

TK-2160

SERVICE MANUAL / 维修手册

C version

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.

维修服务

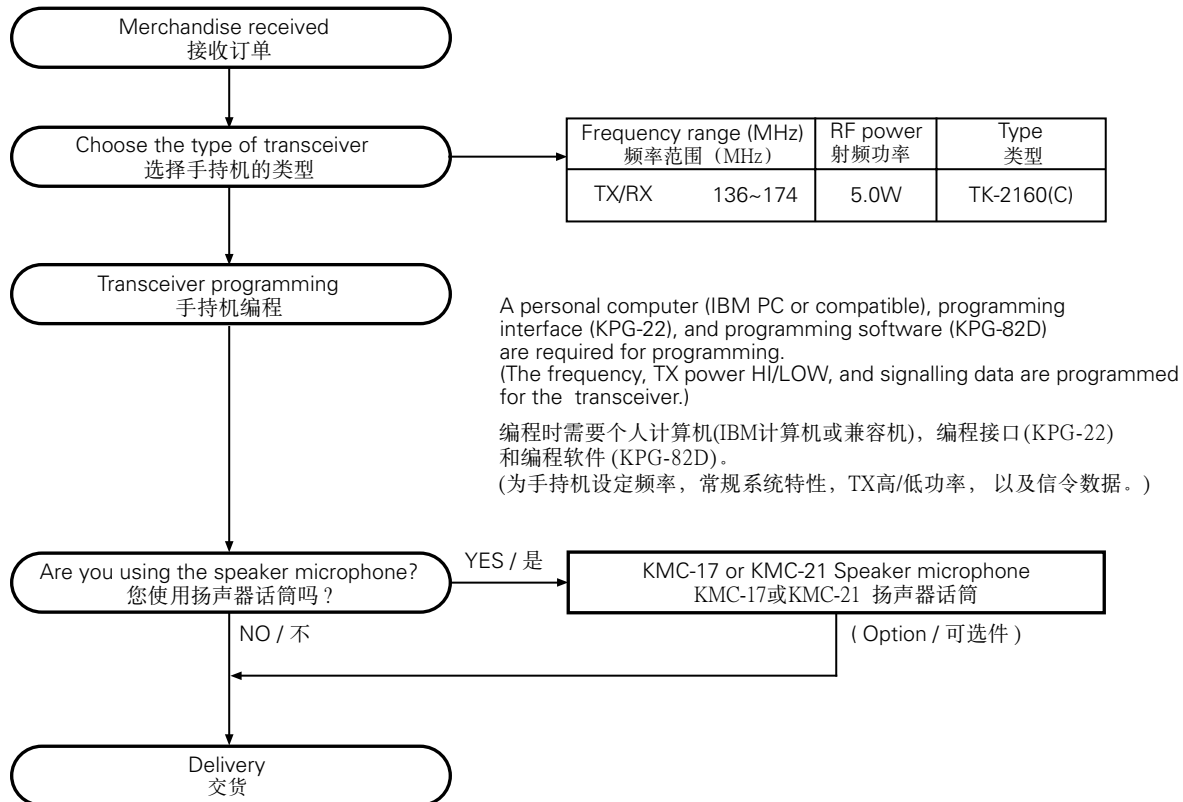
为了便于维修本设备、建立了完整的维修服务体系、提供了包括原理图、印刷电路板图和调整步骤在内的资料供参考。

| Unit | | TX-RX Unit | Frequency range | Remarks |
|---------------------|---|-------------|-----------------|---------------------------------|
| Model & destination | | | | |
| TK-2160 | C | X57-6720-10 | 136~174MHz | IF1 : 49.95MHz LOC : 50.4MHz |

| 单元 | | TX-RX 单元 | 频率范围 | 备注 |
|---------|---|-------------|------------|---------------------------------|
| 型号和类型 | | | | |
| TK-2160 | C | X57-6720-10 | 136~174MHz | IF1 : 49.95MHz LOC : 50.4MHz |

SYSTEM SET-UP / 系统体系

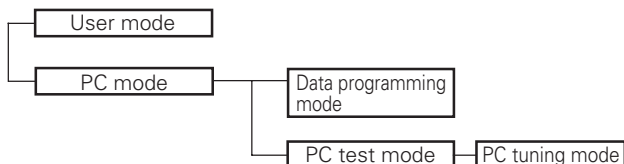
SYSTEM SET-UP / 系统体系



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-2160 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

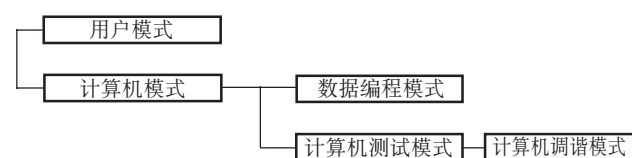
1. Connect the TK-2160 to the personal computer with the interface cable.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the radio enters PC mode.
When data is transmitting from the transceiver, the red LED lights.
When data is received by the transceiver, 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-2160 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-2160 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-2160 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:

- 当把存储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-2160 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-2160 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-2160 to the computer's RS-232C serial port.

3-4. Programming software description

KPG-82D is the programming software for TK-2160 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-2160 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-2160 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-2160 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-2160 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-2160 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。

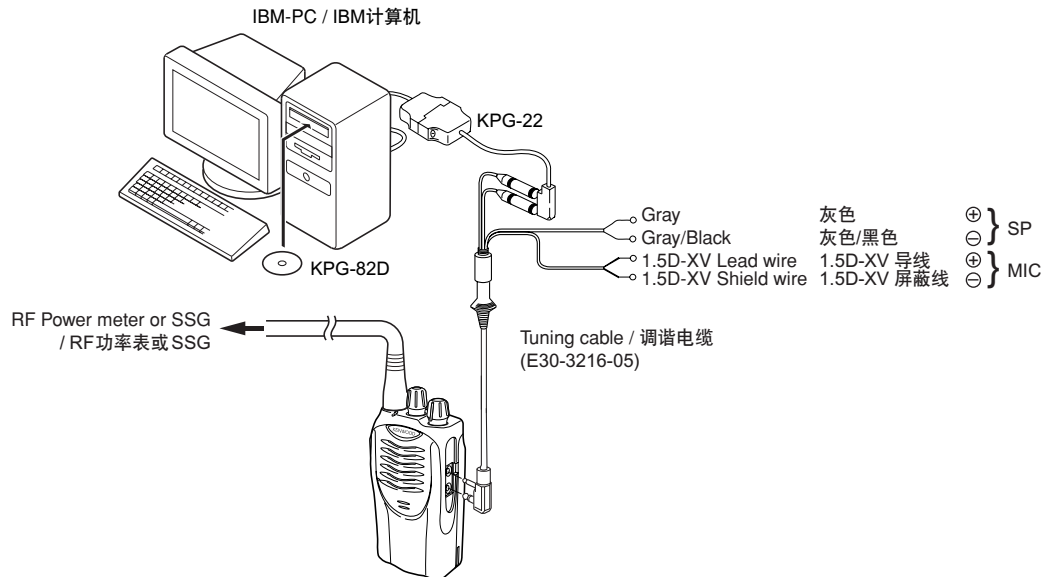


Fig. 1 / 图 1

TK-2160

DISASSEMBLY FOR REPAIR / 维修拆卸

1. Separating the case assembly from the chassis.

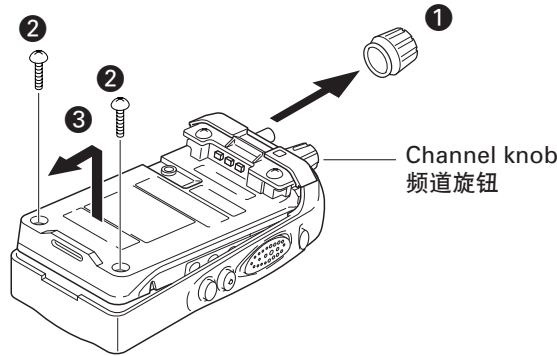
1. Remove the volume knob ①.
2. Remove the two screws ②.
3. Lift the chassis ③, and remove it from the case assembly.

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 ①。
2. 卸下螺丝 ②。
3. 拉起底架 ③，并且把它卸下。

注：机壳和后盖分开之后，请卸下频道旋钮。

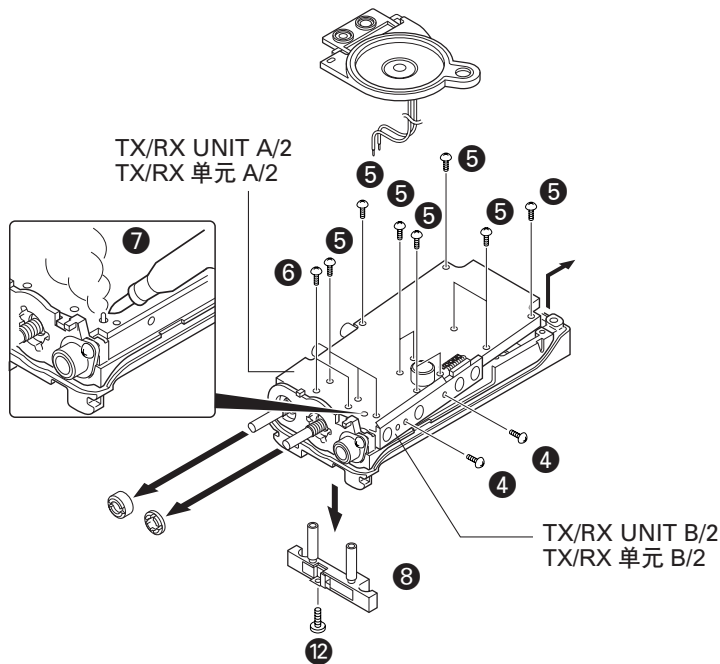


2. Separating the chassis from the TX/RX unit.

1. Remove the two screws ④ fixing the TX/RX unit B/2.
2. Remove the twelve screws ⑤ and two screws ⑥ fixing the TX/RX unit A/2.
3. Remove the solder from the antenna terminal using a soldering iron ⑦, 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 ④。
2. 卸下 TX/RX 单元 A/2 的 12 个螺丝 ⑤ 和 2 个螺丝 ⑥。
3. 用电烙铁 ⑦ 烫下焊接的天线端头，然后卸下天线单元。



Note: The two screws ⑥ of TX/RX unit A/2 are fixing the battery terminal block ⑧.

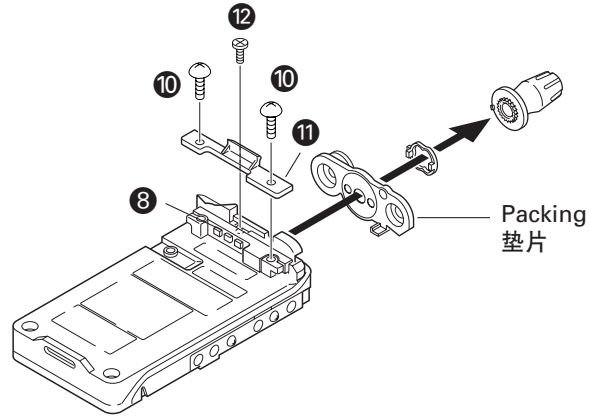
注：卸下固定 TX/RX 单元 A/2 的 2 个螺丝 ⑥，才可以修理电池终端块 ⑧。

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。



TK-2160

DISASSEMBLY FOR REPAIR / 维修拆卸

Assembling

- Installation of battery terminal block and packing



Install them so that no distortion or deformation occurs.

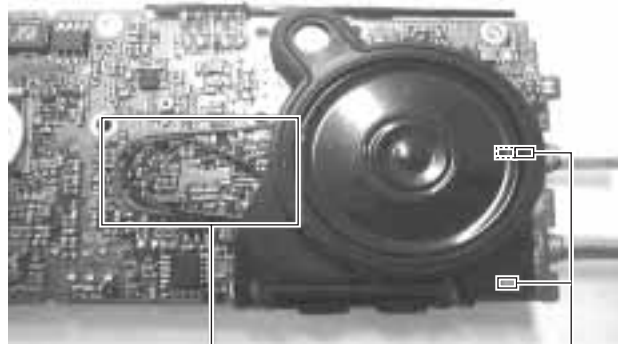
组装

- 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。

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



Wire Styling
引线

- 扬声器、扬声器垫以及扬声器引线的组装

Install the cushion according to the guide.
请按照指示安装扬声器垫。

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

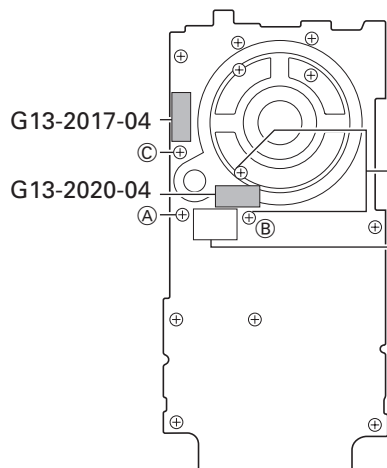
安装时请不要把扬声器从垫子中脱出来。如照片所示放好扬声器引线。

- Attaching the cushion

Attach the cushion as shown in Fig. 1.

- 粘好扬声器垫

如图1所示粘好扬声器垫。



Take screw ② and MIC edge as reference line when sticking.

当粘扬声器垫时，以螺丝 ② 和 MIC 边缘为参考线。

G13-2018-04
Stick between screw ① and ②.
粘贴在螺丝 ① 和 ② 之间。

Fig. 1 / 图 1

Note: Cushion must not cover the screws ①, ② and ③.

注：扬声器垫不能盖住螺丝 ①、② 以及 ③。

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.

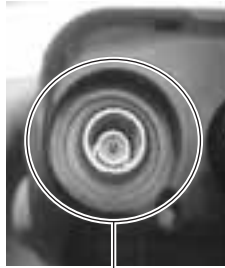
首先, 组装机壳。



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

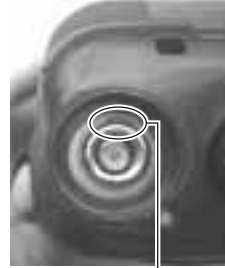
然后, 如图所示按压底架到机壳上。

Good Condition / 正确状态



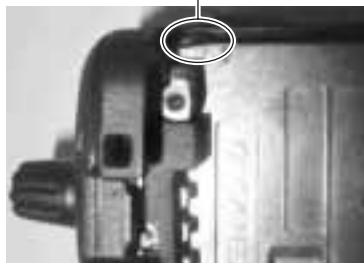
After mount, packing should be in this condition.
 组装后, 垫子应如上述状态。

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.

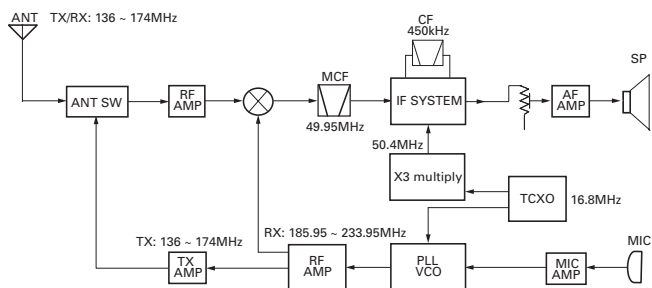


Fig. 1 Frequency configuration / 图 1 频率构成

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。

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。

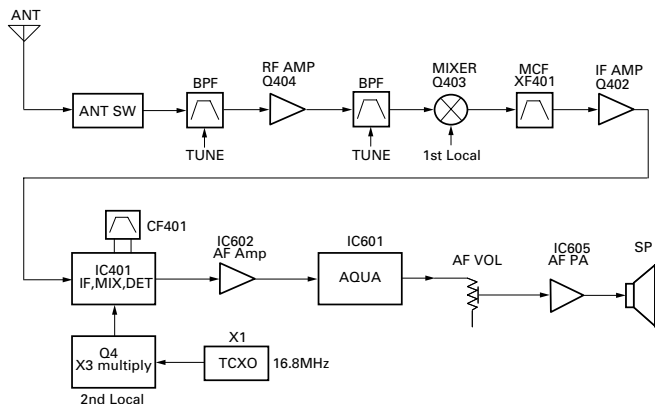


Fig. 2 Receiver section / 图 2 接收部

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 (L411 and L412), and is amplified by the RF amplifier (Q404).

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

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 optimum characteristics, such as adjacent frequency selectivity.

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 (L411 和 L412)，并且被 RF 放大器 (Q404) 放大。

此信号通过 BPF (L407 和 L409) 然后进入混频。这些 BPF 被可变电容器 (D402, D403, D404 和 D405) 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) 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.

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.

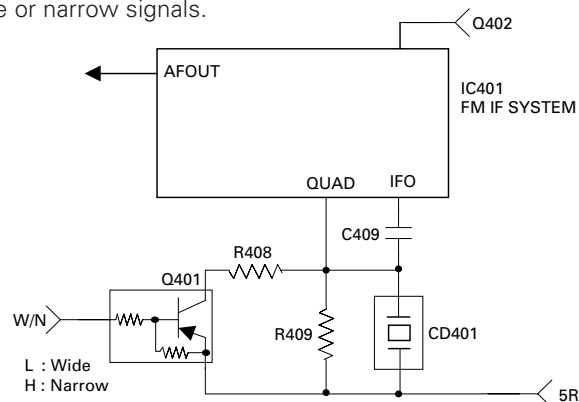


Fig. 3 Wide/Narrow switching circuit / 图 3 宽 / 窄开关电路

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.

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.

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) 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。

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) 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

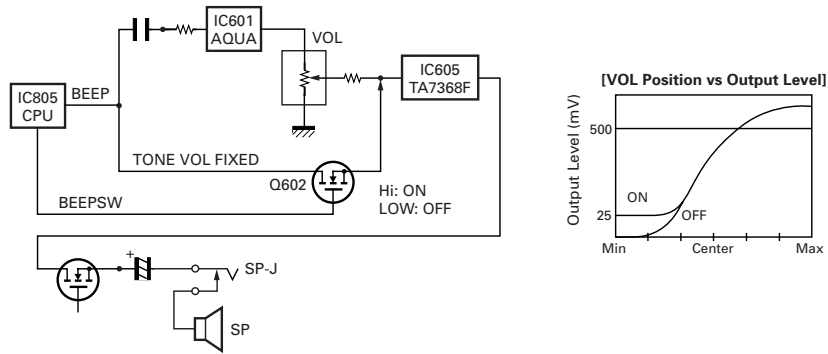


Fig. 4 Tone volume fixed circuit / 图4 音量固定电路

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)

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) 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.

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

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)

(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)

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.

(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 调制器中进行调制。被解调的数据送到 CPU 进行处理。

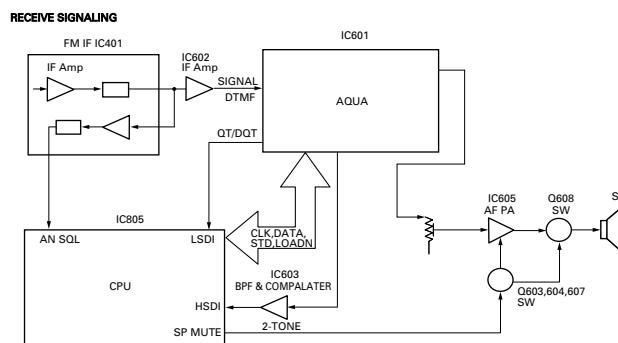


Fig. 5 AF amplifier and squelch / 图5 AF放大器和静噪

CIRCUIT DESCRIPTION / 电路说明

(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.

