

COMPACT SYNTHESIZED
VHF FM TWO-WAY RADIO

TK-705(F)/C3,C4

SERVICE MANUAL

KENWOOD

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F : 5 TONE type
C3, 4 : QT/CTCSS type

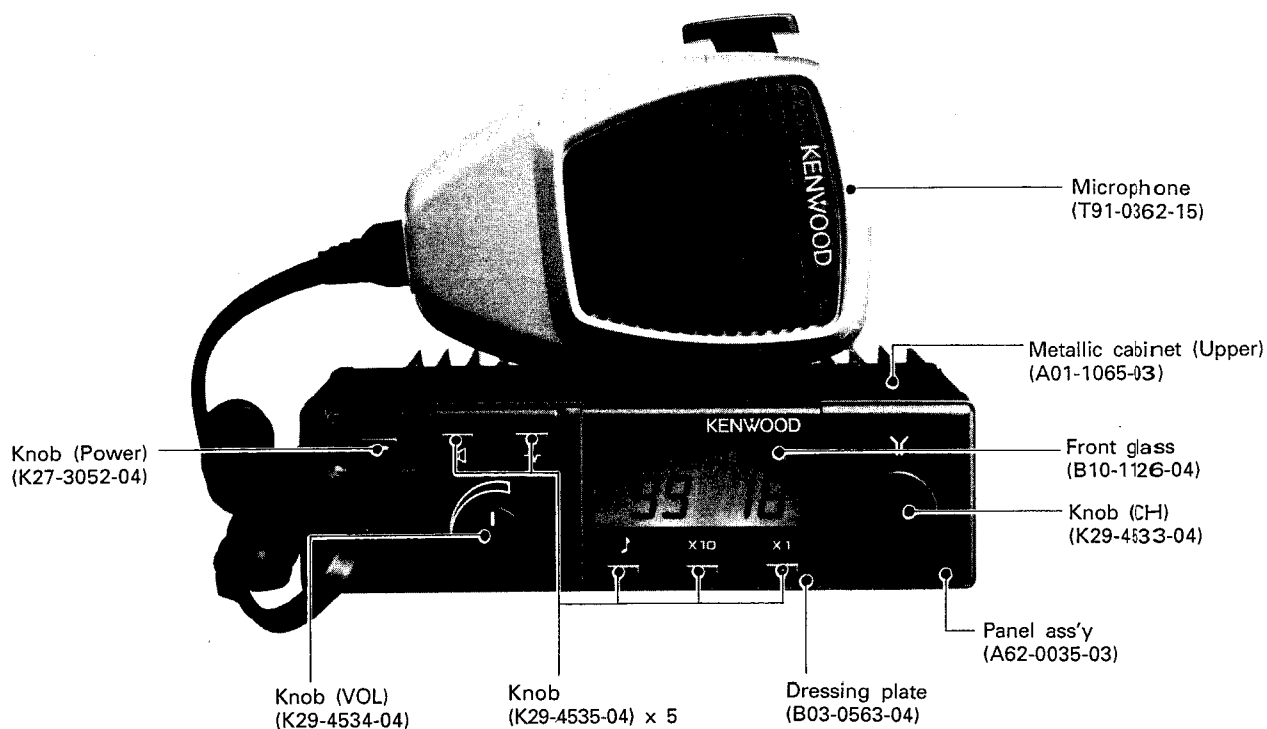


Photo is 5 TONE type.

CONTENTS

GENERAL	2	PACKING	38
SYSTEM SET-UP	4	ADJUSTMENT	39
INSTALLATION	5	TERMINAL FUNCTIONS	44
CONVERSION	6	PC BOARD VIEWS	
FREQUENCY WRITING METHOD	10	APC (X59-3130-00)	45
DISASSEMBLY FOR REPAIR	14	HPC (X59-3740-10)	45
BLOCK DIAGRAM	15	PLL (X58-371X-XX)	46
LEVEL DIAGRAM	17	TX-RX UNIT (X57-355X-XX)	48
CIRCUIT DESCRIPTION	18	JUNCTION PCB (E29-0491-05)	50
DESCRIPTION OF COMPONENTS	24	SCHEMATIC DIAGRAM	51
PARTS LIST	25	QT/CTCSS UNIT (X52-3170-00)	54
EXPLODED VIEW	37	SPECIFICATIONS	BACK COVER

TK-705

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.

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.

1. POWER-UP

To turn on the radio, press the power switch (I/O). The channel indicator will illuminate to indicate power is ON.

2. TO RECEIVE

Operation	Procedure
1. Disable QT (if so equipped)	Remove microphone from its hanger.
2. Unsquench radio	Press the SQUELCH switch (↘).
3. Set VOLUME control	Adjust VOLUME control for a normal listening level.
4. Set SQUELCH control	Press the SQUELCH switch (↘) again.
5. Select operating frequency. (Multichannel models only)	Rotate CH selector switch to desired channel.
The radio will now receive all traffic on the selected channel.	
6. Enable QT (if so equipped)	Insert microphone back into its hanger to activate QT/CTCSS unit.
You will now hear messages for your system only.	

3. TO TRANSMIT

Operation	Procedure
1. Disable QT (if so equipped)	Press the MONITOR switch (🔊) (E) / remove microphone from hanger (C3,C4).
2. Select operating frequency. (Multichannel models only)	
3. LISTEN	DO NOT TRANSMIT if channel is in use.
4. Key transmitter	Press and hold the microphone PTT switch. The LCD on the front panel will indicating the transmitter is ON (🔊).
5. Transmit message	Hold microphone at about 2 inches distance and speak at a normal voice level. Keep transmissions brief.
6. Receive reply	Release the microphone PTT switch.
7. Enable QT at end of the conversation. (if QT equipped)	Press the MONITOR switch (🔊) and replace the microphone into its hanger.

GENERAL

PRE-INSTALLATION CONSIDERATIONS

1. UNPACKING

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

2. LICENSING REQUIREMENTS

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

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

3. PRE-INSTALLATION CHECKOUT

3-1. Introduction

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

3-2. Testing

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

4. PLANNING THE INSTALLATION

4-1. General

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

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

4-2. Antenna

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

4-3. Radio

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

4-4. DC Power and wiring

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

CAUTION:

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

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

5. INSTALLATION PLANNING – CONTROL STATIONS

5-1. Antenna system

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

5-2. Radio location

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

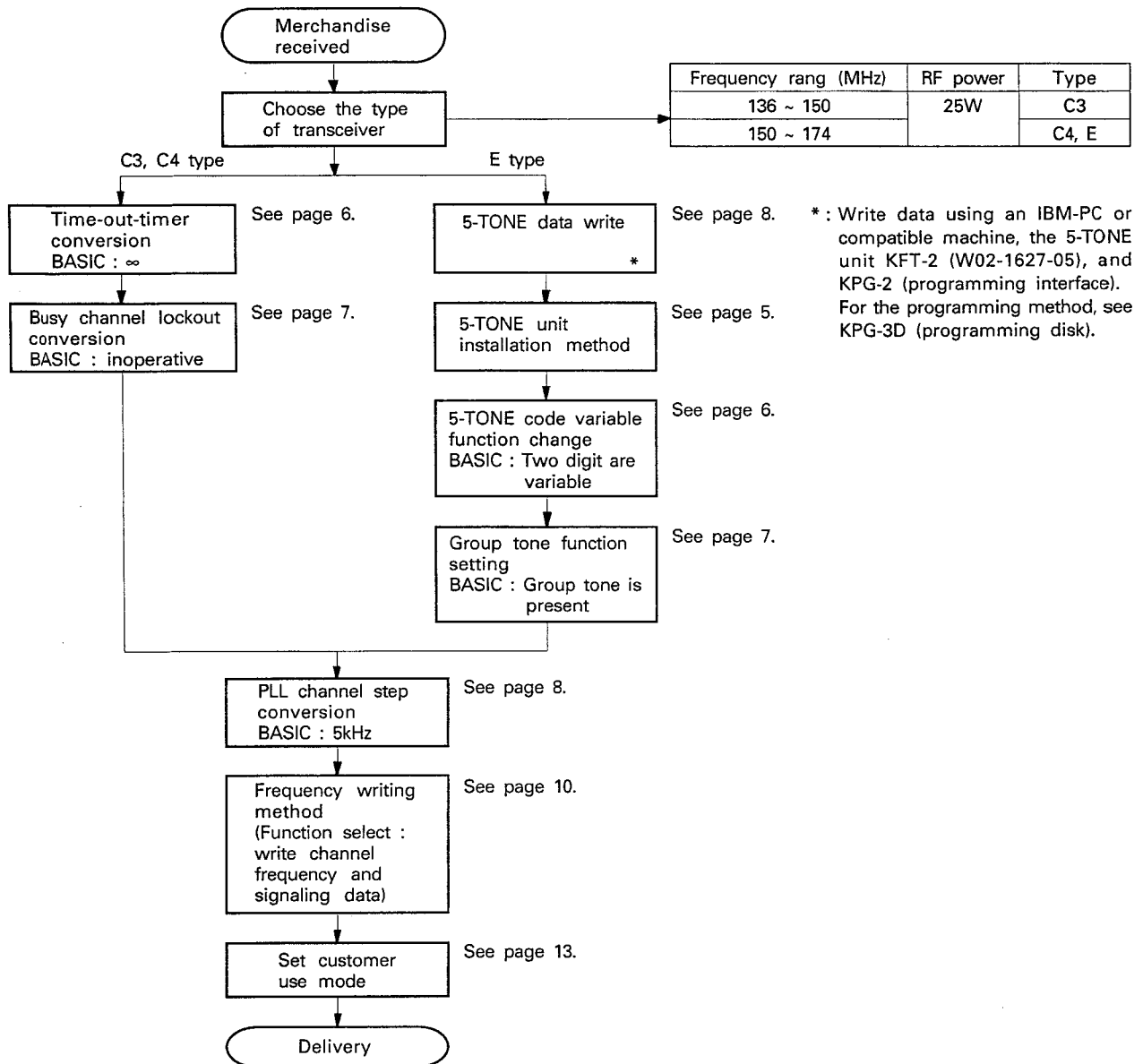
SERVICE

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

TK-705

SYSTEM SET-UP

System Set-up

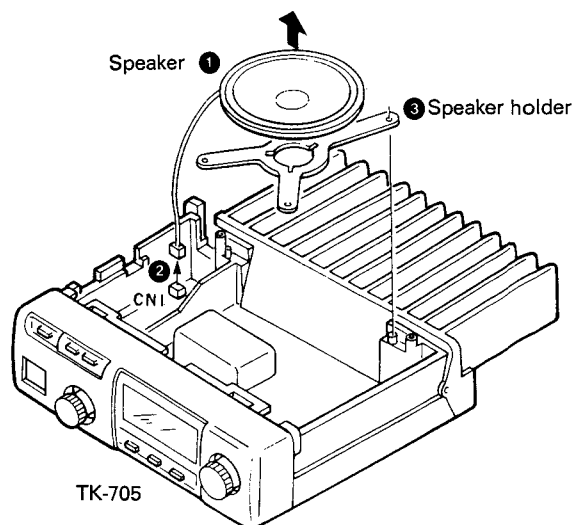


INSTALLATION

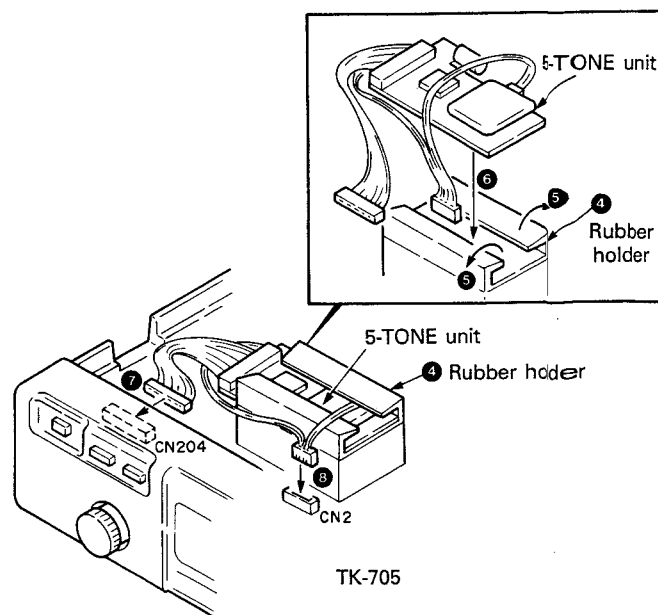
5-TONE Unit Installation Method : E type only

1. Remove the top case of the radio.
2. Remove the speaker (❶) and cable with connector (❷) from the radio.
3. Lift off the speaker holder from the radio (❸).

Note : Remove the short plug (10 pins) from the CN204 of the TX-RX unit (B/2).



4. Widen both ends (❺) of the rubber holder (❹) and insert the 5-TONE unit into which data has been written (❻).
5. Connect the cable with a 10-pin connector (❼) and the cable with a 6-pin connector (❽) to connectors CN204 and CN2, respectively.
6. Connect the cable (❷) with a connector for the speaker (❶) to CN1.
7. Put the speaker holder (❸) back in the radio and put the speaker in it.



TK-705

CONVERSION

Time-out-timer Conversion (TOT) : C3,C4 type only

The time-out-timer returns the unit to the receive state automatically when transmission continues beyond a certain length of time.

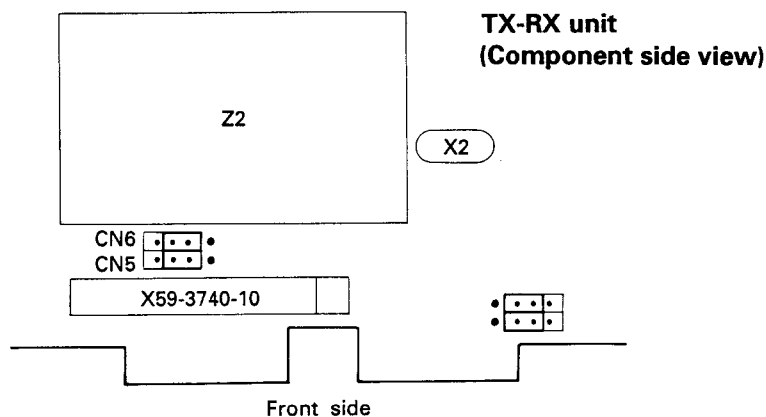
The time limit for the time-out-timer is set by changing the short socket (E18-0254-05) of the connectors (CN5 and CN6) on the TX-RX unit (A/2).

Remove the socket from above.

TOT (sec)	CN5	CN6
∞ *	Side marked	Side marked
30	Side marked	Opposite side
60	Opposite side	Side marked
90	Opposite side	Opposite side

Side marked	Opposite side
Short socket	Short socket
Connector	Connector

* : BASIC



5-TONE Code Variable Function Change : E type only (encode only)

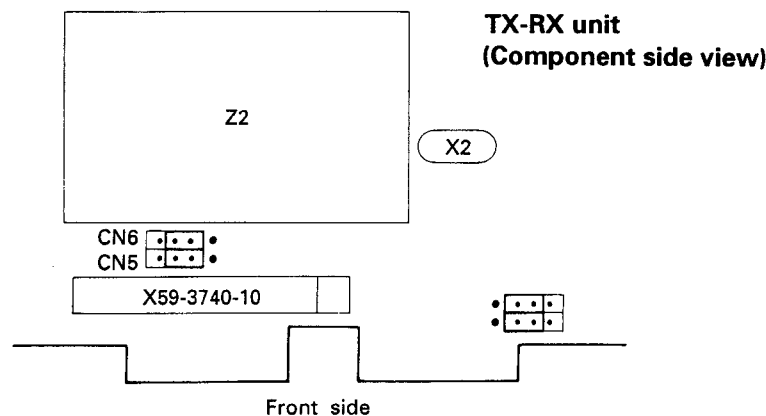
This function is used when the TX CALL code set to call a specific station is not varied and when the lower one or two digits are. The function is changed by

replacing the short sockets of the connectors (CN5 and CN6) on the TX-RX unit (A/2).

	CN5	CN6
Code is not varied	Side marked	Side marked
	Opposite side	Side marked
One digit is variable	Side marked	Opposite side
Two digits are variable*	Opposite side	Opposite side

Side marked	Opposite side
Short socket	Short socket
Connector	Connector

* : BASIC



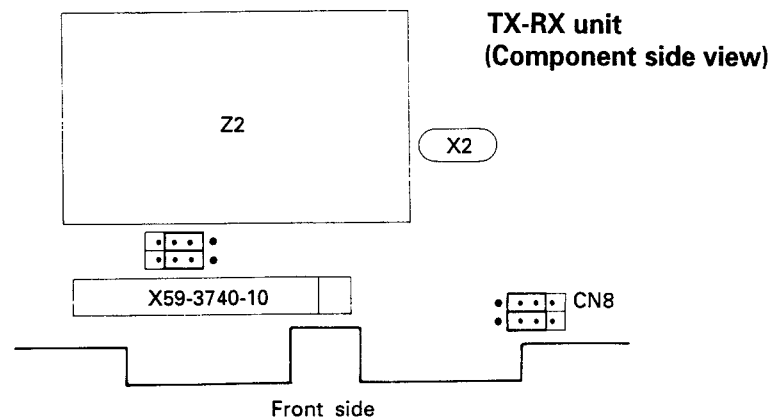
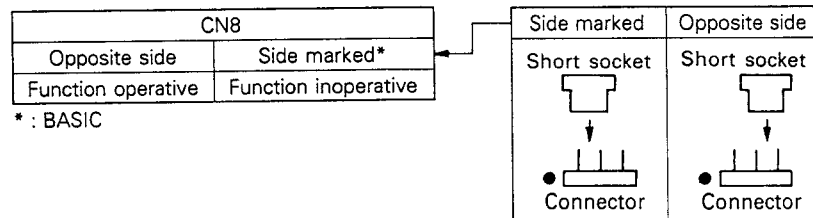
CONVERSION

Busy Channel Lockout Conversion : C3,C4 type only

Busy channel lockout inhibits transmission from the local unit when some signaling has been set for the local unit and BUSY is ON and signaling mismatches.

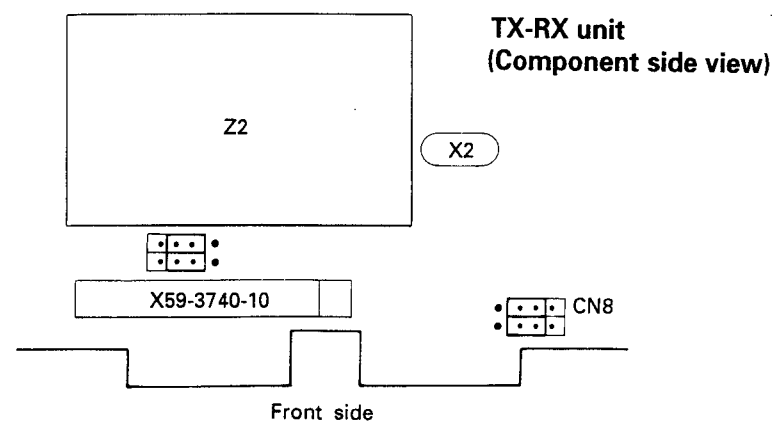
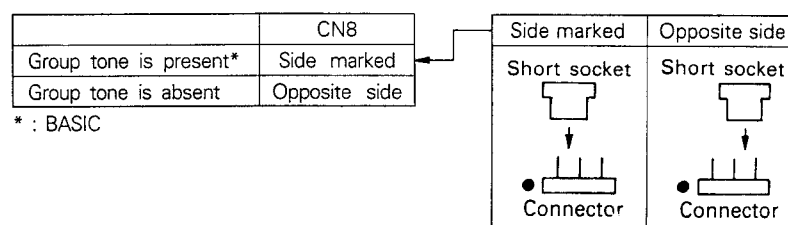
The busy channel lockout is set by changing the short socket of the connector (CN8) on the TX-RX unit (A/2).

Remove the socket from above.



Group Tone Function Setting : E type only

This function calls a specific group (encode only). It is set by replacing the short socket of the connector (CN8) on the TX-RX unit (A/2).



TK-705

CONVERSION

PLL Channel Step Conversion

The PLL channel step frequency is changed from 5kHz to 6.25kHz.

The frequency is set by changing the chip diodes D206, D208 : MA77 on the TX-RX unit (B/2).

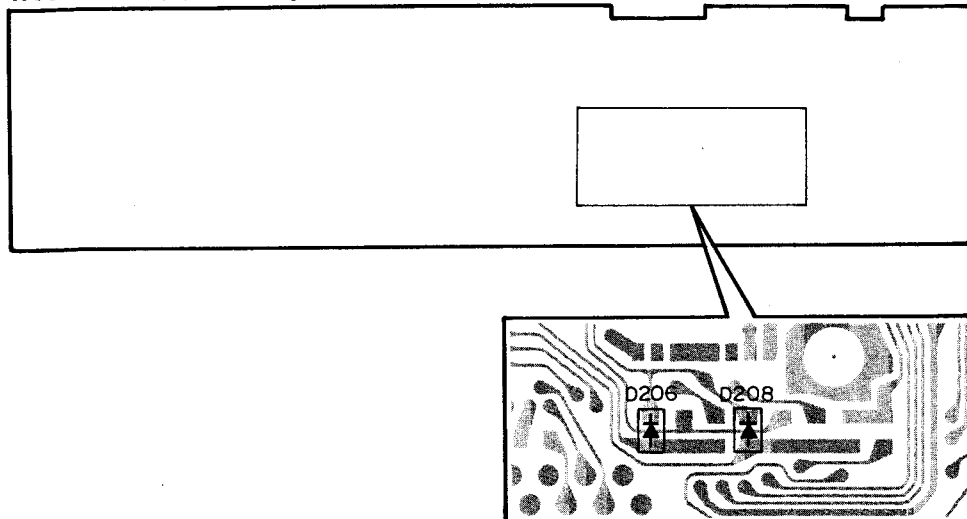
	D206	D208
5kHz*	○	○
6.25kHz	X	○

* : BASIC

○ : Installed

X : Removed

TX-RX unit (B/2) (Component side view)

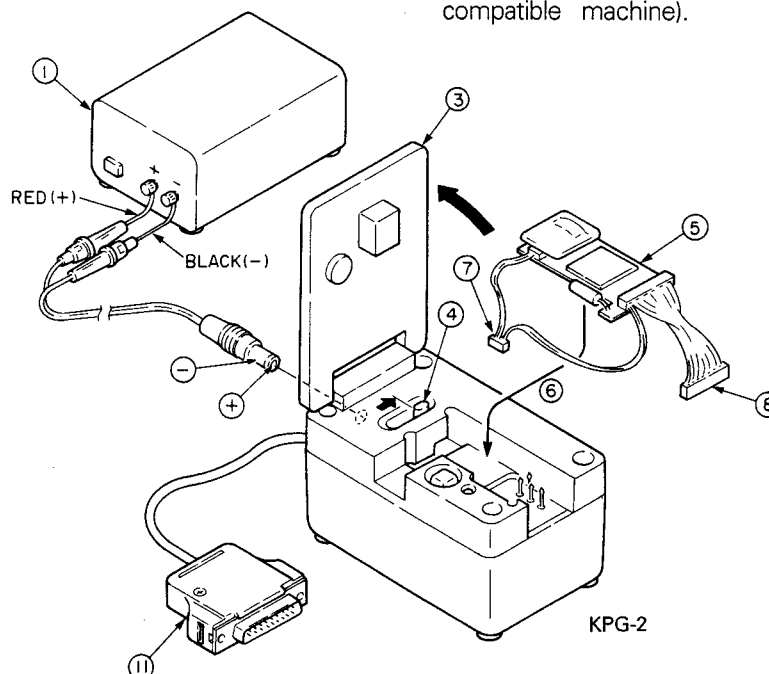


5-TONE Data Write Method : E type only

1. Setting

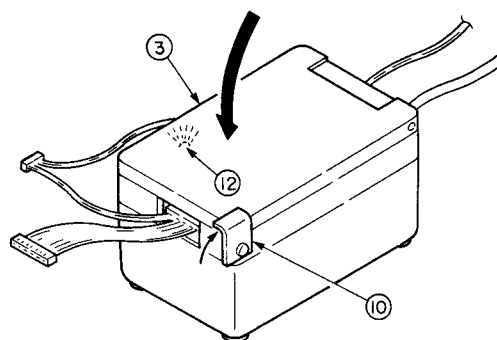
1. Connect the DC power supply to the connector on the rear of the KPG-2 (①). (Do not switch anything on yet.)
Use the cable (②) with a DC plug supplied with the KPG-2.
Use a DC power supply providing 12V DC (8 to 15V), 0.5A.

