800MHz APCO P25 TRANSCEIVER
TK-5400
SERVICE MANUAL

KENWOOD

TK-5400 (K)

Antenna
(KRA-24 : Option)

Knob assy
(Encoder)
(K29-5282-14)

Knob assy
(Volume)
(K29-5283-14)

Toggle switch
(S72-0402-05)

Panel assy
(A62-0537-53)

KENWOOD

Knob assy
(Side key)
(K29-5441-14)

Cabinet assy
(A02-3786-03)

TK-5400 (K2) : With Keypad

Antenna
(KRA-24 : Option)

Knob assy
(Encoder)
(K29-5282-14)

Knob assy
(Volume)
(K29-5283-14)

Toggle switch
(S72-0402-05)

Panel assy
(A62-0537-53)

KENWOOD

Knob assy
(Side key)
(K29-5441-14)

Key top (DTMF)
(K29-5193-23)

Cabinet assy
(With DTMF key)
(A02-3787-03)

**Does not come with antenna.
Antenna is available as an option.**

TK-5400

CONTENTS / GENERAL

GENERAL

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

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

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

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

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

Model & Destination	Unit	X57-6530-10	X53-4030-XX		Frequency range	Remarks	Keypad
			0-10	0-11			
TK-5400	K	✓	✓		806~825MHz (TX)	1st IF : 44.85MHz	–
	K2	✓		✓	851~870MHz (TX,RX)	LOC : 44.395MHz	✓

SYSTEM SET-UP / OPERATING FEATURES

```
┌─────────────────────────────────┐
│       Merchandise received       │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│ License and frequency allocated by FCC │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│   Choose the type of transceiver   │
└─────────────────────────────────┘
```

Model type	TK-5400 K	No keypad
	TK-5400 K2	With keypad

```
┌─────────────────────────────────┐
│     Transceiver programming       │
└─────────────────────────────────┘
```

A personal computer (IBM PC or compatible), programming interface (KPG-36), and programming software (KPG-78D) are required for programming.
(The frequency, signalling data and features are programmed for the transceiver.)

```
┌─────────────────────────────────┐
│  Are you using the optional antenna?  │────YES──▶ ┌──────────────┐
└─────────────────────────────────┘               │   KRA-24     │
                │  NO                              │ Whip antenna │
                │                                  └──────────────┘
                │                                      (Option)
                ▼
┌─────────────────────────────────┐
│ Are you using the speaker microphone? │────YES──▶ ┌──────────────┐
└─────────────────────────────────┘               │   KMC-25     │
                │  NO                              └──────────────┘
                ▼
┌─────────────────────────────────┐
│           Delivery               │
└─────────────────────────────────┘
```

OPERATING FEATURES

1. Getting Acquainted

Microphone   Speaker
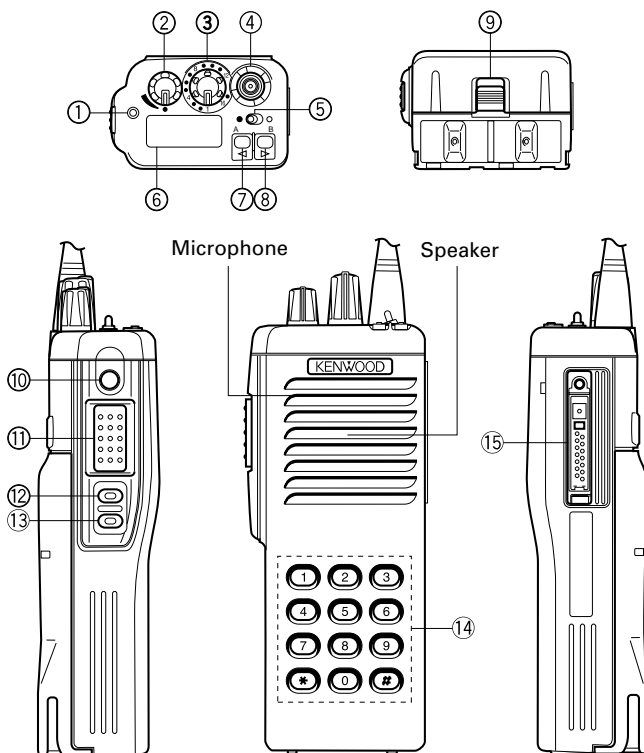
1-1. Key Descriptions

① **Transmit/Busy/Battery low indicator**
Lights red while transmitting. Lights green while receiving. Flashes red when the battery power is low while transmitting. Replace or recharge the battery pack when the battery is low.
Note : This indicator can be disabled by your dealer.

② **Power switch/Volume control**
Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. Turn counterclockwise fully to switch OFF the transceiver.

③ **Rotary encoder**
Rotate this encoder to activate its programmable function (page 4).

④ **Antenna connector**
Connect an (optional KRA-24) antenna to this SMA male type antenna connector.

⑤ **Toggle switch**
Switch the toggle position to activate its programmable function (page 4).

⑥ **Display**
Refer to the display on page 4.

⑦ **Top 1 key**
Press to activate its auxiliary function (page 4).

⑧ **Top 2 key**
Press to activate its auxiliary function (page 4).

⑨ **Battery pack release latch**
Pull back on this latch to release the battery pack.

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OPERATING FEATURES

⑩ **Orange key**
Press to activate its auxiliary function (page 4).
⑪ **PTT (Push-To -Talk) switch**
Press this switch, then speak into the microphone to call a station.
⑫ **Side 1 key**
Press to activate its auxiliary function (page 4).
⑬ **Side 2 key**
Press to activate its auxiliary function (page 4).
⑭ **Keypad (keypad models only)**
Press the keys on the keypad to send DTMF tones.
⑮ **Universal connector**
Connect the (optional) speaker/microphone here. Otherwise, keep the supplied cover in place.

1-2. Display

Indicator	Description
(zone/channel display)	Displays the operating zone or channel number (or name). Also displays various menu functions.
:88	Displays the operating zone, channel, or tone number. When the zone/channel number is between 100 and 199, the lower dot lights. When the number is between 200 and 299, the upper dot also lights. Also displays tA (Talk Around), P1 (Priority 1), or P2 (Priority 2), and other codes, depending on the function being used.
A	Appears when a channel is added to the scanning sequence.
SCN	Appears when you are using Scan mode.
MON	Appears when the monitor function is active.
LO	Appears when low power is selected.
OPT	Appears when you are using the Operator Selectable Tone function.
AUX	Reserved for future operation.

2. Programmable Functions

Refer to the following tables to determine which functions are available for appropriate channels (N/A = Not Available).

Conventional FM :
Channels set up for Conventional FM Operation
Conventional APCO :
Channels set up for Conventional APCO Operation
Trunking APCO :
Channels set up for Trunking APCO Operation

Programmable Function	Conventional FM	Conventional APCO	Trunking APCO
Call Response	N/A	✓	✓
Channel Down	✓	✓	✓
Channel Name	✓	✓	✓
Channel Select	✓	✓	✓
Channel Up	✓	✓	✓
Emergency	✓	✓	✓
External Speaker	✓	✓	✓
Function	✓	✓	✓
Home Channel	✓	✓	✓
Individual	N/A	✓	✓
Invert Display	✓	✓	✓
Key Lock	✓	✓	✓
Lamp	✓	✓	✓
Monitor	✓	✓	N/A
Monitor Momentary	✓	✓	N/A
None	✓	✓	✓
Operator Selectable Tone	✓	•	N/A
Page	N/A	N/A	✓
RF Low Power	✓	✓	✓
Scan	✓	✓	✓
Scan Delete/Add	✓	✓	✓
Scan Program	✓	✓	✓
Site Lock	N/A	N/A	✓
Speaker Attenuation	✓	✓	✓
Squelch Level	✓	•	N/A
Squelch Off	✓	•	N/A
Squelch Off Momentary	✓	•	N/A
System Search	N/A	N/A	✓
Talk Around	✓	✓	N/A
Talkgroup	N/A	✓	✓
Tone	✓	✓	✓
VOX	✓	✓	✓
Zone Down	✓	✓	✓
Zone Select	✓	✓	✓
Zone Up	✓	✓	✓

Note : Functions marked with dot (•) are available in Mixed Mode.

OPERATING FEATURES / REALIGNMENT

3. Data Programming (PC Mode)

3-1. Preparation and Connection

TK-5400 transceiver is programmed by using a personal computer, programming interface cable KPG-36, and programming software KPG-78D.

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

3-2. Programming Interface Cable KPG-36 Description

The KPG-36 is required to interface TK-5400 to the computer. It has a circuit in its D-sub 25pin connector case that converts RS-232C logic level to TTL level.

KPG-36 is used to connect between TK-5400 universal connector and RS-232C serial port of computer.

3-3. Programming Software KPG-78D Description

KPG-78D is the programming software for TK-5400 supplied on a 3.5" floppy disk. This software runs under Windows 95, 98, ME or Windows 2000 on an IBM-PC/XT, AT, or PS2 or compatible machine.

The data can be input to or read from TK-5400 and edited on the screen. The programmed or edited data can be printed out. It is also possible to tune the transceiver.

We recommend that install KPG-78D for example to harddisk first then use it.
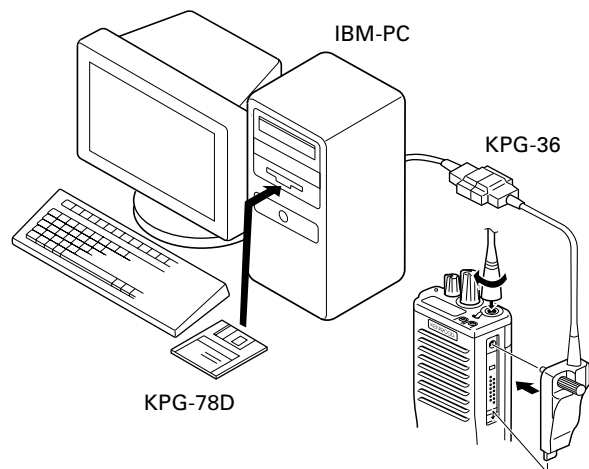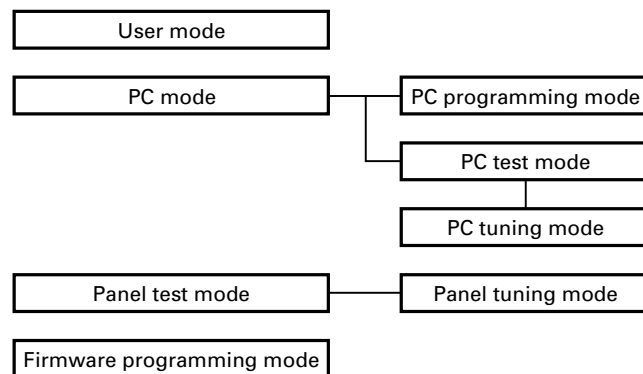
KPG-78D instruction manual part No. : B62-1593-XX.

Fig. 1

REALIGNMENT

1. Mode

Mode	Function
User mode	Customer use this mode
PC mode	Communication between the radio and PC (IBM compatible). It requires the KPG-78D
PC programming mode	Frequency, signalling and features write to the radio and read from the radio.
PC test mode	Check the radio using the PC. This feature is included in the FPU.
Panel test mode (Refer to Adjustment)	Dealer use to check the fundamental characteristics.
Firmware programming mode	Re-write the firmware of the flash ROM.

2. How to Enter Each Mode

Mode	Operation
User mode	Power on
PC mode	Power on begins the USER MODE.
Panel test mode	Hold down the [Side 2] key and [PTT], turn the radio power on, and release [PTT] first.
Firmware programming mode	Held down the [Side 2] key and [PTT], turn the radio power on, and release [Side 2] key first.

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REALIGNMENT

3. Firmware Programming Mode

3-1. Preface

Flash memory is mounted on the transceiver. This allows the transceiver to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

3-2. Connection Procedure

Connect the transceiver to the personal computer (IBM PC or compatible) with the interface cable (KPG-36). (Connection is the same as in the PC Mode.)

3-3. Programming

1. Start up the firmware programming software (Fpro).
2. Set the communications speed and communications port in the Configuration items.
3. Set the firmware to be updated by File select.
4. Held down the [Side 2] and [PTT]. Turn the transceiver power on, and release [Side 2] first. Until the display change to "PROGRAM", also the green LED turns on.
5. Check the connection between the transceiver and the personal computer, and make sure that the transceiver is in the Program mode.
6. Click the "Write" button on the personal computer. A window will display to indicate progress of writing. When the transceiver starts to receive data, "PG" is appeared on 2 digit small LCD.
7. If writing ends successfully, the red LED on the transceiver lights and the checksum is displayed.
8. If you want to continue programming other transceivers, repeat steps 4 to 7.

Notes :

- This mode cannot be entered if the Firmware programming mode is set to Disable in the Programming software (KPG-78D).
- If the updating firmware fails to update the firmware, the red LED on the transceiver does not light and an incorrect checksum appears.
  In this case, turn the transceiver off, then turn it on. The transceiver will automatically starts the Firmware programming mode.
- Since the updating firmware (non-erasable) is stored in the transceiver, you can safely upload the new control firmware again, even if it fails.

- Make sure the communication speed between the FPRO program and the transceiver settings are the same. Refer to section 3-4. for details.
- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before your update the radio firmware.
  Directly copying from the floppy disk to the radio may not work because the access speed is too slow.
- Use a fully charged battery to load firmware into the transceiver.
- Do not turn the power off while loading the firmware.
- If the firmware is loaded in Firmware Programming Mode, use Fpro.EXE of Version 3.01 or later.
- If the firmware is loaded into the transceiver using Fpro.EXE of Version 3.00 or earlier, the old firmware in the transceiver must be erased before loading the new firmware.

3-4. Function

1. If you press the [Top 2] key while "PROGRAM" is displayed, the checksum is displayed. If you press the [Top 2] key while the checksum is displayed, "PROGRAM" is redisplayed.
2. A transmission speed can be selected by pressing the [Top 1] key while "PROGRAM" is displayed.
   19200bps : P R O G R A M**.**   1 dot lights
   38400bps : P R O G R A**.** M**.**   2 dot lights
   57600bps : P R O G R**.** A**.** M**.** 3 dot lights
3. Firmware Erasing Method
   Hold down the [orange] key in Firmware Programming Mode for longer than two seconds, "PROGAM" appears on the LCD, the Orange LED illuminates, and firmware erasure begins.
   When the firmware is erased from the transceiver, the Orange LED goes off.

Note :

Normally, write in the high-speed mode.

4. Panel Test Mode

Setting method refer to ADJUSTMENT.

DISASSEMBLY FOR REPAIR

Disassembly of Front Case and Chassis

1. Remove the 2 screws (❶) and a cap fixed screw (❷).
2. Press the chassis bottom upwards and remove the clips (❸) at the top. The front case is still connected to the chassis by the FPC at this time so be gentle when lifting upwards, otherwise unwanted stress is applied on the FPC.
3. The front case and chassis can only be opened to the side when connected by the FPC (❹).

Front case
Chassis
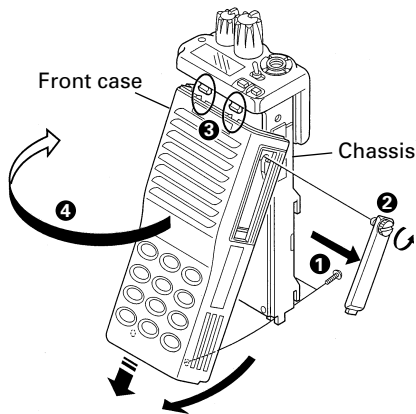
Remove the TX-RX Unit from the Chassis

1. The TX-RX unit cannot be removed simply by removing the eight screws (❺).
2. A total of eight solder connections on the RF power amplifier board (❻).

Remove the Universal Connector

1. The universal connector (❼) is fastened to the chassis with double-side tape.
2. Press firmly with a tool such as a screwdriver and so that it can peel (❽).
   Note : You must replace both parts together when replacing the universal connector or the FPC (❾).

Remove the Side Key Assy

1. The side key assy is clips form a slide-hook structure. Lift up gently and take from the side (❿).

Side key assy

Disassembly of the Panel Assy

1. The LCD assy and toggle switch are joined by wire (⓫). Use caution not to break this wire during handling.

Toggle switch
LCD assy
Panel assy

TK-5400

CIRCUIT DESCRIPTION

1. Overview

The KENWOOD model TK-5400 is an 800MHz/FM/APCO hand-held transceiver designed to operate in the frequency range of 806 to 825MHz (TX)., 851 to 870MHz (TX/RX), the unit consists of a receiver, a transmitter, a phase-locked loop (PLL) frequency synthesizer, base band parts, power supply circuits, a control unit.

2. Circuit Configuration by Frequency

The receiver is a double-conversion superheterodyne using first intermediate frequency (IF) of 44.85MHz and second IF of 455kHz. Incoming signals from the antenna are mixed with the local signal from the PLL circuit to produce the first IF of 44.85MHz.

This is then mixed with the 44.395MHz second local oscillator output to produce the 455kHz second IF. This signal is detected to give the demodulated signal in the DSP.

The transmit signal frequency is generated by the PLL VCO, and modulated by the signal from the DSP. It is then amplified and fed to the antenna.

Fig. 1   Frequency configuration

3. PLL Frequency Synthesizer

The PLL frequency synthesizer of the TK-5400 transceiver consists of a VCXO (X201), a VCO (L702), a PLL IC (IC204) and a buffer amplifier (Q201).

The PLL reference oscillator VCXO produces 16.8MHz and its frequency stability is 1.5 ppm or less (Temperature range –30 to +60°C). VCXO frequency tuning and modulation are performed by applying voltage to pin 1 of the VCXO. The VCXO oscillation output is applied to pin 16 of the PLL IC.
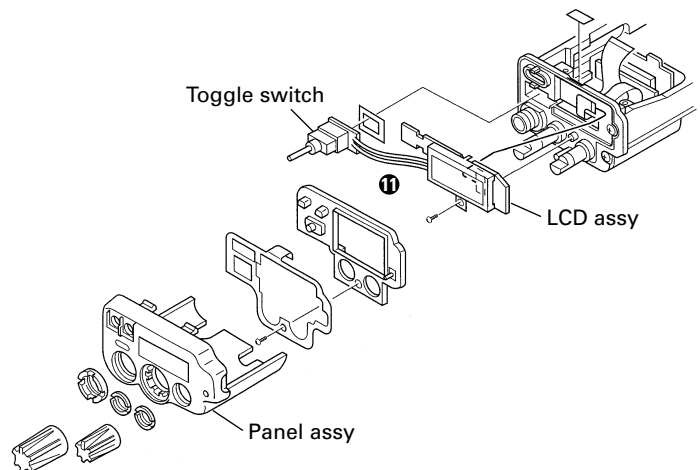
The VCO oscillation frequencies are 403 to 412.5MHz and 425.5 to 435MHz, and locking occurs at both ranges of doubled frequencies of 806 to 825MHz and 851 to 870MHz.

The VCO output components, other than the doubled frequencies, are eliminated by a band-pass filter, and the resulting signal is amplified by a buffer amplifier (Q201) and routed to pin 5 of the PLL IC. The VCO output is amplified by two buffer amplifiers (Q205, Q206) and routed to the transmit drive stage and receiver mixer through the TX/RX switch (D101, D102).

The PLL IC consists of a prescaler, a fractional divider, a reference divider, phase a comparator and a charge pump. The PLL IC is a fractional N type synthesizer and operates at 100kHz, which is 8 times the 12.5kHz channel step. The input signal from pins 5 and 16 of the PLL IC are divided to 100kHz in the PLL IC and compared with a phase comparator. The pulse output signal of the phase comparator is applied to the charge pump and converted to a DC signal with a loop filter (LPF). The DC signal is applied to pin 4 of the VCO and locked to keep the VCO at a fixed frequency.

The PLL division data is output from DPM (pin 29), CPM (pin 30) and EPM (pin 31) of the microprocessor (IC507), converted by level converters (IC201, IC203, IC202) and input to the PLL IC. This division data is fed to the PLL IC when the channel is changed or when transmission is switched to reception. The PLL frequency lock state is always monitored with pin 78 (UL) of the microprocessor. When the PLL is unlocked, the UL goes Low.

When the TK-5400 is operated for Talk Around, the transmit frequency is 851 to 870MHz, so pin 5 (TA) of the VCO is made Low during transmission and the VCO oscillation frequency band is switched. The control signal that is sent to pin 5 of the VCO is output from the shift register IC (IC701) controlled by the microprocessor, and a High signal is output except for Talk Around transmission.

Fig. 2   PLL block diagram

CIRCUIT DESCRIPTION

4. Power Supply Circuit

The battery power (+B) is supplied from the battery terminal to the TX-RX unit through a 3A fuse. The power (SB) that passes through the power supply are routed to three AVR ICs (IC702, IC704, IC705), the DC/DC converter IC (C402) and the power transistor switch (Q5,Q6 : Control unit) for the audio amplifier IC. It is then reduced to 3.8V by the DC/DC converter IC and the signal goes to the three AVR ICs (IC403, IC404, IC405).

5C is common 5V. Unless SAVE is set to OFF, 5V is always output. 5R is 5V for the receive circuitry and 5V is supplied to the RF receive circuit during reception. 5T and 5TB are 5V for the transmit circuitry and 5V is supplied to the RF transmit circuit during transmission. 5M supplies 5V to the shared circuits. 33D mainly provides 3.3V to the microprocessor (IC507), DSP (IC611) I/O section and memory IC (IC508). 25D supplies 2.5V to the DSP core. 33A mainly supplies 3.3V to the A/D converter IC (IC609) for reception and the codec IC (IC608). 33AR provides 3.3V to the 2nd IF amplifier (IC302) for reception.

The power (Vp) switched from the SB by Q5 and Q6 (control unit) supplies approx. 7V to the audio amplifier IC (IC1). The transmit power amplifier power supply (Vd) provides approx. 7.2V from +B through the 3A fuse and current detection resistor.

5. Receiver System

5-1. Front-end RF Amplifier

The signal are passed through an antenna matching coil, where the high-frequency components are amplified by a dual gate FET (Q302). The signals are then fed through the band-pass filter (L302, L307) to reject unwanted signal components, and is fed to the 1st mixer.

5-2. First Mixer

The 1st mixer uses the IC (IC301). The 1st mixer mixes the signal with the signal 1st local oscillator frequency from the VCO, and converts it to the 1st IF (44.85MHz).

The signal then passes through monolithic crystal filter (XF301) to remove unnecessary nearby frequency components. The signal from the MCF is used as the 1st IF signal.
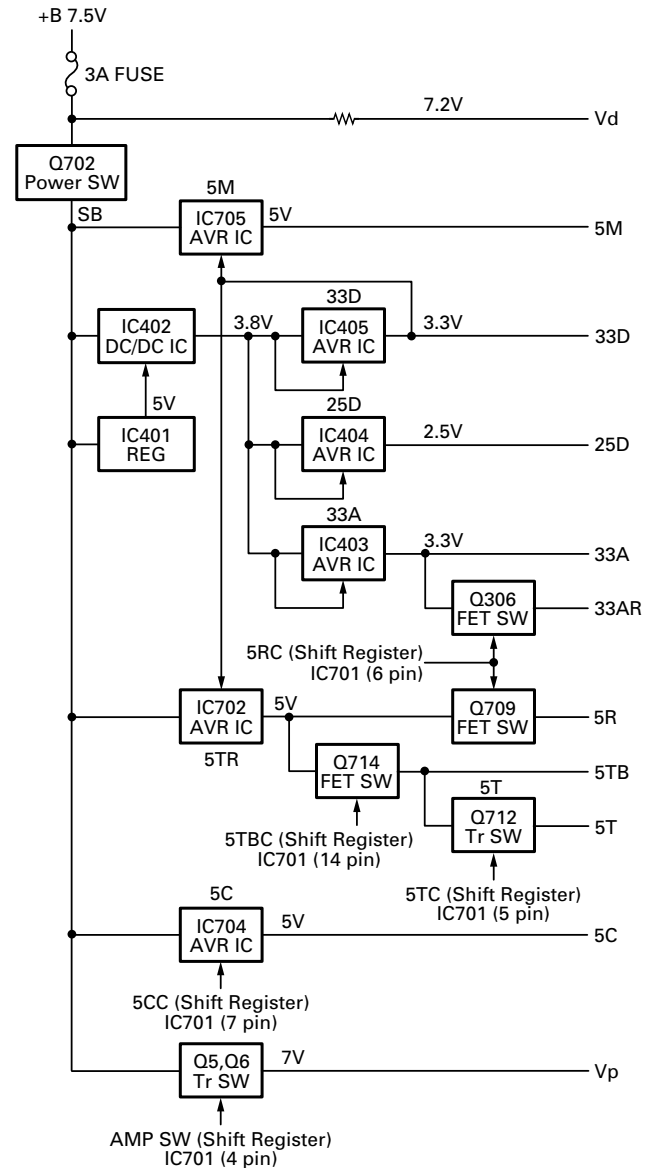
Item	Rating
Nominal center frequency	44.85MHz
Pass bandwidth	±5 to 7kHz at 3dB
Attenuation bandwidth	±25kHz or less at 30dB
Ripple	1.0dB or less
Insertion loss	4dB or less
Guaranteed attenuation	80dB or more at fo±910kHz
	40dB or more within fo±1MHz
Terminating impedance	350Ω/4.5pF

Table 1　Crystal filter XF301 (L71-0588-05)
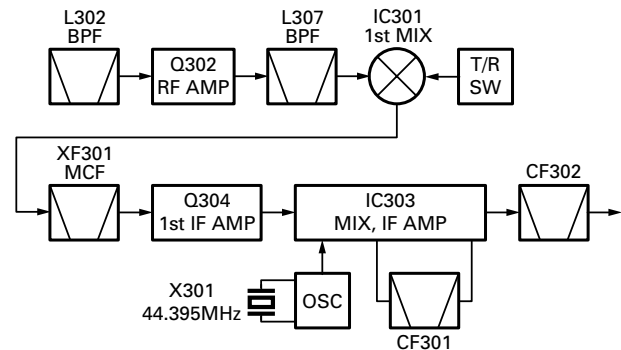

Fig. 3　Power supply circuit

Fig. 4　Receiver system

TK-5400

CIRCUIT DESCRIPTION

5-3. IF Amplifier

The 1st IF signal is amplified (Q304) and fed into IC303 in the MIX, IF AMP IC. The IF signal is then mixed with the 2nd local oscillator frequency of 44.395MHz to generate the 2nd IF of 455kHz. The 455kHz signal is then passed through a ceramic filter (CF301) and fed back into IC303 for additional amplification. Again the 455kHz signal is then passed through a ceramic filter (CF302).

