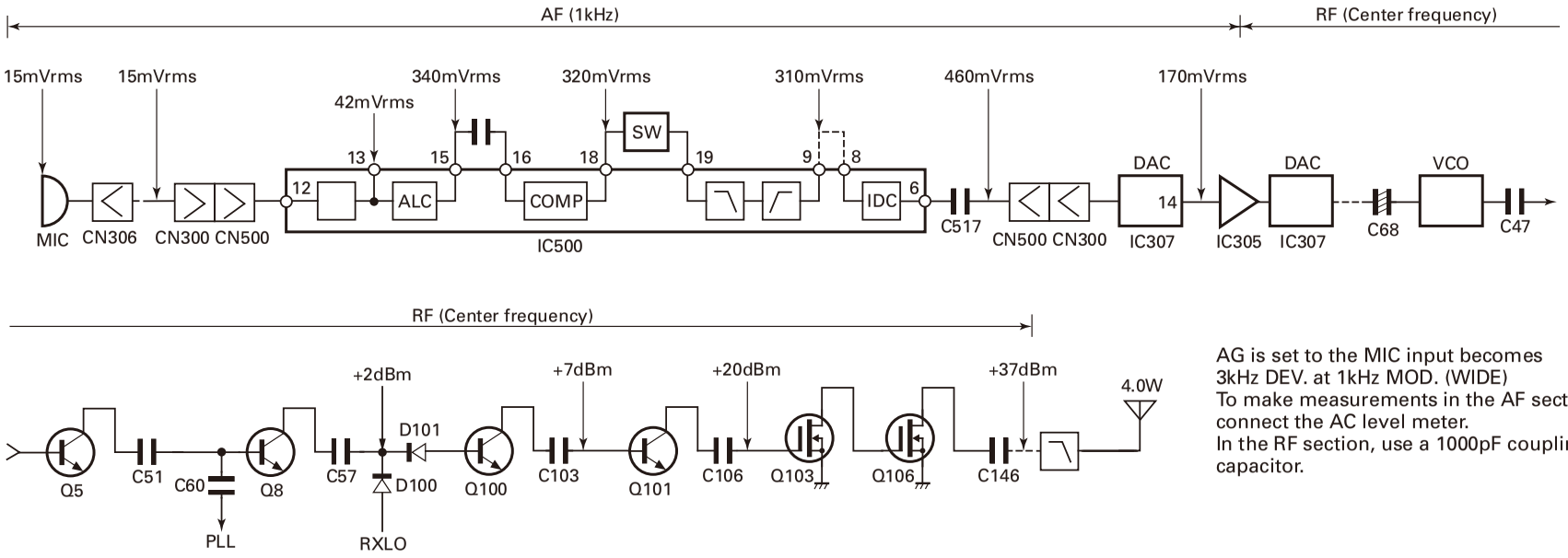
Note : The components marked with a dot (•) are parts of layer 1.

Receiver Section / 接收部分



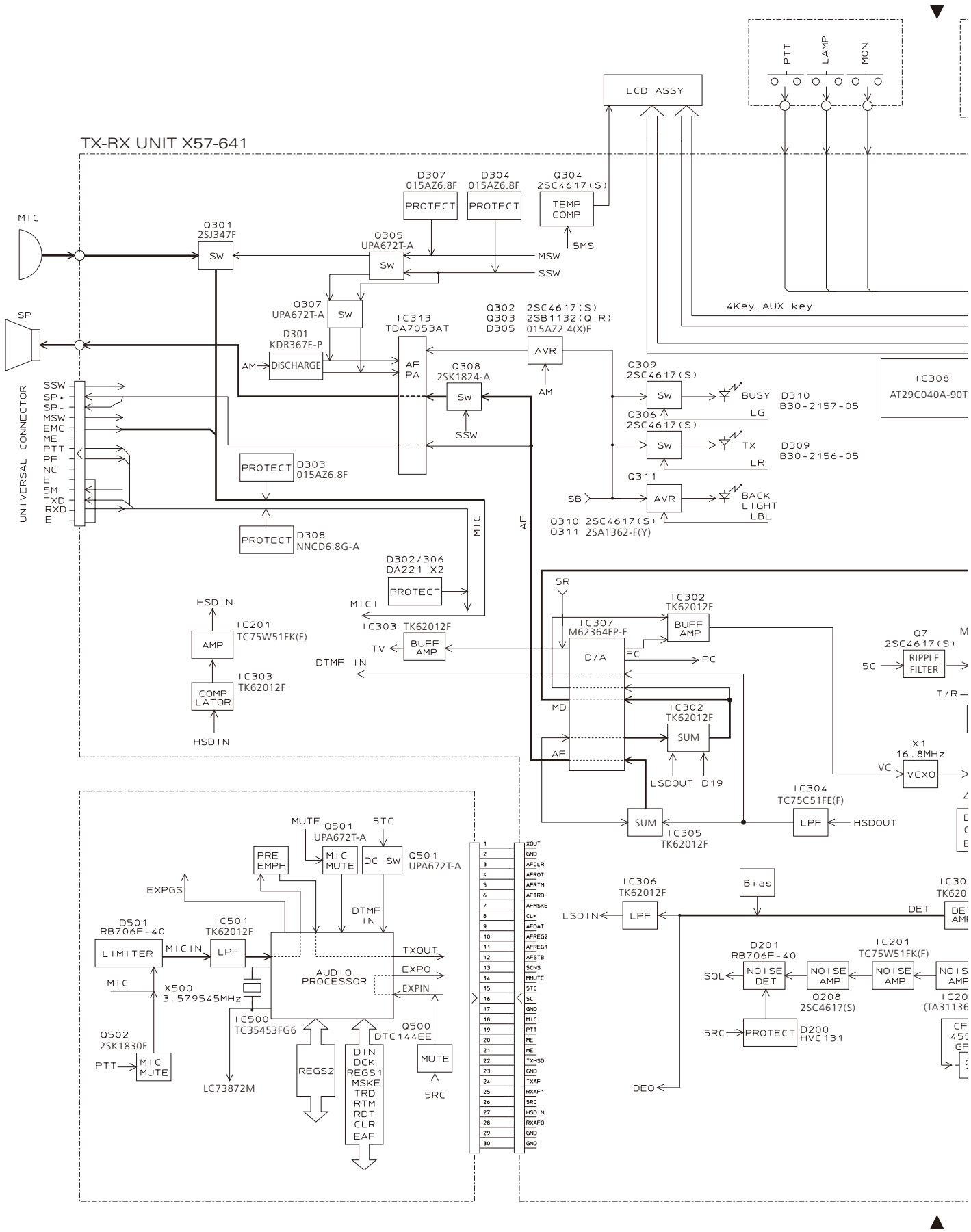
To make measurements in the AF section, connect the AC level meter.
(ANT input: –53dBm, 1kHz FM, 3kHz DEV(WIDE).)
In the RF section, use a 1000pF coupling capacitor. (The display shows the SSG input value required to obtain 12dB SINAD.)

