400MHz FM TRANSCEIVER

TK-840/(N)

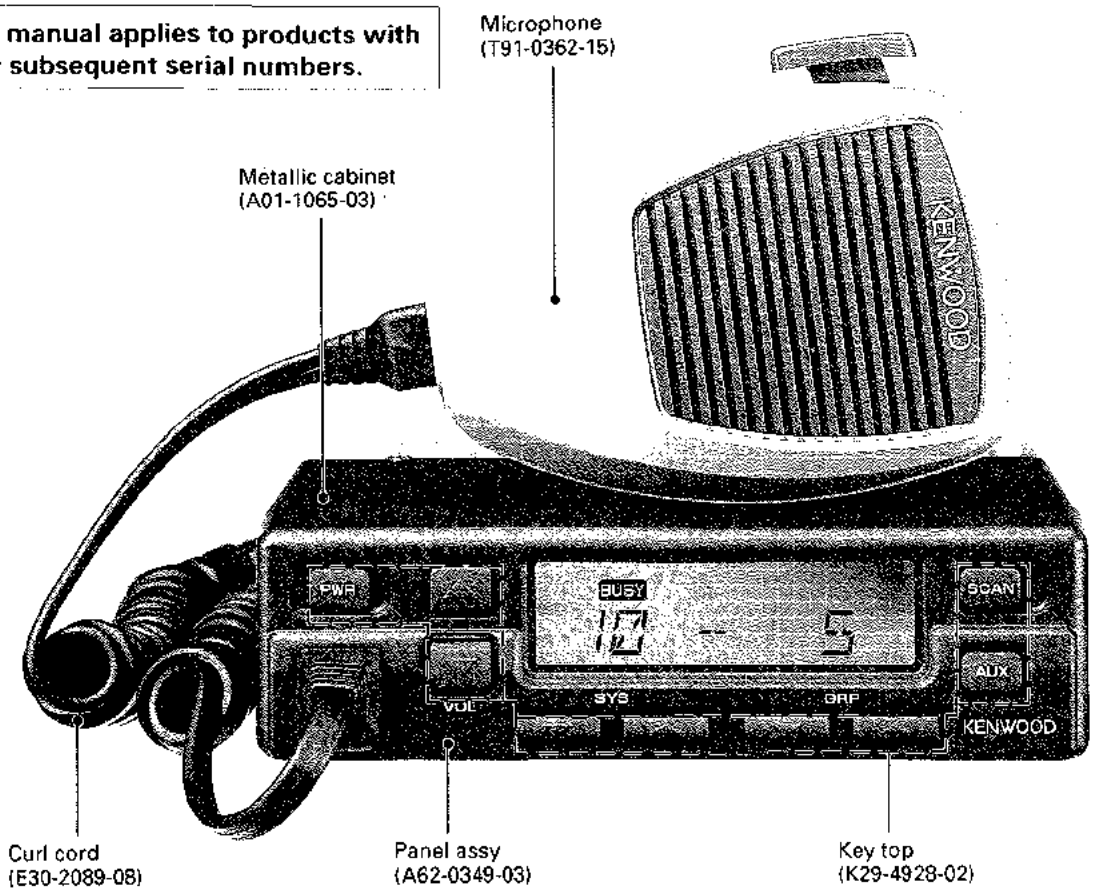
SERVICE MANUAL

REVISED

KENWOOD

B51-8287-10 (N) 1203

This service manual applies to products with 80800000 or subsequent serial numbers.



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

ORDERING REPLACEMENT PARTS

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

PERSONNEL SAFETY

The following precautions are recommended for personnel safety :

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

FCC COMPLIANCE AND TYPE NUMBERS

Type acceptance number	Frequency range	Compliance
ALHTK-840-1	450~488MHz	Parts 90, 22, 74, 95
ALHTK-840-2	488~512MHz	Parts 90, 22
ALHTK-840-3	403~430MHz	Part 90
ALHTK-840N-1	450~488MHz	Parts 22, 74, 90.210, 95
ALHTK-840N-2	488~512MHz	Parts 90.210, 22
ALHTK-840N-3	403~430MHz	Part 90.210

PRE-INSTALLATION CONSIDERNATIONS

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.

GENERAL

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.

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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.

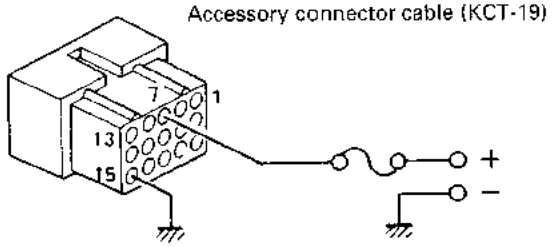
SERVICE

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

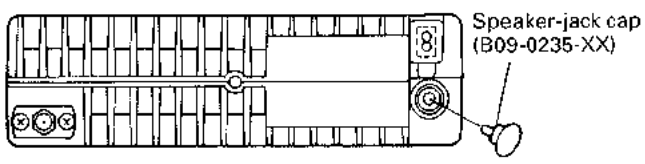
Note

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

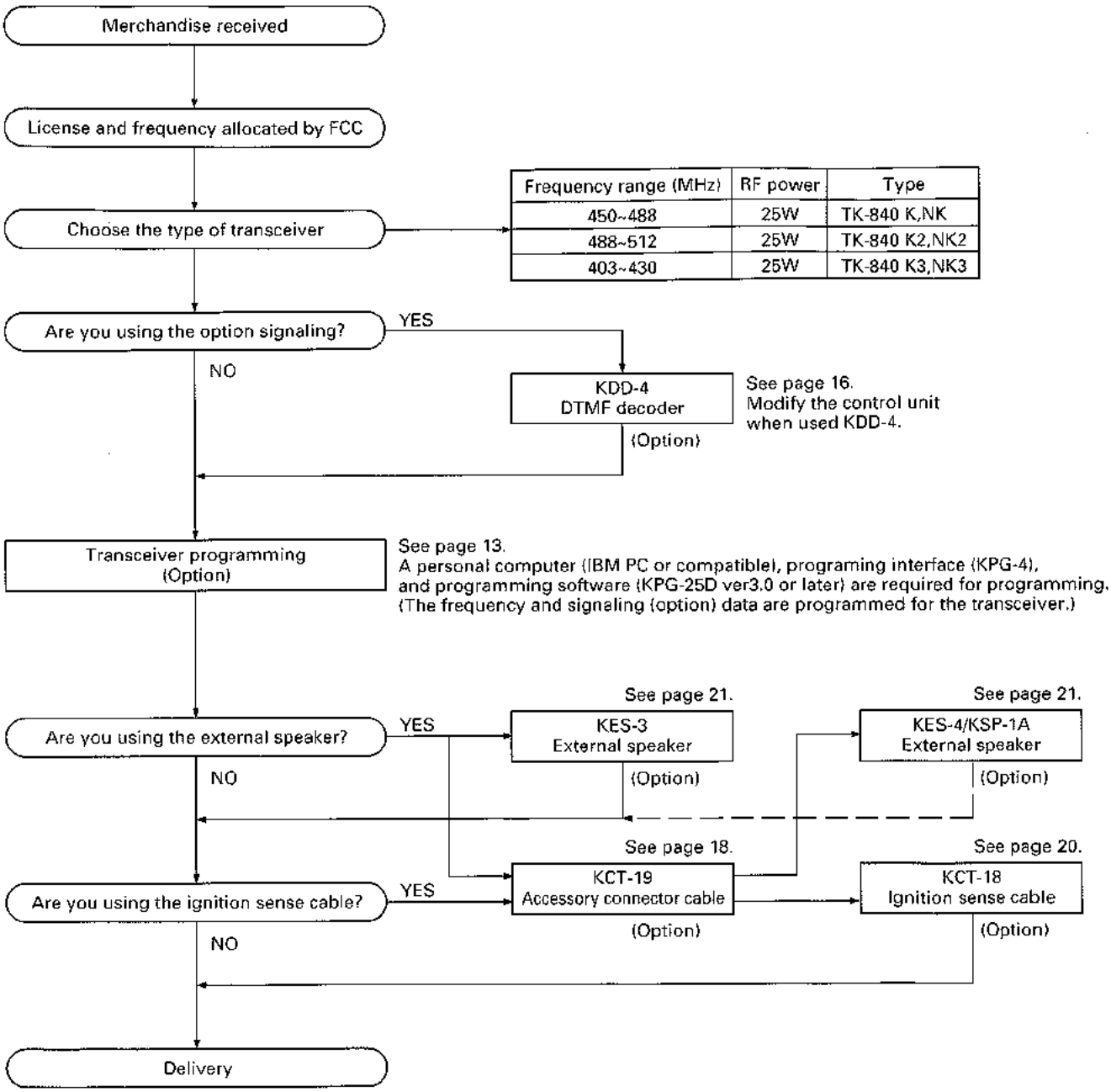
The rating of pin 7 (SB) of the accessory connector cable (KCT-19) on the rear of the radio is 13.6V (1A). Insert a 1A fuse if you use the SB pin for external equipment.



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



SYSTEM SET-UP



Frequency range (MHz)	RF power	Type
450~488	25W	TK-840 K,NK
488~512	25W	TK-840 K2,NK2
403~430	25W	TK-840 K3,NK3

This service manual applies to products with 80800000 or subsequent serial numbers.
The following functions have been added to the previous models:

1) Optional Signaling
- **Decoding settings**

2) New Data Port & Action
- **TXS, SPM, fast DI, BUSY**
- **Data PTT function**
- **Data System/Group settings, Data settings**

OPERATING FEATURES

1. Operation Features

The TK-840/(N) is an 400MHz-band EFJ LTR™-compatible trunked radio designed to operate in both trunked and conventional modes. The programmable features are summarized.

1-1. General Transceiver Features

- Any combination of 32 (MAX) trunked and conventional systems programmable.
- Up to 250 (MAX) groups are programmable in each system.
- 8-digit alphanumeric characters are programmable for each group.
- Types system scan is selectable.
- System lockout for scanning.
- Time-out timer (Dispatch/Telephone)
- CALL indicator
- Clear-to-talk
- External DTMF decoder (The optional KDD-4 DTMF decoder is required.)
- Test mode
- Horn alert port
- Data port

1-2. Trunked System Features

The following features are available with systems programmed for trunked transceiver operation.

- Group Scan
- Transmit Inhibit
- Telephone Interconnect (The optional microphone with DTMF pad is required.)
- Free System Ringback (This feature is available only when a telephone interconnect ID code is selected.)
- Transpond.
- Talk-around (Can be set for each group.)
- System Search

1-3. Conventional System Features

The following features are available with systems programmed for conventional transceiver operation.

- Up to 250 (MAX) channels are programmable in each system. (Channels are selected using the GROUP key.)
- Carrier squelch and QT/DQT operation
- Transmit Disable (Receive-only channel)
- Talk-around (Can be set for each group.)
- Busy Channel Lockout (Can be set for each group.)

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 system returns to the previous conditions.

- **SYSTEM UP/DOWN key**

When the SYSTEM UP/DOWN key is pressed, the system number to be selected is incremented or decremented by one. When the key is held down, the system number changes continuously. After the system number reaches the highest system number, it goes back to the lowest system number. System numbers not set are skipped.

- **GROUP UP/DOWN key**

This key is operated in the same way as the SYSTEM UP/DOWN key. When the system number is changed, the GROUP indicator shows the original group number (the last selected group number in each system). The group to be set may differ by system.

- **SCAN key**

Each time this key is pressed, the system scan function is toggled on and off. The function of this key can be disabled by programming.

OPERATING FEATURES

- **AUX key**

This key toggles the auxiliary function on and off. If this key is pressed once, the auxiliary function is enabled. If the key is pressed again, the auxiliary function is disabled. The confirmation tone is the same as that of the scan key. The following auxiliary functions are available and can be programmed by the FPU:

1) Horn alert
2) Manual relay
3) System scan delete function
4) Fixed revert system call (invalid if the system is not set)
5) Switching between alphanumeric display and system/group indicator (toggle)
   (Invalid if the alphanumeric display is not set)
   When the alphanumeric display is selected, the confirmation tone is output for about 50ms. When the system/group indicator is selected, the confirmation tone is output twice (output 50ms, off 50ms, output 50ms).
7) Option signalling reset
8) Invalid

2-2. Front Panel Displays and Indicators

- **System display**

Indicates the selected system number (1~MAX 32). Only the programmed systems are displayed. The system display is located above the SYSTEM UP/DOWN key.

- **Group display**

Shows the selected group number (1~MAX 250). Zero indicates group 10. Only the programmed groups are displayed. The group display is located above the GROUP UP/DOWN key.

- **Scan indicator**

The (S) mark on the display goes on in system scan mode.

- **Delete (▶) indicator**

When a system locked out of the system scan sequence is selected, the ▶ mark on the display goes on. The mark flashes if there is a locked system during fixed system scan. (It does not light continuously or flash during list type scan.)

- **BUSY indicator**

The BUSY indicator goes on if the PTT button is pressed when the trunked system is busy or while a TX inhibit ID is being received.

- **CALL indicator**

The CALL indicator can be programmed so that it goes on when a specified call is received. This indicator goes off when any front panel key is pressed.

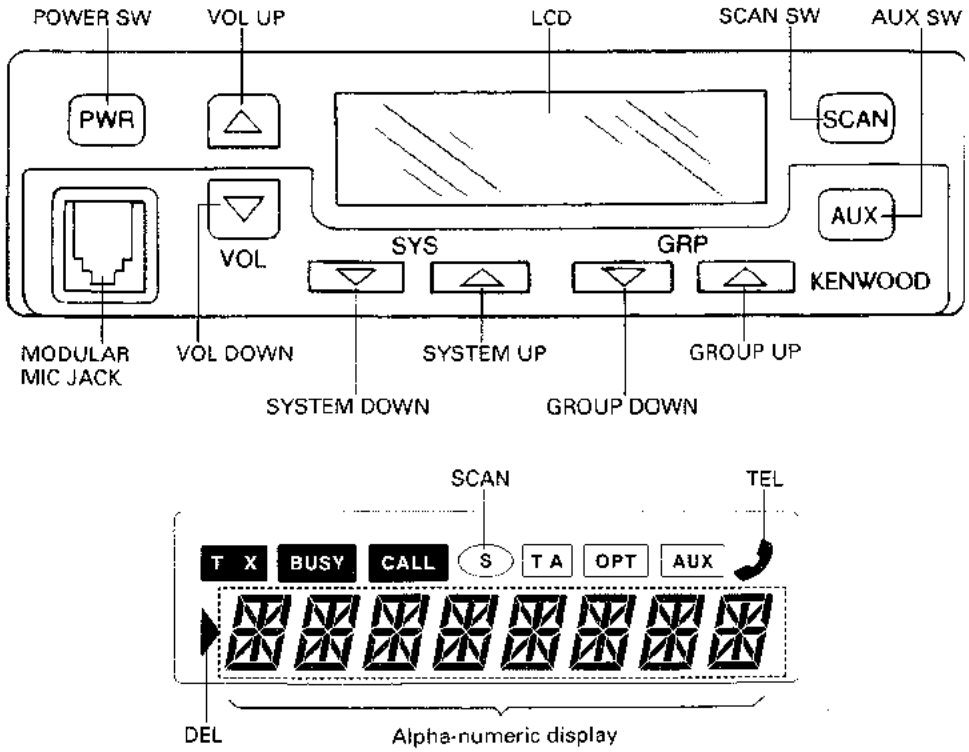


Fig. 1

OPERATING FEATURES

- **Alphanumeric display**

The 8-digit alphanumeric (A/N) display also shows system and group numbers. 8-digit alphanumeric displays can be programmed for each group. If the alphanumeric display is not programmed, the system and group numbers are displayed.

After the dealer's qualified service technician programs the transceiver, the alphanumeric display shows system numbers and group numbers for your specific network.

- **TA indicator**

Appears when the Talk-around system/group is selected.

- **OPT indictor**

Displays the KDD-4 decode latch of optional signaling.

- **AUX (Auxiliary) indicator**

Appears when the manual relay or horn alert function is activated (ON) by pressing the AUX key.

- **Handset indicator**

Appears when a group is selected that is programmed with telephone IDs. (It flashes during AUTO TEL.)

3. Details of Features

3-1. System Scan

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

When the system or group or volume (AUX) key is pressed during scanning, the scan stops and the revert system or group can be changed. Scanning resumes one second after the key is released. If the scan feature is not programmed, the "SCAN" key on the front panel is ineffective.

3-2. System Lockout

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

- **Fixed lockout**

The system to be locked out is selected by programming. When a locked system is selected, the Delete (▶) indicator appears on the left of the SYSTEM indicator. The revert system is scanned even if it is locked out. If there is a locked system, the Delete (▶) indicator flashes during fixed scanning. (It does not light continuously or flash during list type scan.)

- **User selectable lockout**

If the AUX (Auxiliary) key is programmed for the scan lockout feature, the user can lock systems out of the scan sequence with the AUX key. To lock a system out of the scan sequence, press the AUX 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 AUX 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. (It does not light continuously or flash during list type scan.) If all systems are locked out, the scan stops and only the revert system is received.

If another function is assigned to the AUX (Auxiliary) key, the USER SELECTABLE LOCKOUT feature does not function.

3-3. Drop-Out Delay Time (Scan Resume Time)

If a call is received during scan, the scan stops. The scan resume time can be programmed as 0 to 254 seconds in one-second increments. The default value is 3 seconds.

3-4. Dwell Time

The dwell time is the time after transmission ends until the scan resumes in scan mode. Also it is used as an interval from the end of data transmission to reverting back to the previously selected group. It can be set to 0 to 254 seconds by programming. The default value is 15 seconds.

OPERATING FEATURES

3-5. System/Group Revert

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

- **Last call 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 use 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.

3-6. Scan Message Wait

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

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

3-7. Call Indicator

The call indicator can be programmed for each group. In trunked systems, 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.

In 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.

3-8. Time-Out Timer

The time-out timer can be programmed in 15 seconds increments from 15 seconds to ten minutes for dispatch and interconnect operations. 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. The default value is one minute for dispatch and three minutes for interconnect.

3-9. Priority ID Codes

The priority of the programmable decode ID codes for each system is as follows:

1) Fixed ID code 1
2) Fixed ID code 2
3) Selected ID code
4) Other selectable ID codes (Group scan only)
5) Block decode codes

When a call with a higher priority is received, that call is received immediately (except when the transceiver is trunked out).

3-10. Group Scan Operation

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

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

3-11. 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.

3-12. TEL ID Codes (TEL MODE)

The ID code in the TEL ID block can be used to make a phone call by programming the block. To make a phone calls, an optional DTMF microphone is required.

OPERATING FEATURES

3-13. Free System Ringback

This feature is available only when a telephone interconnect 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 Ⓢ 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, or AUX key is changed.

3-14. 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.)

3-15. 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 254 seconds in 1-second increments). If the PTT button is pressed within the time, or if the signaling option has been set, the transpond is not performed.

3-16. Talk-Around

This feature can be programmed to turn on or off for each group. When the PTT button is pressed for the group to which the talk-around feature is set, the home repeater channel is used for transmission, and the repeater link operation is not performed. Signaling must be in LTR format.

If clear-to-talk is set, a proceed tone is output at the beginning of transmission. If both interconnect and talk-around are set, the talk-around operation is not performed.

3-17. Preferred System Revert

This feature is available by assigning this feature to the AUX (Auxiliary) key. The feature is used to move the revert system/group to the fixed programmed system/group quickly. When the AUX key is pressed during scanning, the scan stops temporarily, and the revert system/group is displayed. The scan resumes about one second after the AUX key is released.

3-18. Alphanumeric Display Select

The system/group number display and the alphanumeric display can be switched with the AUX key by assigning this feature to the key. Figure 2 shows the characters that can be displayed. These are basic characters, and can be displayed in each segment. Four digits can be displayed at the same time.

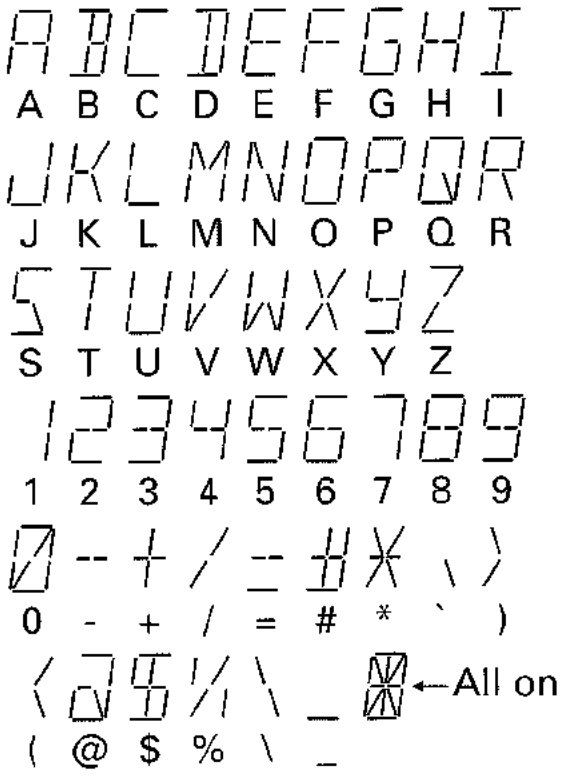


Fig. 2

OPERATING FEATURES

3-19. Audible User Feedback Tones

The transceiver outputs various combinations of three tones (high, mid, and low) to notify the user of the transceiver operating state. The main tones are listed below. The high tone is 1460Hz, the mid tone is 980Hz, the and low tone is 730Hz.

- **Busy tone**

This tone is output when the PTT button is pressed but no repeater is available and transmission is not possible. It is output until transmission is enabled while the PTT button is held down and transmission starts, or until the PTT button is released. (The mid tone and low tone are output alternately in 150ms intervals.)

- **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.)

- **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.)

3-20. Clear-to-Talk

This feature can be programmed to turn on or off.

- **Clear-to-talk operation (Set to ON)**

If a dispatch ID is used and the PTT button is pressed when no repeater can transmit, a busy tone is not output (it is output when an interconnect ID is used). If transmission becomes possible while the PTT button is held down, transmission starts.

When connection with the repeater is completed, a proceed tone is output. The delay tone is not output in this mode. (It is output when an interconnect ID is used.)

- **Normal operation (Set to OFF)**

If the PTT button is pressed when there is no repeater that can transmit signals (no free repeater or TX inhibit is enabled), a busy tone is output. If transmission becomes possible while the PTT button is held down, transmission starts. The delay tone is output if link operation is performed three to six times.

3-21. Conventional System Operation

Up to 250 (MAX) channels can be programmed for each system programmed as a conventional system. Channels can be selected by the group key.

QT (Quiet-Talk), DQT (Digital Quiet-Talk), or carrier squelch can be set for transmit or receive channels. If signaling is set for transmission, a squelch tail eliminator (reverse burst or turn-off code) is transmitted.

OPERATING FEATURES

- **Talk-around**

The Talk-around feature can be programmed for each channel.

- **Transmit disable (receive-only channels)**

Transmission can be programmed to be inhibited for each channel. This feature is used to set receive-only channels. When the PTT button is pressed on a receive-only channel, a busy tone sounds, and transmission is not performed.

- **Busy channel lockout**

The busy channel lockout feature can be programmed for each channel. If a channel is locked out by pressing the PTT button, a busy tone is output, and if transmission becomes possible, it starts.

- **Scanning conventional systems**

For the conventional system scan, only the revert channel of each system is scanned. If QT or DQT is set for the channel, the channels, including signaling, are scanned.

3-22. External Decoder (KDD-4 Option)

The optional DTMF decoder (KDD-4) can be installed in the transceiver. Use of the optional decoder can be programmed for each group (for each channel of a conventional system). The monitor key functions as the external decoder reset key.

The KDD-4 can be set with the decode ID of each group. If it is supported, the following features are available:

Note : Use of "Feature Option - Option Signaling - Decode" setting requires KPG-25D ver3.0 or later.

- **Audio mute**

Decode setting	Action
And	If both ID/QT/DQT and option signaling matches, the audio is output.
Or	If ID/QT/DQT matches, the audio is output.

- **Call indicator, alert tone**

Decode setting	Action
And	If both ID/QT/DQT and option signaling matches, a KDD-4 alert tone is output. CALL lights or flashes (or nothing occurs) according to the CALL indicator set for each group. The CALL indicator/KDD-4 alert tone does not operate unless the Decode Latch input port goes high.
Or	If ID/QT/DQT matches, a KDD_4 alert tone is output. CALL lights or flashes (or nothing occurs) according to the CALL indicator set for each group. The CALL indicator/KDD-4 alert tone does not operate unless the Decode Latch input port goes high.

- **Operation during scan**

Decode setting	Action
And	IF both ID/QT/DQT and option signaling matches during scanning, the scan stops at the system. The display shows "–SCAN–" unil the Decode Latch input port foes low. When the port goes low, the system/group is displayed.
Or	The display shows "–SCAN–" until ID/QT/DQT matches during scanning, then the scan stops at the system. When the port goes low, the system/group is displayed.

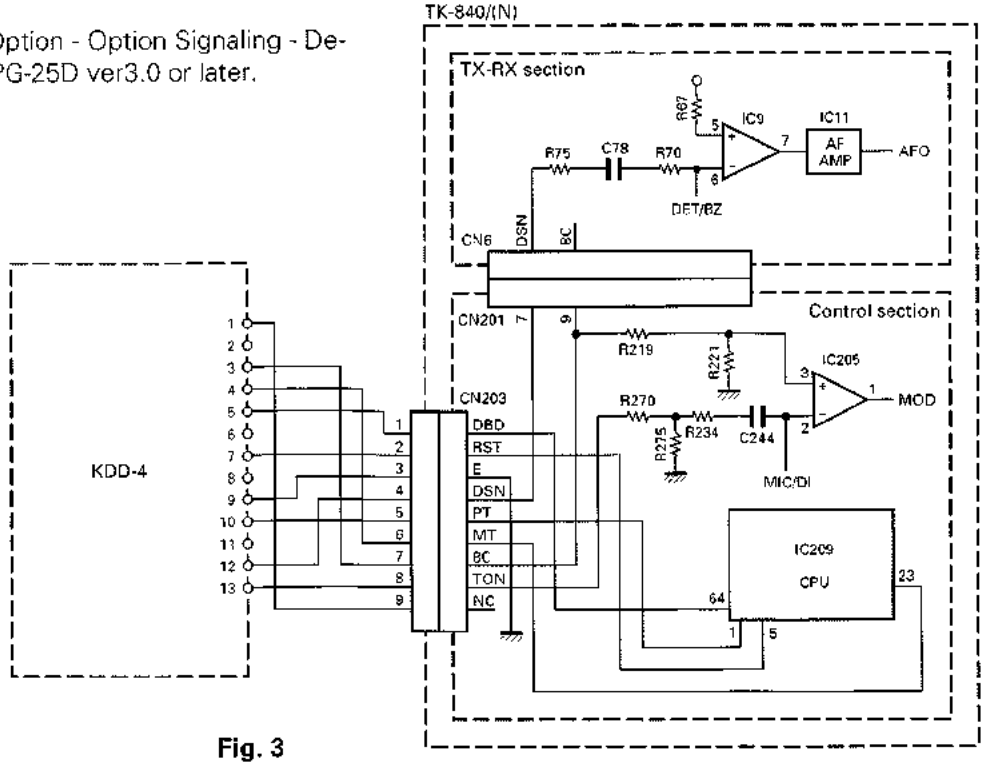


Fig. 3

OPERATING FEATURES

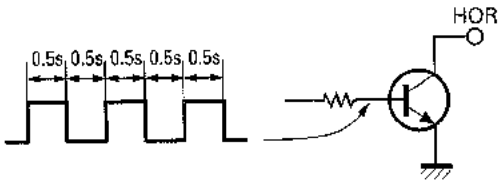
3-23. Horn Alert

Horn alert can be set to on or off for each group. Either continuous or non-continuous operation can be set by the FPU. The horn alert port is enabled or disabled as follows;

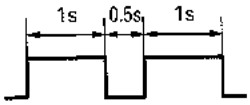
Offhook horn	Hook off	Hook on
Enable	O	O
Disable	X	O

If Horn alert has been set to YES for a group, the horn alert port, HOR, is turned on and off as the following condition:

• Non-continuous



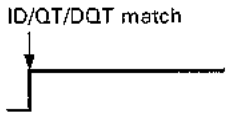
The timing when the fixed LTR ID matches is as follows;



The group for which the optional signaling is set works by ANDing the decode ID with the optional signaling.

• Continuous

Reset with the AUX key or by setting offhook.



The group for which the optional signaling is set works by ANDing the decode ID will the optional signaling if DECODE is set to either AND or NO.

3-24. System Scan Type

• Fix system scan

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

• List type 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.

3-25. Data Communication Functions

Note : KPG-25D ver3.0 or later is required for programming the following parameters.

• Data

Data transmission can be enabled or disabled per group basis.

• Data PTT with QT/DQT (Conventional)

Enables or disables QT/DQT encoding when Data PTT is activated by grounding both DTC and PTT of the accessory connector.

• Data System/Group

Data transmission will be made on the Data System/Group when Data PTT is activated;

1) On the system which includes no data enabled group, or
2) During System Scan

OPERATING FEATURES

4. Transceiver Programming

4-1. Introduction

The TK-840/(N) transceiver is programmed using an IBM PC or compatible machine, a programming interface (KPG-4), and a programming disk (KPG-25D). Figure 4 shows the setup for an IBM PC.

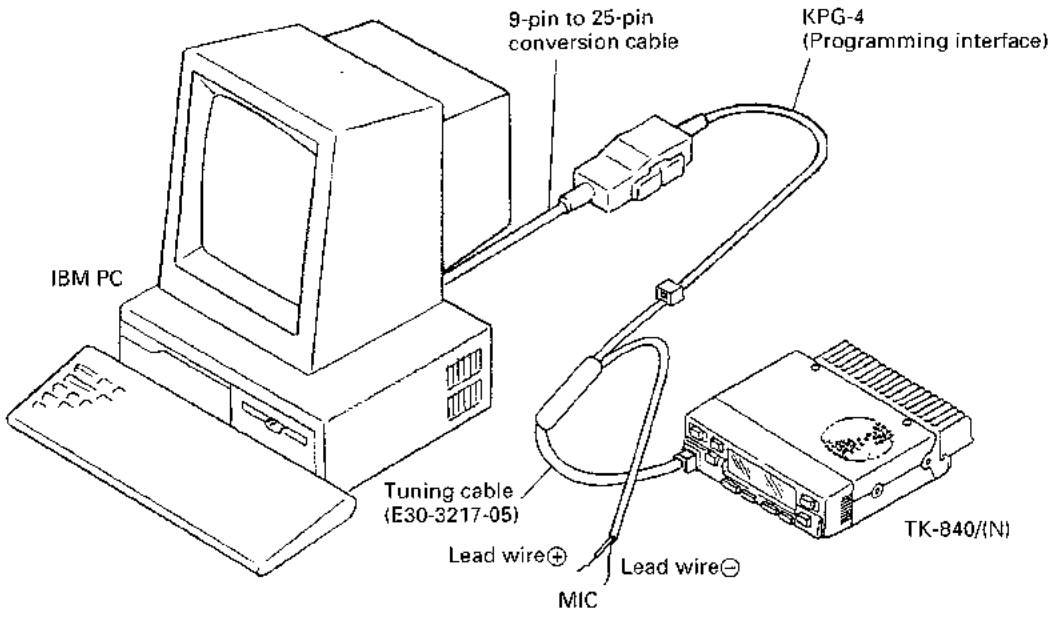


Fig. 4

4-2. KPG-4 Description
(Optional PC programming interface cable)

The KPG-4 is reeded to connect the TK-840/(N) to the computer. It has a circuit in the D-subconnector (25-pin) case that converts the RS-232C logic level to TTL level. The KPG-4 plug is connected to external socket of the TK-840/(N) and to the computer by a conversion cable (option) with a 9-pin female connector and a 25-pin male connector.

4-3. Programming Software Description

KPG-25D is the programming software for the TK-840/(N), supplied on a 3.5" or 5.25" floppy disk. This software runs under MS-DOS (version 3.3 or later) on an IBM-PC/XT, AT, or PS2, or on a compatible machine. Data can be input to or read from the TK-840/(N), and edited on the screen. Programmed data can be printed.

4-4. Data Program Mode

In this mode, data is written into the flash memory in the transceiver. When the power is turned on, data program mode can be entered immediately. When the KPG-4 is connected and commands can be received, "PROGRAM" is displayed to indicate that data program mode has been entered.

Tuning can be done using an IBM PC and KPG-25D, in the same way as in panel tuning mode. You can carry out panel tuning by selecting test mode on the KPG-25D menu screen and following the instructions on the screen. See the KPG-25D instruction manual for details.

OPERATING FEATURES

4-5. Clone Mode (Figure 5)

Programmed data is transferred from one transceiver to another by using a microphone cable.

1. Connect the master set to the slave set with.
2. Turn the slave set on.
3. Hold down the AUX key, turn the master set on, and keep the AUX key down for two more seconds. "CLONE" appears on the display to indicate that clone mode has been entered.
4. Press the SCAN key on the master set. The (S) mark appears and data is sent from the master set to the slave set. "PROGRAM" appears on the slave set to show that it is receiving data.
5. When cloning is complete, the (S) mark on the master set disappears and "CLONE" changes to "END". The slave set is automatically reset and enters user mode.

If cloning fails, the master set shows "ERROR". Repeat steps 4 and 5.

If you wish to clone several sets, switch each of them on and repeat 4 and 5.

5. Description of Each Modes

5-1. Dealer mode

To enter this mode, hold down the GROUP UP key, turn the transceiver on, and keep the GROUP UP key down for two more seconds. The mode can be inhibited by programming.

- **SYSTEM key**

Used to select one of programmed frequencies 1 to 16. If no frequency data has been preset, the frequency listed in Table 1 is written as the default value.

