UHF FM TRANSCEIVER

TK-380

SERVICE MANUAL

REVISED

KENWOOD

© 1999-4 PRINTED IN JAPAN
B51-8455-10(S) 1367

This service manual is same at the TK-380(B51-8455-00) service manual with destination K, K4 and M with the exception of new destination, K2, K3, K5, K6 and M3.

Photo is K4 type with KRA-15

CONTENTS

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

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 data. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions. These are issued as required.

ORDERING REPLACEMENT PARTS

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

PERSONNEL SAFETY

The following precautions are recommended for personnel safety:

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

SERVICE

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

NOTE

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

FCC COMPLIANCE AND TYPE NUMBERS

Type	Type acceptance number	Frequency range	Compliance
K,K4	ALH24623110	450~490MHz	Parts 22,74,80,90,95
K2,K5	ALH24623120	470~512MHz	Parts 22,74,80,90,95
K3,K6	ALH24623130	400~430MHz	Parts 22,74,80,90,95

Model & destination		Unit X57-5750-XX			X54-3210-XX		Frequency range	Remarks	QT/DQT	DTMF	Charger	Battery	16 Key
		0-10	0-11	0-12	0-10	0-11							
TK-380	K, M	○			○		450~490MHz	IF1 : 44.85MHz	○	×	OP	OP	–
	K4	○				○		LOC : 44.395MHz		○			○
	K2		○		○		470~512MHz	IF1 : 44.85MHz	○	×	OP	OP	–
	K5		○			○		LOC : 44.395MHz		○			○
	K3, M3			○	○		400~430MHz	IF1 : 44.85MHz	○	×	OP	OP	–
	K6			○		○		LOC : 44.395MHz		○			○

SYSTEM SET-UP

Merchandise received
↓
License and frequency allocated by FCC
↓
Choose the type of transceiver →

Frequency range (MHz)	RF power	Type
TX/RX 450~490	4.0W	TK-380 K,K4,M
TX/RX 470~512	4.0W	TK-380 K2,K5
TX/RX 400~430	4.0W	TK-380 K3,K6,M3

↓
Transceiver programming

A personal computer (IBM PC or compatible), programming interface (KPG-36), and programming software (KPG-49D) are required for programming.
(The frequency, trunked system features, conventional system features, TX power HI/LOW, and signalling data are programmed for the transceiver.)

↓
Are you using the speaker microphone? — YES → KMC-25 Speaker microphone (Option)
NO
↓
Delivery

OPERATING FEATURES

1. Operation Features

The TK-380 is an UHF FM radio designed to operate in both trunking format and conventional format. The programmable features are summarized.

Model ─┬─ Trunking Format ─┬─ Trunking mode
       └─ Conventional Format └─ Conventional mode

■ **Trunking Format**

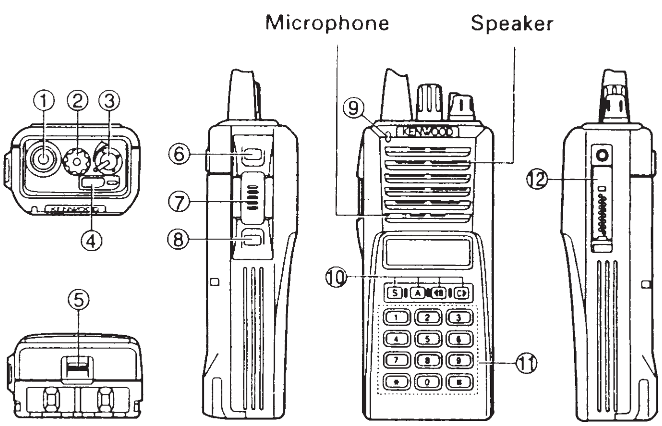
This format can handle up to 32 systems with up to 250 groups in each system. The transceiver can be used in both trunked mode and conventional mode. Systems, groups, and their functions are programmed.

■ **Conventional Format**

This format can handle up to 250 groups with 250 channels in each group.
The transceiver can be used only in conventional mode. Groups, channels, and their functions are programmed.

2. Transceiver Controls and Indicators

2-1. Physical Layout



Note: The transceiver is also available without the DTMF keypad (⑪).

2-2. Panel controls

The key on the top and front panel is momentary-type push buttons. The functions of these keys and knob are explained below.

① Antenna connector

Connect the supplied antenna here.

② System or Group selector knob (Programmable)

- **Trunking Format**

Turning the system (or group) selector knob clockwise increases the system (or group) number by one. Turning the knob in the counterclockwise direction decreases the system (or group) number by one.
After the system number (or group number) reaches the highest system number (or group number), it goes back to lowest system number (or group number).
System numbers (or group numbers) not set are skipped.
Caution : The FPU (KPG-49D) allows selecting between system selector and group selector.

- **Conventional Format**

Turning the group (or channel) selector knob clockwise increases the group (or channel) number by one. Turning the knob in the counterclockwise direction decreases the group (or channel) number by one.
After the group number (or channel number) reaches the highest group number (or channel number), it goes back to lowest group number (or channel number).
Group numbers (or channel numbers) not set are skipped.
Caution : The FPU (KPG-49D) allows selecting between group selector and channel selector.

③ Volume/Power switch

- **Trunking Format**

Transceiver Power and Volume switch. Turn clockwise to switch On the transceiver. Turn counterclockwise fully to switch OFF the transceiver. Also adjusts the volume level. When the power is switched off, all the parameters, such as the system and group, are stored in memory. When the power is switched on again, the system returns to the previous conditions.

- **Conventional Format**

Transceiver Power and Volume switch. Turn clockwise to switch On the transceiver. Turn counterclockwise fully to switch OFF the transceiver. Also adjusts the volume level. When the power is switched off, all the parameters, such as the group and channel, are stored in memory. When the power is switched on again, the group returns to the previous conditions.

④ Auxiliary (orange) key (Programmable)

⑤ Battery pack release catch

Push down to release the battery pack. See Installing the Ni-Cd Battery Pack.

⑥ MONITOR key* (Programmable)

⑦ PTT (Push-To-Talk) key

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

⑧ LAMP key* (Programmable)

⑨ TX/BATT indicator

This red LED lights during transmission (it does not light during busy or when transmit is prohibited). If the battery voltage falls below the programmed voltage during transmission, the brightness of this indicator decreases at intervals of about one second, so it can be used as the battery voltage alert function.

OPERATING FEATURES

⑩ **S, A, ◄ B, and C ► key (Programmable)**

⑪ **DTMF keypad (keypad model only)**
Press the keys on the telephone keypad to send DTMF tones.

⑫ **Universal connector**
Connect the external KMC-25 speaker/ microphone (optional) here. Otherwise, keep the supplied cover in place.

* : MONITOR and LAMP are arbitrary names chosen for these buttons. They can be used for any of the auxiliary functions.

2-3. Programmable keys

The FPU (KPG-49D) enables programmable keys to select the following functions.

■ Trunking Format

Auto Tel, AUX(only when Voice Scrambler is not selected), Connect ID, Disconnect ID, Display Character, Emergency (only AUX key), Function, Group Down, Group Up, Home Group, Key Lock, Lamp, Memory (RCL/STO), Memory (RCL), Memory (STO), Monitor A, Monitor B, Monitor C, Monitor D, Redial, RF Power Lo, Scan, Scan Del/Add, Scan Temporary Delete, Scrambler (Only when Voice Scrambler is selected), System Down, System Up, TEL Disconnect and none.

■ Conventional Format

AUX(only when Voice Scrambler is not selected), Channel Down, Channel UP, Connect ID, Disconnect ID, Display Character, Emergency (only AUX key), Function, Group Down, Group Up, Home Channel, Key Lock, Lamp, Memory (RCL/STO), Memory (RCL), Memory (STO), Monitor A, Monitor B, Monitor C, Monitor D, Operator Selectable Tone, Redial, RF Power Lo, Scan, Scan Del/Add, Scrambler (Only when Voice Scrambler is selected), Talk Around and none.

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

1) Auto TEL (Trunking Format)

Automatically connects available repeaters that are connected to telephone circuits when operating as LTR system. The time allocated to search for available repeaters is 60 seconds, after which connection failure occurs, a DTMF tone is output and the function terminates.
If connection to an available circuit is made, only ID 253, EOT or hang-up time-out can terminate the function.

2) AUX

This function can be programmed when the voice scrambler board is not installed.
If this key is pressed, an underscore ("_") appears at the extreme right of the LCD and AUX port which is inside of the transceiver turns to the active level. If pressed again, the underscore disappears and the AUX ports turns to the deactive level.

3) Channel up/down (Conventional Format)

When the key is pressed each time, the channel number to be selected is incremented/decremented and repeats if held for one second or longer.
This key works as the voice scrambler code selector in the voice scrambler code select mode.

4) Connect ID

Pressing this key in Conventional mode, automatically sends the preset Connect ID.

5) Disconnect ID

Pressing this key in Conventional mode, automatically sends the preset Disconnect ID.

6) Display character

- **Trunking Format**
  This key switches the LCD display between the system/ group number and system/group name.
- **Conventinal Format**
  This key switches the LCD display between the group/ channel number and group/channel name.

7) Emergency

- **Trunking Format**
  Pressing this key for longer than the programmed "Emergency Key Delay Time" causes the transceiver to enter the emergency mode. The transceiver jumps to the programmed "Emergency System/Group" and transmits for the programmed "Active Time".
  The transceiver disables mic mute while transmitting. After finishing transmission, the transceiver receivers for the programmed "Interval Time". The transceiver mutes the speaker while receiving. Following the above sequence, the transceiver continues to transmit and receive.
- **Conventinal Format**
  Pressing this key for longer than the programmed "Emergency Key Delay Time" causes the transceiver to enter the emergency mode. The transceiver jumps to the programmed "Emergency Group/Channel" and transmits for the programmed "Active Time".
  The transceiver disables mic mute while transmitting. After finishing transmission, the transceiver receivers for the programmed "Interval Time". The transceiver mutes the speaker while receiving. Following the above sequence, the transceiver continues to transmit and receive.

8) Function

Pressing this key causes the transceiver to display "FCN". Then, pressing a DTMF key causes the corresponding programmed function to start. This key may be convenient when using many functions with the 12-key keypad (K4, K5, K6 type).

OPERATING FEATURES

9) 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. In Conventional format, this key works as the voice scrambler code selector in the voice scrambler code select mode.

10) Home Channel (Conventional Format)
Press this key once, the channel switches to the pre-programmed home channel.

11) Home group (Trunking Format)
Each pressing of the key selects a preset system/group.

12) Key lock
Pressing this key causes the transceiver to accept entry of only the [Function], [Key Lock], [PTT], [Lamp], [Monitor A], [Monitor B], [Monitor C], [Monitor D], and [Emergency] keys. The locked keys also include the tuning control.

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

14) 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 10 digits per memory.

15) Monitor
Used to release signalling or squelch when operating as a conventional. It is also used to reset option signalling.

16) Operator Selectable Tone (Conventional Format)
This key switches the pre-set decode QT/DQT and encode QT/DQT to OST (Operator Selectable Tone) tone pair.
Press this key, the transceiver enters to OST select mode. In this mode, the display shows "OFF" and the operator can select one of the OST tone pair using the tuning control. The display shows "TONE ∗∗" and tone pair No. ∗∗ is selected.
Press OST key again, the transceiver exits from the OST select mode, and returns to the group/channel mode with the handset indicator (☎) means that the OST tone pair is selected. OST tone pair number or OFF can be memorized for each channel.
16 kinds of tone pair for OST can be programmed by KPG-49D. OST is useful to access the repeater with same radio frequency and different tone (QT/DQT).

17) Redial
Pressing this key when System/Group(Trunking Format), Group/Channel (Conventional Format) is shown, displays the previously transmitted DTMF code. Pressing [PTT] at this time, transmits the code that is currently displayed.

18) RF power low
Used to temporarily switch transmission output to low power. Turning the function on enables:
Hi→Low, Low→Low
Key states are backed up, except in the PC mode when they are reset.

19) Scan
Press this key starts scanning. Pressing this key stops scanning.

20) Scan Del/Add
- **Trunking Format**
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.
- **Conventinal Format**
This key switches the currently displayed channel between "Delete" and "Add".
The "Add" channel contained in the scan sequence, and "Delete" channel is not contained. In the scan mode, this key switches the channel delete or add temporarily.

21) Scan temporary delete (Trunking Format)
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".

22) Scrambler
If a scrambler code (1 to 4) has been set in the FPU, an underscore ("_") appears at the extreme right of the LCD display when scrambler is active. Pressing this key changes ON/OFF of scramble operation.
Holding this key down for 2 seconds sets Scramble Code Select Mode

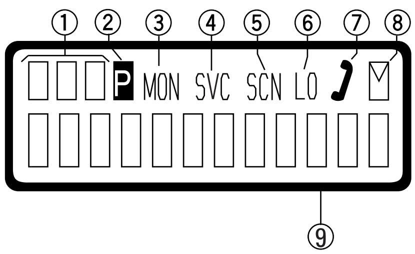
23) System up/down (Trunking Format)
When the key is pressed each time, the system number to be selected is incremented/decremented and repeats if held for one second or longer.

24) Talk Around (Conventional Format)
Press this key, the transceiver uses the receive frequency and the tone for transmission.
The operator can call the other party directory (without repeater). Press this key again, the talk around function goes off.

25) Telephone disconnect (Trunking Format)
Pressing this key ends an RIC connection (disconnects the telephone line).

26) None
Sounds error operation beep, and no action will occur.
Use this function when the transceiver is required to be more simple operated.

2-4. Display



① **Sub display**
Displays the system, channel and group numbers. Also displays various functions, such as TA.

② **P (Priority) indicator**
The P indicator (P) appears when a selected channel is programmed as priority, in conventional operation.

③ **MON (Monitor) indicator**
The MON indicator appears when the button programmed as MONITOR is pressed.

④ **SVC (Service) indicator**
This icon is not used on this transceiver.

⑤ **SCN (Scan) indicator**
The SCN indicator appears when using Scan mode.

⑥ **LO indicator**
Appears when low power is selected.

⑦ **Handset indicator**
The handset indicator (☎) appears when the selected group is programmed as telephone IDs. (Trunking Format) In Conventional Format, the handset indicator (☎) appears when the OST tone pair is selected.

⑧ **MAIL indicator**
This icon is not used on this transceiver.

⑨ **Alphanumeric display**

- **Trunking Format**
  The twelve-character dot matrix alphanumeric display shows the system and group numbers. You can program system and group names with up to ten characters in place of these numbers. The left display is used as a delete indicator (►) and the right is used for the selective call (⁜) or scrambler (_) function. The delete/add indicator shows the systems locked out of the scanning sequence. Selective call and scrambler are optional functions that can be programmed.
- **Conventinal Format**
  The twelve-character dot matrix alphanumeric display shows the group and channel numbers. You can program group and channel names with up to ten characters in place of these numbers. The left display is used as an add indicator (▼) and the right is used for the selective call (⁜) or scrambler (_) function. The add indicator shows the channels unlocked out of the scanning sequence. Selective call and scrambler are optional functions that can be programmed.

3. Scan Operating

3-1. In Case of Trunking Format

1) System scan

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

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

System Scan consists of the following 2 types.

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

- **List type system scan**
  A scan list can be set for each system.
  The list to be scanned can be changed by changing the display system
  If many system have been set, the scan speed can be increased by narrowing the systems to be scanned with scan lists.

2) System lockout

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

- **Fixed lockout**
  The system to be locked out is selected by programming. When a locked system is selected, the Delete (►) 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.

OPERATING FEATURES

- **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.

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

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

4) Dwell time

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

5) System/Group revert

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

- **Last called revert**

The system 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.

6) Scan message wait

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

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

7) Group scan operation

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

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

8) In Conventional system.

If QT or DQT is set for the 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.

3-2. In Case of Conventional Format

1) Scan types

- **Single Group Scan**

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

- **Multiple Group Scan**

You can scan all valid (ADD) channels in the all valid (ADD) group.

2) Scan Start Condition

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

When you activate the key programmed to the scan function, the scan starts. The scan icon “SCN” lights and “-SCAN-” or revert channel (programmable) is indicated on alphanumeric display.

3) Scan Stop Condition

The scan stops temporarily if the following conditions are satisfied.

① A carrier is detected, then signalling matches on channels for which receive the signalling is set by the programming software.

② A carrier is detected on the channel for which receiving signalling is not set by the programming software or when the monitor (signalling cancel) function is activated.

4) Scan Channel Types

① Priority channel is the most important channel for the scan, and always detects a signal during scan and when the scan stops temporarily.

OPERATING FEATURES

② Non-priority channels detects a signal during scan. For the channels that can be selected with the group or channel selector when the scan does not occur, adds an indicator "▼" lights.

5) Priority Channel Setting

A priority channel can be set as follows with the programming software (KPG-49D).

① Specify a priority channel as a fixed priority channel.
② Make a selected channel a priority channel.

6) Scan Type According to the Priority Channel

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

7) Revert Channel

The revert channel is used to transmit during scanning and set by the programming software (KPG-49D).

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

8) Scan End

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

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

9) Temporarily Delete/Add

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

When you would like to add the deleted channel temporarily to scan sequence, select the desired (deleted) channel during scan, activate the delete/add function (for example press the key) before scan re-start.

That channel is added temporarily to scan sequence. The temporary deleted or added channels are returns to pre-set delete/add, when the transceiver exits from scan mode.

4. Details of Features

4-1. In Case of Trunking Format/Conventional Format

1) 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.

2) Sub LCD

You can use 3-digit the display to display the system number, channel number or group number. It is useful when the main (12-digit) display indicates system, group or channel name or other functions.

3) Selective Call Alert LED

You can select whether or not the LED on the transceiver flashes in an orange color when selective call was occurred.

4) PTT ID

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

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

The transceiver is capable to have ID. The format is DTMF. The timing that the transceiver sends ID is programmable.

Connect ID : Connect ID is sent on beginning of transmission.
Disconnect ID : Disconnect ID is sent on end of transmission.
Both : Connect ID is sent on beginning of transmission and disconnect ID is sent on end of transmission.
There is also "PTT ID" setting for each channel.

5) Radio password

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

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

OPERATING FEATURES

6) Battery Warning

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

Then more low voltage is detected during transmission, the transceiver stops transmission and warns it by flashing red "LED" and beep.

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

7) Minimum Volume

The minimum volume is programmable (off (0) to 31). The transceiver remains the minimum volume level however the mechanical volume position is set to zero.

4-2. In Case of Trunking Format

1) 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.

2) 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.

3) System search

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

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

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

4) Transpond

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

5) Transmit inhibit

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

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

6) Auto TEL

A telephone interconnect call can be made by simply pressing the key by assigning this feature to the key. This feature accesses the TEL channel of the available system automatically.

When the key is pressed, a queue tone is output, and the “AUTO TEL” appears on the alphanumeric display along with a flashing handset indicator (☎) to indicate that this mode has been entered. If the TEL ID is set for the revert system, the TEL channel of that system is accessed. If all TEL channels are busy, an attempt is made to access the TEL channels of another system in which the TEL ID code has been programmed. It is repeated for 60 seconds until the access succeeds. If the access succeeds, a dial tone returns from the repeater. If the key is pressed again when the queue tone is sounding, this mode is canceled.

If the access fails after 60 seconds, a deny tone is output and this mode is terminated. When the talk ends, the revert system/group returns. When the scan mode is effective, the scan resumes. The Auto TEL feature can be programmed to turn on or off for each system.

4-3. In Case of Conventional Format

1) "TOT" Pre-Alert

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

"TOT" will be expired when the selected time passes from a TOT pre-alert tone.

2) "TOT" Re-Key Time

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

OPERATING FEATURES

3) "TOT" Reset Time

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

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

4) OST (Operator Selectable Tone)

The transceiver is capable to have "OST" function and 16 tone pair (QT/DQT) with max 10-digit name for each tone pair.

- **"OST" Back Up**

The transceiver is programmable the selected "OST" code is memorized or not. If you set to Disable (no memorized), the "OST" function always starts at "off".

- **Direct "OST"**

It is possible to call "OST" number directory using keypad. In this case, keypad is used for "OST", then "Auto PTT" "Store & Send" functions by keypad are not usable.

5) Clear to Transpond

The transceiver waits the transpond of 2-Tone/DTMF if channel is busy until channel open. This feature prevents the interference to other party.

6) Battery Save

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

5. Option Signalling (DTMF/2 tone)

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

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

Preset operation is triggered when matches with Option Signaling

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

Setting the Selective Call Alert LED will make an orange LED start flashing.

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

AND/OR

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

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

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

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

Auto Reset

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

After Option Signaling is a match, Option Signaling can automatically set to Reset after a specified time.

Dead Beat Disable

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

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

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

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, battery warning and PLL unlocked. It is output until the PTT button is released. (The 697Hz tone is output.)

- **Busy Tone**

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

OPERATING FEATURES/REALIGNMENT

In conventional mode (of conventional format), this informs the user of a Busy Channel Lockout.

- **Group Call Tone**

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

770Hz		770Hz
30ms	30ms	30ms

- **Individual Tone**

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

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

- **Intercept tone (Trunking Format)**

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 (Trunking Format)**

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 CLEAT TO TALK has been set to YES.)

- **Proceed tone (Trunking Format)**

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.)

- **Queue tone (Trunking Format)**

This tone is output until the Auto TEL function is set and the TEL channel is accepted successfully. (The mid tone on for 50ms, off for 50ms, and on for 50ms in 1 second intervals.)

- **Deny tone (Trunking Format)**

This tone is output if the Auto TEL function is set, the queue tone is output, but the TEL channel cannot be accessed within 60 seconds. It is similar to the intercept tone. (The mid tone and low tone are output alternately in 150ms intervals.)

- **Free system ringback mode tone, system search mode tone (Trunking Format)**

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

- **Ringing tone (Trunking Format)**

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.)

- **Pre Alert tone (Conventional Format)**

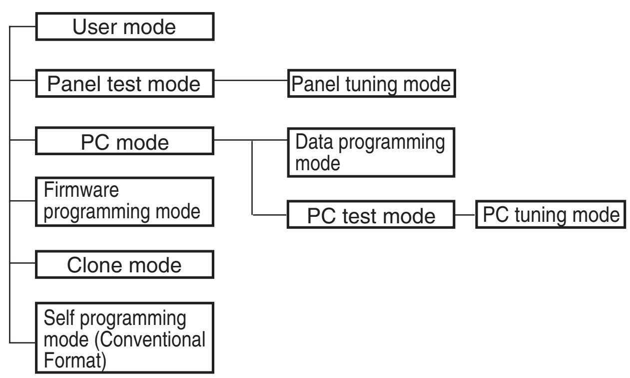
Informs user when nearing transmit inhibit (transmit cutoff) time due to TOT.

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

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

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.
Self programming mode (Conventional Format)	Frequency, signalling and features write to the radio.

REALIGNMENT

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[A]+Power ON (Two seconds)
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode]+[S]
Firmware programming mode	[S]+Power ON (Two seconds)
Clone mode	[C]+Power ON (Two seconds)
Self programming mode (Conventional Format)	[LAMP]+Power ON (Two seconds)

3. Panel Test Mode

Setting method refer to ADJUSTMENT.

4. Panel Tuning Mode

Setting method refer to ADJUSTMENT.

5.PC Mode

5-1. Preface

The TK-380 transceiver is programmed by using a personal computer, programming interface (KPG-36) and programming software (KPG-49D).

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-380 to the personal computer with the interface cable.
2. When the POWER switch on, user mode can be entered immediately. When PC sends command the radio enter PC mode, and “PROGRAM” is displayed on the LCD.
   When data transmitting from transceiver, the red LED is blinking.
   When data receiving to transceiver, the green LED is blinking.

Notes:

- The data stored in the personal computer must match model type, when it is written into the flash memory.
- Change the TK-380 to PC mode, then attach the interface cable.

5-3. KPG-36 description (PC programming interface cable: Option)

The KPG-36 is required to interface the TK-380 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-36 connects the universal connector of the TK-380 to the computers RS-232C serial port.

5-4. Programming software description

The KPG-49D programming disk is supplied in 3-1/2” disk format. The software on this disk allows a user to program TK-380 radios via programming interface cable (KPG-36).

5-5. Programming with IBM PC

If data is transferred to the transceiver from an IBM PC with the KPG-49D, the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

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

KPG-49D instruction manual parts No. : B62-1096-XX

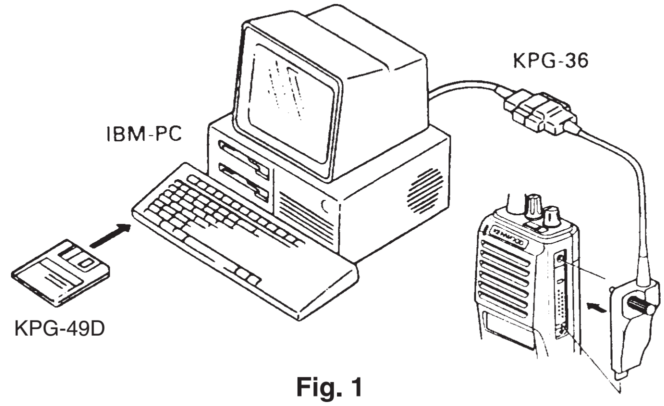


Fig. 1

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the TK-380. This allows the TK-380 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-380 to the personal computer (IBM PC or compatible) with the interface cable (KPG-36). (Connection is the same as in the PC Mode.)

6-3. Programming

1. Start up the programming software (KPG-49D), select "firmware program" in the "Program" item, and press the Return key on the personal computer. This starts up the firmware programmer.
2. The top screen is displayed. Press any key to advance to the next screen.
3. Set the communications speed (normally, 57600 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select (=F1).
5. Turn the TK-380 power ON with the [S] switch held down. Hold the switch down for two seconds until the display changes to "PROG 57600". When "PROG 57600" appears, release your finger from the switch.
6. Check the connection between the TK-380 and the personal computer, and make sure that the TK-380 Is in the Program mode.
7. Press F10 on the personal computer. A window opens on the display to indicate progress of writing. When the TK-

REALIGNMENT

380 starts to receive data. the [P] icon is blinking.
8. If writing ends successfully. the LED on the TK-380 lights and the checksum is displayed.
9. If you want to continue programming other TK-380 s, repeat steps 5 to 8.

Notes:
- To start the Firmware Programmer from KPG-49D, the Fpro path must be set up by KPG-49D Setup.
- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software (KPG-49D).
- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before update the radio firmware.
  Directry copying from the floppy disk to the radio may not work because the access speed is too slow.

6-4. Function

1. If you press the [MON] switch (top of left side) while "PROG 57600" is displayed, the checksum is displayed. If you press the [MON] switch again while the checksum is displayed, "PROG 57600" is redisplayed.
2. If you press the [LAMP] switch (bottom of left side) while "PROG 57600" is displayed, the display changes to "PROG 19200" to indicate that the write speed is low speed (19200 bps). If you press the [LAMP] switch again while "PROG 19200" is displayed, the display changes to "PROG 38400", and the write speed becomes the middle-speed mode (38400 bps). If you press the [LAMP] switch again while "PROG 38400" is displayed, the display returns to "PROG 57600".

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 external universal connectors. The operation is as follows (the transmit radio is the master and the receive radio is a slave).

1. Turn the master TK-380 power ON with the [C] key held down. If the password is set to the TK-380, the TK-380 displays "CLONE LOCK". If the password is not set, the TK-380 displays "CLONE MODE".
2. When "CLONE LOCK" is displayed, only the knob (encoder) and [S], and [0] to [9] keys can be accepted. When you enter the correct password, and "CLONE MODE" is displayed, the TK-380 can be used as the cloning master. The following describes how to enter the password.
3. How to enter the password with the keypad;
   If you press a key while "CLONE LOCK" is displayed. the number that was pressed is displayed on the TK-380. Each press of the key shifts the display in order to the left. When you enter the password and press the [S] key, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
   How to enter the password with the encoder;
   If the encoder is rotated while "CLONE LOCK" is displayed, numbers (0 to 9) are displayed flashing. When you press the [S] key, the currently selected number is determined. If you press the [S] key after entering the password in this procedure, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
4. Power on the slave TK-380.
5. Connect the cloning cable (No. E30-3325-05) to the universal connectors on the master and slave.
6. Press the [S] key on the master while the master displays "CLONE MODE". The data of the master is sent to the slave. While the slave is receiving the data, "PROGRAM" 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 [S] key on the master is pressed while the master displays "END", the master displays "CLONE MODE". Carry out the operation in step 4 to 6.

Note:
Only the same models can be cloned together.

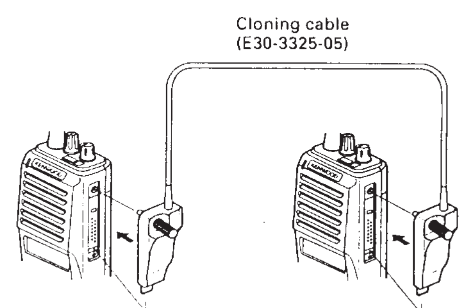


Fig. 2

8. Self Programming Mode

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

8-1. Enter to the self programming mode

Delete R144 (SELF, Figure 3) in the TX-RX unit and turn the power switch on while pressing the [LAMP] key. When enter the self progrumming mode, “SELF PROG” is displayed.

