

TK-5410

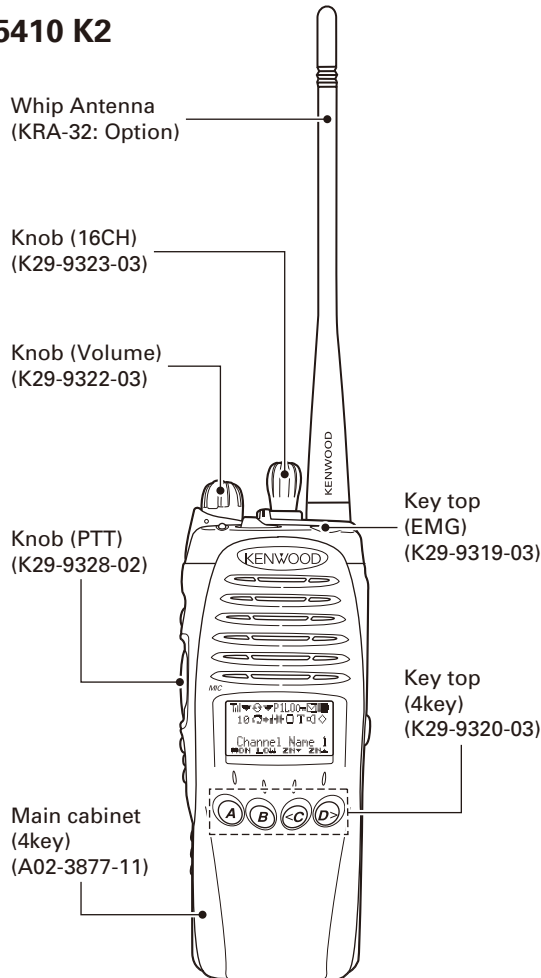
SERVICE MANUAL

KENWOOD

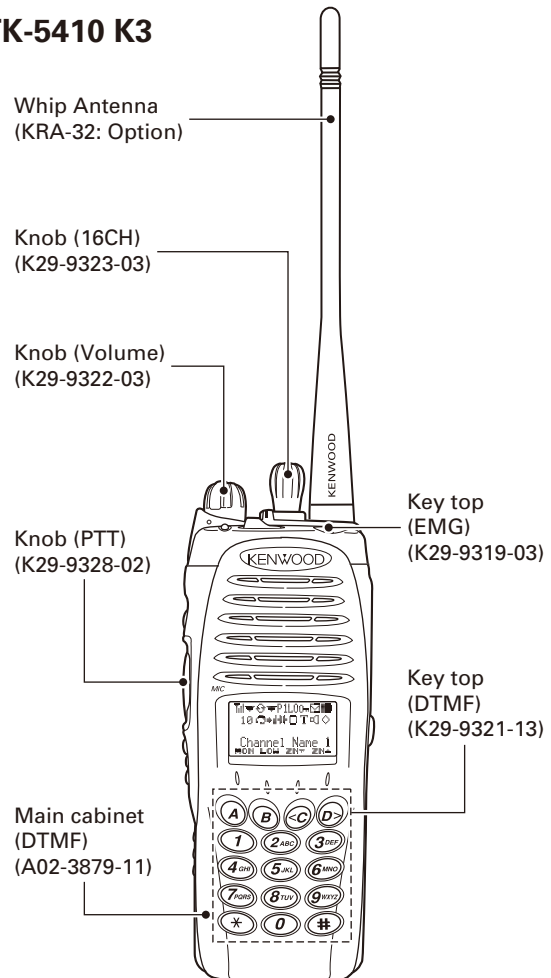
Kenwood Corporation

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TK-5410 K2



TK-5410 K3



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

CONTENTS

GENERAL.....	2
SYSTEM SET-UP	3
REALIGNMENT	3
INSTALLATION.....	6
DISASSEMBLY FOR REPAIR	7
CIRCUIT DESCRIPTION	13
COMPONENTS DESCRIPTION.....	21
PARTS LIST	23
EXPLODED VIEW	34
PACKING.....	35
TROUBLE SHOOTING	36
ADJUSTMENT	38
TERMINAL FUNCTION	64

PC BOARD	
CONTROL UNIT (X53-4390-XX)	70
TX-RX UNIT (X57-7560-10).....	74
INTERCONNECTION DIAGRAM	78
SCHEMATIC DIAGRAM	80
BLOCK DIAGRAM	92
LEVEL DIAGRAM	96
OPTIONAL ACCESSORIES	
KNB-32N (Ni-MH Battery Pack)	97
KNB-33L (Li-ion Battery Pack).....	97
KNB-54N (Ni-MH Battery Pack)	97
KSC-32 (Rapid Charger).....	97
KBP-6 (Battery Case)	97
SPECIFICATIONS	BACK COVER



TK-5410

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Transceivers containing AMBE+2™ Vocoder:

The AMBE+2™ voice coding technology is embedded in the firmware under the license of Digital Voice Systems, Inc.

GENERAL

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

PERSONAL SAFETY

The following precautions are recommended for personal 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.

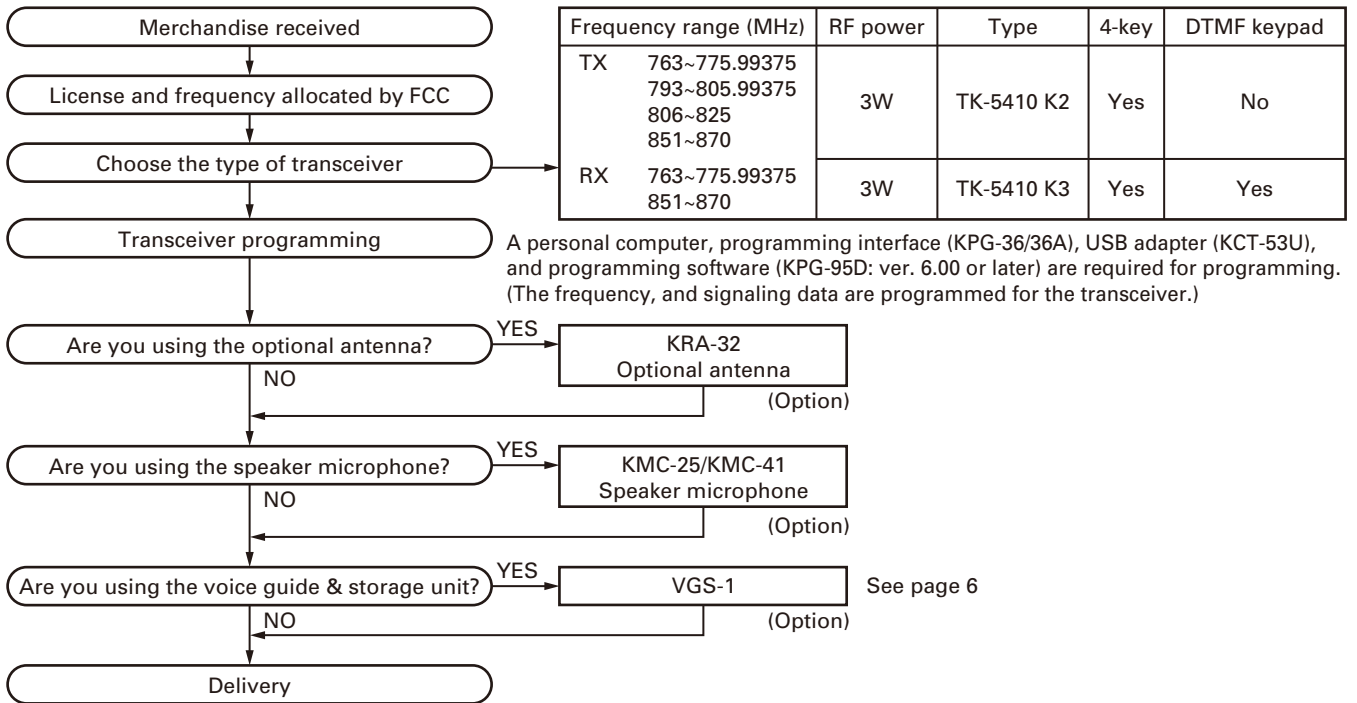
SERVICE

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

NOTE

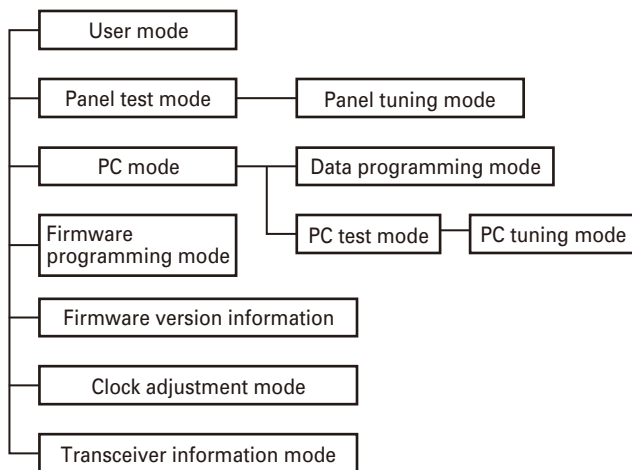
You must use KPG-95D version 6.00 or later for this transceiver. KPG-95D versions earlier than version 6.00 will not work properly.

SYSTEM SET-UP



REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the transceiver.
PC mode	Used for communication between the transceiver and PC.
Data programming mode	Used to read and write frequency data and other features to and from the transceiver.
PC test mode	Used to check the transceiver using the PC. This feature is included in the FPU.
Firmware programming mode	Used when changing the main program of the flash memory.
Firmware version information	Used to confirm the internal firmware version.
Clock adjustment mode	Used by the dealer to adjust date and time.
Transceiver information mode	Used to confirm the transceiver firmware version.

REALIGNMENT

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	Press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first.
PC mode	Received commands from PC
Panel tuning mode	Press the [Side3] key, in Panel test mode
Firmware programming mode	Press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then release the [Side3] key first.
Firmware version information	Press and hold the [Side3] key while turning the transceiver power ON.
Clock adjustment mode	Press and hold the [Orange] and [PTT] keys while turning the transceiver power ON and then release the [Orange] key first.
Transceiver information mode	Press and hold the [Side1] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first.

3. Panel Test Mode

Setting method refer to ADJUSTMENT.

4. Panel Tuning Mode

Setting method refer to ADJUSTMENT.

5. PC Mode

5-1. Preface

The transceiver is programmed by using a personal computer, programming interface (KPG-36/36A), USB adapter (KCT-53U) and programming software (KPG-95D: ver. 6.00 or later).

The programming software can be used with a PC. Figure 1 shows the setup of a PC for programming.

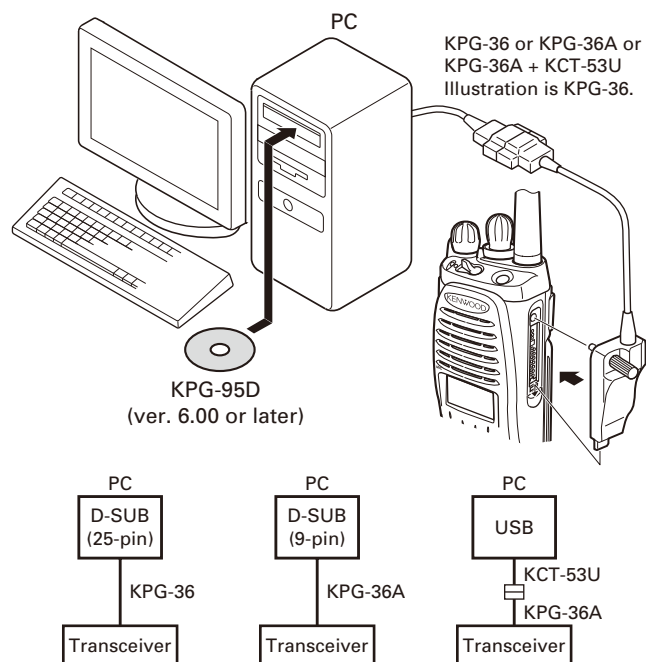


Fig. 1

5-2. Connection procedure

1. Connect the transceiver to the computer using the interface cable and USB adapter (When the interface cable is KPG-36A, the KCT-53U can be used.).

