VHF FM TRANSCEIVER

TK-260G/(N)/270G/(N)

SERVICE MANUAL

5 TONE REVISED

KENWOOD

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Antenna
(T90-0695-15):E,(N)E
(T90-0680-05):(N)T
(T90-0681-05):(N)E2

Knob (CHANNEL SELECTOR)
(K29-5341-03)

Knob (ENC)
(K29-5331-03)

Knob (VOL)
(K29-5332-03)

Knob (VOL)
(K29-5332-03)

Cabinet assy
(A02-2391-23)

Cabinet assy
(A02-2385-23)

Knob (PTT)
(K29-5334-13)

Knob (PTT)
(K29-5334-13)

Knob (Side1)
(K29-5333-13)

Knob (Side1)
(K29-5333-13)

Key top (DTMF)
(K29-5330-02)

TK-260G

TK-270G

CONTENTS

TK-260G/(N)/270G/(N)

GENERAL / SYSTEM SET-UP

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

PERSONNEL SAFETY

The following precautions are recommended for personnel safety:

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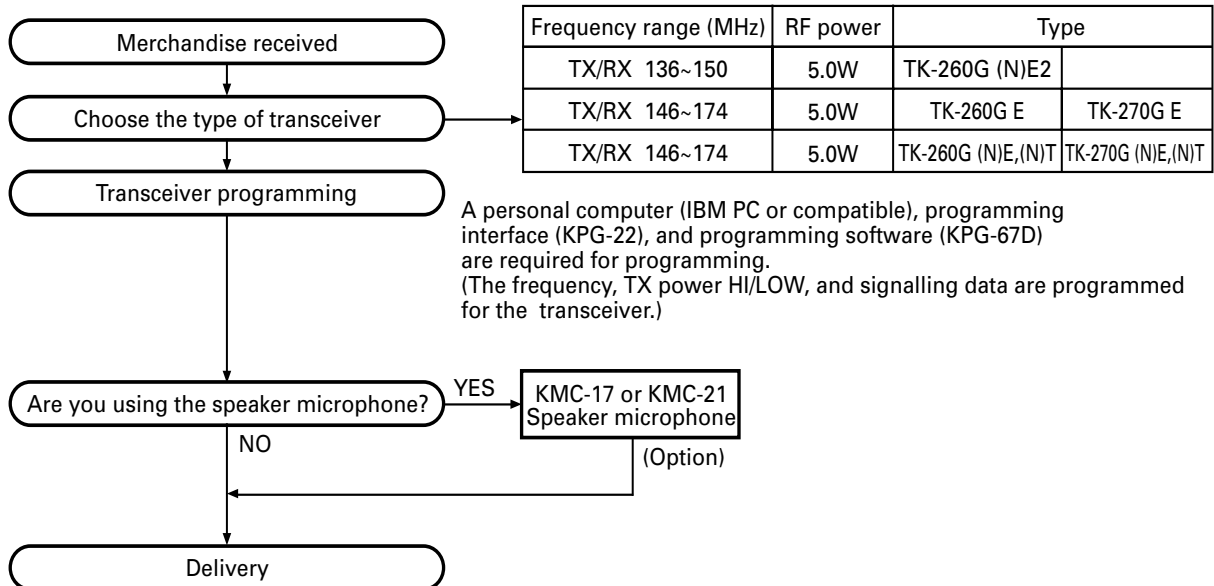
SERVICE

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

NOTE

The terms "Wide" and "Semi wide" used in this service manual correspond to "Wide 5K" and "Wide 4K" respectively that appear in the menu and help texts of the KPG-67D (Field Programming Unit).

Model & destination	Unit	TX-RX Unit	Display Unit	Frequency range	Remarks	Helical Antenna	Charger	Battery	16 Key
TK-260G	E	X57-5872-71	–	146~174MHz	IF1 : 49.95MHz LOC : 50.4MHz	O	OP	OP	–
	(N)E,(N)T	X57-5872-72							
	(N)E2	X57-5872-75		136~150MHz					
TK-270G	E	X57-5872-73	X54-3250-10	146~174MHz					O
	(N)E,(N)T	X57-5872-74							

SYSTEM SET-UP

Merchandise received

Choose the type of transceiver

Frequency range (MHz)	RF power	Type	
TX/RX 136~150	5.0W	TK-260G (N)E2	
TX/RX 146~174	5.0W	TK-260G E	TK-270G E
TX/RX 146~174	5.0W	TK-260G (N)E,(N)T	TK-270G (N)E,(N)T

Transceiver programming

A personal computer (IBM PC or compatible), programming interface (KPG-22), and programming software (KPG-67D) are required for programming.
(The frequency, TX power HI/LOW, and signalling data are programmed for the transceiver.)

Are you using the speaker microphone? — YES → KMC-17 or KMC-21 Speaker microphone (Option)

NO

Delivery

1. Operation Features

• TK-260G

Channel selector
Rotate to select a channel (1 ~ 8).

Antenna

LED indicator
Lights red while transmitting. Lights green while receiving. Flashes orange while receiving a 2-Tone 5-Tone or DTMF signal that matches the one set up in your transceiver. Flashes red when the battery power is low while transmitting.

Power switch/ Volume control
Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. To switch OFF the transceiver, turn counterclockwise fully.
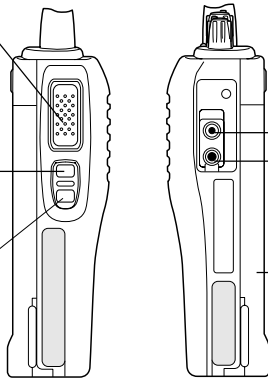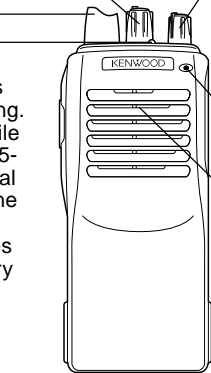
Microphone

Speaker

PTT (Push-to-Talk) switch
Press this switch, then speak into the microphone to call a station.

Side 1 key
Press to activate its programmable function.

Side 2 key
Press to activate its programmable function.

SP/MIC jacks
Connect an optional speaker/ microphone here.

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

Programmable Auxiliary Functions

Side 1 key and **Side 2** key can each be programmed with one of the following auxiliary functions:

• **Squelch Momentary:** Press and hold the **Monitor** key to hear background noise. Release the key to return to normal operation.

• **Squelch Off:** Momentarily press the **Monitor** key to hear background noise. Press the key again to return to normal operation.

• **Monitor Momentary**

  · **Model = DTMF/ 2tone:**

  While pressing this key, " ⊲ " appears and the squelch unmutes if a carrier is present, regardless of the specified Signalling (including Option Signalling). If released, " ⊲ " disappears, and the squelch mutes.

  · **Model = 5tone:**

  Depend on Monitor Function in the 5 Tone Parameters. You can select either QT/DQT or 5tone decoding to be canceled while pressing Monitor key. When Monitor function is activated, " ⊲ " icon appears.

• **Monitor**

  · **Model = DTMF/ 2tone:**

  When this key pressed once ," ⊲ " icon lights and squelch unmutes if a carrier is present, regardless of the specified Signalling (including Option Signalling). If pressed again, " ⊲ " icon goes off and squelch mutes.

  · **Model = 5tone:**

  Depend on Monitor Function in the 5 Tone Parameters. You can select either QT/DQT or 5tone decoding to be canceled when Monitor key is pressed. When Monitor function is activated, " ⊲ " icon appears.

• **None:** No function.

• **RF Power Lo:** Press the **RF Power Lo** key to toggle the output power of a channel between high and low. This can only be used for channels that have been programmed with high power. Pressing **RF Power Lo** while using a channel programmed with low power causes an error tone to sound. (When changing a channel from high to low power, all channels programmed with high power are changed to low.)

• **2-Tone Encode Select:** To transmit using a 2-Tone code, press the **PTT** switch and the **2-Tone Encode Select** key, then speak into the microphone in your normal voice. Release the **PTT** switch and **2-Tone Encode Select** key to receive.

• TK-270G

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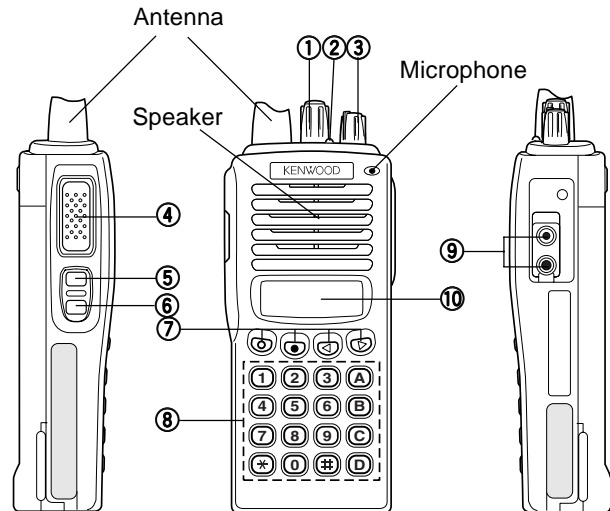
The transceiver is shown with the optional KNB-14 battery pack.

① **Rotary encoder**
Your dealer can program the encoder as either Group Up/Down or Channel Up/Down (default setting). Rotate to select a group or channel. Also rotate to adjust the squelch in Squelch Adjustment mode.

② **LED indicator**
Lights red while transmitting. Lights green while receiving. Flashes orange while receiving a Code Squelch or a Selective Call code, or a 2-Tone 5-Tone or DTMF signal that matches the one set up in your transceiver. Flashes red when the battery power is low while transmitting.

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OPERATING FEATURES

③ **Power switch/ Volume control**
Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. To switch OFF the transceiver, turn counterclockwise fully.

④ **PTT (Push-to-Talk) switch**
Press this switch, then speak into the microphone to call a station.

⑤ **Side 1 key**
This is a PF (Programmable Function) key. Press it to activate its auxiliary function (page 4).

⑥ **Side 2 key**
This is a PF (Programmable Function) key. Press it to activate its auxiliary function (page 4).

⑦ **○, ●, ◄,► keys**
These are PF (Programmable Function) keys. Press each key to activate its auxiliary function.

⑧ **DTMF keypad**
Used for storing and transmitting DTMF numbers.

⑨ **SP/MIC jacks**
Connect an optional speaker/ microphone here.

⑩ **Display**
(See page 5.)

Note: *The PF keys are programmed with default functions:*
- ***Side 1 key:*** *Lamp*
- ***Side 2 key:*** *Monitor A*
- ***○ key:*** *Scan*
- ***● key:*** *Scan Del/Add*
- ***◄ key:*** *Talk Around*
- ***► key:*** *RF Power Lo*

Programmable Auxiliary Functions

Side 1, Side 2, ○, ●, ◄, and ► can be programmed with the auxiliary functions listed below.
- Channel Down
- Channel Up
- Display Character
- Group Down
- Group Up
- Home Channel
- Key Lock
- Lamp
- Squelch Momentary
- Squelch Off
- Monitor Momentary
- Monitor
- None
- Redial
- RF Power Lo
- Scan
- Scan Del/Add
- Talk-Around
- 2-Tone Encode Select
- Call 1 (5-Tone only)
- Call 2 (5-Tone only)
- Sel call Entry

2. Programmable keys

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

1) Channel up/down (TK-270G only)
When the key is pressed each time, the channel number to be selected is incremented/decremented and repeats if held for one second or longer.

2) Display character (TK-270G only)
This key switches the LCD display between the group/ channel number and group/channel name.

3) Group up/down (TK-270G only)
When the key is pressed each time, the group number to be selected is incremented/decremented and repeats if held for one second or longer.

4) Home Channel (TK-270G only)
Press this key once, the channel switches to the pre-programmed home channel.

5) Key lock (TK-270G only)
When the KEY LOCK switch is held down for one second or more, keys other than [PTT], [Side1], [Side2], [VOL], [POWER], and KEY LOCK are locked.
When 12/16 KEY LOCK is set with the FPU, the DTMF key is locked and when front-panel KEY LOCK is set, the DTMF key and the [PF] key are locked.

6) Lamp (TK-270G only)
This key illuminates the LCD and keys on the front panel. When the key is pressed, the LED lamp goes on.
When it is released, the lamp goes off after about five seconds. If any key is pressed while the LED lamp is on, the lamp is kept on for five seconds.

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

8) 2-Tone Encode Select (TK-270G only)
① Press the key programmed as 2-tone Encode Select.
  • A pre-programmed 2-tone code name appears on the display.
② Press the key programmed as Rotary encoder to select you desired 2-tone code name.
③ Press PTT switch and 2-Tone Encode Select key to transmit and release them to receive.

9) Redial (TK-270G only)
Pressing this key when Group/Channel is shown, displays the previously transmitted DTMF code. Pressing [PTT] at this time, transmits the code that is currently displayed.

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OPERATING FEATURES

10) RF power low

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

Hi→Low, Low→Low

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

11) Scan (TK-270G only)

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

12) Scan Del/Add (TK-270G only)

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

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

13) Talk Around (TK-270G only)

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

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

14) None

An error operation beep sounds, and no action will occur. Use this function when the transceiver is required to be operated more simply.
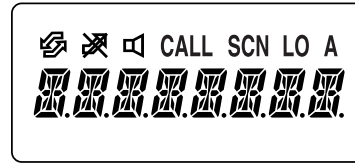
15) Call 1 to 2 (5tone only)

Press the [CALL #] key to transmit the 5tone code that is programmed to "Call #" in the Channel Data.

16) Selcall Entry

Press [Selcall Entry] key to enter the desired Selcall code you want to call.

When you enter Selcall Entry mode, the "TX Address" number appears on the LCD.

To enter Selcall number, use the keypad . You can also use the channel selector to select the number.

3. Display (TK-270G only)

Icon	Description
⊗	Not used on this transceiver.
⊗	Appears when the selected channel is busy.
◁	Appears when QT, DQT, DTMF, 5-Tone or 2-Tone decoding is deactivated (by pressing the **Monitor** key).
CALL	Appears when you receive a Code Squelch, Selective Call, 2-Tone, or DTMF Signalling call. Also appears when you transmit using Code Squelch or Selective Call.
SCN	Appears while scanning.
LO	Appears when using low power on the selected channel.
A	Appears when the selected channel is included in the scanning sequence.
🔢	Displays the selected channel, the squelch level, DTMF digits (when entering digits, confirming digits, or making a call), and messages received via Selective Call.

4. Scan Operating (TK-270G only)

1) Scan types

- **Single Group Scan**

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

- **Multiple Group Scan**

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

2) Scan Start Condition

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

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

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OPERATING FEATURES

3) Scan Stop Condition
The scan stops temporarily if the following conditions are satisfied.
① The receiving signal matches the signalling code in your radio that is set by the programming software (KPG-67D).
② When the Monitor key is depressed.

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

5) Priority Channel Setting
A priority channel can be set as follows with the programming software (KPG-67D).
① Specify a priority channel as a fixed priority channel.
② Make a selected channel a priority channel.
Specify the initial channel before the operator changes it.

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

7) Revert Channel
The revert channel is used to transmit during scanning and set by the programming software (KPG-67D).
① Priority
The transceiver reverts to the priority channel.
② Priority with talkback
The transceiver reverts to the priority channel.
If you press PTT during a resume timer (dropout delay time, TX dwell time) or calling, you can transmit on the current channel to answer to the call however revert channel is set to priority channel.
After resume time, scan re-starts and the transmission channel returns to the priority channel.
③ Selected channel
The transceiver reverts to the channel before scanning or the channel that you changed during scan.
④ Last called channel
The transceiver reverts to the last called channel during scan.
⑤ Last used channel
The transceiver reverts to the last used (transmitted) channel during scan. "Last used" revert channel includes talkback function.

⑥ Selected with talkback
The transceiver reverts to the channel before scanning or the channel that you changed during scan.

8) Scan End
When you reactivate the key programmed to the scan function during scan mode, scan ends.
The scan icon ("SCN") and "SCAN" or revert channel (programmable) display goes off.

9) Temporarily Delete/Add
It is possible to delete or add a channel temporarily during scan. When scan stops on an unnecessary channel, for example by interference of the other party, press the delete/add key, then that channel is deleted temporarily and scan will re-start immediately.
When you would like to add a deleted channel temporarily to the scan sequence, select the desired (deleted) channel during scan, and press the delete/add key before scan re-starts.
That channel is added temporarily to the scan sequence. The temporarily deleted or added channels are returned to their pre-set delete/add conditions when the transceiver exits from scan mode.

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

2) Selective Call Alert LED
You can select whether or not the LED on the transceiver flashes orange when selective call has occurred.
3) PTT ID
PTT ID provides a DTMF ANI to be sent with the PTT button every time it is used (Begin of TX ID at beginning of transmission, End of TX ID at end of transmission, or both).
You can program the PTT ID as one of the followings.
Off, BOT (Begin of TX ID), EOT (End of PTT ID), BOTH.
The contents of ID are programmed for each channel.
The transceiver is capable of having ID. The format is DTMF.
The timing that the transceiver sends the ID is programmable.
Begin of TX ID (BOT) : Begin of TX ID is sent at the beginning of transmission.
End of TX ID (EOT) : End of TX ID is sent at the end of transmission.
Both : Begin of TX ID is sent at the beginning of transmission and End of TX ID is sent at the end of transmission.
There is also a "PTT ID" setting for each channel.

OPERATING FEATURES

4) Battery Warning

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

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

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

5) "TOT" Pre-Alert

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

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

6) "TOT" Re-Key Time

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

7) "TOT" Reset Time

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

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

8) OST (Operator Selectable Tone) (TK-270G K types only)

The transceiver is capable of having the "OST" function and 16 tone pairs (QT/DQT) with a max 10-digit name for each tone pair.

9) Clear to Transpond

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

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

10) Battery Save

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

6. Option Signalling (DTMF/2 tone)

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

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

Preset operation is triggered when there is a match with Option Signaling.

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

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

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

AND/OR

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

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

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

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

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

Auto Reset

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

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

Dead Beat Disable

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

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

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

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OPERATING FEATURES / REALIGNMENT

7. Audible user feedback tones

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

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

- **Power on tone**

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

- **Alert tone**

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

- **Busy Tone**

  This informs the user of a busy channel lock out

- **Group Call Tone**

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

770Hz		770Hz
30ms	30ms	30ms

- **Individual Tone**

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

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

- **Pre Alert tone**

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

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

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

8. 5 tone Standard

The selected 5 tone Standard is used for 5 tone encoding and decoding.

Range:

ZVEI, CCIR, EEA, ZVEI-2, EIA, KENWOOD.

REALIGNMENT

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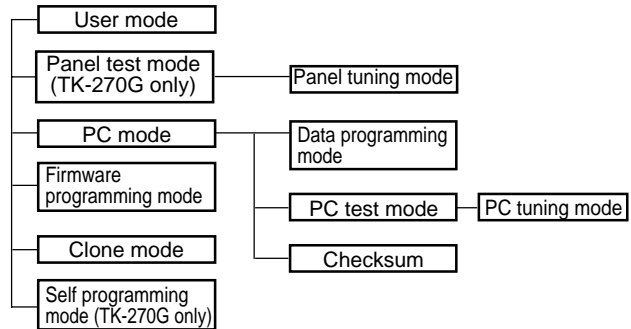
Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the radio.
PC mode	Used for communication between the radio and PC (IBM compatible).
Data programming mode	Used to read and write frequency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

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[◄]+Power ON (Two seconds) (TK-270G only)
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode]+[○]
Firmware programming mode	[Side1]+[Side2]+Power ON (Two seconds)
Clone mode	[Side1]+[►]+Power ON (Two seconds)
Self programming mode	[Side1]+[●]+Power ON (Two seconds) (TK-270G only)

3. For the panel Test Mode (TK-270G only)

For the setting method, refer to ADJUSTMENT.

3-1. For the panel Tuning Mode

For the setting method, refer to ADJUSTMENT.

4. Checksum

Executing this function, "TUNING" appears on the display of TK-270G while calculating the checksum .

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

5. PC Mode

5-1. Preface

The TK-260G/270G transceiver is programmed using a personal computer, a programming interface (KPG-22) and programming software (KPG-67D).

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

5-2. Connection procedure

1. Connect the TK-260G/270G to the personal computer with the interface cable.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the radio enters PC mode.

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

Notes:
- The data stored in the personal computer must match the model type when it is written into the flash memory.
- Change the TK-260G/270G to PC mode, then attach the interface cable.

5-3. KPG-22 description
(PC programming interface cable: Option)

The KPG-22 is required to interface the TK-260G/270G to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-22 connects the SP/MIC connector of the TK-260G/270G to the computers RS-232C serial port.

5-4. Programming software description

The KPG-67D programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program the TK-260G/270G radios via a programming interface cable (KPG-22).

5-5. Programming with IBM PC

If data is transferred to the transceiver from an IBM PC with the KPG-67D, the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

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

KPG-67D installation manual part No. : B62-1153-XX

Fig. 1

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the TK-260G/270G. This allows the TK-260G/270G to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

6-2. Connection procedure

Connect the TK-260G/270G to the personal computer (IBM PC or compatible) with the interface cable (KPG-22). (Connection is the same as in the PC Mode.)

6-3. Programming

1. Start up the programming software (KPG-67D), select "firmware program" in the "Program" item, and press the Return key on your personal computer. This starts up the firmware programmer.
2. The top screen is displayed. Press any key to advance to the next screen.
3. Set the communications speed (normally, 57600 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select (=F1).
5. Hold down the [Side1] and [Side2] switches on the TK-260G/270G, and press the power switch.

When the [Side1] and [Side2] switches are held down for two seconds, "PROG576" appears on the display and the LED lights orange. When "PROG576" is displayed, release the switches (TK-270G only).

9

TK-260G/(N)/270G/(N)

REALIGNMENT

6. Check the connection between the TK-260G/270G and the personal computer, and make sure the TK-260G/270G is in Program mode.
7. Press F10 on the personal computer. A window opens on the display to indicate the writing progress. When the TK-260G/270G begins to receive data, the LED lights green.
8. When data is received successfully, a checksum appears on the display.
   (Since the TK-260G does not have a display, check the checksum with the FPU (KPG-67D).)
9. If you want to continue programming other TK-260G/270Gs, repeat steps 5 to 8.

Notes:
- To start the Firmware Programmer from KPG-67D, the Fpro path must be set up by the KPG-67D Setup.
- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software (KPG-67D).

7. Clone Mode

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

1. Turn the master TK-270G power ON with the [Side1]+[▶] keys held down. The TK-270G displays "␣␣CLONE␣".
2. Power on the slave TK-260G/270G.
3. Connect the cloning cable to the SP/MIC connectors on the master and slave.
4. Press the [O] key on the master while the master displays "␣␣CLONE␣". The data of the master is sent to the slave. While the slave is receiving the data, "-PC-" is displayed. When cloning of data is completed, the master displays "END", and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.

- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before you update the radio firmware.
  Directly copying from the floppy disk to the radio may not work because the access speed is too slow.

6-4. Function
1. If you press the [Side2] switch while "PROGXXX" is displayed, the checksum is displayed. If you press the [Side2] switch again (while the checksum is displayed), "PROGXXX" is redisplayed.
2. A transmission speed can be selected by pressing the [Side1] switch while "PROGXXX" is displayed.
   19200 bps: The LED flashes green and red alternately.
   38400 bps: The LED flashes orange.
   57600 bps: The LED lights orange.

Note:
   Normally, write in the high-speed mode.

5. The other slave can be continuously cloned. When the [O] key on the master is pressed while the master displays "END", and the slave the master displays "␣␣CLONE␣". Carry out the operation in steps 2 to 4.

Note: Use the new cloning cable for TK-260G/270G.
   You cannot use the old cloning cable for TK-260/270.

