

TK-320/320(DM)

SERVICE MANUAL

KENWOOD

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Remove R23 on Control Board to go Above 470 MHz

To Put into Programming mode make
Sure Green Jumper wire is not cut (Contact)
If this still does not allow you to the
Program mode look at the control board X53-3170-10
one side of R6 should be connected to
one side of R23 Pg 57

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GENERAL

INTRODUCTION

SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of the publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions. 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.

SERVICE

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

NOTE.

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

FCC COMPLIANCE AND TYPE ACCEPTANCE NUMBERS

Type acceptance number	Frequency range	Compliance
ALH9TKTK-320-1	450 ~ 470MHz	Part 15, 22, 74, 80, 90 and 95

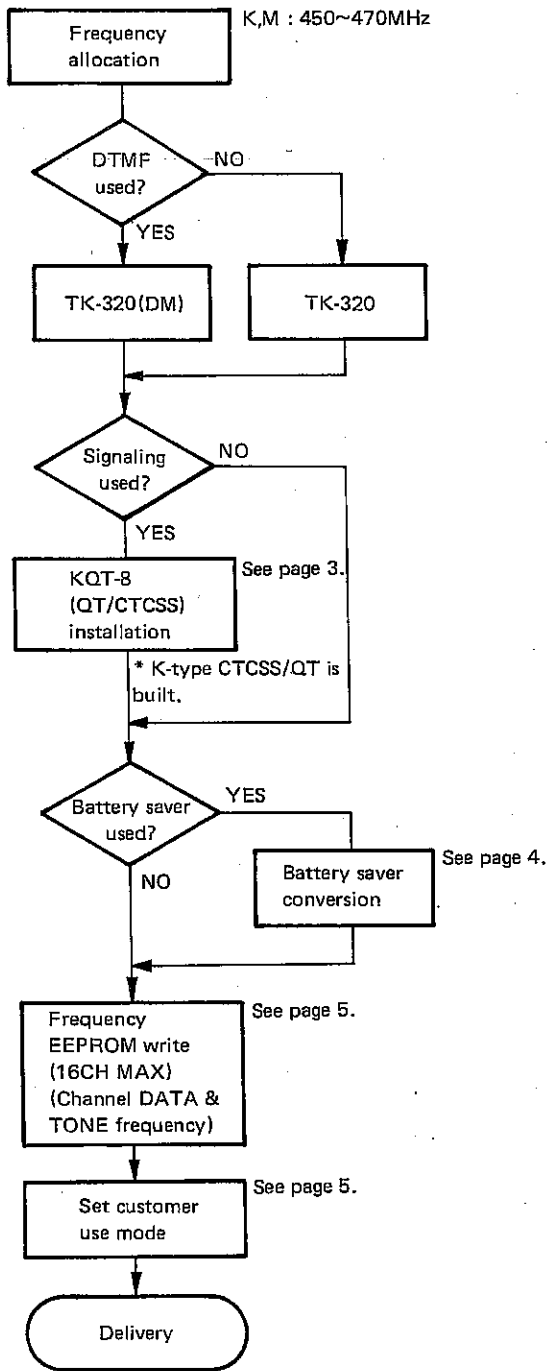
PERSONNEL SAFETY

The following precautions are recommended for personnel safety:

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

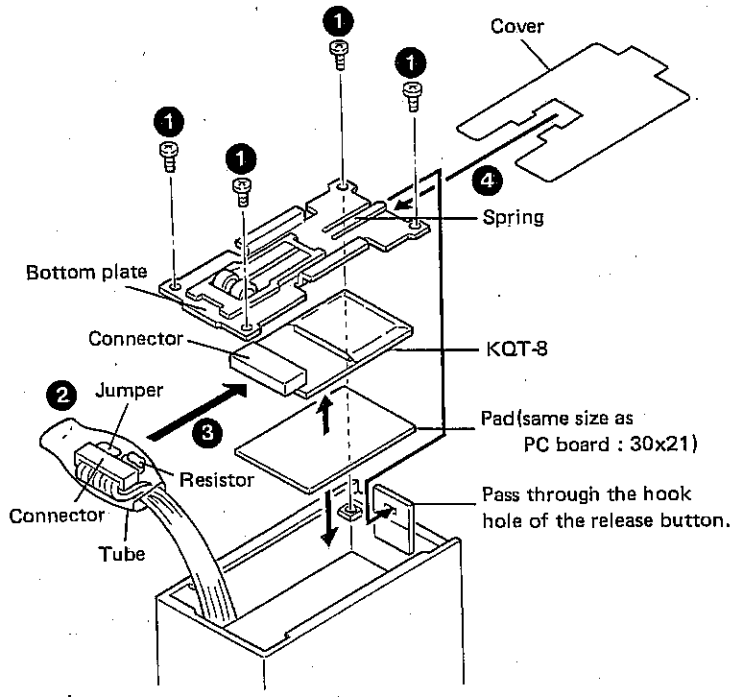
SYSTEM SET-UP / INSTALLATION

System Set-up



Installing KQT-8

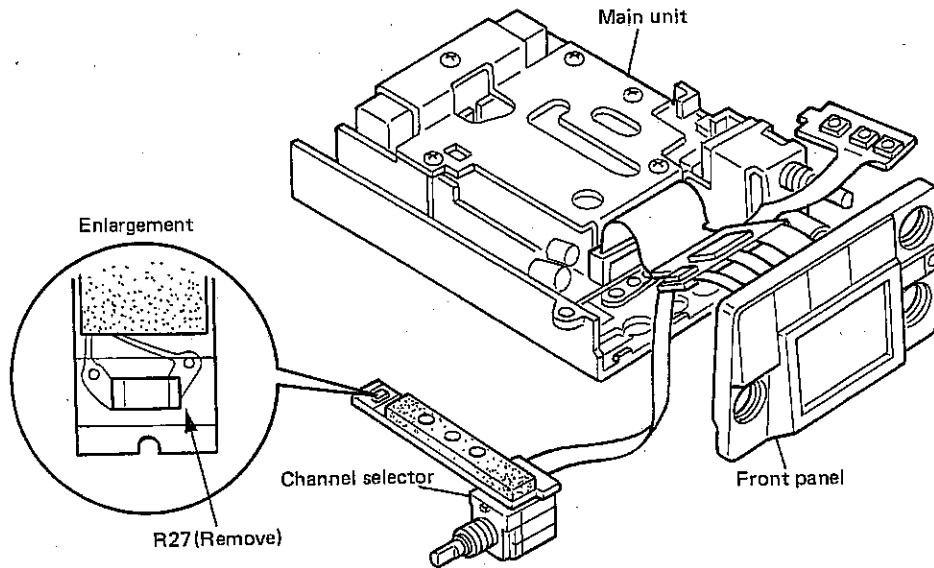
1. Stick the supplied pad on the foil side of KQT-8.
2. Remove the battery pack from the radio, and remove the 4 screws fixing the bottom plate of the radio (1).
3. Lift the bottom plate and take out the connector (2).
4. Remove the transparent tube that covers the connector. Remove the resistor and jumper that are connected to connector pins.
5. Mate the connector (from which the resistor and jumper were removed in step 4) with the KQT-8 connector (3).
6. Remove the remaining sheet of paper from the pad stuck on the back of KQT-8, and then attach KQT-8 to the radio.
7. Insert the cover into the bottom plate with its glossy side facing toward KQT-8 (4).
8. Push up the release button, pass the spring section of the bottom plate through the hook hole, and secure the bottom plate on the main unit. (Take care not to get any wires between the bottom plate and the main unit.)



CONVERSION

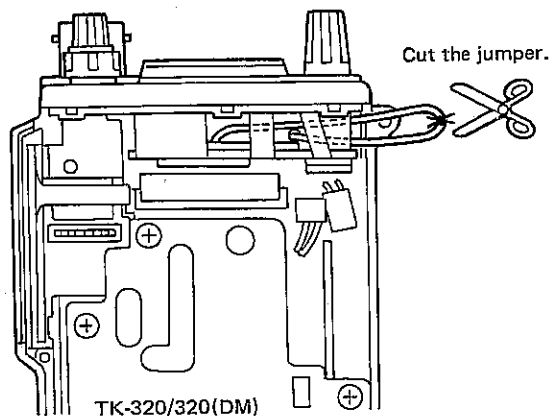
Disabling Battery Saver

1. Disassemble according to the disassembly procedure for the front panel (See disassembly for repair 1, 2, 3, and 6).
2. Remove R27 (at the end of the FPC of the channel selector) in the control unit (X53-3170-10). The battery saver will be disabled.



Setting Customer Use Mode

1. Remove the front shell (See disassembly for repair 1, 2, and 3).
2. Pull out and cut off the green lead between the front panel and the control unit (X53-3170-10).



3. Replace the removed lead.

FREQUENCY WRITING METHOD

Frequency Writing Method (Channel Data and Tone Frequency)

1. Frequency Setting Mode (Memory Write)

• Notes

The frequencies for all channels have been factory set. If they are not required, clear the memory by switching the power on, while holding the MONITOR switch down. (Channel 1, however, is always initialized to 460MHz.)

Individual channels can not be cleared.

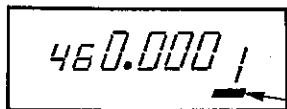
Normally, the frequency is changed in 12.5kHz steps. If LAMP switch is held down while the channel selector is turned, the frequency may be changed in 1MHz steps.

In this mode, transmission and reception are impossible.

• Writing Method (See Flowchart)

When the power is turned on, the system enters the receive frequency setting mode, starting with channel 1. Set the receive frequency and tone frequency for each channel as follows :

- (1) Set the receive frequency with the channel selector.
- (2) Press the PTT switch. The receive frequency specified in step 1 is memorized and the channel indicator shows receive tone frequency input mode.
- (3) Set the receive tone frequency with the channel selector and press the PTT switch.
- (4) The channel indicator now shows transmit frequency input mode. Set the transmit frequency by following step 1 to 3.



TX-mode

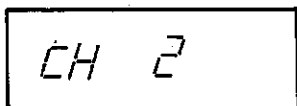
- (5) Repeat steps 1 to 4 for the channels for which frequencies need to be set.
- (6) If frequencies for a channel need not be set, simply press the PTT switch. The next step will be displayed.
- (7) When all 16 channels have been set up, "E n d" is displayed.
- (8) When the MONITOR switch is pressed, the written data is displayed sequentially. If necessary, the data may be modified by turning the channel selector and pressing the PTT switch.