5-4. Digital Signal Processor (DSP) Demodulation Processing

The 455kHz signal that passes through the ceramic filter is amplified to the appropriate value by the 2nd IF amplifier and fed to ADC (pin 6 of IC609). The base band signal A/D-converted at the ADC is processed by the DSP (IC611).

The DSP performs FM demodulation for FM signals and C4FM demodulation for C4FM signals. Then, the base band signal is D/A-converted and an AF signal is output from CODEC (pin 15 of IC608).

The D/A-converted noise component enters the SW (pin 5 of IC706) through CODEC (pin 16 of IC608) and is output as a squelch noise signal.
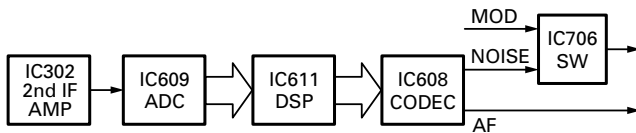

Fig. 5   DSP demodulation processing

5-5. Squelch Circuit

The output from the SW (IC706 pin 6), goes through a low-pass filter (IC601 2/2). The noise component from IC601 (2/2) is amplified by Q602 and rectified by D602 to produce a DC voltage corresponding to the noise level. The DC voltage is fed to the CPU (IC507 pin 88).
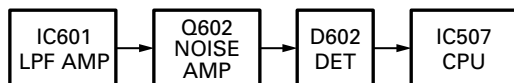

Fig. 6   Squelch circuit

5-6. Audio Amplifier Circuit
• TX-RX unit

The converted D/A signal from IC608 is amplified by AF amplifier IC606 (2/2). The signal then goes through an electronic volume control (IC605), an AF amplifier IC607 (2/2), and an AF switch (Q8 is on and Q7 is on/off the control unit), and is routed to audio power amplifier (IC1 of the control unit), where the signal is amplified and output to the internal speaker.

• Control unit

The audio mute signal (AMP SW) from the microprocessor becomes Low in the standby mode and Q5 and Q6 in the power supply circuit for IC1 are turned off. When the audio outputs, AMP SW becomes High to turn Q5 and Q6 on, and the DC is supplied to power terminal VP of IC1.

Speaker switching is performed by the IC701 (TX-RX unit) using INT AFC or EXT AFC. First, the logic level at the speakers switching terminal (SSW) on the universal connector is fed to the microprocessor (IC507 TX-RX unit). The microprocessor then outputs data to IC701 based on this input.

When there is no SP-MIC installed, this logic level becomes high. When the INT AFC is high, the EXT AFC goes low, so the AF signal is only fed to the amplifier for the internal speaker (INT SP) of IC1.

However, when a SP-MIC has been connected, this logic level becomes low, so the INT AFC goes low and the EXT AFC goes high. In this case, the AF signal is fed only to amplifier for the external speaker (EXT SP) of IC1.
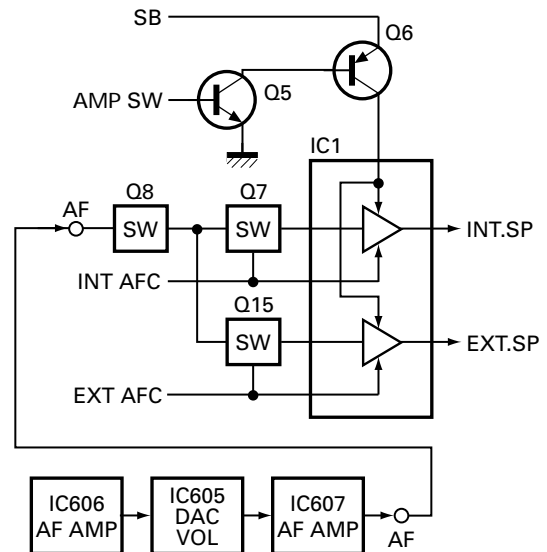

Fig. 7   Audio amplifier circuit

CIRCUIT DESCRIPTION

6. Transmitter System

6-1. Microphone Amplifier

The signal from the noise canceller amplifier (control unit IC3) passes through the MIC changeover circuit (Q711), the mute switch (Q713) and the AGC circuit, and goes to the microphone amplifier IC (IC602).

When an accessory speaker microphone (SP-MIC) is not installed, the microphone switching terminal (MSW/CTS) goes high and the microphone changeover switch (Q711) turns on. When the SP-MIC is installed, the MSW/CTS is connected to GND in the SP-MIC, Q711 turns off, the internal microphone is muted and only the external microphone input is supplied to the microphone amplifier of the TX-RX unit.

The AGC circuit consists of IC602 (1/2), D600, D601, Q600 and Q601. The AGC is operated by using the current obtained by detecting positive or negative polarity of the audio signal amplified by IC602 (1/2) and controlling the positive (+) and negative (–) level of the amplifier.

The transmit audio signal output from IC602 (2/2) is input to pin 3 (AINL) of the codec IC (IC608) and converted from analog to digital. The digitalized transmit audio signal undergoes AGC processing, pre-emphasizing, filtering, vocoding (in APCO mode), and returns to the codec IC (IC608). The signal is converted from digital to analog and an analog signal (C4FM base band signal in APCO mode) is output from pin 16 (AOUTR).

The audio signal that is DSP-processed by the codec IC (IC608) and DSP (IC611) passes through the analog switch (IC706) and amplifier (IC606, IC604) and goes to the D/A converter (IC605). The audio signal whose maximum deviation is adjusted by the D/A converter passes through the AF switch (Q202 is off in TX mode) and goes to VCO modulation input. The audio signal whose modulation balance is adjusted by the D/A converter passes through a buffer amplifier (IC607) and goes to VCXO modulation input.
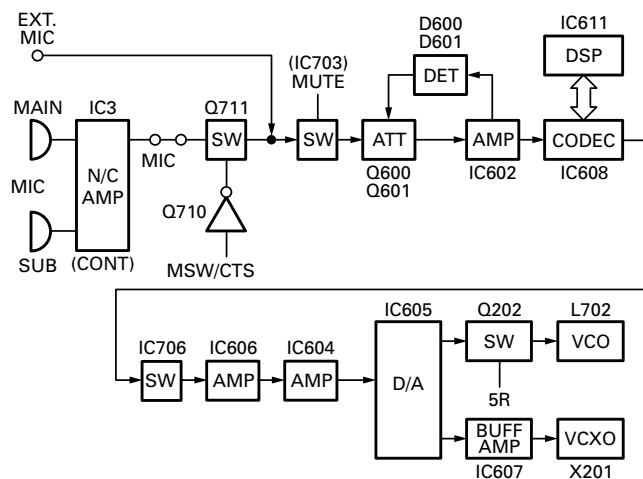
6-2. Noise Cancelling Microphone Circuit

The two signals from INT MIC (Main & Sub) are fed to the positive (+) input (Sub) and to the negative (–) input (Main) of the IC3. If the same signals is fed to both Main and Sub, the Main signal is terminated at the output of IC3 (pin7). In another words, noise from nearby sources not directly connected to the transceiver enters the Main and Sub input at the same signals and is therefore canceled out.

When a signal is only fed to the Main and there is no signal at the Sub, IC3 (pin 7) outputs the Main signal as it is. In other words, only the voice audio of the operator to the Main MIC is input to the Main so that "N/C" switch is set to "L", transistor Q14 is turned off and the Sub microphone also is turned off and the operation is same as above.

6-3. Drive and Final Amplifier

The signal from the T/R switch (D101 is active) is amplified by the pre-drive (Q101) and drive amplifier (Q103) to 50mW. The drive amplifier output is amplified by the RF power amplifier (Q1, Q2, Q3) to 3W (1W when the power is low).

The RF power amplifier has two-stage MOS FET transistor. The output of the RF power amplifier is then passed through the Transmit-Receive (TX-RX) antenna switching (D103 is active) and low-pass filter (LPF) and applied to the antenna terminal.

6-4. APC Circuit

The APC circuit always monitors the current flow through the RF power amplifier (Q1, Q2 or Q3) and maintains a constant current. The voltage drop at R101, R102 and R103 is caused by the current flow through the RF power amplifier and this voltage is applied to the differential amplifier (IC101 1/2).

IC101 (2/2) compares the output voltage of IC101 (1/2) with the reference voltage from IC605. The output of IC101 (2/2) controls the voltages the VGG of the RF power amplifier to make the both voltages to same voltage.

The power high/low switching is carried out by changing the reference voltage. The Q102, Q104 and Q105 are turned on in transmit and the APC circuit is active.
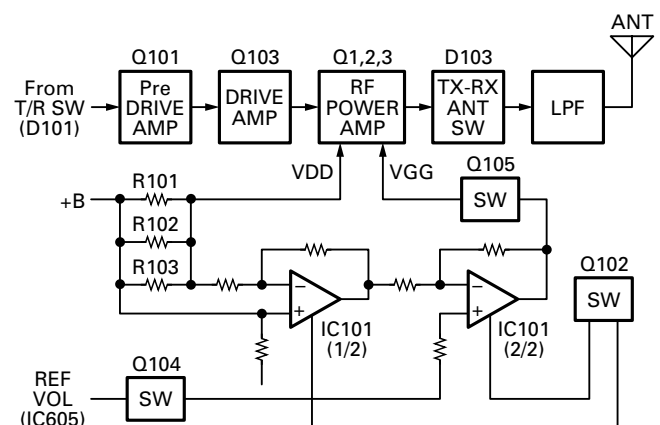

Fig. 8   Microphone amplifier

Fig. 9   Drive and final amplifier and APC circuit

TK-5400

CIRCUIT DESCRIPTION

7. Control Circuit

The control unit has microprocessor IC507, flash memory IC508, and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the control unit. The CPU (IC507) mainly performs the following:
1) Switch between transmission and reception with the PTT signal input.
2) Read a channel, frequency, and program data from the memory circuit.
3) Send a frequency program data to the PLL.
4) Control the audio mute circuit by decode data input.
5) Send serial data to output expander (IC701, IC703) to control various function in the unit.

7-1. CPU

The CPU (IC507) is a 16bit single-chip microprocessor, equipped with a 64k ROM and 10k RAM. This CPU operates at 12.288MHz clock and 3.3V DC. Controls the flash memory IC, the DSP, the receive circuit, the transmitter circuit, the control circuit, and the display circuit and transfers data to or from an external device.

7-2. Memory Circuit

IC508 is a flash memory with 8M bits capacity that stores the transceiver control program for the CPU and the data such as transceiver channels and operating parameters.

This program can be easily written from an external devices. The data, such as DTMF memories and operating parameters, are stored into the EEPROM (IC505).

7-3. Shift Register Circuit

IC701 and 703 are interface ICs for the output port expansion. It is used to expand the CPU (IC507) output ports.
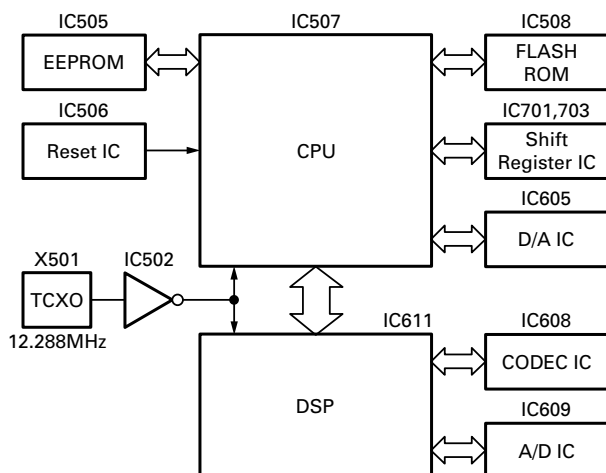
Fig. 10   Control circuit

7-4. D/A Converter

IC605 is used as a conventional semi-fixed-resister converter. It controls the followings:
1) Transmission power
2) Modulation level
3) Audio power
4) Frequency

7-5. Key Input

KI1 or KI2 becomes HIGH when a key is pressed (or Enable signal on the optional circuit).

When KI1 or KI2 becomes HIGH, KI0 also becomes HIGH to trigger the interrupt to IC507 in order to start the key scan.

When the key scan starts, the output terminals (Q1~Q5) become LOW. Only the key sensing circuit remains HIGH. When a key is pressed, the signal routed through KI1 or KI2 to the microprocessor. Then, the microprocessor determines which key is pressed using this signals.
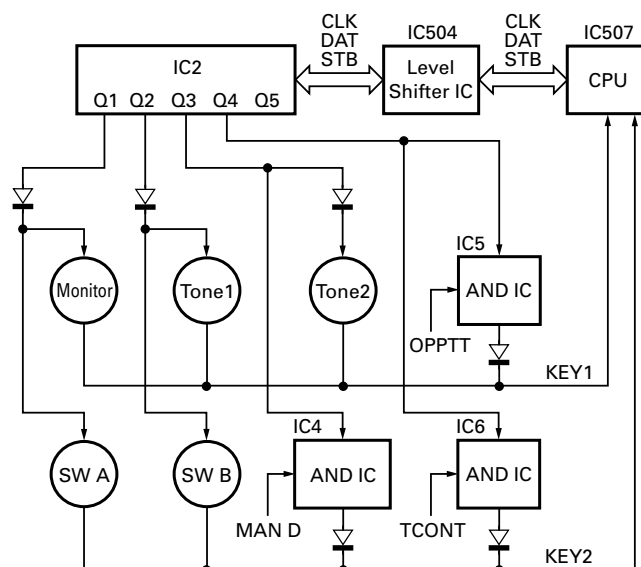
Fig. 11   Key input

7-6. Low Battery Warning

The battery voltage is monitored by the microprocessor (IC507). When the battery voltage falls below the voltage set by the Low battery warning adjustment, the red LED blinks to notify the operator that it is time to replace the battery. If the battery voltage falls even more (approx. 6.0V), a beep sounds and transmission stops.

Low battery warning	Battery condition
The red LED blinks during transmission	The battery voltage is low but the transceiver is still usable.
The red LED blinks and continuous beep sounds while the PTT pressed	The battery voltage is low but the transceiver is not usable to make calls.

CIRCUIT DESCRIPTION / SEMICONDUCTOR DATA

7-7. DSP

The DSP circuit consists of a DSP (IC611), a codec (IC608), and an A/D converter (IC609) and processes the base band signal. The DSP (IC611) operates on an external clock of 12.288MHz (the same as the CPU), the I/O section operates at 3.3V and the core section operates at 2.5V. The DSP carries out the following processes:

- C4FM modulation and demodulation
- Analog FM modulation and demodulation
- Vocoder (IMBE) processing between audio codec and modulation/demodulation
- CAI processing, such as error correction encoding
- QT/DQT encoding/decoding
- DTMF encoding
- Compressor/expander processing
- Transmit/receive audio filtering processing
- VOX processing
- Microphone amplifier AGC processing
- Beep tone generation, audio mute processing
- Modulation level processing

8. Signaling Circuit

8-1. Encode (QT/DQT/DTMF)

Each signaling data signal of QT, DQT and DTMF is generated by the DSP circuit, superposed on a modulation signal and output from pin 16 of the codec IC (IC608).

The modulation balance of the QT/DQT signal is adjusted by the D/A converter (IC605) and the resulting signal is routed to the modulation input of the VCO (L702) and VCXO (X201).

The DTMF deviation of the TX DTMF tone is adjusted by the D/A converter (IC605) and the resulting signal is routed to VCO and VCXO. The RX DTMF tone is output from pin 15 of the codec IC, passes through the receive audio signal system, and is output from the speaker.

8-2. Decode (QT/DQT)

The audio signal is removed from the FM detection signal sent to the DSP circuit and the resulting signal is decoded.

9. Compander Circuit

The term "compander" means compressor and expander. The compander reduces noise by utilizing a compressor and an expander.

The TK-5400 contains DSP IC (IC611) to perform this operation. The TK-5400 compander can be turned on or off using the FPU.

1. PLL : SA7026DH (TX-RX Unit IC204)

1-1. Block Diagram
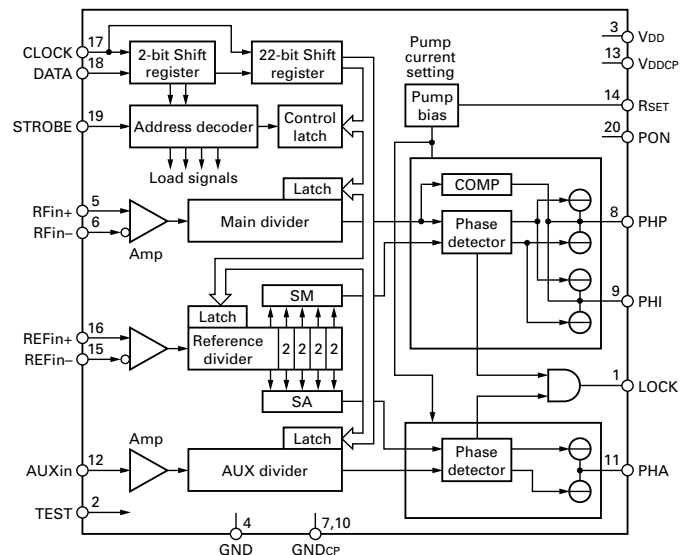
1-2. Pin Function

Pin No.	Pin Name	Function
1	LOCK	Lock detect output
2	TEST	Test (should be either grounded or connected to V_DD)
3	V_DD	Digital supply
4	GND	Digital ground
5	RFin+	RF input to main divider
6	RFin−	RF input to main divider
7	GND_CP	Charge pump ground
8	PHP	Main normal charge pump
9	PHI	Main integral charge pump
10	GND_CP	Charge pump ground
11	PHA	Auxiliary charge pump output
12	AUXin	Input to auxiliary divider
13	V_DDCP	Charge pump supply voltage
14	R_SET	External resistor from this pin to ground sets the charge pump current
15	REFin−	Reference input
16	REFin+	Reference input
17	CLOCK	Programming bus clock input
18	DATA	Programming bus data input
19	STROBE	Programming bus enable input
20	PON	Power down control

TK-5400

SEMICONDUCTOR DATA

2. Microprocessor : 30620M8A-2W4GP (TX-RX Unit IC507)

2-1. Terminal Function

No.	Port Name	I/O	Function	No.	Port Name	I/O	Function
1	P94/DA1/TB41N	I	Not used : GND Pull-down	39	HOLD	I	Not used : Vcc Pull-up
2	(HSDO)	O	HSD Output (Not used)	40	HLDA	O	NC
3	PWR	O	SB Contorol	41	BCLK	O	Not used : Vcc Pull-up
4	SCL	O	EEPROM Clock	42	RD	O	Flash Memory RD bus
5	SDA	I/O	EEPROM Data	43	BHE	O	NC
6	BYTE	I	Data Bus 8 bits	44	WR	O	Flash Memory WR bus
7	CNVss	I	Extended Memory Mode	45	FRBSY	I	Flash Memory RY/BY
8	BSW	O	Battery Detect SW	46	DSPRST	O	DSP RESET
9	(CLKS)	O	Beat Shift (Not used)	47	CS1	O	DSP CS
10	RESET	-	Reset Iuput	48	CS0	O	Flash ROM CS
11	Xout	-	NC	49~59	A19~A9	O	Flash Memory Address bus
12	Vss	-	GND	60	Vcc	-	+3.3V
13	Xin	-	12.288MHz	61	A8	O	Flash Memory Address bus
14	Vcc	-	+3.3V	62	Vss	-	GND
15	NMI	I	Not used : Vcc Pull-up	63~70	A7~A0	O	Flash Memory Address bus
16	BDET (INT2)	I	µ-com Stop Interrupt	71	CH_A	I	Rotary SW 1
17	PSW (INT1)	I	Power Switch Detect	72	CH_B	I	Rotary SW 2
18	HINT (INT0)	I	DSP Interrupt	73	CH_C	I	Rotary SW 3
19	CLKM	O	Common Data	74	CH_D	I	Rotary SW 4
20	DATM	O	Common Clock	75	TGL	I	Toggle SW
21	LDM	O	D/A CS	76	SELF	I	Not used
22	LCDCSM	O	LCD CS	77	DINT	O	DSP Interrupt
23	KESM	O	Key Counter CS	78	UL	I	PLL Lock Detect
24	STBM	O	Shift Register CS	79~86	D7~D0	I/O	Flash Memory Data bus
25	P73	I	Not used : GND Pull-down	87	(SENSB)	I	TX Inhibit
26	SOE	O	Shift Register OE	88	P106/AN6/K23	I	SQL Level
27	PTT	I	PTT	89	CV	I	VCO CV
28	EXSP	I	Ext. SP Install Check	90	(RSSI)	I	RSSI Level
29	DPM	O	PLL Data	91	(TEMP)	I	Temperature
30	CPM	O	PLL Clock	92	BATT	I	Battery Level
31	LEM	O	PLL CS	93	REM	I	SP Key 1/2
32	CTSM	I	CTS	94	Avss	-	GND
33	TXDM	O	TXD	95	VOL	I	Volume Level
34	RXDM	I	RXD	96	Vref	-	+3.3V
35	DSRM	I	DSR	97	Avcc	-	+3.3V
36	RTSM	O	RTS	98	KEY1	I	Key Counter Return 1
37	RDY	I	DSP Ready	99	KEY2	I	Key Counter Return 2
38	ALE	O	NC	100	KEY0	I	Key Input

SEMICONDUCTOR DATA

3. DC/DC Converter : XC6365D103M (TX-RX Unit IC402)

3-1. Block Diagram
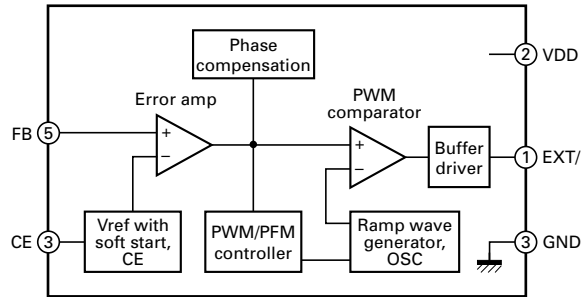
3-2. Pin Assignment

Pin No.	Pin Name	Function
1	EXT/	External transistor connection
2	VDD	Power supply
3	GND	Ground
4	CE	Chip enable
5	FB	Output voltage set-up external