Note: You can clone the programmed data between the transceiver listed below.
   Frequency version must be same.
   Cloning cable parts No.
   E30-3410-05 (TK-270G → TK-260G/270G)
   E30-3411-05 (TK-270G → TK-760G/762G)

Slave Master	TK-260G E TK-270G E	TK-260G (N)E TK-270G (N)E	TK-260G (N)T TK-270G (N)T	TK-762G E	TK-760G (N)E TK-762G (N)E
TK-270G E	OK	N/A	N/A	OK	N/A
TK-270G (N)E	N/A	OK	N/A	N/A	OK
TK-270G (N)T	N/A	N/A	OK	N/A	N/A

REALIGNMENT

Cloning cable parts No.
E30-3410-05 (TK-270G → TK-260G/270G)

E30-3411-05 (TK-270G → TK-760G/762G)

PTT/RXD

GND
REMOTE/TXD

φ 2.5

φ 3.5

Cloning cable

φ 2.5

φ 3.5

1 MBL
PSB
GND
PTT/RXD
ME
MIC
REMOTE/TXD
8 CM

PTT/RXD

GND
REMOTE/TXD
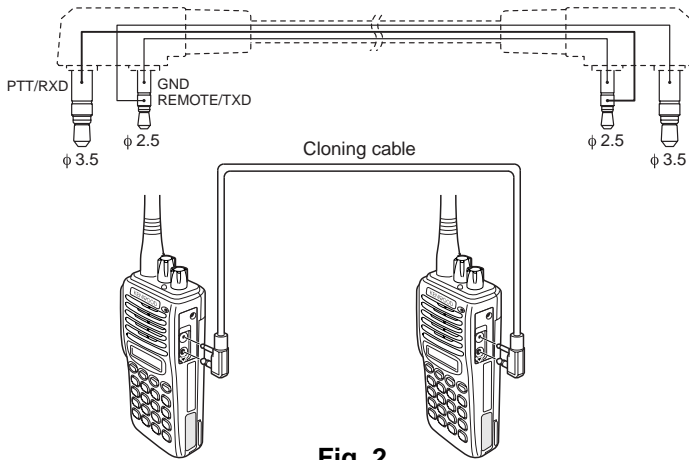
Fig. 2
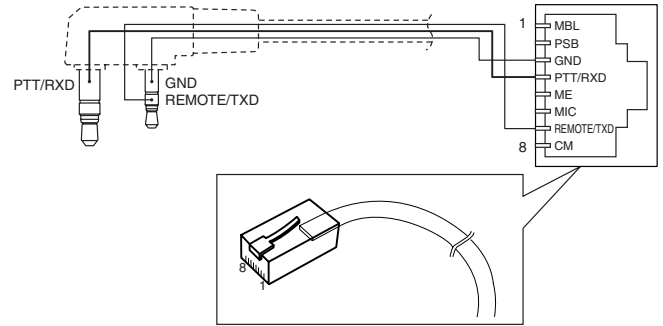
8. Self Programming Mode (TK-270G only)

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

8.1 Self programming mode setting

Remove D17 from the TX-RX unit (Figure 3) (E, (N)E, models only). Hold down the [Side1]+[●] switches and turn the power switch on.

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

Note :

This mode (self programming mode) cannot be set when it has been disabled with the FPU.

X57-587X
Compoent Side

D17
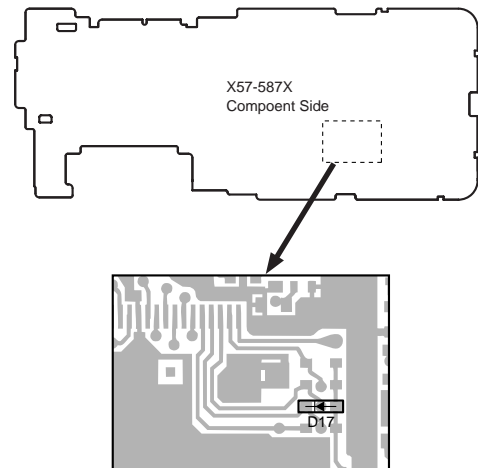
Fig. 3

TK-260G/(N)/270G/(N)

REALIGNMENT

8-2. Channel Setting Mode

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

Pressing [Side2] when "SELF" is displayed, sets Channel Setting Mode.
Select an item set using [►] then change the selection with the encoder.
The data displayed using [◄] is stored in the memory and then proceeds to the next item. Pressing [►] proceeds to the next item without storing it in the memory.
Press [Side2] to set the display to "SELF" and return to reset (default) status.
All channel data is cleared when pressing [◄] key with the blank RX frequency.

No.	Function	Choices	Display	Remarks
	Select Channel	1-128	_1-_1._	[►] : Group selection/
			_1-128._	Channel selection change
	Select Group	1-128	_1.-_1_	
			128.-_1_	
1	RX frequency	Step 2.5kHz-1MHz	STP_250 STP_1M	Display when an item is selected or when a step is changed (about 0.5 seconds) [●] Step change VHF : 2.5, 5.0,6.25,7.5kHz,1MHz,Step
		Blank	R. ——	[Side1] : Freq On/Blank switching
		100.0000-550.0000MHz	R.450.0000	The rightmost dot indicates 50Hz digit (On=5; Off=0).
2	Rx Signaling	OFF	——	[Side1] : Off/QT/DQT switching
		QT 67.0-250.3Hz (EIA Mode)	QT_67.0_ QT_250.3_	[●] : Mode switching
		QT 67.0-254.1Hz (0.1Hz Step Mode)	QT_67.0* QT_254.1*	[○] : Normal/Inverse switching
		DQT 000-777 (Normal) (1 Step Mode)	DQT000N* DQT777N*	
		DQT 023-754 (Normal) (Standard Table Mode)	DQT023N_ DQT754N_	
		DQT 000-777 (Inverse) (1 Step Mode)	DQT000I* DQT777I*	
		DQT 023-754 (Inverse) (Standard Table Mode)	DQT023I DQT754I	
3	TX frequency	Step 2.5kHz-1MHz	STP_250 STP_1M	Same as RX frequency.
		Blank	T. ——	
		100.0000-550.0000MHz	T.450.0000	
4	TX Signaling		Same as RX signaling.	
5	Option Signaling (Only when DTMF/ 2TONE is selected for signalling type)	OFF	NONE___	← Default
		DTMF	DTMF___	
		2-TONE	2TONE___	
6	ID (Only when DTMF is selected for signalling type)	000-9999999999	__ID___	Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			——987	Display when a code is input (Input it with DTMF key.)
		CLEAR	——000	[Side1] : Data clear

| No.	Function	Choices	Display	Remarks
7	Busy Channel Lockout	NO	BCL_NO_	← Default
		Type 1	BCL_1__	BCL_YES for E, (N)E type
		Type 2	BCL_2__	N/A for E, (N)E type
8	Beat shift	No	SHFT_NO_	← Default
		Yes	SHFT_YES	
9	RF Power	High Power	PWR_H__	← Default
		Low Power	PWR_L__	
10	Wide/Narrow (Wide 5K/ Wide 4k)	Wide (Wide 5K)	WIDE___ (Wide_5K_)	( ) : E-Type (N)E: Not used
		Narrow (Wide 4K)	NARROW__ (Wide_4K_)	
11	Scan Delete/ADD	DELETE	SCAN_DEL	
		ADD	SCAN_ADD	← Default
12	Priority Channel	No	P.CH_NO_	Not used when (Scan) Priority is not Fixed.
		Yes	P.CH_YES_	
13	Home Channel	No	H.CH_NO__	Not used when Home Channel is not set in Key Assignment.
		Yes	H.CH_YES_	
14	Compander	No	COMP_NO_	Not used when Wide is selected.
		Yes	COMP_YES	
15	PTT ID	OFF	P.ID_OFF	
		Begin of TX	P.ID_1	
		End of TX	P.ID_2	
		Both	P.ID_3	
16	Begin of TX ID (Only when DTMF/2TONE is selected for signalling type)	0-9999999999999999	_BOT_ID_	Not valid if Dial ID =Disable and PTT ID=OFF, or EOT is set. Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			——987	Display when a code is input (Input it with DTMF key.)
		Blank	——	[Side1] : Data clear
	Begin of TX ID (Only when 5TONE is selected for signalling type)	OFF	_BOT_OFF	Not valid if PTT ID=OFF, or EOT is set.
		Encode A~E	_BOT_A	Turn the rotary encoder.
17	END of TX ID (Only when DTMF/2TONE is selected for signalling type)	0-9999999999999999	_EOT_ID_	Not valid if Dial ID =Disable and PTT ID=OFF, or EOT is set. Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			——987	Display when a code is input (Input it with DTMF key.)
		Blank	——	[Side1] : Data clear
	END of TX ID (Only when 5TONE is selected for signalling type)	OFF	_EOT_OFF	Not valid if PTT ID=OFF, or EOT is set.
		Encode A~H	_EOT_A	Turn the rotary encoder.
18	Decode 1 ID (Only when 5TONE is selected for signalling type)	OFF	DEC1_OFF	Not valid if PTT ID=OFF, or EOT is set.
		Decode A~F	DEC1_A	Turn the rotary encoder.
19	Decode 2 ID (Only when 5TONE is selected for signalling type)	OFF	DEC2_OFF	Turn the rotary encoder.
		Decode A~F	DEC2_A	
20	CALL 1 ID (Only when 5TONE is selected for signalling type)	OFF	_CL1_OFF	Turn the rotary encoder.
		Encode A~H	_CL1_A	
21	CALL 2 ID (Only when 5TONE is selected for signalling type)	OFF	_CL2_OFF	Turn the rotary encoder.
		Encode A~H	_CL2_A	

REALIGNMENT

No.	Function	Choices	Display	Remarks
22	Transpond ID (Only when 5TONE is selected for signalling type)	OFF	_TSP_OFF	Turn the rotary encoder.
		Encode A~H	_TSP_A	
23	PTT ID Monitor (Only when 5TONE is selected for signalling type)	OPEN	PTTM_YES	Turn the rotary encoder.
		DISABLE	PTTM_NO_	
24	CALL 1 Monitor (Only when 5TONE is selected for signalling type)	OPEN	CL1M_YES	Turn the rotary encoder.
		DISABLE	CL1M_NO_	
25	CALL 2 Monitor (Only when 5TONE is selected for signalling type)	OPEN	CL2M_YES	Turn the rotary encoder.
		DISABLE	CL2M_NO_	

• **Flow Chart**

Channel Setting Mode (5TONE Model)
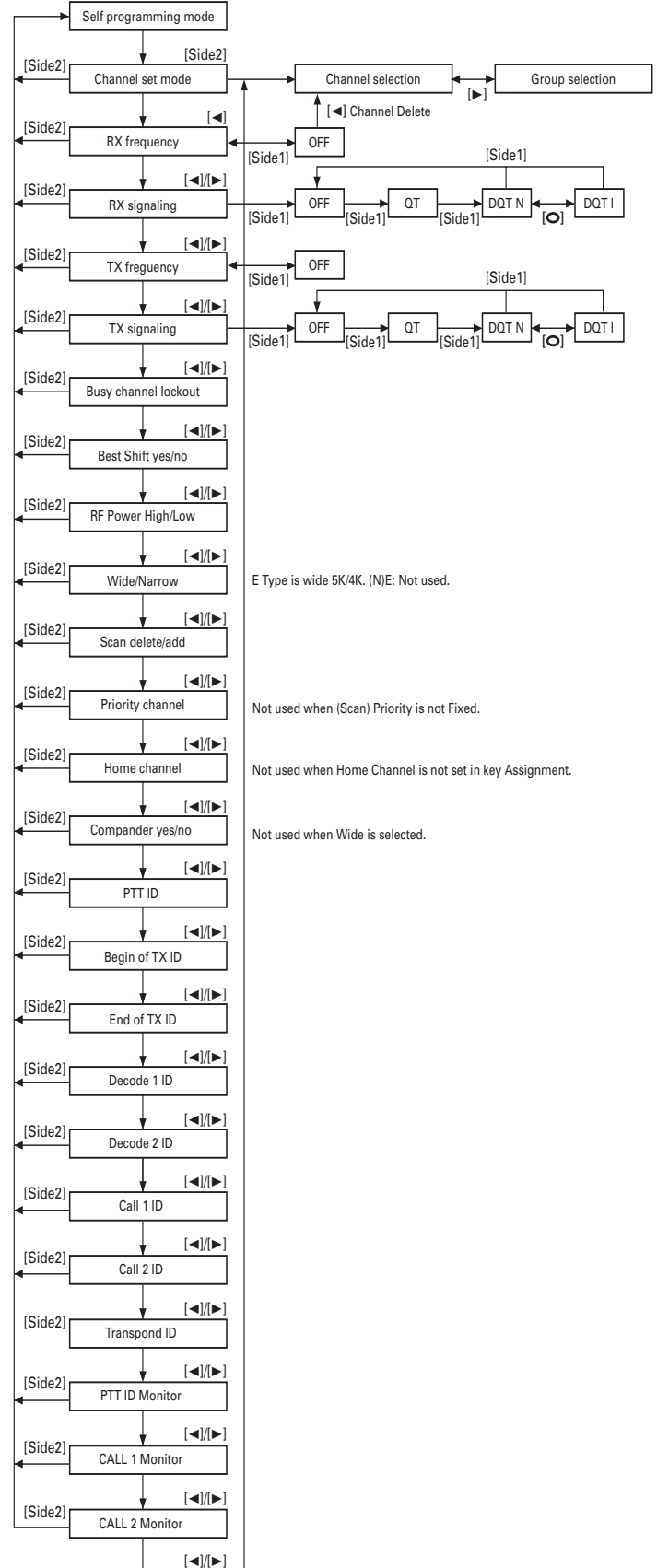
TK-260G/(N)/270G/(N)
REALIGNMENT

8-3. Function Setting Mode

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

Pressing the [Side1] when "SELF" is displayed, sets the Function Setting Mode.
Select an item set using [▶] then change the selection with the encoder.
The data displayed using [◀] is stored in the memory and then proceeds to the next item. Pressing [▶] proceeds to the next item without storing it in the memory.
Press [Side1] to display "SELF" and return to reset (default) status.

Function Setting Mode

No.	Function	Choices	Display	Remarks
		Optional Feature		
1	Power On Tone	YES/NO	PONT_YES	Default:YES
2	Control Tone	YES/NO	CNTT_YES	Default:YES
3	Warning Tone	YES/NO	WART_YES	Default:YES
4	Time Out Timer	OFF,15-300/15s Step	TOT_60	Default:60s
5	TOT Pre-Alert Time	OFF,1-10/ 1s Step	TOTP_PFF	Cannot be set when TOT is OFF. Default:OFF
6	TOT Rekey Time	OFF1-60/ 1s Step	TOTK_OFF	Cannot be set when TOT is OFF. Default:OFF
7	TOT Reset Time	OFF1-15/ 1s Step	TOTS_OFF	Cannot be set when TOT is OFF. Default:OFF
8	Battery Save	ON	BATT_ON	← Default
		OFF	BATT_OFF	
9	Squelch Level	0-9/1 Step	SQL__5	Default;5
		Others		
10	Panel Test/panel Tuning MODE	Enable	PTM_ENA	← Default (Not used for TK-260G)
		Disable	PTM_DIS	

8-4. Memory Reset Mode

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

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

Turning the encoder alternately switches the display between "CANCEL"◀━▶"READY".

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

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

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

When the memory is reset, mode data and model data are not reset.
The TK-260G cannot reset the memory.

• Flow Chart

Function Setting Mode

| [Side1] Self programming mode |
| [Side1] Function set mode |
| [Side1] [Side1] key function |
| [Side1] [MON] key function |
| [Side1] [O] key function |
| [Side1] [●] key function |
| [Side1] [◀] key function |
| [Side1] [▶] key function |
| [Side1] [CH] key function |
| [Side1] Power on tone yes/no |
| [Side1] Contorol tone yes/no |
| [Side1] WArning tone yes/no |
| [Side1] Time Out Timer |
| [Side1] T.O.T. Pre-alert time |
| [Side1] T.O.T. Rekey time |
| [Side1] T.O.T. Reset time |
| [Side1] Clear to Transpond |
| [Side1] Battery Save on/off |
| [Side1] Signaling |

| [Side1] Squelch level |
| [Side1] Priority |
| [Side1] Look back time A |
| [Side1] Look back time B |
| [Side1] Revert channel |
| [Side1] Dropout delay time |
| [Side1] Dwell time |
| [Side1] Digit time |
| [Side1] Inter digit time |
| [Side1] First digit time |
| [Side1] First digit delay |
| [Side1] Rise time with QT |
| [Side1] Dial ID |
| [Side1] No. of DTMF key |
| [Side1] DTMF hold time |
| [Side1] Store & Send |
| [Side1] D key assignment |
| [Side1] DTMF signaling |
| [Side1] Inter mediate code |

| [Side1] Group code |
| [Side1] Auto reset time |
| [Side1] Call alert/Transpond |
| [Side1] Panel test/Panel tuning mode |

TK-260G/(N)/270G/(N)
DISASSEMBLY FOR REPAIR

Separating the case assembly from the chassis.

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

TK-260G

stopper

TK-270G
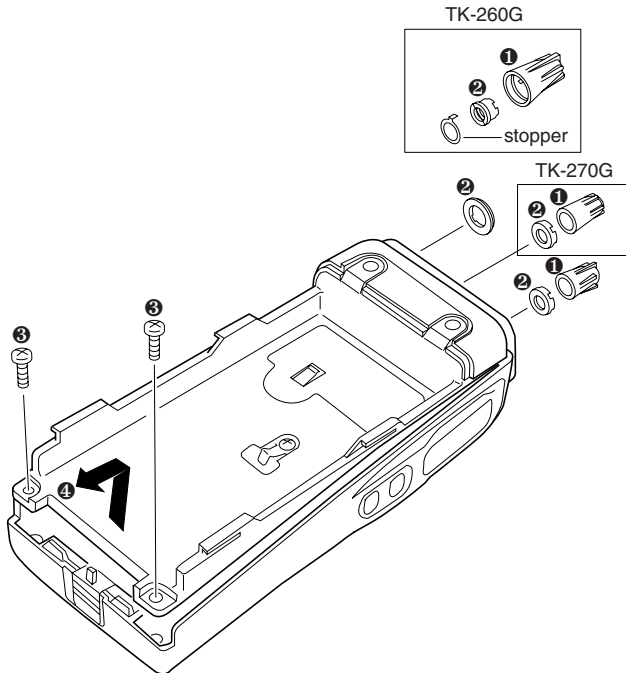
4. Taking cure not to cut the speaker lead ❺, open the chassis and case assembly, and pull the speaker lead with connector ❻.
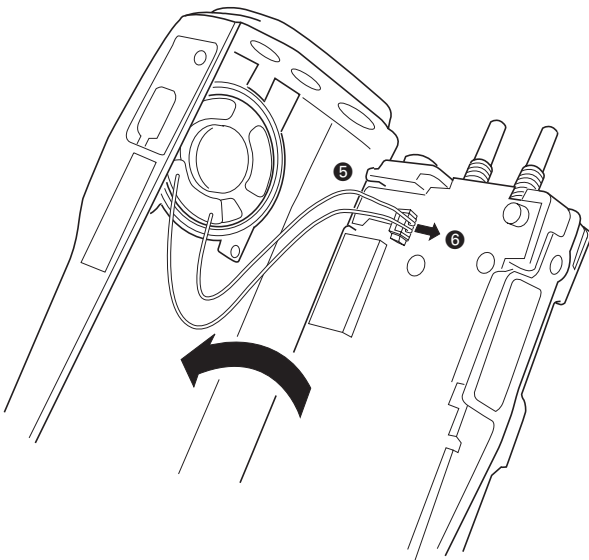
Separating the chassis from the unit.
• TK-260G

1. Remove the twelve small screws ❼, and the three large screws ❽.
2. Remove the solder from the antenna terminal using a soldering iron, then lift the unit off (X57).

• TK-270G

1. Remove the three screws ❾.
   Lift the unit (X54), and rise up the connecter lever in the arrow with your finger ❿.
   Remove the three hexagonal bosses ⓫, and remove the twelve screws ❼.
2. Remove the solder from the antenna terminal using a soldering iron, then lift the unit off (X57).

TK-270G

X54-

X57-

Antenna teminal

Unsolder

X57-
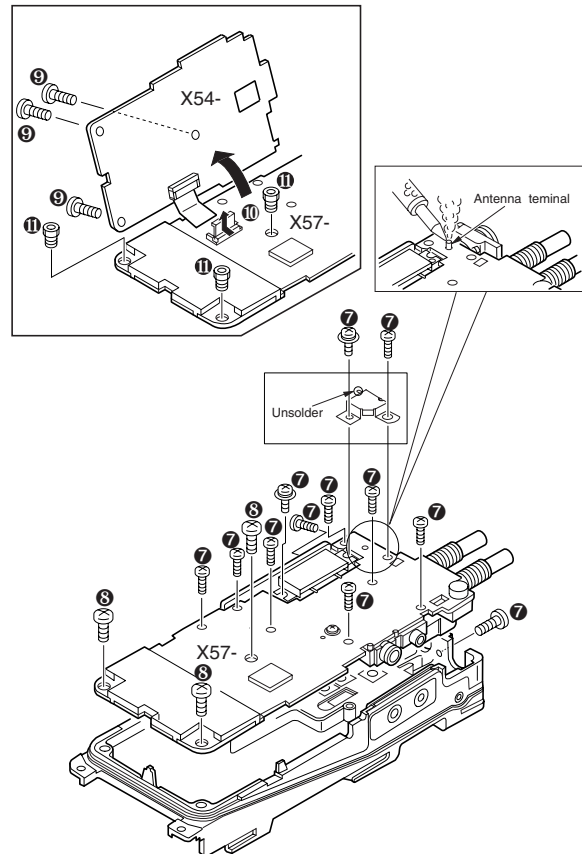
TK-260G/(N)/270G/(N)

CIRCUIT DESCRIPTION

1. Frequency configuration

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

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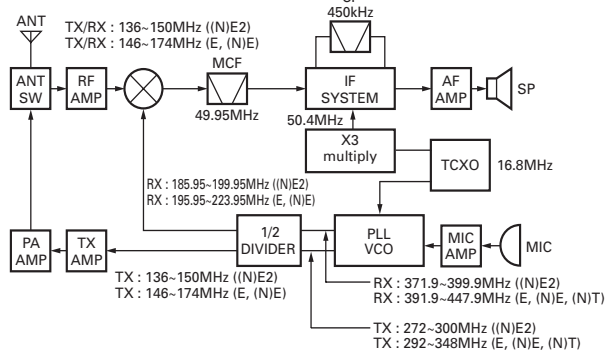
Fig. 1   Frequency configuration

2. Receiver

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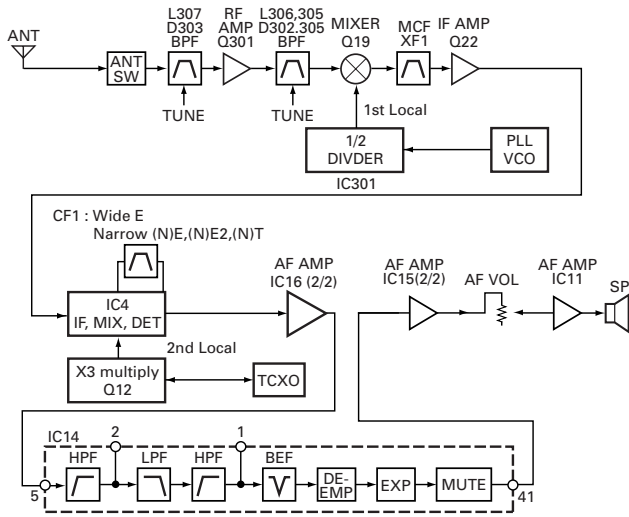
Fig. 2   Receiver section

1) Front end (RF AMP)

The signal coming form the antenna passes through the transmit/receive switching diode circuit, (D3,D7) passes through a BPF(L307), and is amplified by the RF amplifier (Q301).

The resulting signal passes through a BPF (L305 and L306) and goes to the mixer. These BPFs are adjusted by variable capacitors (D302, 303,305). The input voltage to the variable capacitor is regulated by voltage output from the microprocessor (IC13)

2) First mixer

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

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

3) IF Amplifier circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF1) to remove the adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q22) and then applied to the IF system IC (IC4). The IF system IC provides a second mixer, second local oscillator, limiting amplifier, quadrature detector and RSSI (Received Signal Strength Indicator). The second mixer mixes the first IF signal with the 50.4MHz of the second local oscillator output (TCXO X3) and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF1) to remove the adjacent channel signal. The filtered second IF signal is amplified by the limiting amplifier and demodulated by the quadrature detector with the ceramic discriminator (CD1). The demodulated signal is routed to the audio circuit.

