

TK-388G

SERVICE MANUAL / 维修手册

M6 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.

PERSONNEL SAFETY

The following precautions are recommended for personnel 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公布的数据。在出版后可能发生变动、如果需要、可以使用《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信息时、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。

SYSTEM SET-UP / 系统体系

SERVICE

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

Note:

You must use KPG-56D version 3.30 or later for this transceiver. KPG-56D versions 3.20 or earlier do not work properly.

维修服务

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

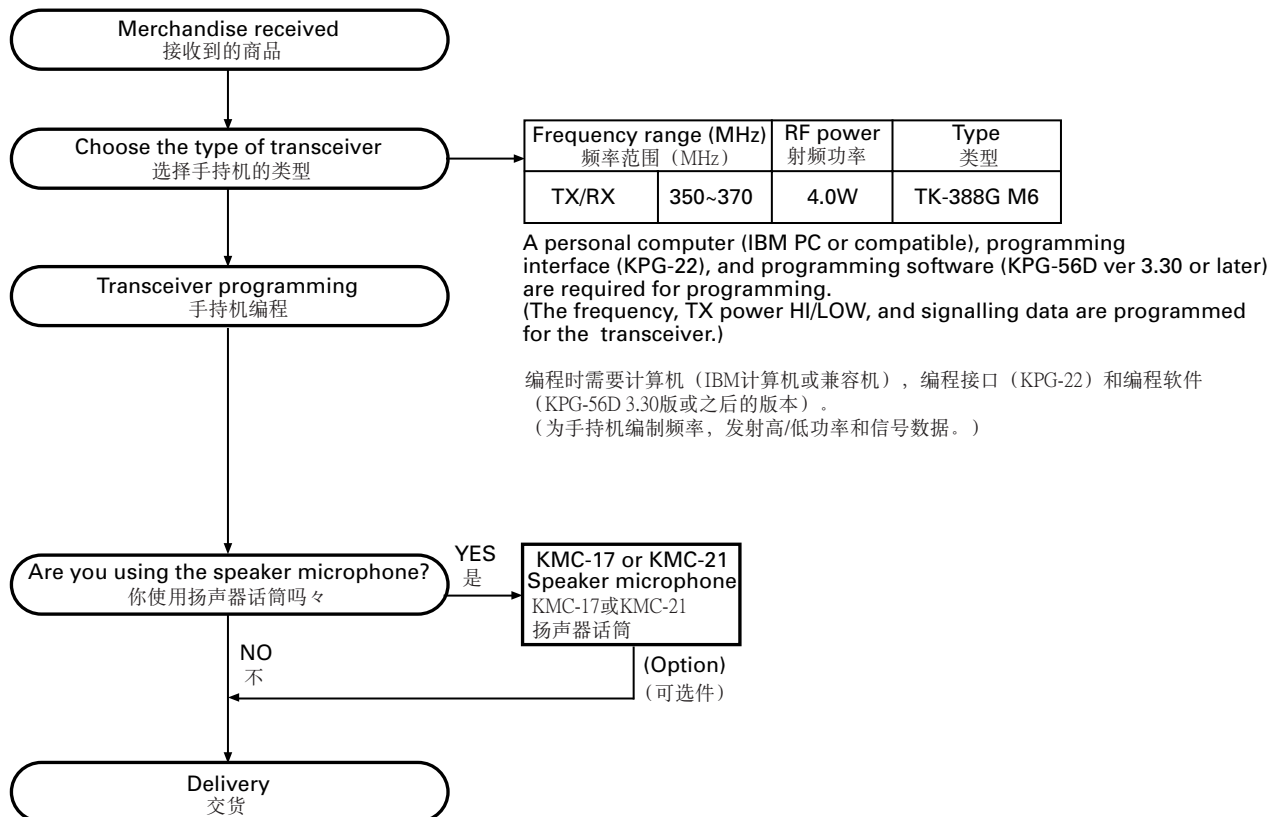
注释：

你必须将KPG-56D 3.30版或之后的版本用于此对讲机。KPG-56D 3.20版或之前的版本不能正常工作。

Model & destination		Unit		Frequency range	Remarks	HELICAL Antenna	Charger	Battery	16 Key
		TX-RX Unit	Display Unit						
TK-388G	M6	X57-6500-21	X54-3250-10	350~370MHz	IF1 : 49.95MHz LOC : 50.4MHz	✓	Option	Option	✓

型号和地址		单元		频率范围	备注	天线	充电器	电池	16键
		TX-RX单元	显示单元						
TK-388G	M6	X57-6500-21	X54-3250-10	350~370MHz	IF1 : 49.95MHz LOC : 50.4MHz	✓	可选件	可选件	✓

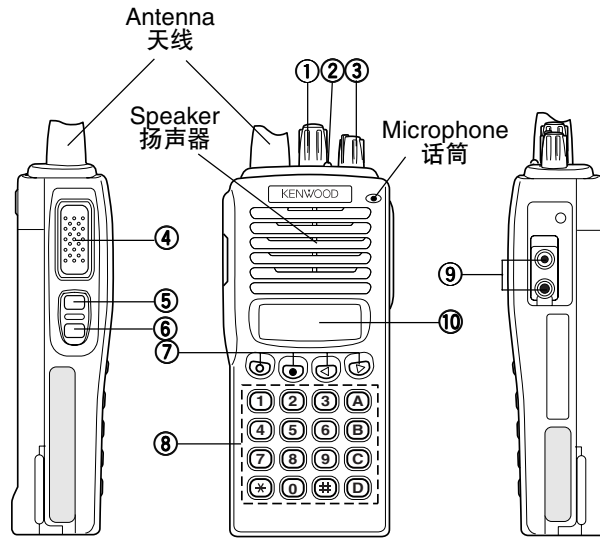
SYSTEM SET-UP / 系统体系



OPERATING FEATURES / 操作特性

1. Operation Features

1. 操作特性



The transceiver is shown with the optional KNB-14 battery pack.

图示的手持机带有可选的 KNB-14 电池。

① Rotary encoder

Your dealer can program the encoder as either Group Up/Down or Channel Up/Down (default setting). Rotate to select a group or channel. Also rotate to adjust the squelch in Squelch Adjustment mode.

① 旋转编码扭

经销商既可以将编码扭设置为组号上/下，也可以设置为信道号上/下（出厂设定）。旋转选择组或信道。也可以旋转调整静噪抑制电路调整模式的噪音阈值。

② LED indicator

Lights red while transmitting. Lights green while receiving. Flashes orange while receiving a Code Squelch or a Selective Call code, or a 2-Tone or DTMF signal that matches the one set up in your transceiver. Flashes red when the battery power is low while transmitting.

② 发光二极管指示灯

发射时显示红灯。接收时显示绿灯。当接收编码静噪抑制电路代码或选择呼叫代码，或双音频或与用户手持机内设定的相匹配的 DTMF 信号时，则橙色灯闪烁。在发射过程中，当电池电压不足时红色灯闪烁。

③ Power switch/ Volume control

Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. To switch OFF the transceiver, turn counterclockwise fully.

③ 电源开关 / 音量控制

顺时针旋转接通手持机电源。旋转调整音量。逆时针旋转到头关闭手持机。

④ PTT (Push-to-Talk) switch

Press this switch, then speak into the microphone to call a station.

④ PTT (通话) 开关

按下此开关，然后通过话筒呼叫对方。

⑤ Side 1 key

This is a PF (Programmable Function) key. Press it to activate its auxiliary function (page 5).

⑤ 侧面 1 按键

这是一个 PF (可编程功能) 按键。按下后开启其辅助功能 (第 5 页)。

⑥ Side 2 key

This is a PF (Programmable Function) key. Press it to activate its auxiliary function (page 5).

⑥ 侧面 2 按键

这是一个 PF (可编程功能) 按键。按下后开启其辅助功能 (第 5 页)。

⑦ O, ●, ◀, ▶ keys

These are PF (Programmable Function) keys. Press each key to activate its auxiliary function.

⑦ O, ●, ◀, ▶ 按键

这些是 PF (可编程功能) 按键。按下每一个键开启其辅助功能。

⑧ DTMF keypad

Used for storing and transmitting DTMF numbers.

⑧ DTMF 键盘

用于储存和发射 DTMF 数码。

⑨ SP/MIC jacks

Connect an optional speaker/ microphone here.

⑨ 扬声器 / 话筒插口

在此连接可选的扬声器 / 话筒。

⑩ Display

(See page 7.)

⑩ 显示

(参见第 7 页。)

OPERATING FEATURES / 操作特性

Note: The PF keys are programmed with default functions:

- **Side 1 key:** Lamp
- **Side 2 key:** Monitor A
- **O key:** Scan
- **● key:** Scan Del/Add
- **◀ key:** Talk Around
- **▶ key:** RF Power Lo

Programmable Auxiliary Functions

Side 1, Side 2, O, ●, ◀, and ▶ can be programmed with the auxiliary functions listed below.

- Channel Down
 - Channel Up
 - Display Character
 - Group Down
 - Group Up
 - Home Channel
 - Key Lock
 - Lamp
 - Monitor A (Monitor Unmute–Momentary)
 - Monitor B (Monitor Unmute–Toggle)
 - Monitor C (Carrier Squelch–Momentary)
 - Monitor D (Carrier Squelch–Toggle)
 - None
 - Redial
 - RF Power Lo
 - Scan
 - Scan Del/Add
 - Selectable QT
 - Talk Around
 - 2-Tone Encode Select
 - Trunking Group Code Select *1
- *1 Available only when using Trunking function.

2. Programmable keys

The functions the FPU programs to the function keys are described in the following sections.

1) Channel up/down

When the key is pressed each time, the channel number to be selected is incremented/decremented and repeats if held for one second or longer.

This key functions as the voice scrambler code selector in the voice scrambler code select mode.

2) Display character

This key switches the LCD display between the group/channel number and group/channel name.

3) Group up/down

When the key is pressed each time, the group number to be selected is incremented/decremented and repeats if held for one second or longer.

注释：可编程功能按键出厂时设定以下功能：

- 侧面 1 按键：指示灯
- 侧面 2 按键：监听器 A
- **O**：扫描
- **●**：删除 / 添加扫描。
- **◀**：直接通话
- **▶**：低射频功率。

可编程辅助功能

侧面 1 键, 侧面 2 键, O, ●, ◀ 和 ▶ 可以编程设定为下面列出的辅助功能。

- 信道号下
 - 信道号上
 - 显示字符
 - 组号上
 - 组号下
 - 守候信道
 - 按键锁定
 - 照明灯
 - 监听 A (监听器非静音 - 瞬间)
 - 监听 B (监听器非静音 - 拨动)
 - 监听 C (载波静噪抑制电路 - 瞬间)
 - 监听 D (载波静噪抑制电路 - 拨动)
 - 无
 - 重拨
 - 低射频功率
 - 扫描
 - 删除 / 添加扫描
 - 选择 QT
 - 直接通话
 - 双音信令编码选择
 - 干线组代码选择 (用于SmarTrunkII®运行) *1
- 只有使用中续功能时才具备*1

2. 可编程按键

FPU 编程设定到功能键中的功能在下面的章节中介绍。

1) 信道号上 / 下

当每按一次按键时，如果按下 1 秒钟或更长的时间，则被选择的信道数码增大 / 减小并且重复。

此按键功能在扰频器编码选择模式中为扰频器编码选择。

2) 显示字符

此按键用于在 LCD 显示器上转换显示组 / 信道号码和组 / 信道名称。

3) 组号上 / 下

当每按一次按键时，如果按下 1 秒钟或更长的时间，则被选择的组号码增大 / 减小并且重复。

OPERATING FEATURES / 操作特性

4) Home Channel

Press this key once, the channel switches to the pre-programmed home channel.

5) Key lock

When the KEY LOCK switch is held down for one second or more, keys other than [PTT], [Side1], [Side2], [VOL], [POWER], and KEY LOCK are locked.

When 12/16 KEY LOCK is set with the FPU, the DTMF key is locked and when front-panel KEY LOCK is set, the DTMF key and the [PF] key are locked.

6) Lamp

This key illuminates the LCD and keys on the front panel. When the key is pressed, the LED lamp goes on.

When it is released, the lamp goes off after about five seconds. If any key is pressed while the LED lamp is on, the lamp is kept on for five seconds.

7) Monitor

Used to release signalling or squelch when operating in conventional mode. It is also used to reset option signalling.

8) Selectable QT (SEL QT)

When the SEL QT switch is pressed, QT frequency can be temporarily changed with the Rotary encoder.

9) Talk Around

Press this key, the transceiver uses the receive frequency and tone for transmission.

The operator can call the other party directly (without repeater). Press this key again, the talk around function goes off.

10) 2-Tone Encode Select

- ① Press the key programmed as 2-tone Encode Select.
 - A pre-programmed 2-tone code name appears on the display.
- ② Press the key programmed as Rotary encoder to select you desired 2-tone code name.
- ③ Press PTT switch and 2-Tone Encode Select key to transmit and release them to receive.

Note:

You cannot change the tone in step ② by using the Rotary encoder keys.

11) Redial

Pressing this key when Group/Channel is shown, displays the previously transmitted DTMF code. Pressing [PTT] at this time, transmits the code that is currently displayed.

12) RF power low

Used to temporarily switch transmission output to low power. Turning the function on enables:

Hi→Low, Low→Low

Key states are backed up, except in the PC mode when they are reset.

4) 守候信道

按此键一次，信道转换到预先编制的守候信道。

5) 按键锁定

当按下按键锁定转换开关1秒钟或更长的时间，除了[PTT]，[侧面1]，[侧面2]，[音量]，[电源]和按键锁定以外的按键被锁住。

当FPU设定12/16按键锁定时，DTMF按键被锁住。设定前面板按键锁定时，DTMF按键和[PF]按键被锁住。

6) 照明灯

此键照亮前端面板上的LCD和按键。当按下此键时，发光二极管指示灯燃亮。

当松开时，大约5秒钟后指示灯熄灭。如果当发光二极管指示灯燃亮时按下任何按键，指示灯将持续燃亮5秒钟。

7) 监听

在常规模式下操作时用于发出信令或静噪抑制电路。也用于复位选择信令。

8) 选择 QT (SEL QT)

当按下SEL QT 开关时，可以使用旋转式编码钮来暂时改变QT频率。

9) 直接通话

按该键，车载台将使用接收频率和音调来发射。

使用者可直接呼叫对方（不需要转发器）。再次按该键将关闭直接通话功能。

10) 双音信令编码选择

- ① 按下编制为双音信令编码选择的键。
 - 预先已编制好的双音信令代码名称显示在显示屏上。
- ② 按下编制为旋转式编码钮的按键，选择需要的双音信令代码名称。
- ③ 按下PTT 开关和双音信令编码选择键用以发送，松开开关和按键则用以接受。

注释：

不可使用旋转式编码按钮在步骤②改变信令。

11) 重拨

当显示组/信道时按下此键，则显示原先发射的DTMF代码。此时按下[PTT]键，则发射目前显示的代码。

12) 低射频功率

用于临时将发射功率转换到低功率。在允许的范围调谐此功能：

高→低，低→低

除了在计算机模式中被复位以外，按键状态可以返回。

OPERATING FEATURES / 操作特性

13) Scan

Pressing this key starts scanning. Pressing this key again stops scanning.

14) Scan Del/Add

This key switches the currently displayed channel between "Delete" and "Add".

The "Add" channel is contained in the scan sequence, the "Delete" channel is not contained. In the scan mode, this key switches the channel between delete or add, temporarily.

15) None

An error operation beep sounds, and no action will occur. Use this function when the transceiver is required to be operated more simply.

13) 扫描

按此键开始扫描。再按此键停止扫描。

14) 删除 / 添加扫描





此键在“删除”和“添加”之间转换当前显示的信道。“添加”信道包含在连续扫描中，“删除”信道不包含在其中。在扫描模式中，此键在删除或添加之间临时转换信道。

15) 无

错误操作 beep 声响起，并且无任何变化。当手持机需要更简单操作时使用此功能。

3. Display / 显示



Icon	Description
	Appears while using trunking.
	Appears when the selected channel is busy.
	Appears when QT, DQT, DTMF, or 2-Tone decoding is deactivated (by pressing the Monitor key).
CALL	Appears when you receive a Code Squelch, Selective Call, 2-Tone, or DTMF Signalling call. Also appears when you transmit using Code Squelch or Selective Call.
SCN	Appears while scanning.
LO	Appears when using low power on the selected channel.
A	Appears when the selected channel is included in the scanning sequence.
	Displays the selected channel, the squelch level, DTMF digits (when entering digits, confirming digits, or making a call), and messages received via Selective Call.

图标	说明
	当使用集群模式时出现。
	当所选择的信道繁忙时出现。
	当 QT, DQT, DTMF 或双音信令解码无效时出现（通过按监听键）。
CALL	当接收编码静噪抑制电路，选择呼叫，双音信令或 DTMF 信令呼叫时出现。当使用编码静噪抑制电路或选择呼叫发射时也出现。
SCN	扫描时出现。
LO	在所选择的信道上使用低功率时出现。
A	当所选择的信道包括在连续扫描中时出现。
	显示所选择的信道，静噪抑制电路电平，DTMF 数字（当输入数字，确认数字或发出呼叫时）和通过选择呼叫接收到的信息。

OPERATING FEATURES / 操作特性

4. Scan Operating

1) Scan types

- **Single Group Scan**

You can scan all valid (ADD) channels in the displayed group that can be selected with the group selector.

- **Multiple Group Scan**

You can scan all valid (ADD) channels in all valid (ADD) groups.

2) Scan Start Condition

One or more non-priority channels must be added to all channels that can be scanned. The transceiver must be in normal receive mode (PTT off).

When you activate the key programmed to the scan function, scan starts. The scan icon ("SCN") lights and "SCAN" is indicated on display.

3) Scan Stop Condition

The scan stops temporarily if the following conditions are satisfied.

- ① The receiving signal matches the signalling code in your radio that is set by the programming software (KPG-56D ver 3.30 or later).
- ② When the monitor key is depressed.

4) Scan Channel Types

- ① Priority channel is the most important channel for scan, and always detects a signal during scan and when the scan stops temporarily.
- ② Non-priority channels detect a signal during scan. For the channels that can be selected with the group or channel selector when the scan does not occur, the "A" icon lights.

5) Priority Channel Setting

A priority channel can be set as follows with the programming software (KPG-56D ver 3.30 or later).

- ① Specify a priority channel as a fixed priority channel.
- ② Make a selected channel a priority channel.
Specify the initial channel before the operator changes it.

6) Scan Type According to the Priority Channel

- ① When no priority channel is set : Only the non-priority channels are scanned.
If a non-priority channel stops temporarily, it stops until there is no signal on the channel.
- ② When priority channel is set : Either priority channel is scanned.
If a non-priority channel stops temporarily, a priority channel signal is detected at certain intervals.
If a priority channel stops temporarily, it stops until there is no signal on the priority channel.

4. 扫描操作

1) 扫描类型

- **单组扫描**

用户可以扫描所有在显示的组中有效的（添加）信道，这些组可以使用组选择器选择。

- **多组扫描**

用户可以扫描在所有有效的（添加）组中所有有效的（添加）信道。

2) 扫描开始条件

一个或多个非优先信道必须添加到所有可以被扫描的信道中。手持机必须处于一般接收模式（PTT 关闭）。

当用户激活按键编制的扫描功能时，扫描开始。扫描图标“SCN”显示在显示器上。

3) 扫描停止条件

如果下述条件具备，则扫描临时停止。

- ① 接收到的信号与用户通过编程软件（KPG-56D 3.30 版或之后的版本）设定的无线电中的信令代码相匹配。
- ② 当按下监听键时。

4) 扫描信道类型

- ① 优先信道是扫描最重要的信道，并且当扫描临时停止时，通常在扫描过程中检测到信号。
- ② 在扫描过程中非优先信道检测到信号。对于可以使用组或信道选择器选择的信道而言，当不能进行扫描时，图标“A”显示。

5) 优先信道设定

可以按照下述方法使用编程软件（KPG-56D 3.30 版或之后的版本）设定优先信道。

- ① 特定一个优先信道为固定优先信道。
- ② 将一个选择的信道作为优先信道。
在操作者改变之前特定此初始信道。

6) 按照优先信道设定扫描类型

- ① 当没有设定优先信道时，只扫描非优先信道。
如果非优先信道临时停止，只有在信道中无信号时才停止。
- ② 当设定优先信道时，扫描每一个优先信道。
如果非优先信道临时停止，则在一定的区间检测优先信道信号。
如果优先信道临时停止，只有在优先信道中无信号时才停止。

OPERATING FEATURES / 操作特性

7) Revert Channel

The revert channel is used to transmit during scanning and set by the programming software (KPG-56D ver 3.30 or later).

- ① Priority
The transceiver reverts to the priority channel.
- ② Priority with talkback
The transceiver reverts to the priority channel.
If you press PTT during a resume timer (dropout delay time, TX dwell time) or calling, you can transmit on the current channel to answer to the call however revert channel is set to priority channel.
After resume time, scan re-starts and the transmission channel returns to the priority channel.
- ③ Selected channel
The transceiver reverts to the channel before scanning or the channel that you changed during scan.
- ④ Last called channel
The transceiver reverts to the last called channel during scan.
- ⑤ Last used channel
The transceiver reverts to the last used (transmitted) channel during scan. "Last used" revert channel includes talkback function.
- ⑥ Selected with talkback
The transceiver reverts to the channel before scanning or the channel that you changed during scan.

8) Scan End

When you reactivate the key programmed to the scan function during scan mode, scan ends.

The scan icon ("SCN") and "SCAN" or revert channel (programmable) display goes off.

9) Temporarily Delete/Add

It is possible to delete or add a channel temporarily during scan. When scan stops on an unnecessary channel, for example by interference of the other party, press the delete/add key, then that channel is deleted temporarily and scan will re-start immediately.

When you would like to add a deleted channel temporarily to the scan sequence, select the desired (deleted) channel during scan, and press the delete/add key before scan re-starts.

That channel is added temporarily to the scan sequence.

The temporarily deleted or added channels are returned to their pre-set delete/add conditions when the transceiver exits from scan mode.

5. Details of Features

1) Time-out timer

The time-out timer can be programmed in 15 seconds increments from 15 seconds to 300. If the transmitter is keyed continuously for longer than the programmed time, the transmitter is disabled and a warning tone sounds while the PTT button is held down. The alert tone stops when the PTT button is released.

7) 回复信道

回复信道用于在扫描过程中发射，并且通过编程软件（KPG-56D 3.30 版或之后的版本）设定。

- ① 优先信道
手持机回复到优先信道。
- ② 带有回应的优先信道
手持机回复到优先信道。
如果在恢复计时器（中途退出延迟时间，发射停顿时间）或呼叫过程中按下 PTT 键，用户可以在当前信道发射来应答呼叫，但是回复信道被设定到优先信道。
恢复时间之后，扫描重新开始并且发射信道返回到优先信道。
- ③ 选择的信道
手持机回复到扫描之前的信道或用户在扫描过程中改变的信道。
- ④ 最后呼叫的信道
在扫描过程中手持机回复到最后呼叫的信道。
- ⑤ 最后使用的信道
在扫描过程中手持机回复到最后使用的（发射）信道。“最后使用的”回复信道包括回应功能。
- ⑥ 选择的带有回应的信道
手持机回复到扫描之前的信道或用户在扫描过程中改变的信道。

8) 扫描结束

当用户在扫描模式过程中重新激活编制为扫描功能的按键时，扫描结束。

扫描指示（“SCN”）和“SCAN”或回复信道（可编程）显示消失。

9) 临时删除 / 添加

在扫描过程中可以临时删除或添加信道。当扫描在一个不需要的信道上停止时，例如由于对方的干扰，按下删除/添加键，则此信道被删除，扫描将立即重新开始。

当需要临时向连续扫描添加一个删除的信道时，在扫描过程中选择需要的（删除的）信道，并且在扫描重新开始之前按下删除/添加键。

信道被临时添加到连续扫描中。

当手持机退出扫描模式时，临时删除的或添加的信道返回到其预设删除/添加环境中。

5. 详细功能

1) 超时计时器

超时计时器可以设置在 15 秒到 300 秒内。如果手持机连续发射的时间超过设置的时间，则自动停止发射并且按 PTT 按键时发出提示声音。松开 PTT 按键时提示声音停止。

OPERATING FEATURES / 操作特性

2) Selective Call Alert LED

You can select whether or not the LED on the transceiver flashes orange when selective call has occurred.

3) PTT ID

PTT ID provides a DTMF ANI to be sent with the PTT button every time it is used (Begin of TX ID at beginning of transmission, End of TX ID at end of transmission, or both).

You can program the PTT ID as one of the followings.

Off, BOT (Begin of TX ID), EOT (End of PTT ID), BOTH.

The contents of ID are programmed for each channel.

The transceiver is capable of having ID. The format is DTMF.

The timing that the transceiver sends the ID is programmable.

Begin of TX ID (BOT) : Begin of TX ID is sent at the beginning of transmission.

End of TX ID (EOT) : End of TX ID is sent at the end of transmission.

Both : Begin of TX ID is sent at the beginning of transmission and End of TX ID is sent at the end of transmission.

There is also a "PTT ID" setting for each channel.

4) Battery Warning

This transceiver has a battery warning feature. If low voltage is detected during transmission, the transceiver warns you by a flashing red "LED".

When the voltage is detected to be even lower during transmission, the transceiver stops transmission and warns you by a flashing red "LED" and a beep.

Please notice "indication" for the battery exchange, charging time by flashing red LED and beep.

5) "TOT" Pre-Alert

The transceiver has a "TOT" pre-alert timer. This parameter selects the time at which the transceiver generates a "TOT" pre-alert tone before the "TOT" is expired.

"TOT" will expire when the selected time passes from the TOT pre-alert tone.

6) "TOT" Re-Key Time

The transceiver has a "TOT" re-key timer. This timer is the time you cannot transmit after the "TOT" is exceeded. After the "TOT" re-key time expires you can transmit again.

7) "TOT" Reset Time

The transceiver has a "TOT" reset timer. This timer is the minimum wait time allowed during a transmission that will reset the "TOT" count.

"TOT" reset time causes the "TOT" to continue even after the PTT is released, unless the "TOT" reset timer has expired.

2) 选择呼叫指示灯

当操作选择呼叫时, 用户可以选择手持机是否闪烁橙色指示灯。

3) PTT ID码

伴随每一次使用 PTT 按键, PTT ID 码提供一个被发送的 DTMF ANI (以发射开始时的发射 ID 码开始, 以发射结束时的发射 ID 码结束, 或两者兼有)。

用户可以按照下述之一编制 PTT ID 码。

Off, BOT (发射 ID 码开始), EOT (PTT ID 码结束), BOTH (两者兼有)。

每一个信道均可编程设制 ID 码。

手持机可以具有 ID 码。格式为 DTMF。

手持机发送 ID 码的时间是可编程设制的。

发射 ID 码开始 (BOT) : 以发射开始时被发送的发射 ID 码开始。

发射 ID 码结束 (EOT) : 以发射结束时被发送的发射 ID 码结束。

两者兼有 : 以发射开始时被发送的发射 ID 码开始, 以发射结束时被发送的发射 ID 码结束。

同样, 每一个信道均有 "PTT ID 码" 设定。

4) 电池预警

手持机具有电池预警功能。如果在发射过程中检测到电源电压不足, 手持机通过闪烁的红色 "指示灯" 警告用户。

在发射过程中当检测到电压持续偏低时, 手持机将停止发射并且通过闪烁的红色 "指示灯" 和发出 beep 音警告用户。

请通过闪烁的红色指示灯和 beep 音注意电池充电器的 "指示", 充电时间。

5) "TOT" 预先告警

手持机具有一个 "TOT" 预先告警计时器。在 "TOT" 终止之前, 此参数设定在手持机产生 "TOT" 预先告警音时的时间。

当 TOT 预先告警音发出开始 "TOT" 将终止。

6) "TOT" 再按键时间

手持机具有一个 "TOT" 再按键定时器。在 "TOT" 时间超出之前, 此定时器是用户不能发射的时间。在 "TOT" 再按键时间终止后, 用户可以再发射。

7) "TOT" 复位时间

手持机具有一个 "TOT" 复位计时器。在复位 "TOT" 计数的发射过程中, 此计时器是最小允许等待时间。

除非 "TOT" 复位计时器终止, 否则即使松开 PTT 键之后, "TOT" 复位时间也使 "TOT" 继续进行。

OPERATING FEATURES / 操作特性

8) Clear to Transpond

The transceiver waits for an acknowledgment signal until the channel become free.

This feature ensures the acknowledgment signal is receive by another party.

9) Battery Save

This is the automatic battery saver during standby mode operation. The receiver circuit is turned on and off to conserve the battery life.

6. Option Signalling (DTMF/2 tone)

Built-in DTMF decoder is available for option signalling.

Built-in 2-Tone decoder is available for option signalling.

It is possible to use individual call, group call, DBD (Dead Beat Disable). **Note** : DBD is only DTMF

Preset operation is triggered when there is match with Option Signalling.

When Option Signalling matches on a Group Channel where it is set to Yes, the Option Signalling display flashes and Option Signalling is canceled. Settings after this will cause "Transpond" or "Alert" to sound.

Setting the Selective Call Alert LED will cause the LED to start flashing orange.

Mute or Unmute is triggered by the ID/QT/DQT/Carrier when option signalling matches (when Option Signal is deactivated by a transmission).

AND/OR

Option Signalling match conditions can be selected with AND/OR logic.

	Alert/Transpond	AF Mute Open
AND	Triggers at match with QT/DQT/ID+DTMF(2tone);Opt	Triggers at match with QT/DQT/ID+DTMF(2tone);Opt
OR	Triggers at match with QT/DQT/ID or DTMF(2tone) ; Opt	Triggers only for match with QT/DQT/ID;Signalling

Even if set as OR, there is no Alert/Transpond just with DTMF.

Even if set as OR, AF mute cannot be canceled just by a match with DTMF.

In conventional channels not set with QT/DQT, signalling is a match just by receiving the carrier.

Auto Reset

When Option Signalling matches on a Group channel where it is set to Yes, Option Signalling is canceled when it matches a group channel set to Yes.

After Option Signalling matches, Option Signalling can automatically Reset after a specified time.

8) 加强自动应答

手持机等待对方信道空闲后、发出自动应答。

此功能保证应答信号被对方接收。

9) 节省电池

在待机模式操作过程中为自动节省电池。接收部电路开启和关闭以延长电池的使用寿命。

6. 可选信令 (DTMF/ 双音信令)

内置 DTMF 解码器对可选信令有效。

内置双音信令解码器对可选信令有效。

使用单独呼叫, 组呼叫, DBD (遥毙) 是可能的。**注释**: DBD 仅适用于 DTMF

当与可选信令相符合时触发预设操作。

当可选信令与设定为是的组信道相匹配时, 可选信令闪动显示并被取消。此后的设定将使“应答”或“告警”发出声音。

设定选择呼叫告警指示灯将使橙色指示灯开始闪烁。

当可选信令相匹配时 (当可选信号被发射抑制时) 通过 ID/QT/DQT 载波触发静音或非静音。

与 / 或

可以使用与 / 或逻辑电路选择可选信令匹配条件。

	告警 / 应答	音频静音打开
与	在与 QT/DQT/ID+DTMF (2tone) 匹配时触发; 可选	在与 QT/DQT/ID+DTMF (2tone) 匹配时触发; 可选
或	在与 QT/DQT/ID 或 DTMF (2tone) 匹配时触发; 可选	仅在与 QT/DQT/ID 匹配时触发; 信令

即使设定为 OR, 也没有只带有 DTMF 的告警 / 应答。

即使设定为 OR, 音频静音也不能被仅带有 DTMF 的信令取消。

在通常情况下, 信道不设定 QT/DQT, 信令仅是接收载波。

自动复位

当可选信令与设定为是的组信道相匹配时, 在与设定为是的组信道相匹配的地方取消可选信令。

可选信令匹配之后, 在特定时间后可选信令自动复位。

OPERATING FEATURES / 操作特性

Dead Beat Disable

When the D.B.D (Dead Beat Disable) code matches, a preset operation is performed.

When D.B.D matches on all group channels regardless of whether Option Signalling = Yes/No, then TX Inhibit or TX/RX Inhibit is activated by the settings performed afterwards. D.B.D is canceled when the D.B.D. code + "#" is received.

Transpond is always activated when the D.B.D code is a matches. Alert is not output. An Option Signalling match is not displayed.

7. Audible user feedback tones

The transceiver outputs various combinations of tones to notify the user of the transceiver operating state. The main tones are listed below

The high tone is 1477Hz, the mid tone is 941Hz, and the low tone is 770Hz.

- **Power on tone**

This tone is output when the transceiver is turned on. (The high tone is output for 500ms.)

- **Alert tone**

This tone is output when the transceiver is in TX inhibition for TOT, battery warning and PLL unlocked. It is output until the PTT button is released. (The 697Hz tone is output.)

- **Busy Tone**

This informs the user of a busy channel lockout.

- **Group Call Tone**

The group call tone informs the user of a group call in DTMF/2 Tone Option Signaling. This tone repeats 7 times.

770Hz		770Hz
30ms	30ms	30ms

- **Individual Tone**

Individual tone is issued on receiving selective call by DTMF/2 Tone Option Signaling.

2000Hz		2000Hz		2000Hz
100ms	100ms	100ms	100ms	100ms

- **Pre Alert tone**

Informs the user when nearing transmit inhibit (transmit cutoff) time due to TOT.

The Pre Alert Tone is issued from the time set for TOT Pre Alert until the TOT triggers.