2. Customer Use Mode

This mode is set by writing frequencies into memory in the frequency setting mode and cutting the internal jumper of the radio (control unit, D4). In this mode, the channel for which the transmit, receive, and tone frequencies have been memorized with the channel selector may be recalled and transmission or reception mode.

CHANNEL INDICATOR

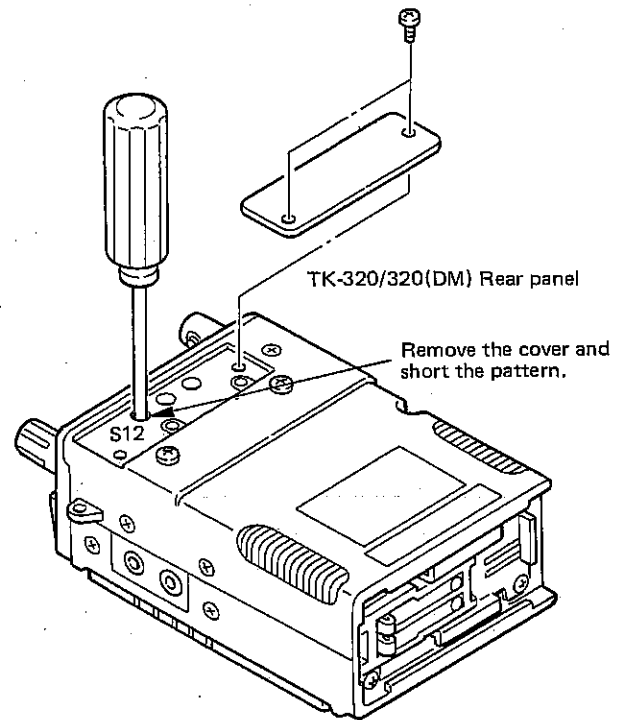
ex



3. Read Mode (The jumper in the Radio is Cut.)

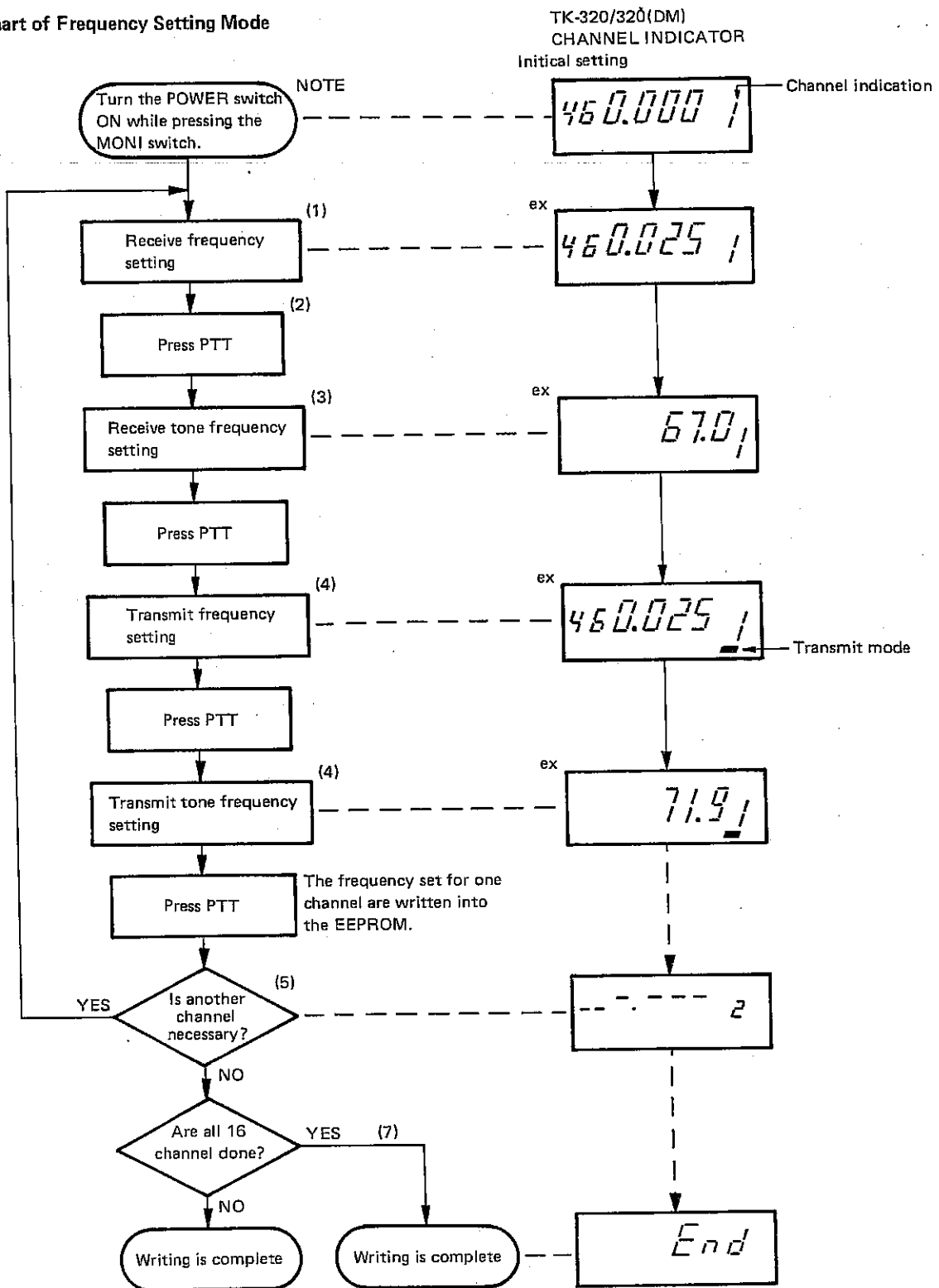
The contents of the memory can be read by pressing the MONITOR switch in customer use mode. (Transmission and reception are impossible.)