4) Wide 5K/Wide 4K changeover circuit (without : (N)E, (N)E2, (N)T)

The Wide 5K (high level) and Wide 4K (low level) data is output from IC5 (OUTPUT EXPANDER), pin 4.

Q23 turns on/off with the Wide 5K/Wide 4K data and the IC4 detector output level is changed to maintain a constant output level during wide or narrow signals.
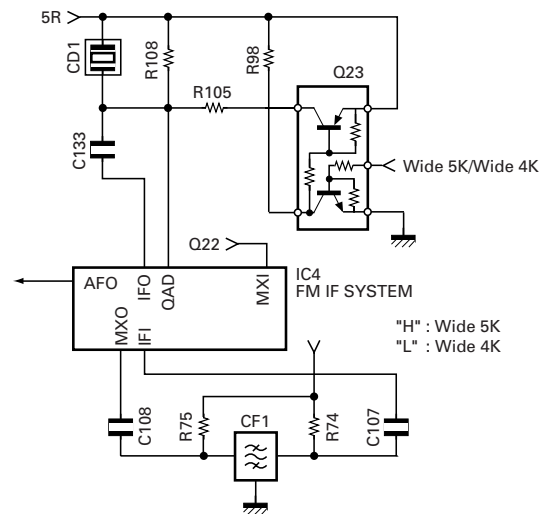
Fig. 3   Wide 5K/Wide 4K changeover circuit

CIRCUIT DESCRIPTION

5) Audio amplifier circuit

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

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

6) Squelch

Part of the AF signal from the IC enters the FM IC (IC4) again, and the noise component is amplified and rectified by a filter and an amplifier to produce a DC voltage corresponding to the noise level.

The DC signal from the FM IC goes to the analog port of the microprocessor (IC13). IC13 determines whether to output sounds from the speaker by checking whether the input voltage is higher or lower than the preset value.

To output sounds from the speaker, IC6 sends a high signal to the SP MUTE line and turns IC11 on through Q32,Q33,Q34 and Q30.(See Fig. 4)

7) Receive signaling

(1) QT/DQT

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

(2) 2-TONE

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

(3) DTMF

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

3. PLL frequency synthesizer

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

1) PLL

The frequency step of the PLL circuit is 5 or 6.25kHz.
A 16.8MHz reference oscillator signal is divided at IC2 by a fixed counter to produce an oscillator (VCO) output signal which is buffer amplified by Q3 then divided in IC2 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal from the phase comparator in IC2. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency.(See Fig. 5)

2) VCO

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

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

The outputs from Q3 to Q4 is divided into 1/2 in passing through a Divider IC (IC301), and goes to the RF amplifiers.

Fig. 4　AF Amplifier and Squelch
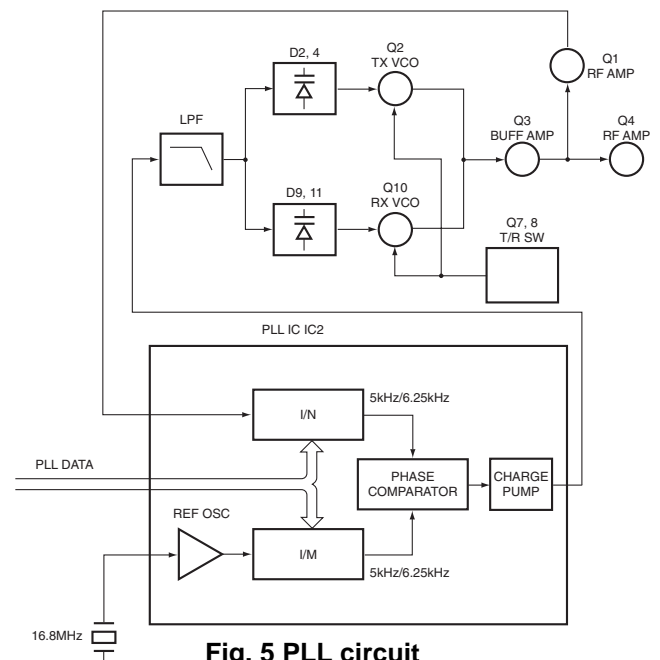
Fig. 5 PLL circuit

CIRCUIT DESCRIPTION

3) UNLOCK DETECTOR

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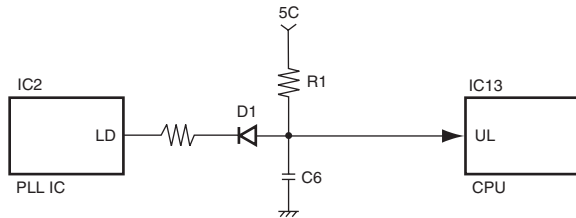
Fig. 6 Unlock detector circuit

4. Transmitter System

1) Microphone amplifier

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

The signal passes through the D/A converter (IC17) for the maximum deviation adjustment, and goes to the VCXO modulation input.
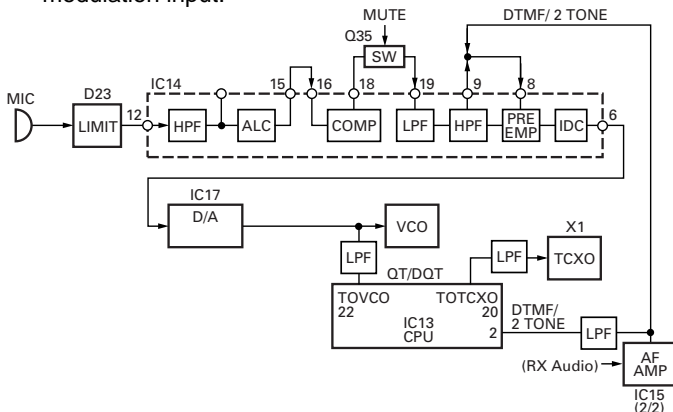
Fig. 7 Microphone amplifier

2) Drive and Final amplifier

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

The output of the drive amplifier is amplified by the RF power amplifier (IC1) to 5.0W (1W when the power is low). The RF power amplifier consists of two MOS FET stages. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D3 is on) and applied to the antenna terminal.
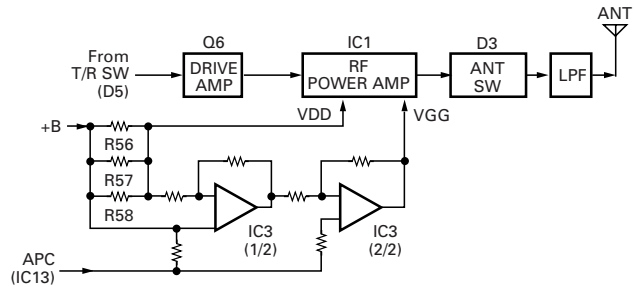
Fig. 8 Drive and final amplifier and APC circuit

3) APC circuit

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

IC3(2/2) compares the output voltage of IC3(1/2) with the reference voltage from IC13, and the output of IC3(2/2) controls the VGG of the RF power amplifier to make both voltages the same.

The change of power high/low is carried out by the change of the reference voltage.

4) Encode signaling

(1) QT/DQT

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

The QT,DQT data of the TOVCO Line is output form pin 22 of the CPU. The signal passes through a low pass CR filter, mixes with the audio signal, and goes to the VCO modulation input. TX deviation is adjusted by the CPU. (See fig.7)

(2) DTMF/2 TONE

High-speed data is output from pin 2 of the CPU. The signal passes through a low-pass CR filter, and provides a TX and SP out tone, and is then applied to the audio processor (IC14). The signal is mixed with the audio signal and goes to the VCO.

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

5. Power supply

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

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

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

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

CIRCUIT DESCRIPTION

6. Control Circuit

The control circuit consists of a microprocessor (IC13) and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the display unit. IC13 mainly performs the following:

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

1) Frequency shift circuit

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

2) Memory circuit

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

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

• Flash Memory

Note : The flash memory holds data such as written with the FPU (KPG-67D), and firmware program (User mode, Test mode, Tuning mode, etc.). This data must be rewritten when replacing the flash memory.

• EEPROM

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

Fig. 9 Memory circuit

3) Low battery warning

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

Low battery warning	Battery condition
The red LED flashes during transmission.	The battery voltage is low but the transceiver is still usable.
The red LED flashes and a continuous beep sounds while PTT is pressed.	The battery voltage is low and the transceiver is not able to make calls.
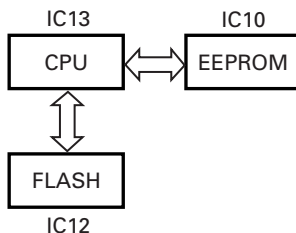
TK-260G/(N)/270G/(N)
CIRCUIT DESCRIPTION/SEMICONDUCTOR DATA

7. CONTROL SYSTEM

Keys and channel selector circuit.

The signal from the keys and channel selector are directly input to the microprocessor, as shown in fig. 10.
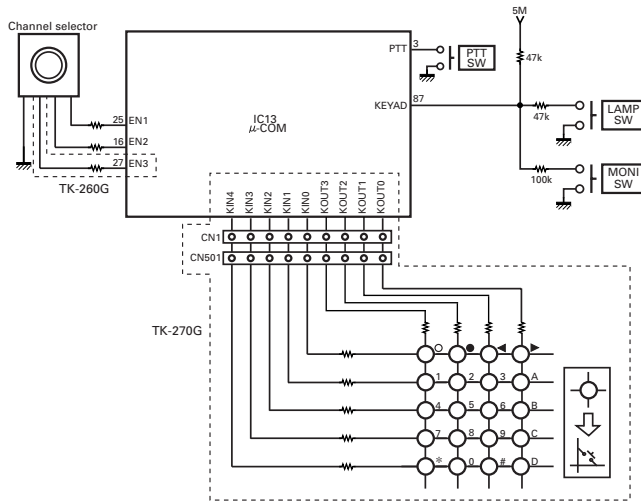
Fig. 10 Control system

SEMICONDUCTOR DATA

LCD Driver : LC75823W (Display UNIT IC501)
(TK-270G only)

■ Block diagram
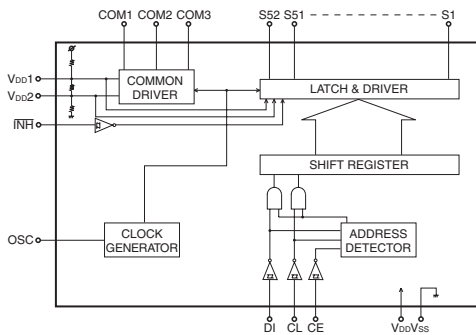
■ Pin function

Pin No.	Name	I/O	Active	Function
1-52	S1-S52	O	-	Segment output for displaying data transferred form serial data.
53-55	COM1-COM3	O	-	Common drive output. Frame frequency fo=(fosc/384)Hz
56	VDD	-	-	
57	$\overline{INH}$	I	L	The display to turn off $\overline{INT}$=L : Turn off $\overline{INT}$=H : Turn on
58	VDD1	I	-	Apply 2/3 the LCD drive bias voltage from outside. If 1/2 the bias is applied, connect to VDD2.
59	VDD2	I	-	Apply 1/3 the LCD drive bias voltage from outside. If 1/2 the bias is applied, connect to VDD1.

Pin No.	Name	I/O	Active	Function
60	VSS	-	-	
61	OSC	I/O	-	Oscillation terminal
62	CE	I	H	Chip enable. Serial data transfer terminal. Connected to the microprocessor.
63	CL	I	⌐	Synchronizing clock. Serial data transfer terminal. Connected to the microprocessor.
64	DI	I	-	Transfer data. Serial data transfer terminal. Connected to the microprocessor.

UPB1509GV (IC301)
■ Pin connection diagram
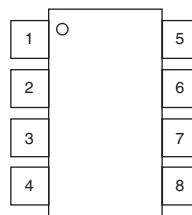
Pin No.	Pin Name
1	V_{CC1}
2	IN
3	$\overline{IN}$
4	GND
5	SW1
6	SW2
7	OUT
8	V_{CC2}

■ Block diagram
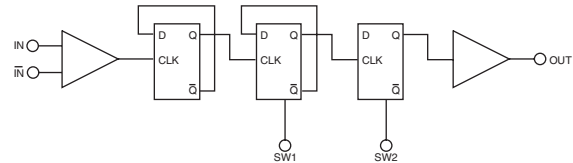
■ Pin Function

Pin No.	Pin name	Applied voltage	Pin voltage	Functions and uses
1	V_{CC1}	2.2-2.5	-	Power supply voltage pin for the input amplifier section and division circuit. Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground (for example, 1000 pF).
2	IN	-	1.7-4.95	Signal input pin. Connect a coupling capacitor to this pin for DC cutting with an external circuit (for example, 1000 pF).
3	$\overline{IN}$	-	1.7-4.95	Input signal bypass pin. Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground (for example, 1000 pF).
4	GND	0	-	Ground pin. Connect it with the ground pattern. The ground pattern on the PC board should be wide enough to minimize impedance.
5	SW1	H/L	-	Division ratio setting pin. The division ratio can be set by the following voltage:
6	SW2			Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground.
7	OUT	-	1.0-4.7	Division signal output pin. Emitter follower output. 0.1 Vpf or more can be output under 200-ohmload. Connect a coupling capacitor to this pin for DC cutting with an external circuit (for example,1000 pF).
8	V_{CC2}	2.2-5.5	-	Power supply voltage pin for the output buffer circuit. Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground (for example, 1000 pF).

For pin 5 SW1:

		SW2	
		H	L
SW1	H	1/2	1/4
	L	1/4	1/2

SEMICONDUCTOR DATA

Microprocessor : 30622M4102GP (TX-RX UNIT : IC13)

■ **Pin function**

Pin No.	Port Name	I/O	Function
1	APC	O	TX:Automatic Power Control data output RX:BPF tuning data
2	DTMF	O	DTMF/2TONE/5TONE BEEP output
3	2TN	I	2Tone and 5Tone decode pulse input
4	DTMSTD	I	DTMF decode detect detect:H
5	SIM	I	Destination select
6	BYTE	I	+5V(5M)
7	CNVSS	I	GND
8	AFSTB	O	Base Band IC strobe/rest output
9	AFFCLK	O	Base Band IC frame rest/system reset output
10	RESET	I	Reset
11	XOUT	O	Clock output
12	VSS	-	GND
13	XIN	I	Clock input
14	VCC	-	+5V
15	NC	I	NC
16	EN2	I	Encoder pulse input 2
17	AUX3	I/O	Option board port 3 *Smar Trunk: Clock output *E Trunk: Step pulse input
18	INT	I	Battery voltage monitor input Low battery:L
19	OE	I	Not used
20	TOTCXO	I	QT/DQT modulation output(TCXO)
21	EEPDAT	I/O	EEPROM data input/output
22	TOVCO	O	QT/DQT modulation output(VCO)
23	AUX1	I	Option board port 1 *Smar Trunk: Req/Ack input *E Trunk: TX Request input
24	SFTSTB	O	Shift register strobe output
25	EN1	O	Encoder pulse input 1
26	DACS	I	Chip select output(Max dev) Select:L
27	EN3	I	CH selector input (TK-260G)
28	NC	O	NC
29	AUX4	O	Option board port 4 *Smar Trunk: Data output
30	AUX2	I/O	Option board port 2 *Smar Trunk: Data input *E Trunk: Synchronizing input
31	KOUT3	O	Key scan output 3
32	KOUT2	O	Key scan output 2
33	TXD	O	Serial data
34	PTT/RXD	I	PTT on: L/Serial data
35	KOUT1	O	Key scan output 1
36	KOUT0	O	Key scan output 0
37	RDY	-	Not used
38	ALE	O	Not used
39	HOLD	I	Not used
40	HLDA	O	Not used
41	BLCK	O	Not used
42	RDY	O	READ signal
43	BHE	O	Not used
44	WR	O	WRITE signal
45	LCDCS	O	LCD chip enable output
46	CNTDAT	O	Common data output (EEPROM,LCD,SHIFT REG,1bit D/A MODEM)
47	CNTCLK	O	Common clock output (EEPROM,LCD,SHIFT REG,1bit D/A MODEM)

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

Shift register 1:BU4094BCFV(IC5)

■ **Pin function**

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

Shift register 2:BU4094BCFV(IC6)

■ **Pin function**

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

TK-260G/(N)/270G/(N)
DESCRIPTION OF COMPONENTS

DISPLAY UNIT (X54-3250-10) (TK-270G Only)

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

TX-RX UNIT (X57-587X-XX)

Ref. No.	Use/Function	Operation/Condition
IC1	IC	RF Power Module
IC2	IC	PLL system
IC3	IC	Comparator (APC)
IC4	IC	FM IF system
IC5,6	IC	Shift register / Output expander
IC7	IC	Voltage regulator / 5V
IC8	IC	Voltage detector / Reset
IC9	IC	Voltage detector / INT
IC10	IC	EEPROM
IC11	IC	AF Power amplifier
IC12	IC	Flash memory
IC13	IC	Microprocessor
IC14	IC	Audio processor
IC15(1/2)	IC	2Tone and 5Tone amplifier
IC15(2/2)	IC	AF Pre amplifier
IC16(1/2)	IC	Bias buffer
IC16(2/2)	IC	AF Buffer amplifier
IC17	IC	D/A converter (TX AF adjustment)
IC18	IC	DTMF decoder
IC19	IC	Active filter / For LSD in
IC301	IC	VCO 1/2 divider
Q1	Transistor	PLL IC fin amplifier
Q2	Transistor	VCO oscillation (TX)
Q3	Transistor	RF Buffer amplifier
Q4	Transistor	RF amplifier
Q6	Transistor	RF amplifier / TX driver
Q7	FET	DC switch
Q8,Q9	Transistor	DC switch
Q10	FET	VCO oscillation (RX)
Q11	Transistor	Ripple filter
Q12	Transistor	Tripler
Q13	Transistor	DC switch
Q14	Transistor	2nd IF W/N switch sets to on when Narrow
Q15	Transistor	DC switch
Q16	Transistor	DC switch / 5R
Q17	Transistor	2nd IF W/N switch sets to on when Wide
Q18	Transistor	DC switch / 5T, Save
Q19	FET	Mixer
Q20,Q21	Transistor	DC switch / 5T, Save
Q22	Transistor	IF amplifier

Ref. No.	Use/Function	Operation/Condition
Q23	Transistor	DC switch / W/N audio amplitude adjust
Q24	Transistor	DC switch / LED (Red)
Q25	Transistor	DC Switch / LED (Green)
Q26	Transistor	DC switch / Squelch
Q27	FET	DC switch / 5T, Save
Q28	Transistor	DC switch / 5M
Q30	FET	SP Mute switch
Q31	Transistor	Clock frequency shift
Q32~34	Transistor	DC switch / SP Mute
Q35(1/2)	FET	Mute switch / MIC line mute
Q35(2/2)	FET	DC switch
Q36	FET	Mute switch
Q301	FET	RF amplifier
D1	Diode	Unlock detect
D2	Variable capacitance diode	Frequency control
D3	Diode	ANT switch
D4	Variable capacitance diode	Frequency control
D5	Diode	TX/RX switch
D6	Variable capacitance diode	TX modulation
D7	Diode	ANT switch
D8	Zener Diode	Overload protection
D9	Variable capacitance diode	Frequency control
D10	Diode	ANT switch
D11	Variable capacitance diode	Frequency control
D12	Diode	Current steering
D13,14	Diode	RF switch (2nd IF wide/narrow)
D15	Diode	Reverse protection
D17	Diode	Model check
D18	LED	LED/ Red, Green
D19	Diode	Model check
D21	Diode	Voltage drop
D22	Diode	Reverse protection
D23	Diode	Voltage clamp
D302,303,305	Variable capacitance diode	Rf BPF turnig

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TK-260G/(N)/270G/(N)

PARTS LIST

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*
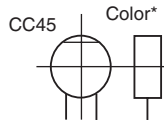
· Capacitor value

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

2   2   0 = 22pF
   Multiplier
   2nd number
   1st number
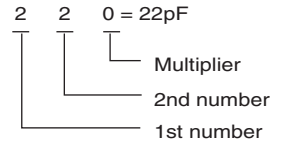
· **Temperature coefficient**

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

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

Example : CC45TH = -470 ± 60ppm/℃

· **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 - 40	+ 80 - 20	+ 100 -0	More than 10μF -10 ~ +50 Less than 4.7μF -10 ~ +75

(Less than 10pF)

Gode	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	1	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	3.0 ±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
H	1.0 ±0.05	0.5 ±0.05	0.5 ±0.05

Dimension

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 (Nomal 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
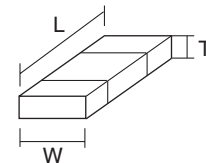
Dimension (Chip resistor)

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
H	1.0 ±0.05	0.5 ±0.05	0.35 ±0.05

Rating wattage

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

TK-260G/(N)/270G/(N)

PARTS LIST

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

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

TK-260G/(N)/270G/(N)
DISPLAY UNIT (X54-3250-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
			TK-260G/(N)/270G/(N)		
1	1C	∗	A02-2385-33	CABINET ASSY	270G
2	1A	∗	A02-2391-23	CABINET ASSY	260G
3	3B,3C	∗	A82-0036-02	REAR PANEL	
4	2E		B09-0351-03	CAP (SP/MIC)	
5	2D		B11-1220-03	ILLUMINATION GUIDE	270G
6	2D	∗	B38-0820-05	LCD	270G
7	2F	∗	B62-1293-30	INSTRUCTION MANUAL	260G
7	2F	∗	B62-1294-30	INSTRUCTION MANUAL	270G
8	1B	∗	D32-0423-04	STOPPER	260G
9	3B,3D		E04-0413-05	RF COAXIAL RECEPTACLE(SMA)	
10	3A,3C		E23-1183-04	RELAY TERMINAL (BATT -)	
11	2A,2D	∗	E23-1184-04	RELAY TERMINAL (BATT +)	
12	2D	∗	E29-1177-04	INTER CONNECTOR (LCD)	270G
13	2C	∗	E37-0805-05	FLAT CABLE (TX/RX-DISP)	270G
14	1D,2B	∗	E37-0829-05	SPEAKER LEAD ASSY	
15	3A,3C	∗	E37-0830-05	FLAT CABLE (PTT)	
16	2A,2D	∗	F10-2302-04	SHIELDING COVER(POWER MODULE)	
17	2A,2C	∗	F10-2304-03	SHIELDING COVER(TX/RX UNIT)	
18	2A,2D	∗	F10-2361-04	SHIELDING COVER(CAV,RADI)	
19	2C	∗	F20-3307-04	INSULATING SHEET(TX/RX UNIT)	270G
20	2C	∗	F20-3308-04	INSULATING SHEET(TX/RX UNIT)	270G
21	1A,1C		G01-0881-04	COIL SPRING (BATT RELEASE)	
22	1D	∗	G10-1232-04	FIBROUS SHEET (SPEAKER)	270G
23	1A	∗	G10-1233-04	FIBROUS SHEET (SPEAKER)	260G
24	3B,3D	∗	G13-1744-14	CUSHION (CHASSIS-BATT)	
25	2D	∗	G13-1762-04	CUSHION (ANT-S,COVER)	270G
26	3A,3D	∗	G53-1530-02	PACKING (SIDE)	
27	2B,2D	∗	G53-1531-03	PACKING (SP/MIC)	
28	1D	∗	G53-0882-03	PACKING (SPEAKER/ECM)	270G
29	2A,2D	∗	G53-0883-04	PACKING (BATT TERMINAL)	
30	1B	∗	G53-0884-04	PACKING (ECM)	260G
31	1A	∗	G53-0885-04	PACKING (SPEAKER)	260G
32	1A,1C	∗	G53-0891-04	PACKING (PTT KNOB)	
33	1E,2F		H12-1487-02	PACKING FIXTURE	
34	1F		H25-0085-04	PROTECTION BAG (100/200/0.07)	
35	2E		H25-2012-04	PROTECTION BAG (75/100/0.08)	
36	3F	∗	H52-1413-02	ITEM CARTON CASE	270G
37	3F	∗	H52-1417-02	ITEM CARTON CASE	260G
38	1A,1C		J19-1572-04	HOLDER (BATT RELEASE)	
39	2D	∗	J19-5352-03	HOLDER (VOL/ENC)	270G
40	2A,2D	∗	J19-5353-14	HOLDER (BATT TERMINAL)	
41	2B	∗	J19-5355-03	HOLDER (VOL/CHANNEL SW)	260G
42	2E		J21-4493-04	SP/MIC HOLDER	
43	2D	∗	J21-8377-03	LCD HOLDER	270G
44	1D	∗	J21-8378-04	SPEAKER FIXTURE	270G
45	2A	∗	J21-8381-14	SPEAKER FIXTURE	260G
46	2E		J29-0624-03	BELT HOOK	
47	2C	∗	J32-0925-04	HEXAGON BOSS	270G
48	1B	∗	K29-5331-03	KNOB (ENCODER)	270G

