UHF FM TRANSCEIVER
# TK-390
# SERVICE MANUAL

REVISED II

# KENWOOD

Antenna
(KRA-15 : Option)

Knob assy (SEL)
(K29-5282-04)

Knob assy (VOL)
(K29-5283-04)

Panel assy
(A62-0537-53)

Knob assy
(Side key)
(K29-5441-04)

Cabinet assy
(A02-2140-63)

Key top (10key)
(K29-5193-23)

**Photo is TK-390 K4 type.
Does not come with antenna.
Antenna is available as an option.**

## CONTENTS

**CAUTION
When using an external power connector,
please use with maximum final module protec-
tion of 10V**

# TK-390

# 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.
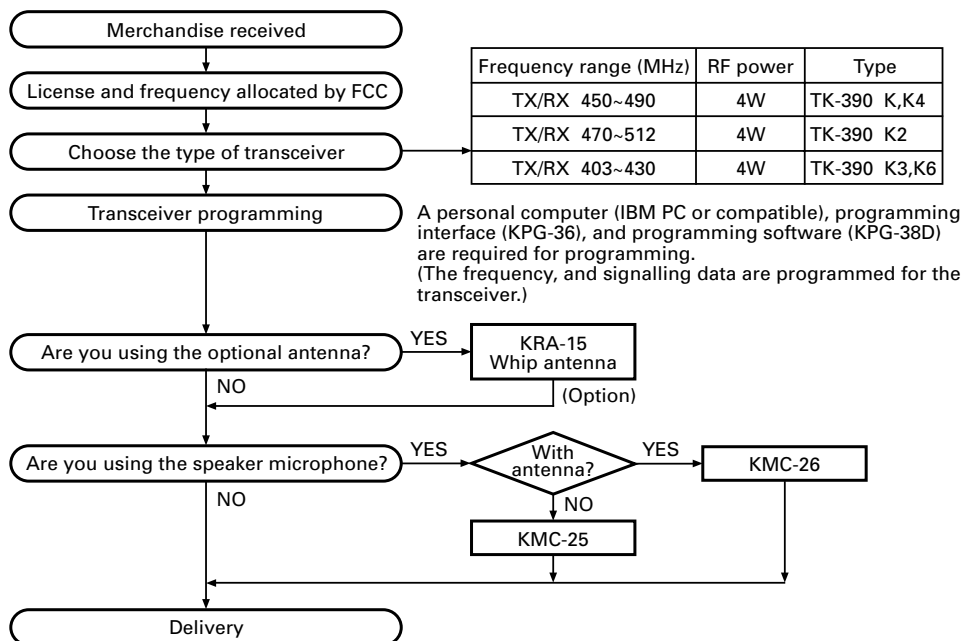• This equipment should be serviced by a qualified technician only.

## 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.
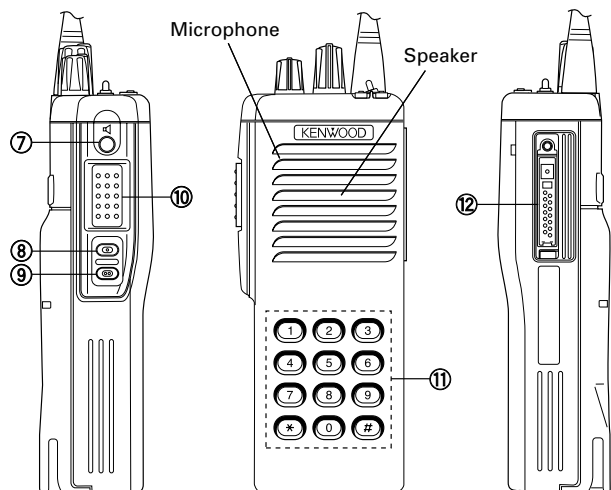
| Model & destination | Unit | X57-540X-XX | | | X53-393X-XX | | | | X45-359X-XX | Frequency range | Remarks | DTMF keypad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0-10 | 0-11 | 0-12 | 0-13 | 0-14 | 0-15 | 0-16 | 0-10 | | | |
| TK-390 | K | ✓ | | | ✓ | | | | | 450~490MHz | 1st IF : 44.85MHz | – |
| | K4 | ✓ | | | | ✓ | | | | 450~490MHz | LOC : 44.395MHz | ✓ |
| | K2 | | ✓ | | ✓ | | | | | 470~512MHz | | – |
| | K3 | | | ✓ | | | ✓ | | ✓ | 403~430MHz | | – |
| | K6 | | | ✓ | | | | ✓ | ✓ | 403~430MHz | | ✓ |

## *SYSTEM SET-UP*



| Frequency range (MHz) | RF power | Type |
|---|---|---|
| TX/RX  450~490 | 4W | TK-390  K,K4 |
| TX/RX  470~512 | 4W | TK-390  K2 |
| TX/RX  403~430 | 4W | TK-390  K3,K6 |

A personal computer (IBM PC or compatible), programming interface (KPG-36), and programming software (KPG-38D) are required for programming.
(The frequency, and signalling data are programmed for the transceiver.)

# OPERATING FEATURES

## 1. Getting Acquainted



SMA male type antenna connector

Battery pack release latch

Display

Microphone

Speaker
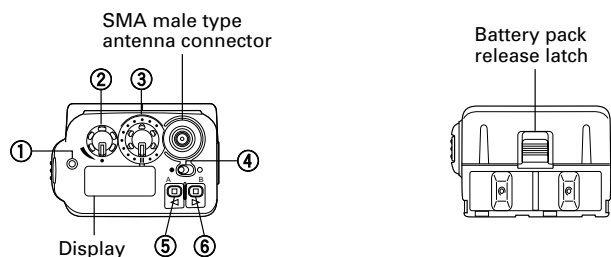
### 1-1. Key Descriptions
**① TX/Busy/Battery low indicator**
Lights red while transmitting. Lights green while receiving. Flashes red when the battery power is low while transmitting; replace or recharge the battery.
**Note :** This indicator can be disabled by your dealer.

**② Power switch/Volume control**
Turn clockwise to switch ON the transceiver. Turn counterclockwise, until a click sounds, to switch OFF the transceiver. Rotate to adjust the volume level.

**③ Selector**
Rotate this control to activate its programmable function (Page 8).

**④ Toggle switch**
Switch the toggle position to activate its programmable function (Page 8).

**⑤ Top 1**
**⑥ Top 2**
**⑦ Orange**
**⑧ Side 1**
**⑨ Side 2**

Press these PF (programmable function) keys to activate their programmable functions (Page 8)

**⑩ PTT (Push-To-Talk) switch**
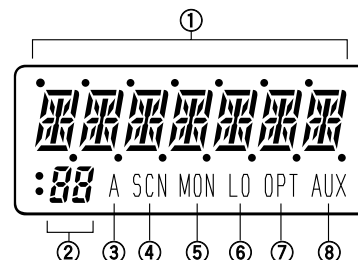Press this switch, then speak into the microphone to call a station.

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

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

### 1-2. Display



**① Alphanumeric display**
Displays the operating group or channel number, or the group or channel name. When making a DTMF or 2 Tone call, the display will alternate between CALL and the channel. Also displays various menu functions.

**② 7 Segment display**
Displays the operating group or channel number. Also displays tA (Talk Around), P1 (Priority1), P2 (Priority2), PP (Priority1 and Priority2), or HC (Home Channel); depending on the function being used.

**③ A (Add) indicator**
Appears when a channel is added to the scanning sequence.

**④ SCN (Scan) indicator**
Appears when Scan mode is active.

**⑤ MON (Monitor) indicator**
Appears when the monitor function is active.

**⑥ LO (Low) indicator**
Appears when low power is selected.

**⑦ OPT indicator**
Appears when Operator Selectable Tone is enabled.

**⑧ AUX (Auxiliary) indicator**
Appears when Aux is ON. Appears and blinks when the optional scrambler board is enabled.

**Note :** The alphanumeric and 7 segment displays can be inverted if a PF key or the toggle switch is programmed with Invert Display (Page 8).

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## 2. Scan Operating

### 2-1. 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.

### 2-2. 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 or the toggle switch (to right position) programmed to the scan function, the scan starts. The scan icon "SCN" lights and "SCAN" or revert channel (programmable) is indicated on 7-digit alphanumeric display.

### 2-3. 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.

### 2-4. Scan Channel Types

1) Priority channel 1 is the most important channel for the scan, and always detects a signal during scan and when the scan stops temporarily.
2) Priority channel 2 is the next important channel for the scan, and always detects a signal during scan and when the scan stops temporarily at a channel other than priority channel 1.
3) 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 "A" lights.

### 2-5. Priority Channel Setting

Priority channels 1 or 2 can be set as follows with the programming software (KPG-38D).
1) Specify priority channels 1 or 2 as fixed priority channels.
2) Make selected channels, priority channels.
3) Operator delectable
Specify the initial channel before the operator changes it.

### 2-6. Scan Type According to the Priority Channel

1) When no priority channels are 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 one priority channel is set : Either priority channel 1 or 2 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.
3) When two priority channels are set : The non-priority channel, priority channels 1 and 2 are scanned.
If a non-priority channel stops temporarily, priority channel 1 and 2 signals are detected at certain intervals.
If priority channel 2 stops temporarily, the priority channel 1 signal is detected at certain intervals.
If priority channel 1 stops temporarily, it stops until there is no signal on priority channel 1.

### 2-7. Revert Channel

The revert channel is used to transmit during scanning and set by the programming software (KPG-38D).
1) Priority 1
The transceiver reverts to the priority channel 1.
2) Priority 1 with talkback
The transceiver reverts to the priority channel 1.
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 1.
After resume time, scan re-starts and transmission channel is return to priority channel 1.
3) Priority 2
The transceiver reverts to the priority channel 2.
4) Priority 2 with talkback
The transceiver reverts to the priority channel 2.
If you press PTT during 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 2.
After resume time, scan re-starts and transmission channel is return to priority channel 2.
5) Selected channel
The transceiver reverts to the channel before scanning or the channel that you changed during scan.
6) Last called channel
The transceiver reverts to the last called channel during the scan.
7) Last used channel
The transceiver reverts to the last used (transmitted) channel during scan.  "Last used" revert channel includes talkback function.
8) Selected with talkback
The transceiver reverts to the channel before scanning or the channel that you changed during scan.

### 2-8. Scan End

When you reactivate the key or the toggle switch (to left position) programmed to the scan function during scan mode, the scan ends.

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

### 2-9. 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.

## 3. Optional Features

You can use these features using the programming software (KPG-38D).

### 3-1. Alphanumeric Display (Group/Channel Name)

The programming software (KPG-38D) enables you to set the alphanumeric display for group/channel name. The total text size of group and channel name are 7-digits.

For example, If you set 2-digits for group name, then you can use 5-digits for channel name. The characters can be used as shown in Figure 1.
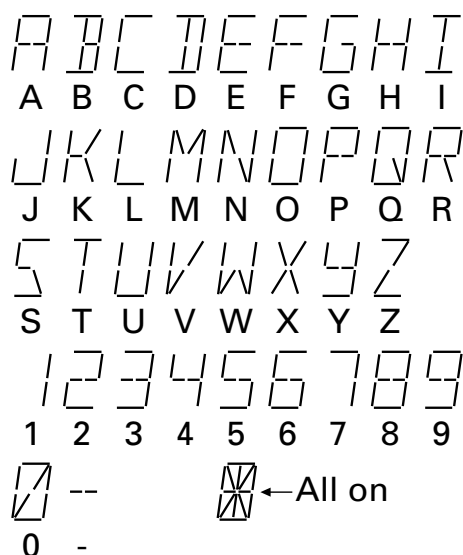


**Fig. 1**

### 3-2. Beep Tones

The beep tones (power on tone, control tone, warning tone, alert tone) are individually programmable to the fixed level 0 to 31 or follow the mechanical volume position.

### 3-3. Minimum Volume

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

### 3-4. Squelch Threshold Level

Squelch threshold level value.
0 (Most loose)~15 (Most tight)

### 3-5. BCL (Busy Channel Lockout) Override

You can transmit in spite of Busy Channel Lockout situation. For example : To make an emergency voice call.

To transmit under busy channel lockout situation, press PTT once more within approx. 500ms after the PTT release.

### 3-6. 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.

### 3-7. 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.

### 3-8. Busy LED

You can program the enable or disable the busy "LED" function when a carrier is detected. "Disable" saves battery life.

### 3-9. TX LED

You can program the enable or disable the transmission "LED" function.

### 3-10. 2-Digit 7-Segment Display

You can use 2-digit 7-segment the display to display the channel number or group number. It is useful when the main (7-digit 13-segment) display indicates group or channel name.

### 3-11. Invert Display

Main (7-digit 13-segment) display and sub (2-digit 7-segment) display can be programmed to invert display.

It is easy to read the display when the operator suspended the transceiver on a waste belt. The operator also can change the display between normal and invert using key. Refer the invert display function of key function.

### 3-12. 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.

### 3-13. External Speaker

It can be selected if the receive sound is made by SP-Mic SP or the main body SP at a SP-Mic mount.

### 3-14. Noise Cancelling MIC

Enable or disable the noise cancelling function of the internal microphone. It is not valid for the external SP/MIC.

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## OPERATING FEATURES

### 3-15. Mode (Enable/Disable)

The transceiver has many special modes mainly for maintenance.

· Self Programming mode
· Panel Test mode
· Clone mode
· Firmware Programming mode
· Version info.

It is possible to set enable/disable for each mode. We recommend to set these mode to Disable after set up to save contents.

### 3-16. ID

The transceiver is capable to have ID. The format is DTMF, MSK or ANI board (if installed). The timing that the transceiver sends ID is programmable.

Connect ID : Connect ID is send on beginning of transmission.

Disconnect ID : Disconnect ID is send on end of transmission.

Both : Connect ID is send on beginning of transmission and disconnect ID is send on end of transmission.

Off : Sending ID function is disabled.

There is also "PTT ID" setting for each channel. Refer "PTT ID" of channel feature.

When you use an ID code for ANI board, the ID code and transmitting timing are configured to the optional ANI board.

### 3-17. OST (Operator Selectable Tone)

The transceiver is capable to have "OST" function and 16 tone pair (QT/DQT) with max 7-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 "DTMF Auto PTT", "DTMF Auto Dial" functions by keypad are not usable.

### 3-18. Emergency
• **Active Time**

Automatic transmission period in the emergency mode.

• **Interval Time**

Interval time between the automatic transmissions.

• **Duration of Locator Tone 1**

Duration of an alert tone before the automatic transmission is performed.

• **Duration of Locator Tone 2**

Duration of an alert tone after the automatic transmission is performed.

• **Man Down Delay Time**

Delay time of entering the emergency mode when the internal Man Down port becomes active.

• **Man Down Pre-alert**

Wait time of the alert tone when the internal Man Down port becomes active to enter the emergency mode. (After an alarm sounds, the transceiver waits for the programmed wait time then enter the emergency mode.)

• **Emergency Channel Display**

Setting for the display in the emergency mode.

The transceiver can be programmed to display "EMERGENCY" channel name when it is in emergency mode.

If you set to "off" by KPG-38D the transceiver shows selected group/channel/status before entering to the emergency mode however the transceiver is in an emergency mode.

• **Emergency Mode Type**

Speaker mute on or off in the emergency mode.

• **Emergency Type**

Select an Emergency code format from DTMF, MSK, ANI board or OFF (Disabled).

• **Emergency DTMF ID**

The Fleet number when you select DTMF in the emergency type.

• **Emergency Call Fleet**

The emergency fleet number when you select MSK in the emergency type.

• **Emergency Call ID**

The emergency DTMF ID code when you select MSK in the above emergency type.

### 3-19. Radio Password (Keypad Model Only)

The radio password prevent unauthorized users operation. Every time the power on, transceiver is locked and unusable until entering correct password.

Enter pre-programmed password by FPU and [#] key causes the transceiver unlocked.

### 3-20. Data Password

The data password prevents unauthorized reading of the programmed transceiver data by FPU. Enter pre-programmed password in FPU reading process. This password also protects the clone.

Enter pre-programmed password by FPU and [#] key to clone.

# OPERATING FEATURES

## 4. Group Features

You can use these features using the programming software (KPG-38D).

### 4-1. "TOT" (Time-Out Timer)

The transceiver has the "TOT". This parameter selects the period of time users can continuously transmit.

When the selected period passes, the transceiver generates an warning tone and stops the transmission.

### 4-2. "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.

### 4-3. "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.

### 4-4. "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.

### 4-5. Group Delete/Add

The transceiver can set the delete/add in each group. If "Delete" is selected, the transceiver does not scan the deleted group in multi group scan.

### 4-6. 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.

### 4-7. Signalling

Signalling "AND/OR" sets the audio unmute condition for any channel programmed with the option signalling (2-Tone/DTMF).

AND : "AND" requires both the valid option signalling and the programmed QT/DQT to be received for audio to unmute (and initiate an option signalling decode alert).

OR : "OR" requires either the valid option signalling or the programmed QT/DQT to be received for audio to unmute (an option signalling decode alert is only initiated if the proper option signalling is decoded).

## 5. Channel Features

You can use these features using the programming software (KPG-38D).

### 5-1. Option Signalling

The transceiver is programmable to the option signalling (2-Tone decode program 1, 2-Tone decode program 2, 2-Tone decode program 3, DTMF decode) to each channel. It is useful to receive an individual call.

Receive format is selectable "AND" or "OR" with QT/DQT for each group. The radio response of option signalling is programmable "(Call) Alert tone" or "Transpond" for each option signalling (2-Tone decode program 1, 2-Tone decode program 2, 2-Tone decode program 3, DTMF).

### 5-2. PTT ID

PTT ID provides a DTMF ANI, MSK ANI or ANI board ID (if installed) 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 channel. The contents of ID are programmed for each transceiver.

### 5-3. Busy Channel Lockout

Transmission is inhibited when the channel is busy. It is able to set this feature "Yes" or "No" for each channel.

### 5-4. Beat Shift

This is the feature that the microprocessor shifts its system clock frequency slightly to prevent the receive interference. This transceiver can program this feature "Yes" or "No" for each channel.

### 5-5. TX Power

You can set the transmission power "High" or "Low" for each channel. The each power setting is tuned at factory.

However, you can re-tune the power, using PC Tuning Mode of KPG-38D.

### 5-6. Wide/Narrow

You can set the occupied band width mode "Wide" or "Narrow" for each channel. It is useful for the operator to use the transceiver on various sites.

### 5-7. Scan Delete/Add

Scanning "delete/add" is programmable for each channel. Set the currently selected channel required to include in the scan sequence to "add".

The operator can change the "delete/add" information using the key programmed to "delete/add" function.

### 5-8. Compander

This function reduces the noise on the communications channel used by the transceiver and improves reception.

If Wide/Narrow function is set to wide, this function doesn't perform.

# OPERATING FEATURES

## 6. Key Functions

You can use these features, using the programming software (KPG-38D). Selector function is selectable channel select or group select.

The functions for Toggle switch are listed page 8 (Fig. 2). Right position is active for programmed function on toggle switch except "group select".

The functions for the top key are listed page 8 (Fig.2). Hold action and shift action are programmable.

The functions for side key are listed page 8 (Fig.2). Hold action and shift action are programmable.

The functions for microphone key are listed page 8 (Fig.2). Hold action is programmable.

### 6-1. No Function

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

### 6-2. AUX.

This function can be programmed when the voice scrambler board is not installed.

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

### 6-3. Channel Down

If this key is pressed once, the channel number decreases by one step. If this key holds down for 500ms (approximate), the channel number decreases continuously.

This key works as the squelch level adjuster in a squelch level adjust mode. This key works as the OST (operator selectable tone) number selector in the OST mode. This key works as the SCR (voice scrambler) code selector in the voice scrambler code select mode.

### 6-4. Channel Up

If this key is pressed once, the channel number increases by one step. If this key holds down for 500ms (approximate), channel number increases continuously.

This key works as the squelch level adjuster in squelch level adjust mode. This key works as the OST (operator selectable tone) number selector in the OST mode. This key works as the SCR (voice scrambler) code selector in the voice scrambler code select mode.

### 6-5. Channel Name

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

### 6-6. Delete/Add

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.

| Function Name | Selector ③ | Toggle Switch ④ | PF Keys ⑤⑥⑦ ⑧⑨ | Speaker/ Microphone PF Keys |
|---|---|---|---|---|
| Aux [1] | | ✓ | ✓ | ✓ |
| Channel Down | | | ✓ | ✓ |
| Channel Name | | | ✓ | ✓ |
| Channel Select | ✓ | | | |
| Channel Up | | | ✓ | ✓ |
| Delete/Add | | | ✓ | ✓ |
| Emergency Call [2] | | | ✓ | ✓ |
| Group Down | | | ✓ | ✓ |
| Group Scan | | ✓ | | |
| Group Select | ✓ | ✓ | | |
| Group Up | | | ✓ | ✓ |
| Home Channel | | | ✓ | ✓ |
| Invert Display | | ✓ | ✓ | ✓ |
| Key Lock | | ✓ | ✓ | ✓ |
| Lamp | | | ✓ | ✓ |
| Low Power | | ✓ | ✓ | ✓ |
| Monitor | | ✓ | ✓ | ✓ |
| Monitor Momentary | | | ✓ | ✓ |
| No Function | | ✓ | ✓ | ✓ |
| Operator Selectable Tone | | | ✓ | ✓ |
| Operator Selectable Priority 1 | | | ✓ | |
| Operator Selectable Priority 2 | | | ✓ | |
| Scan | | ✓ | ✓ | ✓ |
| Scrambler [3] | | ✓ | ✓ | ✓ |
| Shift | | ✓ | ✓ | |
| SP Attenuation | | | | ✓ |
| Squelch Level | | | ✓ | ✓ |
| Squelch OFF | | ✓ | ✓ | ✓ |
| Squelch Momentary | | | ✓ | ✓ |
| Talk Around | | ✓ | ✓ | ✓ |

1 This function can be selected when the scrambler board has not been installed.
2 This function can be selected when the ANI board has been installed.
3 This function can be selected when the scrambler board has been installed.

**Note :** If "Shift" is pregrammed onto one of the PF keys or the toggle switch, the remaining PF keys can be programmed with two different functions. If "Shift" is programmed onto a PF key and the toggle switch, an error will occur and the function will not operate.

**Fig. 2   Programmable functions**

## OPERATING FEATURES

### 6-7. Group Down

If this key is pressed once, the group number decreases by one step. If this key holds down for 500ms (approximate), the group number decreases continuously.

This key works as the squelch level adjuster in squelch level adjust mode. This key works as the OST (operator selectable tone) number selector in the OST mode. This key works as the SCR (voice scrambler) code selector in the voice scrambler code select mode.

### 6-8. Group Up

If this key is pressed once, the group number increases by one step. If this key holds down for 500ms (approximate), the group number increases continuously.

This key works as the squelch level adjuster in the squelch level adjust mode. This key works as the OST (operator selectable tone) number selector in the OST mode. This key works as the SCR (voice scrambler) code selector in the voice scrambler code select mode.

### 6-9. Home Channel

Press this key once, the channel switches to the pre-programmed home channel. Press this key again, the channel goes back to the previous channel.

### 6-10. Invert Display

Press this key once, the displayed the group/channel number or group/channel name are inverted. Press this key again, the display returns to the normal.

For the operator who does not change the display and needs "Invert" only, refer "Invert Display" setting of optional feature.

### 6-11. Key Lock

Pressing this key causes the transceiver to accept an entry of only the [Shift], [KeyLock], [PTT], [Emergency], [LAMP], [Monitor], [Monitor Momentary], [Squelch Off], [Squelch Momentary], [SP MIC Attenuation] keys, [Selector switch], [Volume], [Toggle], [Lamp], [Moni], [Moni momentary], [SQ off] and [SQ momentary].

"Lock" is used to prevent users from unexceptable key press which might cause a transceiver malfunction. The display does not change while the key is being locked.

Switching the transceiver off and on or pressing Key Lock again cancels the key lock. Key locked transceiver can still receive. Pressing this key while scanning, keys are locked but a scanning continues.

### 6-12. Lamp

Press this key, the transceiver illuminates the display and keypad back lit approximate 5 seconds. Press this key again, the transceiver stops the illuminating.

Pressing any key except the LAMP key while the illuminated restarts the 5 second timer.

### 6-13. Low Power

Press this key, the transmission power of all channel changes to Low. Press this key again, the transmission power returns to programmed value.

### 6-14. Monitor

Monitor the channel before a transmission.

Press this key once, "MON" appears and unmutes speaker if a carrier is present, regardless of the specified signalling (including option signalling). Press this key again, "MON" disappears and mutes speaker.

Press this key after the Option Signalling is matched, the Option Signaling is reset and monitor is activated. DBD (Dead Beat Disable) mode is not reset by this operation.

### 6-15. Monitor Momentary

While pressing this key, the monitor function (refer 6-14) is activated. Release this key, the monitor function is deactivated.

### 6-16. Operator Selectable Tone

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 channel up/down key or the group up/down key. 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 "OPT" icon. "OPT" icon 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-38D. OST is useful to access the repeater with same radio frequency and different tone (QT/DQT).

### 6-17. Operator Selectable P1

If priority channel 1 is set as "Fixed" and "None" in the scan information. The operator can select the priority channel 1, using this key (operator selectable fixed P1).

Press this key on normal channel, the channel becomes to priority channel 1. Previous priority channel 1 returns to the normal channel. Press this key on the priority channel 1, the priority 1 will be lost (no priority 1).

### 6-18. Operator Selectable P2

If priority channel 2 is set as "Fixed" and "None" in the scan information. The operator can select the priority channel 2, using this key (operator selectable fixed P2).

Press this key on the normal channel, the channel becomes to the priority channel 2. Previous priority channel 2 returns to the normal channel. Press this key on priority channel 2, the priority 2 will be lost (no priority 2).

### 6-19. Scan

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

### 6-20. Shift

This key activates "Shift + [Key]" function. It is useful when the numbers or more of the functions are necessary.

# TK-390

## OPERATING FEATURES

### 6-21. Squelch Level

The preset squelch level is varied in user mode (0 to 15). Press the key programmed to "squelch level", the transceiver enters to "squelch level adjust mode".

The squelch level can be adjusted by group "up/down" function key or channel "up/down" function key. Press the key programmed to "squelch level" again, the adjusted level is memorized and returns to the normal user mode.

### 6-22. Squelch Momentary

While pressing this key, the transceiver unmutes speaker regardless of an existence of a carrier and "MON" appears and busy "LED" lights on.

Release this key, the transceiver mutes the speaker and "MON" disappears and busy "LED" lights off.

### 6-23. Squelch Off

Press this key, the transceiver unmutes speaker regardless of the existence of a carrier and "MON" appears and busy "LED" lights.

Press this key again, the transceiver mutes the speaker and "MON" disappears and busy "LED" lights off.

### 6-24. Talk Around

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.

### 6-25. Emergency Call

Press this key, the transceiver enters to an emergency mode. In this mode, the channel is switched to the programmed emergency channel automatically and starts transmission with an emergency ID code which is programmed to ANI board.

The display depends on "Emergency Channel Display" setting.

### 6-26. SP Attenuation

Press this key once, the volume level of speaker-microphone is attenuated. Press this key again, the volume level of speaker-microphone returns to the previous level.

## 7. 2-Tone

Built-in 2-Tone decoder (decoder program 1, decoder program 2, decoder program 3) is available for option signalling. It is possible to use individual call or group call.

## 8. DTMF

Built-in DTMF encoder is available for dialing (Manual dial, Auto-dial (9 memory), Re-dial (1 memory)) (Keypad model only). Built-in DTMF decoder is available for option signalling.

It is possible to use individual call, group call, DBD (Dead Beat Disable).

## 9. Data Programming (PC Mode)

### 9-1. Preparation and Connection

TK-390 transceiver is programmed by using a personal computer, programming interface cable KPG-36, and programming software KPG-38D.

The programming software can be used with an IBM-PC or compatible machine. Figure 3 shows the setup for programming.

### 9-2. Programming Interface Cable KPG-36 Description

The KPG-36 is required to interface TK-390 to the computer. It has a circuit in its D-sub 25pin connector case that converts RS-232C logic level to TTL level.

KPG-36 is used to connect between TK-390 universal connector and RS-232C serial port of computer.

### 9-3. Programming Software KPG-38D Description

KPG-38D is the programming software for TK-390 supplied on a 3.5" floppy disk. This software runs under MS-DOS version 3.1 or later on an IBM-PC/XT, AT, or PS2 or compatible machine.

The data can be input to or read from TK-390 and edited on the screen. The programmed or edited data can be printed out. It is also possible to tune the transceiver.

We recommend that install KPG-38D for example to harddisk first then use it.

KPG-38D instruction manual part No. : B62-0814-XX.



**Fig. 3**

# REALIGNMENT

## 1. Mode
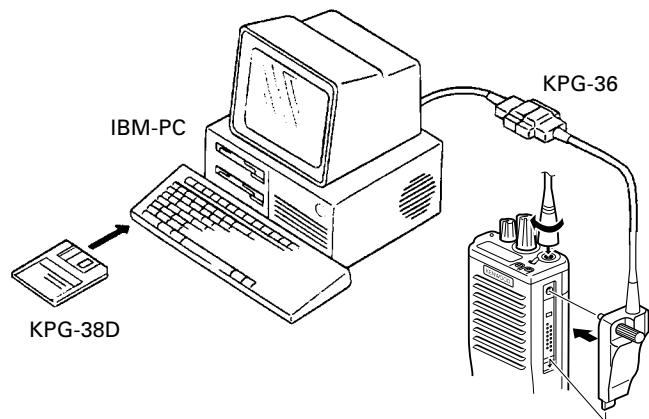
```
┌─────────────────────┐
│      User mode      │
└─────────────────────┘
┌─────────────────────┐      ┌─────────────────────┐
│      PC mode        ├──────┤ PC programming mode │
└─────────────────────┘      └─────────────────────┘
                             ┌─────────────────────┐
                             │    PC test mode     │
                             └─────────────────────┘
                             ┌─────────────────────┐
                             │   PC tuning mode    │
                             └─────────────────────┘
┌─────────────────────┐      ┌─────────────────────┐
│ Self programming mode├─────┤ Channel setting mode│
└─────────────────────┘      └─────────────────────┘
                             ┌─────────────────────┐
                             │  Group setting mode │
                             └─────────────────────┘
                             ┌─────────────────────┐
                             │Function setting mode│
                             └─────────────────────┘
                             ┌─────────────────────┐
                             │  Clone master mode  │
                             └─────────────────────┘
┌─────────────────────┐      ┌─────────────────────┐
│   Panel test mode   ├──────┤  LCD all lamp mode  │
└─────────────────────┘      └─────────────────────┘
                             ┌─────────────────────┐
                             │  Panel tuning mode  │
                             └─────────────────────┘
                             ┌─────────────────────┐
                             │   Clear function    │
                             └─────────────────────┘
┌──────────────────────────┐
│ Firmware programming mode │
└──────────────────────────┘
```
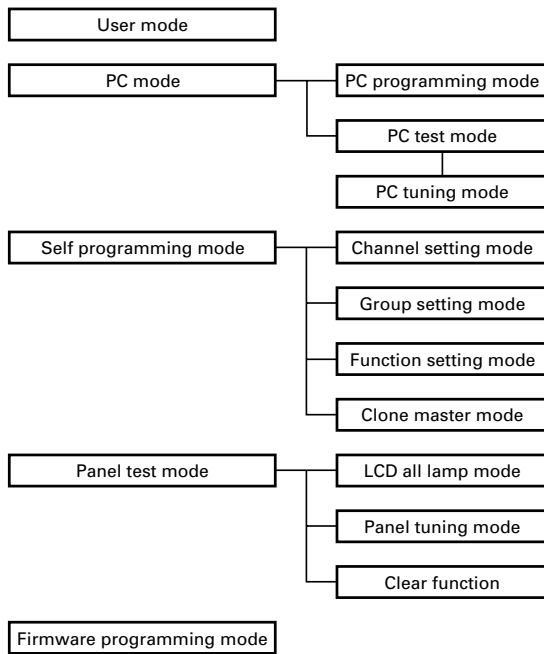
| Mode | Function |
|---|---|
| User mode | Customer use this mode |
| PC mode | Communication between the radio and PC (IBM compatible). It requires the KPG-38D |
| PC programming mode | Frequency, signalling and features write to the radio and read from the radio. |
| PC test mode | Check the radio using the PC. This feature is included in the FPU. |
| Self programming mode | Frequency, signalling and features write to the radio. |
| Panel test mode (Refer to Adjustment) | Dealer use to check the fundamental characteristics. |
| Firmware programming mode | Re-write the firmware of the flash ROM. |

## 2. How to Enter Each Mode

| Mode | Operation |
|---|---|
| User mode | Power on |
| PC mode | Power on begins the USER MODE. |
| Self programming mode | Hold down the [Side 1] key and the [Side 2] key, turn the radio power on. |
| Panel test mode | Hold down the [Side 2] key and [PTT], turn the radio power on, and release [PTT] first. |
| Firmware programming mode | Held down the [Side 2] key and [PTT], turn the radio power on, and release [Side 2] key first. |

## 3. Self Programming

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

### 3-1. Enter to the self programming mode

Turn the power switch on, with the lead wire with plug PF (8 pin) shorted to the E (10 pin) lead (Figure 5), or delete R491 (SELF, Figure 6) in the TX-RX unit and turn the power switch on while pressing the [Side 1] and [Side 2] keys.