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

REALIGNMENT

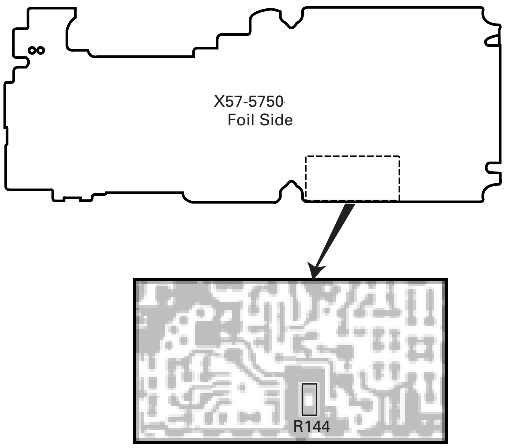


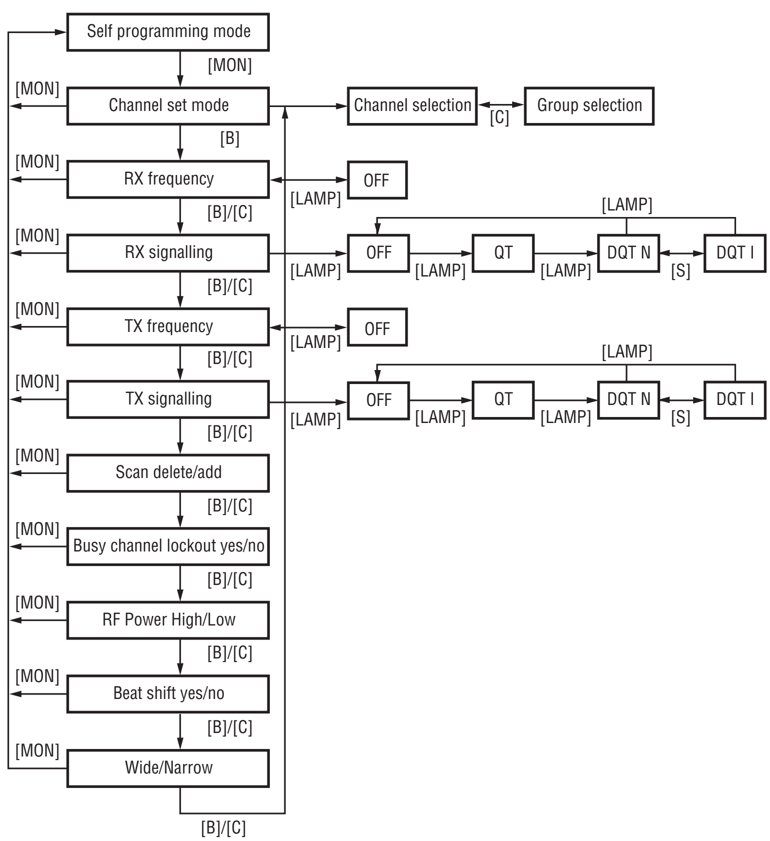
Fig. 3

8-2. Channel Setting Mode

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

Pressing [MON] when [SELF PROG] is displayed, sets Channel Setting Mode.
Select an item set with [C] and change the selection with the encoder.
The data displayed with [B] is stored in the memory and then proceeds to the next item. Pressing [C] proceeds to the next item without storing it in the memory.
Press [MON] to set the display to [SELF PROG] and return to reset (default) status.

- **Flow Chart**



Items set in Channel Setting Mode are as follows.

Function settings	Display	Remarks
Channel select	CH or GRP	
RX Frequency	RXF	[LAMP] : Freq. On/Off switching [A] : 5kHz/6.25kHz/7.5kHz/1MHz step switching
RX Signalling	RXS	[LAMP] : OFF/QT/DQT switching [A] : 1 step/Standard switching [S] : DQT Normal/Invert swtiching
TX Frequency	TXF	Key operation same as RX Frequencies
TX Signalling	TXS	Key operation same as RX Signalling
Scan Del/Add	SCN	Delete/Add
Busy Channel Lockout	BSY	YES/NO
RF Power	PWR	HIGH/LOW
Beat Shift	SFT	YES/NO
Wide/Narrow	W/N	Wide/Narrow

REALIGNMENT

8-3. Function Setting Mode

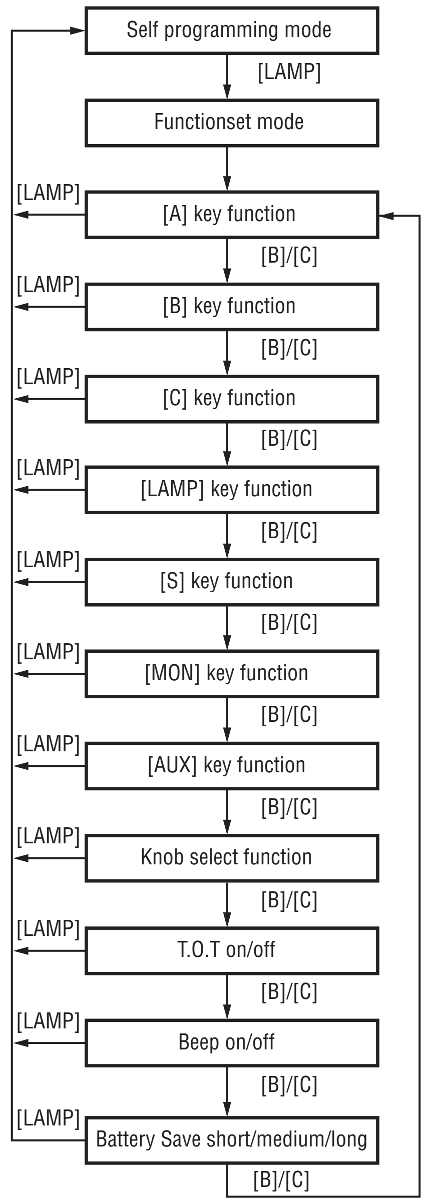
This is a mode for using the panel keys to make function settings without using the FPU, that operate on all channels.

Pressing the [LAMP] when [SELF PROG] is displayed, sets the Function Setting Mode.
Select an item set with [C] and change the selection with the encoder.
Press [LAMP] to display [SELF PROG] and return to reset (default) status.

Items set in Function Set Mode are as follows.

Function settings	Display	Remarks
[A]	A	Key Function
[B]	B	Key Function
[C]	C	Key Function
[LAMP]	LAMP	Key Function
[S]	S	Key Function
[MON]	MON	Key Function
[AUX]	AUX	Key Function
[KNOB]	KNB	Knob Function
T.O.T	TOT	ON/OFF at T.O.T all settings ON:TOT[60s]/Pre-Alert[10s]/ Rekey Time[5s]/Reset Time[5s] OFF:TOT[600s]/Pre-Alert[Off]/ Rekey Time[Off]/Reset Time[Off]
Beep	BEP	ON/OFF at BEEP all settings ON:Power On Tone[On]/ Control Tone[On]/Warning Tone[On] OFF:Power ON Tone[Off]/ Control Tone[Off]/ Watning Tone[Off]
Battery Save	BAT	OFF/SHORT/MEDIUM/LOG

- **Flow Chart**



8-4. Memory Reset Mode

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

Pressing [S] when [SELF PROG] is shown, sets the display to [CLEAR NO?].

Turning the encoder alternately switches the display between [CLEAR NO?]←→[CLEAR YES?].

Pressing [S] when [CLEAR YES?] is shown, clears the data and sets the display to [ALL CLEAR].

Pressing [S] again, returns the display to [SELF PROG].

Pressing [S] when [CLEAR NO?] is shown, returns the display to [SELF PROG] without resetting the data.

CIRCUIT DESCRIPTION

1. Overview

This transceiver is UHF/FM portable transceiver designed to operate in the frequency range of 450 to 490MHz (F1), 470 to 512MHz (F2), 400 to 430MHz (F3) and an UHF/FM band EFJ LTR™ trunked system compatible FM portable transceive that can be programmed to operate on both LTR and conventional systems.

2. Circuit Configuration by Frequency

The receiver is a double-conversion superheterodyne with a first intermediate frequency (IF) of 44.85MHz and a second IF of 455kHz. Incoming signals from the antenna are mixed with the local signal from the PLL to produce the first IF of 44.85MHz.

This is then mixed with the 44.395MHz second local oscillator output to produce the 455kHz second IF. This is detected to give the demodulated signal.

The transmit signal frequency is generated by the PLL VCO, and modulated by the signal from the microphone. It is then amplified and sent to the antenna.

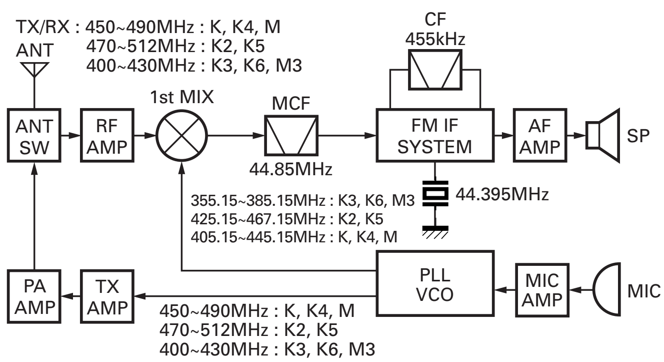


Fig. 1 Frequency configuration

3. Receiver System

3-1. RF unit

An incoming RF signal from the antenna terminal is passed through the antenna switch (D12, D14. and D15 are off) and then the bandpass filter (L47,48,49,51,52,54,55,56). The bandpass filter is adjusted by a variable capacitor. The input voltage to the variable capacitor is regulated by the voltage output from the D/A converter (IC8). The signal is amplified by RF amplifier Q24, and passed through the bandpass filter (L29,31,33,34,36) and band-eliminate filter (L27) to remove the spurious signal again. The resulting signal is applied to the first mixer (IC18), where it is mixed with the first local oscillator signal output from the frequency synthesizer to produce the first IF (44.85MHz). The 1st mixer uses the GaAs IC.

3-2. IF unit

The first IF signal is passed through a four-pole monolithic crystal filter (XF1) to remove a adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q12) and then applied to the IF system IC (IC12). The IF system IC provides a second mixer, second local oscillator, limiting amplifier, quadrature detector and RSSI (Received Signal Strength Indicator). The second mixer mixes the first IF signal with the 44.395MHz of second local oscillator output (crystal unit X2) and produces the second IF signal of 455kHz.

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

3-3. Wide/Narrow changeover circuit

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

The WIDE (high level) and NARROW (low level) data is output from IC19 (microconputer) pin 99.

When a WIDE (high level) data is received, Q6 turn off and Q7 turn on. When a NARROW (low level) data is received, Q6 turn on and Q7 turn off. D5, D7 are switched to ceramic filters when a high/low level data is received.

Q9 turns on/off with the Wide/Narrow data and the IC12 detector output level is changed to maintain a constant output level during wide or narrow signals.

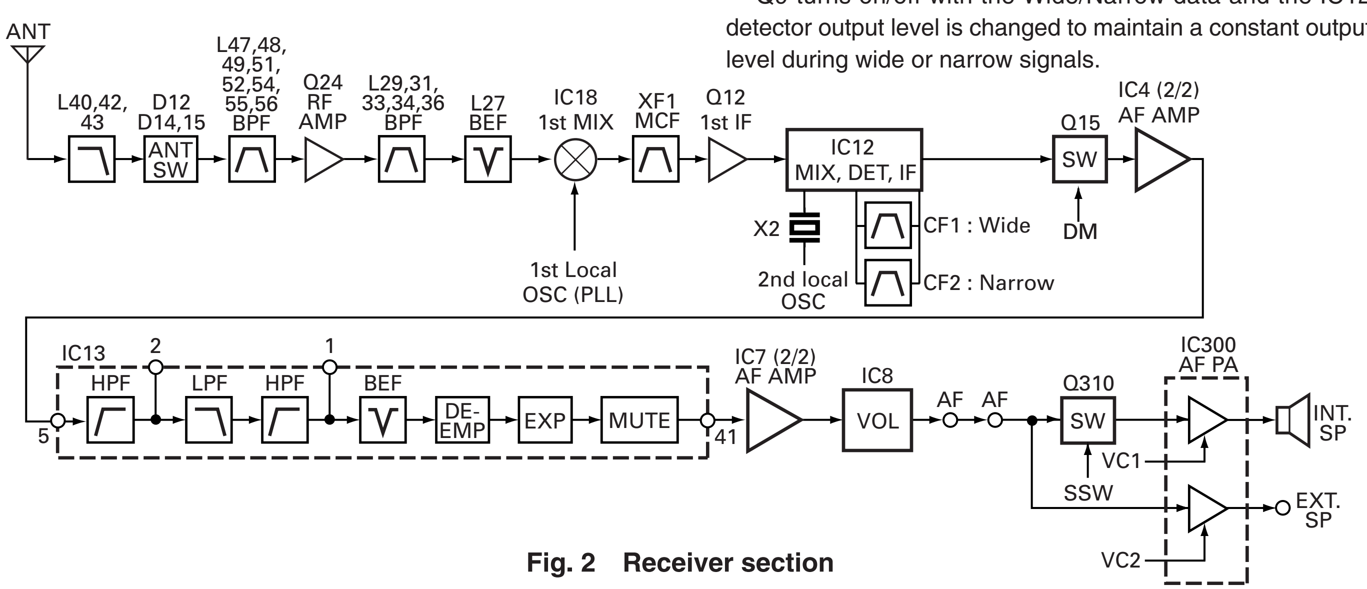


Fig. 2 Receiver section

CIRCUIT DESCRIPTION

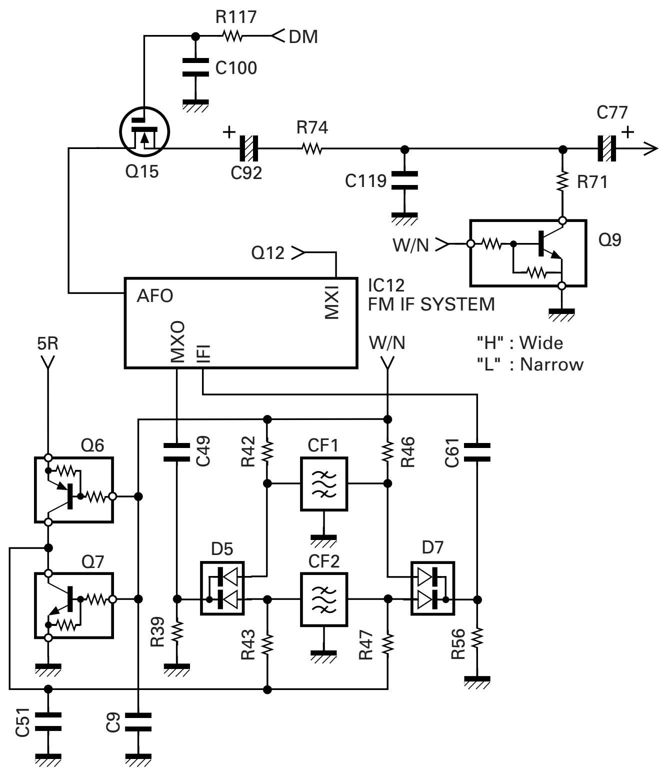


Fig. 3 Wide/Narrow changeover circuit

3-4. Audio amplifier circuit

The demodulated signal from IC12 goes through the mute switch (Q15) and is amplified by IC4 (2/2), high-pass filtered, low-pass filtered, high-pass filtered, band-eliminate filtered, and de-emphasized by IC13.

The signal then goes through an AF amplifier IC7 (2/2), an electronic volume control (IC8), and an AF switch (Q310 is on), and is routed to audio power amplifier (IC300), where it is amplified and output to the internal speaker.

The audio mute signal (AM) from the shift register becomes Low in the standby and Q304, Q305 which are power supply circuit for IC300 turn off. Also, IC13 is set to the power down mode according to data from microprocessor, and the AF signal is muted. When the audio is output, AM becomes High to turn Q304, Q305 ON, and voltage is supplied to power terminal VP of IC300. Also, IC13 is canceled out of the power down mode.

The speaker is switched by the logic of speaker switching terminal SSW on the universal connector. When SP-MIC is not attached, the logic of SSW becomes High and SW (Q310) is turned ON, and the AF signal is input to both amplifiers of IC300.

When SP-MIC is attached, SSW is connected to GND at inside of SP-MIC. For this reason, Q310 is turned OFF, and the AF signal is input only to amplifier for EXT SP of IC300.

Change of INT/EXT SP refer to Fig. 4.

AM	SSW	VC1	VC2	SP
H	H	H	L	INT
H	L	L	H	EXT
L	H	L	L	MUTE
L	L	L	L	MUTE

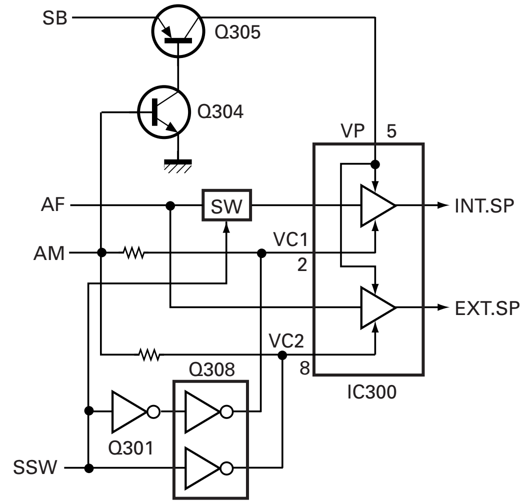


Fig. 4 Audio amplifier circuit

3-5. Squelch circuit

The output from IC12 enters FM IC again, then passed through a band-pass filter. The noise component output from IC12 is amplified by Q4 and rectified by D4 to produce a DC voltage corresponding to the noise level. The DC voltage is sent to the analog port of the CPU (IC19). And IC12 outputs a DC voltage (RSSI) corresponding to the input of the IF amplifier. The CPU reads the RSSI signal via pin 93.

IC19 determines whether to output sounds from the speaker by comparing the input voltage of pin 91 and pin 93 with the preset value.

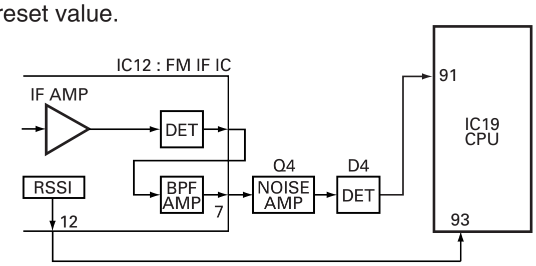


Fig. 5 Squelch circuit

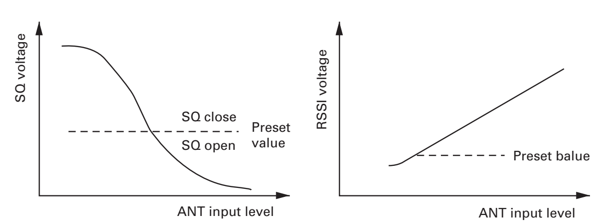


Fig. 6 Squelch and RSSI voltage vs ANT input level

4. Transmitter System

4-1. Microphone amplifier

The signal from the internal microphone goes through the mute switch (Q300).

When the SP-MIC is not attached, the microphone switching terminal (MSW) on the universal connector becomes High, and mute switch (Q300) is turned ON. When the SP-MIC is

CIRCUIT DESCRIPTION

attached, MSW is connected to GND at inside of SP-MIC. For this reason, Q300 is turned OFF, the internal microphone is muted, and only the input of the external microphone is supplied to the microphone amplifier of the TX-RX unit.

The signal from microphone passes through the limitter circuit in D8, Mic mute switch (Q17 is off in TX) and through the high-pass filter, the ALC circuit, the low-pass filter, the high-pass filter, and pre-emphasis/IDC circuit in IC13. When encoding DTMF, mute switch (Q13) is turned OFF for muting the microphone input signal.

The signal passes through the D/A converter (IC8) for the maximum deviation adjustment, and enters the summing amplifier consisting of IC7 (1/2), and is mixed with the low speed data from the CPU (IC19) and 9600bps DATA from Optional Board Terminal.

The output signal from the summing amplifier passes through the D/A converter (IC8) again and goes to the VCO modulation input.

The other output signal from the summing amplifier passes through the D/A converter (IC8) again for the BAL adjustment, and the buffer amplifier (IC1 (2/2)), and goes to the VCXO modulation input.

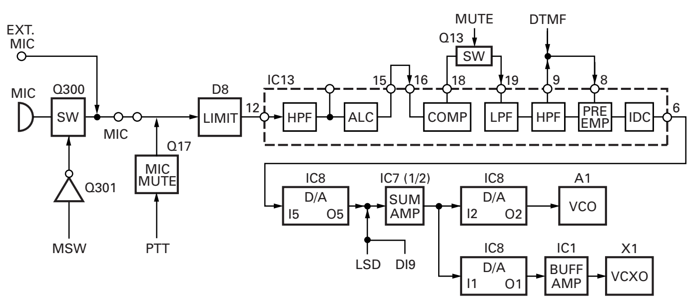


Fig. 7 Microphone amplifier

4-2. Drive and Final amplifier

The signal from the T/R switch (D9 is on) is amplified by the pre-drive (Q18) and drive amplifier (Q20) to 50mW.

The output of the drive amplifier is amplified by the RF power amplifier (IC100) to 4.0W (1W when the power is low). The RF power amplifier consists of two stages MOS FET transistor. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D12 is on) and applied to the antenna terminal.

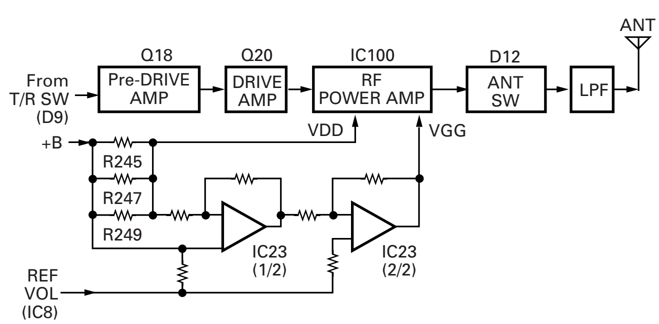


Fig. 8 Drive and final amplifier and APC circuit

4-3. APC circuit

The APC circuit always monitors the current flowing through the RF power amplifier (IC100) and keeps a constant current. The voltage drop at R245, R247 and R249 is caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier (IC23 1/2).

IC23(2/2) compares the output voltage of IC23(1/2) with the reference voltage from IC8, and the output of IC23(2/2) controls the VGG of the RF power amplifier to make the both voltages to same voltage.

The change of power high/low is carried out by the change of the reference voltage. Q22,23 and 25 are turned on in transmit and the APC circuit is active.

5. Frequency Synthesizer Unit

5-1. Frequency synthesizer

The frequency synthesizer consists of the VCXO (X1), VCO (A1), PLL IC(IC14) and buffer amplifiers.

The VCXO generates 16.8MHz. The frequency stability is 1.5ppm within the temperature range of -30 to +60˚C. The frequency tuning and modulation of the VCXO are done to apply a voltage to pin 1 of the VCXO. The output of the VCXO is applied to pin 8 of the PLL IC.

The TK-380's VCO consists of 2VCO and covers a dual range of the 405.15~445.15MHz (K, K4, M), 425.15~467.15MHz (K2, K5), 355.15~385.15MHz (K3, K6, M3), and the 450~490MHz (K, K4, M), 470~512MHz (K2, K5), 400~430MHz (K3, K6, M3). The VCO generates 405.15~445.15MHz (K, K4, M), 425.15~467.15MHz (K2, K5), 355.15~385.15MHz (K3, K6, M3), for providing to the first local signal in receive. In TX, the pin 3 of the VCO goes low and the VCO generates 450~490MHz (K, K4, M), 470~512MHz (K2, K5), 400~430MHz (K3, K6, M3).

The output of the VCO is amplified by the buffer amplifier (Q16) and routed to the pin 5 of the PLL IC. Also the output of the VCO is amplified by the buffer amplifier (Q18) and routed to the next stage according to T/R switch (D9, D23).

The PLL IC consists of a prescaler, fractional divider, reference divider, phase comparator, charge pump. This PLL IC is fractional-N type synthesizer and performs in the 40.50 or 60kHz reference signal which is eighth of the channel step (5, 6.25 or 7.5kHz). The input signal from the pins 5 and 8 of the PLL IC is divided down to the 40, 50 or 60kHz and compared at phase comparator. The pulsed output signal of the phase comparator is applied to the charge pump and transformed into DC signal in the loop filter (LPF). The DC signal is applied to the pin 1 of the VCO and locked to keep the VCO frequency constant.

PLL data is output from DT (pin 75). CP (pin 19) and EP (pin 47) of the microprocessor (IC19). The data are input to the PLL IC when the channel is changed or when transmission is changed to reception and vice versa. A PLL lock condition is always monitored by the pin 31 (UL) of the microprocessor. When the PLL is unlocked, the UL goes low.

CIRCUIT DESCRIPTION

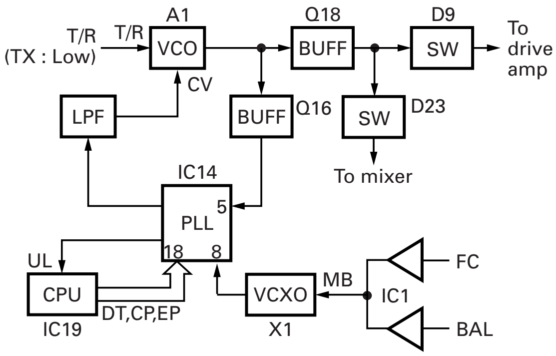


Fig. 9 PLL block diagram

6. Control Circuit

The control circuit consists of microprocessor (IC19) and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the display unit. IC19 mainly performs the following;

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

6-1. Memory circuit

Memory circuit consists of the CPU (IC19) and a flash memory (IC17), a flash memory has a capacity of 2M bits that contains the transceiver control program for the CPU and data such as transceiver channels and operating features.

This program can be easily written from an external devices. Data. such as operating status, are programmed into the EEPROM (IC20).

• Flash Memory

Note : The flash memory holds data such as written with the FPU (KPG-49D), firmware program (User mode, Test mode, Tuning mode, etc.) This data must be rewritten when replacing the flash memory.

• EEPROM

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

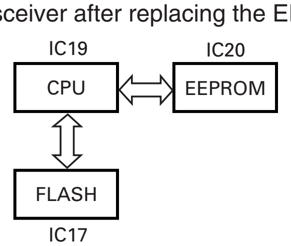


Fig. 10 Memory circuit

6-2. Low battery warning

The battery voltage is monitored by the microprocessor (IC19). When the battery voltage falls below the voltage set by the Low Battery Warning adjustment, the red LED flashes to notify the operator that it is time to replace the battery. If the battery voltage falls even more (approx. 5.8V), a beep sounds and transmission is stopped.

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

6-3. Key input

If the clock is supplied to CLK terminal when the RES terminal (CPU pin 78) of the decade counter (IC301) is set to Low, Q0 to Q7 become High sequentially. Normally, KI1 and KI2 are Low (pulled down). When any key is pressed, KI1 or KI2 become High. The CPU detects which key is pressed, according to the voltage of KI1 and KI2 and clock timing.

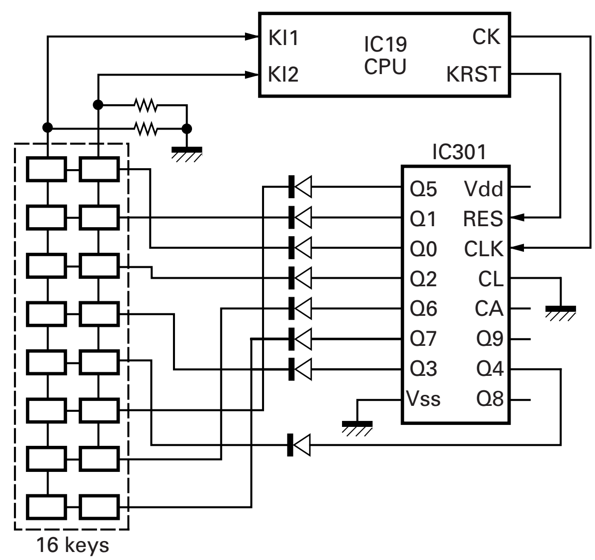


Fig. 11 Key input

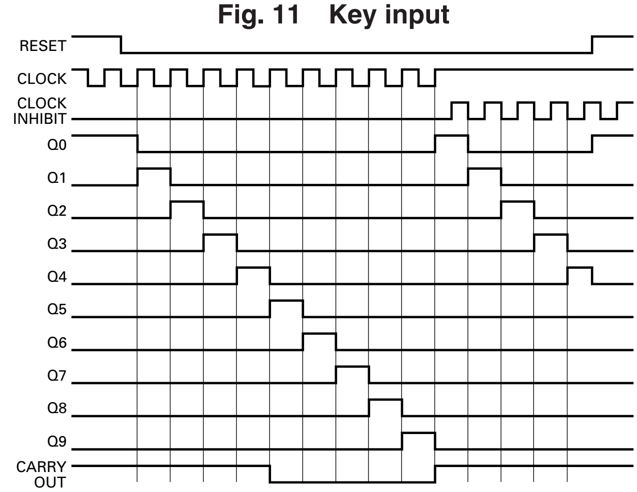


Fig. 12 Decade counter timing chart

CIRCUIT DESCRIPTION

7. Signalling Circuit

7-1. Encode

- **Low-speed data (QT,DQT,LTR)**

Low-speed data is output from pin 1 of the CPU. The signal passes through a low-pass CR filter, and goes to the summing amplifier (IC7 1/2). The signal is mixed with the audio signal and goes to the VCO (A1) and VCXO (X1) modulation input after passing through the D/A converter (IC8) for BAL adjustment.

- **High-speed data (DTMF)**

High-speed data is output from pin 2 of the CPU. The signal passes through a low-pass filter consisting of IC10, and provides a TX DTMF tone and a RX DTMF tone TX DTMF deviation making an adjustment by microprocessor is passed through the D/A convertor (IC8), and then applied to the audio processor (IC13).

The signal is mixed with the audio signal and goes to the VCO and VCXO, the RX DTMF tone is passed a summing amplifier (IC7 2/2), the D/A converter (IC8) for audio control, audio power amplifier and then to the speaker.

- **MSK (ESN)**

ESN utilizes 1200bps MSK signal. MSK signal is output from pin 6 of IC13. The signal passes through the D/A converter (IC8) for the MSK deviation adjustment. and is routed to the VCO. When encoding MSK, the microphone input signal is muted.

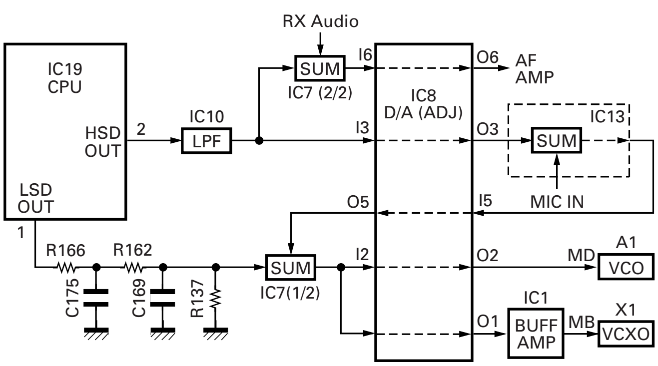


Fig. 13 Encode

7-2. Decode

- **Low-speed data (QT,DQT,LTR)**

The demodulated signal from the IF IC (IC12) is amplified by IC4 (2/2) and passes through a low-pass filter (IC11) to remove audio components. The signal is input to pin 95 of the CPU.