2. Open the lid (③) of the KPG-2 and slide lever (④) in the direction of the arrow.
3. Insert 5-TONE unit (W02-1627-05) (⑤) into the KPG-2 (⑥) as shown in the figure. (Free connectors 7 and 8.)
4. Close the lid (③) of the KPG-2 and secure the lock lever (⑩).
5. Connect the D sub-connector (⑪) to the printer output port of the personal computer (IBM-PC or compatible machine).



CONVERSION

6. The connection diagram is shown in figure.
7. Switch the DC power supply on and make sure that the LED (12) of the KPG-2 goes on.
8. The following section describes how to start the program.



2. To install onto another flexible or hard disk

The user may install the KPG-3D programming software onto another disk as follows :

1. Insert the KPG-3D disk into an appropriate drive if installing from a flexible disk.
2. Type : 'source-drive:' <ENTER>
e.g. A: <ENTER>
3. Type : CD \KENWOOD\KPG3D <ENTER>
4. Type : KPG3DINS 'target-drive:' <ENTER>
e.g. KPG3DINS C: <ENTER>

The program and associated help files and handbook will be loaded into a new sub-directory structure starting at :

\KENWOOD\KPG3D\

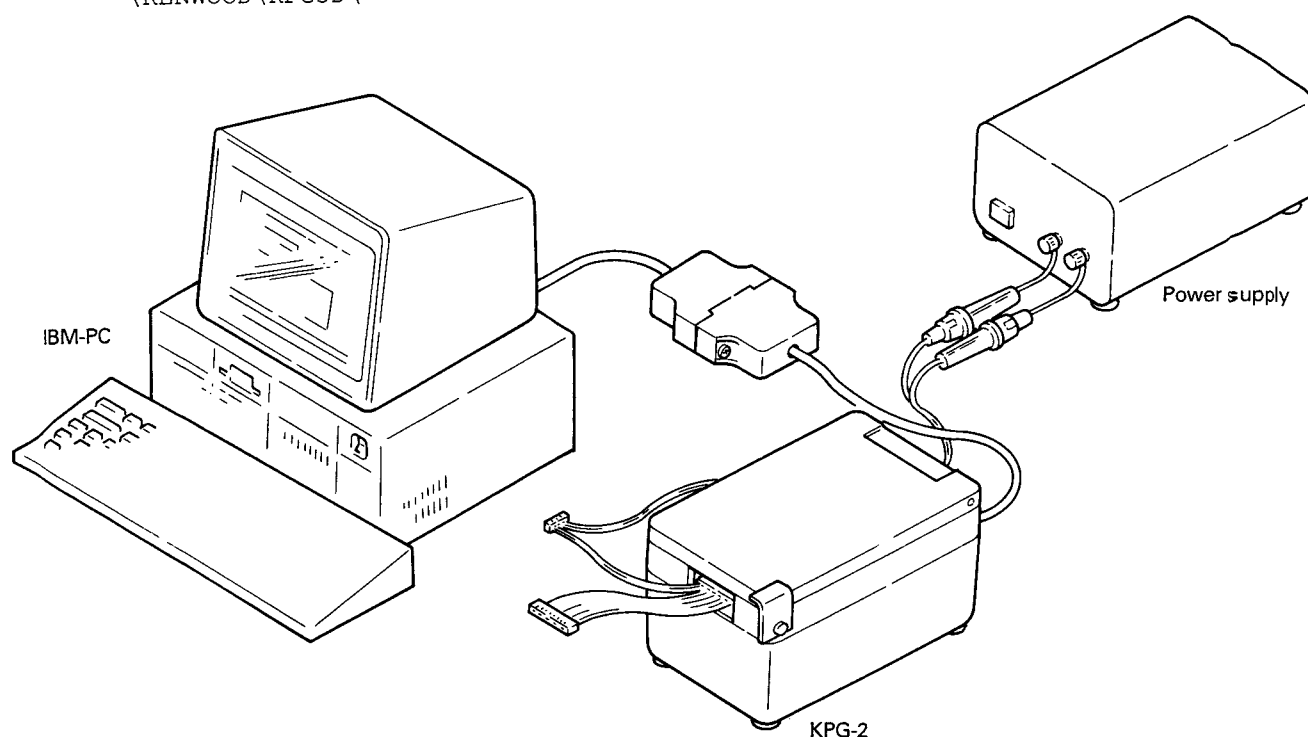
The software may also be installed from a hard disk onto a flexible disk by following the same procedure as above.

3. To start the product support software

If operating the software from a flexible disk, insert the disk into an appropriate drive.

1. Type : 'drive:' <ENTER>
e.g. A: <ENTER>
2. Type : CD \ <ENTER>
3. Type : KPG3D <ENTER> to start the software

Note : □ is space



TK-705

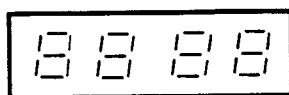
CONVERSION / FREQUENCY WRITING METHOD

4. Precautions for 5-TONE data programming

When data is written into the 5-TONE unit using an IBM-PC, set the TX CALL code as follows :

	IBM-PC display				
The lowermost digit is variable	TX CALL code	*	*	*	I
The lower two digits are variable		*	*	H	I

- * is a 5-TONE code from 0 to 9.
- H and I are related to the TK-705 panel indications as follows. The digits to which H and I are entered become variable.



H : Incremented with the x10 switch.
I : Incremented with the x1 switch.

Frequency Writing Method

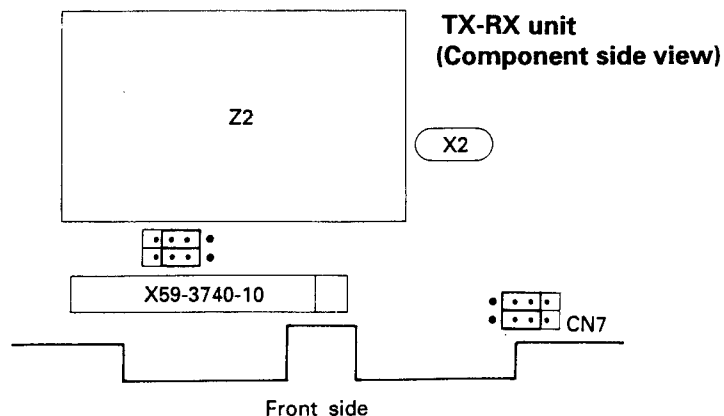
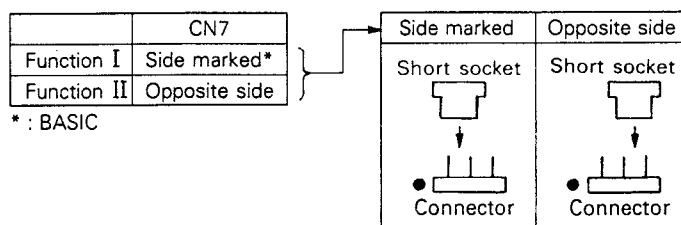
(Function Select)

Function select I and II have the following mode 1) to 5). When frequencies and signaling data are written for the first time after delivery, use the frequency setting mode. Select an appropriate mode as required.

1. Function I and II setting method

To change the function to I or II, change the short socket of the connector CN7 on the TX-RX unit (A/2).

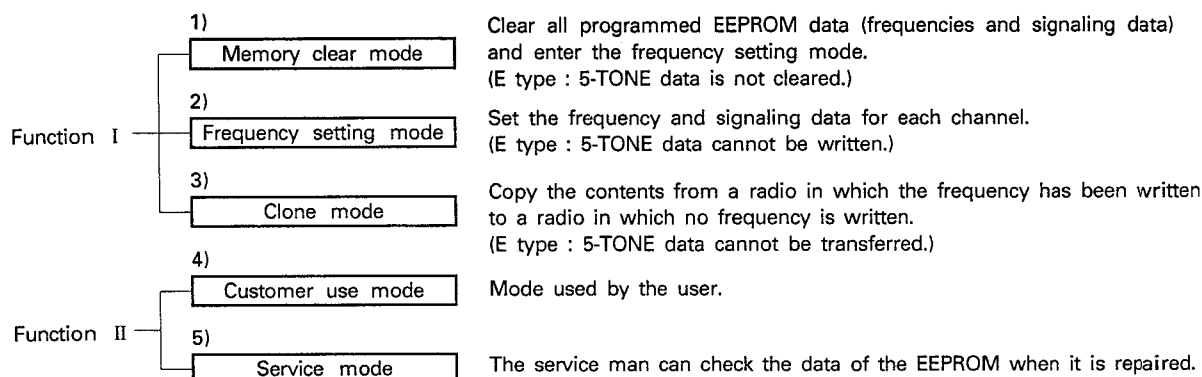
Remove the socket from above.



FREQUENCY WRITING METHOD

2. Modes

Note : After checking or setting in each mode, deliver the product with the customer use mode of Function II set.



1) Memory clear mode

This mode is set by turning the POWER switch on while pressing the MONITOR switch ($\blacktriangleleft$).

After all data of the built-in EEPROM (transmit/receive frequency and transmit/receive signaling data) has been cleared, the frequency setting mode is set.

(E type : 5-TONE data is not cleared.)

2) Frequency setting mode

• Notes

Frequency setting is normal changed in 5kHz (6.25kHz) steps. If the channel selector is turned while pressing the SQUELCH switch ($\swarrow$), it is changed in 1MHz steps.

Transmission or reception cannot be performed in this mode.

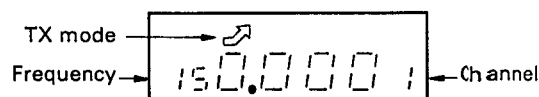
• Writing method (See flowchart)

When the power switch is turned on, the receive frequency setting mode of CH1 on the channel indicator is set. (Only CH1 is initialized to 150.000MHz.)

The transmit/receive frequency and transmit/receive signaling data (QT/CTCSS only) are set for each channel using the following procedure :

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 signaling data input mode. The initial indication is off.

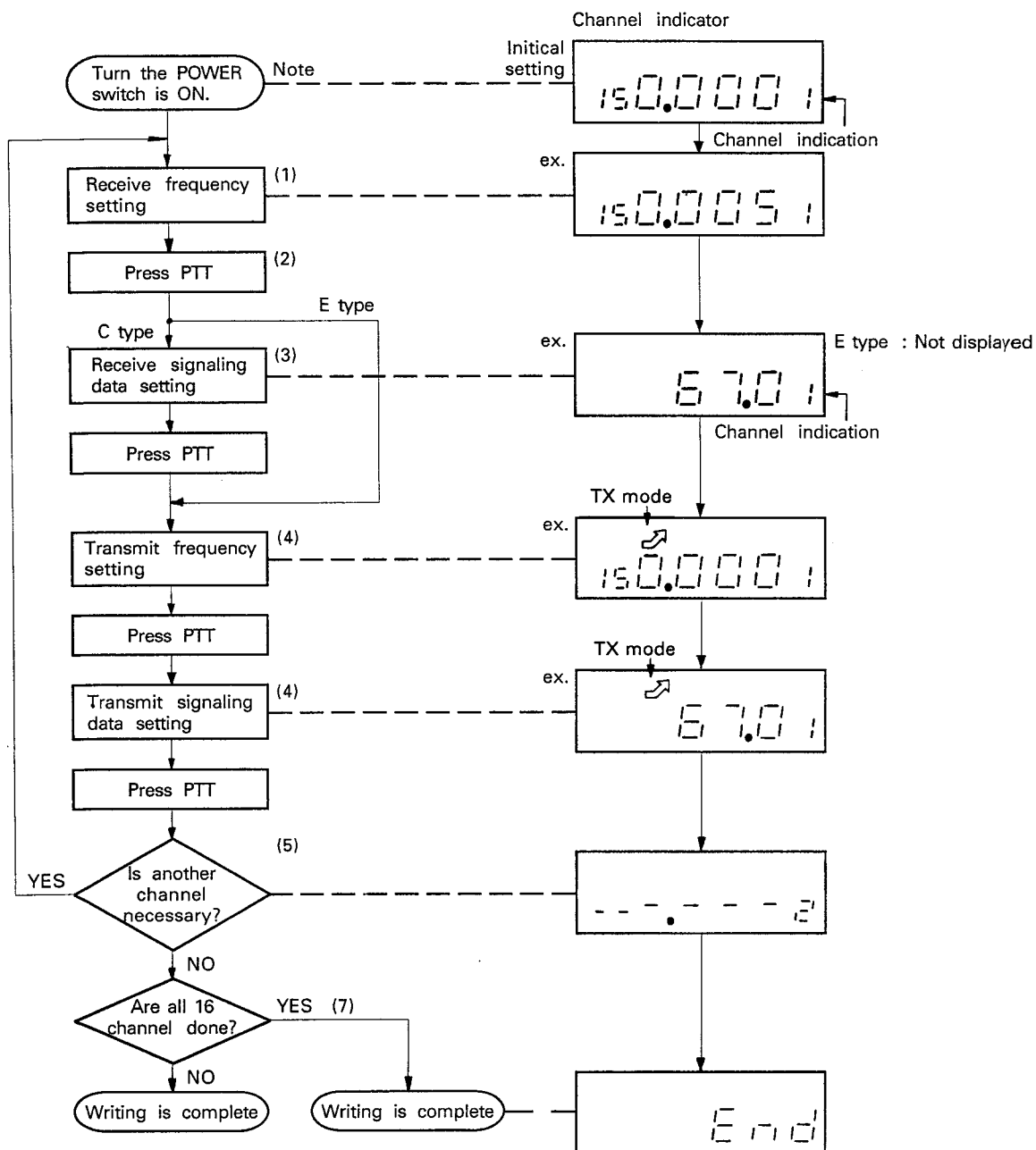
3. Set the receive signaling data with the channel selector and press the PTT switch. If the receive signaling data is not set, press the PTT switch.
(E type receive tone frequency cannot be set because it is skipped.)
4. The channel indicator now shows transmit frequency input mode. Set the transmit frequency by following step 1 to 3.



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, "END" is displayed.
8. When setting is finished, the written contents can be checked by pressing the MONITOR switch ($\blacktriangleleft$). Even when channel data is being checked with the MONITOR switch, the CHANNEL selector, PTT, and SQUELCH switch are valid, and channel data can be rewritten.

FREQUENCY WRITING METHOD

• Flowchart of frequency setting mode



FREQUENCY WRITING METHOD

3) Clone mode

In this mode, two RADIOS are connected, and the contents of the EEPROM data written in one are copied to the EEPROM of the other.

Note : When using the clone mode, verify that the Function Select (page 7) is set to Function I (the CN7 shorting socket is set to "Side marked").

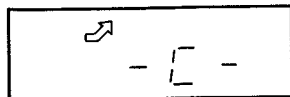
The first IF and PLL step frequency must be set by the same model.

5-TONE data cannot be transferred : E type

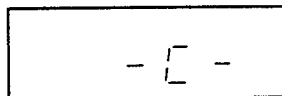
• Operation method

1. Pull out the CHANNEL selector knobs of the two radios.
2. Connect the two radios to the DC power supply. Connect the two radios with the supplied microphone cable (microphone connectors).
3. With the memory clear mode, clear the contents of the EEPROM of the radio to which the frequencies are to be written.
4. Set the two radios to the clone mode by turning on the POWER switch while pressing the "SET 1" key behind the CHANNEL selector with a thin insulating rod. The CHANNEL indicator will show "- C -".
5. Press again the "SET 1" key of the radio in which the frequencies have been written. The TX indicator will be displayed, and writing of frequencies will begin.

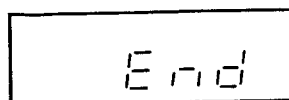
Radio from which data is written



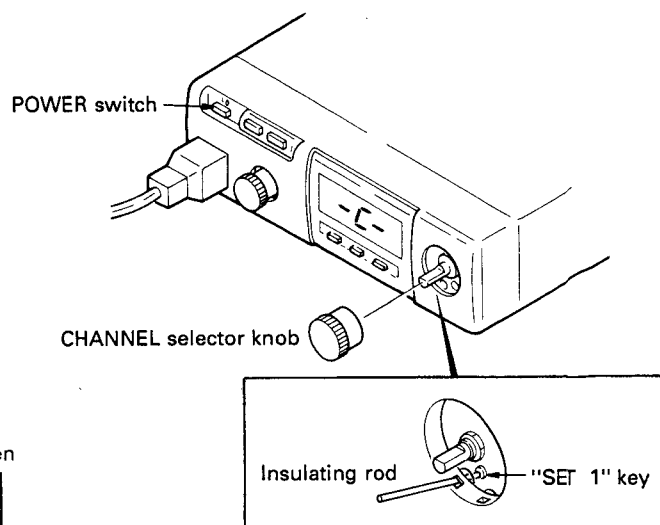
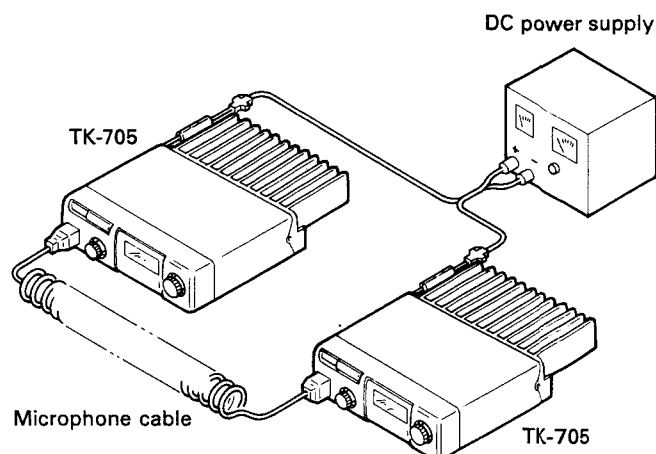
Radio to which data is written



6. Data transfer ends in about 15 seconds, a beep sounds, and the CHANNEL indicator shows "End" (on both radios).



7. Switch to the customer use mode of Function II, and finish writing.



4) Customer use mode

The user can use the radio in this mode.

Set Function II, then turn the POWER switch on to set this mode. (This mode is not set if the POWER switch is turned on while the "SET 1" key is held down.)

5) Service mode

The service man can check the data of the EEPROM in this mode during repair.

Set Function II, then turn the POWER switch on while the "SET 1" key is held down to set the service mode. The receive frequency of CH1 is displayed.

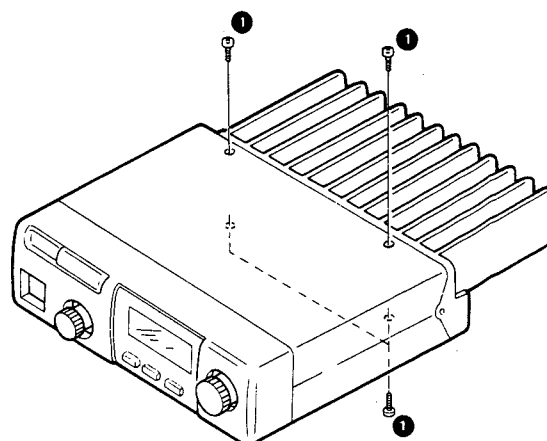
The data for each channel can be checked by pressing the MONITOR switch. However, the CHANNEL selector, PTT, and SQ OFF keys do not work. Also CALL, X1, and X10 (E type), CTCSS (C type) keys do not work.

TK-705

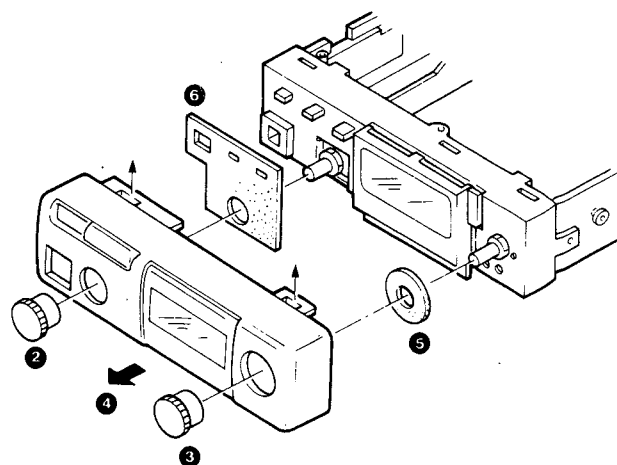
DISASSEMBLY FOR REPAIR

Removing the Front Panel

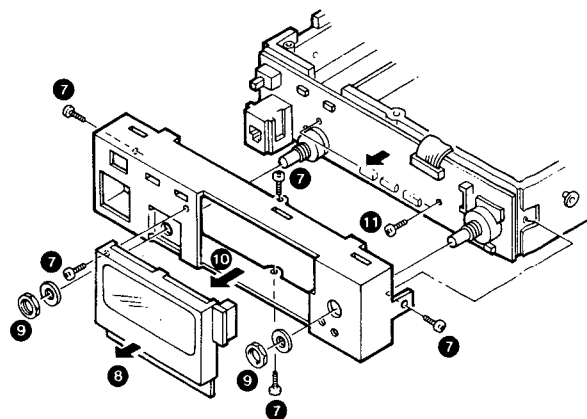
1. Remove the four screws holding the upper and lower cases (1).



2. Pull out the CHANNEL selector knob (2) and volume control knob (3).
3. Slightly lift the stoppers holding the top and bottom of the front panel and pull out the front panel (4).
4. Remove the cushions (5, 6).

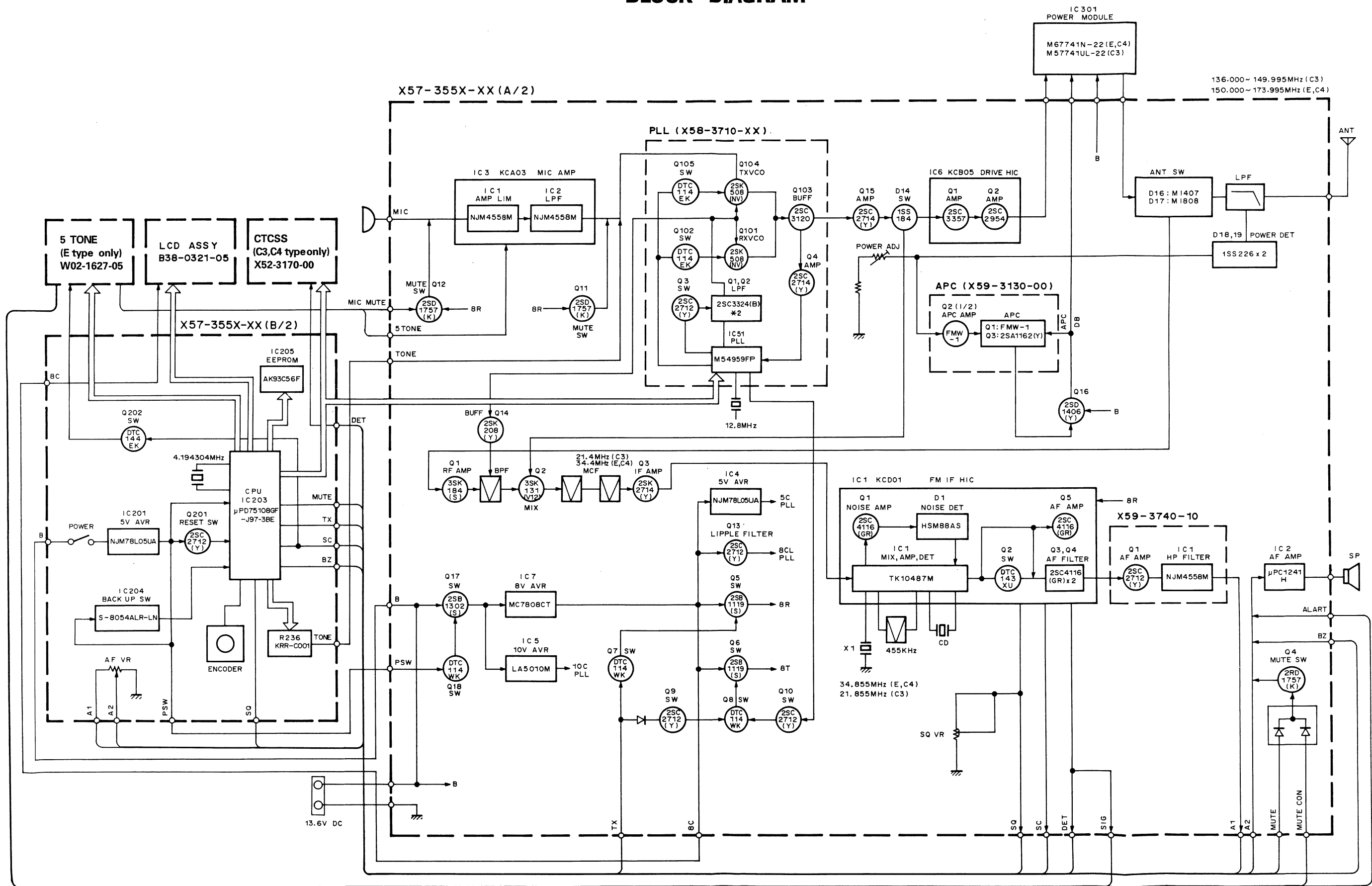


5. Remove the four screws on the sub-panel (7).
6. Pull the display section forward (8).
7. Remove the hexagonal nuts of the CHANNEL selector and volume controls (9).
8. Pull the sub-panel forward (10).
9. Remove the two screws holding the TX-RX unit (B/2), and remove the unit (11).