### Note :

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

• **Additional Modification of the Plug**

It's available to enter the self programming mode by modifying the pattern of lead wire as following.



Cut the pattern between SSW and GND.

**Fig. 4**



Lead wire with plug (E30-3287-08)

SCREW
TUBE

2: RED (RX AF OUTPUT)
3: BLACK (RX AF OUTPUT)
5: WHITE (MIC INPUT)
6: BROWN (MIC GND)
7: BLUE (PTT SW) GND → ON
8: YELLOW (PF SW) ─┐
                   ├─ Shorted
10: BROWN (GND) ───┘
11: GREEN (5M)

**Fig. 5**

# TK-390

# REALIGNMENT



X57-540X-XX
Component side

R491
SELF

TP5
TP4
E
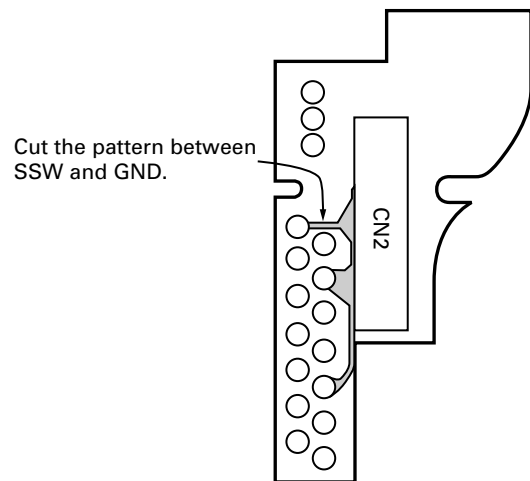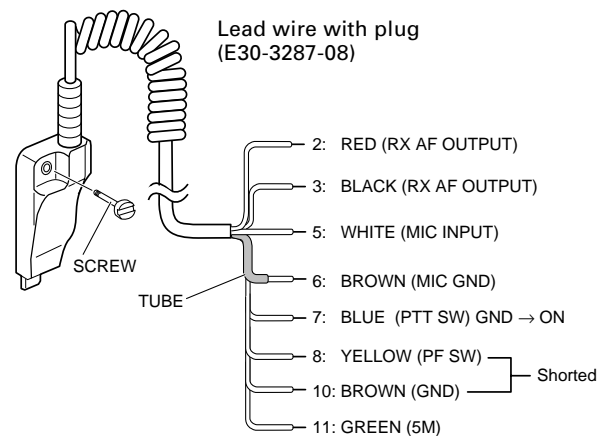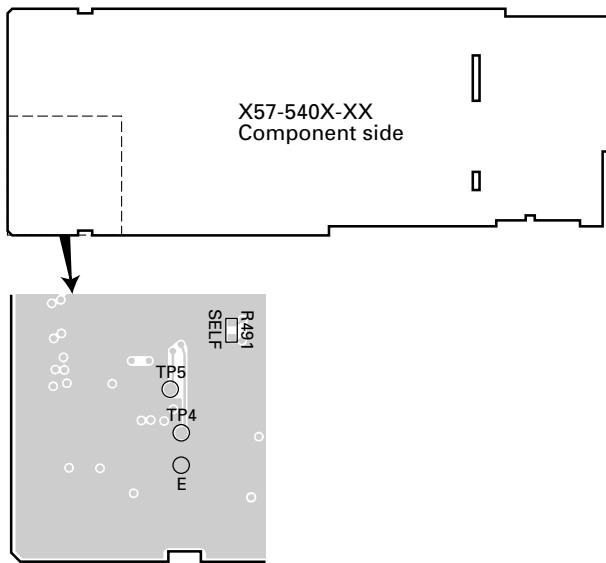
**Fig. 6**

When enter the self programming mode, "FUNC" appears after "SEL" is displayed for half a second.

Selecting any of Channel setting, Group setting, Function setting, or Clone master with the [Top 1] [Top 2] keys and then pressing [PTT] sets the Setting mode for that time.

Key operations in Self programming mode are as follows.

[Selector switch]  : Not used
[PTT]                    : Functions as a RUN or Execute key
[Top 1]                 : Use as a Down key
[Top 2]                 : Use as an Up key
[Side 1]                : Use for select channel steps in Channel setting mode, or switching for QT/DQT.
[Side 2]                : Use as a cancel key
[Orange]               : Add or delete frequencies in Channel setting mode
[Toggle]                : Flipping this to the right while in Channel setting mode, shifts to MHz steps.
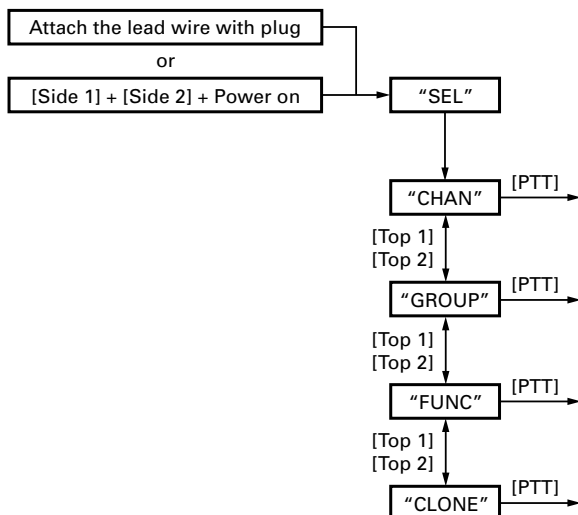


## 3-2. Channel Setting Mode

Set data for each channel while in this mode. After first entering Self programming mode, select the "CHAN" display with [Top 1] [Top 2] and press [PTT] to set Channel Setting mode. Once in Channel Setting mode, select the group that needs setting with the [Top 1] [Top 2] keys and press [PTT]. Next select the channel for setting with the [Top 1] [Top 2] keys and press [PTT]. The setting items and setting data will then appear so reset the data with the [Top 1] [Top 2] keys and press [PTT]. When finished, the display shifts to the next setting item. After finished setting all items press [PTT] to return to Group selection. Changes in the frequency CH steps and the QT/DQT steps can be made in [Side 1].

| No. | Function name | Display | Remarks |
|---|---|---|---|
|  | Select Group/Channel | 1.–1 during group selection<br>1–1. during channel selection | 1–160~160–1 |
| 1 | RX frequency | R450.0125 | Receive frequency |
| 2 | RX signalling | RX 023N | Receive QT/DQT (Dot on right edge is lit up during 1 step changes) |
| 3 | TX frequency | T450.0125 | Transmit frequency |
| 4 | TX signalling | TX 250.3 | Transmit QT/DQT (Dot on right edge is lit up during 1 step changes) |
| 5 | Option signalling | 2ToneA | OFF, DTMF, 2ToneA, 2ToneB, 2ToneC |
| 6 | DEL/ADD | D/A ADD | Delete, Add |
| 7 | Wide/Narrow | WIDE | Wide. Narrow |
| 8 | PTT ID | ID OFF | OFF, ON |
| 9 | TX power | POW HI | High, Low |
| 10 | Busy channel lockout | BCL OFF | OFF, ON |
| 11 | Beat shift | SFT OFF | OFF, ON |

• **Channel step display**



← 5kHz step



← 6.25kHz step
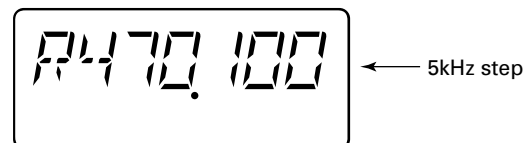
# REALIGNMENT

## • Operation
1. Select the setting value with the [Top 1] [Top 2] keys.
2. Press the [PTT] and the selected value is backed up and operation shifts to the next item for setting.
3. Press [Side 2] on the Group selection screen in order to return to Self programming mode.

## • Note
1. Different sample displays are shown.
2. Setting item No.s are displayed with a 7-segment 2-digit figure on the LCD.
3. Self programming mode cannot be set when set to Disaable with the FPU.
4. A red LED lights up during TX frequency and TX signalling.
5. Press [Orange] on the TX, RX frequencies setting screen in order to clear in the channel frequencies data.
6. Press [Orange] on the signalling setting screen in order to change or off the signalling function.
7. Flipping [Toggle] to the right during setting of RX, TX frequencies and performing Up/Down operation allows frequencies to be changed in MHz steps.
8. The RX and TX frequencies can be entered with the number pad keys.

## • Flow Chart

```
        Self programming mode
                 │ [Top 1] [Top 2]
        Channel setting mode  ◄──────┐
                 │ [PTT]              │
          Group selection            │
   [Side 2] │        │ [PTT]         │
          Channel selection ◄────────┤
   [Side 2] │        │ [PTT]         │
           1. RX frequency           │
   [Side 2] │        │ [PTT]         │
           2. RX signalling ──Orange── OFF ──Orange── QT
   [Side 2] │        │ [PTT]      Orange↑      Orange↓
           3. TX frequency        DQT I ◄── DQT N
   [Side 2] │        │ [PTT]         Orange
           4. TX signalling ──Orange── OFF ──Orange── QT
   [Side 2] │        │ [PTT]      Orange↑      Orange↓
           5. Option signalling    DQT I ◄── DQT N
   [Side 2] │        │ [PTT]         Orange
           6. Scan Delete/Add
   [Side 2] │        │ [PTT]
           7. Wide/Narrow
   [Side 2] │        │ [PTT]
           8. PTT ID on/off
   [Side 2] │        │ [PTT]
           9. TX power Hi/Low
   [Side 2] │        │ [PTT]
           10. Busy channel lockout on/off
   [Side 2] │        │ [PTT]
           11. Beat shift on/off
   [Side 2] │        │ [PTT]
   [Side 2]
```

## 3-3. Group Setting Mode

Set data for each Group while in this mode. After first entering Self programming mode, select the "GROUP" display with [Top 1] [Top 2] and press [PTT] to set Group Setting mode. Once in Group Setting mode, select the group that needs setting with the [Top 1] [Top 2] keys and press [PTT]. Next select the channel for setting with the [Top 1] [Top 2] keys and press [PTT]. The setting items and setting data will then appear so reset the data with the [Top 1] [Top 2] keys and press [PTT]. When finished, the display shifts to the next setting item. After finished setting all items press [PTT] to return to next Group selection.

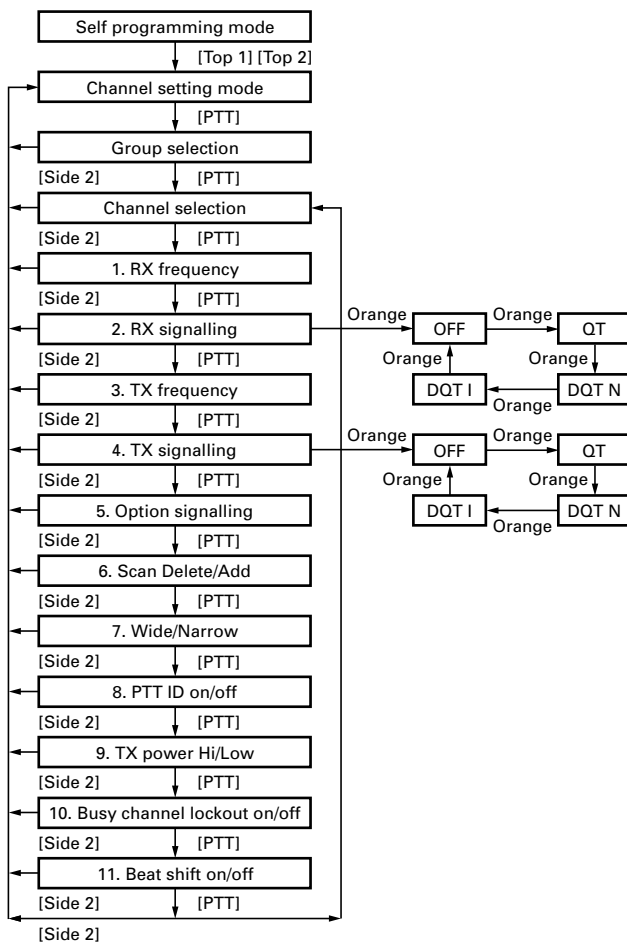| No. | Function name | Display | Remarks |
|-----|---------------|---------|---------|
|  | Select Group | GRP 1 | 1~160 |
| 1 | Battery save | BATT L | OFF, Short, Mid, Long |
| 2 | Time out timer | TOT 60 | OFF, 30s~300s (30s step) |
| 3 | TOT pre alert | TOT.P 10 | OFF, 1s~10s (1s step) |
| 4 | TOT rekey time | TOT.K 2 | OFF, 1s~60s (1s setp) |
| 5 | TOT reset time | TOT.S 2 | OFF, 1s~15s (1s step) |
| 6 | Group Delete/Add | D/A ADD | Delete, Add |
| 7 | Signalling | SIG AND | AND, OR |

## • Operation
1. Select the setting value with the [Top 1] [Top 2] keys.
2. Press the [PTT] and the selected value is backed up and operation shifts to the next item for setting.
3. Press [Side 2] on the Group selection screen in order to return to the Self programming mode initial display.

## • Note
1. Different sample displays are shown.
2. Setting item No.s are displayed with a 7-segment 2-digit figure on the LCD.
3. Self programming mode cannot be set when set to Disable with the FPU.

## • Flow Chart

```
        Self programming mode
                 │ [Top 1] [Top 2]
         Group setting mode ◄──────┐
                 │ [PTT]           │
          Group selection ◄────────┤
   [Side 2] │        │ [PTT]      │
           1. Battery save         │
   [Side 2] │        │ [PTT]      │
           2. Time out timer (TOT) │
   [Side 2] │        │ [PTT]      │
           3. TOT pre-alert         │
   [Side 2] │        │ [PTT]      │
           4. TOT rekey time        │
   [Side 2] │        │ [PTT]      │
           5. TOT reset time        │
   [Side 2] │        │ [PTT]      │
           6. Scan group Delete/Add │
   [Side 2] │        │ [PTT]      │
           7. Signalling AND/OR     │
   [Side 2] │        │ [PTT] ──────┘
   [Side 2]
```

# TK-390

# REALIGNMENT

## 3-4. Function Setting Mode

This mode allows making function settings for the transceiver. After first entering Self programming mode, select "FUNC" display with [Top 1] [Top 2] and then press [PTT] to set this mode. Function setting items are listed below.

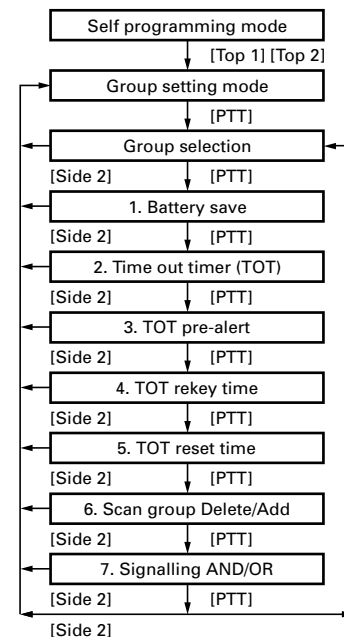| No. | Function name | Display | Remarks |
|-----|---------------|---------|---------|
| 1 | Power on tone | POW.T 15 (or C) | Continuas, 0~31 |
| 2 | Control tone | CON.T 15 (or C) | Continuas, 0~31 |
| 3 | Warning tone | WAR.T 15 (or C) | Continuas, 0~31 |
| 4 | Alert tone | ALR.T 15 (or C) | Continuas, 0~31 |
| 5 | Minimum volume | MIN.V 8 | 0~31 |
| 6 | Battery warning | BATT ON | Disable, Enable |
| 7 | Busy LED | B.LED ON | OFF, ON |
| 8 | TX LED | T.LED ON | OFF, ON |
| 9 | Invert Display | LCD ON | Disabel, Enable |
| 10 | Priority 1 | P1 NONE | None, Selected, Fixed |
| 11 | Priority 1 group | 1.–1 | 1–1~10–16 |
| 12 | Priority 1 channel | 1–1. | (Priority 1= In fixed) |
| 13 | Priority 2 | P2 NONE | None, Selected, Fixed |
| 14 | Priority 2 group | 1.–1 | 1–1~10–16 |
| 15 | Priority 2 channel | 1–1. | (Priority 2= In fixed) |
| 16 | Revert channel | REVT 1 | 1~8<br>1 : Selected<br>2 : Last called<br>3 : Last used<br>4 : Sel+Talk back<br>5 : Priority 1<br>6 : Priority 1+Talk back<br>7 : Priority 2<br>8 : Priority 2+Talk back |
| 17 | Squelch level | SQ.LV 15 | 0~15 |

### • Operation

1. Select the setting value with the [Top 1] [Top 2] keys.
2. Press the [PTT] and the selected value is backed up and operation shifts to the next item for setting.
3. Press [Side 2] on the Group selection screen in order to return to the Self programming mode initial display.

### • Note

1. Different sample displays are shown.
2. Setting item No.s are displayed with a 7-segment 2-digit figure on the LCD.
3. Self programming mode cannot be set when set to Disable with the FPU.

### • Flow Chart



Self programming mode
[Top 1] [Top 2]
Function setting mode
[PTT]
1. Power on tone
[Side 2]        [PTT]
2. Control tone
[Side 2]        [PTT]
3. Warning tone
[Side 2]        [PTT]
4. Alert tone
[Side 2]        [PTT]
5. Minimum volume
[Side 2]        [PTT]
6. Battery warning on/off
[Side 2]        [PTT]
7. Busy LED on/off
[Side 2]        [PTT]
8. TX LED on/off
[Side 2]        [PTT]
9. Invert display on/off
[Side 2]        [PTT]
10. Priority 1 setting
[Side 2]        [PTT]
11. Priority 1 group selection
[Side 2]        [PTT]
12. Priority 1 channel selection
[Side 2]        [PTT]
13. Priority 2 setting
[Side 2]        [PTT]
14. Priority 2 group selection
[Side 2]        [PTT]
15. Priority 2 channel selection
[Side 2]        [PTT]
16. Revert channel
[Side 2]        [PTT]
17. Squelch level
[Side 2]        [PTT]
[Side 2]

# REALIGNMENT

## 3-5. Clone Mode

1. Connect the cloning interface cable between the master side transceiver (source) and slave side transceiver (clone) as shown in the figure.

Cloning interface cable
Part No. E30-3325-05
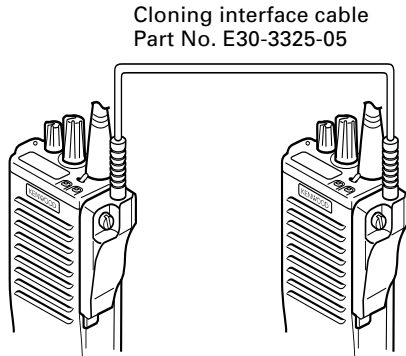


2. Set the master side transceiver to Self programming mode, and the transceiver display to "CLONE" with the [Top 1] key or [Top 2] key and press [PTT].
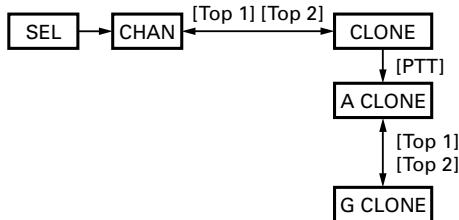


3. Set the power switch on the slave side transceiver to ON.
4. The red LED on the master side transceiver flashes when cloning starts and an "END" message appears when cloning ends.
5. The green LED on the slave side transceiver flashes.
6. When a problem occurs during cloning, an "ERROR" message appears on the master side transceiver.
7. Pressing the [Side 2] key sets clone mode.

## Note :

The master transceiver copies only to type matched slave.

### • All Clone

1. Press [PTT] on the master side transceiver to start cloning of all data except for the transceiver model type and alignment data.



Red lamp flashes
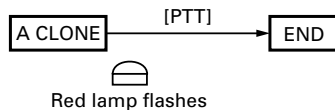
### • Group Clone

1. To clone the transceiver group data and channel data within the group, as well as group alphanumeric data, use the [Top 1] key or [Top 2] key to switch the display on the master side transceiver from "A CLONE" to "G CLONE".
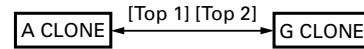


2. Press [PTT] to show the group cloning selection.
3. Select the group with the [Top 1] or [Top 2] keys.
4. Press [PTT] to show the slave side group cloning selection.
5. Select the group with the [Top 1] or [Top 2] keys.



6. Press the master side [PTT] to start cloning.



Red lamp flashes
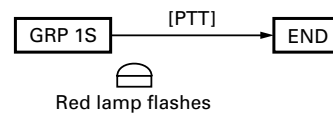
### • Flow Chart
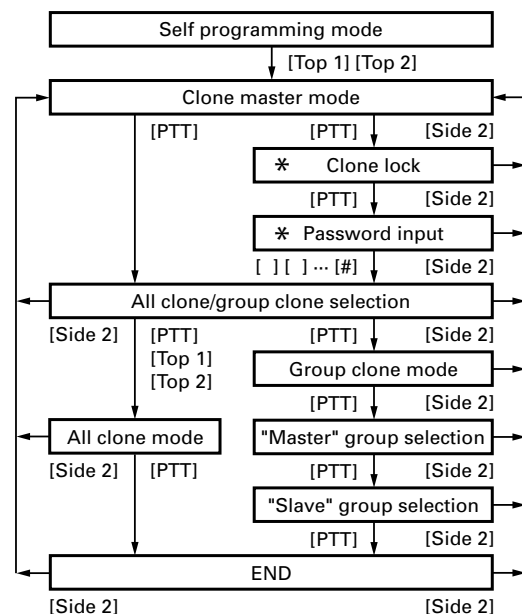


✱ Only the keypad model and set to password with the FPU.

# TK-390

## 4. Firmware Programming Mode

### 4-1. Preface

Flash memory is mounted on the TK-390. This allows the TK-390 to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

### 4-2. Connection Procedure

Connect the TK-390 to the personal computer (IBM PC or compatible) with the interface cable (KPG-36). (Connection is the same as in the PC Mode.)

### 4-3. Programming

1. Start up the programming software (KPG-38D), 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, 38400 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select.
5. Held down the [Side 2] and [PTT]. Turn the TK-390 power on, and release [Side 2] first. Until the display change to "PROGRAM".
6. Check the connection between the TK-390 and the personal computer, and make sure that the TK-390 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-390 starts to receive data, "PG" is appeared on 2 digit sub display.
8. If writing ends successfully, the red LED on the TK-390 lights and the checksum is displayed.
9. If you want to continue programming other TK-390s, repeat steps 5 to 8.

### Notes :

• To start the Firmware Programmer from KPG-38D, the Fpro path must be set up by KPG-38D setup.
• This mode cannot be entered if the Main Program mode is set to Disable in the Programming software (KPG-38D).

### 4-4. Function

1. If you press the [Top 2] switch while "PROGRAM" is displayed, the checksum is displayed. If you press the [Top 1] switch while the checksum is displayed, "PROGRAM" is redisplayed.
2. If you press the [Top 1] switch while "PROGRAM" is displayed, 1 dot light ("M.") to indicate that the write speed is low-speed (19200 bps). If you press the [Top 1] switch again while low-speed (19200 bps), 2 dot lights (".M.") to indicate, and the write speed becomes the high-speed mode (38400 bps).
   The communication speed changes 19200 bps, 38400 bps, 57600 bps (3 dots), and 115200 bps (4 dots) every time you press [PTT] and [Top 1].

### Note :

Normally, write in the high-speed mode.
When the Flash ROM is replaced, the initial communication speed for writing becomes 115200 bps.

## 5. Panel Test Mode

Setting method refer to ADJUSTMENT.

# TK-390

# CIRCUIT DESCRIPTION

## 1. Overview

The KENWOOD model TK-390 is a UHF/FM hand-held transceiver designed to operate in the frequency range of 403 to 512MHz, the unit consists of a receiver, a transmitter, a phase-locked loop (PLL) frequency synthesizer, power supply circuits, a control unit.

## 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 a 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.
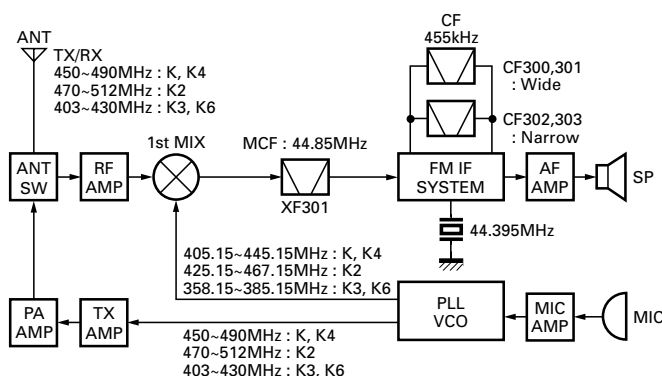


**Fig. 1   Frequency configuration**

## 3. Receiver System

### 3-1. Front-end RF amplifier

The signal coming from the antenna passes through the transmit/receive switching diode circuit, is amplified by the RF amplifier (Q200), and passes through a BPF (L205). The resulting signal is further amplified by the RF amplifier (Q201), passes through a BPF (L210) and goes to the mixer. The band-pass filters (L205 and L210) are two-pole helical resonators that uses varactor diode tuning to reject unwanted signal components.

### 3-2. First mixer

The 1st mixer uses the GaAs IC (IC200). The 1st mixer mixes the signal with the 1st local oscillator frequency from the VCO, and converts it to the 1st IF (44.85MHz).

The signal then passes through monolithic crystal filter (XF301) to remove unnecessary nearby frequency components. The signal from the MCF is used as the 1st IF signal.

### 3-3. IF amplifier

The 1st IF signal is amplified (Q302) and fed into IC300 in the FM IF IC. The IF signal is then mixed with the 2nd local oscillator frequency of 44.395MHz to generate the 2nd IF of 455kHz. The 455kHz signal is then passed through a ceramic filter (CF300, CF301 ; Wide, CF302, CF303 ; Narrow) and fed back into IC300 for additional amplification.
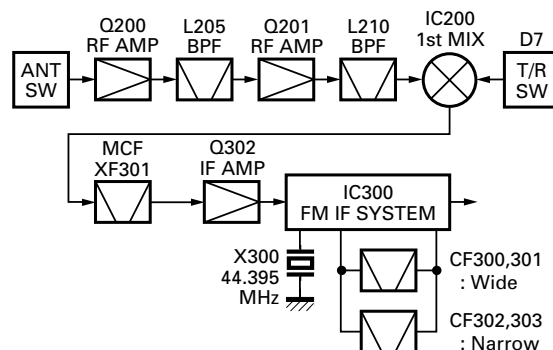


**Fig. 2   Receiver section**

| Item | Rating |
|---|---|
| Nominal center frequency | 44.85MHz |
| Pass band width | ±5~7kHz at 3dB |
| Attenuation band width | ±25kHz or less at 30dB |
| Ripple | 1.0dB or less |
| Insertion loss | 4dB or less |
| Guaranteed attenuation | 80dB or more at fo±910kHz |
| | 40dB or more within fo±1MHz |
| Terminating impedance | 350Ω / 4.5pF |

**Table 1   Crystal filter XF301 (L71-0588-05)**

# TK-390

## CIRCUIT DESCRIPTION

### 3-4. Wide/Narrow changeover circuit

Narrow and Wide settings can be made for each channel by switching the ceramic filters CF300, CF301 (Wide), CF302, CF303 (Narrow).

The WIDE (high level) and NARROW (low level) data is output from IC400 (I/O port expansion) pin 4.

When a WIDE (high level) data is received, Q300, Q303 turn off and Q304 turn on. When a NARROW (low level) data is received, Q303 turn on and Q301, Q304 turn off. D302, D303 are switched to ceramic filters when a high/low level data is received.

Q305 turns on/off with the Wide/Narrow data and the IC300 detector output level is changed to maintain a constant output level during wide or narrow signals.
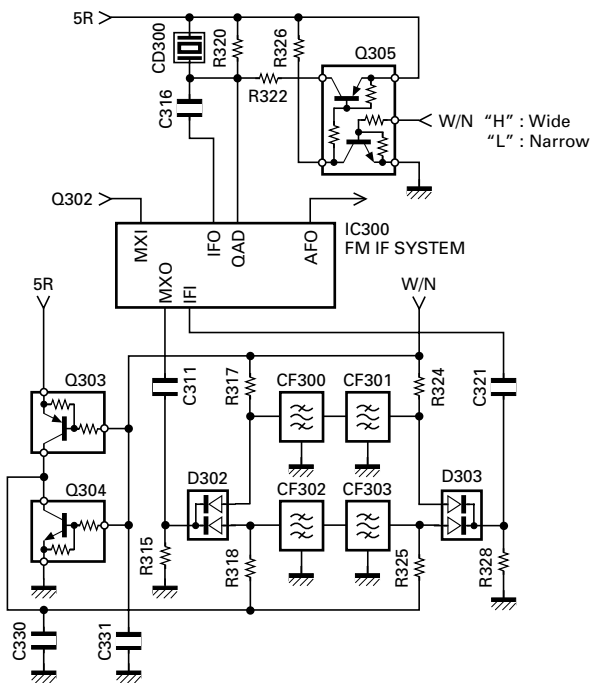


**Fig. 3   Wide/Narrow changeover circuit**

### 3-5. Audio amplifier circuit
#### • TX-RX unit

The demodulated signal from IC300 goes through IC301, and is amplified by IC601 (2/2), high-pass filtered, low-pass filtered, high-pass filtered, band-eliminate filtered, and de-emphasized by IC607.

The signal then goes through an electronic volume control (IC603), an AF amplifier IC604 (2/2), and an AF switch (Q8 is on and Q7 is on of the control unit), and is routed to audio power amplifier (IC1 of the control unit), where it is amplified and output to the internal speaker.

#### • Control unit

The audio mute signal (AMP SW) from the microprocessor becomes Low in the standby and Q5, Q6 which are power supply circuit for IC1 turn off. When the audio is output, AMP SW becomes High to turn Q5, Q6 on, and voltage is supplied to power terminal VP of IC1.

