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## GENERAL

### INTRODUCTION

#### SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of 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 CONSIDERNATIONS

#### 1. UNPACKING

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

#### 2. LICENSING REQUIREMENTS

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

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

### 3. PRE-INSTALLATION CHECKOUT

#### 3-1. Introduction

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

#### 3-2. Testing

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

### 5. INSTALLATION PLANNING – CONTROL STATIONS

#### 5-1. Antenna system

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

#### 5-2. Radio location

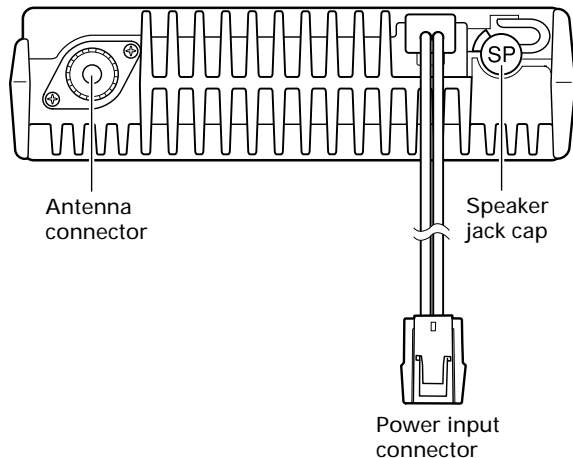
Select a convenient location for your control station radio which is as close as practical to the antenna cable entry point. Secondly, use your system's power supply (which supplies the voltage and current required for your system). Make sure sufficient air can flow around the radio and power supply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

### SERVICE

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

### NOTE

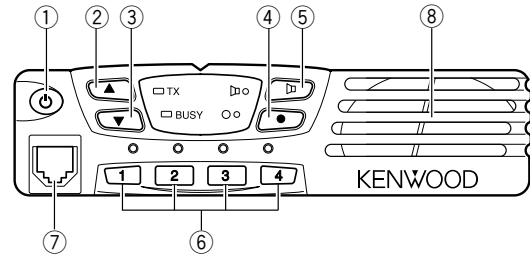
If you do not intend to use the 3.5-mm jack for the external speaker, fit the supplied speaker-jack cap to stop dust and sand getting in.



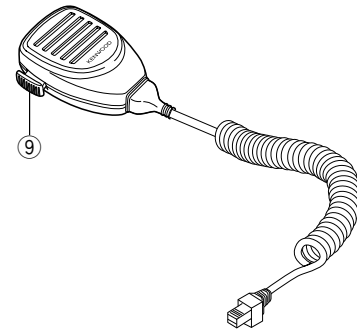
### OPERATING FEATURES

#### 1. Controls and Functions

##### 1-1. Front Panel



##### 1-2. Microphone



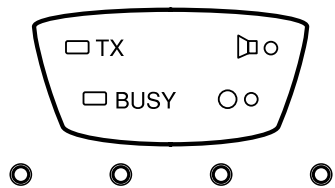
- ① **⏻** (Power) switch  
Press to switch the transceiver ON. Press and hold for approximately 1 seconds to switch the transceiver OFF.
- ② **▲** key  
Press to increase the volume level.
- ③ **▼** key  
Press to decrease the volume level.
- ④ **●** key  
PF (Programmable Function) key. The default 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
- Key Lock
- Monitor
- None (no function)
- Scan On/OFF
- Talk Around
- Temporary Delete

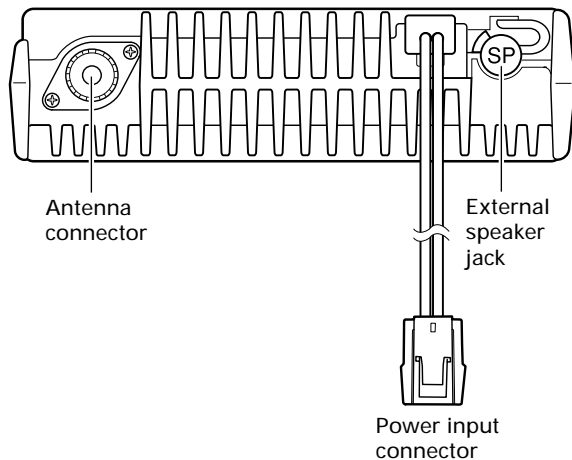
## OPERATING FEATURES

### 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



## 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
- **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 receives for 5\* seconds. The transceiver Mute\* the speaker while receiving. Following the above sequence, the transceiver continues to transmit and receive.

\* Default value.

## OPERATING FEATURES

- **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.

### 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 re-start 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 to be sent with every time PTT (beginning of transmission, end of transmission, or both).

You can program PTT ID "on" or "off" for each channel. The contents of ID are programmed each Radio.

The timing that the transceiver sends ID is programmable.

BOT : DTMF ID (Beginning of TX) is sent on beginning of transmission.

EOT : DTMF ID (End of TX) is sent on end of transmission.

Both : DTMF ID (Beginning of TX) is sent on beginning of transmission and DTMF ID (End of TX) is sent on end of transmission.

## OPERATING FEATURES

### ■ 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.

### ■ 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	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.

# OPERATING FEATURES / REALIGNMENT

## ■ 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

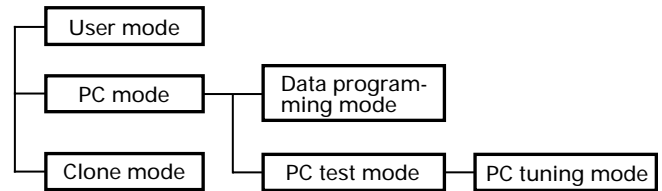
Sounds prior to the TOT TX inhibit activation. If TOT pre alert is set, the tone sounds at the amount of time programmed, before the TOT expires (TOT time – TOT pre alert time = Pre alert tone sounding time). You can select yes or no for the optional feature's warning tone.

## ■ 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.

## REALIGNMENT

### 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.

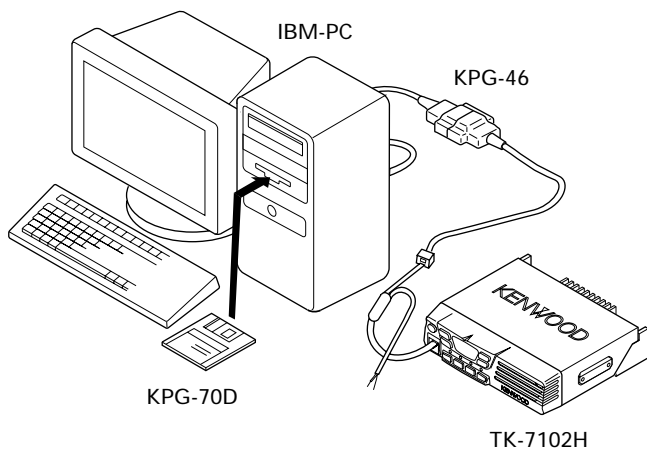


Fig. 1

### 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.

## 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 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.

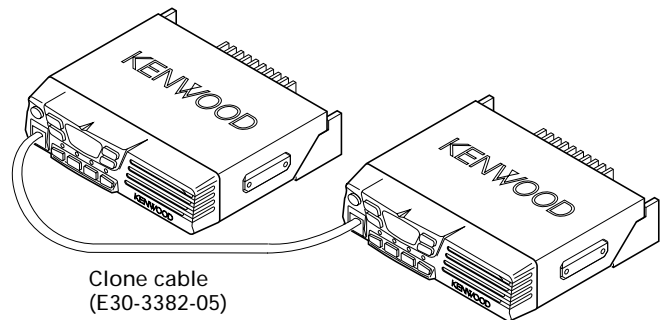
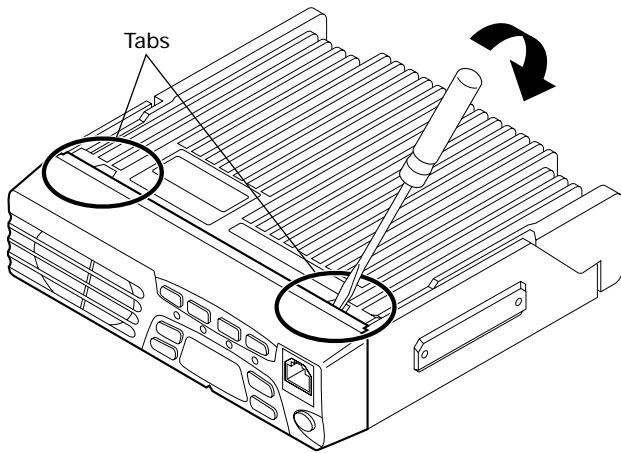


Fig. 2



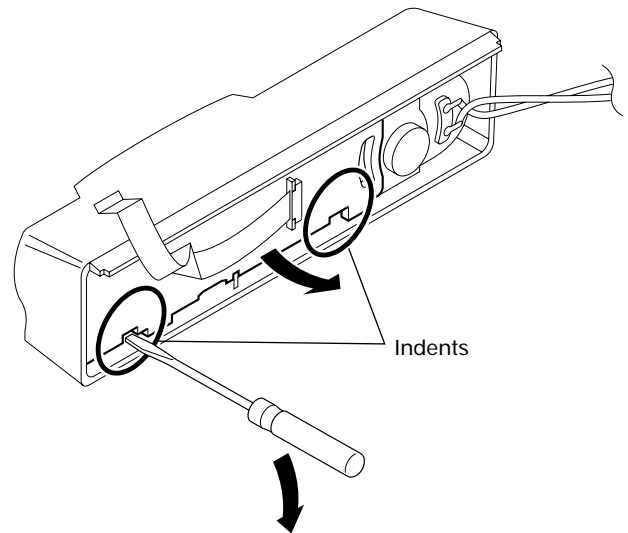
## DISASSEMBLY FOR REPAIR

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



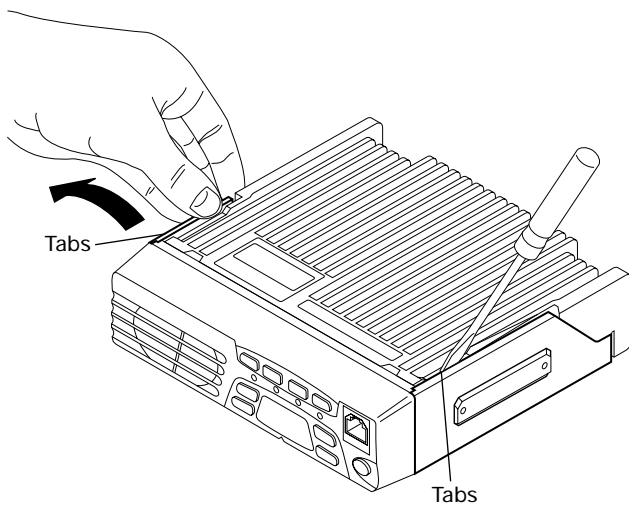
**Fig. 1**

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



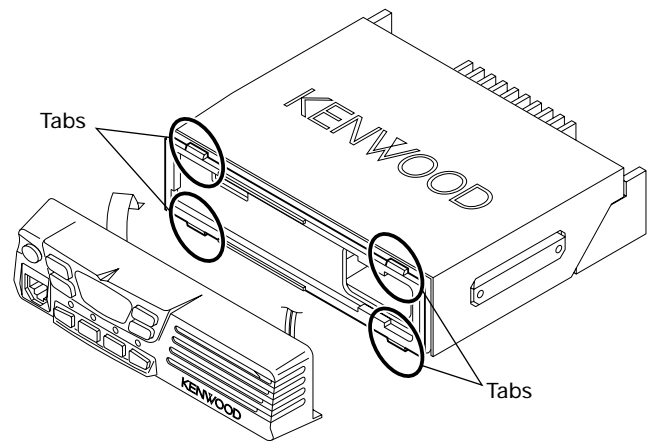
**Fig. 3**

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



**Fig. 2**

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



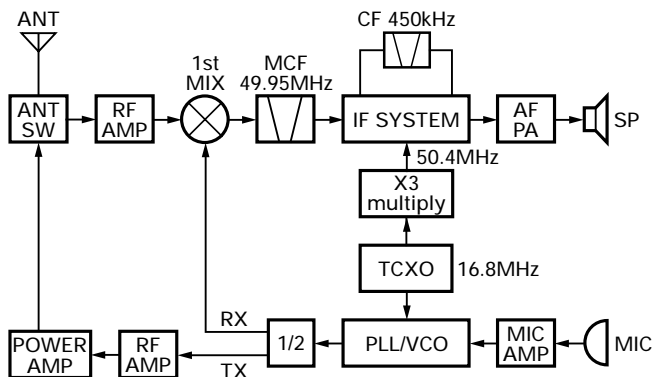
**Fig. 4**

## 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 (Q26) after passing through a transmit/receive switch circuit (D804 is off) and a band pass filter (L36, L38 and varactor diodes: D25, D26). After the signal is amplified (Q26), the signal is filtered through a band pass filter (L30, L32 and varactor diodes: D21, D22) to eliminate unwanted signals before it is passed to the first mixer.

The voltage of these diodes are controlled by tracking the CPU (IC6) 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 (Q21) to create a 49.95MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through two monolithic crystal filters (MCFs : XF1) to further remove spurious signals.

#### ■ IF Amplifier

The first IF signal is amplified by Q19, and the enters IC5 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within IC5 to create a 450kHz second IF signal. The second IF signal is then fed through a 450kHz ceramic filter (Wide : CF1, Narrow : CF2) to further eliminate unwanted signals before it is amplified and FM detected in IC5.

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) : XF1**

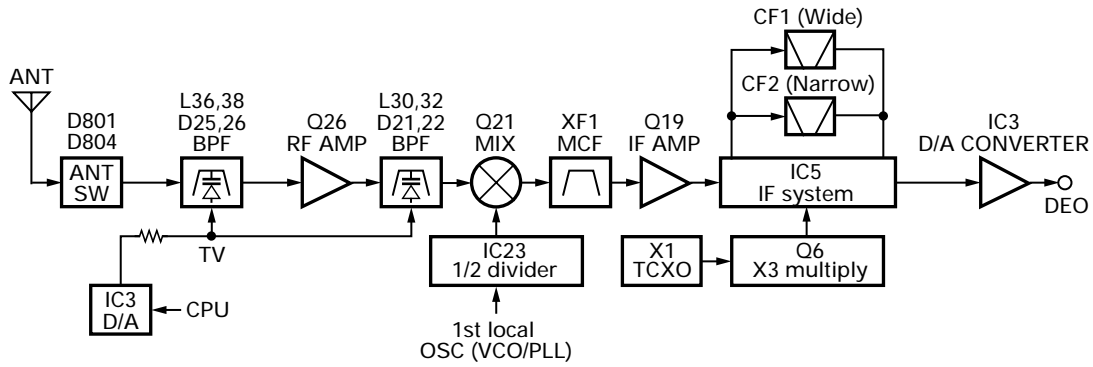
Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	±6.0kHz or more
50dB bandwidth	±12.5kHz or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	35.0dB or more within fo±100kHz
Terminal impedance	2.0kΩ

**Table 2 Ceramic filter (L72-0993-05) : CF1**

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) : CF2**

## CIRCUIT DESCRIPTION

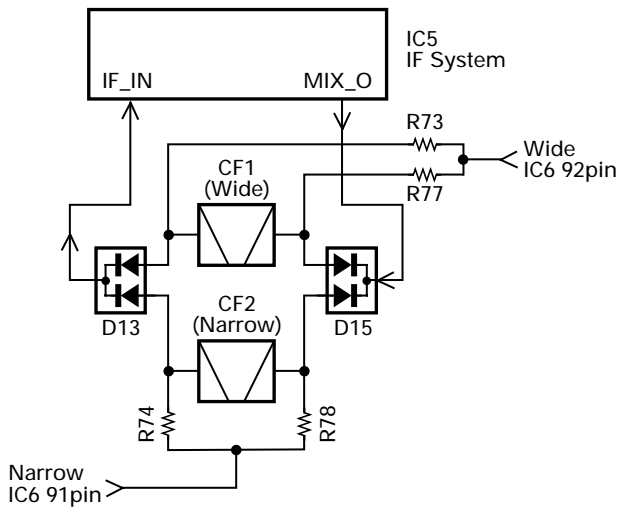


**Fig. 2 Receiver system**

### Wide/Narrow Changeover Circuit

The Wide port (pin 92) and Narrow port (pin 91) of the CPU is used to switch between ceramic filters. When the Wide port is high, the ceramic filter SW diodes (D13, D15) cause CF1 to turn on to receive a Wide signal.

