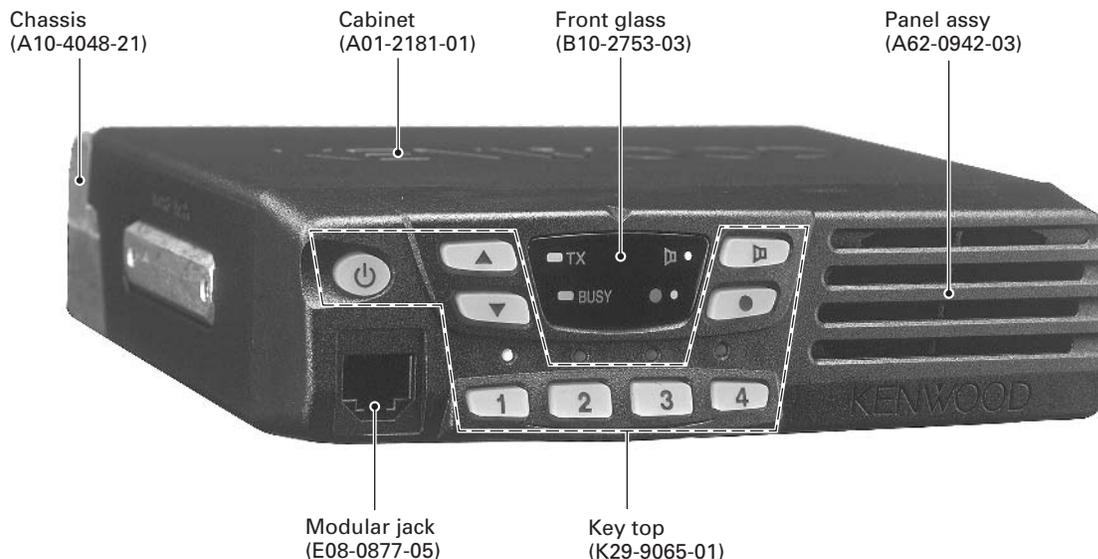


This service manual applies to products with 50300001 or subsequent serial numbers.  
In terms of the products with the serial numbers earlier than 50300001, refer to the TK-7102H service manual as per part No. B51-8610-00 and B51-8627-00.



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### Service Manual List

Title	Parts number	Remarks	Destination	TX-RX unit number	Display unit number
TK-7102H	B51-8610-00		M	X57-6380-20	X54-3340-20
TK-7102H	B51-8627-00	SUPPLEMENT	K,K2,M,M2	X57-6380-XX	X54-3340-20
TK-7102H	B51-8610-10 (This service manual)	REVISED	K,K2,M,M2	X57-6700-XX	X54-3460-20

## 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 this publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions, which are issued as required.

### ORDERING REPLACEMENT PARTS

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

### PERSONNEL SAFETY

The following precautions are recommended for personnel safety :

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

### PRE-INSTALLATION CONSIDERATIONS

#### 1. UNPACKING

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

#### 2. LICENSING REQUIREMENTS

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

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

### 3. PRE-INSTALLATION CHECKOUT

#### 3-1. Introduction

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

#### 3-2. Testing

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

### 4. PLANNING THE INSTALLATION

#### 4-1. General

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

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

#### 4-2. Antenna

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

#### 4-3. Radio

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

#### 4-4. DC Power and wiring

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

# GENERAL / SYSTEM SET-UP

## 5. INSTALLATION PLANNING – CONTROL STATIONS

### 5-1. Antenna system

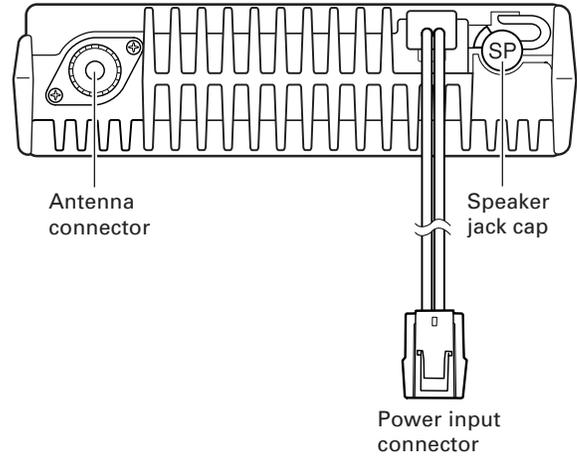
Control station. The antenna system selection depends on many factors and is beyond the scope of this manual. Your KENWOOD dealer can help you select an antenna system that will best serve your particular needs.

### 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.

## NOTE

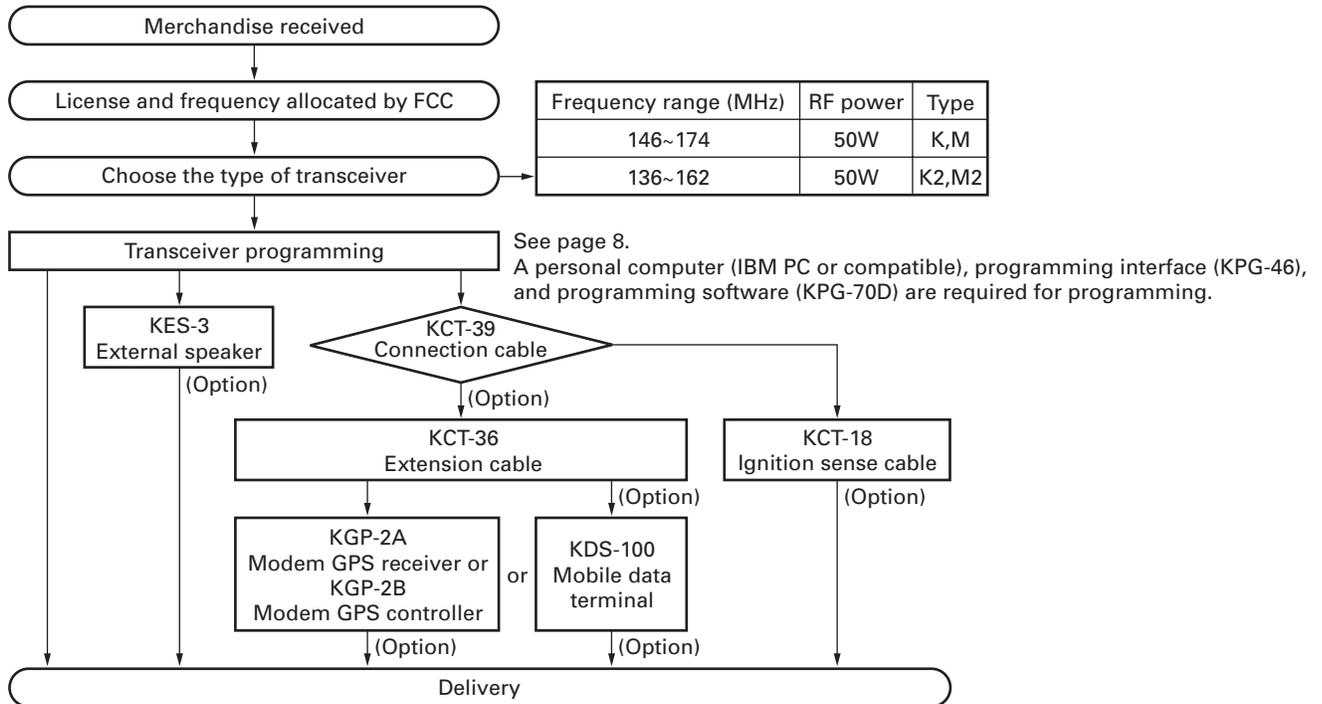
If you do not intend to use the 3.5-mm jack for the external speaker, fit the supplied speaker-jack cap to stop dust and sand from getting in.



## SERVICE

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

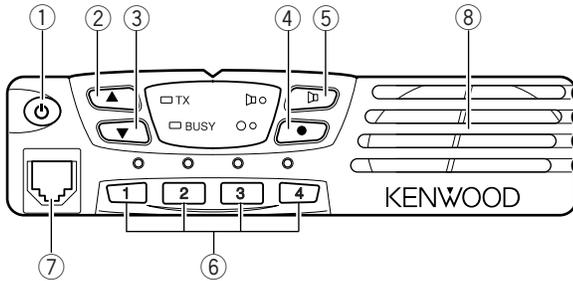
## SYSTEM SET-UP



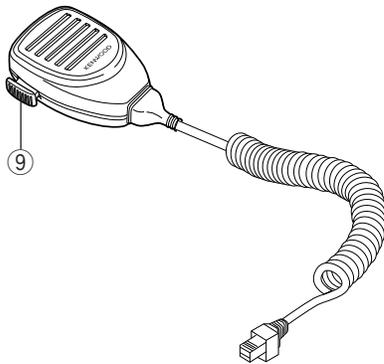
## OPERATING FEATURES

### 1. Controls and Functions

#### 1-1. Front Panel



#### 1-2. Microphone

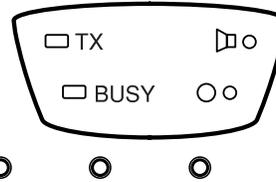


- ① **⏻ (Power) switch**  
Press to switch the transceiver ON. Press and hold for approximately 1 seconds to switch the transceiver OFF.
- ② **▲ key**  
Press to increase the volume level.
- ③ **▼ key**  
Press to decrease the volume level.
- ④ **● key**  
PF (Programmable Function) key. The default setting of this key is None (no function). The programmable functions available for this key are listed below.
- ⑤ **📡 key**  
PF (Programmable Function) key. The default setting of this key is Monitor. Other programmable functions available for this key are listed below.
- ⑥ **1/ 2/ 3/ 4 keys**  
Press to select a channel from 1 to 4.
- ⑦ **Microphone jack**  
Insert the microphone plug into this jack (the microphone is an optional accessory).
- ⑧ **Speaker**  
Internal speaker.
- ⑨ **PTT switch**  
Press this switch, then speak into the microphone to call a station.

#### 1-3. Auxiliary Programmable Functions

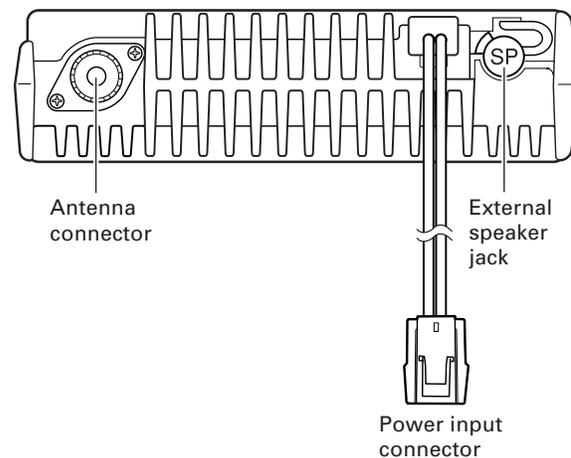
- Emergency
- Scan On/OFF
- Key Lock
- Talk Around
- Monitor
- Temporary Delete
- None (no function)
- AUX
- Horn Alert
- Scan + Temporary Delete

#### 1-4. Display



Indicator	Description
□ TX	Light while transmitting.
□ BUSY	Lights when a signal is detected on the currently selected channel.
📡	Lights while the function programmed onto its corresponding key is activated.
○ ○	Lights while the function programmed onto its corresponding key is activated.
○ ○ ○ ○	Lights to display the currently selected channel (1~ 4).

#### 1-5. Rear panel



# OPERATING FEATURES

## 2. Operation Features

The TK-7102H is a VHF FM radio designed to operate in conventional format. The programmable features are summarized.

## 3. Transceiver Controls and Indicators

### 3-1. Front Panel Controls

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

- **POWER key**

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

- **CHANNEL keys**

- **MONITOR key (Programmable)**

- **● key (Programmable)**

- **VOLUME UP/DOWN key**

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

- **BUSY/TX LED**

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

### 3-2. Programmable Keys

The FPU (KPG-70D) enables programmable keys to select the following functions.

- Emergency
- Key Lock
- Monitor
- Scan ON/OFF
- Talk Around
- Temporary Delete
- None
- AUX
- Horn Alert
- Scan + Temporary Delete

- **Emergency**

Pressing this key for longer than 1 second causes the transceiver to enter the emergency mode. The transceiver jumps to the programmed "Emergency channel" and transmits for 25\* seconds.

The transceiver disables mic mute while transmitting. After finishing transmission, the transceiver receivers for 5\* seconds. The transceiver Mute\* the speaker while receiving. Following the above sequence, the transceiver continues to transmit and receive.

\* Default value.

- **Key lock**

Pressing this key causes the transceiver to accept entry of only the [Vol Up/Down]\*, [Key lock], Microphone [PTT], [Monitor], [Emergency], and [Power] keys.

\* Programmable

- **Monitor**

Used to release signalling (press once) or squelch (press and hold for approximately two seconds) when operating as a conventional. It is also used to reset option signalling.

- **Scan ON/OFF**

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

- **Talk around**

Press this key, the transceiver uses the receive frequency and the tone for transmission.

The operator can call the other party directly (without repeater). Press this key again, the talk around function goes off.

- **Temporary delete**

The "Add" channel contained in the scan sequence, and "Delete" channel is not contained. In the scan mode, this key switches the channel delete temporarily (Press and hold for approximately one second).

When the transceiver is turned off, the transceiver exits the scan or switches the scan function off.

- **None**

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

- **AUX**

Press to activate the auxiliary port. Press again to deactivate the auxiliary port. Auxiliary is used with optional boards, allowing you to activate and deactivate these optional functions. While activated, the AUX icon appears on the display.

- **Horn alert**

Horn Alert is a useful feature that will notify you of a received call while you are away from your vehicle. The transceiver is programmed to sound the vehicle horn or some other external alert device (such as the vehicle headlights) when a call is received that has correct signalling.

- **Scan + Temporarily delete**

To temporarily remove a channel from the Scan list, press and hold this key for approximately one second during Scan, while Scan is paused on the undesired channel, to temporarily remove that channel from the scanning sequence. After switching the Scan function OFF, or switching the transceiver OFF and then ON again, the Scan settings return to normal.

## OPERATING FEATURES

### 4. Scan Operating

#### ■ SCAN start condition

Two or more channels must be added to all channels that can be scanned. The transceiver must be in normal receive mode (PTT off).

When you activate the key programmed to the scan ON/OFF function, the scan starts. The indicator next to the programmed key LED blinks.

#### ■ Scan stop condition

The scan stops temporarily if the following conditions are satisfied.

- 1) A carrier is detected, then QT/DQT matches on channels for which receive the QT/DQT is set by the programming software.
- 2) A carrier is detected on the channels for which receiving QT/DQT is not set by the programming software or when the monitor (signalling cancel) function is activated.

#### ■ Revert channel

The revert channel is used to transmit during scanning and set by the programming software (KPG-70D).

- 1) Selected channel  
The transceiver reverts to the channel before scanning or the channel that you changed during scan.
- 2) Selected with talkback  
The transceiver reverts to the selected channel prior to scan initiation.  
However, if a call is received on a channel other than the selected channel and PTT is pressed before scanning resume, the transceiver "talks back" on the current receive channel.

#### ■ Scan end

When you press the key programmed to the scan function during scan mode, the scan ends.

The indicator next to the programmed key LED turns off.

#### ■ Temporary delete

It is possible to delete channel temporary during scan. When scan stops on unnecessary channel for example by interference of the other party, activate the delete function (for example press and hold the key for approximately one second), then that channel is deleted temporarily and scan restart immediately.

The temporary deleted channels return to pre-set delete/add channels, when the transceiver is turned off or the scan function is switched off.

### 5. Details of Features

#### ■ Time-out timer

The time-out timer can be programmed in 30 seconds increments from 30 seconds to five minutes and off. If the transmitter is transmitted continuously for longer than the programmed time, the transmitter is disabled and a warning tone sounds while the PTT button is held down. The warning tone stops when the PTT button is released.

#### ■ PTT ID

PTT ID provides a DTMF ANI or MSK ID to be sent with every time PTT (connect ID at beginning of transmission, disconnect ID at end of transmission, or both).

You can program PTT ID "on" or "off" for each group channel (DTMF). The contents of ID are programmed for each transceiver.

The transceiver is capable to have ID. The format is DTMF. The timing that the transceiver sends ID is programmable.

BOT : Connect ID is sent on beginning of transmission.

EOT : Disconnect ID is sent on end of transmission.

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

There is also "PTT ID" setting for each channel.

#### ■ Off hook decode

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

#### ■ "TOT" pre-alert

The transceiver has "TOT" pre-alert timer. This parameter selects the time at which the transceiver generates "TOT" pre-alert tone before "TOT" is expired.

"TOT" will be expired when the selected time passes from a TOT pre-alert tone.

#### ■ "TOT" re-key time

The transceiver has "TOT" re-key timer. This timer is the time you can not transmit after "TOT" exceeded. After "TOT" re-key time expired you can transmit again.

#### ■ "TOT" reset time

The transceiver has "TOT" reset timer. This timer is the minimum wait time allowed during a transmission that will reset the "TOT" count.

"TOT" reset time causes the "TOT" to continue even after PTT is released unless the "TOT" reset timer has expired.

#### ■ Clear to transpond

The transceiver waits the transpond of DTMF if channel is busy until channel open. This feature prevents the interference to other party.

### 6. Option Signalling (DTMF)

Built-in DTMF decoder is available for option signalling.

It is possible to use individual call, group call, Stun.

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

If option signalling matches on a channel is set up with option signalling, the channel LED will flash and option signalling will be released. The transpond or alert tone will sound.

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

# OPERATING FEATURES

## ■ SP Unmute

You can select the type of SP Unmute system for each channel. The selection is as follows.

Carrier, QT/DQT:

Channel with this option will not check ID Code in order to open its speaker.

Carrier+DTMF, QT/DQT+DTMF:

Channel that is set with this option will have to check for ID Code in order to open its speaker.

Default:

Carrier, QT/DQT.

SP unmute	Channel setting		RX condition	Speaker condition
	QT/DQT	DTMF		
Carrier	None	None	Carrier	Sounds
		Yes	Carrier	Sounds
			Carrier+DTMF	Sounds
Carrier+DTMF	None	Yes	Carrier	Not Sounds
			Carrier+DTMF	Sounds
QT/DQT	Yes	None	Carrier	Not Sounds
			Carrier+QT/DQT	Sounds
		Yes	Carrier	Not Sounds
			Carrier+QT/DQT	Sounds
			Carrier+QT/DQT+DTMF	Sounds
Carrier+DTMF	Not Sounds			
QT/DQT+DTMF	Yes	Yes	Carrier	Not Sounds
			Carrier+QT/DQT	Not Sounds
			Carrier+QT/DQT+DTMF	Sounds
			Carrier+DTMF	Not Sounds

### Note :

When QT/DQT is not used, QT/DQT and QT/DQT+DTMF can not be selected.

When DTMF is not used, Carrier+DTMF and QT/DQT+DTMF can not be selected.

## ■ Auto Reset

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

## ■ Stun

If the stun code matches, a predetermined action will occur. Whether option signalling is activated or not, when stun matches on any channel, the transceiver will become TX inhibited or TX/RX inhibited. While stun is active, if the stun code + “#” code is received, stun will deactivate.

When stun matches, transpond will function. Alert will not be output.

## 7. Audible User Feedback Tones

The transceiver outputs various combinations of tones to notify the user of the transceiver operating state.

Refer to the help file on the KPG-70D, regarding the functions that are not listed below.

### ■ Stun on tone

When a stun code is received, transpond tone sounds.

### ■ Stun off tone

When a stun release code is received, transpond tone sounds.

### ■ Group call tone

Sounds when a group call with the correct DTMF option signalling is received, repeats 7 times. You can select yes or no in the Alert tone level setting.

### ■ Individual call tone

Sounds when an individual call with the correct DTMF option signalling is received. You can select yes or no in the Alert tone level setting.

### ■ Key input error tone

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

### ■ Transpond tone

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

### ■ Pre alert tone

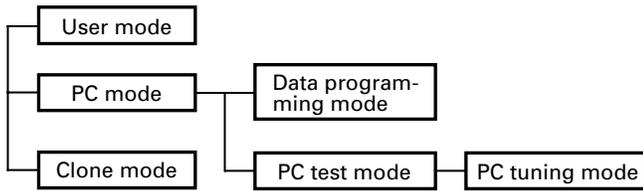
Sounds prior to the TOT TX inhibit activation. If TOT pre alert is set, the tone sounds at the amount of time programmed, before the TOT expires (TOT time – TOT pre alert time = Pre alert tone sounding time). You can select yes or no for the optional feature's warning tone.

### ■ Transmit protection

The final FET is protected against heat while transmitting by making the radio cuts down TX power when the temperature of the final FET becomes higher than reference. After that, if the temperature continue to rise, transmission is stopped. The final FET is also protected against over voltage by having the radio to check that the voltage of power supply connected to the radio is not higher than about 17V when the radio is turned on, otherwise it can not transmit. In both cases when transmission is stopped, a beep will continue to sound until the PTT key is released.

## REALIGNMENT

### 1. Modes



Mode	Function
User mode	For normal use.
PC mode	Used for communication between the radio and PC (IBM compatible).
Data programming mode	Used to read and write frequency data and other features to and from the radio.
PC test mode	Used to check the radio using the PC. This feature is included in the FPU.
PC tuning mode	Used to tune the radio using the PC.
Clone mode	Used to transfer programming data from one radio to another.

### 2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
PC mode	Received commands from PC
Clone mode	[1]+Power ON (Two seconds)

### 3. PC Mode

#### 3-1. Preface

The TK-7102H transceiver is programmed using a personal computer, a programming interface (KPG-46) and programming software (KPG-70D).

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

#### 3-2. Connection Procedure

1. Connect the TK-7102H to the personal computer with the interface cable.
2. When the Power is switched on, user mode can be entered immediately. When the PC sends a command, the radio enters PC mode. When data is transmitted from transceiver, the red LED blink. When data is received by the transceiver, the green LED blink. In the PC mode, 4CH LEDs, [MON] LED and [●] LED are turned on.

#### Notes :

- The data stored in the personal computer must match model type when it is written into the EEPROM.
- Attach the interface cable, then change the TK-7102H to PC mode.

#### 3-3. KPG-46 Description

##### (PC programming interface cable : Option)

The KPG-46 is required to interface the TK-7102H to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-46 connects the modular microphone jack of the TK-7102H to the computers RS-232C serial port.