Speaker switching is done from IC403 (TX-RX unit) by INT AFC or EXT AFC. First, the logic level at the speakers switching terminal (SSW) on the universal connector is input to the microprocessor (IC406 TX-RX unit). The microprocessor then outputs data to IC403 based on this input.

When there is no SP-MIC installed, this logic level is high. When the INT AFC is high, the EXT AFC goes low, so the AF signal is only input to the amplifier for the internal speaker (INT SP) of IC1. However, when a SP-MIC has been installed, this logic level is low, so the INT AFC goes low and the EXT AFC goes high. So that the AF signal is input only to amplifier for the external speaker (EXT SP) of IC1.
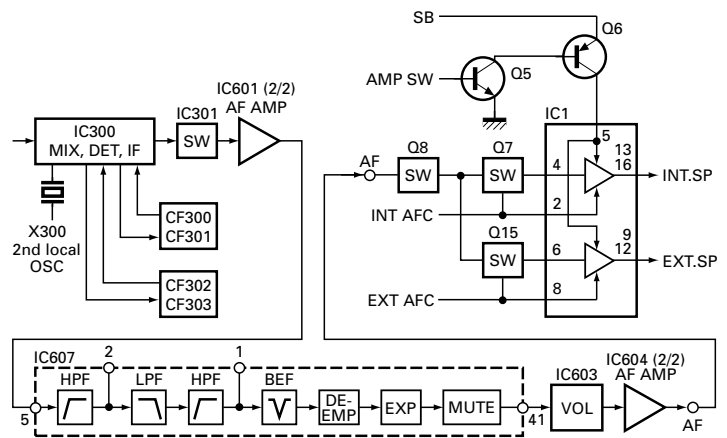


**Fig. 4   Audio amplifier circuit**

### 3-6. Squelch circuit

It amplifies the demodulated noise signal from FM IC (IC300) after filtering through BPF circuit. Then, the amplified signal is coverted to DC signal by the detection circuit. The coverted signal is feeded through the microprocessor (IC 406) and the voltage level is detected by ADC (A/D converter) to control the squelch circuit.
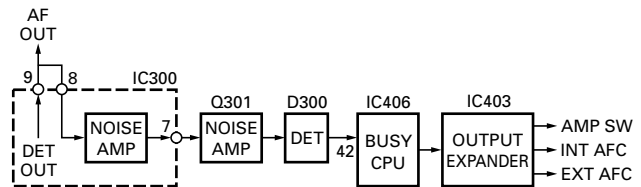


**Fig. 5   Squelch circuit**

# CIRCUIT DESCRIPTION

## 4. Transmitter System

### 4-1. Microphone amplifier

The signal from IC3 (control unit) goes through the mute switch (Q403).

When the SP-MIC is not attached, the microphone switching terminal (MSW) on the universal connector becomes High, and mute switch (Q403) is turned on. When the SP-MIC is attached, MSW is connected to GND at inside of SP-MIC. For this reason, Q403 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 limiter circuit in D601, and through the high-pass filter, the ALC circuit, the low-pass filter, the high-pass filter, and pre-emphasis/IDC circuit in IC607. When encoding DTMF, mute switch (Q601) is turned off for muting the microphone input signal.

The signal passes through the D/A converter (IC603) for the maximum deviation adjustment, and enters the summing amplifier consisting of IC605 (1/2), and is mixed with the low speed data from the CPU (IC406).

The output signal from the summing amplifier goes to the VCO modulation input.

The other output signal from the summing amplifier passes through the D/A converter (IC603) again for the BAL adjustment, and the buffer amplifier (IC604 1/2), and goes to the VCXO modulation input.

### 4-2. Noise cancelling microphone circuit

The two signals from INT MIC (Main & Sub) are input to the positive (+) input (Sub) and to the negative (–) input (Main) of the IC3. If the same signal is input to both Main and Sub, the Main signal is canceled at the output of IC3 (pin 7). In other words, noise from nearby sources not directly connected to the transceiver enters the Main and Sub inputs at the same signal and is therefore canceled out.

When a signal is only input to Main and there is no signal at Sub, the Main signal is output as is, from IC3 (pin 7). In other words, only the voice audio of the operator in extremely close proximity to the Main MIC is input to Main so that the signal is output as is from IC3 (pin 7). Also, when the "N/C" switch is set to "L", transistor Q14 turns off so Sub microphone turns off and operation is the same as above.

### 4-3. Drive and Final amplifier

The signal from the T/R switch (D7 is on) is amplified by the pre-drive (Q6) and drive amplifier (Q8) to 20mW. The output of the drive amplifier is amplified by the RF power amplifier (IC501 or IC801) to 4W (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 Transmit-Receive (TX-RX) antenna switching (D10 is on) and the harmonic filter (LPF) and the Internal-External (INT-EXT) antennal switching (in the universal connector) and applied to the antenna terminal.
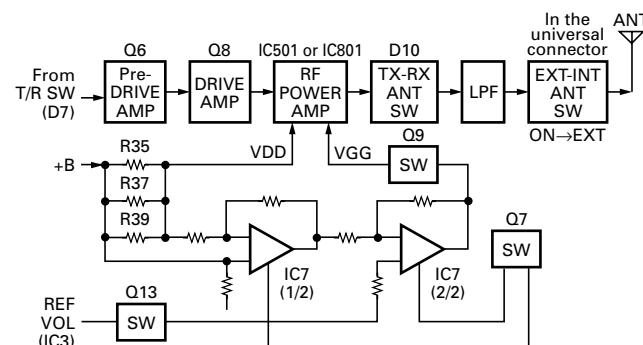


**Fig. 7    Drive and final amplifier and APC circuits**

### 4-4. Internal-External (INT-EXT) antenna switching

The INT-EXT antenna switch housed inside the universal connector only switches to the EXT ANT side when an antenna speaker-microphone has been installed.

This INT-EXT antenna switch works mechanically and switches based on the operation shown in Figure 8.
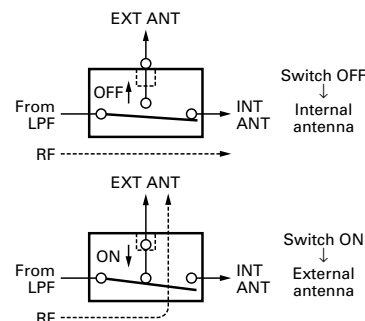


**Fig. 8    Internal-External antenna switching**



**Fig. 6    Microphoen circuit**

# TK-390

### 4-5. APC circuit

The APC circuit always monitors the current flowing through the RF power amplifier (IC501 or IC801) and keeps a constant current. The voltage drop at R35, R37, and R39 is caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier (IC7 1/2).

IC7 (2/2) compares the output voltage of IC7 (1/2) with the reference voltage from IC3, and the output of IC7 (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. Q7, Q9, and Q13 are turned on in transmit and the APC circuit is active. (See Figure 7)

## 5. PLL Frequency Synthesizer

The frequency synthesizer consists of the VCXO (X1), VCO (IC10 or L800), PLL IC (IC5) and buffer amplifiers.

The VCXO generates 16.8MHz. The frequency stability is within 2.0ppm (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 VCO of TK-390 covers the 40MHz spread, setting frequencies in r1, r2 (receive) and t1, t2 (transmit) with a bias voltage applied to the –V terminal of the VCO. A zero (0) volt bias is applied at frequencies lower than r1, t1. Frequencies r1, t1 through r2, t2 are biased with –3 volts. Frequencies higher than r2, t2 are biased with –6 volts.

The relation of VCO frequency versus PLL lock voltage is shown in Figure 11.

The output of the VCO is amplified by the buffer amplifier (Q3) and routed to the pin 5 of the PLL IC. Also the output of the VCO is amplified by the buffer amplifier (Q5) and routed to the next stage according to T/R switch (D7).

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 is the 40 or 50kHz reference signal which is eighth of the channel step (5 or 6.25kHz). The input signal from the pins 1 and 5 of the PLL IC is divided down to the 40 or 50kHz 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 4 of the VCO and locked to keep the VCO frequency constant.

PLL data is output from DT (pin 85), CLK (pin 84) and LE (pin 93) of the microprocessor (IC406). 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 30 (UL) of the microprocessor. When the PLL is unlocked, the UL goes low.
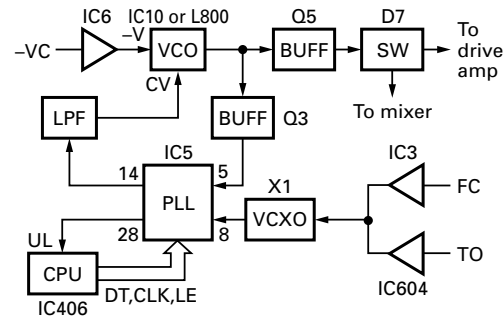


**Fig. 9   PLL block diagram**
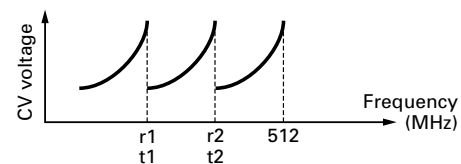


**Fig. 10   CV voltage vs frequency**

## 6. 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 two AVR ICs, and AVR circuit.

IC401 supplies 5V (5CM) to the control circuit. IC402 supplies 5V (5M) to the common circuit.

AVR circuit (Q400, Q402, Q405, Q406) supplies voltage to the TX circuit and the RX circuit. 5C is common 5V and output when SAVE is not set at off. 5R is 5V for reception and output during reception. 5T is 5V for transmission and output during transmission.
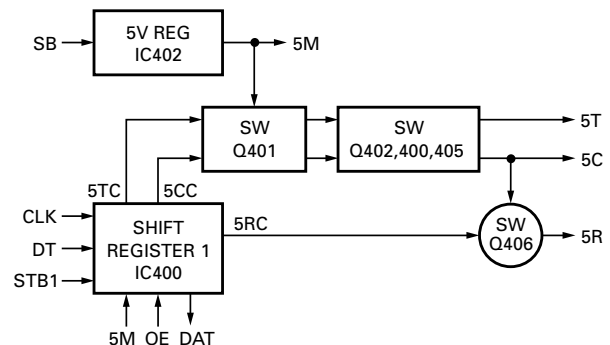


**Fig. 11   Power supply circuit**

# CIRCUIT DESCRIPTION

## 7. Control Circuit

The control unit consists of microprocessor IC406, flash memory IC414, and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the control unit. The CPU (IC406) mainly performs the following :

1) Switching between transmission and reception by PTT signal input.
2) Reading channel, frequency, and program data from the memory circuit.
3) Sending frequency program data to the PLL.
4) Controlling squelch on/off by the pulse signal input from the squelch circuit.
5) Controlling the audio mute circuit by decode data input.
6) Transmitting encode data (QT, DQT).
7) Sending serial data to output expander (IC400, IC403, IC404 and IC405) to control various function in the unit.

### 7-1. Memory circuit

IC414 is a flash memory with 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 DTMF memories and operating status, are programmed into the EEPROM (IC412).
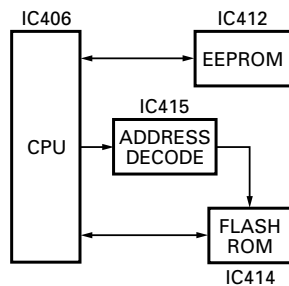


**Fig. 12    Memory circuit**

### 7-2. CPU clock shift

When the CPU (IC406) 12MHz clock (X400) high frequency is multiplexed with the reception frequency, it becomes an internal beat signal, suppressing the signal sensitivity. To prevent this, by turning Q407 on, the clock frequency is shifted (about 4kHz).

(Shift on/off can be set through programming.)
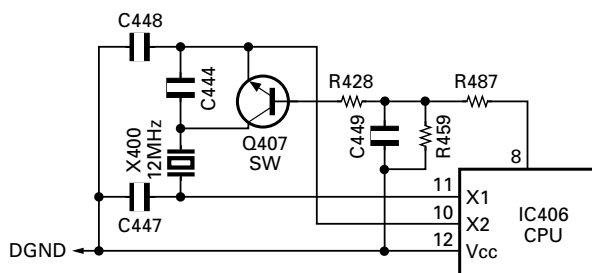


**Fig. 13    CPU clock frequency shift**

### 7-3. Shift register

IC400, 403, 404 and 405 is an interface IC for output port expansion. It is used to expand the CPU (IC406) output ports.

### 7-4. D/A converter

IC3 and IC603 is used as a conventional semi-fixed-resistor converter. It sets the following :

1) RX sensitivity
2) Transmission power
3) Modulation level
4) Audio power
5) Frequency

### 7-5. Key input

KI1 or KI2 becomes HIGH when any key is pressed (or Enable signal on the optional circuit).

When KI1 or KI2 becomes HIGH, KI0 also becomes HIGH to trigger the interrupt to IC406 in order to start the key scan.

When the key scan starts, the output terminals (Q1~Q5) become LOW. Only the key sensing circuit remains HIGH. When a key is pressed, the signal is routed through KI1 or KI2 to the microprocessor. Then, the microprocessor determines which key is pressed using this signals.



**Fig. 14    Key input**

# TK-390
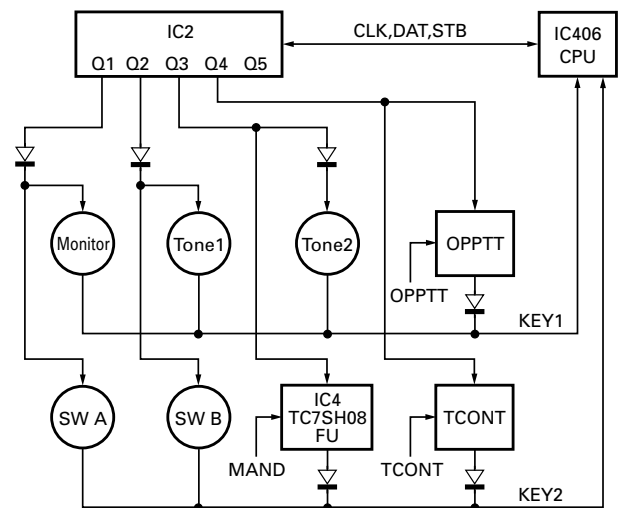
## CIRCUIT DESCRIPTION

### 7-6. Low battery warning

The battery voltage is monitored by the microprocessor (IC406).  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. 5.5V), 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. |

## 8. Signalling Circuit

### 8-1. Encode

The CPU (IC406) transmits the encode data selected by the program.

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

  Low-speed data is output from pin 34 of the CPU.  The signal passes through a low-pass CR filter, and goes to the summing amplifier (IC605 1/2).  The signal is mixed with the audio signal and goes to the VCO (IC10) and VCXO (X1) modulation input after passing through the D/A converter (IC603) for BAL adjustment.

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

  High-speed data is output from pin 35 of the CPU.  The signal passes through a low-pass filter consisting of IC413, and provides a TX DTMF tone and a RX DTMF tone including a beep tone.  The TX DTMF tone is passed to the D/A converter (IC603) for DTMF deviation adjustment, and then applied to the audio processor (IC607).

  The signal is mixed with the audio signal and goes to the VCO and VCXO.  The RX DTMF tone is passed the D/A convertor (IC603) for audio control, summing amplifier (IC604 2/2), audio power amplifier and then to the speaker.

- **MSK**

  The MSK signal (1200 bps) is output from pin 6 of IC607. The signal passes through the D/A converter (IC603) for the MSK deviation adjustment, and is routed to the VCO.

  When encoding MSK, the microphone input signal is muted.
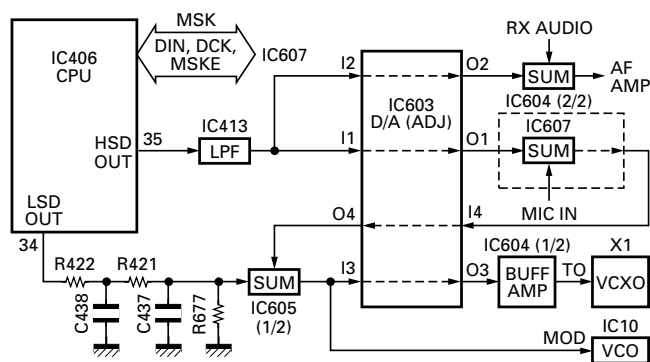


**Fig. 15   Encode**

### 8-2. Decode

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

  The demodulated signal from the FM IF IC (IC300) is amplified by IC601 (2/2) and passes through a low-pass filter (IC602) to remove audio components.  The signal is input to pin 28 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 FM IF IC (IC300) is amplified by IC601 (2/2) and goes to IC600, 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 si carried out.

- **MSK**

  The MSK input signal from the IF IC is amplified by IC601 (2/2) and gose to pin 5 of IC607. The signal is demoduated by MSK demodulator in IC607. The demodulated data goes to the CPU for processing.
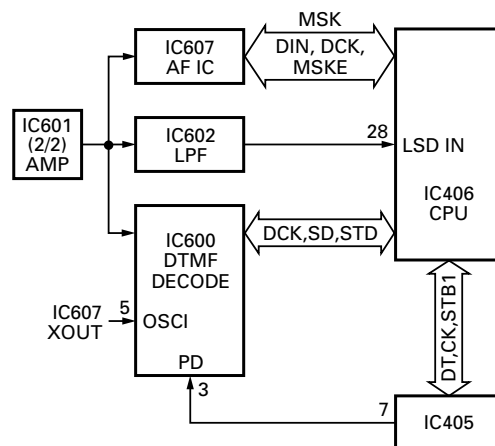


**Fig. 16   Decode**

# CIRCUIT DESCRIPTION

## 9. Compander Circuit

The term compander is a compound of compressor and expander. The compander reduces noise by utilizing a compressor and an expander.

As shown in Fig. 17, the signal input to the compressor is compressed so that the logarithmic ratio is 1/2 with reference to –10dBV, and then output onto the transmission path. The signal is expanded by the expander so that the logarithmic ratio is 2 with reference to –10dBV. This reduces noise on the transmission path and prevents deterioration of the signal quality due to noise during transmission.

The TK-390 contains IC607 (TC35453F) to perform this operation.

Pin 16 : Compressor input pin
Pin 18 : Compressor output pin
Pin 43 : Expander input pin
Pin 41 : Expander output pin

The TK-390 compander can be turned on or off only when modulation is set to Narrow by FPU setting. The compander cannot be turned on when modulation is set to Wide (OFF).
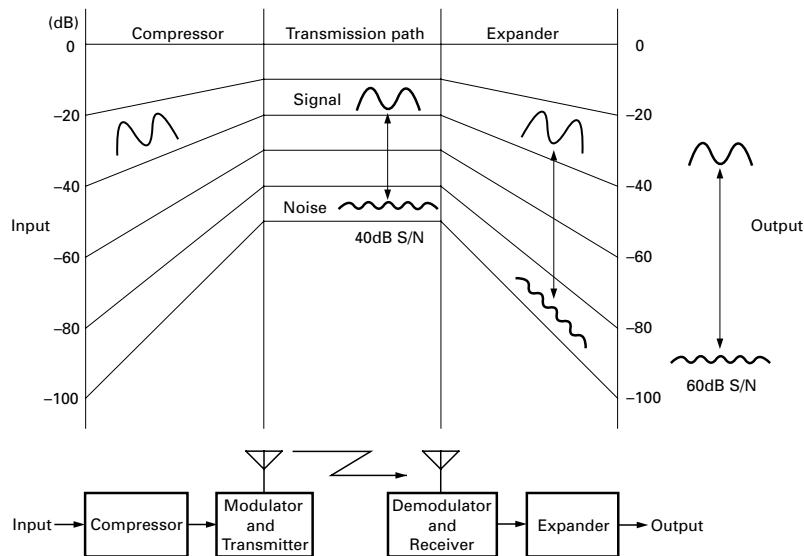
Fig. 17

## 10.   Option Board Terminal

Terminals for mounting the option board are provided at the bottom of the TX-RX unit. The table below shows the correspondence between the board and terminals. Disconnect R414 and R665 in TX-RX unit when the scrambler board is attached.

Connect the option board to the connection terminals of the TX-RX unit.

X57-540X-XX
Component side

Fig. 18

# TK-390
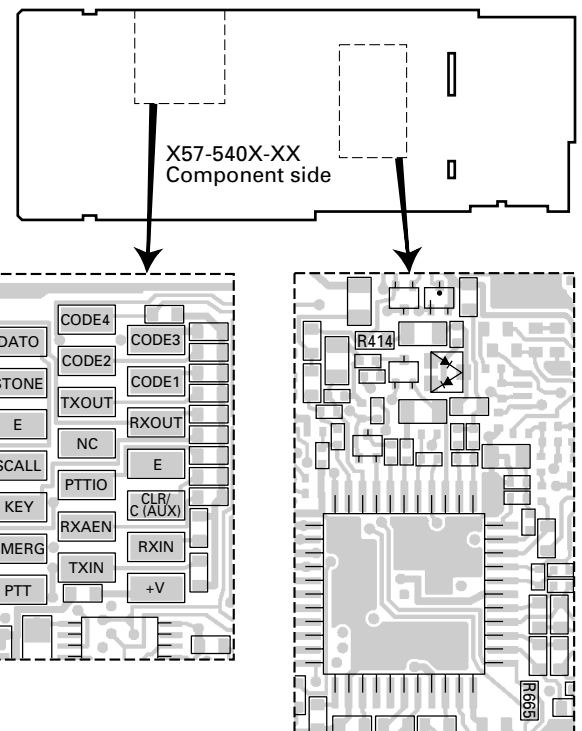
## CIRCUIT DESCRIPTION

### 10-1. Option port 1 (For ANI board etc.)

| Port name | | Description | Connection | Note |
|---|---|---|---|---|
| Abbreviation (PCB) | Name | | | |
| DATI | Data In | Board data input<br>Transceiver (Receiver demodulation circuit)<br>→ ANI board | Connected to the circuit | Reference<br>1kHz STD Dev →<br>250~350mVrms |
| DATO | Data Out | Board data output<br>ANI board → Transceiver (Transmitter modulation circuit) | Connected to the circuit | Reference<br>1kHz/150mVrms →<br>2.5~3.5kHz/wide<br>1.25~1.75kHz/narrow |
| TCONT | T Control | Audio amplifier power control → Control unit (X53) counter → TX-RX unit (X57) microcomputer | Microcomputer input | L : Audio amp on<br>H : Audio amp off |
| STONE | Side Tone | Beep during PTT ID | Connected to the circuit | |
| AUDIH | Audio Inhibit | Microphone muting during PTT ID | Connected to the circuit | |
| E | Ground | Ground | Ground | |
| MUTE | Mute | Mutes transceiver receive tone | Connected to the circuit | |
| SCALL | Selective Call | LED drive port for selective call | Unused, no connection | |
| AUX | Aux | Emergency Channel request → Control unit (X53) counter → TX-RX unit (X57) microcomputer | Microcomputer input | L : EMG CH request<br>H : No EMG CH request |
| PTT | PTT | Microcomputer PTT logic → ANI board | Microcomputer output | L : TX, H : RX |
| MAND | Man Down | Man Down mercury switch input port<br>Transceiver → ANI board | Microphone connector | L : Switch on<br>H : Switch off |
| EMERG | Emergency | Microcomputer Emergency Channel logic<br>→ ANI board | Microcomputer output | L : Emergency operation request<br>H : No emergency operatiion request |
| BUSY | Channel Busy | Microcomputer Busy logic → ANI board | Microcomputer output | L : Busy<br>H : Not busy |
| KEY | (Transmission) Key | Transmission start control GE-Star → Control unit (X53) counter → TX-RX unit (X57) microcomputer | Microcomputer input | L : Transmission request<br>H : No transmission request |
| A+ | Board power supply | Switched B | Power supply | |

### 10-2. Option port 2 (For voice scrambler etc.)

| Abbreviation (PCB) | Name | Description | Check mode operation | Note |
|---|---|---|---|---|
| CODE1 | Scramble Code 1 | First of four bits of scramble code | Microcomputer output | Board code selection (Logic by binary code) |
| CODE2 | Scramble Code 2 | Second of four biits of scramble code | | |
| CODE3 | Scramble Code 3 | Third of four bits of scramble code | | |
| CODE4 | Scramble Code 4 | Fourth of four bits of scramble code | | |
| TXOUT | TX Out | Board → Transceiver (Transmitter modulation circuit) | Connected to the circuit | Reference<br>1kHz/15mVrms →<br>2.5~3.5kHz/wide<br>1.25~1.75kHz/narrow |
| RXOUT | RX Out | Board → Transceiver (Audio amp) | Connected to the circuit | |
| NC | No Connection | No connection | No connection | |
| E | Ground | Ground | Ground | |
| PTTIO | | Scramble modulation/demodulation control | Microcomputer output | L : TX, H : RX |
| CLR/C (AUX) | Clear/Code | Specifies whether to scramble | Microcomputer output | L : Scramble<br>H : Normal |
| RXAEN | | Enables the power save mode of the board | Microcomputer output | L : Power save mode<br>H : Normal |
| RXIN | RX In | Transceiver (Receiver detection output)<br>→ Board | Connected to the circuit | Reference<br>1kHz STD Dev →<br>250~350mVrms |
| TXIN | TX In | Transceiver (Microphone circuit) → Board | Connected to the circuit | |
| +V | Board power supply | Switched B | Power supply | |

# SEMICONDUCTOR DATA

## 1. Microprocessor : 784214GC0648EU (TX-RX Unit IC406)

### 1-1. Terminal function

| Pin No. | Port name | I/O | Function | Pin No. | Port name | I/O | Function |
|---------|-----------|-----|----------|---------|-----------|-----|----------|
| 1 | P120/RTP0 | O | Modem FCLR | 50 | P82/A2 | – | Flash ROM access port. |
| 2 | P121/RTP1 | O | SB control | 51 | P83/A3 | – | |
| 3 | P122/RTP2 | O | D/A converter CS | 52 | P84/A4 | – | |
| 4 | P123/RTP3 | O | Modem MSKE (MSK enable) | 53 | P85/A5 | – | |
| 5 | P124/RTP4 | O | Modem DIN (DATA/TX DATA) | 54 | P86/A6 | – | |
| 6 | P125/RTP5 | I | Model select 1 | 55 | P87/A7 | – | |
| 7 | P126/RTP6 | I | Model select 2 | 56 | P40/AD0 | – | |
| 8 | P127/RTP7 | O | Clock shift | 57 | P41/AD1 | – | |
| 9 | VDD | – | +5V | 58 | P42/AD2 | – | |
| 10 | X2 | – | X'tal (12.0MHz) | 59 | P43/AD3 | – | |
| 11 | X1 | – | | 60 | P44/AD4 | – | |
| 12 | VSS | – | GND | 61 | P45/AD5 | – | |
| 13 | XT2 | – | Open | 62 | P46/AD6 | – | |
| 14 | XT1 | – | GND | 63 | P47/AD7 | – | |
| 15 | RESET | – | CPU reset | 64 | P50/A8 | – | |
| 16 | P00/INTP0 | I | μ-com stop | 65 | P51/A9 | – | |
| 17 | P01/INTP1 | I | Modem TRD (TX clock) | 66 | P52/A10 | – | |
| 18 | P02/INTP2/NMI | I | Modem RTM (RX clock) | 67 | P53/A11 | – | |
| 19 | P03/INTP3 | I | DTMF decode STD | 68 | P54/A12 | – | |
| 20 | P04/INTP4 | I | Key interrupt | 69 | P55/A13 | – | |
| 21 | P05/INTP5 | I | Power switch detect | 70 | P56/A14 | – | |
| 22 | P06/INTP6 | I | MIC PTT | 71 | P57/A15 | – | |
| 23 | AVDD | – | +5V | 72 | VSS | – | GND |
| 24 | AVREF0 | – | +5V | 73 | P60/A16 | – | Flash ROM access port |
| 25 | P10/ANI0 | I | Volume level input | 74 | P61/A17 | – | |
| 26 | P11/ANI1 | I | SP key 1/2 | 75 | P62/A18 | – | Flash ROM (4M bit) access port. |
| 27 | P12/ANI2 | I | (Temp) | 76 | P63/A19 | – | Open |
| 28 | P13/ANI3 | I | QT/DQT input | 77 | P64/RD | – | Flash ROM access port. |
| 29 | P14/ANI4 | I | Battery level input | 78 | P65/WR | – | |
| 30 | P15/ANI5 | I | PLL unlock detect input | 79 | P66/WAIT | I | TX Inhibit (Radio kill) |
| 31 | P16/ANI6 | I | *SQL level input | 80 | P67/ASTB | – | Open |
| 32 | P17/ANI7 | I | *RSSI level input | 81 | VDD | – | +5V |
| 33 | AVSS | – | GND | 82 | P100/TI5/TO5 | O | EEPROM clock |
| 34 | P130/ANO0 | O | LSD (QT/DQT) output | 83 | P101/TI6/TO6 | I/O | EEPROM data |
| 35 | P131/ANO1 | O | DTMF/BEEP output | 84 | P102/TI7/TO7 | O | Common clock |
| 36 | AVREF1 | – | +5V | 85 | P103/TI8/TO8 | O | Common data |
| 37 | P70/RXD2/SI2 | O | Battery DET SW | 86 | P30/TO0 | O | Shift register output enable |
| 38 | P71/TXD2/SO2 | I | EXT. SP install check (No : H) | 87 | P31/TO1 | I | Key counter return 1 |
| 39 | P72/ASCK2/SCK2 | O | Non connect | 88 | P32/TO2 | I | Key counter return 2 |
| 40 | P20/RXD1/SI1 | I | ←FPU | 89 | P33/TI1 | I | Self program flag (Soft pull up) |
| 41 | P21/TXD1/SO1 | O | →FPU | 90 | P34/TI2 | O | Key counter enable |
| 42 | P22/ASCK1/SCK1 | O | Modem STB | 91 | P35/TI00 | I | 2-tone decode latch |
| 43 | P23/PCL | O | DTMF clock | 92 | P36/TI01 | I | Digital SQL |
| 44 | P24/BUZ | I | DTMF decoder SD | 93 | P37 | O | PLL LE |
| 45 | P25/SI0 | O | LCD CS | 94 | TEST | – | GND |
| 46 | P26/SO0 | O | Shift register 1 STB | 95~98 | P90~P93 | I | Rotary SW 1~4 |
| 47 | P27/SCK0 | O | Shift register 2 STB | 99 | P94 | I | Toggle SW input |
| 48 | P80/A0 | – | Flash ROM access port. | 100 | P95 | I | Modem RDT (RX DATA) |
| 49 | P81/A1 | – | | | | | |

## SEMICONDUCTOR DATA / DESCRIPTION OF COMPONENTS

### 2. RF Power Amplifier (Control Unit IC501)

#### XHW2727-2 : K,K2,K4

**2-1. Block diagram**
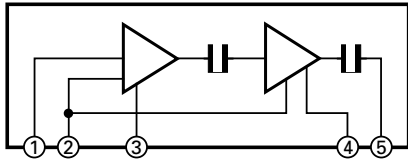


**2-2. Maximum ratings (Flange temperature = 25°C)**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| DC supply voltage (Pins 3,4) | $V_{DD1,2}$ | 10 | Vdc |
| DC control voltage (Pin 2) | Vcont | 10 | Vdc |
| RF input power | Pin | 40 | dBm |
| RF output power ($V_{DD1,2}$=9V) | Pout | 9 | W |
| Operating case temperature range | Tc | −30 to +100 | °C |
| Storage temperature range | Tstg | −30 to +100 | °C |

