VHF FM TRANSCEIVER/甚高频调频无线电收发机

TK-270/(N)/278/(N)/278T

SERVICE MANUAL / 维修手册

REVISED/修订版

KENWOOD

This service manual is same as the TK-270/278(B51-8320-00) service manual with destinations K,M,K2,and M2, with the exception of the new destinations ,(N)K, (N)M,(N)K2,(N)M2,TM,and TM2.

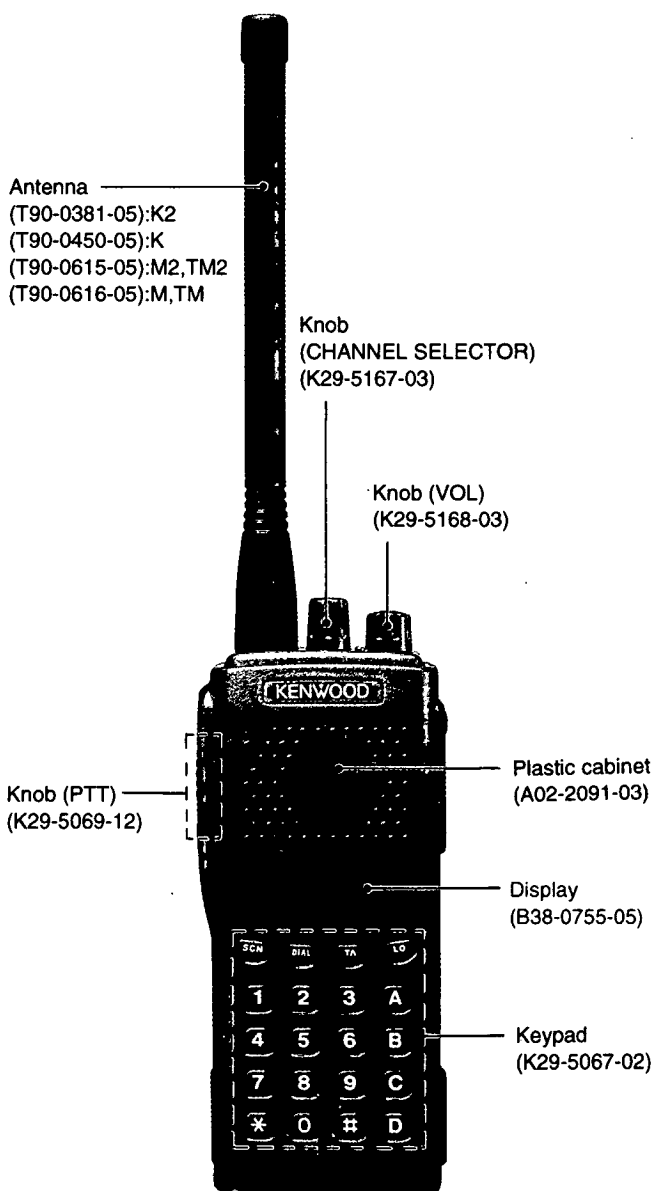本维修手册与TK-270/278(B51-8320-00)相同带有终点K, M, K2及M2, 新终点(N)K, (N)M, (N)K2, (N)M2, TM及TM2除外。

YO4HFU

Antenna
(T90-0381-05):K2
(T90-0450-05):K
(T90-0615-05):M2,TM2
(T90-0616-05):M,TM

Knob
(CHANNEL SELECTOR)
(K29-5167-03)

Knob (VOL)
(K29-5168-03)

Knob (PTT)
(K29-5069-12)

Plastic cabinet
(A02-2091-03)

Display
(B38-0755-05)

Keypad
(K29-5067-02)

PHOTO is M, M2 TYPE

CONTENTS

CAUTION:
When using an external power connector, please use with maximum final module protection of 9V.

TK-270/(N)/278/(N)/278T

目录

GENERAL/ 概要

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 data. 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.

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

NOTE
WE CANNOT guarantee oscillator stability when using channel element manufactured by other than KENWOOD or its authorized agents.

引 言
本手册的范围
本手册是提供给熟悉专业通信设备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。在出版后有可能发生变动，将用《服务通报》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(元件、组件以及机壳)都有识别号码。如果不知道零件号码，为了正确地识别，必须写上此元件所属的机壳或组件的号码，并且应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:
- 在没有认真地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，或者，在易爆性气体环境中，必须关掉电源，不可操作本设备。
- 本设备只应该由有资格的技术人员来维修。

服务
为便于本设备的维修，建立了完整的服务体系，有包括原理图、印刷线路板图和调整步骤在内的资料供参考。

注意
当使用"建伍"或它的指定厂家之外的公司所制造的波道元件时，我们不能保证振荡器的稳定性。

	Destination	Frequency range	Remarks		QT/DQT	2-TONE	DTMF	Charger	Battery
TK-270/(N)	K	150 ~ 170 MHz			O	O	O	OP	OP
TK-270	K2	136 ~ 150 MHz	IF 1	45.05 MHz	O	O	O	OP	OP
TK-278/(N)	M	150 ~ 174 MHz	LOC	44.595 MHz	QT	-	O	OP	OP
	M2	136 ~ 150 MHz			QT	-	O	OP	OP
TK-278T	M	150 ~ 174 MHz			QT	-	O	OP	OP
	M2	136 ~ 150 MHz			QT	-	O	OP	OP

2-TONE is used for decoding only.

两音仅适用于译码。

TK-270/(N)/278/(N)/278T
REALIGNMENT

CONTROLS AND KEYS

① CHANNEL selector

Selects operating channels. Also used for selecting squelch level. If so programmed by your dealer, used for selecting channels to be locked out, or for selecting the QT frequencies so they may be changed.

② POWER/VOL control

Switches the transceiver ON or OFF. Also increases or decreases the transceiver volume.

③ LED indicator

Lights red while transmitting. Flashes red when the battery voltage level is low. Lights green when receiving a station. Flashes orange when receiving the correct signaling for Code Squelch, Selective Call, or 2-Tone (2-Tone: TK-270/(N) only).

④ Display

⑤ SCN key

Used for controlling the Scan function.

⑥ DIAL key

Used for dialing a number with the Store and Send function, or used for storing, confirming, transmitting, or erasing numbers with the Auto-dial function.

⑦ TA key

Toggles the Talk-around function or the Reverse function ON or OFF.

⑧ LO key

Used for setting the transmit power.

⑨ DTMF keypad

Used for storing or transmitting DTMF numbers.

⑩ PTT (Push-to-Talk) switch

Switches the transceiver between receive and transmit modes.

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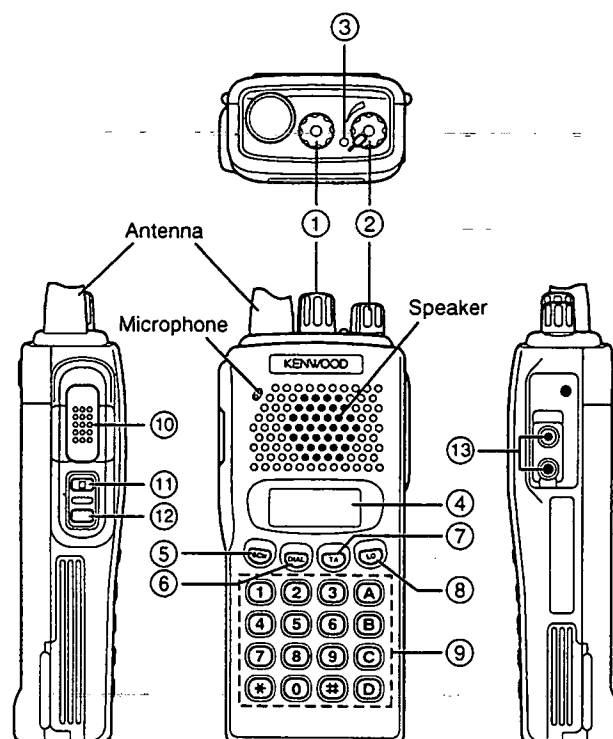
The transceiver is shown with the optional KNB-14 battery pack installed.

⑪ LAMP button

Toggles the Display illumination ON or OFF. The Display light goes OFF approximately 5 seconds after being switched ON.

Pressing any button or key except the LAMP button while the Display is illuminated restarts the 5 second timer. However, pressing the LAMP button switches OFF the light immediately.

⑫ MONI button

Press to monitor activity on your selected channel. Also used with QT, DQT, DTMF, or 2-Tone signaling to mute the speaker after these functions have opened squelch (DQT and 2-Tone: TK-270/(N) only).

JACKS

⑬ Speaker-Microphone jacks

If desired, connect a speaker-microphone here.

模式组合

控制旋钮和功能键

① 信道选择旋钮 (CHANNEL)

选择工作信道，亦用于选择静噪电平。根据贵地经销店的编程设定，还可以用于选择要闭锁定的信道或选择CTCSS (QT) 的频率。

② 电源/音量调节旋钮 (POWER/VOL)

接通或断开通信机的电源。也用于增大或减小通信机的接收音量。

③ 状态指示灯 (LED)

发射期间红色灯亮。电池电压变低到临界电平时红色灯闪烁。接收其它电台信号时绿色灯亮。在使用编码静噪、信息选呼或两音静噪的情况下，接收到正确信号而静噪打开时橙色灯闪烁。(两音信令：仅适用于TK-270/(N)型)。

④ 显示屏

⑤ 扫描键 (SCN)

用以控制扫描功能。

⑥ 拨号键 (DIAL)

在使用存储-发送功能时，用以发出编码，或在使用编位拨号功能时，用以存储、确认、发射或清除编码。

⑦ 脱网通信键 (TA)

启动或退出脱网通信功能或倒频功能。

⑧ 低功率键 (LO)

用以选择发射功率。

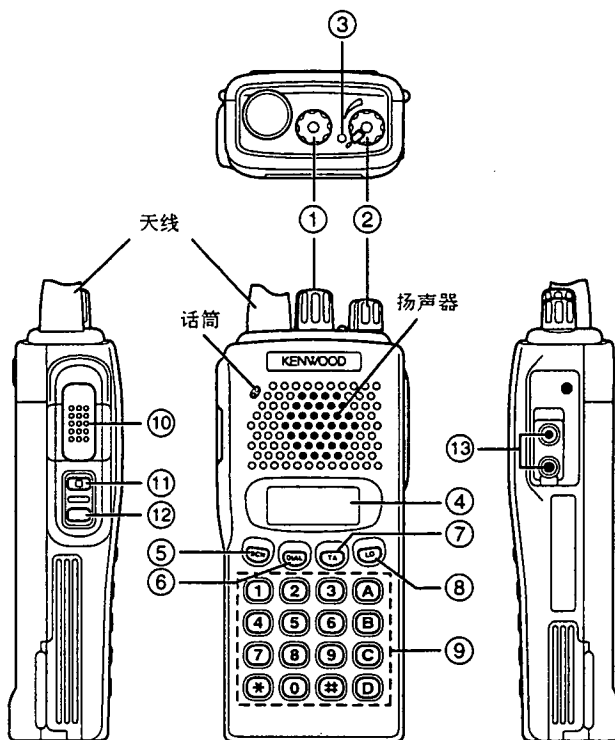**⑨ 双音多频键盘 (DTMF)**

用以存储输入或发出双音多频 (DTMF) 号码。

⑩ 按-讲键 (PTT)

用以转换通信机的发射和接收。

熟悉各部件

装有KNB-14电池(选件)的KNB-14的示意图

⑪ 照明键 (LAMP)

接通或关闭显示屏的照明。照明灯点亮约5秒钟后自动熄灭。

在显示屏被照明期间按下除〔LAMP〕键以外的任何键, 5秒钟定时器便重新进行计时。但是一按〔LAMP〕键便会立即关掉照明灯。

⑫ 监听键 (MONI)

按此键可以监听所选择信道上的情况。在使用CTCSS (QT)、亚音数码静噪 (DQT)、DTMF或两音静噪功能的情况下，静噪打开后，也可以用此键立即关闭静噪 (DQT和两音信令：仅适用于TK-270/(N)型)。

插孔

⑬ 扬声器-话筒插孔

如果需要, 连接外部扬声器-话筒于此处。

TK-270/(N)/278/(N)/278T
REALIGNMENT/模式组合

DISPLAY　显示屏
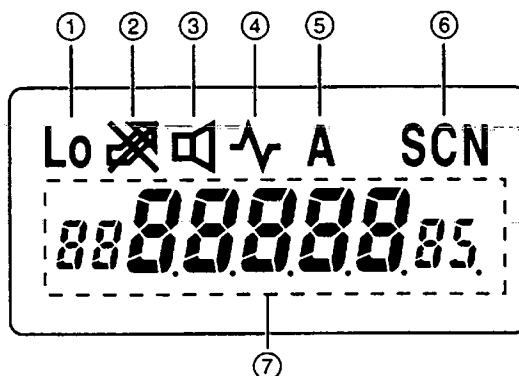
① **Lo**

Appears when the Low Power function is selected.

② **⚡**

Appears when the selected channel is busy.

③ **◁**

Appears when QT, DQT, DTMF, or 2-Tone decoding is deactivated by pressing the MONI button

(DQT and 2-Tone: TK-270/(N) only)

④ **∿**

Appears when the squelch is opened by pressing the MONI button.

⑤ **A**

Appears when the selected channel is assigned to the scan list. The Scan function only scans the channels on the scan list.

⑥ **SCN**

Visible while scanning.

⑦ **88 88888 85**

Displays the selected channel or squelch level. Also displays DTMF digits as they are programmed, confirmed, or transmitted. Messages received via Selective Call also are displayed here.

① **Lo**

当选择了低功率状态时出现。

② **⚡**

当所选择的信道被占用（繁忙）时出现。

③ **◁**

通过按〔MONI〕键使QT、DQT、DTMF或两音静噪无效时出现（DQT和两音信令：仅适用于TK-270/(N)型）。

④ **∿**

通过按下〔MONI〕键使静噪打开时出现。

⑤ **A**

当所选择的信道是在可扫描信道序列中时出现。扫描功能只扫描可扫描信道序列中的信道。

⑥ **SCN**

扫描中出现。

⑦ **88 88888 85**

显示所选择的信道号码或静噪电平代码。当编程、确认或发射时，也显示DTMF数字。在信息选呼时，所接收到的信息也显示在此处。

REALIGNMENT/模式组合

1. TRANSCEIVER MODES

Select the function you want from among the four modes and make the necessary settings.

1. 通信机的工作模式

通信机的工作参数和所需要的功能分别在以下的 4 个模式中选择设定。

```
                                    ┌─────────────────────┐
                                    │ Conventional mode   │
                                    │ 常规通信模式          │
                                    └─────────────────────┘

┌──────────────┐   ┌─────────────────────┐   ┌─────────────────────┐
│ USER MODE    │───│ Trunking Mode       │───│ Trunking Set Mode   │
│ 用户模式      │   │ 集群通信模式          │   │ 集群设定模式          │
└──────────────┘   └─────────────────────┘   └─────────────────────┘

                    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
                      Self Programming Mode
                    │ 自台编程模式                │
                      ┌─────────────────────┐
┌──────────────┐    │ │ Function Set Mode   │   │
│ DEALER MODE  │──────│ 功能设定模式          │
│ 经销商模式    │    │ └─────────────────────┘   │
└──────────────┘
                    │ ┌─────────────────────┐   │
                      │ DTMF Set Mode       │
                    │ │ DTMF 设定模式         │   │
                      └─────────────────────┘
                    │ ┌─────────────────────┐   │
                      │ Channel Set Mode    │
                    │ │ 信道设定模式          │   │
                      └─────────────────────┘
                    └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘

                    ┌─────────────────────┐
                    │ Trunking Set Mode   │
                    │ 集群设定模式          │
                    └─────────────────────┘

                    ┌─────────────────────┐
                    │ Wired Clone Mode    │
                    │ 有线复制模式          │
                    └─────────────────────┘

                    ┌─────────────────────┐
                    │ Wireless Clone Mode │
                    │ 无线复制模式          │
                    └─────────────────────┘

                    ┌─────────────────────┐
                    │ All Reset           │
                    │ 全机复位模式          │
                    └─────────────────────┘

┌──────────────┐    ┌─────────────────────┐
│ TEST MODE    │────│ LCD All Lamp Mode   │
│ 测试模式      │    │ 显示屏全显示模式       │
└──────────────┘    └─────────────────────┘

                    ┌─────────────────────┐
                    │ Destination Set Mode│
                    │ 型式设定模式          │
                    └─────────────────────┘

                    ┌─────────────────────┐
                    │ Frequency Display Mode│
                    │ 频率显示模式          │
                    └─────────────────────┘

                    ┌─────────────────────┐
                    │ Alignment Mode      │
                    │ 调整模式              │
                    └─────────────────────┘

┌──────────────┐
│ PC MODE      │
│ 计算机模式    │
└──────────────┘
```
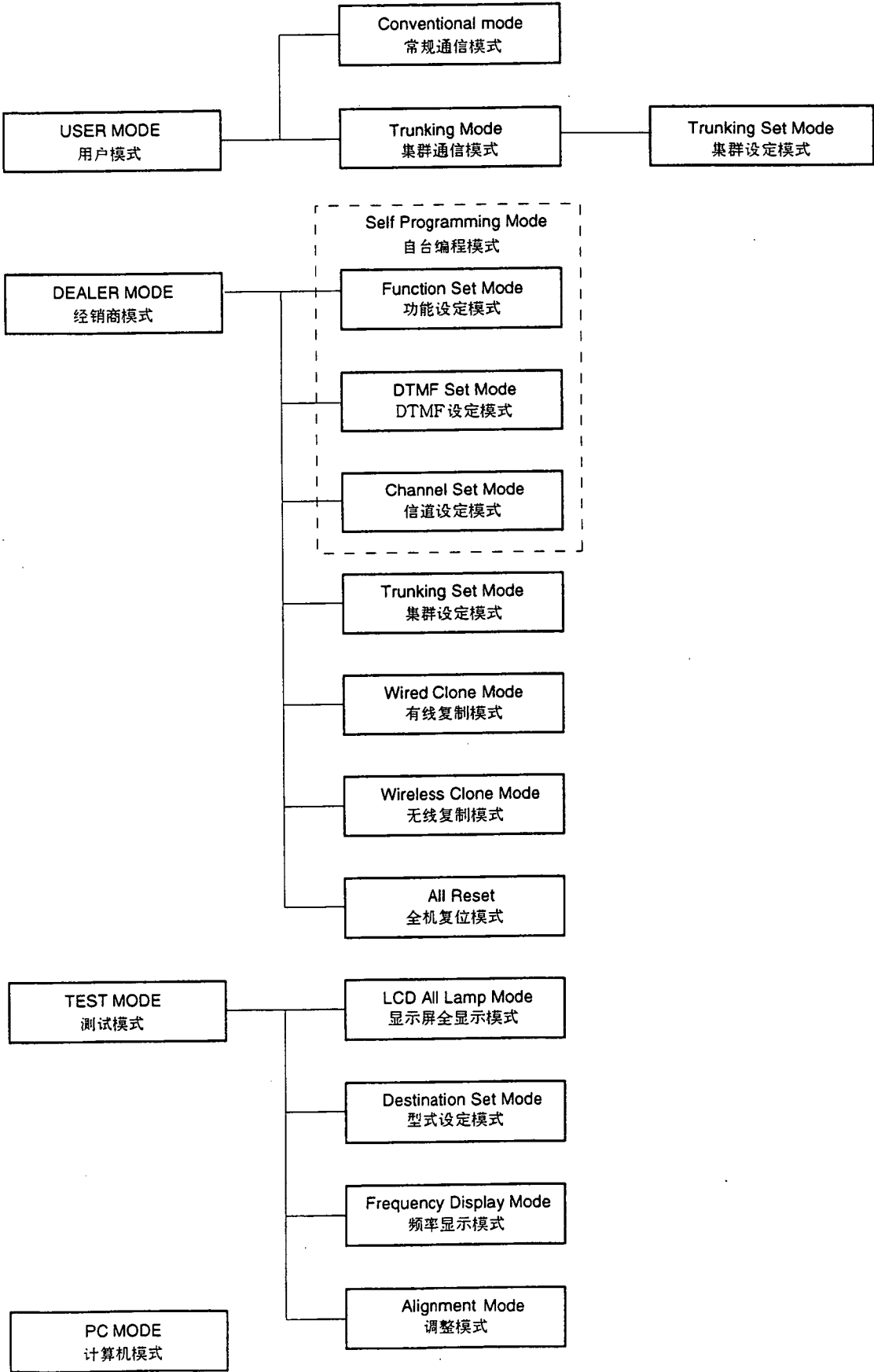
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TK-270/(N)/278/(N)/278T

REALIGNMENT

2. DESCRIPTION OF MODE FUNCTIONS

Note : The SmarTrunk II ™ call is a registered trademark of the Selectone Corporation.

MODE		FUNCTION
USER MODE		This mode is used for routine operation.
CONVENTIONAL MODE		This mode is for use as a transceiver.
TRUNKING MODE		This mode is used when a trunking board has been installed. (board model: board model ST-865KW2)
DEALER MODE		This mode is used by the dealer for making settings for the modes listed below. Function set mode, DTMF set mode, Channel set mode, Trunking set mode, Wired clone mode, Wireless clone mode, All Reset
Self Programming (FUNCTION SET MODE)		This mode is used by the dealer for making ON/OFF settings of each transceiver function according to the user operating needs. 1.Monitor 2.Scan 3.Disable 4.Talk Around 5.Low 6.Priority 7.Priority CH 8.Look Back A 9.Look Back B 10.Revert CH 11.TX Dwell Time 12.Dropout Delay Time 13.Time out Timer 14.Transmit Warning 15.TOT Rekey Time 16.TOT Reset Time 17.Squelch Level 18.Beep 19.Signalling 20.Battery Save 21. Selectable QT 22.DELETE/ADD 23.Dealer Mode - Test Mode ENABLE
Self Programming (DTMF SET MODE)		This mode is used by the dealer for making DTMF ON/OFF settings of each transceiver function according to the user operating needs. 24.Digit Time 25.Interdigit Time 26.First Digit Time 27.Rise Time 28.Rise Time With QT 29.PTT ID 30.Dial ID 31.connect ID 32. Disconnect ID 33.NO. of DTMF key 34.DTMF Hold Time 35.Store & Send 36.D key Assignment 37.DTMF Signaling 38.Intermediate Code 39.Group Code 40.Auto Reset Time 41.Call Alert/Transpond 42.Clear to Transpond
Self Programming (CHANNEL SET MODE)		This mode is used by the dealer for setting channel frequencies and signaling according to the user operating needs without using the FPU. 1.Channel Selection 2.RX Frequency 3.RX Signaling 4.TX Frequency 5.TX Signaling 6.2-Tone/DTMF (TK-270/(N)) TK-278/(N) is DTMF only 7.PTT ID Enable 8.Scan DEL/ADD 9.Busy Channel Lockout 10.Clock Frequency Shift 11.TX Power 12.ID Code (DTMF)
TRUNKING SET MODE		This mode sets operations involving the SmarTrunk II ™.
WIRED CLONE MODE		This mode copies data settings from one transceiver to another by means of an interface cable.
WIRELESS CLONE MODE		This mode copies data settings from one transceiver to another without cables by means of the DTMF signal.
ALL RESET		This mode resets transmit/receive frequencies for each channel and the function settings.
TEST MODE	ALL LCD MODE	This mode lights up all the LCD segments to check them.
	DESTINATION SET MODE	This mode sets the transceiver destination.
	FREQUENCY DISPLAY MODE	This mode is for checking the frequencies and service work.
	ALIGNMENT MODE	This mode is for alignment of transceiver operation.
PC MODE		This mode is used for making settings by operating the FPU connected to the RS-232C port.

模式组合

2. 各模式的功能说明

注)Smar Trunk II™是SELECTONE公司注册的商标。

模 式		功能简要说明
用户模式		通常使用的模式
常规通信模式		作为普通通信机使用的模式
集群通信模式		安装集群逻辑板后使用的模式(逻辑板型号:ST-865KW2)
经销商模式		经销商进行各项设定的模式 (功能设定模式)(DTMF设定模式)(信道设定模式)(集群设定模式) (有线复制模式)(无线复制模式)(全机复位模式)
自台编程 (功能设定模式)		经销商根据用户的使用条件,设定通信机各项功能的有/无 1.监听 2.扫描 3.〔DIAL〕键 4.脱网 5.〔LO〕键 6.优先信道 7.优先信道选择 8.回扫周期A 9.回扫周期B 10.恢复信道选择 11.发射扫描暂停时间 12.停留时间 13.发射定时 14.发射警告 15.TOT恢复时间 16.TOT复位时间 17.静噪电平 18."嘟嘟"音 19.信令控制关系 20.电池省电 21.可变音频CTCSS 22.删除/追加 23.经销商模式和测试模式开放
自台编程 (DTMF设定模式)		经销商根据用户的使用条件设定通信机的各项DTMF功能的有/无 24.号码宽度 25.码间间隔 26.首位号码宽度 27.号码发射延迟时间 28.有CTCSS功能时的号码发射延迟时间 29.ANI号码发射时机 30.电话密码 31.上线码 32.下线码 33.DTMF键盘制式 34.号码发射保留时间 35.输入-发出 36.〔D〕键空码设定 37.DTMF功能选择 38.中间号码选择 39.组呼"王码"选择 40.静噪自动关闭时间 41.被呼提示/自动应答 42.加强自动应答
自台编程 (信道设定模式)		经销商根据用户的使用条件,不用外部编程器而设定通信机的信道频率和删除/追加等参数。 1.信道选择 2.接收频率 3.接收信令 4.发射频率 5.发射信令 6.两音信令/DTMF信令(TK-270/(N) TK-278/(N))仅适用于DTMF 7.ANI功能 8.删除/追加选择 9.禁发功能 10.时钟拍频率偏移 11.发射功率 12.自台号码
集群设定模式		设定SmarTrunk II™系统参数的模式
有线复制模式		用接口电缆把已设定的通信机中的数据传送到其它未设定的通信机中
无线复制模式		用DTMF信号以无线方式把已设定的通信机中的数据传送到其它未设定的通信机中
全机复位模式		把各个信道的发射/接收频率以及功能设定等参数全部初始化
测试模式	显示屏全显示模式	显示屏上所有的字段和标志都显示出来以确认显示屏的模式
	型式设定模式	设定通信机型式的模式
	频率显示模式	用于确认频率和进行修理
	调整模式	对通信机进行调整的模式
计算机模式		使用外部写频器(计算机)通过RS-232C接口对通信机进行各种设定的模式

TK-270/(N)/278/(N)/278T

REALIGNMENT

3. KEYBOARD ENTRY FOR MODE STARTUP

MODE		Startup Key	Remarks
USER MODE	Conventional Mode / Trunking Mode	POWER ON	Switch between Conventional Mode and Trunking Mode by holding down the [MONI] key in POWER ON.
	Trunking Set Mode	POWER ON while the [#] key is held down.	This can be selected when installed with a board with the trunking mode function (board model ST-865KW2).
DEALER MODE	Function Set Mode	While holding down the [LAMP] and [DIAL] keys simultaneously, switch the POWER ON.	Press the [SCN] key to enter Function Set Mode.
	DTMF Set Mode	Same as above	Press the [DIAL] key to enter DTMF Set Mode.
	Channel Set Mode	Same as above	Press the [TA] key to enter Channel Set Mode.
	Trunking Set Mode	Same as above	Press the [LO] key to enter Trunking Set Mode. (when board has been installed)
	Wired Clone Mode	Same as above	Press the [LAMP] key to enter Clone Mode.
	Wireless Clone Mode	Same as above	Press the [MONI] key to enter Wireless Clone Mode.
	All Reset	Same as above	Press the [LO] key while holding down the [PTT] key for All Reset.
TEST MODE	ALL LCD Mode	While holding down the [LAMP] and [TA] keys simultaneously, switch the POWER ON.	Press the [SCN] key to light up the LEDs.
	Destination Set Mode	Same as above	Press the [LO] key to enter Destination Set Mode
	Alignment Mode	Same as above	Press the [TA] key to enter Alignment Mode and then press [LO] while holding down the [LAMP] key.

4. DISABLING THE SELF-PROGRAMMING FUNCTION

- You can make settings to prohibit self write by the user and shifting to dealer mode or test mode with the FPU.

- Canceling Shift-Prohibit
  Short the dealer mode - test mode shift ports and shift-prohibit will cancel at POWER-ON (see diagram), or cancel by using the FPU.
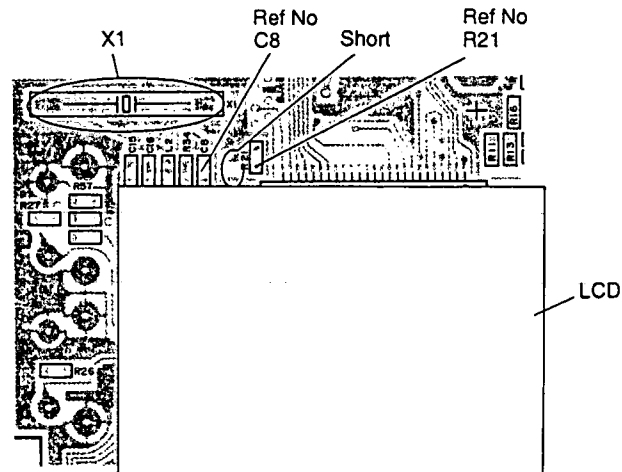
TX-RX UNIT (solder side)

模式组合

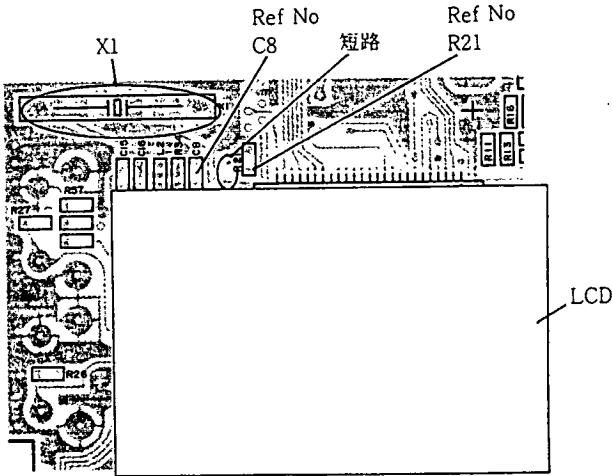## 3．进入各模式的键盘操作方法

模 式		键 操 作	备 注
用户模式	常规通信模式/集群通信模式	接通电源	按住〔MONI〕键，同时接通电源，可切换常规通信模式和集群通信模式
	集群设定模式	按住〔#〕键，同时接通电源	只有装了逻辑板后才能选择集群通信模式（逻辑板型号：ST-865KW2）
经销商模式	功能设定模式	同时按住〔LAMP〕和〔DIAL〕键，接通电源（2秒钟后）	按〔SCN〕键，进入功能设定模式
	DTMF设定模式	同 上	按〔DIAL〕键，进入DTMF设定模式
	信道设定模式	同 上	按〔TA〕键，进入信道设定模式
	集群设定模式	同 上	按〔LO〕键，进入集群设定模式（安装逻辑板后）
	有线复制模式	同 上	按〔LAMP〕键，进入有线复制模式
	无线复制模式	同 上	按〔MONI〕键，进入无线复制模式
	全机复位模式	同 上	同时按〔PTT〕和〔LO〕键
测试模式	显示屏全显示模式	同时按住〔LAMP〕和〔TA〕键，接通电源（2秒钟后）	按〔SCN〕键，进入显示屏全显示模式
	型式设定模式	同 上	按〔LO〕键，进入型式设定模式
	调整模式	同 上	按〔TA〕键，进入调整模式，选择频率后，同时按〔LAMP〕和〔LO〕键

4．自台编程功能的封闭

● 本机可以编程封闭经销商模式和测试模式，以防止使用者利用自台编程功能以及外部写频器自行修改参数或由此产生的误动作。

● 解除封闭的方法：暂时把经销商模式/测试模式进入控制点短路同时接通电源即可解除对经销商模式/测试模式的封闭。（请参看附图）
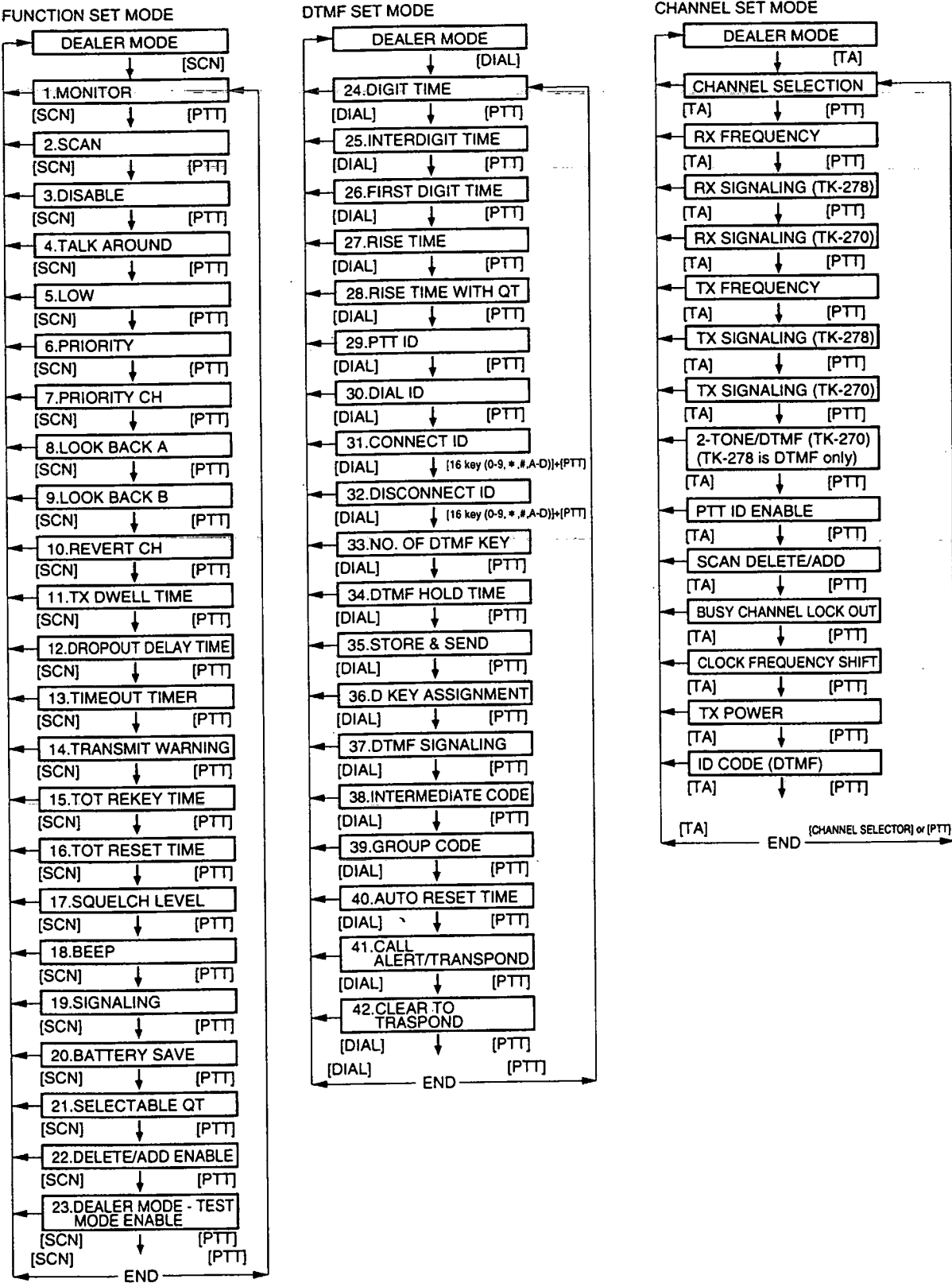用外部写频器（计算机）也可以解除对经销商模式/测试模式的封闭。

RX-TX单元 （焊接面）
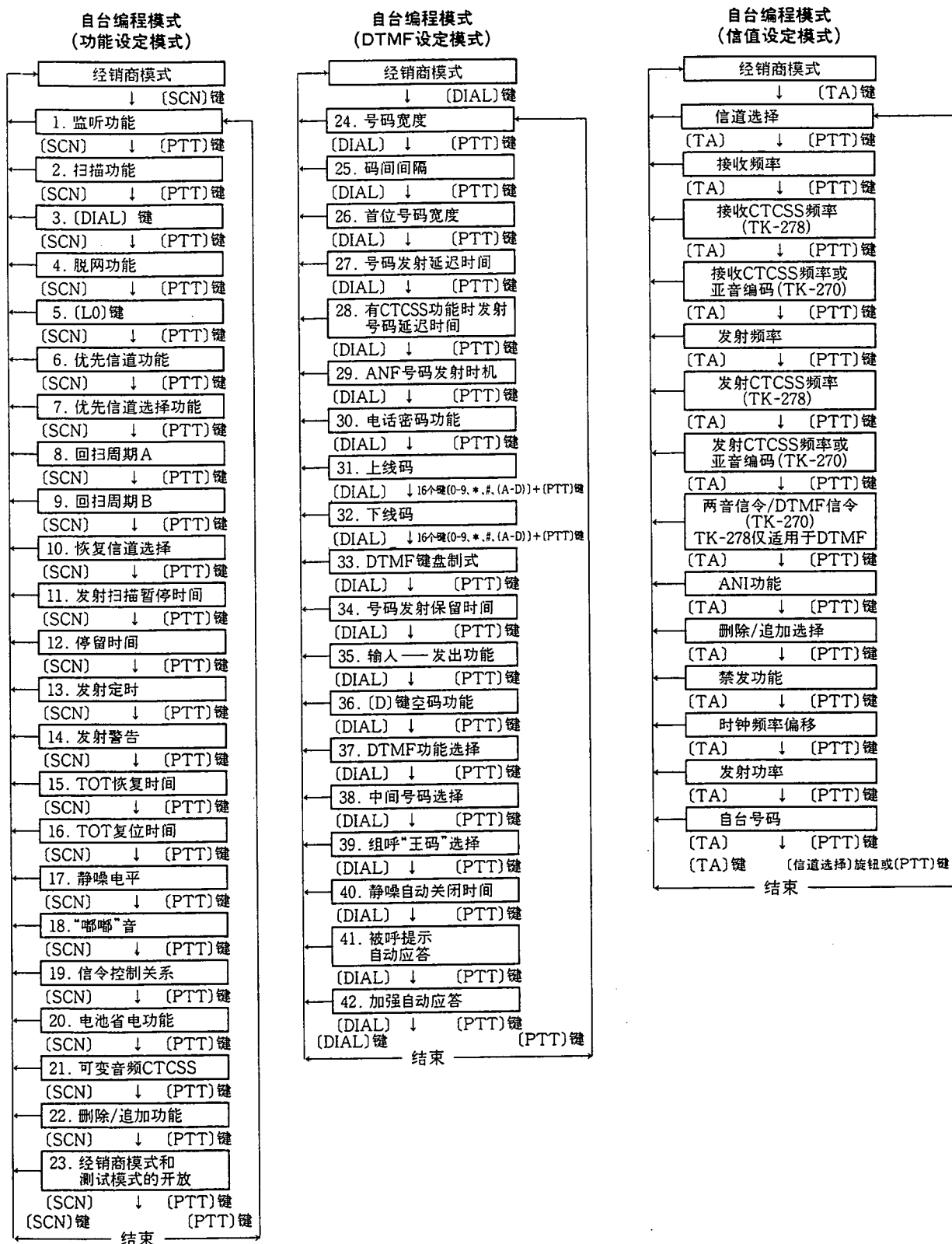
TK-270/(N)/278/(N)/278T

REALIGNMENT

5. SELF PROGRAMMING FLOW CHART

FUNCTION SET MODE

```
┌─> DEALER MODE
│              ↓ [SCN]
├─> 1.MONITOR
│   [SCN]  ↓  [PTT]
├─> 2.SCAN
│   [SCN]  ↓  [PTT]
├─> 3.DISABLE
│   [SCN]  ↓  [PTT]
├─> 4.TALK AROUND
│   [SCN]  ↓  [PTT]
├─> 5.LOW
│   [SCN]  ↓  [PTT]
├─> 6.PRIORITY
│   [SCN]  ↓  [PTT]
├─> 7.PRIORITY CH
│   [SCN]  ↓  [PTT]
├─> 8.LOOK BACK A
│   [SCN]  ↓  [PTT]
├─> 9.LOOK BACK B
│   [SCN]  ↓  [PTT]
├─> 10.REVERT CH
│   [SCN]  ↓  [PTT]
├─> 11.TX DWELL TIME
│   [SCN]  ↓  [PTT]
├─> 12.DROPOUT DELAY TIME
│   [SCN]  ↓  [PTT]
├─> 13.TIMEOUT TIMER
│   [SCN]  ↓  [PTT]
├─> 14.TRANSMIT WARNING
│   [SCN]  ↓  [PTT]
├─> 15.TOT REKEY TIME
│   [SCN]  ↓  [PTT]
├─> 16.TOT RESET TIME
│   [SCN]  ↓  [PTT]
├─> 17.SQUELCH LEVEL
│   [SCN]  ↓  [PTT]
├─> 18.BEEP
│   [SCN]  ↓  [PTT]
├─> 19.SIGNALING
│   [SCN]  ↓  [PTT]
├─> 20.BATTERY SAVE
│   [SCN]  ↓  [PTT]
├─> 21.SELECTABLE QT
│   [SCN]  ↓  [PTT]
├─> 22.DELETE/ADD ENABLE
│   [SCN]  ↓  [PTT]
├─> 23.DEALER MODE - TEST
│       MODE ENABLE
│   [SCN]  ↓  [PTT]
│   [SCN]     [PTT]
└──── END ────
```

DTMF SET MODE

```
┌─> DEALER MODE
│              ↓ [DIAL]
├─> 24.DIGIT TIME
│   [DIAL]  ↓  [PTT]
├─> 25.INTERDIGIT TIME
│   [DIAL]  ↓  [PTT]
├─> 26.FIRST DIGIT TIME
│   [DIAL]  ↓  [PTT]
├─> 27.RISE TIME
│   [DIAL]  ↓  [PTT]
├─> 28.RISE TIME WITH QT
│   [DIAL]  ↓  [PTT]
├─> 29.PTT ID
│   [DIAL]  ↓  [PTT]
├─> 30.DIAL ID
│   [DIAL]  ↓  [PTT]
├─> 31.CONNECT ID
│   [DIAL]  ↓ [16 key (0-9, *,#,A-D)]+[PTT]
├─> 32.DISCONNECT ID
│   [DIAL]  ↓ [16 key (0-9, *,#,A-D)]+[PTT]
├─> 33.NO. OF DTMF KEY
│   [DIAL]  ↓  [PTT]
├─> 34.DTMF HOLD TIME
│   [DIAL]  ↓  [PTT]
├─> 35.STORE & SEND
│   [DIAL]  ↓  [PTT]
├─> 36.D KEY ASSIGNMENT
│   [DIAL]  ↓  [PTT]
├─> 37.DTMF SIGNALING
│   [DIAL]  ↓  [PTT]
├─> 38.INTERMEDIATE CODE
│   [DIAL]  ↓  [PTT]
├─> 39.GROUP CODE
│   [DIAL]  ↓  [PTT]
├─> 40.AUTO RESET TIME
│   [DIAL]  ↓  [PTT]
├─> 41.CALL
│       ALERT/TRANSPOND
│   [DIAL]  ↓  [PTT]
├─> 42.CLEAR TO
│       TRASPOND
│   [DIAL]  ↓  [PTT]
│   [DIAL]     [PTT]
└──── END ────
```

CHANNEL SET MODE

```
┌─> DEALER MODE
│              ↓ [TA]
├─> CHANNEL SELECTION
│   [TA]  ↓  [PTT]
├─> RX FREQUENCY
│   [TA]  ↓  [PTT]
├─> RX SIGNALING (TK-278)
│   [TA]  ↓  [PTT]
├─> RX SIGNALING (TK-270)
│   [TA]  ↓  [PTT]
├─> TX FREQUENCY
│   [TA]  ↓  [PTT]
├─> TX SIGNALING (TK-278)
│   [TA]  ↓  [PTT]
├─> TX SIGNALING (TK-270)
│   [TA]  ↓  [PTT]
├─> 2-TONE/DTMF (TK-270)
│   (TK-278 is DTMF only)
│   [TA]  ↓  [PTT]
├─> PTT ID ENABLE
│   [TA]  ↓  [PTT]
├─> SCAN DELETE/ADD
│   [TA]  ↓  [PTT]
├─> BUSY CHANNEL LOCK OUT
│   [TA]  ↓  [PTT]
├─> CLOCK FREQUENCY SHIFT
│   [TA]  ↓  [PTT]
├─> TX POWER
│   [TA]  ↓  [PTT]
├─> ID CODE (DTMF)
│   [TA]  ↓  [PTT]
│   [TA]      [CHANNEL SELECTOR] or [PTT]
└──── END ────
```

模式组合

5. 自台编程功能的流程图

自台编程模式（功能设定模式）

经销商模式
↓ 〔SCN〕键
1. 监听功能
〔SCN〕↓〔PTT〕键
2. 扫描功能
〔SCN〕↓〔PTT〕键
3.〔DIAL〕键
〔SCN〕↓〔PTT〕键
4. 脱网功能
〔SCN〕↓〔PTT〕键
5.〔L0〕键
〔SCN〕↓〔PTT〕键
6. 优先信道功能
〔SCN〕↓〔PTT〕键
7. 优先信道选择功能
〔SCN〕↓〔PTT〕键
8. 回扫周期A
〔SCN〕↓〔PTT〕键
9. 回扫周期B
〔SCN〕↓〔PTT〕键
10. 恢复信道选择
〔SCN〕↓〔PTT〕键
11. 发射扫描暂停时间
〔SCN〕↓〔PTT〕键
12. 停留时间
〔SCN〕↓〔PTT〕键
13. 发射定时
〔SCN〕↓〔PTT〕键
14. 发射警告
〔SCN〕↓〔PTT〕键
15. TOT恢复时间
〔SCN〕↓〔PTT〕键
16. TOT复位时间
〔SCN〕↓〔PTT〕键
17. 静噪电平
〔SCN〕↓〔PTT〕键
18. "嘟嘟"音
〔SCN〕↓〔PTT〕键
19. 信令控制关系
〔SCN〕↓〔PTT〕键
20. 电池省电功能
〔SCN〕↓〔PTT〕键
21. 可变音频CTCSS
〔SCN〕↓〔PTT〕键
22. 删除/追加功能
〔SCN〕↓〔PTT〕键
23. 经销商模式和测试模式的开放
〔SCN〕↓〔PTT〕键
〔SCN〕键 〔PTT〕键
—— 结束 ——

自台编程模式（DTMF设定模式）

经销商模式
↓〔DIAL〕键
24. 号码宽度
〔DIAL〕↓〔PTT〕键
25. 码间间隔
〔DIAL〕↓〔PTT〕键
26. 首位号码宽度
〔DIAL〕↓〔PTT〕键
27. 号码发射延迟时间
〔DIAL〕↓〔PTT〕键
28. 有CTCSS功能时发射号码延迟时间
〔DIAL〕↓〔PTT〕键
29. ANF号码发射时机
〔DIAL〕↓〔PTT〕键
30. 电话密码功能
〔DIAL〕↓〔PTT〕键
31. 上线码
〔DIAL〕↓16个键(0-9, *, #, (A-D)) +〔PTT〕键
32. 下线码
〔DIAL〕↓16个键(0-9, *, #, (A-D)) +〔PTT〕键
33. DTMF键盘制式
〔DIAL〕↓〔PTT〕键
34. 号码发射保留时间
〔DIAL〕↓〔PTT〕键
35. 输入——发出功能
〔DIAL〕↓〔PTT〕键
36.〔D〕键空码功能
〔DIAL〕↓〔PTT〕键
37. DTMF功能选择
〔DIAL〕↓〔PTT〕键
38. 中间号码选择
〔DIAL〕↓〔PTT〕键
39. 组呼"王码"选择
〔DIAL〕↓〔PTT〕键
40. 静噪自动关闭时间
〔DIAL〕↓〔PTT〕键
41. 被呼提示自动应答
〔DIAL〕↓〔PTT〕键
42. 加强自动应答
〔DIAL〕↓〔PTT〕键
〔DIAL〕键 〔PTT〕键
—— 结束 ——

自台编程模式（信值设定模式）

经销商模式
↓〔TA〕键
信道选择
〔TA〕↓〔PTT〕键
接收频率
〔TA〕↓〔PTT〕键
接收CTCSS频率（TK-278）
〔TA〕↓〔PTT〕键
接收CTCSS频率或亚音编码（TK-270）
〔TA〕↓〔PTT〕键
发射频率
〔TA〕↓〔PTT〕键
发射CTCSS频率（TK-278）
〔TA〕↓〔PTT〕键
发射CTCSS频率或亚音编码（TK-270）
〔TA〕↓〔PTT〕键
两音信令/DTMF信令（TK-270）TK-278仅适用于DTMF
〔TA〕↓〔PTT〕键
ANI功能
〔TA〕↓〔PTT〕键
删除/追加选择
〔TA〕↓〔PTT〕键
禁发功能
〔TA〕↓〔PTT〕键
时钟频率偏移
〔TA〕↓〔PTT〕键
发射功率
〔TA〕↓〔PTT〕键
自台号码
〔TA〕键 〔信道选择〕旋钮或(PTT)键
—— 结束 ——

13

6. DEALER MODE

6-1 Self Programming (Function Setting)

Operation

1. Set in Dealer Mode after first turning POWER ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).

Note : Refer to the notice (on page 20) in the self programming mode.

```
    SEL
```
Dealer Mode

2. Press [SCN] while in Dealer Mode, to enter function Set Mode.
3. In "Channel Selector" turn functions ON and OFF or select settings.
4. Store the value by pressing [PTT] and move to the next function.
5. Press [SCN] to return to Dealer Mode. Data shown on the display at this point will not be stored in the memory.