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

The frequency step of the PLL circuit is 2.5, 5, 6.25 or 7.5kHz. 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)

1) PLL

PLL 电路的频率步进是 2.5, 5, 6.25 或 7.5kHz。

16.8MHz 的参考振荡信号在 IC1 中被一个固定计数器分频。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计数器分频。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

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 (D3, D5, D7 and D8 in transmit mode and D4, D6, D9 and D10 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.

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 D3, D5, D7 和 D8, 在接收模式时为 D4, D6, D9 和 D10) 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。

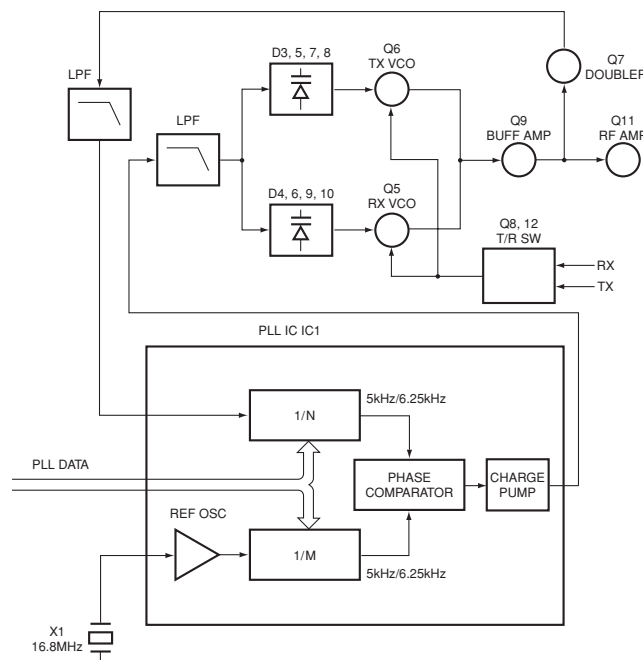


Fig. 6 PLL circuit / 图 6 PLL 电路

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)

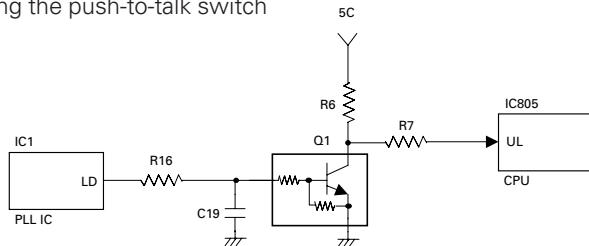


Fig. 7 Unlock detector circuit / 图7 失锁检测器电路

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。

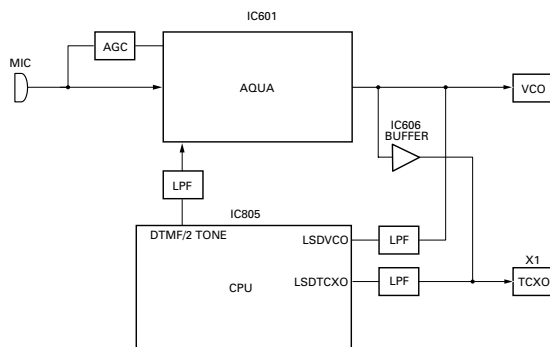


Fig. 8 Microphone amplifier / 图8 话筒放大器

2) Drive and Final Amplifier

The signal from the T/R switch (D201 is on) is amplified by the drive amplifier (Q207) to 50mW. The output of the drive amplifier is amplified by the RF power amplifier (Q211) to 5.0W (1W when the power is low). The RF power amplifier consists of two MOS FET stages. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (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5.0W(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。

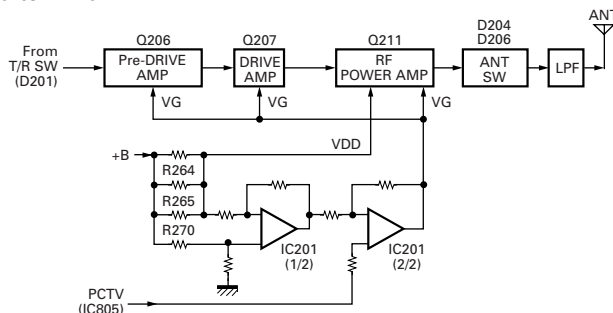


Fig. 9 Drive and final amplifier and APC circuit / 图9 驱动、终端放大器以及APC电路

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 R264, R265 and R270 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 for the microprocessor: 5M,5MS,5C,5R, and 5T. 5M 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 R264, R265 和 R270 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 电源提供给微处理器: 5M,5MS,5C,5R 和 5T。当电源接通时, 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.

- (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) 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.

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。

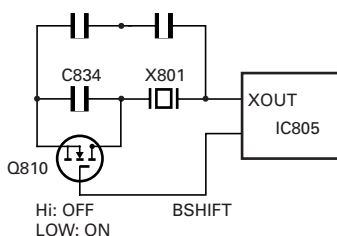


Fig. 10 Frequency shift circuit / 图 10 频率偏移电路

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] |

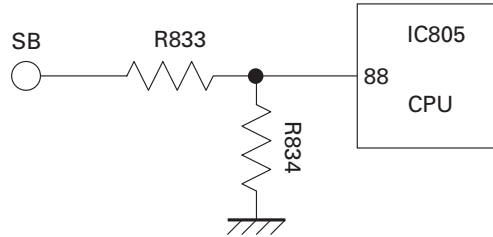


Fig. 12 Low battery warning / 图 12 电池低压警告

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-terminal as below. The microprocessor then detects the battery type.

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

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。

| 阻抗 | 电池类型 | S 终端的输入电压 |
|---------------|--------|-----------|
| 1.8M Ω | Li-ion | 0.3~1.3V |
| 560k Ω | Ni-Cd | 1.3~2.6V |
| 220k Ω | Ni-MH | 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。

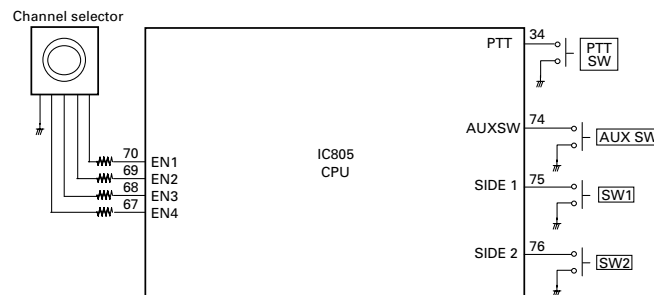


Fig. 13 Control system / 图 13 控制系统

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

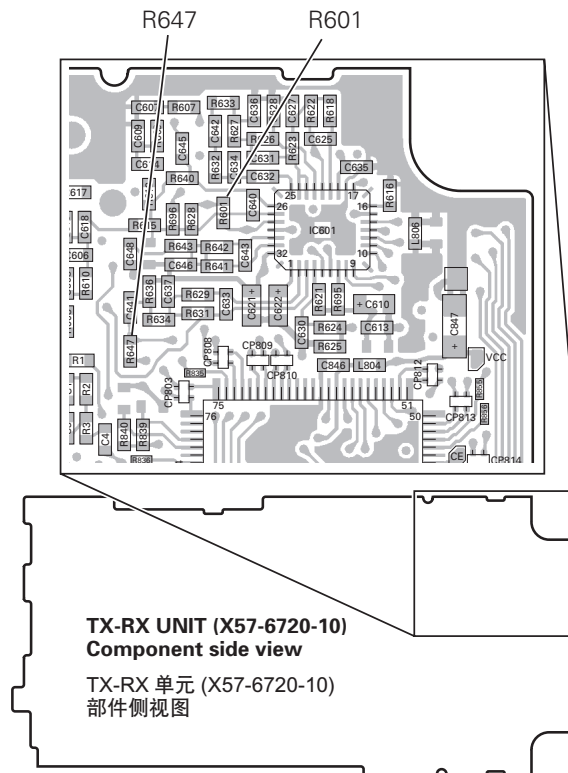
1. 选件板

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"。



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) $\pm 0.5V$ |
| 3 | A3 | AUX3 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| 4 | TXAFI | Transmit AF input | Input sensitivity/Impedance (1kHz std. dev.) | 280 \pm 50mVrms @22k Ω Load |
| 5 | A2 | AUX2 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| 6 | A6 | AUX6 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| 7 | A1 | AUX1 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| 8 | A5 | AUX5 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| 9 | A4 | AUX4 | Load >100k Ω | (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 \pm 0.5V |
| 12 | MIC_O | Mic o utput | Output voltage/Impedance (1kHz 15mVrms mic input) | 2.6 \pm 1.0mVrms @2.2k Ω Load |
| | | | Output voltage/Impedance (1kHz 100mVrms mic input) | 90 \pm 20mVrms @100k Ω Load |
| 13 | TXAFI | Transmit AF input | Input sensitivity/Impedance (1kHz std. dev.) | 280 \pm 50mVrms @22k Ω Load |
| 14 | DEO | Discriminator signal output | Output voltage/Impedance (1kHz std. mod.) | 280 \pm 50mVrms @2.2k Ω Load |
| 15 | NC | Non connection | | Non connection |
| 16 | ALT | Sidetone input | Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX) | 7 \pm 3mVrms @22k Ω Load |
| 17 | MIC_I | Mic input | Input sensitivity/Impedance (1kHz std. dev.) | 7 \pm 3mVrms @22k Ω Load |
| 18 | RA_O | Receiver AF output | Output voltage/Impedance (1kHz std. mod.) | 150 \pm 50mVrms @2.2k Ω Load |
| | | | Output voltage/Impedance (1kHz system mod.) | 290 \pm 50mVrms @100k Ω Load |
| 19 | RA_I | Receiver AF input | Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX) | 75 \pm 20mVrms @22k Ω Load |
| 20 | GND | GND | | Vss |

■ Solder point connection

| Designation | Function | Condition | Value |
|-------------|-----------------------------|--|--|
| MIC_I | Mic input | Input sensitivity/Impedance (1kHz std. dev.) | 7 \pm 3mVrms @22k Ω Load |
| MIC_O | Mic o utput | Output voltage/Impedance (1kHz 15mVrms mic input) | 2.6 \pm 1.0mVrms @2.2k Ω Load |
| | | Output voltage/Impedance (1kHz 100mVrms mic input) | 90 \pm 20mVrms @100k Ω Load |
| RA_I | Receiver AF input | Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX) | 75 \pm 20mVrms @22k Ω Load |
| RA_O | Receiver AF output | Output voltage/Impedance (1kHz std. mod.) | 150 \pm 50mVrms @2.2k Ω Load |
| | | Output voltage/Impedance (1kHz system mod.) | 290 \pm 50mVrms @100k Ω Load |
| A1 | AUX1 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| A2 | AUX2 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| A3 | AUX3 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| A4 | AUX4 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| A5 | AUX5 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| A6 | AUX6 | Load >100k Ω | (Low) Vss ~ 0.4V (High) Vdd-0.8V ~ Vdd |
| SB | Switched B | Output Voltage/7mA load | DC (Battery terminal) $\pm 0.5V$ |
| GND | GND | | Vss |
| 5C | DC 5V | Output Voltage/10mA load | 5.0 \pm 0.5V |
| TXAFI | Transmit AF input | Input sensitivity/Impedance (1kHz std. dev.) | 280 \pm 50mVrms @22k Ω Load |
| DEO | Discriminator signal output | Output voltage/Impedance (1kHz std. mod.) | 280 \pm 50mVrms @2.2k Ω Load |
| LSDFO | Received sub-tone output | Output voltage/Impedance (150Hz 15% mod.) | 180 \pm 50mVrms @2.2k Ω Load |
| ALT | Sidetone input | Input sensitivity/Impedance (1kHz rated AF power/Vol. MAX) | 7 \pm 3mVrms @22k Ω 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, 2TONE. |
| 3 | HSDI | I | High speed data input (2TONE). |
| 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 | BEEP SW | 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(双音频)。 |
| 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 | BEEP SW | 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 i 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 (X57-6720-10)

| 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 |
| IC606 | IC | AF 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 | Doubler |
| 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 |
| 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 |
| Q400 | FET | W/N switch / TX |
| Q401 | Transistor | W/N switch / RX |
| Q402 | Transistor | IF AMP |
| Q403 | FET | Mixer |
| Q404 | FET | RF AMP |
| 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 (X57-6720-10)

| 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 |
| IC606 | IC | AF 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 | 触发器 |
| Q5 | 场效应管 | VCO / RX |
| Q6 | 场效应管 | VCO / TX |
| Q7 | 晶体管 | 倍加器 |
| 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 |
| Q206 | 场效应管 | 预驱动放大器 |
| 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 |
| Q400 | 场效应管 | W/N 开关 / TX |
| 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 |
| 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 |
| D2 | diode | Shift switch |
| D3 | Variable capacitance diode | Frequency control / TX VCO |
| D4 | Variable capacitance diode | Frequency control / RX VCO |
| D5 | Variable capacitance diode | Frequency control / TX VCO |
| D6 | Variable capacitance diode | Frequency control / RX VCO |
| D7 | Variable capacitance diode | Frequency control / TX VCO |
| D8 | Variable capacitance diode | Frequency control / TX VCO |
| D9 | Variable capacitance diode | Frequency control / RX VCO |
| D10 | Variable capacitance diode | Frequency control / RX VCO |
| D11 | Diode | Shift switch |
| D12 | Variable capacitance diode | Modulator |
| D13 | Diode | Current steering |
| D14 | Diode | Shift switch |
| 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 |
| D603 | Diode | Limiter |
| 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 |
| D2 | 二极管 | 变换开关 |
| D3 | 可变电容二极管 | 频率控制 / TX VCO |
| D4 | 可变电容二极管 | 频率控制 / RX VCO |
| D5 | 可变电容二极管 | 频率控制 / TX VCO |
| D6 | 可变电容二极管 | 频率控制 / RX VCO |
| D7 | 可变电容二极管 | 频率控制 / TX VCO |
| D8 | 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 | 频率控制 / RX VCO |
| D11 | 二极管 | 变换开关 |
| D12 | 可变电容二极管 | 调制器 |
| D13 | 二极管 | 电流开关 |
| D14 | 二极管 | 变换开关 |
| 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 |
| 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. Δ indicates safety critical components.
 Parts without **Parts No.** are not supplied.
 Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.
 Teile ohne **Parts No.** werden nicht geliefert.

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

TK-2160 (Y50-578X-XX) TX-RX UNIT (X57-6720-10)

| Ref. No. | Address | New parts | Parts No. | Description | Destination |
|---------------------------------|---------|-----------|--------------|-------------------------------------|-------------|
| TK-2160 | | | | | |
| 1 | 1B | * | A02-3826-43 | CABINET ASSY | |
| 2 | 2B | * | A10-4068-41 | 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 | * | B72-2271-04 | MODEL NAME PLATE | |
| 8 | 3A | * | E04-0446-05 | RF COAXIAL RECEPTACLE(SMA) | |
| 10 | 2A | * | E37-1101-05 | SPEAKER WIRE(RED) | |
| 11 | 2A | * | E37-1102-05 | SPEAKER WIRE(BLACK) | |
| 12 | 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 | * | G53-1581-12 | 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 | * | H52-2064-02 | 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(CH 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(CH) | |
| 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 | |
| TX-RX UNIT (X57-6720-10) | | | | | |
| 47 | 1B | | T07-0369-05 | SPEAKER | |
| 48 | 2C | | T90-0795-15 | HELICAL ANTENNA ACCESSORY | |
| D802 | | | B30-2156-05 | LED(RED) | |
| D803 | | | B30-2157-05 | LED(YELLOW) | |
| C1 | | | CK73GB1H822K | CHIP C 8200PF K | |
| C2 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C3 | | | CK73GB1E123K | CHIP C 0.012UF K | |
| C4 | | | CK73GB0J225K | CHIP C 2.2UF K | |
| C5 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C6 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C7 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C8 | | | CC73GCH1H100 | CHIP C 10PF D | |
| C9 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C10 | | | CC73GCH1H100 | CHIP C 10PF D | |
| C11 -13 | | | CC73GCH1H101 | CHIP C 100PF J | |
| C14 | | | C92-0713-05 | CHIP-TAN 10UF 6.3WV | |
| C15 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C16 | | | CC73GCH1H470 | CHIP C 47PF J | |
| C18 ,19 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C22 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C23 | | | CK73GB0J225K | CHIP C 2.2UF K | |
| C24 | | | C92-0713-05 | CHIP-TAN 10UF 6.3WV | |
| C25 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C27 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C28 | | | CC73GCH1H560 | CHIP C 56PF J | |
| C30 | | | CC73GCH1H220 | CHIP C 22PF J | |
| C31 | | | CC73GCH1H560 | CHIP C 56PF J | |
| C32 | | | C92-0002-05 | CHIP-TAN 0.22UF 35WV | |
| C33 | | | CC73GCH1H470 | CHIP C 47PF J | |
| C34 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C35 | | | CC73GCH1H680 | CHIP C 68PF J | |
| C36 | | | C92-0560-05 | CHIP-TAN 10UF 6.3WV | |
| C37 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C38 ,39 | | | C92-0504-05 | CHIP-TAN 0.68UF 20WV | |
| C40 | | | CK73GB1H471K | CHIP C 470PF K | |
| C41 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C42 | | | CK73GB1H183K | CHIP C 0.018UF K | |
| C43 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C44 | | | CK73FB1A225K | CHIP C 2.2UF K | |
| C45 | | | CC73GCH1H120 | CHIP C 12PF J | |
| C46 | | | CC73GCH1H090 | CHIP C 9.0PF B | |
| C47 | | | CC73GCH1H040 | CHIP C 4.0PF B | |
| C48 | | | CK73HB1C103K | CHIP C 0.010UF K | |
| C49 | | | CK73HB1H102K | CHIP C 1000PF K | |
| C50 | | | CC73GCH1H120 | CHIP C 12PF J | |
| C52 | | | CC73GCH1H050 | CHIP C 5.0PF B | |
| C53 | | | CC73HCH1H560 | CHIP C 56PF J | |
| C54 | | | CC73HCH1H220 | CHIP C 22PF J | |
| C55 | | | CC73GCH1H050 | CHIP C 5.0PF B | |
| C56 ,57 | | | CC73HCH1H270 | CHIP C 27PF J | |
| C58 | | | CC73GCH1H150 | CHIP C 15PF J | |
| C59 | | | CC73HCH1HR75 | CHIP C 0.75PF C | |