4. VCO : L78-0500-05 (TX-RX Unit L702)

4-1. Schematic Diagram

TK-5400
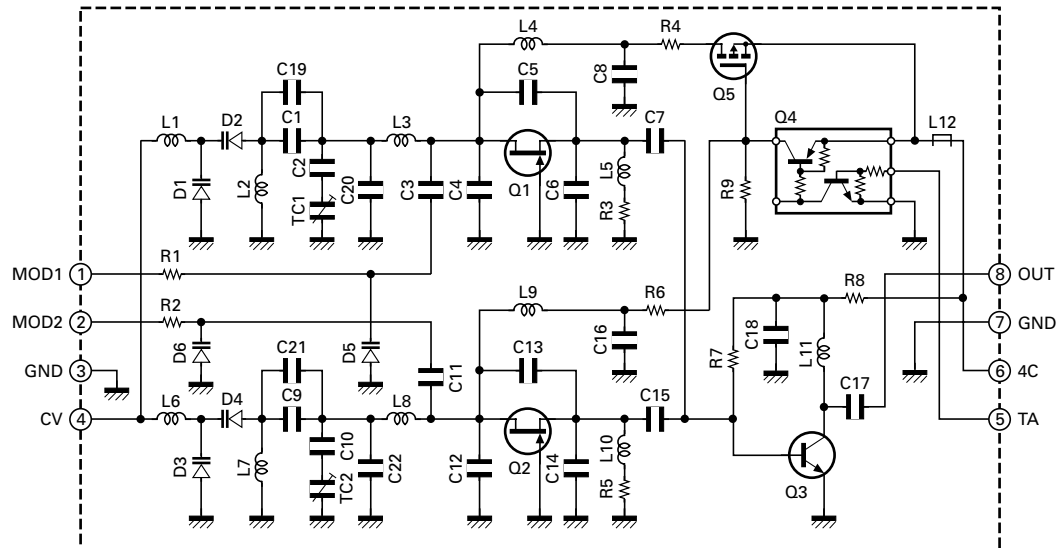
COMPONENTS DESCRIPTION

Control Unit (X53-4030-XX) -10 : K, -11 : K2

Ref. No.	Part Name	Description
IC1	Bi-polar IC	AF Amplifier
IC2	MOS IC	Shift Register
IC3	MOS IC	MIC Noise Canceling Circuit
IC4~6	MOS IC	Option Board Control SW
IC7	MOS IC	Shift Register
IC10	MOS IC	Inverter
IC101	MOS IC	LCD Driver
Q5	Transistor	Power Supply SW Control
Q6	Transistor	AF Amplifier Power Supply SW
Q7	FET	Internal Audio Mute SW
Q8	FET	Audio Mute SW
Q14	Transistor	Noise Canceling SW
Q15	FET	External Audio Mute SW
D2	Zener diode	AVR
D6~9	LED	Back Light
D11~20	Diode	Reverse Current Prevention
D101	Diode	Speed up
D102,103	LED	Back Light
D104	LED	TX/RX LED
D105	Diode	Surge Absorption

TX-RX Unit (X57-6530-10)

Ref. No.	Part Name	Description
IC101	MOS IC	Auto Power Control
IC201~203	MOS IC	Level Converter
IC204	MOS IC	PLL
IC205	MOS IC	DC Amp.
IC301	MOS IC	DBM
IC302	Analog IC	IF Amp.
IC303	Bi-polar IC	Mixer and IF system
IC401	MOS IC	Voltege Detector
IC402	MOS IC	DC/DC Converter
IC403~405	MOS IC	Voltege Regulator
IC502	MOS IC	Buffer
IC504	MOS IC	Level Converter
IC505	ROM IC	EEPROM
IC506	MOS IC	Voltage Detector
IC507	MCU	MPU
IC508	SRAM IC	Flash Memory
IC509~511	MOS IC	Level Converter
IC601~604	MOS IC	Op. Amp.
IC605	MOS IC	D/A Converter
IC606,607	MOS IC	Op. Amp.
IC608	MOS IC	Codec
IC609	MOS IC	A/D Converter
IC611	MPU	DSP
IC701	MOS IC	Shift Register

Ref. No.	Part Name	Description
IC702	MOS IC	Voltage Regulator
IC703	MOS IC	Shift Register
IC704,705	MOS IC	Voltage Regulator
IC706	MOS IC	Dual Bilateral Switch
Q1	FET	RF Driver Amp.
Q2,3	FET	RF Final Amp.
Q101	Transistor	RF Amp.
Q102	Transistor	Switch
Q103	Transistor	RF Amp.
Q104,105	FET	Switch
Q201	Transistor	RF Amp.
Q202	FET	Switch
Q204	Transistor	Filter
Q205,206	Transistor	RF Amp.
Q301	Transistor	RF Switch
Q302	FET	First Amp.
Q304	FET	IF Amp.
Q305	Transistor	Oscillator
Q306	FET	Switch
Q401	FET	DC/DC Converter
Q501	FET	Switch
Q600,601	Transistor	AGC
Q602	Transistor	Noise Amp.
Q701,702	FET	Switch
Q703	Transistor	Switch
Q704	FET	Switch
Q705~707	Transistor	Switch
Q708,709	FET	Switch
Q710	Transistor	Switch
Q711~714	FET	Switch
D101	Diode	Local Switch
D102	Zener diode	Voltage Protection
D103	Diode	Antenna Switch
D105	Diode	Surge Absorption
D201	Diode	Filter
D202	Diode	Local Switch
D301,302	Diode	Attenuater
D401	Diode	DC/DC Converter
D402,403	Diode	Output Stabilization
D501,502	Diode	Reverse Current Protection
D504	Diode	Diode OR Circuit
D600,601	Diode	AGC
D602	Diode	Rectification
D603	Diode	Reverse Current Protection
D701	Diode	Reverse Protection
D702	Diode	Regulator
D703	Diode	Diode OR Circuit
D704,705	Zener diode	Surge Absorption

PARTS LIST

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

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

TK-5400 (Y50-5680-XX)
CONTROL UNIT (X53-4030-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
			TK-5400 (Y50-5680-XX)		
1	1B	✱	A02-3786-13	CABINET ASSY	K
1	1A	✱	A02-3787-13	CABINET ASSY (WITH DTMF KEY)	K2
2	3A	✱	A10-4056-03	CHASSIS	
3	3B		A22-2501-25	SUB PANEL	
4	3B		A62-0537-53	PANEL ASSY	
6	1C		B03-0594-04	DRESSING PLATE ACCESSORY	
7	1C		B09-0363-03	CAP ACCESSORY	
8	2B		B11-1183-14	ILLUMINATION GUIDE	
9	2B		B38-0786-05	LCD	
10	1D	✱	B62-1606-00	INSTRUCTION MANUAL	
11	3A	✱	B72-2066-04	MODEL NAME PLATE	
13	1D		D32-0421-24	STOPPER ACCESSORY	
15	2B		E23-1102-14	TERMINAL (CONT-GND)	
16	3A		E23-1163-04	BATT TERMINAL	
17	2B		E29-1165-05	INTER CONNECTOR (LCD)	
-			E30-3325-05	TRUNK CABLE	
19	2B		E37-0682-05	FLAT CABLE (TX/RX-CONT)	
20	1A,1B		E37-0684-05	LEAD WIRE WITH CONNECTOR (SP)	
21	2B		E37-0692-05	PROCESSED LEAD WIRE (TOGGLE SW)	
22	2A		E37-0722-05	RF COXIAL CABLE	
23	3A		E58-0440-05	UNIVERSAL CONNECTOR	
24	3A		E72-0411-04	TERMINAL BLOCK (BATT+)	
26	3A	✱	F10-2429-04	SHIELDING CASE (FINAL AMP)	
27	2A	✱	F10-2430-03	SHIELDING CASE (TX/RX)	
28	2A	✱	F10-2431-03	SHIELDING CASE (TX/RX)	
30	2A,1B		G01-0891-04	COIL SPRING (BATT RELEASE)	
31	2B		G11-2554-04	SHEET (TOP KEY)	
32	3B		G11-2555-04	SHEET (TOGGLE SW)	
33	3B		G11-4095-04	SHEET (SUB PANEL)	
34	2A	✱	G11-4210-14	SHEET (SHIELDING CASE)	
35	2A	✱	G11-4211-04	SHEET (SHIELDING CASE)	
36	2B		G11-4241-04	SHEET (TOGGLE SW)	
37	2A		G11-4242-04	SHEET (TX/RX)	
38	3A		G11-4243-04	SHEET (TX/RX)	
39	3A		G13-1678-04	CUSHION (TX/RX)	
40	1C		G13-1688-04	CUSHION (CAP)	
41	3B		G13-1772-04	CUSHION (SUB PANEL)	
42	3A		G13-1800-04	CUSHION (BATT TERMINAL)	
43	2B	✱	G13-1942-04	CUSHION (CONT)	
44	3A	✱	G13-1946-04	CUSHION (TX/RX)	
45	2A	✱	G13-1947-04	CUSHION (TX/RX)	
46	2B	✱	G13-1955-04	CUSHION (CONT)	
47	2B	✱	G13-1956-04	CUSHION (CONT)	
48	3A		G53-0822-04	PACKING (PANEL-SUB PANEL)	
49	1B		G53-0823-04	PACKING (SPEAKER)	
50	2B		G53-0874-03	PACKING (RING)	
51	3A		G53-1511-04	PACKING (TERMINAL BLOCK)	
52	3A		G53-1518-04	PACKING (BATT TERMINAL)	
54	2C		H12-3018-02	PACKING FIXTURE	
55	1C		H25-0029-04	PROTECTION BAG (60/110/0.07)	
56	3D	✱	H52-1880-02	ITEM CARTON CASE	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
58	2A,1B		J19-5330-14	HOLDER (BATT RELEASE)	
-			J21-8326-14	HARDWARE FIXTURE (SIDE KEY)	
60	2B		J21-8328-14	HARDWARE FIXTURE (LCD)	
61	2B		J21-8329-14	HARDWARE FIXTURE (CONT)	
62	3B		J21-8343-14	HARDWARE FIXTURE (TOP KEY)	
63	1A,1B		J21-8426-04	HARDWARE FIXTURE (SIDE KEY)	
64	1A,1B		J21-8446-04	HARDWARE FIXTURE (SIDE KEY)	
65	1C		J29-0652-35	BELT CLIP ACCESSORY	
6	1A,1B		J82-0047-15	FPC (SIDE KEY)	
67	3A		J82-0049-15	FPC (VOL-ENC)	
68	3A		J82-0052-15	FPC (UNIVERSAL CONNECTOR)	
69	2B		J99-0346-24	ADHESIVE TAPE (TOGGLE SW)	
71	3B		K29-5172-32	KEY TOP (TOP KEY)	
72	2A		K29-5193-23	KEY TOP (DTMF)	K2
73	2A,1B		K29-9250-03	LEVER KNOB (BATT RELEASE)	
74	3B		K29-5282-14	KNOB ASSY (ENCODER)	
75	3B		K29-5283-14	KNOB ASSY (VOLUME)	
76	1A,1B		K29-5441-14	KNOB ASSY (SIDE KEY)	
77	1A,1B		K29-9139-13	KNOB TOP (SIDE KEY)	
A	3B		N14-0578-04	CIRCULAR NUT (VOL/ENC)	
B	3B		N14-0594-04	CIRCULAR NUT (ANT CONNECTOR)	
C	3A		N30-2608-45	PAN HEAD MACHINE SCREW	
D	2A		N35-2605-45	BINDING HEAD MACHINE SCREW	
E	1A,1B		N78-2030-46	PAN HEAD TAPTITE SCREW	
F	3A		N79-2035-46	PAN HEAD TAPTITE SCREW	
G	2B,3B		N83-2004-45	PAN HEAD TAPTITE SCREW	
H	2A,2B		N83-2005-46	PAN HEAD TAPTITE SCREW	
79	1C		N99-2004-05	SCREW SET ACCESSORY	
81	3A		R31-0638-05	VARIABLE RESISTOR	
83	3A		S60-0408-15	ROTARY SWITCH	
84	2B		S72-0402-05	TOGGLE SWITCH	
86	1A,1B		T07-0349-05	SPEAKER	
87	2B		T91-0575-05	MIC ELEMENT	
-			W01-0441-05	FOR SERVICE KIT	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
			CONTROL UNIT (X53-4030-XX) -10 : K -11 : K2		
D6-9			B30-2171-05	LED	K2
D102,103		✱	B30-2231-05	LED	
D104			B30-2019-05	LED	
C1-5			CK73GB1H471K	CHIP C 470PF K	
C8			CK73FB1C474K	CHIP C 0.47UF K	
C12,13			CK73FB1C474K	CHIP C 0.47UF K	
C14			CK73FB1C104KTD	CHIP C 0.10UF K	
C15			CK73GB1H471K	CHIP C 470PF K	
C16			C92-0734-05	CHIP-TAN 100UF 10WV	
C19			CK73FB1C474K	CHIP C 0.47UF K	
C22			CK73GB1H471K	CHIP C 470PF K	
C27-29			CK73GB1C104K	CHIP C 0.10UF K	
C30			CK73FB1C474K	CHIP C 0.47UF K	
C31			CK73GB1E223K	CHIP C 0.022UF K	

PARTS LIST

CONTROL UNIT (X53-4030-XX)
TX-RX UNIT (X57-6530-10)

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
C32			CK73FB1C474K	CHIP C	0.47UF	K		
C33,34			CK73GB1H471K	CHIP C	470PF	K		
C35			CK73GB1H102K	CHIP C	1000PF	K		
C37			CC73GCH1H101J	CHIP C	100PF	J		
C38,39			CK73GB1H471K	CHIP C	470PF	K		
C43			CK73GB1H471K	CHIP C	470PF	K		
C45,46			CK73GB1H471K	CHIP C	470PF	K		
C103			CK73GB1H102K	CHIP C	1000PF	K		
C104,105			CC73GCH1H101J	CHIP C	100PF	J		
C106			C92-0602-05	CHIP-TAN	1.0UF	10WV		
CN1			E40-5947-05	FLAT CABLE CONNECTOR				
CN3			E40-5948-05	FLAT CABLE CONNECTOR				
CN4			E40-5662-05	PIN ASSY SOCKET				
CN101			E40-5920-05	FLAT CABLE CONNECTOR				
CN501			E04-0403-05	PIN SOCKET				
L1-4			L92-0141-05	FERRITE CHIP				
L6			L92-0149-05	FERRITE CHIP				
L101			L92-0138-05	FERRITE CHIP				
CP1			R90-0723-05	MULTI-COMP	47K X2			
R1			RK73GB1J273J	CHIP R	27K	J	1/16W	
R2			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R3			RK73GB1J470J	CHIP R	47	J	1/16W	
R4,5			RK73GB1J473J	CHIP R	47K	J	1/16W	
R6-8			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R9,10			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R11			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R12			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R13			RK73GB1J473J	CHIP R	47K	J	1/16W	
R14			RK73GB1J104J	CHIP R	100K	J	1/16W	
R15			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R17,18			RK73GB1J473J	CHIP R	47K	J	1/16W	
R19,20			RK73GB1J101J	CHIP R	100	J	1/16W	K2
R22,23			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R26-28			RK73GB1J103J	CHIP R	10K	J	1/16W	
R29,30			RK73GB1J223J	CHIP R	22K	J	1/16W	
R31			R92-1252-05	CHIP R	0 OHM	J	1/16W	K2
R32			RK73GB1J680J	CHIP R	68	J	1/16W	
R33			RK73GB1J223J	CHIP R	22K	J	1/16W	
R34			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R35			RK73GB1J103J	CHIP R	10K	J	1/16W	
R36			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R37-42			RK73GB1J102J	CHIP R	1.0K	J	1/16W	K2
R43,44			RK73GB1J473J	CHIP R	47K	J	1/16W	
R45-49			RK73GB1J102J	CHIP R	1.0K	J	1/16W	K
R45-55			RK73GB1J102J	CHIP R	1.0K	J	1/16W	K2
R56			RK73GB1J153J	CHIP R	15K	J	1/16W	
R57			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R59			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R60			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R63,64			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R66-68			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R101			RK73GB1J104J	CHIP R	100K	J	1/16W	
R102-104			RK73GB1J103J	CHIP R	10K	J	1/16W	
R105			RK73GB1J471J	CHIP R	470	J	1/16W	
R106			RK73GB1J274J	CHIP R	270K	J	1/16W	
R107			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R108			RK73GB1J100J	CHIP R	10	J	1/16W	
R502			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
D2			DTZ3.9(B)	ZENER DIODE				

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
D2			UDZ3.9(B)	ZENER DIODE				
D11			IMN10	DIODE				K2
D12,13			MA2S111	DIODE				
D14			IMN10	DIODE				K2
D15			MA2S111	DIODE				
D16			IMN10	DIODE				K
D16-18			IMN10	DIODE				K2
D19,20			MA2S111	DIODE				
D101			1SS373	DIODE				
D105			NNCD6.8G	ZENER DIODE				
IC1			TDA7053AT	BI-POLAR IC				
IC2			BU4094BCFV	MOS IC				
IC3			NJM2904V	MOS IC				
IC4-6			TC7SH08FU	MOS IC				
IC7			BU4094BCFV	MOS IC				K2
IC10			TC7W04FU	MOS IC				
IC101			LC75824W	MOS IC				
Q5			2SC4617(S)	TRANSISTOR				
Q6			2SB798(DL,DK)	TRANSISTOR				
Q7,8			2SK1824	FET				
Q14			UMC4N	TRANSISTOR				
Q15			2SK1824	FET				

TX-RX UNIT (X57-6530-10)

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
C1,2			CC73HCH1H101J	CHIP C	100PF	J		
C3			CK73GB1C104K	CHIP C	0.10UF	K		
C4			CC73HCH1H090D	CHIP C	9.0PF	D		
C5			CC73HCH1H101J	CHIP C	100PF	J		
C6			CC73HCH1H060D	CHIP C	6.0PF	D		
C8			CC73HCH1H101J	CHIP C	100PF	J		
C10		*	C92-0793-05	CHIP-TAN	2.2UF	16WV		
C12			CC73GCH1H101J	CHIP C	100PF	J		
C13			CC73GCH1H040C	CHIP C	4.0PF	C		
C14,15			CC73HCH1H040C	CHIP C	4.0PF	C		
C16,17			CC73HCH1H101J	CHIP C	100PF	J		
C18			CK73GB1C104K	CHIP C	0.10UF	K		
C19,20			CC73HCH1H100D	CHIP C	10PF	D		
C21			CC73HCH1H101J	CHIP C	100PF	J		
C22,23			CC73GCH1H050C	CHIP C	5.0PF	C		
C24,25			CC73FCH1H150J	CHIP C	15PF	J		
C26			CC73HCH1H101J	CHIP C	100PF	J		
C27			CK73GB1C104K	CHIP C	0.10UF	K		
C28,29			CC73GCH1H080D	CHIP C	8.0PF	D		
C30,31			CC73GCH1H101J	CHIP C	100PF	J		
C32,33			CC73GCH1H2R5C	CHIP C	2.5PF	C		
C34			CC73FCH1H040C	CHIP C	4.0PF	C		
C35			CC73GCH1H101J	CHIP C	100PF	J		
C101,102			CC73GCH1H101J	CHIP C	100PF	J		
C103			C92-0784-05	CHIP-TAN	22UF	20WV		
C104-108			CC73GCH1H101J	CHIP C	100PF	J		
C109			CC73GCH1H040C	CHIP C	4.0PF	C		
C110-112			CC73GCH1H101J	CHIP C	100PF	J		
C113			CC73GCH1H030C	CHIP C	3.0PF	C		
C114			CC73GCH1H101J	CHIP C	100PF	J		
C117			CC73GCH1H101J	CHIP C	100PF	J		
C118			CK73GB1C104K	CHIP C	0.10UF	K		
C119			CC73GCH1H101J	CHIP C	100PF	J		
C120			C92-0784-05	CHIP-TAN	4.7UF	10WV		

PARTS LIST

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
C121			C92-0628-05	CHIP-TAN	10UF	10WV	
C124			CC73GCH1H101J	CHIP C	100PF	J	
C125			CK73FB1C474K	CHIP C	0.47UF	K	
C126,127			CC73GCH1H101J	CHIP C	100PF	J	
C128			CC73GCH1H040C	CHIP C	4.0PF	C	
C129			CC73GCH1H030C	CHIP C	3.0PF	C	
C130			CC73GCH1H101J	CHIP C	100PF	J	
C131			CC73GCH1H1R5C	CHIP C	1.5PF	C	
C132			CC73GCH1H2R5C	CHIP C	2.5PF	C	
C133			CC73GCH1H010C	CHIP C	1.0PF	C	
C134			C92-0784-05	CHIP-TAN	4.7UF	10WV	
C135			CC73GCH1H040C	CHIP C	4.0PF	C	
C200			CC73GCH1H080D	CHIP C	8.0PF	D	
C201			CC73GCH1H101J	CHIP C	100PF	J	
C202			CK73GB1H102K	CHIP C	1000PF	K	
C204,205			CC73GCH1H100D	CHIP C	10PF	D	
C207			CC73GCH1H101J	CHIP C	100PF	J	
C208			CK73GB1C104K	CHIP C	0.10UF	K	
C209			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C211			CK73GB1H102K	CHIP C	1000PF	K	
C212-215			CC73GCH1H101J	CHIP C	100PF	J	
C216			CC73GCH1H020C	CHIP C	2.0PF	C	
C217			CC73GCH1H010C	CHIP C	1.0PF	C	
C218			CC73GCH1H1R5C	CHIP C	1.5PF	C	
C220			CC73GCH1H101J	CHIP C	100PF	J	
C221			C92-0001-05	CHIP C	0.1UF	35WV	
C222			CK73GB1E223K	CHIP C	0.022UF	K	
C223			CC73GCH1H101J	CHIP C	100PF	J	
C225,226			CC73GCH1H101J	CHIP C	100PF	J	
C228,229			CC73GCH1H101J	CHIP C	100PF	J	
C230			C92-0507-05	CHIP-TAN	4.7UF	6.3WV	
C231			CC73GCH1H100D	CHIP C	10PF	D	
C232			CC73GCH1H040C	CHIP C	4.0PF	C	
C233			CC73GCH1H070D	CHIP C	7.0PF	D	
C238,239			CC73GCH1H101J	CHIP C	100PF	J	
C240			C92-0662-05	CHIP-TAN	15UF	6.3WV	
C241			CC73GCH1H100D	CHIP C	10PF	D	
C242			CC73GCH1H101J	CHIP C	100PF	J	
C243			CC73GCH1H040C	CHIP C	4.0PF	C	
C248			CC73GCH1H101J	CHIP C	100PF	J	
C249			CK73GB1H102K	CHIP C	1000PF	K	
C250-252			CC73GCH1H101J	CHIP C	100PF	J	
C253			CC73GCH1H040C	CHIP C	4.0PF	C	
C254			CC73GCH1H101J	CHIP C	100PF	J	
C255			CC73GCH1H1R5C	CHIP C	1.5PF	C	
C301,302			CC73GCH1H101J	CHIP C	100PF	J	
C304			CC73GCH1H101J	CHIP C	100PF	J	
C305			CK73GB1H102K	CHIP C	1000PF	K	
C307			CC73GCH1H101J	CHIP C	100PF	J	
C309			CC73GCH1H040C	CHIP C	4.0PF	C	
C310-313			CC73GCH1H101J	CHIP C	100PF	J	
C314			CC73GCH1HR75C	CHIP C	0.75PF	C	
C315			CK73GB1H102K	CHIP C	1000PF	K	
C318			CC73GCH1H020C	CHIP C	2.0PF	C	
C327			CC73GCH1H151J	CHIP C	150PF	J	
C328			CC73GCH1H101J	CHIP C	100PF	J	
C330,331			CC73GCH1H101J	CHIP C	100PF	J	
C332,333			CK73GB1C104K	CHIP C	0.10UF	K	
C334			CC73GCH1H151J	CHIP C	150PF	J	
C337			CK73GB1H102K	CHIP C	1000PF	K	

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
C338,339			CK73GB1E103K	CHIP C	0.010UF	K	
C340			CC73GCH1H120J	CHIP C	12PF	J	
C341			CC73GCH1H010C	CHIP C	1.0PF	C	
C342			CK73GB1H102K	CHIP C	1000PF	K	
C343			CK73GB1C104K	CHIP C	0.10UF	K	
C344			CC73GCH1H030C	CHIP C	3.0PF	C	
C345,346			CC73GCH1H220J	CHIP C	22PF	J	
C347			CK73GB1C104K	CHIP C	0.10UF	K	
C349,350			CK73GB1C104K	CHIP C	0.10UF	K	
C351			CC73GCH1H030C	CHIP C	3.0PF	C	
C353,354			CK73GB1E103K	CHIP C	0.010UF	K	
C355			CC73GCH1H010C	CHIP C	1.0PF	C	
C356			CK73GB1E103K	CHIP C	0.010UF	K	
C357			CK73GB1C104K	CHIP C	0.10UF	K	
C359			CK73GB1E223K	CHIP C	0.022UF	K	
C360			CK73GB1C104K	CHIP C	0.10UF	K	
C361			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C362,363			CK73GB1C104K	CHIP C	0.10UF	K	
C401		*	C92-0794-05	CHIP-TAN	22UF	20WV	
C402			CK73GB1E103K	CHIP C	0.010UF	K	
C403,404			CK73FB1C105K	CHIP C	1.0UF	K	
C405			CC73GCH1H820J	CHIP C	82PF	J	
C406			C92-1431-05	CHIP C	33UF	16WV	
C407			CK73GB1C104K	CHIP C	0.10UF	K	
C408			CK73FB1C105K	CHIP C	1.0UF	K	
C411,412			CC73GCH1H101J	CHIP C	100PF	J	
C413,414			CK73FB0J475K	CHIP C	4.7UF	K	
C416			CC73GCH1H101J	CHIP C	100PF	J	
C417			CK73FB0J475K	CHIP C	4.7UF	K	
C500,501			CK73GB1E103K	CHIP C	0.010UF	K	
C503			CK73GB1E103K	CHIP C	0.010UF	K	
C504,505			CK73GB1C104K	CHIP C	0.10UF	K	
C506			CK73GB1E103K	CHIP C	0.010UF	K	
C509			CK73GB1C104K	CHIP C	0.10UF	K	
C510			CC73GCH1H101J	CHIP C	100PF	J	
C511-513			CK73GB1C104K	CHIP C	0.10UF	K	
C604			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C605			CK73FB1A105K	CHIP C	1.0UF	K	
C606			CC73GCH1H101J	CHIP C	100PF	J	
C607			CK73FB1A105K	CHIP C	1.0UF	K	
C609			CK73GB1H102K	CHIP C	1000PF	K	
C610			CK73GB1H471K	CHIP C	470PF	K	
C611			CK73GB1H122K	CHIP C	1200PF	K	
C612			CK73GB1C104K	CHIP C	0.10UF	K	
C613			CK73GB1E103K	CHIP C	0.010UF	K	
C614			C92-0003-05	CHIP-TAN	0.47UF	25WV	
C615,616			CC73GCH1H101J	CHIP C	100PF	J	
C617			CC73GCH1H391J	CHIP C	390PF	J	
C619			CC73GCH1H101J	CHIP C	100PF	J	
C620			CK73GB1H562K	CHIP C	5600PF	K	
C621			CK73GB1C104K	CHIP C	0.10UF	K	
C623			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C624			CK73FB1A105K	CHIP C	1.0UF	K	
C625,626			CK73GB1C104K	CHIP C	0.10UF	K	
C628			C92-0713-05	CHIP-TAN	6.3UF	10WV	
C629			CK73GB1H222K	CHIP C	2200PF	K	
C630			CK73GB1C104K	CHIP C	0.10UF	K	
C631			C92-0713-05	CHIP-TAN	6.3UF	10WV	
C632			CK73GB1C104K	CHIP C	0.10UF	K	
C633			CC73GCH1H331J	CHIP C	330PF	J	