6. During function setting a "Beep Op. Tone" sounds each time you store information on the display by pressing [PTT].
7. The message "END" is displayed when function setting is complete.

Function No.	Function Name	Setting (Defaults are underlined)		Display		Remarks
1	MONITOR	OFF		1	OFF	No operation
		Monitor Momentary		1	1	Temporarily cuts off Signaling. Works only when button held down.
		Monitor Lock		1	2	Temporarily cuts off Signaling. Switches each time button is pressed.
		SQ OFF Momentary		1	3	Squelch opens while button is held down.
2	SCAN	OFF		2	OFF	No operation
		CO		2	CO	"Carrier Operate" function
		TO		2	tO	"Time Operate" function
3	DISABLE	Disable		3	OFF	Disables the [DIAL] key.
		Enable		3	ON	Enables the [DIAL] key.
4	TALK AROUND	OFF		4	OFF	No operation
		Talk Around		4	tA	"Talk Around" function
		Reverse		4	rE	"Reverse" function
5	LOW	Disable		5	OFF	Disables the [LO] key.
		Enable		5	ON	Enables the [LO] key.
6	PRIORITY	OFF		6	OFF	No priority settings
		Fixed		6	1	Fixed priority channel
		Selected		6	2	Variable priority channel
7	PRIORITY CHANNEL	1 ~ 32	1	7	1	Priority channel
				7	32	Only "Fixed Priority" enabled
8	LOOK BACK A	0.3s ~ 1.5s (0.1s / 1STEP)	0.5s	8	0.3	The period priority channel that checks priority channel is not busy while normal channel stops during priority scan.
				8	1.5	
9	LOOK BACK B	0.5s ~ 5.0s (0.5s / 1STEP)	2.0s	9	0.5	The period priority channel that checks priority channel is busy for inconsistent signaling while normal channel stops during priority scan.
				9	5.0	
10	REVERT CHANNEL	Selected		10	1	Channel when scan starts.
		Last Call		10	2	Newest channel at pause in scan. Channel where scan is stopped. Channel at start of scan when not stopped at all.

模式组合

6. 经销商模式

6-1 自台编程(功能设定)

操作

1. 同时按住〔LAMP〕和〔DIAL〕键, 接通电源, 2秒钟后进入经销商模式。

注: 请参照自编程序模式时的注意事项(第21页)。

SEL

经销商模式

2. 在经销商模式中, 按〔SCN〕键进入功能设定模式。

3. 用信道选择旋钮选择功能的有效/无效或设定值。

4. 选择设定之后, 按〔PTT〕键, 设定值存入存储器, 菜单转到下一项。

5. 一按〔SCN〕键, 立即从当前项目返回到经销商模式, 当时所显示的项目内容也不被存储。

6. 对于各功能的设定, 一按〔PTT〕键, 所显示的内容就被存储, 此时可以听到确认键操作有效的"嘟——"音。

7. 所有的项目设定完成后, 显示"End"

功能号码	功能名称	选择设定值(有底线的为初始值)		显 示		备 注
1	监听功能	无		1	OFF	监听功能无效
		暂态无条件监听		1	1	按住〔MONI〕键期间打开信令静噪, 监听信道情况。
		稳态无条件监听		1	2	按一下〔MONI〕键, 信令静噪打开, 直到再按一下〔MONI〕键, 循环切换。
		暂态有条件监听		1	3	按住〔MONI〕键期间, 噪声静噪打开。
2	扫描功能	无		2	OFF	扫描功能无效
		CO		2	CO	载波控制扫描
		TO		2	tO	时间控制扫描
3	〔DIAL〕	无效		3	OFF	使〔DIAL〕键无效
		有效		3	ON	使〔DIAL〕键有效
4	脱网功能	无		4	OFF	此项功能无效
		脱网功能		4	tA	脱网功能有效
		倒频功能		4	rE	倒频功能有效
5	〔LO〕	无效		5	OFF	〔LO〕键无效
		有效		5	ON	〔LO〕键有效
6	优先信道	无		6	OFF	没有优先信道
		固定		6	1	固定优先信道
		可选择		6	2	可变优先信道
7	优先信道选择	1~32	1	7	1	优先信道(只在固定优先信道时有效)
				7	32	
8★	回扫周期A	0.3~1.5秒 (步进值: 0.1秒)	0.5秒	8	0.3	在优先扫描时而标准信道停止期间, 检查优先信道的周期优先信道没有占线时
				8	1.5	
9	回扫周期B	0.5~5.0秒 (步进值: 0.5秒)	2.0秒	9	0.5	在优先扫描时而标准信道停止期间, 检查优先信道的周期优先信道占线而信号不一致
				9	5.0	
10	恢复信道选择	选择设定信道		10	1	扫描开始时的信道。
		最后接收呼叫信道		10	2	在扫描进行中, 为最近一次停留的信道。在扫描停留期间, 为正停留的信道。如果一次也未停留过, 则为扫描开始的信道。

TK-270/(N)/278/(N)/278T

REALIGNMENT

Function No.	Function Name	Setting (Defaults are underlined)		Display		Remarks
10	REVERT CHANNEL	Last Used		10	3	Last channel transmitted during scan. Channel where scan is stopped. Channel at start of scan when not stopped at all.
		Selected + Talk Back		10	4	Channel where scan was started during scan. Channel where scan/channel is stopped.
		Priority		10	5	Priority channel
		Priority + Talk Back		10	6	Priority channel during scan. Channel where scan is stopped.
11	TX DWELL TIME	0.5s ~ 5.0s (0.5s / 1STEP)	3.0s	11	0.5	Time until scan restarts when it stops by transmission.
				11	5.0	
12	DROPOUT DELAY TIME	0.5s ~ 5.0s 0.5s / 1STEP)	3.0s	12	0.5	Time until scan restarts when it stops by signal input.
				12	5.0	
13	TIME OUT TIMER	OFF, 30s ~ 300s (30s / 1STEP)	60s	13	OFF	Transmit halted for 10 minutes to save power module.
				13	30	Time from transmit start until transmit stop.
				13	300	
14	TRANSMIT WARNING	OFF, 10s ~ 250s (10s / 1STEP)	OFF	14	OFF	No warning tone
				14	10	Time from transmit start until warning tone is issued.
				14	250	
15	TOT REKEY TIME	OFF 1s ~ 60s (1s / 1STEP)	OFF	15	OFF	Time until transmit is allowed after returning to receive by TOT.
				15	1	Transmit prohibited until preset time elapses.
				15	60	
16	TOT RESET TIME	OFF, 1s ~ 15s (1s / 1STEP)	OFF	16	OFF	TOT is immediately reset after transmit stops.
				16	1	TOT count won't reset until preset time elapses, even if transmit is stopped.
				16	15	
17	SQUELCH LEVEL	0 ~ 9 (1 / 1STEP)	5	17	0	Squelch is set higher (tighter), as the figure increases.
				17	9	
18	BEEP	NO		18	OFF	No beep tone
		YES		18	ON	Beep tone sounds
19	SIGNALING	AND		19	And	Squelch opens when both match.
		OR		19	Or	Squelch opens when either matches.
20	BATTERY SAVE	Disable		20	OFF	No Battery Save function.
		Enable		20	ON	Battery Save function.
21	SELECTABLE QT	Disable		21	OFF	Prohibit Selectable QT
		Enable		21	ON	Permit Selectable QT
22	DELETE / ADD ENABLE	Disable		22	OFF	Prohibit Delete/Add
		Enable		22	ON	Permit Delete/Add
23	DEALER MODE - TEST MODE ENABLE	Disable		23	OFF	Prohibit shift between modes
		Enable		23	ON	Permit shift between modes
END				End		

Press [PTT] to return again to Function Setting when "END" is displayed.

Note : While scanning, if a scan function stops at a non-priority channel, the status of the Priority channel will be checked periodically. The time interval for this checking is as follows:

A When there is no recieve signal on the Priority channel.

B Whe there is a receive signal on the Priority channel, however the signaling is different.

The function No.23 of TK-278T DEALER MODE-TEST MODE ENABLE's default setting is "Disable".

模式组合

功能号码	功能名称	选择设定值(有底线的为初始值)		显 示		备 注
10	恢复信道选择	最后使用信道		10	3	在扫描进行中,为最近一次发射的信道。在扫描停留期间,为正停留的信道。如果一次也未发射过,则为扫描开始的信道。
		选择设定信道+当前通信信道		10	4	在扫描进行中,为扫描开始的信道;在扫描停留期间,为正停留的信道。
		优先信道		10	5	优先信道
		优先信道+当前通信信道		10	6	在扫描进行中,为优先信道;在扫描停留时,为正停留的信道。
11	扫描发射暂停时间	0.5~5.0秒 <u>3.0秒</u> (步进值:0.5秒)		11	0.5	因发射而扫描停止时,直至扫描重新启动为止的时间
				11	5.0	
12	停留时间	0.5~5.0秒 <u>3.0秒</u> (步进值:0.5秒)		12	0.5	因信号输入而扫描停止时,直至扫描重新启动为止的时间
				12	5.0	
13	发射定时(TOT)	OFF,30~300秒 <u>60秒</u> (步进值:30秒)		13	OFF	最大连续发射时间。为保护功率放大器,OFF时,为10分钟
				13	30	
				13	300	
14	发射限时警告	OFF,10~250秒 <u>OFF</u> (步进值:10秒)		14	OFF	无警告音
				14	10	发射开始后到发出告警音的时间
				14	250	
15	TOT恢复时间	OFF,1~60秒 <u>OFF</u> (步进值:1秒)		15	OFF	发射定时器强制通信机回到接收状态,松开〔PTT〕键马上再按〔PTT〕键,可以立即再进入发射状态。
				15	1	发射定时器强制通信机回到接收状态,在设定的时间内,通信机无法进入发射状态
				15	60	
16	TOT复位时间	OFF,1~15秒 <u>OFF</u> (步进值:1秒)		16	OFF	一停止发射,发射定时器立即复位,准备重新计时。
				16	1	即使停止发射,未经过设定的时间,发射定时器也不复位。
				16	15	
17	静噪电平	0~9 <u>5</u> (步进值:1秒)		17	0	数值越大,静噪越深
				17	9	
18	"嘟嘟"音	无		18	OFF	没有"嘟嘟"音功能
		有		18	ON	有"嘟嘟"音功能
19	信令控制关系	<u>AND("与"逻辑)</u>		19	And	当采用两个信令控制时,双方面都满足时静噪才打开
		OR("或"逻辑)		19	Or	当采用两个信令控制时,双方中有一方满足,静噪就打开
20	电池省电功能	无效		20	OFF	电池省电功能无效
		有效		20	ON	电池省电功能有效
21	可变音频CTCSS功能	无效		21	OFF	可变音频CTCSS功能无效
		有效		21	ON	可变音频CTCSS功能有效
22	删除/追加功能	无效		22	OFF	不能对扫描信道序列进行删除/追加
		有效		22	ON	可以对扫描信道序列进行删除/追加
23	经销商模式和测试模式开放	无效		23	OFF	封闭经销商模式和测试模式,不能进入
		有效		23	ON	开放经销商模式和测试模式,可以进入
结束				End		

显示"End"后,一按〔PTT〕键就回到功能设定模式

★注: 回扫周期:选择扫描在一个普通信道上停留时,返回检测优先信道的时间间隔。
　　　 A表示优先信道上无信号时的回扫周期。
　　　 B表示优先信道上有信号但信令不符合时的回扫周期。
　　　 TK-278T的功能23号 DEALER MODE-TEST MODE ENABLE在出厂时被设定为不能使用。

TK-270/(N)/278/(N)/278T
REALIGNMENT

6-2 Self Programming (setting DTMF)
Operation

1. Set in Dealer Mode after first turning Power ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).
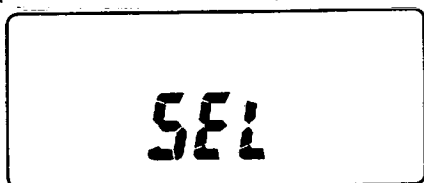
```
SEL
```
Dealer Mode

2. Press [DIAL] while in Dealer Mode, to enter DTMF Set Mode.
3. Make DTMF function ON/OFF or select settings with [Channel Selector] and the 16 keys (0 to 9, * # A to D).

4. Store the selected values or functions 31 and 32 with the 16 keys and other items with the [PTT] switch then move on to the next function.
5. Press [DIAL] key if you wish to return to Dealer Mode. Information shown on the display at this time will not be stored in the memory.
6. During each function setting a "Beep Op. Tone" sounds each time you store information from the display by pressing [PTT].
7. The message "END" is displayed when all DTMF function setting is complete.
8. You can check each setting of each item in sequence, by pressing [MONI] from [Channel Selector].

Function No.	Function Name	Setting (Defaults are underlined)	Display		Remarks	
24	DIGIT TIME	50ms ~ 200ms 50ms	24	50	Code 1 digit time during DTMF auto	
		(10ms / 1STEP)	24	200	transmit.	
25	INTER DIGIT TIME	50ms ~ 200ms 50ms	25	50	Interval time between codes during DTMF	
		(10ms / 1STEP)	25	200	auto transmit.	
26	FIRST DIGIT TIME	50ms ~ 200ms 50ms	26	50	Digit time for 1 code during DTMF auto	
		(10ms / 1STEP)	26	200	transmit.	
27	RISE TIME	100ms ~ 1000ms 100ms	27	100	Set time	Note : Set to BATT SAVE ON and set the Rise Time and Rise time with QTE to 300ms or more when utilizing DTMF Signaling.
		(50ms / 1STEP)	27	1000		
28	RISE TIME WITH QT	100ms ~ 1000ms 100ms	28	100	Set time	
		(50ms / 1STEP)	28	1000		
29	PTT ID	OFF	29	OFF	No sending of PTT ID.	
		Connect	29	1	Send CONNECT ID when [PTT] switch is held down.	
		Disconnect	29	2	Send CONNECT ID when [PTT] switch is released.	
		Both	29	3	Send both CONNECT and DISCONNECT.	
30	DIAL ID	OFF	30	OFF	Prohibit Dial ID	
		ON	30	ON	Permit Dial ID	
31	CONNECT ID	Blank	31	- - - - -	CONNECT ID CODE not set	
		0 x 1 ~ # x 16	31	0	CONNECT ID CODE	
			31	F F F F F		
32	DISCONNECT ID	Blank	32	- - - - -	DISCONNECT ID CODE not set.	
		0 x 1 ~ # x 16	32	0	DISCONNECT ID CODE	
			32	F F F F F		
33	NO. OF DTMF KEY	12keys (0 ~ 9, *, #)	33	12	Disable [A] [B] [C] [D] keys.	
		16keys (0 ~ 9, *, #, A ~ D)	33	16	Enable [A] [B] [C] [D] keys.	
34	DTMF HOLD TIME	Disable	34	OFF	Do not Hold	Function that continues transmission for two seconds even if manual DIAL key is released.
		Enable	34	ON	Hold	
35	STORE & SEND	OFF	35	OFF	Prohibit Store & Send function.	
		ON	35	ON	Permit Store & Send function.	
36	D KEY ASSIGNMENT	D Code	36	d	Send the code for D.	
		1s 16s	36	1	Make unmodulated transmission for preset	
		(1s / 1STEP)	36	16	time.	

模式组合

6-2 自台编程(DTMF 设定)

操作：

1. 同时按住〔LAMP〕和〔DIAL〕键，接通电源，2秒钟后进入经销商模式。

```
SEL
```
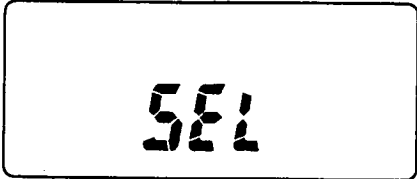
经销商模式

2. 在经销商模式中，按〔DIAL〕键，进入"DTMF设定模式"。

3. 使用信道选择旋钮以及16制式的键盘[0~9、*、#、A~D]选择DTMF功能的有效/无效或设定值。

4. 各项目的选择设定，除了第31、32项是用16制式键盘输入设定外，其余的都是通过按〔PTT〕键存储设定内容，并且菜单转到下一项。

5. 一按〔DIAL〕键，立即从当前项目返回到"经销商设定模式"，当时所显示的内容也不会被存储。

6. 对于各功能的设定，一按〔PTT〕键，所显示的内容就被存储，此时可以听到确认键操作有效的"嘟一"音。

7. 所有的DTMF功能设定完成后，显示"End"

8. 按〔MONI〕键，旋转信道选择旋钮可以依次确认各项目的设定值。

功能号码	功能名称	选择设定值(有底线的为初始值)	显 示		备　　注
24	号码宽度	50~200毫秒　50毫秒 (步进值10毫秒)	24	50	发射DTMF号码时，每一位号码的发射时间
			24	200	
25	码间间隔	50~200毫秒　50毫秒 (步进值：10毫秒)	25	50	发射DTMF号码时，每一位号码之间的时间间隔
			25	200	
26	首位号码宽度	50~200毫秒　50毫秒 (步进值：10毫秒)	26	50	发射DTMF号码时，首位号码的发射时间
			26	200	
27	号码发射延迟时间	100~1000毫秒　100毫秒 (步进值：50毫秒)	27	100	设定时间　　注：在使用电池省电功能以及有
			27	1000	CTCSS功能时使用DTMF功能,
28	有CTCSS功能时 号码发射延迟时间	100~1000毫秒　100毫秒 (步进值：50毫秒)	28	100	设定时间　　发射延迟时间应设定300毫秒以
			28	1000	上
29	ANI功能	无	29	OFF	不发出ANI号码
		上线	29	1	一按〔PTT〕键，发出ANI号码
		下线	29	2	一松开〔PTT〕键，发出ANI号码
		双线	29	3	按下和松开〔PTT〕键时各发出一次ANI号码
30	电话密码功能	无	30	OFF	此功能无效
		有	30	ON	此功能有效
31	上线号码	空位	31	- - - - -	未设置上线号
		0×1位~#×16位	31	0	上线号码
			31	F F F F F	
32	下线号码	空位	32	- - - - -	未设置下线号码
		0×1位~#×16位	32	0	下线号码
			32	F F F F F	
33	DTMF键盘制式	12键 (0~9、*、#)	33	12	〔A〕〔B〕〔C〕〔D〕键无效
		16键 (0~9、*、#、A~D)	33	16	〔A〕〔B〕〔C〕〔D〕键有效
34	号码发射保留时间	无效	34	OFF	不保留　在手动拨号时，即使从按键放开手也
		有效	34	ON	保留　继续进行2秒钟发射的功能
35	输入-发出功能	无	35	OFF	输入-发出功能无效
		有	35	ON	输入-发出功能有效
36	〔D〕键空码功能	"D"号码	36	D	发出D音频
		1~16秒 (步进值：1秒)	36	1	在设定时间内发出无调制信号，起延迟时间的作
			36	16	用

TK-270/(N)/278/(N)/278T

REALIGNMENT

Function No.	Function Name	Setting (Defaults are underlined)	Display		Remarks	
37	DTMF SIGNALING	OFF	37	OFF	No DTMF signaling.	
		Code SQ	37	1	Code Squelch	
		SEL CALL	37	2	Selective Call	
38	INTERMEDIATE CODE	0 ~ 9	38	0	Selected code is set as intermediate code.	
			38	9		
		A ~ D	38	A		
			38	d		
		*	38	E		
		#	38	F		
39	GROUP CODE	OFF	39	OFF	No group code	
		A ~ D	39	A	Selected code is set as group code.	
			39	d		
		*	39	E		
		#	39	F		
40	AUTO RESET TIME	OFF	40	OFF	Do not perform Auto Reset.	Time until coincidence state is canceled after DTMF signaling coincides.
		1s ~ 15s 10s	40	1	Auto Reset is performed for	
		(1s / 1STEP)	40	15	preset time.	
41	CALL ALERT / TRANSPOND	OFF	41	OFF	No operation	
		Call Alert	41	1	The Call Alert tone sounds.	
		TRANSPOND (Call Alert)	41	2	Transpond of Call Alert.	
		TRASPOND (ID Code)	41	3	Transpond of ID Code.	
		TRANSPOND (Transpond Code)	41	4	Transpond of code set in Auto Dial 0.	
42	CLEAR TO TRANSPOND	NO	42	OFF	Disable Clear to Transpond.	Function that waits for transpond until busy signal disappears.
		YES	42	ON	Enable Clear to Transpond.	
END			End			

Returns to setting of "24. DIGIT TIME" after "END" display, when [PTT] is pressed.

Note : When changing and storing the setting for "DTMF SIGNALING" of function No. 37, the ID CODE settings for all channels are reset to "000".

- Notice in self-programming mode

For the setting by self-programming, the basic function is set to OFF as combined in the table below. Therefore, the setting is possible, but the operation is disabled.

Function name	Setting	Disable conditions
2TONE/DTMF	DTMF	37. DTMF signaling is OFF.
2. [SCN]	TO	7. Priority is fixed or selected.
6. Priority	Fixed, Selected	2. [SCN] is OFF.
7. Priority CH		6. Priority is OFF or fixed.
8. Look Back A		6. Priority is OFF.
9. Look Back B		6. Priority is OFF.
10. Revert CH	Priority, Priority+Selected	6. Priority is OFF.
11. Dwell Time		2. [SCN] is OFF.
12. Dropout Delay Time		2. [SCN] is OFF.
14. TOT Pre-Alert		13. Time Out Timer is OFF.
15. TOT Rekey Time		13. Time Out Timer is OFF.
16. TOT Reset Time		13. Time Out Timer is OFF.
31. Connect ID		29. PTTID is OFF or disconnected and 30.Dial ID is OFF.
32. Disconnect ID		29. PTTID is OFF or connected and 30.Dial ID is OFF.
38. Intermediate Code		37. DTMF signaling is OFF or code SQ.
39. Group Code		37. DTMF signaling is OFF.
40. Unmute Time		37. DTMF signaling is OFF.
41. Call Alert/Transpond		37. DTMF signaling is OFF.

模式组合

功能号码	功能名称	选择设定值(有底线的为初始值)	显 示		备 注	
37	DTMF功能选择	<u>无</u>	37	OFF	无DTMF功能	
		编码静噪	37	1	编码静噪	
		选呼	37	2	选择呼叫	
38	中间号码	<u>0~9</u>	38	0	所选择的数字或字符成为中间号码	
			38	3		
		A~D	38	A		
			38	d		
		*	38	E		
		#	38	F		
39	组呼"王码"选择	<u>无</u>	39	OFF	没有组呼号码	
		A~D	39	A	设定组呼的"E"码	
			39	d		
		*	39	E		
		#	39	F		
40	静噪自动关闭时间	<u>无</u>	40	OFF	无自动关闭功能	DTME信号一致后,直至解除一致状态为止的时间
		1~15秒(初始值:10秒)(步进值:1秒)	40	1	编码静噪被打开后,经过设定的时间,将自动关闭	
			41	15		
41	被呼提示/自动应答	<u>OFF</u>	41	OFF	无此类功能	
		被呼提示	41	1	被呼时,有振铃提示	
		自动应答(振铃信号)	41	2	以振铃信号作为应答信号	
		自动应答(自台号码)	41	3	以自台号码作为应答信号	
		自动应答(0存储器内容)	41	4	以缩位拨号的0存储器的内容作为应答信号	
42	加强自动应答	<u>无</u>	42	OFF	加强自动应答无效	直至没有占线为止等待应答的功能
		有	42	ON	加强自动应答有效	
结束			End			

显示"End"后,按〔PTT〕键,就返回第24项"号码宽度"设置。

注:如果变更第37项"DTMF功能选择"的设定,存储了新的设定值,则在信道模式中设定的自台号码被初始化,成为"000"。

● 自编程序模式时的注意事项:

以自编程序模式进行设定时,如下表的组合所示,因为基本功能设定成为OFF,因此虽然可以进行设定,但动作变无效。

功 能 名 称	设 定 内 容	变 无 效 的 条 件
2TONE/DTMF	DTMF	37.DTMF信令成为OFF时。
2.〔SCN〕	TO	7.优先成为被固定或选择时。
6.优先	被固定,被选择	2.〔SCN〕成为OFF时。
7.优先CH		6.优先成为OFF或固定时。
8.回送A		6.优先成为OFF时。
9.回送B		6.优先成为OFF时。
10.反向CH	优先,优先+选择	6.优先成为OFF时。
11.停留时间		2.〔SCN〕成为OFF时。
12.失落延时		2.〔SCN〕成为OFF时。
14.TOT预报警		13.超时定时器成为OFF时。
15.TOT重按键时间		13.超时定时器成为OFF时。
16.TOT复位时间		13.超时定时器成为OFF时。
31.连接ID		29.PTT ID成为OFF或断开,且30.拨号ID成为OFF时。
32.断开ID		29.PTT ID成为OFF或连接,且30.拨号ID成为OFF时。
38.中间代码		37.DTMF信令成为OFF或代码SQ时。
39.群代码		37.DTMF信令成为OFF时。
40.无静噪时间		37.DTMF信令成为OFF时。
41.呼叫报警/转发		37.DTMF信令成为OFF时。

TK-270/(N)/278/(N)/278T

REALIGNMENT

6-3 Self Programming (setting the channels)
Operation

1. Set in Dealer Mode after first turning POWER ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).

$$SEL$$
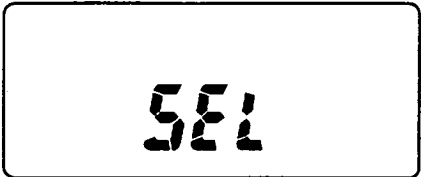
Dealer Mode

2. Press [TA] while in Dealer Mode and set Channel Set Mode.
3. Make DTMF function ON/OFF or select settings with "Channel Selector" and the 16 keys (0 to 9, * # A to D).
4. Store the selected values or functions by pressing the [PTT] switch and then move on to the next function.

5. Press [TA] key if you wish to return to Dealer Mode. Information shown on the display at this time will not be stored in the memory.
6. During each function setting a "Beep Op. Tone" sounds each time you store information from the display in the memory by pressing [PTT].
7. The message "END" is displayed when all DTMF function setting is complete.

Function Name	Setting (Defaults are underlined)		Display	Remarks
Channel Selection	1ch ~ 32CH 1CH		CH 1	● Set to "RX FREQUENCY" after making selection.
			CH 32	
RX FREQUENCY	Blank		- - - - -	● Change in 1 step increments → [Channel Selector]
	100.000MHz or more		100.00000	● Switch between 5kHz/6.25kHz steps → [SCN]
	Under 550.000MHz (5kHz steps)		549.99500	● Blank/frequency display selector → [LO]
	100.000MHz or more		100.00000.	● Change MHz digits → [LAMP] + [Channel Selector]
	Under 550.000MHz (6.25kHz steps)		549.99375.	● The reset value when changing from blank to frequency display is the reset value for that version.
				● The reset (initialization) steps are 5kHz.
				● Set to "RX Signaling" after each frequency setting for the TK-270/(N)/278/(N)/278T. (Set to channel selection when making blank settings.)
RX SIGNALING (TK-278/(N)/278T)	OFF		OFF	● Code selection → [Channel Selector]
	QT 67.0Hz ~ 250.3Hz		1 67.0	● QT Change in 0.1 Hz step mode → [SCN]
			38 250.3	● Blank/QT switching → [LO]
	QT (0.1Hz step mode)		67.0.	● Set to "TX FREQUENCY" after making settings.
	67.0Hz ~ 250.3Hz		250.3.	
RX SIGNALING (TK-270/(N))	OFF		OFF	● Code selection → [Channel Selector]
	QT 67.0Hz ~ 250.3Hz		67.0	● Blank/QT/DQT switching → [LO]
			250.3	● QT Change in 0.1 Hz step mode → [SCN]
	QT (0.1Hz step mode) 67.0Hz ~ 250.3Hz		67.0.	● Switch between DQT standard table mode and 1 step mode → [SCN]
			250.3.	● Switch between DQT Normal and Inverse → [DIAL]
	DQT (Normal - standard table mode)		000	● Set to "TX FREQUENCY" after making settings.
	000 ~ 777		777	
	DQT (Normal - 1 step mode)		000.	
	000 ~ 777		777.	
	DQT (Inverse - standard table mode)		-000	
	-000 ~ -777		-777	
	DQT (Inverse - 1 step mode)		-000.	
	-000 ~ -777		-777.	

模式组合

6-3 自台编程（信道设定）

操作：

1. 同时按住〔LAMP〕和〔DIAL〕键，接通电源，2 秒钟后进入"经销商模式"。
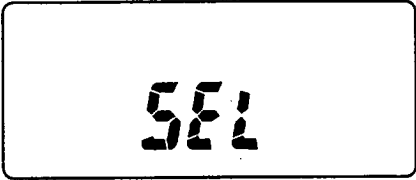
经销商模式

2. 在经销商模式中，按〔TA〕键，进入"信道设定模式"。

3. 用信道选择旋钮以及16制式键盘（0~9、*、#、A~D）选择信道各功能或设定值

4. 选择了设定值后，按〔PTT〕键，所选择的设定值被存储。菜单转到下一项目。

5. 一按〔TA〕键，立即从当前的项目返回到"经销商模式"，当时所显示的内容不被存储。

6. 在设定各项目时，按〔PTT〕键，所选择的内容，被存储，就可以听到确认键操作有效的"嘟—"的声音。

7. 全部的信道功能，参数设定完成后，显示"End"

功 能 名 称	选择设定值（有底线的为初始值）	显 示	备 注
信道选择	1CH~32CH <u>1CH</u>	CH 1	●选定后，移到"接收频率"设定
		CH 32	
接收频率设定	<u>空位</u>	-----	●频率改变 →"信道选择"旋钮
	100.000MHz以上 550.000MHz以下（步进值：5kHz）	100.00000 549.99500	●切换步进值（5/6.25kHz）→〔SCN〕键 ●切换空位/频率显示 →〔LO〕键
	100.000MHz以上 550.000MHz以下（步进值：6.25kHz）	100.00000. 549.99375.	●变为1MHz步进 →〔LAMP〕键＋〔信道选择〕旋钮 ●从空位显示变更到频率显示时，初期值是各频率型式的初始值 ●初始步进值：5kHz ●接收频率设定后，TK-270/(N)/278/(N)/278T 分别进入"接收信令"的设定（如果设定了空位，回到"信道选择"项）
接收CTCSS频率 (TK-278/(N)/278T)	<u>不使用</u>	OFF	●选择代码 →〔信道选择〕旋钮
	CTCSS亚音频（标准） 67.0~250.3Hz	1 67.0 38 250.3	●CTCSS功能，变更到以0.1Hz为步进值自由选择亚音频 →〔SCN〕键 ●切换空位显示和CTCSS频率显示 →〔LO〕键
	CTCSS亚音频（非标准） （步进值：0.1Hz）67.0~250.3Hz	67.0. 250.3.	●设定完成后移到"发射频率"的设定
接收CTCSS频率 或亚音数码 (TK-270/(N))	<u>不使用</u>	OFF	●选择代码 →〔信道选择〕旋钮
	CTCSS（标准） 67.0~250.3Hz	67.0 250.3	●切换显示内容（空位/CTCSS频率/亚音数码）→〔LO〕键 ●CTCSS模式：切换到0.1Hz步进的模式 →〔SCN〕键
	CTCSS（非标准） （步进值：0.1Hz）67.0~250.3Hz	67.0. 250.3.	●亚音数的码标准表模式和1步进模式的切换 →〔SCN〕键 ●亚音数码的正常模式和反向模式的切换 →〔DIAL〕键
	亚音数码（正常·标准表模式） 000~777	000 777	●设定完成后移到"发射频率"的设定
	亚音数码（正常·1步进模式） 000~777	000. 777.	
	亚音数码（反向·标准表模式） -000~-777	-000 -777	
	亚音数码（反向·1步进模式） -000~-777	-000. -777.	

TK-270/(N)/278/(N)/278T

REALIGNMENT

Function Name	Setting (Defaults are underlined)	Display		Remarks	
TX FREQUENCY	Blank	- - - - -		● Change in 1 step increments → [Channel Selector]	
	100.000MHz or more	100.00000		● Switch between 5kHz/6.25kHz steps → [SCN]	
	Under 550.000MHz (5kHz steps)	549.99500		● Blank/frequency display selector → [LO]	
	100.000MHz or more	100.00000.		● Change MHz digits → [LAMP] + [Channel Selector]	
	Under 550.000MHz (6.25kHz steps)	549.99375.		● The reset value the changing from blank to frequency display is the reset value set in RX FREQUENCY.	
				● Set to "TX Signaling" after each frequency setting for the TK-270/(N)/278/(N)/278T.	
				● Set to "DTMF SIGNALING" when making blank settings.	
TX SIGNALING (TK-278/(N)/278T)	OFF		OFF	● Change in 1 step increments → [Channel Selector]	
	QT 67.0Hz ~ 250.3Hz	1	67.0	● QT Change in 0.1 Hz step mode → [SCN]	
		38	250.3	● Blank/QT switching → [LO]	
	QT (0.1Hz step mode) 67.0Hz ~ 250.3Hz		67.0.	● Set to "DTMF SIGNALING" after making settings	
			250.3.		
TX SIGNALING (TK-270/(N))	OFF		OFF	● Code selection → [Channel Selector]	
	QT 67.0Hz ~ 250.3Hz		67.0	● Blank/QT/DQT switching → [LO]	
			250.3	● QT Change in 0.1 Hz step mode → [SCN]	
	QT (0.1Hz step mode) 67.0Hz ~ 250.3Hz		67.0.	● Switch between DQT standard table mode and 1 step mode → [SCN]	
			250.3.	● Switch between DQT Normal and Inverse → [DIAL]	
	DQT (Normal - standard table mode)		000	● Set to "DTMF SIGNALING" after making settings	
	000 ~ 777		777		
	DQT (Normal - 1 step mode)		000.		
	000 ~ 777		777.		
	DQT (Inverse - standard table mode)		-000		
	-000~-777		-777		
	DQT (Inverse - 1 step mode)		-000.		
	-000 ~ -777		-777.		
DTMF SIGNALING ON / OFF (TK-278/(N)/278T)	OFF	1	OFF	No DTMF Signaling	After setting, shift to PTT ID ENABLE setting
	ON	1	ON	Use DTMF Signaling	
2-TONE / DTMF (TK-270/(N))	OFF	1	OFF	No Option signaling	After setting, shift to PTT ID ENABLE setting
	DTMF	1	1	Use DTMF Signaling	
	2-TONE	1	2	Use 2-Tone Signaling	
PTT ID ENABLE	OFF	2	OFF	Disable PTT ID	
	ON	2	ON	Enable PTT ID	
SCAN DELETE / ADD	ADD	3	Add	Set as scan item	
	DELETE	3	dEL	Not set as scan item	
Busy channel Lock out (TK-270/(N))	NO	4	OFF	Transmmission is independent from QT/DQT signalling.	
	YES	4	ON	Transmmission is only possible when a QT/DQT signal match occurs.	
*Busy channel Lock out (TK-278/(N)/278T)	NO	4	OFF	Transmmission is independent from QT or DTMF signalling.	
	1	4	1	Transmmission is only possible when a QT signal match occurs.	
	2	4	2	With the signalling parameter (Function No.19) set to "AND", transmmission is only possible when both QT and DTMF signal matches occur. With the signalling parameter (function No.19) set to "OR", transmmission is possible when eiter QT or DTMF signal (or both) match (es) occur (s).	
CLOCK FREQUENCY SHIFT	Disable	5	OFF	Do not shift clock frequency	
	Enable	5	ON	Shift clock frequency	
TX POWER	High	6	H	Permit switching between High/Low Power	
	Low	6	L	Permit only Low Power	
ID CODE (DTMF)	000	7	000	ID Code	
	9999999999	7	99999		
				● Code input → 10 keys [0 to 9] ● Return to "Channel Selection" for other than the 32 channel settings. ● Move to End for 32 channel settings.	
END			End	● Return to [Channel Selection] with [PTT] or the Channel Selector.	

*Note : Busy channel lock out was newly designed, so it will be available on radios that have the following or larger serial numbers.   TK-278 :S / No. 802XXXXX-

模式组合

功能 名称	选择设定值(有底线的为初始值)	显 示	备 注
发射频率	空位	- - - - -	●频率改变→"信道选择"旋钮 ●切换步进值(5/6.25kHz)→[SCN]键 ●切换空位/频率显示→[LO]键 ●变为1MHz步进→[LAMP]键+[信道选择]旋钮 ●从空位显示切换到频率显示时,初期值是已设定的接收频率 ●发射频率设定后,TK-270/(N)/278/(N)/278T分别进入"发射信令"的设定 ●如果设定了空位,进到"DTMF信令"项
	100.000MHz以上 550.000MHz以下(步进值:5kHz)	100.00000 549.99500	
	100.000MHz以上 550.000MHz以下(步进值:6.25kHz)	100.00000. 549.99375.	
发射CTCSS频率 (TK-278/(N)/278T)	不使用	OFF	●选择代码→[信道选择]旋钮 ●CTCSS功能,变更到以0.1Hz为步进值自由选择亚音频→[SCN]键 ●切换空位显示和CTCSS频率显示→[LO]键 ●设定完成后移到"DTMF信令"的设定
	CTCSS亚音频(标准) 67.0~250.3Hz	1　67.0 38　250.3	
	CTCSS亚音频(非标准)(步进值:0.1Hz)67.0~250.3Hz	67.0. 250.3.	
发射CTCSS频率或亚音数码 (TK-270/(N))	不使用	OFF	●选择代码→[信道选择]旋钮 ●切换显示内容(空位/CTCSS频率/亚音数码)→[LO]键 ●CTCSS模式,切换到0.1Hz步进的模式→[SCN]键 ●亚音数码的标准表模式和1步进模式的切换→[SCN]键 ●亚音数码的正常模式和反向模式的切换→[DIAL]键 ●设定完成后移到"DTMF信令"的设定
	CTCSS(标准) 67.0~250.3Hz	67.0 250.3	
	CTCSS(非标准)(步进值:0.1Hz)67.0~250.3Hz	67.0. 250.3.	
	亚音数码(正常·标准表模式) 000~777	000 777	
	亚音数码(正常·1步进模式) 000~777	000. 777.	
	亚音数码(反向·标准表模式) -000~-777	-000 -777	
	亚音数码(反向·1步进模式) -000~-777	-000. -777.	
DTMF信令 (TK-278/(N)/278T)	无	1　OFF	不使用DTMF信令 ｜ 设定完成后移到[ANI]功能的设定
	有	1　ON	使用DTMF信令
两音信令和 DTMF信令 (TK-270/(N))	无	1　OFF	不使用DTMF信令 ｜ 设定完成后移到[ANI]功能的设定
	DTMF	1　1	使用DTMF信令
	两音	1　2	使用两音信令
ANI功能	无	2　OFF	ANI功能无效
	有	2　ON	ANI功能有效
删除/追加选择	追加	3　Add	可以被扫描
	删除	3　dEL	不能被扫描
锁住繁忙信道 (TK-270/(N))	无	4　OFF	发射与QT/DQT信号无关
	有	4　ON	只在与QT/DQT信号一致时才发射
*锁住繁忙信道 (TK-278/(N)/278T)	无	4　OFF	发射与QT或DTMF信号无关
	1	4　1	只在与QT信号一致时才发射
	2	4　2	把信号参数(第19号功能)设定到"AND",只在与QT和DTMF信号均一致时才发射。 把信号参数(第19号功能)设定到"OR",当与QT或DTMF信号(或两个同时)一致时就发射。
时钟拍频频率偏移	无	5　OFF	不自动离开时钟拍频频率
	有	5　ON	自动离开时钟拍频频率
发射功率	高	6　H	可以切换高/低功率模式
	低	6　L	只能在低功率模式
自台号码 (DTMF)	000	7　000	自己的身份码
	9999999999	7　99999	
			●输入号码→[10个数字键(0~9)] ●未设定满32个信道时返回到"信道选择"项 ●设定满32个信道后,显示结束(End)
结束		End	

注　因为关闭繁忙信道是新设计,所以可在收音机上使用具有以下或较大的系列号码。

TK-278·S/号码802XXXXX-

TK-270/(N)/278/(N)/278T
REALIGNMENT/模式组合

Note : The "ID CODE" setting is skipped when setting "DTMF SIGNALING" to OFF on the TK-278/(N)/278T, or setting "2-TONE / DTMF" to OFF on the TK-270/(N) or when setting 2-Tone.