The CPU digitizes this signal, performs processing such as DC restoration, and decodes the signal.

- **High-speed data (DTMF)**

The DTMF input signal from the IF IC (IC12) is amplified by IC4 (2/2) and goes to IC16, the DTMF decoder. The decoded information is then processed by the CPU. During transmission and standby, the DTMF IC is set to the power down mode when the PD terminal is High. When the line is busy, the PD terminal becomes Low, the power down mode is canceled and decoding is carried out.

- **High-speed data (2 tone)**

The demodulated signal from the IF IC (IC12) is amplified by IC4 (2/2) and passes through an audio processor (IC13) and band-pass filter (IC2) to remove a low-speed data. The CPU digitizes this signal, performs processing such as DC restoration, and decodes the signal.

- **MSK (ESN)**

The MSK input signal from the IF IC is amplified by IC4 (1/2) and goes to pin 5 of IC13. The signal is demodulated by MSK demodulator in IC13. The demodulated data goes to the CPU for processing.

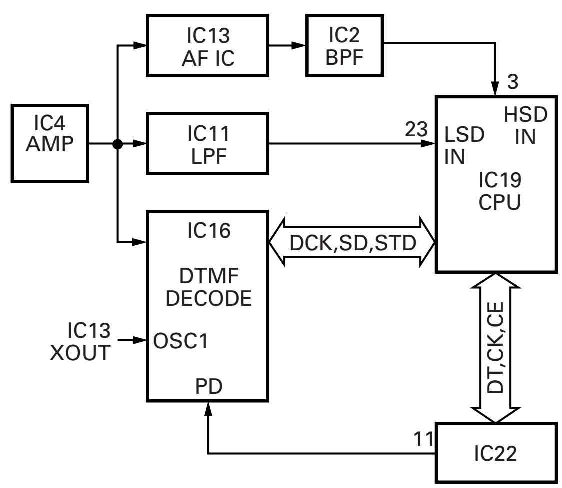


Fig. 14 Decode

CIRCUIT DESCRIPTION

8. Power Supply Circuit

Battery +B is supplied via a 3A fuse from the battery terminal connected to the TX-RX unit. After passing through the power switch, power supply (SB) is applied to the three AVRs. IC5 supplies 5V (5M) to the control circuit, and IC9 supplies 5V (5C) to common circuits. IC6 supplies to the TX circuit, the RX circuit and common circuits of needless save mode. During transmission, 5TC becomes Low and Q3 is turned ON to supply 5V (5T) to the TX circuit. During reception, 5RC becomes Low and Q2 is turned ON to supply 5V (5R) to the RX Circuit.

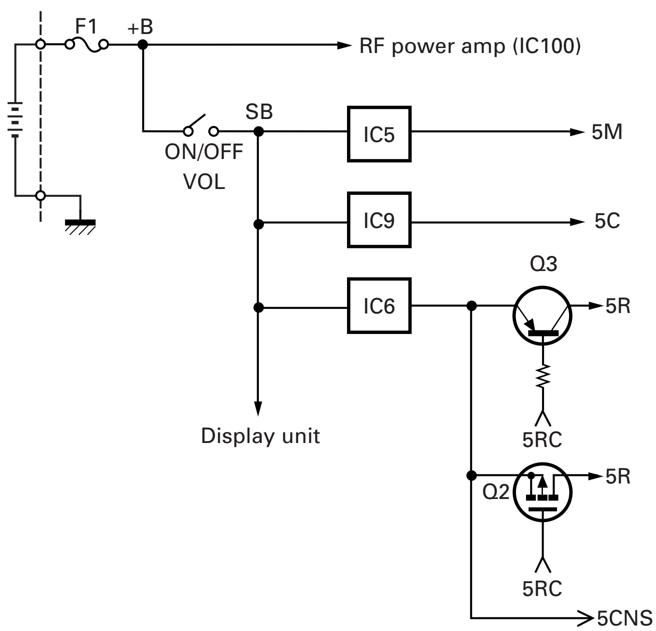


Fig. 15 Power supply circuit

9. Optional Board Terminal

Terminals for mounting the option board are provided at the bottom edge of the TX-RX unit. The table below shows the correspondence between the board and terminals. R37, R69, R250, R259, R260, R276, R280 may have to be removed depending on the type of option board being used.

Name	Function
SB	Battery (7.5V)
GND	Ground
TXD	Serial data
RXD	Serial data
SQ	Busy: high
LOK	Link acquired : low (TX mode)
DI/ANI	Modulation (ANI) input
DEO	Detect output
TXAI/MUTE	Modulation output from board or mic mute: low
TXAO	Modulation input to board
RXAI	Received signal input to board
RXAO	Received signal output from board
D1	Binary 1
D2	Binary 2
OPT	Scramble, Emergency:low
PTTIN	PTT switch signal input to board (TX:low)
5CNS	Battery (5V)
DI9	9600 bps data output
RXEMAO	Received signal output from board (after de-emphasis)
RXEMAI	Received signal input to board (after de-emphasis)
PTTOUT	PTT switch signal output from board (TX:low)
MONI	Busy:low
LAMP	Busy:low
AAC	Audio Amp Control signal output from board (Busy:high)
Audio Beep	Beep signal output from board.
AUX TXD	Serial data
AUX RXD	Serial data

Table 1 Terminal name and function

SEMICONDUCTOR DATA

Microprocesser : 30612M4A-407GP (TX-RX UNIT : IC19)

■ Pin function

Pin No.	Port Name	I/O	Function
1	LSDOUT	O	Low speed data output.
2	HSDOUT	O	High speed data output.
3	HSDIN	I	High speed data input.
4	DTMSTD	I	DTMF decode IC data detect input.
5	SELF	I	Self programming mode input.
6	BYTE	I	+5V.
7	CNVSS	I	GND.
8	SFTOE	O	Shift register output enable.
9	LCDCS	O	LCD driver chip select output.
10	RESET	I	Microcomputer reset input.
11	XOUT	-	9.8304MHz (System clock).
12	VSS	-	GND.
13	XIN	-	9.8304MHz (System clock).
14	VCC	-	+5V
15	AUX	I	AUX switch input.
16	AFTRD	I	MSK modulation data output timing pulse input.
17	AFRTM	I	MSK demodulation data input timing pulse input.
18	EN2	I	Encoder pulse input 2.
19	PLLCLK	O	PLL IC clock output.
20	BEEP	O	Beep data output.
21	AFRDT	I	MSK demodulation data input.
22	AFREG1	O	AF IC register switching data output 1.
23	AFREG2	O	AF IC register switching data output 2.
24	EEPDAT	O	EEPROM data output.
25	DACSTB	O	D/A converter IC data strobe output.
26	AFCLR	O	MSK flame reset output.
27	SAVE	O	Battery save output.
28	LAMP	I	LAMP switch input.
29	AUXTXD	O	External Serial interface output.
30	AUXRXD	I	External Serial interface input.
31	PLLUL	I	PLL unlock detect input.
32	AFMSKE	O	MSK modulation enable (Enable active “H”).
33	TXD	O	Serial interface output (ex. PC).
34	RXD	I	Serial interface input (ex. PC).
35	AFDAT	O	MSK data output.
36	PTT	I	PTT switch input.
37	RDY	-	Not used.
38	ALE	-	Not used.
39	HOLD	-	Not used.
40	HLDA	-	Not used.
41	BLCK	-	Not used.
42	RD	-	Flash memory RD bus.
43	BHE	-	Not used.
44	WR	-	Flash memory WR bus.
45	DTMCLK	O	DTMF decode IC clock output.
46	CNTCLK	O	Common clock output.
47	PLLSTB	O	PLL IC data strobe output.
48	CS0	O	Flash memory chip enable.
49	A19	-	Not used.
50~59	A9~A18	-	Flash memory address bus.
60	VCC	-	+5V
61	A8	-	Flash memory address bus.
62	VSS	-	GND.
63~70	A0~A7	-	Flash memory address bus.
71	MONI	I	Monitor switch input.
72	EN4	I	Encoder pulse input 4.
73	EN3	I	Encoder pulse input 3.
74	EN1	I	Encoder pulse input 1.
75	MINDAT	O	Common data output.
76	KEY2	I	Key scan input 2.
77	KEY1	I	Key scan input 1.
78	RESET	O	Key scan IC reset output..
79~86	D0~D7	-	Flash memory data bus.
87	DTMDAT	I	DTMF decode IC data input.
88	PF	I	PF switch input.
89	VOL	I	Volume level input.
90	BATT	I	Battery voltage input.
91	ANLSQL	I	Squelch level input.
92	TEMP	I	Thermistor input.
93	RSSI	I	Received signal strength indicator input (RSSI).
94	AVSS	-	GND.
95	LSDIN	I	Low speed data input.
96	VREF	-	+5V
97	AVCC	-	+5V
98	SFTSTB1	O	Shift register data strobe output.
99	W/N	O	Wide/Narrow switching output.
100	AFSTB	O	AF IC data strobe output.

Shift register 1 : BU4094BCFV (TX-RX UNIT : IC21)

■ Pin function

Pin No.	Port	Port Name	Function
4	Q1	LEDR	Red LED. H:ON, L:OFF
5	Q2	LEDG	Green LED. H:ON, L:OFF
6	Q3	KEYBLT	Key back light. H:ON, L:OFF
7	Q4	MMUTE	Mic mute. H:Unmute, L:Mute
14	Q5	5RC	RX power control. H:TX, L:RX
13	Q6	5TC	TX power control. H:RX, L:TX
12	Q7	BSHIFT	Beat shift. H:ON, L:OFF
11	Q8	DTMPD	DTMF decode IC power down. H:Power Down, L:Busy

Shift register 2 : BU4094BCFV (TX-RX UNIT : IC22)

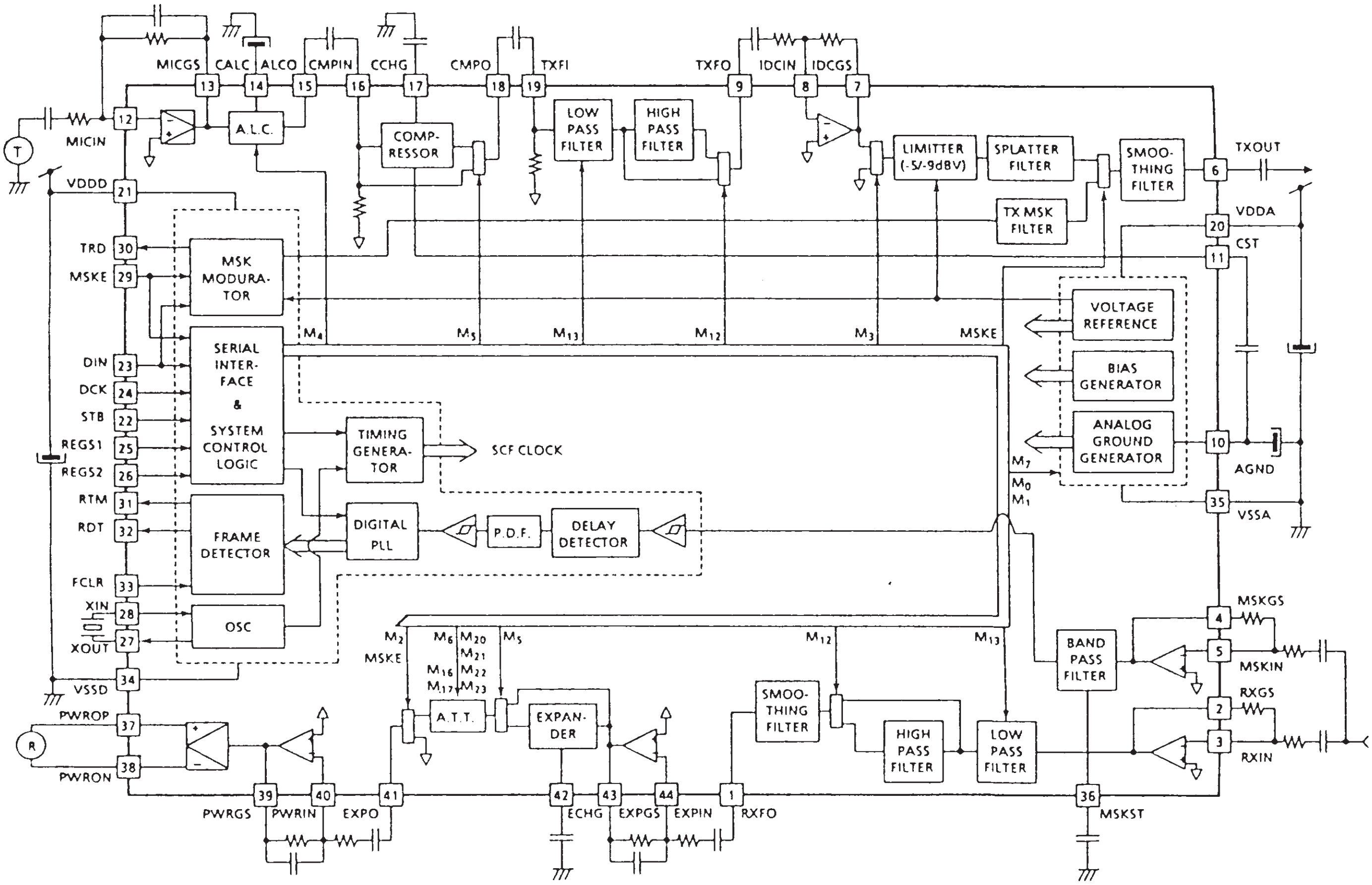
■ Pin function

Pin No.	Port	Port Name	Function
4	Q1	AM1	Audio mute 1. H:Unmute, L:Mute
5	Q2	LOK	Link complete. (Programmable active H/L)
6	Q3	T/R	TX/RX switching. H:RX, L:TX
7	Q4	DM	Dead mute. H:RX, L:TX
14	Q5	OPT	Option board control. H:ON, L:OFF Auxiliary. (Programable active H/L)
13	Q6	CODE1	Option board data 1. H:ON, L:OFF
12	Q7	CODE2	Option board data 2. H:ON, L:OFF
11	Q8	SQ	External squelch. (Programmable active H/L)

SEMICONDUCTOR DATA

Audio Processor : TC35453F (TX-RX Unit IC13)

■ Block diagram



■ Pin function

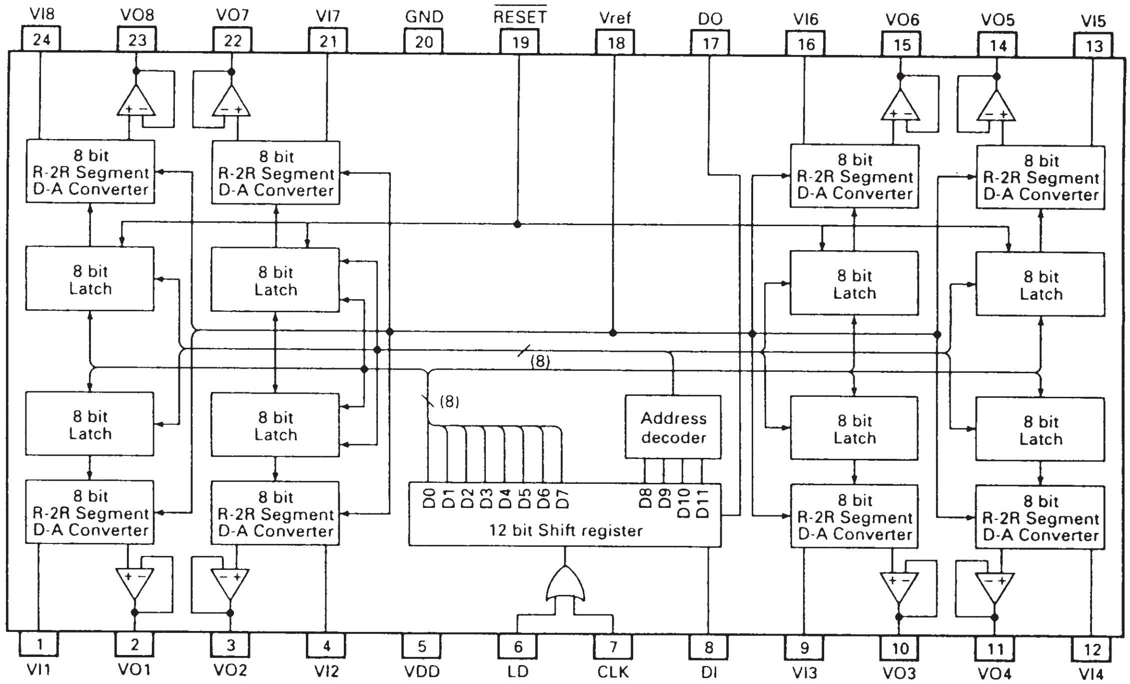
Pin No.	Port Name	I/O	Function
1	RXFO	O	RX audio filter output.
2	RXGS	O	RX audio signal level setting amplifier output.
3	RXIN	I	RX audio signal level setting amplifier input.
4	MSKGS	O	MSK RX level setting amplifier output.
5	MSKIN	I	MSK RX level setting amplifier input.
6	TXOUT	O	TX signal output.
7	IDCGS	O	IDC input level setting amplifier output.
8	IDCIN	I	IDC input level setting amplifier input.
9	TXFO	O	TX audio filter circuit output.
10	AGND	-	Analog reference voltage stabilization.
11	CST	I/O	Compressor stabilization.
12	MICIN	I	Microphone amplifier input.
13	MICGS	O	Microphone amplifier output.
14	CALC	I/O	ALC Circuit response time setting.
15	ALCO	O	ALC circuit output.
16	CMPIN	I	Compressor input.
17	CCHG	I/O	Compressor response time setting.
18	CMPO	O	Compressor output.
19	TXFI	I	TX audio filter input.
20	VDDA	-	Analog power supply.
21	VDDD	-	Digital power supply.
22	STB	I	Data strobe pulse input / system reset input 1.
23	DIN	I	Data input.

Pin No.	Port Name	I/O	Function
24	DCK	I	Data synchronized clock input.
25	REGS1	I	Internal register select input 1
26	REGS2	I	Internal register select input 2.
27	XOUT	O	Oscillation circuit output.
28	XIN	I	Oscillation circuit input.
29	MSKE	I	MSK modulation enable input.
30	TRD	O	MSK modulation data latch timing output.
31	RTM	O	MSK RX synchronized clock output.
32	RDT	O	MSK RX data output.
33	FCLR	I	Flame detect circuit reset input 1 System reset input 2.
34	VSSD	-	Digital ground.
35	VSSA	-	Analog ground.
36	MS KST	I/O	MSK modem demodulation circuit stabilization.
37	PWROP	O	Speaker operation positive output.
38	PWRON	O	Speaker operation negative output.
39	PWRGS	O	RX output level setting amplifier output.
40	PWRIN	I	RX output level setting amplifier input.
41	EXPO	O	Expander output.
42	ECHG	I/O	Expander response time setting.
43	EXPGS	O	Expander input level setting amplifier output.
44	EXPIN	I	Expander input level setting amplifier input.

SEMICONDUCTOR DATA

D/A Converter : M62364FP (TX-RX Unit IC8)

■ Block diagram



■ Pin function

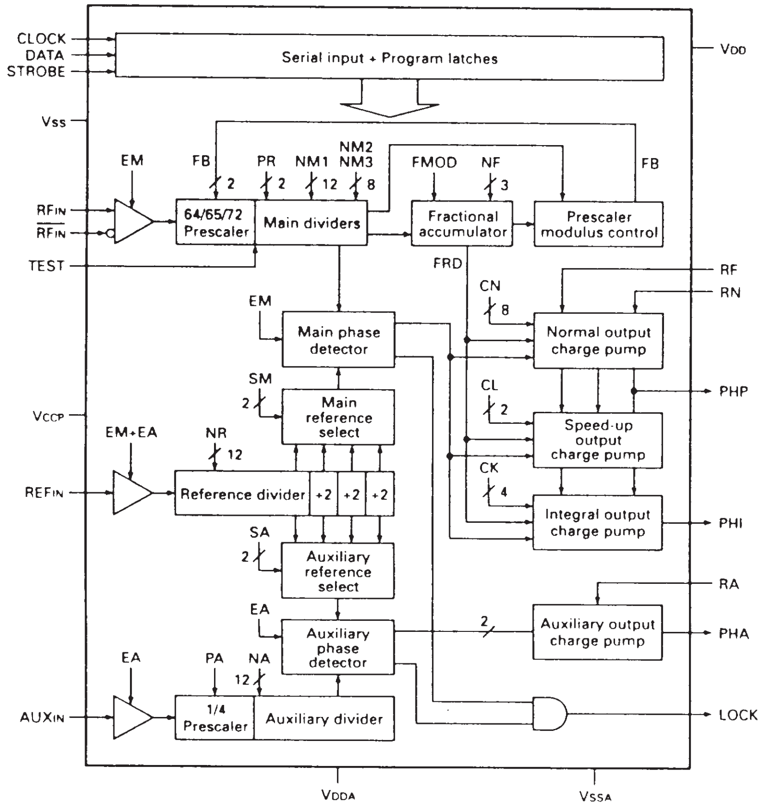
Pin No.	Pin code	I/O	Function
1	VI1	I	D/A converter input.
2,3	VO1,VO2	O	8-bit resolution D/A.
4	VI2	I	D/A Converter input.
5	V_{DD}	-	Power supply.
6	LD	I	When the LD is at the low level, the clock input reception mode is entered. and data can be uptaken by the 12-bit shift register. Then at the threshold rising from low to high, the 12-bit shift register value is loaded to the D/A output register.
7	CLK	I	Shift clock input. With the rise of the shift clock, the input signal from the DI is input to the 12-bit shift register.
8	DI	I	Serial data input. Input serial data 12 bits long.
9	VI3	I	D/A converter input.

Pin No.	Pin code	I/O	Function
10,11	VO3,VO4	O	8-bit resolution D/A.
12,13	VI4,VI5	I	D/A converter input.
14,15	VO5,VO6	O	8-bit resolution D/A.
16	VI6	I	D/A converter input.
17	DO	O	12-bit shift register MSB bit data is output.
18	V_{REF}	-	Terminal for determining the D/A Conversion reference point level. Vo = (VIN - VDAref) x n/256 + VDAref
19	$\overline{\text{RESET}}$	-	When a low level signal is input to the $\overline{\text{RESET}}$ terminal, all the D/A output register value become low.
20	GND	-	GND.
21	VI7	I	D/A converter input.
22,23	VO7,VO8	O	8-bit resolution D/A.
24	VI8	I	D/A converter input.

SEMICONDUCTOR DATA

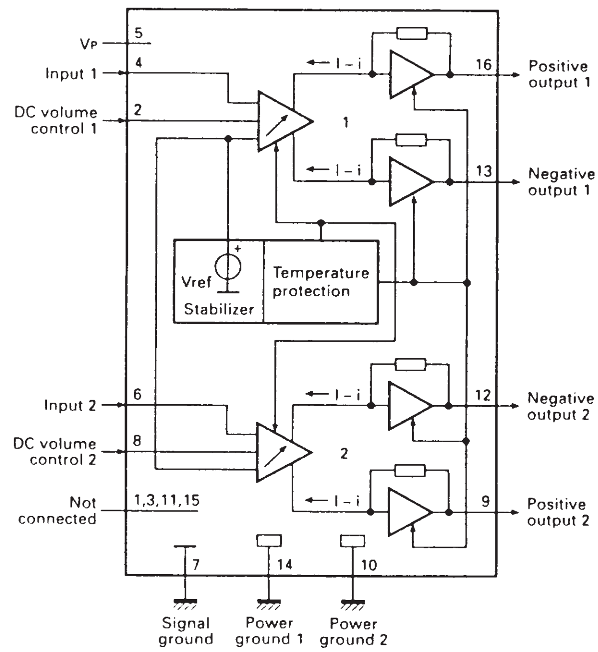
PLL System : SA7025DK (TX-RX Unit IC14)

■ Block diagram



Audio Power Amplifier : TDA7053AT (Display Unit IC300)

■ Block diagram



■ Pin description

Pin No.	Symbol	Description
1	CLOCK	Serial clock input.
2	DATA	Serial data input.
3	STROBE	Serial strobe input.
4	V_{SS}	Digital ground.
5	RF_{IN}	Prescaler positive input.
6	$\overline{RF_{IN}}$	Prescaler negative input.
7	V_{CCP}	Prescaler positive Supply voltage. This pin supplies power to the prescaler and RF input buffer.
8	REF_{IN}	Reference divider input.
9	RA	Auxiliary current setting; resistor to V_{SSA}.
10	AUX_{IN}	AuxIliary divider input.
11	PHA	Auxiliary phase detector output.
12	V_{SSA}	analog ground.
13	PHI	Integral phase detector output.
14	PHP	Proportional phase detector output.
15	V_{DDA}	Analog supply voltage. This pin supplies power to the charge pumps, Auxiliary prescaler. Auxiliary and Reference buffers.
16	RN	Main current setting; resistor to V_{SSA}.
17	RF	Fractional compensation current setting; resistor to V_{SSA}.
18	LOCK	Lock detector output.
19	TEST	Test pin; connect to V_{DD}.
20	V_{DD}	Digital supply voltage. This pin supplies power to the CMOS digital part of the device.

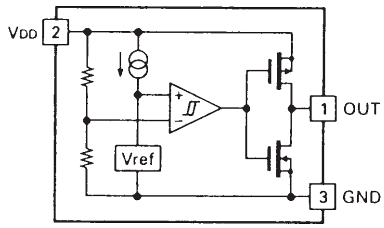
■ Pin description

Pin No.	Symbol	Description
1	NC	Not connected.
2	VC1	DC volume control 1.
3	NC	Not connected.
4	$V_{I(1)}$	Voltage input 1.
5	VP	Positive Supply voltage.
6	$V_{I(2)}$	Voltage input 2.
7	SGND	Signal ground.
8	VC2	DC volume control 2.
9	OUT2+	Positive output 2.
10	PGND2	Power ground 2.
11	NC	Not conncted.
12	OUT2-	Negative output 2.
13	OUT1-	Negative output 1.
14	PGND1	Power ground 1.
15	NC	Not connected.
16	OUT1+	Positive output 1.

SEMICONDUCTOR DATA

Voltage Detector : RN5VL42C (TX-RX Unit IC3)

■ Block diagram (CMOS output)

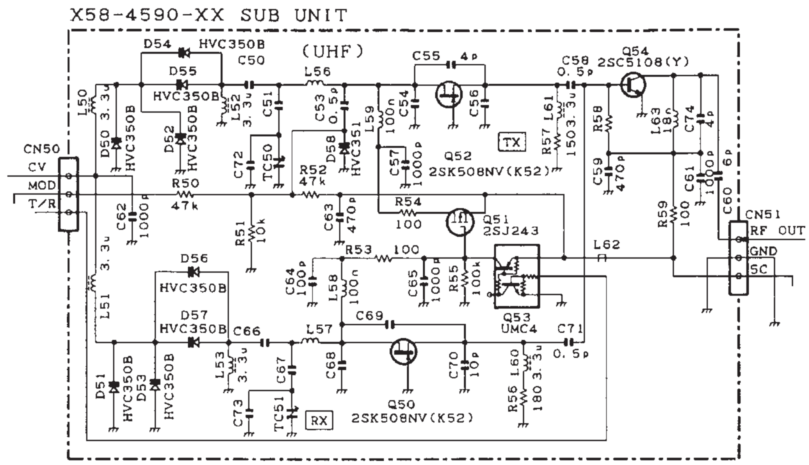


■ Pin function

Pin No.	Pin code	Function
1	OUT	Output.
2	VDD	Power supply.
3	GND	Ground.

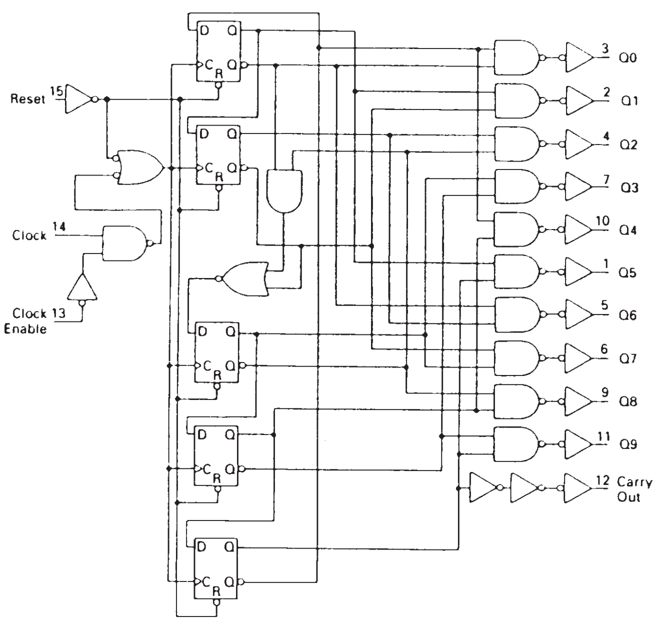
VCO System : X58-4590-XX (SUB Unit : A1)

■ Circuit diagram



Counter : MC74HC4017F (Display Unit IC301)

■ Logic circuit



- **Input**

CLOCK (pin No.14) - Clock Input

The rising edge of this clock advances the count.

- **Controller Input**

RESET (pin No.15) - Asynchronous Reset Input

When this pin is High, the counter is initialized. and Q0 and CARRY OUT output become High. At this time, Q1 to Q9 become Low.

CLOCK ENABLE (Pin No.13) - Clock Enable Input (Low active)

The count operation is forbidden when this pin is High. When it is Low. the normal count is carried out. When the clock input (pin No.14) is used as enable (High active). this input can be used for the count as the rising clock.

- **Output**

Q0 to Q9 (pins 3,2,4,7,10,1,5,6,9,11) - Decoded Decade Counter Output

These outputs become High only during a single clock cycle.