SYSTEM	K,NK		K2,NK2		K3,NK3	
	TX	RX	TX	RX	TX	RX
1	450.000	450.100	488.000	488.100	403.000	403.100
2	450.500	450.600	488.500	488.600	403.500	403.600
3	468.500	468.600	499.500	499.600	415.500	415.600
4	469.000	469.100	500.000	500.100	416.000	416.100
5	469.500	470.500	500.500	501.500	416.500	417.500
6	487.400	487.500	511.400	511.500	429.400	429.500
7	487.900	487.800	511.900	511.800	429.950	429.750

Table 1

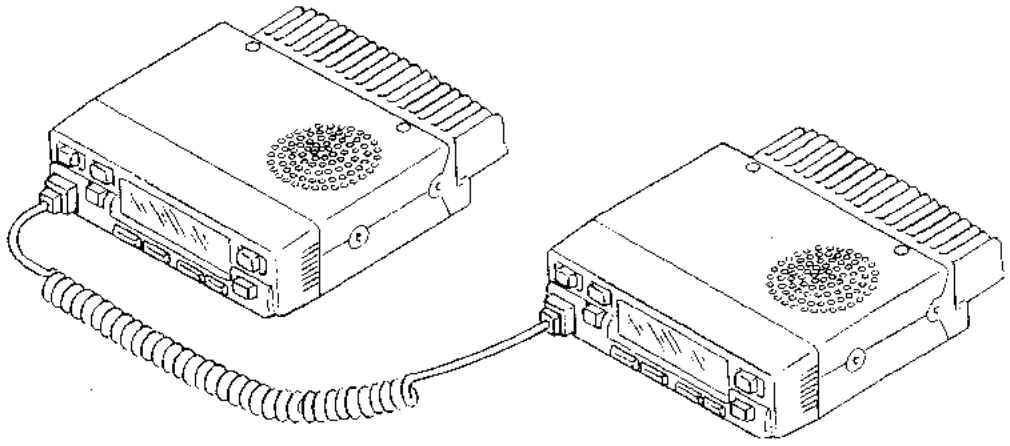


Fig. 5

OPERATING FEATURES

- **GROUP key**

Used to select the signaling encode/decode data or squelch adjustment.

GROUP	TONE
1	None (No decode; squelch can be adjusted.)
2	100Hz square wave (No decode; squelch can be adjusted.)
3	LTR format* (Decode; squelch cannot be adjusted.)
4	QT (67.0Hz) (Decode; Squelch cannot be adjusted.)
5	QT (151.4Hz) (Decode; squelch cannot be adjusted.)
6	QT (210.7Hz) (Decode; squelch cannot be adjusted.)
7	DQT (023N) (Decode; squelch cannot be adjusted.)
8	DQT (754N) (Decode; squelch cannot be adjusted.)

* Area : 0, Goto : 12, Home : 12, ID : 47, Free : 25

Table 2

- **AUX key**

When the AUX key is pressed, talk-around is enabled (the "TA" indicator appears), and transmission is possible on the receive frequency. When the key is pressed again, talk-around is disabled.

- **SCAN key**

When this key is pressed, the squelch is turned off. If a carrier is not present, white noise is heard. The "BUSY" indicator appears.

- **Transmission**

The microphone PTT key is used to start transmission. When the frequency and signaling have been selected with the SYSTEM and GROUP keys, transmission begins and the "TX" indicator appears. The time-out-timer does not work.

5-2. Panel Tuning Mode

This mode can be inhibited by programming. The following can be adjusted with the front keys:

- Squelch level
- QT fine deviation
- DQT fine deviation
- LTR ID fine deviation
- RF power
- DQT balance
- Maximum deviation
- Frequency (TX)

The mode is entered when the GROUP DOWN key is held down, the power turned on, and the key kept down for two more seconds. The display changes from "TUNING" to "UHF F1" (TK-840 K,NK) or "UHF F2" (TK-840 K2,NK2) or "UHF F3" (TK-840 K3,NK3), and then back to the system/group number indication.

Select the frequency to be adjusted by pressing the SYSTEM key when the system/group number is being displayed, then press the SCAN key. Adjustment mode is entered and the adjustment level can be varied between 1 to 256.

- **SYSTEM key**

Used to select the frequency or items to be adjusted.

- **GROUP key**

Used to select signaling encode/decode data or the adjustment level.

- **AUX key**

Used to determine the adjustment level. Select the level with the GROUP key and then press the AUX key. The adjustment level is written into the internal serial EEPROM.

- **SCAN key**

Used to switch between adjustment frequency variable mode and adjustment level (item) mode.

- **Volume key**

Used to vary the volume or adjust the AF power level.

INSTALLATION

1. Installing the Signaling Unit (KDD-4 DTMF : Option)

1-1. KDD-4 assembly

1. Solder the 9-pin leads with connector to the KDD-4 board locations designated with the unit specification numbers. (Fig. 1)

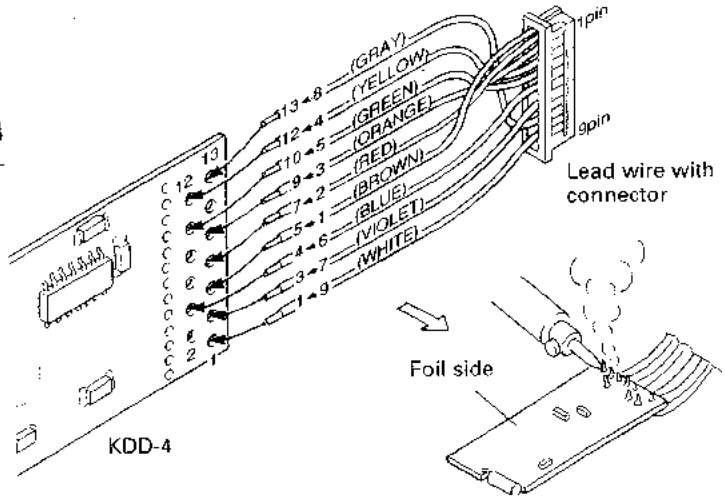


Fig. 1

1-2. Connecting the KDD-4 to the transceiver

1. Remove the two halves of the case transceiver and the control panel. (Fig. 2)

2. Connect the KDD-4 to the TX-RX unit (B/2). (Fig. 3)
   1) Plug the KDD-4 connector into CN203 of the TX-RX unit (B/2) (❶).

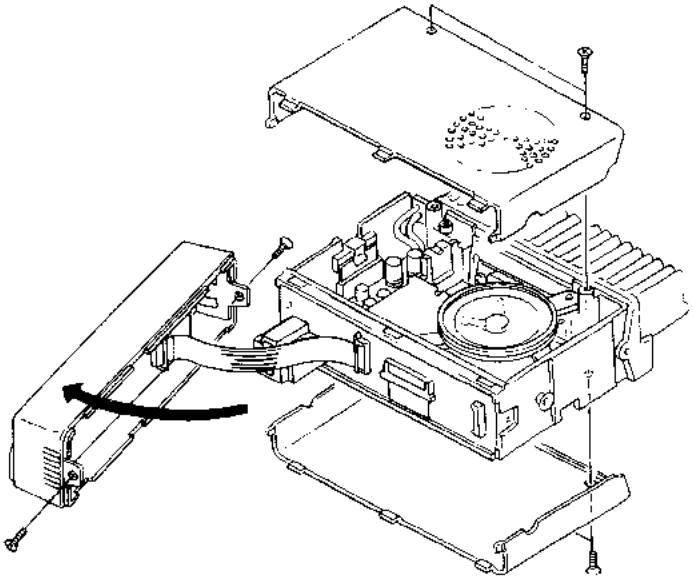


Fig. 2

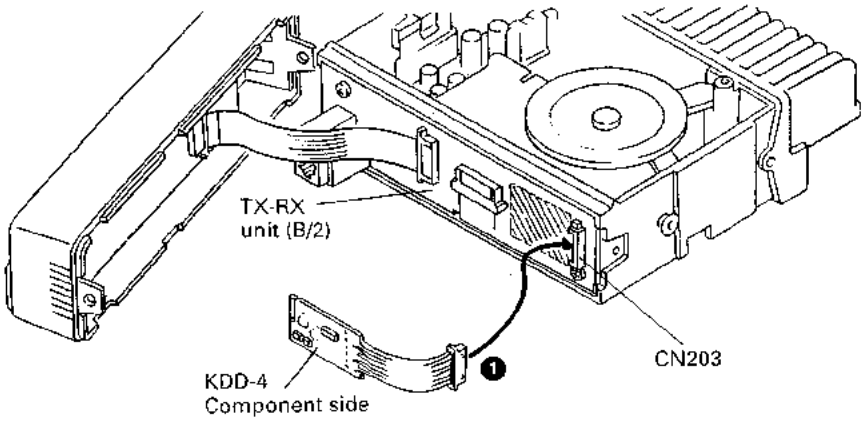


Fig. 3

INSTALLATION

1-3. Setting the KDD-4 code (DTMF)

This product is built using surface mount construction techniques. The solder jumpers used to configure this product should be changed using equipment and techniques suitable for surface mount device repair. Abuse due to the use of inappropriate tools and techniques will VOID the warranty.

Set the jumpers of the KDD-4 according to Table 1. Code programming is done by sending a carrier modulated with DTMF tones to the radio while installed in the radio.

- **Primary code programming**

1) Jumper JU5 & JU6 fo the KDD-4.
2) Jumper wire of pin 8 of the KDD-4 edge to the chassis on the radio during tuning the radio on.
3) Receive an unmodulated carrier of level to quiet the radio.
4) Place the microphone on hook. The radio should mute the audio.
5) Modulate the carrier with the primary DTMF code. The code level should be set to 1kHz deviation.
6) Disconnect the jumper wire of pin 8 and turn the radio off. The primary code is now programmed.

- **Secondary code programming**

1) Jumper wire of pin 2 of the KDD-4 edge to the chassis on the radio during tuning the radio on.
2) Modulate the carrier with the secondary DTMF code.
3) Disconnect the jumper wire of pin 2 and turn the radio off. The secondary code is now porgrammed.

- **TK-840/(N) programming**

See the instruction manual of the KPG-25D programming software.

Jumper No.	Setup
JU1	Open
JU2, JU3, JU9	Short
JU4	B
JU5, JU6	Open
JU7	Open : All call disabled
	Short : All call enabled
JU8 & JU10	Open : Pri. Code with transpond (individual call) Sec. Code without transpond (group call)
	Short : Pri. Code with transpond (individual call) Sec. Code with transpond (D.B.D.)

Table 1 Jumper setup charts

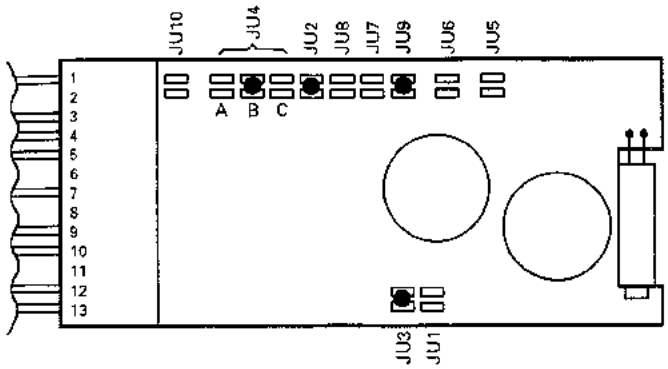


Fig. 4

1-4. Putting insulating tube

1. Put an insulating tube around the KDD-4 board and heat it so that the tube encases the board. (Fig. 5)

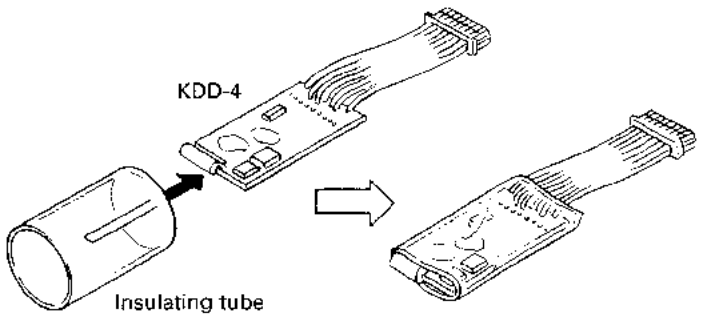


Fig. 5

INSTALLATION

1-5. Installing the KDD-4 in the transceiver

1. Install the KDD-4 on the TX-RX unit (B/2). (Fig. 6)
   1) Attach the pad to the KDD-4 (❷).
   2) Attach the KDD-4 to the TX-RX unit (❸).
   3) Reinstall the panel and the two halves of the cases.

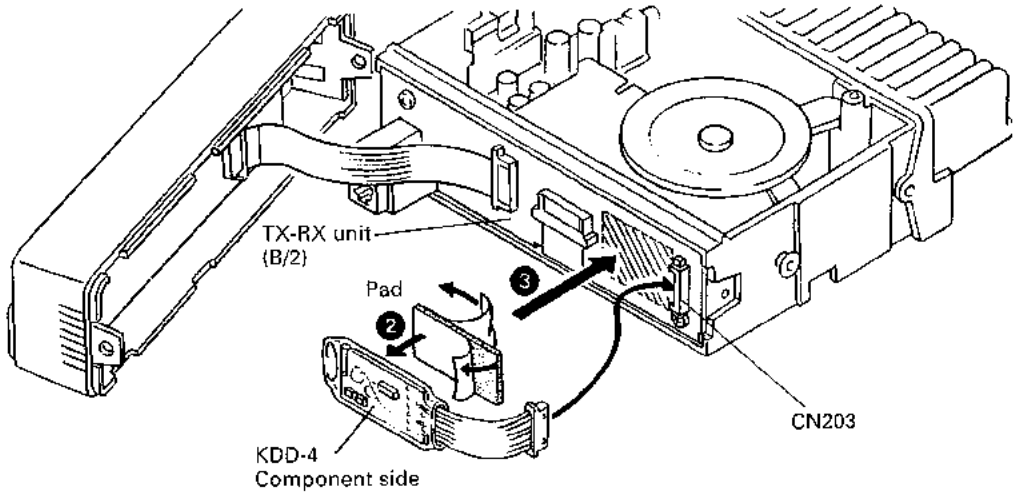


Fig. 6

2. 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.

2-1. 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 (❷).
3. Insert the KCT-19 cable (❸) into the chassis (❹). The wire harness band (❺) must be inside the chassis.
4. Relocate the DC cord bushing in the chassis (❻).
5. Connect the KCT-19 to the TX-RX unit (A/2) as shown in Figure 8 (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.

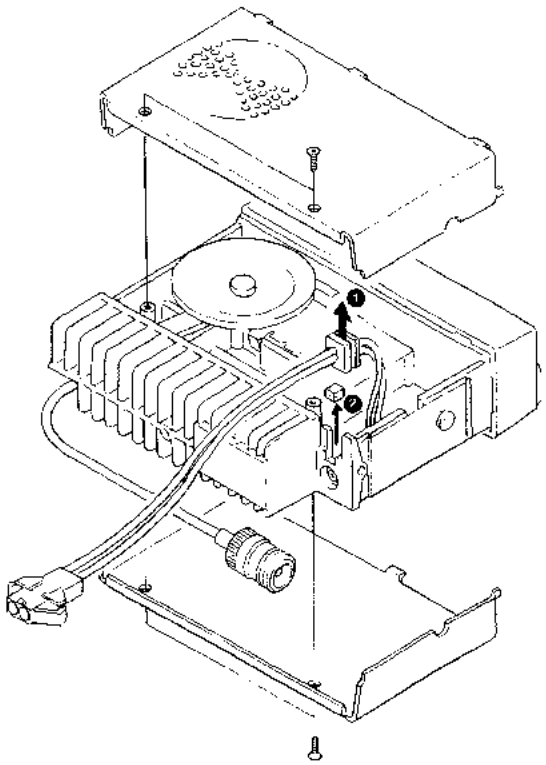


Fig. 7

INSTALLATION

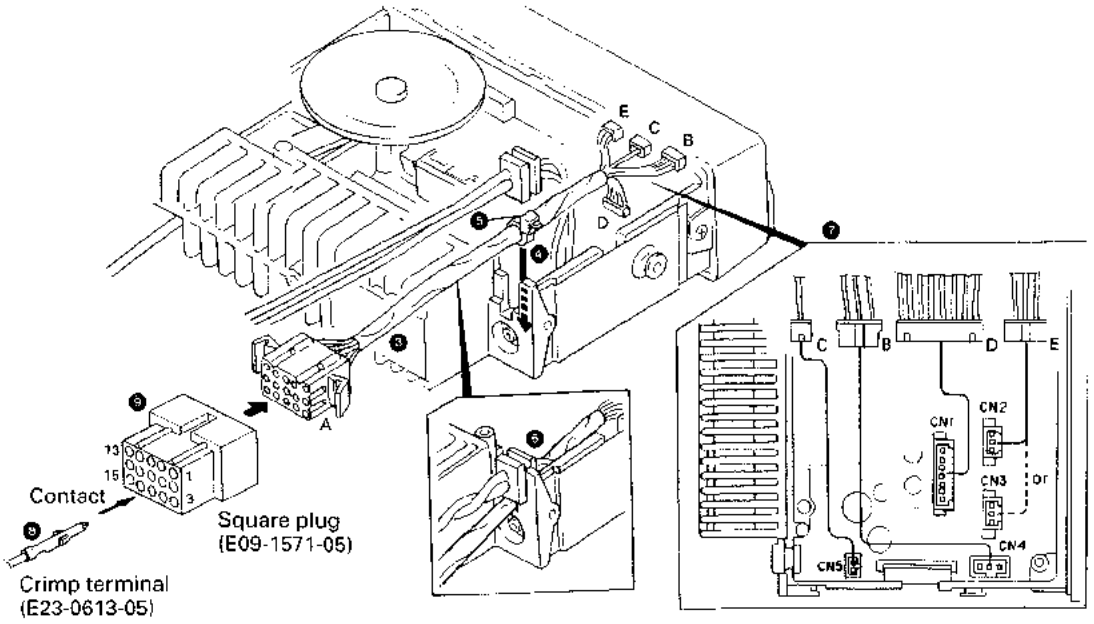


Fig. 8

2-2. Accessory port function

No. (A)	No (B,C,D,E)	Name	Function	Note
1	D-2	HK	External hook input	*1
		BUSY	System busy output	
2	D-5	ME	Microphone ground	*1
		SPM	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 13.4V 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	LOK	Link complete pulse output, active low.	
14	E-2	RXD	Serial control data input	*2
		MM	MIC mute input, active high.	
15	E-3	TXD	Serial control data output	*2
		DTC	Data transmit control with MIC mute input, active low.	

Note

*1 : The functions of A-1, A-2 and A-3 are changed as described in the jumper chart.

*2 : The functions of A-14 and A-15 are changed if the connector E is connected to CN2 or CN3 of the radio.

No.	CN2	CN3
E-1	LOK	LOK
E-2	MM	RXD
E-3	DTC	TXD

- Connect CN5 of the radio to connector C of the KCT-19 instead of to the internal speaker connector, if use external speaker.

2-3. Data equipment connection

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

HK/BUSY

R1 (1kΩ)	R153 (0Ω)	Function
Yes	No	MIC hook input : Default
No	Yes	System busy output indicates if no repeater channel is available in the currently selected LTR system when PTT is pressed, active low.

MI/TXS

R150 (0Ω)	R151 (0Ω)	Function
Yes	No	External MIC input : Default
No	Yes	Transmitter sense output, active high.

DI

R231 (0Ω)	R299 (0Ω)	Function
Yes	No	Data modulation input (Filtered)
No	Yes	Data modulation input (Not filtered) : Default

ME/SPM

R149 (0Ω)	R152 (0Ω)	Function
Yes	No	MIC ground : Default
No	Yes	Speaker mute input, active low.

INSTALLATION

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

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

If you use the Horn Alert function (KDD-4 required) or the Manual Relay function, you can turn the function off while driving with the ignition key.

3-1. Connecting the KCT-18 to the transceiver

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

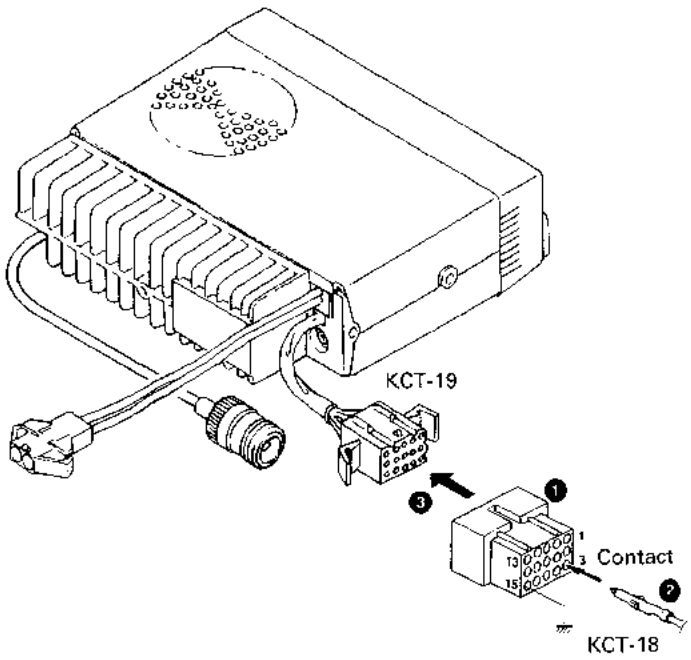


Fig. 9

3-2. Modifying the transceiver

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

1. Remove the lower half of the transceiver case.
2. Set jumper resistors (0Ω) R5 and R6 of the TX-RX unit (A/2) as shown in Table 2.

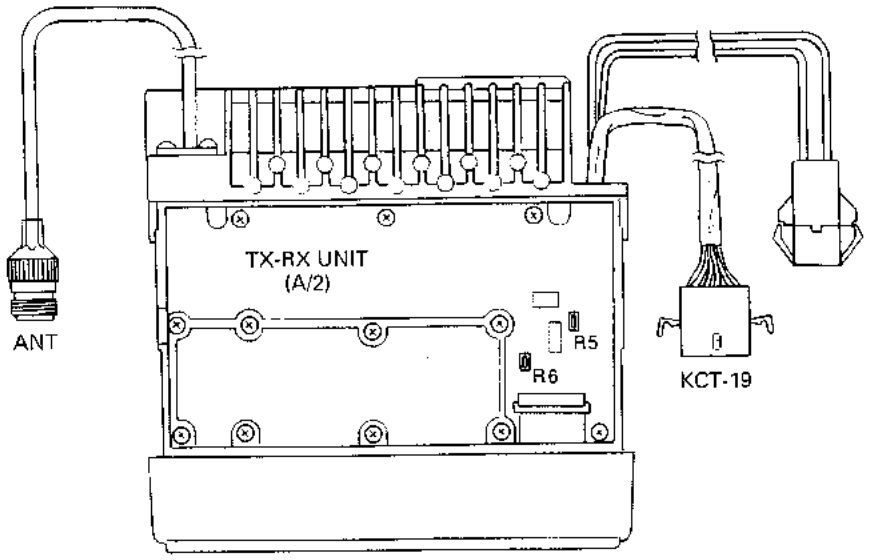


Fig. 10

Operation when KCT-18 is connected	R5	R6	
	Enable	Enable	← **KCT-18 cannot be connected**
Power on/off and Horn Alert or Manual Relay on/off	Disable	Enable	
Horn Alert or Manual Relay on/off	Enable	Disable	
	Disable	Disable	← **Power cannot be turned on**

Table 2 R5 and R6 setup chart

The Horn Alert or Manual Relay function can be turned on and off only if the function has been assigned to the AUX key.

INSTALLATION

4. External Speaker

4-1. 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.

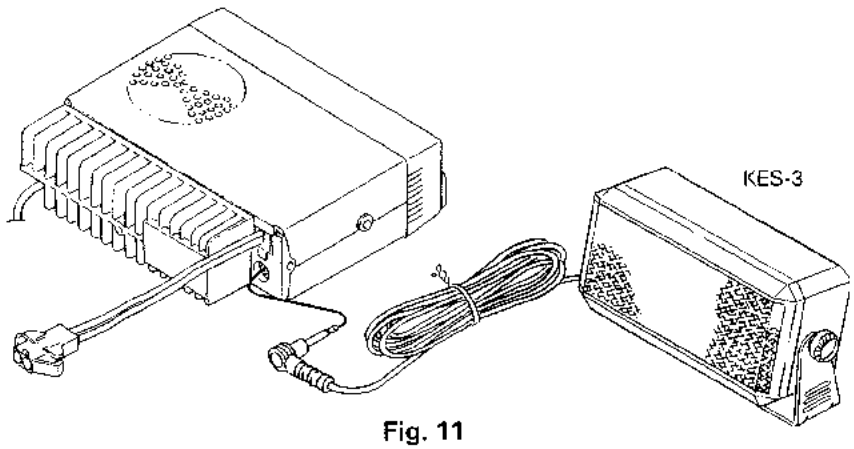


Fig. 11

4-2. 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.

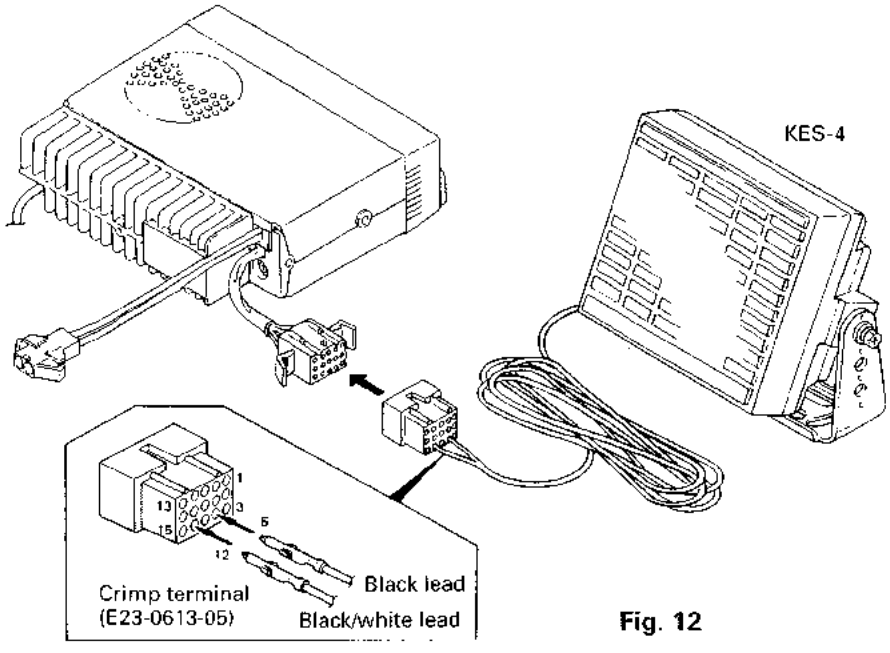


Fig. 12

INSTALLATION

5. Fitting the Control Panel Upside Down

The TK-840/(N) 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. 13)

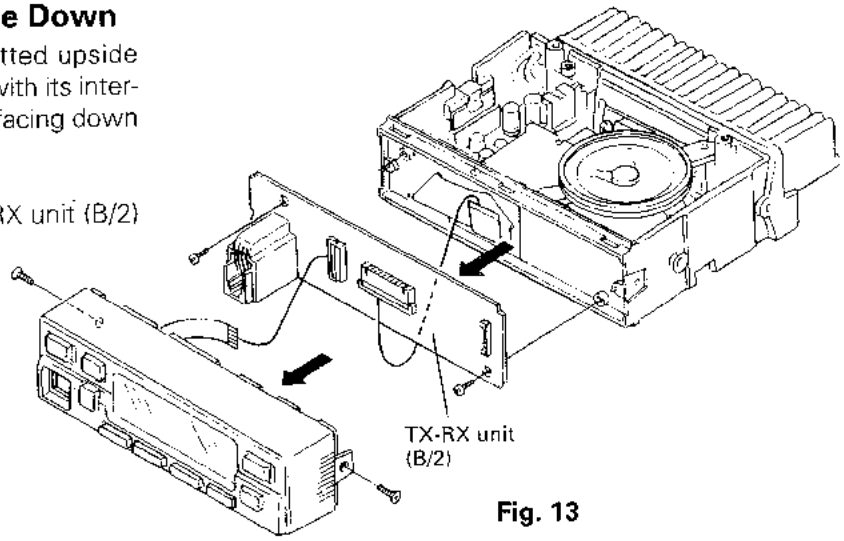


Fig. 13

2. Fold the flat cable (❶) differently (❷).
3. Turn the control section (❸) through 180 degrees (❹), and mount it on the transceiver (❺).
4. Insert the flat cable into control section connector CN201 (❻).

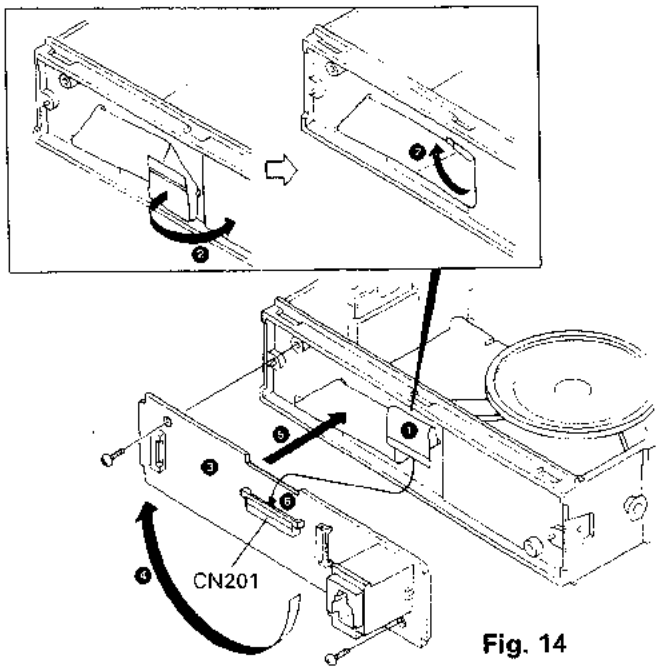


Fig. 14

5. Turn the pnel through 180 degrees and mount it on the transceiver. Refit the two halves of the case to complete installation. (Fig. 15)

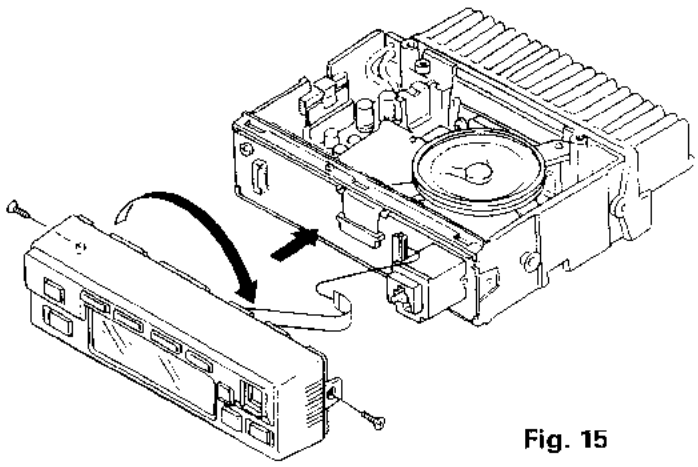
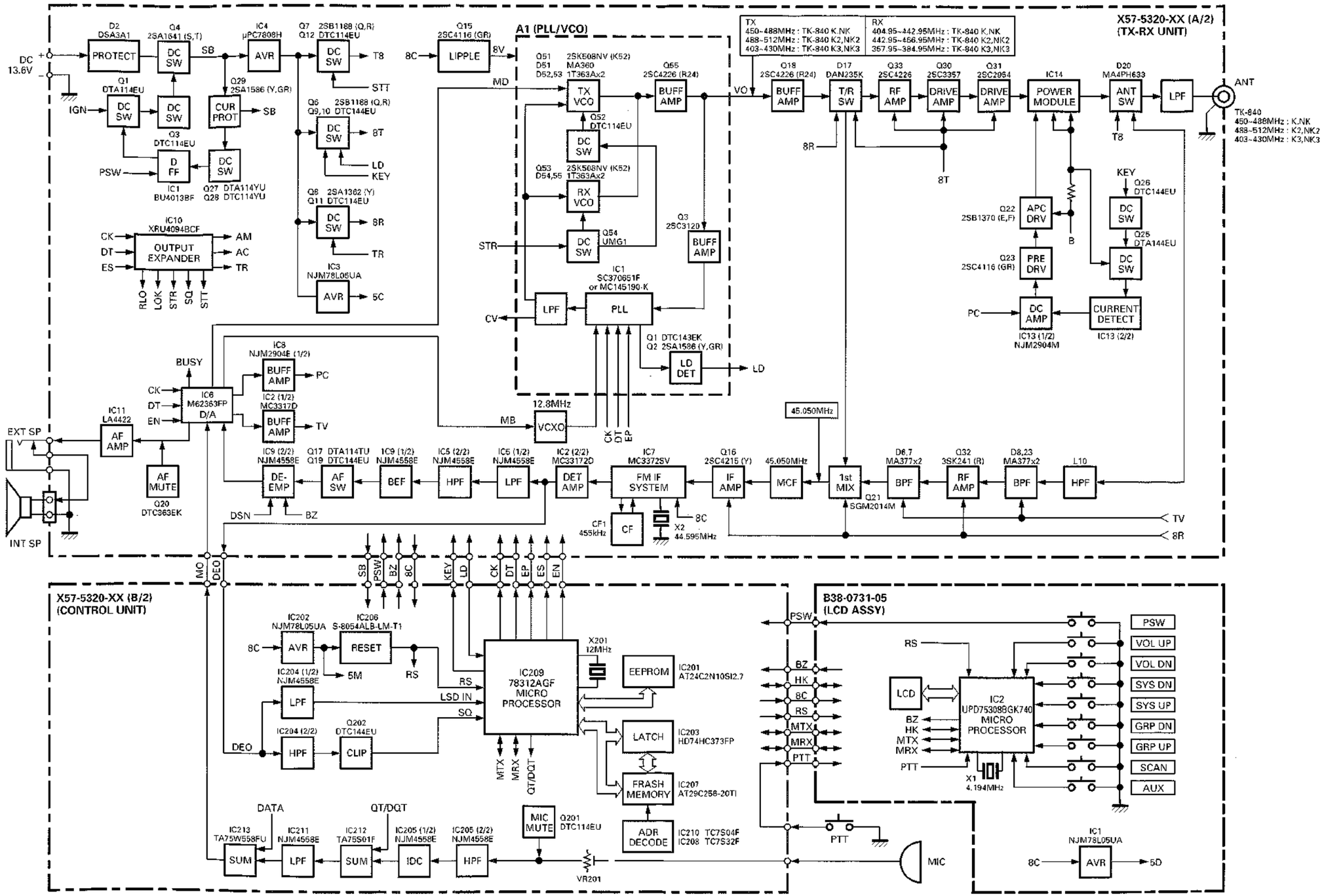
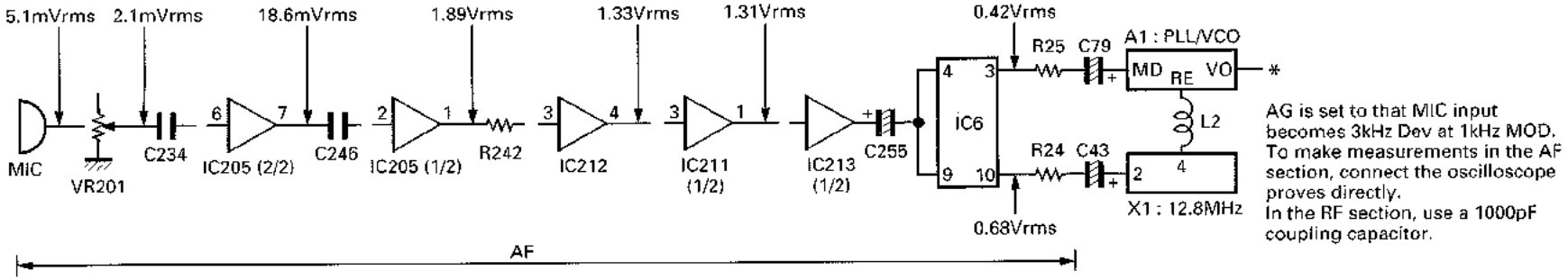