1633Hz		1633Hz		1633Hz
50ms	50ms	50ms	50ms	50ms

遥毙

当 D.B.D (遥毙) 代码匹配时, 进行预设操作。

不管可选信令 = 是/否, 当 D.B.D 与所有的组信道相匹配时, 发射禁止或发射/接收禁止被以后执行的设定激活。当接收到 D.B.D 代码 + “#” 时, D.B.D 被取消。

当 D.B.D 代码自动应答通常被激活。提示音不输出。可选信令不显示。

7. 用户反馈提示音

手持机发出各种合音以提示用户手持机的操作状态。下述为主要的音频。

高音为 1477Hz, 中音为 941Hz, 低音为 770Hz。

- **通电提示音**

手持机接通电源时输出此音。(高音输出为 500ms。)

- **告警提示音**

当手持机由于 TOT, 电池告警和锁相环电路失锁而处于发射禁止时, 输出此音。此音输出直到松开 PTT 键为止。(输出音频为 697Hz。)

- **繁忙提示音**

此提示音告诉使用者繁忙信道被封闭。

- **组呼叫提示音**

组呼叫提示音提示用户在 DTMF/ 双音信令中的一个组呼叫。此音重复 7 次。

770Hz		770Hz
30ms	30ms	30ms

- **个别提示音**

个别提示音用于通过 DTMF/ 双音信令的选择呼叫接收上。

2000Hz		2000Hz		2000Hz
100ms	100ms	100ms	100ms	100ms

- **预先告警音**

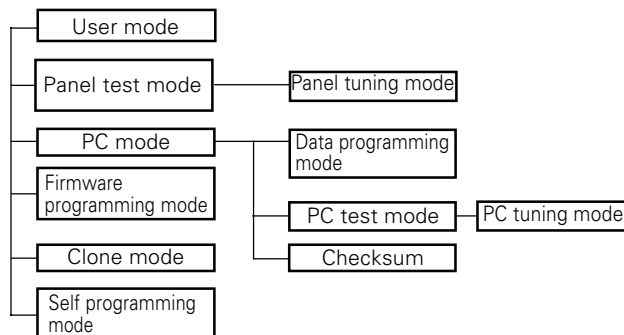
当由于 TOT 而接近发射禁止 (发射截止) 时间时提示用户。预先告警音在 TOT 预先告警设定时间到 TOT 触发器之间出现。

1633Hz		1633Hz		1633Hz
50ms	50ms	50ms	50ms	50ms

REALIGNMENT / 模式组合

REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the radio.
PC mode	Used for communication between the radio and PC (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 FPU. See panel test.
PC tuning mode	Used to tune the radio using the PC. This feature is included in the FPU. See panel tuning.
Firmware programming mode	Used when changing the main program of the flash memory.
Clone mode	Used to transfer programming data from one radio to another.
Self programming mode	Frequency, signalling and features.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[◀]+Power ON (Two seconds)
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode]+[○]
Firmware programming mode	[Side1]+[Side2]+Power ON (Two seconds)
Clone mode	[Side1]+[▶]+Power ON (Two seconds)
Self programming mode	[Side1]+[●]+Power ON (Two seconds)

3. Panel Test Mode

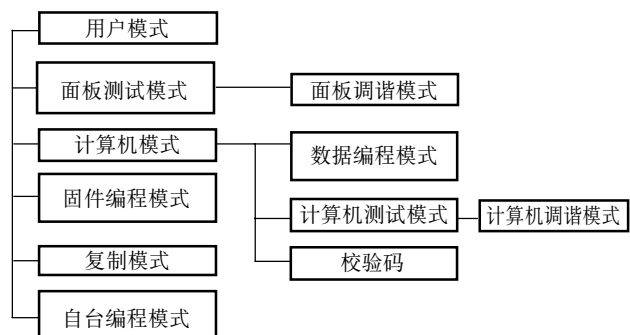
Setting method, refer to ADJUSTMENT.

4. Panel Tuning Mode

Setting method, refer to ADJUSTMENT.

模式组合

1. 模式



模式	功能
用户模式	一般使用。
面板测试模式	用于经销商检查基本功能。
面板调谐模式	用于经销商调整手持机指标。
计算机模式	用于手持机与计算机 (IBM 兼容机) 之间的通信。
数据编程模式	用于阅读和写入频率数据以及其他功能。
计算机测试模式	用于使用计算机检测。此特性包括在 FPU 内。参见面板测试。
计算机调谐模式	用于使用计算机调整。此特性包括在 FPU 内。参见面板调谐。
固件编程模式	当改变Flash Rom中操作主程序时使用。
复制模式	用于从一个手持机编程数据复制到另一个手持机。
自台编程模式	自台设置频率, 信令和功能。

2. 如何进入每一种模式

模式	操作
用户模式	接通电源
面板测试模式	[◀]+接通电源 (2 秒钟)
计算机模式	从计算机接收指令
面板调谐模式	[面板测试模式]+[○]
固件编程模式	[侧面 1]+[侧面 2]+通电 (2 秒钟)
复制模式	[侧面 1]+[▶]+通电 (2 秒钟)
自台编程模式	[侧面 1]+[●]+通电 (2 秒钟)

3. 面板测试模式

设定方式, 参见调整。

4. 面板调谐模式

设定方式, 参见调整。

5. Checksum

Executing this function, "TUNING" appears on the display of TK-388G while calculating the checksum .

When the calculation is completed, the display returns to normal and PC displays the checksum of the radio.

6. PC Mode

6-1. Preface

The TK-388G transceiver is programmed using a personal computer, a programming interface (KPG-22) and programming software (KPG-56D ver 3.30 or later).

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

6-2. Connection procedure

1. Connect the TK-388G 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 transmitted from transceiver, the red LED blink.

When data is received by the transceiver, the green LED blinks.

Notes:

- The data stored in the personal computer must match model type when it is written into the flash memory.
- Change the TK-388G to PC mode, then attach the interface cable.

6-3. KPG-22 description (PC programming interface cable: Option)

The KPG-22 is required to interface the TK-388G to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-22 connects the SP/MIC connector of the TK-388G to the computers RS-232C serial port.

6-4. Programming software description

The KPG-56D (ver 3.30 or later) programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program the TK-388G radios via a programming interface cable (KPG-22).

6-5. Programming with IBM PC

If data is transferred to the transceiver from an IBM PC with the KPG-56D (ver 3.30 or later) , the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

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

KPG-56D (ver 3.30 or later) installation manual part No. : B62-1153-XX

5. 校验码

当计算检查和时“TUNING”出现在TK-388G的显示器上，执行此功能。

当计算完成时，显示器返回到一般状态并且计算机显示手持机的校验码。

6. 计算机模式

6-1 前言

TK-388G 手持机使用计算机，编程电缆（KPG-22）和编程软件（KPG-56D 3.30 版或之后的版本）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。

6-2 连接步骤

1. 使用编程电缆将 TK-388G 与计算机连接。
2. 当接通电源时，可以立即进入用户模式。当计算机发出一个指令时，手持机进入计算机编程模式。
从手持机发射数据时，红色指示灯闪烁。
当通过手持机接收数据时，绿色指示灯闪烁。

注释：

- 储存在计算机内的数据必须与写入到 EEPROM 的格式相匹配。
- 将 TK-388G 改变为计算机编程模式，然后连接编程电缆。

6-3 KPG-22 说明 (计算机编程电缆：可选项)

KPG-22 用于将 TK-388G 与计算机连接。在其 D 型副插座（25 芯）中有一个电平转换电路，此电路可以把 RS-232C 逻辑电平转换为 TTL 电平。

KPG-22 将 TK-388G 的扬声器 / 话筒插座与计算机的 RS-232C 串行口连接。

6-4 编程软件说明

KPG-56D (3.30 版或之后的版本) 编程软盘是一张 3-1/2" 软盘。软盘内的软件允许用户经由编程电缆（KPG-22）对 TK-388G 进行编程设定。

6-5 使用 IBM 计算机编程

如果从使用 KPG-56D (3.30 版或之后的版本) 磁盘的 IBM 计算机将数据发送到手持机，设定的目的数据（通信机的基本参数）均可被修改。由于决定频率范围（频率型式）时，目的数据就确定了，所以一般不需要修改目的数据。

只有在必要的情况下才修改目的数据。

RS-232C 格式的数据经由通用接口输入到通信机的 EEPROM 中。

KPG-56D (3.30 版或之后的版本) 使用说明书零件号码：B62-1153-XX

REALIGNMENT / 模式组合

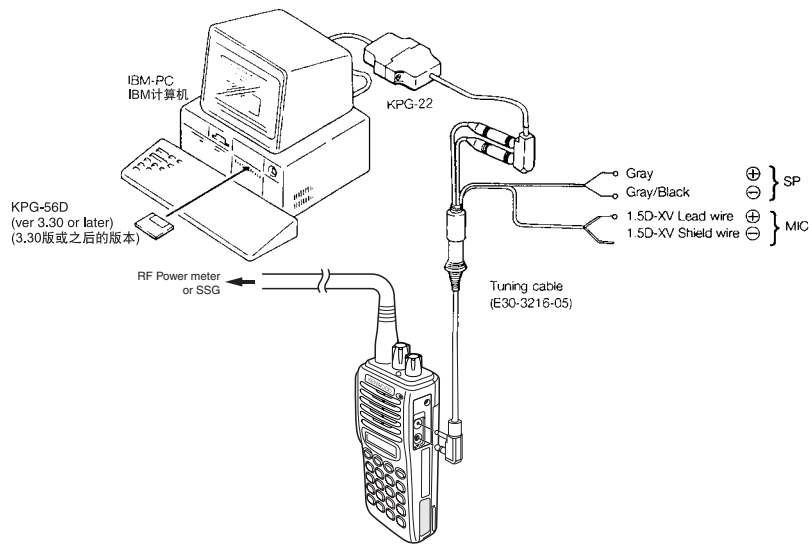


Fig. 1 / 图 1

7. Firmware Programming Mode

7-1. Preface

Flash memory is mounted on the TK-388G. This allows the TK-388G to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

7-2. Connection procedure

Connect the TK-388G to the personal computer (IBM PC or compatible) with the interface cable (KPG-22). (Connection is the same as in the PC Mode.)

7-3. Programming

1. Start up the programming software (KPG-56D ver 3.30 or later), select "firmware program" in the "Program" item, and press the Return key on your personal computer. This starts up the firmware programmer.
2. The top screen is displayed. Press any key to advance to the next screen.
3. Set the communications speed (normally, 57600 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select (=F1).
5. Hold down the [Side1] and [Side2] switches on the TK-388G, and press the power switch.
When the [Side1] and [Side2] switches are held down for two seconds, "PROG 576" appears on the display and the LED lights orange. When "PROG 576" is displayed, release the switches.
6. Check the connection between the TK-388G and the personal computer, and make sure that the TK-388G is in Program mode.
7. Press F10 on the personal computer. A window opens on the display to indicate the writing progress. When the TK-388G begins to receive data, the LED lights green.
8. When data is received successfully, a checksum appears on the display.
9. If you want to continue programming other TK-388G, repeat steps 5 to 8.

7. 固件编程模式

7-1 前言

Flash Rom被安装在TK-388G上。当将来出现新功能时，允许TK-388G升级。（要了解如何获得固件的详细说明，请与服务部门联系。）

7-2 连接步骤

使用编程电缆（KPG-22）将TK-388G与计算机（IBM计算机或兼容机）连接。（与计算机编程模式中的连接方法一样。）

7-3 编程

1. 启动编程软件（KPG-56D 3.30版或之后的版本），在“编程”项目中选择“固件编程”，并按下计算机的回车键。此时启动固件编程器。
2. 此屏幕显示。按任何键进入到下一屏。
3. 在设置项目中设定通信速率（一般为57600bps）和通信端口。
4. 通过文件选择（= F1）设定被修订的固件。
5. 按住TK-388G上的[侧面1]和[侧面2]键，同时按下电源开关。当按住[侧面1]和[侧面2]键两秒钟后，“PROG576”出现在显示器上并且橙色指示灯燃亮。当显示“PROG576”时，松开转换开关。
6. 检查TK-388G与计算机之间的连接，并且确认TK-388G处于编程模式。
7. 按下计算机上的F10键。显示器上开启一个窗口提示写入步骤。当TK-388G开始接收数据时，绿色指示灯燃亮。
8. 当成功接收数据后，校验码出现在显示器上。
9. 如果希望继续编程设制其他TK-388G，重复步骤5到8。

REALIGNMENT / 模式组合

Notes:

- To start the Firmware Programmer from KPG-56D (ver 3.30 or later), the Fpro path must be set up by the KPG-56D (ver 3.30 or later) Setup.
- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software (KPG-56D ver 3.30 or later).
- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before you update the radio firmware.
Directly copying from the floppy disk to the radio may not work because the access speed is too slow.

7-4. Function

1. If you press the [Side2] switch while "PROG XXX" is displayed, the checksum is displayed. If you press the [Side2] switch again (while the checksum is displayed), "PROG XXX" is redisplayed.
2. A transmission speed can be selected by pressing the [Side1] switch while "PROG XXX" is displayed.
19200 bps: The LED flashes green and red alternately.
38400 bps: The LED flashes orange.
57600 bps: The LED lights orange.

Note:

Normally, write in the high-speed mode.

8. Clone Mode

Programming data can be transferred from one radio to another by connecting them via their SP/MIC connectors. The operation is as follows (the transmit radio is the master and the receive radio is the slave).

1. Turn the master TK-388G power ON with the [LAMP]+[▶] key held down. The TK-388G displays "▣▣CLONE▣".
2. Power on the slave TK-388G.
3. Connect the cloning cable to the SP/MIC connectors on the master and slave.
4. Press the [○] key on the master while the master displays "▣▣CLONE▣". The data of the master is sent to the slave. While the slave is receiving the data, "-PC-" is displayed. When cloning of data is completed, the master displays "END", and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.
5. The other slave can be continuously cloned. When the [○] key on the master is pressed while the master displays "END", the master displays "▣▣CLONE▣". Carry out the operation in steps 2 to 4.

Note: You can clone the programmed data between the transceiver frequency version must be same.

Note: Use the new cloning cable for TK-278G/378G/388G. You cannot use the old cloning cable for TK-278/378/388.

注释:

- 要从 KPG-56D (3.30 版或之后的版本) 开启固件编程器, 必须通过 KPG-56D (3.30 版或之后的版本) 来设定预先通路。
- 如果在编程软件 (KPG-56D 3.30 版或之后的版本) 中固件编程模式设定为禁用, 则不能进入此模式。
- 当编制固件时, 在用户修改通信机固件之前, 建议从软盘向硬盘复制数据。
由于读取速率太低, 所以直接从软盘复制到通信机可能无效。

7-4 功能

1. 如果当“PROG XXX”显示时按下[侧面 2]键, 将显示总和。如果再一次按下[侧面 2]键 (当显示总和时), “PROG XXX”将重新显示。
2. 当显示“PROG XXX”时, 通过按下[侧面 1]键可以选择发射速率。
19200bps: 绿色和红色指示灯交替闪烁。
38400bps: 橙色指示灯闪烁。
57600bps: 橙色指示灯燃亮。

注释:

通常在高速率模式中写入。

8. 复制模式

经由扬声器 / 话筒插座连接, 编程数据可以从一台手持机复制到另一个手持机。按照下述步骤操作 (发射方手持机为主机, 接收方手持机为子机)。

1. 按住[指示灯]+[▶]按键开启主机 TK-388G 的电源。TK-388G 显示“▣▣CLONE▣”。
2. 开启子机 TK-388G 的电源。
3. 将主机和子机的扬声器 / 话筒插座用复制电缆连接。
4. 当主机显示“▣▣CLONE▣”时, 按下主机上的[○]键。主机上的数据被发送到子机。当子机接收数据时, 显示“-PC-”。当数据复制完成时, 主机显示“END”, 子机自动在用户模式下操作。子机可以使用与主机相同的程序进行操作。
5. 另一台子机可以继续复制。当主机显示“END”时按下主机上的[○]键, 则主机显示“▣▣CLONE▣”。进行步骤 2 到 4 的操作。

注释: 用户可以在手持机之间复制下表列出的编程数据。频率必须一致。

注释: TK-278G / 378G / 388G 只可使用新复制电缆, 不可使用旧复制电缆。

REALIGNMENT / 模式组合

Cloning cable parts No.
复制电缆零件号码
E30-3410-05 (TK-388G→TK-388G)

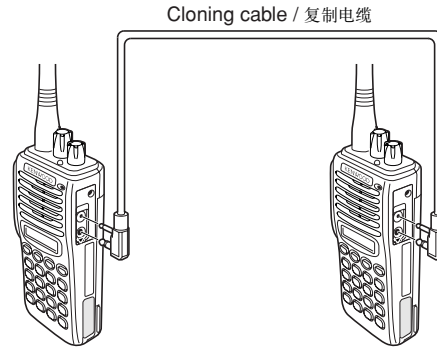
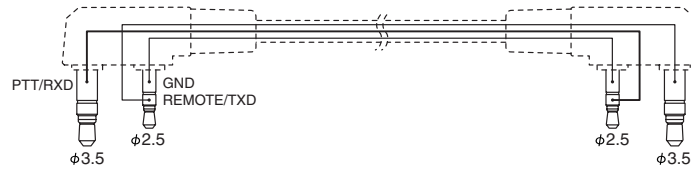


Fig. 2 / 图 2

9. Self Programming Mode

Write mode for frequency data and signalling etc. Mainly used by the person maintaining the user equipment.

9.1 Self programming mode setting

Hold down the [Side1]+[●] switches and turn the power switch on.

When the self programming mode is entered, [SELF] appears on the display.

9. 自台编程模式

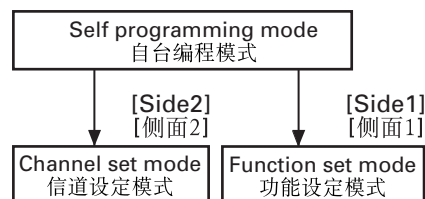
频率数据和信令等的写入模式。主要用于维护用户设备。

9-1 自台编程模式设定

按住[侧面 1]+[●]键并且接通电源。

当进入自台编程模式时,[SELF]出现在显示器上。

• Flow Chart / 流程图



REALIGNMENT / 模式组合

9-2. Channel Setting Mode

This is a mode for making channel settings with the panel keys without using the FPU.

Pressing [Side2] when "SELF" is displayed, sets Channel Setting Mode.

Select an item set using [▶] then change the selection with the encoder.

The data displayed using [◀] is stored in the memory and then proceeds to the next item. Pressing [▶] proceeds to the next item without storing it in the memory.

Press [Side2] to set the display to "SELF" and return to reset (default) status.

All channel data is cleared when pressing [◀] key with the blank RX frequency.

No.	Function	Choices	Display	Remarks		
	Select Channel	1-128	1-1_	[3] : Group selection/ Channel selection change		
	Select Group	1-128	1-1_			
1	RX frequency	Step 2.5kHz-1MHz	STP_250 STP_1000	Display when an item is selected or when a step is changed (about 0.5 seconds) [●] Step change UHF : 5.0,6.25kHz,1MHz,Step		
		Blank	R._____		[Side1] : Freq On/Blank switching	
		100.0000-550.0000MHz	R.100.0000		The rightmost dot indicates 50Hz digit (On=5; Off=0).	
2	Rx Signalling	OFF	_____	[Side1] : Off/QT/DQT switching		
		QT 67.0-250.3Hz (EIA Mode)	QT_67.0_ QT_250.3_	[●] : Mode switching [○] : Normal/Inverse switching		
		QT 67.0-250.3Hz (0.1Hz Step Mode)	QT_67.0* QT_250.3*			
		DQT 000-777 (Normal) (1 Step Mode)	DQT000N* DQT777N*			
		DQT 023-754 (Normal) (Standard Table Mode)	DQT023N DQT754N			
		DQT 000-777 (Inverse) (1 Step Mode)	DQT000I* DQT777I*			
		DQT 023-754 (Inverse) (Standard Table Mode)	DQT023I DQT754I			
		TX frequency	Step 2.5kHz-1MHz		STP_250 STP_1000	Same as RX frequency.
		Blank	T._____			
		100.0000-550.0000MHz	T.100.0000			
4	TX Signalling		Same as RX signaling.			
5	Option Signalling	OFF	NONE__	← Default		
		DTMF	DTMF__			
		2-TONE	2TONE__			

9-2 信道设定模式

这是一种不使用 FPU 而利用面板按键进行信道设定的模式。

当“SELF”显示时按[侧面 2]键，设置信道设定模式。

使用[▶]键选择项目设定，然后用编码旋钮改变选择。

使用[◀]键显示的数据储存在存储器中，然后继续进行下一项。按[▶]键继续进行下一项但不储存在存储器中。

按[侧面 2]键显示“SELF”并且返回到复位（出厂）状态。

按[◀]键且接收频率位于空白档时，所有信道数据将被清除。

序号	功能	选择	显示	备注		
	选择信道	1-128	1-1_	[▶]: 组选择/ 信道选择修改		
		选择组	1-128		1-1_	
1	接收频率	步进频率 2.5KHz-1MHz	STP_250 STP_1000	当一个项目被选择或当步进频率被改变时显示 (大约 0.5 秒钟) [●]步进频率改变 UHF: 5.0,6.25kHz,1MHz, 步进频率		
		空白	R._____		[侧面 1]: 频率 ON/Blank 转换开关	
		100.0000-550.0000MHz	R.100.0000		最右边的点显示 50Hz 位 (开启 = 5 ; 关闭 = 0)	
2	接收信令	关闭	_____	[侧面 1]: 关闭 /QT/DQT 转换开关		
		QT67.0-250.3Hz (EIA 模式)	QT_67.0_ QT_250.3_	[●]: 模式转换开关 [○]: 通常 / 倒频转换开关		
		QT67.0-250.3Hz (0.1Hz 步进模式)	QT_67.0* QT_250.3*			
		DQT000-777 (通常) (1 步进模式)	DQT000N* DQT777N*			
		DQT023-754 (通常) (标准列表模式)	DQT023N DQT754N			
		DQT000-777 (反向) (1 步进模式)	DQT000I* DQT777I*			
		DQT023-754 (反向) (标准表格模式)	DQT023I DQT754I			
		发射频率	步进频率 2.5kHz-1MHz		STP_250 STP_1000	与接收频率相同
		空白	T._____			
		100.0000-550.0000MHz	T.100.0000			
4	发射信令		与接收信令相同			
5	可选信令	关闭	NONE__	← 出厂设定		
		DTMF	DTMF__			
		双音信令	2TONE__			

REALIGNMENT / 模式组合

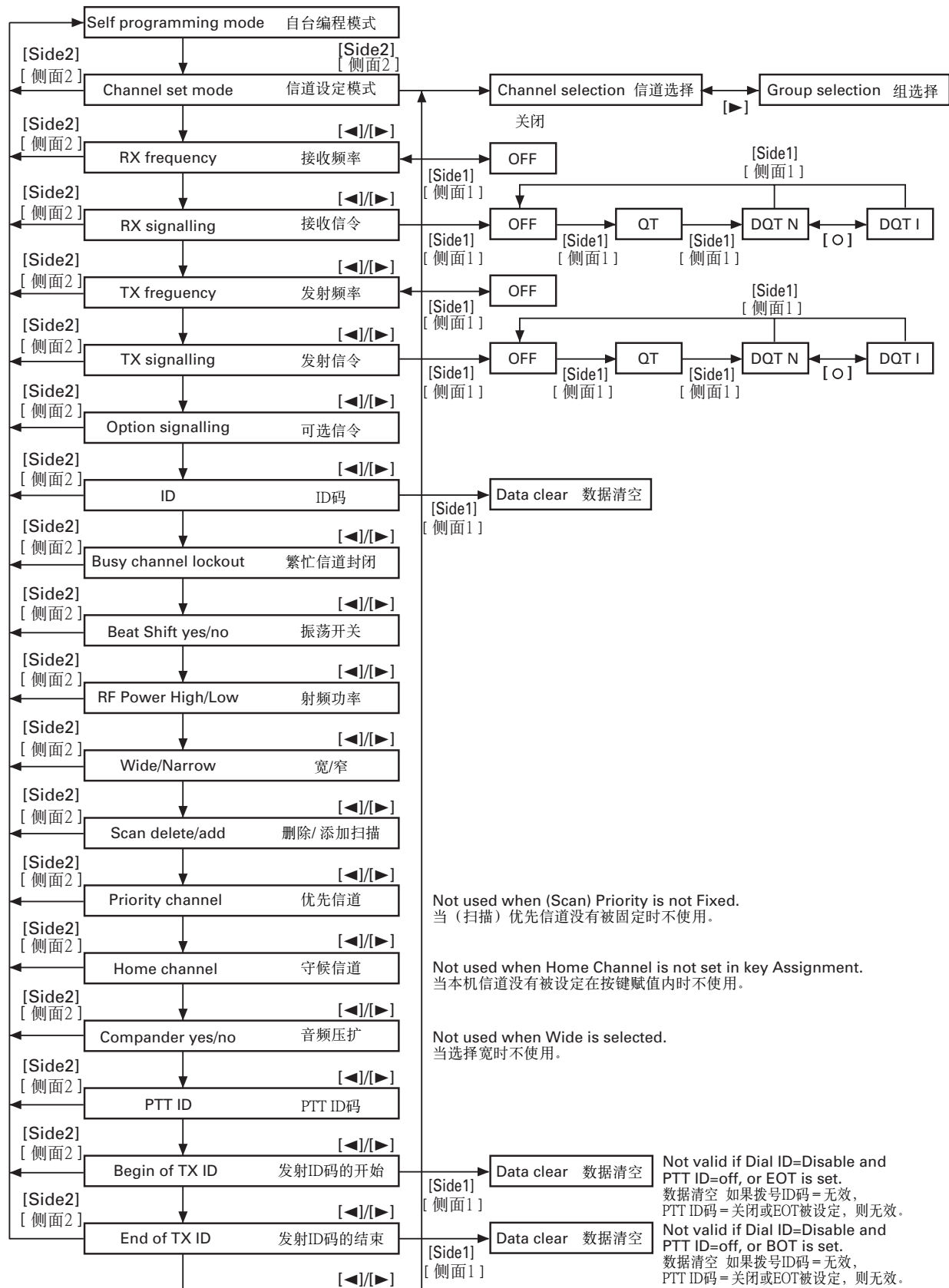
No.	Function	Choices	Display	Remarks
6	ID	000-9999999999	__ID__	Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			___987	Display when a code is input (Input it with DTMF key.)
		Blank	_____	[Side1] : Data clear
7	Busy Channel Lockout	NO	BCL_NO_	← Default
		Type 1	BCL_1_	BCL_YES for K type
		Type 2	BCL_2_	N/A for K type
8	Beat shift	No	SHFT_NO_	← Default
		Yes	SHFT_YES	
9	RF Power	High Power	PWR_H_	← Default
		Low Power	PWR_L_	
10	Wide/Narrow	Wide	WIDE__	
		Narrow	NARROW_	
11	Scan Delete/ADD	DELETE	SCAN_DEL	Not used for TK-388G
		ADD	SCAN_ADD	← Default
12	Priority Channel	No	P.CH_NO_	Not used when (Scan) Priority is not Fixed.
		Yes	P.CH_YES_	
13	Home Channel	No	H.CH_NO_	Not used when Home Channel is not set in Key Assignment.
		Yes	H.CH_YES_	
14	Compander	No	COMP_NO_	Not used when Wide is selected.
		Yes	COMP_YES	
15	PTT ID	OFF	P.ID_OFF	
		Begin of TX	P.ID_1	
		End of TX	P.ID_2	
		Both	P.ID_3	
16	Begin of TX ID	000-9999999999999999	__BOT_ID_	Not valid if Dial ID =Disable and PTT ID=OFF, or EOT is set. Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			___987	Display when a code is input (Input it with DTMF key.)
		Blank	_____	[Side1] : Data clear
17	END of TX ID	000-9999999999999999	__EOT_ID_	Not valid if Dial ID=Disble and PTT ID=OFF, or BOT is set. Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			___987	Display when a code is input (Input it with DTMF key.)
		Blank	_____	[Side1] : Data clear

序号	功能	选择	显示	备注
6	ID 码	000-9999999999	__ID__	当一个项目被选择时显示 (大约 0.5 秒钟)
			12345678	显示当前的设定 (如果是 8 位或更多位, 使其翻页显示。)
			___987	当输入代码时显示 (使用 DTMF 按键输入。)
		空白	_____	[侧面 1]: 数据清空
7	繁忙信道封闭	不	BCL_NO_	← 出厂设定
		类型 1	BCL_1_	对于 K 类型 BCL_YES
		类型 2	BCL_2_	对于 K 类型 N/A
8	振荡开关	不	SHFT_NO_	← 出厂设定
		是	SHFT_YES	
9	射频功率	高功率	PWR_H_	← 出厂设定
		低功率	PWR_L_	
10	宽 / 窄	宽	WIDE__	
		窄	NARROW_	
11	删除 / 添加扫描	删除	SCAN_DEL	TK-388G 不使用
		添加	SCAN_ADD	← 出厂设定
12	优先信道	不	P.CH_NO_	当 (扫描) 优先信道没有被固定时不使用。
		是	P.CH_YES_	
13	守候信道	不	H.CH_NO_	当本机信道没有被设定在按键赋值内时不使用。
		是	H.CH_YES_	
14	音频压扩	不	COMP_NO_	当选择宽时不使用。
		是	COMP_YES	
15	PTT ID 码	关闭	P.ID_OFF	
		发射开始	P.ID_1	
		发射结束	P.ID_2	
		两者兼有	P.ID_3	
16	发射 ID 码的开始	000-9999999999999999	__BOT_ID_	如果拨号 ID 码 = 无效, PTT ID 码 = 关闭或 EOT 被设定, 则无效。当一个项目被选择时显示 (大约 0.5 秒钟)
			12345678	显示当前的设定 (如果是 8 位或更多位, 使其翻页显示。)
			___987	当输入代码时显示 (使用 DTMF 按键输入。)
		空白	_____	[侧面 1]: 数据清空
17	发射 ID 码的结束	000-9999999999999999	__EOT_ID_	如果拨号 ID 码 = 无效, PTT ID 码 = 关闭或 EOT 被设定, 则无效。当一个项目被选择时显示 (大约 0.5 秒钟)
			12345678	显示当前的设定 (如果是 8 位或更多位, 使其翻页显示。)
			___987	当输入代码时显示 (使用 DTMF 按键输入。)
		空白	_____	[侧面 1]: 数据清空

REALIGNMENT / 模式组合

• Flow Chart / 流程图

Channel Setting Mode
信道设定模式



REALIGNMENT / 模式组合

9-3. Function Setting Mode

This is a mode for using the panel keys to make function settings without using the FPU, that operate on all channels.

Pressing the [Side1] when "SELF" is displayed, sets the Function Setting Mode.

Select an item set using [▶] then change the selection with the encoder.

The data displayed using [◀] is stored in the memory and then proceeds to the next item. Pressing [▶] proceeds to the next item without storing it in memory.

Press [Side1] to display "SELF" and return to reset (default) status.