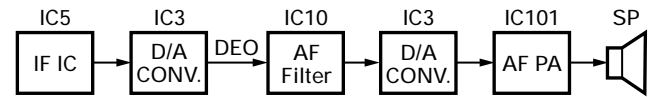
When the Narrow port is high, the ceramic filter SW diodes (D13, D15) cause CF2 to turn on to receive a Narrow signal.



**Fig. 3 Wide/Narrow changeover circuit**

### AF Signal System

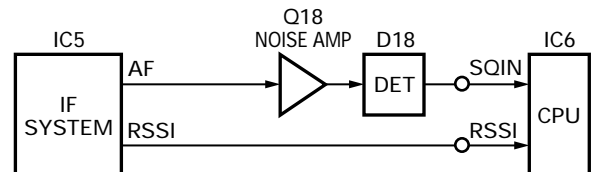
The detection signal from IF IC (IC5) goes to D/A converter (IC3) to adjust the gain and is output to AF filter (IC10) for characterizing the signal. The AF signal output from IC10 and the DTMF signal, BEEP signal are summed and the resulting signal goes to the D/A converter (IC3). The AFO output level is adjusted by the D/A converter. The signal output from the D/A converter is input to the audio power amplifier (IC101). The AF signal from IC101 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 (IC5) passes through a noise amplifier (Q18) to detect noise. A voltage is applied to the CPU (IC6). The CPU controls squelch according to the voltage (SQIN) level. The signal from the RSSI pin of IC5 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**

## CIRCUIT DESCRIPTION

### 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 IC1 by a fixed counter to produce the 5 or 6.25kHz reference frequency. The voltage controlled oscillator (VCO) output signal is buffer amplified by Q15, then divided in IC1 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 IC1. 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 Q11 in transmit mode and Q10 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D10 and D12 in transmit mode and D9 and D11 in receive mode). The TX/RX pin is set low in receive mode causing Q12 and Q7 to turn Q11 off, and turn Q10 on. The TX/RX pin is set high in transmit mode. The outputs from Q10 and Q11 are amplified by Q15 and sent to the RF amplifiers.

#### ■ Unlock Circuit

During reception, the 8RC signal goes high, the 8TC signal goes low, and Q29 turns on. Q31 turns on and a voltage is applied to the collector (8R). During transmission, the 8RC signal goes low, the 8TC signal goes high and Q30 turns on. Q33 turns on and a voltage is applied to 8T.

The CPU in the control unit monitors the PLL (IC1) 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.

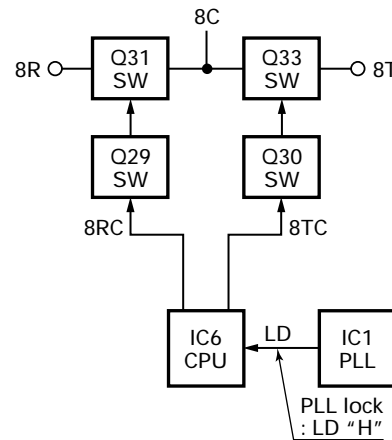


Fig. 7 Unlock circuit

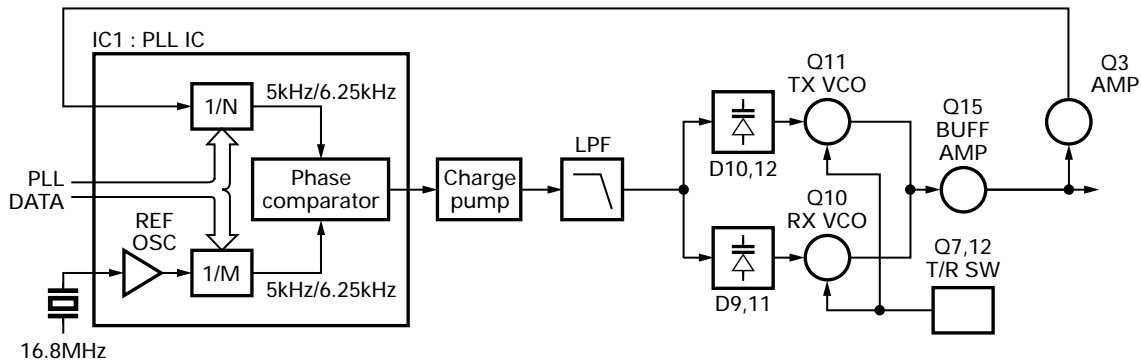


Fig. 6 PLL circuit

## CIRCUIT DESCRIPTION

### 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 (D19) and amplified by Q23, Q25 and Q800. The amplified signal goes to the final amplifier (Q101) 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 (D805, D806) and applies a voltage to IC800. IC800 compares the APC control voltage (PC) generated by the D/A converter (IC3) and DC amplifier (IC4) with the detection output voltage. IC800 generates the voltage to control Q800 and Q101 and stabilizes transmission output.

The APC circuit is configured to protect over current of Q800 and Q101 due to fluctuations of the load at the antenna end and to stabilize transmission output at voltage and temperature variations.

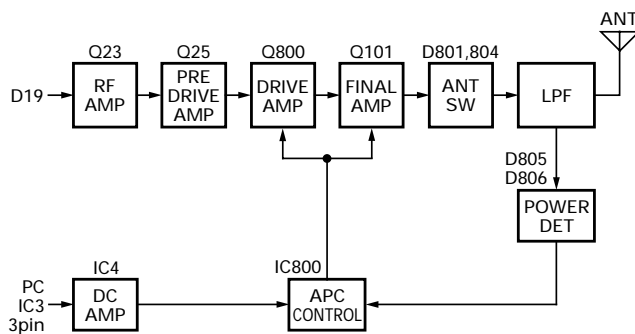


Fig. 9 APC circuit

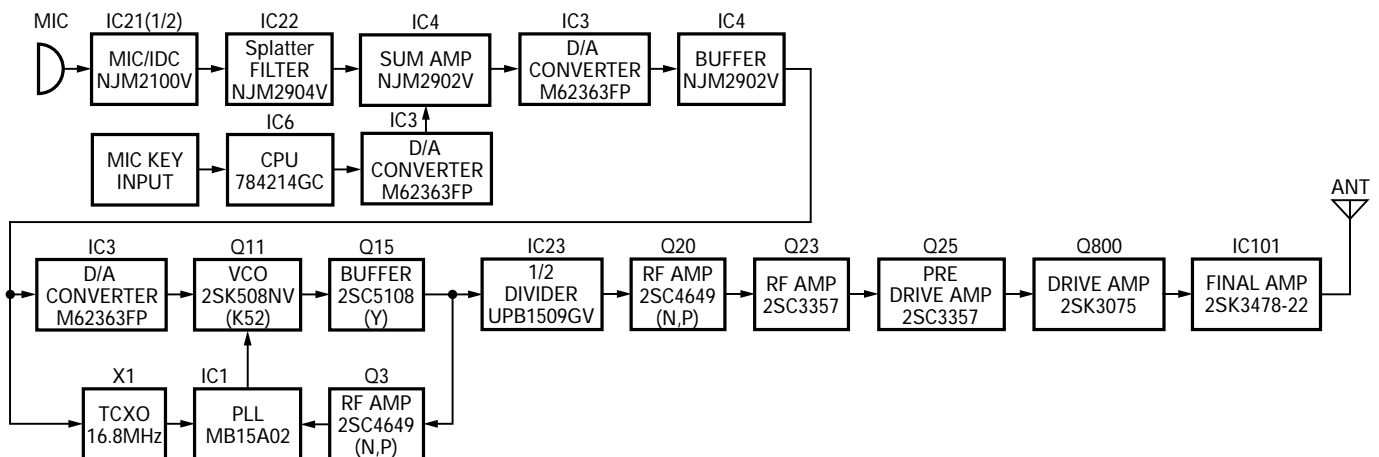


Fig. 8 Transmitter system

### 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 (IC10) and turns the filter select compounder on or off.
- 3) Controls the DTMF decoder (IC9).
- 4) Controls the display unit.
- 5) Controls the PLL (IC1).
- 6) Controls the D/A converter (IC3) and adjusts the volume, modulation and transmission power.

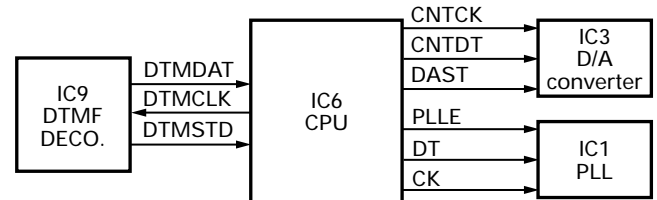


Fig. 10 Control circuit

### ■ Memory Circuit

The transceiver has an 8k-bit EEPROM (IC7). The EEPROM contains adjustment data. The CPU (IC6) controls the EEPROM through three serial data lines.

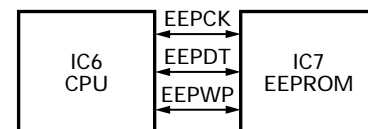


Fig. 11 Memory circuit

## CIRCUIT DESCRIPTION

### ■ Display Circuit

The CPU (IC6) controls the display LEDs. When the transceiver is busy, the LEDG line goes high, Q4 turns on and the green LED (D11) lights. In transmit mode, the LEDR line goes high, Q8 turns on and the red LED (D12) lights. Backlit LEDs (D1~D4) are provided.

When a function key (MON, PF, C1, C2, C3 or C4) is selected, its respective line goes high (LED MON, LED PF, LED C1, LED C2, LED C3 or LED C4), the switch connected to that line turns on and the amber LED lights.

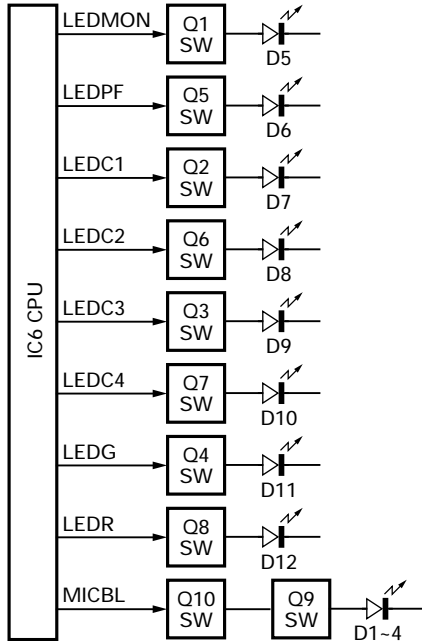


Fig. 12 Display circuit

### ■ 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.

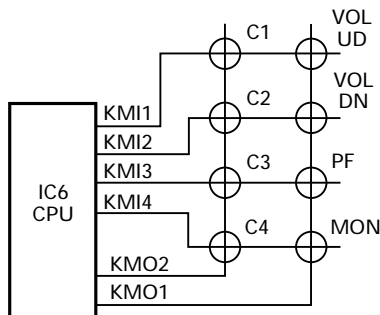


Fig. 13 Key matrix circuit

### ■ Encode

The QT and DQT signals are output from QT/DQT of the CPU (IC6) and summed with the external pin DI line by the summing amplifier (IC4) and the resulting signal goes to the D/A converter (IC3). The DTMF signal is output from DTMF of the CPU and goes to the D/A converter (IC3). The signal is summed with a MIC signal by the summing amplifier (IC4), and the resulting signal goes to the D/A converter (IC3).

The D/A converter (IC3) 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.

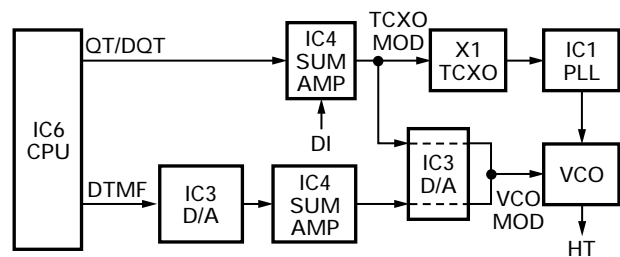


Fig. 14 Encode

### ■ Decode

#### • QT/DQT/DTMF

The signal (DEO) passes through two low-pass filters of IC11, goes to QTIN of the CPU (IC6) to decode QT, DQT. The DTMF signal is decoded by a dedicated IC (IC9) and the resulting signal is sent to the CPU (IC6) as serial data.

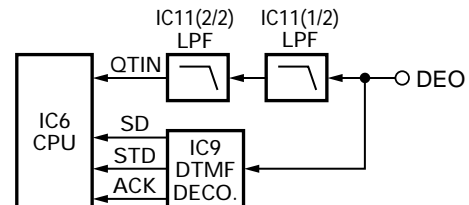


Fig. 15 Decode

### ■ D/A Converter

The D/A converter (IC3) 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

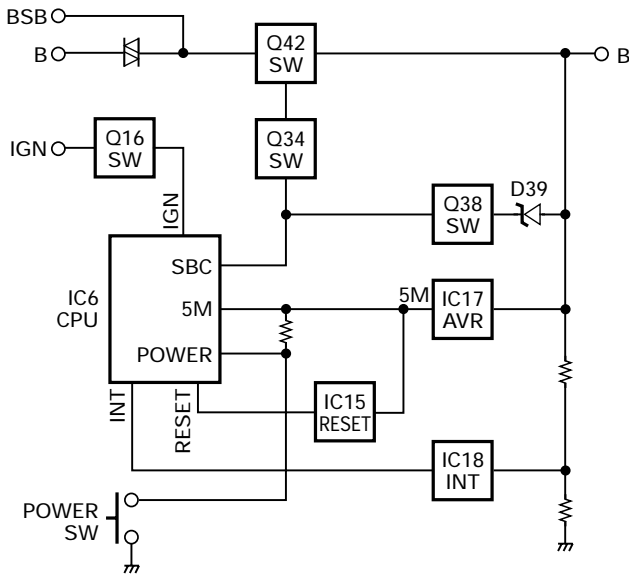
$n$ : Serial data value from the microprocessor (CPU)

## CIRCUIT DESCRIPTION / SEMICONDUCTOR DATA

### Power Supply Circuit

When the POWER switch on the display unit is pressed, the power port on the display unit which is connected to CPU port 18 (POWER), goes low, then CPU port 93 (SBC) goes high, Q34 turns on, SB SW (Q42) turns on and power (SB and BSB) are supplied to the radio.

This circuit has an overvoltage protection circuit. If a DC voltage of 18 V or higher is applied to the power cable, D39 turns on and a voltage is applied to the base of Q38. This voltage turns Q38 on and turns Q34, BSB and SB off.



