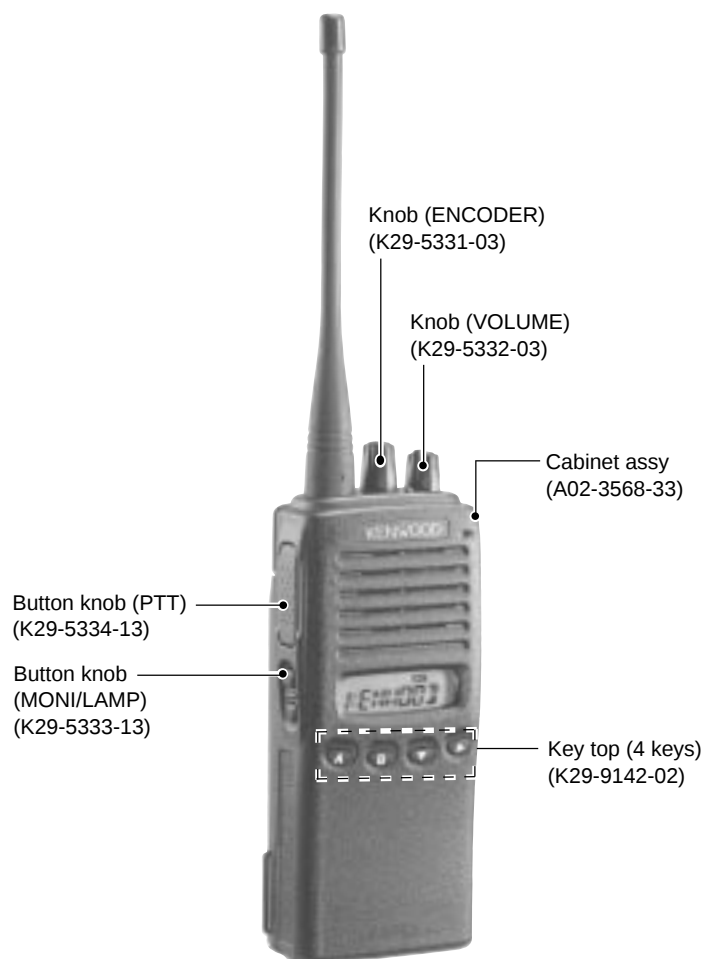




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GENERAL / SYSTEM SET-UP

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.

Unit Model & destination		TX-RX Unit	Display Unit	Frequency range	Remarks
TK-373G	K	X57-6500-10	X54-3250-11	450~470MHz	IF1 : 49.95MHz LOC : 50.4MHz
	K2	X57-6500-11		470~490MHz	

PERSONNEL SAFETY

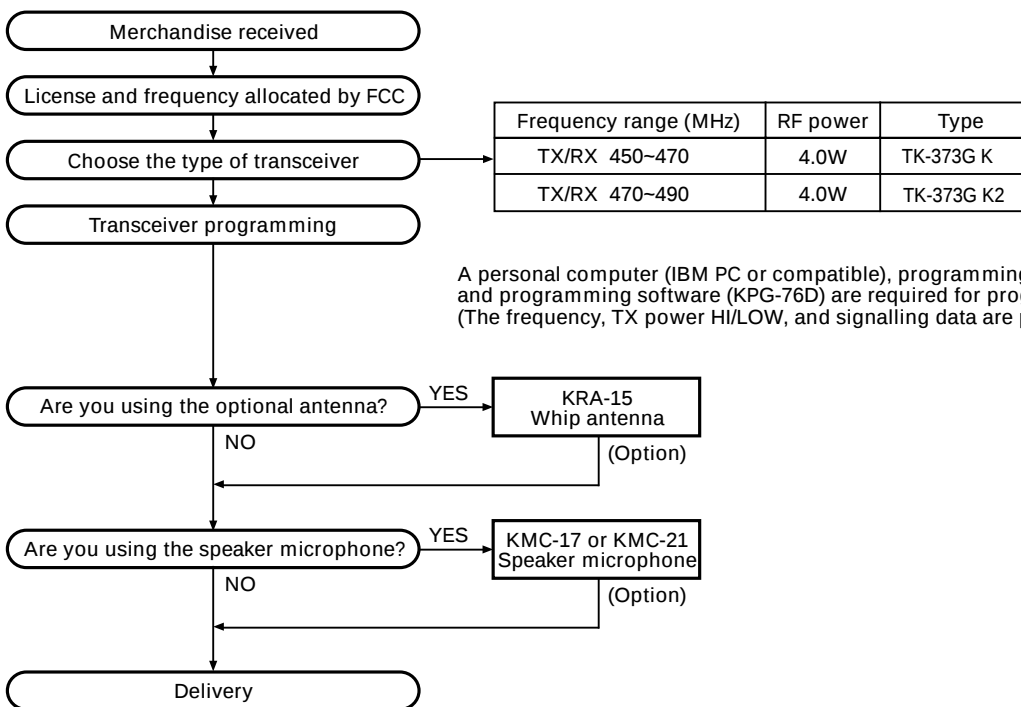
The following precautions are recommended for personnel safety:

- 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

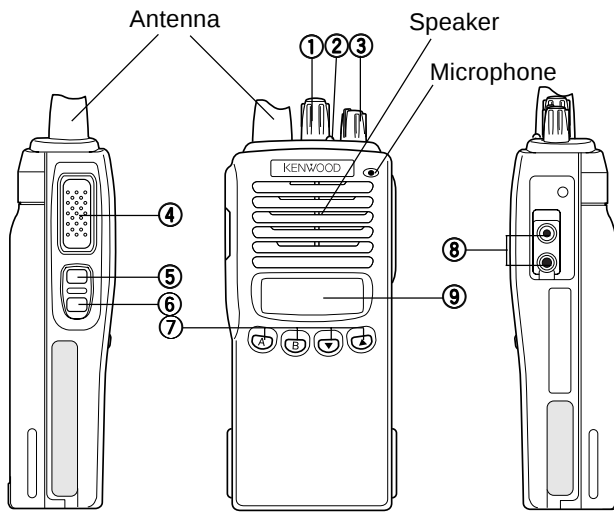
This radio is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained within.

SYSTEM SET-UP



OPERATING FEATURES

1. Operating Features



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

① Rotary encoder

Your dealer can program the encoder as either System Up/Down or Group Up/Down. Rotate to select a system or group.

② Transmit/ Battery low indicator

This red LED lights during transmission. If programmed by your dealer, when the battery pack power is low, the LED flashes during transmission. Replace or recharge the battery pack at such a time.

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.

⑥ Side 2 key

This is a PF (Programmable Function) key.

⑦ A, B, ▼, ▲ keys

These are PF (Programmable Function) keys.

⑧ Speaker /Microphone jacks

Connect an optional speaker/ microphone here.

⑨ Display

Note: The PF keys are programmed with default functions:

- **Side 1 key:** Lamp
- **Side 2 key:** Squelch Off Momentary
- **A key:** None
- **B key:** None
- **▼ key:** Group Down
- **▲ key:** Group Up

Display



Icon	Description
P	Appears when the selected group is programmed as priority.
TA	Appears when the selected group is programmed as Talk Around.
MON	Appears when the key programmed as Monitor is pressed.
CALL	If programmed by your dealer, appears when you receive an ID.
SCN	Appears when you are using Scan mode.
LO	Appears when using low power on the selected group.
	In trunked operation, appears when the selected group is programmed as telephone IDs.
	Appears when the selected system is removed from the scanning sequence.
	Displays the system and group numbers. Your dealer can program system and group names with up to 8 characters, in place of numbers

Programmable Auxiliary Functions

You can program the **Side 1**, **Side 2**, **A**, **B**, **▼**, and **▲** keys with the functions listed below.

- Aux
- Display Character
- DTMF ID (BOT)
- DTMF ID (EOT)
- Group Down
- Group Up
- Home Group
- Key Lock
- Lamp
- Memory (RCL)
- Memory (RCL/STO)
- Memory (STO)
- Monitor Momentary
- Monitor Toggle
- None (No function)
- Redial
- RF Power Low
- Scan
- Scan Del/Add
- Scan Temporary Delete
- Squelch Off Momentary
- Squelch Off Toggle
- System Down
- System Up
- Telephone Disconnect

OPERATING FEATURES

2. Programmable keys

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

1) AUX

If this key is pressed, a dot appears at the extreme right of the LCD and AUX port which is inside of the transceiver turns to the active level. If pressed again, the dot disappears and the AUX ports turns to the deactive level.

2) Display character

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

3) DTMF ID (Begin of TX)

Pressing this key in Conventional mode, automatically sends the preset DTMF ID (Begin of TX).

4) DTMF ID (End of TX)

Pressing this key in Conventional mode, automatically sends the preset DTMF ID (End of TX).

5) Group up/down

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

6) Home group

Each pressing of the key selects a preset system/group.

7) Key lock

Pressing this key causes the transceiver to accept entry of only the [Monitor Toggle], [Key Lock], [PTT], [Lamp], [Monitor Momentary], [Squelch off Momentary], and [Squelch off Toggle] keys.

8) Lamp

This key illuminates the LCD and keys on the front panel. When the key is pressed, the LED lamp goes on. When it is released, the lamp goes off after about five seconds. If any key is pressed while the LED lamp is on, the lamp is kept on for five seconds.

9) Memory

This key allows DTMF memory data to be recalled; up to 32 memories each with a memory dial of up to 16 digits and an A/N of up to 8 digits per memory.

10) None

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

11) Redial

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

12) RF power low

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

Hi→Low, Low→Low

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

13) Scan

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

14) Scan Del/Add

Used to select whether system scan routines are used during system scan. Each pressing of the key (to ON) toggles between lockout and lock. The scan routine is started when on lock. The DEL indicator flashes when the system is on lockout.

15) Scan temporary delete

This key is temporarily deleted a system being scanned. If you press this key when scan is stopped (when a call is being received from another station), the system is temporarily deleted and scanning restarts.

This key operates even when "Scan Type" is set to "List Type System Scan".

16) Squelch off

Used to release signalling or squelch when operating in conventional mode.

17) System up/down

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

18) Telephone disconnect

Pressing this key ends an RIC connection (disconnects the telephone line).

3. Scan Operating

1) System scan

System scan can be selected with the "Scan" key by programming the scan feature. When the "Scan" key is pressed and the "SCN" mark appears, scan mode is entered. Scanning starts from the system following the currently displayed system. When a call is received, scanning stops, and the system and group are displayed.

When the system knob or programming key is touched during scanning, the scan stops and the revert system or group can be changed. Scanning resumes one second after the key is released.

System Scan consists of the following 2 types.

- **Fix system scan**

All the set systems except locked-out ones are scanned. If the DEL/ADD feature is assigned to the programmable key, it can be controlled from the front panel.

OPERATING FEATURES

- **List type system scan**

A scan list can be set for each system.

The list to be scanned can be changed by changing the display system

If many system have been set, the scan speed can be increased by narrowing the systems to be scanned with scan lists.

2) System lockout

The system lockout feature is used to lock systems out of the scan sequence, and can be selected by programming in the following two ways:

- **Fixed lockout**

The system to be locked out is selected by programming. When a locked system is selected, the Delete (P) indicator appears on the left of the SYSTEM indicator. The revert system is scanned even if it is locked out. If there is a locked system, the Delete (P) indicator flashes during fixed scanning.

- **User selectable lockout**

If the scan lockout feature is programmed to a key, the user can lock systems out of the scan sequence with the key. To lock a system out of the scan sequence, press the key when the system is displayed. The Delete (P) indicator is displayed on the left of the SYSTEM indicator.

To unlock a system, select the system and press the key. The Delete (P) indicator disappears to indicate that the system has returned to the scan sequence. The revert system is scanned even if it is locked out. If there a locked system, the Delete (P) indicator flashes during fixed scanning. If all systems are locked out, the scan stops and only the revert system is received.

3) Drop-out delay time (Scan resume time)

If a call is received during scan, the scan stops. The scan resume time can be programmed as 0 to 300 seconds in one-second increments. The default value is 3 seconds.

4) Dwell time

The dwell time is the time after transmission ends until the scan resumes in scan mode. It can be set 0 to 300 seconds by programming. The default value is 3 seconds.

5) System/Group revert

System/Group revert can be programmed for one of the following;

- **Last called revert**

The system/group changes to the revert system or group when a call is received with the system/group being scanned.

- **Last used revert**

If a system/group call is received during scanning and the PTT button is pressed for transmission and response within

the drop out delay time, the system/group is assigned as the new revert system/group.

- **Selected revert**

If the system/group was changed while scanning, the newly selected system/group.

- **Selected + talkback**

If the system/group was changed while scanning, the newly selected system/group. The transceiver "talkback" on the current receive group.

6) Scan message wait

The time for staying with the home repeater that receives a signal during system scan and monitoring data messages can be programmed. If there is no signal from the home repeater, the system is scanned for about 50ms. If there is a signal, three data messages are monitored. Normally, three data messages are monitored for each system, and it can be increased in multiples of three data messages per line to up to eight lines.

If the repeater data message indicates that there is no call, data monitoring is terminated and the home repeater of the next system is scanned.

7) Group scan operation

Group scan can be programmed for each group. In addition to the ID codes of the selected group, the ID codes of the other groups that are permitted for group scan are decoded. (The two fixed ID and block decode codes are always decoded.)

If, during group scanning, a call is received with one of the selectable group ID codes for which group scan is enabled, the group display indicates the group number that the call came in with. That group then becomes the new selected group. Group scan resumes after the specified dropout delay time or dwell time shared by the system scan elapses.

8) In Conventional system.

If QT or DQT is set for the group, the groups, including signalling, are scanned.

In case of the priority group is set in conventional system, if a group scan (including group scan during a system scan) temporarily stops (receiving) in a group that does not have priority, a look back is performed to the priority group. Look back is performed according to the look back time A and B settings. If a call is received on the priority group, reception immediately switches to the priority group.

4. Details of Features

1) Time-out timer

The time-out timer can be programmed in 15 seconds increments from 15 seconds to 600. If the transmitter is keyed continuously for longer than the programmed time, the transmitter is disabled and a warning tone sounds while the

OPERATING FEATURES

PTT button is held down. The alert tone stops when the PTT button is released.

2) 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.

You can program PTT ID "on" or "off" for each group.

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 group.

3) 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.

4) Radio password

When the password is set in the transceiver, user can not use the transceiver unless enter the correct password.

This code can be up to 6 digits from 0 to 9 and input with the keypad or selector, and "A" key.

5) Call indicator

The call indicator can be programmed for each group. In trunked system, it can be set to respond to a selectable decode ID or one of two fixed IDs, except block IDs. When a call is received with a selectable decode ID, the call indicator flashes. When a call is received with a fixed ID, the call indicator lights continuously.

On a conventional system, the call indicator can be programmed to light for each QT or DQT code. It keeps flashing while a call is being received. It is turned off by pressing any front panel key.

6) Free system ringback

This feature is available only when a telephone interconnected ID code is selected. If a busy tone sounds when the PTT button is pressed, the transceiver enters this mode automatically.

When the PTT button is released, a beep sounds for 400ms

to indicate that the mode has been entered. If the scan is on, it is resumed (the "SCN" mark goes on). When any repeater becomes available, a ringing tone sounds and this mode ends.

The mode is terminated when the system, group, scan, PTT, key is changed.

7) System search

This feature can be programmed to automatically access other programmed systems when the selected system cannot be accessed. If an intercept tone sounds when the PTT button is pressed after setting the mode, the transceiver has entered the mode.

If the group ID is a telephone interconnect ID, the transceiver then attempts to access, in succession, other systems that have a telephone interconnect ID in the revert group location. If the group ID is a dispatch ID, the transceiver attempts to access other systems that have a dispatch ID programmed in the revert group location.

If there is no system to be accessed, an intercept tone sounds, the mode is terminated, and the transceiver returns to the first system. If the access is successful, the mode is terminated, and the searched system becomes the new selected system (If during scanning, the scan stops).

8) Transpond

This feature can be programmed to turn on and off for each group. If the ID of the group for which transpond is enabled is received, two data messages (transmit ID and turn-off code) are automatically transmitted if the PTT button is not pressed as a response within the time set (0 to 300 seconds in 1-second increments). If the PTT button is pressed within the time, the transpond is not preformed.

9) Transmit inhibit

The transceiver can be programmed with a transmit inhibit block of ID codes. If an ID code within this block is decoded the preset time before the PTT button is pressed, transmission is inhibited. The BUSY indicator lights and a busy tone sounds until the PTT button is released to indicate that transmission is not possible (except clear-to talk mode).

Transmission with the group for which the encode ID is not set is inhibited, and the busy tone is output while the PTT button is held down, regardless of the clear-to -talk setting.

5. 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.)

OPERATING FEATURES / REALIGNMENT

- **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**

In trunked mode the busy tone informs the user when the repeater cannot be used (System busy or TX inhibit Status).

- **Intercept tone**

This tone indicates that the transceiver is out of range. It indicates that the PTT button is pressed, and transmission has started, but the repeater cannot be connected and talking is not possible. It is output until the PTT button is released. (The mid tone and low tone are output alternately in 200ms intervals.)

- **Delay tone**

This tone is output when the PTT button is pressed and the repeater is accessed three times or more to indicate connection with the repeater is delayed. This tone is the same as the busy tone. (It is not output if CLEAT TO TALK has been set to YES.)

- **Proceed tone**

This tone is output when the PTT button is pressed, transmission starts, and the repeater is connected to indicate that the user can talk if the Clear-to-talk function has been set. (The high tone is output for 100ms.)

- **Free system ringback mode tone, system search mode tone**

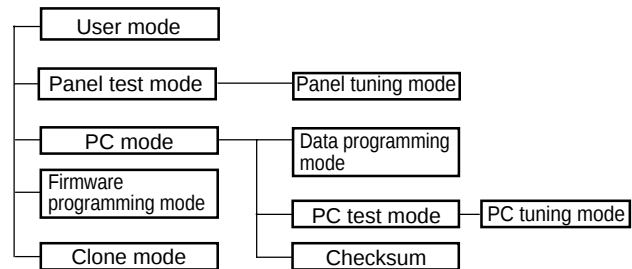
This tone indicates that the transceiver is free system ringback mode or system search mode. (The low tone is output for 400ms.)

- **Ring tone**

This tone indicates that the transceiver can use the repeater in free system ringback mode. (The mid tone and no tone are output eight cycles alternately in 50ms intervals.)

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 programming mode	Used when changing the main program of the flash memory.
Clone mode	Used to transfer programming data from one radio to another.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[▼]+Power ON (Two seconds)
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode]+[A]
Firmware programming mode	[Side1]+[Side2]+Power ON (Two seconds)
Clone mode	[Side1]+[▲]+Power ON (Two seconds)

3. For the panel Test Mode

For the setting method, refer to ADJUSTMENT.

3-1. For the panel Tuning Mode

For the setting method, refer to ADJUSTMENT.