9-3 功能设定模式

这是一种不使用FPU而利用面板按键进行信道设定的模式，在所有信道上操作。

当显示“SELF”时按下[侧面1]键，设置功能设定模式。

使用[▶]键选择项目设定，然后用编码旋钮改变选择。

使用[◀]键显示的数据储存在存储器中，然后继续进行下一项。按[▶]键继续进行下一项但不储存在存储器中。

按[侧面1]键显示“SELF”并且返回到复位（出厂）状态。

Function Setting Mode

No.	Function	Choices	Display	Remarks
Function Key				
1	[Side1]	No Function	LAMP_OFF	
		Talk Around	LAMP_3	
		Display Character	LAMP_5	
		Home Channel	LAMP_7	
		Channel Down	LAMP_8	
		Channel Up	LAMP_9	
		Keylock	LAMP_10	
		Lamp	LAMP_11	← Default
		Selectable QT	LAMP_15	
		2-Tone Encode Select	LAMP_16	
		Monitor A	LAMP_17	
		Monitor B	LAMP_18	
		Monitor C	LAMP_19	
		Monitor D	LAMP_20	
		RF Power Low	LAMP_21	
		Scan	LAMP_22	
		Scan DEL/ADD	LAMP_23	
		Group Down	LAMP_24	
		Group Up	LAMP_25	
		Redial	LAMP_28	
Trunking Group Select	LAMP_29	Only when Trunking is set		
2	[Side2]	No Function	MON_OFF	
		Talk Around	MON_3	
		Display Character	MON_5	
		Home Channel	MON_7	
		Channel Down	MON_8	
		Channel Up	MON_9	
		Keylock	MON_10	
		Lamp	MON_11	
		Selectable QT	MON_15	
		2-Tone Encode Select	MON_16	

功能设定模式

序号	功能	选择	显示	备注
功能键				
1	[侧面1]	无功能	LAMP_OFF	
		直接通话	LAMP_3	
		显示特性	LAMP_5	
		守候信道	LAMP_7	
		信道号上	LAMP_8	
		信道号下	LAMP_9	
		键锁定	LAMP_10	
		指示灯	LAMP_11	← 出厂设定
		选择 QT	LAMP_15	
		双音信令 编码选择	LAMP_16	
		监听 A	LAMP_17	
		监听 B	LAMP_18	
		监听 C	LAMP_19	
		监听 D	LAMP_20	
		低射频功率	LAMP_21	
		扫描	LAMP_22	
		删除/添加扫描	LAMP_23	
		组号下	LAMP_24	
		组号上	LAMP_25	
		重拨	LAMP_28	
干线组代 码选择	LAMP_29	限于中续功能已设置好的情况		
2	[侧面2]	无功能	MON_OFF	
		直接通话	MON_3	
		显示特性	MON_5	
		守候信道	MON_7	
		信道号下	MON_8	
		信道号上	MON_9	
		键锁定	MON_10	
		指示灯	MON_11	
		选择 QT	MON_15	
		双音信令 编码选择	MON_16	

REALIGNMENT / 模式组合

No.	Function	Choices	Display	Remarks		
2	[Side2]	Monitor A	MON_17	← Default		
		Monitor B	MON_18			
		Monitor C	MON_19			
		Monitor D	MON_20			
		RF Power Low	MON_21			
		Scan	MON_22			
		Scan DEL/ADD	MON_23			
		Group Down	MON_24			
		Group Up	MON_25			
		Redial	MON_28			
		Trunking Group Select	MON_29	Only when Trunking is set		
		3	[O]	No Function	KEY1_OFF	
				Talk Around	KEY1_3	
Display Character	KEY1_5					
Home Channel	KEY1_7					
Channel Down	KEY1_8					
Channel Up	KEY1_9					
Keylock	KEY1_10					
Lamp	KEY1_11					
Selectable QT	KEY1_15					
2-Tone Encode Select	KEY1_16					
Monitor A	KEY1_17					
Monitor B	KEY1_18					
Monitor C	KEY1_19					
Monitor D	KEY1_20					
RF Power Low	KEY1_21					
Scan	KEY1_22					
Scan DEL/ADD	KEY1_23			← Default		
Group Down	KEY1_24					
Group Up	KEY1_25					
Redial	KEY1_28					
Trunking Group Select	KEY1_29	Only when Trunking is set				
4	[●]	No Function	KEY2_OFF			
		Talk Around	KEY2_3			
		Display Character	KEY2_5			
		Home Channel	KEY2_7			
		Channel Down	KEY2_8			
		Channel Up	KEY2_9			
		Keylock	KEY2_10			
		Lamp	KEY2_11			
		Selectable QT	KEY2_15			
		2-Tone Encode Select	KEY2_16			
		Monitor A	KEY2_17			
		Monitor B	KEY2_18			

序号	功能	选择	显示	备注		
2	[侧面 2]	监听 A	MON_17	←出厂设定		
		监听 B	MON_18			
		监听 C	MON_19			
		监听 D	MON_20			
		低射频功率	MON_21			
		扫描	MON_22			
		删除/添加扫描	MON_23			
		组号下	MON_24			
		组号上	MON_25			
		重拨	MON_28			
		干线组代码选择	MON_29	限于中继功能已设置好的情况		
		3	[O]	无功能	KEY1_OFF	
				直接通话	KEY1_3	
显示特性	KEY1_5					
守候信道	KEY1_7					
信道号下	KEY1_8					
信道号上	KEY1_9					
键锁定	KEY1_10					
指示灯	KEY1_11					
选择 QT	KEY1_15					
双音信令编码选择	KEY1_16					
监听 A	KEY1_17					
监听 B	KEY1_18					
监听 C	KEY1_19					
监听 D	KEY1_20					
低射频功率	KEY1_21					
扫描	KEY1_22					
删除/添加扫描	KEY1_23			← 出厂设定		
组号下	KEY1_24					
组号上	KEY1_25					
重拨	KEY1_28					
干线组代码选择	KEY1_29	限于中继功能已设置好的情况				
4	[●]	无功能	KEY2_OFF			
		直接通话	KEY2_3			
		显示特性	KEY2_5			
		守候信道	KEY2_7			
		信道号下	KEY2_8			
		信道号上	KEY2_9			
		键锁定	KEY2_10			
		指示灯	KEY2_11			
		选择 QT	KEY2_15			
		双音信令编码选择	KEY2_16			
		监听 A	KEY2_17			
		监听 B	KEY2_18			

REALIGNMENT / 模式组合

No.	Function	Choices	Display	Remarks
4	[●]	Monitor C	KEY2_19	
		Monitor D	KEY2_20	
		RF Power Low	KEY2_21	
		Scan	KEY2_22	
		Scan DEL/ADD	KEY2_23	
		Group Down	KEY2_24	
		Group Up	KEY2_25	
		Redial	KEY2_28	
		Trunking Group Select	KEY2_29	Only when Trunking is set
5	[◀]	No Function	KEY3_OFF	← Default
		Talk Around	KEY3_3	
		Display Character	KEY3_5	
		Home Channel	KEY3_7	
		Channel Down	KEY3_8	
		Channel Up	KEY3_9	
		Keylock	KEY3_10	
		Lamp	KEY3_11	
		Selectable QT	KEY3_15	
		2-Tone Encode Select	KEY3_16	
		Monitor A	KEY3_17	
		Monitor B	KEY3_18	
		Monitor C	KEY3_19	
		Monitor D	KEY3_20	
		RF Power Low	KEY3_21	← Default
		Scan	KEY3_22	
		Scan DEL/ADD	KEY3_23	
		Group Down	KEY3_24	
		Group Up	KEY3_25	
Redial	KEY3_28			
Trunking Group Select	KEY3_29	Only when Trunking is set		
6	[▶]	No Function	KEY4_OFF	
		Talk Around	KEY4_3	
		Display Character	KEY4_5	
		Home Channel	KEY4_7	
		Channel Down	KEY4_8	
		Channel Up	KEY4_9	
		Keylock	KEY4_10	
		Lamp	KEY4_11	
		Selectable QT	KEY4_15	
		2-Tone Encode Select	KEY4_16	
		Monitor A	KEY4_17	
		Monitor B	KEY4_18	
		Monitor C	KEY4_19	
Monitor D	KEY4_20			

序号	功能	选择	显示	备注
4	[●]	监听 C	KEY2_19	
		监听 D	KEY2_20	
		低射频功率	KEY2_21	
		扫描	KEY2_22	
		删除/添加扫描	KEY2_23	
		组号下	KEY2_24	
		组号上	KEY2_25	
		重拨	KEY2_28	
		干线组代码选择	KEY2_29	限于中续功能已设置好的情况
5	[◀]	无功能	KEY3_OFF	← 出厂设定
		直接通话	KEY3_3	
		显示特性	KEY3_5	
		守候信道	KEY3_7	
		信道号下	KEY3_8	
		信道号上	KEY3_9	
		键锁定	KEY3_10	
		指示灯	KEY3_11	
		选择 QT	KEY3_15	
		双音信令编码选择	KEY3_16	
		监听 A	KEY3_17	
		监听 B	KEY3_18	
		监听 C	KEY3_19	
		监听 D	KEY3_20	
		低射频功率	KEY3_21	← 出厂设定
		扫描	KEY3_22	
		删除/添加扫描	KEY3_23	
		组号下	KEY3_24	
		组号上	KEY3_25	
重拨	KEY3_28			
干线组代码选择	KEY3_29	限于中续功能已设置好的情况		
6	[▶]	无功能	KEY4_OFF	
		直接通话	KEY4_3	
		显示特性	KEY4_5	
		守候信道	KEY4_7	
		信道号下	KEY4_8	
		信道号上	KEY4_9	
		键锁定	KEY4_10	
		指示灯	KEY4_11	
		选择 QT	KEY4_15	
		双音信令编码选择	KEY4_16	
		监听 A	KEY4_17	
		监听 B	KEY4_18	
		监听 C	KEY4_19	
监听 D	KEY4_20			

REALIGNMENT / 模式组合

No.	Function	Choices	Display	Remarks
6	[▶]	RF Power Low	KEY4_21	← Default
		Scan	KEY4_22	
		Scan DEL/ADD	KEY4_23	
		Group Down	KEY4_24	
		Group Up	KEY4_25	
		Redial	KEY4_28	
		Trunking Group Select	KEY4_29	Only when Trunking is set
7	[CH]	Channel Up/Down	CH_UP/DN	← Default
		Group Up/Down	GR_UP/DN	
		No Function	KNOB_OFF	
Optional Feature				
8	Power On Tone	YES/NO	PONT_YES	Default: YES
9	Control Tone	YES/NO	CNTT_YES	Default: YES
10	Warning Tone	YES/NO	WART_YES	Default: YES
11	Time Out Timer	OFF, 15-300/15s Step	TOT_60	Default: 60s
12	TOT Pre-Alert Time	OFF, 1-10/1s Step	TOTP_PFF	Cannot be set when TOT is OFF. Default: OFF
13	TOT Rekey Time	OFF 1-60/1s Step	TOTK_OFF	Cannot be set when TOT is OFF. Default: OFF
14	TOT Reset Time	OFF 1-15/1s Step	TOTS_OFF	Cannot be set when TOT is OFF. Default: OFF
15	Clear to Transpond (BCL for Transpond)	YES	CTT_YES	
		NO	CTT_NO	← Default
16	Battery Save	ON	BATT_ON	← Default
		OFF	BATT_OFF	
17	Signalling	OR	SIG_OR	← Default
		AND	SIG_AND	
18	Squelch Level	0-9/1 Step	SQL_5	Default: 5
19	Priority	None	PRI_NONE	← Default
		Fixed	PRI_FIX_	
		Selected	PRI_SEL_	
20	Lock Back Time A	0.5-5.0/0.05	LBA_500	Default: 500ms Cannot be set when Priority = none.
21	Lock Back Time B	0.5-5.0/0.05	LBB_2000	Default: 2000ms Cannot be set when Priority = none.
22	Revert Channel	Selected	REV_SEL	
		Last Called	REV_L/C_	← Default
		Last Used	REV_L/U_	
		Selected + Talk Back	REV_S/T_	
		Priority	REV_PRI_	
		Priority + Talk Back	REV_P/T_	
23	Dropout Delay Time	0-300/1s	DODT__3	Default: 3s
24	Dwell Time	0-300/1s	DWL__3	Default: 3s

序号	功能	选择	显示	备注
6	[▶]	低射频功率	KEY4_21	← 出厂设定
		扫描	KEY4_22	
		删除/添加扫描	KEY4_23	
		组号下	KEY4_24	
		组号上	KEY4_25	
		重拨	KEY4_28	
		干线组代码选择	KEY4_29	限于中续功能已设置好的情况
7	[信道]	上/下信道	CH_UP/DN	← 出厂设定
		上/下组	GR_UP/DN	
		无功能	KNOB_OFF	
可选特性				
8	通电提示音	是/否	PONT_YES	出厂设定: 是
9	控制提示音	是/否	CNTT_YES	出厂设定: 是
10	告警提示音	是/否	WART_YES	出厂设定: 是
11	超时计时器	关闭, 15-300/15s 步进	TOT_60	出厂设定: 60s
12	TOT 预先告警时间	关闭, 1-10/1s 步进	TOTP_PFF	当 TOT 关闭时不能设定。出厂设定: 关闭
13	TOT 再按键时间	关闭, 1-60/1s 步进	TOTK_OFF	当 TOT 关闭时不能设定。出厂设定: 关闭
14	TOT 复位时间	关闭 1-15/1s 步进	TOTS_OFF	当 TOT 关闭时不能设定。出厂设定: 关闭
15	加强应答 (BCL 为应答)	是	CTT_YES	
		否	CTT_NO	← 出厂设定
16	省电	开启	BATT_ON	← 出厂设定
		关闭	BATT_OFF	
17	信令	OR	SIG_OR	← 出厂设定
		AND	SIG_AND	
18	静噪抑制电平	0-9/1 步进	SQL_5	出厂设定: 5
19	优先	无	PRI_NONE	← 出厂设定
		固定	PRI_FIX_	
		可选	PRI_SEL_	
20	回扫周期 A	0.5~5.0/0.05	LBA_500	出厂设定: 500ms 当优先 = 无时不能设定。
21	回扫周期 B	0.5~5.0/0.05	LBB_2000	出厂设定: 2000ms 当优先 = 无时不能设定。
22	恢复信道	选择	REV_SEL	
		最后接收呼叫信道	REV_L/C_	← 出厂设定
		最后使用的信道	REV_L/U_	
		选择 + 应答	REV_S/T_	
		优先	REV_PRI_	
		优先 + 应答	REV_P/T_	
23	停留时间	0~300/1s	DODT__3	出厂设定: 3s
24	扫描发射暂停时间	0~300/1s	DWL__3	出厂设定: 3s

REALIGNMENT / 模式组合

No.	Function	Choices	Display	Remarks
DTMF				
25	Digit Time	50-200/10ms	DIGT__50	Default;50ms
26	Inter Digit Time	50-1000/50ms	IDT__50	Default;50ms
27	First Digit Time	50-200/10ms	FDT__50	Default;50ms
28	First Digit Delay	50-1000/50ms	RIST_100	Default;100ms
29	Rise Time with QT	50-1000/50ms	RTWQ_100	Default;100ms
30	DIAL ID	Enable	DID_ENA	
		Disable	DID_DIS	← Default
31	No.of DTMF Key	12Key	NODK_12	← Default
		16Key	NODK_16	
32	DTMF Hold Time	ON	DHT__ON	← Default
		OFF	DHT__OFF	
33	Store and Send	Enable	SAS_ENA	
		Disable	SAS_DIS	← Default
34	D Key Assignment	D Code	DKA_D_CD	← Default
		1-16/1s	DKA_16__	
35	DTMF Signalling	Code SQ	DTMF_CSQ	← Default
		SEL CALL	DTMF_SEL	
36	Inter Mediaate Code	0-9,A-D,*,#	IMC__#_	Default: # (Can be set only when DTMF signalling = SEL CALL.)
37	Group Code	A-D,*,#	GPCD_FF_	Default;OFF
38	Auto Reset Time	OFF	ART_OFF_	
		1-15/1s	ART__10	Default;10s
39	Call Alert/ Transpond	OFF	CA/T_OFF	← Default
		Call Alert	CA/T_C/A	
		Transpond (Call Alert)	CA/T_T/A	
		Transpond (ID Code)	CA/T_T/I	
		Transpond (Transpond Code)	CA/T_T/T	
Others				
40	Panel Test/panel Tuning MODE	Enable	PTM_ENA	← Default
		Disable	PTM_DIS	

序号	功能	选择	显示	备注
DTMF				
25	数码间隔	50~200/10ms	DIGT__50	出厂设定：50ms
26	中间位时间	50~1000/50ms	IDT__50	出厂设定：50ms
27	首位码宽度	50~200/10ms	FDT__50	出厂设定：50ms
28	首位码延迟	50~1000/50ms	RIST_100	出厂设定：100ms
29	有QT功能时号码发送延迟时间	50~1000/50ms	RTWQ_100	出厂设定：100ms
30	拨号身份码	有效	DID_ENA	
		无效	DID_DIS	← 出厂设定
31	DTMF 按键制式	12 键	NODK_12	← 出厂设定
		16 键	NODK_16	
32	号码发射保留时间	开启	DHT__ON	← 出厂设定
		关闭	DHT__OFF	
33	储存和发送	有效	SAS_ENA	
		无效	SAS_DIS	← 出厂设定
34	D 键赋值	D 代码	DKA_D_CD	← 出厂设定
		1~16/1s	DKA_16__	
35	DTMF 信令	编码静噪	DTMF_CSQ	← 出厂设定
		选择呼叫	DTMF_SEL	
36	中间号码	0~9,A~D,*,#	IMC__#_	出厂设定：#（只有当DTMF = SELCALL时可以被设定。）
37	组呼王码	A~D,*,#	GPCD_FF_	出厂设定：关闭
38	自动静止时间	关闭	ART_OFF_	
		1~15/1s	ART__10	出厂设定：10s
39	呼叫提示/自动应答	关闭	CA/T_OFF	← 出厂设定
		呼叫提示	CA/T_C/A	
		自动应答 (振铃提示)	CA/T_T/A	
		自动应答 (自台号码)	CA/T_T/I	
		自动应答 (应答号码)	CA/T_T/T	
其他				
40	面板测试/面板调谐模式	有效	PTM_ENA	← 出厂设定
		无效	PTM_DIS	

REALIGNMENT / 模式组合

9-4. Memory Reset Mode

This mode is used to clear data for functions that can be set in Self Programming Mode or to return to reset values (default).

Pressing [●] when "SELF" is shown, sets the display to "CANCEL".

Turning the encoder alternately switches the display between "CANCEL" ↔ "READY".

Pressing [●] when "READY" is shown, clears the data and sets the display to "CLEAR".

Pressing [●] again, returns the display to "SELF".

Pressing [●] when "CANCEL" is shown, returns the display to "SELF" without resetting the data.

When the [●] switch is pressed while "SELF" is displayed, the memory is reset.

When the memory is reset, mode data and model data are not reset.

9-4 存储器复位模式

此模式用于清除在自台编程模式中被设定的数据或返回到复位值（出厂设定）。

当显示“SELF”时按[●]键，设定显示为“CANCEL”。

旋转编码旋钮交替转换显示“CANCEL” ↔ “READY”。

当显示“READY”时按[●]键，清除数据并且设定显示为“CLEAR”。

再一次按[●]键，返回到显示“SELF”。

当显示“CANCEL”时按下[●]键，返回到显示“SELF”且不复位数据。

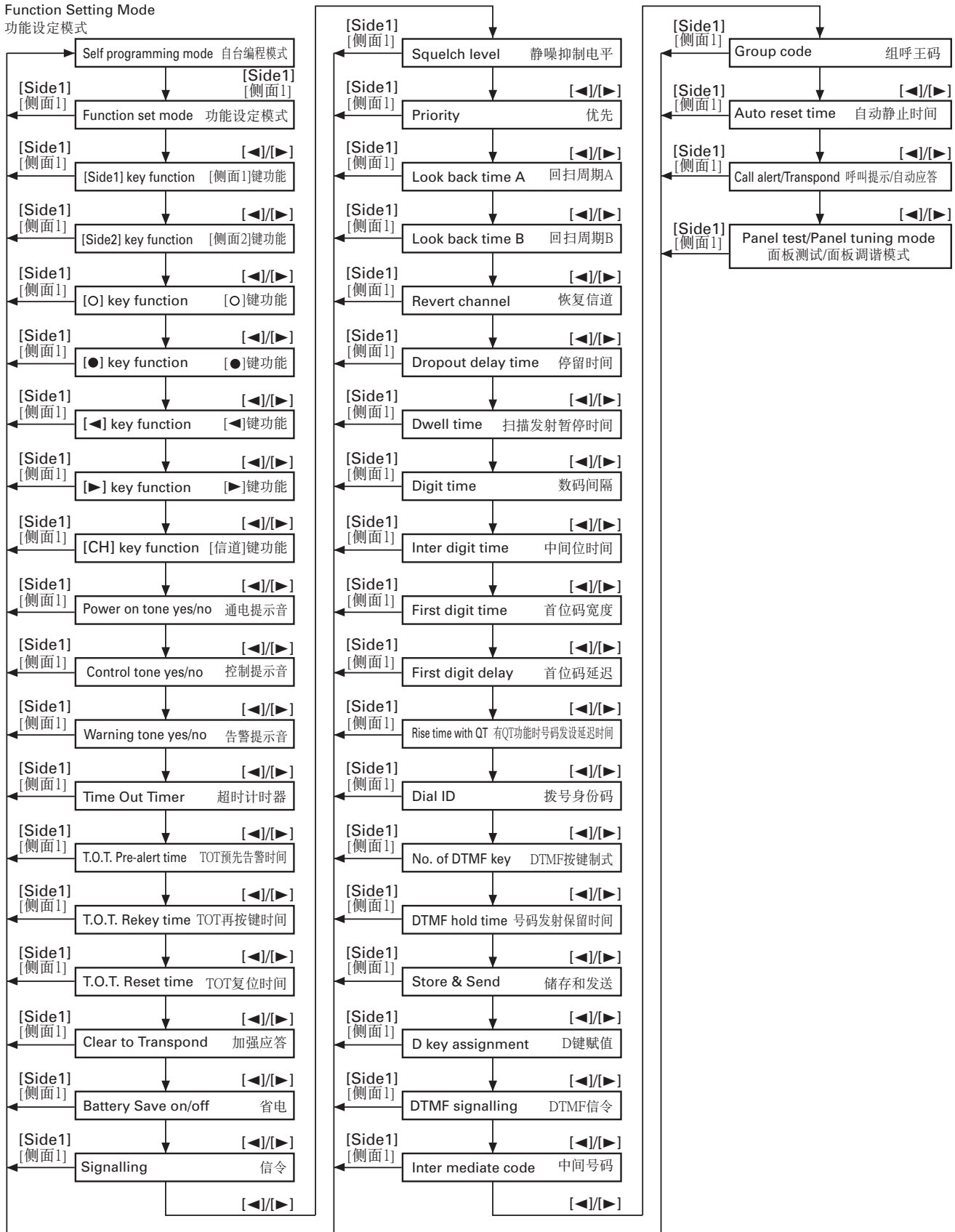
在显示“SELF”时按下[●]键，存储器被复位。

当存储器被复位时，模式数据和型号数据不被复位。

REALIGNMENT / 模式组合

• Flow Chart / 流程图

Function Setting Mode
功能设定模式



TK-388G

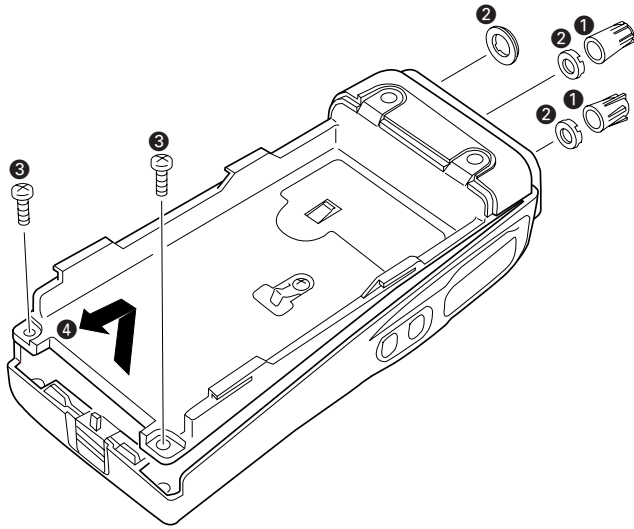
DISASSEMBLY FOR REPAIR / 维修时拆卸部件

Separating the case assembly from the chassis.

1. Remove the two knobs ① and three round units ②.
2. Remove the two screws ③.
3. Expand the right and left sides of the bottom of the case assembly, lift the chassis, and remove it from the case assembly ④.

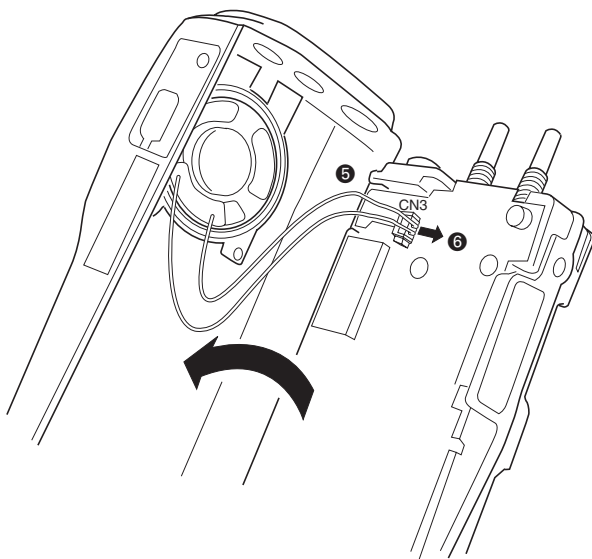
从底座上拆卸外壳

1. 取下两个旋钮 ① 和三个环形螺母 ②。
2. 取下两颗螺丝 ③。
3. 掀开外壳底部的左右两侧，并从外壳中取出底座 ④。



4. Taking care not to cut the speaker lead ⑤, open the chassis and case assembly, and pull the speaker lead with connector ⑥.

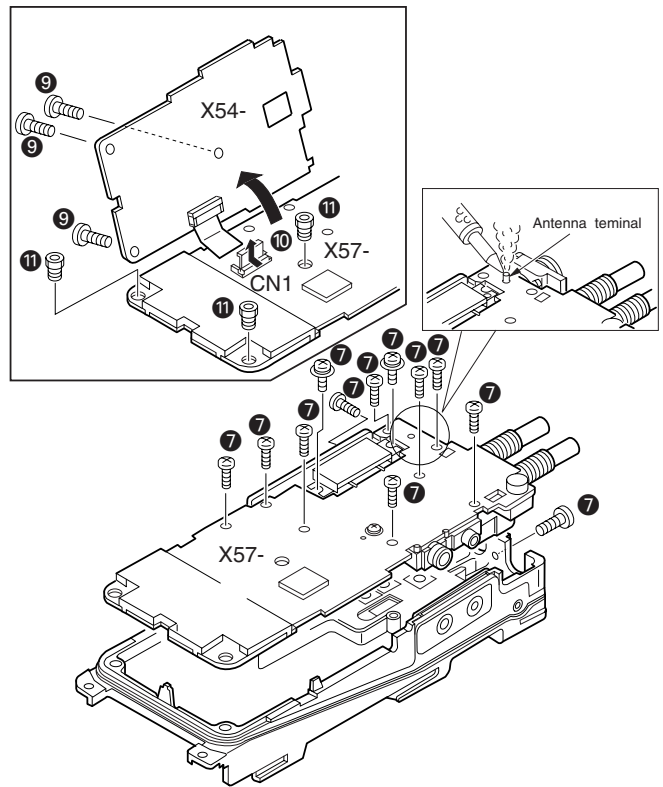
4. 小心不要折断扬声器连线 ⑤，拆下底座和外壳，并取下扬声器连线 ⑥。



Separating the chassis from the unit.

1. Remove the three screws ⑨.
Lift the unit (X54), and rise up the connector lever in the arrow with your finger ⑩.
Remove the three hexagonal bosses ⑪, and remove the twelve screws ⑦.
2. Remove the solder from the antenna terminal using a soldering iron, then lift the unit off (X57).

1. 取下三颗螺丝 ⑨。
卸下单元 (X54)，用手指抬起箭头处的锁扣 ⑩。
取下 3 颗六角形螺丝 ⑪，并继续取下 12 颗螺丝 ⑦。
2. 用电烙铁将天线端点焊开，然后取下主板 (X57)。



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.

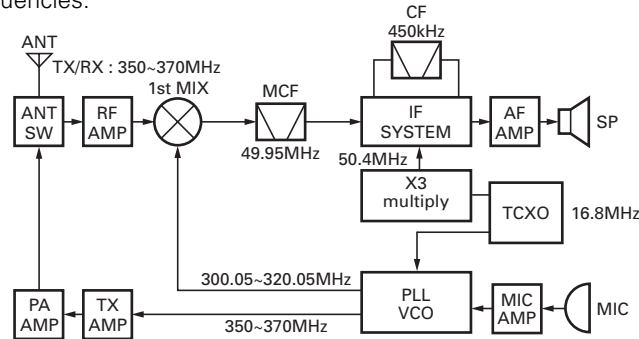


Fig. 1 Frequency configuration / 图 1 频率构成

2. Receiver

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

1. 频率构成

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

发射部由锁相环电路直接产生所需要的频率。图 1 显示各种频率。

2. 接收部

图 2 显示接收部的频率构成。

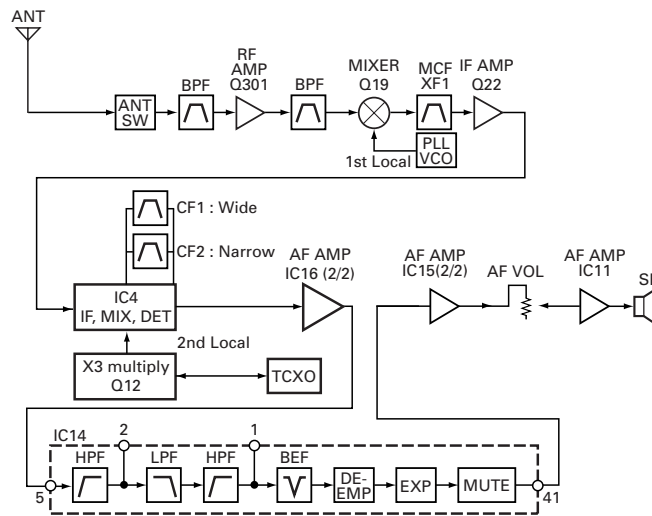


Fig. 2 Receiver section / 图 2 接收部构成

1) Front end (RF AMP)

The signal coming from the antenna passes through the transmit/receive switching diode circuit, (D3,D7) passes through a BPF, and is amplified by the RF amplifier (Q301). The resulting signal passes through a BPF and goes to the mixer.

1) 前级 (射频放大器)

从天线输入的信号经过二极管收发转换电路，(D3, D7) 经过 BPF，被射频放大器 (Q301) 放大。得到的信号经过带通滤波器 BPF 并进入混频器。

2) First mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q19 to produce a first IF frequency of 49.95 MHz.

The resulting signal passes through the XF1 MCF to cut the adjacent spurious and provide the optimum characteristics, such as adjacent frequency selectivity.

2) 第一混频器

来自前端的信号在 Q19 与锁相环电路内生成的第一本振信号混频并生成 49.95MHz 的第一中频信号。

产生的中频信号经过晶体滤波器 XF1 MCF 滤除邻道的杂波信号、以确保邻道选择性等必要的技术指标。

CIRCUIT DESCRIPTION / 电路说明

3) IF Amplifier circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF1) to remove the adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q22) and then applied to the IF system IC (IC4). 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 X3) and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF1; Wide, CF2 ; Narrow) 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 (CD1). The demodulated signal is routed to the audio circuit.

4) Wide/Narrow changeover circuit

Narrow and Wide settings can be made for each channel by switching the ceramic filters CF1 (Wide) and CF2 (Narrow).

The WIDE (high level) and NARROW (low level) data is output from IC5 (OUTPUT EXPANDER), pin 4.

When a WIDE (high level) data is received, Q14 turn off and Q17 turn on. When a NARROW (low level) data is received, Q14 turn on and Q17 turn off. D14 and D13 are switched to ceramic filters when a high/low level data is received.

Q23 turns on/off with the Wide/Narrow data and the IC4 detector output level is changed to maintain a constant output level during wide or narrow signals.

3) 中频放大器电路

第一中频信号经过四级单片晶体滤波器 (XF1) 滤除邻道的杂波信号。经滤波的第一中频信号被第一中频放大器 (Q22) 放大, 然后进入中频集成电路芯片 (IC4)。中频集成电路芯片提供第二混频器, 第二本振信号, 第二中频放大器, 鉴频器和 RSSI (接收信号强度指示器)。第二混频器将第一中频信号与第二本振信号输出 (TCXO X3) 的 50.4MHz 混频并生成 450kHz 的第二中频信号。

第二中频信号经过陶瓷滤波器 (CF1; 宽, CF2; 窄) 消除邻道的杂波信号。经滤波的第二中频信号通过第二中频放大器被放大并且通过陶瓷鉴频器 (CD1) 被解调、产生音频信号到音频电路。

4) 宽 / 窄转换电路

通过转换开启陶瓷滤波器 CF1 (宽带) 和 CF2 (窄带) 可以为每一个信道设置窄带和宽带。

从芯片 IC5 (输出扩展器) 的管脚 4 输出宽带 (高电平) 和窄带 (低电平) 数据。

当接收到宽带 (高电平) 数据时, Q14 关闭, Q17 开启。当接收到窄带 (低电平) 数据时, Q14 开启, Q17 关闭。当接收到高 / 低电平数据时, D14 和 D13 控制转换陶瓷滤波器。带有宽带 / 窄带数据的 Q23 开启 / 关闭和芯片 IC4 检测器输出电平转换以保持一个连续的输出电平来控制宽带和窄带的信号接收。

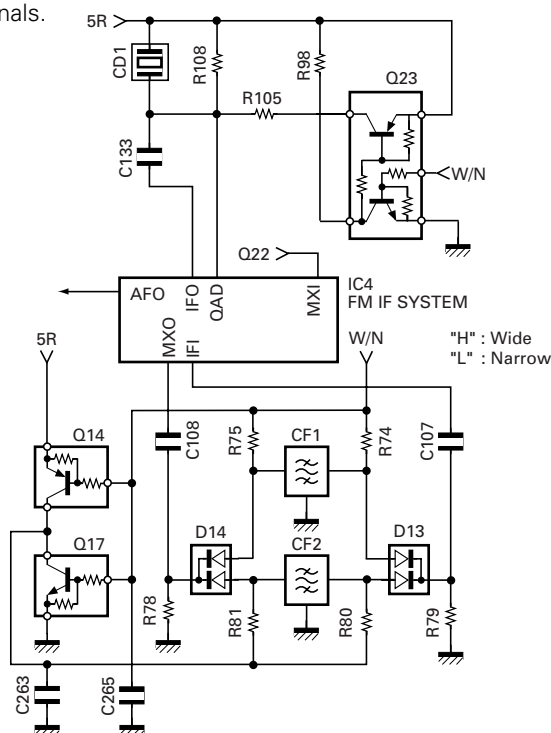


Fig. 3 Wide/Narrow changeover circuit / 图 3 宽 / 窄转换电路

CIRCUIT DESCRIPTION / 电路说明

5) Audio amplifier circuit

The demodulated signal from IC4 is amplified by IC16 (2/2), high-pass filtered, low-pass filtered, high-pass filtered, band-eliminate filtered, and de-emphasized by IC14.

The signal then goes through an AF amplifier IC15 (2/2), an AF volume control (VR2), and is routed to an audio power amplifier (IC11) where it is amplified and output to the speaker.

6) Squelch

Part of the AF signal from the IC enters the FM IC (IC4) 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 (IC13). IC13 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, IC6 sends a high signal to the SP MUTE line and turns IC11 on through Q32, Q33, Q34 and Q30. (See Fig. 4)

7) Receive signalling

(1) QT/DQT (Low-speed data)

300Hz and higher audio frequencies of the output signal from IF IC are cut by a low-pass filter (IC19). The resulting signal enters the microprocessor (IC13). IC13 determines whether the QT or DQT matches the preset value, and controls the SP MUTE and the speaker output sounds according to the squelch results.

