# KENWOOD

## Document Copyrights
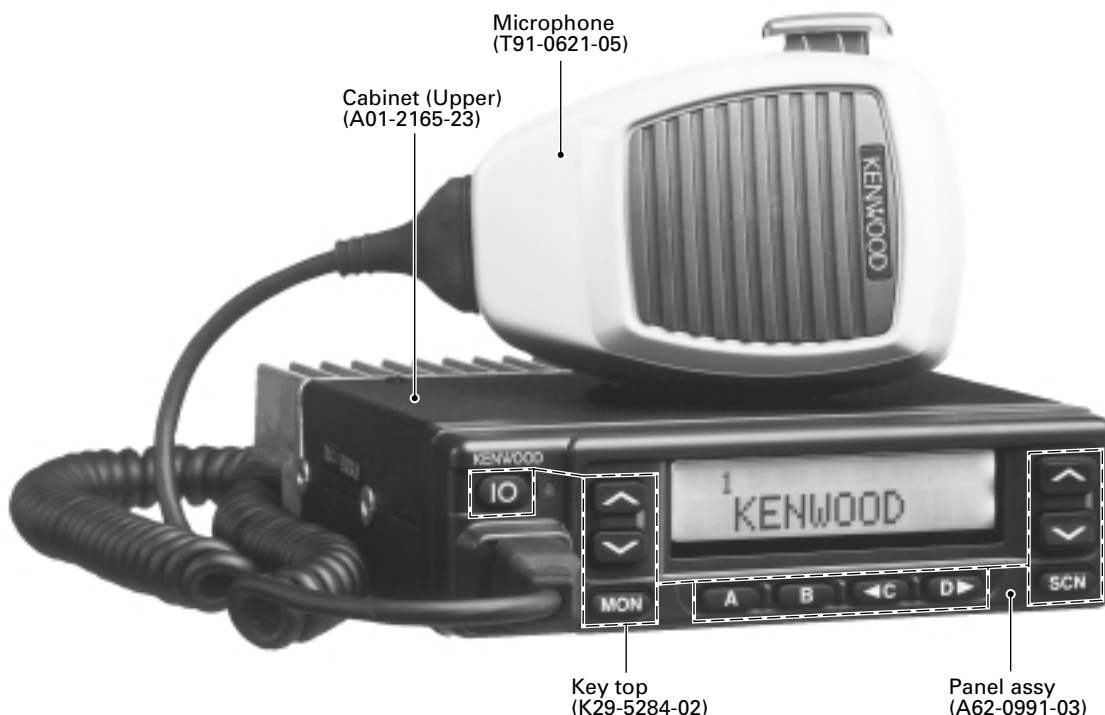
## Disclaimer

800MHz/900MHz FM TRANSCEIVER

# TK-980/981

## SERVICE MANUAL

SUPPLEMENT

# KENWOOD

This service manual applied to products with 30600001 or subsequent serial numbers.
In terms of the products with the serial numbers earlier than 30600001, refer to the TK-980/981 service manual as per part No. B51-8478-10.

Microphone
(T91-0621-05)

Cabinet (Upper)
(A01-2165-23)

Key top
(K29-5284-02)

Panel assy
(A62-0991-03)



## CONTENTS

# GENERAL

## INTRODUCTION
### SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of the publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions, which 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, and chassis. If the part number is not known, include the chassis or kit number of which it is a part, and a sufficient description of the required component for proper identification.

## PERSONNEL SAFETY

The following precautions are recommended for personnel safety :
• DO NOT transmit if someone is within two feet (0.6 meter) of the antenna.
• DO NOT transmit until all RF connectors are secure and any open connectors are properly terminated.
• SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
• All equipment should be properly grounded before power-up for safe operation.
• This equipment should be serviced by only qualified technicians.

## PRE-INSTALLATION CONSIDERATIONS
### 1. UNPACKING

Unpack the radio from its shipping container and check for accessory items. If any item is missing, please contact KENWOOD immediately.

### 2. LICENSING REQUIREMENTS

Federal regulations require a station license for each radio installation (mobile or base) be obtained by the equipment owner. The licensee is responsible for ensuring transmitter power, frequency, and deviation are within the limits permitted by the station license.

Transmitter adjustments may be performed only by a licensed technician holding an FCC first, second or general class commercial radiotelephone operator's license. There is no license required to install or operate the radio.

### 3. PRE-INSTALLATION CHECKOUT
### 3-1. Introduction

Each radio is adjusted and tested before shipment. However, it is recommended that receiver and transmitter operation be checked for proper operation before installation.

### 3-2. Testing

The radio should be tested complete with all cabling and accessories as they will be connected in the final installation. Transmitter frequency, deviation, and power output should be checked, as should receiver sensitivity, squelch operation, and audio output. QT equipment operation should be verified.

## 4. PLANNING THE INSTALLATION
### 4-1. General

Inspect the vehicle and determine how and where the radio antenna and accessories will be mounted.

Plan cable runs for protection against pinching or crushing wiring, and radio installation to prevent overheating.

### 4-2. Antenna

The favored location for an antenna is in the center of a large, flat conductive area, usually at the roof center. The trunk lid is preferred, bond the trunk lid and vehicle chassis using ground straps to ensure the lid is at chassis ground.

### 4-3. Radio

The universal mount bracket allows the radio to be mounted in a variety of ways. Be sure the mounting surface is adequate to support the radio's weight. Allow sufficient space around the radio for air cooling. Position the radio close enough to the vehicle operator to permit easy access to the controls when driving.

### 4-4. DC Power and wiring

1. This radio may be installed in negative ground electrical systems only. Reverse polarity will cause the cable fuse to blow. Check the vehicle ground polarity before installation to prevent wasted time and effort.
2. Connect the positive power lead directly to the vehicle battery positive terminal. Connecting the Positive lead to any other positive voltage source in the vehicle is not recommended.

*CAUTION*

*If DC power is to be controlled by the vehicle ignition switch, a switching relay should be used to switch the positive power lead. The vehicle ignition switch then controls DC to the relay coil.*

3. Connect the ground lead directly to the battery negative terminal.
4. The cable provided with the radio is sufficient to handle the maximum radio current demand. If the cable must be extended, be sure the additional wire is sufficient for the current to be carried and length of the added lead.

### 5. INSTALLATION PLANNING – CONTROL STATIONS

#### 5-1. Antenna system

Control station. The antenna system selection depends on many factors and is beyond the scope of this manual. Your KENWOOD dealer can help you select an antenna system that will best serve your particular needs.

#### 5-2. Radio location

Select a convenient location for your control station radio which is as close as practical to the antenna cable entry point. Secondly, use your system's power supply (which supplies the voltage and current required for your system). Make sure sufficient air can flow around the radio and power supply to allow adequate cooling.

### SERVICE

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

### Note

When you modify your radio as described in system setup, take the following precaution.

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



Accessory connector cable (KCT-19)
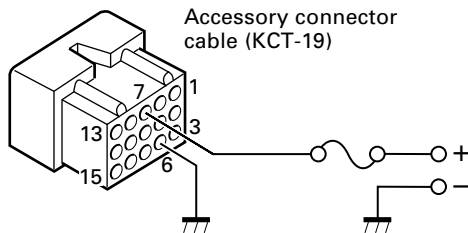
If you do not intend to use the 3.5-mm jack for the external speaker, fit the supplied speaker-jack cap (B09-0235-05) to stop dust and sand getting in.



Speaker-jack cap
(B09-0235-05)
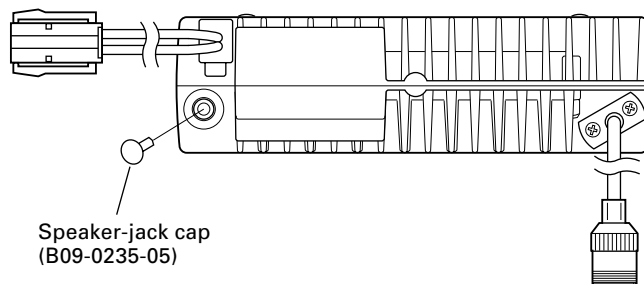
### 1. Operation Features

The TK-980/981 is an 800MHz/900MHz band EFJ LTR™ - compatible trunked radio designed to operate in both trunking and conventional modes. The programmable features are summarized.

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

### 2. Transceiver Controls and Indicators (Fig. 1)

#### 2-1. Front Panel Controls

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

- **POWER key**

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

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

- **SCAN key (Programmable)**

- **MONITOR key (Programmable)**

- **A, B, C and D key (Programmable)**

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

- **BUSY/TX LED**

The BUSY indicator (Green LED) shows that the group is in use. The TX indicator (Red LED) shows that you are transmitting.

#### 2-2. Programmable Keys

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

Auto tel, AUX-A, AUX-B (Only when voice scrambler is not selected), DTMF ID (BOT), DTMF ID (EOT), Display character, Emergency (Only foot key), Function, Group down, Group up, Home group, Horn alert, Key lock, Memory (RCL/STO), Memory (RCL), Memory (STO), Message mode (Only A key), Monitor A, Monitor B, Monitor C, Monitor D, Public address, Redial, Scan, Scan del/add, Scan temporary delete, Scrambler (Only when voice scrambler is selected), Send GPS, System down, System up, TEL disconnect, Volume down, Volume up and None.

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

- **Auto TEL**

Automatically connects available repeaters that are connected to telephone circuits when operating as LTR system. The time allocated to search for available repeaters is 60 seconds, after which connection failure occurs, a DTMF tone is output and the function terminates.

If connection to an available circuit is made, only ID 253, EOT or hang-up time-out can terminate the function.

# TK-980/981

## OPERATING FEATURES

- **AUX-A**

  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.

- **AUX-B**

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

  If this key is pressed, an underscore ("_") appears at the extreme right of the LCD and AUX port which is inside of transceiver turns to the active level.  If pressed again, the underscore disappears and the AUX ports turns to the deactive level.

- **DTMF ID (BOT)**

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

- **DTMF ID (EOT)**

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

- **Display character**

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

- **Emergency**

  Pressing this key for longer than the programmed "Emergency Key Delay Time" causes the transceiver to enter the emergency mode.  The transceiver jumps to the programmed "Emergency system and group" and transmits for the programmed "Active Time".

  The transceiver disables mic mute while transmitting. After finishing transmission, the transceiver receivers for the programmed "Interval Time".  The transceiver mutes the speaker while receiving.  Following the above sequence, the transceiver continues to transmit and receive.

- **Function**

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

- **Group Up/Down**

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

- **Home Group**

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

- **Horn Alert**

  If you are called from the base station using DTMF while you are away from your transceiver, you will be alerted by the vehicle horn or some other type of external alert.  To turn the horn alert function on , press this key.  A confirmation tone sounds, and the display shows "HA" on the sub LCD.

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

- **Key Lock**

  Pressing this key causes the transceiver to accept entry of only the [Function], [Key lock], [PTT], [Monitor A], [Monitor B], [Monitor C], [Monitor D], and [Emergency] keys.

- **Message Mode**

  Press this key to enter the message mode. (See "Alphanumeric Two-way Paging Function" for details)

- **Memory**

  This key allows DTMF memory data to be recalled; up to 32 memories each with a memory dial of up to 16 digits and an A/N of up to 10 digits per memory.

- **Monitor**

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

- **Public Address**

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

  The RADIO continues to scan & receive calls while in PA mode.  Pressing PTT activates PA, and will override an incoming call at anytime; however, no RADIO transmission takes place.

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

- **Redial**

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

- **Scan**

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

- **Scan Del/Add**

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

## OPERATING FEATURES

- **Scan Temporary Delete**

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

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

- **Scrambler**

  If a scrambler code (1 to 16) has been set in the FPU, an underscore ("_") appears at the extreme right of the LCD display when scrambler is active. Pressing this key changes on/off of scramble operation. Press this key for 2 seconds to enter scrambler code selection mode.

- **Send GPS (Optional)**

  Pressing this key causes the transceiver to send a single GPS data. (GPS receiver must be installed.)

- **System Up/Down**

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

- **Telephone Disconnect**

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

- **Volume Up/Down**

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

- **None**

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

### 2-3. Front Panel Displays and Indicators
① **Sub display**

  Displays the system and group numbers. Also displays various functions, such as TA.

② **P (Priority) indicator**

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

③ **MON (Monitor) indicator**

  The MON indicator appears when the button programmed as MONITOR is pressed.

④ **SVC (Service) indictor**

  This icon is not used this transceiver.

⑤ **SCN (Scan) indicator**

  The SCN indicator appears when using scan mode.

⑥ **AUX (Auxiliary) indicator**

  appears when the auxiliary function is activated (ON) by pressing the AUX-A key.

⑦ **Handset indicator**

  The handset indicator (**J**) appears when the selected group is programmed as telephone IDs.

⑧ **MAIL indicator**

  Flashes when a status message (FleetSync™) is received. Lights when a status message is stored in the stack memory.

⑨ **Alphanumeric display**

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

  Displays received messages when using FleetSync™.

⑩ **A,B,C,D key**
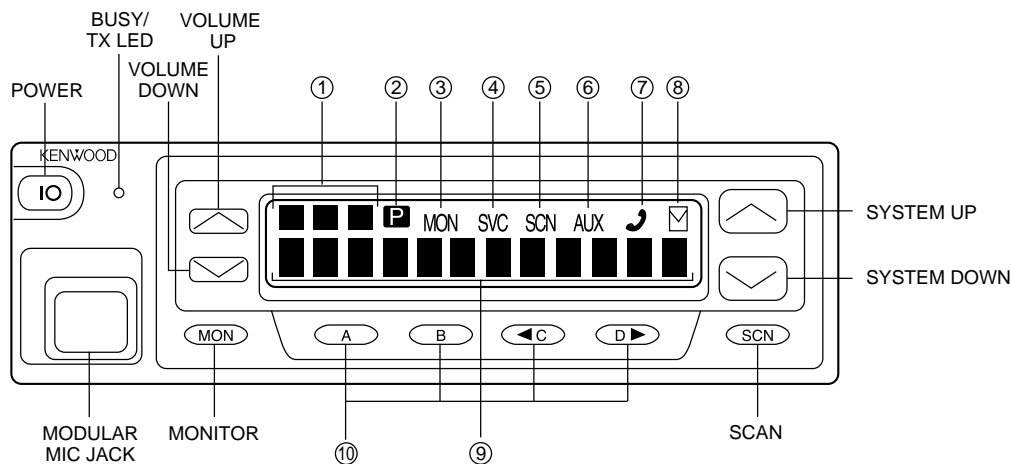
  These keys are programmable function (PF) keys.



**Fig. 1**

# TK-980/981

## OPERATING FEATURES

### 3. Scan Operating

#### ■ System Scan

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

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

There are two types of system scan.

#### • Fix System Scan

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

#### • List Type System Scan

A scan list can be set for each system.

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

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

#### ■ System Lockout

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

#### • Fixed Lockout

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

#### • User Selectable Lockout

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

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

#### ■ Drop-out Delay Time (Scan Resume Time)

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

#### ■ Dwell Time

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

#### ■ System/Group Revert

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

#### • Last Called Revert

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

#### • Last Used Revert

If a system/group call is received during scanning and the PTT button is pressed for transmission and response within the drop out delay time, the system or group is assigned as the new revert system or group.

#### • Selected Revert

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

#### • Selected + Talkback Revert

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

#### ■ Scan Massage Wait

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

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

#### ■ Group Scan Operation

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

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

# OPERATING FEATURES

## ■ In Conventional System

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

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

# 4. Details of Features

## ■ Time-out Timer

The time-out timer can be programmed in 15 seconds increments from 15 seconds to 10 minutes. If the transmitter is keyed continuously for longer than the programmed time, the transmitter is disabled and a warning tone sounds while the PTT button is held down. The alert tone stops when the PTT button is released.

## ■ Sub LCD Display

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

## ■ 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.

## ■ PTT ID

PTT ID provides a DTMF or MSK (FleetSync™ : Fleet-ID) ANI to be sent with every time PTT (beginning of transmission, end of transmission, or both).

You can program PTT ID for each group. You can program PTT ID as "on" or "off" when "DTMF" is selected for the PTT ID type. You can program a PTT ID as "own", "sel" or "off" when "MSK" is selected for the PTT ID type. The contents of ID are programmed for each transceiver.

The timing that the transceiver sends ID is programmable.

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

## ■ Radio Password

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

This code can be up to 6 digits from 0 to 9 and input with the key, and "SCN" key.

## ■ Off Hook Decode

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

## ■ Timed Power Off

This function works as "Automatic Power Switch Off".

Timed power off timer starts from the ignition-off. After the timer expires, the radio will automatically turn off. The timer will be reset if the ignition is turned on and off.

This function requires ignition-sense. Connect the ignition-line to the 9-pin connector which is located at the rear of the radio.

After the timer expires, press the power switch to turn on the radio.

## ■ Horn Alert

Horn alert can be set to on or off for each group. If horn alert has been set to YES for a group and DEC ID/QT/DQT/MSK matches, the horn alert, HOR. is turned on and off. The group for which the optional signalling is set works by ANDing the decode ID/QT/DQT/MSK with the optional signalling.

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

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

## ■ Non-continuous

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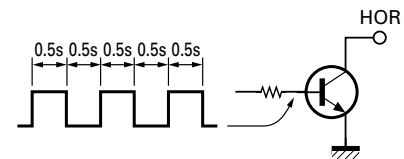


The timing when the fixed LTR ID matches is as follows;

# TK-980/981
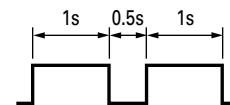
## OPERATING FEATURES

### ■ Continuous

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

| Operation when KCT-18 is connected | R151 | R152 |
|---|---|---|
| KCT-18 cannot be connected | Enable | Enable |
| Power on/off and Horn alert on/off | Disable | Enable |
| Horn alert on/off | Enable | Disable |
| Power cannot be turned on | Disable | Disable |

TX-RX unit A/2
Foil side

R152
R151
Q27
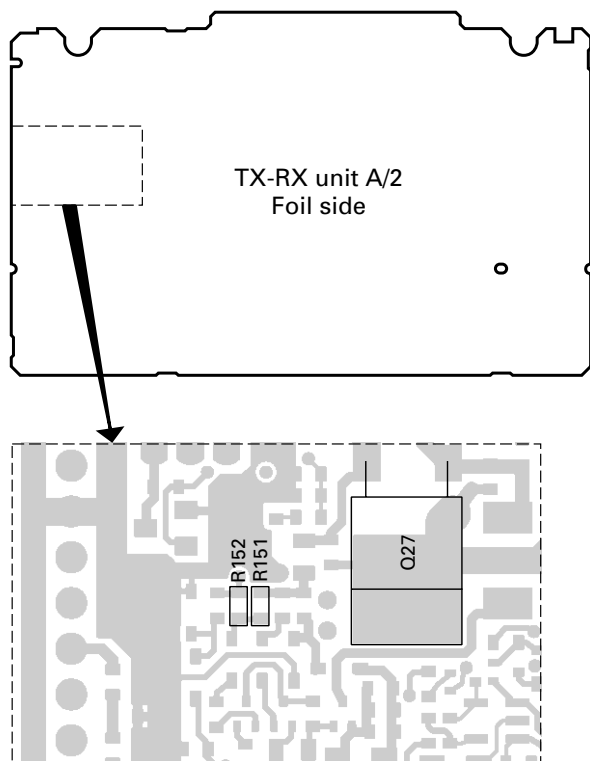
### ■ Call Indicator

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

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

### ■ Free System Ringback

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

When the PTT button is released, a beep sounds for 400ms to indicate that the mode has been entered. If the scan is on, it is resumed (the "SCN" mark goes on). When any repeater becomes available, a ringing tone sounds and this mode ends.

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

### ■ System Search

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

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

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

### ■ Transpond

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

### ■ Data TX with QT/DQT

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

### ■ Transmit Inhibit

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

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

## OPERATING FEATURES

■ **Auto TEL**

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

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

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

■ **ARQ Mode**

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

## 5. Option Signalling

### 5-1. DTMF

Built-in DTMF decoder is available for option signalling.

It is possible to use individual call, group call, D.B.D. (Dead Beat Disable). D.B.D. is used with DTMF only.

If the option signalling matches, a predetermined action will occur.

If option signalling matches on a group which is set up with option signalling, the option signalling indicator ( ✳ ) will flash and option signalling will be released. The transpond or alert tone will sound.

If the selective call alert LED is set up, the orange LED will flash.

While option signalling matches (or if option signalling is deactivated when you are transmitting), you can mute or unmute ID/QT/DQT/Carrier.

■ **AND/OR**

You can select AND or OR for option signalling match conditions.

| | Alert/Transpond | | |
|---|---|---|---|
| AND | QT/DQT/ID+DTMF; Option matches = Action | | |
| OR | QT/DQT/ID+DTMF; Option matches = Action | | |
| | AF mute open | | |
| AND | QT/DQT/ID+DTMF; Option matches = Action | | |
| OR | QT/DQT/ID; Signalling only matches = Action | | |

With OR set up, alert/transpond will not function with only DTMF.

With OR set up, AF mute will not release when only DTMF matches.

With a conventional group not set up with QT or DQT, only the carrier is considered when signalling matches.

■ **Auto Reset**

If option signalling matches a group set up with option signalling, option signalling is released. After matching option signalling, option signalling will temporarily reset automatically.

■ **Dead Beat Disable**

If the D.B.D. code matches, a predetermined action will occur. Whether option signalling is activated or not, when D.B.D. matches on any group, the transceiver will become TX inhibited or TX/RX inhibited. While D.B.D. is active, if the D.B.D. code + "#" code is received, D.B.D. will disactivate.

When D.B.D. matches, transpond will function. Alert will not be output, and option signalling match icon will not appear.

### 5-2. MSK

Built-in MSK (FleetSync™ : Fleet-ID) decoder is available for option signalling. When the group ID matches, squelch remains muted while the station waits for reception of proper MSK signal. When MSK signal matches, squelch unmutes.

■ **AND/OR**

AND : QT/DQT/ID + MSK to unmute. MSK matches = alert tone

OR : QT/DQT/ID to unmute. MSK matches = alert tone

## 6. Alphanumeric Two-way Paging Function (FleetSync™)

■ **General**

The Alphanumeric Two-way Paging Function (FleetSync™) is a Kenwood proprietary protocol. It enables a variety of paging functions.

■ **ID Construction**

A radio unit ID is defined by a combination of 3-digit Fleet and 4-digit ID numbers. Each radio unit must be assigned its own Fleet and ID numbers.

■ **PTT ID**

A pre-programmed unique ID (own) can be sent at the beginning of transmission and/or the end of transmission to identify which radio unit is on air.

When selecting (sel) for MSK ID, the radio calls he specific Fleet user the same as selective call.

# TK-980/981

## OPERATING FEATURES

■ **Selective Call (SELCALL)**
This is a voice call to a particular individual or group of stations.

• **Example of Call Types;**
[100][ALL ] : <Group Call>
All the units whose fleet number is "100" are called.
[100][1000] : <Individual Call>
The unit, whose the fleet number is "100" and ID number is "1000", is called.
[ALL][ALL ] : <Broadcast Call>
All the units are called.
[ALL][1000] : <Supervisor Call>
All ID "1000" are called regardless of their fleet number.

• **Unit ID Encode Block**
Encode ID Block can be set to limit manual dial ID. The radio unit will not accept an ID other than these IDs which are entered from the keypad. If Inter-fleet Call is enabled, block ID setting affects each fleet group.

■ **Status Message**
Using a 2-digit number, you can send and receive a Status message which may be decided in your talk group. Each Status may be displayed with 16 alphanumeric characters if programmed in the radio. A maximum of 9 received messages can be stored in the stack memory, and it can be reviewed after reception. If the message memory becomes full, the oldest one will be erased. The stack memory will be cleared by turning radio power off.

• **Status 80~99 (Special)**
Status numbers from 80 to 99 are reserved for special purposes. Entering these statuses from the DTMF keypad can be inhibited.
Please notice that the following status numbers are used for special purposes;

80~87 : Reserved for future use.
88 : Terminates to emergency mode.
89 : Request for horn alert.
90 : Remote stun on. Disable the received radio unit's TX.
91 : Remote stun on. Disable the received radio unit's TX/RX.
92 : Cancel remote stun. Enable the received radio unit's TX/RX.
93 : Acknowledgement status sent when the radio unit is in stun mode (TX disabled).
94 : Acknowledgement status sent when the radio unit is in stun mode (TX/RX disabled).
95~97 : Reserved for future use.
98 : Man down emergency status (For portable).
99 : Emergency Status.

**Note :** Remote stun works with DTMF D.B.D. function also.

• **Automatic Status Response**
If you pre-select a status number and leave the radio in the Status Mode, it can automatically respond with the selected status number upon request from the base station. (The request function is initiated by serial control on the base station (Optional).)

■ **Short Messase (Optional)**
A maximum of 48 characters can be sent (External equipment is required). Received Short Messages will be displayed in the same manner as a Status Message. A maximum of 4 received messages can be stored in the stack memory. In the Stack Mode, 3-digit LCD indicates the received Short Message as "M01"~"M04".

■ **Long Message (Optional)**
A maximum of 1024 characters can be sent (External equipment is required). Received Long Message will not be displayed or stacked in the radio memory but is output through the COM (Data) port.

■ **Emergency Function**
Emergency status 99 will be sent at the beginning of each emergency transmission.

• **Emergency Status response**
Either "Horn" or "Alert" can be selected for the called radio unit's response to reception of status 99 which is used as an emergency status.

■ **Other Functions**
• **Manual Dial**
Fleet, ID and Status numbers can be entered from DTMF keypad. (DTMF microphopne is required.)

• **FleetSync™ Baud Rate**
MSK data baud rate setting. The same rate must be set as a communication partner.
1200bps :
Data communication is made in 1200bps. The communication area is much wider than 2400bps. Recommended for repeater operation.
2400bps :
Data communication is made in 2400bps. The communication area is narrower than 1200bps, but it will decrease the data traffic. Data rate 2400bps may not work properly depending on the repeater's characteristic.

• **Message Mode Timer**
Message Mode Timer is a delay timer returning from message/stack mode to Normal mode.

• **Status/Short/Long Message on Data Group**
Status/Short/Long Message transmission is made whether on the Data System/Group.

## OPERATING FEATURES

• **Status/Short/Unit ID Message Serial Output (Option)**

Whether a received Status/Short message or PTT ID is output or not from serial port.