REALIGNMENT

4. Checksum

Executing this function, “-PC-” appears on the display of TK-373G 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-373G transceiver is programmed using a personal computer, a programming interface (KPG-22) and programming software (KPG-76D).

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-373G to the personal computer with the interface cable.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the radio enters PC mode.
When data is transmitted from transceiver, the red LED blink.
When data is received by the transceiver, the green LED blinks.

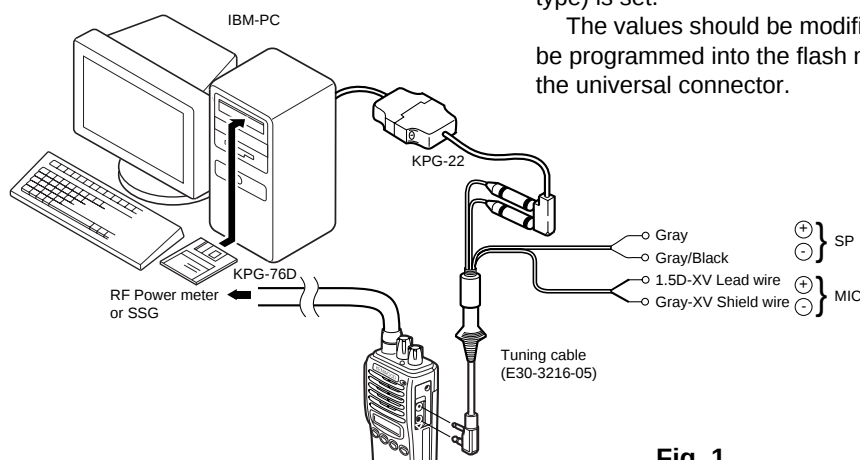


Fig. 1

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the TK-373G. This allows the TK-373G 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-373G 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 (FPRO.EXE).
2. Set the communications speed (normally, 57600 bps) and communications port in the Setup item.

Notes:

- The data stored in the personal computer must match model type when it is written into the flash memory.
- Change the TK-373G 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-373G 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-373G to the computers RS-232C serial port.

5-4. Programming software description

The KPG-76D programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program the TK-373G 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-76D, 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.

3. Set the firmware to be updated by file name item.
4. Hold down the [Side1] and [Side2] switches on the TK-373G, and press the power switch.
When the [Side1] and [Side2] switches are held down for two seconds, "PROG 576" appears on the display and the LED lights orange. When "PROG 576" is displayed, release the switches.
5. Check the connection between the TK-373G and the personal computer, and make sure that the TK-373G is in Program mode.
6. Click "write" button in the window. A window opens on the display to indicate the writing progress. When the TK-373G begins to receive data, the LED lights green.
7. When data is received successfully, a checksum appears on the display.

REALIGNMENT

8. If you want to continue programming other TK-373Gs, repeat steps 4 to 7.

Notes:

- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software (KPG-76D).
- When programming the firmware, it is recommended 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 "PROG XXX" is displayed, the checksum is displayed. If you press the [Side2] switch again (while the checksum is displayed), "PROG XXX" is redisplayed.
2. A transmission speed can be selected by pressing the [Side1] switch while "PROG XXX" is displayed.
19200 bps: The LED flashes green and red alternately.
38400 bps: The LED flashes orange.
57600 bps: The LED lights orange.

Note:

Normally, write in the high-speed mode.

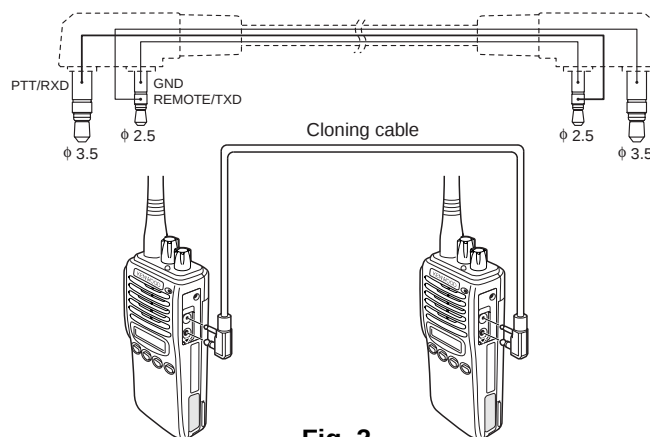
7. Clone Mode

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-373G power ON with the [Side1]+[▲] key held down. The TK-373G displays "▯▯CLONE▯".
2. Power on the slave TK-373G.
3. Connect the cloning cable to the SP/MIC connectors on the master and slave.
4. Press the [A] key on the master while the master displays "▯▯CLONE▯". The data of the master is sent to the slave. While the slave is receiving the data, "-PC-" is displayed. When cloning of data is completed, the master displays "END", and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.
5. The other slave can be continuously cloned. When the [A] key on the master is pressed while the master displays "END", the master displays "▯▯CLONE▯". Carry out the operation in steps 2 to 4.

Note: You can clone the programmed data between the transceiver frequency version must be same.
Use the new cloning cable for TK-372G/373G.
You cannot use the old cloning cable for TK-360/370.

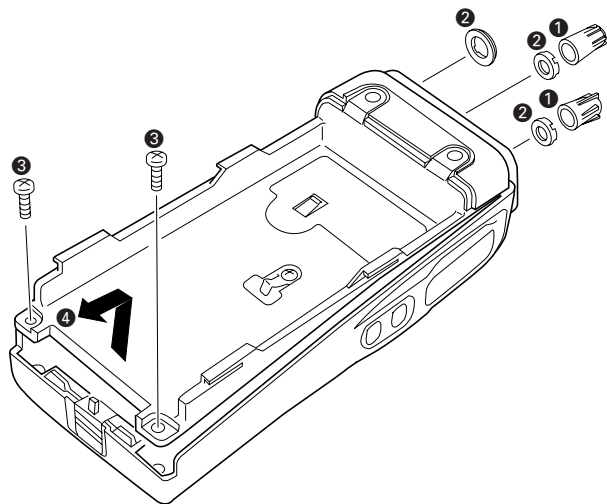
Cloning cable parts No.
E30-3410-05 (TK-373G → TK-373G)



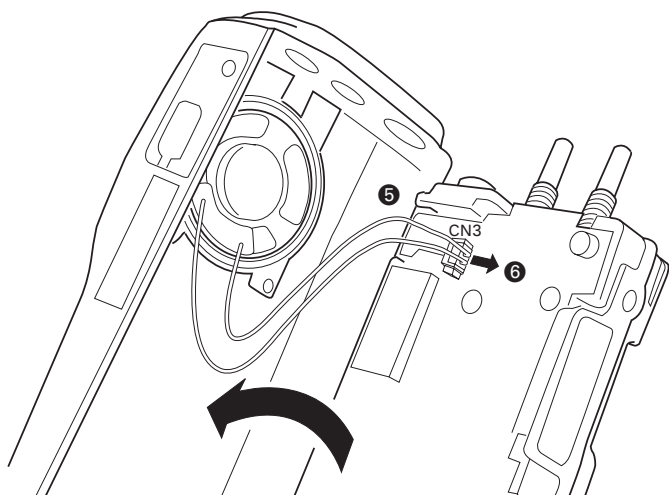
DISASSEMBLY FOR REPAIR

Separating the case assembly from the chassis.

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

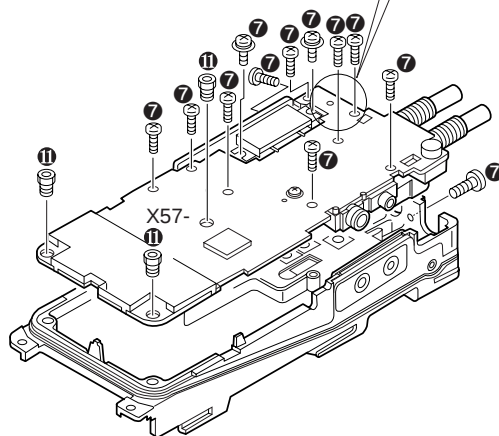
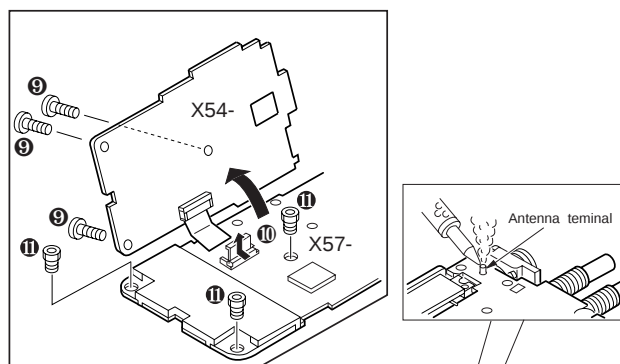


4. Taking care not to cut the speaker lead ⑤, open the chassis and case assembly, and pull the speaker lead with connector ⑥.



Separating the chassis from the unit.

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



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 from the PLL circuit.

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

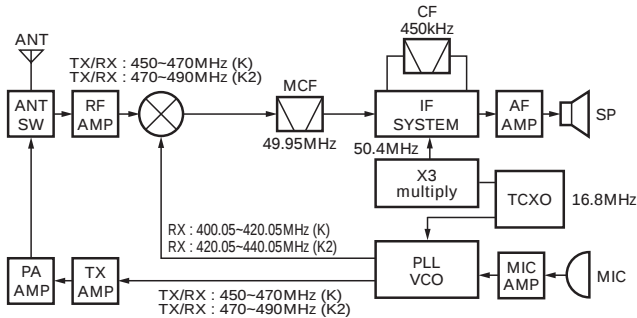


Fig. 1 Frequency configuration

2. Receiver

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

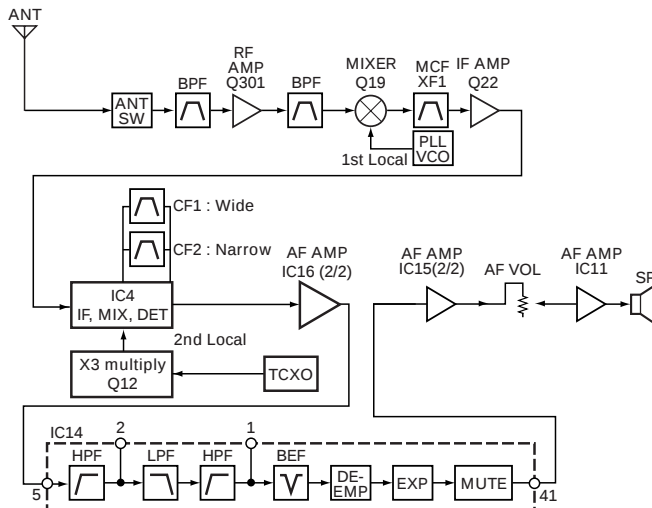


Fig. 2 Receiver section

1) Front end (RF AMP)

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

2) First mixer

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

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

3) IF Amplifier circuit

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

The second IF signal is passed through the ceramic filter (CF1; Wide, CF2; Narrow) to remove the adjacent channel signal. The filtered second IF signal is amplified by the limiting amplifier and demodulated by the quadrature detector with the ceramic discriminator (CD1). The demodulated signal is routed to the audio circuit.

4) Wide/Narrow changeover circuit

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

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

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

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

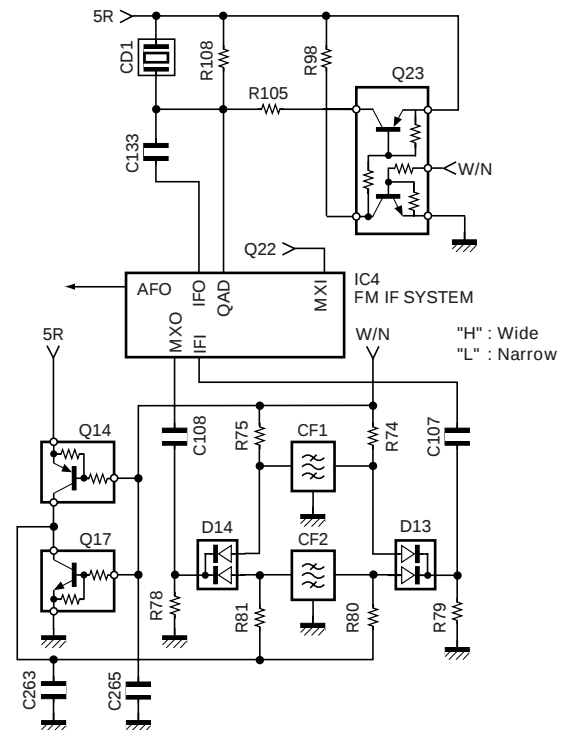


Fig. 3 Wide/Narrow changeover circuit

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

QT/DQT/LTR

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, DQT or LTR matches the preset value, and controls the SP MUTE and the speaker output sounds according to the squelch results.

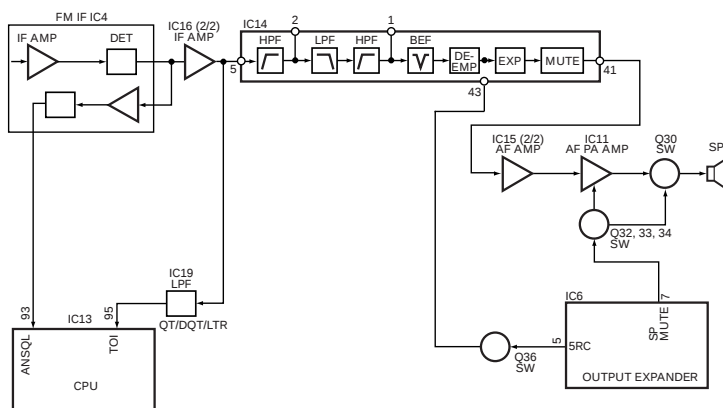


Fig. 4 AF Amplifier and Squelch

3. PLL frequency synthesizer

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

1) PLL

The VCO output is doubled by Q1 and then sent to the PLL IC (IC2).

The frequency step of the PLL circuit is 10 or 12.5kHz.

A 16.8MHz reference oscillator signal is divided at IC2 by a fixed counter to produce oscillator (VCO) output signal which is buffer amplified by Q3 then divided in IC2 by a dual-module programmable counter. The divided signal is compared in phase with the 10 or 12.5kHz 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 turn Q10 on.

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

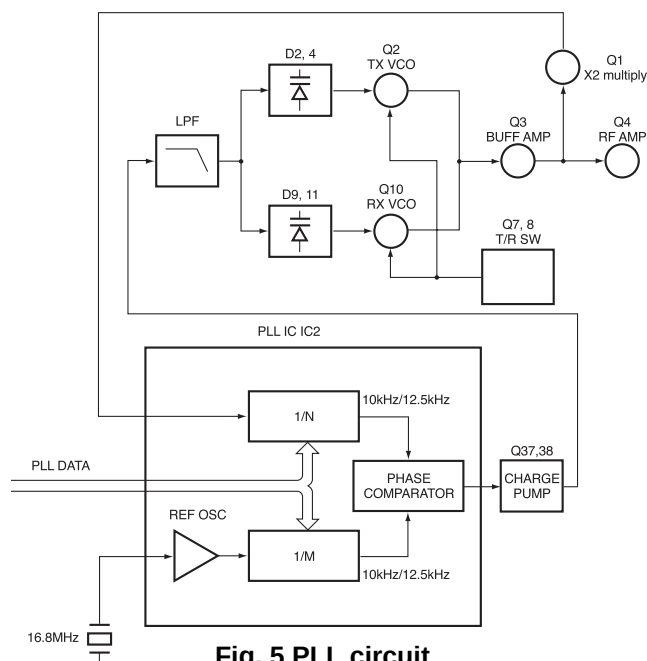


Fig. 5 PLL circuit

3) Unlock Detector

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

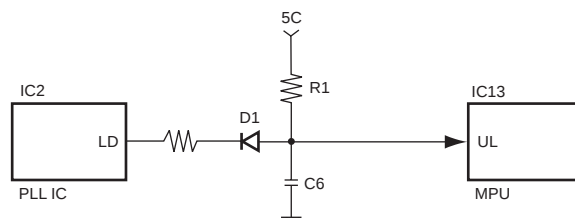


Fig. 6 Unlock detector circuit

CIRCUIT DESCRIPTION

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.

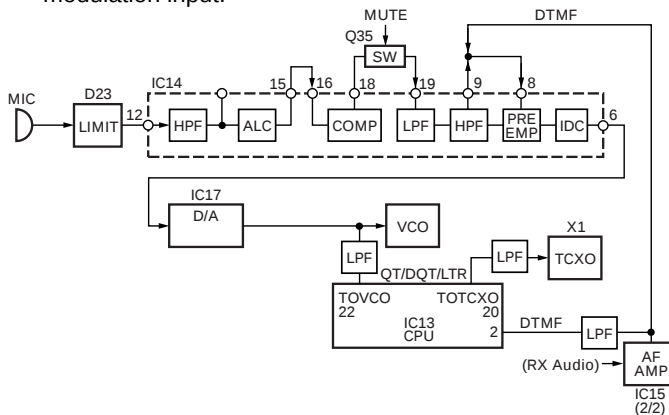


Fig. 7 Microphone amplifier

2) Drive and Final amplifier

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

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

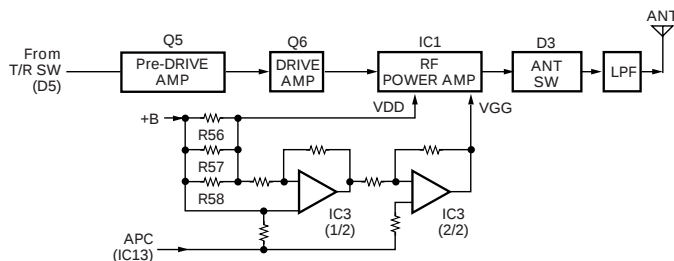


Fig. 8 Drive and final amplifier and APC circuit

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/LTR

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

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

(2) DTMF

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

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

5. Power supply

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

5C is a common 5V.

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

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

6. Control Circuit

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

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

CIRCUIT DESCRIPTION

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-76D) 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.

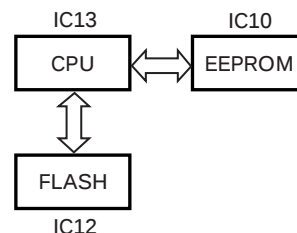


Fig. 9 Memory circuit

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.

8. CONTROL SYSTEM

Keys and channel selector circuit.