CARRY OUT (pin No.12) - Cascade Output Pin

This output is used as the cascade output, or as the ÷10 output during the 50% duty cycle. When the count reaches "5", this output becomes Low. When the count reaches "0" or is reset, this output becomes High. When counters are cascade-connected, this output sends the rise signal to clock input of the next counter.

DESCRIPTION OF COMPONENTS

DISPLAY UNIT (X54-3210-XX)

Ref. No.	Use/Function	Operation/Condition
IC300	IC	Audio power amplifier
IC301	IC	Counter /Key scan
Q300	FET	DC switch / INT MIC on/off
Q301	FET	DC switch
Q302	Transistor	DC switch / LED (Red) driver
Q303	Transistor	DC switch / LED (Green) driver
Q304	Transistor	DC switch
Q305	Transistor	Current driver / Audio amp AVR
Q306	Transistor	DC switch
Q307	Transistor	Current driver / LCD back light LED AVR
Q308	FET	DC switch / SP INT/EXT
Q309	Transistor	Temperature compensation
Q310	FET	Mute switch
D300	Zener diode	Surge absorption
D301	LED	LED / Red, Green
D302	Diode	Quick discharge /AF mute
D303	Zener diode	Voltage reference
D304	Diode	Voltage reference
D305~310	LED	LCD back light
D315~318	Diode	Reverse current prevention
D319~321	Zener diode	Surge absorption

TX-RX UNIT (X57-5750-XX)

Ref. No.	Use/Function	Operation/Condition
IC1,2	IC	Buffer amplifier
IC3	IC	Voltage detector / Reset
IC4	IC	Buffer amplifier
IC5	IC	Voltage regulator / 5M
IC6	IC	Voltage regulator / 5V
IC7	IC	Buffer amplifier
IC8	IC	D/A converter (Adjustment)
IC9	IC	Voltage regulator / 5C
IC10	IC	Active filter / For HSDout
IC11	IC	Active filter / For LSDin
IC12	IC	FM IF system
IC13	IC	Audio processor
IC14	IC	PLL system
IC16	IC	DTMF decoder
IC17	IC	Flash memory
IC18	IC	Active DBM
IC19	IC	Microprocessor
IC20	IC	EEPROM
IC21,22	IC	Shift register / Output expander
IC23	IC	Comparator (APC)
IC24	IC	Analog switch
Q1	Transistor	Switch
Q2	FET	DC switch / 5R
Q3	Transistor	DC switch / 5T
Q4	Transistor	Noise amplifier / Squelch
Q5	FET	DC switch / Save
Q6	Transistor	2nd IF W/N switch sets to on when Narrow
Q7	Transistor	2nd IF W/N switch sets to on when Wide
Q8	Transistor	Ripple filter
Q9	Transistor	DC switch / W/N audio amplitude adjust
Q10	Transistor	AF mute switch
Q11	FET	Mute switch
Q12	Transistor	IF amplifier
Q13	FET	Mute switch / MIC line mute
Q14	FET	DC switch
Q15	FET	DET mute
Q16	Transistor	PLL IC fin amplifier
Q17,18	Transistor	Buffer amplifier
Q19	Transistor	Clock frequency shift
Q20	Transistor	RF amplifier / TX driver
Q21	FET	DC switch
Q22	Transistor	DC switch
Q23	FET	DC switch
Q24	FET	RF amplifier
Q25	Transistor	DC switch
Q26	FET	Mute switch / MIC line mute
D1	Diode	Reverse protection
D2	Diode	Overload protection
D3	Diode	Reverse current protection
D4	Diode	Noise detection
D5	Diode	RF switch (2nd IF wide/narrow)
D6	Diode	Current steering
D7	Diode	RF switch (2nd IF wide/narrow)
D8	Diode	Voltage clamp
D9	Diode	TX/RX switch
D10	Diode	Overload protection
D12,14,15	Diode	ANT switch
D16	Diode	Overload protection
D17,18	Diode	Surge absorption
D20,22	Diode	Varactor tuning
D23	Diode	Voltage drop
D24,25	Diode	ANT switch

SUB UNIT (X58-4590-XX)

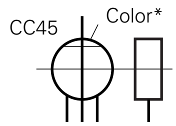
Ref. No.	Use/Function	Operation/Condition
Q50	FET	VCO oscillation
Q51	FET	DC switch
Q52	FET	VCO oscillation
Q53	Transistor	DC switch
Q54	Transistor	RF Buffer amplifier
D50-D57	Diode	Frequency control
D58	Diode	TX modulation

PARTS LIST

CAPACITORS

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

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



• Capacitor value

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

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

• Temperature coefficient

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

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

Example : CC45TH = –470 ± 60ppm/°C

• Tolerance (More than 10pF)

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

(Less than 10pF)

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

• Voltage rating

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

• Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)

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

Refer to the table above.

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

Dimension (Chip capacitors)

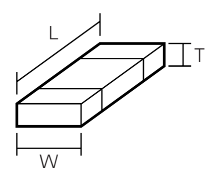
Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
A	4.5 ± 0.5	3.2 ± 0.4	Less than 2.0
B	4.5 ± 0.5	2.0 ± 0.3	Less than 2.0
C	4.5 ± 0.5	1.25 ± 0.2	Less than 1.25
D	3.2 ± 0.4	2.5 ± 0.3	Less than 1.5
E	3.0 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25
G	1.6 ± 0.2	0.8 ± 0.2	Less than 1.0

RESISTORS

• Chip resistor (Carbon)

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

Dimension



• Carbon resistor (Normal type)

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

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

Dimension (Chip resistor)

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

Rating wattage

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

PARTS LIST

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

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

TK-380

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-380 (Y50-488)					
1	1A		A02-2054-53	CABINET ASSY(4 KEYS)	K,K2,K3,M,M3
1	1A		A02-2055-53	CABINET ASSY(16 KEYS)	K4,K5,K6
2	3B		A62-0535-04	PANEL ASSY	
3	2C		B09-0363-03	CAP (SP/MIC) ACSY	
4	2A		B38-0810-05	LCD ASSY	
5	1B		B43-1106-14	BADGE (KENWOOD)	
6	1C		B46-0470-00	WARRANTY CARD ACSY	K,K2,K3,K4,K5,K6
7	1C		B62-0967-00	INSTRUCTION MANUAL ACSY	K,K2,K3,K4,K5,K6
7	1C		B62-0988-00	INSTRUCTION MANUAL ACSY	M,M3
8	3B	*	B72-1447-14	MODEL NAME PLATE	K,K4,M
8	3B	*	B72-1448-04	MODEL NAME PLATE	K2,K5
8	3B	*	B72-1449-14	MODEL NAME PLATE	K3,K6,M3
9	3B		E04-0416-05	RF COAXIAL RECEPTACLE(SMA)	
10	3A		E23-1048-05	TERMINAL (BATT-)	
11	3B		E23-1101-05	TERMINAL (BATT+)	
12	2B		E23-1104-04	TERMINAL (ANT)	
13	2B		E37-0672-05	FLAT CABLE	
14	3A		E37-0673-05	LEAD WIRE WITH CONNECTOR(PTT)	
15	1A		E37-0674-05	LEAD WIRE WITH CONNECTOR(SP)	
16	3B		E58-0440-05	SQUARE SOCKET (SP/MIC)	
17	2A	*	F10-2310-03	SHIELDING PLATE(LCD)	
18	3B		F10-2255-04	SHIELDING PLATE(P-MODULE)	
19	2B		F10-2271-03	SHIELDING CASE (FRONT END)	
20	2B		F10-2272-03	SHIELDING CASE (DBM)	
21	2A	*	F10-2274-13	SHIELDING CASE (VCO-OUT)	
22	2A		F20-3303-04	INSULATING SHEET(MIC/GND)	
23	1A		G01-0881-04	COIL SPRING	
24	1B		G09-0418-05	KNOB SPRING (VOL,ENC)	
25	1B		G10-0799-04	FIBROUS SHEET (SP)	
27	3A		G11-2544-04	SHEET (CHASSIS)	
29	3A	*	G11-2590-04	SHEET (PTT)	
31	3B		G53-0811-03	PACKING (TOP)	
32	3A		G53-0814-04	PACKING (BATT +)	
33	1B		G53-0840-02	PACKING (4 KEYS)	K,K2,K3,M,M3
34	1B		G53-0841-02	PACKING (16 KEYS)	K4,K5,K6
35	2D		H12-3014-02	PACKING FIXTURE	
36	1D		H13-1072-04	CARTON BOARD	
37	3D		H52-1226-02	ITEM CARTON CASE	
38	1A		J19-1572-04	HOLDER	
39	2A	*	J21-8380-03	HARDWARE FIXTURE(P-MODULE)	
40	2C		J29-0618-15	HOOK ACSY	
41	3B		J82-0045-05	FPC (VOL,ENC)	
42	3B	*	J82-0066-05	FPC (SQUARE SOCKET)	
43	1A		K29-5157-03	KNOB (PTT etc)	
44	1A		K29-5158-03	KEY TOP (PTT etc)	
45	1A		K29-5165-03	LEVER KNOB	
46	1B		K29-5231-03	KNOB (VOL)	
47	1B		K29-5232-03	KNOB (ENC)	
A	3B		N14-0569-04	CIRCULAR NUT (VOL,ENC)	
B	3B		N30-2604-46	PAN HEAD MACHINE SCREW(ANT)	
C	3A		N30-2610-46	PAN HEAD MACHINE SCREW(CASE)	
D	2A		N67-2606-46	PAN HEAD SEMS SCREW(P-MODULE)	
E	2A		N83-2005-46	PAN HEAD TAPTITE SCREW(UNIT)	
48	2C		N99-2004-05	SCREW SET ACSY	
49	3B		R31-0617-05	VARIABLE R (POWER SW/VOL)	
50	2B		S70-0414-05	TACT SWITCH (AUX SW)	
SP	1B		T07-0347-05	SPEAKER	
ANT	2D		T90-0682-05	WHIP ANTENNA ACSY	M
ANT	2D	*	T90-0684-05	WHIP ANTENNA ACSY	M3
MIC300	2A		T91-0579-05	MIC ELEMENT	
IC100	2A		M68732HA	IC(P-MODULE (440-490MHz)	K,K4,M
IC100	2A	*	M68732SHA	IC(P-MODULE (470-512MHz)	K2,K5
IC100	2A	*	M68732LA	IC(P-MODULE (400-430MHz)	K3,K6,M3
51	3B		W02-1814-05	ENCODER	
DISPLAY UNIT (X54-3210-XX) -10:K,K2,K3,M,M3 -11:K4,K5,K6					
C301			CC73GCH1H470J	CHIP C 47PF J	
C302			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C304			CK73FB1C474K	CHIP C 0.47UF K	
C305			CC73GCH1H101J	CHIP C 100PF J	
C307			CK73GB1C104K	CHIP C 0.10UF K	
C308			CC73GCH1H101J	CHIP C 100PF J	
C309			CK73FB1C474K	CHIP C 0.47UF K	
C310			CK73GB1C104K	CHIP C 0.10UF K	
C311			CC73GCH1H470J	CHIP C 47PF J	
C312			CK73GB1C104K	CHIP C 0.10UF K	
C313			C92-0628-05	CHIP-TAN 10UF 10WV	
C314			C92-0647-05	TAN C 3.3UF 4WV	
C315			CC73GCH1H101J	CHIP C 100PF J	
C316,317			CC73GCH1H470J	CHIP C 47PF J	
C318			CC73GCH1H101J	CHIP C 100PF J	
C321-333			CC73GCH1H470J	CHIP C 47PF J	
C335-339			CC73GCH1H470J	CHIP C 47PF J	
C340			CK73GB1E153K	CHIP C 0.015UF K	
C341-344			CC73GCH1H470J	CHIP C 47PF J	
CN300			E40-5891-05	FLAT CABLE CONNECTOR(24P:TX-RX	
CN301			E40-5892-05	FLAT CABLE CONNECTOR(14P)	
CN302			E40-5662-05	PIN ASSY SOCKET (SP)	
CN303			E40-5887-05	PIN ASSY (PTT)	
CN304			E40-5823-05	FLAT CABLE CONNECTOR(LCD)	
L300,301			L92-0141-05	FERRITE CHIP	
L302,303			L92-0138-05	FERRITE CHIP	
L304,305			L92-0141-05	FERRITE CHIP	
L306,307			L92-0138-05	FERRITE CHIP	
L308,309			L92-0141-05	FERRITE CHIP	
CP300,301			R90-0723-05	MULTI-COMP 47K X2	
CP302			R90-0724-05	MULTI-COMP 1K X4	K4,K5,K6
CP303			R90-0724-05	MULTI-COMP 1K X4	
R300			RK73GB1J103J	CHIP R 10K J 1/16W	
R301			RK73FB2A101J	CHIP R 100 J 1/10W	
R302			RK73GB1J470J	CHIP R 47 J 1/16W	
R303			RK73GB1J471J		
R304			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R305			RK73GB1J104J	CHIP R 100K J 1/16W	
R306			R92-1252-05	CHIP R 0 OHM	
R307			RK73GB1J821J	CHIP R 820 J 1/16W	
R308			RK73GB1J153J	CHIP R 15K J 1/16W	
R309			R92-1252-05	CHIP R 0 OHM	
R310			RK73GB1J331J	CHIP R 330 J 1/16W	
R311			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R312			RK73GB1J104J	CHIP R 100K J 1/16W	

PARTS LIST

DISPLAY UNIT (X54-3210-XX)
TX-RX UNIT (X57-5750-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R313,314			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R315			RK73GB1J104J	CHIP R 100K J 1/16W	
R316			RK73GB1J473J	CHIP R 47K J 1/16W	
R317			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R318			RK73GB1J104J	CHIP R 100K J 1/16W	
R319			RK73GB1J820J	CHIP R 82 J 1/16W	
R320,321			RK73GB1J820J	CHIP R 82 J 1/16W	K4,K5,K6
R324			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R325			RK73GB1J102J	CHIP R 1.0K J 1/16W	K4,K5,K6
R326			RK73GB1J124J	CHIP R 120K J 1/16W	
R327			RK73GB1J563J	CHIP R 56K J 1/16W	
R328			RK73GB1J124J	CHIP R 120K J 1/16W	
R331			RK73GB1J103J	CHIP R 10K J 1/16W	
R332			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R333			RK73GB1J103J	CHIP R 10K J 1/16W	
R336			R92-1252-05	CHIP R 0 OHM	
R337			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R338-341			RK73GB1J101J	CHIP R 100 J 1/16W	
S301-303			S70-0457-05	TACT SWITCH (PTT)	
D300			NNCD6.8G	ZENER DIODE	
D301			B30-2019-05	LED(RE/GR)	
D302			1SS373	DIODE	
D303			015AZ2.4-X	ZENER DIODE	
D304			MA2S111	DIODE	
D305,306			B30-2171-05	LED(1608/D/8)	
D307-310			B30-2171-05	LED(1608/D/8)	K4,K5,K6
D315			IMN10	DIODE	K4,K5,K6
D316			MA2S111	DIODE	K4,K5,K6
D317			MA2S111	DIODE	
D318			IMN10	DIODE	
D319-321			015AZ6.8	ZENER DIODE	
IC300			TDA7053AT	IC(AUDIO AMP)	
IC301			MC74HC4017F	IC(GATE CMOS)	
Q300			2SJ243	FET	
Q301			UPA672T	FET	
Q302-304			2SC4617(S)	TRANSISTOR	
Q305			2SB798(DL,DK)	TRANSISTOR	
Q306			2SC4617(S)	TRANSISTOR	
Q307			2SB1132(Q,R)	TRANSISTOR	
Q308			UPA672T	FET	
Q309			2SC4617(S)	TRANSISTOR	
Q310			2SK1824	FET	
TH300			TN10-3S154JT	THERMISTOR	

TX-RX UNIT (X57-5750-XX) -10:K,K4,M -11:K2,K5 -12:K3,K6,M3

Ref. No.	Address	New parts	Parts No.	Description	Destination
C1			CK73GB1H471K	CHIP C 470PF K	
C2 ,3			CK73GB1E103K	CHIP C 0.010UF K	
C4 -6			CK73GB1H471K	CHIP C 470PF K	
C7			CK73GB1C104K	CHIP C 0.10UF K	
C8			CK73GB1H103K	CHIP C 0.010UF K	
C9			CK73GB1C104K	CHIP C 0.10UF K	
C10			CK73GB1E103K	CHIP C 0.010UF K	
C11			CK73GB1H471K	CHIP C 470PF K	
C12			CK73GB1E103K	CHIP C 0.010UF K	
C13			CC73GCH1H101J	CHIP C 100PF J	
C14			C92-0628-05	CHIP-TAN 10UF 10WV	
C15			C92-0592-05	CHIP-TAN 4.7UF 6.3WV	
C16			CK73GB1H471K	CHIP C 470PF K	
C17			C92-0628-05	CHIP-TAN 10UF 10WV	
C18			CK73FB1C334K	CHIP C 0.33UF K	
C19			C92-0628-05	CHIP-TAN 10UF 10WV	
C20			CK73GB1C104K	CHIP C 0.10UF K	
C21			C92-0592-05	CHIP-TAN 4.7UF 6.3WV	
C22			CK73GB1H331K	CHIP C 330PF K	
C23			C92-0592-05	CHIP-TAN 4.7UF 6.3WV	
C24 ,25			CK73GB1H471K	CHIP C 470PF K	
C26			CK73GB1E223K	CHIP C 0.022UF K	
C27 -29			CK73GB1H471K	CHIP C 470PF K	
C30			CK73GB1H102K	CHIP C 1000PF K	
C31			CK73GB1C104K	CHIP C 0.10UF K	
C32			CK73FB1A105K	CHIP C 1.0UF K	
C33 ,34			CK73GB1H471K	CHIP C 470PF K	
C35			CK73GB1E103K	CHIP C 0.010UF K	
C36			CK73GB1C104K	CHIP C 0.10UF K	
C37			CK73GB1H471K	CHIP C 470PF K	
C38			CK73GB1H102K	CHIP C 1000PF K	
C39 ,40			CK73GB1C104K	CHIP C 0.10UF K	
C41			C92-0713-05	TAN C 10UF 6.3WV	
C42			CK73GB1H102K	CHIP C 1000PF K	
C43			CK73GB1C333K	CHIP C 0.033UF K	
C44			CK73GB1H471K	CHIP C 470PF K	
C45			CC73GCH1H100D	CHIP C 10PF D	
C46			CC73GCH1H121J	CHIP C 120PF J	
C47			CK73GB1C104K	CHIP C 0.10UF K	
C48			CK73GB1H471K	CHIP C 470PF K	
C49			CK73GB1C104K	CHIP C 0.10UF K	
C50			CC73GCH1H100D	CHIP C 10PF D	
C51			CK73GB1E103K	CHIP C 0.010UF K	
C52			CC73GCH1H271J	CHIP C 270PF J	
C53			CK73GB1H102K	CHIP C 1000PF K	
C54			CK73GB1E103K	CHIP C 0.010UF K	
C55			CK73GB1C104K	CHIP C 0.10UF K	
C56			C92-0662-05	TAN C 15UF 6.3WV	
C57			CK73GB1H472K	CHIP C 4700PF K	
C58			CK73GB1H471K	CHIP C 470PF K	
C59			CK73GB1H222K	CHIP C 2200PF K	
C60			CK73GB1C273K	CHIP C 0.027UF K	
C61			CK73GB1C104K	CHIP C 0.10UF K	
C62			CK73GB1E123K	CHIP C 0.012UF K	
C63			CK73GB1H122K	CHIP C 1200PF K	
C64			CK73GB1H102K	CHIP C 1000PF K	
C65 ,66			CC73GCH1H680J	CHIP C 68PF J	
C67			CK73GB1C104K	CHIP C 0.10UF K	
C68 ,69			CK73GB1E103K	CHIP C 0.010UF K	
C70			CK73GB1C104K	CHIP C 0.10UF K	
C71			CC73GCH1H220J	CHIP C 22PF J	
C72			CK73GB1C683K	CHIP C 0.068UF K	
C73			CC73GCH1H100D	CHIP C 10PF D	
C74			CK73GB1C104K	CHIP C 0.10UF K	
C75			CK73GB1E103K	CHIP C 0.010UF K	
C76			CK73GB1C104K	CHIP C 0.10UF K	
C77			C92-0662-05	TAN C 15UF 6.3WV	
C78			CK73GB1H562J	CHIP C 5600PF J	
C79			C92-0713-05	TAN C 10UF 6.3WV	
C81			CK73GB1H471K	CHIP C 470PF K	
C82			CK73GB1C333K	CHIP C 0.033UF K	
C84			CK73GB1H562J	CHIP C 5600PF J	
C85			CK73GB1H471K	CHIP C 470PF K	
C86			CK73GB1H562J	CHIP C 5600PF J	
C87			CK73GB1C333K	CHIP C 0.033UF K	
C88			CK73GB1C104K	CHIP C 0.10UF K	
C89			CC73GCH1H820J	CHIP C 82PF J	
C91			CK73GB1H471K	CHIP C 470PF K	
C92			C92-0662-05	TAN C 15UF 6.3WV	

PARTS LIST

TX-RX UNIT (X57-5750-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C93			CK73GB1H272J	CHIP C 2700PF J	
C95			CK73GB1H471K	CHIP C 470PF K	
C96			CC73GCH1H330J	CHIP C 33PF J	
C97			CC73GCH1H030B	CHIP C 3.0PF B	
C98 ,99			CK73GB1H272J	CHIP C 2700PF J	
C100-102			CK73GB1C104K	CHIP C 0.10UF K	
C103			CC73GCH1H151J	CHIP C 150PF J	
C104			CK73GB1H152J	CHIP C 1500PF J	
C105			CK73GB1H102K	CHIP C 1000PF K	
C106			CK73GB1E103K	CHIP C 0.010UF K	
C107			CC73GCH1H030B	CHIP C 3.0PF B	
C108			C92-0635-05	TAN C 10UF 6.3WV	
C109			C92-0714-05	TAN C 4.7UF 6.3WV	
C110			CK73GB1C104K	CHIP C 0.10UF K	
C111			CK73GB1H471K	CHIP C 470PF K	
C112			C92-0713-05	TAN C 10UF 6.3WV	
C113,114			CK73GB1C104K	CHIP C 0.10UF K	
C115			CK73GB1H471K	CHIP C 470PF K	
C117,118			CK73GB1C104K	CHIP C 0.10UF K	
C119			CC73GCH1H181J	CHIP C 180PF J	
C120			CK73GB1C473K	CHIP C 0.047UF K	
C121,122			CK73GB1C104K	CHIP C 0.10UF K	
C123			CK73GB1E103K	CHIP C 0.010UF K	
C124,125			CK73GB1C104K	CHIP C 0.10UF K	
C126			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C127			C92-0592-05	CHIP-TAN 4.7UF 6.3WV	
C128			CK73GB1C104K	CHIP C 0.10UF K	
C129			CK73GB1H562J	CHIP C 5600PF J	
C130			CK73GB1H102K	CHIP C 1000PF K	
C131			CK73GB1H562J	CHIP C 5600PF J	
C133			CC73GCH1H050B	CHIP C 5.0PF B	
C134			CK73GB1E153K	CHIP C 0.015UF K	
C135			CK73GB1E103K	CHIP C 0.010UF K	
C136			CK73GB1E473J	CHIP C 0.047UF J	
C137			CK73GB1E103K	CHIP C 0.010UF K	
C138			CC73GCH1H030B	CHIP C 3.0PF B	
C139			CK73GB1H471K	CHIP C 470PF K	
C140			CC73GCH1H050B	CHIP C 5.0PF B	
C141			C92-0592-05	CHIP-TAN 4.7UF 6.3WV	
C142			CK73GB1H471K	CHIP C 470PF K	
C143			CC73GCH1H100D	CHIP C 10PF D	
C144			C92-0714-05	TAN C 4.7UF 6.3WV	
C145			CK73FB1H563K	CHIP C 0.056UF K	
C146,147			CK73GB1H102K	CHIP C 1000PF K	
C149			CK73GB1H471K	CHIP C 470PF K	
C150			CC73GCH1H050B	CHIP C 5.0PF B	
C152			CC73GCH1H330J	CHIP C 33PF J	
C154			CK73GB1C104K	CHIP C 0.10UF K	
C155			CK73GB1H471K	CHIP C 470PF K	
C157			CK73GB1H471K	CHIP C 470PF K	
C159			CK73HB1C103K	CHIP C 0.010UF K	
C160			CK73GB1C104K	CHIP C 0.10UF K	
C161			CC73GCH1H040B	CHIP C 4.0PF B	
C162			CK73GB1H471K	CHIP C 470PF K	
C163			CK73GB1C104K	CHIP C 0.10UF K	
C165			CK73GB1E103K	CHIP C 0.010UF K	
C166			CK73HB1C103K	CHIP C 0.010UF K	
C167			CC73GCH1H040B	CHIP C 4.0PF B	
C168			CC73GCH1H120J	CHIP C 12PF J	K,K3,K4,K6,M,M3
C168			CC73GCH1H070B	CHIP C 7.0PF B	K2,K5
C169			CK73GB1E103K	CHIP C 0.010UF K	
C170			CK73HB1C103K	CHIP C 0.010UF K	
C171			CC73GCH1H070B	CHIP C 7.0PF B	K,K3,K4,K6,M,M3
C171			CC73GCH1H090B	CHIP C 9.0PF B	K2,K5
C172			CC73GCH1H050B	CHIP C 5.0PF B	K,K2,K4,K5,M
C172			CC73GCH1H060B	CHIP C 6.0PF B	K3,K6,M3
C173			CK73GB1H471K	CHIP C 470PF K	
C174			CK73GB1C104K	CHIP C 0.10UF K	
C175			CK73GB1H472K	CHIP C 4700PF K	
C176-180			CK73GB1H471K	CHIP C 470PF K	
C181			CK73GB1E103K	CHIP C 0.010UF K	
C182			CC73GCH1H060B	CHIP C 6.0PF B	
C183			CC73GCH1H270J	CHIP C 27PF J	
C184			CC73GCH1H680J	CHIP C 68PF J	
C185			CK73GB1H471K	CHIP C 470PF K	
C186			CC73GCH1H270J	CHIP C 27PF J	
C188,189			CK73GB1H471K	CHIP C 470PF K	
C190			CK73HB1C103K	CHIP C 0.010UF K	
C191,192			CK73GB1H471K	CHIP C 470PF K	
C193			CC73GCH1H100D	CHIP C 10PF D	
C194			CC73GCH1H4R5B	CHIP C 4.5PF B	K,K4,M
C194			CC73GCH1H040B	CHIP C 4.0PF B	K2,K5
C194			CC73GCH1H3R5B	CHIP C 3.5PF B	K3,K6,M3
C195			CK73GB1H471K	CHIP C 470PF K	
C196			CC73GCH1H390J	CHIP C 39PF J	K,K4,M
C196			CC73GCH1H040B	CHIP C 4.0PF B	K2,K5
C196			CC73GCH1H080J	CHIP C 8.0PF B	K3,K6,M3
C197			CK73FB1C474K	CHIP C 0.47UF K	
C198			CC73GCH1H070B	CHIP C 7.0PF B	K,K4,M
C198			CC73GCH1H1R5B	CHIP C 1.5PF B	K2,K5
C198			CC73GCH1H010B	CHIP C 1.0PF B	K3,K6,M3
C199			CC73GCH1H101J	CHIP C 100PF J	
C200			C92-0565-05	CHIP-TAN 6.8UF 10WV	
C201			CC73GCH1H2R5B	CHIP C 2.5PF B	K,K4,M
C201			CC73GCH1H050B	CHIP C 5.0PF B	K3,K6,M3
C202			CK73GB1H471K	CHIP C 470PF K	
C203			CC73GCH1H050B	CHIP C 5.0PF B	K,K2,K4,K5,M
C203			CC73GCH1H100C	CHIP C 10PF C	K3,K6,M3
C204			CC73GCH1H0R5B	CHIP C 0.5PF B	
C205			CC73GCH1H101J	CHIP C 100PF J	
C206			CC73GCH1H020B	CHIP C 2.0PF B	K3,K6,M3
C207			CC73GCH1H030B	CHIP C 3.0PF B	K,K4,M
C207			CC73GCH1H3R5B	CHIP C 3.5PF B	K2,K5
C207			CC73GCH1H060B	CHIP C 6.0PF B	K3,K6,M3
C208			CK73GB1E103K	CHIP C 0.010UF K	
C209			CK73GB1H471K	CHIP C 470PF K	
C210			CC73GCH1H020B	CHIP C 2.0PF B	K,K4,M
C210			CC73GCH1H3R5B	CHIP C 3.5PF B	K2,K3,K5,K6,M3
C211			CK73FB1C474K	CHIP C 0.47UF K	
C212			CC73GCH1H150J	CHIP C 15PF J	K3,K6,M3
C213			CC73GCH1H101J	CHIP C 100PF J	
C214			CC73GCH1H020B	CHIP C 2.0PF B	K,K3,K4,K6,M,M3
C214			CC73GCH1H060B	CHIP C 6.0PF B	K2,K5
C215			CC73GCH1H060B	CHIP C 6.0PF B	K,K2,K4,K5,M
C215			CC73GCH1H070B	CHIP C 7.0PF B	K3,K6,M3
C216			CC73GCH1H4R5B	CHIP C 4.5PF B	K,K2,K4,K5,M
C216			CC73GCH1H050B	CHIP C 5.0PF B	K3,K6,M3
C217			CC73GCH1H040B	CHIP C 4.0PF B	K,K2,K4,K5,M
C217			CC73GCH1H050B	CHIP C 5.0PF B	K3,K6,M3
C218			CC73GCH1H120J	CHIP C 12PF J	
C219			CC73GCH1H4R5B	CHIP C 4.5PF B	K,K4,M
C219			CC73GCH1H040B	CHIP C 4.0PF B	K2,K5
C219			CC73GCH1H030B	CHIP C 3.0PF B	K3,K6,M3
C220			CC73GCH1H050B	CHIP C 5.0PF B	