**Fig. 16 Power supply circuit**

### SEMICONDUCTOR DATA

#### Microprocessor : 784214AGCXXX (TX-RX Unit IC6)

##### Terminal function

Pin No.	Name	I/O	Function
1	NC	I	
2	DTMOSC	O	DTMF IC Clock Control
3	PLLE	O	PLL IC Chip Select
4	EVLLD	O	E-Volume LD
5	DTMCK	O	DTMF Dec IC Clock
6	DTMDT	I/O	DTMF Dec IC Data
7	UL	O	Unlock Detect
8	BSHIFT	O	Clock Shift
9	VDD	-	
10	X2	-	X'TAL (7.3728MHz)
11	X1	-	X'TAL (7.3728MHz)
12	VSS	-	GND
13	NC	-	OPEN
14	NC	-	GND
15	RESET	-	CPU RESET
16	INT	I	μCOM Stop
17	DMTSDT	I	DTMF Dec IC STD
18	POWER	I	Power Key Input
19	IGN	I	Ignition
20	TX/RX	O	TX/RX
21	LEDMON	O	LED for MON Key
22	LEDPF	O	LED for PF Key
23	AVDD	-	+5V
24	AVREF	-	+5V
25	QTIN	I	QT/DQT Input
26	SQIN	I	Squelch Input
27	RSSI	I	RSSI Input
28	PWRPRCT	I	Power Protect
29	BATT	I	Battery Voltage
30	TEMP1	I	Temperature 1
31	TEMP2	I	Temperature 2
32	TEMP3	I	Temperature 3
33	AVSS	-	GND
34	DTM/BEEP	O	DTMF/Beep Output
35	QT/DQT	O	QT/DQT Output

## SEMICONDUCTOR DATA

Pin No.	Name	I/O	Function
36	AVREF	-	+5V
37	FNC1	I/O	Function Port 1
38	FNC2	I/O	Function Port 2
39	HOOK	I	Hook
40	RXD	I	From FPU
41	TXD	O	To FPU
42	PTT	I	PTT Key
43	FNC3	I/O	Function Port 3
44	FNC4	I/O	Function Port 4
45	FNC5	I/O	Function Port 5
46	FNC6	I/O	Function Port 6
47	FNC7	I/O	Function Port 7
48	FNC8	I/O	Function Port 8
49	NC	I	
50	MUTE1	O	AF Mute
51	MUTE2	O	Speaker Mute
52	MUTE3	O	AF AMP SW
53	DT	O	Common Data
54	CK	O	Common Clock
55	NC	I	
56	EEPCK	O	EEPROM Clock
57	EEPDT	I/O	EEPROM Data
58	EEPWT	O	ROM (EEPROM) Write Protect
59	DST1	I	Destination 1
60	DST2	I	Destination 2
61	DST3	I	Destination 3 (Open)
62	NC	I	
63	24VDET	I	24V Detect
64	NC	I	

Pin No.	Name	I/O	Function
65	LEDC1	O	LED for CH1 Key
66	LEDC2	O	LED for CH2 Key
67	LEDR	O	TX LED
68	LEDG	O	Busy LED
69	MICBL	O	Mic Back Light
70	LEDC3	O	LED for CH3 Key
71	LEDC4	O	LED for CH4 Key
72	VSS	-	GND
73	MICMT	O	Mic1 Mute
74	MICEM	O	Mic2 Mute
75	NC	I	
76	8RC	O	8R Control
77	8TC	O	8T Control
78	CM	I/O	Mic Key Check
79,80	NC	I	
81	VDD5M	-	+5V
82-85	NC	I	
86	KMI1	I	Key Matrix Input 1
87	KMI2	I	Key Matrix Input 2
88	KMI3	I	Key Matrix Input 3
89	KMI4	I	Key Matrix Input 4
90	NC	I	
91	NARROW	O	Wide / Narrow 2
92	WIDE	O	Wide / Narrow
93	SBC	O	Battery Switch
94	FLASH	-	Flash Write Port
95-98	NC	I	
99	KMO1	O	Key Matrix Output 1
100	KMO2	O	Key Matrix Output 2



## DESCRIPTION OF COMPONENTS

## Display Unit (X54-3340-20)

Ref. No.	Parts Name	Description
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
Q1	Transistor	Monitor key light switch
Q2,3	Transistor	Channel key light switch
Q4	Transistor	Busy light switch
Q5	Transistor	Programmable key light switch
Q6,7	Transistor	Channel key light switch
Q8	Transistor	Transmit light switch
Q9,10	Transistor	Key backlit switch

## TX-RX Unit (X57-6380-20)

Ref. No.	Parts Name	Description
D1	Diode	Surge absorption / PTT
D2	Diode	Surge absorption / HOOK
D3	Diode	Surge absorption / MICBL
D4	Diode	Surge absorption / CM
D6	Diode	DC switch
D7	Diode	Voltage dropped
D9	Varicap	RX VCO
D10	Varicap	TX VCO
D11	Varicap	RX VCO
D12	Varicap	TX VCO
D13	Diode	IF switch (Wide/Narrow)
D14	Varicap	Modulation
D15	Diode	IF switch (Wide/Narrow)
D16	Diode	Lipple filter
D18	Diode	Detection
D19	Diode	RF switch (TX/RX)
D20	Diode	Temperature compensation
D21,22	Varicap	RF BPF tuning
D23	Diode	Temperature compensation
D24	Diode	Limiter
D25,26	Varicap	RF BPF tuning

Ref. No.	Parts Name	Description
D38	Diode	Reverse connect protection
D39	Diode	Over voltage detection
D41	Poly switch	Current protection
D43	Diode	OR gate /MIC mute, AGC
D44	Diode	AGC
D800	Diode	Voltage protection
D801	Diode	ANT switch
D804	Diode	ANT switch
D805,806	Diode	APC voltage detect
D807	Diode	Temperature compensation
Q2	FET	Emergency MIC mute / Active while MICEM is H
Q3	Transistor	RF amplifier / PLL F in
Q4,5	Transistor	Charge pump
Q6	Transistor	Buffer amplifier / 16.8MHz 3rd over tone
Q7	FET	T/R switch
Q10	FET	RX VCO
Q11	FET	TX VCO
Q12	Transistor	T/R switch
Q13	Transistor	Beat shift / Active while beat shift is on
Q14	Transistor	Lipple filter
Q15	Transistor	Buffer amplifier / Output of VCO
Q16	Transistor	Ignition / Ignition sens.
Q18	Transistor	Noise amplifier
Q19	Transistor	IF amplifier
Q20	Transistor	RF amplifier / Output of VCO
Q21	FET	Mixer
Q22	FET	AF mute / Active while MUTE1 is H
Q23	Transistor	RF amplifier / Drive stage
Q24	Transistor	Buffer amplifier / RX audio
Q25	Transistor	RF amplifier / Drive stage
Q26	FET	RF amplifier / LNA
Q29	Transistor	DC switch (8R) / Active while RX
Q30	Transistor	DC switch (8T) / Active while TX

## DESCRIPTION OF COMPONENTS

Ref. No.	Parts Name	Description
Q31	Transistor	DC switch (8R) / Active while RX
Q32	Transistor	AF mute / Active while MUTE2 is H
Q33	Transistor	DC switch (8T) / Active while TX
Q34	Transistor	DC switch (SB) / Active when power on
Q35	Transistor	AF mute / Active while MUTE3 is H
Q37	Transistor	Beat shift / Active while beat shift is on
Q38	Transistor	Over voltage detection / Active while PS voltage is more than 18V
Q41	Transistor	MIC mute / Emergency MIC mute
Q42	Transistor	DC switch (SB) / Active when power on
Q43	FET	AF mute / Active while MUTE1 is H
Q101	FET	RF amplifier / Final amplifier
Q800	FET	RF amplifier / Drive amplifier

Ref. No.	Parts Name	Description
IC1	IC	PLL synthesizer
IC3	IC	D/A converter
IC4	IC	Buffer amplifier / SUM amplifier / DC amplifier / 1/2Vcc
IC5	IC	IF demodulation
IC6	IC	CPU
IC7	IC	EEPROM
IC9	IC	DTMF decode
C10	IC	Audio filter
IC11	IC	Active filter (QT/DQT)
IC14	IC	Voltage regulator (5C)
IC15	IC	Voltage detector reset
IC17	IC	Voltage regulator (5M)
IC18	IC	Voltage detector INT
IC19	IC	Divider (7.159MHz)
IC20	IC	Voltage regulator (8C)
IC21	IC	MIC amplifier / IDC
IC22	IC	Splatter filter
IC23	IC	Divider (Hetero)
IC101	IC	AF power amplifier
IC800	IC	APC control

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

**TK-7102H**  
**DISPLAY UNIT (X54-3340-20)**  
**TX-RX UNIT (X57-6380-20)**

Ref. No.	Address	New parts	Parts No.	Description	Destination
<b>TK-7102H</b>					
1	1B	*	A01-2181-01	CABINET	
2	3B	*	A10-4048-11	CHASSIS	
3	3A	*	A62-0942-03	PANEL ASSY	
5	3A	*	B10-2668-03	FRONT GLASS	
6	1D	*	B62-1596-00	INSTRUCTION MANUAL (ENGLISH)	
7	1D	*	B62-1597-00	INSTRUCTION MANUAL (SPANISH)	
8	3B	*	B72-2036-04	MODEL NAME PLATE	K
8	3B	*	B72-2038-04	MODEL NAME PLATE	M
13	3B		E04-0167-05	RF COAXIAL RECEPTACLE (M)	
14	3C		E30-3339-05	DC CORD      ACCESSORY	
15	2B	*	E30-3448-05	DC CORD (RADIO)	
16	2A	*	E37-0961-05	FLAT CABLE	
17	3A	*	E37-0962-05	SPEAKER CABLE	
-		*	E37-1035-05	JUMPER WIRE (TX-RX UNIT)	
20	3B	*	F01-1024-14	HEAT CONDUCTOR CUBE (DRIVE FET)	
21	2B	*	F10-2421-01	SHIELDING COVER (UPPER)	
22	3C		F51-0017-05	FUSE (6*30)      ACCESSORY	
-		*	G10-1274-04	FIBROUS SHEET (PANEL ASSY)	
26	2B,3B	*	G11-4127-14	RUBBER SHEET	
27	3B	*	G13-1468-04	CUSHION (DC CORD)	
28	3A	*	G13-1836-04	CUSHION (SPEAKER)	
29	3B	*	G53-1525-03	PACKING (PANEL)	
30	2B	*	G53-1542-03	PACKING (PHONE JACK)	
31	1B	*	G53-1544-01	PACKING (CABINET)	
34	2C,1D	*	H12-3112-05	PACKING FIXTURE	
35	2C	*	H13-1190-02	CARTON BOARD	
36	1D	*	H25-2341-04	PROTECTION BAG	
37	2D	*	H52-1829-12	ITEM CARTON CASE	
39	3C		J19-1584-05	MIC HOLDER      ACCESSORY	K
40	3D		J29-0662-03	BRACKET      ACCESSORY	
42	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	
44	3C		N99-0395-05	SCREW SET	
46	3A	*	T07-0739-05	SPEAKER	
47	2C		T91-0624-05	MICROPHONE      ACCESSORY	K
<b>DISPLAY UNIT (X54-3340-20)</b>					
D1-4		*	B30-2238-05	LED (Y)	
D5-10		*	B30-2239-05	LED (SY)	
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			CC73GCH1H101J	CHIP C      100PF      J	
C19			CK73GB1H102K	CHIP C      1000PF      K	
Ref. No.	Address	New parts	Parts No.	Description	Destination
<b>TX-RX UNIT (X57-6380-20)</b>					
CN1		*	E40-6170-05	FLAT CABLE CONNECTOR	
J1			E08-0877-05	MODULAR JACK	
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	
Q1-8			KRC102S	DIGITAL TRANSISTOR	
Q9			KRA225S	DIGITAL TRANSISTOR	
Q10			KRC102S	DIGITAL TRANSISTOR	
<b>TX-RX UNIT (X57-6380-20)</b>					
C12			CK73GB1H102K	CHIP C      1000PF      K	
C14			C92-0560-05	CHIP-TAN      10UF      6.3VW	
C22			CK73GB1H102K	CHIP C      1000PF      K	
C24			CK73GB1H103K	CHIP C      0.010UF      K	
C25			CC73GCH1H220J	CHIP C      22PF      J	
C26			CK73GB1C104K	CHIP C      0.10UF      K	
C27			C92-0560-05	CHIP-TAN      10UF      6.3VW	
C28			CK73GB1H102K	CHIP C      1000PF      K	
C29,30			CK73GB1C104K	CHIP C      0.10UF      K	
C31,32			C92-0507-05	CHIP-TAN      4.7UF      6.3VW	
C34			CK73GB1C104K	CHIP C      0.10UF      K	
C35			C92-0560-05	CHIP-TAN      10UF      6.3VW	
C36			CK73GB1H103K	CHIP C      0.010UF      K	
C37			CK73GB1C104K	CHIP C      0.10UF      K	
C40			C92-0514-05	CHIP-TAN      2.2UF      10WV	
C42			CK73GB1H102K	CHIP C      1000PF      K	
C44			CK73GB1C273K	CHIP C      0.027UF      K	
C45			CK73GB1H102K	CHIP C      1000PF      K	
C48			CK73GB1H102K	CHIP C      1000PF      K	
C49			CK73GB1H471K	CHIP C      470PF      K	
C50			CK73GB1C223K	CHIP C      0.022UF      K	
C51			CK73GB1C104K	CHIP C      0.10UF      K	
C52			C92-0507-05	CHIP-TAN      4.7UF      6.3VW	
C53			CK73GB1C104K	CHIP C      0.10UF      K	
C54			C92-0560-05	CHIP-TAN      10UF      6.3VW	
C55			CK73GB1H102K	CHIP C      1000PF      K	
C56			C92-0555-05	CHIP-TAN      0.047UF      35WV	
C58			CK73GB1H122K	CHIP C      1200PF      K	
C59			CK73GB1E103K	CHIP C      0.010UF      K	
C60			C92-0004-05	CHIP-TAN      1.0UF      16WV	
C61			CK73GB1H821K	CHIP C      820PF      K	
C62			CK73GB1H332K	CHIP C      3300PF      K	
C63			CK73GB1H472K	CHIP C      4700PF      K	
C64			C92-0560-05	CHIP-TAN      10UF      6.3VW	
C65			C92-0001-05	CHIP C      0.1UF      35WV	
C66			CC73GCH1H151J	CHIP C      150PF      J	
C71			CK73GB1C104K	CHIP C      0.10UF      K	
C73			CC73GCH1H080B	CHIP C      8.0PF      B	
C74			CC73GCH1H270J	CHIP C      27PF      J	
C75			CC73GCH1H100C	CHIP C      10PF      C	
C77			CC73GCH1H0R5B	CHIP C      0.5PF      B	
C78,79			CK73GB1H471K	CHIP C      470PF      K	
C80			CK73GB1H103K	CHIP C      0.010UF      K	

