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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.

#### PERSONNEL SAFETY

The following precautions are recommended for personnel safety :

- DO NOT transmit if someone is within two feet (0.6 meter) of the antenna.
- 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.
- All equipment should be properly grounded before power-up for safe operation.
- This equipment should be serviced by a qualified technician only.

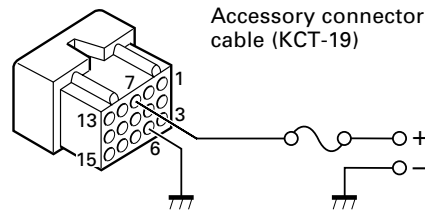
### SERVICE

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

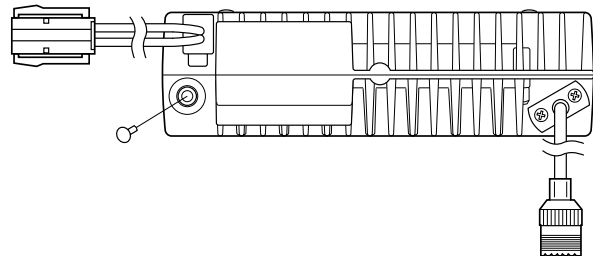
#### Note

When you modify your radio as described in system set-up, take the following precaution.

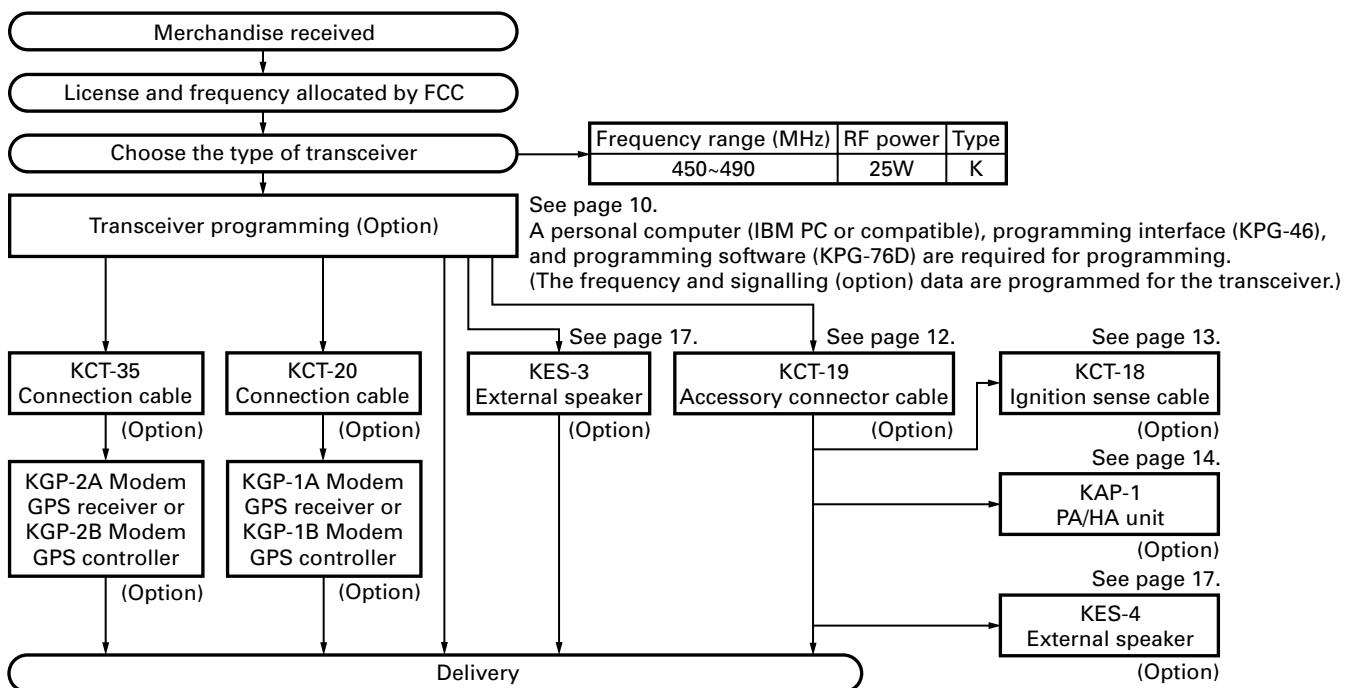
The rating of pin 7 (SB) of the accessory connector cable (KCT-19) on the rear of the radio is 13.6V (1A). Insert a 1A fuse if you use the SB pin for external equipment.



If you do not intend to use the 3.5-mm jack for the external speaker, fit the supplied speaker-jack cap (B09-0235-05) to stop dust and sand getting in.



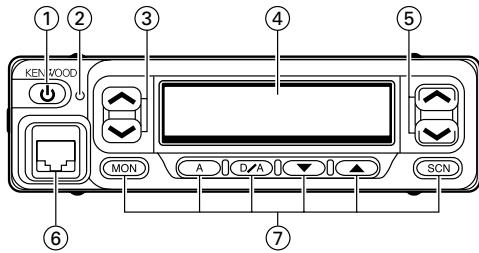
### SYSTEM SET-UP



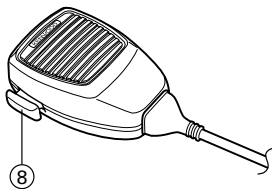
## OPERATING FEATURES

### 1. Controls and Functions

#### 1-1. Front Panel

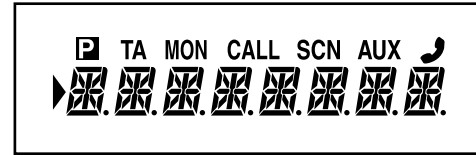


#### 1-2. Microphone



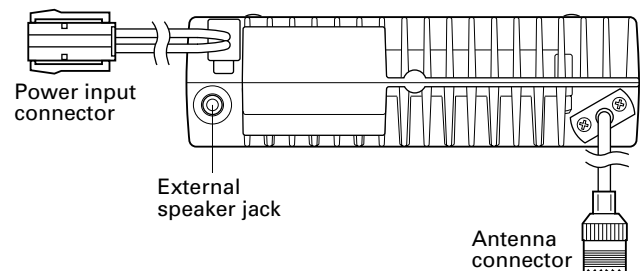
- ① **⏻** (Power) switch  
Press to switch the transceiver ON (or OFF).
- ② LED indicator  
Lights red while transmitting.
- ③ **↕** keys  
Press these keys to activate their programmable auxiliary functions (page 4). The default settings are Volume Up and Volume Down.
- ④ Display  
See right for more information.
- ⑤ **↕** keys  
Press these keys to activate their programmable auxiliary functions (page 4). The default settings are System Up and System Down.
- ⑥ Microphone jack  
Insert the microphone plug into this connector.
- ⑦ MON, A, D/A, **▼**, **▲**, and SCN keys  
Press these keys to activate their programmable auxiliary functions (page 4).
- ⑧ PTT switch  
To transmit, press and hold this switch, then speak into the microphone. Release to receive.

#### 1-3. Display



Indicator	Description
<b>P</b>	Appears when the selected group is programmed as priority.
<b>TA</b>	Appears when the selected group is programmed as Talk Around.
<b>MON</b>	Appears when the key programmed as Monitor is pressed.
<b>CALL</b>	If programmed by your dealer, appears when you receive an ID.
<b>SCN</b>	Appears when you are using Scan mode.
<b>AUX</b>	Appears when the auxiliary function is activated.
<b>☎</b>	In trunked operation, appears when the selected group is programmed as telephone IDs.
<b>▶</b>	Appears when the selected system is removed from the scanning sequence.
<b>XXXXXXXXXX</b>	Displays the system and group numbers. Your dealer can program system and group names with up to 8 characters, in place of numbers.

#### 1-4. Rear Panel



## OPERATING FEATURES

### 1-5. Programmable Auxiliary Functions

You can program the  $\blacktriangle/\blacktriangledown$  (left side),  $\blacktriangle/\blacktriangledown$  (right side), MON, A, D/A,  $\blacktriangledown$ ,  $\blacktriangle$ , and SCN keys with the functions listed below.

- AUX
- Display Character
- DTMF ID (BOT)
- DTMF ID (EOT)
- Emergency \*<sup>1</sup>
- Group Down
- Group Up
- Home Group
- Horn Alert
- Key Lock
- Memory (RCL)
- Memory (RCL/STO)
- Memory (STO)
- Monitor Momentary
- Monitor Toggle
- None (No function)
- Public Address
- Redial
- Scan
- Scan Del/Add
- Scan Temporary Delete
- Squelch Off Momentary
- Squelch Off Toggle
- System Down
- System Up
- Telephone Disconnect
- Volume Down
- Volume Up

\*1 : This function can be used only with a foot switch.

## 2. Operation Features

The TK-863G is a UHF FM radio designed to operate in trunking format. The programmable features are summarized.

## 3. Transceiver Controls and Indicators

### 3-1. Front Panel Controls

All the keys on the front panel are momentary-type push buttons. The functions of these keys are explained below.

- **POWER key**

Transceiver POWER key. When the power is switched off, all the parameters are stored in memory. When the power is switched on again, the transceiver returns to the previous conditions.

- **SYSTEM UP/DOWN key (Programmable)**

- **$\blacktriangle/\blacktriangledown$  key (Programmable)**

- **SCAN key (Programmable)**

- **MONITOR key (Programmable)**

- **A, D/A key (Programmable)**

- **VOLUME UP/DOWN key (Programmable)**

- **TX LED**

The TX indicator (Red LED) shows that you are transmitting.

### 3-2. Programmable Keys

The FPU (KPG-76D) enables programmable keys to select the following functions.

None, AUX, DTMF ID (BOT), DTMF ID (EOT), Display Character, Emergency, Group Down, Group Up, Home Group, Horn Alert, Key Lock, Memory (RCL/STO), Memory (RCL), Memory (STO), Monitor Momentary, Monitor Toggle, Public Address, Redial, Scan, Scan Del/Add, Scan Temporary Delete, Squelch Off Momentary, Squelch Off Toggle, System Down, System Up, Telephone Disconnect, Volume Down and Volume Up.

- **AUX**

If this key is pressed, "AUX" icon lights on the display and AUX port which is inside of the transceiver turns to the active level. If pressed again, the "AUX" icon goes off and the AUX ports turns to the lower level.

- **Display character**

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

- **DTMF ID (BOT)**

In conventional mode, if you press this key, a predetermined DTMF ID (Begin of TX) will be sent automatically.

- **DTMF ID (EOT)**

In conventional mode, if you press this key, a predetermined DTMF ID (End of TX) will be sent automatically.

- **Emergency**

Pressing this key for longer than the programmed "Emergency Key Delay Time" causes the transceiver to enter the Emergency mode and display the "Emergency Display" setting. The transceiver automatically switches to the "Emergency System/Group" and transmits for the programmed "Duration of Transmission Mode".

The transceiver disables MIC mute while transmitting. After finishing transmission, the transceiver receives for the programmed "Duration of Receiving Mode". The transceiver mutes the speaker while receiving.

## OPERATING FEATURES

Following the above sequence, the transceiver continues to transmit and receive. While in Emergency mode, switch the power OFF or press [Emergency] for longer than the programmed "Emergency Key Delay Time" to exit Emergency mode.

**Note** : This function can be assigned to only the Foot switch.

- **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.

- **Home group**

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

- **Horn alert**

If you are called from the base station or other party using signalling for Horn Alert function selected in a group, while you are away from your transceiver, you will be alerted by the vehicle horn or some other type of external alert. To turn the horn alert function on, press this key. A confirmation tone sounds.

If this key is pressed again, the horn alert function is turned off.

- **Key lock**

Pressing this key causes the transceiver to accept entry of only the [Vol Up/Down], [Key lock], [PTT], [Monitor Momentary], [Monitor Toggle], [Squelch Off Momentary], [Squelch Off Toggle], and [Emergency] keys.

- **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.

- **Monitor**

Used to release signalling or squelch when operating as a conventional.

- **None**

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

- **Public address**

Public address amplifies the microphone audio, and outputs it through a PA speaker. PA is activated by pressing this key. A confirmation tone sounds, (and the display shows "PA"). PA can be activated at anytime (scanning or non-scanning).

If this key is pressed again, a confirmation tone will sound, (the display will return to the normal group or SCAN display), and the PA function will turn off.

- **Redial**

If you press this key when the system/group is displayed, the last transmitted DTMF code will appear on the display. Pressing the PTT switch at this time will transmit the displayed DTMF code.

- **Scan**

Press this key starts scanning. Pressing this key stops scanning.

- **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.

- **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".

- **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.

- **Telephone disconnect**

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

- **Volume up/down**

When the key is pressed, the volume level is increased/decreased and repeats if held for 200ms or longer.

## 4. Scan Operating

### ■ 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 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.

There are two types of system scan.

- **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 systems have been set, the scan speed can be increased by narrowing the systems to be scanned with scan lists.

- **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 (▶) 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 (▶) 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 (▶) indicator is displayed on the left of the SYSTEM indicator.

To unlock a system, select the system and press the key. The Delete (▶) 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 (▶) indicator flashes during fixed scanning. If all systems are locked out, the scan stops and only the revert system is received.

- **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.

- **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.

- **System/Group Revert**

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

- **Last called revert**

The system or group changes to the revert system or group when a call is received with the system or 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 or group is assigned as the new revert system or group.

- **Selected revert**

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

- **Selected + Talkback revert**

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

- **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.

- **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 drop-out delay time or dwell time shared by the system scan elapses.

- **In Conventional System**

If QT or DQT is set for the channel, the channels, 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.

## OPERATING FEATURES

### 5. Details of Features

#### ■ Time-out Timer

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

#### ■ PTT ID

PTT ID provides a DTMF ANI to be sent with every time PTT (beginning of transmission, end of transmission, or both).

You can program PTT ID "on" or "off" for each group. The contents of ID are programmed for each transceiver.

The timing that the transceiver sends ID is programmable.

BOT : DTMF ID (BOT) is sent on beginning of transmission.

EOT : DTMF ID (EOT) is sent on end of transmission.

Both : DTMF ID (BOT) is sent on beginning of transmission and DTMF ID (EOT) is sent on end of transmission.

#### ■ 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 key, and "SCN" key.

#### ■ Off Hook Decode

If the Off hook decode function has been enabled, removing and replacing the microphone on the hook has no effect for decoding QT/DQT.

#### ■ Horn Alert

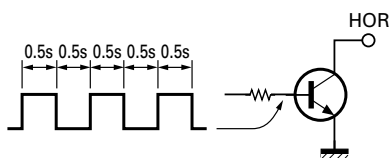
Horn alert can be set to on or off for each group. If horn alert has been set to YES for a group and DEC ID/QT/DQT matches, the horn alert, HOR, is turned on and off.

Either continuous or non-continuous operation can be set by the FPU. The horn alert port is enabled or disabled as follows;

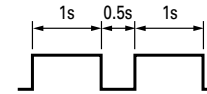
Off hook horn alert	Hook off	Hook on
Enable	Yes	Yes
Disable	No	Yes

#### ■ Pulse

The horn alert port, HOR, is turned on and off as follows;



The timing when the fixed LTR ID matches is as follows (trunking mode);



#### ■ Continuous

Horn alert can be reset by setting an expiration time from the FPU, pressing the Horn Alert key, or setting off hook.

#### ■ Data TX with QT/DQT

Whether programmed QT/DQT is modulated or not with a data transmission. A radio unit can receive a data message regardless of QT/DQT if the receiving unit is not scanning.

#### ■ 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.

#### ■ 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.

#### ■ 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.

## OPERATING FEATURES

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).

### ■ 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 performed.

### ■ 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).

### ■ ARQ Mode

It affects Trunking mode only. Automatic Repeat reQuest (ARQ) mode is a manner to minimize the air traffic of data communication. Also, it enables to occupy the trunking repeater channel for the data communication period.

## 6. Audible User Feedback Tones

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

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

### ■ Power On Tone

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

### ■ Alert Tone

This tone is output when the transceiver is TX inhibition for TOT, and PLL unlocked. It is output until the PTT button is released.

### ■ Password Agreement Tone

When the correct password is entered, the tone sounds. The optional feature's control tone can be set to yes or no.

### ■ PTT Release Tone

When you release the PTT switch, the PTT release tone sounds.

### ■ Busy Tone

Sounds in LTR mode, when you cannot use a repeater (system busy or TX inhibit). Sounds in conventional mode, when busy channel lockout is functioning. You can select yes or no for the optional feature's warning tone.

### ■ Key Press Tone [A]

Sounds when a key is pressed. For toggle keys, sounds when toggle function is turned on (key press tone [B] sounds when it is turned off). You can select yes or no for the optional feature's control tone.

### ■ Key Press Tone [B]

Sounds when a key is pressed. For toggle keys, sounds when the toggle function is turned off (key press tone [A] sounds when it is turned on). You can select yes or no for the optional feature's control tone.

### ■ Key Press Tone [C]

Sounds when a key is pressed. Also sounds when storing data, adding a DTMF code to memory, and when changing test mode settings. You can select yes or no for the optional feature's control tone.

### ■ Key Input Error Tone

Sounds when a key is pressed but that key cannot be used. You can select yes or no for the optional feature's warning tone.

### ■ Roll Over Tone

Sounds at the smallest system/group. You can select yes or no for the optional feature's control tone.

### ■ Transpond Tone

Sounds when an individual call with the correct LTR ID is received.

### ■ 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 of clear to talk has been set to yes.)



# OPERATING FEATURES / REALIGNMENT

## ■ 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 mid tone is output for 400ms.)

## ■ Ringing 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.)

## ■ System Search Tone

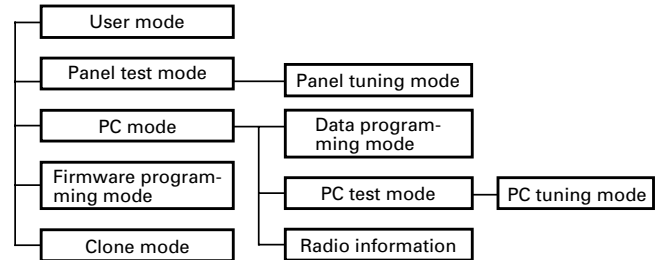
Sounds when the system changes during system search. You can select yes or no for the optional feature's warning tone.

## ■ System Search End Tone

Sounds when a possible connection to a repeater in system search is not made. You can select yes or no for the optional feature's warning tone.

## 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	[SCN]+Power ON (Two seconds)
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode]+[SCN]
Firmware programming mode	[↖]+Power ON (Two seconds)
Clone mode	[↙]+Power ON (Two seconds)

### 3. For the Panel Test Mode

Setting method refer to ADJUSTMENT.

#### 3-1. For the Panel Tuning Mode

Setting method refer to ADJUSTMENT.

## REALIGNMENT

### 4. Radio Information

Executing this function, “-PC-” appears on the display of the TK-863G while calculation the check sum.

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

### 5. PC Mode

#### 5-1. Preface

The TK-863G transceiver is programmed using a personal computer, a programming interface (KPG-46) 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-863G 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 blink.

#### Notes :

- The data stored in the personal computer must match model type when it is written into the flash memory.
- Change the TK-863G to PC mode, then attach the interface cable.

#### 5-3. KPG-46 Description

##### (PC programming interface cable : Option)

The KPG-46 is required to interface the TK-863G 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-46 connects the modular microphone jack of the TK-863G to the computers RS-232C serial port.

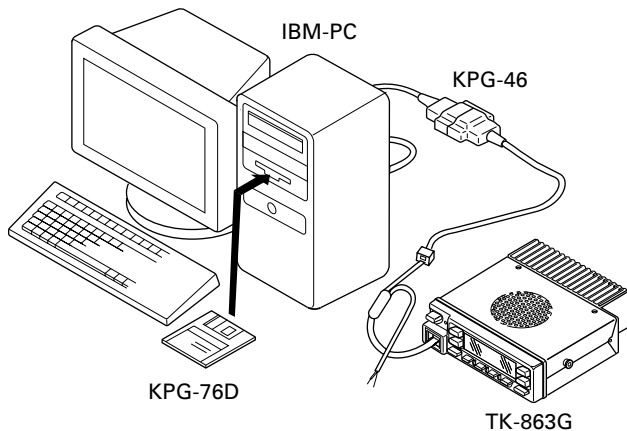


Fig. 1

#### 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 TK-863G radio via a programming interface cable (KPG-46).

#### 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 modular microphone jack.

### 6. Firmware Programming Mode

#### 6-1. Preface

Flash memory is mounted on the TK-863G. This allows the TK-863G 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-863G to the personal computer (IBM PC or compatible) with the interface cable (KPG-46). (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.
3. Set the firmware to be updated by file name item.
4. Turn the TK-863G Power ON with the [^] switch held down. Hold the switch down for two seconds until the display changes to "PROG 576", the BUSY/TX LED lights orange. When "PROG 576" appears, release your finger from the switch.
5. Check the connection between the TK-863G and the personal computer, and make sure that the TK-863G 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-863G starts to receive data, the BUSY/TX LED lights green.
7. If writing ends successfully, the LED on the TK-863G goes off and the checksum is displayed.
8. If you want to continue programming other TK-863G, 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 recommend to copy the data from the floppy disk to your hard disk before you update the radio firmware. Directly copying from the floppy disk to the radio may not work because the access speed is too slow.

## REALIGNMENT

### 6-4. Function

1. If you press the [MON] switch while "PROG 576" is displayed, the checksum is displayed. If you press the [MON] switch again (while the checksum is displayed), "PROG 576" is redisplayed.
2. If you press the [A] switch while "PROG 576" is displayed, the display changes to "PROG 192" to indicate that the write speed is low speed (19200 bps). If you press the [A] switch again while "PROG 192" is displayed, the display changes to "PROG 384", and the write speed becomes the middle speed (38400 bps). If you press the [A] switch again while "PROG 384" is displayed, the display returns to "PROG 576".

#### 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 modular microphone jacks. The operation is as follows (the transmit radio is the master and the receive radio is the slave).

1. Turn the master TK-863G power ON with the [▼] key held down. If the password is set to the TK-863G, the TK-863G displays "CLN LOCK". If the password is not set, the TK-863G displays "CLONE".
2. When "CLN LOCK" is displayed, only the [^/∨] key and [SCN], and [0] to [9] keys can be accepted. When you enter the correct password, and "CLONE" is displayed, the TK-863G can be used as the cloning master. The following describes how to enter the password.
3. How to enter the password with the microphone keypad; If you press a key while "CLN LOCK" is displayed, the number that was pressed is displayed on the TK-863G. Each press of the key shifts the display in order to the left. When you enter the password and press the [SCN] key, "CLONE" is displayed if the entered password is correct. If the password is incorrect, "CLN LOCK" is redisplayed.  
How to enter the password with the [^/∨] key;  
If the [^/∨] key is pressed while "CLN LOCK" is displayed, numbers (0 to 9) are displayed flashing. When you press the [SCN] key, the correctly selected number is determined, and the display shifts to the left. If you press the [SCN] key after entering the password in this procedure, "CLONE" is displayed if the entered password is correct. If the password is incorrect, "CLN LOCK" is redisplayed.

4. Power on the slave TK-863G.
5. Connect the cloning cable (No. E30-3382-05) to the modular microphone jacks on the master and slave.
6. Press the [SCN] 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.
7. The other slave can be continuously cloned. When the [SCN] key on the master is pressed while the master displays "END", the master displays "CLONE". Carry out the operation in step 4 to 6.

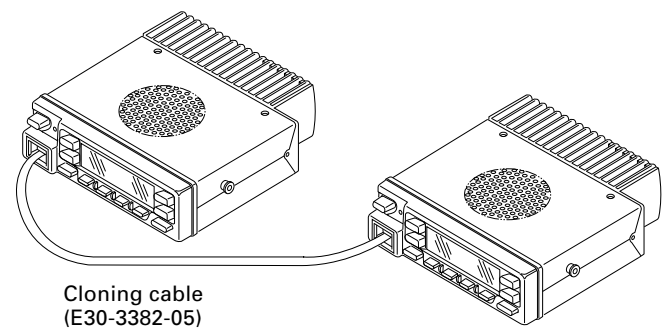


Fig. 2

## INSTALLATION

### 1. Accessory Connection Cable (KCT-19 : Option)

The KCT-19 is an accessory connection cable for connecting external equipment. The connector has 15 pins and the necessary signal lines are selected for use.

#### 1-1. Installing the KCT-19 in the transceiver

1. Remove the upper and lower halves of the transceiver case, and lift the DC cord bushing ( ❶ ) from the chassis.
2. Remove the pad as shown in Figure 1 ( ❷ ).
3. Insert the KCT-19 cable ( ❸ ) into the chassis ( ❹ ).  
The wire harness band ( ❺ ) must be inside the chassis.
4. Replace the DC cord bushing ( ❻ ).
5. Connect the KCT-19 to the TX-RX unit (A/2) as shown in Figure 2 ( ❼ ).
6. Connect the KCT-19 to the external accessory by inserting the crimp terminal ( ❸ ) into the square plug ( ❾ ), both of which are supplied with the KCT-19.