Transmitter Section / 发射部分

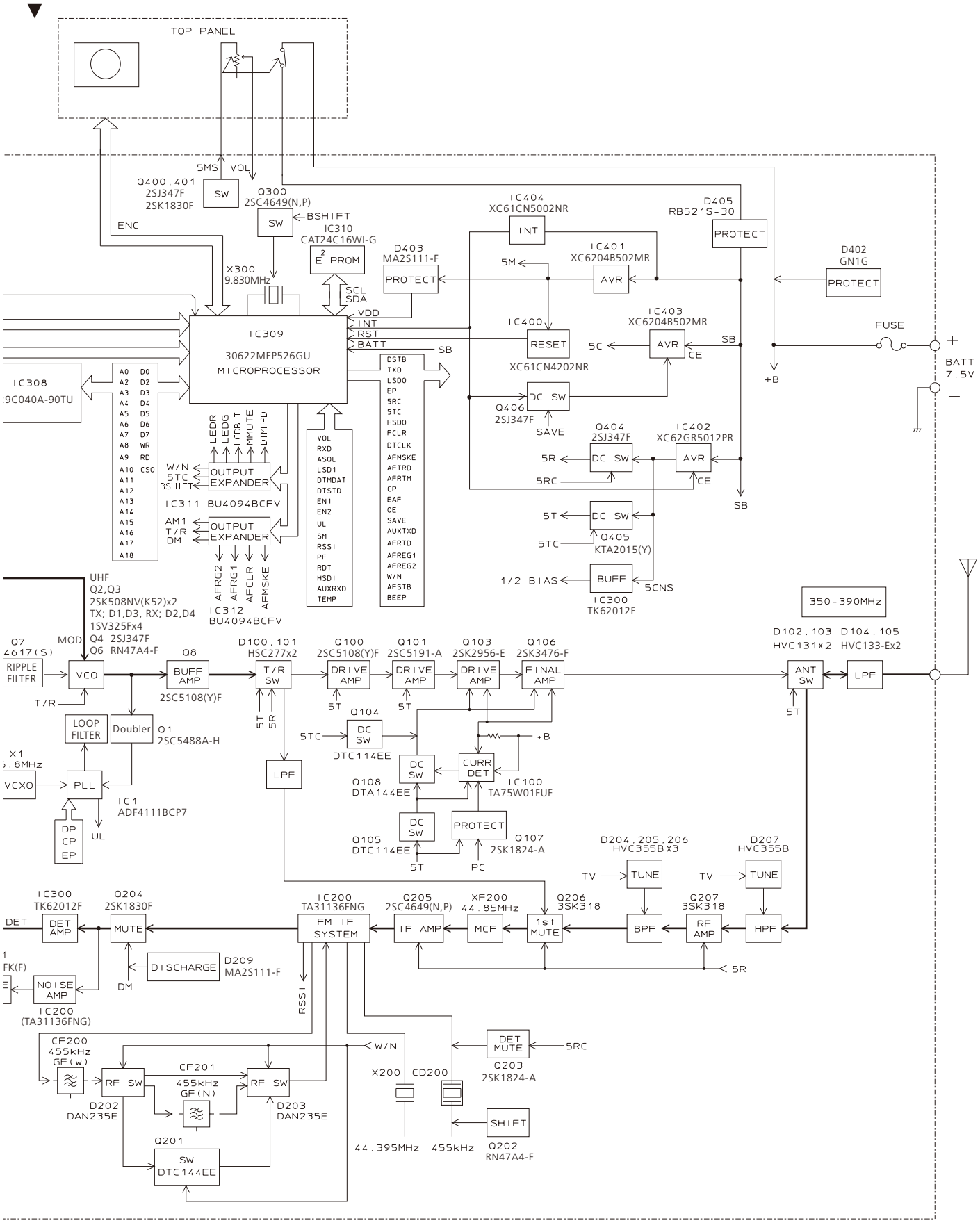


AG is set to the MIC input becomes 3kHz DEV. at 1kHz MOD. (WIDE)
To make measurements in the AF section, connect the AC level meter.
In the RF section, use a 1000pF coupling capacitor.