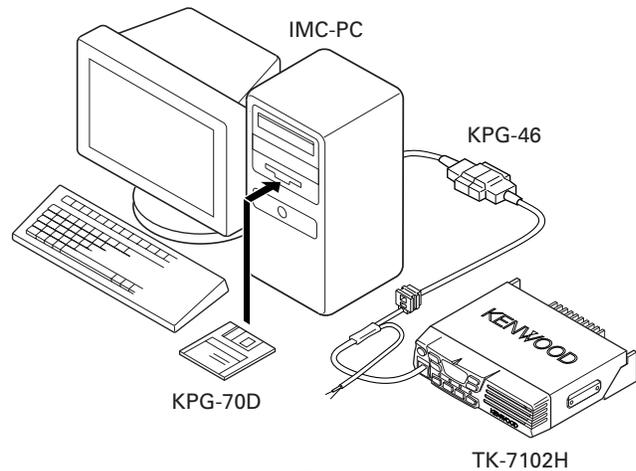


Fig. 1

#### 3-4. Programming Software Description

The KPG-70D programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program TK-7102H radio via a programming interface cable (KPG-46).

#### 3-5. Programming With IBM PC

If data is transferred to the transceiver from an IBM PC with the KPG-70D, the destination data (basic radio information) for each set can be modified.

## REALIGNMENT

### 4. Clone Mode

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

#### Note :

Clone mode should be enabled.

1. Turn the master TK-7102H power ON with the [1] key held down. The TK-7102H [●] LED is turned on.
2. Power on the slave TK-7102H.
3. Connect the cloning cable (No. E30-3382-05) to the modular microphone jacks on the master and slave.
4. Press the [●] key on the master TK-7102H transceiver. The data of the master is sent to the slave. While the master is sending data, [TX] LED blinked. While the slave is receiving the data, 4 LEDs, [MON] LED, [●] LED are turned on and [BUSY] LED blinked. When cloning of data is completed, the master [TX] LED turned off, and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.
5. The other slave can be continuously cloned. Carry out the operation in step 2 to 4.

#### 4-1. Adding the data password.

If the data password is set in the optional feature menu, you must enter the password (Master transceiver) to activate a clone mode.

you can use 1, 2, 3, and 4 to configure the password. The maximum length of the password is 10 digits.

1. [1]+Power ON.
2. [1]~[4] LED, and MON LED are turned ON.
3. Enter the password using [1]~[4] keys.
4. Press [MON] key.
5. If the password matches, the transceiver enters a clone mode. Otherwise, transceiver beeps and returns to the password input mode.

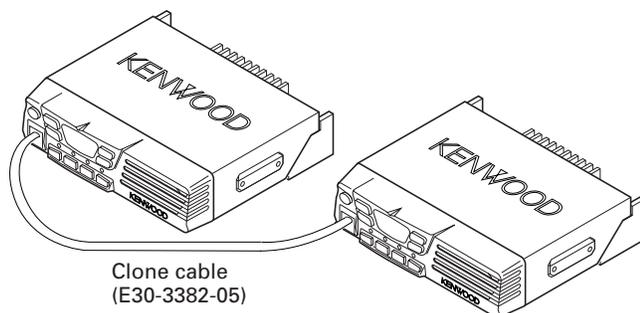


Fig. 2

### 5. Accessory Connection Cable (KCT-39)

The KCT-39 is an accessory connection cable for connecting external equipment. The connector has 15 pins and the necessary signal lines are selected for use.

#### 5-1. Installing the KCT-39 in the Transceiver

1. Lift the DC cord bushing ( ❶ ) from the chassis. Peel the pad as shown in Figure 3 ( ❷ ).

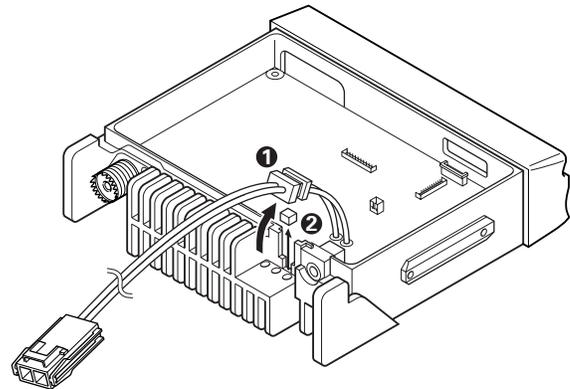


Fig. 3

2. Stick the pad to the DC cord ( ❸ ) and chassis ( ❹ ), both of which are supplied with the KCT-39.

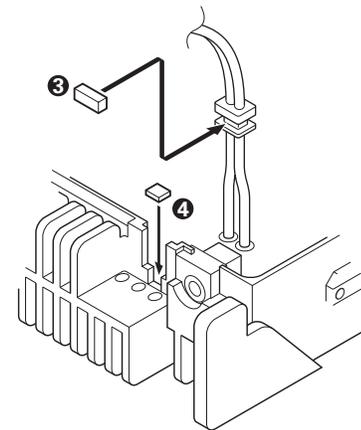


Fig. 4

## REALIGNMENT

3. Insert the KCT-39 cable ( 5 ) into the chassis ( 6 ). The wire harness band ( 7 ) must be inside the chassis and face down.
4. Connect the KCT-39 to the TX-RX unit as shown in Figure 5 ( 8 ).

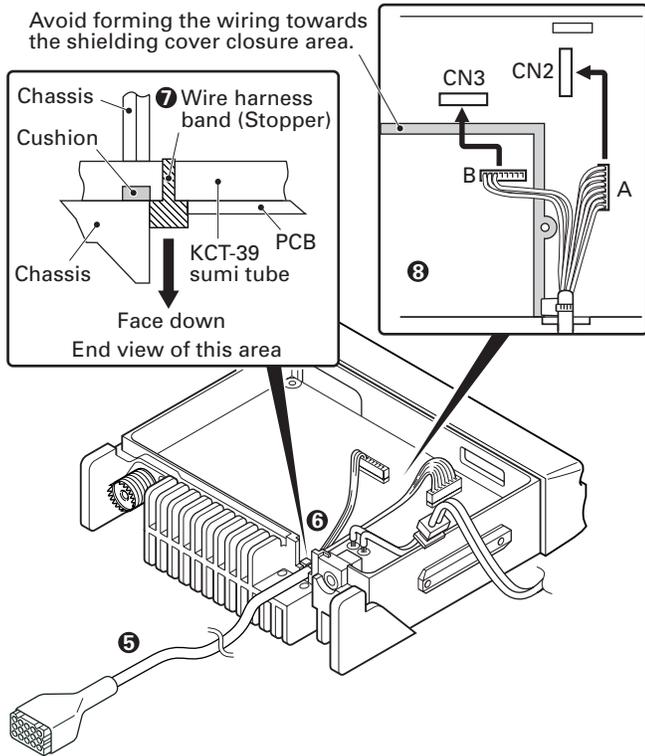


Fig. 5

5. Connect the KCT-39 to the external accessory by inserting the crimp terminal ( 9 ) into the square plug ( 10 ), both of which are supplied with the KCT-39.

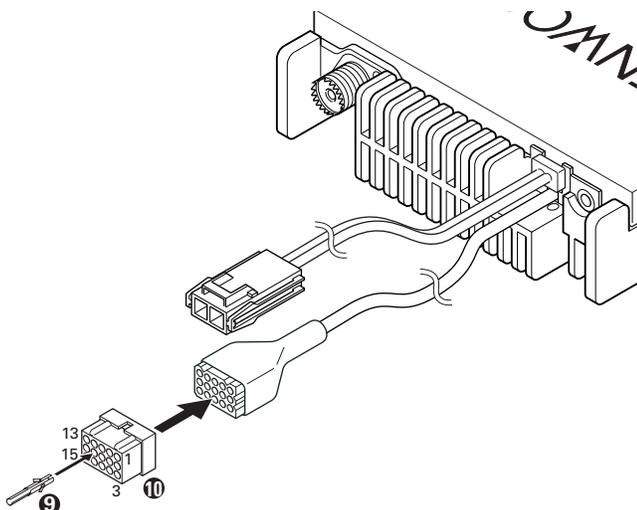
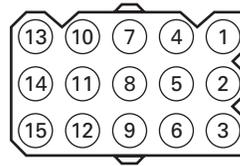


Fig. 6

### ■ Accessory Port Function



No.	Color	Internal connector	Name
1	Red	CN2-1	SB
2	Pink	CN3-1	IGN
3	Black	CN2-3	GND
4	Brown	CN3-3	DETO
5	Orange	CN3-2	DATAI
6	Yellow	CN2-8	FNC4
7	Green	CN2-7	FNC3
8	Blue	CN2-9	FNC5
9	Purple	CN2-12	FNC8
10	Gray	CN2-10	FNC6
11	White	CN2-11	FNC7
12	NC	NC	
13	NC	NC	
14	Sky blue	CN2-6	FNC2
15	Turquoise	CN2-5	FNC1

### 6. Ignition Sense Cable (KCT-18)

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

#### 6-2. Connecting the KCT-18 to the Transceiver

1. Install the KCT-39 in the transceiver. (See the KCT-39 section)
2. Insert the KCT-18 lead terminal ( 1 ) into pin 2 of the KCT-39 ( 2 ).

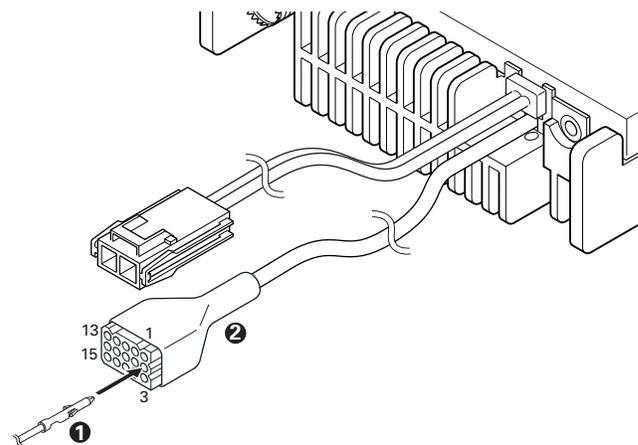


Fig. 7

# REALIGNMENT / INSTALLATION

## 6-3. Modifying the Transceiver

Modify the transceiver as follows to turn the power on and off with the ignition key.

1. Remove the jumper resistor (0Ω) R71 of the TX-RX unit.

### ■ Setting With the KPG-70D

Select "External Devices" from the "Edit" menu and enable the "Ignition Sense".

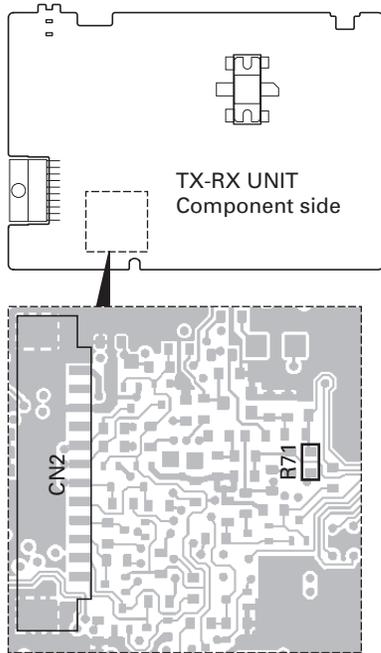


Fig. 8

## INSTALLATION

### 1. Optional Board

#### 1-1. Voice Scrambler Board Connection

##### ■ Modification

1. Remove the cabinet and shielding cover from the transceiver.
2. Delete R202 and R267 on the TX-RX unit.

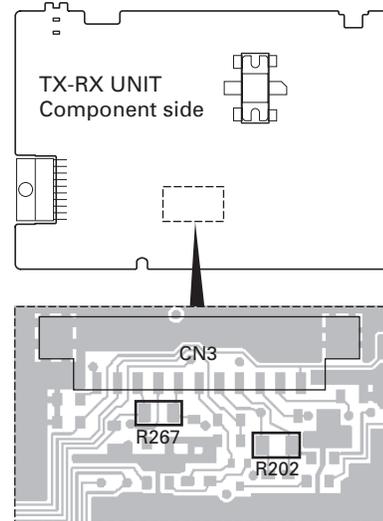


Fig. 1

##### ■ Connection

The functions of pins of CN2 and CN3 on the TX-RX unit are shown in the TERMINAL FUNCTION section (page 34).

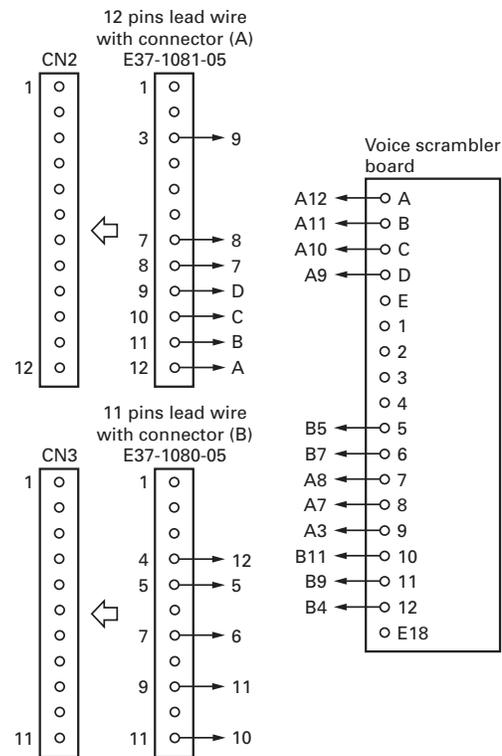


Fig. 2

## INSTALLATION

### ■ Pins Connection

Voice scrambler functions	12 pins lead wire with connector (A)	11 pins lead wire with connector (B)
A	A-12	–
B	A-11	–
C	A-10	–
D	A-9	–
5	–	B-5
6	–	B-7
7	A-8	–
8	A-7	–
9	A-3	–
10	–	B-11
11	–	B-9
12	–	B-4

Avoid forming the wiring towards shielding cover closure area.

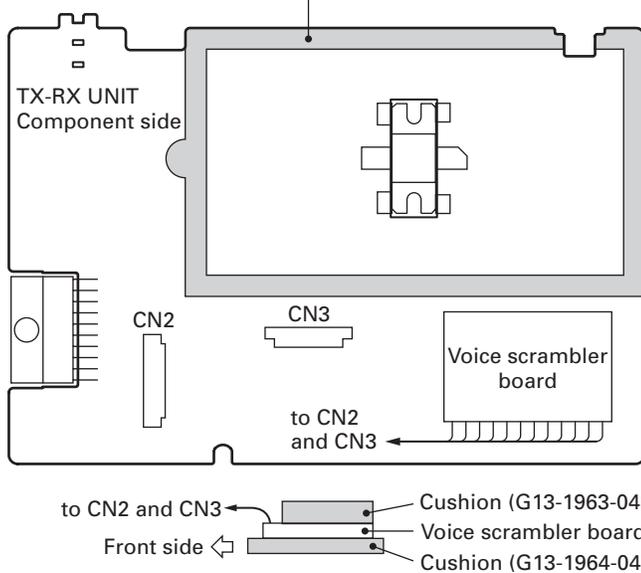


Fig. 3

### ■ Setting With the KPG-70D

Select "External Devices" from the "Edit" menu and set the "Scrambler".

#### Note :

The voice scrambler board is connected subsequent to the de-emphasis circuit.

### 1-2. Example for Connection

#### ■ Picture (Trunking Board)

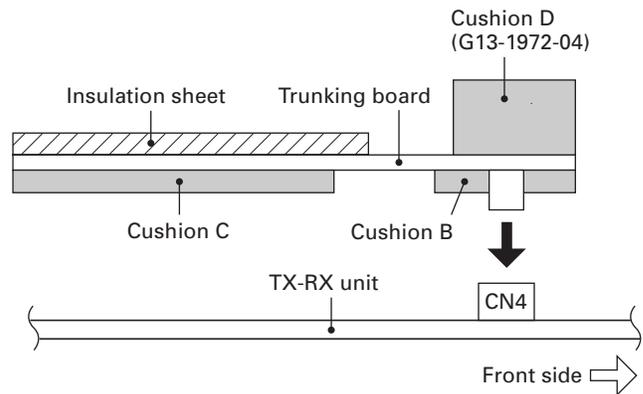
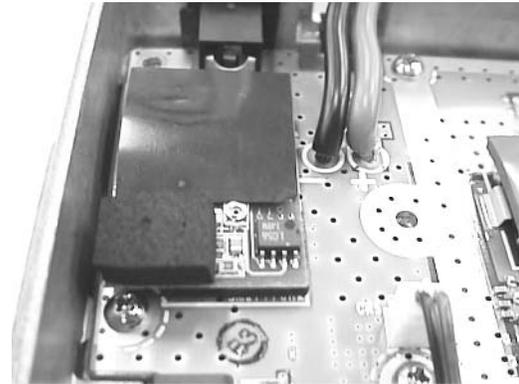


Fig. 4

### ■ Setting With the KPG-70D

Select "External Devices" from the "Edit" menu and set the "SmarTrunk".

## DISASSEMBLY FOR REPAIR

1. When you remove the panel, turn the transceiver up side down. Detach the panel by lifting the tabs as shown below.

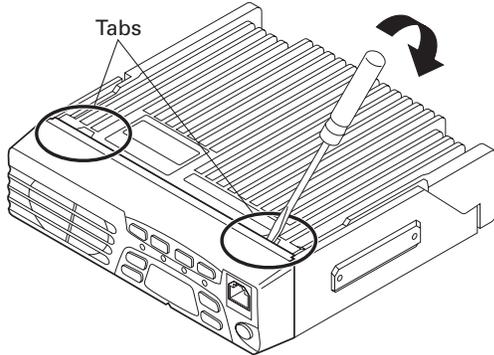


Fig. 1

2. To remove the cabinet, first turn the transceiver up side down. Detach the cabinet by prying the tabs as shown below.

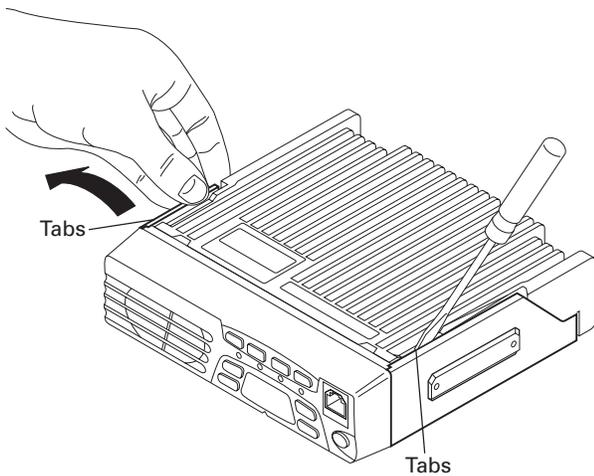


Fig. 2

3. To remove the display unit PCB, detach the PCB by lifting at the indents of the PCB as shown below.

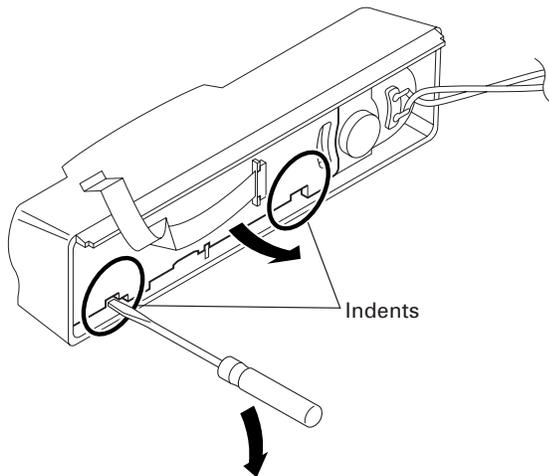


Fig. 3

4. Mount the display unit  
To mount the display unit on the panel, follow the correct procedures shown to ensure easy display unit assembly and good fitting onto the panel.

- ① Snap in bottom of display unit first.
- ② Snap in top of display unit.

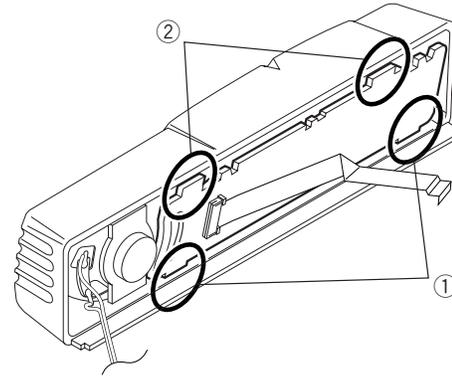


Fig. 4

5. When mounting the front panel, match the 4 tabs of the chassis with the panel, being sure they attach securely.

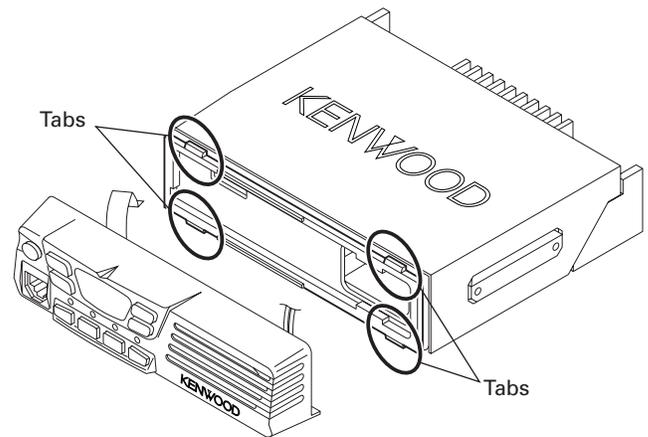


Fig. 5

## CIRCUIT DESCRIPTION

### Frequency Configuration

The receiver utilizes double conversion. The first IF is 49.95MHz and the second IF is 450kHz. The first local oscillator signal is supplied from the PLL circuit.

The PLL circuit in the transmitter generates the necessary frequencies. Figure 1 shows the frequencies.

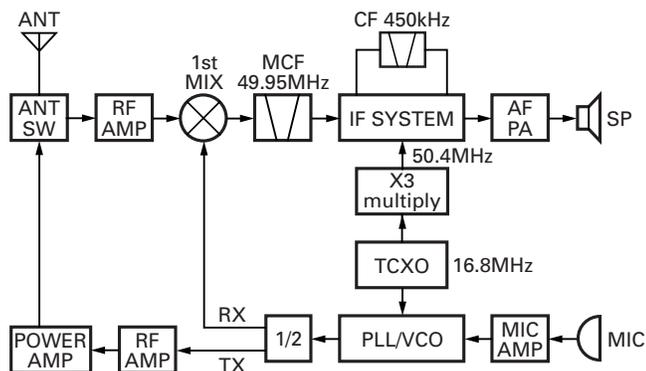


Fig. 1 Frequency configuration

### Receiver System

The receiver is double conversion superheterodyne. The frequency configuration is shown in Figure 1.

