VHF FM TRANSCEIVER / VHF 调频手持对讲机

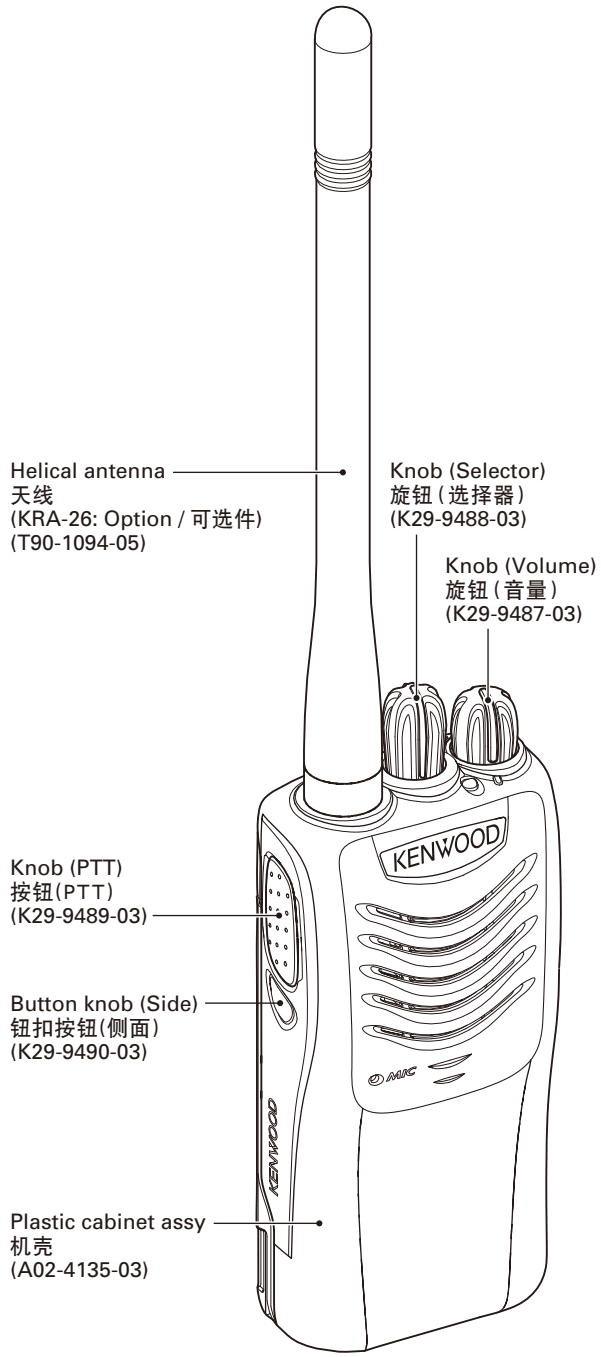
TK-U100(V)

SERVICE MANUAL / 维修手册

KENWOOD

Kenwood Corporation

B51-8938-00 (N)



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

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GENERAL / 概述

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

PERSONAL SAFETY

The following precautions are recommended for personal safety:

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

SERVICE

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

Model	Type	TX-RX unit	Frequency range	Remarks
TK-U100(V)	C	X57-8093-00	144~174MHz	IF1: 38.85MHz LOC: 38.4MHz

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：

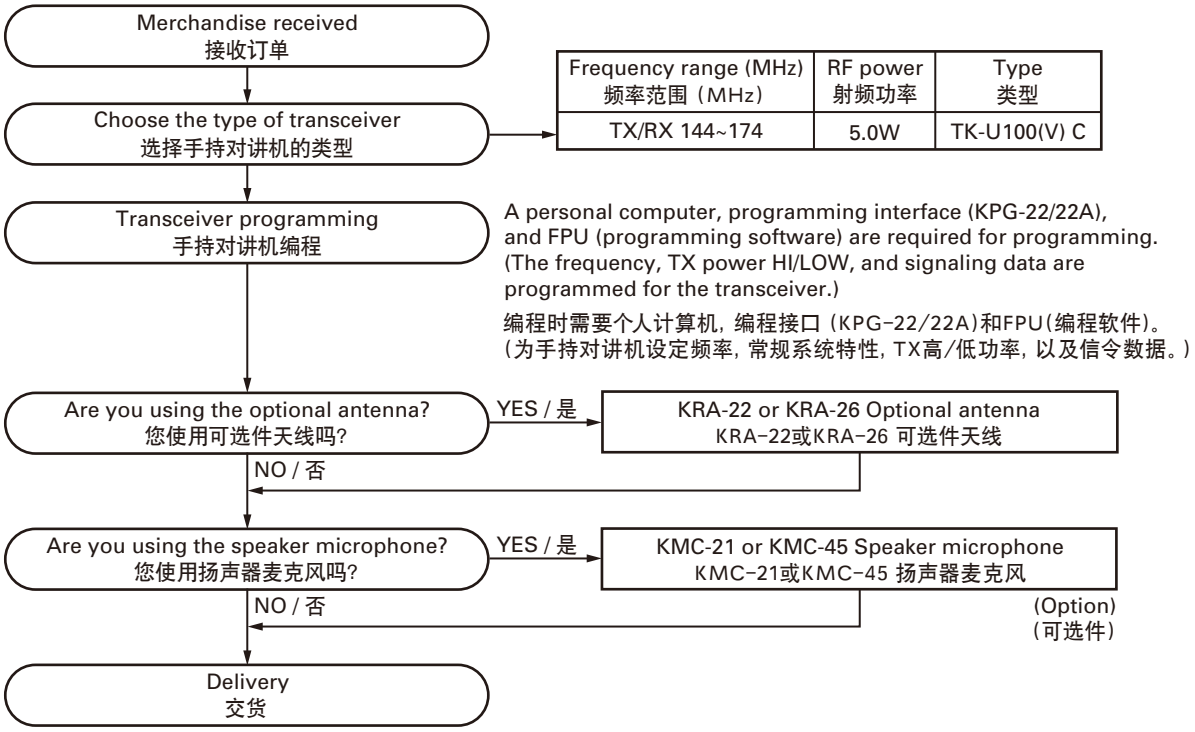
- 在没有认真核实所有射频插头之前或有任何一个脱开的插头没有连接到相应端口上的情况下均不要发射。
- 在电爆管附近或在易燃性气体环境中，必须关闭电源，不要操作本设备。
- 本设备只应该由有资格的技术人员进行维修。

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。

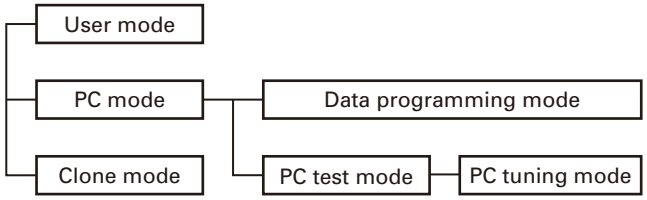
型 号	类型	收发单元	频率范围	备 注
TK-U100(V)	C	X57-8093-00	144~174MHz	IF1:38.35MHz LOC:38.4MHz

SYSTEM SET-UP / 系统体系



REALIGNMENT / 模式组合

1. Modes



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

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
PC mode	Received commands from PC
Clone mode	[PTT]+[Side]+Power ON (Two seconds)

3. PC Mode

3-1. Preface

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

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

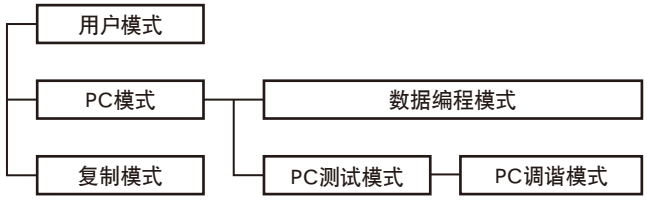
3-2. Connection Procedure

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

Note:

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

1. 模式



模　式	功　能
用户模式	一般使用。
PC 模式	用于手持对讲机与计算机之间的通信。
数据编程模式	用于阅读和写入频率数据以及其他功能。
PC 测试模式	用于使用计算机检测。 此特性包括在 FPU 内。
复制模式	用于从一个手持对讲机编程数据复制到另一个手持对讲机。

2. 如何进入每一种模式

模　式	操　作
用户模式	接通电源
PC 模式	PC 模式
复制模式	[PTT]+[侧面]+ 接通电源 (2 秒钟)

3. PC 模式

3-1. 前言

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

编程软件可以在 PC 上进行使用。图 1 给出了 PC 进行编程的设置。

3-2. 连接操作

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

注意 :

- 必须在电脑上安装 KCT-53U 驱动程序才能使用 USB 适配器 (KCT-53U)。
- 首次使用 USB 适配器 (KCT-53U) 时，请在电脑开机的情况下将 KCT-53U 插入电脑的 USB 端口。

REALIGNMENT / 模式组合

2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the transceiver enters PC mode.
   When data is read from the transceiver, the red LED lights.
   When data is written to by the transceiver, the green LED lights.

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

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

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

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

3-4. KCT-53U Description (USB adapter: Option)

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

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

3-5. FPU (Programming Software) Description

The FPU is the programming software for the transceiver supplied on a CD-ROM. This software runs under windows XP, Vista or 7 on a PC. The software on this disk allows a user to program the transceiver via Programming interface cable (KPG-22/22A).

Note:

Use the FPU that matches the market when you first set the market code and model name/frequency data to the service unit. The unit set by mistake cannot be restored.

Receive frequencies listed below may result in the interference of reception due to the harmonics of internal oscillators.

Enter a frequency not listed in the table.

No.	Frequency (MHz)	No.	Frequency (MHz)
1	152.69375	9	153.60500
2	152.69500	10	153.60625
3	152.70000	11	172.79375
4	152.70500	12	172.79500
5	152.70625	13	172.80000
6	153.59375	14	172.80500
7	153.59500	15	172.80625
8	153.60000		

2. 手持对讲机电源打开时，可以立即进入用户模式。PC 发送指令时，手持对讲机进入 PC 模式。
   手持对讲机发送数据时，红色的 LED 点亮。
   手持对讲机接收数据时，绿色的 LED 点亮。

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

3-3. KPG-22/KPG-22A 说明（PC 编程接口电缆：选购件）

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

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

3-4. KCT-53U 说明（USB 适配器：选购件）

KCT-53U 是将 KPG-22A 连接到电脑 USB 端口的电缆。

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

3-5. FPU（编程软件）说明

FPU 是 CD-ROM 附带的用于手持对讲机的编程软件。该软件在 PC 的 Windows XP、Vista 或 7 下运行。该光盘上的软件允许用户通过编程接口电缆（KPG-22/22A）对手持对讲机进行编程。

注意：

初次设置服务单元的市场代码和机型 / 频率数据时，请使用与市场相符的 FPU。若单元设置有误，将无法予以恢复。

下面列出的接收频率由于内部振荡器的谐波可能对信号接收造成干扰。

输入在表格中没有列出的频率

编号	频率（MHz）	编号	频率（MHz）
1	152.69375	9	153.60500
2	152.69500	10	153.60625
3	152.70000	11	172.79375
4	152.70500	12	172.79500
5	152.70625	13	172.80000
6	153.59375	14	172.80500
7	153.59500	15	172.80625
8	153.60000		

REALIGNMENT / 模式组合

3-6. Programming with PC

If data is transferred to the transceiver from a PC with the FPU, the data for each set can be modified.

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

In this mode the PTT line operate as TXD and RXD data lines respectively.

3-6. 使用 PC 编程

如果使用 FPU 将数据从 PC 传输到手持对讲机，则每套手持对讲机的数据均可修改。

通过 SP/MIC 插孔可以将数据以 RS-232C 格式写入 EEPROM。

在该模式下，PTT 线路分别用作 TXD 和 RXD 数据线路。

List of FPU for transceiver

Model	Type	FPU
TK-U100(V)	C	KPG-137D(C)

手持对讲机的 FPU 名单

型　号	类 型	FPU
TK-U100(V)	C	KPG-137D(C)

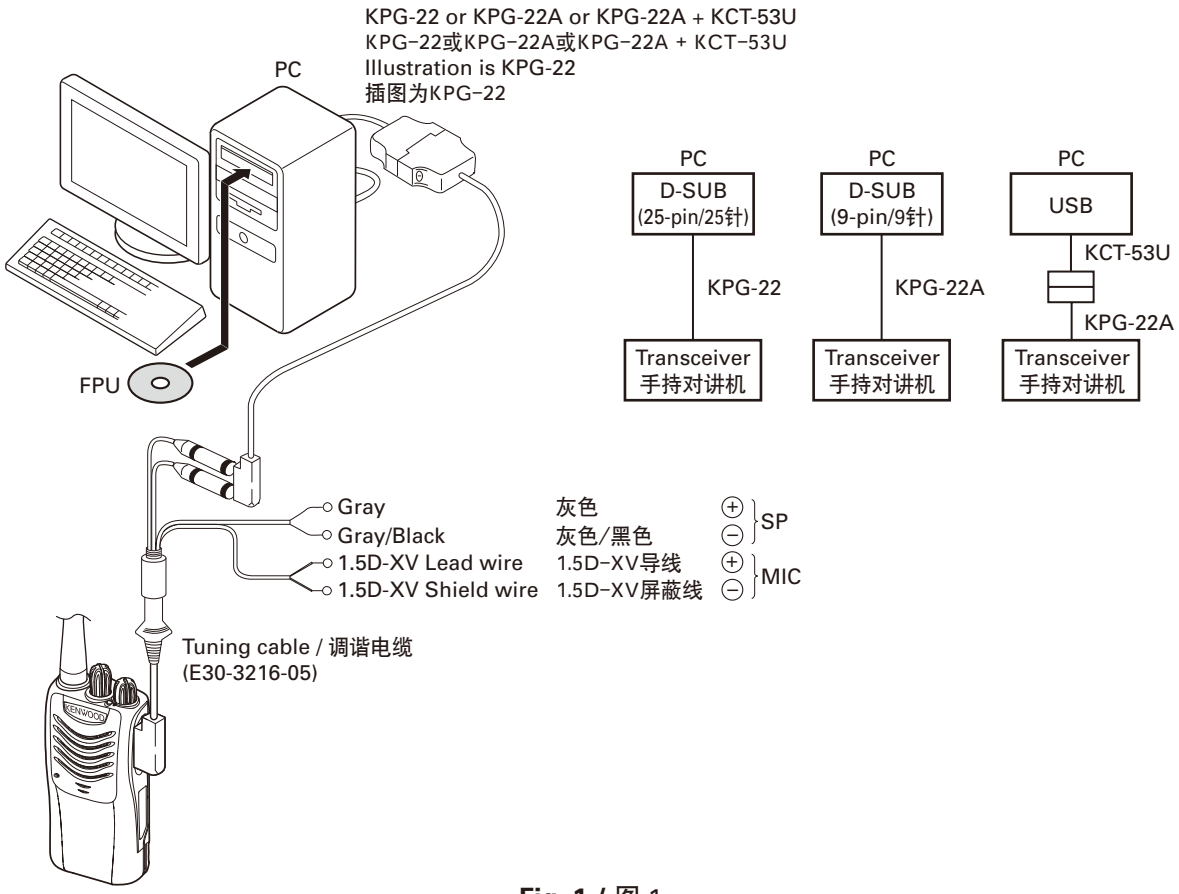


Fig. 1 / 图 1

REALIGNMENT / 模式组合

4. Clone Mode

Programming data can be transferred from one transceiver to another by connecting them via their SP/MIC connectors.

Cloning can be performed as described below (the transmit transceiver is the source and the receive transceiver is the target).

The following data cannot be cloned.
- Tuning data
- Model name data
- ESN data

1. Turn the source transceiver and target transceiver power OFF.
2. Turn the source transceiver power ON while pressing the [PTT] and [Side] keys, to enter clone mode.
3. Connect the cloning cable (part No. E30-3410-05) to the SP/MIC connectors on the source and target transceivers.
4. Turn the target transceiver power ON.
5. Press the [Side] key on the source transceiver.
   The data of the source is sent to the target. While the source is sending data, red LED will light. While the target is receiving the data, green LED will light. When cloning of data is completed, the source red LED turned off, and the target automatically operates in the User mode.
6. Additional targets can be continuously cloned. When the [Side] key on the source is pressed, the data of source is sent to the target again. Repeat steps 3 to 5 to clone additional transceivers.

Note:
- The Model name and Market codes must be the same in order to clone the transceiver.
- If the transceivers clone mode is configured as "Disabled", the transceiver cannot enter clone mode.
- If the Read authorization password is set to the transceiver, the transciever cannot enter to the clone mode.
- Cannot be cloned if the password (overwrite password) is programmed to the target.

4. 复制模式

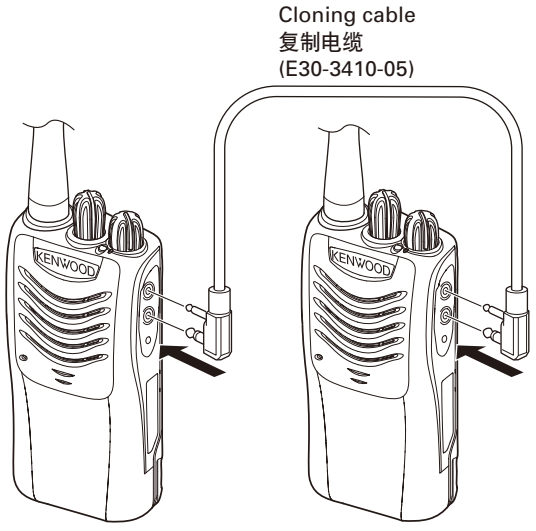
用 SP/MIC 连接器连接手持对讲机，可以将编程数据从一台手持对讲机传输到另一台手持对讲机。

如下所述可进行复制（发射手持对讲机为主机，接收手持对讲机为子机）。

以下数据不能复制。
- 调谐数据
- 机型数据
- ESN 数据

1. 关闭主机和子机的电源。
2. 按［PTT］和［侧面］键的同时打开主机的电源，使其进入复制模式。
3. 将复制电缆（零件号 E30-3410-05）连接到主、子机的 SP/MIC 连接器上。
4. 打开子机的电源。
5. 按主机上的［侧面］键。
   主机的数据便被发送到子机。主机发送数据时，红色 LED 将呈。子机接收数据时，绿色 LED 呈。数据复制完成后，主机的红色 LED 熄灭，子机自动以用户模式运行。
6. 可以继续复制其他子机。按主机上的［侧面］键，主机的数据再次被发送到子机。重复步骤 3 ～ 5 复制其他手持对讲机。

注意：
- 机型和市场代码必须相同才能复制手持对讲机。
- 如果手持对讲机复制模式被设置为“无效”，则手持对讲机不能进入复制模式。
- 如果手持对讲机设置了读取授权密码，则手持对讲机无法进入复制模式。
- 如果子机编程设有密码（改写密码），则无法复制。



DISASSEMBLY FOR REPAIR / 维修拆卸

1. Separating the Case Assembly from the Chassis

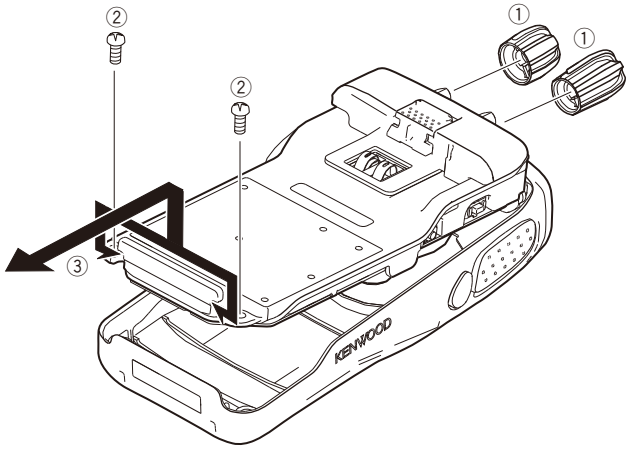
1. Remove the two knobs (①).
2. Remove the two screws (②).
3. Expand the right and left sides of the bottom of the case assembly, lift the chassis, and remove it from the case assembly (③).
4. Taking care not to cut the speaker lead (④), open the chassis and case assembly.

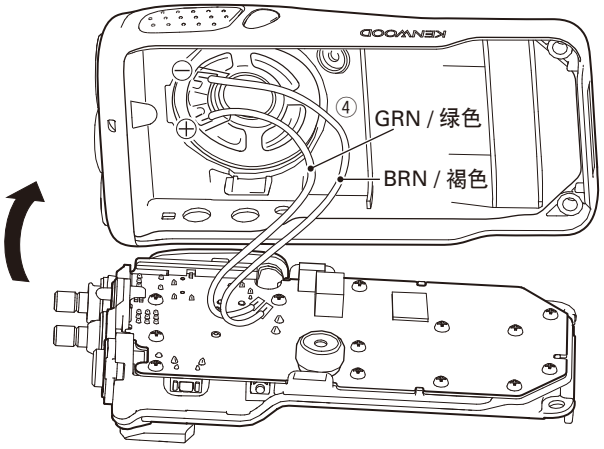
Note: Solder the speaker wire back in its original position if you have removed it.

1. 从机架上分离外壳

1. 取下两旋扭 (①)。
2. 取下两颗螺钉 (②)。
3. 掀开外壳底部的左右两侧，取下机架，并外壳中取出 (③)。
4. 小心不要折断扬声器引线 (④)。拆下机架和外壳。

注意：如果取下了扬声器的导线，请将其焊接到原位上。





DISASSEMBLY FOR REPAIR / 维修拆卸

2. Removing the TX-RX unit from the Chassis

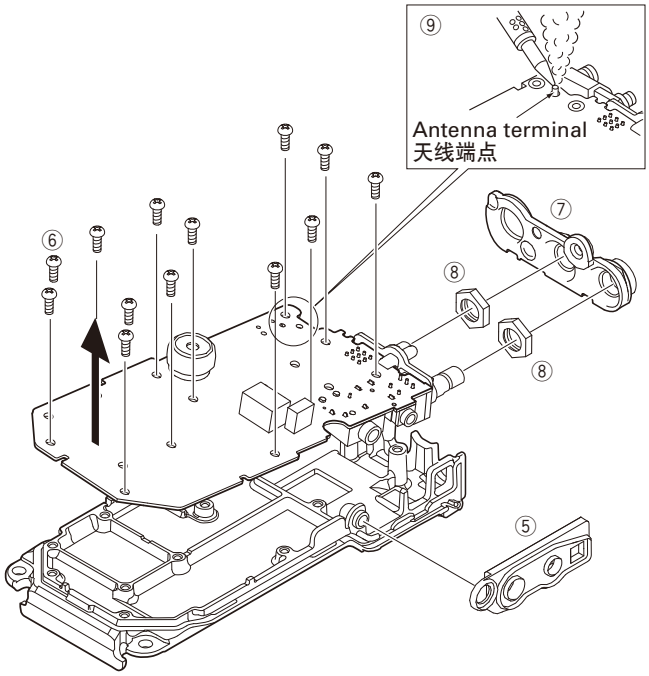
1. Remove the packing (⑤).
2. Remove the 13 screws (⑥).
3. Remove the packing (⑦) and two hexagon nuts (⑧).
4. Remove the solder from the antenna terminal using a soldering iron then lift the unit off (⑨).