TK-705 TK-705

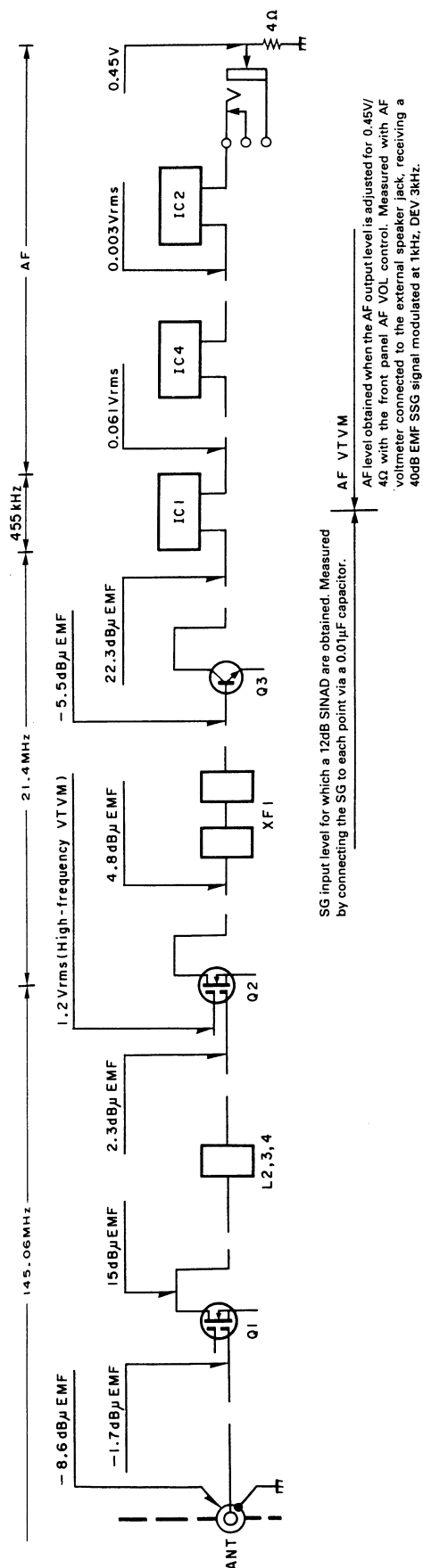
BLOCK DIAGRAM



LEVEL DIAGRAM

CIRCUIT DESCRIPTION

Receiver section



CIRCUIT DESCRIPTION

Receiving System

• Overview

Incoming signals from the antenna pass through a low-pass filter in the final block of the transmitter system, and are switched to the front-end of the receiver system via a receive/transmit switching diode.

The signals are then passed through an antenna matching coil, where the high-frequency components are amplified by a GaAs FET. The signals are then fed into a four-stage bandpass filter that uses varactor diode tuning to reject unwanted signal components, and is fed to the 1st mixer. The 1st mixer uses the N-channel MOS FET that are used in the RF stage to obtain better two-signal characteristics. The 1st mixer mixes the signal with the 1st local oscillator frequency and converts it to the 1st IF (34.4/21.4MHz). The signal then passes through two monolithic crystal filters (MCFs) to remove unnecessary near-by frequency components. The signal from the MCFs is used as the 1st IF signal.

The 1st IF signal is amplified and fed into IC1 (KCD01) in the FM IF HIC. The IF signal is then mixed with the 2nd local oscillator frequency of 34.855/21.855MHz to generate the 2nd IF of 455kHz. The 455kHz signal is then passed through a six element ceramic filter (CFWM455F), and fed back into IC1 for additional amplification. The output signal from the IC1 is then fed into a power amplifier via the audio volume control for application to the speaker.

Item	Rating
Nominal center frequency	34.4MHz
Pass band width	$\pm 7.5\text{kHz}$ or more at 3dB
Attenuation band width	$\pm 28\text{kHz}$ or less at 40dB
Ripple	1.5dB or less
Insertion loss	3dB or less
Guaranteed attenuation	60dB or more within $\pm 1\text{MHz}$ (Spurious : 40dB or more)
Terminating impedance	800 Ω /1.5pF

Table 2 MCF (L71-0298-05) (TX-RX unit XF1)
(E,C4)

Item	Rating
Nominal center frequency	21.4MHz
Pass band width	$\pm 7.5\text{kHz}$ or more at 3dB
Attenuation band width	$\pm 25\text{kHz}$ or less at 40dB
Ripple	1.0dB or less
Insertion loss	2.5dB or less
Guaranteed attenuation	85dB or more within $\pm 1\text{MHz}$ (Spurious : 40dB or more)
Terminating impedance	1.6k Ω /1.0pF

Table 3 MCF (L71-0244-05) (TX-RX unit XF1)
(C3)

Item	Rating
Nominal center frequency	455kHz $\pm 1\text{kHz}$
6dB bandwidth	$\pm 6\text{kHz}$ or more (from 455kHz)
50dB bandwidth	$\pm 12.5\text{kHz}$ or less (from 455kHz)
Ripple (within $\pm 4\text{kHz}$ of 455kHz)	3dB or less
Insertion loss	6dB or less
Guaranteed attenuation (within $\pm 100\text{kHz}$ of 455kHz)	35dB or more
I/O matching impedance	2.0k Ω

Table 4 Ceramic filter CFWM455F (L720372-05)
(TX-RX unit CF1)

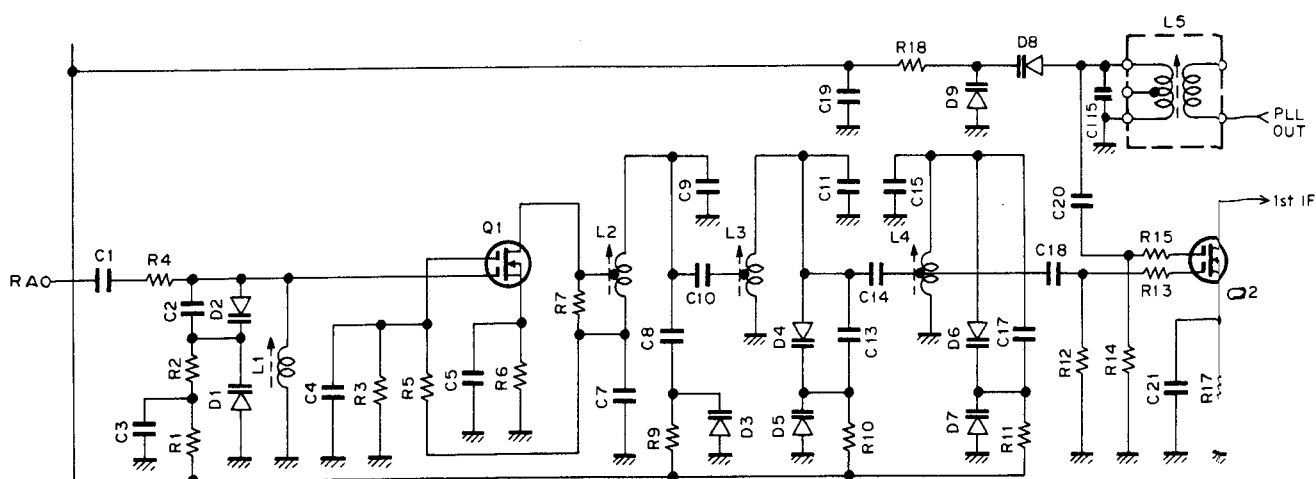


Fig. 2 Front-end section (varactor diode tuning)

TK-705

CIRCUIT DESCRIPTION

Transmitting System

• Overview

The transmitter produces the target frequency through the use of direct FM-modulation via a varactor diode.

• Modulation circuit

Audio signals from the microphone are fed into the mic amplifier HIC IC3 (KCA03) for amplification into two operational amplifiers. The operational amplifiers form a splatter filter for pre-emphasis, amplification, limiting, and removal of unnecessary high-frequency components.

The FM modulation circuit directly FM-modulates the VCO signals, using a varactor diode.

• Pre-amplifier stage circuit

Signals from the VCO are applied to the drive HIC IC6 (KCB05). The amplifier always operates in a linear mode so that signals can be amplified without degradation. Additionally, the amplifier is designed to cover a wide range of frequencies and can produce stable output without adjustment. The APC (Automatic Power Control) controls collector voltage from the last stage of the pre-amplifier.

• Power amplifier circuit

The drive signal is amplified to the required level by the power module. The TK-705 uses a large heat sink for efficient heat dissipation.

• APC circuit

The APC circuit for automatic transmit output control detects part of the power module output, and amplifies it to provide a control voltage for output control. The output control voltage is in inverse proportion to the output from the power module, so it is maintained at the same level.

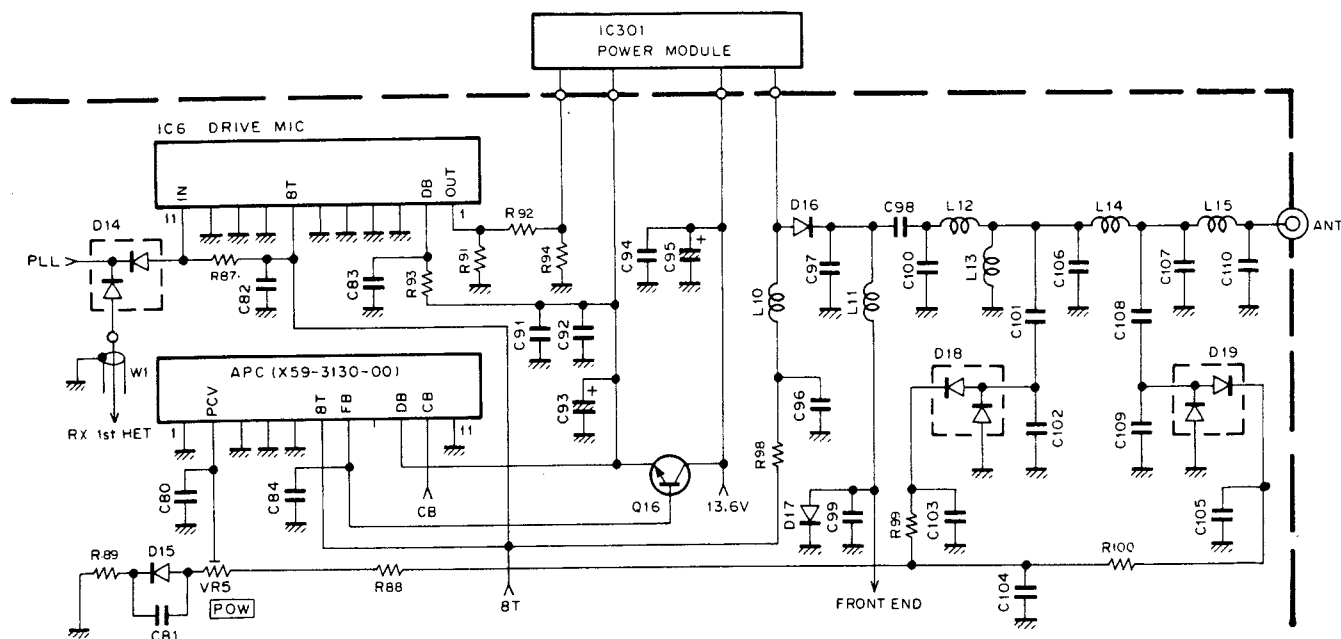


Fig. 3 Pre-amplifier stage, power amplifier, and APC circuits

Item	Symbol	Condition	Rating	Unit
Operating voltage	VCC		17	V
Current consumption	ICC		7	A
Input power	P _{in}	V _{CC1} ≤ 12.5V, Z _G = Z _L = 50Ω	500	W
Output power	P _{out}	Z _G = Z _L = 50Ω	35	W
Operating case temperature	T _{c(op)}		-30 ~ +110	°C
Storage temperature	T _{stg}		-40 ~ +110	°C

Table 5 Power module M57741UL(A) : C3
Power module M67741H-22 : E,C4
maximum ratings (IC301)

CIRCUIT DESCRIPTION

PLL Synthesizer System

• Overview

Figure 4 is the PLL and VCO block diagram. In the TK-705, the PLL system is implemented as a sub-unit which is divided into the upper VCO and lower PLL blocks. The sub-unit is shielded to prevent external interference.

There are two reference frequencies, 6.25kHz and 5kHz, available to allow 5 and 6.25kHz-step operation. The 6.25kHz is obtained by dividing the reference oscillator frequency of 12.8MHz by 2048, and the 5kHz is obtained by dividing it by 2560. The VCO directly generates the dial frequency. This dial frequency is amplified once and then fed into a pulse swallow-type PLL IC for frequency division and phase comparison, in order to lock the frequency.

The PLL system is locked between transmit mode and receive mode. By using a signal ("H" in transmit mode) from pin 11 of the PLL IC (M54959FP), the LPF is deactivated-activated by Q3 only for the moment when the TK-705 enters transmit mode. This helps produce lock more rapidly than previous methods.

In 150MHz mode, f_{VCO} (RX) is calculated by the following formula:

$$f_{VCO} = (150 - 34.4) = \{(n \times 128) + A\} \times f_{osc} / R$$

where,

f_{VCO} : VCO output frequency

n : Binary value of the 10-bit programmable counter

A : Binary value of the 7-bit programmable counter

f_{osc} : 12.8MHz reference frequency

R : Binary value of the 14-bit programmable counter

2560 (5kHz step mode)

2048 (6.25kHz step mode)

In 5kHz step mode,

$n = 180$ and $A = 80$.

Therefore, f_{VCO} is calculated as follows:

$$\begin{aligned} f_{VCO} &= \{(180 \times 128) + 80\} \times 12800 / 2560 \\ &= \{23040 + 80\} \times 5 \\ &= 115600 = 115.600\text{MHz} \end{aligned}$$

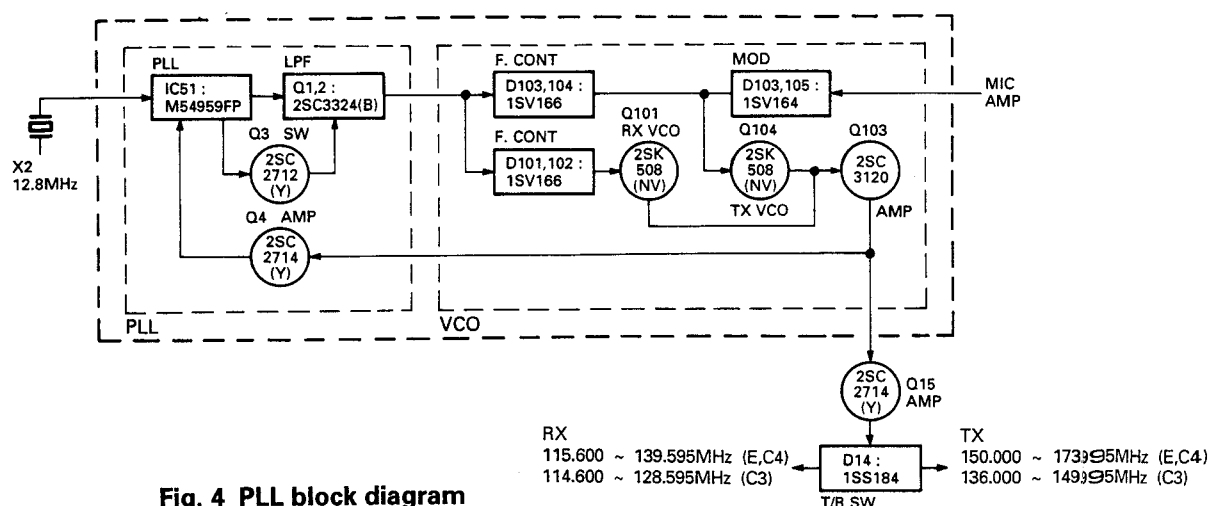


Fig. 4 PLL block diagram

• 8T (8V in transmit mode) and unlock circuits

In receive mode, the base of Q9 has 0.7V. As a result, Q9 is on, and Q8 and Q6 are off, and the collector of Q6 (8T) provides no voltage.

When the PTT switch is depressed. As a result, P121 of CPU becomes "L", turning Q9 off, and Q8 and Q6 on. The 8T line is therefore supplied with 8V.

The unlock circuit operates only in transmit mode. Q10 is a PLL unlocking switching transistor. Usually, the base of Q10 is supplied with 0V ("L"), and the collector is supplied with 8V ("H").

When the PLL is unlocked, the base of Q10 is supplied with 0.7V, turning Q10 on. As a result, the collector of Q10 becomes "L" (0V). This turns Q8 off and the base of Q6 becomes 8V, turning it off. Therefore, when the PLL is unlocked, Q6 is off removing bias voltage from the 8T line. Without the 8T voltage no transmit signal is generated.

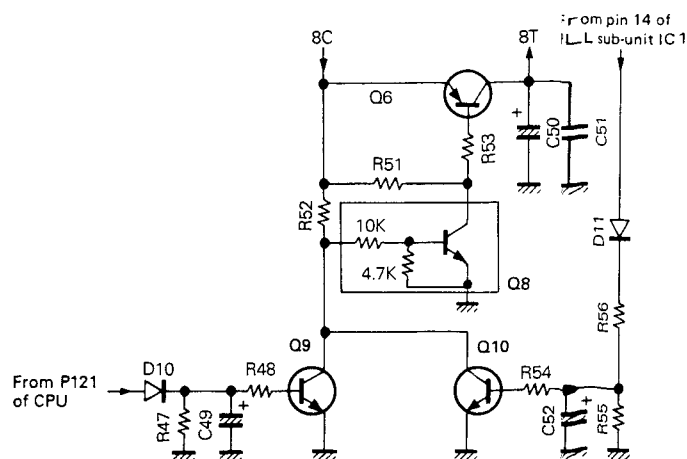


Fig. 5 8T and unlock circuits

CIRCUIT DESCRIPTION

Digital Control System

• Overview

The control system consists of a 8 bit micro-controller (IC203), a reset circuit (Q201), a memory back-up circuit (IC204) and an Electronically Erasable Read Only Memory (EEROM).

• Frequency programming of transmit and receive

Transmit and receive frequencies are programmed by using the channel selector and the PTT switch on the transceiver when an internal jumper is installed.

After the internal jumper is removed, the transceiver reverts to the user mode and the channel selector only selects those frequencies already programmed into the EEROM.

• Reset and back-up circuits

Micro-controller reset and memory back-up are enabled by monitoring 5C voltage.

At initial power on, a differentiator (C203) turns on Q201 to initiate reset of the micro-controller (IC203). If the voltage rises slowly, the output voltage transient of IC204 is detected by IC203 and reset is initiated internally.

If 5C voltage falls below 4.5V, the output of IC204 becomes low, causing the micro-controller to go to the back-up mode.

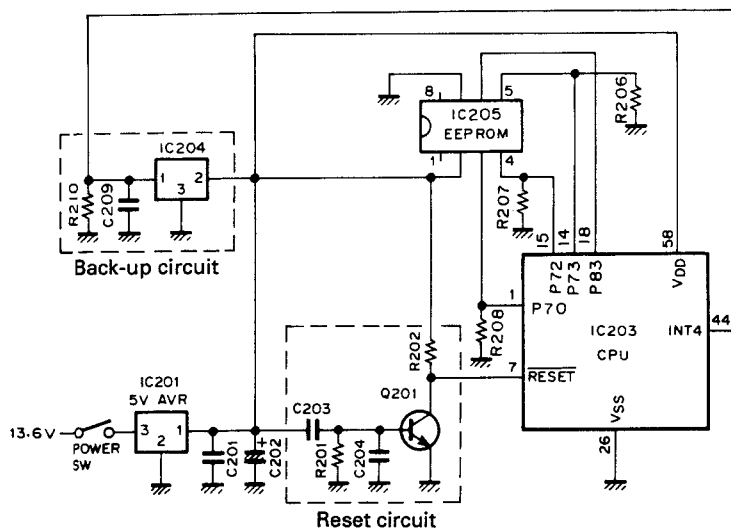


Fig. 6 Reset and back-up circuits

• Display circuit

The display circuit is contained in the LCD assembly. It consists of a LCD driver, its peripheral circuits, and an LCD. The LCD is dynamically operated at a 50% duty cycle. The LCD driver receives LCD data from P61, P72, and P73 of the CPU.

• PLL data output

PLL data is available from P72 (CK), P73 (DT), and P71 (EN1) of the CPU. Figure 7 is a timing chart for PLL data transfer, and Figure 8 shows the format of PLL data.

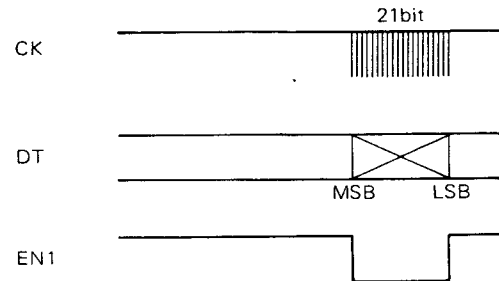
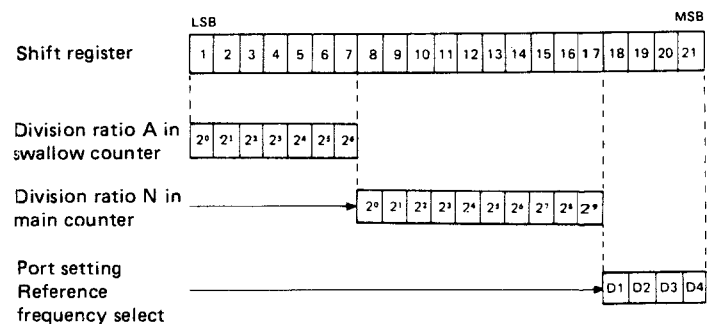


Fig. 7 Timing chart for PLL data transfer



The 21-bit data is made up of the following:

1. Division ratio data A and N (17 bits)

F (display = 34.4MHz in RX mode)

$$= \{(N \times 128) + A\} \times 12.8\text{MHz} / \text{ref}$$

N : Division ratio set in 10-bit main counter (binary)

A : Division ratio set in 7-bit swallow counter (binary)

2. Reference frequency (ref) select (2 bits)

Data	Phase reference frequency	
D1 D2	frequency	
L L	5kHz	5kHz step mode
H L	6.25kHz	6.25kHz step mode

3. Switch select (2 bits)

Data	Output port	
D3 D4	SW1 SW2	
L H	L H	RX mode
H L	H L	TX mode

Fig. 8 PLL data format

CIRCUIT DESCRIPTION

• Input and output of QT/CTCSS unit (C type)

The QT/CTCSS unit receives data from P70, P72, and P73 of the CPU. Figure 9 is a timing chart for CTCSS data transfer, and Figure 10 shows the format of CTCSS data. When a tone from the CTCSS unit is detected, a "L" level signal is sent to P61 of the CPU, opening the squelch.

The CTCSS unit uses decode only and the transmit tone is output from the CPU (IC203).