Note:

- You must install the KCT-53U driver in the computer to use the USB adapter (KCT-53U).
 - When using the USB adapter (KCT-53U) for the first time, plug the KCT-53U into a USB port on the computer with the computer power ON.
2. When the POWER switch on, user mode can be entered immediately. When PC sends command the transceiver enter PC mode, and "PROGRAM" is displayed on the LCD.
When data is transmitting from the transceiver, the red LED lights.
When data is receiving by the transceiver, the green LED lights.

Note:

The data stored in the computer must match the "Model Name and Market Code" when it is written into the EEPROM and flash memory.

REALIGNMENT

5-3. KPG-36/KPG-36A description

(PC programming interface cable: Option)

The KPG-36/36A is required to interface the transceiver to the computer. It has a circuit in its D-sub connector (KPG-36: 25-pin, KPG-36A: 9-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-36/36A connects the universal connector of the transceiver to the RS-232C serial port of the computer.

5-4. KCT-53U description (USB adapter: Option)

The KCT-53U is a cable which connects the KPG-36A to a USB port on a computer.

When using the KCT-53U, install the supplied CD-ROM (with driver software) in the computer. The KCT-53U driver runs under Windows 2000, XP or Vista (32-bit).

5-5. Programming software KPG-95D description

The KPG-95D is the programming software for the transceiver supplied on a CD-ROM. This software runs under Windows 98, ME, Windows NT4.0, Windows 2000, XP or Vista (32-bit) on a PC.

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

6. Firmware Programming Mode

6-1. 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.)

6-2. Connection procedure

Connect the transceiver to the personal computer using the interface cable (KPG-36/36A) and USB adapter (KCT-53U: when the interface cable is KPG-36A, the KCT-53U can be used.). (Connection is the same as in the PC Mode.)

6-3. Programming

1. Start up the firmware programming software (Fpro.exe (ver. 5.00 or later)). The Fpro.exe exists in the KPG-95D installed folder.
2. Set the communications speed (normally, 115200 bps) and communications port in the configuration item.
3. Set the firmware to be updated by File name item.
4. Press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then release the [Side3] key first. Then, the orange LED on the transceiver lights and the "PROGRAM FIRMWARE" is displayed.
5. Check the connection between the transceiver and the personal computer, and make sure that the transceiver is in the Program mode.
6. Press "write" button in the window. The orange LED turns off while the firmware is being erased. [PG] appears on the LCD and the green LED turns on when the firmware data is being received.
7. If writing ends successfully, the checksum is calculated and a result is displayed.

8. If you want to continue programming other transceivers, repeat steps 4 to 7.

Note:

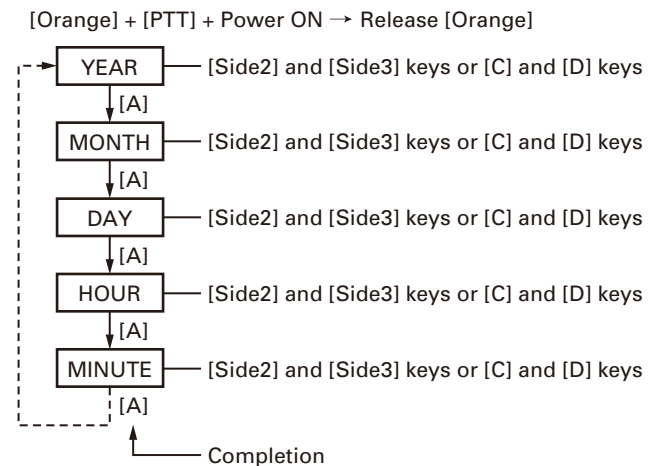
This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software.

7. Firmware Version Information

Press and hold the [Side3] key while turning the transceiver power ON and then keep pressing and holding the [Side3] key, the firmware version information appears on the LCD.

8. Clock Adjustment Mode

8-1. Flow chart of operation



9. Transceiver Information Mode

Use this function to confirm the transceiver firmware version.

1. Press and hold the [Side1] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first.
2. The transceiver firmware version appears on the LCD.
3. To exit the transceiver information mode, turn the transceiver power OFF.

INSTALLATION

Voice Guide & Storage Unit (VGS-1: Option)

■ Installing the VGS-1 unit in the transceiver

1. Remove the 4 screws from the cover.
2. Remove the cover by inserting the tip of a pair of tweezers into the screw hole of the cover and prying it open.

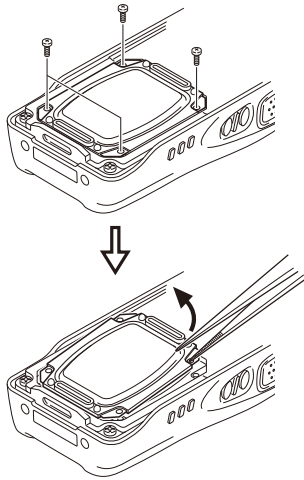


Fig. 1

3. Remove the OPTION PCB from the connector (CN501) of the TX-RX PCB.

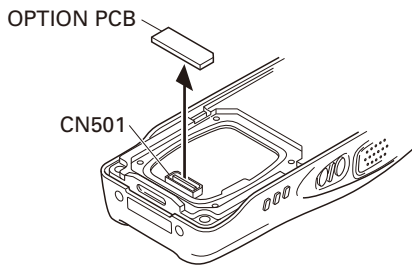


Fig. 2

4. Attach two cushions to the VGS-1 as shown in the figure 3.

Note:

Be sure not to cover the VGS-1 connector (CN1) with the cushion.

5. Insert the VGS-1 connector (CN1) into the connector (CN501) of the TX-RX PCB.

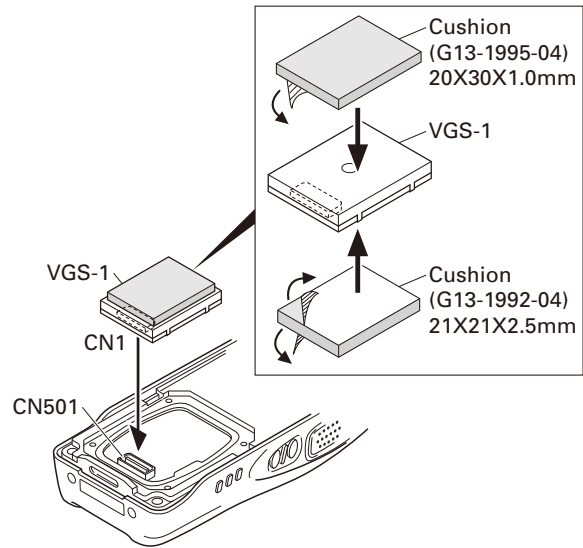


Fig. 3

6. Reinstall the cover using the 4 screws removed in step 1.

Note:

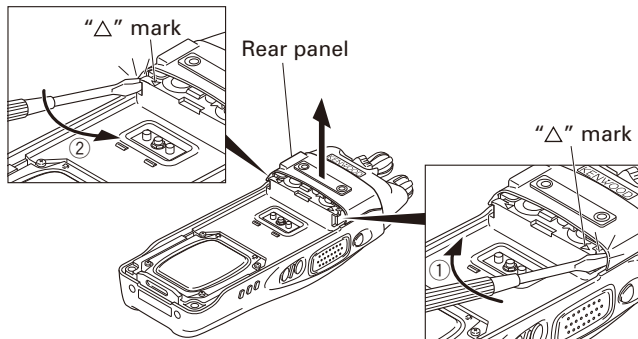
You must setup using the KPG-95D.

DISASSEMBLY FOR REPAIR

Disassembly Procedure

■ Removing the front case from the chassis

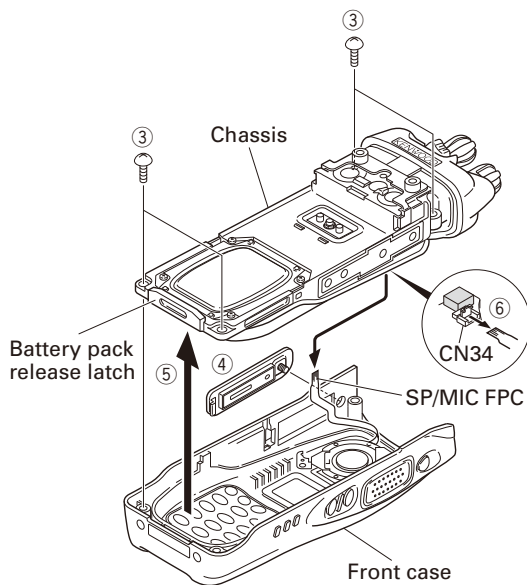
1. Remove the rear panel with a flat-head screwdriver.
Insert the screwdriver between the rear panel (right side) and the chassis (the place next to the "△" mark shown on the chassis), push it in the direction of the arrow ①, and remove the right side of the rear panel. Repeat the above action for the left side of the rear panel ②.



2. Remove the four screws ③ and universal connector cap ④.
3. Lift the battery pack release latch on the bottom of the chassis ⑤ and remove the chassis from the front case.

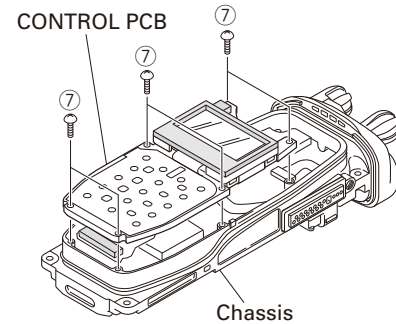
Note:

- Lift the chassis from the front case slowly and carefully. If the chassis is lifted suddenly, the SP/MIC FPC may be pulled and the connector may become damaged.
 - Handle the main packing with care. It is likely to collect dust and dirt.
4. Remove the SP/MIC FPC from the CONTROL PCB connector (CN34) ⑥.

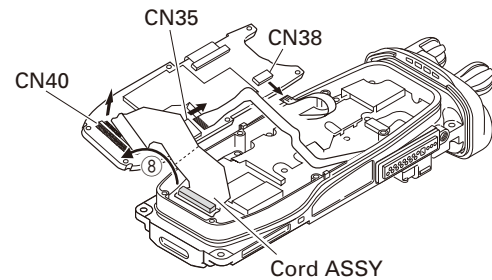


■ Removing the CONTROL PCB (X53-439) from the chassis

1. Remove the six screws ⑦.

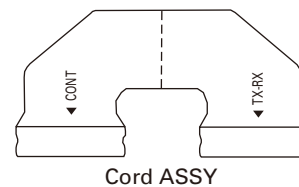


2. On the reverse side of the CONTROL PCB ⑧, remove the cord ASSY and each FPC from the connectors (CN40, CN35, CN38) of the CONTROL PCB.



Note:

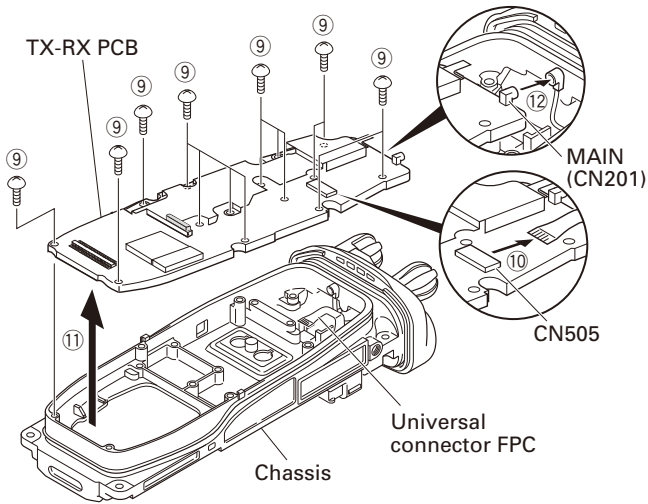
- Fold indications are printed on the Cord ASSY and Universal Connector FPC.
"- - -" line shows creased line on the bottom.



DISASSEMBLY FOR REPAIR

■ Removing the TX-RX PCB (X57-756 A/3) from the chassis

1. Remove the 14 screws ⑨.
2. Remove the universal connector FPC from the TX-RX PCB connector (CN505) ⑩.
3. Insert the two tips of a pair of tweezers into the two holes in the bottom of the shield plate of the TX-RX PCB, firmly squeeze the tweezers to hold the shield plate, then remove the TX-RX PCB ⑪.
4. Remove the coaxial cables from the connector (MAIN (CN201)) of the TX-RX PCB ⑫.