(2) 2-TONE (High-speed data)

Part of the received AF signal output from the AF amplifier IC16(2/2), and then pass through an audio processor (IC14), goes to the other AF amplifier IC15(1/2), is compared, and then goes to IC13. IC13 checks whether 2-TONE data is necessary. If it matches, IC13 carries out a specified operation, such as turning the speaker on. (See Fig. 4)

5) 音频放大器电路

来自芯片 IC4 被解调的信号通过芯片 IC16 (2/2) 被放大，通过芯片 IC14 被高通滤波，低通滤波、带通滤波和去加重。然后信号经过音频放大器芯片 IC15 (2/2)，音频音量控制 (VR2)、到音频功率放大器 (芯片 IC11)，经放大后输出到扬声器。

6) 静噪

从调频集成电路芯片输出的音频信号的一部分重新进入调频集成电路芯片 (芯片 IC4)，通过滤波器和放大器将噪音放大和整流并生成一个对应于噪声分量的直流电压。

直流信号进入微处理器 (芯片 IC13) 的模拟端口。微处理器 (芯片 IC13) 通过比较输入电压是否高于或低于预设值来控制是否关闭或打开扬声器输出。

要打开扬声器输出，芯片 IC6 向扬声器静音控制线发射一个高电平信号、并通过 Q32, Q33, Q34 和 Q30 导通芯片 IC11。(参见图 4)

7) 接收信令

(1) QT/DQT (低速率数据)

从中频集成电路芯片输出的信号、300Hz 以上的音频信号被低通滤波器 (芯片 IC19) 滤除。所得到的信号输入微处理器 (芯片 IC13)。芯片 IC13 根据内部的各种处理判断接收的 QT 或 DQT 是否与预设值一致，并且根据静噪抑制电路的判断结果控制扬声器静音和扬声器输出声音。

(2) 双音信令 (高速率数据)

接收到的音频信号的一部分从音频放大器芯片 IC16 (2/2) 输出，然后经过一个音频处理器 (芯片 IC14) 进入另一个音频放大器芯片 IC15 (1/2)，被比较，然后进入微处理器芯片 IC13。芯片 IC13 检查双音信令数据是否一致。如果一致，芯片 IC13 进行特殊的操作，例如开启扬声器。(参见图 4)

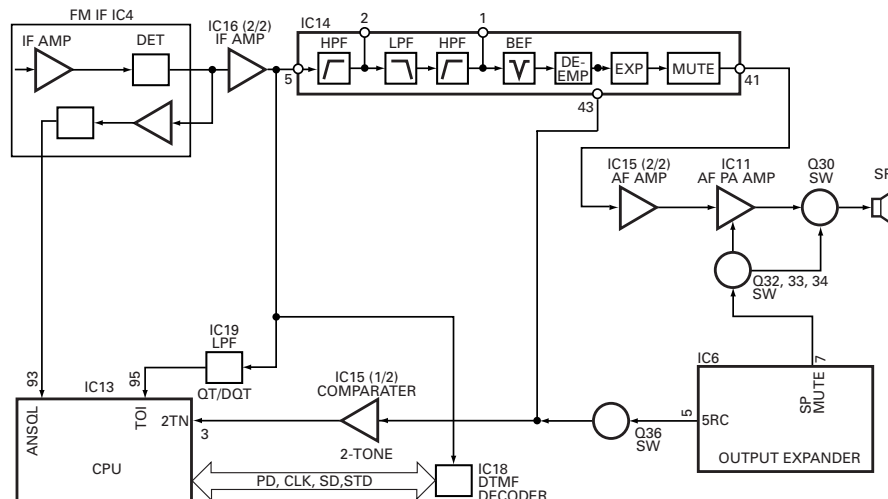


Fig. 4 AF Amplifier and Squelch / 图 4 音频放大器和静噪抑制电路

(3) DTMF (High-speed data)

The DTMF input signal from the IF IC(IC4) is amplified by IC16(2/2) and goes to IC18, the DTMF decoder. The decoded information is then processed by the CPU. During transmission and standby, the DTMF IC is set to the power down mode when the PD terminal is High. When the line is busy, the PD terminal becomes Low, the power down mode is canceled and decoding is carried out.

3. PLL frequency synthesizer

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

1) PLL

The frequency step of the PLL circuit is 5 or 6.25kHz. A 16.8MHz reference oscillator signal is divided at IC2 by a fixed counter to produce oscillator (VCO) output signal which is buffer amplified by Q3 then divided in IC2 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 IC2. 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. 5)

(3) DTMF (高速度数据)

来自于中频集成电路芯片 IC (IC4) 的 DTMF 输入信号通过芯片 IC16 (2/2) 被放大并进入芯片 IC18, DTMF 解码器。被解码的信息通过 CPU 执行。在发射和待机过程中, 当 PD 端子为高时, DTMF 芯片被设定到节电模式。当线路繁忙, PD 端子变低时, 节电模式被取消并进行解码。

3. 锁相环频率合成器

锁相环电路产生接收机的第一本振信号和用于发射的射频载波信号。

1) 锁相环电路

锁相环电路的步进频率为 5 或 6.25kHz。16.8MHz 的参考振荡信号通过一个混合计数器在芯片 IC2 中被分频生成 5 或 6.25kHz 参考频率。压控振荡器 (VCO) 输出的信号, 通过 Q3 缓冲放大, 然后在芯片 IC2 中被双模可编程计数器分频。被分频的信号在带有 5 或 6.25kHz 参考信号的相位比较器芯片 IC2 中被比较。从相位比较器输出的信号进入一个低通滤波器后, 通过电压控制压控振荡器 (VCO) 的输出频率。(参见图 5)

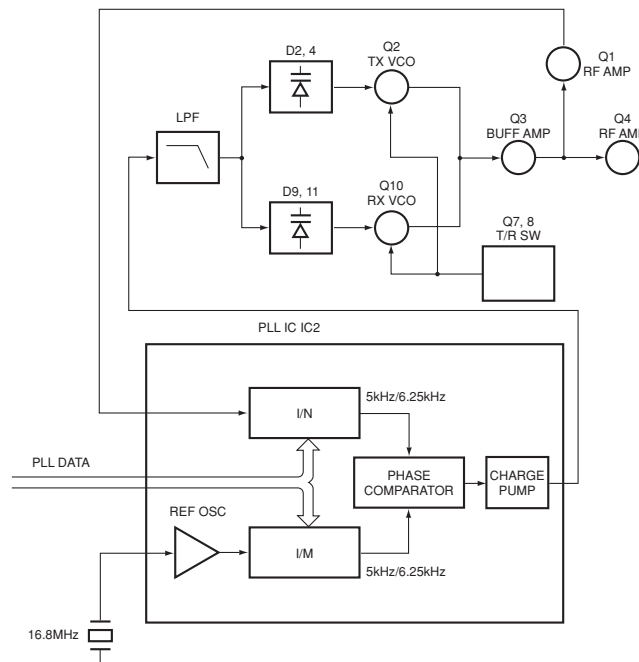


Fig. 5 PLL circuit / 图 5 锁相环电路

2) VCO

The operating frequency is generated by Q2 in transmit mode and Q10 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D2 and D4 in transmit mode and D9 and D11 in receive mode). The T/R pin is set high in receive mode causing Q7 and Q8 to turn Q2 off and turn Q10 on.

The T/R pin is set low in transmit mode. The outputs from Q10 and Q2 are amplified by Q3 and sent to the buffer amplifiers.

2) 压控振荡器 (VCO)

在发射模式中通过 Q2 产生操作频率, 在接收模式中通过 Q10 产生操作频率。控制信号通过相位比较器到变容二极管 (在发射模式中为 D2 和 D4, 在接收模式中为 D9 和 D11)、采用压控振荡器控制电压来控制输出频率。在接收模式中, 由于 Q7 和 Q8 切断 Q2 并且导通 Q10, 所以发射/接收管脚设置为高电平。

在发射模式中, 发射/接收管脚设置为低电平。Q10 和 Q2 的输出通过 Q3 被放大并被发送到缓冲放大器。

CIRCUIT DESCRIPTION / 电路说明

3) Unlock Detector

If a pulse signal appears at the LD pin of IC2, an unlock condition occurs, and the DC voltage obtained from D1, R1, and C6 causes the voltage applied to the microprocessor to go low. When the microprocessor detects this condition, the transmitter is disabled, ignoring the push-to-talk switch input signal. (See Fig. 6)

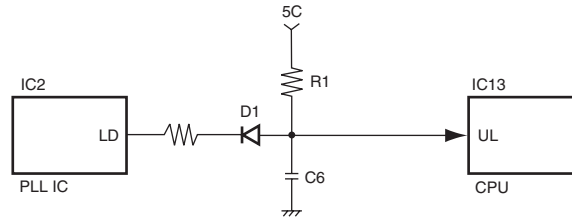


Fig. 6 Unlock detector circuit / 图 6 失锁检测器电路

3) 失锁检测器

如果芯片 IC2 的 LD 管脚上出现高电平, 则产生失锁状态, 并从 D1, R1 获得直流电压, 且 C6 产生的提供给微处理器 UL 管脚的电压降低。当微处理器检测到此情况时, 不能进行发射, 无视通话转换开关输入信号。(参见图 6)

4. Transmitter System

1) Microphone amplifier

The signal from the microphone passes through the limiter circuit in D23, and through the high-pass filter, the ALC circuit, the low-pass filter, the high-pass filter, and pre-emphasis/IDC circuit IC14. When encoding DTMF, the mute switch (Q35) is turned OFF for muting the microphone input signal.

The signal passes through the D/A converter (IC17) for the maximum deviation adjustment, and goes to the VCO modulation input.

4. 发射部系统

1) 音频放大

来自于话筒的调制信号经过 D23 内的限幅电路, 并经过高通滤波器, ALC 电路, 低通滤波器, 高通滤波器和预加重/IDC 处理芯片 IC14。当编码 DTMF 时, 静音转换开关 (Q35) 关闭来抑制话筒输入噪音信号。

信号经过数字/模拟转换器 (芯片 IC17) 进行最大频偏调整, 并进入 VCO 调制输入。

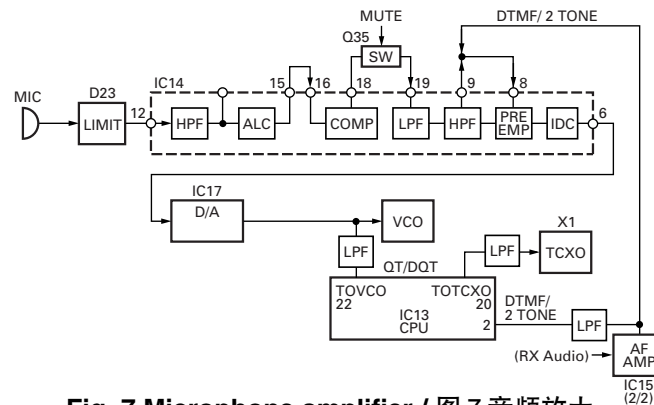


Fig. 7 Microphone amplifier / 图 7 音频放大

2) Drive and Final amplifier

The signal from the T/R switch (D5 is on) is amplified by the pre-drive (Q5) and drive amplifier (Q6) to 50mW.

The output of the drive amplifier is amplified by the RF power amplifier (IC1) to 4.0W (1W when the power is low). The RF power amplifier consists of two MOS FET stages. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D3 is on) and applied to the antenna terminal.

2) 驱动和末级放大器

通过发射/接收转换开关 (D5 导通) 的信号通过前置驱动 (Q5) 和驱动放大器 (Q6) 被放大到 50mW。

驱动放大器 Q5 的输出信号通过射频功率放大器 (芯片 IC1) 被放大到 4.0W (低功率时为 1W)。射频功率放大器包括两段 MOS FET。然后射频功率放大器的输出经过谐波滤波器 (LPF) 和天线转换开关 (D3 导通) 并进入到天线终端。

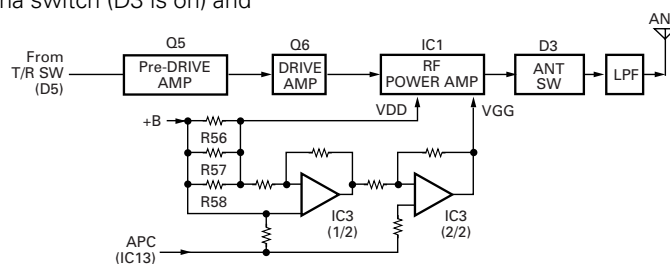


Fig. 8 Drive and final amplifier and APC circuit /

图 8 驱动和末级放大器和自动功率控制电路

3) APC circuit

The APC circuit always monitors the current flowing through the RF power amplifier (IC1) and keeps a constant current. The voltage drop at R56, R57 and R58 is caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier IC3(1/2).

IC3(2/2) compares the output voltage of IC3(1/2) with the reference voltage from IC13, and the output of IC3(2/2) controls the VGG of the RF power 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 (Low-speed data)

QT, DQT data of the TOTCXO Line is output from pin 20 of the CPU. The signal passes through a low-pass CR filter and goes to the TCXO(X1).

The QT, DQT data of the TOVCO Line is output from pin 22 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. (See fig.7)

(2) DTMF/2 TONE (High-speed data)

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 (IC14). The signal is mixed with the audio signal and goes to the VCO.

TX deviation is adjusted by the CPU. (See fig.7)

5. Power supply

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

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

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

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

6. Control Circuit

The control circuit consists of a microprocessor (IC13) and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the display unit. IC13 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) 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) 自动功率控制电路 (APC)

自动功率控制电路通过检测末级放大器场效应管的漏级电流来稳定发射功率。电流经过射频功率放大器使 R56, R57 和 R58 的电压降低并且此电压进入不同的放大器芯片 IC3 (1/2)。芯片 IC3 (2/2) 将芯片 IC3 (1/2) 的输出电压与来自于芯片 IC13 的参考电压进行比较, 芯片 IC3 (2/2) 的输出控制射频功率放大器的 VGG 使两种电压一致。

通过改变参考电压来进行高/低功率的选择。

4) 编码信令

(1) QT/DQT (低速率数据)

TOTCXO 线的 QT, DQT 数据从 CPU 的管脚 20 输出。信号经过低通陶瓷滤波器并进入 TCXO (X1)。

TOVCO 线的 QT, DQT 数据从 CPU 的管脚 22 输出。信号经过低通陶瓷滤波器, 与音频信号混频, 并进入压控振荡器调制输入。通过 CPU 调整发射频偏。(参见图 7)

(2) DTMF/2-TONE (高速率数据)

高速率数据从 CPU 的管脚 2 输出。信号通过低通陶瓷滤波器, 并提供一个发射和接收输出音频, 然后进入到音频处理器 (芯片 IC14)。信号与音频信号混频并进入压控振荡器。

通过 CPU 调整发射频偏。(参见图 7)

5. 电源

5V 电源有供给微处理器的 :5V, 5M, 5C, 5R 和 5T 共 5 种。通常在接通电源时, 马上产生微处理器的 5V 输出。5M 是普通输出, 但是当电源关闭时, 此输出也关闭来预防微处理器发生误操作。

5C 是一个公用的 5V 电源、在电池省电功能中、除休眠状态以外输出。

5R 是在接收过程中用于接收时输出的 5V 电源。

5T 是在发射过程中用于发射时输出的 5V 电源。

6. 控制电路

控制电路包括一个微处理器 (芯片 IC13) 和其外围电路。它包括 TX-RX 单元以及将数据转发到显示单元和从显示单元转发数据。芯片 IC13 主要执行下述功能:

- (1) 通过 PTT 控制发射和接收。
- (2) 从存储器读出系统、组、频率和程序数据。
- (3) 将频率程序数据发送到锁相环电路。
- (4) 通过来自于静噪抑制电路的直流电压信号控制静噪的开启/关闭。
- (5) 通过解码数据输入控制音频静音电路。
- (6) 发射信令和编码数据。

CIRCUIT DESCRIPTION / 电路说明

1) Frequency shift circuit

The microprocessor (IC13) operates at a clock of 9.8304MHz. This oscillator has a circuit that shifts the frequency by BEAT SHIFT SW (Q31).

2) Memory circuit

Memory circuit consists of the CPU (IC13) and a flash memory (IC12). A flash memory has a capacity of 2M bits that contains the transceiver control program for the CPU and data such as transceiver channels and operating features.

This program can be easily written from an external device. Data, such as DTMF memorise and the operating status, are programmed into the EEPROM (IC10).

• Flash Memory

Note : The flash memory holds data such as written with the FPU (KPG-56D ver 3.30 or later) and firmware program (User mode, Test mode, Tuning mode, etc.). This data must be rewritten when replacing the flash memory.

• EEPROM

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

Realign the transceiver after replacing the EEPROM.

1) 频率偏移电路

微处理器以9.8304MHz的时钟操作。此振荡器具有一个通过BEAT SHIFT SW (Q31) 开关转移频率的电路。

2) 存储器电路

存储器电路包括一个CPU (芯片IC13) 和一个Flash Rom存储器 (芯片IC12)。Flash Rom存储器为2M位, 包括CPU的手持机控制程序和数据, 例如手持机信道和操作功能。此程序可以从外置系统轻易写入数据, 例如DTMF存储和操作状态, 被编程到EEPROM (芯片IC10)。

• Flash 存储器

注释 : Flash 存储器保留例如使用FPU (KPG-56D 3.30版或之后的版本) 写入的和固件编程 (用户模式, 测试模式, 调谐模式等) 的数据。当更换Flash存储器时, 此数据必须被覆盖。

• EEPROM

注释 : EEPROM 储存调整数据 (调制, 静噪等)。更换EEPROM后重新调整手持机。

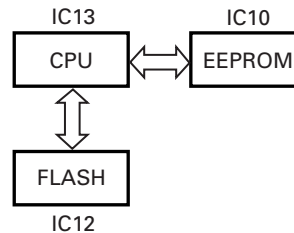


Fig. 9 Memory circuit / 图 9 存储器电路

3) Low battery warning

The battery voltage is monitored by the microprocessor (IC13). When the battery voltage falls below the voltage set by the Low Battery Warning adjustment, the LED flashes red to notify the operator that it is time to replace the battery. If the battery voltage falls even more (approx. 5.8V), a beep sounds and transmission is stopped.

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

3) 电池低电压提示告警

通过微处理器 (芯片IC13) 检测电池电压。当电池的电压低于电池低压告警预设的电压时, 红色指示灯闪烁以提示操作者更换电池。如果电池的电压继续降低 (大约5.8V), 则发出beep音并停止发射。

电池低压告警	电池状态
发射过程中红色指示灯闪烁。	电压降低但仍可使用手持机。
当按下PTT键时红色指示灯闪烁并发出连续beep音。	电池电压降低且手持机不能发出呼叫。

CIRCUIT DESCRIPTION / 电路说明

7. Optional Board Terminal

Terminals for mounting the option board are provided at the bottom edge of the TX-RX unit. The table below shows the correspondence between the board and terminals.

Optional Board Terminal Function (CN5)

Pin	Name	I/O	Function
1	GND	-	GND
2	SB	O	Power output after power switch
3	AUX3	I/O	Board control
4	TXAFI	I	Modulation output from board
5	AUX2	I/O	Board control
6	AUX6	O	Board control
7	AUX1	I	Board control
8	AUX5	O	Board control
9	AUX4	O	Board control
10	TXAFO	O	Modulation input to board
11	5C	O	5V
12	RXAFO	O	Received signal input to board
13	NC	-	NC
14	RXAFI	I	Received signal output from board
15	NC	-	NC
16	ALTTONE	I	ALART TONE output form board
17	NC	-	NC
18	NC	-	NC
19	NC	-	NC
20	GND	-	GND

7. 可选电路板端点

在TX-RX单元的底部边缘提供安装可选电路板的端点。下表给出电路板和端点之间的对应关系。

二次开发端口 (CN5)

管脚	名称	输入/输出	功能
1	GND	-	接地
2	SB	O	电源输出
3	AUX3	I/O	辅助控制
4	TXAFI	I	调制输入
5	AUX2	I/O	辅助控制
6	AUX6	O	辅助控制
7	AUX1	I	辅助控制
8	AUX5	O	辅助控制
9	AUX4	O	辅助控制
10	TXAFO	O	调制输出
11	5C	O	5V
12	RXAFO	O	接收信号输出
13	NC	-	NC
14	RXAFI	I	接收信号输入
15	NC	-	NC
16	ALTTONE	I	提示音输入
17	NC	-	NC
18	NC	-	NC
19	NC	-	NC
20	GND	-	接地

8. CONTROL SYSTEM

Keys and channel selector circuit.

The signal from keys and channel selector input to microprocessor directly as shown in fig. 10.

8. 控制系统

按键和信道选择电路。

来自于按键和信道选择信号如图 10 所示直接输入到微处理器。

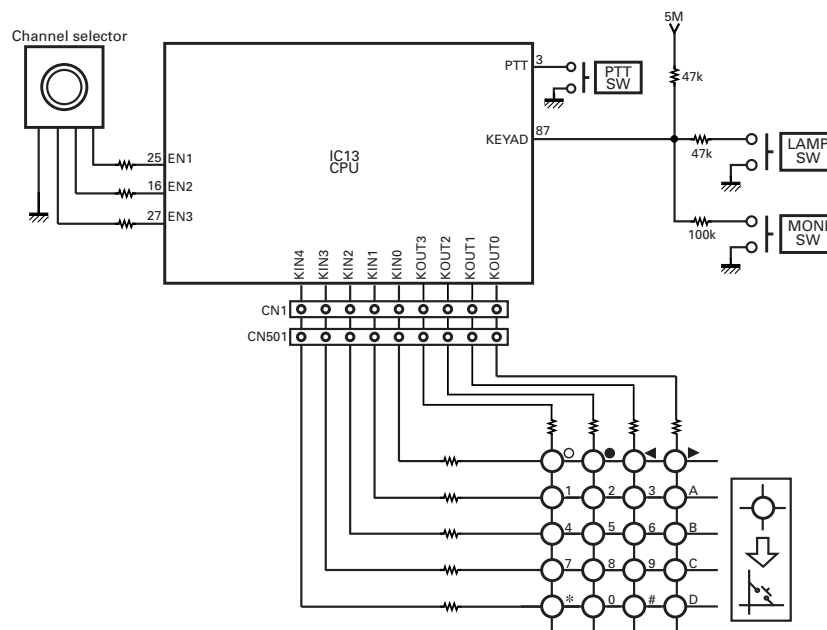


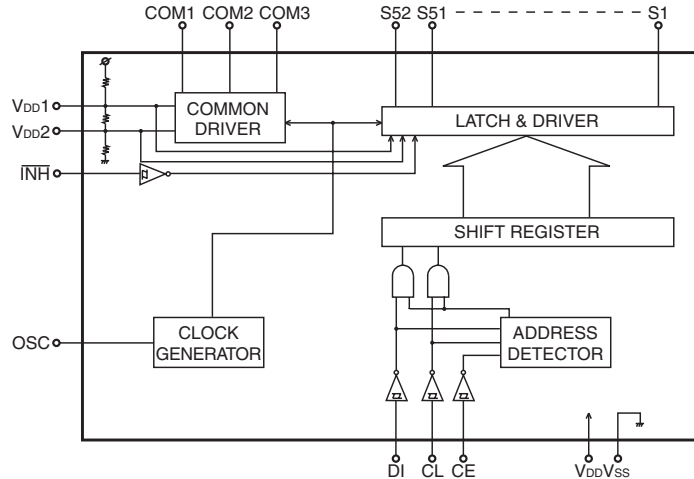
Fig. 10 Control system / 图 10 控制系统

SEMICONDUCTOR DATA / 半导体数据

LCD Driver : LC75823W (Display UNIT IC501)

LCD驱动器:LC75823W(显示单元芯片IC501)

■ Block diagram / 方块图



■ Pin function

Pin No.	Name	I/O	Active	Function
1-52	S1-S52	O	-	Segment output for displaying data transferred form serial data.
53-55	COM1-COM4	O	-	Common drive output. Frame frequency $f_o = (f_{osc}/384)$ Hz
56	VDD	-	-	
57	\overline{INH}	I	L	The display to turn off $\overline{INT} = L$: Turn off $\overline{INT} = H$: Turn on
58	VDD1	I	-	Apply 2/3 the LCD drive bias voltage form outside. If 1/2 the bias is applied, connect to VDD2.
59	VDD2	I	-	Apply 1/3 the LCD drive bias voltage form outside. If 1/2 the bias is applied, connect to VDD1.
60	VSS	-	-	
61	OSC	I/O	-	Oscillation terminal
62	CE	I	H	Chip enable. Serial data transfer terminal. Connected to the microprocessor.
63	CL	I	\uparrow	Synchronizing clock. Serial data transfer terminal. Connected to the microprocessor.
64	DI	I	-	Trnsfer data. Serial data transfer terminal. Connected to the microprocessor.

■ 管脚功能

管脚序号	名称	输入/输出	状态	功能
1-52	S1-S52	O	-	LCD 字段
53-55	COM1-COM4	O	-	公用驱动输出。 帧频率 $f_o = (f_{osc}/384)$ Hz
56	VDD	-	-	
57	\overline{INH}	I	L	关闭显示 $\overline{INT} = \text{低}$: 关闭 $\overline{INT} = \text{高}$: 开启
58	VDD1	I	-	从外部应用 2/3 LCD 驱动偏压。 如果应用 1/2 偏压, 则连接到 VDD2。
59	VDD2	I	-	从外部应用 1/3 LCD 驱动偏压。 如果应用 1/2 偏压, 则连接到 VDD1。
60	VSS	-	-	
61	OSC	I/O	-	振荡终端
62	CE	I	H	有效芯片。串行数据转发终端。 连接到微处理器。
63	CL	I	\uparrow	同步时钟。串行数据转发终端。 连接到微处理器。
64	DI	I	-	转发数据。串行数据转发终端。 连接到微处理器。

Microprocessor : 30622M4A-439GP (TX-RX
UNIT : IC13)

■ Pin function

Pin No.	Port Name	I/O	Function
1	APC	O	TX:Automatic Power Control data output
2	DTMF	O	DTMF/2TONE BEEP output
3	2TN	I	2TONE decode pulse input
4	DTMSTD	I	DTMF decode detect detect:H
5	SIM	I	Destination selct
6	BYTE	I	+5V(5M)
7	CNVSS	I	GND
8	AFSTB	O	Base Band IC strobe/rest output
9	AFFCLK	O	Base Band IC frame rest/system reset output
10	RESET	I	Reset
11	XOUT	O	Clock output
12	VSS	-	GND
13	XIN	I	Clock input
14	VCC	-	+5V
15	NC	I	NC
16	EN2	I	Encoder pulse input 2
17	AUX3	I/O	Option board port 3
18	INT	I	Battery voltage monitor input Low battery:L
19	OE	I	Not used
20	TOTCXO	I	QT/DQT modulation output(TCXO)
21	EEPDAT	I/O	EEPROM data input/output
22	TOVCO	O	QT/DQT modulation output(VCO)
23	AUX1	I	Option board port 1
24	SFTSTB	O	Shift register strobe output
25	EN1	O	Encoder pulse input 1
26	DACS	I	Chip select output(Max dev) Select:L
27	EN3	I	CH selector input
28	NC	O	NC
29	AUX4	O	Option board port 4
30	AUX2	I/O	Option board port 2
31	KOUT3	O	Key scan output 3
32	KOUT2	O	Key scan output 2
33	TXD	O	Serial data
34	PTT/RXD	I	PTT on: L/Serial data
35	KOUT1	O	Key scan output 1
36	KOUT0	O	Key scan output 0
37	RDY	-	Not used
38	ALE	O	Not used
39	HOLD	I	Not used
40	HLDA	O	Not used
41	BLCK	O	Not used
42	RD	O	READ signal
43	BHE	O	Not used
44	WR	O	WRITE signal
45	LCDCS	O	LCD chip enable output
46	CNTDAT	O	Common data output (EEPROM,LCD,SHIFT REG,1bit D/A MODEM)
47	CNTCLK	O	Common clock output (EEPROM,LCD,SHIFT REG,1bit D/A MODEM)

微处理器 : 30622M4A-439GP (TX-RX 单元 :
芯片 IC13)

■ 管脚功能

管脚序号	端口名称	输入/输出	功能
1	APC	O	发射 : 自动功率控制数据输出
2	DTMF	O	DTMF/2TONE BEEP 音输出
3	2TN	I	双音信令解码脉冲输入
4	DTMSTD	I	DTMF 解码检测 检测 : H
5	SIM	I	选择地址
6	BYTE	I	+ 5V (5M)
7	CNVSS	I	接地
8	AFSTB	O	基本频带芯片选通 / 静止输出
9	AFFCLK	O	基本频带芯片帧静止 / 系统复位输出
10	RESET	I	复位
11	XOUT	O	时钟输出
12	VSS	-	接地
13	XIN	I	时钟输入
14	VCC	-	+ 5V
15	NC	I	NC
16	EN2	I	编码器脉冲输入 2
17	AUX3	I/O	可选电路板端口 3
18	INT	I	电池电压监视器输入 低压电池 : L
19	OE	I	不使用
20	TOTCXO	I	QT/DQT 调制输出 (TCXO)
21	EEPDAT	I/O	EEPROM 数据输入 / 输出
22	TOVCO	O	QT/DQT 调制输出 (VCO)
23	AUX1	I	可选电路板端口 1
24	SFTSTB	O	偏移寄存器选通输出
25	EN1	O	编码器脉冲输入 1
26	DACS	I	芯片选择输出 (最大偏差) 选择 : L
27	EN3	I	信道选择器输入
28	NC	O	NC
29	AUX4	O	可选电路板端口 4
30	AUX2	I/O	可选电路板端口 2
31	KOUT3	O	按键扫描输出 3
32	KOUT2	O	按键扫描输出 2
33	TXD	O	串行数据
34	PTT/RXD	I	PTT 开启 : L / 串行数据
35	KOUT1	O	按键扫描输出 1
36	KOUT0	O	按键扫描输出 0
37	RDY	-	不使用
38	ALE	O	不使用
39	HOLD	I	不使用
40	HLDA	O	不使用
41	BLCK	O	不使用
42	RD	O	读出信号
43	BHE	O	不使用
44	WR	O	写入信号
45	LCDCS	O	LCD 芯片有效输出
46	CNTDAT	O	公用数据输出 (EEPROM, LCD, SHIFT REG, 1bit D/A MODEM)
47	CNTCLK	O	公用数据输出 (EEPROM, LCD, SHIFT REG, 1bit D/A MODEM)

SEMICONDUCTOR DATA / 半导体数据

Pin No.	Port Name	I/O	Function
48	CSO	-	Chip select signal
49	A19	-	Not used
50-59	A18-A9	-	Flash memory address bus
60	ACC	-	+5V
61	A8	-	Flash memory address bus
62	VSS	-	GND
63-70	A7-A0	-	Flash memory address bus
71-75	KIN0-KIN4	I	Key scan input
76	PLLUL	O	PLL unlock detect input unlock: L
77	PLLSTB	O	PLL strobe output Latch: L
78	SAVE	I	Battery save output
79-86	D7-D0	-	Flash memory data bus
87	KEYAD	I	MONI LAMP key input
88	BATT	I	Battery voltage input
89	RFDAT	O	PLL data output
90	RFCLK	O	PLL clock output
91	NC	-	NC
92	RSSQL	I	Receive signal strength indicator input
93	ANLSQL	I	Analog squelch level input
94	AVSS	-	GND
95	TOI	I	QT/DQT signal input
96	VREF	-	Reference voltage input
97	AVCC	-	GND
98	DTMPD	O	DTMF IC power control Power down: H
99	DTMCLK	O	DTMF IC decode clock output
100	DTMDAT	I	DTMF IC decode data input

管脚序号	端口名称	输入/输出	功能
48	CSO	-	芯片选择信号
49	A19	-	不使用
50-59	A18-A9	-	Flash 存储器地址总线
60	ACC	-	+ 5V
61	A8	-	Flash 存储器地址总线
62	VSS	-	接地
63-70	A7-A0	-	Flash 存储器地址总线
71-75	KIN0-KIN4	I	按键扫描输入
76	PLLUL	O	PLL 失锁检测输入 失锁 : L
77	PLLSTB	O	PLL 选通输出 锁存 : L
78	SAVE	I	电池生电输出
79-86	D7-D0	-	Flash 存储器数据总线
87	KEYAD	I	MONI LAMP 按键输入
88	BATT	I	电池电压输入
89	RFDAT	O	PLL 数据输出
90	RFCLK	O	PLL 时钟输出
91	NC	-	NC
92	RSSQL	I	接收信号强度指示器输入
93	ANLSQL	I	模拟静噪抑制电路电平输入
94	AVSS	-	接地
95	TOI	I	QT/DQT 信号输入
96	VREF	-	参考电压输入
97	AVCC	-	GND
98	DTMPD	O	DTMF 芯片功率控制 功率降低 : H
99	DTMCLK	O	DTMF 芯片解码时钟输出
100	DTMDAT	I	DTMF 芯片解码数据输入

Shift register 1:BU4094BCFV(IC5)

■ Pin function

Pin No.	Port	I/O	Function
4	W/N	O	Wide/Narrow SW Narrow: L
5	MMUTE	O	RX audio/MIC mute Mute: L
6	NC	O	NC
7	LED0	O	RED LED LED lights: H
11	BSHIFT	O	Beat Shift Shift on: H
12	REG2	O	Base Band IC inter register select 2
13	REG1	O	Base Band IC inter register select 1
14	LED1	O	GREEN LED LED lights: H

偏移寄存器 1 : BU4094BCFV (IC5)

■ 管脚功能

管脚序号	端口	输入/输出	功能
4	W/N	O	宽带 / 窄带转换开关 窄带 : L
5	MMUTE	O	接收音频 / 话筒静音 静音 : L
6	NC	O	NC
7	LED0	O	红色指示灯 指示灯燃亮 : H
11	BSHIFT	O	拍频偏移 转移开启 : H
12	REG2	O	基本频带芯片中间寄存器选择 2
13	REG1	O	基本频带芯片中间寄存器选择 1
14	LED1	O	绿色指示灯 指示灯燃亮 : H

Shift register 2:BU4094BCFV(IC6)

■ Pin function

Pin No.	Port	I/O	Function
4	5MC	O	5MC control Power on: L
5	5RC	O	5R control Power on: L
6	5TC	O	5T control Power on: H
7	SPMUTE	O	AF amp power supply control Power on: H
11	AUX6	O	Option board port 6
12	AUX5	O	Option board port 5
13	LCDBLK	O	LCD back light Back light on: L
14	RX	O	RX/TX VCO SW RX: L

偏移寄存器 2 : BU4094BCFV (IC6)