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

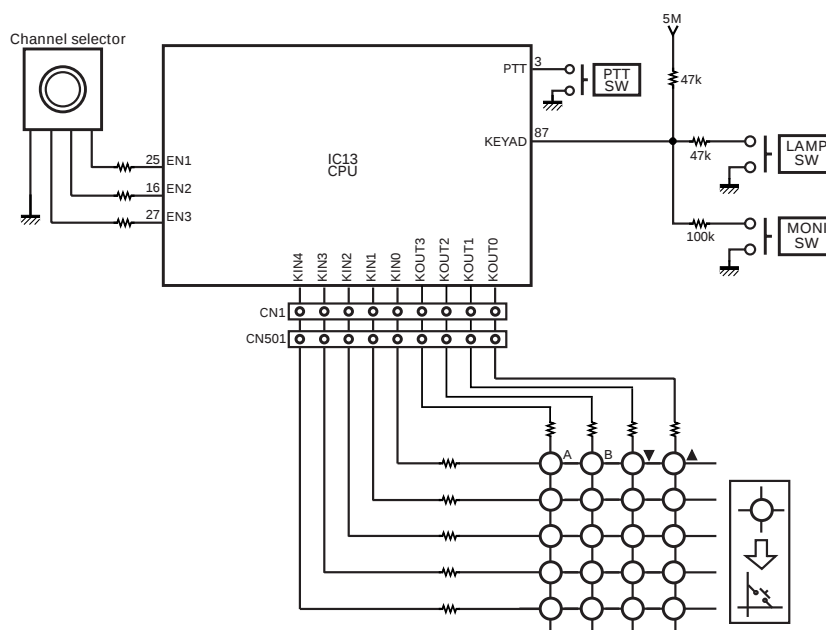
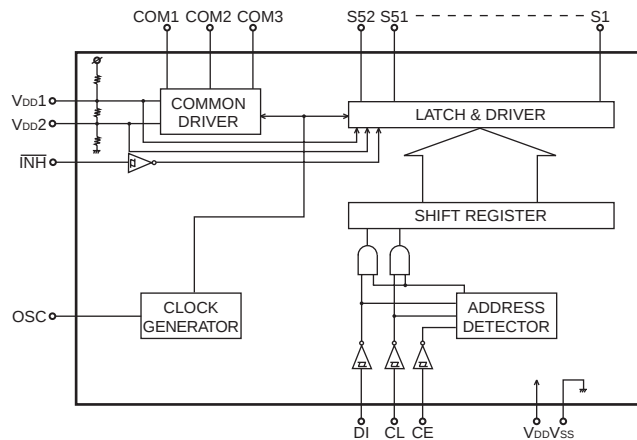


Fig. 10 Control system

SEMICONDUCTOR DATA

LCD Driver : LC75823W (Display UNIT IC501)

■ 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-COM4	O	-	Common drive output. Frame frequency $f_o = (f_{osc}/384) \text{Hz}$
56	VDD	-	-	
57	$\overline{\text{INH}}$	I	L	The display to turn off $\overline{\text{INT}}=\text{L}$: Turn off $\overline{\text{INT}}=\text{H}$: Turn on
58	VDD1	I	-	Apply 2/3 the LCD drive bias voltage form outside. If 1/2 the bias is applied, connect to VDD2.
59	VDD2	I	-	Apply 1/3 the LCD drive bias voltage form outside. If 1/2 the bias is applied, connect to VDD1.
60	VSS	-	-	
61	OSC	I/O	-	Oscillation terminal
62	CE	I	H	Chip enable. Serial data transfer terminal. Connected to the microprocessor.
63	CL	I		Synchronizing clock. Serial data transfer terminal. Connected to the microprocessor.
64	DI	I	-	Trnsfer data. Serial data transfer terminal. Connected to the microprocessor.

Microprocessor : 30622M4A-410GP
(TX-RX UNIT : IC13)

■ Pin function

Pin No.	Port Name	I/O	Function
1	APC	O	TX:Automatic Power Control data output
2	DTMF	O	DTMF BEEP output
3	2TN	-	Not used
4	DTMSTD	I	Not used
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	Not used
18	INT	I	Battery voltage monitor input Low battery:L
19	OE	I	Not used
20	TOTCXO	I	QT/DQT/LTR modulation output(TCXO)
21	EEPDAT	I/O	EEPROM data input/output
22	TOVCO	O	QT/DQT/LTR modulation output(VCO)
23	AUX1	I	
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	Not used
28	NC	O	NC
29	AUX4	O	Not used
30	AUX2	I/O	Not used
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)
48	CSO	-	Chip select signal

SEMICONDUCTOR DATA / DESCRIPTION OF COMPONENTS

Pin No.	Port Name	I/O	Function
49	A19	-	Not used
50-59	A18-A9	-	Flash memory address bus
60	VCC	-	+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	Not used
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/LTR signal input
96	VREF	-	Reference voltage input
97	AVCC	-	GND
98	DTMPD	O	Not used
99	DTMCLK	O	Not used
100	DTMDAT	I	Not used

Shift register 1:BU4094BCFV(IC5)

■ Pin function

Pin No.	Port	I/O	Function
4	W/N	O	Wide/Narrow SW Narrow: 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 Auxiliary Output
12	AUX5	O	Option board port 5 Link complete
13	LCDCLK	O	LCD back light Back light on: L
14	RX	O	RX/TX VCO SW RX: L

DESCRIPTION OF COMPONENTS

DISPLAY UNIT (X54-3250-11)

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
D511	LED	LCD back light
D515,516	LED	LED /Key pad back light

TX-RX UNIT (X57-650X-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	-
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)
IC19	IC	Active filter / For LSD in
Q1	Transistor	PLL IC fin amplifier
Q2	Transistor	VCO oscillation (TX)
Q3	Transistor	RF Buffer amplifier
Q4,5	Transistor	RF amplifier
Q6	Transistor	RF amplifier / TX driver
Q7	FET	DC switch
Q8,Q9	Transistor	DC switch
Q10	FET	VCO oscillation (RX)
Q11	Transistor	Ripple filter
Q12	Transistor	Tripler
Q13	Transistor	DC switch
Q14	Transistor	2 nd IF W/N switch sets to on when Narrow
Q15	Transistor	DC switch
Q16	Transistor	DC switch / 5R
Q17	Transistor	2 nd IF W/N switch sets to on when Wide
Q18	Transistor	DC switch / 5T, Save
Q19	FET	Mixer
Q20,Q21	Transistor	DC switch / 5T, Save
Q22	Transistor	IF amplifier
Q23	Transistor	DC switch / W/N audio amplitude adjust
Q24	Transistor	DC switch / LED (Red)
Q25	Transistor	DC switch / LED (Green)

DESCRIPTION OF COMPONENTS

Ref. No.	Use/Function	Operation/Condition
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
Q37,38	Transistor	PLL charge pump
Q39	FET	Mute switch/DET line Mute
Q301	FET	RF amplifier
D1	Diode	Unlock detect
D2	Variable capacitance diode	Frequency control
D3	Diode	ANT switch
D4	Variable capacitance diode	Frequency control
D5	Diode	TX/RX switch
D6	Variable capacitance diode	TX modulation
D7	Diode	ANT switch
D8	Zener Diode	Overload protection
D9	Variable capacitance diode	Frequency control
D10	Diode	TX/RX Switch
D11	Variable capacitance diode	Frequency control
D12	Diode	Current steering
D13,14	Diode	RF switch (2 nd IF wide/narrow)
D15	Diode	Reverse protection
D17	Diode	Model check
D18	LED	LED/ Red, Green
D21	Diode	Reverse protection
D22	Diode	Reverse protection
D23	Diode	Voltage clamp
D27	Diode	Discharge speed up
D28	Diode	Voltage pull up
D29	Diode	Gain control

TK-373G

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.
TK-373G

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

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-373G					
1	1A		A02-3568-33	CABINET ASSY	K
2	3B		A82-0036-02	REAR PANEL	
3	2C		B09-0351-03	CAP(SP/MIC)	
4	2B		B11-1220-03	ILLUMINATION GUIDE	
5	2B	*	B38-0867-05	LCD	
6	2D	*	B62-1576-00	INSTRUCTION MANUAL	
7	2D	*	B72-2026-04	MODEL NAME PLATE	
7	2D	*	B72-2027-04	MODEL NAME PLATE	
8	3B		E04-0413-05	RF COAXIAL RECEPTACLE(SMA)	
9	3A		E23-1183-04	RELAY TERMINAL(BATT-)	
10	2A		E23-1184-04	RELAY TERMINAL(BATT+)	
11	2B		E29-1177-04	INTER CONNECTOR(LCD)	
12	2A		E37-0805-05	FLAT CABLE(TX/RX-DISP)	K2
13	1B		E37-0829-05	SPEAKER CORD	
14	3A		E37-0830-05	FLAT CABLE(PTT)	
15	2B		F10-2302-04	SHIELDING COVER(POWER MODULE)	
16	2A		F10-2304-03	SHIELDING COVER(TX/RX UNIT)	
17	2A		F20-3307-04	INSULATING SHEET(LCD)	
18	2A		F20-3308-04	INSULATING SHEET(DISP/CHASSIS)	
19	1A		G01-0881-04	COIL SPRING(BATT RELEASE)	
20	1B		G10-1232-04	FIBROUS SHEET(SPEAKER)	
21	3B		G13-1744-14	CUSHION(CHASSIS-BATT)	
22	2B		G13-1783-04	CUSHION(POWER MODULE COVER)	
-			G13-1834-04	CUSHION(BATT TERMINAL + -)	
23	1B		G53-0882-03	PACKING(SPEAKER/ECM)	
24	3A		G53-0883-04	PACKING(BATT TERMINAL+)	
25	1A		G53-0891-04	PACKING(PTT KNOB)	
26	3B		G53-1530-02	PACKING	
27	2B		G53-1531-03	PACKING(SP/MICJACK)	
28	1C,2C		H12-1487-02	PACKING FIXTURE	
29	1C		H25-0085-04	PROTECTION BAG	
30	2C		H25-2012-04	PROTECTION BAG	
31	3D	*	H52-1859-12	ITEM CARTON CASE	
32	1A		J19-1572-04	HOLDER(BATT RELEASE)	
33	2B		J19-5352-03	HOLDER(VOL/ENC)	
34	2A		J19-5353-14	HOLDER(BATT TERMINAL+)	
35	2C		J21-4493-04	SP/MIC HOLDER	
36	2B		J21-8377-03	HARDWARE FIXTURE(LCD)	
37	1B		J21-8378-04	HARDWARE FIXTURE(SPEAKER)	
38	2C		J29-0658-05	BELT HOOK	
39	2A		J32-0925-04	HEXAGON BOSS	
40	1B		K29-5331-03	KNOB(ENCODER)	
41	1B		K29-5332-03	KNOB(VOLUME)	
42	1A		K29-5333-13	BUTTON KNOB(MONI/LAMP)	
43	1A		K29-5334-13	BUTTON KNOB(PTT)	
44	1A		K29-5337-03	LEVER KNOB(BATTRELEASE)	
45	1A	*	K29-9142-02	KEY TOP(4 KEYS)	K2 K
A	3B		N09-2319-05	BINDING HEAD SCREW(SMA)	

Ref. No.	Address	New parts	Parts No.	Description	Destination
B	2A		N09-2331-05	SPECIAL SCREW(BATT TERMINAL+)	
C	1B		N14-0582-14	CIRCULAR NUT(SMA)	
D	1B		N14-0583-04	CIRCULAR NUT(VOL/ENC)	
E	3A		N30-2606-46	PAN HEAD MACHINE SCREW	
F	2A		N39-2030-46	PAN HEAD MACHINE SCREW	
G	2B		N67-2005-46	PAN HEAD SEMS SCREW(POWER MODULE)	
H	1B,3A,3B		N78-2045-46	PAN HEAD TAPTITE SCREW	
I	3A		N79-2030-46	PAN HEAD TAPTITE SCREW	
J	2A,2B		N83-2005-46	PAN HEAD TAPTITE SCREW	
K	2C		N99-2012-05	SCREW SET	
VR2	-		R31-0628-15	VARIABLE RESISTOR	
SP	1B		T07-0326-05	SPEAKER	
S1	-		W02-1969-15	ENCODER	
DISPLAY UNIT (X54-3250-11)					
D506			B30-2210-05	LED(TLY)	
D511			B30-2210-05	LED(TLY)	
D515,516			B30-2171-05	LED(D)	
C501-509			CC73GCH1H221J	CHIP C 220PF J	
C513			CK73GB1H102K	CHIP C 1000PF K	
C515,516			CC73GCH1H101J	CHIP C 100PF J	
CN501			E40-6012-05	FLAT CABLE CONNECTOR	
L501,502			L92-0138-05	FERRITE CHIP	
CP501			R90-0748-05	MULTI-COMP 47K X4	
CP502,503			R90-0724-05	MULTI-COMP 1K X4	
R501-510			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R511			R92-1252-05	CHIP R 00HM J 1/16W	
R512			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R513-515			RK73GB1J103J	CHIP R 10K J 1/16W	
R516			RK73GB1J473J	CHIP R 47K J 1/16W	
R517			RK73GB1J103J	CHIP R 10K J 1/16W	
R518			RK73GB1J471J	CHIP R 470 J 1/16W	
R522			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R523			RK73GB1J473J	CHIP R 47K J 1/16W	
R524			RK73GB1J471J	CHIP R 470 J 1/16W	
D501-504			MA2S111	DIODE	
D505			1SS373	DIODE	
D507			MA2S111	DIODE	
IC501			LC75823W	MOS IC	
Q501	2SB1132(Q,R)	TRANSISTOR			
Q502	2SC4617(S)	TRANSISTOR			
TX-RX UNIT (X57-6500-XX) -10:TK-373G K -11:TK-373G K2					
D18			B30-2019-05	LED(RE/GR)	K2 K
C1			CC73HCH1H100C	CHIP C 10PF C	
C3-5			CC73GCH1H010B	CHIP C 1.0PF B	
C4,5			CC73GCH1H010B	CHIP C 1.0PF B	
C6			CK73HB1A104K	CHIP C 0.10UF K	
C8			CC73GCH1H030B	CHIP C 3.0PF B	

PARTS LIST

TX-RX UNIT (X57-6500-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C9			CK73HB1H471K	CHIP C 470PF K		C75			CK73GB1H471K	CHIP C 470PF K	
C10			CC73GCH1H060B	CHIP C 6.0PF B	K2	C76			CK73GB1H102K	CHIP C 1000PF K	
C10			CC73GCH1H080B	CHIP C 8.0PF B	K	C78			CC73GCH1H470J	CHIP C 47PF J	
C11			CC73GCH1H080D	CHIP C 8.0PF D		C81			CC73GCH1H010C	CHIP C 1.0PF C	
C12			CC73GCH1H070D	CHIP C 7.0PF D		C82			CK73GB1H102K	CHIP C 1000PF K	K
C13			CK73GB1H471K	CHIP C 470PF K		C84,85			CK73GB1H471K	CHIP C 470PF K	
C14			CC73GCH1H0R5B	CHIP C 0.5PF B		C86,87			CC73HCH1H100C	CHIP C 10PF C	
C15			CC73GCH1H101J	CHIP C 100PF J		C88			CC73GCH1H040B	CHIP C 4.0PF B	K
C16			CC73GCH1H050B	CHIP C 5.0PF B	K2	C88			CC73GCH1H050B	CHIP C 5.0PF B	K2
C16			CC73GCH1H060B	CHIP C 6.0PF B	K	C89			CC73GCH1H070B	CHIP C 7.0PF B	
C17			CC73GCH1H040B	CHIP C 4.0PF B	K	C90			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C17,18			CC73GCH1H040B	CHIP C 4.0PF B	K2	C94			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C18			CC73GCH1H060B	CHIP C 6.0PF B	K	C95,96			CK73GB1H471K	CHIP C 470PF K	
C20			CC73GCH1H020B	CHIP C 2.0PF B	K2	C98			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C20			CC73GCH1H030B	CHIP C 3.0PF B	K	C99			CK73GB1C104K	CHIP C 0.10UF K	
C22			CC73GCH1H101J	CHIP C 100PF J		C100			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C23			CC73GCH1H020B	CHIP C 2.0PF B	K	C101			CK73GB1H471K	CHIP C 470PF K	
C23			CC73GCH1H050B	CHIP C 5.0PF B	K2	C104			CK73GB1H471K	CHIP C 470PF K	
C24			CC73GCH1H030B	CHIP C 3.0PF B	K	C107,108			CK73GB1C104K	CHIP C 0.10UF K	
C24			CC73GCH1H080B	CHIP C 8.0PF B	K2	C109			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C25			CC73GCH1H040B	CHIP C 4.0PF B	K	C110			CK73GB1H103K	CHIP C 0.010UF K	
C25			CC73GCH1H090B	CHIP C 9.0PF B	K2	C111			CK73GB1H471K	CHIP C 470PF K	
C26			CC73GCH1H1R5B	CHIP C 1.5PF B		C112			CC73GCH1H050B	CHIP C 5.0PF B	
C27			CC73GCH1H0R5B	CHIP C 0.5PF B		C113			CK73GB1H471K	CHIP C 470PF K	
C28			CC73GCH1H060D	CHIP C 6.0PF D		C114			CK73GB1H391K	CHIP C 390PF K	
C29			CC73GCH1H030B	CHIP C 3.0PF B		C115			CK73GB1C104K	CHIP C 0.10UF K	
C30			CC73GCH1H060D	CHIP C 6.0PF D		C118			CK73GB1H471K	CHIP C 470PF K	
C31			C92-0662-05	CHIP-TAN 15UF 6.3WV		C119			CK73FB1A105K	CHIP C 1.0UF K	
C32			CK73HB1A104K	CHIP C 0.10UF K		C120,121			CK73GB1H471K	CHIP C 470PF K	
C33			CC73GCH1H050B	CHIP C 5.0PF B	K2	C122			CK73FB1A105K	CHIP C 1.0UF K	
C33			CC73GCH1H060B	CHIP C 6.0PF B	K	C123			CK73GB1H391K	CHIP C 390PF K	
C35-41			CK73GB1H471K	CHIP C 470PF K		C124			CC73GCH1H390J	CHIP C 39PF J	K
C42,43			CC73GCH1H101J	CHIP C 100PF J		C124			CC73GCH1H560J	CHIP C 56PF J	K2
C44			CC73HCH1H101J	CHIP C 100PF J		C125,126			CK73GB1H103K	CHIP C 0.010UF K	
C45			CK73GB1H471K	CHIP C 470PF K		C127			CC73GCH1H010B	CHIP C 1.0PF B	
C48,49			C92-0001-05	CHIP-C 0.1UF 35WV		C128			CC73GCH1H120J	CHIP C 12PF J	
C51			C92-0697-05	CHIP-TAN 3.3UF 16WV		C130			CK73GB1H471K	CHIP C 470PF K	
C52			CC73GCH1H030B	CHIP C 3.0PF B	K2	C131			CC73GCH1H100D	CHIP C 10PF D	
C52			CC73GCH1H040B	CHIP C 4.0PF B	K	C132			CK73GB1H103K	CHIP C 0.010UF K	
C53			CK73GB1H471K	CHIP C 470PF K		C133			CC73GCH1H820J	CHIP C 82PF J	
C54			CK73FB1C474K	CHIP C 0.47UF K		C134			CK73GB1H471K	CHIP C 470PF K	
C55			CK73GB1H471K	CHIP C 470PF K		C135			CK73GB1C104K	CHIP C 0.10UF K	
C57			CK73FB1C474K	CHIP C 0.47UF K		C136			CC73GCH1H040B	CHIP C 4.0PF B	
C58			CK73GB1H103K	CHIP C 0.010UF K		C137			CK73GB1H471K	CHIP C 470PF K	
C60			CK73GB1H103K	CHIP C 0.010UF K		C138			CK73GB1C104K	CHIP C 0.10UF K	
C62			CC73GCH1H270J	CHIP C 27PF J	K2	C139			CC73GCH1H181J	CHIP C 180PF J	
C62			CC73GCH1H560J	CHIP C 56PF J	K	C140			CK73GB1H103K	CHIP C 0.010UF K	
C63			CC73GCH1H070B	CHIP C 7.0PF B		C141			CK73GB1C104K	CHIP C 0.10UF K	
C64			CC73GCH1H010B	CHIP C 1.0PF B		C142			CK73FB1A105K	CHIP C 1.0UF K	
C68			C92-0565-05	CHIP-TAN 6.8UF 10WV		C143,144			CK73GB1H471K	CHIP C 470PF K	
C70			CK73GB1H103K	CHIP C 0.010UF K		C146,147			CK73GB1C104K	CHIP C 0.10UF K	
C71			CC73GCH1H101J	CHIP C 100PF J		C148			CK73GB1H103K	CHIP C 0.010UF K	
C72			CC73GCH1H180G	CHIP C 18PF G	K2	C150			CK73GB1H102K	CHIP C 1000PF K	
C72			CC73GCH1H330G	CHIP C 33PF G	K	C151-153			CK73GB1H471K	CHIP C 470PF K	
C73			CK73GB1H471K	CHIP C 470PF K		C155			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C74			CK73FB1E104K	CHIP C 0.10UF K		C156,157			CK73GB1H471K	CHIP C 470PF K	