Fig. 15

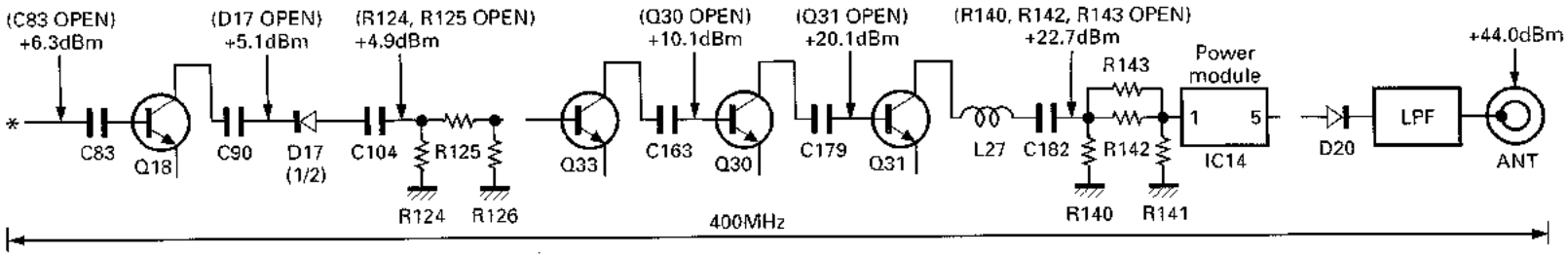
BLOCK DIAGRAM



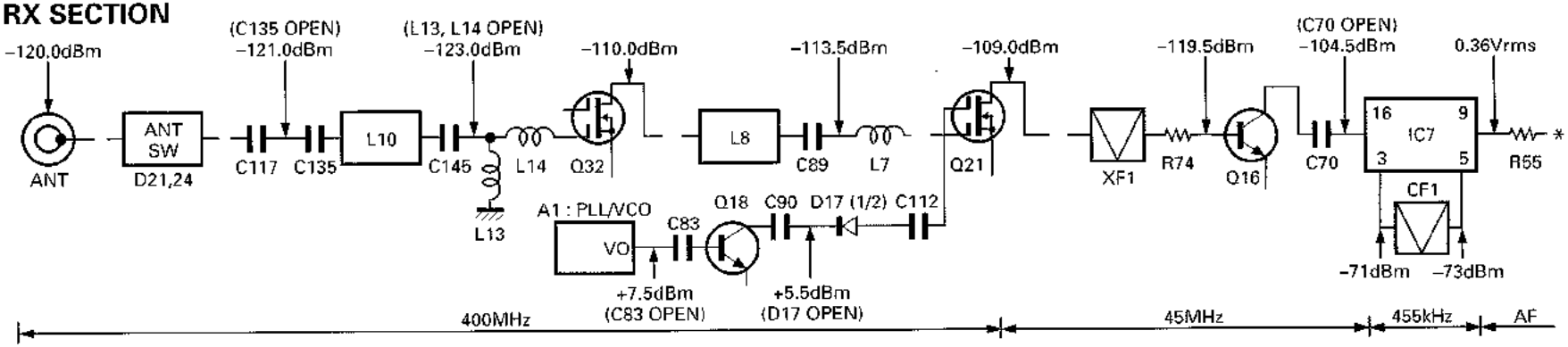
TX SECTION

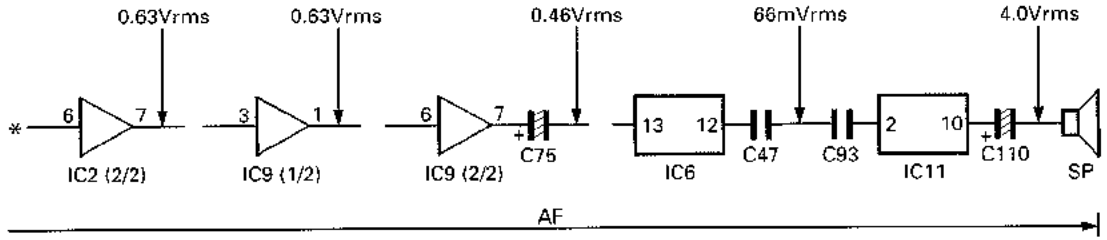


AG is set to that MIC input becomes 3kHz Dev at 1kHz MOD. To make measurements in the AF section, connect the oscilloscope proves directly.
In the RF section, use a 1000pF coupling capacitor.



RX SECTION





To make measurements in the AF section, connect the oscilloscope proves directly.
(ANT input : -47dBm, 1kHz FM, 3kHz dev.)
In the RF section, use a 1000pF coupling capacitor.
(The display shows the SSG input value required to obtain 12dB SINAD.)

CIRCUIT DESCRIPTION

1. Overview

This transceiver is a 400MHz-band EFJ LTR™ trunked-system-compatible FM transceiver that can be programmed to operate on both LTR and conventional systems.

2. Circuit Configuration by Frequency

The receiver is a double-conversion superhet with a first intermediate frequency (IF) of 45.050MHz and a second IF of 455kHz. Incoming signals from the antenna are mixed with the local signal from the PLL to produce the first IF of 45.050MHz.

This is then mixed with the 44.595MHz second local oscillator output to produce the 455Hz second IF. This is detected to give the demodulated signal.

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

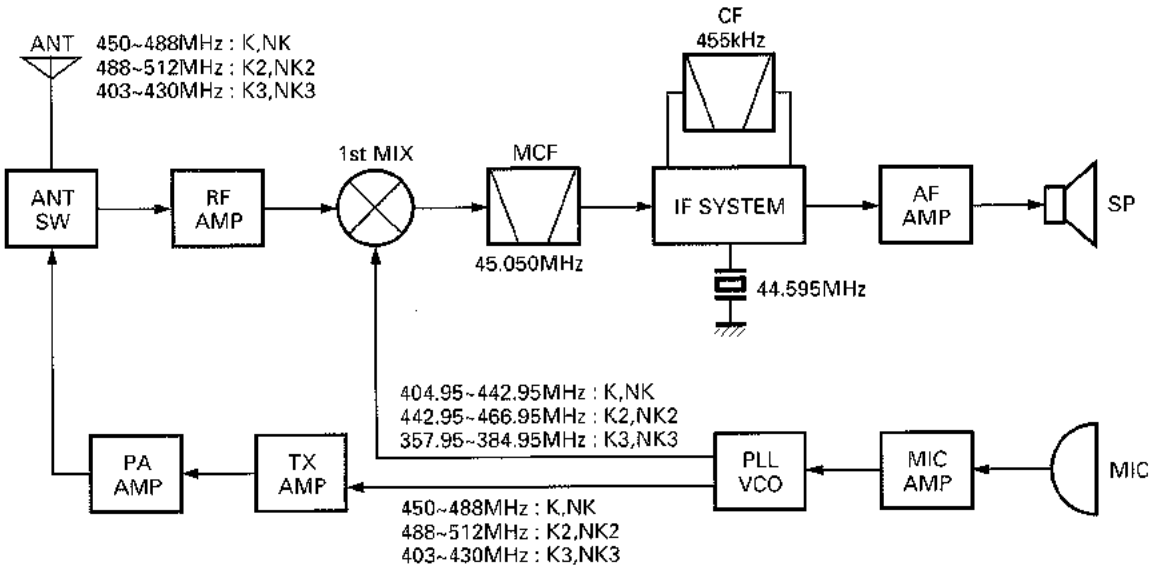


Fig. 1 Frequency configuration

3. Receiving System

3-1. RF unit

An incoming RF signal from the antenna terminal passes through the antenna switch (D20, D21, and D24 are off) and image filter and then the bandpass filter (L10). The signal is amplified by RF amplifier Q32, and passes through the bandpass filter (L8) again. The resulting signal goes to the first mixer (Q21), where it is mixed with the first local oscillator signal output from the frequency synthesizer to produce the first IF 45.050MHz.

3-2. IF unit

The first IF signal then passes through a four-pole monolithic crystal filter (XF1). The signal is amplified by first IF amplifier Q16 and goes to the second IF unit.

The second IF unit consists of an IF system IC (IC7) and the second mixer, second local oscillator, second IF filter, and FM detector. IC7 mixes the signal input to it with the 44.595MHz second local oscillator output of the crystal oscillator (X2) to produce the second IF of 455kHz.

The 455kHz signal then goes through 455kHz ceramic filter CF1, is amplified by the limiting amplifier, demodulated by the quadrature FM detector (in the same IC), and output to the receive audio amplifier.

CIRCUIT DESCRIPTION

3-3. Audio amplifier unit

The demodulated signal is amplified by IC2 (2/2), and goes through a low-pass filter consisting of IC5 (1/2), a high-pass filter consisting of IC5 (2/2), and a BEF consisting of IC9 (1/2) to remove the unwanted audio signal.

The signal the passes through the de-emphasis circuit consisting of the AF switch (Q17 on) and IC9 (2/2), and the volume level is adjusted by the IC6 D/A converter. The resulting signal goes to audio amplifier IC11, is amplified, and is output to the speaker.

3-4. Squelch circuit

The detector output is amplified by IC2 (2/2) and passes through a high-pass filter consisting of IC204 (2/2), which removes the noise components from the signal. Q202 converts the noise pulse level by hysteresis and applies it to the CPU (IC209).

The CPU counts the pulses, integrates them, and turns the squelch on and off according to the calculated value.

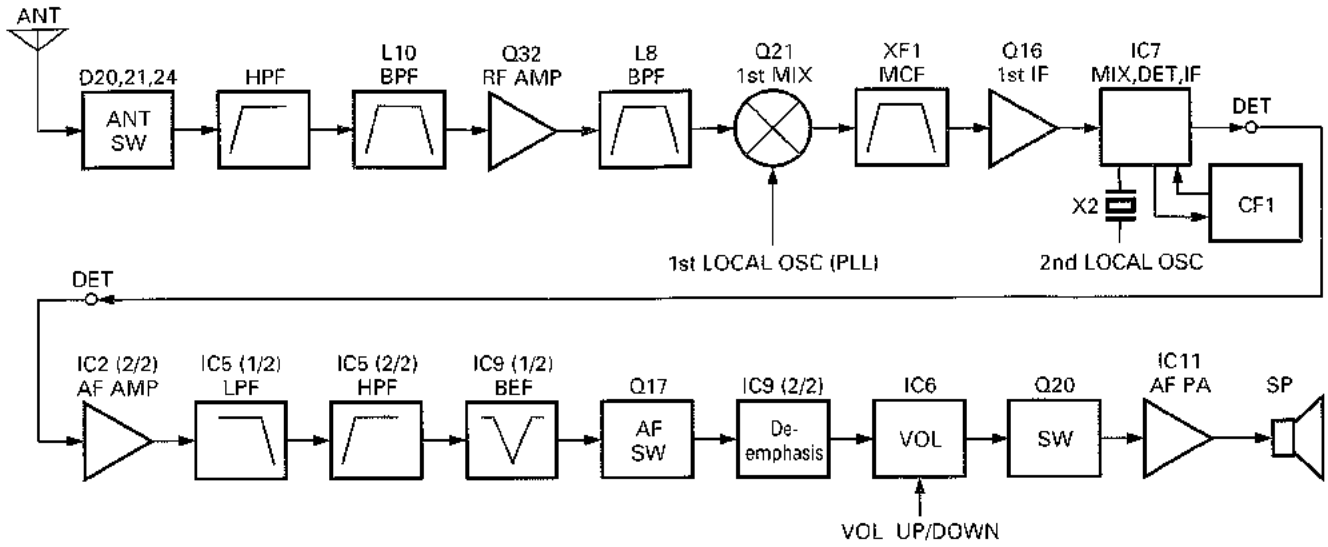


Fig. 2 Receiving system

CIRCUIT DESCRIPTION

4. Transmitter System

4-1. Microphone amplifier

The signal from the microphone goes to the microphone mute switch (Q201 off). It then passes through the high-pass filter in IC205 (2/2) and the pre-emphasis/IDC circuit in IC205 (1/2). (If the option has been installed, the signal is mixed with the encode signal.)

The signal is applied to the IC212 summing amplifier and mixed with QT and DQT from the CPU (IC209). It then passes through the splatter filter (the fourth low-pass filter) consisting of IC211 (1/2, 2/2), which removes unwanted harmonics.

The output from the low-pass filter is input to the D/A converter (IC6) to adjust the modulation.

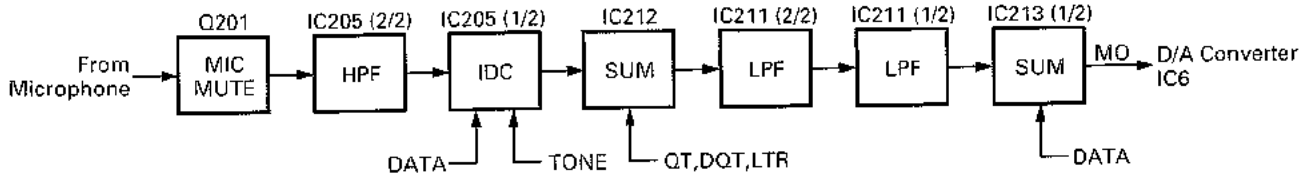


Fig. 3 Microphone amplification

4-2. Final amplifier

The signal from the PLL is amplified by drive amplifier (Q30, Q31, Q33) and power module (IC14) to an output level of 25W, and goes through the antenna switch D20 and harmonic filter, and on to the antenna terminal.

IC13 (1/2) compares the DC input to pin 2 with the reference voltage at pin 3 applied by IC8 (1/2), amplifies the result, and controls the DC amplifier (Q22 and Q23) to keep the transmit final current constant, thus keeping the transmit output constant.

4-3. APC circuit

The direct current that flows through the final module (IC14) produces a voltage across resistors R108, R109, R110, R133 and R134. This voltage is applied to pin 6 of IC13 (2/2), and is input as the reference voltage difference of pin 5 and amplified.

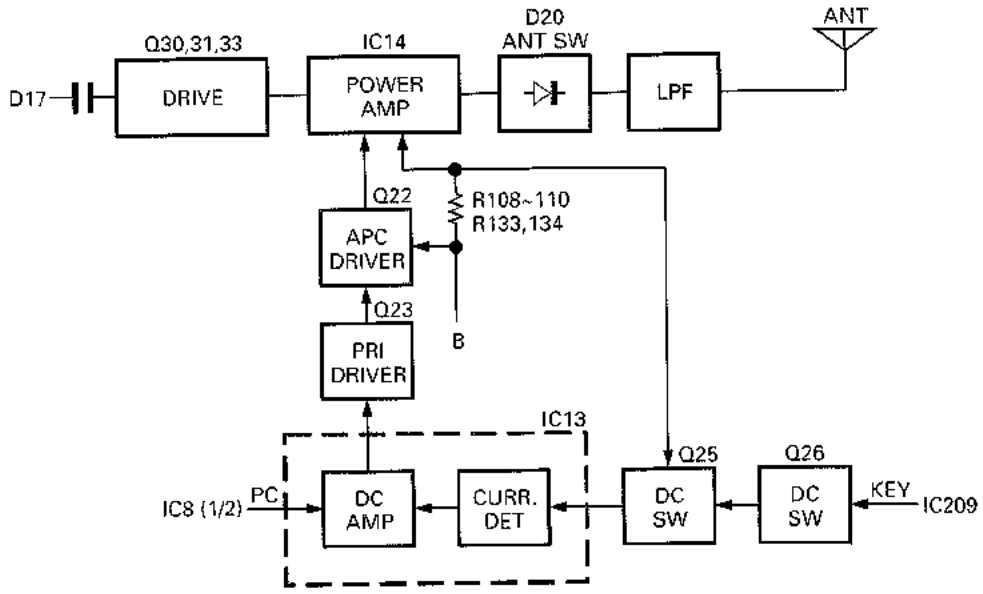


Fig. 4 Transmit power circuit and APC circuit

CIRCUIT DESCRIPTION

5. Frequency Synthesizer Unit

5-1. VCO/PLL

The PLL generates the transmit signal and the first local oscillator receive signal. The RF signal generated by Q51 (TX) or Q53 (RX) in the VCO unit is amplified by Q55, and the resulting signal is output to the TX-RX unit. TX and RX Q51 and Q53 are switched by turning the source line for Q51 and Q53 on and off. This is done by Q52 and Q54 using the control signal (STR) generated by the serial-to-parallel converter in the TX-RX unit. The RF signal passes through Q55 of the VCO unit and amplifier Q3, and is input to IC1 (PLL IC). The 12.8MHz PLL reference signal generated by the VCXO (X1) in the TX-RX unit is also input to IC1.

Both signals are divided according to the division data from the control unit to produce a 12.5kHz signal. The phases are compared, and a phase difference signal is output and passes through the charge pump (in IC1) and the low-pass filter of the lug lead to produce the control voltage for Q51/Q53 (VCO). This voltage is applied to D52 and D53 (TX) or D54 and D55 (RX) in the VCO unit to keep the VCO frequency constant. The other output from Q55 is amplified by the RF amplifier (Q18), and output to the transmit or receive unit via the RF switch (D17).

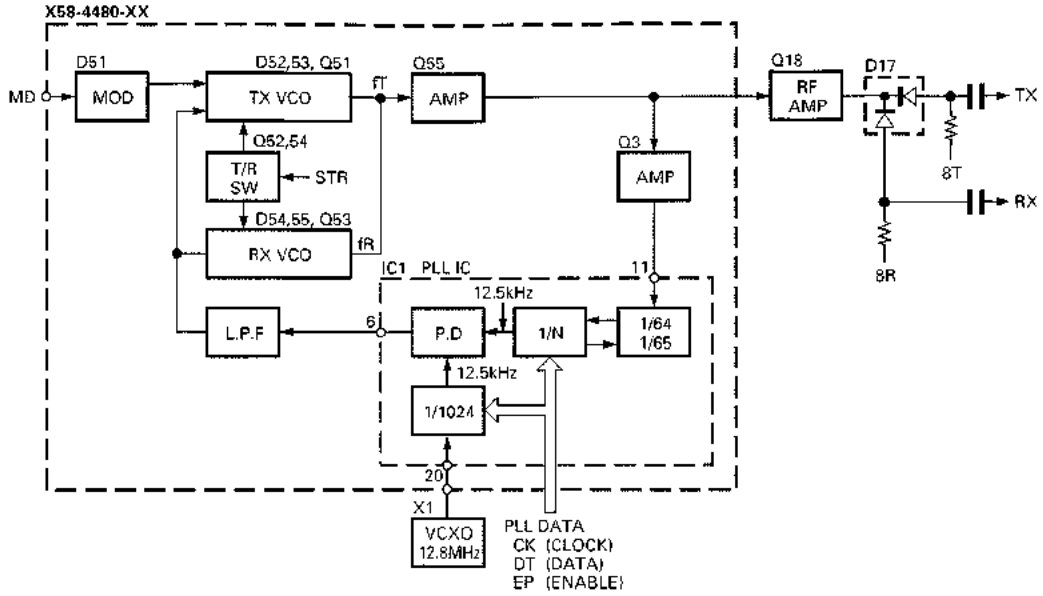


Fig. 5 PLL unit block diagram

5-2. PLL unlock

When the PLL is unlocked, the lock detect signal (LD) of the PLL IC (IC1) is rectified by D1 and Q2, and converted to a DC signal. This signal cuts off the power to the RF switch (D17) and drive circuit, stopping unnecessary transmission.

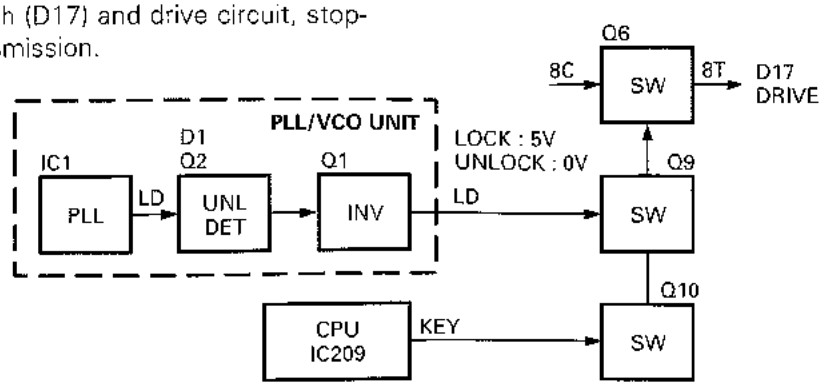


Fig. 6 PLL unlock circuit

CIRCUIT DESCRIPTION

6. Control unit

The control unit consists of CPU (IC209) and its peripheral circuits. It controls the TX and RX units and transfers data to and from the LCD assembly. The CPU has the following main functions:

1) Switching between transmission and reception according to the PTT signal input.
2) Reading system, group, frequency, and program data from the memory circuit.
3) Sending frequency data to the PLL.
4) Turning the squelch on and off according to the pulse signal input from the squelch circuit.
5) Controlling the audio mute circuit according to input decode data.
6) Sending encode data.
7) Sending data to the D/A converter.

6-1. Memory circuit

IC201 is a 2-Kbit EEPROM that stores adjustment and backup data. IC207 is a 256-Kbit flash memory that contains the transceiver control program, and channel and operating feature data. The program and data can be easily written into the memory from external equipment. IC208 and IC210 control the writing of data into IC207.

- **Shift register**

IC10 is an interface IC for I/O port expansion. It is used to expand the CPU (IC209) output ports.

- **D/A converter**

IC6 is used as a conventional semi-fixed-resistor converter. It sets the following:

1) Reference oscillator frequency
2) Transmission power
3) Modulation level
4) Audio power

6-2. TX encode data

The CPU (IC209) transmits encode data.

- **QT, DQT, LTR**

These data items are output from CPU pin 33. The signal from this pin passes through the CR low-pass filter and goes to the summing amplifier (IC212) in the microphone amplifier. It is mixed with the audio signal and output to the splatter filter. It then goes to the D/A converter (IC6) and on to the VCXO and VCO.

6-3. RX decode data

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

The receive detection signal is amplified by IC2 (2/2), and passes through a low-pass filter IC204 (1/2) to remove audio components. This signal is input to pin 27 of the CPU.

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

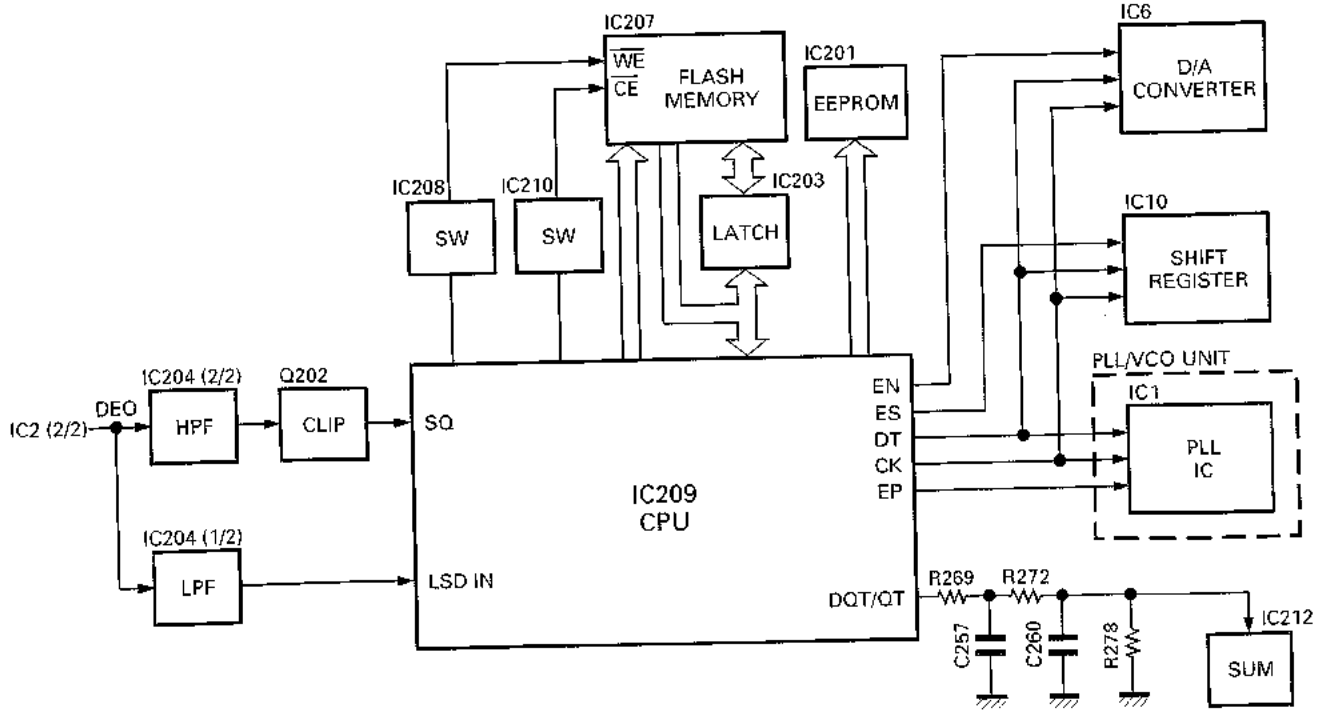


Fig. 7 Control unit block diagram

CIRCUIT DESCRIPTION

6-4. PLL data output

PLL data is output from DATA (pin 61), ENABLE (pin 59), and CLOCK (pin 60) of the CPU (IC209). The signals are input to the PLL IC (IC1) when the channel is changed or when transmission is changed to reception and vice versa.

6-5. Horn control

The horn switch, consisting of Q13, Q14, and Q24, controls the horn relay. It is supplied by the dealer to provide the external horn alert function.

Q24 disables horn alert, turning on when its base is high, to inhibit the function. Normally, the output from IC10 is low, and Q13 is off; the base of Q14 is about 0V and Q14 is off. When horn alert is enabled, the output from IC10 goes high and Q13 turns on. The base current flows through R61 to Q14 to turn Q14 on. Q14 can sink a maximum of 800mA.

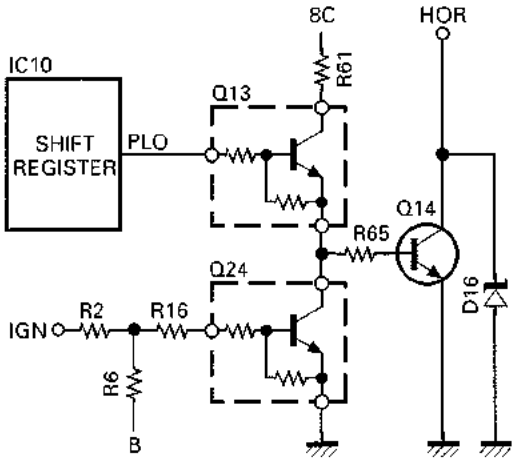


Fig. 8 Horn control circuit

6-6. Power supply circuit

D8 protects IC1 against overvoltage. Each time a pulse comes from the PSW terminal, the IC1 output is reversed. The reversed output signal passes through Q1 and Q3 and drives Q4. A voltage must be applied to the IGN terminal.

If 24V is supplied to the transceiver by mistake, Q2 turns on, and Q3 and Q4 are forced off, so the transceiver does not turn on.

If the SB terminal of the modular jack to which the microphone is connected is shorted or an overcurrent flows, R20 and R33 convert the current to a voltage and Q29 turns on. Its output drives Q28 and turns Q27 on, and the IC1 output forces high. This turns the transceiver off. If the terminal is no longer shorted, the transceiver can be turned on by pressing the power key. R62 and C11 are used to prevent malfunction-ing when a device with a large surge current is connected.

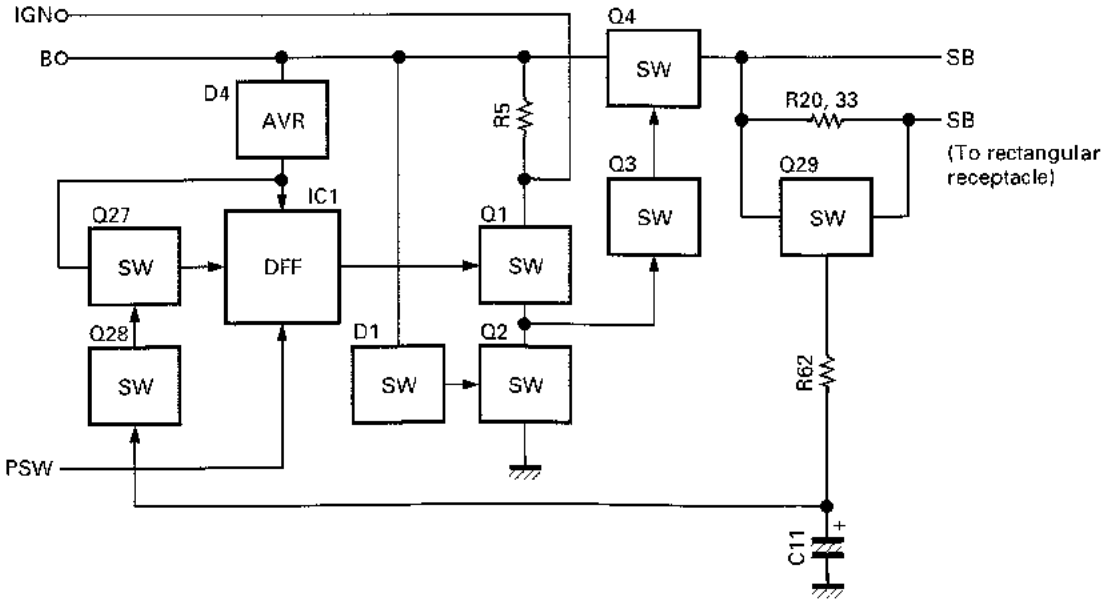


Fig. 9 Power supply circuit

CIRCUIT DESCRIPTION

7. LCD Assembly

The LCD assembly consists of CPU, LCD, power switch circuit, and tone generator.

7-1. CPU

The CPU (IC2) carries out the following main operations:

It sends on/off data serially to the control unit from the AF volume control, UP/DOWN key, system UP/DOWN key, group UP/DOWN key, SCAN key, and AUX key. It receives serial data from the control unit and displays it on the LCD.

The LCD can indicate alphanumeric characters (13 segments, 8 digits), TX, BUSY, CALL, SCAN, Talk-around, Option, AUX, TEL, and Delete.

7-2. Power switch circuit

Each time the power key is pressed, a pulse is sent to the TX-RX unit to turn the transceiver on or off.

7-3. Tone generator

The beeps and alert tones are generated by combining square wave signals of about 700Hz, 900Hz, and 1500Hz generated by the CPU. These signals are output from pins 46, 47, and 48 of the CPU (IC2). The signals are rectified by a CR network and fed to the TX-RX unit LCD assembly and the de-emphasis circuit of IC9 (2/2).