While short S12 (pattern) under the cover on the rear of the radio with the tip of a screwdriver as shown below, turn the POWER switch ON to set this mode.



FREQUENCY WRITING METHOD

4. Flowchart of Frequency Setting Mode



DISASSEMBLY FOR REPAIR

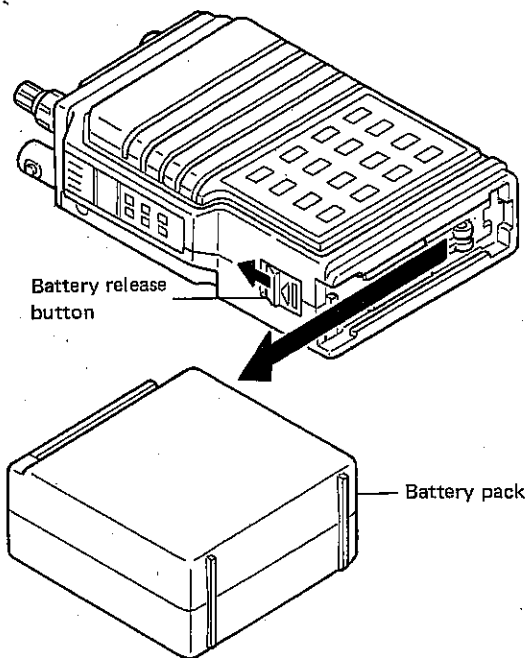
When making repairs, use the disassembly procedure specified for each location.

		Numbers for complete disassembly
1	Remove the front shell (on the SP side)	1, 2, 3
2	Check the components on the TX-RX unit	1, 2, 3, 10 (①, ②, ③)
3	Check the foil side of the TX-RX unit	1, 2, 3, 10 (②', ④, ⑤, ⑤')
4	Replace the components of the TX-RX unit	1, 2, 3, 10 (①, ②, ②', ③, ④, ⑤, ⑤')
5	Disassemble only the front panel	1, 2, 3, 6, 7, 8
6	Disassemble the MIC, SP, and DTMF unit	1, 2, 3, 4

Complete Disassembly

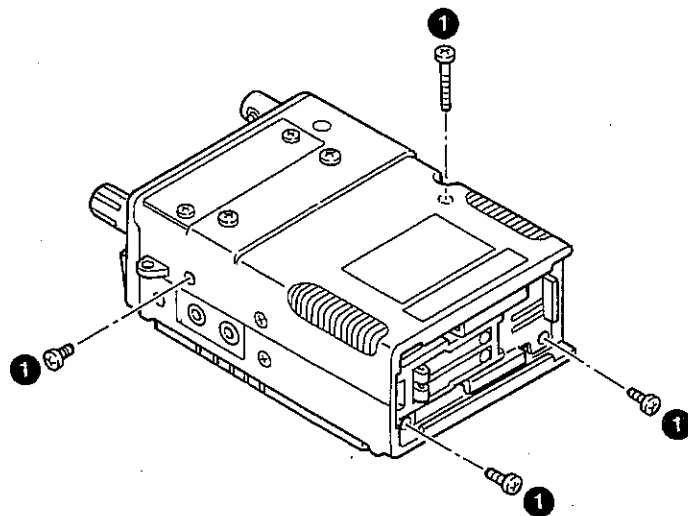
1. Removing Battery

1. While pressing the battery release button in the direction of the triangle "△", slide the battery pack sideways and remove it from the radio.



2. Removing Screws Holding the Case

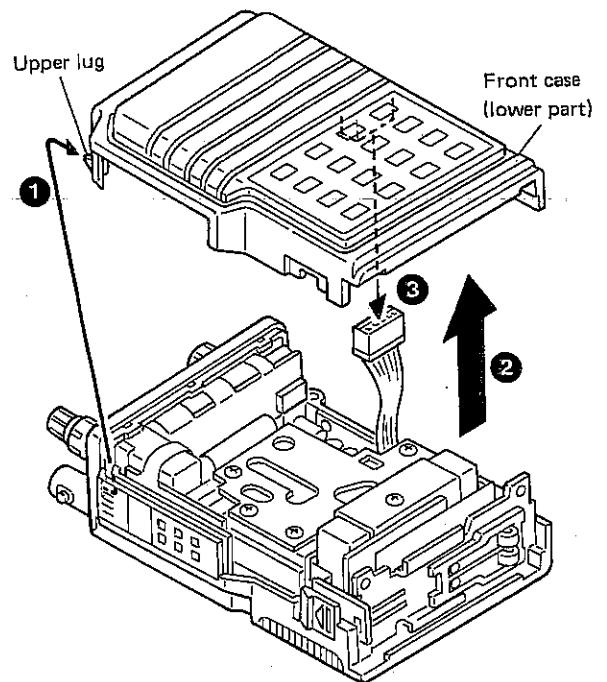
1. Remove the 4 screws holding the case (①).