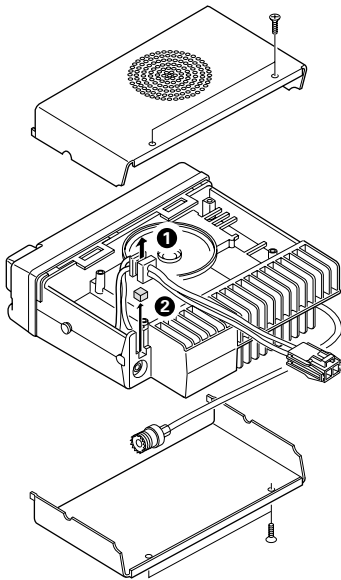


Fig. 1

#### 1-2. KCT-19 Accessory Port Function

No. (A)	No. (B,C,D,E)	Name	Function	Note
1	D-2	DTC	Data channel control/ External hook input	*1
2	D-5	ME	External microphone ground	
3	D-3	IGN	Ignition sense input	
4	D-1	DEO	Receiver detector output	
5	D-6	MI	External microphone input	
6	B-2	E	Ground	
7	B-3	SB	Switched B+, DC 13.6V output. Maximum 1A	
8	D-7	PTT	External PTT input	*1
9	D-4	DI	Data modulation input	
10	B-1	HOR	Horn alert/call output	
11	D-8	SQ	Squelch detect output	*1
12	C-1	SP	Speaker audio output	
13	E-1	AM	Speaker mute input, active high	
14	E-2	MM	MIC mute input, active high	
15	E-3	EMG	Foot switch input, active low	*2
		TXS/LOK	Transmitter sense output, active high	*3

\*1 : MDT mode

\*2 : Emergency mode

\*3 : Foot switch setting : None

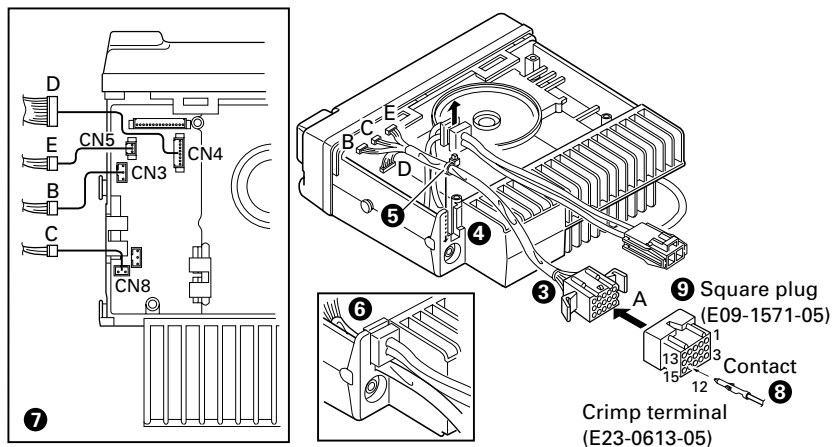


Fig. 2

## INSTALLATION

### 2. Accessory Terminal (TX-RX Unit)

#### 2-1. External Connector Accessory Terminal Method

No.	Name	I/O	Description	Note	
CN1	1	8C	O	DC 8V output	
	2	5S	O	DC 5V output	
	3	AUX5	O		
	4	AUX6	O	Auxiliary output	
	5	NC	-	Non-connection	
	6	AUX3	O	SQ : Squelch detect output	*1
	7	AUX1	I	PTT : External PTT input	*1
	8	AUX4	TXD		
	9	AUX2	RXD		
		I	DTC : Data channel control/ External hook input		
	10	ALT	I	Alert tone input	
	11	AFO	O	Receiver audio signal output	
	12	AFI	I	Receiver audio signal input	
	13	MII	I	Transmit audio signal input	
	14	MIO	O	Transmit audio signal output	
	15	GND	-	Ground	
CN3	1	HOR	O	Horn alert/call output	
	2	E	-	Ground	
	3	SB	O	Switched B+, DC 13.6V output, Maximum 1A	
CN4	1	DEO	O	Receiver detector output Level : 0.35Vrms (Standard modulation)	
	2	DTC	I	Data channel control/ External hook input	
	3	IGN	I	Ignition sense input	
	4	DI	I	Data modulation input	
	5	ME	-	External microphone ground	
	6	MI	I	External microphone input	
	7	PTT	I	External PTT input, active low	
	8	SQ	O	Squelch detect output	
CN5	1	AM	I	Speaker mute input, active high	
	2	MM	I	MIC mute input, active high	
	3	EMG	I	Foot switch input, active low	*2
		TXS/LOK	O		*3
CN7	1	PA/LI	O	Relay for PA function KAP-1 control	
			O	PA/LI ON : High, PA/LI OFF : Low	
	2	SPO	O	Audio signal output to KAP-1	
CN8	1	SP	O	Audio signal output to internal/external speaker	
	2	E	-	Ground	

\*1 : MDT mode

\*2 : Emergency mode

\*3 : Foot switch setting : None

### 3. Ignition Sense Cable (KCT-18 : Option)

The KCT-18 is an optional cable for enabling the ignition function. The ignition function lets you turn the power to the transceiver on and off with the car ignition key.

If you use the Horn Alert function or the Manual Relay function, you can turn the function off while driving with the ignition key.

#### 3-1. Connecting the KCT-18 to the Transceiver

1. Install the KCT-19 in the transceiver. (See the KCT-19 section.)
2. Insert the KCT-18 lead terminal ( ❷ ) into pin 3 of the square plug ( ❶ ) supplied with the KCT-19, then insert the square plug into the KCT-19 connector ( ❸ ).

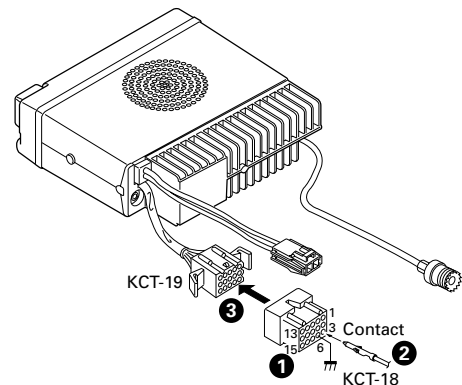


Fig. 3

#### 3-2. Modifying the Transceiver

Modify the transceiver as follows to turn the power or the Horn Alert or Manual Relay function on and off with the ignition key.

1. Remove the lower half of the transceiver case.
2. Set jumper resistors (0Ω) R134 and R135 of the TX-RX unit (A/2) as shown in Table 1.

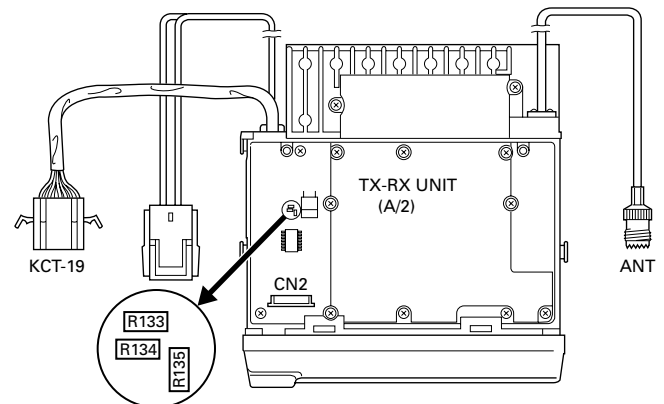


Fig. 4

Operation when KCT-18 is connected	R134	R135
KCT-18 cannot be connected	Enable	Enable
Power on/off and Horn Alert or AUX-A on/off	Disable	Enable
Horn Alert or AUX-A on/off	Enable	Disable
Power cannot be turned on	Disable	Disable

Table 1 R134 and R135 setup chart

## INSTALLATION

### 4. PA/HA Unit (KAP-1 : Option)

#### 4-1. Installing the KAP-1 in the Transceiver

The Horn Alert (max. 2A drive) and Public Address functions are enabled by inserting the KAP-1 W1 (3P; white/black/red) into CN3 on the TX-RX unit (A/2), inserting W2 (3P; green) into CN7 on the TX-RX unit (A/2), and connecting the KCT-19 (option) to CN2 and CN3 of the KAP-1.

##### • Installation procedure

1. Open the upper case of the transceiver.
2. Insert the two cables ( ❶ ) with connectors from the KAP-1 switch unit into the connectors on the transceiver.
3. Secure the switch unit board to the chassis with a screw ( ❷ ). The notch ( ❸ ) in the board must be placed at the front left side.
4. Attach the cushion on the top of the KAP-1 switch unit.

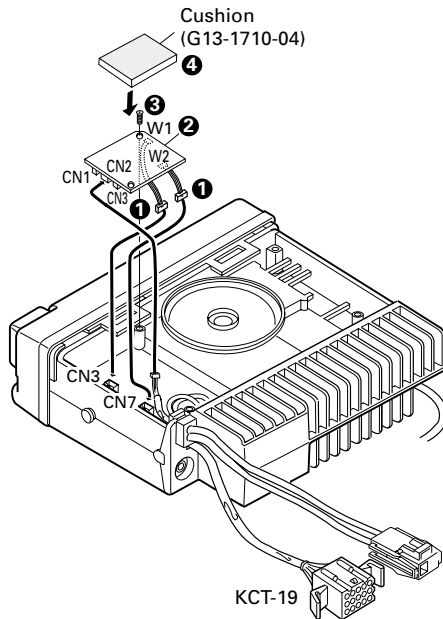


Fig. 5

#### 4-2. Modifying the Transceiver

##### • Horn alert

The signal from pin 4 of IC9 on the TX-RX unit (A/2) turns Q5 and Q1 on and off and drives KAP-1 HA relay K2 to drive the horn with a maximum of 2A.

The default output is HR1. The relay open output can be obtained between HR1 and HR2 by removing R1 in the KAP-1.

	R1	Output form
HR1 (Default)	Enable	
HR2	Disable	

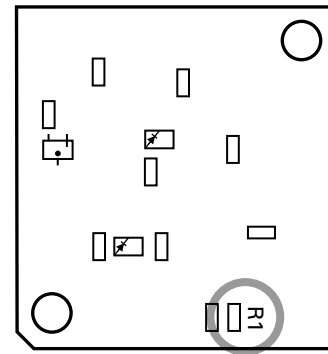


Fig. 6 KAP-1 foil side view

##### • Public address

The signal from pin 13 of IC9 on the TX-RX unit (A/2) drives PA relay K1 in the KAP-1 and switches the audio power amplifier output between the external PA system (through KCT-19) and internal and external speakers.

To use the PA function, R153 on the TX-RX unit (A/2) must be removed.

	R153
Use the PA function	Disable
Do not use the PA function	Enable

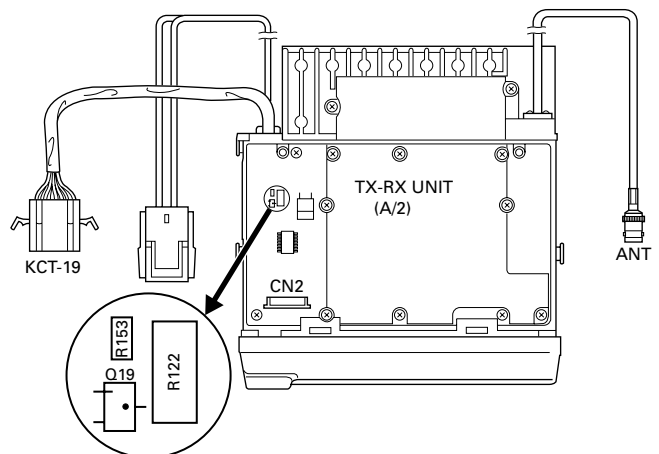


Fig. 7

## INSTALLATION

### • Others

If the PA and HR2 are not necessary and the speaker output is output to an external unit through the KCT-19, connect the KCT-19 C connector to CN8 on the TX-RX unit (A/2).

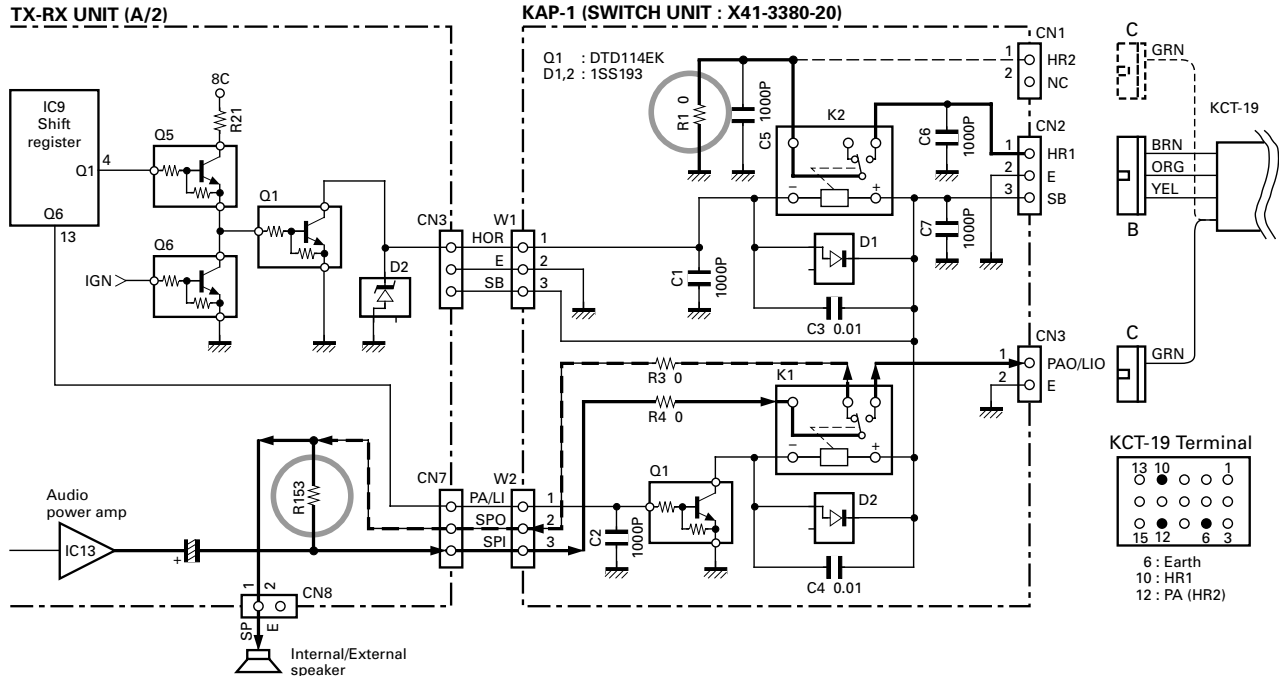


Fig. 8

## 5. Emergency Mode

### 5-1. Transceiver Modification Procedure

#### • Install the foot switch

Install the foot switch through the KCT-19 and KCT-18. When the switch is treaded on, the radio enters the emergency mode.

#### • Change the power switch circuit

TX-RX unit (B/2) : Control section  
 \$R705 : Attach (R92-1252-05, 0Ω)

TX-RX unit (A/2) : RF section  
 R142 : Remove (RK73GB1J473J, 47kΩ)

Once the transceiver is modified, it cannot be turned on and off with the power switch. The power switch turns the LCD backlight and display on and off. (The power is switched on and off by IGNITION SENSE.)

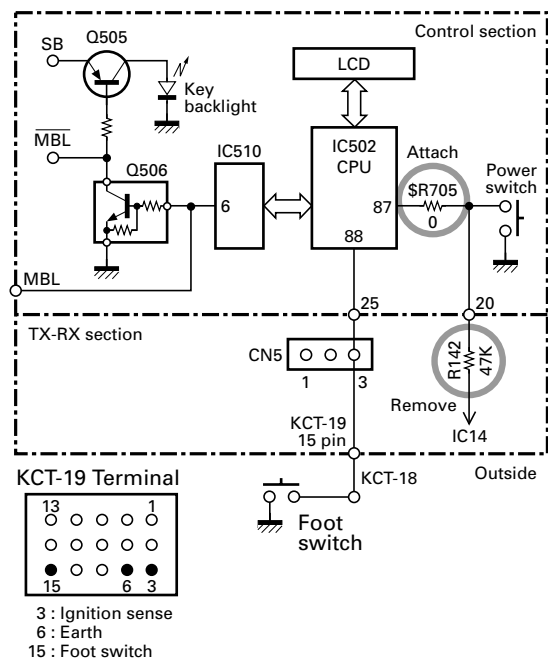


Fig. 9

## INSTALLATION

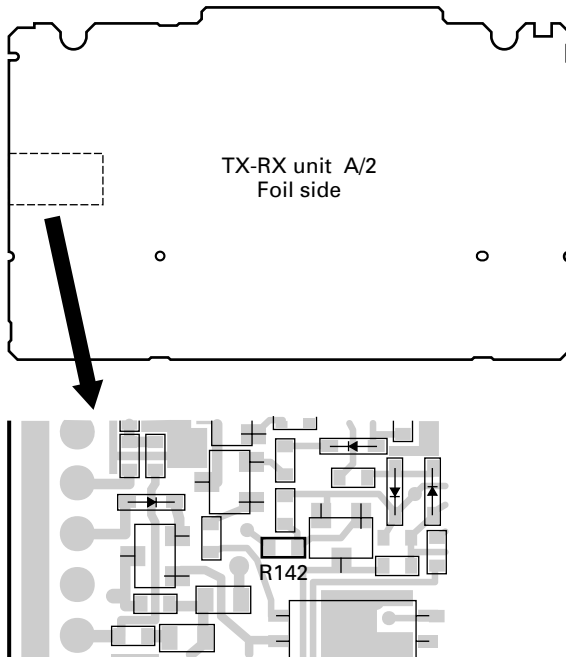
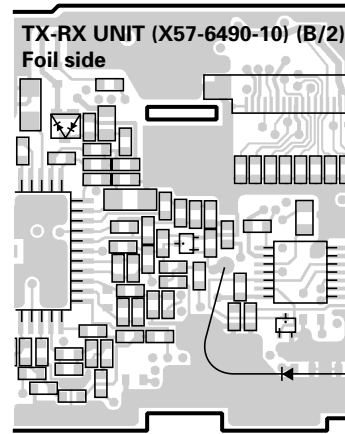
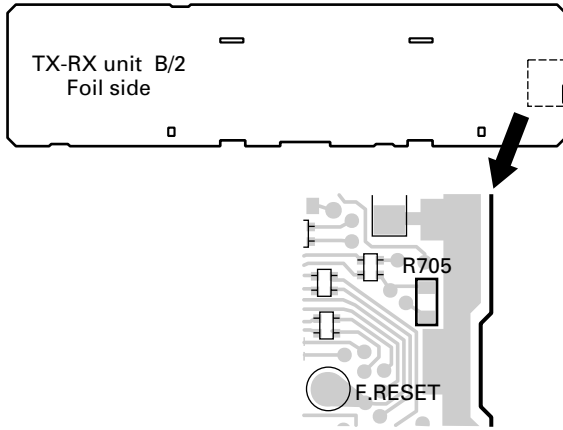


Fig. 10

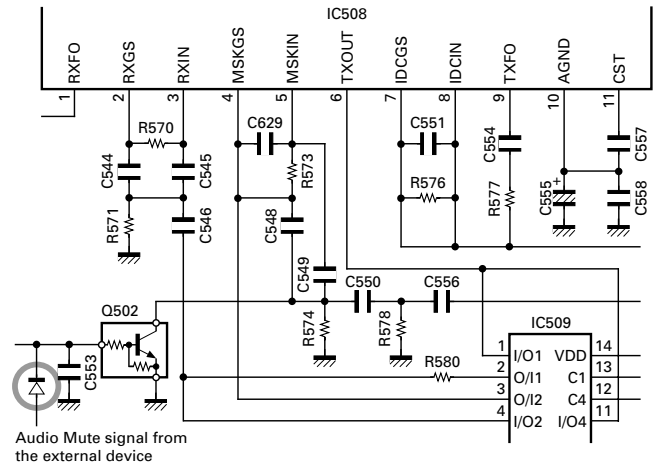


Fig. 11

### 7. Fitting the Control Panel Upside Down

The TK-863G control panel can be fitted upside down, so the transceiver can be mounted with its internal speaker (in the upper half of the case) facing down in your car.

1. Remove the control panel and the TX-RX unit (B/2) control section. (Fig. 12)

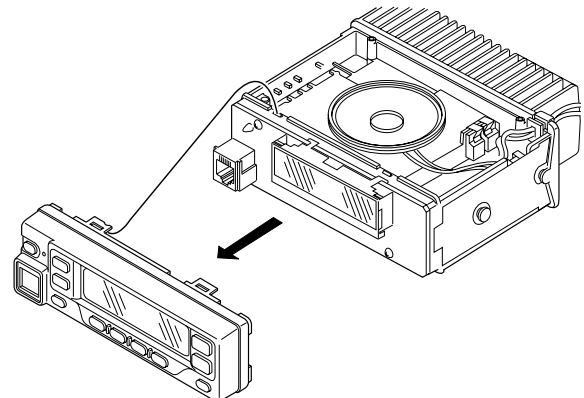


Fig. 12

### 6. Audio Mute

When the transceiver is connected to external devices, you can control the receiving audio signal using the Audio mute signal of the external device. If you mute the receiving audio signal using this modification, the transceiver does not mute the "Audible User Feedback Tones".

#### 6-1. Transceiver Modification Procedure

Solder the lead of a silicon diode to the base of Q502 on the TX-RX unit (B/2). If you connect this line to the Audio Mute signal of the external device using this diode, the audio signal of the receiver can be controlled.



## INSTALLATION

2. Fold the flat cable ( ❶ ) in the opposite direction ( ❷ ).
3. Rotate the control section ( ❸ ) 180 degrees ( ❹ ).
4. Insert the flat cable into the control section connector, CN501 ( ❺ ).
5. Mount the control section on the transceiver ( ❻ ).

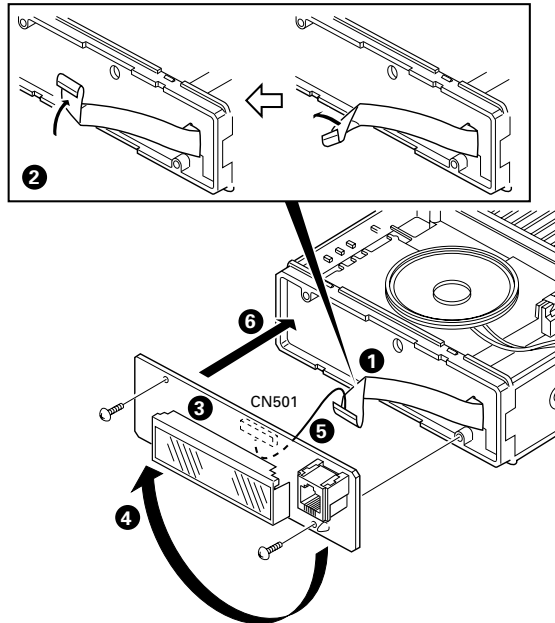


Fig. 13

6. Rotate the control panel 180 degrees and mount it on the transceiver. Refit the two halves of the case to complete installation. (Fig. 14)

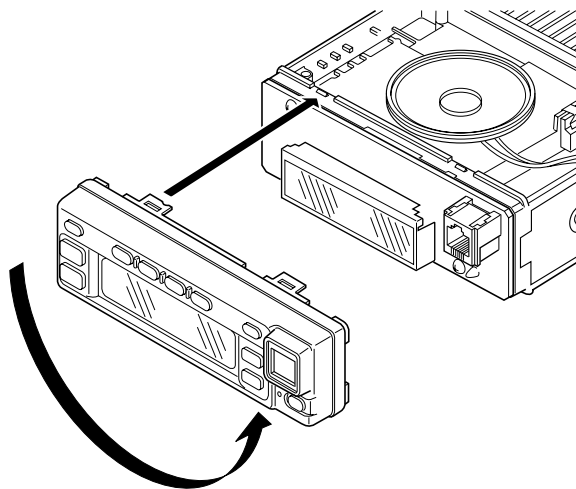


Fig. 14

### 8. External Speaker

#### 8-1. KES-3 : Option

The KES-3 is an external speaker for the 3.5-mm-diameter speaker jack.

##### • Connection procedure

1. Connect the KES-3 to the 3.5-mm-diameter speaker jack on the rear of the transceiver.

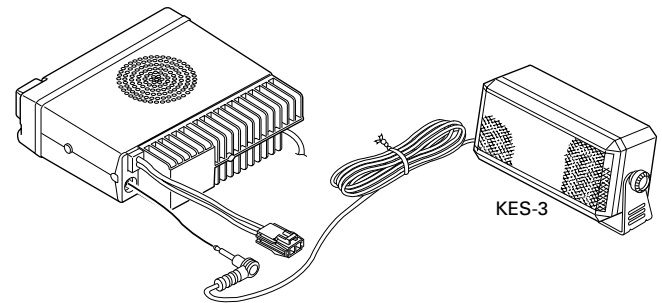


Fig. 15

#### 8-2. KES-4 : Option

The KES-4 is an external speaker used with the accessory connection cable.

##### • Connection procedure

1. Install the KCT-19 in the transceiver. (See the KCT-19 section.)
2. Insert the crimp terminal into the square plug supplied with the KCT-19.
3. Connect CN8 of the transceiver to connector C of the KCT-19 instead of to the internal speaker connector.

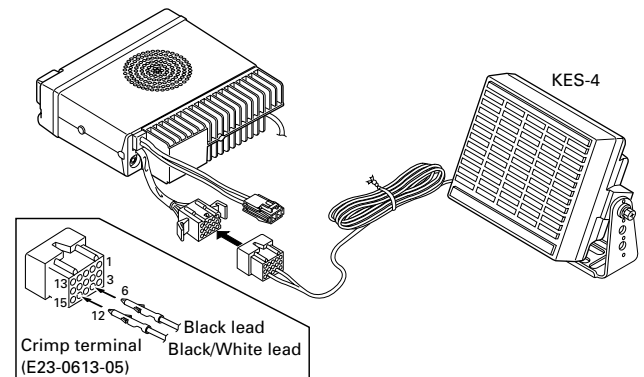


Fig. 16

## CIRCUIT DESCRIPTION

### Frequency Configuration

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

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

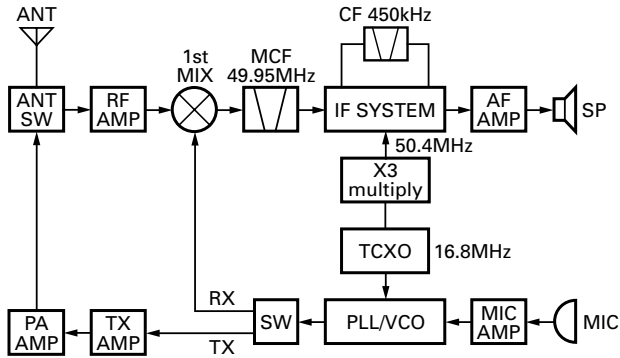


Fig. 1 Frequency configuration

### Receiver System

The receiver is double conversion superheterodyne. The frequency configuration is shown in Figure 1.