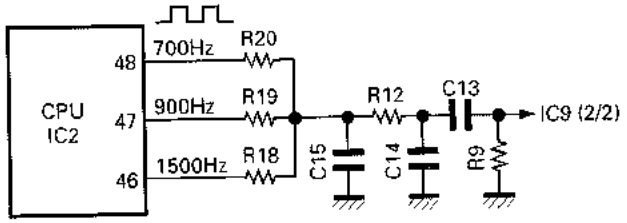
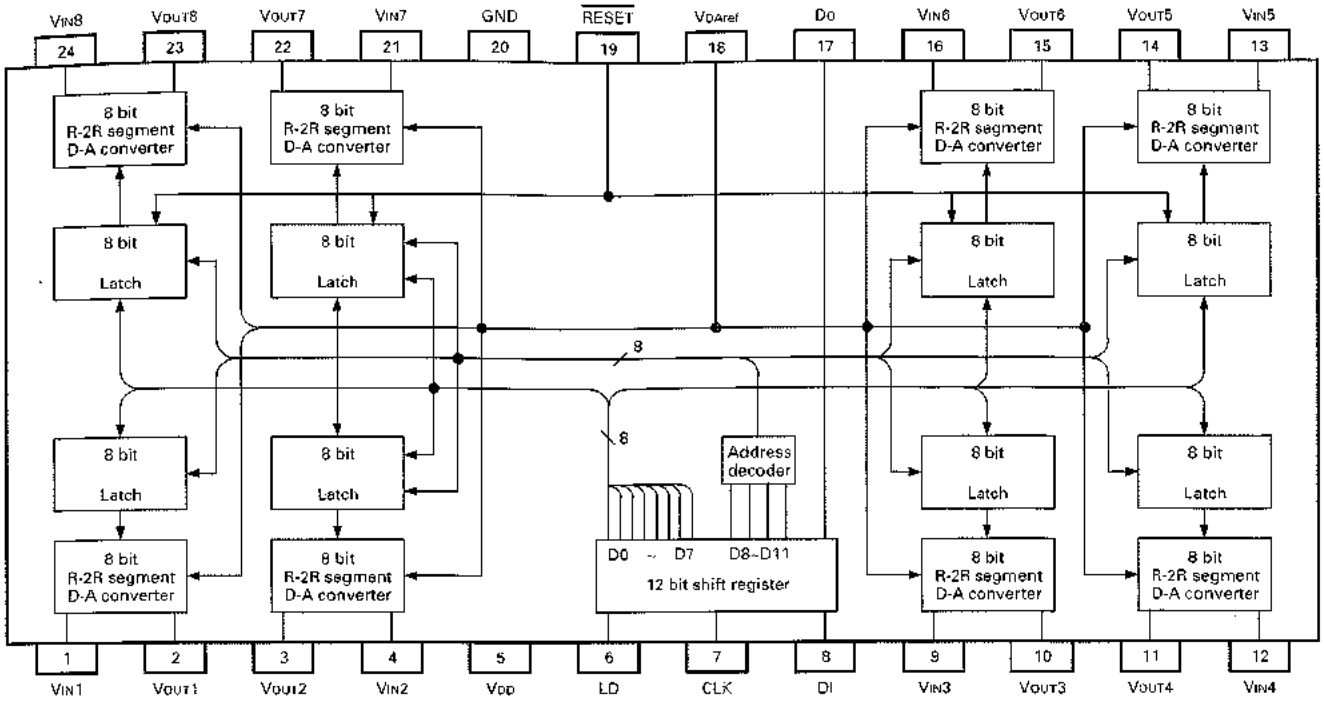


Fig. 10 Tone generator circuit

SEMICONDUCTOR DATA

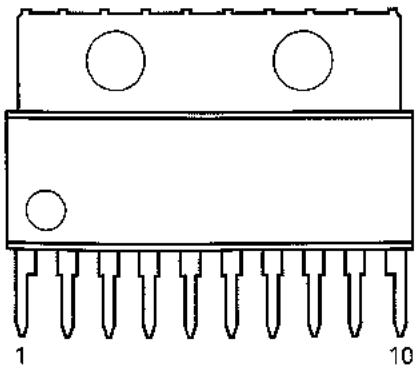
Level Adjuster : M62363FP (TX-RX Unit IC6)

- **Block diagram**

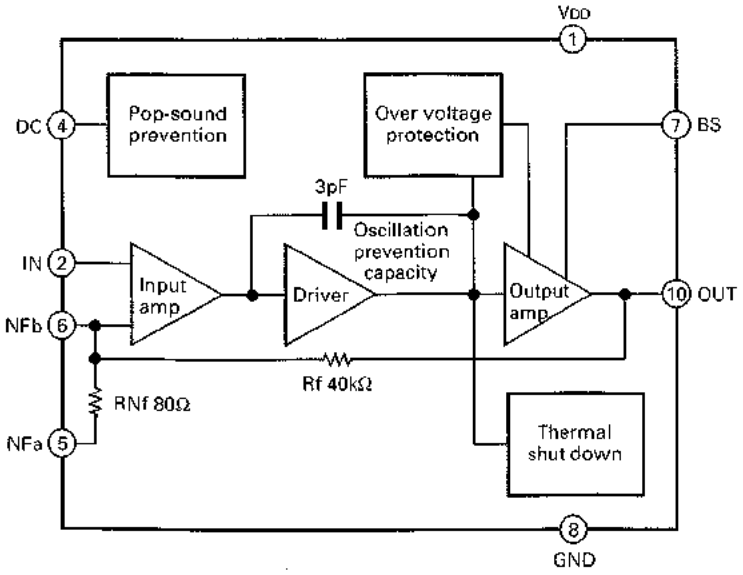


Audio Power Amplifier : LA4422 (TX-RX Unit IC11)

- **Terminal connection diagram**



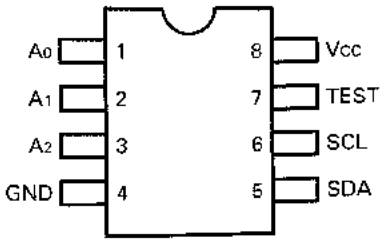
- **Block diagram**



SEMICONDUCTOR DATA

EEPROM : AT2402N10SI2.7 (TX-RX Unit IC201)

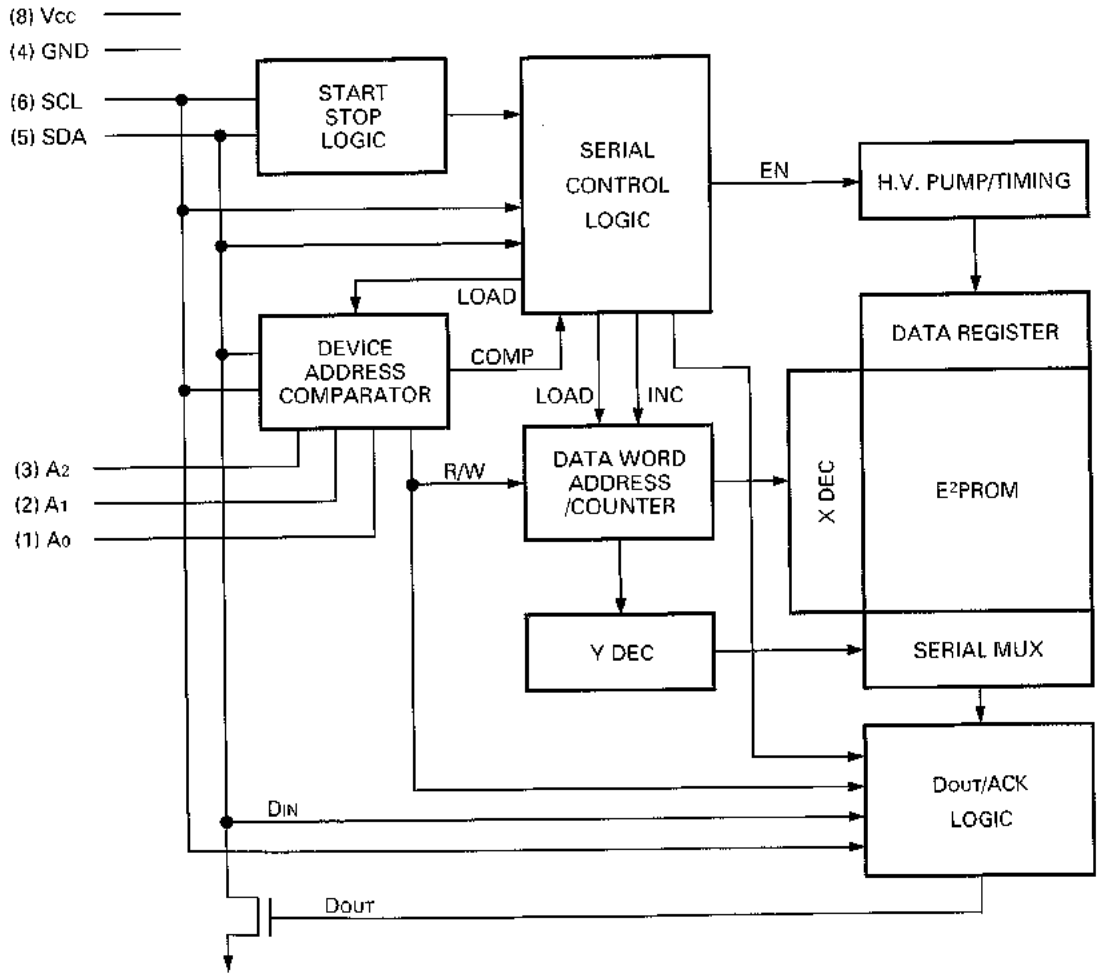
- **Terminal connection diagram**



- **Terminal function**

Pin name	Function
A0~A2	Address input
SDA	Serial data
SCL	Serial clock
TEST	Test input → Ground (GND)
NC	No connect

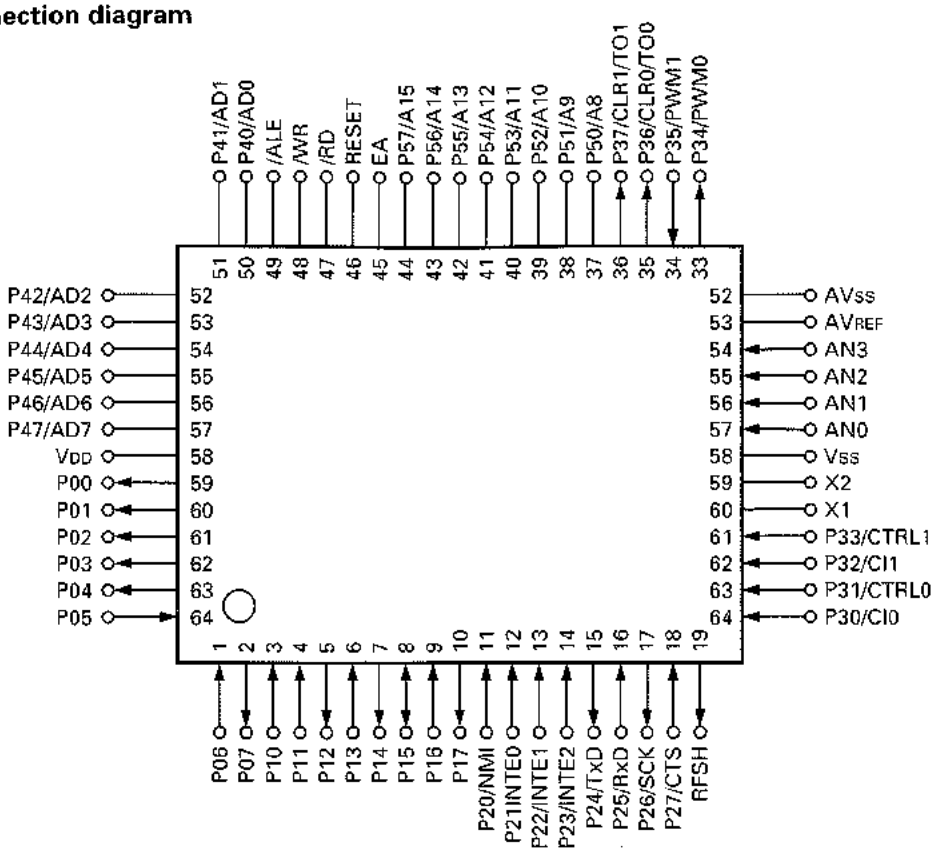
- **Block diagram**



SEMICONDUCTOR DATA

Microprocessor : 78312AGF3563BE (TX-RX Unit IC209)

- **Terminal connection diagram**



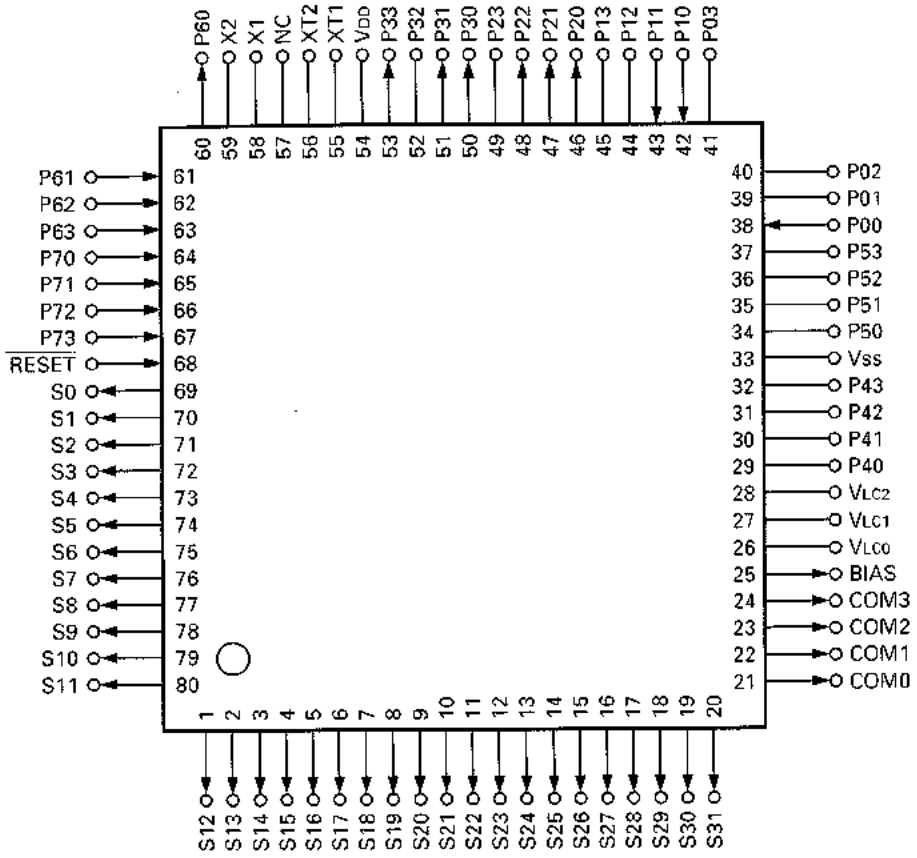
- **Terminal function**

Pin No.	Pin Name	I/O	Function	Pin No.	Pin Name	I/O	Function
1	P06	I	Option signaling transpond PTT.	26	Vss	–	GND.
2	P07	O	D-A converter enable.	27	AN0	I	Low speed data input.
3	P10	I	External PTT.	28	AN1	I	Not use.
4	P11	I	External HOOK.	29	AN2	I	K/K2/K3 band input.
5	P12	O	Option signaling reset.	30	AN3	I	GND.
6	P13	I	Not use.	31	AVREF	–	+5V.
7	P14	O	Data output with clone.	32	AVss	–	GND.
8	P15	I/O	PTT/data output with programming.	33	P34/PWM0	O	Low speed data (Signaling) output
9	P16	I	Data group control input (MDT).	34	P35/PWM1	I	Not use.
10	P17	O	KEY (Transmit : Active "H").	35	P36/CLR0/TO0	O	EEPROM data output.
11	P20/NMI	I	GND.	36	P37/CLR1/TO1	O	Flash memory write protect.
12	P21/INTE0	I	For display serial (RX) data input.	37~44	P50/A8~P57/A15	–	A8~A15 (Bus).
13	P22/INTE1	I	HOOK/data input with programming.	45	EA	–	External access.
14	P23/INTE2	I	Data input with clone.	46	RESET	–	Power on reset.
15	P24/TXD	O	External (TX) data output.	47	/RD	–	Read (Bus).
16	P25/RXD	I	External (RX) data output.	48	/WR	–	Write (Bus).
17	P26/SCK	O	Microphone mute (When receive/link).	49	/ALE	–	Address latch.
18	P27/CTS	I	GND.	50~57	P40/AD0~P47/AD7	–	AD0~AD7 (Bus).
19	RFSH	O	Not use.	58	VDD	–	+5V.
20	P30/CI0	I	Noise pulse input.	59	P00	O	PLL data enable.
21	P31/CTRL0	I	Not use.	60	P01	O	PLL/EEPROM/Shift register/D-A converter clock.
22	P32/CI1	I	Unlock signal input.	61	P02	O	PLL/shift register/D-A converter data.
23	P33/CTRL1	I	Option signaling decode latch.	62	P03	O	Shift register enable.
24	X1	–	12.000MHz.	63	P04	O	For display serial (TX) data output.
25	X2	–	12.000MHz.	64	P05	I	Option signaling deadbeat disable.

SEMICONDUCTOR DATA

Microprocessor : UPD75308BGK740 (LCD Assy IC2)

- **Terminal connection diagram**



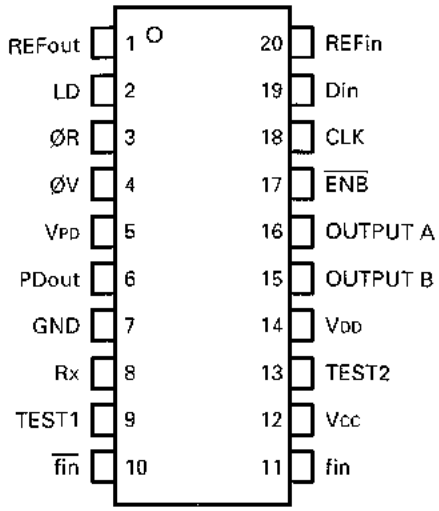
- **Terminal function**

Pin No.	Pin Name	I/O	Function	Pin No.	Pin Name	I/O	Function
1~20	S12~S31	O	LCD output (S20~S1).	52	P32	–	Open (not use).
21~24	COM0~COM3	O	LCD COM0~COM3 output.	53	P33	O	Serial data output.
25	BIAS	O	LCD power supply voltage.	54	VDD	–	+5V.
26~28	VLC0~VLC2	–	LCD voltage level generator.	55	XT1	–	+5V.
29~32	P40~P43	–	Open (not use).	56	XT2	–	Open (not use).
33	Vss	–	GND.	57	NC	–	Open (not use).
34~37	P50~P53	–	Open (not use).	58, 59	X1, X2	–	System clock input.
38	P00	I	HOOK (PC) serial data input.	60	P60	I	AUX switch input.
39~41	P01~P03	–	Open (not use).	61	P61	I	SCAN switch input.
42	P10	I	Serial data input.	62	P62	I	Volume up switch input.
43	P11	I	PTT (PC) serial data input.	63	P63	I	Volume down switch input.
45, 45	P12, P13	–	Open (not use).	64	P70	I	Group up switch input.
46	P20	O	Beep output (Hi).	65	P71	I	Group down switch input.
47	P21	O	Beep output (Med).	66	P72	I	System up switch input.
48	P22	O	Beep output (Lo).	67	P73	I	System down switch input.
49	P23	–	Open (not use).	68	$\overline{\text{RESET}}$	I	System reset input.
50	P30	O	PTT (PC) serial data output.	69~80	S0~S11	O	LCD output (S32~S21).
51	P31	O	HOOK (PC) serial data output.				

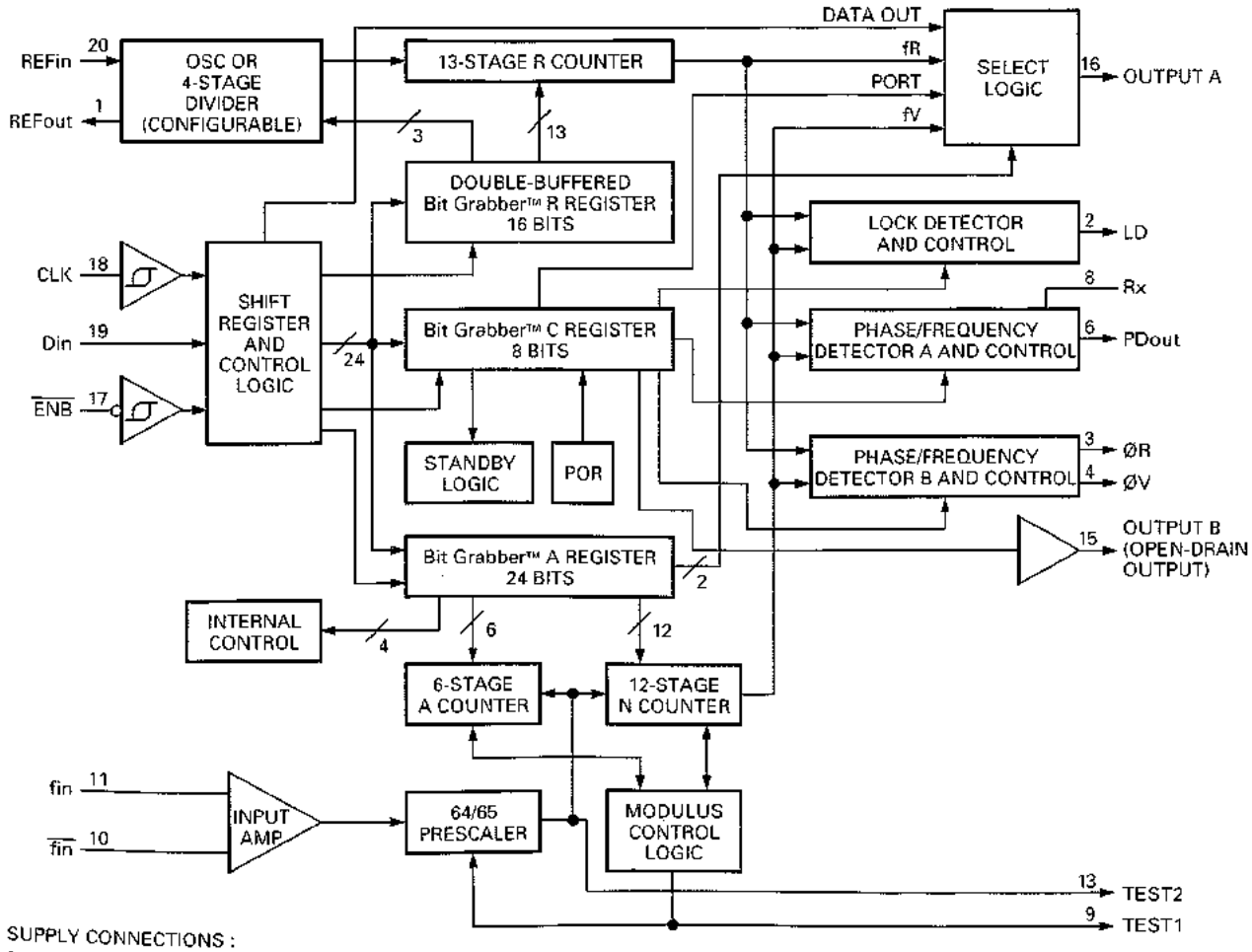
SEMICONDUCTOR DATA

PLL System : SC370651F or MC145190F-K (PLL/VCO IC1)

- **Terminal connection diagram**



- **Block diagram**



SUPPLY CONNECTIONS :
PIN12 = Vcc (V+TO INPUT AMP AND 64/65 PRESCALER)
PIN5 = VPD (V+TO PHASE/FREQUENCY DETECTORS A AND B)
PIN14 = VDD (V+TO BALANCE OF CIRCUIT)
PIN7 = GND (COMMON GROUND)

DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-5320-XX) -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3

Ref. No.	Parts No.	Use/Function	Operation/Condition
IC1	BU4013BF	Power supply circuit logic control	
IC2	MC33172D	Audio amplifier (Detected output)	
IC3	NJM78L05UA	Voltage regualtor	5V.
IC4	µPC7808H	Voltage regulator	8V.
IC5	NJM4558E	Active filter	
IC6	M62363FP	Level adjuster	
IC7	MC3372SV	IF system	1st IF : 45.05MHz, 2nd IF : 455kHz.
IC8	NJM2904E	Buffer amplifier	
IC9	NJM4558E	Active filter	
IC10	XRU4094BCF	I/O port expansion	Or BU4094BCF.
IC11	LA4422	Audio power amplifier	
IC13	NJM2904M	Comparator, DC amplifier	
IC201	AT2402N10SI2.7	EEPROM	Capacity 2-Kbit.
IC202	NJM78L05UA	Voltage regulator	5V.
IC203	HD74HC373FP	Latch	
IC204	NJM4558E	Active filter, Hysteresis comparator	
IC205	NJM4558E	Active filter, Limiter	
IC206	S-8054ALB-LM	Precision reference	
IC207	AT29C256-20TI	Flash memory	
IC208	TC7S32F	DC switch	"L" when IC207 access.
IC209	78312AGF3563BE	Microprocessor	
IC210	TC7S04F	DC switch	"L" when writing program or data from external equipment.
IC211	NJM4558E	Active filter	
IC212	TA75S01F	Adder	
IC213	TA75W558FU		
Q1	DTA114EU	DC switch	On when power switch on.
Q2	DTC114EU	DC switch	On when 24V connected, then Q3 turn off.
Q3	DTC114EU	DC switch	On when power switch on.
Q4	2SA1641(S,T)	DC switch	On when power switch on.
Q5	DTA114YU	DC switch	On when power switch off, then D22 turn on.
Q6, 7	2SB1188(Q,R)	DC switch	RX : 0V, TX : 8V
Q8	2SA1362(Y)	DC switch	RX : 8V, TX : 0V
Q9	DTC144EU	DC switch	On when PLL lock.
Q10	DTC144EU	DC switch	On when PTT switch on.
Q11	DTC114EU	DC switch	On when RX.
Q12	DTC114EU	DC switch	On when TX.
Q13	DTC114EU	DC switch	On when horn control on.
Q14	2SD1624(S)	DC switch	On when horn control on.
Q15	2SC4116(GR)	Ripple filter	
Q16	2SC4215(Y)	RX 1st IF amplifier	45.05MHz.
Q17	DTA114TU	Muting switch	On when no beep sound at busy.
Q18	2SC4226(R24)	RF amplifier	
Q19	DTC144EU	DC switch	On when no beep sound at busy.
Q20	DTC363EK	Muting switch	Off when busy.
Q21	SGM2014M	RX 1st mixer	
Q22	2SB1370(E,F)	APC driver	
Q23	2SC4116(GR)	DC amplifier	APC controller.
Q24	DTC114EK	DC switch	On when IGN line "H".
Q25	DTA144EU	DC switch	On when PTT switch on.
Q26	DTC144EU	DC switch	On when PTT switch on.
Q27	DTA114YU	DC switch	On when modular jack SB terminal shorted.
Q28	DTC114YU	DC switch	On when modular jack SB terminal shorted.
Q29	2SA1586(Y,GR)	DC switch	On when modular jack SB terminal shorted.

DESCRIPTION OF COMPONENTS

Ref. No.	Parts No.	Use/Function	Operation/Condition
Q30	2SC3357	RF amplifier	
Q31	2SC2954	RF amplifier	
Q32	3SK241(R)	RF amplifier	
Q33	2SC4226(R24)	RF amplifier	
Q34	DTC114YU		
Q201	DTC114EU	Muting switch	Off when TX.
Q202	DTC144EU	DC switch	On/off by noise.
D1	02CZ18(X,Y)	Voltage reference	
D2	DSA3A1-FK	Protection	On when reverse connection.
D3	1SS301	Reverse current prevention	
D4	02CZ15(X,Y)	Voltage reference	
D5	1SS301	Reverse current prevention	
D6~8	MA377	BPF tuning	Vari-cap tuning.
D9~15	DA204K	Surge absorption	On when 5V or more and 0V or less.
D16	02CZ20(Y,Z)	Voltage reference	
D17	DAN235K	RF switch	
D18	DA204K	Voltage reference	
D19	HSM88AS	Large input protection	
D20	MA4PH633	TX/RX switch	On when TX
D21	MI809	TX/RX switch	On when TX
D22	1SS355	DC switch	On when power switch off.
D23	MA377	BPF tuning	Vari-cap tuning.
D24	MI809	TX/RX switch	On when TX
D201, 202	DA204K	Surge absorption	On when 5V or more and 0V or less.
D203	1SS301	DC switch	On when microphone mute on.

PLL/VCO (X58-4480-XX) -10 : K,NK -11 : K2,NK2 -12 : K3,NK3

Ref. No.	Parts No.	Use/Function	Operation/Condition
IC1	SC370651F	PLL system	Or MC145190F-K.
Q1	DTC143EK	Lock detection switch	On when PLL unlocked.
Q2	2SA1586(Y,GR)	Lock detection switch	On when PLL unlocked
Q3	2SC3120	Buffer amplifier	
Q51	2SK508NV(K52)	Oscillator for TX	
Q52	DTC114EU	TX/RX switching	
Q53	2SK508NV(K52)	Oscillator for RX	
Q54	UMG1	TX/RX switching	
Q55	2SC4226(R24)	Buffer amplifier	
D1	1SS301	DC switch	On when PLL unlocked.
D51	MA360	Modulator	
D52~55	1T363A	Variable diode	Frequency control.

LCD ASSY (B38-0731-05)

Ref. No.	Parts No.	Use/Function	Operation/Condition
IC1	NJM78L05UA	Voltage regulator	5V.
IC2	UPD75308BGK740	Microprocessor	
ED1	B38-0722-05	LCD	

TK-840/(N)

Ref. No.	Parts No.	Use/Function	Operation/Condition
IC14	S-AU27AM(K)	RF power amplifier	For TK-840 K,NK only
	S-AU27AH(K)	RF power amp	For TK-840 K2,NK2 only
	S-AU27AL(K)	RF power amp	For TK-840 K3,NK3 only

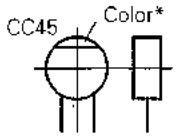
TK-840/(N)

PARTS LSIT

CAPACITORS

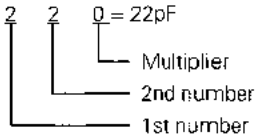
CC 45 TH 1H 220 J
1 2 3 4 5 6

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



• Capacitor value

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



• 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

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40	+80	+100	More than 10μF – 10 ~ +50
							–20	–20	–0	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 (Refer to the table above except dimension)

(EX) CC 73 F SL 1H 000 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)

(EX) CK 73 F F 1H 000 Z
1 2 3 4 5 6 7
(Chip) (B, F)

RESISTORS

• Chip resistor (Carbon)

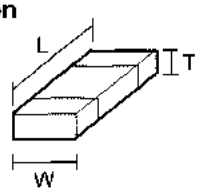
(EX) RD 73 E B 2B 000 J
1 2 3 4 5 6 7
(Chip) (B,F)

• Carbon resistor (Normal type)

(EX) RD 14 B B 2C 000 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



• Dimension (Chip capacitor)

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
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

• Dimension (Chip resistor)

Dimension code	L	W	T	Wattage
E	3.2 ± 0.2	1.6 ± 0.2	0.57	2B
F	2.0 ± 0.3	1.25 ± 0.2	0.45	2A

Rating wattage

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

PARTS LIST

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

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

TK-840/(N)
TX-RX UNIT (X57-5320-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-840/(N)					
1	1B		A01-1065-03	METALLIC CABINET (UPSIDE)	
2	2B		A01-1066-03	METALLIC CABINET (BOTTOM)	
3	1C		A10-1344-01	CHASSIS	
4	2A		A62-0349-03	PANEL ASSY	
6	2E		B09-0235-05	CAP ACCESSORY	
7	2A		B10-1220-04	FRONT GLASS	
8	2A		B38-0731-05	LCD ASSY	
9	1B,1C		B42-2455-04	LABEL (M4x8 MAX)	
10	1C		B42-5650-04	S/No LABEL	
11	1C		B42-3394-14	STANDARD LABEL	
12	1D		B46-0470-00	WARRANTY CARD ACCESSORY	
13	1D		B62-0459-10	INSTRUCTION MANUAL (EN/FR/ES)	
14	1C	*	B72-1231-04	MODEL NAME PLATE	K
14	1C	*	B72-1232-04	MODEL NAME PLATE	K2
14	1C	*	B72-1233-04	MODEL NAME PLATE	K3
14	1C	*	B72-1234-04	MODEL NAME PLATE	NK
14	1C	*	B72-1235-04	MODEL NAME PLATE	NK2
14	1C	*	B72-1236-04	MODEL NAME PLATE	NK3
16	1D		E30-2036-05	GROUND WIRE ACCESSORY	
17	2E		E30-2076-15	DC CORD ACCESSORY	
18	1D		E30-2089-08	CURL CORD (FOR MIC) ACCESSORY	
W1	1C		E30-2145-15	ANTENNA CABLE	
W2	1C		E37-0461-05	LEAD WIRE WITH CONNECTOR (SP)	
W3	1C		E30-2172-15	DC CORD ASSY	
W201	2B		E37-0470-05	FLAT CABLE (CONT-TXRX UNIT)	
W301	2B		E37-0460-05	FLAT CABLE (DISPLY-CONT UNIT)	
21	2B		F12-0435-04	CONDUCTIVE SHEET	
22	1C		F29-0457-04	INSULATING TUBE (ANT CABLE)	
23	2E		F51-0016-05	FUSE (10A)	
25	1B		G02-0575-14	FLAT SPRING (AF IC)	
26	1B		G02-0711-04	FLAT SPRING (APC/AVR)	
-			G10-0651-04	FIBROUS SHEET	
28	1B,2C		G10-0764-04	FIBROUS SHEET (CHASSIS)	
29	2B		G10-0765-04	FIBROUS SHEET (CHASSIS)	
30	1B		G10-0782-04	FIBROUS SHEET (SHIELDING PLAT)	
31	2B		G11-0729-04	SHEET (MODULAR JACK)	
32	1C		G13-1468-04	CUSHION (DC CORD)	
33	2B		G53-0778-04	PACKING (PHONE JACK)	
35	2D	*	H10-6609-02	POLYSTYRENE FOAMED FIXTURE	
36	3E	*	H10-6610-02	POLYSTYRENE FOAMED FIXTURE	
37	2D	*	H12-3013-02	PACKING FIXTURE	
38	1D	*	H13-1005-04	CARTON BOARD	
39	2E		H25-0029-04	PROTECTION BAG (60x110)	
40	3E		H25-0049-03	PROTECTION BAG	
41	2E		H25-0103-04	PROTECTION BAG (125x250)	
42	2D		H25-0796-04	PROTECTION BAG	
43	3D	*	H52-0943-02	ITEM CARTON CASE	
45	2E		J19-1376-15	MICROPHONE HANGER ACCESSORY	
46	1C		J19-1434-04	HOLDER (SP)	
47	1D		J29-0441-03	BRACKET ACCESSORY	
49	2A		K29-4928-02	KEY TOP	