• **Caller ID Display**

PTT ID is displayed on LCD.

• **Call Alert (Continuous)**

The radio can provide the alert tone repeatedly until next operation.

• **PTT ID Sidetone**

This function allows a single beep sound after the PTT ID (MSK) for FleetSync™ signalling is encoded.

• **Caller ID Stack**

The radio stores the last 3 received caller IDs to volatile memory.

■ **GPS Report (Optional)**

ANMEA-0183 GPS unit must be installed.

• **GPS Report Mode**

GPS data can be sent automatically or upon request. Manually sending GPS data works regardless of this setting.

Auto : GPS data is sent both automatically and by request. GPS Auto TX Interval and GPS Time Mark must be adjusted if required.
Poll : GPS data is sent upon request from dispatcher.

• **GPS Report Interval**

Interval time between automatic GPS data transmissions.

• **GPS Time Mark (Per Mobile)**

The amount of time from the 0 (zero) minute of the standardized GPS UTC time to starting the first transmission of GPS data. It must be set to a different value for each radio unit to avoid a transmission crash.

• **Send GPS**

Pressing this key causes the transceiver to send a single GPS data.

• **GPS Report On Data Group**

GPS data transmission is made on the Data System/ Group.

• **Received GPS Data Output**

Any selected sentence can be output through the radio serial port (COM0 or COM1).

1) MAP HEADER NMEA1 ($GPGGA), NMEA2 ($GPGLL), NMEA3 ($GPRMC)
NMEA-0183 standard command. This should be set according to your PC application.

2) MAP HEADER KW1 ($PKLDS)
This is a Kenwood original sentence which consists of "$GPGLL + Fleet + ID + Status". This item should be set according to your PC application.

3) MAP HEADER KW2 ($PKLID)
This is a Kenwood original sentence which consists of "Fleet + ID". This should be set according to your PC application.

■ **Parameters**

• **GTC Count**

Number of Go To data Channel messages to be sent before transmitting a data message if it is being made on Data System/ Group. If a radio unit receives a GTC message, it will move to the Data System/Group of the current system. Increase this item to make sure the called radio unit moves to the Data System/Group.

• **Random Access (Contention)**

When a channel (or all the repeater channels for Trunking mode) is busy, radio unit will not transmit (depending on its Busy Channel Lockout setting in conventional mode). As soon as a channel is cleared, some transmissions may crash. Random access is used to avoid this by employing a random transmission sequence.

• **Number of Retries**

Number of Retries is the maximum number of retry transmission when no acknowledgement is received in the Maximum ACK Wait Time. Increase this item to improve data communication reliability.

• **TX Busy Wait Time**

TX Busy Wait Time is the maximum amount of time before giving up the data transmission when the channel (or all the repeater channels for Trunking mode) is busy. Also, this timer affects if it expires during Random Access period.

• **Maximum ACK Wait Time**

Maximum ACK Wait Time is the maximum amount of time to wait for an acknowledgement from the called radio unit. It is used as an interval time of retries. It must be set greater than the ACK Delay Time of the called radio unit.

# TK-980/981

## OPERATING FEATURES

- **ACK Delay Time**

  ACK Delay Time is the amount of time from the end of receiving a data to the beginning of sending an acknowledgement. It should be adjusted as the repeater's hang-up delay time. Also, it must be set less than the Maximum ACK Wait Time of the calling radio unit.

- **TX Delay Time (RX Capture)**

  TX Delay Time is the amount of unmodulated transmission to let the called unit stop scanning or exit its battery save mode. It is used only when starting a data communication sequence.

- **Data TX Modulation Delay Time**

  Data TX Modulation Delay Time is the amount of time from the beginning of transmission to the beginning of a data modulation. It is used every time data is transmitted. It must be set to more than 300ms if data communication is made in Trunking Mode.

### 7. Audible User Feedback Tones

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

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

■ **Power On Tone**

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

■ **Alert Tone**

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

■ **DBD On Tone**

When a D.B.D. code is received, transpond tone sounds.

■ **DBD Off Tone**

When a D.B.D. release code is received, transpond tone sounds.

■ **Password Agreement Tone**

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

■ **PTT Release Tone**

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

■ **Busy Tone**

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

■ **Group Call Tone**

Sounds when a group call with the correct DTMF option signalling is received, repeats 7 times. You can select yes or no for the optional feature's warning tone.

■ **Individual Call Tone**

Sounds when an individual call with the correct DTMF option signalling is received. You can select yes or no for the optional feature's warning tone.

■ **Key Press Tone [A]**

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

■ **Key Press Tone [B]**

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

■ **Key Press Tone [C]**

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

■ **Key Input Error Tone**

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

■ **Roll Over Tone**

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

■ **Transpond Tone**

Sounds when an individual call with the correct LTR/DTMF option signalling is received. For group calls, only the group tone will sound, not the transpond tone.

■ **Intercept Tone**

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

■ **Delay Tone**

This tone is output when the PTT button is pressed and the repeater is accessed three times or more to indicate connection with the repeater is delayed. This tone is the same as the busy tone. (It is not output of clear to talk has been set to yes.)

# OPERATING FEATURES / REALIGNMENT

■ **Proceed Tone**

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

■ **Queue Tone**

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

■ **Deny Tone**

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

■ **Free System Ringback Mode Tone, System Search Mode Tone**

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

■ **Ringing Tone**

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

■ **System Search Tone**

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

■ **System Search End Tone**

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

## *REALIGNMENT*

### 1. Modes
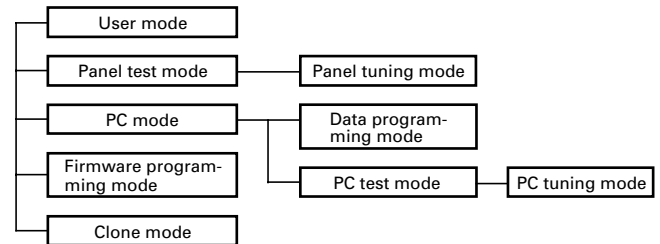


| Mode | Function |
|---|---|
| User mode | For normal use. |
| Panel test mode | Used by the dealer to check the fundament characteristics. |
| Panel tuning mode | Used by the dealer to tune the radio. |
| PC mode | Used for communication between the radio and PC (IBM compatible). |
| Data programming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

### 2. How to Enter Each Mode

| Mode | Operation |
|---|---|
| User mode | Power ON |
| Panel test mode | [A]+Power ON (Two seconds) |
| PC mode | Received commands from PC |
| Panel tuning mode | [Panel test mode]+[SCN] |
| Firmware programming mode | [SCN]+Power ON (Two seconds) |
| Clone mode | [C]+Power ON (Two seconds) |

### 3. Panel Test Mode

Setting method refer to ADJUSTMENT.

### 4. Panel Tuning Mode

Setting method refer to ADJUSTMENT.

# TK-980/981

## REALIGNMENT

## 5. PC Mode

### 5-1. Preface
The transceiver is programmed by using a personal computer, programming interface (KPG-46) and programming software (KPG-49D).

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

### 5-2. Connection Procedure
1. Connect the transceiver to the personal computer with the interface cable.
2. When the Power switch on, user mode can be entered immediately. When PC sends command the radio enter PC mode, and "PROGRAM" is displayed on the LCD. When data transmitting from transceiver, the red LED is blinking. When data receiving to transceiver, the green LED is blinking.

**Notes :**
• The data stored in the personal computer must match model type, when it is written into the flash memory.
• Change the transceiver to PC mode, then attach the interface cable.

### 5-3. KPG-46 Description
### (PC programming interface cable : Option)
The KPG-46 is required to interface the transceiver to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-46 connects the modular microphone jack of the Ttransceiver to the computers RS-232C serial port.

### 5-4. Programming Software Description
The KPG-49D programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program the transceiver radio via programming interface cable (KPG-46).
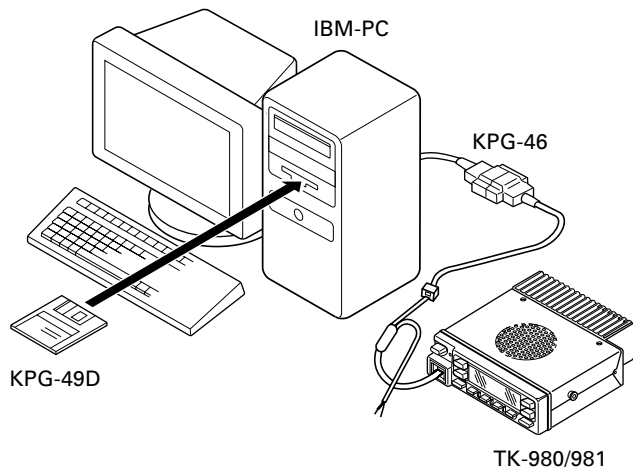


**Fig. 1**

### 5-5. Programming With IBM PC
If data is transferred to the transceiver from an IBM PC with the KPG-49D, the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

The values should be modified only if necessary.

Data can be programmed into the flash memory in RS-232C format via the modular microphone jack.

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

## 6. Firmware Programming Mode

### 6-1. Preface
Flash memory is mounted on the transceiver. This allows the transceiver to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

### 6-2. Connection Procedure
Connect the transceiver to the personal computer (IBM PC or compatible) with the interface cable (KPG-46). (Connection is the same as in the PC Mode.)

### 6-3. Programming
1. Start up the programming software (KPG-49D), select "firmware program" in the "Program" item, and press the Return key on the personal computer. This starts up the firmware programmer.
2. The top screen is displayed. Press any key to advance to the next screen.
3. Set the communications speed (normally, 57600 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select (=F1).
5. Turn the transceiver Power ON with the [SCN] switch held down. Hold the switch down for two seconds until the display changes to "PROG 57600". When "PROG 57600" appears, release your finger from the switch.
6. Check the connection between the transceiver and the personal computer, and make sure that the transceiver 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 transceiver starts to receive data, the [P] icon is blinking.
8. If writing ends successfully, the LED on the transceiver lights and the checksum is displayed.
9. If you want to continue programming other transceivers, repeat steps 5 to 8.

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

# REALIGNMENT

### 6-4. Function

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

### Note :

Normally, write in the high-speed mode.

## 7. Clone Mode

Programming data can be transferred from one radio to another by connecting them via their modular microphone jacks. The operation is as follows (the transmit radio is the master and the receive radio is a slave).

1. Turn the master radio power ON with the [C] key held down. If the password is set to the radio, the radio displays "CLONE LOCK". If the password is not set, the radio displays "CLONE MODE".
2. When "CLONE LOCK" is displayed, only the [System up/down] key and [SCN], and [0] to [9] keys can be accepted. When you enter the correct password, and "CLONE MODE" is displayed, the radio can be used as the cloning master. The following describes how to enter the password.
3. How to enter the password with the microphone keypad. If you press a key while "CLONE LOCK" is displayed, the number that was pressed is displayed on the radio. Each press of the key shifts the display in order to the left. When you enter the password and press the [SCN] key, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
   How to enter the password with the [System up/down] key;
   If the [System up/down] key is pressed while "CLONE LOCK" is displayed, numbers (0 to 9) are displayed flashing. When you press the [SCN] key, the currently selected number is determined, and the display shifts to the left. If you press the [SCN] key after entering the password in this procedure, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
4. Power on the slave radio.
5. Connect the cloning cable (No. E30-3382-05) to the modular microphone jacks on the master and slave.
6. Press the [SCN] key on the master while the master displays "CLONE MODE". The data of the master is sent to the slave. While the slave is receiving the data, "PROGRAM" is displayed. When cloning of data is completed, the mater displays "END", and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.
7. The other slave can be continuously cloned. When the [SCN] key on the master is pressed while the master displays "END", the master displays "CLONE MODE". Carry out the operation in step 4 to 6.

### Note :

Only the same models can be cloned together.



Cloning cable
(E30-3382-05)

**Fig. 2**

# TK-980/981
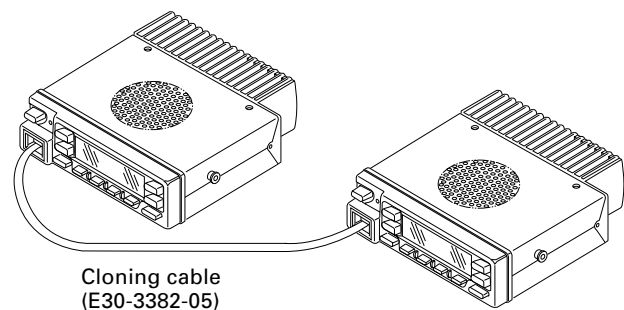
# INSTALLATION

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

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

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

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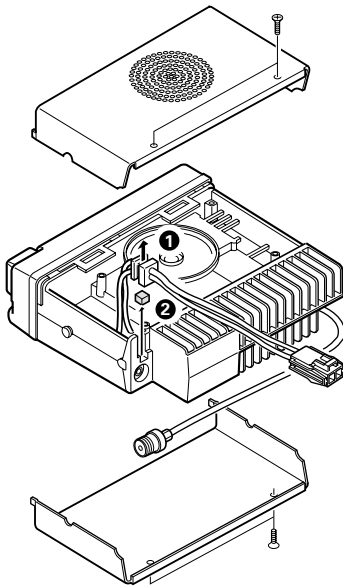


**Fig. 1**
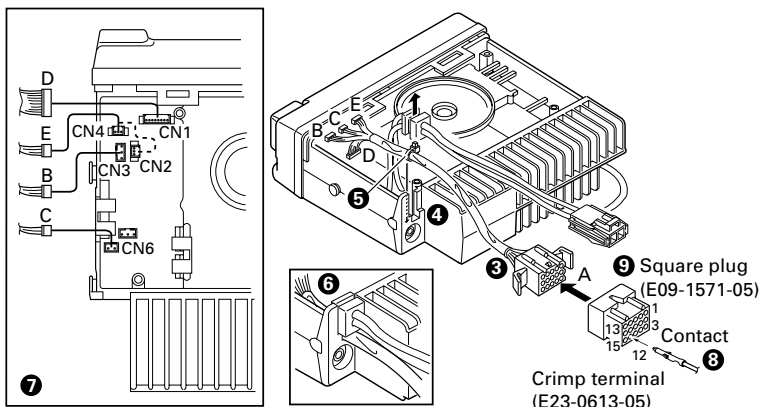


**Fig. 2**

## 1-2. Accessory Port Function

| No. (A) | No. (B,C,D,E) | | Name | Function | Note |
|---|---|---|---|---|---|
| 1 | D-2 | | AHK | External hook input | *1 |
| | | | BUSY | System busy output | |
| 2 | D-5 | | ME | Microphone ground | *1 |
| | | | AM | Speaker audio mute input | |
| 3 | D-3 | | IGN | Ignition sense input | |
| 4 | D-1 | | DEO | Receiver detector output | |
| 5 | D-6 | | MI | External microphone input | *1 |
| | | | TXS | Transmitter sense output | |
| 6 | B-2 | | E | Ground | |
| 7 | B-3 | | SB | Switched B+, DC 13.6V output. Maximum 1A | |
| 8 | D-7 | | PTT | External PTT input, active low. During DTC is low, it works as DATA PTT. | |
| 9 | D-4 | | DI | Data modulation input | |
| 10 | B-1 | | HOR | Horn alert/call output | |
| 11 | D-8 | | SQ | Squelch detect output (Conventional)/ Logic squelch output (LTR), active low. | |
| 12 | C-1 | | SP | Speaker audio output. | |
| 13 | E-1 | CN2 and CN4 | LOK | Link complete pulse output. | *2 |
| | | CN2 | AM | Speaker mute input. | |
| 14 | E-2 | CN4 | RXD | Serial control data input | *2 |
| | | CN2 | MM | MIC mute input, active high. | |
| 15 | E-3 | CN4 | TXD | Serial control data output. | *2 |
| | | CN2 | DTC | Data control channel signal input, Data channel : Low | |
| | | | LOK | Link complete pulse output. | |
| | | | TXS | Transmitter sense output, Active high | |
| | | | FSW | Foot switch input, active low | |

### Note
*1 : The functions of A-1, A-2 and A-5 are changed as described in the jumper chart.
*2 : The functions of A-13, A-14 and A-15 are changed if the connector E is connected to CN2 or CN4 of the radio.

| No. | CN2 | CN4 |
|---|---|---|
| E-1 | LOK/AM | LOK |
| E-2 | MM | RXD |
| E-3 | LOK/DTC/TXS/FSW | TXD |

· Connect CN6 of the radio to connector C of the KCT-19 instead of to the internal speaker connector, if use external speaker.

# INSTALLATION

## 1-3. Data Equipment Connection

The jumpers must be set to either one for each function. Otherwise, the radio will not work properly.

AHK/BUSY

| R64 (0Ω) | R18 (0Ω) | | Function |
|---|---|---|---|
| Yes | No | BUSY | System busy output indicates if no repeater channel is available in the currently selected LTR system when PTT is pressed, active low : Default |
| No | Yes | AHK | MIC hook input/RXD2 (com2). |

ME/AM

| R12 (0Ω) | R167 (0Ω) | | Function |
|---|---|---|---|
| Yes | No | AM | Speaker mute input, active high : Default |
| No | Yes | ME | MIC ground. |

MI/TXS

| R94 (0Ω) | R24 (0Ω) | | Function |
|---|---|---|---|
| Yes | No | TXS | Transmitter sense output, active high : Default |
| No | Yes | MI | Internal MIC input. |

LOK/AM

| R5 (0Ω) | R6 (0Ω) | | Function |
|---|---|---|---|
| Yes | No | AM | Audio mute signal input. |
| No | Yes | LOK | Link complete pulse output : Default |

DTC/LOK/TXS/FSW

| R168 (0Ω) | R84 (0Ω) | R51 (0Ω) | R13 (0Ω) | | Function |
|---|---|---|---|---|---|
| No | No | No | Yes | LOK | Link complete pulse output. |
| Yes | No | No | No | DTC | Data control channel signal input, Data channel : low (Default) |
| No | No | Yes | No | TXS | Transmitter sense output, active high |
| No | Yes | No | No | FSW | Foot switch input, active low |



**TX-RX unit (A/2)**
**Foil side view**



**TX-RX unit (A/2)**
**Component side view**
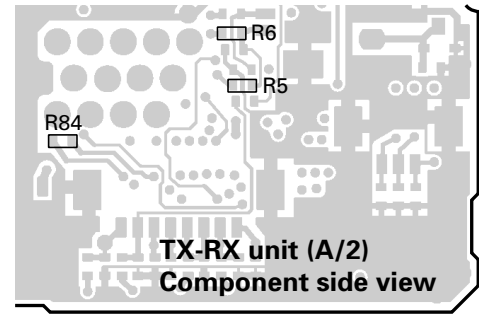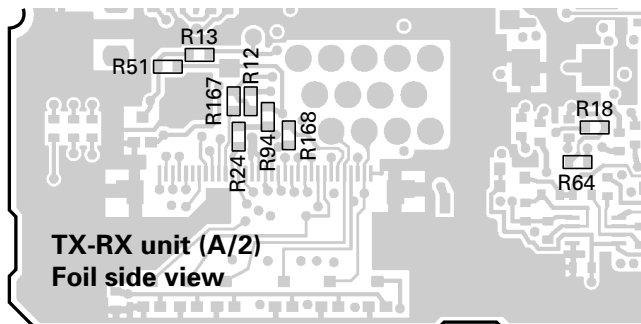
**Note :** The following parts are not installed at the time of shipping; R5,R13,R18,R24,R51,R84,R167

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

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

| Connector No. | Pin No. | Pin name | I/O | Function |
|---|---|---|---|---|
| CN1 | 1 | DEO (DO) | O | Detect signal output. (Output level : 250mVrms; standard modulation) |
| | 2 | AHK (AH) | I | external hook signal input. "COM2" port must be select "AUX HOOK/PTT" / "DATA PTT" function in the KPG-49D. On hook : L, Off hook : H |
| | | BUSY | O | System busy signal output for trunking system. No vacant repeater : L, Vacant repeater : H |
| | | RXD2 | I | Serial data input 2. "COM2" port must be select "REM" / "DATA" / "DATA+GPS" function in the KPG-49D. |
| | 3 | IGN (IG) | I | Ignition input for KCT-18. |
| | 4 | DI | I | External modulation signal input. |
| | 5 | ME | – | MIC earth. |
| | | AM | I | Audio mute signal input. |
| | 6 | MI | I | Internal MIC input. |
| | | TXS | O | Signal indicating whether the transceiver is transmitting or not. TX : H, Another : L |
| | 7 | PTT (PT) | I | External PTT signal input. "COM2" port must be select "AUX HOOK/PTT" / "DATA PTT" function in the KPG-49D. TX : L, Another : H |
| | | TXD2 | O | Serial data output 2. "COM2" port must be select "REM" / "DATA" / "DATA+GPS" function in the KPG-49D. |

# TK-980/981

| Connector No. | Pin No. | Pin name | I/O | Function |
|---|---|---|---|---|
| | 8 | SQ | O | Squelch signal output. Signal logic type can select "Carrier operate relay" or "Tone operate relay". Active logic level or type can select in the KPG-49D. |
| CN2 | 1 | AM | I | Audio mute signal input. |
| | | LOK | O | Access logic signal output. Active level or type can be selectable in the KPG-49D. |
| | 2 | MM | I | MIC mute input. |
| | 3 | DTC | I | Data control channel signal input. Data channel : L, Normal channel : H |
| | | TXS | O | Signal indicating whether the transceiver is transmitting or not. TX : H, Another : L |
| | | FSW | I | Foot switch signal input. Foot sw on : L, Foot sw off : H |
| | | LOK | O | Access logic signal output. Active level or type can be selectable in the KPG-49D. |
| CN3 | 1 | HOR | O | Horn alert signal output. Signal output for horn relay drive (open collector). L level during horn drive : Max. sink current 100mA. |
| | 2 | E | – | Earth. |
| | 3 | SB | O | Power output after power switch (DC 13.6V±15%, 0.75A max.). |
| CN4 | 1 | LOK | O | Access logic signal output. Active level or type can be selectable in the KPG-49D. |
| | 2 | RXD1 | I | Serial data input 1. "COM1" port must be select "REM" / "DATA" / "GPS" / "DATA+GPS" function in the KPG-49D. |
| | 3 | TXD1 | O | Serial data output 1. "COM1" port must be select "REM" / "DATA" / "GPS" / "DATA+GPS" function in the KPG-49D. |
| CN5 | 1 | PA | O | Relay for PA function in KAP-1 control signal. PA on : H, PA off : L |
| | 2 | SPO | O | Audio signal input from KAP-1. |
| | 3 | SPI | I | Audio signal output to KAP-1. |
| CN6 | 1 | SP | O | Output for internal/external speaker. |
| | 2 | E | – | Earth. |

## 3. Optional Board Terminal

Terminal is for mounting the option board are provided at the TX-RX unit (A/2) and TX-RX unit (B/2). The table below shows the correspondence between the board and terminals. Disconnect R529 and R571 in control unit when the scrambler board is attached.

The table below shown the differences between the schematic terminals and the PC board terminals.

| Schematic diagram | | | PC board view | |
|---|---|---|---|---|
| Name | I/O | Function | Name | Unit |
| SB | – | Switched B+, DC 13.6V output. Maximum 0.75A | SB | TX-RX (A/2) |
| 5C | – | 5C | 5C | TX-RX (A/2) |
| GND | – | Earth | E | TX-RX (A/2) |
| DEO | O | Detect signal output (Output level : 250mVrms; standard modulation) | DEO | TX-RX (A/2) |
| RXAI | I | RX audio input | RXAI | TX-RX (B/2) |
| RXAO | O | RX audio output | RXAO | TX-RX (B/2) |
| TXAI | I | TX audio input | TXAI | TX-RX (B/2) |
| TXAO | O | TX audio output | TXAO | TX-RX (B/2) |
| LOK | O | Access logic signal output. Active level or type can be selectable in the KPG-49D. | LOK | TX-RX (A/2) |
| OPT (EMG) | O | Option board select. Please select option board type in the KPG-49D. | OP | TX-RX (A/2) |
| OP1 | O | Option code 1 (for voice scrambler code 1) | C1 | TX-RX (A/2) |
| OP2 | O | Option code 1 (for voice scrambler code 2) | C2 | TX-RX (A/2) |
| OP3 | O | Option code 1 (for voice scrambler code 3) | C3 | TX-RX (A/2) |
| OP4 | O | Option code 1 (for voice scrambler code 4) | C4 | TX-RX (A/2) |
| SQ | O | Squelch signal output. Signal logic type can select "Carrier operate relay" or "Tone operate relay". Active logic level or type can select in the KPG-49D. | SQ | TX-RX (A/2) |
| TXD1 | O | Serial data output 1 | TD1 | TX-RX (A/2) |
| RXD1 | I | Serial data input 1 | RD1 | TX-RX (A/2) |
| TXD2 | O | Serial data output 2 | TD2 | TX-RX (A/2) |
| RXD2 | I | Serial data input 2 | RD2 | TX-RX (A/2) |
| RSSI | O | Receive signal strength indication | RSSI | TX-RX (A/2) |
| PTT | I | PTT | PTT | TX-RX (B/2) |
| MPTT | I | MIC PTT | MPTT | TX-RX (B/2) |
| FSW | I | Foot switch input | FW | TX-RX (A/2) |
| ST | I | Side-tone input | ST | TX-RX (A/2) |

# TK-980/981

## INSTALLATION



**TX-RX unit (A/2) Foil side view**

**TX-RX unit (A/2) Component side view**

**TX-RX unit (B/2) Foil side view**



**Fig. 3**
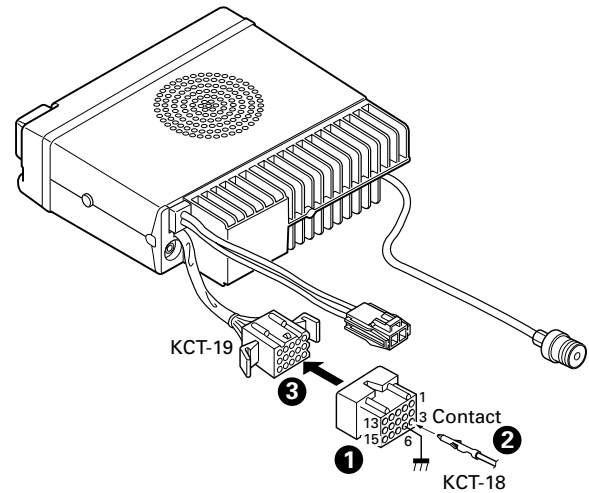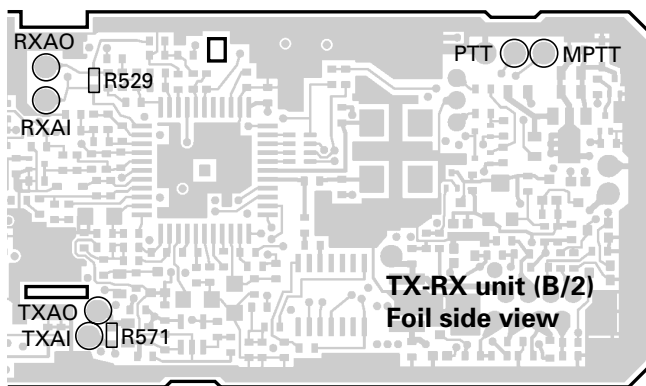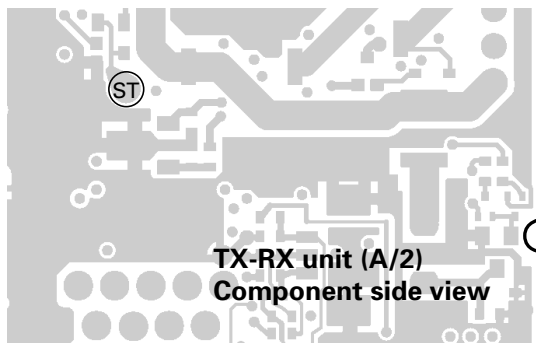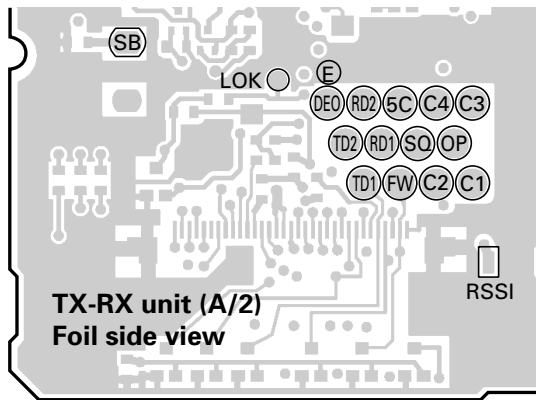
### 4-2. Modifying the Transceiver

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

1. Remove the lower half of the transceiver case.
2. Set jumper resistors (0Ω) R151 and R152 of the TX-RX unit (A/2) as shown in Table 1.