PARTS LIST

TX-RX UNIT (X57-5750-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C221			CK73GB1H471K	CHIP C 470PF K	
C222			CC73GCH1H030B	CHIP C 3.0PF B	K,K4,M
C222			CC73GCH1H4R5B	CHIP C 4.5PF B	K2,K5
C222			CC73GCH1H3R5B	CHIP C 3.5PF B	K3,K6,M3
C223			CC73GCH1H030B	CHIP C 3.0PF B	
C224			CC73GCH1H0R5B	CHIP C 0.5PF B	K3,K6,M3
C225			CC73GCH1H101J	CHIP C 100PF J	
C226			CK73GB1H471K	CHIP C 470PF K	
C227			CC73GCH1H1R5B	CHIP C 1.5PF B	K3,K6,M3
C230			CC73GCH1H010B	CHIP C 1.0PF B	K,K2,K4,K5,M
C230			CC73GCH1H1R5B	CHIP C 1.5PF B	K3,K6,M3
C231			CK73GB1H471K	CHIP C 470PF K	
C232			CC73GCH1H470J	CHIP C 47PF J	
C233			CK73GB1H471K	CHIP C 470PF K	
C234			CC73GCH1H100D	CHIP C 10PF D	
C236			CC73GCH1H470J	CHIP C 47PF J	
C237			CC73GCH1H010B	CHIP C 1.0PF B	K,K2,K4,K5,M
C237			CC73GCH1H1R5B	CHIP C 1.5PF B	K3,K6,M3
C238			CK73GB1E103K	CHIP C 0.010UF K	
C239			CK73GB1H471K	CHIP C 470PF K	
C241			CC73GCH1H130J	CHIP C 13PF J	K,K2,K4,K5,M
C241			CC73GCH1H120J	CHIP C 12PF J	K3,K6,M3
C242,243			CK73GB1H471K	CHIP C 470PF K	
C245			CC73GCH1H3R5B	CHIP C 3.5PF B	K,K4,M
C245			CC73GCH1H030B	CHIP C 3.0PF B	K2,K5
C245			CC73GCH1H020B	CHIP C 2.0PF B	K3,K6,M3
C247			CK73GB1H471K	CHIP C 470PF K	
C248			CC73GCH1H1R5B	CHIP C 1.5PF B	K,K2,K4,K5,M
C248			CC73GCH1H2R5B	CHIP C 2.5PF B	K3,K6,M3
C249-253			CK73GB1H471K	CHIP C 470PF K	
C254			CC73GCH1H050B	CHIP C 5.0PF B	K,K2,K4,K5,M
C254			CC73GCH1H060B	CHIP C 6.0PF B	K3,K6,M3
C255			CC73GCH1H020B	CHIP C 2.0PF B	
C256			CC73GCH1H050B	CHIP C 5.0PF B	K,K2,K4,K5,M
C256			CC73GCH1H060B	CHIP C 6.0PF B	K3,K6,M3
C257,258			CK73GB1H471K	CHIP C 470PF K	
C259			CC73GCH1H101J	CHIP C 100PF J	
C261,262			CK73HB1C103K	CHIP C 0.010UF K	
C263			CK73GB1H103K	CHIP C 0.010UF K	
C264			CC73GCH1H150J	CHIP C 15PF J	
C265			CK73GB1H103K	CHIP C 0.010UF K	
C269			CC73GCH1H030B	CHIP C 3.0PF B	
C276			CC73GCH1H2R5B	CHIP C 2.5PF B	K,K4,M
C276			CC73GCH1H070B	CHIP C 7.0PF B	K2,K5
C276			CC73GCH1H050B	CHIP C 5.0PF B	K3,K6,M3
CN1			E40-5823-05	FLAT CABLE CONNECTOR	
CN2			E40-9517-05	PIN ASSY SOCKET (4P)	
CN3			E40-5890-05	FLAT CABLE CONNECTOR(24P)	
CN4			E23-0342-05	TEST TERMINAL (2P)	
CN5 -12			E23-1081-05	TERMINAL	
F1			F53-0130-05	FUSE (3A)	
CD1			L79-1072-05	TUNING COIL	
CF1			L72-0962-05	CERAMIC FILTER	
CF2			L72-0963-05	CERAMIC FILTER	
L1			L92-0149-05	FERRITE CHIP	
L2			L92-0138-05	FERRITE CHIP	
L3			L40-4791-37	SMALL FIXED INDUCTOR(4.700UH)	
L4			L40-1091-37	SMALL FIXED INDUCTOR(1.000UH)	
L5 ,6			L92-0138-05	FERRITE CHIP	
L9			L40-1271-36	SMALL FIXED INDUCTOR(12NH/8)	
L10			L40-3971-36	SMALL FIXED INDUCTOR(39NH/8)	
L11 ,12			L92-0138-05	FERRITE CHIP	
L13			L40-2271-36	SMALL FIXED INDUCTOR(22NH/8)	
L14			L40-1081-36	SMALL FIXED INDUCTOR(100NH)	
L15			L40-1571-36	SMALL FIXED INDUCTOR(15NH/8)	
L17			L40-1571-36	SMALL FIXED INDUCTOR(15NH/8)	
L18			L39-1272-05	TOROIDAL COIL	
L19			L92-0138-05	FERRITE CHIP	
L20			L40-1571-36	SMALL FIXED INDUCTOR(15NH/8)	
L21 ,22			L39-1272-05	TOROIDAL COIL	
L24			L92-0138-05	FERRITE CHIP	
L25			L40-2771-36	SMALL FIXED INDUCTOR(27NH/8)	
L26			L92-0138-05	FERRITE CHIP	
L27			L40-3378-67	SMALL FIXED INDUCTOR(33NH/8)	K,K2,K4,K5,M
L27		*	L40-4778-67	SMALL FIXED INDUCTOR(47NH/8)	K3,K6,M3
L28			L92-0138-05	FERRITE CHIP	
L29			L40-1578-67	SMALL FIXED INDUCTOR(15NH/8)	K,K4,M
L29		*	L40-1278-67	SMALL FIXED INDUCTOR(12NH/8)	K2,K3,K5,K6,M3
L30			L92-0149-05	FERRITE CHIP	
L31			L40-1878-67	SMALL FIXED INDUCTOR(18NH/8)	K,K4,M
L31			L40-1578-67	SMALL FIXED INDUCTOR(15NH/8)	K2,K3,K5,K6,M3
L32			L34-4564-05	AIR-CORE COIL (4T)	
L33			L40-2278-67	SMALL FIXED INDUCTOR(22NH/8)	K,K2,K4,K5,M
L33			L40-3978-67	SMALL FIXED INDUCTOR(39NH/8)	K3,K6,M3
L34			L40-3378-67	SMALL FIXED INDUCTOR(33NH/8)	K,K2,K4,K5,M
L34		*	L40-4778-67	SMALL FIXED INDUCTOR(47NH/8)	K3,K6,M3
L35			L40-1085-34	SMALL FIXED INDUCTOR(100NH/8)	
L36			L40-3378-67	SMALL FIXED INDUCTOR(33NH/8)	K,K2,K4,K5,M
L36		*	L40-5678-67	SMALL FIXED INDUCTOR(56NH/8)	K3,K6,M3
L37			L34-4564-05	AIR-CORE COIL (4T)	
L38			L40-1878-67	SMALL FIXED INDUCTOR(18NH/8)	K,K4,M
L38			L40-2278-67	SMALL FIXED INDUCTOR(22NH/8)	K2,K3,K5,K6,M3
L39			L40-1871-36	SMALL FIXED INDUCTOR(18NH/8)	
L40			L34-4564-05	AIR-CORE COIL (4T)	
L41			L40-1071-36	SMALL FIXED INDUCTOR(10NH/8)	
L42 ,43			L34-4564-05	AIR-CORE COIL (4T)	
L44			L40-2278-67	SMALL FIXED INDUCTOR(22NH/8)	K,K4,M
L44			L40-1878-67	SMALL FIXED INDUCTOR(18NH/8)	K2,K5
L44		*	L40-2778-67	SMALL FIXED INDUCTOR(27NH/8)	K3,K6,M3
L45			L40-1092-81	SMALL FIXED INDUCTOR	
L46			L40-6878-67	SMALL FIXED INDUCTOR(68NH/8)	K,K2,K4,K5,M
L46			L40-8278-67	SMALL FIXED INDUCTOR(82NH/8)	K3,K6,M3
L47			L40-3378-67	SMALL FIXED INDUCTOR(33NH/8)	K,K4,M
L48 -52			L34-4564-05	AIR-CORE COIL (4T)	
L53			L92-0138-05	FERRITE CHIP	
L54 -56			L40-2771-36	SMALL FIXED INDUCTOR(27NH/8)	K,K4,M
L54 -56			L40-2271-36	SMALL FIXED INDUCTOR(22NH/8)	K2,K5
L54 -56			L40-8271-36	SMALL FIXED INDUCTOR(82NH/8)	K3,K6,M3
X1			L77-1789-05	TCXO (16.8MHZ/4P/16)	
X2			L77-1760-05	CRYSTAL RESONATOR(44.395MHZ)	
X3			L77-1708-05	CRYSTAL RESONATOR(3.579545MHZ)	
X4			L78-0462-05	RESONATOR (9.8304M/8*2.5)	
XF1			L71-0530-05	MCF (44.85MHZ/6P/1)	
CP1			R90-0724-05	MULTI-COMP 1K X4	
CP2			R90-0718-05	MULTI-COMP 4.7K X4	
CP4 ,5			R90-0743-05	MULTIPLE RESISTOR 47K X2	
CP6 -21			R90-0741-05	MULTIPLE RESISTOR 1K X2	
CP22-24			R90-0743-05	MULTIPLE RESISTOR 47K X2	
R1			RK73GB1J103J	CHIP R 10K J 1/16W	
R2			RK73GB1J473J	CHIP R 47K J 1/16W	
R3			RK73GB1J154J	CHIP R 150K J 1/16W	
R4			RK73GB1J104J	CHIP R 100K J 1/16W	
R5			RK73GB1J103J	CHIP R 10K J 1/16W	
R6 ,7			RK73GB1J104J	CHIP R 100K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-5750-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R8			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R9			RK73GB1J474J	CHIP R 470K J 1/16W	
R10			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R11			RK73GB1J104J	CHIP R 100K J 1/16W	
R12			RK73GB1J184J	CHIP R 180K J 1/16W	
R13			RK73GB1J104J	CHIP R 100K J 1/16W	
R14			R92-1252-05	CHIP R 0 OHM	
R15			RK73GB1J104J	CHIP R 100K J 1/16W	
R16 ,17			RK73GB1J473J	CHIP R 47K J 1/16W	
R18			RK73GB1J154J	CHIP R 150K J 1/16W	
R19 ,20			RK73GB1J104J	CHIP R 100K J 1/16W	
R21			RK73GB1J273J	CHIP R 27K J 1/16W	
R22 ,23			RK73GB1J823J	CHIP R 82K J 1/16W	
R24			RK73GB1J473J	CHIP R 47K J 1/16W	
R25			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R26			RK73GB1J473J	CHIP R 47K J 1/16W	
R27			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R28			RK73GB1J474J	CHIP R 470K J 1/16W	
R29			RK73GB1J184J	CHIP R 180K J 1/16W	
R30			RK73GB1J334J	CHIP R 330K J 1/16W	
R31			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R32			RK73GB1J104J	CHIP R 100K J 1/16W	
R33			RK73GB1J184J	CHIP R 180K J 1/16W	
R34			RK73GB1J683J	CHIP R 68K J 1/16W	
R35			RK73GB1J220J	CHIP R 22 J 1/16W	
R36			RK73GB1J154J	CHIP R 150K J 1/16W	
R37			R92-1252-05	CHIP R 0 OHM	
R38			RK73GB1J101J	CHIP R 100 J 1/16W	
R39			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R40 ,41			RK73GB1J334J	CHIP R 330K J 1/16W	
R42 ,43			RK73GB1J223J	CHIP R 22K J 1/16W	
R44			RK73GB1J473J	CHIP R 47K J 1/16W	
R45			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R46 ,47			RK73GB1J223J	CHIP R 22K J 1/16W	
R48			R92-1252-05	CHIP R 0 OHM	
R49			RK73GB1J223J	CHIP R 22K J 1/16W	
R50			RN73GH1J913D	CHIP R 91K D 1/16W	
R51			RN73GH1J683D	CHIP R 68K D 1/16W	
R52			RN73GH1J913D	CHIP R 91K D 1/16W	
R53			RK73GB1J473J	CHIP R 47K J 1/16W	
R54			RK73GB1J123J	CHIP R 12K J 1/16W	
R55			RN73GH1J333D	CHIP R 33K D 1/16W	
R56			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R57			RK73GB1J183J	CHIP R 18K J 1/16W	
R58			RK73GB1J184J	CHIP R 180K J 1/16W	
R59			RK73GB1J564J	CHIP R 560K J 1/16W	
R60			RK73GB1J123J	CHIP R 12K J 1/16W	
R61			RK73GB1J103J	CHIP R 10K J 1/16W	
R62			RN73GH1J913D	CHIP R 91K D 1/16W	
R63			RK73GB1J474J	CHIP R 470K J 1/16W	
R64			RK73GB1J184J	CHIP R 180K J 1/16W	
R65			RK73GB1J103J	CHIP R 10K J 1/16W	
R66			R92-1252-05	CHIP R 0 OHM	
R67			RN73GH1J274D	CHIP R 270K D 1/16W	
R68			RK73GB1J223J	CHIP R 22K J 1/16W	
R69			R92-1252-05	CHIP R 0 OHM	
R70			RN73GH1J682D	CHIP R 6.8K D 1/16W	
R71			RK73GB1J183J	CHIP R 18K J 1/16W	
R72			RK73GB1J155J	CHIP R 1.5M J 1/16W	
R74			RK73GB1J183J	CHIP R 18K J 1/16W	
R75			RN73GH1J683D	CHIP R 68K D 1/16W	
R76			RK73GB1J474J	CHIP R 470K J 1/16W	
R78			RN73GH1J682D	CHIP R 6.8K D 1/16W	
R79			RK73GB1J101J	CHIP R 100 J 1/16W	
R80			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R81			RK73GB1J220J	CHIP R 22 J 1/16W	
R83			RK73GB1J184J	CHIP R 180K J 1/16W	
R85			RK73GB1J103J	CHIP R 10K J 1/16W	
R86			RK73GB1J223J	CHIP R 22K J 1/16W	
R89			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R90			RK73GB1J153J	CHIP R 15K J 1/16W	
R91			RK73GB1J473J	CHIP R 47K J 1/16W	
R93			RK73GB1J183J	CHIP R 18K J 1/16W	
R94			RK73GB1J153J	CHIP R 15K J 1/16W	
R95			RK73GB1J394J	CHIP R 390K J 1/16W	
R96			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R97			RK73GB1J151J	CHIP R 150 J 1/16W	
R100			R92-1252-05	CHIP R 0 OHM	
R101			RK73GB1J560J	CHIP R 56 J 1/16W	
R102			RK73GB1J333J	CHIP R 33K J 1/16W	
R104			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R106			RK73GB1J470J	CHIP R 47 J 1/16W	
R107			RK73GB1J473J	CHIP R 47K J 1/16W	
R109			R92-1252-05	CHIP R 0 OHM	
R110			RK73GB1J220J	CHIP R 22 J 1/16W	
R112			R92-1252-05	CHIP R 0 OHM	
R114			R92-1252-05	CHIP R 0 OHM	
R115			RK73GB1J184J	CHIP R 180K J 1/16W	
R116			RK73GB1J103J	CHIP R 10K J 1/16W	
R117			RK73GB1J184J	CHIP R 180K J 1/16W	
R118			RK73GB1J221J	CHIP R 220 J 1/16W	
R119			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R120			RK73GB1J104J	CHIP R 100K J 1/16W	
R121			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R122			RK73GB1J221J	CHIP R 220 J 1/16W	
R124			R92-1252-05	CHIP R 0 OHM	
R125			RK73GB1J124J	CHIP R 120K J 1/16W	
R126			RK73GB1J470J	CHIP R 47 J 1/16W	
R127			RK73GB1J103J	CHIP R 10K J 1/16W	
R128			R92-1252-05	CHIP R 0 OHM	
R129			RK73HB1J104J	CHIP R 100K J 1/16W	
R130			R92-1252-05	CHIP R 0 OHM	
R131			RK73GB1J470J	CHIP R 47 J 1/16W	
R132			RK73GB1J684J	CHIP R 680K J 1/16W	
R133,134			R92-1368-05	CHIP R 0 OHM	
R135			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R136			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R137			RK73GB1J103J	CHIP R 10K J 1/16W	
R138			RK73HB1J103J	CHIP R 10K J 1/16W	
R139			R92-1252-05	CHIP R 0 OHM	
R140,141			RK73HB1J473J	CHIP R 47K J 1/16W	
R142			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R143			RK73HB1J474J	CHIP R 470K J 1/16W	
R144			R92-1252-05	CHIP R 0 OHM	
R145-152			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R153			R92-1252-05	CHIP R 0 OHM	
R154			RK73GB1J183J	CHIP R 18K J 1/16W	
R156			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R160			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R162			RK73GB1J103J	CHIP R 10K J 1/16W	
R163			RK73HB1J103J	CHIP R 10K J 1/16W	
R166			RK73GB1J223J	CHIP R 22K J 1/16W	
R167			R92-1252-05	CHIP R 0 OHM	
R168			RK73GB1J680J	CHIP R 68 J 1/16W	

PARTS LIST

TX-RX UNIT (X57-5750-XX)
SUB UNIT (X58-4590-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R177			RK73GB1J101J	CHIP R 100 J 1/16W	
R180			RK73GB1J473J	CHIP R 47K J 1/16W	
R184			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R185			RK73GB1J220J	CHIP R 22 J 1/16W	
R189			RK73HB1J473J	CHIP R 47K J 1/16W	
R190			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R195			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R199			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R202			RK73GB1J271J	CHIP R 270 J 1/16W	
R210			RK73GB1J561J	CHIP R 560 J 1/16W	
R216			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R218			RK73HB1J473J	CHIP R 47K J 1/16W	
R219			RK73GB1J180J	CHIP R 18 J 1/16W	K,K4,M
R219			RK73GB1J330J	CHIP R 33 J 1/16W	K2,K5
R219			RK73GB1J220J	CHIP R 22 J 1/16W	K3,K6,M3
R221			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R241			RK73GB1J331J	CHIP R 330 J 1/16W	
R242			R92-1252-05	CHIP R 0 OHM	K,K2,K4,K5,M
R244			R92-1252-05	CHIP R 0 OHM	
R245			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R247			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R248			R92-1252-05	CHIP R 0 OHM	
R249			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R250			R92-1252-05	CHIP R 0 OHM	
R251-253			RN73GH1J154D	CHIP R 150K D 1/16W	
R254			RK73GB1J271J	CHIP R 270 J 1/16W	K,K4,M
R254			RK73GB1J221J	CHIP R 220 J 1/16W	K2,K3,K5,K6,M3
R255-257			RN73GH1J154D	CHIP R 150K D 1/16W	
R258			RK73GB1J271J	CHIP R 270 J 1/16W	K,K4,M
R258			RK73GB1J221J	CHIP R 220 J 1/16W	K2,K3,K5,K6,M3
R259,260			R92-1252-05	CHIP R 0 OHM	
R261			RK73GB1J103J	CHIP R 10K J 1/16W	
R262			RK73GB1J470J	CHIP R 47 J 1/16W	
R263,264			RK73GB1J104J	CHIP R 100K J 1/16W	
R265			RK73GB1J473J	CHIP R 47K J 1/16W	
R266			R92-1252-05	CHIP R 0 OHM	
R267			RK73GB1J181J	CHIP R 180 J 1/16W	
R268			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R269			RK73GB1J223J	CHIP R 22K J 1/16W	
R270			R92-1252-05	CHIP R 0 OHM	
R271			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R272			R92-1252-05	CHIP R 0 OHM	
R273			RK73GB1J223J	CHIP R 22K J 1/16W	
R274			RK73GB1J392J	CHIP R 3.9K J 1/16W	K3,K6,M3
R276			R92-1252-05	CHIP R 0 OHM	
R277			RK73GB1J223J	CHIP R 22K J 1/16W	
R279,280			R92-1252-05	CHIP R 0 OHM	
R282			RK73GB1J223J	CHIP R 22K J 1/16W	
R283			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R284			RK73GB1J221J	CHIP R 220 J 1/16W	
R285			R92-1252-05	CHIP R 0 OHM	
R296			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R297,298			RK73HB1J473J	CHIP R 47K J 1/16W	
R299			RK73GB1J101J	CHIP R 100 J 1/16W	
D1			1SR154-400	DIODE	
D2 ,3			MA2S111	DIODE	
D4			RB706F-40	DIODE	
D5			DAN222	DIODE	
D6			MA2S111	DIODE	
D7			DAN222	DIODE	
D8			RB706F-40	DIODE	
D9			MA2S077	DIODE	

Ref. No.	Address	New parts	Parts No.	Description	Destination
D10			HZU5ALL	DIODE	
D12			HVU131	DIODE	
D14 ,15			MA2S077	DIODE	
D16			HSM88AS	DIODE	
D17 ,18			DA221	DIODE	
D20			HVC372B	VARIABLE CAPACITANCE DIODE	
D22			HVC372B	VARIABLE CAPACITANCE DIODE	
D23			1SS373	DIODE	
D24 ,25			MA2S077	DIODE	
IC1			TA75W01FU	IC(OP AMP X2)	
IC2			TC75W51FU	IC(OP AMP X2)	
IC3			RN5VL42C	IC(REGULATOR)	
IC4			TC75W51FU	IC(OP AMP X2)	
IC5			S-81350HG-KD	IC(VOLTAGE REGULATOR)	
IC6			NJU7201U50	IC(VOLTAGE REGULATOR)	
IC7			TC75W51FU	IC(OP AMP X2)	
IC8			M62364FP	IC(D/A CONVERTER)	
IC9			TK11250BM	IC(VOLTAGE REGULATOR)	
IC10			TA75S01F	IC(OP AMP)	
IC11			TA75W01FU	IC(OP AMP X2)	
IC12			TA31136FN	IC(FM IF DETECTOR)	
IC13			TC35453F	IC(AUDIO PROCESSOR)	
IC14			SA7025DK	IC(PLL SYSTEM)	
IC16			LC73872M	IC(DTMF RECEIVER)	
IC17			AT29C020-90TI	IC	
IC18			GN2011(Q)	IC	
IC19		*	30612M4A-407GP	IC(CPU)	
IC20			AT2408N10SI2.5	IC(8kbit SERIAL EEPROM)	
IC21,22			BU4094BCFV	IC(8bit SHIFT/STORE REGISTER)	
IC23			NJM2904V	IC(APC)	
IC24			TC7S66FU	IC(ANALOG SWITCH)	
Q1			DTC144EE	DIGITAL TRANSISTOR	
Q2			2SJ243	FET	
Q3			2SA1745(6,7)	TRANSISTOR	
Q4			2SC4617(S)	TRANSISTOR	
Q5			2SJ243	FET	
Q6			DTA144EE	DIGITAL TRANSISTOR	
Q7			DTC144EE	DIGITAL TRANSISTOR	
Q8			2SC4617(S)	TRANSISTOR	
Q9 ,10			DTC144EE	DIGITAL TRANSISTOR	
Q11			2SK1824	FET	
Q12			2SC5108(Y)	TRANSISTOR	
Q13 -15			2SK1824	FET	
Q16 -18			2SC5108(Y)	TRANSISTOR	
Q19			2SC4619	TRANSISTOR	
Q20			2SC4988	TRANSISTOR	
Q21			2SK1824	FET	
Q22			DTC114EE	DIGITAL TRANSISTOR	
Q23			2SK1824	FET	
Q24			3SK239A	FET	
Q25			DTA144EE	DIGITAL TRANSISTOR	
Q26			2SK1824	FET	
TH1			157-302-65801	THERMISTOR	
A1			X58-4590-10	SUB UNIT	K,K4,M
A1		*	X58-4590-11	SUB UNIT	K2,K5
A1		*	X58-4590-12	SUB UNIT	K3,K6,M3

A1:SUB UNIT (VCO) (X58-4590-XX) -10:K,K4,M -11:K2,K5 -12:K3,K6,M3

The A1 is replaceable as a unit assembly so individual parts are not kept in stock.

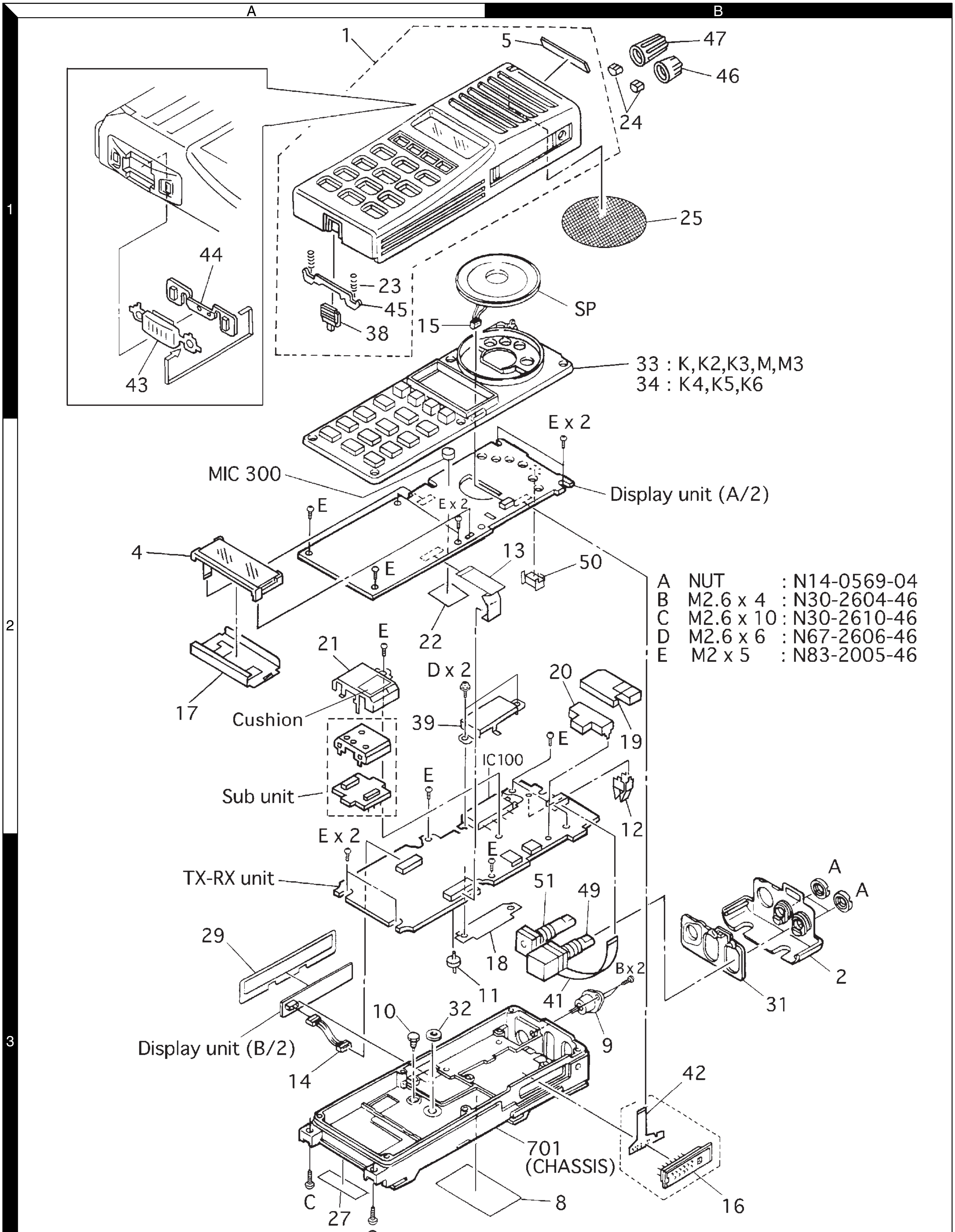
Ref. No.	Address	New parts	Parts No.	Description	Destination
C50			CC73HCH1H220J	CHIP C 22PF J	K,K4,M
C50			CC73HCH1H470J	CHIP C 47PF J	K2,K5
C50			CC73HCH1H270J	CHIP C 27PF J	K3,K6,M3

PARTS LIST

TX-RX UNIT (X57-5750-XX)
SUB UNIT (X58-4590-XX)