## PARTS LIST

### TX-RX UNIT (X57-6380-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C81			CC73GCH1H271J	CHIP C 270PF J		C176			CK73GB1H102K	CHIP C 1000PF K	
C82			CK73GB1H471K	CHIP C 470PF K		C177			CC73GCH1H220J	CHIP C 22PF J	
C84			CK73GB1C104K	CHIP C 0.10UF K		C178			CK73GB1C104K	CHIP C 0.10UF K	
C85			CC73GCH1H010B	CHIP C 1.0PF B		C179			CK73GB1H102K	CHIP C 1000PF K	
C86			CC73GCH1H2R5B	CHIP C 2.5PF B		C180			CK73GB1H103J	CHIP C 0.010UF J	
C87			CC73GCH1H560J	CHIP C 56PF J		C182			CK73GB1C104K	CHIP C 0.10UF K	
C88			CK73GB1C104K	CHIP C 0.10UF K		C184			CK73GB1H102K	CHIP C 1000PF K	
C90			CK73GB1H471K	CHIP C 470PF K		C185			CK73GB1H103J	CHIP C 0.010UF J	
C94			CC73GCH1H011J	CHIP C 100PF J		C186			CC73GCH1H020B	CHIP C 2.0PF B	
C95			CC73GCH1H050B	CHIP C 5.0PF B		C187,188			CK73GB1H102K	CHIP C 1000PF K	
C97			CC73GCH1H060B	CHIP C 6.0PF B		C191			CK73GB1C473K	CHIP C 0.047UF K	
C99,100			CC73GCH1H050B	CHIP C 5.0PF B		C192,193			CK73GB1H103J	CHIP C 0.010UF J	
C101			CK73GB1H471K	CHIP C 470PF K		C194			CK73GB1H102K	CHIP C 1000PF K	
C102			CK73GB1C104K	CHIP C 0.10UF K		C196			CK73GB1C333K	CHIP C 0.033UF K	
C103			C92-0568-05	CHIP-TAN 22UF 10WV		C197			CK73GB1H102K	CHIP C 1000PF K	
C104,105			CC73GCH1H0R5B	CHIP C 0.5PF B		C198			CK73GB1C333K	CHIP C 0.033UF K	
C106			CC73GCH1H180J	CHIP C 18PF J		C199			CC73GCH1H080B	CHIP C 8.0PF B	
C107			CC73GCH1H060B	CHIP C 6.0PF B		C200,201			CK73GB1H102K	CHIP C 1000PF K	
C108,109			CK73GB1H471K	CHIP C 470PF K		C202			CC73GCH1H220J	CHIP C 22PF J	
C110			CC73GCH1H060B	CHIP C 6.0PF B		C206			CC73GCH1H040B	CHIP C 4.0PF B	
C111,112			CC73GCH1H331J	CHIP C 330PF J		C207			CC73GCH1H221J	CHIP C 220PF J	
C113			CK73GB1H102K	CHIP C 1000PF K		C208			CK73GB1H103K	CHIP C 0.010UF K	
C114			CK73GB1C104K	CHIP C 0.10UF K		C209,210			CK73GB1H102K	CHIP C 1000PF K	
C115			CC73GCH1H060B	CHIP C 6.0PF B		C211			CK73GB1E183K	CHIP C 0.018UF K	
C116,117			CK73GB1C104K	CHIP C 0.10UF K		C212			CK73GB1H822K	CHIP C 8200PF K	
C118			CC73GCH1H030B	CHIP C 3.0PF B		C213			CK73GB1H102K	CHIP C 1000PF K	
C119			CK73GB1H103K	CHIP C 0.010UF K		C214			CK73GB1C683K	CHIP C 0.068UF K	
C120			CK73GB1H472K	CHIP C 4700PF K		C216			CC73GCH1H270J	CHIP C 27PF J	
C121			CC73GCH1H020B	CHIP C 2.0PF B		C217			CK73FB1A105K	CHIP C 1.0UF K	
C122			CK73GB1H102K	CHIP C 1000PF K		C218			CK73GB1C104K	CHIP C 0.10UF K	
C123			C92-0662-05	CHIP-TAN 15UF 6.3WV		C220			CK73GB1C473K	CHIP C 0.047UF K	
C125,126			CK73GB1H102K	CHIP C 1000PF K		C221			CK73GB1H102K	CHIP C 1000PF K	
C127			CK73GB1H103K	CHIP C 0.010UF K		C222			CK73GB1E123K	CHIP C 0.012UF K	
C128			CK73GB1H102K	CHIP C 1000PF K		C223			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C129			CK73GB1C104K	CHIP C 0.10UF K		C225			CK73GB1H222K	CHIP C 2200PF K	
C133			CK73GB1H102K	CHIP C 1000PF K		C226			CK73GB1C683K	CHIP C 0.068UF K	
C135			CK73GB1H103K	CHIP C 0.010UF K		C228			CK73GB1H102K	CHIP C 1000PF K	
C136			CK73GB1H102K	CHIP C 1000PF K		C236			CC73GCH1H220J	CHIP C 22PF J	
C138			CC73GCH1H330J	CHIP C 33PF J		C239			CK73GB1H102K	CHIP C 1000PF K	
C141			CC73GCH1H180J	CHIP C 18PF J		C244			CC73GCH1H010B	CHIP C 1.0PF B	
C142			CK73GB1E223K	CHIP C 0.022UF K		C247			CC73GCH1H240J	CHIP C 24PF J	
C143			CK73GB1H102K	CHIP C 1000PF K		C251			CK73GB1H102K	CHIP C 1000PF K	
C144			CK73GB1H392K	CHIP C 3900PF K		C262		*	C92-0795-05	CHIP-TAN 22UF 10WV	
C146			CK73GB1H102K	CHIP C 1000PF K		C265		*	C92-0795-05	CHIP-TAN 22UF 10WV	
C147			CK73GB1E223K	CHIP C 0.022UF K		C268		*	C92-0795-05	CHIP-TAN 22UF 10WV	
C150			CC73GCH1H150J	CHIP C 15PF J		C273			CC73GCH1H040B	CHIP C 4.0PF B	
C152			CC73GCH1H100C	CHIP C 10PF C		C274			CK73GB1H103K	CHIP C 0.010UF K	
C154			CK73GB1H102K	CHIP C 1000PF K		C275			CK73GB1C104K	CHIP C 0.10UF K	
C155			CK73GB1H103K	CHIP C 0.010UF K		C277			CK73FB1A105K	CHIP C 1.0UF K	
C157			CK73GB1H102K	CHIP C 1000PF K		C279			CK73GB1H102K	CHIP C 1000PF K	
C158			CC73GCH1H220J	CHIP C 22PF J		C280		*	C92-0795-05	CHIP-TAN 22UF 10WV	
C160			CK73FB1C334K	CHIP C 0.33UF K		C283			CK73GB1H102K	CHIP C 1000PF K	
C162			CC73GCH1H101J	CHIP C 100PF J		C284			CK73FB1C224K	CHIP C 0.22UF K	
C163			CC73GCH1H080B	CHIP C 8.0PF B		C286			CK73GB1C104K	CHIP C 0.10UF K	
C165			CK73GB1H103K	CHIP C 0.010UF K		C288			C92-0721-05	ELECTRO 330UF 25WV	
C167			CC73GCH1H100C	CHIP C 10PF C		C290			CK73GB1H102K	CHIP C 1000PF K	
C168			CK73GB1H103K	CHIP C 0.010UF K		C295			CK73GB1H102K	CHIP C 1000PF K	
C169-171			CK73GB1H102K	CHIP C 1000PF K		C298,299			CK73GB1H102K	CHIP C 1000PF K	
C173			CK73GB1C104K	CHIP C 0.10UF K		C302			C92-0040-05	CHIP-ELE 47UF 16WV	
C174			CC73GCH1H101J	CHIP C 100PF J		C304			CK73GB1H102K	CHIP C 1000PF K	

## PARTS LIST

TX-RX UNIT (X57-6380-20)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C307			CK73GB1H102K	CHIP C 1000PF K		C835			C93-0603-05	CHIP C 1000PF 500WV	
C308			C92-0560-05	CHIP-TAN 10UF 6.3WV		C836			CK73GB1H103K	CHIP C 0.010UF K	
C310			CK73GB1H103K	CHIP C 0.010UF K		C837			CC73GCH1H120J	CHIP C 12PF J	
C314			CK73GB1C104K	CHIP C 0.10UF K		C838			C93-0603-05	CHIP C 1000PF 500WV	
C316			C92-0516-05	CHIP-TAN 4.7UF 16WV		C839			C93-0565-05	CHIP C 27PF 500WV	
C318			CK73GB1H102K	CHIP C 1000PF K		C840			CC73GCH1H0R5B	CHIP C 0.5PF B	
C320			C92-0722-05	ELECTRO 470UF 16WV		C841			CC73GCH1H020B	CHIP C 2.0PF B	
C326-328			CK73GB1H102K	CHIP C 1000PF K		C843			C93-0566-05	CHIP C 33PF 500WV	
C329			CK73GB1H103K	CHIP C 0.010UF K		C844			CK73GB1H102K	CHIP C 1000PF K	
C330-332			CC73GCH1H101J	CHIP C 100PF J		C846			CC73GCH1H0R5B	CHIP C 0.5PF B	
C333			CK73GB1H102K	CHIP C 1000PF K		C847			CC73GCH1H020B	CHIP C 2.0PF B	
C334			CC73GCH1H180J	CHIP C 18PF J		C849			C93-0566-05	CHIP C 33PF 500WV	
C335,336			CK73GB1C104K	CHIP C 0.10UF K		C850			CK73GB1H102K	CHIP C 1000PF K	
C337			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C852			C93-0564-05	CHIP C 22PF 500WV	
C338			CK73GB1C104K	CHIP C 0.10UF K		C853			CK73FB1C474K	CHIP C 0.47UF K	
C340			C92-0560-05	CHIP-TAN 10UF 6.3WV		C854			CC73GCH1H030B	CHIP C 3.0PF B	
C341			CK73GB1H102K	CHIP C 1000PF K		C855,856			C93-0555-05	CHIP C 5.0PF 500WV	
C342			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		TC1-3			C05-0245-05	CERAMIC TRIMMER CAP (10PF)	
C344-353			CK73GB1H102K	CHIP C 1000PF K		TC5		*	C05-0399-05	CERAMIC TRIMMER CAP (6PF)	
C355			CK73GB1C104K	CHIP C 0.10UF K		CN1			E40-5651-05	FLAT CABLE CONNECTOR	
C358			CK73GB1H102K	CHIP C 1000PF K		CN5			E40-3246-05	PIN ASSY	
C365,366			CK73GB1H102K	CHIP C 1000PF K		CN800			E23-0486-05	TERMINAL	
C367			CC73GCH1H101J	CHIP C 100PF J		J1			E11-0425-05	3.5D PHONE JACK	
C371,372			CK73GB1H471K	CHIP C 470PF K		CF1		*	L72-0993-05	CERAMIC FILTER	
C374			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		CF2		*	L72-0999-05	CERAMIC FILTER	
C375			CK73GB1C104K	CHIP C 0.10UF K		L1			L92-0140-05	FERRITE CHIP	
C376			CK73GB1H102K	CHIP C 1000PF K		L2		*	L41-1005-08	SMALL FIXED INDUCTOR	
C377			C92-0004-05	CHIP-TAN 1.0UF 16WV		L3			L92-0138-05	FERRITE CHIP	
C378			CK73GB1H102K	CHIP C 1000PF K		L4			L92-0140-05	FERRITE CHIP	
C379			CK73GB1C104K	CHIP C 0.10UF K		L5,6			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C508			CK73GB1H102K	CHIP C 1000PF K		L7			L92-0140-05	FERRITE CHIP	
C511			CK73GB1H102K	CHIP C 1000PF K		L8			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C512,513			CC73GCH1H101J	CHIP C 100PF J		L9			L40-2778-67	SMALL FIXED INDUCTOR (27NH)	
C514			CC73GCH1H150J	CHIP C 15PF J		L10			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C515			CC73GCH1H040B	CHIP C 4.0PF B		L11			L40-3978-67	SMALL FIXED INDUCTOR (39NH)	
C518			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		L12			L40-3381-86	SMALL FIXED INDUCTOR (0.33UH)	
C523			CK73GB1H102K	CHIP C 1000PF K		L13			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C524			CK73GB1H392K	CHIP C 3900PF K		L14			L40-3381-86	SMALL FIXED INDUCTOR (0.33UH)	
C525			CK73FB1A105K	CHIP C 1.0UF K		L15			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C526,527			CK73GB1H102K	CHIP C 1000PF K		L16			L92-0140-05	FERRITE CHIP	
C800			CK73GB1H821K	CHIP C 820PF K		L17		*	L41-3385-08	SMALL FIXED INDUCTOR	
C802			CC73GCH1H330J	CHIP C 33PF J		L18			L92-0140-05	FERRITE CHIP	
C803			CC73GCH1H820J	CHIP C 82PF J		L19,20			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C804			CK73GB1H102K	CHIP C 1000PF K		L21		*	L41-3375-06	SMALL FIXED INDUCTOR	
C805			CK73FB1H102K	CHIP C 1000PF K		L22			L34-4554-05	COIL	
C807			CK73GB1H102K	CHIP C 1000PF K		L23			L92-0140-05	FERRITE CHIP	
C808			CK73GB1H681K	CHIP C 680PF K		L24		*	L41-1585-06	SMALL FIXED INDUCTOR	
C809			CK73GB1C104K	CHIP C 0.10UF K		L25		*	L41-1085-06	SMALL FIXED INDUCTOR	
C811			CK73FB1H102K	CHIP C 1000PF K		L26		*	L41-8285-08	SMALL FIXED INDUCTOR	
C812			C93-0573-05	CHIP C 120PF 500WV		L27		*	L41-5685-08	SMALL FIXED INDUCTOR	
C815			C92-0719-05	ELECTRO 47UF 25WV		L30			L34-4612-05	AIR-CORE COIL	
C821			CK73FB1H102K	CHIP C 1000PF K		L31		*	L41-6875-08	SMALL FIXED INDUCTOR	
C824			CM73F2H181J	CHIP C 180PF J		L32			L34-4612-05	AIR-CORE COIL	
C827			C93-0603-05	CHIP C 1000PF 500WV		L33		*	L41-6875-08	SMALL FIXED INDUCTOR	
C828			CM73F2H680J	CHIP C 68PF J		L36		*	L34-4612-05	AIR-CORE COIL	
C829			CK73FB1C474K	CHIP C 0.47UF K		L38		*	L34-4611-05	AIR-CORE COIL	
C831			C93-0560-05	CHIP C 10PF 500WV		L52		*	L41-5675-06	SMALL FIXED INDUCTOR	
C832			C93-0603-05	CHIP C 1000PF 500WV		L54		*	L41-1085-06	SMALL FIXED INDUCTOR	
C833			C93-0562-05	CHIP C 15PF 500WV		L55			L92-0140-05	FERRITE CHIP	
C834			CK73GB1H103K	CHIP C 0.010UF K							