**Fig. 4**
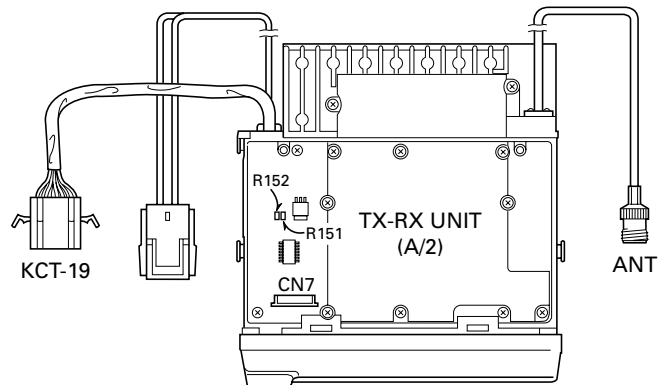
### 4. Ignition Sense Cable (KCT-18 : Option)

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

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

### 4-1. Connecting the KCT-18 to the Transceiver

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

| Operation when KCT-18 is connected. | R151 | R152 |
|---|---|---|
| KCT-18 cannot be connected. | Enable | Enable |
| Power on/off and Horn Alert or AUX-A on/off. | Disable | Enable |
| Horn Alert or AUX-A on/off, Timed power off. | Enable | Disable |
| Power cannot be turned on. | Disable | Disable |

**Table 1    R151 and R152 setup chart**

# TK-980/981

# INSTALLATION

## 5. Connection Cable (KCT-29 : Option)

The KCT-29 connection cable kit is used to connect the TK-980/981 transceiver to the KPG-1A Modem GPS Receiver or the KPG-1B Modem GPS Controller.

### 5-1. Installing the KCT-29 in the transceiver

1. Remove the upper cover from the transceiver.
2. Lift the DC cord bushing ( ❶ ) from the chassis.
3. Remove the pad as shown in Figure 5 ( ❷ ).
4. Insert the KCT-29 cable ( ❸ ) into the chassis ( ❹ ). The wire harness band ( ❺ ) must be inside the chassis.
5. Replace the DC cord bushing ( ❻ ).
6. Connect the KCT-29 to the TX-RX unit (A/2) as shown in Figure 6 ( ❼ ).
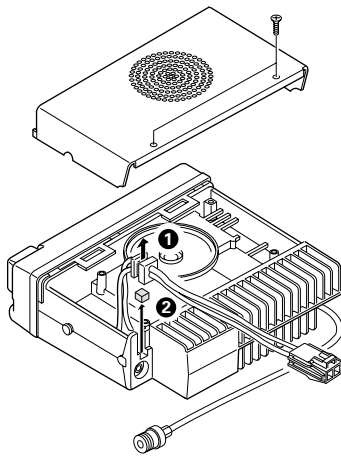


**Fig. 5**
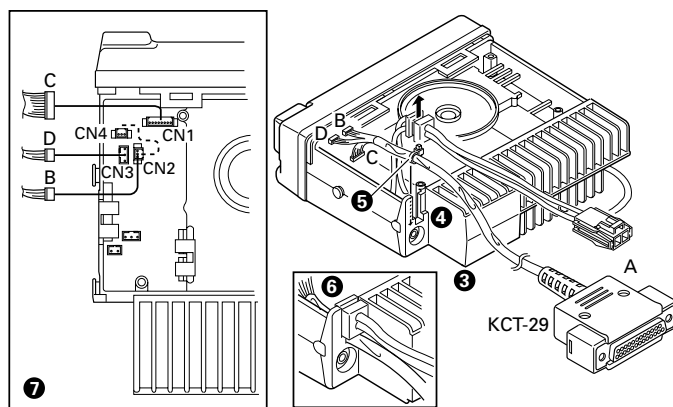


**Fig. 6**

## 6. Interface Cable (KCT-31 : Option)

The KCT-31 is a RS-232C interface cable for LMR mobile radios, TK-980/981.

The 9-pin (D-sub) connector is connected to an external RS-232C terminal. The other end of the cable is connected to the internal connector of LMR mobile radio.

Note : You cannot write a firmware with the KCT-31.

### 6-1. Features

- This KCT-31 has a RS-232C-TTL level interface circuit.
- This KCT-31 does not require an external power supply.
- This KCT-31 can be used up to 9600 bps.
- Compatible with an ER terminal of DTE that has the voltage 6V or more.

### 6-2. Terminal function (D-sub connector)

| Pin No. | I/O | Port name | Function |
|---------|-----|-----------|----------|
| 1 | I | CD | Carrier detect |
| 2 | I | RD | Receive data |
| 3 | O | SD | Transmit data |
| 4 | O | ER | Data terminal ready |
| 5 | – | SG | Signal ground |
| 6 | I | DR | Data set ready |
| 7 | O | RS | Request to send |
| 8 | I | CS | Clear to send |
| 9 | – | CI | Ring indicator |
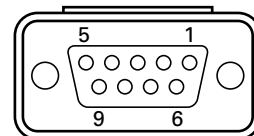
# INSTALLATION

## 6-3. Installing the KCT-31 in the transceiver

**Note :**
When the COM1 is used, A connector is unused.
When the COM2 is used, C connector is unused.

1. Bind the unused connecor to the cable with a retaining band as shown.
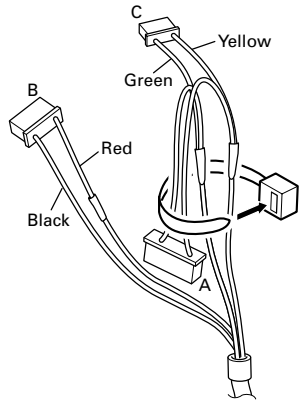
When the COM1 is used.          When the COM2 is used.
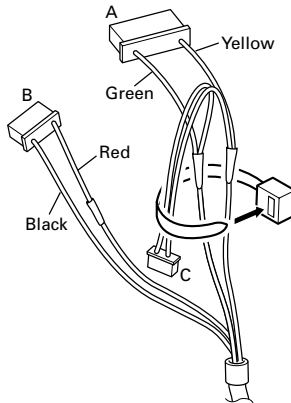


| | A | B | C |
|------|-----|-----|-----|
| COM1 | No | Yes | Yes |
| COM2 | Yes | Yes | No |

**Fig. 7**

2. Make sure the unit's power is turned off.
3. Remove the upper case of the transceiver and lift the DC cable bushing ( ❶ ) from the chassis.
4. Remove the pad as shown in Figure 8 ( ❷ ).
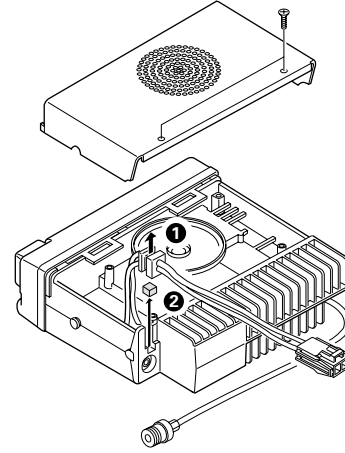


**Fig. 8**

5. Insert the KCT-31 cable ( ❸ ) into the chassis ( ❹ ). The write retaining band ( ❺ ) must be inside the chassis.
6. Replace the DC cable bushing ( ❻ ).
7. Connect the KCT-31 to the TX-RX unit (A/2) as shown in Figure 9 ( ❼ ).
8. Replace the upper case.
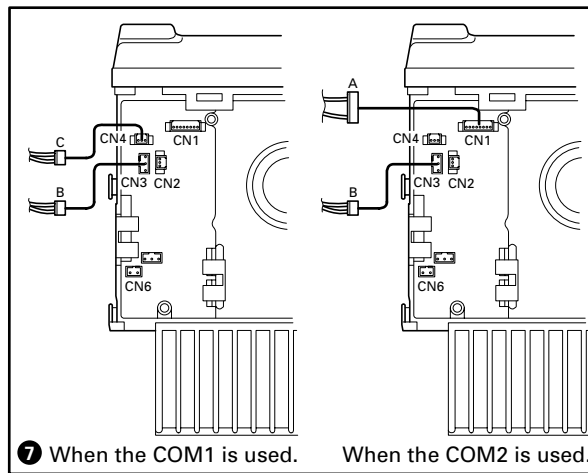


❼ When the COM1 is used.          When the COM2 is used.
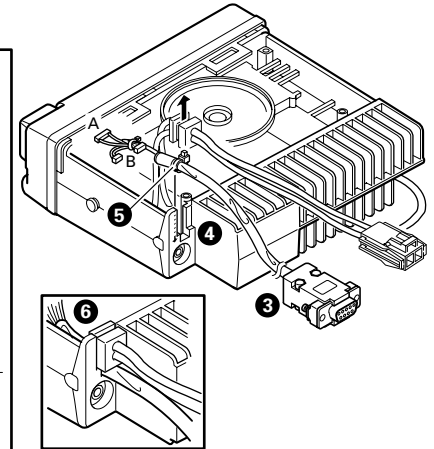
**Fig. 9**

**Note :**
· The modification must be applied to the TK-980/981 transceivers with a serial number of 30600000 or smaller when using a COM2 port. Replace the 47kΩ (R675) chip resistor on the TX-RX unit (B/2) with a 4.7kΩ resistor.

Original                      New
47kΩ (RK73GB1J473J)   →   4.7kΩ (RK73GB1J472J)

· Enable the serial port function on the terminal.
· Refer to the service manual of each radio or the help file that came with the FPU (Field Programming Unit) for details.

# TK-980/981

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

### 7-1. Installing the KAP-1 in the Transceiver

The Horn Alert (max. 2A drive) and Public Address functions are enabled by inserting the KAP-1 W1 (3P; white/black/red) into CN3 on the TX-RX unit (A/2), inserting W2 (3P; green) into CN5 on the TX-RX unit (A/2), and connecting the KCT-19 (option) to CN2 and CN3 of the KAP-1.

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



**Fig. 10**

| | R1 | Output form |
|---|---|---|
| HR1 (Default) | Yes | |
| HR2 | No | |
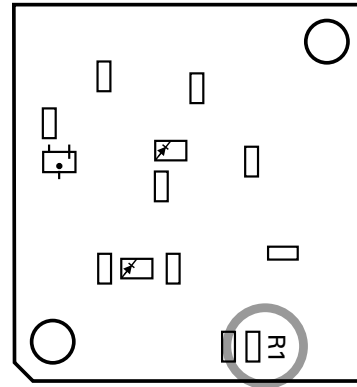


**Fig. 11   KAP-1 foil side view**

- **Public address**

The signal from pin 13 of IC7 on the TX-RX unit (A/2) drives PA relay in the KAP-1 and switches the audio power amplifier output between the external PA system (through KCT-19) and internal and external speakers.

To use the PA function, R109 on the TX-RX unit (A/2) must be removed.

| | R109 |
|---|---|
| Use the PA function | No |
| Do not use the PA function | Yes |

### 7-2. Modifying the Transceiver

- **Horn alert**

The signal from pin 4 of IC7 on the TX-RX unit (A/2) turns Q4 and Q6 on and off and drives KAP-1 HA relay to drive the horn with a maximum of 2A.

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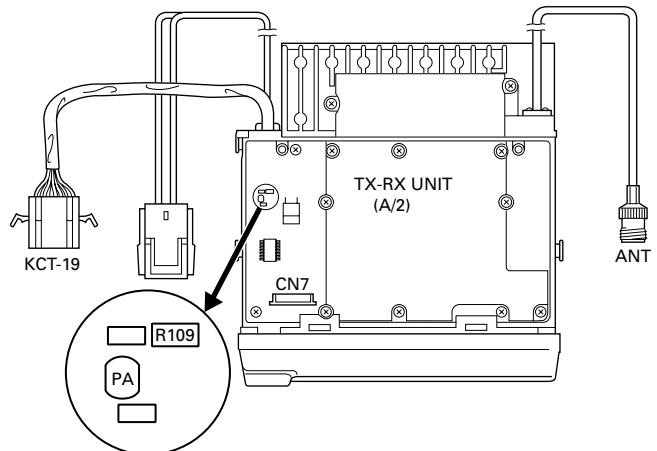


**Fig. 12**

# INSTALLATION

- **Others**

  If the PA and HR2 are not necessary and the speaker output is output to an external unit through the KCT-19, connect the KCT-19 C connector to CN6 on the TX-RX unit (A/2).
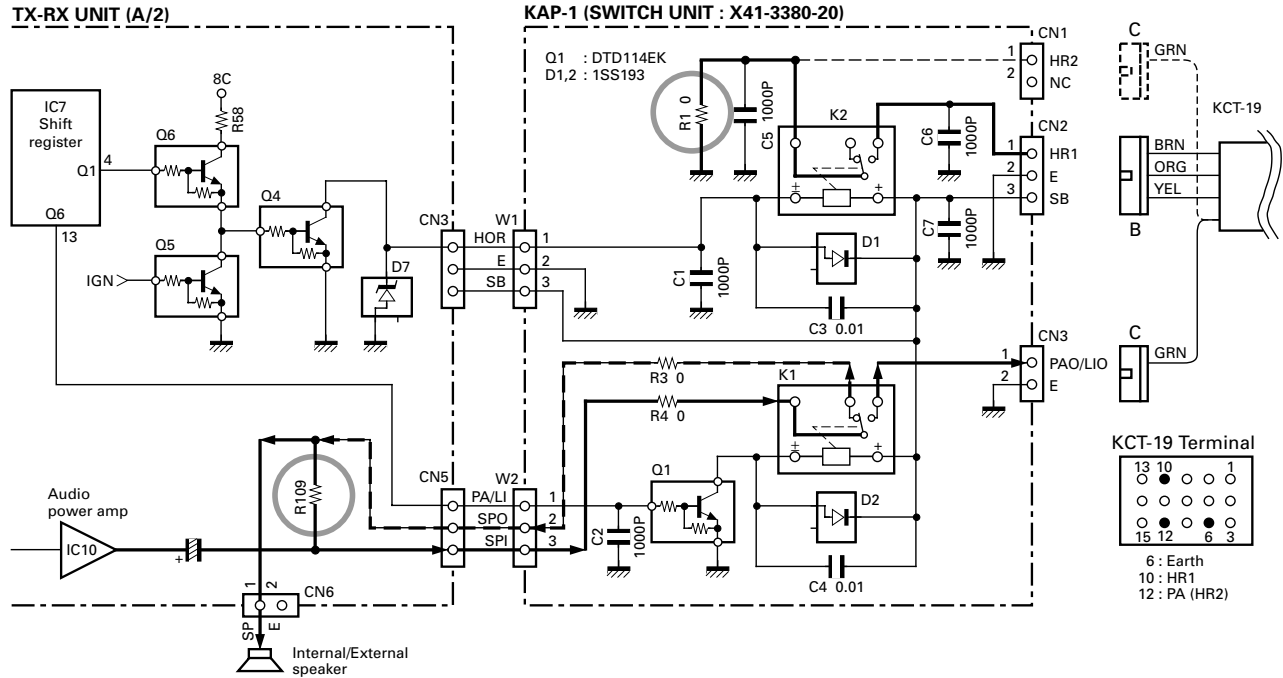


**Fig. 13**

## 8. Fitting the Control Panel Upside Down

The TK-980/981 control panel can be fitted upside down, so the transceiver can be mounted with its internal speaker (in the upper half of the case) facing down in your car.

1. Remove the control panel and the TX-RX unit (B/2) control section. (Fig. 14)
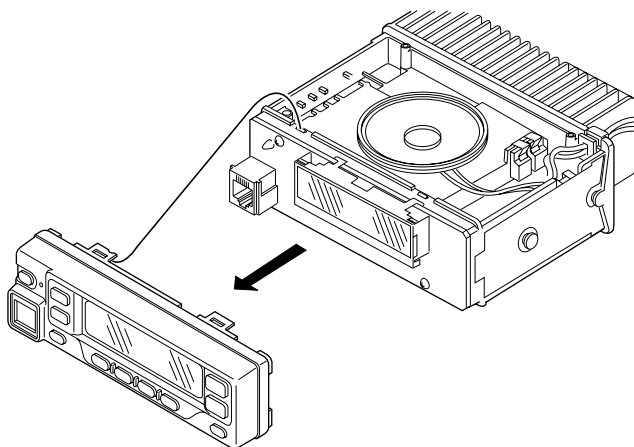


**Fig. 14**

2. Fold the flat cable ( ❶ ) in the opposite direction ( ❷ ).
3. Rotate the control section ( ❸ ) 180 degrees ( ❹ ).
4. Insert the flat cable into the control section connector, CN502 ( ❺ ).
5. Mount the control section on the transceiver ( ❻ ).



**Fig. 15**

# TK-980/981
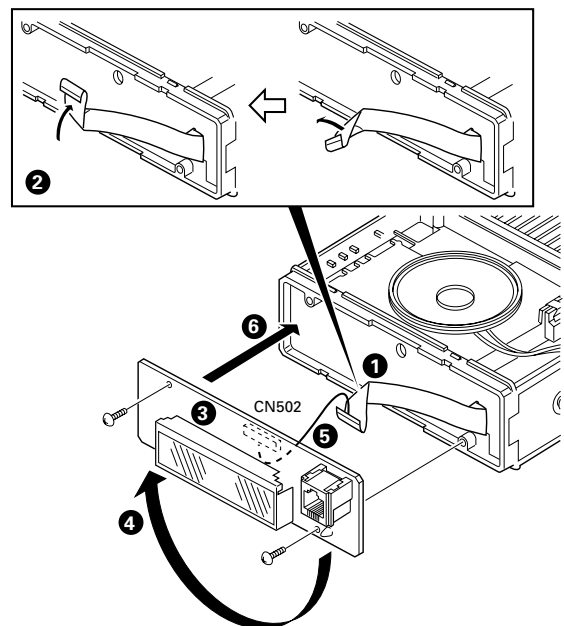
## INSTALLATION

6. Rotate the control panel 180 degrees and mount it on the transceiver. Refit the two halves of the case to complete installation. (Fig. 16)
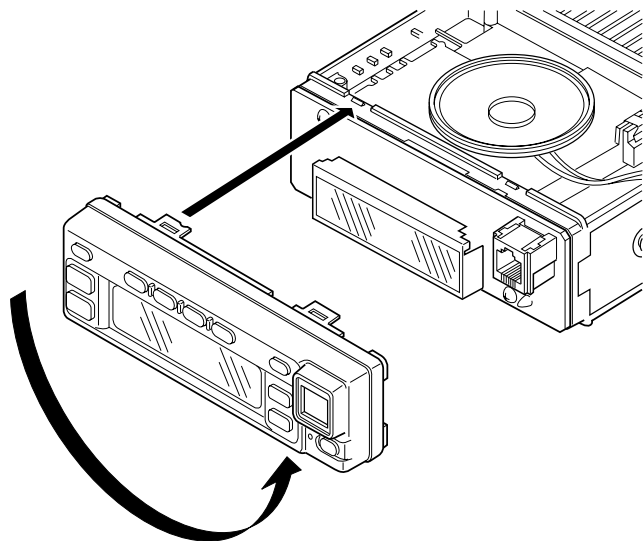


**Fig. 16**

## 9. External Speaker

### 9-1. KES-3 : Option
The KES-3 is an external speaker for the 3.5-mm-diameter speaker jack.

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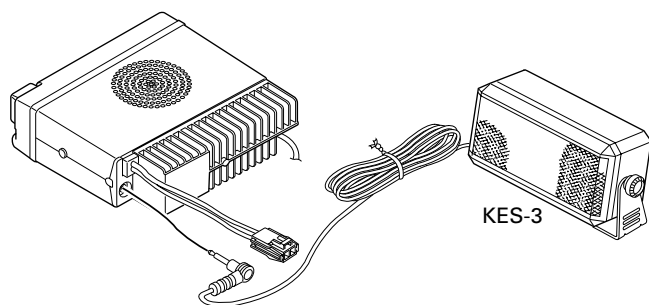


**Fig. 17**

### 9-2. KES-4 : Option
The KES-4 is an external speaker used with the accessory connection cable.

• **Connection procedure**
1. Install the KCT-19 in the transceiver. (See the KCT-19 section.)
2. Insert the crimp terminal into the square plug supplied with the KCT-19.
3. Connect CN5 of the transceiver to connector C of the KCT-19 instead of to the internal speaker connector.
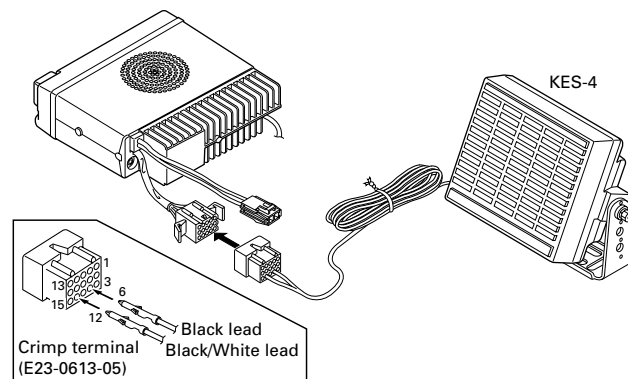


**Fig. 18**

# CIRCUIT DESCRIPTION

## Frequency Configuration

The TX-RX unit (A/2) incorporates a VCO, based on a fractional N type PLL synthesizer system, that allows a channel step of 12.5kHz to be selected. The incoming signal from the antenna is mixed with a first local oscillation frequency to produce a first intermediate frequency of 44.85MHz.