注: 如果设定了不使用DTMF信令(TK-278/(N)/278T)或不使用两音信令/DTMF信令(TK-270/(N)),则自动跳过"自台号码"设定项。

QT Frequency／CTCSS亚音频表

No.	Frequency [Hz]	No.	Frequency [Hz]	No.	Frequency [Hz]	No.	Frequency [Hz]
1	67.0	11	94.8	21	131.8	31	186.2
2	69.3	12	97.4	22	136.5	32	192.8
3	71.9	13	100.0	23	141.3	33	203.5
4	74.4	14	103.5	24	146.2	34	210.7
5	77.0	15	107.2	25	151.4	35	218.1
6	79.7	16	110.9	26	156.7	36	225.7
7	82.5	17	114.8	27	162.2	37	233.6
8	85.4	18	118.8	28	167.9	38	241.8
9	88.5	19	123.0	29	173.8	39	250.3
10	91.5	20	127.3	30	179.9		

DQT Standard Table／亚音数码标准表

023	114	174	315	445	631
025	115	205	331	464	632
026	116	223	343	465	654
031	125	226	346	466	662
032	131	243	351	503	664
043	132	244	364	506	703
047	134	245	365	516	712
051	143	251	371	532	723
054	152	261	411	546	731
065	155	263	412	565	732
071	156	265	413	606	734
072	162	271	423	612	743
073	165	306	431	624	754
074	172	311	432	627	

6-4 Trunking Set Mode

1. Setting the SmarTrunk II™ Panel Programming Mode

■ There are two ways to enter this mode.

1. Select Trunking Mode while holding down the [MONI] key in Power ON.

- Set in SmarTrunk II™ Mode while connections are setup for ST-865KW2. (Scanning with the channel display shown on the LCD)

  If SmarTrunk II™ Mode does not appear, turn off the power and then turn it back on while holding down the [MONI] key. (The display on the LCD starts to scan.)

- Turn the transceiver OFF.
- Press and hold the [#] key on the front panel keypad.
- Turn on the transceiver.
- After the beep is heard, release the [#] key.

2. Hold down the [LAMP] and [DIAL] keys simultaneously, POWER ON is set after about 2 seconds. Then press the [LO] key on the "SEL" display.

- This applies to 1. and 2.

- Enter the dealer programmed 5 digit access code, followed by the [#] key.

- The ST-865KW2 will respond with a high beep. If a low beep is heard the access code was incorrect.
  Turn the transceiver OFF and try the procedure again.

  refer the ST-865KW2's manual for detail.

2. Outlines for Panel Programming Mode settings.
Trunking (SmarTrunk II™)
- number of Trunking Channels
- Primary Code
- Secondary Code
- Priority Subscriber Enable
- Five digit Access Code
- Trunking System ID Number
- Automatic PTT Mode
- Emergency Call Override
- Conventional Mode Control
- Radio-Kill
- Clear channel alerting mode
- Memory Speed-Dialing Programming

  Refer the ST-865KW2's manual for detail.

Note : The SmarTrunk II™ call is a registered trademark of the Selectone Corporation.

6-4 集群设定模式

1. 进入 SmarTrunk II™ 面板编程模式的方法

■ 本模式的进入方法有两种

1) 按住〔MONI〕键，接通电源，选择集群通信模式

- 装有 ST-865KW2 逻辑板的通信机进入集群通信模式。(在显示屏上可以看到信道扫描)
  当通信机没有处于集群通信模式时，暂时关闭电源。然后，按住〔MONI〕键，接通电源，通信机进入集群通信模式。(在显示屏上可以看到信道扫描)
- 关上通信机的电源。
- 按住前面板上的〔#〕键。
- 接通电源。
- 当听到"嘟—"的声音后，松开〔#〕键。
- 输入经销商编程的 5 位接续号码，然后按〔#〕键
  初始接续号码(缺省值)是 12345(初始值)。
- ST-865KW2 将以高音调的"嘟—"音作为应答
  如果听到是低音调的"嘟—"音，则表示输入的接续号码错误。关闭通信机的电源，按以上步骤再试一次。

2) 同时按住〔LAMP〕和〔DIAL〕键，接通电源。2 秒钟后显示屏上出现"SEL"字符，然后，按〔LO〕键

- 适用于 1 和 2
- 输入经销商编程的 5 位接续号码，然后按〔#〕键
- ST-865KW2 将以高调的"嘟—"音作为应答
  如果听到是低音调的"嘟—"音，则表示输入的接续号码错误。关闭通信机的电源，按以上步骤再试一次。

有关详细情况，请参考 ST-865KW2 逻辑板的说明书。

2. 面板编程模式中的设定项目简介
集群(SmarTrunk II™)通信参数
- 集群信道数量
- 主身份号码(用于个别选呼)
- 副身份号码(用于小组呼叫)
- 优先用户功能启动
- 5 位接续码
- 集群系统身份码
- PTT 自动接续模式
- 紧急呼叫强插
- 常规模式控制
- 信道空闲提示模式
- "空中枪毙"功能
- 存储快速拨号编程

有关详细情况，请参考 ST-865KW2 逻辑板的说明书。

注)Smar Trunk II™ 是 SELECTONE 公司注册的商标。

TK-270/(N)/278/(N)/278T
REALIGNMENT/模式组合

6-5 Wired Clone Mode

Connect the optional interface cable (KCT-8) so that the master side (source) and slave side (clone) are joined as shown in the drawing.

6-5 有线复制模式

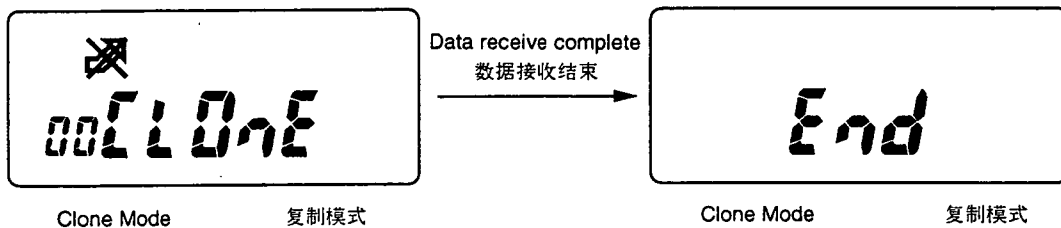把"母机"(复制方)和"子机"(被复制方)用KCT-8接口电缆(选件)按下图所示方法连接起来。
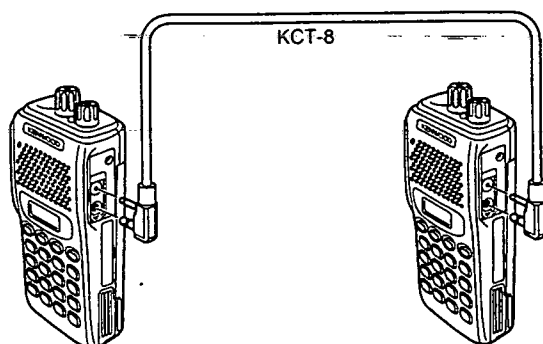
KCT-8

■ Master side
Operation

1. Set in Dealer Mode after first turning Power ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).
2. Press [LAMP] while in dealer mode and set in [Clone Mode (chain line - transmit side)]

■ "母机"方面
操作:

1. 同时按住〔LAMP〕和〔DIAL〕键, 接通电源2秒钟后进入"经销商模式"。
2. 在经销商模式中按〔LAMP〕键, 进入"复制模式(有线·发射方)"。

[LAMP]

Dealer Mode　经销商模式　　Clone Mode　复制模式
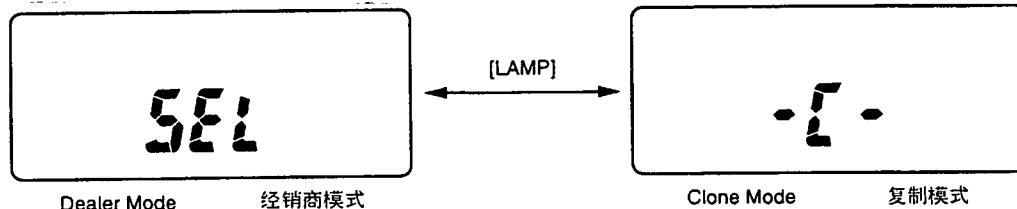
3. Send the clone data by pressing [MONI]. The LED lights up (red) during data transfer.
4. The message "END" is displayed when data transfer is complete and the LED turns off.
5. You can clone other transceivers by pressing [MONI] when "END" is displayed and returning to Clone Mode to start the clone process again. Press [LAMP] if you wish to return to Dealer Mode.

3. 按〔MONI〕键, 开始传送数据。在数据传送中, 发射指示灯(红色)点亮。
4. 数据传送一结束, 显示"End"。发射指示灯熄灭。
5. 在显示〔End的状态下, 按〔MONI〕键, 返回到复制模式, 可以继续对下一台通信机进行复制, 或者, 按〔LAMP〕键, 返回经销商模式。

Sending clone data　LED(red)lights up　Clone data transfer complete　LED turns off
正在传送复制数据　红色指示灯亮　传送数据结束　指示灯熄灭

[LAMP]　[MON 1]

Dealer Mode　经销商模式　　Clone Mode　复制模式
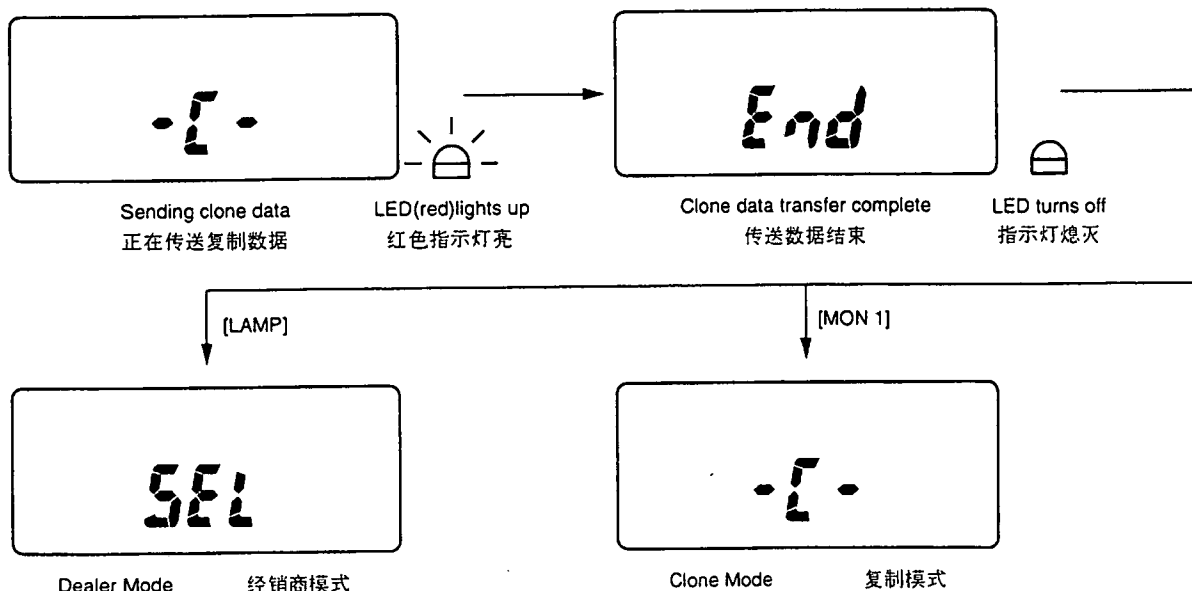
REALIGNMENT/模式组合

■ Slave side
Operation
1. Set Power On with the startup keys and standby.
2. When data is sent from the master, display "BUSY" and "-PC-" and shift to PC Mode.
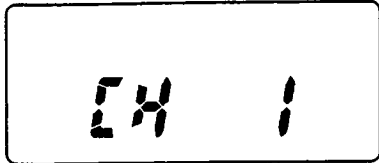
Receiving data
接收数据
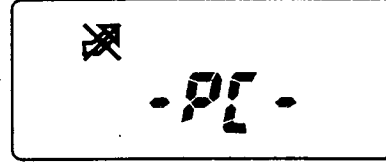
3. The message "END" appears when all data is received.
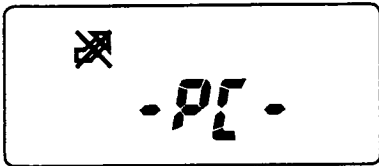
Data receiving complete
数据接收结束

4. After the "END" display appears, operation is the same as for the Master side in 5. on the previous page.

Note : During cloning do not perform any action which might interrupt the cloning such as cutting off power to the transceiver.

6-6 Wireless Clone Mode
Setup the master side (source) and slave side (clone).

Master side
"母机"

Slave side
"子机"

■ Master Side
Operation
1. Set in Dealer Mode after first turning Power ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).

■ "子机"方面
操作：
1. 接通电源，等待。
2. "母机"一发出数据，显示屏上就出现"繁忙"标志，显示"-PC-"字符，进入到计算机模式。

3. 接收完全部数据，显示屏上出现"End"字符。

4. 在显示"End"的状态下，按〔MONI〕键，返回到复制模式，可以继续对其它通信机进行复制。或者，按〔LAMP〕键，返回经销商模式。

注：在复制过程中，不要做诸如关闭通信机电源等使复制中断的操作。

6-6 无线复制模式
准备好"母机"（复制方）和"子机"（被复制方）。

■ "母机"方面
操作：
1. 同时按住〔LAMP〕和〔DIAL〕键，接通电源2秒钟后进入"经销商模式"。

TK-270/(N)/278/(N)/278T
REALIGNMENT/模式组合

2. Press [MONI] in Dealer Mode and set "Wireless Clone Mode" (hereafter shown as Clone Mode). The frequency on the display is the reset frequency matching the destination.

2. 在经销商模式中，按〔MONI〕键进入"无线复制模式"(以下简称复制模式)此时显示的频率是与各型式机相对应的初始频率。

[MON 1]

Dealer Mode   经销商模式   Clone Mode   复制模式
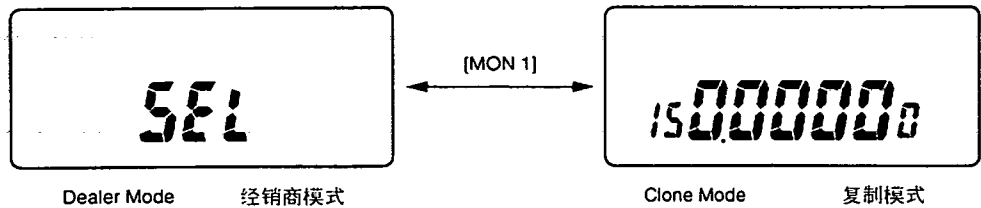
3. Rotate the [CHANNEL Selector] and select the frequency used for the wireless clone.

3. 旋转信道选择旋钮，选择所想使用的无线复制频率。

[CHANNEL Selector]

Clone Mode   经销商模式   Clone Mode   复制模式
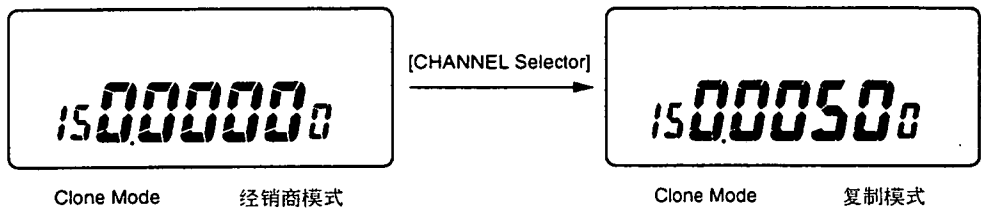
4. Press [PTT] to start data transmission. The display changes to "00 CLONE" and the LED (red) lights up. The leftmost digits (00) on the LCD immediately show the data transfer rate and as data transmission proceeds the digits count upwards in increments of 5 and transmission output sets to LO POWER.

4. 按〔PTT〕键，开始发送数据，显示屏显示"00 CLOnE"，发射指示灯(红色)点亮。显示屏左侧的00位表示数据复制的比率，随着数据的不断发出，以5为基本单位增长。

[PTT]

Clone Mode   复制模式   Clone Mode   复制模式   LED(red)lights up 红色指示灯亮
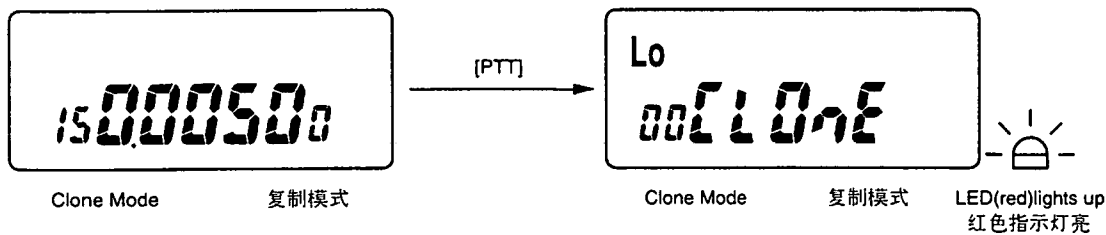
5. The message "END" appears when data transfer is complete and the LED turns off.

5. 数据传送一结束，显示"End"。发射指示灯熄灭。

Data transfer complete 复制模式

Clone Mode   数据发射结束   Clone Mode   复制模式   LED(red)turns off 指示灯熄灭
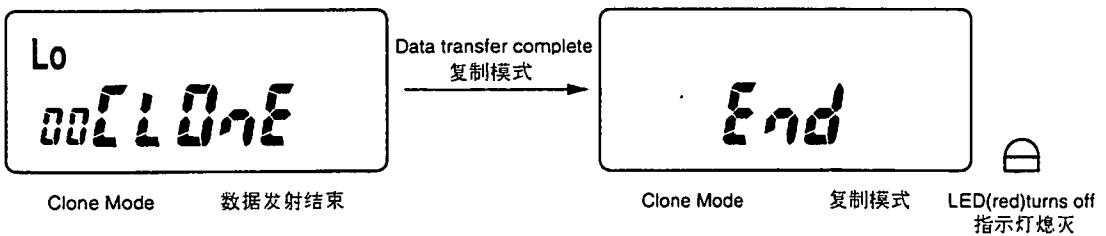
6. You can clone other transceivers by pressing [MONI] when "END" is displayed and returning to Clone Mode to start the clone process again. Press [LAMP] if you wish to return to Dealer Mode.

6. 在显示"End"的状态下，按〔MONI〕键，返回到复制模式，可以继续对下一批通信机进行无线复制。或者，按〔LAMP〕键，返回经销商模式。

REALIGNMENT/模式组合

■ Slave Side

Operation

1. Set in Dealer Mode after first turning Power ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).
2. Press [MONI] in Reset Mode and set "Wireless Clone Mode" (hereafter shown as Clone Mode). The frequency on the display is the reset (initial) frequency matching the destination.
3. The display changes to "00 CLONE" when the data output from the master is received and the "BUSY" display lights up. The leftmost digits (00) on the LCD immediately show the data transfer rate and as data reception proceeds the digits count upwards in increments of 5.

■ "子机"方面

操作：

1. 同时按住〔LAMP〕和〔DIAL〕键，接通电源2秒钟后进入"经销商模式"。
2. 在经销商模式中，按〔MONI〕键进入"无线复制模式"（以下简称复制模式）此时显示的频率是与各型式机相对应的初始频率。
3. 收到"母机"发出的数据，显示屏显示"00 CLOnE"，并且出现"繁忙"标志。显示屏左侧的00位表示数据复制的比率，随着不断收到数据，以5为基本单位增长。

| Clone Mode 复制模式 | Receive DTMF data
接收DTMF数据 → | Clone Mode 复制模式 |
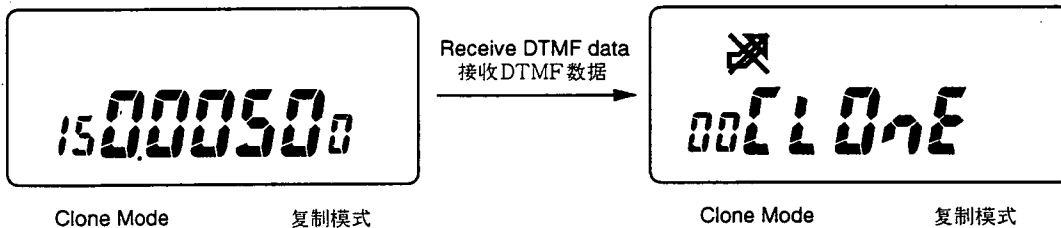
4. The message "END" is displayed when all of the data is received.

4. 收到了全部数据后，显示"End"。

| Clone Mode 复制模式 | Data receive complete
数据接收结束 → | Clone Mode 复制模式 |

5. When the message "END" is displayed, operation is the same as for the master side in (6) on the previous page.

5. 在显示"End"的状态下，按〔MONI〕键，返回到复制模式，可以继续对其它通信机进行无线复制。或者，按〔LAMP〕键，返回到经销商模式。

Please enforce absolutely

(1) Attach the antenna to the transmitting wireless unit.
(2) Remove the antenna from the receiving wireless unit.
(3) Bring the transmitting and the receiving wireless units as close together as possible.

Note : During cloning do not perform any action which might interrupt the cloning such as cutting off power to the transceiver.

请确实加固

(1) 将天线安装在发射无线装置。
(2) 从接收无线装置卸下天线。
(3) 使发射和接收无线装置尽可能靠近。

注：在复制过程中，不要做诸如关闭通信机电源等使复制中断的操作。

TK-270/(N)/278/(N)/278T
## REALIGNMENT/模式组合

7. TEST MODE
7-1 LCD All Lamp Mode
Operation

1. Set in Test Mode after first turning Power ON by simultaneously pressing the [LAMP] and [TA] startup keys (takes about 2 seconds).
2. Set LCD All Lamp Mode by pressing [SCN] while in Test Mode.
3. Pressing [SCN] now switches alternately between Test Mode and LCD All Lamp Mode.

7. 测试模式
7-1 显示屏全显示模式
操作：

1. 同时按住〔LAMP〕和〔TA〕键，接通电源，2秒钟后进入"测试模式"。
2. 在测试模式中，按〔SCN〕键，进入"显示屏全显示模式"。
3. 之后，每按一次〔SCN〕键，测试模式和显示屏全显示模式就切换一次。

ᵗΕЅᵗ	[SCN] ⟷ **Lo ⊠ ⊄ ᐱ A V SCN 88.8.8.8.8.8.85.**
Test Mode 测试模式	LCD All Lamp Mode 显示屏全显示模式
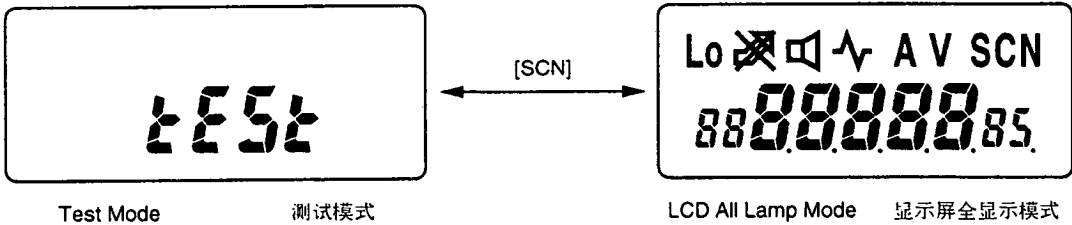
7-2 Destination Set Mode
Operation

1. Set in Test Mode after first turning Power ON by simultaneously pressing the [LAMP] and [TA] startup keys (takes about 2 seconds).
2. Set Destination Set Mode by pressing [LO] while in Test Mode.
3. Rotate the [CHANNEL Selector] to change the destinations. (Display numbers change)
4. Set the display number that you need as the destination by pressing [PTT].
5. Press [LO] to return to Test Mode.

7-2 型式设定模式
操作：

1. 同时按住〔LAMP〕和〔TA〕键，接通电源，2秒钟后进入"测试模式"。
2. 在测试模式中，按〔LO〕键，进入"型式设定模式"。
3. 旋转"信道选择"旋钮，改变型式（变更显示代码）。
4. 按〔PTT〕键，设定当前显示号码所代表的型式。
5. 按〔LO〕键，返回"测试模式"。

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Test Mode   测试模式

[LO] ⟷

0

Destination set mode   型式设定模式

[CHANNEL Selector]

[LO]

1

Destination set mode   型式设定模式

[PTT]

Destination on display is stored in the memory
存储所显示的型式
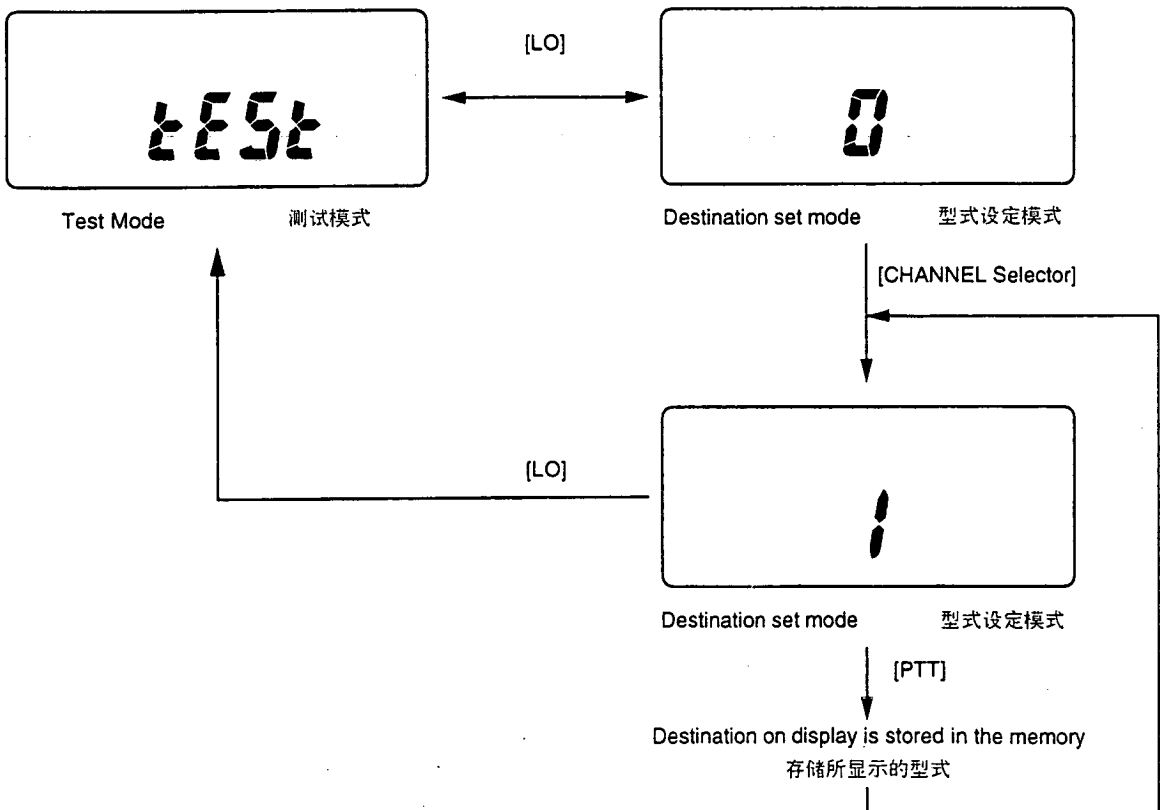
REALIGNMENT/模式组合

Note : Setting the destination with [PTT] clears channel data (frequencies, QT/DQT and channel functions) previously stored in the memory and also partially changes the functions so do not make settings except when made unavoidable due to EEPROM replacement or original settings etc.

注：一旦按〔PTT〕键设定了新型式，则以前存储的信道数据（频率、CTCSS亚音频/亚音数码、各信道的功能）就被清除了，一部分功能也会发生变化。因此，除了在更换EEPROM存储器等必须要设定新型式的情况下，不要进行此项操作。

■ **Display Numbers for Destination Settings**

Model	Destination	Display No.	Reset Freq.(MHz)	TX/RX Freq. (MHz)	IF Freq. (MHz)	1st Local
TK-278/(N)	M2	0	140	136 ~ 150	45.05	UPPER
TK-278T	M	1	150	150 ~ 174	45.05	UPPER
TK-378/(N)	M4	2	410	400 ~ 420	46.35	LOWER
	M	4	450	450 ~ 470	45.05	LOWER
TK-378T	M	4	450	450 ~ 470	45.05	LOWER
TK-270	K2	7	140	136 ~ 150	45.05	UPPER
TK-270/(N)	K	8	150	150 ~ 174	45.05	UPPER
TK-370	K4	10	410	406 ~ 430	45.05	LOWER
TK-370/(N)	K	11	450	450 ~ 470	45.05	LOWER
	K2	12	470	470 ~ 490	45.05	LOWER
	K3	13	490	490 ~ 512	46.35	LOWER

■ 型式设定的显示代码

机 型	型 式	显示代码	初始频率（MHz）	发射/接收频率（MHz）	第一中频频率（MHz）	第一本振频率
TK-278/(N)	M2	0	140	136~150	45.05	较高
TK-278T	M	1	150	150~174	45.05	较高
TK-378/(N)	M4	2	410	400~420	46.35	较低
	M	4	450	450~470	45.05	较低
TK-378T	M	4	450	450~470	45.05	较低
TK-270	K2	7	140	136~150	45.05	较高
TK-270/(N)	K	8	150	150~174	45.05	较高
TK-370	K4	10	410	406~450	45.05	较低
TK-370/(N)	K	11	450	450~470	45.05	较低
	K2	12	470	470~490	45.05	较低
	K3	13	490	490~512	46.35	较低

YO4HFU

TK-270/(N)/278/(N)/278T
REALIGNMENT/模式组合

7-3 Frequency Display Mode (for checking frequencies and for service work)
Operation

1. Set in Test Mode after first turning Power ON by simultaneously pressing the [LAMP] and [TA] startup keys (takes about 2 seconds).
2. Set Frequency Display Mode by pressing [TA] while in Test Mode.
3. Pressing [TA] now switches alternately between Test Mode and Frequency Display Mode.

7-3 频率显示模式（确认频率和维修通信机时使用）
操作：

1. 同时按住〔LAMP〕和〔TA〕键，接通电源，2秒钟后进入"测试模式"。
2. 在测试模式中，按〔TA〕键，进入"频率显示模式"。
3. 之后，每按一次〔TA〕键，测试模式和频率显示模式就切换一次。

Test Mode
测试模式

[TA]

Frequency Display Mode
频率显示模式
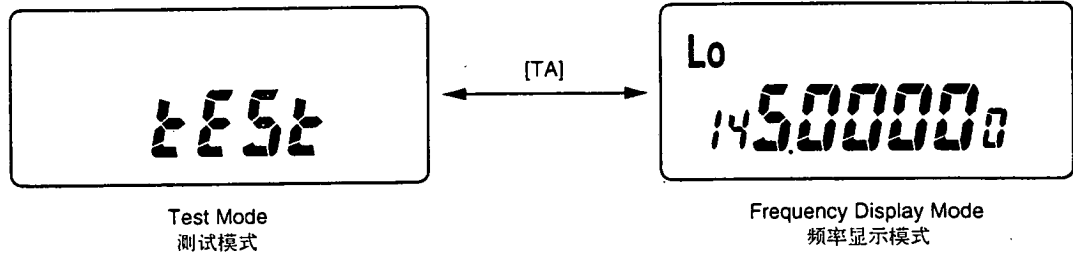
Note 1: The reset (initial) frequency varies according to the type of model.
Note 2: Set the initial transmit power to LO POWER.

注：1. 初始频率根据机型和型式而定。
2. 初始发射功率为低功率。

7-3-1 Changing the Frequency
Operation

1. Rotating the [CHANNEL selector] to the right while in Frequency Test Mode raises the frequency, while turning it to the left lowers the frequency one step at a time.
2. Rotating the [CHANNEL selector] while holding down the [LAMP] key, changes the frequency in 1 MHz steps.
3. The steps are switched in the following order each time [DIAL] is pressed.

7-3-1 调整频率
操作：

1. 在频率显示模式中，向右旋转〔信道选择〕旋钮，频率增高；向左旋转〔信道选择〕旋钮，频率降低。频率按步进值变化。
2. 按住〔LAMP〕键，再旋转〔信道选择〕旋钮，则频率以1 MHz为步进值变化。
3. 每按一次〔DIAL〕键，频率步进值按如下循环顺序变化一级。

→ 5k → 6.25k → 10k → 12.5k
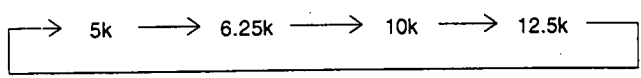
Note 1: The frequency display range is 100MHz or more and less than 550MHz.
Note 2: The value are not shown in steps on the display.

注：1. 频率显示范围在100MHz～550MHz之间。
2. 没有频率步进值显示。

REALIGNMENT/模式组合

7-3-2 QT

Operation

1. To enter QT Set Mode, press [DIAL] while holding down [LAMP] in Frequency Display Mode.
2. Rotate the [CHANNEL selector] and select the QT frequency count tone.
3. Press the key you want to set the tone, this returns to the frequency display. Key operation is not performed at that time.

7-3-2 CTCSS亚音频

操作:

1. 在频率显示模式中, 同时按〔LAMP〕键和〔DIAL〕键, 进入CTCSS频率设定模式。
2. 旋转〔信道选择〕旋钮, 在标准亚音频序列中选择所需要的亚音频。
3. 按任意一个键, 所选择的亚音频就被设定了, 同时自动回到频率显示状态。

[LAMP]+[DIAL]

[CHANNEL Selector]

[KEY]
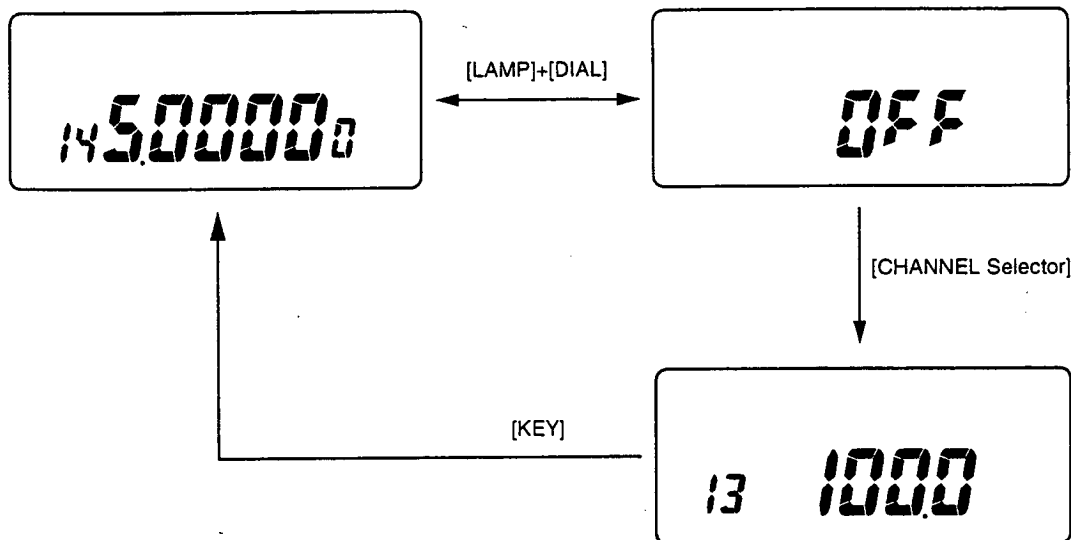
Note 1: The QT that was selected is used for both transmit and receive.

Note 2: The tone that was set is only for the QT frequency. This cannot be changed in 0.1Hz steps.

Note 3: Will not shift to QT Set Mode even if [DIAL] is pressed while [LAMP] is held down during test scan.

注: 1. 设定的亚音频既是接收亚音频又是发射亚音频。

2. 只能选择设定CTCSS标准亚音频, 不能以0.1Hz步进值变更亚音频。

3. 在测试扫描中, 即使同时按〔LAMP〕键和〔DIAL〕键, 也不会进入CTCSS频率设定模式。

TK-270/(N)/278/(N)/278T

REALIGNMENT

8. PC MODE

■ **Refer to the FPU (KPG-27D) operating specifications for details on setting the PC mode.**

● **Preface**

The TK-270/(N)/278/(N)/278T transceiver is programmed by using a personal computer, programming interface (KPG-22) and programming software (KPG-27D).

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

● **Connection procedure**

1. Connect the TK-270/(N)/278/(N)/278T to the personal computer with the interface cable.
2. Turn ON the POWER switch.
   The green LED lights up when the transceiver is receiving data and the busy mark appears.

Notes:
● Do not press the [PTT] key during data transmission or reception.
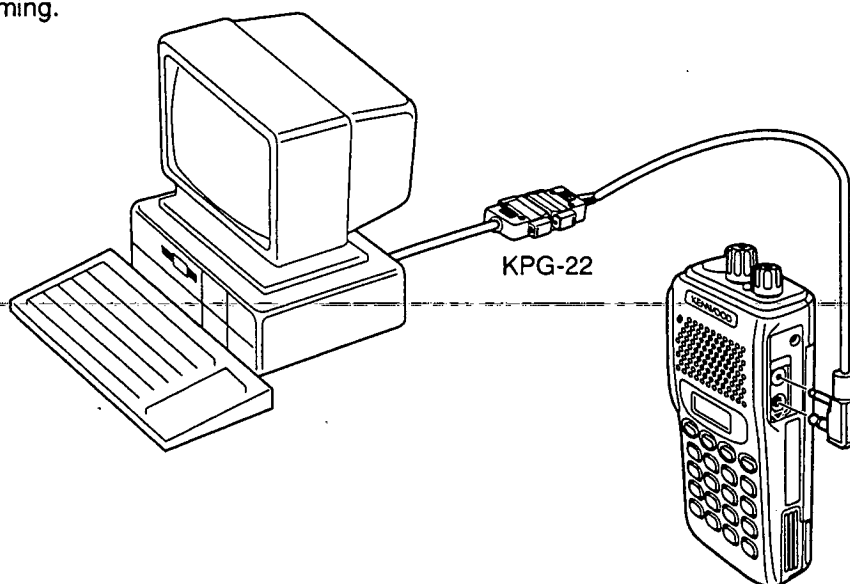
KPG-22

● **KPG-22 description**

(PC programming interface cable: Option)

The KPG-22 is required to interface the TK-270/(N)/278/(N)/278T 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 side panel jacks of the TK-270/(N)/278/(N)/278T to the computers RS-232C serial port.

● **Programming software description**

The KPG-27D Programming Disk is supplied in 5-1/4" and 3-1/2" disk format. The Software on this disk allows a user to program TK-270/(N)/278/(N)/278T radios via Programming Interface cable (KPG-22).

● **Programming with IBM PC**

If data is transferred to the transceiver from an IBM PC with the KPG-27D, 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 E²PROM in RS-232C format via the SP MIC plug.