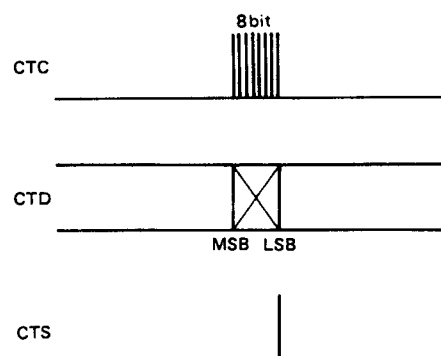


Fig. 9 Timing chart for QT/CTCSS data transfer

Tone frequency select data for CTCSS unit (MN6520)

D0	D1	D2	D3	D4	D5
----	----	----	----	----	----

Example : 88.5Hz L H H H L L

Fig. 10 QT/CTCSS data format

Pin No.	Pin name	I/O	Logic	Function	Pin No.	Pin name	I/O	Logic	Function
1	P41	O	-	TONE output.	33	PTH01	-	-	
2	P40	O	-		34	PTH00	-	-	
3	P53	O	-		35	TI0	I	-	SQ OFF SW input.
4	P52	O	-		36	TI1	I	-	MONI SW input.
5	P51	O	-		37	P23	-	-	
6	P50	O	-		38	P22/PCL	-	-	
7	RESET	I	L	Reset input.	39	P21/PTO1	-	-	
8	X2	-	-	4.194304MHz crystal oscillator.	40	P20/PTO0	O	-	BEEP output.
9	X1	-	-		41	P03/SI	I	-	X10 SW input.
10	P63	O	-	CE of CTCSS.	42	P02/SO	I	-	X1 SW input.
11	P62	I	L	"L" : Signal match for CTCSS DET.	43	P01/SCK	I	-	CALL SW input.
12	P61	O	-	CE of LCD.	44	P00/INT4	I	-	Voltage detection.
13	P60	I	L	"L" when received input busy signal (BUSY SGL).	45	P123	O	L	"L" when operates SQ OFF (SQ OFF output).
14	P73	O	-	DATA of LCD, PLL, CTCSS, 5-TONE, EEPROM.	46	P122	O	H	"H" when operates mute (mute output).
15	P72	O	-	CK of LCD, PLL, CTCSS, EEPROM.	47	P121	O	L	"L" when the circuit control of transmit.
16	P71	O	-	CE of PLL IC.	48	P120	O	-	
17	P70	O	-	CE of EEPROM.	49	P133	I	-	Mic hook.
18	P83	I	-	DO of EEPROM.	50	P132	I	-	PTT SW input.
19	P82	-	-		51	P131	I	-	SET2 SW input.
20	P81	I	H	"H" : LED operation of 5-TONE.	52	P130	I	-	SET1 SW input.
21	P80	I	H	"H" when 5-TONE transmit.	53	P143	I	-	Destination.
22	P93	O	-	MONI of 5-TONE.	54	P142	I	-	
23	P92	O	-	CALL of 5-TONE.	55	P141	I	-	
24	P91	O	-	PTT of 5-TONE.	56	P140	I	-	
25	P90	O	-	CK of 5-TONE.	57	NC	-	-	Not used.
26	Vss	-	-	GND.	58	Vdd	-	-	Power supply pin.
27	P13/INT3	-	-		59	P33	-	-	
28	P12/INT2	I	-	Encoder.	60	P32	O	-	Destination.
29	P11/INT1	I	-		61	P31	O	-	
30	P10/INT0	-	-		62	P30	O	-	
31	PTH03	-	-		63	P43	O	-	TONE output.
32	PTH02	-	-		64	P42	O	-	

Table 6 75108GF-J97-3BE terminal functions (TX-RX unit IC203)

TK-705

DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-355X-XX) 2-70 : E 3-01 : C3 3-02 : C4

Component	Use/Function	Operation/Condition/Compatibility
IC1	2nd local oscillator, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, squelch switching	① 1st IF signal input. ③ ④ 2nd local oscillator. ⑨ Busy output. ⑩ Squelch control. ⑪ S-meter output. ⑬ RD output. ⑮ Low-frequency output.
IC2	AF amplification	① AF input, ⑧ AF output.
IC3	Mic amplification	① Mic input, ② Mic output.
IC4	5V AVR	
IC5	10V AVR	For PLL.
IC6	Transmit drive	
IC7	8V AVR	
IC201	5V AVR	
IC205	EEPROM	
IC203	Microprocessor	See circuit description.
IC204	Voltage detector	
Q1	High-frequency amplification	Operates in receive mode.
Q2	1st mixer	Converts received 144MHz-range signals to 1st IF 10.7MHz.
Q3	High-frequency amplification	Amplifies 1st IF signal.
Q4	AF line mute	Operates when transmit mode, AL 1ch receive mode, CTCSS, bell or squelch is ON.
Q5	8R switching	ON in receive mode.
Q6	8T switching	ON in transmit mode.
Q7	8R switching control	ON in receive mode.
Q8	8T switching control	ON in transmit mode.
Q9	8T switching control	OFF in transmit mode.
Q10	8T switching control	OFF when PLL locked.
Q11	Mic amplifier mute	ON in receive mode.
Q12	Mic line mute	ON in receive and in call mode.
Q13	PLL 8V ripple filter	
Q14	CV line buffer	
Q15	VCO output amplification	
Q16	TX drive stage +B control	
Q17	Power switch	
Q18	Power switch control	ON when power switch is ON.
Q201	Reset switch	ON for approx. 3m when system power turned on, usually OFF.
Q202	BUSY signal inverter	
D14	VCO output switch	
D15	Temperature compensation	
D1~9	Vari-cap tuning	
D10,11	Reverse current prevention	
D12	12.8MHz tuning	For PLL.
D13	Mic line mute switch	
D16, 17	Transmit/receive switching	
D18, 19	Power detection	For APC.
D20	Reverse power protection	
D21	AF mute switch	
D201~210	To be set at destination	
D211	CPU protection	

PARTS LIST

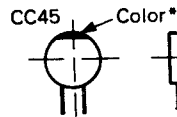
CAPACITORS

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

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

• 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



• Capacitor value

- 0 1 0 = 1pF
1 0 0 = 10pF
1 0 1 = 100pF
1 0 2 = 1000pF = 0.001μF

1 0 3 = 0.01μF

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

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

Example CC45TH = -470 ± 60 ppm/°C

• Tolerance

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

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

Less than 10 pF

• Rating voltage

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

• Chip capacitors

(EX) CC 73 F SL 1H 000 J → Refer to the table above.
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)

RD 14 B B 2C 000 J
1 2 3 4 5 6 7

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

Dimension

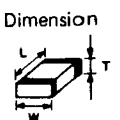
Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25

Dimension

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

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



TK-705

PARTS LIST

※ New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

TK-705

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考
TK-705						
1	1B		A01-1065-03	METALLIC CABINET(UPPER)		
2	2B		A01-1066-03	METALLIC CABINET(LOWER)		
3	1C		A10-1292-01	CHASSIS CALKED ASSY		
4	2B		A22-0765-13	SUB PANEL		
5	2A	*	A62-0035-03	PANEL ASSY	E	
5	2A	*	A62-0036-03	PANEL ASSY	C3C4	
6	2A	*	B03-0563-04	DRESSING PLATE	E	
7	2A	*	B03-0564-04	DRESSING PLATE	C3C4	
8	2A		B10-1126-04	FRONT GLASS		
9	2B		B38-0321-05	LCD ASSY		
9	2B		B38-0322-05	LCD ASSY		
10	1C		B40-3988-04	MODEL NAME PLATE		
11	1B		B42-2455-04	LABEL(M4XM8MAX)		
			B42-3343-04	LABEL(S/NØ)		
		*	B62-0035-00	INSTRUCTION MANUAL	E	
		*	B62-0036-00	INSTRUCTION MANUAL	C3C4	
12	2C	*	E29-0491-05	JUNCTION PCB	C3C4	
			E30-2036-05	GND WIRE(MIC)		
			E30-2076-05	DC CORD ASSY		
34	1C		E30-2145-05	ANT CABLE		
13	1C		E30-2172-05	DC CORD		
		*	E31-3197-15	CONNECTING WIRE(SP)	E	
			E37-0045-05	CONNECTING WIRE	C3C4	
			E40-5121-05	PIN ASSY SOCKET	C3C4	
			E40-5343-05	CONNECTOR		
			E40-9016-05	PIN ASSY SOCKET		
			F05-1031-05	FUSE		
14	1C		G02-0565-04	FLAT SPRING		
15	1B		G02-0576-14	FLAT SPRING		
16	2A		G09-0405-05	KNØB FIXED SPRING		
17	1B		G10-0651-04	NON-WOVEN FABRIC		
18	1B		G10-0681-04	NON-WOVEN FABRIC(CHASSIS)		
19	1B		G10-0686-04	NON-WOVEN FABRIC(CABINET)		
20	1B		G13-0688-04	CUSHION(DC CORD)		
21	2C	*	G13-0816-04	CUSHION	C3C4	
22	1B	*	G13-0984-04	CUSHION(CABINET)		
23	2B		G13-0935-04	CUSHION(VØL)		
24	2A		G13-0936-04	CUSHION(SQ, MONI)		
25	2B		G13-0937-04	CUSHION(CH)		
26	2B		G13-0953-04	CUSHION(X10,X1)		
			G13-0959-04	CUSHION(MIL)		
			H11-0830-04	PØLYSTYRENE PLATE		
			H13-0814-04	PØLYSTYRENE BOARD		
-			H01-8287-04	ITEM CARTØN BOX		
-			H10-2677-02	PØLYSTYRENE FOAMED FIXTURE		
-			H25-0103-04	PROTECTION BAG		
-			H25-0720-04	PROTECTION BAG		
27	1C		J19-1376-15	MIC HANGER		
28	2C	*	J19-1434-04	HOLDER(SP)		
			J19-1476-04	HOLDER(VØ)		
			J21-4282-08	MOUNTING HARDWARE		

E: Scandinavia & Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

▲ indicates safety critical components.

PARTS LIST

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

TK-705

CTCSS UNIT (X52-3170-00)

TX-RX UNIT (X57-335X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考
29	2B		J29-0441-03	MOUNTING BRACKET		
30	2A		K27-3052-04	KNØB (POW)		
31	2A		K29-4533-04	KNØB (CH)		
32	2B		K29-4534-04	KNØB (VOL)		
			K29-4535-04	KNØB (SQ)		
A	2B		N09-0626-04	SCREW (M3X10)		
B	2B		N09-0650-05	SCREW (SUB PANEL)		
C	1C2C		N33-2606-45	SCREW (CABINET)		
D	2B2C		N87-2606-46	BRAZIER HEAD TAPTITE SCREW (PCB		
E	2B		N88-2606-46	FLAT HEAD TAPTITE SCREW (SUB PA	NEL)	
			N99-0321-05	SCREW SET		
33	1B		T07-0246-05	LOUDSPEAKER (FULL RANGE)		
			T91-0362-15	MICROPHONE		
			LC7582	IC (LCD DRIVER)		
			M57741UL-22	IC (POWER MODULE / 136-150MHZ)	C3	
			M67741H-22	IC (POWER MODULE / 150-174MHZ)	EC4	
		*	W02-1627-05	5 TONE UNIT	E	
37	2C2B	*	X52-3170-00	CTCSS UNIT	C3C4	
38	2C2B	*	X57-3552-70	TX-RX UNIT	E	
38	2C2B	*	X57-3553-01	TX-RX UNIT	C3	
38	2C2B	*	X57-3553-02	TX-RX UNIT	C4	
QT/CTCSS UNIT (X52-3170-00)						
C2		*	C92-0521-05	CHIP-TAN 0.47UF 20WV		
C4 -6		*	CK73FB1E104K	CHIP C 0.10UF K		
CN1		*	E40-5341-05	PIN CONNECTOR		
X1		*	L78-0062-05	RESONATOR (1MHZ)		
R6			RK73FB2A473J	CHIP R 47K J 1/10W		
R1			RK73GB1J274J	CHIP R 270K J 1/16W		
R2			RK73GB1J824J	CHIP R 820K J 1/16W		
R4			RK73GB1J103J	CHIP R 10K J 1/16W		
R5			RK73GB1J105J	CHIP R 1.0M J 1/16W		
VR1			R12-6526-05	TRIMMING POT. (47K)		
C1			CK73GB1H471K	CHIP C 470PF K		
C7			CK73GB1H471K	CHIP C 470PF K		
C8 ,9		*	CC73GCH1H221J	CHIP C 220PF J		
D1			DAN202U	DIODE		
IC1		*	FX365LS	IC		
TX-RX UNIT (X57-355X-XX) 2-70 : E 3-01 : C3 3-02 : C4						
C1			CC73FCH1H030C	CHIP C 3PF C	EC4	
C1			CC73FCH1H040C	CHIP C 4PF C	C3	
C2			CC73FCH1H220J	CHIP C 22PF J	C3	
C3			CK73FB1H103K	CHIP C 0.010UF K		
C4 ,5			CK73FB1H102K	CHIP C 1000PF K		
C6			CK73FB1H103K	CHIP C 0.010UF K		
C7			CK73FB1H102K	CHIP C 1000PF K		
C8			CC73FCH1H220J	CHIP C 22PF J	C3	
C8			CC73FCH1H330J	CHIP C 33PF J	EC4	
C9			CC73FCH1H040C	CHIP C 4PF C	C3	
C10			CC73FCH1H0R5C	CHIP C 0.5PF C		

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PARTS LIST

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TX-RX UNIT (X57-335X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C11			CC73FCH1H030C	CHIP C 3PF C	EC4	
C11			CC73FCH1H040C	CHIP C 4PF C	C3	
C12			CK73FB1H103K	CHIP C 0.010UF K		
C13			CC73FCH1H220J	CHIP C 22PF J	C3	
C14			CC73FCH1H0R5C	CHIP C 0.5PF C		
C15			CC73FCH1H0R5C	CHIP C 0.5PF C	EC4	
C15			CC73FCH1H020C	CHIP C 2.0PF C	C3	
C16			CK73FB1H102K	CHIP C 1000PF K		
C17			CC73FCH1H220J	CHIP C 22PF J	C3	
C18			CC73FCH1H150J	CHIP C 15PF J		
C19			CK73FB1H103K	CHIP C 0.010UF K		
C20			CC73FCH1H030C	CHIP C 3PF C		
C21 , 22			CK73FB1H102K	CHIP C 1000PF K		
C23			CK73FB1H103K	CHIP C 0.010UF K		
C24			CC73FCH1H070D	CHIP C 7PF D	C3	
C24			CC73FCH1H090D	CHIP C 9PF D	EC4	
C25			CE04EW1A470M	ELECTRØ 47UF 10WV		
C26			CK73FB1H103K	CHIP C 0.010UF K		
C27 , 28			CK73FB1H102K	CHIP C 1000PF K		
C29			CC73FCH1H330J	CHIP C 33PF J	C3	
C29			CC73FCH1H470J	CHIP C 47PF J	ECE	
C30			CC73FCH1H390J	CHIP C 39PF J	EC4	
C31			CC73FCH1H820J	CHIP C 82PF J	C3	
C31			CK73FB1H102K	CHIP C 1000PF K	EC4	
C32			C92-0511-05	CHIP-TAN 0.15UF 35WV		
C33			CK73EF1C105Z	CHIP C 1.0UF Z		
C34 , 35			CK73EB1H104K	CHIP C 0.10UF K		
C36			CE04EW1A471M	ELECTRØ 470UF 10WV		
C37			CK73FB1H103K	CHIP C 0.010UF K		
C38			CE04EW1C470M	ELECTRØ 47UF 16WV		
C39 , 40			CE04EW1A470M	ELECTRØ 47UF 10WV		
C41			CE04EW1A470M	ELECTRØ 47UF 10WV		
C42			CK73FB1H273K	CHIP C 0.027UF K		
C43			CC73FSL1H101J	CHIP C 100PF J		
C44			CE04EW1C100M	ELECTRØ 10UF 16WV		
C45 , 46			CK73EF1C105Z	CHIP C 1.0UF Z		
C47			CK73FB1H103K	CHIP C 0.010UF K		
C48			CE04EW1A470M	ELECTRØ 47UF 10WV		
C49			C92-0504-05	CHIP-TAN 0.68UF 20WV		
C50			CE04EW1C100M	ELECTRØ 10UF 16WV		
C51			CK73FB1H103K	CHIP C 0.010UF K		
C52			C92-0504-05	CHIP-TAN 0.68UF 20WV		
C53 , 54			CK73FB1H102K	CHIP C 1000PF K		
C55			CK73FB1H471K	CHIP C 470PF K	E	
C56			CC73FSL1H101J	CHIP C 100PF J	E	
C57			CK73FB1H103K	CHIP C 0.010UF K		
C58			CC73FUJ1H180J	CHIP C 18PF J		
C59			CC73FUJ1H150J	CHIP C 15PF J		
C61			CK73EF1C105Z	CHIP C 1.0UF Z		
C62			CK73FB1H103K	CHIP C 0.010UF K		
C63 -65			CK73FB1H102K	CHIP C 1000PF K		
C66			CK73EB1H102K	CHIP C 1000PF K		
C67			CK73FB1H103K	CHIP C 0.010UF K		
C68			CE04EW1A470M	ELECTRØ 47UF 10WV		
C69			CK73FB1H103K	CHIP C 0.010UF K		

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C70 ,71 C72 C73 ,74 C75 C76			CE04EW1A221M CK73FB1H103K CK73FB1H102K CC73FCH1H220J CK73FB1H102K	ELECTRO 220UF 10WV CHIP C 0.010UF K CHIP C 1000PF K CHIP C 22PF J CHIP C 1000PF K		
C77 C78 C79 C80 -82 C83			CC73FCH1H220J CE04EW1C471M CK73FB1H103K CK73FB1H102K CK73EF1C105Z	CHIP C 22PF J ELECTRO 470UF 16WV CHIP C 0.010UF K CHIP C 1000PF K CHIP C 1.0UF Z		
C85 C86 C87 C88 ,89 C90			CK73FB1H103K CE04EW1A470M CK73FB1H102K CK73FB1H103K CE04EW1C102M	CHIP C 0.010UF K ELECTRO 47UF 10WV CHIP C 1000PF K CHIP C 0.010UF K ELECTRO 1000UF 16WV		
C91 C92 C93 C94 C95			CK73FB1H102K CK73EF1C105Z CE04EW1C470M CK73FB1H102K CE04EW1C100M	CHIP C 1000PF K CHIP C 1.0UF Z ELECTRO 47UF 16WV CHIP C 1000PF K ELECTRO 10UF 16WV		
C96 C97 C97 C98 C99			CK73FB1H102K CC45SL2H120J CC45SL2H180J CK45B2H102K CC73FCH1H090D	CHIP C 1000PF K CERAMIC 12PF J CERAMIC 18PF J CERAMIC 1000PF K CHIP C 9PF D	EC4 C3 EC4	
C99 C100 C101 C102 C102			CC73FCH1H220J CM73F2H220J CC73FCH1H0R5C CC73FCH1H020C CC73FCH1H030C	CHIP C 22PF J CHIP C 22PF J CHIP C 0.5PF C CHIP C 2.0PF C CHIP C 3PF C	C3 C3 EC4	
C103-105 C106,107 C106,107 C108 C109			CK73FB1H102K CC45SL2H390J CC45SL2H470J CC73FCH1H0R5C CC73FCH1H020C	CHIP C 1000PF K CERAMIC 39PF J CERAMIC 47PF J CHIP C 0.5PF C CHIP C 2.0PF C	EC4 C3	
C110 C110 C112 C113 C114			CC45SL2H150J CC45SL2H220J CK73FB1H102K CK73FB1H223K CK73EB1H473K	CERAMIC 15PF J CERAMIC 22PF J CHIP C 1000PF K CHIP C 0.022UF K CHIP C 0.047UF K	EC4 C3	
C115 C201 C202 C203 C204			CC73FCH1H020C CK73FB1H103K CE04CW1C100M CK73FB1H223K CK73FB1H102K	CHIP C 2.0PF C CHIP C 0.010UF K ELECTRO 10UF 16WV CHIP C 0.022UF K CHIP C 1000PF K	C3	
C205,206 C207 ,208 C209 C210-214 TC1			CC73FCH1H330J CK73FB1H103K CC73FSL1H101J CK73FB1H102K C05-0346-05	CHIP C 33PF J CHIP C 0.010UF K CHIP C 100PF J CHIP C 1000PF K TRIM CAP(6PF)		
CN1 CN2 CN3 ,4 CN5 -8 CN201,202			E40-3237-05 E40-5183-05 E40-5202-05 E40-5328-05 E40-5203-05	PIN CONNECTOR(SP) PIN CONNECTOR(5TONE) PIN CONNECTOR(13P) PIN CONNECTOR(3P) PIN CONNECTOR(13P)	E	

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TK-705

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TX-RX UNIT (X57-335X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
CN203 CN204 J1 J2 -5 J201			E40-3485-05 E40-5187-05 E11-0425-05 E18-0254-05 E08-0673-05	PIN CONNECTOR(LCD) PIN CONNECTOR(STONE) PHONE JACK SOCKET RECTANGULAR RECEPTACLE(MIC)	E	
TP1 ,2 W1 W201			E23-0465-05 E33-1902-05 E31-6003-15 J30-0545-05	TERMINAL FINISHED WIRE SET(HET) CONNECTING WIRE(CTCSS) SPACER	C3C4	
CD1 CF1 L1 -4 L5 L6			L79-0855-05 L72-0372-05 L34-4080-05 L34-0956-05 L30-0508-05	CERAMIC DISCRI(CDB455C7) CERAMIC FILTER(CFWM455F) COIL COIL IFT(21.4MHZ)	C3	
L6 L7 L8 ,9 L9 L10			L34-4191-05 L40-1001-19 L40-1092-19 L40-3391-19 L34-1239-05	COIL(34.4MHZ) SMALL FIXED INDUCTOR(10UH) SMALL FIXED INDUCTOR(1UH) SMALL FIXED INDUCTOR(3.3UH) COIL	EC4 EC4 C3	
L11 L12 L12 L13 L14 ,15			L34-0895-05 L34-0742-05 L34-0894-05 L34-0908-05 L34-0499-05	COIL COIL COIL COIL COIL	EC4 C3 EC4	
L14 ,15 X1 X1 X2 X201			L34-0894-05 L77-1415-05 L77-1416-05 L77-1383-05 L77-1397-05	COIL CRYSTAL RESONATOR(34.855MHZ) CRYSTAL RESONATOR(21.855MHZ) CRYSTAL RESONATOR(12.8MHZ) CRYSTAL RESONATOR(4.19MHZ)	C3 EC4 C3	
XF1 XF1			L71-0244-05 L71-0298-05	MCF(21.4MHZ) MCF(34.4MHZ)	C3 EC4	
R1 R2 R3 R4 R4			R92-0670-05 RK73FB2A104J RK73FB2A2R2J RK73FB2A330J R92-0670-05	CHIP R 0 OHM CHIP R 100K J 1/10W CHIP R 2.2 J 1/10W CHIP R 33 J CHIP R 0 OHM	C3 EC4	
R5 R6 R7 R8 R9 -11			RK73FB2A274J RK73FB2A101J RK73FB2A103J RK73FB2A101J RK73FB2A104J	CHIP R 270K J 1/10W CHIP R 100 J 1/10W CHIP R 10K J 1/10W CHIP R 100 J 1/10W CHIP R 100K J 1/10W		
R12 R13 R14 R15 R16			RK73FB2A473J R92-0670-05 RK73FB2A473J RK73FB2A470J RK73FB2A274J	CHIP R 47K J 1/10W CHIP R 0 OHM CHIP R 47K J 1/10W CHIP R 47 J 1/10W CHIP R 270K J 1/10W		
R17 R18 R19 R20 R21			RK73FB2A470J RK73FB2A104J R92-0670-05 RK73FB2A102J RK73FB2A101J	CHIP R 47 J 1/10W CHIP R 100K J 1/10W CHIP R 0 OHM CHIP R 1.0K J 1/10W CHIP R 100 J 1/10W		
R22 R22			RK73FB2A681J R92-0670-05	CHIP R 680 J 1/10W CHIP R 0 OHM	C3 EC4	

