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UHF FM TRANSCEIVER / UHF 调频对讲机

TK-3160

SERVICE MANUAL / 维修手册

C · C2 versions

KENWOOD

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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.

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。在出版后如果发生变动、则根据需要使用《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、应注明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打开的插头没有连接到相应端子上的情况下、均不要发射。
- 在电爆管附近或在易燃性气体环境中、必须关掉电源、不要操作本设备。
- 本设备只应该由有资格的技术人员来维修。

GENERAL / 概述

SERVICE

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

Unit / Model & destination		TX-RX Unit	Frequency range	Remarks
TK-3160	C	X57-6733-01	440~480MHz	IF1 : 49.95MHz LOC : 50.4MHz
	C2	X57-6730-12	400~430MHz	

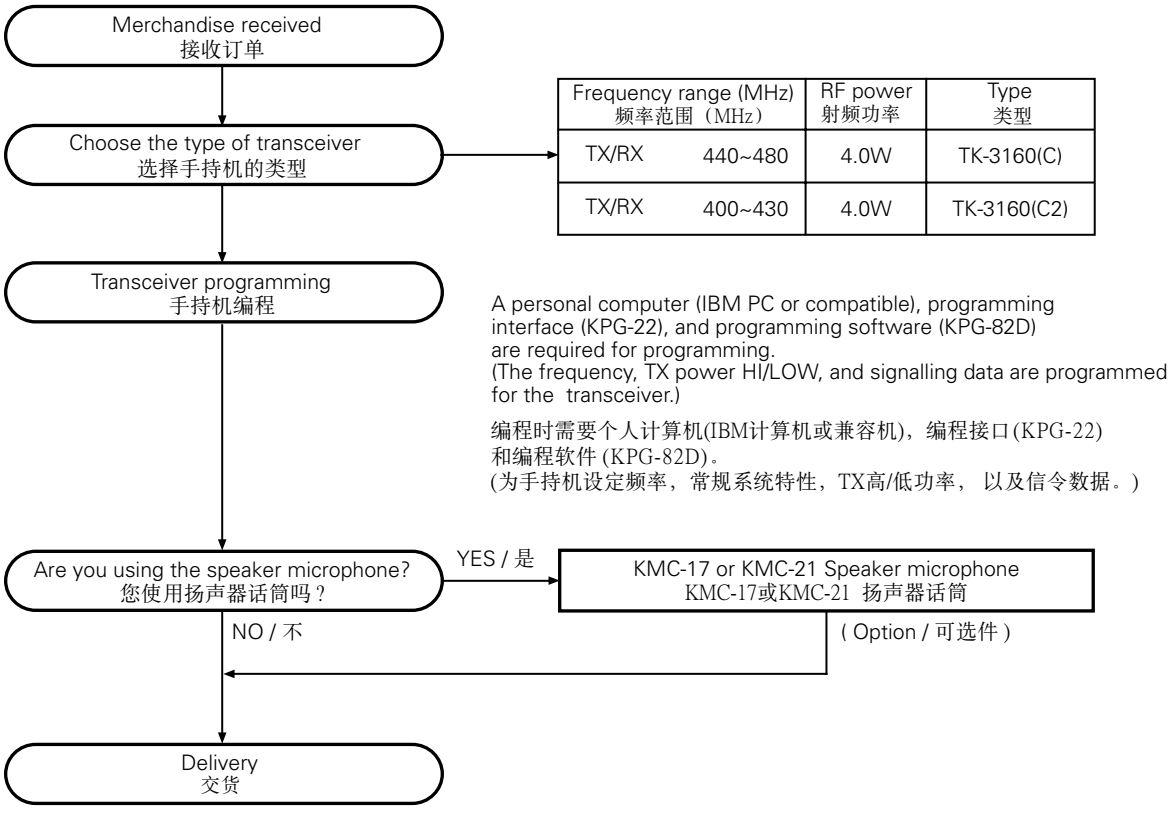
维修服务

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、印刷线路板图和调整步骤在内的资料供参考。

单元 / 型号和类型		TX-RX 单元	频率范围	备注
TK-3160	C	X57-6733-01	440~480MHz	IF1 : 49.95MHz LOC : 50.4MHz
	C2	X57-6730-12	400~430MHz	

SYSTEM SET-UP / 系统体系

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	440~480	4.0W	TK-3160(C)
TX/RX	400~430	4.0W	TK-3160(C2)

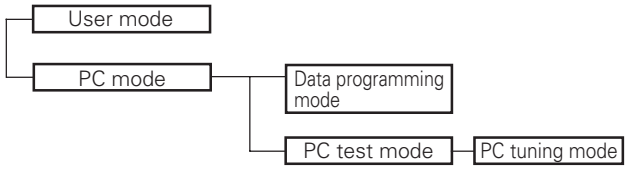
A personal computer (IBM PC or compatible), programming interface (KPG-22), and programming software (KPG-82D) are required for programming.
(The frequency, TX power HI/LOW, and signalling data are programmed for the transceiver.)

编程时需要个人计算机(IBM计算机或兼容机)，编程接口(KPG-22)和编程软件 (KPG-82D)。
(为手持机设定频率，常规系统特性，TX高/低功率， 以及信令数据。)

REALIGNMENT / 模式组合

REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
PC mode	Used for communication between the radio and PC (IBM compatible).
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 KPG-82D.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
PC mode	Received commands from PC

3.PC Mode

3-1. Preface

The TK-3160 transceiver is programmed using a personal computer, a programming interface (KPG-22) and programming software (KPG-82D).

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

3-2. Connection procedure

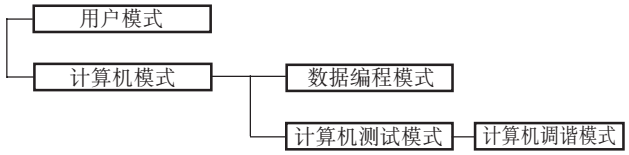
1. Connect the TK-3160 to the personal computer with the interface cable.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the radio enters PC mode.
   When data is transmitting from the transceiver, the red LED lights.
   When data is received by the transceiver, the green LED lights.

Notes:

- The data stored in the personal computer must match the model type when it is written into the EEPROM.
- Change the TK-3160 to PC mode, then attach the interface cable.

模式组合

1 . 模式



模式	功能
用户模式	一般使用
计算机模式	用户手持机与计算机(IBM 兼容机)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	用于使用计算机来检测手持机。此功能包括在 KPG- 82D 内。

2. 如何进入每一种模式

模式	操作
用户模式	接通电源
计算机模式	从计算机接收指令

3. 计算机模式

3-1 前言

TK-3160 手持机使用计算机、编程接口（KPG-22）和编程软件（KPG-82D）进行编程。

IBM 计算机或兼容机可以使用编程软件。图 1 显示 IBM 计算机编程的设置。

3-2 连接步骤

1. 使用接口电缆将 TK-3160 连接到计算机上。
2. 当电源接通时，立即进入用户模式。当 PC 机发出指令时，手持机进入 PC 模式。
   当手持机传送数据时，红色指示灯闪动。
   当手持机传送数据时，绿色指示灯闪动。

注释：

- 当把储存在计算机中的数据写入到 EEPROM 中时，机型型号必须相匹配。
- 将 TK-3160 改变为计算机模式，然后连接接口电缆。

REALIGNMENT / 模式组合

3-3. KPG-22 description (PC programming interface cable: Option)

The KPG-22 is required to interface the TK-3160 with the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-22 connects the side panel connector of the TK-3160 to the computer's RS-232C serial port.

3-4. Programming software description

KPG-82D is the programming software for TK-3160 supplied on a CD-ROM. This software runs under Windows 98, ME, Windows 2000 or XP on an IBM-PC or compatible machine.

The data can be input to or read from TK-3160 and edited on the screen. The programmed or edited data can be printed out. It is also possible to tune the transceiver.

3-3 KPG-22 说明(PC 机编程接口电缆：可选件)

TK-3160需要通过接口电缆KPG-22与电脑连接。此接口电缆的D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-22连接TK-3160的侧面插孔，然后连接到电子计算机的RS-232C串行接口。

3-4 编程软件说明

KPG-82D是手持机TK-3160的编程软件。此软件的运行环境为IBM-PC机或兼容机的Windows 98,ME,Windows 2000或XP。

数据可以被输入到TK-3160手持机或从手持机中读取数据，并且在屏幕上进行编辑。已被编程或编辑的数据可以打印出来。也可以调整手持机的指标。

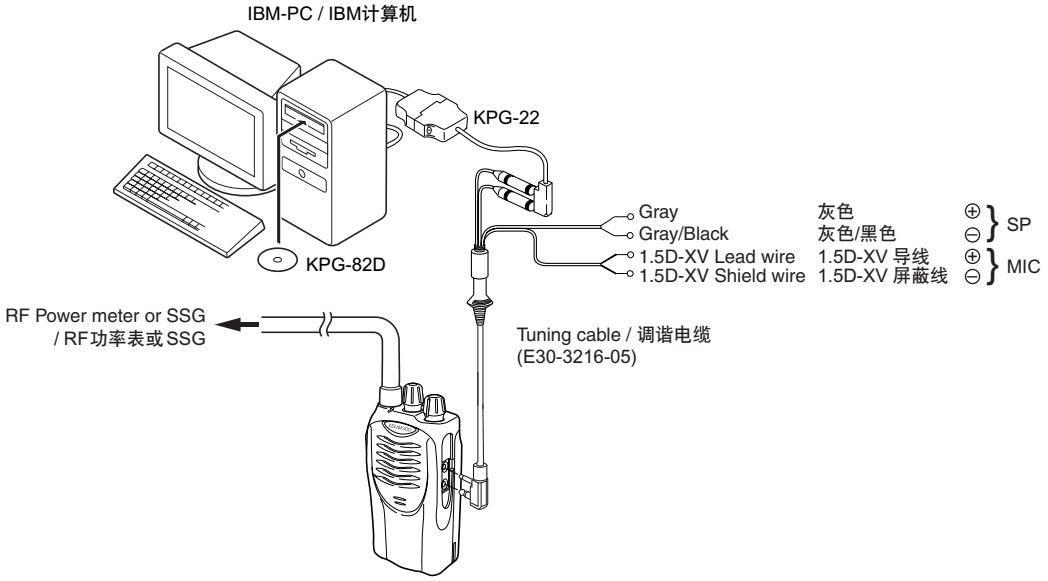


Fig. 1 / 图 1

DISASSEMBLY FOR REPAIR / 维修拆卸

1. Separating the case assembly from the chassis.

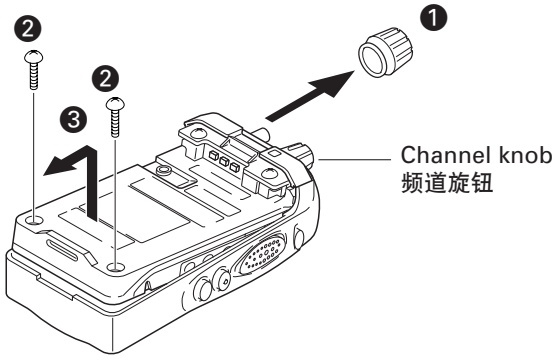
1. Remove the volume knob ❶.
2. Remove the two screws ❷.
3. Lift the chassis ❸, and remove it from the case assembly.

Note: After separating the case assembly from the chassis, remove the channel knob.

1. 从主机上卸下后盖。

1. 卸下旋钮 ❶。
2. 卸下螺丝 ❷。
3. 拉起底架 ❸，并且把它卸下。

注：机壳和后盖分开之后，请卸下频道旋钮。

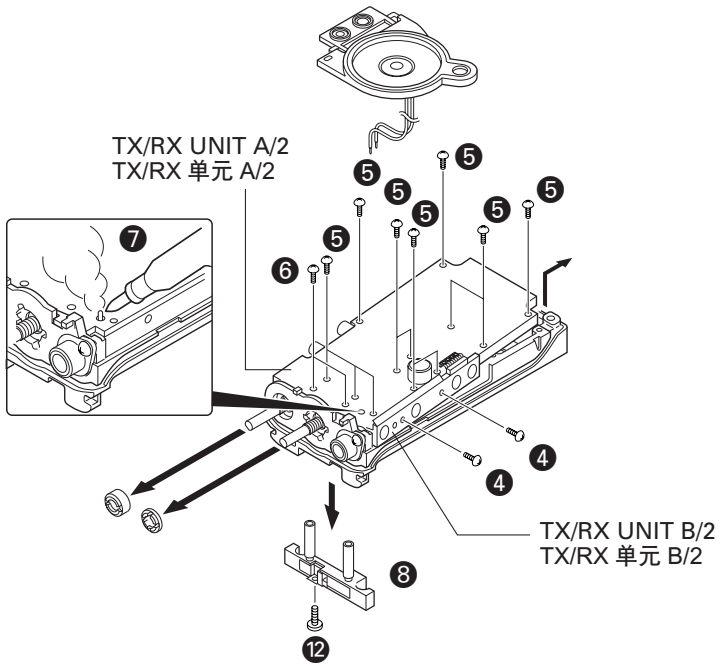


2. Separating the chassis from the TX/RX unit.

1. Remove the two screws ❹ fixing the TX/RX unit B/2.
2. Remove the twelve screws ❺ and two screws ❻ fixing the TX/RX unit A/2.
3. Remove the solder from the antenna terminal using a soldering iron ❼, then lift the unit off.

2. 从 TX/RX 单元卸下底架。

1. 卸下 TX/RX 单元 B/2 的 2 个螺丝 ❹。
2. 卸下 TX/RX 单元 A/2 的 12 个螺丝 ❺ 和 2 个螺丝 ❻。
3. 用电烙铁 ❼ 烫下焊接的天线端头，然后卸下天线单元。



Note: The two screws ❻ of TX/RX unit A/2 are fixing the battery terminal block ❽.

注：卸下固定 TX/RX 单元 A/2 的 2 个螺丝 ❻，才可以修理电池终端块 ❽。

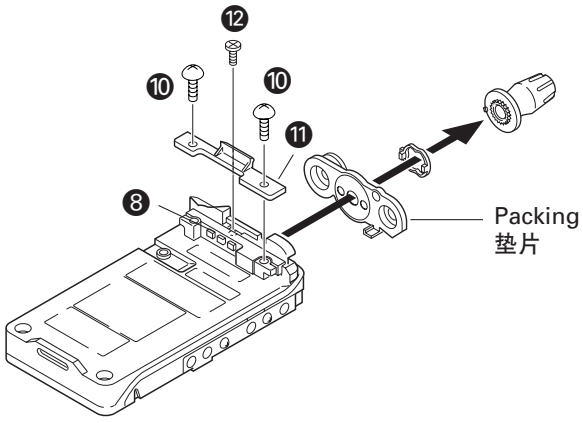
DISASSEMBLY FOR REPAIR / 维修拆卸

3. How to remove the battery terminal block.

1. Remove the two screws ⑩, then pull out the back cover ⑪.
2. Remove the screw ⑫.

3. 如何拆卸电池终端块。

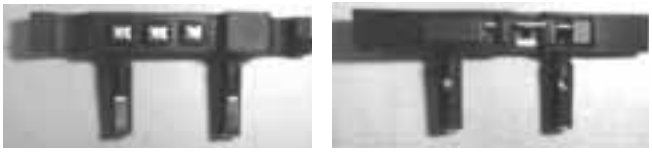
1. 卸下 2 个螺丝 ⑩, 然后拔出后盖 ⑪。
2. 卸下螺丝 ⑫。



DISASSEMBLY FOR REPAIR / 维修拆卸

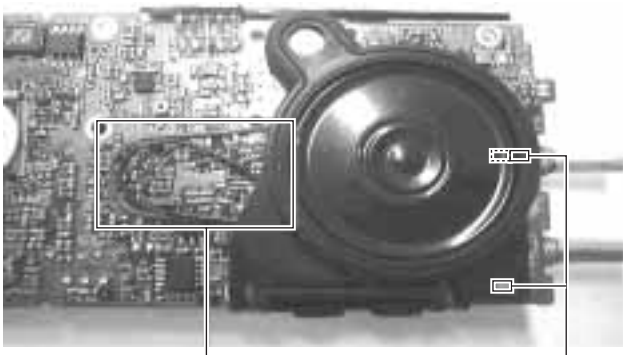
Assembling

- **Installation of battery terminal block and packing**



Install them so that no distortion or deformation occurs.

- **Installation of speakers and cushion, and wire styling of speakers**



Install the speakers so that they do not protrude from the cushion. Perform the wire styling of speakers as shown in a photograph.

- **Attaching the cushion**

Attach the cushion as shown in Fig. 1.

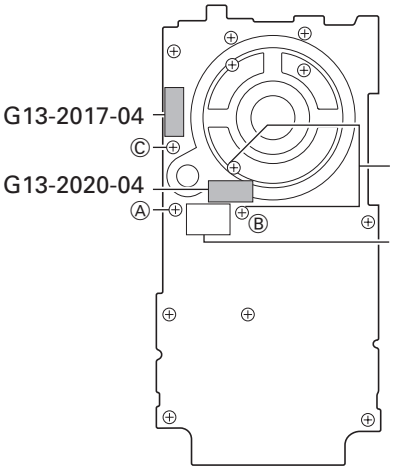


Fig. 1 / 图 1

Note: Cushion must not cover the screws Ⓐ,Ⓑ and Ⓒ.

组装

- **电池终端块和垫片的安装**

安装并且注意不要让它们发生变形。

- **扬声器、扬声器垫以及扬声器引线的组装**

安装时请不要把扬声器从垫子中脱出来。如照片所示放好扬声器引线。

- **粘好扬声器垫**

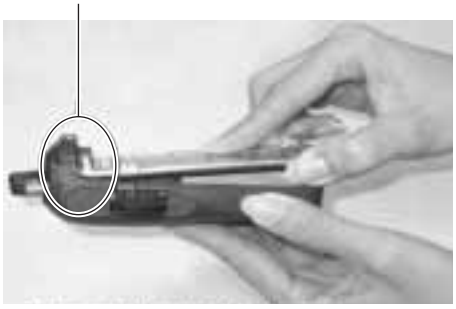
如图 1 所示粘好扬声器垫。

注：扬声器垫不能盖住螺丝 Ⓐ、Ⓑ 以及 Ⓒ。

DISASSEMBLY FOR REPAIR / 维修拆卸

- **Installation of chassis and cabinet assy**
- 底架和机壳的组装

Do not press this area, top packing easily deform.
请不要按压这个区域 , 上垫片容易变形。



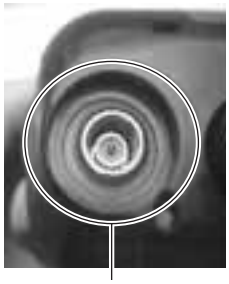
First, mount the set to the cabinet assy.

首先 , 组装机壳。

Second, press down the Chassis to the cabinet assy as shown in the diagram.

然后 , 如图所示按压底架到机壳上。

Good Condition / 正确状态

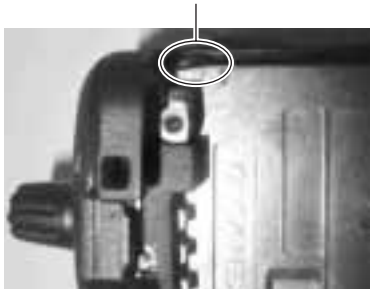


After mount, packing should be in this condition.
组装后，垫子应如上述状态。

NG Condition / 不正确状态

Packing deform.
垫子变形。

Packing protruded out.
垫子露出。



Note:

- Take care that the packing does not protrude from the chassis or case.
- Replace the protruded or deformed packing with a new one.

注意：

- 请小心垫子，不要让它露出底架或机壳。
- 如果露出或变形请换新的垫子。

CIRCUIT DESCRIPTION / 电路说明

1. Frequency Configuration

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

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

1 . 频率构成

本接收机使用二次变频。第一 IF 是 49.95 MHz，第二 IF 是 450 kHz。第一本地振荡信号由 PLL 电路提供。

PLL 电路产生需要的发射频率。

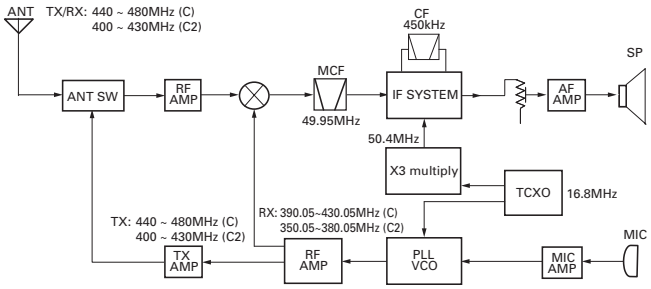


Fig. 1 Frequency configuration / 图 1 频率构成

2. Receiver

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

2 . 接收部

接收部的频率构成如图 2 所示。

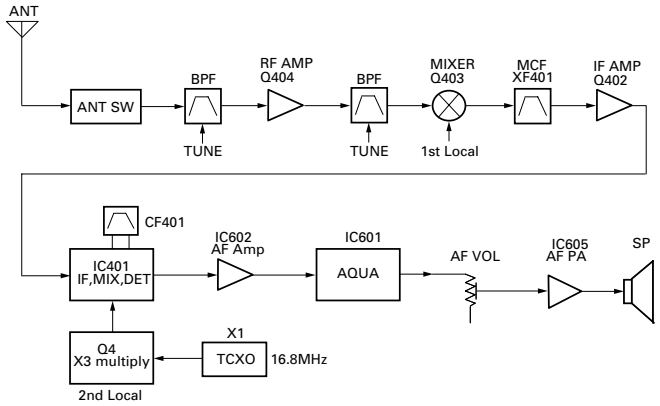


Fig. 2 Receiver section / 图 2 接收部

1) Front End (RF AMP)

The signal coming from the antenna passes through the transmit/receive switching diode circuit, (D204,D206,D208 and D212) passes through a BPF (L413 and L414), and is amplified by the RF amplifier (Q404).

The resulting signal passes through a BPF (L409,L408 and L407),and goes to the mixer. These BPFs are adjusted by variable capacitors (D402,D403,D404,D405 and D406). The input voltage to the variable capacitor is regulated by voltage output from the microprocessor (IC805).

1) 前端 (RF 放大器)

从天线接收的信号进入发送 / 接收转换开关二极管电路 (D204，D206，D208 和 D212)，然后通过 BPF (L413 和 L414)，并且被 RF 放大器 (Q404) 放大。

此信号通过 BPF (L409，L408 和 L407) 然后进入混频。这些 BPF 被可变电容器 (D402，D403，D404，D405 和 D406) 调整。输入可变电容器的电压被经微处理器 (IC805) 的电压输出调整。

2) First Mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q403 to produce a first IF frequency of 49.95 MHz.

The resulting signal passes through the XF401 MCF to cut the adjacent spurious and provide the opitimun characteristics, such as adjacent frequency selectivity.

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 Q403 混频，生成 49.95MHz 频率的第一中频信号。

生成的信号通过 XF401 MCF。

CIRCUIT DESCRIPTION / 电路说明

3) IF Amplifier Circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF401) to remove the adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q402) and then applied to the IF system IC (IC401). The IF system IC provides a second mixer, second local oscillator, limiting amplifier, quadrature detector and RSSI (Received Signal Strength Indicator). The second mixer mixes the first IF signal with the 50.4MHz of the second local oscillator output (TCXO X1) and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF401) 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 (CD401). The demodulated signal is routed to the audio circuit.

3) 中频放大电路

第一中频信号通过晶体滤波器 (XF401) 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（Q402）放大并进入中频系统芯片（IC401）。中频系统芯片提供第二混频器，第二本振信号，限幅放大器，正交检测器和 RSSI（接收信号强度指示器）。第二混频器将第一中频信号与 50.4MHz 的第二本振信号输出（TCXO 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（CF401）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（CD401）的正交检测器解调。经解调的信号进入音频电路。

4) Wide/Narrow Switching Circuit

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

The WIDE (low level) and NARROW (high level) data is output from IC805, pin 54.

When a WIDE (low level) data is received, Q401 turn on. When a NARROW (high level) data is received, Q401 turn off.

Q401 turns on/off with the Wide/Narrow data and the IC401 detector output level is switched to maintain a constant output level during wide or narrow signals.

4) 宽 / 窄开关电路

可以通过开启宽窄开关对各信道进行宽窄设定。

WIDE (低电平) 和 NARROW (高电平) 数据被 IC805、54 管脚输出。

当接收到 WIDE (低电平) 数据时，Q401 接通。

当接收到 NARROW (高电平) 数据时，Q401 断开。

Q401 伴随着宽 / 窄数据而接通 / 断开，IC401 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。

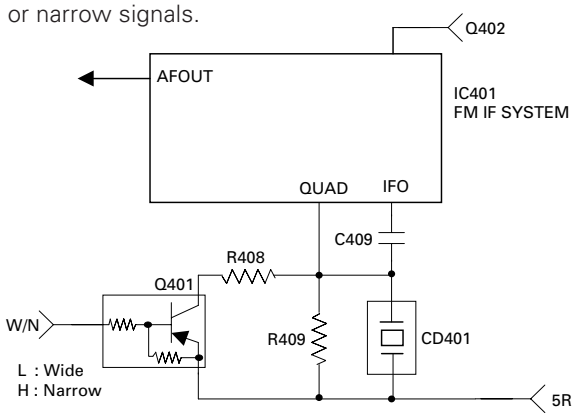


Fig. 3 Wide/Narrow switching circuit / 图 3 宽 / 窄开关电路

5) Audio Amplifier Circuit

The demodulated signal from IC401 is amplified by IC602, and goes to AF amplifier through IC601.

The signal then goes through an AF volume control (VR801), and is routed to an audio power amplifier (IC605) where it is amplified and output to the speaker.

5) 音频放大器电路

来自于 IC401 的解调信号被 IC602 放大，并通过 IC601 送到音频放大器。

信号通过 AF 音量控制 (VR801)，在音频功率放大器（IC605）进行放大后输出到扬声器。

6) Tone Volume Fixed Circuit

This function generates a TONE signal sound even if the AF volume of the transceiver is the minimum.

A TONE signal is sent through Q602 to the AF amplifier when, in the FPU, "TONE Volume Fixed" is set to ON.

6) 音量固定电路

此功能在即使手持机的音量为最小时，也产生提示音信号的输出。

提示音信号通过 Q602 被送到 AF 放大器 . 在编程软件上，要设置“提示音音量固定”。

CIRCUIT DESCRIPTION / 电路说明

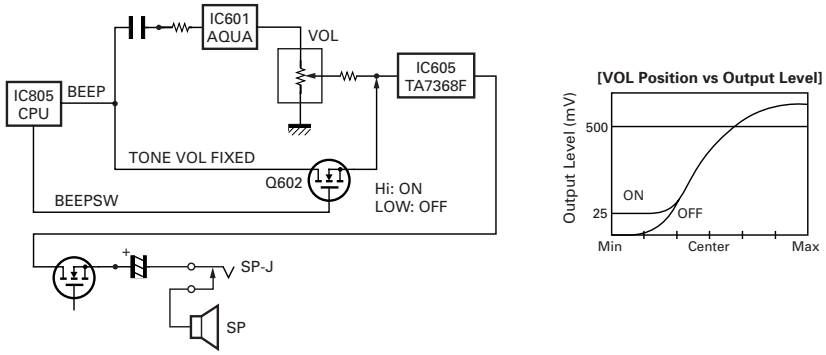


Fig. 4 Tone volume fixed circuit / 图 4 音量固定电路

7) Squelch

Part of the AF signal from the IC enters the FM IC (IC401) again, and the noise component is amplified and rectified by a filter and an amplifier to produce a DC voltage corresponding to the noise level.
The DC signal from the FM IC goes to the analog port of the microprocessor (IC805). IC805 determines whether to output sounds from the speaker by checking whether the input voltage is higher or lower than the preset value. To output sounds from the speaker, IC805 sends a high signal to the SP MUTE line and turns IC605 on through Q603,Q604,Q607 and Q608. (See Fig. 5)

8) Receive Signalling

(1) QT/DQT
The output signal from IF IC(IC401) enters the microprocessor(IC805) through IC601. IC805 determines whether the QT or DQT matches the preset value, and controls the SP MUTE and the speaker output sounds according to the squelch results.