PARTS LIST / 零件表

TX-RX UNIT (X57-6720-10)

| Ref. No. | Address | New parts | Parts No. | Description | Destination | Ref. No. | Address | New parts | Parts No. | Description | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|----------------------|-------------|
| C60 | | | CC73GCH1H070 | CHIP C 7.0PF B | | C338 | | | CC73GCH1H220 | CHIP C 22PF J | |
| C61 | | | CC73HCH1H070 | CHIP C 7.0PF B | | C341 | | | CC73GCH1H100 | CHIP C 10PF D | |
| C62 | | | CK73GB1E103K | CHIP C 0.010UF K | | C344 | | | CC73GCH1H820 | CHIP C 82PF J | |
| C63 | | | CC73GCH1H220 | CHIP C 22PF J | | C349 | | | CC73GCH1H030 | CHIP C 3.0PF B | |
| C64 | | | CC73GCH1H4R5 | CHIP C 4.5PF B | | C351 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C65 | | | CC73HCH1H120 | CHIP C 12PF J | | C352 | | | CC73GCH1H270 | CHIP C 27PF G | |
| C66 | | | CK73GB1H102K | CHIP C 1000PF K | | C353 | | | CC73GCH1H270 | CHIP C 27PF J | |
| C67 | | | CK73HB1C103K | CHIP C 0.010UF K | | C355 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C69 | | | CK73GB1E103K | CHIP C 0.010UF K | | C356 | | | CC73GCH1H060 | CHIP C 6.0PF D | |
| C70 | | | C92-0714-05 | CHIP-TAN 4.7UF 6.3WV | | C358 | | | CC73GCH1H100 | CHIP C 10PF D | |
| C71 | | | CC73HCH1H0R5 | CHIP C 0.5PF B | | C359 | | | CC73GCH1H240 | CHIP C 24PF J | |
| C72 | | | CC73HCH1H040 | CHIP C 4.0PF B | | C360 | | | CC73GCH1H120 | CHIP C 12PF J | |
| C73 | | | CK73GB1H102K | CHIP C 1000PF K | | C362 | | | CC73GCH1H110 | CHIP C 11PF J | |
| C74 | | | CC73HCH1H0R5 | CHIP C 0.5PF B | | C363 | | | CC73GCH1H070 | CHIP C 7.0PF D | |
| C75 ,76 | | | CK73HB1H102K | CHIP C 1000PF K | | C365 | | | CC73GCH1H330 | CHIP C 33PF J | |
| C77 | | | C92-0713-05 | CHIP-TAN 10UF 6.3WV | | C368 | | | CC73GCH1H030 | CHIP C 3.0PF C | |
| C78 | | | CK73HB1H102K | CHIP C 1000PF K | | C400 | | | CK73GB0J225K | CHIP C 2.2UF K | |
| C80 | | | CC73HCH1H330 | CHIP C 33PF J | | C401 | | | CK73GB1H182K | CHIP C 1800PF K | |
| C81 | | | CC73HCH1H150 | CHIP C 15PF J | | C402,403 | | | CC73GCH1H271 | CHIP C 270PF J | |
| C82 -84 | | | CK73HB1H102K | CHIP C 1000PF K | | C405 | | | CC73GCH1H390 | CHIP C 39PF J | |
| C85 | | | CC73HCH1H100 | CHIP C 10PF D | | C406 | | | C92-0713-05 | CHIP-TAN 10UF 6.3WV | |
| C86 | | | CC73GCH1H090 | CHIP C 9.0PF D | | C407 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C87 | | | CC73GCH1H060 | CHIP C 6.0PF B | | C408 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C201,202 | | | CK73GB1H102K | CHIP C 1000PF K | | C409 | | | CC73GCH1H680 | CHIP C 68PF J | |
| C203 | | | CC73GCH1H470 | CHIP C 47PF J | | C410 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C212 | | | CK73GB1H102K | CHIP C 1000PF K | | C411-413 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C241 | | | CK73GB1H102K | CHIP C 1000PF K | | C414 | | | CC73GCH1H330 | CHIP C 33PF J | |
| C242 | | | CC73GCH1H390 | CHIP C 39PF J | | C415 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C243 | | | CK73GB1C104K | CHIP C 0.10UF K | | C416,417 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C246 | | | CK73GB1H102K | CHIP C 1000PF K | | C418 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C248 | | | CK73GB1H102K | CHIP C 1000PF K | | C419 | | | CC73GCH1H010 | CHIP C 1.0PF B | |
| C249 | | | CC73GCH1H100 | CHIP C 10PF D | | C420 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C255 | | | CK73GB1H102K | CHIP C 1000PF K | | C421 | | | CC73GCH1H080 | CHIP C 8.0PF B | |
| C258 | | | CK73GB1C104K | CHIP C 0.10UF K | | C422 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C265 | | | CC73GCH1H220 | CHIP C 22PF J | | C424 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C273 | | | CC73GCH1H101 | CHIP C 100PF J | | C425 | | | CC73GCH1H150 | CHIP C 15PF J | |
| C277 | | | CC73GCH1H270 | CHIP C 27PF J | | C426 | | | CC73GCH1H020 | CHIP C 2.0PF B | |
| C280 | | | CK73GB1H102K | CHIP C 1000PF K | | C427 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C282 | | | CC73GCH1H100 | CHIP C 10PF D | | C428 | | | CC73GCH1H150 | CHIP C 15PF J | |
| C285 | | | C92-0565-05 | CHIP-TAN 6.8UF 10WV | | C429 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C286 | | | CK73GB1A105K | CHIP C 1.0UF K | | C430 | | | CC73GCH1H120 | CHIP C 12PF J | |
| C288 | | | CK73GB1H102K | CHIP C 1000PF K | | C432 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C290,291 | | | CK73GB1H102K | CHIP C 1000PF K | | C434 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C292 | | | CC73GCH1H101 | CHIP C 100PF J | | C435 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C293 | | | CK73GB1H102K | CHIP C 1000PF K | | C436 | | | CC73GCH1H050 | CHIP C 5.0PF B | |
| C295,296 | | | CC73GCH1H050 | CHIP C 5.0PF B | | C437 | | | CC73GCH1H020 | CHIP C 2.0PF B | |
| C297 | | | CK73GB1H102K | CHIP C 1000PF K | | C438 | | | CC73GCH1H090 | CHIP C 9.0PF B | |
| C298 | | | CK73GB1H103K | CHIP C 0.010UF K | | C439 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C299 | | | CK73GB1C104K | CHIP C 0.10UF K | | C440 | | | CK73HB1H102K | CHIP C 1000PF K | |
| C300 | | | CK73GB1A105K | CHIP C 1.0UF K | | C441 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C301 | | | CK73GB1H102K | CHIP C 1000PF K | | C442 | | | CK73HB1A104K | CHIP C 0.10UF K | |
| C302 | | | CC73GCH1H180 | CHIP C 18PF J | | C443 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C308 | | | CK73GB1H103K | CHIP C 0.010UF K | | C444 | | | CC73GCH1H050 | CHIP C 5.0PF B | |
| C309 | | | CC73GCH1H100 | CHIP C 10PF D | | C445 | | | CC73GCH1H020 | CHIP C 2.0PF B | |
| C312 | | | CC73GCH1H820 | CHIP C 82PF J | | C446 | | | CC73GCH1H010 | CHIP C 1.0PF C | |
| C317 | | | CC73GCH1H100 | CHIP C 10PF D | | C447 | | | CC73GCH1H470 | CHIP C 47PF J | |
| C320 | | | CC73GCH1H220 | CHIP C 22PF J | | C448 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C326 | | | CC73GCH1H220 | CHIP C 22PF J | | C456 | | | C92-0714-05 | CHIP-TAN 4.7UF 6.3WV | |
| C329 | | | CK73GB1H102K | CHIP C 1000PF K | | C462 | | | CK73HB1H102K | CHIP C 1000PF K | |
| C333 | | | CC73GCH1H120 | CHIP C 12PF J | | C463,464 | | | CC73GCH1H040 | CHIP C 4.0PF B | |

PARTS LIST / 零件表

TX-RX UNIT (X57-6720-10)

| Ref. No. | Address | New parts | Parts No. | Description | Destination | Ref. No. | Address | New parts | Parts No. | Description | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|---------------------|-------------|
| C465,466 | | | CK73GB1H102K | CHIP C 1000PF K | | C658 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C467 | | | CC73GCH1H270 | CHIP C 27PF J | | C659 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C468 | | | CC73GCH1H010 | CHIP C 1.0PF B | | C660 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C469 | | | CK73GB1H102K | CHIP C 1000PF K | | C661 | | | CK73GB1H471K | CHIP C 470PF K | |
| C472 | | | CK73GB1H102K | CHIP C 1000PF K | | C662,663 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C474 | | | CK73GB1H102K | CHIP C 1000PF K | | C664 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C475 | | | CC73GCH1H4R5 | CHIP C 4.5PF B | | C667 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C476 | | | CC73GCH1H0R5 | CHIP C 0.5PF B | | C668 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C477 | | | CC73GCH1H330 | CHIP C 33PF J | | C669 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C478 | | | CK73GB1H102K | CHIP C 1000PF K | | C671 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C479 | | | CC73GCH1H040 | CHIP C 4.0PF B | | C672,673 | | | CK73GB1H472K | CHIP C 4700PF K | |
| C480 | | | CK73GB1H102K | CHIP C 1000PF K | | C674 | | | CC73GCH1H221 | CHIP C 220PF J | |
| C481 | | | CC73GCH1H220 | CHIP C 22PF J | | C675,676 | | | C92-0804-05 | CHIP-TAN 1.5UF 15WV | |
| C483 | | | CC73GCH1H100 | CHIP C 10PF D | | C677 | | | CK73GB1H332K | CHIP C 3300PF K | |
| C484 | | | CC73GCH1H040 | CHIP C 4.0PF B | | C678 | | | CK73FB1C474K | CHIP C 0.47UF K | |
| C485 | | | CK73GB1H471K | CHIP C 470PF K | | C679 | | | CC73GCH1H101 | CHIP C 100PF J | |
| C486 | | | CC73GCH1H040 | CHIP C 4.0PF B | | C680 | | | C92-0560-05 | CHIP-TAN 10UF 6.3WV | |
| C487 | | | CK73HB1A104K | CHIP C 0.10UF K | | C681 | | | CK73GB1C683K | CHIP C 0.068UF K | |
| C602 | | | CK73GB1A224K | CHIP C 0.22UF K | | C684 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C604 | | | CK73GB1C104K | CHIP C 0.10UF K | | C686 | | | CK73GB1C473K | CHIP C 0.047UF K | |
| C605 | | * | C92-0632-05 | CHIP-TAN 6.8UF 6.3WV | | C687 | | | C92-0560-05 | CHIP-TAN 10UF 6.3WV | |
| C606 | | | CK73GB1H332K | CHIP C 3300PF K | | C688 | | | CC73GCH1H221 | CHIP C 220PF J | |
| C607 | | | CK73GB1H103K | CHIP C 0.010UF K | | C689 | | | CK73GB1C223K | CHIP C 0.022UF K | |
| C608 | | | CK73GB1H392K | CHIP C 3900PF K | | C690 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C609 | | | CK73GB1H103K | CHIP C 0.010UF K | | C691 | | | C92-0665-05 | TANTAL 100UF 6.3WV | |
| C610 | | | C92-0714-05 | CHIP-TAN 4.7UF 6.3WV | | C692 | | | CC73GCH1H221 | CHIP C 220PF J | |
| C611 | | | CK73GB0J105K | CHIP C 1.0UF K | | C693 | | | CK73GB1H471K | CHIP C 470PF K | |
| C613-615 | | | CK73GB1C104K | CHIP C 0.10UF K | | C695 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C618 | | | CK73GB1C104K | CHIP C 0.10UF K | | C696 | | | CK73GB1A224K | CHIP C 0.22UF K | |
| C619 | | | CK73GB1H472K | CHIP C 4700PF K | | C801 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C621,622 | | | C92-0714-05 | CHIP-TAN 4.7UF 6.3WV | | C802 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C624 | | | CK73GB1C104K | CHIP C 0.10UF K | | C803,804 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C625 | | | CC73GCH1H680 | CHIP C 68PF J | | C805 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C627 | | | CK73GB1E123K | CHIP C 0.012UF K | | C807 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C628 | | | CK73GB1H222K | CHIP C 2200PF K | | C809 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C629 | | | CK73GB1H103K | CHIP C 0.010UF K | | C811 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C630 | | | CC73GCH1H101 | CHIP C 100PF J | | C812 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C631 | | | CK73GB1E123K | CHIP C 0.012UF K | | C814 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C632 | | | CK73GB1C104K | CHIP C 0.10UF K | | C815 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C633 | | | CC73GCH1H020 | CHIP C 2.0PF B | | C816,817 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C634 | | | CK73GB1H102K | CHIP C 1000PF K | | C818 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C635 | | | CK73GB1C104K | CHIP C 0.10UF K | | C819 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C636 | | | CK73GB1C683K | CHIP C 0.068UF K | | C820,821 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C637 | | | CC73GCH1H101 | CHIP C 100PF J | | C822 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C638 | | | CK73GB1H102K | CHIP C 1000PF K | | C823 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C639 | | | CC73GCH1H470 | CHIP C 47PF J | | C825 | | | C92-0713-05 | CHIP-TAN 10UF 6.3WV | |
| C640 | | | CC73GCH1H101 | CHIP C 100PF J | | C828 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C641,642 | | | CK73GB1C104K | CHIP C 0.10UF K | | C830 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C643 | | | CC73GCH1H680 | CHIP C 68PF J | | C833 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C645 | | | CK73GB0J225K | CHIP C 2.2UF K | | C834 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C646 | | | CK73GB1H821K | CHIP C 820PF K | | C835,836 | | | CK73GB1A105K | CHIP C 1.0UF K | |
| C647 | | | CK73GB1H102K | CHIP C 1000PF K | | C837 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C648,649 | | | CK73GB1C104K | CHIP C 0.10UF K | | C840 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C650 | | | C92-0713-05 | CHIP-TAN 10UF 6.3WV | | C841 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C652 | | | CK73GB1H102K | CHIP C 1000PF K | | C842 | | | CC73GCH1H150 | CHIP C 15PF J | |
| C653 | | | CK73GB1A224K | CHIP C 0.22UF K | | C843 | | | CC73GCH1H030 | CHIP C 3.0PF C | |
| C654 | | | CK73GB1H103K | CHIP C 0.010UF K | | C845 | | | CC73GCH1H150 | CHIP C 15PF J | |
| C655 | | | CK73GB1E223J | CHIP C 0.022UF J | | C846 | | | CK73GB1H103K | CHIP C 0.010UF K | |
| C656 | | | CK73GB1C104K | CHIP C 0.10UF K | | C847 | | | C92-0712-05 | CHIP-TAN 22UF 6.3WV | |
| C657 | | | CC73GCH1H470 | CHIP C 47PF J | | C848 | | | CC73GCH1H101 | CHIP C 100PF J | |

PARTS LIST / 零件表

TX-RX UNIT (X57-6720-10)

| Ref. No. | Address | New parts | Parts No. | Description | Destination | Ref. No. | Address | New parts | Parts No. | Description | Destination |
|----------|---------|-----------|--------------|------------------------------|-------------|-----------|---------|-----------|--------------|------------------------------|-------------|
| C849 | | | CK73GB1H471K | CHIP C 470PF K | | L406 | | | L40-2785-92 | SMALL FIXED INDUCTOR(270NH) | |
| C850 | | | CK73GB1H103K | CHIP C 0.010UF K | | L407 | | | L41-6878-14 | SMALL FIXED INDUCTOR | |
| C852,853 | | | CK73GB1H102K | CHIP C 1000PF K | | L408 | | | L92-0138-05 | FERRITE CHIP | |
| C854 | | | CK73GB1H103K | CHIP C 0.010UF K | | L409 | | | L41-6878-14 | SMALL FIXED INDUCTOR | |
| C861 | | | CK73FB1A475K | CHIP C 4.7UF K | | L411 | | | L41-6878-14 | SMALL FIXED INDUCTOR | |
| TC1 ,2 | | | C05-0384-05 | CERAMIC TRIMMER CAP(10PF) | | L412 | | | L41-5678-14 | SMALL FIXED INDUCTOR | |
| 9 | 3B | | E37-1085-05 | FLAT CABLE | | L413 | | | L40-3975-92 | SMALL FIXED INDUCTOR(39NH) | |
| CN801 | | | E40-5932-05 | PIN ASSY SOCKET | | L416 | | | L40-5681-86 | SMALL FIXED INDUCTOR(0.56UH) | |
| J601 | | | E11-0457-05 | PHONE JACK | | L601 | | | L92-0140-05 | FERRITE CHIP | |
| F801 | | | F53-0190-05 | FUSE | | L602 | | | L92-0149-05 | FERRITE CHIP | |
| | | * | G11-4300-04 | RUBBER CUSHION | | L801 | | | L92-0149-05 | FERRITE CHIP | |
| | | * | J99-0374-04 | ADHESIVE TAPE | | L802 | | | L92-0140-05 | FERRITE CHIP | |
| CD401 | | | L79-1582-05 | TUNING COIL | | L803-807 | | | L92-0138-05 | FERRITE CHIP | |
| CF401 | | * | L72-1015-05 | CERAMIC FILTER | | X1 | * | | L77-1932-05 | TCXO (16.8MHZ) | |
| L1 | | | L40-4795-85 | SMALL FIXED INDUCTOR(4.7UH) | | X801 | * | | L77-1933-05 | CRYSTAL RESONATOR(7.3728MHZ) | |
| L3 | | | L40-1581-86 | SMALL FIXED INDUCTOR(0.15UH) | | XF401 | * | | L71-0617-25 | MCF (49.95MHZ) | |
| L5 | | | L92-0138-05 | FERRITE CHIP | | CP1 ,2 | | | RK75HA1J473J | CHIP-COM 47K J 1/16W | |
| L6 | | | L40-1085-92 | SMALL FIXED INDUCTOR(100NH) | | CP3 ,4 | | | RK75HA1J102J | CHIP-COM 1.0K J 1/16W | |
| L7 | | | L92-0141-05 | FERRITE CHIP | | CP801,802 | | | RK75HA1J473J | CHIP-COM 47K J 1/16W | |
| L8 | | | L40-1075-92 | SMALL FIXED INDUCTOR(10NH) | | CP803-805 | | | RK75HA1J102J | CHIP-COM 1.0K J 1/16W | |
| L9 | | | L40-1001-86 | SMALL FIXED INDUCTOR(10UH) | | CP806 | | | RK75HA1J473J | CHIP-COM 47K J 1/16W | |
| L10 | | * | L40-1802-86 | SMALL FIXED INDUCTOR(18UH) | | CP807 | | | RK75HA1J102J | CHIP-COM 1.0K J 1/16W | |
| L11 | | | L40-2775-92 | SMALL FIXED INDUCTOR(27NH) | | CP808 | | | RK75HA1J472J | CHIP-COM 4.7K J 1/16W | |
| L12 | | * | L40-1502-86 | SMALL FIXED INDUCTOR(15UH) | | CP809-818 | | | RK75HA1J102J | CHIP-COM 1.0K J 1/16W | |
| L14 | | * | L40-1502-86 | SMALL FIXED INDUCTOR(15UH) | | R1 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| L16 | | | L41-3378-14 | SMALL FIXED INDUCTOR | | R2 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| L17 | | | L41-2278-14 | SMALL FIXED INDUCTOR | | R3 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| L18 | | | L40-2275-92 | SMALL FIXED INDUCTOR(22NH) | | R4 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| L19 ,20 | | | L40-1001-86 | SMALL FIXED INDUCTOR(10UH) | | R5 | | | RK73GB1J224J | CHIP R 220K J 1/16W | |
| L21 | | | L40-2785-92 | SMALL FIXED INDUCTOR(270NH) | | R6 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| L23 | | | L92-0138-05 | FERRITE CHIP | | R7 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| L24 ,25 | | | L40-1085-92 | SMALL FIXED INDUCTOR(100NH) | | R9 | | | RK73GB1J393J | CHIP R 39K J 1/16W | |
| L208 | | | L40-1085-92 | SMALL FIXED INDUCTOR(100NH) | | R12 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| L209 | | | L92-0138-05 | FERRITE CHIP | | R13 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| L213 | | | L40-2775-92 | SMALL FIXED INDUCTOR(27NH) | | R14 | | | RK73GB1J222J | CHIP R 2.2K J 1/16W | |
| L214 | | | L40-4775-92 | SMALL FIXED INDUCTOR(47NH) | | R15 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| L216 | | | L40-1585-54 | SMALL FIXED INDUCTOR(150NH) | | R16 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| L217 | | | L92-0149-05 | FERRITE CHIP | | R17 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| L218 | | | L40-2775-54 | SMALL FIXED INDUCTOR(27NH) | | R18 | | | RK73GB1J474J | CHIP R 470K J 1/16W | |
| L219 | | | L34-4577-05 | AIR-CORE COIL | | R19 | | | RK73GB1J100J | CHIP R 10 J 1/16W | |
| L220 | | | L92-0149-05 | FERRITE CHIP | | R20 ,21 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| L221 | | | L34-4563-05 | AIR-CORE COIL | | R22 | | | RK73GB1J561J | CHIP R 560 J 1/16W | |
| L222 | | | L34-4573-05 | AIR-CORE COIL | | R23 | | | RK73GB1J121J | CHIP R 120 J 1/16W | |
| L223 | | | L34-4563-05 | AIR-CORE COIL | | R24 | | | RK73GB1J471J | CHIP R 470 J 1/16W | |
| L224 | | | L40-2295-85 | SMALL FIXED INDUCTOR(2.2UH) | | R25 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| L225 | | | L34-4576-05 | AIR-CORE COIL | | R26 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| L226 | | | L34-4575-05 | AIR-CORE COIL | | R27 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| L227 | | | L34-4567-05 | AIR-CORE COIL | | R28 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| L228 | | | L40-5675-92 | SMALL FIXED INDUCTOR(56NH) | | R29 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| L229 | | | L34-4566-05 | AIR-CORE COIL | | R30 | | | RK73GB1J393J | CHIP R 39K J 1/16W | |
| L230 | | | L40-1092-81 | SMALL FIXED INDUCTOR | | R31 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| L401 | | | L92-0138-05 | FERRITE CHIP | | R32 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| L402 | | | L40-3975-92 | SMALL FIXED INDUCTOR(39NH) | | R33 | | | RK73HB1J103J | CHIP R 10K J 1/16W | |
| L403 | | | L40-5685-85 | SMALL FIXED INDUCTOR(0.56UH) | | R35 | | | RK73HB1J223J | CHIP R 22K J 1/16W | |
| L404 | | | L40-2785-92 | SMALL FIXED INDUCTOR(270NH) | | R37 | | | RK73HB1J274J | CHIP R 270K J 1/16W | |
| L405 | | | L40-1285-92 | SMALL FIXED INDUCTOR(120NH) | | R38 | | | RK73HB1J271J | CHIP R 270 J 1/16W | |
| | | | | | | R39 | | | RK73GB1J220J | CHIP R 22 J 1/16W | |
| | | | | | | R40 | | | RK73HB1J221J | CHIP R 220 J 1/16W | |
| | | | | | | R41 | | | RK73GB1J331J | CHIP R 330 J 1/16W | |