### 3. RF Power Amplifier (Final Unit IC801)

#### M68732L : K3,K6

**3-1. Block diagram**
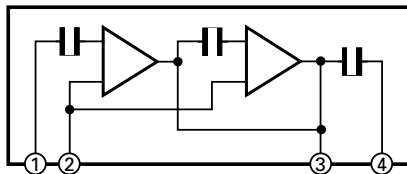


**3-2. Maximum ratings (Flange temperature = 25°C)**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| DC supply voltage (Pins 3) | $V_{DD}$ | 12 | Vdc |
| DC control voltage (Pin 2) | Vcont | 4 | Vdc |
| RF input power | Pin | 70 | dBm |
| RF output power | Pout | 10 | W |
| Operating case temperature range | Tc | −30 to +110 | °C |
| Storage temperature range | Tstg | −40 to +110 | °C |

### Final Unit (X45-3590-10) : K3,K6

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| IC801 | RF power amplifier | |

### Control Unit (X53-3930-XX)

#### -13 : K,K2    -14 : K4    -15 : K3    -16 : K6

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| IC1 | Audio power amplifier | 0.5W/16Ω, BTL method |
| IC2 | Shift register | |
| IC3 | MIC noise canceling circuit | |
| IC4 | Option board (MAND) control switch | AND circuit MAND : "H", OUT : "H" when Q3 port is "H" |
| IC5 | Option board (OPPTT) control switch | AND circuit OPPTT : "H", OUT : "H" when Q4 port is "H" |
| IC6 | Option board (TCONT) control switch | AND circuit MAND : "H", OUT : "H" when Q4 port is "H" |
| IC7 | Shift register | |
| IC10 | Inverter | |
| IC101 | LCD driver | |
| IC501 | RF power amplifier | |
| Q5 | Power supply switch control | AF AMP SW "H" : on |
| Q6 | AF amplifier power supply switch | |
| Q7 | Int. audio mute switch | INT. AFC "H": INT. SP audio signal on |
| Q8 | Audio mute switch | MUTE "L" : RX audio signal off |
| Q14 | Noise cancelling (N/C) switch | N/C switch "H" : N/C on |
| Q15 | Ext. audio mute switch | EXT AFC "H" : EXT. SP audio signal on |
| D2 | AVR | AF AMP power supply |
| D6~9 | Key pad backlight | |
| D11 | Reverse current prevention for number key pad | |
| D12,13 | Reverse current prevention for PF key. | |
| D14 | Reverse current prevention for number key pad | |
| D15,16 | Reverse current prevention for PF key. | |
| D17,18 | Reverse current prevention for number key pad | |
| D19,20 | Reverse current prevention for PF key. | |
| D101 | Speed up | |
| D102,103 | LCD backlight | |
| D104 | LED | Red, green |

# DESCRIPTION OF COMPONENTS

## TX-RX UNIT (X57-5400-XX)　-10 : K,K4　-11 : K2　-12 : K3,K6

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| IC2 | Level shift | |
| IC3 | D/A converter (adjustment) | |
| IC4 | DC-DC converter | Outputs ± twice the input voltage 5M |
| IC5 | Phase locked loop system | |
| IC6 | Level shift | |
| IC7 | APC comparator | |
| IC10 or L800 | VCO system | |
| IC200 | Active DBM | |
| IC300 | FM IF system | 2nd mixer, Quadrature detector, AF output, Noise amplifier output, S-meter output |
| IC301 | Audio mute switch | |
| IC400 | Shift register | Output expander |
| IC401 | Voltage regulator | 5CM |
| IC402 | Voltage regulator | 5M |
| IC403~405 | Shift register | Output expander |
| IC406 | Microprocessor | 16 bit |
| IC409 | Voltage detector | Reset |
| IC412 | EEPROM | |
| IC413 | Active filter | For HSD output |
| IC414 | Flash ROM | |
| IC415 | Address decode latch | NOR gate |
| IC600 | DTMF decoder | |
| IC601 | Buffer amplifier | |
| IC602 | Active filter | LPF for LSD input |
| IC603 | D/A converter (Adjustment) | |
| IC604 | Summing amplifier/ Buffer amplifier | AF/TO |
| IC605 | Summing amplifier | MOD : Summing amplifier |
| IC606 | Active filter | LPF for 2-tone |
| IC607 | Audio processor | |
| Q2 | DC convert switch | |
| Q3 | RF amplifier | Buffer for RF input |
| Q4 | Ripple filter | 4C |
| Q5 | Buffer amplifier | |
| Q6 | RF amplifier | TX drive |
| Q7 | DC switch | APC circuit power switch |
| Q8 | RF amplifier | TX drive |
| Q9 | DC switch | APC voltage control |
| Q10 | DC switch | APC off : Speed up |
| Q13 | DC switch | D/A port protection |
| Q200,201 | RF amplifier | RX front |
| Q301 | Noise amplifier | RX on |
| Q302 | IF amplifier | Post amplifier |
| Q303 | DC switch | 2nd IF W/N switch sets to on when Narrow |
| Q304 | DC switch | 2nd IF W/N switch sets to on when Wide |
| Q305 | DC switch | |
| Q400 | DC switch | 5TC "H" : on |
| Q401 | DC switch | 5CC "H" : on, 5TC "H" : on |
| Q402 | DC switch | Regulator 5T, 5C |
| Q403 | DC switch | MIC mute |
| Q404 | DC switch | MIC switch |
| Q405 | DC switch | 5CC "H" : on |
| Q406 | DC switch | 5R |
| Q407 | Clock frequency shift | |
| Q408 | DC switch | TX LED (Red) driver |
| Q409 | DC switch | Busy LED (Green) driver |
| Q410 | DC switch | Lamp |
| Q411 | Current driver | Lamp : Backlight |
| Q412 | DC switch | SB |
| Q413 | DC switch | BATT voltage detector |
| Q414 | DC switch | Power supply switch |
| Q415 | DC switch | SB |
| Q601 | Mute switch | MIC line mute |
| Q602 | DC switch | |
| D4 | Noise rejection | |
| D6 | Current steering | |
| D7 | TX/RX switch | |
| D8 | Temperature compensation | |
| D9 | Voltage protection | |
| D10,11 | ANT switch | |
| D200 | Overload protection | |
| D201,202 | Varactor tuning | For L205 |
| D203,204 | Varactor tuning | For L210 |
| D300 | AM detector | Noise squelch |
| D301 | DC switch | Squelch speed up |
| D302,303 | RF switch | 2nd IF wide/narrow |
| D400 | Reverse protection | |
| D401 | Overload protection | |
| D402,403 | Surge absorption | |
| D404 | Reverse current prevention | |
| D408 | Reverse current prevention | |
| D409 | Voltage reference | |
| D601 | Voltage clamp | |

# TK-390

## 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-390**
**FINAL UNIT (X45-3590-10), CONTROL UNIT (X53-3930-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| | | | **TK-390** | | |
| 1 | 1A | | A02-2139-63 | CABINET ASSY | K,K2,K3 |
| 1 | 1A | | A02-2140-63 | CABINET ASSY (DTMF) | K4,K6 |
| 2 | 3A | ＊ | A10-1374-71 | CHASSIS | K,K2,K4 |
| 3 | 3B | | A10-4015-21 | CHASSIS | K3,K6 |
| 4 | 2B | | A22-2501-25 | SUB PANEL ASSY | |
| 5 | 2B | ＊ | A62-0537-53 | PANEL ASSY | |
| 7 | 1C | | B03-0594-04 | DRESSING PLATE　ACCESSORY | |
| 8 | 1C | | B09-0363-03 | CAP　　　　　ACCESSORY | |
| 9 | 1B | | B11-1183-14 | ILLUMINATION GUIDE | |
| 10 | 1B | | B38-0786-05 | LCD | |
| 11 | 1A | | B42-3394-14 | STANDARD LABEL | |
| 12 | 1A | | B43-1111-14 | BADGE | |
| 13 | 1D | | B62-0816-30 | INSTRUCTION MANUAL | |
| 14 | 3A | ＊ | B72-1344-14 | MODEL NAME PLATE | K,K4 |
| 14 | 3A | | B72-1345-04 | MODEL NAME PLATE | K2 |
| 14 | 3A | ＊ | B72-1346-14 | MODEL NAME PLATE | K3,K6 |
| 16 | 1D | | D32-0421-24 | STOPPER　　　ACCESSORY | |
| 18 | 2B | ＊ | E23-1102-14 | TERMINAL (TX/RX-GND) | |
| 19 | 3A | | E23-1163-04 | BATT TERMINAL | |
| 20 | 1B | | E29-1165-05 | INTER CONNECTOR (LCD) | |
| - | - | | E30-3325-05 | CLONING CABLE | |
| 22 | 2A | | E37-0682-05 | FLAT CABLE (TX/RX-CONT) | |
| 23 | 1B | | E37-0684-05 | LEAD WIRE WITH CONNECTOR (SP) | |
| 24 | 2B | | E37-0692-05 | PROCESSED LEAD WIRE (TOGGLE SW) | |
| 25 | 2B | | E37-0722-05 | ANTENNA CABLE | |
| 26 | 3B | | E58-0443-25 | UNVERSAL CONNECTOR | |
| 27 | 2A | | E72-0411-04 | TERMINAL BLOCK (BATT+) | |
| 29 | 2A | | F10-2300-04 | SHIELDING CASE | K3,K6 |
| 30 | 2A,3B | ＊ | F12-0453-14 | CONDUCTIVE SHEET (TX/RX-GND) | |
| 32 | 2A | | G01-0891-04 | COIL SPRING (BATT RELEASE) | |
| 33 | 2B | | G11-2537-04 | SHEET (SUB PANEL) | |
| 34 | 2B | | G11-2554-04 | SHEET (KEY TOP) | |
| 35 | 2B | | G11-2555-04 | SHEET (TOGGLE SW) | |
| 36 | 1A | | G11-2658-04 | SHEET (PTT) | |
| 37 | 2A | | G13-1678-04 | CUSHION (TX/RX) | |
| 38 | 1C | | G13-1688-04 | CUSHION (CAP) | |
| 39 | 2A | | G13-1695-04 | CUSHION (DTMF) | K4,K6 |
| 40 | 3A | | G13-1800-04 | CUSHION (BATT TERMINAL+/-) | |
| 41 | 3B | | G53-0822-04 | PACKING (CHASSIS) | |
| 42 | 1B | | G53-0823-04 | PACKING (SP) | |
| 43 | 2A | | G53-0874-03 | PACKING (RING) | |
| 44 | 3A | | G53-1511-04 | PACKING (BATT-) | |
| 45 | 3A | | G53-1518-04 | PACKING (BATT TERMINAL) | |
| 47 | 2C | | H12-3018-02 | PACKING FIXTURE | |
| 48 | 1C | | H25-0029-04 | PROTECTION BAG | |
| 49 | 3D | | H52-1085-02 | ITEM CARTON CASE | |
| 51 | 2A | | J19-5330-14 | HOLDER (BATT REALEASE) | |
| 52 | 1A | | J21-8326-14 | HARDWARE FIXTURE (SIDE KEY) | |
| 53 | 1B | | J21-8328-14 | HARDWARE FIXTURE (LCD) | |
| 54 | 2A | | J21-8329-14 | HARDWARE FIXTURE (CONT UNIT) | |
| 55 | 3A | | J21-8330-04 | HARDWARE FIXTURE (POWER MODULE) | K,K2,K4 |

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| 56 | 2B | | J21-8343-14 | HARDWARE FIXTURE | |
| 57 | 1C | | J29-0652-35 | BELT HOOK　　ACCESSORY | |
| 58 | 1A | | J82-0047-05 | FPC (SIDE KEY) | |
| 59 | 2B | ＊ | J82-0049-15 | FPC (VOL-ENC) | |
| 60 | 3A | | J82-0052-15 | FPC (UNIVERSAL CONNECTOR) | |
| 61 | 2B | ＊ | J99-0346-24 | ADHESIVE TAPE (TOGGLE SW) | |
| 63 | 2B | | K29-5172-32 | KEY TOP (TOP KEY) | |
| 64 | 1A | | K29-5173-13 | KEY TOP (SIDE KEY) | |
| 65 | 1A | | K29-5193-23 | KEY TOP (DTMF) | K4,K6 |
| 66 | 2A | | K29-5220-13 | LEVER KNOB (BATT RELEASE) | |
| 67 | 2B | | K29-5282-04 | KNOB ASSY (VOL) | |
| 68 | 2B | | K29-5283-04 | KNOB ASSY (ENC) | |
| 69 | 1A | | K29-5441-04 | KNOB ASSY (SIDE KEY) | |
| A | 2B | | N14-0578-04 | CIRCULAR NUT (VOL/ENC) | |
| B | 2B | | N14-0594-04 | CIRCULAR NUT (ANT CONNECTOR) | |
| C | 3A | | N30-2608-45 | PAN HEAD MACHINE SCREW | |
| D | 3B | | N67-2605-46 | PAN HEAD SEMS SCREW | K3,K6 |
| E | 1A,2B | | N78-2030-46 | PAN HEAD TAPTITE SCREW | |
| F | 3A | | N79-2035-46 | PAN HEAD TAPTITE SCREW | |
| G | 2A,2B | | N83-2004-46 | PAN HEAD TAPTITE SCREW | |
| H | 2A | | N83-2005-45 | PAN HEAD TAPTITE SCREW | |
| J | 2A | | N89-2605-46 | BAINDING HEAD TAPTITE SCREW | K,K2,K4 |
| 71 | 1C | | N99-2004-05 | SCREW SET　　ACCESSORY | |
| 73 | 2B | | R31-0638-05 | VARIABLE RESISTOR | |
| 75 | 2B | | S60-0408-15 | ROTARY SWITCH | |
| 76 | 2B | | S72-0402-05 | TOGGLE SWITCH | |
| 78 | 1B | | T07-0349-05 | SPEAKER | |
| 79 | 2A | | T91-0575-05 | MIC ELEMENT | |
| - | - | | W01-0441-05 | UNIVERSAL CONNECTOR KIT | |

### FINAL UNIT (X45-3590-10) : K3,K6

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C801 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | K3,K6 |
| C802 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | K3,K6 |
| C803 | | | CC73GCH1H101J | CHIP C | 100PF | J | K3,K6 |
| C804 | | | CK73GB1C104K | CHIP C | 0.10UF | K | K3,K6 |
| C805 | | | CC73GCH1H101J | CHIP C | 100PF | J | K3,K6 |
| C806 | | | CK73GB1C104K | CHIP C | 0.10UF | K | K3,K6 |
| L801 | | | L33-0760-05 | SMALL FIXED INDUCTOR | | | K3,K6 |
| IC801 | 3B | | M68732L | RF POWER MODULE | | | K3,K6 |

### CONTROL UNIT (X53-3930-XX)
### -13 : K,K2　　-14 : K4　　-15 : K3　　-16 : K6

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| D6-9 | | | B30-2171-05 | LED | | | K4,K6 |
| D102,103 | | | B30-2231-05 | LED | | | |
| D104 | | | B30-2019-05 | LED | | | |
| C1-5 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C8 | | | CK73FB1C474K | CHIP C | 0.47UF | K | |

## PARTS LIST

CONTROL UNIT (X53-3930-XX)
TX-RX UNIT (X57-5400-XX)

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| C12,13 | | | CK73FB1C474K | CHIP C | 0.47UF | K | | |
| C14 | | | CK73FB1C104KTD | CHIP C | 0.10UF | K | | |
| C15 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C16 | | | C92-0734-05 | CHIP-TAN | 100UF | 10WV | | |
| C19 | | | CK73FB1C474K | CHIP C | 0.47UF | K | | |
| C22 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C27-29 | | | CK73GB1C104K | CHIP C | 0.10UF | K | | |
| C30 | | | CK73FB1C474K | CHIP C | 0.47UF | K | | |
| C31 | | | CK73GB1E223K | CHIP C | 0.022UF | K | | |
| C32 | | | CK73FB1C474K | CHIP C | 0.47UF | K | | |
| C33,34 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C35 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| C37 | | | CC73GCH1H101J | CHIP C | 100PF | J | | |
| C38,39 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C43 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C45,46 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C103 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| C104,105 | | | CC73GCH1H101J | CHIP C | 100PF | J | | |
| C106 | | | C92-0602-05 | CHIP-TAN | 1.0UF | 10WV | | |
| C501 | | | CK73GB1E183K | CHIP C | 0.018UF | K | | K,K2,K4 |
| CN1 | | | E40-5947-05 | FLAT CABLE CONNECTOR | | | | |
| CN3 | | | E40-5948-05 | FLAT CABLE CONNECTOR | | | | |
| CN4 | | | E40-5662-05 | PIN ASSY SOCKET | | | | |
| CN101 | | | E40-5920-05 | FLAT CABLE CONNECTOR | | | | |
| CN501,502 | | | E04-0403-05 | PIN SOCKET | | | | |
| L1-4 | | | L92-0141-05 | FERRITE CHIP | | | | |
| L6 | | | L92-0149-05 | FERRITE CHIP | | | | |
| L101 | | | L92-0138-05 | FERRITE CHIP | | | | |
| L501 | | | L33-0680-05 | CHOKE COIL (POWER MODULE) | | | | K,K2,K4 |
| CP1 | | | R90-0723-05 | MULTI-COMP | 47K X2 | | | |
| R1 | | | RK73GB1J273J | CHIP R | 27K | J | 1/16W | |
| R2 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R3 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R4,5 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R6-8 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R9,10 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R11 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R12 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R13 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R14 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R15 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | |
| R17,18 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R19,20 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | K4,K6 |
| R22,23 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R26-28 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R29,30 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R31 | | | R92-1252-05 | CHIP R | 0 OHM | | | K4,K6 |
| R32 | | | RK73GB1J680J | CHIP R | 68 | J | 1/16W | |
| R33 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R34 | | | RK73GB1J182J | CHIP R | 1.8K | J | 1/16W | |
| R35 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R36 | | | RK73GB1J182J | CHIP R | 1.8K | J | 1/16W | |
| R37-42 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | K4,K6 |
| R43,44 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R45-49 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | K,K2,K3 |
| R45-55 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | K4,K6 |
| R56 | | | RK73GB1J153J | CHIP R | 15K | J | 1/16W | |
| R57 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R59 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| R60 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R63,64 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R66-68 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R101 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R102-104 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R105 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R106 | | | RK73GB1J274J | CHIP R | 270K | J | 1/16W | |
| R107 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R108 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R502 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| D2 | | | DTZ3.9(B) | ZENER DIODE | | | | |
| D2 | | * | UDZ3.9(B) | ZENER DIODE | | | | |
| D11 | | | IMN10 | DIODE | | | | K4,K6 |
| D12,13 | | | MA2S111 | DIODE | | | | |
| D14 | | | IMN10 | DIODE | | | | K4,K6 |
| D15 | | | MA2S111 | DIODE | | | | |
| D16 | | | IMN10 | DIODE | | | | K,K2,K3 |
| D16-18 | | | IMN10 | DIODE | | | | K4,K6 |
| D19,20 | | | MA2S111 | DIODE | | | | |
| D101 | | | 1SS373 | DIODE | | | | |
| IC1 | | | TDA7053AT | BI-POLAR IC | | | | |
| IC2 | | | BU4094BCFV | MOS IC | | | | |
| IC3 | | | NJM2904V | MOS IC | | | | |
| IC4-6 | | | TC7SH08FU | MOS IC | | | | |
| IC7 | | | BU4094BCFV | MOS IC | | | | K4,K6 |
| IC10 | | | TC7W04FU | MOS IC | | | | |
| IC101 | | | LC75824W | MOS IC | | | | |
| IC501 | | | XHW2727-2 | POWER MODULE | | | | K,K2,K4 |
| Q5 | | | 2SC4617(S) | TRANSISTOR | | | | |
| Q6 | | | 2SB798(DL,DK) | TRANSISTOR | | | | |
| Q7,8 | | | 2SK1824 | FET | | | | |
| Q14 | | | UMC4 | TRANSISTOR | | | | |
| Q15 | | | 2SK1824 | FET | | | | |

### TX-RX UNIT (X57-5400-XX)
### -10 : K,K4   -11 : K2   -12 : K3,K6

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| C1 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | | |
| C5 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| C6 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | | |
| C8 | | | CK73GB1C273K | CHIP C | 0.027UF | K | | |
| C9,10 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| C11 | | | C92-0588-05 | CHIP-TAN | 1.5UF | 16V | | |
| C13 | | | CK73GB1C104K | CHIP C | 0.10UF | K | | |
| C14,15 | | | C92-0588-05 | CHIP-TAN | 1.5UF | 16V | | |
| C16 | | | CK73GB1C104K | CHIP C | 0.10UF | K | | |
| C17 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| C18 | | | C92-0588-05 | CHIP-TAN | 1.5UF | 16V | | |
| C19,20 | | | CK73GB1C104K | CHIP C | 0.10UF | K | | |
| C21 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | | |
| C22 | | | CK73GB1H103K | CHIP C | 0.010UF | K | | |
| C23 | | | CC73GCH1H101J | CHIP C | 100PF | J | | |
| C24 | | | C92-0002-05 | CHIP-TAN | 0.22UF | 35WV | | |
| C27 | | | CK73GB1C104K | CHIP C | 0.10UF | K | | |
| C28 | | | CK73GB1E223K | CHIP C | 0.022UF | K | | |
| C30 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | | |
| C31 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C32 | | | C92-0002-05 | CHIP-TAN | 0.22UF | 35WV | | |
| C33 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | | |

# TK-390

## PARTS LIST

**TX-RX UNIT (X57-5400-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C34 | | | CC73GCH1H331J | CHIP C | 330PF | J | |
| C36 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | K3,K6 |
| C36 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | K,K2,K4 |
| C37 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C38 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | |
| C39 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C40 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C41 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C42 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | |
| C43 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C45 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | K2,K3,K6 |
| C45 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | K,K4 |
| C46 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C47 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C48 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C49 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | K3,K6 |
| C49,50 | | | CK73GB1H471K | CHIP C | 470PF | K | K,K2,K4 |
| C50 | | | CK73GB1H471K | CHIP C | 470PF | K | K3,K6 |
| C51 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | K3,K6 |
| C52 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C53-57 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C58 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C59 | | | CC73GCH1H100D | CHIP C | 10PF | D | K,K2,K4 |
| C59 | | | CC73GCH1H150J | CHIP C | 15PF | J | K3,K6 |
| C60-64 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C66,67 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C69 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K2,K4 |
| C69 | | | CC73GCH1H120J | CHIP C | 12PF | J | K3,K6 |
| C70 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C71 | | | CK73FB1C474K | CHIP C | 0.47UF | K | |
| C73 | | | C92-0543-05 | CHIP-TAN | 3.3UF | 10WV | |
| C76 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C77 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | K,K2,K4 |
| C77 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K3,K6 |
| C78 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C79 | | | CK73FB1C474K | CHIP C | 0.47UF | K | |
| C80 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | K3,K6 |
| C81,82 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C83 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | K,K2,K4 |
| C83 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | K3,K6 |
| C84 | | | CK73GB1H102K | CHIP C | 1000PF | K | K,K4 |
| C84,85 | | | CK73GB1H102K | CHIP C | 1000PF | K | K2,K3,K6 |
| C85 | | | CC73GCH1H150J | CHIP C | 15PF | J | K,K4 |
| C86 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | |
| C87 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C88 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | K,K2,K4 |
| C88 | | | CC73GCH1H150J | CHIP C | 15PF | J | K3,K6 |
| C89 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | K,K2,K4 |
| C89 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | K3,K6 |
| C90 | | | CC73GCH1H120J | CHIP C | 12PF | J | K3,K6 |
| C90 | | | CC73GCH1H180J | CHIP C | 18PF | J | K,K2,K4 |
| C91 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | K,K2,K4 |
| C91 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | K3,K6 |
| C92 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | K3,K6 |
| C92 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | K,K2,K4 |
| C93,94 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C95 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C96 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C97 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C99 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C100 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C101 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C150 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | K3,K6 |
| C150 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | K,K2,K4 |
| C200 | | | CC73GCH1H030B | CHIP C | 3.0PF | B | K2,K3,K6 |
| C200 | | | CC73GCH1H2R5B | CHIP C | 2.5PF | B | K,K4 |
| C201 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | K2 |
| C201 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K3,K6 |
| C202 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C203 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C206 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | K,K4 |
| C206 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K2 |
| C206 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | K3,K6 |
| C207 | | | CC73GCH1H101J | CHIP C | 100PF | J | K2,K3,K6 |
| C207 | | | CK73GB1H471K | CHIP C | 470PF | K | K,K4 |
| C209 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | K2 |
| C209 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | K3,K6 |
| C209,210 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K4 |
| C210 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K2 |
| C210 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | K3,K6 |
| C211 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C212,213 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C215 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K2,K4 |
| C215 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | K3,K6 |
| C216 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | |
| C218 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | K,K4 |
| C218 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K2,K3,K6 |
| C219 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C222 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K4 |
| C222 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | K2 |
| C222 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | K3,K6 |
| C223 | | | CC73GCH1H101J | CHIP C | 100PF | J | K2,K3,K6 |
| C223 | | | CK73GB1H471K | CHIP C | 470PF | K | K,K4 |
| C225 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | K3,K6 |
| C225,226 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K2,K4 |
| C226 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | K3,K6 |
| C227,228 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C229 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K2,K4 |
| C229 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | K3,K6 |
| C230 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | K,K4 |
| C231 | | | CC73GCH1H120J | CHIP C | 12PF | J | K,K4 |
| C231 | | | CC73GCH1H270J | CHIP C | 27PF | J | K2 |
| C231 | | | CC73GCH1H330J | CHIP C | 33PF | J | K3,K6 |
| C233 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | K,K4 |
| C234 | | | CC73GCH1H151J | CHIP C | 150PF | J | |
| C236 | | | CC73GCH1H151J | CHIP C | 150PF | J | |
| C237-239 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C241,242 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C244 | | | CC73GCH1H151J | CHIP C | 150PF | J | |
| C245 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C247,248 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C251 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | K,K2,K4 |
| C251 | | | CC73GCH1H100D | CHIP C | 10PF | D | K3,K6 |
| C253 | | | CK73GB1H102K | CHIP C | 1000PF | K | K2,K3,K6 |
| C255 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C300 | | | CK73GB1H472K | CHIP C | 4700PF | K | |
| C301,302 | | | CC73GCH1H221J | CHIP C | 220PF | J | |
| C303 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C304 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C305 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |

# PARTS LIST

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C306-308 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C309 | | | C92-0602-05 | CHIP-TAN | 1.0UF | 10WV | |
| C310,311 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C312 | | | CK73GB1C333K | CHIP C | 0.033UF | K | |
| C313,314 | | | CC73GCH1H220J | CHIP C | 22PF | J | |
| C315 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C316 | | | CC73GCH1H820J | CHIP C | 82PF | J | |
| C317 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C318 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C319 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C320 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C321 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C323 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C327 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C330-332 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C333 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C334 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C335 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C336 | | | CK73GB1A224K | CHIP C | 0.22UF | K | |
| C337 | | | CK73FB1C334K | CHIP C | 0.33UF | K | |
| C400,401 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C403-411 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C413 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C414 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C415 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C416,417 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C419 | | | C92-0589-05 | CHIP-TAN | 47UF | 6.3WV | |
| C420 | | | C92-0702-05 | ELECTRO | 47UF | 6.3WV | |
| C421 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C422 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C423,424 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C425 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C426 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C427 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C428 | | | C92-0004-05 | CHIP-TAN | 1.0UF | 16WV | |
| C429 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C430 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C431 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C432 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C433 | | | C92-0698-05 | ELECTRO | 47UF | 16WV | |
| C434,435 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C436 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C437 | | | CK73GB1H472K | CHIP C | 4700PF | K | |
| C438 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C439 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C440 | | | CK73GB1C273K | CHIP C | 0.027UF | K | |
| C441,442 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C443 | | | CK73GB1H222K | CHIP C | 2200PF | K | |
| C444 | | | CC73GCH1H070D | CHIP C | 7.0PF | D | |
| C445,446 | | | CK73GB1H222K | CHIP C | 2200PF | K | |
| C447,448 | | | CC73GCH1H180J | CHIP C | 18PF | J | |
| C449 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C450 | | | C92-0713-05 | CHIP-TAN | 10UF | 6.3WV | |
| C454 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C456-477 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C478 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C479 | | | CC73GCH1H271J | CHIP C | 270PF | J | |
| C480 | | | CC73GCH1H221J | CHIP C | 220PF | J | |
| C481 | | | CK73FB1C105K | CHIP C | 1.0UF | K | |
| C482 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C483 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C484 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C485 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C487 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C488 | | | CK73GB1H102K | CHIP C | 1000PF | K | K3,K6 |
| C600 | | | CK73GB1C473K | CHIP C | 0.047UF | K | |
| C601 | | | C92-0003-05 | CHIP-TAN | 0.47UF | 25WV | |
| C602 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C603 | | | CK73GB1C683K | CHIP C | 0.068UF | K | |
| C604 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C606 | | | CK73GB1H222K | CHIP C | 2200PF | K | |
| C607 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C608 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C609 | | | CC73GCH1H121J | CHIP C | 120PF | J | |
| C610 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C611 | | | CK73GB1E123K | CHIP C | 0.012UF | K | |
| C612 | | | C92-0714-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C613 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C619 | | | CC73GCH1H471J | CHIP C | 470PF | J | |
| C621 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C623 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C625,626 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C627 | | | CK73GB1H122J | CHIP C | 1200PF | J | |
| C629,630 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C631,632 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C633 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C634,635 | | | CK73GB1H562J | CHIP C | 5600PF | J | |
| C636 | | | CK73GB1C333K | CHIP C | 0.033UF | K | |
| C637 | | | CK73GB1H562J | CHIP C | 5600PF | J | |
| C638 | | | CK73GB1H272J | CHIP C | 2700PF | J | |
| C639 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | |
| C640,641 | | | CK73GB1H272J | CHIP C | 2700PF | J | |
| C642 | | | CC73HCH1H151J | CHIP C | 150PF | J | |
| C643 | | | CK73GB1H122K | CHIP C | 1200PF | K | |
| C644 | | | CK73HB1H102K | CHIP C | 1000PF | K | |
| C645 | | | CC73GCH1H090D | CHIP C | 9.0PF | D | |
| C646 | | | C92-0713-05 | CHIP-TAN | 10UF | 6.3WV | |
| C647 | | | CK73HB1A104K | CHIP C | 0.10UF | K | |
| C648 | | | CC73HCH1H101J | CHIP C | 100PF | J | |
| C649-651 | | | CK73HB1A104K | CHIP C | 0.10UF | K | |
| C652 | | | C92-0714-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C653,654 | | | CK73HB1E472K | CHIP C | 4700PF | K | |
| C655 | | | CC73HCH1H101J | CHIP C | 100PF | J | |
| C656 | | | CK73FB1H563K | CHIP C | 0.056UF | K | |
| C657 | | | C92-0714-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C659 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C660 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C661 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C663 | | | CC73HCH1H101J | CHIP C | 100PF | J | |
| C664 | | | CK73HB1A104K | CHIP C | 0.10UF | K | |
| C665 | | | CK73GB1C333K | CHIP C | 0.033UF | K | |
| C666 | | | CK73GB1E153K | CHIP C | 0.015UF | K | |
| C668 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C669 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C676,677 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C681 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| CN400 | | | E40-5563-05 | FLAT CABLE CONNECTOR | | | |
| CN401 | | | E40-5947-05 | FLAT CABLE CONNECTOR | | | |
| CN403 | | | E40-5856-05 | FLAT CABLE CONNECTOR | | | |