(2) 2-tone
Part of the received AF signal output from the AF amplifier IC602, and then passes through an audio processor (IC601), goes to the other AF amplifier IC603, is compared, and then goes to IC805. IC805 checks whether 2-tone data is necessary. If it matches, IC805 carries out a specified operation, such as turning the speaker on. (See Fig. 5)

(3) MSK (Fleet Sync)
The MSK input signal from the FM IC is amplified by IC602 (1/2) and goes to pin 31 of IC 601. The signal is demodulated by MSK demodulator in IC 601. The demodulated data goes to the CPU for processing.

7) 静噪

FM IC (IC401) 输出的 AF 信号的一部分再进入 IC，噪声成份通过滤波器和放大器进行放大和修正，生成与噪声电平相应的 DC 电压。
DC 信号通过 FM IC 被送到微处理器的模拟端口 (IC805)。IC805 通过检测输入的电压是高于还是低于预设值来决定是否从扬声器输出声音。由扬声器输出声音时，IC805发送高电平信号给 SP MUTE 线，通过 Q603，Q604，Q607 和 Q608 打开 IC605。(见图 5)。

8) 接收信令

(1) QT/DQT
IC (IC401) 输出的信号通过 IC601 进入微处理器 (IC805)。IC805 测定 QT 或 DQT 是否与设置的值匹配，并根据此结果来控制 SP MUTE 和扬声器输出声音。

(2) 2-tone
从 AF 放大器 IC602 接收的 AF 信号部分通过音频处理器 (IC601), 送到另外的 AF 放大器 IC603, 进行比较，然后送到 IC805。IC805 检查是否具有 2-tone 数据。如果它匹配，IC805 执行指定操作，例如打开扬声器。(见图 5)。

(3) MSK (Fleet Sync)
来自 FM IC 的 MSK 输入信号被 IC602 (1/2) 放大，然后送到 IC601 的 31 脚。信号在 IC601 上的 MSK 调解器中进行调解。被解调的数据送到 CPU 进行处理。

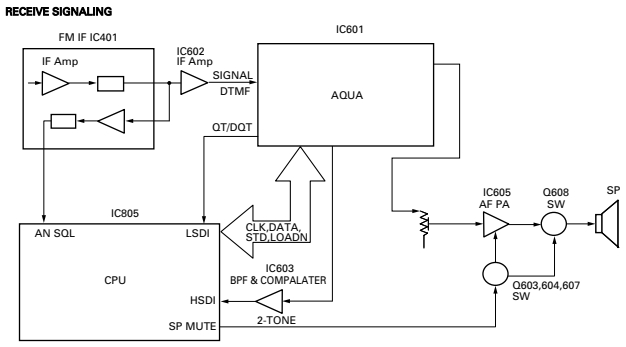


Fig. 5 AF amplifier and squelch / 图 5 AF 放大器和静噪

(4) DTMF
The DTMF input signal from the IF IC (IC401) is amplified by IC602 and goes to IC601. The decoded information is then processed by the CPU.

(4) DTMF
IF IC(IC401)的 DTMF 输出信号被 IC602 放大并且送到 IC601。解码数据由 CPU 处理。

3. PLL Frequency Synthesizer

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

1) PLL

The frequency step of the PLL circuit is 5 or 6.25kHz.
A 16.8MHz reference oscillator signal is divided at IC1 by a fixed counter to produce an oscillator (VCO) output signal which is buffer amplified by Q9 then divided in IC1 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal from the phase comparator in IC1. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency. (See Fig. 6)

2) VCO

The operating frequency is generated by Q6 in transmit mode and Q5 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D4 and D7 in transmit mode and D3 and D9 in receive mode). The RX pin is set high in receive mode causing Q8 and Q12 to turn Q6 off and Q5 on.
The TX pin is set high in transmit mode. The outputs from Q5 and Q6 are amplified by Q9 and sent to the RF amplifiers.

3. PLL 频率合成

PLL 电路产生用于接收的第一本地振荡信号和发射用的 RF 信号。

1) PLL

PLL 电路的频率步进是 5 或 6.25kHz。
16.8MHz 的参考振荡信号在 IC1 中被一个固定记数器分频。振荡器 (VCO) 的输出信号由 Q9 缓冲放大,然后在 IC1 中被一个可编程双模块记数器分频。分频的信号在 IC1 的相位比较器中进行比较。生成的信号通过一个低通滤波器滤波后传送到 VCO 控制振荡器频率。(见图 6)

2) VCO

所使用的频率在发射模式时由 Q6 生成，在接收模式时由 Q5 生成。
通过将从相位比较器所获得的 VCO 控制电压输送给可变二极管 (在发射模式时为D4 和D9，在接收模式时为D3 和D9) 来控制振荡频率。在接收时 RX 脚被设定为高，控制 Q8 和 Q12 来关闭 Q6 接通 Q5。
发射时 TX 脚被设定为高。Q5 和 Q6 的输出被 Q9 放大并且传送给 RF 放大器。

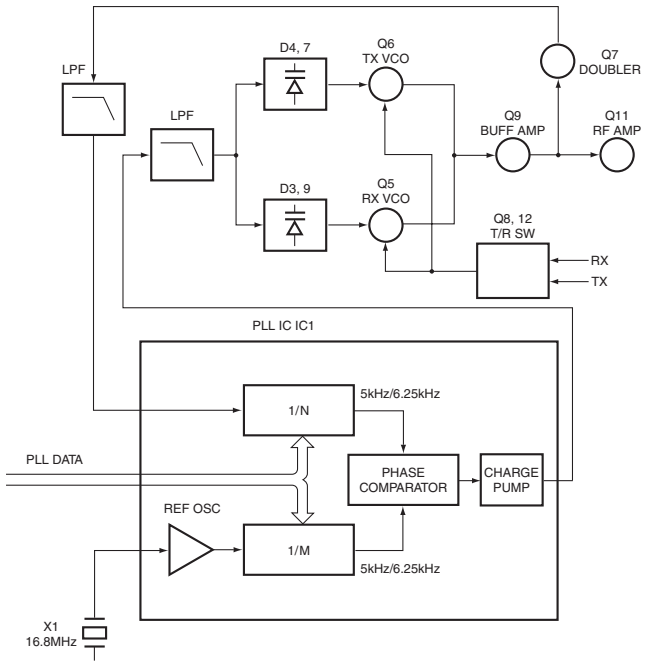


Fig. 6 PLL circuit / 图 6 PLL 电路

CIRCUIT DESCRIPTION / 电路说明

3) Unlock Detector

If a pulse signal appears at the LD pin of IC1, an unlock condition occurs, and the DC voltage obtained from C19,R6 and Q1 causes the voltage applied to the microprocessor to go high. When the microprocessor detects this condition, the transmitter is disabled, ignoring the push-to-talk switch input signal. (See Fig. 7)

3) 失锁检测器

如果脉冲信号出现在IC1的LD管脚上，则发生了失锁的情况，从C19，R6和Q1获得的DC电压使微处理器的输入电压变高。微处理器检测到这个情况后发射被禁止，忽略PTT开关的输入信号。（见图7）

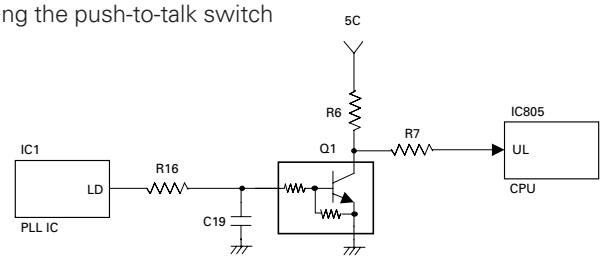


Fig. 7 Unlock detector circuit / 图7 失锁检测器电路

4. Transmitter System

1) Microphone Amplifier

The signal from the microphone passes through the IC601. When encoding DTMF, it is turned OFF for muting the microphone input signal by IC601.

The signal passes through the Audio processor (IC601) for the maximum deviation adjustment, and goes to the VCXO modulation input.

4 . 发射部系统

1) 话筒放大器

来自于话筒的信号通过IC601。当编码DTMF时，话筒输入信号被 IC601 关闭。

信号通过音频处理器 (IC601) 进行最大频偏调整，然后送到 VCXO 调制输入。

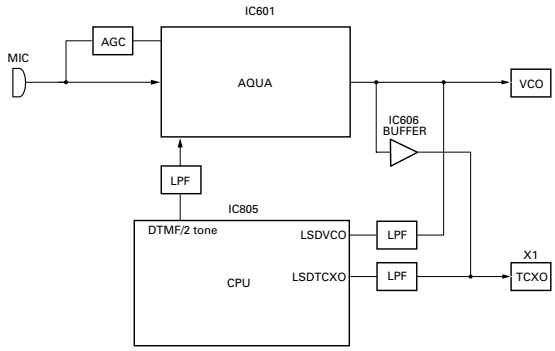


Fig. 8 Microphone amplifier / 图8 话筒放大器

2) Drive and Final Amplifier

The signal from the T/R switch (D201 is on) is amplified by the pre-drive (Q206) and the drive amplifier (Q207) to 50mW. The output of the drive amplifier is amplified by the RF power amplifier (Q211) to 4.0W (1W when the power is low). The RF power amplifier consists of two MOS FET stages. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D204 and D206) and applied to the antenna terminal.

2) 驱动器和终端放大器

来自于 T/R 开关 (D201 ON) 的信号前置驱动放大器 (Q206) 和被驱动放大器 (Q207) 放大到 50mW。

驱动放大器的输出被 RF 功率放大器 (Q211) 放大到 4.0W (当低功率时为 1W)。RF 功率放大器由 2 个 MOS FET 构成。RF 功率放大器的输出通过谐波滤波器 (LPF) 和天线开关 (D204 和 D206) 并且送到天线终端。

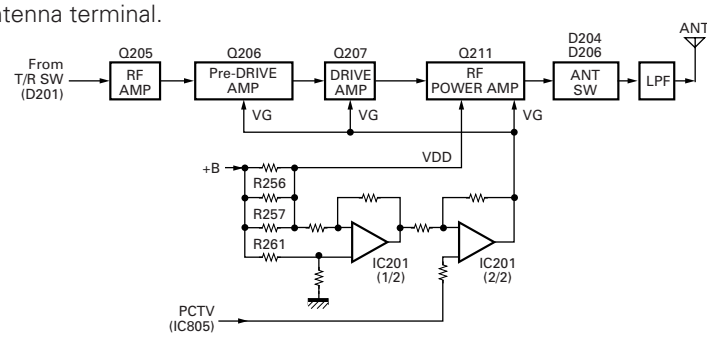


Fig. 9 Drive and final amplifier and APC circuit / 图9 驱动、终端放大器以及 APC 电路

CIRCUIT DESCRIPTION / 电路说明

3) APC Circuit

The APC circuit always monitors the current flowing through the RF power amplifier (Q211) and keeps a constant current. The voltage drop at R256, R257 and R261 is caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier IC201(1/2). IC201(2/2) compares the output voltage of IC201(1/2) with the reference voltage from IC805. The output of IC201(2/2) controls the VG of the RF power amplifier, drive amplifier and pre-drive amplifier to make both voltages the same. The change of power high/low is carried out by the change of the reference voltage.

4) Encode Signalling

(1) QT/DQT

QT,DQT data of the LSDTCXO Line is output from pin 22 of the CPU. The signal passes through a low-pass CR filter and goes to the TCXO(X1).

The QT,DQT data of the LSDVCO Line is output from pin 20 of the CPU. The signal passes through a low pass CR filter, mixes with the audio signal, and goes to the VCO modulation input. TX deviation is adjusted by the CPU.

(2) DTMF/2-tone

High-speed data is output from pin 2 of the CPU. The signal passes through a low-pass CR filter, and provides a TX and SP out tone, and is then applied to the audio processor (IC601). The signal is mixed with the audio signal and goes to the VCO.

TX deviation is adjusted by the CPU.

(3) MSK (Fleet Sync)

Fleet Sync utilizes 1200bps and 2400bps MSK signal is output from pin 6 of IC601. And is routed to the VCO. When encoding MSK, the microphone input signal is muted.

5. Power Supply

There are 3.5V power supply for PLL circuit and five 5V power supplies 5M, 5MS, 5C, 5R, and 5T. 5M for microprocessor is always output while the power is on. 5M is always output, but turns off when the power is turned off to prevent malfunction of the microprocessor.

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

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

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

6. Control Circuit

The control circuit consists of a microprocessor (IC805) and its peripheral circuits. It controls the TX-RX unit. IC805 mainly performs the following:

(1) Switching between transmission and reception by the PTT signal input.

(2) Reading system, group, frequency, and program data from the memory circuit.

3) 自动功率控制 (APC) 电路

APC 电路一直监视通过射频功率放大器 (Q211) 的电流并保持电流稳定。经过射频功率放大器的电流的变化会引起 R256, R257和R261的电压降低，此电压送到差分放大器IC201 (1/2) 。

IC201 (2/2) 将IC201 (1/2) 的输出电压与来自IC805的参考电压进行比较。

IC201 (2/2) 的输出电压控制射频功率放大器，驱动放大器，预驱动放大器的 VG，使电压保持一致。

功率高 / 低的变化是通过变更参考电压来实现的。

4) 编码信令

(1) QT/DQT

LLSDTCXO线的QT,DQT数据从CPU的22管脚输出。信号通过低通CR滤波器，并且送到TCXO (X1)。

LSDVCO线的QT, DQT数据从CPU的20管脚输出。信号通过低通CR滤波器，与音频信号混合，然后输入到VCO。TX频偏被CPU调整。

(2) DTMF/2-tone

高速数据从CPU的2脚输出。信号通过低通CR滤波器，提供TX和SP输出音频，并输入到音频处理器 (IC601)。信号与音频信号混合，然后送到VCO。

TX 频偏被 CPU 调整。

(3) MSK (Fleet Sync)

FleetSync 使用 1200bps 和 2400bps 的 MSK 信号，这些信号从 IC601 的 6 脚输出。并且被发送到 VCO。当编码 MSK 时，话筒输入信号被静音。

5 . 电源

本机用 3.5V 电源提供给 PLL 电路，并用 5 个 5V 电源提供给 5M, 5MS, 5C, 5R 和 5T。当电源接通时，微处理器用的 5M 一直保持输出。5M 虽然为经常输出，但在关闭电源时也被关掉，防止微处理器出现故障状态。

5C 为公共的 5V，在非省电状态时保持输出。

5R 为接收用的 5V，在接收期间保持输出。

5T 为发射用的 5V，在发射期间保持输出。

6 . 控制电路

控制电路是由微处理器(IC805)和外部电路构成。它控制 TX-RX 单元。IC805 的主要功能如下：

(1) 根据 PTT 的输入信号来转换发射和接收状态。

(2) 从存储电路读出系统，组，频率以及编程数据。

CIRCUIT DESCRIPTION / 电路说明

(3) Sending frequency program data to the PLL.
(4) Controlling squelch on/off by the DC voltage from the squelch circuit.
(5) Controlling the audio mute circuit by the decode data input.
(6) Transmitting tone and encode data.

1) Frequency Shift Circuit

The microprocessor (IC805) operates at a clock of 7.3728MHz. This oscillator has a circuit that shifts the frequency by BEAT SHIFT SW (Q810).
A beat sound may be able to be evaded from generation if "Beat Shift" is set to ON when it is generated in the internal spurious transmission modulated sound of a transceiver.

(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。

1) 频率偏移电路

微处理器 (IC805) 在 7.3728MHz 时钟下工作。此振荡器有可以被 BEAT SHIFT SW (Q810) 变换频率的电路。
如果"Beat Shift"被设定为 ON，可以避免产生拍频声音。

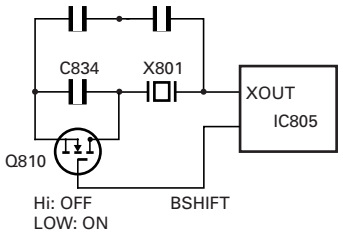


Fig. 10 Frequency shift circuit / 图 10 频率偏移电路

2) Memory Circuit

Memory circuit consists of the CPU (IC805) and an EEPROM (IC804). An EEPROM has a capacity of 64k bits that contains the transceiver control program for the CPU and data such as transceiver channels and operating features.

2) 存储器电路

存储器电路由 CPU (IC805) 和 EEPROM (IC804) 组成。
有 64k bits 的容量，包含 CPU 用的手持机控制程序以及信道和操作功能这样的数据。

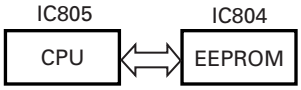


Fig. 11 Memory circuit / 图 11 存储器电路

3) Low Battery Warning

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

(1) The red LED blinks when the battery voltage falls below the voltage (1) shown in the table during transmission.
(2) The red LED blinks when the battery voltage falls below the voltage (2) shown in the table during transmission.

Note:
The transceiver checks the battery voltage during reception even when, in the FPU, the Battery Warning status function is set to "On TX" (default setting).
However, the LED does not blink during reception. During transmission, the LED blinks to generate the warning tone of a low battery voltage.

(3) The transceiver immediately stops transmission when the battery voltage falls below the voltage (3) shown in the table. A message tone beeps while the PTT switch is released.

3) 电池低压警告

通过微处理器监视电池电压。当低于警告电压时将发出警告音。

(1) 发射中，当电池电压低于电压 (1) 时红色 LED 闪烁。

(2) 发射中，当电池电压低于电压 (2) 时送色 LED 闪烁。

注：
即使电池电压警告功能在 FPU 中被设置为"On TX"(默认设定)，手持机在接收时也检测电池电压。
但是在接收期间 LED 指示灯并不闪烁。发射时电池电压过低 LED 会闪烁并产生警告音。

(3) 当电池电压降到电压 (3) 以下，手持机将立刻停止发射。PTT 开关放开时会有一声提示音。

CIRCUIT DESCRIPTION / 电路说明

	Battery Case	Li-ion Battery	Ni-Cd Battery	Ni-MH Battery
(1)	6.2[V]	6.5[V]	6.2[V]	6.2[V]
(2)	7.6[V]	7.1[V]	6.8[V]	7.0[V]
(3)	5.9[V]	6.2[V]	5.9[V]	5.9[V]

	电池盒	锂离子电池	镍镉电池	镍氢电池
(1)	6.2[V]	6.5[V]	6.2[V]	6.2[V]
(2)	7.6[V]	7.1[V]	6.8[V]	7.0[V]
(3)	5.9[V]	6.2[V]	5.9[V]	5.9[V]

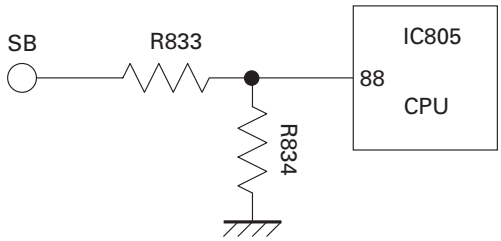


Fig. 12 Low battery warning / 图 12 电池低压警告

4) Battery Type Detection

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

4) 电池类型检测

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

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

阻抗	电池类型	S 终端的输入电压
1.8MΩ	锂离子电池	0.3~1.3V
560kΩ	镍镉电池	1.3~2.6V
220kΩ	镍氢电池	2.6~5.0V
开放	电池盒	0~0.3V

7. Control System

Keys and channel selector circuit.

The signal from the keys and channel selector are directly input to the microprocessor, as shown in fig. 13.

7 . 控制系统

按键和频道选择器电路。

如图 13 所示，来自按键和频道选择器的信号直接输入到微处理器。

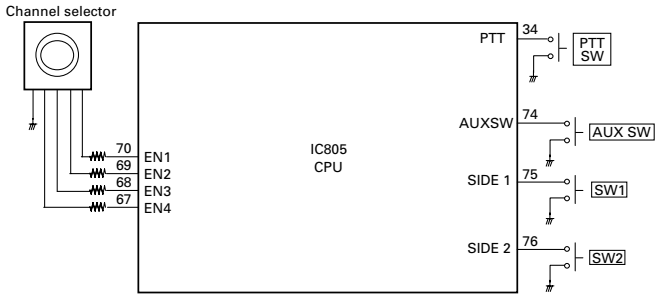


Fig. 13 Control system / 图 13 控制系统

INSTALLATION / 安装

INSTALLATION

1. Optional Board

Remove the TX/RX unit from the radio before installing the optional board in the radio.

The procedure for removing the TX/RX unit is described in the DISASSEMBLY FOR REPAIR section in the Service Manual.

Install the optional board on the back of the TX/RX unit.

For details on installation of the optional board, refer to Installation Information supplied with the optional board.

When installing the optional board, also refer to the chart in TERMINAL FUNCTION section (page 19) given in the Service Manual.

Note: To install and use the Scrambler Board, remove "R601" and "R647" from the front of the TX/RX unit.

安装

1 . 选件板

安装之前，请拆卸 TX/RX 单元。

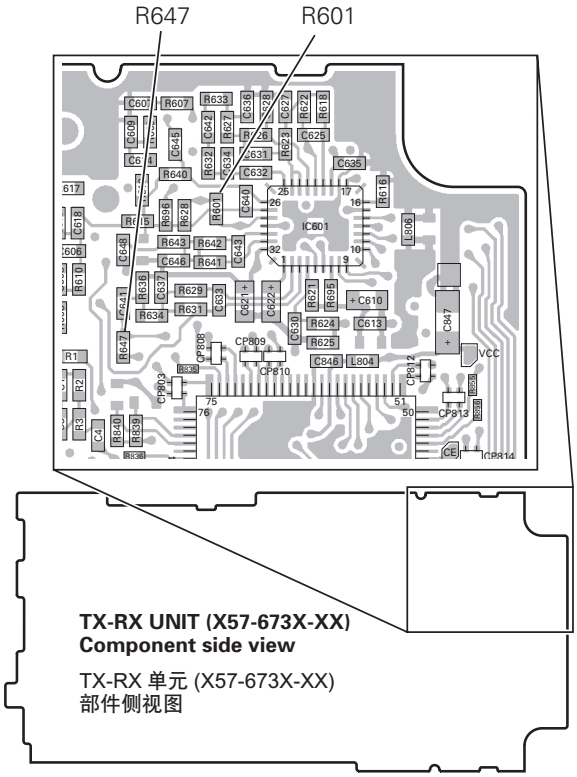
在维修手册的修理拆卸章节有关于拆卸 TX/RX 单元的内容。

在 TX/RX 单元的背面安装选件板。

有关安装选件板的详细内容，请参照选件板随附的安装信息。

安装选件板时，也请参考本维修手册的端子功能章节(第 20 页)给出的表格。

注：安装使用语音扰频器板时，请从 TX/RX 单元前侧面板上拆下"R601"和"R647"。



TX-RX UNIT (X57-673X-XX)
Component side view

TX-RX 单元 (X57-673X-XX)
部件侧视图

TERMINAL FUNCTION / 端子功能

■ CN801

Pin No.	Designation	Function	Condition	Value
1	GND	GND		Vss
2	SB	Switched B	Output Voltage/7mA load	DC (Battery terminal) ±0.5V
3	A3	AUX3	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
4	TXAFI	Transmit AF input	Input sensitivity/Impedance (1kHz std. dev.)	280±50mVrms @22kΩ Load
5	A2	AUX2	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
6	A6	AUX6	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
7	A1	AUX1	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
8	A5	AUX5	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
9	A4	AUX4	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
10	NC	Non connection		Non connection
11	5C	DC 5V	Output Voltage/10mA load	5.0±0.5V
12	MIC_O	Mic o utput	Output voltage/Impedance (1kHz 15mVrms mic input)	2.6±1.0mVrms @2.2kΩ Load
			Output voltage/Impedance (1kHz 100mVrms mic input)	90±20mVrms @100kΩ Load
13	TXAFI	Transmit AF input	Input sensitivity/Impedance (1kHz std. dev.)	280±50mVrms @22kΩ Load
14	DEO	Discriminator signal output	Output voltage/Impedance (1kHz std. mod.)	280±50mVrms @2.2kΩ Load
15	NC	Non connection		Non connection
16	ALT	Sidetone input	Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX)	7±3mVrms @22kΩ Load
17	MIC_I	Mic input	Input sensitivity/Impedance (1kHz std. dev.)	7±3mVrms @22kΩ Load
18	RA_O	Receiver AF output	Output voltage/Impedance (1kHz std. mod.)	150±50mVrms @2.2kΩ Load
			Output voltage/Impedance (1kHz system mod.)	290±50mVrms @100kΩ Load
19	RA_I	Receiver AF input	Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX)	75±20mVrms @22kΩ Load
20	GND	GND		Vss

■ Solder point connection

Designation	Function	Condition	Value
MIC_I	Mic input	Input sensitivity/Impedance (1kHz std. dev.)	7±3mVrms @22kΩ Load
MIC_O	Mic o utput	Output voltage/Impedance (1kHz 15mVrms mic input)	2.6±1.0mVrms @2.2kΩ Load
		Output voltage/Impedance (1kHz 100mVrms mic input)	90±20mVrms @100kΩ Load
RA_I	Receiver AF input	Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX)	75±20mVrms @22kΩ Load
RA_O	Receiver AF output	Output voltage/Impedance (1kHz std. mod.)	150±50mVrms @2.2kΩ Load
		Output voltage/Impedance (1kHz system mod.)	290±50mVrms @100kΩ Load
A1	AUX1	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
A2	AUX2	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
A3	AUX3	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
A4	AUX4	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
A5	AUX5	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
A6	AUX6	Load >100kΩ	(Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd
SB	Switched B	Output Voltage/7mA load	DC (Battery terminal) ±0.5V
GND	GND		Vss
5C	DC 5V	Output Voltage/10mA load	5.0±0.5V
TXAFI	Transmit AF input	Input sensitivity/Impedance (1kHz std. dev.)	280±50mVrms @22kΩ Load
DEO	Discriminator signal output	Output voltage/Impedance (1kHz std. mod.)	280±50mVrms @2.2kΩ Load
LSDFO	Received sub-tone output	Output voltage/Impedance (150Hz 15% mod.)	180±50mVrms @2.2kΩ Load
ALT	Sidetone input	Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX)	7±3mVrms @22kΩ Load