Ref. No.	Address	New parts	Parts No.	Description	Destination
51	2E		N99-0321-05	SCREW SET ACCESSORY	
A	1C,2C		N33-2606-45	OVAL HEAD MACHIN SCREW (CASE)	
B	2B		N67-3008-46	PAN HEAD SEMS SCREW	
C	1B,1C		N83-2606-46	PAN HEAD TAPTITE SCREW	
D	2B		N87-2606-45	BRAZIER HEAD TAPTITE SCREW (CONT)	
E	2B,1C		N87-2608-46	BRAZIER HEAD TAPTITE SCREW	
F	2A		N88-2608-46	FLAT HEAD TAPTITE SCREW (PANEL)	
MIC	1D		T91-0362-15	MICROPHONE (WITH CORD) ACCESSORY	
SP	1C		T07-0246-05	SPEAKER (16 OHM 1W)	
IC14	2C		S-AU27AH(K)	IC (POWER MODULE/488-512MHz)	K2,NK2
IC14	2C		S-AU27AL(K)	IC (POWER MODULE/400-430MHz)	K3,NK3
IC14	2C		S-AU27AM(K)	IC (POWER MODULE/450-490MHz)	K,NK
TX-RX UNIT (X57-5320-XX)					
-10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3					
C1,2			CK73GB1H471K	CHIP C 470PF K	
C3			CK73GB1H102K	CHIP C 1000PF K	
C4-10			CK73GB1H471K	CHIP C 470PF K	
C11			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C12-16			CK73GB1H471K	CHIP C 470PF K	
C17			CE04EW1E471M	ELEC1HO 470UF 25WV	
C18			CK73GB1H102K	CHIP C 1000PF K	
C19			CK73GB1H471K	CHIP C 470PF K	
C20			CK73GB1H102K	CHIP C 1000PF K	
C21			CK73GB1H471K	CHIP C 470PF K	
C22			CC73GCH1H020C	CHIP C 2.0PF C	K2,NK2
C22			CC73GCH1H060D	CHIP C 6.0PF D	K,NK
C22			CC73GCH1H100D	CHIP C 10PF D	K3,NK3
C23			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C24			C92-0036-05	CHIP-ELE 4.7UF 16WV	
C25			CK73GB1H471K	CHIP C 470PF K	
C26			CK73GB1H103K	CHIP C 0.010UF K	
C27			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C28			CK73GB1H471K	CHIP C 470PF K	
C30			CK73FB1E104K	CHIP C 0.10UF K	
C31			CK73GB1C104K	CHIP C 0.10UF K	
C32			CK73GB1H472K	CHIP C 4700PF K	
C33			CK73GB1H103K	CHIP C 0.010UF K	
C34			CK73GB1H102K	CHIP C 1000PF K	
C35			CK73GB1C104K	CHIP C 0.10UF K	
C36			CK73GB1H471K	CHIP C 470PF K	
C37			CK73GB1H103K	CHIP C 0.010UF K	
C38			CK73GB1H471K	CHIP C 470PF K	
C39			CK73GB1C104K	CHIP C 0.10UF K	
C40			CK73GB1H471K	CHIP C 470PF K	
C41			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C42			C92-0543-05	CHIP-TAN 3.3UF 10WV	
C43,44			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C45			CK73GB1H471K	CHIP C 470PF K	
C46			CK73GB1H102K	CHIP C 1000PF K	
C47			CK73FF1C105Z	CHIP C 1.0UF Z	
C48			CK73FB1E104K	CHIP C 0.10UF K	
C49			CK73GB1H682K	CHIP C 6800PF K	
C50			CK73FB1E104K	CHIP C 0.10UF K	

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

TK-840/(N)

PARTS LSIT

TX-RX UNIT (X57-5320-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C51			CK73GB1H102K	CHIP C	1000PF	K	
C52			CK73GB1H682K	CHIP C	6800PF	K	
C53			C92-0543-05	CHIP-TAN	3.3UF	10WV	
C54			CC73GCH1H150J	CHIP C	15PF	J	
C55			CC73GCH1H220J	CHIP C	22PF	J	
C56			CK73GB1H682K	CHIP C	6800PF	K	
C57			CC73GCH1H180J	CHIP C	18PF	J	
C58			CK73GB1H103K	CHIP C	0.010UF	K	
C59			CC73GCH1H220J	CHIP C	22PF	J	K,K2,K3
C60			CC73GCH1H220J	CHIP C	22PF	J	
C61			C92-0041-05	CHIP-ELE	10UF	10WV	
C62			CK73GB1H103K	CHIP C	0.010UF	K	
C63			CK73GB1H102K	CHIP C	1000PF	K	
C64			CK73GB1H103K	CHIP C	0.010UF	K	
C65			CK73GB1H471K	CHIP C	470PF	K	
C66			CK73GB1H102K	CHIP C	1000PF	K	
C67			C92-0546-05	CHIP-TAN	68UF	6.3WV	
C68,69			CK73GB1H103K	CHIP C	0.010UF	K	
C70			CK73GB1H102K	CHIP C	1000PF	K	
C71			C92-0044-05	CHIP-ELE	47UF	10WV	
C72,73			CK73GB1H471K	CHIP C	470PF	K	
C74			C92-0044-05	CHIP-ELE	47UF	10WV	
C75			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C76,77			CK73GB1H103K	CHIP C	0.010UF	K	
C78			CK73FB1E104K	CHIP C	0.10UF	K	
C79			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C80			CK73GB1C104K	CHIP C	0.10UF	K	
C81			C92-0040-05	CHIP-ELE	47UF	16WV	
C82			CK73GB1H103K	CHIP C	0.010UF	K	
C83			CC73GCH1H030C	CHIP C	3.0PF	C	
C84,85			CK73GB1H102K	CHIP C	1000PF	K	
C86			CK73GB1H471K	CHIP C	470PF	K	
C87			CK73GB1H102K	CHIP C	1000PF	K	
C88			CC73GCH1H080D	CHIP C	8.0PF	D	K,K2,K3
C88			CC73GCH1H220J	CHIP C	22PF	J	NK,NK2
C88			CC73GCH1H220J	CHIP C	22PF	J	NK3
C89			CC73GCH1H110J	CHIP C	11PF	J	K,NK
C89			CK73GB1H102K	CHIP C	1000PF	K	K2,K3
C89			CK73GB1H102K	CHIP C	1000PF	K	NK2,NK3
C90			CC73GCH1H040C	CHIP C	4.0PF	C	
C91			CK73GB1H471K	CHIP C	470PF	K	
C92			CK73GB1H102K	CHIP C	1000PF	K	
C93			CK73FF1C105Z	CHIP C	1.0UF	Z	
C94,95			CK73GB1H471K	CHIP C	470PF	K	
C96			CK73GB1H103K	CHIP C	0.010UF	K	
C97			C92-0044-05	CHIP-ELE	47UF	10WV	
C98			CK73GB1H102K	CHIP C	1000PF	K	
C99			C92-0044-05	CHIP-ELE	47UF	10WV	
C100			CC73GCH1H050C	CHIP C	5.0PF	C	K3,NK3
C100			CC73GCH1H150J	CHIP C	15PF	J	K,K2
C100			CC73GCH1H150J	CHIP C	15PF	J	NK,NK2
C101			CK73GB1H102K	CHIP C	1000PF	K	
C102			CK73GB1H103K	CHIP C	0.010UF	K	
C103			CC73GCH1H150J	CHIP C	15PF	J	
C104,105			CK73GB1H471K	CHIP C	470PF	K	
C106			CC73GCH1H050C	CHIP C	5.0PF	C	K3,NK3
C106			CC73GCH1H150J	CHIP C	15PF	J	K,K2,NK
C106			CC73GCH1H150J	CHIP C	15PF	J	NK2
C107			CK73GB1H471K	CHIP C	470PF	K	
C108			C92-0040-05	CHIP-ELE	47UF	16WV	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C109			CK73GB1H103K	CHIP C	0.010UF	K	
C110			CE04EW1A471M	ELECTRO	470UF	10WV	
C111			CQ92M1H104K	MYLAR	0.10UF	K	
C112			CC73GCH1H020C	CHIP C	2.0PF	C	K3,NK3
C112			CC73GCH1H030C	CHIP C	3.0PF	C	K,NK
C112			CC73GCH1H050C	CHIP C	5.0PF	C	K2,NK2
C113			CK73GB1H102K	CHIP C	1000PF	K	
C114			CC73GCH1H020C	CHIP C	2.0PF	C	K3,NK3
C115			CC73GCH1H100D	CHIP C	10PF	D	K3,NK3
C115			CC73GCH1H110J	CHIP C	11PF	J	K,NK
C115			CK73GB1H102K	CHIP C	1000PF	K	K2,NK2
C117			CC73GCH1H120J	CHIP C	12PF	J	K,NK
C117			CC73GCH1H080J	CHIP C	8.0PF	J	K3,NK3
C117			CK73GB1H102K	CHIP C	1000PF	K	K2,NK2
C118			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C119			CK73GB1H102K	CHIP C	1000PF	K	
C120			CK73GB1H471K	CHIP C	470PF	K	
C121			CK73GB1H102K	CHIP C	1000PF	K	
C122			CC73GCH1H060D	CHIP C	6.0PF	D	K,NK
C122			CC73GCH1H100D	CHIP C	10PF	D	K3,NK3
C123			CK73GB1H102K	CHIP C	1000PF	K	
C124			CK73GB1H471K	CHIP C	470PF	K	
C125			C92-0040-05	CHIP-ELE	47UF	16WV	
C126			CK73GB1H471K	CHIP C	470PF	K	
C127			CK73FB1H473K	CHIP C	0.047UF	K	
C128			CK73GB1H102K	CHIP C	1000PF	K	
C129			CK73GB1H471K	CHIP C	470PF	K	
C130			C92-0040-05	CHIP-ELE	47UF	16WV	
C131,132			CC73GCH1H050C	CHIP C	5.0PF	C	K3,NK3
C131,132			CC73GCH1H150J	CHIP C	15PF	J	K,K2,NK
C131,132			CC73GCH1H150J	CHIP C	15PF	J	NK2
C133			CK73GB1H102K	CHIP C	1000PF	K	
C134			CK73GB1H471K	CHIP C	470PF	K	
C135			CC73GCH1H100D	CHIP C	10PF	D	K2,NK2
C135			CC73GCH1H110J	CHIP C	11PF	J	K,NK
C135			CK73GB1H102K	CHIP C	1000PF	K	K3,NK3
C136			CK73GB1H471K	CHIP C	470PF	K	
C137			C92-0040-05	CHIP-ELE	47UF	16WV	
C138,139			CK73GB1H102K	CHIP C	1000PF	K	
C140			CC73GCH1H020C	CHIP C	2.0PF	C	K2,NK2
C140			CC73GCH1H060D	CHIP C	6.0PF	D	K,NK
C141			CK73GB1H471K	CHIP C	470PF	K	
C142			CK73GB1H102K	CHIP C	1000PF	K	
C143			CK73FB1E104K	CHIP C	0.10UF	K	
C144			CK73GB1H471K	CHIP C	470PF	K	
C145			CC73GCH1H030C	CHIP C	3.0PF	C	K3,NK3
C145			CC73GCH1H110J	CHIP C	11PF	J	K,NK
C145			CK73GB1H102K	CHIP C	1000PF	K	K2,NK2
C146			CK73GB1H102K	CHIP C	1000PF	K	
C147			CK73GB1H471K	CHIP C	470PF	K	
C148			CK73GB1H102K	CHIP C	1000PF	K	
C149			CK73GB1H471K	CHIP C	470PF	K	
C150			CC73FCH1H080D	CHIP C	8.0PF	D	K,NK
C150			CC73FCH1H060D	CHIP C	6.0PF	D	K2,NK2
C150			CC73FCH1H100D	CHIP C	10PF	D	K3,NK3
C151			CK73GB1H471K	CHIP C	470PF	K	
C152			C93-0550-05	CHIP C	1.0PF	C	K2,NK2
C152			C93-0552-05	CHIP C	2.0PF	C	K,NK
C152			C93-0554-05	CHIP C	4.0PF	C	K3,NK3
C153			CK73EB1H471K	CHIP C	470PF	K	

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

PARTS LIST

TX-RX UNIT (X57-5320-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C154			CK73EB1H102K	CHIP C	1000PF	K	
C156,157			C93-0550-05	CHIP C	1.0PF	C	K,K3,NK
C156,157			C93-0550-05	CHIP C	1.0PF	C	NK3
C157			C93-0553-05	CHIP C	3.0PF	C	K2,NK2
C158			CK73GB1H471K	CHIP C	470PF	K	
C159			C93-0603-05	CHIP C	1000PF	K	
C160			CC73GCH1H101J	CHIP C	100PF	J	
C161			C93-0555-05	CHIP C	5.0PF	C	K2,NK2
C161			C93-0561-05	CHIP C	12PF	J	K3,NK3
C161,162			C93-0557-05	CHIP C	7.0PF	D	K,NK
C162			C93-0558-05	CHIP C	8.0PF	D	K2,NK2
C162			C93-0559-05	CHIP C	9.0PF	D	K3,NK3
C163			CC73GCH1H030C	CHIP C	3.0PF	C	
C164			C93-0554-05	CHIP C	4.0PF	C	K3,NK3
C164			C93-0555-05	CHIP C	5.0PF	C	K,NK
C164			C93-0556-05	CHIP C	6.0PF	D	K2,NK2
C165			CC73GCH1H060D	CHIP C	6.0PF	D	K,NK
C165			CC73GCH1H100D	CHIP C	10PF	D	K3,NK3
C166			CC73GCH1H010C	CHIP C	1.0PF	C	K,NK
C166			CC73GCH1H020C	CHIP C	2.0PF	C	K2,NK2
C166			CC73GCH1H040C	CHIP C	4.0PF	C	K3,NK3
C167			CK73GB1H471K	CHIP C	470PF	K	
C168			CC73GCH1H220J	CHIP C	22PF	J	
C169			CC73GCH1H040C	CHIP C	4.0PF	C	K,NK
C169			CC73GCH1H060D	CHIP C	6.0PF	D	K3,NK3
C170			CC73GCH1H110J	CHIP C	11PF	J	K2,NK2
C170			CK73GB1H102K	CHIP C	1000PF	K	K,K3,NK
C170			CK73GB1H102K	CHIP C	1000PF	K	NK3
C171			CC73GCH1H060D	CHIP C	6.0PF	D	K2,NK2
C172			CC73GCH1H040C	CHIP C	4.0PF	C	K2,NK2
C172			CC73GCH1H060D	CHIP C	6.0PF	D	K3,NK3
C172			CC73GCH1H050C	CHIP C	5.0PF	C	K,NK
C173			CC73GCH1H150J	CHIP C	15PF	J	K2,NK2
C173			CC73GCH1H180J	CHIP C	18PF	J	K,NK
C173			CC73GCH1H220J	CHIP C	22PF	J	K3,NK3
C174			CC73GCH1H060D	CHIP C	6.0PF	D	K,K2,NK
C174			CC73GCH1H060D	CHIP C	6.0PF	D	NK2
C174			CC73GCH1H080D	CHIP C	8.0PF	D	K3,NK3
C175-178			CK73GB1H471K	CHIP C	470PF	K	
C179			CC73GCH1H080D	CHIP C	8.0PF	D	
C180,181			CK73GB1H471K	CHIP C	470PF	K	
C182			CC73FCH1H390J	CHIP C	39PF	J	
C183-185			CK73GB1H471K	CHIP C	470PF	K	
C186			CK73FB1E104K	CHIP C	0.10UF	K	
C187,188			CK73GB1H102K	CHIP C	1000PF	K	K,K2,NK
C187,188			CK73GB1H102K	CHIP C	1000PF	K	NK2
C187,188			CK73GB1H471K	CHIP C	470PF	K	K3,NK3
C189			CC73GCH1H101J	CHIP C	100PF	J	K2,NK2
C190			CK73GB1H471K	CHIP C	470PF	K	
C191			CC73GCH1H060D	CHIP C	6.0PF	D	
C211-213			CK73GB1H471K	CHIP C	470PF	K	
C220-222			CK73GB1H471K	CHIP C	470PF	K	
C224			CK73GB1H471K	CHIP C	470PF	K	
C225			C92-0009-05	CHIP-TAN	4.7UF	10WV	
C226			CK73GB1H103K	CHIP C	0.010UF	K	
C227,228			CK73GB1H471K	CHIP C	470PF	K	
C229,230			CK73GB1H103K	CHIP C	0.010UF	K	
C231			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C232,233			CK73FB1E273K	CHIP C	0.027UF	K	
C234			CK73GB1E223K	CHIP C	0.022UF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C235			CC73GCH1H101J	CHIP C	100PF	J	K,K2,K3
C235			CC73GCH1H470J	CHIP C	47PF	J	NK,NK2
C235			CC73GCH1H470J	CHIP C	47PF	J	NK3
C236			CK73GB1H471K	CHIP C	470PF	K	
C237			CK73FB1E273K	CHIP C	0.027UF	K	
C238			CK73GB1H222K	CHIP C	2200PF	K	
C239			CK73GB1E223K	CHIP C	0.022UF	K	
C240			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C241			CC73GCH1H470J	CHIP C	47PF	J	
C242			CK73GB1H471K	CHIP C	470PF	K	
C243			CK73GB1H103K	CHIP C	0.01UF	K	
C244			CK73GB1E223K	CHIP C	0.022UF	K	
C245			CC73GCH1H100D	CHIP C	10PF	D	
C246			CK73GB1E223K	CHIP C	0.022UF	K	
C247			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C248			CK73GB1E223K	CHIP C	0.022UF	K	
C249,250			CK73GB1H102K	CHIP C	1000PF	K	
C251			CK73GB1H471K	CHIP C	470PF	K	
C252			CK73GB1H122K	CHIP C	1200PF	K	
C253			CC73FCH1H750J	CHIP C	75PF	J	
C254			CC73GCH1H181J	CHIP C	180PF	J	
C255			C92-0041-05	CHIP-ELE	10UF	10WV	
C256			CK73GB1H332K	CHIP C	3300PF	K	
C257			CK73GB1H472K	CHIP C	4700PF	K	
C259			CK73GB1H102K	CHIP C	1000PF	K	
C260			CK73GB1H103K	CHIP C	0.010UF	K	
C263			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C264			CC73GCH1H101J	CHIP C	100PF	J	
C265			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C266			CC73GCH1H470J	CHIP C	47PF	J	
CN1			E40-5737-05	PIN CONNECTOR ASSY (8P)			
CN2,3			E40-5738-05	PIN CONNECTOR ASSY (3P)			
CN4			E40-3247-05	PIN CONNECTOR ASSY (3P)			
CN5			E40-3246-05	PIN CONNECTOR ASSY (2P)			
CN6			E40-5733-05	FLAT CABLE CONNECTOR (24P)			
CN201			E40-5733-05	FLAT CABLE CONNECTOR (24P)			
CN203			E40-5585-05	PIN ASSY SCCKET (9P)			
CN205			E40-5710-05	FLAT CABLE CONNECTOR (9P)			
J1			E11-0408-05	PHONE JACK			
J201			E58-0426-05	MODULAR JACK			
F1			F53-0108-05	FUSE (1.8A)			
-			J30-0545-05	SPACER			
CD1			L79-1013-05	DISCRI COIL	455kHz		
CF1			L72-0372-05	CERAMIC FILTER	455kHz		K,K2,K3
CF1			L72-0376-05	CERAMIC FILTER	455kHz		NK,NK2
CF1			L72-0376-05	CERAMIC FILTER	455kHz		NK3
L1			L40-1092-34	SMALL FIXED INDUCTOR (1UH)			
L2			L40-1005-34	SMALL FIXED INDUCTOR (10UH)			
L3			L40-1871-36	SMALL FIXED INDUCTOR (18nH)			K2,NK2
L3			L40-3371-36	SMALL FIXED INDUCTOR (33nH)			K,K3,NK
L3			L40-3371-36	SMALL FIXED INDUCTOR (33nH)			NK3
L4			L40-3981-37	SMALL FIXED INDUCTOR (0.39UH)			
L5			L40-3381-37	SMALL FIXED INDUCTOR (0.33UH)			
L6			L40-2271-36	SMALL FIXED INDUCTOR (22nH)			K2,NK2
L6			L40-2771-36	SMALL FIXED INDUCTOR (27nH)			K,K3,NK
L6			L40-2771-36	SMALL FIXED INDUCTOR (27nH)			NK3
L7			L40-1071-35	SMALL FIXED INDUCTOR (10nH)			K,K2,NK
L7			L40-1071-35	SMALL FIXED INDUCTOR (10nH)			NK2

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

PARTS LSIT

TX-RX UNIT (X57-5320-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
L7			L40-1571-35	SMALL FIXED INDUCTOR (15nH)	K3,NK3
L8			L79-1152-05	HELICAL BLOCK 450-488MHz	K,NK
L8			L79-1163-05	HELICAL BLOCK 403-430MHz	K3,NK3
L8			L79-1169-05	HELICAL BLOCK 488-512MHz	K2,NK2
L10			L79-1162-05	HELICAL BLOCK 450-488MHz	K,NK
L10			L79-1163-05	HELICAL BLOCK 403-430MHz	K3,NK3
L10			L79-1169-05	HELICAL BLOCK 488-512MHz	K2,NK2
L11			L40-2771-35	SMALL FIXED INDUCTOR (27nH)	K3,NK3
L11			L40-3371-35	SMALL FIXED INDUCTOR (33nH)	K2,NK2
L11			L40-4771-35	SMALL FIXED INDUCTOR (47nH)	K,NK
L12			L40-1571-35	SMALL FIXED INDUCTOR (15nH)	K,NK
L12			L40-2771-35	SMALL FIXED INDUCTOR (27nH)	K2,NK2
L12			L40-4771-35	SMALL FIXED INDUCTOR (47nH)	K3,NK3
L13			L40-2271-35	SMALL FIXED INDUCTOR (22nH)	K,NK
L13			L40-2771-35	SMALL FIXED INDUCTOR (27nH)	K3,NK3
L13			L40-4771-35	SMALL FIXED INDUCTOR (47nH)	K2,NK2
L14			L40-6871-35	SMALL FIXED INDUCTOR (68nH)	K,K2,NK
L14			L40-6871-35	SMALL FIXED INDUCTOR (68nH)	NK2
L14			L40-8271-35	SMALL FIXED INDUCTOR (82nH)	K3,NK3
L17			L33-1267-05	SMALL FIXED INDUCTOR (27nH)	K2,NK2
L18			L33-0750-05	SMALL FIXED INDUCTOR (17nH)	K2,K3,NK2
L18			L33-0750-05	SMALL FIXED INDUCTOR (17nH)	NK3
L18			L33-1266-05	SMALL FIXED INDUCTOR (14.7nH)	K,NK
L19			L34-1039-05	AIR-CORE COIL (1.5T)	
L20			L34-1113-05	AIR-CORE COIL (1.5T)	
L21			L34-0908-05	AIR-CORE COIL (9.5T)	
L22,23			L34-1039-05	AIR-CORE COIL (1.5T)	
L24			L34-0908-05	AIR-CORE COIL (9.5T)	
L25			L40-1575-34	SMALL FIXED INDUCTOR (15nH)	
L26			L40-2775-34	SMALL FIXED INDUCTOR (27nH)	
L27			L40-1575-34	SMALL FIXED INDUCTOR (15nH)	
L28			L40-1871-36	SMALL FIXED INDUCTOR (18nH)	
L29			L33-0745-05	SMALL FIXED INDUCTOR (33nH)	K,K3,NK
L29			L33-0745-05	SMALL FIXED INDUCTOR (33nH)	NK3
X1			L77-1553-15	VCXO 12.8MHz	NK,NK2
X1			L77-1563-15	VCXO 12.8MHz	NK3
X1			L77-1583-15	TCXO 12.8MHz	K,K2,K3
X2			L77-1595-05	CRYSTAL RESONATOR 44.595MHz	
X201			L78-0308-05	RESONATOR 12.0MHz	
XF1			L71-0409-15	MCF 45.050MHz	K,K2,K3
XF1			L71-0461-05	CRYSTAL FILTER 45.050MHz	NK,NK2
XF1			L71-0461-05	CRYSTAL FILTER 45.050MHz	NK3
R1			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R2			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R3			RK73GB1J103J	CHIP R 10K J 1/16W	
R4			R92-1252-05	CHIP R 0 OHM	
R5,6			R92-0670-05	CHIP R 0 OHM	
R7-12			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R13			R92-1252-05	CHIP R 0 OHM	
R14			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R15			R92-1252-05	CHIP R 0 OHM	
R16			RK73GB1J103J	CHIP R 10K J 1/16W	
R17			RK73GB1J104J	CHIP R 100K J 1/16W	
R18			RK73GB1J123J	CHIP R 12K J 1/16W	
R19			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R20			R92-2540-05	CHIP R 3.9 J 1/4W	
R21			RK73GB1J153J	CHIP R 15K J 1/16W	
R22			RK73GB1J104J	CHIP R 100K J 1/16W	
R23			R92-1215-05	CHIP R 470 J 1/2W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R24			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R25			RK73GB1J473J	CHIP R 47K J 1/16W	
R26			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R27			RK73GB1J224J	CHIP R 220K J 1/16W	K,K2,K3
R27			RK73GB1J474J	CHIP R 470K J 1/16W	NK,NK2
R27			RK73GB1J474J	CHIP R 470K J 1/16W	NK3
R28			RK73GB1J104J	CHIP R 100K J 1/16W	
R29			RK73GB1J223J	CHIP R 22K J 1/16W	
R30			RK73GB1J104J	CHIP R 100K J 1/16W	
R31			RK73GB1J223J	CHIP R 22K J 1/16W	
R32			RK73GB1J183J	CHIP R 18K J 1/16W	
R33			R92-2540-05	CHIP R 3.9 J 1/4W	
R34-36			RK73GB1J473J	CHIP R 47K J 1/16W	
R37			RK73GB1J103J	CHIP R 10K J 1/16W	
R38			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R39			RK73GB1J224J	CHIP R 220K J 1/16W	
R40			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R41,42			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R44			RK73GB1J220J	CHIP R 22 J 1/16W	
R45			RK73GB1J273J	CHIP R 27K J 1/16W	
R46			RK73GB1J473J	CHIP R 47K J 1/16W	
R47			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R48			RK73GB1J563J	CHIP R 56K J 1/16W	
R49			RK73GB1J104J	CHIP R 100K J 1/16W	
R50			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R51			RK73GB1J104J	CHIP R 100K J 1/16W	
R52			RK73GB1J220J	CHIP R 22 J 1/16W	
R53			RK73GB1J224J	CHIP R 220K J 1/16W	
R54			RK73GB1J824J	CHIP R 820K J 1/16W	
R55,56			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R57			RK73GB1J104J	CHIP R 100K J 1/16W	
R58			RK73GB1J824J	CHIP R 820K J 1/16W	
R59			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R60,61			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R62			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R63			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R64			RK73GB1J471J	CHIP R 470 J 1/16W	
R65			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R66			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R67			RK73GB1J103J	CHIP R 10K J 1/16W	
R68			RK73GB1J471J	CHIP R 470 J 1/16W	
R69			RK73GB1J104J	CHIP R 100K J 1/16W	
R70			RK73GB1J223J	CHIP R 22K J 1/16W	
R71			RK73GB1J684J	CHIP R 680K J 1/16W	
R72			RK73GB1J103J	CHIP R 10K J 1/16W	
R73			RK73GB1J101J	CHIP R 100 J 1/16W	
R74			RK73GB1J681J	CHIP R 680 J 1/16W	K,K2,K3
R74			RK73GB1J271J	CHIP R 270 J 1/16W	NK,NK2
R74			RK73GB1J271J	CHIP R 270 J 1/16W	NK3
R75			RK73GB1J103J	CHIP R 10K J 1/16W	
R76			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R77			RK73GB1J101J	CHIP R 100 J 1/16W	
R78			RK73GB1J473J	CHIP R 47K J 1/16W	
R79			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R81			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R82			RK73GB1J331J	CHIP R 330 J 1/16W	K,K2,K3
R82			RK73GB1J271J	CHIP R 270 J 1/16W	NK,NK2
R82			RK73GB1J271J	CHIP R 270 J 1/16W	NK3
R83			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R84			RK73GB1J101J	CHIP R 100 J 1/16W	

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

PARTS LIST

TX-RX UNIT (X57-5320-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
R85			RK73GB1J681J	CHIP R	680 J	1/16W	
R86			RK73GB1J102J	CHIP R	1.0K J	1/16W	
R87			RK73FB2A471J	CHIP R	470 J	1/10W	
R88			RK73FB2A2R2J	CHIP R	2.2 J	1/10W	
R89			RK73FB2A221J	CHIP R	220 J	1/10W	
R90			RK73GB1J101J	CHIP R	100 J	1/16W	K,NK
R90			RK73GB1J471J	CHIP R	470 J	1/16W	K2,K3
R90			RK73GB1J471J	CHIP R	470 J	1/16W	NK2,NK3
R91			RK73FB2A100J	CHIP R	10 J	1/10W	
R92			RK73GB1J472J	CHIP R	4.7K J	1/16W	
R93			RK73FB2A102J	CHIP R	1.0K J	1/10W	
R94			R92-0685-05	CHIP R	22 J	1/2W	
R95			RK73FB2A222J	CHIP R	2.2K J	1/10W	
R96			RK73FB2A331J	CHIP R	330 J	1/10W	
R97			RK73FB2A152J	CHIP R	1.5K J	1/10W	
R98			RK73FB2A681J	CHIP R	680 J	1/10W	
R99			RK73FB2A470J	CHIP R	47 J	1/10W	
R100			RK73GB1J104J	CHIP R	100K J	1/16W	
R101			RK73FB2A470J	CHIP R	47 J	1/10W	
R102			RK73FB2B181J	CHIP R	180 J	1/8W	
R103			RK73EB2B151J	CHIP R	150 J	1/8W	
R104			RK73FB2A183J	CHIP R	18K J	1/10W	K3,NK3
R104			RK73FB2A223J	CHIP R	22K J	1/10W	K,K2,NK
R104			RK73FB2A223J	CHIP R	22K J	1/10W	NK2
R105			RK73GB1J104J	CHIP R	100K J	1/16W	
R106			RK73FB2A154J	CHIP R	150K J	1/10W	
R107			RK73FB2A473J	CHIP R	47K J	1/10W	
R108-110			R92-1203-05	CHIP R	0.22 J	1/2W	
R111			RK73GB1J104J	CHIP R	100K J	1/16W	
R112			RK73FB2A472J	CHIP R	4.7K J	1/10W	
R113			RK73FB2A272J	CHIP R	2.7K J	1/10W	
R114			RK73GB1J104J	CHIP R	100K J	1/16W	
R115,116			RK73FB2A472J	CHIP R	4.7K J	1/10W	
R117			R92-1268-05	RN	4.7K B	1/8W	
R118			R92-2538-05	RN	3.9K B	1/8W	
R119			R92-1261-05	CHIP R	150 J	1/2W	
R120			RK73GB1J101J	CHIP R	100 J	1/16W	
R121			RK73GB1J151J	CHIP R	150 J	1/16W	K,NK
R121			RK73GB1J101J	CHIP R	100 J	1/16W	K2,NK2
R121			RK73GB1J271J	CHIP R	270 J	1/16W	K3,NK3
R122			RK73GB1J683J	CHIP R	68K J	1/16W	
R123			RK73GB1J103J	CHIP R	10K J	1/16W	
R124			RK73GB1J271J	CHIP R	270 J	1/16W	
R125			RK73GB1J180J	CHIP R	18 J	1/16W	
R126			RK73GB1J271J	CHIP R	270 J	1/16W	
R127			RK73GB1J682J	CHIP R	6.8K J	1/16W	
R128			RK73GB1J103J	CHIP R	10K J	1/16W	
R129			RK73GB1J101J	CHIP R	100 J	1/16W	
R130			RK73GB1J470J	CHIP R	47 J	1/16W	
R131			RK73GB1J222J	CHIP R	2.2K J	1/16W	
R132			RK73GB1J102J	CHIP R	1.0K J	1/16W	
R133,134			R92-1203-05	CHIP R	0.22 J	1/2W	
R135			RK73GB1J223J	CHIP R	22K J	1/16W	
R136			R92-1252-05	CHIP R	0 OHM		K3,NK3
R137			RK73GB1J104J	CHIP R	100K J	1/16W	
R138			R92-0679-05	CHIP R	0 OHM		
R139			R92-1252-05	CHIP R	0 OHM		K,K2,NK
R139			R92-1252-05	CHIP R	0 OHM		NK2
R140,141			RK73FB2A821J	CHIP R	820 J	1/10W	
R142,143			RK73FB2A100J	CHIP R	10 J	1/10W	

Ref. No.	Address	New parts	Parts No.	Description			Destination
R144			RK73GB1J333J	CHIP R	33K J	1/16W	
R145			R92-1252-05	CHIP R	0 OHM		
R146			RK73FB2A100J	CHIP R	10 J	1/10W	
R147			RK73GB1J474J	CHIP R	470K J	1/16W	
R148			RK73GB1J103J	CHIP R	10K J	1/16W	NK,NK2
R148			RK73GB1J103J	CHIP R	10K J	1/16W	NK3
R149,150			R92-0670-05	CHIP R	0 OHM		
R155,156			RK73GB1J473J	CHIP R	47K J	1/16W	
R157,158			RK73GB1J104J	CHIP R	100K J	1/16W	
R206,207			RK73GB1J102J	CHIP R	1.0K J	1/16W	
R209			RK73GB1J102J	CHIP R	1.0K J	1/16W	
R211,212			RK73GB1J102J	CHIP R	1.0K J	1/16W	
R213			RK73GB1J681J	CHIP R	680 J	1/16W	
R214,215			RK73GB1J102J	CHIP R	1.0K J	1/16W	
R216			RK73GB1J473J	CHIP R	47K J	1/16W	
R217			RK73GB1J563J	CHIP R	56K J	1/16W	
R219			RK73GB1J153J	CHIP R	15K J	1/16W	
R220			RK73GB1J563J	CHIP R	56K J	1/16W	
R221			RK73GB1J183J	CHIP R	18K J	1/16W	
R222			RK73GB1J103J	CHIP R	10K J	1/16W	
R223			RK73GB1J223J	CHIP R	22K J	1/16W	
R224			RK73GB1J224J	CHIP R	220K J	1/16W	
R225			RK73GB1J274J	CHIP R	270K J	1/16W	
R226			RK73GB1J224J	CHIP R	220K J	1/16W	
R227			RK73GB1J223J	CHIP R	22K J	1/16W	
R228			RK73GB1J473J	CHIP R	47K J	1/16W	
R229			RK73GB1J684J	CHIP R	680K J	1/16W	
R230			RK73GB1J223J	CHIP R	22K J	1/16W	
R231			R92-1252-05	CHIP R	0 OHM		
R232			RK73GB1J473J	CHIP R	47K J	1/16W	
R233			RK73GB1J824J	CHIP R	820K J	1/16W	
R234,235			RK73GB1J124J	CHIP R	120K J	1/16W	
R236			RK73GB1J154J	CHIP R	150K J	1/16W	
R237			RK73GB1J473J	CHIP R	47K J	1/16W	
R238			RK73GB1J561J	CHIP R	560 J	1/16W	
R239-241			RK73GB1J473J	CHIP R	47K J	1/16W	
R242			RK73GB1J153J	CHIP R	15K J	1/16W	
R243			RK73GB1J273J	CHIP R	27K J	1/16W	
R244			RK73GB1J473J	CHIP R	47K J	1/16W	
R245			RK73GB1J104J	CHIP R	100K J	1/16W	
R246,247			RK73GB1J103J	CHIP R	10K J	1/16W	
R248,249			RK73GB1J473J	CHIP R	47K J	1/16W	
R250			RK73GB1J223J	CHIP R	22K J	1/16W	
R251			RK73GB1J473J	CHIP R	47K J	1/16W	
R254			RK73GB1J823J	CHIP R	82K J	1/16W	
R255,256			RK73GB1J473J	CHIP R	47K J	1/16W	
R257			RK73GB1J823J	CHIP R	82K J	1/16W	
R258-260			RK73GB1J473J	CHIP R	47K J	1/16W	
R262,263			RK73GB1J473J	CHIP R	47K J	1/16W	
R265,266			RK73GB1J473J	CHIP R	47K J	1/16W	
R267,268			RK73GB1J683J	CHIP R	68K J	1/16W	
R269			RK73GB1J223J	CHIP R	22K J	1/16W	
R270,271			RK73GB1J473J	CHIP R	47K J	1/16W	
R272			RK73GB1J103J	CHIP R	10K J	1/16W	
R273,274			RK73GB1J473J	CHIP R	47K J	1/16W	
R275			RK73GB1J103J	CHIP R	10K J	1/16W	
R277			RK73GB1J473J	CHIP R	47K J	1/16W	K2,NK2
R277			R92-1252-05	CHIP R	0 OHM		K3,NK3
R278			RK73GB1J223J	CHIP R	22K J	1/16W	
R281			RK73GB1J473J	CHIP R	47K J	1/16W	