#### ■ Front-end RF Amplifier

An incoming signal from the antenna is applied to an RF amplifier (Q353) after passing through a transmit/receive switch circuit (D603, D604, D605 are off) and a band pass filter (L357, L356 and varactor diodes : D353, D354). After the signal is amplified (Q353), the signal is filtered through a band pass filter (L354, L355 and varactor diodes: D351, D352) to eliminate unwanted signals before it is passed to the first mixer.

The voltage of these diodes are controlled by tracking the CPU (IC101) center frequency of the band pass filter. (See Fig. 2)

#### ■ First Mixer

The signal from the RF amplifier is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer (Q352) to create a 49.95MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through one pair of monolithic crystal filter (MCF : XF351) to further remove spurious signals.

#### ■ IF Amplifier

The first IF signal is amplified by Q351, and the enters IC301 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within IC301 to create a 450kHz second IF signal. The second IF signal is then fed through a 450kHz ceramic filter (Wide : CF301, Narrow : CF302) to further eliminate unwanted signals before it is amplified and FM detected in IC301.

Item	Rating
Nominal center frequency	49.95MHz
Pass bandwidth	±5.0kHz or more at 3dB
35dB stop bandwidth	±20.0kHz or less
Ripple	1.0dB or less
Insertion loss	5.0dB or less
Guaranteed attenuation	80dB or more at fo±1MHz Spurious : 40dB or more within fo±1MHz
Terminal impedance	350Ω / 5.5pF

Table 1 Crystal filter (L71-0591-05) : XF351

Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	±6.0kHz or more
50dB bandwidth	±12.5kHz or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	35.0dB or more within fo±100kHz
Terminal impedance	2.0kΩ

Table 2 Ceramic filter (L72-0993-05) : CF301

Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	±4.5kHz or more
50dB bandwidth	±10.0kHz or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	60.0dB or more within fo±100kHz
Terminal impedance	2.0kΩ

Table 3 Ceramic filter (L72-0999-05) : CF302

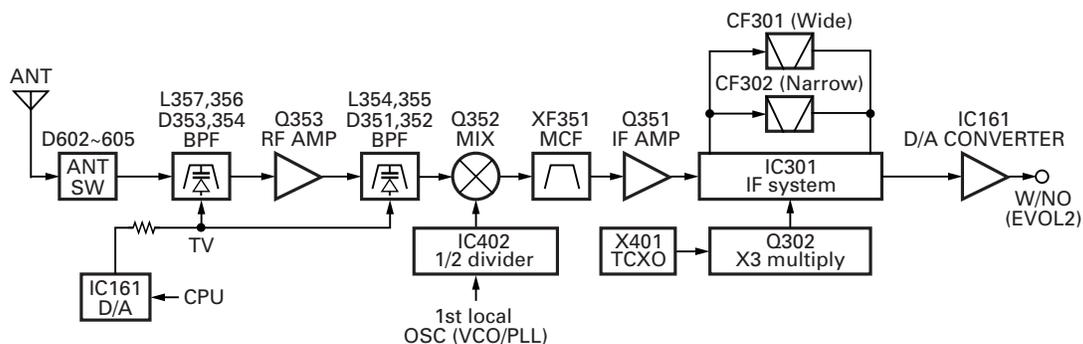


Fig. 2 Receiver system

# CIRCUIT DESCRIPTION

## Wide/Narrow Changeover Circuit

The Wide port (pin 65) and Narrow port (pin 64) of the CPU is used to switch between ceramic filters. When the Wide port is high, the ceramic filter SW diodes (D303, D302) cause CF301 to turn on to receive a Wide signal.

When the Narrow port is high, the ceramic filter SW diodes (D303, D302) cause CF302 to turn on to receive a Narrow signal.

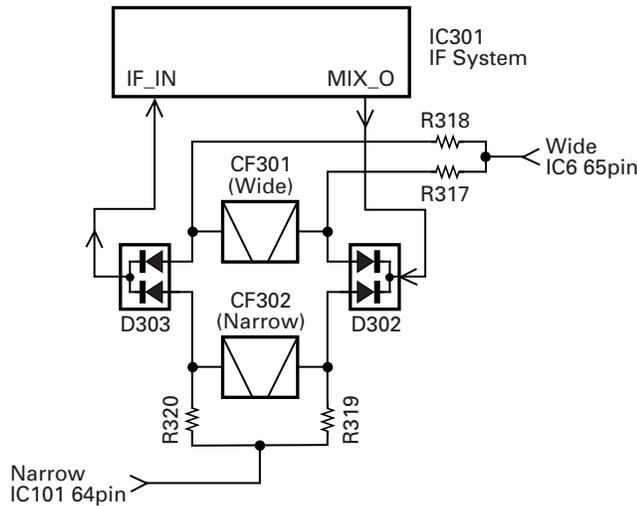


Fig. 3 Wide/Narrow changeover circuit

## AF Signal System

The detection signal from IF IC (IC301) goes to D/A converter (IC161) to adjust the gain and is output to AF filter (IC251) for characterizing the signal. The AF signal output from IC251 and the DTMF signal, BEEP signal are summed and the resulting signal goes to the D/A converter (IC161). The AFO output level is adjusted by the D/A converter. The signal output from the D/A converter is input to the audio power amplifier (IC252). The AF signal from IC252 switches between the internal speaker and speaker jack (J1) output.

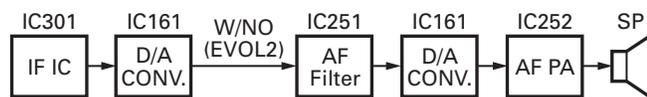


Fig. 4 AF signal system

## Squelch Circuit

The detection output from the FM IF IC (IC301) passes through a noise amplifier (Q301) to detect noise. A voltage is applied to the CPU (IC101). The CPU controls squelch according to the voltage (SQIN) level. The signal from the RSSI pin of IC301 is monitored. The electric field strength of the receive signal can be known before the SQIN voltage is input to the CPU, and the scan stop speed is improved.

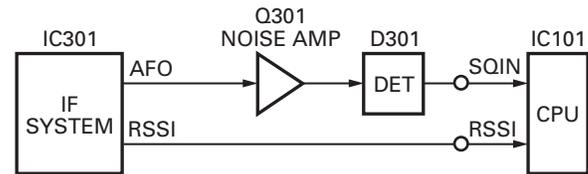


Fig. 5 Squelch circuit

## PLL Frequency Synthesizer

The PLL circuit generates the first local oscillator signal for reception and the RF signal for transmission.

### PLL

The frequency step of the PLL circuit is 5 or 6.25kHz. A 16.8MHz reference oscillator signal is divided at IC401 by a fixed counter to produce the 5 or 6.25kHz reference frequency. The voltage controlled oscillator (VCO) output signal is buffer amplified by Q410, then divided in IC401 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal in the phase comparator in IC401. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency. (See Fig. 6)

### VCO

The operating frequency is generated by Q406 in transmit mode and Q405 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D405 and D406 in transmit mode and D403 and D404 in receive mode). The TX/RX pin is set low in receive mode causing Q408 and Q407 to turn Q406 off, and turn Q405 on. The TX/RX pin is set high in transmit mode. The outputs from Q405 and Q406 are amplified by Q410 and sent to the RF amplifiers.

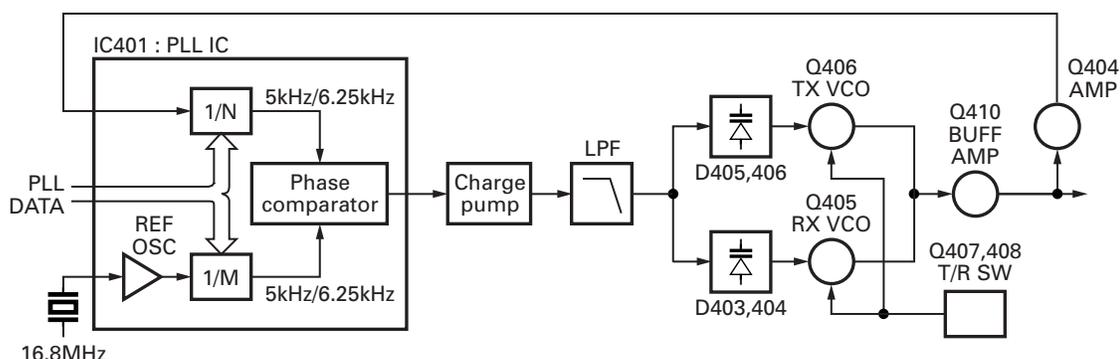


Fig. 6 PLL circuit

## CIRCUIT DESCRIPTION

### ■ Unlock Circuit

During reception, the 8RC signal goes high, the 8TC signal goes low, and Q34 turns on. Q33 turns on and a voltage is applied to the collector (8R). During transmission, the 8RC signal goes low, the 8TC signal goes high and Q36 turns on. Q35 turns on and a voltage is applied to 8T.

The CPU in the control unit monitors the PLL (IC401) LD signal directly. When the PLL is unlocked during transmission, the PLL LD signal goes low. The CPU detects this signal and makes the 8TC signal low. When the 8TC signal goes low, no voltage is applied to 8T, and no signal is transmitted.

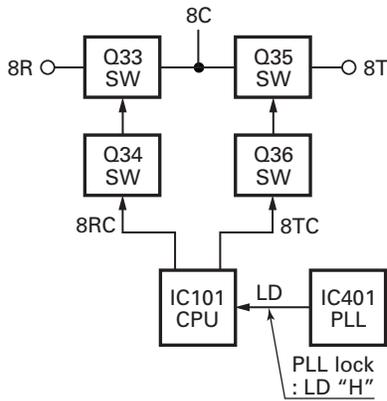


Fig. 7 Unlock circuit

### Transmitter System

#### ■ Outline

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

#### ■ Power Amplifier Circuit

The transmit output signal from the VCO passes through the transmission/reception selection diode (D409) and amplified by Q501, Q502 and Q503. The amplified signal goes to the final amplifier (Q504) through a low-pass filter. The low-pass filter removes unwanted high-frequency harmonic components, and the resulting signal is goes the antenna terminal.

#### ■ APC Circuit

The automatic transmission power control (APC) circuit detects part of a final amplifier output with a diode (D606, D607) and applies a voltage to IC501. IC501 compares the APC control voltage (PC) generated by the D/A converter (IC161) and DC amplifier (IC203) with the detection output voltage. IC501 generates the voltage to control Q503 and Q504 and stabilizes transmission output.

The APC circuit is configured to protect over current of Q503 and Q504 due to fluctuations of the load at the antenna end and to stabilize transmission output at voltage and temperature variations.

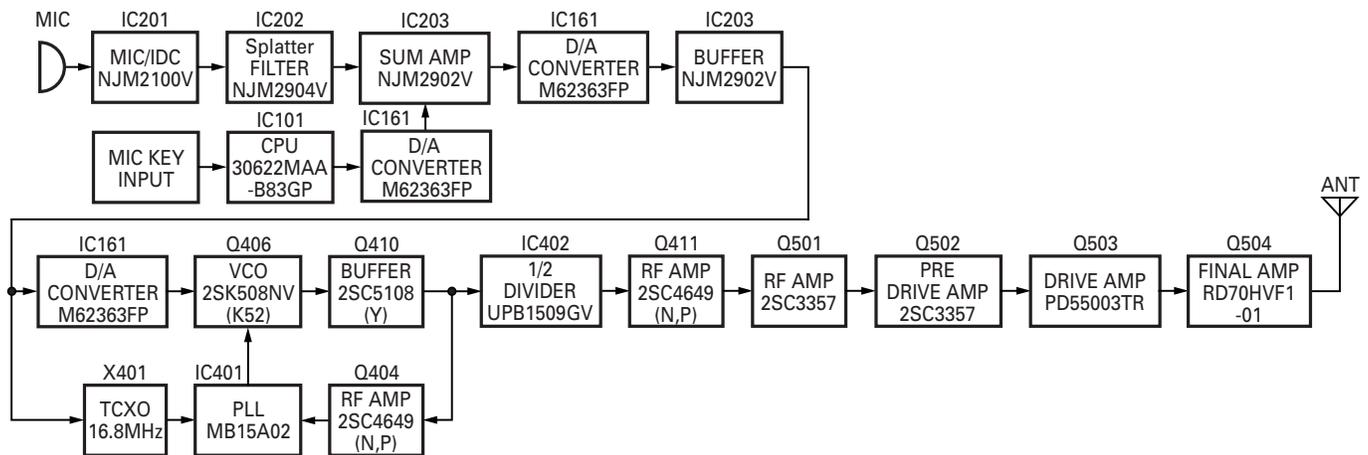


Fig. 8 Transmitter system

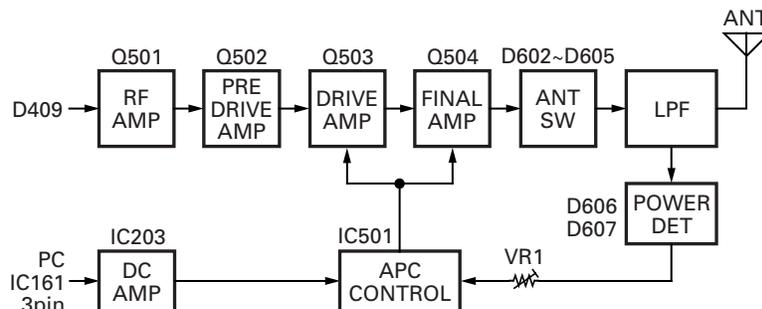


Fig. 9 APC circuit

# CIRCUIT DESCRIPTION

## Control Circuit

The CPU carries out the following tasks:

- 1) Controls the WIDE, NARROW, TX/RX outputs.
- 2) Adjusts the AF signal level of the AF filter (IC251) and turns the filter select compounder on or off.
- 3) Controls the display unit.
- 4) Controls the PLL (IC401).
- 5) Controls the D/A converter (IC161) and adjusts the volume, modulation and transmission power.

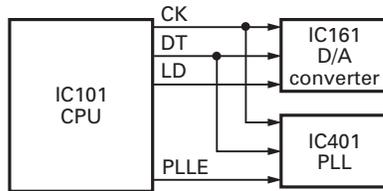


Fig. 10 Control circuit

## Memory Circuit

The transceiver has an 64k-bit EEPROM (IC66). The EEPROM contains adjustment data. The CPU (IC101) controls the EEPROM through three serial data lines.

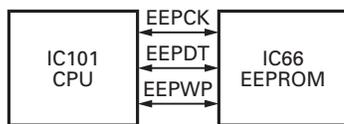


Fig. 11 Memory circuit

## Display Circuit

The shift register controls the display LEDs through the CL and DI lines from the CPU (IC101).

When the transceiver is busy, LED G line becomes high impedance, turning on Q4 and the green LED (D11) lights, in transmit mode, the LED R line becomes low impedance, and the red LED (D12) lights.

Backlit LEDs (D1~D4) are provided and will only goes off when MBL line becomes low impedance.

When a function key (MON, PF, C1, C2, C3 or C4) is selected, its respective line becomes low impedance (LED MON, LED PF, LED C1, LED C2, LED C3 or LED C4), the amber LED lights.

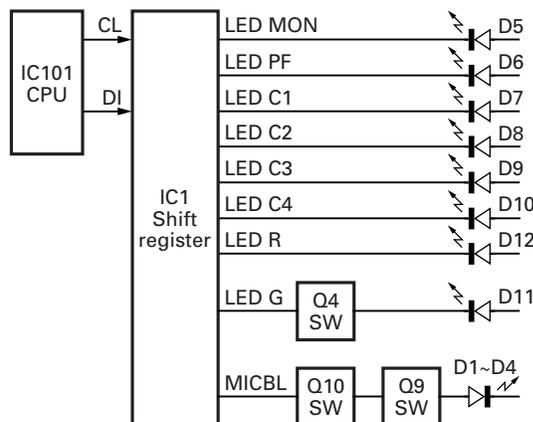


Fig. 12 Display circuit

## Key Matrix Circuit

The TK-7102H front panel has function keys. Each of them is connected to a cross point of a matrix of the KMI1 to KMO2 ports of the microprocessor. The KMO1 to KMO2 ports are always high, while the KMI1 to KMI4 ports are always low.

The microprocessor monitors the status of the KMI1 to KMO2 ports. If the state of one of the ports changes, the microprocessor assumes that the key at the matrix point corresponding to that port has been pressed.

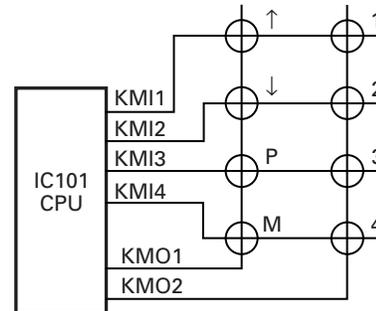


Fig. 13 Key matrix circuit

## Encode

The QT and DQT signals are output from QT/DQT of the CPU (IC101) and summed with the external pin DI line by the summing amplifier (IC203) and the resulting signal goes to the D/A converter (IC161). The DTMF signal is output from DTMF of the CPU and goes to the D/A converter (IC161). The signal is summed with a MIC signal by the summing amplifier (IC203), and the resulting signal goes to the D/A converter (IC161).

The D/A converter (IC161) adjusts the MO level and the balance between the MO and QT/DQT levels. Part of a QT/DQT signal is summed with MO and the resulting signal goes to the VCOMOD pin of the VCO. This signal is applied to a varicap diode in the VCO for direct FM modulation.

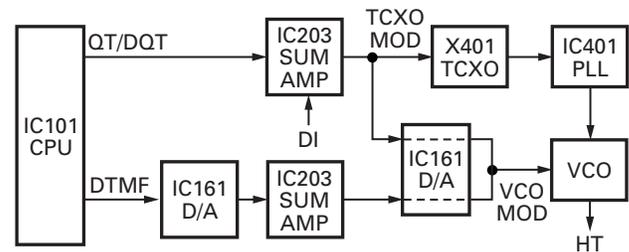


Fig. 14 Encodet

## CIRCUIT DESCRIPTION / SEMICONDUCTOR DATA

### Decode

#### • QT/DQT/DTMF

The signal (W/NO (EVOL2)) goes to SIGNAL (pin 88) of CPU (IC101). The QT/DQT signal will pass through the low-pass filters in the CPU (IC101) and be decoded within the CPU (IC101). The DTMF signal will be decoded within the CPU (IC101).

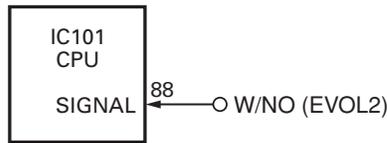


Fig. 15 Decode

### D/A Converter

The D/A converter (IC161) is used to adjust MO modulation, AF volume, TV voltage, FC reference voltage, and PC POWER CONTROL voltage level.

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

$$D/A \text{ output} = (V_{in} - V_{DAREF}) / 256 \times n + V_{DAREF}$$

$V_{in}$ : Analog input

$V_{DAREF}$ : D/A reference voltage

$n$ : Serial data value from the microprocessor (CPU)

### Power Supply Circuit

When the power switch on the display unit is pressed, the power port on the display unit which is connected port 17 (POWER), goes low, then port 82 (SBC) goes high, Q32 turns on, SB SW (Q31) turns on and power (SB) is supplied to the radio.

When the DC power supplied to the radio, the voltage regulator IC (IC33) supply into the CPU VDD and reset voltage detect IC (IC34). IC34 will generate signal (RESET) in to the reset terminal on the CPU (IC101) to carry out a power ON reset. Also, CPU (IC101) is checking on port 91 (Battery Voltage). If DC power is less than about 9.5V, the radio is unable to power on.

When the DC power voltage decreases from normal voltage, the INT voltage detector IC (IC35) will set to high on CPU port 18 (INT) if B line will become less than about 9.5V. Then CPU send to EEPROM (IC66) the backup data and go into STOP mode.

This circuit has an overvoltage protection circuit. If a DC voltage of 18V or higher is applied to the base of Q61, this voltage turns Q61 on and turns Q32 and SB off.

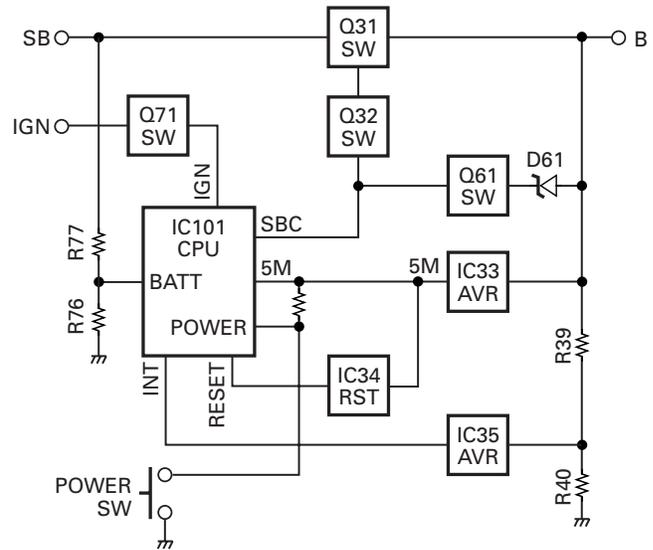


Fig. 16 Power supply circuit

## SEMICONDUCTOR DATA

### Drive Amplifier : PD55003TR (TX-RX Unit Q503)

#### Absolute Maximum Ratings (T<sub>case</sub> = 25°C)

Symbol	Parameter	Value	Unit
V <sub>(BR)DSS</sub>	Drain-Source voltage	40	V
V <sub>GS</sub>	Gate-Source voltage	±20	V
I <sub>D</sub>	Drain current	2.5	A
P <sub>DISS</sub>	Power dissipation (@ T <sub>c</sub> =70°C)	31.7	W
T <sub>j</sub>	Max. operating junction temperature	165	°C
T <sub>STG</sub>	Storage temperature	-65 to +150	°C

# SEMICONDUCTOR DATA

## Microprocessor : 30622MAA-B83GP (TX-RX Unit IC101)

### ■ Terminal Function

Pin No.	Name	I/O	Function
1	QT/DQT	O	QT/DQT output.
2	DTMF/MSK	O	DTMF/MSK/BEEP output
3	PLLE	O	PLL IC chip select.
4,5	NC	I	
6	GND	-	GND.
7	CNVSS	-	DNVss for flash.
8	EVLLD	O	E-volume LD.
9	BSHIFT	O	Beat shift.
10	RESET	-	Reset.
11	XOUT	-	X'tal (14.318MHz).
12	VSS	-	GND.
13	XIN	-	X'tal (14.318MHz).
14	VCC	-	+5V.
15	GND	-	GND (Input only).
16	NC	I	
17	POWER	I	Power key input.
18	INT	I	µcom stop.
19	NC	I	
20	TX/RX	O	TX/RX.
21	UL	O	PLL unlock detect.
22~25	NC	I	
26	EEPWP	O	EEPROM write protect
27	EEPCK	O	EEPROM clock (N ch open drain).
28	EEPDT	I/O	EEPROM data (N ch open drain).
29	FNC1	I/O	Function P1/TxD for flash.
30	FNC2	I/O	Function P2/RxD for flash.
31	CLKFLS	I	SCLK for flash.
32	BSYFLS	O	Busy for flash.
33	TXD	O	To FPU.
34	RXD	I	From FPU.
35	PTT	I	PTT key.
36	HOOK	I	Hook.
37,38	NC	I	
39	EMPFLS	I/O	EPM for flash.
40~42	NC	I	
43	FNC3	I/O	Function port 3.
44	CEFLS	I/O	CE for flash.
45,46	FNC4, FNC5	I/O	Function port 4, 5
47,48	FNC7, FNC6	I/O	Function port 7, 6.
49	FNC8	I/O	Function port 8.
50	AFM	O	AF mute.
51	SPM	O	Speaker mute.