PARTS LIST

TX-RX UNIT (X57-6530-10)

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
C634			CC73GCH1H121J	CHIP C	120PF	J		
C635			CK73GB1H471K	CHIP C	470PF	K		
C638			CK73GB1H102K	CHIP C	1000PF	K		
C639,640			CK73GB1C104K	CHIP C	0.10UF	K		
C641			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C642			CK73FB1A105K	CHIP C	1.0UF	K		
C643,644			CK73GB1H471K	CHIP C	470PF	K		
C645			CK73GB1C104K	CHIP C	0.10UF	K		
C646			CK73GB1E103K	CHIP C	0.010UF	K		
C647			CK73FB0J475K	CHIP C	4.7UF	K		
C648			C92-0501-05	CHIP-TAN	1.5UF	10WV		
C649			CK73GB1E103K	CHIP C	0.010UF	K		
C650			CK73FB0J475K	CHIP C	4.7UF	K		
C651			C92-0501-05	CHIP-TAN	1.5UF	10WV		
C652			CK73GB1H471K	CHIP C	470PF	K		
C653,654			CK73GB1E103K	CHIP C	0.010UF	K		
C655			CK73GB1H471K	CHIP C	470PF	K		
C656			CK73GB1E103K	CHIP C	0.010UF	K		
C657			CK73GB1H471K	CHIP C	470PF	K		
C658			CK73FB1A105K	CHIP C	1.0UF	K		
C659			CK73GB1C104K	CHIP C	0.10UF	K		
C660			CK73GB1H471K	CHIP C	470PF	K		
C661			CK73FB1A105K	CHIP C	1.0UF	K		
C662			CK73GB1E103K	CHIP C	0.010UF	K		
C663,664			CK73GB1C333K	CHIP C	0.033UF	K		
C665			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C666			CK73GB1C104K	CHIP C	0.10UF	K		
C667			CK73GB1H682K	CHIP C	6800PF	K		
C668			CC73GCH1H331J	CHIP C	330PF	J		
C669			CK73GB1H102K	CHIP C	1000PF	K		
C670,671			CK73GB1C104K	CHIP C	0.10UF	K		
C672			C92-0713-05	CHIP-TAN	6.3UF	10WV		
C673			CK73GB1A224K	CHIP C	0.22UF	K		
C674			CK73GB1E103K	CHIP C	0.010UF	K		
C675			CK73FB1C474K	CHIP C	0.47UF	K		
C677			CK73GB1H102K	CHIP C	1000PF	K		
C701-713			CC73GCH1H101J	CHIP C	100PF	J		
C714			CK73GB1H471K	CHIP C	470PF	K		
C715,716			CC73GCH1H101J	CHIP C	100PF	J		
C718			CK73GB1C104K	CHIP C	0.10UF	K		
C719,720			CC73GCH1H101J	CHIP C	100PF	J		
C721			CK73FB1C105K	CHIP C	1.0UF	K		
C722		*	C92-0794-05	CHIP-TAN	22UF	20WV		
C723			C92-0514-05	CHIP-TAN	2.2UF	10WV		
C724-727			CC73GCH1H101J	CHIP C	100PF	J		
C728			C92-0628-05	CHIP-TAN	10UF	10WV		
C729-731			CC73GCH1H101J	CHIP C	100PF	J		
C732			C92-0565-05	CHIP-TAN	6.8UF	10WV		
C733			CK73FB1A105K	CHIP C	1.0UF	K		
C734			C92-0560-05	CHIP-TAN	10UF	6.3WV		
C735,736			CC73GCH1H101J	CHIP C	100PF	J		
C737			C92-0628-05	CHIP-TAN	10UF	10WV		
C738			CC73GCH1H101J	CHIP C	100PF	J		
CN101			E04-0410-05	PIN SOCKET				
CN701			E40-5856-05	FLAT CABLE CONNECTOR				
CN702			E40-5947-05	FLAT CABLE CONNECTOR				
CN703			E40-5563-05	FLAT CABLE CONNECTOR				
CN704,705			E23-0342-05	TEST TERMINAL				
F701			F53-0143-05	FUSE				

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
CF301,302			L72-0916-05	CERAMIC FILTER				
L1		*	L40-2763-69	SMALL FIXED INDUCTOR (2.7NH)				
L2		*	L40-6869-98	SMALL FIXED INDUCTOR (6.8NH)				
L4,5		*	L40-1275-69	SMALL FIXED INDUCTOR (12.0NH)				
L6,7		*	L40-1863-69	SMALL FIXED INDUCTOR (1.8NH)				
L8,9			L34-4573-05	AIR-CORE COIL				
L10,11			L41-3369-16	SMALL FIXED INDUCTOR				
L12,13		*	L41-1271-16	SMALL FIXED INDUCTOR				
L14		*	L92-0419-05	FERRITE CHIP				
L101,102			L40-5663-92	SMALL FIXED INDUCTOR (5.6NH)				
L103			L92-0138-05	FERRITE CHIP				
L104			L92-0149-05	FERRITE CHIP				
L105,106			L40-6875-54	SMALL FIXED INDUCTOR (68NH)				
L107			L33-0761-05	SMALL FIXED INDUCTOR				
L108			L79-1468-05	FILTER MODULE				
L109			L33-0760-05	SMALL FIXED INDUCTOR				
L110,111			L33-0791-05	SMALL FIXED INDUCTOR				
L200			L40-1575-92	SMALL FIXED INDUCTOR (15NH)				
L201			L40-4791-37	SMALL FIXED INDUCTOR (4.700UH)				
L202,203			L92-0140-05	FERRITE CHIP				
L204			L92-0138-05	FERRITE CHIP				
L205			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)				
L206			L92-0138-05	FERRITE CHIP				
L207,208			L40-2763-92	SMALL FIXED INDUCTOR (2.7NH)				
L211,212			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)				
L213			L40-1575-92	SMALL FIXED INDUCTOR (15NH)				
L215			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)				
L217			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)				
L301			L40-1075-92	SMALL FIXED INDUCTOR (10NH)				
L302			L79-1464-05	DIELECTRIC FILTER				
L303			L40-5663-92	SMALL FIXED INDUCTOR (5.6NH)				
L304			L40-2275-92	SMALL FIXED INDUCTOR (22NH)				
L305			L40-6865-92	SMALL FIXED INDUCTOR (6.8NH)				
L306			L40-5663-92	SMALL FIXED INDUCTOR (5.6NH)				
L307			L79-1465-05	DIELECTRIC FILTER				
L311			L40-8275-44	SMALL FIXED INDUCTOR (82.0NH)				
L312			L39-1272-05	TOROIDAL COIL				
L315			L39-1272-05	TOROIDAL COIL				
L316			L92-0140-05	FERRITE CHIP				
L317			L39-1272-05	TOROIDAL COIL				
L318			L40-8275-44	SMALL FIXED INDUCTOR (82.0NH)				
L321			L40-8281-37	SMALL FIXED INDUCTOR (0.820UH)				
L323			L40-1095-34	SMALL FIXED INDUCTOR (1UH)				
L401,402			L33-1413-05	CHOKE COIL				
L501-503			L92-0138-05	FERRITE CHIP				
L601,602			L92-0140-05	FERRITE CHIP				
L701			L92-0136-05	FERRITE CHIP				
L702		*	L78-0500-05	VCO (806-870MHZ)				
X201		*	L77-1909-05	VCXO (16.8MHZ)				
X301			L77-1760-15	CRYSTAL RESONATOR (44.395MHZ)				
X501		*	L77-1880-05	TCXO (12.288MHZ)				
XF301			L71-0588-05	MCF (44.85MHZ)				
CP501,502			RK75HA1J102J	CHIP-COM 1.0K	J	1/16W		
CP503			RK75HA1J473J	CHIP-COM 47K	J	1/16W		
CP505-508			RK75HA1J102J	CHIP-COM 1.0K	J	1/16W		
CP509-511			RK75HA1J473J	CHIP-COM 47K	J	1/16W		
R2			RK73HB1J391J	CHIP R	390	J	1/16W	
R3			RK73HB1J100J	CHIP R	10	J	1/16W	
R4			R92-1368-05	CHIP R	0 OHM			

PARTS LIST

TX-RX UNIT (X57-6530-10)

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
R6			RK73GB1J101J	CHIP R	100	J	1/16W	
R7			RK73HB1J682J	CHIP R	6.8K	J	1/16W	
R8,9		✳	RK73HB1J3R3J	CHIP R	3.3	J	1/16W	
R10			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R11			RK73FB2A101J	CHIP R	100	J	1/10W	
R12			R92-1368-05	CHIP R	0 OHM			
R101-103			RK73EB2ER39K	CHIP R	0.39	K	1/4W	
R104,105			RN73GH1J154D	CHIP R	150K	D	1/16W	
R106			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R107			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R108			RK73GB1J470J	CHIP R	47	J	1/16W	
R109-112			RN73GH1J154D	CHIP R	150K	D	1/16W	
R113			RK73GB1J103J	CHIP R	10K	J	1/16W	
R114			RK73GB1J101J	CHIP R	100	J	1/16W	
R115			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R116			RK73GB1J681J	CHIP R	680	J	1/16W	
R117			RK73GB1J470J	CHIP R	47	J	1/16W	
R119			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R120,121			RK73GB1J473J	CHIP R	47K	J	1/16W	
R122			RK73GB1J104J	CHIP R	100K	J	1/16W	
R123			RK73GB1J105J	CHIP R	1.0M	J	1/16W	
R124			RK73GB1J101J	CHIP R	100	J	1/16W	
R125			RK73GB1J473J	CHIP R	47K	J	1/16W	
R126,127			RK73GB1J104J	CHIP R	100K	J	1/16W	
R128			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R129,130			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R131			RK73GB1J100J	CHIP R	10	J	1/16W	
R132,133			RK73GB1J471J	CHIP R	470	J	1/16W	
R134,135			RK73GB1J561J	CHIP R	560	J	1/16W	
R136			RK73GB1J473J	CHIP R	47K	J	1/16W	
R139			RK73GB1J561J	CHIP R	560	J	1/16W	
R200			RK73GB1J470J	CHIP R	47	J	1/16W	
R201			RK73GB1J103J	CHIP R	10K	J	1/16W	
R202			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R203			RK73GB1J560J	CHIP R	56	J	1/16W	
R204			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R205			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R206			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R207			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R208			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R209			RK73GB1J474J	CHIP R	470K	J	1/16W	
R210			RK73GB1J223J	CHIP R	22K	J	1/16W	
R211			RK73GB1J473J	CHIP R	47K	J	1/16W	
R212			RK73GB1J681J	CHIP R	680	J	1/16W	
R213			RK73GB1J224J	CHIP R	220K	J	1/16W	
R214,215			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R217			RK73GB1J473J	CHIP R	47K	J	1/16W	
R218			RK73GB1J563J	CHIP R	56K	J	1/16W	
R219			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R221			RK73GB1J471J	CHIP R	470	J	1/16W	
R222			RK73GB1J100J	CHIP R	10	J	1/16W	
R223			RK73GB1J471J	CHIP R	470	J	1/16W	
R224			RK73GB1J100J	CHIP R	10	J	1/16W	
R229			RK73GB1J104J	CHIP R	100K	J	1/16W	
R230			RK73GB1J224J	CHIP R	220K	J	1/16W	
R231			RK73GB1J103J	CHIP R	10K	J	1/16W	
R232			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R233			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R234			RK73GB1J104J	CHIP R	100K	J	1/16W	
R235			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R236			RK73GB1J823J	CHIP R	82K	J	1/16W	
R237			RK73GB1J221J	CHIP R	220	J	1/16W	
R238			RK73GB1J822J	CHIP R	8.2K	J	1/16W	
R239			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R240			RK73GB1J681J	CHIP R	680	J	1/16W	
R241			RK73GB1J103J	CHIP R	10K	J	1/16W	
R242			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R243-245			RK73GB1J101J	CHIP R	100	J	1/16W	
R246			RK73GB1J330J	CHIP R	33	J	1/16W	
R301			RK73GB1J104J	CHIP R	100K	J	1/16W	
R302			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R303			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R305,306			RK73GB1J223J	CHIP R	22K	J	1/16W	
R307			RK73GB1J820J	CHIP R	82	J	1/16W	
R308			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R309			RK73GB1J100J	CHIP R	10	J	1/16W	
R317			RK73GB1J471J	CHIP R	470	J	1/16W	
R318			RK73GB1J271J	CHIP R	270	J	1/16W	
R319			RK73GB1J101J	CHIP R	100	J	1/16W	
R320			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R321-323			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R324			RK73GB1J681J	CHIP R	680	J	1/16W	
R325			RK73GB1J331J	CHIP R	330	J	1/16W	
R326			RK73GB1J470J	CHIP R	47	J	1/16W	
R327			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R328			RK73GB1J100J	CHIP R	10	J	1/16W	
R329			RK73GB1J183J	CHIP R	18K	J	1/16W	
R330			RK73GB1J103J	CHIP R	10K	J	1/16W	
R331			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R332			RK73GB1J123J	CHIP R	12K	J	1/16W	
R333			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R334			RK73GB1J221J	CHIP R	220	J	1/16W	
R335			RK73GB1J821J	CHIP R	820	J	1/16W	
R336			RK73GB1J183J	CHIP R	18K	J	1/16W	
R337			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R338			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R339,340			RK73GB1J471J	CHIP R	470	J	1/16W	
R341			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R342			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R343			RK73GB1J183J	CHIP R	18K	J	1/16W	
R344			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R345			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R346			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R348			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R349			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R352-355			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R356			RK73GB1J471J	CHIP R	470	J	1/16W	
R402			RK73GB1J124J	CHIP R	120K	J	1/16W	
R403			RK73GB1J104J	CHIP R	100K	J	1/16W	
R404			RK73GB1J2R2J	CHIP R	2.2	J	1/16W	
R405			RK73GB1J4R7J	CHIP R	4.7	J	1/16W	
R406			RK73GB1J334J	CHIP R	330K	J	1/16W	
R407			RK73GB1J2R2J	CHIP R	2.2	J	1/16W	
R408			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R409			RK73GB1J224J	CHIP R	220K	J	1/16W	
R500			RK73GB1J473J	CHIP R	47K	J	1/16W	
R501			RK73GB1J103J	CHIP R	10K	J	1/16W	
R502-504			RK73GB1J473J	CHIP R	47K	J	1/16W	
R505			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R506			RK73GB1J103J	CHIP R	10K	J	1/16W	

TK-5400

TX-RX UNIT (X57-6530-10)

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation	Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
R507			RK73GB1J104J	CHIP R	100K	J	1/16W		R644			RK73GB1J473J	CHIP R	47K	J	1/16W	
R509			RK73GB1J104J	CHIP R	100K	J	1/16W		R645			RK73GB1J471J	CHIP R	470	J	1/16W	
R510,511			RK73GB1J102J	CHIP R	1.0K	J	1/16W		R646			RK73GB1J473J	CHIP R	47K	J	1/16W	
R512			RK73GB1J100J	CHIP R	10	J	1/16W		R647			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R513			R92-1252-05	CHIP R	0 OHM	J	1/16W		R648			RK73GB1J471J	CHIP R	470	J	1/16W	
R514			RK73GB1J104J	CHIP R	100K	J	1/16W		R649,650			RK73GB1J473J	CHIP R	47K	J	1/16W	
R515-521			RK73GB1J102J	CHIP R	1.0K	J	1/16W		R651			RK73GB1J101J	CHIP R	100	J	1/16W	
R522			RK73GB1J473J	CHIP R	47K	J	1/16W		R652			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R523			RK73GB1J104J	CHIP R	100K	J	1/16W		R653			RK73GB1J101J	CHIP R	100	J	1/16W	
R524			RK73GB1J223J	CHIP R	22K	J	1/16W		R654			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R525			RK73GB1J473J	CHIP R	47K	J	1/16W		R655			RK73GB1J101J	CHIP R	100	J	1/16W	
R526			RK73GB1J103J	CHIP R	10K	J	1/16W		R656			RK73GB1J473J	CHIP R	47K	J	1/16W	
R527			RK73GB1J473J	CHIP R	47K	J	1/16W		R657			RK73GB1J101J	CHIP R	100	J	1/16W	
R528			RK73GB1J104J	CHIP R	100K	J	1/16W		R658			RK73GB1J473J	CHIP R	47K	J	1/16W	
R529			RK73GB1J473J	CHIP R	47K	J	1/16W		R659,660			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R530,531			RK73GB1J102J	CHIP R	1.0K	J	1/16W		R661,662			RK73GB1J101J	CHIP R	100	J	1/16W	
R532			RK73GB1J473J	CHIP R	47K	J	1/16W		R663			RK73GB1J471J	CHIP R	470	J	1/16W	
R534,535			RK73GB1J473J	CHIP R	47K	J	1/16W		R664			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R536			R92-1252-05	CHIP R	0 OHM	J	1/16W		R665			RK73GB1J471J	CHIP R	470	J	1/16W	
R537			RK73GB1J473J	CHIP R	47K	J	1/16W		R666-669			RK73GB1J473J	CHIP R	47K	J	1/16W	
R538,539			R92-1252-05	CHIP R	0 OHM	J	1/16W		R670			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R540-542			RK73GB1J473J	CHIP R	47K	J	1/16W		R671			RK73GB1J101J	CHIP R	100	J	1/16W	
R543			R92-1252-05	CHIP R	0 OHM	J	1/16W		R672			RK73GB1J473J	CHIP R	47K	J	1/16W	
R544-546			RK73GB1J102J	CHIP R	1.0K	J	1/16W		R673			RK73GB1J101J	CHIP R	100	J	1/16W	
R547			RK73GB1J223J	CHIP R	22K	J	1/16W		R674			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R548			RK73GB1J473J	CHIP R	47K	J	1/16W		R675			RK73GB1J473J	CHIP R	47K	J	1/16W	
R550,551			RK73GB1J473J	CHIP R	47K	J	1/16W		R677			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R553			RK73GB1J473J	CHIP R	47K	J	1/16W		R678,679			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R554			R92-1252-05	CHIP R	0 OHM	J	1/16W		R680			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R555			RK73GB1J473J	CHIP R	47K	J	1/16W		R681			RK73GB1J471J	CHIP R	470	J	1/16W	
R603			RK73GB1J104J	CHIP R	100K	J	1/16W		R682			RK73GB1J224J	CHIP R	220K	J	1/16W	
R604			RK73GB1J563J	CHIP R	56K	J	1/16W		R683			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R607			RK73GB1J103J	CHIP R	10K	J	1/16W		R684			RK73GB1J220J	CHIP R	22	J	1/16W	
R608			RK73GB1J124J	CHIP R	120K	J	1/16W		R685			RK73GB1J153J	CHIP R	15K	J	1/16W	
R610			RK73GB1J104J	CHIP R	100K	J	1/16W		R688			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R611,612			RK73GB1J273J	CHIP R	27K	J	1/16W		R689			RK73GB1J104J	CHIP R	100K	J	1/16W	
R613			RK73GB1J473J	CHIP R	47K	J	1/16W		R692,693			RK73GB1J473J	CHIP R	47K	J	1/16W	
R614			RK73GB1J823J	CHIP R	82K	J	1/16W		R701			RK73GB1J101J	CHIP R	100	J	1/16W	
R616			RK73GB1J334J	CHIP R	330K	J	1/16W		R702			RK73GB1J103J	CHIP R	10K	J	1/16W	
R617			RK73GB1J184J	CHIP R	180K	J	1/16W		R703			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R618,619			RK73GB1J473J	CHIP R	47K	J	1/16W		R704			RK73GB1J104J	CHIP R	100K	J	1/16W	
R620			RK73GB1J273J	CHIP R	27K	J	1/16W		R705			RK73GB1J473J	CHIP R	47K	J	1/16W	
R621			RK73GB1J153J	CHIP R	15K	J	1/16W		R706			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R622,623			RK73GB1J223J	CHIP R	22K	J	1/16W		R707,708			RK73GB1J471J	CHIP R	470	J	1/16W	
R624			R92-1252-05	CHIP R	0 OHM	J	1/16W		R709			RK73GB1J473J	CHIP R	47K	J	1/16W	
R627			R92-1252-05	CHIP R	0 OHM	J	1/16W		R710			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R628			RK73GB1J224J	CHIP R	220K	J	1/16W		R711-714			RK73GB1J104J	CHIP R	100K	J	1/16W	
R630			RK73GB1J124J	CHIP R	120K	J	1/16W		R715			RK73GB1J103J	CHIP R	10K	J	1/16W	
R631			RK73GB1J563J	CHIP R	56K	J	1/16W		R716			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R632			RK73GB1J4R7J	CHIP R	4.7	J	1/16W		R717			RK73GB1J104J	CHIP R	100K	J	1/16W	
R633			RK73GB1J470J	CHIP R	47	J	1/16W		R718			RK73GB1J473J	CHIP R	47K	J	1/16W	
R634			RK73GB1J4R7J	CHIP R	4.7	J	1/16W		R719			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R635			RK73GB1J273J	CHIP R	27K	J	1/16W		R720			RK73GB1J473J	CHIP R	47K	J	1/16W	
R636,637			RK73GB1J473J	CHIP R	47K	J	1/16W		R722,723			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R638			RK73GB1J184J	CHIP R	180K	J	1/16W		R724			RK73GB1J473J	CHIP R	47K	J	1/16W	
R639			RK73GB1J104J	CHIP R	100K	J	1/16W		R725-728			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R640			RK73GB1J101J	CHIP R	100	J	1/16W		R729			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R641			RK73GB1J123J	CHIP R	12K	J	1/16W		R730			R92-0670-05	CHIP R	0 OHM			
R642			RK73GB1J184J	CHIP R	180K	J	1/16W		R731			R92-1252-05	CHIP R	0 OHM	J	1/16W	
R643			RK73GB1J224J	CHIP R	220K	J	1/16W		R732-734			RK73GB1J473J	CHIP R	47K	J	1/16W	

PARTS LIST

Ref. No.	Address	New parts	Parts No.	Description				Desti-nation
R735			RK73GB1J821J	CHIP R	820	J	1/16W	
R736			RK73GB1J473J	CHIP R	47K	J	1/16W	
R737			RK73GB1J104J	CHIP R	100K	J	1/16W	
R738			RK73GB1J473J	CHIP R	47K	J	1/16W	
R739			RK73GB1J104J	CHIP R	100K	J	1/16W	
R741			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R742			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R743			RK73GB1J471J	CHIP R	470	J	1/16W	
R744			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R745			RK73GB1J101J	CHIP R	100	J	1/16W	
R746			RK73GB1J473J	CHIP R	47K	J	1/16W	
R747			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R748			RK73GB1J473J	CHIP R	47K	J	1/16W	
D101			MA2S077	DIODE				
D102			UDZS4.7B	ZENER DIODE				
D103			HVU131	DIODE				
D105		∗	HZU11B2	ZENER DIODE				
D201			1SS389	DIODE				
D202			MA2S077	DIODE				
D301,302			MA2S077	DIODE				
D401			HRB0502A	DIODE				
D402			DA221	DIODE				
D403			1SS389	DIODE				
D501,502			MA2S111	DIODE				
D504			1SS361	DIODE				
D600,601			HSM88AS	DIODE				
D602			MA742	DIODE				
D603			1SS389	DIODE				
D701			1SR154-400	DIODE				
D702			MA2S111	DIODE				
D703			1SS361	DIODE				
D704,705			NNCD6.8G	ZENER DIODE				
IC101			NJM2904V	MOS IC				
IC201-203			TC7SET08FU	MOS IC				
IC204		∗	SA7026DH	MOS IC				
IC205			TC75W51FU	MOS IC				
IC301			GN2011(Q)	MOS IC				
IC302		∗	KM4100IT5	ANALOG IC				
IC303		∗	AD607	BI-POLAR IC				
IC401		∗	XC61CN5002NR	MOS IC				
IC402		∗	XC6365D103M	MOS IC				
IC403		∗	XC6204B332M	MOS IC				
IC404		∗	XC6204B252M	MOS IC				
IC405		∗	XC6204B332M	MOS IC				
IC502			TC7W04FU	MOS IC				
IC504			TC74VHCT541AFT	MOS IC				
IC505		∗	AT24256N10SI27	ROM IC				
IC506		∗	PST3527U	MOS IC				
IC507		∗	30620M8A-2W4GP	MPU				
IC508			MBM29LV800B90	SRAM IC				
IC509-511			TC7WH32FK	MOS IC				
IC601-604			TC75W51FU	MOS IC				
IC605			M62364FP	MOS IC				
IC606,607			TC75W51FU	MOS IC				
IC608			AK4550VT	MOS IC				
IC609		∗	TLV2544IPW	MOS IC				
IC611			320VC5410GGW	DSP				
IC701			BU4094BCFV	MOS IC				
IC702			XC6204B502MR	MOS IC				