The signal is then mixed with a second local oscillation frequency of 44.395MHz to produce a second intermediate frequency of 455kHz. This is called a double-conversion system. The transmit signal frequency is generated by the PLL VCO, and modulated by the signal from the microphone. It is then amplified by TX amplifier and PA amplifier, and sent to the antenna.
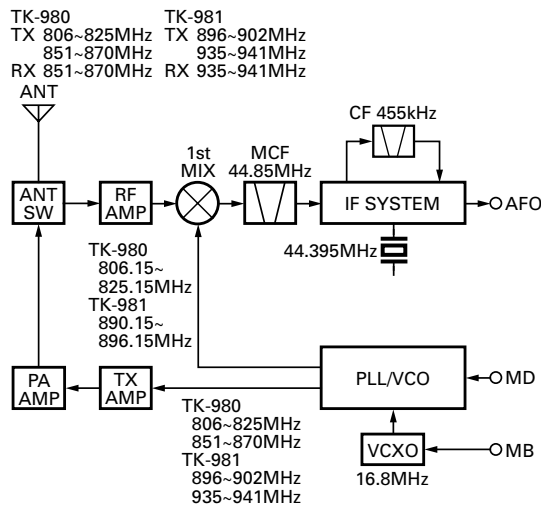
**Fig. 1 Frequency configuration**

## Receiver System

### ■ Outline

An incoming RF signal from the antenna terminal passes through the antenna switch (D208, D209, and D210 are off) and then the bandpass filter (L203). The signal is amplified by RF amplifier Q201, and passes through the bandpass filter (L207) again. The resulting signal goes to the first mixer (Q203), where it is mixed with the first local oscillator signal output from the frequency synthesizer to produce the first IF 44.85MHz.
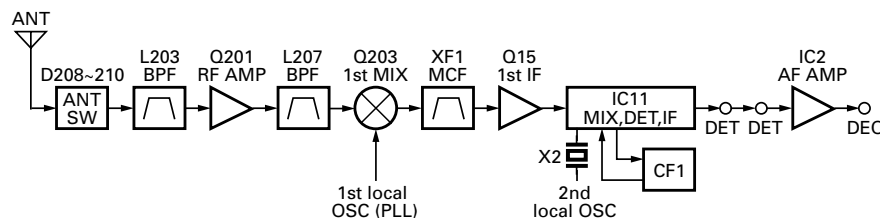
**Fig. 2 Receiver system**

### ■ AF Signal System

The detection signal (DEO) from the TX-RX unit (A/2) goes to the audio processor (IC504) of the TX-RX unit (B/2). The signal passes through a filter in the audio processor to adjust the gain, and is output to IC502. IC502 sums the AF signal and the DTMF signal and returns the resulting signal to the TX-RX unit (A/2). The signal (AFO) sent to the TX-RX unit (A/2) is input to the D/A converter (IC5). The AFO output level is adjusted by the D/A converter. The signal output from the D/A converter is added with the BEEP signal (BPO) and the resulting signal is input to the audio power amplifier (IC10). The AF signal from IC10 switches between the internal speaker and speaker jack (J1) output.
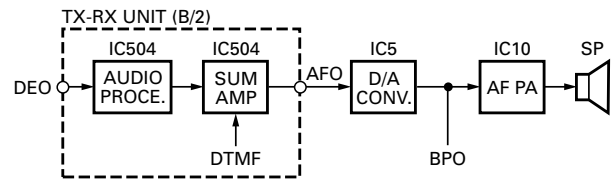
**Fig. 3 AF signal system**

### ■ Squelch Circuit

The detection output from the FM IF IC (IC11) is amplified by IC2 and the signal (DEO) is sent to the TX-RX unit (B/2). The signal passes through a high-pass filter and a noise amplifier (Q503) in the TX-RX unit (B/2) to detect noise. A voltage is applied to the CPU (IC511). The CPU controls squelch according to the voltage (ASQ) level. The signal from the RSSI pin of IC11 is monitored. The electric field strength of the receive signal can be known before the ASQ voltage is input to the CPU, and the scan stop speed is improved.
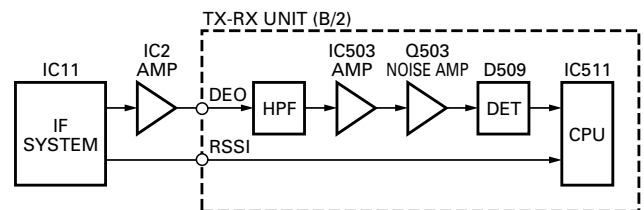
**Fig. 4 Squelch circuit**

# TK-980/981

## CIRCUIT DESCRIPTION

### Transmitter System

#### ■ Outline

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

#### ■ Younger-stage circuit

The signal output from the VCO is amplified by a buffer amplifier (Q7) and goes to the drive block. The younger-stage circuit provides a stable drive output without a need for adjustment. The APC circuit controls voltage in the younger final stage (Q204).

#### ■ VCO/PLL Circuit

The TK-980/981 has a common VCO for the transmitter and the receiver in a sub-unit (A1). It is housed in a solid shielded case and connected to the TX-RX unit (A/2) through CN101. A filtered low-noise power supply is used for the VCO and varicap diodes.

The VCO is described below. It is designed so that Q101 turns on with a prescribed frequency when a reverse bias is applied to D100 and D101 by using the control voltage (CV) through CN101. The control voltage is changed by turning the trimmer capacitor (TC100). The output from Q103 is applied to the buffer amplifier (Q102) the output from Q102 is applied to the doubler (Q100) to generate a VCO output signal. This signal is used as a drive input signal or a local signal of the first mixer. Since a signal output from Q100 is input to the PLL IC, it passes through CN101 and buffer amplifier (Q300) and goes to the PLL IC (IC300). The modulation signal from CN101 is applied to D102 and passes through C106 and C107 to modulate the carrier.

The PLL IC uses a fractional N type synthesizer to improve the C/N ratio and lock-up speed. The VCO output signal input to the pin 5 of the PLL IC is divided to produce a comparison frequency according to a channel step. This signal is compared with the reference frequency which is output from the VCXO (X1). VCXO provides 16.8MHz, 1.5ppm (–30 to +60°C) and guarantees stable performance when the temperature changes. The output signal from the phase comparator passes through a charge pump and an external active LPF (Q301, Q302) in the PLL IC to generate a DC VCO control voltage CV. Serial data (DT, CK, EP) are output from the CPU (IC511) and shift register (IC8) in the TX-RX unit (B/2) to control the PLL IC. The PLL lock status is always monitored by the CPU.

#### ■ Unlock Circuit

During reception, the TR line goes high, the KEY line goes low, and Q10 turns on. Q11 turns on and a voltage is applied to the collector (8R). During transmission, the TR line goes low, the KEY line goes high and Q13 turns on. Q12 turns on and a voltage is applied to 8T.

The CPU in the TX-RX unit (B/2) monitors the PLL (IC300) LD line directly. When the PLL is unlocked during transmission, the PLL LD line goes low. The CPU detects this signal and makes the KEY line low. When the KEY line goes low, no voltage is applied to 8T, and no signal is transmitted.
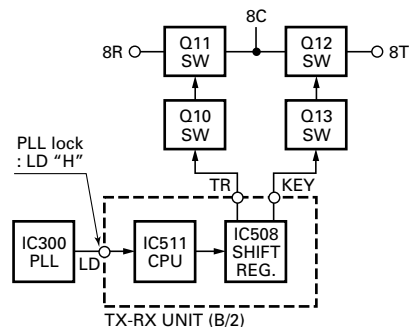
**Fig. 6    Unlock circuit**

#### ■ Power Amplifier Circuit/Final

The transmit output signal from the VCO is amplified to a specified level of the power module (IC400) by the drive block (Q202, Q204). The amplified signal goes to a low-pass filter. The low-pass filter removes unwanted high-frequency harmonics. The resulting signal passes through the transmission/reception selection diode (D208), then goes to the antenna terminal.

#### ■ APC Circuit

The direct current that flows through the final module (IC400) produces a voltage across resistors R127. This voltage is applied to pin 6 of IC13 (2/2), and is input as the reference voltage difference of pin 5 and amplified.
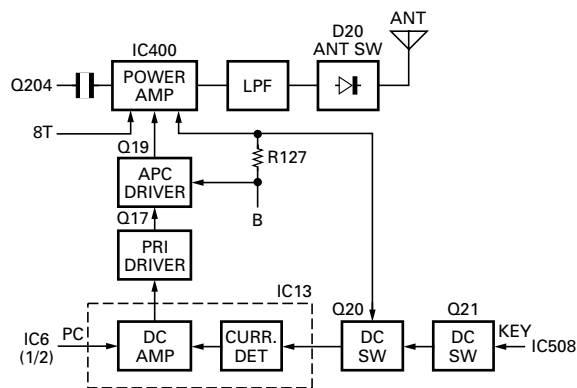
**Fig. 7    APC circuit**
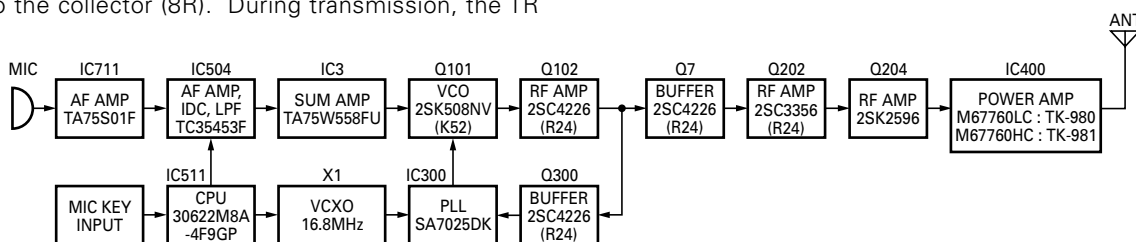
**Fig. 5    Transmitter system**

# CIRCUIT DESCRIPTION

## Control Circuit

The CPU carries out the following tasks:

1) Controls the shift register (IC7, IC8, IC508) AF MUTE, T/R KEY outputs.
2) Adjusts the AF signal level of the audio processor (IC504) and turns the filter select compounder on or off.
3) Controls the DTMF decoder (IC507).
4) Controls the LCD assembly display data.
5) Controls the PLL (IC300).
6) Controls the D/A converter (IC5) and adjusts the volume, modulation and transmission power.
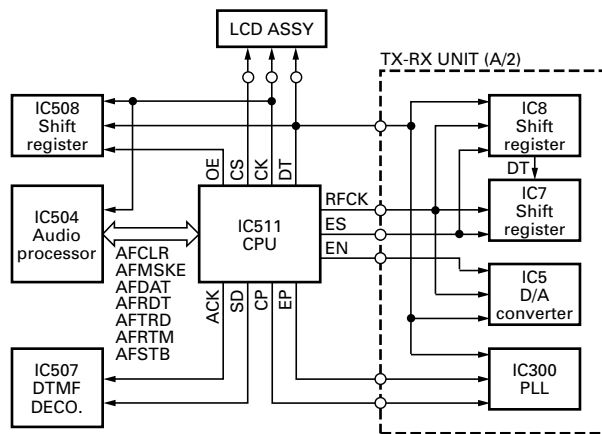
**Fig. 8    Control circuit**

### ■ Memory Circuit

The transceiver has a 2M-bit (256k x 8) flash ROM (IC510) and an 8k-bit EEPROM (IC512). The flash ROM contains firmware programs, data and user data which is programmed with the FPU. The EEPROM contains adjustment data. The CPU (IC511) controls the flash ROM through an external address bus and an external data bus. The CPU controls the EEPROM through two serial data lines.
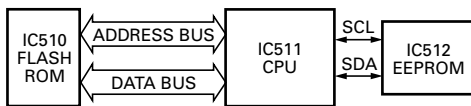
**Fig. 9    Memory circuit**

### ■ Display Circuit

The CPU (IC511) controls the shift register (IC508) and display LEDs. When the LG line goes high when the transceiver is busy, Q508 turns on and the green LED on D511 lights. In transmit mode, the LR line goes high, Q509 turns on and the red light lights. Backlighting LEDs for the key operation unit (D512~D517) and LCD are provided.

When the KBLC line goes high, Q512 turns on, then Q515 and Q513 turns on, and the key illumination LED lights. A voltage is applied to the LEDA line to turn on the LCD backlight.
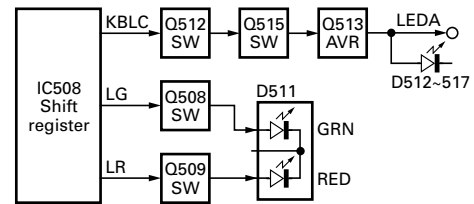
**Fig. 10    Display circuit**

### ■ Key Matrix Circuit

The TK-980/981 front panel has ten keys. Each of them is connected to a cross point of a matrix of the KEY1 to KEY7 ports of the microprocessor. The KEY5 to KEY7 ports are always high, while the KEY1 to KEY4 ports are always low.

The microprocessor monitors the status of the KEY1 to KEY7 ports. If the state of one of the ports changes, the microprocessor assumes that the key at the matrix point corresponding to that port has been pressed. Unused points (KEY1 to KEY7) are also used for foot switch (FSW) input.
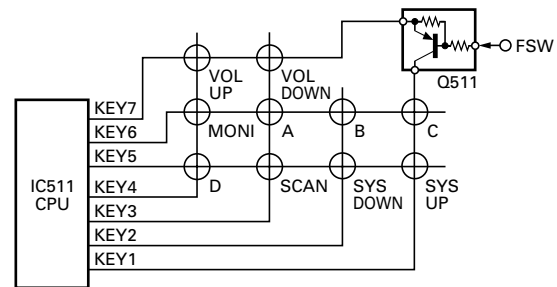
**Fig. 11    Key matrix circuit**

### ■ Encode

The QT, DQT, and LTR signals are output from LSDO of the CPU (IC511) and go to the D/A converter (IC5) of the TX-RX unit (A/2). The DTMF signal is output from HSDO of the CPU and goes to the audio processor (IC504). An MSK signal is output from the audio processor according to the data (AFDAT) from the CPU. The signal is summed with a MIC/MSK signal by the audio processor (IC504), and the resulting signal passes through an analog switch (IC506) and goes to the TX-RX unit (A/2) (MO).

MO is summed with the external pin DI line by the summing amplifier (IC3) and the resulting signal goes to the D/A converter (IC5). The D/A converter (IC5) adjusts the MO level and the balance between the MO and TO levels. Part of a TO signal is summed with an output signal from pin 3 (MO) of IC5 and the resulting signal goes to the MD pin of the VCO. This signal is applied to a varicap diode in the VCO for direct FM modulation.
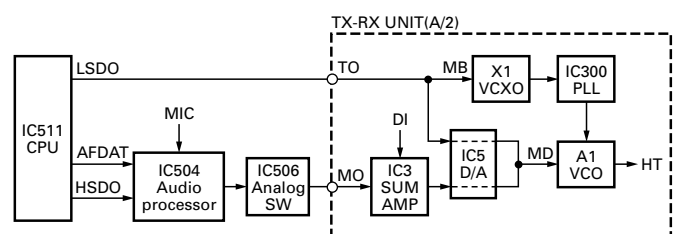
**Fig. 12    Encode**

# CIRCUIT DESCRIPTION

## ■ Decode

The signal (DEO) detected by the TX-RX unit (A/2) passes through two low-pass filters of IC501, goes to LSDI of the CPU (IC511) to decode QT, DQT, and LTR. The DTMF signal is decoded by a dedicated IC (IC507) and the resulting signal is sent to the CPU (IC511) as serial data (STD).
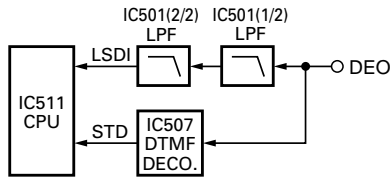


**Fig. 13    Decode**

## ■ D/A Converter

The D/A converter (IC5) is used to adjust TONE and MO modulation, beep, AF volume, TV voltage, FC reference voltage, and PC POWER CONTROL voltage level.

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

D/A output = (Vin – VDAref) / 256 x n + VDAref

   Vin : Analog input

   VDAref : D/A reference voltage

   n : Serial data value from the microprocessor (CPU)

## ■ Horn Control

The horn switch, consisting of Q4, Q5, and Q6, controls the horn relay. It is supplied by the dealer to provide the external horn alert function.

Q5 disables horn alert, turning on when its base is high, to inhibit the function. Normally, the output from IC7 is low, and Q6 is off; the base of Q4 is about 0V and Q4 is off. When horn alert is enabled, the output from IC7 goes high and Q6 turns on. The base current flows through R58 to Q4 to turn Q4 on. Q4 can sink a maximum of 100mA. If the operational KAP-1 is used, it can drive up to 2A.
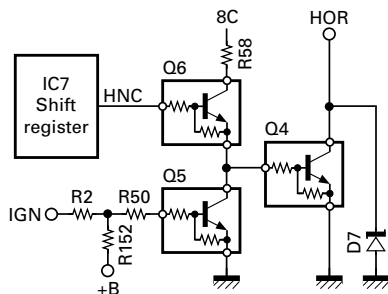


**Fig. 14    Horn control**

## ■ PA Switch

If the optional KAP-1 is used, the PA (Public Address) function becomes available. In this case, the signal flow changes as follows;

| "PA2" | Q507 | SW.A | SW.B | SW.D | Public address |
|---|---|---|---|---|---|
| L | L | L | H | H | OFF |
| H | H | H | L | L | ON |
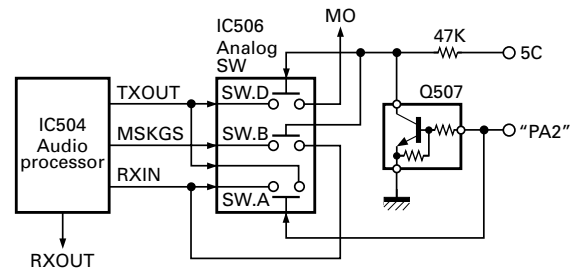


**Fig. 15    PA switch**

## Power Supply Circuit

When the POWER switch on the TX-RX unit (B/2) is pressed, the PSW signal goes low. This signal is inverted by Q26 and sent to a flip-flop IC (IC15). This IC outputs a control signal when the PSW goes low. When the power turns on, pin 1 of IC15 outputs a low signal and Q30 turns on. The base of Q28 goes high, Q28 turns on, SB SW (Q27) turns on and power (SB) is supplied to the set.

This circuit has an over-voltage protection circuit. If a DC voltage of 20V or higher is applied to the power cable, D34 turns on and a voltage is applied to the base of Q31. This voltage turns Q31 on and turns Q28 and SBSW off. This circuit has a TIMED POWER OFF (TOF) function which can be programmed by software.

It is controlled through pin 6 of IC7. When the TOF line goes high, Q22 turns on and then Q25 turns on. Pin 6 of IC15 goes high, then pin 1 goes high to turn Q27 off.
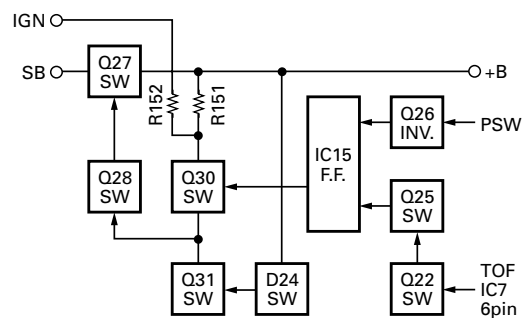


**Fig. 16    Power supply circuit**

# SEMICONDUCTOR DATA

## Microprocessor : 30622M8A-4F9GP (TX-RX Unit (B/2) IC511)

### ■ Terminal function

| Pin No. | Name | I/O | Function | Pin No. | Name | I/O | Function |
|---------|------|-----|----------|---------|------|-----|----------|
| 1 | LSDOUT | O | Low speed data output. | 36 | RFCLK | O | Common clock output. (TX-RX unit A/2) |
| 2 | HSDOUT | O | High speed data output. | 37 | RDY | – | Not used. |
| 3 | HSDIN | I | High speed data input. | 38 | ALE | – | Not used. |
| 4 | DTMSTD | I | DTMF decode IC data detect input. | 39 | HOLD | – | Not used. |
| 5 | SELF | I | Not used. | 40 | HLDA | – | Not used. |
| 6 | BYTE | I | +5V. | 41 | BLCK | – | Not used. |
| 7 | CNVSS | I | GND. | 42 | RD | – | Flash memory RD bus. |
| 8 | SFTOE | O | Shift register output enable. | 43 | BHE | – | Not used. |
| 9 | LCDCS | O | LCD driver chip select output. | 44 | WR | – | Flash memory WR bus. |
| 10 | RESET | I | Microcomputer reset input. | 45 | DTMCLK | O | DTMF decode IC clock output. |
| 11 | XOUT | – | 9.8304MHz (System clock). | 46 | CNTCLK | O | Common clock output. (TX-RX unit B/2) |
| 12 | VSS | – | GND. | 47 | EP | O | PLL IC data strobe output. |
| 13 | XIN | – | 9.8304MHz (System clock). | 48 | CSO | O | Flash memory chip enable. |
| 14 | VCC | – | +5V. | 49 | A19 | – | Not used. |
| 15 | IGN | I | Ignition input. | 50~59 | A18~A9 | – | Flash memory address bus. |
| 16 | AFTRD | I | MSK modulation data output timing pulse input. | 60 | VCC | – | +5V. |
| 17 | AFRTM | I | MSK demodulation data input timing pulse input. | 61 | A8 | – | Flash memory address bus. |
| | | | | 62 | VSS | – | GND. |
| 18 | MICDAT | O | MIC key data output. | 63~70 | A7~A0 | – | Flash memory address bus. |
| 19 | CP | O | PLL IC clock output. | 71~74 | KEY1~KEY4 | I/O | Key matrix data input/output 1~4. |
| 20 | BEEP | O | Beep data output. | 75 | MINDAT | O | Common data output. |
| 21 | AFRDT | I | MSK demodulation data input. | 76~78 | KEY5~KEY7 | I | Key matrix data input 5~7. |
| 22 | AFREG1 | O | AF IC register switching data output 1. | 79~86 | D7~D0 | – | Flash memory data bus. |
| 23 | AFREG2 | O | AF IC register switching data output 2. | 87 | DTMDAT | I | DTMF decode IC data input. |
| 24 | EEPDAT | O | EEPROM data output. | 88 | AUXDTC | I | External DTC input. |
| 25 | EN | O | D/A converter IC data strobe output. | 89 | MICBLC | O | MIC back light control output. |
| 26 | AFCLR | O | MSK flame reset output. | 90 | POWSW | I | Power switch input. |
| 27 | RXCOM2 | I | External hook input / External serial interface input. | 91 | ANLSQL | I | Squelch level input. |
| 28 | TXCOM2 | I/O | External PTT input / External serial interface output. | 92 | PTT | I | PTT switch input. |
| | | | | 93 | RSSI | I | Received signal strength indicator input (RSSI). |
| 29 | TXCOM1 | O | External serial interface output. | 94 | AVSS | – | GND. |
| 30 | RXCOM1 | I | External serial interface input. | 95 | LSDIN | I | Low speed data input. |
| 31 | LD | I | PLL unlock detect input. | 96 | VREF | – | +5V. |
| 32 | AFMSKE | O | MSK modulation enable. (Enable active "H") | 97 | AVCC | – | +5V. |
| 33 | TXD | O | Serial interface output. | 98 | ES1 | O | Shift register data strobe output. (TX-RX unit B/2) |
| 34 | HOOK | I | Hook input / Serial interface input. | 99 | ES2 | O | Shift register data strobe output. (TX-RX unit A/2) |
| 35 | AFDAT | O | MSK data output. | 100 | AFSTB | O | AF IC data strobe output. |

# TK-980/981
## SEMOCONDUCTOR DATA / DESCRIPTION OF COMPONENTS

### Shift Register : BU4094BCFV
#### ■ Terminal function (TX-RX unit (B/2) IC508)

| Pin No. | Port | Name | Function |
|---|---|---|---|
| 1 | ES | ES1 | Strobe |
| 2 | DT | DAT | Data |
| 3 | CK | | Clock |
| 4 | Q1 | LEDR | Red LED.  H : ON, L : OFF |
| 5 | Q2 | LEDG | Green LED.  H : ON, L : OFF |
| 6 | Q3 | KEYBLT | Key back light.  H : ON, L : OFF |
| 7 | Q4 | MMUTE | MIC mute.  H: Mute, L : Unmute |
| 8 | VSS | | GND |
| 9 | | | NC |
| 10 | | | NC |
| 11 | Q8 | PA2 | Public address 2.  H : ON, L : OFF |
| 12 | Q7 | BSHIFT | Beat shift.  H : ON, L : OFF |
| 13 | Q6 | KEY | TX power switching.  H : TX, L : RX |
| 14 | Q5 | T/R | TX/RX switching.  H : RX, L : TX |
| 15 | OE | | Output enable |
| 16 | VDC | | +5V |

#### ■ Terminal function (TX-RX unit (A/2) IC8)

| Pin No. | Port | Name | Function |
|---|---|---|---|
| 1 | STB | ES | Strobe |
| 2 | SI | DT | Data |
| 3 | CLK | CK | Clock |
| 4 | Q1 | AM1 | Audio mute 1.  H : Mute, L : Unmute |
| 5 | Q2 | LOK | Link complete. (Programmable active H/L) |
| 6 | Q3 | POR | Buffer amplifier and mixer switch. H : Normal, L : Power sw on (an instant) |
| 7 | Q4 | DM | Dead mute.  H : RX, L : TX |
| 8 | VSS | | GND |
| 9 | QS | | IC7 data output |
| 10 | | | NC |
| 11 | Q8 | SQ | External squelch. (Programmable active H/L) |
| 12 | Q7 | CODE2 | Option board data 2.  H : ON, L : OFF |
| 13 | Q6 | CODE1 | Option board data 1.  H : ON, L : OFF |
| 14 | Q5 | OPT | Option board control. H : ON, L : OFF / Auxiliary B. (Programmable active H/L) |
| 15 | OE | | Output |
| 16 | VDC | | +5V. |

#### ■ Terminal function (TX-RX unit (A/2) IC7)

| Pin No. | Port | Name | Function |
|---|---|---|---|
| 1 | STB | ES | Strobe |
| 2 | SI | DT | Data |
| 3 | CLK | CK | Clock |
| 4 | Q1 | HORN | Horn alert.  H : ON, L : OFF |
| 5 | Q2 | H/L | NC |
| 6 | Q3 | TIMOFF | Timed power off.  H : Power off |
| 7 | Q4 | CODE3 | Option board data 1.  H : ON, L : OFF |
| 8 | VSS | | GND |
| 9 | | | NC |
| 10 | | | NC |
| 11 | Q8 | W/N | Wide/Narrow switching. (Not used) H : Wide, L : Narrow |
| 12 | Q7 | BUSY | Trunked system busy. H : Not busy, L : Busy |
| 13 | Q6 | PA1 | Public address 1.  H : ON, L : OFF |
| 14 | Q5 | CODE4 | Option board data 1.  H : ON, L : OFF |
| 15 | OE | | Output enable |
| 16 | VDC | | +5V |

### DESCRIPTION OF COMPONENTS

### TX-RX Unit (X57-6520-XX) (A/2)
#### -10 : TK-980   -11 : TK-981

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| IC1~3 | Amplifier | |
| IC4 | Switch | |
| IC5 | D/A convert | |
| IC6 | Amplifier | |
| IC7,8 | Shift/store register | |
| IC9 | 5V AVR | |
| IC10 | AF amplifier | |
| IC11 | FM demodulation | |
| IC12 | 5V AVR | |
| IC13 | DC amplifier | Current detect/PC |
| IC14 | 8V AVR | |
| IC15 | Power supply logic circuit control | |
| IC16 | 9V AVR | 8CL |
| IC300 | PLL synthesizer | |
| IC400 | Power module | RF power 15W |
| Q1 | AF switch | |
| Q2 | Ripple filter | |

# DESCRIPTION OF COMPONENTS

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| Q4 | DC switch | HOR |
| Q5 | DC switch | IGN |
| Q6 | DC switch | HOR CONT. |
| Q7 | Buffer amplifier | |
| Q8,9 | AF mute switch | |
| Q10,11 | DC switch | 8R |
| Q12,13 | DC switch | 8T |
| Q15 | IF amplifier | |
| Q17 | APC pre drive | APC |
| Q18 | RX mute | |
| Q19 | APC drive | APC |
| Q20 | Current detector SW | TX on |
| Q21 | Pre current detector SW | TX on |
| Q22 | DC switch | TOF |
| Q25 | DC switch | TOF |
| Q26 | DC switch | PSW |
| Q27 | SB switch | |
| Q28 | DC switch | SB |
| Q30,31 | DC switch | SB |
| Q32 | AF switch | |
| Q33 | DC switch | POR. Q7 SW |
| Q34 | Thermal protection SW | |
| Q201 | RF amplifier | Front amplifier |
| Q202 | RF amplifier | Pre drive |
| Q203 | Mixer | |
| Q204 | RF amplifier | Drive |
| Q205 | DC switch | POR. Q203 SW |
| Q300 | RF amplifier | PLL input |
| Q301,302 | CP | |
| D1~6 | Surge absorption | |
| D7 | Voltage reference | |
| D11 | DC switch | |
| D16 | Reverse current prevention | |
| D17 | Surge absorption | |
| D18,19 | RF switch | TX/RX |
| D20 | Reverse current prevention | |
| D21 | Voltage reference | |
| D24 | Current protection | |
| D26 | Reverse current prevention | |
| D28 | Voltage reference | |
| D31 | Reverse current prevention | |
| D32 | Surge absorption | |
| D34 | Voltage reference | |
| D35 | Limiter | |
| D37 | Reverse protection | |

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| D200 | Limiter | Excessive input protection |
| D208~210 | RF switch | TX/RX |

## TX-RX Unit (X57-6520-XX) (B/2)
### -10 : TK-980   -11 : TK-981

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| IC501~503 | Amplifier | |
| IC504 | Audio processor | |
| IC506 | Analog switch | |
| IC507 | DTMF decoder | |
| IC508 | Shift/store register | |
| IC509 | Reset IC | |
| IC510 | Flash ROM | |
| IC511 | CPU | |
| IC512 | EEPROM | |
| IC513 | 8V AVR | |
| IC711 | Amplifier | |
| Q501 | MIC mute | |
| Q502 | AF mute | |
| Q503 | Amplifier | Noise |
| Q507 | DC switch | PA |
| Q508,509 | DC switch | LED |
| Q510 | Clock shift | |
| Q511 | DC switch | FSW |
| Q512 | DC switch | BLC |
| Q513 | AVR | |
| Q515 | DC switch | Q513 SW |
| D501 | Surge absorption | |
| D502 | Current protection | |
| D503~505 | Surge absorption | |
| D507 | OR gate | MIC mute |
| D508,509 | Limiter | |
| D510 | Reverse current prevention | |
| D511~517 | Light emission | |
| D518 | Voltage reference back light | |
| D520 | Discharge | Speed up |

## PLL/VCO (X58-4530-XX)  -10 : TK-980   -11 : TK-981

| Ref. No. | Use / Function | Operation / Condition |
|---|---|---|
| Q100 | Buffer amplifier | |
| Q101 | VCO | |
| Q102 | Doubler | |
| D100,101 | VCO control | |
| D102 | VCO modulation | |

# TK-980/981

PARTS LIST

## CAPACITORS

CC 45 TH 1H 220 J
1　2　3　4　5　6

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

CC45 — Color*
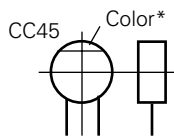
### • Capacitor value

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

2 2 0 = 22pF
- Multiplier
- 2nd number
- 1st number
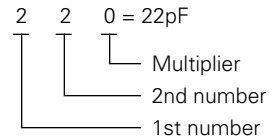
### • Temperature coefficient

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

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

Example : CC45TH = −470 ± 60ppm/°C

### • Tolerance (More than 10pF)

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

### (Less than 10pF)

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

### • Voltage rating

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

### • Chip capacitors

(EX)　C C 7 3 F S L 1 H 0 0 0 J
　　　1　2　3　4　5　6　7

(Chip) (CH, RH, UJ, SL)

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

(Chip) (B, F)

Refer to the table above.