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| Ref. No. | Address | New parts | Parts No. | Description | Destination | Ref. No. | Address | New parts | Parts No. | Description | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|----------------------|-------------|
| R42 | | | RK73GB1J683J | CHIP R 68K J 1/16W | | R431 | | | RK73GB1J105J | CHIP R 1.0M J 1/16W | |
| R43 ,44 | | | RK73HB1J220J | CHIP R 22 J 1/16W | | R433 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R46 | | | RK73HB1J154J | CHIP R 150K J 1/16W | | R434 | | | RK73HB1J103J | CHIP R 10K J 1/16W | |
| R47 | | | RK73HB1J472J | CHIP R 4.7K J 1/16W | | R435 | | | RK73HB1J224J | CHIP R 220K J 1/16W | |
| R49 | | | RK73HB1J101J | CHIP R 100 J 1/16W | | R436 | | | RK73HB1J473J | CHIP R 47K J 1/16W | |
| R50 | | | RK73HB1J332J | CHIP R 3.3K J 1/16W | | R437 | | | RK73HB1J224J | CHIP R 220K J 1/16W | |
| R51 | | | RK73HB1J103J | CHIP R 10K J 1/16W | | R438 | | | RK73GB1J471J | CHIP R 470 J 1/16W | |
| R55 | | | RK73G1J333D | CHIP R 33K D 1/16W | | R440 | | | RK73GB1J470J | CHIP R 47 J 1/16W | |
| R56 | | | RK73HB1J331J | CHIP R 330 J 1/16W | | R441 | | | RK73GB1J221J | CHIP R 220 J 1/16W | |
| R57 | | | RK73G1J104D | CHIP R 100K D 1/16W | | R443 | | | RK73HB1J224J | CHIP R 220K J 1/16W | |
| R58 | | | RK73HB1J222J | CHIP R 2.2K J 1/16W | | R457 | | | RK73HB1J104J | CHIP R 100K J 1/16W | |
| R59 | | | RK73HB1J470J | CHIP R 47 J 1/16W | | R459 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R60 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | | R460 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R61 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | R461 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| R201 | | | RK73GB1J101J | CHIP R 100 J 1/16W | | R462 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R202 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | | R463 | | | RK73GB1J105J | CHIP R 1.0M J 1/16W | |
| R203 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R465 | | | RK73GB1J105J | CHIP R 1.0M J 1/16W | |
| R214 | | | RK73GB1J223J | CHIP R 22K J 1/16W | | R466,467 | | | R92-0670-05 | CHIP R 0 OHM | |
| R215 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | R468 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | |
| R252 | | | RK73GB1J331J | CHIP R 330 J 1/16W | | R469 | | | RK73GB1J221J | CHIP R 220 J 1/16W | |
| R254 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R601 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R256 | | | RK73GB1J683J | CHIP R 68K J 1/16W | | R602 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R257 | | | RK73GB1J473J | CHIP R 47K J 1/16W | | R603 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R258 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R604 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R259 | | | RK73GB1J150J | CHIP R 15 J 1/16W | | R607-609 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R260 | | | RK73GB1J331J | CHIP R 330 J 1/16W | | R610 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R261-263 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R612 | | | RK73GB1J682J | CHIP R 6.8K J 1/16W | |
| R264,265 | | | RK73EB2ER39K | CHIP R 0.39 K 1/4W | | R613 | | | RK73GB1J824J | CHIP R 820K J 1/16W | |
| R267 | | | RK73GB1J103J | CHIP R 12K J 1/16W | | R615 | | | RK73GB1J334J | CHIP R 330K J 1/16W | |
| R268 | | | RK73GB1J820J | CHIP R 82 J 1/16W | | R616 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R269 | | | RK73GB1J473J | CHIP R 47K J 1/16W | | R617 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R270 | | | RK73EB2ER39K | CHIP R 0.39 K 1/4W | | R618 | | | RK73G1J364D | CHIP R 360K D 1/16W | |
| R272-277 | | | RK73GH1J154D | CHIP R 150K D 1/16W | | R621 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R278 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | R622 | | | RK73GB1J684J | CHIP R 680K J 1/16W | |
| R279 | | | RK73GB1J473J | CHIP R 47K J 1/16W | | R623 | | | RK73GB1J274G | CHIP R 270K G 1/16W | |
| R280 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R624 | | | RK73GB1J822J | CHIP R 8.2K J 1/16W | |
| R281 | | | RK73GB1J222J | CHIP R 2.2K J 1/16W | | R625 | | | RK73GB1J563J | CHIP R 56K J 1/16W | |
| R282 | | | RK73GB1J105J | CHIP R 1.0M J 1/16W | | R626,627 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R283,284 | | | RK73GB1J104J | CHIP R 100K J 1/16W | | R628 | | | RK73GB1J224J | CHIP R 220K J 1/16W | |
| R285,286 | | | RK73GB1J271J | CHIP R 270 J 1/16W | | R629 | | | RK73GB1J394J | CHIP R 390K J 1/16W | |
| R287 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R630 | | | RK73GB1J684J | CHIP R 680K J 1/16W | |
| R401 | | | RK73GB1J100J | CHIP R 10 J 1/16W | | R631 | | | RK73GB1J394J | CHIP R 390K J 1/16W | |
| R403 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | R632 | | | RK73GB1J823J | CHIP R 82K J 1/16W | |
| R404 | | | RK73GB1J334J | CHIP R 330K J 1/16W | | R633 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| R406 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | | R634 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R407 | | | RK73GB1J474J | CHIP R 470K J 1/16W | | R636 | | | RK73GB1J474J | CHIP R 470K J 1/16W | |
| R408 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | | R637 | | | RK73GB1J394J | CHIP R 390K J 1/16W | |
| R409 | | | RK73GB1J392J | CHIP R 3.9K J 1/16W | | R639 | | | RK73GB1J393J | CHIP R 39K J 1/16W | |
| R412 | | | RK73GB1J122J | CHIP R 1.2K J 1/16W | | R640 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R413 | | | RK73GB1J124J | CHIP R 120K J 1/16W | | R641,642 | | | RK73GB1J124J | CHIP R 120K J 1/16W | |
| R414 | | | RK73GB1J681J | CHIP R 680 J 1/16W | | R643 | | | RK73GB1J154J | CHIP R 150K J 1/16W | |
| R415 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | | R644,645 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R416 | | | RK73GB1J101J | CHIP R 100 J 1/16W | | R646 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| R417 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R647 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R418 | | | RK73GB1J561J | CHIP R 560 J 1/16W | | R648 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R419 | | | RK73GB1J221J | CHIP R 220 J 1/16W | | R649 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R421-424 | | | RK73GB1J823J | CHIP R 82K J 1/16W | | R650 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R425 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R651 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R427 | | | RK73GB1J105J | CHIP R 1.0M J 1/16W | | R652 | | | RK73GB1J273J | CHIP R 27K J 1/16W | |
| R428,429 | | | RK73HB1J562J | CHIP R 5.6K J 1/16W | | R653 | | | RK73GB1J392J | CHIP R 3.9K J 1/16W | |

PARTS LIST / 零件表

TX-RX UNIT (X57-6720-10)

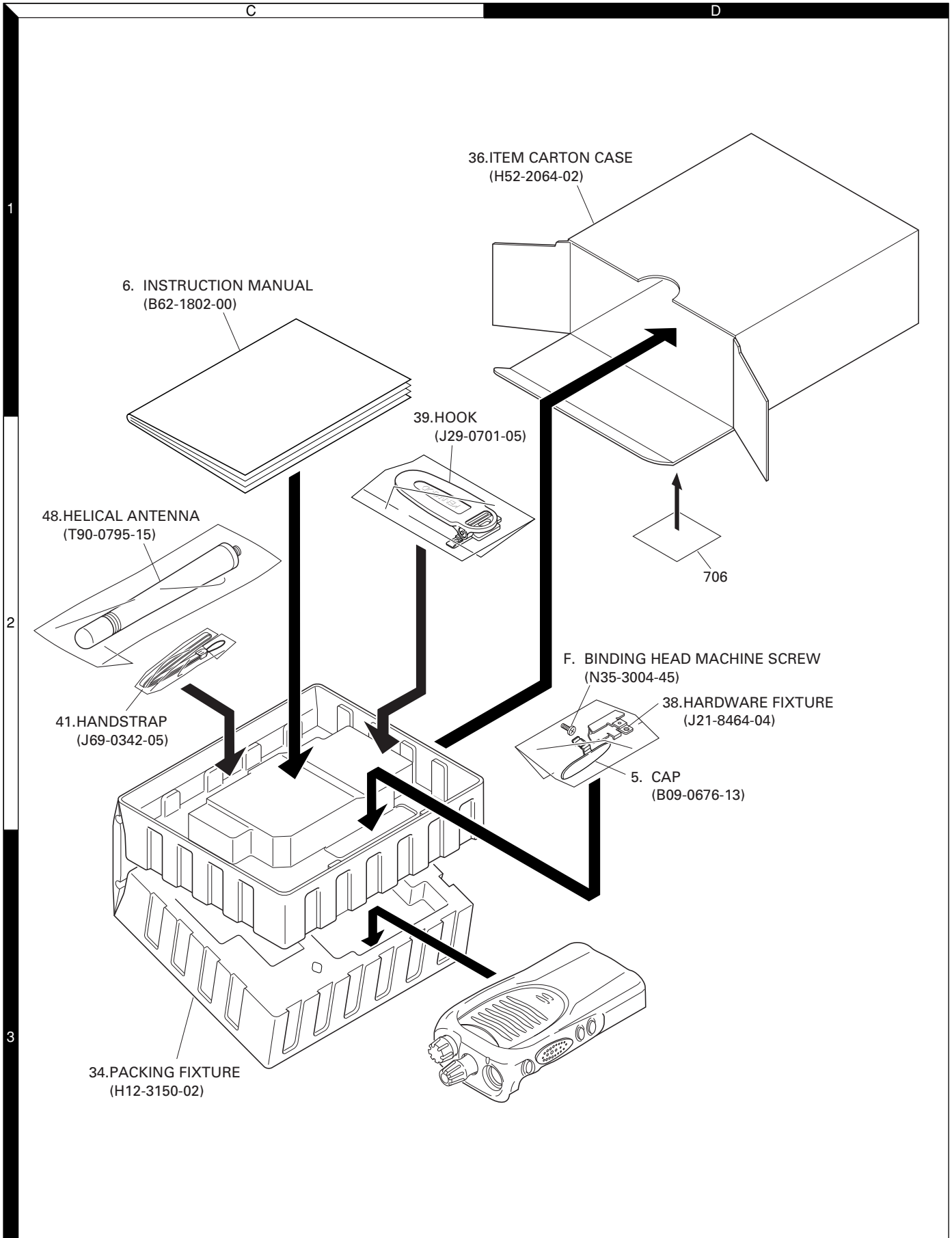
| Ref. No. | Address | New parts | Parts No. | Description | Destination | Ref. No. | Address | New parts | Parts No. | Description | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|----------------------------|-------------|
| R654 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | R839,840 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R655,656 | | | RK73GB1J105J | CHIP R 1.0M J 1/16W | | R841 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R657 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | | R842 | | | R92-1368-05 | CHIP R 0 OHM | |
| R658 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | R844 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R660 | | | RK73GB1J154J | CHIP R 150K J 1/16W | | R845 | | | R92-1368-05 | CHIP R 0 OHM | |
| R661 | | | RK73GB1J684J | CHIP R 680K J 1/16W | | R847,848 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R665 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | R849 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R666 | | | RK73GB1J822J | CHIP R 8.2K J 1/16W | | R851 | | | R92-1368-05 | CHIP R 0 OHM | |
| R667 | | | RK73GB1J104J | CHIP R 100K J 1/16W | | R852 | | | RK73HB1J473J | CHIP R 47K J 1/16W | |
| R668 | | | RK73GB1J473J | CHIP R 47K J 1/16W | | R854 | | | RK73GB1J680J | CHIP R 68 J 1/16W | |
| R669 | | | RK73GB1J222J | CHIP R 2.2K J 1/16W | | R855-857 | | | RK73HB1J102J | CHIP R 1.0K J 1/16W | |
| R670 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | R858 | | | R92-1368-05 | CHIP R 0 OHM | |
| R671 | | | RK73GB1J683J | CHIP R 68K J 1/16W | | R859 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R672 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | R860 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| R673 | | | RK73GB1J272J | CHIP R 2.7K J 1/16W | | R862 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R674 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | VR1 | | | R12-7491-05 | TRIMMING POT.(68K) | |
| R675 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | S802-805 | | | S70-0457-05 | TACT SWITCH | |
| R676 | | | RK73GB1J151J | CHIP R 150 J 1/16W | | MIC60 | | | T91-0543-05 | MIC ELEMENT | |
| R677-679 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | D2 | | | HSC277 | DIODE | |
| R681 | | | RK73GB1J222J | CHIP R 2.2K J 1/16W | | D3 -10 | | | 1SV325 | VARIABLE CAPACITANCE DIODE | |
| R682 | | | RK73GB1J100J | CHIP R 10 J 1/16W | | D11 | | | HSC277 | DIODE | |
| R683 | | | RK73GB1J474J | CHIP R 470K J 1/16W | | D12 | | | 1SV278 | VARIABLE CAPACITANCE DIODE | |
| R684 | | | RK73GB1J182J | CHIP R 1.8K J 1/16W | | D13 | | | MA2S111 | DIODE | |
| R686 | | | RK73GB1J471J | CHIP R 470 J 1/16W | | D14 | | | HSC277 | DIODE | |
| R687 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | D201 | | | HSC277 | DIODE | |
| R688,689 | | | RK73GB1J101J | CHIP R 100 J 1/16W | | D203 | | | HZU5CLL | ZENER DIODE | |
| R691 | | | RK73GB1J333J | CHIP R 33K J 1/16W | | D204 | | | HVC131 | DIODE | |
| R692 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | D206 | | | HVC131 | DIODE | |
| R693 | | | RK73GB1J273J | CHIP R 27K J 1/16W | | D208 | | | HVC131 | DIODE | |
| R694,695 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | D212 | | | HVC131 | DIODE | |
| R696 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | D401 | | | HSC277 | DIODE | |
| R697 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | D402-405 | | | 1SV305 | VARIABLE CAPACITANCE DIODE | |
| R698 | | | RK73GB1J152J | CHIP R 1.5K J 1/16W | | D603-606 | | | RB706F-40 | DIODE | |
| R802 | | | RK73GB1J101J | CHIP R 100 J 1/16W | | D801 | | | RB521S-30 | DIODE | |
| R803,804 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | D805 | | | 1SR154-400 | DIODE | |
| R805 | | | RK73GB1J153J | CHIP R 15K J 1/16W | | IC1 | | | MB15E03SL | MOS IC | |
| R807 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | IC201 | | | TA75W01FU | MOS IC | |
| R808 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | IC401 | | | TA31136FN | MOS IC | |
| R809 | | | RK73GB1J272J | CHIP R 2.7K J 1/16W | | IC601 | * | | AQUA | MOS IC | |
| R810 | | | RK73GB1J334J | CHIP R 330K J 1/16W | | IC602 | | | TC75S51FE | MOS IC | |
| R811 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | | IC603 | | | TC75W51FU | MOS IC | |
| R812 | | | RK73GB1J334J | CHIP R 330K J 1/16W | | IC604 | | | TC75S51FE | MOS IC | |
| R813 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | | IC605 | | | TA7368F | MOS IC | |
| R814 | | | RK73GB1J153J | CHIP R 15K J 1/16W | | IC606 | | | TC75S51FE | MOS IC | |
| R815 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | | IC801 | | | XC6204B502MR | MOS IC | |
| R816 | | | RK73GB1J224J | CHIP R 220K J 1/16W | | IC802 | * | | PST9134NR | MOS IC | |
| R817 | | | RK73GB1J272J | CHIP R 2.7K J 1/16W | | IC803 | | | XC61CN5002NR | MOS IC | |
| R818 | | | RK73GB1J821J | CHIP R 820 J 1/16W | | IC804 | * | | CAT24WC64JI | ROM IC | |
| R819 | | | RK73GB1J103J | CHIP R 10K J 1/16W | | IC805 | * | | 30622MCA-7G7 | MPU | |
| R820 | | | RK73GB1J561J | CHIP R 560 J 1/16W | | IC806 | * | | TC7W74FU | MOS IC | |
| R821 | | | RK73GB1J331J | CHIP R 330 J 1/16W | | Q1 | | | DTC144EE | DIGITAL TRANSISTOR | |
| R823 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | Q2 ,3 | | | UMG9N | TRANSISTOR | |
| R824 | | | RK73GB1J183J | CHIP R 18K J 1/16W | | Q4 | | | KTC4082 | TRANSISTOR | |
| R825 | | | RK73GB1J473J | CHIP R 47K J 1/16W | | Q5 ,6 | | | 2SK508NV(K52 | FET | |
| R827 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | | Q7 | | | 2SC5108(Y) | TRANSISTOR | |
| R828 | | | RK73GB1J332J | CHIP R 3.3K J 1/16W | | Q8 | | | 2SJ347 | FET | |
| R829 | | | RK73GB1J272J | CHIP R 2.7K J 1/16W | | Q9 | | | 2SC5108(Y) | TRANSISTOR | |
| 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 | | | | | | | |