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
IC703			BU4094BCFV	MOS IC	
IC704,705			XC6204B502MR	MOS IC	
IC706			TC7W66FU	MOS IC	
Q1		∗	2SK3391	FET	
Q2,3		∗	2SK3390	FET	
Q101			2SC5108(Y)	TRANSISTOR	
Q102			DTC114EE	DIGITAL TRANSISTOR	
Q103			2SC4988	TRANSISTOR	
Q104			2SK1824	FET	
Q105			HN1L02FU	FET	
Q201			2SC5108(Y)	TRANSISTOR	
Q202			2SK1830	FET	
Q204			2SC4617(S)	TRANSISTOR	
Q205,206			2SC5108(Y)	TRANSISTOR	
Q301			2SC4617(S)	TRANSISTOR	
Q302			3SK274∗J	FET	
Q304			2SK1215(E)	FET	
Q305			2SC5108(Y)	TRANSISTOR	
Q306			SSM3J05FU	FET	
Q401			TPC6102	FET	
Q501			HN1L02FU	FET	
Q600			2SC4738(GR)	TRANSISTOR	
Q601			2SA1832(GR)	TRANSISTOR	
Q602			2SC4617(S)	TRANSISTOR	
Q701			2SK1830	FET	
Q702			TPC6102	FET	
Q703			2SC4617(S)	TRANSISTOR	
Q704			2SK1830	FET	
Q705			2SB1132(Q,R)	TRANSISTOR	
Q706,707			2SC4617(S)	TRANSISTOR	
Q708			HN1L02FU	FET	
Q709			SSM3J05FU	FET	
Q710			DTC144EE	DIGITAL TRANSISTOR	
Q711			2SJ347	FET	
Q712			2SJ243	FET	
Q713			2SK1830	FET	
Q714			SSM3J05FU	FET	
TH101			157-503-65001	THERMISTOR	
TH102			157-502-65001	THERMISTOR	

TK-5400

EXPLODED VIEW

A		: N14-0578-04
B		: N14-0594-04
C	M2.6 x 8 BLK	: N30-2608-45
D	M2.6 x 5 (Bi) BLK	: N35-2605-45
E	M2 x 3	: N78-2030-46
F	M2 x 3.5	: N79-2035-46
G	M2 x 4 BLK	: N83-2004-45
H	M2 x 5	: N83-2005-46

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

PACKING

C   D

7   Cap (SP/MIC)
(B09-0363-03)

6   Dressing plate
(B03-0594-04)

40   Cushion (Cap)
(G13-1688-04)

13   Stopper
(D32-0421-24)

705   Pamphlet

55   Protection bag
(H25-0029-04)

79   Screw set
(N99-2004-05)

65   Belt hook
(J29-0652-35)

10   Instruction manual
(B62-1606-00)

54   Packing fixture
(H12-3018-02)

56   Item carton case
(H52-1880-02)

707   Sticker

706   UPC code label

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

TK-5400

ADJUSTMENT

Test Equipment Required for Alignment

No.	Test Equipment		Major Specifications
1	Standard Signal Generator (SSG)	Frequency Range Modulation Output	Maximum 900MHz or more. Frequency modulation and external modulation. –133dBm/0.05µV to 7dBm/501mV
2	Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω. Up to 900MHz. Full scale of 10W or so.
3	Deviation Meter	Frequency Range	800 to 870MHz.
4	Digital Volt Meter (DVM)	Measuring Range Accuracy	FS=18V or so. High input impedance for minimum circuit loading.
5	Oscilloscope		DC through 30MHz.
6	High Sensitivity Frequency Counter	Frequency Range Frequency Stability	Up to 1GHz or so. 0.2ppm or less.
7	Ammeter		5A.
8	AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 1MHz. 1mV to 10V.
9	Audio Generator (AG)	Frequency Range Output	100Hz to 100kHz or more. 0 to 1V.
10	Distortion Meter	Capability Input Level	3% or less at 1kHz. 50mV to 10Vrms.
11	16Ω Dummy Load		Approx. 16Ω, 5W.
12	Regulated Power Supply		5V to 10V, approx. 5A Useful if ammeter equipped.
13	Spectrum Analyzer	Measuring Range	DC to 1GHz or more.
14	Tracking Generator	Center Frequency Frequency Deviation Output Voltage	50kHz to 1GHz. ±35MHz. 100mV or more.

■ **The following parts are required for adjustment**

1. Antenna connector adapter

The antenna connector of this radio uses an SMA terminal.

Use an antenna connector adapter [SMA(f) – BNC(f) or SMA(f) – N(f)] for adjustment. (The adapter is not provided as an option, so buy a commercially-available one.)

Note

When the antenna connector adapter touches the knob, draw out the knob to mount the connector.

2. Universal connector

Use the interface cable (KPG-36) for PC tuning or the lead wire with plug (E30-3287-08) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the radio and tighten the screw.

The lead wire with plug (E30-3287-08) and screw (N08-0535-08) terminals are as follows. Numbers are universal connector terminal numbers.

Caution

1. When connecting the plug to the universal connector of the radio, a short circuit may occur. To provent this, be sure to turn the radio POWER switch off.
2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the figure.
3. Do not connct an instrument between red or black and GND.

• **Universal connector**


```
1 : SSW          2 : SP+
3 : SP–          4 : MSW
5 : EMC          6 : ME
7 : PTT          8 : PF
9 : NC          10 : E
11 : 5M         12 : TXD
13 : RXD        14 : NC
```
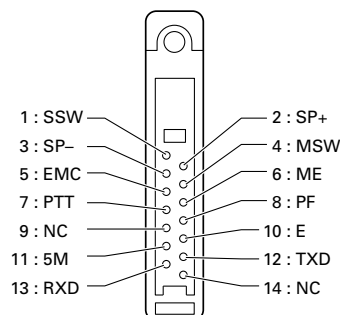
ADJUSTMENT

- **Panel tuning**

2 : RED (RX AF OUTPUT)

3 : BLACK (RX AF OUTPUT)

5 : WHITE (MIC INPUT)

6 : BROWN (MIC GND)

7 : BLUE (PTT SW) GND → ON

8 : YELLOW (PF SW)

10 : BROWN (GND)

11 : GREEN (5M)

SCREW

TUBE

To Radio

BLU (7) PTT SW

BRN (10)

RED (2) 100μ 10V

16Ω

BLK (3) 100μ 10V

AF Voltmeter

WHT (5) 10μ 10V

BRN (6)

Audio generator
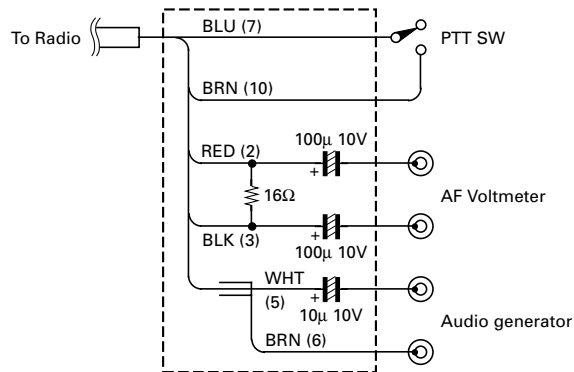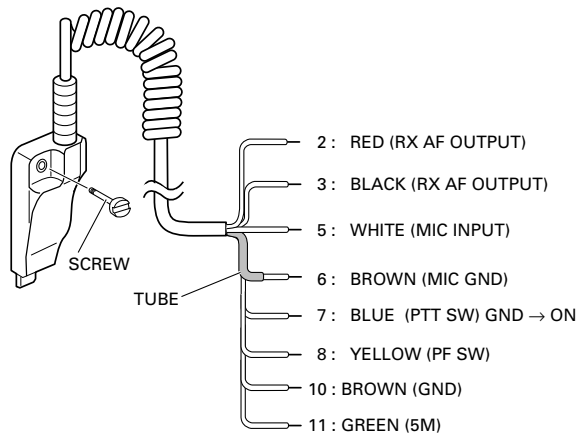
- **PC tuning**

Connect the wires to the PCB in the connector case of interface cable.

For output the wires out of the connector case, need to process the connector case.

KPG-36

Remove the screw

Connector case

PCB layout

16Ω

100μ 10V

100μ 10V

AF voltmeter

10μ 10V

Audio generator

Shield
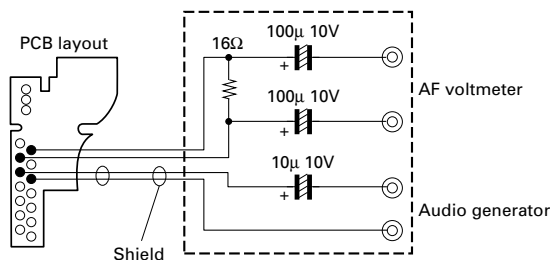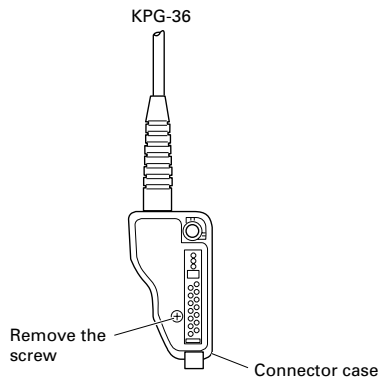
Repair Jig (Chassis)

Use jig (part No.: A10-4064-03) for repairing the TK-5400 Place the TX-RX unit on the jig and fit it with 7 screws.

Note : Supply power from an external power supply (Battery terminal : +, jig (chassis) : –)

Battery terminal (+)

TX-RX unit

Jig
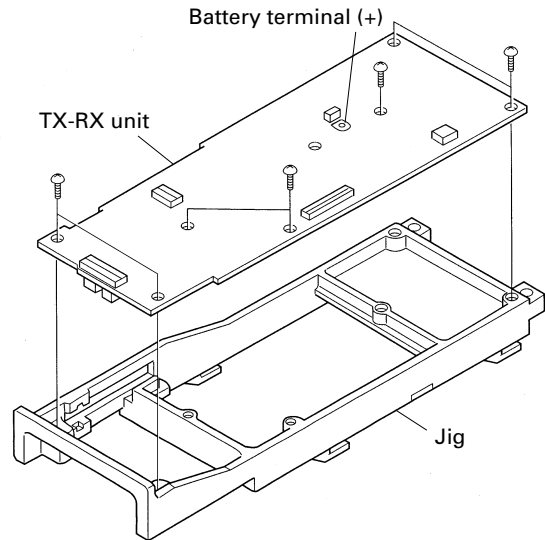
How to Remove the Flat Cable

1. Gently draw out both sides of the connector lever uniformly in the direction of the arrow with tweezers. (CN101, CN703)

Tweezers
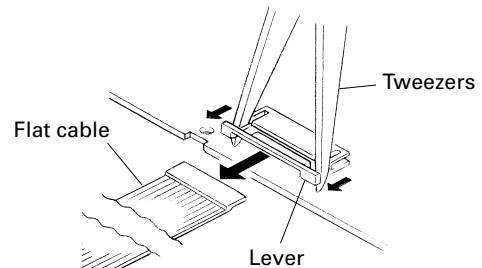
Flat cable

Lever

2. Gently rise up the connector lever in the direction of the arrow with a fine regular screwdriver or tweezers. (CN1, CN3, CN701, CN702)

Note : Gently push both sides of the connector lever, when put in the flat cable.

Regular screwdriver

Flat cable

Lever

TK-5400
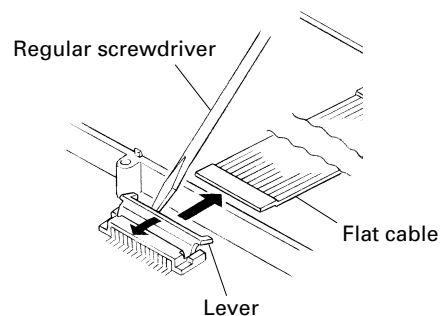
ADJUSTMENT

Straightening the Coaxial Cable

1. When you connect the coaxial connector to the PCB, the coaxial cable may be slightly curved toward the chassis (Fig. 1).
2. In this case, place a regular screw driver between the chassis and the coaxial cable, then push and straighten the coaxial cable so that it passes through directly above the screw head (❶) (Fig. 2).
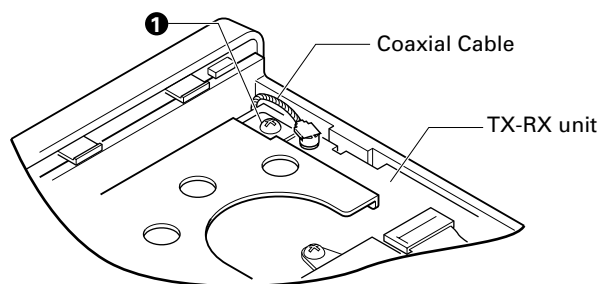
Fig. 1
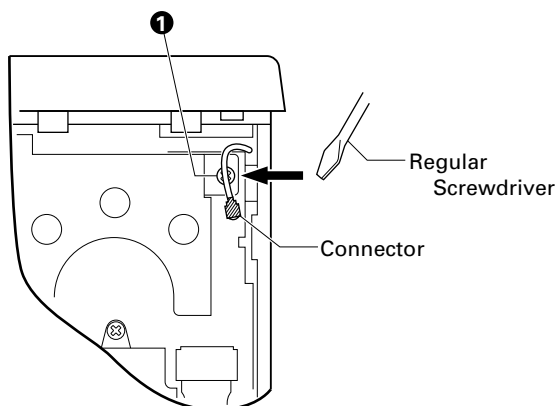
Fig. 2

Panel Test Mode

1. This mode is used for making transceiver connection tests and clearing the memory.
2. To set panel test mode , turn on the power switch with [Side 2] key and [PTT] key are still held down and then first release [PTT] key.
3. This mode cannot be set when disabled with the FPU .

1. Panel Test
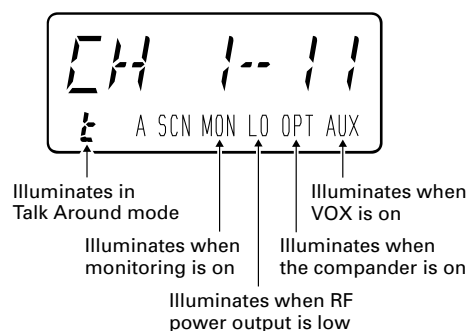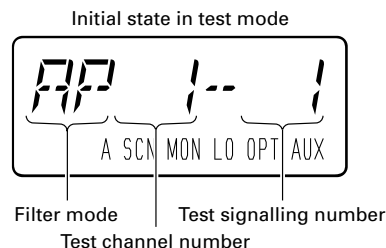
1. When the panel test mode is activated, the channel selected with the [Selector] key and the last used signaling number are displayed. When it is activated for the first time, the signaling number is 1.
2. If test signaling 15 (Tone Test Pattern) is selected, the result of Bit Error Rate (BER) calculation is shown on the transceiver LCD. The BER value is also output from the serial port.
3. While in Panel Test mode, press [Orange] key and [PTT] key at the same time to erase all the programmed data. However, the radio hardware adjustment parameters are not erased.
   Since the Model Type data is also erased, you will not be able to read the programmed transceiver data after erasing.
   But you can write the programming data to the transceiver.
4. When the [Orange] key is held down and the [PTT] key is pressed in panel test mode, the clear function is activated to clear all setting data. However, the model type and adjustment values are not cleared.
5. The APCO and analog modes are switched automatically by selecting test signaling. When APCO mode is effective, "A" is displayed on the 7-segment display.

ADJUSTMENT

• Key Function

Controls	Operation
[Selector]	Used to select a test channel.
[PTT]	Used to switch between transmission and reception.
[Top 1]	Used for signaling down.
[Top 2]	Used for signaling up.
[Side 1]	Change filter mode. When this key is held down for longer than one second, panel adjustment mode is activated.
[Side 2]	Switch between low and high power for transmission. When this key is held down for longer than one second, the LCD and all LEDs turn on.
[Orange]	Turns squelch off in analog mode. Does not work in APCO mode.
[Toggle Switch]	Switch between talk around and semi-duplex mode.

• Filter Mode

Display	Condition
AP	APCO (12.5kHz) Filter
WD	WIDE (25kHz) Filter
NP	NPSPAC (20kHz) Filter
NW	NARROW (12.5kHz) Filter

• Test Frequency

Test Channel	RX Frequency	TX Frequency
1	851.0500	806.0500
2	851.5500	806.5500
3	860.0000	815.0000
4	860.5000	815.5000
5	865.9875	820.9875
6	869.4000	824.4000
7	869.9000	824.9000
8	855.4000	810.4000
9	865.6000	820.6000
10	856.4000	811.4000
11~16	Not Used	Not Used

• Test Signalling

No.	RX Signalling	TX Signalling	APCO/ Analog
1	None	None	Analog
2	None	100Hz Square wave	Analog
3	QT 67.0Hz	QT 67.0Hz	Analog
4	QT 151.4Hz	QT 151.4Hz	Analog
5	QT 210.7Hz	QT 210.7Hz	Analog
6	QT 254.1Hz	QT 254.1Hz	Analog
7	DQT 023N	DQT 023N	Analog
8	DQT 445N	DQT 445N	Analog
9	DQT 754I	DQT 754I	Analog
10	None	DTMF Code "9"	Analog
11	None	DTMF Single Tone 1633Hz	Analog
12	NAC 293	NAC 293	APCO
13	NAC 023	NAC 023	APCO
14	NAC 5EA	NAC 5EA	APCO
15	1011Hz Tone Test Pattern	1011Hz Tone Test Pattern	APCO
16	None	Silence Pattern	APCO
17	None	Calibration Pattern	APCO
18	None	Transmitter Test Pattern	APCO
19	None	Symbol Rate Pattern	APCO
20	None	Low Deviation Pattern	APCO
21	None	Fidelity Pattern	APCO

2. Panel Tuning

Various adjustments are made with transceiver keys in this mode.
1. When the [Side 1] key is held down for longer than one second, the panel adjustment mode is activated.
2. When the [Side 1] key is held down for longer than one second during panel adjustment, the panel adjustment mode is terminated and the panel test mode returns.
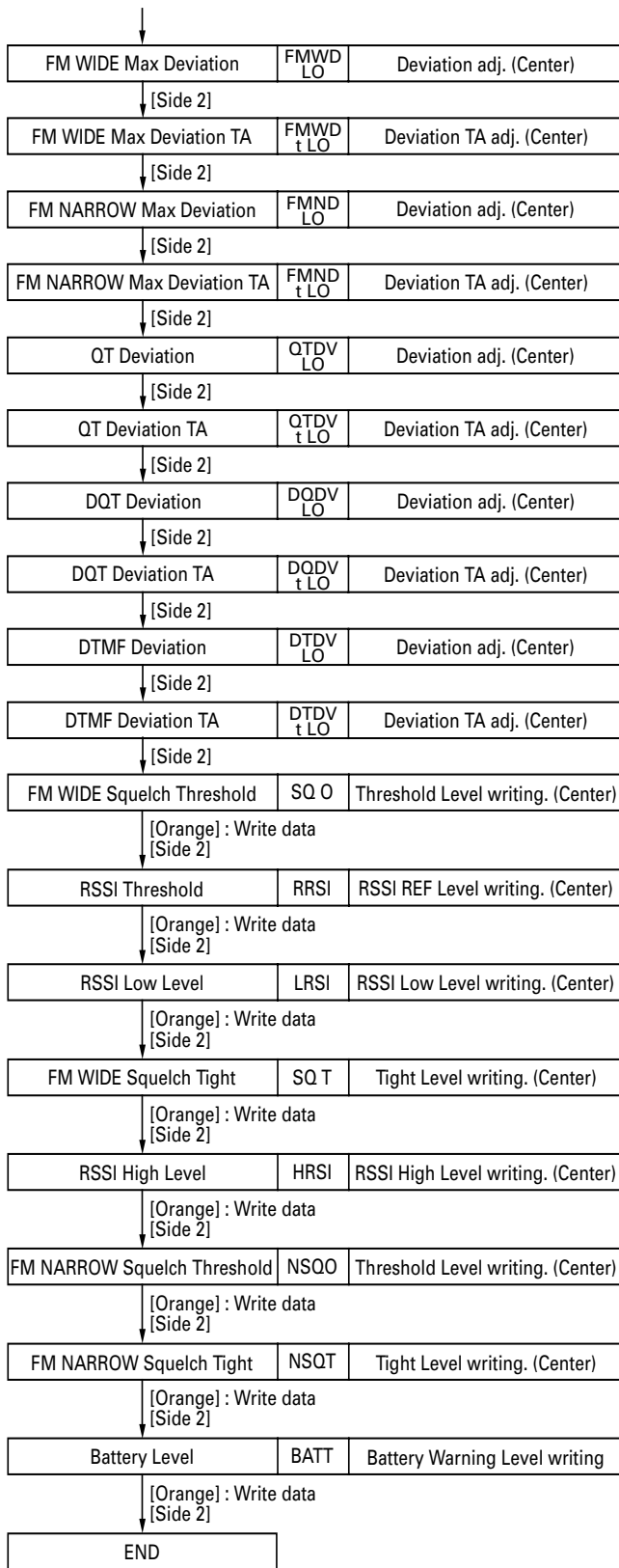
• Key Function

Controls	Operation
[Selector]	(Unused)
[PTT]	Transmission. When the battery low voltage is adjusted, the adjustment value is displayed on the LCD.
[Top 1]	Functions as a down key.
[Top 2]	Functions as an up key.
[Side 1]	Leaves the panel adjustment mode and returns to the panel test mode.
[Side 2]	Places setting data into memory and moves to the next item.
[Orange]	Changes mode if there is an adjustment item for correction. Used to write data into memory when SQL, RSSL or battery low voltage is adjusted.
[Toggle Switch]	(Unused)

TK-5400

ADJUSTMENT

3. Flow Chart

Function Name	Display	Adj Remarks

Frequency Tune	TXF	TX Frequency Adj.