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

(KPG-27D Instruction Manual Parts No : B62-0629-20)

模式组合

8．计算机模式

■ **关于计算机模式的设定请参阅外部写频软件(KPG-27D)的操作说明书**

● **序言**

可以使用个人计算机、编程接口电缆(KPG-22)和编程软件(KPG-27D)从外部对TK-270/(N)/278/(N)/278T通信机进行编程设定。编程软件可以在IBM PC及其兼容计算机上运行。编程时，按附图所示连接计算机和通信机。

● **连接步骤**

1．用接口电缆连接TK-270/(N)/278/(N)/278T和计算机。

2．打开电源开关。
当通信机接收到数据时，通信机的绿色指示灯点亮，并且显示屏上出现"繁忙"标志。

注意：

● 在传送或接收数据的过程中，不要按通信机的〔PTT〕键。
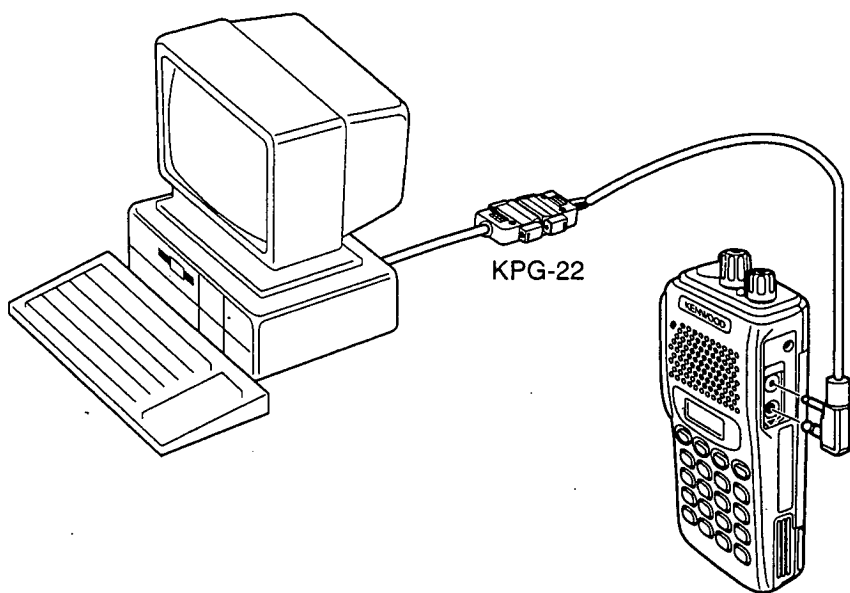
KPG-22

● **KPG-22说明**

(计算机编程接口电缆：选件)

KPG-22是TK-270/(N)/278/(N)/278T与计算机连接时不可缺少的接口，在其D型副插座(25芯)中有一个电平转换电路，可以把RS-232C逻辑电平转换为TTL电平。

KPG-22一端连接到TK-270/(N)/278/(N)/278T的外部扬声器/话筒插座上，另一端和计算机的RS-232C串行接口相连接。

● **编程软件说明**

KPG-27D编程软件磁盘有两种规格供选择，一种是5-1/4英寸的磁盘，另一种是3-1/2英寸的磁盘。有了此磁盘就可以通过编程接口电缆(KPG-22)对TK-270/(N)/278/(N)/278T进行外部编程设定。

● **用IBM PC计算机编程**

如果用装有KPG-27D磁盘的IBM PC计算机向通信机传送数据，可以改变各项调整的目的数据(通信机的基本参数)。由于决定频率范围(频率型式)的时候，目的数据就确定了，因此，在通常情况下，不需要修改它们。

只有在必要的情况下，才修改目的数据值。

RS-232C格式的数据通过通信机的外部扬声器/话筒插口编程设定到通信机内的EEPROM存储器中。

在此模式中，〔PTT〕线的作用相当于接收数据线。

(KPG-27D使用说明书零件号码：B62-0629-20)

TK-270/(N)/278/(N)/278T
REALIGNMENT/模式组合

■ Operation
1. PC → TRANSCEIVER (Storing)

■ 操作
1. 计算机 → 通信机

Transceiver status	Display	LED
Reset status (User Mode) 初始状态(用户模式)	**CH 1**	
Receive data from PC 从计算机接收数据	**-PC-**	Green lamp lights up 绿色灯亮
End of data reception 接收数据结束	**End**	Turns OFF 熄灭

2. TRANSCEIVER → PC (Loading)

2. 通信机 → 计算机

Transceiver status	Display		LED
Reset status (User Mode) 初始状态(用户模式)		**CH 1**	
Transmit data from transceiver to PC 通信机向计算机送发数据	LED (red) lights up 红色指示灯亮	**-PC-**	Red lamp lights up 红色灯亮
End of data transmission 发送数据结束	LED turns off 指示灯熄灭	**End**	Turns OFF 熄灭

REALIGNMENT/模式组合

9. ALL RESET

Operation

1. Set in Dealer Mode after first turning Power ON by simultaneously pressing the [LAMP] and [DIAL] keys (takes about 2 seconds).
2. Press the [LO] key while holding down the [PTT] key in Dealer Mode to trigger All Reset. The EEPROM data is then reset. The display does not change but the LED (red) lights up.
3. The LED turns off when All Reset is complete.
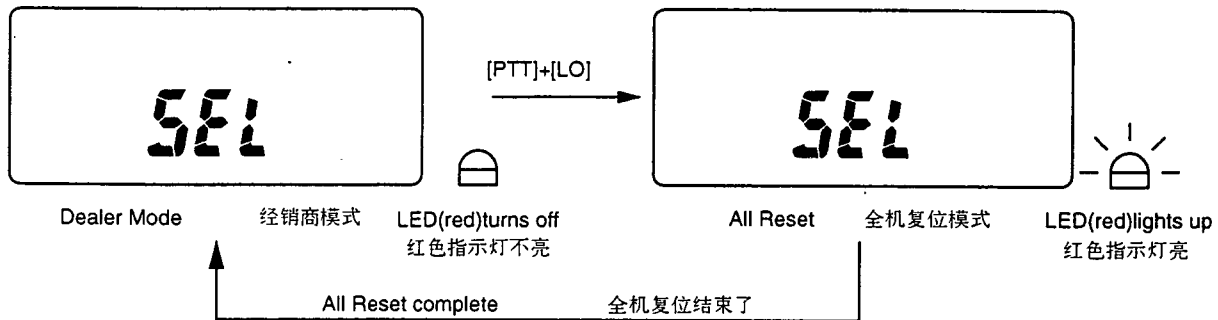
9. 全机复位模式

操作：

1. 同时按住〔LAMP〕和〔DIAL〕键，接通电源，2秒钟后进入"经销商模式"。
2. 在经销商模式中，同时按〔PTT〕和〔LO〕键，进行全机复位。
   EEPROM存储器中的数据被初始化。显示屏的显示没有变化。红色指示灯点亮。
3. 全复位结束，指示灯熄灭。

[PTT]+[LO]

| Dealer Mode | 经销商模式 | LED(red)turns off 红色指示灯不亮 | All Reset | 全机复位模式 | LED(red)lights up 红色指示灯亮 |

All Reset complete   全机复位结束了

10. AUXILIARY (AUX)

Operation

1. Set Power ON with the startup keys.
2. Switch between H and L level on the AUX terminal by pressing the [TA] key while holding down the [MONI] key. A "BAR" display appears at the left side of the LCD during H level.

Note : The AUX terminal referred to here is the EXTRA terminal on the component side of the printed circuit board.
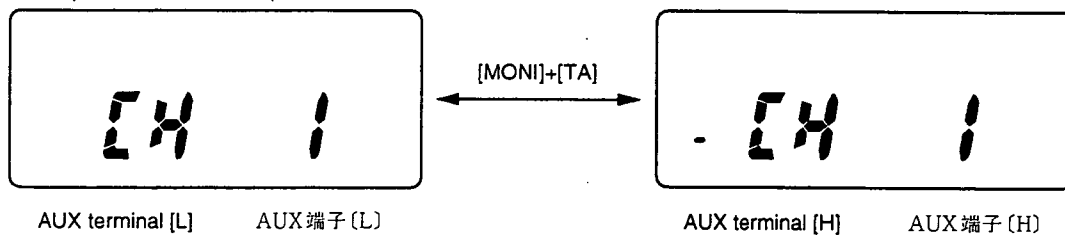
10. 辅助控制端子（AUX）

操作：

1. 接通电源。
2. 同时按〔MONI〕和〔TA〕键，可以转换辅助端子的高/低电平〔AUX端子在电路板的元件面叫EXTRA（附加）端子〕。当处于高电平时，在显示屏的左端出现短"横条"标志。

[MONI]+[TA]

| AUX terminal [L] | AUX端子〔L〕 | AUX terminal [H] | AUX端子〔H〕 |

TK-270/(N)/278/(N)/278T

DISASSEMBLY FOR REPAIR / 为维修的拆卸

Separating the case assembly from the chassis
1. Remove the two knobs ❶ and three round nuts ❷, and remove the panel ❸.
2. Remove the one screw ❹.
3. Expand the right and left sides of the bottom of the case assembly, lift the chassis, and remove it from the case assembly ❺.
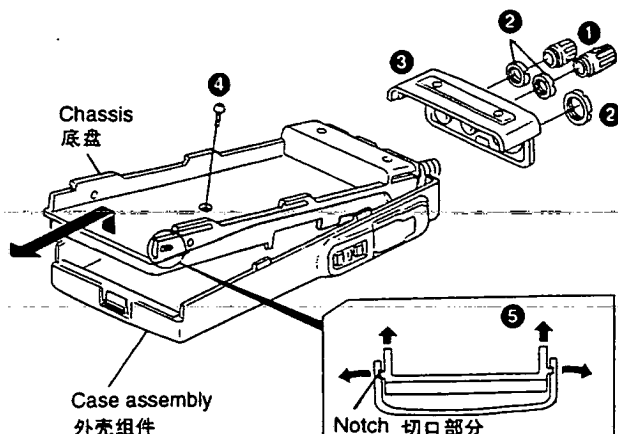
外壳组件和底盘的分离
1. 卸下2个旋钮(❶)和3个圆形螺母(❷)，然后卸下面板(❸)。
2. 取下1个螺丝(❹)。
3. 边左右分别扩展外壳组件下侧，边抬起底盘并从外壳组件拔出(❺)。

Chassis 底盘

Case assembly 外壳组件

Notch 切口部分

Separating the chassis from the unit
1. Remove the four screws ❻.
2. Remove the one screw ❼ and the fitting.
3. Remove the solder from the antenna terminal using a soldering iron and lift the unit off ❽.
4. Remove the two screws ❾ and remove the antenna connector.

Note :When reassembling the unit in the chassis, be sure to solder the antenna terminal.
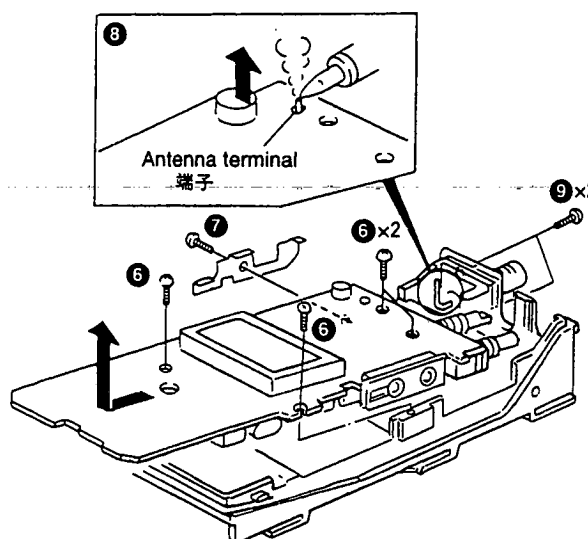
底盘和装置的分离
1. 取下4个螺丝(❻)。
2. 取下1个螺丝(❼)并卸下安装配件。
3. 将钎焊烙铁贴到天线端子并边熔化焊锡边抬起装置(❽)并卸下。
4. 取下2个螺丝(❾)并卸下天线连接器。

注意: 将装置组装在底盘上时，注意不要忘记锡焊天线端子。

Antenna terminal 端子

Removing the lever
1. Raise the lever on the lower case ❿, insert a small normal screwdriver into the clearance between the case and lever, open the case carefully ⓫, and lift the lever off.

Note :Do not force to separate the case from the lever.

调节杆卸下方法
1. 用手指压下外壳下侧的调节杆(❿)并在外壳与调节杆的间隙稍微插入小型-螺丝刀小心打开(⓫)，然后抬起调节杆并卸下。

注意: 请勿硬行撬开外壳与调节杆的间隙。

Lever knob 调节杆

Case assembly 外壳组件
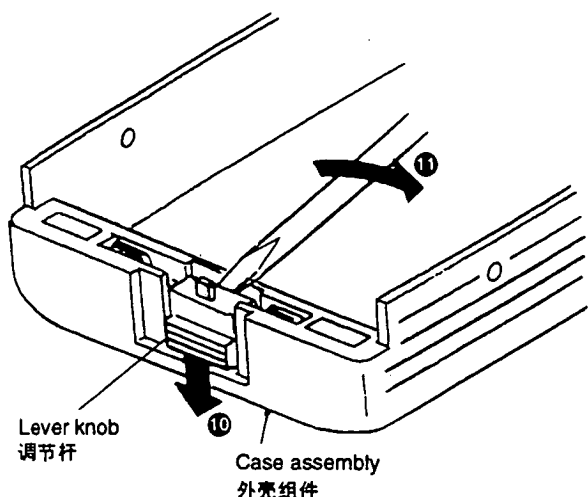
DISASSEMBLY FOR REPAIR / 为维修的拆卸

Protecting the ground terminal of the RF power amplifier

1. Take special care to prevent damage to the ground terminal of the RF power amplifier. Do not attach the silicon compound coated on the RF power amplifier to the ground terminal.

射频功率放大器周围的接地端子的保护

1. 由于射频功率放大器周围的接地端子易于变形，操作时需予以注意。另外，请注意不要让涂敷在射频功率放大器上的硅复合物附着在接地端子上。

Ground terminal
接地端子

RF POWER AMP
silicon compound
射频功率放大器
硅复合物
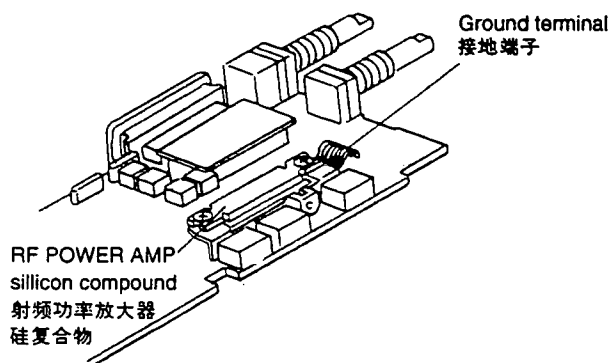
Assembling the case assembly and chassis

1. When assembling the chassis into the case assembly, insert the chassis claw into the hole in the case, and push in the chassis slowly ⑬.
2. Tighten the one screw ④.

Note :After assembling the chassis, check whether the claw shown in Fig. ⑮ fits into the notch in the case assembly. After installing the chassis, verify that the packing does not protrude to the outside⑭.

外壳组件和底盘的装配

1. 在将底盘组装在外壳组件时，要将底盘的卡爪对准外壳的孔，然后慢慢推入底盘（⑬）。
2. 紧固1个螺丝（④）。

注意：组装了底盘后，确认图（⑮）的卡爪有无确实进入切口部分。另外，还要确认组装了底盘后衬垫有无露出外面（⑭）。

Hole
外壳的孔

⑭ Packing
衬垫

⑮

⑬
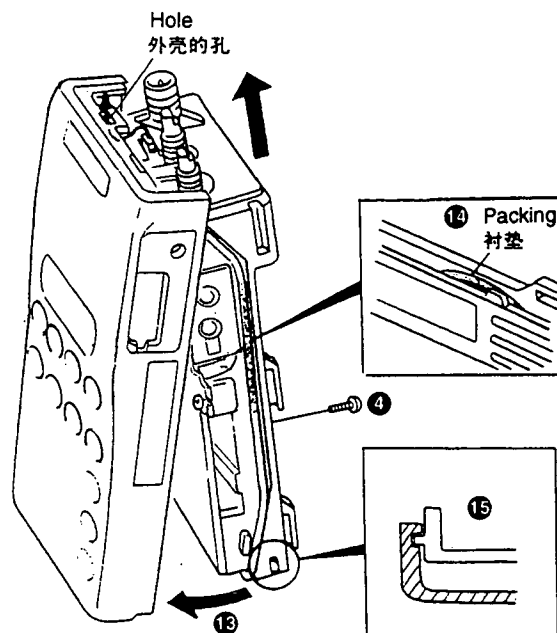
Assembling the panel

1. When assembling the panel, push in the both sides of the case assembly with fingers ⑯, fit the claw on the panel into the notch in the case assembly, and tighten the round nut ⑰.

Note :If the claw does not fit into the notch in the case assembly, there will be a gap.

面板的组装

1. 组装面板时，边用手指将外壳组件的两侧（⑯）推向内侧，边对准外壳组件的凹孔和面板的卡爪并利用圆形螺母（⑰）加以紧固。

注意：如果面板的卡爪没有进入外壳组件的凹孔中，将会出现间隙。

Panel
面板

⑰

⑰x2

⑯

⑯
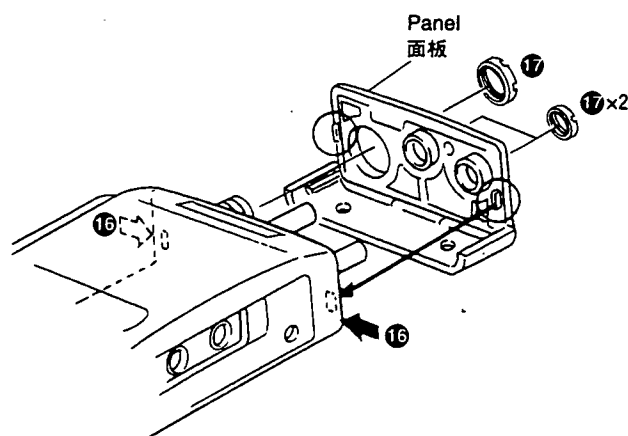
TK-270/(N)/278/(N)/278T
DISASSEMBLY FOR REPAIR / 为维修的拆卸

Speaker installation location
1. When installing the speaker, align the notch in the speaker with the line on the case assembly.
2. After determining the installation location, push in the speaker gently.

扬声器安装位置
1. 扬声器的安装位置通过将扬声器的切口部分对准外壳组件的线内的位置来决定。
2. 安装位置决定之后，轻轻推入扬声器。

Notch
切口部分

Line 线
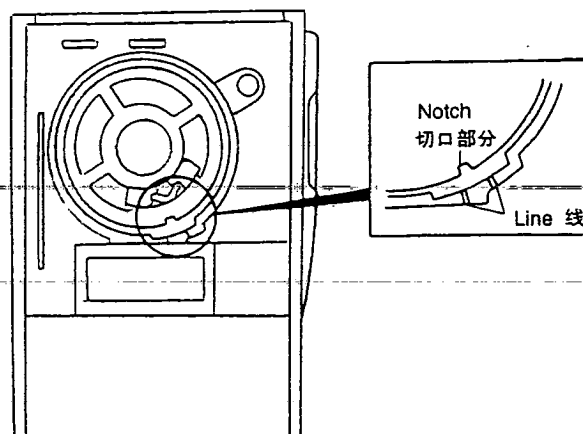
Do not lose the inter-connector.
Do not lose the inter-connector because it may fall when disassembling, reassembling, or adjusting the case assembly, chassis, or unit.

注意内部连接线的遗失
在进行外壳组件、底盘、装置的分离、组装、调整等时，由于有内部连接线掉下的可能性，需予以注意。

Inter-connector
互连器
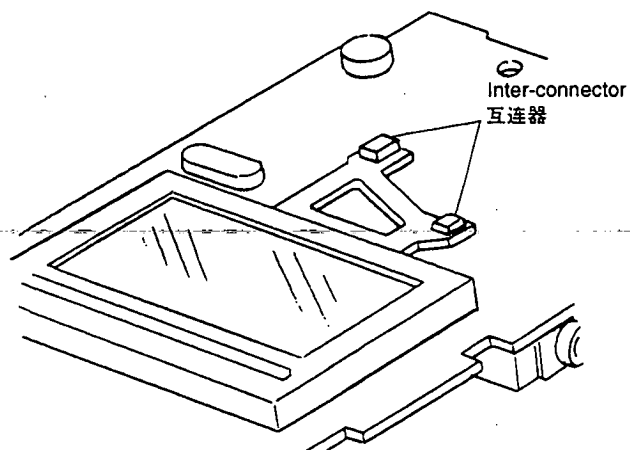
CIRCUIT DESCRIPTION/电路说明

1. FREQUENCY CONFIGURATION

The receiver utilizes double conversion. The first IF is 45.05 MHz and the second IF is 455 kHz. The first local oscillator signal is supplied from the PLL circuit.

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

1. 电路构成

接收部采用二次变频超外差方式。第 1 中频为 45.05 MHz，第 2 中频为 455kHz，第 1 本振频率由锁相环（PLL）电路产生。

发射部由PLL电路直接产生所需要的频率。各频率如图 1 所示。
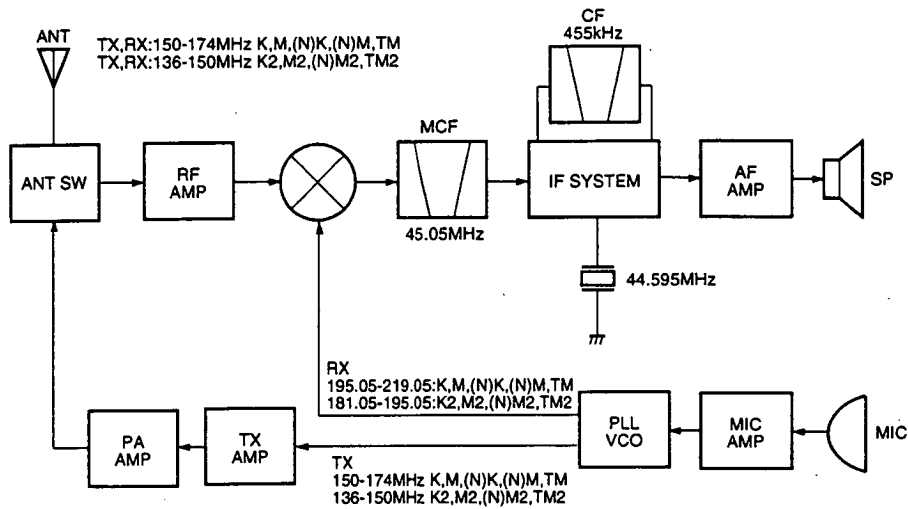
Fig. 1 Frequency configuration

2. RECEIVER SYSTEM

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

2. 接收部

接收部的简要构成如图 2 所示。
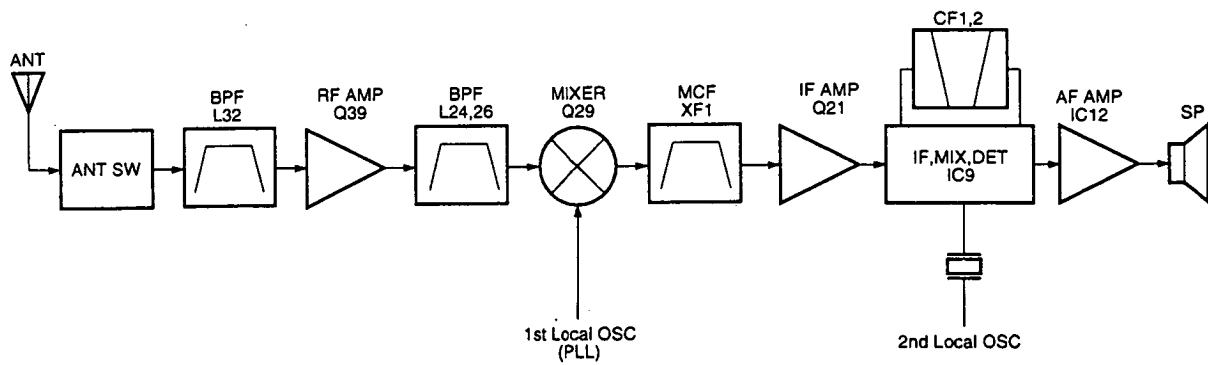
Fig. 2 Reciver section cofiguration

YO4HFU

TK-270/(N)/278/(N)/278T

CIRCUIT DESCRIPTION/电路说明

2-1 Front end (RF AMP)

The signal coming from the antenna passes through the transmit/receive switching diode circuit, passes through a BPF (L32), and is amplified by the RF amplifier (Q39). The resulting signal passes through a BPF (L26 and L24) and goes to the mixer.

2-2 First mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q29 to produce a first IF frequency of 45.05 MHz.

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

2-3 IF amplifier

The signal then passes through the first IF (Q21), and is amplified and goes to the IF IC (IC9). IC9 incorporates the functions of the second OSC, second mixer, second IF amplifier, detector, noise amplifier, and noise detector.

The signal input to the IC is mixed with the RF signal of the second OSC to produce a 455kHz second IF signal. The signal is amplified by the IF amplifier. The signal passes through the ceramic filters (CF1 and CF2) to provide the necessary selectivity.

The signal is detected by the IC and output as an AF signal.

2-1 前级(射频放大器)

从天线输入的接收信号经过由二级管构成的收发转换电路，再通过由L32组成的带通滤波器(BPF)，在射频放大器(Q39)被进一步放大。然后通过由L26、L24组成的带通滤波器(BPF)进入混频器。

2-2 第1混频器

来自前级的信号在Q29与来自锁相环(PLL)电路的第1本振信号混频，产生第1中频信号(45.05MHz)。

产生的中频信号通过晶体滤波器(XF1)滤除邻近的杂波信号，以确保邻道选择性等必要的技术指标。

2-3 中频放大器(IF AMP)

通过了晶体滤波器的信号被第1中频放大器(Q21)放大后进入中频集成电路(IC9)。IC9是集第2本振、第2混频器、第2中频放大器、鉴频器、噪声放大器、噪声整流电路为一体的集成电路芯片。

进入集成电路的信号与第2本振信号混频，产生455kHz的第2中频信号，第二中频信号经过中频放大器放大后再通过陶瓷滤波器(CF1、CF2)滤波以保证必要的选择性。

最后，通过滤波器的中频信号在集成电路内经鉴频产生音频信号输出。

CIRCUIT DESCRIPTION/电路说明

2-4 AF amplifier

The AF signal from the IF IC is amplified by IC8 (1/2) and passes through the high-pass filter (Q25 and Q28) to remove 300 Hz and lower frequencies to suppress the sub-audio signal.

The signal then passes through the de-emphasis circuit to restore the audio frequency characteristics. The signal passes through AF VOL and enters the IC12 audio power amplifier to drive the speaker. (See Fig. 3.)

2-5 Squelch

Part of the AF signal from the IC enters the FM IC 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 (IC1). IC1 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, IC1 sends a high signal to the MUTE and AFCO lines and turns IC12 on through Q30, Q35, Q34, Q36, and Q40. (See Fig. 3.)

2-6 Receive signaling
1) QT/DQT (The TK-270/(N) only DQT.)

300 Hz-and-higher audio frequencies of the signal output from IF IC are cut by a low-pass filter (IC14). The resulting signal enters the microprocessor (IC1). IC1 determines whether the QT or DQT matches the preset value, and controls the MUTE and AFCO and the speaker output sounds in line with the squelch results of that content.

2-4 音频放大器（AF AMP）

从中频集成电路输出的音频信号经IC8（1/2）放大，再通过由Q25和Q28组成的高通滤波器（HPF）滤除300Hz以下的信号，以防止听到亚音频信号。

通过高通滤波器的信号再经过去加重电路使音频信号恢复原来的频率特性。然后，音频信号通过音量控制电路（AF VOL），再经过音频功率放大器（IC12）放大后驱动扬声器。（见第3图）

2-5 静噪

从中频集成电路输出的音频信号的一部分再次进入调频集成电路，通过滤波器和放大器对其噪声分量放大，再对噪声分量进行整流，产生一个和噪声分量相对应的直流电压。调频集成电路输出此直流信号到微处理器（IC1）的模拟端口。输入的直流电压和一个预先设置的电压值比较大小，IC1根据比较结果控制开放或关闭扬声器的输出。

当扬声器发出声音时，MUTE及AFCO线被置为（HI）高电平，通过Q30和Q35、Q34以及Q36、Q40使IC12的电源成为接通（ON）状态，扬声器发出声音。（见第3图）

2-6 接收信令
1) CTCSS信令/亚音数码信令
　（QT/DQT，DQT仅适用于TK-270/（N）型）

中频集成电路输出的部分信号经过低通滤波器IC14（LPF）使300Hz以上的音频信号被滤除，然后输入到微处理器（IC1），IC1根据内部的各种处理判断接收的亚音频或亚音数码（QT或DQT）是否与被预先设定的值一致，其判断结果和噪声静噪的判断结果一起控制MUTE及AFCO，由此控制扬声器的输出。

TK-270/(N)/278/(N)/278T

CIRCUIT DESCRIPTION/电路说明

2) DTMF

The part of the received AF signal passes through a high-pass filter (Q25 and Q28) and goes to IC3.

IC3 detects a DTMF signal and sends received DTMF data to IC1. IC1 carries out various operations, such as sound output, according to the DTMF data.

2) 双音多频(DTMF)

接收的音频信号通过由Q25、Q28组成的高通滤波器(HPF)后，部分信号被输入到IC3。IC3是DTMF信号检测专用集成电路，然后将所接收的DTMF的数据送到IC1，而IC1将根据该数据决定是否释放扬声器输出的编码控制。

3) 2-TONE (The TK-270/(N) only 2-TONE.)

Part of the receive AF signal output from the AF amplifier (IC8 1/2) goes to the other IC8 (1/2), is compared, and goes to IC1. IC1 checks whether 2-TONE data is necessary. If it matches, IC1 carries out a specified operation, such as turning the speaker on. (See Fig. 3.)

3) 双音信令(2-TONE)(仅适用于TK-270/(N)型)

接收的音频信号经过音频放大器(IC8 1/2)后，一部分信号输入到IC8(1/2)另一部分电路中，经比较后被输入到IC1，在IC1内判断是否是与本机设定一致的两音数据。当判断是一致时，IC1发出解除扬声器输出的两音编码控制的指令。(见第3图)
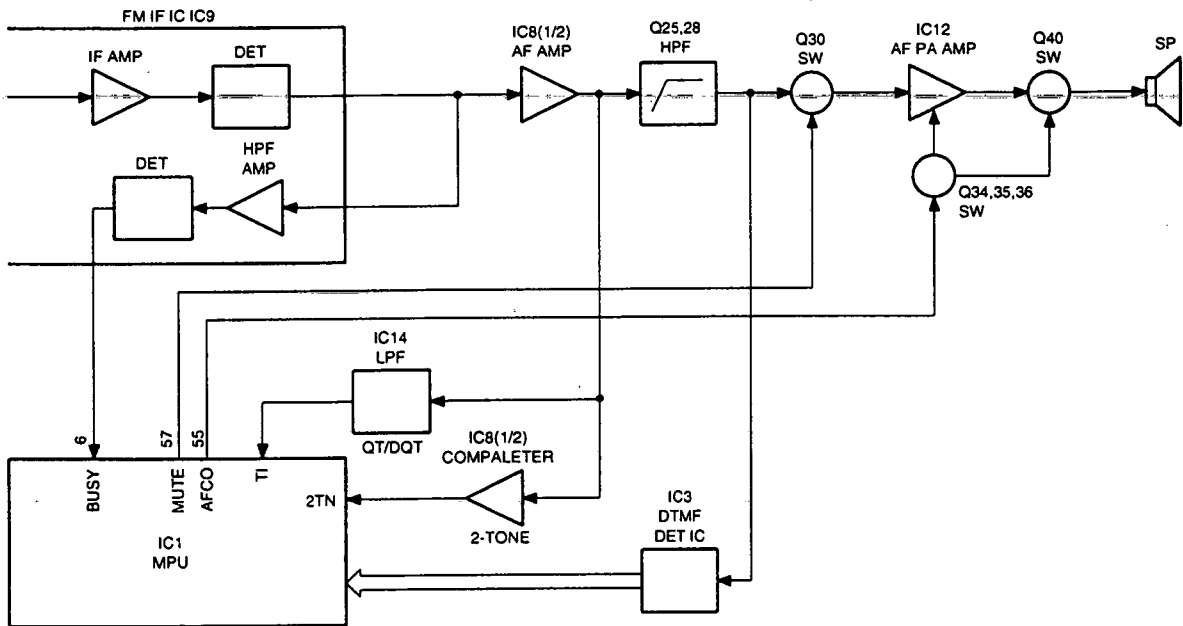

Fig.3 AF Amplifier and Squelch

CIRCUIT DESCRIPTION/电路说明

3. PLL

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

3-1 PLL

The receiver has a VCO (Q16), and the transmitter has another VCO (Q18). Figure 1 shows the VCO frequencies.

The generated signal passes through the Q20 buffer and Q14 amplifier and enters the IC6 PLL IC. IC6 incorporates the reference oscillation divider and phase comparator functions. The input signal is divided into a 5 or 6.25kHz signal according to the divide ratio data from the microcomputer (IC1). This signal and the 5 or 6.25kHz signal divided from the reference signal enter the phase comparator to produce a differential signal. The frequency control signal is output from the charge pump.

This signal passes through the passive LPF and goes to the varicap to control the VCO frequency. (See Fig. 4.)

3. 锁相环(PLL)电路

PLL电路产生接收机的第1本振信号和发射机的射频载波信号。

3-1 PLL

接收和发射分别具有单独的压控振荡器(VCO)。接收用压控振荡器以Q16为中心构成，发射用压控振荡器以Q18为中心构成，振荡频率如第1图所示。

振荡信号通过Q20缓冲器，再通过Q14放大器进入IC6 PLL集成电路。

IC6是包括了基准振荡分频器、相位比较器的集成电路，输入的振荡信号经过按微处理器(IC1)指定的分频比分频，成为5kHz或6.25kHz信号，然后和对基准振荡器分频而产生的5kHz或6.25kHz信号一起加到相位比较器进行相位比较，从而产生一个相位差信号，此相位差信号经电荷泵产生一个频率控制信号。

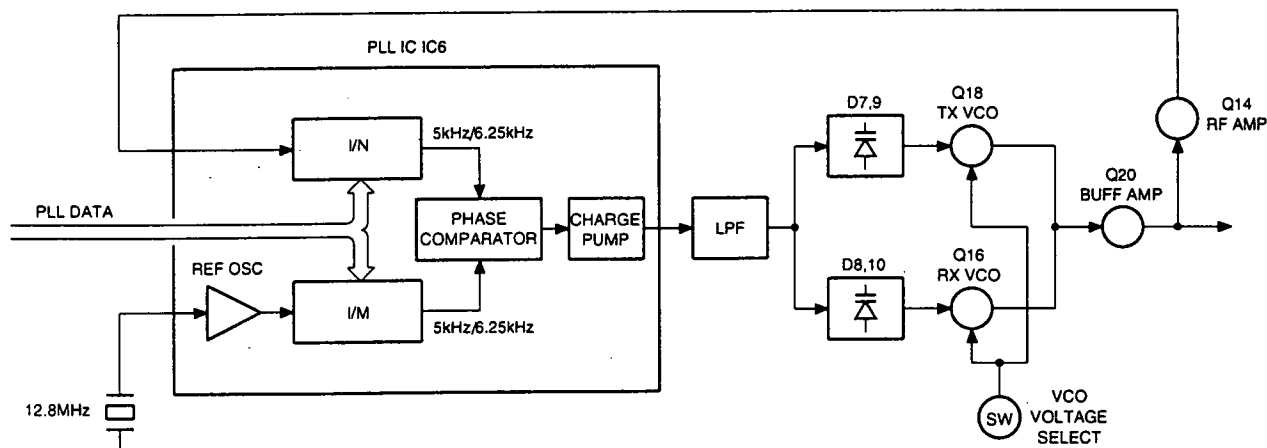该控制信号通过无源低通滤波器(LPF)后加到VCO的变容二极管上以控制其输出频率。(参见第4图)

Fig.4 PLL circuit

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CIRCUIT DESCRIPTION/电路说明

3-2 Reference oscillator circuit

The reference oscillator circuit in the PLL IC produces the 12.8MHz PLL reference frequency. To stabilize the frequency, the characteristics of the 12.8MHz crystal oscillator are controlled and the frequency is temperature-compensated.

It is compensated for by changing the DC voltage applied to D4. Changes in the ambient temperature are input to the analog port of IC1 using the TH3 thermistor. IC1 judges the temperature and outputs a voltage to the TC1, TC2, or TC3 port.

The temperature compensation value is corrected according to the differences in the characteristics of the thermistors in the TC1, TC2, and TC3 circuits. The temperature compensation is carried out when the temperature is -10℃ or less.

3-2 基准振荡器

锁相环的基准信号是PLL集成电路内部振荡电路产生的12.8MHz振荡信号。为了确保频率稳定度，采用经过特性选择的12.8MHz晶体，并且采取了如下的温度补偿措施。

频率的温度补偿是通过改变加到D4上的直流电压实现的。利用热敏电阻TH3的热敏特性感应周围的温度的变化，感应的信号被加到IC1的模拟端口，IC1判断温度后对TC1、TC2、TC3中的某一点施加电压。
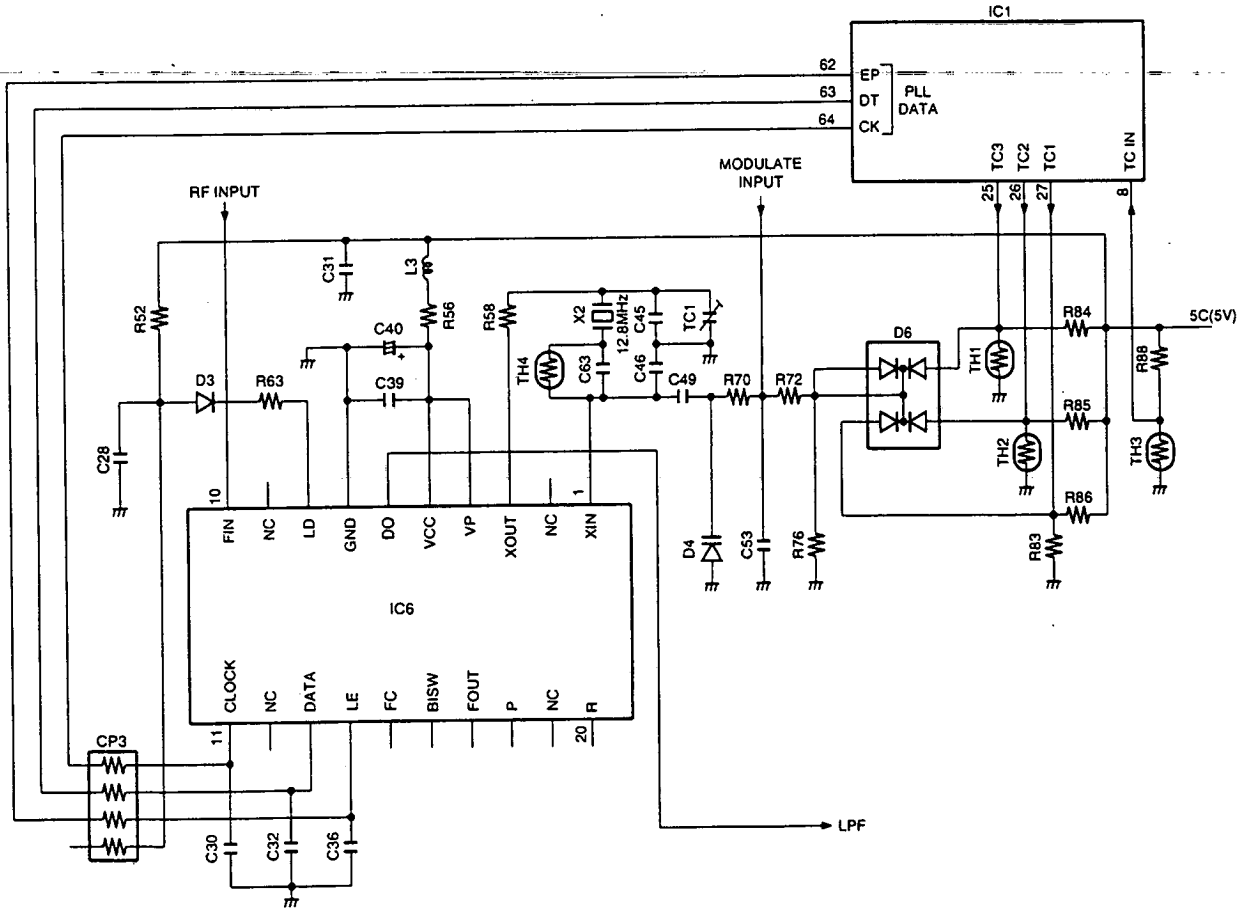
根据TC1、2、3所在的各个电路的热敏特性的不同产生相应的温度补偿值。补偿在约−10℃以下的低温进行。

Fig.5 Referencd Oscillator circuit

CIRCUIT DESCRIPTION/电路说明

4. TRANSMITTER

4-1 Transmit audio

The modulation signal from the microphone is amplified by IC10 (1/2), passes through a preemphasis circuit, and is amplified by the other IC10 (1/2) to perform IDC operation.

The signal then passes through a low-pass filter (splatter filter) (Q22 and Q17) and cuts 3 kHz and higher frequencies. The resulting signal goes to the VCO through the VCO modulation terminal for direct FM modulation.

4-2 QT/DQT encoder (The TK-270/(N) only DQT.)

A necessary signal for QT/DQT encoding is generated by IC1 and is FM-modulated to the PLL reference signal. Since the reference OSC does not modulate the loop characteristic frequency or higher, modulation is performed at the VCO side by adjusting the balance.

4-3 DTMF

The DTMF encode signal is also generated by IC1. This signal goes to IC10, and follows the same route as for ordinary modulation.

Q32 and Q37 mutes the microphone line when sending the DTMF to prevent a malfunction resulting from audio signals. (See Fig. 6.)

4. 发射部

4-1 发射音频

由话筒输入的调制信号在IC10 (1/2)的一部分电路中被放大并经过预加重处理，然后在IC10(1/2)的另一部分电路中再被放大限幅，至此完成了对输入信号的瞬时频偏控制(IDC)。

然后，通过由Q22、Q17组成的低通滤波器(邻道干扰滤波器)滤除信号中3 kHz频率以上的部分，再从VCO的调制端子进入VCO进行直接频率调制(FM)。

4-2 CTCSS信令/亚音数码信令编码器

（QT/DQT编码，DQT仅适用于TK-270/(N)）

CTCSS/亚音数码的编码是由IC1产生所需的信号，该信号被PLL的基准频率调整。因为在基准振荡器不能对频率环路特性外的频率进行调制，因此，较高频率的信号通过分配器在VCO进行调制。

4-3 DTMF

DTMF的编码信号也在IC1产生。IC1产生的信号进入IC10，以后的过程与普通的调制过程相同。

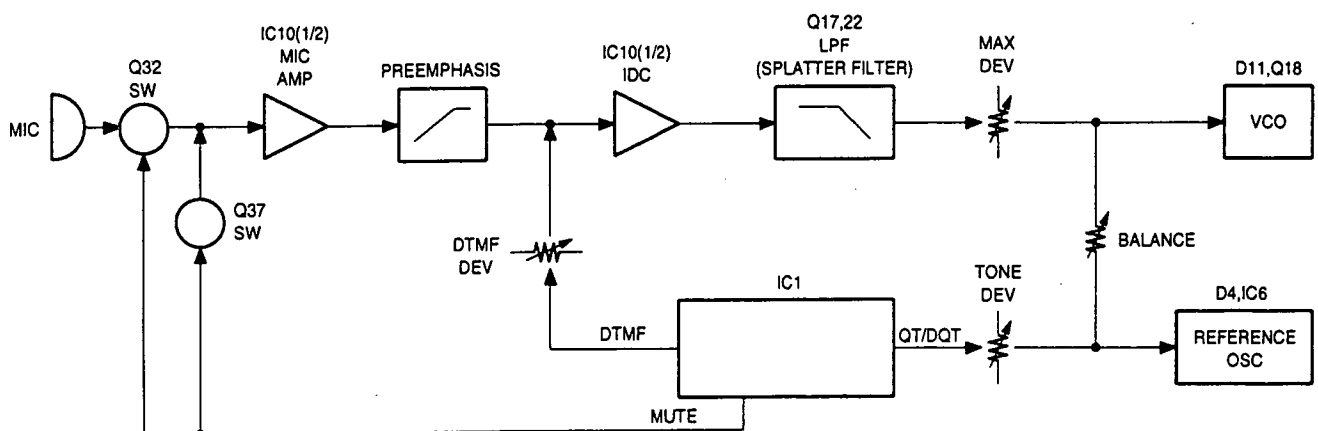在发射DTMF号码期间，在Q32及Q37对话筒输入实行静音，防止因拾取声频信号而造成的误动作。（见第6图）

Fig.6 Transmit audio and QT/DQT

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CIRCUIT DESCRIPTION/电路说明

4-4 VCO and RF amplifier

The modulation signal is modulated to VCO by D11. The RF signal from the PLL is amplified by Q26 and Q31 to the sufficient level to drive the power module.

4-5 Final module

The MOS FET-type power module (IC11) is used to amplify the transmission power.

4-6 ANT switch and LPF

The signal from the module passes through the D22 SW and L31 LPF and is output from the ANT terminal. D22 and D23 are used to switch between transmission and reception. The chip-type LPF is used to provide required attenuation.

4-7 APC

The APC keeps the current constant to the final module. The current to the final module is output as a voltage by detecting the potential difference between R215, R217, and R218 by IC13 (1/2). IC13 (1/2) compares the signal with the APC voltage from IC1 and controls the voltage so that they have the same value. The output becomes the IC11 power control voltage, and the current is kept constant in this loop.

The APC voltage from IC1 has the preset high or low power level. (See Fig. 7.)