BLOCK DIAGRAM / 方块图



BLOCK DIAGRAM / 方块图



OPTIONAL ACCESSORIES / 可选附件

KSC-25 (Battery charger / 电池充电器)

■ External View / 外视图

KNB-24L (Li-ion battery pack / 锂离子电池)

■ External View / 外视图

SPECIFICATIONS

General

Frequency Range
- RX, TX ..... 350 to 390MHz

Channel Spacing 6.25kHz/ 12.5kHz/ 25kHz
Battery Voltage ..... DC 7.5V±20%
Battery Life ..... More than 9 hours at 4W (5-5-90 duty cycle with KNB-24L battery)
Temprature Range ..... –30°C to +60°C (–22°F to + 140°F)
Dimension and Weight
With KNB-24L (1400mAh battery) ..... 105 (4.13) H x 56 (2.21) W x 29.5 (1.16) D mm (inch), 0.66lbs (300g)
(Dimensions not including protrusions, weight includes antenna and belt hook)

Receiver (Measurements made per TIA/EIA-603)

RF Input Impedance 50Ω
Sensitivity
- 12dB SINAD ..... 0.28µV (Narrow)/ 0.25µV (Wide)

Selectivity ..... 65dB (Narrow)/ 70dB (Wide)
Intermodulation ..... 62dB (Narrow)/ 70dB (Wide)
Spurious (Except for IF 1/2) 70dB
Frequency Stability ..... ±0.00025% (–30°C to +60°C)
Channel Spread 40MHz
Audio Power Output ..... 500mW at 16Ω less than 5% distortion

Transmitter (Measurements made per TIA/EIA-603)

RF Power Output
- Hi 4W
- Low 1W

RF Output Impedance 50Ω
Spurious ..... –70dB
Modulation ..... ±2.5kHz (Narrow)/ ±5.0kHz (Wide)
FM Noise ..... –40dB (Narrow)/ –45dB (Wide)
Audio Distortion ..... Less than 3%
Frequency Stability ..... ±0.00025% (–30°C to +60°C)
Channel Spread 40MHz

TK-3148

规　　格

概述

频率范围
　RX, TX ..... 350 ～ 390MHz
信道间距..... 6.25kHz/ 12.5kHz/ 25kHz
电池电压..... 直流 7.5V±20%
电池寿命..... 4W 时长于 9 个小时（使用 KNB-24L 电池 5-5-90 工作周期）
温度范围..... -30℃到 +60℃ (-22 ℉到 +140 ℉)
尺寸和重量
带有 KNB-24L(1400mAh 电池）..... 105(4.13) 高 ×56(2.21) 宽 ×29.5(1.16) 长 mm（英寸）,0.66lbs(300g)
（尺寸大小不包括突出部分，重量包括天线和皮带夹子）

接收部（以每 TIA/EIA-603 进行测量）

射频输入阻抗..... 50Ω
灵敏度
　12dB SINAD ..... 0.28μV（窄）/ 0.25μV（宽）
选择性..... 65dB（窄）/ 70dB（宽）
互调..... 62dB（窄）/ 70dB（宽）
假信号响应（不包括中频 1/2）..... 70dB
频率稳定性..... ±0.00025%(-30℃到 +60℃)
信道频率扩展..... 40MHz
音频功率输出..... 16Ω 时为 500mW, 失真小于 5%

发射部（以每 TIA/EIA-603 进行测量）

射频功率输出
　高 4W
　低 1W
射频输出阻抗..... 50Ω
寄生..... -70dB
调制..... ±2.5kHz（窄）/ ±5.0kHz（宽）
频率调制噪音..... -40dB（窄）/ -45dB（宽）
音频失真..... 低于 3%
频率稳定性..... ±0.00025%(-30℃到 +60℃)
信道频率扩展..... 40MHz

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

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

Kenwood Electronics Canada Inc.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

Kenwood Electronics Deutschland GmbH
Rembrücker Str. 15, 63150 Heusenstamm, Germany

Kenwood Electronics Belgium N.V.
Leuvensesteenweg 248 J, 1800 Vilvoorde, Belgium

Kenwood Electronics France S.A.
L'Etoile Paris Nord 2, 50 Allée des Impressionnistes, Bp 58416 Villepinte, 95944 Roissy Ch De Gaulle Cedex

Kenwood Electronics UK Limited
KENWOOD House, Dwight Road, Watford, Herts., WD18 9EB United Kingdom

Kenwood Electronics Europe B.V.
Amsterdamseweg 37, 1422 AC Uithoorn, The Netherlands

Kenwood Electronics Italia S.p.A.
Via G. Sirtori, 7/9 20129 Milano, Italy

Kenwood Ibérica, S.A.
Bolivia, 239-08020 Barcelona, Spain

Kenwood Electronics Australia Pty. Ltd.
(A.C.N. 001 499 074)
16 Giffnock Avenue, Centrecourt Estate, North Ryde, N.S.W. 2113 Australia