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

2. 拆卸收发单元

1. 取下橡胶垫（⑤）。
2. 取下 13 颗螺钉（⑥）。
3. 取下橡胶垫（⑦）和两个六角形螺母（⑧）。
4. 用电烙铁烫开天线端点处的焊锡，并拆卸主板（⑨）。

注意：当重新将主板安装到机架上时，确保将天线端点处焊接好。

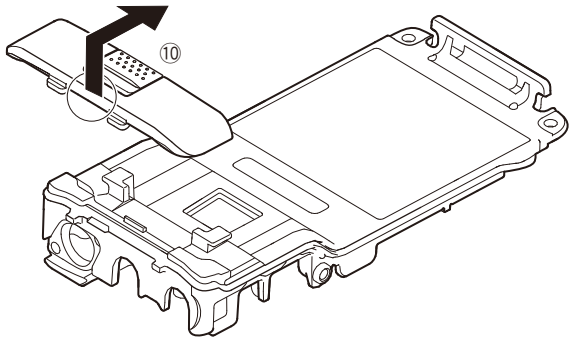


3. Removing the Rear Panel

1. Raise the rear panel on the chassis (⑩).

3. 取下后面板

1. 从机架上提起后面板（⑩）。



CIRCUIT DESCRIPTION / 电路说明

1. Frequency Configuration

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

The PLL circuit in the transmitter generates the necessary frequencies.

1. 频率构成

接收部采用二次变频超外差方式。第一中频为 38.85MHz，第二中频为 450kHz。第一本振频率信号由锁相环电路提供。

发射部由锁相环电路直接产生所需的频率。

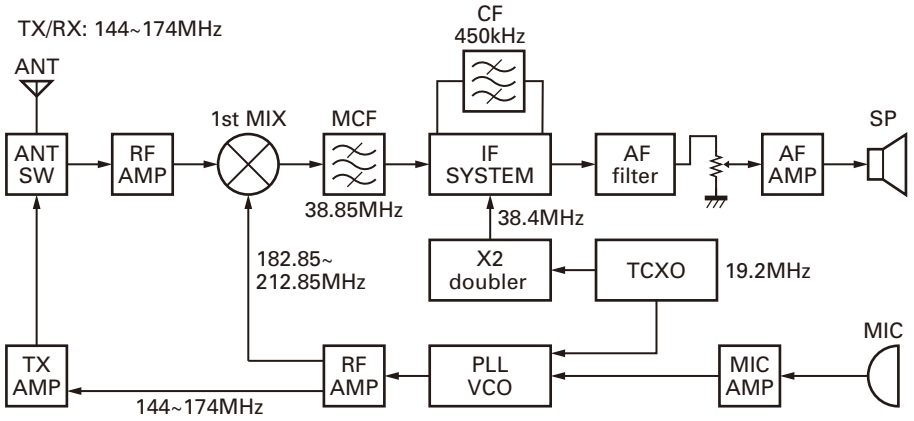


Fig. 1 Frequency configuration / 图 1 频率构成

2. Receiver System

The receiver system is shown in Figure 2.

2-1. Front End (RF Amplifier) Circuit

The signal coming from the antenna passes through the transmit/receive switching diode circuit (D101, D102, and D103) and a BPF (L210), and is then amplified by the RF amplifier (Q204).

The resulting signal passes through a BPF (L207 and L208) and goes to the mixer. These BPFs are adjusted by variable capacitors (D201 and D202). The input voltage to the variable capacitor is a regulated voltage output from the DAC (IC300).

2. 接收部系统

接收部系统的如图 2 所示。

2-1. 前端（高频放大器）电路

从天线接收的信号进入发送 / 接收转换开关二极管电路（D101、D102 和 D103），然后通过 BPF（L210），并且被射频放大器（Q204）放大。

此信号通过 BPF（L207 和 L208）然后进入混频。这些 BPF 被可变电容器（D201 和 D202）调整。输入可变电容器的电压被经 DAC（IC300）的电压输出调整。

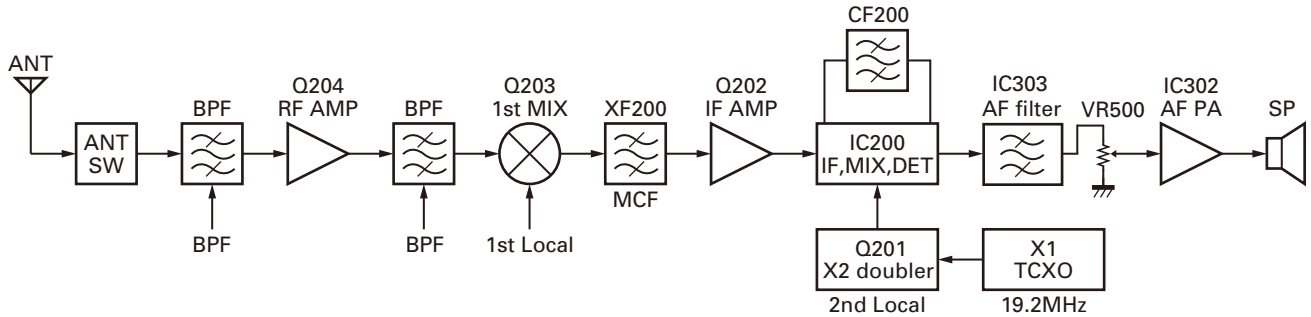


Fig. 2 Receiver system / 图 2 接收部系统

CIRCUIT DESCRIPTION / 电路说明

2-2. First Mixer

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

The resulting signal passes through the XF200 MCF to cut the adjacent spurious and provide the optimum characteristics, such as adjacent frequency selectivity.

2-2. 第一混频器

前端的信号与 PLL 电路产生的第一本振信号在 Q203 混频，生成 38.85MHz 频率的第一中频信号。

生成的信号通过 XF200 MCF。

2-3. IF Amplifier Circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF200) to remove the adjacent channel signal.

The filtered first IF signal is amplified by the first IF amplifier (Q202) and then applied to the IF system IC (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 38.4MHz of the second local oscillator output (TCXO X1) and produces the second IF signal of 450kHz.

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

2-3. 中频放大电路

第一中频信号通过晶体滤波器（XF200）消除相邻信道的信号。经滤波的第一中频信号被第一中频放大器（Q202）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 38.4MHz 的第二本振信号输出（TCXO X1）进行混频，并生成 450kHz 的第二中频信号。

第二中频信号通过陶瓷滤波器（CF200）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）的正交检测器解调。经解调的信号进入音频电路。

2-4. Audio Amplifier Circuit

The demodulated signal from IC200 is amplified by IC305, IC303 and goes to AF amplifier through IC302.

The signal then goes through an volume control (VR500), and is routed to an audio power amplifier (IC302) where it is amplified and output to the speaker.

To output sounds from the speaker, IC400 sends a high signal to the SPMUT line and turns IC400 on through Q300, Q301, Q302 and Q306.

2-4. 音频放大器电路

来自于 IC200 的解调信号被 IC305 放大，并通过 IC302, IC303 送到 AF 放大器。

信号通过 AF 音量控制（VR500），在音频功率放大器（IC302）进行放大后输出到扬声器。

由扬声器输出声音时，IC400 发送高电平信号给 SPMUT，通过 Q300、Q301、Q302 和 Q306 打开 IC400。

3. Transmitter System

3-1. Microphone Amplifier Circuit

The signal from microphone amplified by IC301 and goes through mute switch (IC300).

IC304 is composed of high-pass filter, low-pass filter and pre-emphasis/IDC circuit.

The output signal from the DAC IC (IC300) goes to the VCO modulation input.

3. 发射机系统

3-1. 麦克风放大器电路

麦克风的信号被 IC301 放大，然后通过静音开关（IC300）。

IC304 由高通滤波器、低通滤波器和预加重 /IDC 电路组成。

DAC IC(IC300) 的输出信号送入 VCO 调制输入。

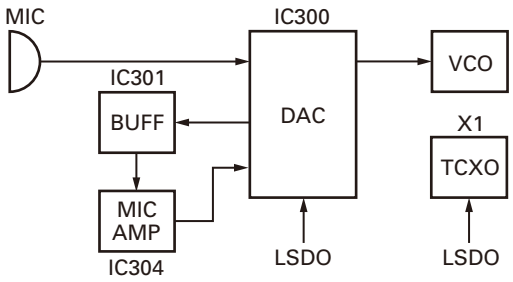


Fig. 3　Microphone amplifier circuit / 图 3　麦克风放大器电路

CIRCUIT DESCRIPTION / 电路说明

3-2. Driver and Final Amplifier Circuit

The signal from the T/R switch (D100 is on) is amplified by the pre-drive amplifier (Q100) to 30mW.

The output of the pre-drive amplifier is amplified by the drive amplifier (Q101) and the RF final amplifier (Q102) to 5.0W (1W when the power is low).

The drive amplifier and the RF final amplifier consist of two MOS FET stages.

The output of the RF final amplifier is then passed through the harmonic filter (LPF) and antenna switch (D101 and D102) and is applied to the antenna terminal.

3-2. 驱动器和末级放大器电路

来自于 T/R 开关 (D100 ON) 的信号被预驱动放大器 (Q100) 放大到 30mW。

预驱动放大器的输出被驱动放大器 (Q101) 和射频末级放大器 (Q102) 放大到 5.0W(当低功率时为 1W)。

驱动放大器和 RF 末级放大器由 2 个 MOS FET 构成。

射频末级放大器的输出通过谐波滤波器 (LPF) 和天线开关 (D101 和 D102) 并且送到天线终端。

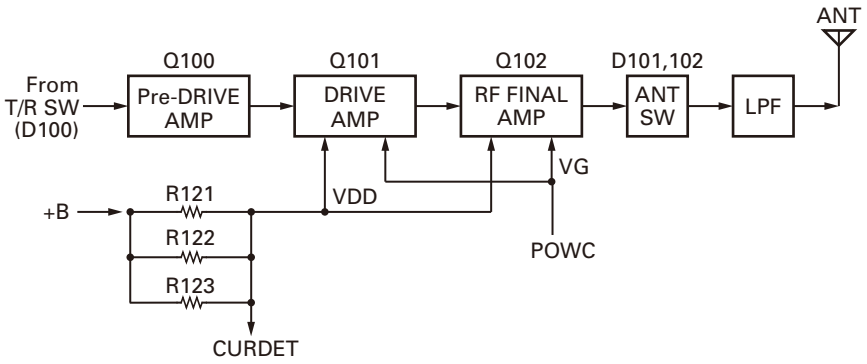


Fig. 4 Drive and final amplifier circuit / 图 4 驱动及末级放大器电路

4. Frequency Synthesizer Circuit

4-1. Frequency Synthesizer

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

The TCXO generates 19.2MHz. The frequency stability is 5.0ppm 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 1 of the PLL IC.

The VCO consists of 1VCO and covers a dual range of the 144.00~174.00MHz and the 182.85~212.85MHz. The VCO generates 182.85~212.85MHz for providing to the first local signal in receive.

The PLL IC consists of a prescaler, reference divider, phase comparator, charge pump (The frequency step of the PLL circuit is 5 or 6.25kHz).

PLL data is output from DATA (pin 19), CLOCK (pin 18) and PLDL (pin 20) of the MCU (IC400). 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 22 (PLUL) of the MCU. When the PLL is unlocked, the PLUL goes low.

4. 频率合成器电路

4-1. 频率合成器

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

TCXO 产生 19.2MHz 的频率。在温度为 -30 ～ +60℃的范围内，频率的稳定性为 5.0ppm。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 1 上。

VCO 由 1VCO 组成，并且覆盖了 144.00 ～ 174.00MHz 和 182.85 ～ 212.85MHz 双波段。VCO 产生 182.85 ～ 212.85MHz 的频率，以提供接收的第一个本振信号。

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 5kHz 或 6.25kHz)。

PLL 数据从 MCU(IC400) 的 DATA(针脚 19)，CLOCK(针脚 18) 和 PLDL(针脚 20) 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 22(PLUL) 监控。当 PLL 失锁时，PLUL 为低电位。

CIRCUIT DESCRIPTION / 电路说明

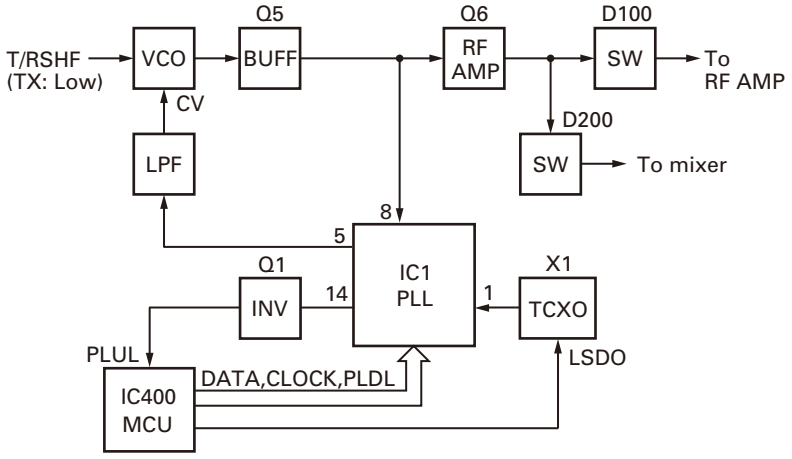


Fig. 5 PLL block diagram / 图 5 PLL 方块图

5. Control Circuit

The control consists of the MCU (IC400) and its peripheral circuits. It controls the TX-RX unit. IC400 mainly performs the following;

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

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

5. 控制电路

控制电路是由微处理器（IC400）和外部电路构成。它控制收发单元。IC400 的主要功能如下：

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

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

6. Signaling Circuit

6-1. Encode

■ Low-speed data (QT, DQT)

Low-speed data is output from pin 49 (LSDO) of the MCU (IC400). The signal passes through a low-pass CR filter. The signal is mixed with the audio signal and goes to the VCO and TCXO (X1) modulation input after signal processing in the DAC IC (IC300).

■ High-speed data (DTMF)

High-speed data (HSD) is output from pin 50 (HSDO) of the MCU.

The signal passes through a low-pass CR filter. TX deviation making an adjustment by MCU is applied to the DAC IC (IC300). The signal is mixed with the audio signal and goes to the VCO and TCXO.

6. 信令电路

6-1. 编码

■低速数据（QT, DQT）

低速数据从微处理器（IC400）的针脚 49(LSDO）输出。信号通过低通 CR 滤波器。此信号与音频信号混合，在 DAC IC(IC300）中进行信号处理之后，进入 VCO 和 TCXO(X1）调制输入。

■高速数据（DTMF）

高速数据（HSD）从微处理器的针脚 50(HSDO）输出。

信号通过低通 CR 滤波器。由微处理器进行调整的 TX 频偏被施加到 DAC IC(IC300)。此信号与音频信号混合，然后送入 VCO 和 TCXO。

CIRCUIT DESCRIPTION / 电路说明

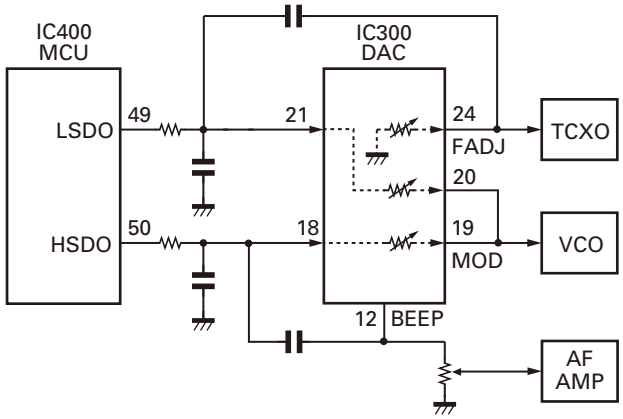


Fig. 6 Encode / 图 6 编码

6-2. Decode

■ QT/DQT

The output signal from IF IC (IC200) enters the MCU (IC400) through IC300. IC400 determines whether the QT or DQT matches the preset value, and controls the SPMUT and the speaker output sounds according to the squelch results.

6-2. 解码

■ QT/DQT

IF IC(IC200) 的输出信号通过 IC300 送入微处理器 (IC400)。IC400 确认 QT 或 DQT 是否与预设值匹配，控制 SPMUT，然后扬声器根据静噪结果输出声音。

7. Power Supply

There are five 5V power supplies for the MCU:

5M is always output while the power is on.

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

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

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

5MS is 5V for the SP/MIC connector and the DAC IC (IC300).

7. 电源

微处理器有 5 个 5V 电源。

电源打开时，5M 总是输出。

5C 是普通的 5V 电源，它在 SAVE 没有设为 ON 时输出。

5R 是接收用 5V 电源，它在接收期间输出。

5T 是为发射用的 5V 电源，它在发射期间保持输出。

5MS 是 SP/MIC 和 DAC IC(IC300) 的 5V 电源。

SEMICONDUCTOR DATA / 半导体数据

MCU: F2136ACNKDRB (TX-RX unit IC400)

Pin No.	Signal Name	I/O	Function
1	NC	O	NC
2	VREF	-	Reference voltage input
3	MODE	I	Mode select for MCU
4,5	NC	O	NC
6	RESET	I	Reset signal input
7	XOUT	O	Oscillation circuit
8	Vss	-	GND
9	XIN	I	Oscillation circuit
10	Vcc	-	Power supply
11	BSFT	O	Beat shift for MCU clock
12~14	NC	O	NC
15	E2WP	O	Write protect for EEPROM
16	E2DAT	I/O	Data input/output from EEPROM
17	E2CLK	O	Clock for EEPROM
18	CLOCK	O	Clock for PLL/DAC IC
19	DATA	O	Data for PLL/DAC IC
20	PLDL	O	Load enable for PLL IC
21	PLPS	O	Power saving for PLL IC
22	PLUL	I	Lock detect signal from PLL IC
23	NC	O	NC
24	EN4	I	Encoder input 4
25	EN3	I	Encoder input 3
26	EN2	I	Encoder input 2
27	EN1	I	Encoder input 1
28	NC	O	NC
29	OPTDET	I	2pin option detection
30	LEDR	O	LED (Red) control
31	LEDG	O	LED (Green) control
32	SPMUT	O	Power switch for AF amp
33	NC	O	NC
34	5TC	O	5T control
35	5CC	O	5C control
36	5MSC	O	5MS control
37	DACLD	O	Load enable for DAC IC
38	PTT	I	PTT key input
39	PFKEY	I	Side key input
40	INT	I	INT signal input
41	VDCSW	O	Voltage discharge switch
42	WID/NAR	O	Wide/Narrow control
43	RXD	I	Serial data input (FPU)
44	TXD	O	Serial data output (FPU)
45,46	NC	O	NC
47	VOXIN	I	VOX level input
48	CVDET	I	VCO voltage detection

MCU: F2136ACNKDRB(收发单元 IC400)

管脚号	接口名称	输入/输出	功　　能
1	NC	输出	未连接
2	VREF	-	基准电压
3	MODE	输入	选择模式 (MCU)
4,5	NC	输出	未连接
6	RESET	输入	MCU 复位
7	XOUT	输出	MCU 时钟输出
8	Vss	-	接地
9	XIN	输入	11.0592MHz 时钟输入
10	Vcc	-	5.0V
11	BSFT	输出	拍频偏移
12~14	NC	输出	未连接
15	E2WP	输出	EEPROM 写入控制
16	E2DAT	输入/输出	EEPROM 数据输入 / 输出
17	E2CLK	输出	EEPROM 时钟
18	CLOCK	输出	PLL/DAC 时钟
19	DATA	输出	PLL/DAC 数据
20	PLDL	输出	PLL 启用
21	PLPS	输出	PLL 省电状态控制
22	PLUL	输入	PLL 失锁检测
23	NC	输出	未连接
24	EN4	输入	编码器输入 4
25	EN3	输入	编码器输入 3
26	EN2	输入	编码器输入 2
27	EN1	输入	编码器输入 1
28	NC	输出	未连接
29	OPTDET	输入	耳机检测
30	LED_R	输出	红色 LED 控制
31	LED_G	输出	绿色 LED 控制
32	SPMUT	输出	AF IC 开关
33	NC	输出	未连接
34	5TC	输出	5T 控制
35	5CC	输出	5C 控制
36	5MSC	输出	5MS 控制
37	EVOLLD	输出	DAC 启用
38	PTT	输入	PTT 键输入
39	PFKEY	输入	侧面键输入
40	INT	输入	MCU 停止
41	VDCSW	输出	电压放电开关
42	WID/NAR	输出	宽 / 窄切换
43	RXD	输入	串行数据输出 (FPU)
44	TXD	输出	串行数据输入 (FPU)
45,46	NC	输出	未连接
47	VOXIN	输入	VOX 水平输入
48	CVDET	输入	VCO 电压电平

SEMICONDUCTOR DATA / 半导体数据

Pin No.	Signal Name	I/O	Function
49	LSDO	O	Low speed data output
50	HSDO	O	DTMF/beep output
51	BATT	I	Battery voltage input
52	RSSI	I	RSSI input
53	SQL	I	Squelch input
54	LSDIN	I	LSD input
55	THDET	I	Thermistor input
56	CURDET	I	Current detection
57	T/RSHF	O	VCO shift control
58	5VC	O	5V control
59~61	NC	O	NC
62	TYPE2	I	Destination selection 2
63	TYPE1	I	Destination selection 1
64	5RC	O	5R control

管脚号	接口名称	输入/输出	功　　能
49	LSDO	输出	低速数据
50	HSDO	输出	侧音 AF 输出
51	BATT	输入	电池电压输入
52	RSSI	输入	RSSI 电平
53	SQ	输入	静噪电平
54	LSDIN	输入	低速数据
55	THDET	输入	热敏电阻输入
56	CURDET	输入	电流检测
57	T/RSHF	输出	VCO 偏移控制
58	5VC	输出	5V 控制
59~61	NC	输出	未连接
62	TYPE2	输入	类型选择 2
63	TYPE1	输入	类型选择 1
64	5RC	输出	5R 控制