DISASSEMBLY FOR REPAIR

3. Removing Front Case

1. Lift the front shell (lower part), remove the upper lug (1), and then remove the entire front case (2).
2. Remove the MIC and SP connector cables in the front shell (3).



Caution : Assembling the Front Case

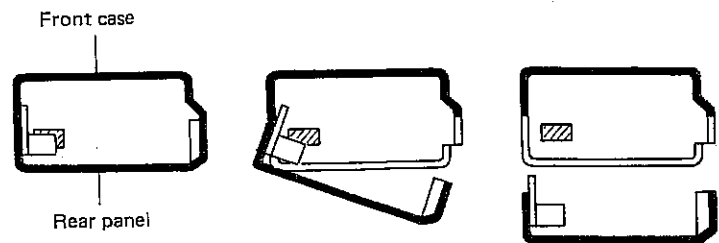
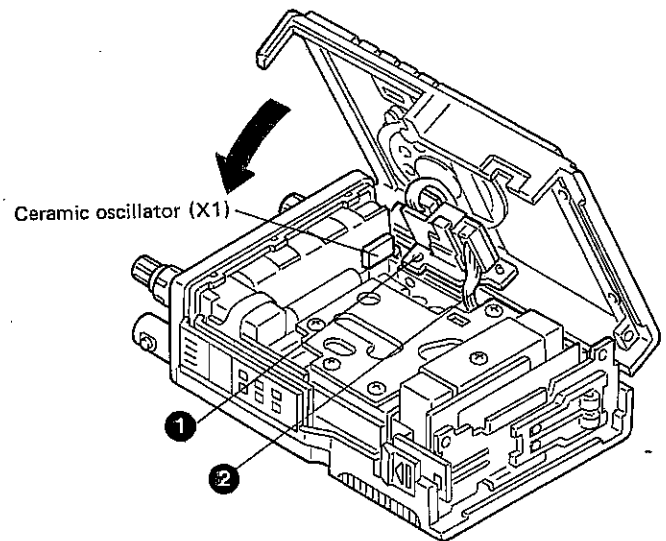
When inserting the ceramic oscillator (X1) mounted on the FPC of the front panel into the front case, use the following procedure, taking care not to damage the oscillator against the SP jack.

1. Insert the shell from the right side first, rather than from above.
2. Make sure that the SP jack is located under the ceramic oscillator (X1).

Take care that the screw (1) holding the SP and MIC jacks does not catch the FPC.

3. Insert the left side of the case carefully.

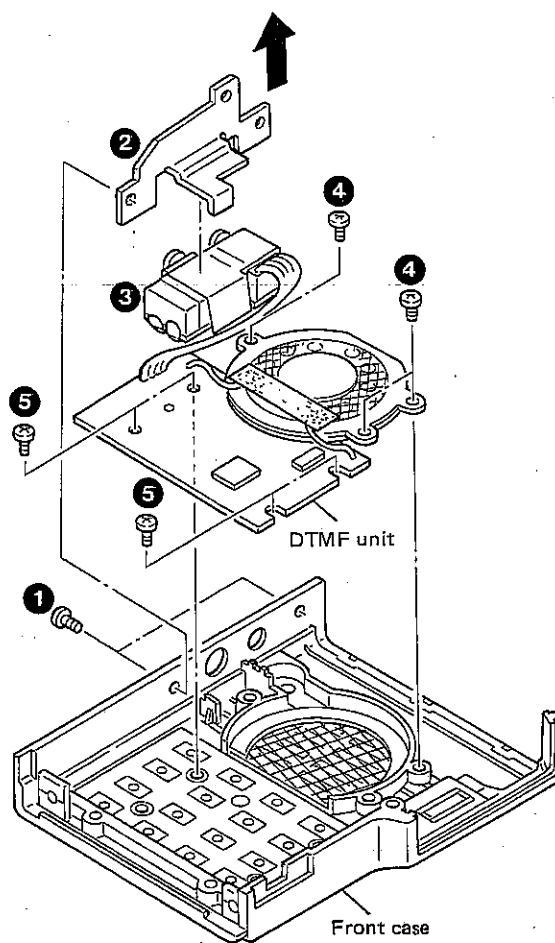
Note : Cable should not be between a front panel and TX-RX unit (2).