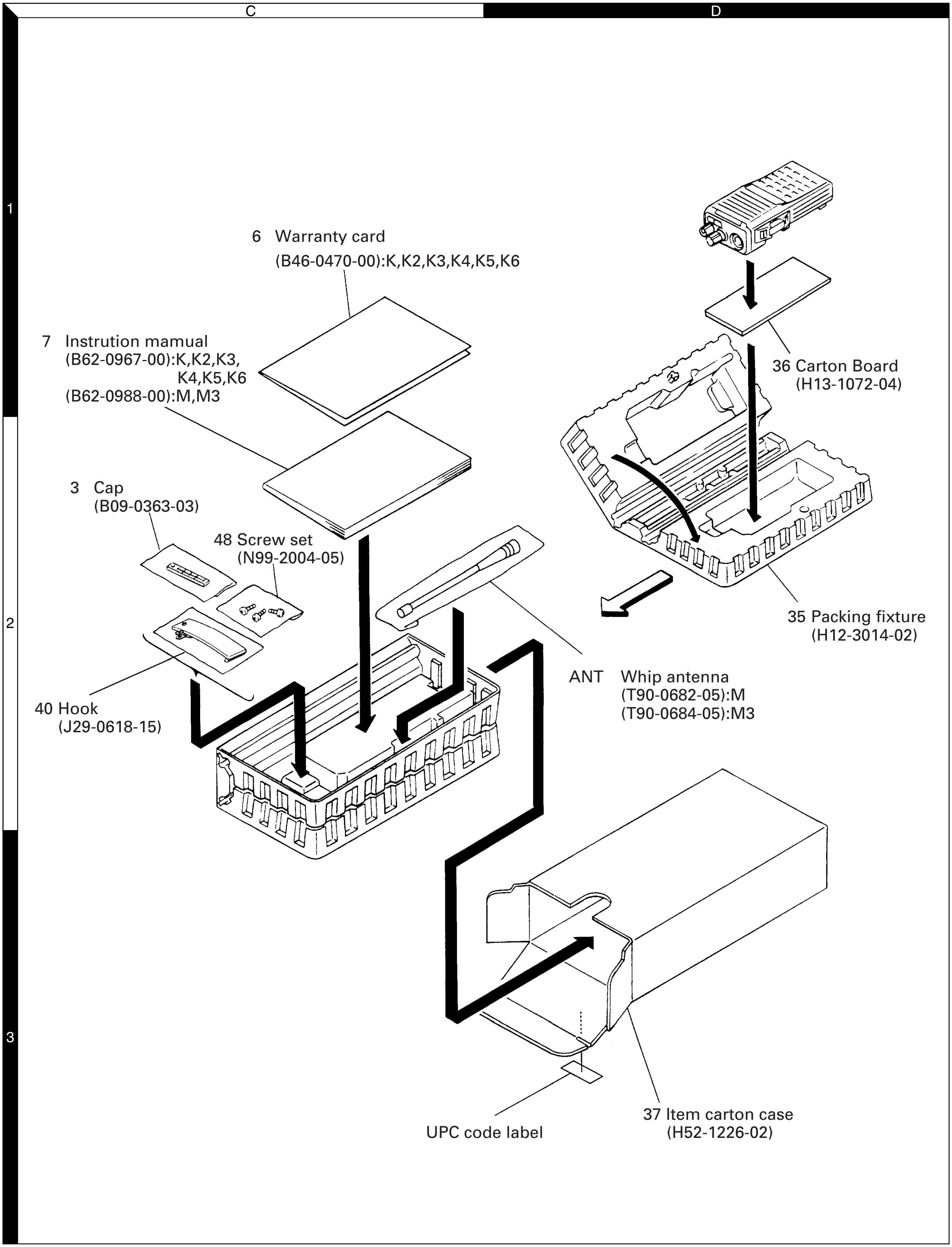
Ref. No.	Address	New parts	Parts No.	Description	Destination
C51		*	CC73HCH1H030B	CHIP C 3.0PF B	K,K4,M
C51			CC73HCH1H080B	CHIP C 8.0PF B	K2,K5
C51			CC73HCH1H050B	CHIP C 5.0PF B	K3,K6,M3
C53			CC73HCH1H0R5B	CHIP C 0.5PF B	
C54		*	CC73HCH1H030B	CHIP C 3.0PF B	K,K4,M
C54			CC73HCH1H020B	CHIP C 2.0PF B	K2,K5
C54		*	CC73HCH1H060B	CHIP C 6.0PF B	K3,K6,M3
C55			CC73HCH1H040B	CHIP C 4.0PF B	K,K4,M
C55		*	CC73HCH1H060B	CHIP C 6.0PF B	K2,K5
C55			CC73HCH1H050B	CHIP C 5.0PF B	K3,K6,M3
C56		*	CC73HCH1H060B	CHIP C 6.0PF B	K,K3,K4,K6,M,M3
C56			CC73HCH1H070B	CHIP C 7.0PF B	K2,K5
C57			CK73HB1H102K	CHIP C 1000PF K	
C58			CC73HCH1H0R5B	CHIP C 0.5PF B	
C59			CK73HB1H471K	CHIP C 470PF K	
C60		*	CC73HCH1H060B	CHIP C 6.0PF B	
C61 ,62			CK73HB1H102K	CHIP C 1000PF K	
C63			CK73HB1H471K	CHIP C 470PF K	
C64			CC73HCH1H101J	CHIP C 100PF J	
C65			CK73HB1H102K	CHIP C 1000PF K	
C66			CC73HCH1H470J	CHIP C 47PF J	K,K4,M
C66			CC73HCH1H220J	CHIP C 22PF J	K2,K5
C66		*	CC73HCH1H560J	CHIP C 56PF J	K3,K6,M3
C67		*	CC73HCH1H030B	CHIP C 3.0PF B	K,K4,M
C67		*	CC73HCH1H060B	CHIP C 6.0PF B	K2,K3,K5,K6,M3
C68		*	CC73HCH1H030B	CHIP C 3.0PF B	K,K2,K4,K5,M
C68			CC73HCH1H050B	CHIP C 5.0PF B	K3,K6,M3
C69			CC73HCH1H050B	CHIP C 5.0PF B	K,K4,M
C69		*	CC73HCH1H080B	CHIP C 8.0PF B	K2,K5
C69		*	CC73HCH1H090B	CHIP C 9.0PF B	K3,K6,M3
C70		*	CC73HCH1H100B	CHIP C 10PF B	
C71			CC73HCH1H0R5B	CHIP C 0.5PF B	
C72		*	CC73HCH1H030B	CHIP C 3.0PF B	K2,K5
C72			CC73HCH1H010B	CHIP C 1.0PF B	K3,K6,M3
C73			CC73HCH1H0R5B	CHIP C 0.5PF B	K,K4,M
C73			CC73HCH1H010B	CHIP C 1.0PF B	K2,K3,K5,K6,M3
C74			CC73HCH1H040B	CHIP C 4.0PF B	
TC50,51			C05-0384-05	CERAMIC TRIMMER CAP(10P/8)	
CN50,51			E40-5622-05	PIN ASSY	
L50 -53			L40-3391-37	SMALL FIXED INDUCTOR(3.300UH)	
L56		*	L34-4573-05	AIR-CORE COIL	K,K3,K4,K6,M,M3
L56		*	L34-4572-05	AIR-CORE COIL	K2,K5
L57		*	L34-4574-05	AIR-CORE COIL	K,K3,K4,K6,M,M3
L57		*	L34-4573-05	AIR-CORE COIL	K2,K5
L58 ,59			L40-1085-44	SMALL FIXED INDUCTOR(100.0NH)	
L60 ,61			L40-3391-37	SMALL FIXED INDUCTOR(3.300UH)	
L62			L92-0138-05	FERRITE CHIP	
L63			L40-1875-44	SMALL FIXED INDUCTOR(18.0NH)	
R50			RK73HB1J473J	CHIP R 47K J 1/16W	
R51			RK73HB1J103J	CHIP R 10K J 1/16W	
R52			RK73HB1J473J	CHIP R 47K J 1/16W	
R53 ,54			RK73HB1J101J	CHIP R 100 J 1/16W	
R55			RK73HB1J104J	CHIP R 100K J 1/16W	
R56			RK73HB1J181J	CHIP R 180 J 1/16W	
R57			RK73HB1J151J	CHIP R 150 J 1/16W	
R58			RK73HB1J224J	CHIP R 220K J 1/16W	K,K2,K4,K5,M
R58			RK73HB1J474J	CHIP R 470K J 1/16W	K3,K6,M3
R59			RK73HB1J101J	CHIP R 100 J 1/16W	
D50 -57			HVC350B	VARIABLE CAPACITANCE DIODE	
D58			HVC351	VARIABLE CAPACITANCE DIODE	
Q50			2SK508NV(K52)	FET	
Q51			2SJ243	FET	
Q52			2SK508NV(K52)	FET	
Q53			UMC4	TRANSISTOR	
Q54			2SC5108(Y)	TRANSISTOR	

EXPLODED VIEW



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

PACKING


C
D
1
2
3
6 Warranty card
(B46-0470-00):K,K2,K3,K4,K5,K6
7 Instrution mamual
(B62-0967-00):K,K2,K3,
K4,K5,K6
(B62-0988-00):M,M3
3 Cap
(B09-0363-03)
48 Screw set
(N99-2004-05)
40 Hook
(J29-0618-15)
36 Carton Board
(H13-1072-04)
35 Packing fixture
(H12-3014-02)
ANT Whip antenna
(T90-0682-05):M
(T90-0684-05):M3
UPC code label
37 Item carton case
(H52-1226-02)

ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment		Major Specifications	
1.	Standard Signal Generator (SSG)	Frequency Range	400 to 512MHz
		Modulation	Frequency modulation and external modulation.
		Output	-127dBm/0.1μV to greater than -47dBm/1mV
2.	Power Meter	Input Impedance	50Ω.
		Operation Frequency	400 to 512MHz or more.
		Measurement Range	Vicinity of 10W
3.	Deviation Meter	Frequency Range	400 to 512MHz.
4.	Digital Volt Meter (DVM)	Measuring Range	10mV to 10V DC
		Input Impedance	High input impedance for minimum circuit loading.
5.	Oscilloscope		DC through 30MHz.
6.	High Sensitivity Frequency Counter	Frequency Range	10Hz to 1000MHz.
		Frequency Stability	0.2ppm or less.
7.	Ammeter		5A.
8.	AF Volt Meter (AF VTVM)	Frequency Range	50Hz to 10kHz.
		Voltage Range	1mV to 10V.
9.	Audio Generator (AG)	Frequency Range	50Hz to 5kHz or more.
		Output	0 to 1V.
10.	Distortion Meter	Capability	3% or less at 1kHz.
		Input Level	50mV to 10Vrms.
11.	Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12.	Tracking Generator	Center frequency	50kHz to 600MHz
		Output Voltage	100mV or more
13.	16Ω Dummy Load		Approx. 16Ω, 3W.
14.	Regulated Power Supply		5V to 10V, approx. 5A
			Useful if ammeter equipped.

■ The following parts are required for adjustment

1. Antenna connector adapter

The antenna connector of this radio uses an SMA terminal.

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

Note

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

2. Universal connector

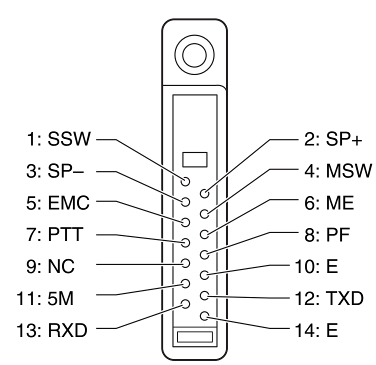
Use the interface cable (KPG-36) for PC tuning or the lead wire with plug (E30-3287-18) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the radio and tighten the screw.

The lead wire with plug (E30-3287-18) and screw (N08-0535-08) terminals are as follows. Numbers are universal connector terminal numbers.

Caution

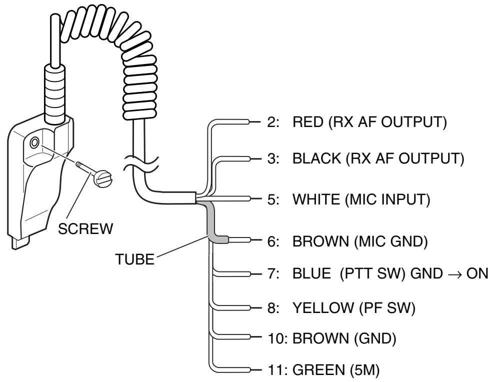
1. When connecting the plug to the universal connector of the radio, a short circuit may occur. To provent this, be sure to turn the radio POWER switch off.
2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the figure.
3. Do not connct an instrument between red or black and GND.

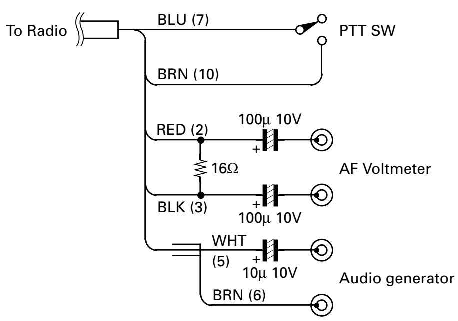
- **Universal connector**



ADJUSTMENT

- **Panel tuning**

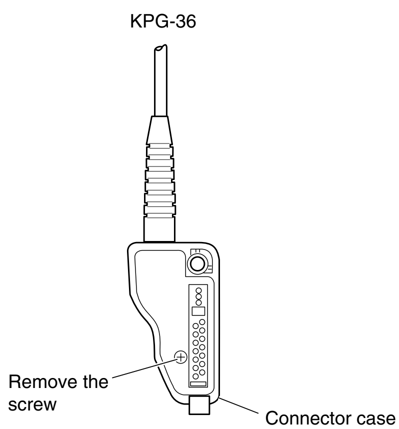


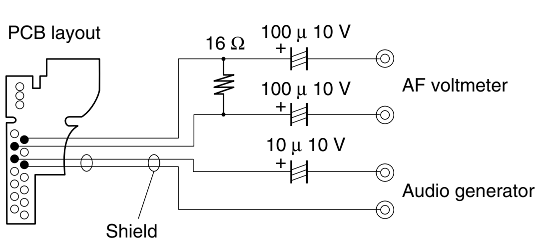


- **PC tuning**

Connect the wires to the PCB in the connector case of interface cable.

For output the wires out of the connector case, need to process the connector case.

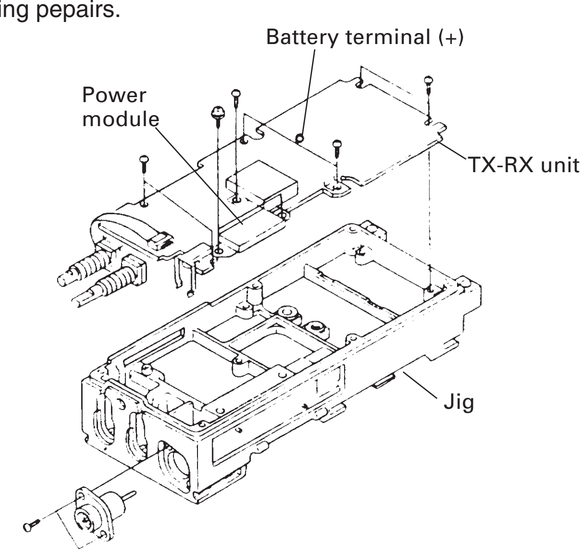




Repair Jig (Chassis)

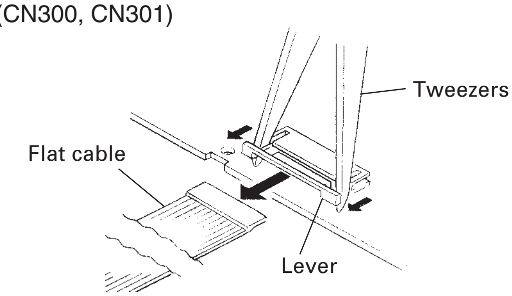
Use jig (part No.: A10-1383-14) for repairing the TK-380. Place the TX-RX unit on the jig and fit it with 7 screws.

The jig facilitates the voltage check and protects the module when the voltage on the flow side of the TX-RX unit is checked during pepairs.

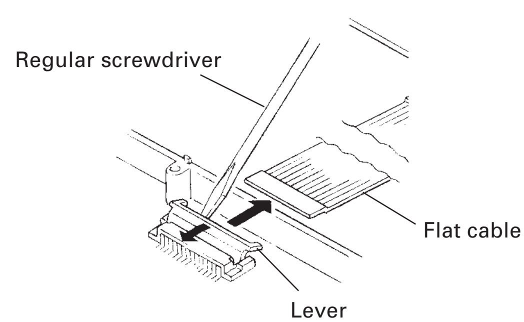


How to Remove the Flat Cable

1. Gently draw out both sides of the connector lever uniformly in the direction of the arrow with tweezers. (CN300, CN301)



2. Gently rise up the connector lever in the direction of the arrow with a fine regular screwdriver or tweezers. (CN1, CN3, CN304)



ADJUSTMENT

Test Mode

■ Test mode operating features

This transceiver has a test mode. ***To enter test mode, press [A] key and turn power on. Hold [A] 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**

Controls	"FCN" appears	"FCN" not appears
[PTT]	Used when making a transmission.	Used when making a transmission.
[AUX]	Unused	Unused
[MON]	Monitor ON and OFF.	Monitor ON and OFF.
[LAMP]	Lights the lamp for five seconds. Lighting is extended for a further five seconds by pressing any key while the lamp is lit.	Changes wide and narrow.
[S]	Sets to the Tuning mode.	Sets to the Tuning mode.
[A]	Function OFF	Function ON.
[B]	Compander function ON and OFF.	RF power HIGH and LOW.
[C]	Beat shift ON and OFF	Changes signalling.
[O] to [9], and [#],[∗]	Used as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent. (keypad model)	Used as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent. (keypad model)
[ENCODER]	Changes channel.	Changes channel.

Note: If a [S],[A],[B],[C] key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent.

- **LCD indicator**

"SCN" Unused
"☎" Lights at Compander ON.
"LO" Lights at RF Power Low.
"P" Unused
"MON" Lights at moniter ON.
"SVC" Unused
"✉" Unused

- **LED indicator**

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

- **Sub LCD indicator**

"FCN" appears at Function ON.
"n" appears at Narrow ON.

■ 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.	UHF-F1 K, K4, M	
	RX	TX
1	470. 05000	470. 10000
2	470. 05000	450. 10000
3	489. 95000	489. 90000
4	470. 00000	470. 00000
5	470. 20000	470. 20000
6	470. 40000	470. 40000
7~16	——	——

Channel No.	UHF-F2 K2, K5	
	RX	TX
1	491.05000	491. 10000
2	470. 05000	470. 10000
3	511. 95000	511. 90000
4	491. 00000	491. 00000
5	491. 20000	491. 20000
6	491. 40000	491. 40000
7~16	——	——

Channel No.	UHF-F3 K3, K6, M3	
	RX	TX
1	418. 05000	418. 10000
2	400. 05000	400. 10000
3	429. 95000	429. 90000
4	418. 00000	418. 00000
5	418. 20000	418. 20000
6	418. 40000	418. 40000
7~16	——	——

ADJUSTMENT

Signalling

Signalling No.	RX	TX
1	None	None
2	None	100Hz square
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	DTMF DEC, (159D)	DTMF ENC, (159D)
11	None	DTMF tone 9
12	2 tone 321.7/928.1Hz	None
13	Single tone 1200Hz	Single tone 1200Hz
14	None	MSK
15	MSK code	MSK code

- **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 16Ω 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)

1␣ – ␣␣1

channel No. Signalling No.

Press [S], now in tuning mode. Use [◄ B] button to write tuning data through tuning modes, and channel selector knob to adjust tuning requirements (1 to 256 appears on LCD).

Use [C ►] button to select the adjustment item through tuning modes. Use [A] button to adjust 3 or 5 point tuning, and use [LAMP] button to switch between Wide/Narrow.

LCD display (Tuning mode)

FREQ␣␣␣1

Adjustment item Adjustment (1~256)

Panel Tuning Mode

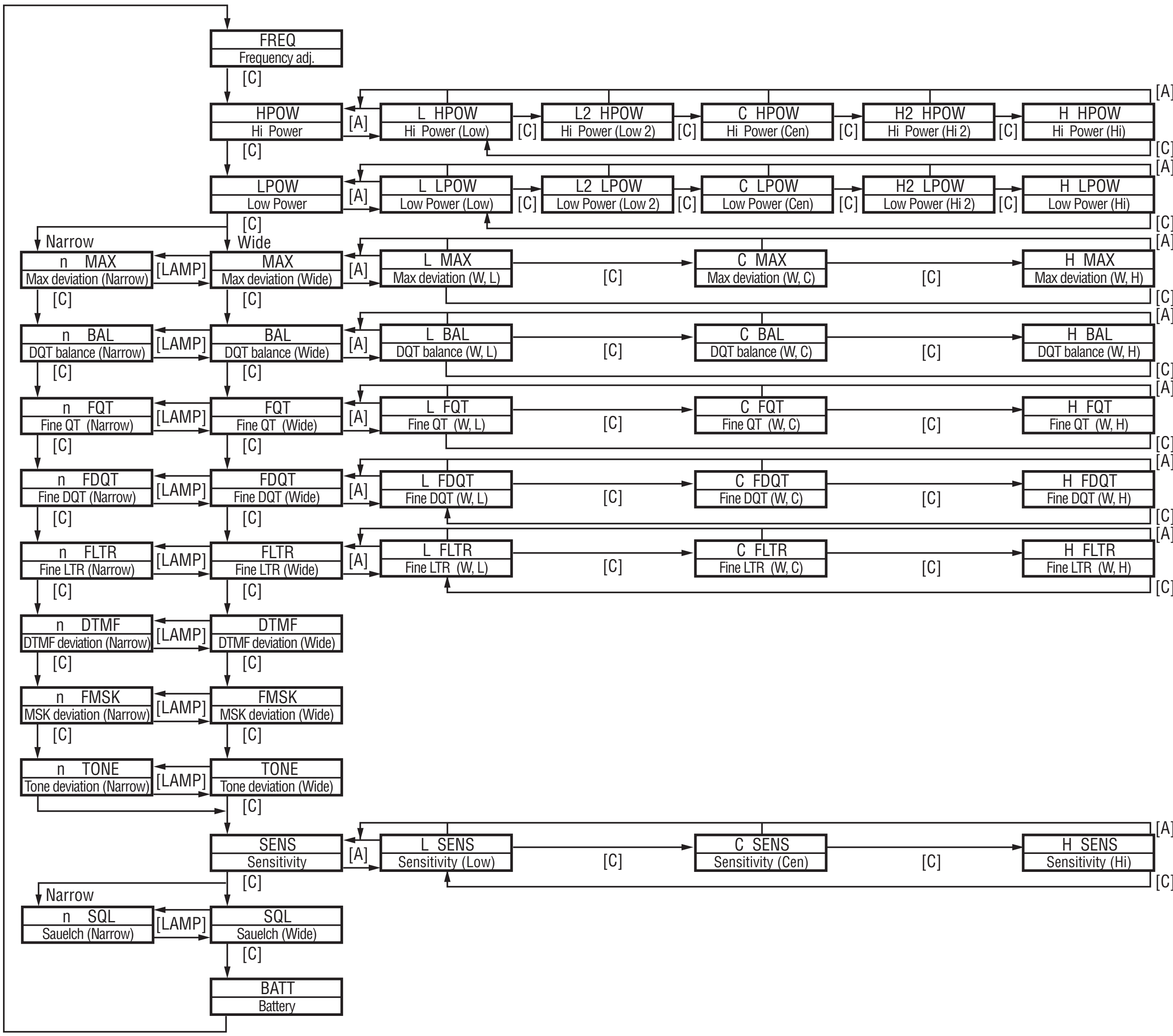
	UHF-F1 K,K4,M	
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
L	450.05000	450.10000
L2	460.05000	460.10000
C	470.05000	470.10000
H2	480.05000	480.10000
H	489.95000	489.90000

	UHF-F2 K2,K5	
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
L	470.05000	470.10000
L2	480.55000	480.60000
C	491.05000	491.10000
H2	501.55000	501.60000
H	511.95000	511.90000

	UHF-F3 K3,K6,M3	
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
L	400.05000	400.10000
L2	409.05000	409.10000
C	418.05000	418.10000
H2	424.05000	424.10000
H	429.95000	429.90000

ADJUSTMENT

■ Tuning mode



ADJUSTMENT

Common Section

Item	Condition	Measurement			Adjustment			Specifications/ Remark
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) BATT terminal voltage:7.5V 2) SSG Standard modulation [Wide] MOD:1kHz, DEV:3kHz [Narrow] MOD:1kHz, DEV:1.5kHz							
2. VCO lock voltage RX	[Panel Test Mode] 1) CH-Sig:2-1	Power meter DVM	Panel TX-RX	ANT CV (CN14)			Check	0.8V or more
	2) CH-Sig:3-1							4.4V or less
TX	3) CH-Sig:2-1 PTT:ON							0.8V or more
	4) CH-Sig:3-1 PTT:ON							4.4V or less

Transmitter Section [Panel Tuning Mode except when Panel TEST Mode is specified.]

Item	Condition	Measurement			Adjustment			Specifications/ Remark
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency Adjust	1) Adj item [FREQ] Adjust [∗∗∗] PTT:ON	Power meter Am meter	Panel	ANT	Panel	Encoder knob	Center frequency	± 100Hz
2. Max Power Check	1) Adj item [HPOW] Adjust [256] 2) Adj item [L HPOW] → [L2 HPOW] → [C HPOW] → [H2 HPOW] → [H HPOW] Adjust [256] PTT:ON						Check	4.3W or more
3. Hight Power Adjust	1) Adj item [HPOW] Adjust [∗∗∗] 2) Adj item [L HPOW] → [L2 HPOW] → [C HPOW] → [H2 HPOW] → [H HPOW] Adjust [∗∗∗] PTT:ON					Encoder knob	4.0W	±0.1W 2.2A or less
4. Hight Power Check	[Panel Test Mode] 1) CH-Sig:1-1 PTT:ON						Check	3.8~4.2W 2.3A or less
	2) CH-Sig:2-1 PTT:ON							
	3) CH-Sig:3-1 PTT:ON							
5. Low Power Adjust	1) Adj item [LPOW] Adjust [∗∗∗] 2) Adj item [L LPOW] → [L2 LPOW] → [C LPOW] → [H2 LPOW] → [H LPOW] Adjust [∗∗∗] PTT:ON				Panel	Encoder knob	0.8W	±0.1W 1.0A or less
6. Low Power Check	[Panel Test Mode] 1) CH-Sig:1-1 Set low power (Push [B]) PTT:ON						Check	0.5~1.5W 1.2A or less
	2) CH-Sig:2-1 PTT:ON							
	3) CH-Sig:3-1 PTT:ON							

ADJUSTMENT

[Panel Tuning Mode except when Panel TEST Mode is specified.]

Item	Condition	Measurement			Adjustment			Specifications/ Remark
		Test equipment	Unit	Terminal	Unit	Parts	Method	
7. Max DEV Adjust [Wide]	1) Adj item [MAX] Adjust [***] AG:1kHz / 150mV Dev meter filter LPF:15kHz HPF:OFF 2) Adj item [L MAX] → [C MAX] → [H MAX] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	Panel	ANT Universal connector	Panel	Encoder knob	3.8kHz (According to the larger +,-)	±50Hz
[Narrow]	1) Adj item [n MAX] Adjust [***] PTT:ON						1.75kHz (According to the larger+,-)	
8. MIC Sensitivity Check	**[Panel Test Mode]** 1) CH-Sig:1-1 AG:1kHz / 15mV LPF:15kHz PTT:ON						Check	2.2~3.0kHz
9. DQT Balance Adjust [Wide]	1) Adj item [BAL] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [L BAL] → [C BAL] → [H BAL] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	Panel	ANT Universal connector	Panel	Encoder knob	Make the demodulation waves into square waves.	
[Narrow]	3) Adj item [n BAL] Adjust [***] PTT:ON							
10.QT Deviation Adjust [Wide]	1) Adj item [FQT] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [L FQT] → [C FQT] → [H FQT] Adjust [***] PTT:ON						Wide:0.75kHz Narrow:0.35kHz	±50Hz
[Narrow]	3) Adj item [n FQT] Adjust [***] PTT:ON							
11.DQT Devition Adjust [Wide]	1) Adj item [FDQT] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [L FDQT] → [C FDQT] → [H FDQT] Adjust [***] PTT:ON							
[Narrow]	3) Adj item [n FDQT] Adjust [***] PTT:ON							

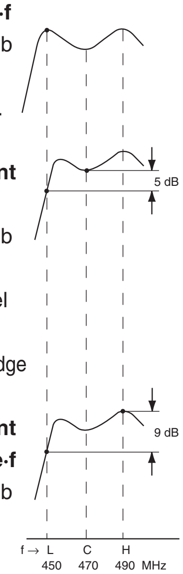
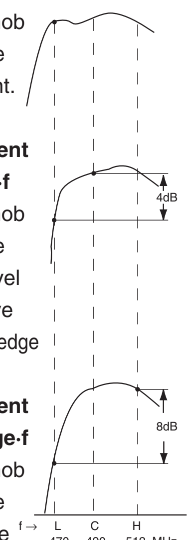
ADJUSTMENT

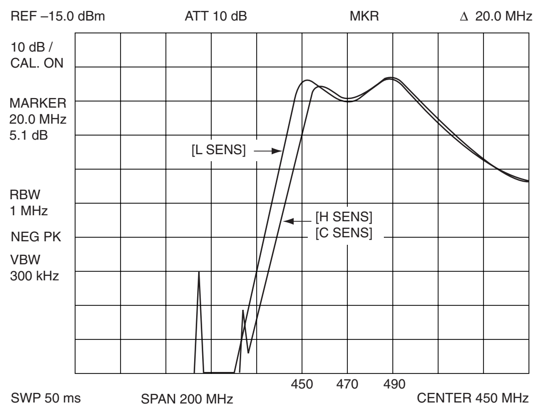
[Panel Tuning Mode except when Panel TEST Mode is specified.]

Item	Condition	Measurement			Adjustment			Specifications/ Remark
		Test equipment	Unit	Terminal	Unit	Parts	Method	
12.LTR Deviation Adjust [Wide]	1) Adj item [FLTR] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [L FLTR] → [C FLTR] → [H FLTR] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	Panel	ANT Universal connector	Panel	Encoder knov	1.0kHz	±0.1kHz
[Narrow]	3) Adj item [n FLTR] Adjust [***] PTT:ON						0.75kHz	±50Hz
13.DTMF Deviation Adjust [Wide]	1) Adj item [DTMF] Adjust [***] LPF:15kHz HPF:OFF PTT:ON						Wide:2.5kHz Narrow:1.25kHz	±0.1kHz
[Narrow]	2) Adj item [n DTMF] Adjust [***] PTT:ON							
14.MSK Deviation Adjust [Wide]	1) Adj item [FMSK] Adjust [***] LPF:15kHz HPF:OFF PTT:ON							
[Narrow]	2) Adj item [n FMSK] Adjust [***] PTT:ON							
15.TONE Deviation Adjust [Wide]	1) Adj item [TONE] Adjust [***] LPF:15kHz HPF:OFF PTT:ON							
[Narrow]	2) Adj item [n TONE] Adjust [***] PTT:ON							
16.BATT Detection Writing	1) Adj item [BATT] Adjust [***] PTT:ON	Power meter DVM	Panel	ANT BATT terminal	Panel	Encoder knob	After pressing the PTT switch, confirm that one predetermined numeric in the range 1 to 256 appears and then press [B] key. That numeric will be stored in memory.	BATT terminal voltage:6.2V
17.BATT Detection Check	**[Panel Test Mode]** 1) CH-Sig:1-1 BATT terminal voltage:6.5V PTT:ON						Check	No blinking of LED
	2) BATT terminal voltage:5.7V PTT:ON							Blinking of LED

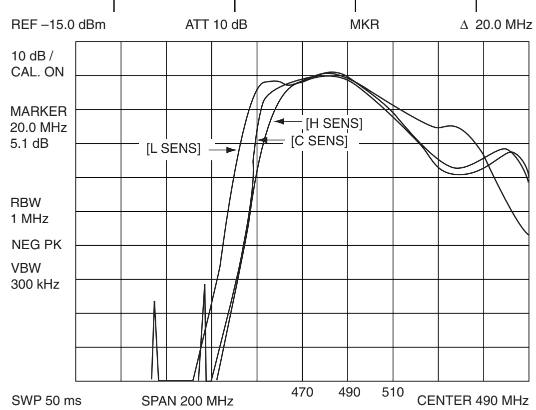
ADJUSTMENT

Receiver Section [Panel Tuning Mode except when Panel TEST Mode is specified.]