[Side 2]

TX High Power	POW		[Orange] →	TX High Power (Low)	POW L	High Power adj. (Low edge)

[Side 2]

[Side 2] → | TX High Power (Cen) | POW C | High Power adj. (Center) |

[Side 2]

| TX High Power (Hi) | POW H | High Power adj. (Hi edge) |

[Side 2]

[Orange]
[Side 2]

| TX High Power TA | POW t | [Orange] → | TX High Power TA (Low) | POW t L | High Power TA adj. (Low edge) |

[Side 2]

[Side 2] → | TX High Power TA (Cen) | POW t C | High Power TA adj. (Center) |

[Side 2]

| TX High Power TA (Hi) | POW t H | High Power TA adj. (Hi edge) |

[Side 2]

[Orange]
[Side 2]

TX Low Power	POW LO	Low Power adj. (Center)

[Side 2]

| TX Low Power TA | POW t LO | Low Power TA adj. (Center) |

[Side 2]

| MIC Sensitivity | MIC LO | Initial Value : 129 (The item for dealer) |

[Side 2]

| VCO/VCXO Balance | BAL LO | DQT Balance adj. (Center) |

[Side 2]

| VCO/VCXO Balance TA | BAL t LO | DQT Balance TA adj. (Center) |

[Side 2]

| APCO High Deviation | HDVA LO | Deviation adj. (Center) | [Orange] → | APCO High Deviation (Low) | HDVA L LO | Deviation adj. (Low edge) |

[Side 2]

[Side 2] → | APCO High Deviation (Hi) | HDVA H LO | Deviation adj. (Hi edge) |

[Side 2]

[Orange]
[Side 2]

| APCO High Deviation TA | HDVA t LO | Deviation adj. (Center) | [Orange] → | APCO High Deviation (Low) | HDVA tL LO | Deviation adj. (Low edge) |

[Side 2]

[Side 2] → | APCO High Deviation (Hi) | HDVA tH LO | Deviation adj. (Hi edge) |

[Side 2]

[Orange]
[Side 2]

ADJUSTMENT

FM WIDE Max Deviation	FMWD LO	Deviation adj. (Center)

↓ [Side 2]

FM WIDE Max Deviation TA	FMWD t LO	Deviation TA adj. (Center)

↓ [Side 2]

FM NARROW Max Deviation	FMND LO	Deviation adj. (Center)

↓ [Side 2]

FM NARROW Max Deviation TA	FMND t LO	Deviation TA adj. (Center)

↓ [Side 2]

QT Deviation	QTDV LO	Deviation adj. (Center)

↓ [Side 2]

QT Deviation TA	QTDV t LO	Deviation TA adj. (Center)

↓ [Side 2]

DQT Deviation	DQDV LO	Deviation adj. (Center)

↓ [Side 2]

DQT Deviation TA	DQDV t LO	Deviation TA adj. (Center)

↓ [Side 2]

DTMF Deviation	DTDV LO	Deviation adj. (Center)

↓ [Side 2]

DTMF Deviation TA	DTDV t LO	Deviation TA adj. (Center)

↓ [Side 2]

FM WIDE Squelch Threshold	SQ O	Threshold Level writing. (Center)

↓ [Orange] : Write data [Side 2]

RSSI Threshold	RRSI	RSSI REF Level writing. (Center)

↓ [Orange] : Write data [Side 2]

RSSI Low Level	LRSI	RSSI Low Level writing. (Center)

↓ [Orange] : Write data [Side 2]

FM WIDE Squelch Tight	SQ T	Tight Level writing. (Center)

↓ [Orange] : Write data [Side 2]

RSSI High Level	HRSI	RSSI High Level writing. (Center)

↓ [Orange] : Write data [Side 2]

FM NARROW Squelch Threshold	NSQO	Threshold Level writing. (Center)

↓ [Orange] : Write data [Side 2]

FM NARROW Squelch Tight	NSQT	Tight Level writing. (Center)

↓ [Orange] : Write data [Side 2]

Battery Level	BATT	Battery Warning Level writing

↓ [Orange] : Write data [Side 2]

END

BER (Bit Error Rate) Measurement

1. The Panel Test Mode is used to measure the BER with the TK-5400 (see 1. Panel Test.).
2. Select a filter to be measured (see Filter Mode.).
3. Select a frequency to be measured (see Test Frequency.).
4. Select "15" for test signaling (see Test Signaling.).
   (If there is no RF input signal, the display shows ".999999".)

```
 .999999
```

5. Enter a standard input signal into the receiver as a standard tone test pattern.
6. Adjust the input signal level to achieve the standard bit error rate (BER).
   (For example, if the BER is 5%, the display shows ".050000".)

```
 .050000
```

C4FM (APCO) Deviation Adjustment

1. The TK-5400 adjusts the deviation between High Deviation ±1800Hz and Low Deviation ±600Hz for the C4FM (APCO).
2. The Symbol Rate Pattern is used when adjusting the High Deviation for the C4FM (APCO) (see Test Signaling.). This test signal has a peak deviation equal to $2/\pi$ 1800Hz = 2827Hz.
3. The Low Deviation Pattern is used when checking the Low Deviation for the C4FM (APCO) (see Test Signaling.). This test signal has a peak deviation equal to $2/\pi$ 600Hz = 942Hz.

TK-5400

ADJUSTMENT

Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : TXF PTT : ON Press [Side 2] to store the digit number after adjustment.	Power meter f. counter	Panel	ANT	Panel	Top1/Top2	815.500MHz	±100Hz
2. Maximum power check	1) Set panel tuning mode. CH : 4 (Center) BATT terminal voltage : 7.5V Digit number : 256 LCD display : POW PTT : ON	Power meter Ammeter					Check	>3.5W
3. TX high power adjustment	1) Set panel tuning mode. CH : 4 (Cener) LCD display : POW Press [Orange] key to enter 3 point adjustment mode. LCD display : POW L PTT : ON				Panel	Top1/Top2	3.0W	±0.1W
	2) Press [Side 2] key. LCD display : POW C PTT : ON							
	3) Press [Side 2] key. LCD display : POW H PTT : ON Press [Side 2] to store the digit number after adjustment.							
4. TX high power adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : POW t Press [Orange] key to ener 3 point adjustment mode. LCD display : POW tL PTT : ON						3.0W	±0.1W
	2) Press [Side 2] key. LCD display : POW tC PTT : ON							
	3) Press [Side 2] key. LCD display : POW tH PTT : ON Press [Side 2] to store the digit number after adjustment.							
5. TX low power adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : POW LO PTT : ON Press [Side 2] to store the digit number after adjustment.						1.0W	±0.1W
6. TX low power adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : POW t LO PTT : ON Press [Side 2] to store the digit number after adjustment.							

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
7. MIC sensitivity adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : MIC LO PTT : ON Set at constant value 129. Press [Side 2] to store the digit number after adjustment.	Deviation meter Oscilloscope AG AF VTVM	Panel Side	ANT Universal	Panel	Top 1/ Top 2	Fixed digit number 129.	
8. VCO/VCXO balance adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : BAL LO Deviation meter filter setting LPF : 3kHz HPF : OFF De-emphasis : OFF PTT : ON Press [Side 2] to store the digit number after adjustment.						Make the demodulation waveform into square shape.	Remember to set oscilloscope's coupling to DC.
9. VCO/VCXO balance adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : BAL t LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
10. APCO high deviation adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : HDVA LO Deviation meter filter setting LPF : 3kHz HPF : OFF De-emphasis : OFF DET : Peak (+/–) PTT : ON Press [Side 2] to store the digit number after adjustment.	Deviation meter	Panel	ANT			2827Hz	2771~2883Hz
11. APCO high deviation adjustment at low frequency	1) Set panel tuning mode, then press [Orange] key to enter the 3 point adjustment mode. LCD display : HDVA L LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
12. APCO high deviation adjustment at high frequency	1) Set panel tuning mode. and press [Side 2] key to set high frequency. LCD display : HDVA H LO PTT : ON Press [Side 2] to store the digit number after adjustment.							

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ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
13. APCO high deviation adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : HDVA t LO Deviation meter filter setting LPF : 3kHz HPF : OFF De-emphasis : OFF DET : Peak (+/–) PTT : ON Press [Side 2] to store the digit number after adjustment.	Deviation	Panel	ANT	Panel	Top 1/ Top 2	2827Hz	2771~2883Hz
14. APCO high deviation adjustment at low frequency (TA)	1) Set panel tuning mode, then press [Orange] key to enter the 3 point adjustment mode. LCD display : HDVA tL LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
15. APCO high deviation adjustment at high frequency (TA)	1) Set panel tuning mode, and press [Side 2] key to set high frequency. LCD display : HDVA tH LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
16. FM wide deviation adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : FMWD LO Deviation meter filter seting LPF : 15kHz HPF : OFF De-emphasis : OFF DET : Peak (+/–) MIC input : 150mV/1kHz PTT : ON Press [Side 2] to store the digit number after adjustment.	Deviation meter Oscilloscope AG	Panel Side	ANT Universal			4.0kHz	±50Hz
17. FM wide deviation adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : FMWD t LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
18. FM narrow deviation adjustment	1) Set panel tuning mode CH : 4 (Center) LCD display : FMND LO Deviation meter filter setting HPF : 15kHz LPF : OFF De-emphasis : OFF DET : Peak (+/–) MIC input : 150mV/1kHz PTT : ON Press [Side 2] to store the digit number after adjustment.						2.0kHz	±50Hz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
19. FM narrow deviation adjustment (TA)	1) Set panel tuning mode CH : 4 (Center) LCD display : FMND t LO PTT : ON Press [Side 2] to store the digit number after adjustment.	Deviation meter Oscilloscope AG	Panel Side	ANT Universal	Panel	Top1/ Top2	2.05kHz	±50Hz
20. QT deviation adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : QTDV LO Deviation meter filter setting LPF : 3kHz HPF : PFF De-emphasis : OFF DET : (p-p)/2 PTT : ON Press [Side 2] to store the digit number after adjustment.						±0.75kHz	±50Hz
21. QT deviation adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : QTDV t LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
22. DQT deviation adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : DQDV LO Deviation meter filter setting LPF : 3kHz HPF : OFF De-emphasis : OFF DET : (p-p)/2 PTT : ON Press [Side 2] to store the digit number after adjustment.						±0.75kHz	±50Hz
23. DQT deviation adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : DQDV t LO PTT : ON Press [Side 2] to store the digit number after adjustment.							
24. DTMF deviation adjustment	1) Set panel tuning mode. CH : 4 (Center) LCD display : DTDV LO Deviation meter filter setting LPF : 15kHz HPF : PFF De-emphasis : OFF PTT : ON Press [Side 2] to store the digit number after adjustment.						±3.0kHz	±0.2kHz
25. DTMF deviation adjustment (TA)	1) Set panel tuning mode. CH : 4 (Center) LCD display : DTDV t LO PTT : ON Press [Side 2] to store the digit number after adjustment.							

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ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
26. TX low power check at low frequency	1) Set panel test mode. CH : 1 Signalling : 1 Toggle SW : A side PTT : ON Press [Side 2] to store the digit number after adjustment.	Power meter Ammeter	Panel	ANT			Check	0.7~1.3W
27. TX low power check at high frequency	1) Set panel test mode. CH : 7 Signalling : 1 Toggle SW : A side PTT : ON							
28. TX low power check at low frequency (TA)	1) Set panel test mode. CH : 1 Signalling : 1 Toggle SW : B side PTT : ON							
29. TX low power check at high frequency (TA)	1) Set panel test mode. CH : 7 Signalling : 1 Toggle SW : B side PTT : ON							
30. APCO low deviation check	1) Set panel test mode. Mode : AP CH : 4 (Center) Signalling : 20 (Low deviation pattern) Toggle SW : A side Deviation meter filter setting 　LPF : 3kHz 　HPF : OFF 　De-emphasis : OFF 　DET : Peak (+/–) PTT : ON	Deviation meter	Panel	ANT			Check	895~989Hz
31. APCO low deviation check (TA)	1) Set panel test mode. Mode : AP CH : 4 (Center) Signalling : 20 (Low deviation pattern) Toggle SW : B side PTT : ON							
32. FM NPSPAC deviation check	1) Set panel test mode. Mode : NP CH : 4 (Center) Signalling : 1 Toggle SW : A side Deviation meter filter setting 　LPF : 15kHz 　HPF : OFF 　De-emphasis : OFF 　DET : Peak (+/–) MIC input : 150mV/1kHz PTT : ON	Deviation meter Oscilloscope AG	Panel Side	ANT Universal			Check	3.3kHz±50Hz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
33. FM NPSPAC deviation check (TA)	1) Set panel test mode Mode : NP CH : 4 (Center) Signalling : 1 Toggle SW : B side PTT : ON	Deviation meter Oscilloscope AG	Panel Side	ANT Universal			Check	3.3kHz±50Hz
34. TX FM wide S/N check	1) Set panel test mode. Mode : WD CH : 4 (Center) Signalling : 1 Toggle SW : A side Deviation meter filter setting LPF : 3kHz HPF : 300Hz De-emphasis : 750µs PTT : ON						Check	<–45dB
35. TX FM wide S/N check (TA)	1) Set panel test mode. Mode : WD CH : 4 (Center) Signalling : 1 Toggle SW : B side PTT : ON							
36. TX FM NPSPAC S/N check	1) Set panel test mode. Mode : NP CH : 4 (Center) Signalling : 1 Toggle SW : A side Deviation meter filter setting LPF : 3kHz HPF : 300Hz De-emphasis : 750µs PTT : ON						Check	<–42dB
37. TX FM NPSPAC S/N chack (TA)	1) Set panel test mode. Mode : NP CH : 4 (Center) Signalling : 1 Toggle SW : B side PTT : ON							
38. TX FM narrow S/N check	1) Set panel test mode. Mode : NW CH : 4 (Center) Signalling : 1 Toggel SW : A side Deviation meter filter setting LPF : 3kHz HPF : 300Hz De-emphasis : 750µs PTT : ON						Check	<–39dB
39. TX FM narrow S/N chack (TA)	1) Set panel test mode. Mode : NW CH : 4 (Center) Signalling : 1 Toggle SW : B side PTT : ON							

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ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
40. FM wide MIC sensitivity check	1) Set panel test mode. Mode : WD CH : 1 Signalling : 1 Toggle SW : A side AG input : 1kHz Deviation meter filter setting LPF : 15kHz HPF : OFF PTT : ON	Deviation meter Oscilloscope AG	Panel Side	ANT Universal			Adjust AG input level to get a standard MOD., 3.0kHz DEV.	15mV±5mV
41. FM wide MIC sensitivity check (TA)	1) Set panel test mode. Mode : WD CH : 1 Signalling : 1 Toggle SW : B side PTT : ON							
42. FM NPSPAC MIC sensitivity check	1) Set panel test mode. Mode : NP CH : 1 Signalling : 1 Toggle SW : A side AG input : 1kHz Deviation meter filter setting LPF : 15kHz HPF : OFF PTT : ON						Adjust AG input level to get a standard MOD., 2.4kHz DEV.	15mV±5mV
43. FM NPSPAC MIC sensitivity check (TA)	1) Set panel test mode. Mode : NP CH : 1 Signalling : 1 Toggle SW : B side PTT : ON							
44. FM narrow MIC sensitivity check	1) Set panel test mode. Mode : NR CH : 1 Signalling : 1 Toggle SW : A side AG input : 1kHz Deviation meter filter setting LPF : 15kHz HPF : OFF PTT : ON						Adjust AG input level to get a standard MOD., 1.5kHz DEV.	15mV±5mV
45. FM narrow MIC sensitivity check (TA)	1) Set panel test mode. Mode : NR CH : 1 Signalling : 1 Toggle SW : B side PTT : ON							

ADJUSTMENT

Receiver Section

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. SQ threshold level writing for wide	1) Set panel tuning mode. CH 4 : (Center) LCD display : SQ O Input RF signal corresponding to 12dB SINAD – 4dB with 3kHz DEV. from SSG. Press [Orange] key to store the digit number.	SSG Audio analyzer Oscilloscope AG	Panel Side	ANT Universal	Side	Side 2 Orange	Writing	12dB SINAD – 4dB 3kHz DEV.
2. RSSI reference level writing	1) Set panel tuning mode. CH : 4 (Center) LCD display : RRSI Input RF signal corresponding to 12dB SINAD – 4.5dB from SSG. Press [Orange] key to store the digit number.							12dB SINAD – 4.5dB
3. RSSI low level writing	1) Set panel tuning mode. CH : 4 (Center) LCD display : LRSI Input RF signal –120dBm from SSG. Press [Orange] key to store the digit number.							–120dBm
4. SQ tight level writing for wide	1) Set panel tuning mode. CH : 4 (Center) LCD display : SQ T Input RF signal corresponding to 12dB SINAD + 6.5dB with 3kHz DEV. from SSG. Press [Orange] key to store the digit number.							12dB SINAD + 6.5dB 3kHz DEV.
5. RSSI high level writing	1) Set panel tuning mode. CH : 4 (Center) LCD display : HRSI Inut RF signal –70dBm from SSG. Press [Orange] key to store the digit number.							–70dBm
6. SQ threshold level writing for narrow	1) Set panel tuning mode. CH : 4 (Center) LCD display : NSQO Input RF signal corresponding to 12dB SINAD – 3dB with 1.5kHz DEV. from SSG. Press [Orange] key to store the digit number.							12dB DINAD – 3.0dB 1.5kHz DEV.
7. SQ tight level writing for narrow	1) Set panel tuning mode. CH : 4 (Center) LCD display : NSQT Input RF signal corresponding to 12dB SINAD + 6dB with 1.5kHz DEV. from SSG. Press [Orange] key to store the digit number.							12dB SINAD + 6.0dB 1.5kHz DEV.

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ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. Battery warning level writing	1) Set panel tuning mode. CH : 4 (Center) LCD display : BATT Set DC power supply 6.8V at battery terminal. Press [PTT] to show the digit number. Press [Orange] key to store the digit number.	Power meter DC VTVM	Panel Bottom	ANT BATT terminal	Side	Orange	Writing	6.8V at BATT terminal
9. Battery warning function check	1) Set panel user mode. BATT terminal voltage : 7.0V PTT : ON						Check	Can transmit.
	2) BATT terminal voltage : 6.6V PTT : ON							LED (Red) must blink. Can transmit.
10. SQ1 sensitivity check	1) Set user mode. Frequency : Any Mode : FM Set the SQ level 1.	SSG SINAD meter	Panel Side	ANT Universal			Measure the SINAD level where the SQ open continuously.	Wide : <SINAD 8dB NPS : <SINAD 8dB Narrow : <SINAD 8dB
11. SQ15 sensitivity check	1) Set user mode. Frequency : Any Mode : FM Set the SQ level 15.							Wide : >SINAD 18dB NPS : >SINAD 16dB Narrow : >SINAD 14dB

Note :
Befor the SQ and RSSI adjustment, you need to measure the reference sensitivity at FM wide, NPSPAC, and narrow in order for each adjustment items to set SSG level.

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TERMINAL FUNCTION

CN No.	Pin No.	Name	I/O	Function
TX-RX UNIT (X57-6530-10)				
CN701	1	SSW	I	EXT/INT speaker switch input.
	2	SP+	O	BTL output + for external speaker.
	3	SP–	O	BTL output – for external speaker.
	4	MSW/CTS	I	EXT/INT MIC switch input.
	5	EMC	I	External microphone input.
	6	EME	–	External microphone GND.
	7	PTT	I	External PTT input.
	8	REM	I	Programmable function key input.
	9	RTS	O	Request to send.
	10	E	–	GND
	11	5M	–	5V.
	12	TXD	O	Serial data output.
	13	RXD	I	Serial data input.
	14	DSR	I	Data set ready.
CN702	1	TCONT	O	For optional board.
	2	OPPTT	O	For optional board.
for	3	AMPSW	O	Audio AMP control switch output.
X53	4	EXAFC	O	External speaker switch control.
(A/6)	5	INAFC	O	Internal speaker switch control.
	6	NC	–	Not use.
	7	KES	O	Key counter clear to send.
	8	DGND	–	Digital GND.
	9	KEY1	I	Key input.
	10	KEY2	I	Key input.
	11	LCS	O	LCD clear to send.
	12	PTT	I	PTT signal input.
	13	N/CSW	O	Noise canseler microphone switch output.
	14	NC	–	Not use.
	15	CLK	O	Clock data output.
	16	DAT	O	Data output.
	17	E	–	GND.
	18	SB	–	Power output after power switch.
	19	SB	–	Power output after power switch.
	20	5M	–	5V.
	21	MICE	–	MIC GND.
	22	MIC	I	MIC signal input.
	23	AF	O	Audio output.
	24	AFE	–	Audio GND.

CN No.	Pin No.	Name	I/O	Function
	25	AFE	–	Audio GND.
	26	SP+	I	BTL input + for external speaker.
	27	SP–	I	BTL input – for external speaker.
	28	MUTE	O	Audio mute signal output.
	29	SD TO	O	For optional board.
	30	MAN D	O	For optional board.
	31	LAMP	O	Backlight LED control. Normally : 0V, Lighting : 7.5V
	32	Q7	O	Key scan IC Q7 signal input.
	33	Q6	O	Key scan IC Q6 signal input.
CN703	1	CH D	I	CH switch data.
	2	CH A	I	CH switch data.
for	3	CH C	I	CH switch data.
X53	4	CH B	I	CH switch data.
(B/6)	5	DGND	–	Digital GND.
	6	VOL	I	Voltage level input for audio control.
	7	33D	–	3.3V.
	8	B+	–	Power input after passing through the fuse.
	9	B+	–	Power input after passing through the fuse.
	10	PWSW	–	Power output after power switch.
	11	PWSW	–	Power output after power switch.
	12	TGL	I	Normally : 3.3V, switched toggle when connected GND.
	13	KEY2	I	Key input.
	14	Q6	O	Key scan IC Q6 signal output.
	15	Q7	O	Key scan IC Q7 signal output.
	16	LCDCS	O	Chip select output for LCD driver.
	17	CLK	O	Clock data output for LCD driver.
	18	DAT	O	Data output for LCD driver.
	19	LAMP	–	Backlight LED control. Normally : 0V, Lighting : 7.5V
	20	TXLED	–	TX LED control. Normally : 0V, Lighting : 7.5V
	21	BLED	–	Busy LED control. Normally : 0V, Lighting : 7.5V
	22	5M	–	5V.
CONTROL UNIT (X53-4030-XX) (A/6)				
CN1	1	Q6	O	Key scan IC Q6 output.
	2	Q7	O	Key scan IC Q7 output.

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TERMINAL FUNCTION

CN No.	Pin No.	Name	I/O	Function
for X57	3	LAMP	I	Backlight LED control. Normally : 0V, Lighting : 7.5V
	4	MAN D	I	For optional board.
	5	SD TO	I	For optional board.
	6	MUTE	I	Audio mute signal input.
	7	SP–	O	BTL output – for external speaker.
	8	SP+	O	BTL output + for external speaker.
	9	AFE	–	Audio GND.
	10	AFE	–	Audio GND.
	11	AF	I	Audio output.
	12	MIC	O	MIC signal input.
	13	MICE	–	MIC GND.
	14	5CM	–	5V.
	15	SB	–	Power output after power switch.
	16	SB	–	Power output after power switch.
	17	E	–	GND.
	18	DATA	I	Data input.
	19	CLK	I	Clock data input.
	20	5TB	–	Not use.
	21	N/CSW	I	Noise canseler microphone switch input.
	22	PTT	O	PTT signal output.
	23	LCS	–	Not use.
	24	KEY2	O	Key output.
	25	KEY1	O	Key output.
	26	DGND	–	Digital GND.
	27	KES	I	Key counter clear to send.
	28	NC	–	Not use.
	29	INAFC	I	Internal speaker switch input.
	30	EXAFC	I	External speaker switch input.

CN No.	Pin No.	Name	I/O	Function
	31	AMPSW	I	Audio AMP control switch input.
	32	OPPTT	I	For optional board.
	33	TCONT	I	For optional board.
CN3	1	Q8	O	Key scan IC Q8 signal output.
	2	Q7	O	Key scan IC Q7 signal output.
	3	PTTE	–	PTT GND.
	4	PTT	I	Normally : 5V, transmit when connected GND.
	5	KI1	I	Key input.
	6	Q6	O	Key scan IC Q6 signal output.
CN4	1	+	–	BTL + output for internal speaker.
	2	–	–	BTL – output for internal speaker.
CONTROL UNIT (X53-4030-XX) (B/6)				
CN101 for X57	1	DGND	–	Digital GND.
	2	TOGGLE	O	Normally : 5V, switched toggle when connected GND.
	3	KI2	O	Key output.
	4	Q6	I	Key scan IC Q6 signal input.
	5	Q7	I	Key scan IC Q7 signal input.
	6	CE	I	Chip select input for LCD driver.
	7	CL	I	Clock data input for LCD driver.
	8	DI	I	Data input for LCD driver.
	9	LAMP	–	Backlight LED control. Normally : 0V, Lighting : 7.5V
	10	TX LED	–	TX LED control. Normally : 0V, Lighting : 7.5V
	11	BLED	–	Busy LED control. Normally : 0V, Lighting : 7.5V
	12	5CM	–	5V.