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R23			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R24			RK73FB2A391J	CHIP R 390 J 1/10W		
R25			RK73FB2A101J	CHIP R 100 J 1/10W		
R26			RK73FB2A224J	CHIP R 220K J 1/10W		
R27			RK73FB2A471J	CHIP R 470 J 1/10W		
R28			R92-0670-05	CHIP R 0 ΩHM		
R29			R92-0670-05	CHIP R 0 ΩHM	C3	
R30			RK73FB2A153J	CHIP R 15K J 1/10W	EC4	
R30			RK73FB2A473J	CHIP R 47K J 1/10W	C3	
R31			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R32			R92-0670-05	CHIP R 0 ΩHM		
R33			RK73FB2A273J	CHIP R 27K J 1/10W	E	
R34			RK73FB2A273J	CHIP R 27K J 1/10W		
R35			R92-1220-05	CHIP R 1 J 1/10W		
R36			RK73FB2A101J	CHIP R 100 J 1/10W		
R37			R92-0670-05	CHIP R 0 ΩHM		
R38			RK73FB2A822J	CHIP R 8.2K J 1/10W		
R39			RK73FB2A473J	CHIP R 47K J 1/10W	E	
R40			RK73FB2A473J	CHIP R 47K J 1/10W		
R41			RK73FB2A333J	CHIP R 33K J 1/10W		
R42			RK73FB2A473J	CHIP R 47K J 1/10W		
R43			RK73FB2A223J	CHIP R 22K J 1/10W		
R44			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R45			RK73FB2A822J	CHIP R 8.2K J 1/10W		
R46			RK73FB2A272J	CHIP R 2.7K J 1/10W		
R47			RK73FB2A334J	CHIP R 330K J 1/10W		
R48			RK73FB2A223J	CHIP R 22K J 1/10W		
R49			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R50 -52			RK73FB2A103J	CHIP R 10K J 1/10W		
R53			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R54			RK73FB2A223J	CHIP R 22K J 1/10W		
R55			RK73FB2A473J	CHIP R 47K J 1/10W		
R56			R92-0670-05	CHIP R 0 ΩHM		
R57 ,58			RK73FB2A103J	CHIP R 10K J 1/10W	E	
R59			RK73FB2A224J	CHIP R 220K J 1/10W	E	
R60			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R61 ,62			RK73FB2A103J	CHIP R 10K J 1/10W		
R63 ,64			R92-0670-05	CHIP R 0 ΩHM		
R65			RK73FB2A103J	CHIP R 10K J 1/10W	C3	
R65			RK73FB2A223J	CHIP R 22K J 1/10W	EC4	
R66			R92-0670-05	CHIP R 0 ΩHM		
R67			RK73FB2A104J	CHIP R 100K J 1/10W		
R68			R92-0670-05	CHIP R 0 ΩHM		
R69			RK73FB2A104J	CHIP R 100K J 1/10W		
R70			RK73FB2A473F	CHIP R 47K F 1/10W		
R71			RK73FB2A823F	CHIP R 82K F 1/10W		
R72			RK73FB2A153F	CHIP R 15K F 1/10W		
R73			RK73FB2A220J	CHIP R 22 J 1/10W		
R74			R92-0670-05	CHIP R 0 ΩHM		
R75			RK73FB2A104J	CHIP R 100K J 1/10W		
R76			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R77			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R78			RK73FB2A471J	CHIP R 470 J 1/10W		
R79			R92-0670-05	CHIP R 0 ΩHM		
R80			RK73FB2A122J	CHIP R 1.2K J 1/10W		

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R81			RK73FB2A220J	CHIP R 22 J 1/10W		
R82			RK73FB2A223J	CHIP R 22K J 1/10W		
R83			RK73FB2A103J	CHIP R 10K J 1/10W		
R84 ,85			RK73FB2A101J	CHIP R 100 J 1/10W		
R86 ,87			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R88			RK73FB2A104J	CHIP R 100K J 1/10W		
R89			R92-0670-05	CHIP R 0 OHM		
R90			RK73FB2A100J	CHIP R 10 J 1/10W		
R91			RK73FB2A471J	CHIP R 470 J 1/10W	C3	
R92			RK73FB2A120J	CHIP R 12 J	C3	
R92			R92-0670-05	CHIP R 0 OHM	EC4	
R93			R92-0685-05	CHIP R 22 J 1/2W	C3	
R93			R92-0699-05	SOLID 10 1/2W	EC4	
R94			RK73FB2A471J	CHIP R 470 J 1/10W	C3	
R95			R92-0670-05	CHIP R 0 OHM		
R96			R92-1215-05	CHIP R 470 J 1/2W		
R97			RK73FB2A103J	CHIP R 10K J 1/10W		
R98			R92-1213-05	CHIP R 100 J 1/2W		
R99 ,100			RK73FB2A223J	CHIP R 22K J 1/10W		
R101			RK73FB2A100J	CHIP R 10 J 1/10W		
R201			RK73FB2A563J	CHIP R 56K J 1/10W		
R202			RK73FB2A473J	CHIP R 47K J 1/10W		
R203			RK73FB2A103J	CHIP R 10K J 1/10W		
R204			RK73FB2A473J	CHIP R 47K J 1/10W		
R205			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R206-209			RK73FB2A473J	CHIP R 47K J 1/10W		
R210			RK73FB2A183J	CHIP R 18K J 1/10W		
R213-215			RK73FB2A473J	CHIP R 47K J 1/10W		
R216			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R217,218			RK73FB2A473J	CHIP R 47K J 1/10W		
R221,222			RK73FB2A473J	CHIP R 47K J 1/10W		
R225			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R226			RK73FB2A103J	CHIP R 10K J 1/10W		
R231,232			RK73FB2A473J	CHIP R 47K J 1/10W		
R233			R92-0679-05	CHIP R 0 OHM		
R234			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R235			RK73FB2A2R2J	CHIP R 2.2 J 1/10W	E	
VR1			R12-3132-05	TRIM POT. 47K		
VR2			R12-6423-05	TRIM POT. (10K)		
VR3			R12-6423-05	TRIM POT. (10K)	E	
VR4			R12-3132-05	TRIM POT. (47K)		
VR5			R12-3126-05	TRIMMING POT. (10K)		
VR201			R05-3452-05	POTENTIOMETER (10K.A)		
S201			S40-2440-15	PUSH SWITCH (PWS)		
S202,203			S40-1436-05	TACT SWITCH (SET1)		
S204,205			S40-1086-05	TACT SWITCH (X1)	E	
S206-208			S40-1086-05	TACT SWITCH (CALL)		
D1			1SV164	CHIP DIODE		
D2			1SV164	CHIP DIODE	EC4	
D3			1SV164	CHIP DIODE		
D4			1SV164	CHIP DIODE	EC4	
D5			1SV164	CHIP DIODE	C3	
D5			1SV166	CHIP DIODE	EC4	
D6			1SV164	CHIP DIODE	EC4	

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D7 ,8 D9 D9 D10 ,11 D12			1SV164 1SV164 1SV166 1SS184 MA344B	CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE	C3 EC4	
D13 D14 D15 D16 D17			1SS184 1SS184 1SS181 MI407 MI808	CHIP DIODE CHIP DIODE CHIP DIODE DIODE CHIP DIODE	E	
D18 ,19 D20 D21 D201-204 D205			1SS226 DSA3A1 1SS184 MA77 MA77	CHIP DIODE DIODE CHIP DIODE CHIP DIODE CHIP DIODE	E	
D206 D207 D208 D209 D210			MA77 MA77 MA77 MA77 MA77	CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE	E C3	
D211 D212 IC1 IC2 IC3			1SS226 MA77 KCD01 UPC1241H KCA03	CHIP DIODE CHIP DIODE HIC(FM-IF) IC(AF POWER AMP) HIC(MIC AMP)		
IC4 IC5 IC6 IC7 IC201			NJM78L05UA LA5010M KCB05 MC7808CT NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V) IC(VOLTAGE REGULATOR/ +10V) HIC(DRIVE) IC(VOLTAGE REGULATOR/ +8V) IC(VOLTAGE REGULATOR/ +5V)		
IC203 IC204 IC205 Q1 Q2			75108GF-J97-3BE S-8054ALR-LN AK93C46F 3SK184(S) 3SK131(V12)	IC(CPU) IC(BUCK UP) IC(EEPROM) FET FET		
Q3 Q4 Q5 ,6 Q7 Q8			2SC2714(Y) 2SD1757K 2SB1119S DTC114WK DTC114WK	TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR DIGITAL TRANSISTOR		
Q9 ,10 Q11 Q12 Q13 Q14			2SC2712(Y) 2SD1757K 2SD1757K 2SC2712(Y) 2SK208(Y)	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR FET	E	
Q15 Q16 Q17 Q18 Q201			2SC2714(Y) 2SD1406(Y) 2SB1302S DTC114WK 2SC2712(Y)	TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR		
Q202 R236 TH1			DTC114EK R90-0711-05 157-252-55038	DIGITAL TRANSISTOR LADDER R THERMISTOR(2.5K)		
S209			W02-0866-05	ROTARY ENCODER		

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TK-705

PARTS LIST

✕ New Parts

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TX-RX UNIT (X57-335X-XX)

PLL (X58-371X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
Z1 Z2 Z2 Z3			X59-3740-10 X58-3710-10 X58-3711-01 X59-3130-00	SUB UNIT(HPF) SUB UNIT(PLL) SUB UNIT(PLL) SUB UNIT(APC)	EC4 C3	
			212-2503-05	GLASS WOLL TUBE		
PLL (X58-371X-XX) 0-10 : E,C4 1-01 : C3						
C1 C2 ,3 C4 C5 C8			CK73FB1E223K CK73FB1H102K CK73FB1E223K CK73FB1H471K C92-0003-05	CHIP C 0.022UF K CHIP C 1000PF K CHIP C 0.022UF K CHIP C 470PF K CHIP-TAN 0.47UF 25WV		
C9 C10 C11 ,12 C13 ,14 C6 ,7			CK73EB1E473K CC73FCH1H050C CK73FB1H102K CK73FB1E223K C92-0516-05	CHIP C 0.047UF K CHIP C 5.0PF C CHIP C 1000PF K CHIP C 0.022UF K CHIP-TAN 4.7UF 16WV		
C101 C110			CC73GSL1H221J CC73GSL1H221J	CHIP C 220PF J CHIP C 220PF J	EC4 EC4	
CN1 CN101 CN102			E40-5201-05 E40-0411-05 E40-0311-05 F11-1122-14	PIN CONNECTOR(7P) PIN CONNECTOR(4P) PIN CONNECTOR(3P) SHIELDING COVER		
L1 L101,102 L103 L103 L104-106			L40-3391-19 L40-4791-19 L34-2331-05 L34-2331-05 L40-4791-19	SMALL FIXED INDUCTOR(3.3UH) SMALL FIXED INDUCTOR(4.7UH) COIL 4T COIL 4T SMALL FIXED INDUCTOR(4.7UH)	EC4 C3	
L107 L107 L108 L109			L34-2331-05 L34-2332-05 L40-4791-19 L40-1092-19	COIL 4T COIL 3T SMALL FIXED INDUCTOR(4.7UH) SMALL FIXED INDUCTOR(1UH)	C3 EC4	
R6 R7 R7 R8 R9			RK73GB1J152J RK73GB1J222J RK73GB1J272J RK73GB1J392J RK73GB1J222J	CHIP R 1.5K J 1/16W CHIP R 2.2K J 1/16W CHIP R 2.7K J 1/16W CHIP R 3.9K J 1/16W CHIP R 2.2K J 1/16W	EC4 C3	
R10 ,11 R12 R13 R14 R1-5			RK73GB1J103J RK73GB1J472J RK73FB2A473J RK73GB1J223J RK73FB2A473J	CHIP R 10K J 1/16W CHIP R 4.7K J 1/16W CHIP R 47K J 1/10W CHIP R 22K J 1/16W CHIP R 47K J 1/10W		
R15 R16 R101 R102 R103			RK73GB1J103J RK73GB1J221J RK73GB1J101J RK73GB1J470J RK73GB1J101J	CHIP R 10K J 1/16W CHIP R 220 J 1/16W CHIP R 100 J 1/16W CHIP R 47 J 1/16W CHIP R 100 J 1/16W		
R104 R105 R106 R107 R108			RK73GB1J222J RK73GB1J472J RK73GB1J471J RK73GB1J101J RK73GB1J470J	CHIP R 2.2K J 1/16W CHIP R 4.7K J 1/16W CHIP R 470 J 1/16W CHIP R 100 J 1/16W CHIP R 47 J 1/16W		
R109			RK73GB1J183J	CHIP R 18K J 1/16W		

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PLL (X58-371X-XX)

APC (X59-3130-00)

HPF (X59-3740-10)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
R110 R111 R112,113 R114			RK73GB1J470J RK73GB1J101J RK73GB1J471J RK73GB1J104J	CHIP R 47 J 1/16W CHIP R 100 J 1/16W CHIP R 470 J 1/16W CHIP R 100K J 1/16W		
C101 C102 C102 C103,104 C105			CC73GCH1H470J CC73GCH1H030C CC73GCH1H1R5C CK73GB1E103K CC73GCH1H020C	CHIP C 47PF J CHIP C 3PF C CHIP C 1.5PF C CHIP C 0.01UF K CHIP C 2PF C	C3 C3 EC4	
C106 C107,108 C109 C110 C111			CC73GCH1H220J CK73GB1H102K CK73GB1E103K CC73GCH1H270J CC73GCH1H010C	CHIP C 22PF J CHIP C 1000PF K CHIP C 0.01UF K CHIP C 27PF J CHIP C 1PF C	C3	
C112,113 C114 C115 C116 C117			CK73GB1E103K CC73GCH1H020C CC73GCH1H030C CK73GB1H102K CC73GCH1H0R5C	CHIP C 0.01UF K CHIP C 2PF C CHIP C 3PF C CHIP C 1000PF K CHIP C 0.5PF C	C3	
C118 D101-104 D105 IC1 Q1 ,2			CK73GB1H102K 1SV166 1SV164 M54959FP 2SC3324(B)	CHIP C 1000PF K DIODE DIODE IC(FREQ SYNTHESIZER PLL) TRANSISTOR		
Q3 Q4 Q101 Q102 Q103			2SC2712(Y) 2SC2714(Y) 2SK508NV(K52) DTC114EK 2SC3120	TRANSISTOR TRANSISTOR FET DIGITAL TRANSISTOR TRANSISTOR		
Q104 Q105			2SK508NV(K52) DTC114EK	FET DIGITAL TRANSISTOR		
APC (X59-3130-00)						
C1 C2 C3 C4 C5			CK73FB1H102K C92-0501-05 CK73FB1H472K CK73FB1H102K CK73FB1H472K	CHIP C 1000PF K CHIP-TAN 1.5UF 10WV CHIP C 4700PF K CHIP C 1000PF K CHIP C 4700PF K		
C6			CK73FB1H102K E23-0471-05	CHIP C 1000PF K TERMINAL		
R1 R2 R3 R6 R4 ,5			RD41FB2B222J RD41FB2B102J RD41FB2B152J RD41FB2B122J RD41FB2B103J	CARBON 2.2K J 1/8W CARBON 1K J 1/8W CARBON 1.5K J 1/8W CARBON 1.2K J 1/8W CARBON 10K J 1/8W		
Q3 Q1 ,2			2SA1162(Y) FMW-1	TRANSISTOR TRANSISTOR		
HPF (X59-3740-10)						
C7 C8 C10 C4-6			CK73FB1H102K CK73FB1H272K CK73EF1C105Z CK73FB1H272K E23-0471-05	CHIP C 1000PF K CHIP C 2700PF K CHIP C 1.0UF Z CHIP C 2700PF K TERMINAL		

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TK-705

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※ New Parts
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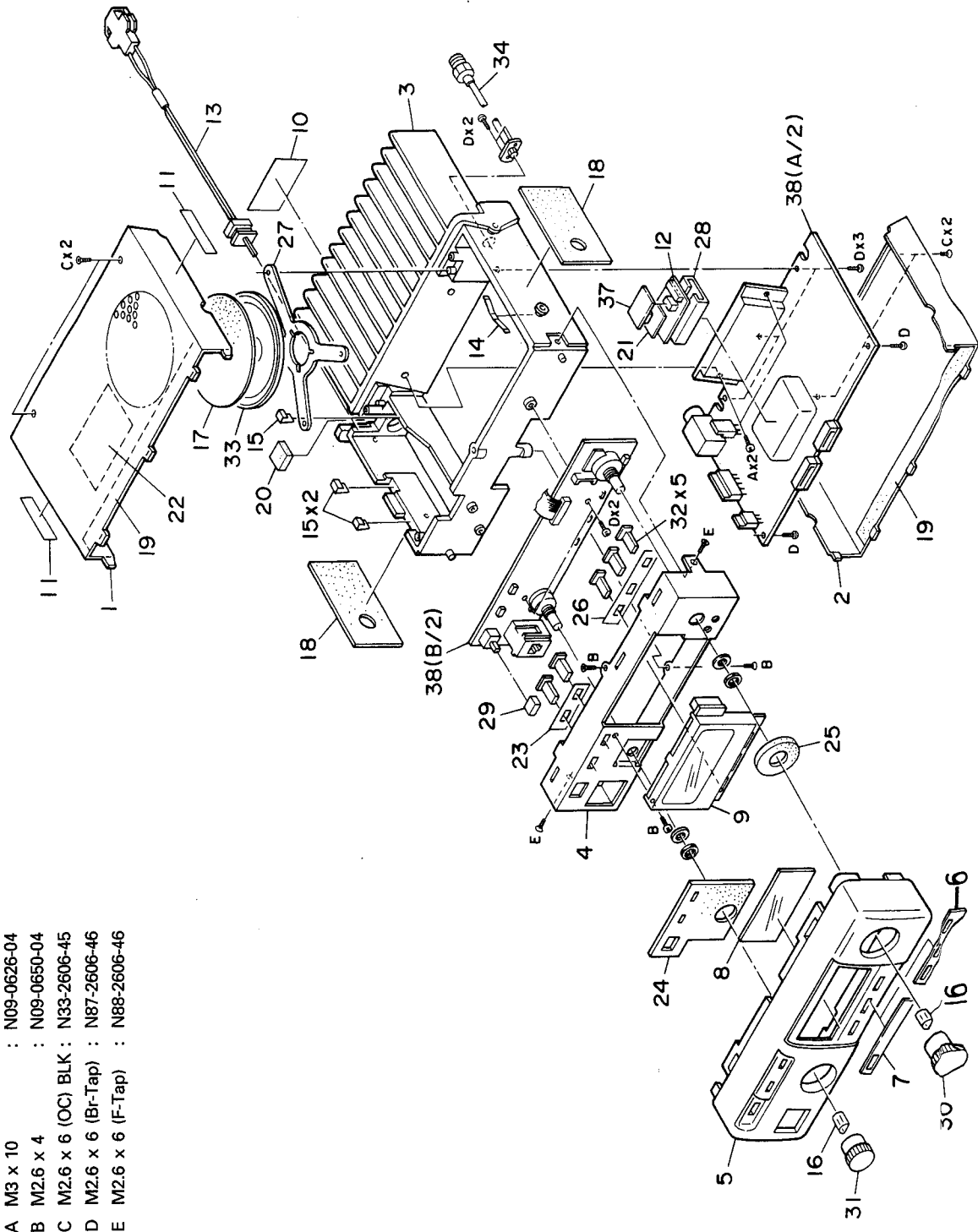
HPF (X59-3740-10)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
R1			RK73GB1J394J	CHIP R 390K J 1/16W		
R2			RK73GB1J681J	CHIP R 681 J 1/16W		
R3			RK73GB1J332J	CHIP R 3.3K J 1/16W		
R4			RK73GB1J124J	CHIP R 120K J 1/16W		
R5			RK73GB1J683J	CHIP R 68K J 1/16W		
R6 ,7			RK73GB1J824J	CHIP R 820K J 1/16W		
R8			RK73FB2A124G	CHIP R 120K G 1/10W		
R9			RK73FB2A564G	CHIP R 560K G 1/10W		
R10			RK73FB2A104G	CHIP R 100K G 1/10W		
R16			RK73GB1J122J	CHIP R 1.2K J 1/16W		
R17			R92-0670-05	CHIP R 0 OHM		
C1-3			CK73GB1H272K	CHIP C 2700PF K		
IC1			NJM4558M	IC(OP AMP X2)		
Q1			2SC2712(Y)	TRANSISTOR		

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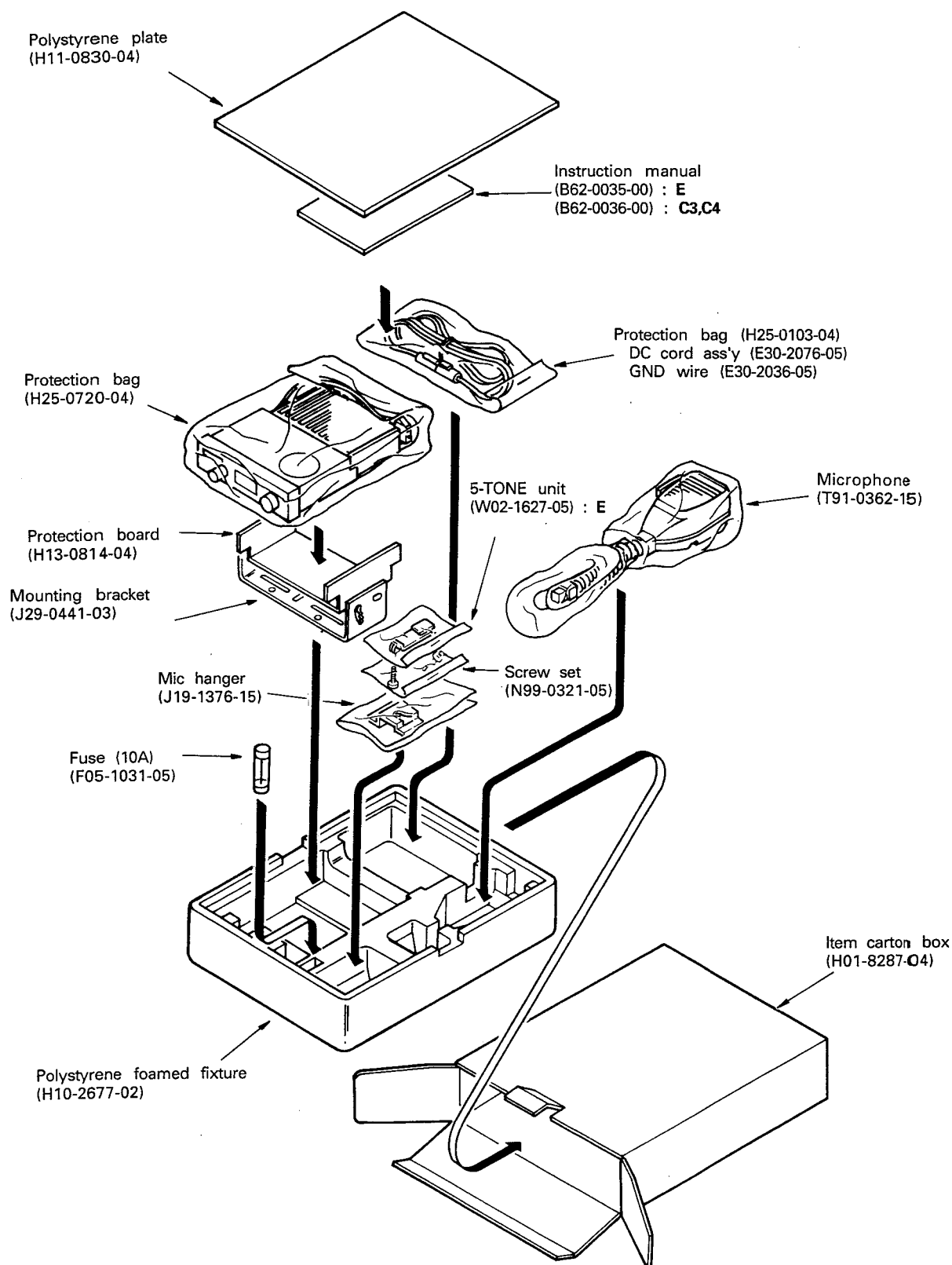
 indicates safety critical components.

EXPLODED VIEW



TK-705

PACKING



ADJUSTMENT

Test Equipment Required for Alignment

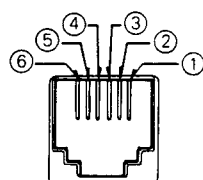
No.	Test Equipment	Major Specifications	
1	Standard Signal Generator (SSG)	Frequency Range Modulation Output	130 to 174MHz. Frequency modulation and external modulation. 0.1μV to greater than 1mV.
2	Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω. 130 to 174MHz or more. Vicinity of 60W.
3	Deviation Meter	Frequency Range	130 to 174MHz.
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 200MHz. 0.2ppm or less.
7	Ammeter		10A.
8	AF Volt Meter (AFVTVM)	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 10V DC or less. 50kΩ/V or greater.
12	4Ω Dummy Load		Approx. 4Ω, 3W.
13	Regulated Power Supply		13.6V, approx. 15A (adjustable from 9 to 17 V). Useful if ammeter equipped.

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

	RX freq' fr() MHz			TX freq' fr() MHz		
	L	M	H	L	M	H
E,C4	150.050	162.050	173.950	150.000	162.000	173.995
C3	136.050	143.050	149.950	136.000	143.000	149.995

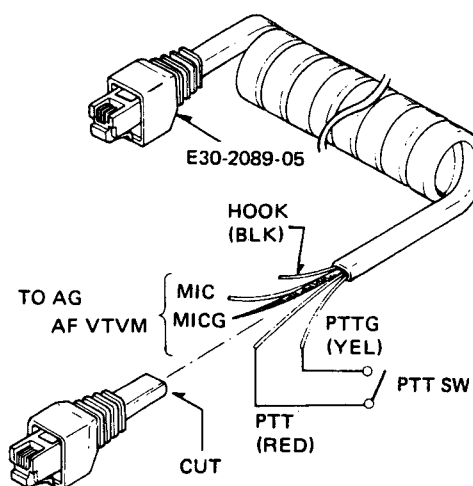
L : Low freq' M : Mid freq' H : Hi freq'

**MIC connector
front view**



- ① SB
- ② PTTG
- ③ PTT
- ④ MICG
- ⑤ MIC
- ⑥ HOOK

- The following test cables are recommended.