PARTS LIST / 零件表

TX-RX UNIT (X57-6720-10)

| Ref. No. | Address | New parts | Parts No. | Description | Destination | Ref. No. | Address | New parts | Parts No. | Description | Destination |
|----------|---------|-----------|---------------|--------------------|-------------|----------|---------|-----------|-----------|-------------|-------------|
| Q10 | | | 2SC4617(S) | TRANSISTOR | | | | | | | |
| Q11 | | | 2SC5108(Y) | TRANSISTOR | | | | | | | |
| Q12 | | | 2SJ347 | FET | | | | | | | |
| Q206 | | * | 2SK3077 | FET | | | | | | | |
| Q207 | | | 2SK2596 | FET | | | | | | | |
| Q208 | | | DTC114EE | DIGITAL TRANSISTOR | | | | | | | |
| Q209 | | | 2SK879(GR) | FET | | | | | | | |
| Q210 | | | DTC114EE | DIGITAL TRANSISTOR | | | | | | | |
| Q211 | | | 2SK2595 | FET | | | | | | | |
| Q212 | | | 2SK1824 | FET | | | | | | | |
| Q213 | | | DTA144EE | DIGITAL TRANSISTOR | | | | | | | |
| Q400 | | | 2SK1824 | FET | | | | | | | |
| Q401 | | | DTA144EE | DIGITAL TRANSISTOR | | | | | | | |
| Q402 | | | 2SC4649(N,P) | TRANSISTOR | | | | | | | |
| Q403,404 | | | 3SK318 | 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 ,2 | | | B57331V2104J | THERMISTOR | | | | | | | |

PACKING / 包装



ADJUSTMENT / 调整

Test Equipment Required for Alignment

| Test Equipment | Major Specifications | |
|---------------------------------------|---|---|
| 1. Standard Signal Generator (SSG) | Frequency Range Modulation Output | 136 to 174MHz. Frequency modulation and external modulation. -127dBm/0.1 μ V to greater than -47dBm/1mV |
| 2. Power Meter | Input Impedance Operation Frequency Measurement Range | 50 Ω . 136 to 174MHz. Vicinity of 10W |
| 3. Deviation Meter | Frequency Range | 136 to 174MHz. |
| 4. Digital Volt Meter (DVM) | Measuring Range Input Impedance | 10mV to 10V DC High input impedance for minimum circuit loading. |
| 5. Oscilloscope | | DC through 30MHz. |
| 6. High Sensitivity Frequency Counter | Frequency Range Frequency Stability | 10Hz to 1000MHz. 0.2ppm or less. |
| 7. Ammeter | | 5A. |
| 8. AF Volt Meter (AF VTVM) | Frequency Range Voltage Range | 50Hz to 10kHz. 1mV to 10V. |
| 9. Audio Generator (AG) | Frequency Range Output | 50Hz to 5kHz or more. 0 to 1V. |
| 10. Distortion Meter | Capability Input Level | 3% or less at 1kHz. 50mV to 10Vrms. |
| 11. 8 Ω Dummy Load | | Approx. 8 Ω , 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 调制 输出 | 136 到 174MHz。 调频和外部调制。 -127dBm/0.1 μ V 到大于 -47dBm/1mV |
| 2. 功率计 | 输入阻抗 操作频率 测量范围 | 50 Ω 。 136 到 174MHz。 10W 左右 |
| 3. 频偏仪 | 频率范围 | 136 到 174MHz。 |
| 4. 数字电压表 (DVM) | 测量范围 输入阻抗 | 10mV 到 10V DC 为最小电路负载高输入阻抗。 |
| 5. 示波器 | | 直流到 30MHz。 |
| 6. 高灵敏度频率计数器 | 频率范围 频率稳定性 | 10Hz 到 1000MHz。 0.2ppm 或更低。 |
| 7. 电流表 | | 5A。 |
| 8. 音频电压表 (AF VTVM) | 频率范围 电压范围 | 50Hz 到 10kHz。 1mV 到 10V。 |
| 9. 音频发生器 (AG) | 频率范围 输出 | 50Hz 到 5kHz 或更高。 0 到 1V。 |
| 10. 失真测试仪 | 容量 输入电平 | 1kHz 时 3% 或更低。 50mV 到 10Vrms。 |
| 11. 8 Ω 假负载 | | 大约 8 Ω , 3W。 |
| 12. 可调电源 | | 5V 到 10V, 大约 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-2160. 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.

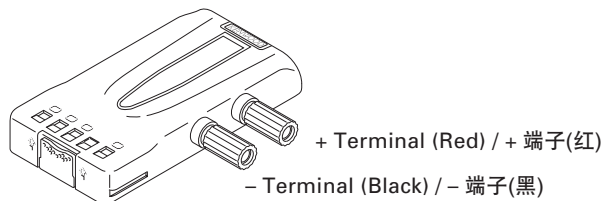
3. Battery Jig (W05-0909-00)

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-2160。将 TX-RX 单元放置在机壳上, 并且拧上螺钉。

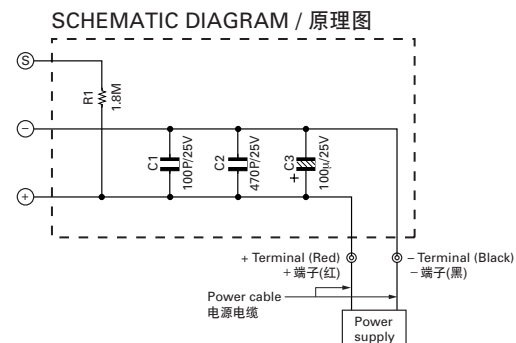
在维修过程中, 需要在 TX-RX 单元的电路板上检测电压时, 机壳可以方便地进行电压检测, 并且保护模块。

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。

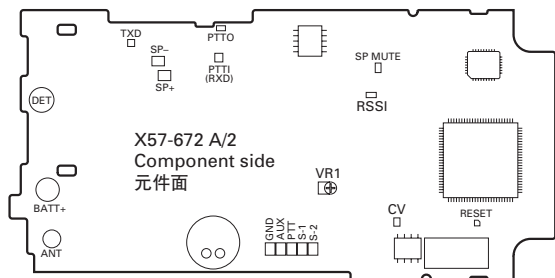
注: 当使用电池夹具时, 你必须测定电池夹具的终端电压。因为, 电源和电池夹具之间会有一些的电压下降, 尤其在手持机发射的时候。



ADJUSTMENT / 调整

Adjustment points TX-RX unit (X57-672) Component side view

TX-RX 单元(X57-672) 调整点 元件面视图

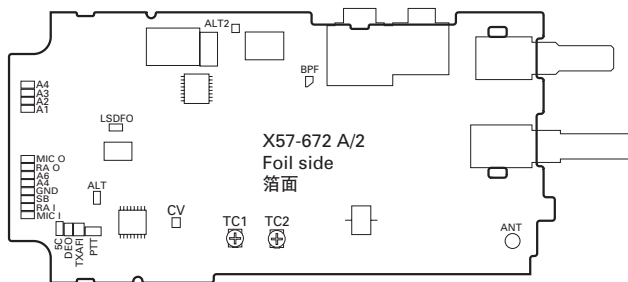


VR1 : Frequency adjustment
RSSI : Band-pass wave form test point

VR1 : 频率调整
RSSI : 带通波形测试点

Foil Side View

箔面视图



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

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

Fig. 1 Adjustment points

图 1 调整点

ADJUSTMENT / 调整

■ 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 | 155.05000 | 155.10000 |
| 2 | 136.05000 | 136.10000 |
| 3 | 173.95000 | 173.90000 |
| 4 | 155.00000 | 155.00000 |
| 5 | 155.20000 | 155.20000 |
| 6 | 155.40000 | 155.40000 |
| 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

| TEST CH | C | |
|---------|------------|------------|
| | RX | TX |
| Center | 155.050MHz | 155.100MHz |
| Low | 136.050MHz | 136.000MHz |
| High | 173.950MHz | 173.900MHz |
| Low' | 145.550MHz | 145.600MHz |
| High' | 164.550MHz | 164.600MHz |
| | 155.000MHz | 155.000MHz |
| | 155.200MHz | 155.200MHz |
| | 155.400MHz | 155.400MHz |

■ 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 | 155.050 | 155.100 |
| 2 | 136.050 | 136.100 |
| 3 | 173.950 | 173.900 |
| 4 | 155.000 | 155.000 |
| 5 | 155.200 | 155.200 |
| 6 | 155.400 | 155.400 |
| 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

| 测试 CH | C | |
|-------|------------|------------|
| | RX | TX |
| 中心 | 155.050MHz | 155.100MHz |
| 低 | 136.050MHz | 136.000MHz |
| 高 | 173.950MHz | 173.900MHz |
| 低' | 145.550MHz | 145.600MHz |
| 高' | 164.550MHz | 164.600MHz |
| | 155.000MHz | 155.000MHz |
| | 155.200MHz | 155.200MHz |
| | 155.400MHz | 155.400MHz |

ADJUSTMENT / 调整

Common Section

| Item | Condition | Measurement | | Adjustment | | Specifications/ Remark |
|------------------------------|--|--------------------|-----------|------------|--------|---------------------------|
| | | Test equipment | Terminal | Parts | Method | |
| 1. Setting | 1) BATT terminal vorage: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 | 3.8V ±0.2V |
| | 2) CH:Low | | | | Check | 0.6V or more |
| 3. VCO lock voltage TX | 3) CH:High PTT:ON | | | TC1 | ADJ | 3.8V ±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 | | 4.8W ±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 | | | | | |
| | | | | | | |
| 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 | | | | | |
| 5. VOX 1 Writing [Wide] | TEST CH:Center AG:1KHz/60mV | | | | | |

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 | 3.8V ±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 | 3.8V ±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 | | 4.8W ±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 | | | | | |
| 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+,-) |
| 5. VOX 1 写入 [宽] | 测试 CH : 中心 AG : 1KHz / 60mV | | | | | |

ADJUSTMENT / 调整

| Item | Condition | Measurement | | Adjustment | | Specifications/ Remark |
|--|--|--|-------------------------|---------------------------------|---|---|
| | | Test equipment | Terminal | Parts | Method | |
| 6.VOX 10 Writing [Wide] | TEST CH:Center AG:1KHz/4.0mV | Power meter Dev meter Oscilloscope | ANT SP/MIC connector | Programming Software:KPG-82D | | |
| 7.DQT TCXO Balance Writing | TEST CH:Center (Wide/Narrow) | AG AF VTVM | ANT | Programming Software:KPG-82D | Write | 230 hex (Wide/Narrow) |
| 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 | | |
| 6. VOX 10 写入 [宽] | 测试 CH: 中心 AG: 1KHz / 4.0mV | 功率计 频偏仪 示波器 AG AF VTVM | ANT SP/MIC 连接器 | 编程软件: KPG-82D | | | |
| 7. DQT TCXO 平衡写入 | 测试 CH: 中心 (宽 / 窄) | | | | | | ANT |
| 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] | | | | | | |
| 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] | | | | | | |
| 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] | | | | | | |
| 11. 单音频偏调整 [宽] | 测试 CH: 中心 LPF: 15kHz HPF: OFF PTT: ON | | | | | 3.0kHz | ±100Hz |
| | [窄] | | | | | | |
| 12. DTMF 频偏调整 [宽] | 测试 CH: 中心 LPF: 15kHz HPF: OFF PTT: ON | | | | | 3.0kHz | ±100Hz |
| | [窄] | | | | | | |
| 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 | | | | | |

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) | S S G D V M O s c i l l o s c o p e A F V T V M | ANT RSSI | Programming Software:KPG-82D | RSSI MAX | |
| 2. Sesitivity 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 |
| 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 |
| 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:-120 dBm(0.22μV) SSG MOD:1.5kHz |
| 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

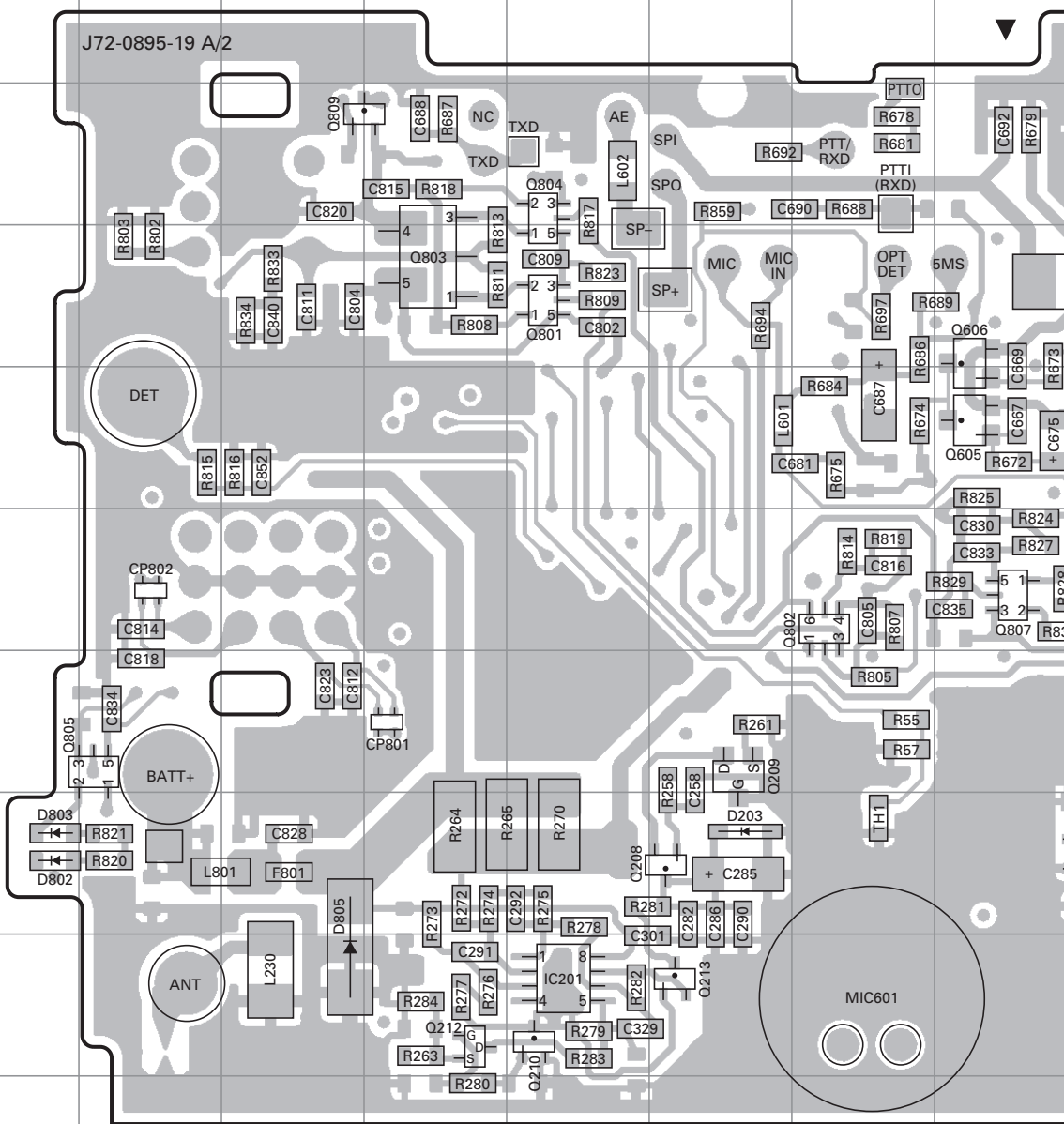
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|-------------------|--|------------------------------|-------------|-------------------|----------|----------------|
| | | 测试设备 | 终端 | 部件 | 方法 | |
| 1. BPF 波形调整 | 测试 CH : 低 低' 中心 高' 高 (5 点) SSG 输出 : -103dBm (1.58 μ V) | SSG DVM 示波器 AF VTVM | ANT RSSI | 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. 静噪阈值写入 [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 : -120 dBm (0.22 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-2160 PC BOARD / PC 板

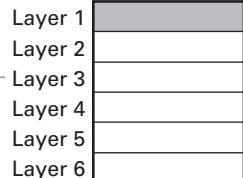
TX-RX UNIT (X57-6720-10)

| Ref. NO. | Address |
|----------|---------|
| IC201 | 9G |
| IC601 | 4Q |
| IC602 | 6M |
| IC603 | 8M |
| IC604 | 6L |
| IC605 | 3L |
| IC606 | 9N |
| 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 |
| Q400 | 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 |
| D603 | 5M |
| D604 | 7K |
| D605 | 5K |
| D606 | 5K |
| D802 | 8C |
| D803 | 8C |
| D805 | 9E |

TX-RX UNIT (X57-6720-10) Component side view (J72-0895-19)