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

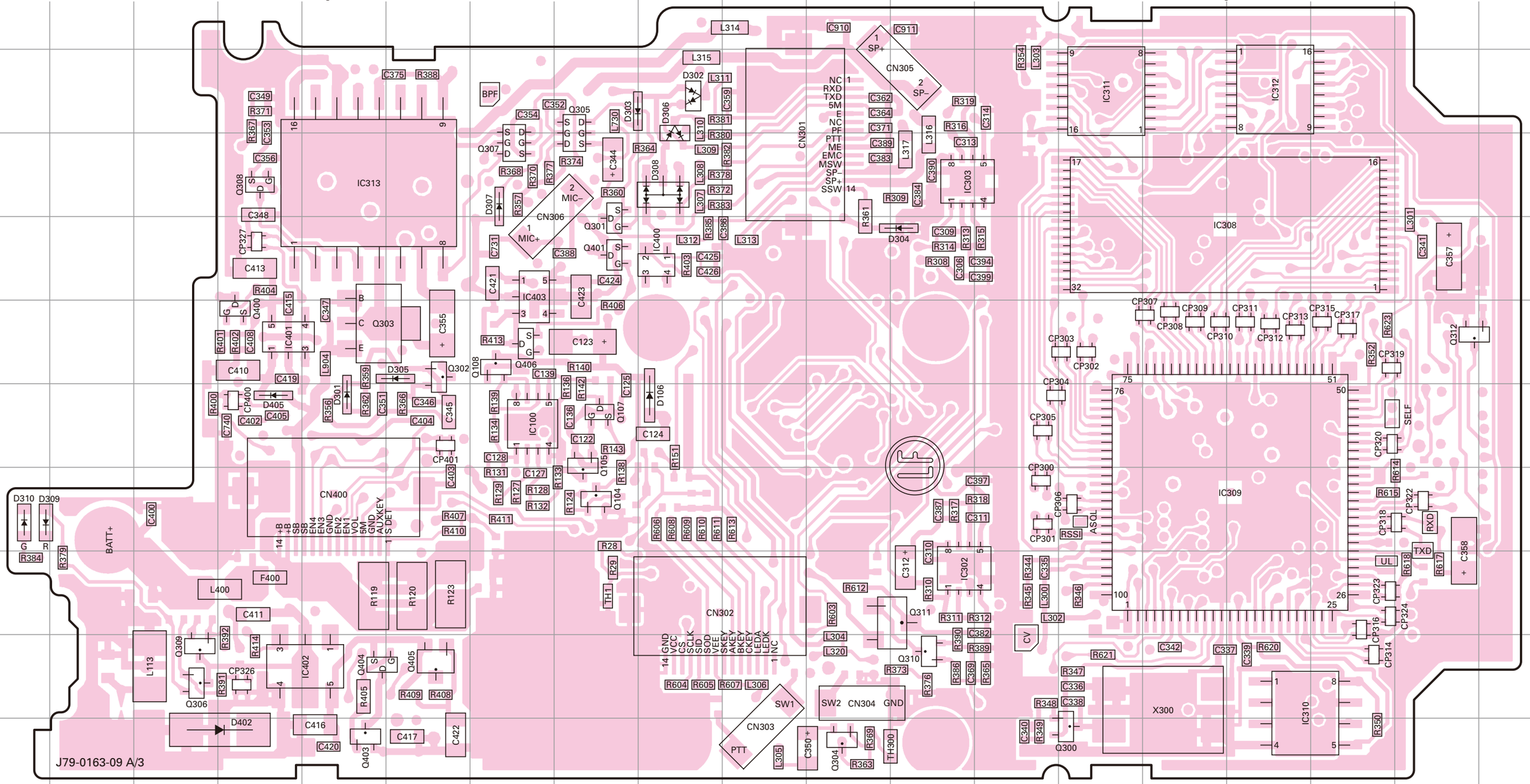
Kenwood Electronics Singapore Pte Ltd
1 Ang Mo Kio Street 63, Singapore 569110

TK-3148 PC BOARD / PC板

PC BOARD / PC板 TK-3148

TX-RX UNIT (X57-6413-01) (A/3) Component side view (J79-0163-09 A/3)

TX-RX UNIT (X57-6413-01) (A/3) Component side view (J79-0163-09 A/3)