Item	Condition	Measurement			Adjustment			Specifications/ Remark
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity Adjust (BPF characteristic)	1) Adj item [SENS] Adjust [***] 2) Low-edge frequency Adj item [L SENS] Spe-Ana setting Center·f : 450MHz(K,K4,M) Span : 200MHz RBW : 1MHz VBW : 300kHz REF level : -15dBm ATT : 10dB Tra-G setting Input level:-30dBm 3) Center frequency Adj item [C SENS] 4) High-edge frequency Adj item [H SENS]	Tracking generator Specturm analyzer	Panel TX-RX	ANT TP (CN13) Need couple capacitor (1000PF)	Panel	Encoder knob	**Adjustment Low-edge·f** Turn a knob and make peak point. **Adjustment Center·f** Turn a knob and make center level 5dB above from Low-edge level. **Adjustment High-edge·f** Turn a knob and make High-edge level 9dB above from Low-edge level.	 (K,K4,M)
	1) Adj item [SENS] Adjust [***] 2) Low-edge frequency Adj item [L SENS] Spe-Ana setting Center·f : 490MHz(K2,,5) Span : 200MHz RBW : 1MHz VBW : 300kHz REF level : -15dBm ATT : 10dB Tra-G setting Input level:-30dBm 3) Center frequency Adj item [C SENS] 4) High-edge frequency Adj item [H SENS]						**Adjustment Low-edge·f** Turn a knob and make peak point. **Adjustment Center·f** Turn a knob and make center level 4dB above from Low-edge level. **Adjustment High-edge·f** Turn a knob and make High-edge level 8dB above from Low-edge level.	 (K2,K5)

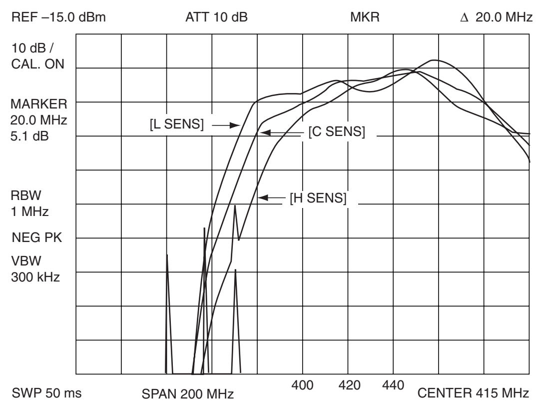
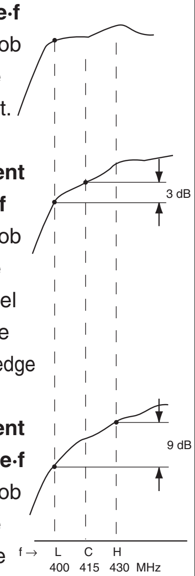


Band Pass Filter Characteristic (K,K4,M)

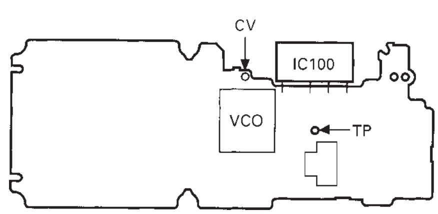


Band Pass Filter Characteristic (K2,K5)

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remark
		Test equipment	Unit	Terminal	Unit	Parts	Method	
	1) Adj item [SENS] Adjust [∗∗∗] 2) Low-edge frequency Adj item [L SENS] Spe-Ana setting Center·f : 415MHz(K3,K6,M3) Span : 200MHz RBW : 1MHz VBW : 300kHz REF level : -15dBm Tra-G setting Input level :-30dBm 3) Center frequency Adj item [C SENS] 4) High-edge frequency Adj item [H SENS]	 **Band Pass Filter Characteristic (K3,K6,M3)**					**Adjustment Low-edge·f** Turn a knob and make peak point. **Adjustment Center·f** Turn a knob and make center level 3dB above from Low-edge level. **Adjustment High-edge·f** Turn a knob and make High-edge level 9dB above from Low-edge level.	 (K3,K6,M3)
2. Sensitivity Check	**[Panel Test Mode]** 1) CH-Sig:1-1 SSG OUT Wide:-118dBm (MOD:1kHz / ±3kHz) Narrow:-117dBm (MOD:1kHz / ±1.5kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector			Check	12dB SINAD or more
3. Squelch Adjust	1) Adj item [SQL] Adjust [∗∗∗] SSG OUT: 12dB SINAD level : K,K3,K4,K6,M 12dB SINAD level -1dB : K2,K5,M3					Encoder knob	Adjust to point of opening squelch.	
	2) Adj item [n SQL] Adjust [∗∗∗] 12dB SINAD level : K,K3,K4,K6,M 12dB SINAD level -1dB : K2,K5,M3							
4. Squelch Check	**[Panel Test Mode]** 1) CH-Sig:1-1 SSG OUT: 12dB SINAD level						Check	Squelch must be opened.
	2) SSG OUT:OFF							Squelch must be closed.

Adjustment points
TX-RX unit (X57-5750)
component side view



TERMINAL FUNCTION

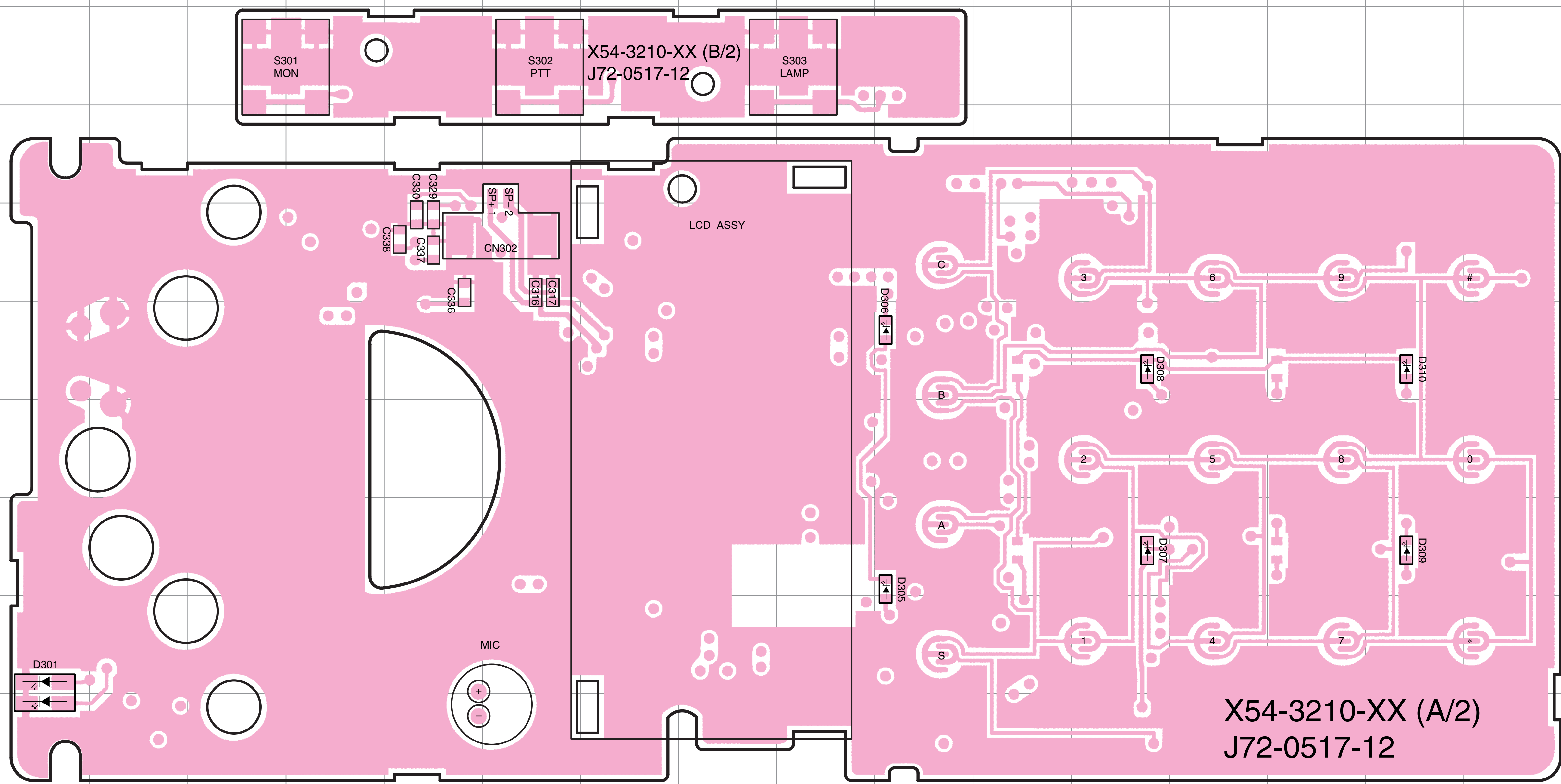
CN No.	Pin No.	Name	I/O	Function
TX-RX UNIT (X57-5750-XX): TX-RX section				
CN1	1	B	O	Power input after passing through the fuse.
	2	B	O	Power input after passing through the fuse.
	3	SB	I	Power output after power switch.
	4	SB	I	Power output after power switch.
	5	5M	O	5V.
	6	VOL	I	Volume level input for audio control.
	7	E	-	GND
	8	EN2	I	Encoder pulse input.
	9	E	-	GND
	10	EN1	I	Encoder pulse input.
CN2 for X54-SW section	1	MON	I	Normally; 5V. MON when connected GND.
	2	LAMP	I	Normally; 5V. LAMP when connected GND.
	3	PTT	I	Normally; 5V. transmit when connected GND.
	4	GND	-	GND
CN3 for X54-Display unit	1	AF	O	Audio output.
	2	AFE	-	Audio GND.
	3	NC	-	Not use.
	4	PF	I	External PF signal input.
	5	CK	O	Clock data output.
	6	RXD	I	Serial control signal input.
	7	TXD	O	Serial control signal output.
	8	DT	O	Data output for LCD driver/decade counter.
	9	KRS	O	Key scan IC reset output.
	10	KI1	I	KEY input
	11	KI2	I	KEY input
	12	GND	-	GND
	13	5M	O	5V.
	14	AM	O	Audio mute signal output. Mute: “L”. Unmute: “H”
	15	CS	O	LCD driver chip select output.
	16	NC	-	Not use.
	17	PTT	I	PTT signal input.
	18	AUX	I	AUX key input.
	19	LR	O	TX LED control. Normally: 0V, lighting: 5V.
	20	LG	O	RX LED control. Normally: 0V, lighting: 5V.
	21	LBL	O	Backlight LED control. Normally: 0V, lighting: 5V.
	22	ME	-	MIC GND.
	23	MIC	I	MIC signal input.
	24	SB	O	Power output after power switch.
DISPLAY UNIT (X54-3210-XX A/2) : DISPLAY section				
CN300 for X57-TX-RX unit	1	SB	I	Power input after power switch.
	2	MIC	O	MIC signal output.
	3	ME	-	MIC GND.
	4	LBL	I	Backlight LED control. Normally: 0V, lighting: 5V.
	5	LG	I	RX LED control. Normally: 0V, lighting: 5V.
	6	LR	I	TX LED control. Normally: 0V, lighting: 5V.
	7	AUX	O	AUX key output.

CN No.	Pin No.	Name	I/O	Function
	8	PTT	O	PTT signal output.
	9	NC	-	Not use.
	10	CS	I	LCD driver chip select input.
	11	AM	I	Audio mute signal input. Mute: “L”, Unmute: “H”
	12	5M	I	5V.
	13	GND	-	GND
	14	KI2	O	KEY output
	15	KI1	O	KEY output
	16	KRS	I	Key scan IC reset input
	17	DT	I	Data input for LCD driver/decade counter.
	18	TXD	I	Serial control signal input.
	19	RXD	O	Serial control signal output.
	20	CK	I	Clock data input.
	21	PF	O	External PF signal output.
	22	NC	-	Not use.
	23	AFE	-	Audio GND.
	24	AF	I	Audio input.
CN301	1	SSW	I	EXT/INT speaker switch input.
	2	SP+	O	BTL output + for external speaker.
	3	SP-	O	BTL output - for external speaker.
	4	MSW	I	EXT/INT MIC switch input.
	5	EMC	I	External microphone input.
	6	ME	-	External microphone ground.
	7	PTT	I	External PTT input.
	8	PF	I	Programmable function key input.
	9	NC	-	Not use.
	10	E	-	GND
	11	5M	O	5V output
	12	TXD	O	Serial data output.
	13	RXD	I	Serial data input.
	14	NC (E)	-	Not use (GND)
CN302	1	SP	O	Output for internal speaker.
	2	E	-	GND
CN304	1	NC	-	Not use.
	2	LEDK	I	Backlight LED control.
	3	LEDA	O	Backlight LED control.
	4	VCI	O	LCD power supply.
	5	SOD	O	Serial data output for LCD driver.
	6	SID	I	Serial data input for LCD driver.
	7	SCLK	O	Clock data output for LCD driver.
	8	CS	O	LCD driver chip select output.
	9	Vcc	O	5V
	10	GND	-	GND
DISPLAY UNIT (X54-3210-XX B/2) : SW section				
CN303 For X57-TX-RX unit	1	MON	O	Normally; 5V.,MON when connected GND.
	2	LAMP	O	Normally; 5V, LAMP when connected GND.
	3	PTT	O	Normally; 5V, transmit when connected GND.
	4	GND	-	GND

DISPLAY UNIT (X54-3210-XX) (-10) : K,K2,K3, M,M3 (-11) : K4,K5,K6 Component Side View

DISPLAY UNIT
(X54-3210-XX)

Ref. No.	Address
D301	9C
D305	8L
D306	6L
D307	8N
D308	6N
D309	8Q
D310	6Q



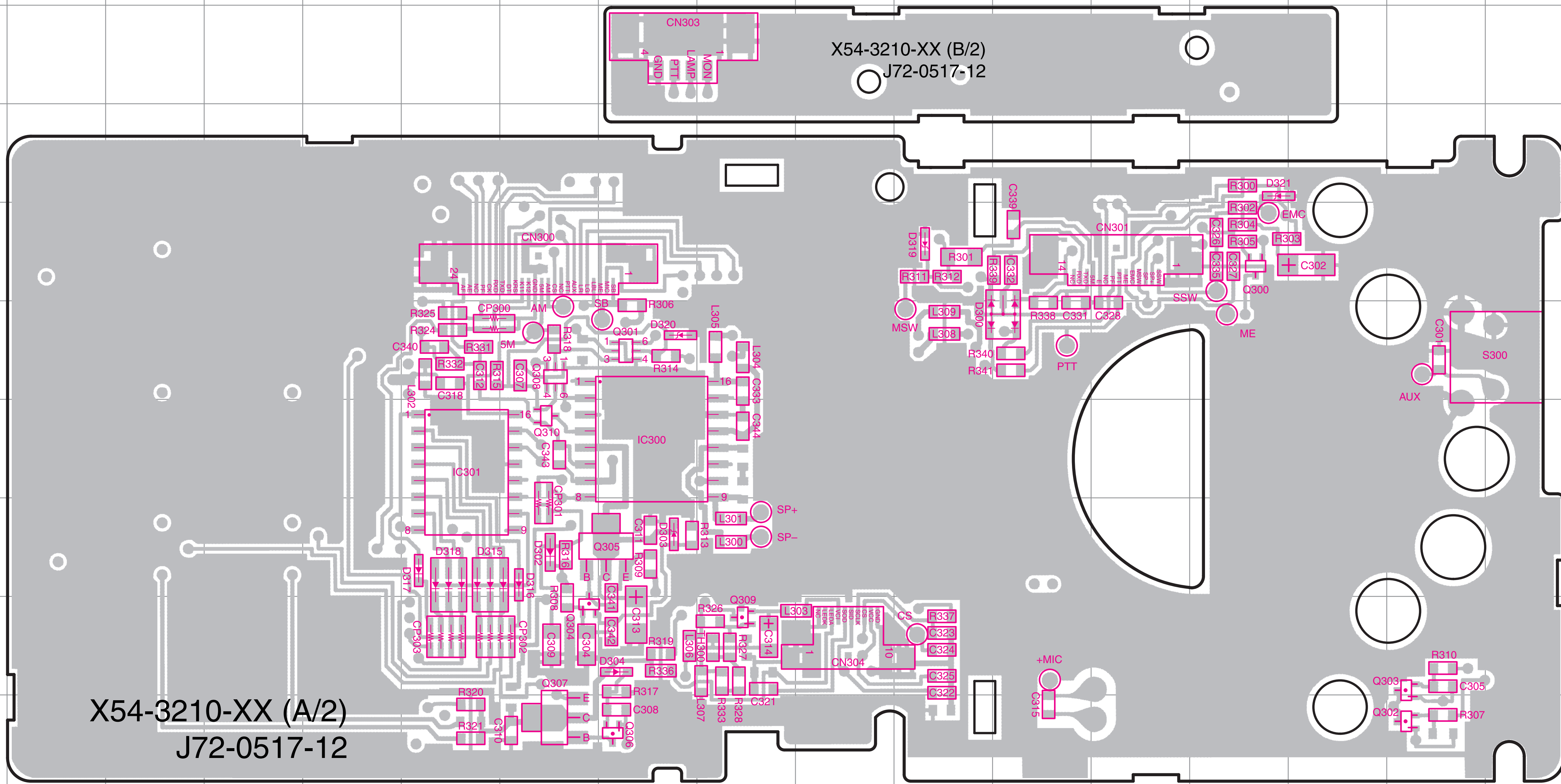
Component side

Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

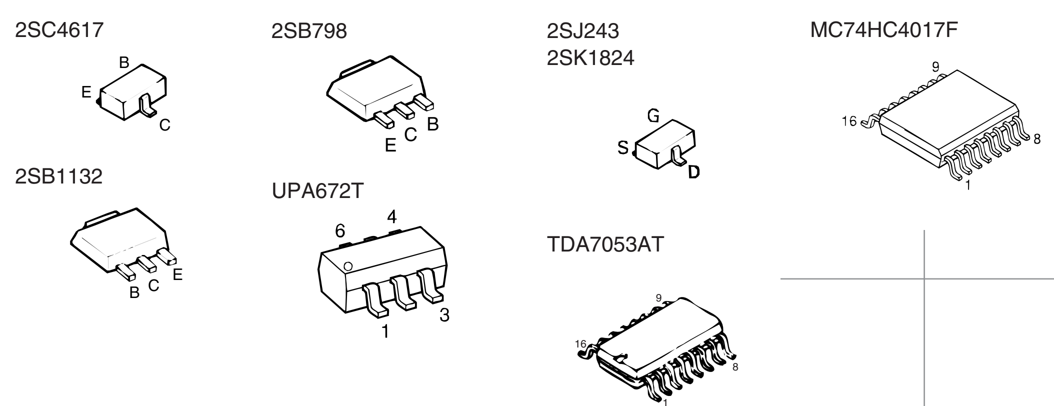
TK-380 PC BOARD VIEW

DISPLAY UNIT (X54-3210-XX) (-10) : K,K2,K3, M,M3 (-11) : K4,K5,K6 Foil Side View



DISPLAY UNIT
(X54-3210-XX)

Ref. No.	Address
D300	6L
D302	8G
D303	8H
D304	9H
D315	8F
D316	8G
D317	8F
D318	8F
D319	5K
D320	6H
IC300	7H
IC301	7F
Q300	5N
Q301	6H
Q302	10P
Q303	9P
Q304	9G
Q305	8H
Q306	10H
Q307	10G
Q308	6G
Q309	9I



Component side

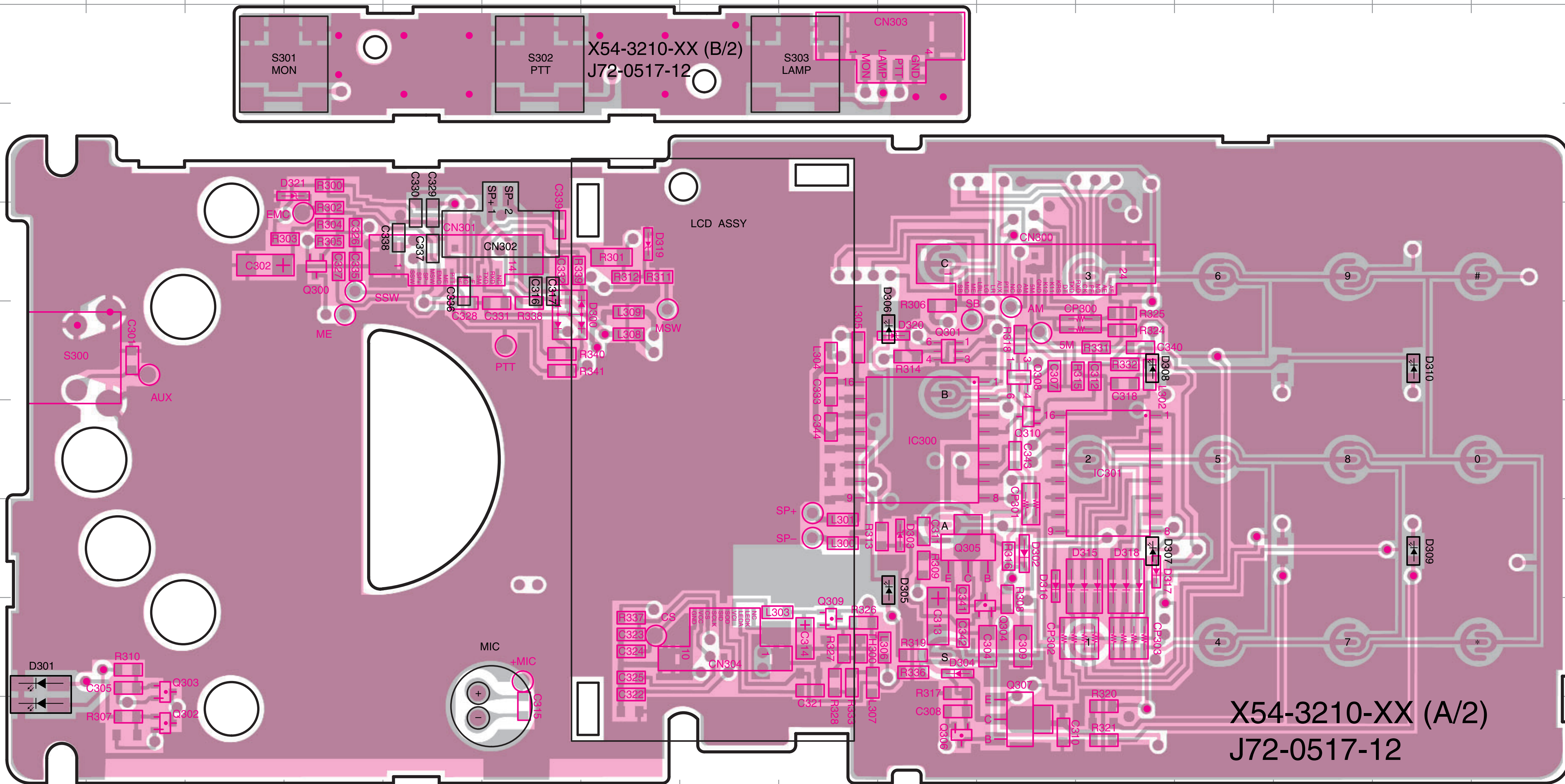
Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

DISPLAY UNIT (X54-3210-XX) (-10) : K,K2,K3, M,M3 (-11) : K4,K5,K6 Component Side + Foil Side View

DISPLAY UNIT
(X54-3210-XX)

Ref. No.	Address
D300	6H
D301	9C
D302	8M
D303	8L
D304	9L
D305	8L
D306	6L
D307	8N
D308	6N
D309	8Q
D310	6Q
D315	8N
D316	8M
D317	8N
D318	8N
D319	5I
D320	6L
IC300	7L
IC301	7N
Q300	5F
Q301	5L
Q302	10D
Q303	9D
Q304	9M
Q305	8L
Q306	10L
Q307	10M
Q308	9M
Q309	9K



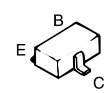
Âú Connect 1 and 4.

Component side

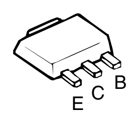
Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

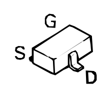
2SC4617



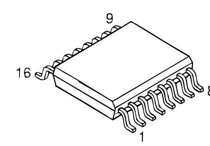
2SB798



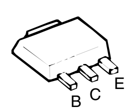
2SJ243
2SK1824



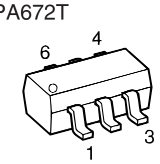
MC74HC4017F



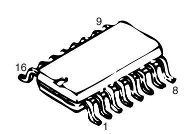
2SB1132



UPA672T

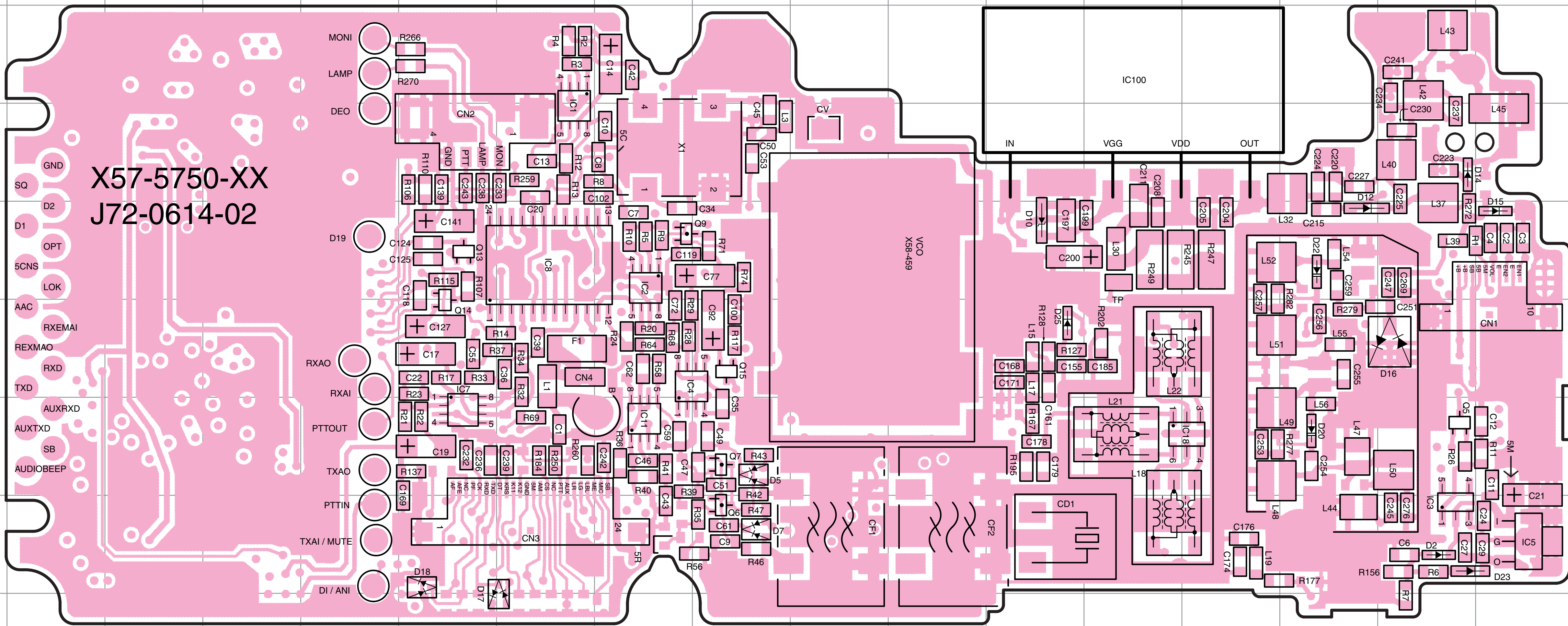


TDA7053AT



TK-380 PC BOARD VIEW

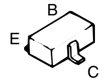
TX-RX UNIT (X57-5750-XX) (-10) : K,K4,M (-11) : K2,K5 (-12) : K3,K6,M3 Component Side View



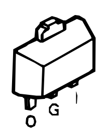
TX-RX UNIT
(X57-5750-XX)

Ref. No.	Address
D2	8P
D5	7I
D7	8I
D10	5L
D12	4O
D14	4P
D15	5Q
D16	6P
D17	8F
D18	8F
D20	7O
D22	5O
D23	8P
D25	6L
IC1	4G
IC2	5H
IC3	8P
IC4	6I
IC5	8Q
IC7	7F
IC8	5G
IC11	7H
IC18	7N
Q5	7P
Q6	8I
Q7	7I
Q9	5I
Q13	5F
Q14	5F
Q15	6I