COMPONENTS DESCRIPTION / 元件说明

TX-RX unit (X57-8093-00)

Ref. No.	Part Name	Description
IC1	IC	PLL system
IC200	IC	FM IF system
IC300	IC	DAC
IC301	IC	LSD buffer
IC302	IC	AF power AMP
IC303	IC	AF filter
IC304	IC	MIC AMP
IC305	IC	QT/DQT filter
IC400	IC	MCU
IC401	IC	EEPROM
IC500	IC	Voltage detector/ RESET
IC501	IC	Voltage regulator/ 5V
IC503	IC	Voltage regulator/ 5V
Q1	Transistor	DC switch
Q2	Transistor	TX/RX RF switch
Q3	Transistor	Ripple filter
Q4	FET	VCO
Q5	Transistor	RF buffer AMP
Q6	Transistor	RF AMP
Q7	Transistor	Voltage regulator/ 3V

收发单元 (X57-8093-00)

有关号码	零 件 名 称	说　　明
IC1	IC	PLL 系统
IC200	IC	FM IF 系统
IC300	IC	DAC
IC301	IC	LSD 缓冲器
IC302	IC	AF 放大器
IC303	IC	AF 滤波器
IC304	IC	麦克风放大器
IC305	IC	QT/DQT 滤波器
IC400	IC	微处理器
IC401	IC	EEPROM
IC500	IC	电压检测器 / 复位
IC501	IC	电压调节器 /5V
IC503	IC	电压调节器 /5V
Q1	晶体管	直流开关
Q2	晶体管	收发开关
Q3	晶体管	纹波滤波器
Q4	场效应管	VCO 振荡器
Q5	晶体管	射频缓冲放大器
Q6	晶体管	射频放大器
Q7	晶体管	电压调节器 /3.3V

COMPONENTS DESCRIPTION / 元件说明

Ref. No.	Part Name	Description
Q100	Transistor	Pre drive AMP
Q101	FET	Drive AMP
Q102	FET	Final AMP
Q103	Transistor	Voltage discharge switch
Q200	Transistor	W/N switch
Q201	Transistor	Doubler
Q202	Transistor	IF AMP
Q203	FET	Mixer
Q204	FET	RF AMP
Q300,301	Transistor	DC switch
Q302	FET	Mute switch
Q303	FET	DC switch
Q304	Transistor	DC switch
Q305	Transistor	W/N switch
Q306	FET	Mute switch
Q400	Transistor	Switch
Q401,402	Transistor	DC switch
Q500,501	FET	DC switch
Q502	Transistor	DC switch
D1	Diode	Current steering
D2,3	Variable capacitance diode	Frequency control/ VCO
D4	Diode	TX/RX RF switch
D5	Variable capacitance diode	Modulator/ TX VCO
D6	Variable capacitance diode	Frequency control/ VCO
D7	Diode	Ripple filter
D100	Diode	TX/RX RF switch
D101~103	Diode	ANT switch
D200	Diode	TX/RX RF switch
D201~203	Variable capacitance diode	RX BPF tuning
D301	Diode	Current steering
D400	LED	LED/ Green
D401	LED	LED/ Red
D402	Diode	VCO speed up
D500	Diode	Protect
D501	Diode	Current steering

有关号码	零 件 名 称	说　　明
Q100	晶体管	预驱动放大器
Q101	场效应管	驱动放大器
Q102	场效应管	末级放大器
Q103	晶体管	电压放电开关
Q200	晶体管	宽 / 窄开关
Q201	晶体管	倍频器
Q202	晶体管	IF 放大器
Q203	场效应管	混频器
Q204	场效应管	高频放大器
Q300, 301	晶体管	直流开关
Q302	场效应管	静音开关
Q303	场效应管	直流开关
Q304	晶体管	直流开关
Q305	晶体管	宽 / 窄开关
Q306	场效应管	静音开关
Q400	晶体管	开关
Q401, 402	晶体管	直流开关
Q500, 501	场效应管	直流开关
Q502	晶体管	直流开关
D1	二极管	整流
D2, 3	可变电容二极管	频率控制 /VCO
D4	二极管	收发开关
D5	可变电容二极管	调制器 /TX VCO
D6	可变电容二极管	频率控制 /VCO
D7	二极管	纹波滤波器
D100	二极管	收发开关
D101~103	二极管	天线开关
D200	二极管	收发开关
D201~203	可变电容二极管	RX BPF 调谐
D301	二极管	整流
D400	LED	LED/ 绿色
D401	LED	LED/ 红色
D402	二极管	VCO 加速
D500	二极管	保护
D501	二极管	整流

PARTS LIST / 零件表

✻ New Parts. ⚠indicates safety critical components.
Parts without **Parts No.** are not supplied.
✻ 新零件。⚠代表对安全至关重要的零件。
我们不会提供没有**零件号**的零件。

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

TK-U100(V)
TX-RX UNIT (X57-8093-00)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-U100(V)					
1	1A	✻	A02-4135-03	PLASTIC CABINET ASSY	
2	3A	✻	A10-4150-01	CHASSIS	
3	3B	✻	A82-0081-02	REAR PANEL	
5	2B	✻	B11-1892-03	ILLUMINATION GUIDE	
7	3B	✻	E04-0486-05	RF COAXIAL RECEPTACLE (SMA)	
8	2A	✻	E23-1364-04	TERMINAL (BATT)	
9	1B	✻	E37-1535-05	PROCESSED LEAD WIRE (SP-/BRN)	
10	1B	✻	E37-1536-05	PROCESSED LEAD WIRE (SP+/GRN)	
11	2A	✻	E72-0436-03	TERMINAL BLOCK (BATT)	
13	3B	✻	G01-4571-04	COIL SPRING	
14	2A		G11-4437-04	SHEET (Q102-CHASSIS)	
15	3B	✻	G13-2348-14	CUSHION (BATT-TERMINAL)	
16	2A	✻	G53-1867-03	PACKING (CHASSIS)	
17	1B	✻	G53-1868-02	PACKING (TOP)	
18	3B	✻	G53-1869-03	PACKING (JACK)	
19	1A	✻	G53-1871-04	PACKING (MIC)	
21	1B	✻	K29-9487-03	KNOB (VOL)	
22	1B	✻	K29-9488-03	KNOB (SELECTOR)	
23	1A	✻	K29-9489-03	KNOB (PTT)	
24	1A	✻	K29-9490-03	BUTTON KNOB (SIDE KEY)	
25	3B	✻	K29-9491-03	LEVER KNOB (BATTERY)	
A	2B,3B		N09-2438-05	BINDING HEAD SCREW (ANT)	
B	3A		N30-2606-48	PAN HEAD MACHINE SCREW (CABINE)	
C	1A,2A		N83-2005-48	PAN HEAD TAPTITE SCREW (X57)	
27	1B		T07-0787-05	SPEAKER	
				ACCESSORIES / 随机附件	
		✻	B09-0744-03	CAP (SP/MIC) ACCESSORY	
		✻	B62-2299-00	INSTRUCTION MANUAL (E) ACCESSORY	
		✻	B62-2309-00	INSTRUCTION MANUAL (C) ACCESSORY	
		✻	J29-0751-05	BELT CLIP ACCESSORY	
			N35-3005-43	BINDING HEAD SCREW ACCESSORY	
		✻	T90-1094-05	HELICAL ANTENNA ACCESSORY (146-162MHz)	
		✻	W08-1245-05	AC ADAPTER ACCESSORY	
		✻	W08-1248-05	CHARGER ACCESSORY	
		✻	W09-1071-05	BATTERY ASSY ACCESSORY	
		✻	X57-8090-21	TX-RX UNIT (FOR SERVICE)	
TX-RX UNIT (X57-8093-00)					
D400			B30-1782-05	LED (GREEN)	
D401			B30-1779-05	LED (RED)	
C1			CK73GB1E154K	CHIP C 0.15UF K	
C2		✻	CK73HB1A184K	CHIP C 0.18UF K	
C4			CS77CA1A6R8M	CHIP TNTL 6.8UF 10WV	
C5			CS77CA1DR68M	CHIP TNTL 0.68UF 20WV	
C6			CK73HB1A105K	CHIP C 1.0UF K	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C7		✻	CC73HCH1H560G	CHIP C 56PF G	
C8			CK73HB1H102K	CHIP C 1000PF K	
C9			CK73HB1A104K	CHIP C 0.10UF K	
C11			CK73HB1A105K	CHIP C 1.0UF K	
C12			CC73HCH1H0R5B	CHIP C 0.5PF B	
C13			CS77CP0J010M	CHIP TNTL 1.0UF 6.3WV	
C14,15			CK73HB1C103K	CHIP C 0.010UF K	
C16			CK73HB1H102K	CHIP C 1000PF K	
C17			CC73HCH1H150J	CHIP C 15PF J	
C18,19			CK73HB1H102K	CHIP C 1000PF K	
C20			CS77CA1C100M	CHIP TNTL 10UF 16WV	
C21,22			CC73GCH1H090B	CHIP C 9.0PF B	
C23,24			CK73HB1H102K	CHIP C 1000PF K	
C25			CK73HB1C103K	CHIP C 0.010UF K	
C26			CK73HB1H102K	CHIP C 1000PF K	
C27			CC73HCH1H220J	CHIP C 22PF J	
C28			CK73HB1H102K	CHIP C 1000PF K	
C29			CC73GCH1H0R5B	CHIP C 0.5PF B	
C30			CK73HB1H102K	CHIP C 1000PF K	
C31			CK73HB1C103K	CHIP C 0.010UF K	
C32			CK73HB1H102K	CHIP C 1000PF K	
C33			CC73HCH1H470J	CHIP C 47PF J	
C34			CK73HB1H102K	CHIP C 1000PF K	
C35			CC73HCH1H150J	CHIP C 15PF J	
C36			CC73HCH1H090B	CHIP C 9.0PF B	
C37			CC73HCH1H150J	CHIP C 15PF J	
C38			CC73GCH1H220J	CHIP C 22PF J	
C39			CC73HCH1H120J	CHIP C 12PF J	
C40,41			CK73HB1H102K	CHIP C 1000PF K	
C42			CC73HCH1H150J	CHIP C 15PF J	
C43			CK73HB1H102K	CHIP C 1000PF K	
C44			CK73HB1A104K	CHIP C 0.10UF K	
C53			CC73HCH1H030B	CHIP C 3.0PF B	
C59			CK73HB1C333K	CHIP C 0.033UF K	
C100			CC73HCH1H120J	CHIP C 12PF J	
C101-104			CK73HB1H102K	CHIP C 1000PF K	
C105			CK73HB1A105K	CHIP C 1.0UF K	
C106			CC73HCH1H090B	CHIP C 9.0PF B	
C107,108			CK73HB1H102K	CHIP C 1000PF K	
C109			CC73HCH1H150J	CHIP C 15PF J	
C110			CK73HB1H102K	CHIP C 1000PF K	
C111			CK73HB1C103K	CHIP C 0.010UF K	
C112			CC73HCH1H560J	CHIP C 56PF J	
C113,114			CK73HB1H102K	CHIP C 1000PF K	
C116			CK73HB1C103K	CHIP C 0.010UF K	
C117			CK73FB1A225K	CHIP C 2.2UF K	
C119,120			CK73HB1H102K	CHIP C 1000PF K	
C121			CC73GCH1H330J	CHIP C 33PF J	
C122			CC73GCH1H470J	CHIP C 47PF J	
C123			CC73GCH1H070B	CHIP C 7.0PF B	
C124			CK73HB1H102K	CHIP C 1000PF K	
C125			CC73GCH1H270J	CHIP C 27PF J	
C126			CC73GCH1H050B	CHIP C 5.0PF B	
C127			CK73GB1H102K	CHIP C 1000PF K	
C128			CC73GCH1H060B	CHIP C 6.0PF B	

PARTS LIST / 零件表

TX-RX UNIT (X57-8093-00)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C129			CK73HB1H102K	CHIP C	1000PF	K	
C130			CC73GCH1H220J	CHIP C	22PF	J	
C131			CK73GB1H102K	CHIP C	1000PF	K	
C132			CC73GCH1H120J	CHIP C	12PF	J	
C134			CK73HB1H102K	CHIP C	1000PF	K	
C135			CC73GCH1H060B	CHIP C	6.0PF	B	
C136			CC73GCH1H270J	CHIP C	27PF	J	
C137			CC73GCH1H060B	CHIP C	6.0PF	B	
C138			CC73GCH1H120J	CHIP C	12PF	J	
C139			CK73FB1C475K	CHIP C	4.7UF	K	
C145			CK73HB1H102K	CHIP C	1000PF	K	
C146			CC73HCH1H180J	CHIP C	18PF	J	
C152			CK73HB1A104K	CHIP C	0.10UF	K	
C158,159			CK73HB1H102K	CHIP C	1000PF	K	
C200			CK73FB1A106K	CHIP C	10UF	K	
C201			CK73HB1H102K	CHIP C	1000PF	K	
C202			CK73HB1C103K	CHIP C	0.010UF	K	
C203			CC73HCH1H331J	CHIP C	330PF	J	
C204			CK73HB1E223K	CHIP C	0.022UF	K	
C205			CK73HB1A104K	CHIP C	0.10UF	K	
C206,207			CC73HCH1H221J	CHIP C	220PF	J	
C208			CK73HB1A104K	CHIP C	0.10UF	K	
C209			CC73HCH1H220J	CHIP C	22PF	J	
C210			CK73HB1A104K	CHIP C	0.10UF	K	
C211			CK73HB1C333K	CHIP C	0.033UF	K	
C212,213			CK73HB1A104K	CHIP C	0.10UF	K	
C214			CK73HB1C103K	CHIP C	0.010UF	K	
C215			CC73HCH1H220J	CHIP C	22PF	J	
C216			CK73HB1C103K	CHIP C	0.010UF	K	
C217			CC73HCH1H050C	CHIP C	5.0PF	C	
C218			CK73HB1C103K	CHIP C	0.010UF	K	
C219			CC73HCH1H220J	CHIP C	22PF	J	
C220			CK73HB1H102K	CHIP C	1000PF	K	
C221			CK73HB1C103K	CHIP C	0.010UF	K	
C222			CC73HCH1H080D	CHIP C	8.0PF	D	
C223			CC73HCH1H060B	CHIP C	6.0PF	B	
C224			CK73HB1C103K	CHIP C	0.010UF	K	
C225			CC73HCH1H050C	CHIP C	5.0PF	C	
C226			CK73HB1H102K	CHIP C	1000PF	K	
C227			CK73HB1C103K	CHIP C	0.010UF	K	
C228			CC73HCH1H100D	CHIP C	10PF	D	
C230			CC73HCH1H050C	CHIP C	5.0PF	C	
C231			CC73HCH1H220J	CHIP C	22PF	J	
C232			CC73HCH1H020B	CHIP C	2.0PF	B	
C234			CC73HCH1H101J	CHIP C	100PF	J	
C235-237			CK73HB1H102K	CHIP C	1000PF	K	
C238			CC73HCH1H270J	CHIP C	27PF	J	
C239			CK73HB1H102K	CHIP C	1000PF	K	
C240			CC73HCH1H010B	CHIP C	1.0PF	B	
C242			CC73HCH1H270J	CHIP C	27PF	J	
C243			CC73HCH1H010B	CHIP C	1.0PF	B	
C244-246			CK73HB1H102K	CHIP C	1000PF	K	
C247			CC73HCH1H470J	CHIP C	47PF	J	
C248			CK73HB1H102K	CHIP C	1000PF	K	
C249			CC73HCH1H270J	CHIP C	27PF	J	
C250			CC73HCH1H470G	CHIP C	47PF	G	
C256			CK73HB1H102K	CHIP C	1000PF	K	
C257			CK73HB1C103K	CHIP C	0.010UF	K	
C300,301			CK73HB1H102K	CHIP C	1000PF	K	
C302		✻	C92-0953-05	ELECTRO	100UF	6.3WV	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C303			CK73HB1C473K	CHIP C	0.047UF	K	
C304			CK73FB1A106K	CHIP C	10UF	K	
C305			CK73HB1C103K	CHIP C	0.010UF	K	
C306			CK73HB1A224K	CHIP C	0.22UF	K	
C308			CK73GB1E105K	CHIP C	1.0UF	K	
C309			CK73HB1A104K	CHIP C	0.10UF	K	
C310			CK73HB1C473K	CHIP C	0.047UF	K	
C311			CK73HB1A105K	CHIP C	1.0UF	K	
C312			CK73HB1C473K	CHIP C	0.047UF	K	
C313			CK73HB1A104K	CHIP C	0.10UF	K	
C314			CC73HCH1H101J	CHIP C	100PF	J	
C315			CK73FB1A106K	CHIP C	10UF	K	
C316			CK73HB1A104K	CHIP C	0.10UF	K	
C317			CK73HB1C103K	CHIP C	0.010UF	K	
C318			CC73HCH1H221J	CHIP C	220PF	J	
C319			CK73HB1C103K	CHIP C	0.010UF	K	
C320			CK73GB1E104K	CHIP C	0.10UF	K	
C321			CK73HB1C103K	CHIP C	0.010UF	K	
C322			CK73HB1H102K	CHIP C	1000PF	K	
C323			CK73HB1A104K	CHIP C	0.10UF	K	
C324		✻	CK73HB1A184K	CHIP C	0.18UF	K	
C326		✻	CK73HB1H822K	CHIP C	8200PF	K	
C328		✻	CK73HB1A394K	CHIP C	0.39UF	K	
C329			CK73HB1C333K	CHIP C	0.033UF	K	
C330			CK73HB1H561K	CHIP C	560PF	K	
C332			CK73HB1C103K	CHIP C	0.010UF	K	
C333			CK73HB1H102K	CHIP C	1000PF	K	
C334,335		✻	CK73HB1A184K	CHIP C	0.18UF	K	
C336			CK73HB1C103K	CHIP C	0.010UF	K	
C337		✻	CK73HB1A184K	CHIP C	0.18UF	K	
C338			CC73HCH1H331J	CHIP C	330PF	J	
C339			CK73HB1A104K	CHIP C	0.10UF	K	
C340			CC73HCH1H100B	CHIP C	10PF	B	
C341			CK73HB1H332K	CHIP C	3300PF	K	
C342			CK73HB1C103K	CHIP C	0.010UF	K	
C343		✻	CK73HB1A184K	CHIP C	0.18UF	K	
C344		✻	CK73HB1C273K	CHIP C	0.027UF	K	
C345			CK73HB1H102K	CHIP C	1000PF	K	
C346		✻	CK73HB1A184K	CHIP C	0.18UF	K	
C347			CK73HB1A105K	CHIP C	1.0UF	K	
C349			CK73HB1C473K	CHIP C	0.047UF	K	
C350			CK73HB1H102K	CHIP C	1000PF	K	
C352			CK73HB1H102K	CHIP C	1000PF	K	
C353			CK73GB1E105K	CHIP C	1.0UF	K	
C354			CK73HB1A224K	CHIP C	0.22UF	K	
C355			CK73HB1A105K	CHIP C	1.0UF	K	
C357,358			CK73HB1A104K	CHIP C	0.10UF	K	
C360			CK73HB1A104K	CHIP C	0.10UF	K	
C400			CK73HB1A104K	CHIP C	0.10UF	K	
C401			CK73HB1H102K	CHIP C	1000PF	K	
C402			CC73HCH1H120J	CHIP C	12PF	J	
C403			CC73HCH1H010B	CHIP C	1.0PF	B	
C404			CK73HB1A104K	CHIP C	0.10UF	K	
C405			CK73HB1H102K	CHIP C	1000PF	K	
C406			CC73HCH1H120J	CHIP C	12PF	J	
C407			CK73HB1H102K	CHIP C	1000PF	K	
C408			CK73HB1C103K	CHIP C	0.010UF	K	
C409			CK73HB1H102K	CHIP C	1000PF	K	
C411-415			CK73HB1H102K	CHIP C	1000PF	K	
C500			CC73HCH1H101J	CHIP C	100PF	J	