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

TK-840/(N)

PARTS LSIT

TX-RX UNIT (X57-5320-XX)
PLL/VCO (X58-4480-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R283,284			RK73GB1J473J	CHIP R 47K J 1/16W	
R285			RK73FB2A100J	CHIP R 10 J 1/10W	
R286			RK73GB1J683J	CHIP R 68K J 1/16W	
R287			RK73GB1J823J	CHIP R 82K J 1/16W	
R288			RK73GB1J821J	CHIP R 820 J 1/16W	
R289			RK73GB1J104J	CHIP R 100K J 1/16W	
R290			RK73GB1J224J	CHIP R 220K J 1/16W	
R291			R92-1252-05	CHIP R 0 OHM	
R293			RK73GB1J473J	CHIP R 47K J 1/16W	
R294			RK73GB1J393J	CHIP R 39K J 1/16W	
R295			RK73GB1J223J	CHIP R 22K J 1/16W	
R296			RK73GB1J333J	CHIP R 33K J 1/16W	
R297			RK73GB1J223J	CHIP R 22K J 1/16W	
R299			R92-0670-05	CHIP R 0 OHM	
VR201			R12-6423-05	TRIM POT. 10K	
D1			02CZ18(X,Y)	ZENER DIODE	
D2			DSA3A1-FK	SURGE ABSORBER	
D3			1SS301	DIODE	
D4			02CZ15(X,Y)	ZENER DIODE	
D5			1SS301	DIODE	
D6-8			MA377	DIODE	
D9-15			DA204K	DIODE	
D16			02CZ20(Y,Z)	ZENER DIODE	
D17			DAN235K	DIODE	
D18			DA204K	DIODE	
D19			HSM88AS	DIODE	
D20			MA4PH633	DIODE	
D21			MI809	DIODE	
D22			1SS355	DIODE	
D23			MA377	DIODE	
D24			MI809	DIODE	
D25			MI809	DIODE	K2,NK2
D201,202			DA204K	DIODE	
D203			1SS301	DIODE	
IC1			BU4013BF	IC (D TYPE FLIP FLOP X2)	
IC2			MC33172D	IC (OP AMP X2)	
IC3			NJM78L05UA	IC (VOLTAGE REGULATOR/ +5V)	
IC4			UPC7808H	IC (VOLTAGE REGULATOR/ +8V)	
IC5			NJM4558E	IC (OP AMP X2)	
IC6			M62363FP	IC (8bit D/A CONVERTER)	
IC7			MC3372SV	IC (FM IF)	
IC8			NJM2904E	IC (OP AMP X2)	
IC9			NJM4558E	IC (OP AMP X2)	
IC10			BU4094BCF	IC (8-STAGE SHIFT/STORE REGISTE	
IC10			XBU4094BCF	IC (SHIFT/STORE REGISTER)	
IC11			LA4422	IC (AF POWER AMP/ 5.8W)	
IC13			NJM2904M	IC (OP AMP X2)	
IC201			AT2402N10SI2.7	IC (2kbit SERIAL EEPROMM)	
IC202			NJM78L05UA	IC (VOLTAGE REGULATOR/ +5V)	
IC203			HD74HC373FP	IC (D-TYPE TRANSPARENT LATCES)	
IC204,205			NJM4558E	IC (OP AMP X2)	
IC206			S-8054ALB-LM	IC (VOLTAGE DETECTOR)	
IC207			AT29C256-20TI	IC (256kbit PEROM)	
IC208			TC7S32F	IC (2CH NAND GATE)	
IC209			78312AGF3563BE	IC (16/8bit MICROPROCESSOR)	
IC210			TC7S04F	IC (2CH NAND GATE)	
IC211			NJM4558E	IC (OP AMP X2)	
IC212			TA75S01F	IC (OP AMP)	
IC213			TA75W558FU	IC (OP AMP X2)	
Q1			DTA114EU	DIGITAL TRANSISTOR	

Ref. No.	Address	New parts	Parts No.	Description	Destination
Q2,3			DTC114EU	DIGITAL TRANSISTOR	
Q4			2SA1641(S,T)	TRANSISTOR	
Q5			DTA114YU	DIGITAL TRANSISTOR	
Q6,7			2SB1188(Q,R)	TRANSISTOR	
Q8			2SA1362(Y)	TRANSISTOR	
Q9,10			DTC144EU	DIGITAL TRANSISTOR	
Q11-13			DTC114EU	DIGITAL TRANSISTOR	
Q14			2SD1624(S)	TRANSISTOR	
Q15			2SC4116(GR)	TRANSISTOR	
Q16			2SC4215(Y)	TRANSISTOR	
Q17			DTA114TU	DIGITAL TRANSISTOR	
Q18			2SC4226(R24)	TRANSISTOR	
Q19			DTC144EU	DIGITAL TRANSISTOR	
Q20			DTC363EK	DIGITAL TRANSISTOR	
Q21			SGM2014M	FET	
Q22			2SB1370(E,F)	TRANSISTOR	
Q23			2SC4116(GR)	TRANSISTOR	
Q24			DTC114EK	TRANSISTOR	
Q25			DTA144EU	DIGITAL TRANSISTOR	
Q26			DTC144EU	DIGITAL TRANSISTOR	
Q27			DTA114YU	DIGITAL TRANSISTOR	
Q28			DTC114YU	DIGITAL TRANSISTOR	
Q29			2SA1586(Y,GR)	DIGITAL TRANSISTOR	
Q30			2SC3357	TRANSISTOR	
Q31			2SC2954	DIGITAL TRANSISTOR	
Q32			3SK241(R)	FET	
Q33			2SC4226(R24)	DIGITAL TRANSISTOR	
Q34			DTC114YU	DIGITAL TRANSISTOR	
Q201,202			DTC144EU	DIGITAL TRANSISTOR	
TH1			157-501-55003	THERMISTOR (50K)	K3,NK3
TH201			157-302-53008	THERMISTOR (3K)	

PLL/VCO (X58-4480-XX)
-10 : K,NK -11 : K2,NK2 -12 : K3,NK3

C1			CC73GCH1H101J	CHIP C	100PF	J	
C2			CK73GB1H102K	CHIP C	1000PF	K	
C3			C92-0004-05	CHIP TAN	1.0UF	16WV	
C4,5			CC73GCH1H101J	CHIP C	100PF	J	
C6			CK73GB1H102K	CHIP C	1000PF	K	
C7			C92-0543-05	CHIP-TAN	3.3UF	10WV	
C8			CK73GB1H103K	CHIP C	0.010UF	K	
C9			C92-0536-05	CHIP-TAN	10UF	10WV	
C10			C92-0555-05	CHIP-TAN	0.047UF	35WV	
C11,12			CK73GB1H102K	CHIP C	1000PF	K	
C13			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C14			CC73GCH1H020C	CHIP C	2.0PF	C	
C15,16			CK73GB1H102K	CHIP C	1000PF	K	
C17			C92-0001-05	CHIP-TAN	0.10UF	35WV	
C18,19			CK73GB1H102K	CHIP C	1000PF	K	
C51			CK73GB1H102K	CHIP C	1000PF	K	
C52			CC73GCH1H020C	CHIP C	2.0PF	C	K3,NK3
C53			CC73GCH1H1R5C	CHIP C	1.5PF	C	K,K2,NK
C53			CC73GCH1H1R5C	CHIP C	1.5PF	C	NK2
C54			CC73GCH1H0R5C	CHIP C	0.5PF	C	
C55			CK73GB1H102K	CHIP C	1000PF	K	
C56			CC73GCH1H101J	CHIP C	100PF	J	
C57			CK73GB1H102K	CHIP C	1000PF	K	
C58			CC73GCH1H080D	CHIP C	8.0PF	D	K2,NK2

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

PARTS LIST

PLL/VCO (X58-4480-XX)
LCD ASSY (B38-0731-05)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C58			CC73GCH1H120J	CHIP C	12PF	J	K3,NK3
C58			CC73GCH1H150J	CHIP C	15PF	J	K,NK
C59			CC73GCH1H070D	CHIP C	7.0PF	D	K3,NK3
C59			CC73GCH1H090D	CHIP C	9.0PF	D	K,K2,NK
C59			CC73GCH1H090D	CHIP C	9.0PF	D	NK2
C60			CC73GCH1H020C	CHIP C	2.0PF	C	K,NK
C60			CC73GCH1H0R5C	CHIP C	0.5PF	C	K2,NK2
C60			CC73GCH1H040C	CHIP C	4.0PF	C	K3,NK3
C61			CC73GCH1H080D	CHIP C	8.0PF	D	
C62			CC73GCH1H080D	CHIP C	8.0PF	D	K3,NK3
C62			CC73GCH1H100D	CHIP C	10PF	D	K,K2,NK
C62			CC73GCH1H100D	CHIP C	10PF	D	NK2
C63			CK73GB1H102K	CHIP C	1000PF	K	
C64			CC73GCH1H010C	CHIP C	1.0PF	C	
C65			CK73GB1H102K	CHIP C	1000PF	K	
C66			CC73GCH1H100D	CHIP C	10PF	D	K3,NK3
C66			CC73GCH1H150J	CHIP C	15PF	J	K,NK
C66,67			CC73GCH1H070D	CHIP C	7.0PF	D	K2,NK2
C67			CC73GCH1H050C	CHIP C	5.0PF	C	K3,NK3
C67			CC73GCH1H060D	CHIP C	6.0PF	D	K,NK
C68			CC73GCH1H010C	CHIP C	1.0PF	C	K2,NK2
C68			CC73GCH1H020C	CHIP C	2.0PF	C	K3,NK3
C68			CC73GCH1H1R5C	CHIP C	1.5PF	C	K,NK
C69			CC73GCH1H080D	CHIP C	8.0PF	D	K,K2,NK
C69			CC73GCH1H080D	CHIP C	8.0PF	D	NK2
C69			CC73GCH1H100D	CHIP C	10PF	D	K3,NK3
C70			CC73GCH1H100D	CHIP C	10PF	D	
C71			CC73GCH1H010C	CHIP C	1.0PF	C	
C72-74			CK73GB1H102K	CHIP C	1000PF	K	
C75			CC73GCH1H070D	CHIP C	7.0PF	D	
C76,77			CK73GB1H102K	CHIP C	1000PF	K	
C78			CC73GCH1H060D	CHIP C	6.0PF	D	K2,NK2
C78			CC73GCH1H070D	CHIP C	7.0PF	D	K,K3,NK
C78			CC73GCH1H070D	CHIP C	7.0PF	D	NK3
C79,80			CK73GB1H471K	CHIP C	470PF	K	
TC51,52			C05-0384-05	TRIM CAP.	10PF		
CN1			E40-5699-05	PIN CONNECTOR ASSY (7P)			
CN51			E40-5755-05	PIN CONNECTOR ASSY (6P)			
-			F10-2148-04	SHIELDING CASE			
L51,52			L40-1095-34	SMALL FIXED INDUCTOR (1UH)			
L53			L33-0744-05	SMALL FIXED INDUCTOR (23nH)			K3,NK3
L53			L33-0750-05	SMALL FIXED INDUCTOR (17nH)			K,K2,NK
L53			L33-0750-05	SMALL FIXED INDUCTOR (17nH)			NK2
L54-57			L40-1095-34	SMALL FIXED INDUCTOR (1UH)			
L58			L33-0744-05	SMALL FIXED INDUCTOR (23nH)			K,K2,NK
L58			L33-0744-05	SMALL FIXED INDUCTOR (23nH)			NK2
L58			L33-0745-05	SMALL FIXED INDUCTOR (33nH)			K3,NK3
L59,60			L40-1095-34	SMALL FIXED INDUCTOR (1UH)			
L61			L40-1871-35	SMALL FIXED INDUCTOR (18nH)			K2,NK2
L61			L40-2771-35	SMALL FIXED INDUCTOR (27nH)			K,K3,NK
L61			L40-2771-35	SMALL FIXED INDUCTOR (27nH)			NK3
L62			L40-3971-35	SMALL FIXED INDUCTOR (39nH)			
R1			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R2-4			RK73GB1J102J	CHIP R	1.0K	J 1/16W	
R5			RK73GB1J123J	CHIP R	12K	J 1/16W	
R6			RK73GB1J333J	CHIP R	33K	J 1/16W	
R7			RK73GB1J101J	CHIP R	100	J 1/16W	
R8			RK73GB1J102J	CHIP R	1.0K	J 1/16W	
R9			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R10			RK73GB1J101J	CHIP R	100	J 1/16W	
R11			RK73GB1J473J	CHIP R	47K	J 1/16W	
R12,13			RK73GB1J102J	CHIP R	1.0K	J 1/16W	
R14			RK73GB1J330J	CHIP R	33	J 1/16W	
R15			RK73GB1J272J	CHIP R	2.7K	J 1/16W	K,NK
R15			RK73GB1J332J	CHIP R	3.3K	J 1/16W	K2,K3
R15			RK73GB1J332J	CHIP R	3.3K	J 1/16W	NK2,NK3
R16			RK73GB1J223J	CHIP R	22K	J 1/16W	
R17			RK73GB1J152J	CHIP R	1.5K	J 1/16W	
R18			RK73GB1J101J	CHIP R	100	J 1/16W	
R19			RK73GB1J103J	CHIP R	10K	J 1/16W	
R20			RK73GB1J101J	CHIP R	100	J 1/16W	
R21,22			R92-1252-05	CHIP R	0 OHM		
R24			RK73GB1J471J	CHIP R	470	J 1/16W	
R51			RK73GB1J683J	CHIP R	68K	J 1/16W	
R52			RK73GB1J333J	CHIP R	33K	J 1/16W	
R53			RK73GB1J101J	CHIP R	100	J 1/16W	
R54			RK73GB1J221J	CHIP R	220	J 1/16W	
R55			R92-1252-05	CHIP R	0 OHM		
R56			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R57			RK73GB1J151J	CHIP R	150	J 1/16W	
R58			RK73GB1J221J	CHIP R	220	J 1/16W	
R59			RK73GB1J181J	CHIP R	180	J 1/16W	K,NK
R59			RK73GB1J221J	CHIP R	220	J 1/16W	K2,K3
R59			RK73GB1J221J	CHIP R	220	J 1/16W	NK2,NK3
R60			RK73GB1J103J	CHIP R	10K	J 1/16W	
R61			RK73GB1J153J	CHIP R	15K	J 1/16W	K2,NK2
R61			RK73GB1J223J	CHIP R	22K	J 1/16W	K,K3,NK
R61			RK73GB1J223J	CHIP R	22K	J 1/16W	NK3
R62			RK73GB1J330J	CHIP R	33	J 1/16W	
R63			RK73GB1J101J	CHIP R	100	J 1/16W	K,K3,NK
R63			RK73GB1J101J	CHIP R	100	J 1/16W	NK3
R63			RK73GB1J470J	CHIP R	47	J 1/16W	K2,NK2
R64			RK73GB1J333J	CHIP R	33K	J 1/16W	K3,NK3
D1			1SS301	DIODE			
D51			MA360	VARI CAP DIODE			
D52-55			1T363A	VARI CAP DIODE			
IC1			MC145190F-K	IC (1.1GHz PLL SYNTHESIZER)			
IC1			SC370651F	IC (1.1GHz PLL SYNTHESIZER)			
Q1			DTC143EK	DIGITAL TRANSISTOR			
Q2			2SA1588(Y,GR)	TRANSISTOR			
Q3			2SC3120	TRANSISTOR			
Q51			2SK508NV(K52)	FET			
Q52			DTC114EU	DIGITAL TRANSISTOR			
Q53			2SK508NV(K52)	FET			
Q54			UMG1	DIGITAL TRANSISTOR			
Q55			2SC4226(R24)	TRANSISTOR			

LCD ASSY (B38-0731-05)

C1			CC73GCH1H101J	CHIP C	100PF	J	
C2			CK73GB1H103K	CHIP C	0.010UF	K	
C3,4			CC73GCH1H101J	CHIP C	100PF	J	
C5			CK73GB1H103K	CHIP C	0.010UF	K	
C6-8			CC73GCH1H101J	CHIP C	100PF	J	
C9			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C10,11			CK73GB1H103K	CHIP C	0.010UF	K	

TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

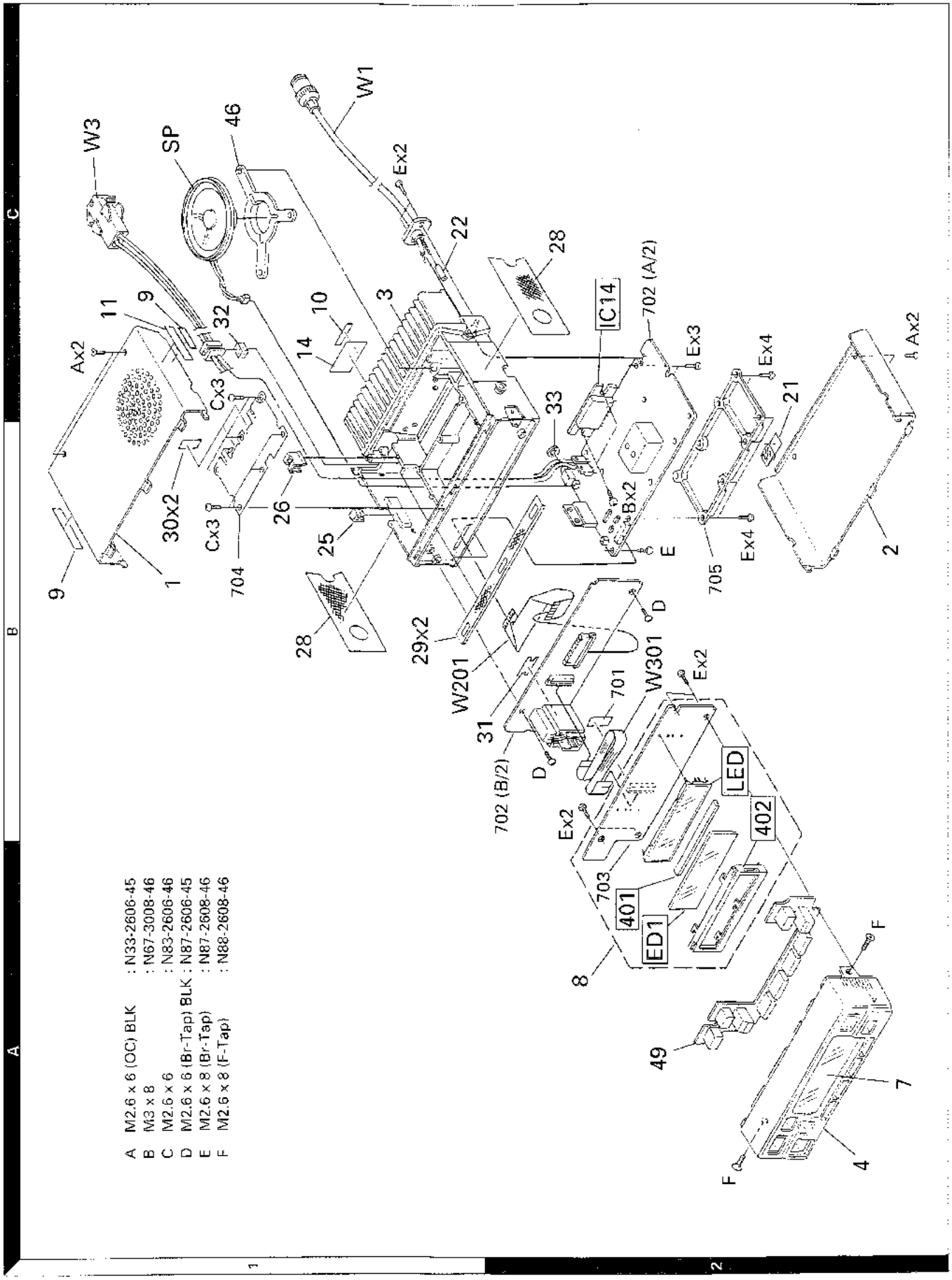
PARTS LSIT

LCD ASSY (B38-0731-05)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C12			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C13-16			CK73GB1H103K	CHIP C 0.010UF K	
401	2A		E29-0494-08	INTER CONNECTOR	
CN1			E40-5710-05	FLAT CABLE CONNECTOR (9P)	
402	2A		J21-4306-08	HARDWARE FIXTURE	
X1			L78-0043-05	CRYSTAL RESONATOR (4.194MHz)	
R1			R92-1252-05	CHIP R 0 OHM	
R2-4			RK73FB2A271J	CHIP R 270 J 1/10W	
R5			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R6			RK73FB2A271J	CHIP R 270 J 1/10W	
R7,8			RK73GB1J473J	CHIP R 47K J 1/16W	
R9			RK73GB1J103J	CHIP R 10K J 1/16W	
R10,11			RK73GB1J473J	CHIP R 47K J 1/16W	
R12			RK73GB1J103J	CHIP R 10K J 1/16W	
R13-17			R92-1252-05	CHIP R 0 OHM	
R18,19			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R20			RK73GB1J223J	CHIP R 22K J 1/16W	
R21-23			R92-1252-05	CHIP R 0 OHM	
ED1	2A		B38-0722-05	LCD	
IC1			NJM78L05UA	IC (VOLTAGE REGULATOR/ +5V)	
IC2			UPD75308BGK740	IC (4bit MICROPROCESSOR)	
LED	2B		B38-0336-05	LED ASSY	

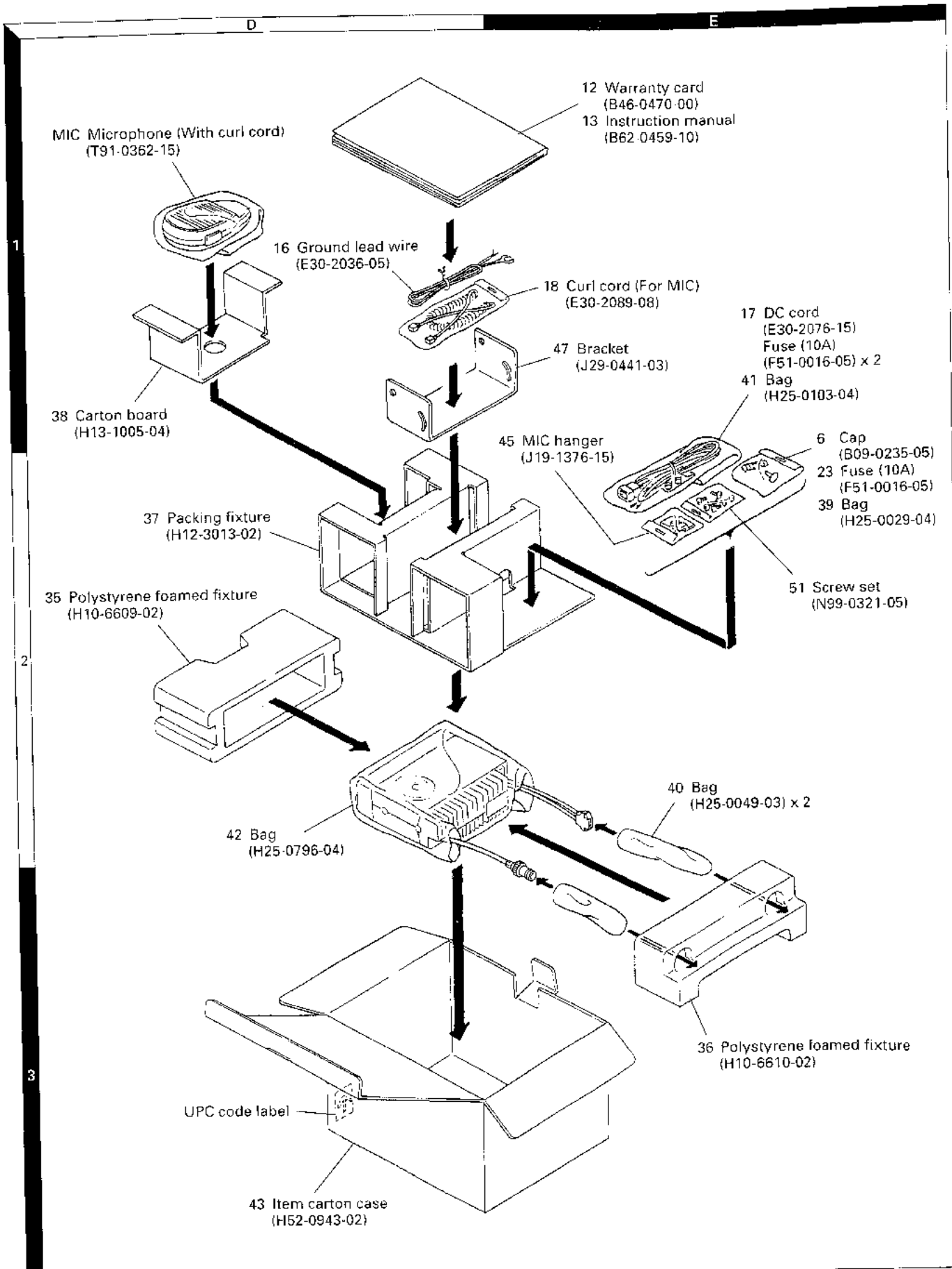
TK-840 : K,K2,K3
TK-840(N) : NK,NK2,NK3

EXPLODED VIEW



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

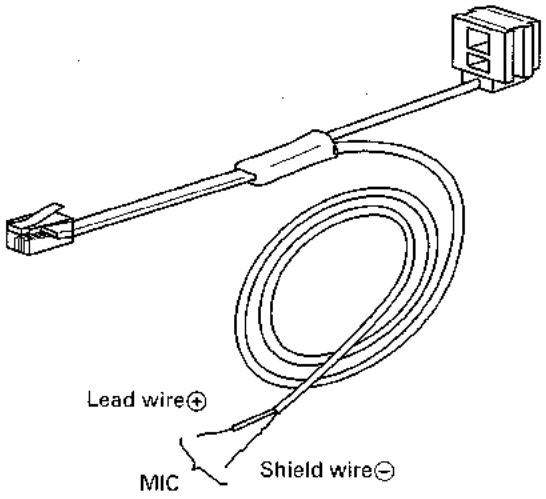
PACKING


D
E
1
2
3
12 Warranty card
(B46-0470-00)
13 Instruction manual
(B62-0459-10)
MIC Microphone (With curl cord)
(T91-0362-15)
16 Ground lead wire
(E30-2036-05)
18 Curl cord (For MIC)
(E30-2089-08)
17 DC cord
(E30-2076-15)
Fuse (10A)
(F51-0016-05) x 2
47 Bracket
(J29-0441-03)
41 Bag
(H25-0103-04)
38 Carton board
(H13-1005-04)
45 MIC hanger
(J19-1376-15)
6 Cap
(B09-0235-05)
23 Fuse (10A)
(F51-0016-05)
39 Bag
(H25-0029-04)
37 Packing fixture
(H12-3013-02)
51 Screw set
(N99-0321-05)
35 Polystyrene foamed fixture
(H10-6609-02)
40 Bag
(H25-0049-03) x 2
42 Bag
(H25-0796-04)
36 Polystyrene foamed fixture
(H10-6610-02)
UPC code label
43 Item carton case
(H52-0943-02)

ADJUSTMENT

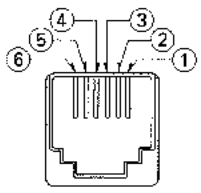
Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	400 to 520MHz Frequency modulation and external modulation –127dBm/0.1μV to greater than –7dBm/100mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 400 to 520MHz or more Vicinity of 30W
3. Deviation Meter	Frequency Range	400 to 520MHz
4. Digital Volt Meter (DVM)	Measuring Range Accuracy	1 to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		10A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 3mV to 3V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. Voltmeter	Measuring Range Input Impedance	1.5 to 30V DC or less 50kΩ/V or greater
12. 4Ω Dummy Load		Approx. 4Ω, 3W
13. Regulated Power Supply		13.6V, approx. 10A (adjustable from 9 to 17V) Useful if ammeter requipped

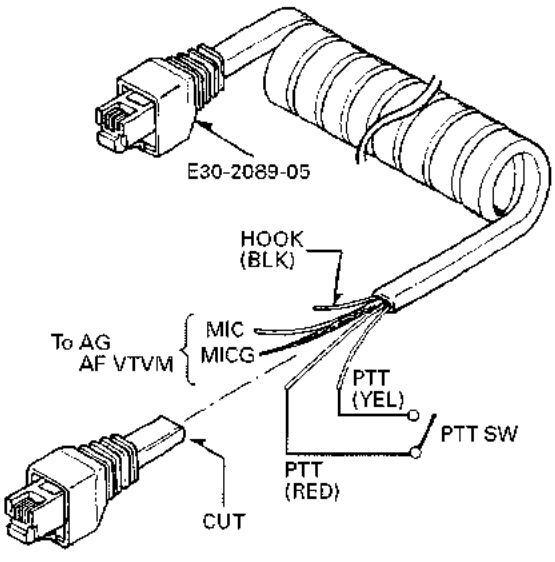


Tuning cable (E30-3217-05)

Adapter cable (E30-3217-05) is required for injecting an audio if PC tuning is used.
See "Transceiver Programming" section for the connection.



MIC connector (Front view)

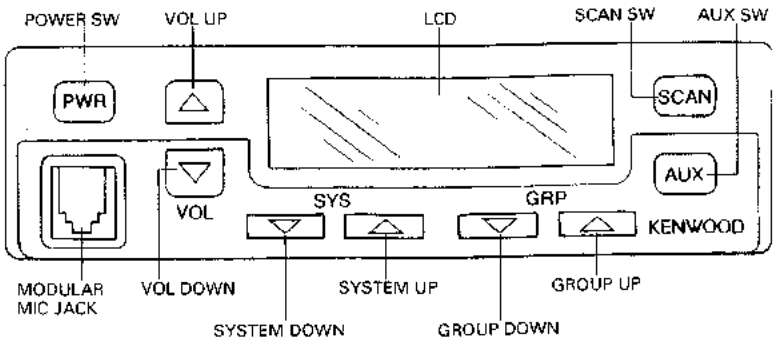


Test cable for microphone input

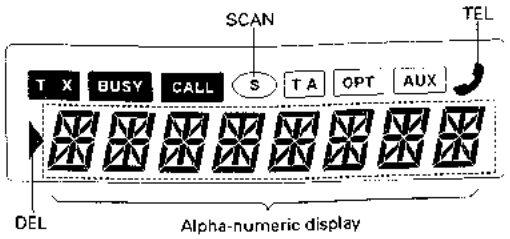
ADJUSTMENT

Adjustment Location

1. Switch



2. Display section (LCD)



- **User mode**

No.	Key name		Description	
1	PWR	Non-lock	Power supply	ON/OFF
2	VOL	Non-lock	Receive volume, beep volume	UP/DOWN
3	SYS	Non-lock	System	UP/DOWN
4	GRP	Non-lock	Group	UP/DOWN
5	SCAN	Non-lock	System scan (LTR/Conventional)	ON/OFF
			System search (LTR)	ON/OFF
6	AUX	Non-lock	AUX function	ON/OFF

AUX function (Can be set by the FPU)

1	Horn alert ON/OFF
2	Manual relay ON/OFF
3	Group name ON/OFF
4	Fixed revert call
5	Auto tel
6	Delete
7	Optional signaling reset

No.	Name	Description
1	Alpha-numeric (8 digits)	Shows the group name, system, and group numbers. System : Shows a selected system number (1 to 32). Group : Shows a selected group number (1 to 250)
2	(S)	SCAN indicator
3	▶	Delete indicator
4	TX	Transmission indicator
5	BUSY	Busy indicator
6	CALL	Call indicator
7	TA	Talk-around indicator
8	AUX	Displayed when the horn alert or manual relay function is turned on with the AUX key.
9	OPT	Decode latch indicator (KDD-4)
10	📞	Telephone indicator

- **Dealer mode**

No.	Key name		Description	
1	PWR	Non-lock	Power supply	ON/OFF
2	VOL	Non-lock	Receive volume, beep volume	UP/DOWN
3	SYS	Non-lock	System	UP/DOWN
4	GRP	Non-lock	Group	UP/DOWN
5	SCAN	Non-lock	Squelch	ON/OFF
6	AUX	Non-lock	Talk around	ON/OFF

- **Tuning mode**

No.	Key name		Description	
1	PWR	Non-lock	Power supply	ON/OFF
2	VOL	Non-lock	Receive volume, beep volume	UP/DOWN
3	SYS	Non-lock	System Adjustment item selection	UP/DOWN
4	GRP	Non-lock	Group Adjustment level	UP/DOWN UP/DOWN
5	SCAN	Non-lock	Switching between frequency mode and adjustment mode	
6	AUX	Non-lock	Adjustment data writing	

ADJUSTMENT

Common Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	

1. Memory frequency

• Frequency range (MHz)

450~488 : K,NK
488~512 : K2,NK2
403~430 : K3,NK3

• Adjustment frequency (MHz)

System	K,NK		K2,NK2		K3,NK3	
	TX	RX	TX	RX	TX	RX
1	450.000	450.100	488.000	488.100	403.000	403.100
2	450.500	450.600	488.500	488.600	403.500	403.600
3	468.500	468.600	499.500	499.600	415.500	415.600
4	469.000	469.100	500.000	500.100	416.000	416.100
5	469.500	470.500	500.500	501.500	416.500	417.500
6	487.400	487.500	511.400	511.500	429.400	429.500
7	487.900	487.800	511.900	511.800	429.950	429.750

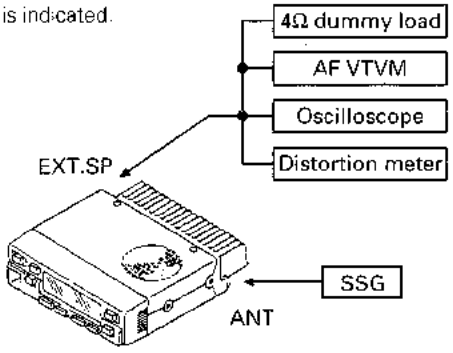
• Signaling

GRP	Modulation	Squelch type
1	None	Carrier
2	100Hz square wave	Carrier
3	LTR format data	LTR format data
4	QT (67.0Hz) tone	QT (67.0Hz)
5	QT (151.4Hz) tone	QT (151.4Hz)
6	QT (210.7Hz) tone	QT (210.7Hz)
7	DQT (023N) code	DQT (023N)
8	DQT (754N) code	DQT (754N)

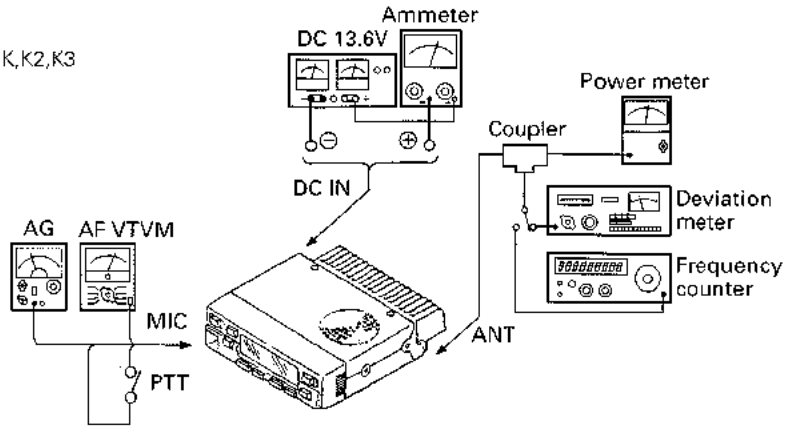
2. Setting

• Receiver section

The indicated SSG output level are for maximum output.
Whenever there is no modulation designation, standard modulation (MOD : 1kHz, DEV : ±3kHz : K,K2,K3 ±1.5kHz : NK,NK2,NK3) is indicated.