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TX-RX UNIT (X57-6500-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C158			CK73FB1A105K	CHIP C 1.0UF K		C238			CK73GB1H392K	CHIP C 3900PF K	
C159			CK73GB1H471K	CHIP C 470PF K		C239			CK73GB1C104K	CHIP C 0.10UF K	
C161			CK73GB1H471K	CHIP C 470PF K		C240			CK73GB1H272J	CHIP C 2700PF J	
C162			CK73GB1H103K	CHIP C 0.010UF K		C241			CK73GB1H471K	CHIP C 470PF K	
C163,164			CK73GB1H471K	CHIP C 470PF K		C242			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C165			CK73GB1H103K	CHIP C 0.010UF K		C243			CK73FB1A105K	CHIP C 1.0UF K	
C166			CK73FF1E104Z	CHIP C 0.10UF Z		C244			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C167			CK73GB1H471K	CHIP C 470PF K		C245			CK73GB1H471K	CHIP C 470PF K	
C170,171			CK73GB1H471K	CHIP C 470PF K		C246			CK73FB1A105K	CHIP C 1.0UF K	
C173			C92-0567-05	CHIP-TAN 68UF 6.3WV		C247			CK73GB1E123K	CHIP C 0.012UF K	
C174			CK73GB1H471K	CHIP C 470PF K		C249			CK73GB1H222K	CHIP C 2200PF K	
C176			CC73GCH1H101J	CHIP C 100PF J		C250			CK73GB1C683K	CHIP C 0.068UF K	
C177			CK73GB1C473K	CHIP C 0.047UF K		C253,254			CK73GB1H103K	CHIP C 0.010UF K	
C178			C92-0560-05	CHIP-TAN 10UF 6.3WV		C255			CK73GB1H183K	CHIP C 0.018UF K	
C179			CK73GB1C104K	CHIP C 0.10UF K		C257,258			CK73GB1E153K	CHIP C 0.015UF K	
C180			CK73GB1H103K	CHIP C 0.010UF K		C259			CC73GCH1H121J	CHIP C 120PF J	
C181			CK73GB1C393K	CHIP C 0.039UF K		C260			CK73GB1H183K	CHIP C 0.018UF K	
C182			CK73GB1H102K	CHIP C 1000PF K		C261			CK73GB1E153K	CHIP C 0.015UF K	
C183,184			CK73GB1C104K	CHIP C 0.10UF K		C262			CK73GB1H102K	CHIP C 1000PF K	
C185			CC73GCH1H180J	CHIP C 18PF J		C263			CK73GB1C104K	CHIP C 0.10UF K	
C186,187			CK73GB1C104K	CHIP C 0.10UF K		C265,266			CK73GB1C104K	CHIP C 0.10UF K	
C189			CK73GB1H103K	CHIP C 0.010UF K		C268			CK73GB1H102K	CHIP C 1000PF K	
C190,191			CK73GB1C104K	CHIP C 0.10UF K		C271			CK73GB1H102K	CHIP C 1000PF K	
C192,193			CC73GCH1H300J	CHIP C 30PF J		C272			CK73HB1H471K	CHIP C 470PF K	
C194			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C273-276			CK73GB1H471K	CHIP C 470PF K	
C196			CC73GCH1H101J	CHIP C 100PF J		C277			CC73GCH1H680J	CHIP C 68PF J	
C198,199			CK73GB1H103K	CHIP C 0.010UF K		C278			CK73GB1C104K	CHIP C 0.10UF K	
C200			CK73GB1A224K	CHIP C 0.22UF K		C302			CC73GCH1H010B	CHIP C 1.0PF B	
C201			CK73GB1H103K	CHIP C 0.010UF K		C303			CC73GCH1H030B	CHIP C 3.0PF B	
C202,203			CK73GB1C104K	CHIP C 0.10UF K		C304			CK73GB1H471K	CHIP C 470PF K	
C204			CK73FB1C474K	CHIP C 0.47UF K		C305,306			CC73GCH1H0R5B	CHIP C 0.5PF B	
C205			CK73GB1H103K	CHIP C 0.010UF K		C307			CC73GCH1H220J	CHIP C 22PF J	
C206-208			CK73GB1C104K	CHIP C 0.10UF K		C309			CC73GCH1H100D	CHIP C 10PF D	K2
C209			CK73GB1H332K	CHIP C 3300PF K		C309			CK73GB1H471K	CHIP C 470PF K	K
C210			CK73GB1H102K	CHIP C 1000PF K		C311			CC73GCH1H020B	CHIP C 2.0PF B	K2
C211			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C311			CC73GCH1H030B	CHIP C 3.0PF B	K
C212			CK73GB1H122K	CHIP C 1200PF K		C312			CC73GCH1H010B	CHIP C 1.0PF B	K2
C213			CK73GB1H103K	CHIP C 0.010UF K		C312			CC73GCH1H020B	CHIP C 2.0PF B	K
C215			CK73GB1C104K	CHIP C 0.10UF K		C314			CC73GCH1H020B	CHIP C 2.0PF B	K2
C216			CK73GB1H332K	CHIP C 3300PF K		C314			CC73GCH1H030B	CHIP C 3.0PF B	K
C217			CK73GB1E153K	CHIP C 0.015UF K		C316,317			CK73GB1H471K	CHIP C 470PF K	
C218			CK73FB1H563K	CHIP C 0.056UF K		C325-327			CK73GB1H471K	CHIP C 470PF K	
C219			CK73GB1C104K	CHIP C 0.10UF K		C333			CC73GCH1H330J	CHIP C 33PF J	K2
C221			CK73GB1H471K	CHIP C 470PF K		C333			CC73GCH1H390J	CHIP C 39PF J	K
C222			CK73GB1H103K	CHIP C 0.010UF K		C334			CC73HCH1H040B	CHIP C 4.0PF B	
C223			C92-0560-05	CHIP-TAN 10UF 6.3WV		C335			CC73GCH1H050B	CHIP C 5.0PF B	K2
C224			CK73GB1H122K	CHIP C 1200PF K		C336			CK73FB1A105K	CHIP C 1.0UF K	
C225			CC73GCH1H101J	CHIP C 100PF J		TC1,2			C05-0384-05	CERAMIC TRIMMER CAP(10PF)	
C226,227			CK73GB1H562J	CHIP C 5600PF J		TC301,302			C05-0383-05	CERAMIC TRIMMER CAP(6PF)	
C229			CK73FB1H471K	CHIP C 470PF K		TC303			C05-0384-05	CERAMIC TRIMMER CAP(10PF)	
C230			CK73GB1H562J	CHIP C 5600PF J		CN1			E40-6012-05	FLAT CABLE CONNECTOR	
C231			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		CN3			E40-5662-05	PIN ASSY SOCKET	
C232			CK73GB1H103K	CHIP C 0.010UF K		J1			E11-0457-05	PHONE JACK	
C233			CC73GCH1H151J	CHIP C 150PF J		F1			F53-0130-05	FUSE	
C234,235			CK73GB1H272J	CHIP C 2700PF J		F1			F53-0217-05	FUSE	
C236			CK73GB1C104K	CHIP C 0.10UF K							

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Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
CD1			L79-1794-05	TUNING COIL		CP20			RK75HA1J472J	CHIP-COM 4.7K J 1/16W	
CF1			L72-0968-05	CERAMIC FILTER		R1			RK73HB1J124J	CHIP R 120K J 1/16W	
CF2			L72-0969-05	CERAMIC FILTER		R2			RK73HB1J683J	CHIP R 68K J 1/16W	
L1			L40-3963-92	SMALL FIXED INDUCTOR(3.9NH)		R3			RK73GB1J392J	CHIP R 3.9K J 1/16W	K
L2			L92-0138-05	FERRITE CHIP		R3			RK73GB1J472J	CHIP R 4.7K J 1/16W	K2
L3			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)		R4			RK73HB1J101J	CHIP R 100 J 1/16W	
L4			L33-0744-05	SMALL FIXED INDUCTOR		R5			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L5-7			L34-4546-05	AIR-CORE COIL	K2	R6			R92-1252-05	CHIP R 00HM J 1/16W	
L5-7			L34-4547-05	AIR-CORE COIL	K	R7			RK73HB1J100J	CHIP R 10 J 1/16W	
L8			L40-1575-92	SMALL FIXED INDUCTOR(15NH)		R8			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L9			L40-1075-92	SMALL FIXED INDUCTOR(10NH/1608)		R9			RK73GB1J332J	CHIP R 3.3K J 1/16W	
L10			L40-1095-34	SMALL FIXED INDUCTOR(1UH)		R10			RK73GB1J331J	CHIP R 330 J 1/16W	
L11			L40-1092-81	SMALL FIXED INDUCTOR		R13			RK73GB1J472J	CHIP R 4.7K J 1/16W	
L12			L40-2702-86	SMALL FIXED INDUCTOR(27UH)	K2	R14			RK73GB1J332J	CHIP R 3.3K J 1/16W	
L12			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)	K	R16			RK73GB1J391J	CHIP R 390 J 1/16W	
L14			L40-1875-92	SMALL FIXED INDUCTOR(18NH)		R17			RK73HB1J103J	CHIP R 10K J 1/16W	
L15			L40-1085-92	SMALL FIXED INDUCTOR(100NH)		R18			RK73GB1J683J	CHIP R 68K J 1/16W	
L17			L34-4546-05	AIR-CORE COIL	K2	R19			RK73GB1J332J	CHIP R 3.3K J 1/16W	
L17			L34-4547-05	AIR-CORE COIL	K	R20			RK73GB1J122J	CHIP R 1.2K J 1/16W	
L18-20			L92-0138-05	FERRITE CHIP		R21			RK73GB1J331J	CHIP R 330 J 1/16W	
L21			L40-1875-92	SMALL FIXED INDUCTOR(18NH)		R22			RK73HB1J561J	CHIP R 560 J 1/16W	
L22		*	L40-1885-92	SMALL FIXED INDUCTOR(180NH)		R23			RK73HB1J681J	CHIP R 680 J 1/16W	
L23			L92-0138-05	FERRITE CHIP		R24			RK73GB1J682J	CHIP R 6.8K J 1/16W	
L24			L40-5681-86	SMALL FIXED INDUCTOR(0.56UH)		R25			RK73GB1J470J	CHIP R 47 J 1/16W	
L25			L40-2785-92	SMALL FIXED INDUCTOR(270NH)		R26			RK73GB1J561J	CHIP R 560 J 1/16W	
L26			L33-0744-05	SMALL FIXED INDUCTOR		R27			RK73GB1J390J	CHIP R 39 J 1/16W	
L27			L92-0149-05	FERRITE CHIP		R28,29			RK73GB1J271J	CHIP R 270 J 1/16W	
L30			L40-2702-86	SMALL FIXED INDUCTOR(27UH)		R30			RK73HB1J391J	CHIP R 390 J 1/16W	
L31			L40-2785-92	SMALL FIXED INDUCTOR(270NH)		R31			RK73GB1J101J	CHIP R 100 J 1/16W	
L32			L40-1005-85	SMALL FIXED INDUCTOR(10UH)		R33			RK73GB1J101J	CHIP R 100 J 1/16W	
L35			L40-2275-92	SMALL FIXED INDUCTOR(22NH)		R34			RK73GB1J473J	CHIP R 47K J 1/16W	
L36			L40-1085-85	SMALL FIXED INDUCTOR(0.10UH)		R35			RK73GB1J104J	CHIP R 100K J 1/16W	
L37			L40-6885-85	SMALL FIXED INDUCTOR(0.68UH)		R36			RK73GB1J473J	CHIP R 47K J 1/16W	
L38			L92-0138-05	FERRITE CHIP		R37			RK73GB1J392J	CHIP R 3.9K J 1/16W	
L39			L92-0149-05	FERRITE CHIP		R38			RK73GB1J101J	CHIP R 100 J 1/16W	
L40,41			L92-0138-05	FERRITE CHIP		R39			RK73GB1J220J	CHIP R 22 J 1/16W	
L42			L92-0131-05	FERRITE CHIP		R41			RK73GB1J100J	CHIP R 10 J 1/16W	
L43,44			L92-0138-05	FERRITE CHIP		R42			RK73GB1J220J	CHIP R 22 J 1/16W	
L47		*	L40-3363-92	SMALL FIXED INDUCTOR(3.3NH)		R43			RK73GB1J101J	CHIP R 100 J 1/16W	
L302			L34-4546-05	AIR-CORE COIL		R44			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L303			L40-2785-92	SMALL FIXED INDUCTOR(270NH)		R45			RK73GB1J562J	CHIP R 5.6K J 1/16W	
L304-306			L34-4546-05	AIR-CORE COIL		R46			RN73GH1J154D	CHIP R 150K D 1/16W	
L307			L40-4785-85	SMALL FIXED INDUCTOR(0.47UH)		R47			RK73GB1J104J	CHIP R 100K J 1/16W	
L308-310			L34-4546-05	AIR-CORE COIL		R48			RK73GB1J334J	CHIP R 330K J 1/16W	
L311			L40-3375-92	SMALL FIXED INDUCTOR(33NH)	K2	R49			RK73GB1J103J	CHIP R 10K J 1/16W	
L312			L40-1575-92	SMALL FIXED INDUCTOR(15NH)	K2	R50			RN73GH1J154D	CHIP R 150K D 1/16W	
L312			L40-2775-92	SMALL FIXED INDUCTOR(27NH)	K	R51			RK73GB1J102J	CHIP R 1.0K J 1/16W	
X1			L77-1833-05	TCXO(16.8MHZ)		R52			RK73GB1J181J	CHIP R 180 J 1/16W	
X2			L78-0479-05	RESONATOR(3.58MHZ)		R53			RK73GB1J472J	CHIP R 4.7K J 1/16W	
X3			L77-1810-05	CRYSTAL RESONATOR(9.8304MHZ)		R54			RN73GH1J154D	CHIP R 150K D 1/16W	
X3			L77-1835-05	CRYSTAL RESONATOR(9.8304MHZ)		R55			RK73GB1J105J	CHIP R 1.0M J 1/16W	
XF1		*	L71-0601-05	CRYSTAL FILTER(49.95MHZ)		R56-58			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
CP1			R90-0724-05	MULTI-COMP 1K X4		R59			RN73GH1J154D	CHIP R 150K D 1/16W	
CP2-9			R90-0741-05	MULTIPLE RESISTOR		R60			R92-1252-05	CHIP R 00HM J 1/16W	
CP10			R90-0724-05	MULTI-COMP 1K X4		R61			RK73GB1J563J	CHIP R 56K J 1/16W	
CP11-18			R90-0741-05	MULTIPLE RESISTOR		R62			RN73GH1J154D	CHIP R 150K D 1/16W	