PARTS LIST / 零件表

TX-RX UNIT (X57-8093-00)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C501,502			CK73HB1H102K	CHIP C 1000PF K	
C503			CK73FB1A475K	CHIP C 4.7UF K	
C504			CK73HB1H102K	CHIP C 1000PF K	
C505			CK73GB1E105K	CHIP C 1.0UF K	
C506			CK73HB1H102K	CHIP C 1000PF K	
C507			CK73FB1A106K	CHIP C 10UF K	
C511			CK73HB1H102K	CHIP C 1000PF K	
C513,514			CK73GB1E105K	CHIP C 1.0UF K	
C515,516			CK73HB1H102K	CHIP C 1000PF K	
C517			CK73FB1A475K	CHIP C 4.7UF K	
C522-524			CK73HB1H102K	CHIP C 1000PF K	
J300	2B		E11-0484-05	3.5D PHONE JACK (3.5D/MIC)	
J301	2B	✻	E11-0717-05	2.5D PHONE JACK (2.5D/SP)	
F101			F53-0287-05	FUSE (0.5A)	
F300		✻	F53-0467-05	FUSE (0.315A)	
F500			F53-0372-05	FUSE (3.15A)	
101	2A		J30-1308-04	SPACER (MIC300)	
CF200	2A	✻	L72-1046-05	CERAMIC FILTER (450KHZ)	
CD200	2A		L79-1914-05	CERAMIC DISCRIMINATOR	
L1,2			L40-1001-86	SMALL FIXED INDUCTOR (10UH)	
L3			L41-1878-14	SMALL FIXED INDUCTOR (18NH)	
L4			L41-1278-14	SMALL FIXED INDUCTOR (12NH)	
L5,6			L40-1001-86	SMALL FIXED INDUCTOR (10UH)	
L7			L40-1285-71	SMALL FIXED INDUCTOR (120NH)	
L8			L40-2775-71	SMALL FIXED INDUCTOR (27NH)	
L9			L40-8275-71	SMALL FIXED INDUCTOR (82NH)	
L11			L40-1001-86	SMALL FIXED INDUCTOR (10UH)	
L100			L40-6875-71	SMALL FIXED INDUCTOR (68NH)	
L101			L40-1085-71	SMALL FIXED INDUCTOR (100NH)	
L102			L40-3375-71	SMALL FIXED INDUCTOR (33NH)	
L103		✻	L41-8275-53	SMALL FIXED INDUCTOR (82NH)	
L104			L34-4577-05	AIR-CORE COIL	
L105		✻	L34-4571-05	AIR-CORE COIL	
L106,107			L34-4573-05	AIR-CORE COIL	
L108			L34-4574-05	AIR-CORE COIL	
L109		✻	L41-2295-52	SMALL FIXED INDUCTOR (2.2UH)	
L110-112			L34-4577-05	AIR-CORE COIL	
L203			L40-2775-71	SMALL FIXED INDUCTOR (27NH)	
L204			L41-8285-14	SMALL FIXED INDUCTOR (820NH)	
L205			L40-2275-71	SMALL FIXED INDUCTOR (22NH)	
L206			L40-1285-71	SMALL FIXED INDUCTOR (120NH)	
L207,208			L41-8278-14	SMALL FIXED INDUCTOR (82NH)	
L209			L41-6878-14	SMALL FIXED INDUCTOR (68NH)	
L210			L41-1878-14	SMALL FIXED INDUCTOR (18NH)	
L211			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)	
L212			L40-8281-86	SMALL FIXED INDUCTOR (0.82UH)	
L213			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)	
X1		✻	L77-3074-05	TCXO (19.2MHZ)	
X400			L77-2974-05	CRYSTAL RESONATOR (11.0592MHZ)	
XF200		✻	L71-0669-05	MCF (38.85MHZ)	
R1			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R2			RK73HB1J103J	CHIP R 10K J 1/16W	
R3			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R5			RK73HB1J821J	CHIP R 820 J 1/16W	
R9			RK73HB1J103J	CHIP R 10K J 1/16W	
R11			RK73HB1J272J	CHIP R 2.7K J 1/16W	
R12			RK73HB1J104J	CHIP R 100K J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R13			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R14			RK73HB1J103J	CHIP R 10K J 1/16W	
R15			RK73HB1J104J	CHIP R 100K J 1/16W	
R16-22			RK73HB1J103J	CHIP R 10K J 1/16W	
R23			RK73HB1J104J	CHIP R 100K J 1/16W	
R25			RK73HB1J100J	CHIP R 10 J 1/16W	
R26			RK73HB1J392J	CHIP R 3.9K J 1/16W	
R27			RK73HB1J271J	CHIP R 270 J 1/16W	
R28			RK73HB1J560J	CHIP R 56 J 1/16W	
R29			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R30			RK73HB1J470J	CHIP R 47 J 1/16W	
R32			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R33			RK73HB1J473J	CHIP R 47K J 1/16W	
R34			RK73HB1J100J	CHIP R 10 J 1/16W	
R37			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R38			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R39			RK73HB1J331J	CHIP R 330 J 1/16W	
R40			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R41			RK73HB1J100J	CHIP R 10 J 1/16W	
R42			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R43			RK73HB1J103J	CHIP R 10K J 1/16W	
R45			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R50			RK73HB1J104J	CHIP R 100K J 1/16W	
R51			RK73HB1J333J	CHIP R 33K J 1/16W	
R52			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R100			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R101			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R102			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R103			RK73HB1J180J	CHIP R 18 J 1/16W	
R104			RK73HB1J331J	CHIP R 330 J 1/16W	
R105			RK73HB1J180J	CHIP R 18 J 1/16W	
R106			RK73HB1J104J	CHIP R 100K J 1/16W	
R107			RK73HB1J100J	CHIP R 10 J 1/16W	
R108			RK73HB1J823J	CHIP R 82K J 1/16W	
R109			RK73HB1J470J	CHIP R 47 J 1/16W	
R111			RK73HB1J683J	CHIP R 68K J 1/16W	
R112			RK73HB1J470J	CHIP R 47 J 1/16W	
R113			RK73HB1J563J	CHIP R 56K J 1/16W	
R114			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R115			RK73FB2B000J	CHIP R 0.0 J 1/8W	
R116			RK73HB1J393J	CHIP R 39K J 1/16W	
R117			RK73HB1J271J	CHIP R 270 J 1/16W	
R119			RK73HB1J271J	CHIP R 270 J 1/16W	
R120			RK73HB1J331J	CHIP R 330 J 1/16W	
R121-123			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R136			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R139			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R155			RK73HB1J150J	CHIP R 15 J 1/16W	
R200			RK73HB1J103J	CHIP R 10K J 1/16W	
R201			RK73HB1J470J	CHIP R 47 J 1/16W	
R202			RK73HB1J392J	CHIP R 3.9K J 1/16W	
R203			RK73HB1J333J	CHIP R 33K J 1/16W	
R204			RK73HB1J271J	CHIP R 270 J 1/16W	
R205			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R206			RK73HB1J224J	CHIP R 220K J 1/16W	
R207			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R208			RK73HB1J101J	CHIP R 100 J 1/16W	
R209			RK73HB1J470J	CHIP R 47 J 1/16W	
R210			RK73HB1J334J	CHIP R 330K J 1/16W	
R212			RK73HB1J184J	CHIP R 180K J 1/16W	

If a part reference number is listed in a shaded box, that part does not come with the PCB.
维修部件的 PCB 板里不含阴影显示文字的零件。

PARTS LIST / 零件表

TX-RX UNIT (X57-8093-00)

Ref. No.	Address	New parts	Parts No.	Description				Destination
R213			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R214			RK73HB1J681J	CHIP R	680	J	1/16W	
R215			RK73HB1J331J	CHIP R	330	J	1/16W	
R216			RK73HB1J470J	CHIP R	47	J	1/16W	
R217			RK73FB2B000J	CHIP R	0.0	J	1/8W	
R218			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R219			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R220			RK73HB1J331J	CHIP R	330	J	1/16W	
R221			RK73HB1J823J	CHIP R	82K	J	1/16W	
R222			RK73HB1J104J	CHIP R	100K	J	1/16W	
R223,224			RK73HB1J823J	CHIP R	82K	J	1/16W	
R225			RK73HB1J820J	CHIP R	82	J	1/16W	
R226,227			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R228			RK73HB1J470J	CHIP R	47	J	1/16W	
R229			RK73HB1J152J	CHIP R	1.5K	J	1/16W	
R230			RK73HB1J820J	CHIP R	82	J	1/16W	
R231			RK73HB1J821J	CHIP R	820	J	1/16W	
R232,233			RK73HB1J104J	CHIP R	100K	J	1/16W	
R234			RK73HB1J184J	CHIP R	180K	J	1/16W	
R236			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R257			RK73HB1J560J	CHIP R	56	J	1/16W	
R260			RK73HB1J273J	CHIP R	27K	J	1/16W	
R264			RK73HB1J394J	CHIP R	390K	J	1/16W	
R267			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R300			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R301			RK73HB1J101J	CHIP R	100	J	1/16W	
R302			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R303			RK73HB1J471J	CHIP R	470	J	1/16W	
R304			RK73HB1J473J	CHIP R	47K	J	1/16W	
R305-308			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R309			RK73HB1J182J	CHIP R	1.8K	J	1/16W	
R310,311			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R312			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R313-315			RK73HB1J103J	CHIP R	10K	J	1/16W	
R316			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R317			RK73HB1J334J	CHIP R	330K	J	1/16W	
R318			RK73HB1J274J	CHIP R	270K	J	1/16W	
R321			RK73HB1J474J	CHIP R	470K	J	1/16W	
R322			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R323			RK73HB1J562J	CHIP R	5.6K	J	1/16W	
R324,325			RK73HH1J473D	CHIP R	47K	D	1/16W	
R326			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R327			RK73HB1J824J	CHIP R	820K	J	1/16W	
R328			RK73HB1J684J	CHIP R	680K	J	1/16W	
R329,330			RK73HB1J103J	CHIP R	10K	J	1/16W	
R332			RK73HB1J272J	CHIP R	2.7K	J	1/16W	
R334			RK73HB1J103J	CHIP R	10K	J	1/16W	
R335			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R336			RK73HB1J823J	CHIP R	82K	J	1/16W	
R337			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R340			RK73HB1J103J	CHIP R	10K	J	1/16W	
R342			RK73HB1J153J	CHIP R	15K	J	1/16W	
R344			RK73HB1J103J	CHIP R	10K	J	1/16W	
R345			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R347			RK73HB1J103J	CHIP R	10K	J	1/16W	
R348			RK73HB1J563J	CHIP R	56K	J	1/16W	
R350			RK73HB1J471J	CHIP R	470	J	1/16W	
R351			RK73HB1J181J	CHIP R	180	J	1/16W	
R352			RK73HB1J104J	CHIP R	100K	J	1/16W	
R353			RK73HB1J102J	CHIP R	1.0K	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description				Destination
R354			RK73HB1J334J	CHIP R	330K	J	1/16W	
R355			RK73HB1J473J	CHIP R	47K	J	1/16W	
R356			RK73HB1J183J	CHIP R	18K	J	1/16W	
R357			RK73HB1J564J	CHIP R	560K	J	1/16W	
R358			RK73HB1J473J	CHIP R	47K	J	1/16W	
R360			RK73HB1J224J	CHIP R	220K	J	1/16W	
R361			RK73HB1J561J	CHIP R	560	J	1/16W	
R363			RK73HB1J562J	CHIP R	5.6K	J	1/16W	
R364			RK73HB1J471J	CHIP R	470	J	1/16W	
R365			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R366			RK73HB1J104J	CHIP R	100K	J	1/16W	
R367			RK73HB1J473J	CHIP R	47K	J	1/16W	
R369			RK73HB1J103J	CHIP R	10K	J	1/16W	
R370			RK73HH1J473D	CHIP R	47K	D	1/16W	
R371			RK73HB1J822J	CHIP R	8.2K	J	1/16W	
R372			RK73HH1J473D	CHIP R	47K	D	1/16W	
R373			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R374			RK73HH1J473D	CHIP R	47K	D	1/16W	
R375			RK73HB1J103J	CHIP R	10K	J	1/16W	
R376			RK73HH1J473D	CHIP R	47K	D	1/16W	
R377			RK73HB1J393J	CHIP R	39K	J	1/16W	
R378			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R379			RK73HB1J104J	CHIP R	100K	J	1/16W	
R386			RK73HB1J392J	CHIP R	3.9K	J	1/16W	
R388			RK73HB1J822J	CHIP R	8.2K	J	1/16W	
R389			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R390			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R392,393			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R400			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R401			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R406			RK73HB1J101J	CHIP R	100	J	1/16W	
R407			RK73HB1J473J	CHIP R	47K	J	1/16W	
R408			RK73HB1J101J	CHIP R	100	J	1/16W	
R409,410			RK73GB2A221J	CHIP R	220	J	1/10W	
R411,412			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R413			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R414			RK73HB1J474J	CHIP R	470K	J	1/16W	
R438			RK73HB1J473J	CHIP R	47K	J	1/16W	
R455			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R502			RK73HB1J334J	CHIP R	330K	J	1/16W	
R505			RK73HB1J473J	CHIP R	47K	J	1/16W	
R508			RK73HB1J473J	CHIP R	47K	J	1/16W	
R509			RK73HB1J104J	CHIP R	100K	J	1/16W	
R511			RK73HB1J334J	CHIP R	330K	J	1/16W	
VR500	2B	✻	R31-0684-05	VARIABLE RESISTOR				
S400	2A		S70-0414-05	TACT SWITCH (PTT)				
S401			S70-0514-05	TACT SWITCH (SIDE)				
S402	2B	✻	S60-0447-05	ROTARY SWITCH (SELECTOR)				
MIC300	2A	✻	T91-0674-05	MIC ELEMENT				
D1		✻	DA2S101	DIODE				
D2,3			1SV325F	VARIABLE CAPACITANCE DIODE				
D4			HSC277	DIODE				
D5,6			HVC350B	VARIABLE CAPACITANCE DIODE				
D7		✻	DA2S101	DIODE				
D100			HSC277	DIODE				
D101,102			HVC131	DIODE				
D103			RN142S	DIODE				
D200			HSC277	DIODE				
D201-203			HVC350B	VARIABLE CAPACITANCE DIODE				

If a part reference number is listed in a shaded box, that part does not come with the PCB.
维修部件的 PCB 板里不含阴影显示文字的零件。

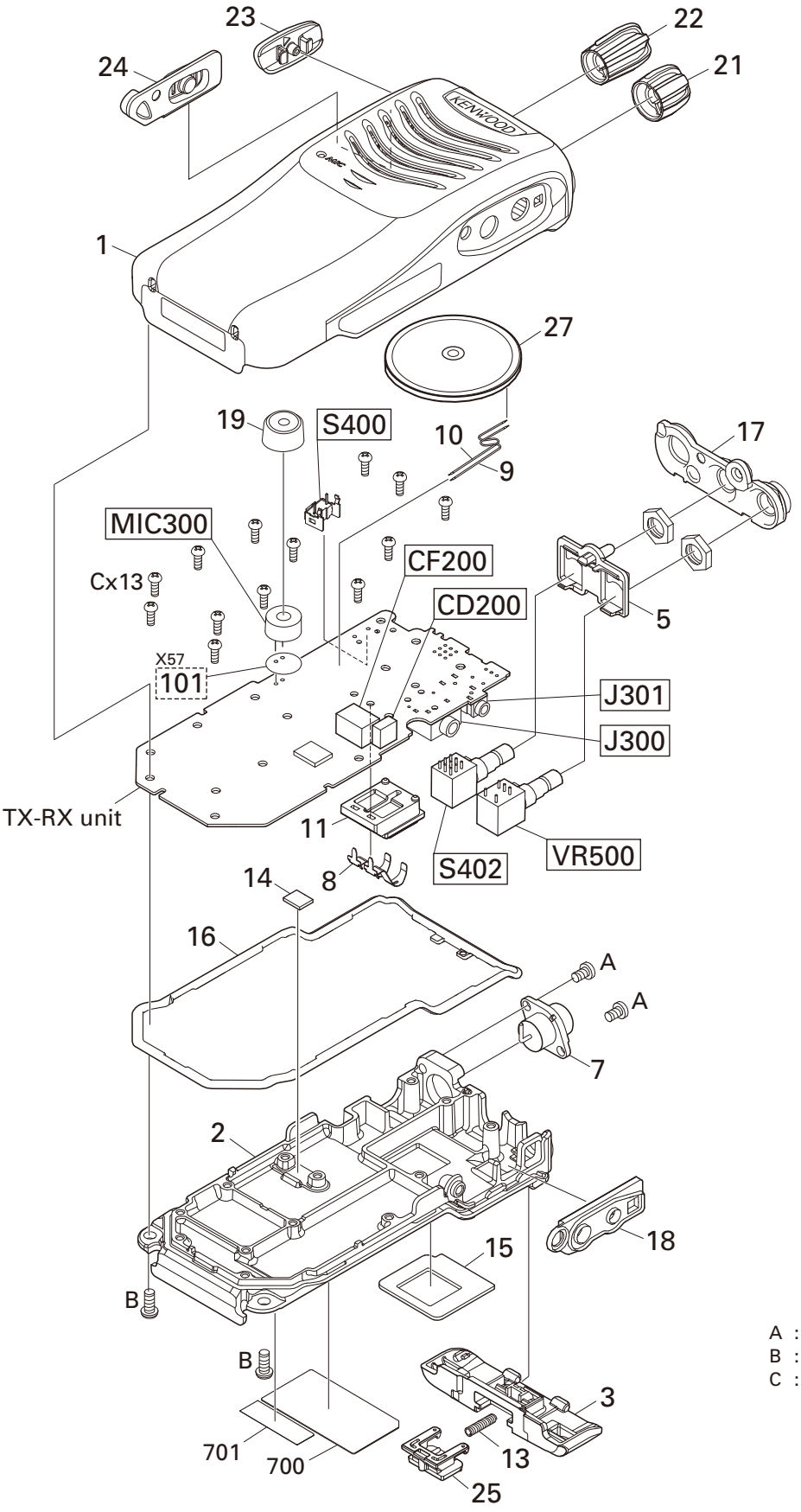
PARTS LIST / 零件表

TX-RX UNIT (X57-8093-00)

Ref. No.	Address	New parts	Parts No.	Description	Destination
D301			KDR731	DIODE	
D402		✻	DA2S101	DIODE	
D500			GN1G	DIODE	
D501			RB521S-30	DIODE	
IC1			MB15E03SL-E1	MOS-IC	
IC200			NJM2591V	BI-POLAR IC	
IC300		✻	R2A20178NP	DAC IC	
IC301		✻	NJM12904RB1	MOS-IC	
IC302		✻	TA7368PL	MOS-IC	
IC303-305		✻	NJM12904RB1	MOS-IC	
IC400		✻	F2136ACNKDRB	MCU	
IC401		✻	EX24016ATAS0A	ROM IC	
IC500		✻	XC6120N302N-G	MOS-IC	
IC501			XC6209B502PR	MOS-IC	
IC503			XC6209B502PR	MOS-IC	
Q1,2			RT1N141U-T111	TRANSISTOR	
Q3			2SC5383-T111	TRANSISTOR	
Q4			MCH3914(7)-H	FET	
Q5			2SC5108(Y)F	TRANSISTOR	
Q6			2SC5636	TRANSISTOR	
Q7			2SC5383-T111	TRANSISTOR	
Q100			2SC4926YD	TRANSISTOR	
Q101			RFM01U7P	FET	
Q102			RD07MUS2BT112	FET	
Q103			RT1N141U-T111	TRANSISTOR	
Q200			RT1P237U-T111	TRANSISTOR	
Q201,202			KTC4080E-P	TRANSISTOR	
Q203,204			3SK318	FET	
Q300,301			RT1N441U-T111	TRANSISTOR	
Q302			2SK3577-A	FET	
Q303			SSM6J08FU(F)	FET	
Q304			RT1P237U-T111	TRANSISTOR	
Q305			RT1N144U-T111	TRANSISTOR	
Q306			2SK3577-A	FET	
Q400			2SC4919-S	TRANSISTOR	
Q401,402			RT1N144U-T111	TRANSISTOR	
Q500		✻	MCH3309-H	FET	
Q501			SSM3J05FU-F	FET	
Q502			RT1P237U-T111	TRANSISTOR	
TH100			B57331V2104J	THERMISTOR	

Ref. No.	Address	New parts	Parts No.	Description	Destination

EXPLODED VIEW / 部件分解图



A : N09-2438-05
B : N30-2606-48
C : N83-2005-48

Parts with the exploded numbers larger than 700 are not supplied. / 编号大于 700 的零件未提供分解图。
If a part reference number is listed in a box on the exploded view of the PCB, that part does not come with the PCB. These parts must be ordered separately. / 维修部件的 PCB 板里不含方里的文字所表示的零件。这些零件必需另外购买。

ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	136 to 174MHz Frequency modulation and external modulation –127dBm/0.1µV to greater than –47dBm/1mV
2. RF Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω 136 to 174MHz Vicinity of 10W
3. Deviation Meter	Frequency Range	136 to 174MHz
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. DC Ammeter		5A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center frequency Output Voltage	50kHz to 600MHz 100mV or more
13. 8Ω Dummy Load		Approx. 8Ω, 3W
14. Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped

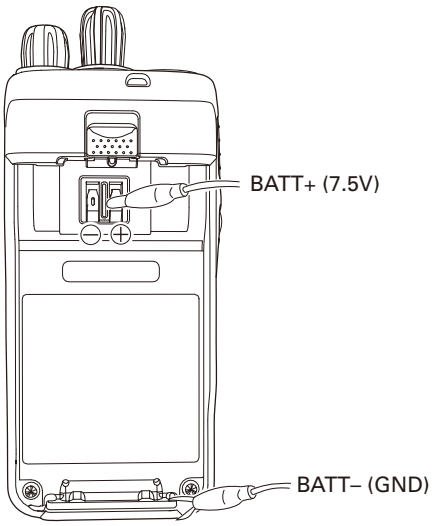
■ Antenna connector adapter

The antenna connector of this transceiver uses an SMA terminal.

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

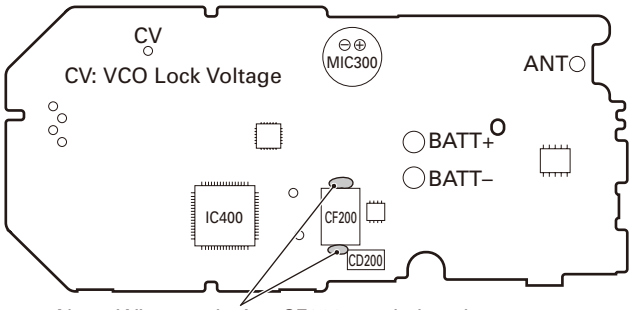
■ DC supply

BATT+, BATT–: External power supply terminal (Fasten it with an alligator clip.)



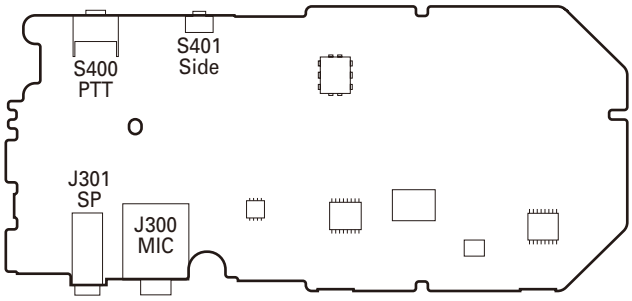
Adjustment Points

TX-RX unit (Component side view)



Note: When replacing CF200, apply bond to the point shown in the figure.