TERMINAL FUNCTION / 端子功能

■ CN801

管脚号码	名称	功能	状况	数值
1	GND	GND		Vss
2	SB	可关闭的 B	输出电压 /7mA 负载	DC(电池端子)± 0.5V
3	A3	AUX3	负载 > 100k Ω	(低)Vss_0.4V (高)Vdd-0.8V_Vdd
4	TXAFI	发射 AF 输入	输入灵敏度 / 阻抗 (1kHz std dev)	280 ± 50mVrms @22k Ω 负载
5	A2	AUX2	负载 > 100k Ω	(低) Vss ~ 0.4V (高) Vdd ~ 0.8V ~ Vdd
6	A6	AUX6	负载 > 100k Ω	(低) Vss ~ 0.4V (高) Vdd ~ 0.8V ~ Vdd
7	A1	AUX1	负载 > 100k Ω	(低) Vss ~ 0.4V (高) Vdd ~ 0.8V ~ Vdd
8	A5	AUX5	负载 > 100k Ω	(低) Vss ~ 0.4V (高) Vdd ~ 0.8V ~ Vdd
9	A4	AUX4	负载 > 100k Ω	(低) Vss ~ 0.4V (高) Vdd ~ 0.8V ~ Vdd
10	NC	未连接		未连接
11	5C	DC 5V	输出电压 /10mA 负载	5.0 ± .5V
12	MIC_O	话筒输出	输出电压 / 阻抗 (1kHz 15mVrms 话筒输入)	2.6 ± 1.0mVrms @2.2k Ω 负载
			输出电压 / 阻抗 (1kHz 100mVrms 话筒输入)	90 ± 20mVrms @100k Ω 负载
13	TXAFI	发射 AF 输入	输入灵敏度 / 阻抗 (1kHz std. dev.)	280 ± 0mVrms @22k Ω 负载
14	DEO	鉴频信号输出	输出电压 / 阻抗 (1kHz std. mod.)	280 ± 0mVrms @2.2k Ω 负载
15	NC	未连接		未连接
16	ALT	侧音输入	输入灵敏度 / 阻抗 (1kHz 定级的 AF 功率 /Vol. 最大)	7 ± 3mVrms @22k Ω 负载
17	MIC_I	话筒输入	输入灵敏度 / 阻抗 (1kHz std. dev.)	7 ± 3mVrms @22k Ω 负载
18	RA_O	接收器 AF 输出	输出电压 / 阻抗 (1kHz std. mod.)	150 ± 50mVrms @2.2k Ω 负载
			输出电压 / 阻抗 (1kHz 系统 mod.)	290 ± 50mVrms @100k Ω 负载
19	RA_I	接收器 AF 输入	输入灵敏度 / 阻抗 (1kHz 定级的 AF 功率 /Vol. 最大)	75 ± 20mVrms @22k Ω 负载
20	GND	GND		Vss

■ 焊接点连接

指示	功能	状况	数值
MIC_I	话筒输入	输入灵敏度 / 阻抗 (1kHz std. dev.)	7 ± 3mVrms @22k Ω 负载
MIC_O	话筒输出	输出电压 / 阻抗 (1kHz 15mVrms 话筒输入)	2.6 ± 1.0mVrms @2.2k Ω 负载
		输出电压 / 阻抗 (1kHz 100mVrms 话筒输入)	90 ± 20mVrms @100k Ω 负载
RA_I	接收器 AF 输入	输入灵敏度 / 阻抗 (1kHz 定级的 AF 功率 /Vol. 最大)	75 ± 20mVrms @22k Ω 负载
RA_O	接收器 AF 输出	输出电压 / 阻抗 (1kHz std. mod.)	150 ± 50mVrms @2.2k Ω 负载
		输出电压 / 阻抗 (1kHz 系统 mod.)	290 ± 50mVrms @100k Ω 负载
A1	AUX1	负载 >100k Ω	(低) Vss ~ 0.4V (高) Vdd-0.8V ~ Vdd
A2	AUX2	负载 >100k Ω	(低) Vss ~ 0.4V (高) Vdd-0.8V ~ Vdd
A3	AUX3	负载 >100k Ω	(低) Vss ~ 0.4V (高) Vdd-0.8V ~ Vdd
A4	AUX4	负载 >100k Ω	(低) Vss ~ 0.4V (高) Vdd-0.8V ~ Vdd
A5	AUX5	负载 >100k Ω	(低) Vss ~ 0.4V (高) Vdd-0.8V ~ Vdd
A6	AUX6	负载 >100k Ω	(低) Vss ~ 0.4V (高) Vdd-0.8V ~ Vdd
SB	被关闭的 B	输出电压 /7mA 负载	DC (电池端子) ± 0.5V
GND	GND		Vss
5C	DC 5V	输出电压 /10mA 负载	5.0 ± 0.5V
TXAFI	通信 AF 输入	输入灵敏度 / 阻抗 (1kHz std. dev.)	280 ± 50mVrms @22k Ω 负载
DEO	辨别者信号输出	输出电压 / 阻抗 (1kHz std. mod.)	280 ± 50mVrms @2.2k Ω 负载
LSDFO	接收的亚音频输出	输出电压 / 阻抗 (150Hz 15% mod.)	180 ± 50mVrms @2.2k Ω 负载
ALT	侧音输入	输入灵敏度 / 阻抗 (1kHz 定级的 AF 功率 /Vol. 最大)	7 ± 3mVrms @22k Ω 负载

SEMICONDUCTOR DATA / 半导体数据

Microprocessor : M30622MCA7G7GP (TX-RX UNIT : IC805)

■ Pin function

Pin No.	Port Name	I/O	Function
1	PCTV	O	APC/BPF control data output.
2	DTMF	O	DTMF, 2-tone.
3	HSDI	I	High speed data input (2-tone).
4	EEPDAT	I/O	EEPROM data input/output.
5	EEPCLK	O	EEPROM Clock
6	BYTE	I	GND.
7	CNVSS	I	GND.
8	AUX5	O	Option Board 5
9	AUX6	O	Option Board 6
10	RESET	I	CPU reset.
11	XOUT	O	CPU clock.
12	VSS	-	GND.
13	XIN	I	CPU clock.
14	VCC	-	+5V.
15	NC	I	NC
16	INT	I	Battery voltage monitor input Low battery : L
17	RDF/FD	I	Base Band IC Data input
18	TCLK/ DTRDI	I	Base Band IC Data input
19	NC	-	NC
20	LSDVCO	O	Low speed data output (VCO).
21	NC	I	NC
22	LSDTCXO	O	Low speed data output (TCXO).
23	NC	I	NC
24	BEEP	O	Beep output.
25	OPTDET	I	Option detect input
26	NC	-	NC
27	NC	-	NC
28	NC	-	NC
29	AUX4	O	Option board port 4
30	AUX2	I/O	Option board port 2
31	NC	-	NC
32	NC	-	NC
33	TXD	I/O	Serial data.
34	PTT/RXD	I	PTT on : L/Serial data.
35	STD	I	Base Band IC Data input
36	BBDIR	O	Base Band IC Data output
37	BBCLK	O	Base Band IC clock output
38	BBDI/O	I/O	Base Band IC Data input/output
39	NC	-	NC
40	TDATA/ DTRCLK	O	Base Band IC Data output
41	DTRLOADN	O	Base Band IC Data output
42	AUX3	O	Option board port 3
43	AUX1	O	Option board port 1
44	NC	-	NC
45	NC	-	NC
46	DSW	O	APC voltage discharge Switch
47	BEEPSW	O	Beep switch.
48	AFCOUT	O	AF amp power supply control
49	AFMUTE	O	RX audio mute
50	NC	-	NC
51	TX	O	TX VCO power supply switch TX:L

微处理器：M30622MCA7G7GP (TX-RX 单元：IC805)

■ 管脚功能

管脚号码	接口名称	输入 / 输出	功能
1	PCTV	输出	APC/BPF 控制数据输出。
2	DTMF	输出	DTMF, 2-tone。
3	HSDI	输入	高速数据输入 (2-tone)。
4	EEPDAT	输入 / 输出	EEPROM 数据输入 / 输出。
5	EEPCLK	输出	EEPROM 时钟
6	BYTE	输入	GND。
7	CNVSS	输入	GND。
8	AUX5	输出	可选板 5
9	AUX6	输出	可选板 6
10	RESET	输入	CPU 复位。
11	XOUT	输出	CPU 时钟。
12	VSS	-	GND。
13	XIN	输入	CPU 时钟。
14	VCC	-	+5V。
15	NC	输入	NC
16	INT	输入	电池电压监视器输入低电池 : L
17	RDF/FD	输入	基带 IC 数据输入
18	TCLK/ DTRDI	输入	基带 IC 数据输入
19	NC	-	NC
20	LSDVCO	输出	低速度数据输出(VCO)。
21	NC	输入	NC
22	LSDTCXO	输出	低速度数据输出 (TCXO).
23	NC	输入	NC
24	BEEP	输出	哔哔声输出。
25	OPTDET	输入	可选检测输入
26	NC	-	NC
27	NC	-	NC
28	NC	-	NC
29	AUX4	输出	可选板 4
30	AUX2	输入 / 输出	可选板 2
31	NC	-	NC
32	NC	-	NC
33	TXD	输入 / 输出	串行数据。
34	PTT/RXD	输入	PTT on : L 串行数据。
35	STD	输入	基带 IC 数据输入
36	BBDIR	输出	基带 IC 数据输出
37	BBCLK	输出	基带 IC 时钟输出
38	BBDI/O	输入 / 输出	基带 IC 数据输入 / 输出
39	NC	-	NC
40	TDATA/ DTRCLK	输出	基带 IC 数据输出
41	DTRLOADN	输出	基带 IC 数据输出
42	AUX3	输出	可选板 3
43	AUX1	输出	可选板 1
44	NC	-	NC
45	NC	-	NC
46	DSW	输出	APC 电压放电开关
47	BEEPSW	输出	哔哔声开关。
48	AFCOUT	输出	AF 放大器电源控制
49	AFMUTE	输出	RX 音频静音
50	NC	-	NC
51	TX	输出	TX VCO 电源开关 TX:L

SEMICONDUCTOR DATA / 半导体数据

Pin No.	Port Name	I/O	Function
52	RX	O	RX VCO power supply switch RX:L
53	BSHIFT	O	Beet shift switch.
54	W/N	O	W/N switch Wide:L
55	NC	-	NC
56	APCSW	O	APC switch output.
57	SAVE	O	Battery save output.
58	5TC	O	5T control output.
59	5RC	O	5R control output.
60	VCC	-	+5V.
61	5MSC	O	5M control output.
62	VSS	-	GND.
63	NC	-	NC
64	NC	-	NC
65	NC	-	NC
66	NC	-	NC
67	EN4	I	CH selector input 4.
68	EN3	I	CH selector input 3.
69	EN2	I	CH selector input 2.
70	EN1	I	CH selector input 1.
71	NC	-	NC
72	LEDTX	O	RED LED lights control output
73	LEDRX	O	GREEN LED lights control output
74	AUXSW	I	Key input (Emergency).
75	SIDE1	I	Side key 1 input.
76	SIDE2	I	Side key 2 input.
77	NC	-	NC
78	NC	-	NC
79	SIM1	I	Destination select 1.
80	SIM2	I	Destination select 2.
81	NC	-	NC
82	PLLUL	I	PLL unlock detect input. unlock : L
83	RFCLK	O	PLL clock output. Latch : L
84	RFDAT	O	PLL data output.
85	PS	O	PLL power save output.
86	PLLSTB	O	PLL strobe output.
87	BATTSEL	I	Battery distinction input.
88	BATT	I	Battery voltage input.
89	VOX	I	VOX input.
90	RSSQL	I	Received signal strength indicator input.
91	ANSQL	I	Squelch level input.
92	LSDI	I	Low speed data input (QT/DQT).
93	THM	I	Thermistor input.
94	AVSS	-	GND.
95	NC	-	NC
96	VREF	-	+5V.
97	AVCC	-	+5V.
98	NC	-	NC
99	NC	-	NC
100	NC	-	NC

管脚号码	接口名称	输入 / 输出	功能
52	RX	输出	RX VCO 电源开关 RX:L
53	BSHIFT	输出	拍频偏移开关。
54	W/N	输出	W/N 开关 宽 : L
55	NC	-	NC
56	APCSW	输出	APC 开关输出。
57	SAVE	输出	电池节省输出。
58	5TC	输出	5T 控制输出。
59	5RC	输出	5R 控制输出。
60	VCC	-	+5V。
61	5MSC	输出	5M 控制输出。
62	VSS	-	GND。
63	NC	-	NC
64	NC	-	NC
65	NC	-	NC
66	NC	-	NC
67	EN4	输入	CH 选择器输入 4。
68	EN3	输入	CH 选择器输入 3。
69	EN2	输入	CH 选择器输入 2。
70	EN1	输入	CH 选择器输入 1。
71	NC	-	NC
72	LEDTX	输出	红 LED 指示灯控制输出
73	LEDRX	输出	绿 LED 指示灯控制输出
74	AUXSW	输入	键输入(紧急)。
75	SIDE1	输入	侧键 1 输入。
76	SIDE2	输入	侧键 2 输入。
77	NC	-	NC
78	NC	-	NC
79	SIM1	输入	类型选择 1。
80	SIM2	输入	类型选择 2。
81	NC	-	NC
82	PLLUL	输入	PLL 失锁检测输入 开放 : L
83	RFCLK	输出	PLL 时钟输出 锁定 : L
84	RFDAT	输出	PLL 数据输出。
85	PS	输出	PLL 电力节省输出。
86	PLLSTB	输出	PLL 选通输出。
87	BATTSEL	输入	电池差别输入。
88	BATT	输入	电池电压输入。
89	VOX	输入	VOX 输入。
90	RSSQL	输入	接收信号强度指示器输入。
91	ANSQL	输入	静噪电平输入。
92	LSDI	输入	低速数据输入 (QT/DQT)。
93	THM	输入	热敏电阻输入。
94	AVSS	-	GND。
95	NC	-	NC
96	VREF	-	+5V。
97	AVCC	-	+5V。
98	NC	-	NC
99	NC	-	NC
100	NC	-	NC

COMPONENTS DESCRIPTION / 元件说明

TX-RX UNIT (X57-673X-XX)

Ref. No.	Use/Function	Operation/Condition
IC1	IC	PLL system
IC201	IC	Comparator (APC)
IC401	IC	FM IF system
IC601	IC	Audio processor
IC602	IC	AF AMP
IC603(1/2)	IC	HSD AMP
IC603(2/2)	IC	HSD AMP
IC604	IC	VOX AMP
IC605	IC	AF Power AMP
IC801	IC	Voltage regulator / 5V
IC802	IC	Voltage detector / Reset
IC803	IC	Voltage detector / INT
IC804	IC	EEPROM
IC805	IC	Microprocessor
IC806	IC	Flip Flop
Q1	Transistor	Level shift
Q2	Transistor	Level shift
Q3	Transistor	Level shift
Q4	Transistor	Tripler
Q5	FET	VCO / RX
Q6	FET	VCO / TX
Q7	Transistor	PLL IC f-in AMP
Q8	FET	DC switch / TX VCO
Q9	Transistor	RF Buffer AMP
Q10	Transistor	Ripple filter
Q11	Transistor	RF AMP
Q12	FET	DC switch / RX VCO
Q205	Transisitor	Pre-drive AMP
Q206	FET	Pre-drive AMP
Q207	FET	TX Drive AMP
Q208	Transistor	APC switch
Q209	FET	APC switch
Q210	Transistor	APC switch
Q211	FET	TX Final AMP
Q212	FET	APC switch
Q213	Transistor	APC switch
Q401	Transistor	W/N switch / RX
Q402	Transistor	IF AMP
Q403	FET	Mixer
Q404	FET	RF AMP
Q407	FET	DC switch
Q408	FET	W/N switch / TX
Q601	FET	AF Mute
Q602	FET	Beep switch
Q603	Transistor	DC switch / SP Mute
Q604	Transistor	DC switch
Q605	Transistor	MIC AGC
Q606	Transistor	MIC AGC
Q607	Transistor	DC switch / SP Mute
Q608	FET	SP Mute switch
Q801	Transistor	5T switch
Q802(1/2)	FET	5TC switch
Q802(2/2)	FET	SAVE switch
Q803(1/2)	Transistor	AVR / 5C
Q803(2/2)	Transistor	AVR / 5T

TX-RX 单元 (X57-673X-XX)

编号	使用 / 功能	操作 / 状态
IC1	IC	PLL 系统
IC201	IC	比较器 (APC)
IC401	IC	FM IF 系统
IC601	IC	音频处理器
IC602	IC	AF 放大器
IC603(1/2)	IC	HSD 放大器
IC603(2/2)	IC	HSD 放大器
IC604	IC	VOX 放大器
IC605	IC	AF 电力放大器
IC801	IC	电压调节器 / 5V
IC802	IC	电压检测器 / 复位
IC803	IC	电压检测器 / INT
IC804	IC	EEPROM
IC805	IC	微处理器
IC806	IC	触发器
Q1	晶体管	电平变换
Q2	晶体管	电平变换
Q3	晶体管	电平变换
Q4	晶体管	3 倍频器
Q5	场效应管	VCO / RX
Q6	场效应管	VCO / TX
Q7	晶体管	PLL IC f-in 放大器
Q8	场效应管	DC 开关 / TX VCO
Q9	晶体管	RF 缓冲放大器
Q10	晶体管	触发滤波器
Q11	晶体管	RF 放大器
Q12	场效应管	DC 开关 / RX VCO
Q205	晶体管	DC 开关
Q206	场效应管	前置驱动放大器
Q207	场效应管	TX 驱动放大器
Q208	晶体管	APC 开关
Q209	场效应管	APC 开关
Q210	晶体管	APC 开关
Q211	场效应管	TX 终端放大器
Q212	场效应管	APC 开关
Q213	晶体管	APC 开关
Q401	晶体管	W/N 开关 / RX
Q402	晶体管	IF 放大器
Q403	场效应管	混频器
Q404	场效应管	RF 放大器
Q407	场效应管	前置驱动放大器
Q408	场效应管	W/N 开关 / TX
Q601	场效应管	AF 静音
Q602	场效应管	哔哔声开关
Q603	晶体管	DC 开关 / SP 静音
Q604	晶体管	DC 开关
Q605	晶体管	MIC AGC
Q606	晶体管	MIC AGC
Q607	晶体管	DC 开关 / SP 静音
Q608	场效应管	SP 静音开关
Q801	晶体管	5T 开关
Q802(1/2)	场效应管	5TC 开关
Q802(2/2)	场效应管	SAVE 开关
Q803(1/2)	晶体管	AVR / 5C
Q803(2/2)	晶体管	AVR / 5T

COMPONENTS DESCRIPTION / 元件说明

Ref. No.	Use/Function	Operation/Condition
Q804	Transistor	5C switch
Q805(1/2)	Transistor	LED switch / Green
Q805(2/2)	Transistor	LED switch / Red
Q806	Transistor	AVR / PLLB
Q807	Transistor	PLLB switch
Q808	Transistor	5MS switch
Q809	Transistor	5R switch
Q810	FET	Beet shift switch
D3	Variable capacitance diode	Frequency control / RX VCO
D4	Variable capacitance diode	Frequency control / TX VCO
D7	Variable capacitance diode	Frequency control / TX VCO
D9	Variable capacitance diode	Frequency control / RX VCO
D10	Variable capacitance diode	Modulator
D11	Diode	Current steering
D201	Diode	TX/RX RF switch
D203	Zener diode	APC protect
D204	Diode	ANT switch
D206	Diode	ANT switch
D208	Diode	ANT switch
D212	Diode	ANT switch
D401	Diode	TX/RX RF switch
D402	Variable capacitance diode	RF BPF tuning
D403	Variable capacitance diode	RF BPF tuning
D404	Variable capacitance diode	RF BPF tuning
D405	Variable capacitance diode	RF BPF tuning
D406	Variable capacitance diode	RF BPF tuning
D407	Diode	Rectifier
D603	Diode	Limitter
D604	Diode	Detector
D605	Diode	Detector
D606	Diode	Detector
D801	Diode	5M protector
D802	LED	LED / Red
D803	LED	LED / Green
D805	Diode	Reverse protection

编号	使用 / 功能	操作 / 状态
Q804	晶体管	5C 开关
Q805(1/2)	晶体管	LED 开关 / 绿
Q805(2/2)	晶体管	LED 开关 / 红
Q806	晶体管	AVR / PLLB
Q807	晶体管	PLLB 开关
Q808	晶体管	5MS 开关
Q809	晶体管	5R 开关
Q810	场效应管	拍频偏移开关
D3	可变电容二极管	频率控制 / RX VCO
D4	可变电容二极管	频率控制 / TX VCO
D7	可变电容二极管	频率控制 / TX VCO
D9	可变电容二极管	频率控制 / RX VCO
D10	可变电容二极管	调制器
D11	二极管	电流开关
D201	二极管	TX/RX RF 开关
D203	齐纳二极管	APC 保护
D204	二极管	ANT 开关
D206	二极管	ANT 开关
D208	二极管	ANT 开关
D212	二极管	ANT 开关
D401	二极管	TX/RX RF 开关
D402	可变电容二极管	RF BPF 调谐
D403	可变电容二极管	RF BPF 调谐
D404	可变电容二极管	RF BPF 调谐
D405	可变电容二极管	RF BPF 调谐
D406	可变电容二极管	RF BPF 调谐
D407	二极管	整流器
D603	二极管	限幅器
D604	二极管	检测器
D605	二极管	检测器
D606	二极管	检测器
D801	二极管	5M 保护器
D802	LED	LED / 红
D803	LED	LED / 绿
D805	二极管	反转保护器

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-3160 (Y50-5793-XX)
TX-RX UNIT (X57-673X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-3160					
1	1B		A02-3826-43	CABINET ASSY	
2	2B	∗	A10-4068-51	CHASSIS	
3	3A		A82-0054-02	REAR PANEL	
4	3A		B01-0694-03	ESCUTCHEON	
5	2D		B09-0676-13	CAP ACCESSORY	
6	1C		B62-1802-00	INSTRUCTION MANUAL	
7	3B	∗	B72-2284-04	MODEL NAME PLATE	C
7	3B	∗	B72-2285-04	MODEL NAME PLATE	C2
8	3A		E04-0446-05	RF COAXIAL RECEPTACLE(SMA)	
9	2A		E37-1101-05	SPEAKER WIRE(RED)	
10	2A		E37-1102-05	SPEAKER WIRE(BLACK)	
11	3A		E72-0416-23	BATT TERMINAL BLOCK	
13	2B		G11-4090-04	SHEET(FINAL FET)	
14	3B		G11-4254-04	SHEET(PTT)	
15	3A		G11-4287-04	SHEET(BATT TERMINAL BLOCK)	
16	3A		G11-4289-04	SHEET(CHASSIS)	
20	1A		G11-4306-04	SHEET	
21	2A		G11-4312-04	SHEET	
22	2B		G13-2001-04	CUSHION(CHASSIS)	
23	2B		G13-2014-04	CUSHION(CHASSIS BOTTOM)	
24	2B		G13-2017-04	CUSHION	
25	2B		G13-2018-04	CUSHION	
26	3A		G13-2019-04	CUSHION	
27	2B		G13-2020-04	CUSHION	
28	3A		G13-2026-04	CUSHION	
29			G13-2027-04	CUSHION	
30	2B		G53-1580-03	PACKING(CHASSIS)	
31	1B	∗	G53-1581-22	PACKING(SPEAKER)	
32	3A		G53-1582-03	PACKING(BATT TERMINAL BLOCK)	
33	3A		G53-1641-02	PACKING	
34	3C		H12-3150-02	PACKING FIXTURE	
35			H25-2345-04	PROTECTION BAG	
36	1D		H52-2070-02	ITEM CARTON CASE	
37	2A		J19-5454-03	HOLDER	
38	2D		J21-8464-04	HARDWARE FIXTURE ACCESSORY	
39	2C		J29-0701-05	HOOK ACCESSORY	
40	3A		J30-1275-14	SPACER(KNOB)	
41	2C		J69-0342-05	HANDSTRAP ACCESSORY	
42	1A		K29-9278-13	KNOB(VOLUME)	
43	3A		K29-9280-13	KNOB(CH SELECTOR)	
44	1B		K29-9332-03	KNOB(PTT)	
A	3A		N14-0583-04	CIRCULAR NUT(CHANNEL)	
B	3A		N14-0805-04	CIRCULAR NUT(VOLUME)	
C	3A		N30-2604-46	PAN HEAD MACHINE SCREW	
D	3B		N30-2612-46	PAN HEAD MACHINE SCREW	
E	3A,3B		N30-3006-45	PAN HEAD MACHINE SCREW	
F	2D		N35-3004-45	BINDING HEAD MACHINE SCREW	
G	3A,3B		N78-2040-46	PAN HEAD TAPTITE SCREW	
H	2A,2B		N83-2005-46	PAN HEAD TAPTITE SCREW	
45	2A		R31-0650-05	VARIABLE RESISTOR	
46	2A		S60-0420-05	ROTARY SWITCH	
47	1B		T07-0369-05	SPEAKER	
48	2C		T90-0798-15	HELICAL ANTENNA ACCESSORY	C
48	2C		T90-0800-15	HELICAL ANTENNA ACCESSORY	C2
TX-RX UNIT (X57-673X-XX) 3-01:C 0-12:C2					
D802			B30-2156-05	LED(RED)	
D803			B30-2157-05	LED(YELLOW)	
C1			CK73GB1H392K	CHIP C 3900PF K	
C2			CK73GB1H471K	CHIP C 470PF K	
C3			CK73GB1H103K	CHIP C 0.010UF K	
C5			CK73GB1H471K	CHIP C 470PF K	
C6			CK73GB1H103K	CHIP C 0.010UF K	
C7			CK73GB1H471K	CHIP C 470PF K	
C8			CC73GCH1H100D	CHIP C 10PF D	
C9			CK73GB1H103K	CHIP C 0.010UF K	
C10			CC73GCH1H100D	CHIP C 10PF D	
C11 -13			CC73GCH1H101J	CHIP C 100PF J	
C14			C92-0713-05	CHIP-TAN 10UF 6.3WV	
C15			CK73GB1H102K	CHIP C 1000PF K	
C16			CC73GCH1H470J	CHIP C 47PF J	
C18, 19			CK73GB1C104K	CHIP C 0.10UF K	
C22			CK73GB1C104K	CHIP C 0.10UF K	
C24			C92-0713-05	CHIP-TAN 10UF 6.3WV	
C25			CK73GB1H471K	CHIP C 470PF K	
C27			CK73GB1H103K	CHIP C 0.010UF K	
C28			CC73GCH1H560J	CHIP C 56PF J	
C29			CK73GB1H471K	CHIP C 470PF K	
C30			CC73GCH1H220J	CHIP C 22PF J	
C31			CC73GCH1H560J	CHIP C 56PF J	
C32			C92-0002-05	CHIP-TAN 0.22UF 35WV	
C33			CC73GCH1H470J	CHIP C 47PF J	
C34			CK73GB1H471K	CHIP C 470PF K	
C35			CC73GCH1H680J	CHIP C 68PF J	
C36			C92-0585-05	CHIP-TAN 4.7UF 16WV	
C37			CK73GB1H103K	CHIP C 0.010UF K	C
C37			CK73GB1H822K	CHIP C 8200PF K	C2
C38, 39			C92-0002-05	CHIP-TAN 0.22UF 35WV	
C40			CK73GB1H183K	CHIP C 0.018UF K	
C41, 42			CK73GB1A105K	CHIP C 1.0UF K	
C43, 44			CC73HCH1H101J	CHIP C 100PF J	
C45			CC73HCH1H020B	CHIP C 2.0PF B	C
C45			CC73HCH1H050B	CHIP C 5.0PF B	C2
C46			CC73HCH1H220J	CHIP C 22PF J	C2
C46			CC73HCH1H270J	CHIP C 27PF J	C
C47			CK73GB1H471K	CHIP C 470PF K	
C48			CC73HCH1H120J	CHIP C 12PF J	
C49			CC73HCH1H390J	CHIP C 39PF J	
C50			CC73HCH1H020C	CHIP C 2.0PF C	C2
C50			CC73HCH1H040C	CHIP C 4.0PF C	C
C51			CC73HCH1H120J	CHIP C 12PF J	C
C51			CC73HCH1H220J	CHIP C 22PF J	C2
C52			CC73GCH1H050C	CHIP C 5.0PF C	C