4-4 VCO及射频放大器

调制信号在D11被VCO输出信号调制。PLL输出的射频信号在Q26、Q31被放大，以达到末级功率放大器所需的激励电平。

4-5 末级功率放大器

功率放大采用MOS FET末级功率放大器(IC11)。

4-6 天线(ANT)转换及低通滤波器(LPF)

末级功率放大器输出的信号通过D22二级管一个和低通滤波器(L31)后从天线端子发射出去。D22与D23一起构成了收发转换电路。低通滤波器采用了片状元件,保证有足够的衰减量。

4-7 自动功率控制电路(APC电路)

自动功率控制电路的作用是使流入末级功率放大器的电流为恒定值。IC13(1/2)检测流入末级的电流在R215、217、218上产生电位差, 输出一个电压信号。此电压信号在IC13(1/2)中与IC1提供的APC电压相比较, 始终控制此信号的电压值和APC电压值相同,把控制输出电压作为IC11的功率控制电压, 此闭合回路的动作使电流成为恒定值。

IC1提供的APC电压对应于预先设定的高(HI)/低(LOW)功率的电压。(见第7图)

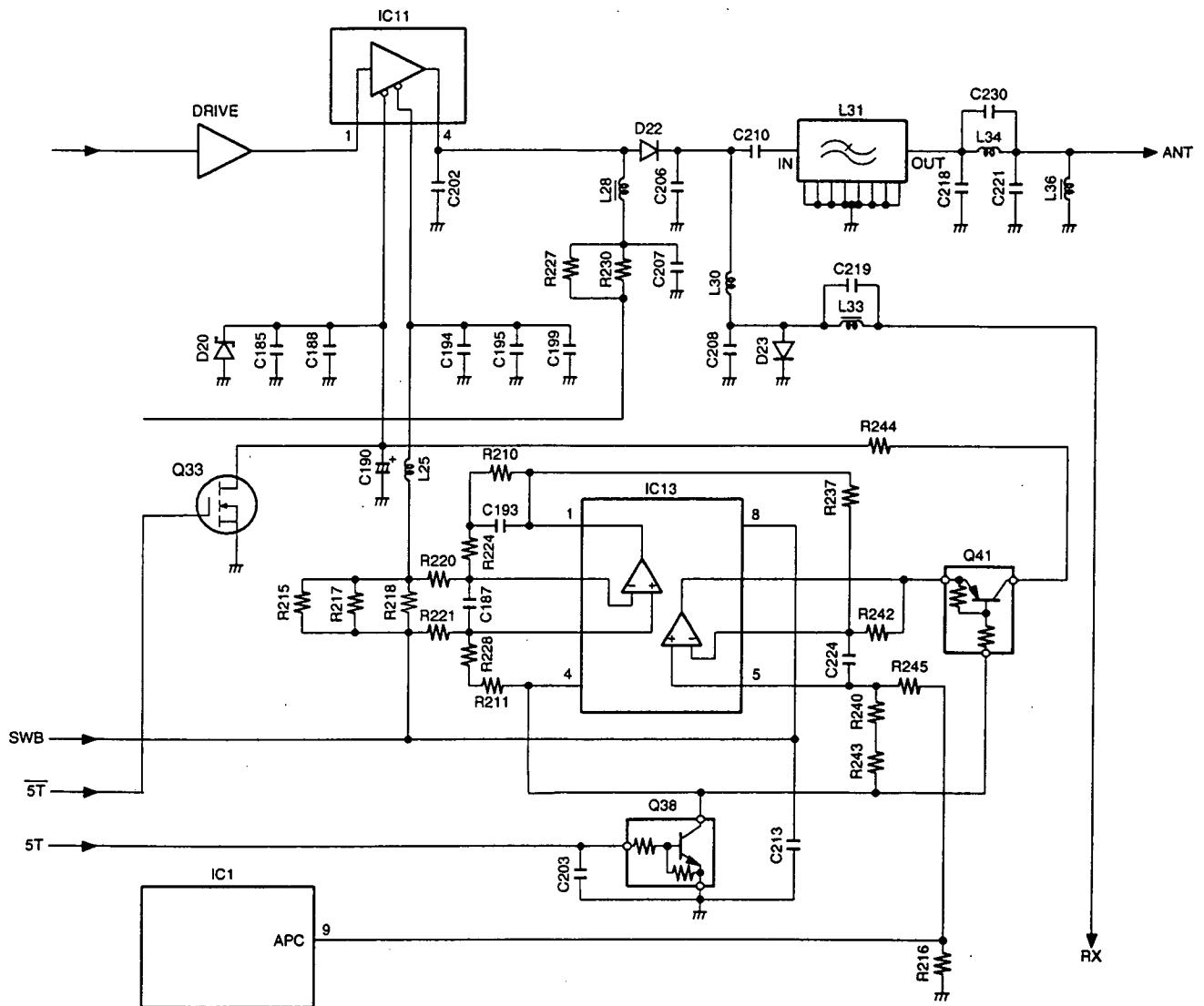## CIRCUIT DESCRIPTION/电路说明

Fig.7 APC

TK-270/(N)/278/(N)/278T
CIRCUIT DESCRIPTION/电路说明

5. POWER SUPPLY

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

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

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

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

6. CONTROL SYSTEM

The IC1 CPU operates at 8.38MHz clocks. This oscillator has a circuit that shifts the frequency according to EEPROM data.

IC1 controls the LCD driver and keys.

5. 电源

5V电源系统有微处理器用的5V、5M、5C、5R、5T共5种。微处理器用的5V一接通电源马上就产生输出。5M是普通输出，但一关闭电源开关，此输出同时关闭，以防止微处理器系统产生误动作。

5C为共用的5V电源，在电池省电功能中，除"休眠"状态以外输出。

5R为接收用5V电源，在接收时输出。

5T为发射用5V电源，在发射时输出。

6. 控制系统

IC1中央处理器(CPU)以8.38MHz的时钟工作，该振荡器具有根据EEPROM的数据使频率偏移的电路。

IC1独立进行LCD的驱动、键控制处理。

● **Keys and rotary encoder circuit**

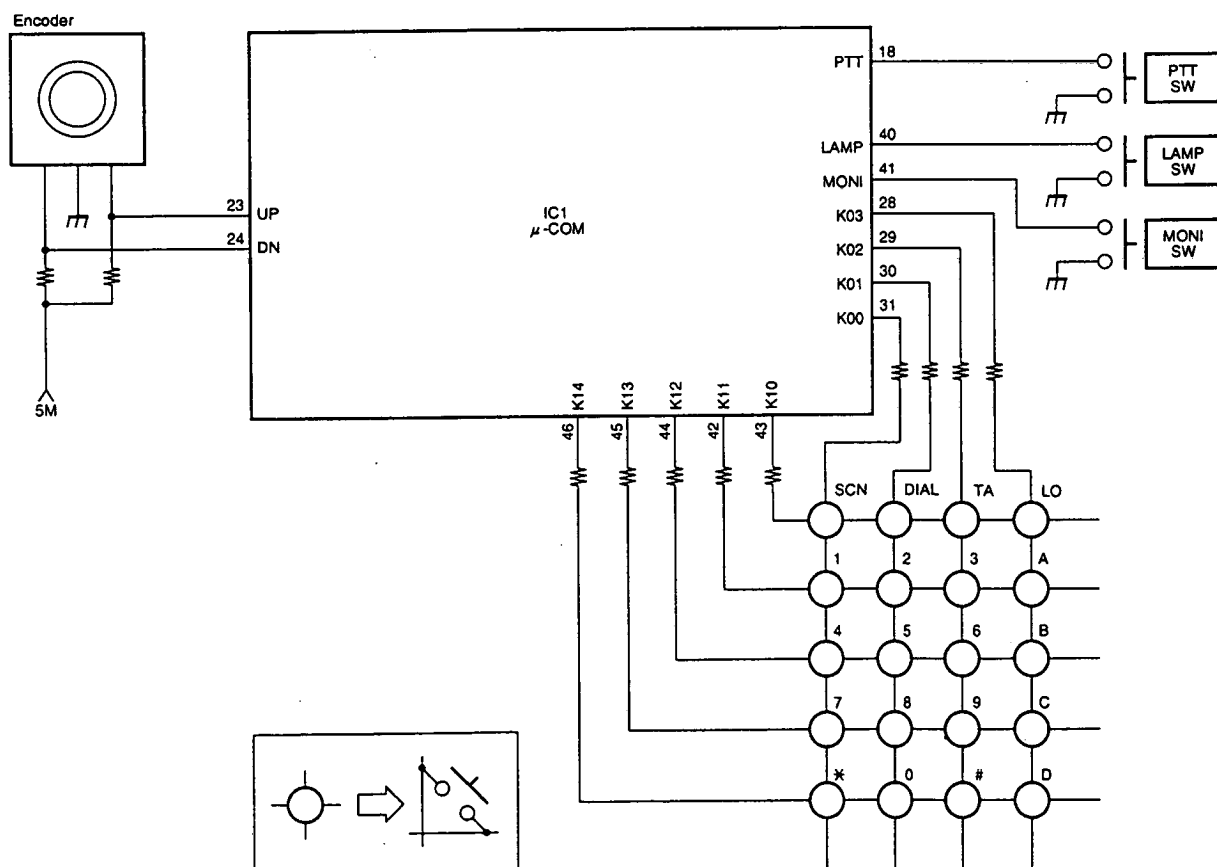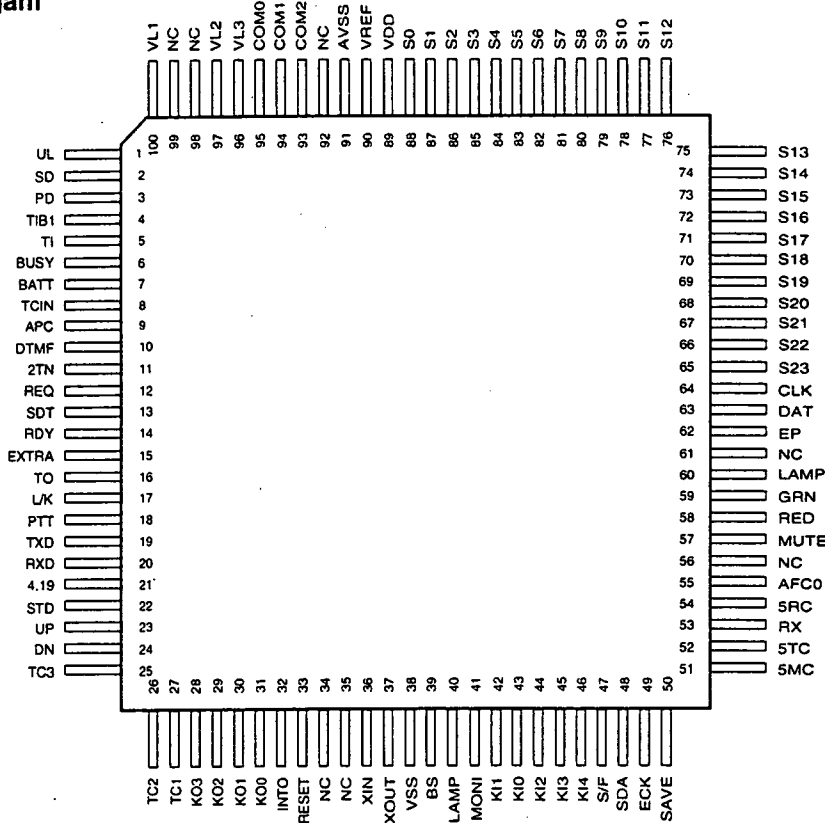The signal from keys and rotary encoder input to microprocesser directly as shown in Figure 8.

● **键和旋转编码器的电路**

如图8所示，来自键和编码旋钮的信号直接被输入到微处理器。

Fig.8 Keys and rotary encoder circuit

SEMICONDUCTOR DATA

Microprocessor : M38267M8L189GP (IC1)

- ● Pin connection diagam

- ● Pin function

Pin No.	Port name	I/O	Function
1	UL	I	PLL unlock detection pin
2	SD	I	Serial data from DTMF IC
3	PD	O	DTMF IC power down pin H : Power down
4	TIB1	I	QT/DQT external circuit center point input
5	TI	I	QT/DQT signal input
6	BUSY	I	Busy input
7	BATT	I	Battery voltage detection
8	TCIN	I	TCXO voltage input
9	APC	O	Auto power control D/A output
10	DTMF	O	DTMF output
11	2TN	I	2-tone signal input pin
12	REQ	I	Data input from SmarTrunk II™ module
13	SDT	I	Acknowledge input from SmarTrunk II™ module
14	RDY	O	Ready signal output to SmarTrunk II™ module
15	EXTRA	O	AUX output
16	TO	O	QT/DQT output
17	L/K	I	[LAMP] + [key] enable judgment
18	PTT	I	[PTT] key input Connected to RXD
19	TXD	O	RS-232C output Connected to SP/mic test (REM)
20	RXD	I	RS-232C input Connected to [PTT] line
21	4.19	O	8.38/2=4.19 MHz output
22	STD	I	Signal input interrupt from DTMF IC
23	UP	I	Encoder input
24	DN	I	Encoder input
25	TC3	O	Switch port for temperature correction
26	TC2	O	Switch port for temperature correction

TK-270/(N)/278/(N)/278T

IC数据

Microprocessor : M38267M8L189GP (IC1)

● **Pin connection diagam**
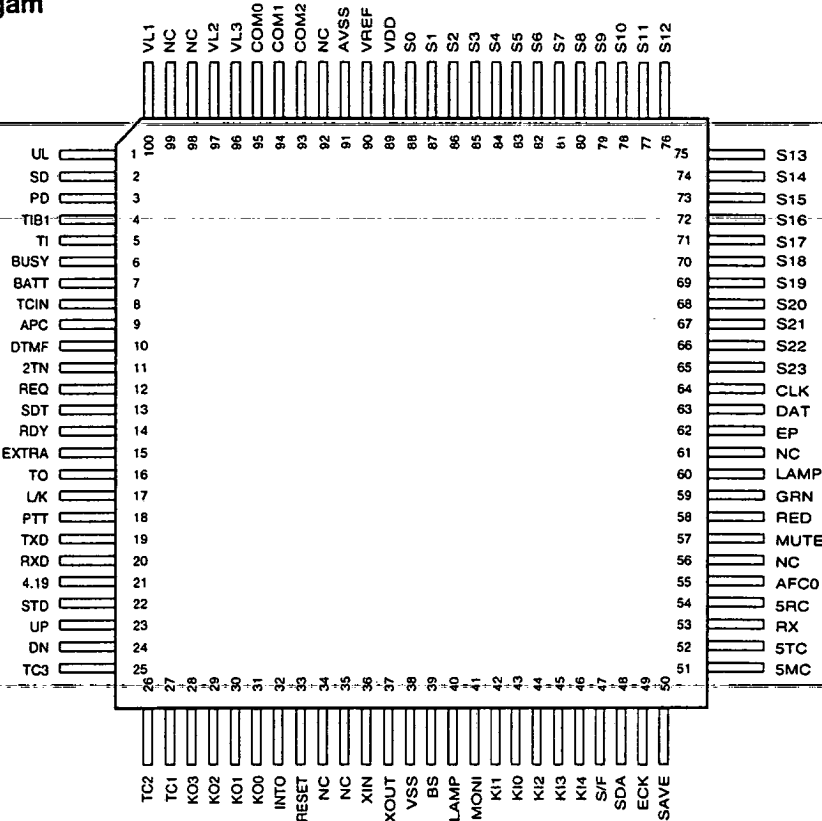
● 端子功能

引脚号	电路端子名称	输入/输出	功　　　能
1	UL	I	PLL UNLOCK检测端子
2	SD	I	来自DTMF IC的串行数据
3	PD	O	DTMF IC的停电端子　H…停电
4	TIBI	I	QT/DQT外部电路中点输入
5	TI	I	QT/DQT信号输入
6	BUSY	I	BUSY输入
7	BATT	I	电池电压检测
8	TCIN	I	TCXO电压输入
9	APC	O	自动电源控制D/A输出
10	DTMF	O	DTMF输出
11	2TN	I	双音调信号输入端子
12	REQ	I	输入来自Smar Trunk Ⅱ™模块的数据
13	SDT	I	输入来自Smar Trunk Ⅱ™模块的确认
14	RDY	O	输出向Smar Tmunk Ⅱ™模块的READY信号
15	EXTRA	O	AUX输出
16	TO	O	QT/DQT输出
17	L/K	I	〔LAMP〕+〔按键〕的允许判定
18	PTT	I	〔PTT〕键输入与RXD连接
19	TXD	O	RS-232C输出连接到扬声器/传声器的TEST(REM)
20	RXD	I	RS-232C输入与〔PTT〕线路连接
21	4.19	O	8.38/4.19MHz输出
22	STD	I	来自DTMF IC的信号输入中断
23	UP	I	编码器输入
24	DN	I	编码器输入
25	TC3	O	温度补偿用SW端口
26	TC2	O	温度补偿用SW端口

SEMICONDUCTOR DATA

Pin No.	Port name	I/O	Function
27	TC1	O	Switch port for temperature correction
28	KO3	O	Key matrix output Nch open drain output
29	KO2	O	Key matrix output Nch open drain output
30	KO1	O	Key matrix output Nch open drain output
31	KO0	O	Key matrix output Nch open drain output
32	INT0	I	Microcomputer stop input
33	RESET	I	Microcomputer reset pin
34	NC	I	Not connected
35	NC	O	Not connected
36	XIN	I	8.388608 MHz oscillator
37	XOUT	O	8.388608 MHz oscillator
38	VSS	-	Ground
39	BS	O	Beet shift pin H : Shift
40	LAMP	I	[LAMP] key input
41	MONI	I	[MONI] key input
42	KI1	I	Key matrix input
43	KI0	I	Key matrix input
44	KI2	I	Key matrix input
45	KI3	I	Key matrix input
46	KI4	I	Key matrix input
47	S/F	I	Simple plate/multi-function plate judgment H : Multi-function plate
48	SDA	I/O	EEPROM data line
49	ECK	O	EEPROM clock line
50	SAVE	O	Battery save line (5C) control H : Save off L : Save on
51	5MC	O	Control of power supply (5M) for other than microcomputer and EEPROM L : Power supply on
52	5TC	O	Transmission power supply (5T) control H : Power supply on
53	RX	O	TX/RX VCO select H : RX L : TX
54	5RC	O	Reception power supply (5R) control H : Power supply on
55	AFC0	O	AF amp power supply H : Power supply on
56	NC	O	Not connected
57	MUTE	O	Reception audio mute and mic mute H : Mic mute L : Reception audio mute
58	RED	O	Red LED control H : Lit
59	GRN	O	Green LED control H : Lit
60	LAMP	O	LCD lamp control H : Lit
61	NC	O	Not connected
62	EP	O	PLL IC enabled PLL IC latches data when this signal high
63	DAT	O	Common data output
64	CLK	O	Common clock output
65 ~ 88	S23 ~ S0	O	LCD segment
89	VDD	-	Microcomputer power supply, 5V input
90	VREF	I	A/D conversion reference voltage; connected to Vcc
91	AVSS	I	A/D converter power supply; connected to Vss
92	NC	O	Not connected
93	COM2	O	LCD common
94	COM1	O	LCD common
95	COM0	O	LCD common
96	VL3	I	LCD drive power supply Vcc
97	VL2	I	2/3 VL3
98	NC	I	Not connected
99	NC	I	Not connected
100	VL1	I	1/3 VL3

引脚号	电路端子名称	输入/输出	功　　　　能		
27	TC1	O	温度补偿用SW端口		
28	KO3	O	键矩阵输出　Nch开式式遗漏输出		
29	KO2	O	键矩阵输出　Nch开式式遗漏输出		
30	KO1	O	键矩阵输出　Nch开式式遗漏输出		
31	KO0	O	键矩阵输出　Nch开式式遗漏输出		
32	INTO	I	微计算机停止输入		
33	RESET	I	微计算机复位端子		
34	NC	I	NC		
35	NC	O	NC		
36	XIN	I	8.388608MHz振子		
37	XOUT	O	8.388608MHz振子		
38	VSS	—	GND		
39	BS	O	BEET SHIFT端子	H…SHIFT	
40	LAMP	I	〔LAMP〕键输入		
41	MONI	I	〔MONI〕键输入		
42	KI1	I	键矩阵输入		
43	KI0	I	键矩阵输入		
44	KI2	I	键矩阵输入		
45	KI3	I	键矩阵输入		
46	KI4	I	键矩阵输入		
47	S/F	I	简易版/多功能版的判定	H…多功能版	
48	SDA	I/O	E²PROM数据线路		
49	ECK	O	E²PROM时钟线路		
50	SAVE	O	电池节约线路(5C)控制	H…节约OFF　L…节约ON	
51	5MC	O	微计算机、E²PROM以外电源(5M)的控制	L…电源ON	
52	5TC	O	发射系电源(5T)控制	H…电源ON	
53	RX	O	TX/RX VCO转换	H…RX　L…TX	
54	5RC	O	接收系电源(5R)控制	L…电源ON	
55	AFCO	O	AF放大器电源	H…电源ON	
56	NC	O	NC		
57	MUTE	O	接收音频的静噪和传声器静噪	H…传声器静噪　L…接收音频静噪	
58	RED	O	红色LED控制	H…发亮	
59	GRN	O	绿色LED控制	H…发亮	
60	LAMP	O	LCD照明用灯的控制	H…发亮	
61	NC	O	NC		
62	EP	O	PLL IC允许　PLL IC在H锁存数据		
63	DAT	O	共同数据输出		
64	CLK	O	共同时钟输出		
65～88	S23～S0	O	LCD字段		
89	VDD	—	微计算机电源。5V输入		
90	VREF	I	A/D转换基准电压。与Vcc连接		
91	AVSS	I	A/D转换器电源。与Vss连接		
92	NC	O	NC		
93	COM2	O	LCD共同		
94	COM1	O	LCD共同		
95	COM0	O	LCD共同		
96	VL3	I	LCD驱动电源　Vcc		
97	VL2	I	2/3VL3		
98	NC	I	NC		
99	NC	I	NC		
100	VL1	I	1/3VL3		

SEMICONDUCTOR DATA/电路说明

Voltage detector : RN5VL45C (IC5)

- **Block diagram**
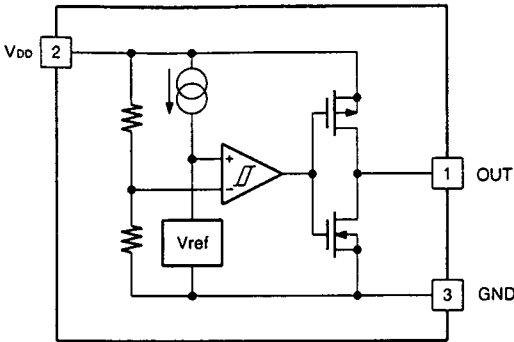
- **Pin description**

Pin No.	Pin name	Function
1	OUT	Output pin
2	V_{DD}	Power supply pin
3	GND	GROUND pin

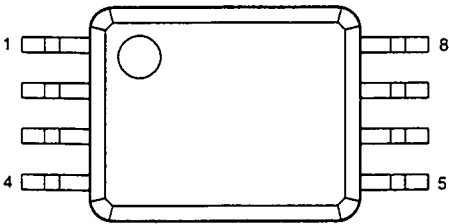### Audio amp : NJM2100V (IC10)

- **Pin connection diagram**
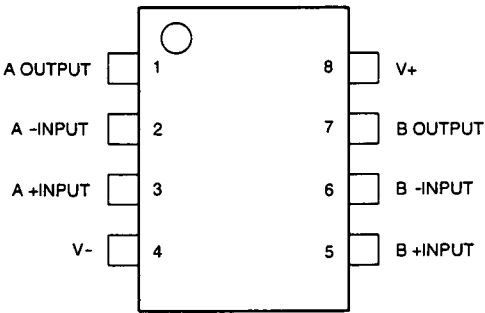
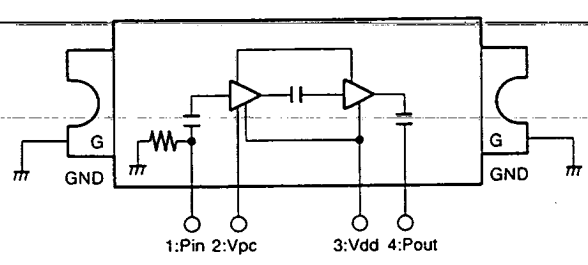- **Equivalent circuit**
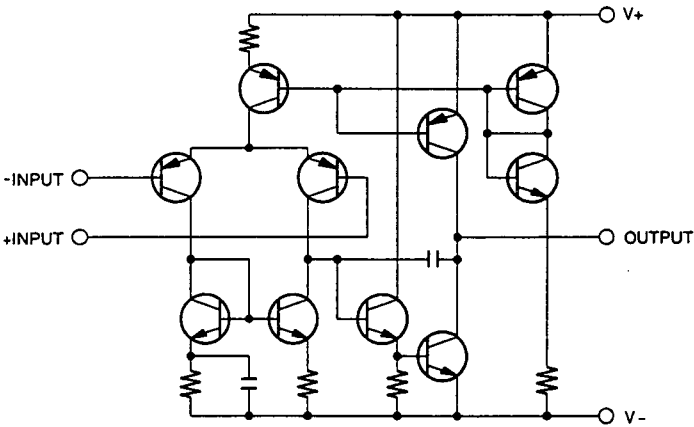
- **External view**

TK-270/(N)/278/(N)/278T
SEMICONDUCTOR DATA/电路说明

Power module : PF0313-01 (K2, M2) (IC11)
: PF0314-01 (K, M)

- **Pin connection diagram**

- **Electrode configuration**

1. Input power
2. PC voltage
3. Supply voltage
4. Output power
5. GROUND

1:Pin 2:Vpc   3:Vdd 4:Pout

APC : NJM2904V (IC13)

- **Pin connection diagram**

- **Equivalent circuit**

A OUT   1   8   V+

A –IN   2   7   B OUT

A +IN   3   6   B –IN

GND   4   5   B +IN

INPUTS

- **External view**

1   8

4   5

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13

OUTPUT

V+
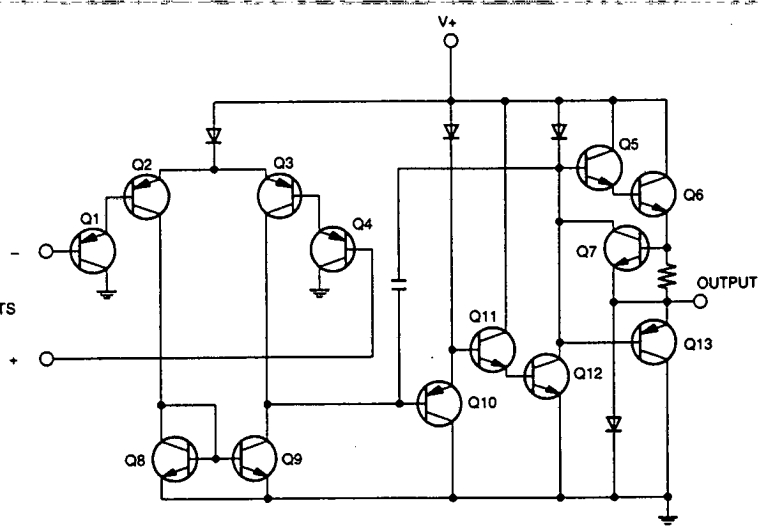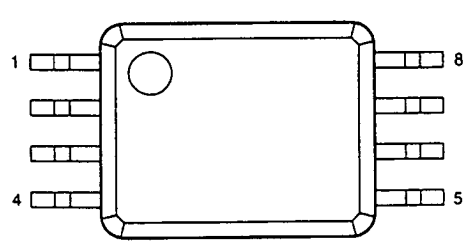
DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-4850-XX)

Ref. No.	Parts No.	Description
IC1	M38267M8L189GP	IC, MICRO PROCESSOR
IC2	PST9140NR	IC, RESET SWITCH
IC3	LC73881M	IC, DTMF DECODER
IC4	AT2408N10SI2.5	IC, EEPROM
IC5	RN5VL45C	IC, VOLTAGE DETECT
IC6	LMX1511TMX	IC, PHASE LOCKED LOOP SYSTEM
IC7	S-81350HG-KD	IC, VOLTAGE REGURATER
IC8	TA75W01FU	IC, AUDIO AMP ACTIVE FILTER
IC9	TA31136FN	IC, IF SYSTEM
IC10	NJM2100V	IC, AUDIO AMP
IC11	PF0314-01	IC, RF POWER AMP
IC11	PF0313-01	IC, RF POWER AMP
IC11	PF0314-01	IC, RF POWER AMP
IC11	RF0313-01	IC, RF POWER AMP
IC12	TA7368F	IC, AUDIO POWER AMP
IC13	NJM2904V	IC, APC
IC14	TA75W01FU	IC, ACTIVE FILTER
Q1 ~ Q3	DTC114EE	TRANSISTOR, DC SWITCH
Q4	DTC114YE	TRANSISTOR, CLOCK FREQUENCY SHIFT
Q5	UMG3N	TRANSISTOR, DC SWITCH
Q6	UPA572T	FET, DC SWITCH
Q7	DTA114YE	TRANSISTOR, DC SWITCH
Q8	MP5A02	TRANSISTOR, DC SWITCH
Q9	UMG3N	TRANSISTOR, DC SWITCH
Q12	DTA114YE	TRANSISTOR, DC SWITCH
Q14	2SC4619	TRANSISTOR, RF AMP
Q15	DTA114EE	TRANSISTOR, AF MUTE SWITCH
Q16	2SK1875(V)	FET, VCO RX
Q17	2SC4617(S)	TRANSISTOR, ACTIVE FILTER
Q18	2SK1875(V)	FET, VCO TX
Q19	2SJ243	FET, DC SWITCH
Q20	2SC5108(Y)	TRANSISTOR, RF BUFFER AMP
Q21	2SC5108(Y)	TRANSISTOR, IF AMP
Q22	2SC4617(S)	TRANSISTOR, ACTIVE FILTER
Q23	UMC4	TRANSISTOR, DC SWITCH
Q24	2SC4617(S)	TRANSISTOR, RIPPLE FILTER
Q25	2SC4617(S)	TRANSISTOR, ACTIVE FILTER
Q26	2SC5108(Y)	TRANSISTOR, RF AMP
Q28	2SC4617(S)	TRANSISTOR, ACTIVE FILTER
Q29	SGM2014M	FET, MIXER
Q30	2SK1824	FET, AUDIO MUTE
Q31	2SC4988	TRANSISTOR, TX DRIVE
Q32	DTA144EE	TRANSISTOR, AUDIO MUTE SWITCH
Q33	2SK1824	TRANSISTOR, DC SWITCH
Q34	2SA1362(GR)	TRANSISTOR, DC SWITCH
Q35, Q36	DTC144EE	TRANSISTOR, DC SWITCH
Q37	2SC4919	TRANSISTOR, AUDIO MUTE SWITCH
Q38	DTC114EE	TRANSISTOR, DC SWITCH
Q39	2SK1215(E)	FET, RF AMP
Q40	2SK1588	FET, AUDIO MUTE SWITCH
Q41	DTA144EE	TRANSISTOR, DC SWITCH
D1	B30-2143-05	LED, LCD BACK LIGHT
D2	B30-2019-05	LED, TX BUSY LED
D3	MA2S111	DIODE, UNLOCK DETECT
D4	1SV269	VARIABLE CAPACITANCE DIODE, FREQUENCY CON
D5	1SS373	DIODE, REVERSE-FLOW PREVENTION
D6	UMNIN	DIODE, DC CUT

TK-270/(N)/278/(N)/278T

DESCRIPTION OF COMPONENTS

Ref. No.	Parts No.	Description
D7 ~ D10	1SV283	VARIABLE CAPACITANCE DIODE, FREQUENCY CON
D11	1SV214	VARIABLE CAPACITANCE DIODE, TX MODULATION
D14	MA2S111	DIODE, CUEERNT STEERING
D15	DA221	DIODE, LIMITTER
D16, D17	MA2S077	DIODE, RF SWITCH
D19	1SS372	DIODE, AGC DETECT
D20	MA8062	ZENER DIODE, BOLTAGE PROTECTION
D21	DAN222	DIODE, REVERCE PROTECTION
D22	HVU131	DIODE, ANT SWITCH
D23	MA2S077	DIODE, ANT SWITCH
D24	1SR154-400	DIODE, REVERCE PROTECTION

TX-RX单元(X57-4850-XX)

参考编码	部件号	动作/条件/互换
IC1	M38267M8 L189GP	集成电路，微处理机
IC2	PST9140NR	集成电路，复位开关
IC3	LC73881M	集成电路，DTMF编码器
IC4	AT2408N10S12.5	集成电路，EEPROM
IC5	RN5VL45C	集成电路，电压检测
IC6	LMX1511TMX	集成电路，锁相环系统
IC7	S-81350HG-KD	集成电路，稳压器
IC8	TA75W01FU	集成电路，音频放大器有源滤波器
IC9	TA31136FN	集成电路，中频系统
IC10	NJM2100V	集成电路，音频放大器
IC11	PF0314-01	集成电路，射频功率放大器
IC11	PF0313-01	集成电路，射频功率放大器
IC11	PF0314-01	集成电路，射频功率放大器
IC11	PF0313-01	集成电路，射频功率放大器
IC12	TA7368F	集成电路，音频功率放大器
IC13	NJM2904V	集成电路，APC
IC14	TA75W01FU	集成电路，有源滤波器
Q1～Q3	DTC114EE	晶体管，直流开关
Q4	DTC114YE	晶体管，时钟频移
Q5	UMG3N	晶体管，直流开关
Q6	UPA572T	场效应晶体管，直流开关
Q7	DTA114YE	晶体管，直流开关
Q8	MP5A02	晶体管，直流开关
Q9	UMG3N	晶体管，直流开关
Q12	DTA114YE	晶体管，直流开关
Q14	2SC4619	晶体管，射频放大器
Q15	DTA114EE	晶体管，音频静噪开关
Q16	2SK1875(V)	场效应晶体管，VCO接收
Q17	2SC4617(S)	晶体管，有源滤波器
Q18	2SK1875(V)	场效应晶体管，VCO发射
Q19	2SJ243	场效应晶体管，直流开关
Q20	2SC5108(Y)	晶体管，射频缓冲放大器
Q21	2SC5108(Y)	晶体管，中频放大器
Q22	2SC4617(S)	晶体管，有源滤波器
Q23	UMC4	晶体管，直流开关
Q24	2SC4617(S)	晶体管，波纹滤波器
Q25	2SC4617(S)	晶体管，有源滤波器
Q26	2SC5108(Y)	晶体管，射频放大器
Q28	2SC4617(S)	晶体管，有源滤波器
Q29	SGM2014M	场效应晶体管，混频器
Q30	2SK1824	场效应晶体管，音频静噪
Q31	2SC4988	晶体管，直流激励
Q32	DTA144EE	晶体管，音频静噪开关
Q33	2SK1824	晶体管，直流开关
Q33	DTC144EE	晶体管，直流开关
Q34	2SA1362(GR)	晶体管，直流开关
Q35、Q36	DTC144EE	晶体管，直流开关
Q37	2SC4919	晶体管，音频静噪开关
Q38	DTC114EE	晶体管，直流开关
Q39	2SK1215(E)	场效应晶体管，射频放大器
Q40	2SK1588	场效应晶体管，音频静噪开关
Q41	DTA144EE	晶体管，直流开关
D1	B30-2143-05	LED，LCD背面照明
D2	B30-2019-05	LED，接收占线LED
D3	MA2S111	二极管，解锁检测
D4	1SV269	可变电容二极管，频率控制
D5	1SS373	逆流防止
D6	UMNIN	二极管，直流截止

TK-270/(N)/278/(N)/278T
元件的说明

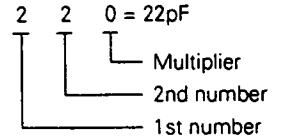| 参考编码	部件号	动作/条件/互换
D7～D10	ISV283	可变电容二极管，频率控制
D11	ISV214	可变电容二极管，接收调制
D14	MA2S111	二极管，电流导引
D15	DA221	二极管，限幅器
D16、D17	MA2S077	二极管，射频开关
D17	MA2S077	二极管，射频开关
D19	1SS372	二极管，自动增益控制检测
D20	MA8062	齐纳二极管，电压保护
D21	DAN222	二极管，反向保护
D22	HVU131	二极管，天线开关
D23	MA2S077	二极管，天线开关
D24	1SR154-400	二极管，反向保护

PARTS LIST/零件目录

CAPACITORS

CC 45 TH 1H 220 J
1   2   3   4   5   6

1 = Type ... ceramic, electrolytic, etc.
2 = Shape ... round, square, ect.
3 = Temp. coefficient
4 = Voltage rating
5 = Value
6 = Tolerance

CC45   Color*
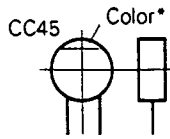
• Capacitor value

010 = 1pF
100 = 10pF
101 = 100pF
102 = 1000pF = 0.001µF
103 = 0.01µF

2 2 0 = 22pF
— Multiplier
— 2nd number
— 1st number

• Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	–80	–150	–220	–330	–470	–750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = –470 ± 60ppm/°C

• Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 / –20	+80 / –20	+100 / –0	More than 10µF – 10 ~ +50
										Less than 4.7µF –10 ~ +75

(Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

• Voltage rating

2nd word / 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	–
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	–
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	–

• Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
  1   2   3   4   5   6   7

(Chip) (CH, RH, UJ, SL)

(EX) C K 7 3 F F 1 H 0 0 0 Z
  1   2   3   4   5   6   7

(Chip) (B, F)

Refer to the table above.

1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance

Dimension (Chip capacitors)

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
A	4.5 ± 0.5	3.2 ± 0.4	Less than 2.0
B	4.5 ± 0.5	2.0 ± 0.3	Less than 2.0
C	4.5 ± 0.5	1.25 ± 0.2	Less than 1.25
D	3.2 ± 0.4	2.5 ± 0.3	Less than 1.5
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25
G	1.6 ± 0.2	0.8 ± 0.2	Less than 1.0

RESISTORS

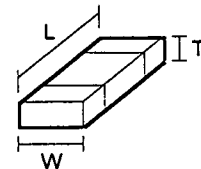**• Chip resistor (Carbon)**

(EX) R K 7 3 E B 2 B 0 0 0 J
  1   2   3   4   5   6   7

(Chip) (B, F)

• Carbon resistor (Normal type)

(EX) R D 1 4 B B 2 C 0 0 0 J
  1   2   3   4   5   6   7

1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Rating wattage
6 = Value
7 = Tolerance

Dimension

Dimension (Chip resistor)

Dimension code	L	W	T
E	3.2 ± 0.2	1.6 ± 0.2	1.0
F	2.0 ± 0.3	1.25 ± 0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1

Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

TK-270/(N)/278/(N)/278T

PARTS LIST/零件目录

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

TK-270/(N)/278/(N)/278T
TX-RX UNIT (X57-4850-XX)

Ref. No.	Adress	New parts	Parts No.	Description		Destination
				TK-270/(N)/278/(N)/278T		
1	1B		A02-2091-03	PLASTIC CABINET	(FRONT)	
2	3A		A10-1355-31	CHASSIS	(REAR)	
3	2B		A62-0494-04	MAIN PANEL	(TOP)	
4	1A		B01-0682-02	PANEL ESCUTCHEON	(PTT)	
5	1B		B09-0351-03	CAP	(S/M JACKS)	
6	3B		B11-1142-14	REFLECTOR	(TX-RX)	
7	1B		B42-3394-14	FACE PLATE,LABEL	(FCC)	K,K2,NK
8	3A		B42-5656-04	FACE PLATE,LABEL	(CHASSIS)	
9	-		B46-0470-00	WARRNTY CARD		K,K2,NK
10	-		B62-0628-10	INSTRUCTION MANUAL		
11	3A		B72-1014-14	MODEL NAME PLATE (F1)		K
11	3A		B72-1015-14	MODEL NAME PLATE (F2)		K2
11	3A	*	B72-1020-14	MODEL NAME PLATE (F1)		M
11	3A	*	B72-1021-14	MODEL NAME PLATE (F2)		M2
11	3A	*	B72-1160-04	MODEL NAME PLATE (F1)		NK
11	3A	*	B72-1164-04	MODEL NAME PLATE (F1)		NM
11	3A	*	B72-1165-04	MODEL NAME PLATE (F2)		NM2
11	3A	*	B72-1300-04	MODEL NAME PLATE (T)		TM,TM2
12	3B		E04-0197-05	RF COAXIAL CONNECTOR ANT	(TNC)	M,M2,TM
12	3B		E04-0197-05	RF COAXIAL CONNECTOR ANT	(TNC)	TM2,NM
12	3B		E04-0197-05	RF COAXIAL CONNECTOR ANT	(TNC)	NM2
12	3B		E04-0198-05	RF COAXIAL CONNECTOR ANT	(SCREW)	K,K2,NK
13	3A		E23-1006-04	TERMINAL	(BATT -)	
14	2A		E29-1151-24	CONNECTOR&TERMINAL	(SP)	
15	2B		F20-1167-04	INSULATING BOARD		
16	2B		F20-1168-04	INSULATING BOARD	(LCD)	
17	1A		G01-0881-04	LEAF SPRING,FLAT SPRING		
18	2B		G09-0418-05	SPRING	(KNOB)	
19	3B		G11-0775-04	SHEET	(CHASSIS VCO)	
20	3B		G11-0769-04	SHEET	(CHASSIS)	
21	2B		G13-1512-04	FORMED PLATE	(SP)	
22	2B		G53-0808-02	PACKING	(TOP)	
23	2B		G53-0791-03	PACKING	(SP/MIC)	
24	2B		G53-0792-04	PACKING	(BATT HOLDER)	
25	1B		G53-0794-03	PACKING	(SP)	
26	-		H12-1487-02	PACKING FIXTURE		
27	-		H25-0085-04	BAG		
28	-		H25-2012-04	BAG		
29	-		H52-0732-12	ITEM CARTON CASE		
30	1A		J19-1572-04	HOLDER	(RELEASE)	
31	1B		J21-4493-04	HARDWARE FIXTURE	(SP/MIC)	
32	3A		J21-8307-14	HARDWARE FIXTURE	(CHASSIS)	
33	3B		J29-0624-03	HOOK		
34	3B		J30-1235-04	SPACER	(CHASSIS)	
35	2A		K29-5067-02	KNOB	(DTMF)	
36	1A		K29-5068-03	KNOB	(RELEASE)	
37	1A		K29-5069-12	KNOB	(PTT)	
38	2B		K29-5167-03	KNOB	(CH)	
39	2B		K29-5168-13	KNOB	(VOL)	
A	2B		N14-0567-04	NUT	(ANT-SCREW)	K,K2,NK
A	2B		N14-0568-04	NUT	(ANT-TNC)	M,M2,TM
A	2B		N14-0568-04	NUT	(ANT-TNC)	TM2,NM

Ref. No.	Adress	New parts	Parts No.	Description		Destination
A	2B		N14-0568-04	NUT	(ANT-TNC)	NM2
B	2B		N14-0569-04	NUT	(VOL/CH)	
C	3B		N30-2604-46	SCREW	(ANT)	
D	3A		N32-2005-46	FLAT HEAD MACHIN SCREW		
E	3A		N35-2610-45	BINDING HEAD MACHINE SCREW		
F	3A		N79-2035-46	PAN HEAD TAPTITE SCREW		
G	2A,2B		N83-2005-46	BINDING HEAD TAPTITE SCREW		
H	1B,3B		N99-0396-05	SCREW SET		
40	1B		T07-0326-05	LOUDSPEAKER(FULLRANGE)		
41	-		T90-0381-05	ANTENNA (134-150MHZ) SCREW		K2
41	-		T90-0450-05	ANTENNA (150-162MHZ) SCREW		K,NK
41	-		T90-0615-05	ANTENNA (134-150MHZ) TNC		M2,TM2
41	-		T90-0615-C5	ANTENNA (134-150MHZ) TNC		NM2
41	-		T90-0616-C5	ANTENNA (150-166MHZ) TNC		M,TM,NM