TX-RX unit (Foil side view)



调　整

调整所需的测试设备

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	136 到 174MHz 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 136 到 174MHz 10W 左右
3. 频偏仪	频率范围	136 到 174MHz
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. 直流电流表		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 0V 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. 8Ω 假负载		大约 8Ω，3W
14. 可调电源		5V 到 10V，大约 3A 配备了电流表时更好

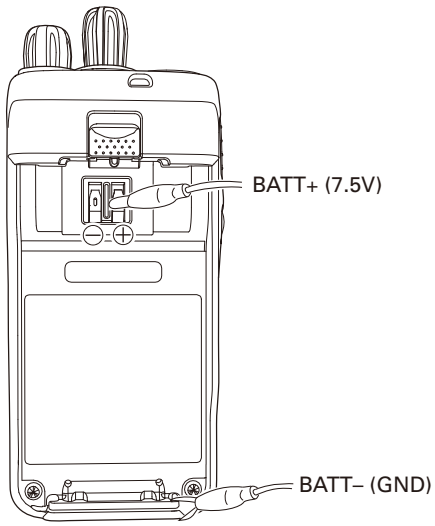
■天线接口转换头

此手持对讲机的天线接口使用 SMA 终端。

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

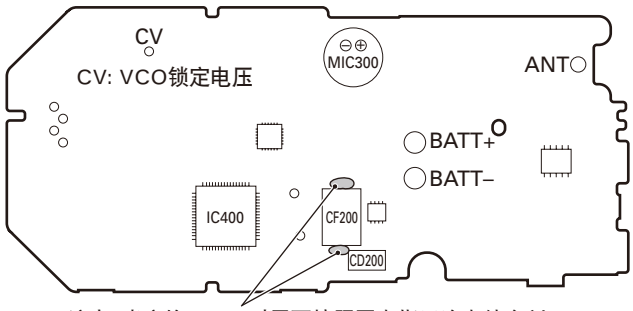
■ DC 电源

BATT+, BATT- ：外部电源插脚（用鳄鱼嘴夹固定。）



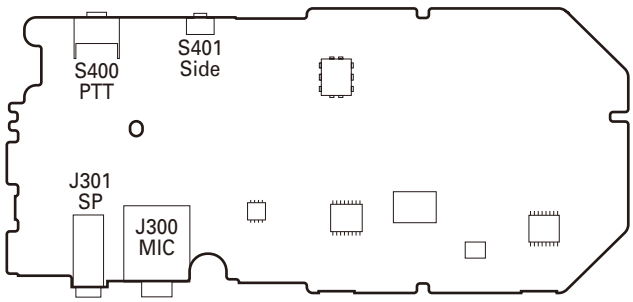
调整点

收发单元（元件面视图）



注意: 当交换CF200时需要按照图上指示涂上粘合剂。

收发单元（箔面视图）



ADJUSTMENT / 调整

Frequency and Signaling

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

■ Test Frequency (MHz)

CH	RX Frequency	TX Frequency
1	159.05000	159.10000
2	144.05000	144.10000
3	173.95000	173.90000
4	159.00000	159.00000
5	159.20000	159.20000
6	159.40000	159.40000
7~16	-	-

■ Signaling

No.	RX (Decode)	TX (Encode)
1	None	None
2	None	100Hz 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 254.1Hz	QT 254.1Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	None	DTMF (Code: 159D)
10	None	DTMF (Code: 9)

Preparations for Tuning the Transceiver

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

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

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

■ Adjustment frequency (MHz)

Tuning point	RX	TX
Low	144.05000	144.10000
Center	159.05000	159.10000
High	173.95000	173.90000

频率和信令

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

■测试频率（MHz）

信　道	接 收 频 率	发 射 频 率
1	159.05000	159.10000
2	144.05000	144.10000
3	173.95000	173.90000
4	159.00000	159.00000
5	159.20000	159.20000
6	159.40000	159.40000
7 ～ 16	–	–

■信令

编　号	接收（解码）	发射（编码）
1	无	无
2	无	100Hz 方波
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 254.1Hz	QT 254.1Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	无	DTMF（码 :159D）
10	无	DTMF（码 :9）

调谐手持对讲机的准备

在尝试调谐手持对讲机前，请将手持对讲机连接到合适的电源上。

发射打开时，手持对讲机必须连接到合适的等效负载上（如功率表）。

扬声器输出连接器必须端接 8Ω 的等效负载，调谐期间，必须始终连接到交流电压表和音频失真仪或 SINAD 测量仪表上。

■调整频率（MHz）

调 谐 点	接　收	发　射
低	144.05000	144.10000
中	159.05000	159.10000
高	173.95000	173.90000

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	1) Adj item: High		TX-RX	ANT (CV)		FPU	4.0V	±0.1V

Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency	1) Adj item: High Press [Transmit] button.	f. counter	TX-RX	ANT		FPU	173.900MHz	±50Hz
2. High Transmit Power and Protective Current	1) Adj item: Low, Center, High (3 points) BATT terminal voltage: 7.5V Press [Transmit] button.	Power meter Ammeter				FPU	4.8W	±0.1W 2.0A or less
3. Low Transmit Power	1) Adj item: Low, Center, High (3 points) BATT terminal voltage: 7.5V Press [Transmit] button.						1.0W	±0.1W 1.0A or less
4. DQT Balance [Wide]	1) Adj item: Low, Center, High (3 points) (Signaling: Square wave) Deviation meter filter LPF: 3kHz HPF: OFF Press [Transmit] button.	Power meter Deviation meter Oscilloscope AG AF VTVM	TX-RX	ANT SP/MIC connector		FPU	Make the demodulation wave into square waves.	
5. Maximum Deviation [Wide]	1) Adj item: Center, Low, High (3 points) AG: 1kHz/150mV Deviation meter filter LPF: 15kHz HPF: OFF Press [Transmit] button.						4.0kHz (According to the lager +, –)	±100Hz
6. Battery Warning Level	1) BATT terminal voltage: 5.9V	DVM	TX-RX	BATT terminal		FPU	Write	BATT terminal voltage: 5.9V
7. Battery Detection Check (User mode)	1) BATT terminal voltage: 5.7V PTT: ON	Power meter		ANT			Check	LED blinks No transmit power
	2) BATT terminal voltage: 7.5V PTT: ON	DVM		BATT terminal				LED does not blink

- This transceiver is designed to make adjustments simple.
- It is not necessary to adjust the fixed values for the DTMF-DEV, DQT-DEV, QT-DEV, and MIC sensitivity.
- The TX-DEV Narrow setting uses the Wide calculated adjustment level value.

调　整

共通部分

项　目	条　件	测　量			调　整			规　格 / 备　注
		测量装置	单元	端子	单元	部件	方　法	
1. 设定	1)BATT 端子电压 :7.5V 2)标准信号发生器调制 ［宽］ 调制 :1kHz, 频偏 :3kHz ［窄］ 调制 :1kHz, 频偏 :1.5kHz							
2. VCO 锁定电压	1)调整项目 : 高		收发	天线 (CV)		FPU	4.0V	±0.1V

发射部分

项　目	条　件	测　量			调　整			规　格 / 备　注
		测量装置	单元	端子	单元	部件	方　法	
1. 频率	1)调整项目 : 高 按［发射］按钮。	频率计数器	收发	天线		FPU	173.900MHz	±50Hz
2. 高发射功率和保护电流	1)调整项目 : 低, 中, 高 (3 点) BATT 端子电压 :7.5V 按［发射］按钮。	功率计 电流表				FPU	4.8W	±0.1W 2.0A 或更低
3. 低发射功率	1)调整项目 : 低, 中, 高 (3 点) BATT 端子电压 :7.5V 按［发射］按钮。						1.0W	±0.1W 1.0A 或更低
4. DQT 平衡 ［宽带］	1)调整项目 : 低, 中, 高 (3 点) (信令信道 : 方波) 频偏仪滤波器 LPF:3kHz HPF:OFF 按［发射］按钮。	功率计 频偏仪 示波器 AG AF VTVM	收发	天线 SP/MIC 连接器		FPU	把解调波调整为方波。	
5. 最大频偏 ［宽带］	1)调整项目 : 中, 低, 高 (3 点) AG:1kHz/150mV 频偏仪滤波器 LPF:15kHz HPF:OFF 按［发射］按钮。						4.0kHz (按照较大＋, －)	±100Hz
6. 电池警告电平	1)BATT 端子电压 :5.9V	DVM	收发	BATT 端子		FPU	写入	BATT 端子电压 :5.9V
7. 电池指示检查 (用户模式)	1)BATT 端子电压 :5.7V PTT: 开启	功率计 DVM		天线 BATT 端子			检查	手持对讲机不能发射, LED 闪烁
	2)BATT 端子电压 :7.5V PTT: 开启							手持对讲机可以发射, 不会引起 LED 闪烁

- 该手持对讲机的设计采用了简化调整。
- 不需要调整 DTMF 频偏 , BPF, MIC 灵敏度。
- 窄带的 TX 频偏是被自动调整。

ADJUSTMENT

Receiver Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity Check [Narrow]	1) Adj item: Low, High (2 points) SSG output: –115dBm (0.4µV) SSG DEV: 1.5kHz	SSG DVM Oscilloscope AF VTVM	TX-RX	ANT SP/MIC connector			Check	12dB SINAD or more
[Wide]	2) TEST CH: 1 SSG output: –117dBm (0.32µV) SSG DEV: 3.0kHz							
2. Squelch Level 5 [Wide]	1) Adj item: Low, Center, High (3 points) SSG output: –121dBm (0.2µV) SSG DEV: 3.0kHz					FPU	Write	
[Narrow]	2) Adj item: Low, Center, High (3 points) SSG output: –121dBm (0.2µV) SSG DEV: 1.5kHz							

- It is not necessary to adjust the fixed value for the BPF.
- The Squelch Level 9 setting uses the Squelch Level 5 calculated adjustment level value.

调　整

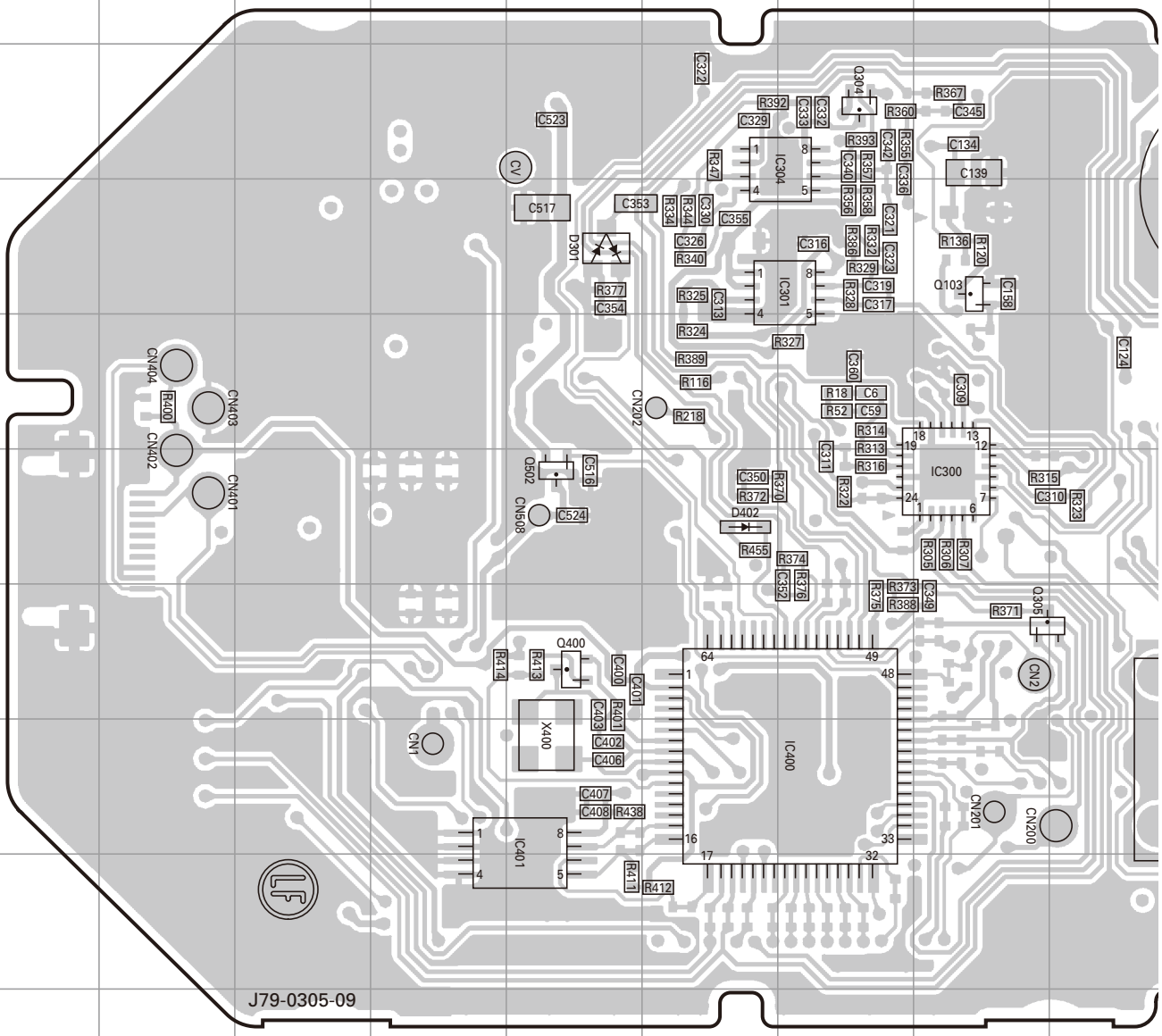
接收部分

项　目	条　件	测　量			调　整			规　格 / 备　注
		测量装置	单元	端子	单元	部件	方　法	
1. 灵敏度检查 [窄带]	1) 调整项目 : 低 , 高 (2 点) SSG 输出 :-115dBm(0.4μV) SSG 频偏 :1.5kHz	SSG DVM 示波器 AF VTVM	收发	天线 SP/MIC 连接器			检查	12dB SINAD 或更高
[宽带]	2) 测试信道 :1 SSG 输出 :-117dBm(0.32μV) SSG 频偏 :3.0kHz							
2. 静噪 (5) [宽带]	1) 调整项目 : 低 , 中 , 高 (3 点) SSG 输出 :-121dBm(0.2μV) SSG 频偏 :3.0kHz					FPU	写入	
[窄带]	2) 调整项目 : 低 , 中 , 高 (3 点) SSG 输出 :-121dBm(0.2μV) SSG 频偏 :1.5kHz							

- 不需要 BPF 调整。
- 静噪 (9) 是被自动调整。

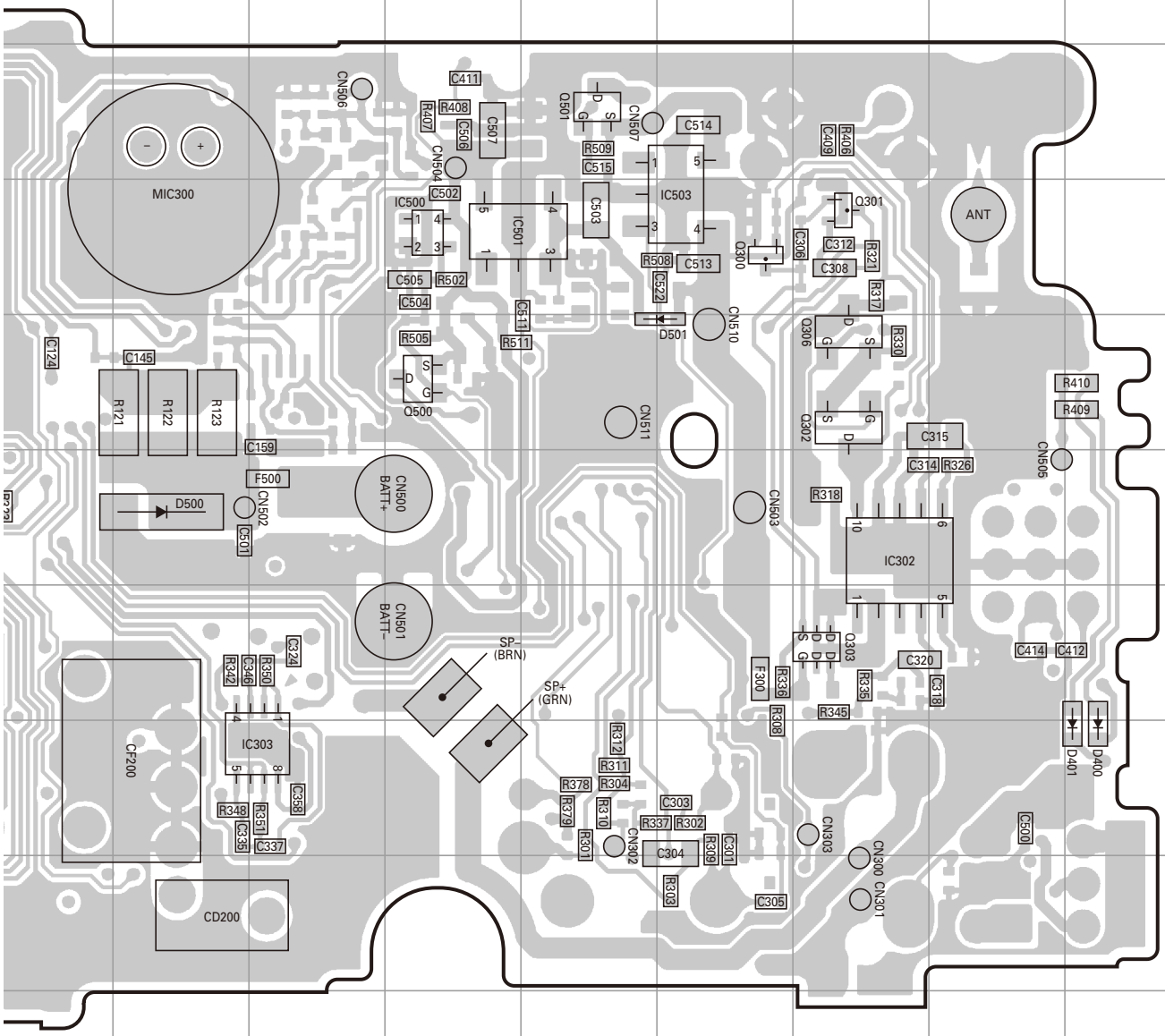
TK-U100(V) PC BOARD / 印刷电路板

TX-RX UNIT (X57-8093-00) Component side view (J79-0305-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	6I	Q103	4I	Q501	3N
IC301	4H	Q300	4O	Q502	6F
IC302	6P	Q301	4P	D301	4F
IC303	8L	Q302	5P	D400	8R
IC304	3H	Q303	7P	D401	8R
IC400	8H	Q304	3H	D402	6G
IC401	8F	Q305	7I	D500	6K
IC500	4M	Q306	5P	D501	5O
IC501	4M	Q400	7F		
IC503	4O	Q500	5M		

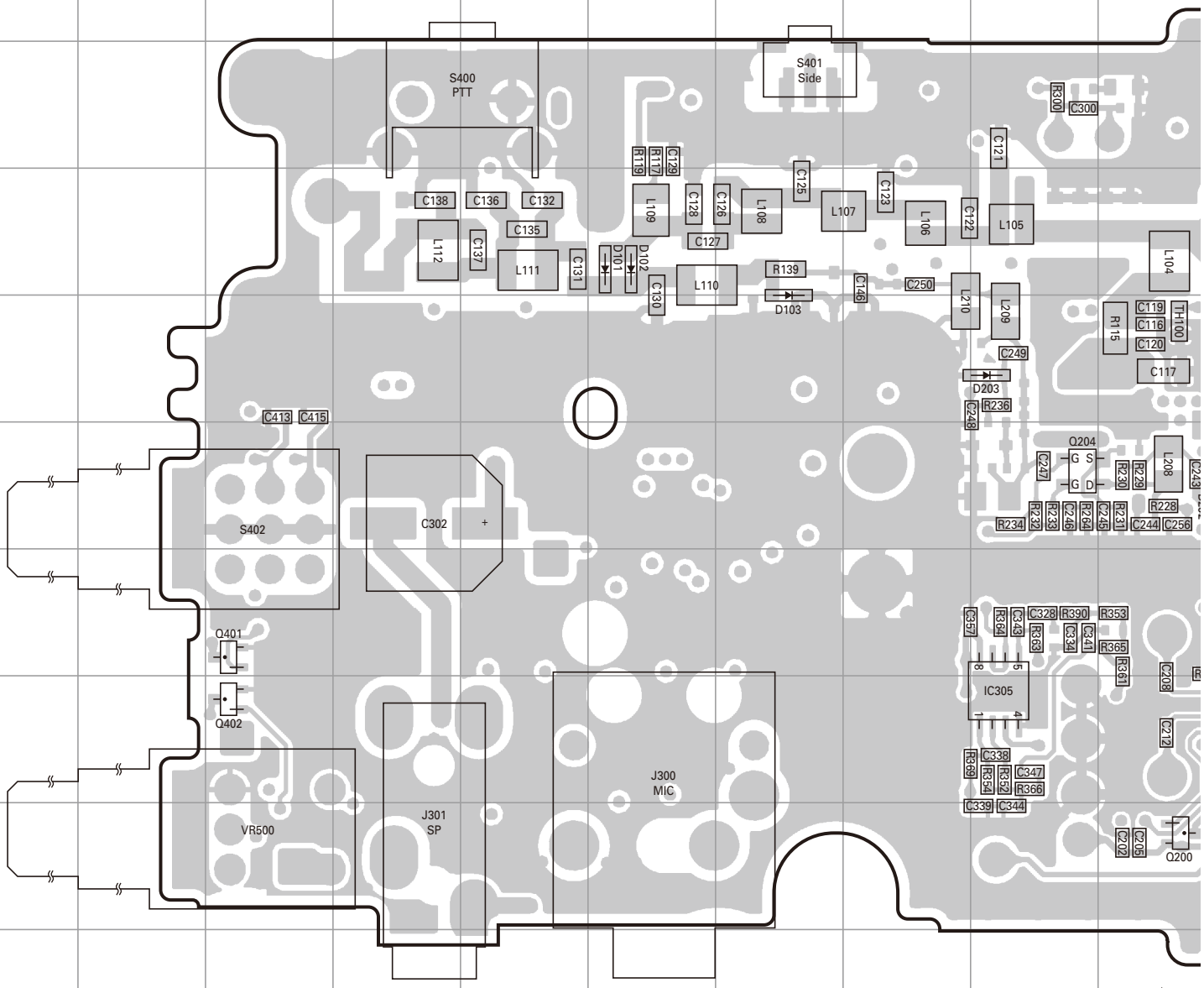
TX-RX UNIT (X57-8093-00) Component side view (J79-0305-09)