#### ■ Front-end RF Amplifier

An incoming signal from the antenna is applied to an RF amplifier (Q34) after passing through a transmit/receive switch circuit (D33 and D34 are off) and a BPF (L22 : two-pole helical resonators). After the signal is amplified (Q34), the signal is filtered by a BPF (L13 : two-pole helical resonators) to eliminate unwanted signals before it is passed to the first mixer. Band pass filters (L22 and L13) have varactor diodes (D28, D31, D18 and D23).

The voltage of these diodes are controlled by to track the CPU (IC502) center frequency of the band pass filter. (See Fig. 2)

#### ■ First Mixer

The signal from the RF amplifier is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer (Q15) to create a 49.95MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through one pair of monolithic crystal filter (MCF : XF1) to further remove spurious signals.

#### ■ IF Amplifier

The first IF signal is amplified by Q13, and the enters IC5 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within IC5 to create a 450kHz second IF signal. The second IF signal is then fed through a 450kHz ceramic filter (Narrow : CF1, Wide : CF2) to further eliminate unwanted signals before it is amplified and FM detected in IC5.

Item	Rating
Nominal center frequency	49.95MHz
Pass bandwidth	±5.0kHz or more at 3dB
35dB stop bandwidth	±20.0kHz or less
Ripple	1.0dB or less
Insertion loss	5.0dB or less
Guaranteed attenuation	80dB or more at fo±1MHz
	Spurious : 40dB or more within fo±1MHz
Terminal impedance	350Ω±5% / 5.5pF±0.5pF

Table 1 Crystal filter (L71-0551-25) : XF1

Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	±4.5kHz or more
50dB bandwidth	±10.0kHz or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	55.0dB or more within fo±100kHz
Terminal impedance	2.0kΩ

Table 2 Ceramic filter (L72-0994-05) : CF1

Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	±6.0kHz or more
50dB bandwidth	±12.5kHz or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	35.0dB or more within fo±100kHz
Terminal impedance	2.0kΩ

Table 3 Ceramic filter (L72-0993-05) : CF2

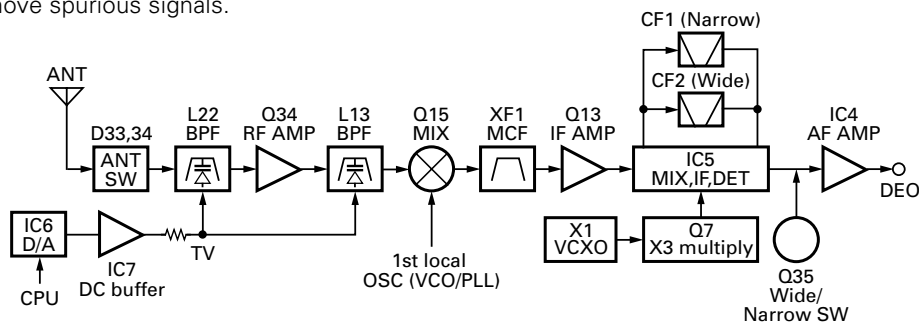


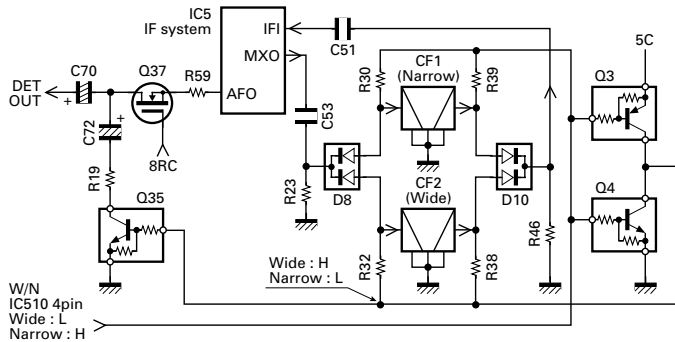
Fig. 2 Receiver system

## CIRCUIT DESCRIPTION

### Wide/Narrow Changeover Circuit

The W/N port (pin 4) of the shift register (IC510) is used to switch between ceramic filters. When the W/N port is high, Q4 turns on and the ceramic filter SW diode (D8, D10) CF1 turns on to receive a Narrow signal. At the same time, Q35 turns on and one of the filters is selected so that the wide and narrow audio output levels are equal.

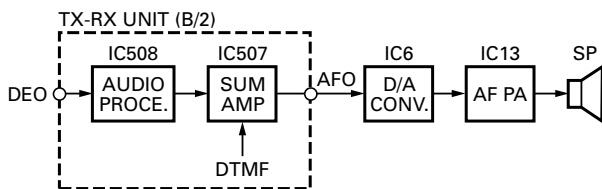
When the W/N port is low, Q3 turns on and the ceramic filter SW diode (D8, D10) CF2 turns on to receive a Wide signal.



**Fig. 3 Wide/Narrow changeover circuit**

### AF Signal System

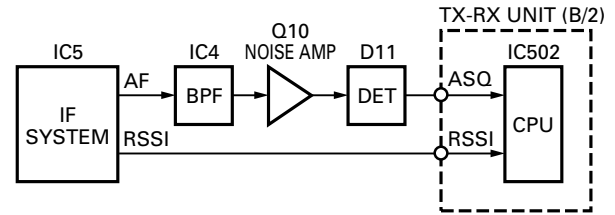
The detection signal (DEO) from the TX-RX unit (A/2) goes to the audio processor (IC508) of the TX-RX unit (B/2). The signal passes through a filter in the audio processor to adjust the gain, and is output to IC507. IC507 sums the AF signal and the DTMF signal, BEEP signal and returns the resulting signal to the TX-RX unit. The signal (AFO) sent to the TX-RX unit (A/2) is input to the D/A converter (IC6). The AFO output level is adjusted by the D/A converter. The signal output from the D/A converter is input to the audio power amplifier (IC13). The AF signal from IC13 switches between the internal speaker and speaker jack (J1) output.



**Fig. 4 AF signal system**

### Squelch Circuit

The detection output from the FM IF IC (IC5) passes through a band-pass filter and a noise amplifier (Q10) in the TX-RX unit (B/2) to detect noise. A voltage is applied to the CPU (IC502). The CPU controls squelch according to the voltage (ASQ) level. The signal from the RSSI pin of IC5 is monitored. The electric field strength of the receive signal can be known before the ASQ voltage is input to the CPU, and the scan stop speed is improved.



**Fig. 5 Squelch circuit**

### PLL Frequency Synthesizer

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

### PLL

The VCO output is doubled by Q9 and then sent to the PLL IC (IC3). The frequency step of the PLL circuit is 10 or 12.5kHz. A 16.8MHz reference oscillator signal is divided at IC3 by a fixed counter to produce the 10 or 12.5kHz reference frequency. The voltage controlled oscillator (VCO) output signal is buffer amplified by Q106 (Sub-unit), then divided in IC3 by a dual-module programmable counter. The divided signal is compared in phase with the 10 or 12.5kHz reference signal in the phase comparator in IC3. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency. (See Fig. 6)

### VCO

The TK-863G has VCO in a Sub-unit (A1) housed in a solid shielded case and connected to the TX-RX unit (A/2) through CN101.

The operating frequency is generated by Q103 in transmit mode and Q101 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D102 and D104 in transmit mode and D101 and D103 in receive mode). The RX (ST) pin is set low in receive mode causing Q102 to turn Q103 off, and turn Q101 on. The RX (ST) pin is set low in transmit mode. The outputs from Q101 and Q103 are amplified by Q106 and sent to the buffer amplifiers.

## CIRCUIT DESCRIPTION

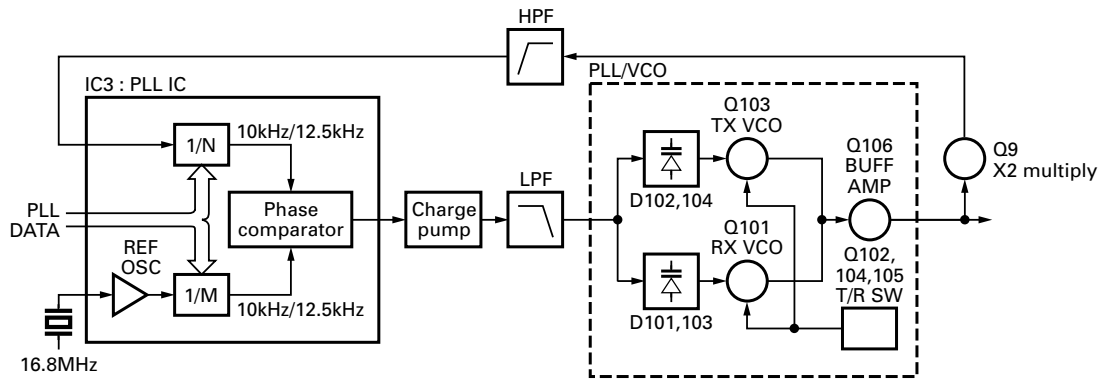


Fig. 6 PLL circuit

### Unlock Circuit

During reception, the 8RC signal goes high, the 8TC signal goes low, and Q16 turns on. Q18 turns on and a voltage is applied to the collector (8R). During transmission, the 8RC signal goes low, the 8TC signal goes high and Q29 turns on. Q28 turns on and a voltage is applied to 8T.

The CPU in the TX-RX unit (B/2) monitors the PLL (IC3) LD signal directly. When the PLL is unlocked during transmission, the PLL LD signal goes low. The CPU detects this signal and makes the 8TC signal low. When the 8TC signal goes low, no voltage is applied to 8T, and no signal is transmitted.

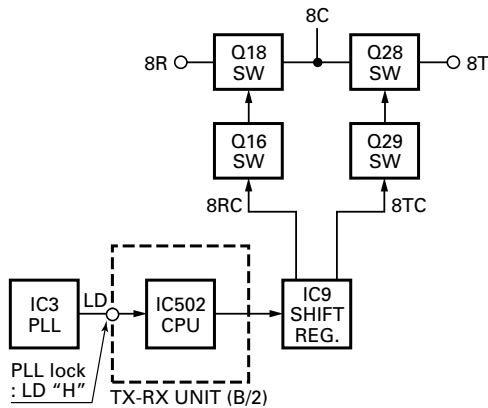


Fig. 7 Unlock circuit

### Transmitter System

#### Outline

The transmitter circuit produces and amplifies the desired frequency directly. It FM-modulates the carrier signal by means of a varicap diode

#### Power Amplifier Circuit

The transmit output signal from the VCO is amplified to a specified level of the power module (IC400) by the drive block (Q22, Q25 and Q27). The amplified signal passes through the transmission/reception selection diode (D16) and goes to a low-pass filter. The low-pass filter removes unwanted high-frequency harmonic components, and the resulting signal is goes the antenna terminal.

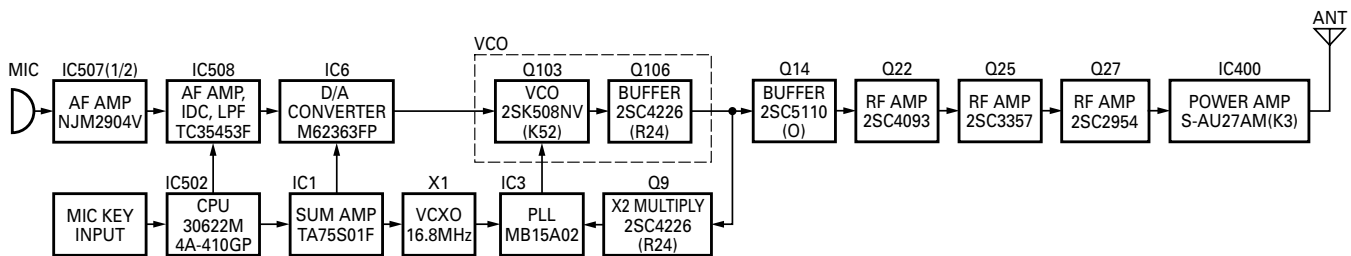


Fig. 8 Transmitter system

## CIRCUIT DESCRIPTION

### ■ APC Circuit

The automatic transmission power control (APC) circuit detects part of a power module output with a diode (D35, D36) and applies a voltage to IC15. IC15 compares the APC control voltage (PC) generated by the D/A converter (IC6) and DC amplifier (IC7) with the detection output voltage to control Q31 and Q32, generates DB voltage from B voltage, and stabilizes transmission output.

The APC circuit is configured to protect over current of the power module due to fluctuations of the load at the antenna end and to stabilize transmission output at voltage and temperature variations.

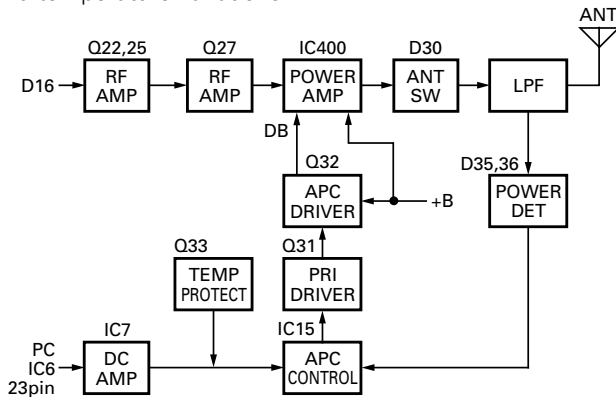


Fig. 9 APC circuit

### Control Circuit

The CPU carries out the following tasks:

- 1) Controls the shift register (IC9, IC510) AF MUTE, WIDE/NARROW, T/R KEY outputs.
- 2) Adjusts the AF signal level of the audio processor (IC508) and turns the filter select compounder on or off.
- 3) Controls the DTMF decoder (IC511).
- 4) Controls the LCD assembly display data.
- 5) Controls the PLL (IC3).
- 6) Controls the D/A converter (IC6) and adjusts the volume, modulation and transmission power.

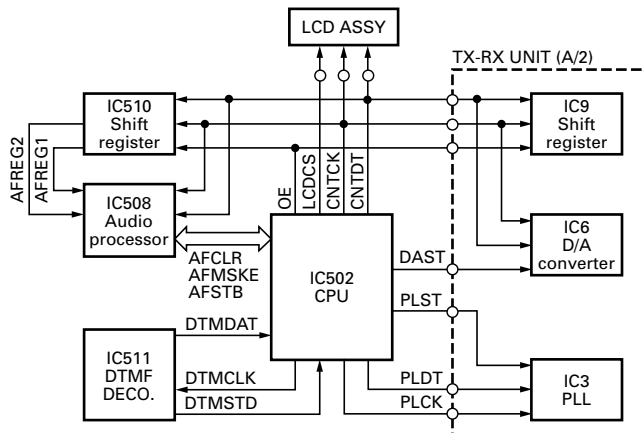


Fig. 10 Control circuit

### ■ Memory Circuit

The transceiver has a 2M-bit (256k x 8) flash ROM (IC501) and an 8k-bit EEPROM (IC505). The flash ROM contains firmware programs, data and user data which is programmed with the FPU. The EEPROM contains adjustment data. The CPU (IC502) controls the flash ROM through an external address bus and an external data bus. The CPU controls the EEPROM through two serial data lines.

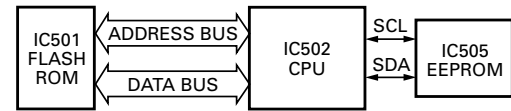


Fig. 11 Memory circuit

### ■ Display Circuit

The CPU (IC502) controls the shift register (IC510) and display LEDs. When the LED1 line goes high when the transceiver is busy, Q508 turns on and the green LED on D521 lights. In transmit mode, the LED0 line goes high, Q504 turns on and the red light lights. Backlighting LEDs for the key operation unit (D509~D514) and LCD are provided.

When the MBL line goes high, Q506 turns on, then Q505 turns on, and the key illumination LED lights. A voltage is applied to the MBL line to turn on the LCD backlight.

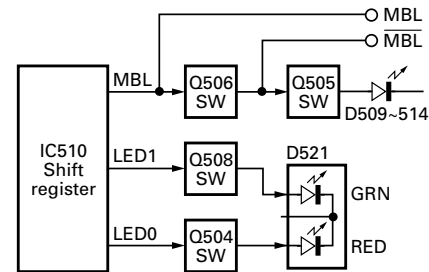


Fig. 12 Display circuit

### ■ Key Matrix Circuit

The TK-8603G front panel has function keys. Each of them is connected to a cross point of a matrix of the KIN0 to KOUT2 ports of the microprocessor. The KOUT0 to KOUT2 ports are always high, while the KIN0 to KIN2 ports are always low.

The microprocessor monitors the status of the KIN0 to KOUT2 ports. If the state of one of the ports changes, the microprocessor assumes that the key at the matrix point corresponding to that port has been pressed.

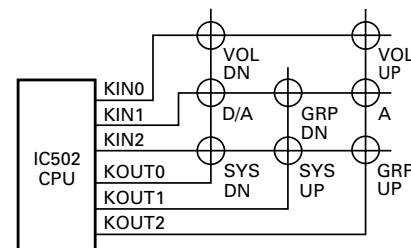


Fig. 13 Key matrix circuit

## CIRCUIT DESCRIPTION

### ■ Encode

The LTR, QT and DQT signals are output from TO of the CPU (IC502) and summed with the external pin DI line by the summing amplifier (IC2) and the resulting signal goes to the D/A converter (IC6) of the TX-RX unit (A/2). The DTMF signal is output from DTMF of the CPU and goes to the audio processor (IC508). The signal is summed with a MIC signal by the audio processor (IC508), and the resulting signal passes through an analog switch (IC509) and goes to the TX-RX unit (A/2) (MO).

The D/A converter (IC6) adjusts the MO level and the balance between the MO and TO levels. Part of a TO signal is summed with MO and the resulting signal goes to the MD pin of the VCO. This signal is applied to a varicap diode in the VCO for direct FM modulation.

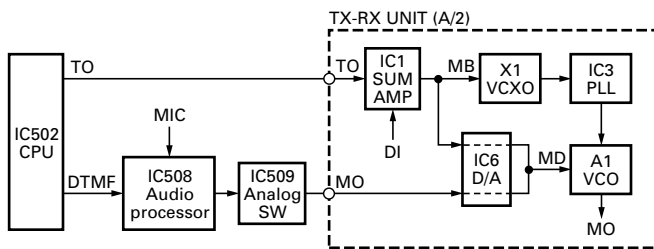


Fig. 14 Encode

### ■ Decode

#### • QT/DQT/LTR

The signal (DEO) detected by the TX-RX unit (B/2) passes through two low-pass filters of IC513, goes to TOI of the CPU (IC502) to decode QT, DQT and LTR.

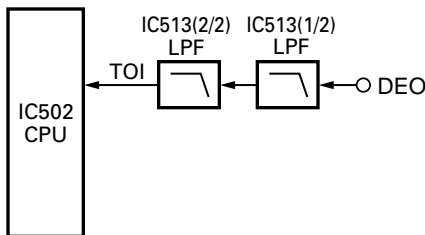


Fig. 15 Decode

### ■ D/A Converter

The D/A converter (IC6) is used to adjust TONE and MO modulation, AF volume, TV voltage, FC reference voltage, and PC power control voltage level.

Adjustment values are sent from the CPU as serial data. The D/A converter has a resolution of 256 and the following relationship is valid:

$$\text{D/A output} = (\text{Vin} - \text{VDAref}) / 256 \times n + \text{VDAref}$$

Vin: Analog input

VDAref: D/A reference voltage

n: Serial data value from the microprocessor (CPU)

### Power Supply Circuit

When the POWER switch on the TX-RX unit (B/2) is pressed, the PSW signal goes low. This signal is inverted by Q26 and sent to a flip-flop IC (IC14). This IC outputs a control signal when the PSW goes low. When the power turns on, pin 1 of IC14 outputs a low signal and Q20 turns on. The base of Q19 goes high, Q19 turns on, SB SW (Q23) turns on and power (SB) is supplied to the set.

This circuit has an overvoltage protection circuit. If a DC voltage of 20 V or higher is applied to the power cable, D21 turns on and a voltage is applied to the base of Q21. This voltage turns Q21 on and turns Q19 and SBSW off.

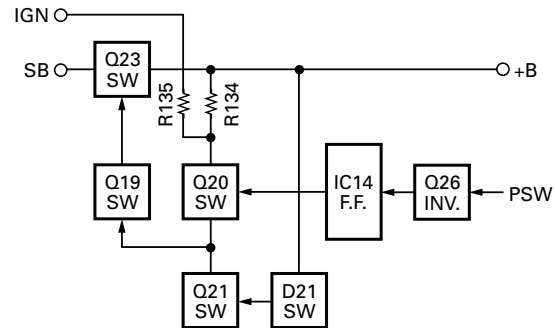


Fig. 16 Power supply circuit

## SEMICONDUCTOR DATA

## Microprocessor : 30622M4A-410GP (TX-RX Unit IC502)

## ■ Terminal function

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	EMGT	O	External MIC control. Mobile MIC : H	39	HOLD	I	Not used.
2	DTMF	O	DTMF/BEEP output.	40,41	NC	-	NC.
3	2TN	-	Not used.	42	RD	O	READ signal.
4	DTMSTD	I	DTMF decode detect. Detect : H	43	NC	-	NC.
5	SIM	I	Destination select.	44	WR	O	WRITE signal.
6	BYTE	I	+5V (5C).	45	LCDCS	O	LCD chip enable output.
7	CNVSS	I	GND.	46	CNTDAT	O	Common data output. (LCD, SHIFT REG, VOL, Audio processor)
8	AFSTB	O	Base band IC strobe/reset output.	47	CNTCLK	O	Common clock output. (EEPROM, LCD, SHIFT REG, VOL, Audio processor)
9	AFFCLK	O	Base band IC frame detect reset/ system reset output.	48	CSO	-	Chip select signal.
10	RESET	I	Reset.	49	A19	-	Not used.
11	XOUT	O	Clock output.	50~59	A18~A9	-	Flash memory address bus.
12	VSS	-	GND.	60	ACC	-	+5V.
13	XIN	I	Clock input.	61	A8	-	Flash memory address bus.
14	VCC	-	+5V.	62	VSS	-	GND.
15	NC	I	Pull up.	63~70	A7~A0	-	Flash memory address bus.
16	MICDAT	I/O	MIC data input/output.	71~73	KIN0~KIN2	I	Key scan input.
17	AUX3	O	Squelch detect output.	74	MON	I	[MON] key input. On : L
18	NC	-	NC.	75	SCN	I	[SCN] key input. On : L
19	OE	I	Output enable control sift register.	76	PLLUL	I	PLL unlock detect input. Unlock : L
20	NC	-	NC.	77	PLLSTB	O	PLL strobe output. Latch : H
21	EEPDAT	I/O	EEPROM data input/output.	78	MUTE	I	RX audio mute. Mute : H
22	TO	O	QT/DQT/LTR modulation output.	79~86	D7~D0	-	Flash memory data bus.
23	AUX1	I	External PTT input.	87	PWR (EMG)	I	[PWR] key input (key interrupt). On : L
24	SFTSTB1	O	Shift register strobe output.	88	EMG/TXS	I	Emergency input (key interrupt). On : L
25	DACSTB	O	D/A converter enable output.	89	RFDAT	O	PLL data output.
26	PTT	I	PTT. PTT on : L	90	RFCLK	O	PLL clock output.
27,28	NC	-	NC.	91	NC	-	NC.
29	AUX4	O		92	RSSQL	I	Receive signal strength indicator input.
30	AUX2	I/O		93	ANLSQL	I	Analog squelch level input.
31	PA	O	MIC audio line sw control. PA : H	94	AVSS	-	GND.
32	KOUT2	O	Key scan output 2.	95	TOI	I	QT/DQT/LTR signal input.
33	TXD	O	Serial data. PTT on : L	96	VREF	-	Reference voltage input.
34	HOOK	I	HOOK/RXD. On hook : L	97	AVCC	-	+5V.
35	KOUT1	O	Key scan output 1.	98	DTMPD	-	Not used.
36	KOUT0	O	Key scan output 0.	99	DTMCLK	-	Not used.
37	RDY	I	Pull up.	100	DTMDAT	-	Not used.
38	NC	-	NC.				