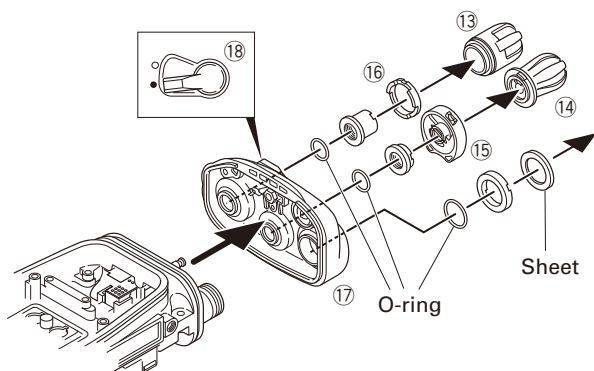


■ Removing the top panel from the chassis

1. Remove the volume knob ⑬ and channel knob ⑭.
2. Remove the concentric switch knob ⑮.
3. Remove the volume torque-up packing ⑯ using a pair of tweezers.
4. Remove the nuts from the volume knob, channel knob and antenna receptacle.
5. Remove the top panel ⑰.

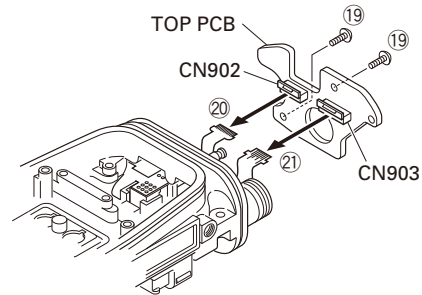
Note:

- Before removing the top panel, set the lever switch to the "●" position (circle painted in white) ⑱.
- Each of the volume knob, channel knob and antenna receptacle on the top panel has an O-ring. Take care not to lose them after removing the panel.



■ Removing the TOP PCB (X57-756 B/3) from the chassis

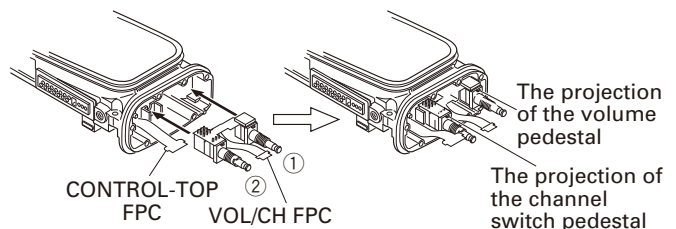
1. Remove the two screws ⑲.
2. Lift the TOP PCB and remove the VOL/CH FPC ⑳ and CONTROL-TOP FPC ㉑ from the two connectors (CN902, CN903) of the TOP PCB.



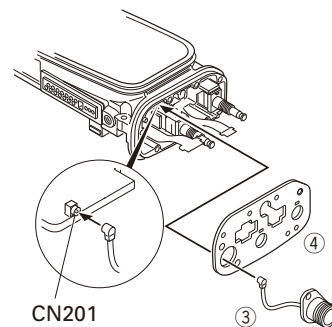
Precautions for Reassembly

■ Installing the VOL/CH FPC and CONTROL-TOP FPC on the TOP PCB

1. Remove the volume ① and channel switch ② from the chassis.
2. Position the coaxial cable connecting the ANT PCB and TX-RX PCB as shown in the figure below.



3. Pass the coaxial cable ③ of the antenna receptacle through the round hole of the hardware fixture ④, then insert it into the coaxial connector (MAIN (CN201)) of the TX-RX PCB.



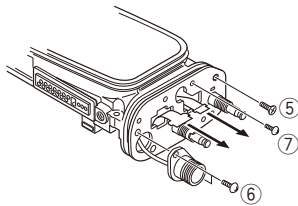
DISASSEMBLY FOR REPAIR

4. Pass the volume, channel switch, VOL/CH FPC and CONTROL-TOP FPC through hardware fixture holes, then bring the hardware fixture into contact with the chassis and fix it with a screw ⑤.

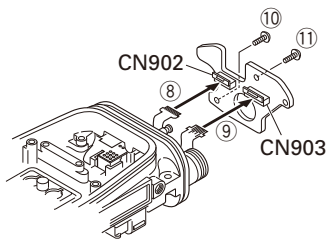
Note:

The projections of the volume and channel switch pedestals must protrude from the square holes of the hardware fixture.

5. Fix the antenna receptacle with the two screws ⑥.
6. Fix the hardware fixture with a screw ⑦.

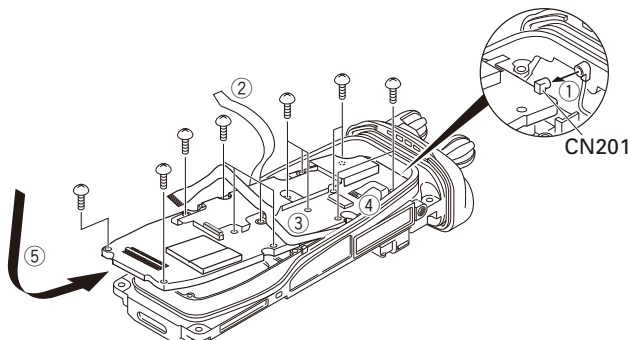


7. Insert the VOL/CH FPC ⑧ and the CONTROL-TOP FPC ⑨ into the connectors (CN902, CN903) of the TOP PCB.
8. Fix the TOP PCB with a screw ⑩.
9. Fix the TOP PCB with a screw ⑪.



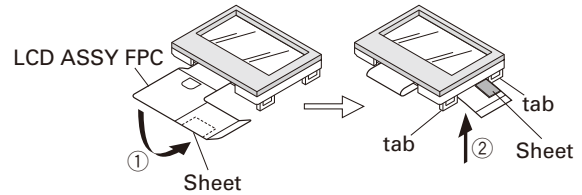
TX-RX PCB Installation Procedure

1. Insert the coaxial cable of the antenna receptacle into the coaxial connector (CN201) of the TX-RX PCB ①.
2. Grasp both sides of the lower part of the TX-RX PCB, tilt the TX-RX PCB and install the chassis so that the PTT FPC ②, CONTROL-TOP FPC ③ and universal connector FPC ④ are not caught ⑤.
3. Fix the TX-RX PCB with the 14 screws.



LCD ASSY Installation Procedure

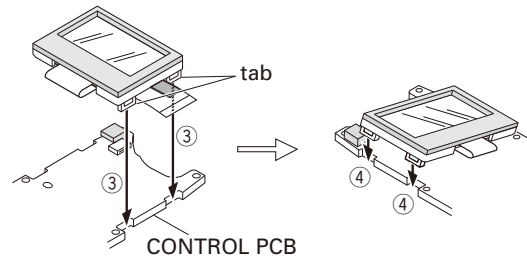
1. Fold the LCD ASSY FPC to the back of the holder ① so that the FPC is between the two tabs on the right side of the holder ②.



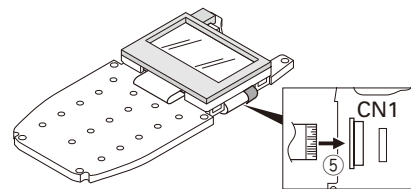
2. Fit the two tabs on the right side of the holder ③ and the two tabs on the left side of the holder ④ into the CONTROL PCB.

Note:

Take care that the FPC is not caught when fitting the two tabs on the right side of the holder.



3. Insert the FPC into the CONTROL PCB connector (CN1) ⑤.



DISASSEMBLY FOR REPAIR

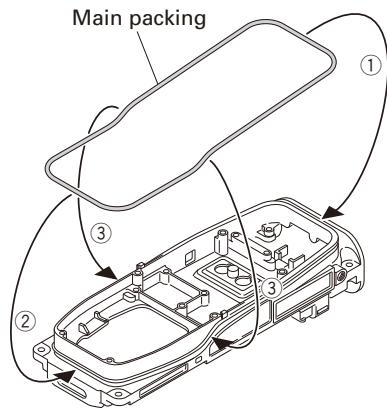
■ Main Packing (G53-1637-04) Installation Procedure

1. Hook the packing (coated with silicon oil) in the upper groove of the chassis ①, then fit the packing into the lower groove of the chassis ②.

Note:

Ensure that the chassis grooves and packing are free from dirt and dust.

2. Fit the packing into the grooves on both sides of the chassis ③. (Fit the packing into the groove in the chassis by tracing it lightly with your fingers.)



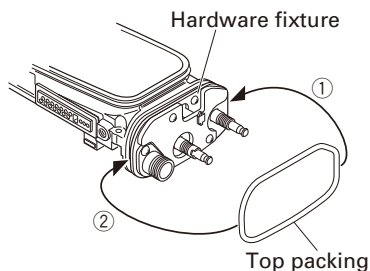
Note:

To remove the packing from the chassis groove, use a resin adjustment bar or other such device. If the packing is pried with a sharp metallic tool, such as tweezers, the packing may become damaged.

3. Verify that the packing fits snugly into the groove of the chassis.

■ Top Packing (G53-1638-04) Installation Procedure

1. Ensure that the hardware fixture is first secured to the chassis.
2. Hook the packing (coated with silicon oil) in the upper left groove of the chassis ①, then fit the packing into the right groove of the chassis ②.



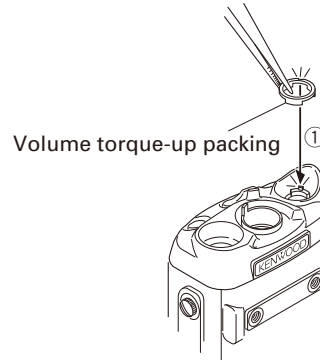
Note:

- Verify that the chassis grooves and packing are free from dirt and dust.
- To remove the packing from the chassis groove, use a resin adjustment bar or other such device. If the packing is pried with a sharp metallic tool, such as tweezers, the packing may become damaged.

3. Verify that the packing fits snugly into the groove of the chassis.

■ Volume Torque-up Packing (G53-1628-04) Installation Procedure

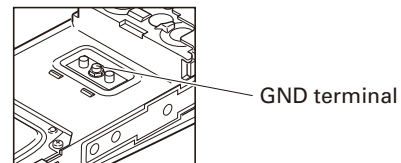
Insert the packing using a pair of tweezers so that the hollow of the packing fits the convex of the panel ①.



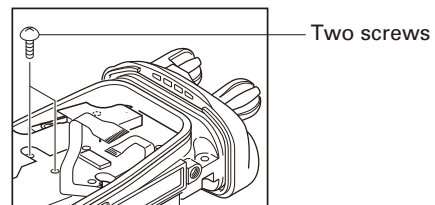
■ Screw sequence for mounting the battery terminal block to the chassis

Attach the battery terminal block to the chassis as described in the following procedure.

1. Loosely fix the hexagon screws of the GND terminal to the chassis (enough so that the hexagon screws do not move).



2. Tighten the two screws from the TX-RX PCB side.



3. Firmly tighten the hexagon screws of the GND terminal.

DISASSEMBLY FOR REPAIR

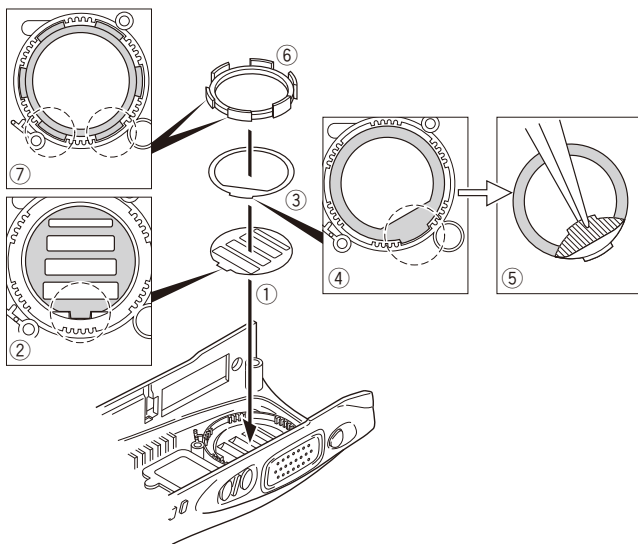
Installation Procedure During Parts Replacement

■ Attaching the Sheet (G10-1338-04, J99-0383-14) to the Front Case Speaker and Installation of the Packing (G53-1633-04)

1. Attach a new fiber sheet ① (G10-1338-04) so that its convex fits the hollow of the front case ②.
2. Attach a new pressure sensitive adhesive sheet ③ (J99-0383-14) so that its convex fits the hollow of the front case ④.
3. Remove the separation sheet from the pressure sensitive adhesive sheet with a pair of tweezers ⑤.
4. Fit the packing ⑥ (G53-1633-04) into the front case speaker.