DISASSEMBLY FOR REPAIR

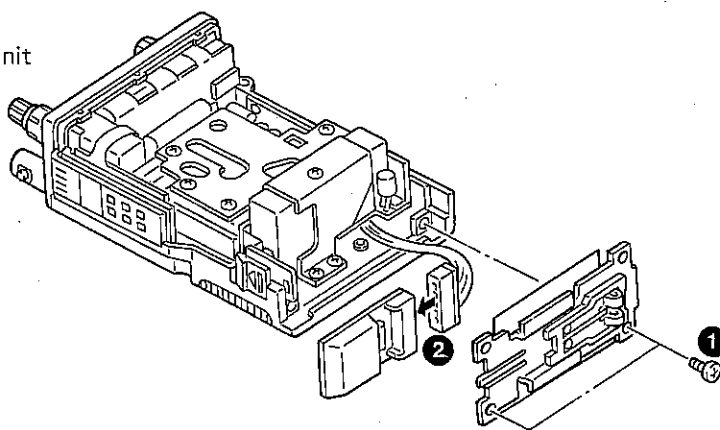
4. Removing MIC, SP, and DTMF Unit (in Front Case)

1. Remove the 2 screws from the case (❶).
2. Lift the upper part of the metal fitting slightly (❷) and take out the SP and MIC jack unit (❸).
3. Remove the 3 screws from the SP (❹) and take out the SP.
4. Remove the 4 screws from the DTMF unit (❺) and take out the DTMF unit.



5. Removing QT/CTCSS Unit

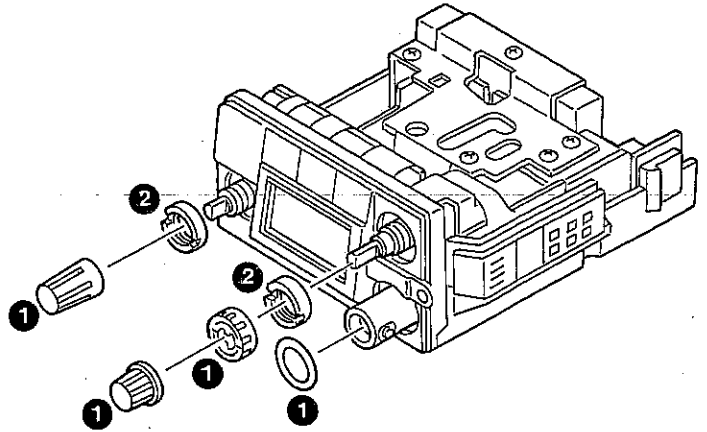
1. Remove the 2 screws from the case (❶).
2. Disconnect the connector lead from the QT/CTCSS unit and remove the QT/CTCSS unit (❷).



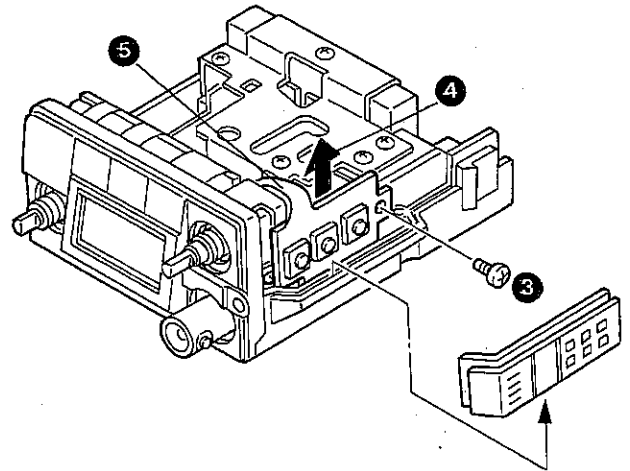
DISASSEMBLY FOR REPAIR

6. Removing Front Panel.

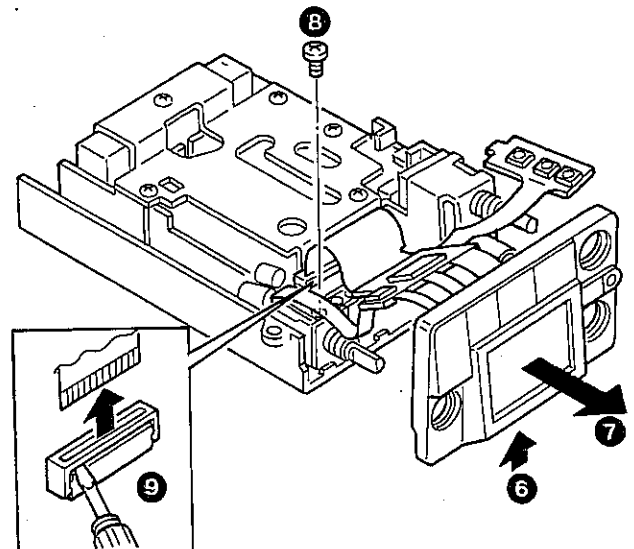
1. Pull off the 3 knobs and ring from the panel (1).
2. Remove the 2 round nuts (2).