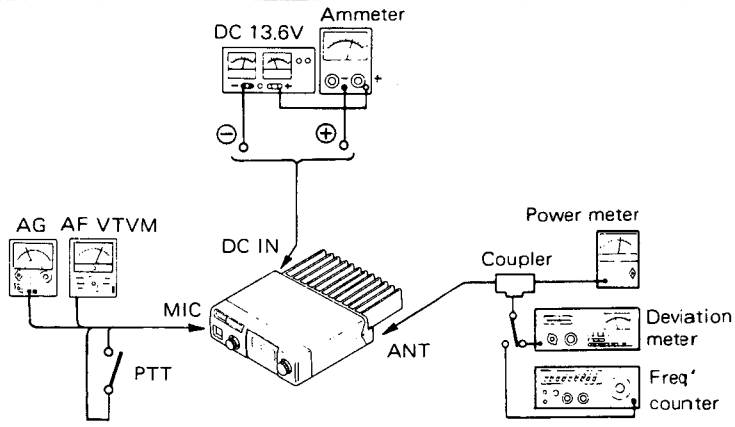


Test cable for Microphone input

TK-705

ADJUSTMENT

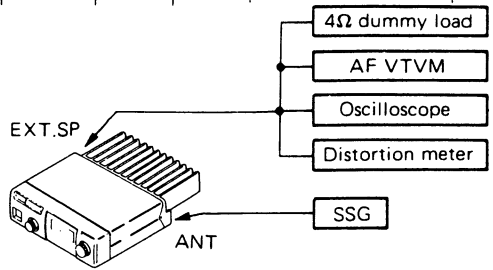
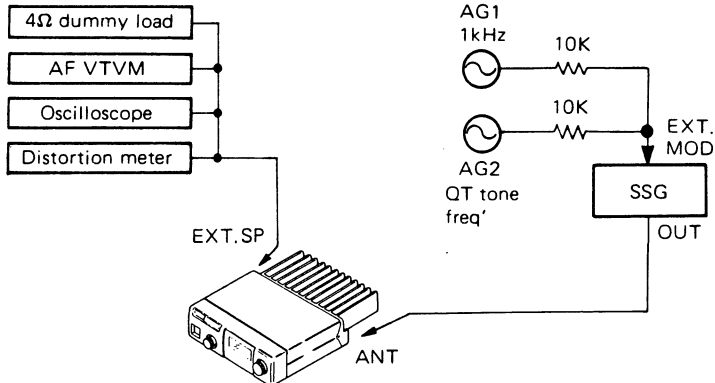
Common Section Adjustment

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Write in freq' and signaling data with EEPROM writer. Source voltage : DC 13.6V POWER SW : OFF VOL VR : Full counterclockwise (CCW). TX-RX unit VR1, 5 : CCW VR2, 4 : Center							
2. PLL	RX	1) CH : Channel with lowest RX FREQ' (f _{RL}).	DVM Dummy	TX-RX Rear panel	TP2 ANT		Check	1.5 ~ 3.5V E,C4
		2) CH : Channel with highest RX FREQ' (f _{RH}).						1.5 ~ 3.0V C3
	TX	3) CH : Channel with loest TX FREQ' (f _{TL}). PTT : ON						6.5 ~ 9.0V E,C4
		4) CH : Channel with highest TX FREQ' (f _{TH}). PTT : ON						6.0 ~ 9.0V C3
								2.5 ~ 4.0V E,C4
								1.5 ~ 3.5V C3
								6.5 ~ 9.0V E,C4
								5.5 ~ 9.0V C3
3. Transmit frequency adjustment	1) CH : Channel with TX center FREQ' (f _{TM}). PTT : ON	f. counter Power meter	Rear panel	ANT	TX-RX	TC1	Freq' adj. of TX.	±100Hz
	2) CH : Check other channel PTT : ON						Check	

Receiver Section Adjustment

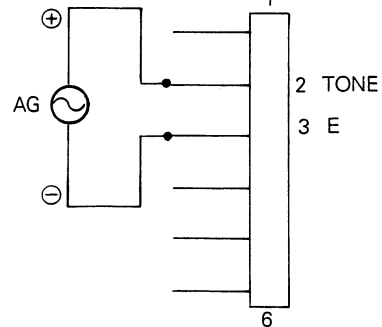
Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. BPF	1) CH : Channel with loest RX FREQ' (f _{RL}). E,C4 CH : Channel with RX center FREQ' (f _{RM}). C3 SSG output : 0.5μV/-113dBm MOD : 1kHz DEV : ±3kHz SQ SW(✓): OFF	DC V.M	TX-RX	TP1	TX-RX	L1~5	Repeat for MAX.	
2. Distortion	1) CH : Channel with RX center FREQ' (f _{RM}). SSG output : 501μV/-53dBm MOD : 1kHz DEV : ±3kHz MONI SW : ON E	Distortion meter Oscilloscope	Rear panel	SP	TX-RX	L6	Repeat for MIN.	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. Receiving sensitivity	1) CH : Channel with lowest RX FREQ' (f _{RL}), channel with RX center FREQ' (f _{RM}) and channel with highest RX FREQ' (f _{RH}). SSG output : 0.25μV/-119dBm MOD : 1kHz DEV : ±3kHz SQ SW : OFF MONI SW : ON E	AF V.M Oscilloscope	Rear panel	SP			Check 	SINAD 12dB or more.
4. Squelch	1) CH : Channel with RX center FREQ' (f _{RM}). SQ SW : ON MONI SW : ON E SSG output : 0.2μV/-121dBm	LCD			TX-RX	VR1	Set to the point at which squelch just open.	Busy indicator () should light.
	2) SSG output : 0.1μV/-127dBm						Check	Squelch should close.
	3) SSG output : 0.25μV/-119dBm						Check	Squelch should open.
5. Adjusting decoder sensitivity for signaling squelch QT/CTCSS unit C3,C4	1) CH : Set the channel selector to the channel with which QT (CTCSS) is used. SSG FREQ' : Set it to the FREQ' of the channel mentioned above. SSG output : Turn the SSG output so that the SINAD sensitivity becomes 10dB.							
	2) SSG MOD SW : EXT. MOD AG1 FREQ' : 1kHz AG2 FREQ' : QT tone freq'.							
	3) AG1 : Power switch OFF AG2 output : Adjust the output level of AG2 so that SSG deviation becomes 0.75kHz.							
	4) AG1 : Power switch ON AG1 output : Adjust the output level of AG1 so that the SSG deviation becomes 3.75kHz. (i.e., QT tone frequency/ 0.75kHz deviation, +1kHz/3kHz deviation) MIC hook : ON hook MONI SW : OFF	Rear panel	EXT. SP	QT/CTCSS			Check	Open.
6. 5-TONE decode operation check E	1) SSG output : 0dBμV/-113dBm MOD : 1kHz DEV : ±3kHz Match to the receive code of the set. SQ SW : OFF	DC 13.6V Ammeter					5-TONE generator SSG EXT. MOD OUT ANT	A whistling sound is produced when 5-TONE matches.

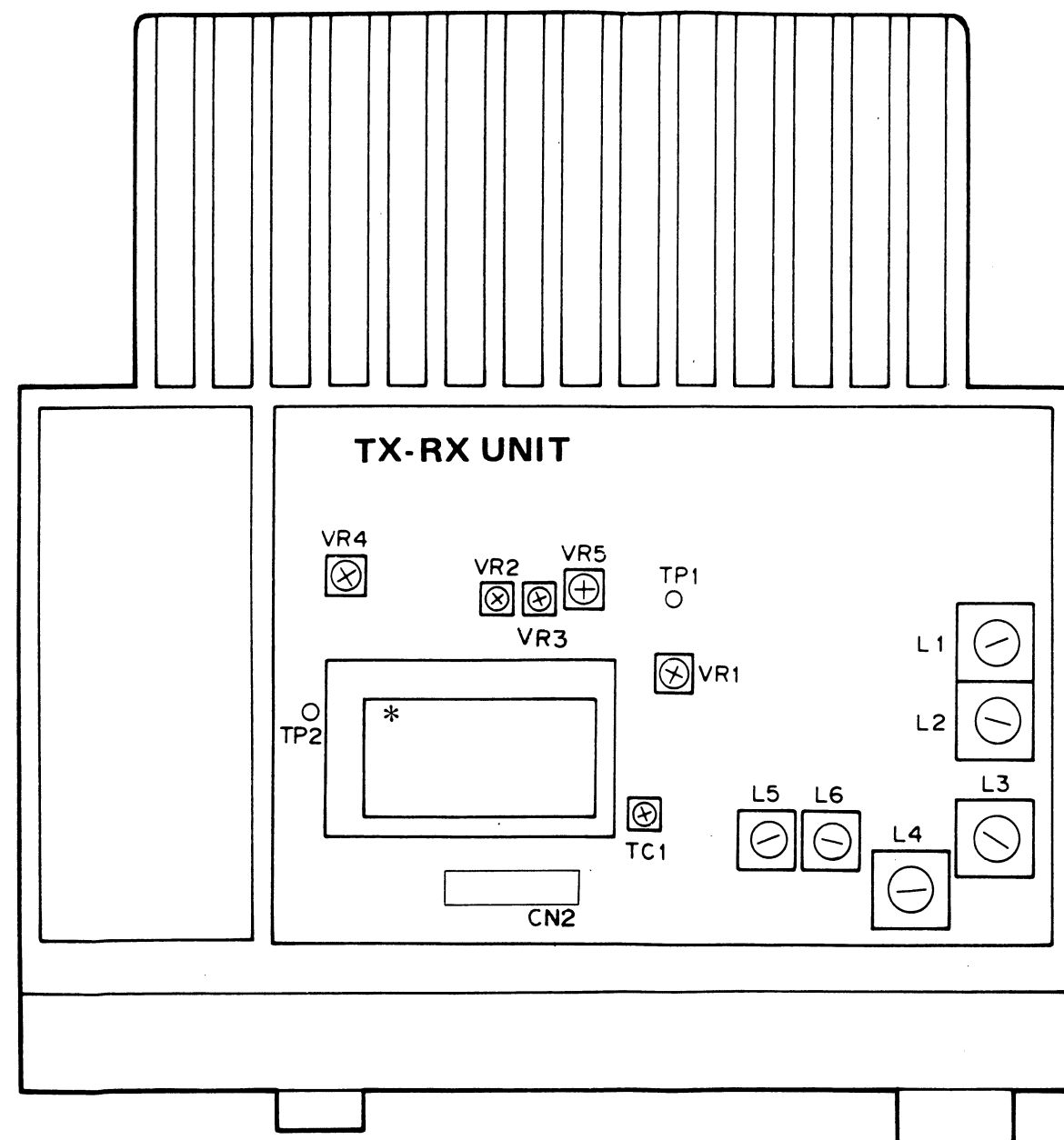
ADJUSTMENT

Transmitter Section Adjustment

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. APC	1) CH : Channel with TX center FREQ' (f _{TM}). PTT : ON	Power meter Ammeter	Rear panel	ANT			Check	30W or more. TX indicator () on.
	2) CH : Channel with lowest TX FREQ' (f _{TL}) and channel with highest TX FREQ' (f _{TH}). PTT : ON				TX-RX	VR5	27W	±1W, 7.0A or less.
2. Tone deviation adjustment	1) CH : Set the channel selector to the channel with which QT (CTCSS) is used. Deviation meter filter LPF : 3kHz HPF : 50Hz De-emphasis : 750μs PTT : ON	Power meter Deviation meter	Rear panel	ANT			Check	±0.5kHz~1.25kHz
3. Maximum deviation adjustment	1) Connect AG to the MIC terminal. AG : 1kHz/50mV Deviation meter filter LPF : 20kHz HPF : 50Hz De-emphasis : OFF TX-RX unit VR1 : MAX CW CH : Channel with highest TX FREQ' (f _{TH}). PTT : ON	Power meter Deviation meter	Rear panel	ANT	TX-RX	VR4	±4.2kHz ADJ. (±4.9kHz ADJ. when signaling unit installed.) Adjust one more than the other by switching between -P and +P.	±100Hz
4. MIC sensitivity adjustment	1) AG : 1kHz/5mV				TX-RX	VR2	±3kHz ADJ. (±3.75kHz ADJ. when signaling unit installed.)	±100Hz
5. 5-TONE deviation adjustment E	1) Remove the 5-TONE connector (CN2) in the TX-RX unit. Connect the AG output to connecting wire (E37-0045-05), (pin 2 : AG output, Pin 3 : GND), then insert to CN2 on the TX-RX unit. AG : 1kHz/225mV Deviation meter filter LPF : 3kHz HPF : 50Hz De-emphasis : 750μs CALL SW : ON	Power meter Deviation meter	Rear panel	ANT	TX-RX	VR3	±2kHz ADJ. 	±100Hz
6. Protection	1) CH : Channel with lowest TX FREQ' (f _{TL}). ANT : Open PTT : ON	Ammeter					Check	7.0A or less.

ADJUSTMENT

Adjustment Point (Top View)



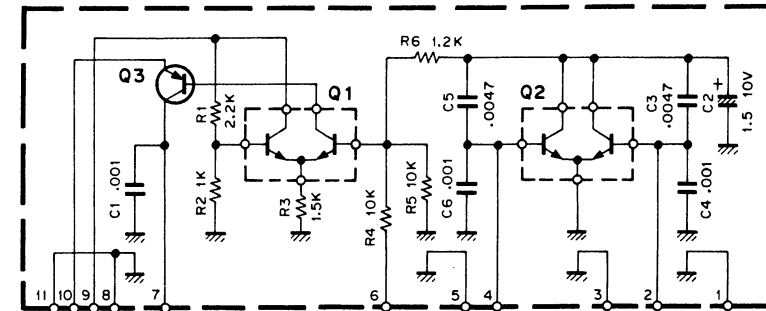
* E : 5TONE unit
C3,C4 : QT/CTCSS unit

TERMINAL FUNCTIONS

Connector No.	Terminal No.	Terminal Name	Terminal Function
TX-RX UNIT (X57-355X-XX) (A/2)			
CN1	1	SP	Speaker input.
	2	E	GND.
CN2	1	SIG	Signal input.
	2	TONE	TONE output.
	3	NC	GND.
	4	ALART	BEEP output.
	5	MUTE CON	AF mute.
	6	MIC MUTE	MIC mute.
CN3	1	E	GND.
	2	MODE	Function select.
	3	COM	Common.
	4	SC	Squelch busy control output.
	5	SQ	Squelch output.
	6	LO	Busy CH lockout control select.
	7	DET	Audio output.
	8	8C	Common +8V.
	9	TX	TX control.
	10	DT	PLL data.
	11	CK	PLL clock.
	12	EN	PLL enable.
	13	E	GND.
CN4	1	E	GND.
	2	A2	Audio input.
	3	TOT1	T.O.T. select.
	4	TO	Tone input.
	5	MIC	MIC input.
	6	ME	MIC GND.
	7	TOT2	T.O.T. select.
	8	BEEP	BEEP input.
	9	A1	AF output.
	10	MUTE	AF mute input.
	11	PSW	Power switch control input.
	12	B	+13.6V.
	13	E	GND.
TX-RX UNIT (X57-355X-XX) (B/2)			
CN201	1	E	GND.
	2	MODE	Function select.
	3	COM	Common.
	4	SC	Squelch busy control output.
	5	SQ	Squelch output.
	6	LO	Busy CH lockout control select.
	7	DET	Audio output.
	8	8C	Common +8V.
	9	TX	TX control.
	10	DT	PLL data.
	11	CK	PLL clock.
	12	EN	PLL enable.
	13	E	GND.
CN202	1	E	GND.
	2	A1	Audio select.
	3	TOT1	T.O.T. select.
	4	TO	Tone input.
	5	MIC	MIC input.
	6	ME	MIC GND.
	7	TOT2	T.O.T. select.
	8	BEEP	BEEP input.
	9	A1	AF output.
	10	MUTE	AF mute input.
	11	PSW	Power switch control input.
	12	B	+13.6V
	13	E	GND.
CN203	1	CE	Display enable.
	2	DT	Display data.
	3	CK	Display clock.
	4	E	GND.
	5	5C	Common +5V.
	6	8C	Common +8V.
CN204	1	LED	Indication.
	2	TX	TX control.
	3	MONI	Monitor control.
	4	CALL	Call control.
	5	BUSY	Audio output.
	6	SB	+13.6V
	7	PTT	PTT control.
	8	GND	GND.
	9	DT	Data.
	10	CK	Clock.

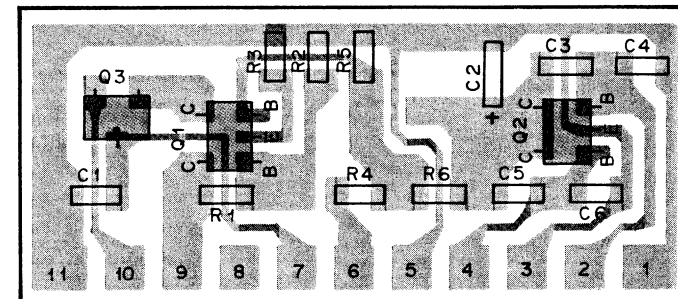
APC (X59-3130-00)

APC (X59-3130-00)



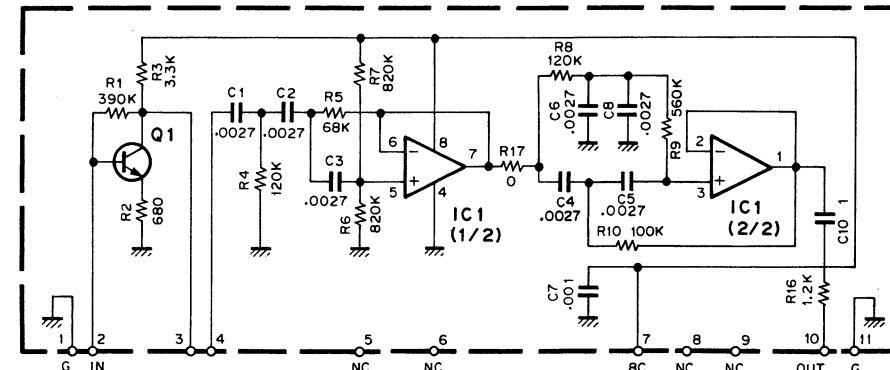
Q1, 2 : FMW-1
Q3 : 2SA1162 (Y)

APC (X59-3130-00) Foil side view



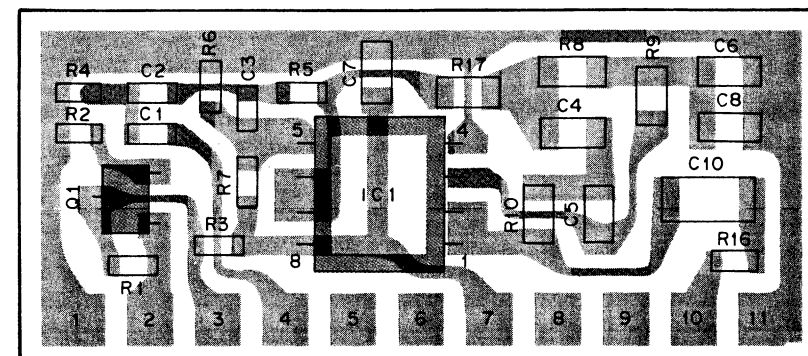
HPF (X59-3740-10)

HPF (X59-3740-10)



Q1 : 2SC2712 (Y)
IC1 : NJM4558M

HPF (X59-3740-10) Foil side view



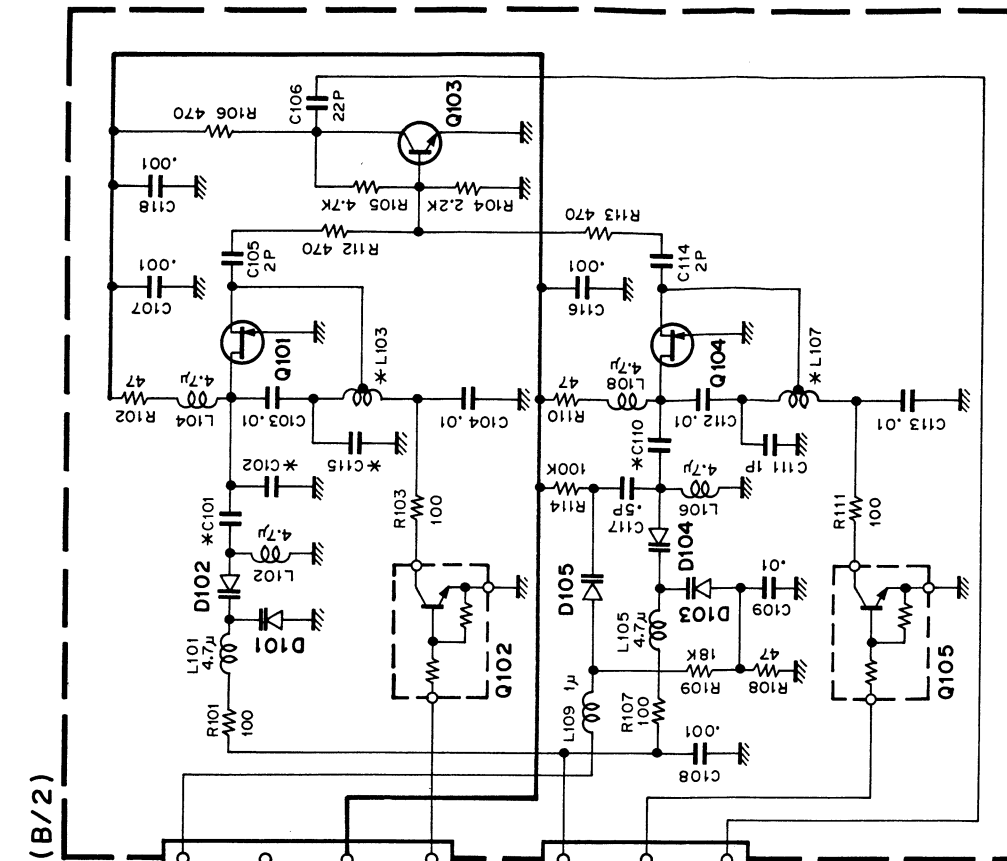
FMW-1

2SA1162
2SC2712

NJM4558M

■ : Component side
■ : Foil side

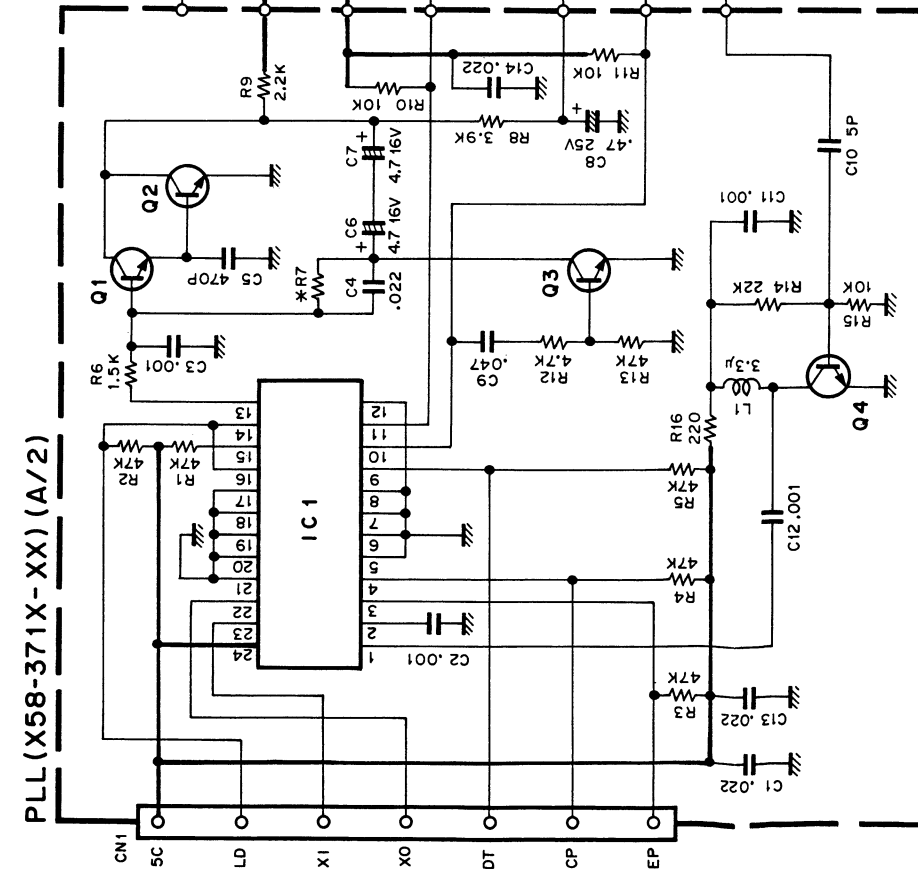
PLL (X58-371X-XX) 0-10 : E,C4 1-01 : C3



D101~104 : 1SV166
D105 : 1SV164

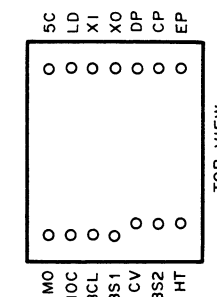
Q101, 104 : 2SK508NV (K52)
Q102, 105 : DTC114EK
Q103 : 2SC3120