• Transmitter section



3. Dealer mode setting

1) Power supply voltage : DC 13.6V
2) Hold the GRP UP key down and press the PWR key
(Keep the GRP UP key down for two seconds after the power comes on.)

4. Tuning mode setting and operation procedure

• Procedure	• Operation procedure
1. Set tuning mode	Hold the GRP DOWN key down and press the PWR key. (Keep the GRP DOWN key down for two seconds after the power comes on.)
2. Select SYS and GRP	SYS key UP/DOWN, GRP key UP/DOWN
3. Set adjustment mode	Press the SCAN key once
4. Select adjustment items	SYS key UP/DOWN Adjustment items : SQL, PWR, DEV, BAL, FQT, FDQT, FID, SENS
5. Carry out adjustment	GRP key UP/DOWN
6. Determine setting	Press the AUX key once. (Move to the next adjustment item.)
7. Adjustment is complete	Press the PWR key once. (Power OFF)

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. PLL lock voltage	1) Set dealer mode CH : SYS 7 (fH) GRP 1 AUX : ON (Talk-around mode) PTT : ON (Transmit)	DVM Power meter	TX-RX (A/2)	CV	PLL	TC52	6.7V	±0.1V
						TC51	6.7V	
	2) CH : SYS 1(fL) GRP 1 PTT : ON (Transmit)						Check	1.2V or more

Receiver Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity	1) Set tuning mode CH : SYS 4 GRP 1 Select SENS in adjustment mode. SSG freq' : : 469.100MHz **K,NK** : 500.100MHz **K2,NK2** . 416.100MHz **K3,NK3** SSG output : –116dBm/0.355µV **K,K2,K3** –115dBm/0.4µV **NK,NK2,NK3** SSG MOD : 1kHz AF output : 0.45V/4Ω	SSG AF VTVM Distortion meter Oscilloscope AG	Rear panel	ANT ACC (EXT.SP)			Adjust for maximum SINAD.	Three-point adjustment can be made in PC tuning.
2. Squelch	1) Set tuning mode CH : SYS 4 GRP 1 Select SQL in adjustment mode. SSG freq' : 469.100MHz **K,NK** : 500.100MHz **K2,NK2** : 416.100MHz **K3,NK3** SSG output : Value when 3dB is subtracted from the sensitivity value of 12dB SINAD. SSG MOD : 1kHz						Squelch closed once. Then squelch must be opened.	
3. Squelch check	1) Set dealer mode CH : SYS 4 GRP 1 SSG output : 8dB SINAD level						Check	Squelch must be opened.
	2) SSG output : OFF							Squelch must be closed.
4. QT check	1) Set dealer mode CH : SYS 4 GRP 1 SSG MOD INT : 1kHz EXT : 151.4Hz SSG system MOD DEV : ±3.75kHz SSG output : 10dB SINAD level							
	2) CH : SYS 4 GRP 5						Check	Squelch must be opened.
	3) CH : SYS 4 GRP 4, 6							Squelch must be closed.

ADJUSTMENT

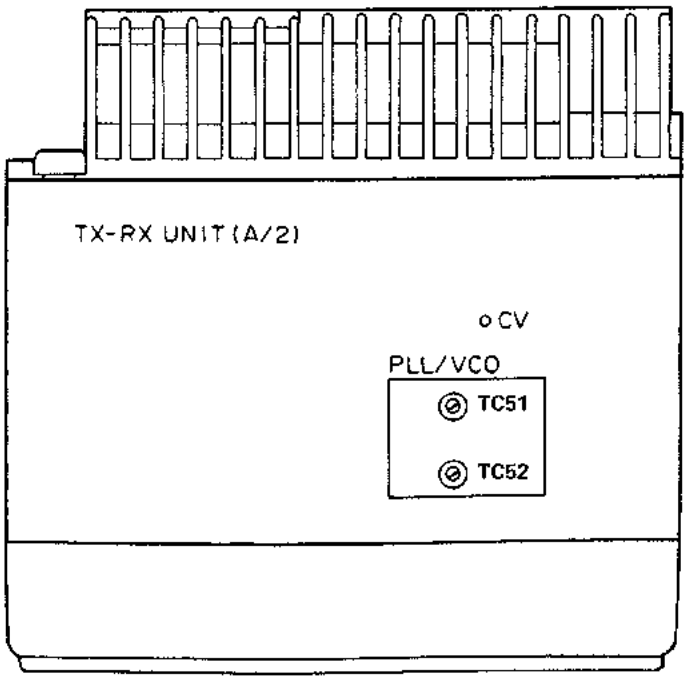
Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency check	1) Set dealer mode CH : SYS 4 GRP 1 Select FREQ in adjustment mode. PTT : ON	Power meter F. counter	Rear panel	ANT			Check	469.000MHz±0.1kHz **K,NK** 500.000MHz±0.1kHz **K2,NK2** 416.000MHz±0.1kHz **K3,NK3**
2. Maximum power check	1) Set tuning mode CH : SYS 4 GRP 1 PTT : ON	Power meter	Rear panel	ANT			Check (Maximum power position)	26.5W or more
3. Power	1) Set tuning mode CH : SYS 4 GRP 1 Select POWR in adjustment mode. PTT : ON						25.0W	±1.0W
4. Power check	1) Set dealer mode CH : SYS 1, 7 GRP 1 TA mode : ON (AUX key : ON) PTT : ON	Power meter Ammeter	Rear panel	ANT DC IN			Check	21.0~29.0W Less than 7.5A **K,NK** Less than 7.0A **K2,K3,NK2,KN3**
5. Modulation balanced	1) Set tuning mode CH : SYS 4 GRP 2 MIC input : OFF Select BAL in adjustment mode. Deviation meter filter LPF : 3kHz HPF : OFF De-emphasis : OFF PTT : ON	Power meter Deviation meter Oscilloscope AF VTVM AG	Rear panel Front panel	ANT MIC			Make the de-modulation waveform neat.	
6. Maximum deviation	1) Set tuning mode CH : SYS 4 GRP 1 Connect AG to the MIC terminal. Select TEV in adjustment mode. AG : 1kHz/50mV Deviation meter filter LPF : 15kHz HPF : OFF De-emphasis : OFF PTT : ON						3.8kHz (According to the larger +, -)	±0.05kHz **K,K2,K3**
							1.7kHz (According to the larger +, -)	±0.05kHz **NK,NK2,NK3**
7. MIC sensitivity check	1) Set tuning mode CH : SYS 4 GRP 1 AG : 1kHz/5mV **K,K2,K3** 1kHz/2.5mV **NK,NK2,NK3** PTT : ON						Check	±2.4~3.6kHz **K,K2,K3** ±0.6~0.9kHz **NK,NK2,NK3**

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. QT deviation	1) Set tuning mode CH : SYS 4 GRP 5 Select *FQT* in adjustment mode. Deviation meter filter LPF : 3kHz HPF : 50Hz PTT : ON	Power meter Deviation meter Oscilloscope AF VTVM AG	Rear panel Front panel	ANT MIC				0.75kHz±0.04kHz **K,K2,K3** 0.35kHz±0.02kHz **NK,NK2,NK3**
9. DQT deviation	1) Set tuning mode CH : SYS 4 GRP 7 Select *FDQT* in adjustment mode. Deviation meter filter LPF : 3kHz HPF : OFF PTT : ON							0.75kHz±0.1kHz **K,K2,K3** 0.35kHz±0.05kHz **NK,NK2,NK3**
10. Fine LTR	1) Set tuning mode CH : SYS 4 GRP 3 Select *FID* in adjustment mode. Deviation meter filter LPF : 3kHz HPF : OFF PTT : ON							1.0kHz±0.1kHz **K,K2,K3** 0.75kHz±0.05kHz **NK,NK2,NK3**

Adjustment Point



TERMINAL FUNCTION

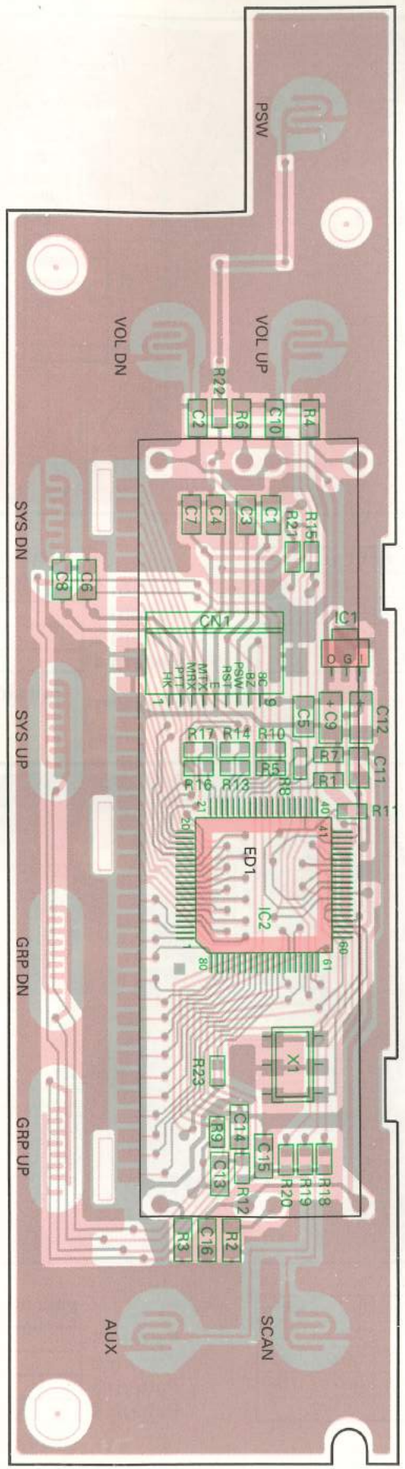
CN No.	Pin No.	Pin name	I/O	Function
TX-RX UNIT (X57-5320-XX) (A/2) : TX-RX section				
CN1	1	DEO	O	Detection signal output (650mV/47kΩ).
	2	HK/BUSY	I	External HOOK signal input.
To				On hook : "L", Off hook : "H"
KCT-19	3	IGN	I	Ignition input for KCT-18.
	4	DI	I	External modulation signal input.
	5	ME/SPM	–	MIC earth.
	6	MI/TXS	I/O	Internal MIC signal output, Externa MIC signal input (Standard modulation at 600Ω, 5mV).
	7	PTT	I	External PTT signal input. GND : TX, Open : RX
	8	SQ	O	Squelch signal output. Carrier in : Active "H"
CN2	1	LOK	O	Link complete signal output. Link complete : Active "L"
TO	2	MM	I	MIC mute signal input.
KCT-19				Mute : "H", Unmute : Open
	3	DTC	I	Data TX group control signal input.
CN3	1	LOK	O	Link complete signal output. Link complete : Active "L"
To	2	RXD	I	Serial control signal input.
KCT-19	3	TXD	O	Serial control signal output.
CN4	1	HOR	O	Horn alert control signal output. Signal output for horn relay drive (open collector). "L" level during horn drive : max. sink current 800mA.
To KCT-19	2	E	–	Earth.
	3	SB	O	Power output after power switch (+13.6V±15%, 1A max.).
CN5	1	SP	O	Output for internal/external speaker.
To INT. SP or KCT-19	2	E	–	Earth.
CN6	1	E	–	Earth.
	2	BZ	I	Beep signal input.
To	3	PSW	I	Power switch control signal input.
Control section				Power switch on : 0V
	4	DI	O	External modulation signal output.
	5	DEO	O	Detection signal output.
	6	MM	O	MIC mute signal output. Mute : "H", Unmute : Open
	7	DSN	I	RX audio tone input for KDD-4.
	8	MO	I	Modulation signal input.
	9	8C	O	Common 8V output (+8V±5%).
	10	ME	–	MIC earth.
	11	MI	I/O	Internal MIC signal input, External MIC signal output.
	12	HK	O	External HOOK signal output. On hook : "L", Off hook : "H"
	13	SB	O	Power output after power switch (+13.6V±15%).
	14	KEY	I	KEY signal input. TX : "H"
	15	CK	I	Clock input for PLL/Shift register/ D-A converter.
	16	DT	I	Data input for PLL/Shift register/ D-A converter.
	17	DTC	O	Data TX group control output.
	18	LD	O	Lock detect output for PLL. Lock : "H", Unlock : "L"
	19	ES	I	Enable input for shift register.
	20	RXD	O	Serial control signal output.
	21	TXD	I	Serial control signal input.
	22	EP	I	Enable input for PLL.
	23	EN	I	Enable input for D-A converter.
	24	PTT	O	External PTT signal output. GND : TX, Open : RX
J1		EXT SP	O	Output for external speaker (4W/5% distortion).
J2		DC 13.6V	I	Power supply input (DC 13.6V±15%).
J3		ANT	I/O	Connect for ANT connector.
TX-RX UNIT (X57-5320-XX) (B/2) : Control section				
CN201	1	E	–	Earth.
	2	BZ	O	Beep signal output.
To	3	PSW	O	Power switch control signal output.
TX-RX				Power switch on : 0V
section	4	DI	I	External modulation signal input.
	5	DEO	I	Detection signal input.
	6	MM	I	MIC mute signal input. Mute : "H", Unmute : Open
	7	DSN	O	RX audio tone output for KDD-4.
	8	MO	O	Modulation signal output.
	9	8C	I	Common 8V input (+8V±5%).
	10	ME	–	MIC earth.
	11	MI	I/O	Internal MIC signal output, External MIC signal input.
	12	HK	I	External HOOK signal input. On hook : "L", Off hook : "H"
	13	SB	I	Power input after power switch (+13.6V ±15%).
	14	KEY	O	KEY signal output. TX : "H"
	15	CK	O	Clock output for PLL/Shift register/ D-A converter.
	16	DT	O	Data output for PLL/Shift register/ D-A converter.
	17	DTC	I	Data TX group control signal input.
	18	LD	I	Lock detect input for PLL. Lock : "H", Unlock : "L"
	19	ES	O	Enable output for shift register.
	20	RXD	I	Serial control signal input.
	21	TXD	O	Serial control signal output.
	22	EP	O	Enable output for PLL.
	23	EN	O	Enable output for D-A converter.
	24	PTT	I	External PTT signal input. GND : TX, Open : RX
CN203	1	DBD	I	Dead beat disable input.
	2	RST	I	Reset signal input.
To	3	E	–	Earth.
KDD-4	4	DSN	O	RX audio tone output.
	5	PT	O	Transpond PTT signal output. GND : TX, Normally 5V
	6	MT	O	Decode latch signal output. Code match : Active "L"
	7	8C	I	Common 8V input (+8V±5%).
	8	TON	O	TX audio tone output.
	9	NC	–	Not use.

TERMINAL FUNCTION

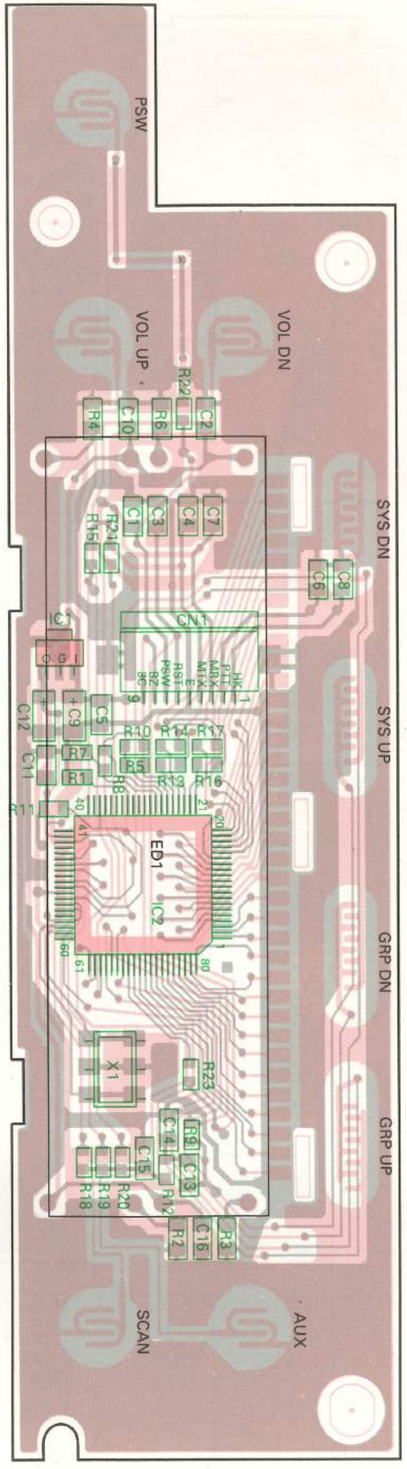
CN No.	Pin No.	Pin name	I/O	Function
CN205	1	8C	O	Common 8V output (+8V±5%).
	2	BZ	I	Beep signal input.
To	3	PSW	I	Power switch control signal input.
Display				Power switch on : 0V
section	4	RS	O	Reset signal output for display.
	5	E	–	Earth.
	6	MTX	O	Serial control signal output for display.
	7	MRX	I	Serial control signal input for display.
	8	PTT	I/O	PTT signal output, Serial data input/output.
	9	HK	I/O	Hook signal output, Serial data input/output.
J201	1	SB	O	Power output after power switch (+13.6V±15%, 200mA max.).
To	2	E	–	Earth.
MIC	3	PTT	I/O	PTT signal input (GND : TX, Open : RX). Serial data input/output.
jack	4	ME	–	MIC earth.
	5	MI	I	MIC signal input. (Standard modulation at 600Ω, 5mV)
	6	HK	I/O	Hook signal input. On hook : "L", Off hook : "H" Serial data input/output.

CN No.	Pin No.	Pin name	I/O	Function
PLL/VCO (X58-4480-XX)				
CN1	1	EP	I	Enable input for PLL.
	2	CK	I	Clock input for PLL.
	3	DT	I	Data input for PLL.
	4	RE	I	VCXO 12.8MHz input for PLL.
	5	5C	I	Common 5V input (+5V±5%).
	6	LD	O	Lock detect output for PLL. Lock : "H", Unlock : "L"
	7	8C	I	Common 8V input (+8V±5%).
CN51	1	VO	O	VCO signal output.
	2	E	–	Earth.
	3	8V	I	8V input for VCO.
	4	MD	I	Modulation signal input.
	5	CV	O	PLL lock voltage output.
LCD ASSY (B38-0731-05) : Display section				
CN1	1	HK	I/O	Hook signal input, Serial data input/output.
	2	PTT	I/O	PTT signal input, Serial data input/output.
To	3	MRX	O	Serial control signal output for display.
Control	4	MTX	I	Serial control signal input for display.
section	5	E	–	Earth.
	6	RST	I	Reset signal input for display.
	7	PSW	O	Power switch control signal output. Power switch on : 0V
	8	BZ	O	Beep signal output.
	9	8C	I	Common 8V input (+8V±5%).

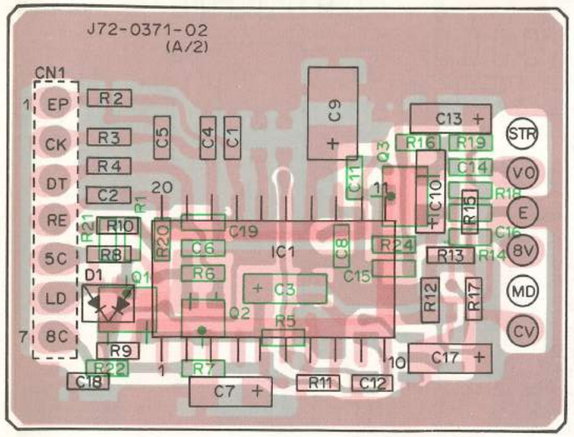
LCD ASSY (B38-0731-05)
Component side view



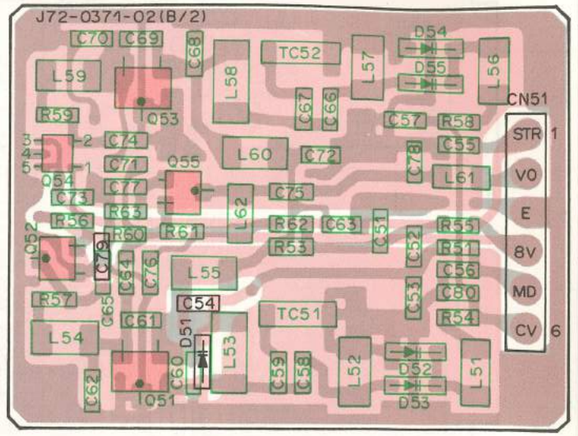
LCD ASSY (B38-0731-05)
Foil side view



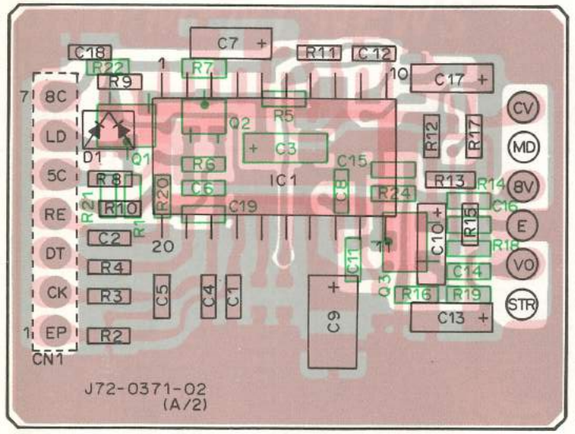
PLL/VCO (X58-4480-XX) (A/2)
-10 : K,NK -11 : K2,NK2 -12 : K3,NK3
Component side view



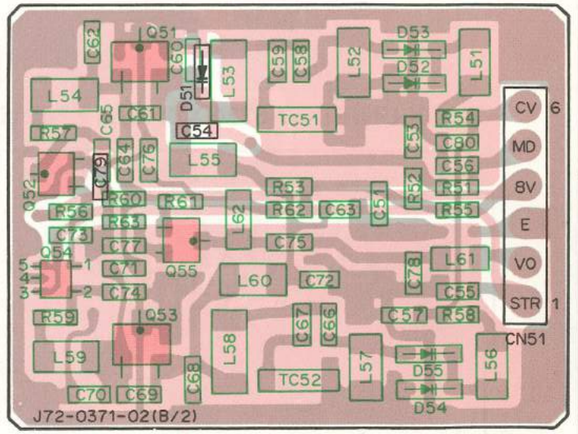
PLL/VCO (X58-4480-XX) (B/2)
-10 : K,NK -11 : K2,NK2 -12 : K3,NK3
Component side view



PLL/VCO (X58-4480-XX) (A/2)
Foil side view



PLL/VCO (X58-4480-XX) (B/2)
Foil side view



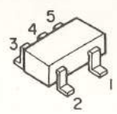
Component side
Pattern 1
Pattern 2
Foil side

DTC114EU
DTC143EK
2SA1586
2SC3120
2SC4226

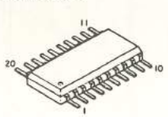
2SK508NV

NJM78L05UA

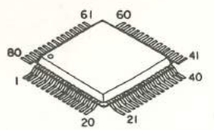
UMG1



MC145190F-K
SC370651F

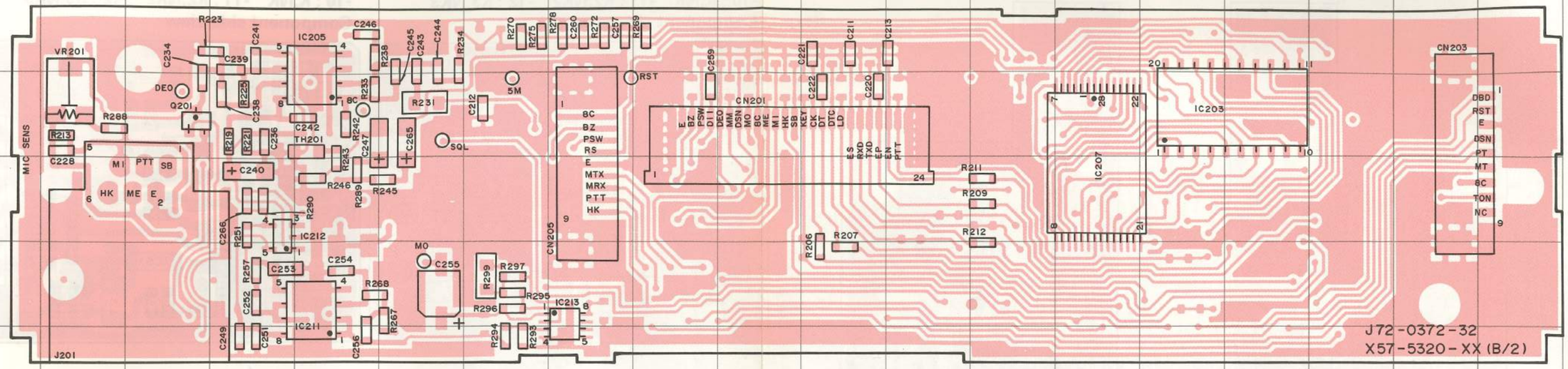


UPD75308BGK740



TK-840/(N) PC BOARD VIEWS

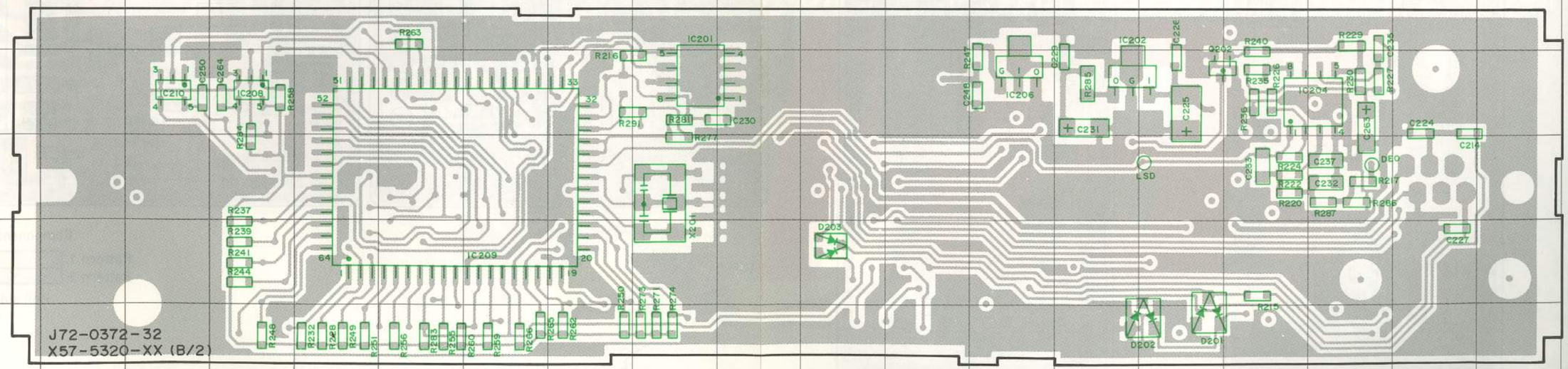
TX-RX UNIT (X57-5320-XX) (B/2) Component side view -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3



Ref. No.	Address	Ref. No.	Address
IC203	3O	IC212	4D
IC205	2E	IC213	5H
IC207	4N	Q201	3C
IC211	5E		

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

TX-RX UNIT (X57-5320-XX) (B/2) Foil side view -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3

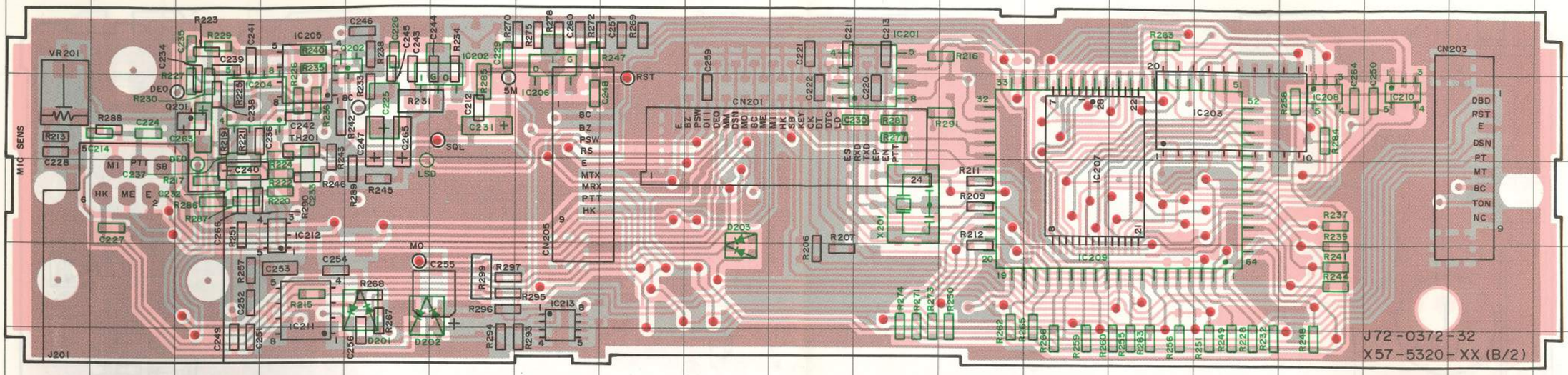


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC201	9I	IC208	9D	D201	12O
IC202	9N	IC209	11G	D202	12O
IC204	9Q	IC210	9C	D203	11K
IC206	9M	Q202	9O		

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

PC BOARD VIEW TK-840/(N)

TX-RX UNIT (X57-5320-XX) (B/2) Component side view + Foil side -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC201	2K	IC207	4M	IC213	5G
IC202	2F	IC208	3P	Q201	3C
IC203	3O	IC209	5M	Q202	2E
IC204	3C	IC210	3Q	D201	5E
IC205	2D	IC211	5D	D202	5E
IC206	2G	IC212	4D	D203	4I