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

TK-U100(V) PC BOARD / 印刷电路板

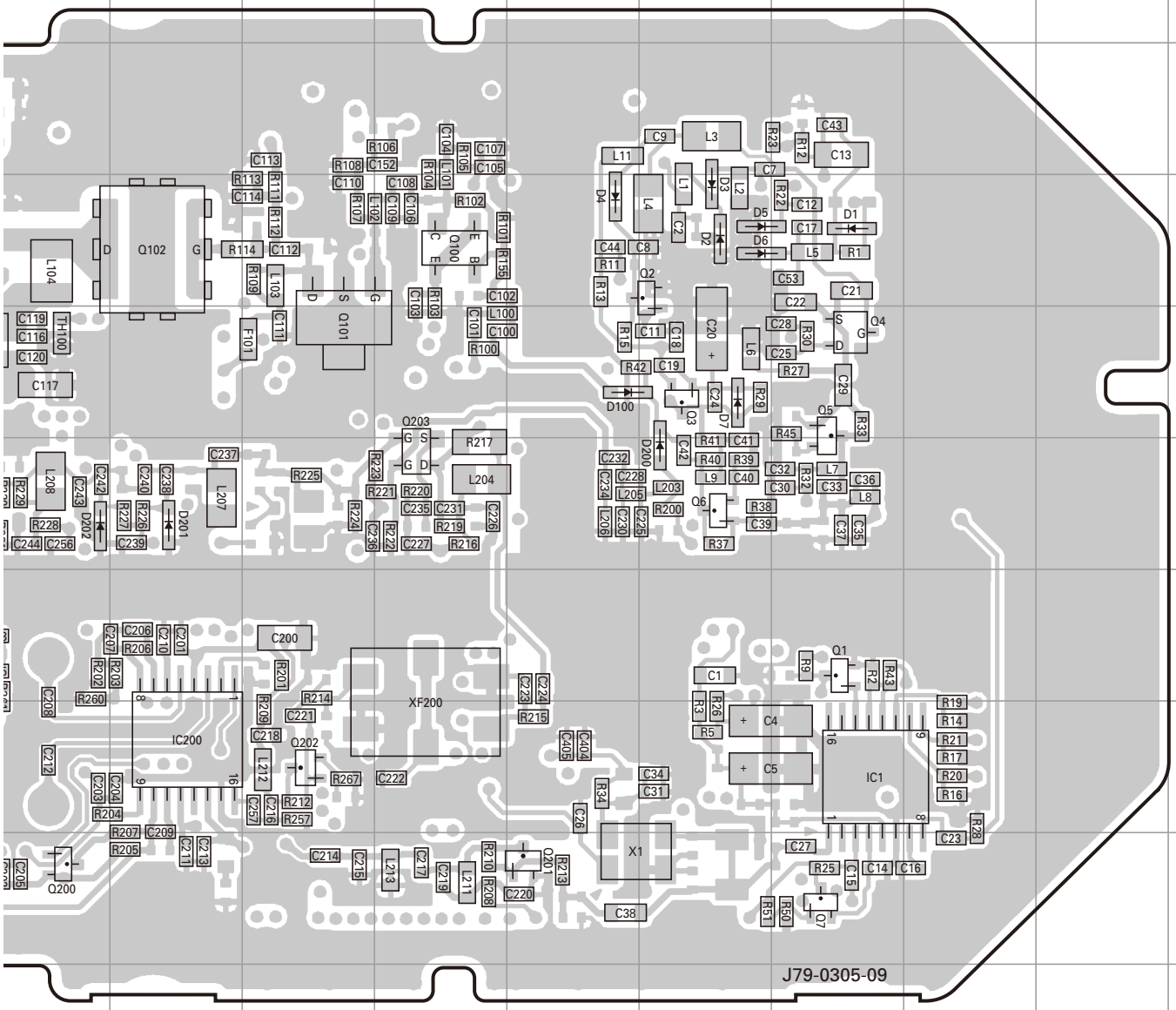
TX-RX UNIT (X57-8093-00) Foil side view (J79-0305-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	8P	Q7	9P	Q401	7C	D100	5N
IC200	8K	Q100	4M	Q402	8C	D101	4F
IC305	8I	Q101	5L	D1	4P	D102	4F
Q1	7P	Q102	4K	D2	4O	D103	5G
Q2	4O	Q200	9J	D3	4O	D200	6O
Q3	5O	Q201	9N	D4	4N	D201	6K
Q4	5P	Q202	8L	D5	4O	D202	6J
Q5	5P	Q203	6M	D6	4O	D203	5I
Q6	6O	Q204	6I	D7	5O		

PC BOARD / 印刷电路板 TK-U100(V)

TX-RX UNIT (X57-8093-00) Foil side view (J79-0305-09)

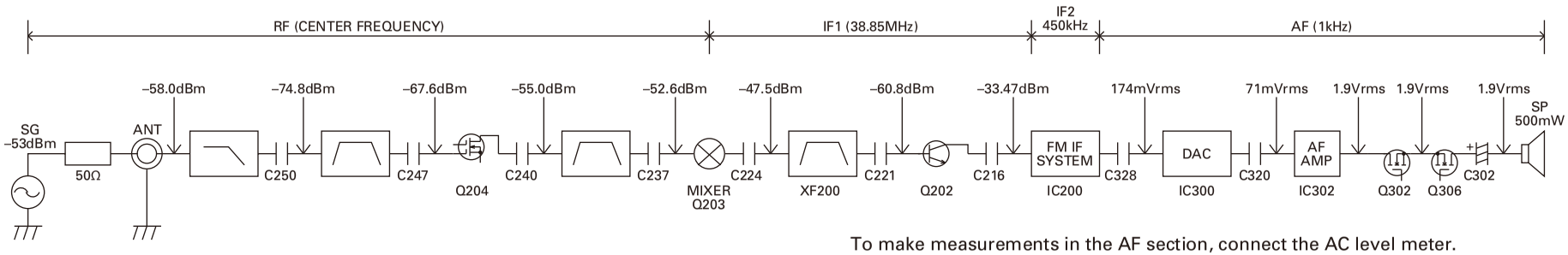


Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	

Foil side

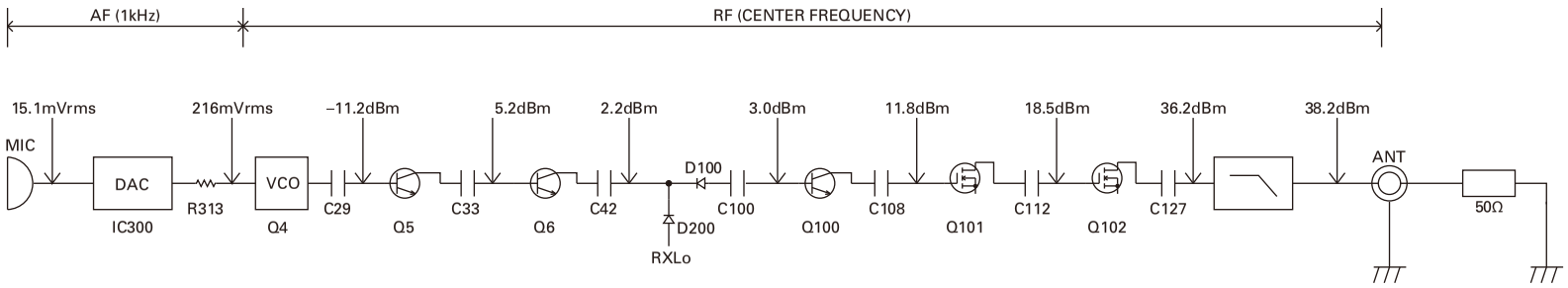
Receiver Section / 接收部分



To make measurements in the AF section, connect the AC level meter.
(ANT input : –53dBm, 1kHz FM, 1.5kHz DEV (Narrow).)
In the RF section, use a high impedance probe. (ANT input : –53dBm, MOD off.)

要在AF段进行测量，请连接交流电平表。
（ANT输入：–53dBm，1kHz FM，1.5kHz频偏(窄带)。）
在RF段，请使用高阻抗探针。（ANT输入：–53dBm，MOD关。）

Transmitter Section / 发射部分



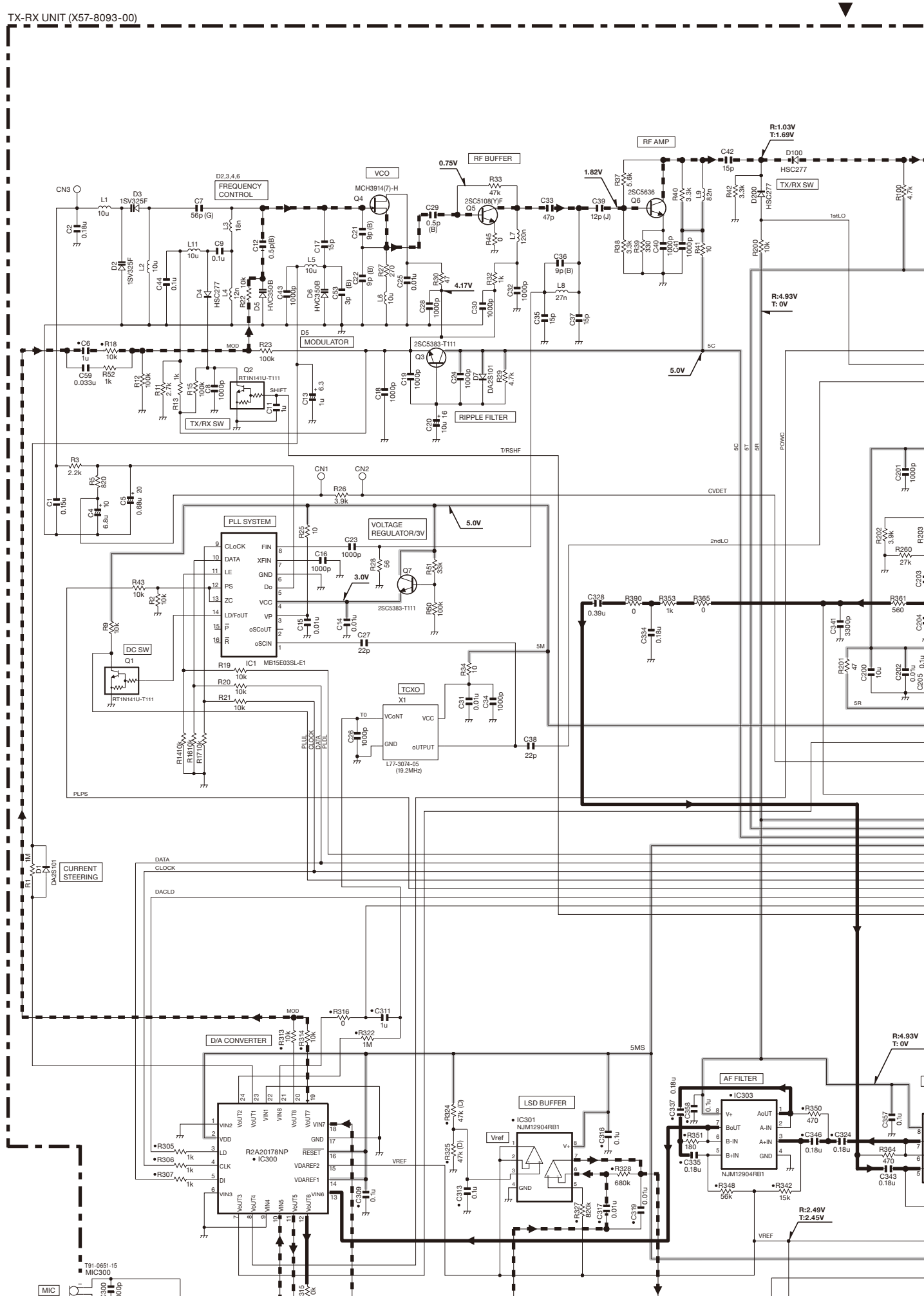
AG is set to the MIC input becomes 1.5kHz DEV, at 1kHz MOD. (Narrow)
To make measurements in the AF section, connect the AC level meter.
In the RF section, use a 1000pF coupling capacitor

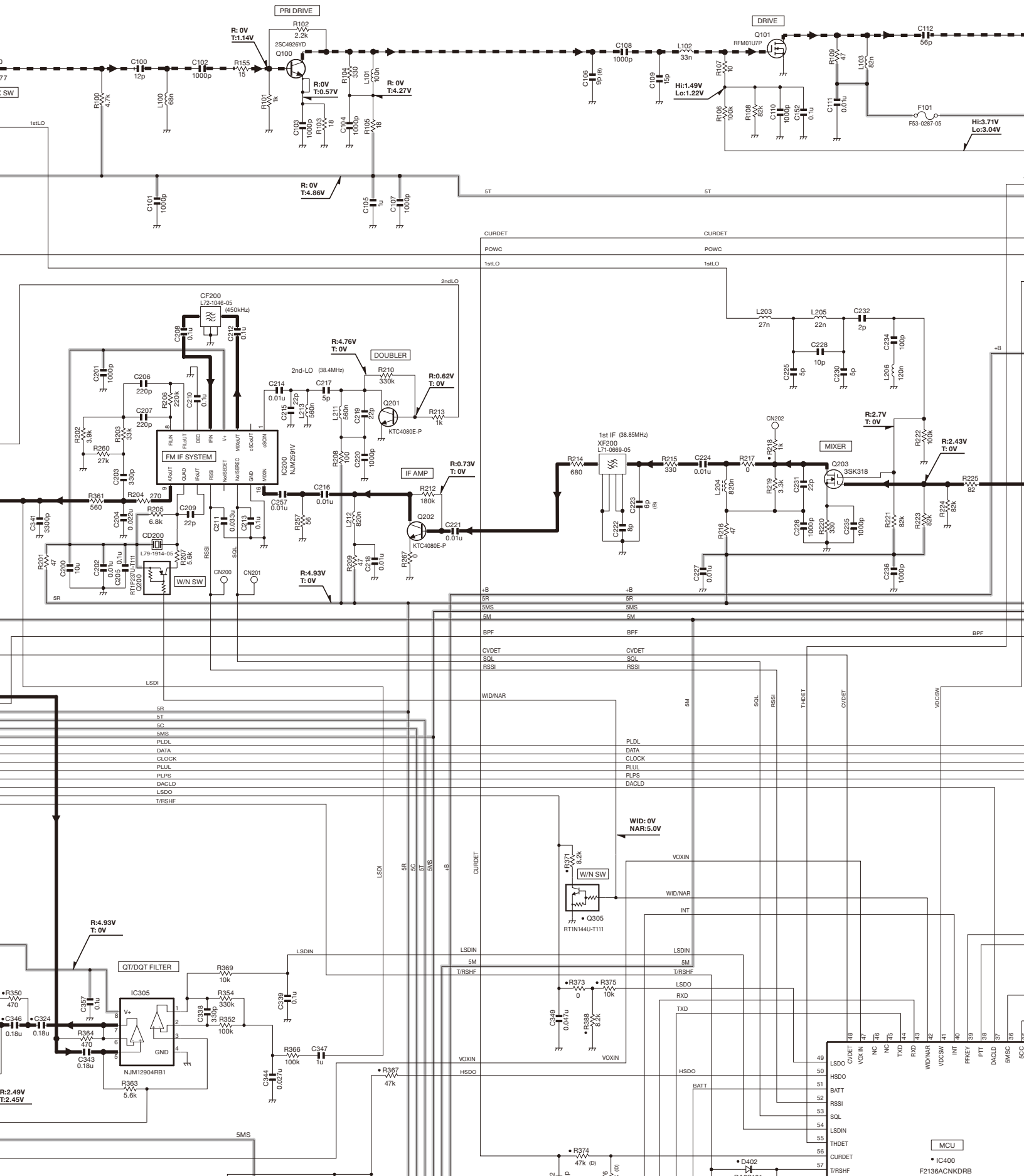
AG被设为麦克风输入，为1.5kHz频偏在1kHz调制。（窄带）
要在AF段进行测量，请连接交流电平表。
在RF段，请使用1000pF耦合电容。

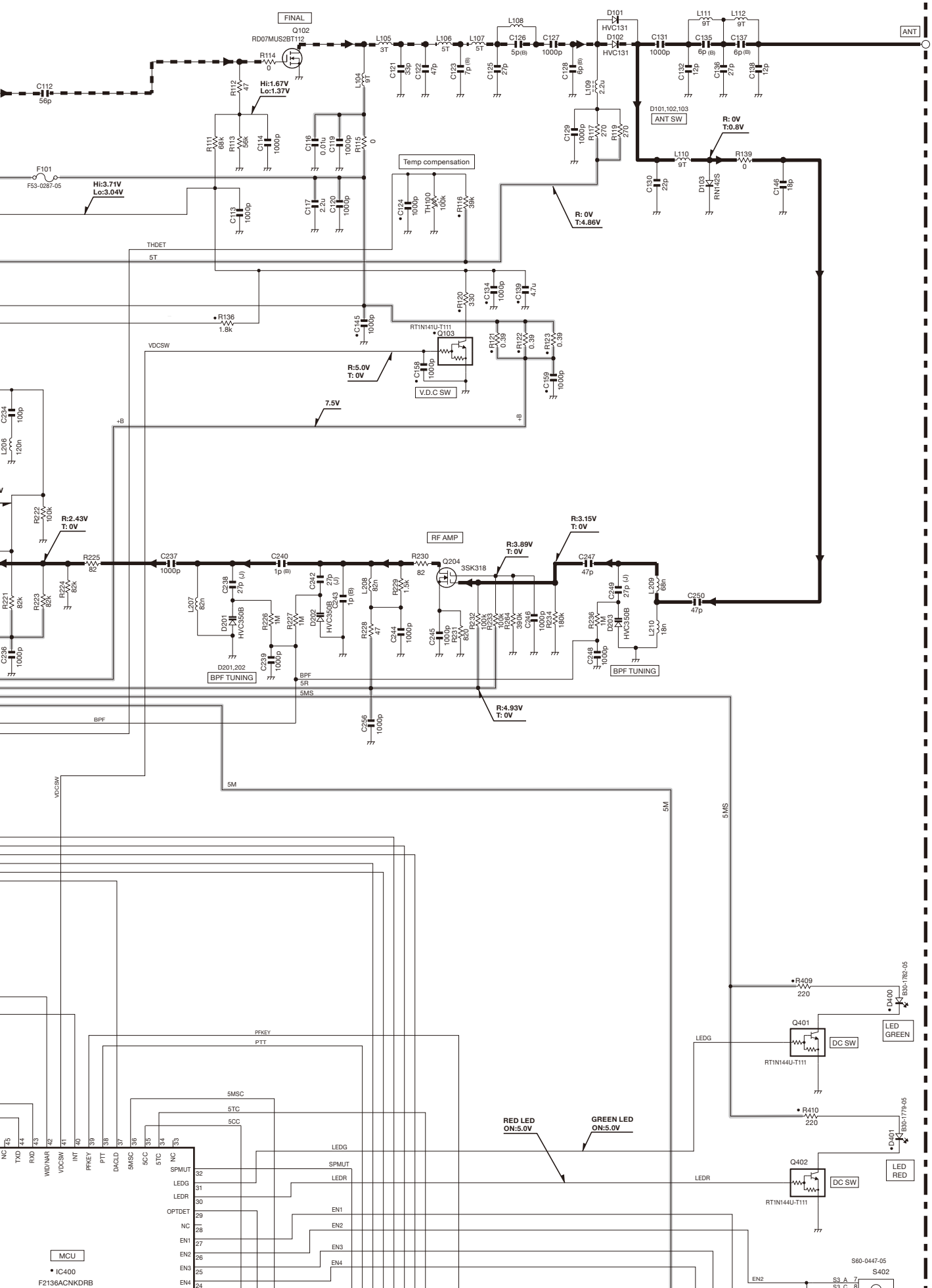
SCHEMATIC DIAGRAM / 原理图 TK-U100(V)

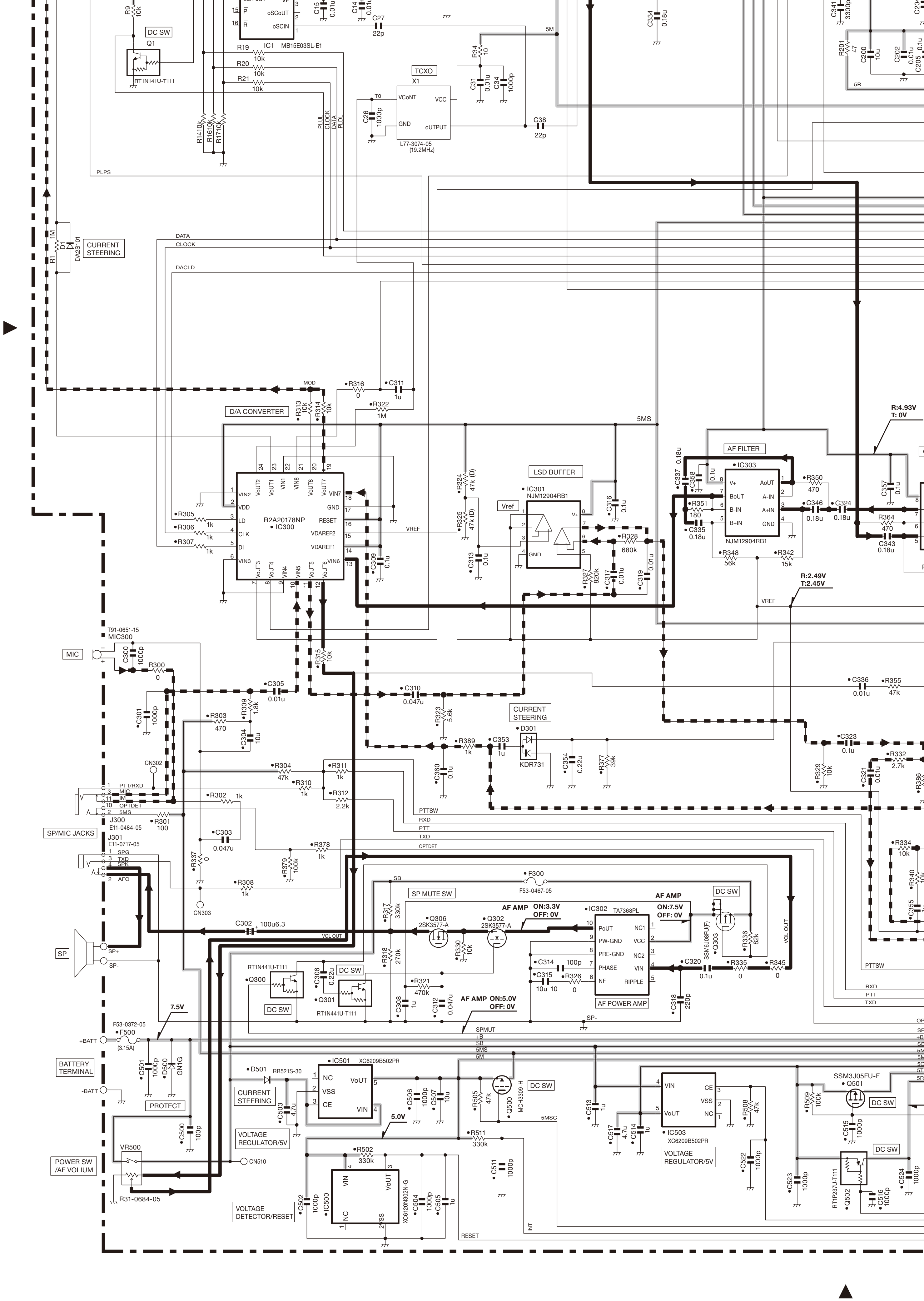
TX-RX UNIT (X57-8093-00)