## PARTS LIST

### TX-RX UNIT (X57-6380-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L800,801		*	L41-2775-06	SMALL FIXED INDUCTOR		R60			RK73GB1J103J	CHIP R 10K J 1/16W	
L802			L34-4608-05	AIR-CORE COIL		R61			RK73GB1J473J	CHIP R 47K J 1/16W	
L803		*	L34-4692-05	AIR-CORE COIL		R62,63			RK73GB1J104J	CHIP R 100K J 1/16W	
L804		*	L34-4667-05	AIR-CORE COIL		R64			RK73GB1J154J	CHIP R 150K J 1/16W	
L805		*	L34-4668-05	AIR-CORE COIL		R67			RK73GB1J223J	CHIP R 22K J 1/16W	
L806-808		*	L34-4670-05	AIR-CORE COIL		R70			RK73GB1J473J	CHIP R 47K J 1/16W	
L809		*	L34-4667-05	AIR-CORE COIL		R72			RK73GB1J224J	CHIP R 220K J 1/16W	
L810		*	L34-4705-05	AIR-CORE COIL		R73,74			RK73GB1J103J	CHIP R 10K J 1/16W	
L811		*	L34-4693-05	AIR-CORE COIL		R76			RK73GB1J101J	CHIP R 100 J 1/16W	
X1		*	L77-1868-15	TCXO (16.8MHZ)		R77,78			RK73GB1J103J	CHIP R 10K J 1/16W	
X2		*	L77-1867-05	CRYSTAL RESONATOR (7.159MHZ)		R80-85			RK73GB1J102J	CHIP R 1.0K J 1/16W	
XF1		*	L71-0591-05	MCF (49.95MHZ)		R86			RK73GB1J101J	CHIP R 100 J 1/16W	
R1			RK73GB1J332J	CHIP R 3.3K J 1/16W		R87			RK73GB1J223J	CHIP R 22K J 1/16W	
R2			RK73GB1J102J	CHIP R 1.0K J 1/16W		R88			RK73GB1J101J	CHIP R 100 J 1/16W	
R3			R92-1252-05	CHIP R 0 OHM J 1/16W		R89			RK73GB1J104J	CHIP R 100K J 1/16W	
R4,5			RK73GB1J101J	CHIP R 100 J 1/16W		R94			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R6,7			R92-1252-05	CHIP R 0 OHM J 1/16W		R97			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R10,11			RK73GB1J102J	CHIP R 1.0K J 1/16W		R98,99			RK73GB1J221J	CHIP R 220 J 1/16W	
R12			RK73GB1J152J	CHIP R 1.5K J 1/16W		R100			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R13			RK73GB1J102J	CHIP R 1.0K J 1/16W		R101			RK73GB1J124J	CHIP R 120K J 1/16W	
R15			RK73GB1J100J	CHIP R 10 J 1/16W		R102			RK73GB1J223J	CHIP R 22K J 1/16W	
R18			RK73GB1J913J	CHIP R 91K J 1/16W		R103			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R19			RK73GB1J683J	CHIP R 68K J 1/16W		R104			R92-1252-05	CHIP R 0 OHM J 1/16W	
R20			RK73GB1J104J	CHIP R 100K J 1/16W		R106			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R21			RK73GB1J152J	CHIP R 1.5K J 1/16W		R107			RK73GB1J101J	CHIP R 100 J 1/16W	
R22			RK73GB1J122J	CHIP R 1.2K J 1/16W		R108			RK73GB1J274J	CHIP R 270K J 1/16W	
R23			RK73GB1J102J	CHIP R 1.0K J 1/16W		R109			R92-1252-05	CHIP R 0 OHM J 1/16W	
R24			RK73GB1J754J	CHIP R 750K J 1/16W		R111			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R26,27			RK73GH1J153D	CHIP R 15K D 1/16W		R113			RK73GB1J183J	CHIP R 18K J 1/16W	
R28			R92-1252-05	CHIP R 0 OHM J 1/16W		R114			R92-1252-05	CHIP R 0 OHM J 1/16W	
R30			RK73GB1J152J	CHIP R 1.5K J 1/16W		R115			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R31			RK73GB1J244J	CHIP R 240K J 1/16W		R117			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R32			R92-1252-05	CHIP R 0 OHM J 1/16W		R118			RK73GB1J473J	CHIP R 47K J 1/16W	
R33			RK73GB1J102J	CHIP R 1.0K J 1/16W		R119			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R34			RK73GB1J562J	CHIP R 5.6K J 1/16W		R120			RK73GB1J473J	CHIP R 47K J 1/16W	
R36			RK73GB1J471J	CHIP R 470 J 1/16W		R122,123			RK73GB1J473J	CHIP R 47K J 1/16W	
R37			RK73GB1J153J	CHIP R 15K J 1/16W		R124			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R38			RK73GB1J562J	CHIP R 5.6K J 1/16W		R126			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R39			RK73GB1J103J	CHIP R 10K J 1/16W		R127			RK73GB1J104J	CHIP R 100K J 1/16W	
R40			RK73GB1J224J	CHIP R 220K J 1/16W		R128			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R41			RK73GB1J273J	CHIP R 27K J 1/16W		R130			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R42			RK73GB1J183J	CHIP R 18K J 1/16W		R132			RK73GB1J471J	CHIP R 470 J 1/16W	
R43			RK73GB1J273J	CHIP R 27K J 1/16W		R133			RK73GB1J101J	CHIP R 100 J 1/16W	
R44			R92-1252-05	CHIP R 0 OHM J 1/16W		R134			R92-1252-05	CHIP R 0 OHM J 1/16W	
R45			RK73GB1J334J	CHIP R 330K J 1/16W		R135-140			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R46			RK73GB1J681J	CHIP R 680 J 1/16W		R141			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R47			RK73GB1J563J	CHIP R 56K J 1/16W		R142-144			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R48			RK73GB1J154J	CHIP R 150K J 1/16W		R145			R92-1252-05	CHIP R 0 OHM J 1/16W	
R49			RK73GB1J823J	CHIP R 82K J 1/16W		R146			RK73GB1J334J	CHIP R 330K J 1/16W	
R50			RK73GB1J473J	CHIP R 47K J 1/16W		R147			RK73GB1J473J	CHIP R 47K J 1/16W	
R51			RK73GB1J102J	CHIP R 1.0K J 1/16W		R148			RK73GB1J223J	CHIP R 22K J 1/16W	
R52			RK73GB1J683J	CHIP R 68K J 1/16W		R149			RK73GB1J104J	CHIP R 100K J 1/16W	
R53			RK73GB1J823J	CHIP R 82K J 1/16W		R150			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R54			RK73GB1J103J	CHIP R 10K J 1/16W		R151			RK73GB1J103J	CHIP R 10K J 1/16W	
R55			RK73GB1J272J	CHIP R 2.7K J 1/16W		R152			RK73GB1J473J	CHIP R 47K J 1/16W	
R56			RK73GB1J152J	CHIP R 1.5K J 1/16W		R153			RK73GB1J331J	CHIP R 330 J 1/16W	
R57			RK73GB1J683J	CHIP R 68K J 1/16W		R154			RK73GB1J471J	CHIP R 470 J 1/16W	
R58			RK73GB1J473J	CHIP R 47K J 1/16W		R155			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R59			RK73GB1J223J	CHIP R 22K J 1/16W		R156			RK73GB1J101J	CHIP R 100 J 1/16W	
						R158			RK73GB1J102J	CHIP R 1.0K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-6380-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R159,160			RK73GB1J101J	CHIP R 100 J 1/16W		R242			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R161			RK73GB1J473J	CHIP R 47K J 1/16W		R245			RK73GB1J104J	CHIP R 100K J 1/16W	
R162			RK73GB1J102J	CHIP R 1.0K J 1/16W		R248			RK73GB1J473J	CHIP R 47K J 1/16W	
R163			RK73GB1J471J	CHIP R 470 J 1/16W		R252			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R164			RK73GB1J333J	CHIP R 33K J 1/16W		R255			RK73GB1J473J	CHIP R 47K J 1/16W	
R165			R92-1252-05	CHIP R 0 OHM J 1/16W		R258			RK73GB1J104J	CHIP R 100K J 1/16W	
R166			RK73GB1J102J	CHIP R 1.0K J 1/16W		R260			RK73GB1J473J	CHIP R 47K J 1/16W	
R167			RK73GB1J470J	CHIP R 47 J 1/16W		R261			RK73GB1J123J	CHIP R 12K J 1/16W	
R168			RK73GB1J183J	CHIP R 18K J 1/16W		R262			R92-1215-05	CHIP R 470 J 1/2W	
R169			RK73GB1J222J	CHIP R 2.2K J 1/16W		R264			RK73GB1J391J	CHIP R 390 J 1/16W	
R172			RK73GB1J102J	CHIP R 1.0K J 1/16W		R265			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R173			RK73GB1J104J	CHIP R 100K J 1/16W		R266			RK73GB1J334J	CHIP R 330K J 1/16W	
R174			RK73GB1J470J	CHIP R 47 J 1/16W		R268			R92-0670-05	CHIP R 0 OHM	
R175			RK73GB1J271J	CHIP R 270 J 1/16W		R271			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R176			RK73GB1J823J	CHIP R 82K J 1/16W		R272,273			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R177			RK73GB1J102J	CHIP R 1.0K J 1/16W		R274			RK73GB1J223J	CHIP R 22K J 1/16W	
R178			RK73GB1J180J	CHIP R 18 J 1/16W		R275			RK73GB1J333J	CHIP R 33K J 1/16W	
R179			RK73GB1J154J	CHIP R 150K J 1/16W		R276-278			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R180			RK73GB1J271J	CHIP R 270 J 1/16W		R279	*		RK73G1J393D	CHIP R 39K D 1/16W	
R181			RK73GB1J102J	CHIP R 1.0K J 1/16W		R280			RK73GH1J274D	CHIP R 270K D 1/16W	
R183			RK73GB1J222J	CHIP R 2.2K J 1/16W		R281			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R184			R92-1252-05	CHIP R 0 OHM J 1/16W		R282			RK73GB1J684J	CHIP R 680K J 1/16W	
R185			RK73GB1J103J	CHIP R 10K J 1/16W		R283			RK73GB1J184J	CHIP R 180K J 1/16W	
R186			RK73GB1J100J	CHIP R 10 J 1/16W		R285			RK73GB1J681J	CHIP R 680 J 1/16W	
R188			RK73GB1J104J	CHIP R 100K J 1/16W		R286			RK73GB1J124J	CHIP R 120K J 1/16W	
R189			RK73GH1J124D	CHIP R 120K D 1/16W		R287			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R190			RK73GB1J123J	CHIP R 12K J 1/16W		R288			R92-1252-05	CHIP R 0 OHM J 1/16W	
R191			RK73GH1J913D	CHIP R 91K D 1/16W		R301			RK73GB1J104J	CHIP R 100K J 1/16W	
R192			RK73GB1J562J	CHIP R 5.6K J 1/16W		R302			RK73GB1J683J	CHIP R 68K J 1/16W	
R193			RK73GB1J470J	CHIP R 47 J 1/16W		R303			RK73GB1J334J	CHIP R 330K J 1/16W	
R194			RK73GB1J153J	CHIP R 15K J 1/16W		R304			RK73GB1J224J	CHIP R 220K J 1/16W	
R195			RK73GH1J562D	CHIP R 5.6K D 1/16W		R305			RK73GB1J913J	CHIP R 91K J 1/16W	
R196			RK73GB1J471J	CHIP R 470 J 1/16W		R306			RK73GB1J224J	CHIP R 220K J 1/16W	
R198			RK73GB1J220J	CHIP R 22 J 1/16W		R307			RK73GB1J333J	CHIP R 33K J 1/16W	
R202			RK73GB1J332J	CHIP R 3.3K J 1/16W		R308			R92-1252-05	CHIP R 0 OHM J 1/16W	
R203			RK73FB2A470J	CHIP R 47 J 1/10W		R310			RK73GB1J104J	CHIP R 100K J 1/16W	
R204			RK73GB1J104J	CHIP R 100K J 1/16W		R311			RK73GB1J101J	CHIP R 100 J 1/16W	
R205			RK73FB2A100J	CHIP R 10 J 1/10W		R313			RK73GB1J821J	CHIP R 820 J 1/16W	
R206			R92-1252-05	CHIP R 0 OHM J 1/16W		R318			RK73FB2A222J	CHIP R 2.2K J 1/10W	
R207			RK73GB1J823J	CHIP R 82K J 1/16W		R319,320			RK73GB1J474J	CHIP R 470K J 1/16W	
R208			RK73GB1J151J	CHIP R 150 J 1/16W		R321			R92-1252-05	CHIP R 0 OHM J 1/16W	
R209			RK73GB1J394J	CHIP R 390K J 1/16W		R322			RK73GB1J683J	CHIP R 68K J 1/16W	
R210			RK73GB1J334J	CHIP R 330K J 1/16W		R323			R92-1252-05	CHIP R 0 OHM J 1/16W	
R211			RK73GB1J473J	CHIP R 47K J 1/16W		R324,325			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R213			R92-1217-05	CHIP R 0 OHM		R326			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R214			RK73GB1J562J	CHIP R 5.6K J 1/16W		R328			R92-1252-05	CHIP R 0 OHM J 1/16W	
R215			RK73GB1J104J	CHIP R 100K J 1/16W		R329			RK73GB1J473J	CHIP R 47K J 1/16W	
R216			RK73GB1J562J	CHIP R 5.6K J 1/16W		R330			RK73GB1J183J	CHIP R 18K J 1/16W	
R217			RK73GB1J474J	CHIP R 470K J 1/16W		R331			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R218			RK73GB1J224J	CHIP R 220K J 1/16W		R332			RK73GB1J474J	CHIP R 470K J 1/16W	
R219			RK73GB1J105J	CHIP R 1.0M J 1/16W		R333			RK73GB1J394J	CHIP R 390K J 1/16W	
R221			RK73FB2A471J	CHIP R 470 J 1/10W		R334,335			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R224			RK73FB2A120J	CHIP R 12 J 1/10W		R800			RK73GB1J101J	CHIP R 100 J 1/16W	
R227			RK73GB1J223J	CHIP R 22K J 1/16W		R801			RK73GB1J333J	CHIP R 33K J 1/16W	
R228			RK73GB1J184J	CHIP R 180K J 1/16W		R802			RK73GB1J224J	CHIP R 220K J 1/16W	
R229			RK73GB1J223J	CHIP R 22K J 1/16W		R803			RK73EB2B330J	CHIP R 33 J 1/8W	
R232			RK73GB1J184J	CHIP R 180K J 1/16W		R804			RK73GB1J333J	CHIP R 33K J 1/16W	
R233			RK73FB2A471J	CHIP R 470 J 1/10W		R805			RK73EB2B331J	CHIP R 330 J 1/8W	
R234			RK73GB1J153J	CHIP R 15K J 1/16W		R807,808			RK73GB1J471J	CHIP R 470 J 1/16W	
R237			RK73GB1J104J	CHIP R 100K J 1/16W		R809			RK73GB1J102J	CHIP R 1.0K J 1/16W	

## PARTS LIST

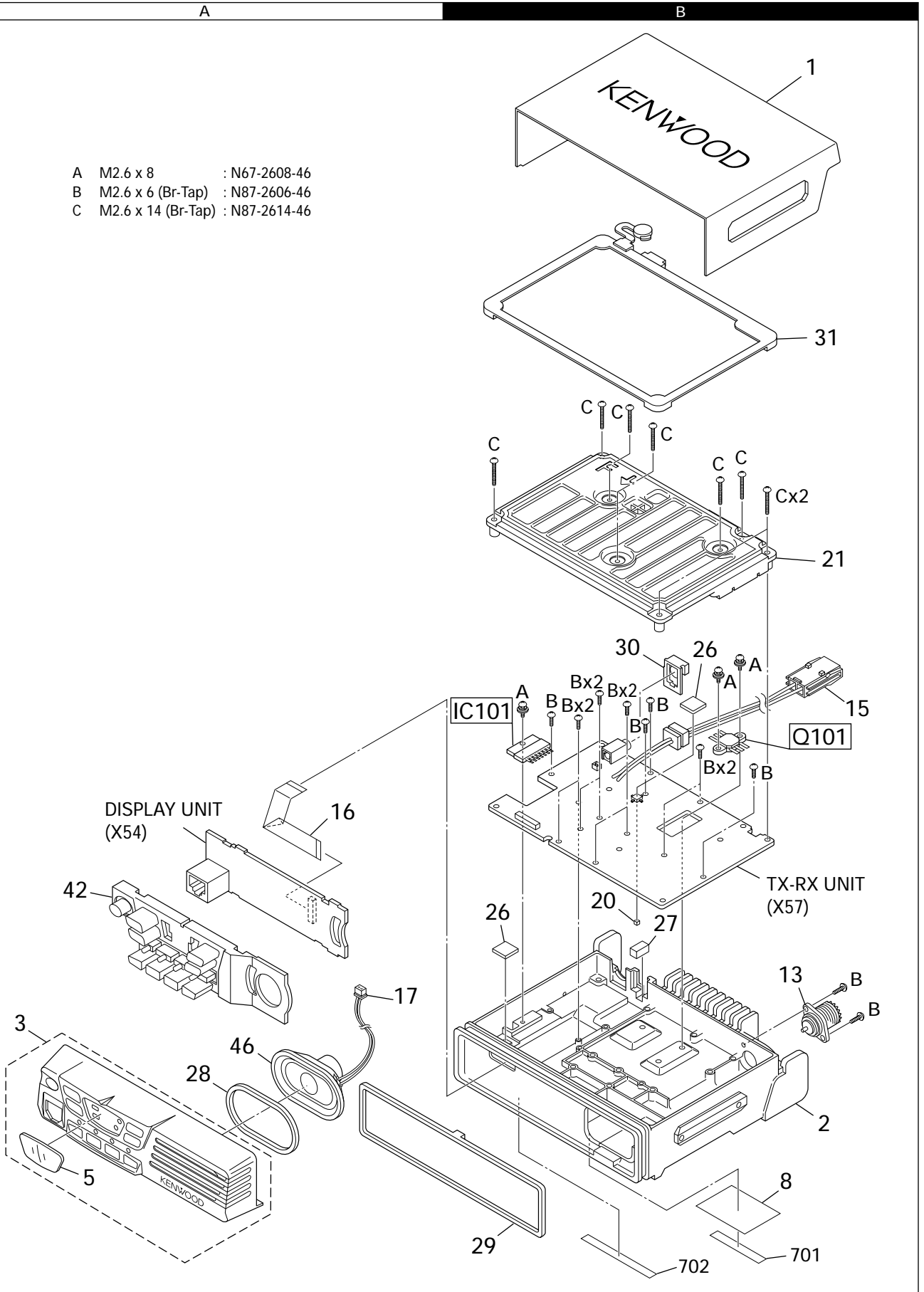
## TX-RX UNIT (X57-6380-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R811			R92-1215-05	CHIP R 470 J 1/2W		Q3			2SC4649(N,P)	TRANSISTOR	
R812,813			RK73GB1J473J	CHIP R 47K J 1/16W		Q4			2SA1832(GR)	TRANSISTOR	
R814			RK73GB1J563J	CHIP R 56K J 1/16W		Q5			2SC4738(GR)	TRANSISTOR	
R816			R92-1252-05	CHIP R 0 OHM J 1/16W		Q6			2SC4617(S)	TRANSISTOR	
R817			RK73GB1J473J	CHIP R 47K J 1/16W		Q7			2SJ243	FET	
R818			RK73GB1J221J	CHIP R 220 J 1/16W		Q10,11			2SK508NV(K52)	FET	
R819			R92-1252-05	CHIP R 0 OHM J 1/16W		Q12			KRX102U	TRANSISTOR	
R820			RK73GB1J473J	CHIP R 47K J 1/16W		Q13			2SK1824	FET	
R821			R92-1261-05	CHIP R 150 J 1/2W		Q14			2SC4617(S)	TRANSISTOR	
R822,823			RK73GB1J223J	CHIP R 22K J 1/16W		Q15			2SC5108(Y)	TRANSISTOR	
R824			RK73GB1J473J	CHIP R 47K J 1/16W		Q16		*	KRC414RTK	DIGITAL TRANSISTOR	
R825			R92-1252-05	CHIP R 0 OHM J 1/16W		Q18			2SC2412K	TRANSISTOR	
R888			F53-0108-05	FUSE 1.8A 50V		Q19,20			2SC4649(N,P)	TRANSISTOR	
D1-4			DA221	DIODE		Q21		*	3SK255	FET	
D6			MA2S111	DIODE		Q22			2SK1824	FET	
D7			HZU5ALL	DIODE		Q23			2SC3357	TRANSISTOR	
D9-12			MA2S304	VARIABLE CAPACITANCE DIODE		Q24			2SC4617(S)	TRANSISTOR	
D13			DAN222	DIODE		Q25			2SC3357	TRANSISTOR	
D14			MA360	VARIABLE CAPACITANCE DIODE		Q26		*	3SK255	FET	
D15			DAN222	DIODE		Q29,30			KRC102S	DIGITAL TRANSISTOR	
D16			MA2S111	DIODE		Q31			2SA1745(6,7)	TRANSISTOR	
D18			MA742	DIODE		Q32			DTC363EU	DIGITAL TRANSISTOR	
D19			DAN235E	DIODE		Q33			KTA1664(Y)	TRANSISTOR	
D20			1SS355	DIODE		Q34,35			KRC102S	DIGITAL TRANSISTOR	
D21,22			HVC350B	VARIABLE CAPACITANCE DIODE		Q37			2SK1824	FET	
D23			DA221	DIODE		Q38		*	KRC404RTK	DIGITAL TRANSISTOR	
D24			MA742	DIODE		Q41			2SC4919	TRANSISTOR	
D25,26			HVC350B	VARIABLE CAPACITANCE DIODE		Q42			2SA1641(S,T)	TRANSISTOR	
D38			ZSH5MA27	SURGE ABSORBER		Q43			2SK1824	FET	
D39			02DZ18(X,Y)	ZENER DIODE		Q101	2B		2SK3478-22	FET	
D41		*	1812L110PR	VARISTOR		Q800			2SK3075	FET	
D43			DAN222	DIODE		TH1		*	B57331V2104J	THERMISTOR	
D44			1SS372	DIODE		TH3		*	B57331V2104J	THERMISTOR	
D800			02DZ5.1(Y)	ZENER DIODE		TH5		*	B57331V2104J	THERMISTOR	
D801			MA4PH633	DIODE							
D804			XB15A709	DIODE							
D805,806			MA742	DIODE							
D807			1SS355	DIODE							
IC1			MB15A02	MOS IC							
IC3			M62363FP	MOS IC							
IC4			NJM2902V	MOS IC							
IC5			TK14489V	BI-POLAR IC							
IC6		*	784214AGC141	MPU							
IC7			24LC08BT-1SN	ROM IC							
IC9			LC73872M	MOS IC							
IC10			NJM2902V	MOS IC							
IC11			NJM2904V	MOS IC							
IC14			NJM78L05UA	BI-POLAR IC							
IC15			PST9140NR	MOS IC							
IC17			NJM78L05UA	BI-POLAR IC							
IC18			PST9140NR	MOS IC							
IC19			TC7W74FU	MOS IC							
IC20		*	KIA7808AF	ANALOG IC							
IC21			NJM2100V	MOS IC							
IC22			NJM2904V	MOS IC							
IC23			UPB1509GV	BI-POLAR IC							
IC101	2B		LA46001FU	BI-POLAR IC							
IC800			TA75W01FU	MOS IC							
Q2			2SJ243	FET							