PARTS LIST

TX-RX UNIT (X57-6500-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R64,65			RK73GB1J104J	CHIP R 100K J 1/16W	K	R133			R92-1252-05	CHIP R 00HM J 1/16W	
R67			RK73GB1J104J	CHIP R 100K J 1/16W		R135			RK73GB1J100J	CHIP R 10 J 1/16W	
R68			RN73GH1J154D	CHIP R 150K D 1/16W		R137			RK73GB1J101J	CHIP R 100 J 1/16W	
R69			RK73GB1J220J	CHIP R 22 J 1/16W		R138			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R70			RK73GB1J104J	CHIP R 100K J 1/16W		R139			RK73GB1J151J	CHIP R 150 J 1/16W	
R71			RK73GB1J124J	CHIP R 120K J 1/16W	K2	R140			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R72			RK73GB1J103J	CHIP R 10K J 1/16W		R142			R92-1368-05	CHIP R 00HM	
R73			RK73GB1J273J	CHIP R 27K J 1/16W		R143			RK73GB1J184J	CHIP R 180K J 1/16W	
R74,75			RK73GB1J223J	CHIP R 22K J 1/16W		R144			R92-1252-05	CHIP R 00HM J 1/16W	
R76			R92-1252-05	CHIP R 00HM J 1/16W		R145			RK73GB1J474J	CHIP R 470K J 1/16W	
R77			RK73GB1J100J	CHIP R 10 J 1/16W	K	R146			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R78,79			RK73GB1J153J	CHIP R 15K J 1/16W		R147			RK73GB1J470J	CHIP R 47 J 1/16W	
R80,81			RK73GB1J223J	CHIP R 22K J 1/16W		R148			RK73GB1J220J	CHIP R 22 J 1/16W	
R82			RK73GB1J102J	CHIP R 1.0K J 1/16W		R149			RK73GB1J104J	CHIP R 100K J 1/16W	
R84			RK73GB1J394J	CHIP R 390K J 1/16W		R150			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R84			RK73GB1J474J	CHIP R 470K J 1/16W	K	R151			RK73GB1J473J	CHIP R 47K J 1/16W	
R85			RK73GB1J102J	CHIP R 1.0K J 1/16W		R152			RK73GB1J823J	CHIP R 82K J 1/16W	
R86			RK73GB1J334J	CHIP R 330K J 1/16W		R153			RK73GB1J104J	CHIP R 100K J 1/16W	
R87			R92-1252-05	CHIP R 00HM J 1/16W		R154			RK73GB1J564J	CHIP R 560K J 1/16W	
R88			RK73GB1J102J	CHIP R 1.0K J 1/16W		R155			RK73GB1J473J	CHIP R 47K J 1/16W	
R89			RK73GB1J821J	CHIP R 820 J 1/16W		R156			RN73GH1J683D	CHIP R 68K D 1/16W	
R90,91			RK73GB1J332J	CHIP R 3.3K J 1/16W		R157			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R92			RK73GB1J100J	CHIP R 10 J 1/16W		R158			R92-1252-05	CHIP R 00HM J 1/16W	
R93			RK73GB1J332J	CHIP R 3.3K J 1/16W		R159			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R94			RK73GB1J121J	CHIP R 120 J 1/16W		R160			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R95			RK73GB1J681J	CHIP R 680 J 1/16W		R161			RK73GB1J563J	CHIP R 56K J 1/16W	
R96			RK73GB1J221J	CHIP R 220 J 1/16W		R162			RN73GH1J333D	CHIP R 33K D 1/16W	
R97			RK73GB1J183J	CHIP R 18K J 1/16W		R163			RN73GH1J274D	CHIP R 270K D 1/16W	
R98			RK73GB1J473J	CHIP R 47K J 1/16W		R164			RK73GB1J184J	CHIP R 180K J 1/16W	
R99			RK73GB1J684J	CHIP R 680K J 1/16W		R165			RK73GB1J473J	CHIP R 47K J 1/16W	
R100			RK73GB1J473J	CHIP R 47K J 1/16W		R166			RK73GB1J103J	CHIP R 10K J 1/16W	
R101			RK73GB1J104J	CHIP R 100K J 1/16W		R167			RK73GB1J564J	CHIP R 560K J 1/16W	
R102,103			RK73GB1J272J	CHIP R 2.7K J 1/16W		R169			RK73GB1J473J	CHIP R 47K J 1/16W	
R104			RK73GB1J472J	CHIP R 4.7K J 1/16W		R170,171			RK73GB1J474J	CHIP R 470K J 1/16W	
R105,106			RK73GB1J272J	CHIP R 2.7K J 1/16W		R172			RK73GB1J473J	CHIP R 47K J 1/16W	
R107			RK73GB1J470J	CHIP R 47 J 1/16W		R173			RK73GB1J104J	CHIP R 100K J 1/16W	
R108			RK73GB1J222J	CHIP R 2.2K J 1/16W		R174			R92-1252-05	CHIP R 00HM J 1/16W	
R109			RK73GB1J102J	CHIP R 1.0K J 1/16W		R175			RK73GB1J103J	CHIP R 10K J 1/16W	
R110,111			RK73GB1J103J	CHIP R 10K J 1/16W		R176			R92-1252-05	CHIP R 00HM J 1/16W	
R112			RK73GB1J102J	CHIP R 1.0K J 1/16W		R177			RK73GB1J473J	CHIP R 47K J 1/16W	
R113			RK73GB1J391J	CHIP R 390 J 1/16W		R178,179			RK73GB1J104J	CHIP R 100K J 1/16W	
R114,115			RK73GB1J103J	CHIP R 10K J 1/16W		R180			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R116,117			RK73GB1J153J	CHIP R 15K J 1/16W		R181			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R118			RK73GB1J473J	CHIP R 47K J 1/16W		R182,183			R92-1252-05	CHIP R 00HM J 1/16W	
R119			R92-1252-05	CHIP R 00HM J 1/16W		R184			RK73GB1J823J	CHIP R 82K J 1/16W	
R120,121			RK73GB1J473J	CHIP R 47K J 1/16W		R185			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R122			RK73GB1J102J	CHIP R 1.0K J 1/16W		R186			RK73GB1J155J	CHIP R 1.5M J 1/16W	
R123			RK73GB1J104J	CHIP R 100K J 1/16W		R198			RK73GB1J393J	CHIP R 39K J 1/16W	
R124			RK73GB1J334J	CHIP R 330K J 1/16W		R199			RK73GB1J103J	CHIP R 10K J 1/16W	
R126			RK73GB1J472J	CHIP R 4.7K J 1/16W		R200			RK73GB1J101J	CHIP R 100 J 1/16W	
R127			RK73GB1J333J	CHIP R 33K J 1/16W		R201			R92-1252-05	CHIP R 00HM J 1/16W	
R128			RK73GB1J102J	CHIP R 1.0K J 1/16W		R202			RK73GB1J474J	CHIP R 470K J 1/16W	
R129			RK73GB1J224J	CHIP R 220K J 1/16W		R203			R92-1252-05	CHIP R 00HM J 1/16W	
R130			R92-1252-05	CHIP R 00HM J 1/16W		R204			RK73GB1J273J	CHIP R 27K J 1/16W	
R131			RK73GB1J101J	CHIP R 100 J 1/16W		R205			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R132			RK73GB1J104J	CHIP R 100K J 1/16W		R206			RK73GB1J471J	CHIP R 470 J 1/16W	

PARTS LIST

TX-RX UNIT (X57-6500-XX)

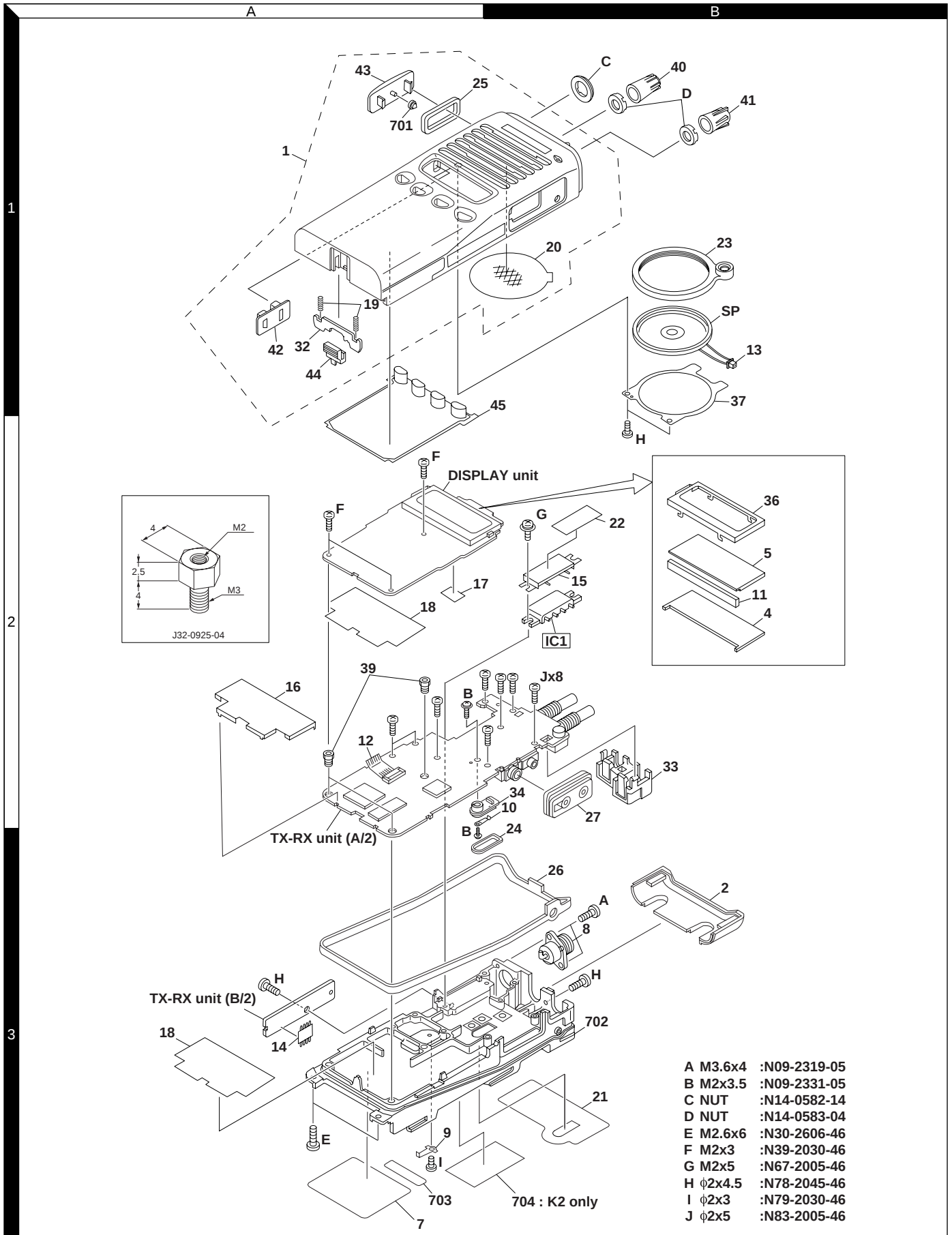
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R207			RK73GB1J101J	CHIP R 100 J 1/16W		S402,403			S70-0424-05	TACT SWITCH	
R208			RN73GH1J682D	CHIP R 6.8K D 1/16W		MIC1			T91-0579-05	MIC ELEMENT	
R209			RK73GB1J224J	CHIP R 220K J 1/16W		D1			MA2S111	DIODE	
R210			RK73GB1J474J	CHIP R 470K J 1/16W		D2			MA2S376	VARIABLE CAPACITANCE DIODE	
R211			RK73GB1J103J	CHIP R 10K J 1/16W		D3			HVU131	DIODE	
R212			RN73GH1J683D	CHIP R 68K D 1/16W		D4			MA2S376	VARIABLE CAPACITANCE DIODE	
R213			RN73GH1J682D	CHIP R 6.8K D 1/16W		D5			HSC277	DIODE	
R214			RK73GB1J473J	CHIP R 47K J 1/16W		D6			MA360	VARIABLE CAPACITANCE DIODE	
R215			RK73GB1J184J	CHIP R 180K J 1/16W		D7			HSC277	DIODE	
R218			R92-1252-05	CHIP R 00HM J 1/16W		D7			HVC131	DIODE	
R219			RK73GB1J223J	CHIP R 22K J 1/16W		D8			HZU5ALL	DIODE	
R220,221			RK73GB1J184J	CHIP R 180K J 1/16W		D9			MA2S376	VARIABLE CAPACITANCE DIODE	
R222			RK73GB1J153J	CHIP R 15K J 1/16W		D10			HSC277	DIODE	
R223			RK73GB1J223J	CHIP R 22K J 1/16W		D11			MA2S376	VARIABLE CAPACITANCE DIODE	
R226			R92-1252-05	CHIP R 00HM J 1/16W		D12			MA2S111	DIODE	
R230			RK73GB1J223J	CHIP R 22K J 1/16W		D13,14			DAN235E	DIODE	
R231			RK73GB1J563J	CHIP R 56K J 1/16W		D15			HSC277	DIODE	
R232,233			R92-1252-05	CHIP R 00HM J 1/16W		D17			MA2S111	DIODE	
R234			RK73GB1J564J	CHIP R 560K J 1/16W		D21			1SS373	DIODE	
R235			RK73GB1J474J	CHIP R 470K J 1/16W		D22			1SR154-400	DIODE	
R237			R92-1252-05	CHIP R 00HM J 1/16W		D23			RB706F-40	DIODE	
R239			RK73GB1J153J	CHIP R 15K J 1/16W		D27			MA2S111	DIODE	
R240			RK73GB1J223J	CHIP R 22K J 1/16W		D28,29			RB706F-40	DIODE	
R241			RK73GB1J564J	CHIP R 560K J 1/16W		IC1			M68732H	POWER MODULE	
R242			R92-1252-05	CHIP R 00HM J 1/16W		IC1			M68732UH	POWER MODULE	
R245			RK73GB1J104J	CHIP R 100K J 1/16W		IC3			NJM2904V	MOS IC	
R249			R92-1252-05	CHIP R 00HM J 1/16W		IC4			TA31136FN	MOS IC	
R250			RK73GB1J472J	CHIP R 4.7K J 1/16W		IC5,6			BU4094BCFV	MOS IC	
R252,253			R92-1252-05	CHIP R 00HM J 1/16W		IC7			XC62GR5012PR	MOS IC	
R254			RK73GB1J184J	CHIP R 180K J 1/16W		IC8			PST9140NR	MOS IC	
R255			RK73GB1J474J	CHIP R 470K J 1/16W		IC9			RN5VL45C	MOS IC	
R256			R92-1252-05	CHIP R 00HM J 1/16W		IC10			AT2408N10SI2.5	ROM IC	
R258			R92-1252-05	CHIP R 00HM J 1/16W		IC10			24LC08BT-1SN	ROM IC	
R259			RK73GB1J473J	CHIP R 47K J 1/16W		IC11			TA7368F	MOS IC	
R260,261			R92-1252-05	CHIP R 00HM J 1/16W		IC12			AT29C020-90TI	ROM IC	
R270,271			RK73HB1J103J	CHIP R 10K J 1/16W		IC13			30622M4A-410GP	MPU	
R272			RK73HB1J472J	CHIP R 4.7K J 1/16W		IC14			TC35453F	MOS IC	
R273			RK73HB1J562J	CHIP R 5.6K J 1/16W		IC15,16			TC75W51FU	MOS IC	
R274			R92-1368-05	CHIP R 00HM		IC17			X9C103SI	ANALOG IC	
R275			RK73HB1J221J	CHIP R 220 J 1/16W		IC19			TC75W51FU	MOS IC	
R276-278			RK73GB1J104J	CHIP R 100K J 1/16W		Q1			2SC5010-T1	TRANSISTOR	
R280			RK73GB1J154J	CHIP R 150K J 1/16W		Q2			2SC4226(R24)	TRANSISTOR	
R301			R92-0679-05	CHIP R 00HM		Q3			2SC5010-T1	TRANSISTOR	
R303,304			R92-1252-05	CHIP R 00HM J 1/16W		Q4,5			2SC5108(Y)	TRANSISTOR	
R305			RK73GB1J104J	CHIP R 100K J 1/16W		Q6			2SC4988	TRANSISTOR	
R307			RK73GB1J563J	CHIP R 56K J 1/16W		Q7			2SJ243	FET	
R309			RK73GB1J101J	CHIP R 100 J 1/16W		Q8			RN47A4	TRANSISTOR	
R310			RK73GB1J221J	CHIP R 220 J 1/16W		Q9			DTC144EE	DIGITAL TRANSISTOR	
R314			RK73GB1J104J	CHIP R 100K J 1/16W		Q10			2SK508NV(K52)	FET	
R318			RK73GB1J104J	CHIP R 100K J 1/16W		Q11			2SC4617(S)	TRANSISTOR	
R320,321			R92-1252-05	CHIP R 00HM J 1/16W		Q12			2SC4649(N,P)	TRANSISTOR	
R322			R92-1368-05	CHIP R 00HM		Q13,14			DTA144EE	DIGITAL TRANSISTOR	
R326			RK73GB1J124J	CHIP R 120K J 1/16W		Q15			DTC114EE	DIGITAL TRANSISTOR	
R327			RK73GB1J393J	CHIP R 39K J 1/16W		Q16			DTA114YE	DIGITAL TRANSISTOR	
VR1			R12-7491-05	TRIMMING POT.(68K)		Q17			DTC144EE	DIGITAL TRANSISTOR	
S401			S70-0457-05	TACT SWITCH							

PARTS LIST

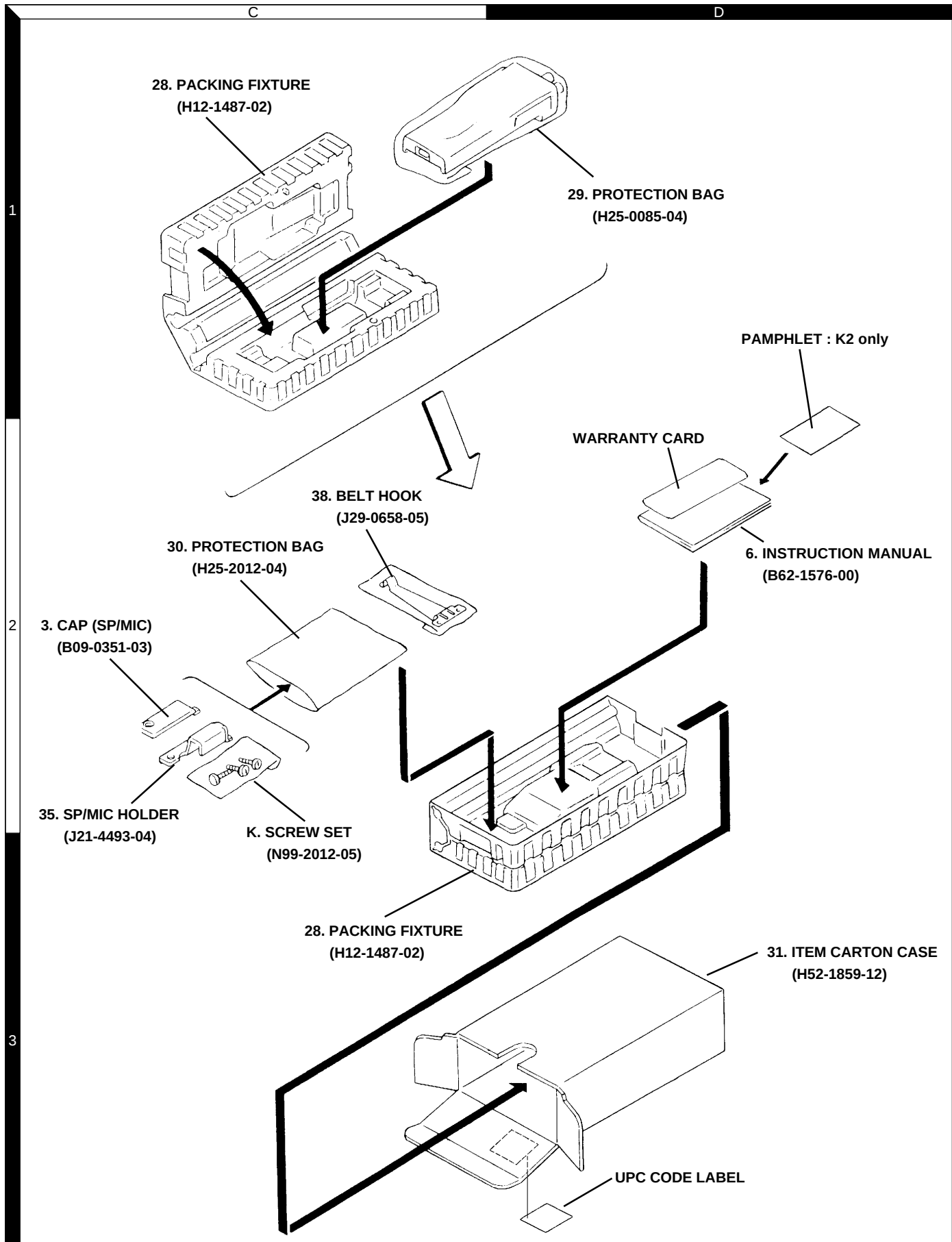
TX-RX UNIT (X57-6500-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
Q18			FP210	TRANSISTOR							
Q19			3SK318	FET							
Q20,21			UMG3N	TRANSISTOR							
Q22			2SC4649(N,P)	TRANSISTOR							
Q23			RN47A4	TRANSISTOR							
Q24,25			DTC114EE	DIGITAL TRANSISTOR							
Q26			DTA114EE	DIGITAL TRANSISTOR							
Q27			UPA572T	FET							
Q28			DTA114YE	DIGITAL TRANSISTOR							
Q30			2SK1588	FET							
Q31			2SC4649(N,P)	TRANSISTOR							
Q32			2SA1362(GR)	TRANSISTOR							
Q33,34			DTC144EE	DIGITAL TRANSISTOR							
Q35			UPA672T	FET							
Q36			2SK1824	FET							
Q37			2SA1774(S)	TRANSISTOR							
Q38			2SC4617(S)	TRANSISTOR							
Q39			2SK1824	FET							
Q301			3SK318	FET							

EXPLODED VIEW



PACKING



ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	450 to 470MHz (K) 470 to 490MHz (K2) Frequency modulation and external modulation. -127dBm/0.1μV to greater than -47dBm/1mV
2. Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω. 450 to 470MHz (K) 470 to 490MHz (K2) Vicinity of 5W
3. Deviation Meter	Frequency Range	450 to 470MHz (K) 470 to 490MHz (K2)
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading.
5. Oscilloscope		DC through 30MHz.
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz. 0.2ppm or less.
7. Ammeter		5A.
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz. 1mV to 10V.
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more. 0 to 1V.
10. Distortion Meter	Capability Input Level	3% or less at 1kHz. 50mV to 10Vrms.
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center frequency Output Voltage	50kHz to 600MHz 100mV or more
13. 8Ω Dummy Load		Approx. 8Ω, 3W.
14. Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped.