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CONTROL UNIT (X53-4030-XX) -10 : K -11 : K2 Component side view (J72-0867-19)

TOP2 TOP1

LCD

R105

D102

D103

D104

F/6
GND
S1
TOGGLE SW
TGL

B/6

CN501

D/6
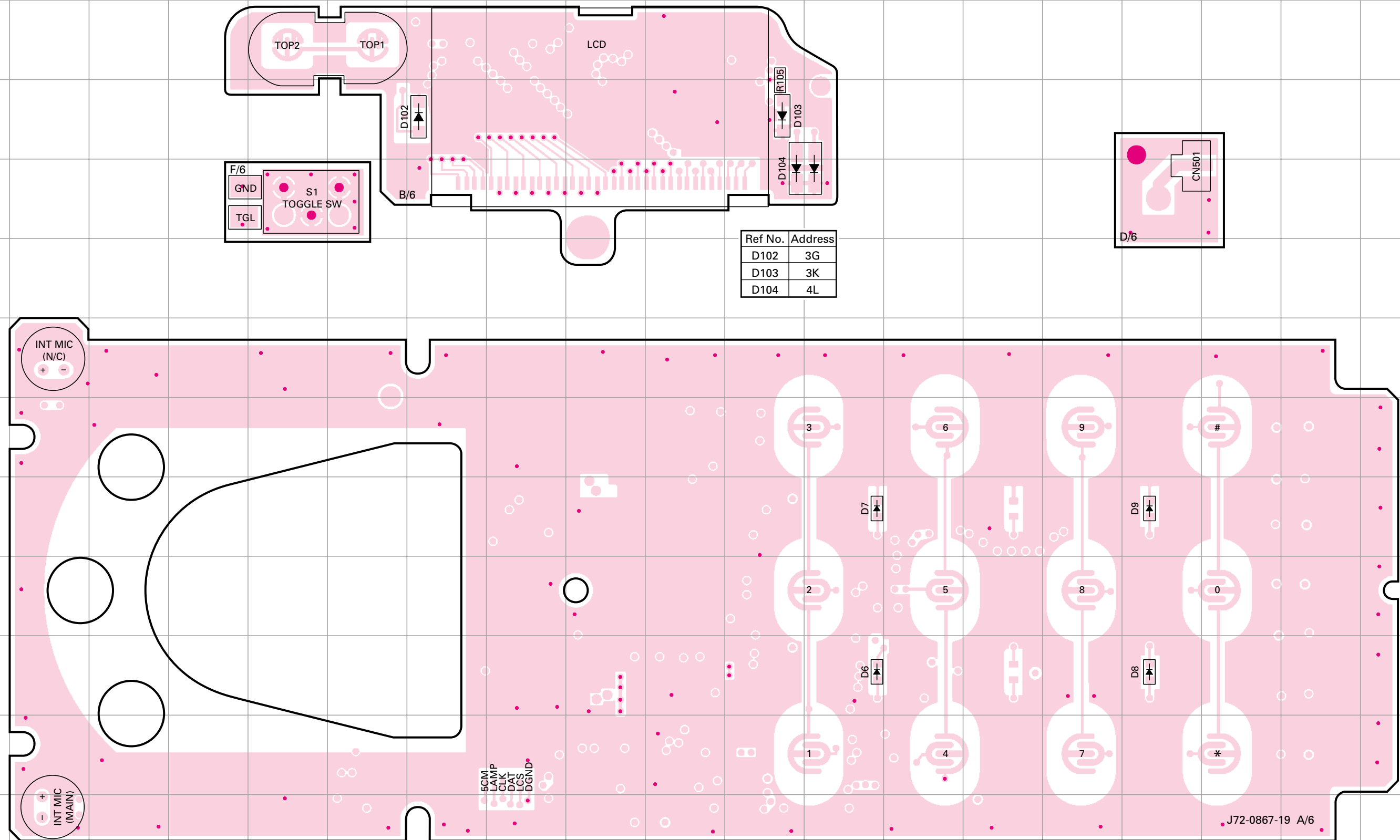
Ref No.	Address
D102	3G
D103	3K
D104	4L

INT MIC
(N/C)
+ −

3 6 9 #

D7 D9

2 5 8 0

D6 D8

1 4 7 *

5CM
LAMP
CLK
DAT
LCS
DGND

INT MIC
(MAIN)
+
−

J72-0867-19 A/6

Ref No.	Address
D6	10L
D7	8L
D8	10P
D9	8P

Component side
Layer 1
Layer 2
Layer 3
Layer 4
Foil side

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44

● Connect 1 and 4
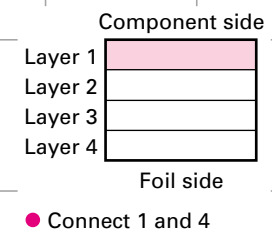
CONTROL UNIT (X53-4030-XX) -10 : K -11 : K2 Foil side view (J72-0867-19)

D/6

F/6

B/6
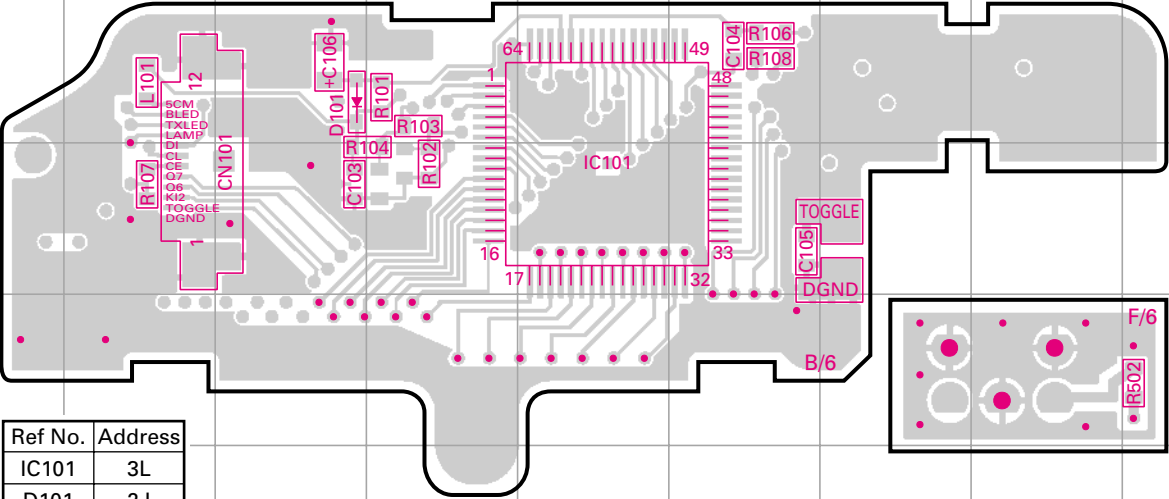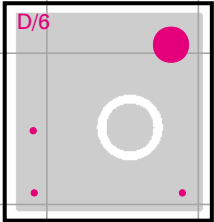
Ref No.	Address
IC101	3L
D101	2J

J72-0867-19 A/6

Component side

Layer 1
Layer 2
Layer 3
Layer 4

Foil side

● Connect 1 and 4

Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address	Ref No.	Address
IC1	7J	IC6	11H	Q7	8I	D11	9F	D16	12G	D105	11N
IC2	11G	IC7	11F	Q8	9I	D12	9H	D17	9G		
IC3	9L	IC10	11H	Q14	8L	D13	9G	D18	9E		
IC4	12H	Q5	9J	Q15	8I	D14	9F	D19	9H		
IC5	11H	Q6	8J	D2	9J	D15	12N	D20	9G		

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TX-RX UNIT (X57-6530-10) Component side view (J72-0825-19)

J72-0825-19 A/2

J72-0825-19 B/2

Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	

Foil side

47

48
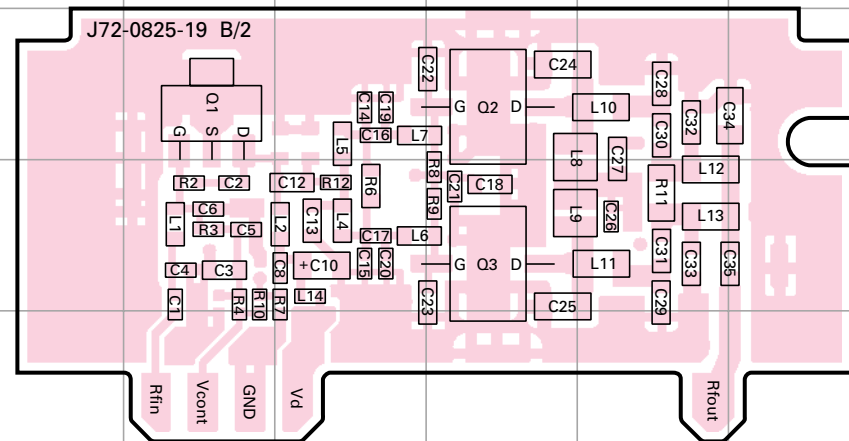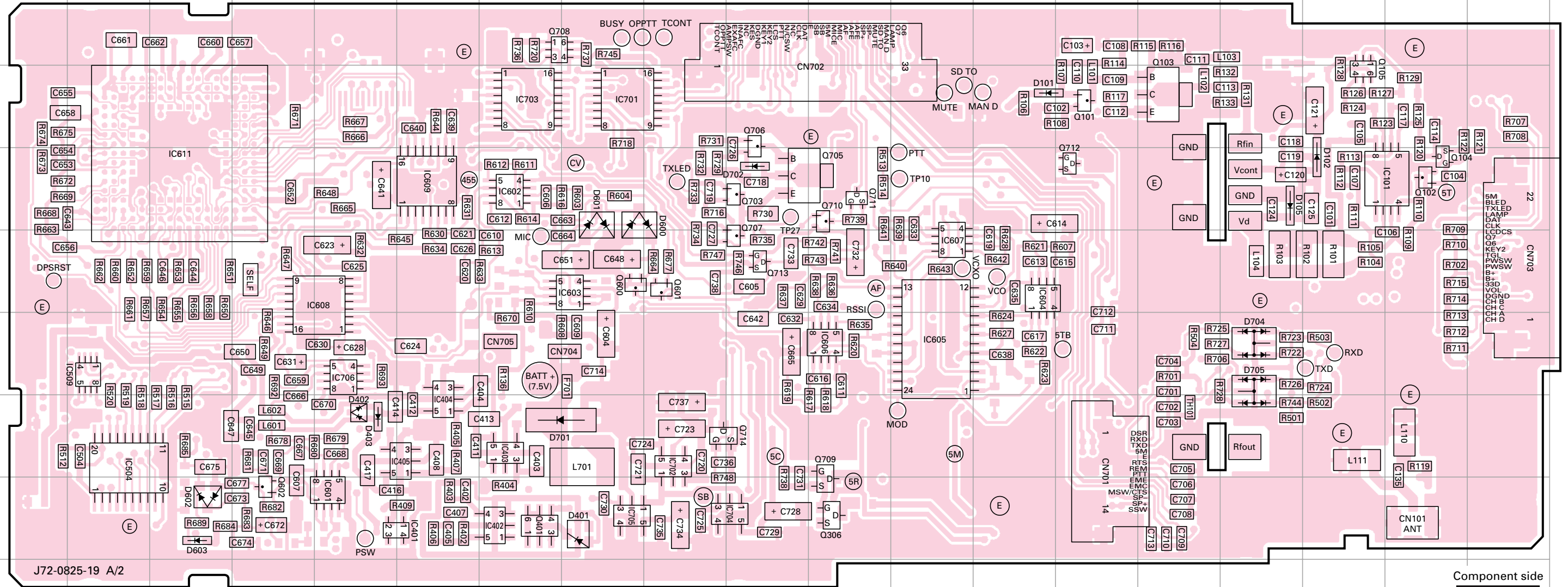
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC101	4R	IC609	4F	Q306	8K	D101	3M
IC401	8F	IC611	4C	Q401	8G	D102	4Q
IC402	8G	IC701	3H	Q600	5H	D105	4P
IC403	7G	IC702	7I	Q601	5I	D401	8H
IC404	7F	IC703	3G	Q602	8D	D402	7E
IC405	7F	IC704	8J	Q703	4J	D403	7E
IC504	7B	IC705	8H	Q705	4K	D600	4H
IC509	6B	IC706	6E	Q706	3J	D601	4H
IC601	8E	Q1	10B	Q707	5J	D602	8C
IC602	4G	Q2	10D	Q708	2G	D603	8C
IC603	5H	Q3	11D	Q709	8K	D701	7G
IC604	5M	Q101	3N	Q710	4K	D702	4J
IC605	6L	Q102	4R	Q711	4K	D704	6P
IC606	6K	Q103	3O	Q712	4N	D705	6P
IC607	5L	Q104	4R	Q713	5J		
IC608	5E	Q105	3Q	Q714	7I		
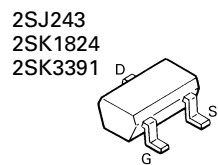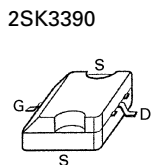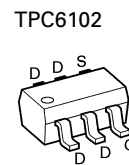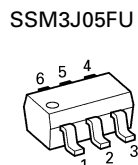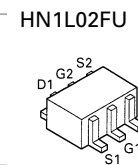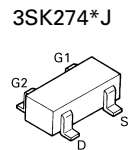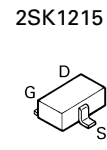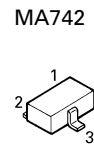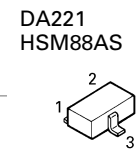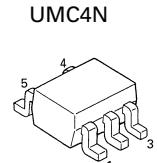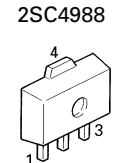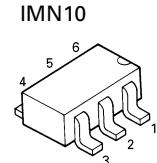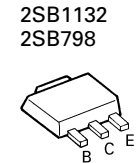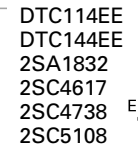
DTC114EE
DTC144EE
2SA1832
2SC4617
2SC4738
2SC5108

2SB1132
2SB798

IMN10

2SC4988

UMC4N

DA221
HSM88AS

MA742

2SK1215

2SJ347
2SK1830

3SK274*J

HN1L02FU

SSM3J05FU

TPC6102

2SK3390

2SJ243
2SK1824
2SK3391

TX-RX UNIT (X57-6530-10)   Foil side view (J72-0825-19)

J72-0825-19 A/2

J72-0825-19 B/2

Component side

Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6

Foil side
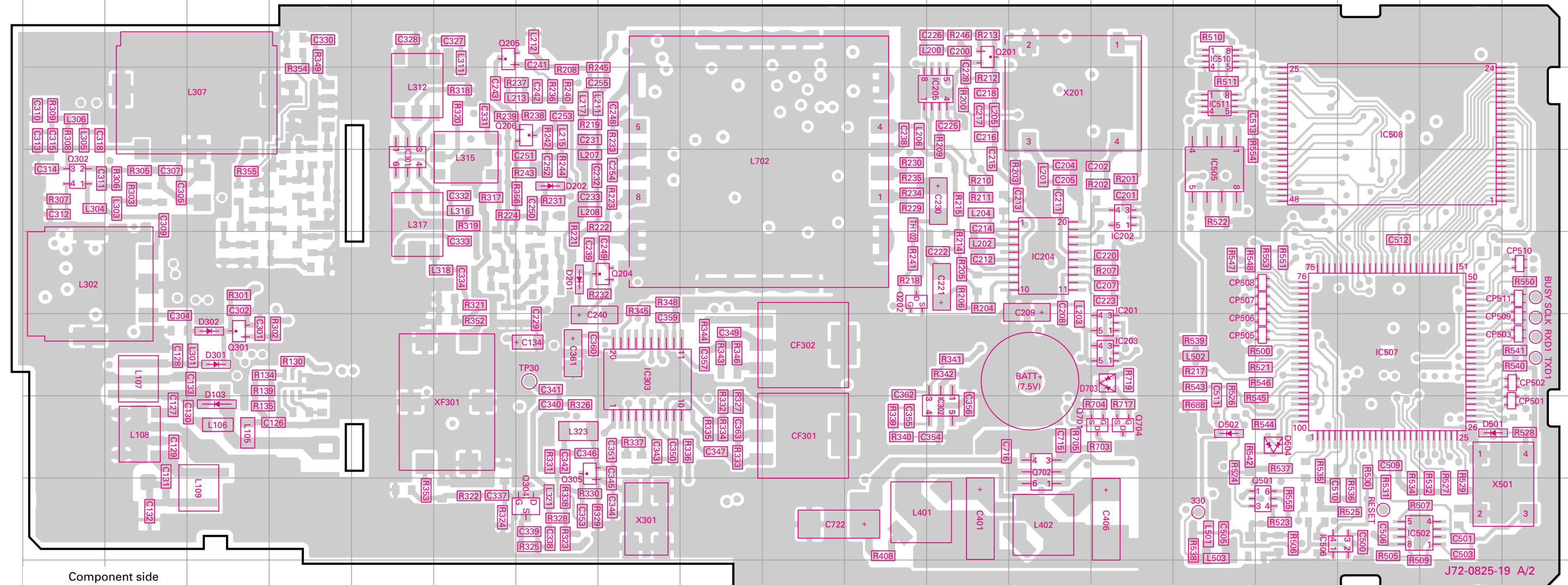
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XC6204B332M
XC6204B502MR
XC6365D103M
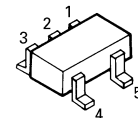
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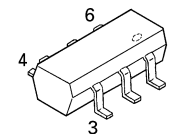
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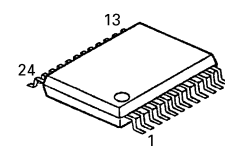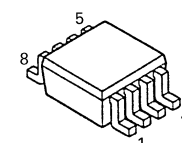TC7SET08FU
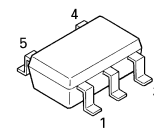
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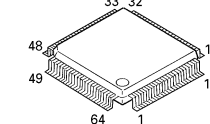
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BU4094BCFV
TLV2544IPW
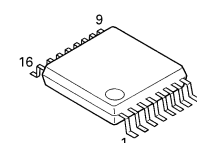
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NJM2904V
TC7WH32FK
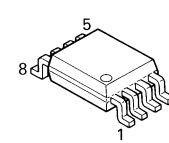
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TC7W04FU
TC7W66FU
TC75W51FU

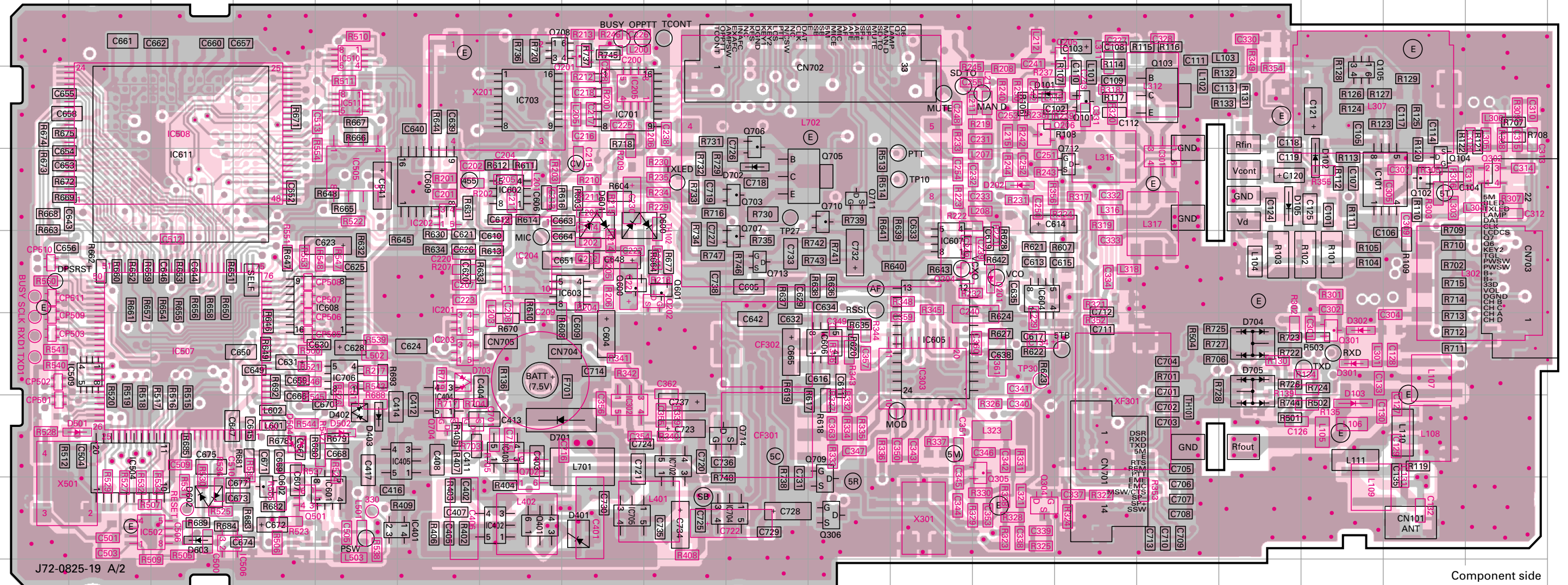| Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC201	6N	IC506	8Q	Q301	6C	D202	4G
IC202	4N	IC507	6Q	Q302	4A	D301	6C
IC203	6N	IC508	3Q	Q304	8G	D302	6C
IC204	5M	IC510	2O	Q305	7G	D501	7R
IC205	3L	IC511	3O	Q501	8P	D502	7O
IC301	4E	Q201	2L	Q701	7N	D504	7P
IC302	7L	Q202	5K	Q702	7M	D703	6N
IC303	6H	Q204	5H	Q704	7N		
IC502	8R	Q205	2F	D103	7C		
IC505	4O	Q206	3G	D201	5G		

49

50
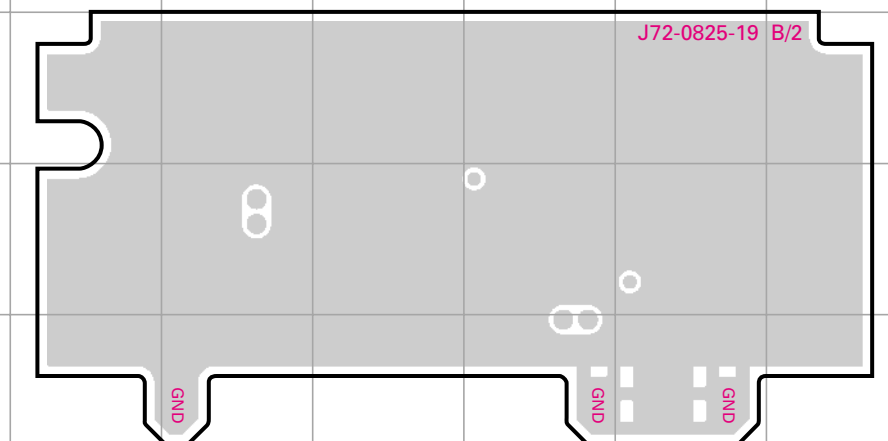
TK-5400 PC BOARD

TX-RX UNIT (X57-6530-10) Component side view + Foil side (J72-0825-19)
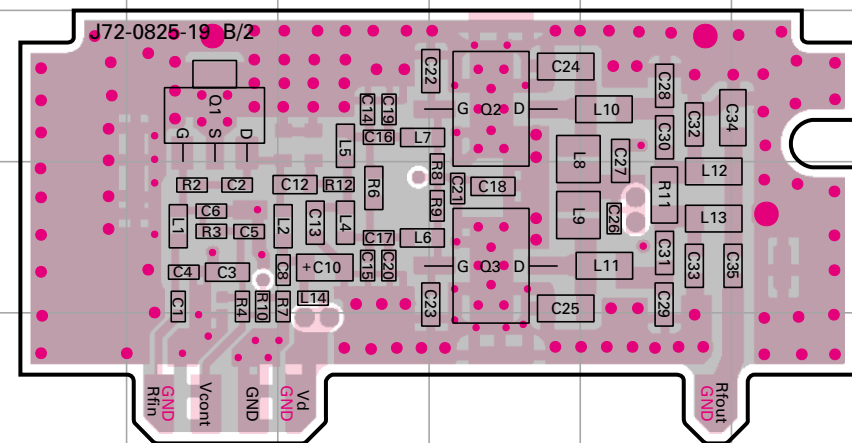
J72-0825-19 A/2

J72-0825-19 B/2

| Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC101	4R	IC506	8C	IC702	7I	Q206	3M	Q707	5J	D402	7E
IC201	6F	IC507	6C	IC703	3G	Q301	6Q	Q708	2G	D403	7E
IC202	4F	IC508	3C	IC704	8J	Q302	4S	Q709	8K	D501	7B
IC203	6F	IC509	6B	IC705	8H	Q304	8M	Q710	4K	D502	7E
IC204	5G	IC510	2E	IC706	6E	Q305	7M	Q711	4K	D504	7D
IC205	3H	IC511	3E	Q1	10B	Q306	8K	Q712	4N	D600	4H
IC301	4O	IC601	8E	Q2	10D	Q401	8G	Q713	5J	D601	4H
IC302	7H	IC602	4G	Q3	11D	Q501	8D	Q714	7I	D602	8C
IC303	6L	IC603	5H	Q101	3N	Q600	5H	D101	3M	D603	8C
IC401	8F	IC604	5M	Q102	4R	Q601	5I	D102	4Q	D701	7G
IC402	8G	IC605	6L	Q103	3O	Q602	8D	D103	7Q	D702	4J
IC403	7G	IC606	6K	Q104	4R	Q701	7F	D105	4P	D703	6F
IC404	7F	IC607	5L	Q105	3Q	Q702	7G	D201	5M	D704	6P
IC405	7F	IC608	5E	Q201	2H	Q703	4J	D202	4M	D705	6P
IC502	8B	IC609	4F	Q202	5I	Q704	7F	D301	6Q		
IC504	7B	IC611	4C	Q204	5L	Q705	4K	D302	6Q		
IC505	4E	IC701	3H	Q205	2N	Q706	3J	D401	8H		

TDA7053AT
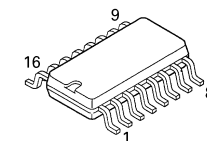
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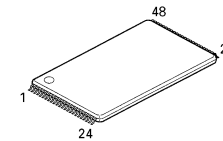
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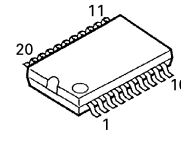
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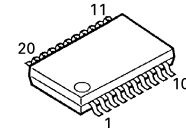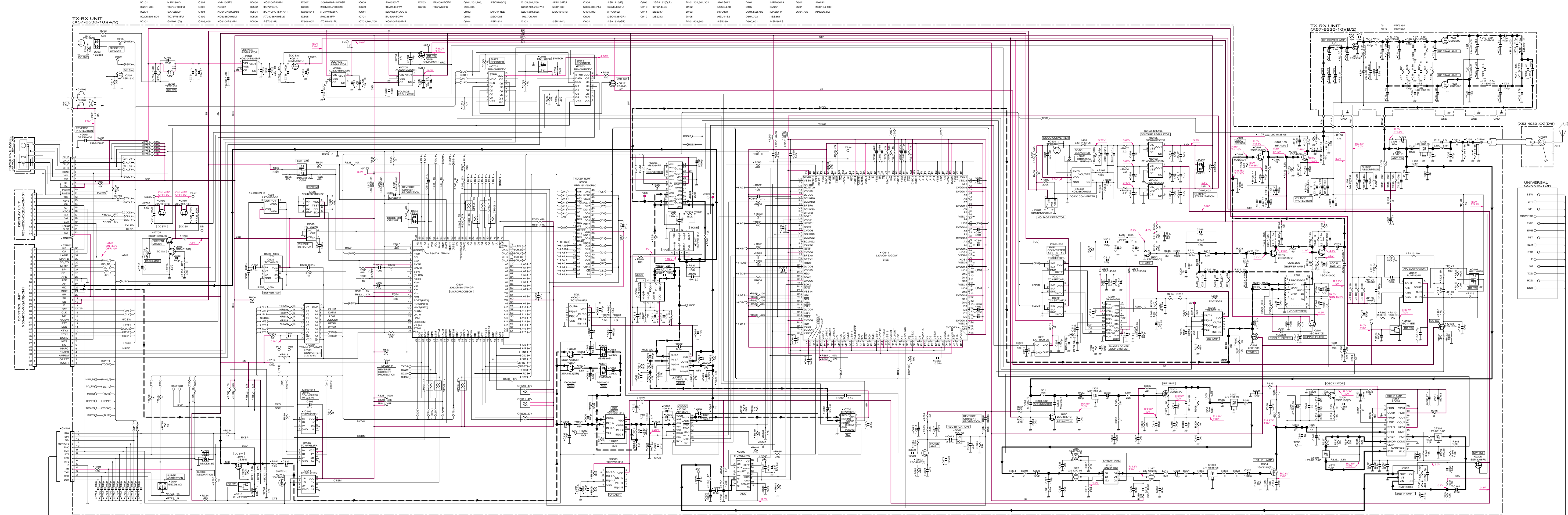
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XC61CN5002NR
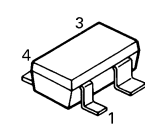
30620M8A-2W4GP
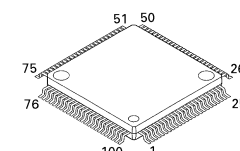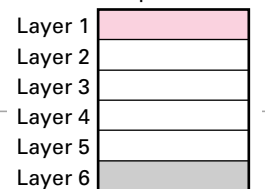
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

● Connect 1 and 6

Note : Components marked with a dot (-) are parts of layer 1.