	R7	C101	C102	C110	C115
0-10	2.2K	220P	1.5P	220P	—
1-01	2.7K	47P	3P	27P	3P

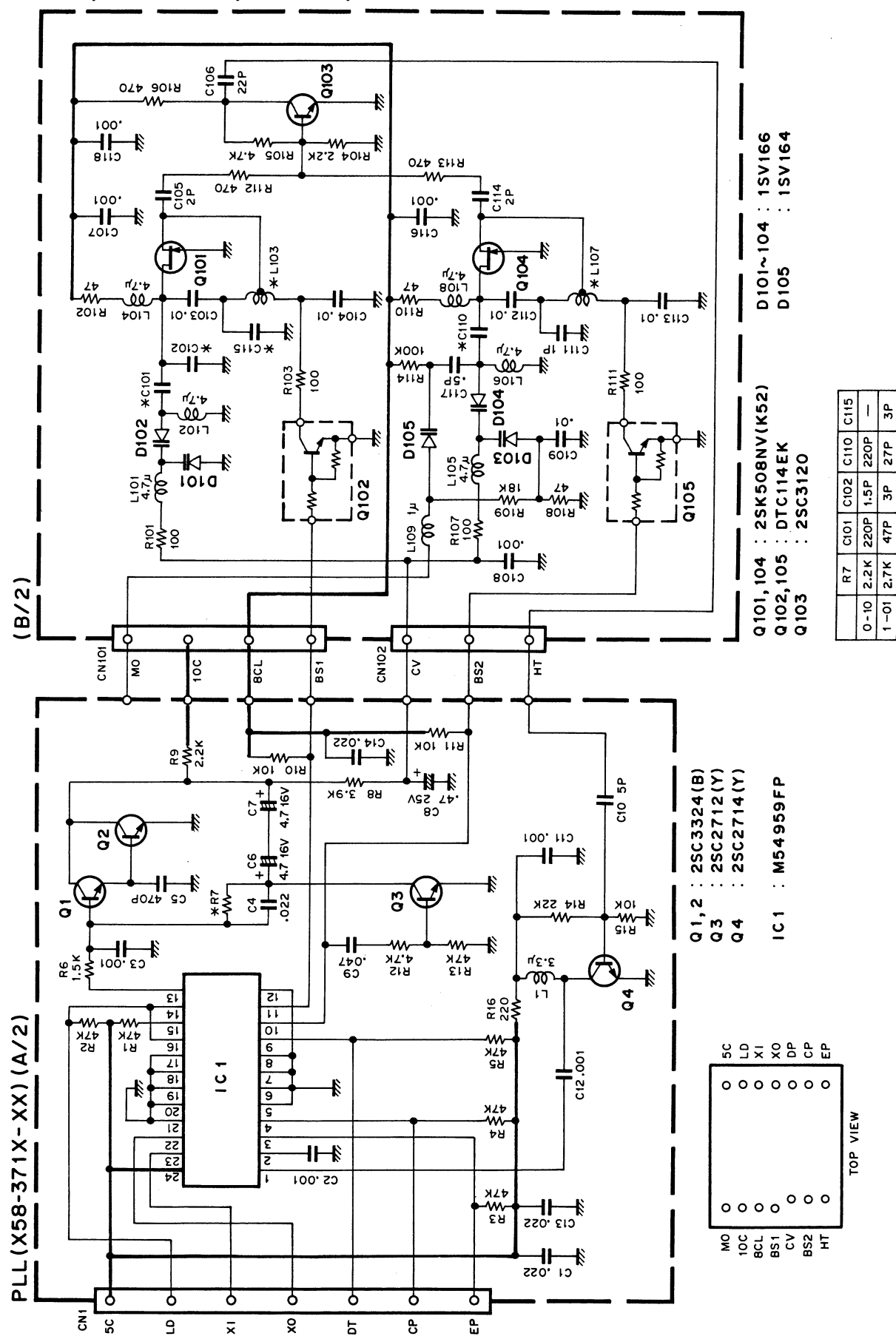


Q1, 2 : 2SC3324 (B)
Q3 : 2SC2712 (Y)
Q4 : 2SC2714 (Y)

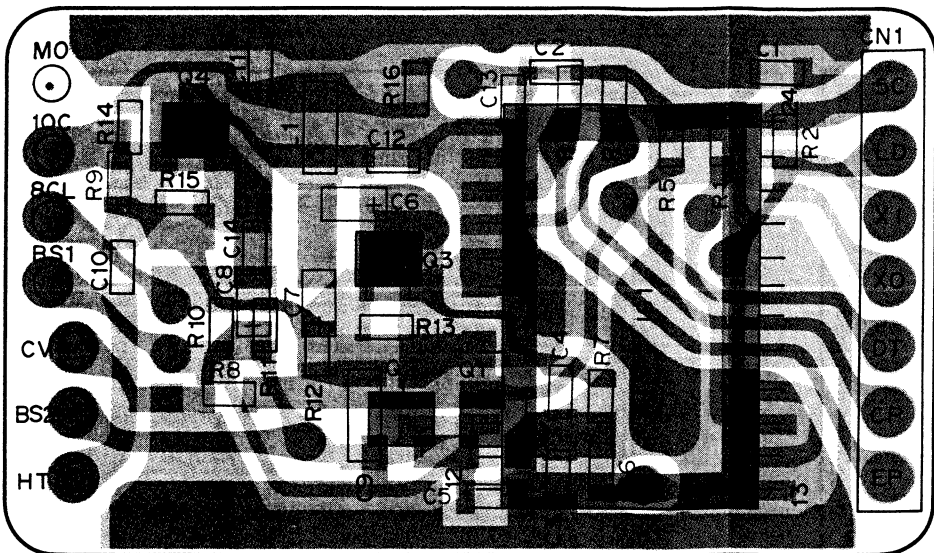
IC1 : M54959FP



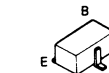
PLL (X58-371X-XX) 0-10 : E,C4 1-01 : C3



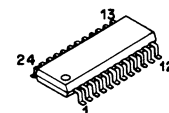
PLL (X58-371X-XX) (A/2) Component side view



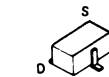
2SC2712
2SC2714
2SC3120
2SC3324
DTC114EK



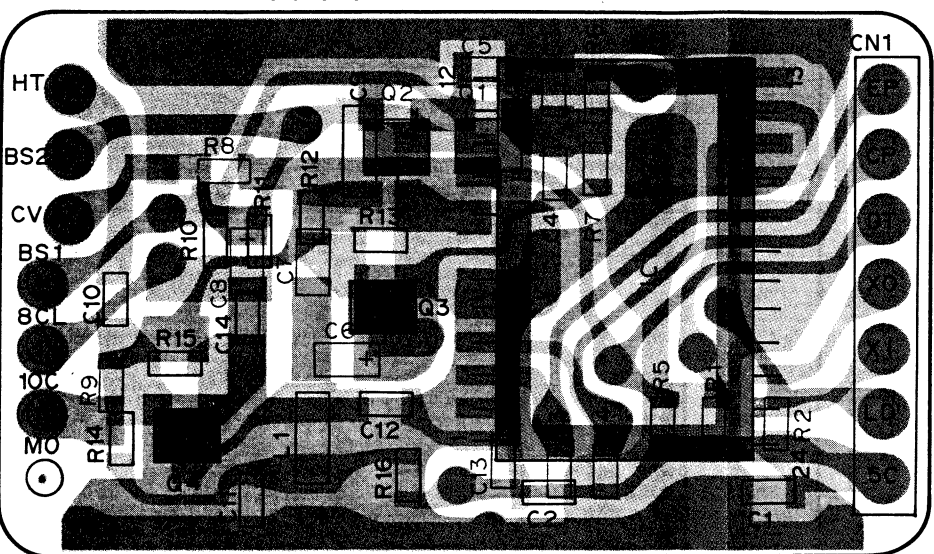
M54959FP



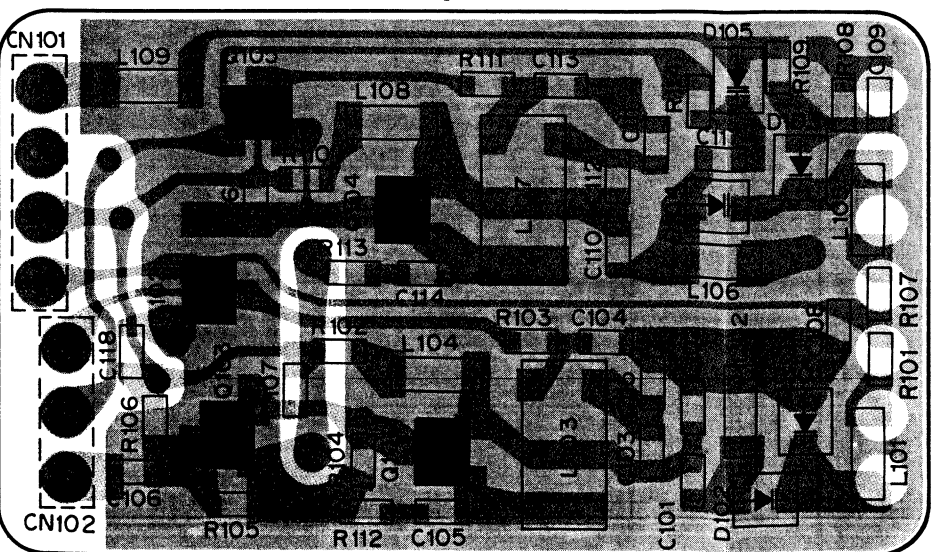
2SK508NV



PLL (X58-371X-XX) (A/2) Foil side view



PLL (X58-371X-XX) (B/2) Component side view

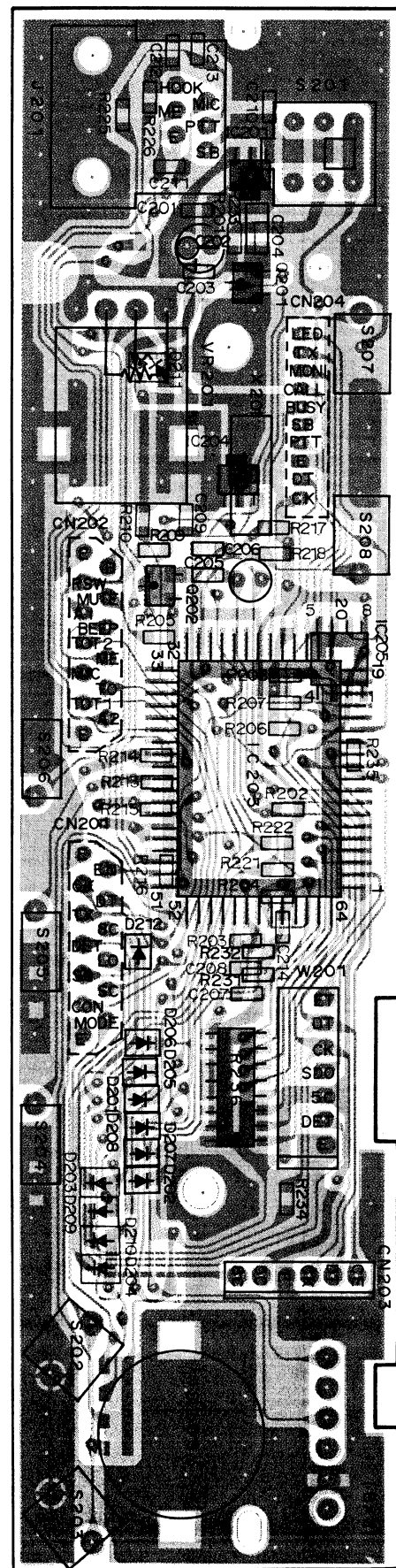


■ : Component side
■ : Foil side

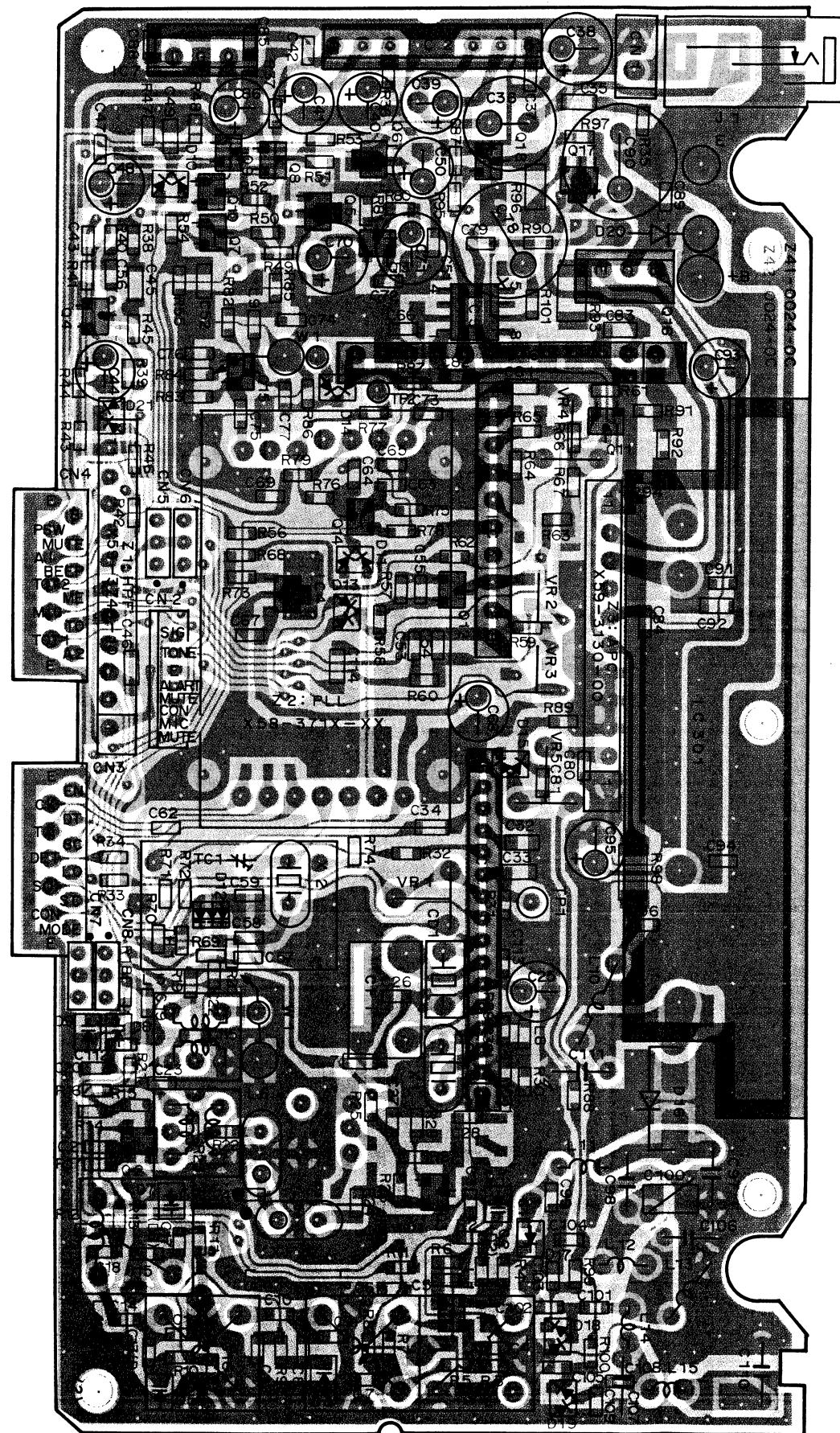
TK-705 PC BOARD VIEWS

TX-RX UNIT (X57-355X-XX) Component side view

2-70 : E 3-01 : C3 3-02 : C4

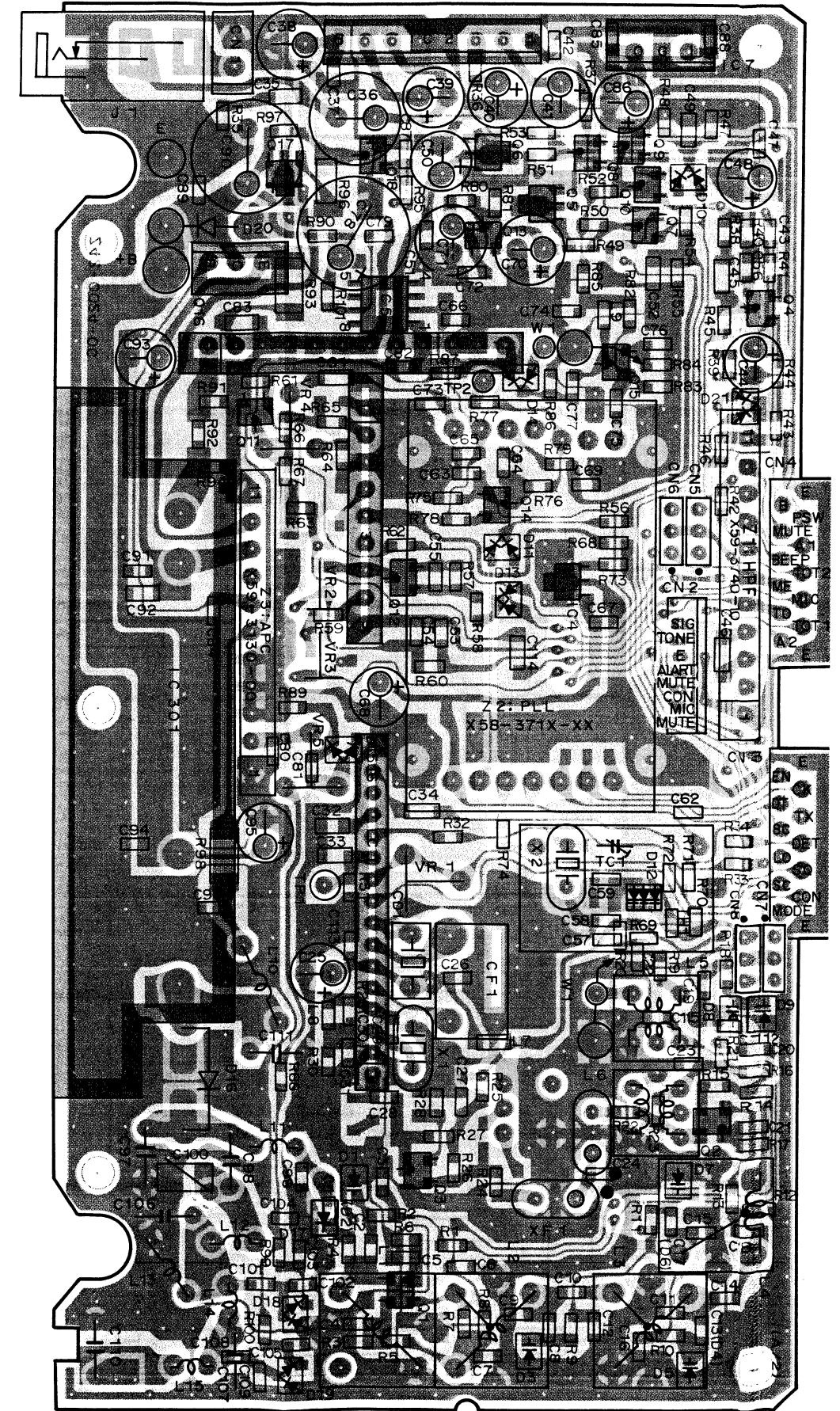


48



TX-RX UNIT (X57-355X-XX) Foil side view

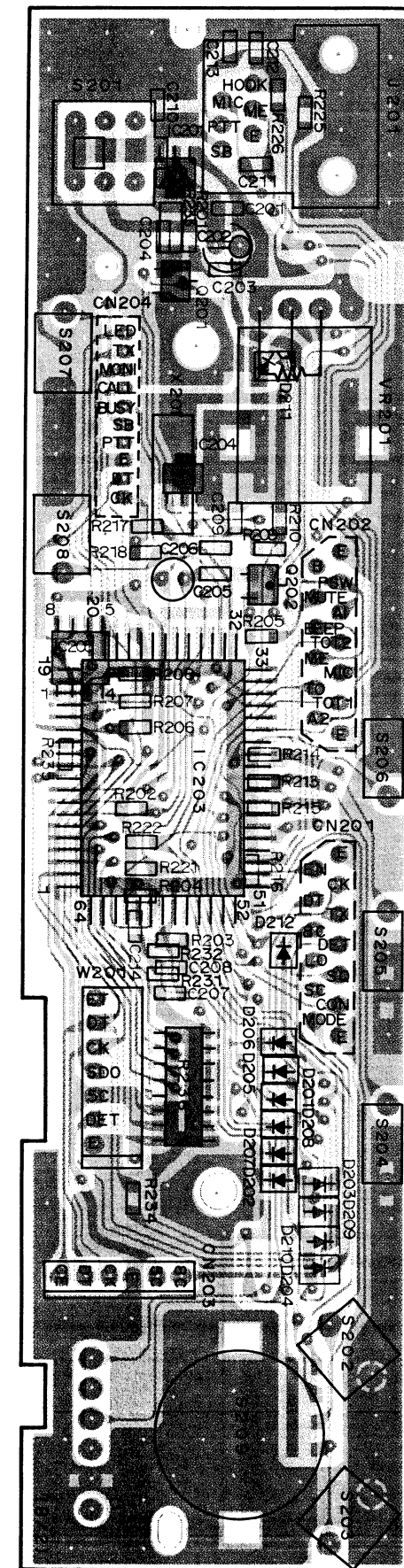
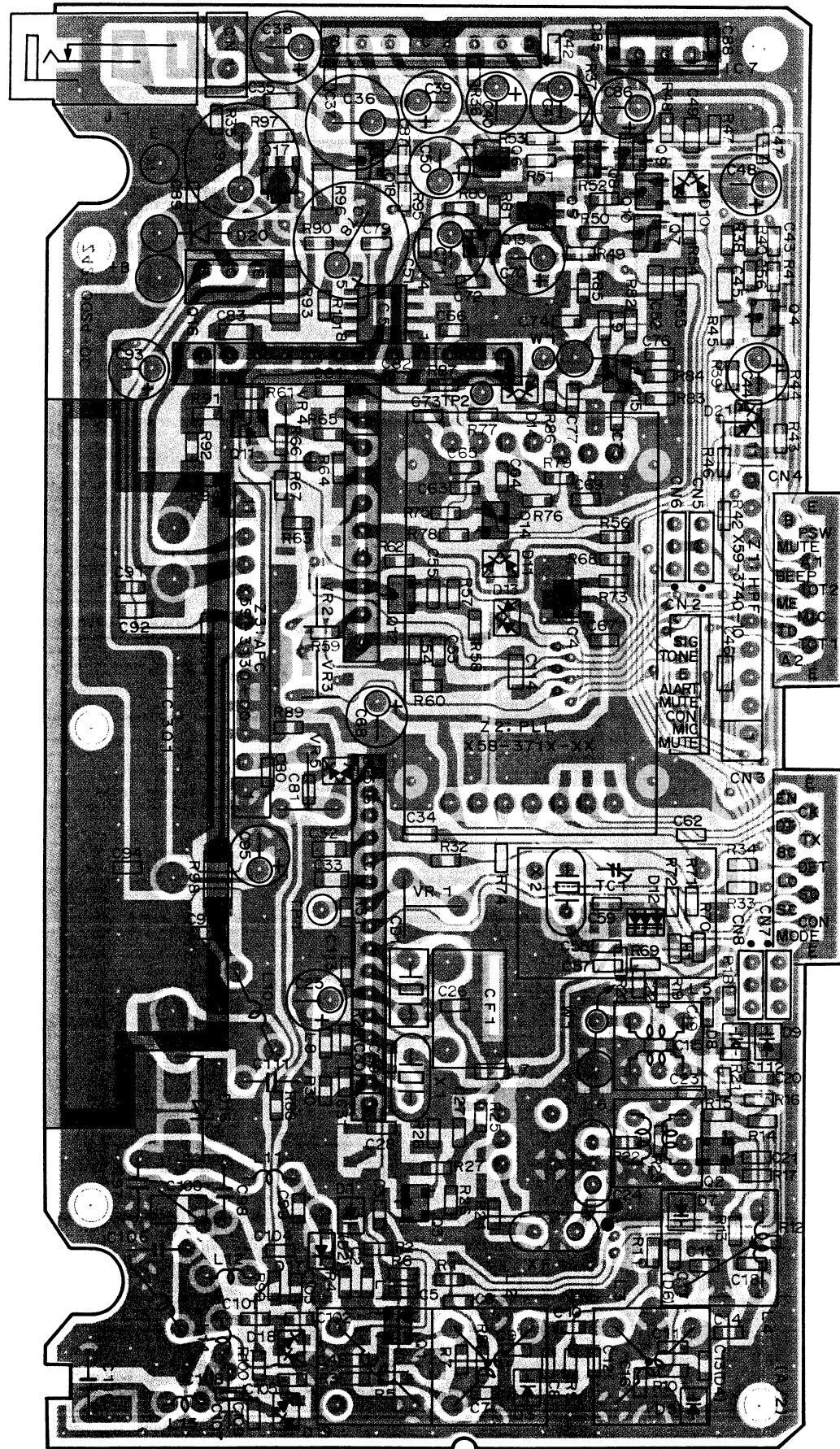
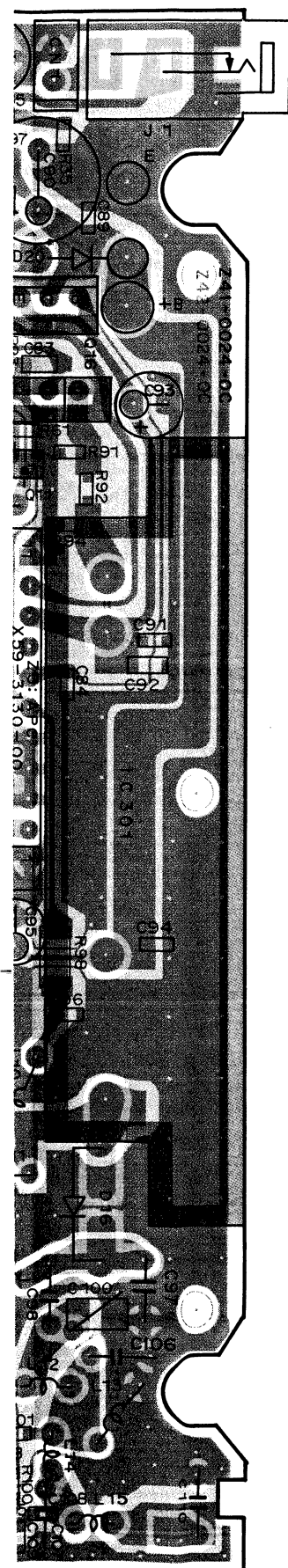
2-70 : E 3-01 : C3 3-02 : C4