## SEMICONDUCTOR DATA / DESCRIPTION OF COMPONENTS

### Shift Register : BU4094BCFV

#### ■ Terminal function (TX-RX unit IC510)

Pin No.	Port	Name	Function
4	Q1	W/N	Wide/Narrow SW. Narrow : H
5	Q2	MUTE	MIC mute (M models only). Mute : H
6	Q3	MBL	MIC/LCD backlight control. Backlight on : H
7	Q4	LED0	Red LED. LED lights : H
11	Q8	BSHIFT	Beat shift. Shift on : H
12	Q7	AFREG2	Base band IC inter register select 2.
13	Q6	AFREG1	Base band IC inter register select 1.
14	Q5	LED1	Green LED. LED lights : H

#### ■ Terminal function (TX-RX unit IC9)

Pin No.	Port	Name	Function
4	Q1	HNC	Horn alert control. Horn alert on : H
5	Q2	8RC	8R control. RX : H
6	Q3	8TC	8T control. TX : H
7	Q4	SPMUTE	Speaker mute control. Mute on : H
11	Q8	AUX6	Auxiliary output.
12	Q7	AUX5	
13	Q6	PA/LI	PA/LIGHT control. PA/LIGHT on : H
14	Q5	RX	TX/RX VCO switch. RX : L

### DESCRIPTION OF COMPONENTS

#### Display Unit (X54-3270-10)

Ref. No.	Use/Function	Operation/Condition
D801	Reverse current prevention	
D802~805	Light emission	
D808	Current stability	
IC801	LCD driver	
Q801	DC switch (LED)	

#### TX-RX Unit (X57-6490-10)

Ref. No.	Use/Function	Operation/Condition
D1	Surge absorption	
D2	Voltage reference	
D3~5	Surge absorption	
D8	IF switch (Wide/Narrow)	
D9	DC switch	
D10	IF switch (Wide/Narrow)	
D11	Noise amp detect	
D14	Surge absorption	
D15	OR gate	SP mute, AM
D16	RF switch (TX/RX)	Heterodyne
D17	Temperature compensation	Drive
D18	RF BPF tuning	
D19	Surge absorption	
D20	Reverse current prevention	
D21	Voltage reference	
D23	RF BPF tuning	
D24	Voltage reference	
D25	Surge absorption	
D26	Reverse current prevention	
D27	Reverse current prevention	
D28	RF BPF tuning	
D30	ANT switch	
D31	RF BPF tuning	



## DESCRIPTION OF COMPONENTS

Ref. No.	Use/Function	Operation/Condition	Ref. No.	Use/Function	Operation/Condition
D33,34	ANT switch		IC9	Shift/Store register	HNC, 8RC, 8TC, SPMUTE, RX, PA/LI, AUX5, AUX6
D35,36	APC voltage detect		IC10	5V AVR	5C (TX/RX)
D39	Voltage reference	Power protection	IC11	9V AVR	9C
D40	Charge	DEO	IC12	8V AVR	8C
D41	Temperature compensation	APC	IC13	AF amplifier	
D42	Voltage drop	Charge pump	IC14	Power supply logic circuit control	
D54	Discharge		IC15	DC amplifier	APC control
D501	Reverse current prevention	KOUT 0	IC400	Power module	
D502	Reverse current prevention	KOUT 1	IC501	Flash ROM	
D503	Reverse current prevention	KOUT 2	IC502	CPU	
D504	Reverse current prevention	KOUT 0	IC503	Reset IC	Low voltage output when powering up
D506	Voltage discharger	When powering down	IC505	EEPROM	
D507	Reverse current prevention	KOUT 2	IC507	Amplifier	MIC, AFO
D508	Limiter	MIC	IC508	Audio processor	Compander, Mic amplifier, ALC, AF filter, IDC
D509~514	Key backlight	Active while MBL is H	IC509	Analog switch	MO, DEO, EMG, MI switch
D521	Busy/TX LED	Lights green while busy, red while TX	IC510	Shift/Store register	W/N, MM2, MBL, LED0, LED1, AFREG1, AFREG2, BSHIFT
D523	OR gate	MIC mute, MM, MM2	IC512	5V AVR	5C (Control)
D524	Surge absorption	HOOK/RXD	IC513	Amplifier	QT/DQT decode
D525	Surge absorption	PTT/TXD	Q1	DC switch	HOR
D526	Current protection		Q2	DC switch	5S
D527	Surge absorption	CM	Q3	DC switch (W/N)	Active when narrow is selected
D528	Surge absorption	MBL	Q4	DC switch (W/N)	Active when wide is selected
D529	Limiter	QT/DQT decode limiter	Q5	DC switch	HNC
IC1	Sum amplifier	DI, TO mixing	Q6	DC switch	IGN
IC2	DC amplifier	FC, TCXO control	Q7	Buffer amplifier	16.8MHz x 3
IC3	PLL synthesizer	Reference 16.8MHz, PLL lock : LD H	Q8	Lipple filter	8CL
IC4	Amplifier	DEO	Q9	Buffer amplifier	PLL f in, X2 multiply
IC5	AF demodulation	Quadrature detector, 2nd mixer, OSC, IF amplifiler, RSSI	Q10	Noise amplifier	Squelch
IC6	D/A converter		Q11	Charge pump	øP
IC7	DC amplifier	PC/TV control	Q12	Charge pump	øR
			Q13	IF amplifier	49.95MHz
			Q14	Buffer amplifier	Heterodyne
			Q15	Mixer	
			Q16	DC switch	8R cont, On at RX

## DESCRIPTION OF COMPONENTS

Ref. No.	Use/Function	Operation/Condition
Q17	AF mute	Active while AF mute is active
Q18	DC switch	8R, active while RX
Q19,20	DC switch	SB switch, active when power up
Q21	DC switch	Active while PS voltage is more than 20V
Q22	RF amplifier	
Q23	DC switch	SB switch, active while power on
Q24	AF mute	Active while power switch is off
Q25	RF amplifier	Pre-drive
Q26	Inverter	Active while power switch is low
Q27	RF amplifier	Drive
Q28	DC switch	8T, active on TX
Q29	DC switch	8T cont, active on TX
Q31	APC controller	
Q32	APC controller	DB
Q33	APC controller	Power protection
Q34	L.N.A.	
Q35	W/N switch	Active on narrow
Q36	DC switch	Power protection
Q37	AF mute switch	Inactive on mute
Q38	DC switch	5S
Q501	Clock switch shift	Clock shift is active while BSHIFT is H
Q502	AF mute	Active while MUTE is H

Ref. No.	Use/Function	Operation/Condition
Q503	Inverter	Active while PA2 is H, public address is active
Q504	LED switch (Red)	Active while LED0 is H, TX is active
Q505,506	Key backlight switch	Active while MBL is H
Q508	LED switch (Green)	Active while LED1 is H, RX is active
Q509	MIC mute	Active while MM is H and MM2 is H

## PLL/VCO (X58-4670-17)

Ref. No.	Use/Function	Operation/Condition
D101	RX VCO	
D102	TX VCO	
D103	RX VCO	
D104	TX VCO	
D105	Modulation	
Q101	Oscillator	RX
Q102	Inverter	Active while ST is H
Q103	Oscillator	TX
Q104	TX/RX switch (TX)	Active while ST is H
Q105	TX/RX switch (RX)	Active while Q102 is off
Q106	Buffer amplifier	

## PARTS LIST

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

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

**TK-863G**  
**DISPLAY UNIT (X54-3270-10)**  
**TX-RX UNIT (X57-6490-10)**

Ref. No.	Address	New parts	Parts No.	Description	Destination
<b>TK-863G</b>					
1	1B		A01-2165-23	CABINET (UPPER)	
2	2A		A01-2166-23	CABINET (BOTTOM)	
3	2A		A62-0642-03	PANEL ASSY	
5	1D		B09-0235-05	CAP                    ACCESSORY	
6	2B		B11-1226-03	ILLUMINATION GUIDE	
7	2A		B38-0868-05	LCD	
8	2D		B62-1577-00	INSTRUCTION MANUAL	
9	1C		B72-2025-04	MODEL NAME PLATE	
11	2B		E29-1179-04	INTER CONNECTOR	
12	1C		E30-2145-15	ANTENNA CABLE	
13	1D		E30-3339-05	DC CORD            ACCESSORY	
14	1C		E30-3340-05	DC CORD (RADIO)	
-	-		E30-3404-05	TRUNK CABLE	
16	1C		E37-0790-25	SPEAKER CABLE	
17	2B		E37-0815-05	FLAT CABLE	
-	-		F10-2280-12	SHIELDING COVER	
18	2B		F12-0435-04	CONDUCTIVE SHEET	
19	1D		F51-0016-05	FUSE (6*30)    10A	
20	1C		G02-0791-04	FLAT SPRING (AF,APC)	
21	1B		G02-0841-14	FLAT SPRING (BPF)	
22	1B,1C		G10-1221-04	FIBROUS SHEET (SIDE)	
23	1B		G10-1222-14	FIBROUS SHEET (UP,DOWN)	
24	1A,2A,2C		G10-1223-14	FIBROUS SHEET (CABINET)	
25	1C		G13-1468-04	CUSHION (DC CORD)	
26	1B		G13-1759-04	CUSHION (SPEAKER)	
27	2C		G53-0796-04	PACKING (PHONE JACK)	
30	3D		H10-6618-12	POLYSTYRENE FOAMED FIXTURE (F)	
31	2E		H10-6619-12	POLYSTYRENE FOAMED FIXTURE (R)	
32	1D		H12-1391-03	INNER PACKING CASE	
33	1E,2E		H25-0720-04	PROTECTION BAG (200X350)	
34	3E		H52-1519-02	ITEM CARTON CASE	
36	2D		J19-1584-05	MIC HOLDER        ACCESSORY	
37	2A		J21-8382-03	HARDWARE FIXTURE	
38	1D		J29-0627-23	BRACKET            ACCESSORY	
40	2A		K29-9140-02	KEY TOP	
A	2A,1B		N33-2606-45	OVAL HEAD MACHINE SCREW	
B	2C		N67-3008-46	PAN HEAD SEMS SCREW W	
C	2B,1C		N87-2606-46	BRAZIER HEAD TAPTITE SCREW	
D	2B		N87-2612-46	BRAZIER HEAD TAPTITE SCREW	
42	2D		N99-0395-05	SCREW SET        ACCESSORY	
44	1B		T07-0368-05	SPEAKER	
45	1D		T91-0621-05	MICROPHONE        ACCESSORY	
<b>DISPLAY UNIT (X54-3270-10)</b>					
D802-805		*	B30-2220-05	LED (YELLOW)	
C801-803			CC73GCH1H101J	CHIP C    100PF    J	
C804			CK73GF1A105Z	CHIP C    1.0UF        Z	
C805			CK73GB1H102K	CHIP C    1000PF    K	
C806,807			CK73GB1H471K	CHIP C    470PF        K	
CN801			E40-6020-05	PIN ASSY	

Ref. No.	Address	New parts	Parts No.	Description	Destination
L801			L92-0138-05	FERRITE CHIP	
R801-803			RK73GB1J103J	CHIP R    10K    J    1/16W	
R804			RK73GB1J473J	CHIP R    47K    J    1/16W	
R805			RK73GB1J474J	CHIP R    470K    J    1/16W	
R806			R92-1252-05	CHIP R    0 OHM    J    1/16W	
R808			RK73GB1J392J	CHIP R    3.9K    J    1/16W	
R809			RK73FB2A270J	CHIP R    27        J    1/10W	
D801			MA2S111	DIODE	
D808			DA204U	DIODE	
IC801			LC75823W	MOS IC	
Q801			2SB1132(Q,R)	TRANSISTOR	
<b>TX-RX UNIT (X57-6490-10)</b>					
D509-514			B30-2050-05	LED	
D521			B30-2151-05	LED (RED/GREEN)	
C1-11			CK73GB1H471K	CHIP C    470PF    K	
C13-19			CK73GB1H471K	CHIP C    470PF    K	
C20			C92-0507-05	CHIP-TAN 4.7UF    6.3WV	
C21			CK73GB1H471K	CHIP C    470PF    K	
C22			CK73GB1C104K	CHIP C    0.10UF    K	
C23,24			C92-0507-05	CHIP-TAN 4.7UF    6.3WV	
C25			CC73GCH1H060D	CHIP C    6.0PF     D	
C26			CK73GB1H471K	CHIP C    470PF    K	
C28			CC73GCH1H060D	CHIP C    6.0PF     D	
C29			C92-0507-05	CHIP-TAN 4.7UF    6.3WV	
C30			CC73GCH1H020B	CHIP C    2.0PF     B	
C31			CK73GB1H102K	CHIP C    1000PF    K	
C32			C92-0662-05	CHIP-TAN 15UF     6.3WV	
C33			CC73GCH1H220J	CHIP C    22PF      J	
C34			CK73GB1A105K	CHIP C    1.0UF     K	
C35			CK73GB1C104K	CHIP C    0.10UF    K	
C36			CK73GB1H102K	CHIP C    1000PF    K	
C37			CK73FB1C334K	CHIP C    0.33UF    K	
C39			CK73GB1C104K	CHIP C    0.10UF    K	
C40			CK73GB1H102K	CHIP C    1000PF    K	
C41			CK73GB1H103K	CHIP C    0.010UF    K	
C43			C92-0507-05	CHIP-TAN 4.7UF    6.3WV	
C44			CK73GB1H331K	CHIP C    330PF     K	
C45			CC73GCH1H470J	CHIP C    47PF      J	
C46			CK73GB1H103K	CHIP C    0.010UF    K	
C47			C92-0561-05	CHIP-ELE 22UF     16WV	
C49			CK73GB1H102K	CHIP C    1000PF    K	
C51			CK73GB1C104K	CHIP C    0.10UF    K	
C52			CC73GCH1H680J	CHIP C    68PF      J	
C53			CK73GB1C104K	CHIP C    0.10UF    K	
C54			CK73GB1H103K	CHIP C    0.010UF    K	
C55			CC73GCH1H010B	CHIP C    1.0PF     B	
C56			CC73GCH1H220J	CHIP C    22PF      J	
C58			CK73GB1E223K	CHIP C    0.022UF    K	
C60			CK73GB1H102K	CHIP C    1000PF    K	
C61			CC73GCH1H050C	CHIP C    5.0PF     C	
C62			CC73GCH1H101J	CHIP C    100PF     J	
C63			CK73GB1C104K	CHIP C    0.10UF    K	

## PARTS LIST

## TX-RX UNIT (X57-6490-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C64			CK73GB1H103K	CHIP C 0.010UF K		C135			CK73GB1H471K	CHIP C 470PF K	
C66			CK73GB1H102K	CHIP C 1000PF K		C138			CK73FB1E104K	CHIP C 0.10UF K	
C67			CK73GB1H471K	CHIP C 470PF K		C139,140			CK73GB1H471K	CHIP C 470PF K	
C68			CC73GCH1H101J	CHIP C 100PF J		C141			C92-0719-05	ELECTRO 47UF 25WV	
C69			CK73GB1C104K	CHIP C 0.10UF K		C142,143			CK73GB1H471K	CHIP C 470PF K	
C70			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C144			CK73GB1H102K	CHIP C 1000PF K	
C71			CC73GCH1H101J	CHIP C 100PF J		C145			CC73GCH1H070D	CHIP C 7.0PF D	
C72			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C146			CK73GB1H471K	CHIP C 470PF K	
C73			CC73GCH1H101J	CHIP C 100PF J		C148,149			CK73GB1H471K	CHIP C 470PF K	
C74,75			CK73GB1H471K	CHIP C 470PF K		C150			CK73FF1C105Z	CHIP C 1.0UF Z	
C77			C92-0561-05	CHIP-ELE 22UF 16WV		C152			CC73GCH1H060D	CHIP C 6.0PF D	
C78			CK73GB1C104K	CHIP C 0.10UF K		C153			CC73GCH1H040C	CHIP C 4.0PF C	
C79,80			CK73GB1H102K	CHIP C 1000PF K		C154			CK73GB1H102K	CHIP C 1000PF K	
C81			CK73GB1H471K	CHIP C 470PF K		C155			CC73GCH1H060D	CHIP C 6.0PF D	
C82			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C156			CK73GB1H471K	CHIP C 470PF K	
C83			CC73GCH1H270J	CHIP C 27PF J		C157			CK73GB1H102K	CHIP C 1000PF K	
C84			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C158			CK73GB1H471K	CHIP C 470PF K	
C86			C92-0662-05	CHIP-TAN 15UF 6.3WV		C160,161			C92-0719-05	ELECTRO 47UF 25WV	
C87			CC73GCH1H330J	CHIP C 33PF J		C162,163			CK73GB1H471K	CHIP C 470PF K	
C88			CK73GB1H103K	CHIP C 0.010UF K		C164			CK73GB1H102K	CHIP C 1000PF K	
C89			CK73GB1H471K	CHIP C 470PF K		C165			C92-0719-05	ELECTRO 47UF 25WV	
C91			CC73GCH1H020B	CHIP C 2.0PF B		C166			CE04EW1E471M	ELECTRO 470UF 25WV	
C92			CK73GB1H471K	CHIP C 470PF K		C167			CK73GB1H471K	CHIP C 470PF K	
C93			C92-0511-05	CHIP-TAN 0.15UF 35WV		C168			CC73GCH1H060D	CHIP C 6.0PF D	
C94-96			CK73GB1H471K	CHIP C 470PF K		C169			CK73GB1H471K	CHIP C 470PF K	
C97			C92-0546-05	CHIP-TAN 68UF 6.3WV		C172			CE04EW1E471M	ELECTRO 470UF 25WV	
C98			CK73GB1H103K	CHIP C 0.010UF K		C173			CK73GB1C104K	CHIP C 0.10UF K	
C99			C92-0588-05	CHIP-TAN 1.5UF 16V		C174			CK73GB1H471K	CHIP C 470PF K	
C100			CC73GCH1H020B	CHIP C 2.0PF B		C177			CC73FCH1H220J	CHIP C 22PF J	
C101			CK73GB1H471K	CHIP C 470PF K		C178			CC73GCH1H060D	CHIP C 6.0PF D	
C102			CC73GCH1H020B	CHIP C 2.0PF B		C179			CK73GB1H471K	CHIP C 470PF K	
C103			CK73GB1H471K	CHIP C 470PF K		C181,182			CK73GB1H471K	CHIP C 470PF K	
C104			C92-0001-05	CHIP C 0.1UF 35WV		C183			CK73GB1C104K	CHIP C 0.10UF K	
C105			CK73GB1H471K	CHIP C 470PF K		C185			CK73GB1C104K	CHIP C 0.10UF K	
C106			CC73GCH1H180J	CHIP C 18PF J		C186			CK73GB1H471K	CHIP C 470PF K	
C107			CK73GB1H471K	CHIP C 470PF K		C187			CC73GCH1H060D	CHIP C 6.0PF D	
C108			CC73GCH1H020B	CHIP C 2.0PF B		C189,190			CK73GB1H471K	CHIP C 470PF K	
C109			CK73GB1H471K	CHIP C 470PF K		C191			CK73GB1C104K	CHIP C 0.10UF K	
C110			CC73GCH1H070D	CHIP C 7.0PF D		C192			C92-0719-05	ELECTRO 47UF 25WV	
C111			CC73GCH1H030C	CHIP C 3.0PF C		C195			CK73GB1C104K	CHIP C 0.10UF K	
C112			CK73GB1H471K	CHIP C 470PF K		C196,197			CK73GB1H471K	CHIP C 470PF K	
C113			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C198			C92-0719-05	ELECTRO 47UF 25WV	
C114			C92-0697-05	CHIP-TAN 3.3UF 16WV		C201			CK73GB1H471K	CHIP C 470PF K	
C115			CK73GB1H471K	CHIP C 470PF K		C202			CK73GB1C104K	CHIP C 0.10UF K	
C116			CK73GB1H103K	CHIP C 0.010UF K		C203			CK73GB1H471K	CHIP C 470PF K	
C117			CK73GB1H102K	CHIP C 1000PF K		C204			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C118			CK73GB1H471K	CHIP C 470PF K		C206			CK73GB1H102K	CHIP C 1000PF K	
C119			CK73GB1H103K	CHIP C 0.010UF K		C207			CK73GB1H103K	CHIP C 0.010UF K	
C120			CC73GCH1H040C	CHIP C 4.0PF C		C208			CC73GCH1H050C	CHIP C 5.0PF C	
C121			CK73GB1H471K	CHIP C 470PF K		C209			CC73FCH1H050C	CHIP C 5.0PF C	
C122,123			CK73GB1C104K	CHIP C 0.10UF K		C210			CK73GB1H103K	CHIP C 0.010UF K	
C125			C92-0005-05	CHIP-TAN 2.2UF 6.3WV		C211			CC73GCH1H180J	CHIP C 18PF J	
C126			CC73GCH1H120J	CHIP C 12PF J		C212			CK73GB1H471K	CHIP C 470PF K	
C127			CK73GB1H103K	CHIP C 0.010UF K		C215			CC73FCH1H060D	CHIP C 6.0PF D	
C128			C92-0543-05	CHIP-TAN 3.3UF 10WV		C216			CC73GCH1H0R5B	CHIP C 0.5PF B	
C129			CK73FF1C105Z	CHIP C 1.0UF Z		C217			CC73GCH1H020B	CHIP C 2.0PF B	
C130			CK73GB1H103K	CHIP C 0.010UF K		C218			CK73GB1C104K	CHIP C 0.10UF K	
C131			CK73GB1H102K	CHIP C 1000PF K		C219			CC73FCH1H040C	CHIP C 4.0PF C	
C133			CK73GB1H471K	CHIP C 470PF K		C220			CK73GB1H471K	CHIP C 470PF K	
C134			CK73FB1E104K	CHIP C 0.10UF K		C221			C93-0550-05	CHIP C 1.0PF C	

## PARTS LIST

TX-RX UNIT (X57-6490-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C222			CC73GCH1H0R5B	CHIP C 0.5PF B		C557			CK73GB1C104K	CHIP C 0.10UF K	
C223			CC73GCH1H020B	CHIP C 2.0PF B		C558			CC73GCH1H101J	CHIP C 100PF J	
C224			CK73GB1H471K	CHIP C 470PF K		C559			CK73GB1H102K	CHIP C 1000PF K	
C225			C93-0603-05	CHIP C 1000PF K		C560-563			CK73GB1C104K	CHIP C 0.10UF K	
C226			C93-0556-05	CHIP C 6.0PF D		C564			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C227			C93-0558-05	CHIP C 8.0PF D		C565,566			CK73GB1H472K	CHIP C 4700PF K	
C229			C93-0556-05	CHIP C 6.0PF D		C567			CC73GCH1H101J	CHIP C 100PF J	
C230,231			CK73GB1C104K	CHIP C 0.10UF K		C568			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C241			CK73GB1H471K	CHIP C 470PF K		C569			CK73GB1E223K	CHIP C 0.022UF K	
C248			C92-0585-05	CHIP-TAN 4.7UF 16WV		C570			CK73FF1C105Z	CHIP C 1.0UF Z	
C250			CK73FF1C105Z	CHIP C 1.0UF Z		C571,572			CK73GB1H102K	CHIP C 1000PF K	
C251			CK73GB1H221K	CHIP C 220PF K		C573			CK73FB1H563K	CHIP C 0.056UF K	
C254			CK73GB1C104K	CHIP C 0.10UF K		C574			CC73GCH1H470J	CHIP C 47PF J	
C257			CK73GB1C104K	CHIP C 0.10UF K		C575			CK73GB1H102K	CHIP C 1000PF K	
C259			CK73GB1C104K	CHIP C 0.10UF K		C578			CK73GB1H103K	CHIP C 0.010UF K	
C265			CK73GB1H471K	CHIP C 470PF K		C579			CC73GCH1H101J	CHIP C 100PF J	
C266			CK73GB1A105K	CHIP C 1.0UF K		C580			CK73GB1C104K	CHIP C 0.10UF K	
C270			CK73GB1H471K	CHIP C 470PF K		C581			CK73GB1H102K	CHIP C 1000PF K	
C271			CK73GB1H681K	CHIP C 680PF K		C583			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C275			CK73GB1H471K	CHIP C 470PF K		C585			CC73GCH1H101J	CHIP C 100PF J	
C278			CK73GB1H221K	CHIP C 220PF K		C587			CK73GB1H103K	CHIP C 0.010UF K	
C285			CK73GB1H221K	CHIP C 220PF K		C589			C92-0606-05	CHIP-TAN 4.7UF 10WV	
C292-294			CK73GB1H471K	CHIP C 470PF K		C590			CK73GB1H102K	CHIP C 1000PF K	
C298			CC73GCH1H680J	CHIP C 68PF J		C594			CK73GB1H102K	CHIP C 1000PF K	
C299			CK73GB1H471K	CHIP C 470PF K		C596			CK73GB1H102K	CHIP C 1000PF K	
C300			CK73GB1A105K	CHIP C 1.0UF K		C597			CC73GCH1H101J	CHIP C 100PF J	
C501			CK73GB1H102K	CHIP C 1000PF K		C598			CK73GB1H102K	CHIP C 1000PF K	
C502			CK73GB1C104K	CHIP C 0.10UF K		C599			CC73GCH1H101J	CHIP C 100PF J	
C503			CK73GB1H471K	CHIP C 470PF K		C600			CK73GB1H102K	CHIP C 1000PF K	
C504			CK73GB1H103K	CHIP C 0.010UF K		C601,602			CC73GCH1H101J	CHIP C 100PF J	
C505			CK73GB1C104K	CHIP C 0.10UF K		C603			CK73GB1H102K	CHIP C 1000PF K	
C506,507			CK73GB1H103K	CHIP C 0.010UF K		C604-606			CC73GCH1H101J	CHIP C 100PF J	
C508			CK73GB1H472K	CHIP C 4700PF K		C608-610			CC73GCH1H101J	CHIP C 100PF J	
C509			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C611,612			CK73GB1H471K	CHIP C 470PF K	
C514			CC73GCH1H680J	CHIP C 68PF J		C613			CC73GCH1H101J	CHIP C 100PF J	
C515			CK73GB1H103K	CHIP C 0.010UF K		C615			CK73GB1H471K	CHIP C 470PF K	
C516			CC73GCH1H270J	CHIP C 27PF J		C616			CC73GCH1H101J	CHIP C 100PF J	
C517			CK73GB1E153K	CHIP C 0.015UF K		C618			CK73GB1H102K	CHIP C 1000PF K	
C518			CC73GCH1H270J	CHIP C 27PF J		C620			CK73GB1H471K	CHIP C 470PF K	
C519			CK73GB1H102K	CHIP C 1000PF K		C621			CK73GB1H102K	CHIP C 1000PF K	
C523			CC73GCH1H121J	CHIP C 120PF J		C623			CK73GB1H102K	CHIP C 1000PF K	
C525			CK73GB1E123K	CHIP C 0.012UF K		C626			CK73GB1C104K	CHIP C 0.10UF K	
C526			CK73GB1C683K	CHIP C 0.068UF K		C628			CK73GB1C104K	CHIP C 0.10UF K	
C527			CK73GB1H222K	CHIP C 2200PF K		C629			CC73GCH1H470J	CHIP C 47PF J	
C530			CK73GB1H152K	CHIP C 1500PF K		C630			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C533			CK73GB1C104K	CHIP C 0.10UF K		C631			CK73GB1H103K	CHIP C 0.010UF K	
C534,535			CK73GB1H103K	CHIP C 0.010UF K		C632			CK73FF1C105Z	CHIP C 1.0UF Z	
C536,537			CK73GB1C104K	CHIP C 0.10UF K		C633			CK73GB1C104K	CHIP C 0.10UF K	
C538			C92-0560-05	CHIP-TAN 10UF 6.3WV		C720			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C539			CK73GB1H103K	CHIP C 0.010UF K		CN1			E40-6047-05	PIN ASSY	
C540,541			CK73GB1C104K	CHIP C 0.10UF K		CN2			E40-6021-05	FLAT CABLE CONNECTOR	
C542			CC73GCH1H331J	CHIP C 330PF J		CN3			E40-3247-05	PIN ASSY	
C543			CK73GB1H102K	CHIP C 1000PF K		CN4			E40-5737-05	PIN ASSY	
C544-546			CK73GB1H562K	CHIP C 5600PF K		CN5			E40-5738-05	PIN ASSY	
C548-550			CK73GB1H272K	CHIP C 2700PF K		CN7			E40-3247-05	PIN ASSY	
C551			CC73GCH1H151J	CHIP C 150PF J		CN8			E40-3246-05	PIN ASSY	
C553			CK73GB1H102K	CHIP C 1000PF K		CN501			E40-6021-05	FLAT CABLE CONNECTOR	
C554			CK73GB1H122K	CHIP C 1200PF K		J1			E11-0442-05	3.5D PHONE JACK (3P)	
C555			C92-0560-05	CHIP-TAN 10UF 6.3WV		J501			E08-0877-05	MODULAR JACK	
C556			CK73GB1C333K	CHIP C 0.033UF K							