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

### Dimension (Chip capacitors)

| Dimension code | L | W | T |
|---|---|---|---|
| Empty | 5.6 ± 0.5 | 5.0 ± 0.5 | Less than 2.0 |
| A | 4.5 ± 0.5 | 3.2 ± 0.4 | Less than 2.0 |
| B | 4.5 ± 0.5 | 2.0 ± 0.3 | Less than 2.0 |
| C | 4.5 ± 0.5 | 1.25 ± 0.2 | Less than 1.25 |
| D | 3.2 ± 0.4 | 2.5 ± 0.3 | Less than 1.5 |
| E | 3.2 ± 0.2 | 1.6 ± 0.2 | Less than 1.25 |
| F | 2.0 ± 0.3 | 1.25 ± 0.2 | Less than 1.25 |
| G | 1.6 ± 0.2 | 0.8 ± 0.2 | Less than 1.0 |
| H | 1.0 ± 0.05 | 0.5 ± 0.05 | 0.5 ± 0.05 |

**Dimension**

## RESISTORS

### • Chip resistor (Carbon)

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

(Chip) (B,F)

### • Carbon resistor (Normal type)

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

1 = Type … ceramic, electrolytic, etc.
2 = Shape … round, square, ect.
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance
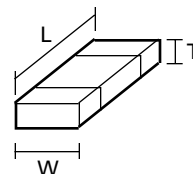
### Dimension (Chip resistor)

| Dimension code | L | W | T |
|---|---|---|---|
| E | 3.2 ± 0.2 | 1.6 ± 0.2 | 1.0 |
| F | 2.0 ± 0.3 | 1.25 ± 0.2 | 1.0 |
| G | 1.6 ± 0.2 | 0.8 ± 0.2 | 0.5 ± 0.1 |
| H | 1.0 ± 0.05 | 0.5 ± 0.05 | 0.35 ± 0.05 |

### Rating wattage

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

# PARTS LIST

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

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

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| | | | | **TK-980/981** | | | |
| 1 | 1A | | A01-2165-23 | CABINET | UPPER | | |
| 2 | 2A | | A01-2166-23 | CABINET | LOWER | | |
| 3 | 2A | | A62-0991-03 | PANEL ASSY | | | |
| 5 | 1D | | B09-0235-05 | CAP | ACC | | |
| 6 | 2B | | B38-0814-05 | LCD ASSY | | | |
| 7 | 2D | ✽ | B62-1549-00 | INSTRUCTION MANUAL | | | |
| 8 | 1C | ✽ | B72-2047-04 | MODEL NAME PLATE | | | TK-980 |
| 8 | 1C | ✽ | B72-1488-24 | MODEL NAME PLATE | | | TK-981 |
| 10 | 2B | ✽ | E23-1136-04 | GROUND TERMINAL | | | |
| 11 | 1C | | E30-3031-15 | ANTENNA CABLE | | | |
| 12 | 1D | | E30-3339-05 | DC CORD | ACC | | |
| 13 | 1C | | E30-3340-05 | DC CORD | | | |
| 14 | 2B | | E37-0789-05 | FLAT CABLE | CONT-TX-RX | | |
| 15 | 1B | ✽ | E37-0790-25 | LEAD WIRE WITH CONNECTOR | SP | | |
| 17 | 2B | | F20-1192-04 | INSULATING SHEET | | | |
| 18 | 1D | | F51-0016-05 | FUSE (6✽30) | 6A | | |
| 20 | 1B,1C | | G02-0791-04 | FLAT SPRING | AF,APC,AVR | | |
| 21 | 1B,1C | | G10-1221-04 | FIBROUS SHEET | SIDE | | |
| 22 | 1B | | G10-1222-14 | FIBROUS SHEET | UP,DOWN | | |
| 23 | 1A,2B | | G10-1223-14 | FIBROUS SHEET | SHIELD CASE | | |
| 24 | 1C | | G13-1468-04 | CUSHION | DC CORD | | |
| 25 | 1B | ✽ | G13-1873-04 | CUSHION | SP | | |
| 26 | 2C | | G53-0796-04 | PACKING | PHONE JACK | | |
| 28 | 3D | | H10-6618-12 | POLYSTYRENE FOAMED FIXTURE | | | |
| 29 | 2E | | H10-6619-12 | POLYSTYRENE FOAMED FIXTURE | | | |
| 30 | 1D | | H12-1391-03 | INNER PACKING CASE | ACC | | |
| 31 | 1E | | H25-0720-04 | PROTECTION BAG (200X350) | | | |
| 32 | 3E | | H52-1431-02 | ITEM CARTON CASE | | | TK-980 |
| 32 | 3E | | H52-1432-02 | ITEM CARTON CASE | | | TK-981 |
| 34 | 2D | | J19-1584-05 | HOLDER | ACC | | |
| 35 | 1D | | J29-0627-23 | BRACKET | ACC | | |
| 37 | 2B | | K29-5284-02 | KEY TOP | | | |
| A | 1A,2A | | N33-2606-45 | OVAL HEAD MACHINE SCREW | | | |
| B | 2C | | N67-3008-46 | PAN HEAD SEMS SCREW W | | | |
| C | 1A,2B,1C | | N87-2606-46 | BRAZIER HEAD TAPTITE SCREW | | | |
| D | 2B | | N87-2612-46 | BRAZIER HEAD TAPTITE SCREW | | | |
| 39 | 2D | | N99-0395-05 | SCREW SET | ACC | | |
| 41 | 1B | | T07-0246-05 | SPEAKER | | | |
| 42 | 1D | | T91-0621-05 | MICROPHONE | ACC | | |

## TX-RX UNIT (X57-6520-XX)  -10 : TK-980   -11 : TK-981

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| D511 | | | B30-2151-05 | LED (RED/GRE) | | | |
| D512-517 | | | B30-2171-05 | LED (D) | | | |
| C1-15 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C16 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | |
| C18 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C19 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C20-22 | | | CC73GCH1H101J | CHIP C | 100PF | J | |

**TK-980/981**
**TX-RX UNIT (X57-6520-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C23 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C24 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C25 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C27 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C28 | | | CC73GCH1H220J | CHIP C | 22PF | J | |
| C29 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | |
| C30 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C31 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | |
| C32 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C33 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C34 | | | C92-0568-05 | CHIP-TAN | 22UF | 10WV | |
| C35 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C36 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | |
| C37 | | | C92-1341-05 | ELECTRO | 100UF | 16WV | |
| C38 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C39 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C40 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C41 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | |
| C42 | | | C92-0546-05 | CHIP-TAN | 68UF | 6.3WV | |
| C43,44 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C45 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C46 | | | C92-0004-05 | CHIP-TAN | 1.0UF | 16WV | |
| C47 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C48 | | | CK73FF1C105Z | CHIP C | 1.0UF | Z | |
| C49 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C51 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C52 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C54 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C55 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C56 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C57 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C58 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C59 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C60 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C61 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C62 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C63 | | | CK73FF1C105Z | CHIP C | 1.0UF | Z | |
| C64 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C65 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C66 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C67 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C68 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C70 | | | C92-0719-05 | ELECTRO | 47UF | 25WV | |
| C71 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C72,73 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C74 | | | C92-0719-05 | ELECTRO | 47UF | 25WV | |
| C75 | | | C92-0044-05 | CHIP-ELE | 47UF | 10WV | |
| C76 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C77 | | | C92-0719-05 | ELECTRO | 47UF | 25WV | |
| C78 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C79 | | | C92-0722-05 | ELECTRO | 470UF | 16WV | |
| C80 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C83 | | | CK73FB1H473K | CHIP C | 0.047UF | K | |
| C84 | | | CC73GCH1H120J | CHIP C | 12PF | J | TK-980 |
| C84 | | | CC73GCH1H220J | CHIP C | 22PF | J | TK-981 |

# TK-980/981

# PARTS LIST

**TX-RX UNIT (X57-6520-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C85 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C87 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C88 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C89 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C90 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C91,92 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C94 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C96 | | | CC73GCH1H180J | CHIP C | 18PF | J | |
| C97 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C98 | | | CC73GCH1H150J | CHIP C | 15PF | J | |
| C99 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C100 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | TK-980 |
| C102 | | | CC73GCH1H270J | CHIP C | 27PF | J | |
| C103 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C104 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C105 | | | C92-0004-05 | CHIP-TAN | 1.0UF | 16WV | |
| C106 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C107 | | | C92-0628-05 | CHIP-TAN | 10UF | 10WV | |
| C108 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C109,110 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C111 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C112 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C113 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C114 | | | C92-0543-05 | CHIP-TAN | 3.3UF | 10WV | |
| C115 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C116 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C117 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C118 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C121 | | | C92-0543-05 | CHIP-TAN | 3.3UF | 10WV | |
| C123 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C124,125 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C126 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C127 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C128,129 | | | CC73GCH1H470J | CHIP C | 47PF | J | |
| C131 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C132 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C134 | | | CK73FB1C224K | CHIP C | 0.22UF | K | |
| C136 | | | CK73FB1C224K | CHIP C | 0.22UF | K | |
| C137 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C142,143 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C144 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C150 | | | CC73GCH1H220J | CHIP C | 22PF | J | |
| C151 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C152 | | | C92-0777-05 | ELECTRO | 1000UF | 25WV | |
| C153 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C155 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C156 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C157 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C158,159 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | |
| C160 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C161 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C162 | | | C92-0585-05 | CHIP-TAN | 4.7UF | 16WV | |
| C164 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C166 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C167 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C168 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | |
| C169 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C170 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | |
| C171 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C172 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C173 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C174 | | | C92-0585-05 | CHIP-TAN | 4.7UF | 16WV | |
| C175 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C176 | | | CC73GCH1H470J | CHIP C | 47PF | J | TK-980 |
| C176 | | | CC73GCH1H101J | CHIP C | 100PF | J | TK-981 |
| C177 | | | C92-0519-05 | CHIP-TAN | 1.0UF | 25WV | |
| C178 | | | CC73GCH1H470J | CHIP C | 47PF | J | TK-980 |
| C179 | | | CC73GCH1H101J | CHIP C | 100PF | J | TK-981 |
| C195-198 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C207 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C209 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C210 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C211 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C212 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | |
| C213 | | | CC73GCH1H010B | CHIP C | 1.0PF | B | |
| C214,215 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C216 | | | CC73GCH1H010B | CHIP C | 1.5PF | B | TK-981 |
| C216 | | | CC73GCH1H1R5B | CHIP C | 1.5PF | B | TK-980 |
| C217 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C218 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C219 | | | CC73GCH1H110J | CHIP C | 11PF | J | TK-980 |
| C219 | | | CC73GCH1H120J | CHIP C | 12PF | J | TK-981 |
| C220 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C221 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C222 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C224 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C227 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C228 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C229 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C234 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C235 | | | CC73GCH1H080D | CHIP C | 8.0PF | D | |
| C236 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C240 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C245 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C246 | | | C92-0001-05 | CHIP C | 0.1UF | 35WV | |
| C247 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C249 | | | CC73GCH1H100D | CHIP C | 10PF | D | |
| C251 | | | CC73GCH1H050C | CHIP C | 5.0PF | C | TK-981 |
| C251 | | | CC73GCH1H060D | CHIP C | 6.0PF | D | TK-980 |
| C252 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C253 | | | CC73FCH1H080D | CHIP C | 8.0PF | D | TK-981 |
| C253 | | | CC73FCH1H100D | CHIP C | 10PF | D | TK-980 |
| C255 | | | CC73FCH1H040C | CHIP C | 4.0PF | C | TK-981 |
| C255 | | | CC73FCH1H060D | CHIP C | 6.0PF | D | TK-980 |
| C256 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C257 | | | C92-0719-05 | ELECTRO | 47UF | 25WV | |
| C258 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C259 | | | C92-0719-05 | ELECTRO | 47UF | 25WV | |
| C260 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C261 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C262 | | | C92-0719-05 | ELECTRO | 47UF | 25WV | |
| C263 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C264 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C265 | | | C93-0550-05 | CHIP C | 1.0PF | C | |
| C266 | | | C93-0552-05 | CHIP C | 2.0PF | C | TK-981 |
| C266 | | | C93-0553-05 | CHIP C | 3.0PF | C | TK-980 |
| C267 | | | C93-0568-05 | CHIP C | 47PF | J | |
| C268 | | | CC73FCH1H010C | CHIP C | 1.0PF | C | TK-981 |
| C268 | | | CC73FCH1H470J | CHIP C | 47PF | J | TK-980 |
| C269 | | | C93-0560-05 | CHIP C | 10PF | D | |

# PARTS LIST

| Ref. No. | Address | New parts | Parts No. | Description | | | Destination |
|---|---|---|---|---|---|---|---|
| C271 | | | C93-0550-05 | CHIP C | 1.0PF | C | |
| C272 | | | CC73GCH1H010C | CHIP C | 1.0PF | C | |
| C273 | | | C93-0552-05 | CHIP C | 2.0PF | C | TK-981 |
| C273 | | | C93-0553-05 | CHIP C | 3.0PF | C | TK-980 |
| C274 | | | CC73GCH1H221J | CHIP C | 220PF | J | |
| C275 | | | C92-0002-05 | CHIP-TAN | 0.22UF | 35WV | |
| C276 | | | C92-0657-05 | CHIP-TAN | 2.2UF | 20WV | TK-981 |
| C276 | | | C92-0754-05 | CHIP-TAN | 4.7UF | 20WV | TK-980 |
| C284-286 | | | CC73GCH1H470J | CHIP C | 47PF | J | |
| C289 | | | CK73GB1E103K | CHIP C | 0.010UF | K | |
| C303 | | | C92-0565-05 | CHIP-TAN | 6.8UF | 10WV | |
| C304 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C306 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C307 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C308 | | | CC73GCH1H2R5B | CHIP C | 2.5PF | B | |
| C309 | | | CC73GCH1H010B | CHIP C | 1.0PF | B | |
| C310 | | | CC73GCH1H1R5B | CHIP C | 1.5PF | B | TK-981 |
| C310 | | | CC73GCH1H2R5B | CHIP C | 2.5PF | B | TK-980 |
| C313 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C314 | | | C92-0001-05 | CHIP C | 0.1UF | 35WV | TK-980 |
| C314 | | | C92-0503-05 | CHIP C | 0.068UF | 35WV | TK-981 |
| C315 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C317 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C318,319 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C320 | | | C92-0003-05 | CHIP-TAN | 0.47UF | 25WV | TK-981 |
| C320 | | | C92-0519-05 | CHIP-TAN | 1.0UF | 25WV | TK-980 |
| C321 | | | CC73GCH1H040C | CHIP C | 4.0PF | C | |
| C322 | | | C92-0003-05 | CHIP-TAN | 0.47UF | 25WV | TK-981 |
| C322 | | | C92-0519-05 | CHIP-TAN | 1.0UF | 25WV | TK-980 |
| C325 | | | C92-0003-05 | CHIP-TAN | 0.47UF | 25WV | TK-981 |
| C325 | | | C92-0519-05 | CHIP-TAN | 1.0UF | 25WV | TK-980 |
| C326 | | | CK73FB1C154K | CHIP C | 0.15UF | K | |
| C327 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C328 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C330 | | | CC73FCH1H101J | CHIP C | 100PF | J | |
| C437 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C438 | | | CC73GCH1H220J | CHIP C | 22PF | J | |
| C501 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C503,504 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C505 | | | CK73GB1C683K | CHIP C | 0.068UF | K | |
| C506 | | | CK73GB1E123K | CHIP C | 0.012UF | K | |
| C509 | | | CK73GB1H222K | CHIP C | 2200PF | K | |
| C510 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C511 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C512 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C513 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C514 | | | CK73GB1H152K | CHIP C | 1500PF | K | |
| C515 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C516,517 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C518 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C519 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C520 | | | CC73GCH1H121J | CHIP C | 120PF | J | |
| C521,522 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C523 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C524 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C525 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C526 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C527 | | | CK73GB1C333K | CHIP C | 0.033UF | K | |
| C528 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C529 | | | CK73GB1H562K | CHIP C | 5600PF | K | |
| C531 | | | CK73GB1H562K | CHIP C | 5600PF | K | |
| C533 | | | CK73GB1H562K | CHIP C | 5600PF | K | |
| C535 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C536 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C537 | | | CK73GB1H272K | CHIP C | 2700PF | K | |
| C539 | | | CK73GB1H272K | CHIP C | 2700PF | K | |
| C540 | | | CC73GCH1H271J | CHIP C | 270PF | J | |
| C541 | | | CC73GCH1H151J | CHIP C | 150PF | J | |
| C542 | | | CC73GCH1H271J | CHIP C | 270PF | J | |
| C543 | | | CK73GB1H272K | CHIP C | 2700PF | K | |
| C544 | | | CC73GCH1H030C | CHIP C | 3.0PF | C | |
| C545 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C546 | | | CK73GB1H122K | CHIP C | 1200PF | K | |
| C547 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C548 | | | C92-0712-05 | CHIP-TAN | 22UF | 6.3WV | |
| C549 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C550 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C552 | | | CK73GB1C333K | CHIP C | 0.033UF | K | |
| C553 | | | CK73GB1H472K | CHIP C | 4700PF | K | |
| C554-558 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C559 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C560 | | | C92-0507-05 | CHIP-TAN | 4.7UF | 6.3WV | |
| C561 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C562,563 | | | CK73GB1H472K | CHIP C | 4700PF | K | |
| C564 | | | CK73GB1E223K | CHIP C | 0.022UF | K | |
| C565 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C566 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C567 | | | CK73GB1E223K | CHIP C | 0.022UF | K | |
| C568 | | | C92-0712-05 | CHIP-TAN | 22UF | 6.3WV | |
| C569 | | | CC73GCH1H470J | CHIP C | 47PF | J | |
| C570 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C571 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C572 | | | CK73FB1H563K | CHIP C | 0.056UF | K | |
| C574 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C575 | | | CK73FB1C334K | CHIP C | 0.33UF | K | |
| C576 | | | CK73GB1C473K | CHIP C | 0.047UF | K | |
| C577 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C578 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C579 | | | CK73GB1H472K | CHIP C | 4700PF | K | |
| C580 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C581,582 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C583 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C584 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C592 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C593 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C594,595 | | | CC73GCH1H270J | CHIP C | 27PF | J | |
| C596 | | | CC73GCH1H680J | CHIP C | 68PF | J | |
| C597 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C598,599 | | | CC73GCH1H101J | CHIP C | 100PF | J | |
| C600,601 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C602 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C603 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C604 | | | C92-0560-05 | CHIP-TAN | 10UF | 6.3WV | |
| C605 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C606 | | | CK73GB1H472K | CHIP C | 4700PF | K | |
| C607 | | | CK73GB1C104K | CHIP C | 0.10UF | K | |
| C608 | | | CK73GB1H392K | CHIP C | 3900PF | K | |
| C609,610 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C612 | | | CK73GB1H103K | CHIP C | 0.010UF | K | |
| C613 | | | C92-0606-05 | CHIP-TAN | 4.7UF | 10WV | |