■ 管脚功能

管脚序号	端口	输入/输出	功能
4	5MC	O	5MC 控制 电源开启 : L
5	5RC	O	5R 控制 电源开启 : L
6	5TC	O	5T 控制 电源开启 : H
7	SPMUTE	O	音频放大器电源控制 电源开启 : H
11	AUX6	O	可选电路板端口 6
12	AUX5	O	可选电路板端口 5
13	LCDBLK	O	LCD 背景灯光 背景灯光开启 : L
14	RX	O	接收 / 发射压控振荡器转换开关 接收 : L

COMPONENTS DESCRIPTION / 元件说明

DISPLAY UNIT (X54-3250-10)

Ref. No.	Use/Function	Operation/Condition
IC501	IC	LCD driver
Q501	Transistor	Current driver / LCD back light LED AVR
Q502	Transistor	DC switch
D505	Diode	Speed up
D506	LED	LCD back light
D507	Diode	Voltage reference
D508~510	LED	LED /Key pad back light
D511	LED	LCD back light
D512~516	LED	LED /Key pad back light

TX-RX UNIT (X57-6500-21)

Ref. No.	Use/Function	Operation/Condition
IC1	IC	RF Power Module
IC2	IC	PLL system
IC3	IC	Comparator (APC)
IC4	IC	FM IF system
IC5,6	IC	Shift register / Output expander
IC7	IC	Voltage regulator / 5V
IC8	IC	Voltage detector / Reset
IC9	IC	Voltage detector / INT
IC10	IC	EEPROM
IC11	IC	AF Power amplifier
IC12	IC	Flash memory
IC13	IC	Microprocessor
IC14	IC	Audio processor
IC15(1/2)	IC	2Tone amplifier
IC15(2/2)	IC	AF Pre amplifier
IC16(1/2)	IC	Bias buffer
IC16(2/2)	IC	AF Buffer amplifier
IC17	IC	D/A converter (TX AF adjustment)
IC18	IC	DTMF decoder
IC19	IC	Active filter / For LSD in
Q1	Transistor	PLL IC fin amplifier
Q2	Transistor	VCO oscillation (TX)
Q3	Transistor	RF Buffer amplifier
Q4,5	Transistor	RF amplifier
Q6	Transistor	RF amplifier / TX driver
Q7	FET	DC switch
Q8,Q9	Transistor	DC switch
Q10	FET	VCO oscillation (RX)
Q11	Transistor	Ripple filter
Q12	Transistor	Tripler
Q13	Transistor	DC switch
Q14	Transistor	2 nd IF W/N switch sets to on when Narrow
Q15	Transistor	DC switch
Q16	Transistor	DC switch / 5R
Q17	Transistor	2 nd IF W/N switch sets to on when Wide
Q18	Transistor	DC switch / 5T, Save
Q19	FET	Mixer
Q20,Q21	Transistor	DC switch / 5T, Save
Q22	Transistor	IF amplifier
Q23	Transistor	DC switch / W/N audio amplitude adjust
Q24	Transistor	DC switch / LED (Red)
Q25	Transistor	DC switch / LED (Green)
Q26	Transistor	DC switch / Squelch
Q27	FET	DC switch / 5T, Save
Q28	Transistor	DC switch / 5M
Q30	FET	SP Mute switch

显示单元 (X54-3250-10)

Ref. No.	使用 / 功能	操作 / 状态
IC501	芯片	LCD 驱动器
Q501	晶体管	电流驱动器 / LCD 背景灯光 LED AVR
Q502	晶体管	直流转换开关
D505	二极管	提高速率
D506	发光二极管	LCD 背景灯光
D507	二极管	电源参考
D508~510	发光二极管	发光二极管 / 键盘背景灯光
D511	发光二极管	LCD 背景灯光
D512~516	发光二极管	发光二极管 / 键盘背景灯光

TX-RX 单元 (X57-6500-21)

Ref. No.	使用 / 功能	操作 / 状态
IC1	IC	射频功率模块
IC2	IC	锁相环电路系统
IC3	IC	比较器 (自动功率控制)
IC4	IC	中频系统
IC5,6	IC	偏移寄存器 / 输出扩展器
IC7	IC	电压调节器 / 5V
IC8	IC	电压检测器 / 复位
IC9	IC	电压检测器 / INT
IC10	IC	EEPROM
IC11	IC	音频功率放大器
IC12	IC	Flash 存储器
IC13	IC	微处理器
IC14	IC	音频处理器
IC15(1/2)	IC	双音信令放大器
IC15(2/2)	IC	音频前置放大器
IC16(1/2)	IC	偏压缓冲器
IC16(2/2)	IC	音频缓冲放大器
IC17	IC	数字 / 模拟转换器 (发射音频调整)
IC18	IC	DTMF 解码器
IC19	IC	有源滤波器 / 为 LSD 内
Q1	晶体管	锁相环电路芯片终止放大器
Q2	晶体管	压控振荡器 (发射)
Q3	晶体管	射频缓冲放大器
Q4,5	晶体管	射频放大器
Q6	晶体管	射频放大器 / 发射驱动器
Q7	场效应管	直流开关
Q8,Q9	晶体管	直流开关
Q10	场效应管	压控振荡器 (接收)
Q11	晶体管	脉动滤波器
Q12	晶体管	三倍频
Q13	晶体管	直流开关
Q14	晶体管	当窄带时第二中频宽/窄转换开关设定为开启
Q15	晶体管	直流开关
Q16	晶体管	直流开关 / 5R
Q17	晶体管	当宽带时第二中频宽/窄转换开关设定为开启
Q18	晶体管	直流开关 / 5T, 省电
Q19	场效应管	混频器
Q20,Q21	晶体管	直流开关 / 5T, 省电
Q22	晶体管	中频放大器
Q23	晶体管	直流开关 / 宽 / 窄音频振幅调整
Q24	晶体管	直流开关 / 发光二极管 (红色)
Q25	晶体管	直流开关 / 发光二极管 (绿色)
Q26	晶体管	直流开关 / 静音抑制电路
Q27	场效应管	直流开关 / 5T, 省电
Q28	晶体管	直流开关 / 5M
Q30	场效应管	扬声器静音开关

COMPONENTS DESCRIPTION / 元件说明

Ref. No.	Use/Function	Operation/Condition
Q31	Transistor	Clock frequency shift
Q32~34	Transistor	DC switch / SP Mute
Q35(1/2)	FET	Mute switch / MIC line mute
Q35(2/2)	FET	DC switch
Q36	FET	Mute switch
Q39	FET	Mute switch / DET line Mute
Q301	FET	RF amplifier
D1	Diode	Unlock detect
D2	Variable capacitance diode	Frequency control
D3	Diode	ANT switch
D4	Variable capacitance diode	Frequency control
D5	Diode	TX/RX switch
D6	Variable capacitance diode	TX modulation
D7	Diode	ANT switch
D8	Zener Diode	Overload protection
D9	Variable capacitance diode	Frequency control
D10	Diode	TX/RX switch
D11	Variable capacitance diode	Frequency control
D12	Diode	Current steering
D13,14	Diode	RF switch (2 nd IF wide/narrow)
D15	Diode	Reverse protection
D18	LED	LED/ Red, Green
D21	Diode	Reverse protection
D22	Diode	Reverse protection
D23	Diode	Voltage clamp
D27	Diode	Discharge speed up
D28	Diode	Voltage pull up

Ref. No.	使用 / 功能	操作 / 状态
Q31	晶体管	时钟频率偏移
Q32~34	晶体管	直流开关 / 扬声器静音
Q35(1/2)	场效应管	静音开关 / 扬声器引线静音
Q35(2/2)	场效应管	直流开关
Q36	场效应管	静音开关
Q39	场效应管	静音开关 / DET line 静音
Q301	场效应管	射频放大器
D1	二极管	失锁检测
D2	变容二极管	频率控制
D3	二极管	天线开关
D4	变容二极管	频率控制
D5	二极管	发射 / 接收开关
D6	变容二极管	调制发射
D7	二极管	天线开关
D8	基纳二极管	超载保护
D9	变容二极管	频率控制
D10	二极管	发射 / 接收开关
D11	变容二极管	频率控制
D12	二极管	电流方向
D13,14	二极管	射频开关 (第二中频宽 / 窄)
D15	二极管	反向保护
D18	发光二极管	发光二极管 / 红色, 绿色
D21	二极管	电压降低
D22	二极管	反向保护
D23	二极管	钳位电压
D27	二极管	放电加速
D28	二极管	电压保持

TK-388G

PARTS LIST / 零件表

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

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

TK-388G (Y50-5280-21)
DISPLAY UNIT (X54-3250-10)
TX-RX UNIT (X57-6500-21)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-388G					
1	1A	*	A02-2385-53	CABINET ASSY	
2	3B		A82-0036-02	REAR PANEL	
3	2C		B09-0351-03	CAP(SP/MIC)	
4	2B		B11-1220-03	ILLUMINATION GUIDE	
5	2B		B38-0820-05	LCD	
6	2D	*	B62-1688-00	INSTRUCTION MANUAL	
7	3A	*	B72-2119-04	MODEL NAME PLATE	
8	3B		E04-0413-05	RF COAXIAL RECEPTACLE(SMA)	
9	3A		E23-1183-04	RELAY TERMINAL(BATT -)	
10	2B		E23-1184-04	RELAY TERMINAL(BATT +)	
11	2B		E29-1177-04	INTER CONNECTOR(LCD)	
12	2A		E37-0805-05	FLAT CABLE(TX/RX-DISPLAY UNIT)	
13	1B		E37-0829-05	SPEAKER LEAD ASSY	
14	3A		E37-0830-05	FLAT CABLE(PTT)	
15	2B		F10-2302-04	SHIELDING COVER(POWER MODULE)	
16	2A		F10-2304-03	SHIELDING COVER(TX-RX UNIT)	
17	2A		F20-3307-04	INSULATING SHEET(LCD)	
18	2A		F20-3308-04	INSULATING SHEET(DISPLAY UNIT)	
19	1A		G01-0881-04	COIL SPRING(BATT RELEASE)	
20	1B		G10-1232-04	FIBROUS SHEET(SP)	
21	3A	*	G11-4252-14	SHEET(PTT)	
22	3B		G13-1744-14	CUSHION(CHASSIS-BATT)	
23	3B		G13-1783-04	CUSHION(POWER MODULE COVER)	
24	2B	*	G13-1867-14	CUSHION(BATT TERMINAL)	
25	1B		G53-0882-03	PACKING(SP)	
26	2B		G53-0883-04	PACKING(BATT TERMINAL +)	
27	1A		G53-0891-04	PACKING(PTT KNOB)	
28	3B		G53-1528-04	PACKING(SMA)	
29	3B		G53-1530-02	PACKING(SIDE)	
30	2B		G53-1531-03	PACKING(SP/MIC)	
31	1C,2D		H12-1487-02	PACKING FIXTURE	
32	1D		H25-0085-04	PROTECTION BAG (100/200/0.07)	
33	2C		H25-2012-04	PROTECTION BAG (75/100/0.08)	
34	3D	*	H52-1953-02	ITEM CARTON CASE	
35	1A		J19-1572-04	HOLDER(BATT RELEASE)	
36	2B		J19-5352-03	HOLDER(VOL/ENC)	
37	2B	*	J19-5353-24	HOLDER(BATT TERMINAL +)	
38	2C		J21-4493-04	HARDWARE FIXTURE(SP/MIC)	
39	2B		J21-8377-03	HARDWARE FIXTURE(LCD)	
40	1B		J21-8378-04	HARDWARE FIXTURE(SP)	
41	2C		J21-8393-04	HARDWARE FIXTURE(HAND STRAP)	
42	2C		J21-8399-04	HARDWARE FIXTURE ASSY(HAND STRAP)	
43	2C		J29-0658-05	BELT HOOK	
44	2A		J32-0925-04	HEXAGON BOSS	
45	2C		J69-0339-05	HAND STRAP	
46	1B		J69-0345-04	RING(VOL/ENC)	
47	2C		J69-0349-04	RING(HAND STRAP)	
48	1B		K29-5331-03	KNOB(ENCODER)	
49	1B		K29-5332-03	KNOB(VOLUME)	
50	1A		K29-5333-13	BUTTON KNOB(MONI/LAMP)	
51	1A	*	K29-5334-23	BUTTON KNOB(PTT)	
52	1A		K29-5337-03	LEVER KNOB(BATT RELEASE)	

Ref. No.	Address	New parts	Parts No.	Description	Destination
53	1A		K29-5459-12	KEY TOP(DTMF)	
A	3B		N09-2319-05	BINDING HEAD SCREW(SMA)	
B	2B		N09-2331-05	SPECIAL SCREW(BATT TERMINAL +)	
C	1B		N14-0582-14	CIRCULAR NUT(SMA)	
D	1B		N14-0589-04	CIRCULAR NUT(VOL/ENC)	
E	3A		N30-2606-46	PAN HEAD MACHINE SCREW(CHASSIS)	
F	2A		N39-2030-46	PAN HEAD MACHINE SCREW(LCD)	
G	2B		N67-2005-46	PAN HEAD SEMS SCREW W/POWER MODULE)	
H	3A,3B		N78-2045-46	PAN HEAD TAPTITE SCREW(TX-RX B/2)	
I	3A		N79-2030-46	PAN HEAD TAPTITE SCREW(BATT TERMINAL -)	
J	1B		N83-2005-46	PAN HEAD TAPTITE SCREW(TX-RX A/2)	
54	2C		N99-2012-05	SCREW SET	
VR2			R31-0628-15	VARIABLE RESISTOR(VOLUME)	
55	1B		T07-0326-05	SPEAKER	
56	2D		T90-0735-05	HELICAL ANTENNA	
S1			W02-1969-15	ENCODER	
DISPLAY UNIT (X54-3250-10)					
D506			B30-2210-05	LED(LCD BACKLIGHT)	
D508-510			B30-2171-05	LED(KEY BACKLIGHT)	
D511			B30-2210-05	LED(LCD BACKLIGHT)	
D512-516			B30-2171-05	LED(KEY BACKLIGHT)	
C501-509			CC73GCH1H221J	CHIP C 220PF J	
C513			CK73GB1H102K	CHIP C 1000PF K	
C515,516			CC73GCH1H101J	CHIP C 100PF J	
CN501			E40-6012-05	FLAT CABLE CONNECTOR	
L501,502			L92-0138-05	FERRITE CHIP	
CP501			R90-0748-05	MULTI-COMP 47K X4	
CP502,503			R90-0724-05	MULTI-COMP 1K X4	
R501-510			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R511			R92-1252-05	CHIP R 0 OHM J 1/16W	
R512			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R513-515			RK73GB1J103J	CHIP R 10K J 1/16W	
R516			RK73GB1J473J	CHIP R 47K J 1/16W	
R517			RK73GB1J103J	CHIP R 10K J 1/16W	
R518			RK73GB1J471J	CHIP R 470 J 1/16W	
R519-522			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R523			RK73GB1J473J	CHIP R 47K J 1/16W	
R524			RK73GB1J471J	CHIP R 470 J 1/16W	
D501-504			MA2S111	DIODE	
D505			1SS373	DIODE	
D507			MA2S111	DIODE	
IC501			LC75823W	MOS IC	
Q501			2SB1132(Q,R)	TRANSISTOR	
Q502			2SC4617(S)	TRANSISTOR	
TX-RX UNIT (X57-6500-21)					
D18			B30-2019-05	LED(RED/GREEN)	
C2			CC73GCH1H070B	CHIP C 7.0PF B	
C3			CC73GCH1H1R5B	CHIP C 1.5PF B	

PARTS LIST / 零件表

TX-RX UNIT (X57-6500-21)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C4,5			CC73GCH1H020B	CHIP C 2.0PF B		C95,96			CK73GB1H471K	CHIP C 470PF K	
C6			CK73HB1A104K	CHIP C 0.10UF K		C98			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C7			CC73GCH1H070B	CHIP C 7.0PF B		C99			CK73GB1C104K	CHIP C 0.10UF K	
C8			CC73GCH1H030B	CHIP C 3.0PF B		C100			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C9			CK73HB1H471K	CHIP C 470PF K		C101			CK73GB1H471K	CHIP C 470PF K	
C10			CC73GCH1H100D	CHIP C 10PF D		C104			CK73GB1H471K	CHIP C 470PF K	
C11			CC73GCH1H220J	CHIP C 22PF J		C107,108			CK73GB1C104K	CHIP C 0.10UF K	
C12			CC73GCH1H100D	CHIP C 10PF D		C109			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C13			CK73GB1H471K	CHIP C 470PF K		C110			CK73GB1H103K	CHIP C 0.010UF K	
C14			CC73GCH1H0R5B	CHIP C 0.5PF B		C111			CK73GB1H471K	CHIP C 470PF K	
C16,17			CC73GCH1H040B	CHIP C 4.0PF B		C112			CC73GCH1H080B	CHIP C 8.0PF B	
C18			CC73GCH1H060B	CHIP C 6.0PF B		C113			CK73GB1H471K	CHIP C 470PF K	
C20			CC73GCH1H030B	CHIP C 3.0PF B		C114			CK73GB1H391K	CHIP C 390PF K	
C22			CC73GCH1H101J	CHIP C 100PF J		C115			CK73GB1C104K	CHIP C 0.10UF K	
C23			CC73GCH1H070B	CHIP C 7.0PF B		C118			CK73GB1H471K	CHIP C 470PF K	
C24			CC73GCH1H080B	CHIP C 8.0PF B		C119			C92-0713-05	TAN C 10UF 6.3WV	
C25			CC73GCH1H090B	CHIP C 9.0PF B		C120,121			CK73GB1H471K	CHIP C 470PF K	
C26			CC73GCH1H040B	CHIP C 4.0PF B		C122			CK73FB1A105K	CHIP C 1.0UF K	
C27			CC73GCH1H0R5B	CHIP C 0.5PF B		C123			CK73GB1H391K	CHIP C 390PF K	
C28			CC73GCH1H060D	CHIP C 6.0PF D		C124			CC73GCH1H390J	CHIP C 39PF J	
C29			CC73GCH1H030B	CHIP C 3.0PF B		C125,126			CK73GB1H103K	CHIP C 0.010UF K	
C30			CC73GCH1H060D	CHIP C 6.0PF D		C127			CC73GCH1H010B	CHIP C 1.0PF B	
C31			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C128			CC73GCH1H120J	CHIP C 12PF J	
C32			CK73HB1A104K	CHIP C 0.10UF K		C130			CK73GB1H471K	CHIP C 470PF K	
C33			CC73GCH1H050B	CHIP C 5.0PF B		C131			CC73GCH1H100D	CHIP C 10PF D	
C35-41			CK73GB1H471K	CHIP C 470PF K		C132			CK73GB1H103K	CHIP C 0.010UF K	
C42,43			CC73GCH1H101J	CHIP C 100PF J		C133			CC73GCH1H680J	CHIP C 68PF J	
C44			CC73HCH1H101J	CHIP C 100PF J		C134			CK73GB1H471K	CHIP C 470PF K	
C45			CK73GB1H471K	CHIP C 470PF K		C135			CK73GB1C104K	CHIP C 0.10UF K	
C48			C92-0503-05	CHIP-TAN 0.068UF 35WV		C136			CC73GCH1H040B	CHIP C 4.0PF B	
C49			C92-0002-05	CHIP-TAN 0.22UF 35WV		C137			CK73GB1H471K	CHIP C 470PF K	
C51			C92-0501-05	CHIP-TAN 1.5UF 10WV		C138			CK73GB1C104K	CHIP C 0.10UF K	
C52			CC73GCH1H040B	CHIP C 4.0PF B		C139			CC73GCH1H181J	CHIP C 180PF J	
C53			CK73GB1H471K	CHIP C 470PF K		C140			CK73GB1H103K	CHIP C 0.010UF K	
C54			CK73FB1C474K	CHIP C 0.47UF K		C141			CK73GB1C104K	CHIP C 0.10UF K	
C55			CK73GB1H471K	CHIP C 470PF K		C142			CK73FB1A105K	CHIP C 1.0UF K	
C57			CK73FB1C474K	CHIP C 0.47UF K		C143,144			CK73GB1H471K	CHIP C 470PF K	
C58			CK73GB1H103K	CHIP C 0.010UF K		C146,147			CK73GB1C104K	CHIP C 0.10UF K	
C60			CK73GB1H103K	CHIP C 0.010UF K		C148			CK73GB1H103K	CHIP C 0.010UF K	
C62			CC73GCH1H390J	CHIP C 39PF J		C150			CK73GB1H102K	CHIP C 1000PF K	
C63			CC73GCH1H030B	CHIP C 3.0PF B		C151-153			CK73GB1H471K	CHIP C 470PF K	
C64			CC73GCH1H010B	CHIP C 1.0PF B		C155			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C68			C92-0565-05	CHIP-TAN 6.8UF 10WV		C156,157			CK73GB1H471K	CHIP C 470PF K	
C70			CK73GB1H103K	CHIP C 0.010UF K		C158			CK73FB1A105K	CHIP C 1.0UF K	
C71			CC73GCH1H101J	CHIP C 100PF J		C159			CK73GB1H471K	CHIP C 470PF K	
C72			CC73GCH1H100C	CHIP C 10PF C		C161			CK73GB1H471K	CHIP C 470PF K	
C73			CK73GB1H471K	CHIP C 470PF K		C162			CK73GB1H103K	CHIP C 0.010UF K	
C74			CK73FB1E104K	CHIP C 0.10UF K		C163,164			CK73GB1H471K	CHIP C 470PF K	
C75			CK73GB1H471K	CHIP C 470PF K		C165			CK73GB1H103K	CHIP C 0.010UF K	
C76			CK73GB1H102K	CHIP C 1000PF K		C166			CK73FF1E104Z	CHIP C 0.10UF Z	
C78			CC73GCH1H470J	CHIP C 47PF J		C167			CK73GB1H471K	CHIP C 470PF K	
C81			CC73GCH1H010C	CHIP C 1.0PF C		C170,171			CK73GB1H471K	CHIP C 470PF K	
C82			CK73GB1H102K	CHIP C 1000PF K		C173			C92-0567-05	CHIP-TAN 68UF 6.3WV	
C84,85			CK73GB1H471K	CHIP C 470PF K		C174			CK73GB1H471K	CHIP C 470PF K	
C86,87			CC73HCH1H100C	CHIP C 10PF C		C176			CC73GCH1H101J	CHIP C 100PF J	
C88			CC73GCH1H040B	CHIP C 4.0PF B		C177			CK73GB1C473K	CHIP C 0.047UF K	
C89			CC73GCH1H050B	CHIP C 5.0PF B		C178			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C90			C92-0560-05	CHIP-TAN 10UF 6.3WV		C179			CK73GB1C104K	CHIP C 0.10UF K	
C92			CC73GCH1H470G	CHIP C 47PF G		C180			CK73GB1H103K	CHIP C 0.010UF K	
C94			C92-0560-05	CHIP-TAN 10UF 6.3WV		C182			CK73GB1H102K	CHIP C 1000PF K	

PARTS LIST / 零件表

TX-RX UNIT (X57-6500-21)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C183,184			CK73GB1C104K	CHIP C 0.10UF K		C262			CK73GB1H102K	CHIP C 1000PF K	
C185			CC73GCH1H180J	CHIP C 18PF J		C263			CK73GB1C104K	CHIP C 0.10UF K	
C186,187			CK73GB1C104K	CHIP C 0.10UF K		C265,266			CK73GB1C104K	CHIP C 0.10UF K	
C189			CK73GB1H103K	CHIP C 0.010UF K		C268			CK73GB1H102K	CHIP C 1000PF K	
C190,191			CK73GB1C104K	CHIP C 0.10UF K		C269			CK73GB1H152K	CHIP C 1500PF K	
C192,193			CC73GCH1H300J	CHIP C 30PF J		C270			CK73GB1H222K	CHIP C 2200PF K	
C194			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C271			CK73GB1H102K	CHIP C 1000PF K	
C196			CC73GCH1H101J	CHIP C 100PF J		C273-276			CK73GB1H471K	CHIP C 470PF K	
C198,199			CK73GB1H103K	CHIP C 0.010UF K		C277			CC73GCH1H680J	CHIP C 68PF J	
C200			CK73GB1A224K	CHIP C 0.22UF K		C278			CK73GB1C104K	CHIP C 0.10UF K	
C201			CK73GB1H103K	CHIP C 0.010UF K		C302			CC73GCH1H030B	CHIP C 3.0PF B	
C202,203			CK73GB1C104K	CHIP C 0.10UF K		C303			CC73GCH1H060B	CHIP C 6.0PF B	
C204			CK73FB1C474K	CHIP C 0.47UF K		C304			CK73GB1H471K	CHIP C 470PF K	
C205			CK73GB1H103K	CHIP C 0.010UF K		C305			CC73GCH1H010B	CHIP C 1.0PF B	
C206-208			CK73GB1C104K	CHIP C 0.10UF K		C306			CC73GCH1H1R5B	CHIP C 1.5PF B	
C209			CK73GB1H472K	CHIP C 4700PF K		C307			CC73GCH1H220J	CHIP C 22PF J	
C210			CK73GB1H102K	CHIP C 1000PF K		C309			CK73GB1H471K	CHIP C 470PF K	
C211			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C311,312			CC73GCH1H060B	CHIP C 6.0PF B	
C212			CK73GB1H122K	CHIP C 1200PF K		C314			CC73GCH1H040B	CHIP C 4.0PF B	
C213			CK73GB1H103K	CHIP C 0.010UF K		C316,317			CK73GB1H471K	CHIP C 470PF K	
C215			CK73GB1C104K	CHIP C 0.10UF K		C325-327			CK73GB1H471K	CHIP C 470PF K	
C216			CK73GB1H472K	CHIP C 4700PF K		C336			CK73FB1A105K	CHIP C 1.0UF K	
C217			CK73GB1E153K	CHIP C 0.015UF K		C337			CK73HB1H471K	CHIP C 470PF K	
C218			CK73FB1H563K	CHIP C 0.056UF K		TC1,2			C05-0384-05	CERAMIC TRIMMER CAP(10PF)	
C219,220			CK73GB1C104K	CHIP C 0.10UF K		TC301,302			C05-0384-05	CERAMIC TRIMMER CAP(10PF)	
C221			CK73GB1H471K	CHIP C 470PF K		TC303			C05-0385-05	CERAMIC TRIMMER CAP(20PF)	
C222			CK73GB1H103K	CHIP C 0.010UF K		CN1			E40-6012-05	FLAT CABLE CONNECTOR	
C223			C92-0560-05	CHIP-TAN 10UF 6.3WV		CN3			E40-5662-05	PIN ASSY SOCKET	
C224			CK73GB1H122K	CHIP C 1200PF K		CN5			E40-5932-05	PIN ASSY SOCKET	
C225			CC73GCH1H101J	CHIP C 100PF J		J1			E11-0457-05	PHONE JACK(2.5/3.5)	
C226,227			CK73GB1H562J	CHIP C 5600PF J		F1			F53-0130-05	FUSE(3A)	
C229			CK73FB1H471K	CHIP C 470PF K		F1			F53-0217-05	FUSE(3A)	
C230			CK73GB1H562J	CHIP C 5600PF J		CD1			L79-1794-05	TUNING COIL	
C231			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		CF1			L72-0968-05	CERAMIC FILTER	
C232			CK73GB1H103K	CHIP C 0.010UF K		CF2			L72-0969-05	CERAMIC FILTER	
C233			CC73GCH1H151J	CHIP C 150PF J		L2			L92-0138-05	FERRITE CHIP	
C234,235			CK73GB1H272J	CHIP C 2700PF J		L3			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)	
C236			CK73GB1C104K	CHIP C 0.10UF K		L4			L33-0751-05	SMALL FIXED INDUCTOR	
C238			CK73GB1H392K	CHIP C 3900PF K		L5-7			L34-4547-05	AIR-CORE COIL	
C239			CK73GB1C104K	CHIP C 0.10UF K		L8			L40-2275-92	SMALL FIXED INDUCTOR(22NH)	
C240			CK73GB1H272J	CHIP C 2700PF J		L9			L40-1575-92	SMALL FIXED INDUCTOR(15NH)	
C241			CK73GB1H471K	CHIP C 470PF K		L10			L40-1095-34	SMALL FIXED INDUCTOR(1UH)	
C242			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		L11			L40-1092-81	SMALL FIXED INDUCTOR	
C243			CK73FB1A105K	CHIP C 1.0UF K		L12			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)	
C244			C92-0560-05	CHIP-TAN 10UF 6.3WV		L14			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
C245			CK73GB1H471K	CHIP C 470PF K		L15			L40-1085-92	SMALL FIXED INDUCTOR(100NH)	
C246			CK73FB1A105K	CHIP C 1.0UF K		L17			L34-4547-05	AIR-CORE COIL	
C247			CK73GB1E123K	CHIP C 0.012UF K		L18-20			L92-0138-05	FERRITE CHIP	
C248			CK73GB1H103K	CHIP C 0.010UF K		L21			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
C249			CK73GB1H222K	CHIP C 2200PF K		L22			L40-1885-92	SMALL FIXED INDUCTOR(180NH)	
C250			CK73GB1C683K	CHIP C 0.068UF K		L23			L92-0138-05	FERRITE CHIP	
C251			CK73GB1C104K	CHIP C 0.10UF K		L24			L40-2281-37	SMALL FIXED INDUCTOR(0.220UH)	
C252			CK73GB1C473K	CHIP C 0.047UF K		L25			L40-2785-92	SMALL FIXED INDUCTOR(270NH)	
C253,254			CK73GB1H103K	CHIP C 0.010UF K		L26			L33-1287-05	CHOKO COIL	
C255			CK73GB1H183K	CHIP C 0.018UF K		L27			L92-0149-05	FERRITE CHIP	
C257			CK73GB1E153K	CHIP C 0.015UF K		L30			L40-2702-86	SMALL FIXED INDUCTOR(27UH)	
C258			CK73GB1C333K	CHIP C 0.033UF K		L31			L40-2785-92	SMALL FIXED INDUCTOR(270NH)	
C259			CC73GCH1H121J	CHIP C 120PF J		L32			L40-1005-85	SMALL FIXED INDUCTOR(10UH)	
C260			CK73GB1H183K	CHIP C 0.018UF K							
C261			CK73GB1E153K	CHIP C 0.015UF K							