Note:

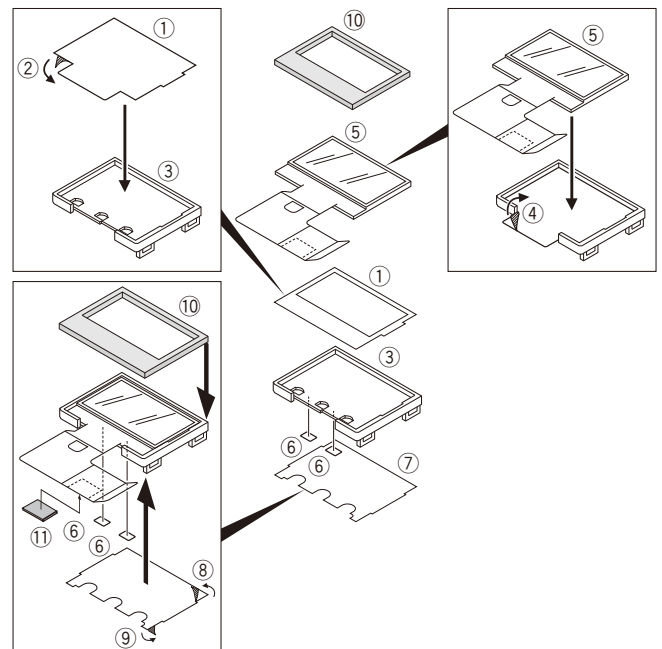
Fit the packing into the hollow of the case so that the two low-height places in the convex of the packing are positioned on the lower side ⑦.



5. Verify that the packing does not ride on the rib of the case.

■ Installing a new LCD ASSY to the holder

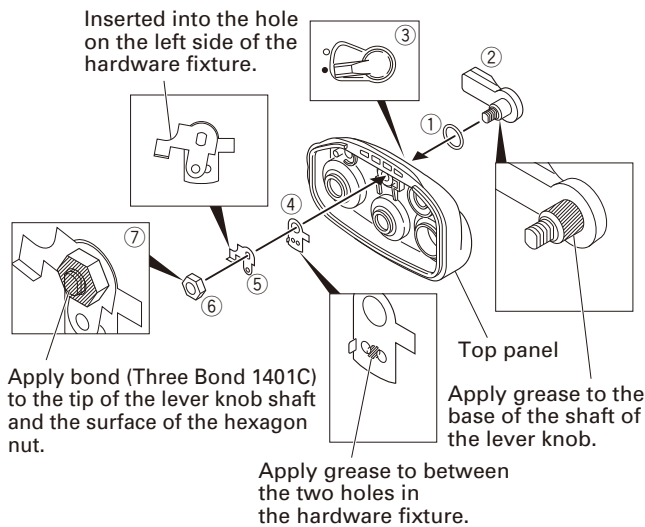
1. Remove the separation paper (brown) from the new sheet ① ②, and attach the sheet to the surface of the holder ③.
2. Remove the protection sheets attached to both sides of the new LCD ASSY.
3. Remove the separation paper (white) from the sheet in step 1 ④, then attach the LCD ASSY ⑤ to the sheet.
4. Attach two pieces of double-sided adhesive tape ⑥ to the back of the holder and remove the separation paper.
5. Remove the protection sheet (transparent) attached to one side of the new filter ⑦ ⑧ and remove the protection sheet (yellow) from the other side ⑨.
6. Attach the filter from step 5 to the back of the holder.
7. Attach the new cushion ⑩ so that it fits to the corner of the holder convex.



DISASSEMBLY FOR REPAIR

■ Procedures when Replacing the Top Panel

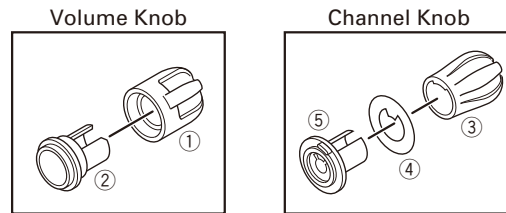
1. Insert the O-ring ① into the lever switch part of the new top panel.
2. Apply grease to the base of the shaft of the lever knob ② and install the lever knob so that it is in the “●” position (circle painted in white) on the top panel ③.
3. Pass the hardware fixture ④ through the shaft and install it onto the top panel.
4. Apply grease to between the two holes in the hardware fixture ④.
5. Install the hardware fixture ⑤ so that it is inserted into the hole on the left side of the hardware fixture ④.
6. Fix the two hardware fixtures with the hexagon nut ⑥.
7. Apply bond (Three Bond 1401C) to the tip of the lever knob shaft and the surface of the hexagon nut ⑦.



■ Volume Knob and Channel Knob Parts Replacement

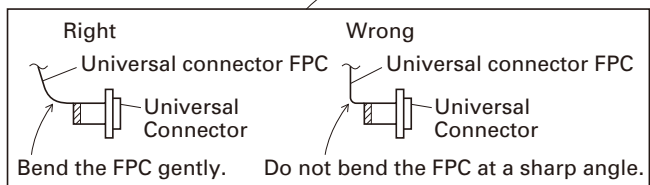
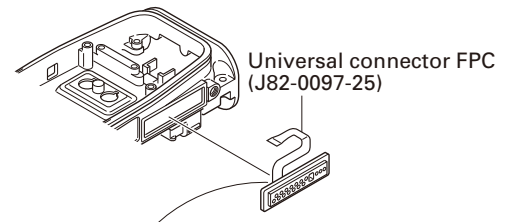
Since the volume knob consists of two components, a knob ① and a spacer ②, replace and reinstall these two parts at the same time.

Since the channel knob consists of three components, a knob ③, a 16CH display seal ④ and a spacer ⑤, replace and reinstall these three parts at the same time.



■ Procedure when replacing the universal connector FPC (J82-0097-25)

When assembling a new universal connector FPC, insert the FPC into the chassis hole by gently bending the FPC as shown in the figure.



CIRCUIT DESCRIPTION

1. Overview

The KENWOOD model TK-5410 is a 700M/800MHz FM & P25 Portable transceiver designed to operate in the frequency range of 763 to 775.99375MHz, 793 to 805.99375MHz (700M) and 806 to 825MHz, 851 to 870MHz (800M).

The unit consists of a receiver, a transmitter, a phase-locked loop (PLL) frequency synthesizer, a digital control unit, and a power supply circuit.

2. Frequency Configuration

The receiver is a double-conversion super heterodyne using a first intermediate frequency (IF) of 58.05MHz and a second IF of 450kHz. Incoming signals from the antenna are mixed with the local signal from the PLL circuit to produce the first IF of 58.05MHz.

This is then mixed with the 57.6MHz second local signal to produce the 450kHz 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.

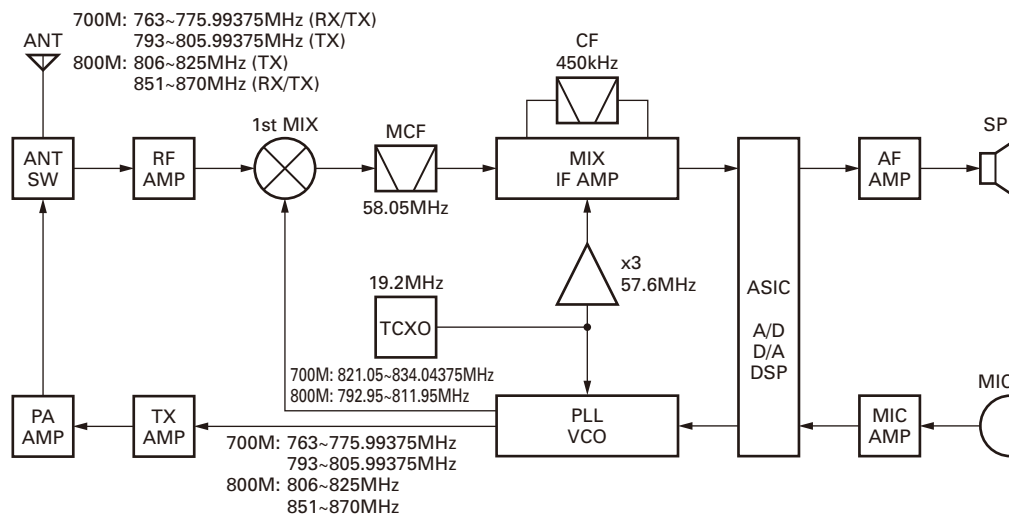


Fig. 1 Frequency configuration

3. Receiver System

3-1. Front-end RF Amplifier

The receive signal from antenna SW (D202, D203, D303, D304) is amplified by a RF amplifier (700MHz band: Q305, 800MHz band: Q302) and passes through the band-pass filter (700MHz band: L301, L303, 800MHz band: L300, L302) to remove unwanted signals. These are controlled with the RF filter switch (IC309 and IC310). The signal is then fed to the 1st mixer.

3-2. 1st Mixer

The 1st mixer uses a silicon monolithic mixer (IC300). The 1st mixer mixes the signal with the 1st local oscillator frequency from the VCO, and converts it to the 1st IF (58.05MHz) (700M/Upper heterodyne, 800M/Lower heterodyne).

The signal then passes through the monolithic crystal filter (XF300) to remove unnecessary nearby frequency components. The signal from the MCF is used as the 1st IF signal.

3-3. IF Amplifier

The 1st IF signal is amplified by the IF amplifier (Q309) and fed into the FM IC (IC304). The IF signal is then mixed with the 2nd local oscillator frequency of 57.6MHz to generate the 2nd IF of 450kHz. The 450kHz signal is then passed through a ceramic filter (CF300) and fed back into IC304 for additional amplification.

3-4. Wide/Narrow/P25 Switching Circuit

Wide, Narrow, NPSPAC and P25 settings can be made for each channel by switching the ceramic filters CF303 (Wide, NPSPAC), and CF302 (Narrow, P25). These are controlled with multiplexers (IC306, IC307).

When a W_/N signal line is H, the 450kHz signal is passed through a ceramic filter (CF303).

When a W_/N signal line is L, the 450kHz signal is passed through a ceramic filter (CF302).

The signal is then fed into ASIC (IC10) through ceramic filter (CF400). The signal is then demodulated in ASIC, and the AF signal is dealing with DSP (IC3).

CIRCUIT DESCRIPTION

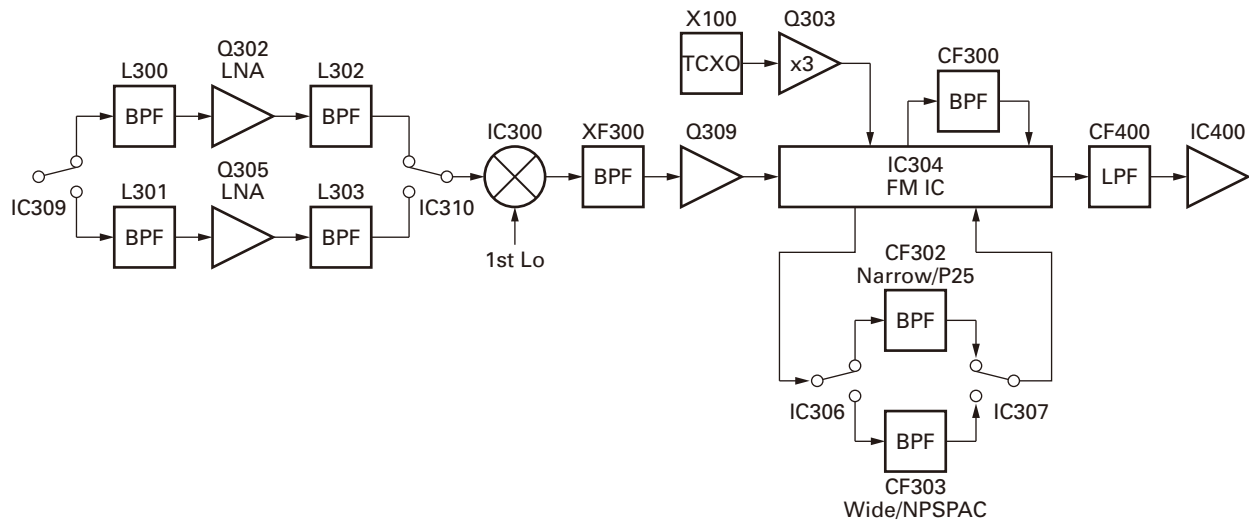


Fig. 2 RF and IF circuit

3-5. Audio Amplifier Circuit

The AF signal from ASIC (IC10) is filtered for anti-aliasing and to eliminate unwanted spectrums. Next, the AF signal goes through an electronic volume control (IC10) to adjust its level and a buffering AF amplifier IC506. Finally the AF signal into the audio power amplifier (IC11, IC12).