# PARTS LIST

**TX-RX UNIT (X57-6520-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| C614 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C616 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C617 | | | CC73GCH1H101J | CHIP C 100PF J | |
| C620 | | | CC73GCH1H101J | CHIP C 100PF J | |
| C622,623 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C624 | | | CC73GCH1H101J | CHIP C 100PF J | |
| C625 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C626 | | | CC73GCH1H101J | CHIP C 100PF J | |
| C627 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C628 | | | CC73GCH1H101J | CHIP C 100PF J | |
| C630 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C631-634 | | | CC73GCH1H101J | CHIP C 100PF J | |
| C714 | | | CC73GCH1H331J | CHIP C 330PF J | |
| C715 | | | CK73GB1H102K | CHIP C 1000PF K | |
| C718 | | | C92-0712-05 | CHIP-TAN 22UF 6.3WV | |
| C720 | | | CC73GCH1H470J | CHIP C 47PF J | |
| C722,723 | | | CC73GCH1H221J | CHIP C 220PF J | |
| C726 | | | CK73GB1C104K | CHIP C 0.10UF K | |
| C728 | | | C92-0772-05 | CHIP-TAN 10UF 6.3WV | |
| CN1 | | | E40-5737-05 | PIN ASSY | |
| CN2 | | | E40-5738-05 | PIN ASSY | |
| CN3 | | | E40-3247-05 | PIN ASSY | |
| CN4 | | | E40-5738-05 | PIN ASSY | |
| CN5 | | | E40-3247-05 | PIN ASSY | |
| CN6 | | | E40-3246-05 | PIN ASSY | |
| CN7 | | | E40-5982-05 | FLAT CABLE CONNECTOR | |
| CN501 | | | E40-5823-05 | FLAT CABLE CONNECTOR | |
| CN502 | | | E40-5982-05 | FLAT CABLE CONNECTOR | |
| J1 | 2C | | E11-0442-05 | 3.5D PHONE JACK (3P) | |
| J501 | 1B | | E08-0877-05 | MODULAR JACK | |
| - | | | J31-0543-05 | COLLAR (LH-5-1.5) | |
| CF1 | | | L72-0986-05 | CERAMIC FILTER | TK-981 |
| CF1 | | | L72-0998-05 | CERAMIC FILTER | TK-980 |
| L1 | | | L40-4795-34 | SMALL FIXED INDUCTOR (4.7UH) | |
| L3,4 | | | L40-1875-92 | SMALL FIXED INDUCTOR (18NH) | |
| L5 | | | L40-1092-34 | SMALL FIXED INDUCTOR | |
| L6 | | | L34-4459-05 | COIL | |
| L8 | | | L92-0138-05 | FERRITE CHIP | |
| L9 | | | L40-8265-92 | SMALL FIXED INDUCTOR (8.2NH) | |
| L10 | | | L40-1092-34 | SMALL FIXED INDUCTOR | |
| L11 | | | L40-1091-37 | SMALL FIXED INDUCTOR (1.000UH) | |
| L203 | | | L79-1465-05 | DIELECTRIC FILTER | TK-980 |
| L203 | | | L79-1467-05 | DIELECTRIC FILTER | TK-981 |
| L205 | | | L40-1075-92 | SMALL FIXED INDUCTOR (10NH) | TK-981 |
| L205 | | | L40-8265-92 | SMALL FIXED INDUCTOR (8.2NH) | TK-980 |
| L206 | | | L40-6865-92 | SMALL FIXED INDUCTOR (6.8NH) | TK-981 |
| L206 | | | L40-8265-92 | SMALL FIXED INDUCTOR (8.2NH) | TK-980 |
| L207 | | | L79-1465-05 | DIELECTRIC FILTER | TK-980 |
| L207 | | | L79-1467-05 | DIELECTRIC FILTER | TK-981 |
| L208 | | | L40-4763-92 | SMALL FIXED INDUCTOR (4.7NH) | |
| L209 | | | L40-8265-92 | SMALL FIXED INDUCTOR (8.2NH) | |
| L210 | | | L40-3985-45 | SMALL FIXED INDUCTOR (0.39UH) | |
| L211 | | | L40-6885-45 | SMALL FIXED INDUCTOR (0.68UH) | |
| L218 | | | L40-1078-94 | SMALL FIXED INDUCTOR (10NH) | |
| L220 | | | L34-1306-15 | AIR-CORE COIL | |
| L221 | | | L34-1317-05 | AIR-CORE COIL | |
| L222,223 | | | L34-1307-05 | AIR-CORE COIL | TK-980 |
| L222,223 | | | L34-1313-05 | AIR-CORE COIL | TK-981 |
| L224 | | | L34-1306-15 | AIR-CORE COIL | |
| L225 | | | L92-0179-05 | FERRITE CHIP | |
| L226 | | | L40-1078-94 | SMALL FIXED INDUCTOR (10NH) | |
| L229 | | | L34-1308-15 | AIR-CORE COIL | |
| L300 | | | L40-1563-92 | SMALL FIXED INDUCTOR (1.5NH) | |
| L301 | | | L40-3963-92 | SMALL FIXED INDUCTOR (3.9NH) | TK-981 |
| L301 | | | L40-4763-92 | SMALL FIXED INDUCTOR (4.7NH) | TK-980 |
| L303,304 | | | L40-2763-92 | SMALL FIXED INDUCTOR (2.7NH) | |
| L305 | | | L92-0179-05 | FERRITE CHIP | |
| L501-508 | | | L92-0138-05 | FERRITE CHIP | |
| X1 | | | L77-1882-05 | VCXO (16.8MHZ) | |
| X2 | | | L77-1762-05 | CRYSTAL RESONATOR (44.395MHZ) | |
| X501 | | | L77-1708-05 | CRYSTAL RESONATOR (3.579545MHZ) | |
| X502 | | | L78-0462-05 | RESONATOR (9.8304MHz) | |
| XF1 | | | L71-0525-05 | MCF (5KHZ) | TK-980 |
| XF1 | | | L71-0583-05 | MCF (3.75KHZ) | TK-981 |
| CP501 | | | R90-0724-05 | MULTI-COMP 1K X4 | |
| R1 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R2 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R3 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| R4 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R6,7 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R8 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R9 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R10,11 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R12 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R14 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R15 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R16 | | | RK73GB1J274J | CHIP R 270K J 1/16W | |
| R17 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R19 | | | RK73GB1J153J | CHIP R 15K J 1/16W | |
| R20 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R21 | | | RK73GB1J563J | CHIP R 56K J 1/16W | |
| R22 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R23 | | | RK73GB1J224J | CHIP R 220K J 1/16W | |
| R25 | | | RK73GB1J394J | CHIP R 390K J 1/16W | |
| R26 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R27 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R28 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R29 | | | RK73GB1J220J | CHIP R 22 J 1/16W | |
| R30 | | | RK73GB1J224J | CHIP R 220K J 1/16W | |
| R31 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R32,33 | | | RK73GB1J474J | CHIP R 470K J 1/16W | |
| R34 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R36 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R37 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R39 | | | RK73GB1J101J | CHIP R 100 J 1/16W | |
| R40 | | | RK73GB1J472J | CHIP R 4.7K J 1/16W | |
| R41 | | | RK73GB1J183J | CHIP R 18K J 1/16W | |
| R42 | | | RK73GB1J333J | CHIP R 33K J 1/16W | |
| R44,45 | | | RK73GB1J154J | CHIP R 150K J 1/16W | |
| R46 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R47 | | | RK73GB1J473J | CHIP R 47K J 1/16W | |
| R48 | | | RK73GB1J122J | CHIP R 1.2K J 1/16W | |
| R49 | | | RK73GB1J102J | CHIP R 1.0K J 1/16W | |
| R50 | | | RK73GB1J103J | CHIP R 10K J 1/16W | |
| R52 | | | RK73GB1J104J | CHIP R 100K J 1/16W | |
| R53 | | | R92-1252-05 | CHIP R 0 OHM J 1/16W | |
| R54 | | | RK73GB1J154J | CHIP R 150K J 1/16W | |

# PARTS LIST

**TX-RX UNIT (X57-6520-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | | | | Destination |
|---|---|---|---|---|---|---|---|---|
| R55 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R56 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R57 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R58 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R60 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R61 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R62 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R63-65 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R66 | | | RK73GB1J682J | CHIP R | 6.8K | J | 1/16W | |
| R67 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R69 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R70-73 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R74 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R75 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R76 | | | RK73GB1J153J | CHIP R | 15K | J | 1/16W | |
| R77 | | | RK73GB1J333J | CHIP R | 33K | J | 1/16W | |
| R78 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R79 | | | RK73GB1J180J | CHIP R | 18 | J | 1/16W | TK-981 |
| R79 | | | RK73GB1J390J | CHIP R | 39 | J | 1/16W | TK-980 |
| R80 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R82,83 | | | RK73GB1J151J | CHIP R | 150 | J | 1/16W | TK-980 |
| R82,83 | | | RK73GB1J271J | CHIP R | 270 | J | 1/16W | TK-981 |
| R85 | | | RK73GB1J122J | CHIP R | 1.2K | J | 1/16W | |
| R86,87 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R88 | | | RK73EB2B181J | CHIP R | 180 | J | 1/8W | |
| R89 | | | RK73EB2B151J | CHIP R | 150 | J | 1/8W | |
| R90 | | | RK73GB1J2R2J | CHIP R | 2.2 | J | 1/16W | |
| R91 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R92 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | |
| R93 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | |
| R94 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R95 | | | RK73FB2A154J | CHIP R | 150K | J | 1/10W | |
| R96 | | | RK73GB1J181J | CHIP R | 180 | J | 1/16W | TK-981 |
| R96 | | | RK73GB1J331J | CHIP R | 330 | J | 1/16W | TK-980 |
| R97,98 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R99 | | | RK73GB1J152J | CHIP R | 1.5K | J | 1/16W | |
| R100 | | | RK73GB1J151J | CHIP R | 150 | J | 1/16W | TK-981 |
| R100 | | | RK73GB1J331J | CHIP R | 330 | J | 1/16W | TK-980 |
| R101 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | |
| R102 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | |
| R103 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | |
| R104 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | |
| R105 | | | R92-2538-05 | RN | 3.9K | B | 1/8W | |
| R106 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R107 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R109 | | | R92-0670-05 | CHIP R | 0 OHM | | | |
| R110 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R111 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R112,113 | | | R92-1268-05 | RN | 4.7K | B | 1/8W | |
| R116 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R118 | | | RK73GB1J392J | CHIP R | 3.9K | J | 1/16W | TK-980 |
| R119 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R120 | | | R92-1268-05 | RN | 4.7K | B | 1/8W | |
| R121 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R122 | | | RK73FB2A272J | CHIP R | 2.7K | J | 1/10W | |
| R124 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R127 | | | R92-2680-05 | RESISTOR | | | | |
| R128 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R129 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R132 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R134 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R135 | | | R92-1261-05 | CHIP R | 150 | J | 1/2W | |
| R137 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R139 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R140 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R141 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R143 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R144 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R145 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R146 | | | R92-1215-05 | CHIP R | 470 | J | 1/2W | |
| R148 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | |
| R150 | | | R92-0670-05 | CHIP R | 0 OHM | | | |
| R151-153 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R154 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R155 | | | RK73GB1J333J | CHIP R | 33K | J | 1/16W | |
| R156 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R157 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R158,159 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R160 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | |
| R163 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R166 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R168 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R170,171 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R172 | | | RK73GB1J221J | CHIP R | 220 | J | 1/16W | |
| R176 | | | R92-0670-05 | CHIP R | 0 OHM | | | |
| R181,182 | | | R92-0679-05 | CHIP R | 0 OHM | | | |
| R209 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R210 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R211 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R212 | | | RK73GB1J5R6J | CHIP R | 5.6 | J | 1/16W | |
| R214 | | | RK73GB1J221J | CHIP R | 220 | J | 1/16W | |
| R217 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R218 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R219 | | | RK73GB1J273J | CHIP R | 27K | J | 1/16W | |
| R220 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R221 | | | RK73GB1J153J | CHIP R | 15K | J | 1/16W | |
| R223 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R226 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R231 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R235 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R236 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R237 | | | RK73GB1J153J | CHIP R | 15K | J | 1/16W | |
| R239 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | |
| R240 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R241 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R243-245 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R247 | | | R92-0699-05 | CHIP R | 10 | J | 1/2W | TK-981 |
| R247 | | | R92-1259-05 | CHIP R | 18 | J | 1/2W | TK-980 |
| R248,249 | | | R92-1215-05 | RESISTOR | 470 | | 1/2W | TK-981 |
| R248,249 | | | R92-2571-05 | RESISTOR | 270 | | 1/2W | TK-980 |
| R250 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R251 | | | RK73GB1J474J | CHIP R | 470K | J | 1/16W | |
| R252 | | | R92-1217-05 | CHIP R | 0 OHM | | | |
| R253,254 | | | RK73GB1J821J | CHIP R | 820 | J | 1/16W | |
| R255,256 | | | R92-1308-05 | CHIP R | 22 | J | 1W | |
| R257,258 | | | R92-0670-05 | CHIP R | 0 OHM | | | |
| R301-303 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R305 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R306 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | TK-981 |
| R306 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | TK-980 |

# PARTS LIST

**TX-RX UNIT (X57-6520-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| R307 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R308 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R309 | | | RK73GB1J333J | CHIP R | 33K | J | 1/16W | TK-980 |
| R309 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | TK-981 |
| R310 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | TK-980 |
| R310 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | TK-981 |
| R311 | | | RK73GB1J561J | CHIP R | 560 | J | 1/16W | |
| R312 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R313 | | | RK73GB1J273J | CHIP R | 27K | J | 1/16W | |
| R314 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | TK-981 |
| R314 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | TK-980 |
| R315 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R316,317 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R318 | | | RK73GB1J391J | CHIP R | 390 | J | 1/16W | |
| R319 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R320 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R321 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R322 | | | RK73GB1J100J | CHIP R | 10 | J | 1/16W | |
| R323 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R408 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R411 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R414 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R502 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | |
| R503 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R504 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | |
| R505 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R506 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R507,508 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | |
| R512 | | | RK73GB1J122J | CHIP R | 1.2K | J | 1/16W | |
| R513 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R515 | | | RN73GH1J913D | CHIP R | 91K | D | 1/16W | |
| R516 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R518 | | | RN73GH1J333D | CHIP R | 33K | D | 1/16W | |
| R519 | | | RN73GH1J913D | CHIP R | 91K | D | 1/16W | |
| R520 | | | RN73GH1J683D | CHIP R | 68K | D | 1/16W | |
| R521 | | | RK73GB1J105J | CHIP R | 1.0M | J | 1/16W | |
| R522 | | | RN73GH1J913D | CHIP R | 91K | D | 1/16W | |
| R523 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | |
| R524 | | | RN73GH1J274D | CHIP R | 270K | D | 1/16W | |
| R525 | | | RK73GB1J334J | CHIP R | 330K | J | 1/16W | |
| R526 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | |
| R527 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R528 | | | RK73GB1J153J | CHIP R | 15K | J | 1/16W | |
| R529 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R530 | | | RK73GB1J394J | CHIP R | 390K | J | 1/16W | |
| R531 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R532 | | | RK73GB1J334J | CHIP R | 330K | J | 1/16W | |
| R533 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R535 | | | RK73GB1J155J | CHIP R | 1.5M | J | 1/16W | |
| R536 | | | RN73GH1J682D | CHIP R | 6.8K | D | 1/16W | |
| R537,538 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R540 | | | RK73GB1J474J | CHIP R | 470K | J | 1/16W | |
| R541 | | | RK73GB1J274J | CHIP R | 270K | J | 1/16W | |
| R542 | | | RN73GH1J683D | CHIP R | 68K | D | 1/16W | |
| R544 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R545 | | | RK73GB1J182J | CHIP R | 1.8K | J | 1/16W | |
| R546 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | |
| R547 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R548 | | | RK73GB1J183J | CHIP R | 18K | J | 1/16W | |
| R550 | | | RN73GH1J682D | CHIP R | 6.8K | D | 1/16W | |

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|---|---|---|---|---|---|---|---|---|
| R551 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R552 | | | RK73GB1J334J | CHIP R | 330K | J | 1/16W | |
| R553 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R554 | | | RK73GB1J332J | CHIP R | 3.3K | J | 1/16W | |
| R555 | | | RK73GB1J394J | CHIP R | 390K | J | 1/16W | |
| R556 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R558 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R562 | | | RK73GB1J273J | CHIP R | 27K | J | 1/16W | |
| R564 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R566 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R567 | | | RK73GB1J220J | CHIP R | 22 | J | 1/16W | |
| R568 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R569 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R571,572 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R573 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | |
| R574 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R575 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R576 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R577 | | | RK73GB1J153J | CHIP R | 15K | J | 1/16W | |
| R579 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R580 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R581 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R582 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R584 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R585,586 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R587 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R588 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R612 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | |
| R614 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R616 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R624 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R633 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R645 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R658 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R667,668 | | | RK73GB1J181J | CHIP R | 180 | J | 1/16W | |
| R670 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R672,673 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R674 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | |
| R675 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R676 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R677 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R678 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R679 | | | RK73FB2A390J | CHIP R | 39 | J | 1/10W | |
| R680 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | |
| R681 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R682 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R683 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R701 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R702 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R705,706 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | |
| R716 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R718 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | |
| R719 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R720 | | | RK73GB1J683J | CHIP R | 68K | J | 1/16W | |
| R721 | | | RK73GB1J334J | CHIP R | 330K | J | 1/16W | |
| R722 | | | RK73FB2A680J | CHIP R | 68 | J | 1/10W | |
| R723 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R724 | | | RK73GB1J392J | CHIP R | 3.9K | J | 1/16W | |
| R725 | | | RK73GB1J562J | CHIP R | 5.6K | J | 1/16W | |
| R726,727 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |

# PARTS LIST

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| D1-6 | | | DA204U | DIODE | |
| D7 | | | 02DZ20(Y,Z) | ZENER DIODE | |
| D11 | | | DAN202U | DIODE | |
| D16 | | | 1SS355 | DIODE | |
| D17 | | | DA204U | DIODE | |
| D18,19 | | | HVC131 | DIODE | |
| D20 | | | 1SS355 | DIODE | |
| D21 | | | 02DZ5.6(X,Y) | ZENER DIODE | |
| D24 | | | MINISMDC075-02 | VARISTOR | |
| D26 | | | 1SS355 | DIODE | |
| D28 | | | 02DZ15(X,Y) | ZENER DIODE | |
| D31 | | | 1SS355 | DIODE | |
| D32 | | | 22ZR-10D | SURGE ABSORBER | |
| D34 | | | 02DZ18(X,Y) | ZENER DIODE | |
| D35 | | | MA742 | DIODE | |
| D37 | | | DSA3A1 | DIODE | |
| D200 | | | HSM88AS | DIODE | |
| D208 | | | MA4PH633 | DIODE | |
| D209,210 | | | XB15A709 | DIODE | |
| D501 | | | DA204U | DIODE | |
| D502 | | | MINISMDC075-02 | VARISTOR | |
| D503-505 | | | DA204U | DIODE | |
| D507 | | | DAN202U | DIODE | |
| D508,509 | | | MA742 | DIODE | |
| D510 | | | HSC119 | DIODE | |
| D518 | | | 02DZ9.1(X,Y) | ZENER DIODE | |
| D520 | | | MA2S111 | DIODE | |
| IC1 | | | TA75W01FU | MOS IC | |
| IC2 | | | TC75W51FU | MOS IC | |
| IC3 | | | TA75W558FU | MOS IC | |
| IC4 | | | TC4S66F | MOS IC | |
| IC5 | | | M62363FP | MOS IC | |
| IC6 | | | TA75W558FU | MOS IC | |
| IC7,8 | | | BU4094BCFV | MOS IC | |
| IC9 | | | TA78L05F | MOS IC | |
| IC10 | | | LA4422 | BI-POLAR IC | |
| IC11 | | | TA31136FN | MOS IC | |
| IC12 | | | TA78L05F | MOS IC | |
| IC13 | | | NJM2904E | MOS IC | |
| IC14 | | | TA7808S | MOS IC | |
| IC15 | | | TC4013BF(N) | MOS IC | |
| IC16 | | | NJM78L08UA | BI-POLAR IC | |
| IC300 | | | SA7025DK | MOS IC | |
| IC400 | 2C | | M67760HC | HYBRID IC | TK-981 |
| IC400 | 2C | | M67760LC | HYBRID IC | TK-980 |
| IC501 | | | TA75W558FU | MOS IC | |
| IC502 | | | TC75W51FU | MOS IC | |
| IC503 | | | TA75W558FU | MOS IC | |
| IC504 | | | TC35453F | MOS IC | |
| IC506 | | | BU4066BCFV | MOS IC | |
| IC507 | | | LC73872M | MOS IC | |
| IC508 | | | BU4094BCFV | MOS IC | |
| IC509 | | | RH5VL42C | MOS IC | |
| IC510 | | | AT29C020-90TI | ROM IC | |
| IC510 | | | W29C020C90 | SRAM IC | |
| IC511 | | | 30622M8A-4F9GP | MPU | |
| IC512 | | | AT2408N10SI2.5 | ROM IC | |
| IC512 | | | 24LC08BT-ISN | ROM IC | |
| IC513 | | | TA78L05F | MOS IC | |
| IC711 | | | TA75S01F | MOS IC | |

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|---|---|---|---|---|---|
| Q1 | | | 2SK1824 | FET | |
| Q2 | | | 2SC2412K(S) | TRANSISTOR | |
| Q4 | | | DTD114EK | DIGITAL TRANSISTOR | |
| Q5,6 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q7 | | | 2SC4226(R24) | TRANSISTOR | |
| Q8 | | | DTC363EU | DIGITAL TRANSISTOR | |
| Q9 | | | DTA114YUA | DIGITAL TRANSISTOR | |
| Q10 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q11 | | | 2SA1362(Y) | TRANSISTOR | |
| Q12 | | | 2SB1132(Q,R) | TRANSISTOR | |
| Q13 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q15 | | | 2SC2059K(P) | TRANSISTOR | |
| Q17 | | | 2SC4116(GR) | TRANSISTOR | |
| Q18 | | | 2SK1824 | FET | |
| Q19 | | | 2SB1370(E,F) | TRANSISTOR | |
| Q20 | | | DTA144EUA | DIGITAL TRANSISTOR | |
| Q21 | | | DTC144EUA | DIGITAL TRANSISTOR | |
| Q22 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q25,26 | | | DTA114EE | DIGITAL TRANSISTOR | |
| Q27 | | | 2SA1641(S,T) | TRANSISTOR | |
| Q28 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q30 | | | DTA114EE | DIGITAL TRANSISTOR | |
| Q31 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q32 | | | 2SK1824 | FET | |
| Q33 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q34 | | | 2SC2712(GR) | TRANSISTOR | |
| Q201 | | | 2SC4094(R37) | TRANSISTOR | |
| Q202 | | | 2SC3356(R24) | TRANSISTOR | |
| Q203 | | | 3SK255 | FET | |
| Q204 | | | 2SK2596 | FET | |
| Q205 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q300 | | | 2SC4226(R24) | TRANSISTOR | |
| Q301,302 | | | 2SC3722K(S) | TRANSISTOR | |
| Q501 | | | DTC314TU | DIGITAL TRANSISTOR | |
| Q502 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q503 | | | 2SC4617(S) | TRANSISTOR | |
| Q507 | | | DTC144EE | DIGITAL TRANSISTOR | |
| Q508,509 | | | 2SC4617(S) | TRANSISTOR | |
| Q510 | | | 2SC4619 | TRANSISTOR | |
| Q511 | | | DTA144WE | DIGITAL TRANSISTOR | |
| Q512 | | | DTC114EE | DIGITAL TRANSISTOR | |
| Q513 | | | 2SC2873(Y) | TRANSISTOR | |
| Q515 | | | DTC114EE | DIGITAL TRANSISTOR | |
| TH1 | | | 157-104-55001 | THERMISTOR | |

### PLL/VCO (X58-4530-XX)   -10 : TK-980   -11 : TK-981

| Ref. No. | Address | New parts | Parts No. | Description | | | Desti-nation |
|---|---|---|---|---|---|---|---|
| C100 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C101 | | | CC73GCH1H4R5B | CHIP C | 4.5PF | B | TK-981 |
| C101 | | | CC73GCH1H080B | CHIP C | 8.0PF | B | TK-980 |
| C102 | | | CC73GCH1HR75C | CHIP C | 0.75PF | C | |
| C103 | | | CK73GB1H471K | CHIP C | 470PF | K | |
| C104 | | | CC73GCH1H1R5B | CHIP C | 1.5PF | B | TK-980 |
| C104 | | | CC73GCH1H020B | CHIP C | 2.0PF | B | TK-981 |
| C105 | | | CC73GCH1H040B | CHIP C | 4.0PF | B | TK-981 |
| C105 | | | CC73GCH1H060B | CHIP C | 6.0PF | B | TK-980 |
| C106,107 | | | CC73GCH1HR75B | CHIP C | 0.75PF | B | |
| C108 | | | CK73GB1H102K | CHIP C | 1000PF | K | |
| C109 | | | CC73GCH1H030B | CHIP C | 3.0PF | B | |
| C110 | | | CC73GCH1H050B | CHIP C | 5.0PF | B | |

# TK-980/981

# PARTS LIST

**PLL/VCO (X58-4530-XX)**

| Ref. No. | Address | New parts | Parts No. | Description | | | | Desti-nation |
|----------|---------|-----------|-----------|-------------|---|---|---|------------|
| C111 | | | CC73GCH1H470J | CHIP C | 47PF | J | | |
| C112 | | | CK73GB1H471K | CHIP C | 470PF | K | | |
| C113 | | | CC73GCH1H040B | CHIP C | 4.0PF | B | | TK-980 |
| C113 | | | CC73GCH1H050B | CHIP C | 5.0PF | B | | TK-981 |
| C114 | | | CK73GB1H471K | CHIP C | 470PF | K | | TK-981 |
| | | | | | | | | |
| C114 | | | CK73GB1H102K | CHIP C | 1000PF | K | | TK-980 |
| C115 | | | CC73GCH1H030B | CHIP C | 3.0PF | B | | |
| C116 | | | CC73GCH1H060B | CHIP C | 6.0PF | B | | |
| C117 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| C118 | | | CC73GCH1HR75B | CHIP C | 0.75PF | B | | |
| | | | | | | | | |
| TC100 | | | C05-0384-05 | CERAMIC TRIMMER CAP (10P) | | | | |
| | | | | | | | | |
| CN100 | | | E40-5699-05 | PIN ASSY | | | | |
| | | | | | | | | |
| - | | | F10-2279-04 | SHIELDING CASE | | | | |
| | | | | | | | | |
| L100,101 | | | L40-1595-34 | SMALL FIXED INDUCTOR (1.5UH) | | | | |
| L102 | | | L40-1071-35 | SMALL FIXED INDUCTOR (10NH) | | | | TK-981 |
| L102 | | | L40-1271-35 | SMALL FIXED INDUCTOR (12NH) | | | | TK-980 |
| L103 | | | L34-4518-05 | AIR-CORE COIL | | | | |
| L104 | | | L40-1098-76 | SMALL FIXED INDUCTOR (1UH) | | | | |
| | | | | | | | | |
| L105 | | | L40-1571-35 | SMALL FIXED INDUCTOR (15NH) | | | | TK-981 |
| L105 | | | L40-3971-35 | SMALL FIXED INDUCTOR (39NH) | | | | TK-980 |
| L106 | | | L40-1571-35 | SMALL FIXED INDUCTOR (15NH) | | | | TK-981 |
| L106 | | | L40-2771-35 | SMALL FIXED INDUCTOR (27NH) | | | | TK-980 |
| L107 | | | L40-1595-34 | SMALL FIXED INDUCTOR (1.5UH) | | | | |
| | | | | | | | | |
| R100,101 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R102 | | | RK73GB1J102J | CHIP R | 1.0K | J | 1/16W | |
| R103 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| R104 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R105 | | | RK73GB1J823J | CHIP R | 82K | J | 1/16W | |
| | | | | | | | | |
| R106 | | | RK73GB1J154J | CHIP R | 150K | J | 1/16W | |
| R107 | | | RK73GB1J270J | CHIP R | 27 | J | 1/16W | |
| R108,109 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R110 | | | RK73GB1J181J | CHIP R | 180 | J | 1/16W | TK-981 |
| R110 | | | RK73GB1J221J | CHIP R | 220 | J | 1/16W | TK-980 |
| | | | | | | | | |
| R111 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | |
| R112 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | |
| R113 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R114 | | | R92-1252-05 | CHIP R | 0 OHM | J | 1/16W | |
| | | | | | | | | |
| D100,101 | | | 1SV283 | VARIABLE CAPACITANCE DIODE | | | | |
| D102 | | | 1SV214 | VARIABLE CAPACITANCE DIODE | | | | |
| Q100 | | | 2SC4226(R24) | TRANSISTOR | | | | |
| Q101 | | | 2SK508NV(K52) | FET | | | | |
| Q102 | | | 2SC4226(R24) | TRANSISTOR | | | | |

| Ref. No. | Address | New parts | Parts No. | Description | Desti-nation |
|----------|---------|-----------|-----------|-------------|------------|
| | | | | | |

## EXPLODED VIEW

A M2.6 x 6 (OC) BLK : N33-2606-45
B M3 x 8 : N67-3008-46
C M2.6 x 6 (Br-Tap) : N87-2606-46
D M2.6 x 12 (Br-Tap) : N87-2612-46

IC400

TX-RX unit (A/2)

J1

TX-RX unit (B/2)