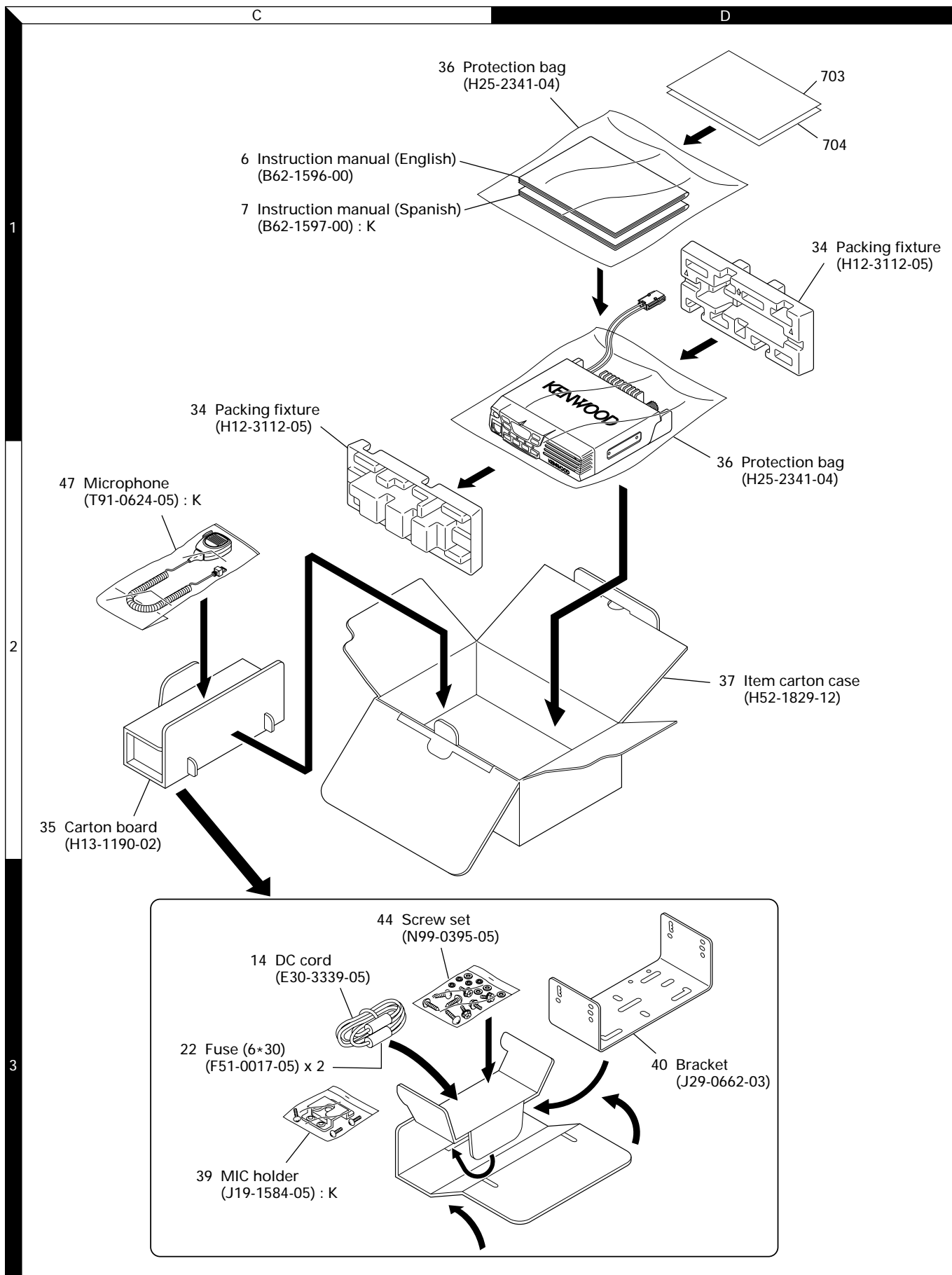
## EXPLODED VIEW

- 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



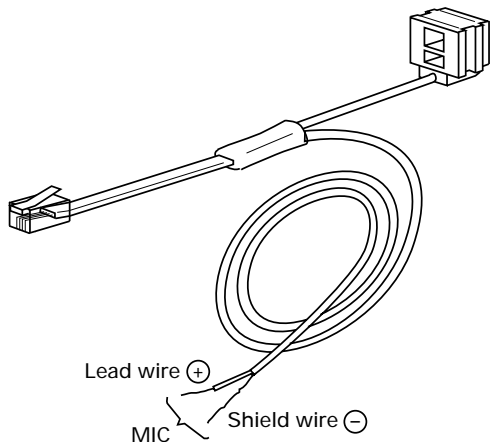
## ADJUSTMENT

### Test Equipment Required for Alignment

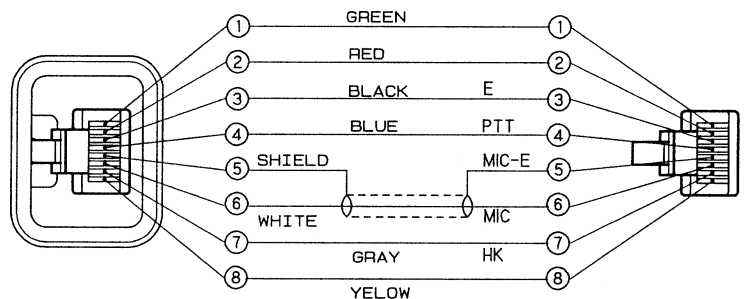
Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	136 to 175MHz Frequency modulation and external modulation -127dBm/0.1μV to greater than -7dBm/100mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 136 to 175MHz or 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 requipped
13. Spectrum Analyzer	Center frequency	50KHz to 600MHz
14. Tracking Generator	Output Voltage	100mV or more

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

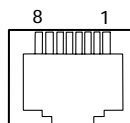
Adapter cable (E30-3383-05) is required for injecting an audio if PC tuning is used. See "PC Mode" section for the connection.



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



### MIC connector (Front view)

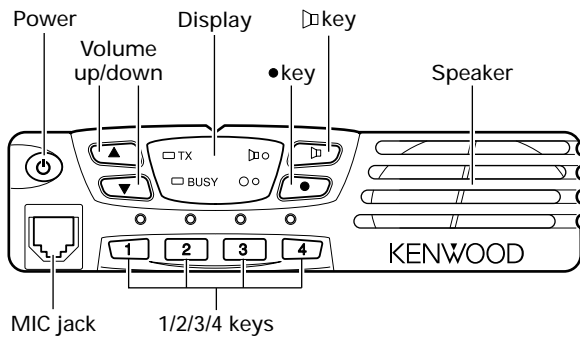


- 1 : BLC
- 2 : PSB
- 3 : E
- 4 : PTT
- 5 : ME
- 6 : MIC
- 7 : HOOK
- 8 : CM

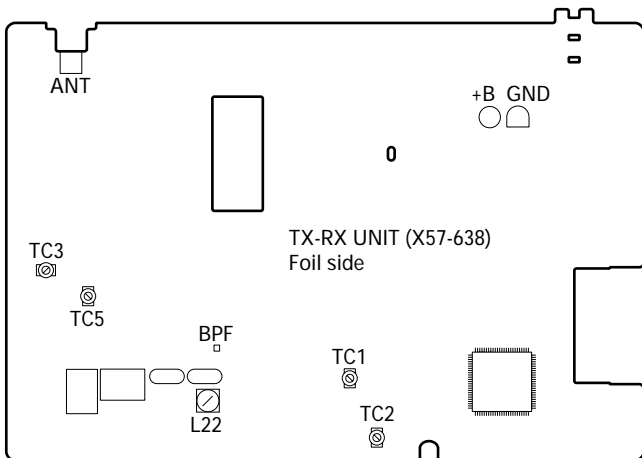
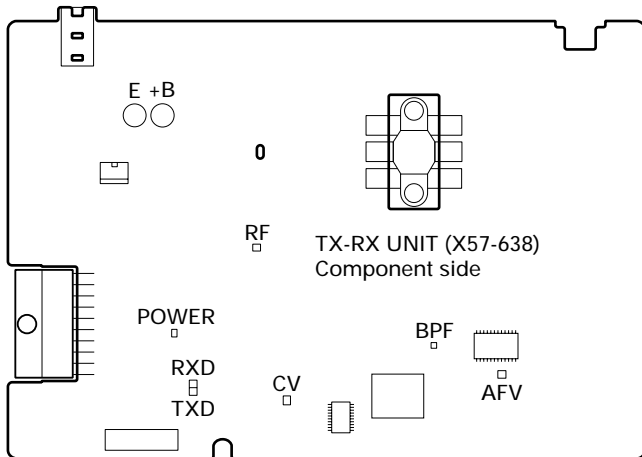
## ADJUSTMENT

### Adjustment Location

#### ■ Switch



#### ■ Adjustment Points



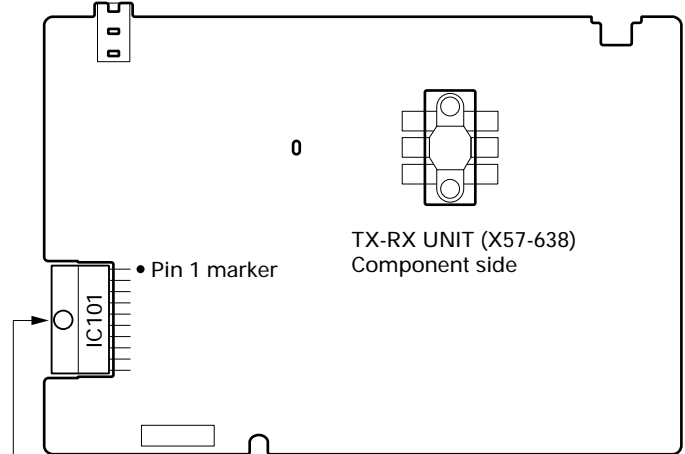
#### ■ Note

##### • EEPROM

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

##### • AF PA IC (IC101)

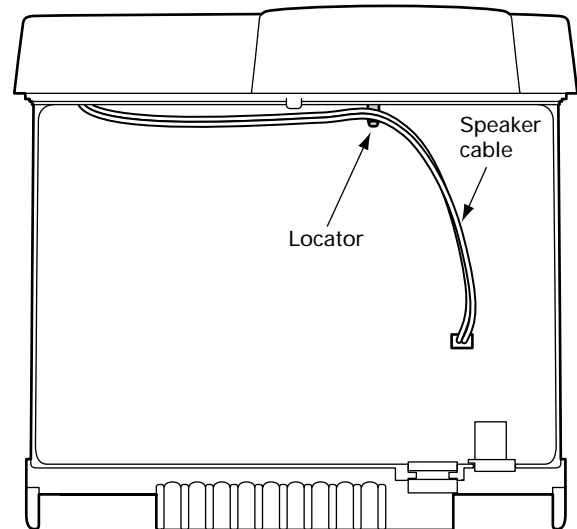
How to mounting the IC101.



Part name label face down

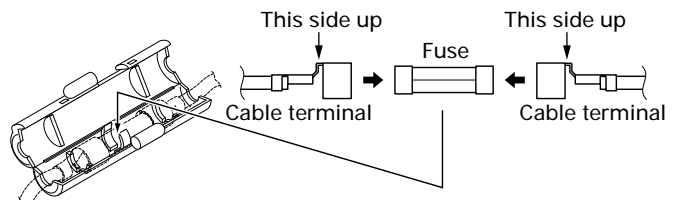
##### • SPEAKER CABLE

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 follows.



## ADJUSTMENT

### Replacing a Drive FET (Q800)

1. When replacing the Drive FET, you must also replace its heat conductor cube, because the heat conductor cube is removed along with the FET.
2. After removing the FET and its heat conductor cube, solder a new Drive FET to the PCB. Make sure the FET is in the proper position before soldering.
3. Attach the heat conductor cube to the FET as instructed below.

#### ■ How to Solder the Heat Conductor Cube

1. Place a piece of soldering wire (about 2.5~3.0 mm long x 0.6mm diameter) into the FET hole on the PCB (①).
2. Place the heat conductor cube on the PCB surface beside the FET hole. The rounded surface of the heat conductor cube must face upward (as shown below) (②).
3. Slide and drop the cube into the FET hole so that the rounded surface of the cube is now horizontal (as shown below) (③).

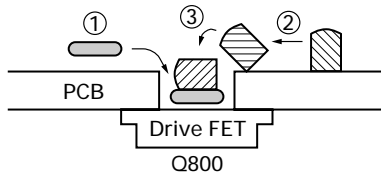


Fig. 1

4. Place a heated soldering iron onto the top of the cube, using an iron tip 900M-T-3CF. Hold the soldering iron in position for about 5 seconds (See the figure 2).