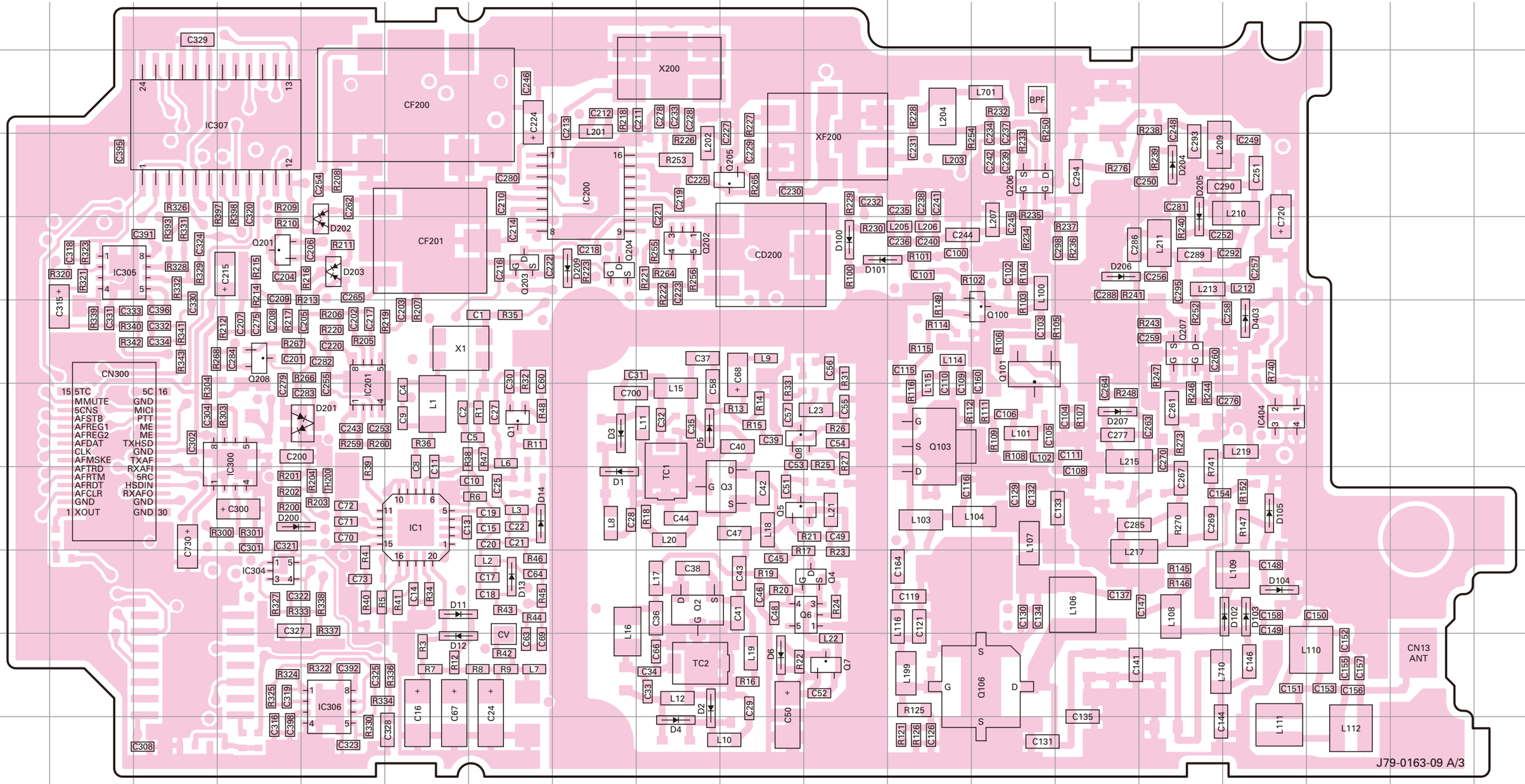
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC100	7G	IC312	3P	Q105	7H	Q304	11K	Q311	9L	Q406	6G	D306	3I
IC302	9L	IC313	4E	Q107	7H	Q305	3H	Q312	6R	D106	7I	D307	4G
IC303	4L	IC400	5I	Q108	6G	Q306	10C	Q400	6D	D301	7E	D308	4I
IC308	5O	IC401	6D	Q300	11N	Q307	4G	Q401	5H	D302	3I	D309	8A
IC309	8P	IC402	10E	Q301	5H	Q308	4D	Q403	11E	D303	3H	D310	8A
IC310	10P	IC403	5G	Q302	6F	Q309	10C	Q404	10E	D304	5L	D402	11D
IC311	3N	Q104	8H	Q303	6E	Q310	10L	Q405	10F	D305	6F	D405	7D

Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

PC BOARD / PC板 TK-3148

TX-RX UNIT (X57-6413-01) (A/3) Foil side view (J79-0163-09 A/3)

TX-RX UNIT (X57-6413-01) (A/3) Foil side view (J79-0163-09 A/3)