The audio output can be provided to an external speaker (CN505 12-pin, 13-pin) or internal speaker (CN34 1-pin, 2-pin, 3-pin, 4-pin). When the INAMT signal is H, AF signal loads CN34. When the EXAMT signal is H, AF signal loads CN505.

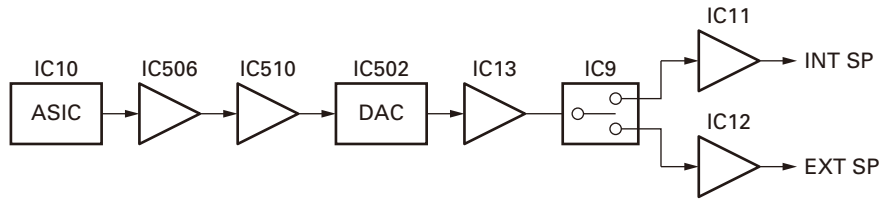


Fig. 3 Audio amplifier circuit

3-6. Squelch Circuit

It amplifies the demodulated noise signal from FM IC (IC304) after filtering through the BPF circuit. Then amplified signal is converted to a DC signal by the detection circuit. The converted signal is fed to the ASIC (IC10).

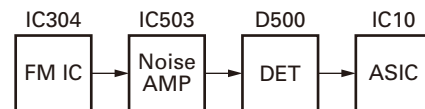


Fig. 4 Squelch circuit

CIRCUIT DESCRIPTION

4. Transmitter System

4-1. Audio Band Circuit

The signal from the microphone passes through the mute switch (Q506), summing amplifier (IC516), and AGC circuit (IC516, D511, D512, Q504, Q505), and goes to the microphone amplifier (IC513). It is then fed into ASIC (IC10) and converted from analog to digital. The digitalized signal undergoes AGC processing, pre-emphasizing, filtering, vocoding (in P25 mode), and returns to the ASIC (IC10). The signal is converted from digital to analog and is amplified by ASIC (IC10). Then the signal is adjusted to the appropriate level and is passed through the amplifier (IC512), and then to the VCO and TCXO in the PLL section.

4-2. Base Band Circuit

The audio signal output from the base band circuit is converted to digital data with a sampling frequency of 48kHz. This digital data is sent to the DSP (IC3), and voice signals of 300Hz or lower and frequencies of 3kHz or higher are cut off so that the audio range of 300Hz to 3kHz is extracted. The audio signal is then pre-emphasized in FM mode and synthesized with signals, such as QT and DQT, as required, and is then output from the ASIC (IC10). In Digital mode, the audio signal is converted to the C4FM base band signal and output from IC10. The DTMF and MSK base band signals are also generated by the DSP and output via IC10.

LPF (IC512) works as a smoothing filter. The DAC (IC502) assigns the base band signal to the VCO and TCXO (X100). At this time, the level output according to the transmit carrier is fine-adjusted according to each modulation method.

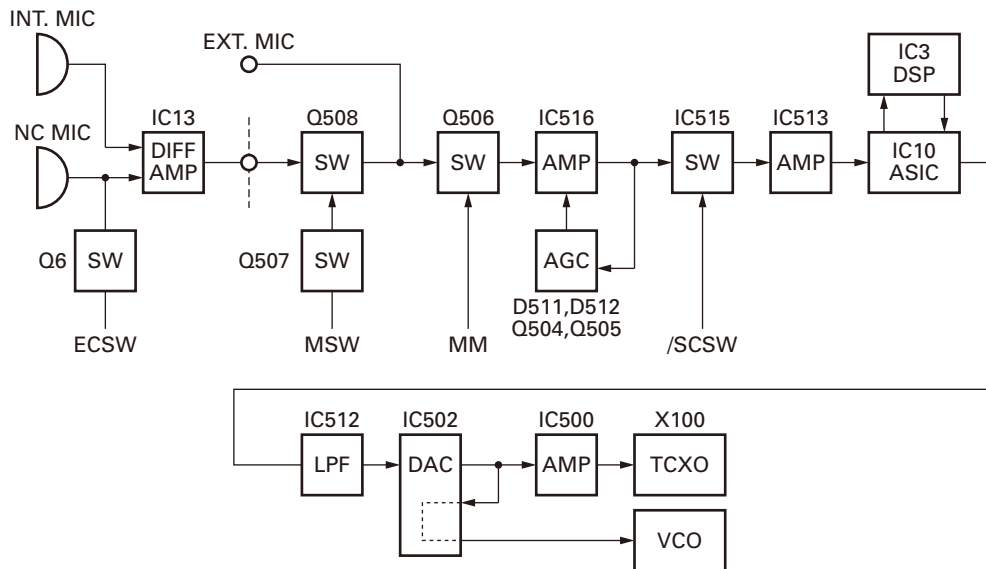


Fig. 5 Audio band and Base band circuit

CIRCUIT DESCRIPTION

4-3. Drive and Final amplifier

The transmit signal passing through the T/R switch (D200) is amplified to approx. 50mW by the two transistor amplification circuits (Q200, Q201). The transmit signal output from Q201 passes through an attenuator to improve high-frequency signal matching, and is amplified by the drive amplifier (Q202). The signal is then applied to the final amplifier (Q204) so that the antenna output is 3W (1W for Low Power).

The output of the final amplifier (Q204) is then passed through the antenna switch (D202, D203), spurious removing LPF (L212) and surge protection HPF. It is then applied to the antenna terminal (CN201).

4-4. APC circuit

The APC circuit detects the current of the drive amplifier (Q202) and final amplifier (Q204) during transmission

and controls the output power by controlling the current. It detects the current using R222 and R223 and applies a drop voltage between both resistors during transmission to APC IC (IC201). It controls the transmission current of the drive amplifier and final amplifier so that it is constant by comparing this current with the reference voltage output from pin 7 of IC200. The reference voltage input to pin 6 of IC200 is output from the DAC (IC502). High/Low power output is set according to the DAC output voltage.

4-5. Temperature Protection Circuit

The temperature protection circuit reduces the APC voltage when the temperature of Q204 rises, to prevent thermal destruction of the final amplifier (Q204). The ASIC (IC10) detects the temperature with a thermistor (TH200) to control the reference voltage to the APC circuit.

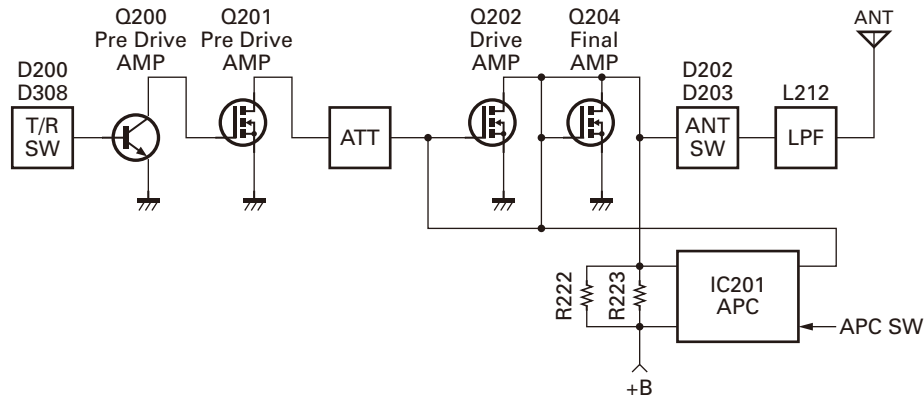


Fig. 6 Drive and final amplifier and APC circuit

5. PLL Frequency Synthesizer

5-1. TCXO (X100)

TCXO (X100) generates a reference frequency of 19.2MHz for the PLL frequency synthesizer. This reference frequency is applied to pin 8 of the PLL IC (IC101).

The TCXO oscillation frequency is fine-adjusted by controlling the voltage applied to pin 1 of the TCXO with DAC (IC502). It is also controlled with pin 1 of the TCXO if the output from the TCXO is modulated.

5-2. VCO

There are two VCOs (VCO1, VCO2). VCO1 (Q106) generate the 1st local receive signal for the 800MHz band (396.475 to 405.975MHz) and transmits a carrier for the 700MHz band (381.5 to 403.0MHz). VCO2 (Q107) generates the 1st local receive signal for the 700MHz band (410.525 to

417.025MHz) and transmits a carrier for the 800MHz band (403.0 to 435.0MHz).

The VCO oscillation frequency is determined by one system of operation switching terminal "VCOSW1" and two systems of voltage control terminals "CV" and "ASSIST". The operation switching terminal, "VCOSW1", is controlled by the ASIC (IC10). When the VCOSW1 logic is high, the VCO1 outputs the signal, and if the logic is low, VCO2 outputs the signal.

The voltage control terminals, "CV" and "assist", are controlled by the PLL IC (IC101) and ASIC (IC10) and the output frequency changes continuously according to the applied voltage. For the modulation input terminal, "VCO_MOD", the output frequency changes according to the applied voltage. This is used to modulate the VCO output. "VCO_MOD" works only when transmitting (user pressed PTT).

CIRCUIT DESCRIPTION

5-3. Doubler (Q111)

The doubler (Q111) extracts the double harmonic component from the signal output from the VCO. This double harmonic component is then fed into pin 5 of the PLL IC.

5-4. PLL IC (IC101)

The PLL IC compares the differences in phases of the VCO oscillation frequency and the TCXO reference frequency, returns the difference to the VCO CV terminal and realizes the "Phase Locked Loop" for the return control. This allows the VCO oscillation frequency to accurately match (lock) the desired frequency.

When the frequency is controlled by the PLL, the frequency convergence time increases as the frequency difference increases when the set frequency is changed. To supplement this, the ASIC (IC10) is used before it is controlled by the PLL IC to bring the VCO oscillation frequency close

to the desired frequency. As a result, the VCO CV voltage does not change and is always stable at approx. 2.5V.

The desired frequency is set for the PLL IC by the ASIC through the 3-line "PCS_RF", "SDO0", "SCK0" serial bus. Whether the PLL IC is locked or not is monitored by the ASIC through the "PLD" signal line. If the VCO is not the desired frequency (unlock), the "PLD" logic is low.

5-5. Local Switch (D200, D308)

The connection destination of the signal output from the VCO is changed with the diode switch (D200) that is controlled by the transmission power supply, 5T, and the diode switch (D308) that is controlled by the receiver power supply, 5R.

If the 5T logic is high, it is connected to a transmit-side pre-drive (Q200). If the 5T logic is low, it is connected to a receiver-side mixer (IC300).