# TK-390

**TX-RX UNIT (X57-5400-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| CN404,405 | | | E23-0342-05 | TEST TERMINAL | |
| F400 | | | F53-0143-05 | FUSE | |
| CD300 | | | L79-1072-05 | TUNING COIL | |
| CF300,301 | | | L72-0916-05 | CERAMIC FILTER | |
| CF302,303 | | | L72-0939-05 | CERAMIC FILTER | |
| L1 | | | L92-0138-05 | FERRITE CHIP | |
| L3 | | | L92-0140-05 | FERRITE CHIP | |
| L5 | | | L40-3981-37 | SMALL FIXED INDUCTOR (0.390UH) | |
| L7 | | | L40-2275-44 | SMALL FIXED INDUCTOR (22.0NH) | K,K4 |
| L7 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K2 |
| L7 | | | L40-3375-44 | SMALL FIXED INDUCTOR (33.0NH) | K3,K6 |
| L8 | | | L40-1275-44 | SMALL FIXED INDUCTOR (12.0NH) | K,K2,K4 |
| L8 | | | L40-1575-44 | SMALL FIXED INDUCTOR (15.0NH) | K3,K6 |
| L9 | | | L40-1575-44 | SMALL FIXED INDUCTOR (15.0NH) | K,K2,K4 |
| L9 | | | L40-1875-44 | SMALL FIXED INDUCTOR (18.0NH) | K3,K6 |
| L10,11 | | | L92-0149-05 | FERRITE CHIP | |
| L12 | | | L33-0760-05 | SMALL FIXED INDUCTOR | |
| L13 | | | L40-1095-34 | SMALL FIXED INDUCTOR (1UH) | |
| L14 | | | L33-1224-05 | SMALL FIXED INDUCTOR | |
| L15,16 | | | L33-0761-05 | SMALL FIXED INDUCTOR | |
| L17 | | | L40-1092-81 | SMALL FIXED INDUCTOR | |
| L18 | | | L40-4791-37 | SMALL FIXED INDUCTOR (4.700UH) | |
| L19 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | |
| L20,21 | | | L92-0140-05 | FERRITE CHIP | |
| L150 | | | L33-0760-05 | SMALL FIXED INDUCTOR | |
| L152 | | | L40-1075-44 | SMALL FIXED INDUCTOR (10.0NH) | K,K2,K4 |
| L152 | | | L40-2275-44 | SMALL FIXED INDUCTOR (22.0NH) | K3,K6 |
| L153 | | | L40-3375-44 | SMALL FIXED INDUCTOR (33.0NH) | K2 |
| L153 | | | L40-3975-44 | SMALL FIXED INDUCTOR (39.0NH) | K,K4 |
| L153 | | | L40-4775-44 | SMALL FIXED INDUCTOR (47.0NH) | K3,K6 |
| L200 | | | L40-3975-34 | SMALL FIXED INDUCTOR (39NH/8) | K2 |
| L200 | | | L40-4775-34 | SMALL FIXED INDUCTOR (47NH/8) | K,K4 |
| L200 | | | L40-5675-34 | SMALL FIXED INDUCTOR (56NH/8) | K3,K6 |
| L201 | | | L40-1875-44 | SMALL FIXED INDUCTOR (18.0NH) | K,K2,K4 |
| L201,202 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K3,K6 |
| L202 | | | L40-2275-44 | SMALL FIXED INDUCTOR (22.0NH) | K,K2,K4 |
| L203 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K,K2,K4 |
| L203 | | | L40-5675-44 | SMALL FIXED INDUCTOR (56.0NH) | K3,K6 |
| L204 | | | L40-2275-44 | SMALL FIXED INDUCTOR (22.0NH) | K,K2,K4 |
| L204 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K3,K6 |
| L205 | | | L79-1470-05 | HELICAL BLOCK | |
| L206 | | | L40-1875-44 | SMALL FIXED INDUCTOR (18.0NH) | K,K2,K4 |
| L206,207 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K3,K6 |
| L207 | | | L40-2275-44 | SMALL FIXED INDUCTOR (22.0NH) | K2 |
| L207,208 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K,K4 |
| L208 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K2 |
| L208 | | | L40-5675-44 | SMALL FIXED INDUCTOR (56.0NH) | K3,K6 |
| L209 | | | L40-2275-44 | SMALL FIXED INDUCTOR (22.0NH) | K,K2,K4 |
| L209 | | | L40-2775-44 | SMALL FIXED INDUCTOR (27.0NH) | K3,K6 |
| L210 | | | L79-1470-05 | HELICAL BLOCK | |
| L212 | | | L40-8275-44 | SMALL FIXED INDUCTOR (82.0NH) | |
| L214 | | | L40-8275-44 | SMALL FIXED INDUCTOR (82.0NH) | |
| L215,216 | | | L39-1272-05 | TOROIDAL COIL | |
| L217 | | | L92-0140-05 | FERRITE CHIP | |
| L218 | | | L39-1272-05 | TOROIDAL COIL | |
| L219 | | | L40-8275-44 | SMALL FIXED INDUCTOR (82.0NH) | |
| L220 | | | L40-1575-44 | SMALL FIXED INDUCTOR (15.0NH) | K,K4 |
| L221,222 | | | L92-0176-05 | FERRITE CHIP | |

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| L300 | | | L40-1095-34 | SMALL FIXED INDUCTOR (1UH) | | | | |
| L301 | | | L40-3391-37 | SMALL FIXED INDUCTOR (3.300UH) | | | | |
| L400 | | | L92-0136-05 | FERRITE CHIP | | | | |
| L401 | | | L92-0138-05 | FERRITE CHIP | | | | |
| L404 | | | L40-1001-37 | SMALL FIXED INDUCTOR (10.00UH) | | | | |
| L800 | | ✱ | L78-0488-05 | VCO | | | | K,K4 |
| L800 | | ✱ | L78-0489-05 | VCO | | | | K2 |
| L800 | | ✱ | L78-0490-05 | VCO | | | | K3,K6 |
| L905 | | | L92-0138-05 | FERRITE CHIP | | | | |
| X1 | | | L77-1704-05 | TCXO (16.8MHZ) | | | | |
| X300 | | | L77-1741-05 | CRYSTAL RESONATOR (44.395MHZ) | | | | |
| X400 | | ✱ | L77-1863-05 | CRYSTAL RESONATOR (12.0MHZ) | | | | |
| X600 | | | L77-1708-05 | CRYSTAL RESONATOR (3.579545MHZ) | | | | |
| XF301 | | | L71-0588-05 | MCF (44.85MHZ) | | | | |
| CP1 | | | R90-0714-05 | MULTI-COMP | 10K X4 | | | |
| CP700-707 | | | R90-0741-05 | MULTIPLE RESISTOR | | | | |
| CP711-716 | | | R90-0741-05 | MULTIPLE RESISTOR | | | | |
| CP718-721 | | | R90-0741-05 | MULTIPLE RESISTOR | | | | |
| R4 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R5 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R6 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R7 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R8 | | | RK73GB1J682J | CHIP R | 6.8K | J | 1/16W | |
| R9 | | | RK73GB1J183J | CHIP R | 18K | J | 1/16W | |
| R11 | | | RK73GB1J273J | CHIP R | 27K | J | 1/16W | |
| R13 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R14 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | |
| R15 | | | RK73GB1J682J | CHIP R | 6.8K | J | 1/16W | |
| R16 | | | RK73GB1J151J | CHIP R | 150 | J | 1/16W | |
| R17 | | | RK73GB1J394J | CHIP R | 390K | J | 1/16W | |
| R18 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R19 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R24 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R25 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | |
| R27 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R28 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R29 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | K,K2,K4 |
| R29 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | K3,K6 |
| R31 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R32-34 | | | RK73GB1J272J | CHIP R | 2.7K | J | 1/16W | |
| R35 | | | RK73EB2ER39K | CHIP R | 0.39 | K | 1/4W | |
| R37 | | | RK73EB2ER39K | CHIP R | 0.39 | K | 1/4W | |
| R38 | | | RK73GB1J272J | CHIP R | 2.7K | J | 1/16W | K,K2,K4 |
| R38 | | | RK73GB1J682J | CHIP R | 6.8K | J | 1/16W | K3,K6 |
| R39 | | | RK73EB2ER39K | CHIP R | 0.39 | K | 1/4W | |
| R40 | | | RK73GB1J123J | CHIP R | 12K | J | 1/16W | K3,K6 |
| R40 | | | RK73GB1J682J | CHIP R | 6.8K | J | 1/16W | K,K2,K4 |
| R41,42 | | | RN73GH1J154D | CHIP R | 150K | D | 1/16W | |
| R43 | | | RK73GB1J220J | CHIP R | 22 | J | 1/16W | K,K2,K4 |
| R43 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | K3,K6 |
| R44,45 | | | RN73GH1J154D | CHIP R | 150K | D | 1/16W | |
| R46 | | | RK73GB1J152J | CHIP R | 1.5K | J | 1/16W | K,K2,K4 |
| R46 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | K3,K6 |
| R47,48 | | | RN73GH1J154D | CHIP R | 150K | D | 1/16W | |
| R49 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | K3,K6 |
| R49 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | K,K2,K4 |
| R50 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R51 | | | RK73GB1J221J | CHIP R | 220 | J | 1/16W | |
| R52 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |

# PARTS LIST

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| R53 | | | RK73GB1J270J | CHIP R | 27 | J | 1/16W | K3,K6 |
| R53 | | | RK73GB1J820J | CHIP R | 82 | J | 1/16W | K,K2,K4 |
| R54 | | | RK73GB1J122J | CHIP R | 1.2K | J | 1/16W | K3,K6 |
| R54 | | | RK73GB1J681J | CHIP R | 680 | J | 1/16W | K,K2,K4 |
| R55 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R56 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R57 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R58 | | | RK73GB1J105J | CHIP R | 1.0M | J | 1/16W | |
| R59 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R60 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | K,K2,K4 |
| R60 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | K3,K6 |
| R61 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R63 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R65 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | |
| R67 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R69-71 | | | RK73GB1J821J | CHIP R | 820 | J | 1/16W | |
| R73 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R74 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R75 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R76 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R79 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R80 | | | RK73GB1J560J | CHIP R | 56 | J | 1/16W | |
| R82 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R201 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R202 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R203 | | | RK73GB1J331J | CHIP R | 330 | J | 1/16W | K2 |
| R203 | | | RK73GB1J561J | CHIP R | 560 | J | 1/16W | K,K3,K4 |
| R203 | | | RK73GB1J561J | CHIP R | 560 | J | 1/16W | K6 |
| R205,206 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R208 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R209 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R210 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | K2,K3,K6 |
| R210 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | K,K4 |
| R212,213 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R214 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R215 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | |
| R216 | | | RK73GB1J271J | CHIP R | 270 | J | 1/16W | |
| R217 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R218,219 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R220 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R221 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | |
| R222 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R223 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | |
| R227 | | | R92-1252-05 | CHIP R | 0 OHM | | | K2,K3,K6 |
| R300 | | | RK73GB1J220J | CHIP R | 22 | J | 1/16W | |
| R301 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R303 | | | RK73GB1J274J | CHIP R | 270K | J | 1/16W | |
| R304 | | | RK73GB1J182J | CHIP R | 1.8K | J | 1/16W | |
| R305 | | | RK73GB1J183J | CHIP R | 18K | J | 1/16W | |
| R306 | | | RK73GB1J271J | CHIP R | 270 | J | 1/16W | |
| R307 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R308 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R313 | | | RK73GB1J331J | CHIP R | 330 | J | 1/16W | |
| R315 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R317,318 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R319 | | | RK73GB1J123J | CHIP R | 12K | J | 1/16W | |
| R320 | | | RK73GB1J392J | CHIP R | 3.9K | J | 1/16W | |
| R321 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R323 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R324,325 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R328 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R329 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R330 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R331 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R332 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | |
| R333 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R334 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R335 | | | RK73GB1J681J | CHIP R | 680 | J | 1/16W | |
| R336 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | |
| R337 | | | RK73GB1J332J | CHIP R | 3.3K | J | 1/16W | |
| R339 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R340 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R341 | | | RK73GB1J333J | CHIP R | 33K | J | 1/16W | |
| R400 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R401 | | | RK73GB1J272J | CHIP R | 2.7K | J | 1/16W | |
| R402 | | | RK73GB1J332J | CHIP R | 3.3K | J | 1/16W | |
| R403 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R404 | | | RK73GB1J182J | CHIP R | 1.8K | J | 1/16W | |
| R405 | | | RK73GB1J332J | CHIP R | 3.3K | J | 1/16W | |
| R406 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R407 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R408 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R409 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R410 | | | RK73GB1J272J | CHIP R | 2.7K | J | 1/16W | |
| R411 | | | RK73GB1J821J | CHIP R | 820 | J | 1/16W | |
| R412 | | | RK73GB1J182J | CHIP R | 1.8K | J | 1/16W | |
| R413 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R414 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R415 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R416 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R418,419 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R420 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R421 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R422 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R423 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R424 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R425 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R426,427 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R428 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R429 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R430 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R431 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R432,433 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R434 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R435,436 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R437 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R438-441 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R442 | | | RK73GB1J152J | CHIP R | 1.5K | J | 1/16W | |
| R443 | | | RK73GB1J821J | CHIP R | 820 | J | 1/16W | |
| R444 | | | R92-0670-05 | CHIP R | 0 OHM | | | |
| R445 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R446 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R447 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R448 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R449-451 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R452-455 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R456-459 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R460-462 | | | R92-1252-05 | CHIP R | 0 OHM | | | |
| R464 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R466 | | | R92-1252-05 | CHIP R | 0 OHM | | | |

# TK-390

**TX-RX UNIT (X57-5400-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| R467,468 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R469 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R470-472 | | | R92-1252-05 | CHIP R 0 OHM | |
| R474 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R475-477 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| R478 | | | RK73GB1J471J | CHIP R 470 J 1/16W | |
| R479 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R480 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R481 | | | R92-1252-05 | CHIP R 0 OHM | |
| R482 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R483 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R484 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R486 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R487 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R488 | | | R92-1368-05 | CHIP R 0 OHM | |
| R489 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R490 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R491 | | | R92-1252-05 | CHIP R 0 OHM | |
| R493 | | | RK73GB1J100J | CHIP R 10 J 1/16W | |
| R494 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R495 | | | RK73GB1J471J | CHIP R 470 J 1/16W | |
| R496 | | | R92-1252-05 | CHIP R 0 OHM | |
| R601 | | | RK73GB1J153J | CHIP R 15K J 1/16W | |
| R602 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| R603 | | | R92-1252-05 | CHIP R 0 OHM | |
| R605,606 | | | R92-1252-05 | CHIP R 0 OHM | |
| R607 | | | RK73GB1J153J | CHIP R 15K J 1/16W | |
| R608 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R609 | | | RK73GB1J154J | CHIP R 150K J 1/16W | |
| R610 | | | RK73GB1J563J | CHIP R 56K J 1/16W | |
| R611 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R612 | | | RK73GB1J334J | CHIP R 330K J 1/16W | |
| R614 | | | RK73GB1J184J | CHIP R 180K J 1/16W | |
| R615,616 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R617 | | | R92-1252-05 | CHIP R 0 OHM | |
| R618 | | | RK73GB1J683J | CHIP R 68K J 1/16W | |
| R619 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| R621 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R622 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| R623 | | | RK73GB1J334J | CHIP R 330K J 1/16W | |
| R624 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R626 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R628 | | | RK73GB1J334J | CHIP R 330K J 1/16W | |
| R629 | | | RK73GB1J223J | CHIP R 22K J 1/16W | |
| R635 | | | RK73GB1J393J | CHIP R 39K J 1/16W | |
| R636,637 | | | R92-1252-05 | CHIP R 0 OHM | |
| R638 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R639 | | | RN73GH1J913D | CHIP R 91K D 1/16W | |
| R640 | | | RN73GH1J683D | CHIP R 68K D 1/16W | |
| R641 | | | RN73GH1J913D | CHIP R 91K D 1/16W | |
| R642 | | | RN73GH1J333D | CHIP R 33K D 1/16W | |
| R643 | | | RK73GB1J564J | CHIP R 560K J 1/16W | |
| R644 | | | RK73GB1J474J | CHIP R 470K J 1/16W | |
| R645 | | | RN73GH1J274D | CHIP R 270K D 1/16W | |
| R646 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R647 | | | R92-1252-05 | CHIP R 0 OHM | |
| R648 | | | RN73GH1J913D | CHIP R 91K D 1/16W | |
| R649 | | | RN73HH1J682D | CHIP R 6.8K D 1/16W | |
| R650 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R651 | | | RK73GB1J155J | CHIP R 1.5M J 1/16W | |
| R652 | | | RK73HB1J473J | CHIP R 47K J 1/16W | |
| R653 | | | RK73HB1J184J | CHIP R 180K J 1/16W | |
| R654 | | | RN73HH1J683D | CHIP R 68K D 1/16W | |
| R655 | | | RK73HB1J474J | CHIP R 470K J 1/16W | |
| R656 | | | RN73HH1J682D | CHIP R 6.8K D 1/16W | |
| R657 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| R658 | | | RK73HB1J224J | CHIP R 220K J 1/16W | |
| R659 | | | RK73HB1J103J | CHIP R 10K J 1/16W | |
| R660 | | | RK73HB1J223J | CHIP R 22K J 1/16W | |
| R661 | | | RK73HB1J394J | CHIP R 390K J 1/16W | |
| R662 | | | RK73HB1J470J | CHIP R 47 J 1/16W | |
| R663 | | | RK73HB1J220J | CHIP R 22 J 1/16W | |
| R664 | | | RK73GB1J333J | CHIP R 33K J 1/16W | |
| R665,666 | | | R92-1252-05 | CHIP R 0 OHM | |
| R668 | | | RK73GB1J334J | CHIP R 330K J 1/16W | |
| R669 | | | R92-1252-05 | CHIP R 0 OHM | |
| R670-673 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R674,675 | | | RK73HB1J473J | CHIP R 47K J 1/16W | |
| R677 | | | RK73GB1J333J | CHIP R 33K J 1/16W | |
| R679 | | | R92-1252-05 | CHIP R 0 OHM | |
| R680 | | | R92-1368-05 | CHIP R 0 OHM | |
| R688 | | | R92-1368-05 | CHIP R 0 OHM | |
| R742 | | | RK73GB1J272J | CHIP R 2.7K J 1/16W | |
| R743 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R922 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R923,924 | | | R92-1368-05 | CHIP R 0 OHM | |
| D4 | | | MA2S077 | DIODE | |
| D6 | | | MA2S111 | DIODE | |
| D7 | | | DAN235E | DIODE | |
| D8 | | | DA221 | DIODE | |
| D9 | | | HZU4CLL | ZENER DIODE K3,K6 | |
| D9 | | | MA8062 | ZENER DIODE | K,K2,K4 |
| D10 | | | MI809 | DIODE | |
| D10 | | | XB15A709 | DIODE | |
| D11 | | | MA77 | DIODE | |
| D200 | | | HSM88AS | DIODE | |
| D201-204 | | | 1SV273 | VARIABLE CAPACITANCE DIODE | |
| D300 | | | MA742 | DIODE | |
| D301 | | | MA2S111 | DIODE | |
| D302,303 | | | DAN235E | DIODE | |
| D400 | | | 1SR154-400 | DIODE | |
| D401 | | | MA2S111 | DIODE | |
| D402,403 | | | NNCD6.8G | ZENER DIODE | |
| D404 | | | 1SS301 | DIODE | |
| D408 | | | 1SS301 | DIODE | |
| D409 | | | MA2S111 | DIODE | |
| D601 | | | MA742 | DIODE | |
| IC2 | | | LMC7101BIM5 | MOS IC | |
| IC3 | | | M62354GP | MOS IC | |
| IC4 | | | MAX865 | MOS IC | |
| IC5 | | | SA7025DK | MOS IC | |
| IC6 | | | LMC7101BIM5 | MOS IC | |
| IC7 | | | NJM2904V | MOS IC | |
| IC10 | | ✻ | KCH35 | VCO | K2 |
| IC10 | | ✻ | KCH37 | VCO | K3,K6 |
| IC10 | | ✻ | KCH41 | VCO | K,K4 |
| IC200 | | | GN2011(Q) | MOS IC | |
| IC300 | | | TA31136FN | MOS IC | |
| IC301 | | | TC7S66FU | MOS IC | |

# PARTS LIST

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| IC400 | | | BU4094BCFV | MOS IC | |
| IC401,402 | | | TK11250BM | MOS IC | |
| IC403-405 | | | BU4094BCFV | MOS IC | |
| IC406 | | | 784214GC0648EU | MPU | |
| IC409 | | | PST9132NR | MOS IC | |
| IC412 | | | AT2408N10SI2.5 | ROM IC | |
| IC413 | | | TC75W51FU | MOS IC | |
| IC414 | | | AT29C020-90TI | ROM IC | |
| IC415 | | | TC7S02F | MOS IC | |
| IC600 | | | LC73872M | MOS IC | |
| IC601 | | | TC75W51FU | MOS IC | |
| IC602 | | | TA75W01FU | MOS IC | |
| IC603 | | | M62364FP | MOS IC | |
| IC604-606 | | | TC75W51FU | MOS IC | |
| IC607 | | | TC35453F | MOS IC | |
| Q2 | | | 2SJ144(GR) | FET | |
| Q3 | | | 2SC5066(O) | TRANSISTOR | |
| Q4 | | | 2SC4617(S) | TRANSISTOR | |
| Q5 | | | 2SC5108(Y) | TRANSISTOR | |
| Q6 | | | 2SC5110(O) | TRANSISTOR | |
| Q7 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q8 | | | 2SC4988 | TRANSISTOR | |
| Q9 | | | DTA144EE | DIGITAL TRANSISTOR | |
| Q10 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q13 | | | 2SK1824 | FET | |
| Q200,201 | | * | 3SK293 | FET | |
| Q301 | | | 2SC4617(S) | TRANSISTOR | |
| Q302 | | | 2SK1215(E) | FET | |
| Q303 | | | DTA144EE | DIGITAL TRANSISTOR | |
| Q304 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q305 | | | UMC4 | TRANSISTOR | |
| Q400 | | | UMG3N | TRANSISTOR | |
| Q401 | | | UPA572T | FET | |
| Q402 | | | FP210 | TRANSISTOR | |
| Q403 | | | 2SJ243 | FET | |
| Q404 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q405 | | | UMG3N | TRANSISTOR | |
| Q406 | | | DTA123JE | DIGITAL TRANSISTOR | |
| Q407 | | | 2SC4215(Y) | TRANSISTOR | |
| Q408-410 | | | 2SC4617(S) | TRANSISTOR | |
| Q411 | | | 2SB1132(Q,R) | TRANSISTOR | |
| Q412 | | | 2SK1824 | FET | |
| Q413 | | | HN1L02FU | FET | |
| Q414 | | | 2SK1824 | FET | |
| Q415 | | | 2SJ517 | FET | |
| Q601,602 | | | 2SK1824 | FET | |
| TH301 | | | 157-104-65001 | THERMISTOR | |

# TK-390

## EXPLODED VIEW

| | | |
|---|---|---|
| A | | : N14-0578-04 |
| B | | : N14-0594-04 |
| C | M2.6 x 8 BLK | : N30-2608-45 |
| D | M2.6 x 5 | : N67-2605-46 |
| E | M2 x 3 | : N78-2030-46 |
| F | M2 x 3.5 | : N79-2035-46 |
| G | M2 x 4 | : N83-2004-46 |
| H | M2 x 5 BLK | : N83-2005-45 |
| J | M2.6 x 5 (Bi-Tap) | : N89-2605-46 |

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

# PACKING

C | D

8 Cap (SP/MIC)
(B09-0363-03)
38 Cushion (Cap)
(G13-1688-04)

7 Dressing plate
(B03-0594-04)

16 Stopper
(D32-0421-24)

13 Instruction manual
(B62-0816-30)

48 Protection bag
(H25-0029-04)

71 Screw set
(N99-2004-05)

702 Warranty card

57 Belt hook
(J29-0652-35)

47 Packing fixture
(H12-3018-02)

49 Item carton case
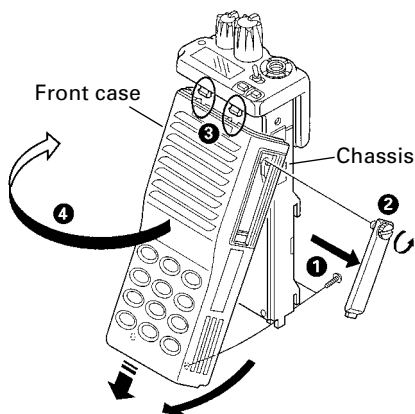(H52-1085-02)

UPC code label

**Parts with the exploded numbers larger than 700 are not supplied.**
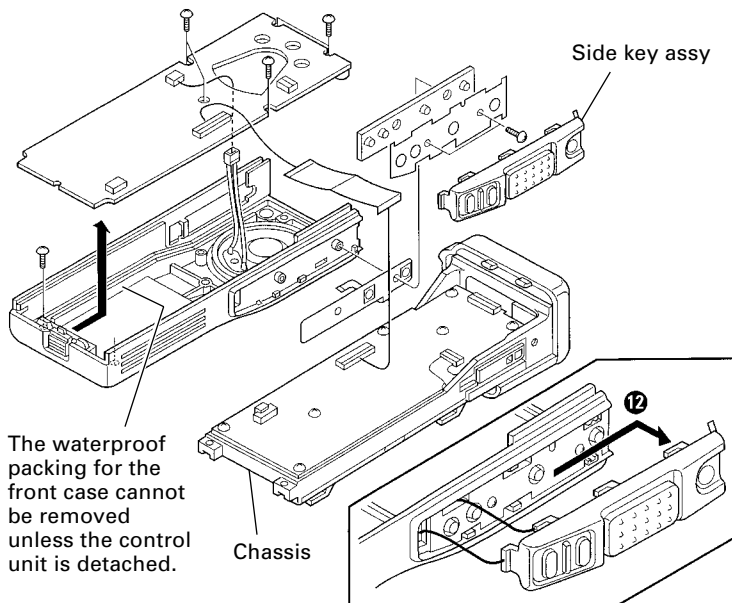
# TK-390

## DISASSEMBLY FOR REPAIR

### Disassembly of Front Case and Chassis

1. Remove the 2 screws ( ❶ ) and a cap fixed screw ( ❷ ).
2. Press the chassis bottom upwards and remove the clips ( ❸ ) at the top. The front case is still connected to the chassis by the FPC at this time so be gentle when lifting upwards, otherwise unwanted stress is applied on the FPC.
3. The front case and chassis can only be opened to the side when connected by the FPC ( ❹ ).



### Remove the TX-RX Unit from the Chassis

1. The TX-RX unit cannot be removed simply by removing the seven screws ( ❺ ).
2. A total of 9 solder connections, 6 on the RF power module ( ❻ ) and 3 on the antenna daughter board ( ❼ ) must be disconnected.

### Remove the Universal Connector

1. The universal connector ( ❽ ) is fastened to the chassis with double-side tape.
2. First unsolder the connection on the antenna daughter board ( ❾ ).
3. Press firmly with a tool such as a screwdriver and so that it can peel ( ❿ ).
   **Note :** You must replace both parts together when replacing the universal connector or the FPC ( ⓫ ).



### Remove the Side Key Assy

1. The side key assy is clips form a slide-hook structure. Lift up gently and take from the side ( ⓬ ).
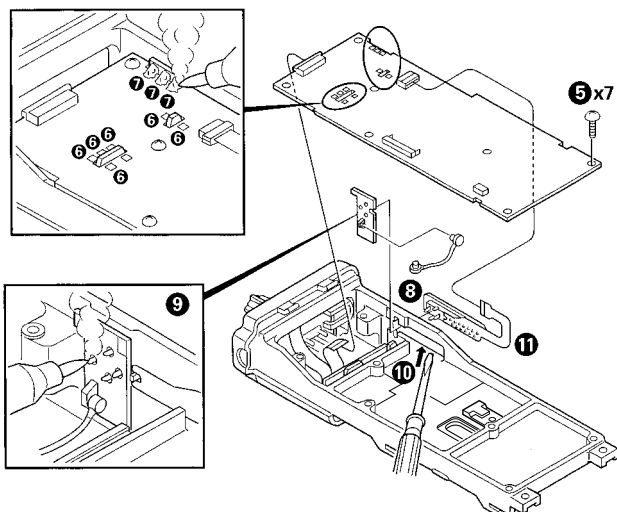


The waterproof packing for the front case cannot be removed unless the control unit is detached.

### Disassembly of the Panel Assy

1. The LCD assy and toggle switch are joined by wire ( ⓭ ). Use caution not to break this wire during handling.
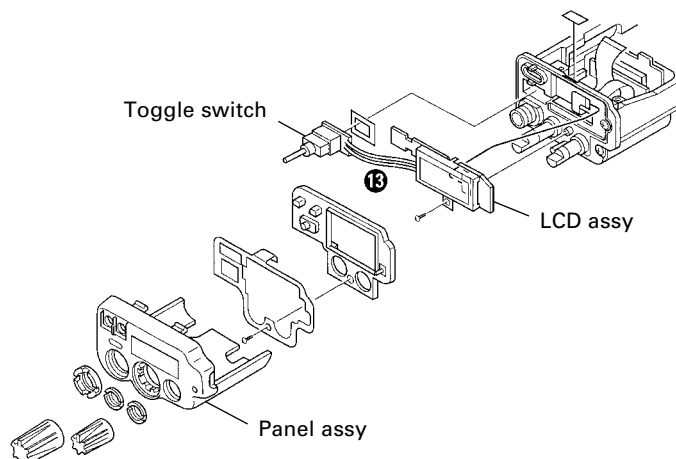
# ADJUSTMENT

## Test Equipment Required for Alignment

| No. | Test Equipment | Major Specifications | |
|---|---|---|---|
| 1 | Standard Signal Generator (SSG) | Frequency Range<br>Modulation<br>Output | Maximum 600MHz or more.<br>Frequency modulation and external modulation.<br>–133dBm/0.05µV to 7dBm/501mV |
| 2 | Power Meter | Input Impedance<br>Operation Frequency<br>Measurement Range | 50Ω.<br>Up to 600MHz.<br>Full scale of 10W or so. |
| 3 | Deviation Meter | Frequency Range | 400 to 560MHz. |
| 4 | Digital Volt Meter (DVM) | Measuring Range<br>Accuracy | FS=18V or so.<br>High input impedance for minimum circuit loading. |
| 5 | Oscilloscope | | DC through 30MHz. |
| 6 | High Sensitivity Frequency Counter | Frequency Range<br>Frequency Stability | Up to 1GHz or so.<br>0.2ppm or less. |
| 7 | Ammeter | | 5A. |
| 8 | AF Volt Meter (AF VTVM) | Frequency Range<br>Voltage Range | 50Hz to 1MHz.<br>1mV to 10V. |
| 9 | Audio Generator (AG) | Frequency Range<br>Output | 100Hz to 100kHz or more.<br>0 to 1V. |
| 10 | Distortion Meter | Capability<br>Input Level | 3% or less at 1kHz.<br>50mV to 10Vrms. |
| 11 | 16Ω Dummy Load | | Approx. 16Ω, 5W. |
| 12 | Regulated Power Supply | | 5V to 10V, approx. 5A<br>Useful if ammeter equipped. |
| 13 | Spectrum Analyzer | Measuring Range | DC to 1GHz or more. |
| 14 | Tracking Generator | Center Frequency<br>Frequency Deviation<br>Output Voltage | 50kHz to 600MHz.<br>±35MHz.<br>100mV or more. |

### ■ 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 (E30-3287-08) 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 (E30-3287-08) 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**



Universal connector

- EXT/INT RF SW
- 1: SSW
- 2: SP+
- 3: SP–
- 4: MSW
- 5: EMC
- 6: ME
- 7: PTT
- 8: PF
- 9: NC
- 10: E
- 11: 5M
- 12: TXD
- 13: RXD
- 14: NC

# TK-390

# ADJUSTMENT

• **Panel tuning**



2: RED (RX AF OUTPUT)
3: BLACK (RX AF OUTPUT)
5: WHITE (MIC INPUT)
6: BROWN (MIC GND)
7: BLUE (PTT SW) GND → ON
8: YELLOW (PF SW)
10: BROWN (GND)
11: GREEN (5M)

SCREW
TUBE



To Radio
BLU (7)          PTT SW
BRN (10)
RED (2)    100µ 10V
16Ω              AF Voltmeter
BLK (3)    100µ 10V
WHT (5)    10µ 10V
BRN (6)          Audio generator
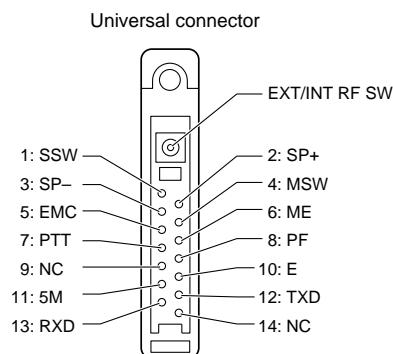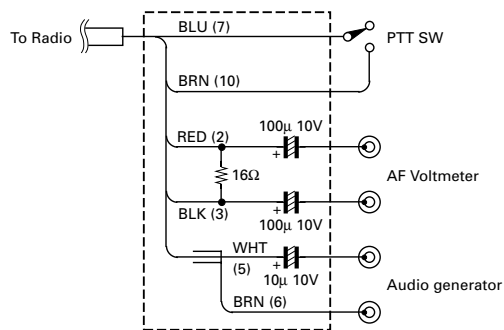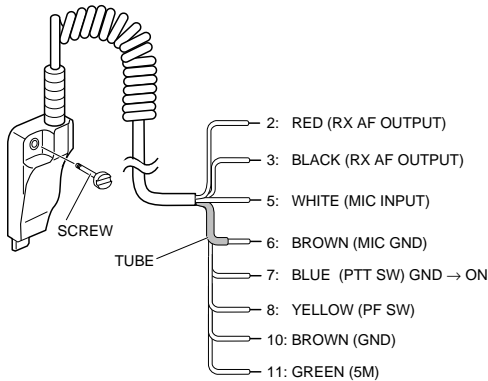
• **PC tuning**

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.