PARTS LIST / 零件表

TX-RX UNIT (X57-6500-21)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L34			L92-0140-05	FERRITE CHIP		R36			RK73GB1J473J	CHIP R	47K J 1/16W
L35			L40-2275-92	SMALL FIXED INDUCTOR(22NH)		R37			RK73GB1J392J	CHIP R	3.9K J 1/16W
L36			L40-1085-85	SMALL FIXED INDUCTOR(0.10UH)		R38			RK73GB1J101J	CHIP R	100 J 1/16W
L37			L40-6885-85	SMALL FIXED INDUCTOR(0.68UH)		R39			RK73GB1J220J	CHIP R	22 J 1/16W
L38			L92-0138-05	FERRITE CHIP		R41			RK73GB1J100J	CHIP R	10 J 1/16W
L39			L92-0149-05	FERRITE CHIP		R42			RK73GB1J101J	CHIP R	100 J 1/16W
L40,41			L92-0138-05	FERRITE CHIP		R43			RK73GB1J221J	CHIP R	220 J 1/16W
L42			L92-0131-05	FERRITE CHIP		R44			RK73GB1J102J	CHIP R	1.0K J 1/16W
L43,44			L92-0138-05	FERRITE CHIP		R45			RK73GB1J562J	CHIP R	5.6K J 1/16W
L48			L40-3375-57	SMALL FIXED INDUCTOR(33NH 5%)		R46			RN73GH1J154D	CHIP R	150K D 1/16W
L302			L34-4546-05	AIR-CORE COIL		R47			RK73GB1J104J	CHIP R	100K J 1/16W
L303			L40-1085-92	SMALL FIXED INDUCTOR(100NH)		R48			RK73GB1J564J	CHIP R	560K J 1/16W
L304-306			L34-4546-05	AIR-CORE COIL		R49			RK73GB1J103J	CHIP R	10K J 1/16W
L307			L40-4785-85	SMALL FIXED INDUCTOR(0.47UH)		R50			RN73GH1J154D	CHIP R	150K D 1/16W
L308-310			L34-4546-05	AIR-CORE COIL		R51			RK73GB1J102J	CHIP R	1.0K J 1/16W
L312			L40-1575-92	SMALL FIXED INDUCTOR(15NH)		R52			RK73GB1J101J	CHIP R	100 J 1/16W
L313			L40-1075-92	SMALL FIXED INDUCTOR(10NH)		R53			RK73GB1J472J	CHIP R	4.7K J 1/16W
L314			L40-2275-92	SMALL FIXED INDUCTOR(22NH)		R54			RN73GH1J154D	CHIP R	150K D 1/16W
X1			L77-1833-05	TCXO(16.8MHZ)		R55			RK73GB1J105J	CHIP R	1.0M J 1/16W
X2			L78-0479-05	RESONATOR(3.58MHZ)		R56-58			RK73EB2ER39K	CHIP R	0.39 K 1/4W
X3			L77-1810-05	CRYSTAL RESONATOR(9.8304MHZ)		R59			RN73GH1J154D	CHIP R	150K D 1/16W
X3			L77-1835-05	CRYSTAL RESONATOR(9.8304MHZ)		R60			R92-1252-05	CHIP R	0 OHM J 1/16W
XF1			L71-0601-05	CRYSTAL FILTER(49.95MHZ)		R61			RK73GB1J563J	CHIP R	56K J 1/16W
CP1			R90-0724-05	MULTI-COMP 1K X4		R62			RN73GH1J154D	CHIP R	150K D 1/16W
CP2-9			R90-0741-05	MULTIPLE RESISTOR		R64,65			RK73GB1J104J	CHIP R	100K J 1/16W
CP10			R90-0724-05	MULTI-COMP 1K X4		R67			RK73GB1J104J	CHIP R	100K J 1/16W
CP11-18			R90-0741-05	MULTIPLE RESISTOR		R68			RN73GH1J154D	CHIP R	150K D 1/16W
CP19			R90-0718-05	MULTI-COMP 4.7K X4		R69			RK73GB1J220J	CHIP R	22 J 1/16W
CP20			RK75HA1J472J	CHIP-COM 4.7K J 1/16W		R70			RK73GB1J104J	CHIP R	100K J 1/16W
R1			RK73HB1J124J	CHIP R 120K J 1/16W		R71			RK73GB1J124J	CHIP R	120K J 1/16W
R2			RK73HB1J104J	CHIP R 100K J 1/16W		R72			RK73GB1J103J	CHIP R	10K J 1/16W
R3			RK73GB1J392J	CHIP R 3.9K J 1/16W		R73			RK73GB1J273J	CHIP R	27K J 1/16W
R4			RK73HB1J102J	CHIP R 1.0K J 1/16W		R74,75			RK73GB1J223J	CHIP R	22K J 1/16W
R5			RK73GB1J152J	CHIP R 1.5K J 1/16W		R76			R92-1252-05	CHIP R	0 OHM J 1/16W
R6			R92-1252-05	CHIP R 0 OHM J 1/16W		R78,79			RK73GB1J153J	CHIP R	15K J 1/16W
R7			RK73HB1J100J	CHIP R 10 J 1/16W		R80,81			RK73GB1J223J	CHIP R	22K J 1/16W
R8			RK73HB1J102J	CHIP R 1.0K J 1/16W		R82			RK73GB1J102J	CHIP R	1.0K J 1/16W
R9			RK73GB1J332J	CHIP R 3.3K J 1/16W		R84			RK73GB1J474J	CHIP R	470K J 1/16W
R10			RK73GB1J331J	CHIP R 330 J 1/16W		R85			RK73GB1J102J	CHIP R	1.0K J 1/16W
R13			RK73GB1J472J	CHIP R 4.7K J 1/16W		R86			RK73GB1J334J	CHIP R	330K J 1/16W
R14			RK73GB1J332J	CHIP R 3.3K J 1/16W		R87			R92-1252-05	CHIP R	0 OHM J 1/16W
R16			RK73GB1J391J	CHIP R 390 J 1/16W		R88			RK73GB1J102J	CHIP R	1.0K J 1/16W
R17			RK73HB1J103J	CHIP R 10K J 1/16W		R89			RK73GB1J821J	CHIP R	820 J 1/16W
R18			RK73GB1J683J	CHIP R 68K J 1/16W		R90,91			RK73GB1J332J	CHIP R	3.3K J 1/16W
R19			RK73GB1J332J	CHIP R 3.3K J 1/16W		R92			RK73GB1J100J	CHIP R	10 J 1/16W
R20			RK73GB1J122J	CHIP R 1.2K J 1/16W		R93			RK73GB1J332J	CHIP R	3.3K J 1/16W
R21			RK73GB1J331J	CHIP R 330 J 1/16W		R94			RK73GB1J121J	CHIP R	120 J 1/16W
R22			RK73HB1J561J	CHIP R 560 J 1/16W		R95			RK73GB1J681J	CHIP R	680 J 1/16W
R23			RK73HB1J222J	CHIP R 2.2K J 1/16W		R96			RK73GB1J221J	CHIP R	220 J 1/16W
R24			RK73GB1J682J	CHIP R 6.8K J 1/16W		R97			RK73GB1J183J	CHIP R	18K J 1/16W
R25			RK73GB1J470J	CHIP R 47 J 1/16W		R98			RK73GB1J473J	CHIP R	47K J 1/16W
R26			RK73GB1J561J	CHIP R 560 J 1/16W		R99			RK73GB1J684J	CHIP R	680K J 1/16W
R27			RK73GB1J390J	CHIP R 39 J 1/16W		R100			RK73GB1J473J	CHIP R	47K J 1/16W
R28,29			RK73GB1J271J	CHIP R 270 J 1/16W		R101			RK73GB1J104J	CHIP R	100K J 1/16W
R30			RK73HB1J332J	CHIP R 3.3K J 1/16W		R102,103			RK73GB1J272J	CHIP R	2.7K J 1/16W
R31			RK73GB1J101J	CHIP R 100 J 1/16W		R104			RK73GB1J472J	CHIP R	4.7K J 1/16W
R33			RK73GB1J101J	CHIP R 100 J 1/16W		R105,106			RK73GB1J272J	CHIP R	2.7K J 1/16W
R34			RK73GB1J473J	CHIP R 47K J 1/16W		R107			RK73GB1J470J	CHIP R	47 J 1/16W
R35			RK73GB1J104J	CHIP R 100K J 1/16W		R108			RK73GB1J122J	CHIP R	1.2K J 1/16W
						R109			RK73GB1J102J	CHIP R	1.0K J 1/16W

PARTS LIST / 零件表

TX-RX UNIT (X57-6500-21)

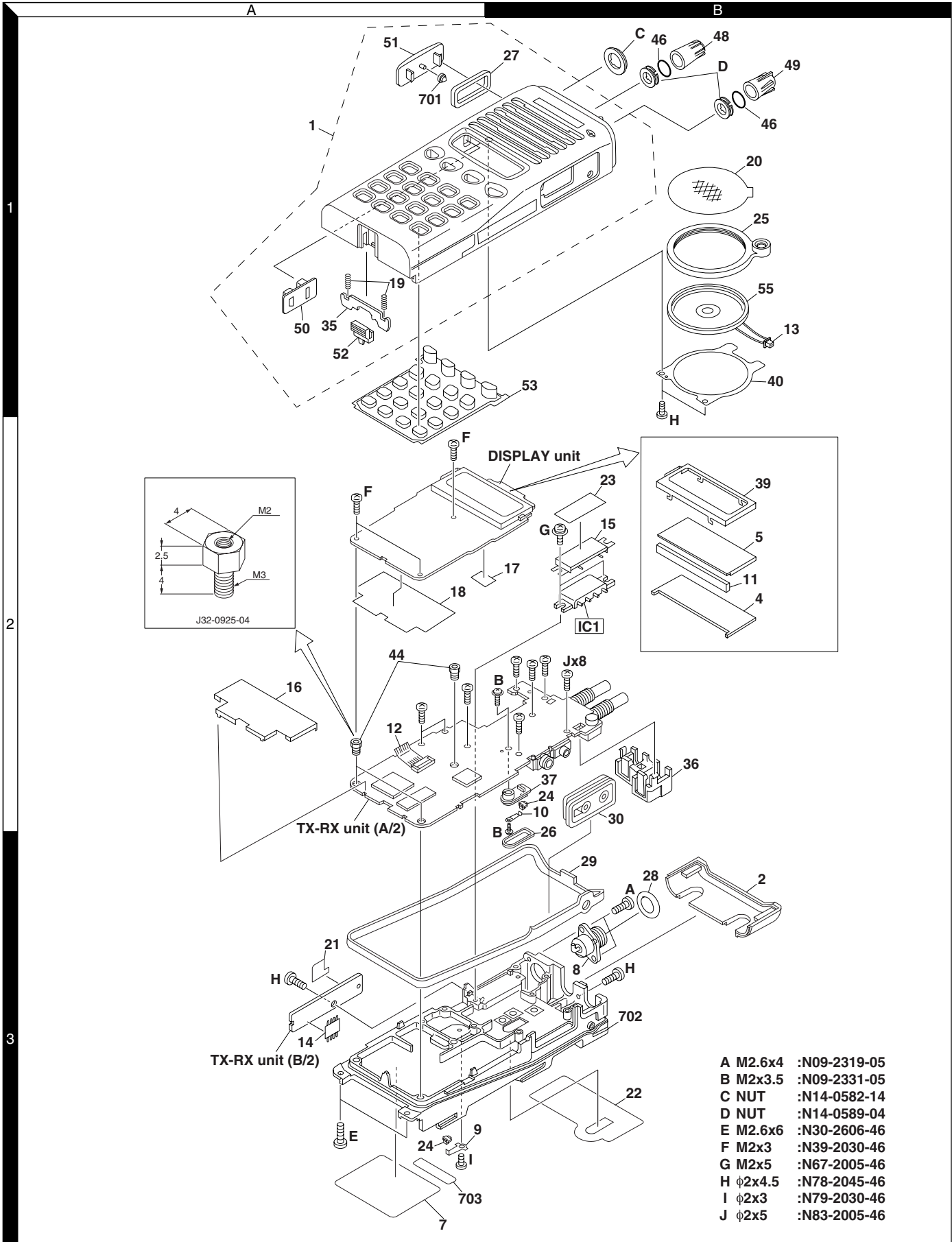
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R110,111			RK73GB1J103J	CHIP R 10K J 1/16W		R180			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R112			RK73GB1J102J	CHIP R 1.0K J 1/16W		R181			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R113			RK73GB1J391J	CHIP R 390 J 1/16W		R182,183			R92-1252-05	CHIP R 0 OHM J 1/16W	
R114,115			RK73GB1J103J	CHIP R 10K J 1/16W		R184			RK73GB1J273J	CHIP R 27K J 1/16W	
R116,117			RK73GB1J153J	CHIP R 15K J 1/16W		R185			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R118			RK73GB1J473J	CHIP R 47K J 1/16W		R186			RK73GB1J155J	CHIP R 1.5M J 1/16W	
R119			R92-1252-05	CHIP R 0 OHM J 1/16W		R198			RK73GB1J393J	CHIP R 39K J 1/16W	
R120,121			RK73GB1J473J	CHIP R 47K J 1/16W		R199			RK73GB1J103J	CHIP R 10K J 1/16W	
R122			RK73GB1J102J	CHIP R 1.0K J 1/16W		R200			RK73GB1J101J	CHIP R 100 J 1/16W	
R123			RK73GB1J104J	CHIP R 100K J 1/16W		R201			R92-1252-05	CHIP R 0 OHM J 1/16W	
R124			RK73GB1J334J	CHIP R 330K J 1/16W		R202			RK73GB1J474J	CHIP R 470K J 1/16W	
R126			RK73GB1J472J	CHIP R 4.7K J 1/16W		R203			R92-1252-05	CHIP R 0 OHM J 1/16W	
R127			RK73GB1J333J	CHIP R 33K J 1/16W		R204			RK73GB1J273J	CHIP R 27K J 1/16W	
R128			RK73GB1J102J	CHIP R 1.0K J 1/16W		R205			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R129			RK73GB1J224J	CHIP R 220K J 1/16W		R206			RK73GB1J471J	CHIP R 470 J 1/16W	
R130			R92-1252-05	CHIP R 0 OHM J 1/16W		R207			RK73GB1J101J	CHIP R 100 J 1/16W	
R131			RK73GB1J101J	CHIP R 100 J 1/16W		R208			RN73GH1J682D	CHIP R 6.8K D 1/16W	
R132			RK73GB1J104J	CHIP R 100K J 1/16W		R209			RK73GB1J224J	CHIP R 220K J 1/16W	
R133			R92-1252-05	CHIP R 0 OHM J 1/16W		R210			RK73GB1J474J	CHIP R 470K J 1/16W	
R135			RK73GB1J100J	CHIP R 10 J 1/16W		R211			RK73GB1J103J	CHIP R 10K J 1/16W	
R137			RK73GB1J101J	CHIP R 100 J 1/16W		R212			RN73GH1J683D	CHIP R 68K D 1/16W	
R138			RK73GB1J102J	CHIP R 1.0K J 1/16W		R213			RN73GH1J682D	CHIP R 6.8K D 1/16W	
R139			RK73GB1J151J	CHIP R 150 J 1/16W		R214			RK73GB1J473J	CHIP R 47K J 1/16W	
R140			RK73GB1J102J	CHIP R 1.0K J 1/16W		R215			RK73GB1J184J	CHIP R 180K J 1/16W	
R142			R92-1368-05	CHIP R 0 OHM		R218			R92-1252-05	CHIP R 0 OHM J 1/16W	
R143			RK73GB1J184J	CHIP R 180K J 1/16W		R219			RK73GB1J223J	CHIP R 22K J 1/16W	
R144			R92-1252-05	CHIP R 0 OHM J 1/16W		R220,221			RK73GB1J184J	CHIP R 180K J 1/16W	
R145			RK73GB1J474J	CHIP R 470K J 1/16W		R222			RK73GB1J153J	CHIP R 15K J 1/16W	
R146			RK73GB1J472J	CHIP R 4.7K J 1/16W		R223			RK73GB1J223J	CHIP R 22K J 1/16W	
R147			RK73GB1J470J	CHIP R 47 J 1/16W		R224			RK73GB1J103J	CHIP R 10K J 1/16W	
R148			RK73GB1J220J	CHIP R 22 J 1/16W		R225			RK73GB1J153J	CHIP R 15K J 1/16W	
R149			RK73GB1J104J	CHIP R 100K J 1/16W		R226			R92-1252-05	CHIP R 0 OHM J 1/16W	
R150			RK73GB1J102J	CHIP R 1.0K J 1/16W		R230			RK73GB1J223J	CHIP R 22K J 1/16W	
R151			RK73GB1J473J	CHIP R 47K J 1/16W		R231			RK73GB1J563J	CHIP R 56K J 1/16W	
R152			RK73GB1J823J	CHIP R 82K J 1/16W		R232,233			R92-1252-05	CHIP R 0 OHM J 1/16W	
R153			RK73GB1J104J	CHIP R 100K J 1/16W		R234			RK73GB1J124J	CHIP R 120K J 1/16W	
R154			RK73GB1J564J	CHIP R 560K J 1/16W		R235			RK73GB1J334J	CHIP R 330K J 1/16W	
R155			RK73GB1J473J	CHIP R 47K J 1/16W		R237			R92-1252-05	CHIP R 0 OHM J 1/16W	
R156			RN73GH1J683D	CHIP R 68K D 1/16W		R239			RK73GB1J153J	CHIP R 15K J 1/16W	
R157			RK73GB1J102J	CHIP R 1.0K J 1/16W		R240			RK73GB1J223J	CHIP R 22K J 1/16W	
R158			R92-1252-05	CHIP R 0 OHM J 1/16W		R241			RK73GB1J334J	CHIP R 330K J 1/16W	
R159			RK73GB1J102J	CHIP R 1.0K J 1/16W		R242			R92-1252-05	CHIP R 0 OHM J 1/16W	
R160			RK73GB1J222J	CHIP R 2.2K J 1/16W		R244			RK73HB1J561J	CHIP R 560 J 1/16W	
R161			RK73GB1J563J	CHIP R 56K J 1/16W		R245			RK73GB1J104J	CHIP R 100K J 1/16W	
R162			RN73GH1J333D	CHIP R 33K D 1/16W		R249			R92-1252-05	CHIP R 0 OHM J 1/16W	
R163			RN73GH1J274D	CHIP R 270K D 1/16W		R250			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R164			RK73GB1J184J	CHIP R 180K J 1/16W		R252,253			R92-1252-05	CHIP R 0 OHM J 1/16W	
R165			RK73GB1J473J	CHIP R 47K J 1/16W		R254			RK73GB1J184J	CHIP R 180K J 1/16W	
R166			RK73GB1J103J	CHIP R 10K J 1/16W		R255			RK73GB1J474J	CHIP R 470K J 1/16W	
R167			RK73GB1J564J	CHIP R 560K J 1/16W		R256-258			R92-1252-05	CHIP R 0 OHM J 1/16W	
R168			RK73GB1J102J	CHIP R 1.0K J 1/16W		R259			RK73GB1J473J	CHIP R 47K J 1/16W	
R169			RK73GB1J473J	CHIP R 47K J 1/16W		R260,261			RK73GB1J224J	CHIP R 220K J 1/16W	
R170,171			RK73GB1J474J	CHIP R 470K J 1/16W		R276-278			RK73GB1J104J	CHIP R 100K J 1/16W	
R172			RK73GB1J473J	CHIP R 47K J 1/16W		R280			RK73GB1J154J	CHIP R 150K J 1/16W	
R173			RK73GB1J104J	CHIP R 100K J 1/16W		R301			R92-0679-05	CHIP R 0 OHM	
R174			R92-1252-05	CHIP R 0 OHM J 1/16W		R303			R92-1252-05	CHIP R 0 OHM J 1/16W	
R175			RK73GB1J103J	CHIP R 10K J 1/16W		R305			RK73GB1J104J	CHIP R 100K J 1/16W	
R176			R92-1252-05	CHIP R 0 OHM J 1/16W		R307			RK73GB1J563J	CHIP R 56K J 1/16W	
R177			RK73GB1J473J	CHIP R 47K J 1/16W		R308			R92-1252-05	CHIP R 0 OHM J 1/16W	
R178,179			RK73GB1J104J	CHIP R 100K J 1/16W		R309			RK73GB1J101J	CHIP R 100 J 1/16W	

PARTS LIST / 零件表

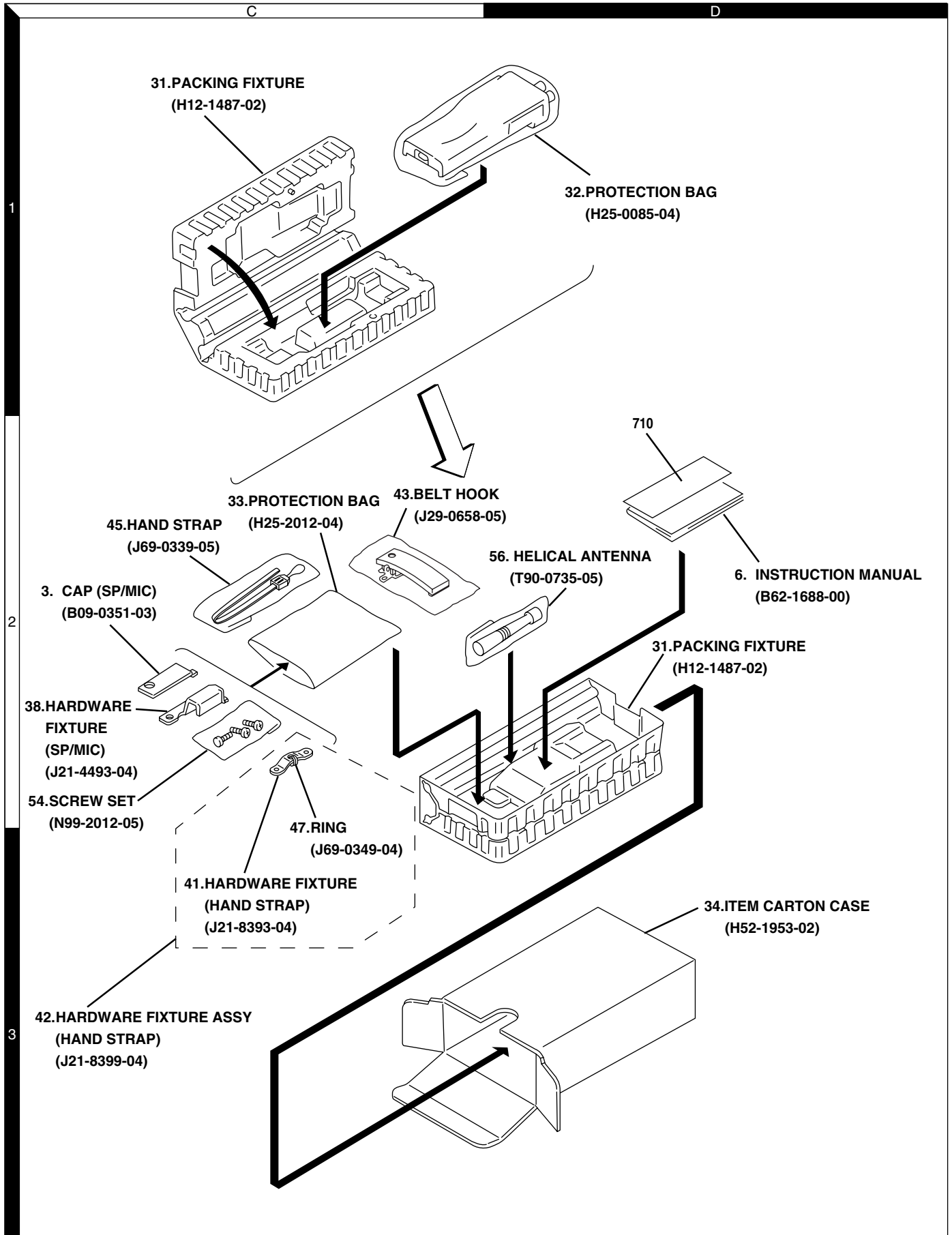
TX-RX UNIT (X57-6500-21)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R310			RK73GB1J221J	CHIP R 220 J 1/16W		Q12			2SC4649(N,P)	TRANSISTOR	
R314			RK73GB1J104J	CHIP R 100K J 1/16W		Q13,14			DTA144EE	DIGITAL TRANSISTOR	
R318			RK73GB1J104J	CHIP R 100K J 1/16W		Q15			DTC114EE	DIGITAL TRANSISTOR	
R320			R92-1252-05	CHIP R 0 OHM J 1/16W		Q16			DTA114YE	DIGITAL TRANSISTOR	
R326			RK73GB1J124J	CHIP R 120K J 1/16W		Q17			DTC144EE	DIGITAL TRANSISTOR	
R327			RK73GB1J393J	CHIP R 39K J 1/16W		Q18			FP210	TRANSISTOR	
VR1			R12-7491-05	TRIMMING POT.(68K)		Q19			3SK318	FET	
S401			S70-0457-05	TACT SWITCH		Q20,21			UMG3N	TRANSISTOR	
S402,403			S70-0424-05	TACT SWITCH		Q22			2SC4649(N,P)	TRANSISTOR	
MIC1			T91-0579-05	MIC ELEMENT		Q23			RN47A4	TRANSISTOR	
D1			MA2S111	DIODE		Q24,25			DTC114EE	DIGITAL TRANSISTOR	
D2			MA2S376	VARIABLE CAPACITANCE DIODE		Q26			DTA114EE	DIGITAL TRANSISTOR	
D3			HVU131	DIODE		Q27			UPA572T	FET	
D4			MA2S376	VARIABLE CAPACITANCE DIODE		Q28			DTA114YE	DIGITAL TRANSISTOR	
D5			HSC277	DIODE		Q30			2SK1588	FET	
D6			MA360	VARIABLE CAPACITANCE DIODE		Q31			2SC4649(N,P)	TRANSISTOR	
D7			HSC277	DIODE		Q32			2SA1362(GR)	TRANSISTOR	
D8			HZU5ALL	DIODE		Q33,34			DTC144EE	DIGITAL TRANSISTOR	
D9			MA2S376	VARIABLE CAPACITANCE DIODE		Q35			UPA672T	FET	
D10			HSC277	DIODE		Q36			2SK1824	FET	
D11			MA2S376	VARIABLE CAPACITANCE DIODE		Q39			2SK1824	FET	
D12			MA2S111	DIODE		Q301			3SK318	FET	
D13,14			DAN235E	DIODE							
D15			HSC277	DIODE							
D21			1SS373	DIODE							
D22			1SR154-400	DIODE							
D23			RB706F-40	DIODE							
D27			MA2S111	DIODE							
D28			RB706F-40	DIODE							
IC1		*	RA07M3340M	IC(RF POWER AMP)							
IC2			MB15A02	MOS IC							
IC3			NJM2904V	MOS IC							
IC4			TA31136FN	MOS IC							
IC5,6			BU4094BCFV	MOS IC							
IC7			XC62GR5012PR	MOS IC							
IC8			PST9140NR	MOS IC							
IC9			RN5VL45C	MOS IC							
IC10			AT2408N10S12.5	ROM IC							
IC10			24LC08BT-1SN	ROM IC							
IC11			TA7368F	MOS IC							
IC12			AT29C020-90TI	ROM IC							
IC13			30622M4A-439GP	MPU							
IC14			TC35453F	MOS IC							
IC15			TA75W01FU	MOS IC							
IC16			TC75W51FU	MOS IC							
IC17			X9C103SI	ANALOG IC							
IC18			LC73872M	MOS IC							
IC19			TC75W51FU	MOS IC							
Q1			2SC5010-T1	TRANSISTOR							
Q2			2SC4226(R24)	TRANSISTOR							
Q3			2SC5010-T1	TRANSISTOR							
Q4,5			2SC5108(Y)	TRANSISTOR							
Q6			2SC4988	TRANSISTOR							
Q7			2SJ243	FET							
Q8			RN47A4	TRANSISTOR							
Q9			DTC144EE	DIGITAL TRANSISTOR							
Q10			2SK508NV(K52)	FET							
Q11			2SC4617(S)	TRANSISTOR							

EXPLODED VIEW / 部件分解图



PACKING / 包装



ADJUSTMENT / 调整

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	350 to 370MHz Frequency modulation and external modulation. -127dBm/0.1 μ V to greater than -47dBm/1mV
2. Power Meter	Input Impedance Operation Frequency Measurement Range	50W. 350 to 370MHz or more. Vicinity of 10W
3. Deviation Meter	Frequency Range	350 to 370MHz.
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading.
5. Oscilloscope		DC through 30MHz.
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz. 0.2ppm or less.
7. Ammeter		5A.
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz. 1mV to 10V.
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more. 0 to 1V.
10. Distortion Meter	Capability Input Level	3% or less at 1kHz. 50mV to 10Vrms.
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center frequency Output Voltage	50kHz to 600MHz 100mV or more
13. 8 Ω Dummy Load		Approx. 8 Ω , 3W.
14. 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	350 到 370MHz 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 350 到 370MHz 或更高 10W 左右
3. 偏差仪	频率范围	350 到 370MHz
4. 数字电压表 (DVM)	测量范围 输入阻抗	直流 10mV 到 10V 为最小电路负载高输入阻抗
5. 示波器		直流到 30MHz
6. 高灵敏度频率计数器	频率范围 频率稳定性	10Hz 到 1000MHz 0.2ppm 或更低
7. 电流表		5A.
8. 音频电压表 (AF VTVM)	频率范围 电压范围	50Hz 到 10kHz 1mV 到 10V
9. 音频发生器 (AG)	频率范围 输出	50Hz 到 5kHz 或更高 0 到 1V
10. 失真测试仪	容量 输入电平	在 1kHz 时 3% 或更低 50mV 到 10Vrms
11. 频谱分析仪	测量范围	直流到 1GHz 或更高
12. 轨迹发生器	中心频率 输出电压	50kHz 到 600MHz 100mV 或更高
13. 8 Ω 假负载		大约 8 Ω , 3W
14. 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.)

Note

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

■ 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。)

注释

当天线接口转换头接触到其他旋钮时，拔出该旋钮并安装转换头。

Repair Jig (Chassis)

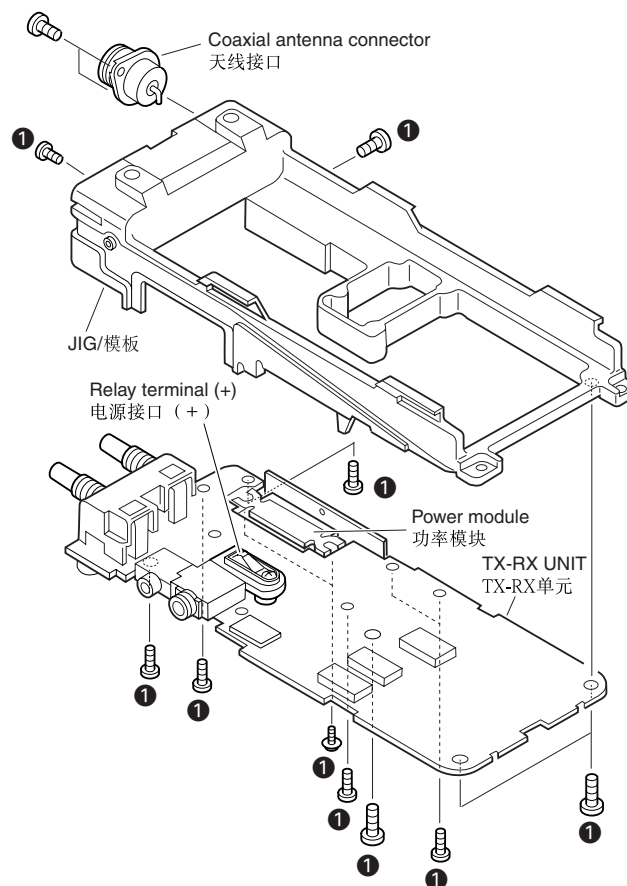
1. Jig (chassis : Part No. A10-4009-03) for adjustment.
2. Use the jig as follows.
 - ① Place the TX-RX unit on the jig and fix it with thirteen screws ①.
 - ② Solder the antenna terminal of the TX-RX unit.
3. Supply power from an external power supply.

Relay terminal : + (7.5V)
Jig (Chassis) : -

维修模板（机架）

1. 用于调整的模板（机架：部件号码 A10-4009-03）
2. 按下述方法使用模板。
 - ① 将 TX-RX 单元放置在模板上并使用 13 颗螺钉拧紧 ①。
 - ② 将 TX-RX 单元的天线焊点焊好。
3. 供电来自于外部稳压电源。

电源接口 : + (7.5V)
模板（机架）：-



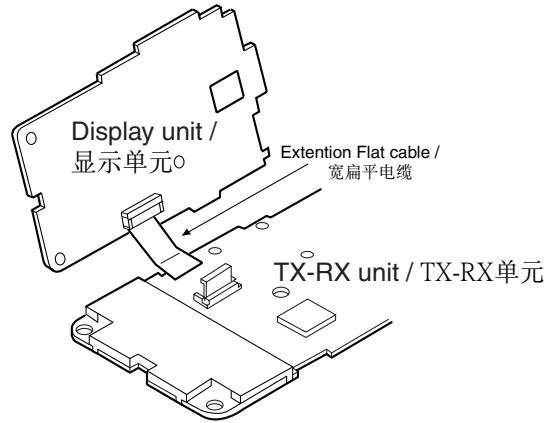
ADJUSTMENT / 调整

Repair Jig (Extention Flat cable : part No. E37-0851-05)

This cable is used for connecting the TK-388G display unit and TX-RX unit when you test or repair the transceiver.

维修用具 (宽扁平电缆: 部件号码E37-0851-05)

当用户测试或维修手持机时, 此电缆用于连接TK-388G的显示单元和TX-RX单元。



Caution : You must connect TK-388G display unit when you test or repair the transceiver.

注意：当用户测试或维修手持机时, 必须连接TK-388G的显示单元。

Test Mode

■ Test mode operating features

This transceiver has a test mode. **To enter test mode, press the [◀] key and turn the power on. Hold the [◀] key until the test channel No. and test signalling No. appear on LCD.** Test mode can be inhibited by programming. To exit test mode, switch the power on again. The following functions are available in test mode.

• Controls

[PTT]	Used when making a transmission.
[Side2]	Monitor ON and OFF.
[Side1]	Changes wide and narrow.
[○]	Sets to the Tuning mode.
[●]	Unused
[◀]	RF power HIGH and LOW.
[▶]	Changes signalling.
[0] to [9], and [#],[*]	Used as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent.
[ENCODER]	Changes channel.

• LCD indicator

"LO" Lights at RF Power Low.
"🔊" Lights at monitor ON.

• LED indicator

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

测试模式

■ 测试模式操作功能

本手持机具有测试模式。要进入测试模式, 按下[◀]键并接通电源。按住[◀]键直到测试信道号码和测试信令号码出现在LCD上为止。测试模式可以通过编程被禁止。要退出测试模式, 再一次开启电源。下述功能在测试模式中有效。

• 控制

[PTT]	进行发射时使用。
[侧面 2]	监视器开启和关闭。
[侧面 1]	改变宽带和窄带。
[○]	设定到调整模式。
[●]	不使用
[◀]	射频高和低功率。
[▶]	改变信令。
[0]到[9], 和[#],[*] 和[A]到[D]	作为DTMF键盘使用。如果在发射过程中按下下一个按键, 应于所按按键的DTMF被发射。
[ENCODER]	改变信道。

• LCD指示器

"LO" 低发射功率时显示。
"🔊" 开启监视器时显示。

• LED指示器

红色LED 发射过程中燃亮。电池低压告警过程中闪烁。
绿色LED 有载波时燃亮。

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)

Channel No.	RX Frequency	TX Frequency
1	360.05000	360.00000
2	350.05000	350.00000
3	369.95000	370.00000
4	360.00000	360.00000
5	360.20000	360.20000
6	360.40000	360.40000
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 250.3Hz	QT 250.3Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	DTMF DEC, (159D)	DTMF ENC, (159D)
10	None	DTMF tone 9
11	2 tone 321.7/928.1Hz	None
12	Single tone 1200Hz	Single tone 1200Hz

• 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).

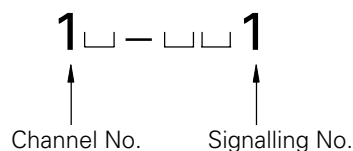
The speaker output connector must be terminated with a 8Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

• Transceiver tuning

(To place the transceiver in tuning mode)

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

LCD display (Test mode)



■ 频率和信令

为下表所列的频率调整设定。需要时，按照调整步骤重新调整以获得用户在实际操作中想要的频率。

频率 (MHz)

信道号码	接收频率	发射频率
1	360.05000	360.00000
2	350.05000	350.00000
3	369.95000	370.00000
4	360.00000	360.00000
5	360.20000	360.20000
6	360.40000	360.40000
7~16	—	—

信令

信令号码	接收	发射
1	无	无
2	无	100Hz 方波
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 250.3Hz	QT 250.3Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	DTMF DEC,(159D)	DTMF ENC,(159D)
10	无	DTMF 音频 9
11	双音信令 321.7/928.1Hz	无
12	单音信令 1200Hz	单音信令 1200Hz

• 调整手持机的准备

在进行调整手持机之前，将主机与电源连接。

无论何时调整发射部分，主机必须连接到合适的假负载（或功率仪）。

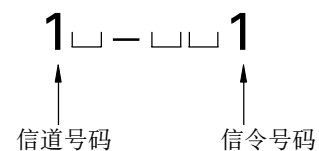
在整个调整过程中，扬声器输出必须经过 8 Ω 假负载并被连接到一个交流电压表和一个音频失真测试仪或一个 SINAD 测量仪。

• 手持机调整

(将手持机置于调整模式)

信道显示在 LCD 上。按照调整所需设定信道。

LCD 显示 (测试模式)



ADJUSTMENT / 调整

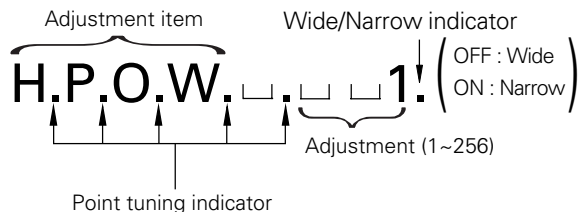
Press [O], to enter tuning mode. Use the [◀] key to write tuning data through the tuning modes, and the channel selector knob to adjust the tuning requirements (1 to 256 appears on LCD).