PARTS LIST / 零件表

TX-RX UNIT (X57-673X-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C52			CC73GCH1H070D	CHIP C	7.0PF	D	C2
C53			CC73HCH1H030B	CHIP C	3.0PF	B	C
C53			CC73HCH1H050B	CHIP C	5.0PF	B	C2
C54			CC73HCH1H020C	CHIP C	2.0PF	C	C2
C54			CC73HCH1H030C	CHIP C	3.0PF	C	C
C55, 56			CC73HCH1H010B	CHIP C	1.0PF	B	
C57			CC73GCH1H030C	CHIP C	3.0PF	C	C
C57			CC73GCH1H040C	CHIP C	4.0PF	C	C2
C58			CC73HCH1H050B	CHIP C	5.0PF	B	
C59			CC73GCH1H050C	CHIP C	5.0PF	C	C
C59			CC73GCH1H070D	CHIP C	7.0PF	D	C2
C60			CC73HCH1H040B	CHIP C	4.0PF	B	C
C60			CC73HCH1H050B	CHIP C	5.0PF	B	C2
C61			CK73HB1H471K	CHIP C	470PF	K	
C62			CC73HCH1H070B	CHIP C	7.0PF	B	C
C62			CC73HCH1H090B	CHIP C	9.0PF	B	C2
C63			CC73GCH1H100D	CHIP C	10PF	D	
C64			CC73HCH1H050B	CHIP C	5.0PF	B	C
C64			CC73HCH1H060B	CHIP C	6.0PF	B	C2
C65			CC73HCH1H101J	CHIP C	100PF	J	
C66			CC73HCH1H120J	CHIP C	12PF	J	
C67			CK73HB1H471K	CHIP C	470PF	K	
C68			CK73GB1H471K	CHIP C	470PF	K	
C69			CC73HCH1H070B	CHIP C	7.0PF	B	
C70			CK73HB1H471K	CHIP C	470PF	K	
C71			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C72			CC73HCH1H0R5B	CHIP C	0.5PF	B	
C73			CK73GB1H471K	CHIP C	470PF	K	
C74			CC73HCH1H100D	CHIP C	10PF	D	
C75, 76			CK73HB1H471K	CHIP C	470PF	K	
C77			C92-0713-05	CHIP-TAN	10UF	6.3WV	
C78			CK73HB1H471K	CHIP C	470PF	K	
C80			CC73HCH1H070D	CHIP C	7.0PF	D	
C82			CC73HCH1H330J	CHIP C	33PF	J	
C83 -85			CK73HB1H471K	CHIP C	470PF	K	
C86			CC73HCH1H070D	CHIP C	7.0PF	D	
C92			CK73GB1H471K	CHIP C	470PF	K	
C94, 95			CK73HB1A104K	CHIP C	0.10UF	K	
C201,202			CK73GB1H471K	CHIP C	470PF	K	
C205			CK73GB1A224K	CHIP C	0.22UF	K	
C223			CK73GB1H471K	CHIP C	470PF	K	C2
C223,224			CK73GB1H471K	CHIP C	470PF	K	C
C224			CC73GCH1H090D	CHIP C	9.0PF	D	C2
C226			CK73GB1H471K	CHIP C	470PF	K	
C233			CK73GB1H471K	CHIP C	470PF	K	
C241			CK73GB1H471K	CHIP C	470PF	K	
C242			CC73GCH1H060D	CHIP C	6.0PF	D	
C243			CK73GB1C104K	CHIP C	0.10UF	K	
C248			CC73GCH1H050C	CHIP C	5.0PF	C	C2
C249			CC73GCH1H130J	CHIP C	13PF	J	
C255			CK73GB1H471K	CHIP C	470PF	K	
C258			CK73GB1C104K	CHIP C	0.10UF	K	
C280			CC73GCH1H330J	CHIP C	33PF	J	C2
C280			CK73GB1H471K	CHIP C	470PF	K	C
C282			CC73GCH1H101J	CHIP C	100PF	J	C2
C282			CC73GCH1H220J	CHIP C	22PF	J	C
C283			CC73GCH1H100D	CHIP C	10PF	D	
C284			CC73GCH1H200J	CHIP C	20PF	J	
C286			C92-0565-05	CHIP-TAN	6.8UF	10WV	
C288			CK73GB1A105K	CHIP C	1.0UF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C290-293			CK73GB1H471K	CHIP C	470PF	K	
C294			CC73GCH1H101J	CHIP C	100PF	J	
C295			CC73GCH1H270J	CHIP C	27PF	J	C2
C295			CC73GCH1H330J	CHIP C	33PF	J	C
C296			CK73GB1H471K	CHIP C	470PF	K	
C297			CK73GB1H103K	CHIP C	0.010UF	K	
C298			CK73GB1C104K	CHIP C	0.10UF	K	
C299			CK73GB1A105K	CHIP C	1.0UF	K	
C300			CC73GCH1H180J	CHIP C	18PF	J	C2
C300			CC73GCH1H220J	CHIP C	22PF	J	C
C301			CK73GB1H103K	CHIP C	0.010UF	K	
C308			CC73GCH1H150J	CHIP C	15PF	J	C2
C308			CC73GCH1H270J	CHIP C	27PF	J	C
C309			CK73GB1H471K	CHIP C	470PF	K	
C326			CK73GB1H471K	CHIP C	470PF	K	
C333			CC73GCH1H040B	CHIP C	4.0PF	B	C2
C341			CC73GCH1H150J	CHIP C	15PF	J	C2
C341			CC73GCH1H3R5B	CHIP C	3.5PF	B	C
C349			CC73GCH1H070B	CHIP C	7.0PF	B	
C351			CC73GCH1H270J	CHIP C	27PF	J	
C352			CK73GB1H471K	CHIP C	470PF	K	
C353			CC73GCH1H040B	CHIP C	4.0PF	B	
C355			CC73GCH1H050B	CHIP C	5.0PF	B	
C356			CC73GCH1H101J	CHIP C	100PF	J	
C358			CC73GCH1H030B	CHIP C	3.0PF	B	C
C358			CC73GCH1H040B	CHIP C	4.0PF	B	C2
C359			CC73GCH1H010B	CHIP C	1.0PF	B	C2
C359			CC73GCH1H1R5B	CHIP C	1.5PF	B	C
C360			CC73GCH1H080B	CHIP C	8.0PF	B	C2
C360			CC73GCH1H3R5B	CHIP C	3.5PF	B	C
C361			CC73GCH1H2R5B	CHIP C	2.5PF	B	
C363			CC73GCH1H070B	CHIP C	7.0PF	B	C2
C363			CC73GCH1H4R5B	CHIP C	4.5PF	B	C
C364			CC73GCH1H020B	CHIP C	2.0PF	B	C
C364			CC73GCH1H1R5B	CHIP C	1.5PF	B	C2
C368			CC73GCH1H100D	CHIP C	10PF	D	C
C368			CC73GCH1H150J	CHIP C	15PF	J	C2
C371			CC73GCH1H010B	CHIP C	1.0PF	B	C
C371			CC73GCH1H020B	CHIP C	2.0PF	B	C2
C372			CK73GB1H471K	CHIP C	470PF	K	
C401			CK73GB1H182K	CHIP C	1800PF	K	
C402,403			CC73GCH1H331J	CHIP C	330PF	J	
C405			CC73GCH1H390J	CHIP C	39PF	J	
C406			C92-0713-05	CHIP-TAN	10UF	6.3WV	
C407			CK73GB1H103K	CHIP C	0.010UF	K	
C408			CK73GB1C104K	CHIP C	0.10UF	K	
C409			CC73GCH1H680J	CHIP C	68PF	J	
C410			CK73GB1H471K	CHIP C	470PF	K	
C411-413			CK73GB1C104K	CHIP C	0.10UF	K	
C414			CC73GCH1H100D	CHIP C	10PF	D	
C415			CK73GB1H471K	CHIP C	470PF	K	
C416,417			CK73GB1H103K	CHIP C	0.010UF	K	
C418			CK73GB1H471K	CHIP C	470PF	K	
C419			CC73GCH1H010B	CHIP C	1.0PF	B	
C420			CK73GB1C104K	CHIP C	0.10UF	K	
C421			CC73GCH1H080B	CHIP C	8.0PF	B	
C422			CK73GB1H103K	CHIP C	0.010UF	K	
C424			CK73GB1H103K	CHIP C	0.010UF	K	
C425			CC73GCH1H060D	CHIP C	6.0PF	D	
C426			CC73GCH1H020B	CHIP C	2.0PF	B	C

PARTS LIST / 零件表

TX-RX UNIT (X57-673X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C426			CC73GCH1H2R5B	CHIP C 2.5PF B	C2
C427			CC73GCH1H100D	CHIP C 10PF D	
C428			CK73GB1H471K	CHIP C 470PF K	
C429			CC73GCH1H120J	CHIP C 12PF J	
C430			CK73GB1H471K	CHIP C 470PF K	
C431			CK73GB1H103K	CHIP C 0.010UF K	
C432			CK73GB1H471K	CHIP C 470PF K	
C434			CC73GCH1H050B	CHIP C 5.0PF B	C
C434			CC73GCH1H090B	CHIP C 9.0PF B	C2
C435			CK73GB1H471K	CHIP C 470PF K	
C439			CC73GCH1H180J	CHIP C 18PF J	C2
C439			CK73GB1H471K	CHIP C 470PF K	C
C445			CC73GCH1H050B	CHIP C 5.0PF B	C
C445			CC73GCH1H3R5B	CHIP C 3.5PF B	C2
C447			CC73GCH1H470J	CHIP C 47PF J	
C448			CC73GCH1H030B	CHIP C 3.0PF B	C
C448			CC73GCH1H4R5B	CHIP C 4.5PF B	C2
C456			CK73HB1H471K	CHIP C 470PF K	
C464			CC73GCH1H020B	CHIP C 2.0PF B	C
C464			CC73GCH1H4R5B	CHIP C 4.5PF B	C2
C465			CC73GCH1H1R5B	CHIP C 1.5PF B	C2
C465			CC73GCH1H2R5B	CHIP C 2.5PF B	C
C466			CC73GCH1H470J	CHIP C 47PF J	
C467			CK73HB1H471K	CHIP C 470PF K	
C468,469			CC73GCH1H030B	CHIP C 3.0PF B	C
C468,469			CC73GCH1H3R5B	CHIP C 3.5PF B	C2
C470			CK73HB1H471K	CHIP C 470PF K	
C471			CC73GCH1H470J	CHIP C 47PF J	
C472			C92-0714-05	CHIP-TAN 4.7UF 6.3WV	
C473			CC73HCH1H070B	CHIP C 7.0PF B	
C474,475			CK73GB1H471K	CHIP C 470PF K	
C478,479			CK73HB1H471K	CHIP C 470PF K	
C481,482			CK73GB1H471K	CHIP C 470PF K	
C483			CC73GCH1H050B	CHIP C 5.0PF B	C
C483			CC73GCH1H060B	CHIP C 6.0PF B	C2
C484			CC73GCH1H470J	CHIP C 47PF J	
C485			CC73GCH1H030B	CHIP C 3.0PF B	C
C485			CC73GCH1H2R5B	CHIP C 2.5PF B	C2
C487			CK73GB1H471K	CHIP C 470PF K	
C488			CC73GCH1H030B	CHIP C 3.0PF B	
C489			CC73GCH1H470J	CHIP C 47PF J	
C490			CC73GCH1H0R5B	CHIP C 0.5PF B	C
C490			CC73GCH1H010B	CHIP C 1.0PF B	C2
C491			CC73GCH1H050B	CHIP C 5.0PF B	C2
C491			CC73GCH1H060B	CHIP C 6.0PF B	C
C492			CC73GCH1H030B	CHIP C 3.0PF B	C
C492			CC73GCH1H4R5B	CHIP C 4.5PF B	C2
C493			CK73GB1H471K	CHIP C 470PF K	
C494			CK73GB1H103K	CHIP C 0.010UF K	
C495			CC73GCH1H010C	CHIP C 1.0PF C	
C501			CK73GB1H471K	CHIP C 470PF K	
C503			CC73HCH1H0R5B	CHIP C 0.5PF B	C
C504			CK73HB1H471K	CHIP C 470PF K	
C506			CK73GB1A105K	CHIP C 1.0UF K	
C507			CK73GB0J225K	CHIP C 2.2UF K	
C508			CK73GB1H471K	CHIP C 470PF K	
C601			CK73GB1A224K	CHIP C 0.22UF K	
C605			C92-0632-05	CHIP-TAN 6.8UF 6.3WV	
C607			CK73GB1H103K	CHIP C 0.010UF K	
C608			CK73GB1H392K	CHIP C 3900PF K	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C609			CK73GB1H103K	CHIP C 0.010UF K	
C610			C92-0714-05	CHIP-TAN 4.7UF 6.3WV	
C611			CK73GB1A105K	CHIP C 1.0UF K	
C613-615			CK73GB1C104K	CHIP C 0.10UF K	
C616			CK73GB1H332K	CHIP C 3300PF K	
C618			CK73GB1C104K	CHIP C 0.10UF K	
C619			CK73GB1H392K	CHIP C 3900PF K	
C621,622			C92-0714-05	CHIP-TAN 4.7UF 6.3WV	
C624			CK73GB1C104K	CHIP C 0.10UF K	
C625			CC73GCH1H680J	CHIP C 68PF J	
C627			CK73GB1E123K	CHIP C 0.012UF K	
C628			CK73GB1H222K	CHIP C 2200PF K	
C629			CK73GB1C104K	CHIP C 0.10UF K	
C630			CC73GCH1H101J	CHIP C 100PF J	
C631			CK73GB1E123K	CHIP C 0.012UF K	
C632			CK73GB1C104K	CHIP C 0.10UF K	
C633			CC73GCH1H020B	CHIP C 2.0PF B	
C634			CK73GB1H102K	CHIP C 1000PF K	
C635			CK73GB1C104K	CHIP C 0.10UF K	
C636			CK73GB1C683K	CHIP C 0.068UF K	
C637			CC73GCH1H101J	CHIP C 100PF J	
C638			CK73GB1H471K	CHIP C 470PF K	
C639			CC73GCH1H470J	CHIP C 47PF J	
C640			CC73GCH1H101J	CHIP C 100PF J	
C641,642			CK73GB1C104K	CHIP C 0.10UF K	
C643			CC73GCH1H680J	CHIP C 68PF J	
C645			CK73GB0J225K	CHIP C 2.2UF K	
C646			CK73GB1H821K	CHIP C 820PF K	
C647			CK73GB1H471K	CHIP C 470PF K	
C648,649			CK73GB1C104K	CHIP C 0.10UF K	
C650			C92-0713-05	CHIP-TAN 10UF 6.3WV	
C652			CK73GB1H471K	CHIP C 470PF K	
C653			CK73GB1A224K	CHIP C 0.22UF K	
C654			CK73GB1H103K	CHIP C 0.010UF K	
C655			CK73GB1C223K	CHIP C 0.022UF K	
C656			CK73GB1C104K	CHIP C 0.10UF K	
C657			CC73GCH1H470J	CHIP C 47PF J	
C658			CK73GB1C104K	CHIP C 0.10UF K	
C659			CK73GB1H103K	CHIP C 0.010UF K	
C660			CK73GB1A105K	CHIP C 1.0UF K	
C662,663			CK73GB1C104K	CHIP C 0.10UF K	
C664			CK73GB1H102K	CHIP C 1000PF K	
C665			CK73GB1H471K	CHIP C 470PF K	
C667			CK73GB1H471K	CHIP C 470PF K	
C668			CK73GB1H103K	CHIP C 0.010UF K	
C669			CK73GB1H471K	CHIP C 470PF K	
C671			CK73GB1C104K	CHIP C 0.10UF K	
C672,673			CK73GB1H392K	CHIP C 3900PF K	
C674			CC73GCH1H221J	CHIP C 220PF J	
C675,676			C92-0804-05	CHIP-TAN 1.5UF 15WV	
C677			CK73GB1H332K	CHIP C 3300PF K	
C678			CK73FB1C474K	CHIP C 0.47UF K	
C679			CC73GCH1H101J	CHIP C 100PF J	
C680			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C681			CK73GB1C223K	CHIP C 0.022UF K	
C684			CK73GB1C104K	CHIP C 0.10UF K	
C686			CK73GB1C473K	CHIP C 0.047UF K	
C687			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C688			CC73GCH1H221J	CHIP C 220PF J	
C689			CK73GB1C223K	CHIP C 0.022UF K	

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Ref. No.	Address	New parts	Parts No.	Description	Destination
C690			CK73GB1H102K	CHIP C 1000PF K	
C691			C92-0665-05	TANTAL 100UF 6.3WV	
C692			CC73GCH1H221J	CHIP C 220PF J	
C693			CK73GB1H471K	CHIP C 470PF K	
C695			CK73GB1H471K	CHIP C 470PF K	
C696			CK73GB1A224K	CHIP C 0.22UF K	
C801			CK73GB1A105K	CHIP C 1.0UF K	
C802			CK73GB1H103K	CHIP C 0.010UF K	
C803,804			CK73GB1A105K	CHIP C 1.0UF K	
C805			CK73GB1H471K	CHIP C 470PF K	
C807			CK73GB1H471K	CHIP C 470PF K	
C809			CK73GB1A105K	CHIP C 1.0UF K	
C811			CK73GB1C104K	CHIP C 0.10UF K	
C812			CK73GB1H103K	CHIP C 0.010UF K	
C814			CK73GB1H103K	CHIP C 0.010UF K	
C816,817			CK73GB1H471K	CHIP C 470PF K	
C818			CK73GB1H103K	CHIP C 0.010UF K	
C819			CK73GB1H471K	CHIP C 470PF K	
C820,821			CK73GB1A105K	CHIP C 1.0UF K	
C822			CK73GB1H471K	CHIP C 470PF K	
C823			CK73GB1H103K	CHIP C 0.010UF K	
C825			C92-0713-05	CHIP-TAN 10UF 6.3WV	
C828			CK73GB1H471K	CHIP C 470PF K	
C829			CK73HB1H471K	CHIP C 470PF K	
C830			CK73GB1C104K	CHIP C 0.10UF K	
C832			CK73HB1H471K	CHIP C 470PF K	
C833			CK73GB1A105K	CHIP C 1.0UF K	
C834			CK73GB1C104K	CHIP C 0.10UF K	
C835,836			CK73GB1A105K	CHIP C 1.0UF K	
C837			CK73GB1H471K	CHIP C 470PF K	
C840			CK73GB1H471K	CHIP C 470PF K	
C841			CK73GB1H103K	CHIP C 0.010UF K	
C842			CC73GCH1H150J	CHIP C 15PF J	
C843			CC73GCH1H030C	CHIP C 3.0PF C	
C845			CC73GCH1H150J	CHIP C 15PF J	
C846			CK73GB1H103K	CHIP C 0.010UF K	
C847			C92-0712-05	CHIP-TAN 22UF 6.3WV	
C849			CK73GB1H471K	CHIP C 470PF K	
C850			CK73GB1H103K	CHIP C 0.010UF K	
C852,853			CK73GB1H471K	CHIP C 470PF K	
C854			CK73GB1H103K	CHIP C 0.010UF K	
C861			CK73FB1A475K	CHIP C 4.7UF K	
C862-865			CK73HB1H471K	CHIP C 470PF K	
TC1 ,2			C05-0384-05	CERAMIC TRIMMER CAP(10PF)	
50			E37-1085-05	FLAT CABLE	
CN801			E40-5932-05	PIN ASSY SOCKET	
J601			E11-0457-05	PHONE JACK	
F801			F53-0190-05	FUSE	
			G11-4300-14	RUBBER CUSHION	
CD401			L79-1582-05	TUNING COIL	
CF401			L72-1015-05	CERAMIC FILTER	
L1			L40-4795-85	SMALL FIXED INDUCTOR(4.7UH)	
L3			L40-1581-86	SMALL FIXED INDUCTOR(0.15UH)	
L5			L92-0138-05	FERRITE CHIP	
L6			L40-1085-92	SMALL FIXED INDUCTOR(100NH)	
L7			L92-0138-05	FERRITE CHIP	
L8			L40-1885-92	SMALL FIXED INDUCTOR(180NH)	

Ref. No.	Address	New parts	Parts No.	Description	Destination
L9			L40-2785-92	SMALL FIXED INDUCTOR(270NH)	
L10			L92-0163-05	BEADS CORE	
L11			L40-1885-92	SMALL FIXED INDUCTOR(180NH)	
L12			L40-2785-92	SMALL FIXED INDUCTOR(270NH)	
L14			L41-1578-14	SMALL FIXED INDUCTOR	C
L14			L41-1878-14	SMALL FIXED INDUCTOR	C2
L15			L41-1878-14	SMALL FIXED INDUCTOR	C
L15			L41-2278-14	SMALL FIXED INDUCTOR	C2
L16			L40-1275-92	SMALL FIXED INDUCTOR(12NH)	
L17 ,18			L41-2285-03	SMALL FIXED INDUCTOR	
L19			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
L20 ,21			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)	
L22			L92-0163-05	BEADS CORE	
L23			L40-2275-92	SMALL FIXED INDUCTOR(22NH)	C
L23			L40-2775-92	SMALL FIXED INDUCTOR(27NH)	C2
L25			L40-2275-92	SMALL FIXED INDUCTOR(22NH)	
L205			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
L207			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
L208			L92-0138-05	FERRITE CHIP	
L209			L40-8265-92	SMALL FIXED INDUCTOR(8.2NH)	
L213			L40-8265-92	SMALL FIXED INDUCTOR(8.2NH)	
L216			L40-1575-54	SMALL FIXED INDUCTOR(15NH)	
L217			L92-0149-05	FERRITE CHIP	
L218			L40-1263-92	SMALL FIXED INDUCTOR(1.2NH)	C
L218			L40-1563-92	SMALL FIXED INDUCTOR(1.5NH)	C2
L220			L34-4602-05	AIR-CORE COIL	
L221			L92-0149-05	FERRITE CHIP	
L222			L40-2285-54	SMALL FIXED INDUCTOR(220NH)	
L223			L34-4572-05	AIR-CORE COIL	
L224-226			L34-4564-05	AIR-CORE COIL	
L227			L40-1092-81	SMALL FIXED INDUCTOR	
L228			L41-3369-16	SMALL FIXED INDUCTOR	C2
L401			L92-0138-05	FERRITE CHIP	
L402			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
L403			L40-5685-85	SMALL FIXED INDUCTOR(0.56UH)	
L404			L40-2785-92	SMALL FIXED INDUCTOR(270NH)	
L405			L40-2775-92	SMALL FIXED INDUCTOR(27NH)	C
L405			L40-3375-92	SMALL FIXED INDUCTOR(33NH)	C2
L407-409			L41-6868-14	SMALL FIXED INDUCTOR	C
L407-409			L41-8268-14	SMALL FIXED INDUCTOR	C2
L410			L92-0138-05	FERRITE CHIP	
L411			L41-2285-03	SMALL FIXED INDUCTOR	
L413,414			L41-6868-14	SMALL FIXED INDUCTOR	C
L413,414			L41-8268-14	SMALL FIXED INDUCTOR	C2
L415			L41-4778-03	SMALL FIXED INDUCTOR	
L416			L40-5681-86	SMALL FIXED INDUCTOR(0.56UH)	
L601			L92-0140-05	FERRITE CHIP	
L602			L92-0149-05	FERRITE CHIP	
L801			L92-0149-05	FERRITE CHIP	
L802			L92-0140-05	FERRITE CHIP	
L803-807			L92-0138-05	FERRITE CHIP	
X1			L77-1932-05	TCXO (16.8MHZ)	
X801			L77-1933-05	CRYSTAL RESONATOR(7.3728MHZ)	
XF401			L71-0617-25	MCF (49.95MHZ)	
CP1 ,2			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP3 ,4			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP801,802			RK75HA1J473J	CHIP-COM 47K J 1/16W	
CP803-805			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP806			RK75HA1J473J	CHIP-COM 47K J 1/16W	