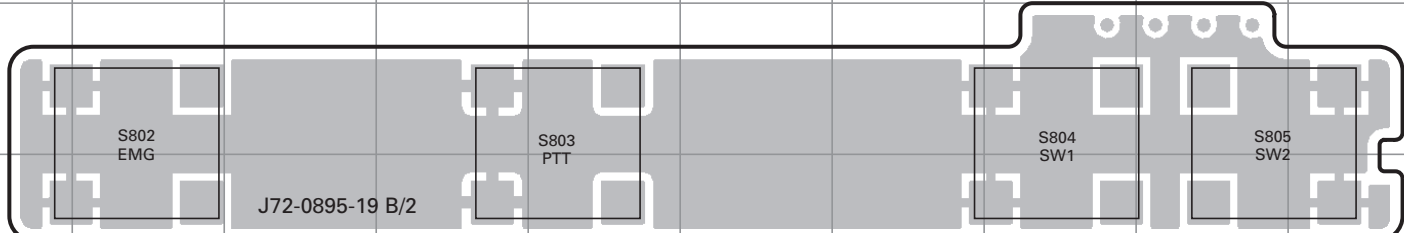
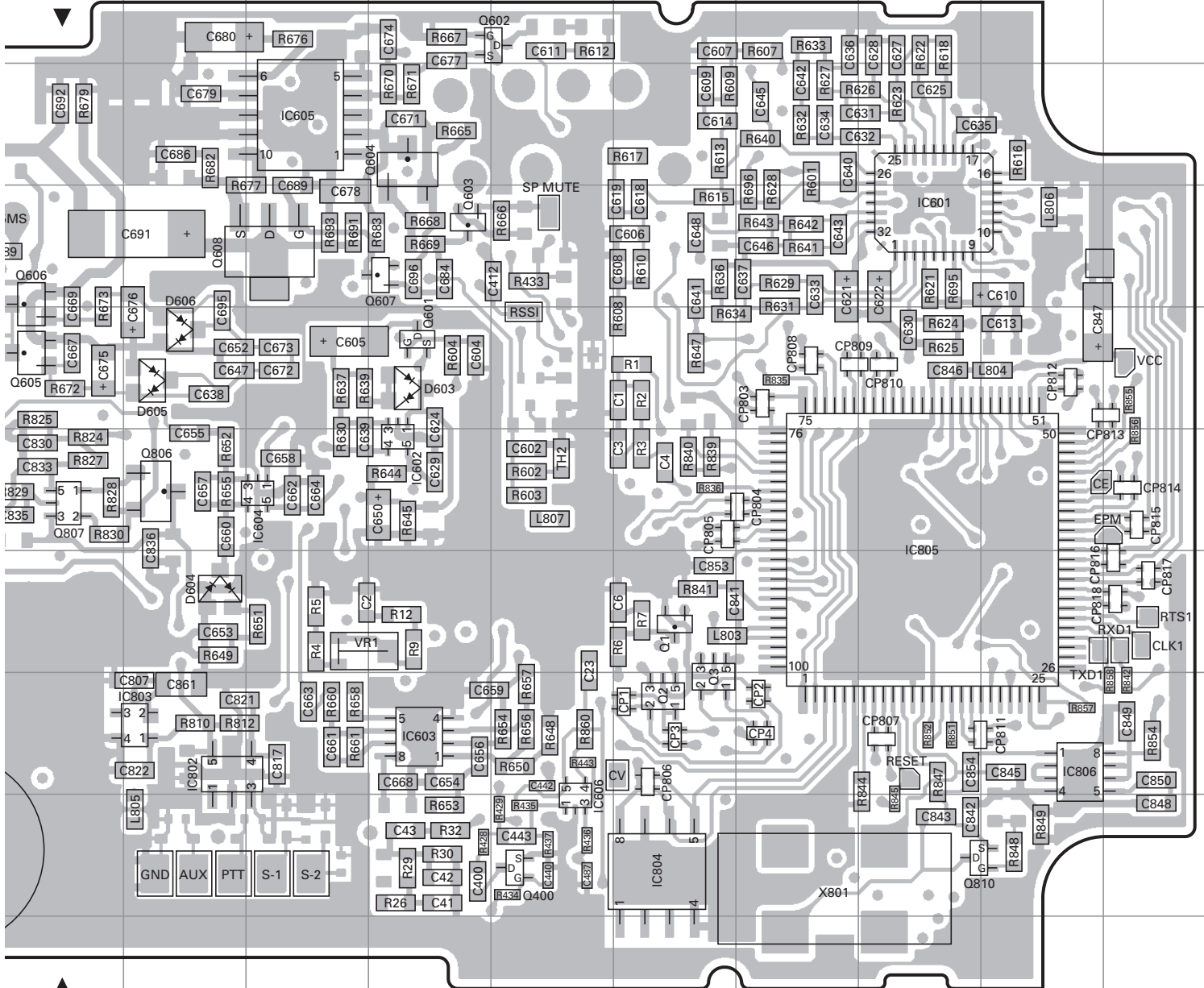
Component side



Foil side

PC BOARD / PC 板 TK-2160

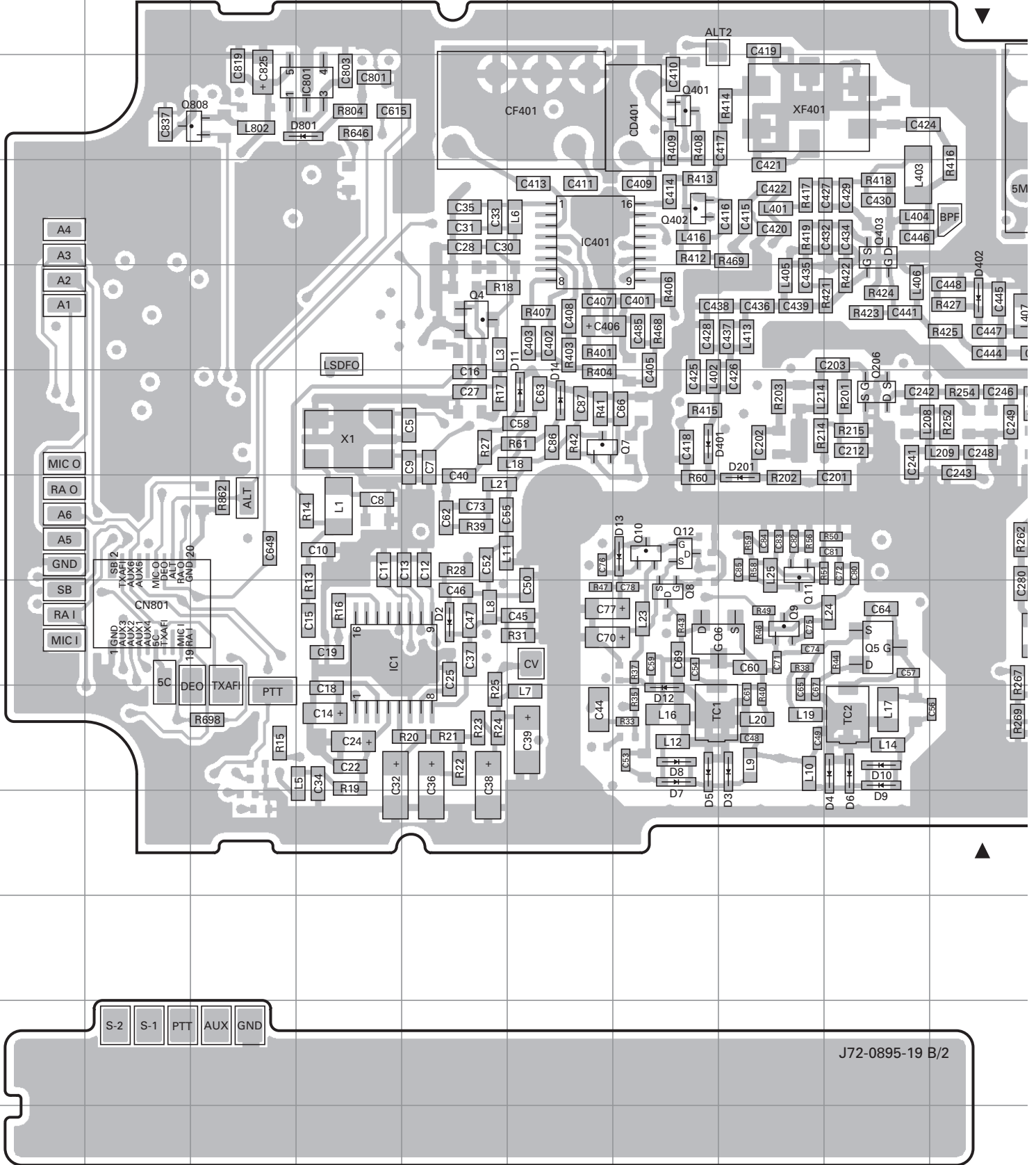
TX-RX UNIT (X57-6720-10) Component side view (J72-0895-19)



J72-0895-19 B/2

TK-2160 PC BOARD / PC 板

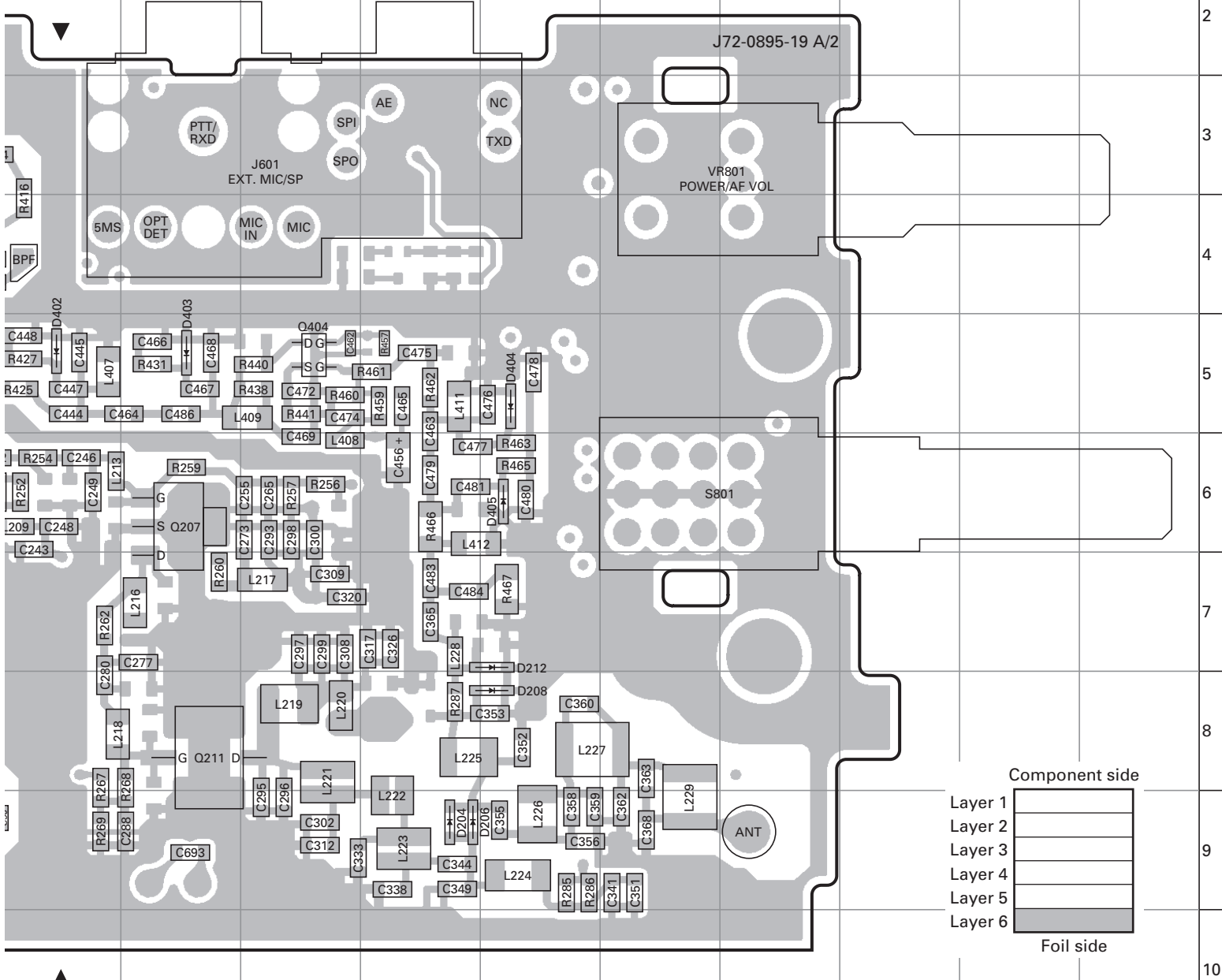
TX-RX UNIT (X57-6720-10) Foil side view (J72-0895-19)



J72-0895-19 B/2

PC BOARD / PC 板 TK-2160

TX-RX UNIT (X57-6720-10) Foil side view (J72-0895-19)



TX-RX UNIT
(X57-6720-10)

| 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 |

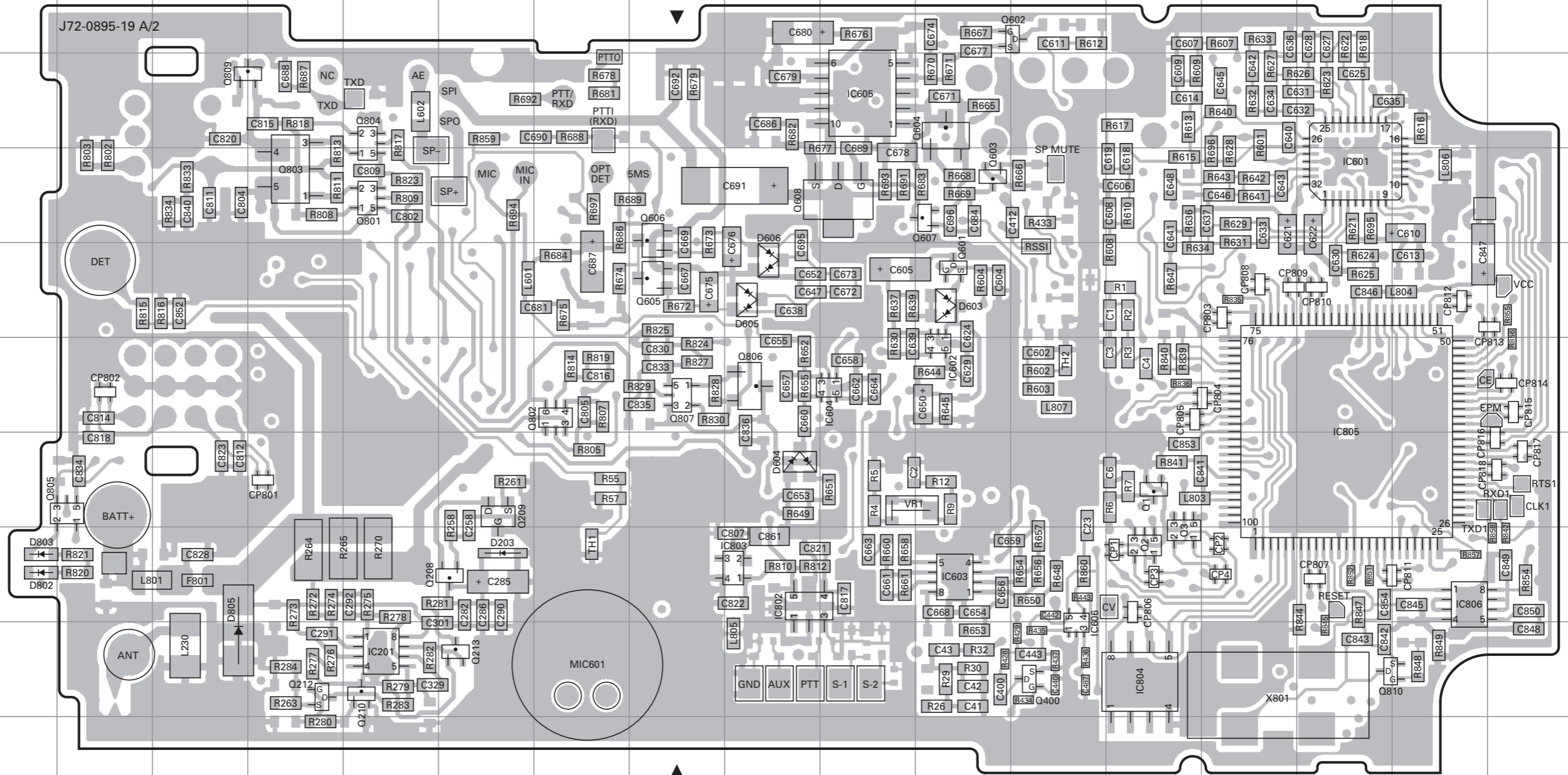
| Ref. NO. | Address |
|----------|---------|
| Q402 | 4G |
| Q403 | 4I |
| Q404 | 5L |
| Q808 | 3C |
| D2 | 8E |
| D3 | 9H |
| D4 | 9I |
| D5 | 9G |
| D6 | 9I |
| D7 | 9G |
| D8 | 9G |
| D9 | 9I |
| D10 | 9I |
| D11 | 6F |
| D12 | 9G |
| D13 | 7G |

| 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 |

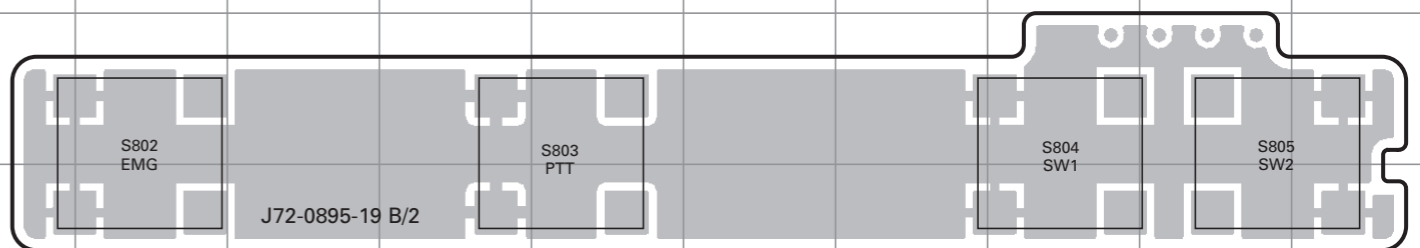
TX-RX UNIT
(X57-6720-10)

| Ref. NO. | Address |
|----------|---------|
| IC201 | 9G |
| IC601 | 4Q |
| IC602 | 6M |
| IC603 | 8M |
| IC604 | 6L |
| IC605 | 3L |
| IC606 | 9N |
| 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 |
| Q400 | 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 |
| D603 | 5M |
| D604 | 7K |
| D605 | 5K |
| D606 | 5K |
| D802 | 8C |
| D803 | 8C |
| D805 | 9E |

TX-RX UNIT (X57-6720-10) Component side view (J72-0895-19)



TX-RX UNIT (X57-6720-10) Component side view (J72-0895-19)



Component side

| |
|---------|
| Layer 1 |
| Layer 2 |
| Layer 3 |
| Layer 4 |
| Layer 5 |
| Layer 6 |