■ 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.)

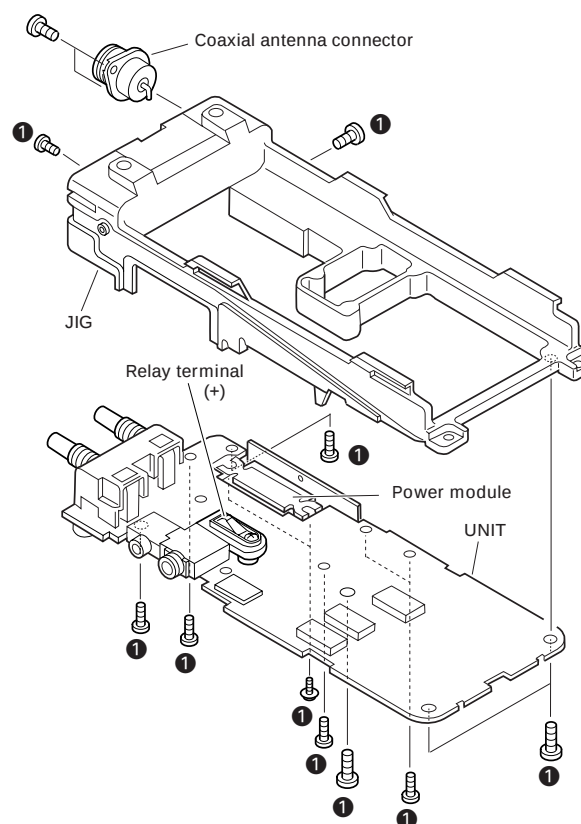
Note

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

Repair Jig (Chassis)

1. Jig (chassis : Part No. A10-4009-03) 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.

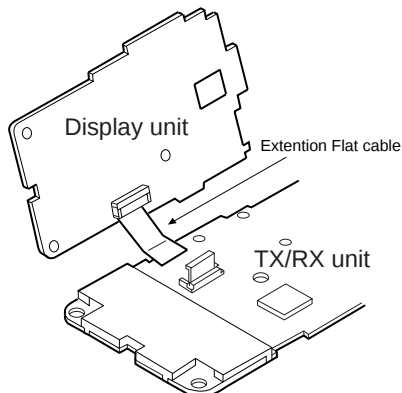
Relay terminal : + (7.5)
Jig (Chassis) : -



ADJUSTMENT

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

This cable is used for connecting the TK-373G display unit and TX/RX unit when you test or repair the transceiver.



Caution : You must connect TK-373G display unit when you test or repair the transceiver.

Test Mode

■ Test mode operating features

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

• Controls

[PTT]	Used when making a transmission.
[Side1]	Changes wide and narrow.
[Side2]	Monitor ON and OFF.
[A]	Sets to the Tuning mode.
[B]	Unused
[▼]	RF power HIGH and LOW.
[▲]	Changes signalling.
[ENCODER]	Changes channel.

• LCD indicator

“LO” Lights at RF Power Low.
“MON” 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.

■ 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) (K type)

Channel No.	RX Frequency	TX Frequency
1	460. 05000	460. 10000
2	450. 05000	450. 10000
3	469. 95000	469. 90000
4	460. 00000	460. 00000
5	460. 20000	460. 20000
6	460. 40000	460. 40000
7~16	—	—

Frequency (MHz) (K2 type)

Channel No.	RX Frequency	TX Frequency
1	480. 05000	480. 10000
2	470. 05000	470. 10000
3	489. 95000	489. 90000
4	480. 00000	480. 00000
5	480. 20000	480. 20000
6	480. 40000	480. 40000
7~16	—	—

Signalling

Signalling No.	RX	TX
1	None	None
2	None	100Hz square wave
3	LTR DATA	LTR DATA
4	QT 67.0Hz	QT 67.0Hz
5	QT 151.4Hz	QT 151.4Hz
6	QT 210.7Hz	QT 210.7Hz
7	QT 250.3Hz	QT 250.3Hz
8	DQT D023N	DQT D023N
9	DQT D754I	DQT D754I
10	None	DTMF tone 9

• 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.

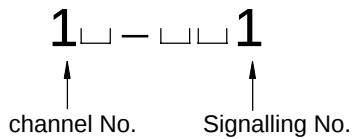
• Transceiver tuning

(To place the transceiver in tuning mode)

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

ADJUSTMENT

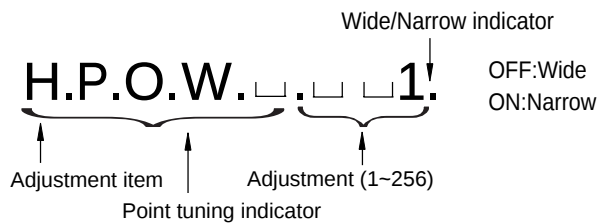
LCD display (Test mode)



Press [A], 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 [B] key to adjust 3 or 5 point tuning, and use the [Side1] key to switch between Wide/Narrow.

LCD display (Tuning mode)



Panel Tuning Mode (K type)

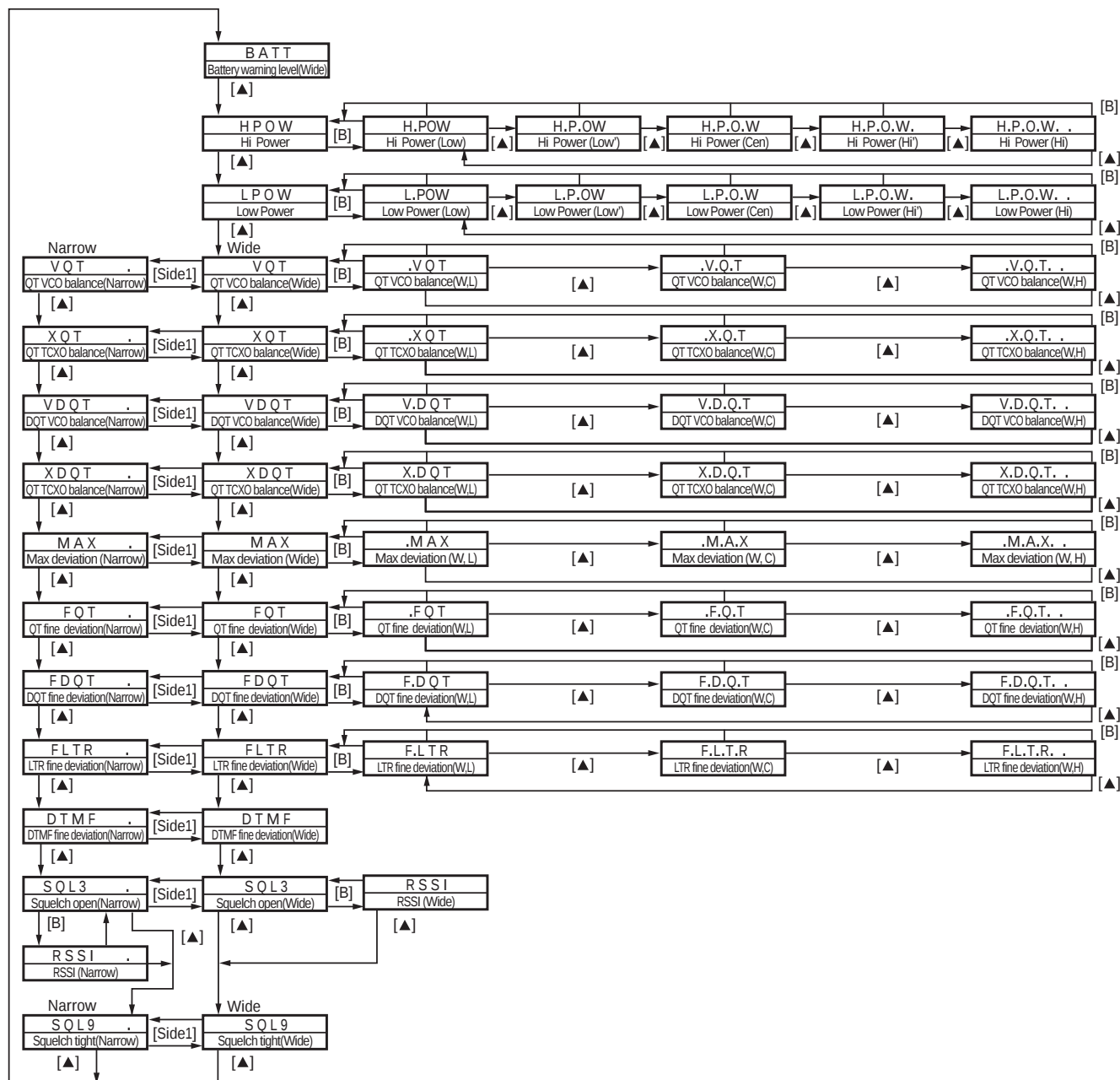
	450-470(MHz)	
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
Low	450.05000	450.00000
Low'	455.05000	455.00000
Center	460.05000	460.00000
High'	465.05000	465.00000
High	469.95000	470.00000

Panel Tuning Mode (K2 type)

	470-490(MHz)	
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
Low	470.05000	470.00000
Low'	475.05000	475.00000
Center	480.05000	480.00000
High'	485.05000	485.00000
High	489.95000	490.00000

ADJUSTMENT

■ Tuning mode



ADJUSTMENT

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 [Narrow] MOD:1kHz, DEV:1.5kHz [Semi wide] MOD:1kHz, DEV:2.4kHz					
2. VCO lock voltage	[Panel Test Mode] 1) CH-Sig:2-1	Power meter DVM	ANT CV(LV)		Check	0.8V or more
RX	2) CH-Sig:3-1					3.5V ± 0.1V (K,K2)
TX	3) CH-Sig:2-1 PTT:ON					0.8V or more
	4) CH-Sig:3-1 PTT:ON					3.5 ± 0.1V (K,K2)

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 (460.0 MHz) ± 100Hz (K) (480.0 MHz) ± 100Hz (K2)	
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	4.2W 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	4.2W	±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	3.0~5.0W 2.3A or less
5. Low Power Adjust	1) Adj item [LPOW] Adjust [***] 2) Adj item [L.P O W] → [L.P.O W] → [L.P.O.W] → [L.P.O.W.] → [L.P.O.W. .] Adjust [***] PTT:ON			Encoder knob	1.0W	±0.1W 1.0A or less

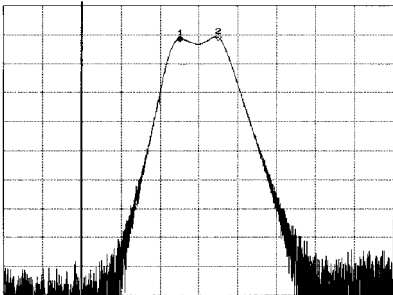
ADJUSTMENT

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				Check	0.5~1.5W 1.2A or less
	2) CH-Sig:2-1 PTT:ON					
	3) CH-Sig:3-1 PTT:ON					
7. Max DEV Adjust [Wide]	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	3.8kHz (According to the larger +,-)	±50Hz
	[Narrow] 1) Adj item [MAX .] Adjust [***] PTT:ON				1.75kHz (According to the larger+,-)	
8. MIC Sensitivity Check	[Panel Test Mode] 1) CH-Sig:1-1 AG:1kHz / 12mV LPF:15kHz PTT:ON				Check	2.2~3.6kHz
9. QT TCXO Balance	Adj item [X Q T] Adjust [200] : K, K2 Wide, Narrow	Power meter Dev meter Oscilloscope AG AF VTVM	ANT SP/MIC connector	Encoder knob		
10.DQT TCXO Balance	Adj item [X D Q T] Adjust [150] : K, K2 Wide, Narrow					
11.DQT VCO Balance Adjust [Wide]	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			Make the demodulation waves into square waves.	
	[Narrow] 3) Adj item [V D Q T .] Adjust [***] PTT:ON					
12.QT VCO Balance	Adj item [***] $[VDQT] \times \frac{200}{150} = [VQT]$ (K, K2)					

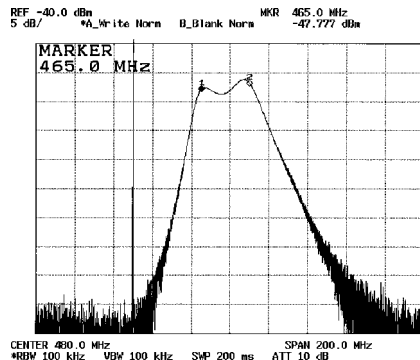
ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
13.QT Deviation Adjust [Wide]	1) Adj item [FQT] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [.F Q T] → [.F.Q.T] → [.F.Q.T. .] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope	ANT SP/MIC connector	Encoder knob	Wide:0.85kHz Narrow:0.40kHz	±40Hz ±40Hz
	[Narrow] 3) Adj item [FQT .] Adjust [***] PTT:ON					
14.DQT Deviation Adjust [Wide]	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				Wide:0.75kHz Narrow:0.35kHz	±50Hz
	[Narrow] 3) Adj item [FDQT .] Adjust [***] PTT:ON				Wide:0.75kHz Narrow:0.35kHz	±50Hz
15.LTR Deviation Adjust [Wide]	1) Adj item [FLTR] Adjust [***] LPF:15kHz HPF:OFF 2) Adj item [F.L T R] → [F.L.T.R] → [F.L.T.R. .] Adjust [***] PTT:ON				Wide:1.0kHz Narrow:0.75kHz	±50Hz
	[Narrow] 3) Adj item [FLTR .] Adjust [***] PTT:ON					
16.DTMF Deviation Adjust [Wide]	1) Adj item [DTMF] Adjust [***] LPF:15kHz HPF:OFF PTT:ON				Wide:3.0kHz Narrow:1.5kHz	±0.1kHz
	[Narrow] 2) Adj item [DTMF .] 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 predeter- mined numeric in the range of 1 to 256 appears and then press the [▼] key. That number will be stored in memory.	BATT terminal voltage:5.9V
18.BATT Detection Check	[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

ADJUSTMENT

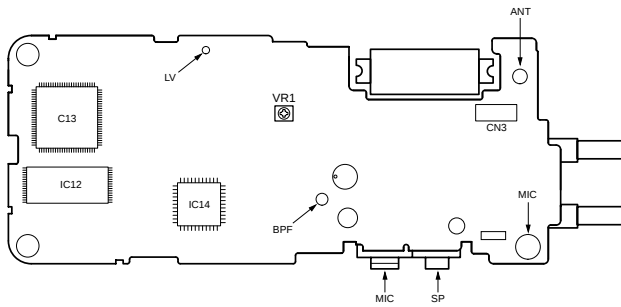
Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
K type						
1. BPF Adjustment	(PANEL TEST MODE) CH-Sig 1-1 Tra-G setting -40dBm	Tracking generator Spectrum analyzer	ANT BPF	TC301, TC302, TC303	Adjust wave form to figure 1.	
REF -40.0 dBm 5 dB/ 40.0 kHz Norm 0.01 kHz Norm MKR 450.0 MHz -45.684 dBm  CENTER 450.0 MHz #RBW 100 kHz VBW 100 kHz SMP 200 ms ATT 10 dB SPAN 200.0 MHz Fig. 1						
2. Sensitivity Check	[Panel Test Mode] 1) CH-Sig:1-1 SSG OUT Wide:-118dBm (0.28μV) (MOD:1kHz / ±3kHz) Narrow:-116dBm (0.35μV) (MOD:1kHz / ±1.5kHz)	SSG AF VTVM Oscilloscope	ANT		Check	12dB SINAD or more
3. Squelch (Open) Adjust [Wide]	1) Adj item [SQL3] Adjust [***] SSG OUT: -124dBm				Encoder knob squelch.	Adjust to the squelch threshold point
[Narrow]	2) Adj item [SQL3.] Adjust [***] SSG OUT: -123dBm					
4. Squelch(Tight) Adjust [Wide] [Narrow]	1) Adj item [SQL9] Adjust [***] SSG OUT:-117dBm (0.3μV) 2) Adj item [SQL9.] SSG OUT:-116dBm (0.35μV)					Adjust to the squelch threshold point
5. Squelch Check	[Panel Test Mode] 1) CH-Sig:1-1 SQ Level : [SQL5] SSG OUT: -118dBm (0.28μV) 2) SSG OUT:OFF				Check	Squelch must be opened. Squelch must be closed.

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark	
		Test equipment	Terminal	Parts	Method		
K2 type							
1. BPF Adjustment	(PANEL TEST MODE) CH-Sig 1-1 Tra-G setting -40dBm	Tracking generator Spectrum analyzer	ANT BPF	TC301, TC302, TC303	Adjust wave form to figure 1.		
 Fig. 1							
2. Sensitivity Check	[Panel Test Mode] 1) CH-Sig:1-1 SSG OUT Wide:-118dBm (0.28μV) (MOD:1kHz / ±3kHz) Narrow:-116dBm (0.35μV) (MOD:1kHz / ±1.5kHz)	SSG AF VTVM Oscilloscope	ANT		Check	12dB SINAD or more	
3. Squelch (Open) Adjust [Wide]	1) Adj item [SQL3] Adjust [***] SSG OUT: -122dBm (0.18μV)				Encoder knob squelch.	Adjust to the squelch threshold point	
	2) Adj item [SQL3.] Adjust [***] SSG OUT: -120dBm (0.22μV)						
4. Squelch(Tight) Adjust [Wide] [Narrow]	1) Adj item [SQL9] Adjust [***] SSG OUT:-117dBm (0.3μV)						Adjust to the squelch threshold point
	2) Adj item [SQL9.] SSG OUT:-116dBm (0.35μV)						
5. Squelch Check	[Panel Test Mode] 1) CH-Sig:1-1 SQ Level : [SQL5] SSG OUT: -118dBm (0.28μV) 2) SSG OUT:OFF				Check	Squelch must be opened. Squelch must be closed.	