Use the [▶] key to select the adjustment item through the tuning modes. Use the [●] key to adjust 3 or 5 point tuning, and use the [Side1] key to switch between Wide/Narrow.

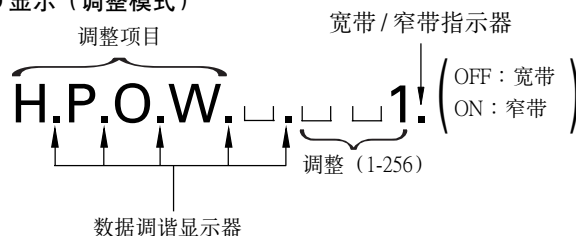
按[O]键，进入调整模式。通过调整模式使用[◀]键写入调整数据，并且旋转信道选择旋钮来调整所需的信道（1到256出现在LCD上）。

通过调整模式使用[▶]键选择调整项目。使用[●]键调整3或5点调谐，并使用[侧面1]键转换开启宽带/窄带。

LCD display (Tuning mode)



LCD 显示（调整模式）



Panel Tuning Mode

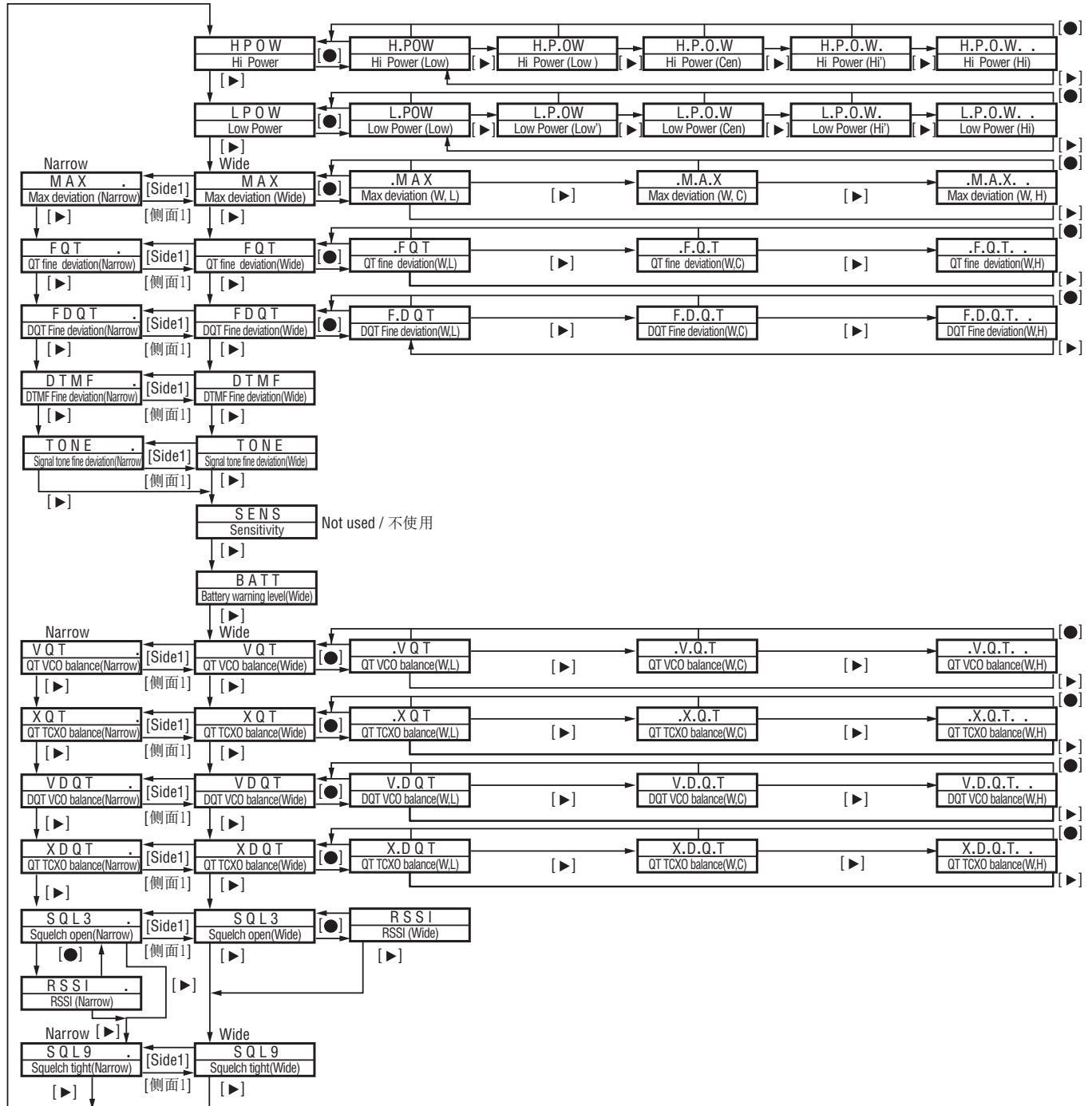
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
Low	350.05000	350.00000
Low'	355.05000	355.00000
Center	360.05000	360.00000
High'	365.05000	365.00000
High	369.95000	370.00000

面板调谐模式

测试信道	接收频率 (MHz)	发射频率 (MHz)
Low	350.05000	350.00000
Low'	355.05000	355.00000
Center	360.05000	360.00000
High'	365.05000	365.00000
High	369.95000	370.00000

ADJUSTMENT / 调整

■ Tuning mode / 调整模式



ADJUSTMENT

Common Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Setting	1) BATT terminal voltage:7.5V 2) SSG Standard modulation [Wide] MOD:1kHz, DEV:3kHz [Narrow] MOD:1kHz, DEV:1.5kHz					
2. VCO lock voltage RX TX	[Panel Test Mode] 1) CH-Sig:3-1	Power meter DVM	ANT CV(LV)	TC2	ADJ	3.5V ± 0.1V
	2) CH-Sig:2-1				Check	0.8V or more
	3) CH-Sig:3-1 PTT:ON			TC1	ADJ	3.5V ± 0.1V
	4) CH-Sig:2-1 PTT:ON				Check	0.8V or more

Transmitter Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Frequency Adjust	1) PTT:ON	Freq. Counter Power meter Am meter	ANT	VR1	Center frequency (360.0 MHz) ± 100Hz	
2. Max Power Check	1) Adj item [HPOW] Adjust [256] 2) Adj item [H.P.O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W. .] Adjust [256] PTT:ON					
3. High Power Adjust	1) Adj item [HPOW] Adjust [***] 2) Adj item [H.P.O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W. .] Adjust [***] PTT:ON			Encoder knob	4.0W	±0.1W 2.2A or less
4. High Power Check	[Panel Test Mode] 1) CH-Sig:1-1 PTT:ON 2) CH-Sig:2-1 PTT:ON 3) CH-Sig:3-1 PTT:ON				Check	3.0~5.0W 2.3A or less
5. Low Power Adjust	1) Adj item [LPOW] Adjust [***] 2) Adj item [L.P.O W] → [L.P.O W] → [L.P.O.W] → [L.P.O.W.] → [L.P.O.W. .] Adjust [***] PTT:ON			Encoder knob	1.0W	±0.1W 1.0A or less
6. Low Power Check	[Panel Test Mode] 1) CH-Sig:1-1 Set low power (Push [◀]) PTT:ON 2) CH-Sig:2-1 PTT:ON 3) CH-Sig:3-1 PTT:ON				Check	0.5~1.5W 1.2A or less

调整


公用部分

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
1. 设定	1) 电池终端 电压 : 7.5V 2)SSG 标准 调制 [宽带]MOD:1kHz DEV:3kHz [窄带]MOD:1kHz DEV:1.5kHz					
2. 压控振荡器电压 接收 发射	[面板测试模式]	功率仪 数字电压表	天线 CV (LV)	TC2	调整	3.5V ± 0.1V
	1) CH-Sig:3-1				检查	0.8V 或更高
	2) CH-Sig:2-1			TC1	调整	3.5V ± 0.1V
	3) CH-Sig:3-1 PTT:开启				检查	0.8V 或更高
4) CH-Sig:2-1 PTT:开启						

发射部分

项目	条件	测量		调整		规格 / 备注	
		测试设备	终端	部件	方法		
1. 频率调整	1) PTT:开启	频率计数器 功率仪 电流表	天线	VR1	中心频率 (360.0MHz) ± 100Hz		
2. 最大功率检查	1) 调整项目[HPOW] 调整[256]			[H.P.O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W..]		检查	4.2W 或更高
	2) 调整项目 [H.P.O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W..] 调整 [256] PTT:开启						
3. 高功率调整	1) 调整项目[HPOW] 调整[* * *]			[H.P.O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W..]	编码旋钮	4.0W	± 0.1W 2.2A 或更低
	2) 调整项目 [H.P.O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W..] 调整 [* * *] PTT:开启						
4. 高功率检查	[面板测试模式]					检查	3.0-5.0W 2.3A 或更低
	1) CH-Sig:1-1 PTT:开启						
	2) CH-Sig:2-1 PTT:开启						
5. 低功率调整	1) 调整项目[LPOW] 调整[* * *]	[L.P.O W] → [L.P.O W] → [L.P.O.W] → [L.P.O.W.] → [L.P.O.W..]	编码旋钮	1.0W	± 0.1W 1.0A 或更低		
	2) 调整项目 [L.P.O W] → [L.P.O W] → [L.P.O.W] → [L.P.O.W.] → [L.P.O.W..] 调整 [* * *] PTT:开启						
6. 低功率检查	[面板测试模式]			检查	0.5-1.5W 1.2A 或更低		
	1) CH-Sig:1-1 设定低功率 (按[◀]键) PTT:开启						
	2) CH-Sig:2-1 PTT:开启						
	3) CH-Sig:3-1 PTT:开启						

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
7. Max DEV Adjust [Wide]	1) Adj item [MAX] Adjust [***] AG:1kHz / 120mV Deviation meter filter LPF:15kHz HPF:OFF	Power meter Deviation meter Oscilloscope AG AF VTVM	ANT SP/MIC connector	Encoder knob	4.2kHz (According to the larger +,-)	±50Hz
	2) Adj item [.M A X] → [.M.A.X] → [.M.A.X. .]				Adjust [***] PTT:ON	
[Narrow]	1) Adj item [MAX .] Adjust [***] PTT:ON				2.1kHz (According to the larger+,-)	
8. MIC Sensitivity Check	[Panel Test Mode] 1) CH-Sig:1-1 AG:1kHz / 12mV LPF:15kHz PTT:ON				Check	2.2~3.8kHz
9. QT TCXO Balance	Adj item [X Q T] Adjust [200] Wide, Narrow		ANT SP/MIC connector	Encoder knob		
10.DQT TCXO Balance	Adj item [X D Q T] Adjust [150] Wide, Narrow					
11.DQT VCO Balance Adjust [Wide]	1) Adj item [VDQT] Adjust [***] LPF:3kHz HPF:OFF				Make the demodulation waves into square waves.	
	2) Adj item [V.D Q T] → [V.D.Q.T] → [V.D.Q.T. .]	Adjust [***] PTT:ON				
[Narrow]	3) Adj item [V D Q T .] Adjust [***] PTT:ON					
12. QT VCO Balance	Adj item [VQT] Adjust [***] $[VDQT] \times \frac{200}{150} = [VQT]$					
13. QT Deviation Adjust [Wide]	1) Adj item [FQT] Adjust [***] LPF:3kHz HPF:OFF				0.90kHz	±40Hz
	2) Adj item [.F Q T] → [.F.Q.T] → [.F.Q.T. .]	Adjust [***] PTT:ON				
[Narrow]	3) Adj item [FQT .] Adjust [***] PTT:ON				0.42kHz	

调整

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
7. 最大 DEV 调整 [宽]	1) 调整项目[MAX] 调整[***] AG:1kHz/120mV 频偏仪滤波器 LPF:15kHz HPF:关闭 2) 调整项目 [.M A X] → [.M.A.X] → [.M.A.X. .] 调整[***] PTT:开启	功率仪 频偏仪 示波器 音频发生器 音频电压表	天线 扬声器 / 话筒接口	编码旋钮	4.2kHz (按照较大+,-)	± 50Hz
[窄]	1) 调整项目[MAX.] 调整[***] PTT:开启				2.1kHz (按照较大+,-)	
8. 话筒 灵敏度 检查	[面板测试模式] 1) CH-Sig:1-1 AG:1kHz/12mV LPF:15kHz PTT:开启				检查	2.2~3.8kHz
9. QT TCXO 平衡	调整项目[X Q T] 调整[200] 宽, 窄		天线 扬声器 / 话筒接口	编码旋钮		
10. QT TCXO 平衡	调整项目[X D Q T] 调整[150] 宽, 窄					
11. DQT 压控振 荡器 平衡 调整 [宽]	1) 调整项目[V D Q T] 调整[***] LPF:3kHz HPF:关闭 2) 调整项目 [V.D Q T] → [V.D.Q.T] → [V.D.Q.T. .] 调整[***] PTT:开启				使调整波形为方 形波。	
[窄]	3) 调整项目[V D Q T.] 调整[***] PTT:开启					
12. QT 压控振荡器 平衡	调整项目[VQT] 调整[***] $[VDQT] \times \frac{200}{150} = [VQT]$					
13. QT 偏差 调整 [宽]	1) 调整项目[FQT] 调整[***] LPF:3kHz HPF:关闭 2) 调整项目 [.F Q T] → [.F.Q.T] → [.F.Q.T. .] 调整[***] PTT:开启				0.90kHz	± 40Hz
[窄]	3) 调整项目[F Q T.] 调整[***]				0.42kHz	

ADJUSTMENT

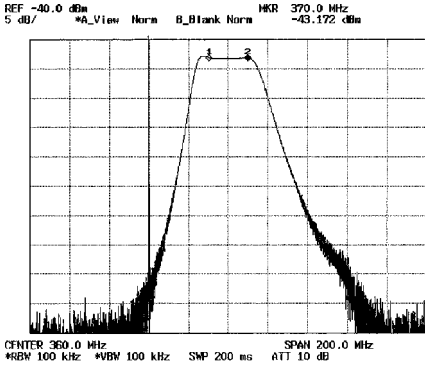
Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
14.DQT Deviation Adjust [Wide]	1) Adj item [FDQT] Adjust [***] LPF:3kHz HPF:OFF	Power meter Deviation meter Oscilloscope	ANT SP/MIC connector	Encoder knob	0.75kHz	±50Hz
	2) Adj item [F.D.Q.T] → [F.D.Q.T] → [F.D.Q.T.] Adjust [***] PTT:ON					
	[Narrow]				3) Adj item [FDQT.] Adjust [***] PTT:ON	
15.DTMF Deviation Adjust [Wide]	1) Adj item [DTMF] Adjust [***] LPF:15kHz HPF:OFF PTT:ON				2.5kHz	±0.1kHz
	[Narrow]				2) Adj item [DTMF.] Adjust [***] PTT:ON	
16.TONE Deviation Adjust [Wide]	1) Adj item [TONE] Adjust [***] LPF:15kHz HPF:OFF PTT:ON				3.0kHz	±0.1kHz
	[Narrow]				2) Adj item [TONE.] Adjust [***] PTT:ON	
17.BATT Detection Writing	1) Adj item [BATT] Adjust [***] PTT:ON	Power meter DVM	ANT BATT terminal	Encoder knob	After pressing the PTT switch, confirm that one predetermined numeric in the range of 1 to 256 appears and then press the [◀] key. That number will be stored in memory.	BATT terminal voltage:5.9V
	18.BATT Detection Check					
	2) BATT terminal voltage:5.7V PTT:ON					Blinking of LED

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. DQT 频偏 调整 [宽]	1) 调整项目[FDQT] 调整[* * *] LPF:3kHz HPF:关闭	功率仪 频偏仪 示波器	天线 扬声器 / 话筒接口	编码旋钮	0.75kHz	± 50Hz
	2) 调整项目 [F.D Q T] → [F.D.Q.T] → [F.D.Q.T..] 调整[* * *] PTT:开启					
	[窄]				3) 调整项目[FDQT.] 调整[* * *] PTT:开启	
15. DTMF 频偏 调整 [宽]	1) 调整项目[DTMF] 调整[* * *] LPF:15kHz HPF:关闭 PTT:开启				2.5kHz	± 0.1kHz
	[窄]				2) 调整项目[DTMF.] 调整[* * *] PTT:开启	
16. TONE 频偏 调整 [宽]	1) 调整项目[TONE] 调整[* * *] LPF:15kHz HPF:关闭 PTT:开启				3.0kHz	± 0.1kHz
	[窄]				2) 调整项目[TONE.] 调整[* * *] PTT:开启	
17. 电池 检测 写入	1) 调整项目[BATT] 调整[* * *] PTT:开启	功率仪 数字电压表	天线 电池 终端	编码旋钮	按下 PTT 开关后， 确认一个 1 到 256 内的预定数字出现， 然后按 [◀] 键。 此数字将储存在存储器中。	电池终端 电压：5.9V
18. 电池 检测 检查	[面板测试模式]				检查	LED 不闪烁
	1) CH-Sig:1-1 电池终端电压：6.5V PTT：开启					LED 闪烁
	2) 电池终端电压：5.7V PTT：开启					

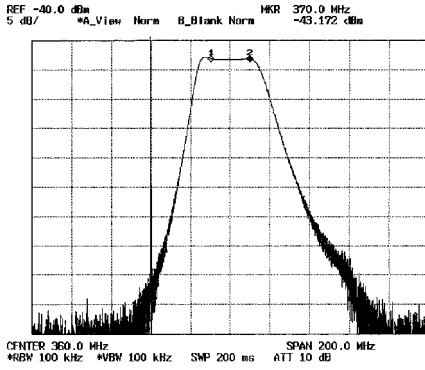
ADJUSTMENT

Receiver Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. BPF Adjustment	[Panel Test Mode] CH-Sig 1-1 Tra-G setting -40dBm	Tracking generator Spectrum analyzer	ANT BPF	TC301, TC302, TC303	Adjust wave form to figure 1.	
 <p>Fig. 1 BPF-WAVE</p>						
2. Sensitivity Check	[Panel Test Mode] 1) CH-Sig:1-1 SSG OUT Oscilloscope Wide:-118dBm (0.28μV) (MOD:1kHz / ±3kHz) Narrow:-116dBm (0.35μV) (MOD:1kHz / ±1.5kHz)	SSG AF VTVM	ANT		Check	12dB SINAD or more
3. Squelch (Open) Adjust [Wide]	1) Adj item [SQL3] Adjust [***] SSG OUT: -124dBm (0.141μV)			Encoder knob	Adjust to the squelch threshold point	
[Narrow]	2) Adj item [SQL3.] Adjust [***] SSG OUT: -123dBm (0.158μV)					
4. Squelch(Tight) Adjust [Wide]	1) Adj item [SQL9] Adjust [***] SSG OUT:-117dBm (0.316μV)					
[Narrow]	2) Adj item [SQL9.] SSG OUT:-116dBm (0.35μV)					
5. Squelch Check	[Panel Test Mode] 1) CH-Sig:1-1 SQ Level : [SQL5] SSG OUT: -118dBm (0.28μV)				Check	Squelch must be opened.
	2) SSG OUT:OFF					Squelch must be closed.

调整

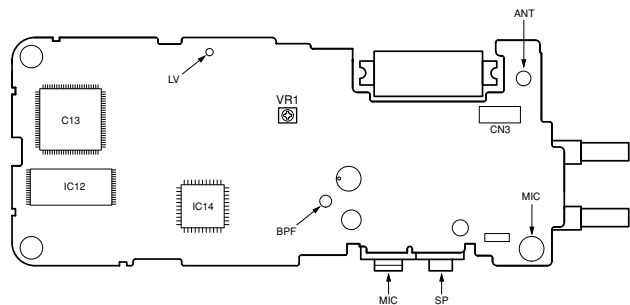
接收部分

项目	条件	测量		调整		规格 / 备注
		测试设备	终端	部件	方法	
1. BPF 调整	[面板测试模式] CH-Sig : 1-1 Tra-G 设定 -40dBm	轨迹发生器 频谱分析仪	天线 BPF	TC301, TC302, TC303	按图 1 调整波形。	
 <p>图 1 BPF 波形</p>						
2. 灵敏度 检查	[面板测试模式] 1) CH-Sig : 1-1 标准信号发生器输出 宽 : -118dBm (0.28 μ V) (MOD : 1kHz/(\pm 3kHz)) 窄 : -116dBm (0.35 μ V) (MOD : 1kHz/(\pm 1.5kHz))	标准信号发生器 音频电压表 示波器	天线		检查	12dB SINAD 或更高
3. 静噪抑制电路 (打开) 调整 [宽]	1) 调整项目[SQL3] 调整[* * *] 标准信号发生器输出： -124dBm (0.141 μ V)			编码旋钮	调整到噪音抑制 电路临界点	
[窄]	2) 调整项目[SQL3] 调整[* * *] 标准信号发生器输出： -123dBm (0.158 μ V)					
4. 静噪抑制电路 (密闭) 调整 [宽]	1) 调整项目[SQL9] 调整[* * *] 标准信号发生器输出： -117dBm (0.316 μ V)					
[窄]	2) 调整项目[SQL9] 标准信号发生器输出： -116dBm (0.35 μ V)					
5. 静噪抑制电路 检查	[面板测试模式] 1) CH-Sig:1-1 SQ 电平 :[SQL5] 标准信号发生器输出： -118dBm (0.28 μ V)				检查	静噪必须被打开。
	2) 标准信号发生器输出：关闭					静噪必须被关闭。

ADJUSTMENT / 调整

Adjustment points TX-RX unit (X57-6500-21) Component side view

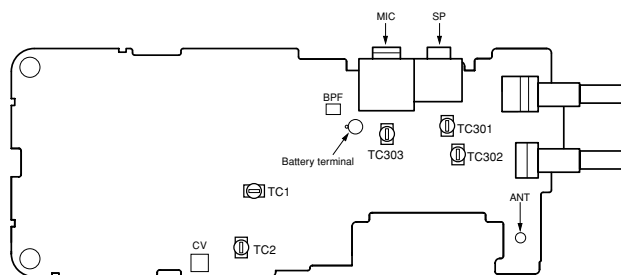
调整点 TX-RX 单元 (X57-6500-21)
元件侧视图



VR1 : Frequency adjustment
VR1 : 频率调整

Foil Side View

锡箔面侧视图



TC1 : Transmit lock voltage adjustment
TC2 : Receive lock voltage adjustment
TC301 :
TC302 : } Band-pass filter waveform adjustment
TC303 : }
BPF : Band-pass filter test point
CV(LV) : Lock voltage adjustment terminal.

TC1 : 发射锁定电压调整
TC2 : 接收锁定电压调整
TC301 :
TC302 : } 带通滤波器波形调整
TC303 : }
BPF : 带通滤波器测试点
CV (LV) : 锁定电压调整终端。

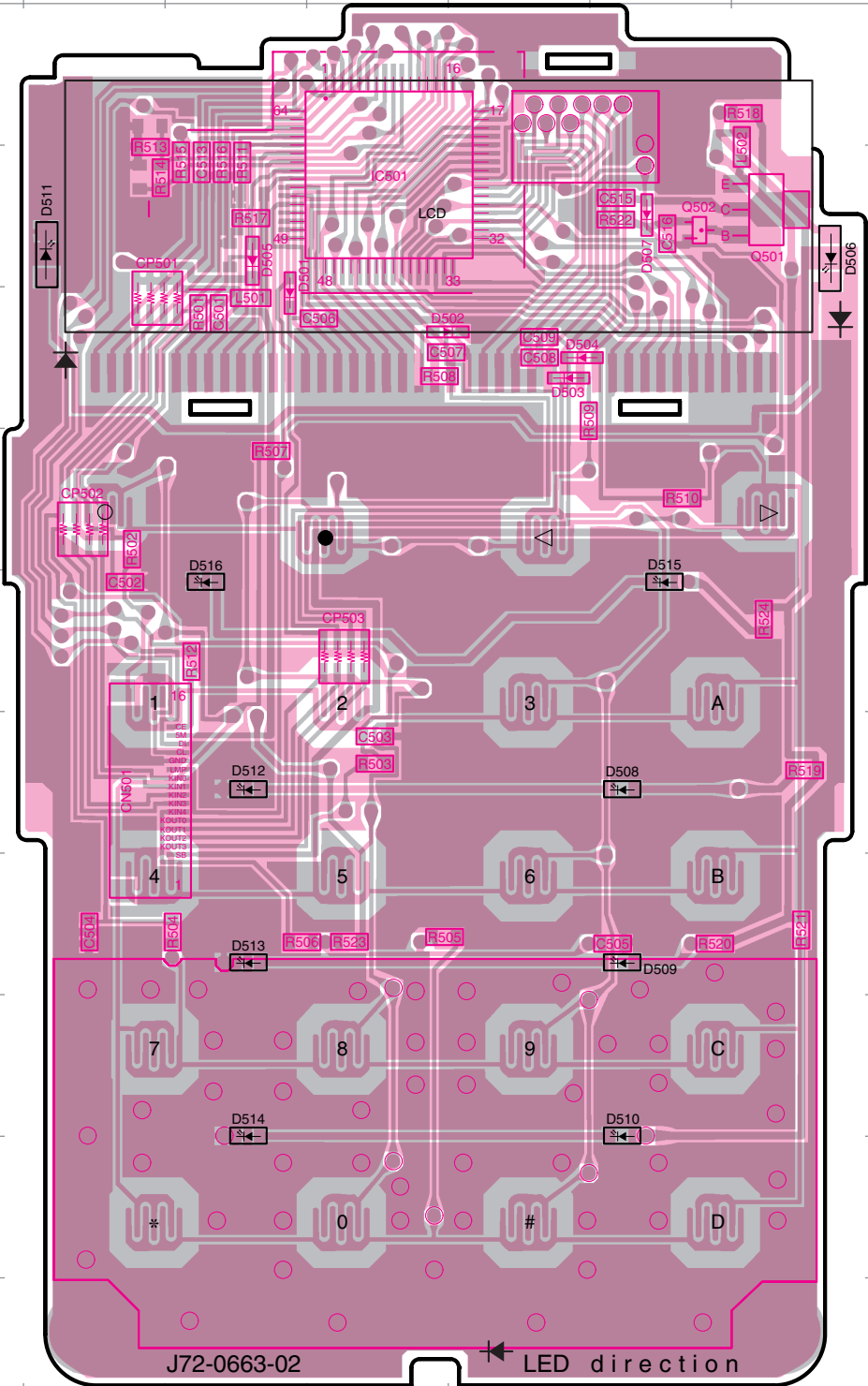
Fig. 2 Adjustment points / 图 2 调整点

DISPLAY UNIT (X54-3250-10) Component Side View (J72-0663-02)

DISPLAY UNIT (X54-3250-10) Foil Side View (J72-0663-02)

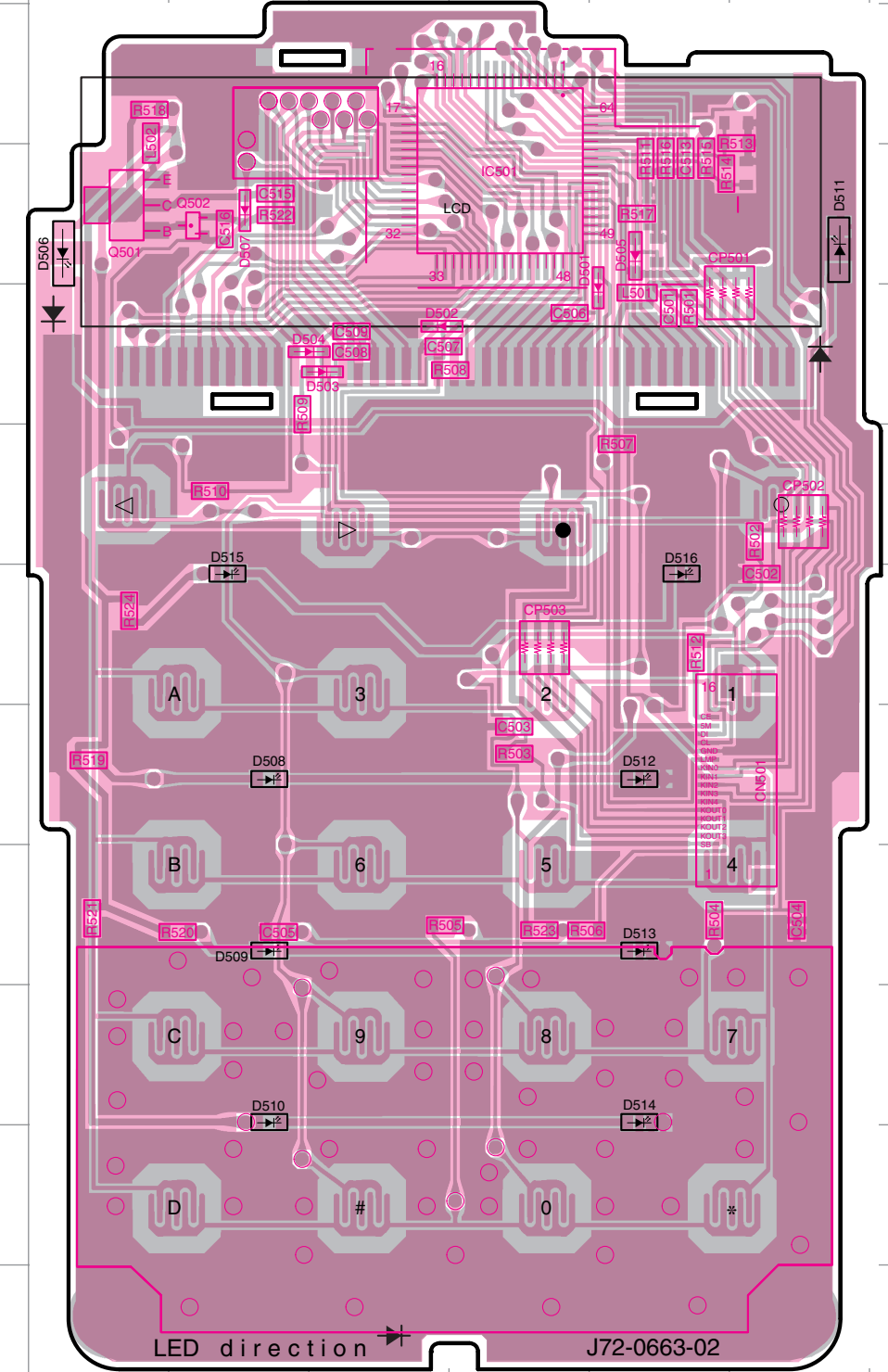
DISPLAY UNIT (X54-3250-10)

Ref. NO.	Address
IC501	4E
Q501	4H
Q502	4G
D501	4D
D502	5F
D503	5F
D504	5F
D505	4D
D506	4H
D507	4G
D508	8G
D509	9G
D510	10G
D511	4C
D512	8D
D513	9D
D514	10D
D515	7G
D516	7D

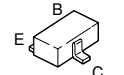


DISPLAY UNIT (X54-3250-10)

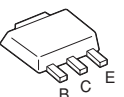
Ref. NO.	Address
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Q501	4K
Q502	4L
D501	4O
D502	5M
D503	5M
D504	5M
D505	4O
D506	4K
D507	4L
D508	8L
D509	9L
D510	10L
D511	4P
D512	8O
D513	9O
D514	10O
D515	7L
D516	7O



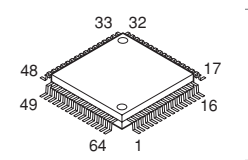
2SC4617(S)



2SB1132(Q,R)



LC75823W



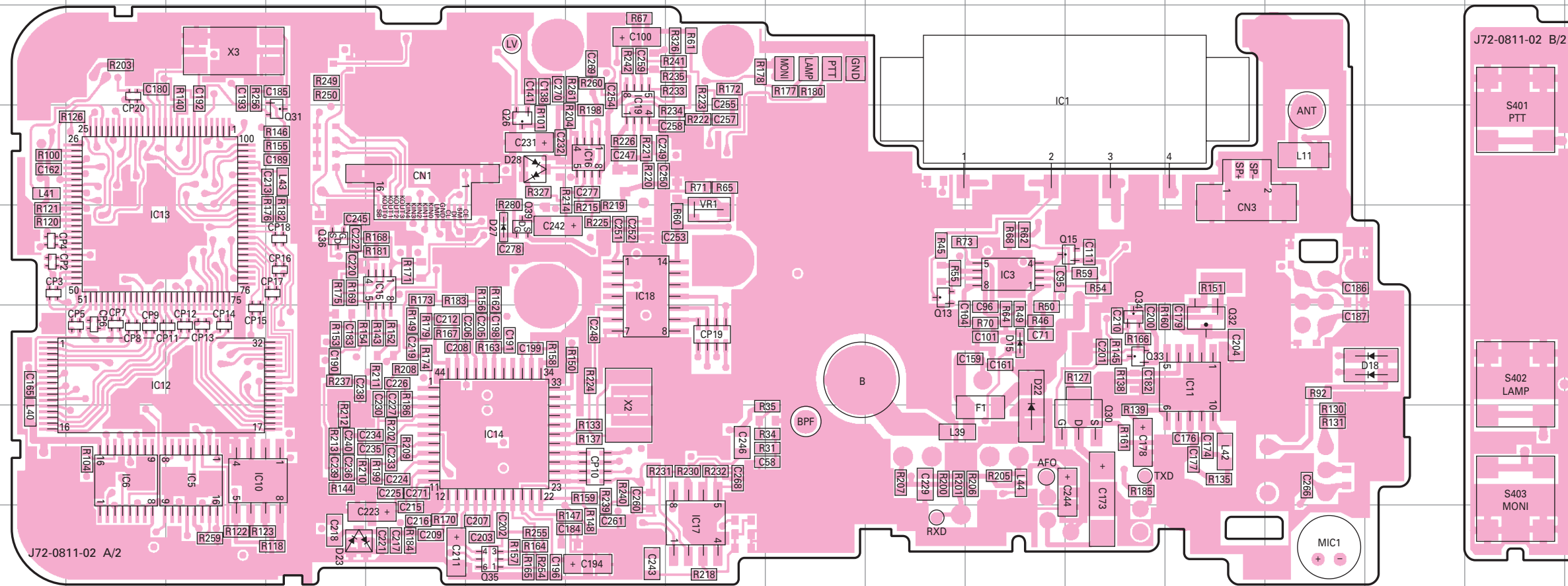
Component Side
 Foil Side

Component Side
 Foil Side

TK-388G

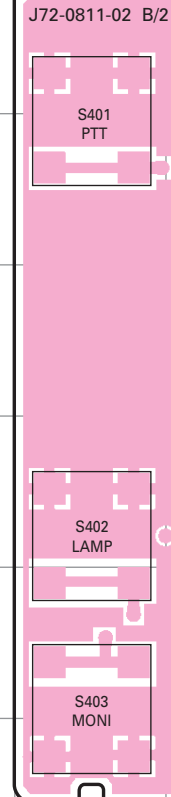
PC BOARD / PC 板视图

TX-RX UNIT (X57-6500-21) Component Side View (J72-0811-02)