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TX-RX UNIT (X57-673X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
CP807			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
CP808			RK75HA1J472J	CHIP-COM 4.7K J 1/16W	
CP809-818			RK75HA1J102J	CHIP-COM 1.0K J 1/16W	
R1			RK73GB1J223J	CHIP R 22K J 1/16W	
R2			RK73GB1J103J	CHIP R 10K J 1/16W	
R3			RK73GB1J474J	CHIP R 470K J 1/16W	
R4			R92-1252-05	CHIP R 0 OHM J 1/16W	
R5			RK73GB1J224J	CHIP R 220K J 1/16W	
R6			RK73GB1J473J	CHIP R 47K J 1/16W	
R7, 8			R92-1252-05	CHIP R 0 OHM J 1/16W	
R9			RK73GB1J393J	CHIP R 39K J 1/16W	
R12			RK73GB1J101J	CHIP R 100 J 1/16W	
R13			R92-1252-05	CHIP R 0 OHM J 1/16W	
R14			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R15			R92-1252-05	CHIP R 0 OHM J 1/16W	
R16			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R17			RK73GB1J101J	CHIP R 100 J 1/16W	
R18			RK73GB1J474J	CHIP R 470K J 1/16W	
R19			RK73GB1J100J	CHIP R 10 J 1/16W	
R20, 21			R92-1252-05	CHIP R 0 OHM J 1/16W	
R22			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R23			RK73GB1J471J	CHIP R 470 J 1/16W	C2
R23, 24			RK73GB1J681J	CHIP R 680 J 1/16W	C
R24			RK73GB1J102J	CHIP R 1.0K J 1/16W	C2
R25			RK73GB1J103J	CHIP R 10K J 1/16W	
R26			RK73GB1J223J	CHIP R 22K J 1/16W	
R27			RK73GB1J103J	CHIP R 10K J 1/16W	
R28			RK73GB1J393J	CHIP R 39K J 1/16W	
R29			RK73GB1J104J	CHIP R 100K J 1/16W	C
R29			RK73GB1J823J	CHIP R 82K J 1/16W	C2
R30			RK73HB1J123J	CHIP R 12K J 1/16W	C2
R30			RK73HB1J333J	CHIP R 33K J 1/16W	C
R31			RK73GB1J560J	CHIP R 56 J 1/16W	
R32			RK73HB1J153J	CHIP R 15K J 1/16W	
R33			RK73HB1J473J	CHIP R 47K J 1/16W	
R34			RK73GB1J473J	CHIP R 47K J 1/16W	
R35			RK73GB1J220J	CHIP R 22 J 1/16W	
R36			RK73HB1J100J	CHIP R 10 J 1/16W	
R37			RK73HB1J181J	CHIP R 180 J 1/16W	
R38			RK73HB1J100J	CHIP R 10 J 1/16W	
R39			RK73HB1J151J	CHIP R 150 J 1/16W	
R40			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R41			RK73GB1J154J	CHIP R 150K J 1/16W	
R43			RK73HB1J154J	CHIP R 150K J 1/16W	
R44			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R46			RK73HB1J101J	CHIP R 100 J 1/16W	
R47			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R48			RK73HB1J103J	CHIP R 10K J 1/16W	
R49			RK73GJ1J333D	CHIP R 33K D 1/16W	
R50			RK73HB1J331J	CHIP R 330 J 1/16W	
R51			RK73GJ1J104D	CHIP R 100K D 1/16W	
R55			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R56			RK73HB1J470J	CHIP R 47 J 1/16W	
R57			R92-1368-05	CHIP R 0 OHM	
R58			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R202			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R203			R92-1252-05	CHIP R 0 OHM J 1/16W	
R204			RK73GB1J153J	CHIP R 15K J 1/16W	
R207			RK73GB1J333J	CHIP R 33K J 1/16W	
R215			R92-1252-05	CHIP R 0 OHM J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R222			RK73GB1J331J	CHIP R 330 J 1/16W	
R224			RK73GB1J220J	CHIP R 22 J 1/16W	
R229			RK73GB1J331J	CHIP R 330 J 1/16W	
R230			RK73GB1J180J	CHIP R 18 J 1/16W	
R231,232			RK73GB1J331J	CHIP R 330 J 1/16W	
R234			RK73GB1J103J	CHIP R 10K J 1/16W	
R235			RK73GB1J101J	CHIP R 100 J 1/16W	
R237			RK73GB1J123J	CHIP R 12K J 1/16W	C2
R237			RK73GB1J223J	CHIP R 22K J 1/16W	C
R242			RK73GB1J124J	CHIP R 120K J 1/16W	C
R242			RK73GB1J563J	CHIP R 56K J 1/16W	C2
R247			RK73GB1J473J	CHIP R 47K J 1/16W	
R251			R92-1252-05	CHIP R 0 OHM J 1/16W	
R252			RK73GB1J220J	CHIP R 22 J 1/16W	
R253			R92-1252-05	CHIP R 0 OHM J 1/16W	
R255			R92-1252-05	CHIP R 0 OHM J 1/16W	
R256,257			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R259,260			RK73GB1J473J	CHIP R 47K J 1/16W	C
R259,260			RK73GB1J683J	CHIP R 68K J 1/16W	C2
R261			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R262			R92-0670-05	CHIP R 0 OHM	
R263			RK73GB1J101J	CHIP R 100 J 1/16W	
R264,265			RK73GH1J154D	CHIP R 150K D 1/16W	
R267-270			RK73GH1J154D	CHIP R 150K D 1/16W	
R271			RK73GB1J103J	CHIP R 10K J 1/16W	
R272			RK73GB1J473J	CHIP R 47K J 1/16W	
R273			R92-1252-05	CHIP R 0 OHM J 1/16W	
R274			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R275			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R276,277			RK73GB1J104J	CHIP R 100K J 1/16W	
R278			R92-0670-05	CHIP R 0 OHM C	
R279,280			RK73GB1J271J	CHIP R 270 J 1/16W	
R281,282			R92-1252-05	CHIP R 0 OHM J 1/16W	
R401			RK73GB1J100J	CHIP R 10 J 1/16W	
R403			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R404			RK73GB1J334J	CHIP R 330K J 1/16W	
R406			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R407			RK73GB1J474J	CHIP R 470K J 1/16W	
R408			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R409			RK73GB1J392J	CHIP R 3.9K J 1/16W	
R412			RK73GB1J122J	CHIP R 1.2K J 1/16W	C
R412			RK73GB1J331J	CHIP R 330 J 1/16W	C2
R413			RK73GB1J124J	CHIP R 120K J 1/16W	
R414			RK73GB1J681J	CHIP R 680 J 1/16W	
R415			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R416			RK73GB1J101J	CHIP R 100 J 1/16W	
R417			RK73GB1J470J	CHIP R 47 J 1/16W	
R419			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R420			RK73GB1J151J	CHIP R 150 J 1/16W	
R422			RK73GB1J104J	CHIP R 100K J 1/16W	
R423			RK73GB1J563J	CHIP R 56K J 1/16W	
R424			RK73HB1J104J	CHIP R 100K J 1/16W	
R425			RK73GB1J563J	CHIP R 56K J 1/16W	
R427			R92-1252-05	CHIP R 0 OHM J 1/16W	
R430,431			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R438			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R440			RK73HB1J221J	CHIP R 220 J 1/16W	
R441			RK73HB1J101J	CHIP R 100 J 1/16W	
R457			RK73HB1J104J	CHIP R 100K J 1/16W	
R459			RK73GB1J104J	CHIP R 100K J 1/16W	

PARTS LIST / 零件表

TX-RX UNIT (X57-673X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R460			RK73GB1J683J	CHIP R 68K J 1/16W	
R461			R92-1252-05	CHIP R 0 OHM J 1/16W	
R462,463			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R464			R92-0670-05	CHIP R 0 OHM	
R465			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R469			RK73GB1J221J	CHIP R 220 J 1/16W	
R471			RK73GB1J104J	CHIP R 100K J 1/16W	
R474			RK73GB1J103J	CHIP R 10K J 1/16W	
R475			RK73GB1J683J	CHIP R 68K J 1/16W	
R476			RK73GB1J103J	CHIP R 10K J 1/16W	
R601			R92-1252-05	CHIP R 0 OHM J 1/16W	
R602			RK73GB1J124J	CHIP R 120K J 1/16W	C2
R602			RK73GB1J184J	CHIP R 180K J 1/16W	C
R603			R92-1252-05	CHIP R 0 OHM J 1/16W	
R604			RK73GB1J184J	CHIP R 180K J 1/16W	
R607-609			RK73GB1J103J	CHIP R 10K J 1/16W	
R610			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R612			RK73GB1J273J	CHIP R 27K J 1/16W	
R613			RK73GB1J824J	CHIP R 820K J 1/16W	
R615			RK73GB1J334J	CHIP R 330K J 1/16W	
R616			R92-1252-05	CHIP R 0 OHM J 1/16W	
R617			RK73GB1J473J	CHIP R 47K J 1/16W	
R618			RK73GJ1J364D	CHIP R 360K D 1/16W	
R621			RK73GB1J473J	CHIP R 47K J 1/16W	
R622			RK73GB1J684J	CHIP R 680K J 1/16W	
R623			RK73GB1J274G	CHIP R 270K G 1/16W	
R624			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R625			RK73GB1J563J	CHIP R 56K J 1/16W	
R626,627			RK73GB1J184J	CHIP R 180K J 1/16W	
R628			RK73GB1J224J	CHIP R 220K J 1/16W	
R629			RK73GB1J394J	CHIP R 390K J 1/16W	
R630			RK73GB1J684J	CHIP R 680K J 1/16W	
R631			RK73GB1J394J	CHIP R 390K J 1/16W	
R632			RK73GB1J823J	CHIP R 82K J 1/16W	
R633			RK73GB1J223J	CHIP R 22K J 1/16W	
R634			RK73GB1J153J	CHIP R 15K J 1/16W	
R636			RK73GB1J474J	CHIP R 470K J 1/16W	
R637			RK73GB1J394J	CHIP R 390K J 1/16W	
R639			RK73GB1J393J	CHIP R 39K J 1/16W	
R640			RK73GB1J184J	CHIP R 180K J 1/16W	
R641,642			RK73GB1J124J	CHIP R 120K J 1/16W	
R643			RK73GB1J184J	CHIP R 180K J 1/16W	
R644,645			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R646			RK73GB1J223J	CHIP R 22K J 1/16W	
R647			R92-1252-05	CHIP R 0 OHM J 1/16W	
R648			RK73GB1J103J	CHIP R 10K J 1/16W	
R649			RK73GB1J104J	CHIP R 100K J 1/16W	
R650			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R651			R92-1252-05	CHIP R 0 OHM J 1/16W	
R652			RK73GB1J273J	CHIP R 27K J 1/16W	
R653			RK73GB1J392J	CHIP R 3.9K J 1/16W	
R654			RK73GB1J103J	CHIP R 10K J 1/16W	
R655,656			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R657			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R658			RK73GB1J103J	CHIP R 10K J 1/16W	
R660			RK73GB1J154J	CHIP R 150K J 1/16W	
R661			RK73GB1J684J	CHIP R 680K J 1/16W	
R665			R92-1252-05	CHIP R 0 OHM J 1/16W	
R666			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R667			RK73GB1J104J	CHIP R 100K J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R668			RK73GB1J473J	CHIP R 47K J 1/16W	
R669			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R670			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R671			RK73GB1J683J	CHIP R 68K J 1/16W	
R672			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R673			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R674			R92-1252-05	CHIP R 0 OHM J 1/16W	
R675			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R676			RK73GB1J151J	CHIP R 150 J 1/16W	
R677-679			R92-1252-05	CHIP R 0 OHM J 1/16W	
R681			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R682			RK73GB1J100J	CHIP R 10 J 1/16W	
R683			RK73GB1J474J	CHIP R 470K J 1/16W	
R684			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R686			RK73GB1J471J	CHIP R 470 J 1/16W	
R687			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R688,689			RK73GB1J101J	CHIP R 100 J 1/16W	
R691			RK73GB1J333J	CHIP R 33K J 1/16W	
R692			R92-1252-05	CHIP R 0 OHM J 1/16W	
R693			RK73GB1J273J	CHIP R 27K J 1/16W	
R694,695			R92-1252-05	CHIP R 0 OHM J 1/16W	
R696			RK73GB1J103J	CHIP R 10K J 1/16W	
R697			R92-1252-05	CHIP R 0 OHM J 1/16W	
R698			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R802			RK73GB1J101J	CHIP R 100 J 1/16W	
R803,804			R92-1252-05	CHIP R 0 OHM J 1/16W	
R805			RK73GB1J153J	CHIP R 15K J 1/16W	
R807			RK73GB1J103J	CHIP R 10K J 1/16W	
R808			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R809			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R810			RK73GB1J334J	CHIP R 330K J 1/16W	
R811			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R812			RK73GB1J334J	CHIP R 330K J 1/16W	
R813			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R814			RK73GB1J153J	CHIP R 15K J 1/16W	
R815			R92-1252-05	CHIP R 0 OHM J 1/16W	
R816			RK73GB1J224J	CHIP R 220K J 1/16W	
R817			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R818			RK73GB1J821J	CHIP R 820 J 1/16W	
R819			RK73GB1J103J	CHIP R 10K J 1/16W	
R820			RK73GB1J561J	CHIP R 560 J 1/16W	
R821			RK73GB1J331J	CHIP R 330 J 1/16W	
R823			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R824			RK73GB1J183J	CHIP R 18K J 1/16W	
R825			RK73GB1J473J	CHIP R 47K J 1/16W	
R827			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R828			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R829			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R830			RK73GB1J821J	CHIP R 820 J 1/16W	
R833,834			RK73GH1J474D	CHIP R 470K D 1/16W	
R835,836			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R839,840			RK73GB1J473J	CHIP R 47K J 1/16W	
R841			R92-1252-05	CHIP R 0 OHM J 1/16W	
R842			R92-1368-05	CHIP R 0 OHM	
R844			RK73GB1J473J	CHIP R 47K J 1/16W	
R845			R92-1368-05	CHIP R 0 OHM	
R847,848			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R849			R92-1252-05	CHIP R 0 OHM J 1/16W	
R851			R92-1368-05	CHIP R 0 OHM	
R852			RK73HB1J473J	CHIP R 47K J 1/16W	

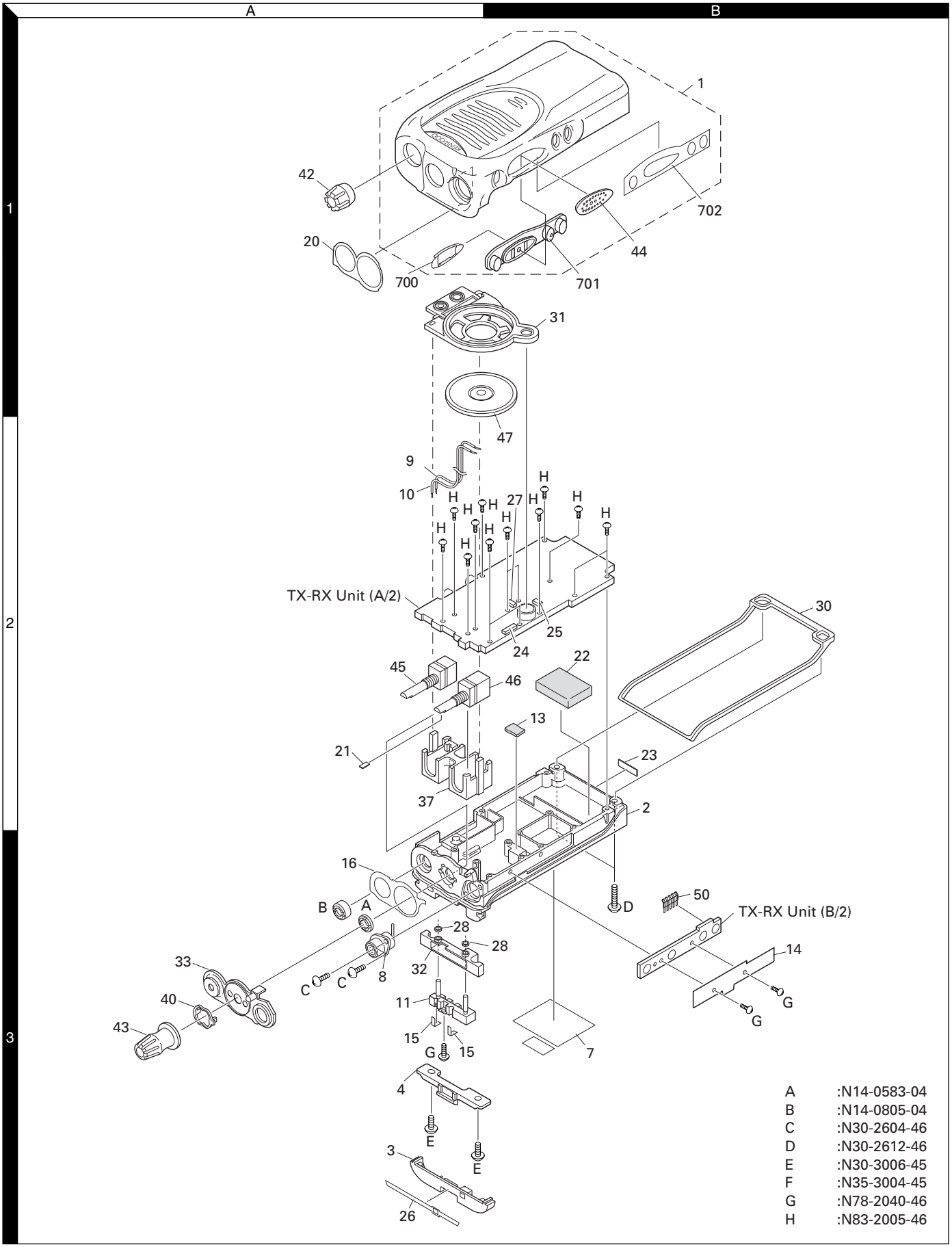
PARTS LIST / 零件表

TX-RX UNIT (X57-673X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R854			RK73GB1J680J	CHIP R 68 J 1/16W	
R855-857			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R858			R92-1368-05	CHIP R 0 OHM	
R859			RK73GB1J104J	CHIP R 100K J 1/16W	
R862			R92-1252-05	CHIP R 0 OHM J 1/16W	
VR1			R12-7491-05	TRIMMING POT.(68K OHM)	
S802-805			S70-0457-05	TACT SWITCH	
MIC60			T91-0543-05	MIC ELEMENT	
D3 ,4			1SV325	VARIABLE CAPACITANCE DIODE	
D7			1SV325	VARIABLE CAPACITANCE DIODE	
D9			1SV325	VARIABLE CAPACITANCE DIODE	
D10			1SV278	VARIABLE CAPACITANCE DIODE	
D11			HSC277	DIODE	
D201			HSC277	DIODE	
D203			HZU5CLL	ZENER DIODE	
D204			HVC131	DIODE	
D206			HVC131	DIODE	
D208			HVC131	DIODE	
D212			HVC131	DIODE	
D401			HSC277	DIODE	
D402-406			HVC369B	VARIABLE CAPACITANCE DIODE	
D407			RB521S-30	DIODE	
D603-606			RB706F-40	DIODE	
D801			RB521S-30	DIODE	
D805			1SR154-400	DIODE	
D812,813			015AZ6.8	ZENER DIODE	
IC1			MB15E03SL	MOS IC	
IC201			TA75W01FU	MOS IC	
IC401			TA31136FN	MOS IC	
IC601			AQUA-L	MOS IC	
IC602			TC75S51FE	MOS IC	
IC603			TC75W51FU	MOS IC	
IC604			TC75S51FE	MOS IC	
IC605			TA7368F	MOS IC	
IC801			XC6204B502MR	MOS IC	
IC802			PST9134NR	MOS IC	
IC803			XC61CN5002NR	MOS IC	
IC804			CAT24WC64JI	ROM IC	
IC805			30622MCA-7G7GP	MPU	
IC806			TC7W74FU	MOS IC	
Q1			DTC144EE	DIGITAL TRANSISTOR	
Q2, 3			UMG9N	TRANSISTOR	
Q4			KTC4082	TRANSISTOR	
Q5, 6			2SK508NV(K52)	FET	
Q7			2SC5108(Y)	TRANSISTOR	
Q8			2SJ347	FET	
Q9			2SC5108(Y)	TRANSISTOR	
Q10			2SC4617(S)	TRANSISTOR	
Q11			2SC5108(Y)	TRANSISTOR	
Q12			2SJ347	FET	
Q205			2SC5108(Y)	TRANSISTOR	
Q206			2SK3077	FET	
Q207			2SK2596	FET	
Q208			DTC114EE	DIGITAL TRANSISTOR	
Q209			2SK879(GR)	FET	
Q210			DTC114EE	DIGITAL TRANSISTOR	
Q211			2SK3476	FET	

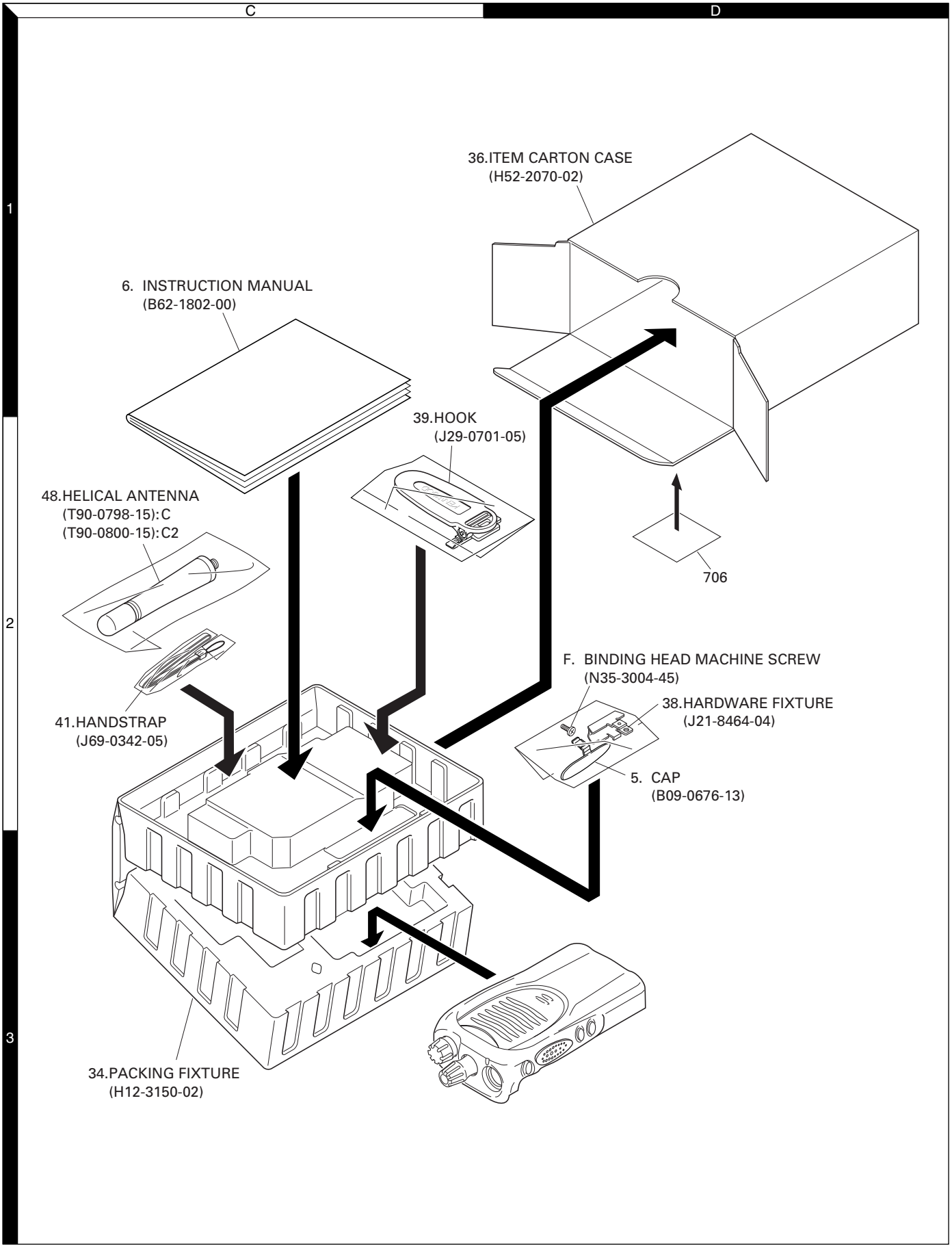
Ref. No.	Address	New parts	Parts No.	Description	Destination
Q212			2SK1824	FET	
Q213			DTA144EE	DIGITAL TRANSISTOR	
Q401			DTA144EE	DIGITAL TRANSISTOR	
Q402			2SC4649(N,P)	TRANSISTOR	
Q403,404			3SK318	FET	
Q407,408			2SK1824	FET	
Q601,602			2SK1824	FET	
Q603			DTC144EE	DIGITAL TRANSISTOR	
Q604			2SA1362(GR)	TRANSISTOR	
Q605			2SC4116(Y)	TRANSISTOR	
Q606			2SA1586(Y,GR)	TRANSISTOR	
Q607			DTC144EE	DIGITAL TRANSISTOR	
Q608			2SK1588	FET	
Q801			UMG3N	TRANSISTOR	
Q802			UPA672T	FET	
Q803			FP210	TRANSISTOR	
Q804			UMG3N	TRANSISTOR	
Q805			UMG9N	TRANSISTOR	
Q806			KTA1298(Y)	TRANSISTOR	
Q807			UMG3N	TRANSISTOR	
Q808,809			DTA123JE	DIGITAL TRANSISTOR	
Q810			2SK1824	FET	
TH1			B57331V2104J	THERMISTOR	
TH600			B57331V2104J	THERMISTOR	

EXPLODED VIEW / 部件分解图



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

PACKING / 包装


C
D
1
2
3
36.ITEM CARTON CASE
(H52-2070-02)
6. INSTRUCTION MANUAL
(B62-1802-00)
39.HOOK
(J29-0701-05)
48.HELICAL ANTENNA
(T90-0798-15):C
(T90-0800-15):C2
706
F. BINDING HEAD MACHINE SCREW
(N35-3004-45)
38.HARDWARE FIXTURE
(J21-8464-04)
41.HANDSTRAP
(J69-0342-05)
5. CAP
(B09-0676-13)
34.PACKING FIXTURE
(H12-3150-02)

ADJUSTMENT / 调整

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range	400 to 480MHz.
	Modulation	Frequency modulation and external modulation.
	Output	-127dBm/0.1μV to greater than -47dBm/1mV
2. Power Meter	Input Impedance	50Ω.
	Operation Frequency	400 to 480MHz.
	Measurement Range	Vicinity of 10W
3. Deviation Meter	Frequency Range	400 to 480MHz.
4. Digital Volt Meter (DVM)	Measuring Range	10mV to 10V DC
	Input Impedance	High input impedance for minimum circuit loading.
5. Oscilloscope		DC through 30MHz.
6. High Sensitivity Frequency Counter	Frequency Range	10Hz to 1000MHz.
	Frequency Stability	0.2ppm or less.
7. Ammeter		5A.
8. AF Volt Meter (AF VTVM)	Frequency Range	50Hz to 10kHz.
	Voltage Range	1mV to 10V.
9. Audio Generator (AG)	Frequency Range	50Hz to 5kHz or more.
	Output	0 to 1V.
10. Distortion Meter	Capability	3% or less at 1kHz.
	Input Level	50mV to 10Vrms.
11. 8Ω Dummy Load		Approx. 8Ω, 3W.
12. Regulated Power Supply		5V to 10V, approx. 3A
		Useful if ammeter equipped.

所需的用于调整的测试设备

测试设备	主要特性	
1. 标准信号发生器 (SSG)	频率范围	400 到 480MHz。
	调制	调频和外部调制。
	输出	-127dBm/0.1μV到大于 -47dBm/1mV
2. 功率计	输入阻抗	50Ω。
	操作频率	400 到 480MHz。
	测量范围	10W 左右
3. 频偏仪	频率范围	400 到 480MHz。
4. 数字电压表 (DVM)	测量范围	10mV 到 10V DC
	输入阻抗	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	10Hz 到 1000MHz。
	频率稳定性	0.2ppm 或更低。
7. 电流表		5A。
8. 音频电压表 (AF VTVM)	频率范围	50Hz 到 10kHz。
	电压范围	1mV 到 10V。
9. 音频发生器 (AG)	频率范围	50Hz 到 5kHz 或更高。
	输出	0 到 1V。
10. 失真测试仪	容量	1kHz 时 3% 或更低。
	输入电平	50mV 到 10Vrms。
11. 8Ω假负载		大约 8Ω，3W。
12. 可调电源		5V 到 10V, 大约 3A
		配备了电流表时有用。

ADJUSTMENT / 调整

■ The following parts are required for adjustment

1. 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.)

2. Repair Jig (Chassis)

Use jig (part No.: A10-4082-02) for repairing the TK-3160. Place the TX-RX unit on the jig and fit it with screws.

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

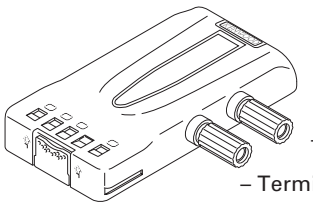
3. Battery Jig (W05-0909-00)

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

When using the battery jig in user mode, the transceiver assumes that a lithium-ion battery pack is attached to the transceiver. In adjustment mode, battery type detection is not performed. Refer to page 17 for details.

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.