3. Remove the screw (3) and lift off the SW unit (4), taking care not to break off the FPC (5).



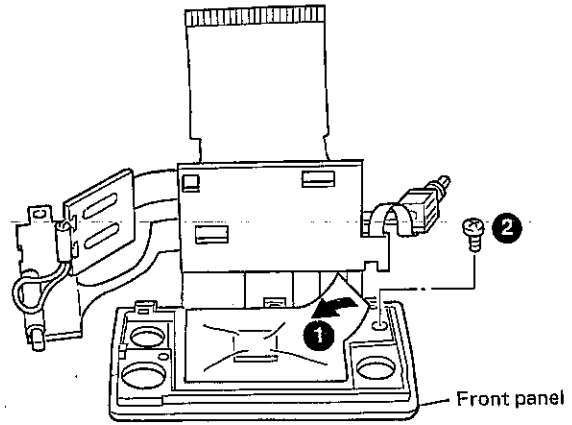
4. Slightly lift the front panel in the direction of the arrow (6) and lift off the panel (7).
5. Remove the screw (8), unlock the FPC connector lock with the tip of a screwdriver, and remove the FPC (9).



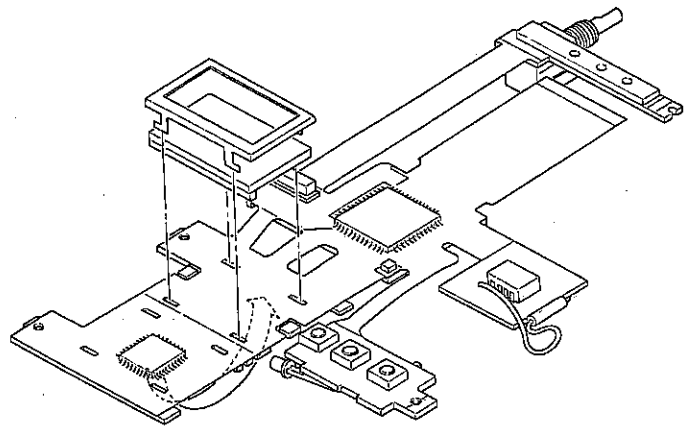
DISASSEMBLY FOR REPAIR

7. Disassembling Front Panel

1. Remove the sheet (1) and remove the screw (2) holding the LCD PC board.

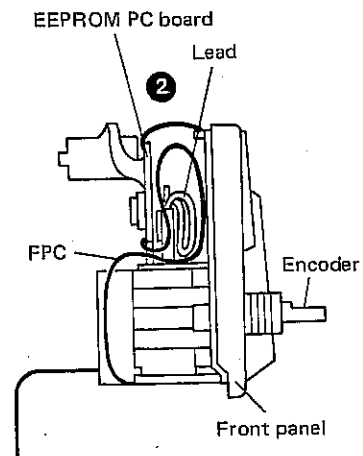
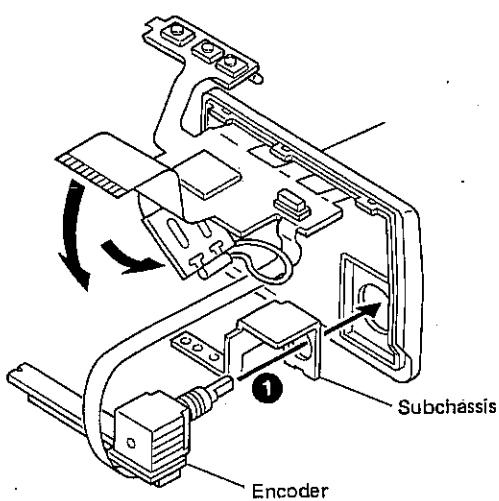


8. Installing LCD Panel



9. Assembling Front Panel (Flexible PC Board)

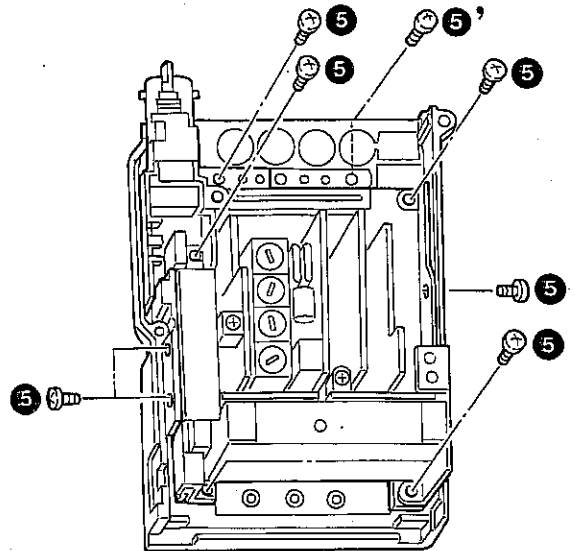
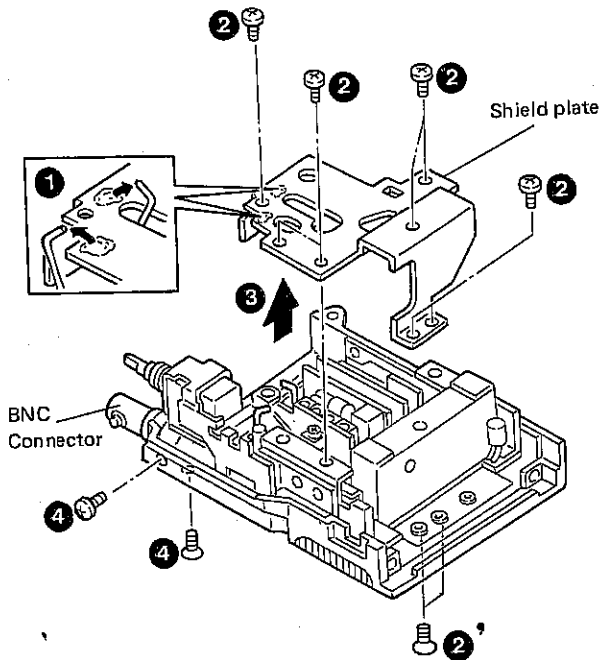
1. Insert the subchassis into the encoder, and install the encoder on the front panel (1).
2. Insert the EEPROM PC board lead between the FPC of the encoder and fold the CPU board (2).