Ref. No.	Address	New parts	Parts No.	Description	Destination
49	1C	∗	K29-5332-03	KNOB (VOLUME)	
50	1A,1C	∗	K29-5333-13	BUTTON KNOB (MONI/LAMP)	
51	1A,1C	∗	K29-5334-13	BUTTON KNOB (PTT)	
52	1A,1C		K29-5337-03	LEVER KNOB (BATT RELEASE)	
53	1B	∗	K29-5341-03	KNOB (CHANNEL SELCTOR)	260G
54	1C	∗	K29-5459-12	KEY TOP (DTMF)	270G
A	3B,3D		N09-2319-05	BINDING HEAD SCREW	
B	2A,2D	∗	N09-2331-05	SPECIAL SCREW	
C	1B,1D		N14-0582-14	CIRCULAR NUT	
D	1B,1D		N14-0583-04	CIRCULAR NUT	
E	1B	∗	N14-0588-04	CIRCULAR NUT	260G
F	3A,3C		N30-2606-46	PAN HEAD MACHINE SCREW	
G	2A		N30-3004-46	PAN HEAD MACHINE SCREW	260G
H	2C		N39-2030-46	PAN HEAD MACHINE SCREW	270G
I	2A,2D	∗	N67-2005-46	PAN HEAD SEMS SCREW W	
J	3A,3B,3C,3D	∗	N78-2045-46	PAN HEAD TAPTITE SCREW	
K	3A,3C	∗	N79-2030-46	PAN HEAD TAPTITE SCREW	
L	2A,2C,2D		N83-2005-46	PAN HEAD TAPTITE SCREW	
M	2E	∗	N99-2012-05	SCREW SET	
VR2	-	∗	R31-0628-15	VARIABLE RESISTOR	
S1	-	∗	S60-0418-05	ROTARY SWITCH	260G
SP	1D		T07-0326-05	SPEAKER	270G
SP	2A		T07-0327-05	SPEAKER	260G
ANT	-		T90-0680-05	HELICAL ANTENNA	NT
ANT	-		T90-0681-05	HELICAL ANTENNA	NE2
ANT	-		T90-0695-15	HELICAL ANTENNA	E,NE
S1	-	∗	W02-1969-05	ENCODER	270G
			DISPLAY UNIT (X54-3250-10) (TK-270G only)		
D506			B30-2210-05	LED(LCD BACK LIGHT)	
D508-510			B30-2171-05	LED(LCD BACK LIGHT)	
D511			B30-2210-05	LED(LCD BACK LIGHT)	
D512-516			B30-2171-05	LED(LCD BACK LIGHT)	
C501-509			CC73GCH1H221J	CHIP C 220PF J	
C513			CK73GB1H102K	CHIP C 1000PF K	
C515,516			CC73GCH1H101J	CHIP C 100PF J	
CN501			E40-6012-05	FLAT CABLE CONNECTOR	
			J72-0663-02	PRINTED WIRING BOARD	
L501,502			L92-0138-05	FERRITE CHIP	
CP501			R90-0748-05	MULTI-COMP 47K X4	
CP502,503			R90-0724-05	MULTI-COMP 1K X4	
R501-510			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R511			R92-1252-05	CHIP R 0 OHM	
R512			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R513-515			RK73GB1J103J	CHIP R 10K J 1/16W	
R516			RK73GB1J473J	CHIP R 47K J 1/16W	
R517			RK73GB1J103J	CHIP R 10K J 1/16W	
R518			RK73GB1J471J	CHIP R 470 J 1/16W	
R519-522			RK73GB1J102J	CHIP R 1.0K J 1/16W	

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260G : TK-260G E,(N)E,(N)T,(N)E2   A : TK-260G E   D : TK-270G E
270G : TK-270G E,(N)E,(N)T   B : TK-260G (N)E,(N)T E : TK-270G (N)E,(N)T
                                   C : TK-260G (N)E2

PARTS LIST

DISPLAY UNIT (X54-3250-10)
TX-RX UNIT (X57-5872-XX)

Ref. No.	Address	New parts	Parts No.	Description				Destination
R523			RK73GB1J473J	CHIP R	47K	J	1/16W	
R524			RK73GB1J471J	CHIP R	470	J	1/16W	
D501-504			MA2S111	DIODE				
D505			1SS373	DIODE				
D507			MA2S111	DIODE				
IC501			LC75823W	IC				
Q501			2SB1132(Q,R)	TRANSISTOR				
Q502			2SC4617(S)	TRANSISTOR				

TX-RX UNIT (X57-5872-XX)
-71:TK-260G E   -73:TK-270G E   -72:TK-260G (N)E,(N)T
-74:TK-270G (N)E,(N)T -75:TK-260G (N)E2

Ref. No.	Address	New parts	Parts No.	Description				Destination
D18			B30-2019-05	LED(RED/GRE)				
C1			CK73GB1H471K	CHIP C	470PF	K		
C3,4			CC73GCH1H070B	CHIP C	7.0PF	B		A,B,D,E
C3,4			CC73GCH1H090B	CHIP C	9.0PF	B		C
C5			CC73GCH1H100C	CHIP C	10PF	C		A,B,D,E
C5			CC73GCH1H120G	CHIP C	12PF	G		C
C6			CK73GB1C104K	CHIP C	0.10UF	K		
C8			CC73GCH1H030B	CHIP C	3.0PF	B		
C9			CK73GB1H102K	CHIP C	1000PF	K		C
C9,10			CK73GB1H102K	CHIP C	1000PF	K		A,B,D,E
C10			CC73GCH1H101J	CHIP C	100PF	J		C
C11			CC73GCH1H820J	CHIP C	82PF	J		C
C11,12			CC73GCH1H180J	CHIP C	18PF	J		A,B,D,E
C12			CC73GCH1H220G	CHIP C	22PF	G		C
C13			CK73GB1H102K	CHIP C	1000PF	K		
C14			CC73GCH1H010B	CHIP C	1.0PF	B		
C16			CC73GCH1H150G	CHIP C	15PF	G		
C17			CC73GCH1H040B	CHIP C	4.0PF	B		C
C17			CC73GCH1H060B	CHIP C	6.0PF	B		A,B,D,E
C18			CC73GCH1H330G	CHIP C	33PF	G		A,B,D,E
C18			CK73GB1H471K	CHIP C	470PF	K		C
C20			CC73GCH1H110J	CHIP C	11PF	J		C
C21			CC73GCH1H100C	CHIP C	10PF	C		C
C22			CC73GCH1H101J	CHIP C	100PF	J		
C23			CC73GCH1H100C	CHIP C	10PF	C		C
C23			CC73GCH1H220G	CHIP C	22PF	G		A,B,D,E
C24			CC73GCH1H160G	CHIP C	16PF	G		A,B,D,E
C24			CC73GCH1H240G	CHIP C	24PF	G		C
C25			CC73GCH1H130G	CHIP C	13PF	G		A,B,D,E
C25			CC73GCH1H180G	CHIP C	18PF	G		C
C26			CC73GCH1H040B	CHIP C	4.0PF	B		C
C27			CC73GCH1H0R5B	CHIP C	0.5PF	B		
C28			CC73GCH1H040C	CHIP C	4.0PF	C		
C30			CC73GCH1H100D	CHIP C	10PF	D		
C31			C92-0507-05	CHIP-TAN	4.7UF	6.3WV		
C32			CK73GB1C104K	CHIP C	0.10UF	K		
C33			CC73GCH1H080B	CHIP C	8.0PF	B		A,B,D,E
C33			CC73GCH1H150G	CHIP C	15PF	G		C
C35-37			CK73GB1H102K	CHIP C	1000PF	K		
C40,41			CK73GB1H102K	CHIP C	1000PF	K		
C42-44			CC73GCH1H101J	CHIP C	100PF	J		
C45			CK73GB1H471K	CHIP C	470PF	K		
C48,49			C92-0001-05	CHIP-C	0.1UF	35WV		

Ref. No.	Address	New parts	Parts No.	Description				Destination
C51			C92-0514-05	CHIP-TAN	2.2UF	10WV		
C52			CC73GCH1H050B	CHIP C	5.0PF	B		C
C52			CC73GCH1H390J	CHIP C	39PF	J		A,B,D,E
C53			CK73GB1H102K	CHIP C	1000PF	K		
C54			CK73FB1C474K	CHIP C	0.47UF	K		
C55			CK73GB1H102K	CHIP C	1000PF	K		
C57			CK73FB1C474K	CHIP C	0.47UF	K		
C58			CK73GB1H103K	CHIP C	0.010UF	K		
C60			CK73GB1H103K	CHIP C	0.010UF	K		
C62			CC73GCH1H150G	CHIP C	15PF	G		C
C62			CC73GCH1H221J	CHIP C	220PF	J		A,B,D,E
C63			CC73GCH1H050B	CHIP C	5.0PF	B		
C64			CC73GCH1H010B	CHIP C	1.0PF	B		
C68			C92-0565-05	CHIP-TAN	6.8UF	10WV		
C70			CK73GB1H103K	CHIP C	0.010UF	K		
C71			CC73GCH1H101J	CHIP C	100PF	J		
C72			CC73GCH1H060B	CHIP C	6.0PF	B		A,B,D,E
C72			CC73GCH1H200J	CHIP C	20PF	J		C
C73			CK73GB1H102K	CHIP C	1000PF	K		
C74			CK73FB1E104K	CHIP C	0.10UF	K		
C75,76			CK73GB1H102K	CHIP C	1000PF	K		
C78			CC73GCH1H470J	CHIP C	47PF	J		
C81			CC73GCH1H010C	CHIP C	1.0PF	C		
C82			CK73GB1H102K	CHIP C	1000PF	K		
C84,85			CK73GB1H102K	CHIP C	1000PF	K		
C86,87			CC73GCH1H100D	CHIP C	10PF	D		
C88			CC73GCH1H1R5B	CHIP C	1.5PF	B		A,B,D,E
C88			CC73GCH1H3R5B	CHIP C	3.5PF	B		C
C89			CC73GCH1H050B	CHIP C	5.0PF	B		
C90			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C94			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C95,96			CK73GB1H102K	CHIP C	1000PF	K		
C98			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C99			CK73GB1C104K	CHIP C	0.10UF	K		
C100			C92-0507-05	CHIP-TAN	4.7UF	6.3WV		
C101			CK73GB1H102K	CHIP C	1000PF	K		
C104			CK73GB1H102K	CHIP C	1000PF	K		
C107,108			CK73GB1C104K	CHIP C	0.10UF	K		
C109			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C110			CK73GB1H103K	CHIP C	0.010UF	K		
C111			CK73GB1H102K	CHIP C	1000PF	K		
C112			CC73GCH1H020B	CHIP C	2.0PF	B		
C113			CK73GB1H471K	CHIP C	470PF	K		
C114			CK73GB1H391K	CHIP C	390PF	K		
C115			CK73GB1C104K	CHIP C	0.10UF	K		
C118			CK73GB1H102K	CHIP C	1000PF	K		
C119			CK73FB1A105K	CHIP C	1.0UF	K		
C120,121			CK73GB1H102K	CHIP C	1000PF	K		
C122			CK73FB1A105K	CHIP C	1.0UF	K		
C123			CK73GB1H391K	CHIP C	390PF	K		
C124			CC73GCH1H270J	CHIP C	27PF	J		B,E
C124			CC73GCH1H390J	CHIP C	39PF	J		A,D
C124			CC73GCH1H560J	CHIP C	56PF	J		C
C125,126			CK73GB1H103K	CHIP C	0.010UF	K		
C128			CC73GCH1H060D	CHIP C	6.0PF	D		A,D
C128			CC73GCH1H100D	CHIP C	10PF	D		B,C,E

260G : TK-260G E,(N)E,(N)T,(N)E2   A : TK-260G E   D : TK-270G E
270G : TK-270G E,(N)E,(N)T   B : TK-260G (N)E,(N)T   E : TK-270G (N)E,(N)T
                                      C : TK-260G (N)E2

TK-260G/(N)/270G/(N)
PARTS LIST

TX-RX UNIT (X57-5872-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C130			CK73GB1H471K	CHIP C	470PF	K	
C131			CC73GCH1H100D	CHIP C	10PF	D	
C132			CK73GB1H103K	CHIP C	0.010UF	K	
C133			CC73GCH1H820J	CHIP C	82PF	J	
C135			CK73GB1H103K	CHIP C	0.010UF	K	
C136			CC73GCH1H060B	CHIP C	6.0PF	B	C
C136			CC73GCH1H100D	CHIP C	10PF	D	A,B,D,E
C137			CK73GB1H102K	CHIP C	1000PF	K	
C138			CK73GB1C104K	CHIP C	0.10UF	K	
C139			CC73GCH1H181J	CHIP C	180PF	J	
C140			CK73GB1H103K	CHIP C	0.010UF	K	
C141			CK73GB1C104K	CHIP C	0.10UF	K	
C142			CK73FB1A105K	CHIP C	1.0UF	K	
C143,144			CK73GB1H102K	CHIP C	1000PF	K	
C146,147			CK73GB1C104K	CHIP C	0.10UF	K	
C148			CK73GB1H103K	CHIP C	0.010UF	K	
C150-153			CK73GB1H102K	CHIP C	1000PF	K	
C155			C92-0662-05	CHIP-TAN	15UF	6.3WV	
C156,157			CK73GB1H102K	CHIP C	1000PF	K	
C158			CK73FB1A105K	CHIP C	1.0UF	K	
C159			CK73GB1H102K	CHIP C	1000PF	K	
C161			CK73GB1H102K	CHIP C	1000PF	K	
C162			CK73GB1H103K	CHIP C	0.010UF	K	
C163,164			CK73GB1H102K	CHIP C	1000PF	K	
C165			CK73GB1H103K	CHIP C	0.010UF	K	
C166			CK73FF1E104Z	CHIP C	0.10UF	Z	
C167			CK73GB1H102K	CHIP C	1000PF	K	
C170,171			CK73GB1H471K	CHIP C	470PF	K	
C173			C92-0567-05	CHIP-TAN	68UF	6.3WV	
C174			CK73GB1H102K	CHIP C	1000PF	K	
C176			CC73GCH1H101J	CHIP C	100PF	J	
C177			CK73GB1C473K	CHIP C	0.047UF	K	
C178			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C179			CK73GB1C104K	CHIP C	0.10UF	K	
C180			CK73GB1H103K	CHIP C	0.010UF	K	
C181			CK73GB1C393K	CHIP C	0.039UF	K	
C182			CK73GB1H102K	CHIP C	1000PF	K	
C183,184			CK73GB1C104K	CHIP C	0.10UF	K	
C185			CC73GCH1H180J	CHIP C	18PF	J	
C186,187			CK73GB1C104K	CHIP C	0.10UF	K	D,E
C189			CK73GB1H103K	CHIP C	0.010UF	K	
C190,191			CK73GB1C104K	CHIP C	0.10UF	K	
C192,193			CC73GCH1H300J	CHIP C	30PF	J	
C194			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C196			CC73GCH1H101J	CHIP C	100PF	J	
C198,199			CK73GB1H103K	CHIP C	0.010UF	K	
C200			CK73GB1A224K	CHIP C	0.22UF	K	
C201			CK73GB1H103K	CHIP C	0.010UF	K	
C202,203			CK73GB1C104K	CHIP C	0.10UF	K	
C204			CK73FB1C474K	CHIP C	0.47UF	K	
C205			CK73GB1H103K	CHIP C	0.010UF	K	
C206-208			CK73GB1C104K	CHIP C	0.10UF	K	
C209			CK73GB1H332K	CHIP C	3300PF	K	
C210			CK73GB1H102K	CHIP C	1000PF	K	
C211			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C212			CK73GB1H122K	CHIP C	1200PF	K	
C213			CK73GB1H103K	CHIP C	0.010UF	K	
C215			CK73GB1C104K	CHIP C	0.10UF	K	
C216			CK73GB1H332K	CHIP C	3300PF	K	
C217			CK73GB1E153K	CHIP C	0.015UF	K	
C218			CK73FB1H563K	CHIP C	0.056UF	K	
C219,220			CK73GB1C104K	CHIP C	0.10UF	K	
C221			CK73GB1H471K	CHIP C	470PF	K	
C222			CK73GB1H103K	CHIP C	0.010UF	K	
C223			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C224			CK73GB1H122K	CHIP C	1200PF	K	
C225			CC73GCH1H101J	CHIP C	100PF	J	
C226,227			CK73GB1H562J	CHIP C	5600PF	J	
C229			CK73FB1H102K	CHIP C	1000PF	K	
C230			CK73GB1H562J	CHIP C	5600PF	J	
C231			C92-0521-05	CHIP-TAN	0.47UF	20WV	
C232			CK73GB1H471K	CHIP C	470PF	K	
C233			CC73GCH1H151J	CHIP C	150PF	J	
C234,235			CK73GB1H272J	CHIP C	2700PF	J	
C236			CK73GB1C104K	CHIP C	0.10UF	K	
C238			CK73GB1H392K	CHIP C	3900PF	K	
C239			CK73GB1C333K	CHIP C	0.033UF	K	A,B,C
C239			CK73GB1C104K	CHIP C	0.10UF	K	D,E
C240			CK73GB1H272J	CHIP C	2700PF	J	
C241			CK73GB1H102K	CHIP C	1000PF	K	
C242			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C243			CK73FB1A105K	CHIP C	1.0UF	K	
C244			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C245			CK73GB1H471K	CHIP C	470PF	K	
C246			CK73FB1A105K	CHIP C	1.0UF	K	
C247			CK73GB1E123K	CHIP C	0.012UF	K	
C248			CK73GB1H103K	CHIP C	0.010UF	K	
C249			CK73GB1H222K	CHIP C	2200PF	K	
C250			CK73GB1C683K	CHIP C	0.068UF	K	
C251			CK73GB1C104K	CHIP C	0.10UF	K	
C252			CK73GB1C473K	CHIP C	0.047UF	K	
C253,254			CK73GB1H103K	CHIP C	0.010UF	K	
C255			CK73GB1H183K	CHIP C	0.018UF	K	
C257			CK73GB1E153K	CHIP C	0.015UF	K	
C258			CK73GB1C333K	CHIP C	0.033UF	K	
C259			CC73GCH1H121J	CHIP C	120PF	J	
C260			CK73GB1H183K	CHIP C	0.018UF	K	
C261			CK73GB1E153K	CHIP C	0.015UF	K	
C262			CK73GB1H102K	CHIP C	1000PF	K	
C266			CK73GB1C104K	CHIP C	0.10UF	K	
C268			CK73GB1H102K	CHIP C	1000PF	K	
C269			CK73GB1H152K	CHIP C	1500PF	K	
C270			CK73GB1H222K	CHIP C	2200PF	K	
C271			CK73GB1H102K	CHIP C	1000PF	K	
C301			CK73GB1C104K	CHIP C	0.10UF	K	
C303			CK73GB1H102K	CHIP C	1000PF	K	
C305			CK73GB1H102K	CHIP C	1000PF	K	
C307			CC73GCH1H100D	CHIP C	10PF	D	A,B,D,E
C307			CC73GCH1H150G	CHIP C	15PF	G	C
C308			CK73GB1H102K	CHIP C	1000PF	K	
C309			CC73GCH1H030B	CHIP C	3.0PF	B	C
C310			CC73GCH1H150G	CHIP C	15PF	G	C

260G : TK-260G E,(N)E,(N)T,(N)E2
270G : TK-270G E,(N)E,(N)T

A : TK-260G E
B : TK-260G (N)E,(N)T
C : TK-260G (N)E2

D : TK-270G E
E : TK-270G (N)E,(N)T

PARTS LIST

TX-RX UNIT (X57-5872-XX)

Ref. No.	Address	New parts	Parts No.	Description				Destination
C310			CC73GCH1H220G	CHIP C	22PF	G		A,B,D,E
C311			CC73GCH1H120G	CHIP C	12PF	G		C
C311			CC73GCH1H180G	CHIP C	18PF	G		A,B,D,E
C312			CC73GCH1H220J	CHIP C	22PF	J		
C314			CC73GCH1H050B	CHIP C	5.0PF	B		C
C315			CC73GCH1H010B	CHIP C	1.0PF	B		C
C316			CC73GCH1H220J	CHIP C	22PF	J		C
C316			CC73GCH1H330J	CHIP C	33PF	J		A,B,D,E
C317,318			CK73GB1H102K	CHIP C	1000PF	K		
C319			CC73GCH1H220J	CHIP C	22PF	J		C
C319			CC73GCH1H390J	CHIP C	39PF	J		A,B,D,E
C320			CK73GB1C104K	CHIP C	0.10UF	K		
C323			CK73GB1C104K	CHIP C	0.10UF	K		
C324			CC73GCH1H090D	CHIP C	9.0PF	D		A,B,D,E
C324			CC73GCH1H220J	CHIP C	22PF	J		C
C326			CK73GB1H102K	CHIP C	1000PF	K		
TC1,2			C05-0384-05	CERAMIC TRIMMER CAP(10P)				
CN1			E40-6012-05	FLAT CABLE CONNECTOR D,E				
CN3			E40-5662-05	PIN ASSY SOCKET				
J1			E11-0457-05	PHONE JACK (2.5/3.5D)				
F1			F53-0130-05	FUSE				
CD1			L79-1474-05	TUNING COIL				
CF1			L72-0968-05	CERAMIC FILTER A,D				
CF1			L72-0969-05	CERAMIC FILTER B,C,E				
L2			L92-0138-05	FERRITE CHIP				
L3			L40-3391-86	SMALL FIXED INDUCTOR(3.3U)				
L4			L33-0745-05	SMALL FIXED INDUCTOR				
L5			L34-4548-05	AIR-CORE COIL(5.5T)				A,B,D,E
L5			L34-4549-05	AIR-CORE COIL(6.5T)				C
L6			L34-4549-05	AIR-CORE COIL(6.5T)				A,B,D,E
L6			L34-4550-05	AIR-CORE COIL(7.5T)				C
L7			L34-4548-05	AIR-CORE COIL				
L9			L40-6875-92	SMALL FIXED INDUCTOR(68NH)				C
L9			L40-8275-92	SMALL FIXED INDUCTOR(82NH)				A,B,D,E
L10			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)				
L11			L40-1092-81	SMALL FIXED INDUCTOR				
L12			L40-3391-86	SMALL FIXED INDUCTOR(3.3U)				
L14			L40-1085-92	SMALL FIXED INDUCTOR(100NH)				
L15			L40-5675-92	SMALL FIXED INDUCTOR(56NH)				
L17			L34-4550-05	AIR-CORE COIL				
L18-20			L92-0138-05	FERRITE CHIP				
L21			L40-1875-92	SMALL FIXED INDUCTOR(18NH)				
L22			L40-1085-92	SMALL FIXED INDUCTOR(100NH)				
L23			L92-0138-05	FERRITE CHIP				
L24			L40-5681-86	SMALL FIXED INDUCTOR(0.56U)				
L25			L40-1085-92	SMALL FIXED INDUCTOR(100NH)				
L26			L33-0745-05	SMALL FIXED INDUCTOR				
L27			L92-0149-05	FERRITE CHIP				
L30			L40-2702-86	SMALL FIXED INDUCTOR(27U)				
L31			L40-1085-92	SMALL FIXED INDUCTOR(100NH)				
L32			L40-1005-85	SMALL FIXED INDUCTOR(10U)				
L35			L40-1285-92	SMALL FIXED INDUCTOR(120NH)				A,B,D,E
L35			L40-1585-92	SMALL FIXED INDUCTOR(150NH)				C
L36			L40-1085-85	SMALL FIXED INDUCTOR(0.10U)				C