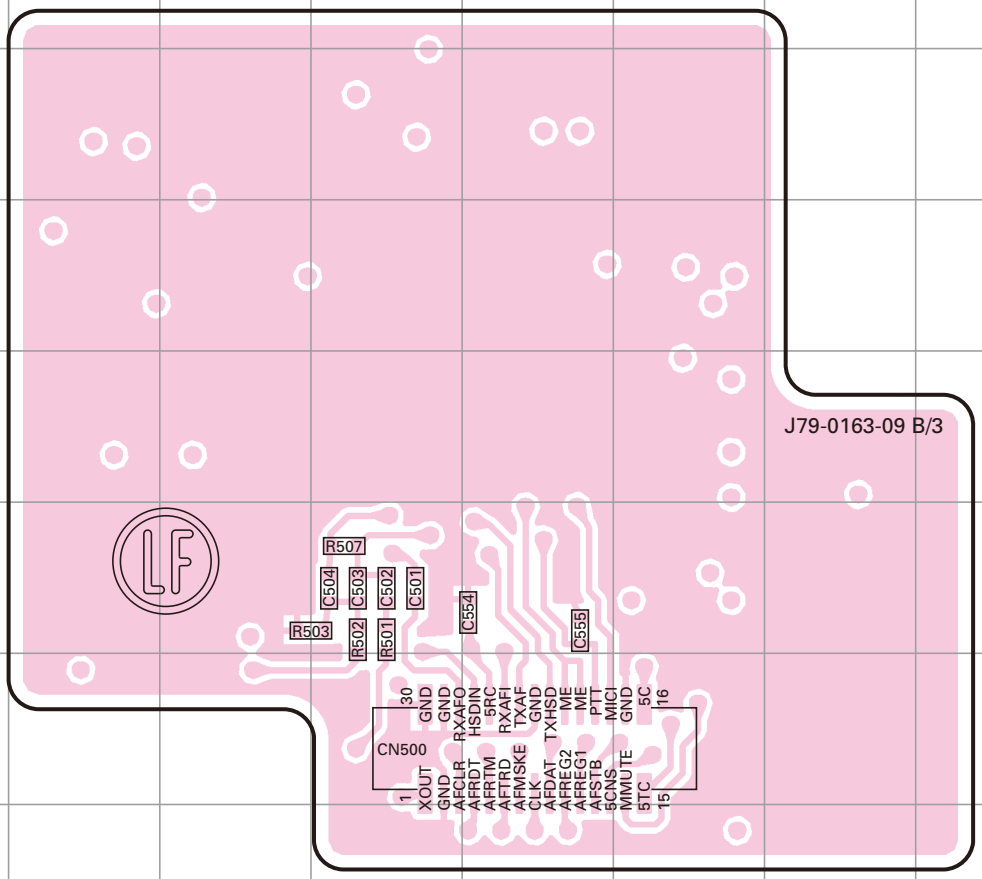
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	8F	IC404	7P	Q8	7J	Q204	5H	D4	11I	D101	5K	D203	5E
IC200	4H	Q1	7G	Q100	6M	Q205	4J	D5	7I	D102	9P	D204	4O
IC201	7E	Q2	9I	Q101	6M	Q206	4M	D6	10J	D103	9P	D205	4O
IC300	7D	Q3	8J	Q103	7L	Q207	6O	D11	9F	D104	9P	D206	5N
IC304	9D	Q4	9K	Q106	10M	Q208	6D	D12	10F	D105	8P	D207	7N
IC305	5B	Q5	8J	Q201	5D	D1	8H	D13	9G	D200	8D	D209	5H
IC306	10E	Q6	9K	Q202	5I	D2	10I	D14	8G	D201	7E	D403	6P
IC307	3C	Q7	10K	Q203	5G	D3	7H	D100	5K	D202	5E		

Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

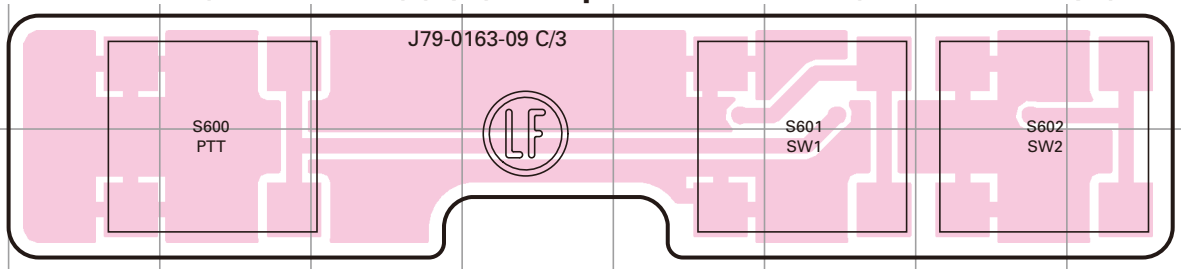
4

TK-3148 PC BOARD / PC板

TX-RX UNIT (X57-6413-01) (B/3) Component side view (J79-0163-09 B/3)



TX-RX UNIT (X57-6413-01) (C/3) Component side view (J79-0163-09 C/3)