Cx2

Dx11

704

23

14

17

C

6

37

3

2

23

Ax2

J501

C

22x2

21

703

703

1

23

41

25

15

20x2

Cx2

11

13

24

8

701

702

21

24

26

B

B

10

Cx2

**Parts with the exploded numbers larger than 700 are not supplied.**                                    41

# TK-980/981

## PACKING



42 Microphone (T91-0621-05)

31 Protection bag (H25-0720-04)

12 DC cord (E30-3339-05)

5 Cap (B09-0235-05)

18 Fuse (F51-0016-05) x 2

35 Bracket (J29-0627-23)

30 Inner packing case (H12-1391-03)

34 Holder (J19-1584-05)

39 Screw set (N99-0395-05)

29 Polystyrene foamed fixture (H10-6619-12)

705 Warranty card

31 Protection bag (H25-0720-04)

7 Instruction manual (B62-1549-00)

28 Polystyrene foamed fixture (H10-6618-12)

32 Item carton case
(H52-1431-02) : TK-980
(H52-1432-02) : TK-981

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

# ADJUSTMENT

## Test Mode

### ■ Test Mode Operating Features

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

• **Controls ("FCN" appears)**

| | |
|---|---|
| [PTT] | Used when making a transmission. |
| [MON] | Monitor on and off. |
| [SCN] | MSK 1200bps and 2400bps. |
| [A] | Function off. |
| [B] | Compander function on and off. |
| [C] | Talk around on and off. |
| [D] | Function off. |
| [System Up/Down] | Changes channel |
| [Volume Up/Down] | Volume up/down. |

• **Controls ("FCN" not appears)**

| | |
|---|---|
| [PTT] | Used when making a transmission. |
| [MON] | Monitor on and off. |
| [SCN] | Sets to the tuning mode. |
| [A] | Function on. |
| [B] | None. |
| [C] | Changes signalling. |
| [D] | None. |
| [System Up/Down] | Changes channel |
| [Volume Up/Down] | Volume up/down. |

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

• **LCD indicator**

| | |
|---|---|
| "SCN" | Unused |
| "♪" | Lights at compander on. |
| "AUX" | Unused. |
| "P" | Unused. |
| "MON" | Lights at monitor on. |
| "SVC" | Unused. |
| "☑" | Lights at MSK 2400bps. |

• **LED indicator**

| | |
|---|---|
| Red LED | Lights during transmission. |
| Green LED | Lights when there is a carrier. |

• **Sub LCD indicator**

| | |
|---|---|
| "FCN" | Appears at function on. |

### ■ Frequency and Signalling

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

• **Frequency (MHz)**

| Channel | TK-980 | | TK-981 | |
|---|---|---|---|---|
| No. | RX (TX : TA) | TX | RX (TX : TA) | TX |
| 1 | 851.05000 | 806.05000 | 935.0250 | 896.0250 |
| 2 | 851.55000 | 806.55000 | 935.0500 | 896.0500 |
| 3 | 860.00000 | 815.00000 | 938.0000 | 899.0000 |
| 4 | 860.50000 | 815.50000 | 938.0250 | 899.0250 |
| 5 | 865.98750 | 820.98750 | 939.9875 | 900.9875 |
| 6 | 869.40000 | 824.40000 | 940.4000 | 901.4000 |
| 7 | 869.90000 | 824.90000 | 940.9000 | 901.9000 |
| 8 | 855.40000 | 810.40000 | 936.2500 | 897.2500 |
| 9 | 865.60000 | 820.60000 | 939.3000 | 900.3000 |
| 10 | 867.50000 | 822.50000 | 936.7500 | 897.7500 |
| 11~16 | – | – | – | – |

• **Signalling**

| Signalling No. | RX | TX |
|---|---|---|
| 1 | None | None |
| 2 | None | 100Hz square |
| 3 | LTR data | LTR data |
| 4 | QT 67.0Hz | QT 67.0Hz |
| 5 | QT 151.4Hz | QT 151.4Hz |
| 6 | QT 210.7Hz | QT 210.7Hz |
| 7 | QT 250.3Hz | QT 250.3Hz |
| 8 | DQT D023N | DQT D023N |
| 9 | DQT D754I | DQT D754I |
| 10 | DTMF DEC, (159D) | DTMF ENC, (159D) |
| 11 | None | DTMF tone |
| 12 | None | None |
| 13 | None | Single tone 1200Hz |
| 14 | None | MSK |
| 15 | MSK code | MSK code |

**Note :** In test mode, if the operation frequency is in NPSPAC band (e.g. SYS 10), all deviations are automatically changed as the system deviation becomes ±4kHz.

• **Preparations for tuning the transceiver**

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

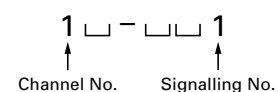Whenever the transmitter is turned, the unit must be connected to a suitable dummy load (i.e. power meter).

The speaker output connector must be terminated with a 4Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

• **Transceiver tuning**
  **(To place transceiver in tuning mode)**

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

LCD display (Test mode)



Channel No.    Signalling No.

# TK-980/981

## ADJUSTMENT

Press [SCN], now in tuning mode. Use [B] button to write tuning data through tuning modes, and [System Up/Down] : to adjust tuning requirements (1 to 256 appears on LCD).

Use [C] button to select the adjustment item through tuning modes. Use [A] button to adjust 3-point tuning.

LCD display (Tuning mode)

F R E Q ␣ ␣ ␣ 1

↑ Adjustment item     ↑ Adjustment (1~256)

### ■ Tuning Mode

| Display | Function name |
|---|---|

| | | [A] | | [A] | | [A] |
|---|---|---|---|---|---|---|
| **FREQ 256** Frequency adj. | | | | | | |
| [C] | | | | | | |
| **POW 256** Power | [A] | **L POW 256** Power (Low) | [C] | **C POW 256** Power (Cen) | [C] | **H POW 256** Power (Hi) |
| [C] | | [C] | | | | [C] |
| **TPOW 256** TA power | [A] | **L TPOW 256** TA power (Low) | [C] | **C TPOW 256** TA power (Cen) | [C] | **H TPOW 256** TA power (Hi) |
| [C] | | [C] | | | | [C] |
| **MAX 256** Max deviation | [A] | **L MAX 256** Max deviation (L) | [C] | **C MAX 256** Max deviation (C) | [C] | **H MAX 256** Max deviation (H) |
| [C] | | [C] | | | | [C] |
| **NMAX 256** Max deviation (NPSPAC TK-980) | [A] | **L NMAX 256** Max deviation (NPSPAC) (L) | [C] | **C NMAX 256** Max deviation (NPSPAC) (C) | [C] | **H NMAX 256** Max deviation (NPSPAC) (H) |
| [C] | | [C] | | | | [C] |
| **BAL 256** DQT balance | [A] | **L BAL 256** DQT balance (L) | [C] | **C BAL 256** DQT balance (C) | [C] | **H BAL 256** DQT balance (H) |
| [C] | | [C] | | | | [C] |
| **FQT 256** Fine QT | [A] | **L FQT 256** Fine QT (L) | [C] | **C FQT 256** Fine QT (C) | [C] | **H FQT 256** Fine QT (H) |
| [C] | | [C] | | | | [C] |
| **FDQT 256** Fine DQT | [A] | **L FDQT 256** Fine DQT (L) | [C] | **C FDQT 256** Fine DQT (C) | [C] | **H FDQT 256** Fine DQT (H) |
| [C] | | [C] | | | | [C] |
| **FLTR 256** Fine LTR | [A] | **L FLTR 256** Fine LTR (L) | [C] | **C FLTR 256** Fine LTR (C) | [C] | **H FLTR 256** Fine LTR (H) |
| [C] | | [C] | | | | [C] |
| **DTMF 256** DTMF deviation | | | | | | |
| [C] | | | | | | |
| **FMSK 256** MSK deviation | | | | | | |
| [C] | | | | | | |
| **TONE 256** Tone deviation | | | | | | |
| [C] | | | | | | |
| **SQL 256** Squelch (Wide) | | | | | | |
| [C] | | | | | | |

# ADJUSTMENT

## Test Equipment Required for Alignment

| Test Equipment | Major Specifications | |
|---|---|---|
| 1. Standard Signal Generator (SSG) | Frequency Range | 806 to 870MHz (TK-980), 896 to 941MHz (TK-981) |
| | Modulation | Frequency modulation and external modulation |
| | Output | –127dBm/0.1µV to greater than –7dBm/100mV |
| 2. Power Meter | Input Impedance | 50Ω |
| | Operation Frequency | 806 to 870MHz or more (TK-980), 896 to 941MHz (TK-981) |
| | Measurement Capability | Vicinity of 30W |
| 3. Deviation Meter | Frequency Range | 806 to 870MHz (TK-980), 896 to 941MHz (TK-981) |
| 4. Digital Volt Meter (DVM) | Measuring Range | 1 to 16V DC |
| | Accuracy | High input impedance for minimum circuit loading |
| 5. Oscilloscope | | DC through 30MHz |
| 6. High Sensitivity Frequency Counter | Frequency Range | 10Hz to 1000MHz |
| | Frequency Stability | 0.2ppm or less |
| 7. Ammeter | | 10A |
| 8. AF Volt Meter (AF VTVM) | Frequency Range | 50Hz to 10kHz |
| | Voltage Range | 3mV to 3V |
| 9. Audio Generator (AG) | Frequency Range | 50Hz to 5kHz or more |
| | Output | 0 to 1V |
| 10. Distortion Meter | Capability | 3% or less at 1kHz |
| | Input Level | 50mV to 10Vrms |
| 11. Voltmeter | Measuring Range | 1.5 to 30V DC or less |
| | Input Impedance | 50kΩ/V or greater |
| 12. 4Ω Dummy Load | | Approx. 4Ω, 4W |
| 13. Regulated Power Supply | | 13.6V, approx. 10A (adjustable from 9 to 17V) Useful if ammeter requipped |

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

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



Lead wire ⊕
MIC
Shiel wire ⊖
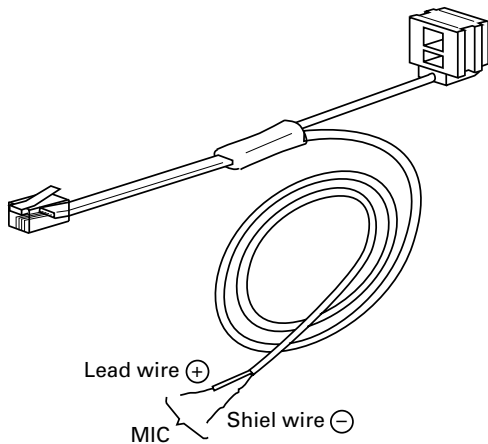
### MIC connector (Front view)



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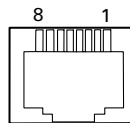
1 : BLC
2 : PSB
3 : E
4 : PTT
5 : ME
6 : MIC
7 : HOOK
8 : CM

### Test cable for microphone input



8
1
E30-3382-05

PTT (TXD) BLK
ME (GND) RED
HOOK (RXD) YEL

Cut

# TK-980/981
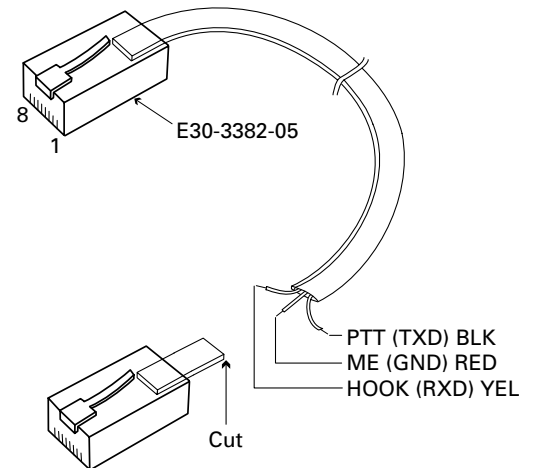
# ADJUSTMENT

## Adjustment Location
### ■ Switch
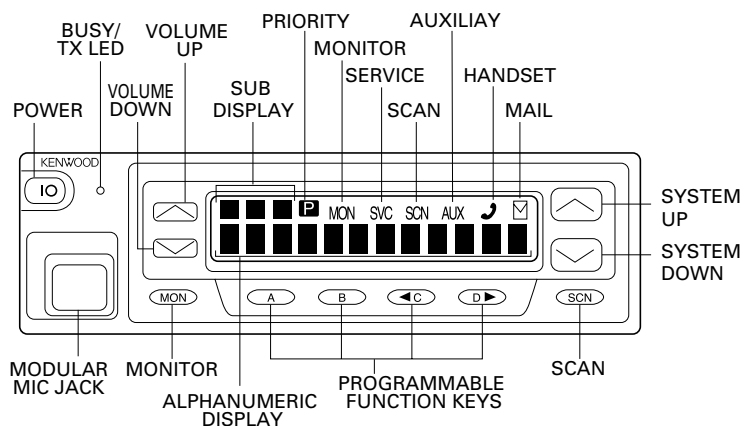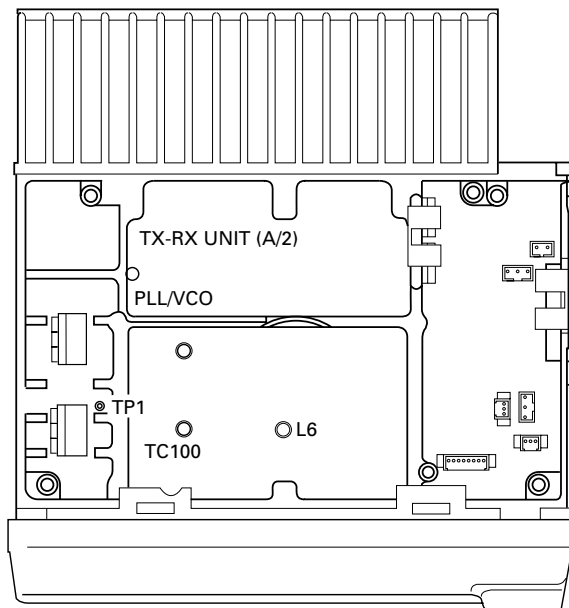


### ■ Note
### • Flash memory
The firmware program (User mode, Test mode, Tuning mode, etc.) and the data programmed by the FPU (KPG-49D) for the flash memory, is stored in memory. When parts are changed, program the data again.

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

### ■ Adjustment Point



### ■ Repair Jig (Chassis)
Use jig (Part No. : A10-4010-02) for repairing the TK-980/981. The jig facilitates the voltage check when the voltage on the component side TX-RX unit (A/2) is checked during repairs.

## Common Section

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|------|----------|------|-------|--------|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. PLL lock voltage | 1) Set test mode<br>CH : (TA) CH7 - Sig1<br>PTT : ON (Transmit) | DVM<br>Power meter<br>F. conter | TX-RX<br>(A/2) | TP1 | PLL | TC100 | 1.5V | ±0.1V |
| | 2) CH : CH1 - Sig1<br>PTT : ON (Transmit) | | | | | | Check | 6.6V or less |

# ADJUSTMENT

## Receiver Section

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|-----------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Discriminator | 1) Set test mode<br>CH : CH4 - Sig1<br>SSG output : –53dBm<br>AF : 1.4V/4Ω | SSG<br><br>AF VTVM<br>Oscilloscope | Rear panel | ANT<br><br>ACC<br>(EXT.SP) | TX-RX<br>(A/2) | L6 | AF output maximum. | |
| 2. Sensitivity check | 1) Set test mode<br>CH : CH1 - Sig 1<br>SSG output : –116dBm<br>SSG MOD : 3kHz<br>AF output : 1V/4Ω | SSG<br><br>AF VTVM<br>Distortion meter<br>Oscilloscope | | ANT<br><br>ACC<br>(EXT.SP) | | | Check<br>. | 12dB SINAD or more. |
| 3. Squelch | 1) Set test mode<br>CH : CH4 - Sig 1<br>Select "SQL" in tuning mode.<br>SSG freq'<br>  : 860.5MHz (TK-980)<br>  : 938.025MHz (TK-981)<br>SSG output : Value when 2dB is subtracted from the sensitivity value of 12dB SINAD.<br>SSG MOD : 3kHz (TK-980)<br>           1.5kHz (TK-981) | AG | | | | | Squelch closed once.<br>Then squelch must be opened. | |
| 4. Squelch check | 1) Set test mode<br>CH : CH4 - Sig1<br>SSG output : 12dB SINAD level | | | | | | Check | Squelch must be opened. |
| | 2) SSG output : OFF | | | | | | | Squelch must be closed. |
| 5. QT check | 1) Set test mode<br>CH : CH4 - Sig5<br>SSG MOD<br>  INT : 1kHz<br>  EXT : 151.4Hz<br>SSG system MOD DEV<br>  : ±3.75kHz (TK-980)<br>  : ±1.85kHz (TK-981)<br>SSG output : 10dB SINAD level | | | | | | | |
| | 2) CH : CH1 - Sig4<br>    CH1 - Sig6<br>    CH1 - Sig7 | | | | | | Check | Squelch must be closed. |

## Transmitter Section

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|---|---|-----------|---|---|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Frequency | 1) Set test mode<br>Select "FREQ" in tuning mode.<br>PTT : ON | Power meter<br>F. counter | Rear panel | ANT | | | Check | 806.050MHz±100Hz (TK-980)<br>896.025MHz±100Hz (TK-981) |
| 2. Maximum power check | 1) Set test mode<br>Select "H POW" in tuning mode.<br>"POW 256"<br>PTT : ON | | | | | | Check | 16.0W or more.<br>. |

# TK-980/981

## ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------|-----------|-------------|------|----------|------|-------|--------|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 3. High power | 1) Set test mode<br>Select "POW" in tuning mode.<br>"L POW"<br>PTT : ON | Power meter<br>F. counter | Rear panel | ANT | | | 15.0W | ±1.0W |
| | 2) "C POW"<br>PTT : ON | | | | | | | |
| | 3) "H POW"<br>PTT : ON | | | | | | | |
| 4. TA power | 1) Set test mode<br>Select "L POW" in tuning mode.<br>"L TPOW"<br>PTT : ON | Power meter | | | | | 13.0W | ±1.0W |
| | 2) "C TPOW"<br>PTT : ON | | | | | | | |
| | 3) "H TPOW"<br>PTT : ON | | | | | | | |
| 5. Power check | 1) Set test mode<br>CH : CH1 - Sig1<br>　　　CH4 - Sig1<br>　　　CH7 - Sig1<br>PTT : ON | Power meter<br><br>Ammeter | | ANT<br><br>DC IN | | | Check | 15W±1W<br>7A or less |
| 6. Modulation balanced | 1) Set test mode<br>MIC input : OFF<br>Select "BAL" in tuning mode.<br>"L BAL"<br>Deviation meter filter<br>　LPF : 3kHz, HPF : OFF<br>　De-emphasis : OFF | Power meter<br>Deviation meter<br>Oscilloscope<br><br>AF VTVM<br>AG | Rear panel<br><br><br>Front panel | ANT<br><br><br><br>MIC | | | Make the de-modulation waveform neat. |  |
| | 2) "C BAL"<br>PTT : ON | | | | | | | |
| | 3) "H BAL"<br>PTT : ON | | | | | | | |
| 7. Maximum deviation | 1) Set test mode<br>Connect AG to the MIC terminal.<br>Select "MAX" in tuning mode.<br>"L MAX"<br>AG : 1kHz/50mV<br>Deviation meter filter<br>　LPF : 15kHz, HPF : OFF<br>　De-emphasis : OFF<br>PTT : ON | | | | | | 3.8kHz (TK-980)<br>1.75kHz (TK-981)<br>(According to the larger +, −) | ±50Hz |
| | 2) "C MAX"<br>PTT : ON | | | | | | | |
| | 3) "H MAX"<br>PTT : ON | | | | | | | |
| 8. NPSPAC maximum deviation | 1) Set test mode<br>Connect AG to the MIC terminal.<br>Select "NMAX" in tuning mode.<br>"L NMAX"<br>AG : 1kHz/50mV<br>Deviation meter filter<br>　LPF : 15kHz, HPF : OFF<br>　De-emphasis : OFF<br>PTT : ON | | | | | | 2.9kHz (TK-980)<br>(According to the larger +, −) | ±50Hz |
| | 2) "C NMAX"<br>PTT : ON | | | | | | | |
| | 3) "H NMAX"<br>PTT : ON | | | | | | | |

# ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 9. MIC sensitivity check | 1) Set test mode<br>CH : CH4 - Sig1<br>AG : 1kHz/5mV<br>PTT : ON | Power meter<br>Deviation meter<br>Oscilloscope | Rear panel | ANT | | | Check | 2.2~3.8kHz (TK-980)<br>1.1~1.9kHz (TK-981) |
| 10. QT deviation | 1) Set test mode<br>Select "FQT" in tuning mode.<br>"L FQT"<br>Deviation meter filter<br>  LPF : 3kHz<br>  HPF : OFF<br>PTT : ON | AF VTVM<br>AG | Front panel | MIC | | | 0.75kHz (Tk-980)<br>0.35kHz (TK-981) | ±50Hz |
| | 2) "C FQT"<br>PTT : ON | | | | | | | |
| | 3) "H FQT"<br>PTT : ON | | | | | | | |
| 11. DQT deviation | 1) Set test mode<br>Select "F DQT" in tuning mode.<br>"L FDQT"<br>Deviation meter filter<br>  LPF : 3kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 0.75kHz (TK-980)<br>0.35kHz (TK-981) | ±50Hz |
| | 2) "C FDQT"<br>PTT : ON | | | | | | | |
| | 3) "H FDQT"<br>PTT : ON | | | | | | | |
| 12. Fine LTR | 1) Set test mode<br>Select "FLTR" in tuning mode.<br>"L FLTR"<br>deviation meter filter<br>  LPF : 3kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 1.0kHz (TK-980)<br>0.75kHz (TK-981) | ±50Hz |
| | 2) "C FLTR"<br>PTT : ON | | | | | | | |
| | 3) "H FLTR"<br>PTT : ON | | | | | | | |
| 13. DTMF deviation | 1) Set test mode<br>Select "DTMF" in tuning mode.<br>Deviation meter filter<br>  LPF : 15kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 3.0kHz (TK-980)<br>1.5kHz (TK-981) | ±0.2kHz |
| 14. MSK deviation | 1) Set test mode<br>Select "FMSK" in tuning mode.<br>Deviation meter filter<br>  LPF : 15kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 3.0kHz (TK-980)<br>1.5kHz (TK-981) | ±0.1kHz |
| 15. TONE deviation | 1) Set test mode<br>Select "TONE" in tuning mode.<br>Deviation meter filter<br>  LPF : 15kHz<br>  HPF : OFF<br>PTT : ON | | | | | | 3.0kHz (TK-980)<br>1.5kHz (TK-981) | ±0.1kHz |

# PC BOARD VIEWS  TK-980/981

## PLL/VCO (X58-4530-XX)　-10 : TK-980　-11 : TK-981
### Component side view



J72-0608-02
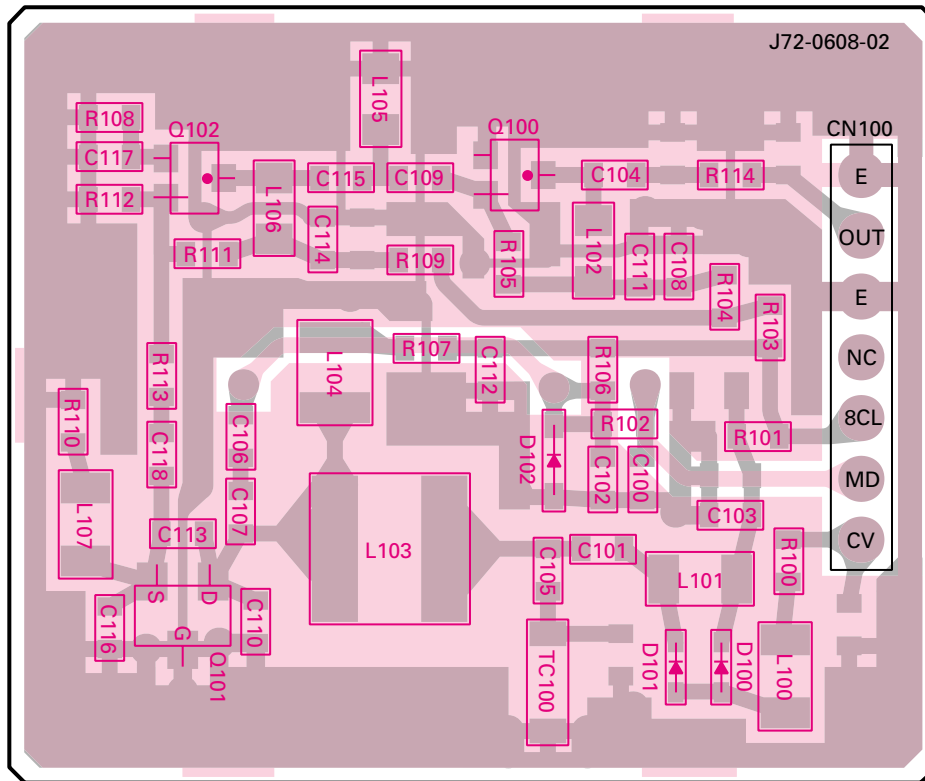
## PLL/VCO (X58-4530-XX)　-10 : TK-980　-11 : TK-981
### Foil side view