KPG-36



Remove the screw

Connector case

PCB layout



16 Ω    100 µ 10 V
100 µ 10 V          AF voltmeter
10 µ 10 V
Audio generator

Shield
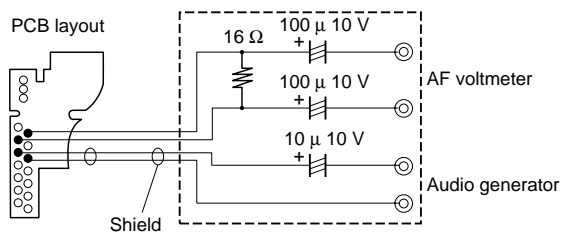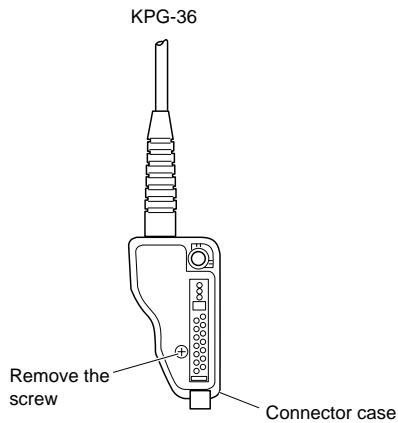
## Repair Jig (Chassis)

Use jig (part No.: A10-1399-03) for repairing the TK-390 Place the TX-RX unit on the jig and fit it with 7 screws.

**Note :** Supply power from an external power supply (Battery terminal : +, jig (chassis) : –)



Battery terminal (+)

TX-RX unit

Jig
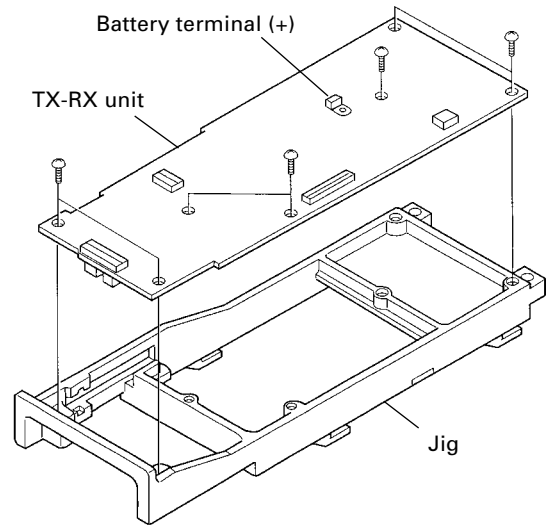
## How to Remove the Flat Cable

1. Gently draw out both sides of the connector lever uniformly in the direction of the arrow with tweezers. (CN101, CN400)



Tweezers
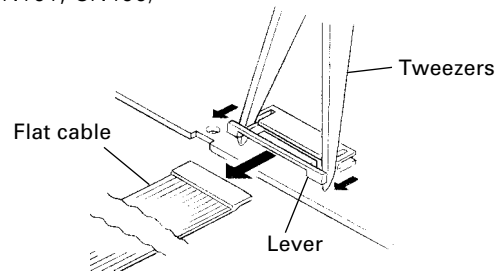
Flat cable

Lever

2. Gently rise up the connector lever in the direction of the arrow with a fine regular screwdriver or tweezers. (CN1, CN3, CN401, CN403)

**Note :** Gently push both sides of the connector lever, when put in the flat cable.



Regular screwdriver

Flat cable

Lever
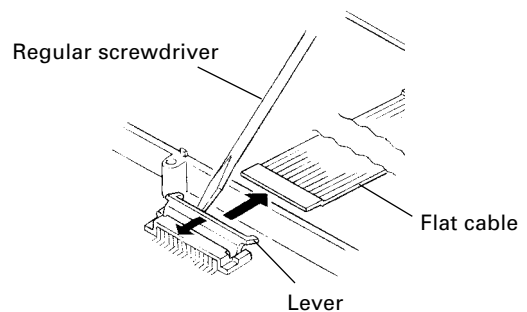
# ADJUSTMENT

## Panel Test Mode

This mode is used for making transceiver connection tests and clearing the memory.

To set Panel test mode, turn on the power with [Side 2] and [PTT] are still held down and then first release [PTT]. This mode cannot be set when disabled with the FPU.

In Panel test mode, when channel or signalling is selected, the signalling that was most recently used is displayed.

Channel    Signalling

```
CH  1- 2
```
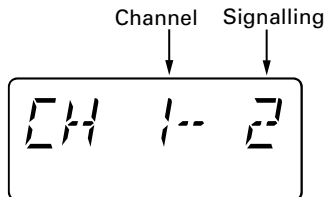
Key operations in Panel test mode are as follows.

| | |
|---|---|
| [Selector switch] | : Use to select the test channel. |
| [PTT] | : For transmit. |
| [Top 1] | : For down signalling. |
| [Top 2] | : For up signalling. |
| [Side 1] | : For setting Panel tuning mode. |
| [Side 2] | : For switching power between Hi/Low. Enter the LCD all lamp mode if held down for 2 seconds. |
| [Orange] | : For monitoring. |
| [Toggle] | : For switching between Wide/Narrow. |

### Frequency (MHz)

| CH | RX | TX |
|----|----|----|
| 1 | 470.1000 (Center) | 470.0000 (Center) |
| 2 | 450.1000 (Low) | 450.0000 (Low) |
| 3 | 489.9000 (Hi) | 489.9750 (Hi) |
| 4 | 470.0000 | 470.0000 |
| 5 | 470.2000 | 470.2000 |
| 6 | 470.4000 | 470.4000 |

### Signalling

| No. | Encode tone | Decode tone |
|-----|-------------|-------------|
| 1 | None | None |
| 2 | QT 67.0Hz | QT 67.0Hz |
| 3 | QT 250.3Hz | QT 25.03Hz |
| 4 | DQT 023N | DQT 023N |
| 5 | None | 2 tone 321.7/928.1Hz |
| 6 | DTMF (9) | DTMF (159) |
| 7 | MSK PN pattern | None |
| 8 | 100Hz square wave | None |
| 9 | Single tone 1633Hz | None |

### • LCD all lamp mode

```
Panel test mode
    │ [Side 2]
    │ holding about 2 sec.
LCD all lamp mode
```
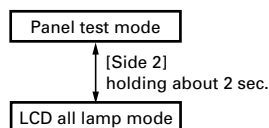
### • Clear function

Pressing [PTT] while holding down [Orange] in Panel test mode, triggers the clear function which clears all transceiver data settings.

### • Panel tuning mode

Press [Side 1] in Panel test mode to set Panel tuning mode.

**Note :** Different sample displays are shown.

| Function name | Display | Remarks |
|---|---|---|
| Varicap shift voltage (Mid) | VSWM 73 | VCO –3V adj. |
| Varicap shift voltage (High) | VSWH145 | VCO –6V adj. |
| Voltage change frequency (Low-Mid) | 464.000 | VCO –3V shift RX frequency |
| Voltage change frequency (Low-Mid) | 464.000 | VCO –3V shift TX frequency |
| Voltage change frequency (Mid-High) | 479.000 | VCO –6V shift RX frequency |
| Voltage change frequency (Mid-High) | 479.000 | VCO –6V shift TX frequency |
| Frequency tune | FREQ 140 | TX frequency adj. |

RF high power — POW 100 — [Orange]

| | Display | Remarks |
|---|---|---|
| RF high power (Low) | POW 100 L | High power adj. (Low edge) |
| RF high power (Cen) | POW 100 C | High power adj. (Center) |
| RF high power (Hi) | POW 100 H | High power adj. (Hi edge) |

| Function name | Display | Remarks |
|---|---|---|
| RF low power | POW 50 LO | Low power adj. |
| Max deviation | MDV 60 | |

[Orange]

| | Display | Remarks |
|---|---|---|
| Max deviation (Low) | MDV 90 L | Deviation adj. (Low edge) |
| Max deviation (Cen) | MDV 62 C | Deviation adj. (Center) |
| Max deviation (Hi) | MDV 44 H | Deviation adj. (Hi edge) |

| Function name | Display | Remarks |
|---|---|---|
| Deviation balance | BLNC125 | |
| QT deviation | QTDV150 | |
| DQT deviation | DQDV117 | |
| DTMF deviation | DTDV165 | |
| MSK deviation | MSDV100 | |
| Sensitivity | SNS 70 MON | |

[Orange]

| | Display | Remarks |
|---|---|---|
| Sensitivity (Low) | SNS 15 L MON | Sensitivity adj. (Low edge) |
| Sensitivity (Cen) | SNS 70 C MON | Sensitivity adj. (Center) |
| Sensitivity (Hi) | SNS 200 H MON | Sensitivity adj. (Hi edge) |

| Function name | Display | Remarks |
|---|---|---|
| Squelch tight | SQ T255 | |
| Squelch open | SQ O 87 | |
| Battery level | BATT––– |

[PTT] → BATT150

[Orange] : Write data

[Side 2] → END

# TK-390

# ADJUSTMENT

## Common Section

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|------------|------|----------|------|-------|--------|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Varicap shift voltage Mid | 1) Set panel tuning mode Push Side2 to select VSWM ✳✳ | DC VTVM | TX-RX | TP2 | Panel | Top1/ Top2 | –3V | ±0.1V |
| High | 2) Push Side2 to select VSWH ✳✳✳ | | | | | | –6V | ±0.1V |
| 2. Voltage change frequency Low–Mid RX | 1) Set panel tuning mode Push Side2 to select ✳✳✳.✳✳✳ r1 | | | TP1 | | | 4.15V | ±0.05V |
| TX | 2) Push Side2 to select ✳✳✳.✳✳✳ t1 | | | | | | 4.15V | ±0.05V |
| Mid–Hi RX | 3) Push Side2 to select ✳✳✳.✳✳✳ r2 | | | | | | 4.15V | ±0.05V |
| TX | 4) Push Side2 to select ✳✳✳.✳✳✳ t2 | | | | | | 4.15V | ±0.05V |

## Transmitter Section

**Caution :** When adjusting transmit power and sensitivity, connect the cable to the SMA antenna connector on the top panel. At this time, use the antenna-less type jig connector (E30-3287-08) in the universal connector.

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|------------|------|----------|------|-------|--------|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Frequency adjustment | 1) Set panel test mode CH No. : 1 Signalling No. : 1 Select FRQ ✳✳✳ in panel tuning mode PTT : ON | Power meter f. counter | Panel | ANT | Panel | Top1/ Top2 | 470.000MHz | ±50Hz |
| | When the TCXO (X1) is replaced, perform the frequency tune in PC tuning mode from the FPU menu. | | | | | | | |
| 2. Maximum power check | 1) Set panel test mode CH No. : 3 Signalling No. : 1 BATT terminal voltage : 7.5V Select POW 255 in panel tuning mode PTT : ON | Power meter Ammeter | Panel | ANT | | | Check | 4.0W or more |
| 3. TX high power adjustment | 1) Set panel test mode CH No. : 3 Signalling No. : 1 Select POW ✳✳✳ in tuning mode Push Orange to 3 point adjustment mode Select POW ✳✳✳ L PTT : ON | | | | Panel | Top1/ Top2 | 4.20W | ±0.1W 2.3A or less |
| | 2) Push Side2 to select POW ✳✳✳ M PTT : ON | | | | | | | |
| | 3) Push Side2 to select POW ✳✳✳ H PTT : ON | | | | | | | |

# ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|------------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 4. TX high power check | 1) Set panel test mode CH No. : 1 Signalling No. : 1 PTT : ON | Power meter Ammeter | Panel | ANT | | | Check | 3.7W~5.2W 2.3A or less |
| | 2) CH No. : 2 Signalling No. : 1 PTT : ON | | | | | | | |
| | 3) CH No. : 3 Signalling No. : 1 PTT : ON | | | | | | | |
| 5. TX low power adjustment | 1) Set panel test mode CH No. : 3 Signalling No. : 1 Select POW ✳✳✳ LO in panel tuning mode PTT : ON | | | | Panel | Top1/ Top2 | 1.0W | ±0.1W 1.2A or less |
| 6. TX low power check | 1) Set panel test mode CH No. : 1 Signalling No. : 1 Set low power (Push Side2) PTT : ON | | | | | | Check | 0.5W~1.5W 1.2A or less |
| | 2) CH No. : 2 Signalling No. : 1 Set low power (Push Side2) PTT : ON | | | | | | | |
| | 3) CH No. : 3 Signalling No. : 1 Set low power (Push Side2) PTT : ON | | | | | | | |
| 7. DQT balance adjustment | 1) Set panel test mode CH No. : 3 Signalling No. : 1 Select BLNC ✳✳✳ in panel tuning mode Deviation meter filter setting LPF : 3kHz HPF : OFF PTT : ON | Power meter Deviation meter Oscilloscope AG AF VTVM | Panel Side | ANT Universal | Panel | Top1/ Top2 | Make the demodu-lation waves into square waves. | |

# TK-390

## ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|------------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 8. Maximum deviation adjustment (Wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select MDV ✳✳✳<br>　in panel tuning mode<br>Push Orange to 3 point<br>　adjustment mode<br>Select MDV ✳✳✳<br>　　　L<br>AG : 1kHz/150mV<br>Deviation meter filter setting<br>　LPF : 15kHz<br>　HPF : OFF<br>PTT : ON | Power meter<br>Deviation meter<br>Oscilloscope<br><br>AG<br>AF VTVM | Panel<br><br><br>Side | ANT<br><br><br>Universal | Panel | Top1/<br>Top2 | 3.95kHz<br>(According to the larger +, −) | ±50Hz |
| | 2) Push Side2 to select<br>　MDV ✳✳✳<br>　　M<br>PTT : ON | | | | | | | |
| | 3) Push Side2 to select<br>　MDV ✳✳✳<br>　　H<br>PTT : ON | | | | | | | |
| 9. Maximum deviation adjustment (narrow) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select MDV ✳✳✳<br>　in panel tuning mode<br>Turn the toggle SW to the<br>　right (narrow).<br>Push Orange to 3 point<br>　adjustment mode<br>Select MDV ✳✳✳<br>　　　N L<br>AG : 1kHz/150mV<br>Deviation meter filter setting<br>　LPF : 15kHz<br>　HPF : OFF<br>PTT : ON | | | | | | 1.90kHz<br>(According to the larger +, −) | ±50Hz |
| | 2) Push Side2 to select<br>　MDV ✳✳✳<br>　N M<br>PTT : ON | | | | | | | |
| | 3) Push Side2 to select<br>　MDV ✳✳✳<br>　N H<br>PTT : ON | | | | | | | |
| 10. MIC sensitivity check | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>AG : 1kHz/15mV<br>Deviation meter filter setting<br>　LPF : 15kHz<br>　HPF : OFF<br>PTT : ON | | | | | | Check | 1.8kHz~3.6kHz |
| | 2) Turn the toggle SW to the<br>　right (narrow)<br>PTT : ON | | | | | | | 0.9kHz~1.8kHz |

# ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 11. QT deviation adjustment (wide) | 1) Set panel tuning mode<br>CH No. : 3<br>Signalling No. : 1<br>MIC input : OFF<br>Select QTDV ✱✱✱<br>  in panel tuning mode<br>Deviation meter filter setting<br>  LPF : 3kHz<br>  HPF : 50Hz<br>  De-emphasis : 750µs<br>PTT : ON | Power meter<br>Deviation meter<br>Oscilloscope<br><br>AG<br>AF VTVM | Panel<br><br><br><br><br>Side | ANT<br><br><br><br><br>Universal | Panel | Top1/<br>Top2 | 0.75kHz | ±0.05kHz |
| 12. QT deviation adjustment (narrow) | 1) Set panel tuning mode<br>CH No. : 3<br>Signalling No. : 1<br>MIC input : OFF<br>Select QTDV ✱✱✱<br>  in panel tuning mode<br>Turn the toggle SW to the<br>  right (narrow)<br>Deviation meter filter setting<br>  LPF : 3kHz<br>  HPF : 50Hz<br>  De-emphasis : 750µs<br>PTT : ON | | | | | | 0.375kHz | ±0.05kHz |
| 13. DQT deviation adjustment (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select DQDV ✱✱✱<br>  in panel tuning mode<br>Deviation meter filter setting<br>  LPF : 3kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 0.75kHz | ±0.05kHz |
| 14. DQT deviation adjustment (narrow) | 1) Set panel tuning mode<br>CH No. : 3<br>Signalling No. : 1<br>Select DQDV ✱✱✱<br>  in panel tuning mode<br>Turn the toggle SW to the<br>  right (narrow)<br>Deviation meter filter setting<br>  LPF : 3kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 0.375kHz | ±0.05kHz |
| 15. DTMF deviation adjustment (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select DTDV ✱✱✱<br>  in tuning mode<br>Deviation meter filter setting<br>  LPF : 15kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 3.0kHz | ±50Hz |

# TK-390

# ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|------|----------|------|-------|--------|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 16. DTMF deviation adjustment (narrow) | 1) Set panel tuning mode<br>CH No. : 3<br>Signalling No. : 1<br>Select DTDV ✻✻✻<br> in panel tuning mode<br>Turn the toggle SW to the<br> right (narrow)<br>Deviation meter filter setting<br> LPF : 15kHz<br> HPF : OFF<br>PTT : ON | Power meter<br>Deviation<br>meter<br>Oscilloscope<br><br>AG<br>AF VTVM | Panel<br><br><br><br><br>Side | ANT<br><br><br><br><br>Universal | Panel | Top1/<br>Top2 | 1.5kHz | ±50Hz |
| 17. MSK deviation adjustment (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select MSDV ✻✻✻<br> in panel tuning mode<br>Deviation meter filter setting<br> LPF : 15kHz<br> HPF : OFF<br>PTT : ON | | | | | | 3.00kHz | ±50Hz |
| 18. MSK deviation adjustment (narrow) | 1) Set panel tuning mode<br>CH No. : 3<br>Signalling No. : 1<br>Select MSDV ✻✻✻<br> in panel tuning mode<br>Turn the toggle SW to the<br> right (narrow)<br>Deviation meter filter setting<br> LPF : 15kHz<br> HPF : OFF<br>PTT : ON | | | | | | 1.50kHz | ±50Hz |
| 19. Transmission S/N check (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Deviation meter filter setting<br> LPF : 300Hz<br> HPF : 3kHz<br> De-emphasis : 750μs<br>PTT : ON | | | | | | Check | 42dB or more |
| 20. Transmission S/N check (narrow) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Turn the toggle SW to the<br> right (narrow)<br>Deviation meter filter setting<br> LPF : 300Hz<br> HPF : 3kHz<br> De-emphasis : 750μs<br>PTT : ON | | | | | | | 37dB or more |
| 21. BATT detection writing | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select BATT ✻✻✻<br> in panel tuning mode<br>PTT : ON | Power meter<br><br>DC VTVM | Panel<br><br>Bottom | ANT<br><br>BATT<br>terminal | Side | Orange | Write the voltage level | 6.2V |

# ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|------------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 22. BATT detection check | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>BATT terminal voltage : 5.3V<br>PTT : ON | Power meter<br><br>DC VTVM | Panel<br><br>Bottom | ANT<br><br>BATT terminal | | | Check | Cannot transmit<br>LED (TX) blinks |
| | 2) BATT terminal voltage : 6.5V<br>PTT : ON | | | | | | | Transmit |

## Receiver Section

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|------------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. AF level check | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>SSG freq. : Each freq.<br>　　output : –53dBm/501μV<br>　　MOD. : 1kHz<br>　　DEV. : 3kHz | SSG<br><br>AF VTVM<br>Oscilloscope<br>Distortion meter<br>Audio analyzer | Panel<br><br>Side | ANT<br><br>Universal | | | Check | 0.63V±0.3V<br>3% or less |
| | 2) Turn the toggle SW to the right (narrow)<br>SSG freq. : Each freq.<br>　　output : –53dBm/501μV<br>　　MOD. : 1kHz<br>　　DEV. : 1.5kHz | | | | | | | 0.63V±0.3V<br>5% or less |
| 2. Hum and noise ratio check | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>SSG output : –53dBm/501μV | | | | | | | 42dB or more |
| | 2) Turn the toggle SW to the right (narrow)<br>SSG output : –53dBm/501μV | | | | | | | 37dBm |
| 3. BPF coil<br><br>Use this adjustment procedure after replacing any of the BPF coils | 1) Set panel test mode<br>CH No. : 2<br>Connect the spectrum analyzer to TP3.<br>Signalling No. : 1<br>Push Orange to 3 point adjustment mode<br>Select SNS　25<br>　　　　　　L | Tracking generator<br><br>Spectrum analyzer | Panel<br><br>TX-RX | ANT<br><br>TP3 | TX-RX | L205<br>L210 | Adjust the BPF coil so that the waveform is peaked. The frequency with the peak waveform does not have to be the center frequency.<br>After finished peaking the waveform, perform a 3 point adjustment and set for maximum sensitivity.<br><br>RX BPF 0-10<br>REF –10.0dBm　ATT 10dB　A write B blank<br>10dB/<br>　　　　　　　Center<br>　　　　　　　　　　　△MKR –31.07dBm<br>TG LEVEL<br>–30dBm　　　　　　　　　Hi<br>RBW 300kHz<br>VBW 10kHz<br>SWP 70ms　　　Low<br>　　　　　SPAN 100.0MHz | |

# TK-390

# ADJUSTMENT

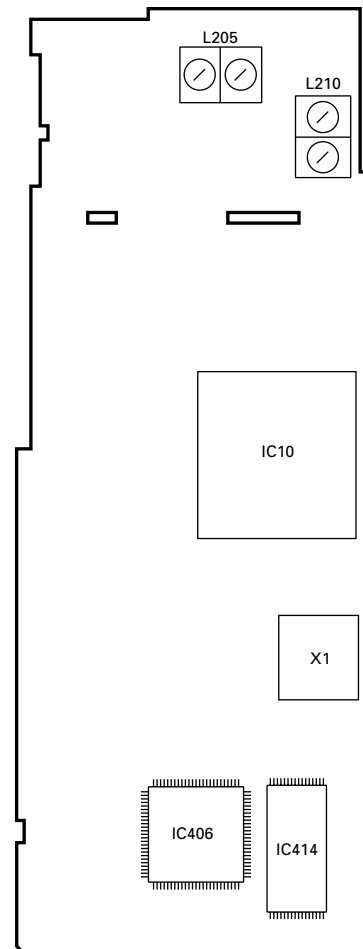| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|------------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 4. Sensitivity adjustment and check (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select SNS ✳✳✳<br>   in panel tuning mode<br>Push Orange to 3 point<br>   adjustment mode<br>Select SNS ✳✳✳<br>       L<br>SSG freq. : Low<br>      output : –116dBm/0.35µV | SSG<br><br>AF VTVM<br>Oscilloscope<br>Distortion meter<br>Audio analyzer | Panel<br><br>Side | ANT<br><br>Universal | Panel | Top1/Top2 | Adjust for maximum SINAD | 12dB SINAD or more |
| | 2) Push Side2 to select<br>  SNS ✳✳✳<br>   M<br>SSG freq. : Center | | | | | | | |
| | 3) Push Side2 to select<br>  SNS ✳✳✳<br>   H<br>SSG freq. : Hi | | | | | | | |
| 5. Sensitivity check (narrow) | 1) Set panel test mode<br>CH No. : 1<br>Signalling No. : 1<br>SSG output : –116dBm/0.35µV<br>    MOD. : 1kHz<br>    DEV. : 1.5kHz<br>Turn the toggle SW to the<br>   right (narrow) | | | | | | Check | 12dB SINAD or more |
| | 2) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Turn the toggle SW to the<br>   right (narrow) | | | | | | | |
| | 3) Set panel test mode<br>CH No. : 5<br>Signalling No. : 1<br>Turn the toggle SW to the<br>   right (narrow) | | | | | | | |
| 6. Tight squelch adjustment (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select SQ T✳✳✳<br>   in panel tuning mode<br>SSG output : 6dB above to<br>     12dB SINAD level. | | | | Panel | Top1/Top2 | Adjust to point of opening squelch | |
| 7. Tight squelch adjustment (narrow) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select SQ T✳✳✳<br>   in panel tuning mode<br>Turn the toggle SW to the<br>   right (narrow)<br>SSG output : 6dB above to<br>     12dB SINAD level. | | | | | | | |
| 8. Squelch adjustment (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select SQ O✳✳✳<br>   in panel tuning mode<br>SSG output : 3dB below to<br>     12dB SINAD level | | | | | | Adjust to point of opening squelch | |

# ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|------|----------|------|-------|--------|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 9. Squelch adjustment (narrow) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Select SQ O✳✳✳<br> in panel tuning mode<br>Turn the toggle SW to the<br> right (narrow)<br>SSG output : 3dB below to<br> 12dB SINAD level | SSG<br><br>AF VTVM<br>Oscilloscope<br>Distortion<br>meter<br>Audio<br>analyzer | Panel<br><br>Side | ANT<br><br>Universal | Panel | Top1/<br>Top2 | Adjust to point of opening squelch | |
| 10. Squelch check (wide) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>SSG output : –118dBm/0.28µV | | | | | | Check | Squelch must be opened |
| | 2) SSG output : –127dBm/0.1µV | | | | | | | Squelch must be closed |
| 11. Squelch check (narrow) | 1) Set panel test mode<br>CH No. : 3<br>Signalling No. : 1<br>Turn the toggle SW to the<br> right (narrow)<br>SSG output : –118dBm | | | | | | Check | Squelch must be opened |
| | 2) SSG output : –127dBm | | | | | | | Squelch must be closed |

## Adjustment Point
### ■ Component side
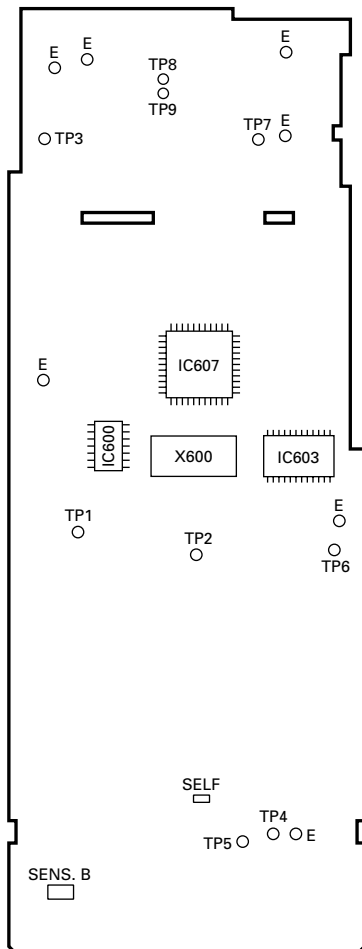
### ■ Foil side

# TK-390  PC BOARD VIEW

## FINAL UNIT (X45-3590-10)  Component side view : K3,K6



IC801

J72-0654-12
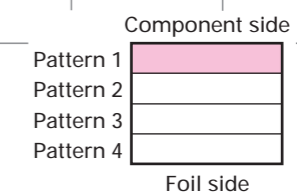
C806  C805

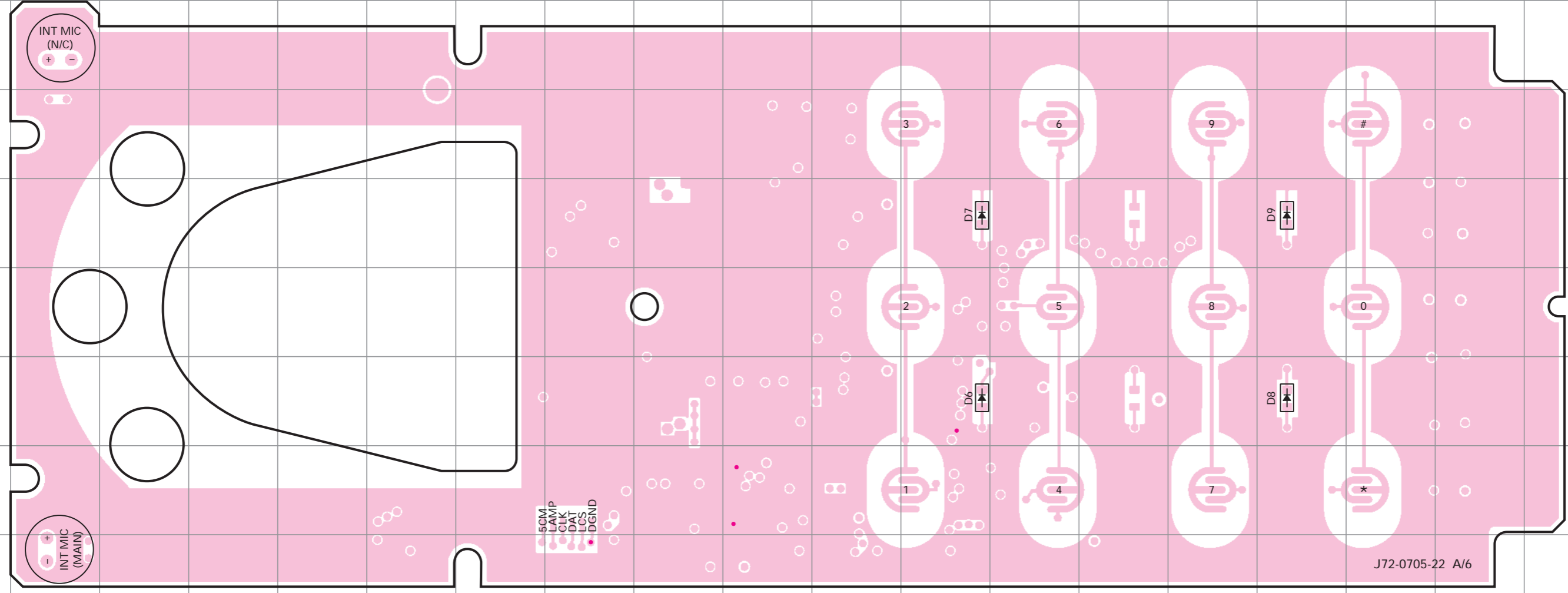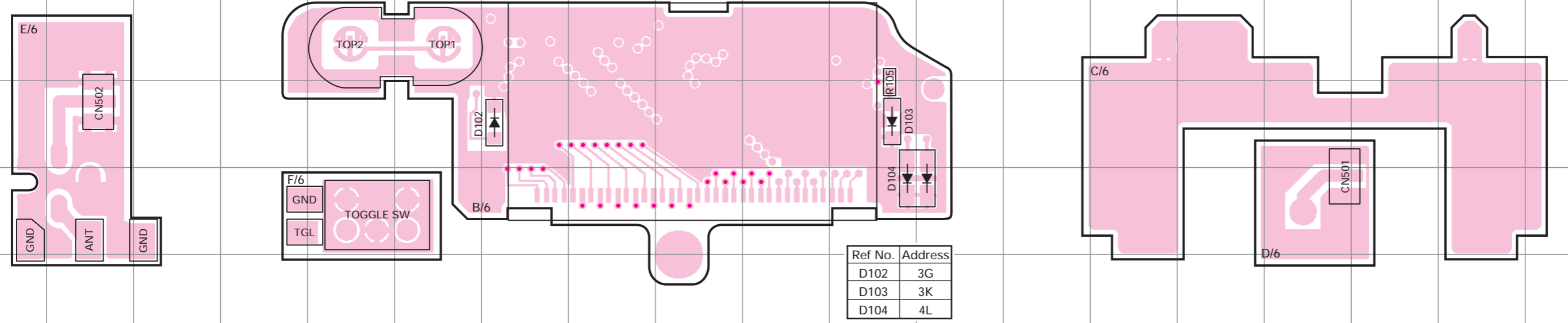C804  C803