Note : The components marked with a dot (•) are parts of layer 1. / 注意 : 标有点号 (•) 的零件为第一层的零件。

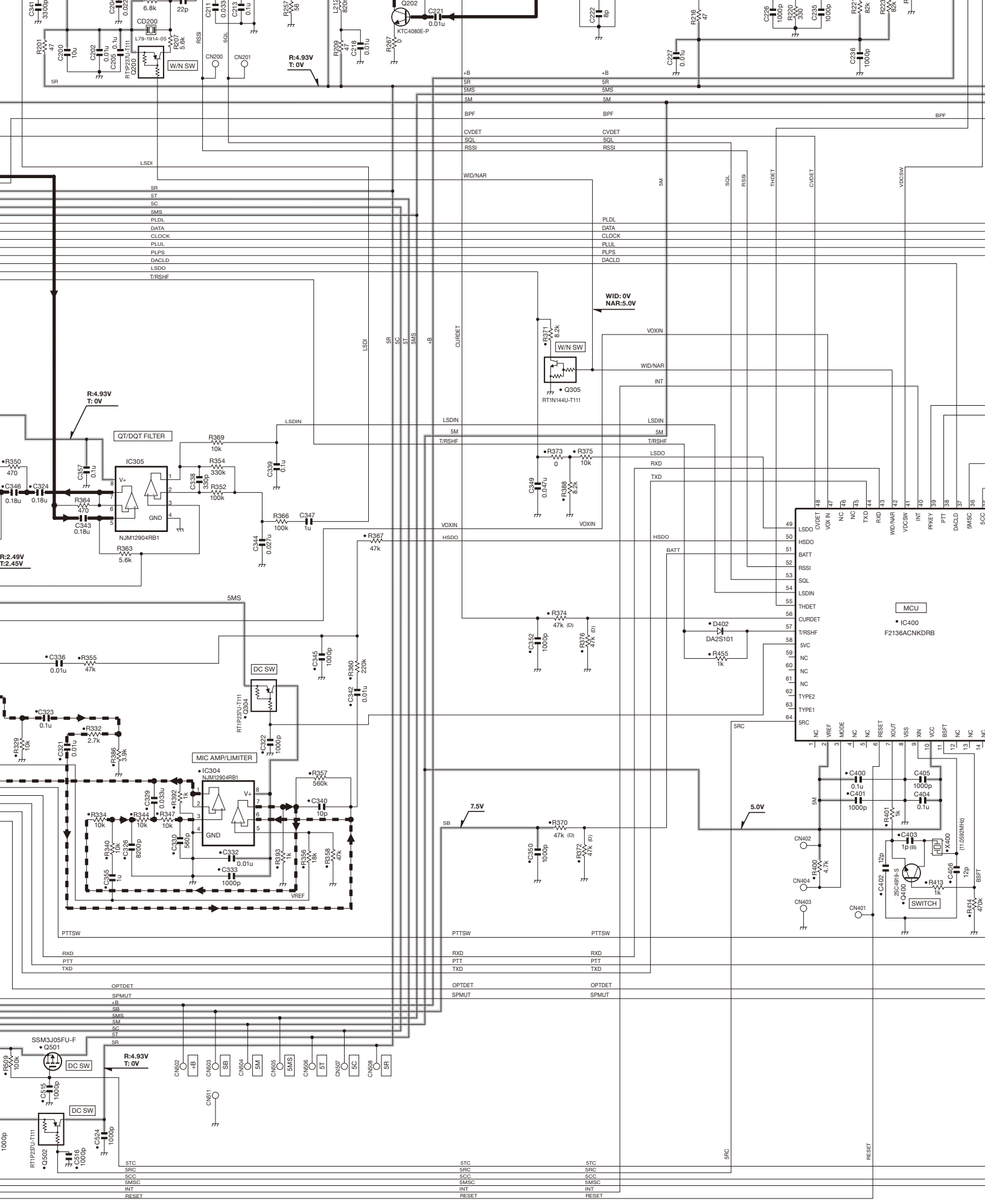

TX-RX UNIT (X57-8093-00)
FREQUENCY CONTROL
VCO
MCH3914(7)-H
RF BUFFER
RF AMP
TX/RX SW
MODULATOR
RIPPLE FILTER
PLL SYSTEM
VOLTAGE REGULATOR/3V
DC SW
TCXO
L77-3074-05 (19.2MHz)
CURRENT STEERING
D/A CONVERTER
LSD BUFFER
AF FILTER
R2A20178NP • IC300
NJM12904RB1
MIC300
T91-0651-15
MIC
DATA
CLOCK
DACLD
MOD
SHIFT
CVDET
T/RSHF
PLPS
5M
5MS
5C
5T
5R
POWC
1stLO
2ndLO
VREF
0.75V
1.82V
4.17V
5.0V
3.0V
R:1.03V T:1.69V
R:4.93V T:0V
R:2.49V T:2.45V


PRI DRIVE
R: 0V
T:1.14V
R102
2.2k
2SC4926YD
Q100
R:0V
T:0.57V
R: 0V
T:4.27V
R: 0V
T:4.86V
DRIVE
Q101
RFM01U7P
Hi:1.49V
Lo:1.22V
F101
F53-0287-05
Hi:3.71V
Lo:3.04V
1stLO
2ndLO
5T
CURDET
POWC
CF200
L72-1046-05
(450kHz)
R:4.76V
T: 0V
DOUBLER
2nd-LO (38.4MHz)
R:0.62V
T: 0V
Q201
KTC4080E-P
FM IF SYSTEM
IC200
NJM2591V
IF AMP
R:0.73V
T: 0V
Q202
KTC4080E-P
CD200
L79-1914-05
W/N SW
CN200
CN201
R:4.93V
T: 0V
1st IF (38.85MHz)
XF200
L71-0669-05
MIXER
Q203
3SK318
R:2.7V
T: 0V
R:2.43V
T: 0V
CN202
+B
5R
5MS
5M
BPF
CVDET
SQL
RSSI
LSDI
WID/NAR
PLDL
DATA
CLOCK
PLUL
PLPS
DACLD
LSDO
T/RSHF
WID: 0V
NAR:5.0V
Q305
RT1N144U-T111
VOXIN
INT
LSDIN
RXD
TXD
HSDO
BATT
THDET
VDCSW
QT/DQT FILTER
IC305
NJM12904RB1
R:2.49V
T:2.45V
D402
MCU
IC400
F2136ACNKDRB

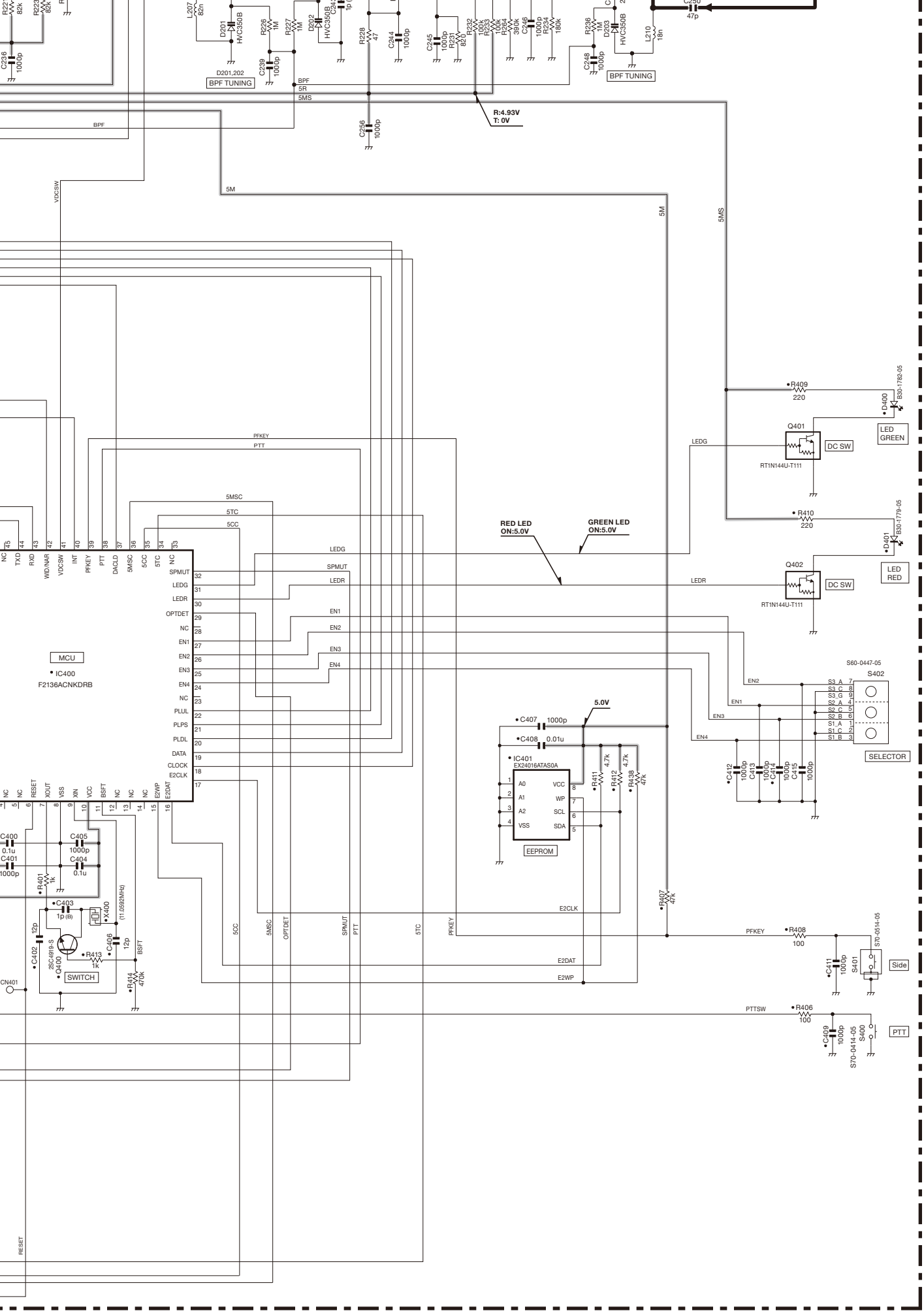

FINAL
Q102
RD07MUS2BT112
ANT
D101
HVC131
D102
HVC131
ANT SW
D101,102,103
R: 0V
T:0.8V
R: 0V
T:4.86V
Temp compensation
TH100
100k
F101
F53-0287-05
Hi:3.71V
Lo:3.04V
Hi:1.67V
Lo:1.37V
THDET
5T
VDCSW
R:5.0V
T: 0V
V.D.C SW
RT1N141U-T111
Q103
7.5V
+B
RF AMP
Q204
3SK318
R:2.43V
T: 0V
R:3.89V
T: 0V
R:3.15V
T: 0V
R:4.93V
T: 0V
D201,202
BPF TUNING
BPF
5R
5MS
5M
VDCSW
PFKEY
PTT
5MSC
5TC
5CC
MCU
IC400
F2136ACNKDRB
SPMUT
LEDG
LEDR
OPTDET
EN1
EN2
EN3
EN4
RED LED
ON:5.0V
GREEN LED
ON:5.0V
R409
220
D400
B30-1782-05
LED
GREEN
Q401
DC SW
RT1N144U-T111
R410
220
D401
B30-1779-05
LED
RED
Q402
DC SW
RT1N144U-T111
S60-0447-05
S402



DC SW
Q1
RT1N141U-T111
R9 10k
IC1 MB15E03SL-E1
oSCoUT
oSCIN
C15 0.01u
C14 0.01u
C27 22p
R19 10k
R20 10k
R21 10k
R1410k
R1610k
R1710k
PLUL
CLOCK
DATA
PLDL
TCXO
X1
VCoNT
VCC
GND
oUTPUT
L77-3074-05 (19.2MHz)
C26 1000p
R34 10
C31 0.01u
C34 1000p
C38 22p
5M
C334 0.18u
C341 3300p
R201 47
C200 10u
C202 0.01u
C205 0.1u
5R
PLPS
DATA
CLOCK
DACLD
R1 1M
D1 DA2S101
CURRENT STEERING
MOD
R316 0
C311 1u
R322 1M
R313 10k
R314 10k
D/A CONVERTER
R2A20178NP
IC300
VIN2
VDD
LD
CLK
DI
VIN3
VoUT2
VoUT1
VIN1
VIN8
VoUT8
VoUT7
VIN7
GND
RESET
VDAREF2
VDAREF1
VIN6
VoUT3
VoUT4
VIN4
VIN5
VoUT5
VoUT6
R305 1k
R306 1k
R307 1k
C309 0.1u
VREF
5MS
R324 47k (D)
R325 47k (D)
C313 0.1u
LSD BUFFER
IC301
NJM12904RB1
Vref
V+
GND
C316 0.1u
R328 680k
R327 820k
C317 0.01u
C319 0.01u
AF FILTER
IC303
NJM12904RB1
V+
BoUT
B-IN
B+IN
AoUT
A-IN
A+IN
GND
C337 0.18u
C358 0.1u
R351 180
C335 0.18u
R348 56k
R342 15k
R350 470
C346 0.18u
C324 0.18u
R:4.93V
T: 0V
C357 0.1u
R364 470
C343 0.18u
R:2.49V
T:2.45V
VREF
T91-0651-15
MIC300
MIC
C300 1000p
R300 0
C305 0.01u
C301 1000p
R309 1.8k
R303 470
C304 10u
R315 10k
C310 0.047u
R323 5.6k
CURRENT STEERING
D301
KDR731
R389 1k
C353 1u
C360 0.1u
C354 0.22u
R377 39k
C336 0.01u
R355 47k
C323 0.1u
R332 2.7k
R329 10k
C321 0.01u
R386
CN302
R304 47k
R311 1k
R310 1k
R312 2.2k
R302 1k
PTT/RXD
MIC
IM
OPTDET
5MS
J300
E11-0484-05
R301 100
SP/MIC JACKS
J301
E11-0717-05
SPG
TXD
SPK
AFO
C303 0.047u
R337 0
R378 1k
R379 100k
R308 1k
CN303
PTTSW
RXD
PTT
TXD
OPTDET
R334 10k
R340 10k
C355
SB
F300
F53-0467-05
SP MUTE SW
R317 330k
Q306 2SK3577-A
Q302 2SK3577-A
AF AMP ON:3.3V OFF: 0V
IC302 TA7368PL
PoUT
PW-GND
PRE-GND
PHASE
NF
NC1
VCC
NC2
VIN
RIPPLE
AF AMP ON:7.5V OFF: 0V
DC SW
Q303 SSM6J08FU(F)
R336 82k
VOL OUT
C302 100u6.3
SP
SP+
SP-
R318 270k
R330 10k
C314 100p
C315 10u 10
R326 0
R335 0
R345 0
C320 0.1u
C318 220p
AF POWER AMP
RT1N441U-T111
Q300
DC SW
C306 0.22u
Q301
RT1N441U-T111
R321 470k
C308 1u
C312 0.047u
AF AMP ON:5.0V OFF: 0V
SP-
SPMUT
+B
SB
5MS
5M
7.5V
F53-0372-05
F500 (3.15A)
+BATT
BATTERY TERMINAL
C501 1000p
D500 GN1G
-BATT
PROTECT
D501 RB521S-30
IC501 XC6209B502PR
NC
VSS
CE
VoUT
VIN
CURRENT STEERING
C503 4.7u
VOLTAGE REGULATOR/5V
C506 1000p
C507 10u
R505 47k
Q500 MCH3309-H
DC SW
5MSC
5.0V
C500 100p
VR500
POWER SW /AF VOLIUM
R31-0684-05
CN510
R502 330k
VIN
VoUT
NC
VSS
IC500
XC6120N302N-G
C502 1000p
C504 1000p
C505 1u
VOLTAGE DETECTOR/RESET
R511 330k
C511 1000p
RESET
INT
C513 1u
IC503 XC6209B502PR
VIN
VoUT
CE
VSS
NC
C517 4.7u
C514 1u
VOLTAGE REGULATOR/5V
R508 47k
C522 1000p
SSM3J05FU-F
Q501
DC SW
R509 100k
C515 1000p
C523 1000p
Q502 RT1P237U-T111
C516 1000p
C524 1000p



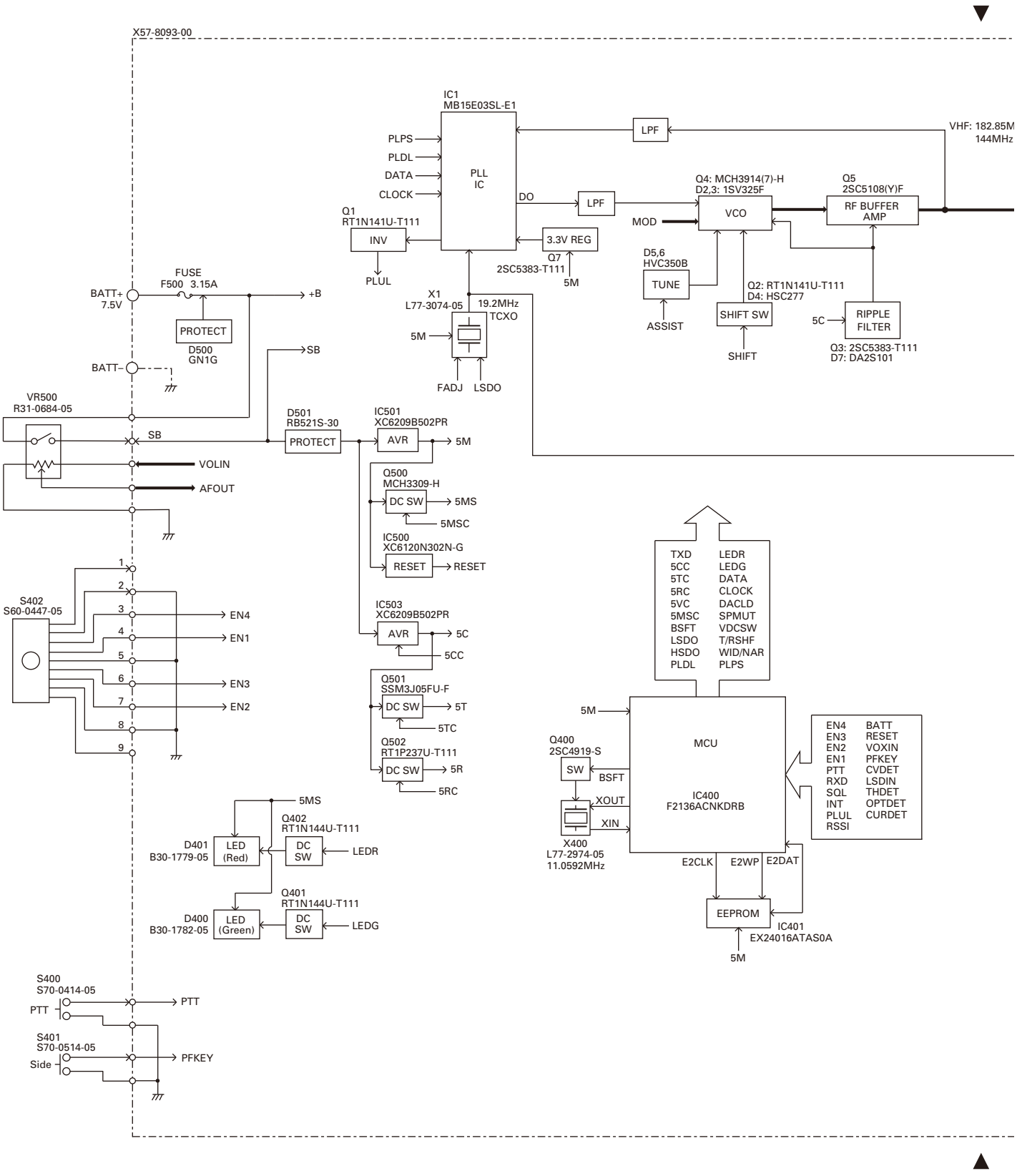
Note : The components mark



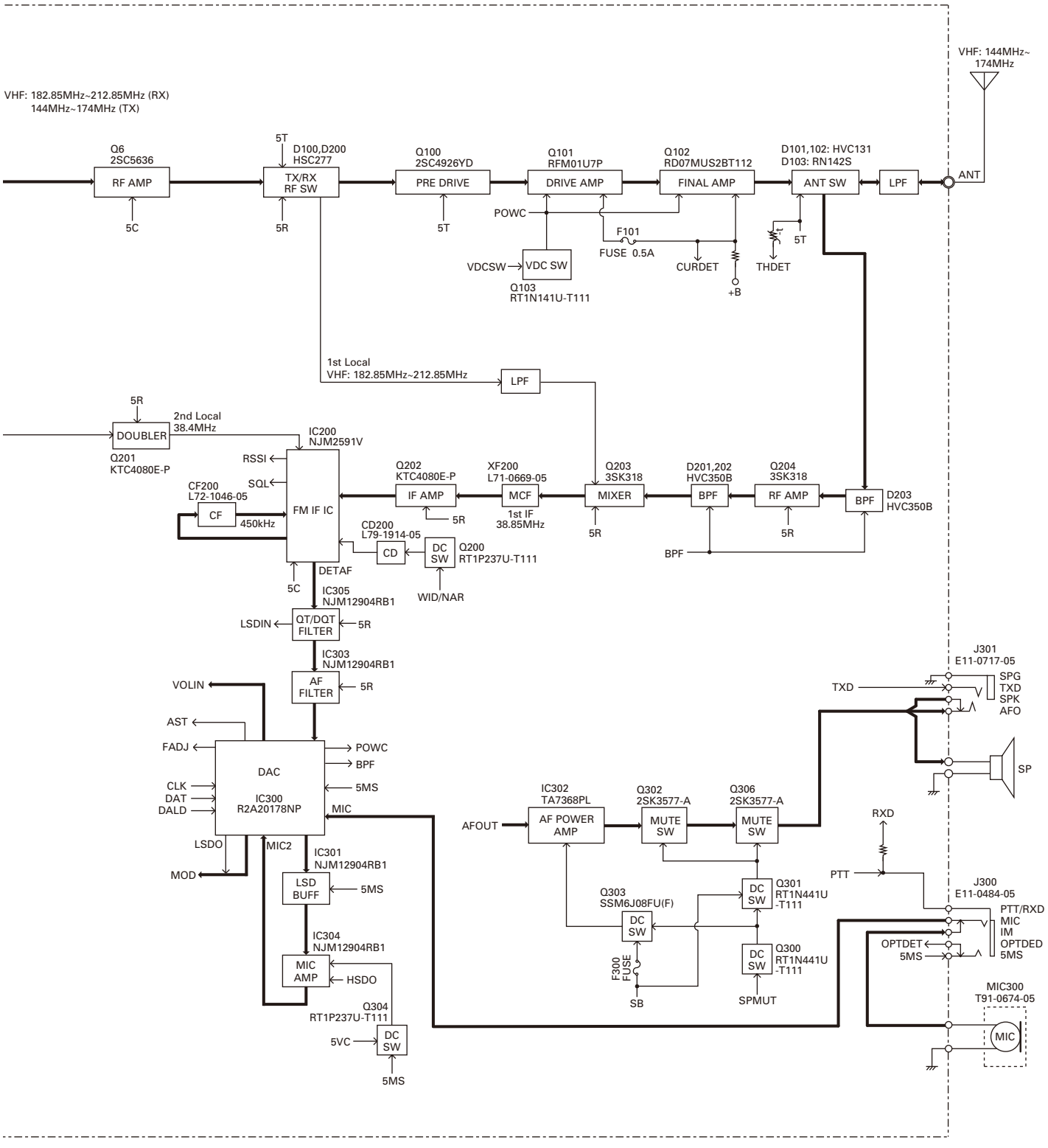
nponents marked with a dot (•) are parts of layer 1. / 注意 : 标有点号 (•) 的零件为第一层的零件。