TK-5400 **SCHEMATIC DIAGRAM**

Note : Components marked with a dot (·) are parts of layer 1.

IC1 :TDA7053AT
IC2 :BU4094BCFV
IC3 :NJM2904V
IC4-6 :TC7SH08FU
IC10 :TC7W04FU

Q5 :2SC4617(S)
Q6 :2SB798(DL,DK)
Q7,8,15 :2SK1824
Q14 :UMC4N

D2 :DTZ3.9(B) or UDZ3.9(B)
D12,13,15,19,20 :MA2S111
D16 :IMN10
D105 :NNCD6.8G

CONTROL UNIT
(X53-4030-XX)(A/6)

SHIFT REGISTER
IC2 BU4094BCFV

REVERSE CURRENT PREVENTION
D16 IMN10

IC4-6
OPTION BOARD CONTROL SWITCH

INVERTER
IC10 TC7W04FU

IC4 TC7SH08FU
IC5 TC7SH08FU
IC6 TC7SH08FU

5.0V

SHIFT REGISTER

REVERSE CURRENT PREVENTION

BACKLIGHT
LAMP

REVERSE CURRENT PREVENTION

5CM
LAMP
CLK
DAT
LCS
DGMD

ORANGE
PTT
SIDE 1
SIDE 2

CN3

LCD
X53-(B/6)
IC101 LC75824W
LCD DRIVER

:BB A SCN MON LO OPT AUX

X53-(F/6)
TOGGLE SW
S1
R502 1k

D101 SPEED UP
D102,103 BACKLIGHT

R106 270k
C104 100p
D101 1SS373
R107 4.7k
R101 100k
R103 10k
R102 10k
R104 10k
R105 470

C105 100p
L101
5.0V
LED

CN101
CN703
TX-RX UNIT X57-6530-10

IC101 :LC75824W
D101 :1SS373
D102,103 :B30-2231-05
D104 :B30-2019-05

AUDIO MUTE SWITCH
5.0V
Q8 2SK1824

R14 100k
C43 470p
R68
C14 0.1u

D105 NNCD6.8G
SURGE ABSORPTION

INT.AUDIO MUTE SWITCH
Q7 2SK1824

AF AMPLIFIER
IC1 TDA7053AT

MIC NOISE CANCELING CIRCUIT
IC3 NJM2904V

INT SP.
CN4

R36 1.8k
C45 470p C46 470p
MIC1 INT MIC (MAIN)
MIC2 INT MIC (N/C)

R30 22k
C32 0.47u
R29 22k
C19 0.47u

R35 10k
R33 22k
R32 68
C31 0.022u
R34 1.8k
Q14 UMC4N
R43 47k
C35 1000p
N/CSW

NOISE CANCELING SWITCH

EXT.AUDIO MUTE SWITCH
Q15 2SK1824

AF AMP POWER SUPPLY SWITCH
Q6 2SB798(DL,DK)

POWER SUPPLY SWITCH CONTROL
Q5 2SC4617(S)
AVR
D2 DTZ3.9(B) or UDZ3.9(B)

7.4V
R1 27k
R56 15k

R12 1k
R13 47k
R64

TX-RX UNIT X57-6530-10

CN702
CN1
MAN.D

		D6	D7	D8	D9	D11	D14	D17	D18	R19	R20	R31	R37	R38	R39	R40	R41	R42	R50	R51	R52	R53	R54	R55	IC7
-10	K	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
-11	K2	B30-2171-05	B30-2171-05	B30-2171-05	B30-2171-05	IMN10	IMN10	IMN10	IMN10	100	100	0	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k	BU4094BCFV

BLOCK DIAGRAM
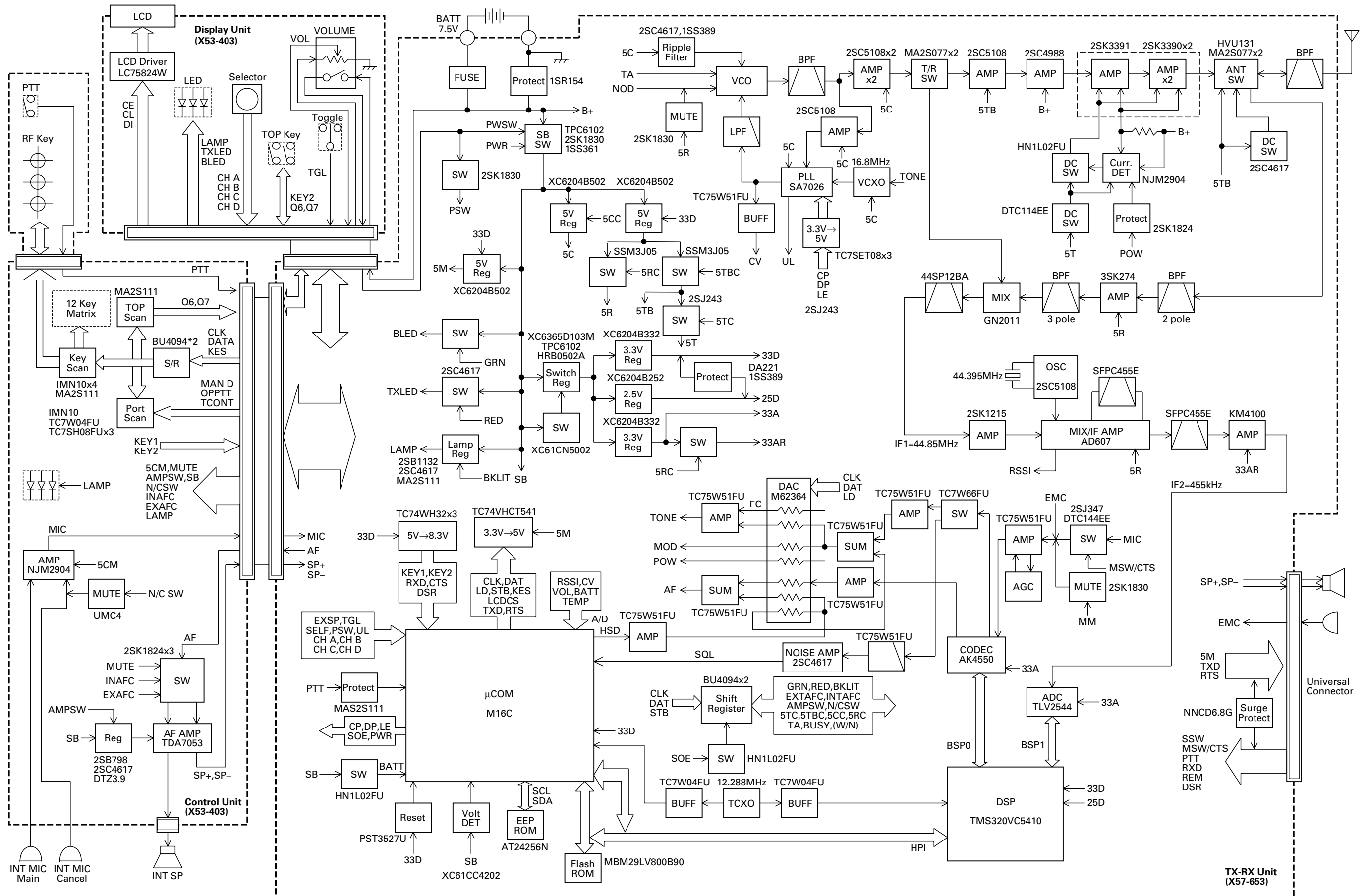
LEVEL DIAGRAM

Receiver Section

RF (860.55MHz)   IF1 (44.85MHz)

−120.0dBm −122.5dBm −124.5dBm −107.0dBm −109.0dBm −114.0dBm −117.0dBm −96.0dBm

ANT

L108 C127 C304 L302 C309 Q302 C318 L307 C330 IC301 C334 R352 XF301 R353 C337 Q304 C340

IF2 (455kHz)   AF

−45.0dBm −27.0dBm 27mVrms 100mVrms 100mVrms 810mVrms 27mVrms

IC303 MIX IF AMP R344 CF302 C362 IC302 C626 455 ADC IC609 DSP IC611 CODEC IC608 C642 IC606 AF DAC IC605 R641 IC607 AF AMP IC1 SP 500mW (BLT)

Measurement conditions

- In the RF and IF1 sections, use a 1000pF coupling capacitor. (The RF input level shows the SSG input level for obtaining 12dB SINAD.)
- In the IF2 section, use a 0.1μF coupling capacitor. (The RF input level from the SSG shows the SSG input level for obtaining 12dB SINAD sensitivity.)
- In the AF section, make measurements with an AC level meter. (The SSG RF output level is −53dBm, 1kHz FM MOD. 3kHz DEV.)

Transmitter Section

AF

17.4mVrms 16.3mVrms 14.7mVrms 47mVrms 96.5mVrms 96mVrms 370mVrms 238mVrms

MIC (MAIN) IC3 NC AMP C19 C605 R604 IC602 TP18 C624 CODEC IC608 C631 SW IC706 C665 IC606 MOD IC604 R624 DAC IC605 VCO

RF (824.90MHz)

−13dBm −3.5dBm 2.6dBm 7.4dBm 18dBm 25.9dBm 35.7dBm 3.0W=34.8dBm

VCO L702 PLL C241 Q205 C243 Q206 C253 D101 D102 RX Lo Q101 C109 Q103 C113 C1 Q1 C12 Q2 Q3 C35 D103 C127 L108 ANT

PA
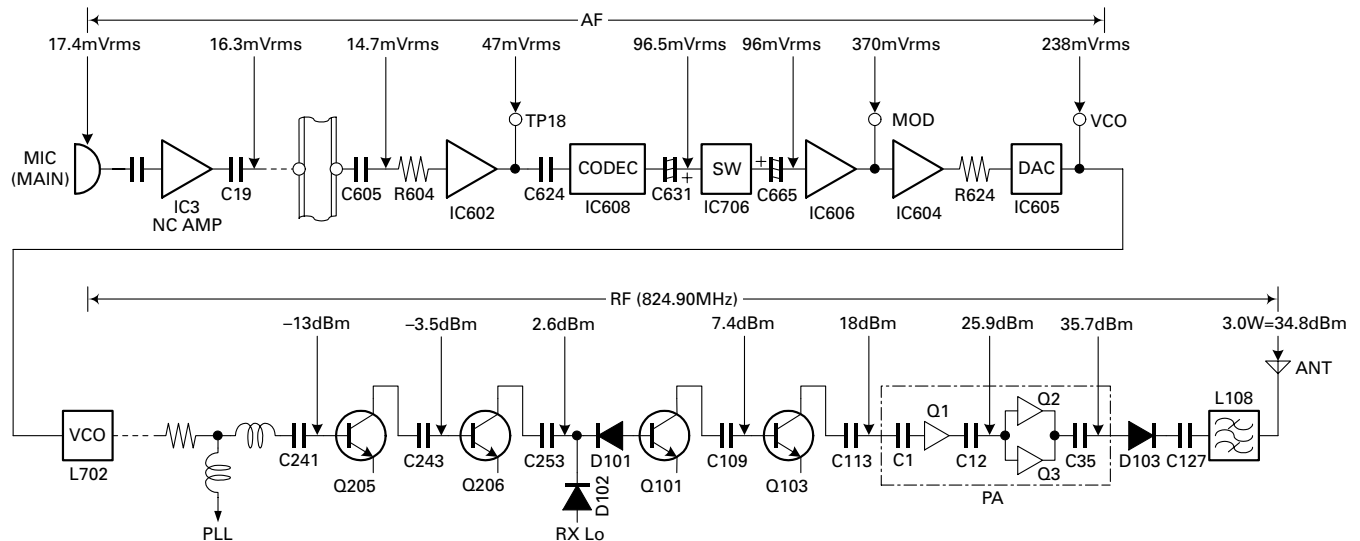
Measurement conditions

- Connect the audio generator (AG) to the microphone terminal. The AG output has such a level that FM modulation is 3kHz at 1kHz.
- In the AF section, make measurements with an AC level meter.
- In the RF section, open the circuit after the measurement point and make measurements through a 100pF capacitor with a spectrum analyzer.

TK-5400

KMC-25 (Speaker Microphone)

KMC-25   External View

KMC-25   Schematic Diagram
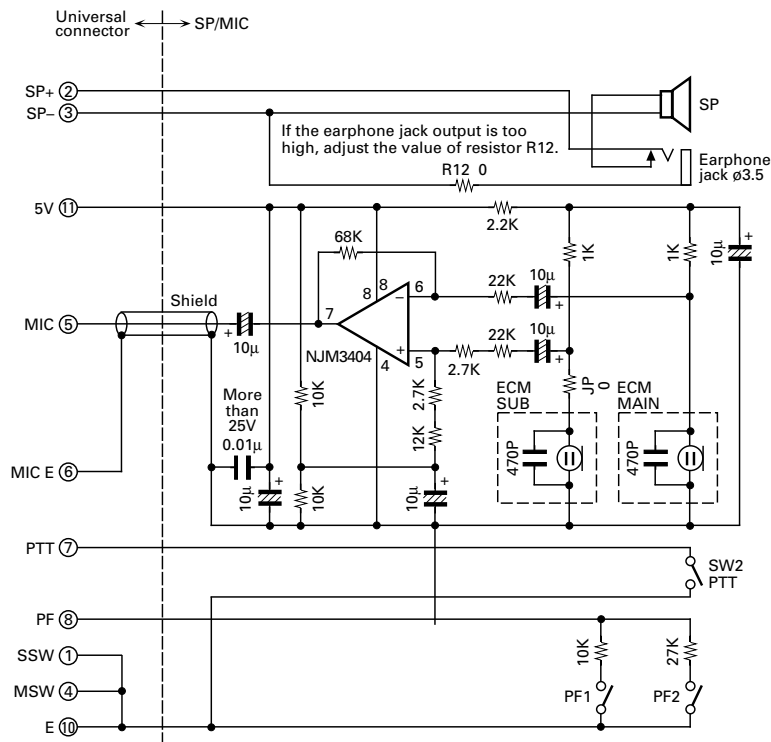
KMC-25   Specifications

Microphone

    Impedance 2.2kΩ

    Sensitivity .... −65dB±4.0dB at 1kHz

Speaker

    Impedance 16Ω

    Input 0.5W

    Maximum input 1.5W

Dimensions .... 62 W x 81 H x 29 D (mm)

Weight (With plug cord) .... Approx. 220g

KMC-25   Parts List

✱ : New parts

Ref. No.	New parts	Parts No.	Description	Model
		A02-3699-08	Case (Front)	
		A02-2093-08	Case (Rear)	
		B09-0382-08	Cap (Phone)	
		D10-0629-08	Lever (PTT)	
	✱	E30-3484-08	Lead wire with plug assy	
		J29-0644-08	Clip assy	
		J42-0495-08	Bushing	
	✱	S70-0471-08	Tact switch	
		T07-0359-08	Speaker	
	✱	T91-0584-08	MIC element (SUB)	
	✱	T91-0634-08	MIC element (MAIN)	
		N08-0547-08	Dressed screw	

TK-5400

KNB-17A (Ni-Cd Battery) / KNB-21N/22N (Ni-MH Battery)

**KNB-17A
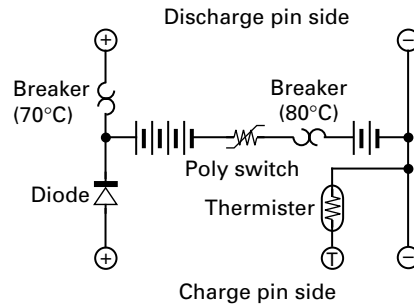External View**

**KNB-17A
Schematic Diagram**

Discharge pin side

Breaker
(70±5°C)   Breaker
(80±5°C)

Diode   Thermister

Charge pin side
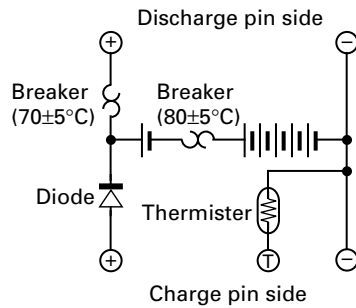
**KNB-17A
Specifications**

Voltage .... 7.2V (1.2V x 6)
Charging current 1500mAh
Dimensions (mm) .... 58.0 W x 110.8 H x 20.0 D
   (Projections included)
Charger and charging time
   KSC-19 (Normal Charger) .... Approx. 8 hours
   KSC-20 (Rapid charger) .... Approx. 1.3 hour
Weight 220g

**KNB-21N
External View**

**KNB-21N
Schematic Diagram**

Discharge pin side

Breaker
(70°C)   Breaker
(80°C)

Poly switch

Diode   Thermister

Charge pin side

**KNB-21N
Specifications**

Voltage .... 7.2V (1.2V x 6)
Charging current 1600mAh
Dimensions (mm) .... 63.8 W x 110.8 H x 17.2 D
   (Projections included)
Charger and charging time
   KSC-24 (Rapid charger) .... Approx. 80 minutes
Weight 210g

**KNB-22N
External View**

**KNB-22N
Schematic Diagram**

Discharge pin side

Breaker
(70°C)   Breaker
(80°C)   Poly switch

Diode   Thermister

Charge pin side
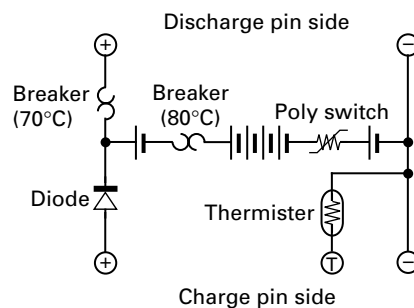
**KNB-22N
Specifications**

Voltage .... 7.2V (1.2V x 6)
Charging current 2100mAh
Dimensions (mm) .... 63.8 W x 110.8 H x 20.2 D
   (Projections included)
Charger and charging time
   KSC-24 (Rapid charger) .... Approx. 110 minutes
Weight 250g

TK-5400

KPG-36 (Programming Interface Cable) / KSC-19 (Regular Charger) / KSC-20/24 (Rapid Charger)

KPG-36   External View

KSC-20   External View

KSC-20   Specifications

Charging current .... 1100mA±150mA
Charging time .... KNB-17A : Approx. 80 min.
Source voltage .... Approx. 15V
Usable temperature range ...... 0°C~40°C
Dimensions (Body only) .... 105 W x 52 H x 135 D (mm)
Weight (Body only) 0.18kg

KSC-19   External View

KSC-24   External View

KSC-19   Charging

KNB-17A

   Voltage 7.2V
   Battery capacity 1500mAh
   Charging time .... Approx. 8 hours

KSC-24   Specifications

Charging current .... 1100mA±150mA
Charging time .... KNB-17A : Approx. 80 min.
                                          KNB-21N : Approx. 80 min.
                                          KNB-22N : Approx. 110 min.
Source voltage .... Approx. 15V
Usable temperature range ...... 0°C~40°C
Dimensions (Body only) .... 105 W x 55 H x 135 D (mm)
Weight (Body only) .... Approx. 180g

SPECIFICATIONS

GENERAL

Frequency Range .... 806 to 825MHz, 851 to 870MHz : TX   851 to 870MHz : RX
Number of Channels .... 512 channels
Zones .... 16 max.
Channels .... 250 max.
Channel Spacing .... FM analog : 12.5/25kHz (NPSPAC)   Digital (C4FM) : 12.5kHz
Operating Voltage .... 7.5V DC ± 20%
Battery Life (5-5-90 duty cycle) .... KNB-17A (Ni-Cd) : 7 hours
                                                                            KNB-21N (Ni-MH) : 8 hours
                                                                            KNB-22N (Ni-MH) : 10 hours
Operating Temperature Range .... –22°F to +140°F (–30°C to +60°C)
Frequency Stability (–22°F to +140°F) .... ±1.5ppm
Antenna Impedance 50Ω
Dimensions (W x H x D) (Projections not included) .... 2-5/16 x 6-3/32 x 1-1/2 in. (58 x 155 x 38 m) with KNB-17A battery
Weight (net) .... 1.29 lbs (587g) with KNB-17A (no antenna)

RECEIVER

Sensitivity .... Digital C4FM @5% BER : 0.30μV   FM 12dB SINAD : 0.30μV
Selectivity .... Digital : 60dB   FM @25kHz : 72dB   FM @12.5kHz : 63dB
Intermodulation Distortion .... Digital : 70dB   FM @25kHz : 70dB   FM @12.5kHz : 63dB
Spurious and Image .... Digital : 73dB   FM : 73dB
Audio Output (into 16Ω) 500mW
Audio Distortion .... Less than 3%

TRANSMITTER

RF Power Output .... Hi : 3W, Low : 1W
Spurious and Harmonics 60dB
FM Hum and Noise .... FM @25kHz : 45dB   FM @12.5kHz : 39dB
Audio Distortion .... Less than 2%
Modulation 16K0F3E, 11K0F3E, 8K10F1E, 8K10F1D

FM measurements made per TIA/EIA 603.
Digital measurements made per TIA/EIA 102.

KENWOOD reserves the right to change specifications without prior notice.

APPLICABLE MIL-STD

Standard	MIL 810C Methods/Procedures	MIL 810D Methods/Procedures	810E Methods/Procedures	810F Methods/Procedures
Low Pressure	500.1/Procedure I	500.2/Procedure I, II	500.3/Procedure I, II	500.4/Procedure I, II
High temperature	501.1/Procedure I, II	501.2/Procedure I, II Cat. A1	501.3/Procedure I, II Cat. A1	501.4/Procedure I, II
Low temperature	502.1/Procedure I	502.2/Procedure I, II Cat. C1	501.3/Procedure I, II Cat. C1	502.4/Procedure I, II
Temperature Shock	503.1/Procedure I	503.2/Procedure I Cat. A1, C1	503.3/Procedure I Cat. A1, C1	503.4/Procedure I, II
Solar Radiation	505.1/Procedure I	505.2/Procedure I	505.3/Procedure I	505.4/Procedure I
Rain	506.1/Procedure I, II	506.2/Procedure I, II	506.3/Procedure I, II	506.4/Procedure I, III
Humidity	507.1/Procedure II	507.2/Procedure II	507.3/Procedure II	507.4
Salt Fog	509.1/Procedure I	509.2/Procedure I	509.3/Procedure I	509.4
Dust	510.1/Procedure I	510.2/Procedure I	510.3/Procedure I	510.4/Procedure I, III
Vibration	514.2/Procedure VIII, X	514.3/Procedure I Cat. 8	514.4/Procedure I Cat. 8	514.5/Procedure I Cat. 20
Shock	516.2/Procedure I, II, V	516.3/Procedure I, IV	516.4/Procedure I, IV	516.5/Procedure I, IV, V

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