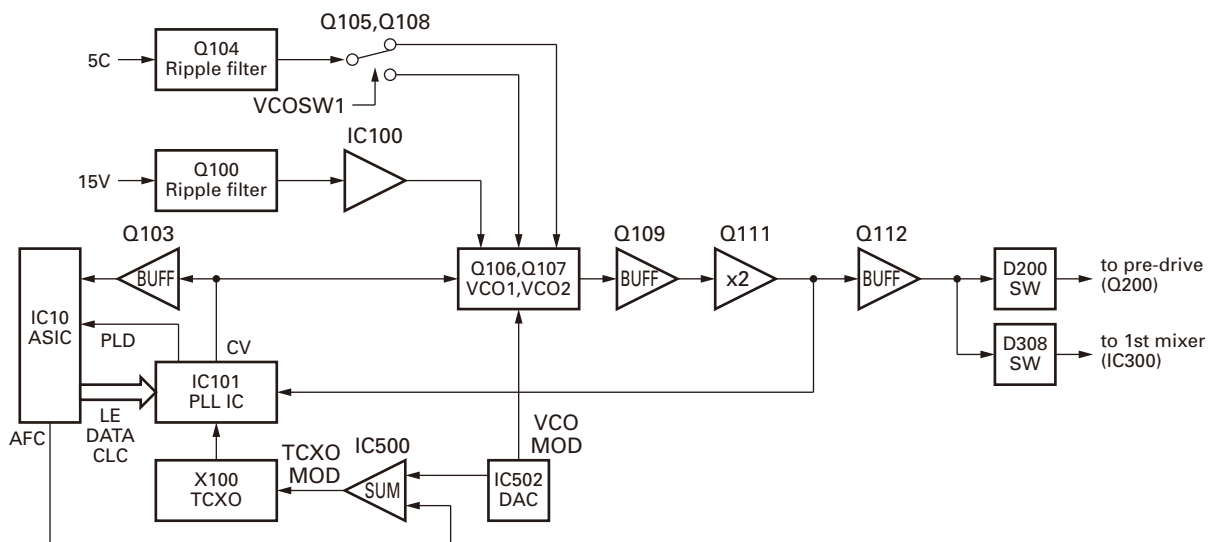


Fig. 7 PLL block diagram

6. Control Circuit

The control circuit consists of the ASIC (IC10) and its peripheral circuits. IC10 mainly performs the following;

- 1) Switching between transmission and reception by PTT signal input.
- 2) Reading system, zone, frequency, and program data from the memory circuit.
- 3) Sending frequency program data to the PLL.
- 4) Controlling squelch on/off by the DC voltage from the squelch circuit.
- 5) Controlling the audio mute circuit by decode data input.

6-1. ASIC

The ASIC (IC10) is 32bit RISC processor, equipped with peripheral function and ADC/DAC.

This ASIC operates at a 18.432MHz clock and 3.3V/1.5V DC. It controls the flash memory, SRAM, DSP, receiver circuit, transmitter circuit, control circuit, and display circuit and transfers data to or from an external device.

CIRCUIT DESCRIPTION

6-2. Memory Circuit

The memory circuit consists of the ASIC (IC10), the SRAM (IC4), and the flash memory (IC1). The flash memory has capacity of 32M-bit that contains the transceiver control program for the ASIC and stores the data. It also stores the data for transceiver channels and operating parameters that are written by the FPU. This program can be easily written from external devices. The SRAM has a capacity of 1M-bit that contains work area and data area.

■ Flash memory

Note: The flash memory stores the data that is written by the FPU (KPG-95D), tuning data (Deviation, Squelch, etc.), and firmware program (User mode, Test mode, Tuning mode, etc.). This data must be rewritten when replacing the flash memory.

■ SRAM (static memory)

Note: The SRAM has a temporary data area and work area. When the power supply is off, it is backed up via an internal secondary lithium battery. Therefore, the saved data is not lost.

■ Real-time clock

The clock function is based on a real-time clock IC (IC7). When the power supply is off, it is backed up by an internal secondary lithium battery

6-3. LCD

The LCD is controlled using the bus lines on the connector (CN1) of the control unit. The LCD contrast voltage is corrected using IC712.

6-4. Temperature Detection Circuit

The temperature detection circuit detects the temperature using a temperature IC (IC714) and corrects the thermal characteristic change of the squelch or LCD.

6-5. Key Detection Circuit

Keys are detected using a Key scan circuit in IC10. The/KEY1* signals that are normally pulled down go high when any key is pressed.

6-6. Low Battery Warning

The battery voltage is divided using R713 and R714 and is detected by the ASIC (IC10). 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. 5.8V), 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 the warning tone while the PTT switch is pressed.	The battery voltage is low and the transceiver is not usable to make calls.

6-7. Battery Type Detection

The transceiver automatically detects the battery type, measuring the resistance between the S-terminal and GND terminal on the battery pack and changes the supplied voltage to the S-terminal as below. The microprocessor then detects the battery type.

Battery type	Input voltage of S-terminal	Resistor value
Battery case	0~0.2V	Short
Li-ion battery	1.00~1.11	47kΩ
Ni-Cd battery	3.23~3.37	Open
Ni-MH battery	1.90~2.06	150kΩ

6-8. VOX

The VOX function can be used only with an external microphone.

The VOX (Voice Operated Transmission) function detects voice input to the microphone and automatically switches between transmission and reception.

If the microphone input exceeds a certain level, transmission automatically begins. If the input falls below a certain level, the transceiver automatically returns to receive mode.

The transceiver realizes this function using DSP (IC8).

6-9. DSP

The DSP circuit consists of a DSP (IC3) and processes the base band signal. The DSP operates on an external clock of 18.432MHz (the same as the IC10). The I/O section operates at 3.3V and the core section operates at 1.5V. The DSP carries out the following processes:

- C4FM, CQPSK processing
- Analog FM pre-emphasis/de-emphasis
- Vocoder processing between audio codec and modulation/demodulation
- CAI processing, such as error correction encoding
- QT/DQT encoding/decoding
- DTMF encoding
- Compressor/expander processing
- Voice scrambler processing
- Transmit/receive audio filtering processing
- Microphone amplifier AGC processing
- Audio mute processing
- Modulation level processing

CIRCUIT DESCRIPTION

7. Power Supply Circuit

The power supply voltage (+B) is supplied from the battery terminal, and is then passed through the fuse (F700).

If +B voltage is detected above 5.6V by the voltage detection IC (IC16), IC17 CE pin (pin 6) becomes high and IC17 outputs 3.1V (pin 3). Additionally, when VOL SW is ON, the 3.6V and 15V DC/DC converter (IC707, IC708) CE pin (pin 4) becomes high and the 3.6V power source turns ON.

The output from the 3.6V DC/DC converter (IC707) provides the power source for three regulators (IC705, IC706, IC710) and 1.5V DC/DC converter (IC709). After these parts became ON, the Flash (IC1), DSP (IC3), SRAM (IC4), and

ASIC (IC10) start to operate. After the ASIC starts up, it begins controlling two regulators (IC701, IC702) with the SBC and /SAVE signals. After that, the two regulators (IC700, IC704) are controlled by the SB and 5M signals.

The output voltage from IC701 is switched by the 5RC signal (which is turned on while receiving) or the 5TC signal (which is turned on while transmitting). These signals are controlled by the ASIC (IC10).

The output voltage from IC700 is controlled by Q703 and Q704, and is used as a power source for 5MCS, for an optional accessory which is connected to the universal connector (CN505).

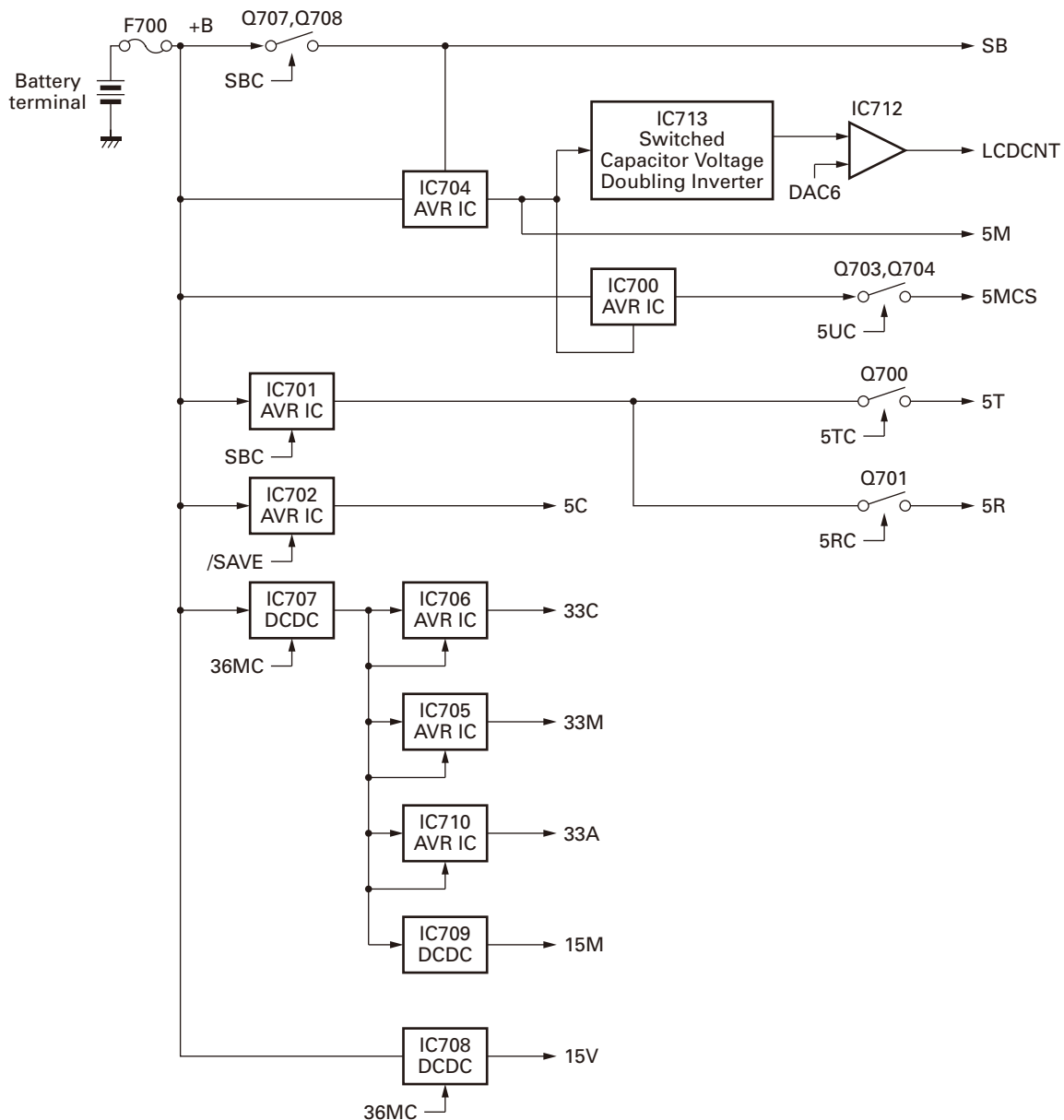


Fig. 8 Power supply circuit

CIRCUIT DESCRIPTION

8. Signaling Circuit

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

Each data signal of QT, DQT and DTMF is generated by the DSP circuit, superimposed on a modulation signal and output from IC10. The modulation balance of the QT/DQT signal is adjusted by the D/A converter (IC502) and the resulting signal is routed to the modulation input of the VCO and TCXO (X100). Each deviation of the TX QT, DQT and DTMF tone is adjusted by changing the output level of IC108 and the resulting signal is routed to the VCO and TCXO.

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. Comander Circuit

The term "comander" means compressor and expander. The comander reduces noise by utilizing a compressor and an expander. The transceiver contains a DSP (IC3) to perform this operation. The transceiver comander can be turned on or off using the FPU.