## PARTS LIST

## TX-RX UNIT (X57-6490-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
F1			F53-0108-05	FUSE		R14			RK73GB1J474J	CHIP R 470K J 1/16W	
-			J31-0543-05	COLLAR		R15			RK73GB1J104J	CHIP R 100K J 1/16W	
CF1			L72-0959-05	CERAMIC FILTER		R16			RK73GB1J220J	CHIP R 22 J 1/16W	
CF1			L72-0994-05	CERAMIC FILTER		R17			RK73GB1J154J	CHIP R 150K J 1/16W	
CF2			L72-0973-05	CERAMIC FILTER		R18			RK73GB1J103J	CHIP R 10K J 1/16W	
CF2			L72-0993-05	CERAMIC FILTER		R19			RK73GB1J392J	CHIP R 3.9K J 1/16W	
L1			L40-1005-34	SMALL FIXED INDUCTOR (10UH)		R20			RK73GB1J124J	CHIP R 120K J 1/16W	
L2-4			L40-3381-86	SMALL FIXED INDUCTOR (0.33UH)		R21			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L5			L34-4530-05	COIL		R22			RK73GB1J474J	CHIP R 470K J 1/16W	
L6			L40-8275-77	SMALL FIXED INDUCTOR (82NH)		R23			RK73GB1J223J	CHIP R 22K J 1/16W	
L7			L40-5685-85	SMALL FIXED INDUCTOR (0.56UH)		R24			RK73GB1J103J	CHIP R 10K J 1/16W	
L8			L40-8285-85	SMALL FIXED INDUCTOR (0.82UH)		R25			R92-1252-05	CHIP R 0 OHM J 1/16W	
L9			L40-1575-77	SMALL FIXED INDUCTOR (15NH)		R26			RK73GB1J104J	CHIP R 100K J 1/16W	
L10			L40-2275-77	SMALL FIXED INDUCTOR (22NH)		R29			R92-1252-05	CHIP R 0 OHM J 1/16W	
L11,12			L40-1575-34	SMALL FIXED INDUCTOR (15NH)		R30			RK73GB1J103J	CHIP R 10K J 1/16W	
L13			L79-1585-05	HELICAL BLOCK		R31			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L14			L40-1875-77	SMALL FIXED INDUCTOR (18NH)		R32			RK73GB1J103J	CHIP R 10K J 1/16W	
L15			L40-6875-77	SMALL FIXED INDUCTOR (68NH)		R33			R92-1252-05	CHIP R 0 OHM J 1/16W	
L16			L40-6875-34	SMALL FIXED INDUCTOR (68NH)		R34			RK73GB1J104J	CHIP R 100K J 1/16W	
L17			L40-1275-77	SMALL FIXED INDUCTOR (12NH)		R35			RK73GB1J224J	CHIP R 220K J 1/16W	
L18			L40-1075-34	SMALL FIXED INDUCTOR (10NH)		R36			RK73GB1J223J	CHIP R 22K J 1/16W	
L19			L40-3375-77	SMALL FIXED INDUCTOR (33NH)		R37			R92-1252-05	CHIP R 0 OHM J 1/16W	
L20			L40-1875-77	SMALL FIXED INDUCTOR (18NH)		R38-40			RK73GB1J103J	CHIP R 10K J 1/16W	
L21			L34-4478-05	AIR-CORE COIL		R41			RK73GB1J224J	CHIP R 220K J 1/16W	
L22			L79-1585-05	HELICAL BLOCK		R42			RK73GB1J473J	CHIP R 47K J 1/16W	
L24			L92-0179-05	FERRITE CHIP		R43			RK73GB1J683J	CHIP R 68K J 1/16W	
L26			L40-3375-34	SMALL FIXED INDUCTOR (33NH)		R44			RK73GB1J153J	CHIP R 15K J 1/16W	
L27			L40-1575-34	SMALL FIXED INDUCTOR (15NH)		R46			RK73GB1J223J	CHIP R 22K J 1/16W	
L29			L34-1185-05	AIR-CORE COIL		R47			RK73GB1J101J	CHIP R 100 J 1/16W	
L30,31			L34-1039-05	AIR-CORE COIL		R48			RK73GB1J474J	CHIP R 470K J 1/16W	
L32			L34-4478-05	AIR-CORE COIL		R49			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L33			L92-0179-05	FERRITE CHIP		R50			RK73GB1J104J	CHIP R 100K J 1/16W	
L38,39			L40-1075-77	SMALL FIXED INDUCTOR (10NH)		R51-53			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L501			L92-0138-05	FERRITE CHIP		R54			R92-1252-05	CHIP R 0 OHM J 1/16W	
L503,504			L92-0138-05	FERRITE CHIP		R56			RK73GB1J100J	CHIP R 10 J 1/16W	
L510			L92-0138-05	FERRITE CHIP		R57			RK73GB1J471J	CHIP R 470 J 1/16W	
X1			L77-1881-05	TCXO (16.8MHZ)		R58			RK73GB1J682J	CHIP R 6.8K J 1/16W	
X501			L78-0479-05	RESONATOR (3.58MHZ)		R59			RK73GB1J472J	CHIP R 4.7K J 1/16W	
X502			L78-0462-05	RESONATOR (9.8304MHZ)		R60			RK73GB1J154J	CHIP R 150K J 1/16W	
XF1			L71-0551-25	MCF (49.95MHZ)		R61			RK73GB1J221J	CHIP R 220 J 1/16W	
CP501-505			R90-0741-05	MULTIPLE RESISTOR		R62			RK73GB1J224J	CHIP R 220K J 1/16W	
CP508-514			R90-0741-05	MULTIPLE RESISTOR		R63			RK73GB1J154J	CHIP R 150K J 1/16W	
CP516-524			R90-0741-05	MULTIPLE RESISTOR		R64,65			RK73GB1J103J	CHIP R 10K J 1/16W	
CP526,527			R90-0741-05	MULTIPLE RESISTOR		R66			RK73GB1J101J	CHIP R 100 J 1/16W	
CP529-531			R90-0741-05	MULTIPLE RESISTOR		R67			RK73GB1J222J	CHIP R 2.2K J 1/16W	
CP533-536			R90-0741-05	MULTIPLE RESISTOR		R68			RK73GB1J221J	CHIP R 220 J 1/16W	
CP538			R90-0741-05	MULTIPLE RESISTOR		R69			R92-1252-05	CHIP R 0 OHM J 1/16W	
CP539			R90-0724-05	MULTI-COMP 1K X4		R70			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R1			R92-1252-05	CHIP R 0 OHM J 1/16W		R71			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R2			RK73GB1J102J	CHIP R 1.0K J 1/16W		R72			R92-1252-05	CHIP R 0 OHM J 1/16W	
R3			R92-1252-05	CHIP R 0 OHM J 1/16W		R75			R92-1252-05	CHIP R 0 OHM J 1/16W	
R4			RK73GB1J333J	CHIP R 33K J 1/16W		R76			RK73GB1J223J	CHIP R 22K J 1/16W	
R6			R92-1252-05	CHIP R 0 OHM J 1/16W		R77			RK73GB1J224J	CHIP R 220K J 1/16W	
R7,8			RK73GB1J102J	CHIP R 1.0K J 1/16W		R78			RK73GB1J104J	CHIP R 100K J 1/16W	
R9,10			R92-1252-05	CHIP R 0 OHM J 1/16W		R79			RK73GB1J681J	CHIP R 680 J 1/16W	
R11			RK73GB1J102J	CHIP R 1.0K J 1/16W		R80			RK73GB1J471J	CHIP R 470 J 1/16W	
R12			RK73GB1J104J	CHIP R 100K J 1/16W		R81			RK73GB1J101J	CHIP R 100 J 1/16W	
R13			RK73GB1J472J	CHIP R 4.7K J 1/16W		R82			RK73GB1J561J	CHIP R 560 J 1/16W	
						R83			RK73GB1J684J	CHIP R 680K J 1/16W	
						R84			R92-1252-05	CHIP R 0 OHM J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-6490-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R85,86			RK73GB1J122J	CHIP R 1.2K J 1/16W		R160			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R87			RK73GB1J102J	CHIP R 1.0K J 1/16W		R161,162			RK73GB1J104J	CHIP R 100K J 1/16W	
R88			RK73GB1J271J	CHIP R 270 J 1/16W		R163			R92-0670-05	CHIP R 0 OHM	
R89			RK73GB1J102J	CHIP R 1.0K J 1/16W		R164			R92-1215-05	CHIP R 470 J 1/2W	
R90			RK73GB1J104J	CHIP R 100K J 1/16W		R166			RK73GB1J151J	CHIP R 150 J 1/16W	
R91			RK73GB1J823J	CHIP R 82K J 1/16W		R169			RK73GB1J103J	CHIP R 10K J 1/16W	
R92			RK73GB1J822J	CHIP R 8.2K J 1/16W		R170			RK73FB2A222J	CHIP R 2.2K J 1/10W	
R93			RK73GB1J821J	CHIP R 820 J 1/16W		R171			RK73GB1J333J	CHIP R 33K J 1/16W	
R94			RK73GB1J392J	CHIP R 3.9K J 1/16W		R172			RK73GB1J223J	CHIP R 22K J 1/16W	
R95			RK73GB1J103J	CHIP R 10K J 1/16W		R173			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R97,98			RK73GB1J101J	CHIP R 100 J 1/16W		R174			RK73GB1J103J	CHIP R 10K J 1/16W	
R99			RK73GB1J271J	CHIP R 270 J 1/16W		R175			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R100,101			RK73GB1J222J	CHIP R 2.2K J 1/16W		R176			RK73GB1J103J	CHIP R 10K J 1/16W	
R103			RK73GB1J472J	CHIP R 4.7K J 1/16W		R177			R92-1261-05	CHIP R 150 J 1/2W	
R104			RK73GB1J682J	CHIP R 6.8K J 1/16W		R178			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R105			RK73GB1J101J	CHIP R 100 J 1/16W		R179			RK73GB1J223J	CHIP R 22K J 1/16W	
R106			RK73GB1J102J	CHIP R 1.0K J 1/16W		R180,181			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R107			RK73GB1J473J	CHIP R 47K J 1/16W		R182			R92-0670-05	CHIP R 0 OHM	
R108			RK73GB1J152J	CHIP R 1.5K J 1/16W		R184			R92-1252-05	CHIP R 0 OHM J 1/16W	
R109			RK73GB1J103J	CHIP R 10K J 1/16W		R185			RK73GB1J473J	CHIP R 47K J 1/16W	
R110			RK73GB1J470J	CHIP R 47 J 1/16W		R186			R92-1252-05	CHIP R 0 OHM J 1/16W	
R111			RK73GB1J101J	CHIP R 100 J 1/16W		R187			RK73GB1J101J	CHIP R 100 J 1/16W	
R112			RK73GB1J471J	CHIP R 470 J 1/16W		R188			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R113			RK73GB1J100J	CHIP R 10 J 1/16W		R189			RK73GB1J101J	CHIP R 100 J 1/16W	
R114			RK73GB1J472J	CHIP R 4.7K J 1/16W		R190			RK73GB1J473J	CHIP R 47K J 1/16W	
R115			RK73GB1J563J	CHIP R 56K J 1/16W		R192			RK73GB1J103J	CHIP R 10K J 1/16W	
R116			RK73GB1J473J	CHIP R 47K J 1/16W		R193			RK73GB1J104J	CHIP R 100K J 1/16W	
R117			RK73GB1J221J	CHIP R 220 J 1/16W		R196			RK73GB1J333J	CHIP R 3.3K J 1/16W	
R118			RK73GB1J681J	CHIP R 680 J 1/16W		R197			R92-1252-05	CHIP R 0 OHM J 1/16W	
R119			RK73GB1J222J	CHIP R 2.2K J 1/16W		R198			RK73GB1J104J	CHIP R 100K J 1/16W	
R120			R92-1252-05	CHIP R 0 OHM J 1/16W		R199-202			R92-1252-05	CHIP R 0 OHM J 1/16W	
R121			RK73GB1J100J	CHIP R 10 J 1/16W		R207			R92-1252-05	CHIP R 0 OHM J 1/16W	
R122			R92-1215-05	CHIP R 470 J 1/2W		R208			RK73GB1J100J	CHIP R 10 J 1/16W	
R123			RK73GB1J472J	CHIP R 4.7K J 1/16W		R210			RK73GB1J153J	CHIP R 15K J 1/16W	
R124			RK73GB1J103J	CHIP R 10K J 1/16W		R219			R92-1252-05	CHIP R 0 OHM J 1/16W	
R125			RK73GB1J333J	CHIP R 33K J 1/16W		R221			R92-1252-05	CHIP R 0 OHM J 1/16W	
R126			RK73GB1J471J	CHIP R 470 J 1/16W		R232			R92-1252-05	CHIP R 0 OHM J 1/16W	
R127,128			RK73GB1J104J	CHIP R 100K J 1/16W		R233			RK73GB1J333J	CHIP R 33K J 1/16W	
R129			RK73GB1J331J	CHIP R 330 J 1/16W		R234,235			RK73GB1J104J	CHIP R 100K J 1/16W	
R130			RK73GB1J152J	CHIP R 1.5K J 1/16W		R236			RK73GB1J823J	CHIP R 82K J 1/16W	
R131			RK73GB1J681J	CHIP R 680 J 1/16W		R237			RK73GB1J104J	CHIP R 100K J 1/16W	
R132			R92-0670-05	CHIP R 0 OHM		R242			RK73GB1J393J	CHIP R 39K J 1/16W	
R133-136			R92-1252-05	CHIP R 0 OHM J 1/16W		R501			RK73GB1J473J	CHIP R 47K J 1/16W	
R138			RK73GB1J102J	CHIP R 1.0K J 1/16W		R502			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R140			RK73FB2A2R2J	CHIP R 2.2 J 1/10W		R503			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R141			R92-0685-05	CHIP R 22 J 1/2W		R504-507			RK73GB1J473J	CHIP R 47K J 1/16W	
R142			RK73GB1J473J	CHIP R 47K J 1/16W		R508			R92-1252-05	CHIP R 0 OHM J 1/16W	
R143			RK73GB1J101J	CHIP R 100 J 1/16W		R510			R92-1252-05	CHIP R 0 OHM J 1/16W	
R145,146			RK73GB1J473J	CHIP R 47K J 1/16W		R511			RK73GB1J473J	CHIP R 47K J 1/16W	
R147,148			RK73GB1J104J	CHIP R 100K J 1/16W		R512			RK73GB1J104J	CHIP R 100K J 1/16W	
R149			RK73GB1J151J	CHIP R 150 J 1/16W		R513			RK73GB1J683J	CHIP R 68K J 1/16W	
R150			RK73GB1J104J	CHIP R 100K J 1/16W		R514			RK73GB1J473J	CHIP R 47K J 1/16W	
R151			RK73FB2A102J	CHIP R 1.0K J 1/10W		R515,516			RK73GB1J153J	CHIP R 15K J 1/16W	
R152			R92-1252-05	CHIP R 0 OHM J 1/16W		R517			RK73GB1J473J	CHIP R 47K J 1/16W	
R153			R92-0670-05	CHIP R 0 OHM		R518			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R154			RK73GB1J152J	CHIP R 1.5K J 1/16W		R519			RK73GB1J103J	CHIP R 10K J 1/16W	
R155			RK73GB1J104J	CHIP R 100K J 1/16W		R520-522			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R156			RK73FB2A5R6J	CHIP R 5.6 J 1/10W		R527			R92-1252-05	CHIP R 0 OHM J 1/16W	
R158			R92-0670-05	CHIP R 0 OHM		R528			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R159			RK73GB1J473J	CHIP R 47K J 1/16W		R530			RK73GB1J473J	CHIP R 47K J 1/16W	

## PARTS LIST

## TX-RX UNIT (X57-6490-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R531			RK73GB1J564J	CHIP R 560K J 1/16W		R610,611			RK73GB1J473J	CHIP R 47K J 1/16W	
R533			RK73GB1J564J	CHIP R 560K J 1/16W		R612			R92-1201-05	CHIP R 220 J 1/2W	
R534			RK73GB1J474J	CHIP R 470K J 1/16W		R613			RK73GB1J103J	CHIP R 10K J 1/16W	
R536			RK73GB1J153J	CHIP R 15K J 1/16W		R614,615			R92-1252-05	CHIP R 0 OHM J 1/16W	
R538			RK73GB1J103J	CHIP R 10K J 1/16W		R616			RK73GB1J474J	CHIP R 470K J 1/16W	
R539			R92-1252-05	CHIP R 0 OHM J 1/16W		R617			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R540			RK73GB1J223J	CHIP R 22K J 1/16W		R618			RK73GB1J683J	CHIP R 68K J 1/16W	
R541			RK73GB1J184J	CHIP R 180K J 1/16W		R619			RK73GB1J104J	CHIP R 100K J 1/16W	
R543			RK73GB1J184J	CHIP R 180K J 1/16W		R620,621			RK73GB1J103J	CHIP R 10K J 1/16W	
R546			RN73GH1J913D	CHIP R 91K D 1/16W		R622			RK73GB1J473J	CHIP R 47K J 1/16W	
R548			RN73GH1J333D	CHIP R 33K D 1/16W		R630			R92-1252-05	CHIP R 0 OHM J 1/16W	
R549			RN73GH1J913D	CHIP R 91K D 1/16W		R701			RK73GB1J683J	CHIP R 68K J 1/16W	
R550			RN73GH1J683D	CHIP R 68K D 1/16W		R722			R92-1252-05	CHIP R 0 OHM J 1/16W	
R553			RK73GB1J105J	CHIP R 1.0M J 1/16W		R724			RK73GB1J473J	CHIP R 47K J 1/16W	
R554			RN73GH1J913D	CHIP R 91K D 1/16W		R725			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R557			RN73GH1J274D	CHIP R 270K D 1/16W		R726			R92-1252-05	CHIP R 0 OHM J 1/16W	
R558			R92-1252-05	CHIP R 0 OHM J 1/16W		D1			DA204U	DIODE	
R559			RK73GB1J333J	CHIP R 33K J 1/16W		D2			02D220(Y,Z)	ZENER DIODE	
R560			RK73GB1J474J	CHIP R 470K J 1/16W		D3-5			DA204U	DIODE	
R561			RK73GB1J333J	CHIP R 33K J 1/16W		D8			DAN235E	DIODE	
R562			R92-1252-05	CHIP R 0 OHM J 1/16W		D9			1SS355	DIODE	
R563			RK73GB1J473J	CHIP R 47K J 1/16W		D10			DAN235E	DIODE	
R564			RK73GB1J223J	CHIP R 22K J 1/16W		D11			MA742	DIODE	
R565			R92-1252-05	CHIP R 0 OHM J 1/16W		D14			1SS355	DIODE	
R566			RK73GB1J563J	CHIP R 56K J 1/16W		D15			DAN202K	DIODE	
R567			RK73GB1J334J	CHIP R 330K J 1/16W		D16			DAN235E	DIODE	
R568			RK73GB1J473J	CHIP R 47K J 1/16W		D17			DA204U	DIODE	
R569			RK73GB1J102J	CHIP R 1.0K J 1/16W		D18			KV1848K	VARIABLE CAPACITANCE DIODE	
R570			RK73GB1J155J	CHIP R 1.5M J 1/16W		D19,20			1SS355	DIODE	
R571			RN73GH1J682D	CHIP R 6.8K D 1/16W		D21			02DZ18(X,Y)	ZENER DIODE	
R572			RK73GB1J473J	CHIP R 47K J 1/16W		D23			KV1848K	VARIABLE CAPACITANCE DIODE	
R573			RK73GB1J474J	CHIP R 470K J 1/16W		D24			02DZ15(X,Y)	ZENER DIODE	
R574			RN73GH1J683D	CHIP R 68K D 1/16W		D25			22ZR-10D	SURGE ABSORBER	
R575			RK73GB1J101J	CHIP R 100 J 1/16W		D26			DSA3A1-FK	DIODE	
R576			RK73GB1J224J	CHIP R 220K J 1/16W		D27			1SS355	DIODE	
R577			RK73GB1J103J	CHIP R 10K J 1/16W		D28			KV1848K	VARIABLE CAPACITANCE DIODE	
R578			RN73GH1J682D	CHIP R 6.8K D 1/16W		D30			MA4PH633	DIODE	
R579			RK73GB1J223J	CHIP R 22K J 1/16W		D31			KV1848K	VARIABLE CAPACITANCE DIODE	
R580			R92-1252-05	CHIP R 0 OHM J 1/16W		D33,34			XB15A709	DIODE	
R581			RK73GB1J394J	CHIP R 390K J 1/16W		D35,36			MA742	DIODE	
R582			RK73GB1J273J	CHIP R 27K J 1/16W		D39			UDZS4.7B	ZENER DIODE	
R583			RK73GB1J470J	CHIP R 47 J 1/16W		D40			RB706F-40	DIODE	
R584			RK73GB1J220J	CHIP R 22 J 1/16W		D41			1SS355	DIODE	
R585			R92-1252-05	CHIP R 0 OHM J 1/16W		D42			HZU5ALL	DIODE	
R586			RK73GB1J473J	CHIP R 47K J 1/16W		D54			MA2S111	DIODE	
R587			R92-1252-05	CHIP R 0 OHM J 1/16W		D501-504			MA2S111	DIODE	
R592			RK73GB1J103J	CHIP R 10K J 1/16W		D506,507			MA2S111	DIODE	
R593			RK73GB1J181J	CHIP R 180 J 1/16W		D508			RB706F-40	DIODE	
R594			RK73GB1J392J	CHIP R 3.9K J 1/16W		D523			DAN202U	DIODE	
R595			RK73GB1J181J	CHIP R 180 J 1/16W		D524,525			DA204U	DIODE	
R598			RK73GB1J473J	CHIP R 47K J 1/16W		D526			1812L075PR	VARISTOR	
R599			RK73GB1J102J	CHIP R 1.0K J 1/16W		D527,528			DA204U	DIODE	
R600			R92-1252-05	CHIP R 0 OHM J 1/16W		D529			RB706F-40	DIODE	
R602			RK73GB1J473J	CHIP R 47K J 1/16W		IC1,2			TA75S01F	MOS IC	
R603			RK73GB1J101J	CHIP R 100 J 1/16W		IC3			MB15A02	MOS IC	
R604			RK73GB1J472J	CHIP R 4.7K J 1/16W		IC4			NJM4558M	MOS IC	
R605			RK73GB1J332J	CHIP R 3.3K J 1/16W		IC5			TA31136FN	MOS IC	
R606			RK73GB1J102J	CHIP R 1.0K J 1/16W		IC6			M62363FP	MOS IC	
R607			RK73GB1J101J	CHIP R 100 J 1/16W		IC7			NJM2904M	MOS IC	
R608			RK73GB1J122J	CHIP R 1.2K J 1/16W							