TX-RX UNIT (X57-355X-XX) Foil side view

2-70 : E 3-01 : C3 3-02 : C4

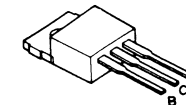
■ : Component side
■ : Foil side



2SC2712
2SC2714
2SD1757K
DTC114EK
DTC114WK
DTC144WK



2SD1406



2SB1119S
2SB1302S



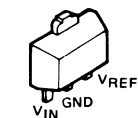
2SK208



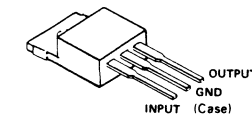
3SK131
3SK184



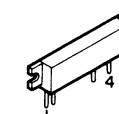
NJM78L05UA
S-8054ALR-LN



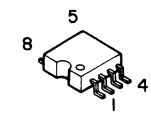
MC7808CT



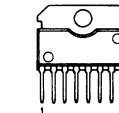
M57741UL-22
M67741H-22



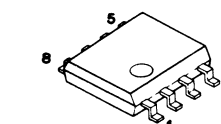
AK93C46F



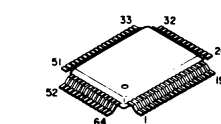
μPC1241H



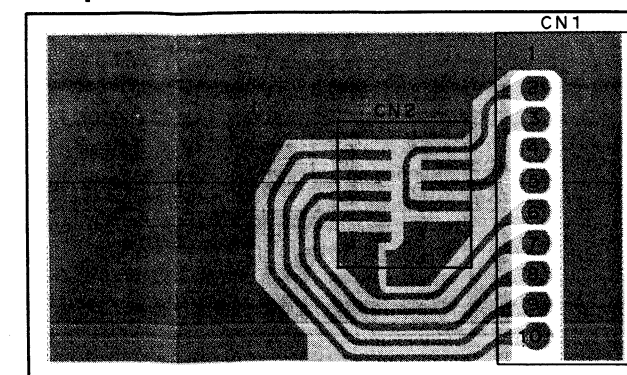
LA5010M



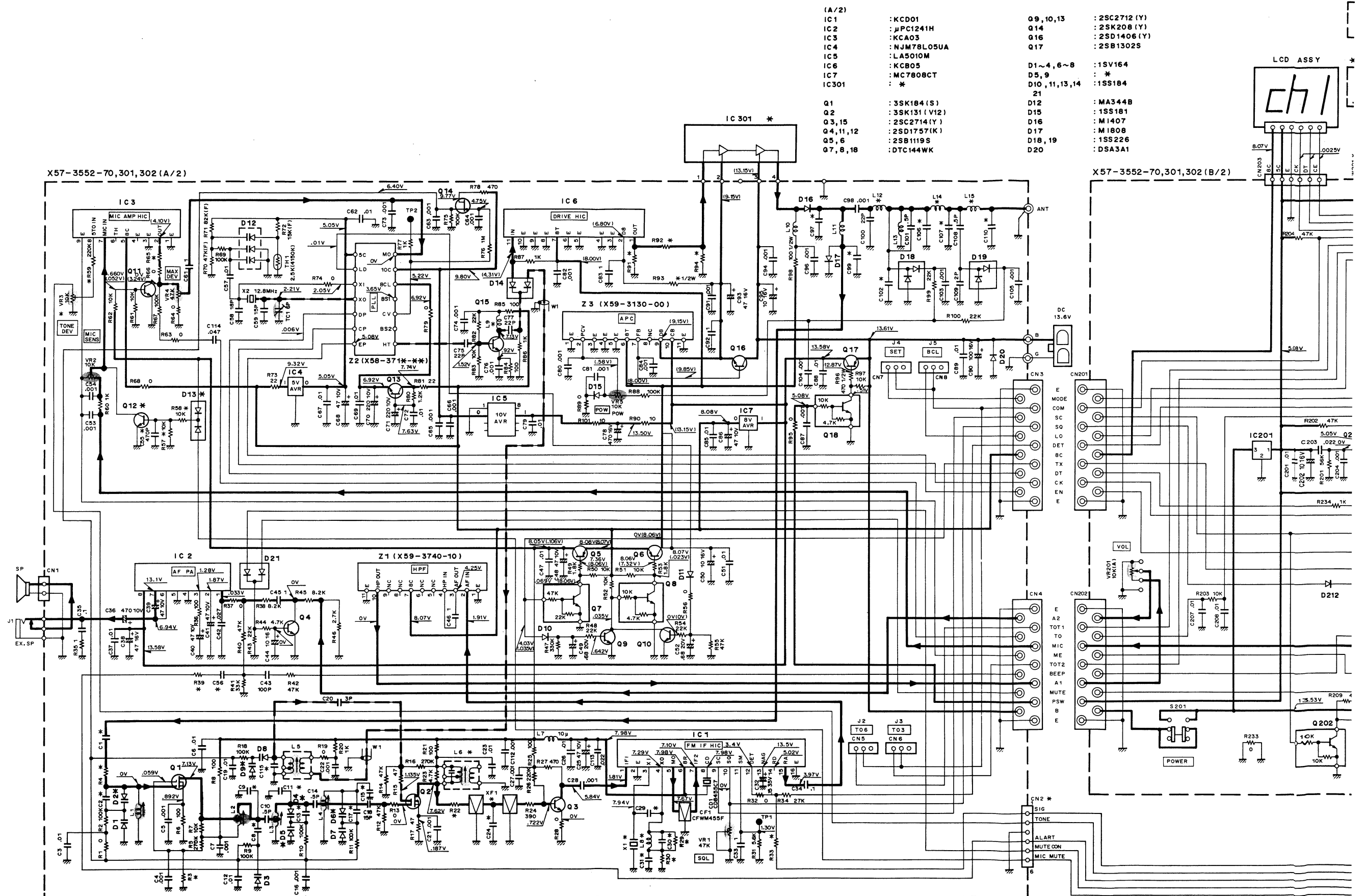
75108GF-J97-3BE



JUNCTION PCB (E29-0491-05)
Component side view



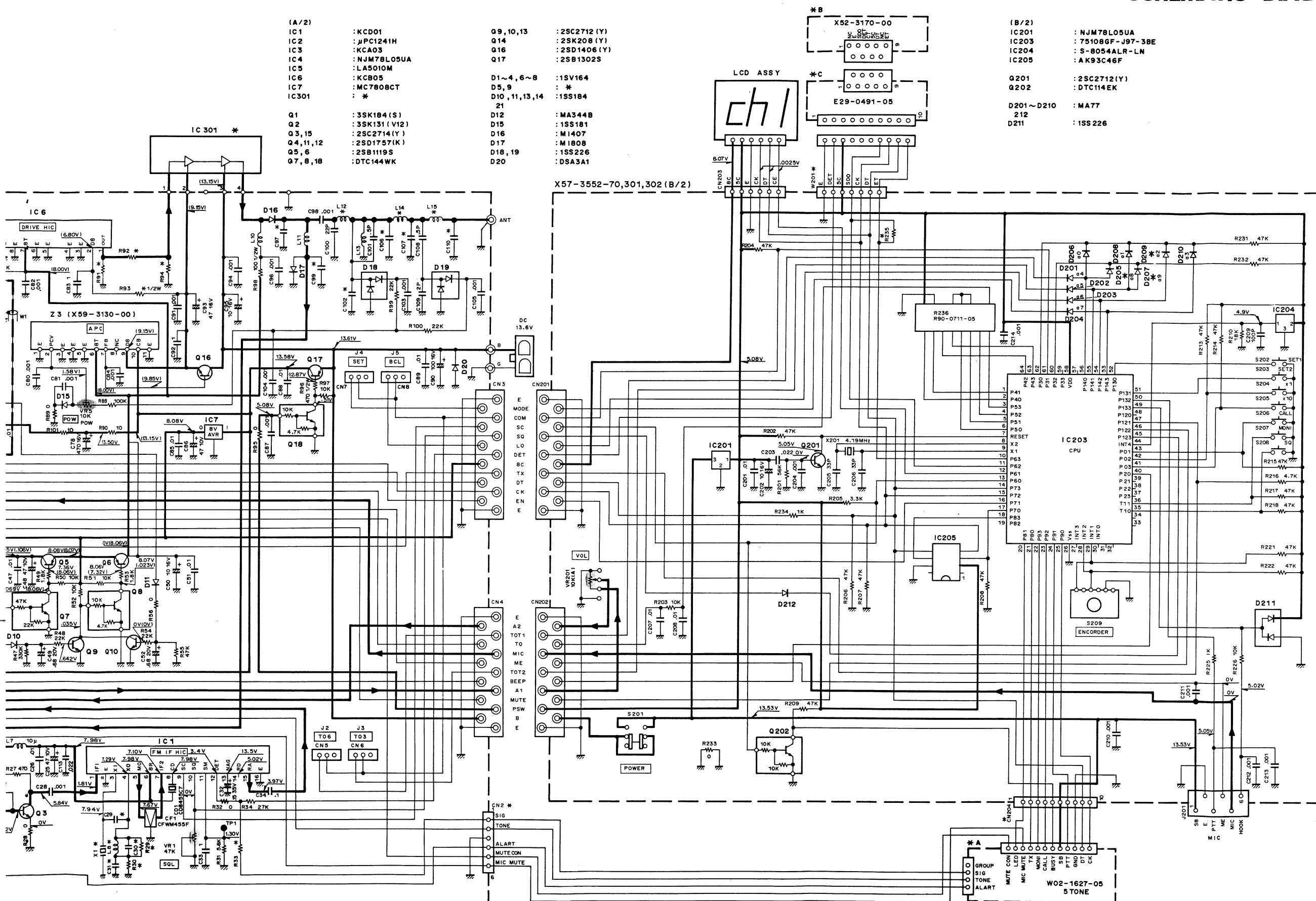
Signal line Control line Common DC line



- (A/2)
- IC1 : KCD01
IC2 : μ PC1241H
IC3 : KCA03
IC4 : NJM78L05UA
IC5 : LA5010M
IC6 : KCB05
IC7 : MC7808CT
IC301 : *
- Q1 : 3SK184 (S)
Q2 : 3SK131 (V12)
Q3,15 : 2SC2714 (Y)
Q4,11,12 : 2SD1757 (K)
Q5,6 : 2SB1119S
Q7,8,18 : DTC144WK
- Q9,10,13 : 2SC2712 (Y)
Q14 : 2SK208 (Y)
Q16 : 2SD1406 (Y)
Q17 : 2SB1302S
- D1~4,6~8 : 1SV164
D5,9 : *
D10,11,13,14 : 1SS184
D12 : MA344B
D15 : 1SS181
D16 : M1407
D17 : M1808
D18,19 : 1SS226
D20 : DSA3A1

○ : USED X : NOT USED

	X57-355X-XX	IC301	Z2 X58-371X-XX	XF1	X1	*A	*B	*C	Q12	L6	L8	L9	L12	L14,L15	C1	C2	C8	C9	C11	C13	C15	C17	C24	C29	C30	C31	C35	C36	C37	C39	C102	C106	C107	C110	C115	VR3	R4	R22	R29	R30	R33	R39	R57	R58	R59	R65	R91	R92	R93	R94	
TK706 E	X57-3552-70	M67741H-22	X58-3710-10	L71-0298	L77-1415	○	×	×	×	×	1U	1U	L34-0742	L34-0499	3P	×	33P	×	3P	×	.5P	×	9P	47P	39P	.001	470P	100P	12P	9P	3P	39P	39P	15P	×	○	○	○	×	15K	27K	47K	10K	10K	220K	22K	×	10	×		
TK706 C2	X57-3553-01	M57741UL-22	X58-3711-01	L71-0244	L77-1416	×	○	○	×	×	3.3U	×	L34-0894	L34-0894	4P	22P	22P	4P	4P	22P	2P	22P	7P	33P	×	82P	×	×	18P	22P	2P	47P	47P	22P	2P	×	33	680	○	47K	×	×	×	×	×	10K	47K	10	2	22	470
TK706 C4	X57-3553-02	M67741H-22	X58-3710-10	L71-0298	L77-1415	×	×	×	×	×	1U	1U	L34-0742	L34-0499	3P	×	33P	×	3P	×	.5P	×	9P	47P	39P	.001	×	×	12P	9P	3P	39P	39P	15P	×	×	○	○	○	×	15K	×	×	×	×	×	22K	×	10	×	



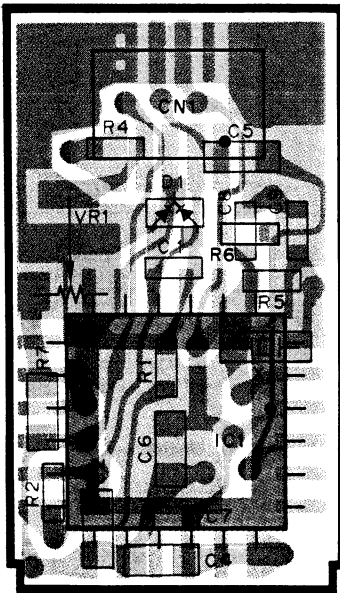
S	L8	L9	L12	L14, L15	C1	C2	C8	C9	C11	C13	C15	C17	C24	C29	C30	C31	C35	C36	C97	C99	C102	C106	C107	C110	C115	VR3	R4	R22	R29	R30	R33	R39	R57	R58	R59	R65	R91	R92	R93	R94	R235	D2	D4	D5	D6	D9	D13	D205	D207	D209	CN2	CN2M	W20	
-4191	1U	1U	L34 - 0742	L34 - 0499	3P	X	33P	X	3P	X	.5P	X	9P	47P	39P	.001	470P	100P	12P	9P	3P	39P	39P	15P	X	0	0	0	X	15K	27K	47K	10K	10K	220K	22K	X	0	10	X	2.2	15V164	15V164	15V166	15V164	15V166	0	0	0	X	0	0	X	0
-0508	X	3.3U	L34 - 0894	L34 - 0894	4P	22P	22P	4P	4P	22P	2P	22P	7P	33P	X	82P	X	X	18P	22P	2P	47P	47P	22P	2P	X	33	680	0	47K	X	X	X	X	X	10K	470	12	22	470	X	X	15V164	X	15V164	X	15V166	X	X	X	X	X	0	
-4191	1U	1U	L34 - 0742	L34 - 0499	3P	X	33P	X	3P	X	.5P	X	9P	47P	39P	.001	X	X	12P	9P	3P	39P	39P	15P	X	X	0	0	0	X	15K	X	X	X	X	X	22K	X	0	10	X	15V164	15V164	15V166	15V164	15V166	X	X	X	X	X	X	0	

Parts List

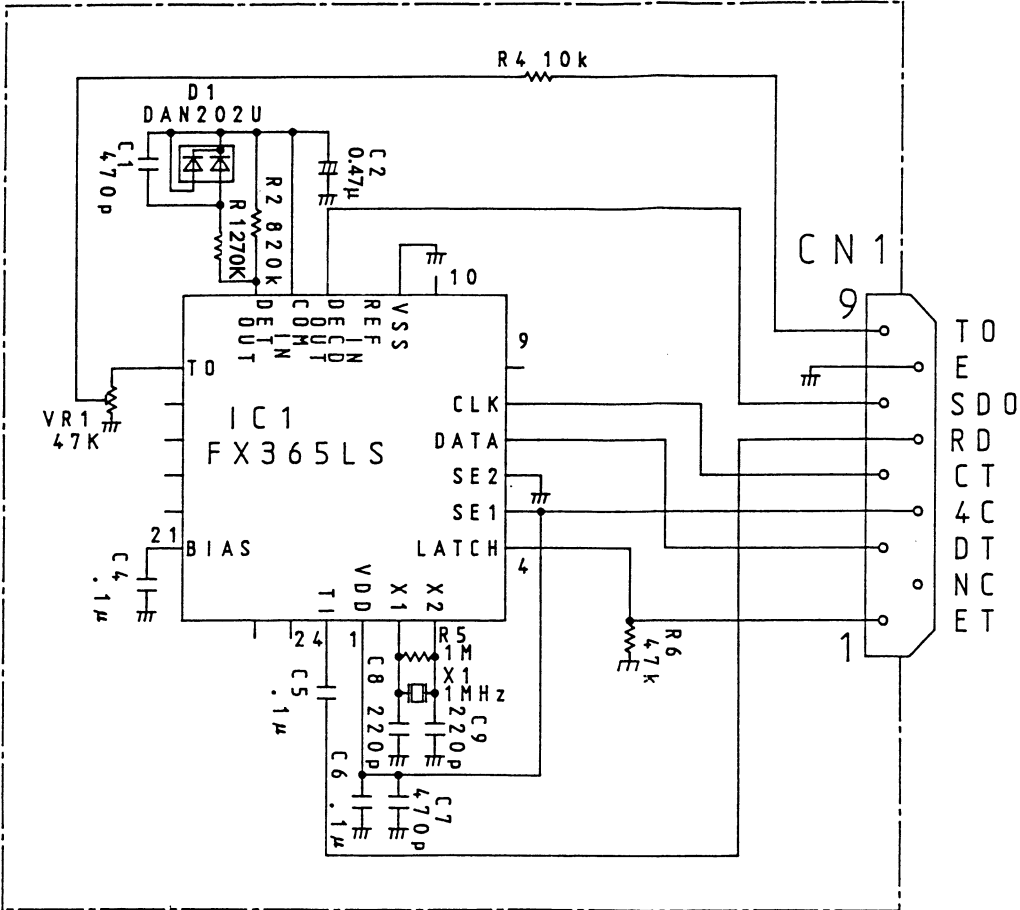
Ref. No.	New parts	Parts No.	Description
C1		CK73GB1H471K	CHIP C 470pF K
C2		C92-0521-05	CHIP TAN 0.47μF 20VV
C4~6		CK73FB1E104K	CHIP C 0.1μF K
C7		CK73GB1H471K	CHIP C 470pF K
C8,9		CC73GCH1H221J	CHIP C 220pF J
CN1		E40-6341-05	CONNECTOR
		G10-0692-04	CUSHION
		H21-0704-04	CUSHION
X1	*	L78-0062-05	Crystal 1MHz
R1		RK73BG1J274J	CHIP R 270k J
R2		RK73BG1J824J	CHIP R 820K J
R4		RK73BF1J103J	CHIP R 10k J
R5		RK73BG1J105J	CHIP R 1M J
R6		RK73BG1J473J	CHIP R 47k J
VR1		R12-6526-05	TRIMMING POT. 47k
IC1	*	FX365LS	IC
D1		DAN202U	CHIP DIODE

PC Board View

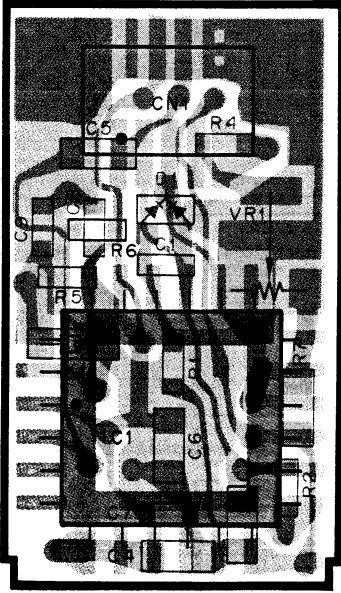
Component side view



Circuit Diagram



Foil side view



SPECIFICATIONS

GENERAL

Frequency Range	136 ~ 150MHz (C3 type) 150 ~ 174MHz (E, C4 type)
Number of Channels	16 semi-duplex channels
Channel Spacing	30kHz (PLL channel step 5.0kHz)
Selective Calling	5 tone encode, decode for (F) model only ZVEI (ZVEI-1, ZVEI-2, DZVEI, PZVEI), EEA, CCIR, NATEL, EIA
Input Voltage	13.6V DC negative ground
Current Drain	0.3A on standby 0.7A on receive 6.0A on transmit
Duty Cycle	Receiver 100%, Transmitter 20%
Temperature Range	-30°C to +60°C (-22°F to +140°F)
Dimensions and Weight	5.51" (140mm) W x 1.58" (40mm) H x 34" (161mm) D, 2.20lbs. (1.0kg)

RECEIVER

(Measurements made per EIA standard EIA-204-C)

RF Input Impedance	50Ω
Sensitivity	
EIA 12dB SINAD	0.2μV
20dB Quieting	0.3μV
Squelch Sensitivity	0.25μV threshold
Modulation Acceptance	±7kHz
Selectivity	-80dB
Intermodulation	-75dB
Spurious and Image Rejection	-90dB
Audio Power Output	4W at 4Ω less than 5% distortion
Frequency Stability	±0.0005% from -30°C to +60°C
Channel Frequency Spread	24MHz

TRANSMITTER

(Measurements made per EIA standard EIA-152-B)

RF Power Output	25 W adjustable to 5W
RF Output Impedance	50Ω
Spurious and Harmonics	-70dB
Modulation	F3E, ±5kHz for 100% at 1000Hz
FM Noise	-50dB
Microphone Impedance	Low impedance
Audio Distortion	1.0% at 1000Hz
Frequency Stability	±0.0005% from -30°C to +60°C
Channel Frequency Spread	24MHz

Radio specifications may vary in accordance with the type accepted local national regulations (including 12.5kHz narrow channel spacing).

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