Pin No.	Name	I/O	Function
52	AMPSW	O	AF AMP switch.
53	DT	O	Common data.
54	CK	O	Common clock.
55,56	NC	I	
57~59	DST1~DST3	I	Destination 1~3
60	VCC	-	+5V.
61	NC	I	
62	VSS	-	GND.
63	NC	I	
64	NARROW	O	
65	WIDE	O	
66~68	NC	I	
69	CL	O	Clock for LCD.
70	CE	O	Chip enable for LCD.
71	DI	O	Transfer data to LCD.
72	IGN	I	Ignition.
73	MICMT1	O	Mic 1 mute.
74	MICEM	O	Mic 2 mute.
75	MICMT2	O	Mic 3 mute.
76	8RC	O	8R control.
77	8TC	O	8T control.
78	CM	I/O	Mic key check.
79~81	NC	I	
82	SBC	O	Battery switch.
83	KMI2	I	Key matrix 2.
84	KMI1	I	Key matrix 1.
85	KMI3	I	Key matrix 3.
86	KMI4	I	Key matrix 4.
87	NC	I	
88	SIGNAL	I	DTMF/QT/DQT input.
89	TEMP2	I	Temperature 2.
90	TEMP1	I	Temperature 1.
91	BATT	I	Battery voltage.
92	RSSI	I	RSSI input.
93	SQIN	I	Squelch input.
94	AVSS	-	GND.
95	NC	I	
96	VREF	-	+5V.
97	AVCC	-	+5V.
98	NC	I	
99	KMO1	O	Key matrix output 1.
100	KMO2	O	Key matrix output 2.

## COMPONENTS DESCRIPTION

## Display Unit (X54-3460-20)

Ref. No.	Parts name	Description
IC1	IC	Shift register for LED & MICBL control
Q4	Transistor	Busy light switch
Q9,10	Transistor	Key backlit switch
D1~4	LED	Key backlit
D5	LED	Monitor key light
D6	LED	Programmable key light
D7~10	LED	Channel key light
D11	LED	Busy
D12	LED	Transmit
D13	Diode	Surge protection

## TX-RX Unit (X57-6700-XX)

Ref. No.	Parts name	Description
IC31	IC	Voltage regulator (8C)
IC32	IC	Voltage regulator (5C)
IC33	IC	Voltage regulator (5M)
IC34	IC	Voltage detector reset
IC35	IC	Voltage detector int
IC66	IC	EEPROM
IC101	IC	CPU
IC161	IC	Digital potentiometer
IC201	IC	MIC amplifier / IDC
IC202	IC	MIC amplifier / Splatter filter
IC203	IC	Buffer amplifier / SUM amplifier / DC amplifier / 1/2 Vcc
IC251	IC	Audio filter
IC252	IC	Audio amplifier
IC301	IC	FM demodulation
IC401	IC	PLL synthesizer
IC402	IC	Divider (Hetero)
IC501	IC	APC controller
Q1	FET	TX AF
Q31,32	Transistor	DC switch (SB) / Active when power is on
Q33,34	Transistor	DC switch (8R) / Active while RX
Q35,36	Transistor	DC switch (8T) / Active while TX
Q61	Transistor	Over voltage detection / Active when PS voltage is more than 18V
Q71	Transistor	Ignition / Ignition sens
Q86,87	Transistor	Beat shift / Active while beat shift is on
Q201	Transistor	AF amplifier / MIC mute / Emergency MIC mute
Q202	FET	Emergency MIC mute / Active when MICEM is H
Q251	Transistor	Buffer amplifier / RX audio
Q252,253	FET	AF mute / Active while AFM is H

Ref. No.	Parts name	Description
Q254	Digital transistor	AF mute / Active while SPM is H
Q255	Transistor	AF mute / Active while AMPSW is H
Q301	Transistor	Noise amplifier / SQL amplifier
Q302	Transistor	Buffer amplifier / 16.8MHz 3rd over tone
Q351	Transistor	IF amplifier
Q352	FET	Mixer
Q353	FET	RF amplifier / LNA
Q354	Transistor	RF BPF
Q402,403	Transistor	Charge pump
Q404	Transistor	RF amplifier / PLL F in
Q405	FET	RX VCO
Q406	FET	TX VCO
Q407	FET	T/R switch
Q408	Transistor	T/R switch
Q410	Transistor	Buffer amplifier / Output of VCO
Q411	Transistor	RF amplifier / Output of VCO
Q440	Transistor	Lipple filter
Q501,502	Transistor	RF amplifier / Drive stage
Q503	FET	RF amplifier / Drive amplifier
Q504	FET	RF amplifier / Final amplifier
D1	Diode	Surge absorption / CM
D2	Diode	Surge absorption / HOOK
D3	Diode	Surge absorption / PTT
D4~11	Diode	Surge absorption / FNC1~8
D31	Diode	Reverse connection protection
D32	Poly switch	Current protection
D61	Diode	Over voltage detection
D201	Diode	OR gate / MIC mute, AGC
D202	Diode	AGC
D251	Diode	Limiter
D301	Diode	Detection
D302,303	Diode	IF switch (Wide/Narrow)
D351~354	Varicap	RF BPF tuning
D401	Diode	Lipple filter
D402	Diode	Voltage dropped
D403,404	Varicap	RX VCO
D405,406	Varicap	TX VCO
D407	Varicap	Modulation
D408	Diode	Lipple filter
D409	Diode	RF switch (TX/RX)
D501,502	Diode	Temperature compensation
D503	Diode	Voltage protection
D602~605	Diode	ANT switch
D606,607	Diode	APC voltage detect
D608	Diode	Temperature compensation

## PARTS LIST

\* New Parts.  $\Delta$  indicates safety critical components.

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.

L : Scandinavia

Y : PX (Far East, Hawaii)

Y : AAFES (Europe)

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

### TK-7102H

**DISPLAY UNIT (X54-3460-20)**

**TX-RX UNIT (X57-6700-XX)**

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
<b>TK-7102H</b>					
1	1B		A01-2181-01	CABINET	
2	3B	*	A10-4048-21	CHASSIS	
3	3A		A62-0942-03	PANEL ASSY	
5	3A	*	B10-2753-03	FRONT GLASS	
8	1D	*	B62-1596-10	INSTRUCTION MANUAL (ENGLISH)	
9	1D	*	B62-1597-10	INSTRUCTION MANUAL (SPANISH)	
10	3B	*	B72-2036-14	MODEL NAME PLATE	K
10	3B	*	B72-2037-14	MODEL NAME PLATE	K2
10	3B	*	B72-2038-14	MODEL NAME PLATE	M
10	3B	*	B72-2039-14	MODEL NAME PLATE	M2
12	3B		E04-0167-05	RF COAXIAL PECEPTACLE (M)	
14	3C		E30-3339-05	DC CORD           ACCESSORY	
15	2B		E30-3448-05	DC CORD (RADIO)	
16	2A		E37-1041-05	FLAT CABLE	
-			E37-1080-05	FOR SCRAMBLER BOARD (B)	
-			E37-1081-05	FOR SCRAMBLER BOARD (A)	
19	3A		E37-1082-05	SPEAKER CABLE	
21	2B		F10-2449-01	SHIELDING COVER	
22	3C		F51-0017-05	FUSE (6*30)       ACCESSORY	
24	2B		G02-0894-04	EARTH SPRING (FINAL FET)	
-			G10-1274-04	FIBROUS SHEET (PANEL ASSY)	
25	3B	*	G11-4127-14	RUBBER SHEET (CHASSIS)	
26	2B		G11-4240-04	RUBBER SHEET (DRIVE FET)	
27	3B		G13-1468-04	CUSHION (DC CORD)	
28	3A		G13-1836-04	CUSHION (SPEAKER)	
-			G13-1963-04	CUSHION (SCRAMBLER BOARD)	
-			G13-1964-04	CUSHION (SCRAMBLER BOARD)	
-			G13-1972-04	CUSHION (TRUNKING BOARD)	
30	3A		G53-1525-03	PACKING (PANEL)	
31	2B		G53-1542-03	PACKING (PHONE JACK)	
32	1B		G53-1544-01	PACKING (CABINET)	
33	2A		G53-1548-02	GASKET	
35	2C,1D		H12-3112-05	PACKING FIXTURE	
36	3D		H13-1190-02	CARTON BOARD	
37	1D		H25-2341-04	PROTECTION BAG	
38	2D		H52-1829-22	ITEM CARTON CASE	
40	3C		J19-1584-05	HOLDER           ACCESSORY	K,K2
41	3D		J29-0662-03	BRACKET         ACCESSORY	
43	3A		K29-9065-01	KEY TOP	
A	2B		N67-2608-46	PAN HEAD SEMS SCREW W	
B	2B,3B		N87-2606-46	BRAZIER HEAD TAPTITE SCREW	
C	1B,2B		N87-2614-46	BRAZIER HEAD TAPTITE SCREW	
45	3C		N99-0395-05	SCREW SET       ACCESSORY	
47	3A		T07-0739-05	SPEAKER	
48	2C		T91-0624-05	MICROPHONE     ACCESSORY	K,K2
<b>DISPLAY UNIT (X54-3460-20)</b>					
D1-4			B30-2238-05	LED (Y)	
D5-10			B30-2239-05	LED (SY)	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
D11			B30-2237-05	LED (YG)	
D12			B30-2240-05	LED (SR)	
C4			CK73GB1H103K	CHIP C   0.010UF   K	
C8-17			CK73GB1H103K	CHIP C   0.010UF   K	
C18			CK73GB1A105K	CHIP C   1.0UF       K	
C25			CK73GB1H103K	CHIP C   0.010UF   K	
C27			CK73GB1C104K	CHIP C   0.10UF       K	
CN1			E40-6005-05	FLAT CABLE CONNECTOR	
J1			E08-0877-05	MODULAR JACK	
L1			L92-0138-05	FERRITE CHIP	
CP3,4			RK75GB1J392J	CHIP-COM 3.9K   J   1/16W	
R1-6			RK73GB1J102J	CHIP R   1.0K    J   1/16W	
R7-15			RK73FB2A272J	CHIP R   2.7K    J   1/10W	
R16			RK73GB1J101J	CHIP R   100     J   1/16W	
R17			RK73GB1J100J	CHIP R   10      J   1/16W	
R18			RK73GB1J472J	CHIP R   4.7K    J   1/16W	
R19,20			RK73GB1J222J	CHIP R   2.2K    J   1/16W	
D13			DA221	DIODE	
IC1			BU2090FS	MOS IC	
Q4			KRC102S	DIGITAL TRANSISTOR	
Q9			KRA225S	DIGITAL TRANSISTOR	
Q10			KRC102S	DIGITAL TRANSISTOR	
<b>TX-RX UNIT (X57-6700-XX)   -22 : M   -23 : M2   -24 : K   -25 : K2</b>					
C10			CK73GB1H102K	CHIP C   1000PF   K	
C13-26			CK73GB1H471K	CHIP C   470PF     K	
C28			CK73GB1H221K	CHIP C   220PF     K	
C29			CK73GB1H471K	CHIP C   470PF     K	
C30			CK73GB1H102K	CHIP C   1000PF   K	
C33			CK73GB1H102K	CHIP C   1000PF   K	
C34			C92-0721-05	CHIP-ELE 330UF   25WV	
C35-38			CK73GB1H102K	CHIP C   1000PF   K	
C39,40			CK73GB1C104K	CHIP C   0.10UF     K	
C41			C92-0795-05	CHIP-TAN 22UF     10WV	
C42			CK73GB1H103K	CHIP C   0.010UF   K	
C43-45			C92-0795-05	CHIP-TAN 22UF     10WV	
C49,50			CK73GB1H103K	CHIP C   0.010UF   K	
C51			C92-0560-05	CHIP-TAN 10UF     6.3WV	
C52,53			CK73GB1H102K	CHIP C   1000PF   K	
C54,55			CK73GB1C104K	CHIP C   0.10UF     K	
C56			CK73GB1H102K	CHIP C   1000PF   K	
C61			CK73GB1H102K	CHIP C   1000PF   K	
C66			CK73GB1H102K	CHIP C   1000PF   K	
C72			CK73GB1H102K	CHIP C   1000PF   K	
C77,78			CK73GB1H102K	CHIP C   1000PF   K	
C82			CK73GB1H102K	CHIP C   1000PF   K	
C83			CK73GB1C104K	CHIP C   0.10UF     K	
C87			CC73GCH1H180J	CHIP C   18PF     J	
C88,89			CC73GCH1H060B	CHIP C   6.0PF     B	
C90			CC73GCH1H180J	CHIP C   18PF     J	
C97,98			CK73GB1H102K	CHIP C   1000PF   K	
C101			CK73GB1H102K	CHIP C   1000PF   K	
C102			CK73GB1C104K	CHIP C   0.10UF     K	

## PARTS LIST

## TX-RX UNIT (X57-6700-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C103			CK73GB1H102K	CHIP C 1000PF K		C301			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C104			CK73GB1C104K	CHIP C 0.10UF K		C302			CK73GB1H102K	CHIP C 1000PF K	
C151			CK73GB1H182K	CHIP C 1800PF K		C303			CK73GB1H472K	CHIP C 4700PF K	
C152			CK73GB1H392K	CHIP C 3900PF K		C304,305			CC73GCH1H331J	CHIP C 330PF J	K,M
C161			CK73GB1H102K	CHIP C 1000PF K		C304,305			CC73GCH1H391J	CHIP C 390PF J	K2,M2
C162			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C306			CK73GB1H102K	CHIP C 1000PF K	
C163			CK73GB1H102K	CHIP C 1000PF K		C307			CK73GB1E223K	CHIP C 0.022UF K	
C164			C92-0560-05	CHIP-TAN 10UF 6.3WV		C308			CK73GB1H102K	CHIP C 1000PF K	
C201			CK73GB1C104K	CHIP C 0.10UF K		C309			CK73GB1E223K	CHIP C 0.022UF K	
C202			CK73GB1H102K	CHIP C 1000PF K		C310			CK73FB1C334K	CHIP C 0.33UF K	
C203			CK73GB1C273K	CHIP C 0.027UF K		C311,312			CK73GB1C104K	CHIP C 0.10UF K	
C204			C92-0514-05	CHIP-TAN 2.2UF 10WV		C313			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C205			CK73GB1C104K	CHIP C 0.10UF K		C314			CK73GB1H103K	CHIP C 0.010UF K	
C206			CK73GB1H102K	CHIP C 1000PF K		C315-318			CK73GB1C104K	CHIP C 0.10UF K	
C207			CK73GB1C223K	CHIP C 0.022UF K		C319			CC73GCH1H101J	CHIP C 100PF J	
C208			CK73GB1H103K	CHIP C 0.010UF K		C322			CC73GCH1H560J	CHIP C 56PF J	
C210			CK73GB1C104K	CHIP C 0.10UF K		C323			CC73GCH1H271J	CHIP C 270PF J	
C211			CK73GB1H821K	CHIP C 820PF K		C324			CK73GB1H103K	CHIP C 0.010UF K	
C212			CK73GB1H122K	CHIP C 1200PF K		C326			CK73GB1H103K	CHIP C 0.010UF K	
C213			CK73GB1H332K	CHIP C 3300PF K		C350			CK73GB1H471K	CHIP C 470PF K	
C214			CC73GCH1H151J	CHIP C 150PF J		C351			CC73GCH1H330J	CHIP C 33PF J	
C215			CK73GB1C104K	CHIP C 0.10UF K		C353			CK73GB1H103K	CHIP C 0.010UF K	
C217,218			C92-0560-05	CHIP-TAN 10UF 6.3WV		C355			CC73GCH1H150J	CHIP C 15PF J	
C220			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C357			CK73GB1H103K	CHIP C 0.010UF K	
C221			CK73GB1C104K	CHIP C 0.10UF K		C358			CK73GB1H102K	CHIP C 1000PF K	
C225			C92-0004-05	CHIP-TAN 1.0UF 16WV		C359			CC73GCH1H080B	CHIP C 8.0PF B	
C226			CK73GB1H472K	CHIP C 4700PF K		C360-362			CK73GB1H102K	CHIP C 1000PF K	
C227			CK73GB1E103K	CHIP C 0.010UF K		C363			CK73GB1H103K	CHIP C 0.010UF K	
C228			C92-0560-05	CHIP-TAN 10UF 6.3WV		C364			CK73GB1H102K	CHIP C 1000PF K	
C229			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C366			CK73GB1C104K	CHIP C 0.10UF K	
C230			CK73GB1C104K	CHIP C 0.10UF K		C367			CC73GCH1H101J	CHIP C 100PF J	K,M
C231,232			CK73GB1H102K	CHIP C 1000PF K		C367			CC73GCH1H151J	CHIP C 150PF J	K2,M2
C233			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C368			CC73GCH1H220J	CHIP C 22PF J	
C250			CK73GB1C104K	CHIP C 0.10UF K		C369			CC73GCH1H0R5B	CHIP C 0.5PF B	K2,M2
C251			C92-0714-05	CHIP-TAN 4.7UF 6.3WV		C369			CC73GCH1H040B	CHIP C 4.0PF B	K,M
C252			CC73GCH1H390J	CHIP C 39PF J		C370			CK73GB1H102K	CHIP C 1000PF K	
C253,254			CK73GB1A105K	CHIP C 1.0UF K		C371			CC73GCH1H020B	CHIP C 2.0PF B	
C255			CK73GB1H822K	CHIP C 8200PF K		C372			CK73GB1H102K	CHIP C 1000PF K	
C256			CK73GB1E183K	CHIP C 0.018UF K		C373			CC73GCH1H040B	CHIP C 4.0PF B	K,M
C257			CK73GB1C393K	CHIP C 0.039UF K		C374			CC73GCH1H220J	CHIP C 22PF J	
C258-261			CK73GB1H103J	CHIP C 0.010UF J		C375-380			CK73GB1H102K	CHIP C 1000PF K	
C262			CK73GB1H102K	CHIP C 1000PF K		C382			CC73GCH1H220J	CHIP C 22PF J	
C263,264			CK73GB1C333K	CHIP C 0.033UF K		C383			CK73GB1H102K	CHIP C 1000PF K	
C265,266			CK73GB1C104K	CHIP C 0.10UF K		C384			CC73GCH1H010B	CHIP C 1.0PF B	
C267			CK73GB1A474K	CHIP C 0.47UF K		C386			CC73GCH1H240J	CHIP C 24PF J	K,M
C268			CK73GB1C104K	CHIP C 0.10UF K		C386			CC73GCH1H270J	CHIP C 27PF J	K2,M2
C269			CK73GB1A105K	CHIP C 1.0UF K		C387			CK73GB1H102K	CHIP C 1000PF K	
C270			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C388			CC73GCH1H040B	CHIP C 4.0PF B	K,M
C271			CK73GB1H332K	CHIP C 3300PF K		C388			CC73GCH1H060B	CHIP C 6.0PF B	K2,M2
C272			CK73GB1H102K	CHIP C 1000PF K		C389			CK73GB1H102K	CHIP C 1000PF K	
C273			CK73GB1A105K	CHIP C 1.0UF K		C401-403			CC73GCH1H101J	CHIP C 100PF J	
C274			CK73FB1C224K	CHIP C 0.22UF K		C404			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C275			CK73GB1A105K	CHIP C 1.0UF K		C406			CK73GB1H102K	CHIP C 1000PF K	
C276,277			CK73GB1H102K	CHIP C 1000PF K		C408			CC73GCH1H220J	CHIP C 22PF J	
C278			CK73GB1C104K	CHIP C 0.10UF K		C409			CK73GB1C104K	CHIP C 0.10UF K	
C279			C92-0516-05	CHIP-TAN 4.7UF 16WV		C410			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C280			C92-0040-05	CHIP-ELE 47UF 16WV		C411			CK73GB1C104K	CHIP C 0.10UF K	
C281			CK73GB1H102K	CHIP C 1000PF K		C412			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C282			C92-0722-05	CHIP-ELE 470UF 16WV		C413			CK73GB1H103K	CHIP C 0.010UF K	
C283			CK73GB1H102K	CHIP C 1000PF K		C414			CK73GB1C104K	CHIP C 0.10UF K	