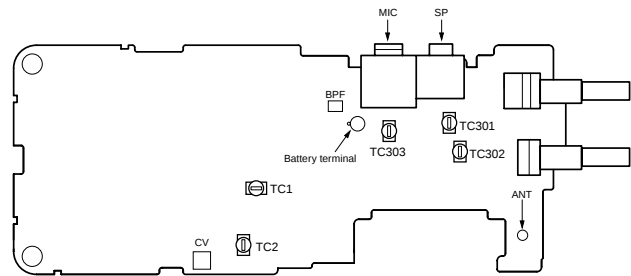
ADJUSTMENT

Adjustment points TX-RX unit (X57-650) Component side view



VR1 : Frequency adjustment

Foil Side View



TC1 : Transmit lock voltage adjustment

TC2 : Receive lock voltage adjustment

TC301 :
TC302 : } Band-pass filter waveform adjustment
TC303 :

BPF : Band-pass filter test point

CV(LV) : Lock voltage adjustment terminal.

Fig. 2 Adjustment points

PC BOARD VIEW

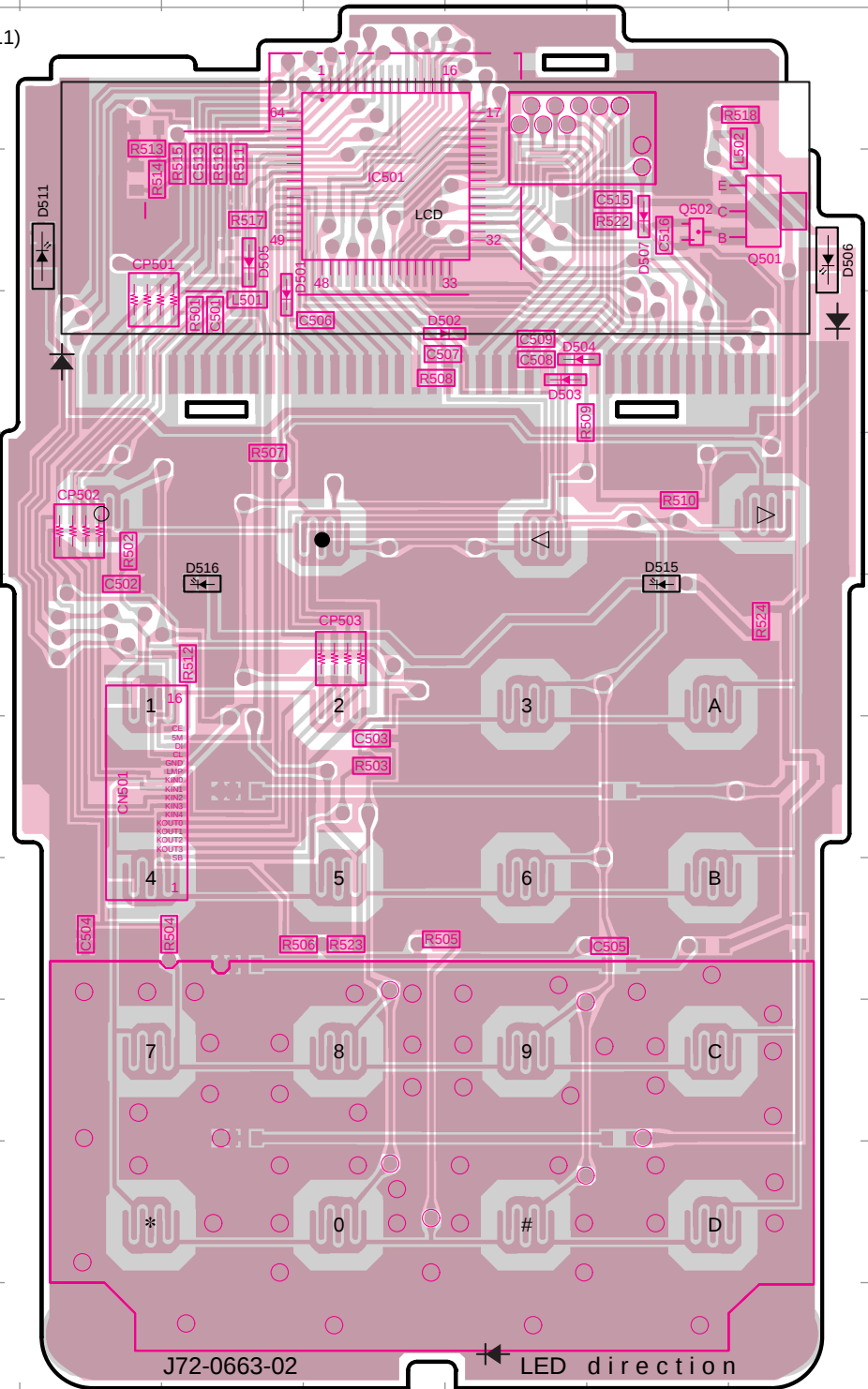
TK-373G

DISPLAY UNIT (X54-3250-11) Component Side View (J72-0663-02)

DISPLAY UNIT (X54-3250-11) Foil Side View (J72-0663-02)

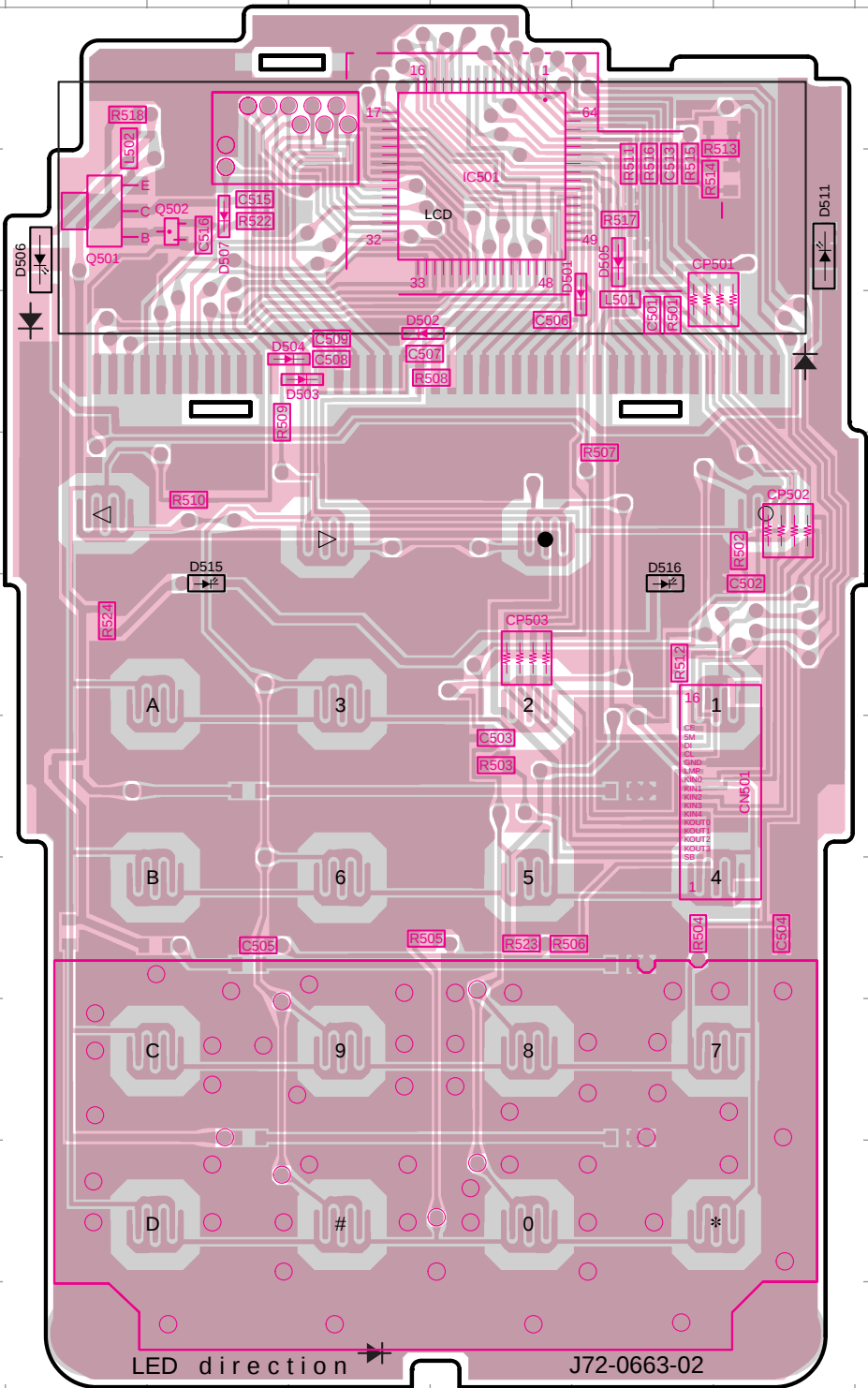
DISPLAY UNIT (X54-3250-11)
Component Side View

Ref. NO.	Address
IC501	4E
Q501	4H
Q502	4G
D501	4D
D502	5F
D503	5F
D504	5F
D505	4D
D506	4H
D507	4G
D511	4C
D515	7G
D516	7D



DISPLAY UNIT (X54-3250-11)
Foil Side View

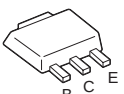
Ref. NO.	Address
IC501	4N
Q501	4K
Q502	4L
D501	4O
D502	5M
D503	5M
D504	5M
D505	4O
D506	4K
D507	4L
D508	8L
D509	9L
D510	10L
D511	4P
D512	8O
D513	9O
D514	10O
D515	7L
D516	7O



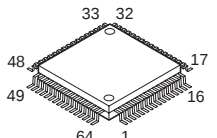
2SC4617(S)



2SB1132(Q,R)



LC75823W

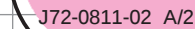


Component Side
Foil Side

Component Side
Foil Side

PC BOARD VIEW

0-11:TK-373G K2



Ref. NO.	Address
IC1	3M
IC3	5M
IC5	8C
IC6	8C
IC10	8D
IC11	7N
IC12	7D
IC13	5C
IC14	7G
IC15	6F
IC16	4H
IC17	8I
IC19	4H
Q13	6L
Q15	5M
Q26	4G
Q30	7M
Q31	4D
Q32	6O
Q33	6N
Q34	6N
Q35	9G
Q36	5E
Q39	5G
D15	6M
D17	4E
D22	7M
D23	8E
D27	5G
D28	4G
D29	4H

A 3D perspective drawing of a rectangular block. The top surface is labeled 'B'. The left vertical face is labeled 'E'. The right vertical face has a small rectangular protrusion at the bottom, which is labeled 'C'.



A 3-pin DIN connector is shown, with pins labeled D and G. Pin D is the top pin, and pin G is the bottom pin. The middle pin is not labeled.

A 3D perspective view of a 16-pin DIP package. The package is rectangular with a circular notch on the top surface. The pins are numbered 1 to 16, with 1 at the bottom right and 16 at the top left.

A diagram of a 5-pin D-sub connector. The pins are numbered 1 through 5. Pin 1 is at the bottom center, pin 2 is at the bottom left, pin 3 is at the bottom right, pin 4 is at the top left, and pin 5 is at the top center. The connector is shown from a perspective view.

A 3D perspective diagram of a DRAM array. The array is a rectangular block with a grid of memory cells on top. The top edge is labeled '32', indicating 32 columns. The front edge is labeled '16', indicating 16 rows. The left edge is labeled '17', indicating 17 word lines. The right edge is labeled '16', indicating 16 bit lines.

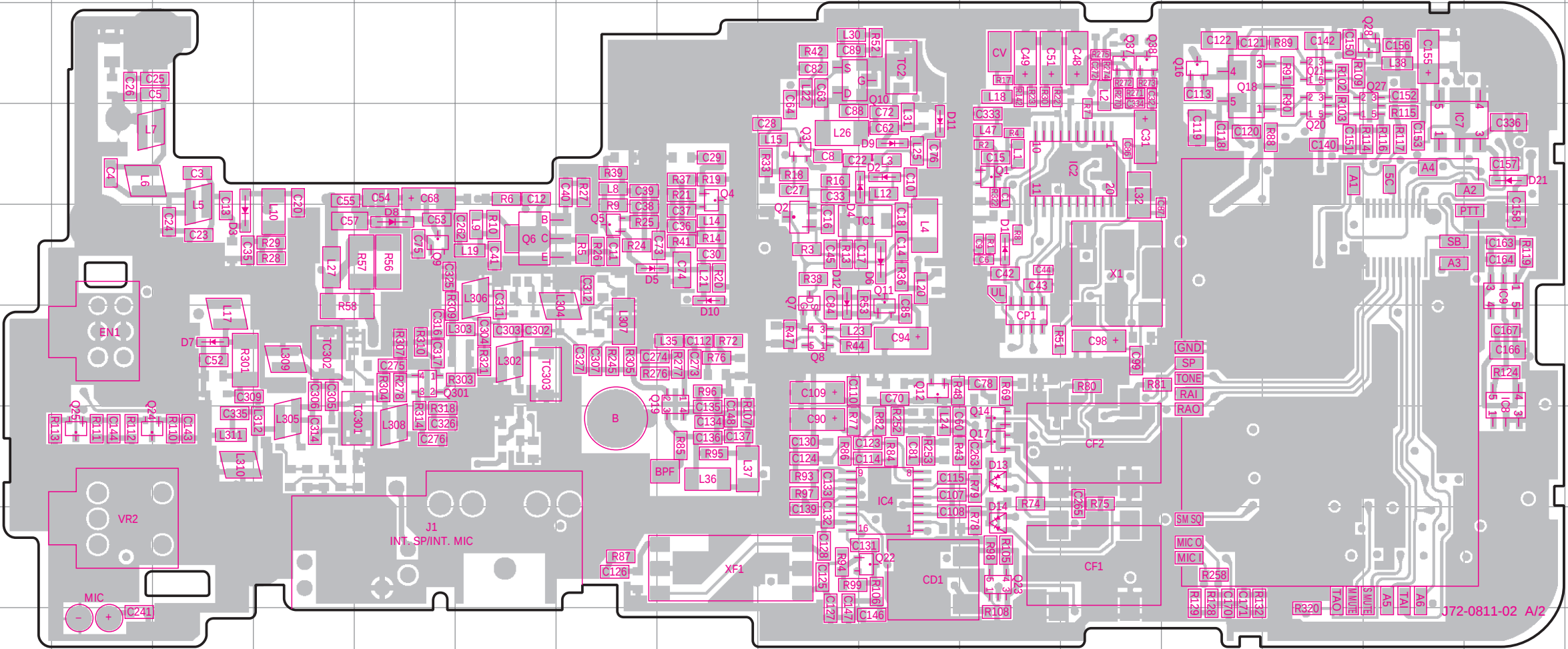
A diagram of a 5-pin D-sub connector. The pins are numbered 1 to 5. Pin 1 is the top pin on the right. Pin 2 is the pin below it. Pin 3 is the pin below that. Pin 4 is the top pin on the left. Pin 5 is the pin below it.

A diagram of a 5-pin D-sub connector. The pins are numbered 1 through 5. Pin 1 is at the bottom right, pin 2 is next to it, pin 3 is next to pin 2, pin 4 is next to pin 3, and pin 5 is at the top left. The connector is shown in a perspective view.

TX-RX UNIT (X57-650X-XX) Foil Side View (J72-0811-02)
0-10:TK-373G K
0-11:TK-373G K2

TX-RX UNIT (X57-650X-XX)
Foil Side View

Ref. NO.	Address
IC4	7L
IC7	4Q
IC8	6R
IC9	5R
Q1	4M
Q2	5K
Q3	4K
Q4	4J
Q5	5I
Q6	5H
Q7	5K
Q8	6K
Q9	5G
Q10	3K
Q11	6L
Q12	6L
Q14	7M
Q16	3O
Q17	7M
Q18	3O
Q19	6J
Q20	4P
Q21	3P
Q22	8L
Q23	8M
Q24	7D
Q25	7D
Q27	4Q
Q28	3Q
Q37	3N
Q38	3N
Q301	6G
D1	5M
D2	4L
D3	5E
D4	4L
D5	5I
D6	5L
D7	6E
D8	5G
D9	4L
D10	5J
D11	4L
D12	5K
D13	7M
D14	8M
D21	4R



DTA114YE
2SC4226(R24)
2SA1774(S)
2SC4617(S)
2SC5108(Y)
2SC4649(N,P)

2SK508NV(K52)

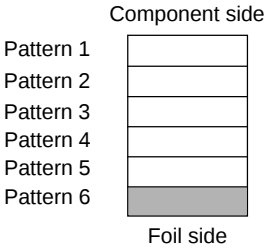
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PST9140NR
RN47A4
RN5VL45C
UPA572T