L801

C802

C801

IN    Vcont    VCC

OUT
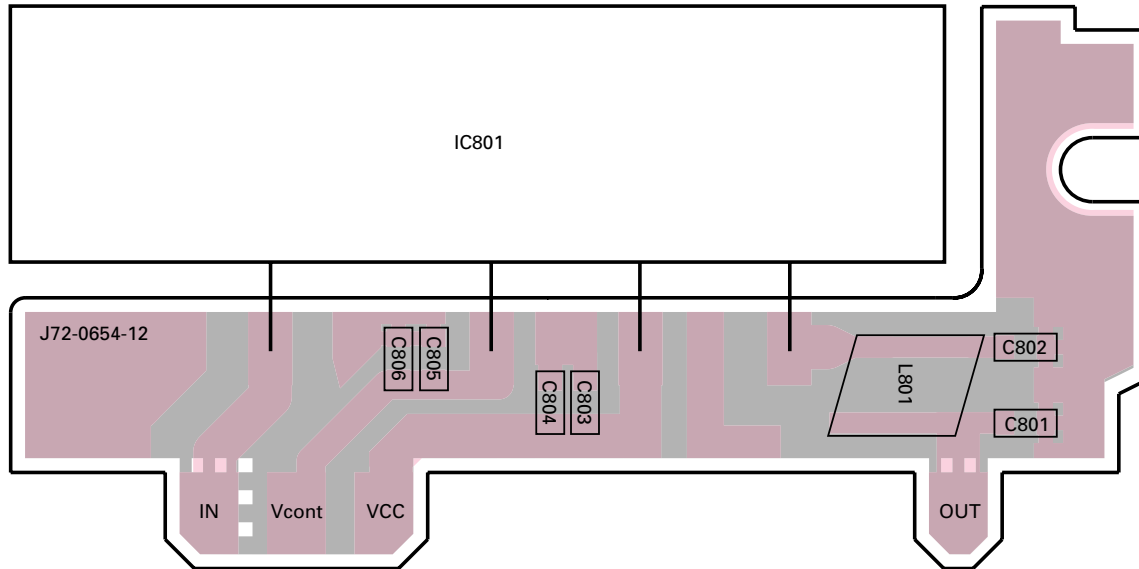
# TK-390 PC BOARD VIEWS

CONTROL UNIT (X53-3930-XX)  -13 : K,K2   -14 : K4   -15 : K3   -16 : K6   Component side view

E/6

CN502

GND  ANT  GND

TOP2  TOP1

F/6
GND
TGL
TOGGLE SW

B/6

D102

R105

D103

D104

C/6

CN501

D/6

| Ref No. | Address |
|---------|---------|
| D102 | 3G |
| D103 | 3K |
| D104 | 4L |

INT MIC
(N/C)
+  −

3  6  9  #

D7  D9

2  5  8  0

D6  D8

1  4  7  ∗

5CM
LAMP
CLK
DAT
LCS
DGND

INT MIC
(MAIN)
+  −

J72-0705-22  A/6

| Ref No. | Address |
|---------|---------|
| D6 | 10L |
| D7 | 8L |
| D8 | 10P |
| D9 | 8P |

Component side

Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

51

52

● Connect 1 and 4

## CONTROL UNIT (X53-3930-XX)  -13 : K,K2  -14 : K4  -15 : K3  -16 : K6  Foil side view
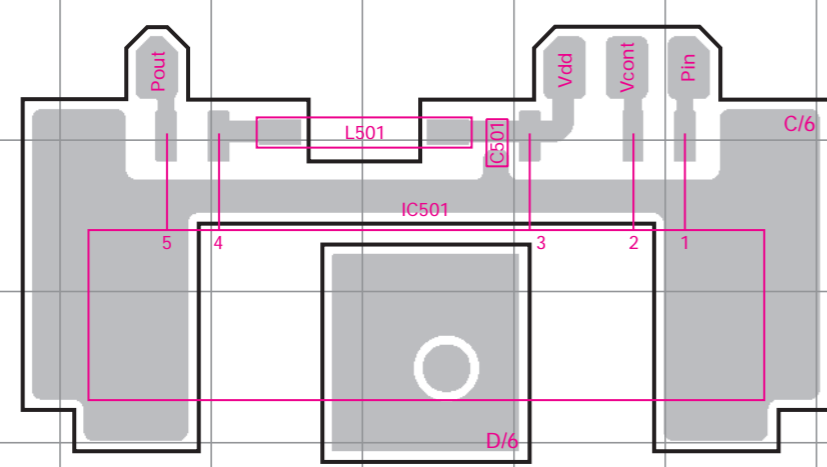
| Ref No. | Address |
|---------|---------|
| IC501 | 3D |

| Ref No. | Address |
|---------|---------|
| IC101 | 3L |
| D101 | 2J |
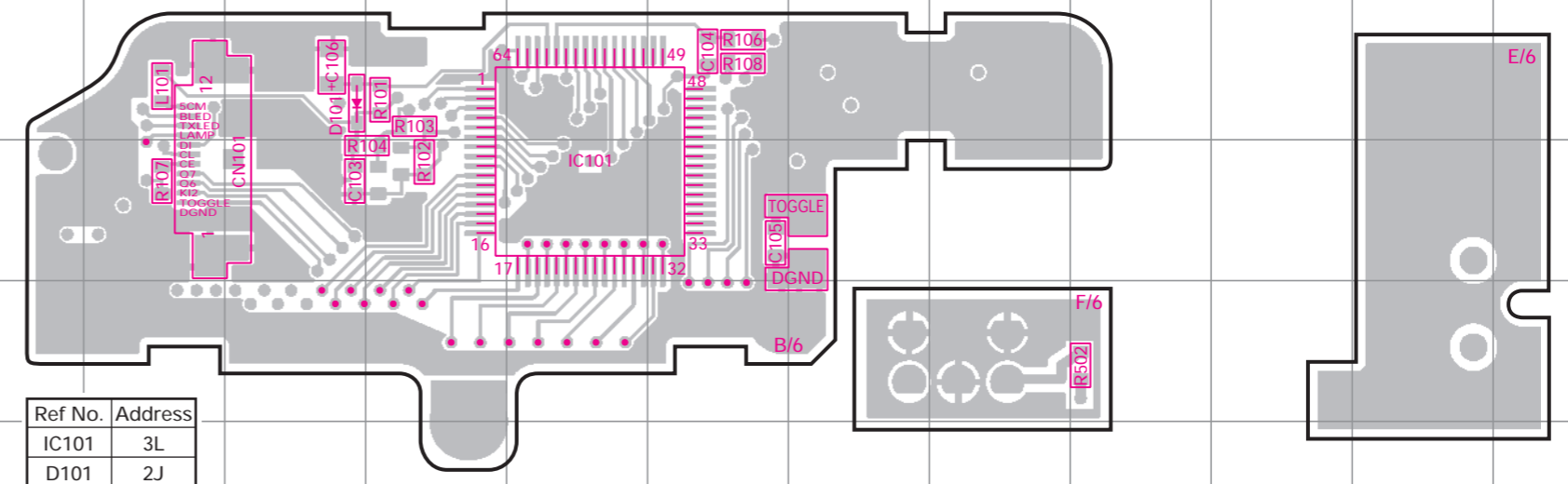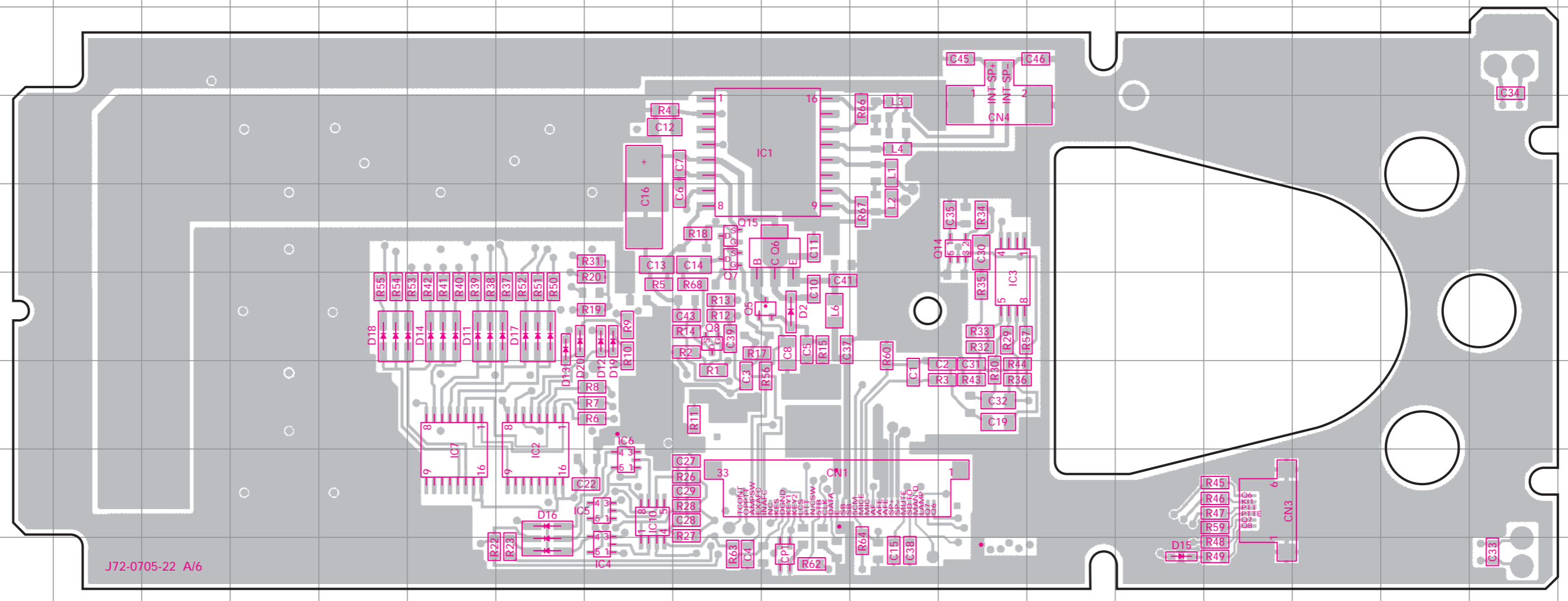
J72-0705-22  A/6

| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| IC1 | 7J | IC6 | 11H | Q7 | 8I | D11 | 9F | D16 | 12G |
| IC2 | 11G | IC7 | 11F | Q8 | 9I | D12 | 9H | D17 | 9G |
| IC3 | 9L | IC10 | 11H | Q14 | 8L | D13 | 9G | D18 | 9E |
| IC4 | 12H | Q5 | 9J | Q15 | 8I | D14 | 9F | D19 | 9H |
| IC5 | 11H | Q6 | 8J | D2 | 9J | D15 | 12N | D20 | 9G |

Component side

Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

● Connect 1 and 4

53
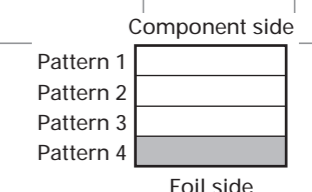
54

# TK-390  PC BOARD VIEW

**TX-RX UNIT (X57-5400-XX)  -10 : K,K4   -11 : K2   -12 : K3,K6   Component side view**

J72-0520-42
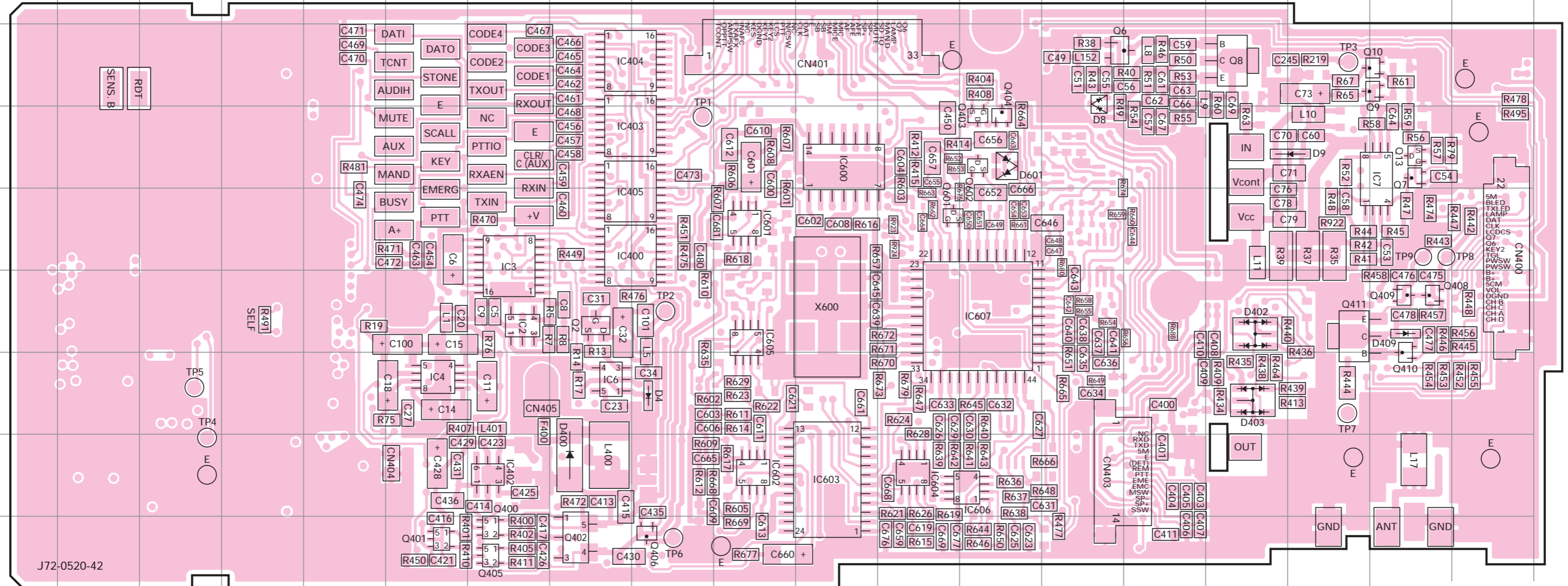
| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|
| IC2 | 6G | IC602 | 8J | Q13 | 4R | Q601 | 5L |
| IC3 | 5G | IC603 | 8K | Q400 | 9G | Q602 | 4M |
| IC4 | 7F | IC604 | 8L | Q401 | 9F | D4 | 7I |
| IC6 | 7H | IC605 | 6J | Q402 | 9H | D8 | 3N |
| IC7 | 4R | IC606 | 8M | Q403 | 4M | D9 | 4Q |
| IC400 | 5H | IC607 | 6M | Q404 | 4M | D400 | 8H |
| IC402 | 8G | Q2 | 6H | Q405 | 9G | D402 | 6P |
| IC403 | 4H | Q6 | 3N | Q406 | 9I | D403 | 7P |
| IC404 | 3H | Q7 | 4R | Q408 | 6R | D409 | 6R |
| IC405 | 5H | Q8 | 3P | Q409 | 6R | D601 | 4M |
| IC600 | 4K | Q9 | 3R | Q410 | 7R | | |
| IC601 | 5J | Q10 | 3R | Q411 | 6Q | | |

DTA123JE    2SC5066
DTA144EE    2SC5108
DTC114EE    2SC5110
DTC144EE
2SC4215
2SC4617

2SB1132    IMN10    2SB798    UMC4    UMG3N    2SC4988

FP210    DA221 HSM88AS    MA742    1SS301    2SK1215    2SJ144    2SJ517    UPA572T    3SK293

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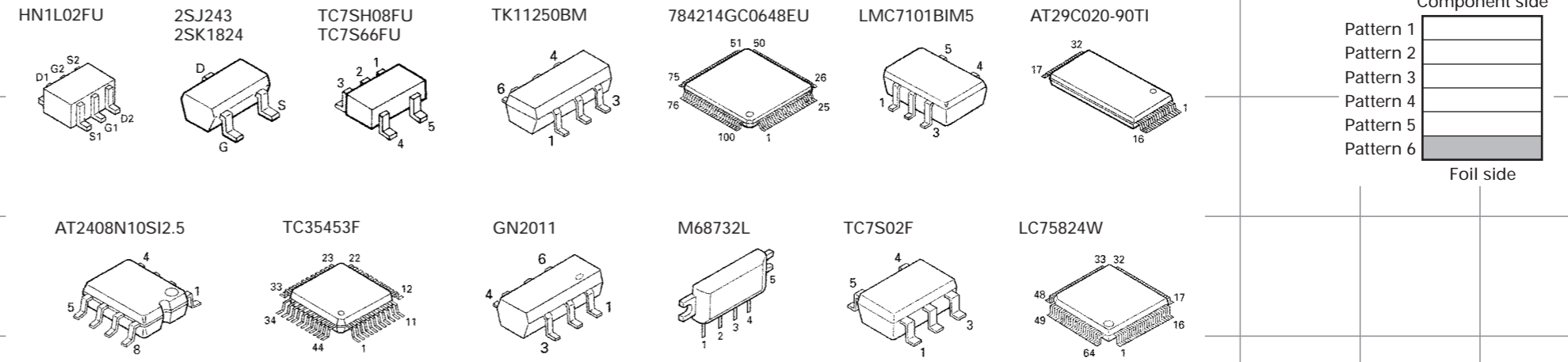Pattern 5
Pattern 6
Foil side

55    56
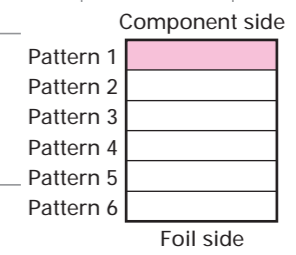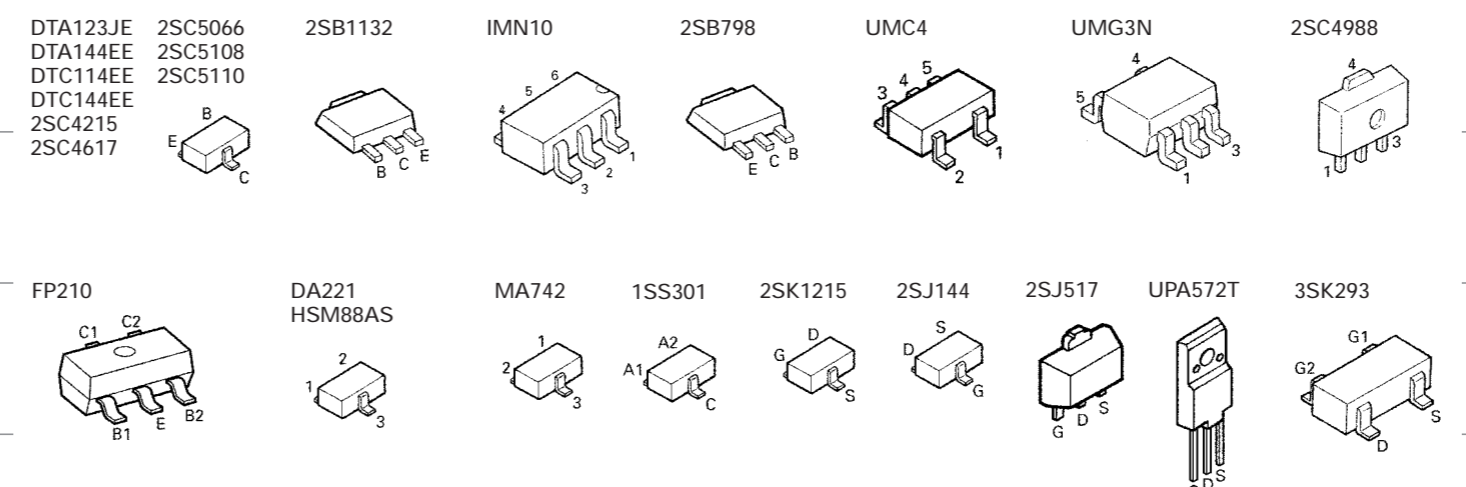
**TX-RX UNIT (X57-5400-XX)  -10 : K,K4  -11 : K2  -12 : K3,K6  Foil side view**
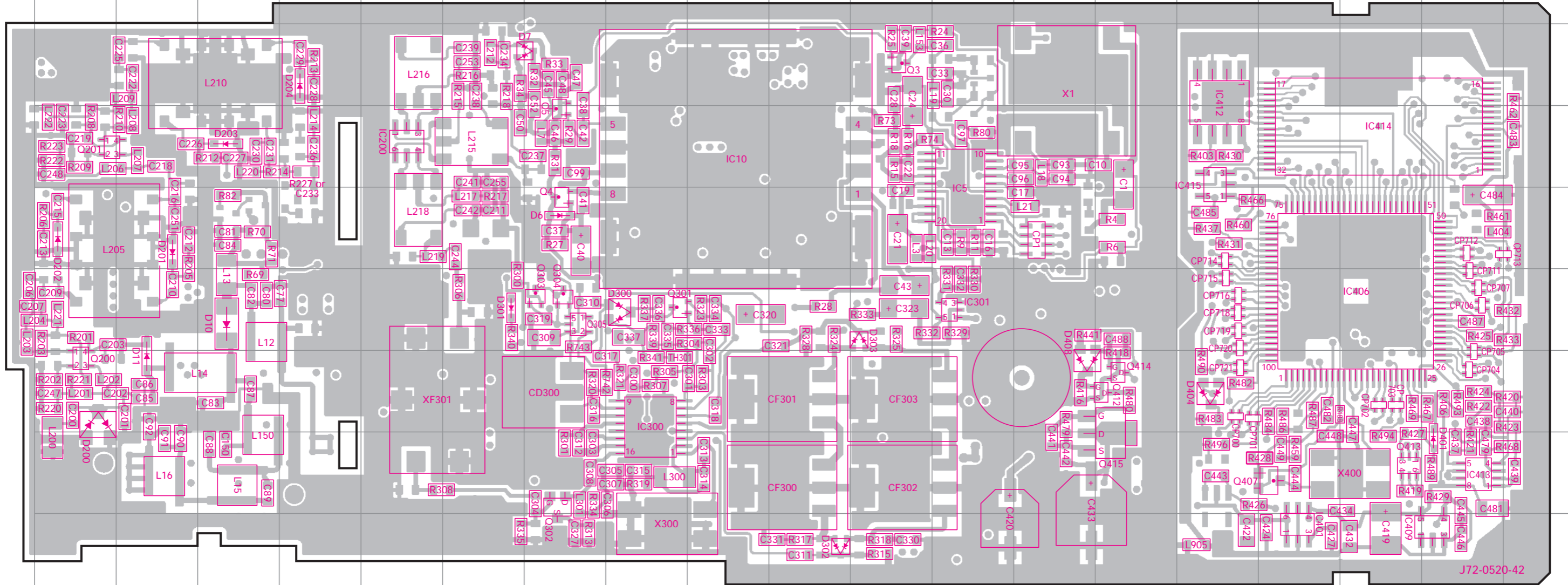
J72-0520-42

| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|
| IC5     | 4L      | IC415   | 4O      | Q407    | 8P      | D202    | 5A      |
| IC10    | 4I      | Q3      | 3K      | Q412    | 7N      | D203    | 4C      |
| IC200   | 4E      | Q4      | 5G      | Q413    | 8Q      | D204    | 3D      |
| IC300   | 7H      | Q5      | 4G      | Q414    | 7N      | D300    | 6H      |
| IC301   | 6L      | Q200    | 7A      | Q415    | 8N      | D301    | 6F      |
| IC401   | 9P      | Q201    | 4A      | D6      | 5G      | D302    | 9J      |
| IC406   | 6Q      | Q301    | 6H      | D7      | 3G      | D303    | 6K      |
| IC409   | 9R      | Q302    | 8G      | D10     | 6C      | D401    | 8R      |
| IC412   | 3O      | Q303    | 6G      | D11     | 7B      | D404    | 7O      |
| IC413   | 8R      | Q304    | 6G      | D200    | 7A      | D408    | 7M      |
| IC414   | 4Q      | Q305    | 6G      | D201    | 5B      |         |         |

HN1L02FU

2SJ243
2SK1824

TC7SH08FU
TC7S66FU

TK11250BM

784214GC0648EU

LMC7101BIM5

AT29C020-90TI

AT2408N10SI2.5

TC35453F

GN2011

M68732L

TC7S02F

LC75824W

Component side

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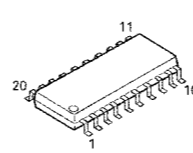Pattern 5
Pattern 6

Foil side

57

58

# TK-390  PC BOARD VIEW

**TX-RX UNIT (X57-5400-XX)  -10 : K,K4   -11 : K2   -12 : K3,K6   Component side view + Foil side**
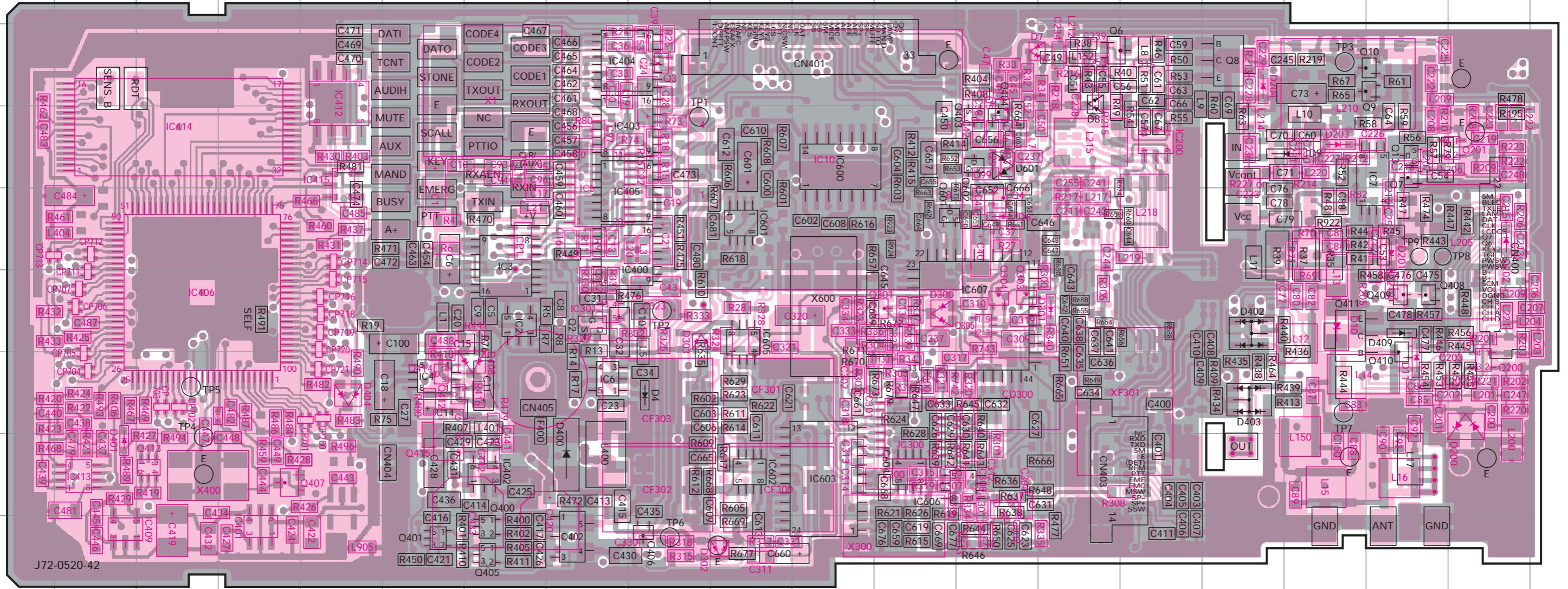
J72-0520-42

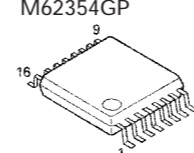| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| IC2 | 6G | IC405 | 5H | Q2 | 6H | Q304 | 6M | Q413 | 8C | D203 | 4Q |
| IC3 | 5G | IC406 | 6C | Q3 | 3I | Q305 | 6M | Q414 | 7F | D204 | 3P |
| IC4 | 7F | IC409 | 9B | Q4 | 5M | Q400 | 9G | Q415 | 8F | D300 | 6L |
| IC5 | 5H | IC412 | 3E | Q5 | 4M | Q401 | 9F | Q601 | 5L | D301 | 6N |
| IC6 | 7H | IC413 | 8B | Q6 | 3N | Q402 | 9H | Q602 | 4M | D302 | 9J |
| IC7 | 4R | IC414 | 4C | Q7 | 4R | Q403 | 4M | D4 | 7I | D303 | 6I |
| IC10 | 4K | IC415 | 4E | Q8 | 3P | Q404 | 4M | D6 | 5M | D400 | 8H |
| IC200 | 4O | IC600 | 4K | Q9 | 3R | Q405 | 9G | D7 | 3M | D401 | 8B |
| IC300 | 7L | IC601 | 5J | Q10 | 3R | Q406 | 9I | D8 | 3N | D402 | 6P |
| IC301 | 6H | IC602 | 8J | Q13 | 4R | Q407 | 8D | D9 | 4Q | D403 | 7P |
| IC400 | 5H | IC603 | 8K | Q200 | 7S | Q408 | 6R | D10 | 6Q | D404 | 7E |
| IC401 | 9D | IC604 | 8L | Q201 | 4S | Q409 | 6R | D11 | 7R | D408 | 7G |
| IC402 | 8G | IC605 | 6J | Q301 | 6L | Q410 | 7R | D200 | 7S | D409 | 6R |
| IC403 | 4H | IC606 | 8M | Q302 | 8M | Q411 | 6Q | D201 | 5R | D601 | 4M |
| IC404 | 3H | IC607 | 6M | Q303 | 6M | Q412 | 7F | D202 | 5S | | |