Ref. No.	Address	New parts	Parts No.	Description				Destination
L36			L40-1285-85	SMALL FIXED INDUCTOR(0.12U)				A,B,D,E
L37			L40-5685-85	SMALL FIXED INDUCTOR(0.56U)				C
L37			L40-8285-85	SMALL FIXED INDUCTOR(0.82U)				A,B,D,E
L38			L92-0138-05	FERRITE CHIP				
L39			L92-0149-05	FERRITE CHIP				
L40,41			L92-0138-05	FERRITE CHIP				
L42			L92-0131-05	FERRITE CHIP				
L43,44			L92-0138-05	FERRITE CHIP				
L302			L33-0745-05	SMALL FIXED INDUCTOR				
L304			L40-8288-76	SMALL FIXED INDUCTOR(0.82UH)				
L305			L34-4621-05	COIL				
L306			L34-4622-05	COIL				
L307			L34-4446-05	COIL				
L308			L40-4785-85	SMALL FIXED INDUCTOR(0.47U)				
X1			L77-1794-05	TCXO (16.8MHZ/4P/16)				
X2			L78-0479-05	RESONATOR (3.58MHZ/12)				
X3			L77-1810-05	CRYSTAL RESONATOR(9.8304MHZ)				
X3			L77-1835-05	CRYSTAL RESONATOR(9.8304MHZ)				
XF1			L71-0546-05	CRYSTAL FILTER (49.95MHZ)				A,D
XF1			L71-0571-05	CRYSTAL FILTER (49.95MHZ)				B,C,E
CP1			R90-0724-05	MULTI-COMP 1K X4				
CP2-9			R90-0741-05	MULTIPLE RESISTOR				
CP10			R90-0724-05	MULTI-COMP 1K X4				
CP11-18			R90-0741-05	MULTIPLE RESISTOR				
CP19			R90-0718-05	MULTI-COMP 4.7K X4				
CP20			RK75HA1J472J	CHIP R	4.7K	J	1/16W	
R1			RK73GB1J124J	CHIP R	120K	J	1/16W	
R2			RK73GB1J104J	CHIP R	100K	J	1/16W	
R3			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R4			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R5			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R6			R92-1252-05	CHIP R	0 OHM			
R7			RK73GB1J100J	CHIP R	10	J	1/16W	
R8			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R10			RK73GB1J331J	CHIP R	330	J	1/16W	C
R10			RK73GB1J561J	CHIP R	560	J	1/16W	A,B,D,E
R13			RK73GB1J822J	CHIP R	8.2K	J	1/16W	
R14			RK73GB1J561J	CHIP R	560	J	1/16W	
R16			RK73GB1J391J	CHIP R	390	J	1/16W	
R17			RK73GB1J103J	CHIP R	10K	J	1/16W	
R18			RK73GB1J124J	CHIP R	120K	J	1/16W	
R19			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R20			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R21			RK73GB1J221J	CHIP R	220	J	1/16W	
R22			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R23			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R26			RK73GB1J561J	CHIP R	560	J	1/16W	
R27			RK73GB1J270J	CHIP R	27	J	1/16W	
R28,29			RK73GB1J271J	CHIP R	270	J	1/16W	
R30			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R31			RK73GB1J101J	CHIP R	100	J	1/16W	
R33			RK73GB1J101J	CHIP R	100	J	1/16W	
R34			RK73GB1J473J	CHIP R	47K	J	1/16W	
R35			RK73GB1J104J	CHIP R	100K	J	1/16W	
R36			RK73GB1J473J	CHIP R	47K	J	1/16W	
R37			RK73GB1J472J	CHIP R	4.7K	J	1/16W	

260G : TK-260G E,(N)E,(N)T,(N)E2   A : TK-260G E   D : TK-270G E
270G : TK-270G E,(N)E,(N)T   B : TK-260G (N)E,(N)T   E : TK-270G (N)E,(N)T
C : TK-260G (N)E2

TK-260G/(N)/270G/(N)
PARTS LIST

TX-RX UNIT (X57-5872-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
R38			RK73GB1J101J	CHIP R	100	J	1/16W	
R39			RK73GB1J562J	CHIP R	5.6K	J	1/16W	
R40			RK73GB1J183J	CHIP R	18K	J	1/16W	
R41			RK73GB1J101J	CHIP R	100	J	1/16W	
R42			RK73GB1J220J	CHIP R	22	J	1/16W	
R43			RK73GB1J101J	CHIP R	100	J	1/16W	
R44			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R45			RK73GB1J331J	CHIP R	330	J	1/16W	
R46			RN73GH1J154D	CHIP R	150K	D	1/16W	
R47			RK73GB1J104J	CHIP R	100K	J	1/16W	
R48			RK73GB1J334J	CHIP R	330K	J	1/16W	
R49			RK73GB1J103J	CHIP R	10K	J	1/16W	
R50			RN73GH1J154D	CHIP R	150K	D	1/16W	
R51			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R52			RK73GB1J151J	CHIP R	150	J	1/16W	
R53			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R54			RN73GH1J154D	CHIP R	150K	D	1/16W	
R55			RK73GB1J105J	CHIP R	1.0M	J	1/16W	
R56-58			RK73EB2ER39K	CHIP R	0.39	K	1/4W	
R59			RN73GH1J154D	CHIP R	150K	D	1/16W	
R60			R92-1252-05	CHIP R	0 OHM			
R61			RK73GB1J473J	CHIP R	47K	J	1/16W	
R62			RN73GH1J154D	CHIP R	150K	D	1/16W	
R64,65			RK73GB1J104J	CHIP R	100K	J	1/16W	
R68			RN73GH1J154D	CHIP R	150K	D	1/16W	
R70			RK73GB1J104J	CHIP R	100K	J	1/16W	
R71			RK73GB1J124J	CHIP R	120K	J	1/16W	
R72			RK73GB1J103J	CHIP R	10K	J	1/16W	
R73			RK73GB1J273J	CHIP R	27K	J	1/16W	
R76			RK73FB2A151J	CHIP R	150	J	1/10W	C
R76			R92-0670-05	CHIP R	0 OHM			A,B,D,E
R77			R92-1252-05	CHIP R	0 OHM			
R82			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R83			RK73GB1J103J	CHIP R	10K	J	1/16W	
R84			RK73GB1J394J	CHIP R	390K	J	1/16W	A,C,D
R84			RK73GB1J474J	CHIP R	470K	J	1/16W	B,E
R85			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R86			RK73GB1J334J	CHIP R	330K	J	1/16W	A,C,D
R86			RK73GB1J394J	CHIP R	390K	J	1/16W	B,E
R87			RK73GB1J271J	CHIP R	270	J	1/16W	B,C,E
R87			RK73GB1J331J	CHIP R	330	J	1/16W	A,D
R88			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R89			RK73GB1J821J	CHIP R	820	J	1/16W	
R90,91			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R92			RK73GB1J100J	CHIP R	10	J	1/16W	
R93			RK73GB1J222J	CHIP R	2.2K	J	1/16W	C
R93			RK73GB1J332J	CHIP R	3.3K	J	1/16W	A,B,D,E
R94			RK73GB1J471J	CHIP R	470	J	1/16W	
R95			RK73GB1J222J	CHIP R	2.2K	J	1/16W	A,B,D,E
R95			RK73GB1J821J	CHIP R	820	J	1/16W	C
R96			RK73GB1J101J	CHIP R	100	J	1/16W	C
R96			RK73GB1J151J	CHIP R	150	J	1/16W	A,B,D,E
R97			RK73GB1J183J	CHIP R	18K	J	1/16W	
R98			RK73GB1J392J	CHIP R	3.9K	J	1/16W	A,D
R99			RK73GB1J684J	CHIP R	680K	J	1/16W	
R100			RK73GB1J473J	CHIP R	47K	J	1/16W	
R101			RK73GB1J104J	CHIP R	100K	J	1/16W	
R102,103			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R104			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R105			RK73GB1J472J	CHIP R	4.7K	J	1/16W	A,D
R106			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R107			RK73GB1J470J	CHIP R	47	J	1/16W	
R108			RK73GB1J152J	CHIP R	1.5K	J	1/16W	A,D
R108			RK73GB1J272J	CHIP R	2.7K	J	1/16W	B,C,E
R109			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R110,111			RK73GB1J103J	CHIP R	10K	J	1/16W	
R112			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R113			RK73GB1J391J	CHIP R	390	J	1/16W	
R114,115			RK73GB1J103J	CHIP R	10K	J	1/16W	
R116,117			RK73GB1J153J	CHIP R	15K	J	1/16W	
R118			RK73GB1J473J	CHIP R	47K	J	1/16W	
R119			R92-1252-05	CHIP R	0 OHM			
R120,121			RK73GB1J473J	CHIP R	47K	J	1/16W	
R122			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R123			RK73GB1J104J	CHIP R	100K	J	1/16W	
R124			RK73GB1J334J	CHIP R	330K	J	1/16W	
R126			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R127			RK73GB1J333J	CHIP R	33K	J	1/16W	
R128			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R129			RK73GB1J224J	CHIP R	220K	J	1/16W	
R130			R92-1252-05	CHIP R	0 OHM			
R131			RK73GB1J101J	CHIP R	100	J	1/16W	
R132			RK73GB1J104J	CHIP R	100K	J	1/16W	
R133			R92-1252-05	CHIP R	0 OHM			
R135			RK73GB1J100J	CHIP R	10	J	1/16W	
R137			RK73GB1J101J	CHIP R	100	J	1/16W	
R138			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R139			RK73GB1J151J	CHIP R	150	J	1/16W	
R140			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R142			R92-1252-05	CHIP R	0 OHM			
R143			RK73GB1J184J	CHIP R	180K	J	1/16W	
R144			R92-1252-05	CHIP R	0 OHM			
R145			RK73GB1J474J	CHIP R	470K	J	1/16W	
R146			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R147			RK73GB1J470J	CHIP R	47	J	1/16W	
R148			RK73GB1J220J	CHIP R	22	J	1/16W	
R149			RK73GB1J104J	CHIP R	100K	J	1/16W	
R150			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R151			RK73GB1J473J	CHIP R	47K	J	1/16W	
R152			RK73GB1J823J	CHIP R	82K	J	1/16W	
R153			RK73GB1J104J	CHIP R	100K	J	1/16W	
R154			RK73GB1J564J	CHIP R	560K	J	1/16W	
R155			RK73GB1J473J	CHIP R	47K	J	1/16W	
R156			RN73GH1J683D	CHIP R	68K	D	1/16W	
R157			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R158			R92-1252-05	CHIP R	0 OHM			
R159			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R160			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R161			RK73GB1J563J	CHIP R	56K	J	1/16W	
R162			RN73GH1J333D	CHIP R	33K	D	1/16W	
R163			RN73GH1J274D	CHIP R	270K	D	1/16W	
R164			RK73GB1J184J	CHIP R	180K	J	1/16W	

260G : TK-260G E,(N)E,(N)T,(N)E2
270G : TK-270G E,(N)E,(N)T

A : TK-260G E
B : TK-260G (N)E,(N)T
C : TK-260G (N)E2
D : TK-270G E
E : TK-270G (N)E,(N)T

PARTS LIST

TX-RX UNIT (X57-5872-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
R165			RK73GB1J473J	CHIP R	47K	J	1/16W	
R166			RK73GB1J103J	CHIP R	10K	J	1/16W	
R167			RK73GB1J564J	CHIP R	560K	J	1/16W	
R168			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R169			RK73GB1J473J	CHIP R	47K	J	1/16W	
R170			RK73GB1J394J	CHIP R	390K	J	1/16W	
R171			RK73GB1J474J	CHIP R	470K	J	1/16W	
R172			RK73GB1J473J	CHIP R	47K	J	1/16W	
R173			RK73GB1J104J	CHIP R	100K	J	1/16W	
R174			R92-1252-05	CHIP R	0 OHM			
R175			RK73GB1J103J	CHIP R	10K	J	1/16W	
R176			R92-1252-05	CHIP R	0 OHM			
R177			RK73GB1J473J	CHIP R	47K	J	1/16W	
R178,179			RK73GB1J104J	CHIP R	100K	J	1/16W	
R180			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R181			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R182,183			R92-1252-05	CHIP R	0 OHM			
R184			RK73GB1J333J	CHIP R	33K	J	1/16W	A,B,D,E
R184			RK73GB1J393J	CHIP R	39K	J	1/16W	C
R185			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R186			RK73GB1J155J	CHIP R	1.5M	J	1/16W	
R198			RK73GB1J154J	CHIP R	150K	J	1/16W	
R199			RK73GB1J103J	CHIP R	10K	J	1/16W	
R200			RK73GB1J101J	CHIP R	100	J	1/16W	
R201			R92-1252-05	CHIP R	0 OHM			
R202			RK73GB1J474J	CHIP R	470K	J	1/16W	
R203			R92-1252-05	CHIP R	0 OHM			
R204			RK73GB1J104J	CHIP R	100K	J	1/16W	
R205			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R206			RK73GB1J471J	CHIP R	470	J	1/16W	
R207			RK73GB1J101J	CHIP R	100	J	1/16W	
R208			RN73GH1J682D	CHIP R	6.8K	D	1/16W	
R209			RK73GB1J224J	CHIP R	220K	J	1/16W	
R210			RK73GB1J474J	CHIP R	470K	J	1/16W	
R211			RK73GB1J103J	CHIP R	10K	J	1/16W	
R212			RN73GH1J683D	CHIP R	68K	D	1/16W	
R213			RN73GH1J682D	CHIP R	6.8K	D	1/16W	
R214			RK73GB1J184J	CHIP R	180K	J	1/16W	
R215			RK73GB1J474J	CHIP R	470K	J	1/16W	
R218			R92-1252-05	CHIP R	0 OHM			
R219			RK73GB1J273J	CHIP R	27K	J	1/16W	
R220,221			RK73GB1J184J	CHIP R	180K	J	1/16W	
R222			RK73GB1J153J	CHIP R	15K	J	1/16W	
R223			RK73GB1J223J	CHIP R	22K	J	1/16W	
R224			RK73GB1J103J	CHIP R	10K	J	1/16W	
R225			RK73GB1J153J	CHIP R	15K	J	1/16W	
R226			R92-1252-05	CHIP R	0 OHM			
R230			RK73GB1J223J	CHIP R	22K	J	1/16W	
R231			RK73GB1J104J	CHIP R	100K	J	1/16W	
R232			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R233			R92-1252-05	CHIP R	0 OHM			
R234			RK73GB1J124J	CHIP R	120K	J	1/16W	
R235			RK73GB1J334J	CHIP R	330K	J	1/16W	
R237			R92-1252-05	CHIP R	0 OHM			
R239			RK73GB1J153J	CHIP R	15K	J	1/16W	
R240			RK73GB1J223J	CHIP R	22K	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description			Destination
R241			RK73GB1J334J	CHIP R	330K	J	1/16W	
R242			R92-1252-05	CHIP R	0 OHM			
R244			RK73GB1J561J	CHIP R	560	J	1/16W	
R247-249			R92-1252-05	CHIP R	0 OHM			
R250			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R251			RK73GB1J474J	CHIP R	470K	J	1/16W	
R252,253			R92-1252-05	CHIP R	0 OHM			
R254			RK73GB1J184J	CHIP R	180K	J	1/16W	
R255			RK73GB1J474J	CHIP R	470K	J	1/16W	
R256-258			R92-1252-05	CHIP R	0 OHM			
R259			RK73GB1J473J	CHIP R	47K	J	1/16W	
R260,261			RK73GB1J224J	CHIP R	220K	J	1/16W	
R301			R92-0679-05	CHIP R	0 OHM			
R302			R92-1252-05	CHIP R	0 OHM			
R303			RK73GB1J101J	CHIP R	100	J	1/16W	C
R303			RK73GB1J221J	CHIP R	220	J	1/16W	A,B,D,E
R304			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R305			RK73GB1J5R6J	CHIP R	5.6	J	1/16W	
R306			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R307			RK73GB1J821J	CHIP R	820	J	1/16W	
R308			R92-0670-05	CHIP R	0 OHM			
R309			RK73GB1J821J	CHIP R	820	J	1/16W	
R311			RK73GB1J471J	CHIP R	470	J	1/16W	
R312-314			RK73GB1J104J	CHIP R	100K	J	1/16W	
R316			RK73GB1J470J	CHIP R	47	J	1/16W	
R318			R92-1252-05	CHIP R	0 OHM			
R319			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R320			R92-1252-05	CHIP R	0 OHM			
VR1			R12-7491-05	TRIMMING POT.(68K)				
S401			S70-0457-05	TACT SWITCH				
S402,403			S70-0424-05	TACT SWITCH				
MIC1			T91-0579-05	MIC ELEMENT				
D1			MA2S111	DIODE				
D2			MA2SV05	VARIABLE CAPACITANCE DIODE				
D3			HVU131	DIODE				
D4			MA2SV05	VARIABLE CAPACITANCE DIODE				
D5			HSC277	DIODE				
D6			MA360	VARIABLE CAPACITANCE DIODE				
D7			HSC277	DIODE				
D8			MA8062	ZENER DIODE				
D9			MA2S304	VARIABLE CAPACITANCE DIODE				
D10			HSC277	DIODE				
D11			MA2S304	VARIABLE CAPACITANCE DIODE				
D12			MA2S111	DIODE				
D15			HSC277	DIODE				
D17			MA2S111	DIODE				D,E
D19			MA2S111	DIODE				A,B,C
D21			1SS373	DIODE				
D22			1SR154-400	DIODE				
D23			RB706F-40	DIODE				
D301			HSC277	DIODE				C
D302,303			HVC350B	VARIABLE CAPACITANCE DIODE				
D305			HVC350B	VARIABLE CAPACITANCE DIODE				
IC1			PF0313-03	IC(RF POWER AMP)				C
IC1			PF0314-05	IC(RF POWER AMP)				A,B,D,E

260G : TK-260G E,(N)E,(N)T,(N)E2
270G : TK-270G E,(N)E,(N)T

A : TK-260G E
B : TK-260G (N)E,(N)T
C : TK-260G (N)E2

D : TK-270G E
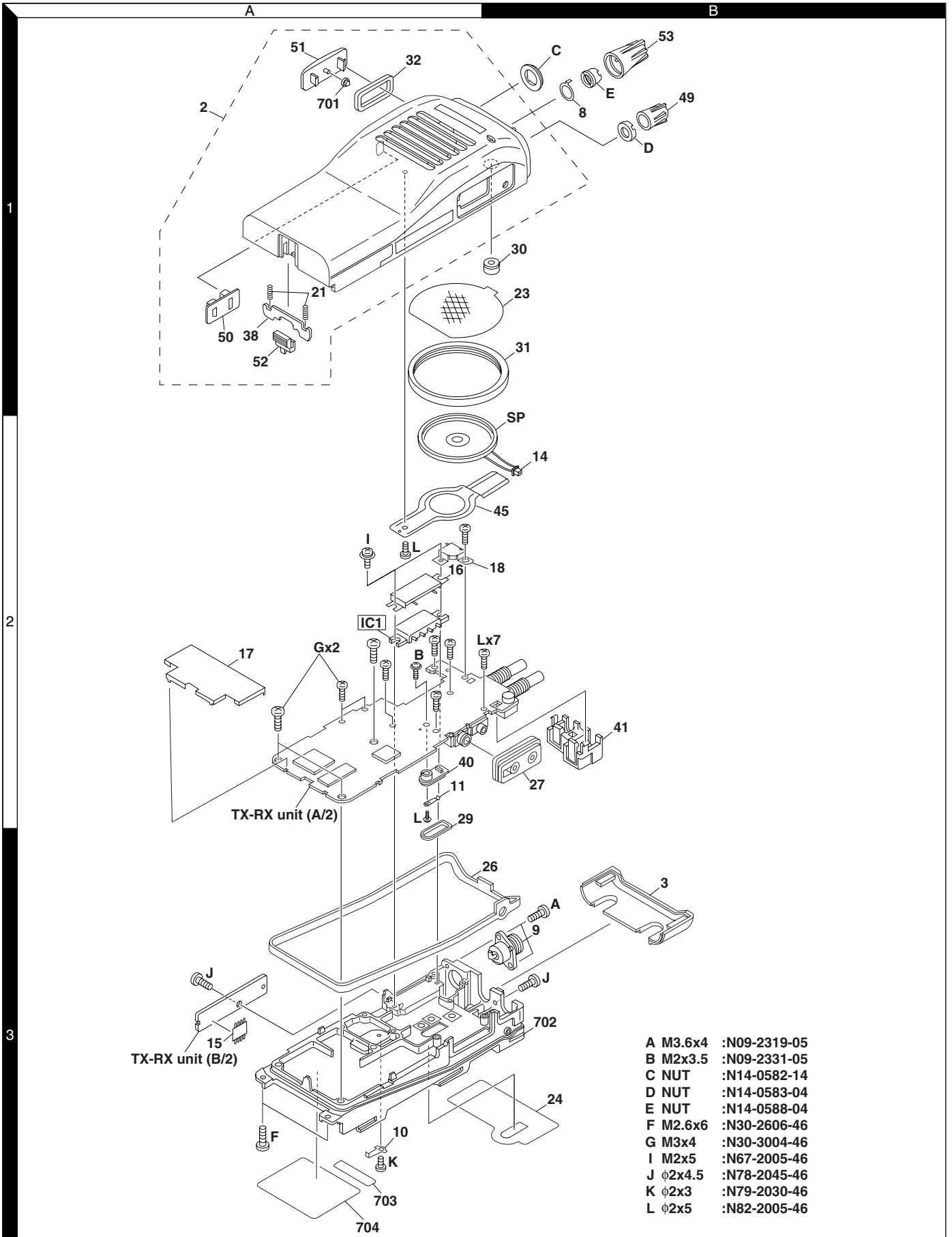**E : TK-270G (N)E,(N)T**

TK-260G/(N)/270G/(N)

PARTS LIST

TX-RX UNIT (X57-5872-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
IC2			MB15A02	IC							
IC3			NJM2904V	IC(APC)							
IC4			TA31136FN	IC(FM IF DETECTOR)							
IC5,6			BU4094BCFV	IC(8bit SHIFT/STORE REGISTER)							
IC7			S-81350HG-KD	IC(VOLTAGE REGULATOR)							
IC8			PST9140NR	IC(RESET SW)							
IC9			RN5VL45C	IC(REGULATOR)							
IC10			AT2408N10SI2.5	IC(8bit SERIAL EEPROM)							
IC11			TA7368F	IC(AF POWER AMP)							
IC12			AT29C020-90TI	IC							
IC13			30622M4102GP	MPU							
IC14			TC35453F	IC(AUDIO PROCESSOR)							
IC15			TA75W01FU	IC(OP AMP X2)							
IC16			TC75W51FU	IC(OP AMP X2)							
IC17			X9C103SI	IC(TERMINAL VOLTAGE)							
IC18			LC73872M	IC(DTMF RECEIVER)							
IC19			TA75W01FU	IC(OP AMP X2)							
IC301			UPB1509GV	IC							
Q1			2SC5108(Y)	TRANSISTOR							
Q2			2SC4226(R24)	TRANSISTOR							
Q3,4			2SC5108(Y)	TRANSISTOR							
Q6			2SC4988	TRANSISTOR							
Q7			2SJ243	FET							
Q8			UMC4	TRANSISTOR							
Q9			DTC144EE	DIGITAL TRANSISTOR							
Q10			2SK508NV(K52)	FET							
Q11			2SC4617(S)	TRANSISTOR							
Q12			2SC4649(N,P)	TRANSISTOR							
Q13			DTA144EE	DIGITAL TRANSISTOR							
Q15			DTC114EE	DIGITAL TRANSISTOR							
Q16			DTA114YE	DIGITAL TRANSISTOR							
Q18			FP210	TRANSISTOR							
Q19			3SK166A	FET							
Q20,21			UMG3N	TRANSISTOR							
Q22			2SC4619	TRANSISTOR							
Q23			UMC4	TRANSISTOR	A,D						
Q24,25			DTC114EE	DIGITAL TRANSISTOR							
Q26			DTA114EE	DIGITAL TRANSISTOR							
Q27			UPA572T	FET							
Q28			DTA114YE	DIGITAL TRANSISTOR							
Q30			2SK1588	FET							
Q31			2SC4619	TRANSISTOR							
Q32			2SA1362(GR)	TRANSISTOR							
Q33,34			DTC144EE	DIGITAL TRANSISTOR							
Q35			UPA672T	FET							
Q36			2SK1824	FET							
Q301			2SK1215(E)	FET							