PARTS LIST

TX-RX UNIT (X57-6700-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C416-418			CK73GB1H102K	CHIP C 1000PF K		C526			CK73GB1H681K	CHIP C 680PF K	
C421,422			CK73GB1H471K	CHIP C 470PF K		C527			CK73GB1H102K	CHIP C 1000PF K	
C423			C92-0555-05	CHIP-TAN 0.047UF 35WV		C528			CK73GB1H221K	CHIP C 220PF K	
C424			C92-0004-05	CHIP-TAN 1.0UF 16WV		C529			CK73FB1H102K	CHIP C 1000PF K	
C425			C92-0001-05	CHIP C 0.1UF 35WV		C530			CK73FB1C474K	CHIP C 0.47UF K	
C426			CC73GCH1H120J	CHIP C 12PF J	K2,M2	C531			C92-0719-05	CHIP-ELE 47UF 25WV	
C426			CC73GCH1H270J	CHIP C 27PF J	K,M	C533			C93-0570-05	CHIP C 68PF J	K,M
C427			CC73GCH1H040B	CHIP C 4.0PF B	K2,M2	C533			C93-0572-05	CHIP C 100PF J	K2,M2
C427			CC73GCH1H080B	CHIP C 8.0PF B	K,M	C536			CK73FB1H102K	CHIP C 1000PF K	
C428			CK73GB1H471K	CHIP C 470PF K		C541,542			CM73F2H270J	CHIP C 27PF J	K,M
C429			CC73GCH1H010B	CHIP C 1.0PF B	K,M	C545			C93-0603-05	CHIP C 1000PF K	
C429			CC73GCH1H020B	CHIP C 2.0PF B	K2,M2	C546			CK73FB1C474K	CHIP C 0.47UF K	
C430,431			CC73GCH1H050B	CHIP C 5.0PF B		C549			CM73F2H221J	CHIP C 220PF J	
C432			CC73GCH1H0R5B	CHIP C 0.5PF B		C550			CM73F2H680J	CHIP C 68PF J	
C434			CC73GCH1H330J	CHIP C 33PF J	K2,M2	C552			C93-0564-05	CHIP C 22PF J	K2,M2
C434			CK73GB1H471K	CHIP C 470PF K	K,M	C552,553			C93-0562-05	CHIP C 15PF J	K,M
C435			CC73GCH1H050B	CHIP C 5.0PF B	K2,M2	C553			C93-0550-05	CHIP C 1.0PF C	K2,M2
C435			CC73GCH1H100C	CHIP C 10PF C	K,M	C554			C93-0603-05	CHIP C 1000PF K	
C436			CC73GCH1H0R5B	CHIP C 0.5PF B		C555			C93-0555-05	CHIP C 5.0PF C	
C437			CK73GB1H471K	CHIP C 470PF K		C556			C93-0603-05	CHIP C 1000PF K	
C438			CC73GCH1H020B	CHIP C 2.0PF B		C557,558			CK73GB1H103K	CHIP C 0.010UF K	
C439			CC73GCH1H060B	CHIP C 6.0PF B	K,M	C559			CK73GB1C104K	CHIP C 0.10UF K	
C439,440			CC73GCH1H060B	CHIP C 6.0PF B	K2,M2	C560			CK73GB1H102K	CHIP C 1000PF K	
C440			CC73GCH1H070B	CHIP C 7.0PF B	K,M	C574			CK73GB1H102K	CHIP C 1000PF K	
C441			CC73GCH1H0R5B	CHIP C 0.5PF B		C576			CK73GB1H221K	CHIP C 220PF K	
C442			C92-0560-05	CHIP-TAN 10UF 6.3WV		C601			CC73GCH1H120J	CHIP C 12PF J	K,M
C444			CK73GB1H471K	CHIP C 470PF K		C601			CC73GCH1H180J	CHIP C 18PF J	K2,M2
C448,449			CK73GB1H471K	CHIP C 470PF K		C602			C93-0555-05	CHIP C 5.0PF C	
C450			C92-0568-05	CHIP-TAN 22UF 10WV		C603			C93-0603-05	CHIP C 1000PF K	
C451,452			CK73GB1H471K	CHIP C 470PF K		C605			C93-0564-05	CHIP C 22PF J	K,M
C453			CK73GB1H221K	CHIP C 220PF K		C605			C93-0566-05	CHIP C 33PF J	K2,M2
C454			CC73GCH1H060B	CHIP C 6.0PF B		C606			CC73GCH1H0R5B	CHIP C 0.5PF B	
C455			CC73GCH1H030B	CHIP C 3.0PF B		C607			CC73GCH1H020B	CHIP C 2.0PF B	
C456			CC73GCH1H020B	CHIP C 2.0PF B		C608			C93-0566-05	CHIP C 33PF J	
C457			CK73GB1H102K	CHIP C 1000PF K		C610			CC73GCH1H0R5B	CHIP C 0.5PF B	
C458			CK73GB1H221K	CHIP C 220PF K		C611			CC73GCH1H020B	CHIP C 2.0PF B	
C459			CK73GB1H102K	CHIP C 1000PF K		C613			C93-0566-05	CHIP C 33PF J	
C460			CC73GCH1H180J	CHIP C 18PF J		C615			C93-0564-05	CHIP C 22PF J	
C461			CK73GB1H102K	CHIP C 1000PF K		C616,617			CK73GB1H102K	CHIP C 1000PF K	
C462			CC73GCH1H100C	CHIP C 10PF C		TC351			C05-0399-05	CERAMIC TRIMMER CAP (6PF)	
C463,464			CK73GB1H102K	CHIP C 1000PF K		TC352			C05-0245-05	CERAMIC TRIMMER CAP (10PF)	
C465			CC73GCH1H220J	CHIP C 22PF J		TC401,402			C05-0245-05	CERAMIC TRIMMER CAP (10PF)	
C466			CC73GCH1H101J	CHIP C 100PF J		J1			E11-0425-05	3.5D PHONE JACK (3P)	
C467			CK73GB1H102K	CHIP C 1000PF K		CN1			E40-6268-05	FLAT CABLE CONNECTOR	
C468			CK73GB1H221K	CHIP C 220PF K		CN2			E40-5702-05	PIN ASSY	
C471			CC73GCH1H100C	CHIP C 10PF C	K,M	CN3			E40-6292-05	PIN ASSY	
C471			CC73GCH1H120J	CHIP C 12PF J	K2,M2	CN4			E40-5932-05	PIN ASSY SOCKET	
C501,502			CK73GB1H102K	CHIP C 1000PF K		CN5			E40-3246-05	PIN ASSY	
C503			CC73GCH1H101J	CHIP C 100PF J		CN601			E23-0486-05	TERMINAL	
C504-507			CK73GB1H102K	CHIP C 1000PF K		F501			F53-0108-05	FUSE (1.8A/50V)	
C509			CC73GCH1H150J	CHIP C 15PF J		CF301			L72-0993-05	CERAMIC FILTER	
C510			CC73GCH1H080B	CHIP C 8.0PF B		CF302			L72-0999-05	CERAMIC FILTER	
C511-514			CK73GB1H102K	CHIP C 1000PF K		L101			L92-0443-05	FERRITE CHIP	
C515			CC73GCH1H270J	CHIP C 27PF J		L201			L92-0443-05	FERRITE CHIP	
C516			CK73GB1H821K	CHIP C 820PF K		L301			L34-4554-05	COIL	
C517			CC73GCH1H030B	CHIP C 3.0PF B		L302			L41-3385-08	SMALL FIXED INDUCTOR	
C518			CC73GCH1H330J	CHIP C 33PF J		L303,304			L40-3381-86	SMALL FIXED INDUCTOR (0.33UH)	
C519			CC73GCH1H820J	CHIP C 82PF J		L351			L41-8285-08	SMALL FIXED INDUCTOR	
C522			CK73FB1H102K	CHIP C 1000PF K							
C525			CK73GB1H102K	CHIP C 1000PF K							

## PARTS LIST

## TX-RX UNIT (X57-6700-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L352			L41-5685-08	SMALL FIXED INDUCTOR		R70			RK73GB1J473J	CHIP R 47K J 1/16W	
L354-356			L34-4612-05	AIR-CORE COIL	K,M	R71			RK73GB1J472J	CHIP R 4.7K J 1/16W	
L354-356			L34-4613-05	AIR-CORE COIL	K2,M2	R72			RK73GB1J105J	CHIP R 1.0M J 1/16W	
L357			L34-4611-05	AIR-CORE COIL		R73			RK73GB1J104J	CHIP R 100K J 1/16W	
L401			L92-0443-05	FERRITE CHIP		R74			RK73GB1J473J	CHIP R 47K J 1/16W	
L403			L41-1005-08	SMALL FIXED INDUCTOR		R75			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L404			L92-0442-05	FERRITE CHIP		R76			RK73GH1J183D	CHIP R 18K D 1/16W	
L405			L92-0443-05	FERRITE CHIP		R77			RK73GH1J134D	CHIP R 130K D 1/16W	
L406,407			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	K,M	R78			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L406,407			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	K2,M2	R81			RK73GB1J473J	CHIP R 47K J 1/16W	
L408			L40-2778-67	SMALL FIXED INDUCTOR (27NH)	K,M	R82			R92-1252-05	CHIP R 0 OHM J 1/16W	
L408			L40-3978-67	SMALL FIXED INDUCTOR (39NH)	K2,M2	R86			R92-1252-05	CHIP R 0 OHM J 1/16W	
L409-412			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	K,M	R87			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L409-412			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	K2,M2	R91,92			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L413			L40-3978-67	SMALL FIXED INDUCTOR (39NH)	K,M	R93,94			RK73GB1J562J	CHIP R 5.6K J 1/16W	
L413			L40-6878-67	SMALL FIXED INDUCTOR (68NH)	K2,M2	R101,102			RK73GB1J473J	CHIP R 47K J 1/16W	
L414			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	K2,M2	R103-106			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L414,415			L40-4791-86	SMALL FIXED INDUCTOR (4.7UH)	K,M	R107,108			RK73GB1J473J	CHIP R 47K J 1/16W	
L415			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	K2,M2	R109			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L416,417			L92-0443-05	FERRITE CHIP		R110			RK73GB1J473J	CHIP R 47K J 1/16W	
L418			L40-6875-92	SMALL FIXED INDUCTOR (68NH)	K2,M2	R111			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L418			L41-3375-06	SMALL FIXED INDUCTOR	K,M	R112,113			RK73GB1J473J	CHIP R 47K J 1/16W	
L419			L41-1085-06	SMALL FIXED INDUCTOR		R114-119			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L420			L41-1585-06	SMALL FIXED INDUCTOR		R120-123			R92-1252-05	CHIP R 0 OHM J 1/16W	
L421			L41-1085-06	SMALL FIXED INDUCTOR		R124			RK73GB1J473J	CHIP R 47K J 1/16W	
L422			L41-5675-06	SMALL FIXED INDUCTOR		R125-128			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L501,502			L41-6875-08	SMALL FIXED INDUCTOR		R129			R92-1252-05	CHIP R 0 OHM J 1/16W	
L503,504			L41-2775-06	SMALL FIXED INDUCTOR		R130,131			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L505			L34-4606-05	AIR-CORE COIL	K,M	R151			RK73GB1J103J	CHIP R 10K J 1/16W	
L505			L34-4645-05	AIR-CORE COIL	K2,M2	R152			RK73GB1J472J	CHIP R 4.7K J 1/16W	
L506			L34-4693-05	AIR-CORE COIL		R161			RK73GB1J122J	CHIP R 1.2K J 1/16W	
L507			L34-4732-05	AIR-CORE COIL		R162			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L508			L34-4669-05	AIR-CORE COIL		R163			RK73GB1J473J	CHIP R 47K J 1/16W	
L509			L34-4667-05	AIR-CORE COIL		R164-166			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L601			L34-4668-05	AIR-CORE COIL		R201			RK73GB1J681J	CHIP R 680 J 1/16W	
L602-604			L34-4670-05	AIR-CORE COIL		R202			R92-0670-05	CHIP R 0 OHM	
L605			L34-4667-05	AIR-CORE COIL		R203			RK73GB1J104J	CHIP R 100K J 1/16W	
X86			L77-1934-05	CRYSTAL RESONATOR (14.31818MHZ)		R204			RK73GB1J183J	CHIP R 18K J 1/16W	
X401			L77-1868-15	TCXO (16.8MHZ)		R205			RK73GB1J821J	CHIP R 820 J 1/16W	
XF351			L71-0591-05	MCF (49.95MHZ)		R206			RK73GB1J101J	CHIP R 100 J 1/16W	
R1			RK73GB1J101J	CHIP R 100 J 1/16W		R207			RK73GB1J754J	CHIP R 750K J 1/16W	
R2			R92-1252-05	CHIP R 0 OHM J 1/16W		R208			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R3			RK73GB1J102J	CHIP R 1.0K J 1/16W		R209			RK73GB1J244J	CHIP R 240K J 1/16W	
R4			RK73GB1J332J	CHIP R 3.3K J 1/16W		R210			RK73GB1J183J	CHIP R 18K J 1/16W	
R5			RK73GB1J223J	CHIP R 22K J 1/16W		R211,212			RK73GB1J823J	CHIP R 82K J 1/16W	
R31			RK73GB1J472J	CHIP R 4.7K J 1/16W		R213			RK73GB1J334J	CHIP R 330K J 1/16W	
R32			R92-1215-05	CHIP R 470 J 1/2W		R214,215			RK73GB1J683J	CHIP R 68K J 1/16W	
R33			RK73GB1J473J	CHIP R 47K J 1/16W		R216			RK73GB1J274J	CHIP R 270K J 1/16W	
R34			RK73GB1J472J	CHIP R 4.7K J 1/16W		R217			RK73GB1J224J	CHIP R 220K J 1/16W	
R35			RK73GB1J473J	CHIP R 47K J 1/16W		R218			RK73GB1J823J	CHIP R 82K J 1/16W	
R36			RK73GB1J152J	CHIP R 1.5K J 1/16W		R219			RK73GB1J184J	CHIP R 180K J 1/16W	
R37			R92-1252-05	CHIP R 0 OHM J 1/16W		R220,221			RK73GH1J153D	CHIP R 15K D 1/16W	
R38			RK73GB1J334J	CHIP R 330K J 1/16W		R222			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R39			RK73GB1J474J	CHIP R 470K J 1/16W		R223			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R40			RK73GB1J394J	CHIP R 390K J 1/16W		R224			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R41			RK73GB1J334J	CHIP R 330K J 1/16W		R225			RK73GB1J154J	CHIP R 150K J 1/16W	
R61			RK73GB1J471J	CHIP R 470 J 1/16W		R226			RK73GB1J104J	CHIP R 100K J 1/16W	
R62			RK73GB1J102J	CHIP R 1.0K J 1/16W		R227			RK73GB1J223J	CHIP R 22K J 1/16W	
R66,67			RK73GB1J473J	CHIP R 47K J 1/16W		R228			RK73GB1J103J	CHIP R 10K J 1/16W	
R68,69			RK73GB1J102J	CHIP R 1.0K J 1/16W		R229			RK73GB1J684J	CHIP R 680K J 1/16W	

# PARTS LIST

TX-RX UNIT (X57-6700-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R230			RK73GB1J124J	CHIP R 120K J 1/16W		R355,356			RK73GB1J102J	CHIP R 1.0K J 1/16W	K2,M2
R231			RK73GB1J683J	CHIP R 68K J 1/16W		R356			RK73GB1J102J	CHIP R 1.0K J 1/16W	K,M
R232			RK73GB1J912J	CHIP R 9.1K J 1/16W		R358			RK73GB1J470J	CHIP R 47 J 1/16W	
R233			RK73GB1J682J	CHIP R 6.8K J 1/16W		R359			RK73GB1J224J	CHIP R 220K J 1/16W	
R249-251			RK73GB1J473J	CHIP R 47K J 1/16W		R360			RK73GB1J474J	CHIP R 470K J 1/16W	
R252			RK73GB1J474J	CHIP R 470K J 1/16W		R361			RK73GB1J470J	CHIP R 47 J 1/16W	K,M
R253			R92-1252-05	CHIP R 0 OHM J 1/16W		R361			RK73GB1J560J	CHIP R 56 J 1/16W	K2,M2
R254			RK73GB1J681J	CHIP R 680 J 1/16W		R362			RK73GB1J474J	CHIP R 470K J 1/16W	
R255,256			RK73GB1J562J	CHIP R 5.6K J 1/16W		R363			RK73GB1J154J	CHIP R 150K J 1/16W	
R257			RK73GB1J105J	CHIP R 1.0M J 1/16W		R364			R92-1252-05	CHIP R 0 OHM J 1/16W	
R258			RK73GB1J272J	CHIP R 2.7K J 1/16W		R365			RK73GB1J104J	CHIP R 100K J 1/16W	
R259			RK73GB1J123J	CHIP R 12K J 1/16W		R366			RK73GB1J471J	CHIP R 470 J 1/16W	
R260			RK73GB1J224J	CHIP R 220K J 1/16W		R367			RK73GB1J470J	CHIP R 47 J 1/16W	
R261			RK73GB1J124J	CHIP R 120K J 1/16W		R368			RK73GB1J104J	CHIP R 100K J 1/16W	
R262			RK73GB1J183J	CHIP R 18K J 1/16W		R369			R92-1252-05	CHIP R 0 OHM J 1/16W	
R263			RK73GH1J913D	CHIP R 91K D 1/16W		R370			RK73GB1J151J	CHIP R 150 J 1/16W	
R264			RK73GH1J124D	CHIP R 120K D 1/16W		R371			RK73GB1J474J	CHIP R 470K J 1/16W	
R265			RK73GH1J562D	CHIP R 5.6K D 1/16W		R372			RK73GB1J124J	CHIP R 120K J 1/16W	K2,M2
R266			RK73GB1J562J	CHIP R 5.6K J 1/16W		R372			RK73GB1J224J	CHIP R 220K J 1/16W	K,M
R267			R92-0670-05	CHIP R 0 OHM		R373			RK73GB1J684J	CHIP R 680K J 1/16W	
R268			RK73GB1J102J	CHIP R 1.0K J 1/16W		R374			RK73GB1J124J	CHIP R 120K J 1/16W	K2,M2
R269			RK73GB1J823J	CHIP R 82K J 1/16W		R374			RK73GB1J184J	CHIP R 180K J 1/16W	K,M
R270			RK73GB1J272J	CHIP R 2.7K J 1/16W		R375,376			RK73GB1J104J	CHIP R 100K J 1/16W	
R271			RK73GB1J561J	CHIP R 560 J 1/16W		R378			RK73GB1J100J	CHIP R 10 J 1/16W	K2,M2
R272			RK73GB1J152J	CHIP R 1.5K J 1/16W		R378			R92-1252-05	CHIP R 0 OHM J 1/16W	K,M
R273			RK73GB1J472J	CHIP R 4.7K J 1/16W		R379			RK73GB1J104J	CHIP R 100K J 1/16W	
R274,275			RK73GB1J153J	CHIP R 15K J 1/16W		R401-403			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R276			RK73GB1J473J	CHIP R 47K J 1/16W		R404			RK73GB1J103J	CHIP R 10K J 1/16W	
R277			RK73GB1J683J	CHIP R 68K J 1/16W		R405			R92-1252-05	CHIP R 0 OHM J 1/16W	
R278			RK73GB1J123J	CHIP R 12K J 1/16W		R407			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R279			RK73GB1J472J	CHIP R 4.7K J 1/16W		R408			RK73GB1J100J	CHIP R 10 J 1/16W	
R280			RK73GB1J391J	CHIP R 390 J 1/16W		R409			RK73GB1J104J	CHIP R 100K J 1/16W	
R281			R92-0670-05	CHIP R 0 OHM		R410			RK73GB1J103J	CHIP R 10K J 1/16W	K2,M2
R301,302			RK73GB1J472J	CHIP R 4.7K J 1/16W		R410			RK73GB1J822J	CHIP R 8.2K J 1/16W	K,M
R303			RK73GB1J223J	CHIP R 22K J 1/16W		R411			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R304			RK73GB1J472J	CHIP R 4.7K J 1/16W		R412,413			RK73GB1J103J	CHIP R 10K J 1/16W	
R305			RK73GB1J182J	CHIP R 1.8K J 1/16W		R414			RK73GB1J471J	CHIP R 470 J 1/16W	
R306			RK73GB1J274J	CHIP R 270K J 1/16W		R415			R92-1252-05	CHIP R 0 OHM J 1/16W	
R308			RK73GB1J334J	CHIP R 330K J 1/16W		R416			RK73GB1J471J	CHIP R 470 J 1/16W	
R309			RK73GB1J332J	CHIP R 3.3K J 1/16W		R417			RK73GB1J224J	CHIP R 220K J 1/16W	
R310			RK73GB1J102J	CHIP R 1.0K J 1/16W		R418,419			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R311			RK73GB1J333J	CHIP R 33K J 1/16W		R420			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R312			RK73GB1J473J	CHIP R 47K J 1/16W		R421			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R313			RK73GB1J104J	CHIP R 100K J 1/16W		R422			RK73GB1J103J	CHIP R 10K J 1/16W	
R314			RK73GB1J222J	CHIP R 2.2K J 1/16W		R423			RK73GB1J331J	CHIP R 330 J 1/16W	K2,M2
R315			RK73GB1J183J	CHIP R 18K J 1/16W		R423,424			RK73GB1J221J	CHIP R 220 J 1/16W	K,M
R316			RK73GB1J223J	CHIP R 22K J 1/16W		R424			RK73GB1J221J	CHIP R 220 J 1/16W	K2,M2
R317-320			RK73GB1J103J	CHIP R 10K J 1/16W		R425,426			RK73GB1J473J	CHIP R 47K J 1/16W	
R321			RK73GB1J323J	CHIP R 22K J 1/16W		R427			RK73GB1J104J	CHIP R 100K J 1/16W	
R322			RK73GB1J101J	CHIP R 100 J 1/16W		R428			RK73GB1J473J	CHIP R 47K J 1/16W	
R323			RK73GB1J224J	CHIP R 220K J 1/16W		R429,430			RK73GB1J101J	CHIP R 100 J 1/16W	
R324			R92-1252-05	CHIP R 0 OHM J 1/16W		R431			RK73GB1J104J	CHIP R 100K J 1/16W	
R325			RK73GB1J333J	CHIP R 33K J 1/16W		R432			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R349			RK73GB1J473J	CHIP R 47K J 1/16W		R433			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R350			RK73GB1J273J	CHIP R 27K J 1/16W		R434			R92-1252-05	CHIP R 0 OHM J 1/16W	
R351			RK73GB1J471J	CHIP R 470 J 1/16W		R435			RK73GB1J101J	CHIP R 100 J 1/16W	
R352			RK73GB1J101J	CHIP R 100 J 1/16W		R436			RK73GB1J124J	CHIP R 120K J 1/16W	
R353			RK73GB1J104J	CHIP R 100K J 1/16W		R437			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R354			RK73GB1J331J	CHIP R 330 J 1/16W		R438			RK73GB1J223J	CHIP R 22K J 1/16W	
R355			RK73GB1J471J	CHIP R 470 J 1/16W	K,M	R439			RK73GB1J473J	CHIP R 47K J 1/16W	