SA7025DK

BU4094BCFV
M62354GP

MAX856
NJM2904V
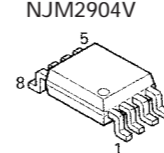
M62364FP
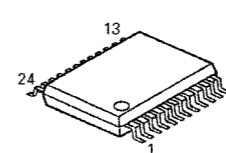
TA75W01FU
TC7W04FU
TC75W51FU
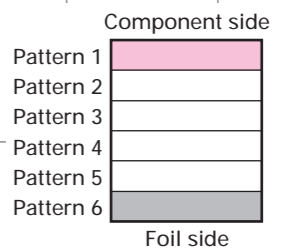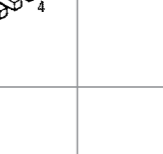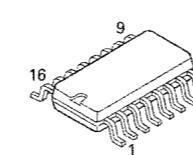
TDA7053AT

XHW2727-2

TA31136FN

LC73872M

Component side

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

Foil side

● Connect 1 and 6

59

60

Note : Components marked with a dot (·) are parts of pattern 1.
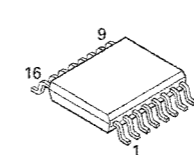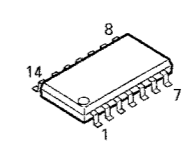
# TK-390 SCHEMATIC DIAGRAM

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

IC1 : TDA7053AT   Q5 : 2SC4617(S)   D2 : DTZ3.9(B) or UDZ3.9(B)
IC2 : BU4094BCFV   Q6 : 2SB798(DL,DK)   D12,13,15,19,20 : MA2S111
IC3 : NJM2904V   Q7,8,15 : 2SK1824   D16 : IMN10
IC4-6 : TC7SH08FU   Q14 : UMC4
IC10 : TC7W04FU

X53-3930-XX(A/6)
CONTROL UNIT

CN401
CN1
Q6

X57-5400-XX TX-RX UNIT

SHIFT REGISTER   IC2 BU4094BCFV
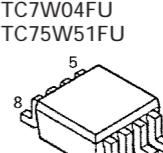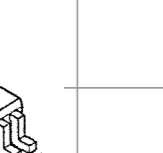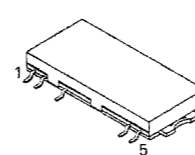D16 IMN10
REVERSE CURRENT PREVENTION

D6-9
KEY PAD BACKLIGHT

1 2 3
4 5 6
7 8 9
* 0 #

*D17 *D11
*D14 *D18

IC4-6
OPTION BOARD CONTROL SWITCH

INVERTER
IC10 TC7W04FU
1A VCC 8
3Y 1Y 7
2A 3A 6
GND 2Y 5

IC4 TC7SH08FU
OUTY GND
INA
VCC INB

IC5 TC7SH08FU
OUTY GND
INA
VCC INB

IC6 TC7SH08FU
OUTY GND
INA
VCC INB

SHIFT REGISTER
REVERSE CURRENT PREVENTION

5.0V

LCD
A SCN MON LO OPT AUX

X53-(B/6)

IC101 LC75824W
LCD DRIVER

LCD BACKLIGHT
SPEED UP

X53-(F/6)
TOGGLE SW
TOP 2 TOP 1
S1
R502 1k

R106 270k   C104 100p
D101 1SS373
R101 100k   C106
R103 10k
R104 10k
R107 4.7k
R102 10k

5.0V
LED

CN101
CN400

X57-5400-XX
TX-RX UNIT

IC101 : LC75824W
D101 : 1SS373
D102,103 : B30-2231-05
D104 : B30-2019-05

CP1 47k·2
C1 470p
C2 470p

R22 1k
R23 1k

R40 *R41 *R42
*R53 *R54 *R55

R10 1k   D19 MA2S111
R9 1k   D20 MA2S111

D12 MA2S111   R45 1k
R46 1k
R47 1k
D13 MA2S111   R48 1k
D15 MA2S111   R49 1k

CN3
ORANGE
PTT
SIDE 1
SIDE 2
R59 1k

D12,13,15,19,20
REVERSE CURRENT PREVENTION

L2 L1

R12 1k   R14 100k   C43 470p   R13 47k   R64 0
C38 470p   C39 470p

AUDIO MUTE SWITCH SIGNAL OFF   5.0V   Q8 2SK1824
R68 0   C14 0.1u
R1 27k
R17 47k   R4 47k   C12 0.47u
R2 1k
RE:0V RI:4.8V T:0V
RE:4.8V RI:0V T:0V
RE:0V RI:2.0V T:0V

INT.AUDIO MUTE SWITCH
Q7 2SK1824

AF AMP POWER SUPPLY SWITCH
C37 100p   L6
R56 15k
Q6 2SB798(DL,DK)

POWER SUPPLY SWITCH CONTROL
Q5 2SC4617(S)
AVR
D2 DTZ3.9(B) or UDZ3.9(B)
R:4.8V T:0V
7.4V
C4 470p   C3 470p
R11   C8 0.47u   C5 470p   R15 2.2k

R18 47k   R5 47k   C13 0.47u
RE:2.0V RI:0V T:0V

EXT.AUDIO MUTE SWITCH
Q15 2SK1824

AUDIO POWER AMPLIFIER
IC1 TDA7053AT
1 NC1 OUT1+ 16
NC1 NC4
NC2 PGND1
VI<1> OUT1-
VP OUT2+
VI<2> NC3
SGND PGND2
8 VC2 OUT2- 9

C19 0.47u
C16 100u10
R66 0   L4
R67 0

MIC NOISE CANCELING CIRCUIT
IC3 NJM2904V
1 AOUT V+ 8
A-IN BOUT
A+IN B-IN
GND B+IN

R29 22k
R30 22k   C32 0.47u
R57
5.0V
C30 0.47u
R35 22k   R34 1.8k   Q14 UMC4
R33 22k   R32 68
R31 0.022u   R43 47k   C35 1000p

L3
CN4 1 INT SP.
R36 1.8k   C45 470p   C46 470p
2
MIC1 INT MIC (MAIN)
C33 470p
R44 47k
MIC2 INT MIC (N/C)
C34 470p

N/CSW
NOISE CANCELLING SWITCH

| | | D6 | D7 | D8 | D9 | D11 | D14 | D17 | D18 | R19 | R20 | R31 | R37 | R38 | R39 | R40 | R41 | R42 | R50 | R51 | R52 | R53 | R54 | R55 | IC7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -13 | K,K2 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO |
| -14 | K4 | B30-2171-05 | B30-2171-05 | B30-2171-05 | B30-2171-05 | IMN10 | IMN10 | IMN10 | IMN10 | 100 | 100 | 0 | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | BU4094BCFV |
| -15 | K3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO |
| -16 | K6 | B30-2171-05 | B30-2171-05 | B30-2171-05 | B30-2171-05 | IMN10 | IMN10 | IMN10 | IMN10 | 100 | 100 | 0 | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | 1k | BU4094BCFV |

# TK-390      TK-390

## BLOCK DIAGRAM
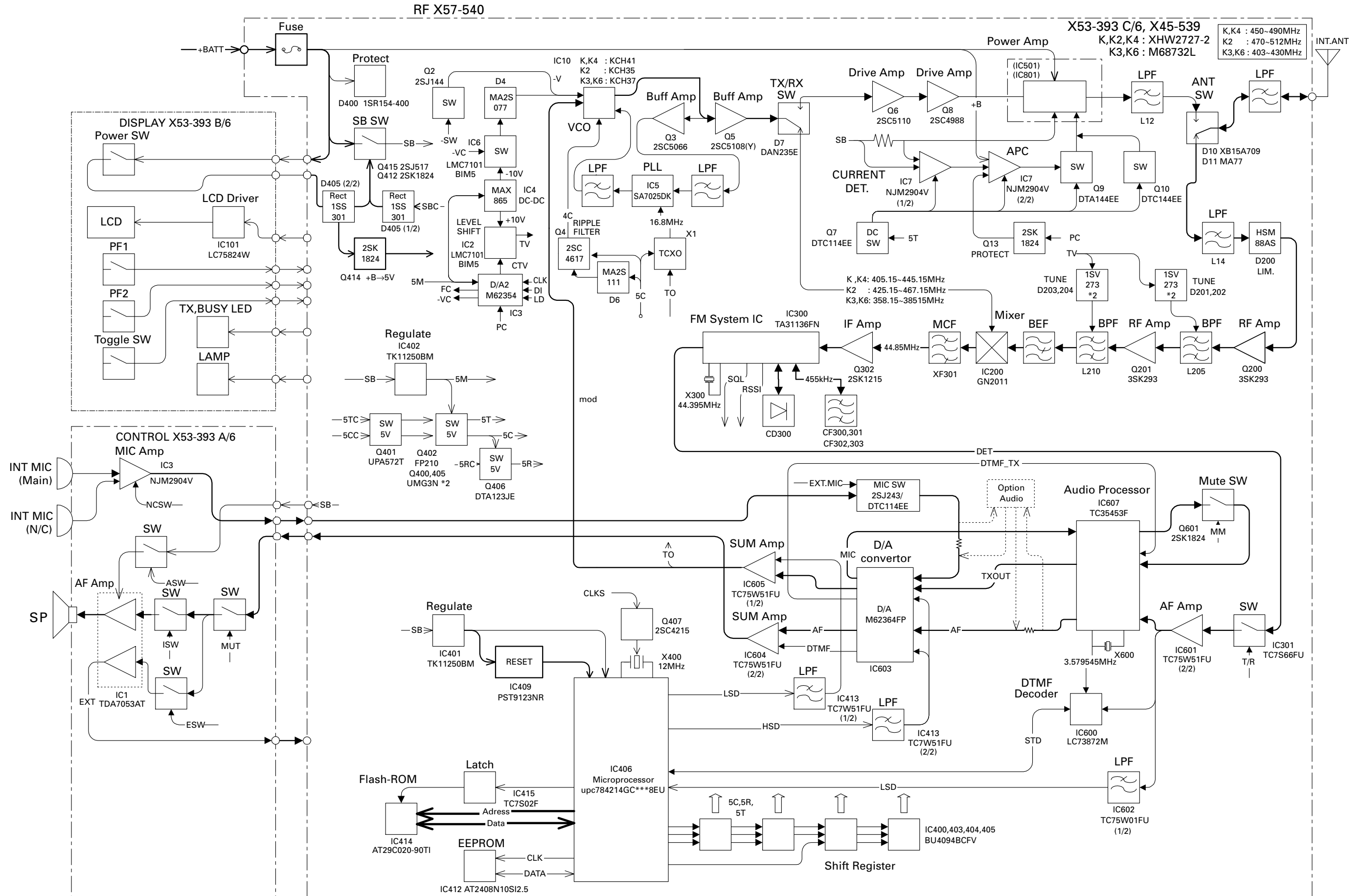
# LEVEL DIAGRAM

## Receiver Section

ANT

-121.0dBm
-112.0dBm
-99.5dBm
-104.5dBm
-90.5dBm
-96.0dBm
-104.5dBm
-113.5dBm
-104.5dBm
-104.5dBm
240mVrms
310mVrms

C85
Q200
L205
Q201
L210
L216
IC200
L218
XF301
C304
Q302
C308
FM IF SYSTEM
IC601 (2/2)

*RF
IF (44.85MHz)
IF2 (455kHz)
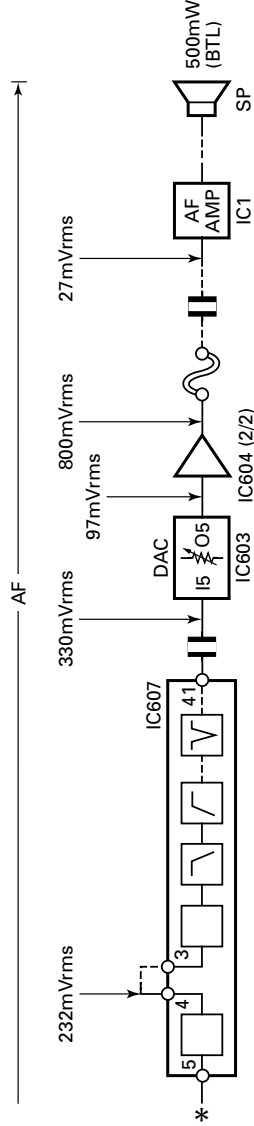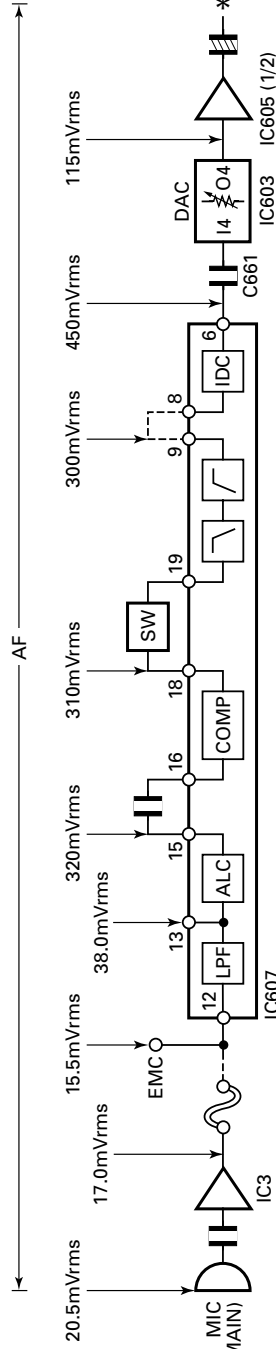AF
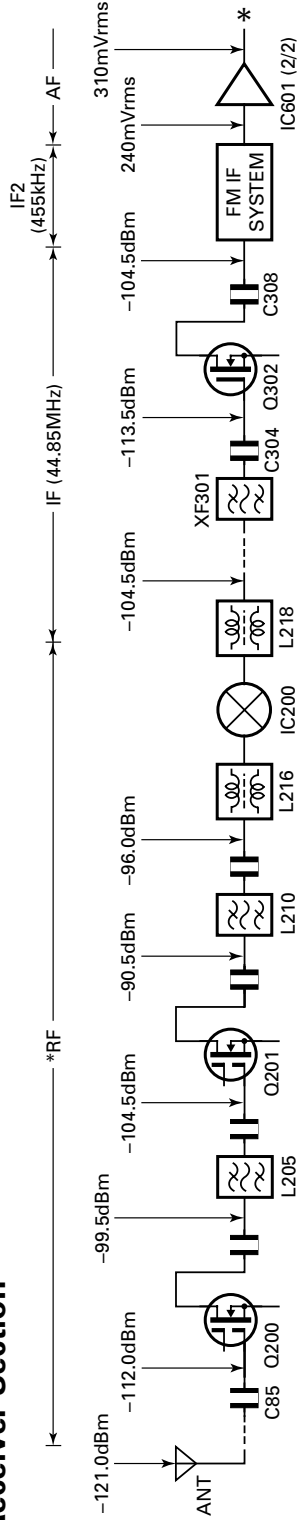
To make measurements in the AF section, connect the AC level meter. (ANT input : –47dBm, 1kHz FM, 3kHz DEV.)
In the RF section, use a 1000pF coupling capacitor. (The display shows the SSG input value required to obtain 12dB SINAD.)

AF

232mVrms
330mVrms
97mVrms
800mVrms
27mVrms

IC607
41
12
13
15
16
18
3
4
5

LPF
ALC

DAC
IC603
I5  O5

IC604 (2/2)

AF AMP
IC1

SP
500mW (BTL)

*

## Transmitter Section

MIC (MAIN)

20.5mVrms
17.0mVrms
15.5mVrms
38.0mVrms
320mVrms
310mVrms
300mVrms
450mVrms
115mVrms

IC3 NC AMP
EMC

IC607
12
13
15
16
18
19
8
9
6

LPF
ALC
COMP
SW
IDC

DAC
IC603
I4  O4

IC605 (1/2)

*

AF
*RF
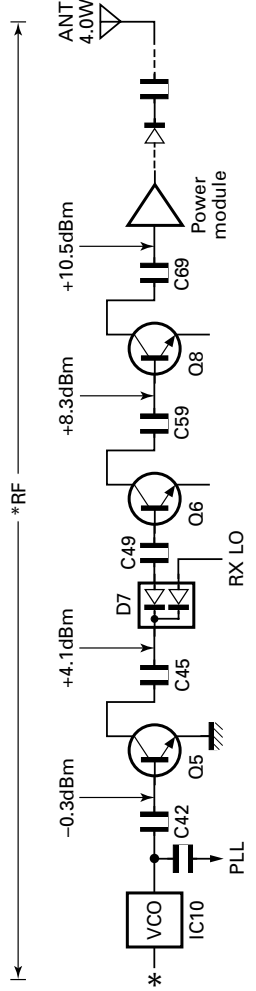
*RF frequency
470.0MHz : K,K4
490.0MHz : K2
416.0MHz : K3,K6

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

VCO
IC10
PLL

C42
Q5
C45
C49
D7

RX LO

Q6
C59
Q8
C69
Power module

ANT
4.0W

-0.3dBm
+4.1dBm
+8.3dBm
+10.5dBm

*

# TK-390

## TERMINAL FUNCTION

| CN No. | Pin No. | Name | I/O | Function |
|---|---|---|---|---|
| **TX-RX UNIT (X57-5400-XX)** | | | | |
| CN400 | 1 | CH D | I | CH switch data. |
| | 2 | CH A | I | CH switch data. |
| for | 3 | CH C | I | CH switch data. |
| X53 | 4 | CH B | I | CH switch data. |
| (B/6) | 5 | E | – | GND. |
| | 6 | VOL | I | Voltage level input for audio control. |
| | 7 | 5CM | – | 5V. |
| | 8 | B+ | – | Power input after passing through the fuse. |
| | 9 | B+ | – | Power input after passing through the fuse. |
| | 10 | SB | – | Power output after power switch. |
| | 11 | SB | – | Power output after power switch. |
| | 12 | TOGGLE | I | Normally : 5V, switched toggle when connected GND. |
| | 13 | KEY2 | I | Key input. |
| | 14 | Q6 | O | Key scan IC Q6 signal output. |
| | 15 | Q7 | O | Key scan IC Q7 signal output. |
| | 16 | LCDCS | O | Chip select output for LCD driver. |
| | 17 | CLK | O | Clock data output for LCD driver. |
| | 18 | DAT | O | Data output for LCD driver. |
| | 19 | LAMP | – | Backlight LED control. Normally : 0V, Lighting : 7.5V |
| | 20 | TXLED | – | TX LED control. Normally : 0V, Lighting : 7.5V |
| | 21 | BLED | – | Busy LED control. Normally : 0V, Lighting : 7.5V |
| | 22 | 5M | – | 5V. |
| CN401 | 1 | TCONT | O | For optional board. (See page 22.) |
| | 2 | OPPTT | O | For optional board. (See page 22.) |
| for | 3 | AMPSW | O | Audio AMP control switch output. |
| X53 | 4 | EXAFC | O | External speaker switch control. |
| (A/6) | 5 | INAFC | O | Internal speaker switch control. |
| | 6 | KRS | O | Key scan IC reset output. |
| | 7 | KCK | O | Key scan IC clock data output. |
| | 8 | SOD | – | Not use. |
| | 9 | KEY1 | I | Key input. |
| | 10 | KEY2 | I | Key input. |
| | 11 | LCS | – | Not use. |
| | 12 | PTT | I | PTT signal input. |
| | 13 | N/CSW | O | Noise canseler microphone switch output. |
| | 14 | NC | – | Not use. |
| | 15 | CLK | O | Clock data output. |
| | 16 | DAT | O | Data output. |
| | 17 | E | – | GND. |
| | 18 | SB | – | Power output after power switch. |
| | 19 | SB | – | Power output after power switch. |
| | 20 | 5M | – | 5V. |
| | 21 | MICE | – | MIC GND. |
| | 22 | MIC | I | MIC signal input. |
| | 23 | AF | O | Audio output. |
| | 24 | AFE | – | Audio GND. |
| | 25 | AFE | – | Audio GND. |

| CN No. | Pin No. | Name | I/O | Function |
|---|---|---|---|---|
| | 26 | SP+ | I | BTL input + for external speaker. |
| | 27 | SP– | I | BTL input – for external speaker. |
| | 28 | MUTE | O | Audio mute signal output. |
| | 29 | SD TO | O | For optional board. |
| | 30 | MAN D | O | For optional board. |
| | 31 | LAMP | O | Backlight LED control. Normally : 0V, Lighting : 7.5V |
| | 32 | Q7 | O | Key scan IC Q7 signal input. |
| | 33 | Q6 | O | Key scan IC Q6 signal input. |
| CN402 | 1 | AFE | – | Audio GND. |
| | 2 | AFE | – | AUdio GND. |
| CN403 | 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 GND. |
| | 7 | PTT | I | External PTT input. |
| | 8 | PF | I | Programmable function key input. |
| | 9 | NC | – | Not use. |
| | 10 | E | – | GND |
| | 11 | 5M | – | 5V. |
| | 12 | TXD | O | Serial data output. |
| | 13 | RXD | I | Serial data input. |
| | 14 | NC | – | Not use. |
| **CONTROL UNIT (X53-3930-XX) (A/6)** | | | | |
| CN1 | 1 | Q6 | O | Key scan IC Q6 output. |
| | 2 | Q7 | O | Key scan IC Q7 output. |
| for | 3 | LAMP | I | Backlight LED control. Normally : 0V, Lighting : 7.5V |
| X57 | 4 | MAN D | I | For optional board. (See page 22.) |
| | 5 | SD TO | I | For optional board. (See page 22.) |
| | 6 | MUTE | I | Audio mute signal input. |
| | 7 | SP– | O | BTL output – for external speaker. |
| | 8 | SP+ | O | BTL output + for external speaker. |
| | 9 | AFE | – | Audio GND. |
| | 10 | AFE | – | Audio GND. |
| | 11 | AF | I | Audio output. |
| | 12 | MIC | O | MIC signal input. |
| | 13 | MICE | – | MIC GND. |
| | 14 | 5M | – | 5V. |
| | 15 | SB | – | Power output after power switch. |
| | 16 | SB | – | Power output after power switch. |
| | 17 | E | – | GND. |
| | 18 | DATA | I | Data input. |
| | 19 | CLK | I | Clock data input. |
| | 20 | NC | – | Not use. |
| | 21 | N/CSW | I | Noise canseler microphone switch input. |
| | 22 | PTT | O | PTT signal output. |
| | 23 | LCS | – | Not use. |
| | 24 | KEY2 | O | Key output. |
| | 25 | KEY1 | O | Key output. |

# TERMINAL FUNCTION / KNB-17A (Ni-Cd BATTERY)

| CN No. | Pin No. | Name | I/O | Function |
|---|---|---|---|---|
| | 26 | NC | – | Not use. |
| | 27 | KCK | I | Key scan IC clock data input. |
| | 28 | KRS | I | Key scan IC reset input. |
| | 29 | INAFC | I | Internal speaker switch input. |
| | 30 | EXAFC | I | External speaker switch input. |
| | 31 | AMPSW | I | Audio AMP control switch input. |
| | 32 | OPPTT | I | For optional board. (See page 22.) |
| | 33 | TCONT | I | For optional board. (See page 22.) |
| CN2 | 1 | AFE | – | Audio GND. |
| for X57 | 2 | AFE | – | Audio GND. |
| CN3 | 1 | Q8 | O | Key scan IC Q8 signal output. |
| | 2 | Q7 | O | Key scan IC Q7 signal output. |
| | 3 | PTTE | – | PTT GND. |
| | 4 | PTT | I | Normally : 5V, transmit when connected GND. |
| | 5 | KI1 | I | Key input. |
| | 6 | Q6 | O | Key scan IC Q6 signal output. |
| CN4 | 1 | + | – | BTL + output for internal speaker. |
| | 2 | – | – | BTL – output for internal speaker. |
| **CONTROL UNIT (X53-3930-XX) (B/6)** | | | | |
| CN101 | 1 | E | – | GND. |
| | 2 | TOGGLE | O | Normally : 5V, switched toggle when |
| for | | | | connected GND. |
| X57 | 3 | KI2 | O | Key output. |
| | 4 | Q6 | I | Key scan IC Q6 signal input. |
| | 5 | Q7 | I | Key scan IC Q7 signal input. |
| | 6 | CE | I | Chip select input for LCD driver. |
| | 7 | CL | I | Clock data input for LCD driver. |
| | 8 | DI | I | Data input for LCD driver. |
| | 9 | LAMP | – | Backlight LED control. |
| | | | | Normally : 0V, Lighting : 7.5V |
| | 10 | TX LED | – | TX LED control. |
| | | | | Normally : 0V, Lighting : 7.5V |
| | 11 | BLED | – | Busy LED control. |
| | | | | Normally : 0V, Lighting : 7.5V |
| | 12 | 5M | – | 5V. |

## KNB-17A External View



## KNB-17A Circuit Diagram
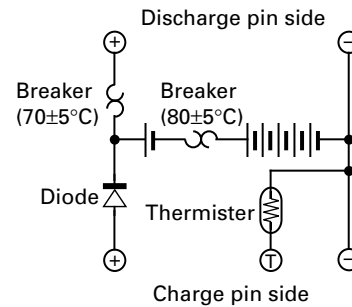


## KNB-17A Specifications

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

# TK-390

## KMC-25/26 (SPEAKER MICROPHONE)

### KMC-25 External View

### KMC-26 External View

Note : Stubby antenna are options

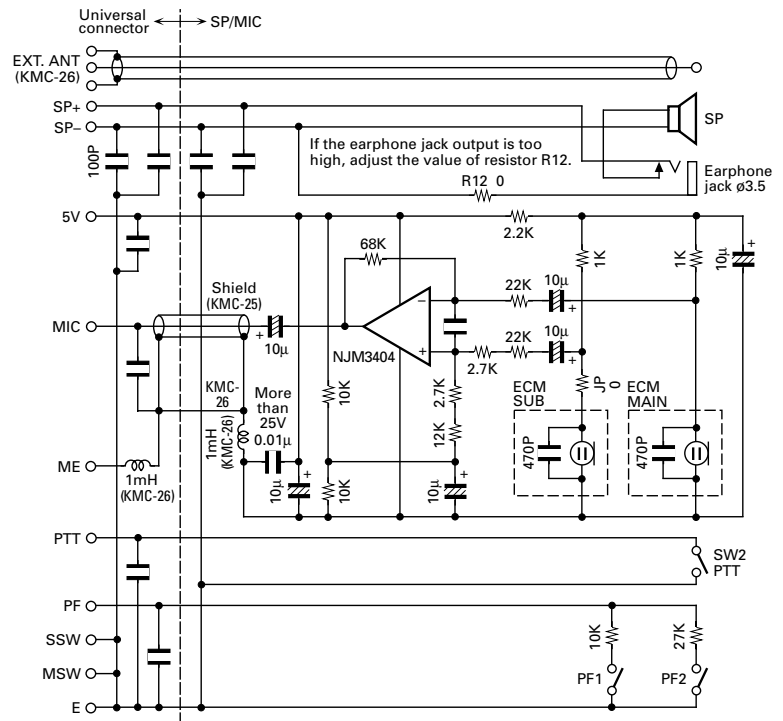### KMC-25/26 Specifications

Microphone
    Impedance ............................... 2kΩ
    Sensitivity ............................... −65dB±4.0dB at 1kHz
Speaker
    Impedance ............................... 16Ω
    Input ........................................ 0.5W
    Maximum input ........................ 1.5W
Dimensions ................................... 62 W x 81 H x 29 D (mm)
Weight (With plug cord) .............. Approx. 0.17kg

### KMC-25/26 Circuit Diagram



### KMC-25/26 Parts List

✻ : New parts

| Ref. No. | New parts | Parts No. | Description | Model |
|---|---|---|---|---|
| | | A02-2092-08 | Case (Front) | 25 |
| | ✻ | A02-2253-08 | Case (Front) | 26 |
| | | A02-2093-08 | Case (Rear) | 25 |
| | ✻ | A02-2254-08 | Case (Rear) | 26 |
| | | B09-0382-08 | Cap (Phone) | |
| | | D10-0629-08 | Lever (PTT) | |
| | | E04-0415-08 | RF coaxial receptacle | 26 |
| | | E30-3287-08 | Lead wire with plug assy | 25 |
| | ✻ | E30-3322-08 | Lead wire with plug assy | 26 |
| | | J29-0644-08 | Clip assy | |
| | | J42-0495-08 | Bushing | |
| | | S70-0459-08 | Tact switch | |
| | | T07-0359-08 | Speaker | |
| | | T91-0584-08 | MIC element | |
| | | N08-0535-08 | Dressed screw | |

# TK-390

## KSC-19 (CHARGER) / KSC-20 (RAPID CHARGER) / KPG-36 (PRO-GRAMMING INTERFACE CABLE) / KRA-15 (WHIP ANTENNA)

### KSC-19   External View

### KPG-36   External View

### KSC-19   Charging

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

### KSC-20   External View

### KRA-15   External View

M    : 450~490MHz
M2  : 470~512MHz
M3  : 403~430MHz

### KSC-20   Specifications

Charging current ..................... 1100mA±150mA
Charging time .......................... KNB-17A : 80 min.±24%
Source voltage ........................ Approx 15V
Ambient temperature ............. 0°C~40°C
Dimensions ............................. 105 W x 135 D x 52 H (mm)
Weight ................................... 0.18kg

# TK-390

## SPECIFICATIONS

### GENERAL

| | |
|---|---|
| Frequency Range ................................................ | 450 to 490MHz : K,K4    470~512MHz : K2    403~430MHz : K3,K6 |
| Number of Channels ............................................ | 160 channels |
| Channel Spacing ................................................. | Wide : 25kHz, Narrow : 12.5kHz |
| | (PLL channel step 5kHz, 6.25kHz) |
| Battery Voltage ................................................... | 7.5V DC ± 20% |
| Battery Life ........................................................ | 10 hours at 4W (5-5-90 duty cycle) |
| Temperature Range ............................................ | –30°C to +60°C (–22°F to +140°F) |
| Dimensions and Weight ..................................... | 6-3/32" (155mm) H x 2-5/16" (58mm) W x 1-1/2" (38mm) D, 1.25 lbs (565g) |
|    With Keypad Model ....................................... | 6-3/32" (155mm) H x 2-5/16" (58mm) W x 1-9/16" (39.5mm) D |

### RECEIVER (Measurements made per EIA standard EIA-603)

| | |
|---|---|
| Sensitivity | |
|    EIA 12dB SINAD ........................................... | 0.25µV |
|    20dB Quieting .............................................. | 0.35µV |
| Selectivity ........................................................ | Wide : –73dB, Narrow : –68dB |
| Intermodulation ................................................ | Wide : –73dB, Narrow : –65dB |
| Spurious and Image Rejection ........................... | –73dB |
| Audio Power Output .......................................... | 500mW at less than 3% distortion |
| Frequency Stability ........................................... | ±0.0002% from –30°C to +60°C |
| Channel Frequency Spread ............................... | 40MHz : K,K4    42MHz : K2    27MHz : K3,K6 |

### TRANSMITTER ( Measurements made per EIA standard EIA-603)

| | |
|---|---|
| RF Power Output ............................................... | Hi : 4W, Low : 1W |
| Spurious and Harmonics .................................... | –70dB |
| Type of Emission .............................................. | Wide : 16K0F3E, Narrow : 11K0F3E |
| FM Noise .......................................................... | Wide : –45dB, Narrow : –40dB |
| Audio Distortion ................................................ | Less than 3.0% at 1000Hz |
| Frequency Stability ........................................... | ±0.0002% from –30°C to +60°C |
| Channel Frequency Spread ............................... | 40MHz : K,K4    42MHz : K2    27MHz : K3,K6 |