TX-RX UNIT (X57-4850-XX)
-13:K, -14:K2, -17:NK, -20:M,TM, -21:M2,TM2, -22:NM, -23:NM2

Ref. No.	Adress	New parts	Parts No.	Description			Destination
42	2A		B11-1143-03	FILTER	(REFLECTOR)		
43	2A		B11-1169-04	FILTER	(REFLECTOR)		
44	2A		838-0755-05	DISPLAY ASSY			
C1,2			CK73GB1C273K	CHIP C	0.027UF	K	
C3			CK73GB1H102K	CHIP C	1000PF	K	
C4,5			CK73GB1H103K	CHIP C	0.010UF	K	
C6			CK73GB1H102K	CHIP C	1000PF	K	
C7			CK73GB1C104K	CHIP C	0.10UF	K	
C8			CC73GCH1H100D	CHIP C	10PF	D	
C9			CC73GCH1H221J	CHIP C	220PF	J	
C10			CK73GB1H103K	CHIP C	0.010UF	K	
C11			CC73GCH1H221J	CHIP C	220PF	J	
C12			CK73GB1H102K	CHIP C	1000PF	K	
C13,14			CC73GCH1H221J	CHIP C	220PF	J	
C15			CC73GCH1H030C	CHIP C	3.0PF	C	
C16			CC73GCH1I1100D	CHIP C	10PF	D	
C17			CC73GCH1H221J	CHIP C	220PF	J	
C18			CK73GB1C104K	CHIP C	0.10UF	K	
C19,20			CK73GB1H102K	CHIP C	1000PF	K	
C21-23			CC73GCH1H221J	CHIP C	220PF	J	
C24,25			CK73GB1H102K	CHIP C	1000PF	K	
C26			CC73GCH1H221J	CHIP C	220PF	J	
C27			CK73GB1H102K	CHIP C	1000PF	K	
C28			CK73GB1C104K	CHIP C	0.10UF	K	
C30			CC73GCH1H101J	CHIP C	100PF	J	
C31			CK73GB1H102K	CHIP C	1000PF	K	
C32			CC73GCH1H101J	CHIP C	100PF	J	
C33			CK73GB1H102K	CHIP C	1000PF	K	
C34			CK73GB1H103K	CHIP C	0.010UF	K	
C35			CK73GB1H102K	CHIP C	1000PF	K	
C36			CC73GCH1H101J	CHIP C	100PF	J	
C37			CK73FB0J105K	CHIP C	1.0UF	K	
C38			C92-0662-05	CHIP-TAN	15UF	6.3WV	
C39			CK73GB1C104K	CHIP C	0.10UF	K	
C40			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C41			CK73GB1H102K	CHIP C	1000PF	K	
C42			C92-0662-05	CHIP-TAN	15UF	6.3WV	

TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

TK-270/(N)/278/(N)/278T

PARTS LIST/零件目录

Ref. No.	Adress	New parts	Parts No.	Description			Destination
C43,44			CK73GB1H102K	CHIP C	1000PF	K	
C45			CC73GCH1H130J	CHIP C	13PF	J	
C46			CC73GCH1H200J	CHIP C	20PF	J	
C47,48			CK73GB1H102K	CHIP C	1000PF	K	
C49			CC73GCH1H101J	CHIP C	100PF	J	
C50			C92-0576-05	CHIP-TAN	1.0UF	6.3WV	
C51			CK73GB1H102K	CHIP C	1000PF	K	
C52			CK73FB0J105K	CHIP C	1.0UF	K	
C53			CK73GB1H102K	CHIP C	1000PF	K	
C55			CK73EF1C105Z	CHIP C	1.0UF	Z	
C56			CK73FB1C224K	CHIP C	0.22UF	K	
C57			CK73GB1H392K	CHIP C	3900PF	K	
C58			CK73GB1H102K	CHIP C	1000PF	K	
C59			C92-0659-05	CHIP-TAN	10UF	6.3WV	
C62			CK73GB1C333K	CHIP C	0.033UF	K	
C63			CC73GCH1H181J	CHIP C	180PF	J	
C64			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C65,66			C92-0653-05	CHIP-TAN	0.68UF	10WV	
C67			CK73GB1H471K	CHIP C	470PF	K	
C68			CK73GB1H681K	CHIP C	680PF	K	
C69,70			CK73GB1H102K	CHIP C	1000PF	K	
C71			CC73GCH1H330J	CHIP C	33PF	J	K,K2
C71			CC73GCH1H470J	CHIP C	47PF	J	M,M2
C71			CC73GCH1H470J	CHIP C	47PF	J	TM,TM2
C71			CC73GCH1H560J	CHIP C	56PF	J	NM
C71			CC73GCH1H820J	CHIP C	82PF	J	NK,NM2
C72,73			CK73GB1E123K	CHIP C	0.012UF	K	
C74			CK73GB1H472K	CHIP C	4700PF	K	
C75			CK73GB1C104K	CHIP C	0.10UF	K	M,TM,M2
C75			CK73GB1C104K	CHIP C	0.10UF	K	TM2,NM
C75			CK73GB1C104K	CHIP C	0.10UF	K	NM2
C75			CK73GB1C103K	CHIP C	0.010UF	K	K,K2,NK
C76			CK73GB1H182K	CHIP C	1800PF	K	
C77			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C78,79			CK73GB1H102K	CHIP C	1000PF	K	
C80			CC73GCH1H221J	CHIP C	220PF	J	
C81			CK73GB1E223K	CHIP C	0.022UF	K	
C82			CK73GB1H103K	CHIP C	0.010UF	K	
C83			C92-0576-05	CHIP-TAN	1.0UF	6.3WV	
C84			CK73GB1H102K	CHIP C	1000PF	K	
C85			CC73GCH1H101J	CHIP C	100PF	J	
C86			CC73GCH1H221J	CHIP C	220PF	J	
C88			CK73GB1H103K	CHIP C	0.010UF	K	
C89			CK73GB1H471K	CHIP C	470PF	K	
C90			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C91			CC73GCH1HR75B	CHIP C	0.75PF	B	
C92			CK73GB1C104K	CHIP C	0.10UF	K	
C93			CC73GCH1H151J	CHIP C	150PF	J	K2,M2
C93			CC73GCH1H151J	CHIP C	150PF	J	TM2,NM2
C93			CC73GCH1H221J	CHIP C	220PF	J	K,M,NK
C93			CC73GCH1H221J	CHIP C	220PF	J	TM,NM
C94			CC73GCH1H820J	CHIP C	82PF	J	
C95			CK73GB1C104K	CHIP C	0.10UF	K	
C96			CC73GCH1H470J	CHIP C	47PF	J	
C99			CC73GCH1H050C	CHIP C	5.0PF	C	K,M,NK
C99			CC73GCH1H050C	CHIP C	5.0PF	C	TM,NM
C99			CC73GCH1H080D	CHIP C	8.0PF	D	K2,M2
C99			CC73GCH1H080D	CHIP C	8.0PF	D	TM2,NM2
C100			CC73GCH1H180J	CHIP C	18PF	J	K2,M2

Ref. No.	Adress	New parts	Parts No.	Description			Destination
C100			CC73GCH1H180J	CHIP C	18PF	J	TM2,NM2
C100			CC73GCH1H150J	CHIP C	15PF	J	K,NK,M
C100			CC73GCH1H150J	CHIP C	15PF	J	TM,NM
C101			C92-0587-05	CHIP-TAN	2.2UF	4WV	
C102			CK73FB1E104K	CHIP C	0.10UF	K	
C103			CK73GB1H103K	CHIP C	0.010UF	K	
C104			CC73GCH1H050C	CHIP C	5.0PF	C	K2,M2
C104			CC73GCH1H050C	CHIP C	5.0PF	C	TM2,NM2
C104			CC73GCH1H090D	CHIP C	9.0PF	D	K,M,NK
C104			CC73GCH1H090D	CHIP C	9.0PF	D	TM,NM
C105			CC73GCH1H180J	CHIP C	18PF	J	K2,M2
C105			CC73GCH1H180J	CHIP C	18PF	J	TM2,NM2
C105			CC73GCH1H200J	CHIP C	20PF	J	K,M,NK
C105			CC73GCH1H200J	CHIP C	20PF	J	TM,NM
C106			CK73GB1H103K	CHIP C	0.010UF	K	
C108,109			CK73GB1H102K	CHIP C	1000PF	K	
C110			CC73GCH1H270J	CHIP C	27PF	J	
C111			CK73GB1H102K	CHIP C	1000PF	K	
C112			CK73GB1H471K	CHIP C	470PF	K	
C113			CK73GB1H103K	CHIP C	0.010UF	K	
C114			CC73GCH1H150J	CHIP C	15PF	J	
C115			CK73GB1H103K	CHIP C	0.010UF	K	
C116,117			CK73GB1C104K	CHIP C	0.10UF	K	
C118			CK73GB1H332K	CHIP C	3300PF	K	
C119			CK73GB1H471K	CHIP C	470PF	K	
C120			CC73GCH1H0R5C	CHIP C	0.5PF	C	
C121			CC73GCH1H150J	CHIP C	15PF	J	
C122			CK73GB1C104K	CHIP C	0.10UF	K	
C123			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C125			CK73GB1C104K	CHIP C	0.10UF	K	
C126			CK73GB1H102K	CHIP C	1000PF	K	
C127			CK73GB1C473K	CHIP C	0.047UF	K	
C128			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C129			CK73GB1H102K	CHIP C	1000PF	K	
C130			CK73GB1C104K	CHIP C	0.10UF	K	
C132			CK73GB1C333K	CHIP C	0.033UF	K	
C133			CC73GCH1H330J	CHIP C	33PF	J	
C134			CK73GB1C333J	CHIP C	0.033UF	J	
C135			CC73GCH1H100D	CHIP C	10PF	D	
C136			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C137			CK73GB1H272K	CHIP C	2700PF	K	
C138			CC73GCH1H150J	CHIP C	15PF	J	
C139			CK73GB1H561K	CHIP C	560PF	K	
C140			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C141			CK73GB1C333J	CHIP C	0.033UF	J	K,K2,M,TM
C141			CK73GB1C333J	CHIP C	0.033UF	J	M2,TM2
C141			CK73GB1C273J	CHIP C	0.027UF	J	NK,NM
C141			CK73GB1C273J	CHIP C	0.027UF	J	NM2
C142,143			CK73GB1H102K	CHIP C	1000PF	K	
C144			CC73GCH1H060D	CHIP C	6.0PF	D	K,K2,M
C144			CC73GCH1H060D	CHIP C	6.0PF	D	TM,M2
C144			CC73GCH1H060D	CHIP C	6.0PF	D	TM2
C144			CC73GCH1H200J	CHIP C	20PF	J	NK,NM
C144			CC73GCH1H200J	CHIP C	20PF	J	NM2
C145			CK73GB1C333J	CHIP C	0.033UF	J	
C147			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C148			CK73GB1C473K	CHIP C	0.047UF	K	
C149			CK73GB1H102K	CHIP C	1000PF	K	
C150			CK73GB1C473K	CHIP C	0.047UF	K	

TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

TK-270/(N)/278/(N)/278T

PARTS LIST/零件目录

TX-RX UNIT (X57-4850-XX)

Ref. No.	Adress	New parts	Parts No.	Description	Destination
C151			CK73GB1C333K	CHIP C 0.033UF K	
C152			CK73GB1H103K	CHIP C 0.010UF K	
C153,154			CK73GB1H102K	CHIP C 1000PF K	
C155			CK73GB1H103K	CHIP C 0.010UF K	
C156			CC73GCH1H220J	CHIP C 22PF J	
C157,158			CK79GB1H102K	CHIP C 1000PF K	
C159,160			CK73GB1H103K	CHIP C 0.010UF K	
C161			CC73GCH1H150J	CHIP C 15PF J	K,K2,M
C161			CC73GCH1H150J	CHIP C 15PF J	TM,M2
C161			CC73GCH1H150J	CHIP C 15PF J	TM2
C161			CC73GCH1H180J	CHIP C 18PF J	NK,NM
C161			CC73GCH1H180J	CHIP C 18PF J	NM2
C162			CC73GCH1H100D	CHIP C 10PF D	
C163			CK73GB1C473K	CHIP C 0.047UF K	
C164,165			CK73GB1C104K	CHIP C 0.10UF K	
C166			CK73GB1H102K	CHIP C 1000PF K	
C167			CK73GB1E223K	CHIP C 0.022UF K	
C168			CK73GB1H102K	CHIP C 1000PF K	
C169			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C170			CC73GCH1H020C	CHIP C 2.0PF C	
C171			CK73GB1H102K	CHIP C 1000PF K	
C172			CK73GB1H222K	CHIP C 2200PF K	
C173			CK73GB1C104K	CHIP C 0.10UF K	
C174			CK73GB1H102K	CHIP C 1000PF K	
C175			CK73GB1H682K	CHIP C 6800PF K	
C176			CK73GB1H102K	CHIP C 1000PF K	
C177			CK73GB1E223K	CHIP C 0.022UF K	
C178			CK73GB1C473K	CHIP C 0.047UF K	
C179			CK73GB1H102K	CHIP C 1000PF K	
C180			C92-0576-05	CHIP-TAN 1.0UF 6.3WV	
C181			CK73GB1C393K	CHIP C 0.039UF K	
C182			CC73GCH1H220J	CHIP C 22PF J	K2,M2
C182			CC73GCH1H220J	CHIP C 22PF J	TM2,NM2
C182			CC73GCH1H180J	CHIP C 18PF J	K,NK,M
C182			CC73GCH1H180J	CHIP C 18PF J	TM,NM
C183			CK73FB1C474K	CHIP C 0.47UF K	
C184-186			CK73GB1H102K	CHIP C 1000PF K	
C187			CK73GB1H471K	CHIP C 470PF K	
C188			CK73FB1C474K	CHIP C 0.47UF K	
C189			CC73GCH1H030C	CHIP C 3.0PF C	M,TM,NM
C189			CC73GCH1H060D	CHIP C 6.0PF D	K2,M2
C189			CC73GCH1H060D	CHIP C 6.0PF D	TM2,NM2
C189			CC73GCH1H040C	CHIP C 4.0PF C	K,NK
C190			C92-0565-05	CHIP-TAN 6.8UF 10WV	
C191			CK73GB1H272K	CHIP C 2700PF K	K,K2
C191			CK73GB1H102K	CHIP C 1000PF K	M,M2
C191			CK73GB1H102K	CHIP C 1000PF K	TM,TM2
C191			CK73GB1H102K	CHIP C 1000PF K	NM,NM2
C191			CK73GB1H332K	CHIP C 3300PF K	NK
C192			CK73GB1H471K	CHIP C 470PF K	
C193			CC73GCH1H101J	CHIP C 100PF J	
C194			CK73GB1H102K	CHIP C 1000PF K	
C195			CK73GB1H103K	CHIP C 0.010UF K	
C196			CK73GB1H102K	CHIP C 1000PF K	
C197,198			CK73GB1C104K	CHIP C 0.10UF K	
C199			CK73FB1C474K	CHIP C 0.47UF K	
C200			CK73GB1H102K	CHIP C 1000PF K	
C201			CC73GCH1H101J	CHIP C 100PF J	
C202			CC73GCH1H020C	CHIP C 2.0PF C	K2,M2
C202			CC73GCH1H020C	CHIP C 2.0PF C	TM2,NM2
C202			CC73GCH1H070D	CHIP C 7.0PF D	K,M,NK
C202			CC73GCH1H070D	CHIP C 7.0PF D	TM,NM
C203			CK73GB1H102K	CHIP C 1000PF K	
C204			CC73GCH1H050C	CHIP C 5.0PF C	K,M,NK
C204			CC73GCH1H050C	CHIP C 5.0PF C	TM,NM
C204			CC73GCH1H070D	CHIP C 7.0PF D	K2,M2
C204			CC73GCH1H070D	CHIP C 7.0PF D	TM2,NM2
C205			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C206			CC73GCH1H030C	CHIP C 3.0PF C	K,M,NK
C206			CC73GCH1H030C	CHIP C 3.0PF C	TM,NM
C206			CC73GCH1H120J	CHIP C 12PF J	K2,M2
C206			CC73GCH1H120J	CHIP C 12PF J	TM2,NM2
C207			CK73GB1H102K	CHIP C 1000PF K	K2
C207			CC73GCH1H330J	CHIP C 33PF J	K,NK,M
C207			CC73GCH1H330J	CHIP C 33PF J	TM,NM
C207			CC73GCH1H101J	CHIP C 100PF J	M2,TM2
C207			CC73GCH1H101J	CHIP C 100PF J	NM2
C208			CC73GCH1H270J	CHIP C 27PF J	K,M,NK
C208			CC73GCH1H270J	CHIP C 27PF J	TM,NM
C208			CC73GCH1H330J	CHIP C 33PF J	K2,M2
C208			CC73GCH1H330J	CHIP C 33PF J	TM2,NM2
C209			CK73GB1C104K	CHIP C 0.10UF K	
C210			CC73GCH1H470J	CHIP C 47PF J	
C211			CK73GB1H102K	CHIP C 1000PF K	
C212			CK73GB1C473K	CHIP C 0.047UF K	
C213			CK73GB1H102K	CHIP C 1000PF K	
C214			C92-0567-05	CHIP-TAN 68UF 6.3WV	
C215			CC73GCH1H060D	CHIP C 6.0PF D	K,M,NK
C215			CC73GCH1H060D	CHIP C 6.0PF D	TM,NM
C215			CC73GCH1H090D	CHIP C 9.0PF D	K2,M2
C215			CC73GCH1H090D	CHIP C 9.0PF D	TM2,NM2
C216			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C217			CK73GB1H103K	CHIP C 0.010UF K	
C218			CC73GCH1H070D	CHIP C 7.0PF D	K,M,NK
C218			CC73GCH1H070D	CHIP C 7.0PF D	TM,NM
C218			CC73GCH1H100D	CHIP C 10PF D	K2
C218			CC73GCH1H080D	CHIP C 8.0PF D	M2,TM2
C218			CC73GCH1H080D	CHIP C 8.0PF D	NM2
C219			CC73GCH1H120J	CHIP C 12PF J	K,M,NK
C219			CC73GCH1H120J	CHIP C 12PF J	TM,NM
C219			CC73GCH1H150J	CHIP C 15PF J	K2,M2
C219			CC73GCH1H150J	CHIP C 15PF J	TM2,NM2
C220			CK73GB1H102K	CHIP C 1000PF K	
C221			CC73GCH1H010B	CHIP C 1.0PF B	K,K2,NK
C221			CC73GCH1H030C	CHIP C 3.0PF C	M,TM,NM
C221			CC73GCH1H060D	CHIP C 6.0PF D	M2,TM2
C221			CC73GCH1H060D	CHIP C 6.0PF C	NM2
C222			CC73GCH1H150J	CHIP C 15PF J	
C223			CC73GCH1H100D	CHIP C 10PF D	K,M,NK
C223			CC73GCH1H100D	CHIP C 10PF D	TM,NM
C223			CC73GCH1H120J	CHIP C 12PF J	K2,M2
C223			CC73GCH1H120J	CHIP C 12PF J	TM2,NM2
C224			CK73GB1H471K	CHIP C 470PF K	
C225			CK73GB1H102K	CHIP C 1000PF K	
C226			CK73GB1H471K	CHIP C 470PF K	
C227-229			CK73GB1H102K	CHIP C 1000PF K	
C230			CC73GCH1H1R5C	CHIP C 1.5PF C	K2,M2
C230			CC73GCH1H1R5C	CHIP C 1.5PF C	TM2,NM2

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TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

PARTS LIST/零件目录

TX-RX UNIT (X57-4850-XX)

Ref. No.	Adress	New parts	Parts No.	Description	Destination
C230			CC73GCH1H020C	CHIP C 2.0PF C	K,NK,M
C230			CC73GCH1H020C	CHIP C 2.0PF C	TM,NM
TC1			C05-0380-15	TRIMMER CAPACITOR	
TC2,3			C05-0383-05	TRIMMER CAPACITOR	
45	2B		E23-1005-04	TERMINAL	
46	2A		E23-1020-04	TERMINAL	
47	2A		E29-1146-04	CONNECTOR&TERMINAL (LCD)	
J1			E11-0457-05	PHONE JACK	
F1			F53-0130-05	FUSE (3A/32V)	
.	.		G13-1303-04	FORMED PLATE(CRYSYAL)	
48	2B		J19-1571-04	HOLDER (BATT +)	
49	1A		J21-4494-04	HARDWARE FIXTURE (LCD)	
50	2A		J21-4495-14	HARDWARE FIXTURE	
51	1A		J30-1218-04	SPACER (LCD)	
CD1			L79-1072-05	FILTER	
CF1,2			L72-0916-05	CERAMIC FILTER 455KHZ	K,K2,M,TM
CF1,2			L72-0916-05	CERAMIC FILTER 455KHZ	M2,TM2
CF1,2			L72-0939-05	CERAMIC FILTER 455KHZ	NK,NM
CF1,2			L72-0939-05	CERAMIC FILTER 455KHZ	NM2
L1,2			L40-2281-37	SMALL FIXED INDUCTOR 0.22UH	
L3			L92-0138-05	CORE	
L4			L40-2281-37	SMALL FIXED INDUCTOR 0.22UH	
L5			L92-0138-05	CORE	
L6-8			L40-6891-37	SMALL FIXED INDUCTOR 6.800UH	
L9			L33-0744-05	CHOKE COIL 23N	K,M,NK
L9			L33-0744-05	CHOKE COIL 23N	TM,NM
L9			L33-1267-05	CHOKE COIL 27N	K2,M2
L9			L33-1267-05	CHOKE COIL 27N	TM2,NM2
L10			L33-0751-05	CHOKE COIL 39N	K2,M2
L10			L33-0751-05	CHOKE COIL 39N	TM2,NM2
L10			L33-1267-05	CHOKE COIL 27N	K,M,NK
L10			L33-1267-05	CHOKE COIL 27N	TM,NM
L11			L40-1091-37	SMALL FIXED INDUCTOR 1.000UH	
L12			L40-6891-37	SMALL FIXED INDUCTOR 6.800UH	
L13			L40-1085-35	SMALL FIXED INDUCTOR 100NH	K,M,NK
L13			L40-1085-35	SMALL FIXED INDUCTOR 100NH	TM,NM
L13			L40-1281-35	SMALL FIXED INDUCTOR 120NH	K2,M2
L13			L40-1281-35	SMALL FIXED INDUCTOR 120NH	TM2,NM2
L14			L92-0138-05	CORE	
L15			L40-1085-35	SMALL FIXED INDUCTOR 100NH	
L16			L40-6881-37	SMALL FIXED INDUCTOR 0.680UH	K,K2,M,TM
L16			L40-6881-37	SMALL FIXED INDUCTOR 0.680UH	M2,TM2
L16			L40-2281-37	SMALL FIXED INDUCTOR 0.220UH	NK,NM
L16			L40-2281-37	SMALL FIXED INDUCTOR 0.220UH	NM2
L17,18			L92-0138-05	CORE	
L19			L40-1081-37	SMALL FIXED INDUCTOR 0.100UH	K,M,NK
L19			L40-1081-37	SMALL FIXED INDUCTOR 0.100UH	TM,NM
L19			L40-1581-37	SMALL FIXED INDUCTOR 0.150UH	K2,M2
L19			L40-1581-37	SMALL FIXED INDUCTOR 0.150UH	TM2,NM2
L20			L40-1081-37	SMALL FIXED INDUCTOR 0.100UH	M,M2,TM
L20			L40-1081-37	SMALL FIXED INDUCTOR 0.100UH	TM2,NM
L20			L40-1081-37	SMALL FIXED INDUCTOR 0.100UH	NM2
L21			L40-2285-54	SMALL FIXED INDUCTOR 220NH	K,M,NK
L21			L40-2285-54	SMALL FIXED INDUCTOR 220NH	TM,NM
L22			L40-6871-35	SMALL FIXED INDUCTOR 68NH	K2,M2
L22			L40-6871-35	SMALL FIXED INDUCTOR 68NH	TM2,NM2
L22			L40-5671-35	SMALL FIXED INDUCTOR 56NH	K,M,NK
L22			L40-5671-35	SMALL FIXED INDUCTOR 56NH	TM,NM
L23			L92-0138-05	CORE	
L24			L34-4447-05	COIL	
L25			L92-0149-05	CORE	
L26			L34-4447-05	COIL	
L27			L40-4785-48	SMALL FIXED INDUCTOR 470NH	K,M,NK
L27			L40-4785-48	SMALL FIXED INDUCTOR 470NH	TM,NM
L27			L40-5685-48	SMALL FIXED INDUCTOR 560NH	K2,M2
L27			L40-5685-48	SMALL FIXED INDUCTOR 560NH	TM2,NM2
L28			L40-1085-34	SMALL FIXED INDUCTOR 100NH	K2,M2
L28			L40-1085-34	SMALL FIXED INDUCTOR 100NH	TM2,NM2
L29			L92-0131-05	CORE	
L30			L33-0765-05	CHOKE COIL 50NH	
L31			L79-1076-05	FILTER	K2,M2
L31			L79-1076-05	FILTER	TM2,NM2
L31			L79-1157-05	FILTER 148MHZ	K,M,NK
L31			L79-1157-05	FILTER 148MHZ	TM,NM
L32			L34-4446-05	COIL	
L33			L33-0745-05	CHOKE COIL	
L34			L33-0765-05	CHOKE COIL 50NH	
L35			L92-0149-05	CORE	
L36			L40-1092-81	SMALL FIXED INDUCTOR	
L37			L40-4781-37	SMALL FIXED INDUCTOR 0.470UH	NK,NM
L37			L40-4781-37	SMALL FIXED INDUCTOR 0.470UH	NM2
X1			L77-1630-05	CRYSTAL RESONATOR 8.388608MHZ	
X2		*			
X3			L77-1661-05	CRYSTAL RESONATOR 44.595MHZ	
XF1			L71-0409-15	MCF 45.050M	K,K2,M,TM
XF1			L71-0409-15	MCF 45.050M	M2,TM2
XF1			L71-0461-05	CRYSTAL FILTER 45.050M	NK,NM
XF1			L71-0461-05	CRYSTAL FILTER 45.050M	NM2
J	3B		N38-2640-46	PAN HEAD MACHINE SCREW	
K	3B		N78-2640-46	PAN HEAD TAPTITE SCREW	
RCP1,2			R90-0724-05	MULTI-COMP 1K X4	
CP3			R90-0714-05	MULTI-COMP 10K X4	
CP4			R90-0718-05	MULTI-COMP 4.7K X4	
R1,2			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R3			R92-1252-05	CHIP R 0 OHM	
R5,6			RK73GB1J104J	CHIP R 100K J 1/16W	
R7-9			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R10			RK73GB1J104J	CHIP R 100K J 1/16W	
R11			RK73GB1J103J	CHIP R 10K J 1/16W	
R12-15			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R16,17			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R18,19			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R20			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R21			RK73GB1J103J	CHIP R 10K J 1/16W	
R22			RK73GB1J151J	CHIP R 150 J 1/16W	
R23,24			RK73GB1J473J	CHIP R 47K J 1/16W	
R25			RK73GB1J103J	CHIP R 10K J 1/16W	
R26,27			RK73GB1J104J	CHIP R 100K J 1/16W	
R28			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R29			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R30			RK73GB1J391J	CHIP R 390 J 1/16W	
R31,32			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R33,34			RK73GB1J100J	CHIP R 10 J 1/16W	

TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

TK-270/(N)/278/(N)/278T
PARTS LIST/零件目录

TX-RX UNIT (X57-4850-XX)

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R35			RK73GB1J473J	CHIP R	47K	J	1/16W	
R36			RK73GB1J183J	CHIP R	18K	J	1/16W	
R37-41			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R42			RK73GB1J334J	CHIP R	330K	J	1/16W	
R43			RK73GB1J103J	CHIP R	10K	J	1/16W	
R44-47			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R48			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R49			R92-1252-05	CHIP R	0 OHM			
R50			RK73GB1J102J	CHIP R	1.0K		1/16W	
R51			RK73GB1J104J	CHIP R	100K	J	1/16W	
R52			RK73GB1J154J	CHIP R	150K	J	1/16W	K,K2,M,TM
R52			RK73GB1J154J	CHIP R	150K	J	1/16W	M2,TM2
R52			RK73GB1J154J	CHIP R	150K	J	1/16W	NM,NM2
R52			RK73GB1J474J	CHIP R	470K	J	1/16W	NK
R53			RK73GB1J473J	CHIP R	47K	J	1/16W	
R54			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R55			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R56			RK73GB1J150J	CHIP R	15	J	1/16W	
R57			RK73GB1J104J	CHIP R	100K	J	1/16W	
R58			RK73GB1J223J	CHIP R	22K			
R59			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R60			RK73GB1J224J	CHIP R	220K	J	1/16W	
R61			RK73GB1J103J	CHIP R	10K	J	1/16W	
R62			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R63-65			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R68			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R69			RK73GB1J821J	CHIP R	820	J	1/16W	
R70			RK73GB1J473J	CHIP R	47K	J	1/16W	
R71			RK73GB1J124J	CHIP R	120K	J	1/16W	
R72			RK73GB1J104J	CHIP R	100K	J	1/16W	
R73			RK73GB1J333J	CHIP R	33K	J	1/16W	
R74			RK73GB1J103J	CHIP R	10K	J	1/16W	
R75			RK73GB1J474J	CHIP R	470K	J	1/16W	
R76			RK73GB1J154J	CHIP R	150K	J	1/16W	
R79			RK73GB1J391J	CHIP R	390	J	1/16W	
R80,81			RK73GB1J151J	CHIP R	150	J	1/16W	
R83			RN73GH1J333D	METAL FILM R	33K	D	1/16W	
R84,85			RN73GH1J243D	METAL FILM R	24K	D	1/16W	
R86			RN73GH1J393D	METAL FILM R	39K	D	1/16W	
R87			RK73GB1J103J	CHIP R	10K	J	1/16W	
R88			RN73GH1J103D	METAL FILM R	10K	D	1/16W	
R90			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R92			R92-1252-05	CHIP R	0 OHM			
R94			RK73GB1J683J	CHIP R	68K	J	1/16W	
R97			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R98			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R99			RK73GB1J103J	CHIP R	10K	J	1/16W	
R100			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R101			RK73GB1J103J	CHIP R	10K	J	1/16W	
R104			RK73GB1J104J	CHIP R	100K	J	1/16W	
R105			RK73GB1J103J	CHIP R	10K	J	1/16W	
R106			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R107			RK73GB1J562J	CHIP R	5.6K	J	1/16W	
R108			RK73GB1J393J	CHIP R	39K	J	1/16W	
R109			RK73GB1J154J	CHIP R	150K	J	1/16W	K,K2
R109			RK73GB1J563J	CHIP R	56K	J	1/16W	NK,NM2
R109			RK73GB1J823J	CHIP R	82K	J	1/16W	NM
R109			RK73GB1J104J	CHIP R	100K	J	1/16W	M,M2
R109			RK73GB1J104J	CHIP R	100K	J	1/16W	TM,TM2

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R110			RK73GB1J104J	CHIP R	100K	J	1/16W	K2,M2
R110			RK73GB1J104J	CHIP R	100K	J	1/16W	TM2,NM2
R110			RK73GB1J473J	CHIP R	47K	J	1/16W	K,M,NK
R110			RK73GB1J473J	CHIP R	47K	J	1/16W	TM,NM
R111			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R112			RK73GB1J103J	CHIP R	10K	J	1/16W	
R113			RK73GB1J684J	CHIP R	680K	J	1/16W	
R114			RK73GB1J333J	CHIP R	33K	J	1/16W	
R115			RK73GB1J473J	CHIP R	47K	J	1/16W	
R116			RK73GB1J184J	CHIP R	180K	J	1/16W	
R117			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R118			RK73GB1J124J	CHIP R	120K	J	1/16W	
R119			RK73GB1J473J	CHIP R	47K	J	1/16W	M,TM,M2
R119			RK73GB1J473J	CHIP R	47K	J	1/16W	TM2,NM
R119			RK73GB1J473J	CHIP R	47K	J	1/16W	NM2
R120			RK73GB1J684J	CHIP R	680K	J	1/16W	
R121			RK73GB1J104J	CHIP R	100K	J	1/16W	
R122			RN73GH1J183D	METAL FILM R	18K	D	1/16W	K,K2,NK
R122			RN73GH1J183D	METAL FILM R	18K	D	1/16W	NM,NM2
R123			RN73GH1J103D	METAL FILM R	10K	D	1/16W	K,K2,NK
R123			RN73GH1J103D	METAL FILM R	10K	D	1/16W	NM,NM2
R124			RK73GB1J183J	CHIP R	18K	J	1/16W	
R125			RK73GB1J473J	CHIP R	47K	J	1/16W	
R127			R92-1252-05	CHIP R	0 OHM			M,TM
R127			R92-1252-05	CHIP R	0 OHM			M2,TM2
R128			RK73GB1J104J	CHIP R	100K	J	1/16W	
R129			RK73GB1J271J	CHIP R	270	J	1/16W	
R130			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R131			RK73GB1J823J	CHIP R	82K	J	1/16W	K,K2,M,TM
R131			RK73GB1J823J	CHIP R	82K	J	1/16W	M2,TM2
R131			RK73GB1J154J	CHIP R	150K	J	1/16W	NK,NM
R131			RK73GB1J154J	CHIP R	150K	J	1/16W	NM2
R132			RK73GB1J103J	CHIP R	10K	J	1/16W	
R135			RK73GB1J271J	CHIP R	270	J	1/16W	K,M,NK
R135			RK73GB1J271J	CHIP R	270	J	1/16W	TM,NM
R135			RK73GB1J331J	CHIP R	330	J	1/16W	K2,M2
R135			RK73GB1J331J	CHIP R	330	J	1/16W	TM2,NM2
R136			RK73GB1J185J	CHIP R	1.8M	J	1/16W	
R137			RK73GB1J183J	CHIP R	18K	J	1/16W	
R138			RK73GB1J333J	CHIP R	33K	J	1/16W	
R139			RK73GB1J103J	CHIP R	10K	J	1/16W	
R140			RK73GB1J183J	CHIP R	18K	J	1/16W	M,TM
R140			RK73GB1J183J	CHIP R	18K	J	1/16W	M2,TM2
R140			RN73GH1J183D	METAL FILM R	18K	D	1/16W	NM,NM2
R141			RK73GB1J104J	CHIP R	100K	J	1/16W	
R142			RK73GB1J393J	CHIP R	39K	J	1/16W	
R143			RK73GB1J124J	CHIP R	120K	J	1/16W	
R145,146			RK73GB1J104J	CHIP R	100K	J	1/16W	
R147			RK73GB1J103J	CHIP R	10K	J	1/16W	
R148			RK73GB1J681J	CHIP R	680	J	1/16W	
R149			RK73GB1J564J	CHIP R	560K	J	1/16W	
R150			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R151			RK73GB1J104J	CHIP R	100K	J	1/16W	
R152			RK73GB1J103J	CHIP R	10K	J	1/16W	M,TM
R152			RK73GB1J103J	CHIP R	10K	J	1/16W	M2,TM2
R152			RN73GH1J103D	METAL FILM R	10K	J	1/16W	NM,NM2
R153			RK73GB1J185J	CHIP R	1.8M	J	1/16W	
R155			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R156			RK73GB1J392J	CHIP R	3.9K	J	1/16W	

TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

PARTS LIST/零件目录

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R157			RK73GB1J681J	CHIP R	680	J	1/16W	K,K2,M,TM
R157			RK73GB1J681J	CHIP R	680	J	1/16W	M2,TM2
R157			RK73GB1J271J	CHIP R	270	J	1/16W	NK,NM
R157			RK73GB1J271J	CHIP R	270	J	1/16W	NM2
R158			RK73GB1J333J	CHIP R	33K	J	1/16W	
R159,160			RK73GB1J154J	CHIP R	150K	J	1/16W	
R161			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R162			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R163			RK73GB1J104J	CHIP R	100K	J	1/16W	
R164			RK73GB1J392J	CHIP R	3.9K	J	1/16W	
R165			RK73GB1J123J	CHIP R	12K	J	1/16W	
R166			RK73GB1J393J	CHIP R	39K	J	1/16W	
R167			RK73GB1J184J	CHIP R	180K	J	1/16W	
R168			RK73GB1J104J	CHIP R	100K	J	1/16W	
R169			RK73GB1J181J	CHIP R	180	J	1/16W	K,M,NK
R169			RK73GB1J181J	CHIP R	180	J	1/16W	TM,NM
R169			RK73GB1J271J	CHIP R	270	J	1/16W	K2,M2
R169			RK73GB1J271J	CHIP R	270	J	1/16W	TM2,NM2
R171			RK73GB1J392J	CHIP R	3.9K	J	1/16W	K,K2,M,TM
R171			RK73GB1J392J	CHIP R	3.9K	J	1/16W	M2,TM2
R171			RK73GB1J332J	CHIP R	3.3K	J	1/16W	NK,NM
R171			RK73GB1J332J	CHIP R	3.3K	J	1/16W	NM2
R172			RK73GB1J562J	CHIP R	5.6K	J	1/16W	
R173			R92-1252-05	CHIP R	0 OHM			K,K2,M,TM
R173			R92-1252-05	CHIP R	0 OHM			M2,TM2
R174			RK73GB1J473J	CHIP R	47K	J	1/16W	
R175,176			RK73GB1J154J	CHIP R	150K	J	1/16W	
R177			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R178			RK73GB1J101J	CHIP R	100	J	1/16W	
R179			RK73GB1J330J	CHIP R	33	J	1/16W	
R180			RK73GB1J392J	CHIP R	3.9K	J	1/16W	
R181			RK73GB1J152J	CHIP R	1.5K	J	1/16W	K,K2,M,TM
R181			RK73GB1J152J	CHIP R	1.5K	J	1/16W	M2,TM2
R182			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R185			RK73GB1J562J	CHIP R	5.6K	J	1/16W	
R186			RK73GB1J334J	CHIP R	330K	J	1/16W	
R188			RK73GB1J470J	CHIP R	47	J	1/16W	
R190			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R191			RK73GB1J103J	CHIP R	10K	J	1/16W	
R192			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R193			RK73GB1J561J	CHIP R	560	J	1/16W	
R194			R92-1252-05	CHIP R	0 OHM			
R195			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R196			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R197			RK73GB1J331J	CHIP R	330	J	1/16W	
R198			RK73GB1J102J	CHIP R	1.0K	J	1/16W	K,K2,NK
R198			RK73GB1J222J	CHIP R	2.2K	J	1/16W	M,M2,TM
R198			RK73GB1J222J	CHIP R	2.2K	J	1/16W	TM2,NM
R198			RK73GB1J222J	CHIP R	2.2K	J	1/16W	NM2
R199,200			RK73GB1J103J	CHIP R	10K	J	1/16W	
R201			RK73GB1J330J	CHIP R	33	J	1/16W	
R202			RK73GB1J101J	CHIP R	100	J	1/16W	
R203			R92-1252-05	CHIP R	0 OHM			
R204			RK73GB1J153J	CHIP R	15K	J	1/16W	
R205			RK73GB1J101J	CHIP R	100	J	1/16W	K,K2,NK
R207			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R208			RK73GB1J473J	CHIP R	47K	J	1/16W	
R209			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R210,211			RN73GH1J154D	METAL FILM R	150K	D	1/16W	
R212			R92-1252-05	CHIP R	0 OHM			
R213			RK73GB1J153J	CHIP R	15K	J	1/16W	
R215			RK73EB2ER39K	CHIP R	0.39	K	1/4W	
R216			RK73GB1J104J	CHIP R	100K	J	1/16W	
R217,218			RK73EB2ER39K	CHIP R	0.39	K	1/4W	
R219			RK73GB1J153J	CHIP R	15K	J	1/16W	
R220,221			RN73GH1J154D	METAL FILM R	150K	D	1/16W	
R222			RK73GB1J274J	CHIP R	270K	J	1/16W	K,K2
R222			RK73GB1J684J	CHIP R	680K	J	1/16W	M,M2
R222			RK73GB1J684J	CHIP R	680K	J	1/16W	TM,TM2
R222			RK73GB1J684J	CHIP R	680K	J	1/16W	NM,NM2
R222			RK73GB1J224J	CHIP R	220K	J	1/16W	NK
R223			RK73GB1J153J	CHIP R	15K	J	1/16W	
R224			RN73GH1J154D	METAL FILM R	150K	D	1/16W	
R225			RK73GB1J470J	CHIP R	47	J	1/16W	
R226			RK73GB1J151J	CHIP R	150	J	1/16W	
R227			RK73GB1J271J	CHIP R	270	J	1/16W	
R228			RN73GH1J154D	METAL FILM R	150K	D	1/16W	
R229			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R230			RK73GB1J271J	CHIP R	270	J	1/16W	
R231			RK73GB1J563J	CHIP R	56K	J	1/16W	
R232			RK73GB1J223J	CHIP R	22K	J	1/16W	
R233			RK73GB1J333J	CHIP R	33K	J	1/16W	
R234			RK73GB1J271J	CHIP R	270	J	1/16W	K,K2,NK
R234			RK73GB1J151J	CHIP R	150	J	1/16W	M,M2
R234			RK73GB1J151J	CHIP R	150	J	1/16W	TM,TM2
R234			RK73GB1J151J	CHIP R	150	J	1/16W	NM,NM2
R235			RK73GB1J100J	CHIP R	10	J	1/16W	
R236			RK73GB1J331J	CHIP R	330	J	1/16W	
R237			RK73GB1J103J	CHIP R	10K	J	1/16W	
R238			RK73GB1J474J	CHIP R	470K	J	1/16W	
R239			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R240			RK73GB1J273J	CHIP R	27K	J	1/16W	
R241			RK73GB1J471J	CHIP R	470	J	1/16W	
R242			RK73GB1J105J	CHIP R	1.0M	J	1/16W	
R243			R92-1252-05	CHIP R	0 OHM			
R244			RK73GB1J152J	CHIP R	1.5K	J	1/16W	K2,M2
R244			RK73GB1J152J	CHIP R	1.5K	J	1/16W	TM2,NM2
R244			RK73GB1J331J	CHIP R	330	J	1/16W	K,NK,M
R244			RK73GB1J331J	CHIP R	330	J	1/16W	TM,NM
R245			RK73GB1J104J	CHIP R	100K	J	1/16W	
R246			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R247,248			RK73GB1J101J	CHIP R	100	J	1/16W	
VR1,2			R12-7491-05	TRIMMING POT.	68K			
VR3			R12-7488-05	TRIMMING POT.	22K			
VR4			R31-0613-05	VARIABLE RESISTOR				
S1			S70-0414-05	TACT SWITCH				
S3,4			S70-0414-05	TACT SWITCH				
52	2B		T91-0575-05	MICROPHONE				
01			B30-2143-05	LAMP,LED	YG			
D2			B30-2019-05	LAMP,LED	RE/GR			
D3			MA2S111	DIODE				
D4			1SV269	DIODE				
D5			1SS373	DIODE				
D6			UMN1N	DIODE				
D7-10			1SV283	DIODE				
D11			1SV214	DIODE				

TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

TK-270/(N)/278/(N)/278T

PARTS LIST/零件目录

TX-RX UNIT (X57-4850-XX)

Ref. No.	Adress	New parts	Parts No.	Description	Destination
D14			MA2S111	DIODE	
D15			DA221	DIODE	
D16,17			MA2S077	DIODE	
D19			1SS372	DIODE	
D20			MA6062	DIODE	
D21			DAN222	DIODE	
D22			HVU131	DIODE	
D23			MA2S077	DIODE	
D24			1SR154-400	DIODE	
IC1		•	M38267M8L189GP	IC (MICRO PROCESSOR)	
IC2			PST9140NR	IC (RESET SWITCH)	
IC3			LC73881M	IC (DTMF DECODER)	
IC4			AT2408N10SI2.5	IC (8kbit SERIAL EEPROM)	
IC5			RN5VL45C	IC (VOLTAGE DETECT)	
IC6			LMX1511TMX	IC (PLL FREQUENCY SYNTHESIZER)	
IC7			S-81350HG-KD	IC (VOLTAGE REGULATOR)	
IC8			TA75W01FU	IC (OP AMP X2)	
IC9			TA31136FN	IC (FM IF DETECTOR)	
IC10			NJM2100V	IC (AUDIO AMP)	
IC11			PF0313-01	IC (RF POWER AMP)	K2,M2
IC11			PF0313-01	IC (RF POWER AMP)	TM2,NM2
IC11			PF0314-01	IC (RF POWER AMP)	K,M,NK
IC11			PF0314-01	IC (RF POWER AMP)	TM,NM
IC12			TA7368F	IC (AF POWER AMP)	
IC13			NJM2904V	IC (APC)	
IC14			TA75W01FU	IC (OP AMP X2)	
Q1-3			DTC114EE	DIGITAL TRANSISTOR	
Q4			DTC114YE	DIGITAL TRANSISTOR	
Q5			UMG3N	TRANSISTOR	
Q6			UPA572T	FET	
Q7			DTA114YE	DIGITAL TRANSISTOR	
Q8			MP5A02	TRANSISTOR	
Q9			UMG3N	TRANSISTOR	
Q12			DTA114YE	DIGITAL TRANSISTOR	
Q14			2SC4619	TRANSISTOR	
Q15			DTA114EE	DIGITAL TRANSISTOR	
Q16			2SK1875(V)	FET	
Q17			2SC4617(S)	TRANSISTOR	
Q18			2SK1875(V)	FET	
Q19			2SJ243	FET	
Q20,21			2SC5108(Y)	TRANSISTOR	
Q22			2SC4617(S)	TRANSISTOR	
Q23			UMC4	TRANSISTOR	
Q24,25			2SC4617(S)	TRANSISTOR	
Q26			2SC5108(Y)	TRANSISTOR	
Q28			2SC4617(S)	TRANSISTOR	
Q29			SGM2014M	FET	
Q30			2SK1824	FET	
Q31			2SC4988	TRANSISTOR	
Q32			DTA144EE	DIGITAL TRANSISTOR	
Q33			2SK1824	FET	
Q34			2SA1362(GR)	TRANSISTOR	
Q35,36			DTC144EE	DIGITAL TRANSISTOR	
Q37			2SC4919	TRANSISTOR	
Q38			DTC114EE	DIGITAL TRANSISTOR	
Q39			2SK1215(E)	FET	
Q40			2SK1588	FET	
Q41			DTA144EE	DIGITAL TRANSISTOR	
S2			W02-1814-05	FRONT END UNIT,ELECTRIC UNIT	
TH1-5			157-302-65801	THERMISTOR	