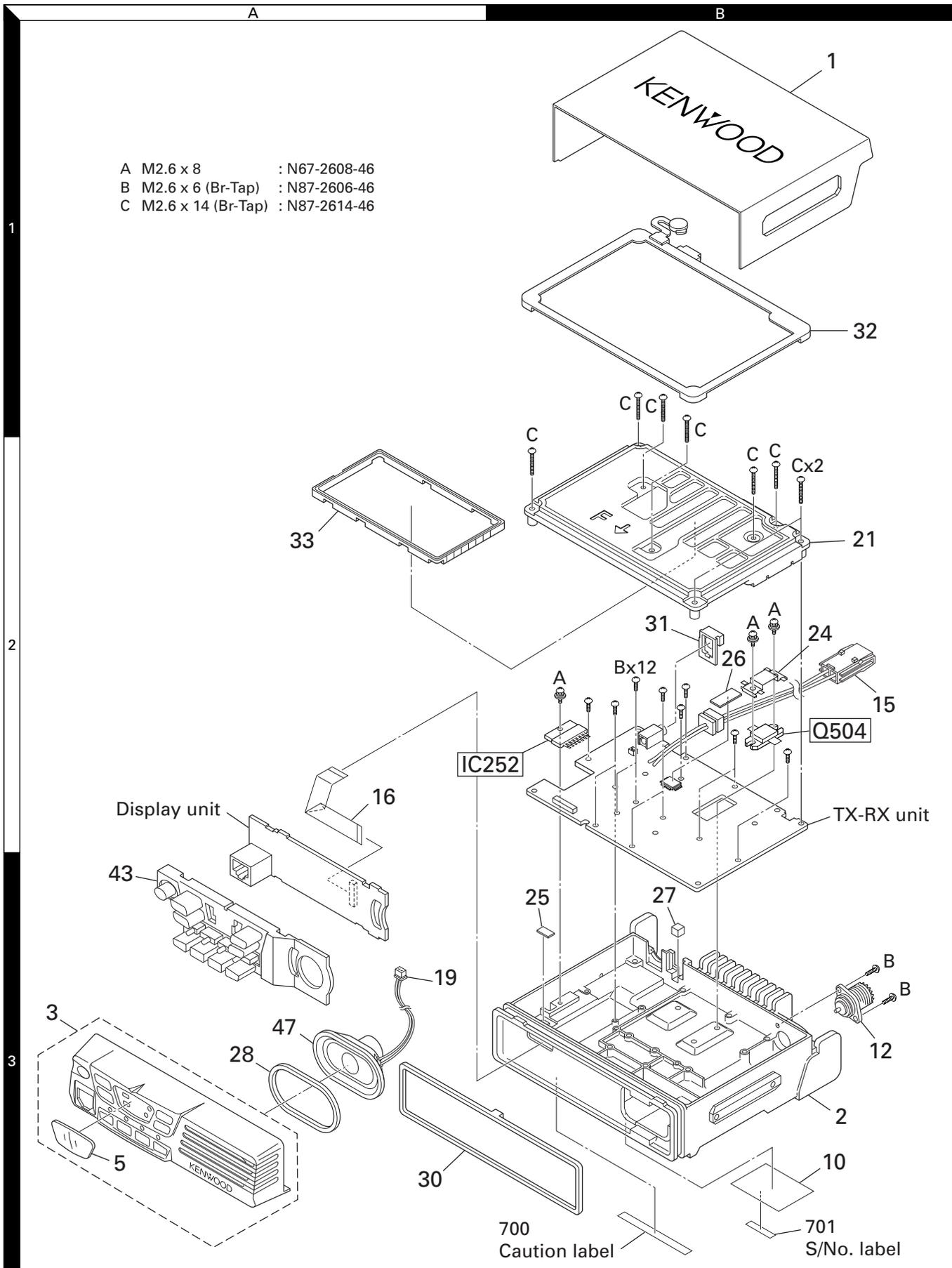
## PARTS LIST

## TX-RX UNIT (X57-6700-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R440-442			RK73GB1J101J	CHIP R 100 J 1/16W		D604,605			XB15A709	DIODE	K2,M2
R443			RK73GB1J222J	CHIP R 2.2K J 1/16W		D605			XB15A709	DIODE	K,M
R444			RK73GB1J102J	CHIP R 1.0K J 1/16W		D606,607			MA742	DIODE	
R501			RK73GB1J102J	CHIP R 1.0K J 1/16W		D608			1SS355	DIODE	
R502			RK73GB1J271J	CHIP R 270 J 1/16W		IC31			KIA7808AF	ANALOG IC	
R503			RK73GB1J180J	CHIP R 18 J 1/16W		IC32,33			NJM78L05UA	BI-POLAR IC	
R504			RK73GB1J271J	CHIP R 270 J 1/16W		IC34,35			PST9140NR	MOS IC	
R505			RK73GB1J222J	CHIP R 2.2K J 1/16W		IC66			AT24C64N10S118	ROM IC	
R506			RK73GB1J103J	CHIP R 10K J 1/16W		IC101			30622MAA-B83GP	MPU	
R507			RK73GB1J100J	CHIP R 10 J 1/16W		IC161			M62363FP	MOS IC	
R509			RK73GB1J220J	CHIP R 22 J 1/16W		IC201			NJM2100V	MOS IC	
R510			RK73GB1J152J	CHIP R 1.5K J 1/16W		IC202			NJM2904V	MOS IC	
R511			RK73FB2A470J	CHIP R 47 J 1/10W		IC203			NJM2902V	MOS IC	
R512			RK73FB2A100J	CHIP R 10 J 1/10W		IC251			NJM2902V	MOS IC	
R513			RK73FB2A222J	CHIP R 2.2K J 1/10W		IC252	2B		LA4600	AF POWER IC	
R514			R92-1217-05	CHIP R 0 OHM		IC301			TK14489V	BI-POLAR IC	
R516			R92-0670-05	CHIP R 0 OHM		IC401			MB15A02	MOS IC	
R518			RK73EB2B330J	CHIP R 33 J 1/8W		IC402			UPB1509GV	BI-POLAR IC	
R519			RK73GB1J333J	CHIP R 33K J 1/16W		IC501			TA75W01FU	MOS IC	
R520			RK73GB1J183J	CHIP R 18K J 1/16W		Q1			2SK1824	FET	
R521			RK73GB1J101J	CHIP R 100 J 1/16W		Q31			2SA1641(S,T)	TRANSISTOR	
R522			RK73EB2B181J	CHIP R 180 J 1/8W	K,M	Q32			KRC102S	DIGITAL TRANSISTOR	
R522			RK73EB2B331J	CHIP R 330 J 1/8W	K2,M2	Q33			2SA1745(6,7)	TRANSISTOR	
R523			RK73GB1J393J	CHIP R 39K J 1/16W	K,M	Q34			KRC102S	DIGITAL TRANSISTOR	
R523			RK73GB1J473J	CHIP R 47K J 1/16W	K2,M2	Q35			KTA1664(Y)	TRANSISTOR	
R524			R92-1215-05	CHIP R 470 J 1/2W		Q36			KRC102S	DIGITAL TRANSISTOR	
R525			RK73GB1J563J	CHIP R 56K J 1/16W		Q61			KRC404RTK	DIGITAL TRANSISTOR	
R526			R92-1261-05	CHIP R 150 J 1/2W		Q71			KRC414RTK	DIGITAL TRANSISTOR	
R527			RK73GB1J224J	CHIP R 220K J 1/16W		Q86,87			2SK1824	FET	
R528,529			RK73GB1J471J	CHIP R 470 J 1/16W		Q201			2SC4919	TRANSISTOR	
R530			RK73GB1J102J	CHIP R 1.0K J 1/16W		Q202			2SJ243	FET	
R531			RK73GB1J473J	CHIP R 47K J 1/16W		Q251			2SC4617(S)	TRANSISTOR	
R532,533			R92-1252-05	CHIP R 0 OHM J 1/16W		Q252,253			2SK1824	FET	
R601,602			RK73GB1J223J	CHIP R 22K J 1/16W		Q254			DTC363EU	DIGITAL TRANSISTOR	
R603			RK73GB1J473J	CHIP R 47K J 1/16W		Q255			KRC102S	DIGITAL TRANSISTOR	
R605			RK73GB1J153J	CHIP R 15K J 1/16W		Q301			2SC2412K	TRANSISTOR	
R606			RK73GB1J221J	CHIP R 220 J 1/16W		Q302			2SC4617(S)	TRANSISTOR	
VR1			R12-6427-05	TRIMMING POT. (47K)		Q351			2SC5108(Y)	TRANSISTOR	
D1-11			DA221	DIODE		Q352,353			3SK255	FET	
D31			ZSH5MA27	SURGE ABSORBER		Q354			2SK1824	FET	
D32			1812L110PR	VARIATOR		Q402			2SA1832(GR)	TRANSISTOR	
D61			02DZ18(X,Y)	ZENER DIODE		Q403			2SC4738(GR)	TRANSISTOR	
D201			DAN222	DIODE		Q404			2SC4649(N,P)	TRANSISTOR	
D202			1SS372	DIODE		Q405,406			2SK508NV(K52)	FET	
D251			MA742	DIODE		Q407			2SJ243	FET	
D301			MA742	DIODE		Q408			KRX102U	TRANSISTOR	
D302,303			DAN222	DIODE		Q410			2SC5108(Y)	TRANSISTOR	
D351-354			HVC350B	VARIABLE CAPACITANCE DIODE		Q411			2SC4649(N,P)	TRANSISTOR	
D401			MA2S111	DIODE		Q440			2SC4617(S)	TRANSISTOR	
D402			HZU5ALL	DIODE		Q501,502			2SC3357	TRANSISTOR	
D403-406			MA2S304	VARIABLE CAPACITANCE DIODE		Q503			PD55003TR	FET	
D407			MA360	VARIABLE CAPACITANCE DIODE		Q504	2B		RD70HVF1-01	RF POWER FET	
D408			MA2S111	DIODE		TH97,98			B57331V2104J	THERMISTOR	
D409			DAN235E	DIODE		TH301			B57331V2104J	THERMISTOR	
D501			1SS355	DIODE		TH351			B57331V2104J	THERMISTOR	K2,M2
D502			DA221	DIODE							
D503			02DZ5.1(Y)	ZENER DIODE							
D602			MA4PH633	DIODE							
D603			XB15A709	DIODE	K,M						

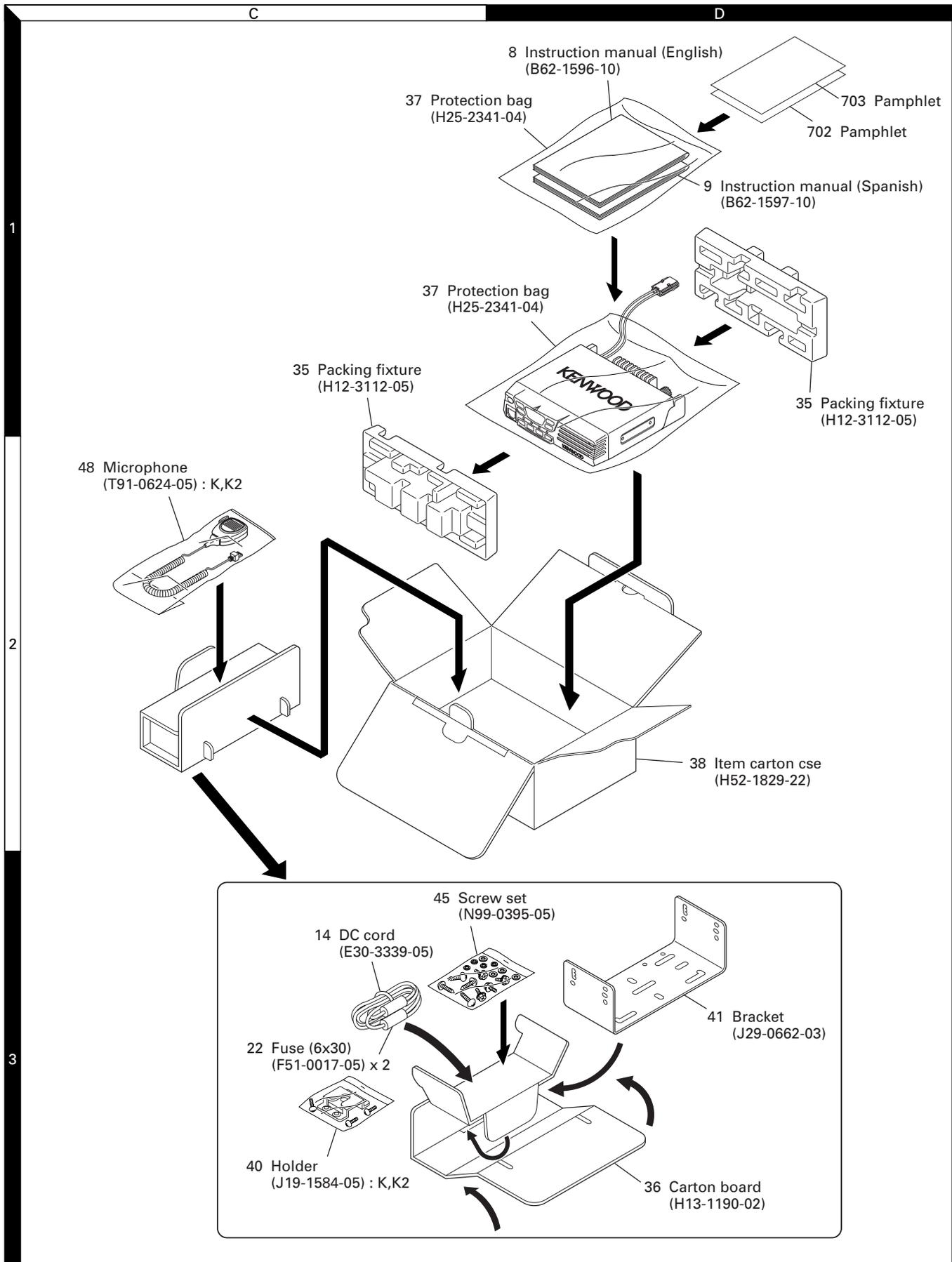
# EXPLODED VIEW

- A M2.6 x 8 : N67-2608-46
- B M2.6 x 6 (Br-Tap) : N87-2606-46
- C M2.6 x 14 (Br-Tap) : N87-2614-46



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

## PACKING

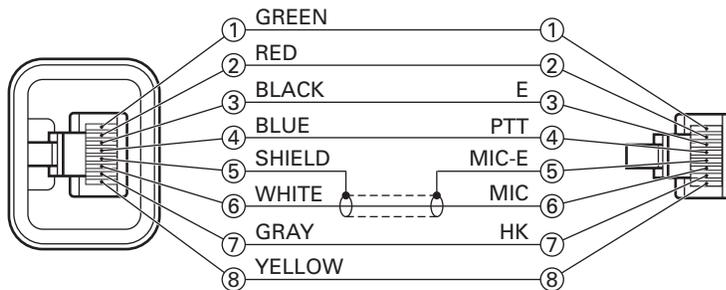


# ADJUSTMENT

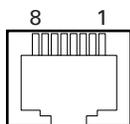
## Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	136 to 175MHz Frequency modulation and external modulation -127dBm/0.1μV to greater than -7dBm/100mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 136 to 175MHz or more Vicinity of 100W
3. Deviation Meter	Frequency Range	136 to 175MHz
4. Digital Volt Meter (DVM)	Measuring Range Accuracy	1 to 20V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		20A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 3V
9. Audio Generator (AG)	Frequency Range Output	20Hz to 20kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. 4Ω Dummy Load		Approx. 4Ω, 10W or more
12. Regulated Power Supply		13.6V, approx. 20A (adjustable from 9 to 17V) Useful if ammeter reequipped
13. Spectrum Analyzer	Center frequency	50KHz to 600MHz
14. Tracking Generator	Output Voltage	100mV or more

### Test cable for microphone input (E30-3360-08)



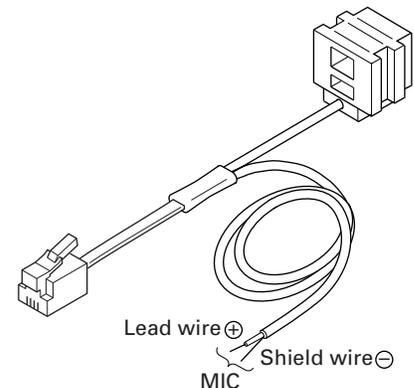
### MIC connector (Front view)



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

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

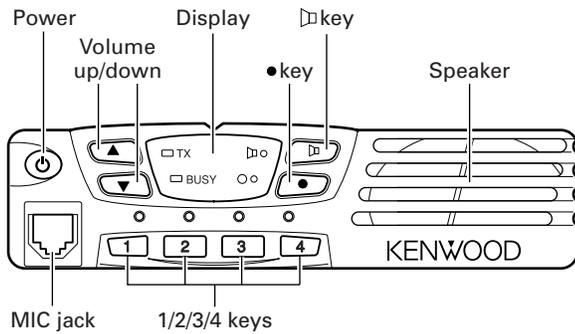
Adapter cable (E30-3383-05) is required for injecting an audio if PC tuning is used. See "PC Mode" section for the connection.



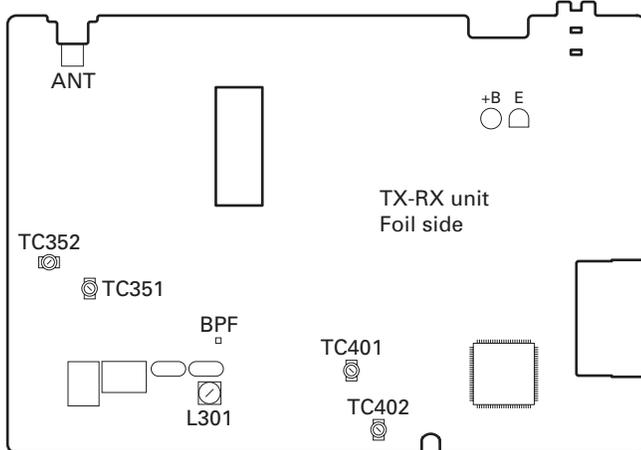
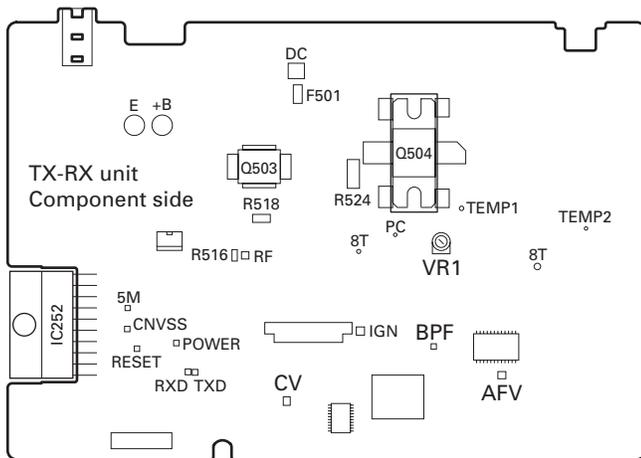
## ADJUSTMENT

### Adjustment Location

#### ■ Switch



#### ■ Adjustment Points



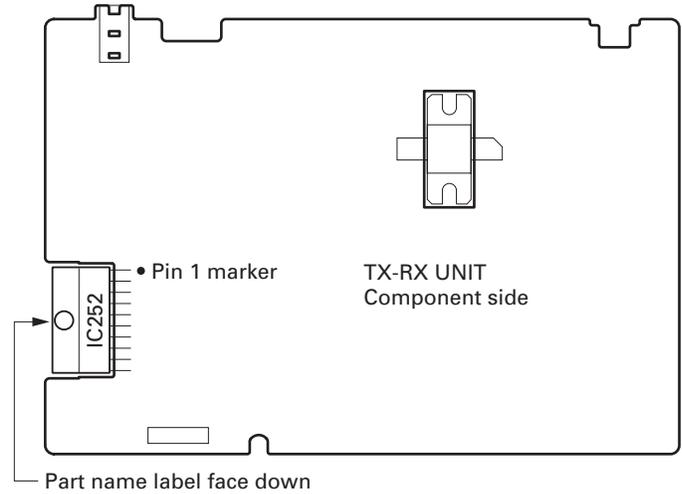
#### ■ Notes

##### • EEPROM

The tuning data (Deviation, Squelch, etc.) for the EEPROM, is stored in memory. When parts are changed, re-adjust the transceiver.

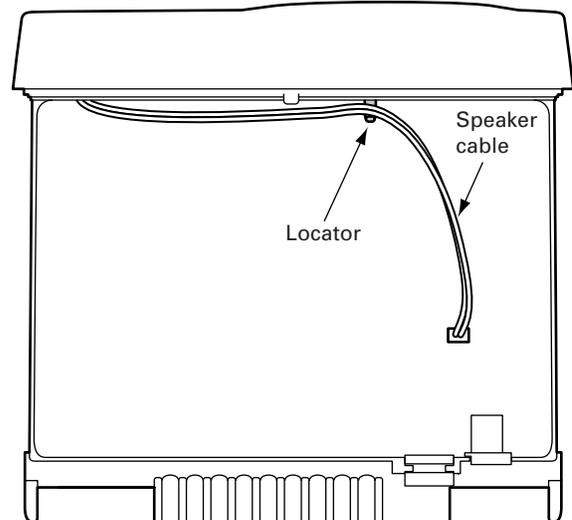
##### • AF PA IC (IC252)

How to mounting the IC252.



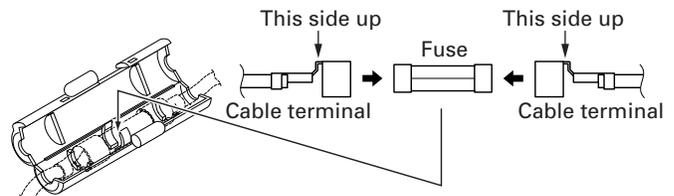
##### • Speaker Cable

The speaker cable should be formed before mounting the shield cover as below.



##### • Fuse

To mount the fuse, the cable terminal direction must be as follow.