Battery Jig / 电池夹具



■ 下面是调整时所需的部件

1. 天线接口转换头

此手持机的天线接口使用 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。)

2. 维修机架（机壳）

使用机壳（A10-4082-02）维修 TK-3160。将 TX-RX 单元放置在机壳上，并且拧上螺钉。

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

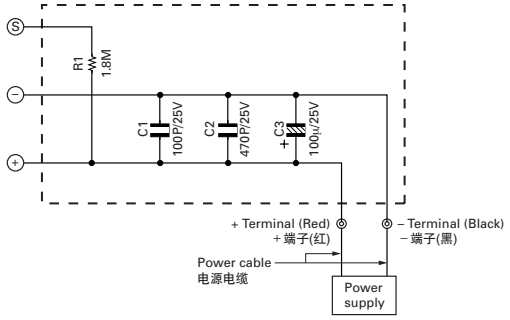
3. 电池夹具 (W05-0909-00)

在手持机的电池夹具和电源之间连接适当的电源电缆，确认了输出电压之后接通电源开关，电压超过或极性颠倒都有可能损坏手持机。

当在用户模式使用电池夹具时，手持机假定安装的是锂离子电池。在调整模式，请确认电池类型。详细内容请参照第17页。

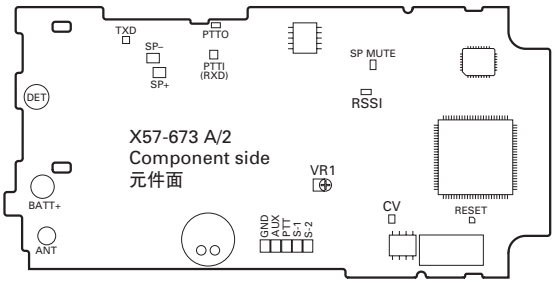
注：当使用电池夹具时，你必须测定电池夹具的终端电压。因为，电源和电池夹具之间会有一些的电压下降，尤其在手持机发射的时候。

SCHEMATIC DIAGRAM / 原理图



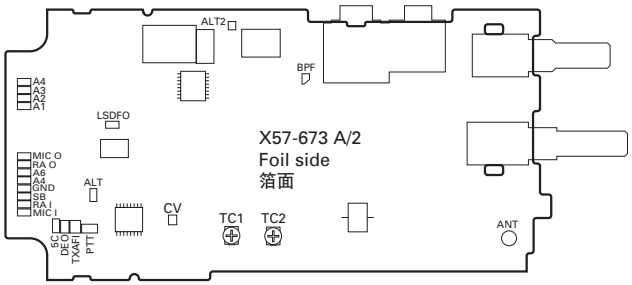
ADJUSTMENT / 调整

Adjustment points TX-RX unit (X57-673)
Component side view



VR1 : Frequency adjustment
RSSI : Band-pass wave form test point

Foil Side View



TC1 : Transmit lock voltage adjustment
TC2 : Receive lock voltage adjustment
CV : Lock voltage adjustment terminal.

Fig. 1 Adjustment points

■ Frequency and signalling

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 (MHz) C type

Channel No.	RX Frequency	TX Frequency
1	460.050	460.100
2	440.050	440.100
3	479.950	479.900
4	460.000	460.000
5	460.200	460.200
6	460.400	460.400
7~16	——	——

Frequency (MHz) C2 type

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

Signalling

Signalling No.	RX	TX
1	None	None
2	None	100Hz Square Wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 254.1Hz	QT 254.1Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	DTMF 159D	DTMF 159D
10	None	DTMF tone 9
11	2 Tone: A:321.7Hz B:928.1Hz	2 Tone: A:321.7Hz B:928.1Hz
12	None	Single Tone:1000Hz
13	None	MSK
14	MSK Code	MSK Code

- **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 (C type)

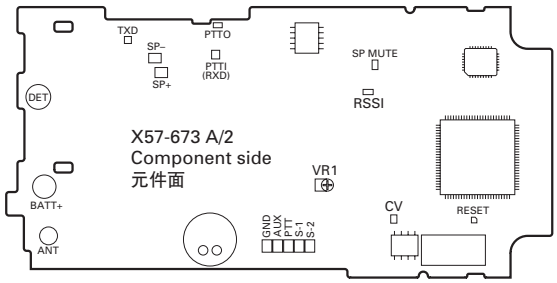
	C	
TEST CH	RX	TX
Center	460.050MHz	460.100MHz
Low	440.050MHz	440.100MHz
High	479.950MHz	479.900MHz
Low'	450.050MHz	450.100MHz
High'	470.050MHz	470.100MHz
	460.000MHz	460.000MHz
	460.200MHz	460.200MHz
	460.400MHz	460.400MHz

Adjustment Frequency (C2 type)

	C2	
TEST CH	RX	TX
Center	415.050MHz	415.100MHz
Low	400.050MHz	400.100MHz
High	429.950MHz	429.900MHz
Low'	407.550MHz	407.600MHz
High'	422.550MHz	422.600MHz
	415.000MHz	415.000MHz
	415.200MHz	415.200MHz
	415.400MHz	415.400MHz

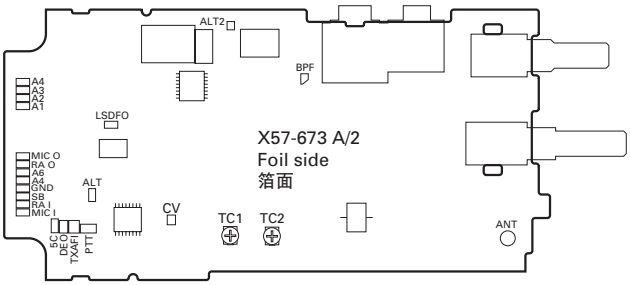
ADJUSTMENT / 调整

TX-RX 单元(X57-673) 调整点 元件面视图



VR1 : 频率调整
RSSI : 带通波形测试点

箔面视图



TC1 : 发射锁定电压调整
TC2 : 接收锁定电压调整
CV : 锁定电压调整终端

图 1 调整点

■ 频率和信令

频率设定调整如下表所示。当需要时，按照如下调整程序重新调整，以便获得您在实际操作时希望的频率。

频率 (MHz) C 类型

信道号码	RX 频率	TX 频率
1	460.050	460.100
2	440.050	440.100
3	479.950	479.900
4	460.000	460.000
5	460.200	460.200
6	460.400	460.400
7~16	——	——

频率 (MHz) C2 类型

信道号码	RX 频率	TX 频率
1	415.050	415.100
2	400.050	400.100
3	429.950	429.900
4	415.000	415.000
5	415.200	415.200
6	415.400	415.400
7~16	——	——

信令

信令号码	RX	TX
1	无	无
2	无	100Hz 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 254.1Hz	QT 254.1Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	DTMF 159D	DTMF 159D
10	无	DTMF 音频 9
11	2-Tone : A : 321.7Hz B : 928.1Hz	2-Tone : A : 321.7Hz B : 928.1Hz
12	无	单音 : 1000Hz
13	无	MSK
14	MSK 代码	MSK 代码

- **调谐手持机的准备**

在调谐手持机之前，把装置连接到规定的电源。

任何时候调整发射，装置必须连接到合适的假负载 (即功率表)。

在全部调谐过程中,扬声器输出端子必须连接8Ω 假负载连接到 AC 伏特计和音频失真仪或 SINAD 测试表。

调整频率 (C 类型)

测试 CH	C	
	RX	TX
中心	460.050MHz	460.100MHz
低	440.050MHz	440.100MHz
高	479.950MHz	479.900MHz
低′	450.050MHz	450.100MHz
高′	470.050MHz	470.100MHz
	460.000MHz	460.000MHz
	460.200MHz	460.200MHz
	460.400MHz	460.400MHz

调整频率 (C2 类型)

测试 CH	C2	
	RX	TX
中心	415.050MHz	415.100MHz
低	400.050MHz	400.100MHz
高	429.950MHz	429.900MHz
低′	407.550MHz	407.600MHz
高′	422.550MHz	422.600MHz
	415.000MHz	415.000MHz
	415.200MHz	415.200MHz
	415.400MHz	415.400MHz

ADJUSTMENT / 调整

Common Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Setting	1) BATT terminal votage:7.5V 2) SSG standard modulation [Wide] MOD:1kHz,DEV:3kHz [Narrow] MOD:1kHz,DEV:1.5kHz					
2. VCO lock voltage RX	1) CH:High	Power meter DVM	ANT CV	TC2	ADJ	3.5V ±0.2V
	2) CH:Low				Check	0.6V or more
3. VCO lock voltage TX	3) CH:High PTT:ON			TC1	ADJ	3.5V ±0.2V
	4) CH:Low PTT:ON				Check	0.6V or more

Transmitter Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Frequency Adjust [Wide]	1) CH:Center 2) PTT:ON	Frequency counter	ANT	VR1		Center frequency ±50Hz
2. High power Adjust [Wide]	TEST CH: Low Low' Center High' High (5 points) BATT terminal voltage:7.5V PTT:ON	Power meter Ampere meter		Programming Software:KPG-82D		4.0W ±0.1W 2.0 A or less
3. Low power Adjust [Wide]	TEST CH: Low Low' Center High' High (5 points) BATT terminal voltage:7.5V PTT:ON					1.0W ±0.1W 1.0 A or less
4. Max deviation Adjust [Wide]	TEST CH: Low Center High (3 points) AG:1kHz/150mV Dev meter filter LPF:15kHz HPF:OFF PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	ANT SP/MIC connector		4.2kHz (According to the lager +,–)	±50Hz
[Narrow]	TEST CH:Center PTT:ON				2.1kHz (According to the lager +,–)	±50Hz
5. VOX 1 Writing [Wide]	TEST CH:Center AG:1KHz/60mV					
6. VOX 10 Writing [Wide]	TEST CH:Center AG:1KHz/4.0mV					

ADJUSTMENT / 调整

公共部分

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
1. 设置	1) BATT终端电压 : 7.5V 2) SSG 标准调制 [宽] MOD:1kHz,DEV:3kHz [窄] MOD:1kHz,DEV:1.5kHz					
2. VCO 锁定电压 RX	1) CH : 高	功率计 DVM	ANT CV	TC2	ADJ	3.5V ±0.2V
	2) CH : 低				检查	0.6V 或以上
3. VCO 锁定电压 TX	3) CH : 高 PTT : ON			TC1	ADJ	3.5V ±0.2V
	4) CH : 低 PTT : ON				检查	0.6V 或以上

发射部

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
1. 频率调整 [宽]	1) CH : 中心 2) PTT : ON	频率计	ANT	VR1		中心频率 ±50Hz
2. 高功率调整 [宽]	测试 CH : 低 低′ 中心 高′ 高 (5 点) BATT 终端电压 : 7.5V PTT : ON	功率计 电流表		编程软件 : KPG-82D		4.0W ±0.1W 2.0 A 或以下
3. 低功率调整 [宽]	测试 CH : 低 低′ 中心 高′ 高 (5 点) BATT 终端电压 : 7.5V PTT : ON					1.0W ±0.1W 1.0 A 或以下
4. 最大频偏调整 [宽]	测试 CH : 低 中心 高 (3 点) AG : 1kHz / 150mV 频偏仪滤波器 LPF : 15kHz HPF : OFF PTT : ON	功率计 频偏仪 示波器 AG AF VTVM	ANT SP / MIC 连接器		4.2kHz (根据最大+,-)	±50Hz
[窄]	测试 CH : 中心 PTT : ON				2.1kHz (根据最大+,-)	±50Hz
5. VOX 1 写入 [宽]	测试 CH : 中心 AG : 1KHz / 60mV					
6. VOX 10 写入 [宽]	测试 CH : 中心 AG : 1KHz / 4.0mV					

ADJUSTMENT / 调整

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
7.DQT TCXO Balance Writing [Wide]	TEST CH:Center	Power meter Dev meter Oscilloscope AG AF VTVM	ANT	Programming Software:KPG-82D	Write	200 hex
[Narrow]						120 hex
8.DQT VCO Balance Adjust [Wide]	TEST CH: Low Center High (3 points) LPF:3kHz HPF:OFF PTT:ON				Make the demodulation wave into square waves	
[Narrow]	TEST CH:Center PTT:ON					
9.QT Deviation Adjust [Wide]	TEST CH:Low Center High (3 points) LPF:3kHz HPF:OFF PTT:ON				0.8kHz	±40Hz
[Narrow]	TEST CH:Center PTT:ON				0.4kHz	±40Hz
10.DQT Deviation Adjust [Wide]	TEST CH: Low Center High (3 points) LPF:3kHz HPF:OFF PTT:ON				0.75kHz	±40Hz
[Narrow]	TEST CH:Center PTT:ON				0.35kHz	±40Hz
11.Tone Deviation Adjust [Wide]	TEST CH:Center LPF:15kHz HPF:OFF PTT:ON				3.0kHz	±100Hz
[Narrow]	TEST CH:Center PTT:ON				1.5kHz	±100Hz
12.DTMF Deviation Adjust [Wide]	TEST CH:Center LPF:15kHz HPF:OFF PTT:ON				3.0kHz	±100Hz
[Narrow]	TEST CH: Center PTT:ON				1.5kHz	±100Hz
13.MSK Deviation Adjust [Wide]	TEST CH: Low Center High (3 points) LPF:15kHz HPF:OFF PTT:ON				3.0kHz	±100Hz
[Narrow]	TEST CH:Center PTT:ON				1.5kHz	±100Hz

ADJUSTMENT / 调整

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
7.DQT TCXO 平衡写入 [宽]	测试 CH : 中心	功率计 频偏仪 示波器 AG AF VTVM	ANT	编程软件 : KPG-82D	写入	200 hex
[窄]						120 hex
8. DQT VCO 平衡调整 [宽]	测试 CH : 低 中心 高 (3 点) LPF : 3kHz HPF : OFF PTT : ON				把解调波调整为方波	
[窄]	测试 CH : 中心 PTT : ON					
9. QT 频偏调整 [宽]	测试 CH : 低 中心 高 (3 点) LPF : 3kHz HPF : OFF PTT : ON				0.8kHz	±40Hz
[窄]	测试 CH : 中心 PTT : ON				0.4kHz	±40Hz
10. DQT 频偏调整 [宽]	测试 CH : 低 中心 高 (3 点) LPF : 3kHz HPF : OFF PTT : ON				0.75kHz	±40Hz
[窄]	测试 CH : 中心 PTT : ON				0.35kHz	±40Hz
11.单音频偏调整 [宽]	测试 CH : 中心 LPF : 15kHz HPF : OFF PTT : ON				3.0kHz	±100Hz
[窄]	测试 CH : 中心 PTT : ON				1.5kHz	±100Hz
12. DTMF 频偏调整 [宽]	测试 CH : 中心 LPF : 15kHz HPF : OFF PTT : ON				3.0kHz	±100Hz
[窄]	测试 CH : 中心 PTT : ON				1.5kHz	±100Hz
13. MSK 频偏调整 [宽]	测试 CH : 低 中心 高 (3 点) LPF : 15kHz HPF : OFF PTT : ON				3.0kHz	±100Hz
[窄]	测试 CH : 中心 PTT : ON				1.5kHz	±100Hz

ADJUSTMENT / 调整

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
14.BATT Detection Writing [Wide]	BATT terminal voltage:5.9V PTT:ON	Power meter DVM	ANT BATT terminal		Write	BATT terminal voltage:5.9V
15.BATT Detection Check	1) BATT terminal voltage:5.5V PTT:ON				Check	LED blinks
	2) BATT terminal voltage:7.5V PTT:ON					LED does not blink

Receiver Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1.BPF Wave form ADJ	TEST CH: Low Low' Center High' High (5 points) SSG otuput:–103 dBm(1.58µV)	SSG DVM Oscilloscope AF VTVM	ANT RSSI	Programming Software:KPG-82D	RSSI MAX	
2.Sensitivity check [Wide]	TEST CH: Low Low' Center High' High (5 points) SSG otuput:–117 dBm(0.3µV) SSG MOD:3kHz		ANT		Check	12dB SINAD or more
[Narrow]	TEST CH:Center SSG otuput:–115 dBm(0.4µV) SSG MOD:1.5kHz				Check	12dB SINAD or more
3.Squelch tight writing [Wide]	TEST CH:Center SSG otuput:–117 dBm(0.3µV) SSG MOD:3.0kHz			Programming Software:KPG-82D	write	Squelch open
[Narrow]	TEST CH:Center SSG otuput:–116 dBm(0.35µV) SSG MOD:1.5kHz					Squelch open
4.Squelch threshold writing [Wide]	TEST CH:Center SSG otuput:–122 dBm(0.18µV) SSG MOD:3.0kHz					Squelch open
[Narrow]	TEST CH:Center SSG otuput:–121 dBm(0.2µV) SSG MOD:1.5kHz					Squelch open
5.RSSI writing [Wide]	TEST CH:Center SSG otuput:–123 dBm(0.16µV) SSG MOD:off					
[Narrow]	TEST CH:Center SSG otuput:–122 dBm(0.18µV) SSG MOD:off					

ADJUSTMENT / 调整

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
14.电池检测写入 [宽]	BATT 终端电压 : 5.9V PTT : ON	功率计 DVM	ANT BATT 终端		写入	BATT 终端电压 : 5.9V
15.BATT 测试检测	1) BATT 终端电压 : 5.5V PTT : ON				检查	LED 闪烁
	2) BATT 终端电压 : 7.5V PTT : ON					LED 不闪烁

接收部

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
1. BPF 波形调整	测试 CH : 低 低′ 中心 高′ 高 (5 点) SSG 输出 : -103dBm (1.58 μ V)	SSG DVM 示波器 AF VTVM	ANT RSSI	编程软件 : KPG-82D	RSSI MAX	
2. 灵敏度检查 [宽]	测试 CH : 低 低′ 中心 高′ 高 (5 点) SSG 输出 : -117 dBm (0.3 μ V) SSG MOD : 3kHz		ANT		检查	12dB SINAD 或以上
[窄]	测试 CH : 中心 SSG 输出 : -115 dBm(0.4 μ V) SSG MOD : 1.5kHz				检查	12dB SINAD 或以上
3. 深静噪写入 [宽]	测试 CH : 中心 SSG 输出 : -117 dBm(0.3 μ V) SSG MOD : 3.0kHz			编程软件 : KPG-82D	写入	静噪开放
[窄]	测试 CH : 中心 SSG 输出 : -116 dBm(0.35 μ V) SSG MOD : 1.5kHz					静噪开放
4. 静噪阀值写入 [宽]	测试 CH : 中心 SSG 输出 : -122 dBm(0.18 μ V) SSG MOD : 3.0kHz					静噪开放
[窄]	测试 CH : 中心 SSG 输出 : -121 dBm(0.2 μ V) SSG MOD : 1.5kHz					静噪开放
5. RSSI 写入 [宽]	测试 CH : 中心 SSG 输出 : -123 dBm(0.16 μ V) SSG MOD : off					
[窄]	测试 CH : 中心 SSG 输出 : -122 dBm(0.18 μ V) SSG MOD : off					

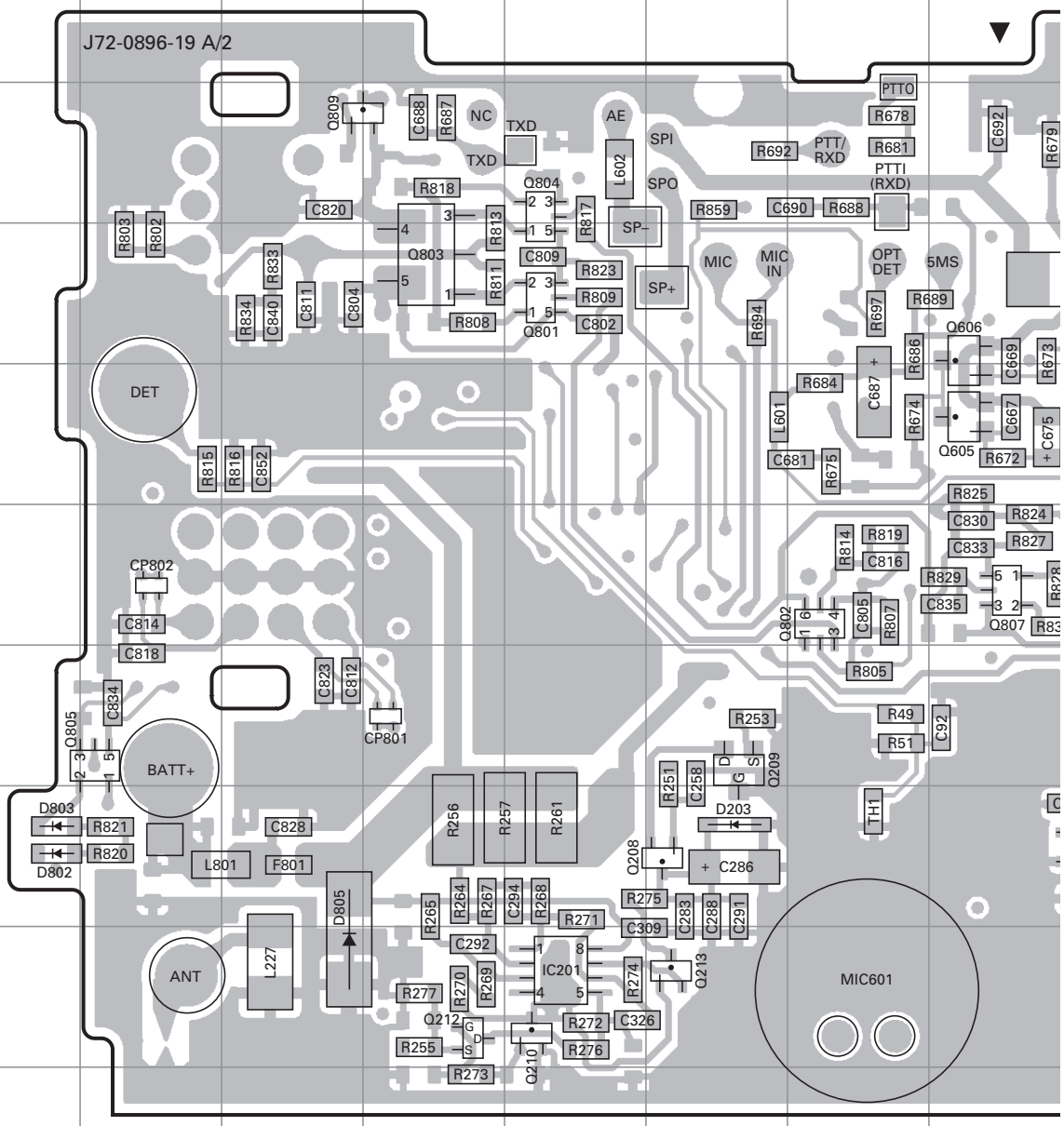
TK-3160 PC BOARD / PC 板

TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2

Component side view (J72-0896-19)

TX-RX UNIT
(X57-673X-XX)

Ref. NO.	Address
IC201	9G
IC601	4Q
IC602	6M
IC603	8M
IC604	6L
IC605	3L
IC802	8K
IC803	8K
IC804	9O
IC805	7Q
IC806	8R
Q1	7O
Q2	8O
Q3	8O
Q208	8H
Q209	7H
Q210	9G
Q212	9F
Q213	9H
Q407	6M
Q408	9N
Q601	5M
Q602	2N
Q603	4M
Q604	3M
Q605	5J
Q606	4J
Q607	4M
Q608	4L
Q801	4G
Q802	6I
Q803	4F
Q804	3G
Q805	7D
Q806	6K
Q807	6J
Q809	3E
Q810	9R
D203	8H
D407	6M
D603	5M
D604	7K
D605	5K
D606	5K
D802	8C
D803	8C
D805	9E



Component side

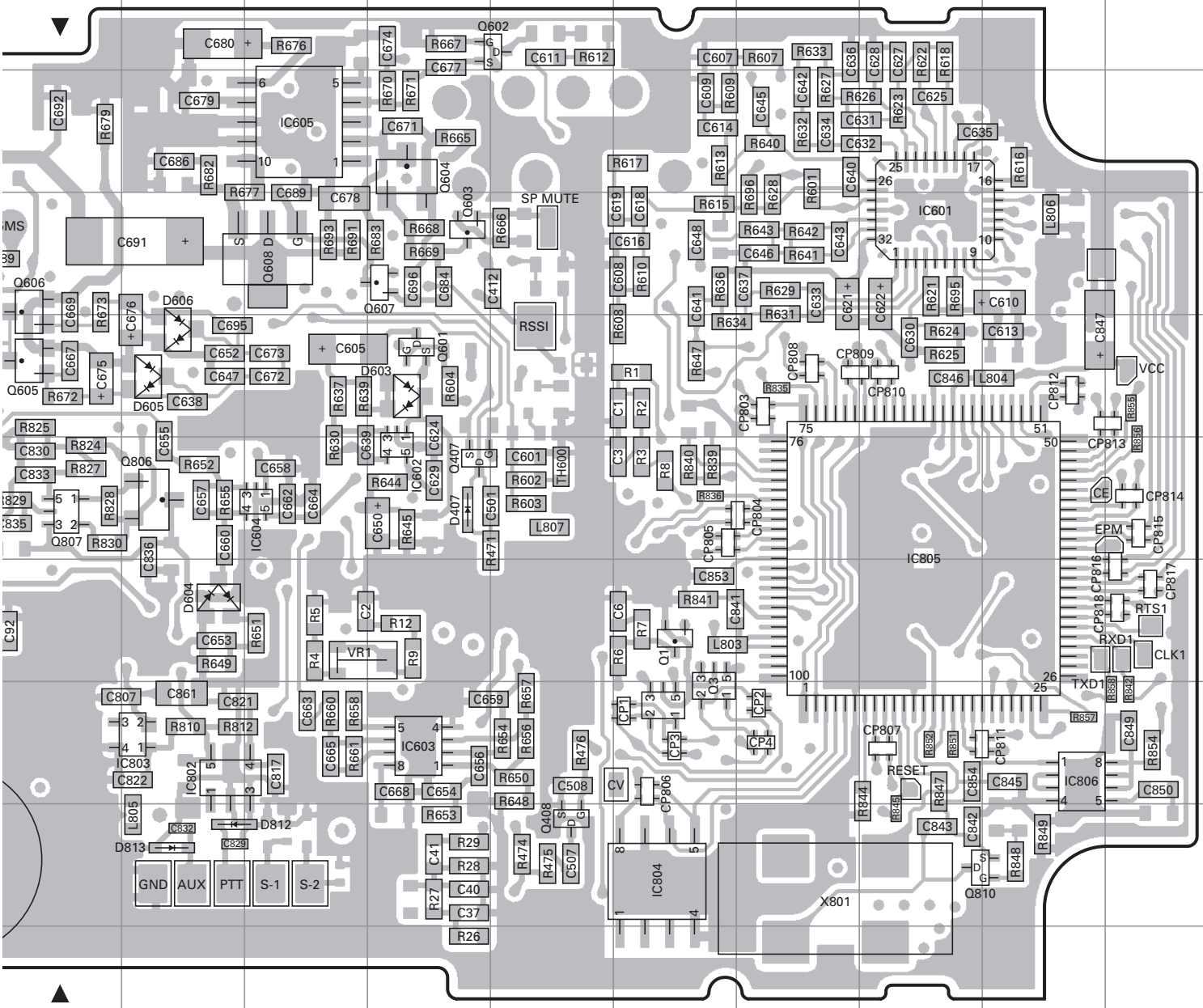
Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	

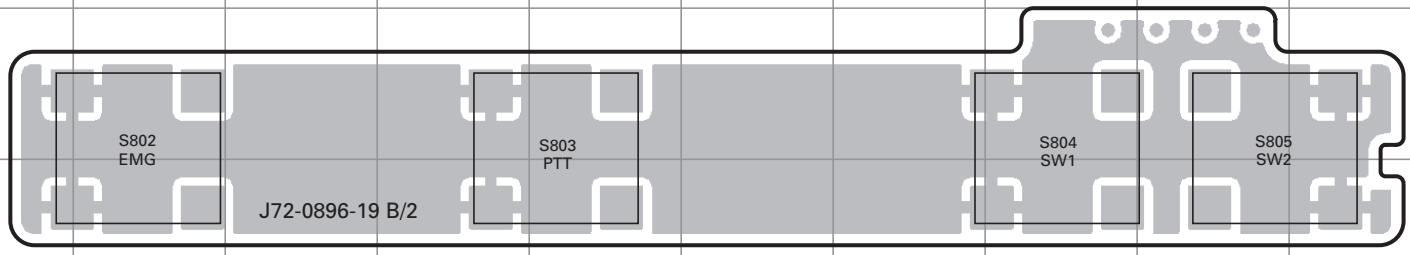
Foil side

PC BOARD / PC 板 TK-3160

TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2

Component side view (J72-0896-19)