COMPONENTS DESCRIPTION

Control unit (X53-4390-XX)

Ref. No.	Part Name	Description
IC1	IC	Flash memory
IC3	IC	DSP
IC4	IC	Static memory
IC5	IC	Voltage detector (RST)
IC6	IC	Buffer AMP (Logic)
IC7	IC	Real-time clock
IC8	IC	Clock buffer AMP
IC9	IC	Bus buffer (LCD)
IC10	IC	ASIC
IC11,12	IC	Audio AMP (BTL)
IC13	IC	Audio AMP (1/2 Audio pre-AMP, 2/2 NC MIC AMP)
IC15	IC	I/O Expander
IC16	IC	Voltage Detector (/BINT)
IC17	IC	Voltage regulator (3.1V)
IC18	IC	Bus buffer (LCD)
IC19	IC	5V to 3.3V Level convertor
Q1,2	Transistor	AVR for backlight LED
Q3,5	Transistor	5A AVR
Q4	FET	DC switch (5AC)
Q6	Transistor	Echo cancel MIC switch
Q7,8	FET	DC switch (/BINT,PSW)
Q10,11	FET	DC switch (BLED,TXLED)
Q12	Transistor	DC switch (36MC)
Q13,16	Transistor	DC switch
Q14	FET	DC switch (31BU)
Q15	FET	DC switch (STCAMI)
D1	Zener diode	AVR for backlight LED
D2~5	LED	Key backlight
D6~8	LED	LCD backlight
D9~12	LED	Key backlight
D13~16	Diode	Reverse current prevention
D19,20,22	Varistor	Surge absorption
D23~26	Diode	Reverse current prevention
D27	Varistor	Surge absorption

TX-RX unit (X57-7560-10)

Ref. No.	Part Name	Description
IC100	IC	DC AMP
IC101	IC	PLL IC
IC200	IC	Buffer AMP (APC)
IC201	IC	APC AMP
IC300	IC	Mixer
IC304	IC	IF IC
IC306,307	IC	RX filter control
IC309,310	IC	RX band control switch
IC400	IC	IF AMP
IC500	IC	Buffer AMP (AFC/TCXO_MOD)
IC501	IC	5V to 3.3V Level convertor
IC502	IC	DAC
IC503	IC	A_SQL
IC505	IC	I/O Expander
IC506	IC	Buffer AMP (AF)
IC507~509	IC	AF pass control
IC510	IC	DC AMP/Summing AMP
IC511	IC	Logic switch
IC512	IC	Modulation
IC513	IC	Buffer AMP (MIC)
IC514	IC	Buffer AMP (VOX)
IC515	IC	MIC switch (/SCSW)
IC516	IC	Buffer AMP (MIC)
IC517	IC	Buffer AMP (Logic)
IC700	IC	AVR (5MCS)
IC701	IC	AVR (5T/5R)
IC702	IC	AVR (5C)
IC704	IC	AVR (5M)
IC705	IC	AVR (33M)
IC706	IC	AVR (33C)
IC707	IC	DC/DC converter (3.6V)
IC708	IC	DC/DC converter (15V)
IC709	IC	DC/DC converter (1.5V)
IC710	IC	AVR (33A)
IC712	IC	DC AMP (LDCNT)
IC713	IC	DC/DC converter
IC714	IC	Temperature detection

COMPONENTS DESCRIPTION

Ref. No.	Part Name	Description
Q100	Transistor	15V ripple filter
Q102	FET	PLL IC reset
Q103	FET	CV detection
Q104	Transistor	Ripple filter
Q105	FET	VCO control switch
Q106,107	FET	VCO
Q108	FET	VCO control switch
Q109	Transistor	RF AMP
Q111	Transistor	Double AMP
Q112	Transistor	RF AMP
Q200	Transistor	RF AMP
Q201	FET	RF AMP
Q202	FET	RF AMP (Drive AMP)
Q203	FET	APC switch
Q204	FET	RF AMP (Final AMP)
Q205	Transistor	DC switch (5M)
Q206	FET	APC
Q207	Transistor	APC switch
Q208	FET	APC switch
Q300	FET	RX band switch
Q302	FET	RF AMP (LNA)
Q303	Transistor	Tripler AMP
Q304	Transistor	Wide/Narrow control switch
Q305	FET	RF AMP (LNA)
Q308	FET	RX band switch
Q309	Transistor	IF AMP
Q311	Transistor	RX Isolator
Q312	Transistor	Local AMP
Q502	Transistor	SQL AMP
Q503	FET	TONE switch
Q504,505	Transistor	MIC AGC
Q506	FET	MIC mute switch
Q507,508	FET	Int/Ext MIC switch
Q509	FET	DC switch
Q700	FET	5TC
Q701	FET	5RC
Q703	FET	5MC
Q704	FET	5MCS switch
Q705	FET	DC/DC (15V)
Q706	FET	DC/DC (3.6V)
Q707	FET	DC switch
Q708	FET	DC switch
Q709	FET	15V switch

Ref. No.	Part Name	Description
D100~107	Variable capacitance diode	VCO (Frequency control)
D119	Diode	Assist DC
D200	Diode	TX/RX switch
D201	Zener diode	Surge absorption
D202,203	Diode	TX/RX switch
D303,304	Diode	TX/RX switch
D305	Diode	Protect of RF power
D308	Diode	TX/RX switch
D500	Diode	SQL
D501	Diode	PLD
D502,504	Zener diode	Surge absorption
D505	Diode	/PTT
D510	Diode	VOX
D511,512	Diode	MIC AGC
D515,516	Zener diode	Surge absorption
D517	Diode	VOX DC
D518,519	Diode	RXD1
D521	Diode	OPT6
D700	Diode	+B
D702	Diode	33M
D704	Diode	AVR CE (IC705, IC706, IC710)
D706	Diode	DC/DC converter (3.6V)
D901	LED	TX/RX LED

PARTS LIST

* New Parts. Δ indicates safety critical components.

Parts without **Parts No.** are not supplied.Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia

Y : PX (Far East, Hawaii)

C : China

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

TK-5410

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
TK-5410						68	3D	*	H52-2320-02	ITEM CARTON CASE	
1	1B		A02-3877-11	MAIN CABINET (4KEY)	K2	70	1A		J19-5475-12	HOLDER (LCD)	
2	1B		A02-3879-11	MAIN CABINET (DTMF)	K3	71	2B		J19-5477-04	HOLDER (EMG)	
3	3A	*	A10-4084-51	CHASSIS		72	2B		J21-8482-13	MOUNTING HARDWARE (TOP)	
4	2B		A62-1104-02	PANEL (TOP)		73	2B	*	J21-8483-13	MOUNTING HARDWARE (SP)	
5	3A		A82-0057-02	REAR PANEL		74	3A		J21-8484-04	MOUNTING HARDWARE (NC MIC)	
7	2B		B03-3612-04	DRESSING PLATE (16CH)		76	2B		J21-8495-04	MOUNTING HARDWARE (LEVER SW PANEL)	
8	1B,2C		B09-0682-13	CAP (SP/MIC) ACCESSORY		77	2B		J21-8581-04	MOUNTING HARDWARE (LEVER SW)	
9	2B		B11-1821-03	ILLUMINATION GUIDE (TX-BUSY)		78	2C		J29-0730-05	BELT CLIP ACCESSORY	
10	1A		B11-1832-04	FILTER (LCD)		79	2B		J39-0646-03	SPACER (VOL)	
11	1A	*	B38-0929-05	LCD		80	2B		J39-0647-03	SPACER (16CH)	
13	3A		B41-1841-04	CAUTION STICKER (HUMAN BODY PROTECTION)		82	3B		J82-0097-25	FPC (UNIV)	
14	1B		B43-1171-04	BADGE (FRONT)		83	2B		J82-0098-05	FPC (SP/MIC)	
15	2B		B43-1172-04	BADGE (REAR)		84	2A	*	J87-0011-05	FPC (LEAD FREE/CONT-TOP)	
16	2D	*	B59-2596-00	SUB-INSTRUCTION MANUAL (QRC)		85	2A	*	J87-0025-05	FPC (LEAD FREE/VOL,CH)	
17	2C	*	B62-2155-00	INSTRUCTION MANUAL (ENG/FRE)		86	3A		J99-0377-14	ADHESIVE SHEET (PTT)	
22	2B		E37-1126-25	LEAD WIRE WITH CONNECTOR (ANT)		88	1B		J99-0383-14	ADHESIVE SHEET (SP)	
23	3B		E58-0510-15	RECTANGULAR RECEPTACLE (UNIV)		89	1A		J99-0390-04	ADHESIVE SHEET (LCD FILTER)	
24	3A		E72-0420-33	TERMINAL BLOCK		91	2B		K29-9319-03	KEY TOP (EMG)	
26	3A	*	F07-1887-22	COVER ASSY		92	1B		K29-9320-03	KEY TOP (4KEY)	
27	2A	*	F10-3104-03	SHIELDING CASE (CONT-B)		93	1A		K29-9321-13	KEY TOP (DTMF)	
28	2A	*	F10-3114-03	SHIELDING CASE (TXRX-A UPPER)		94	2B		K29-9322-03	KNOB (VOL)	
29	2A	*	F10-3115-04	SHIELDING CASE (TXRX-A BOTTOM)		95	2B		K29-9323-03	KNOB (16CH)	
31	3A		G10-1327-04	FIBROUS SHEET (AIR)		97	2B		K29-9324-13	KNOB (CONCENTRIC SW)	
32	1B		G10-1338-04	FIBROUS SHEET (SP)		98	1B		K29-9325-04	KNOB (LEVER SW)	
33	1A		G10-1346-04	FIBROUS SHEET (LCD FPC)		99	1A		K29-9327-03	KEY TOP (PTT)	
34	3A		G10-1366-04	FIBROUS SHEET (REAR PANEL)		100	1A		K29-9328-02	KNOB (PTT)	
35	1A		G11-4302-04	SHEET (LCD)		A	1B,2C		N08-0531-14	DRESSED SCREW (CAP) ACCESSORY	
37	3A		G11-4303-14	SHEET (PTT)		B	2B		N09-2439-25	SPECIAL SCREW (SP)	
38	1B,2C		G11-4340-04	RUBBER SHEET (CAP) ACCESSORY		C	3A		N09-2441-25	SPECIAL SCREW (COVER ASSY)	
39	-		G11-4346-08	SHEET (UNIV)		D	2B		N09-2442-15	SPECIAL SCREW (ANT)	
40	2B		G11-4490-04	SHEET (ANT)		E	3A		N09-2443-14	HEXAGON HEAD SCREW (-TERMINAL)	
41	1B	*	G11-4526-04	SHEET (MIC)		F	3A		N09-6574-05	SPECIAL SCREW (CASE)	
43	3A		G13-1941-04	CUSHION (CHASSIS/PCB)		G	2B		N14-0813-14	CIRCULAR NUT (VOL)	
44	1A		G13-2036-04	CUSHION (MIC)		H	2B		N14-0814-14	CIRCULAR NUT (CH)	
45	2A		G13-2046-04	CUSHION (UNIV)		J	2B		N14-0815-04	CIRCULAR NUT (ANT)	
46	3A		G13-2070-04	CUSHION (OPB)		K	2B		N14-0817-14	HEXAGON NUT (LEVER SW)	
47	2A,2B		G13-2071-04	CONDUCTIVE CUSHION (CHASSIS/PCB)		L	2C		N30-3008-60	PAN HEAD MACHINE SCREW (BELT CLIP)	
49	2A,2B		G13-2079-04	CUSHION (VOL)		M	2B		N32-2004-48	FLAT HEAD MACHINE SCREW (TOP)	
50	1A	*	G13-2087-14	CUSHION (LCD)		N	1A,2A		N83-2005-48	PAN HEAD TAPTITE SCREW (CONT/TXRX)	
51	2A	*	G13-2284-04	CUSHION (CORD ASSY)		O	2B		N83-2006-43	PAN HEAD TAPTITE SCREW (TOP)	
52	2A	*	G13-2307-04	CONDUCTIVE CUSHION (SHIELDING)		102	3B		R31-0654-05	VARIABLE RESISTOR (VOL)	
53	2B		G53-1628-04	PACKING (VOL-TQ-UP)		104	2B		S60-0431-15	ROTARY SWITCH (CH)	
55	2B		G53-1629-05	PACKING (VOL,CH O-RING)		105	1A		S79-0454-05	KEYBOARD ASSY (4KEY & DTMF)	
56	2B		G53-1630-05	PACKING (ANT O-RING)		107	1A		T07-0755-15	SPEAKER	
57	2A		G53-1631-05	PACKING (LEVER SW O-RING)		108	2A,2B		T91-0575-05	MIC ELEMENT (MAIN MIC,NC MIC)	
58	1B		G53-1633-04	PACKING (SP)		110	1A		W09-0971-05	LITHIUM CELL	
59	1B,2A		G53-1634-14	PACKING (MAIN MIC,NC MIC)		112	3A		X41-3690-10	SWITCH UNIT (FPC (PTT))	
61	2A		G53-1637-04	PACKING (MAIN)		113	2A	*	X42-3370-10	CORD ASSY (FPC (100PIN))	
62	2B		G53-1638-04	PACKING (TOP)		-	-	*	X53-4390-14	SERVICE CONTROL UNIT	K2
63	3A		G53-1640-03	PACKING (BATT)		-	-	*	X53-4390-15	SERVICE CONTROL UNIT	K3
64	3A		G53-1649-05	PACKING (-TERMINAL O-RING)							
66	3A		G53-1663-23	PACKING (TERMINAL BLOCK)							
67	1D	*	H12-3169-05	PACKING FIXTURE							