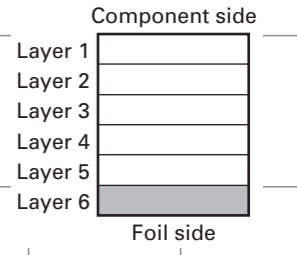
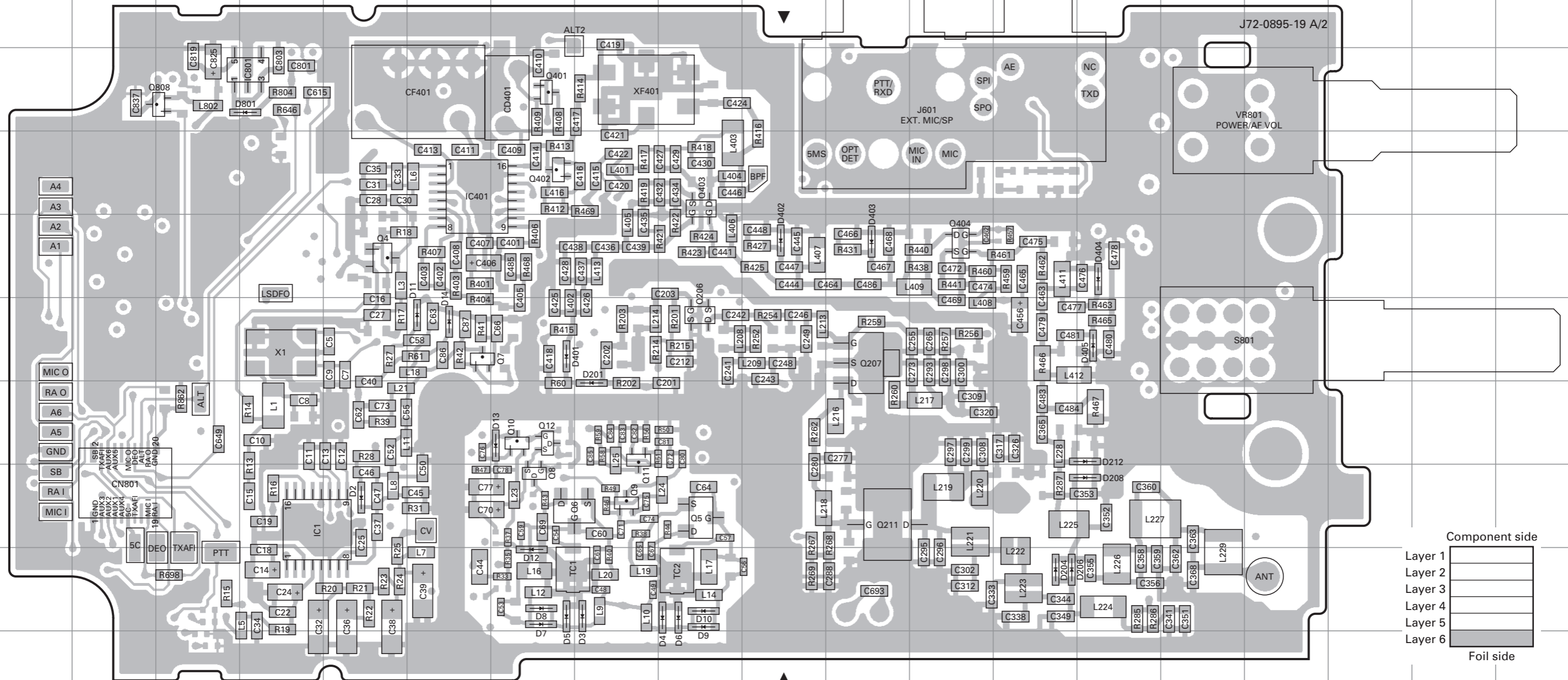
Foil side

TK-2160 PC BOARD / PC 板

PC BOARD / PC 板 TK-2160

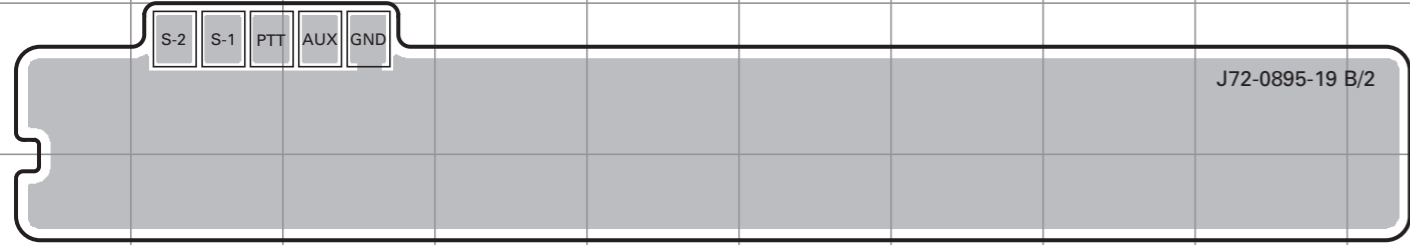
TX-RX UNIT (X57-6720-10) Foil side view (J72-0895-19)

TX-RX UNIT (X57-6720-10) Foil side view (J72-0895-19)



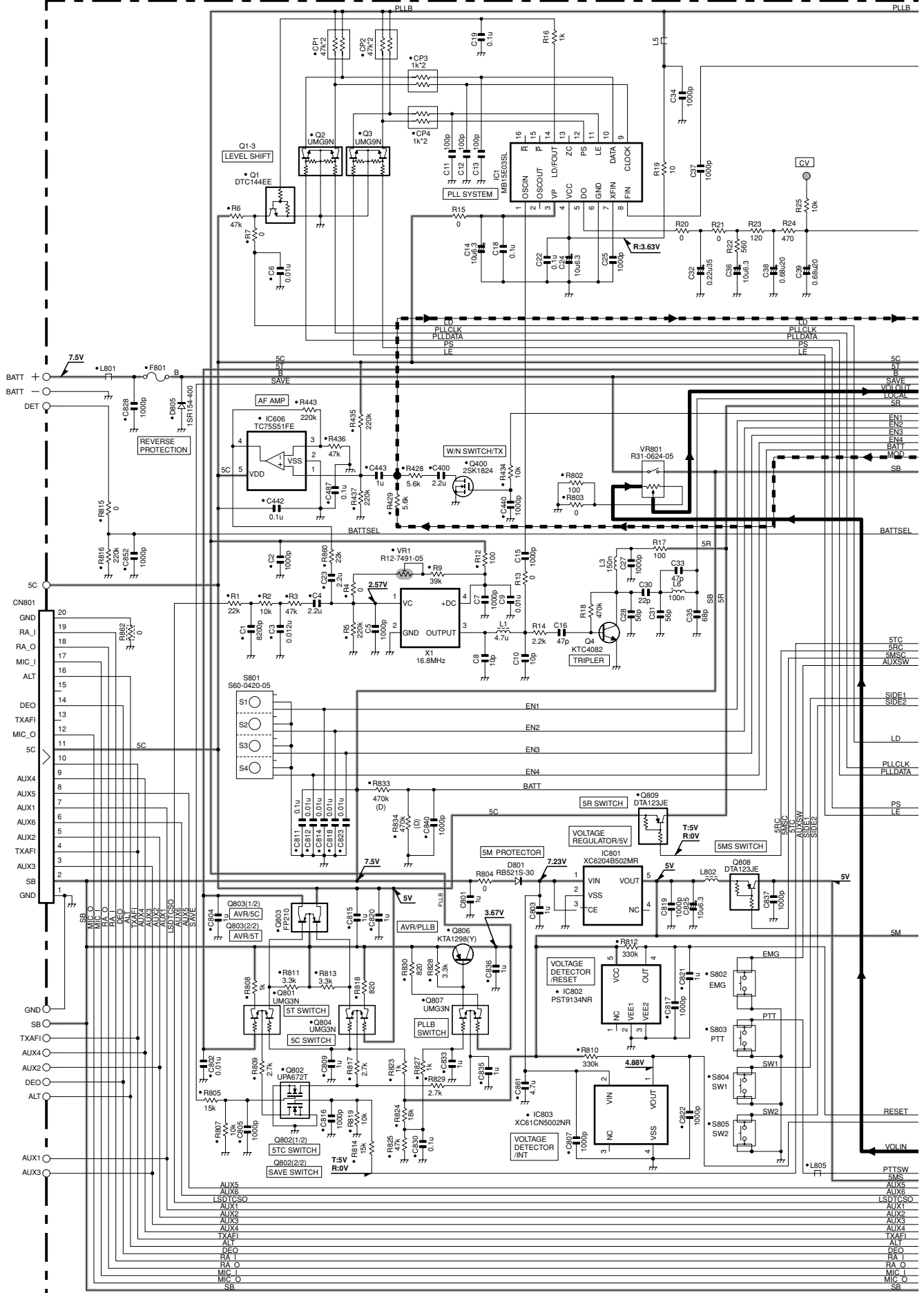
TX-RX UNIT (X57-6720-10)

| Ref. NO. | Address | Ref. NO. | Address | Ref. NO. | Address |
|----------|---------|----------|---------|----------|---------|
| IC1 | 8D | Q402 | 4G | D14 | 6F |
| IC401 | 4F | Q403 | 4I | D201 | 7H |
| IC801 | 3D | Q404 | 5L | D204 | 9M |
| Q4 | 5E | Q808 | 3C | D206 | 9M |
| Q5 | 8I | D2 | 8E | D208 | 8N |
| Q6 | 8G | D3 | 9H | D212 | 7N |
| Q7 | 6F | D4 | 9I | D401 | 6G |
| Q8 | 8G | D5 | 9G | D402 | 5J |
| Q9 | 8H | D6 | 9I | D403 | 5K |
| Q10 | 7G | D7 | 9G | D404 | 5N |
| Q11 | 7H | D8 | 9G | D405 | 6N |
| Q12 | 7G | D9 | 9I | D801 | 3D |
| Q206 | 6I | D10 | 9I | | |
| Q207 | 6K | D11 | 6F | | |
| Q211 | 8K | D12 | 9G | | |
| Q401 | 3G | D13 | 7G | | |



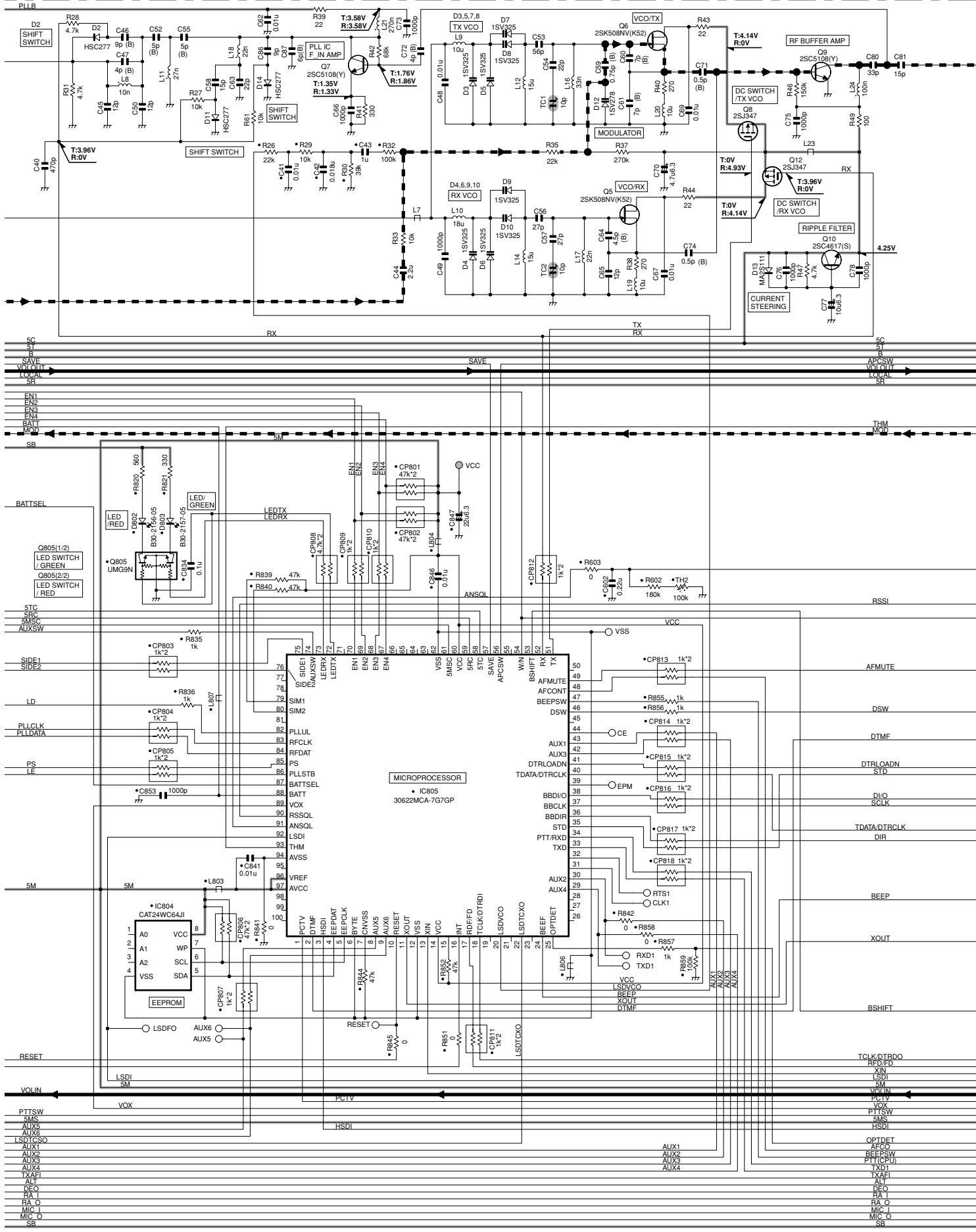
TK-2160 SCHEMATIC DIAGRAM / 原理图

TX-RX UNIT (X57-6720-10)



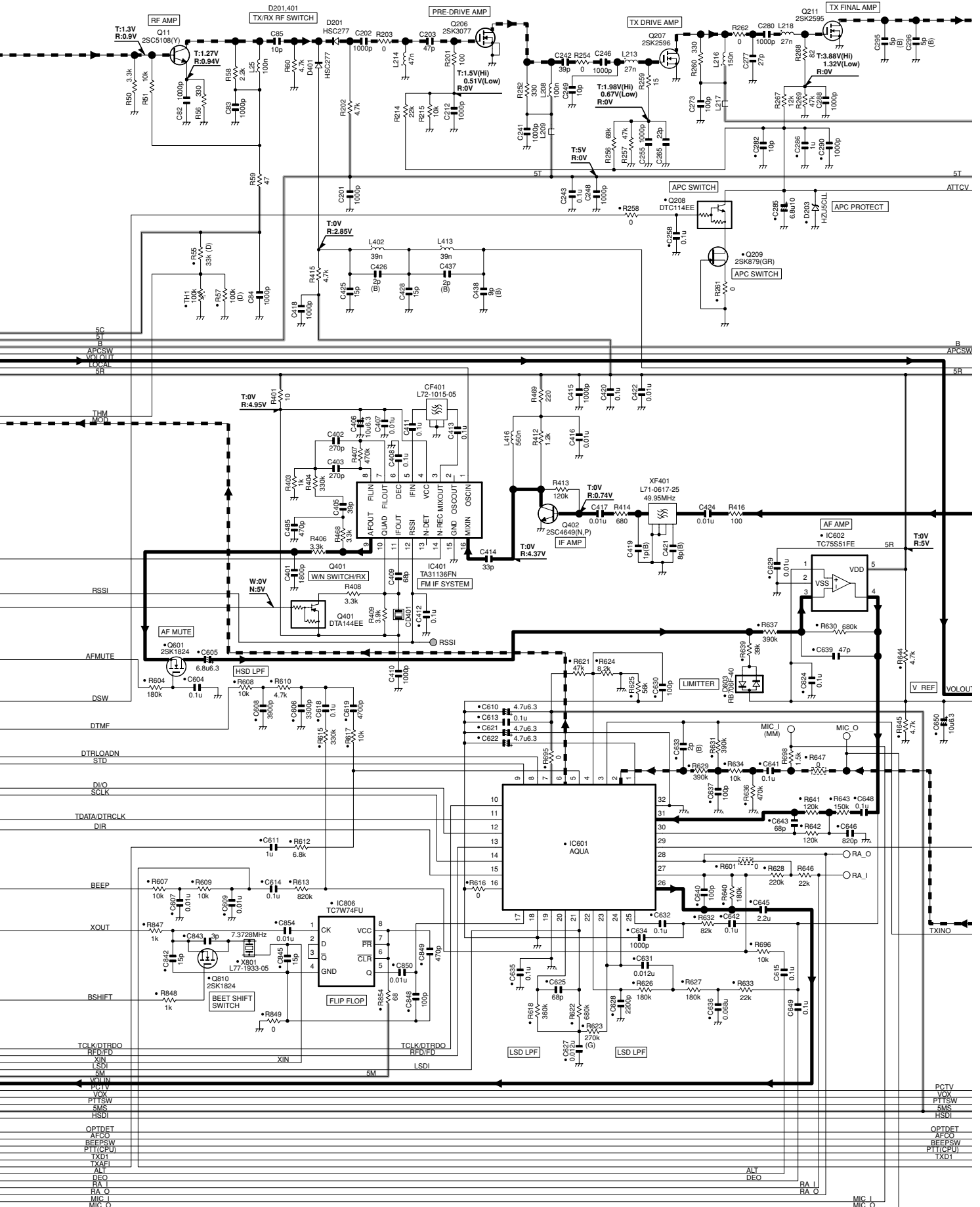
SCHEMATIC DIAGRAM / 原理图 TK-2160

TX-RX UNIT (X57-6720-10)