MEMO / 笔记

BLOCK DIAGRAM / 方块图



BLOCK DIAGRAM / 方块图



TK-U100(V)

SPECIFICATIONS / 规格

GENERAL

Frequency Range.....144~174MHz
Number of Channels.....MAX. 16
Channel Spacing.....25kHz (Wide), 12.5kHz (Narrow)
PLL Channel Stepping.....5kHz, 6.25kHz
Operating Voltage.....7.5V DC±20%
Battery Life.....More than 10 hours at 5W
(5-5-90 duty cycle with accessory battery)
Operating Temperature Range.....–20°C to +60°C
Frequency Stability.....±5.0ppm
Channel Frequency Spread.....30MHz
Dimensions and Weight (W x H x D)
(Dimensions not including protrusions)
Radio only.....54 x 113 x 14 mm, 130g
With accessory battery.....54 x 113 x 24.9 mm, 203g

RECEIVER (Measurements mode per TIA/EIA-603)

Sensitivity
EIA 12dB SINAD.....0.25µV (Wide), 0.28µV (Narrow)
Selectivity.....70dB (Wide), 60dB (Narrow)
Intermodulation Distortion.....65dB (Wide), 60dB (Narrow)
Spurious Response.....65dB
Audio Output.....500mW at 8Ω

TRANSMITTER (Measurements mode per TIA/EIA-603)

RF Output Power.....5W/1W
Spurious Response.....65dB
Modulation.....16K0F3E (Wide), 11K0F3E (Narrow)
FM Hum & Noise.....45dB (Wide), 40dB (Narrow)
Modulation Distortion.....Less than 5%

Measurements made per TIA/EIA-603 and specifications shown are typical.
Kenwood reserves the right to change specifications without prior notice or obligation.

概　述

频率范围.....144 ～ 174MHz
信道数量.....最大 16
信道间隔.....25kHz（宽带），12.5kHz（窄带）
PLL 频道步进.....5kHz，6.25kHz
工作电源电压.....7.5V DC±20%
电池寿命.....在 5W 时高于 10 时间
（5-5-90 工作循环带有附件电池）
工作温度范围.....-20°C ～ +60°C
频率稳定度.....±5.0ppm
信道频率扩展.....30MHz
尺寸及重量（宽 × 高 × 长）
（尺寸大小不包括突出部分）
仅对讲机时.....54×113×14 mm，130g
带有附件电池.....54×113×24.9 mm，203g

接收部（依据 TIA/EIA-603 获得的模拟测量值）

灵 敏 度
EIA 12dB SINAD.....0.25µV（宽带），0.28µV（窄带）
选 择 性.....70dB（宽带），60dB（窄带）
互调抑制.....65dB（宽带），60dB（窄带）
杂散响应.....65dB
音频输出功率.....8Ω 时 500mW

发射部（依据 TIA/EIA-603 获得的模拟测量值）

射频功率输出.....5W/1W
杂散射频分量.....65dB
调　　制.....16K0F3E（宽带），11K0F3E（窄带）
调频噪声.....45dB（宽带），40dB（窄带）
调制失真.....低于 5%

依据 TIA/EIA-603 获得的测量值和所示规格均为典型值。
建伍公司有权变更技术规格，恕不预先通知。

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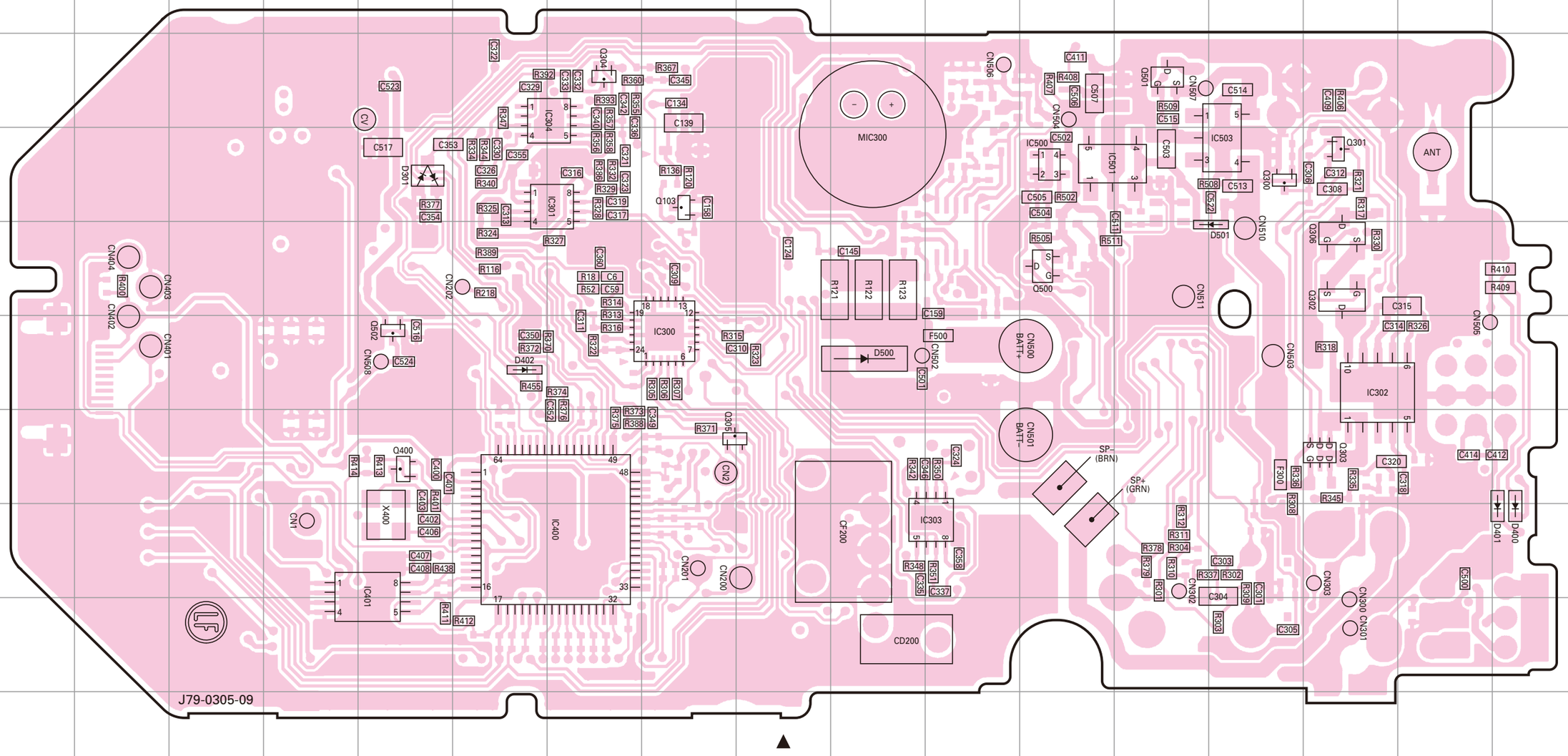
TK-U100(V) PC BOARD / 印刷电路板

PC BOARD / 印刷电路板 TK-U100(V)

TX-RX UNIT (X57-8093-00) Component side view (J79-0305-09)

TX-RX UNIT (X57-8093-00) Component side view (J79-0305-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	6I	Q103	4I	Q501	3N
IC301	4H	Q300	4O	Q502	6F
IC302	6P	Q301	4P	D301	4F
IC303	8L	Q302	5P	D400	8R
IC304	3H	Q303	7P	D401	8R
IC400	8H	Q304	3H	D402	6G
IC401	8F	Q305	7I	D500	6K
IC500	4M	Q306	5P	D501	5O
IC501	4M	Q400	7F		
IC503	4O	Q500	5M		

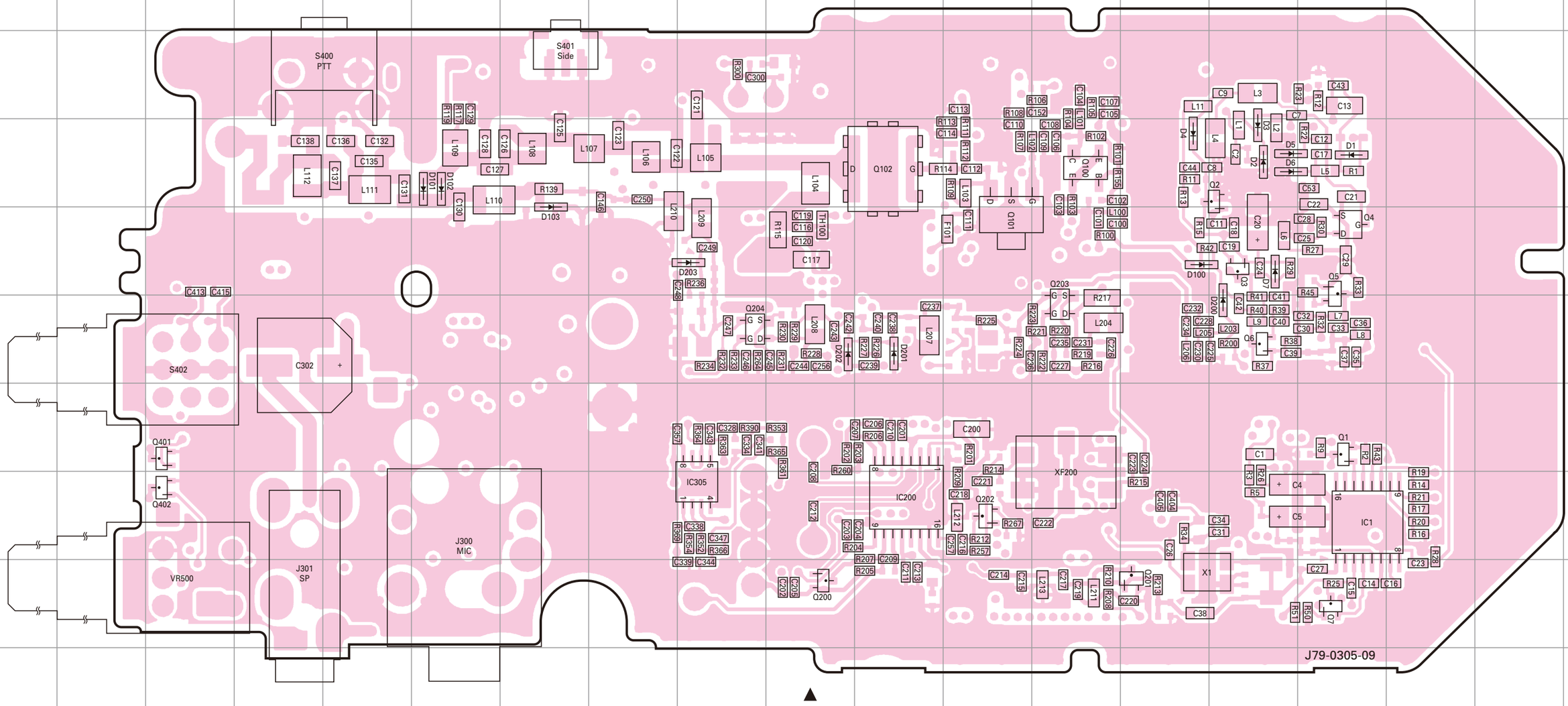
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Foil side

TK-U100(V) PC BOARD / 印刷电路板

PC BOARD / 印刷电路板 TK-U100(V)

TX-RX UNIT (X57-8093-00) Foil side view (J79-0305-09)

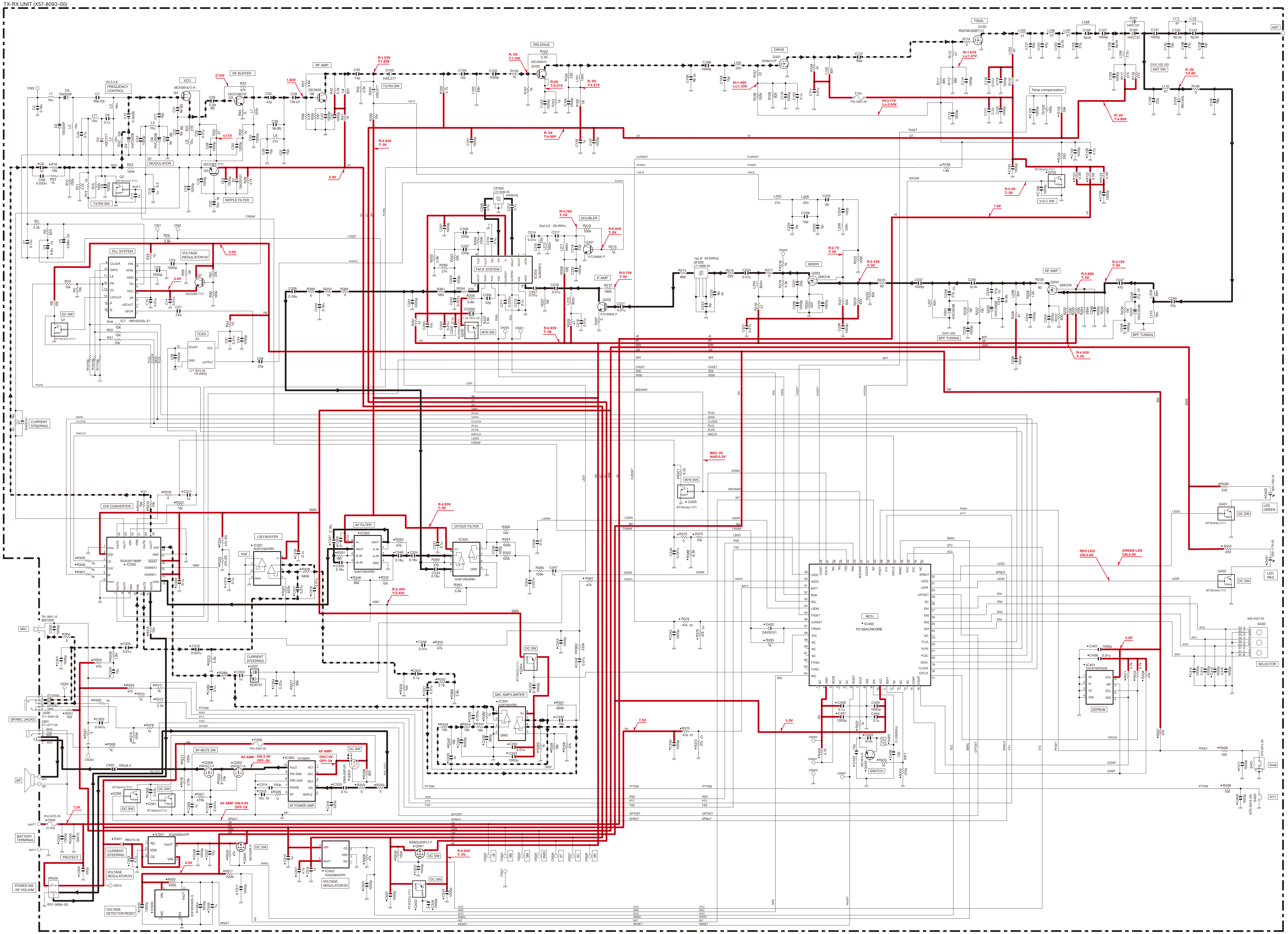
TX-RX UNIT (X57-8093-00) Foil side view (J79-0305-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	8P	Q7	9P	Q401	7C	D100	5N
IC200	8K	Q100	4M	Q402	8C	D101	4F
IC305	8I	Q101	5L	D1	4P	D102	4F
Q1	7P	Q102	4K	D2	4O	D103	5G
Q2	4O	Q200	9J	D3	4O	D200	6O
Q3	5O	Q201	9N	D4	4N	D201	6K
Q4	5P	Q202	8L	D5	4O	D202	6J
Q5	5P	Q203	6M	D6	4O	D203	5I
Q6	6O	Q204	6I	D7	5O		

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

TX-RX UNIT (X57-8093-00)



X57-8093-00

VHF: 144MHz~174MHz

ANT

IC1 MB15E03SL-E1

PLPS
PLDL
DATA
CLOCK
DO

PLL IC

LPF

VHF: 182.85MHz~212.85MHz (RX)
144MHz~174MHz (TX)

Q1 RT1N141U-T111
INV
PLUL

3.3V REG
Q7 2SC5383-T111
5M

X1 L77-3074-05 19.2MHz TCXO
5M
FADJ
LSDO

MOD
Q4: MCH3914(7)-H D2,3: 1SV325F
VCO

D5,6 HVC350B
TUNE
ASSIST

Q2: RT1N141U-T111 D4: HSC277
SHIFT SW
SHIFT

Q5 2SC5108(Y)F
RF BUFFER AMP
5C
RIPPLE FILTER
Q3: 2SC5383-T111 D7: DA2S101

Q6 2SC5636
RF AMP
5C

5T
D100,D200 HSC277
TX/RX RF SW
5R

Q100 2SC4926YD
PRE DRIVE
5T

Q101 RFM01U7P
DRIVE AMP
POWC
VDCSW
VDC SW
Q103 RT1N141U-T111

Q102 RD07MUS2BT112
FINAL AMP
F101
FUSE 0.5A
CURDET
+B

D101,102: HVC131
D103: RN142S
ANT SW
5T
THDET

LPF

BATT+ 7.5V
FUSE F500 3.15A
+B
PROTECT
D500 GN1G
BATT−
SB

VR500 R31-0684-05
SB
VOLIN
AFOUT

D501 RB521S-30
PROTECT

IC501 XC6209B502PR
AVR
5M

Q500 MCH3309-H
DC SW
5MS
5MSC

IC500 XC6120N302N-G
RESET
RESET

IC503 XC6209B502PR
AVR
5C
5CC

Q501 SSM3J05FU-F
DC SW
5T
5TC

Q502 RT1P237U-T111
DC SW
5R
5RC

S402 S60-0447-05
1
2
3
4
5
6
7
8
9
EN4
EN1
EN3
EN2

D401 B30-1779-05
LED (Red)
Q402 RT1N144U-T111
DC SW
LEDR

D400 B30-1782-05
LED (Green)
Q401 RT1N144U-T111
DC SW
LEDG

5MS

S400 S70-0414-05
PTT
PTT

S401 S70-0514-05
Side
PFKEY

TXD LEDR
5CC LEDG
5TC DATA
5RC CLOCK
5VC DACLD
5MSC SPMUT
BSFT VDCSW
LSDO T/RSHF
HSDO WID/NAR
PLDL PLPS

5M
Q400 2SC4919-S
SW
BSFT
XOUT
XIN
X400 L77-2974-05 11.0592MHz

MCU
IC400 F2136ACNKDRB

EN4 BATT
EN3 RESET
EN2 VOXIN
EN1 PFKEY
PTT CVDET
RXD LSDIN
SQL THDET
INT OPTDET
PLUL CURDET
RSSI

E2CLK E2WP E2DAT
EEPROM
IC401 EX24016ATAS0A
5M

1st Local
VHF: 182.85MHz~212.85MHz
LPF

5R
2nd Local 38.4MHz
DOUBLER
Q201 KTC4080E-P

IC200 NJM2591V
RSSI
SQL
CF200 L72-1046-05
CF
450kHz
FM IF IC
DETAF
5C

Q202 KTC4080E-P
IF AMP
5R

XF200 L71-0669-05
MCF
1st IF 38.85MHz

Q203 3SK318
MIXER
5R

D201,202 HVC350B
BPF

Q204 3SK318
RF AMP
5R

BPF
D203 HVC350B

CD200 L79-1914-05
CD
DC SW
Q200 RT1P237U-T111
WID/NAR

IC305 NJM12904RB1
QT/DQT FILTER
LSDIN
5R

IC303 NJM12904RB1
AF FILTER
5R

VOLIN
AST
FADJ
CLK
DAT
DALD
LSDO
MOD

DAC
IC300 R2A20178NP

POWC
BPF
5MS
MIC
MIC2

IC301 NJM12904RB1
LSD BUFF
5MS

IC304 NJM12904RB1
MIC AMP
HSDO

Q304 RT1P237U-T111
5VC
DC SW
5MS

IC302 TA7368PL
AF POWER AMP
AFOUT

Q302 2SK3577-A
MUTE SW

Q306 2SK3577-A
MUTE SW

Q303 SSM6J08FU(F)
DC SW
F300 FUSE
SB

Q301 RT1N441U -T111
DC SW

Q300 RT1N441U -T111
DC SW
SPMUT

RXD
PTT

J301 E11-0717-05
SPG
TXD
SPK
AFO
TXD
SP

J300 E11-0484-05
PTT/RXD
MIC
IM
OPTDED
5MS
OPTDET
5MS

MIC300 T91-0674-05
MIC