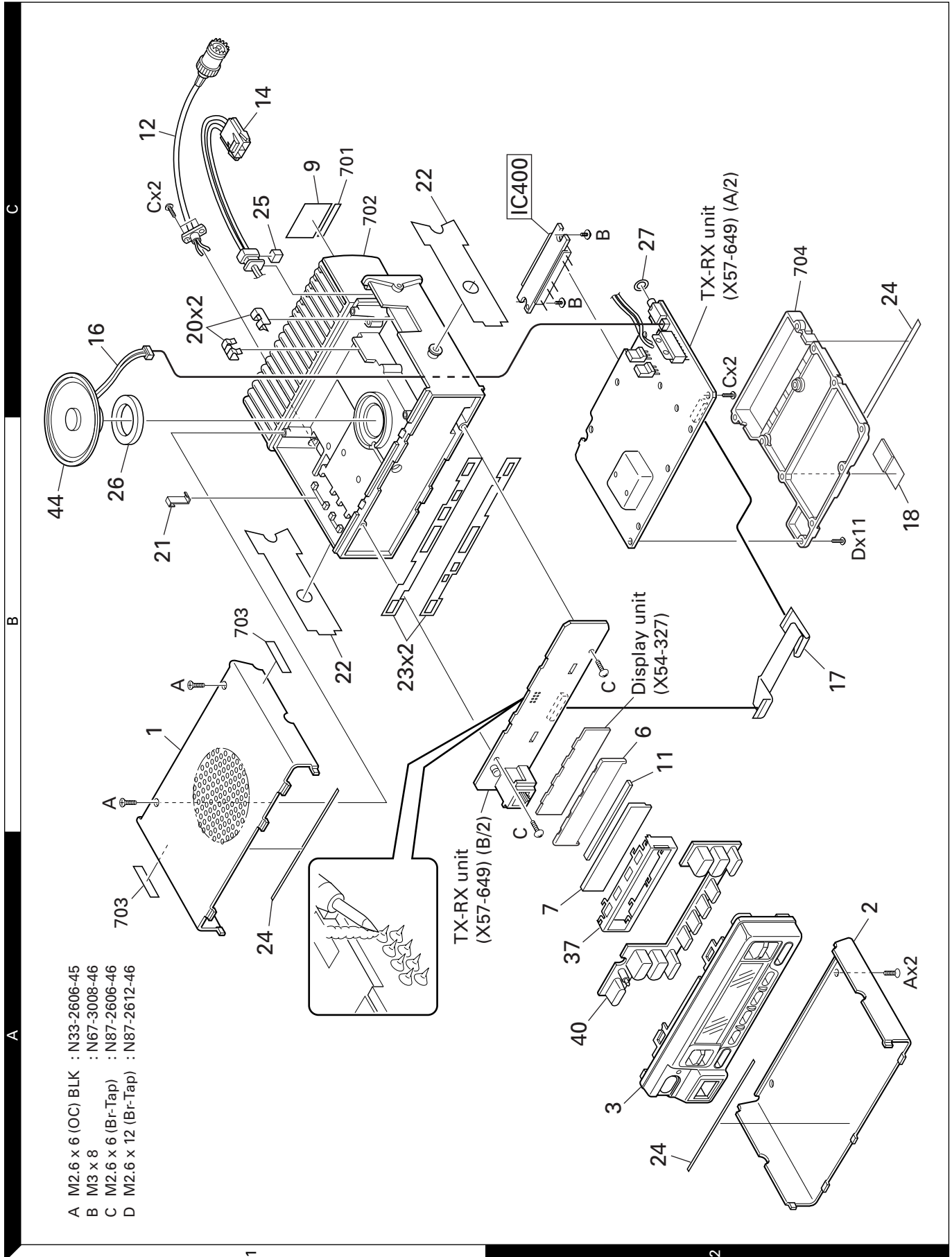


## PARTS LIST

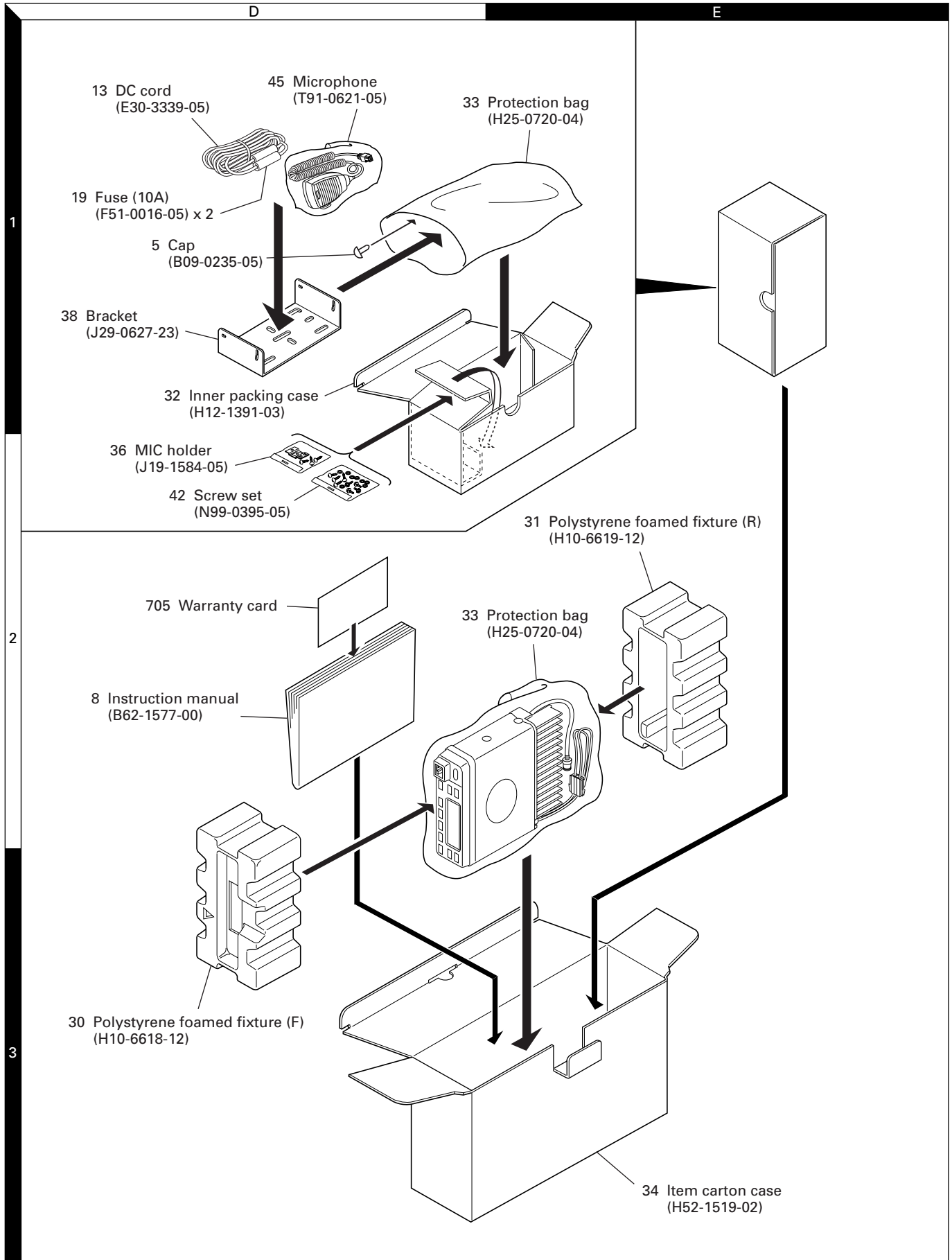
TX-RX UNIT (X57-6490-10)  
PLL/VCO (X58-4670-17)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
IC9			BU4094BCF	MOS IC		TH1			157-153-65001	THERMISTOR	
IC10			NJM78L05UA	BI-POLAR IC		<b>PLL/VCO (X58-4670-17)</b>					
IC11			AN8009M	MOS IC		C102			CK73GB1H471K	CHIP C 470PF	K
IC12			TA7808S	MOS IC		C104			CC73GCH1H120J	CHIP C 12PF	J
IC13			LA4422	BI-POLAR IC		C105			CC73GCH1H070D	CHIP C 7.0PF	D
IC14			TC4013BF(N)	MOS IC		C107			CC73GCH1H060D	CHIP C 6.0PF	D
IC15	2C		TA75S01F	MOS IC		C108			CC73GCH1HR75B	CHIP C 0.75PF	B
IC400			S-AU27AM(K3)	RF POWER MODULE		C110			CC73GCH1H030B	CHIP C 3.0PF	B
IC501			AT29C020-90TI	ROM IC		C111			CC73GCH1H050B	CHIP C 5.0PF	B
IC502			30622M4A-410GP	MPU		C112			CC73GCH1H1R5B	CHIP C 1.5PF	B
IC503			RH5VL42C	MOS IC		C113			CC73GCH1H010B	CHIP C 1.0PF	B
IC505			AT2408N10SI2.5	ROM IC		C114			CC73GCH1H040B	CHIP C 4.0PF	B
IC505			24LC08BT-1SN	ROM IC		C115			CC73GCH1H060D	CHIP C 6.0PF	D
IC507			NJM2904V	MOS IC		C116			CC73GCH1H050B	CHIP C 5.0PF	B
IC508			TC35453F	MOS IC		C117			CK73GB1H471K	CHIP C 470PF	K
IC509			BU4066BCFV	MOS IC		C118			CC73GCH1H050B	CHIP C 5.0PF	B
IC510			BU4094BCFV	MOS IC		C119,120			CK73GB1H471K	CHIP C 470PF	K
IC512			NJM78L05UA	BI-POLAR IC		C121			CC73GCH1H050B	CHIP C 5.0PF	B
IC513			TA75W558FU	MOS IC		C122			CC73GCH1HOR5B	CHIP C 0.5PF	B
Q1			DTD114EK	DIGITAL TRANSISTOR		C123			CK73GB1H471K	CHIP C 470PF	K
Q2			KRA225S	DIGITAL TRANSISTOR		C124			CC73GCH1HOR5B	CHIP C 0.5PF	B
Q3			DTA114EKA	DIGITAL TRANSISTOR		C125			CK73GB1H102K	CHIP C 1000PF	K
Q4-6			DTC114EKA	DIGITAL TRANSISTOR		C126			CK73GB1H471K	CHIP C 470PF	K
Q7			2SC4649(N,P)	TRANSISTOR		C127			CC73GCH1H050B	CHIP C 5.0PF	B
Q8			2SC2412K	TRANSISTOR		TC106			C05-0384-05	CERAMIC TRIMMER CAP (10PF)	
Q9			2SC4226(R24)	TRANSISTOR		TC109			C05-0384-05	CERAMIC TRIMMER CAP (10PF)	
Q10			2SC2412K	TRANSISTOR		CN101			E40-6019-05	PIN ASSY	
Q11			2SA1774(S)	TRANSISTOR		-			F10-2279-04	SHIELDING CASE	
Q12			2SC4617(S)	TRANSISTOR		L101-104			L40-1595-34	SMALL FIXED INDUCTOR (1.5UH)	
Q13			2SC4649(N,P)	TRANSISTOR		L105			L40-3975-34	SMALL FIXED INDUCTOR (39NH)	
Q14			2SC5110(O)	TRANSISTOR		L106			L40-2775-34	SMALL FIXED INDUCTOR (27NH)	
Q15			3SK255	FET		L107,108			L40-1098-76	SMALL FIXED INDUCTOR (1UH)	
Q16			DTC114EKA	DIGITAL TRANSISTOR		L109,110			L40-1595-34	SMALL FIXED INDUCTOR (1.5UH)	
Q17			DTC363EU	DIGITAL TRANSISTOR		L111			L34-4547-05	AIR-CORE COIL	
Q18			2SA1745(6,7)	TRANSISTOR		L115			L34-4547-05	AIR-CORE COIL	
Q19			DTC114EKA	DIGITAL TRANSISTOR		R101,102			RK73GB1J101J	CHIP R 100 J 1/16W	
Q20			DTA114EKA	DIGITAL TRANSISTOR		R103			RK73GB1J102J	CHIP R 1.0K J 1/16W	
Q21			DTC114EKA	DIGITAL TRANSISTOR		R104			RK73GB1J101J	CHIP R 100 J 1/16W	
Q22			2SC4093	TRANSISTOR		R105			RK73GB1J154J	CHIP R 150K J 1/16W	
Q23			2SA1641(S,T)	TRANSISTOR		R106			RK73GB1J470J	CHIP R 47 J 1/16W	
Q24			DTA114EKA	DIGITAL TRANSISTOR		R107-110			RK73GB1J103J	CHIP R 10K J 1/16W	
Q25			2SC3357	TRANSISTOR		R111			RK73GB1J331J	CHIP R 330 J 1/16W	
Q26			DTA114EKA	DIGITAL TRANSISTOR		R112,113			RK73GB1J221J	CHIP R 220 J 1/16W	
Q27			2SC2954	TRANSISTOR		R114			RK73GB1J470J	CHIP R 47 J 1/16W	
Q28			2SB1132(Q,R)	TRANSISTOR		R115			RK73GB1J103J	CHIP R 10K J 1/16W	
Q29			DTC114EKA	DIGITAL TRANSISTOR		R116			RK73GB1J392J	CHIP R 3.9K J 1/16W	
Q31			2SC2412K	TRANSISTOR		R117			RK73GB1J101J	CHIP R 100 J 1/16W	
Q32			2SB1565(E,F)	TRANSISTOR		D101-104			1SV283	VARIABLE CAPACITANCE DIODE	
Q33			DTC114EKA	DIGITAL TRANSISTOR		D105			1SV214	VARIABLE CAPACITANCE DIODE	
Q34			3SK255	FET		Q101			2SK508NV(K52)	FET	
Q35			DTC144EKA	DIGITAL TRANSISTOR		Q102			DTC114EUA	DIGITAL TRANSISTOR	
Q36			2SC2412K	TRANSISTOR		Q103			2SK508NV(K52)	FET	
Q37,38			2SK1824	FET		Q104,105			2SC4081	TRANSISTOR	
Q501			2SC4649(N,P)	TRANSISTOR		Q106			2SC4226(R24)	TRANSISTOR	
Q502,503			DTC114EE	DIGITAL TRANSISTOR							
Q504			2SC4617(S)	TRANSISTOR							
Q505			2SB1132(Q,R)	TRANSISTOR							
Q506			DTC114EE	DIGITAL TRANSISTOR							
Q508			2SC4617(S)	TRANSISTOR							
Q509			DTC363EU	DIGITAL TRANSISTOR							

## EXPLODED VIEW



## PACKING



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

## ADJUSTMENT

### Test Mode

#### ■ Test Mode Operating Features

This transceiver has a test mode. **To enter test mode, press [SCN] key and turn power on. Hold [SCN] key until test channel No. and test signalling No. appears 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.
[MON]	Monitor on and off.
[SCN]	Sets to the tuning mode.
[A]	Function on.
[D/A]	RF power high and low.
[▼]	Changes signalling.
[▲]	Changes wide and narrow
[↔]	Changes channel.
[Volume↔]	Volume up/down.

#### • LCD indicator

"SCN"	Unused.
"AUX"	Lights at RF power low.
"MON"	Lights at monitor on.
"Right side dot"	Lights at narrow.

#### • LED indicator

Red LED	Lights during transmission.
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)

Channel No.	RX	TX
1 (Center)	470.050	470.100
2 (Low)	450.050	450.100
3 (High)	489.950	489.900
4	470.000	470.000
5	470.200	470.200
6	470.400	470.400
7~16	-	-

#### • Signalling

No.	Decode	Encode
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 turned, the unit must be connected to a suitable dummy load (i.e. power meter).

The speaker output connector must be terminated with a 4Ω 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 transceiver in tuning mode)

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

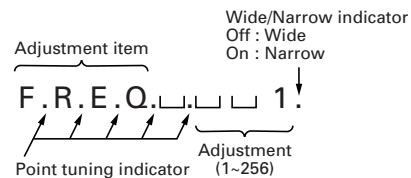
LCD display (Test mode)



Press [SCN], now in tuning mode. Use [D/A] button to write tuning data through tuning modes, and [↔] to adjust tuning requirements (1 to 256 appears on LCD).

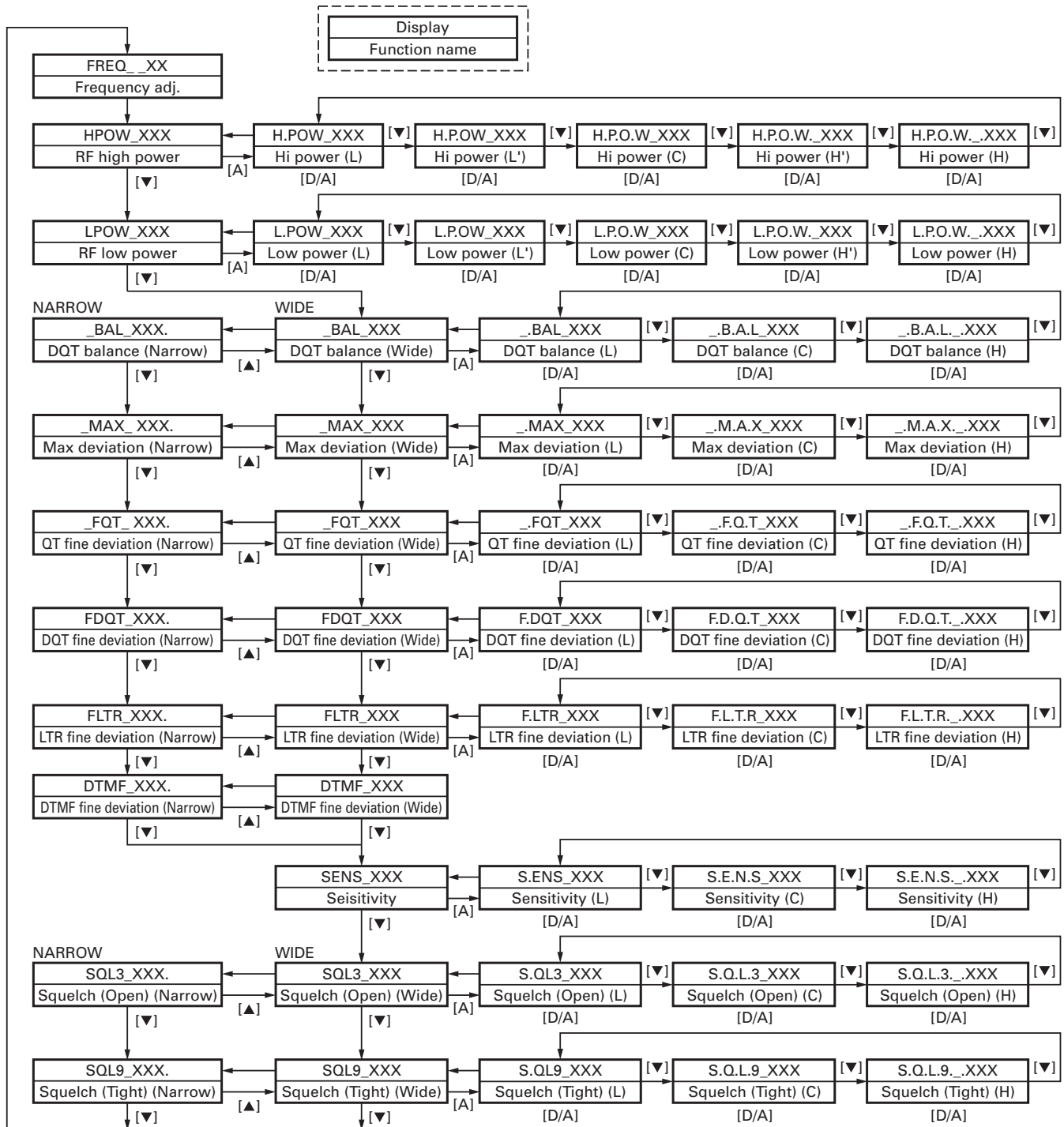
Use [▼] button to select the adjustment item through tuning modes. Use [A] button to adjust 3-point or 5-point tuning, and use [▲] button to switch between wide/narrow.

LCD display (Tuning mode)



## ADJUSTMENT

### ■ Tuning Mode



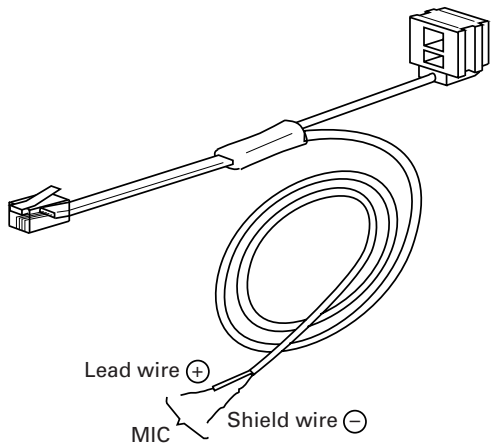
## ADJUSTMENT

### Test Equipment Required for Alignment

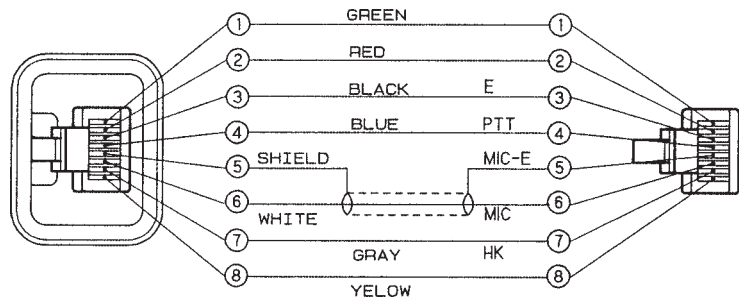
Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	450 to 490MHz Frequency modulation and external modulation -127dBm/0.1μV to greater than -7dBm/100mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 450 to 490MHz or more Vicinity of 100W
3. Deviation Meter	Frequency Range	450 to 490MHz
4. Digital Volt Meter (DVM)	Measuring Range Accuracy	1 to 20V 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		20A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 3V
9. Audio Generator (AG)	Frequency Range Output	20Hz to 20kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. 4Ω Dummy Load		Approx. 4Ω, 10W or more
12. Regulated Power Supply		13.6V, approx. 20A (adjustable from 9 to 17V) Useful if ammeter required

### Tuning cable (E30-3383-05)

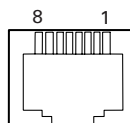
Adapter cable (E30-3383-05) is required for injecting an audio if PC tuning is used. See "PC Mode" section for the connection.



### Test cable for microphone input (E30-3360-08)



### MIC connector (Front view)

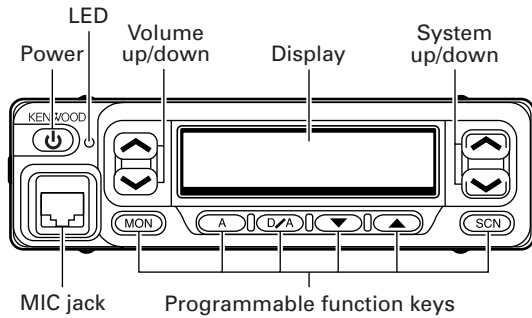


- 1 : BLC
- 2 : PSB
- 3 : E
- 4 : PTT
- 5 : ME
- 6 : MIC
- 7 : HOOK
- 8 : CM

## ADJUSTMENT

### Adjustment Location

#### ■ Switch



#### ■ Note

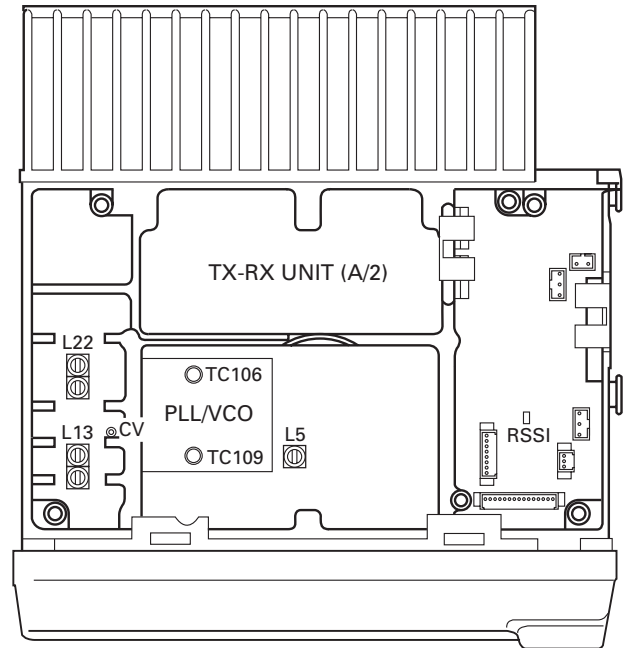
##### • Flash memory

The firmware program (User mode, Test mode, Tuning mode, etc.) and the data programmed by the FPU (KPG-76D) for the flash memory, is stored in memory. When parts are changed, program the data again.

##### • EEPROM

The tuning data (Deviation, Squelch, etc.) for the EEPROM, is stored in memory. When parts are changed, readjust the transceiver.

### ■ Adjustment Point



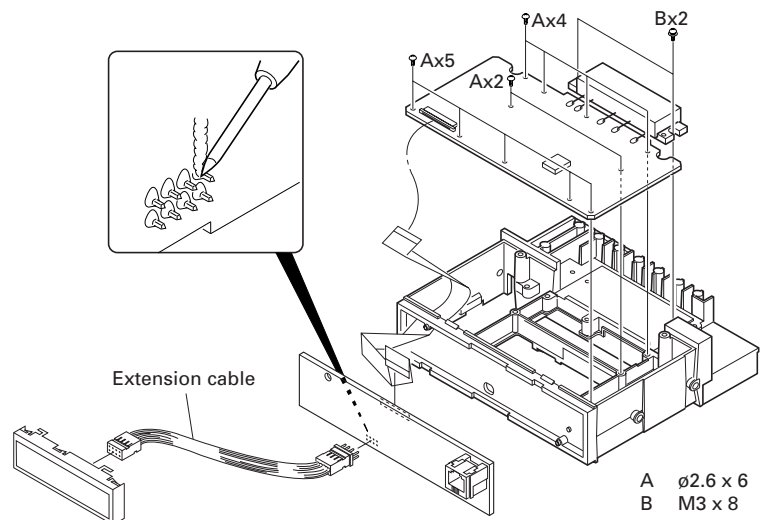
### ■ Repair Jig

#### • Chassis

Use jig (Part No. : A10-4010-02) for repairing the TK-863G. The jig facilitates the voltage check when the voltage on the component side TX-RX unit (A/2) is checked during repairs.