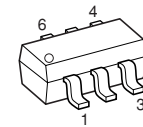


TX-RX UNIT (X57-6500-21)

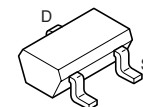
Ref. NO.	Address
IC3	5K
IC5	7C
IC6	7B
IC10	7C
IC11	6M
IC12	6B
IC13	5B
IC14	7F
IC15	6E
IC16	4G
IC17	8H
IC18	6G
IC19	4G
Q13	6J
Q15	5L
Q26	4F
Q30	7L
Q31	4D
Q32	6M
Q33	6L
Q34	6L
Q35	8F
Q36	5D
Q39	5F
D15	6K
D18	6O
D22	7K
D23	8D
D27	5F
D28	4F



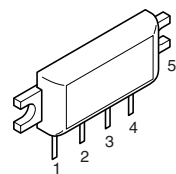
UPA672T



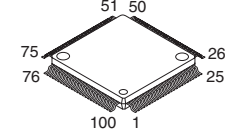
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RA07M3340M



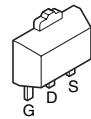
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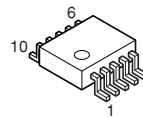
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DTA144EE
DTC144EE
DTC144EE
2SA1362



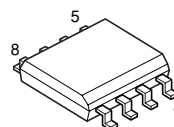
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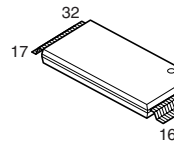
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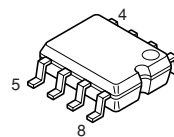
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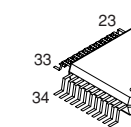
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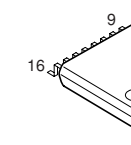
AT2408N10SI2.5



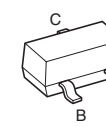
TC35453F



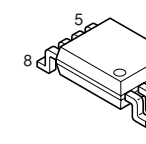
BU4094BCFV



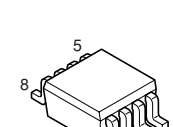
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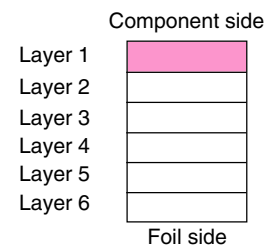
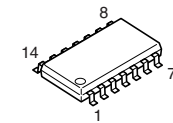
NJM2904V
24LC08BT-ISN



TA75W01FU
TC75W51FU



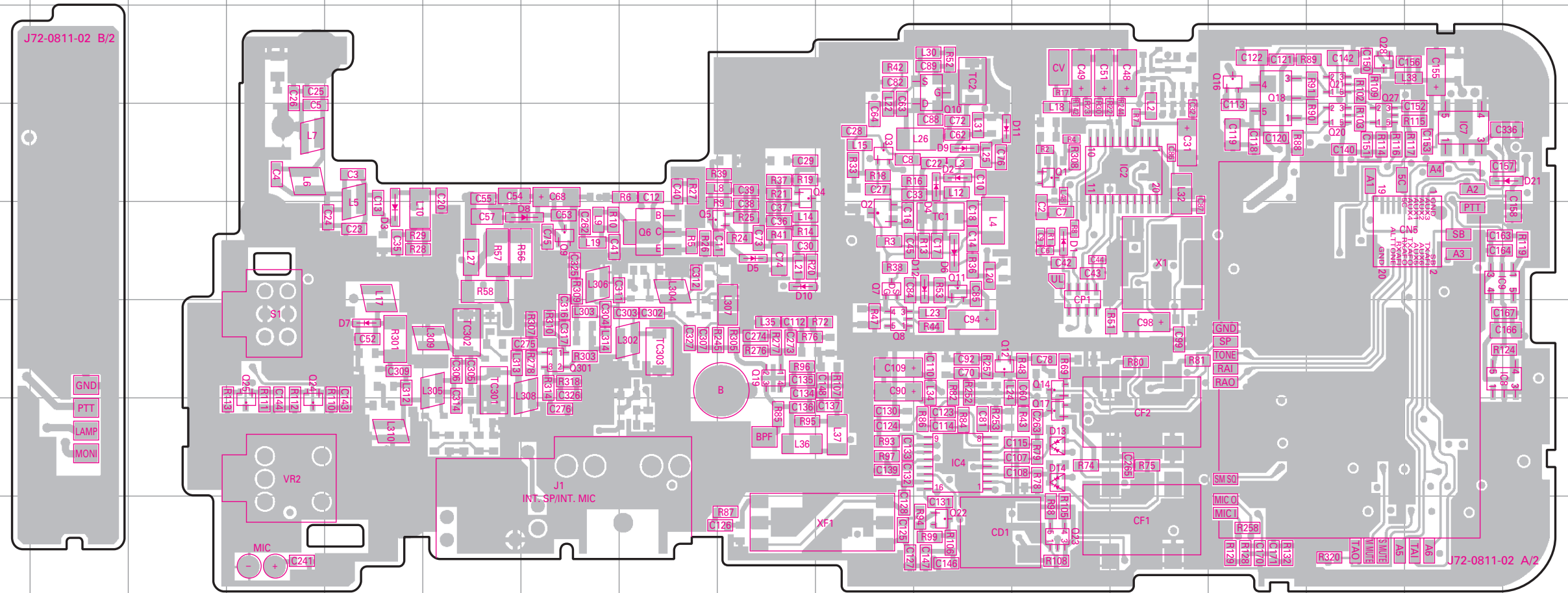
LC73872M



TX-RX UNIT (X57-6500-21) Foil Side View (J72-0811-02)

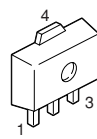
TX-RX UNIT (X57-6500-21)

Ref. NO.	Address
IC2	4O
IC4	7M
IC7	4R
IC8	6S
IC9	6S
Q1	4N
Q2	5L
Q3	4L
Q4	4K
Q5	5K
Q6	5J
Q7	5L
Q8	6L
Q9	5I
Q10	3M
Q11	5L
Q12	6M
Q14	6N
Q16	3P
Q17	7N
Q18	3P
Q19	6K
Q20	4Q
Q21	3Q
Q22	8M
Q23	8N
Q24	7F
Q25	7F
Q27	4Q
Q28	3Q
Q301	6I
D1	5N
D2	4M
D3	5G
D4	4M
D5	5K
D6	5M
D7	6G
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D9	4M
D10	5K
D11	4M
D12	5M
D13	7N
D14	7N
D21	4S

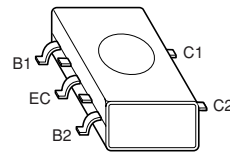


DTA114YE
DTA144EE
DTC114EE
DTC144EE
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2SC4617
2SC5010-T1
2SC5108

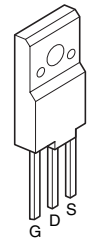
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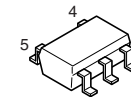
FP2102



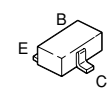
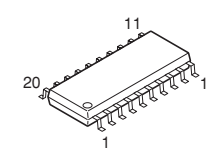
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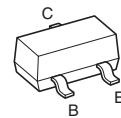
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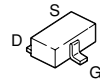
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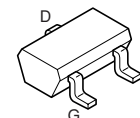
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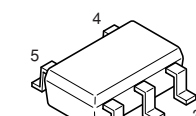
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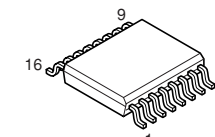
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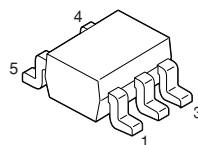
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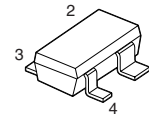
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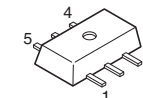
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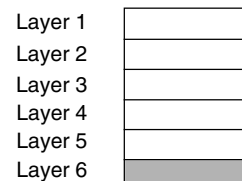
3SK318



XC62GR5012PR



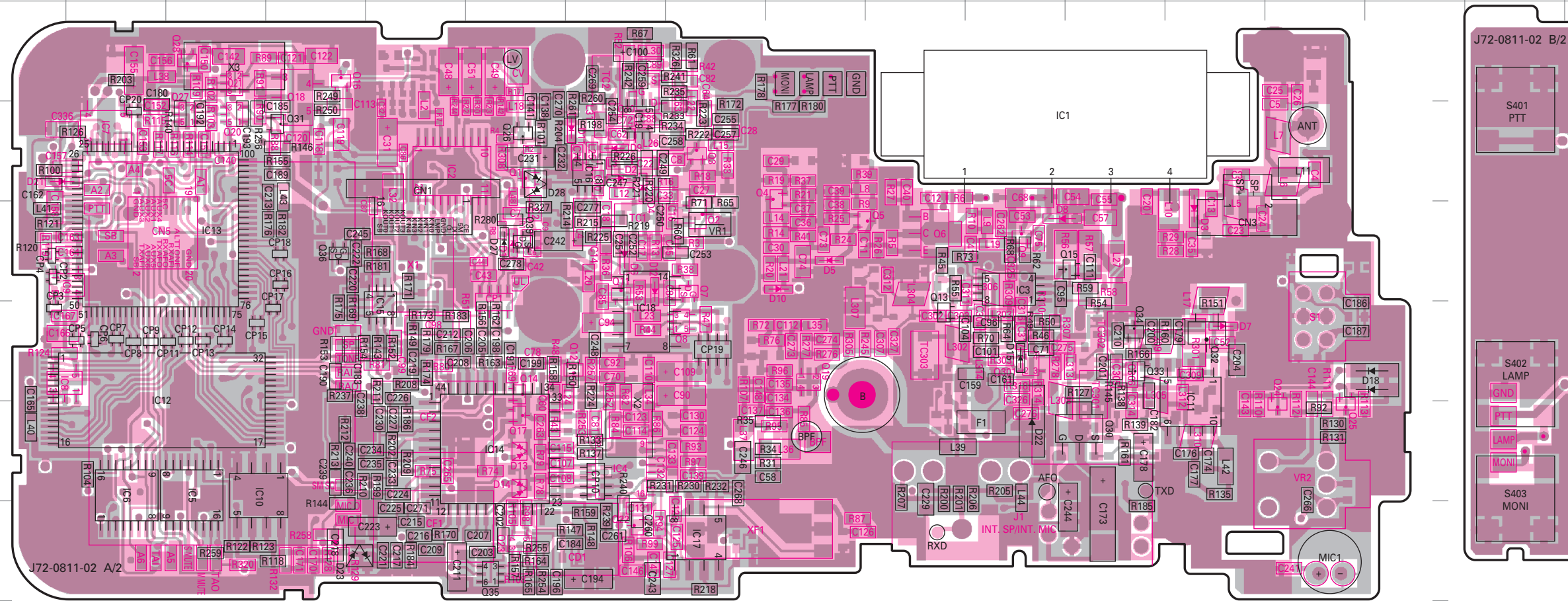
Component side



Foil side

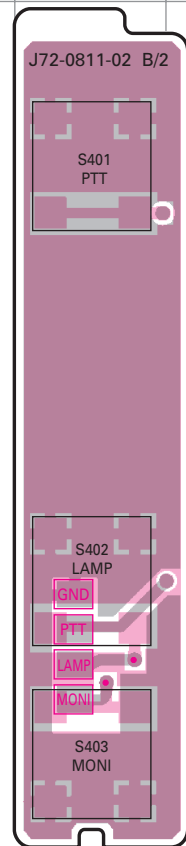
TK-388G PC BOARD / PC 板视图

TX-RX UNIT (X57-6500-21) Component Side View + Foil Side View (J72-0811-02)

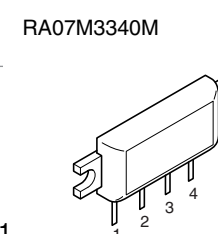
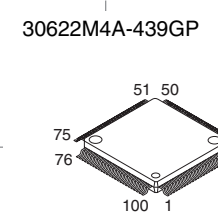
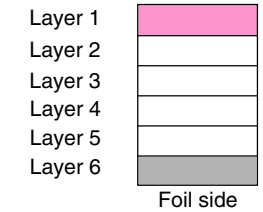


TX-RX UNIT (X57-6500-21)

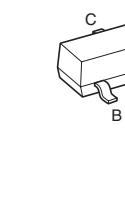
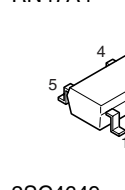
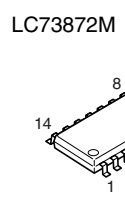
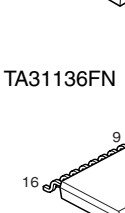
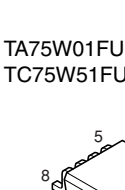
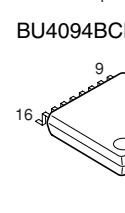
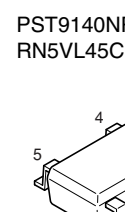
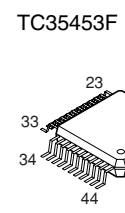
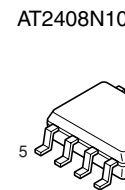
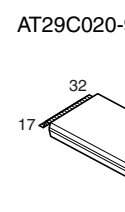
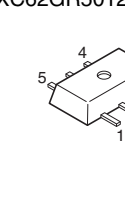
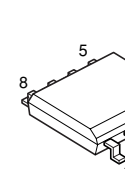
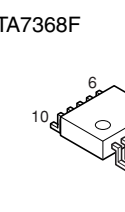
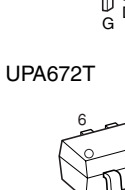
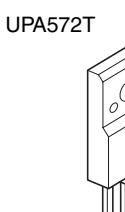
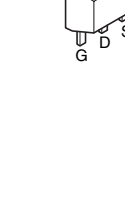
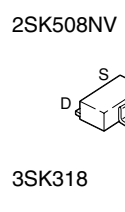
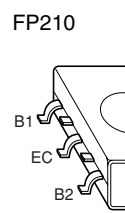
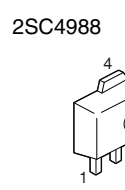
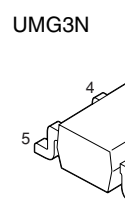
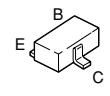
Ref. NO.	Address
IC2	4E
IC3	5K
IC4	7G
IC5	7C
IC6	7B
IC7	4B
IC8	6A
IC9	6A
IC10	7C
IC11	6M
IC12	6B
IC13	5B
IC14	7F
IC15	6E
IC16	4G
IC17	8H
IC18	6G
IC19	4G
Q1	4F
Q2	5H
Q3	4H
Q4	4I
Q5	5I
Q6	5J
Q7	5H
Q8	6H
Q9	5K
Q10	3G
Q11	5H
Q12	6G
Q13	6J
Q14	6F
Q15	5L
Q16	3D
Q17	7F
Q18	3D
Q19	6I
Q20	4C
Q21	3C
Q22	8G
Q23	8F
Q24	7N
Q25	7N
Q26	4F
Q27	4C
Q28	3C
Q30	7L
Q31	4D
Q32	6M
Q33	6L
Q34	6L
Q35	8F
Q36	5D
Q39	5F
Q301	6K
D1	5F
D2	4G
D3	5M
D4	4G
D5	5I
D6	5G
D7	6M
D8	5K
D9	4G
D10	5I
D11	4G
D12	5G
D13	7F
D14	7F
D15	6K
D18	6O
D21	4S
D22	7K
D23	8D
D27	5F
D28	4F

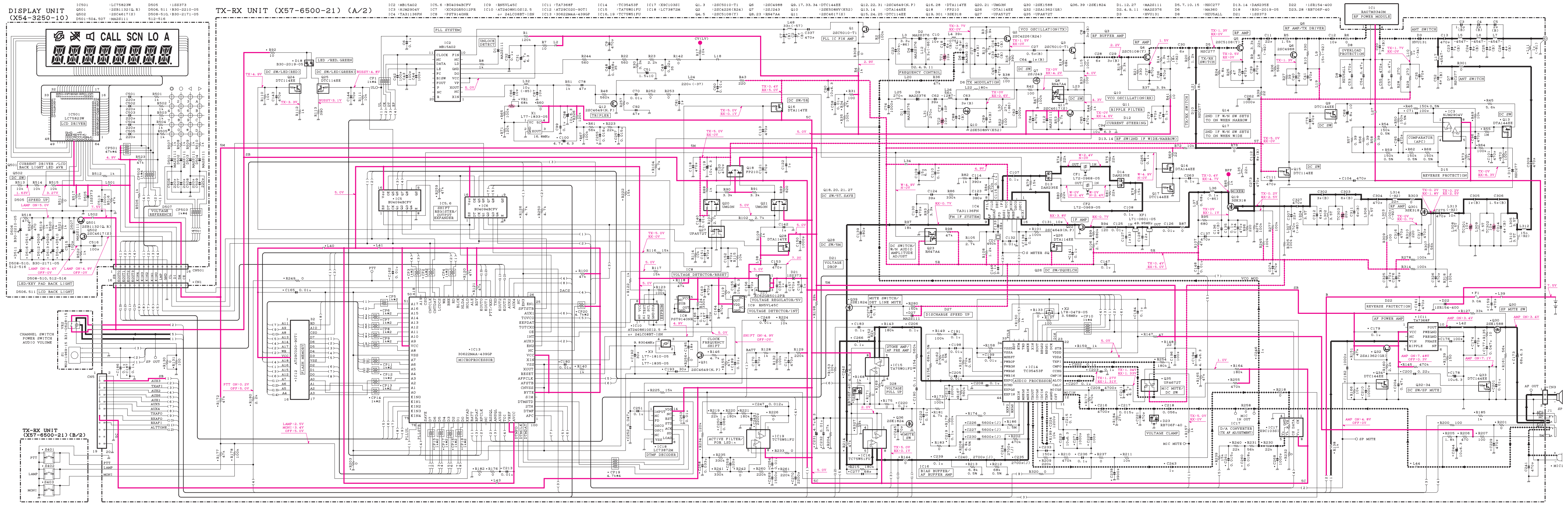


● Connect 1 and 6.
Component side



- DTA114EE
- DTA114YE
- DTA144EE
- DTC114EE
- DTC144EE
- 2SA1362
- 2SC4226
- 2SC4617
- 2SC5010-T1
- 2SC5108



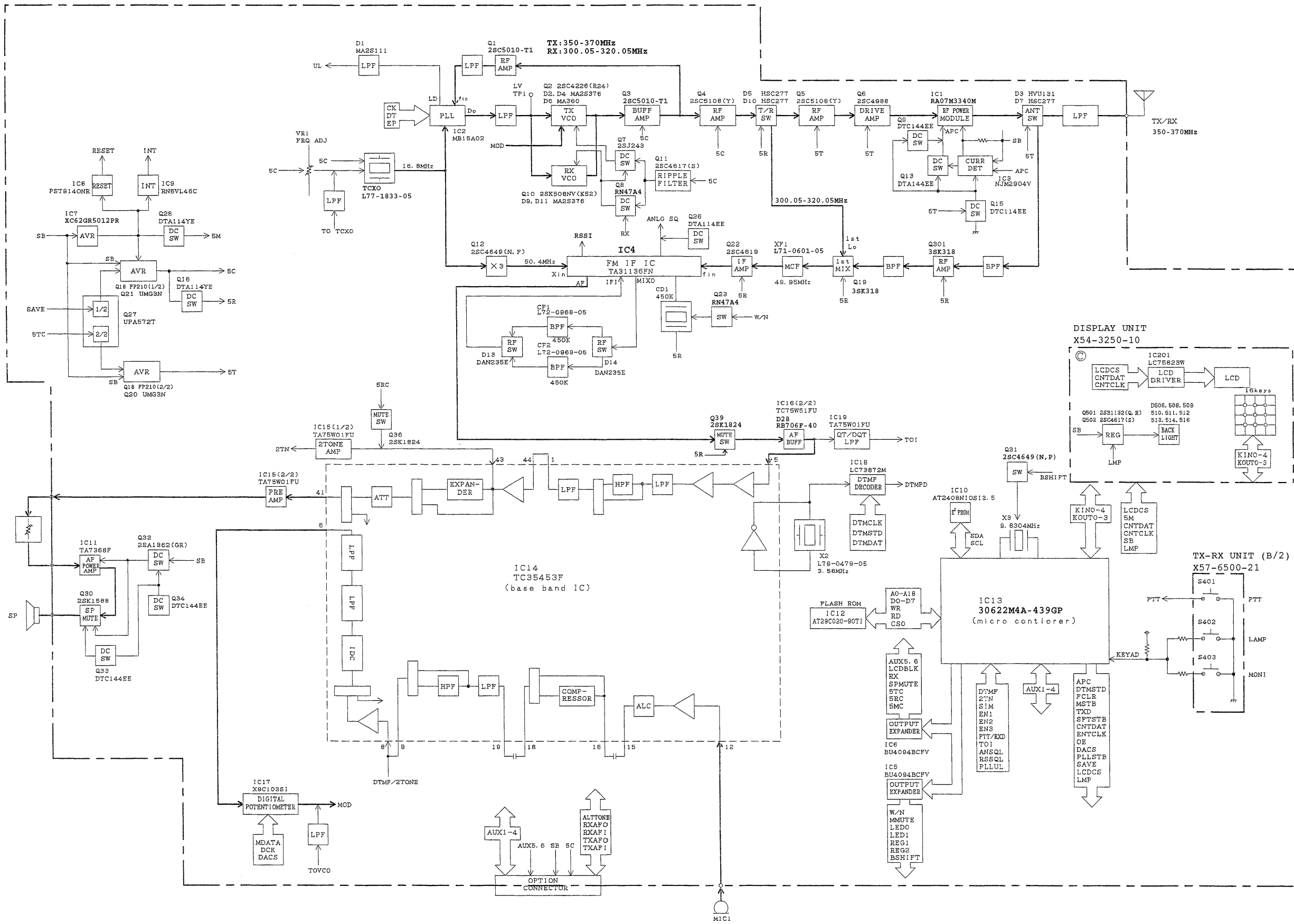


Note) Component marked with a dot (●) are Parts of layer 1.

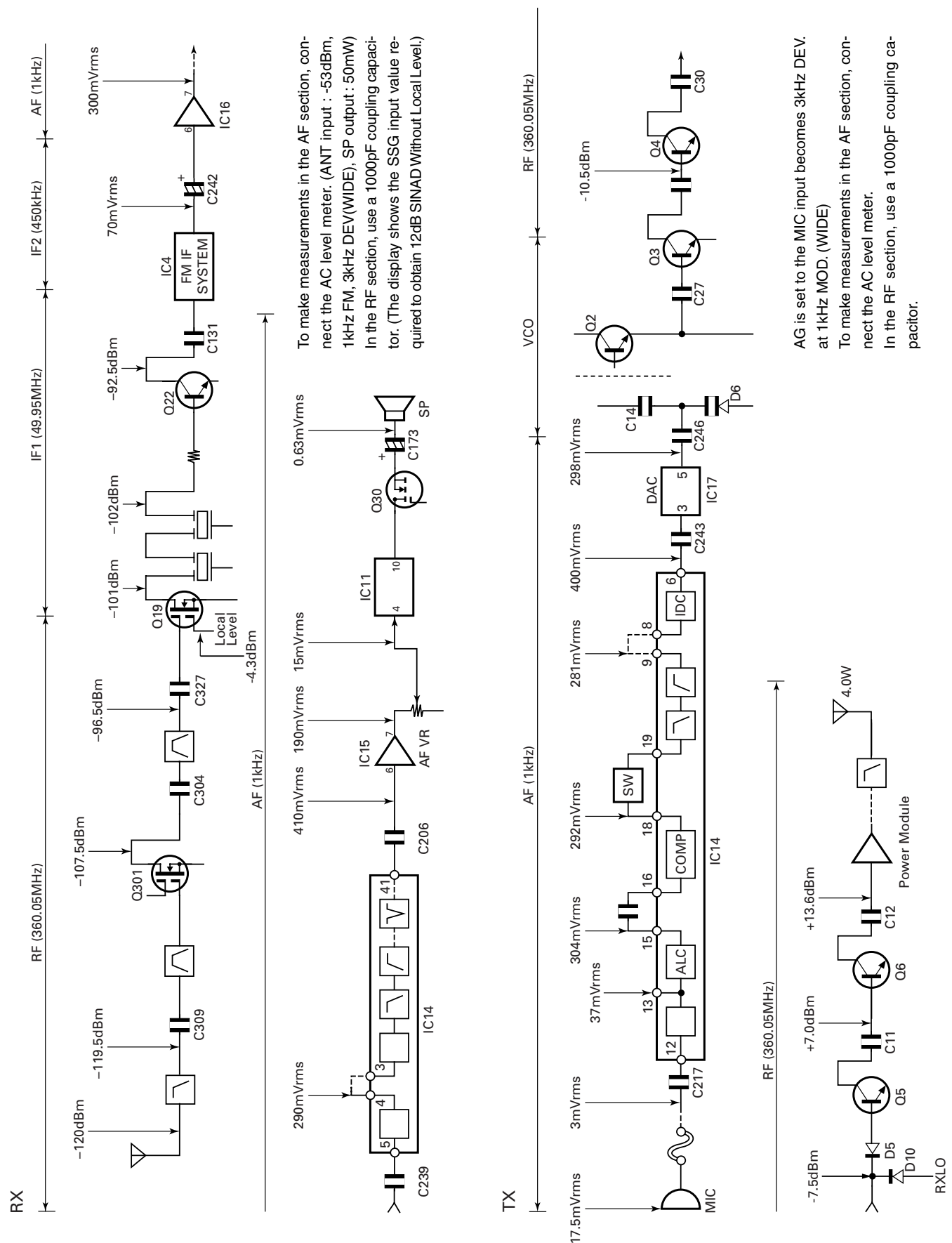
TK-388G TK-388G

BLOCK DIAGRAM / 方块图

TX-RX UNIT (A/2)
X57-6500-21



LEVEL DIAGRAM / 电平图

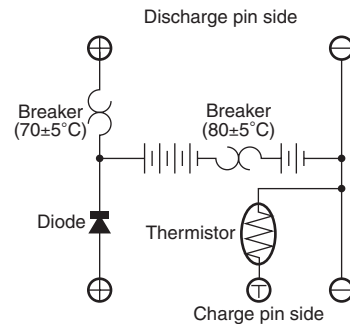


KNB-14/KNB-15A (Ni-Cd BATTERY)

KNB-14



CIRCUIT DIAGRAM



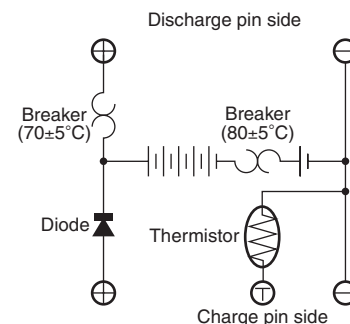
SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Charging current	: 600mAh
Dimensions	: 60.8W x 110.8H x 17.3D (mm) (projections included)
Charger and charging time:	KSC-15 (normal charger), approximately 8 hours KSC-16 (rapid charger), approximately 1 hour
Weight	: 165g

KNB-15A



CIRCUIT DIAGRAM



SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Charging current	: 1100mAh
Dimensions	: 60.8W x 110.8H x 20.3D (mm) (projections included)
Charger and charging time:	KSC-15 (normal charger), approximately 8 hours KSC-16 (rapid charger), approximately 2 hours
Weight	: 210g

KMC-17 / KMC-21 (SPEAKER MICROPHONE)

KMC-17 (Speaker microphone)



KMC-17 Parts List

Ref. No.	New parts	Parts No.	Description	Re- marks
		A02-0907-08	Case (Front)	
		A02-0908-08	Case (Rear)	
		B09-0316-08	Cap	
		D10-0606-08	Lever (PTT)	
		E11-0421-05	Phone jack	
		E30-3138-18	Coil cord	
		F07-0889-08	Silicon rubber (PTT)	
		G53-0569-08	Packing (MIC case)	
		J29-0440-08	Clip assy	
		J39-0601-08	Packing (MIC)	
		N46-2605-60	Screw (Clip assy)	
		N46-3016-60	Screw (Case)	
		N80-2005-41	Screw (MIC unit)	
		S50-1415-05	Tact switch (PTT)	
		T07-0290-05	Loudspeaker (1W, 8Ω)	
		T91-0534-08	Condenser MIC	

KMC-21 (Speaker microphone)



KMC-21 Parts List

Ref. No.	New parts	Parts No.	Description	Re- marks
		A02-1979-08	Case (Front)	
		A02-0980-18	Case (Rear)	
		E11-0453-08	Phone jack	
		E30-3239-08	Coil cord	
		F07-1414-08	Cover	
		K29-5077-08	Lever (PTT)	
		S70-0444-08	Tact switch (PTT)	
		T07-0335-05	Loudspeaker	
		T91-0564-08	Condenser MIC	

MEMO

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规格

概述

频率范围	350~370MHz
信道数量	最多 128 个
组数量	最多 128 个
信道间隔	25kHz (宽) 12.5kHz (窄)
PLL 步进值	5kHz, 6.25kHz
工作电压	7.5V 直流 ± 20%
电池寿命	4W 时长于 4 个小时 (使用 KNB-14 电池 5-5-90 工作周期) 4W 时长于 8 个小时 (使用 KNB-15A 电池 5-5-90 工作周期)
工作温度范围	-30°C 到 + 60°C (-22° F 到 + 140° F)
尺寸和重量	
带有 KNB-14 (7.2V 600mAh 电池)	58 (2-5/16) 宽 × 135 (5-5/16) 高 × 32 (1-1/4) 长毫米 (英寸) 400g (0.88lbs)
带有 KNB-15A (7.2V 1100mAh 电池)	58 (2-5/16) 宽 × 135 (5-5/16) 高 × 35 (1-3/8) 长毫米 (英寸) 440g (0.97lbs)

接收部 (以每 EIA 标准 EIA-RS316B 进行测量)

灵敏度	
EIA 12dB SINAD	0.25 μ V (宽) /0.28 μ V (窄)
选择性	70dB (宽) /65dB (窄)
互调	65dB (宽) /60dB (窄)
假信号响应	60dB
音频功率输出	500mW
频率稳定性	± 2.5ppm
信道频率扩展	20MHz

发射部 (以每 EIA 标准 EIA-316B 进行测量)

射频功率输出	4W/1W
寄生谐波	70dB
调制	16K ϕ F3E (宽) /11K ϕ F3E (窄)
频率调制噪音	45dB (宽) /40dB (窄)
音频失真	低于 5%
频率稳定性	± 2.5ppm
信道频率扩展	20MHz

SPECIFICATIONS

General

Frequency Range	350~370MHz
Number of channels	Max. 128
Number of groups	Max. 128
Channel Spacing	25kHz (Wide) 12.5kHz (Narrow)
PLL channel stepping	5kHz, 6.25kHz
Operating Voltage	7.5 VDC±20%
Battery Life	More than 4 hours at 4 watts (5-5-90 duty cycle with KNB-14 battery) More than 8 hours at 4 watts (5-5-90 duty cycle with KNB-15A battery)
Operating Temperature range	-30°C to +60°C (-22 °F to +140 °F)
Dimensions and Weight	
With KNB-14 (7.2V 600mAh battery)	58 (2-5/16) W x 135 (5-5/16) H x 32 (1-1/4) D mm (in) 400g (0.88lbs)
With KNB-15A (7.2V 1100mAh battery)	58 (2-5/16) W x 135 (5-5/16) H x 35 (1-3/8) D mm (in) 440g (0.97lbs)

Receiver (Measurements made per EIA standard EIA-RS316B)

Sensitivity	
EIA 12dB SINAD	0.25µV (Wide)/0.28µV (Narrow)
Selectivity	70dB (Wide)/65dB (Narrow)
Intermodulation	65dB (Wide)/60dB (Narrow)
Spurious response	60dB
Audio Power Output	500mW
Frequency Stability	±2.5ppm
Channel Frequency Spread	20MHz

Transmitter (Measurements made per EIA standard EIA 316B)

RF Power output	4W/1W
Spurious and Harmonics	70dB
Modulation	16KφF3E (Wide)/11KφF3E (Narrow)
FM Noise	45dB (Wide)/40dB (Narrow)
Audio Distortion	Less than 5%
Frequency Stability	±2.5ppm
Channel Frequency Spread	20MHz

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