Component side

Layer 1

Layer 2

Layer 3

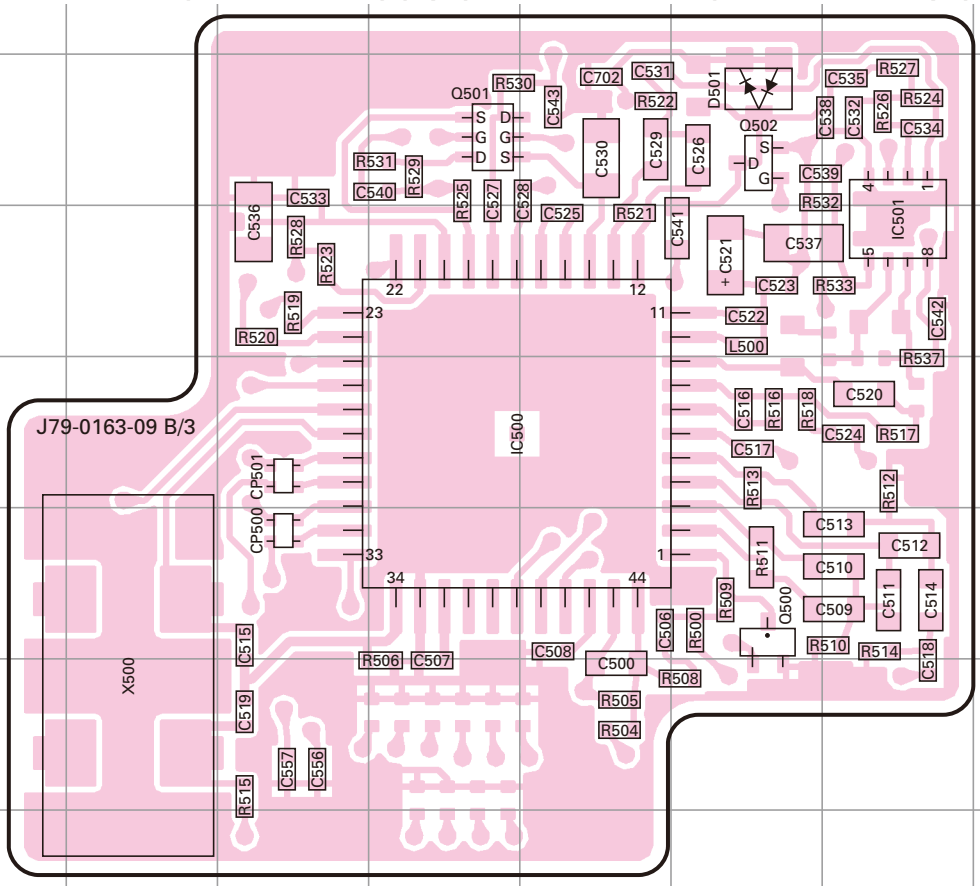
Layer 4

Layer 5

Layer 6

Foil side

TX-RX UNIT (X57-6413-01) (B/3) Foil side view (J79-0163-09 B/3)



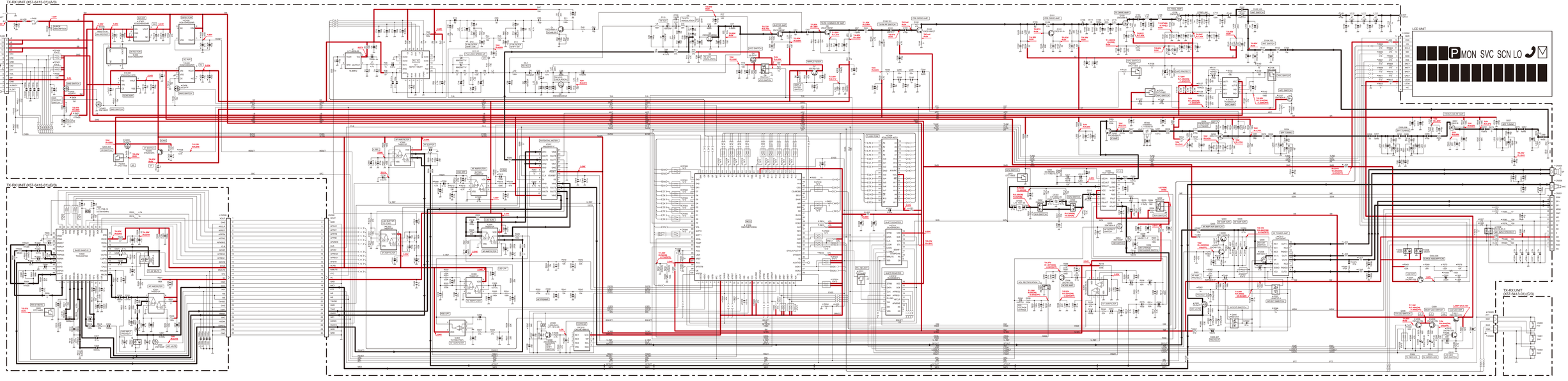
Ref. No.	Address
IC500	5F
IC501	4I
Q500	6H
Q501	3F
Q502	3H
D501	3H

TX-RX UNIT (X57-6413-01) (C/3) Foil side view (J79-0163-09 C/3)

Component side

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

Foil side


TX-RX UNIT (X57-6413-01) (A/3)
TX-RX UNIT (X57-6413-01) (B/3)
LCD UNIT
TX-RX UNIT (X57-6413-01) (C/3)
PMON SVC SCN LO

TX-RX UNIT X57-641

MIC
SP
UNIVERSAL CONNECTOR
SSW
SP+
SP-
MSW
EMC
ME
PTT
PF
NC
E
SM
TXD
RXD
E

Q301 2SJ347F
Q305 UPA672T-A
Q307 UPA672T-A
D301 KDR367E-P
IC313 TDA7053AT
AF PA
Q308 2SK1824-A
D307 015AZ6.8F
D304 015AZ6.8F
Q304 2SC4617(S)
TEMP COMP
5MS
MSW
SSW
Q302 Q303 D305 2SC4617(S) 2SB1132(Q,R) 015AZ2.4(X)F
AVR
AM
DISCHARGE
PROTECT D303 015AZ6.8F
PROTECT D308 NNCD6.8G-A
D302/306 DA221 X2
PROTECT
MIC
AF

LCD ASSY
PTT
LAMP
MON
TOP PANEL
4Key.AUX key

Q309 2SC4617(S)
Q306 2SC4617(S)
Q311
SW
AVR
BUSY
LG
TX
LR
BACK LIGHT
LBL
D310 B30-2157-05
D309 B30-2156-05
Q310 2SC4617(S)
Q311 2SA1362-F(Y)
SB

IC308 AT29C040A-90TU
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18
D0 D1 D2 D3 D4 D5 D6 D7 WR RD CS0