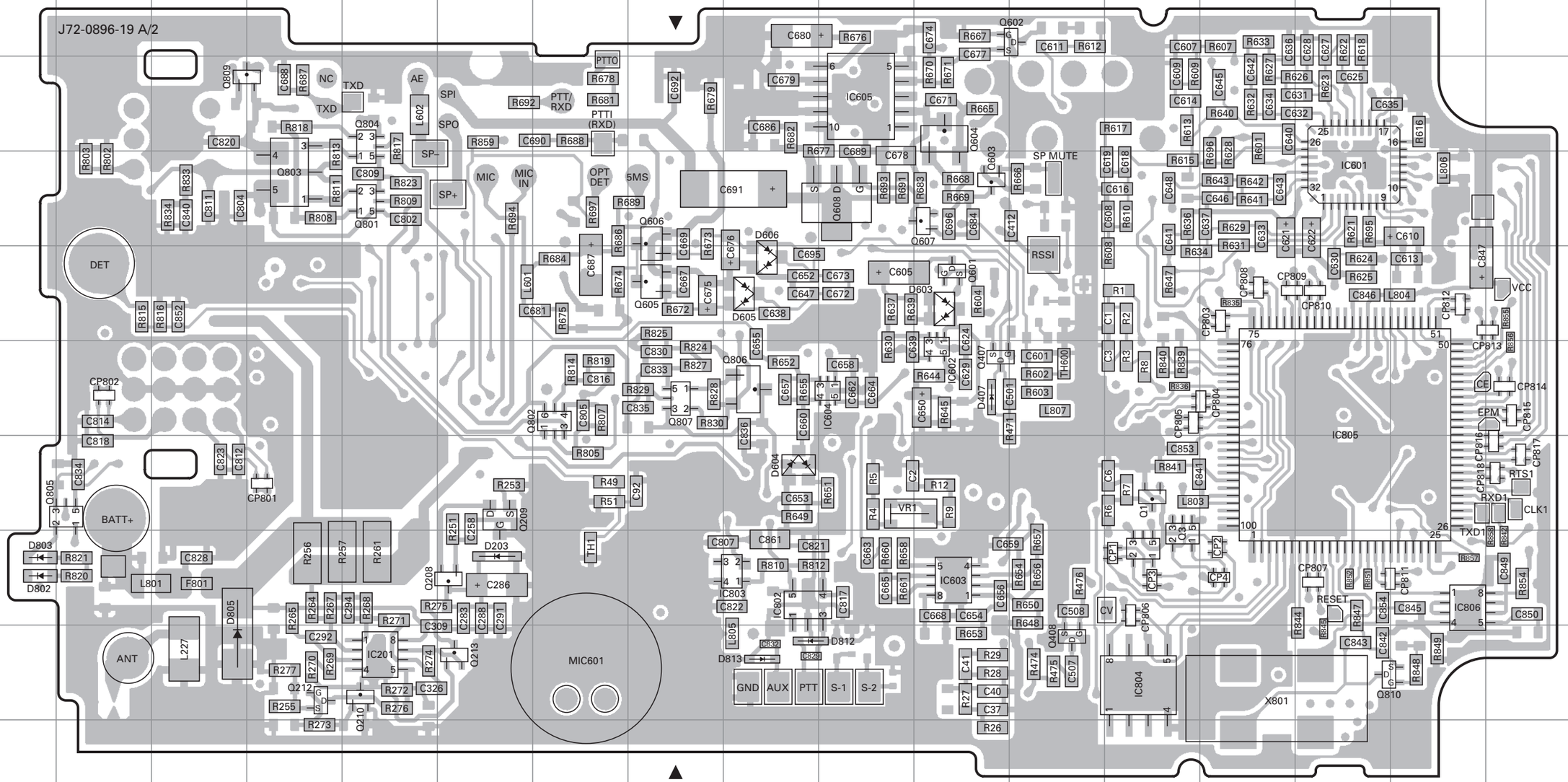


PC BOARD / PC 板 TK-3160

TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2
Component side view (J72-0896-19)

TX-RX UNIT
(X57-673X-XX)

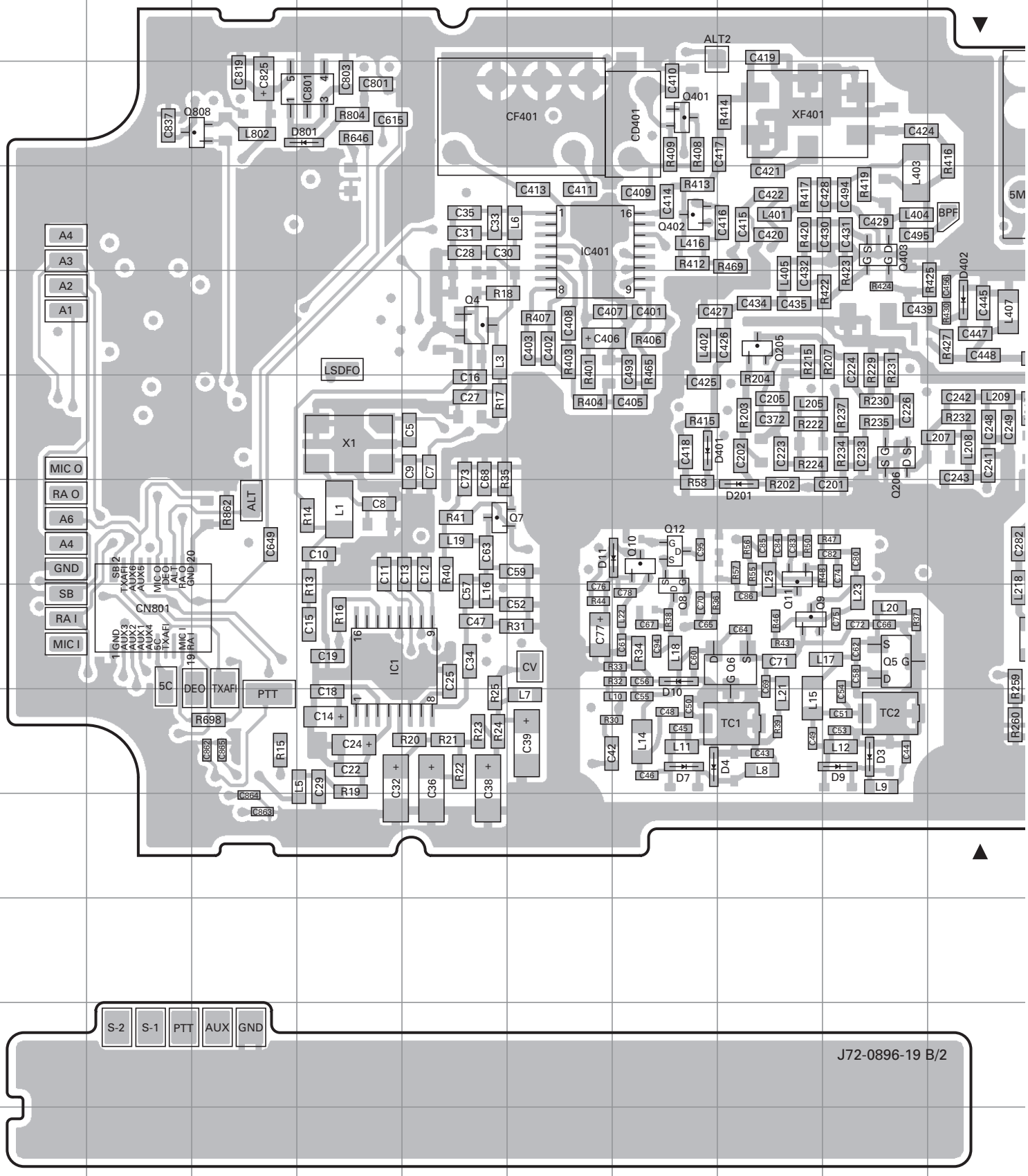
Ref. NO.	Address
IC201	9G
IC601	4Q
IC602	6M
IC603	8M
IC604	6L
IC605	3L
IC802	8K
IC803	8K
IC804	9O
IC805	7Q
IC806	8R
Q1	7O
Q2	8O
Q3	8O
Q208	8H
Q209	7H
Q210	9G
Q212	9F
Q213	9H
Q407	6M
Q408	9N
Q601	5M
Q602	2N
Q603	4M
Q604	3M
Q605	5J
Q606	4J
Q607	4M
Q608	4L
Q801	4G
Q802	6I
Q803	4F
Q804	3G
Q805	7D
Q806	6K
Q807	6J
Q809	3E
Q810	9R
D203	8H
D407	6M
D603	5M
D604	7K
D605	5K
D606	5K
D802	8C
D803	8C
D805	9E



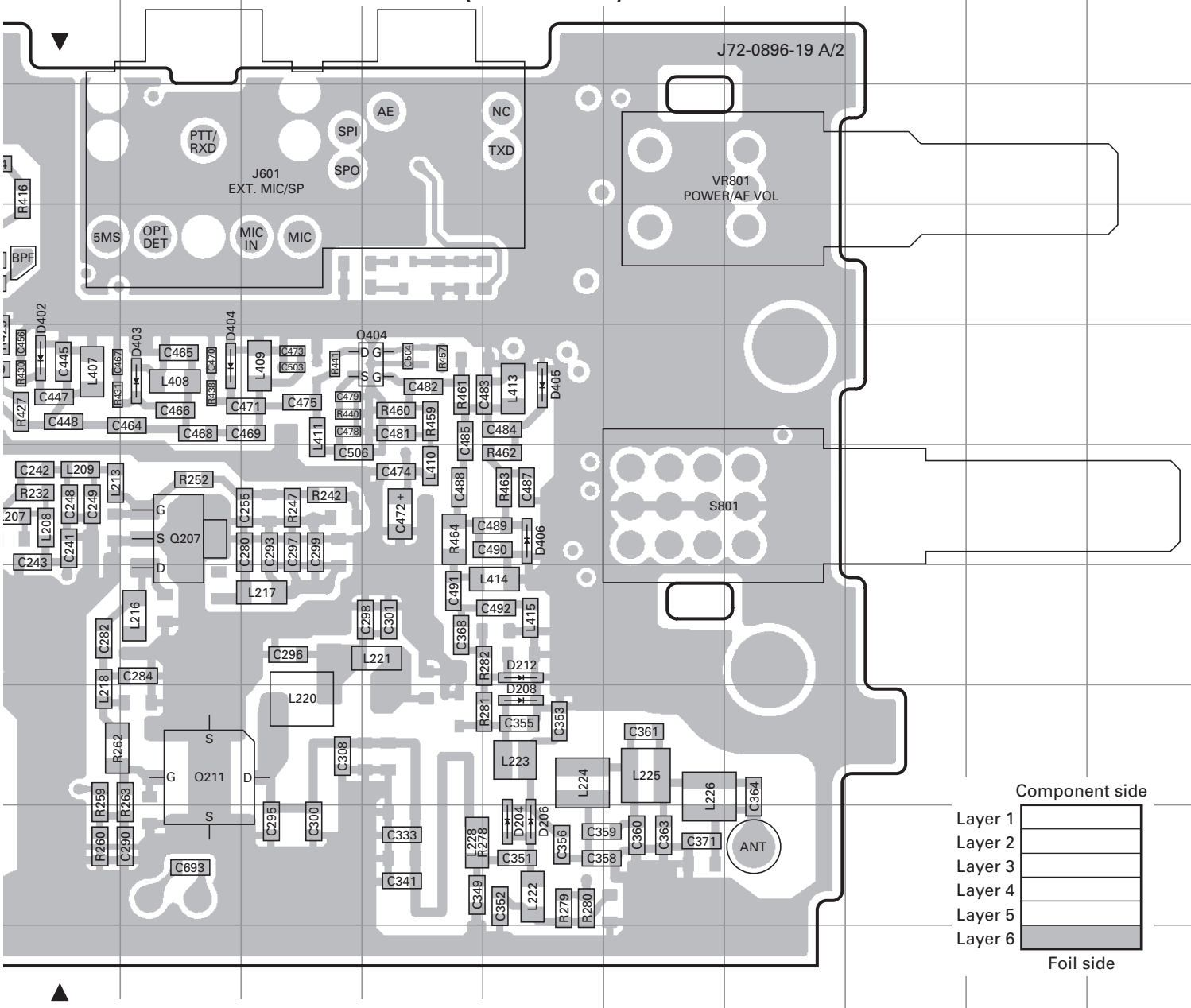
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

TK-3160 PC BOARD / PC 板

TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2
Foil side view (J72-0896-19)



TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2
Foil side view (J72-0896-19)



TX-RX UNIT
(X57-673X-XX)

Ref. NO.	Address
IC1	8D
IC401	4F
IC801	3D
Q4	5E
Q5	8I
Q6	8G
Q7	6F
Q8	8G
Q9	8H
Q10	7G
Q11	7H
Q12	7G
Q206	6I
Q207	6K
Q211	8K
Q401	3G

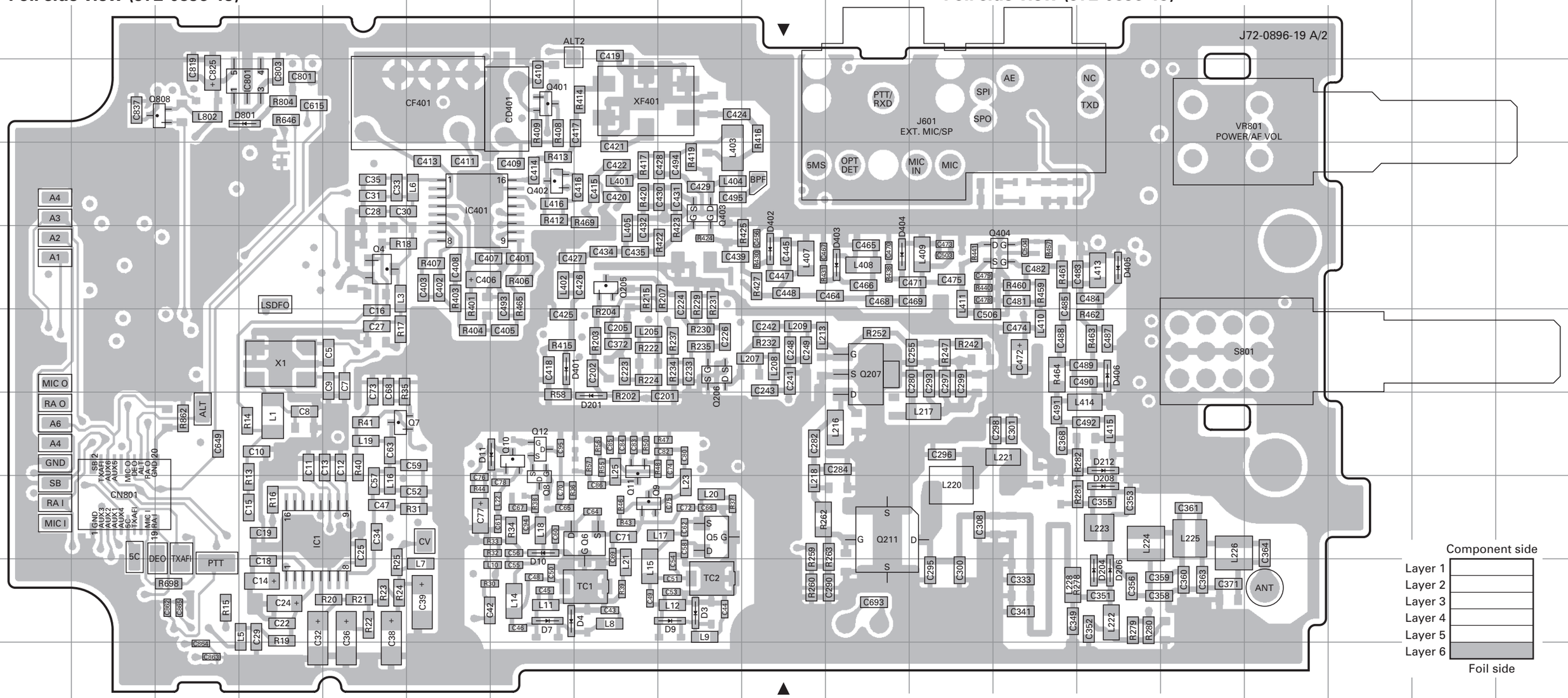
Ref. NO.	Address
Q402	4G
Q403	4I
Q404	5L
Q808	3C
D2	8E
D3	9H
D4	9I
D5	9G
D6	9I
D7	9G
D8	9G
D9	9I
D10	9I
D11	6F
D12	9G
D13	7G

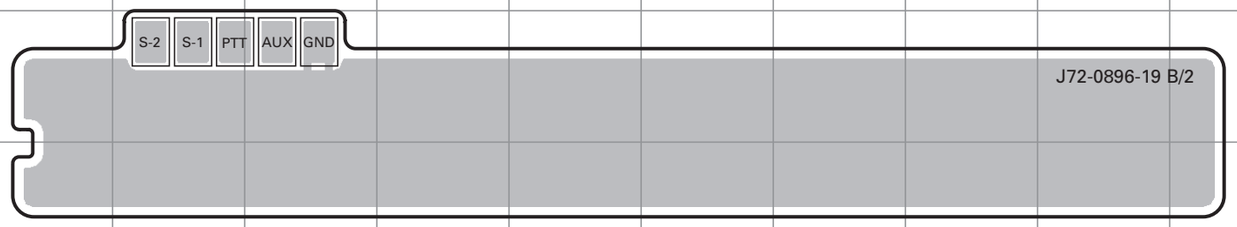
Ref. NO.	Address
D14	6F
D201	7H
D204	9M
D206	9M
D208	8N
D212	7N
D401	6G
D402	5J
D403	5K
D404	5N
D405	6N
D801	3D

PC BOARD / PC 板 TK-3160

TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2
Foil side view (J72-0896-19)

TX-RX UNIT (X57-673X-XX) 3-01 : C 0-12 : C2
Foil side view (J72-0896-19)





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

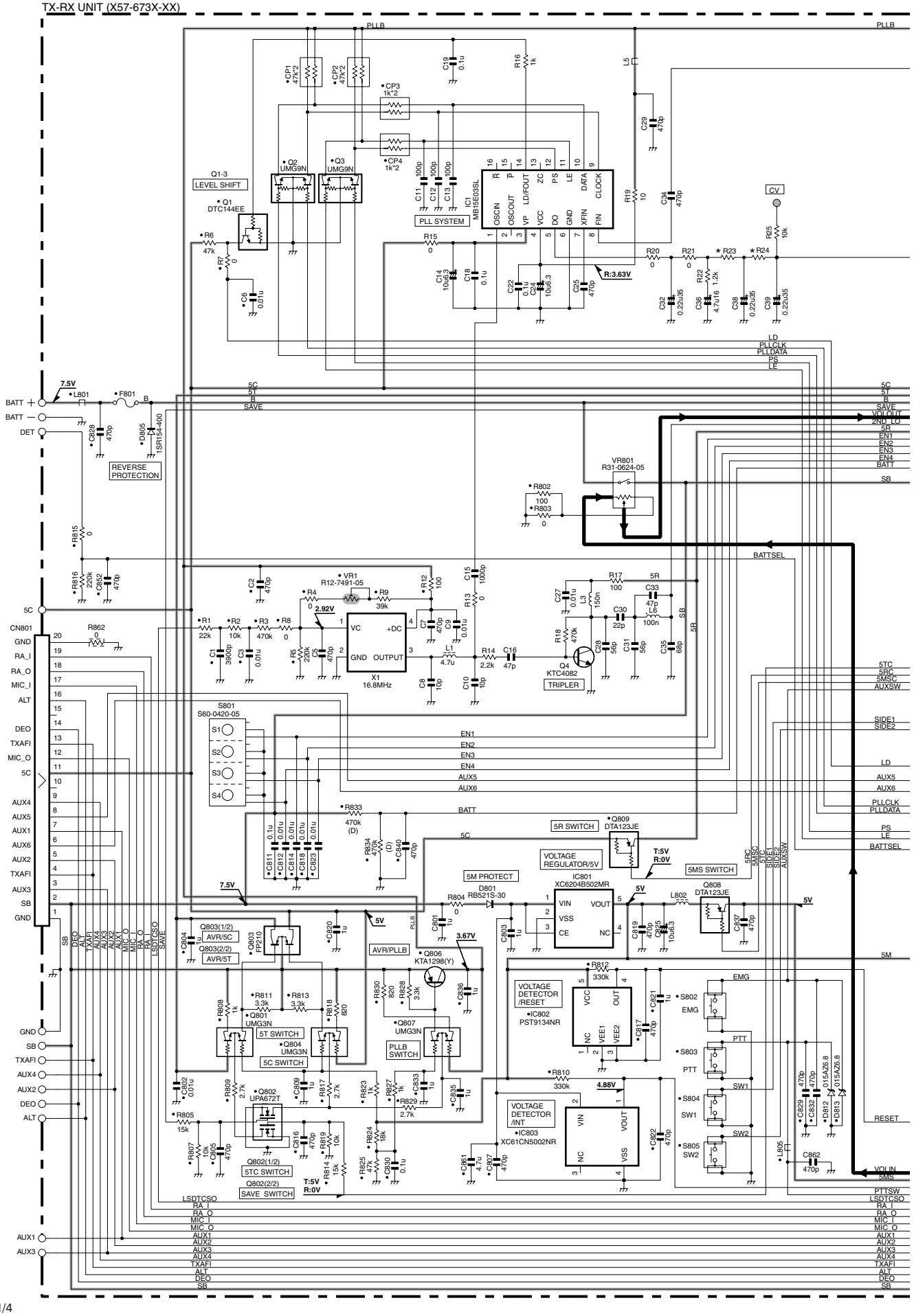
TX-RX UNIT
(X57-673X-XX)

Ref. NO.	Address
IC1	8D
IC401	4F
IC801	3D
Q4	5E
Q5	8I
Q6	8G
Q7	6F
Q8	8G
Q9	8H
Q10	7G
Q11	7H
Q12	7G
Q206	6I
Q207	6K
Q211	8K
Q401	3G

Ref. NO.	Address
Q402	4G
Q403	4I
Q404	5L
Q808	3C
D2	8E
D3	9H
D4	9I
D5	9G
D6	9I
D7	9G
D8	9G
D9	9I
D10	9I
D11	6F
D12	9G
D13	7G

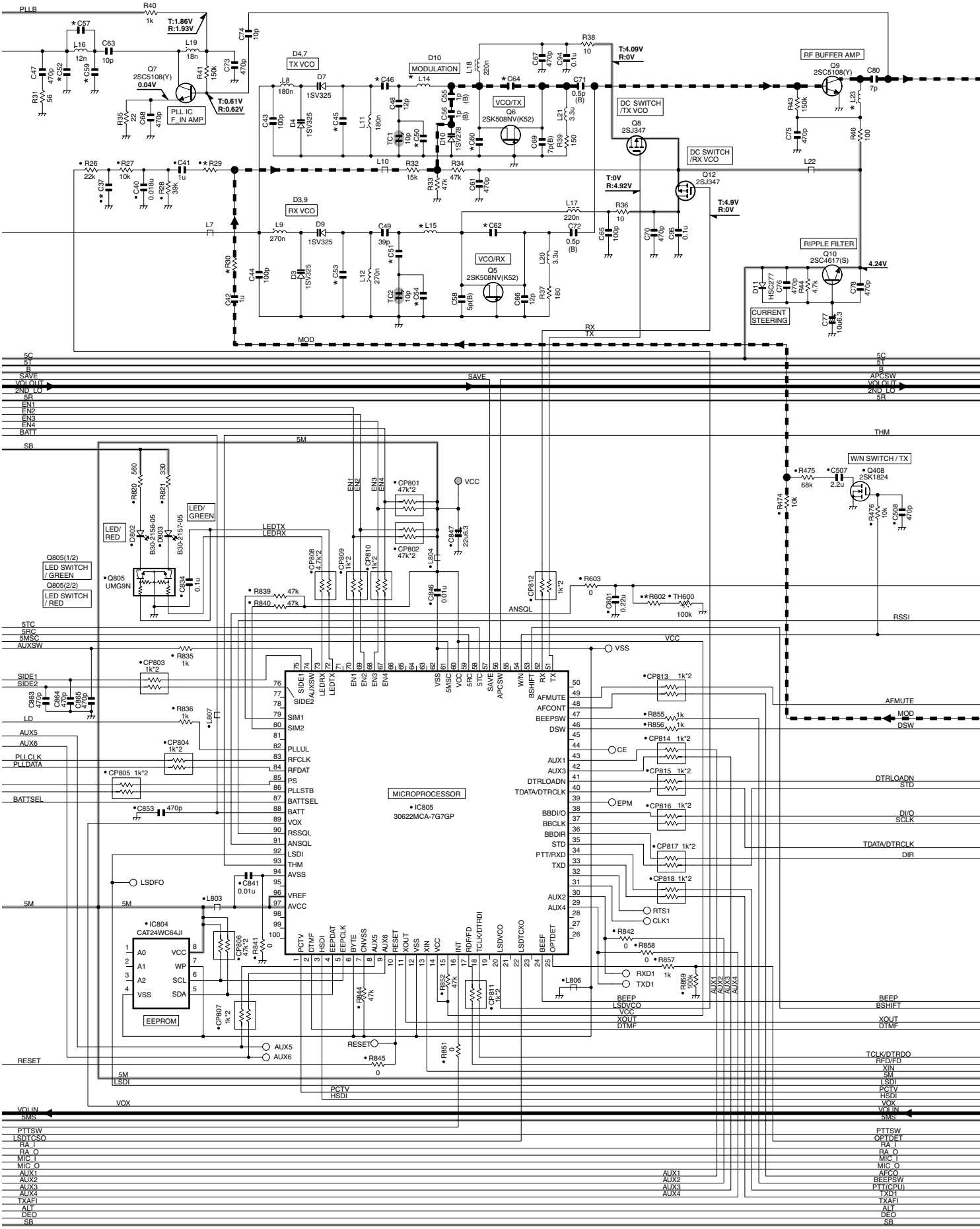
Ref. NO.	Address
D14	6F
D201	7H
D204	9M
D206	9M
D208	8N
D212	7N
D401	6G
D402	5J
D403	5K
D404	5N
D405	6N
D801	3D