# ADJUSTMENT

## Test Frequency (MHz)

Channel	K,M		K2,M2	
	TX	RX	TX	RX
1 : Center	160.100	160.050	149.100	149.050
2 : Low	146.100	146.050	136.100	136.050
3 : High	173.900	173.950	161.900	161.950
4	160.000	160.000	149.000	149.000
5	160.200	160.200	149.200	149.200
6	160.400	160.400	149.400	149.400

## PCB Section

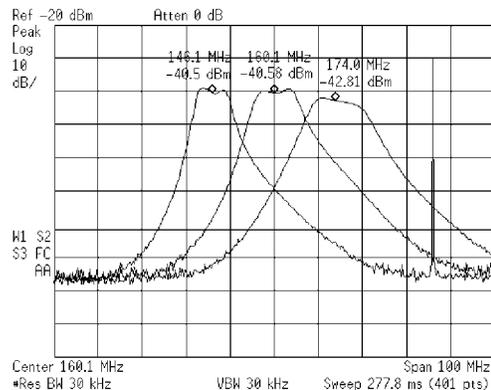
Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
1. Setting	1) Power supply voltage DC Power supply terminal : 13.6V					
2. VCO lock voltage*	1) CH : TX high	Digital voltmeter	CV	TC402	5.5V	±0.1V
	2) CH : RX high			TC401	5.5V	±0.1V
	3) CH : TX low				Check	0.7V or more
	4) CH : RX low					
3. IF coil	1) CH : RX center (Wide) 2) SSG output : -53dBm (501μV) Mod : 1kHz Dev : 3kHz	SSG Digital voltmeter	AFV	L301	3.25~3.35V (DC)	
4. RF bandpass filter	1) CH : RX center (Wide) CH : RX low (Wide) CH : RX high (Wide) 2) Tra generator output : -30dBm Connect the spectrum analyzer to BPF terminal	Tra generator Spectrum analyzer	ANT BPF	TC351 TC352	Adjust the BPF waveform to Fig. 1	

### \* Adjustment of TX VCO lock voltage

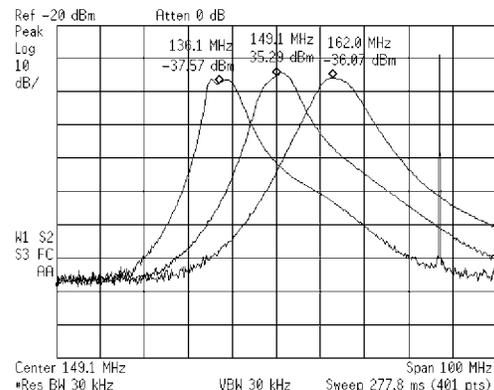
1. Remove R516, F501, R518 and R524 (all on component side).
2. Remove PCB from chassis.
3. Transmit and check voltage at [CV] point.

**Warning :** Do not transmit if step "1." is not complete.

4. Adjust of voltage can be done by tuning TC402.



K,M



K2,M2

Fig. 1

## ADJUSTMENT

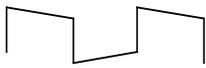
## Receiver Section

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
1. Seisitivity	1) CH : RX low (Wide/Narrow) CH : RX center (Wide/Narrow) CH : RX high (Wide/Narrow) 2) SSG output : -118dBm (0.28 $\mu$ V) (Wide) : -116dBm (0.35 $\mu$ V) (Narrow) Mod : 1kHz Dev : $\pm$ 3.0kHz (Wide) Dev : $\pm$ 1.5kHz (Narrow)	SSG Oscilloscope AF V.M Distortion meter	ANT EXT. SP		Check	SINAD : 12dB or higher
2. Squelch 9	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide) 2) SSG output : -115dBm (0.4 $\mu$ V) (Wide) : -114dBm (0.45 $\mu$ V) (Narrow) Mod : 1kHz Dev : $\pm$ 3.0kHz (Wide) Dev : $\pm$ 1.5kHz (Narrow)			PC key	Adjust to open the squelch	
3. Squelch 1	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide) 2) SSG output : -120dBm (0.22 $\mu$ V) (Wide) : -119dBm (0.25 $\mu$ V) (Narrow) Mod : 1kHz Dev : $\pm$ 3.0kHz (Wide) Dev : $\pm$ 1.5kHz (Narrow)					

## Transmitter Section

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
1. Frequency	1) CH : TX center 2) Transmit	Frequency counter	ANT	PC key	Adjust to center frequency	Within $\pm$ 100Hz
2. Maximum power limiting	1) CH : TX high 2) Transmit	Power meter		VR1	53W Hex data 255	$\pm$ 1W
3. High power	1) CH : TX low CH : TX low' CH : TX center CH : TX high' CH : TX high 2) Transmit			PC key	50W	$\pm$ 1.0W
4. Low power	1) CH : TX low CH : TX low' CH : TX center CH : TX high' CH : TX high 2) Transmit				25W	$\pm$ 1.0W

## ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
5. DQT balance	1) CH : TX low (Wide) CH : TC center (Wide/Narrow) CH : TX high (Wide) 2) Transmit	Modulation analyzer or Linear detector (LPF : 3kHz) Oscilloscope	ANT	PC key	Adjust the waveform as below 	
6. MAX balance	1) CH : TX low (Wide) CH : TC center (Wide/Narrow) CH : TX high (Wide) 2) AG : 1kHz/50mV 3) Transmit	Modulation analyzer or Linear detector (LPF : 15kHz) Oscilloscope AG AF V.M	ANT MIC		±4.0kHz (Wide) ±2.0kHz (Narrow) According to the large +, -	±50Hz
7. MIC sensitivity	1) CH : TX center (Wide/Narrow) 2) AG : 1kHz/5mV 3) Transmit				Check	±3kHz±0.2kHz (Wide) ±1.5kHz±0.1kHz (Narrow)
8. DQT deviation	1) CH : TX low (Wide) CH : TX center (Wide/Narrow) CH : TX high (Wide) 2) Transmit	Modulation analyzer or Linear detector (LPF : 3kHz) Oscilloscope			±0.75kHz (Wide) ±0.35kHz (Narrow)	±0.05kHz
9. QT deviation	1) CH : TX low (Wide) CH : TX center (Wide/Narrow) CH : TX high (Wide) 2) Transmit				±0.75kHz (Wide) ±0.35kHz (Narrow)	±0.05kHz
10. DTMF /MSK deviation	1) CH : TX center (Wide/Narrow) 2) Transmit				±3.0kHz (Wide) ±1.5kHz (Narrow)	±0.2kHz

### If normal power is not obtained, please follow the step below

Open the shielding cover (upper), and screw 3 locations around ANT pin.

- Switch off the transceiver.  
Impedance of Final FET (Q504) and Drive FET (Q503) can be measured easily using DVM  $\Omega$  mode.  
Normal condition – Gate : 20k $\Omega$ ~50k $\Omega$ , Drain : 1M $\Omega$ ~2M $\Omega$   
The above impedance values are rough estimations.
- Switch on the transceiver. Check the voltage at F501 output point.  
The voltage is around 13.6V in receiving condition. The voltage will be 12.6V~ in transmitting condition. If found 0V at this point then F501 is broken.
- Remove R516.

- Connect 50 $\Omega$  load at the ANT location.  
Transmit and check current drain at High power mode.  
If the current drain is less than 1A, then Final FET is broken.  
If the current drain is less than 5.0A, short the Drive FET gate to ground, and check the current drain.  
If the current drain is not 0.1A less than the original value, then the Drive FET is broken.
- Check input power level at Drive FET gate location.  
Connect the wire to [RF] location.  
Transmit and check for power to be within the range of 0.3W~0.6W.  
If power found is less than 0.3W, check the circuit before the Drive FET.

## TERMINAL FUNCTION

### CN2

No.	Name	I/O	Function
1	SB	O	Battery voltage DC supply
2	NC	-	-
3	GND	O	Ground
4	NC	-	-
5	FNC1	I/O	Programable I/O (programmed by FPU)
6	FNC2	I/O	Programable I/O (programmed by FPU)
7	FNC3	I/O	Programable I/O (programmed by FPU)
8	FNC4	I/O	Programable I/O (programmed by FPU)
9	FNC5	I/O	Programable I/O (programmed by FPU)
10	FNC6	I/O	Programable I/O (programmed by FPU)
11	FNC7	I/O	Programable I/O (programmed by FPU)
12	FNC8	I/O	Programable I/O (programmed by FPU)

### ■ Function Port Assignment

KDS100, KGP-2A/2B			
	Name		I/O
FNC1	-		-
FNC2	-		-
FNC3	Data Channel		I
FNC4	PTT		I
FNC5	Carrier Operated Relay		O
FNC6	Audio Mute		I
FNC7	Mic Mute		I
FNC8	TX Relay		O
SmarTrunk II			
	Name		I/O
FNC1	TXD		O
FNC2	RXD		I
FNC3	Reset		O
FNC4	-		-
FNC5	-		-
FNC6	-		-
FNC7	-		-
FNC8	-		-
Scrambler			
	Name		I/O
FNC1	-		-
FNC2	-		-
FNC3	TX Relay		O
FNC4	Scrambler		O
FNC5	Scrambler Code1 (1)		O
FNC6	Scrambler Code2 (2)		O
FNC7	Scrambler Code3 (4)		O
FNC8	Scrambler Code4 (8)		O

Port Function is Low Active. (Exclude : Scrambler Code)

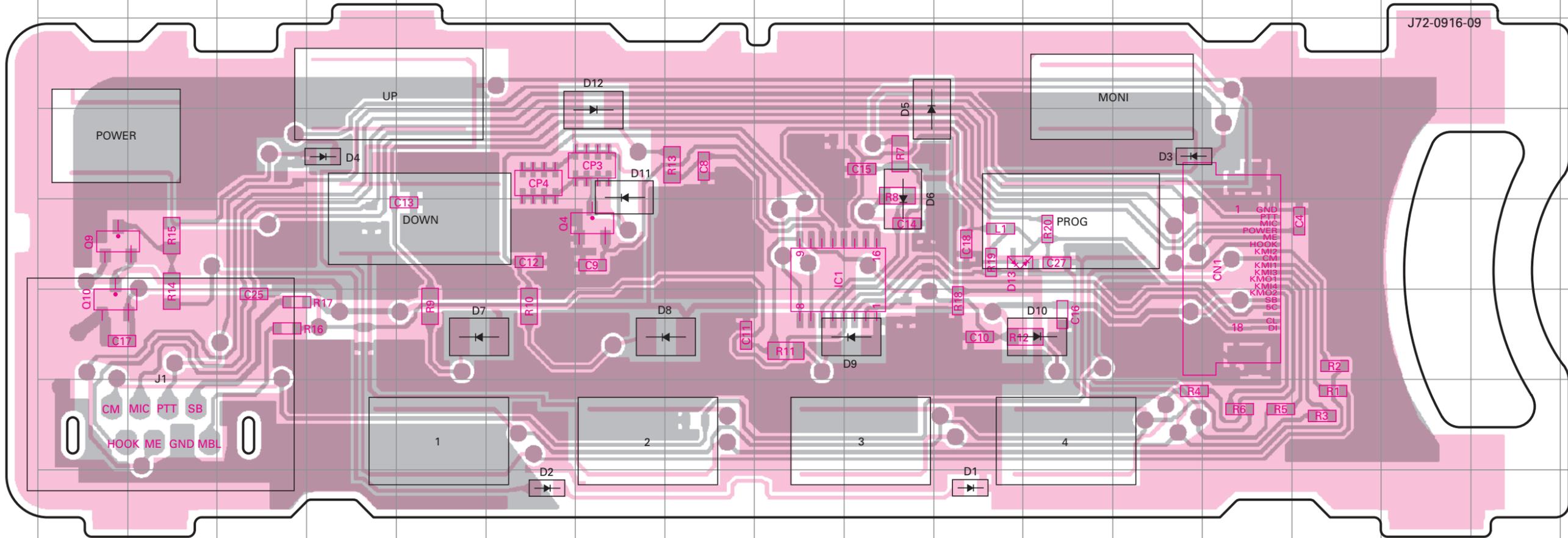
### CN3

No.	Name	I/O	Function
1	IGN	I	Ignition sens input
2	DATAI	I	External transmit signal input
3	DETO	O	FM detector output
4	TXAFI	I	TX audio input from scrambler board
5	TXAFO	O	TX audio output to scrambler board
6	EMGMIC	I	Emergency MIC input (1kHz/1.2mVrms)
7	RXAFO	O	RX audio output to scrambler board
8	ALTI	I	External alert tone signal input
9	RXAFI	I	RX audio input from scrambler board
10	5C	O	5V DC power supply (50mA MAX)
11	8C	O	8V DC power supply (50mA MAX)

### CN4

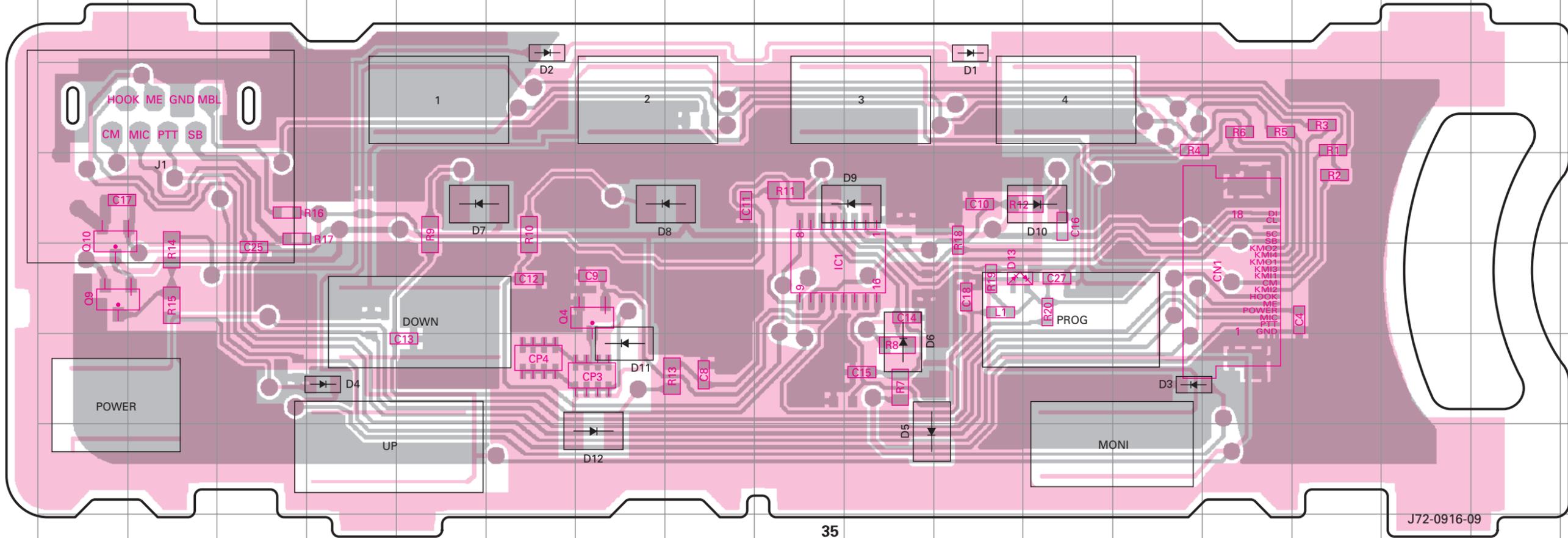
No.	Name	I/O	Function
1	GND	O	Ground
2	NC	-	-
3	NC	-	-
4	NC	-	-
5	FNC2	I/O	Programable I/O (programmed by FPU)
6	NC	-	-
7	NC	-	-
8	FNC3	I/O	Programable I/O (programmed by FPU)
9	FNC1	I/O	Programable I/O (programmed by FPU)
10	NC	-	-
11	5C	O	5V DC power supply (50mA MAX)
12	NC	-	-
13	DATAI	I	External transmit signal input
14	DETO2	O	FM detector output
15	ALTI	I	External alert tone signal input
16	NC	-	-
17	NC	-	-
18	NC	-	-
19	NC	-	-
20	GND	O	Ground

DISPLAY UNIT (X54-3460-20) Component side view (J72-0916-09)



Ref. No.	Address
IC1	4I
Q4	4G
Q9	4A
Q10	5A
D1	7K
D2	7F
D3	3M
D4	3D
D5	2J
D6	3J
D7	5E
D8	5G
D9	5J
D10	5L
D11	3G
D12	2G
D13	4K

DISPLAY UNIT (X54-3460-20) Foil side view (J72-0916-09)

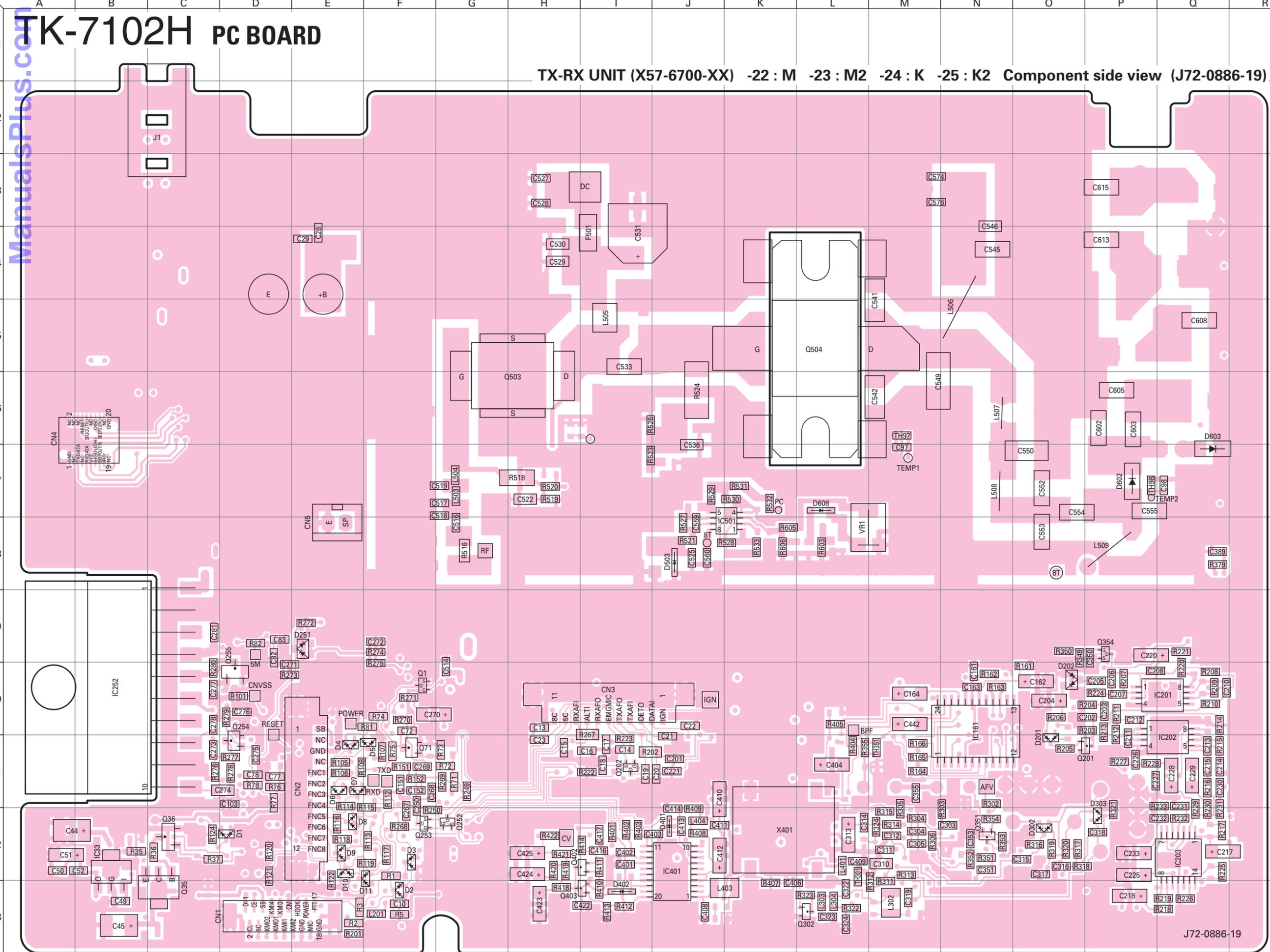


Ref. No.	Address
IC1	11I
Q4	11G
Q9	11A
Q10	10A
D1	8K
D2	8F
D3	12M
D4	12D
D5	13J
D6	12J
D7	10E
D8	10G
D9	10J
D10	10L
D11	12G
D12	13G
D13	11K

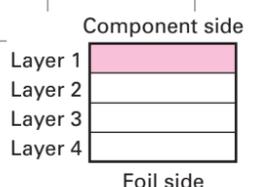
Component side  
Foil side

# TK-7102H PC BOARD

TX-RX UNIT (X57-6700-XX) -22 : M -23 : M2 -24 : K -25 : K2 Component side view (J72-0886-19)



Ref. No.	Address
IC33	12B
IC161	10N
IC201	10Q
IC202	11Q
IC203	12Q
IC252	10B
IC401	12J
IC501	8K
Q1	10F
Q35	13C
Q36	12C
Q71	11F
Q201	11P
Q202	11I
Q252	12G
Q253	12F
Q254	11D
Q255	10D
Q302	13L
Q351	12N
Q354	9P
Q402	12I
Q403	13I
Q503	6H
Q504	5L
D1	12D
D2	13F
D3	12F
D4	11E
D5	11F
D6	11E
D7	11E
D8	12E
D9	12E
D10	12E
D11	12F
D201	11O
D202	10O
D251	9E
D302	12O
D303	12P
D401	12J
D402	13I
D503	8J
D602	7P
D603	7Q
D608	7L

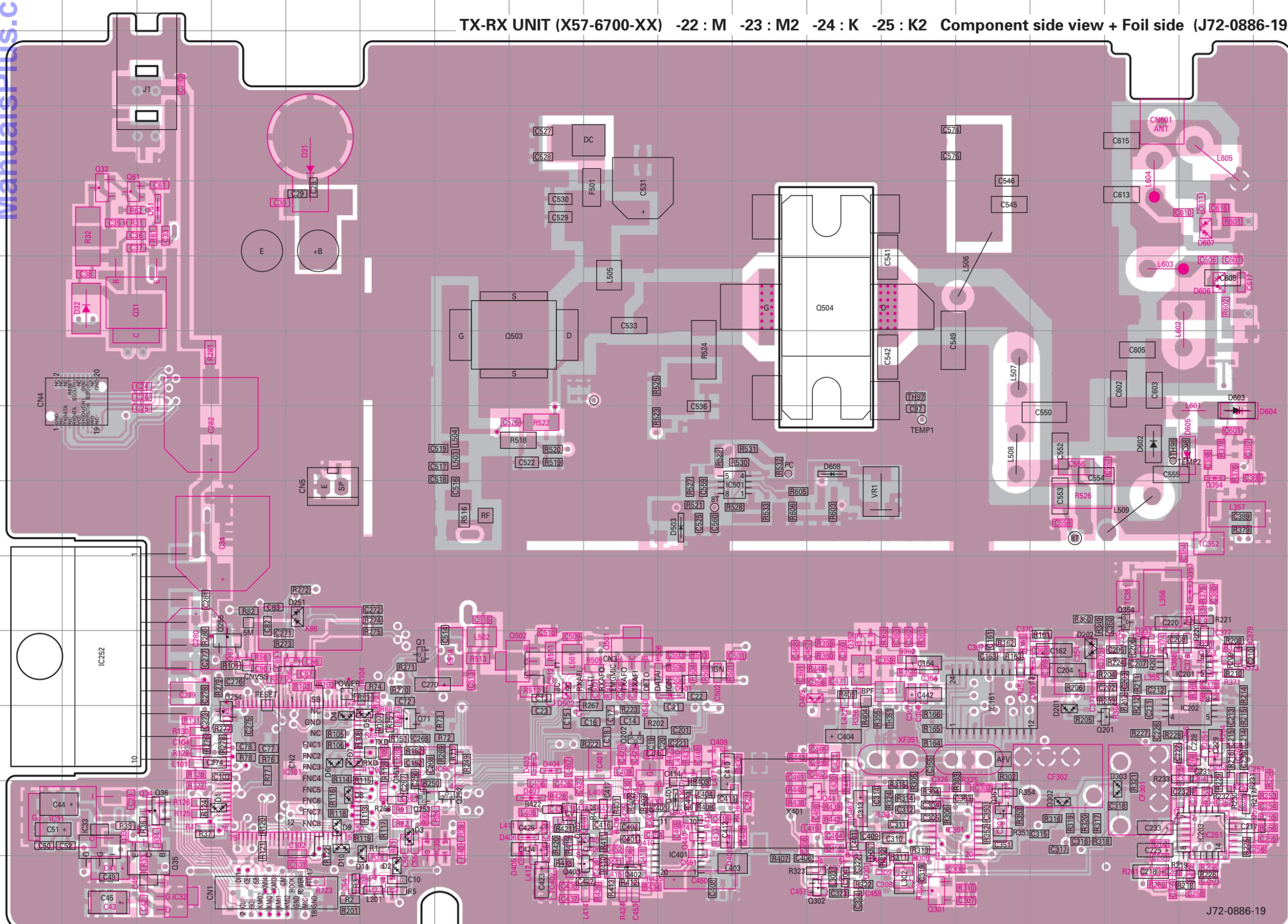


J72-0886-19

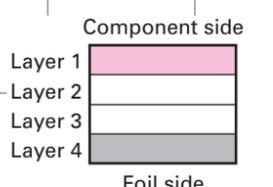


# TK-7102H PC BOARD

TX-RX UNIT (X57-6700-XX) -22 : M -23 : M2 -24 : K -25 : K2 Component side view + Foil side (J72-0886-19)