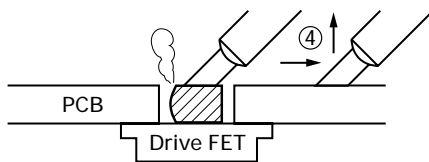
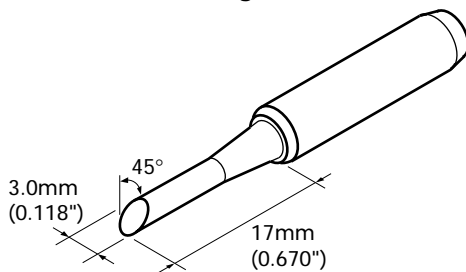


Fig. 2



900M-T-3CF

5. The solder melts and binds the FET and the cube securely. Then, slide the soldering iron along the PCB surface to cool the soldering down (④). If the heat conductor cube comes off from the PCB or the soldering can be seen on the top of the plate, the soldering has not been successful. The soldering must bind the heat conductor cube and FET securely (see the figure 3).

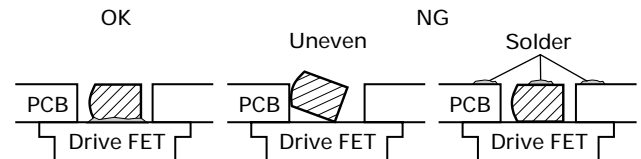


Fig. 3

6. After soldering the heat conductor cube to the PCB, check the level of PCB surface. The surface of the heat conductor cube must be free of flux and solder. It must be flat and smooth, at the same level as the PCB surface (as shown below).

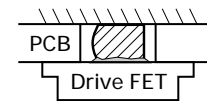


Fig. 4

#### ■ How to Check the Heat Conductor Cube Surface

1. Slide your index finger along the PCB surface (as shown below) (⑤).

The surface should be flat and smooth. If you feel that the surface is uneven because of solder or flux, grind them using meshed copper or re-solder the cube in order to flatten the surface.

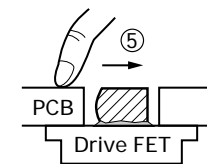


Fig. 5

### Test Frequency (MHz)

Channel	TX	RX
1 : Center	160.100	160.050
2 : Low	146.100	146.050
3 : High	173.900	173.950
4	160.000	160.000
5	160.200	160.200
6	160.400	160.400

## ADJUSTMENT

### 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	TC2	5.5V	±0.1V
	2) CH : RX high			TC1	5.5V	±0.1V
	3) CH : TX low				Check	0.8V or more
	4) CH : RX low					
3. IF coil	1) CH : RX center (Wide)	SSG Digital voltmeter	AFV	L22	3.2~3.3V (DC)	
	2) SSG output : -53dBm (501μV) Mod : 1kHz, Dev : 3kHz					
4. RF bandpass filter	1) CH : RX center (Wide) CH : RX low (Wide) CH : RX high (Wide)	Tra generator Spectrum analyzer	ANT BPF	TC3 TC5	Adjust the BPF waveform to Fig. 1	
	2) Tra generator output : -30dBm Connect the spectrum analyzer to BPF terminal					

#### \* Adjustment of TX VCO lock voltage

1. Remove R224, R888 (fuse), R803 and R811 (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 TC2.

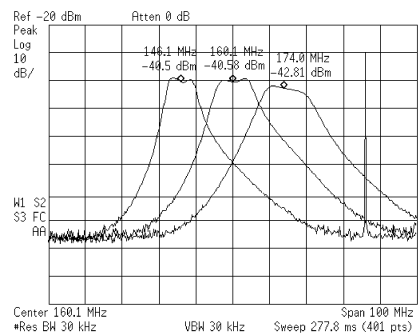


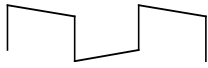
Fig. 1

### 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)	SSG Oscilloscope AF V.M Distortion meter	ANT EXT. SP		Check	SINAD : 12dB or higher
	2) SSG output : -118dBm (0.28μV) (Wide) : -116dBm (0.35μV) (Narrow) Mod : 1kHz Dev : ±3.0kHz (Wide) Dev : ±1.5kHz (Narrow)					
2. Squelch 9	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide)			PC key	Adjust to open the squelch	
3. Squelch 1	2) SSG output : -113dBm (0.5μV) (Wide) : -112dBm (0.56μV) (Narrow) Mod : 1kHz Dev : ±3.0kHz (Wide) Dev : ±1.5kHz (Narrow)					
	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide)					
3. Squelch 1	2) SSG output : -120dBm (0.22μV) (Wide) : -119dBm (0.25μV) (Narrow) Mod : 1kHz Dev : ±3.0kHz (Wide) Dev : ±1.5kHz (Narrow)					
	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide)					

## ADJUSTMENT

## 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 $\pm 100\text{Hz}$
2. High power	1) CH : TX low CH : TX low' CH : TX center CH : TX high' CH : TX high 2) Transmit	Power meter			50W	$\pm 1.0\text{W}$
3. Low power	1) CH : TX low CH : TX low' CH : TX center CH : TX high' CH : TX high 2) Transmit				25W	$\pm 1.0\text{W}$
4. 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	Adjust the waveform as below 
5. 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	ANT MIC	$\pm 4.0\text{kHz}$ (Wide) $\pm 2.0\text{kHz}$ (Narrow) According to the large +, -	$\pm 50\text{Hz}$	
6. MIC sensitivity	1) CH : TX center (Wide/Narrow) 2) AG : 1kHz/5mV 3) Transmit	AF V.M		Check	$\pm 3\text{kHz} \pm 0.2\text{kHz}$ (Wide) $\pm 1.5\text{kHz} \pm 0.1\text{kHz}$ (Narrow)	
7. 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		$\pm 0.75\text{kHz}$ (Wide) $\pm 0.35\text{kHz}$ (Narrow)	$\pm 0.05\text{kHz}$	
8. QT deviation	1) CH : TX low (Wide) CH : TX center (Wide/Narrow) CH : TX high (Wide) 2) Transmit			$\pm 0.75\text{kHz}$ (Wide) $\pm 0.35\text{kHz}$ (Narrow)	$\pm 0.05\text{kHz}$	
9. DTMF deviation	1) CH : TX center (Wide/Narrow) 2) Transmit			$\pm 3.0\text{kHz}$ (Wide) $\pm 1.5\text{kHz}$ (Narrow)	$\pm 0.2\text{kHz}$	

**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 (Q101) and Drive FET (Q800) can be measured easily using DVM  $\Omega$  mode.  
Normal condition – Gate :  $2\text{M}\Omega \sim$ , Drain :  $20\text{k}\Omega \sim 50\text{k}\Omega$   
The above impedance values are rough estimations.
- Switch on the transceiver. Check the voltage at R888 (fuse) 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 R888 (fuse) is broken.
- Remove R224.

- 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

### CN1 (TX-RX Unit)

Pin No.	Name	Function
1	GND	Ground
2	PTT	PTT/TXD
3	HOOK	Hook detection/RXD
4	ME	Mic ground
5	MIC	Mic signal input
6	POWER	Power switch
7	LED MON	Signal of MON Key control
8	LED PF	Signal of PF Key control
9	LED C1	Signal of channel 1 control
10	LED C2	Signal of channel 2 control
11	LED R	Signal of TX control
12	LED G	Signal of Busy control
13	MICBL	Mic backlight control
14	LED C3	Signal of channel 3 control
15	LED C4	Signal of channel 4 control
16	CM	Mic data detection
17	KM11	Key matrix input 11
18	KM12	Key matrix input 22
19	KM13	Key matrix input 33
20	KM14	Key matrix input 44
21	KM01	Key matrix input 01
22	KM02	Key matrix input 02
23	PSB	Switched B

### J1 (TX-RX Unit)

Pin No.	Name	Function
1	SP	Audio signal output to internal/external speaker.
2	E	Ground

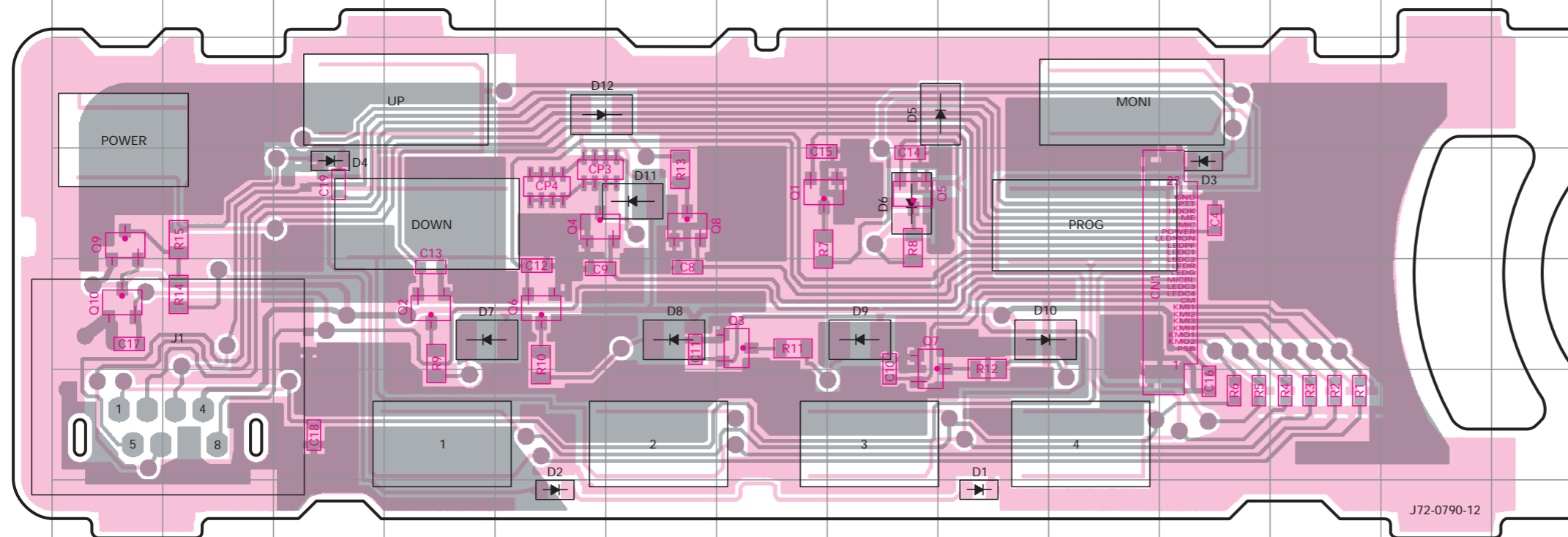
### J1 (Control Unit)

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



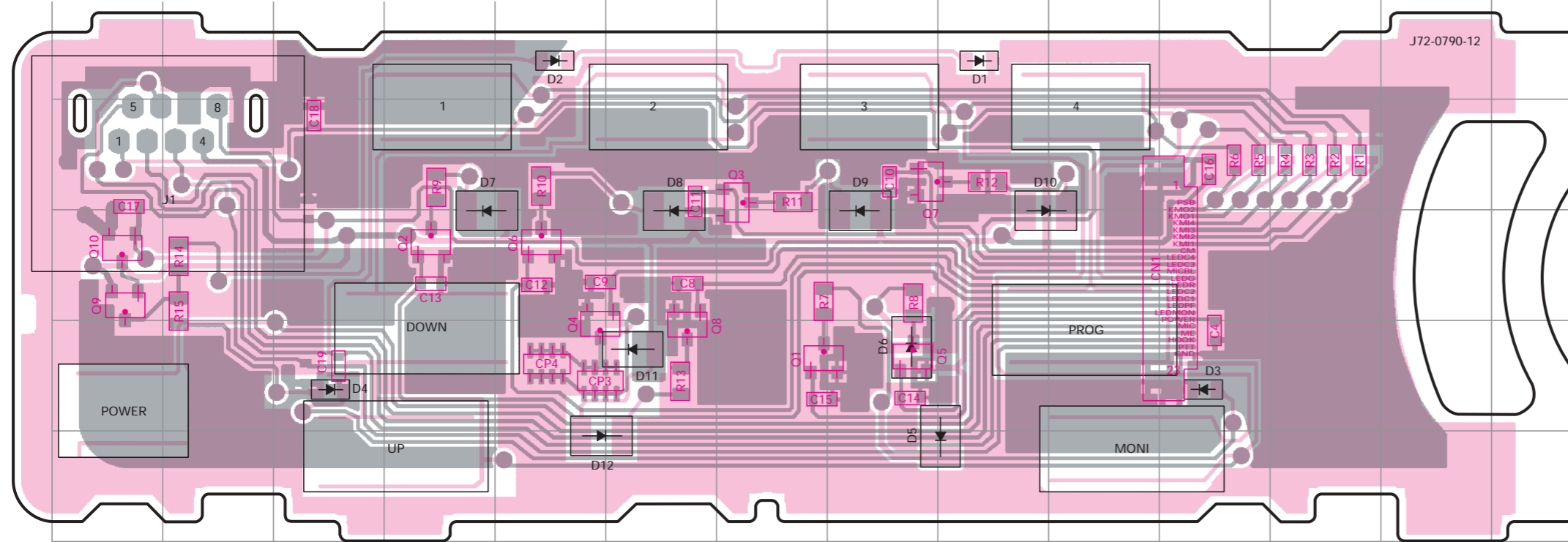
# PC BOARD VIEWS TK-7102H

## DISPLAY UNIT (X54-3340-20) Component side view



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
Q1	3G	Q5	3H	Q9	3A	D3	3K	D7	4D	D11	3F
Q2	4D	Q6	4E	Q10	4A	D4	3C	D8	4F	D12	2E
Q3	4G	Q7	4H	D1	6I	D5	2I	D9	4H		
Q4	3E	Q8	3F	D2	6E	D6	3H	D10	4I		

## DISPLAY UNIT (X54-3340-20) Foil side view



Component side  
 Foil side

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
Q1	11G	Q5	11H	Q9	10A	D3	11K	D7	10D	D11	11F
Q2	10D	Q6	10E	Q10	10A	D4	11C	D8	10F	D12	12E
Q3	9G	Q7	9H	D1	8I	D5	12I	D9	10H		
Q4	11E	Q8	11F	D2	8E	D6	11H	D10	10I		

KRC404RTK  
KRC414RTK  
2SA1745  
2SA1832  
2SC2412K  
2SC4617  
2SC4738  
2SC5108

2SC3357

2SA1641

KTA1664

DTC363EU

KRA225S  
KRC102S

2SC4649  
2SC4919

LA4600

TC7W74FU

DA221

MA742

2SK508NV

3SK255

2SJ243  
2SK1824

M62363FP

KRX102U

784214AGC141

PST9140NR

MR15A02

NJM78L05UA

NJM2100V  
NJM2904V  
UPB1509GV  
24LC08BT-1SN

TA75W01FU

LC73872M  
NJM2902V

KIA7808AF

TK14489V

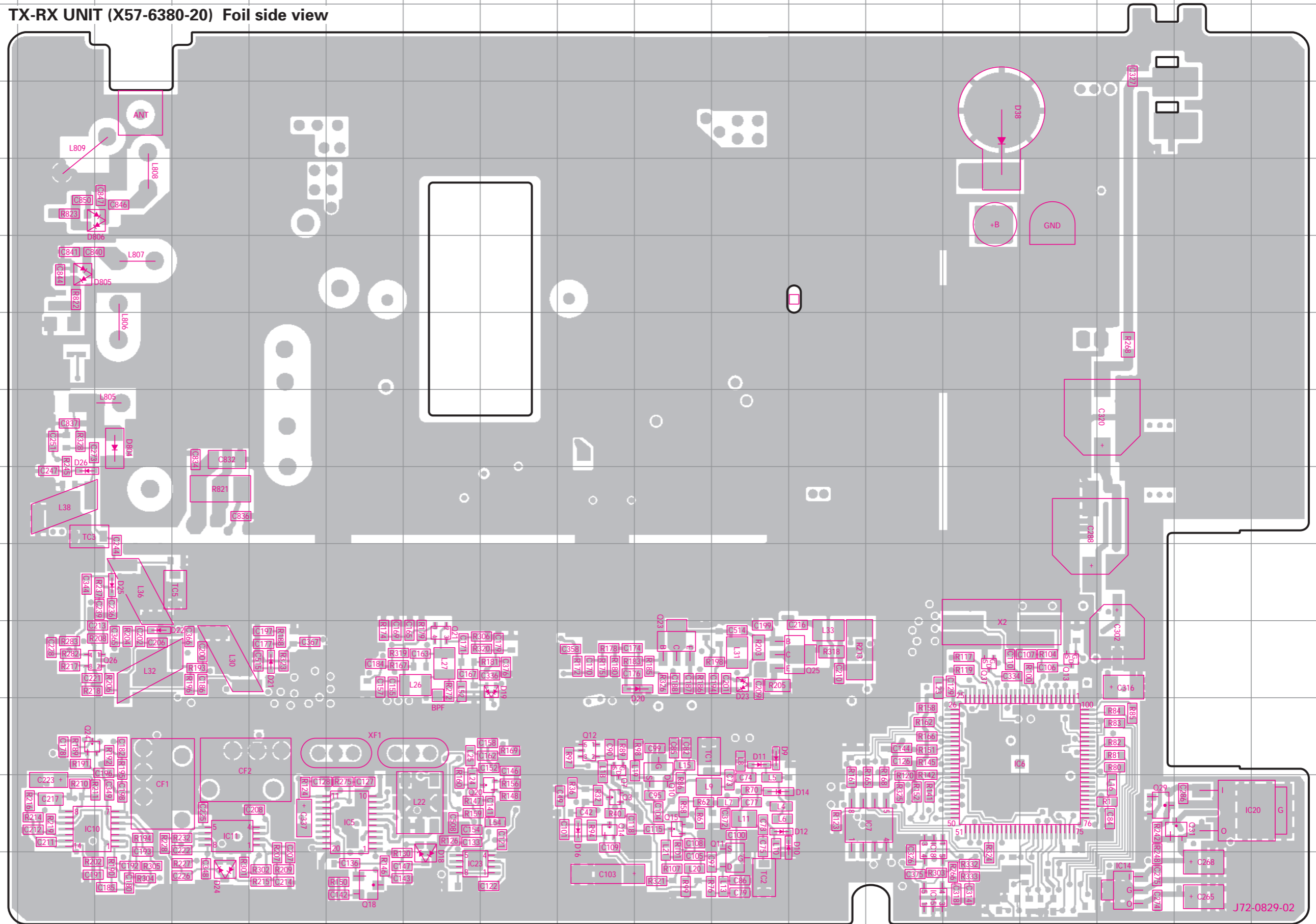
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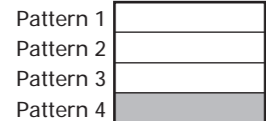