TK-3160 SCHEMATIC DIAGRAM / 原理图



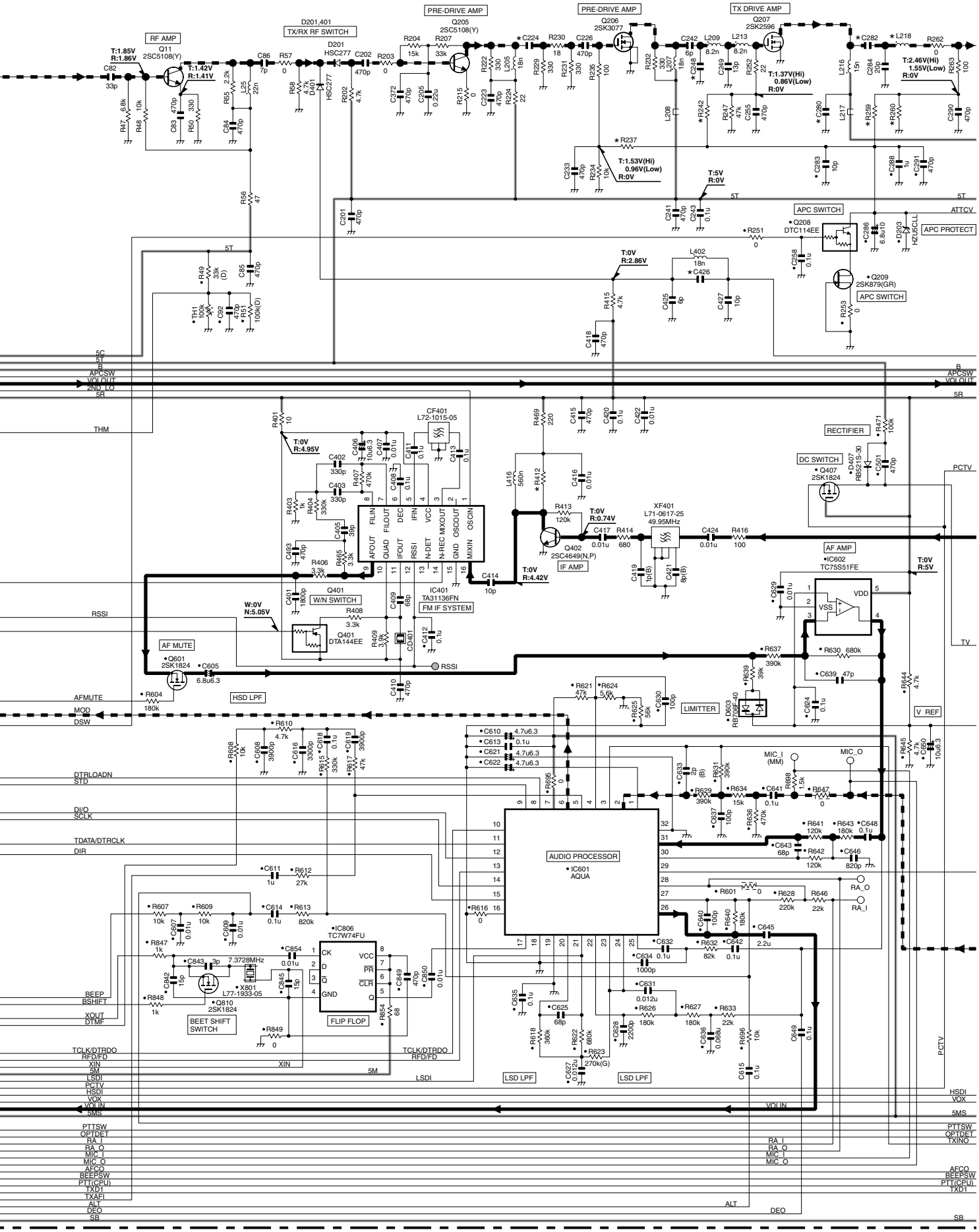
SCHEMATIC DIAGRAM / 原理图 TK-3160

TX-RX UNIT (X57-673X-XX)



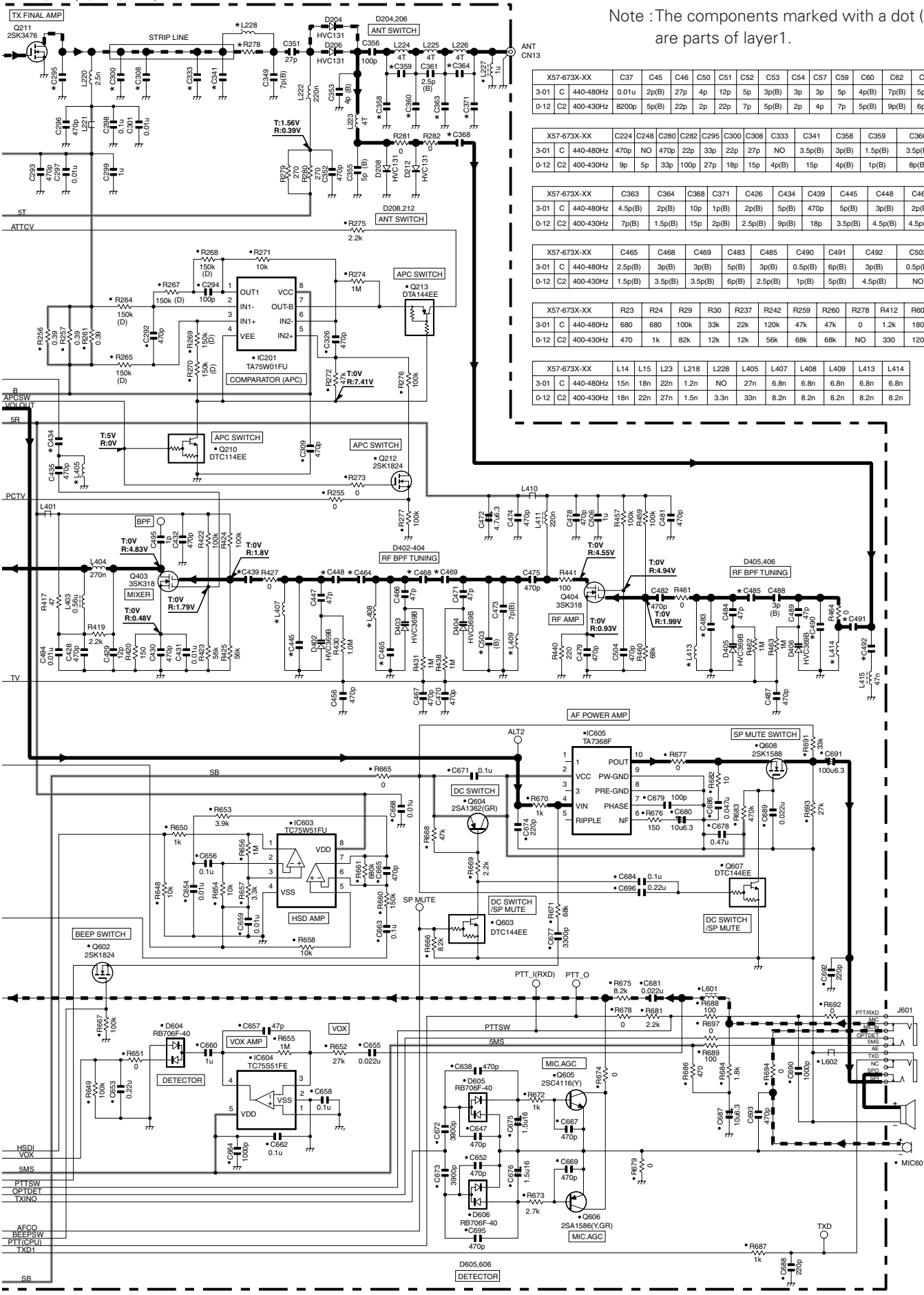
TK-3160 SCHEMATIC DIAGRAM / 原理图

TX-RX UNIT (X57-673X-XX)



SCHEMATIC DIAGRAM / 原理图 TK-3160

TX-RX UNIT (X57-673X-XX)



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

X57-673X-XX		C37	C45	C46	C50	C51	C52	C53	C54	C57	C59	C60	C62	C64
3-01	C	440-480Hz	0.01u	2p(B)	27p	4p	12p	5p	3p(B)	3p	3p	5p	4p(B)	7p(B)	5p(B)
0-12	C2	400-430Hz	8200p	5p(B)	22p	2p	22p	7p	5p(B)	2p	4p	7p	5p(B)	9p(B)	6p(B)

X57-673X-XX		C224	C248	C280	C282	C295	C300	C308	C333	C341	C358	C359	C360
3-01	C	440-480Hz	470p	NO	470p	22p	33p	22p	27p	NO	3.5p(B)	3p(B)	1.5p(B)	3.5p(B)
0-12	C2	400-430Hz	9p	5p	33p	100p	27p	18p	15p	4p(B)	15p	4p(B)	1p(B)	8p(B)

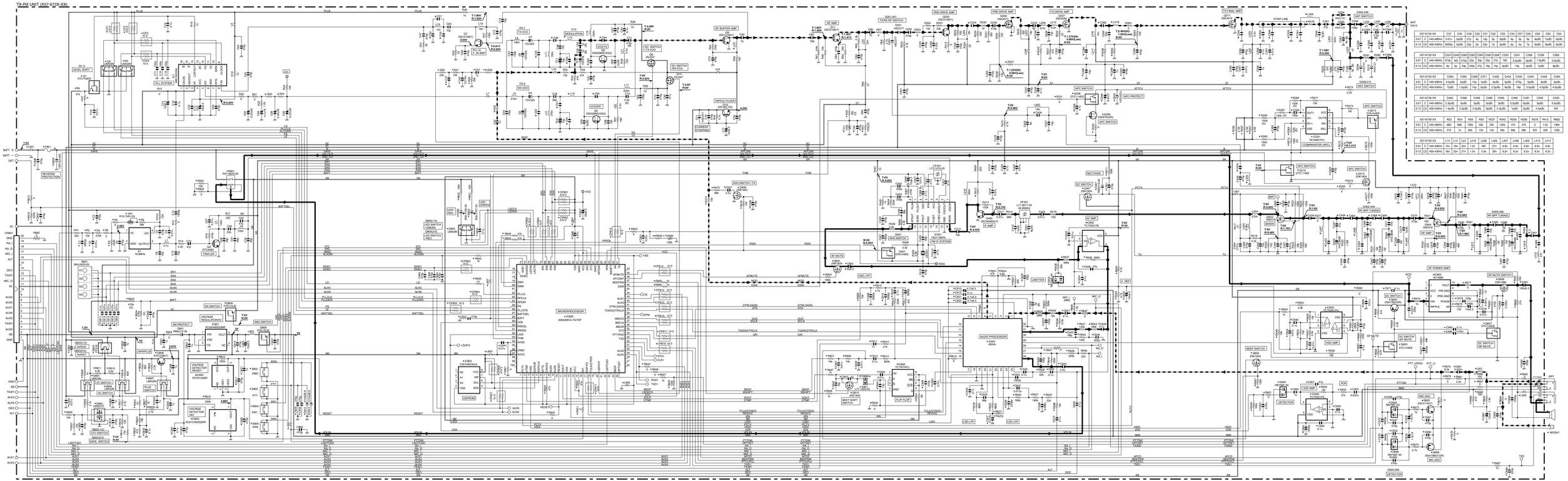
X57-673X-XX		C363	C364	C368	C371	C426	C434	C439	C445	C448	C464
3-01	C	440-480Hz	4.5p(B)	2p(B)	10p	1p(B)	2p(B)	5p(B)	470p	5p(B)	3p(B)	2p(B)
0-12	C2	400-430Hz	7p(B)	1.5p(B)	15p	2p(B)	2.5p(B)	9p(B)	18p	3.5p(B)	4.5p(B)	4.5p(B)

X57-673X-XX		C465	C468	C469	C483	C485	C490	C491	C492	C503
3-01	C	440-480Hz	2.5p(B)	3p(B)	3p(B)	5p(B)	3p(B)	0.5p(B)	6p(B)	3p(B)	0.5p(B)
0-12	C2	400-430Hz	1.5p(B)	3.5p(B)	3.5p(B)	6p(B)	2.5p(B)	1p(B)	5p(B)	4.5p(B)	NO

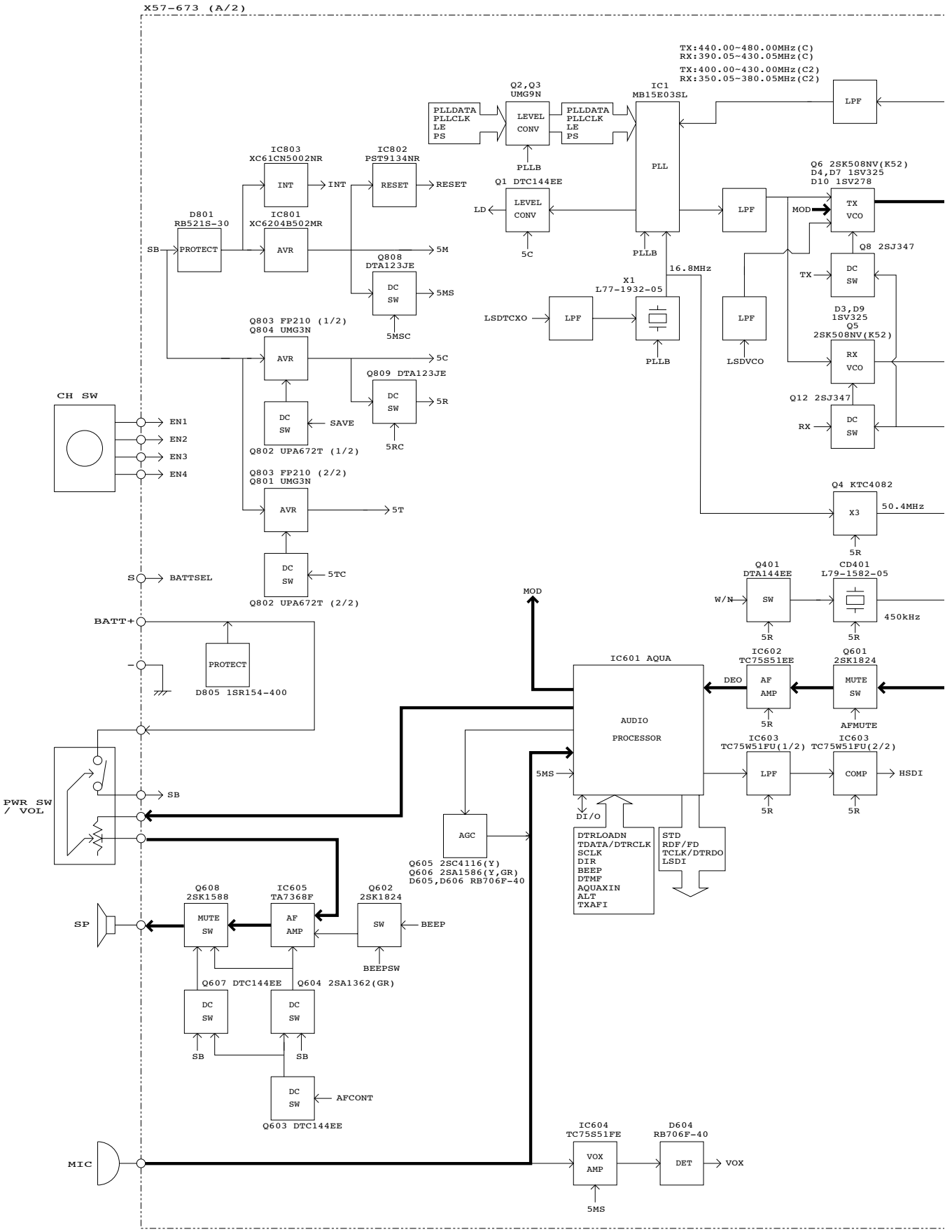
X57-673X-XX		R23	R24	R29	R30	R237	R242	R259	R260	R278	R412	R602
3-01	C	440-480Hz	680	680	100k	33k	22k	120k	47k	47k	0	1.2k	180k
0-12	C2	400-430Hz	470	1k	82k	12k	12k	56k	68k	68k	NO	330	120k

X57-673X-XX		L14	L15	L23	L218	L228	L405	L407	L408	L409	L413	L414
3-01	C	440-480Hz	15n	18n	22n	1.2n	NO	27n	6.8n	6.8n	6.8n	6.8n	6.8n
0-12	C2	400-430Hz	18n	22n	27n	1.5n	3.3n	33n	8.2n	8.2n	8.2n	8.2n	8.2n

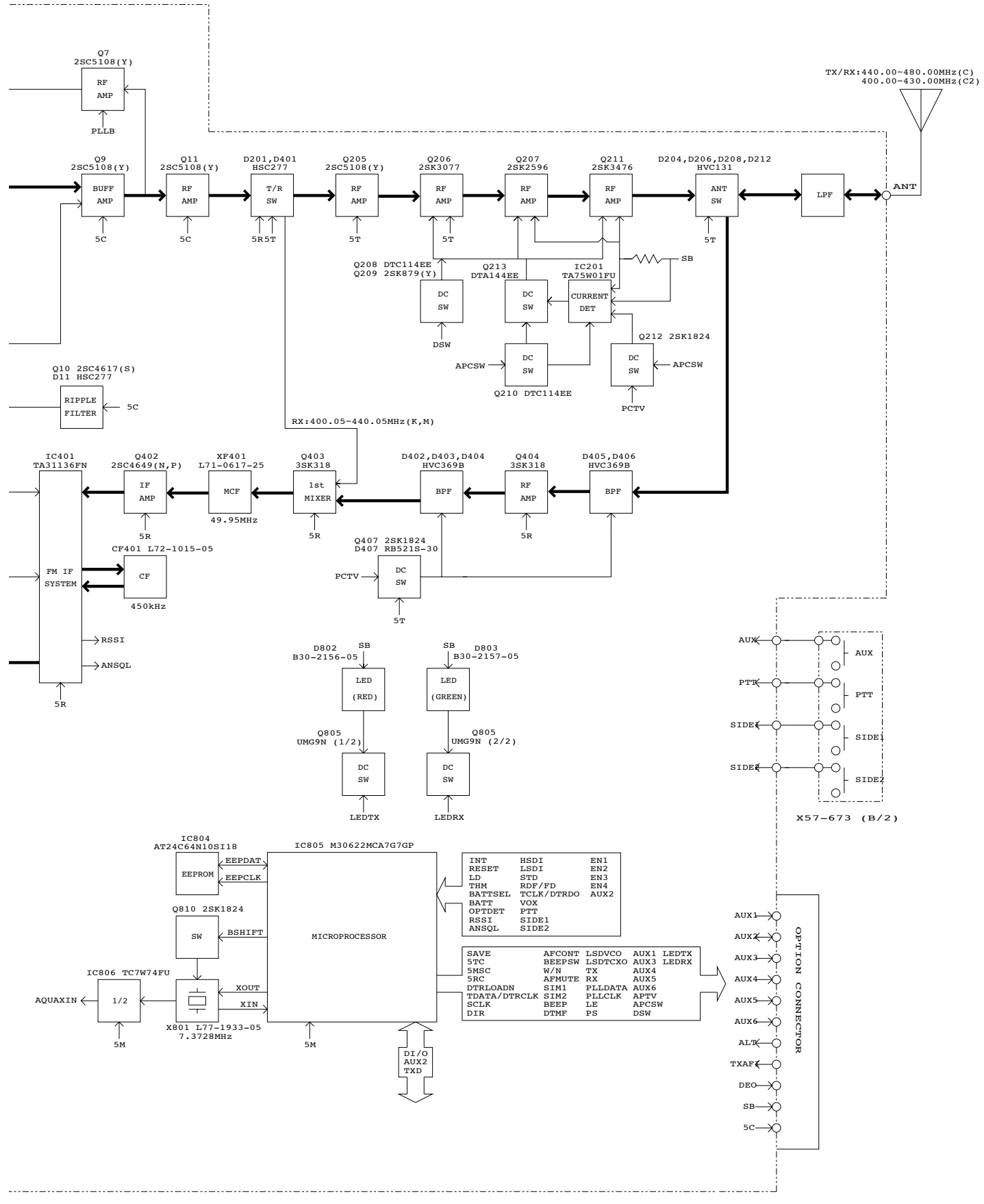
TK-3160 SCHEMATIC DIAGRAM / 原理图



BLOCK DIAGRAM / 方块图

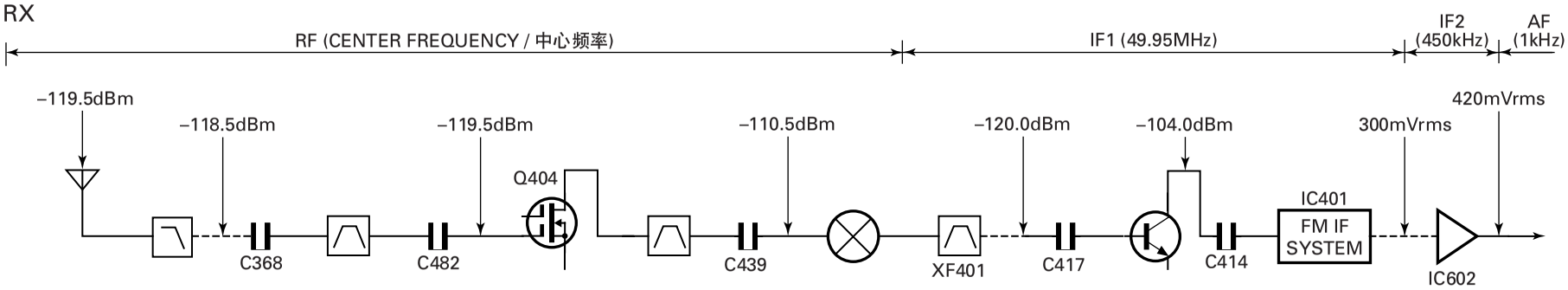


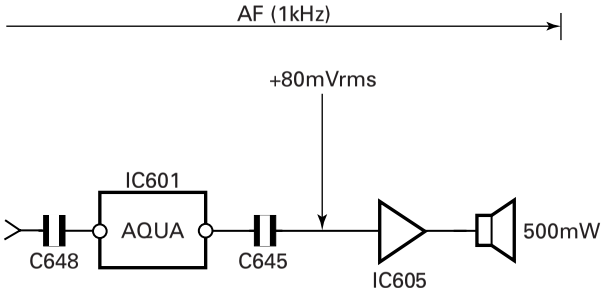
BLOCK DIAGRAM / 方块图



LEVEL DIAGRAM / 电平图

RX

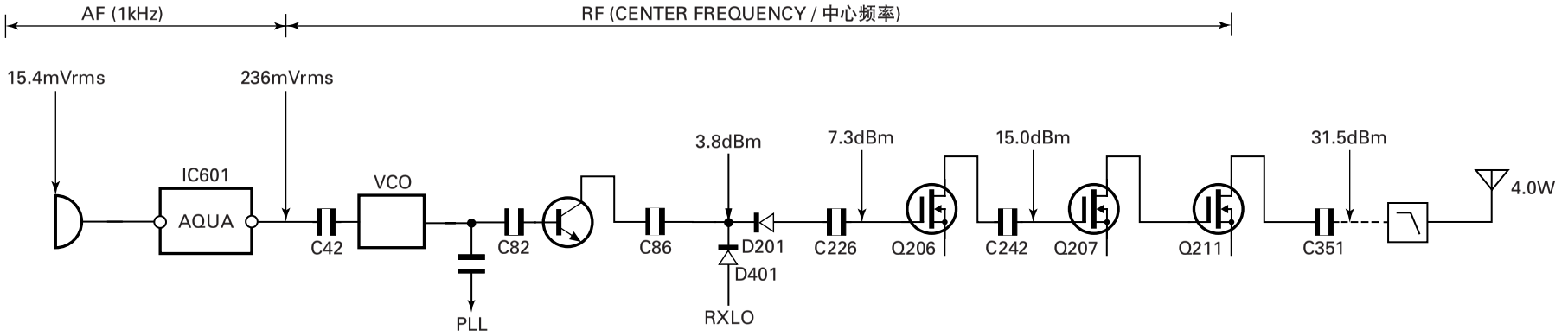




To make measurements in the AF section, connect the AC level meter. (ANT input : -53dBm, 1kHz FM, 3kHz DEV(WIDE).)
In the RF section, use a 1000pF coupling capacitor. (The display shows the SSG input value required to obtain 12dB SINAD Without Local Level.)

如要在 AF 部测量，则连接 AC 电平表。(天线输入: - 53dBm , 1kHz FM , 3kHz DEV(宽))
如要在 RF 部测量，请使用 1000pF 耦合电容器。
(图中显示了获得 12dB SINAD 所需的 SSG 输入值，没有本地电平。)

TX



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

AG 被设置成话筒输入得到 3kHz DEV 在 1kHz MOD (宽)。
如要在 AF 部测量，则连接 AC 电平表。
如要在 RF 部测量，请使用 1000pF 耦合电容器。

SPECIFICATIONS

General

Frequency Range	440~480MHz (C), 400~430MHz (C2)
Number of channels	Max. 16
Number of groups	Max. 16
Channel Spacing	25kHz (Wide) 12.5kHz (Narrow)
PLL Channel Stepping	5kHz, 6.25kHz
Operating Voltage	7.5 VDC±20%
Battery Life	More than 9 hours at 5 watts (5-5-90 duty cycle with KNB-24L battery)
Operating Temperature range	–30˚C to +60˚C (–22 ˚F to +140 ˚F)
Dimensions and Weight	
With KNB-24L (1400mAh battery)	56 (2-3/16) W x 109.3 (4-5/16) H x 34.5 (1-3/8) D mm (in) 290g (0.64lbs)
With KNB-25A (1200mAh battery)	56 (2-3/16) W x 109.3 (4-5/16) H x 40.7 (1-5/8) D mm (in) 355g (0.78lbs)
With KNB-26N (2000mAh battery)	56 (2-3/16) W x 109.3 (4-5/16) H x 40.7 (1-5/8) D mm (in) 400g (0.88lbs)

Receiver (Measurements made per EIA standard EIA-603)

Sensitivity	
EIA 12dB SINAD	0.25μV (Wide)/0.28μV (Narrow)
Selectivity	70dB (Wide)/62dB (Narrow)
Inter modulation	65dB (Wide)/62dB (Narrow)
Spurious response	65dB
Audio Power Output	500mW / 8Ω
Frequency Stability	±2.5ppm
Channel Frequency Spread	40MHz (C), 30MHz (C2)

Transmitter (Measurements made per EIA standard EIA-603)

RF Power Output	4W/1W
Spurious and Harmonics	70dB
Modulation	16KϕF3E (Wide)/11KϕF3E (Narrow)
FM Noise	45dB (Wide)/43dB (Narrow)
Audio Distortion	Less than 5%
Frequency Stability	±2.5ppm
Channel Frequency Spread	40MHz (C), 30MHz (C2)

TK-3160

规格

概述

频率范围	440~480MHz (C), 400~430MHz (C2)
频道数	最大 16
组数	最大 16
信道间距	25kHz (宽) 12.5kHz (窄)
PLL 频道步进	5kHz, 6.25kHz
电池电压	7.5 VDC ± 20%
电池寿命	5W 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° F 到 + 140° F）
尺寸和重量	
带有 KNB-24L (1400mAh 电池)	56 (2-3 / 16) W x 109.3 (4-5 / 16) H x 34.5 (1-3 / 8) D mm (英寸) 290g (0.64 lbs)
带有 KNB-25A (1200mAh 电池)	56 (2-3 / 16) W x 109.3 (4-5 /16) H x 40.7 (1-5 / 8) D mm (英寸) 355g (0.78 lbs)
带有 KNB-26N (2000mAh 电池)	56 (2-3 / 16) W x 109.3 (4-5 / 16) H x 40.7 (1-5 / 8) D mm (英寸) 400g (0.88 lbs)

接收部（根据 EIA 标准 EIA-603 测定）

灵敏度	
EIA 12dB SINAD	0.25μV (宽) / 0.28μV (窄)
选择性	70dB (宽) / 62dB (窄)
互调	65dB (宽) / 62dB (窄)
假信号响应	65dB
音频功率输出	500mW / 8 Ω
频率稳定性	± 2.5ppm
信道频率扩展	40MHz (C), 30MHz (C2)

发射部（根据 EIA 标准 EIA-603 测定）

射频功率输出	4W / 1W
假信号和谐波	70dB
调制	16KφF3E (宽) / 11KφF3E (窄)
FM 噪音	45dB (宽) / 43dB (窄)
音频失真	低于 5%
频率稳定性	± 2.5ppm
信道频率扩展	40MHz (C), 30MHz (C2)

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