#### • Extension cable

Part No. : E30-3404-05



## ADJUSTMENT

## Common Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks		
		Test-equipment	Unit	Terminal	Unit	Parts	Method			
1. PLL lock voltage	RX 1) Set test mode CH : CH3 - Sig1	DVM Power meter F. conter	TX-RX (A/2)	CV	PLL	TC106	6.0V	±0.1V		
						TC109	6.5V			
	TX 2) PTT : ON (Transmit)								Check	0.9V or more
	RX 3) CH : CH2 - Sig1 AUX : ON (talk-around mode)									0.9V or more
	TX 4) PTT : ON (Transmit)						0.9V or more			

## Receiver Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Discriminator • Wide	1) Set test mode CH : CH1 - Sig1 SSG output : -53dBm/501μV SSG MOD : 3kHz AF : 1.4V/4Ω	SSG AF VTVM Oscilloscope	Rear panel	ANT ACC (EXT.SP)	TX-RX (A/2)	L5	AF output maximum.	
2. Sensitivity • Wide	1) Set test mode Select "SENS" in tuning mode. "S.E.N.S" Adjust [250] SSG freq' : 489.950MHz SSG output : -103dBm/1.58μV SSG MOD : 3kHz AF output : 1V/4Ω	SSG AF VTVM Distortion meter Oscilloscope AG	Rear panel	ANT ACC (EXT.SP)	TX-RX (A/2)	L13 L22	RSSI voltage maximum.	
	2) "S.ENS" Adjust [***] SSG freq' : 450.050MHz	DVM	TX-RX (A/2)	RSSI	Front panel	~/~	RSSI voltage maximum.	
	3) "S.E.N.S._." Adjust [***] SSG freq' : 470.050MHz							
3. Squelch 3 • Wide	1) Set test mode Select "SQL3" in tuning mode. "S.QL3" Adjust [***] SSG freq' : 450.050MHz SSG output : -124dBm/0.14μV SSG MOD : 3kHz (Wide) 1.5kHz (Narrow)	SSG AF VTVM Distortion meter Oscilloscope AG	Rear panel	ANT ACC (EXT.SP)	Front panel	~/~	Adjust to the squelch threshold point.	
	2) "S.Q.L.3" Adjust [***] SSG freq' : 470.050MHz							
	3) "S.Q.L.3._." Adjust [***] SSG freq' : 489.950MHz							
	• Narrow 4) "SQL3***." Adjust [***] SSG freq' : 470.050MHz							




## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. Squelch 9 • Wide	1) Set test mode Select "SQL9" in tuning mode. "S.QL9" Adjust [***] SSG freq' : 450.050MHz SSG output : -116dBm/0.35μV SSG MOD : 3kHz (Wide) 1.5kHz (Narrow)	SSG AF VTVM Distortion meter Oscilloscope AG	Rear panel	ANT ACC (EXT.SP)	Front panel	~/~	Adjust to the squelch threshold point.	
	2) "S.Q.L.9" Adjust [***] SSG freq' : 470.050MHz							
	3) "S.Q.L.9._." Adjust [***] SSG freq' : 489.950MHz							
	• Narrow							
4) "SQL9***." Adjust [***] SSG freq' : 470.050MHz								
5. Squelch check	1) Set test mode CH : CH1 - Sig1~CH3 - Sig1 SSG output : -116dBm/0.35μV Squelch level : 5						Check	Squelch must be opened. (Wide/Narrow)
	2) SSG output : OFF							Squelch must be closed. (Wide/Narrow)
6. QT check	1) Set test mode CH : CH1 - Sig5 SSG MOD INT : 3kHz (Wide) 1.5kHz (Narrow) EXT : 151.4Hz SSG system MOD DEV : ±3.75kHz (Wide) ±1.85kHz (Narrow) SSG output : 10dB SINAD level						Check	Squelch must be opened.
	2) CH : CH1 - Sig4 CH1 - Sig6 CH1 - Sig7							


## Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency	1) Set test mode Select "FREQ" in tuning mode. PTT : ON Adjust [_*]	Power meter F. counter	Rear panel	ANT	Front panel	~/~	Check	470.100MHz±100Hz
2. Power output	1) Maximum power Set test mode Select "HPOW" in tuning mode. "H.POW" Adjust [256] PTT : ON							

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. High power	1) Set test mode Select "HPOW" in tuning mode. "H.POW" PTT : ON Adjust [***]	Power meter F. counter	Rear panel	ANT	Front panel	~/~	25.0W	±1.0W
	2) "H.P.O.W" PTT : ON Adjust [***]							
	3) "H.P.O.W" PTT : ON Adjust [***]							
	4) "H.P.O.W." PTT : ON Adjust [***]							
	5) "H.P.O.W._." PTT : ON Adjust [***]							
4. Low power	1) Set test mode Select "LPOW" in tuning mode. "L.POW" PTT : ON Adjust [***]	Power mete					5.0W	±0.5W
	2) "L.P.O.W" PTT : ON Adjust [***]							
	3) "L.P.O.W" PTT : ON Adjust [***]							
	4) "L.P.O.W." PTT : ON Adjust [***]							
	5) "L.P.O.W._." PTT : ON Adjust [***]							
5. Power check	1) Set test mode CH : CH1 - Sig1 CH2 - Sig1 CH3 - Sig1 PTT : ON	Power meter  Ammeter	Rear panel	ANT  DC IN			Check	25W±1W, 8A or less
6. Modulation balanced • Wide	1) Set test mode MIC input : OFF Select "BAL" in tuning mode. "_.BAL" Deviation meter filter LPF : 3kHz HPF : OFF De-emphasis : OFF PTT : ON Adjust [***]	Power meter Deviation meter Oscilloscope  AF VTVM AG	Rear panel  Front panel	ANT  MIC	Front panel	~/~	Make the de- modulation waveform neat.	(Wide/Narrow)  

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
	2) “_B.A.L.” PTT : ON Adjust [***]	Power meter Deviation meter Oscilloscope	Rear panel	ANT	Front panel	~/~	Make the de-modulation waveform neat.	(Wide/Narrow) 
	3) “_B.A.L._.” PTT : ON Adjust [***]		Front panel	MIC				
• Narrow	4) “_BAL***.” PTT : ON Adjust [***]		AF VTVM AG					
7. Maximum deviation • Wide	1) Set test mode Connect AG to the MIC terminal. Select “MAX” in tuning mode. “_MAX” AG : 1kHz/50mV Deviation meter filter LPF : 15kHz HPF : OFF De-emphasis : OFF PTT : ON Adjust [***]						3.80kHz (Wide) 1.75kHz (Narrow) (According to the larger +, -)	±50Hz (Wide/Narrow)
	2) “_M.A.X” PTT : ON Adjust [***]							
	3) “_M.A.X._.” PTT : ON Adjust [***]							
• Narrow	4) “_MAX***.” PTT : ON Adjust [***]							
8. MIC sensitivity check	1) Set test mode CH : CH1 - Sig1 AG : 1kHz/5mV PTT : ON Adjust [***]						Check	±3kHz±0.2kHz (Wide) ±1.5kHz±0.05kHz (Narrow)
9. QT deviation • Wide	1) Set test mode Select “FQT” in tuning mode. “_FQT” Deviation meter filter LPF : 3kHz, HPF : OFF PTT : ON Adjust [***]				Front panel	~/~	0.75kHz	±50Hz (Wide/Narrow)
	2) “_F.Q.T” PTT : ON Adjust [***]							
	3) “_F.Q.T._.” PTT : ON Adjust [***]							
• Narrow	4) “_FQT***.” PTT : ON Adjust [***]						0.35kHz	

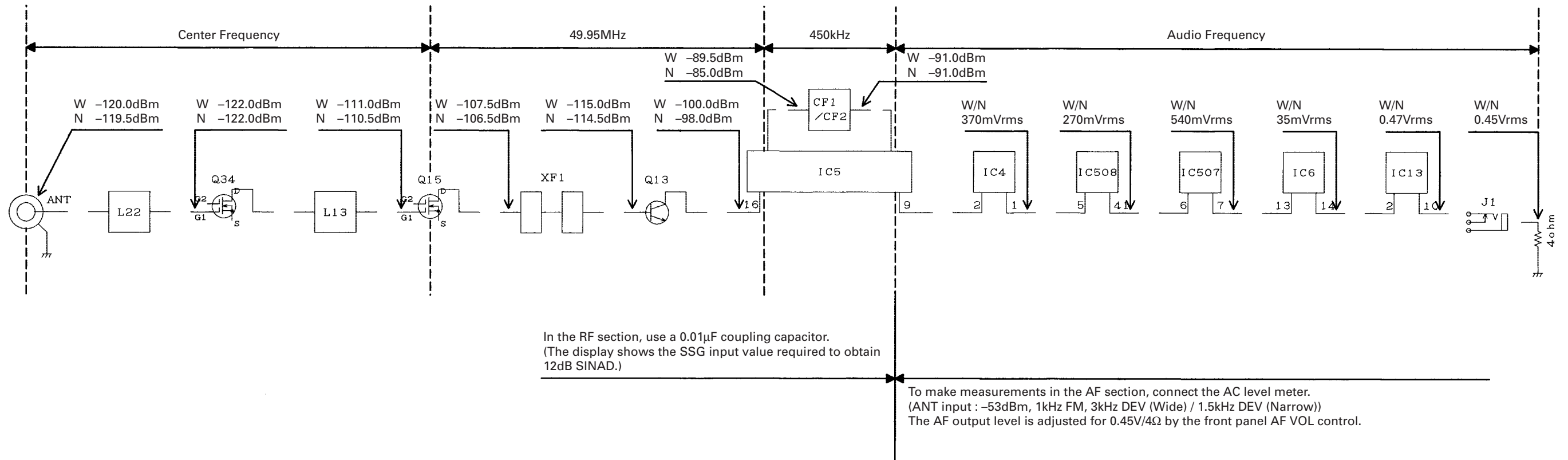
## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
10. DQT deviation • Wide	1) Set test mode Select "FDQT" in tuning mode. "F.DQT" Deviation meter filter LPF : 3kHz HPF : OFF PTT : ON Adjust [***]	Power meter Deviation meter Oscilloscope	Rear panel	ANT	Front panel	~/~	0.75kHz	±50Hz (Wide/Narrow)
	2) "F.D.Q.T" PTT : ON Adjust [***]							
	3) "F.D.Q.T._." PTT : ON Adjust [***]							
	4) "FDQT***." PTT : ON Adjust [***]	AF VTVM AG	Front panel	MIC			0.375kHz	
• Narrow								
11. LTR deviation • Wide	1) Set test mode Select "FLTR" in tuning mode. "F.LTR" Deviation meter filter LPF : 3kHz HPF : OFF PTT : ON Adjust [***]						1.0kHz	±50Hz (Wide/Narrow)
	2) "F.L.T.R" PTT : ON Adjust [***]							
	3) "F.L.T.R._." PTT : ON Adjust [***]							
	4) "FLTR***." PTT : ON Adjust [***]						0.75kHz	
• Narrow								
12. DTMF deviation • Wide	1) Set test mode Select "DTMF" in tuning mode. Deviation meter filter LPF : 15kHz HPF : OFF PTT : ON Adjust [***]						3.0kHz	±0.2kHz
	2) "DTMF***." PTT : ON Adjust [***]						1.5kHz	±0.1kHz
• Narrow								

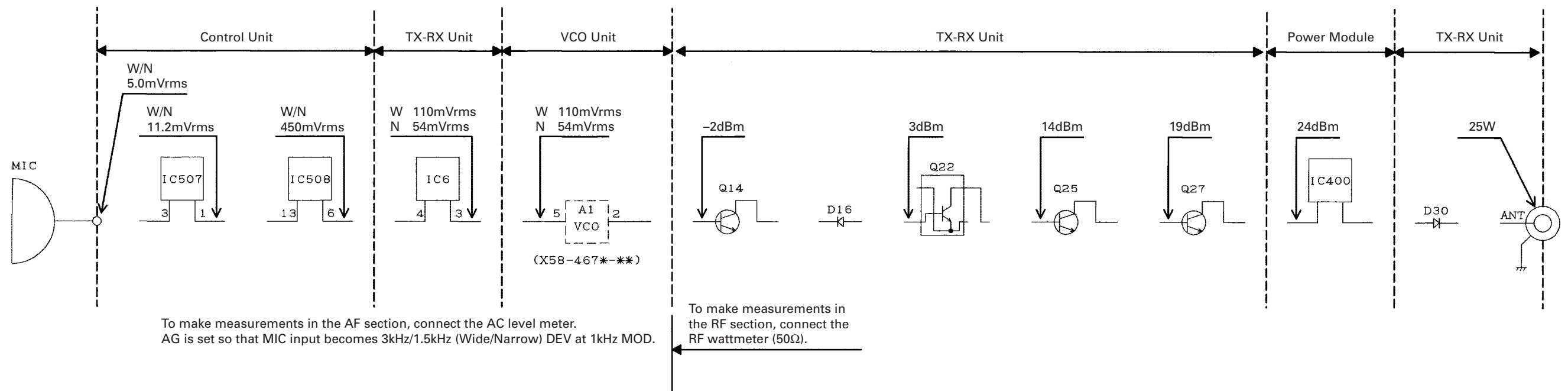
# TK-863G TK-863G

## LEVEL DIAGRAM

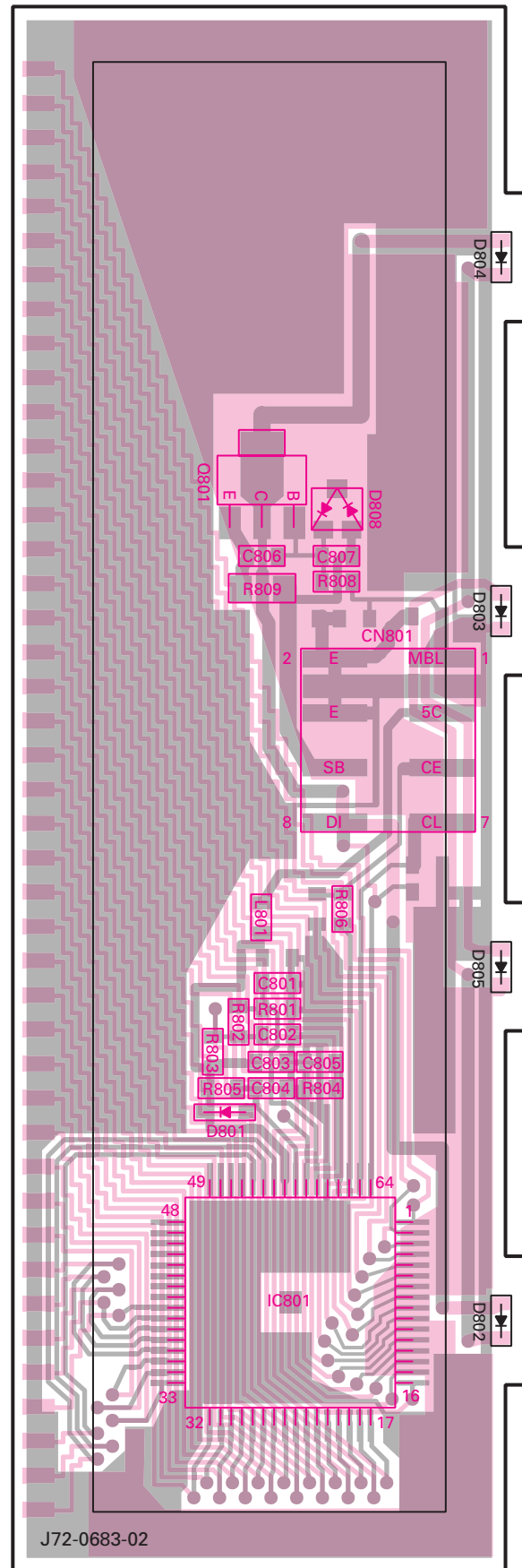
### Receiver Section



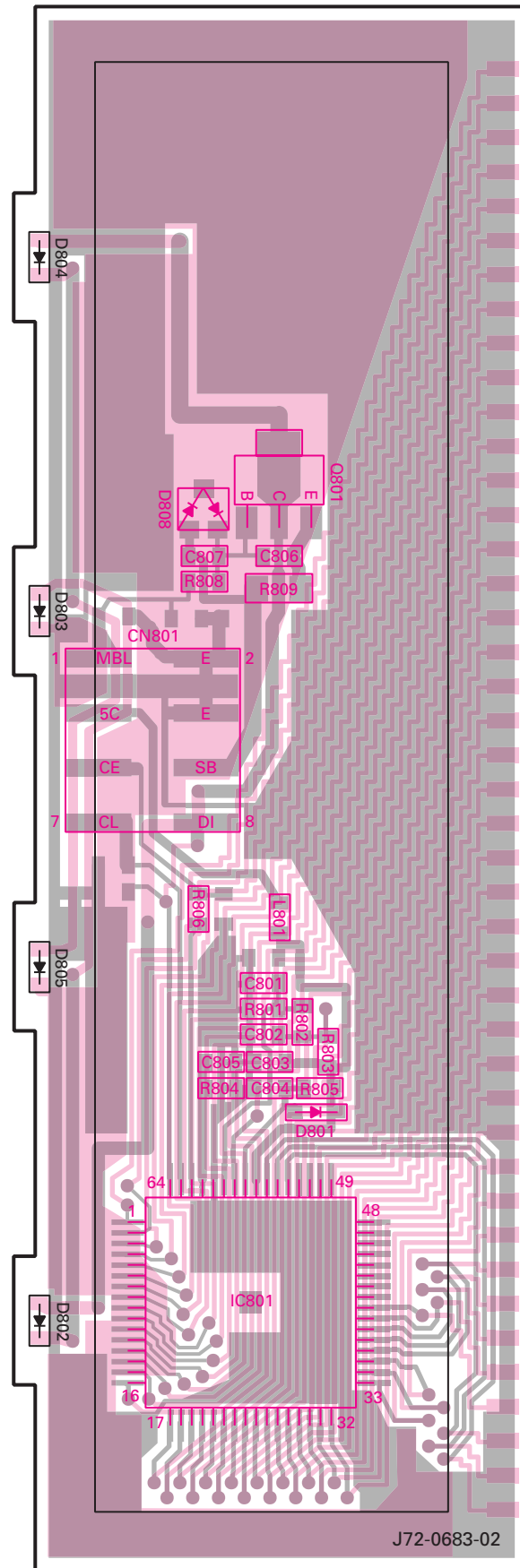
### Transmitter Section



DISPLAY UNIT (X54-3270-10) (J72-0683-02)  
Component side view

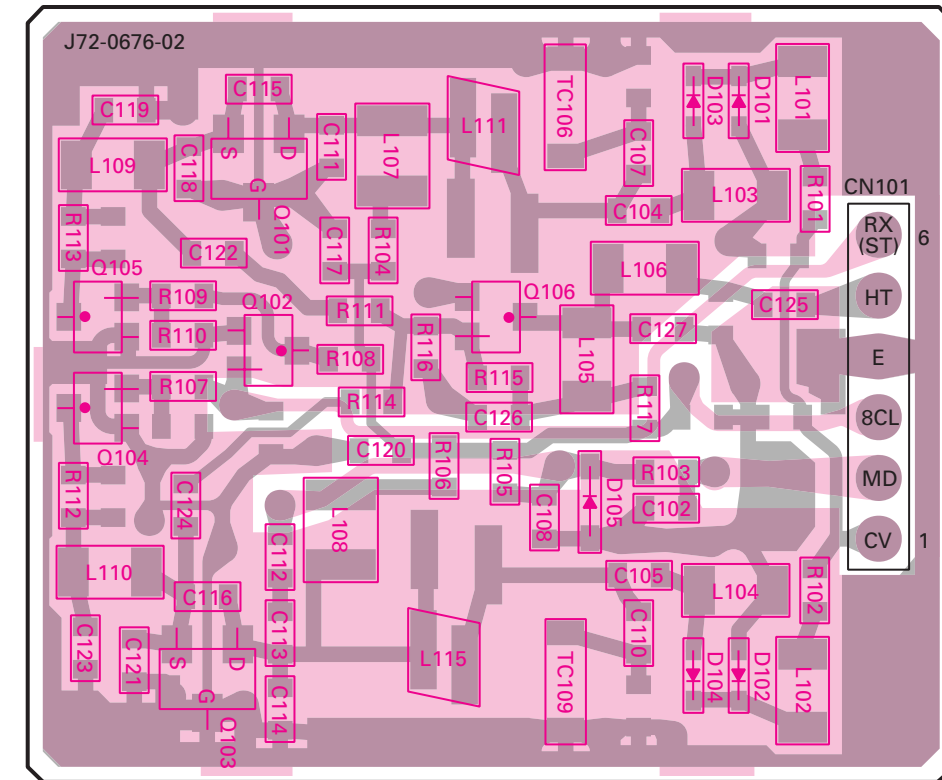


DISPLAY UNIT (X54-3270-10) (J72-0683-02)  
Foil side view

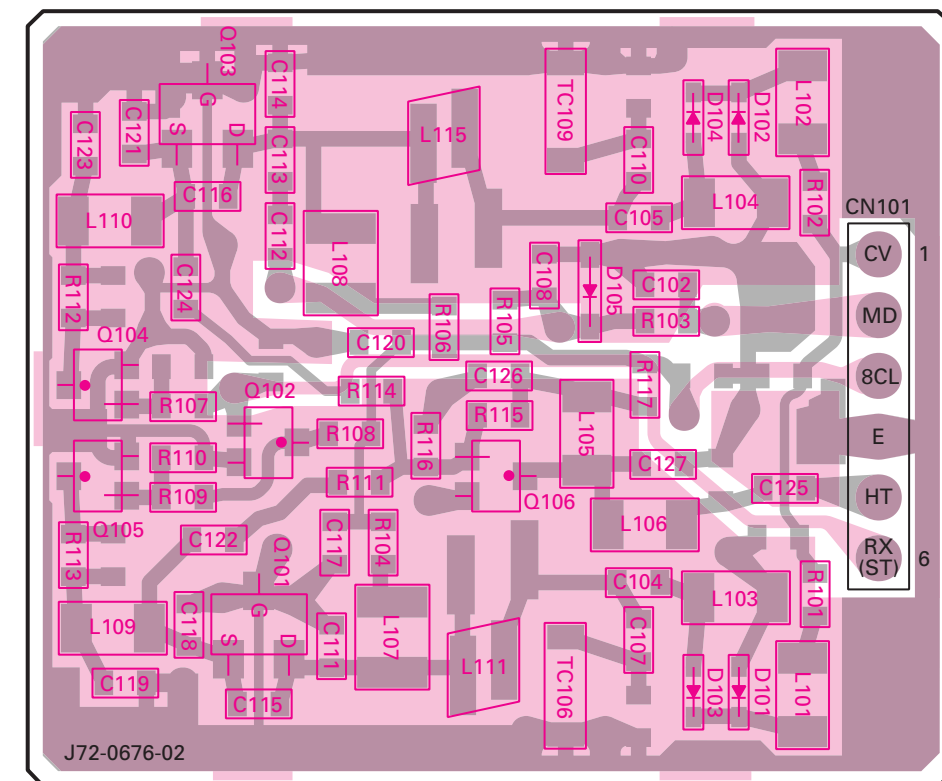


Component side Foil side

PLL/VCO (X58-4670-17) Component side view (J72-0676-02)



PLL/VCO (X58-4670-17) Foil side view (J72-0676-02)



Component side Foil side

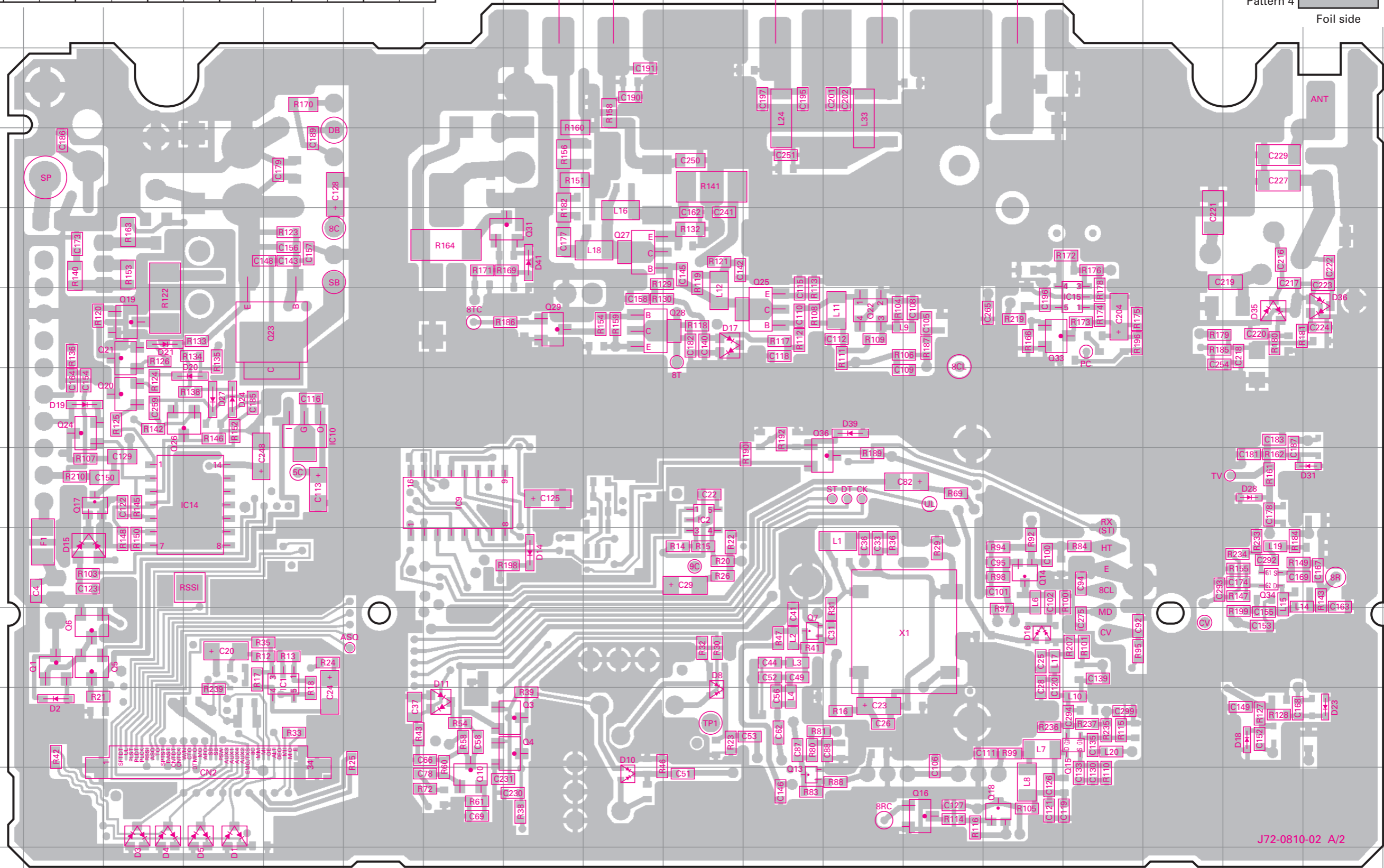
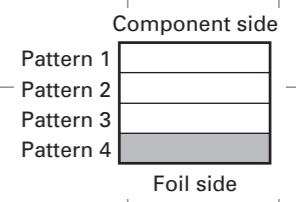
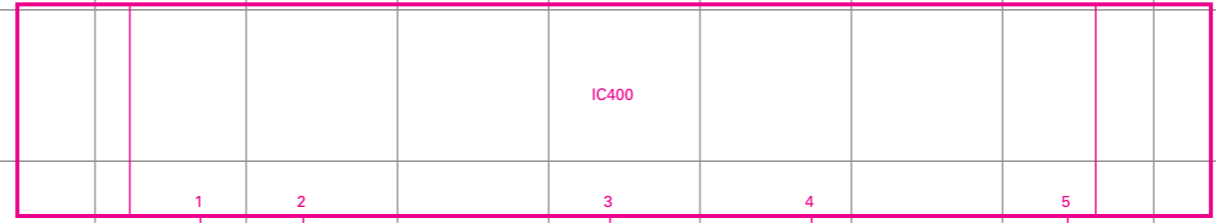