DISASSEMBLY FOR REPAIR

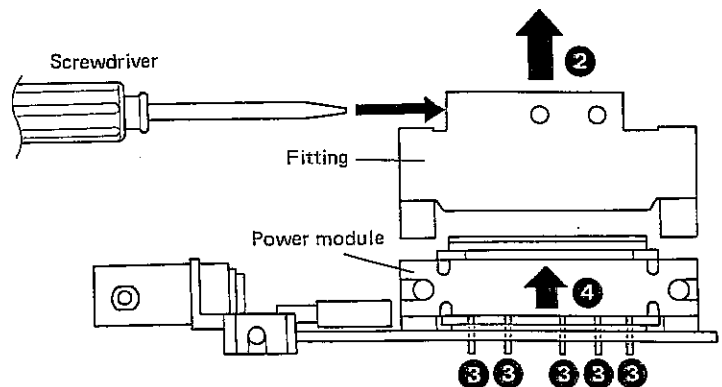
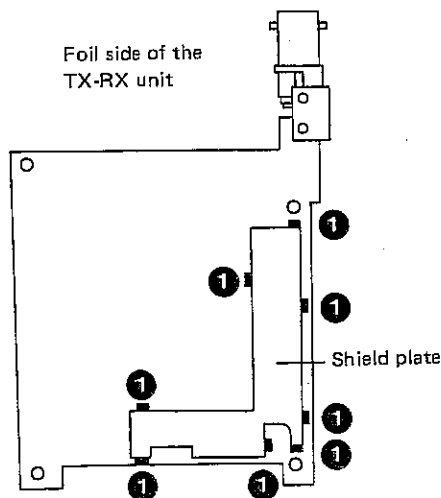
10. Removing the TX-RX Unit

1. Remove the two leads soldered to the shield plate (1).
2. Remove the 7 screws (2) that hold the shield plate and lift off the shield plate (3).
3. Remove the 2 screws from the BNC connector that holds the rear panel (4).
4. Remove the 8 screws holding the rear panel (5).



11. Removing Power Module (TX-RX Unit)

1. Desolder the 8 soldered parts of the shield plate on the foil side of the TX-RX unit and remove the shield plate (1).
2. Remove the metal fitting on the power module by inserting a screwdriver (2).
3. Desolder the 5 soldered leads (3) of the power module fixed on the TX-RX unit and pull off the power module (4).



SPECIFICATIONS

GENERAL

Frequency Range	450 - 470MHz
Number of Channels	16
Channel Spacing	25kHz (PLL channel step 12.5kHz)
Battery Voltage	
With KNB-5 or KNB-6	7.5V DC
With KNB-7	12.5V DC
Current Drain	
Standby	60mA
Receive	150mA
Transmit	1.0A at 2W (approx.) with KNB-5 or KNB-6 battery 1.3A at 4W with KNB-7 battery
Temperature Range	-30°C to +60°C (-22°F to +140°F)
Dimensions & Weight	
With KNB-5 (7.5V 600mA battery)	5.41" (137.5mm) H x 2.28" (58mm) W x 1.16" (29.5mm) D, 14.1 ozs. (400g)
With KNB-6 (7.5V 1100mA battery)	7.11" (180.5mm) H x 2.28" (58mm) W x 1.16" (29.5mm) D, 18.3ozs. (520g)
With KNB-7 (12.5V 600mA battery)	7.11" (180.5mm) H x 2.28" (58mm) W x 1.16" (29.5mm) D, 18.3ozs. (520g)

RECEIVER (Measurements made per EIA Standard EIA-316-B)

Sensitivity	
EIA 12dB SINAD	0.25 μ V
20dB Quieting	0.35 μ V
Squelch Sensitivity	0.16 μ V threshold
Modulation Acceptance	\pm 7kHz
Adjacent Channel Selectivity	-60dB
Intermodulation	-55dB
Spurious Rejection	-60dB
Image Rejection	-50dB
Audio Power Output	200mW at less than 5% distortion
Frequency Stability	\pm 0.0005% from -30°C to +60°C
Channel Frequency Spread	20MHz

TRANSMITTER (Measurements made per EIA Standard EIA-316-B)

BF Power Output	
With KNB-5 or KNB-6	2W typical at 460MHz
With KNB-7	4W
Spurious & Harmonics	-55dB
Modulation	F3E, \pm 5kHz for 100% at 1000Hz
FM Noise	-43dB
Microphone Impedance	High impedance
Audio Distortion	Less than 3% at 1000Hz
Frequency Stability	\pm 0.0005% from -30°C to +60°C
Channel Frequency Spread	20MHz

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