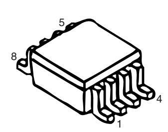
DTA144EE
DTC144EE



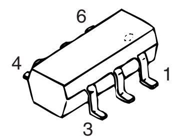
S-81350HG-KD



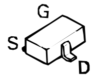
TA75W01FU
TC75W51FU



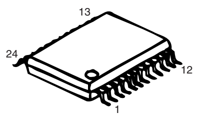
GN2011



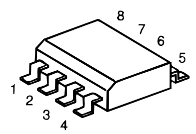
2SJ243
2SK1824



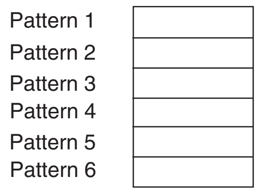
M62364FP



RN5VL42C



Component side

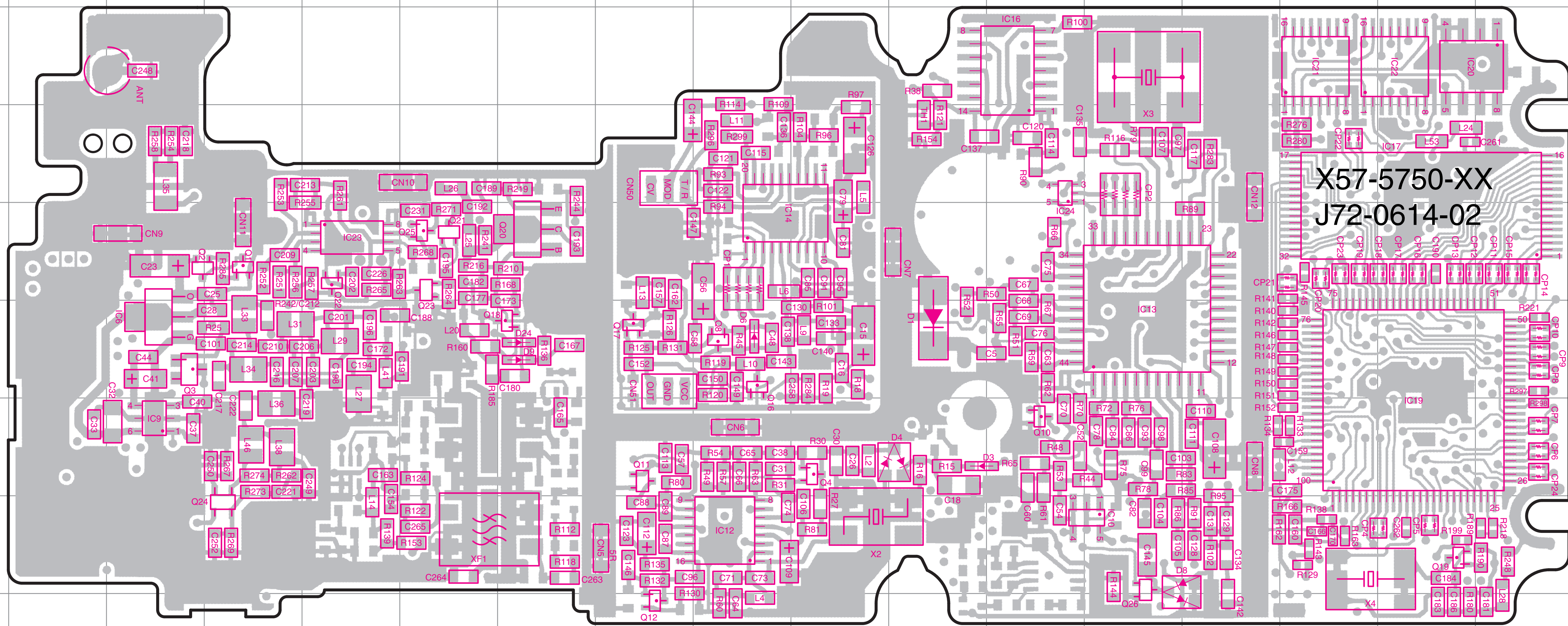


Foil side

TX-RX UNIT (X57-5750-XX) (-10) : K,K4,M (-11) : K2,K5 (-12) : K3,K6,M3 Foil Side View

TX-RX UNIT
(X57-5750-XX)

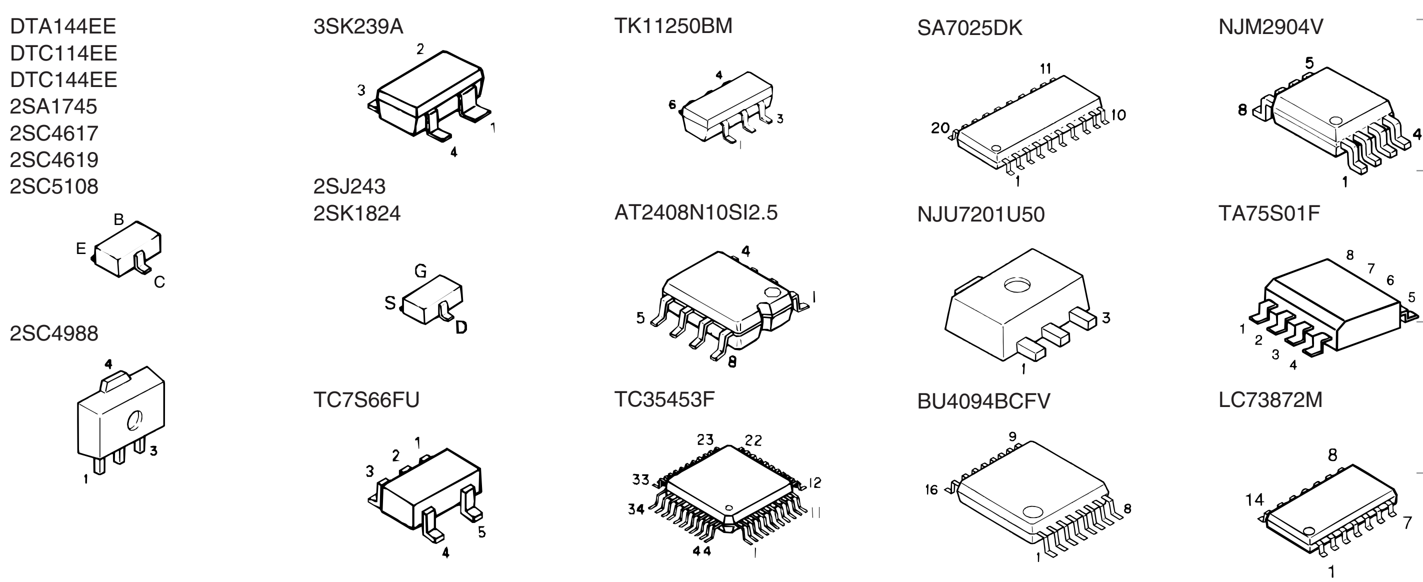
Ref. No.	Address
D1	6L
D3	7L
D4	7L
D6	5J
D8	8N
D9	6H
D24	6H
IC6	6D
IC9	7D
IC10	8N
IC12	8J
IC13	6N
IC14	5K
IC16	3M
IC19	7Q
IC20	3Q
IC21	3P
IC22	3Q
IC23	5F
IC24	4M
Q1	5E
Q2	5E
Q3	6D
Q4	7K
Q8	6J
Q10	7M
Q11	7I
Q12	9I
Q16	6J
Q17	6I
Q18	6H
Q19	8Q
Q20	5H
Q21	5G
Q22	5F
Q23	5G
Q24	8E
Q25	5G



Component side

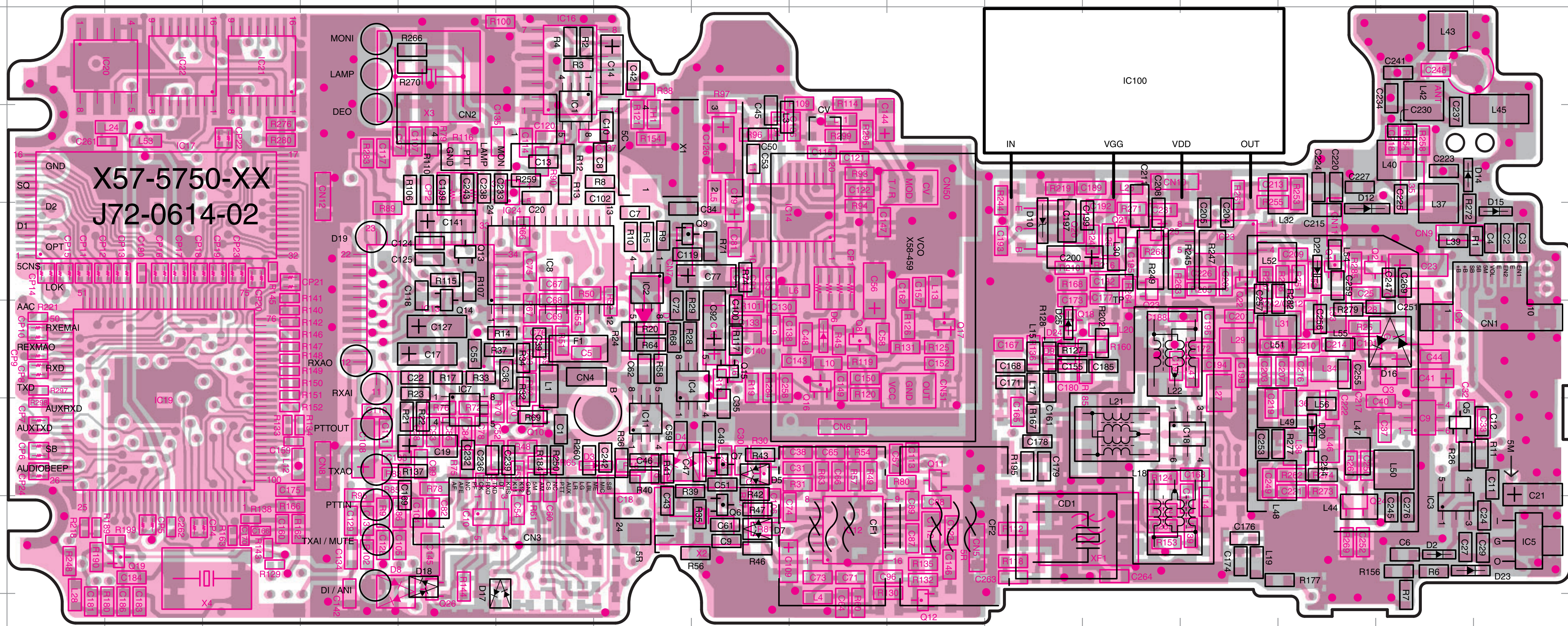
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Pattern 5
Pattern 6

Foil side

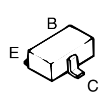


TK-380 PC BOARD VIEW

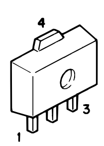
TX-RX UNIT (X57-5750-XX) (-10) : K,K4,M (-11) : K2,K5 (-12) : K3,K6,M3 Component Side + Foil Side View



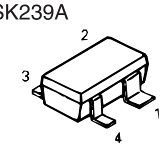
DTA144EE
DTC114EE
DTC144EE
2SA1745
2SC4617
2SC4619
2SC5108



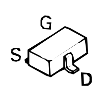
2SC4988



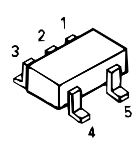
3SK239A



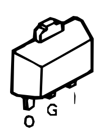
2SJ243
2SK1824



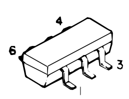
TC7S66FU



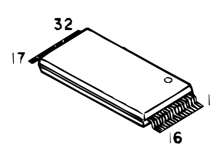
S-81350HG-KD



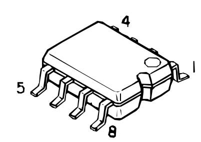
TK11250BM



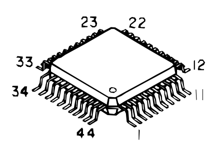
AT29C020-90TI



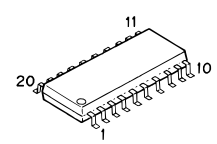
AT2408N10SI2.5



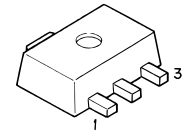
TC35453F



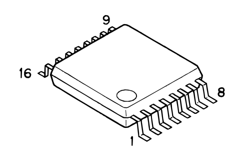
SA7025DK



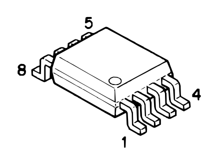
NJU7201U50



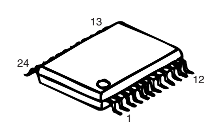
BU4094BCFV



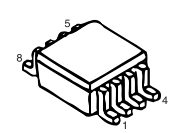
NJM2904V



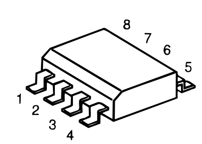
M62364FP



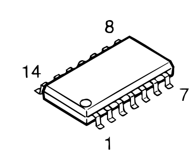
TA75W01FU
TC75W51FU



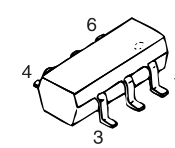
RN5VL42C
TA75S01F



LC73872M



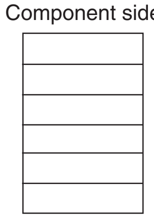
GN2011



Åú Connect 1 and 6.

Component side

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

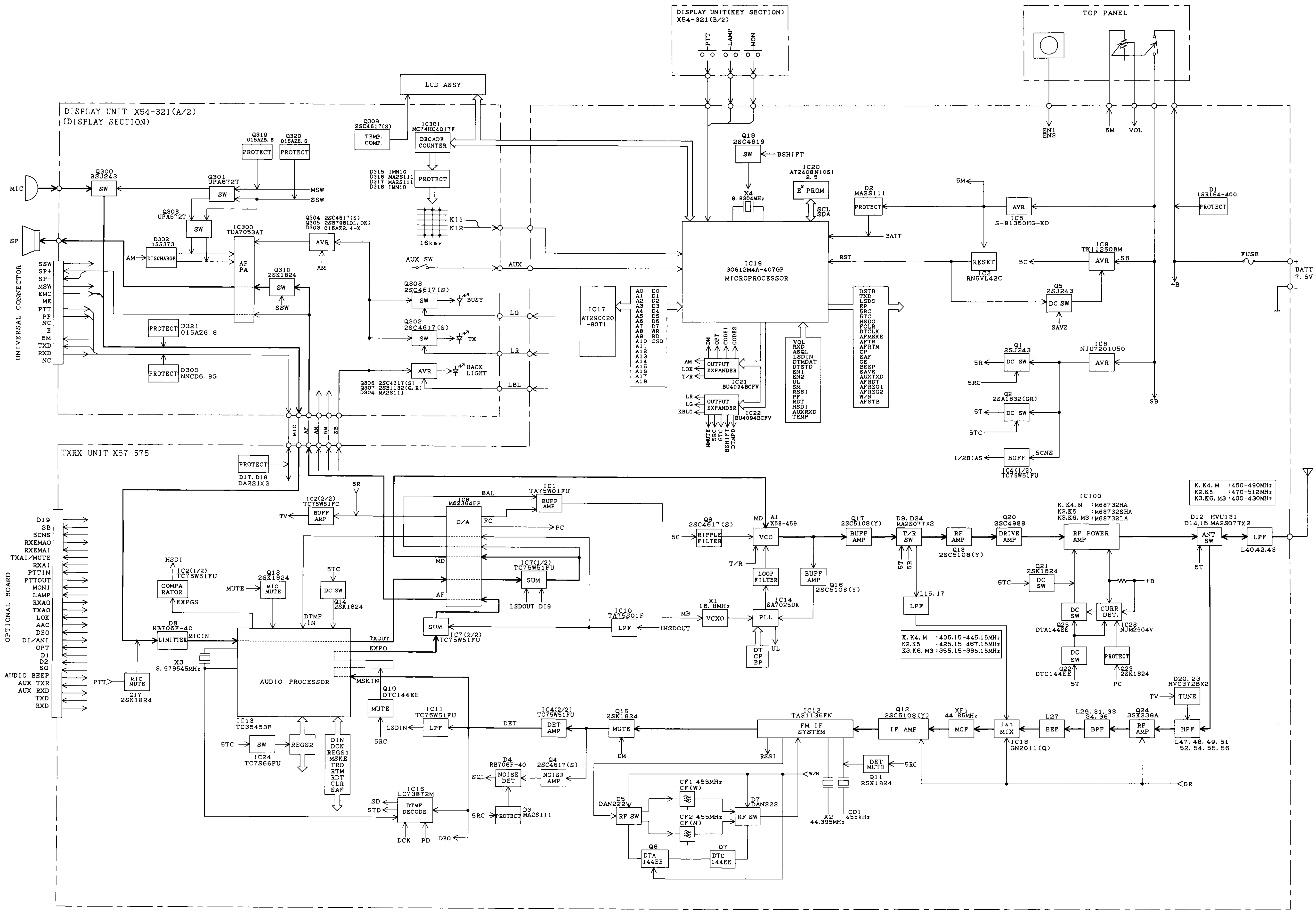


Foil side

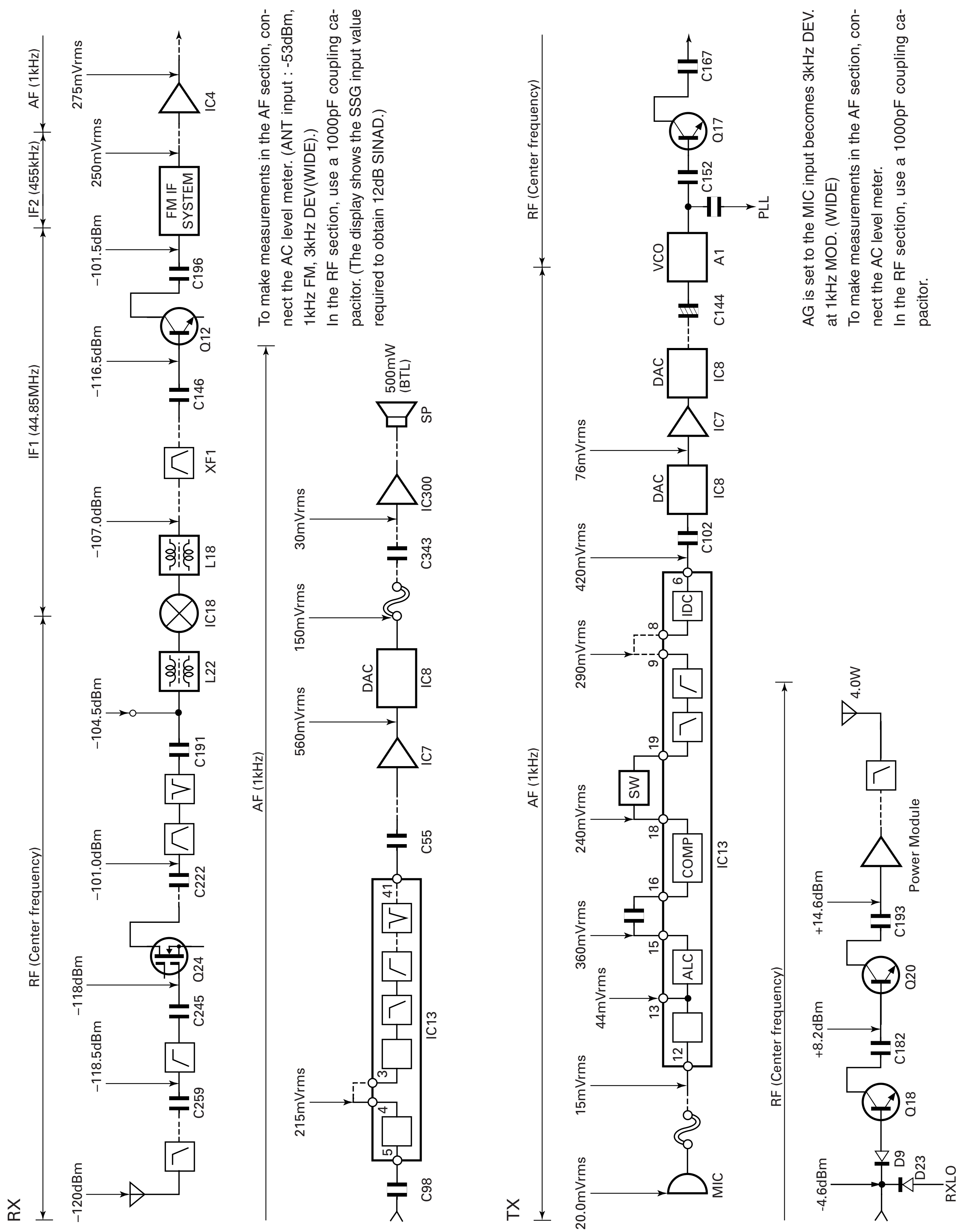
TX-RX UNIT
(X57-5750-XX)

Ref. No.	Address
D1	6H
D2	8P
D3	7H
D4	7H
D5	7I
D6	6J
D7	8I
D8	8F
D9	6L
D10	5L
D12	4O
D14	4P
D15	5Q
D16	6P
D17	8F
D18	8F
D20	7O
D22	4Q
D23	8P
D24	6L
D25	6L
IC1	4G
IC2	5H
IC3	8P
IC4	6I
IC5	8Q
IC6	6P
IC7	7F
IC8	5G
IC9	6P
IC10	6F
IC11	7H
IC12	8J
IC13	6F
IC14	6I
IC16	6G
IC18	7N
IC19	7C
IC20	3C
IC21	6D
IC22	3C
IC23	5N
IC24	4G
Q1	5O
Q2	5O
Q3	6P
Q4	7I
Q5	7P
Q6	8I
Q7	7I
Q8	6J
Q9	5I
Q10	7G
Q11	7K
Q12	9K
Q13	5F
Q14	5F
Q15	6I
Q16	6J
Q17	6K
Q18	6L
Q19	6C
Q20	5L
Q21	5M
Q22	5N
Q23	5M
Q24	8O
Q25	5M

BLOCK DIAGRAM



LEVEL DIAGRAM

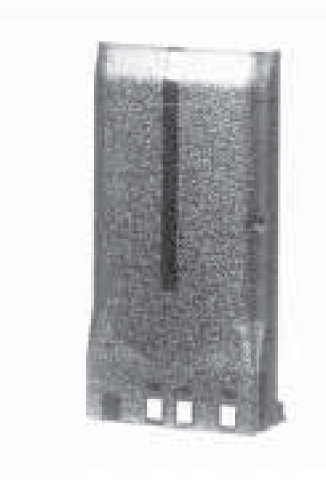


TK-380

KNB-16A/17A (Ni-Cd BATTERY) / KPG-36 (PROGRAMMING INTERFACE CABLE) / KSC-19 (CHARGER) / KRA-15 (WHIP ANTENNA)

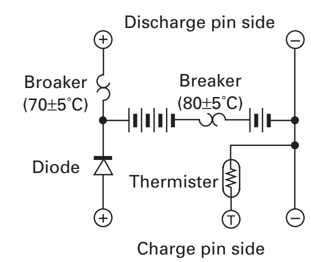
KNB-16A External View

KNB-17A External View

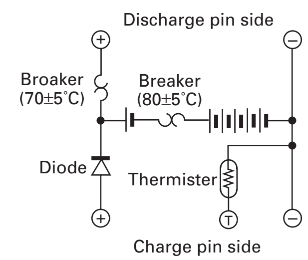


KPG-36 External View

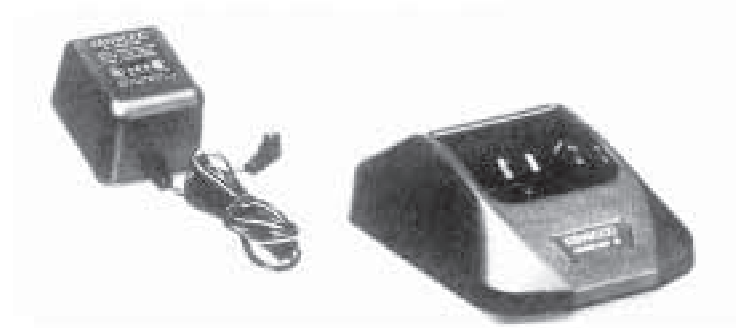
KNB-16A Circuit Diagram



KNB-17A Circuit Diagram



KSC-19 External View



KNB-16A Specifications

Voltage ....7.2V (1.2V x 6)
Charging current 1100mAh
Dimensions (mm).........................58 W x 110.8 H x 17.2 D
(Projections included)
Charger and charging time
KSC-19 (Normal Charger) ...... Approx. 8 hours
KSC-20 (Rapid Charger) .... Approx. 1 hour
Weight 180g

KNB-17A Specifications

Voltage ....7.2V (1.2V x 6)
Charging current 1500mAh
Dimensions (mm).........................58.0 W x 110.8 H x 20.0 D
(Projections included)
Charger and charging time
KSC-19 (Normal Charger) ...... Approx. 8 hours
KSC-20 (Rapid Charger) .... Approx. 1.3 hour
Weight 220g

KSC-19 Charging

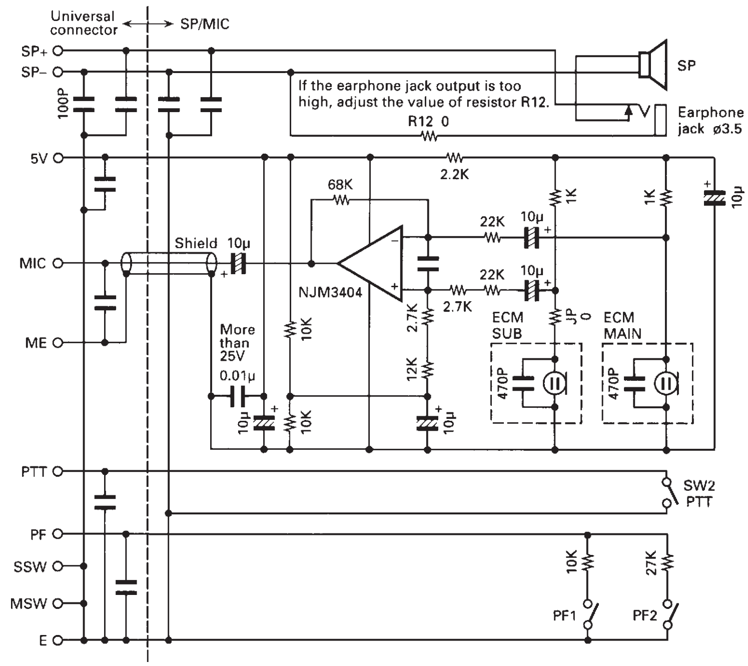
KNB-16A
Voltage 7.2V
Battery capacity 1100mAh
Charging time..........................Approx. 8 hours
KNB-17A
Voltage 7.2V
Battery capacity 1500mAh
Charging time..........................Approx. 8 hours

KRA-15 External View

KMC-25 (SPEAKER MICROHONE)

External View

Circuit Diagram



Specifications

Microphone
- Impedance 2kΩ
- Sensitivity ....-65dB±4.0dB at 1kHz

Speaker
- Impedance 16Ω
- Input 0.5W
- Maximum input........................1.5W

Dimensions ....62W x 81 H x 29 D (mm)
Weight (With plug cord) ....Approx. 0.17kg

TK-380

SPECIFICATION

General

Frequency Range	
RX, TX	K, K4, M : 450 to 490MHz
	K2, K5 : 470 to 512MHz
	K3, K6, M3 : 400 to 430MHz
Systems	Maximum 32
Groups	Maximum 250 (Case of 1 system)
Channels	LTR Model : Maximum 600
	Conventional Model :Maximum 250
Channel Spacing (Wide/Narrow)	25/12.5kHz, (PLL step 5k, 6.25kHz)
Battery Voltage	DC 7.5V ±20%
Battery Life	More than 8 hours at 5-5-90 duty cycle with KNB-16A battery
Temprature Range	–30˚C to +60˚C (-22˚F to + 140˚F)
Dimension and Weight	
With KNB-16A (1100mAh battery)	5.33” (135mm) H x 2.29” (58mm) W x 1.34” (34mm) D 1.01lbs (460g)

Receiver (Measurements made per EIA-RS 316B)

RF Input Impedance	50Ω
Sensitivity	
12dB SINAD	0.25µV
Selectivity (Wide/Narrow)	70dB/62dB
Intermodulation (Wide/Narrow)	70dB/62dB
Spurious (Except for IF 1/2)	70dB
Frequency Stability	±0.00025% (-30˚C to +60˚C)
Channel Spread	40MHz : K,K4,M
	42MHz : K2,K5
	30MHz : K3,K6,M3
Audio Power Output	500mW at 16Ω less than 5% distortion

Transmitter (Measurements made per EIA-RS 316B)

RF Power Output	
Hi	4W
Low	1W
RF Output Impedance	50Ω
Spurious	-70dB
Modulation (Wide/Narrow)	16K0F3E/11K0F3E
FM Noise (Wide/Narrow)	-45dB/-40dB
Audio Distortion (Wide/Narrow)	Less then 3%/5%
Frequency Stability	±0.00025% (-30˚C to +60˚C)
Channel Spread	40MHz : K,K4,M
	42MHz : K2,K5
	30MHz : K3,K6,M3

KENWOOD CORPORATION
14-6, Dogenzaka 1-chome, Shibuya-ku, Tokyo 150-8501, Japan

KENWOOD SERVICE CORPORATION
P.O. BOX 22745, 2201 East Dominguez Street, Long Beach, CA 90801-5745, U.S.A.

KENWOOD ELECTRONICS LATIN AMERICA S.A.
P.O. BOX 55-2791 Piso 6 Plaza Chase Cl, 47 y Aquilino de la Guardio Panama, Republic of Panama

KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

KENWOOD ELECTRONICS DEUTSCHLAND GMBH
Rembrücker Str. 15, 63150 Heusenstamm, Germany

KENWOOD ELECTRONICS BELGIUM N.V.
Mechelsesteenweg 418 B-1930 Zaventem, Belgium

KENWOOD ELECTRONICS FRANCE S.A.
13, Boulevard Ney, 75018 Paris, France

KENWOOD ELECTRONICS U.K. LIMITED
KENWOOD House, Dwight Road, Watford, Herst., WD1 8EB United Kingdom

KENWOOD ELECTRONICS EUROPE B.V.
Amsterdamseweg 37, 1422 AC Uithoorn, The Netherlands

KENWOOD ELECTRONICS ITALIA S.p.A.
Via G. Sirtori, 7/9 20129 Milano, Italy

KENWOOD IBERICA S.A.
Bolivia, 239-08020 Barcelona, Spain

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
(A.C.N. 001 499 074)
P.O. Box 504, 8 Figtree Drive, Australia Centre, Homebush, N.S.W. 2140, Australia

KENWOOD & LEE ELECTRONICS, LTD.
Unit 3712-3724, Level 37, Tower one Metroplaza, 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong

KENWOOD ELECTRONICS TECHNOLOGIES(S) PTE LTD.
Sales Marketing Division
1 Ang Mo Kio Street 63, Singapore 569110

Free Manuals Download Website
http://myh66.com
http://usermanuals.us
http://www.somanuals.com
http://www.4manuals.cc
http://www.manual-lib.com
http://www.404manual.com
http://www.luxmanual.com
http://aubethermostatmanual.com
Golf course search by state
http://golfingnear.com
Email search by domain
http://emailbydomain.com
Auto manuals search
http://auto.somanuals.com
TV manuals search
http://tv.somanuals.com