TK-270: K, K2, NK
TK-278: M, M2, NM, NM2
TK-278T: TM, TM2

EXPLODED VIEW/外观

LCD ASSY

TX-RX UNIT
(X57-485)

RF POWER AMP

ACCESSORY

ACCESSORY

52
MIC

A	NUT	:N14-0567-04
A	NUT	:N14-0568-04
B	NUT	:N14-0569-04
C	M2×4	:N30-2604-46
D	M2×5	:N32-2005-46
E	M2.6×10	:N35-2610-45
F	M2×3.5	:N79-2035-46
G	M2×5	:N83-2005-46
H		:N99-0396-05
J		:N38-2640-46
K		:N78-2640-46
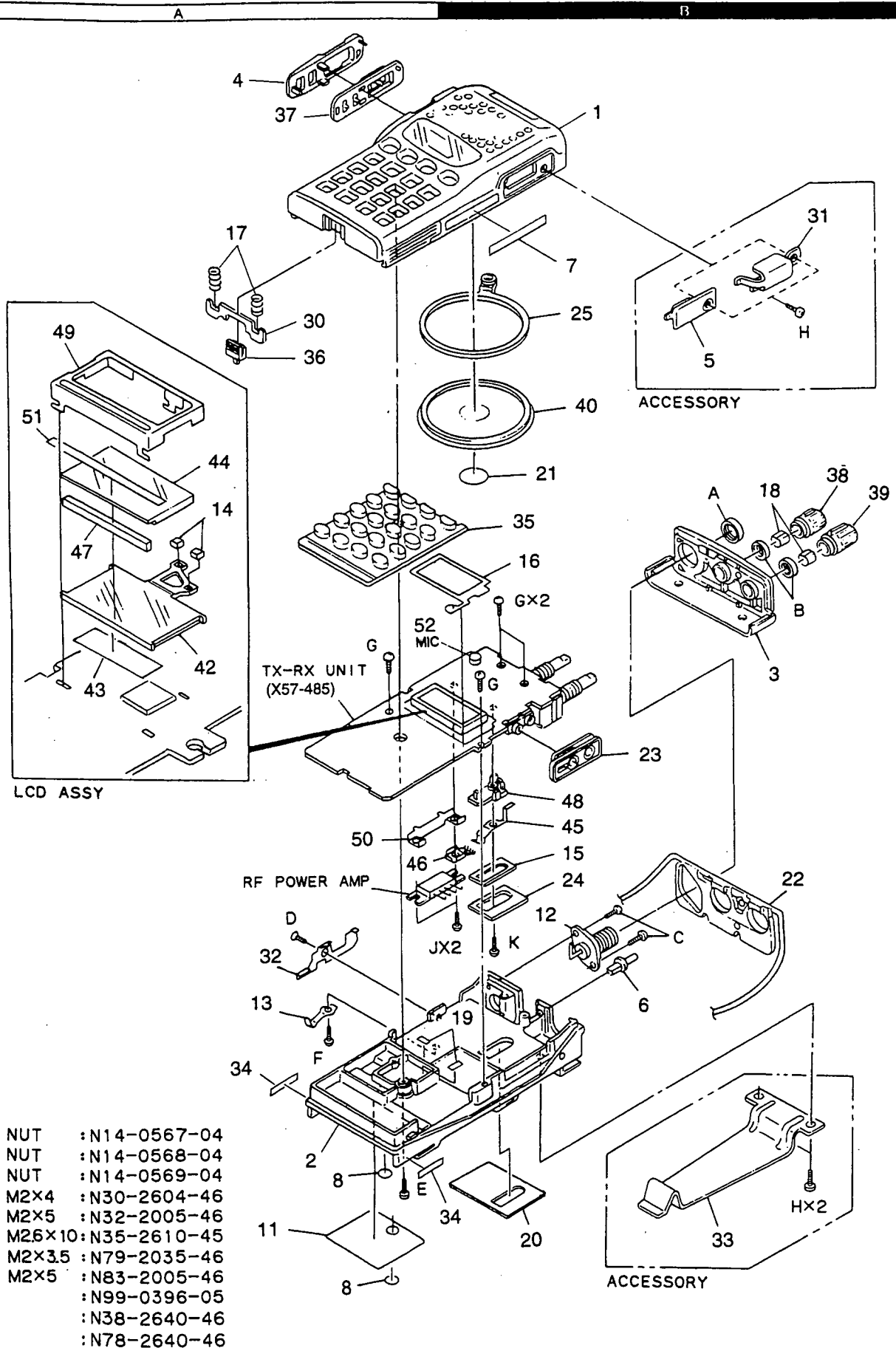
TK-270/(N)/278/(N)/278T

PACKING／包装

26 Packing fixture
(H12-1487-02)

27 Bag
(H25-0085-04)

*1
(T90-0381-05) : K2
(T90-0450-05) : K, NK
(T90-0615-05) : M2, TM2, NM2
(T90-0616-05) : M, TM, NM

9 User & Warranty card
(B46-0470-00) : K, K2, NK

33 Hook
(J29-0624-03)

28 Bag
(H25-2012-04)

41 Antena *1

10 Instruction manual
(B62-0628-10)

5 Cap (S/M jacks)
(B09-0351-03)

31 Hardware fixture (SP/MIC)
(J21-4493-04)

Screw set
(N99-0396-05)

26 Packing fixture
(H12-1487-02)

29 Item carton case
(H52-0732-12)
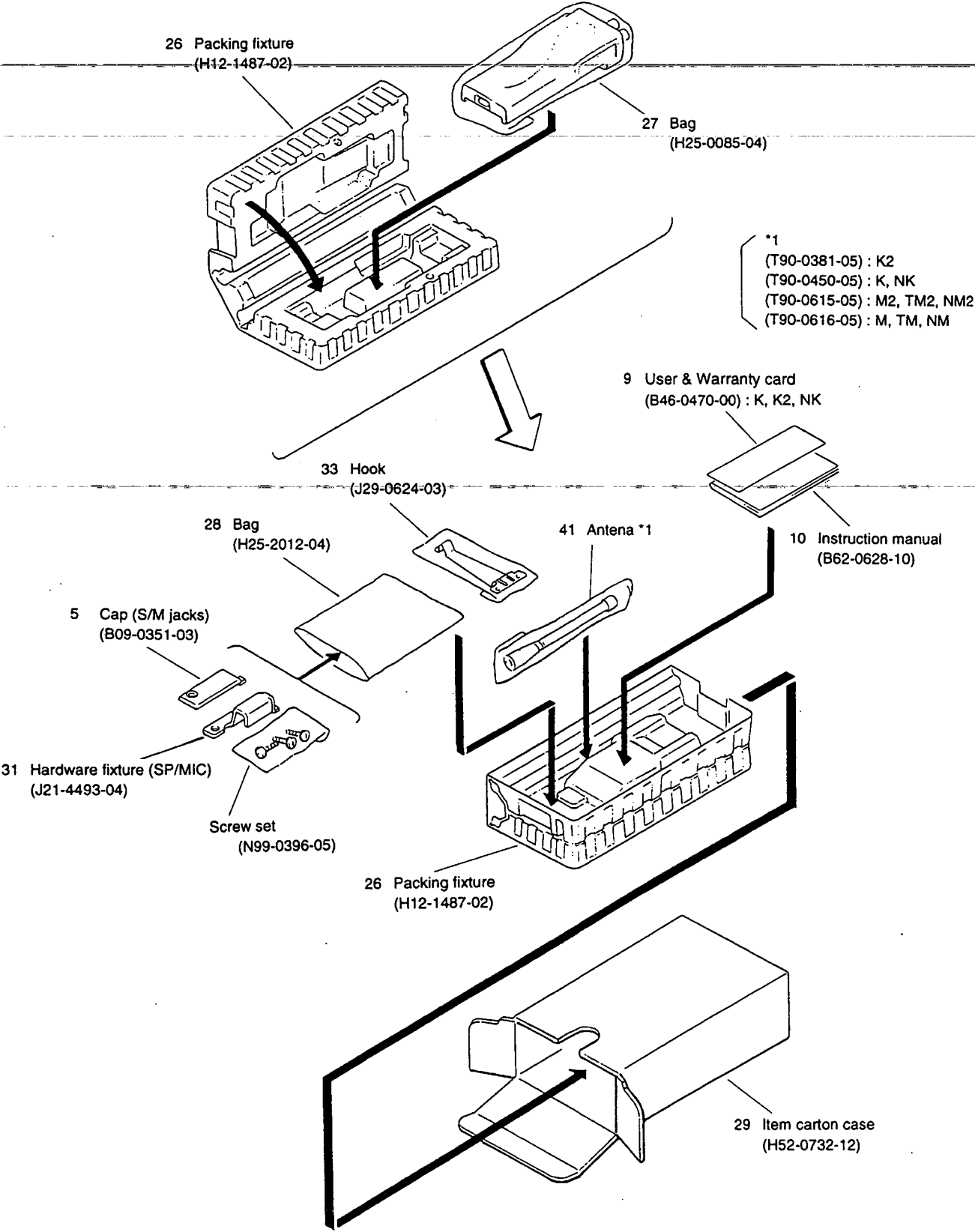
ADJUSTMENT

Required Test Equipment

1. Stabilized Power supply
1. The supply voltage can be changed between 5V and 18V, and the current is 3A or more.
2. The standard voltage is 7.5V.

2. DC Ammeter
1. Class 1 ammeter (17 ranges and other features).
2. The full scale can be set to either 300mA or 3A.
3. A cable of less internal loss must be used.

3. Frequency Counter (f. counter)
1. Frequencies of up to 1GHz or so can be measured.
2. The sensitivity can be changed to 500MHz or below, and measurements are highly stable and accurate (0.2ppm or so).

4. Power Meter
1. Measurable frequency : Up to 500MHz
2. Impedance : 50Ω, unbalanced
3. Measuring range : Full scale of 10W or so
4. A standard cable (5D2W 1m) must be used.

5. RF VTVM (RF V.M)
1. Measurable frequency : Up to 500MHz or so

6. Linear Detector
1. Measurable frequency : Up to 500MHz
2. Characteristics are flat, and CN is 60dB or more.

7. Digital Voltmeter
1. Voltage range : FS = 18V or so
2. Input resistance : 1MΩ or more

8. Oscilloscope
1. Measuring range : DC to 30MHz
2. Provides highly accurate measurements for 5 to 25MHz.

9. AF Voltmeter (AF VTVM)
1. Measurable frequency : 50Hz to 1MHz
2. Maximum sensitivity : 1mV or more

10. Spectrum Analyzer
1. Measuring range : DC to 1GHz or more

11. Standard Signal Generator (SSG)
1. Maximum frequency : 500MHz or more
2. Output : –20dB/0.1μV to 120dB/1V
3. Output impedance : 50Ω

12. Tracking Generator
1. Center frequency : 50kHz to 500MHz
2. Frequency deviation : ±35MHz
3. Output voltage : 100mV or more

13. Dummy Load
1. 8Ω, 3W or more

- Use a non-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils).
- To protect the SSG, do not send out signals while adjusting the receiving unit.
- The indicated SSG output levels are for maximum output.

	Destination	Frequency range	Remark
TK-270/(N)	K	150 ~ 174 MHz	
TK-270	K2	136 ~ 150 MHz	IF 1 45.05 MHz
TK-278/(N)	M	150 ~ 174 MHz	LOC 44.595 MHz
TK-278T	M2	136 ~ 150 MHz	

① CHANNEL selector
② POWER/VOL
③ LED
④ Display
⑤ SCN key
⑥ DIAL key
⑦ TA key
⑧ LO key
⑨ DTMF keypad
⑩ PTT
⑪ LAMP
⑫ MONI
⑬ Speaker / MIC

所需测试仪器

	Destination	Frequency range	Remark
TK-270/(N)	K	150 ~ 174 MHz	
TK-270	K2	136 ~ 150 MHz	IF 1　45.05 MHz
TK-278/(N)	M	150 ~ 174 MHz	LOC 44.595 MHz
TK-278T	M2	136 ~ 150 MHz	
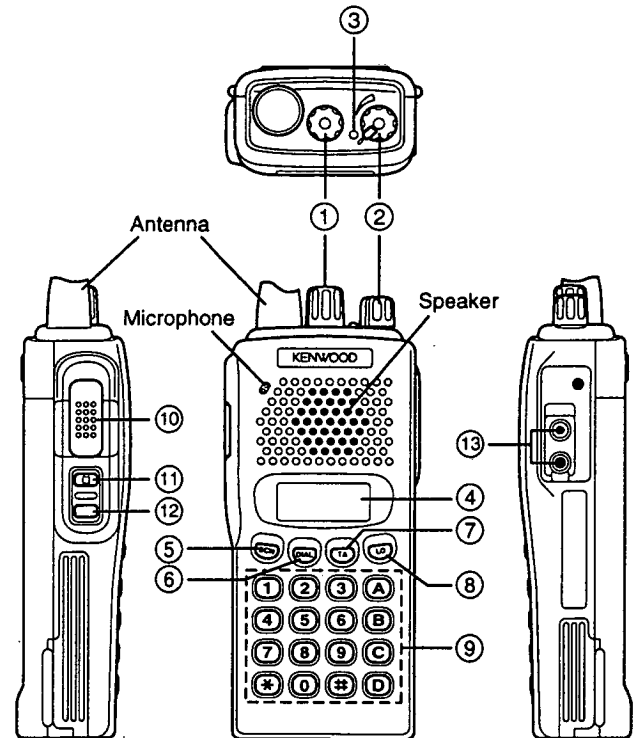
1．稳压电源
1．输出电压可在5V与8V之间调整，并且电流是3A或更大。
2．标准电压是7.5V。

2．直流电流表
1．1级电流表(17量程和其他特性)。
2．满刻度能被设定到300mA和3A。
3．必须使用低损耗电缆。

3．频率计
1．可测量最高达到1GHz左右的频率。
2．灵敏度能被改变到500MHz或更低，并且具有高稳定度和精确度(0.2ppm左右)。

4．功率表
1．频率范围：最高达到500MHz。
2．阻抗：50Ω，非平衡式。
3．量程：10W左右的满刻度。
4．必须使用标准导线(5D2W 1m)。

5．射频电子管电压表(射频电压表)
1．频率范围：最高达到500MHz左右。

6．线性检波器
1．频率范围：最高达到500MHz。
2．特性是平坦的，且CN是60dB或更大。

7．数字式电压表
1．电压最程：FS＝18V左右。
2．输入电阻：1MΩ或更大。

示波器
1．量程：DC到30MHz。
2．为5至25MHz提供高度地精确的测量。

9．音频电压表(音频电子管电压表)
1．频率范围：50Hz至1MHz。
2．最大灵敏度：1mV或更高。

10．频谱分析仪
1．量程：DC至1GHz或更高。

11．标准信号发生器(SSG)
1．最大频率：500MHz或更大。
2．输出：-20dB/0.1μV至120dB/1V。
3．输出阻抗：50Ω。

12．跟踪发送器
1．中心频率：50kHz至500MHz。
2．频率漂移：±35MHz。
3．输出电压：100mV或更大。

13．假负载
1．8Ω，3W或更大。

• 利用如胶木杆之类的绝缘杆来调节(特别是对端子和线圈)。
• 为了保护标准信号发生器，在调节接收单元的同时，不可发送出信号。
• 被表示的标准信号发生器的输出水平是为最大输出。
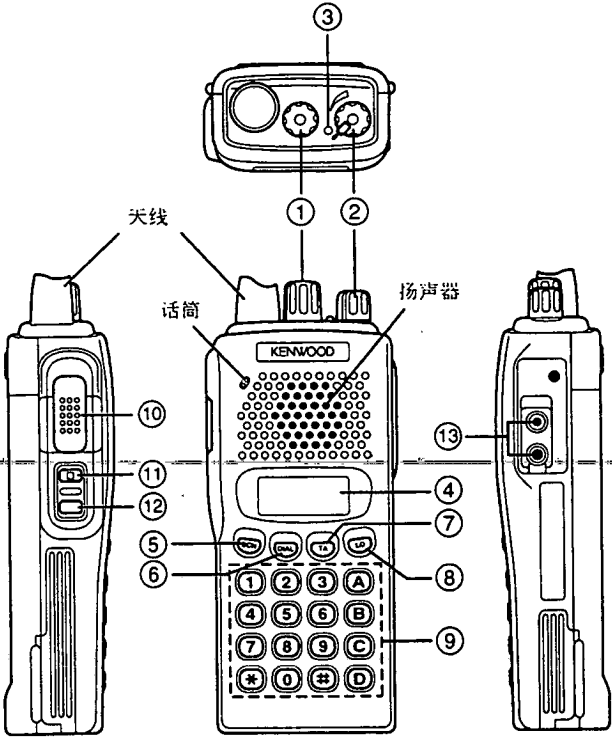
① 信道选择旋钮(CHANNEL)
② 电源/音量调节旋钮(POWER/VOL)
③ 状态指示灯(LED)
④ 显示屏
⑤ 扫描键(SCN)
⑥ 拨号键(DIAL)
⑦ 脱网通信键(TA)
⑧ 低功率键(LO)
⑨ 双音多频键盘(DTMF)
⑩ 按-讲键(PTT)
⑪ 照明键(LAMP)
⑫ 监听键(MONI)
⑬ 扬声器-话筒插孔

ADJUSTMENT/调整

Chassis side

SP MIC

Case assy side
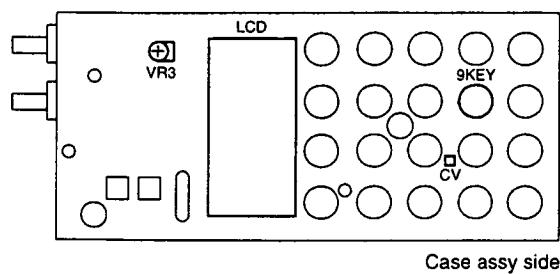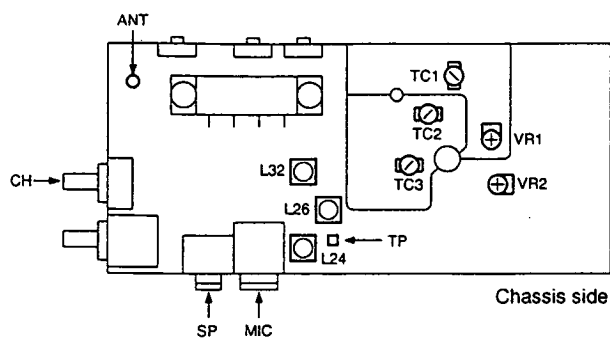
TC1: Frequency adjustment
TC2: Receive lock voltage adjustment
TC3: Transmit lock voltage adjustment
VR1: DQT waveform adjustment
VR2: DEV adjustment
L24: ⎫
L26: ⎬ Band-pass filter waveform adjustment
L32: ⎭
ANT: Antenna connector
SP : Speaker jack
MIC: Microphone jack
TP : Band-pass filter test point
CH : Channel selector

VR3: DTMF DEV adjustment
[9] key: DTMF [9] key terminal
CV : Lock voltage adjustment terminal

TC1 : 频率调整
TC2 : 接收锁定电压调整
TC3 : 发射锁定电压调整
VR1 : DQT波形调整
VR2 : DEV调整
L24 ⎫
L26 ⎬ B. P. F. 波形调整
L32 ⎭
ANT : 天线端子
SP : 扬声器插孔
MIC : 话筒器插孔
TP : B. P. F. 测试点
CH : 信道选择开关

VR3 : DTMF DEV调整
[9]键 : DTMF 9 键端子
CV : 锁定电压调整端子

YO4HFU

ADJUSTMENT FREQUENCY LIST　调整频率一览表

CH	K,(N)K		K2		M,(N)M,TM		M2,(N)M2,TM2	
	TX f(MHz)	RX f(MHz)	TX f(MHz)	RX f(MHz)	TX f(MHz)	RX f(MHz)	TX f(MHz)	RX f(MHz)
Center	162.000	162.100	143.000	143.100	162.000	162.100	143.000	143.100
LO	150.000	150.100	136.000	136.100	150.000	150.100	136.000	136.100
Hi	173.975	173.900	149.975	149.900	173.975	173.900	149.975	149.900
OFF BAND	145.000	145.100	154.975	154.900	145.000	145.100	154.975	154.900

TK-270/(N)/278/(N)/278T
ADJUSTMENT/调整

Alignment Mode (Alignment procedure used during servicing)

Operation

1. Set in Test Mode after first turning Power ON by simultaneously pressing the [LAMP] and [TA] startup keys (takes about 2 seconds).
2. Press [TA] while in Test Mode to set Tune Display Mode. After selecting the frequency, press [LO] while holding down [LAMP].

Frequency Display Mode
频率显示模式

[LAMP]+[LO]

Tune Display Mode
TUNE显示频率

1 Adjusting Transmit Power

Use this procedure to adjust the transmit Hi Power or Low Power level.

1. Connect the power meter to the transceiver.
2. Set the frequency and then set the "TUNE" display.
3. Transmission is performed automatically at Hi Power when the [PTT] key is pressed. The display "H XXX" now appears. (XXX = 0 to 254)
4. Adjust the [CHANNEL selector] while observing the power meter in order to obtain the transmit power needed. Turn the control clockwise for an increase in power, and turn counterclockwise for a decrease in power.
5. Pressing any key other than [PTT] stores the alignment value into the memory and returns to the "TUNE" display. Pressing the [PTT] key stores the alignment value into the memory and switches to Low Power for transmit.
   The display "L XXX" appears at this time. (XXX = 0 to 254)
6. Adjust the [CHANNEL selector] while observing the power meter in order to obtain the transmit power needed. Turn the control clockwise for an increase in power, and turn counterclockwise for a decrease in power.
7. Pressing any key stores the alignment value into the memory and returns to the "TUNE" display.

调整模式（维修通信机时所用的调整方法）
操作：

1. 同时按住〔LAMP〕和〔TA〕键，接通电源，2秒钟后进入"测试模式"。
2. 在测试模式中，按〔TA〕键，显示屏显示出频率，选择好所需要的频率后，同时按〔LAMP〕和〔LO〕键，显示屏上出现"tUnE"字符，进入调整模式。

1 调整发射功率

调整高发射功率值和低发射功率值

1. 把功率表连接到通信机上。
2. 选择好频率后，使通信机处于显示"tUnE"的状态。
3. 一按〔PTT〕键，就自动以高功率发射。此时，显示屏上显示"H×××"，（×××=0～254）。
4. 一边看着功率表，一边用〔信道选择〕旋钮把发射功率调整到目的值。顺时针方向旋转〔信道选择〕旋钮，发射功率变大，逆时针方向旋转〔信道选择〕旋钮，发射功率变小。
5. 一按〔PTT〕键以外的键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。一按〔PTT〕键，调整值被存入存储器中，通信机切换到低功率状态发射，此时显示"L×××"。
6. 一边看着功率表，一边用〔信道选择〕旋钮把发射功率调整到目的值。顺时针方向旋转〔信道选择〕旋钮，发射功率变大，逆时针方向旋转〔信道选择〕旋钮，发射功率变小。
7. 按任意一个键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。

Power meter
功率计

Antenna terminal
天线端子

Transceiver
通信机
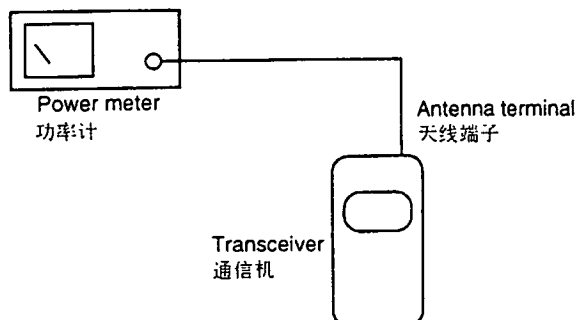
ADJUSTMENT/调整

2 Aligning the Battery Reference Value

Use this procedure to adjust the reference value for issuing battery low voltage alarms.

1. Using an external power supply, feed in the reference value at which you wish to trigger the alarm.
2. Set the frequency and then set the "TUNE" display.
3. Transmission is performed automatically at Hi Power when the [TA] key is pressed. The display "B XXX" now appears. (XXX = 1 to 255)
4. Adjust by moving the [CHANNEL selector] counterclockwise when the red LED is lit, and by moving in the clockwise direction when the red LED is flashing. The point where the red LED is flashing indicates detection of the low voltage.
5. Pressing any key stores the reference value into the memory and returns to the "TUNE" display.
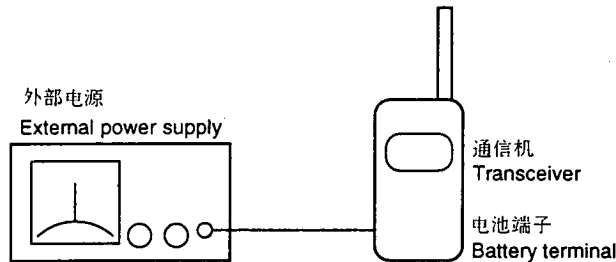
2 调整电池临界值

调整电池临界电平告警功能的临界值

1. 从外部给通信机提供一个希望能启动告警功能的电源电平。
2. 选择好频率后，使通信机处于显示"tUnE"的状态。
3. 按〔TA〕键，通信机自动以高功率发射。此时，显示"B ×××"。(×××=1～255)。
4. 如果此时红色发射指示灯稳定发光，则向逆时针方向旋转〔信道选择〕旋钮，直到发射指示灯恰好闪烁；如果此时红色发射指示灯闪烁，则向顺时针方向旋转〔信道选择〕旋钮，直到发射指示灯恰好闪烁。发射指示灯闪烁就是检测出电池电压低于设定值而发出的告警信号。
5. 按任意一个键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。

外部电源
External power supply

通信机
Transceiver

电池端子
Battery terminal

3 Storing the BUSY Reference Value

Use this procedure to align squelch values for 3 and 9. Other squelch levels are set based on these values.

1. Connect the signal generator to the transceiver.
2. Set the frequency and then set the "TUNE" display.
3. Input a signal at the level at which you want squelch 9 to open.
4. Press [MONI] to let the transceiver receive this signal. The display "9 XXX" now appears. (XXX = 1 to 255)
5. Turn the [CHANNEL selector] and align at the position where you want the squelch to open.
6. Pressing any key other than [MONI] stores this value into the memory and returns to the "TUNE" display. The display "3 XXX" now appears. (XXX = 1 to 255)
7. Next output a signal from the signal generator at which you want squelch 3 to open. Align by using the [CHANNEL selector] just as with squelch 9.
8. Pressing any key stores these values into the memory and returns to the "TUNE" display.
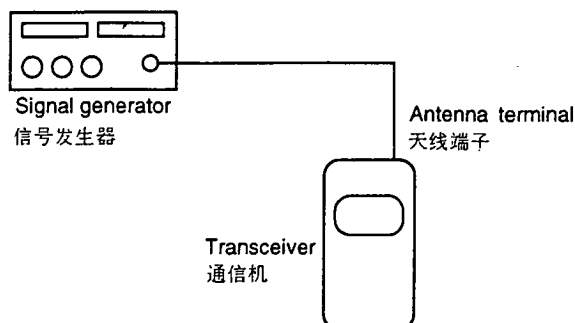
3 写入"繁忙"状态的基准值

调整静噪电平级3和9的值，其它静噪电平级的值根据3和9的值自动计算。

1. 把信号发生器连接到通信机上。
2. 选择好频率后，使通信机处于显示"tUnE"的状态。
3. 输入一个希望能恰好打开9级静噪的信号电平。
4. 按〔MONI〕键，开始进行接收。此时，显示屏上显示"9 ×××"。(×××=1～255)
5. 旋转〔信道选择〕旋钮到静噪恰好开启的位置。顺时针方向旋转〔信道选择〕旋钮，静噪变深。
6. 按〔MONI〕键以外的键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。按〔MONI〕键，调整值被存入存储器中，转换到对静噪电平3的调整。此时，显示屏上显示"3 ×××"。(×××=1～255)
7. 从信号发生器输入一个希望能恰好打开3级静噪的信号电平。之后的操作和调整9级静噪电平的操作相同。
8. 按任意一个键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。

Signal generator
信号发生器

Antenna terminal
天线端子

Transceiver
通信机

YO4HFU

TK-270/(N)/278/(N)/278T
ADJUSTMENT/调整

4 Adjusting QT Deviation

Use this procedure to adjust the transmit QT deviation.

1. Connect the modulation analyzer to the transceiver as shown.
2. Select the frequency and QT, and then set the "TUNE" display.
3. Press [SCN] to automatically start transmission and send the preset QT. If the QT was set to OFF, then 67.0Hz is sent.
4. While observing the modulation analyzer, adjust the deviation with the [CHANNEL selector].
5. Pressing any key stores these values into the memory and returns to the "TUNE" display.

4 CTCSS调制频偏

调整发射CTCSS亚音频信号的调制频偏

1. 把调制分析仪连接到通信机上。
2. 选择好频率和CTCSS亚音频率后，使通信机处于显示"tUnE"的状态。
3. 按〔SCN〕键，通信机开始自动发出预先设定的亚音频信号。当设定CTCSS功能为OFF（无效）时，发出67.0Hz的亚音信号。
4. 一边看着调制分析仪，一边用〔信道选择〕旋钮调整频偏。顺时针方向旋转〔信道选择〕旋钮，频偏加大。
5. 按任意一个键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。

Modulation Analyzer
调制分析仪

分接器
Coupler

Power meter 功率计

Antenna terminal
天线端子
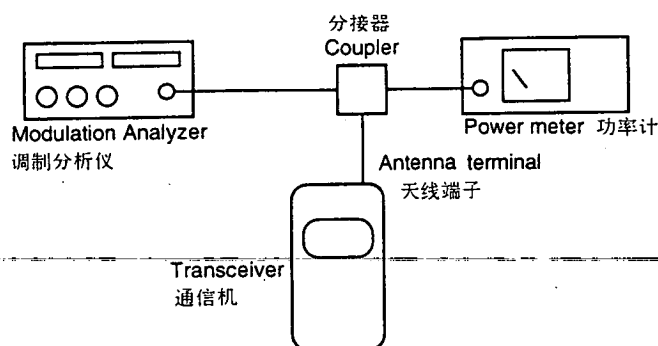
Transceiver
通信机

5 Adjusting DQT Deviation

Use this procedure to adjust the transmit QT deviation.

1. Connect the modulation analyzer to the transceiver as shown.
2. Select the frequency, and then set the "TUNE" display.
3. Press [DIAL] to automatically start transmission and send the DQT CODE 023 Normal.
4. While observing the modulation analyzer, adjust the deviation with the [CHANNEL selector].
5. Pressing any key stores these values into the memory and returns to the "TUNE" display.

5 调整亚音数码的调制频偏

调整发射亚音数码信号的调制频偏

1. 把调制分析仪连接到通信机上。
2. 选择好频率后，使通信机处于显示"tUnE"的状态。
3. 按〔DIAL〕键，通信机开始自动发出023N的亚音数码。
4. 一边看着调制分析仪，一边用〔信道选择〕旋钮调整频偏。顺时针方向旋转〔信道选择〕旋钮，频偏加大。
5. 按任意一个键，调整值被存入存储器中，通信机回到显示"tUnE"的状态。

Modulation Analyzer
调制分析仪

分接器
Coupler

Power meter 功率计

Antenna terminal
天线端子

Transceiver
通信机
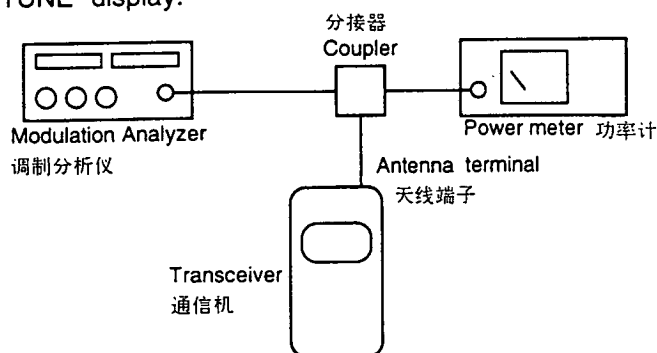
ADJUSTMENT/调整

Use the jig (chassis) for adjustment to stabilize electrical operations. The frequency (TC1) and deviation (VR2) can be adjusted without using the jig.

(Remove the nameplate (B42-5656-04) on the chassis side.)

要调整(为防止电气动作的不稳定)时，请使用夹具(底盘)来进行。但是频率调整(TC1)和偏移调整(VR2)可以不需使用夹具来进行。(请剥离底盘侧的 [B42-5656-04]。)

1. Jig for adjustment (part number A10-1368-03)

1．调整用夹具(零件号: A10-1368-03)

2. Use the jig as follows:

1. Insert the coaxial antenna connector into the jig.
2. Place the unit on the jig and fix it with four screws ❶.
3. Solder the antenna terminal to the terminal of the unit.

Notes:1. Do not install the NiCd battery when using the jig for adjustment, repair, or checking.
(If the NiCd battery is installed, the relay terminal (+) may be damaged.)

Notes:2. Supply power from an external power supply.
(Relay terminal: +; Jig (chassis): -)

2．夹具使用方法

1．将天线同轴连接器安装在夹具上。
2．将装置安放在夹具上并用4个螺丝❶来固定。
3．将天线端子钎焊在装置的端子上。

注意: 1．使用夹具进行调整及修理检查等时，不要装入镍铬电池。(如果装入镍铬电池，可能会破损中继端子⊕。)

2．电源请利用外部电源来供应。(中继端子为⊕侧，夹具(底盘)为⊖侧。)

Label model number 标牌

Relay terminal (+) side 中继端子⊕侧

VR2　TC1

Jig for adjustment 调整用夹具

Unit 装置

Antenna terminal 天线端子

Chassis 底盘

Coaxial antenna connector 天线同轴连接器
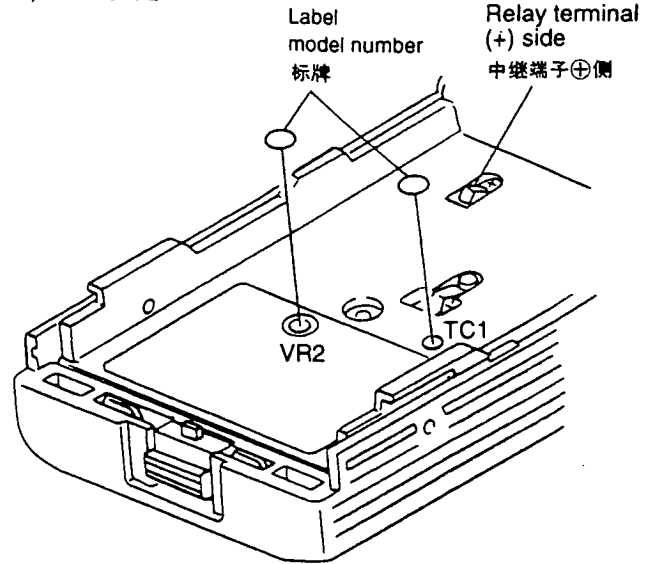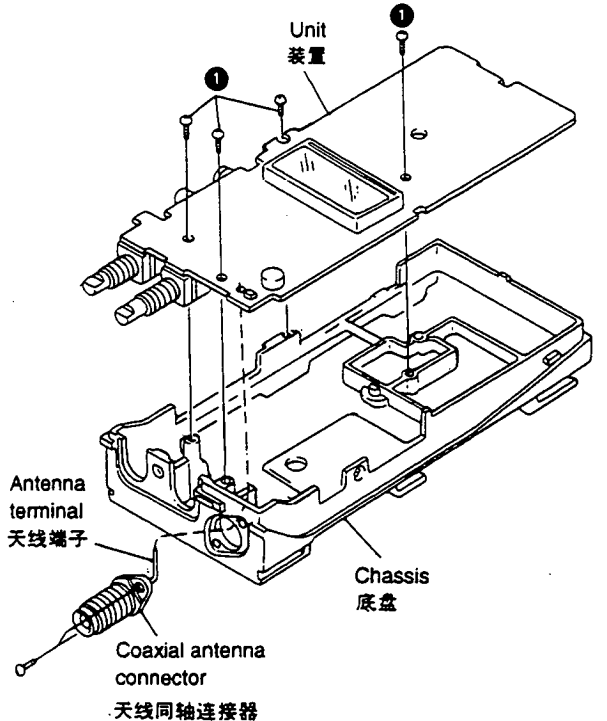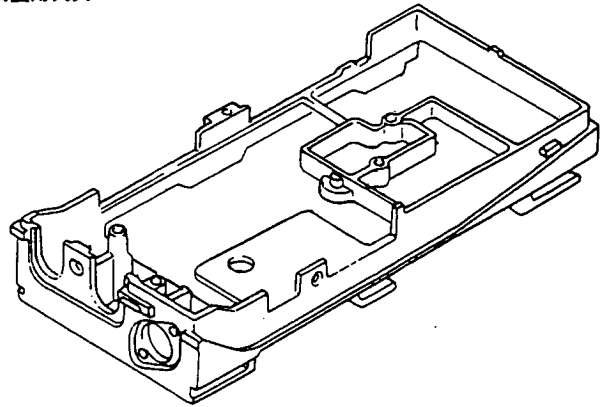
TK-270/(N)/278/(N)/278T

ADJUSTMENT

Section common to the transmitter and receiver (VCO)

Item	Condition	Measurement		Adjustment		Specifications/
		Test equipment	Terminal	Parts	Method	Remarks
1. Setting	1) Power supply voltage Battery terminal:7.5 V					
2. VCO lock voltage	1) CH:TX Hi M,TM,K,(N)M,(N)K TYPE CH:TX OFF BAND M2,TM2,K2, (N)M2 TYPE	Digital voltmeter	CV	TC3	Adjust to 3.8 V ± 0.05 V.	3.8 V ± 0.05V
	2) CH:TX OFF BAND M,TM,K,(N)M, (N)K TYPE CH:TX LO M2,TM2,K2,(N)M2 TYPE	Digital voltmeter	CV	TC3	Confirm that it is 0.7 V or higher. M,TM.K,(N)M,(N)K TYPE Confirm that it is 1.3 V or higher. M2,TM2,K2,(N)M2 TYPE	0.7 V or higher 1.3 V or higher
	3) CH:RX Hi M,TM,K,(N)M,(N)K TYPE CH:RX OFF BAND M2,TM2,K2, (N)M2 TYPE	Digital voltmeter	CV	TC2	Adjust to 3.8 V ± 0.05 V.	3.8 V ± 0.05V
	4) CH:RX OFF BAND M,TM,K,(N)M, (N)K TYPE CH:RX LO M2,TM2,K2,(N)M2 TYPE	Digital voltmeter	CV	TC2	Confirm that it is 0.8 V or higher. M,TM,K,(N)M,(N)K TYPE Confirm that it is 1.4 V or higher. M2,TM2,K2,(N)M2 TYPE	0.8 V or higher 1.4 V or higher

Receiver Section Adjustment

Item	Condition	Measurement		Adjustment		Specifications/
		Test equipment	Terminal	Parts	Method	Remarks
1. Band-pass filter	1) Given frequency 2) Tra generator output -40 dBm Connect the spectrum analyzer to the TP terminal.	Tra generator Spectrum analyzer	ANT TP	L24 L26 L32	Adjust the frequency so that it becomes the spect-rum waveform shown in Fig. 1.	
2. Sensitivity	1) CH:RX center CH:RX LO CH:RX Hi At each frequency: SSG output:-118 dBm K,K2 -116 dBm (N)K :-121 dBm M,TM,M2, TM2 -119 dBm (N)M,(N)M2 MOD:1kHz DEV :±3kHz M,TM,K type ±1.5kHz (N)M, (N)K type 2) CH:RX OFF BAND SSG output:-117 dBm M,TM,M2, TM2 type -115 dBm (N)M,(N)M2 type	SSG Oscilloscope AF. V.M Distortion meter	ANT SP		Check	SINAD:12 dB or higher
3. Squelch	1) CH:RX center MONI:ON	SSG Oscilloscope AF. V.M Distortion meter	ANT SP	Channel selector	Level 9 Adjust to close the squelch with the channel selector. (except of (N)M) Set of "244"with the channel selector. ((N)M only)	The squelch must be closed. (except of (N)M) Set of "244". (N)M only
	2) Level 9 SSG output:-116 dBm except of (N)M SSG output:OFF (N)M only MONI:ON					
	3) Level 3 SSG output:-128 dBm K,M,TM type SSG output:-125 dBm (N)M only SSG output:OFF (N)K only MONI:ON				Level 3 Adjust to close the squelch with the channel selector.	The squelch must be closed. (except of (N)K) Up the data (+8) than point that squelch is closed. (N)K only
	4) Adjustment mode See 3. (page 77)					

调整

收发共同部（VCO）

项 目	条 件	测 量 部 位		调 整 部 位		规 格
		测量机器	端子	部件	方 法	
1.设置	1)电源电压 蓄电池端子7.5V					
2.VCO 锁定电压	1)CH：TX Hi M，TM，K，(N)M， (N)K型 CH：TX OFF BAND M2， TM2，K2，(N)M2型	数字电压表	CV	TC3	调整成为3.8V±0.05V	3.8V±0.05V
	2)CH：TX OFF BAND M，TM， K，(N)M，(N)K型 CH：TX LO M2，TM2， K2，(N)M2型	数字电压表	CV	TC3	确认成为0.7V以上 M，TM，K，(N)M，(N)K型 确认成为1.3V以上 M2，TM2，K2，(N)M2型	0.7V以上 1.3V以上
	3)CH：RX Hi M，TM，K，(N)M， (N)K型 CH：RX OFF BAND M2， TM2，K2，(N)M2型	数字电压表	CV	TC2	调整成为3.8V±0.05V	3.8V±0.05V
	4)CH：RX OFF BAND M，TM， K，(N)M，(N)K型 CH：RX LO M2，TM2， K2，(N)M2型	数字电压表	CV	TC2	确认成为0.8V以上 M，TM，K，(N)M，(N)K型 确认成为1.4V以上 M2，TM2，K2，(N)M2型	0.8V以上 1.4V以上
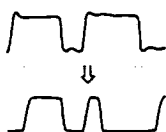
接收部