# PC BOARD VIEW TK-863G

Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address
IC1	11E	Q4	12H	Q17	9B	Q26	8C	D2	12B	D16	11N	D28	9Q
IC2	9J	Q5	11B	Q18	13N	Q27	6I	D3	13C	D17	7J	D31	9R
IC9	9G	Q6	11B	Q19	7C	Q28	7I	D4	13C	D18	12Q	D35	7Q
IC10	8E	Q7	11K	Q20	8C	Q29	7H	D5	13D	D19	8B	D36	7R
IC14	9D	Q10	13G	Q21	7C	Q31	6H	D8	12J	D20	8D	D39	8L
IC15	7O	Q13	13K	Q22	7L	Q33	7N	D10	13I	D21	7C	D41	6H
IC400	2K	Q14	10N	Q23	7E	Q34	10Q	D11	12G	D23	12R		
Q1	11B	Q15	12O	Q24	8B	Q36	9K	D14	10H	D24	8D		
Q3	12H	Q16	13M	Q25	7K	D1	13D	D15	10B	D27	8D		

TX-RX UNIT (X57-6490-10) (A/2) Foil side view (J72-0810-02)



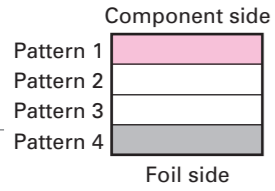
J72-0810-02 A/2



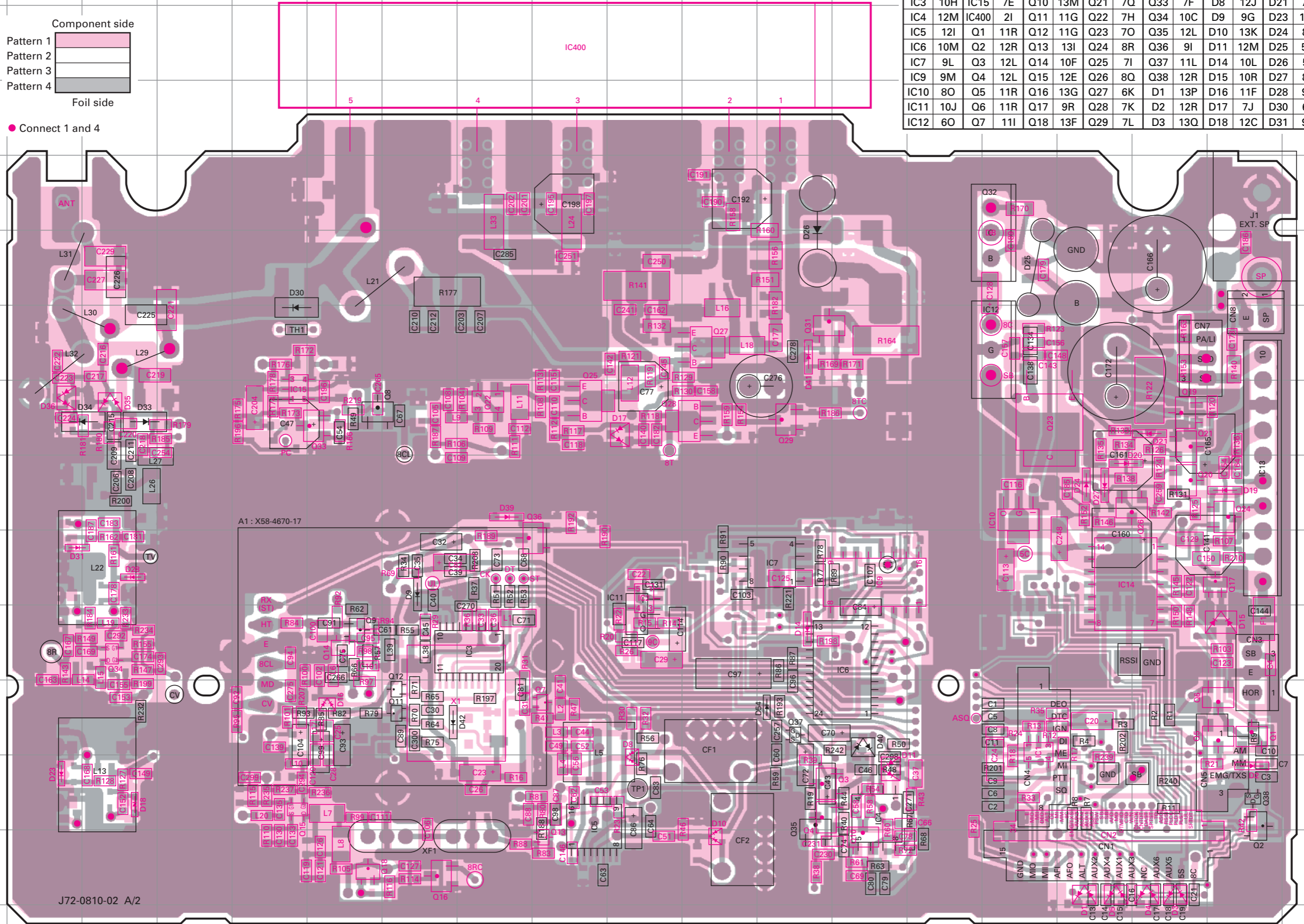
# TK-863G PC BOARD VIEW

## TX-RX UNIT (X57-6490-10) (A/2) Component side view + Foil side (J72-0810-02)

Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address
IC1	11O	IC13	8R	Q8	7F	Q19	7Q	Q31	6L	D4	13Q	D19	8R	D33	7C
IC2	9J	IC14	9P	Q9	10F	Q20	8Q	Q32	4O	D5	13P	D20	8P	D34	7C
IC3	10H	IC15	7E	Q10	13M	Q21	7Q	Q33	7F	D8	12J	D21	7Q	D35	7C
IC4	12M	IC400	2I	Q11	11G	Q22	7H	Q34	10C	D9	9G	D23	12B	D36	7B
IC5	12I	Q1	11R	Q12	11G	Q23	7O	Q35	12L	D10	13K	D24	8P	D39	8H
IC6	10M	Q2	12R	Q13	13I	Q24	8R	Q36	9I	D11	12M	D25	5O	D40	11M
IC7	9L	Q3	12L	Q14	10F	Q25	7I	Q37	11L	D14	10L	D26	5L	D41	6L
IC9	9M	Q4	12L	Q15	12E	Q26	8Q	Q38	12R	D15	10R	D27	8P	D42	11G
IC10	8O	Q5	11R	Q16	13G	Q27	6K	D1	13P	D16	11F	D28	9C	D54	11L
IC11	10J	Q6	11R	Q17	9R	Q28	7K	D2	12R	D17	7J	D30	6E		
IC12	6O	Q7	11I	Q18	13F	Q29	7L	D3	13Q	D18	12C	D31	9B		



● Connect 1 and 4



A1 : X58-4670-17

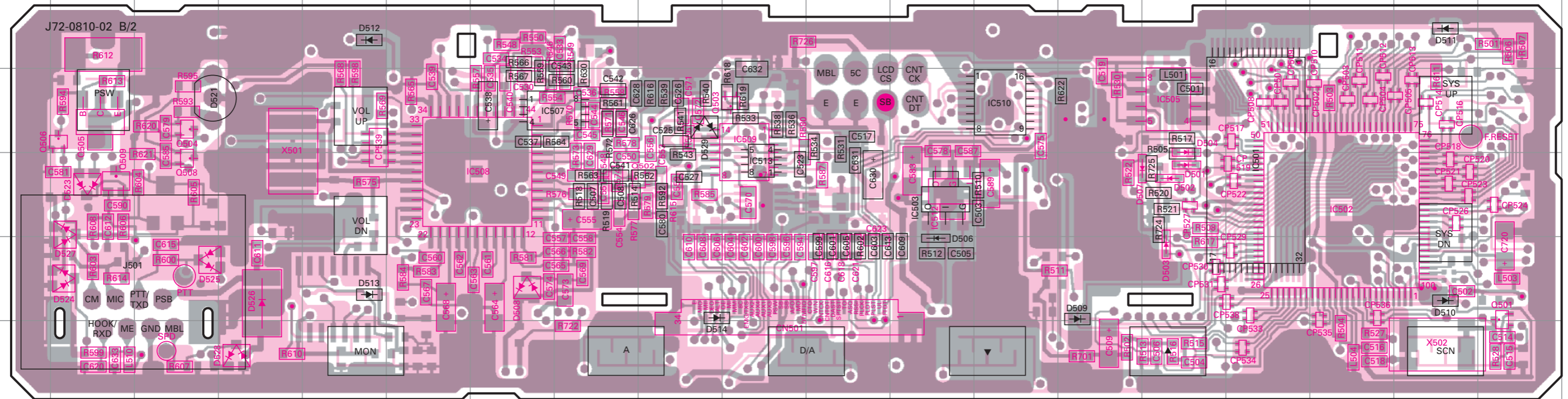
J72-0810-02 A/2



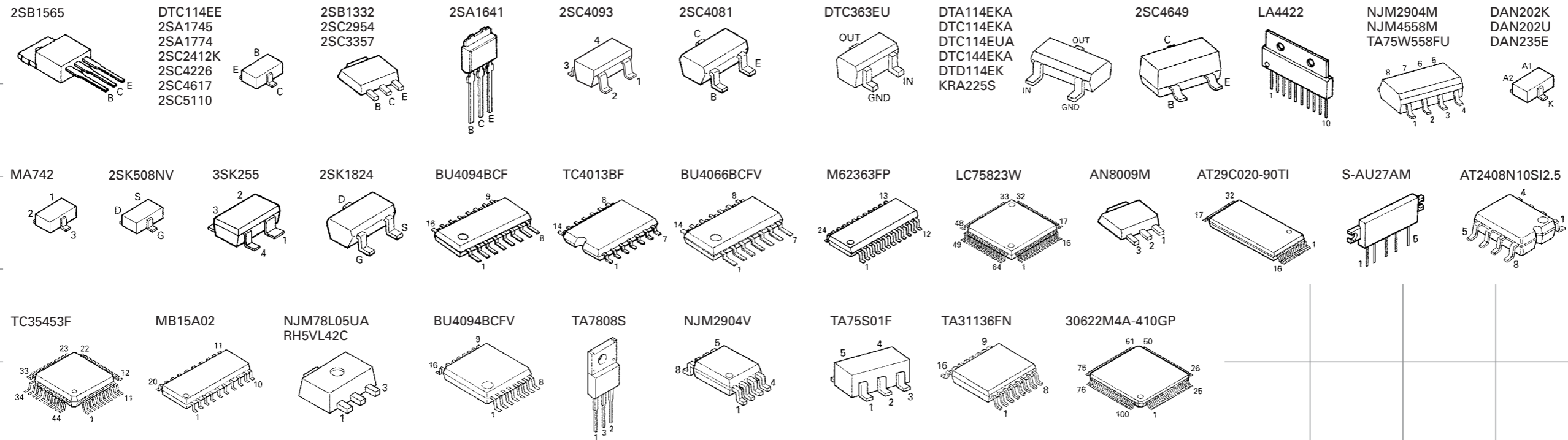
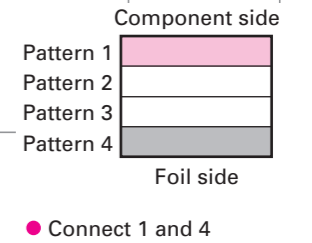


# TK-863G PC BOARD VIEW

## TX-RX UNIT (X57-6490-10) (B/2) Component side view + Foil side (J72-0810-02)

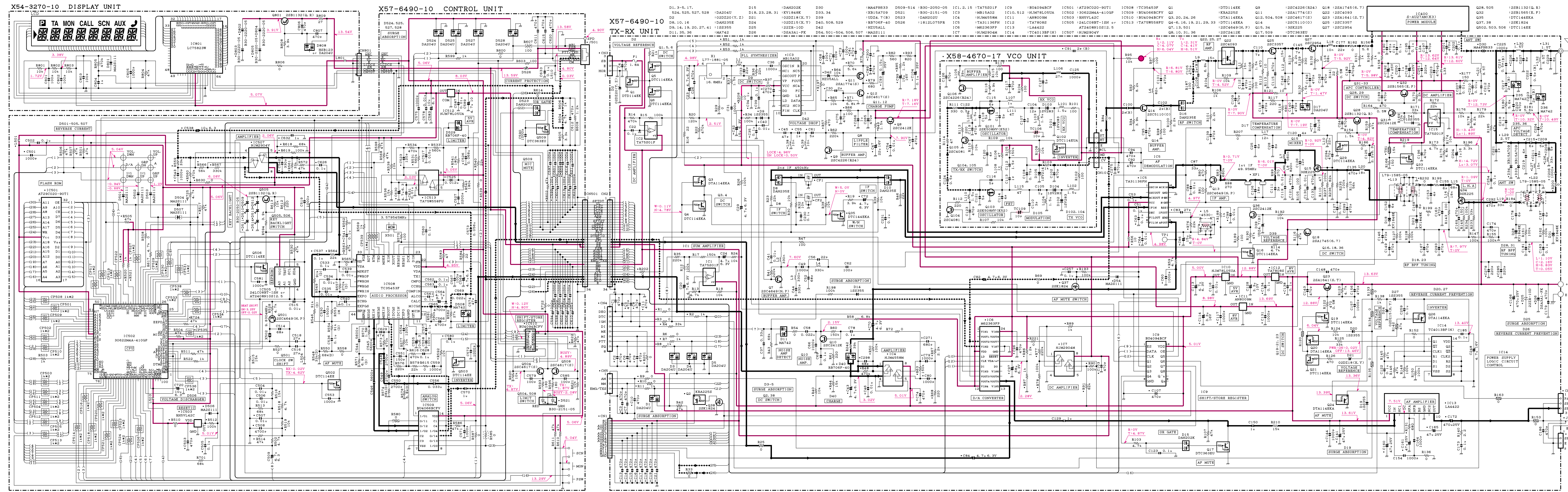


Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address
IC501	4P	IC509	3J	Q503	3J	D501	4O	D508	5G	D514	5I	D527	5B
IC502	4Q	IC510	3M	Q504	3C	D502	4O	D509	5N	D521	3C	D528	6D
IC503	4L	IC512	4L	Q505	3B	D503	5O	D510	5R	D523	4B	D529	3I
IC505	3O	IC513	4J	Q506	3B	D504	3O	D511	2R	D524	5B		
IC507	3H	Q501	5S	Q508	4C	D506	5L	D512	2E	D525	5C		
IC508	4G	Q502	4I	Q509	4B	D507	4O	D513	5E	D526	5D		

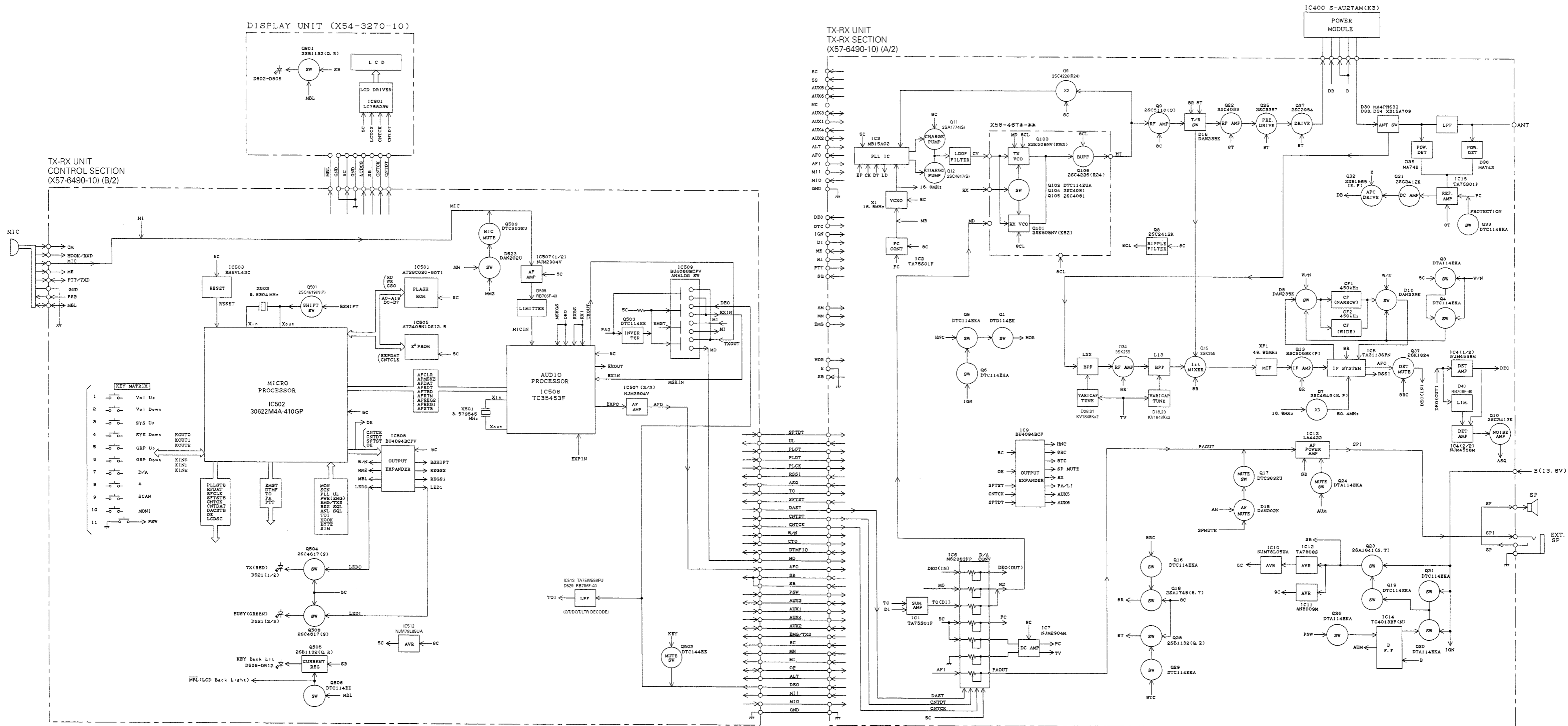




Note : Components marked with a dot (.) are parts of patterun 1.



BLOCK DIAGRAM



# TERMINAL FUNCTION

## CN1 (TX-RX Unit)

Pin No.	Name	Function
1	8C	DC 8V output.
2	5S	DC 5V output.
3	AUX5	
4	AUX6	Auxiliary output.
5	NC	Non-connection
6	AUX3	SQ : Squelch detect output. *1
7	AUX1	PTT : External PTT input. *1
8	AUX4	
9	AUX2	DTC : Data channel control/External hook input.
10	ALT	Alert tone input.
11	AFO	Receiver audio signal output.
12	AFI	Receiver audio signal input.
13	MII	Transmit audio signal input.
14	MIO	Transmit audio signal output.
15	GND	Ground

## CN3 (TX-RX Unit)

Pin No.	Name	Function
1	HOR	Horn alert/call output.
2	E	Ground.
3	SB	Switched B+, DC 13.6V output, Maximum 1A.

## CN4 (TX-RX Unit)

Pin No.	Name	Function
1	DEO	Receiver detector output. Level : 0.35Vrms (Standard modulation)
2	DTC	Data channel control/External hook input.
3	IGN	Ignition sense input.
4	DI	Data modulation input. Level : 0.7Vrms at 3kHz deviation
5	ME	External microphone ground.
6	MI	External microphone input.
7	PTT	External PTT input, active low.
8	SQ	Squelch detect output.

## CN2 (TX-RX Unit) ↔ CN501 (Control Unit)

Pin No.	Name	Function
1	SFTDT	Serial data for IC9 (Shift register).
2	UL	Lock detect.
3	PLST	Strobe signal for IC3 (PLL IC).
4	PLDT	Serial data for IC3 (PLL IC).
5	PLCK	Clock pulse for IC3 (PLL IC).
6	RSSI	Receive signal strength indicator.
7	ASQ	Analog squelch.
8	TO	Transmit sub-tone signal output.
9	SFTST	Strobe signal for IC9 (Shift register).
10	DAST	Strobe signal for IC6 (Shift register).
11	CNTDT	Control serial data for IC6.
12	CNTCK	Control clock pulse for IC6.
13	W/N	Change signal of wide or narrow.
14	CTO	Received sub-tone signal.
15	DTMFIO	DTMF signal.
16	MO	Modulation signal.
17	AFO	Receiver audio signal.
18	SB	Switched B.
19	SB	Switched B.
20	PSW	Power switch.
21	AUX3	Squelch detect output.
22	AUX1	External PTT input.
23	AUX4	
24	AUX2	
25	EMG/TXS	Foot switch input signal.
26	8C	DC 8V.
27	MM	MIC mute.
28	MI	External MIC input signal.
29	OE	Output enable for IC9 (Shift register).
30	ALT	Alert tone signal.
31	DEO	Receiver detector output.
32	MII	Transmit audio signal input.
33	MIO	Transmit audio signal output.
34	GND	Ground.

## CN5 (TX-RX Unit)

Pin No.	Name	Function
1	AM	Speaker mute input, active high.
2	MM	MIC mute input, active high
3	EMG/TXS	EMG : Foot switch input, active low. *2

## CN7 (TX-RX Unit)

Pin No.	Name	Function
1	PA/LI	Relay for PA function KAP-1 control. "H" : PA/LI on, "L" : PA/LI off
2	SPO	Audio signal output to KAP-1
3	SPI	Audio signal input from KAP-1

## CN8 (TX-RX Unit)

Pin No.	Name	Function
1	SP	Audio signal output to internal/external speaker.
2	E	Ground

## J501 (Control Unit)

Pin No.	Name	Function
1	MBL	MIC backlight control.
2	PSB	13.6V.
3	GND	Ground.
4	PTT/TXD	PTT.
5	ME	MIC ground.
6	MIC	MIC signal input.
7	HOOK/RXD	Hook detection
8	CM	MIC data detection.

## CN101 (PLL/VCO) ↔ TX-RX Unit

Pin No.	Name	Function
1	CV	Control voltage input.
2	MD	Modulation input.
3	8CL	8V input.
4	E	Ground.
5	HT	Signal output.
6	RX (ST)	Switched transmit input. H : Transmit

## SPECIFICATIONS

### GENERAL

Frequency Range .....	450 to 490MHz
Number of Systems .....	Maximum 32 systems
Number of Groups .....	Maximum 250 groups
Channel Spacing .....	Wide : 25kHz    Narrow : 12.5kHz
PLL Channel Stepping .....	5, 6.25kHz
Operating Voltage .....	13.6V DC $\pm$ 15%
Current Drain .....	Less than 0.4A on standby Less than 1.0A on receive Less than 8.0A on transmit
Operating Temperature Range .....	-30°C to +60°C (-22°F to +140°F)
Dimensions & Weight .....	140 (5-33/64) W x 40 (1-37/64) H x 145 (5-45/64) D mm (inch), 940g (2.07 lbs)
Channel Frequency Spread .....	40MHz

### RECEIVER (Measurements made per EIA standard EIA/TIA-204-D)

Sensitivity (12dB SINAD) .....	Wide : 0.28 $\mu$ V    Narrow : 0.35 $\mu$ V
Selectivity .....	Wide : 80dB    Narrow : 65dB
Intermodulation .....	Wide : 75dB    Narrow : 63dB
Spurious Responce .....	85dB
Audio Power Output .....	4.0W
Frequency Stability .....	$\pm$ 2.5ppm

### TRANSMITTER (Measurements made per EIA standard EIA-152-C)

RF Power Output .....	25W
Spurious and Harmonics .....	65dB
Modulation .....	Wide : 16K0F3E    Narrow : 11K0F3E
FM Noise .....	Wide : 50dB    Narrow : 45dB
Audio Distortion .....	Less than 3%
Frequency Stability .....	$\pm$ 2.5ppm

# TK-863G

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