260G : TK-260G E,(N)E,(N)T,(N)E2   A : TK-260G E   D : TK-270G E
270G : TK-270G E,(N)E,(N)T   B : TK-260G (N)E,(N)T   E : TK-270G (N)E,(N)T
                                         C : TK-260G (N)E2

TK-260G/(N)/270G/(N)

EXPLODED VIEW (TK-260G)

A M3.6x4	:N09-2319-05	
B M2x3.5	:N09-2331-05	
C NUT	:N14-0582-14	
D NUT	:N14-0583-04	
E NUT	:N14-0588-04	
F M2.6x6	:N30-2606-46	
G M3x4	:N30-3004-46	
I M2x5	:N67-2005-46	
J φ2x4.5	:N78-2045-46	
K φ2x3	:N79-2030-46	
L φ2x5	:N82-2005-46	

Parts with the exploded numbers larger than 700 are not supplied. 31

TK-260G/(N)/270G/(N)
EXPLODED VIEW (TK-270G)

DISPLAY unit

TX-RX unit (A/2)

TX-RX unit (B/2)

IC1

SP

Lx8

J32-0925-04

M2
M3
4
2.5
4

A M3.6x4 :N09-2319-05
B M2x3.5 :N09-2331-05
C NUT   :N14-0582-14
D NUT   :N14-0583-04
F M2.6x6 :N30-2606-46
H M2x3   :N39-2030-46
I M2x5   :N67-2005-46
J φ2x4.5 :N78-2045-46
K φ2x3   :N79-2030-46
L φ2x5   :N82-2005-46

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

PACKING

E   F

33.PACKING FIXTURE
(H12-1487-02)

1

34.PROTECTION BAG
(H25-0085-04)

46. BELT HOOK
(J29-0624-03)

ANT. HELICAL ANTENNA
(T90-0695-15) : E, (N)E
(T90-0680-05) : (N)T
(T90-0681-05) : (N)E2

35. PROTECTION BAG
(H25-2012-04)

7. INSTRUCTION MANUAL
(B62-1293-10) : 260G
INSTRUCTION MANUAL
(B62-1294-10) : 270G

2

4. CAP (SP/MIC)
(B09-0351-03)

43.SP/MIC HOLDER
(J21-4493-04)

M. SCREW SET
(N99-2012-05)

36.ITEM CARTON CASE
(H52-1413-02) : 270G
37.ITEM CARTON CASE
(H52-1417-02) : 260G

33. PACKING FIXTURE
(H12-1487-02)

3

UPC CODE LABEL

TK-260G/(N)/270G/(N)
ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range	136 to 150MHz ((N)E2) 146 to 174MHz (E, (N)E).
	Modulation	Frequency modulation and external modulation.
	Output	-127dBm/0.1µV to greater than -47dBm/1mV
2. Power Meter	Input Impedance	50Ω.
	Operation Frequency	136 to 150MHz ((N)E2) 146 to 174MHz (E, (N)E).
	Measurement Range	Vicinity of 10W
3. Deviation Meter	Frequency Range	136 to 150MHz ((N)E2) 146 to 174MHz (E, (N)E).
4. Digital Volt Meter (DVM)	Measuring Range	10mV to 10V DC
	Input Impedance	High input impedance for minimum circuit loading.
5. Oscilloscope		DC through 30MHz.
6. High Sensitivity Frequency Counter	Frequency Range	10Hz to 1000MHz.
	Frequency Stability	0.2ppm or less.
7. Ammeter		5A.
8. AF Volt Meter (AF VTVM)	Frequency Range	50Hz to 10kHz.
	Voltage Range	1mV to 10V.
9. Audio Generator (AG)	Frequency Range	50Hz to 5kHz or more.
	Output	0 to 1V.
10. Distortion Meter	Capability	3% or less at 1kHz.
	Input Level	50mV to 10Vrms.
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center frequency	50kHz to 600MHz
	Output Voltage	100mV or more
13. 8Ω Dummy Load		Approx. 8Ω, 3W.
14. Regulated Power Supply		5V to 10V, approx. 3A
		Useful if ammeter equipped.

ADJUSTMENT

■ **The following parts are required for adjustment**

1. Antenna connector adapter

The antenna connector of this radio uses an SMA terminal.

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

Note

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

Repair Jig (Chassis)

1. Jig (chassis : Part No. A10-4009-13) for adjustment.
2. Use the jig as follows.
   ① Place the TX-RX unit on the jig and fix it with thirteen screws ❶.
   ② Solder the antenna terminal of the TX-RX unit.
3. Supply power from an external power supply.
   Relay terminal : + (7.5)
   Jig (Chassis) : -
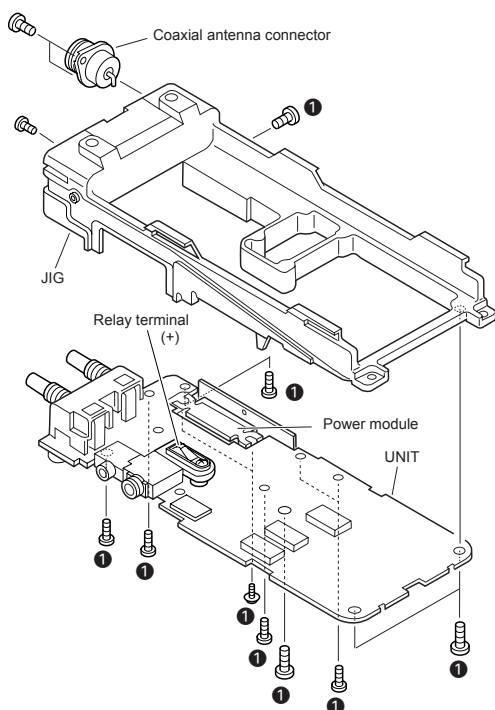
Repair Jig (Extention Flat cable : part No. E37-0851-05)

This cable is used for connecting the TK-270G display unit and TX/RX unit when you test or repair the transceiver.
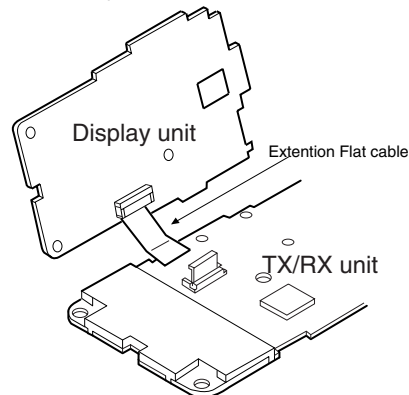
Caution : You must connect TK-270G display unit when you test or repair the transceiver.

Test Mode (TK-270G only)

■ **Test mode operating features**

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

• **Controls**

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

• **LCD indicator**

"LO"   Lights at RF Power Low.

" 🕮 "   Lights at monitor ON.

• **LED indicator**

Red LED   Lights during transmission. Blinks during low battery voltage warning.

Green LED   Lights when there is a carrier.

TK-260G/(N)/270G/(N)
ADJUSTMENT

■ Frequency and signalling

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

Frequency (MHz) (N)E2 type

Channel No.	RX Frequency	TX Frequency
1	143. 05000	143. 00000
2	136. 05000	136. 00000
3	149. 95000	150. 00000
4	143. 00000	143. 02500
5	143. 20000	143. 20000
6	143. 40000	143. 40000
7~16	——	——

Frequency (MHz) E, (N)E, (N)T type

Channel No.	RX Frequency	TX Frequency
1	160. 05000	160. 00000
2	146. 05000	146. 00000
3	173. 95000	174. 00000
4	160. 00000	160. 02500
5	160. 20000	160. 20000
6	160. 40000	160. 40000
7~16	——	——

Signalling

Signalling No.	RX	TX
1	None	None
2	None	100Hz square wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 250.3Hz	QT 250.3Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	DTMF DEC, (159D)	DTMF ENC, (159D)
10	None	DTMF tone 9
11	2 tone 321.7/928.1Hz	ENC
12	Single tone 1200Hz	Single tone 1200Hz

• Preparations for tuning the transceiver

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

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

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

• Transceiver tuning

(To place the transceiver in tuning mode)

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

LCD display (Test mode)

$$1\sqcup - \sqcup\sqcup 1$$

channel No.   Signalling No.
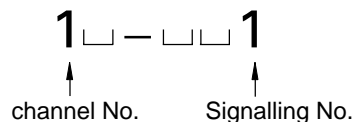
Press [○], to enter tuning mode. Use the [◄] key to write tuning data through the tuning modes, and the channel selector knob to adjust the tuning requirements (1 to 256 appears on LCD).

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

LCD display (Tuning mode)   Wide/Narrow indicator

Wide 5K/Wide 4K indicator

$$H.P.O.W.\sqcup.\sqcup\sqcup 1!$$

Adjustment item

Point tuning indicator

Adjustment (1~256)

	ON	OFF
E	Wide 4K	Wide 5K
(N)E	–	Narrow
(N)E2	–	Narrow
(N)T	–	Narrow
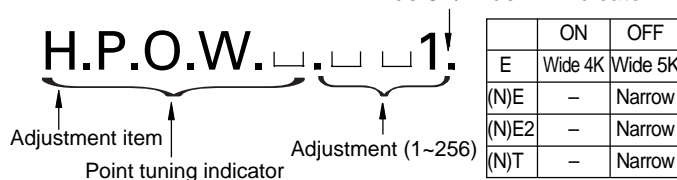
Panel Tuning Mode (N)E2 type

TEST Ch	136-150(MHz)	
	RX frequency (MHz)	TX frequency (MHz)
Low	136.05000	136.00000
Low'	139.55000	139.50000
Center	143.05000	143.00000
High'	146.55000	146.50000
High	149.95000	150.00000

Panel Tuning Mode E, (N)E, (N)T type

TEST Ch	146-174(MHz)	
	RX frequency (MHz)	TX frequency (MHz)
Low	146.05000	146.00000
Low'	153.05000	153.00000
Center	160.05000	160.00000
High'	167.05000	167.00000
High	173.95000	174.00000

ADJUSTMENT

■ **Tuning mode**

Box	Sub-label
H P O W	Hi Power
H.P.O W	Hi Power (Low)
H.P.O W	Hi Power (Low')
H.P.O.W	Hi Power (Cen)
H.P.O.W.	Hi Power (Hi')
H.P.O.W..	Hi Power (Hi)
L P O W	Low Power
L.P O W	Low Power (Low)
L.P.O W	Low Power (Low')
L.P.O W	Low Power (Cen)
L.P.O.W.	Low Power (Hi')
L.P.O.W..	Low Power (Hi)
M A X . (Narrow)	Max deviation (Narrow)
M A X (Wide)	Max deviation (Wide)
.M A X	Max deviation (W, L)
.M.A.X	Max deviation (W, C)
.M.A.X..	Max deviation (W, H)
F Q T . (Narrow)	QT fine deviation(Narrow)
F Q T (Wide)	QT fine deviation(Wide)
.F Q T	QT fine deviation(W,L)
.F.Q.T	QT fine deviation(W,C)
.F.Q.T..	QT fine deviation(W,H)
F D Q T . (Narrow)	DQT Fine deviation(Narrow)
F D Q T (Wide)	DQT Fine deviation(Wide)
F.D Q T	DQT Fine deviation(W,L)
F.D.Q.T	DQT Fine deviation(W,C)
F.D.Q.T..	DQT Fine deviation(W,H)
D T M F . (Narrow)	DTMF Fine deviation(Narrow)
D T M F (Wide)	DTMF Fine deviation(Wide)
T O N E . (Narrow)	Siqunal tone fine deviation(Narrow)
T O N E (Wide)	Siqunal tone fine deviation(Wide)
S E N S	Sensitivity
S.E N S	Sensitivity (Low)
S.E.N.S	Sensitivity (Cen)
S.E.N.S..	Sensitivity (Hi)
B A T T	Battery warning level(Wide)
V Q T . (Narrow)	QT VCO balance(Narrow)
V Q T (Wide)	QT VCO balance(Wide)
.V Q T	QT VCO balance(W,L)
.V.Q.T	QT VCO balance(W,C)
.V.Q.T..	QT VCO balance(W,H)
X Q T . (Narrow)	QT TCXO balance(Narrow)
X Q T (Wide)	QT TCXO balance(Wide)
.X Q T	QT TCXO balance(W,L)
.X.Q.T	QT TCXO balance(W,C)
.X.Q.T..	QT TCXO balance(W,H)
V D Q T . (Narrow)	DQT VCO balance(Narrow)
V D Q T (Wide)	DQT VCO balance(Wide)
V.D Q T	DQT VCO balance(W,L)
V.D.Q.T	DQT VCO balance(W,C)
V.D.Q.T..	DQT VCO balance(W,H)
X D Q T . (Narrow)	QT TCXO balance(Narrow)
X D Q T (Wide)	QT TCXO balance(Wide)
X.D Q T	QT TCXO balance(W,L)
X.D.Q.T	QT TCXO balance(W,C)
X.D.Q.T..	QT TCXO balance(W,H)
S Q L 3 . (Narrow)	Squelch open(Narrow)
S Q L 3 (Wide)	Squelch open(Wide)
R S S I	RSSI (Wide)
R S S I .	RSSI (Narrow)
S Q L 9 . (Narrow)	Squelch tight(Narrow)
S Q L 9 (Wide)	Squelch tight(Wide)

Navigation labels used in flow: [●], [▶], [Side1], Narrow, Wide

TK-260G/(N)/270G/(N)
ADJUSTMENT

Since the TK-260G cannot be tuned from the panel, the FPU (KPG-67D) should be used for adjustment.
Adjust the receive BPF waveform according to the appropriate adjustment item.

Note

Precision parts are used for the PTT, side1, and side2 switches.

In order to avoid damaging these switches, do not press them using your fingers. However, if it is necessary to press these switches, be sure to press them at 90˚ angles, pressing them at other angles can easily damage the parts.

Common Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Setting	1) BATT terminal voltage:7.5V					
	2) SSG Standard modulation					
	[Wide] MOD:1kHz, DEV:3kHz					
	[Semi Wide] MOD:1kHz, DEV:24kHz					
	[Narrow] MOD:1kHz, DEV:1.5kHz					
2. VCO lock voltage RX TX	**[Panel Test Mode]** 1) CH-Sig:2-1 2) CH-Sig:3-1 3) CH-Sig:2-1 PTT:ON 4) CH-Sig:3-1 PTT:ON	Power meter DVM	ANT CV(LV)		Check	0.8V or more 4.0V ± 0.1V 0.8V or more (E,(N)E,(N)T) 0.6V or more ((N)E2) 3.5V ± 0.1V ((N)E2) 4.0V ± 0.1V (E,(N)E,(N)T)

Transmitter Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Frequency Adjust	1) PTT:ON	Freq. Counter Power meter Am meter	ANT	VR1	Center frequency (143.0 MHz) ± 50Hz ((N)E2) (160.0 MHz) ± 50Hz (E,(N)E,(N)T)	
2. Max Power Check	1) Adj item [HPOW] Adjust [256] 2) Adj item [H.P O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W. .] Adjust [256] PTT:ON				Check	5.2W or more
3. Hight Power Adjust	1) Adj item [HPOW] Adjust [∗∗∗] 2) Adj item [H.P O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W.] → [H.P.O.W. .] Adjust [∗∗∗] PTT:ON			Encoder knob	5.0W	±0.1W 2.2A or less
4. Hight Power Check	**[Panel Test Mode]** 1) CH-Sig:1-1 PTT:ON 2) CH-Sig:2-1 PTT:ON 3) CH-Sig:3-1 PTT:ON				Check	4.0~6.0W 2.3A or less
5. Low Power Adjust	1) Adj item [LPOW] Adjust [∗∗∗] 2) Adj item [L.P O W] → [L.P.O W] → [L.P.O.W] → [L.P.O.W.] → [L.P.O.W. .] Adjust [∗∗∗] PTT:ON			Encoder knob	1.0W	±0.1W 1.0A or less

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	

6. Low Power Check	**[Panel Test Mode]**
	1) CH-Sig:1-1
	   Set low power (Push [◄])
	   PTT:ON
	2) CH-Sig:2-1
	   PTT:ON
	3) CH-Sig:3-1
	   PTT:ON
		Freq. Counter
		Power meter
		Am meter
			ANT	VR1	Check	0.5~1.5W
						1.2A or less

7. Max DEV Adjust
[Wide 5K]
E
	1) Adj item [MAX]
	   Adjust [∗∗∗]
	   AG:1kHz / 120mV
	   Dev meter filter
	   LPF:15kHz
	   HPF:OFF
	2) Adj item
	   [.M A X] → [.M.A.X] → [.M.A.X. .]
	   Adjust [∗∗∗]
	   PTT:ON
		Power meter
		Dev meter
		Oscilloscope
		AG
		AF VTVM
			ANT
			SP/MIC connector
				Encoder knob	4.2kHz
					(According to the larger +,-)
						±50Hz

[Narrow]
(N)E,(N)E2,(N)T
	1) Adj item [MAX]
	   Adjust [∗∗∗]
	   AG:1kHz / 120mV
	   Dev meter filter
	   LPF:15kHz
	   HPF:OFF
	2) Adj item
	   [.M A X] → [.M.A.X] → [.M.A.X. .]
	   Adjust [∗∗∗]
	   PTT:ON
					2.1kHz
					(According to the larger+,-)	

[Wide 4K]
E
	1) Adj item [MAX .]
	   Adjust [∗∗∗]
	   PTT:ON
					3.3kHz
					(According to the larger+,-)	

8. MIC Sensitivity Check	**[Panel Test Mode]**
	1) CH-Sig:1-1
	   AG:1kHz / 12mV
	   LPF:3kHz
	   PTT:ON
					Check	2.2~3.8kHz

9. QT TCXO Balance	Adj item [X Q T] Adjust [200]		ANT SP/MIC connector	Encoder knob		
10.DQT TCXO Balance	Adj item [X D Q T] Adjust [150]					

TK-260G/(N)/270G/(N)
ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
11.DQT VCO Balance Adjust [Wide 5K] E	1) Adj item [VDQT] Adjust [∗∗∗] LPF:3kHz HPF:OFF 2) Adj item [V.D Q T] → [V.D.Q.T] → [V.D.Q.T. .] Adjust [∗∗∗] PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	ANT SP/MIC connector	Encoder knob	Make the demodulation waves into square waves.	⎍⎍⎍
[Narrow] (N)E,(N)E2,(N)T	1) Adj item [VDQT] Adjust [∗∗∗] LPF:3kHz HPF:OFF 2) Adj item [V.D Q T] → [V.D.Q.T] → [V.D.Q.T. .] Adjust [∗∗∗] PTT:ON					
[Wide 4K] E	1) Adj item [VDQT.] Adjust [∗∗∗] PTT:ON					
12.QT VCO Balance	Adj item [V Q T] Adjust [∗∗∗] $[VDQT] \times \dfrac{200}{150} = [VQT]$					
13.QT Deviation Adjust [Wide 5K] E	1) Adj item [FQT] Adjust [∗∗∗] LPF:3kHz HPF:OFF 2) Adj item [.F Q T] → [.F.Q. T] → [.F.Q.T. .] Adjust [∗∗∗] PTT:ON				Wide 5K:0.90kHz Narrow:0.42kHz Wide 4K:0.72kHz	±40Hz ±40Hz ±40Hz
[Narrow] (N)E,(N)E2,(N)T	1) Adj item [FQT] Adjust [∗∗∗] LPF:3kHz HPF:OFF 2) Adj item [.F Q T] → [.F.Q. T] → [.F.Q.T. .] Adjust [∗∗∗] PTT:ON					
[Wide 4K] E	1) Adj item [FQT.] Adjust [∗∗∗] PTT:ON					
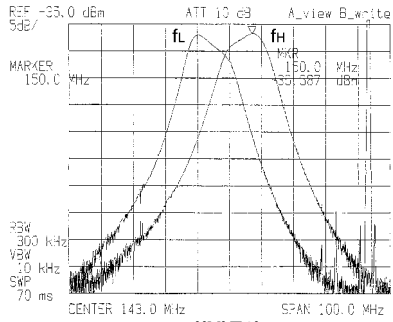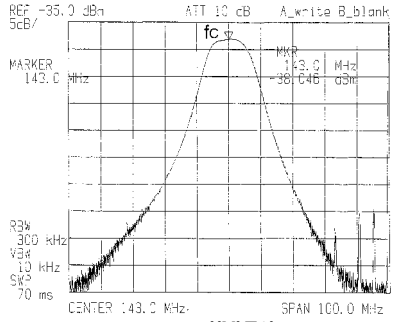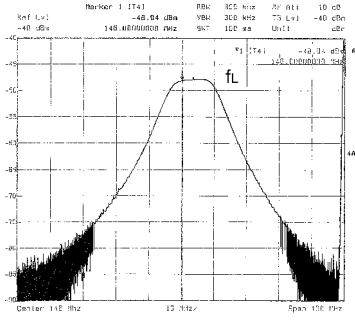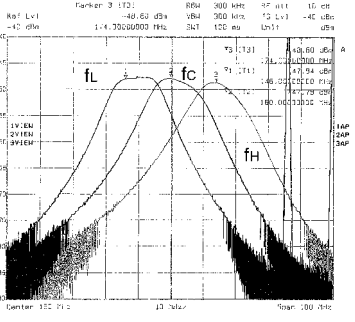
ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
14.DQT Devition Adjust [Wide] E [Narrow] (N)E,(N)E2,(N)T	1) Adj item [FDQT] Adjust [∗∗∗] LPF:3kHz HPF:OFF 2) Adj item [F.D Q T] → [F.D.Q.T] → [F.D.Q.T. .] Adjust [∗∗∗] PTT:ON	Power meter Dev meter Oscilloscope	ANT SP/MIC connector	Encoder knob	Wide 5K:0.75kHz Narrow:0.35kHz Wide 4K:0.6kHz	±50Hz
[Wide 4K] E	3) Adj item [FDQT.] Adjust [∗∗∗] PTT:ON					
15.DTMF Deviation Adjust [Wide 5K] E [Narrow] (N)E,(N)E2,(N)T	1) Adj item [DTMF] Adjust [∗∗∗] LPF:15kHz HPF:OFF PTT:ON				Wide 5K:2.5kHz Narrow:1.25kHz Wide 4K:2kHz	±0.1kHz
[Wide 4K] E	2) Adj item [DTMF .] Adjust [∗∗∗] PTT:ON					
16.TONE Deviation Adjust [Wide 5K] E [Narrow] (N)E,(N)E2,(N)T	1) Adj item [TONE] Adjust [∗∗∗] LPF:15kHz HPF:OFF PTT:ON				Wide 5K:3.0kHz Narrow:1.5kHz Wide 4K:2.4kHz	±0.1kHz
[Wide 4K] E	2) Adj item [TONE .] Adjust [∗∗∗] PTT:ON					
17.BATT Detection Writing	1) Adj item [BATT] Adjust [∗∗∗] PTT:ON	Power meter DVM	ANT BATT terminal	Encoder knob	After pressing the PTT switch, confirm that one predetermined numeric in the range of 1 to 256 appears, then press the [◄] key. That number will be stored in memory.	BATT terminal voltage:5.9V
18.BATT Detection Check	**[Panel Test Mode]** 1) CH-Sig:1-1 BATT terminal voltage:6.5V PTT:ON				Check	No blinking of LED
	2) BATT terminal voltage:5.7V PTT:ON					Blinking of LED

TK-260G/(N)/270G/(N)
ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Sensitivity Adjustment	Adj item [SENS] Adjust [∗∗∗] f_L f_c [S.E N S] → [S.E.N.S] →	DVM		Encoder knob	f_L : ([S.E N S]) : [60] ((N)E2) [81] (E,(N)E) f_c : (S.E.N.S) : [100] ((N)E2) [135] (E,(N)E)	
	f_H [S.E.N.S. .]				f_H : (S.E.N.S. .) : [130] ((N)E2) [198] (E,(N)E)	
2. BPF	(PANEL TEST MODE) CH-Sig 2-1 Tra-G setting -40dBm	Tracking generator spectrum analyzer	ANT BPF	L305, L306, L307	Adjust wave form to figure 1.(f_L)	
	CH-Sig 1-1				Check wave form to figure 2.(f_c)	
	CH-Sig 3-1				Check wave form to figure 1.(f_H)	

((N)E2)
Fig. 1

((N)E2)
Fig. 2

(E, (N)E)
Fig. 1

BPF-WAVE

(E, (N)E)
Fig. 2

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	

3. Sensitivity Check	**[Panel Test Mode]**
	1) CH-Sig:1-1
	   SSG OUT
	   Wide:-117dBm
	   (MOD:1kHz / ±3kHz)
	   Narrow:-115dBm
	   (MOD:1kHz / ±1.5kHz)
	   Semi wide:-116dBm
	   (MOD:1kHz / ±2.4kHz)
		SSG
		AF VTVM
		Oscilloscope
			ANT		Check	12dB SINAD or more

4. Squelch (open) Adjust
[Wide 5K]
E
[Narrow]
(N)E,(N)E2,(N)T
[Wide 4K]
E
	1) Adj item [SQL3]
	   Adjust [∗∗∗]
	   SSG OUT:
	   Wide:-125dBm
	   Narrow:-124dBm
	
	2) Adj item [SQL3.]
	   Adjust [∗∗∗]
	   Semi wide:-125dBm
					Encoder knob squelch.	Adjust to the squelch threshold point

5. Squelch(Tight) Adjust
[Wide 5K]
E
[Narrow]
(N)E,(N)E2,(N)T
[Wide 4K]
E
	1) Adj item [SQL9]
	   Adjust [∗∗∗]
	   SSG OUT:
	   Wide:-117dBm
	   Narrow:-116dBm
	
	1) Adj item [SQL9.]
	   SSG OUT:
	   Semi wide:-117dBm
						Adjust to the squelch threshold point

6. Squelch Check	**[Panel Test Mode]**
	1) CH-Sig:1-1
	   SQ Level:[SQL5]
	   SSG OUT:
	    W:-118dBm
	    N:-116dBm
	2) SSG OUT:OFF
					Check	Squelch must be opened.
						