项 目	条 件	测 量 部 位		调 整 部 位		规 格
		测量机器	端子	部件	方 法	
1.B.P.F.	1)任意的频率	梯形波发生器 频谱分析器	ANT T.P	L24 L26 L32	按图1的频谱分析器波形 进行调整	
	2)梯形发生器输出－40dBm 将频谱分析器连接到T.P端 子					
2.灵敏度	1)CH：RX Center CH：RX LO CH：RX Hi 在各频率： SSG输出：－118dBm K，K2型 －116dBm (N)K SSG输出：－121dBm M，TM， M2，TM2 －119dBm(N)M，(N)M2 MOD：1KHz DEV：±3KHz(M，TM，K型) ±1.5kHz((N)M，(N)K型)	SSG 示波器 AF.V.M 失真系数计	ANT S.P.		确认	SINAD 12dB以上
	2)CH：RX OFF BAND SSG输出：117dBm M，TM，M2，TM2型 －115dBm，(N)M，(N)M2型					
3.静噪	1)CH：RX Center MONI：ON	SSG 示波器 AF.V.M 失真系数计	ANT S.P.	信道 选择 开关	电平9 用信道选择器调整到消除 静噪。 用信道选择器设定 "244"只限(N)M型	应闭合 (N)M除外 设定"244"只限(N)M型 必需消除静噪
	2)电平9 SSG输出：－116dBm (N)M除外 SSG输出：OFF 只限(N)M型 MONI：ON					
	3)电平3 SSG输出：－128dBm （只限K，M，TM型） SSG输出：－125dBm （只限(N)M型） SSG输出：OFF （只限(N)K型） MONI：ON				电平3 用信道选择器调整到消除 静噪。	应闭合 (N)K除外 达到数据(＋8)指出静噪被消 除。只限(N)K型 必需消除静噪
	4)调整模式 见3(77页)					

TK-270/(N)/278/(N)/278T

ADJUSTMENT
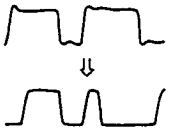
Transmitter

Item	Condition	Measurement		Adjustment		Specifications/
		Test equipment	Terminal	Parts	Method	Remarks
1. Transmit frequency	1) CH:TX center PTT:ON	Frequency counter	ANT	TC1	Adjust to ± 150 Hz.	Within ± 150 Hz
2. DQT/ Balance	1) CH:TX Hi 2) Adjustment mode See 5. Press the [DIAL] key.	Modulation analyzer or linear detector (L.P.F:3kHz) Oscilloscope	ANT	VR1	Rectify the waveform to square wave.	⌐⌐⌐ ⇓ ⌐⌐⌐
3. Full power	1) CH: TX center Battery terminal: 9.0 V PTT: ON	Power meter Ammeter	ANT	Channel selector	Turn the channel selector to increase the value. Verify that it is 6.8 W or higher.	6.8 W or higher
	2) Adjustment mode See 1.					
4. High power	1) CH: TX center Battery terminal: 9.0 V PTT: ON	Power meter Ammeter	ANT	Channel selector	Adjust it to 6.3 W ± 0.1 W with the channel selector .	6.3W ± 0.1W 2.2 A or lower
	2) Adjustment mode See 1.					
	3) CH: TX Hi Battery terminal: 7.5 V PTT: ON				Check	4.0 ~ 5.5W 2.2 A or lower
	4) CH: TX LO Battery terminal: 7.5 V PTT: ON				Check	4.0 ~ 5.5W 2.2 A or lower
					To make a check, change the "TUNE" mode to the VFO mode. The LO indicator must be off on the LCD.	
5. Low power	1) CH: TX center PTT: ON	Power meter Ammeter	ANT	Channel selector	Adjust it to 1.0 W ± 0.1 W with the channel selector.	1.0 ± 0.1W 1.0 A or lower
	2) Adjustment mode See 1.					
	3) CH: TX Hi PTT: ON				Check	0.5 ~ 1.5W
	4) CH: TX LO Battery terminal: 7.5 V				Check	0.5 ~ 1.5W
					To make a check, change the "TUNE" mode to the VFO mode. The LO indicator must appear on the LCD.	
6. Modulation	1) CH: TX center	Modulation analyzer or linear detector (L.P.F:15kHz) Oscilloscope Low-frequency oscillator AF. V.M.	ANT MIC	VR2		
	2) Low-frequency oscillator output Closed: 1 kHz 50mV PTT:ON M,TM,(N)M type 130mV PTT:ON K,(N)K type				Adjust it to ± 4.1 kHz ± 100 Hz K,M ,TM type ± 2.0 kHz ± 100 Hz (N)K,(N)M type	±4.1kHz ±100Hz K,M,TM type ±2.0kHz ±100Hz (N)K,(N)M type
	3) Low-frequency oscillator output 20 dBm down 1kHz:5mV M,TM,(N)M type 1kHz:13mV K,(N)K type				Check	±2.2kHz ~ ±3.6kHz K, M,TM type ±1.1kHz ~ ±1.8kHz (N)K, (N)M type

调整

发射部

项 目	条 件	测 量 部 位		调 整 部 位		规 格
		测量机器	端子	部件	方 法	
1.发射频率	1)CH：TX Center PTT：ON	频率计	ANT	TC1	调整成为±150Hz	±150Hz以内
2.DQT/平衡	1)CH：TX Hi 2)调整模式 见5 按下〔DIAL〕键	调制分析器 或 线性检波器 (L.P.F：3kHz) 示波器	ANT	VRI	将波形整形为矩形波	
3.全功率	1)CH：TX Center 蓄电池端子9.0V PTT：ON 2)调整模式 见1	功率计 电流计	ANT	信道 选择 开关	旋转信道选择开关来增大 数值并确认成为6.8W以 上	6.8W以上
4.高功率	1)CH：TX Center 蓄电池端子9.0V PTT：ON 2)调整模式 见1	功率计 电流计	ANT	信道 选择 开关	使用信道选择开关来调整 成为6.3W±0.1W	6.3W±0.1W 2.2A以下
	3)CH：TX Hi 蓄电池端子7.5V PTT：ON				确认	4.0～5.5W 2.2A以下
	4)CH：TX LO 蓄电池端子7.5V PTT：ON				确认	4.0～5.5W 2.2A以下
					确认在经过"TUNE"而在VFO模式进行LCD上LO显示应 熄灭	
5.低功率	1)CH：TX Center PTT：ON 2)调整模式 见1	功率计 电流计	ANT	信道 选择 开关	使用信道选择开关来调整 成为1.0W±0.1W	1.0±0.1W 1.0A以下
	3)CH：TX Hi PTT：ON				确认	0.5～1.5W
	4)CH：TX LO PTT：ON 蓄电池端子7.5V				确认	0.5～1.5W
					确认在经过"TUNE"而在VFO模式进行LCD上LO显示应 亮灯	
6.调制度	1)CH：TX Center 2)低频振荡器输出 1kHz 50mV PTT：ON 　M, TM, (N)M型 130mV PTT：ON 　K, (N)K型 3)低频振荡器输出 降低20dBm 1kHz：5mV M, TM, (N)M型 1kHz：13mV K, (N)K型	调制分析器 或 线性检波器 (L.P.F：15kHz) 示波器 低频振荡器 AF. V. M	ANT MIC	VR2	调整成为±4.1kHz±100Hz (K, M, TM型) 调整成为±2.0kHz±100Hz ((N)K, (N)M型) 确认	±4.1kHz±100Hz(K, M, TM型) ±2.0kHz±100Hz((N)K, (N)M型) ±2.2kHz～±3.6kHz(K, M, TM型) ±1.1kHz～±1.8kHz((N)K, (N)M型)

TK-270/(N)/278/(N)/278T

ADJUSTMENT

Transmitter

Item	Condition	Measurement		Adjustment		Specifications/
		Test equipment	Terminal	Parts	Method	Remarks
7. Transmit S/N	1) CH:TX center HPF:300Hz LPF:3kHz DEMP:750 μs	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF. V.M.	ANT MIC		Check	40 dB or higher K,M,TM type 34 dB or higher (N)K,(N)M type
8. QT DEV	1) CH: TX center 2) QT: 151.4 Hz 3) Adjustment mode See 4. Press the [SCN] key. LPF: 3 kHz	Modulation analyzer or linear detector Oscilloscope Low-frequency oscillator AF. V.M.		Channel selector	Adjust it to 0.75kHz ± 50 Hz with the channel selector. K,M,TM type Adjust it to 0.35kHz ± 50 Hz with the channel selector. (N)K,(N)M type	0.75kHz ± 50Hz K,M,TM type 0.35kHz ± 50Hz (N)K,(N)M type
9. DQT DEV K,(N)K TYPE ONLY	1) CH:TX center 2) Adjustment mode See 5. Press the [DIAL] key. LPF: 3 kHz	Modulation analyzer or linear detector Oscilloscope	ANT	Channel selector	Adjust it to 0.75kHz ± 50 Hz with the channel selector. K,M,TM type Adjust it to 0.35kHz ± 50 Hz with the channel selector. (N)K,(N)M type	0.75kHz ± 50Hz K,M,TM type 0.35kHz ± 50Hz (N)K,(N)M type
10. DTMF DEV	1)CH:TX center 2) Set as following using the [9] key: PTT:ON LPF:15kHz	Modulation analyzer or linear detector Oscilloscope	ANT	VR3	Check it to ±2.5kHz ~ ±4.5kHz K,M,TM type ±1.25kHz ~ ±2.25kHz (N)K,(N)M type	±2.5kHz ~ ±4.5kHz K,M,TM type 1.25kHz ~ ±2.25kHz (N)K,(N)M type
11. Battery warning	1) Battery terminal: 5.8 V 2) Adjustment mode See 2. Press the [TA] key.			Channel selector	Adjust so that the LED flashes using the channel selector.	The LED must flash.
	3) Battery terminal: 6.3 V				Verify that the LED lights.	Check

YO4HFU

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调整

发射部

项 目	条 件	测 量 部 位		调 整 部 位		规 格
		测量机器	端子	部件	方 法	
7.发射 信噪比	1)CH：TX Center HPF　：300Hz LPF　：3kHz DEMP：750μS	调制分析器 或 线性检波器 示波器 低频振荡器 AF.V.M	ANT MIC		确认	40dB以上 (K,M,TM型) 高于34dB ((N)K,(N)M型)
8.QT DEV	1)CH：TX Center 2)QT：151.4Hz 3)调整模式 见4 按下〔SCN〕键 L.P.F.：3kHz	调制分析器 或 线性检波器 示波器 低频振荡器 AF.V.M		信道 选择 开关	使用信道选择开关来调整 成为0.75kHz±50Hz (K,M,TM型) 使用信道选择开关来调整 成为0.35kHz±50Hz ((N)K,(N)M型)	0.75kHz±50Hz (K,M,TM型) 0.35kHz±50Hz ((N)K,(N)M型)
9.DQT DEV 仅K,(N)K型	1)CH：TX Center 2)调整模式 见5 按下〔DIAL〕键 L.P.F.：3kHz	调制分析器 或 线性检波器	ANT	信道 选择 开关	使用信道选择开关来调整 成为0.75kHz±50Hz (K,M,TM型) 使用信道选择开关来调整 成为0.35kHz±50Hz ((N)K,(N)M型)	0.75kHz±50Hz (K,M,TM型) 0.35kHz±50Hz ((N)K,(N)M型)
10.DTMF DEV	1)CH：TX Center 2)用〔9〕键 PTT：ON L.P.F.：15kHz	调制分析器 或 线性检波器	ANT	VR3	从下例检查 ±2.5kHz～±4.5kHz (K,M,TM型) ±1.25kHz～±2.25kHz ((N)K,(N)M型)	±2.5kHz～±4.5kHz (K,M,TM型) ±1.25kHz～±2.25kHz ((N)K,(N)M型)
11.蓄电池 报警	1)蓄电池端子5.8V 2)调整模式 见2 按下〔TA〕键			信道 选择 开关	在LED闪烁的点用信道 选择开关进行调整	LED闪烁
	3)蓄电池端子6.3V				确认LED发亮	确认

TK-270/(N)/278/(N)/278T
ADJUSTMENT/调整

BPF-Wave

(M,TM type)

REF 0.0 dBm — ATT 10 dB — A_write B_blank
10dB/

TG LEVEL
−40 dBm

Δ MKR
24.0 MHz
−1.77 dB

RBW
300 kHz
VBW
100 kHz
SWP
50 ms

CENTER 174.0 MHz — SPAN 100.0 MHz

(M2,TM2 type)

REF −10.0 dBm — ATT 10 dB — A_write B_blank
10dB/

TG LEVEL
−40 dBm

Δ MKR
14.0 MHz
−1.80 dB

RBW
300 kHz
VBW
100 kHz
SWP
50 ms

CENTER 150.0 MHz — SPAN 100.0 MHz

(K type)

REF 0.0 dBm — ATT 10 dB — A_write B_blank
10dB/

TG LEVEL
−35 dBm

Δ MKR
24.0 MHz
−3.62 dB

RBW
300 kHz
VBW
1 kHz
SWP
700 ms

CENTER 162.0 MHz — SPAN 100.0 MHz

(K2 type)

RL 0.00 dBm — MKR #1 ΔFRQ 14.0 MHz
ATTEN 10 dB — −1.47 dB
10.00 dB/DIV — 95.8 29 K2-1 Input=−40 dBm

MARKER
14.0 MHz
−1.47 dB
1

CENTER 150.0 MHz — SPAN 100.0 MHz
RB 300 kHz — *VB 10.0 kHz — ST 100.0 msec

Fig.1

YO4HFU

TX-RX UNIT (X57-4850-XX) Component Side View
0-13:K, 0-14:K2, 0-17:NK, 0-20:M,TM, 0-21:M2,TM2, 0-22:NM, 0-23:NM2

J72-0414-22
X57-4850-XX

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

LC73881M

NJM2100V
NJM2904V

DTA114YE
DTC114EE
DTC114YE
2SC4617

2SK1824

M38267M8L189GP

AT240BNIOSI2.5

PC BOARD VIEWS / 印刷线路板图　TK-270/(N)/278/(N)/278T

YO4HFU

TX-RX UNIT (X57-4850-XX) Foil Side View
0-13:K, 0-14:K2, 0-17:NK, 0-20:M,TM, 0-21:M2,TM2, 0-22:NM, 0-23:NM2

X57-4850-XX
J72-0414-22

Ref. NO.	Address
IC6	5K
IC8	8M
IC9	9K
IC11	5G
IC12	10M
IC13	5D
IC14	8E
Q5	7D
Q6	8D
Q8	8C
Q9	7B
Q12	7B
Q14	5J
Q15	9I
Q16	6K
Q18	7J
Q19	7J
Q20	6J
Q21	10J
Q23	7J
Q24	8J
Q25	9E
Q26	6I
Q28	9D
Q29	9H
Q31	7H
Q33	7F
Q34	9M
Q35	9M
Q38	6D
Q39	8G
Q40	10P
Q41	5F
D2	8B
D3	5J
D4	5L
D6	5M
D7	7K
D8	6L
D9	7J
D10	7K
D11	8K
D14	8J
D15	8E
D16	8I
D17	7I
D20	5F
D22	7D
D23	7C

Pattern 1
Pattern 2
Pattern 3
Pattern 4
Pattern 5
Pattern 6

Component side

Foil side

LMX1511TMX

NJM2904V
NJM2100V

TA7368F

DTA114EE	2SA1362
DTA114YE	2SC4226
DTA144EE	2SC4617
DTC114EE	2SC4619
DTC144EE	2SC5108

2SK508NV

UMC4

SGM2014M

2SJ243
2SK1824

2SK1215

2SK1588

89

90

YO4HFU
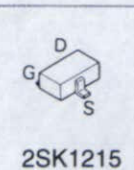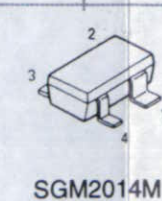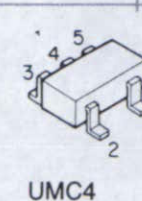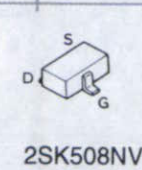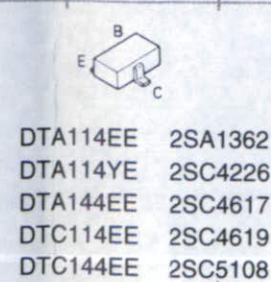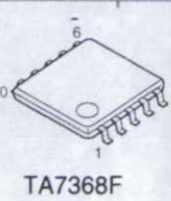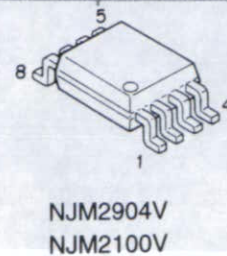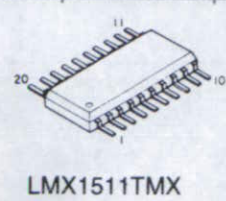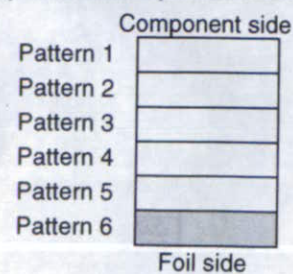
TX-RX UNIT (X57-4850-XX) Component Side View + Foil Side View
0-13:K, 0-14:K2, 0-17:NK, 0-20:M,TM, 0-21:M2,TM2, 0-22:NM, 0-23:NM2

J72-0414-22
X57-4850-XX

● Connect 1 and 6

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

LMX1511TMX   TA7368F   TA75W01FU

DTA114EE 2SA1362
DTA114YE 2SC4226
DTA144EE 2SC4617
DTC114EE 2SC4619
DTC114YE 2SC5108
DTC144EE

2SK508NV   UMC4   SGM2014M   2SJ243 / 2SK1824   2SK1588   M38267M8L189GP

2SK1215

TX-RX UNIT(X57-485)
(Component side) + (Foil side)

Ref. NO.	Address
IC1	7K
IC2	9J
IC3	5N
IC4	6O
IC5	9K
IC6	5G
IC7	10O
IC8	8E
IC9	9G
IC10	7P
IC11	5K
IC12	10E
IC13	5N
IC14	8M
Q1	10J
Q2	9P
Q3	9P
Q4	5K
Q5	7O
Q6	8N
Q7	9N
Q8	8O
Q9	7P
Q12	7P
Q14	5H
Q15	9I
Q16	6G
Q17	6O
Q18	7H
Q19	7H
Q20	6H
Q21	10H
Q22	6O
Q23	7I
Q24	8H
Q25	9M
Q26	6I
Q28	9N
Q29	9J
Q30	9N
Q31	7J
Q32	10M
Q33	7L
Q34	9E
Q35	9E
Q36	9B
Q37	10N
Q38	6N
Q39	8K
Q40	10B
Q41	5M
D1	10K
D2	9P
D3	4H
D4	5F
D5	10O
D6	5E
D7	7H
D8	6G
D9	7H
D10	7G
D11	8H
D14	8H
D15	8N
D16	8I
D17	7I
D19	4O
D20	5L
D21	9N
D22	7N
D23	7O
D24	10P
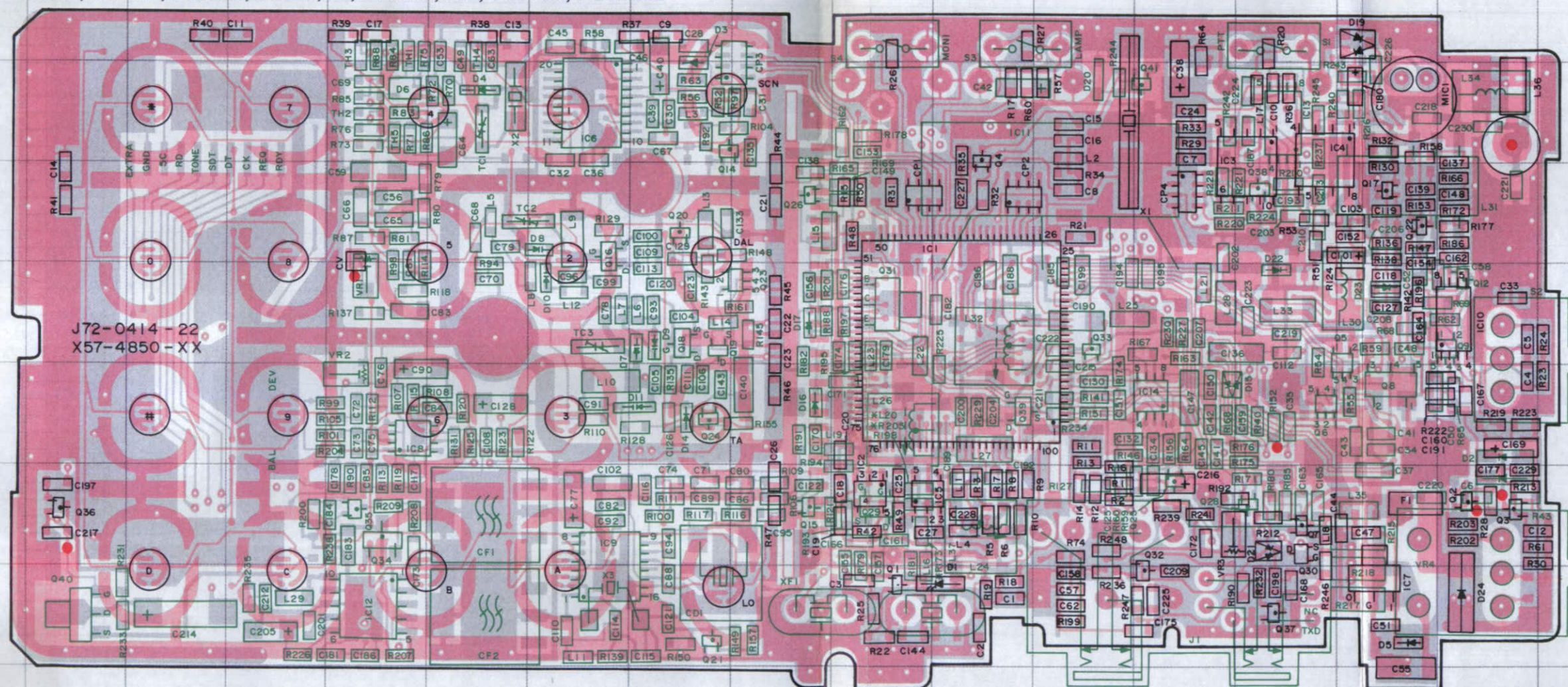
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93
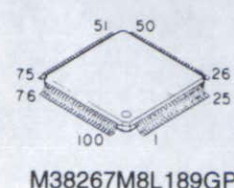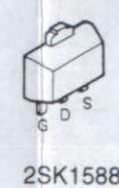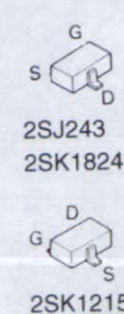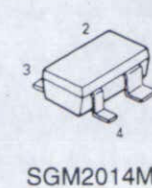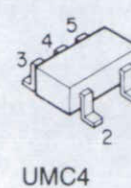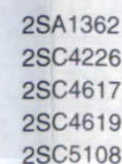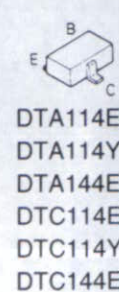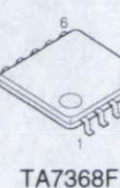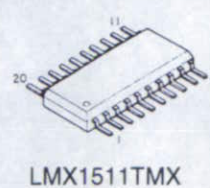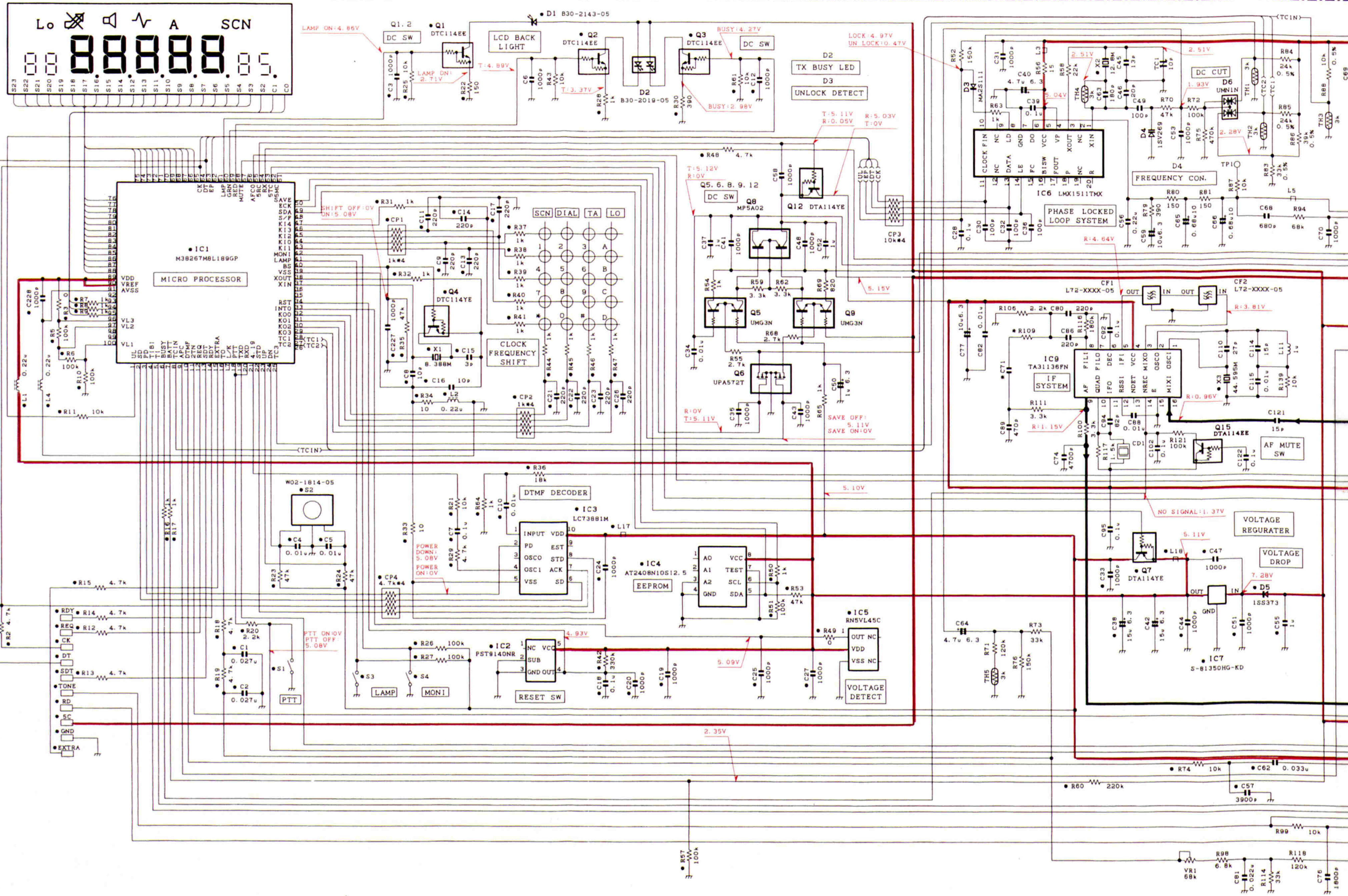
			IC11	R109	R110	R119	R122	R123	R127	R131	R135	R140	R152	R157	R169	R171	R173	R181	R198	R205	R222	R234	R244	C71	C75	C93	C99	C100	C104	C105	C141	C144	C161	C182	C189	C191	C202	C204	C206	C207	C208	C
TK-278/278T	0-20	M	RF0314-01	100k	47k	47k	-	-	0	82k	270	18k	10k	680	180	3.9k	0	1.5k	2.2k	-	680k	150	330	47p	0.1u	220p	5p	15p	9p	20p	0.033u(J)	6p	15p	18p	3p	1000p	2p	5p	3p	33p	27p
	0-21	M2	RF0313-01	100k	100k	47k	-	-	0	82k	330	18k	10k	680	270	3.9k	0	1.5k	2.2k	-	680k	150	1.5k	47p	0.1u	150p	8p	18p	9p	18p	0.033u(J)	6p	15p	22p	6p	1000p	2p	7p	12p	33p	27p
TK-270	0-13	K	PF0314-01	150k	47k	-	18k(D)	10k(D)	-	82k	270	-	-	680	180	3.9k	0	1.5k	1k	100	270k	270	330	33p	0.01u	220p	18p	15p	9p	18p	0.033u(J)	6p	15p	18p	4p	2700p	5p	7p	12p	33p	27p
	0-14	K2	PF0313-01	150k	100k	-	18k(D)	10k(D)	-	82k	330	-	-	680	270	3.9k	0	1.5k	1k	100	270k	270	330	33p	0.01u	150p	18p	18p	9p	18p	0.033u(J)	6p	15p	22p	6p	2700p	2p	7p	12p	33p	27p
TK-278(N)	0-22	NM	RF0314-01	82k	47k	47k	18k(D)	10k(D)	-	150k	270	18k(D)	10k(D)	270	180	3.3k	-	2.2k	-	680k	150	330	56p	0.1u	150p	8p	18p	9p	18p	0.027u(J)	20p	18p	18p	2p	1000p	2p	7p	12p	33p	27p
	0-23	NM2	PF0313-01	56k	100k	47k	18k(D)	10k(D)	-	150k	330	18k(D)	10k(D)	270	180	3.3k	-	2.2k	-	680k	150	330	82p	0.1u	150p	18p	18p	9p	18p	0.027u(J)	20p	18p	22p	6p	1000p	2p	7p	12p	33p	27p
TK-270(N)	0-17	NK	RF0314-01	56k	47k	-	18k(D)	10k(D)	-	150k	270	-	-	270	180	3.3k	-	1k	100	220k	270	330	82p	0.01u	220p	5p	15p	9p	18p	0.027u(J)	20p	18p	18p	4p	3300p	7p	5p	2p	33p	27p

Y04HFU

Note) ● Ref. No. : Parts of pattern 1.

YO4HFU
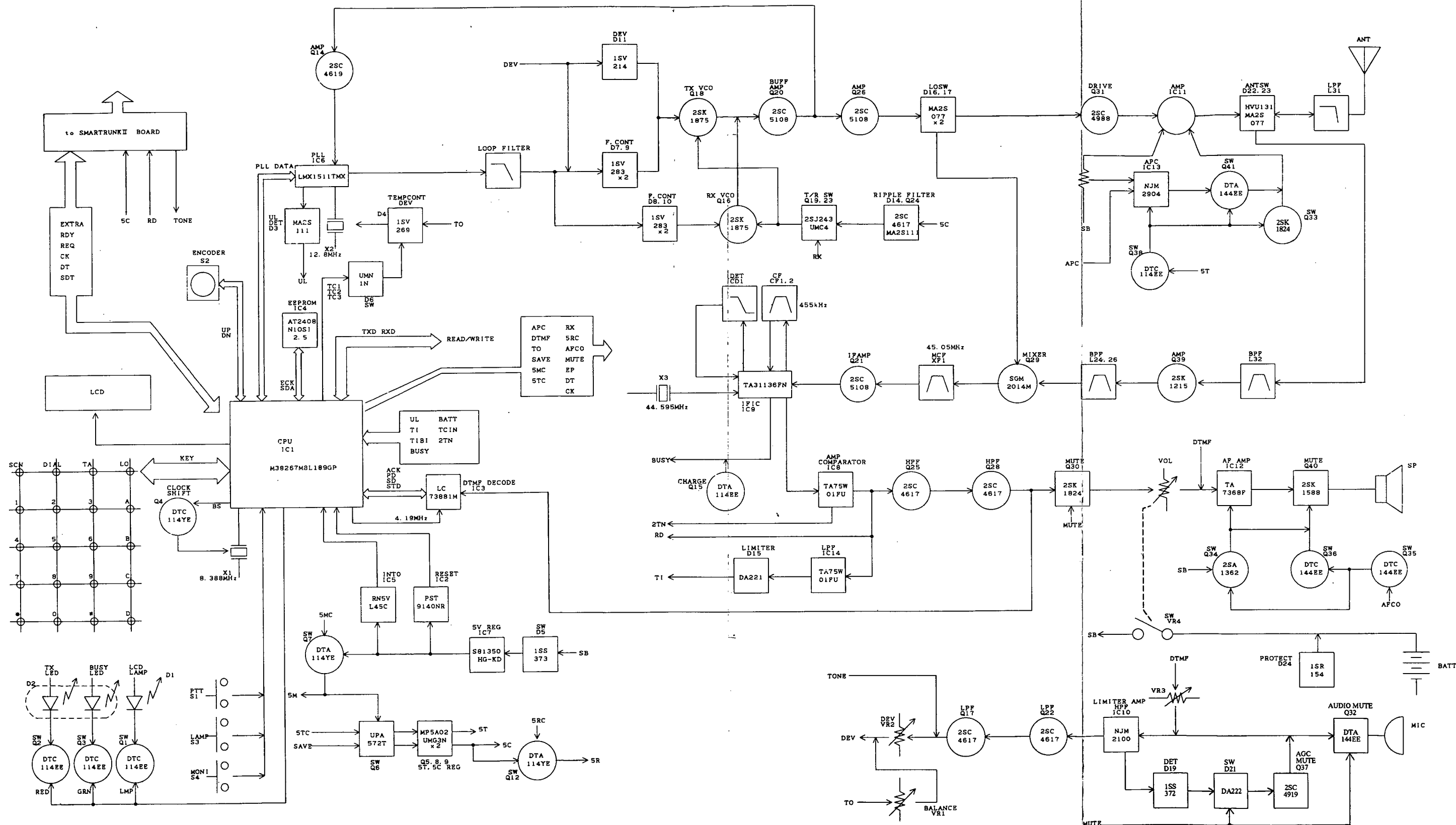
		TX VCO FREQUENCY	RX VCO FREQUENCY	IC11
TK-278/(N) TK-278T	M	150.000-174.000 MHz	195.050-219.050 MHz	PFO314
	M2	136.000-150.000 MHz	181.050-195.050 MHz	PFO313
TK-270/(N)	K	150.000-174.000 MHz	195.050-219.050 MHz	PFO314
TK-270	K2	136.000-150.000 MHz	181.050-195.050 MHz	PFO313

RX Section

供给电压为7.5V。RF电平的输入信号设定成 f＝1kHz和±3kHz (±1.5kHz：(N)型) DEV，AF电平的输出信号调节成0.63V，负荷8Ω。12dB的RF和IF电平为SINAD输入电平，信号通过SSG到1,000pF电容器输入到各点。
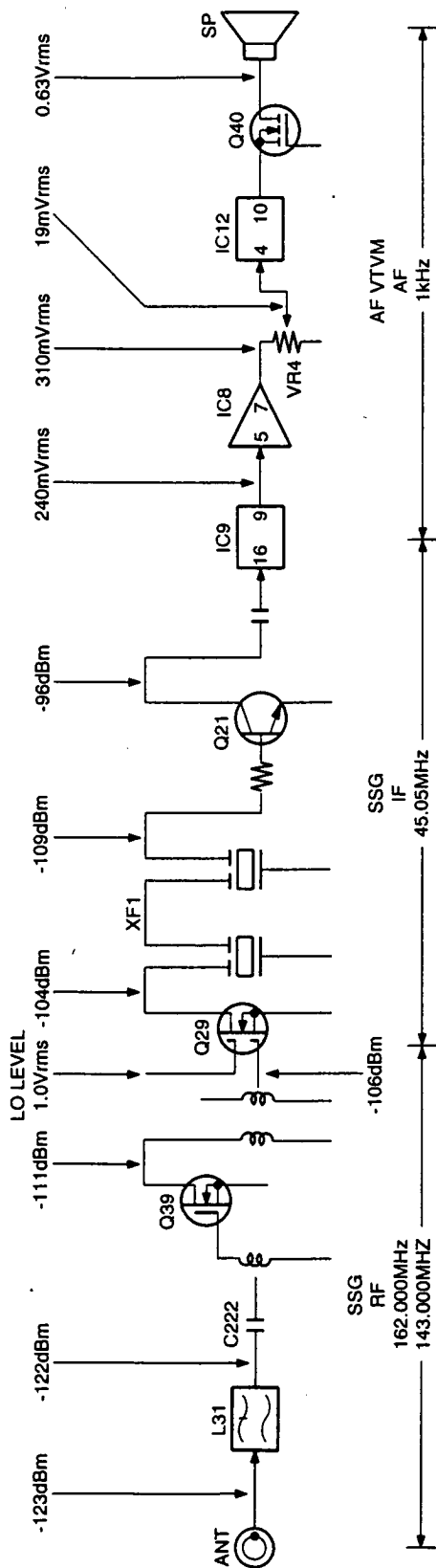
The supply voltage is 7.5 V. The input signal in an RF level is set to f = 1 kHz and ±3 kHz (±1.5kHz:(N)type) DEV, and the output signal in an AF level is adjusted to 0.63 V in a load of 8Ω. The RF and IF levels are a SINAD input level of 12 dB in which signals are input from SSG to each point through a 1000 pF capacitor.

TX Section

AF电平利用AF VTVM测量。RF电平利用RF VTVM测量。每一电平以高阻抗测量。
发射频率是162.000MHz及143.000MHz。
音频发生器被控制成在MIC脚处的输入信号对1kHz调制频率具备±3kHz (±1.5kHz：(N) 型) 的偏差。

The AF level is measured by an AF VTVM. The RF level is measured by an RF VTVM. Each of levels measured at high impedance.
The transmitting frequency is 162.000MHz or 143.000MHz.
The audio generator is controlled so that the input signal at the MIC pin has a deviation of ±3kHz (±1.5kHz:(N)type) for a modulation frequency of 1kHz.

Y04HFU

TK-270/(N)/278/(N)/278T
KNB-14/KNB-15A (Ni-Cd BATTERY)

KNB-14

CIRCUIT DIAGRAM

Discharge pin side

Breaker (70±5℃) Breaker (80±5℃)

Diode   Thermistor

Charge pin side

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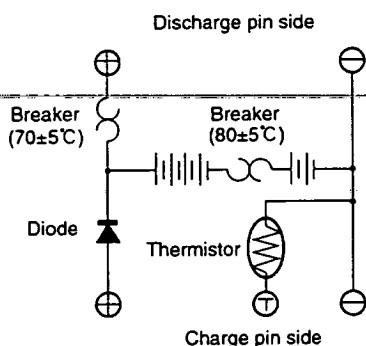
Voltage   : 7.2V(1.2V×6)
Charging current : 600mAh
Dimensions   : 60.8W×110.8H×17.3D(mm)
                    (projections included)
Charger and charging time:
    KSC-15 (normal charger), approximately 8 hours
    KSC-16 (rapid charger), approximately 1 hour
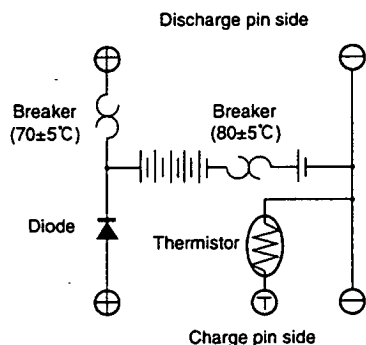Weight   : 165g

规　格

电　　压: 7.2V(1.2V×6)
公称容量: 600mAh
尺　　寸: 60.8(宽)×110.8(高)×17.3(深)(mm)
          (包括凸边)
充电器、充电时间: KSC-15(一般充电器)约8小时
                 KSC-16(快速充电器)约1小时
重　　量: 165g

KNB-15A

CIRCUIT DIAGRAM

Discharge pin side

Breaker (70±5℃) Breaker (80±5℃)

Diode   Thermistor

Charge pin side

SPECIFICATIONS

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

规　格

电　　压: 7.2V(1.2V×6)
公称容量: 1100mAh
尺　　寸: 60.8(宽)×110.8(高)×20.3(深)(mm)
          (包括凸边)
充电器、充电时间: KSC-15(一般充电器)约8小时
                 KSC-16(快速充电器)约2小时
重　　量: 210g

规　格

一般

频率范围·····················TK-270/(N)：K(150～174MHz) TK-278/(N)/278T：M(150～174MHz)
TK-270：K2(136～150MHz)　　TK-278/(N)/278T：M2(136～150MHz)

频道数·····················32※

频道间隔·····················30(25)kHz(K, M, TM型/12.5kHz((N)K, (N)M型)(锁相环频道步进5/6.25kHz)

工作电压·····················7.5VDC

电池寿命·····················以5W，8小时以上(使用KNB-15A电池，以5-5-90占空因数)

温度范围·····················－30°C至＋60°C(－22°F至＋140°F)

外形尺寸和重量

　使用KNB-14(7.2V 600mAh电池)时·····················58(2-5/16)W×135(5-5/16)H×30(1-3/16)Dmm(in)
400g(0.88lbs)

　使用KNB-15A(7.2V 1100mAh电池)时 ·····················58(2-5/16)W×135(5-5/16)H×33(1-5/16)mm(in)
440g(0.97lbs)

※关于装备Smar Tunk II™的无线电设备，频道1～16为传统的频道，而频道17～32为Smar Tunk II™频道。

接收机(根据电子工业协会标准EIA-316B测量)

灵敏度

　电子工业协会标准12dB的信号对噪声和失真比 ·····0.25μV(TK-270)/0.16μV(TK-278/278T)/0.28μV(TK-270(N))
/0.20μV(TK-278(N))

调制可接收性·····················±7kHz(TK-270/278/278T)/±3.5kHz(TK-270(N)/278(N))

选择性·····················70dB(TK-270)/65dB(TK-270(N)/278/278T/278(N))

互调制·····················65dB(TK-270/278/278T)/60dB(TK-270(N)/278(N))

假信号响应·····················60dB

音频功率输出·····················于小于10%的失真500mW

频率稳定性·····················±0.0005%从－30°C至＋60°C

频道频率扩展·····················24MHz

发射机(根据电子工业协会标准EIA-316B测量)

射频功率输出·····················5W/1W

乱真和谐波·····················－70dB

调制·····················16KφF3E(TK-270/278/278T)/11KφF3E(TK-270(N)/278(N))

最大频率偏移·····················±5kHz(TK-270/278/278T)/±2.5kHz(TK-270(N)/278(N))
(对于100%，于1000Hz)

调频噪音·····················－45dB(TK-270/278/278T)/－43dB(TK-270(N)/278(N))

音频失真·····················5%

频率稳定性·····················±0.0005%从－30°C至＋60°C

频道频率扩展·····················24MHz

YO4HFU

TK-270/(N)/278/(N)/278T

SPECIFICATIONS

GENERAL

Frequency Range .... TK-270/(N):K(150 ~ 174MHz) TK-278/(N)/278T:M(150 ~ 174MHz)
TK-270:K2(136 ~ 150MHz)   TK-278/(N)/278T:M2(136 ~ 150MHz)

Number of channels .... 32※

Cannel Spacing .... 30(25)kHz K,M,TM type / 12.5kHz (N)K,(N)M type
(PLL channel step 5/6.25kHz)

Operating Voltage.. 7.5 VDC

Battery Life .... More than 8 hours at 5 watts (5-5-90 duty cycle with KNB-15A battery)

Temperature Life .... -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 × 135 (5-5/16) H × 30 (1-3/16) D mm (in)
400g (0.88lbs)

  With KNB-15 (7.2V 1100mAh battery)............. 58 (2-5/16) W × 135 (5-5/16) H × 33 (1-5/16) D mm (in)
440g (0.97lbs)

※On SmarTrunk II™ configured radios, channels 1 ~ 16 are conventional, and 17 ~ 32 are SmarTrunk II™ channels.

RECEIVER (Measurements made per EIA standard EIA-316B)

Sensitivity

  EIA 12dB SINAD.. 0.25µV (TK-270) / 0.16µV (TK-278/278T) / 0.28µV (TK-270(N)) /
0.20µV(TK-278(N))

Modulation Acceptance .... ±7kHz (TK-270/278/278T) / ±3.5kHz (TK-270(N)/278(N))

Selectivity .... 70dB (TK-270) / 65dB (270(N)/278/278T/278(N))

Intermodulation.. 65dB (TK-270/278/278T) / 60dB (270(N)/278(N))

Spurious responce... 60dB

Audio Power Output.. 500mW at less than 10% distortion

Frequency Stability .... ±0.0005% from -30°C to +60°C

Channel Frequency Spread............................... 24MHz

TRANSMITTER (Measurements made per EIA standard EIA-316B)

RF Power output.. 5W / 1W

Spurious and Harmonics .... -70dB

Modulation .... 16K φ F3E (TK-270/278/278T) / 11K φ F3E (TK-270(N)/278(N))

Maximum frequency deviation........................... ±5kHz (TK-270/278/278T) / ±2.5kHz (TK-270(N)/278(N)) (for 100% at
1000Hz)

FM Noise .... -45dB (TK-270/278/278T) / -43dB (TK-270(N)/278(N))

Audio Distortion 5%

Frequency Stability.. ±0.0005% from -30°C to +60°C

Channel Frequency Spread................................ 24MHz