TK-2160 SCHEMATIC DIAGRAM / 原理图

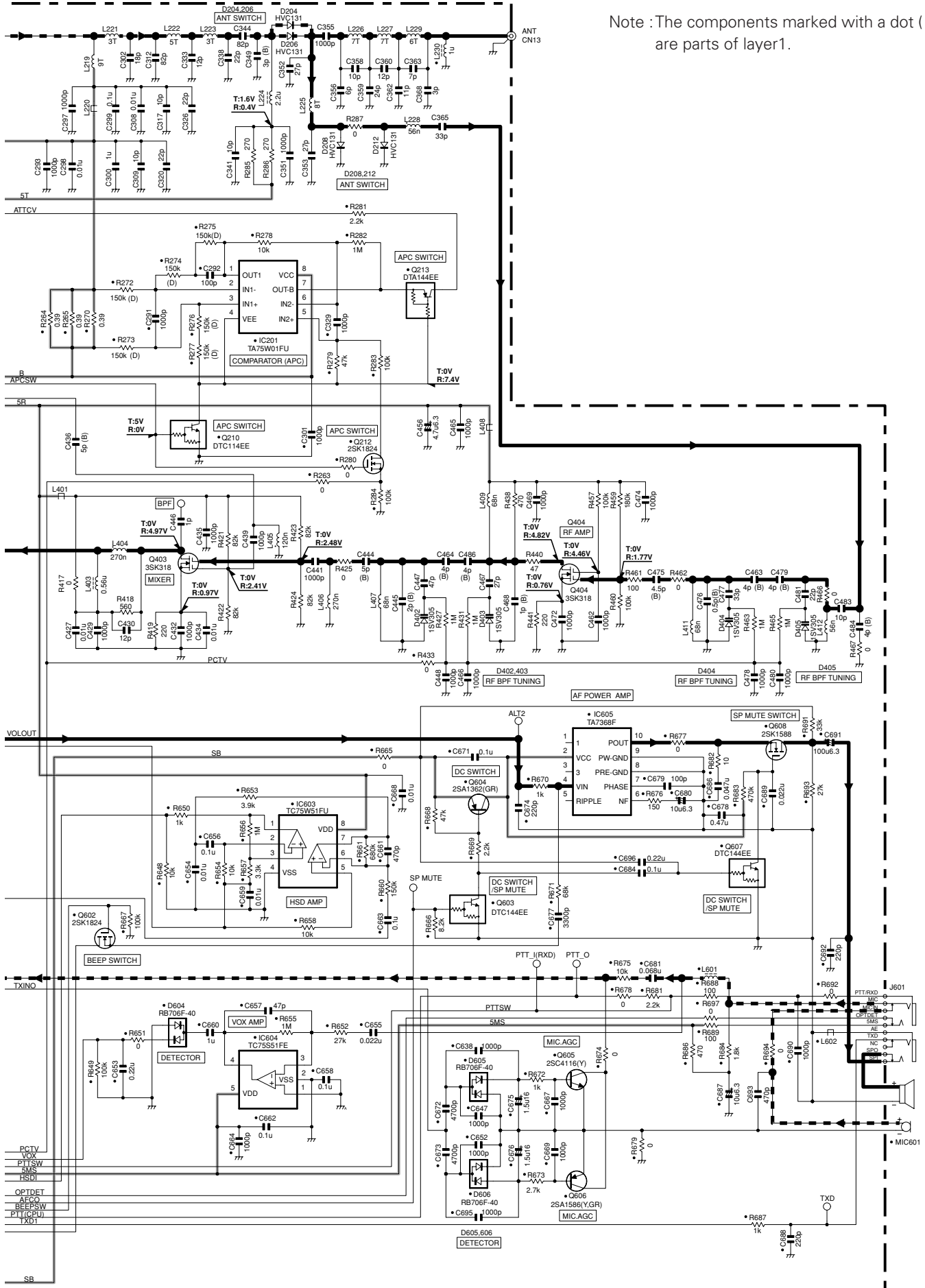
TX-RX UNIT (X57-6720-10)



SCHEMATIC DIAGRAM / 原理图 TK-2160

TX-RX UNIT (X57-6720-10)

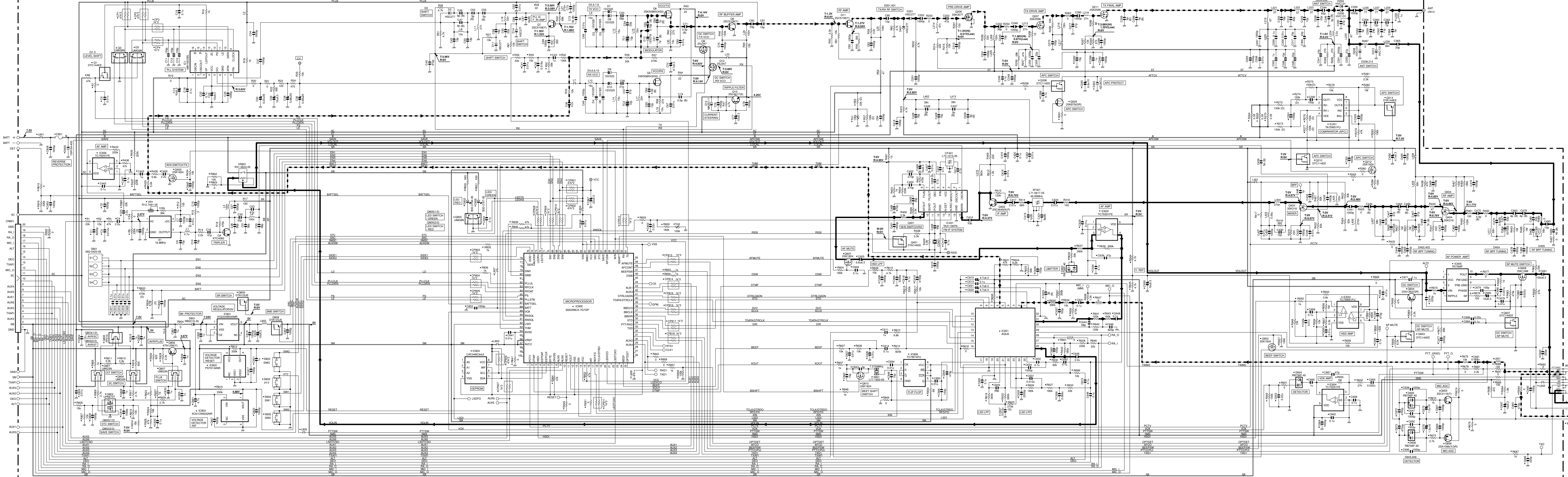
Note : The components marked with a dot (●) are parts of layer1.



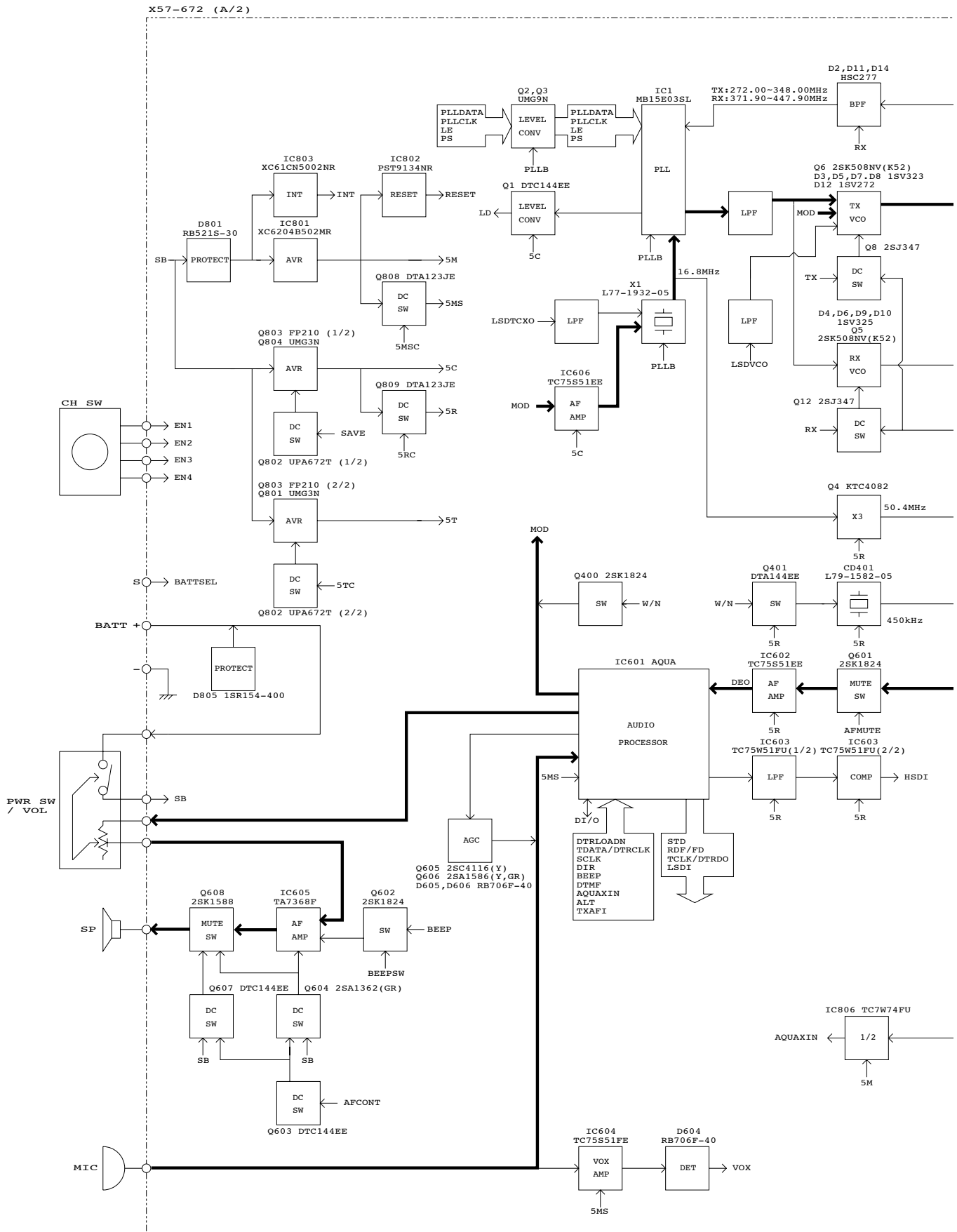
1
2
3
4
5
6
7

TK-2160 SCHEMATIC DIAGRAM / 原理图

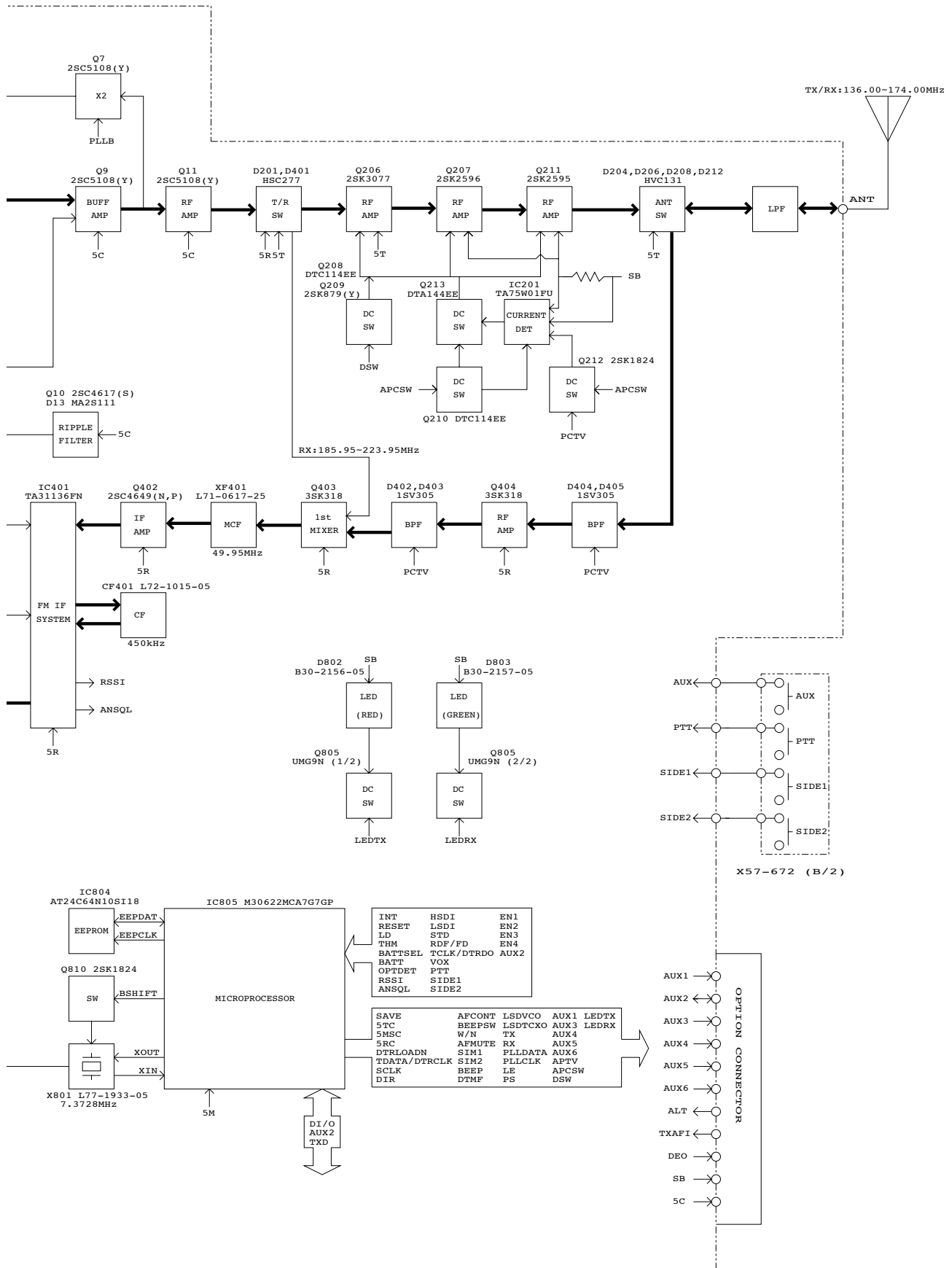
TX-RX UNIT (X57-6720-10)



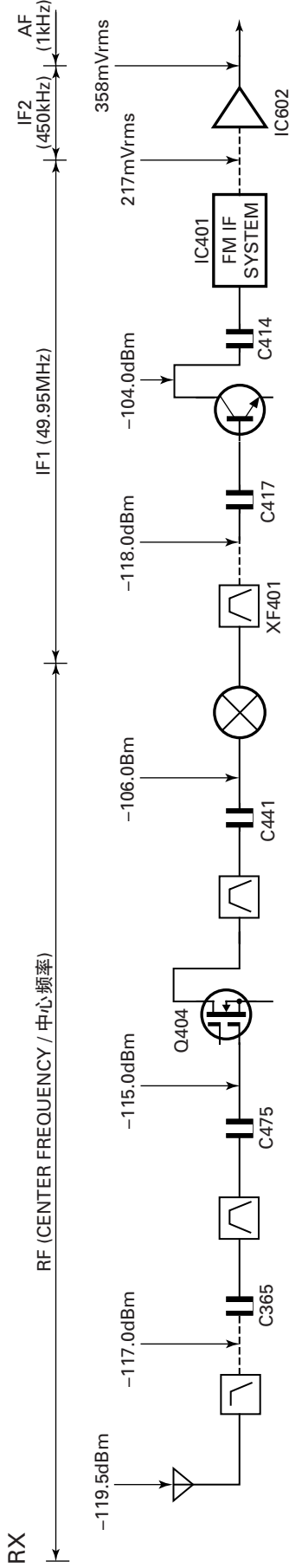
BLOCK DIAGRAM / 方块图



BLOCK DIAGRAM / 方块图

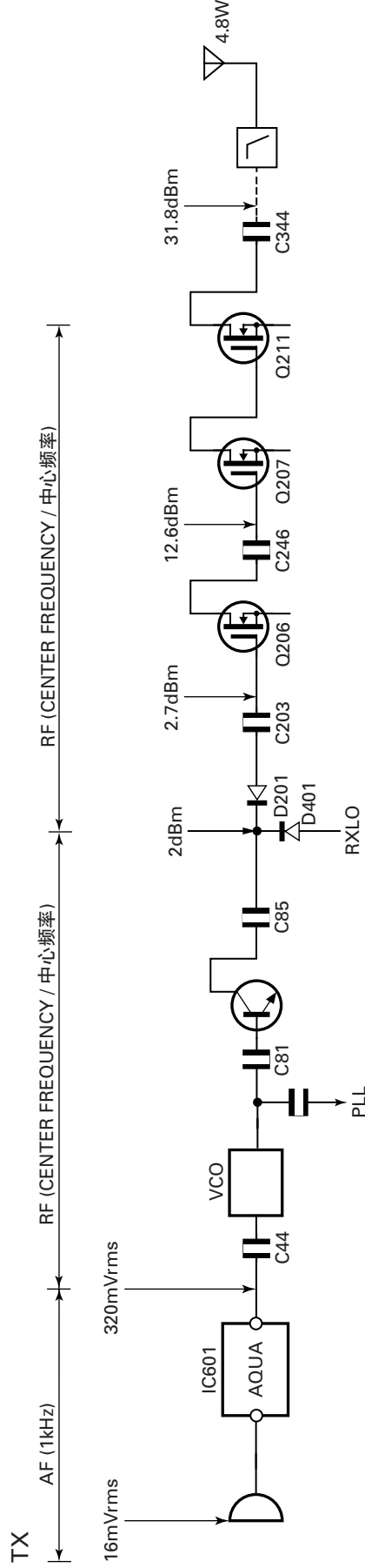


LEVEL DIAGRAM / 电平图



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。)

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.)



AG is set to the MIC input becomes 3kHz DEV. at
1kHz MOD. (WIDE)
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。

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.

SPECIFICATIONS

General

| | |
|--------------------------------------|---|
| Frequency Range | 136~174MHz (C) |
| Number of channels | Max. 16 |
| Number of groups | Max. 16 |
| Channel Spacing | 25kHz, 30kHz (Wide) 12.5kHz, 15kHz (Narrow) |
| PLL Channel Stepping | 2.5kHz, 5kHz, 6.25kHz, 7.5kHz |
| Operating Voltage | 7.5 VDC \pm 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 | 0.25 μ V (Wide)/0.28 μ V (Narrow) |
| Selectivity | 70dB (Wide)/62dB (Narrow) |
| Inter modulation | 65dB (Wide)/62dB (Narrow) |
| Spurious response | 65dB |
| Audio Power Output | 500mW / 8 Ω |
| Frequency Stability | \pm 2.5ppm |
| Channel Frequency Spread | 38MHz |

Transmitter (Measurements made per EIA standard EIA-603)

| | |
|--------------------------------|---|
| RF Power Output | 5W/1W |
| Spurious and Harmonics | 70dB |
| Modulation | 16K ϕ F3E (Wide)/11K ϕ F3E (Narrow) |
| FM Noise | 45dB (Wide)/43dB (Narrow) |
| Audio Distortion | Less than 5% |
| Frequency Stability | \pm 2.5ppm |
| Channel Frequency Spread | 38MHz |

概述

| | |
|-------------------------------|--|
| 频率范围 | 136 ~174MHz |
| 频道数 | 最大 16 |
| 组数 | 最大 16 |
| 信道间距 | 25kHz, 30kHz (宽) 12.5kHz, 15kHz (窄) |
| PLL 频道步进 | 2.5kHz, 5kHz, 6.25kHz, 7.5kHz |
| 电池电压 | 7.5 VDC \pm 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°C 到 + 60°C (-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 | 0.25 μ V (宽) / 0.28 μ V (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 | \pm 2.5ppm |
| 信道频率扩展 | 38MHz |

发射部 (根据 EIA 标准 EIA-603 测定)

| | |
|--------------|---|
| 射频功率输出 | 5W / 1W |
| 假信号和谐波 | 70dB |
| 调制 | 16K ϕ F3E (宽) / 11K ϕ F3E (窄) |
| FM 噪音 | 45dB (宽) / 43dB (窄) |
| 音频失真 | 低于 5% |
| 频率稳定性 | \pm 2.5ppm |
| 信道频率扩展 | 38MHz |

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