						Squelch must be closed.

TK-260G/(N)/270G/(N)

ADJUSTMENT

Adjustment points TX-RX unit (X57-587)
Component side view
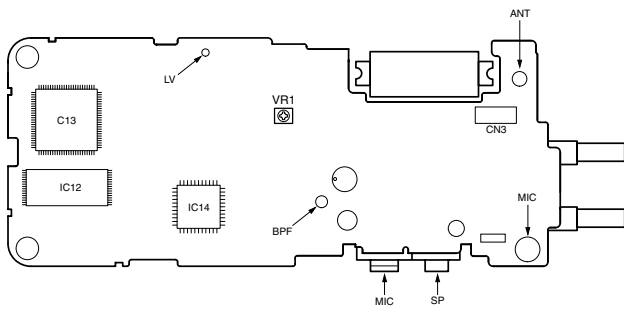
Foil Side View
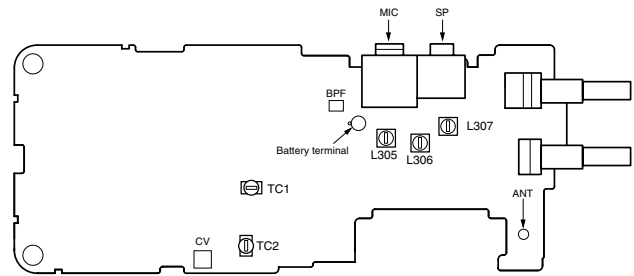
VR1 : Frequency adjustment

TC1 : Transmit lock voltage adjustment
TC2 : Receive lock voltage adjustment
L305:
L306:   Band-pass filter waveform adjustment
L307:
BPF : Band-pass filter test point
CV(LV) : Lock voltage adjustment terminal.

Fig. 2 Adjustment points

DISPLAY UNIT (X54-3250-10) Component Side View

DISPLAY UNIT (X54-3250-10) Foil Side View

DISPLAY UNIT (X54-3250-10)
Component Side View

Ref. NO.	Address
IC501	4E
Q501	4H
Q502	4G
D501	4D
D502	5F
D503	5F
D504	5F
D505	4D
D506	4H
D507	4G
D508	8G
D509	9G
D510	10G
D511	4C
D512	8D
D513	9D
D514	10D
D515	7G
D516	7D
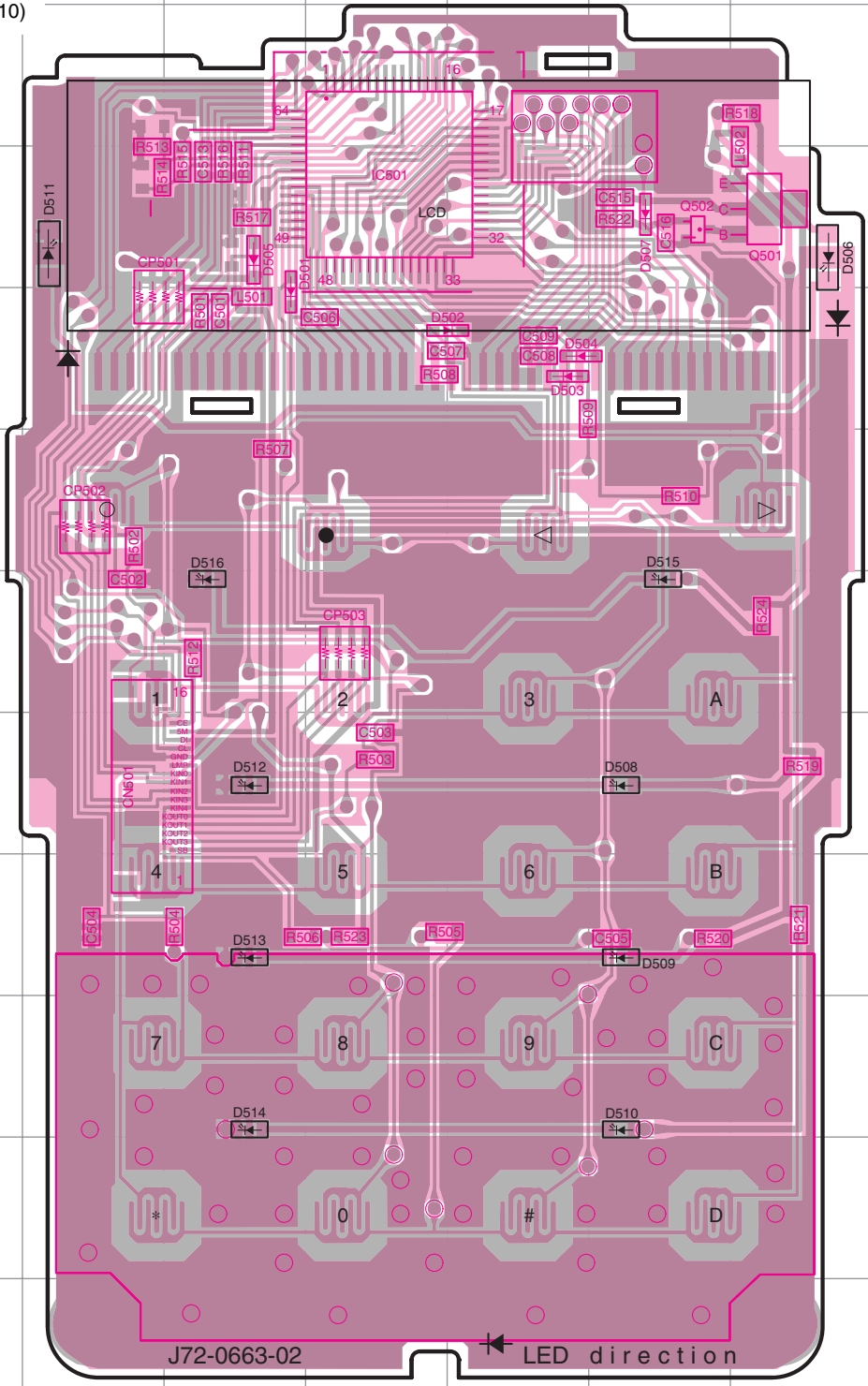
DISPLAY UNIT (X54-3250-10)
Foil Side View

Ref. NO.	Address
IC501	4N
Q501	4K
Q502	4L
D501	4O
D502	5M
D503	5M
D504	5M
D505	4O
D506	4K
D507	4L
D508	8L
D509	9L
D510	10L
D511	4P
D512	8O
D513	9O
D514	10O
D515	7L
D516	7O
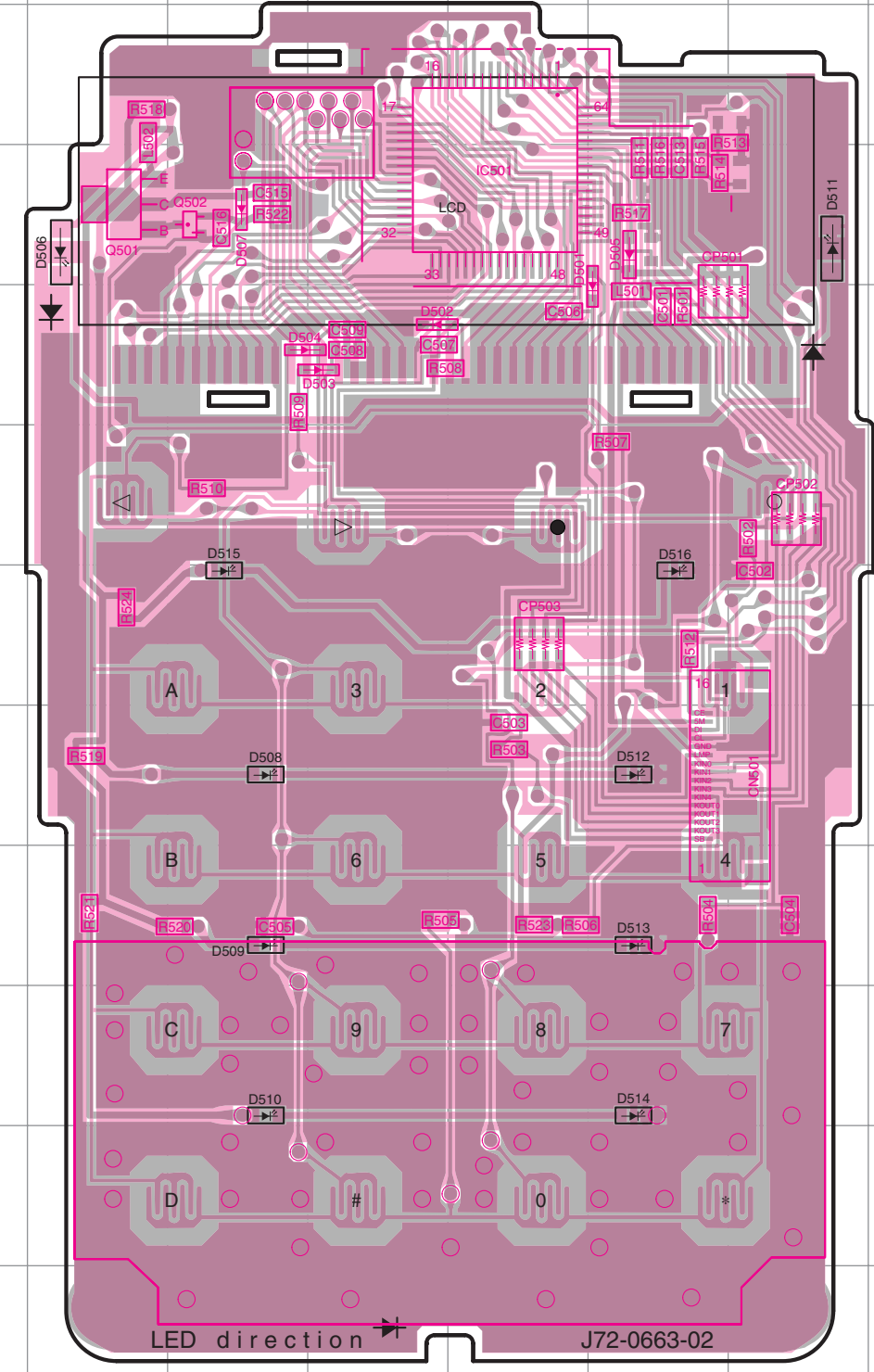
2SC4617(S)

2SB1132(Q,R)

LC75823W

LED direction   J72-0663-02

J72-0663-02   LED direction

Component Side
Foil Side

Component Side
Foil Side

45

46
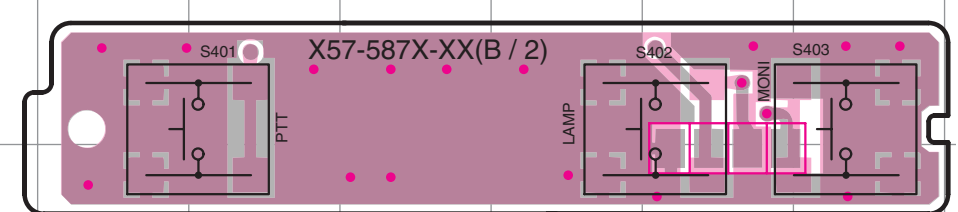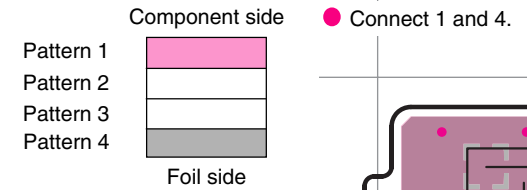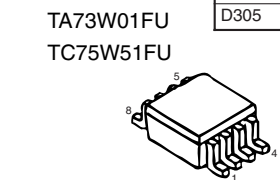
TK-260G/(N)/270G/(N) PC BOARD VIEW

TX RX UNIT (X57-587X-XX) Component Side View
2-71:TK260G E, 2-72:TK-260G (N)E, (N)T, 2-73:TK-270G E,
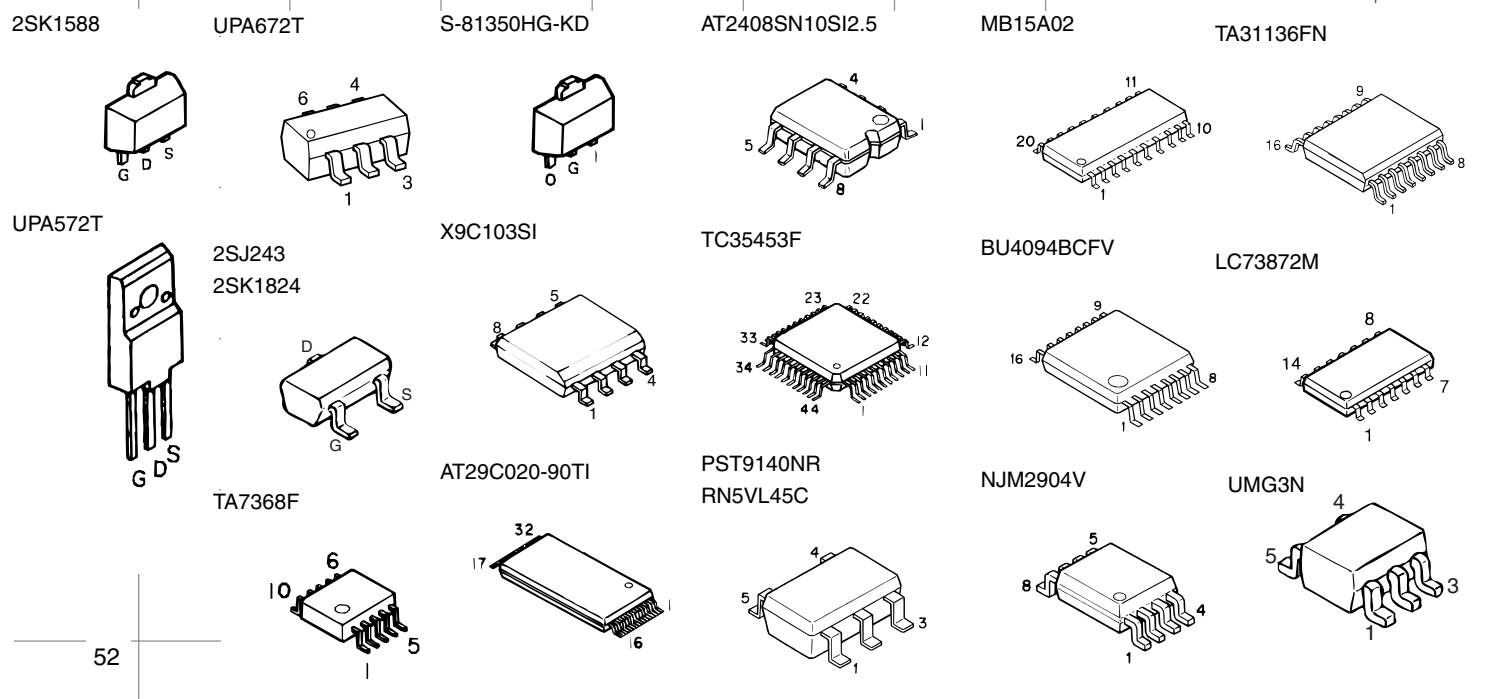2-74:TK-270G (N)E, (N)T, 2-75:TK-260G (N)E2

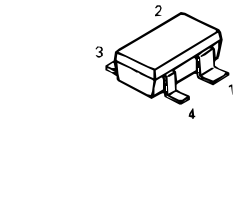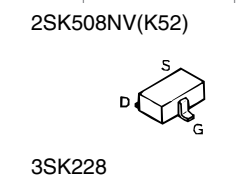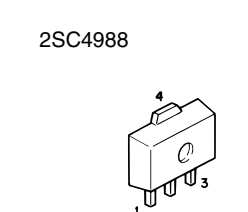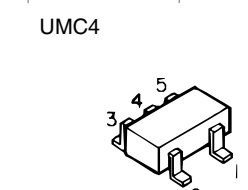X57-587X-XX(A / 2)
J72-0664-12

TX-RX UNIT (X57-587X-XX)
Component Side View

Ref. NO.	Address
IC1	8E
IC3	6F
IC5	4O
IC6	4P
IC10	4M
IC11	5C
IC12	5O
IC13	7O
IC14	4L
IC15	6M
IC16	7K
IC17	3I
IC18	6J
IC19	8J
Q13	6G
Q15	6E
Q26	8K
Q30	4E
Q31	8N
Q32	5D
Q33	5D
Q34	6D
Q35	3L
Q36	6M
D15	5F
D17	7M
D18	5B
D19	7M
D22	5F
D23	3M

X57-587X-XX(B / 2)

S401 S402 S403
PTT LAMP MONI

Component side

Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

UPA672T

X9C103SI

TC35453F

TA73W01FU
TC75W51FU

2SK1824

AT29C020-90TI

BU4094BCFV

LC73872M

30622M4102GP

DTA114EE
DTA144EE
DTC114EE
2SA1362(GR)
2SC4619

2SK1588

TA7368F

AT2408SN10SI2.5

NJM2904V

M68732H

TX RX UNIT (X57-587X-XX) Foil Side View
2-71:TK260G E, 2-72:TK-260G (N)E, (N)T, 2-73:TK-270G E,
2-74:TK-270G (N)E, (N)T, 2-75:TK-260G (N)E2

TX-RX UNIT (X57-587X-XX)
Foil Side View

Ref. NO.	Address
IC2	7H
IC4	4J
IC7	8D
IC8	5D
IC9	6D
IC301	8L
Q1	7I
Q2	7K
Q3	7K
Q4	7L
Q6	7M
Q7	6J
Q8	6J
Q9	6N
Q10	8J
Q11	6J
Q12	5I
Q14	5I
Q16	8G
Q17	5I
Q18	8F
Q19	5L
Q20	8F
Q21	8F
Q22	3J
Q23	3I
Q24	5Q
Q25	5R
Q27	8E
Q28	8E
Q301	5O
D1	7I
D2	7J
D3	7P
D4	7J
D5	6L
D6	6J
D7	5P
D8	7O
D9	7J
D10	6L
D11	8I
D12	6J
D13	4I
D14	4I
D21	7D
D301	6P
D302	5N
D303	4O
D305	5M

X57-587X-XX(A / 2)
J72-0664-12

X57-587X-XX(B / 2)

Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side
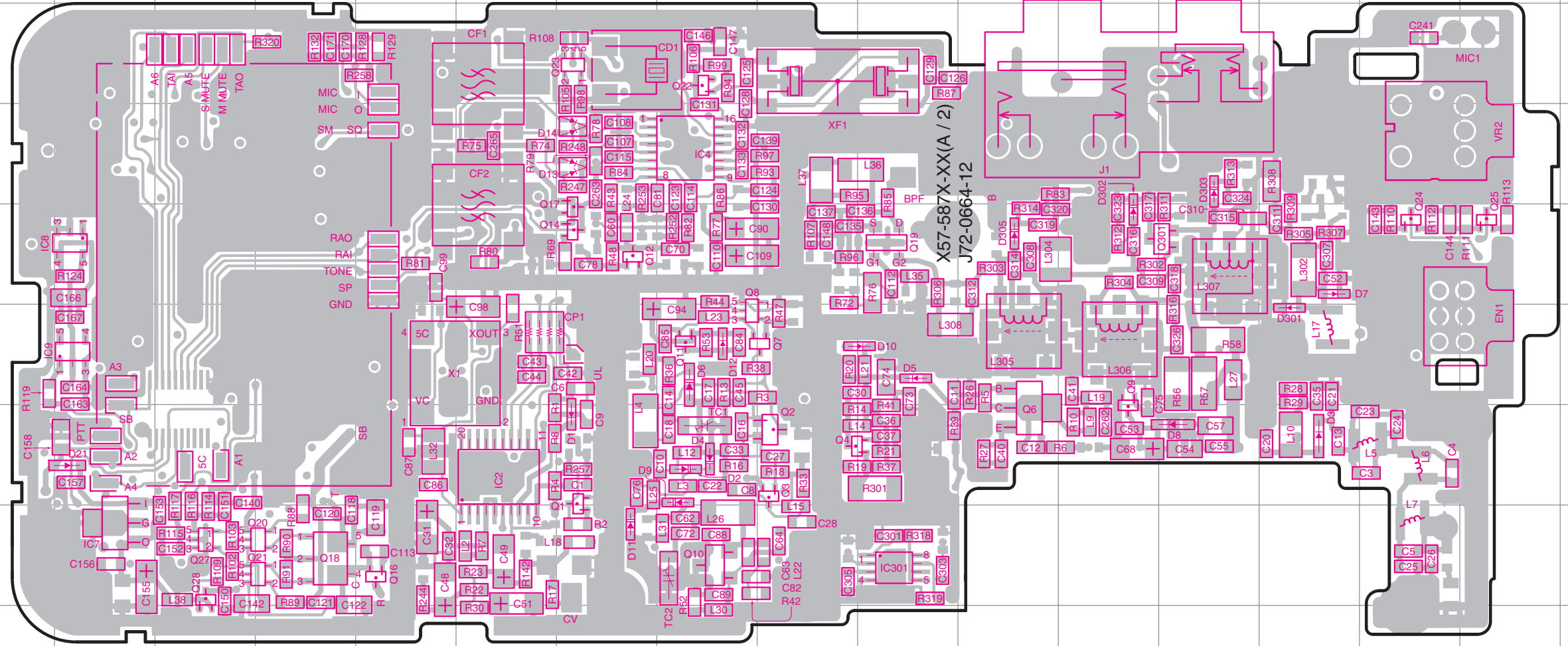
DTA114EE
DTA114YE
DTA144EE
DTC114EE
DTC144EE
2SC4226(R24)
2SC4617(S)
2SC5108(Y)
2SC4649(N,P)

UMC4

2SC4988

2SK508NV(K52)