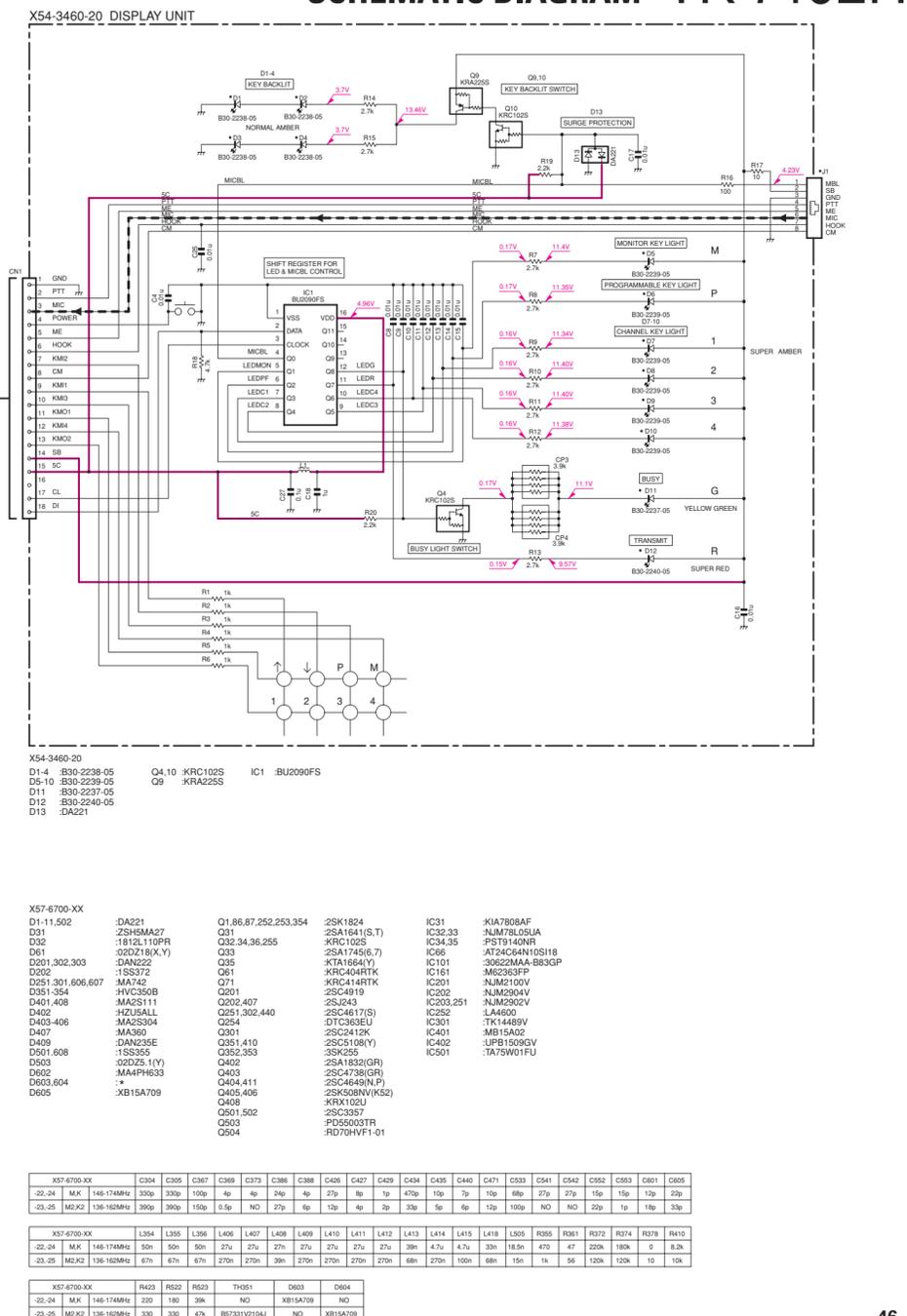
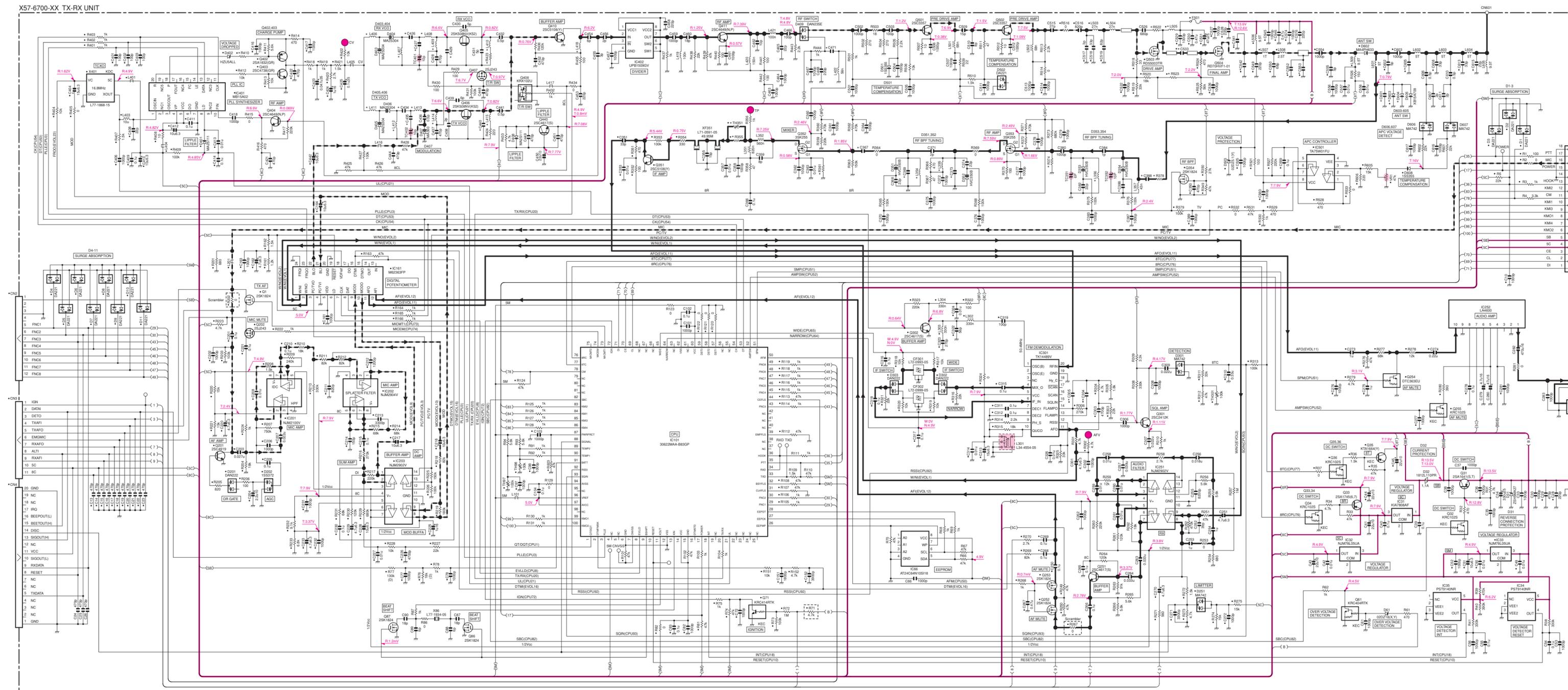
Ref. No.	Address	Ref. No.	Address
IC31	12B	Q411	12L
IC32	13C	Q440	12J
IC33	12B	Q501	10I
IC34	13F	Q502	10H
IC35	12G	Q503	6H
IC66	11G	Q504	5L
IC101	11E	D1	12D
IC161	10N	D2	13F
IC201	10Q	D3	12F
IC202	11Q	D4	11E
IC203	12Q	D5	11F
IC251	12Q	D6	11E
IC252	10B	D7	11E
IC301	12N	D8	12E
IC401	12J	D9	12E
IC402	13L	D10	12E
IC501	8K	D11	12F
Q1	10F	D31	3E
Q31	5B	D32	5B
Q32	4B	D61	4C
Q33	12C	D201	11O
Q34	12C	D202	10O
Q35	13C	D251	9E
Q36	12C	D301	13L
Q61	4B	D302	12O
Q71	11F	D303	12P
Q86	10E	D351	10O
Q87	10D	D352	10P
Q201	11P	D353	9Q
Q202	11I	D354	7Q
Q251	11Q	D401	12J
Q252	12G	D402	13I
Q253	12F	D403	11H
Q254	11D	D404	11H
Q255	10D	D405	12H
Q301	13M	D406	12H
Q302	13L	D407	12H
Q351	12N	D408	12J
Q352	10L	D409	10L
Q353	10Q	D501	10J
Q354	9P	D502	10H
Q402	12I	D503	8J
Q403	13I	D602	7P
Q404	12J	D603	7Q
Q405	11I	D604	7Q
Q406	13H	D605	7Q
Q407	11J	D606	5Q
Q408	11J	D607	4Q
Q410	12I	D608	7L



● Connect 1 and 4

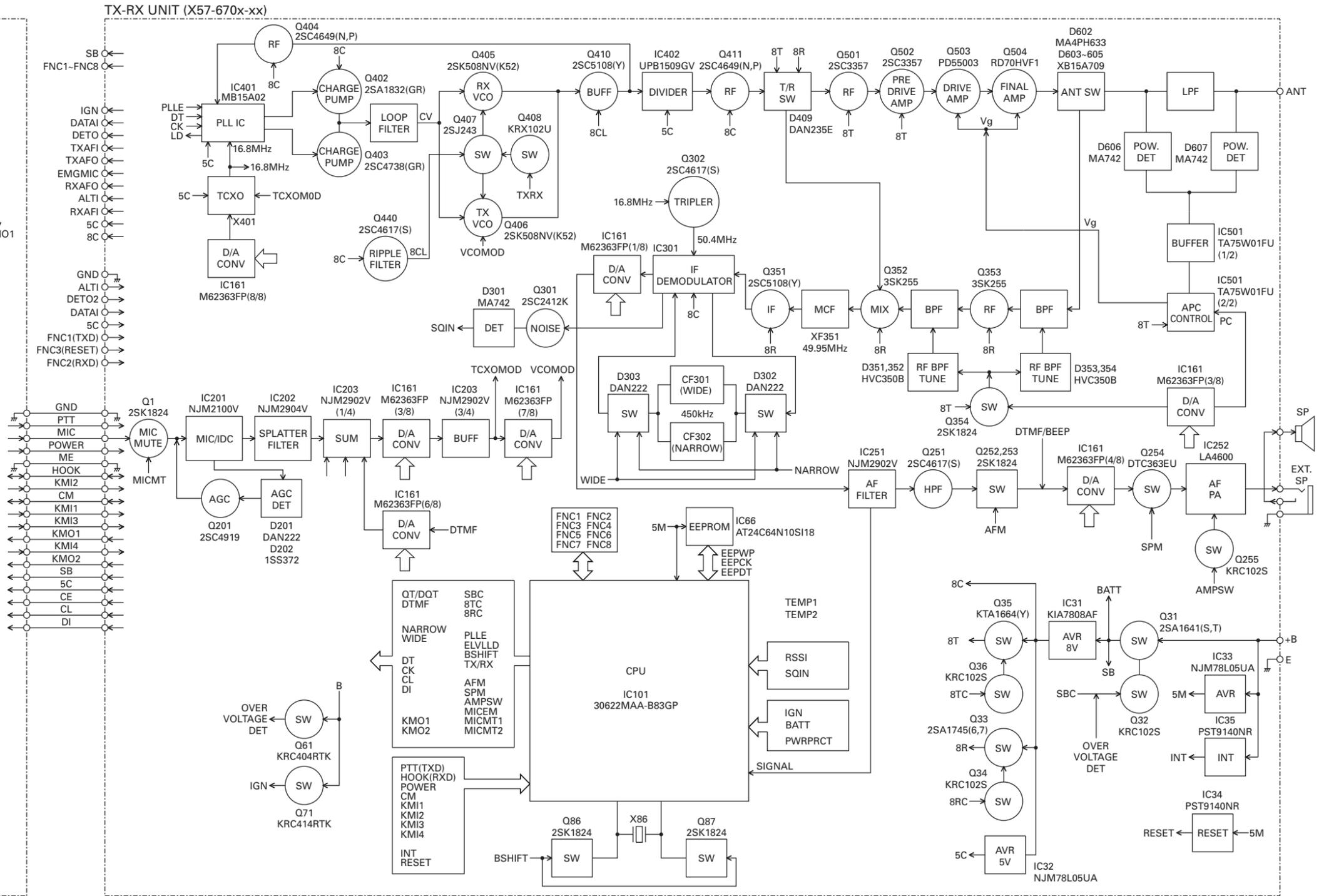
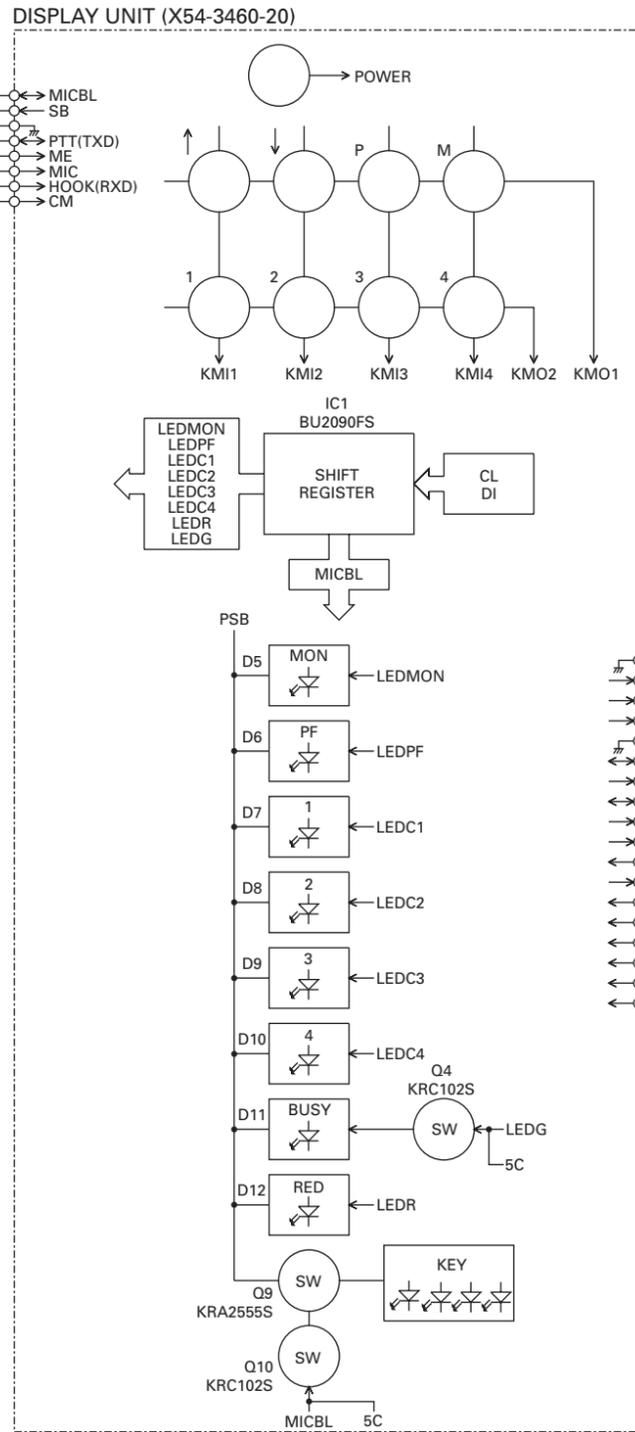
Note : The components marked with a dot (•) are parts of layer 1.

# SCHEMATIC DIAGRAM TK-7102H



# TK-7102H TK-7102H

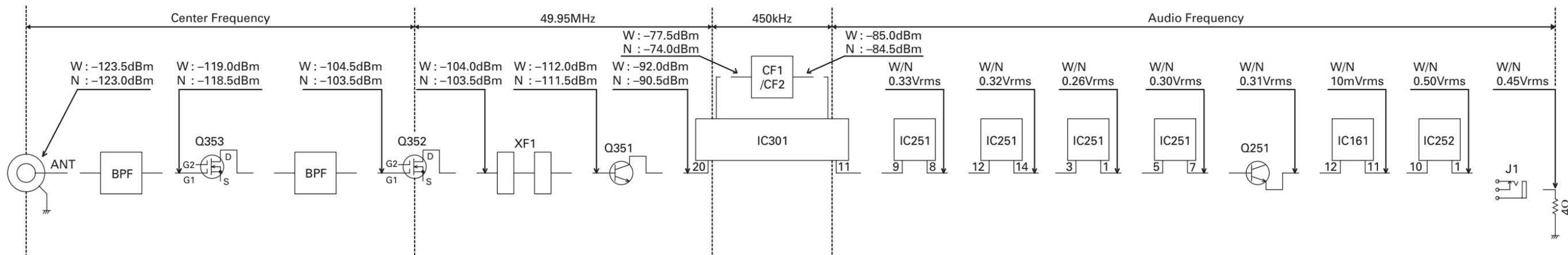
## BLOCK DIAGRAM



# TK-7102H TK-7102H

## LEVEL DIAGRAM

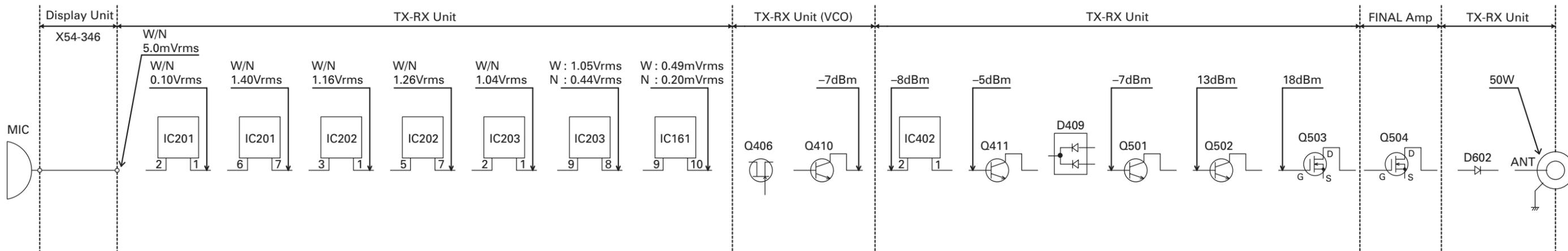
### Receiver Section



To make measurements in the RF section, connect the RF level meter.  
In the RF section, use a 0.01μF coupling capacitor.  
(The display shows the SSG input value required to obtain 12dB SINAD.)

To make measurements in the AF section, connect the AC level meter.  
(ANT input : -53dBm, 1kHz FM, 3kHz DEV (Wide)/1.5kHz DEV (Narrow))  
The AF output level is adjusted for a 0.45V/4Ω by the front panel AF VOL control.

### Transmitter Section



To make measurements in the AF section, connect the AC level meter.  
AG is set so that MIC input becomes 3kHz/1.5kHz (Wide/Narrow) DEV at 1kHz MOD.

To make measurements in the RF section, connect the RF Wattmeter (50Ω).

# SPECIFICATIONS

## GENERAL

Frequency Range .....	K,M : 146 to 174MHz	K2,M2 : 136 to 162MHz
Channels / Groups .....	4 channels	
Channel Spacing .....	Wide : 25kHz	Narrow : 12.5kHz
PLL Channel Stepping .....	2.5, 5, 6.25, 7.5kHz	
Operating Voltage .....	13.6V DC $\pm$ 15%	
Current Drain .....	Less than 0.4A on standby	
	Less than 1.0A on receive	
	Less than 14.0A on transmit	
Operating Temperature Range .....	-30°C to +60°C	
Dimensions & Weight .....	6.30 (160) W x 1.70 (43) H x 5.40 (137) D inch (mm), 2.60 lbs (1.18kg)	
Channel Frequency Spread .....	28MHz	

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

Sensitivity (12dB SINAD) .....	Wide : 0.28 $\mu$ V	Narrow : 0.35 $\mu$ V
Selectivity .....	Wide : 75dB	Narrow : 65dB
Intermodulation .....	Wide : 70dB	Narrow : 60dB
Spurious Response .....	75dB	
Audio Power Output .....	4.0W	
Frequency Stability .....	$\pm$ 2.5ppm	

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

RF Power Output .....	High : 50W	Low : 25W
Spurious and Harmonics .....	70dB	
Modulation .....	Wide : 16K0F3E	Narrow : 11K0F3E
FM Noise .....	Wide : 45dB	Narrow : 40dB
Audio Distortion .....	Less than 3%	
Frequency Stability .....	$\pm$ 2.5ppm	

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