J72-0608-02
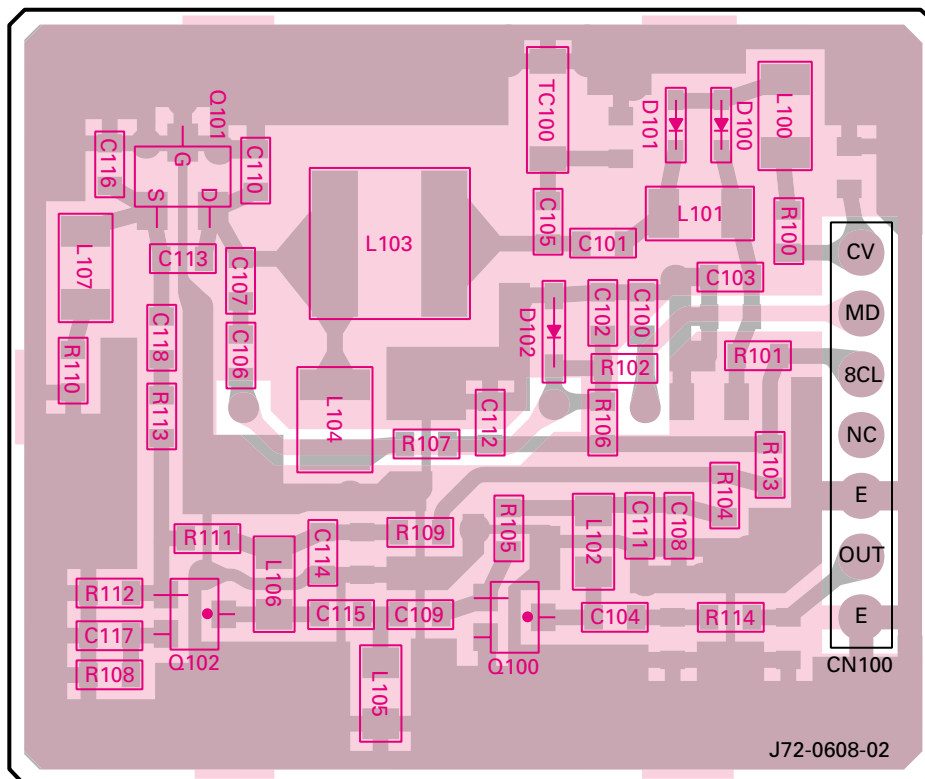
Component side
Foil side

# TK-980/981 PC BOARD VIEW

TX-RX UNIT (X57-6520-XX) (A/2)   -10 : TK-980   -11 : TK-981
Component side view

Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side
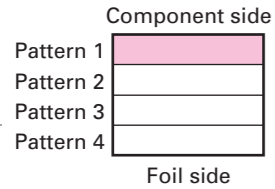
| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|
| IC5 | 10M | Q4 | 11R | Q20 | 6L | D11 | 9M |
| IC6 | 9K | Q5 | 10R | Q21 | 6L | D16 | 9R |
| IC9 | 10O | Q6 | 10R | Q32 | 12J | D24 | 10R |
| IC10 | 8R | Q8 | 9O | Q205 | 13C | D32 | 5O |
| IC11 | 12J | Q9 | 9Q | Q300 | 9F | D37 | 6P |
| IC14 | 6O | Q10 | 7M | Q301 | 11G | | |
| IC300 | 10H | Q13 | 7M | Q302 | 11F | | |
| IC400 | 2I | Q19 | 5O | D7 | 11R | | |
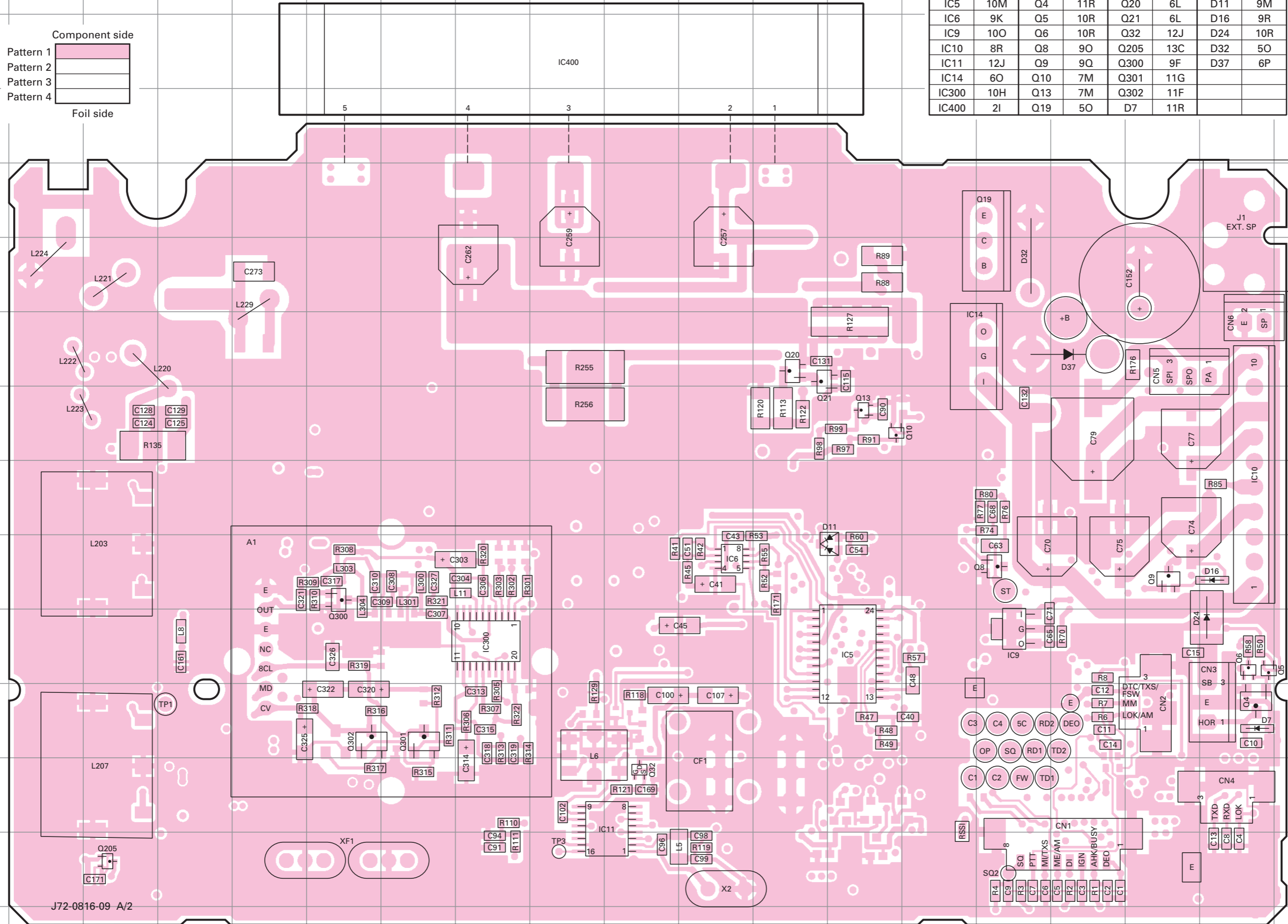
J72-0816-09  A/2

51

**TX-RX UNIT (X57-6520-XX) (A/2)   -10 : TK-980   -11 : TK-981**
**Foil side view**

| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IC1 | 9M | IC400 | 2K | Q25 | 10C | Q203 | 13Q | D19 | 10N | D209 | 7Q |
| IC2 | 13G | Q1 | 8E | Q26 | 10C | Q204 | 7J | D20 | 8C | D210 | 7R |
| IC3 | 10E | Q2 | 11N | Q27 | 7D | D1 | 13D | D21 | 8C | | |
| IC4 | 8E | Q7 | 10O | Q28 | 8D | D2 | 13C | D26 | 8D | | |
| IC7 | 9G | Q11 | 7G | Q30 | 8C | D3 | 13C | D28 | 8C | | |
| IC8 | 10G | Q12 | 7H | Q31 | 8C | D4 | 13C | D31 | 8C | | |
| IC12 | 9H | Q15 | 13L | Q33 | 9N | D5 | 13E | D34 | 8C | | |
| IC13 | 6G | Q17 | 5G | Q34 | 7Q | D6 | 12C | D35 | 12F | | |
| IC15 | 10D | Q18 | 11J | Q201 | 10Q | D17 | 13E | D200 | 9R | | |
| IC16 | 10I | Q22 | 10C | Q202 | 7L | D18 | 10N | D208 | 6Q | | |

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

J72-0816-09  A/2

54

# TK-980/981 PC BOARD VIEW

**TX-RX UNIT (X57-6520-XX) (A/2)    -10 : TK-980   -11 : TK-981**
**Component side view + Foil side**

Component side
- Pattern 1
- Pattern 2
- Pattern 3
- Pattern 4

Foil side

● Connect 1 and 4

| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IC1 | 9G | IC13 | 6M | Q8 | 9O | Q22 | 10Q | Q203 | 13C | D7 | 11R | D32 | 5O |
| IC2 | 13M | IC14 | 6O | Q9 | 9Q | Q25 | 10Q | Q204 | 7J | D11 | 9M | D34 | 8Q |
| IC3 | 10O | IC15 | 10P | Q10 | 7M | Q26 | 10Q | Q205 | 13C | D16 | 9R | D35 | 12N |
| IC4 | 8O | IC16 | 10K | Q11 | 7M | Q27 | 7P | Q300 | 9F | D17 | 13O | D37 | 6P |
| IC5 | 10M | IC300 | 10H | Q12 | 7L | Q28 | 8P | Q301 | 11G | D18 | 10F | D200 | 9B |
| IC6 | 9K | IC400 | 2I | Q13 | 7M | Q30 | 8Q | Q302 | 11F | D19 | 10F | D208 | 6C |
| IC7 | 9M | Q1 | 8O | Q15 | 13H | Q31 | 8Q | D1 | 13P | D20 | 8Q | D209 | 7C |
| IC8 | 10M | Q2 | 11F | Q17 | 5M | Q32 | 12J | D2 | 13Q | D21 | 8Q | D210 | 7B |
| IC9 | 10O | Q4 | 11R | Q18 | 11J | Q33 | 9F | D3 | 13Q | D24 | 10R | | |
| IC10 | 8R | Q5 | 10R | Q19 | 5O | Q34 | 7C | D4 | 13Q | D26 | 8P | | |
| IC11 | 12J | Q6 | 10R | Q20 | 6L | Q201 | 10C | D5 | 13O | D28 | 8Q | | |
| IC12 | 9L | Q7 | 10E | Q21 | 6L | Q202 | 7H | D6 | 12Q | D31 | 8Q | | |

J72-0816-09  A/2

**TX-RX UNIT (X57-6520-XX) (B/2)   -10 : TK-980   -11 : TK-981   Component side view**

J72-0816-09  B/2
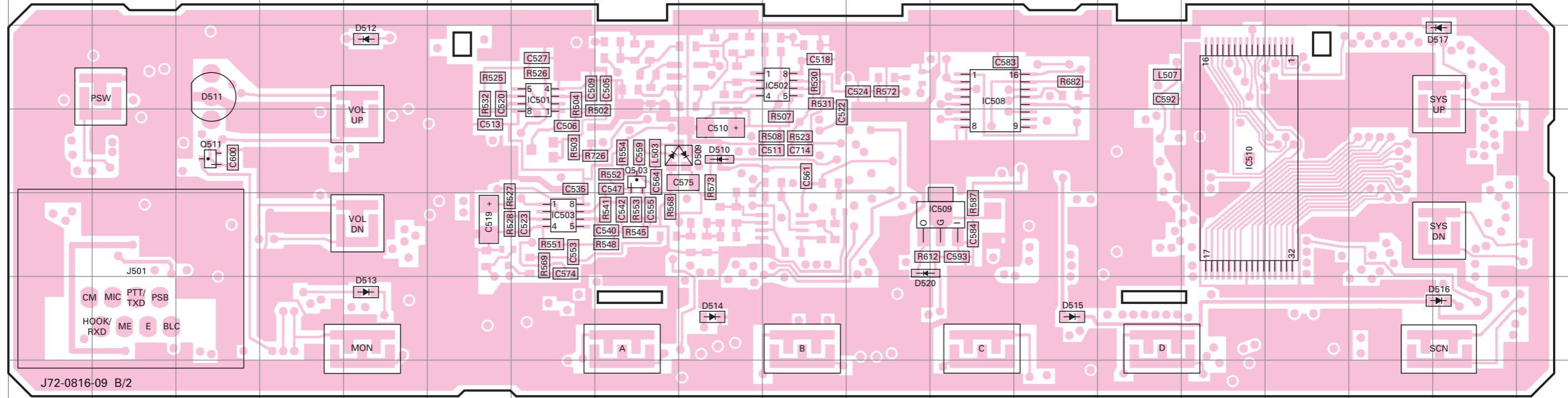
| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|
| IC501 | 2G | IC510 | 3O | D511 | 2C | D516 | 5R |
| IC502 | 2J | Q503 | 3H | D512 | 2E | D517 | 2R |
| IC503 | 4G | Q511 | 3C | D513 | 5E | D520 | 4K |
| IC508 | 2L | D509 | 3I | D514 | 5I | | |
| IC509 | 4L | D510 | 3I | D515 | 5M | | |
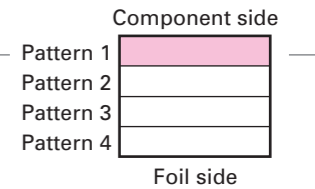
Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side

**TX-RX UNIT (X57-6520-XX) (B/2)   -10 : TK-980   -11 : TK-981   Foil side view**

J72-0816-09  B/2
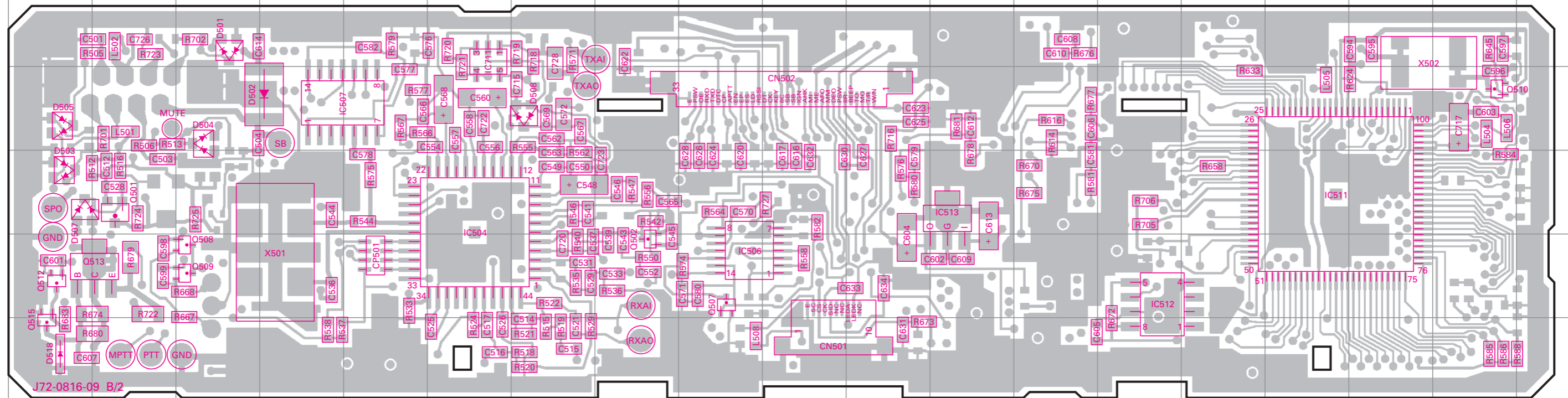
| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| IC504 | 10F | IC513 | 10L | Q508 | 11C | Q515 | 12A | D505 | 9A |
| IC506 | 11I | IC711 | 8F | Q509 | 11C | D501 | 8C | D507 | 10A |
| IC507 | 9D | Q501 | 10B | Q510 | 9R | D502 | 9D | D508 | 9G |
| IC511 | 10P | Q502 | 11H | Q512 | 11A | D503 | 10A | D518 | 12A |
| IC512 | 11N | Q507 | 11I | Q513 | 11B | D504 | 9C | | |
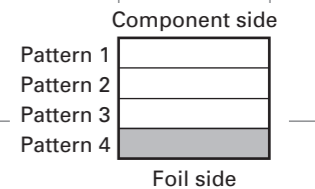
Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side

58

# TK-980/981 PC BOARD VIEW

**TX-RX UNIT (X57-6520-XX) (B/2)   -10 : TK-980   -11 : TK-981   Component side view + Foil side**



J72-0816-09  B/2
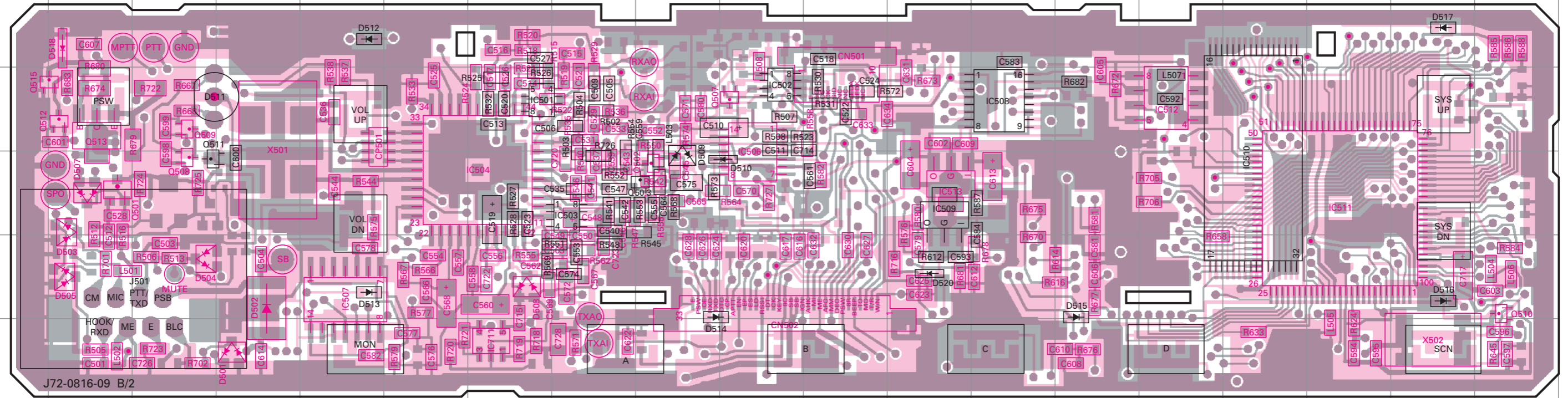
| Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address | Ref No. | Address |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| IC501 | 3G | IC508 | 3M | IC711 | 6G | Q509 | 3C | D501 | 6D | D508 | 5G | D514 | 5I | | |
| IC502 | 3J | IC509 | 4L | Q501 | 4B | Q510 | 5S | D502 | 5D | D509 | 4I | D515 | 5N | | |
| IC503 | 4H | IC510 | 4P | Q502 | 4I | Q511 | 4C | D503 | 4B | D510 | 4J | D516 | 5R | | |
| IC504 | 4G | IC511 | 4Q | Q503 | 4I | Q512 | 3B | D504 | 5C | D511 | 3C | D517 | 2R | | |
| IC506 | 4J | IC512 | 3O | Q507 | 3J | Q513 | 3B | D505 | 5B | D512 | 2E | D518 | 2B | | |
| IC507 | 5E | IC513 | 4L | Q508 | 4C | Q515 | 3B | D507 | 4B | D513 | 5E | D520 | 5L | | |

Component side

| | |
|---|---|
| Pattern 1 | |
| Pattern 2 | |
| Pattern 3 | |
| Pattern 4 | |

Foil side

● Connect 1 and 4

DTA114EE
DTA144EUA
DTA144WE
DTC114EE
DTC144EE
DTD114EK
2SA1362
2SC2059K
2SC2412K
2SC2712

2SC3356
2SC3722K
2SC4116
2SC4226
2SC4617
2SC4619

2SB1132
2SC2873

2SA1641

2SB1370

2SC4094

DTC314TU
DTC363EU

DTC144EUA

2SK2596

LA4422

NJM2904E
TA75W558FU

DAN202U

TA78L05F

DTA114YUA
HAM88AS

3SK255

MA742

2SK508NV

2SK1824

TC4013BF

BU4066BCFV

M62363FP

TC4S66F

NJM78L08UA

AT29C020-90TI
W29C020C90

AT2408N10SI2.5
24LC08BT-ISN

TC35453F

M67760HC
M67760LC

SA7025DK

RH5VL42C

BU4094BCFV

TA7808S

TA75W01FU
TC75W51FU

TA75S01F

TA31136FN

LC73872M

30622M8A-4F9GP

59

SCHEMATIC DIAGRAM TK-980/981

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

TK-980/981 SCHEMATIC DIAGRAM

X57-652X-XX(B/2) TX-RX UNIT CONTROL SECTION

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

# BLOCK DIAGRAM

## LEVEL DIAGRAM

### Receiver Section

Center Frequence | 44.85MHHz | 455kHHz | Audio Frequence

−120dBm −121.5dBm −115.0dBm −105.0dBm −119.6dBm −107.5dBm

−90dBm −98dBm

CF1 /CF2

62mVrmsVrms 30mVrms 820mVrms 820mVrms 16mVrms 0.45Vrms

Q201 L203 L207 Q203 ANT

XF1 Q15

3 16 IC11 9 5

IC2 2 1 IC504 5 41 IC502 6 7 IC5 13 14 IC10 2 10

J1 4Ω

SG input level for 12dB SINAD are obtained Measured by connecting SG to each point Via a 0.01uF capacitor.

AF VTVM

AF level obtained when the AF output level is adjusted for 0.45V/4Ω with the front panel AF VOL control. Measured with AF voltmeter connected to the external speaker Jack, receiving a −53dBm EMF SSG signal modulated at 1kHz. DEV. 3kHz(TK-980), 1.5kHz(TK-981).

### Transmitter Section

TX-RX UNIT (B/2) | TX-RX UNIT (A/2) | VCO UNIT | TX-RX UNIT (A/2) | POWER MODULE | TX-RX UNIT (A/2)

5.2mVrms 2mVrms 12mVrms 450mVrms 450mVrms 530mVrms 160mVrms 4dBm 6dBm 14dBm 18dBm 15W

MIC

IC711 1 4 IC504 13 6 IC506 11 10 IC3 2 1 IC5 1 2

A1 VCO 6 2

Q7 Q202 Q204

IC400 1 5

ANT

(X58-4530-XX)

1. AG is set so that MIC input becomes 3kHz DEV. (TK-980), 1.5kHz DEV. (TK-981) at 1kHz mod.
2. Transmitting frequency: Center frequency.

# TK-980/981

## TERMINAL FUNCTION

### CN7 (TX-RX Unit A/2) ⟷ CN502 (TX-RX Unit B/2)

| Pin No. | Name | Function |
|---|---|---|
| 1 | W/N | Wide/Narrow switch input.  H : Wide |
| 2 | T/R | TX/RX switch input.  H : Receive |
| 3 | MO | Modulation signal input. |
| 4 | TO | Low speed data signal input. |
| 5 | BEEP | Beep input. |
| 6 | 8R | NC (8V) |
| 7 | PSW | Power switch. |
| 8 | DEO | Recovery signal output. |
| 9 | MM | MIC mute.  H : MIC mute |
| 10 | AFO | Recovery signal input. |
| 11 | ME | MIC ground. |
| 12 | MI | Internal MIC output. |
| 13 | AHK | Hook signal output.  H : Off hook |
| 14 | IGN | Ignition output. |
| 15 | SB | 13.6V output. |
| 16 | SB | 13.6V output. |
| 17 | 8C | 8V output. |
| 18 | KEY | TX/Lock detection input. |
| 19 | CK | Shift register clock input. |
| 20 | DT | PLL/Shift register/DA converter input. |
| 21 | RSSI | RSSI signal output. |
| 22 | LD | PLL unlock detection output. |
| 23 | ES | Shift register enable input. |
| 24 | EP | PLL enable signal input. |
| 25 | EN | DA converter enable signal input. |
| 26 | APTT | PTT signal output. |
| 27 | CP | PLL clock. |
| 28 | DTC | Data control signal output. |
| 29 | TXD | Serial data |
| 30 | RXD | Serial data. |
| 31 | OE | Serial data. |
| 32 | FSW | Foot switch output. |
| 33 | E | Ground. |

### CN101 (VCO) ⟷ TX-RX Unit (A/2)

| Pin No. | Name | Function |
|---|---|---|
| 1 | E | Ground. |
| 2 | HT | Signal output. |
| 3 | E | Ground. |
| 4 | NC | Unused terminal. |
| 5 | 8CL | 8V input. |
| 6 | MD | Modulation output. |
| 7 | CV | Control voltage input. |

### CN501 (TX-RX Unit B/2)

| Pin No. | Name | Function |
|---|---|---|
| 1 | E | Ground (0V). |
| 2 | 5C | Logic power. |
| 3 | CS | Chip selector signal.  L : Option |
| 4 | CK | Serial clock signal. |
| 5 | SID | Serial data input. |
| 6 | (NC) | Unused terminal. |
| 7 | (NC) | Unused terminal. |
| 8 | LED(A) | LED anode terminal. |
| 9 | LED(K) | LED cathode terminal. |
| 10 | NC | Unused terminal. |

### J501 (TX-RX Unit B/2)

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

# SPECIFICATIONS

**GENERAL**

Frequency Range ............................... TK-980   RX : 851~870MHz      TX : 806~825MHz, 851~870MHz

                                            TK-981   RX : 935~941MHz      TX : 896~902MHz, 935~941MHz

Number of Channels .......................... Maximum 600 channels (LTR mode)

                                            Maximum 250 channels (Conventional mode)

Channel Spacing ............................... TK-980   25kHz (PLL channel step 12.5kHz)

                                            TK-981   12.5kHz (PLL channel step 12.5kHz)

Input Voltage ..................................... 13.6V DC negative ground

Current Drain .................................... 0.4A on standby

                                            1.0A on receive

                                            7A on transmit

Temperature Range ........................... –30°C to +60°C (–22°F to +140°F)

Dimensions & Weight ........................ 140 (5.51) W x 40 (1.58) H x 145 (5.73) D  mm (inch), 0.94kg (2.07 lbs)


**RECEIVER** (Measurements made per EIA standard EIA/TIA-603)

RF Input Impedance ........................... 50Ω

Sensitivity (EIA 12dB SINAD) ............. 0.25μV

Selectivity ......................................... TK-980 : 75dB      TK-981 : 68dB

Intermodulation.................................. TK-980 : 70dB      TK-981 : 65dB

Spurious and Image Rejection............ 80dB

Audio Power Output .......................... 4W at 4Ω less than 5% distortion

Frequency Stability ............................ ±1.5ppm from –30°C to +60°C

Channel Frequency Spread ................ TK-980 : 19MHz     TK-981 : 6MHz


**TRANSMITTER** (Measurements made per EIA standard EIA/TIA-603)

RF Power Output ............................... 15W

Spurious and Harmonics..................... –60dB

Modulation ........................................ TK-980 : 16K0F3E     TK-981 : 11K0F3E

FM Noise ........................................... TK-980 : –45dB     TK-981 : –40dB

Microphone Impedance...................... Low impedance

Audio Distortion ................................ TK-980 : 3% or less at 1kHz    TK-981 : 5% or less at 1kHz

Frequency Stability ............................ ±1.5ppm from –30°C to +60°C

Channel Frequency Spread ................ TK-980 : 64MHz     TK-981 : 45MHz


Specifications are for K (U.S.A) models only.

# TK-980/981