3SK228

UPA572T

2SJ243

S-81350HG-KD

PST9140NR
RN5VL45C

FP210
B1 C1
EC C2
B2

MB15A02

TA31136FN

UMG3N

49

50
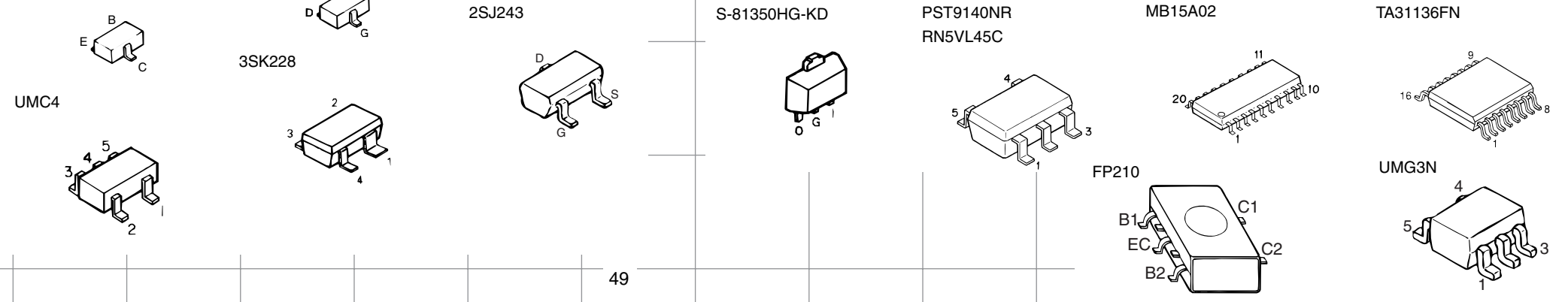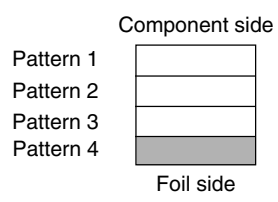
TK-260G/(N)/270G/(N) PC BOARD VIEW

TX RX UNIT (X57-587X-XX) Component Side + Foil Side View
2-71:TK260G E, 2-72:TK-260G (N)E, (N)T, 2-73:TK-270G E,
2-74:TK-270G (N)E, (N)T, 2-75:TK-260G (N)E2
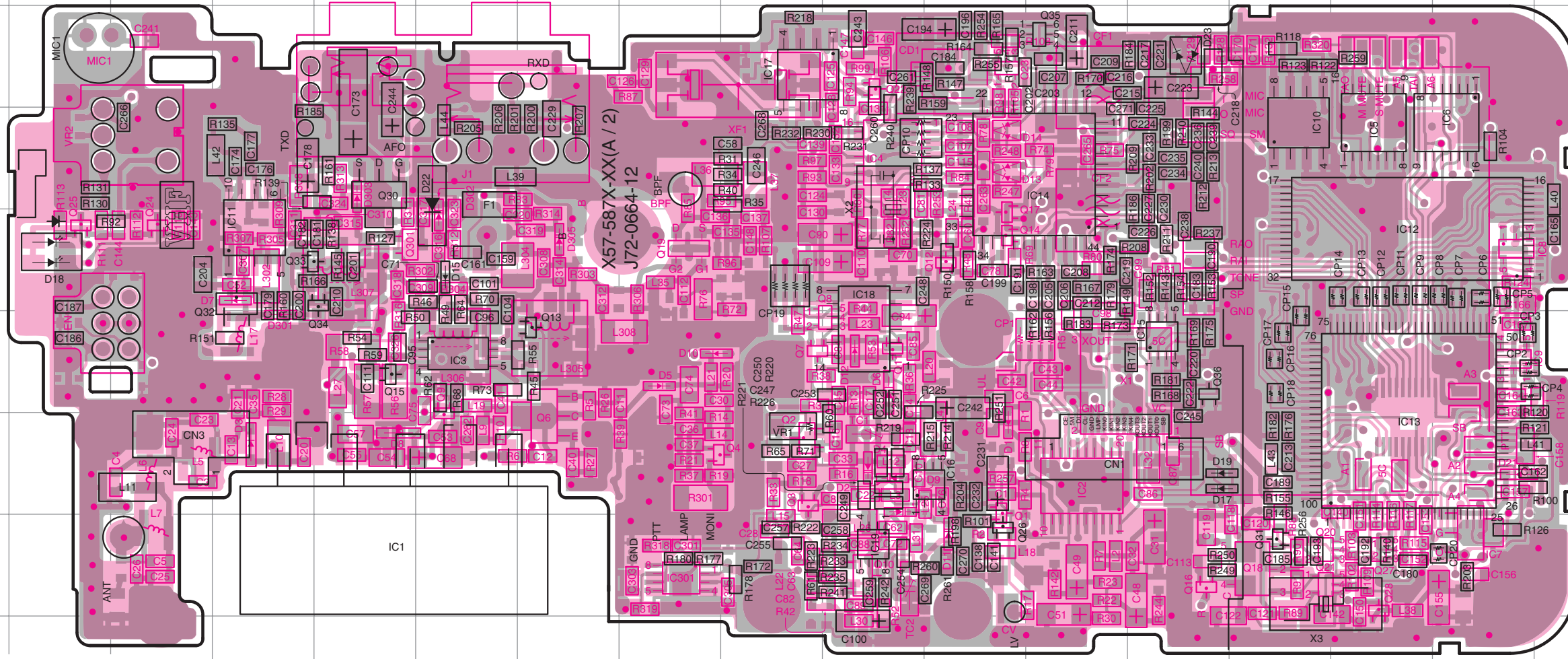
Ref. NO.	Address	Ref. NO.	Address
IC1	8E	Q21	8N
IC2	7L	Q22	3J
IC3	6F	Q23	3K
IC4	4J	Q24	5C
IC5	4O	Q25	5B
IC6	4P	Q26	8K
IC7	8P	Q27	8O
IC8	5P	Q28	8O
IC9	6P	Q30	4E
IC10	4M	Q31	8N
IC11	5C	Q32	5D
IC12	5O	Q33	5D
IC13	7O	Q34	6D
IC14	4L	Q35	3L
IC15	6M	Q36	6M
IC16	7K	Q301	5E
IC17	3I	D1	7K
IC18	6J	D2	7J
IC19	8J	D3	7D
IC301	8H	D4	7J
Q1	7K	D5	6H
Q2	7I	D6	6J
Q3	7I	D7	5D
Q4	7H	D8	7E
Q6	7G	D9	7J
Q7	6I	D10	6H
Q8	6J	D11	8K
Q9	6F	D12	6J
Q10	8J	D13	4K
Q11	6J	D14	4K
Q12	5K	D15	5F
Q13	6G	D17	7M
Q14	5K	D18	5B
Q15	6E	D19	7M
Q16	8K	D21	7P
Q17	5K	D22	5F
Q18	8N	D23	3M
Q19	5H	D301	6D
Q20	8N	D302	5F
		D303	4E
		D305	5G

Component side
● Connect 1 and 4.

Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side

X57-587X-XX(B / 2)

X57-587X-XX(A / 2)
J72-0664-12

DTA114EE
DTA114YE
DTA144EE
DTC114EE
DTC144EE
2SA1362(GR)
2SC4226(R24)
2SC4617(S)
2SC4619
2SC5108(Y)
2SC4649(N,P)

30622M4102GP

FP210

UMC4

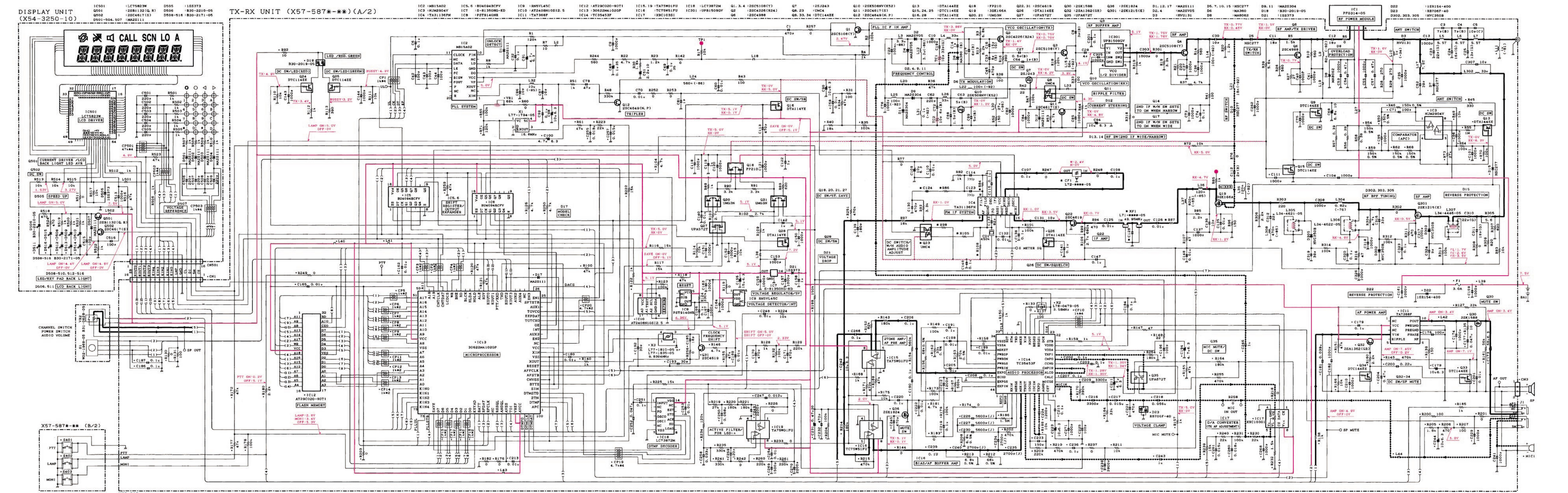2SK508NV(K52)

M68732H

2SC4988

3SK228

2SK1588

UPA672T

UPA572T

2SJ243
2SK1824

TA7368F

S-81350HG-KD

X9C103SI

AT29C020-90TI

AT2408SN10SI2.5

TC35453F

PST9140NR
RN5VL45C

MB15A02

BU4094BCFV

NJM2904V

TA73W01FU
TC75W51FU

TA31136FN

LC73872M

UMG3N

TX-RX UNIT (X57-587*-**)(A/2)
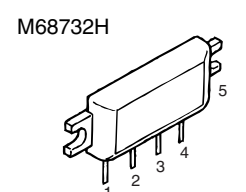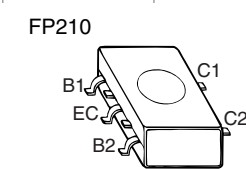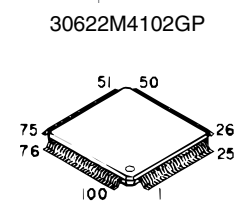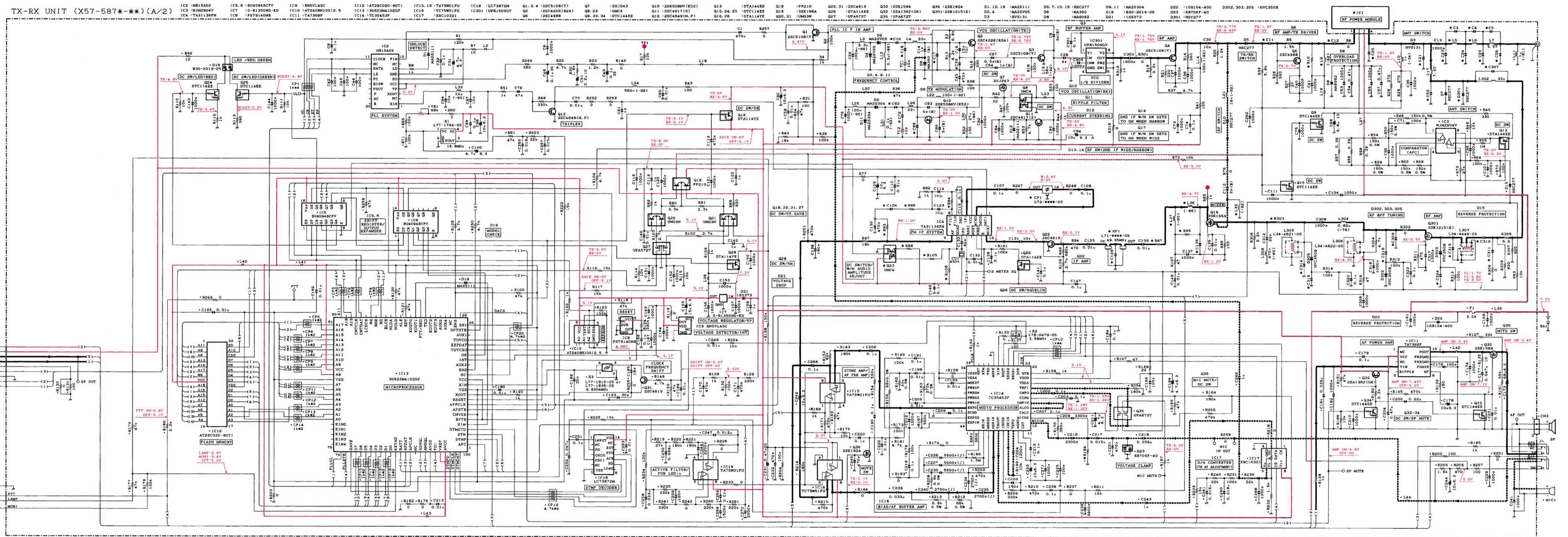
Note) Component marked with a dot (●) are Parts of pattern 1.

TK-270G/(N) SCHEMATIC DIAGRAM

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

LEVEL DIAGRAM

KNB-14/KNB-15A (Ni-Cd BATTERY)
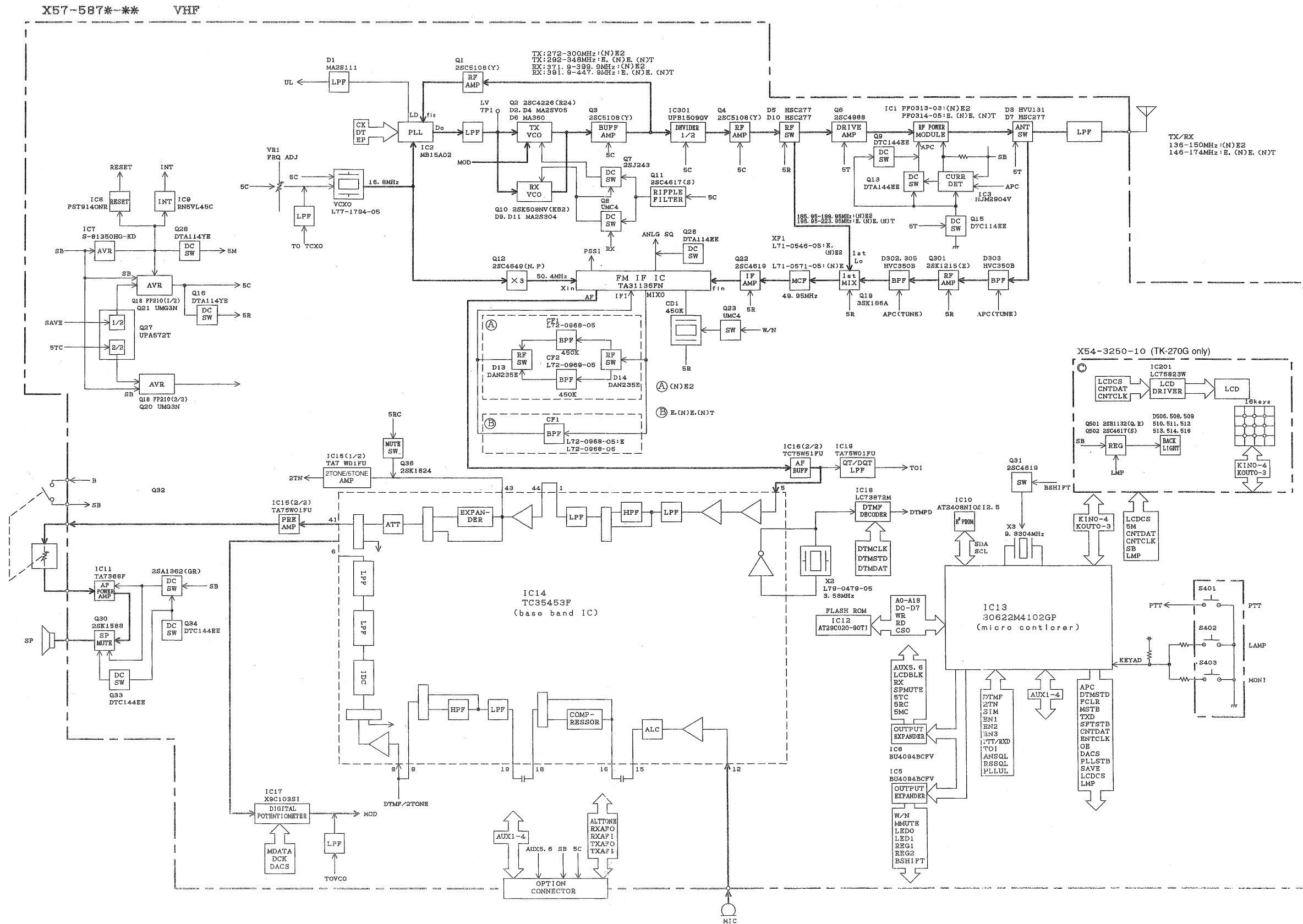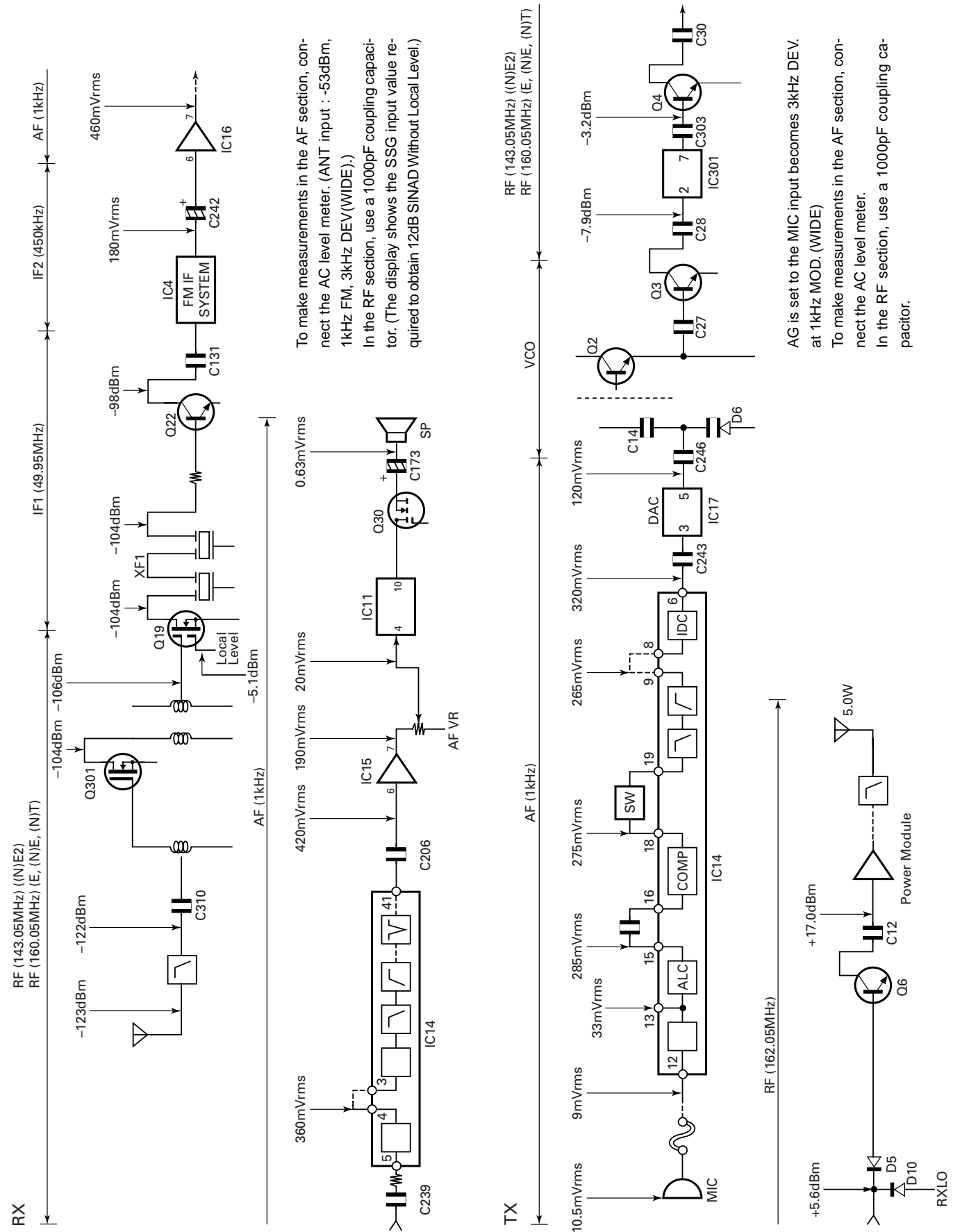
To make measurements in the AF section, connect the AC level meter. (ANT input : -53dBm, 1kHz FM, 3kHz DEV.(WIDE).)
In the RF section, use a 1000pF coupling capacitor. (The display shows the SSG input value required to obtain 12dB SINAD Without Local Level.)

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

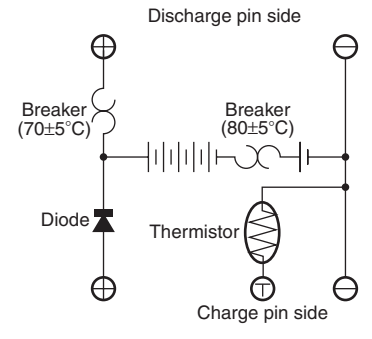**KNB-14**

CIRCUIT DIAGRAM
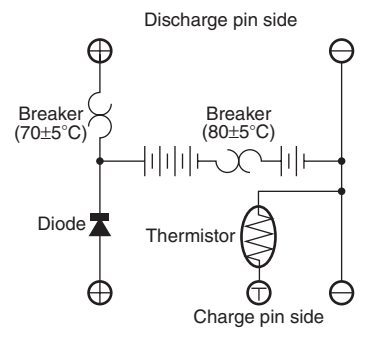
SPECIFICATIONS

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

KNB-15A

CIRCUIT DIAGRAM

SPECIFICATIONS

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

OPTIONS

KMC-17 (Speaker microphone)

KMC-17 Parts List

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

KMC-21 (Speaker microphone)

KMC-21 Parts List

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

TK-260G/(N)/270G/(N)
SPECIFICATIONS

General

Frequency Range .... 146~174MHz (E, (N)E, (N)T) 136~150MHz ((N)E2)
Number of channels .... Max. 8 (TK-260G) Max. 128 (TK-270G)
Number of groups .... Max. 128 (TK-270G)
Channel Spacing .... 25kHz (Wide) 20kHz (Semi wide) 12.5kHz (Narrow)
PLL Step 2.5kHz, 5kHz, 6.25kHz, 7.5kHz
Operating Voltage .... 7.5 VDC±20%
Battery Life .... More than 8 hours at 5 watts (5-5-90 duty cycle with KNB-15A battery)
Operating Temperature range .... -30˚C to +60˚C (-22 ˚F to +140 ˚F)
Dimensions and Weight
  With KNB-14 (7.2V 600mAh battery) .... 58 (2-5/16) W x 135 (5-5/16) H x 32 (1-1/4) D mm (in)
                                                       400g (0.88lbs)
  With KNB-15A (7.2V 1100mAh battery) .... 58 (2-5/16) W x 135 (5-5/16) H x 35 (1-3/8) D mm (in)
                                                       440g (0.97lbs)

Receiver (Measurements made per ETS standard)

Sensitivity
  EIA 12dB SINAD .... 0.25μV (Wide, Semi wide)/0.32μV (Narrow)
Selectivity .... 70dB (Wide, Semi wide)/60dB (Narrow)
Inter modulation 65dB
Spurious response 70dB
Audio Power Output 500mW
Frequency Stability .... ±3.0ppm
Channel Frequency Spread .... 28MHz (E, (N)E, (N)T) 14MHz ((N)E2)

Transmitter (Measurements made per ETS standard)

RF Power Output 5W/1W
Spurious and Harmonics 70dB
Modulation .... ±5.0kHz@25kHz (Wide)/±4.0kHz@20kHz (Semi wide)/±2.5kHz@12.5kHz (Narrow)
FM Noise EIA .... 45dB (Wide)/43dB (Semi wide)/40dB (Narrow)
Audio Distortion 5%
Frequency Stability .... ±3.0ppm
Channel Frequency Spread .... 28MHz (E, (N)E, (N)T) 14MHz ((N)E2)General