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

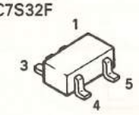
● Connect 1 and 4

DTC144EU

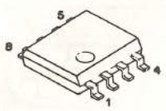
NJM78L05UA

S-8054ALB-LM

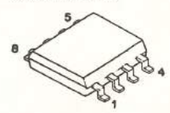
TA75S01F
TC7S04F
TC7S32F



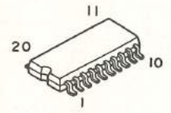
NJM4558E



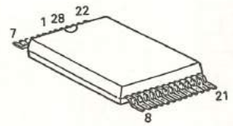
AT2401N10SI2.7
TA75W558FU



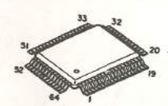
HD74HC373FP



AT29C256-20TI

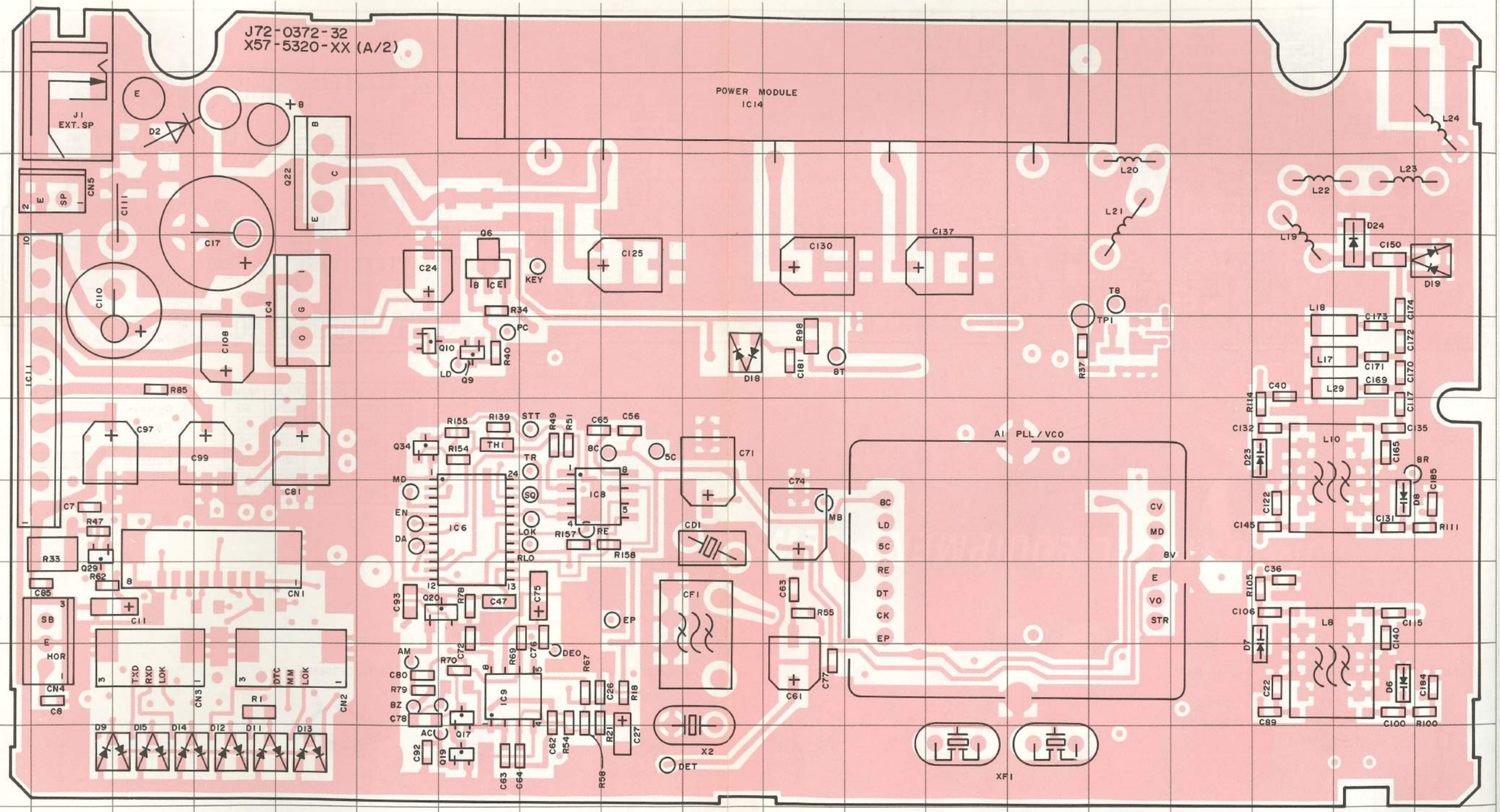


78312AGF3563BE



TK-840/(N) PC BOARD VIEW

TX-RX UNIT (X57-5320-XX) (A/2) Component side view -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3



Component side

Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC4	5E	Q9	6G	Q29	8B	D9	11C	D18	6J
IC6	8G	Q10	6F	Q34	7F	D11	11D	D19	5S
IC8	8H	Q17	10G	D2	3C	D12	11D	D23	7Q
IC9	10G	Q19	11G	D6	10R	D13	11E	D24	5R
IC14	3J	Q20	9G	D7	10Q	D14	11D		
Q6	5G	Q22	4E	D8	8R	D15	11C		

DTA114EU DTA114TU DTA114YU DTA144EU DTC114EK DTC114EU DTC114YU DTC144EU DTC363EK

2SA1362 2SA1586 2SC4116 2SC4215 2SC4226

2SB1188 2SC2954 2SC3357 2SD1624

2SB1370

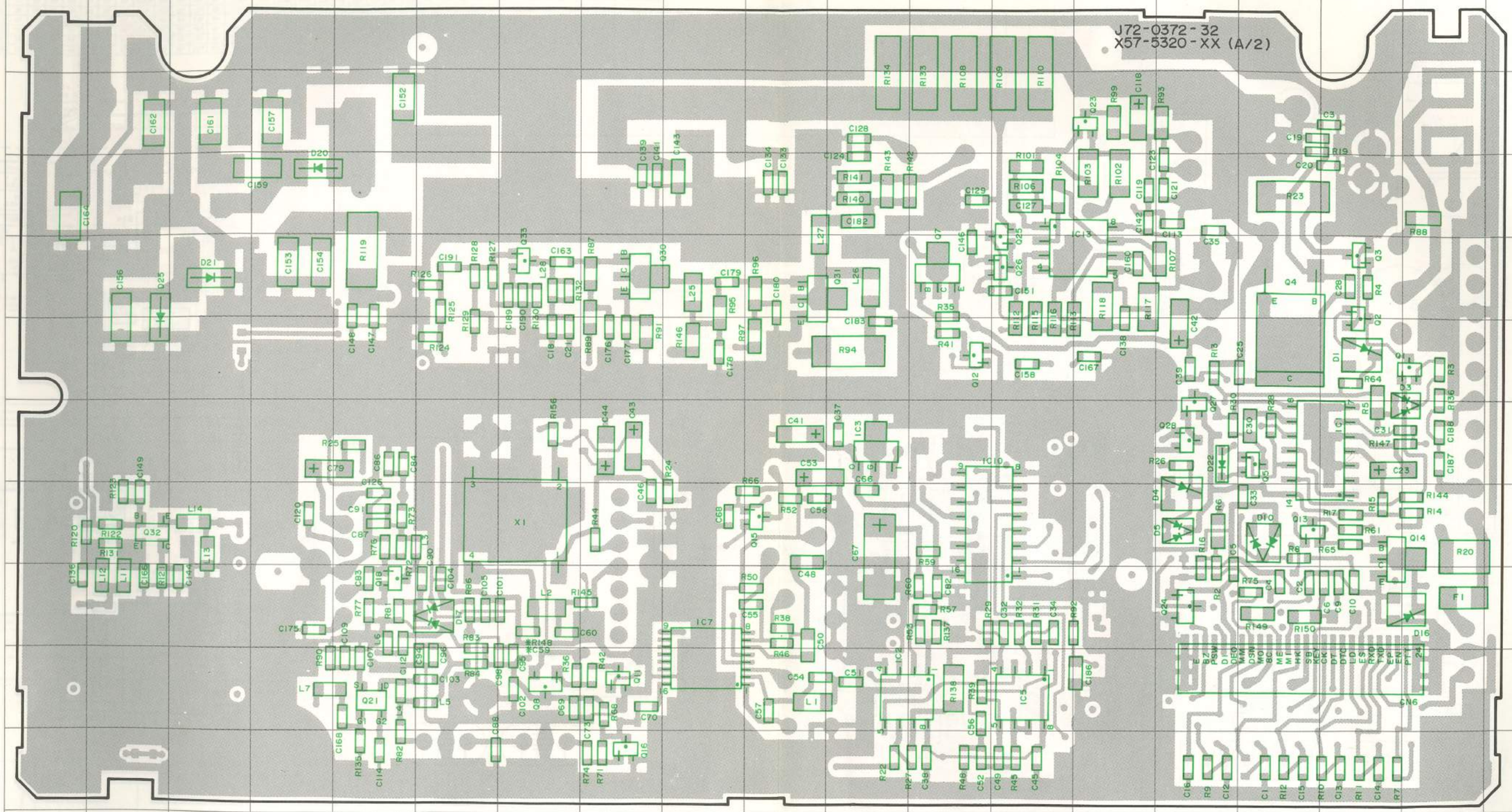
2SA1641

3SK214 SGM2014M

NJM78L05UA

µPC7808H

TX-RX UNIT (X57-5320-XX) (A/2) Foil side view -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3



Component side

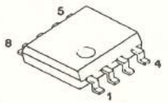
Pattern 1
Pattern 2
Pattern 3
Pattern 4

Foil side

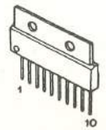
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	7Q	Q1	6R	Q11	10H	Q21	10E	Q30	5H	D5	8O	D25	5B
IC2	10K	Q2	5Q	Q12	6L	Q23	2N	Q31	5J	D10	8P		
IC3	7K	Q3	5Q	Q13	8P	Q24	9O	Q32	8B	D16	9R		
IC5	10M	Q4	6P	Q14	8Q	Q25	5M	Q33	5G	D17	9F		
IC7	10I	Q5	7P	Q15	8J	Q26	5M	D1	6Q	D20	4D		
IC10	8L	Q7	5L	Q16	11H	Q27	7O	D3	7R	D21	5C		
IC13	5N	Q8	10G	Q18	9E	Q28	7O	D4	8O	D22	7O		

S-AU27AH(K)
S-AU27AL(K)
S-AU27AM(K)

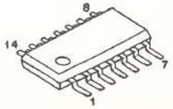
MC33172D
NJM2904E
NJM2904M
NJM4558E



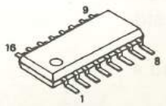
LA4422



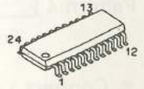
BU4013BF



BU4094BCF
MC3372SV
XRU4094BCF

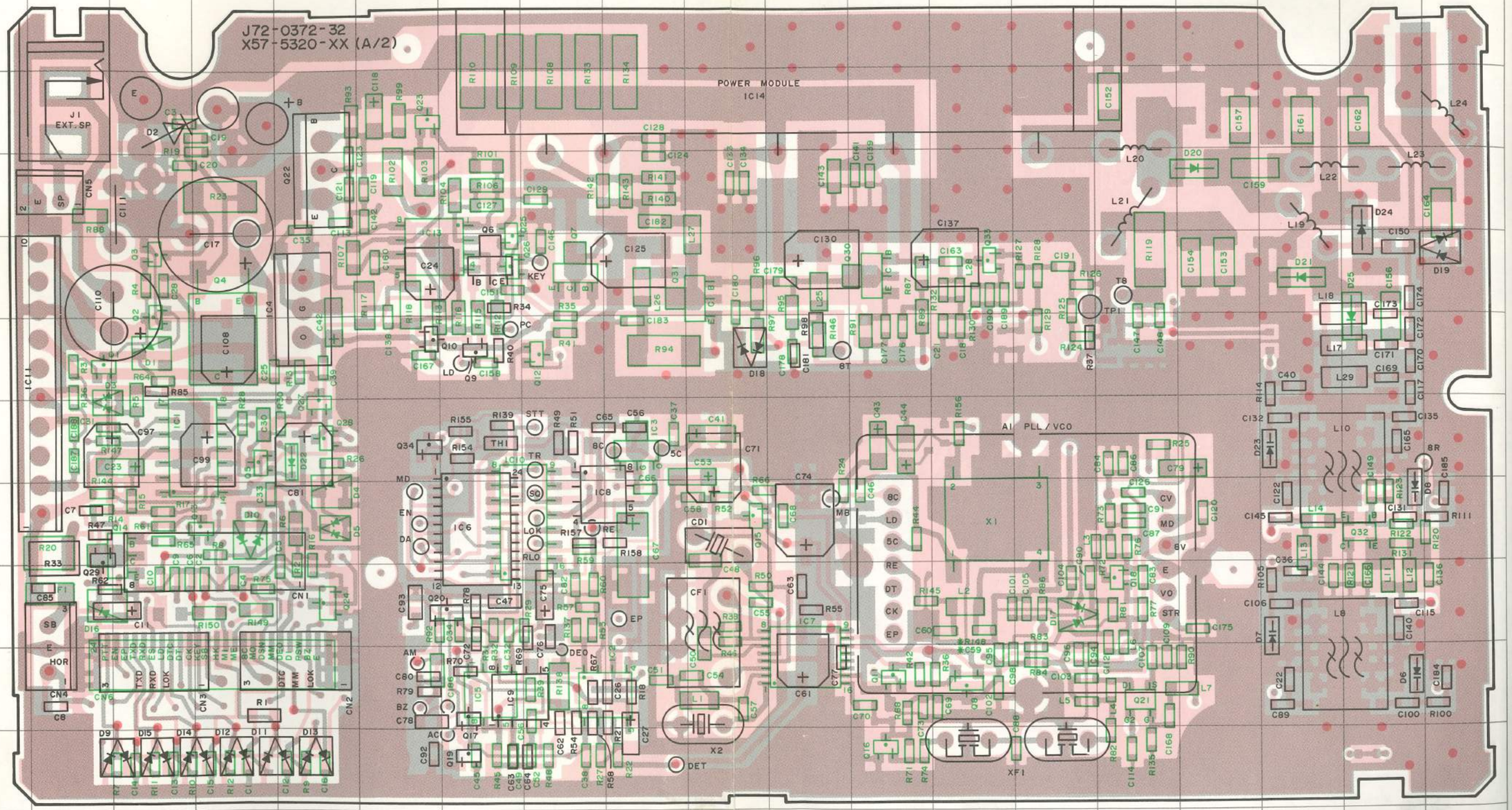


M62363FP



TK-840/(N) PC BOARD VIEW

TX-RX UNIT (X57-5320-XX) (A/2) Component side view + Foil side -10 : K -11 : K2 -12 : K3 -13 : NK -14 : NK2 -15 : NK3



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	Ref. No.	Address	Ref. No.	Address
IC1	7D	IC9	10G	Q5	7D	Q13	8D	Q21	10O	Q29	8B	D3	7B	D11	11D	D19	5S
IC2	10I	IC10	8H	Q6	5G	Q14	8C	Q22	4E	Q30	5L	D4	8E	D12	11D	D20	4P
IC3	7I	IC13	5F	Q7	5H	Q15	8J	Q23	3F	Q31	5J	D5	8E	D13	11E	D21	5Q
IC4	5E	IC14	3J	Q8	10M	Q16	11L	Q24	9E	Q32	8R	D6	10R	D14	11D	D22	7E
IC5	10G	Q1	6B	Q9	6G	Q17	10G	Q25	5G	Q33	5M	D7	10Q	D15	11C	D23	7Q
IC6	8G	Q2	5C	Q10	6F	Q18	9O	Q26	5G	Q34	7F	D8	8R	D16	9B	D24	5R
IC7	10K	Q3	5C	Q11	10L	Q19	11G	Q27	7E	D1	6C	D9	11C	D17	9N	D25	5R
IC8	8H	Q4	6D	Q12	6H	Q20	9G	Q28	7E	D2	3C	D10	8D	D18	6J		

MODEL NAME	UNIT NAME	A1	L3	L6	L7	L8	L10	L11	L12	L13	L14	L17	L18	L29	C22	C59	C88	C89	C100,106	C112	C114	C115	C117	C122	C131,132	C135	C140	C145	C150	C152	C156	C157	C161	C162	C164	C165
TK-840K	X57-5320-10	X58-4480-10	33nH	27nH	10nH	L79-1162-05	L79-1162-05	47nH	15nH	22nH	68nH	NO	15nH	YES	6P	YES	8P	11P	15P	3P	NO	11P	12P	6P	15P	11P	6P	11P	8P	2P	YES	1P	7P	7P	5P	6P
TK-840K2	X57-5320-11	X58-4480-11	18nH	22nH	10nH	L79-1169-05	L79-1169-05	33nH	27nH	47nH	68nH	YES	17nH	NO	2P	YES	8P	1000P	15P	5P	NO	1000P	1000P	NO	15P	10P	2P	1000P	6P	1P	NO	3P	5P	8P	6P	NO
TK-840K3	X57-5320-12	X58-4480-12	33nH	27nH	15nH	L79-1163-05	L79-1163-05	27nH	47nH	27nH	82nH	NO	17nH	YES	10P	YES	8P	1000P	5P	2P	YES	10P	8P	10P	5P	1000P	NO	3P	10P	4P	YES	1P	12P	9P	4P	10P
TK-840NK	X57-5320-13	X58-4480-10	33nH	27nH	10nH	L79-1162-05	L79-1162-05	47nH	15nH	22nH	68nH	NO	15nH	YES	6P	NO	22P	11P	15P	3P	NO	11P	12P	6P	15P	11P	6P	11P	8P	2P	YES	1P	7P	7P	5P	6P
TK-840NK2	X57-5320-14	X58-4480-11	18nH	22nH	10nH	L79-1169-05	L79-1169-05	33nH	27nH	47nH	68nH	YES	17nH	NO	2P	NO	22P	1000P	15P	5P	NO	1000P	1000P	NO	15P	10P	2P	1000P	6P	1P	NO	3P	5P	8P	6P	NO
TK-840NK3	X57-5320-15	X58-4480-12	33nH	27nH	15nH	L79-1163-05	L79-1163-05	27nH	47nH	27nH	82nH	NO	17nH	YES	10P	NO	22P	1000P	5P	2P	YES	10P	8P	10P	5P	1000P	NO	3P	10P	4P	YES	1P	12P	9P	4P	10P

TX-RX UNIT (TX-RX SECTION) (X57-5320-XX) (A/2) -10:K -11:K2 -12:K3 -13:NK -14:NK2 -15:NK3

PLL/VCO (X58-4480-XX)
Q1 : DTC143EK
Q2 : 2SA1586(Y,GR)
Q3 : 2SC3120
Q51,53 : 2SK508NV(K52)
Q52 : DTC114EU
Q54 : UMG1
Q55 : 2SC4226(R24)

D1 : 1SS301
D51 : MA360
D52~54 : 1T363A

IC1 : SC370651F or MC145190F-K

KDD-4

TX-RX UNIT (CONTROL SECTION) (X57-5320-XX) (B/2)

LCD ASS'Y (DISPLAY SECTION) (B38-0731-05)

W201 W301

*A1:PLL (X58-4480-XX)(A/2)

*VCO (X58-4480-XX)(B/2)

(X58-4480-XX)

	C53	C58	C59	C60	C62	C66	C67	C68	C69	C78	L53	L58	L61	R15	R59	R61	R63	R64
-10	1.5P	15P	9P	2P	10P	15P	6P	1.5P	8P	7P	17nH	23nH	27nH	2.7K	180	22K	100	NO
-11	1.5P	8P	9P	0.5P	10P	7P	7P	1P	8P	6P	17nH	23nH	18nH	3.3K	220	15K	47	NO
-12	2P	12P	7P	4P	8P	10P	5P	2P	10P	7P	23nH	33nH	27nH	3.3K	220	22K	100	YES

IC2 MC33172D
IC5 NJM4558E
IC6 M62363FP
IC7 MC3372SV
IC8 NJM2904E
IC9 NJM4558E
IC10 XRU4094BCF or BU4094BCF
IC14 POWER MODULE

SCHEMATIC DIAGRAM TK-840/(N)

MODEL NAME	UNIT NAME	A1	L3	L6	L7	L8	L10	L11	L12	L13	L14	L17	L18	L29	C22	C59	C68	C89	C100,106	C112	C114	C115	C117	C122	C131,132	C135	C140	C145	C150	C152	C156	C157	C161	C162	C164	C165	C166	C169	C170	C171	C172	C173	C174	C187,188	C189	R27	R74	R82	R90	R104	R121	R136	R139	R148	TH1	D25	XF1	CF1	X1	IC14
TK-840K	X57-5320-10	X58-4480-10	33nH	27nH	10nH	L79-1162-05	L79-1162-05	47nH	15nH	22nH	68nH	NO	15nH	YES	6P	YES	8P	11P	15P	3P	NO	11P	12P	6P	15P	11P	6P	11P	8P	2P	YES	1P	7P	7P	5P	6P	1P	4P	1000P	NO	5P	18P	6P	1000P	NO	220K	680	330	100	22K	150	NO	YES	NO	NO	YES	L71-0409-15	L72-0372-05	L77-1583-15	S-AU27AM(K)
TK-840K2	X57-5320-11	X58-4480-11	18nH	22nH	10nH	L79-1169-05	L79-1169-05	33nH	27nH	47nH	68nH	YES	17nH	NO	2P	YES	8P	1000P	15P	5P	NO	1000P	1000P	NO	15P	10P	2P	1000P	6P	1P	NO	3P	5P	8P	6P	NO	2P	NO	11P	YES	4P	15P	6P	1000P	YES	220K	680	330	470	22K	100	NO	YES	NO	NO	YES	L71-0409-15	L72-0372-05	L77-1583-15	S-AU27AM(K)
TK-840K3	X57-5320-12	X58-4480-12	33nH	27nH	15nH	L79-1163-05	L79-1163-05	27nH	47nH	27nH	82nH	NO	17nH	YES	10P	YES	8P	1000P	5P	2P	YES	10P	8P	10P	5P	1000P	NO	3P	10P	4P	YES	1P	12P	9P	4P	10P	4P	6P	1000P	NO	6P	22P	8P	470P	NO	220K	680	330	470	18K	270	YES	NO	NO	YES	YES	L71-0409-15	L72-0372-05	L77-1583-15	S-AU27AL(K)
TK-840NK	X57-5320-13	X58-4480-10	33nH	27nH	10nH	L79-1162-05	L79-1162-05	47nH	15nH	22nH	68nH	NO	15nH	YES	6P	NO	22P	11P	15P	3P	NO	11P	12P	6P	15P	11P	6P	11P	8P	2P	YES	1P	7P	7P	5P	6P	1P	4P	1000P	NO	5P	18P	6P	1000P	YES	220K	680	330	100	22K	150	NO	YES	NO	NO	YES	L71-0409-15	L72-0372-05	L77-1583-15	S-AU27AM(K)
TK-840NK2	X57-5320-14	X58-4480-11	18nH	22nH	10nH	L79-1169-05	L79-1169-05	33nH	27nH	47nH	68nH	NO	15nH	YES	17nH	NO	2P	NO	22P	1000P	15P	5P	NO	1000P	1000P	NO	15P	10P	2P	1000P	6P	1P	NO	3P	5P	8P	6P	NO	2P	NO	11P	YES	4P	15P	6P	1000P	YES	220K	680	330	470	22K	100	NO	YES	NO	NO	YES	L71-0409-15	L72-0372-05	L77-1583-15	S-AU27AL(K)
TK-840NK3	X57-5320-15	X58-4480-12	33nH	27nH	15nH	L79-1163-05	L79-1163-05	27nH	47nH	27nH	82nH	NO	17nH	YES	10P	NO	22P	1000P	5P	2P	YES	10P	8P	10P	5P	1000P	NO	3P	10P	4P	YES	1P	12P	9P	4P	10P	4P	6P	1000P	NO	6P	22P	8P	470P	NO	470K	270	270	470	18K	270	YES	NO	YES	YES	NO	L71-0461-05	L72-0376-05	L77-1563-15	S-AU27AL(K)

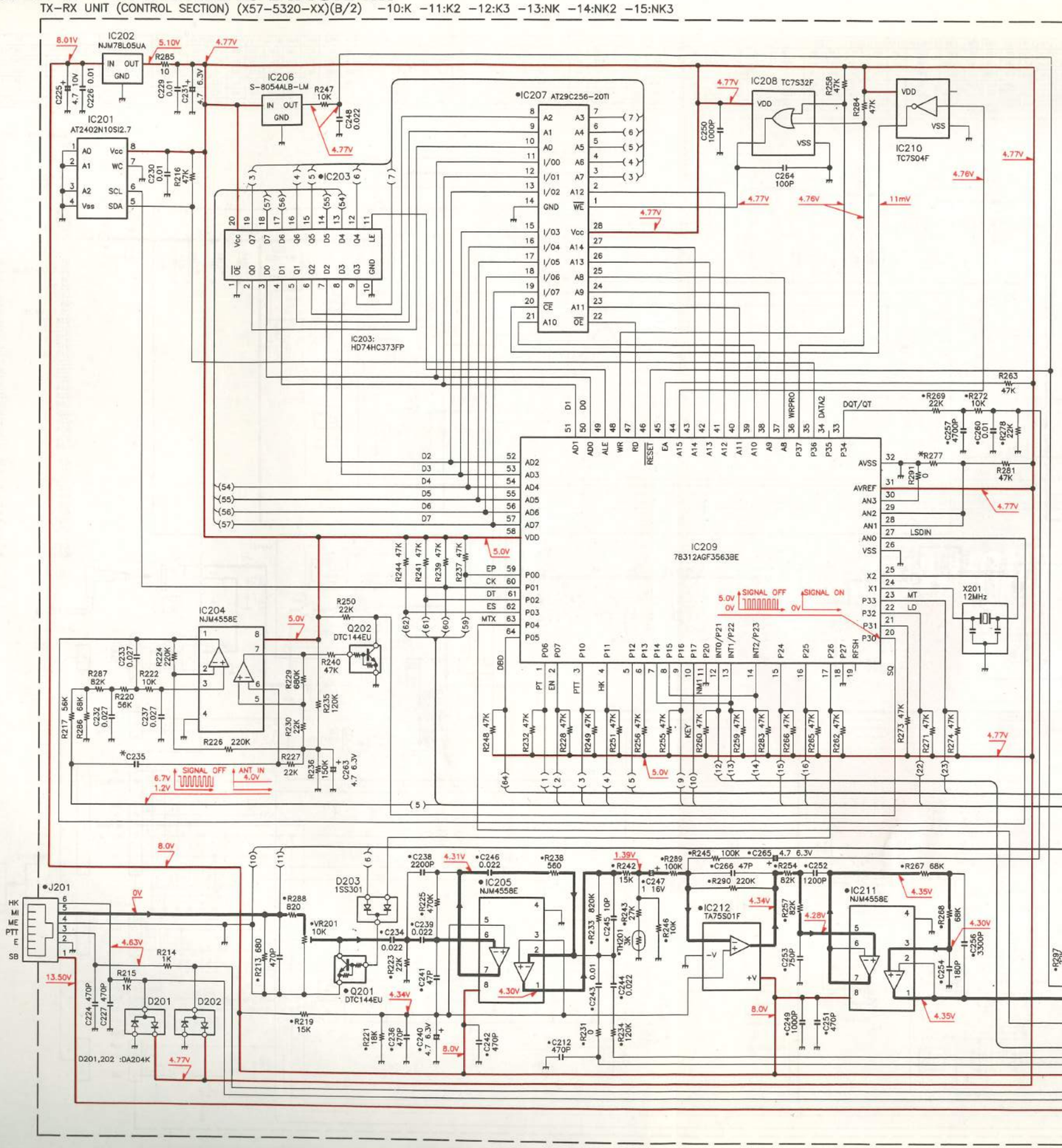
-15:NK3

TX-RX UNIT (X57-5320-XX)

D1	:02CZ18(X,Y)
D2	:DSA3A1
D3,5	:1SS301
D4	:02CZ15(X,Y)
D6~8,23	:MA377
D9~15,18	:DA204K
D16	:02CZ20(Y,Z)
D17	:DAN235K
D19	:HSM88AS
D20	:MA4PH633
D21,24	:MI809
D22	:1SS355
Q1	:DTA114EU
Q2,3,11~13,29	:DTC114EU
Q4	:2SA1641(S,T)
Q5,27	:DTA114YU
Q6,7	:2SB1188(Q,R)
Q8	:2SA1362(Y)
Q9,10,19,26	:DTC144EU
Q14	:2SD1624(S)
Q15,23	:2SC4116(GR)
Q16	:2SC4215(Y)
Q17	:DTA114TU
Q18,33	:2SC4226(R24)
Q20	:DTC363EK
Q21	:SGM2014M
Q22	:2SB1370(E,F)
Q24	:DTC114EU
Q25	:DTA144EU
Q28	:DTC114YU
Q29	:2SA1586(Y,GR)
Q30	:2SC3357
Q31	:2SC2954
Q32	:3SK241(R)
Q34	:DTC114YU
IC1	:BU4013BF
IC2	:MC33172D
IC5,9	:NJM4558E
IC3	:NJM78L05UA
IC4	:μPC7808H
IC6	:M62363FP
IC7	:MC3372SV
IC8	:NJM2904E
IC10	:XRU4094BCF or BU4094BCF
IC11	:LA4422
IC13	:NJM2904M

TK-840/(N) SCHEMATIC DIAGRAM

TX-RX UNIT (CONTROL SECTION) (X57-5320-XX)(B/2) -10:K -11:K2 -12:K3 -13:NK -14:NK2 -15:NK3



IC201 :AT2402N10SI2.7
IC202 :NJM78L05UA
IC203 :HD74HC373FP
IC204,205,211 :NJM4558E
IC206 :S-8054ALB-LM
IC207 :AT29C256-20TI
IC208 :TC7S32F
IC209 :78312AGF3563BE
IC210 :TC7S04F
IC212 :TA75S01F
IC213 :TA75W558FU

Q201,202 :DTC144EU

D201,202
D203

MODEL NA
TK-840K
TK-840K2
TK-840K3
TK-840NK
TK-840NK
TK-840NK

KDD-4

LCD ASS'Y (DISPLAY

TX-RX UNIT
(TX-RX SECTION)
(X57-5320-XX)(A/2)

LED ASS'Y

-14:NK2 -15:NK3

IC201 :AT2402N10SI2.7
IC202 :NJM78L05UA
IC203 :HD74HC373FP
IC204,205,211 :NJM4558E
IC206 :S-8054ALB-LM
IC207 :AT29C256-20TI
IC208 :TC7S32F
IC209 :78312AGF3563BE
IC210 :TC7S04F
IC212 :TA75S01F
IC213 :TA75W558FU

Q201,202 :DTC144EU

D201,202 :DA204K
D203 :1SS301

MODEL NAME	UNIT NAME	C235	R277
TK-840K	X57-5320-10	100P	NO
TK-840K2	X57-5320-11	100P	47K
TK-840K3	X57-5320-12	100P	0
TK-840NK	X57-5320-13	47P	NO
TK-840NK2	X57-4590-14	47P	47K
TK-840NK3	X57-4590-15	47P	0

KDD-4

TX-RX UNIT
(TX-RX SECTION)
(X57-5320-XX)(A/2)

LCD ASS'Y (DISPLAY SECTION) (B38-0731-05)

ED1

T X BUSY CALL S TA OPT AUX

IC1 NJM78L05UA

IC2
μPD75308BGK740

SYSTEM DOWN
SYSTEM UP
GROUP DOWN
GROUP UP
VOLUME DOWN
VOLUME UP
SCAN
AUX
POWER

SPECIFICATIONS

GENERAL	
Frequency Range	450~488MHz : K,NK 488~512MHz : K2,NK2 403~430MHz : K3,NK3
Systems	Max. 32
Group	Max. 250
Conventional Channels	Max. 308
Channel Spacing	25kHz (PLL step : 12.5kHz) : K,K2,K3 12.5kHz (PLL step : 5kHz/6.25kHz) : NK,NK2,NK3
Input Voltage	13.6V DC (Negative ground)
Current Drain	Less than 0.4A : Standby Less than 1.0A : Receive Less than 7.0A : Transmit
Duty Cycle	RX : 100% TX : 20%
Operating Temperature Range	–22°F~+140°F (–30°C~+60°C)
Dimensions (W x H x D)	5-33/64 x 1-37/64 x 5-5/16 in. (140 x 40 x 135mm)
Weight (Net)	2.09 lbs (950g)
RECEIVER (Measurement made per EIA standard EIA-204-D)	
RF Input Impedance	50Ω
Sensitivity (EIA 12dB SINAD)	0.3μV : K,K2,K3 0.35μV : NK,NK2,NK3
Modulation Acceptance	±7kHz : K,K2,K3 ±3.5kHz : NK,NK2,NK3
Selectivity	–73dB : K,K2,K3 –68dB : NK,NK2,NK3
Intermodulation Distortion	–70dB " K,K2,K3 –65dB : NK,NK2,NK3
Spurious & Image Rejection	–75dB
Channel Frequency Spread	38MHz : K,NK 24MHz : K2,NK2 27MHz : K3,NK3
Audio Output	4W at less than 5% distortion
TRANSMITTER (Measurement made per EIA standard EIA-152-C)	
RF Power Output	25W
RF Output Impedance	50Ω
Spurious & Harmonics	–65dB
Modulation	F3E, F1D, F2D
FM Noise	–45dB : K,K2,K3 –43dB : NK,NK2,NK3

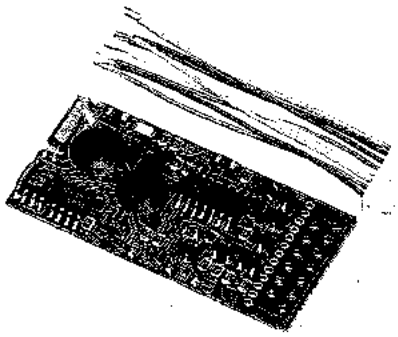
Applicable MIL standard

	MIL 810C Methods/Procedures	MIL 810D Methods/Procedures	MIL 810E Methods/Procedures
Dust	510.1/Procedure 1	510.2/Procedure 1	510.3/Procedure 1
Vibration	514.2/Procedure 8, 10	514.3/Procedure 1	514.4/Procedure 1
Shock	516.2/Procedure 1, 2, 3, 5	516.3/Procedure 1, 3, 4, 5, 6	516.4/Procedure 1, 3, 4, 5, 6

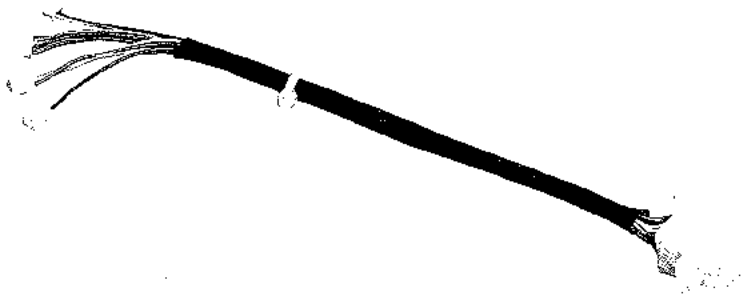
TK-840/(N)

KCT-19 (ACCESSORY CONNECTION CABLE) / KDD-4 (DTMF DECODER) / KPG-25D (PROGRAMMING DISK)

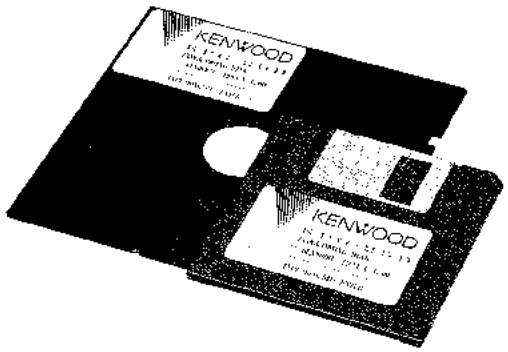
KDD-4 External View



KCT-19 External View



KPG-25D External View



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1996-11/1997-9/1998-5 (N) 500