## TX-RX UNIT (X57-6380-20) Foil side view

Ref. No.	Address
IC5	12G
IC6	11O
IC7	12N
IC10	12C
IC11	12E
IC14	13Q
IC15	13N
IC18	12N
IC20	12R
IC23	13H
Q3	12J
Q7	11J
Q10	11K
Q11	13L
Q12	11J
Q13	10P
Q14	12J
Q15	12K
Q18	13G
Q20	12I
Q21	10H
Q23	10K
Q24	11C
Q25	10M
Q26	10D
Q29	12Q
Q31	12R
Q37	10O
D9	11L
D10	12L
D11	11L
D12	12L
D14	12L
D16	12J
D18	13H
D19	10I
D20	10K
D21	10F
D22	10D
D23	10L
D24	13E
D25	9D
D26	8C
D38	3O
D304	7D
D305	5C
D806	4D



Component side



Foil side


# TK-7102H PC BOARD VIEW

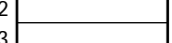
## TX-RX UNIT (X57-6380-20) Component side view + Foil side




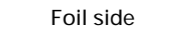
Ref. No.	Address	Ref. No.	Address
IC1	12J	Q32	11D
IC3	10N	Q33	13C
IC4	12P	Q34	3D
IC5	12M	Q35	10D
IC6	11D	Q37	10E
IC7	12F	Q38	4D
IC9	9E	Q41	11O
IC10	12Q	Q42	3E
IC11	12O	Q43	12F
IC14	13C	Q101	5K
IC15	13F	Q800	5G
IC17	12B	D1	13F
IC18	12F	D2	12F
IC19	10D	D3	12F
IC21	10P	D6	12J
IC22	11P	D7	13I
IC23	13L	D9	11H
IC101	10B	D10	12G
IC800	8J	D11	11H
Q2	11I	D12	12H
Q3	12J	D13	12O
Q4	12H	D14	12H
Q5	13H	D15	12O
Q6	13K	D16	12J
Q7	11J	D18	13L
Q10	11I	D19	10K
Q11	13H	D20	10I
Q12	11J	D21	10N
Q13	10D	D22	10P
Q14	12J	D23	10H
Q15	12I	D24	13O
Q16	11F	D25	9P
Q18	13M	D26	8Q
Q19	12N	D38	3E
Q20	12K	D39	4D
Q21	10L	D41	7C
Q22	11F	D43	11O
Q23	10I	D44	10O
Q24	11Q	D305	5Q
Q25	10G	D800	8J
Q26	10P	D801	7P
Q29	12C	D804	7P
Q30	12C	D806	4P
Q31	12B	D807	7K

Component side

Pattern 1 

Pattern 2 

Pattern 3 

Pattern 4 

Foil side

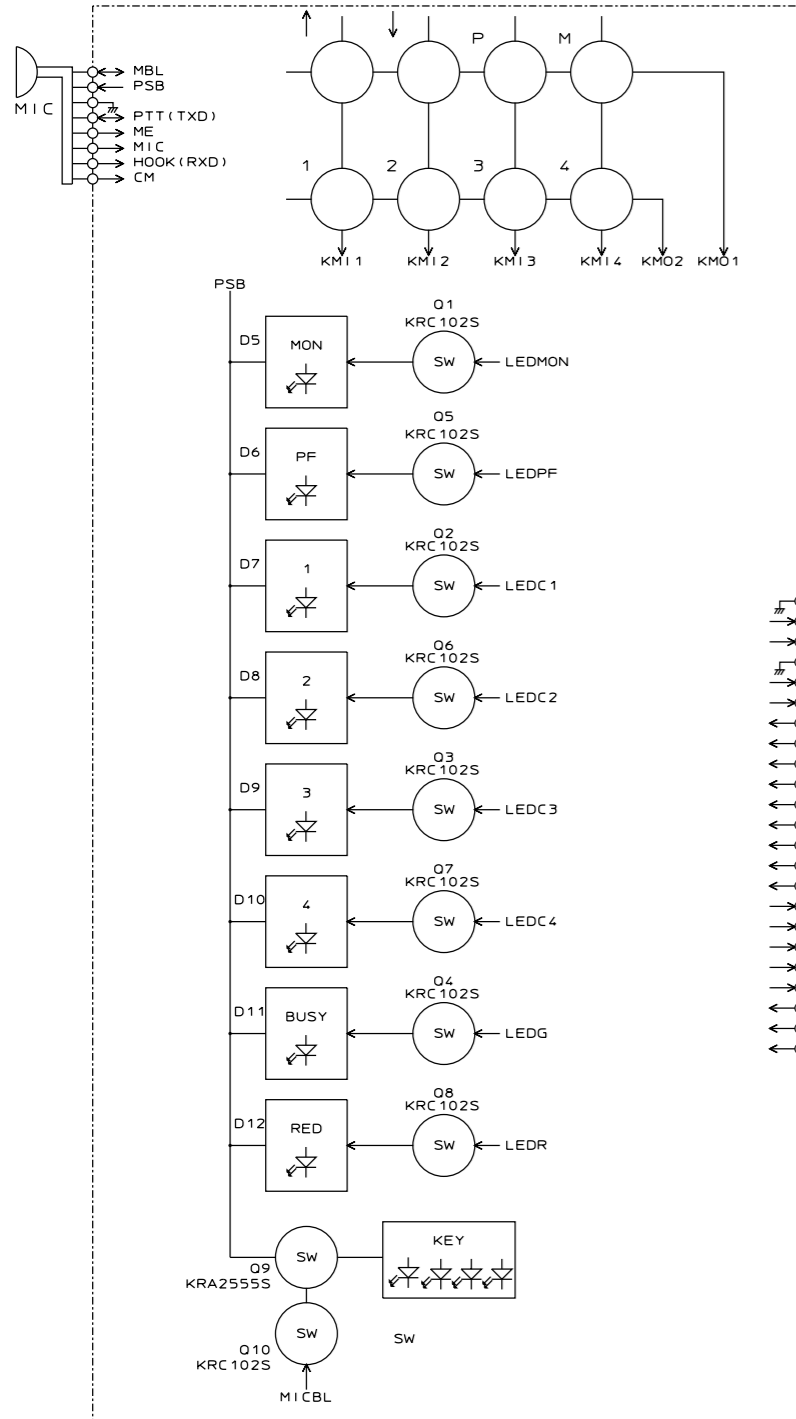
● Connect 1 and 4



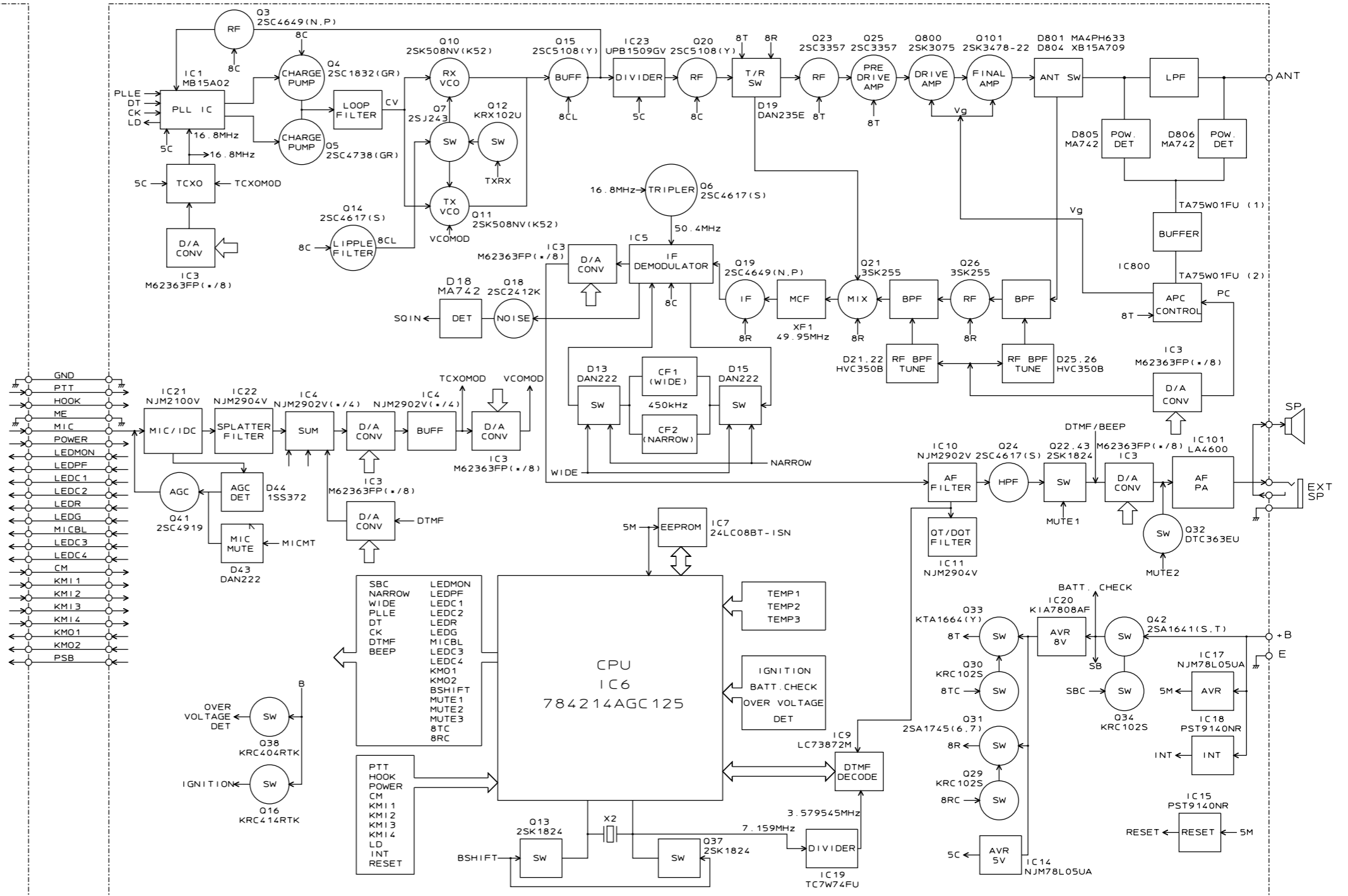
# TK-7102H TK-7102H

## BLOCK DIAGRAM

### DISPLAY UNIT X54-334\*-\*\*



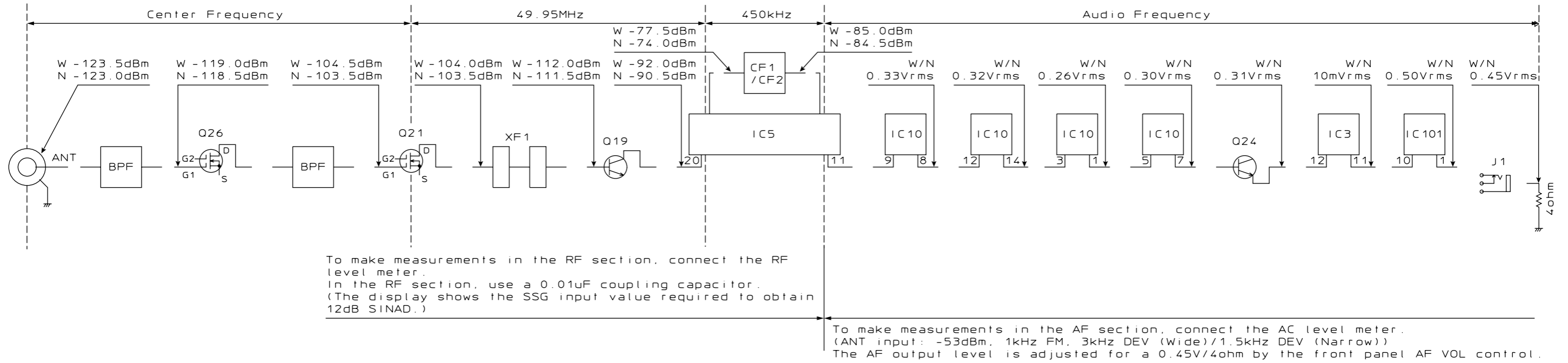
### TX-RX UNIT X57-638\*-\*\*



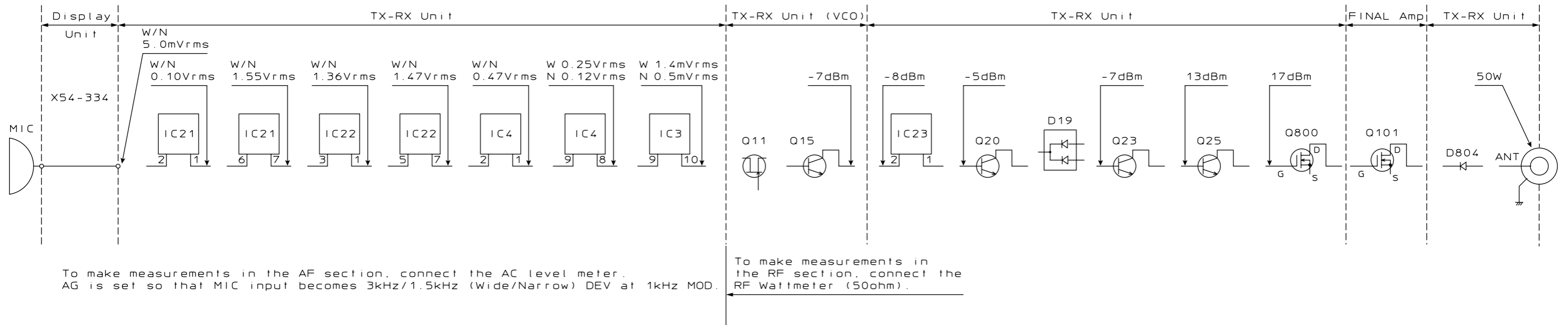
# TK-7102H TK-7102H

## LEVEL DIAGRAM

### Receiver Section



### Transmitter Section



## SPECIFICATIONS

### GENERAL

Frequency Range .....	146 to 174MHz
Number of Channels .....	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 .....	50W
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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