IC309 30622MEP526GU MICROPROCESSOR
LEDR LEDG LCDBLT MMUTE DTMFPD
W/N 5TC BSHIFT
OUTPUT EXPANDER
IC311 BU4094BCFV
AM1 T/R DM
OUTPUT EXPANDER
AFREG2 AFREG1 AFCLR AFMSKE
IC312 BU4094BCFV

VOL RXD ASQL LSD1 DTMDAT DTSTD EN1 EN2 UL SM RSSI PF RDT HSDI AUXRXD TEMP
DSTB TXD LSDO EP 5RC 5TC HSDO FCLR DTCLK AFMSKE AFTRD AFRTM CP EAF OE SAVE AUXTXD AFRTD AFREG1 AFREG2 W/N AFSTB BEEP

5MS VOL
Q400,401 2SJ347F 2SK1830F
SW
Q300 2SC4649(N,P)
BSHIFT
ENC
IC310 CAT24C16WI-G
E² PROM
SCL SDA
X300 9.830MHz
VDD INT RST BATT SB

IC404 XC61CN5002NR
INT
D405 RB521S-30
PROTECT
D403 MA2S111-F
IC401 XC6204B502MR
AVR
5M
D402 GN1G
IC400
RESET
XC61CN4202NR
IC403 XC6204B502MR
5C
SB
CE
FUSE
BATT 7.5V
Q406 2SJ347F
DC SW
SAVE
Q404 2SJ347F
IC402 XC62GR5012PR
5R
5RC
5T
Q405 KTA2015(Y)
1/2 BIAS
BUFF
5CNS
IC300 TK62012F
+B

HSDIN
IC201 TC75W51FK(F)
AMP
IC303 TK62012F
COMP LATOR
HSDIN
IC303 TK62012F
MIC
TV
BUFF AMP
DTMF IN

5R
IC307 M62364FP-F
D/A
FC
PC
MD
AF
IC302 TK62012F
BUFF AMP
SUM
LSDOUT D19
IC305 TK62012F
SUM
IC304 TC75C51FE(F)
LPF
HSDOUT

UHF
Q2,Q3
2SK508NV(K52)x2
TX; D1,D3, RX; D2,D4
1SV325Fx4
Q4 2SJ347F
Q6 RN47A4-F
MOD
Q7 2SC4617(S)
RIPPLE FILTER
5C
VCO
T/R
Q8 BUFF AMP 2SC5108(Y)F
LOOP FILTER
Doubler
Q1 2SC5488A-H
X1 16.8MHz
VCXO
VC
PLL
IC1 ADF4111BCP7
DP CP EP
UL

D100,101 HSC277x2
T/R SW
5T 5R
LPF
Q100 2SC5108(Y)F
DRIVE AMP
Q101 2SC5191-A
DRIVE AMP
Q103 2SK2956-E
DRIVE AMP
Q106 2SK3476-F
FINAL AMP
Q104
DC SW
DTC114EE
5TC
Q108 DTA144EE
DC SW
CURR DET
IC100 TA75W01FUF
+B
Q105 DTC114EE
DC SW
PROTECT
Q107 2SK1824-A
5T
PC

350-390MHz
D102,103 HVC131x2
D104,105 HVC133-Ex2
ANT SW
LPF
5T

MUTE Q501 UPA672T-A
5TC
PRE EMPH
MIC MUTE
DC SW
Q501 UPA672T-A
EXPGS
DTMF IN
D501 RB706F-40
IC501 TK62012F
LIMITER
MICIN
LPF
TXOUT
EXPO
EXPIN
AUDIO PROCESSOR
MIC
X500 3.579545MHz
IC500 TC35453FG6
Q500 DTC144EE
Q502 2SK1830F
PTT
MIC MUTE
MUTE
5RC
LC73872M
REGS2
DIN DCK REGS1 MSKE TRD RTM RDT CLR EAF
XOUT GND AFCLR AFROT AFRTM AFTRD AFMSKE CLK AFDAT AFREG2 AFREG1 AFSTB SCNS MMUTE 5TC 5C GND MICI PTT ME ME TXHSD GND TXAF RXAF1 5RC HSDIN RXAF0 GND GND

IC306 TK62012F
LPF
LSDIN
Bias
DEO
IC300 TK62012F
DET AMP
DET
Q204 2SK1830F
MUTE
DISCHARGE
D209 MA2S111-F
DM
D201 RB706F-40
NOISE DET
SQL
5RC
PROTECT
D200 HVC131
NOISE AMP
Q208 2SC4617(S)
IC201 TC75W51FK(F)
NOISE AMP
NOISE AMP
IC200 (TA31136FNG)

IC200 TA31136FNG
FM IF SYSTEM
RSSI
Q205 2SC4649(N,P)
IF AMP
XF200 44.85MHz
MCF
Q206 3SK318
1st MUTE
D204,205,206 HVC355Bx3
TV
TUNE
BPF
Q207 3SK318
RF AMP
D207 HVC355B
TV
TUNE
HPF
5R

CF200 455kHz GF(W)
RF SW
D202 DAN235E
CF201 455kHz GF(N)
RF SW
D203 DAN235E
Q201
SW DTC144EE
W/N
X200 44.395MHz
CD200 455kHz
DET MUTE
5RC
Q203 2SK1824-A
SHIFT
Q202 RN47A4-F