TA31136FN

2SC4988

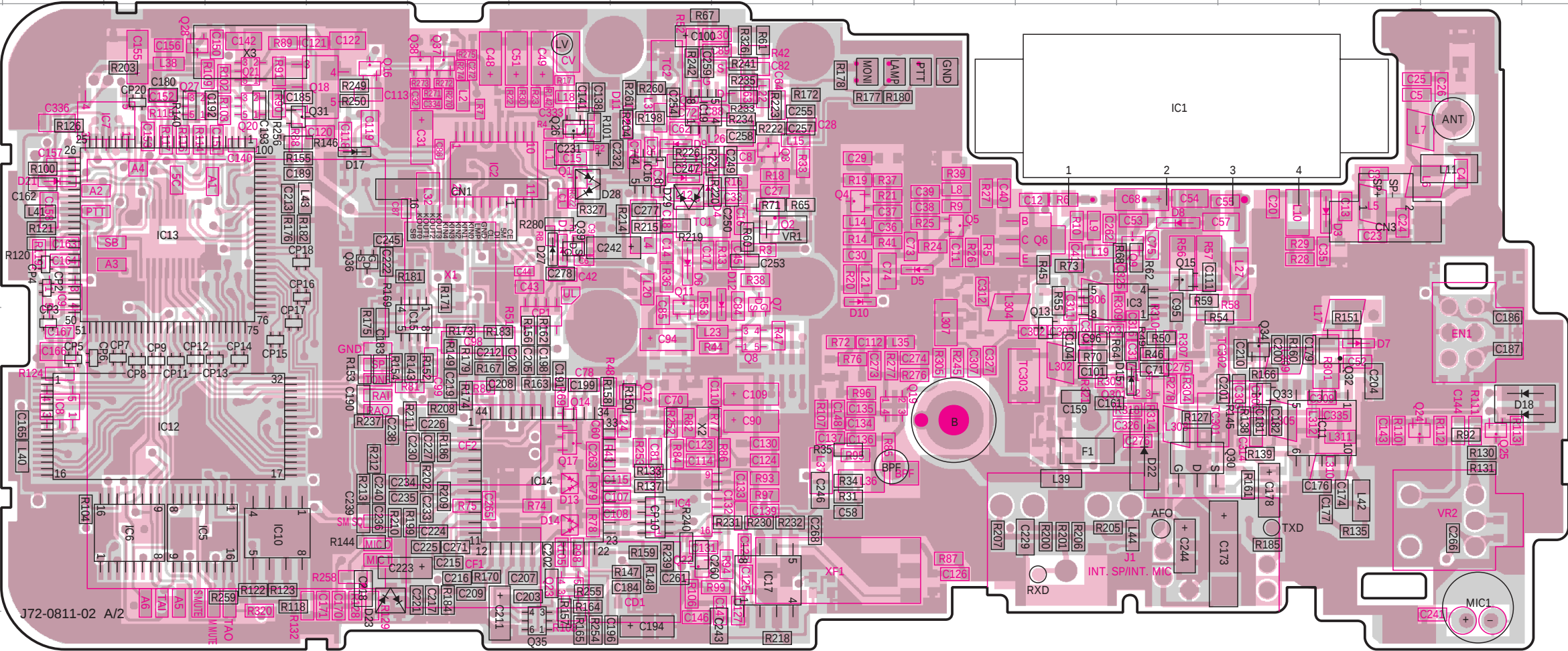
2SJ243



TK-373G

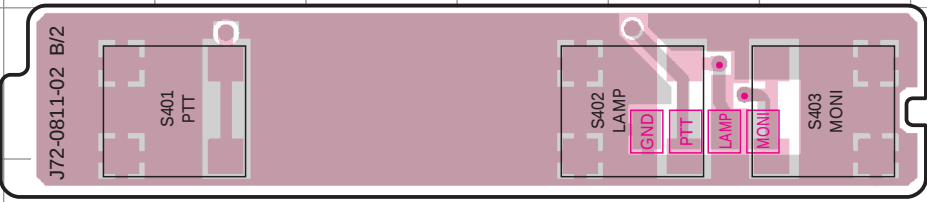
PC BOARD VIEW

TX-RX UNIT (X57-650X-XX) Component Side View + Foil Side View (J72-0811-02)
0-10:TK-373G K
0-11:TK-373G K2

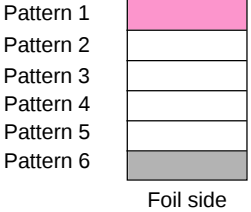


TX-RX UNIT (X57-650X-XX)
Component Side + Foil Side View

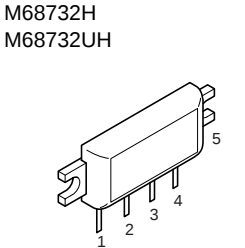
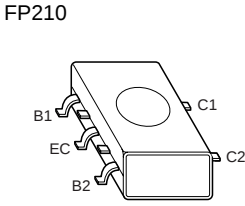
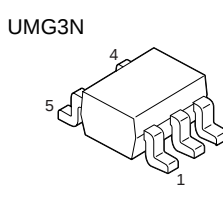
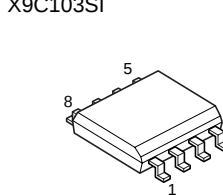
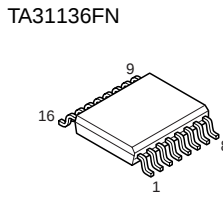
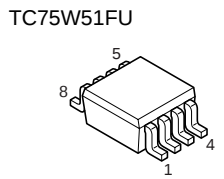
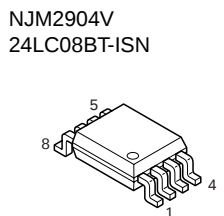
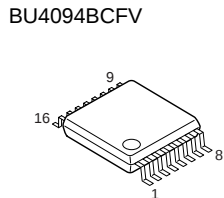
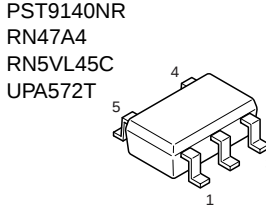
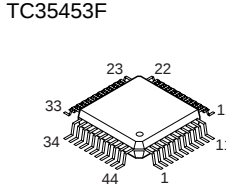
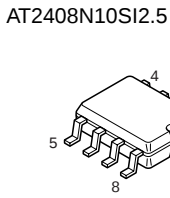
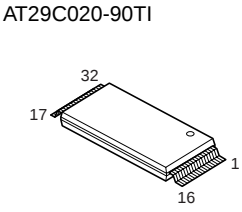
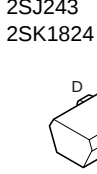
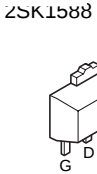
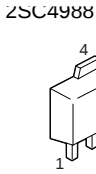
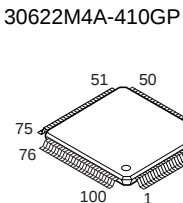
Ref. No.	Address	Ref. No.	Address
IC1	3M	Q23	8G
IC3	5M	Q24	7P
IC4	7H	Q25	7P
IC5	8C	Q26	4G
IC6	8C	Q27	4C
IC7	4C	Q28	3C
IC8	6B	Q30	7M
IC9	5B	Q31	4D
IC10	8D	Q32	6O
IC11	7N	Q33	6N
IC12	7D	Q34	6N
IC13	5C	Q35	9G
IC14	7G	Q36	5E
IC15	6F	Q37	3F
IC16	4H	Q38	3F
IC17	8I	Q39	5G
IC19	4H	Q301	6M
Q1	4G	D1	5G
Q2	5I	D2	4H
Q3	4I	D3	5O
Q4	4J	D4	4H
Q5	5K	D5	5K
Q6	5L	D6	5H
Q7	5I	D7	6O
Q8	6I	D8	5M
Q9	5M	D9	4H
Q10	3I	D10	5J
Q11	6H	D11	4H
Q12	6H	D12	5I
Q13	6L	D13	7G
Q14	7G	D14	8G
Q15	5M	D15	6M
Q16	3E	D17	4E
Q17	7G	D21	4B
Q18	3E	D22	7M
Q19	6J	D23	8E
Q20	4D	D27	5G
Q21	3D	D28	4G
Q22	8H	D29	4H

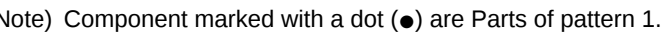


● Connect 1 and 6.
Component side



DIA114EE
DTA114YE
DTC114EE
DTC144EE
2SA1362(GR)
2SC4226(R24)
2SC4617(S)
2SC5108(Y)
2SC4649(N,P)
2SC5010-T1

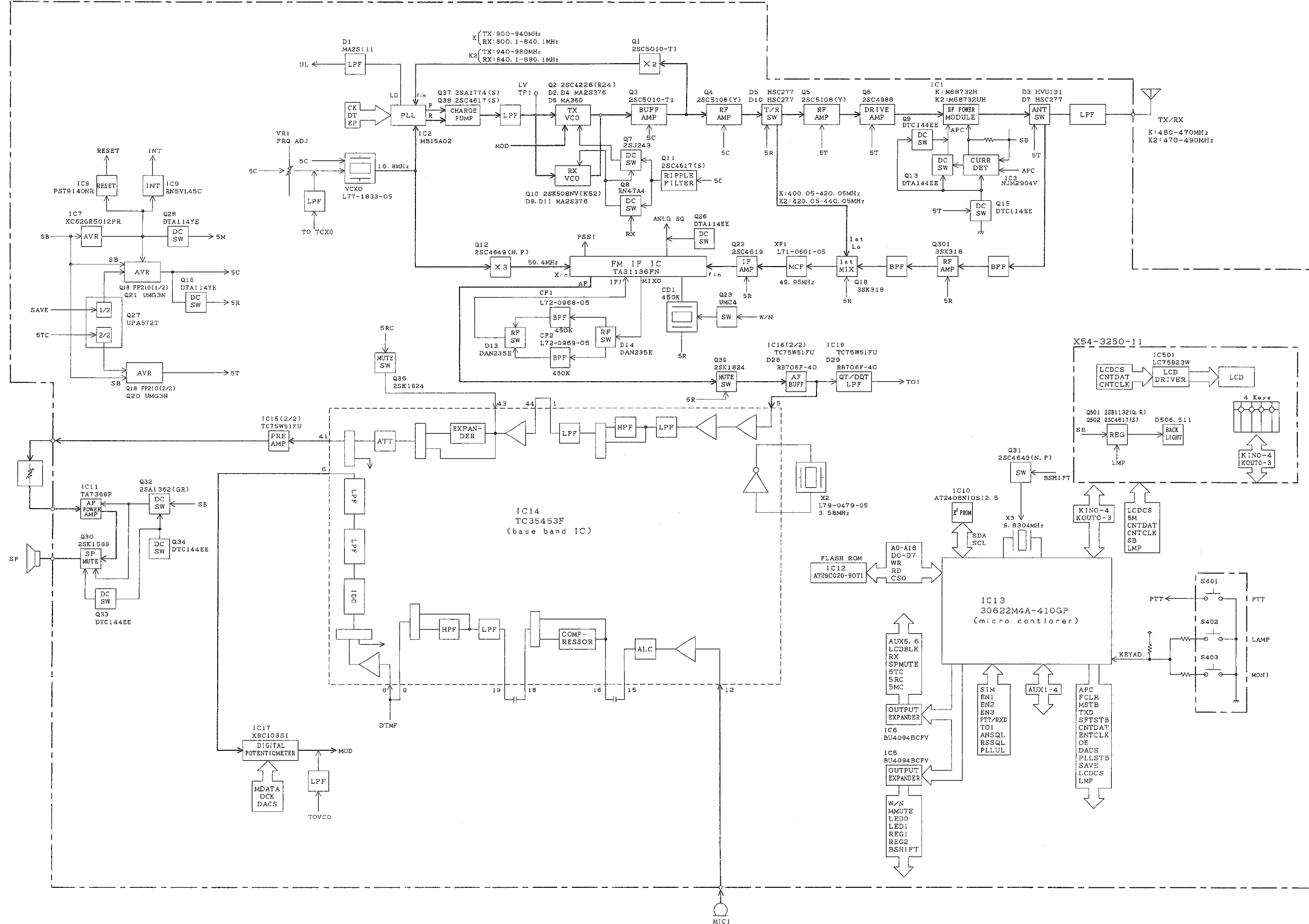




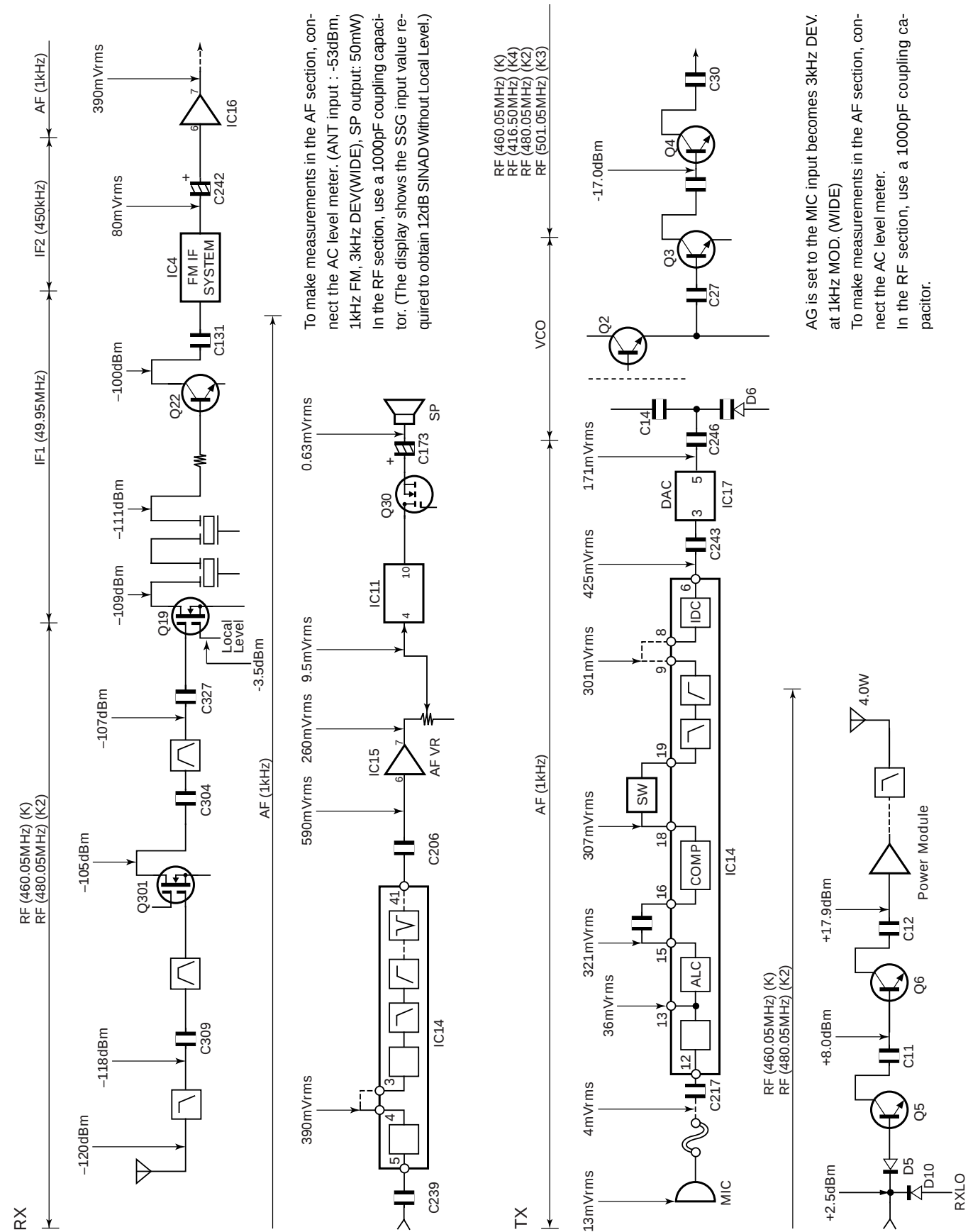
TK-373G TK-373G

BLOCK DIAGRAM

X57-650*-**



LEVEL DIAGRAM

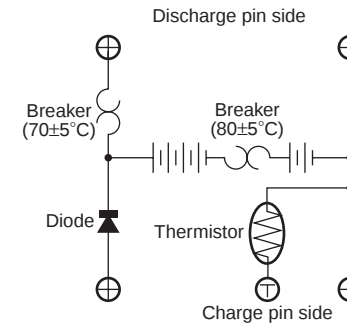


KNB-14/KNB-15A (Ni-Cd BATTERY) / KNB-20N (Ni-MH BATTERY)

KNB-14



SCHEMATIC DIAGRAM



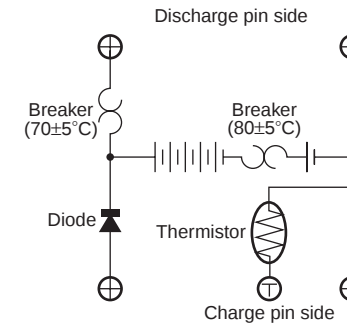
SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Capacity	: 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
KSC-24 (rapid charger)	, approximately 40 minutes
Weight	: 165g

KNB-15A



SCHEMATIC DIAGRAM



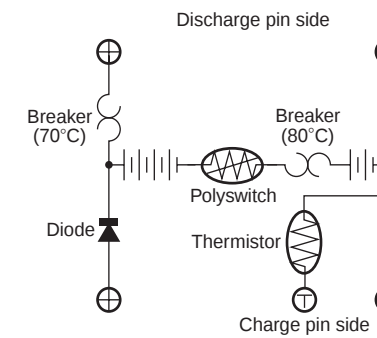
SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Capacity	: 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
KSC-24 (rapid charger)	, approximately 1 hour
Weight	: 210g

KNB-20N



SCHEMATIC DIAGRAM



SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Capacity	: 1600mAh
Dimensions	: 63.8W x 110.8H x 17.2D (mm) (projections included)
Charger and charging time:	
KSC-24 (rapid charger)	, approximately 80 minutes
Weight	: 210g

KMC-17/KMC-21 (SPEAKER MICROPHONE)

KMC-17 (Speaker microphone)



KMC-17 Parts List

Ref. No.	New parts	Parts No.	Description	Re- marks
		A02-0907-08	Case (Front)	
		A02-0908-08	Case (Rear)	
		B09-0316-08	Cap	
		D10-0606-08	Lever (PTT)	
		E11-0421-05	Phone jack	
		E30-3138-08	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	

SPECIFICATION

General

Frequency Range	450~470MHz (K) 470~490MHz (K2)
Systems	Max. 32
Groups	Max. 250 (Case of 1 system)
Channels	Max. 600
Channel Spacing	25kHz (Wide) 12.5kHz (Narrow)
PLL channel stepping	5kHz, 6.25kHz
Operating Voltage	7.5 VDC $\pm$ 20%
Battery Life	More than 4 hours at 4 watts (5-5-90 duty cycle with KNB-14 battery) More than 8 hours at 4 watts (5-5-90 duty cycle with KNB-15A battery)
Operating Temperature range	-30°C to +60°C (-22 °F to +140 °F)
Dimensions and Weight	
With KNB-14 (7.2V 600mAh battery)	58 (2-5/16) W x 135 (5-5/16) H x 32 (1-1/4) D mm (in) 400g (0.88lbs)
With KNB-15A (7.2V 1100mAh battery)	58 (2-5/16) W x 135 (5-5/16) H x 35 (1-3/8) D mm (in) 440g (0.97lbs)

Receiver (Measurements made per EIA standard EIA-RS316B)

Sensitivity

EIA 12dB SINAD	0.25 μ V (Wide)/0.28 μ V (Narrow)
Selectivity	70dB (Wide)/65dB (Narrow)
Intermodulation	65dB (Wide)/60dB (Narrow)
Spurious response (Except for IF 1/2)	60dB
Audio Power Output	500mW
Frequency Stability	$\pm$ 2.5ppm
Channel Frequency Spread	20MHz (K, K2)

Transmitter (Measurements made per EIA standard EIA 316B)

RF Power output	4W/1W
Spurious and Harmonics	70dB
Modulation	16K ϕ F3E (Wide)/11K ϕ F3E (Narrow)
FM Noise	45dB (Wide)/40dB (Narrow)
Audio Distortion	Less than 5%
Frequency Stability	$\pm$ 2.5ppm
Channel Frequency Spread	20MHz (K, K2)

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