PARTS LIST

CONTROL UNIT (X53-4390-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination	
CONTROL UNIT (X53-4390-XX) -11: K2 -12: K3						C96			CK73HBOJ474K	CHIP C	0.47UF	K
D2-5			B30-2171-05	LED	K3	C97-100			CK73HB1H471K	CHIP C	470PF	K
D5			B30-2171-05	LED	K2	C101			CK73HB1A104K	CHIP C	0.10UF	K
D6-8			B30-2261-05	LED		C102			CK73HB1H471K	CHIP C	470PF	K
D9-12			B30-2171-05	LED	K3	C103-111			CK73HB1H472K	CHIP C	4700PF	K
D12			B30-2171-05	LED	K2	C112			CK73HB1A104K	CHIP C	0.10UF	K
C12-15			CK73HB1A104K	CHIP C		C113,114			CK73GB0J106K	CHIP C	10UF	K
C16			CK73HBOJ105K	CHIP C		C115			CK73HB1H471K	CHIP C	470PF	K
C17			CK73HB1E103K	CHIP C		C116			CK73HBOJ105K	CHIP C	1.0UF	K
C18,19			CK73HB1A104K	CHIP C		C117			CK73GB1E105K	CHIP C	1.0UF	K
C21,22			CK73HB1H102K	CHIP C		C118,119			CK73HB1E103K	CHIP C	0.010UF	K
C23			CK73HB1A104K	CHIP C		C120			CK73HB1H472K	CHIP C	4700PF	K
C24			CC73HCH1H101J	CHIP C		C121,122			CK73HB1E103K	CHIP C	0.010UF	K
C25			CK73HB1A104K	CHIP C		C136,137			CK73HB1A104K	CHIP C	0.10UF	K
C27			CK73HB1A104K	CHIP C		C141			CK73HB1A104K	CHIP C	0.10UF	K
C29			CK73HB1A104K	CHIP C		C143			CK73HB1A104K	CHIP C	0.10UF	K
C30			CK73HB1E103K	CHIP C		C144			CC73HCH1H221J	CHIP C	220PF	J
C31			CK73HB1A104K	CHIP C		C146,147			CK73HB1A104K	CHIP C	0.10UF	K
C32			CK73HB1E103K	CHIP C		C148-152			CK73HBOJ105K	CHIP C	1.0UF	K
C33			CK73HBOJ105K	CHIP C		C153,154			CK73HB1A104K	CHIP C	0.10UF	K
C34			CK73HB1A104K	CHIP C		C155			CK73HB1H102K	CHIP C	1000PF	K
C35			CK73HBOJ105K	CHIP C		C156			CC73HCH1H470J	CHIP C	47PF	J
C36			CK73HB1A104K	CHIP C		C157			CC73HCH1H101J	CHIP C	100PF	J
C37			CK73HB1E103K	CHIP C		C161			CK73HB1E103K	CHIP C	0.010UF	K
C38,39			CK73HB1A104K	CHIP C		CN1	*	E40-6884-05	FLAT CABLE CONNECTOR			
C40			CK73HB1E103K	CHIP C		CN34	*	E41-3183-05	FLAT CABLE CONNECTOR			
C44			CK73HB1E682K	CHIP C		CN35		E40-6755-05	FLAT CABLE CONNECTOR			
C47			CK73HB1E103K	CHIP C		CN38	*	E40-6777-05	FLAT CABLE CONNECTOR			
C48			CK73HB1A104K	CHIP C		CN40	*	E40-6846-05	PIN ASSY			
C49			CK73GB0J106K	CHIP C		CN37		J19-5386-05	HOLDER (LITHIUM CELL)			
C50-55			CK73HB1A104K	CHIP C		L4-6		L92-0444-05	CHIP FERRITE			
C56			CK73HB1E103K	CHIP C		L7,8		L92-0162-05	BEADS CORE			
C57,58			CK73GB1E105K	CHIP C		L9		L92-0444-05	CHIP FERRITE			
C59,60			CC73HCH1H101J	CHIP C		L10		L92-0149-05	CHIP FERRITE			
C61			CK73HB1H102K	CHIP C		L11,12		L92-0467-05	CHIP FERRITE			
C62			CK73HB1E103K	CHIP C		L13		L92-0163-05	BEADS CORE			
C63			CK73HBOJ105K	CHIP C		L14,15		L92-0467-05	CHIP FERRITE			
C64,65			CK73HB1A104K	CHIP C		L16,17		L92-0444-05	CHIP FERRITE			
C66			CK73HB1E682K	CHIP C		L19		L92-0444-05	CHIP FERRITE			
C67			CK73HB1A104K	CHIP C		L20,21		L92-0163-05	BEADS CORE			
C68			CK73GB0J106K	CHIP C		L22,23		L92-0446-05	BEADS CORE			
C69			CC73HCH1H101J	CHIP C		L24,25		L92-0162-05	BEADS CORE			
C70,71			CK73HB1A104K	CHIP C		L27		L92-0446-05	BEADS CORE			
C72			CC73HCH1H030C	CHIP C		X1		L77-1802-05	CRYSTAL RESONATOR(32768HZ)			
C73			CK73HB1E103K	CHIP C		X2		L77-3015-05	TCXO (18.432MHZ)			
C74			CK73HBOJ105K	CHIP C		R5		RK73HB1J474J	CHIP R	470K	J	1/16W
C75-78			CK73HB1A104K	CHIP C		R6-9		RK73HB1J101J	CHIP R	100	J	1/16W
C79			CK73HB1E103K	CHIP C		R9		RK73HB1J101J	CHIP R	100	J	1/16W
C80			CK73HBOJ105K	CHIP C		R11-13		RK73HB1J181J	CHIP R	180	J	1/16W
C81-85			CK73HB1A104K	CHIP C		R16		RK73HB1J474J	CHIP R	470K	J	1/16W
C86			CC73HCH1H101J	CHIP C		R17		RK73HB1J222J	CHIP R	2.2K	J	1/16W
C87			CK73HB1A104K	CHIP C		R18		RK73HB1J102J	CHIP R	1.0K	J	1/16W
C88			CK73HB1H102K	CHIP C		R19,20		RK73HB1J104J	CHIP R	100K	J	1/16W
C90			CK73HB1A104K	CHIP C		R21		RK73HB1J474J	CHIP R	470K	J	1/16W
C91			CK73HB1H102K	CHIP C		R25,26		RK73HB1J473J	CHIP R	47K	J	1/16W
C92			CK73HB1A104K	CHIP C		R27		RK73HB1J104J	CHIP R	100K	J	1/16W
C93			CK73HBOJ105K	CHIP C		R29		RK73HB1J104J	CHIP R	100K	J	1/16W
C94			CK73HBOJ474K	CHIP C		R30		RK73HB1J474J	CHIP R	470K	J	1/16W
C95			CK73HB1H102K	CHIP C		R31		RK73HB1J471J	CHIP R	470	J	1/16W

PARTS LIST

CONTROL UNIT (X53-4390-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R32-34			RK73HB1J104J	CHIP R 100K J 1/16W		R135,136			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R35,36			RK73HB1J471J	CHIP R 470 J 1/16W		R137-142			RK73HB1J473J	CHIP R 47K J 1/16W	
R37-39			RK73HB1J000J	CHIP R 0.0 J 1/16W		R143,144			RK73HB1J104J	CHIP R 100K J 1/16W	
R40-42			RK73HB1J101J	CHIP R 100 J 1/16W		R145			RK73HB1J473J	CHIP R 47K J 1/16W	
R43			RK73HB1J104J	CHIP R 100K J 1/16W		R146,147			RK73HB1J104J	CHIP R 100K J 1/16W	
R44			RK73HB1J101J	CHIP R 100 J 1/16W		R148			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R45			RK73HB1J471J	CHIP R 470 J 1/16W		R151			RK73HB1J104J	CHIP R 100K J 1/16W	
R46-49			RK73HB1J104J	CHIP R 100K J 1/16W		R152			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R50			RK73HB1J473J	CHIP R 47K J 1/16W		R154-156			RK73HB1J474J	CHIP R 470K J 1/16W	
R51			RK73HB1J104J	CHIP R 100K J 1/16W		R157			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R52			RK73HB1J000J	CHIP R 0.0 J 1/16W		R158			RK73HB1J474J	CHIP R 470K J 1/16W	
R53			RK73HB1J104J	CHIP R 100K J 1/16W		R159			RK73HB1J104J	CHIP R 100K J 1/16W	
R54-57			RK73HB1J471J	CHIP R 470 J 1/16W		R160			RK73HB1J471J	CHIP R 470 J 1/16W	
R58			RK73HB1J104J	CHIP R 100K J 1/16W		R161			RK73HB1J103J	CHIP R 10K J 1/16W	
R59			RK73HB1J471J	CHIP R 470 J 1/16W		R162			RK73HB1J474J	CHIP R 470K J 1/16W	
R60-65			RK73HB1J104J	CHIP R 100K J 1/16W		R163			RK73HB1J471J	CHIP R 470 J 1/16W	
R66			RK73HB1J102J	CHIP R 1.0K J 1/16W		R164,165			RK73HB1J474J	CHIP R 470K J 1/16W	
R67			RK73HB1J151J	CHIP R 150 J 1/16W		R166-168			RK73HB1J103J	CHIP R 10K J 1/16W	
R69			RK73HB1J153J	CHIP R 15K J 1/16W		R169,170			RK73HB1J474J	CHIP R 470K J 1/16W	
R70			RK73HB1J474J	CHIP R 470K J 1/16W		R171			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R71			RK73HB1J104J	CHIP R 100K J 1/16W		R172			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R72			RK73HB1J102J	CHIP R 1.0K J 1/16W		R173			RK73HB1J474J	CHIP R 470K J 1/16W	
R74			RK73HB1J470J	CHIP R 47 J 1/16W		R174,175			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R75			RK73HB1J103J	CHIP R 10K J 1/16W		R176			RK73HB1J103J	CHIP R 10K J 1/16W	
R76			RK73HB1J473J	CHIP R 47K J 1/16W		R177			RK73HB1J474J	CHIP R 470K J 1/16W	
R77,78			RK73HB1J222J	CHIP R 2.2K J 1/16W		R178			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R80,81			RK73HB1J220J	CHIP R 22 J 1/16W		R179			RK73HB1J473J	CHIP R 47K J 1/16W	
R82			RK73HB1J470J	CHIP R 47 J 1/16W		R181			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R83,84			RK73HB1J000J	CHIP R 0.0 J 1/16W		R182			RK73HB1J473J	CHIP R 47K J 1/16W	
R86			RK73HB1J474J	CHIP R 470K J 1/16W		R184			RK73HB1J473J	CHIP R 47K J 1/16W	
R88			RK73HB1J000J	CHIP R 0.0 J 1/16W		R185			RK73HB1J100J	CHIP R 10 J 1/16W	
R90			RK73HH1J104D	CHIP R 100K D 1/16W		R187			RK73HB1J471J	CHIP R 470 J 1/16W	
R92-95			RK73HH1J153D	CHIP R 15K D 1/16W		R188,189			RK73HB1J104J	CHIP R 100K J 1/16W	
R96,97			RK73HH1J683D	CHIP R 68K D 1/16W		R190			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R98,99			RK73HH1J473D	CHIP R 47K D 1/16W		R191-199			RK73HB1J104J	CHIP R 100K J 1/16W	
R100			RK73HB1J102J	CHIP R 1.0K J 1/16W		R201,202			RK73HB1J103J	CHIP R 10K J 1/16W	
R101			RK73HB1J104J	CHIP R 100K J 1/16W		R203			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R102			RK73HB1J102J	CHIP R 1.0K J 1/16W		R204			RK73HB1J104J	CHIP R 100K J 1/16W	
R103			RK73HB1J000J	CHIP R 0.0 J 1/16W		R205-212			RK73HB1J103J	CHIP R 10K J 1/16W	
R105			RK73HB1J104J	CHIP R 100K J 1/16W		R215			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R106			RK73HB1J000J	CHIP R 0.0 J 1/16W		R219-221			RK73HB1J101J	CHIP R 100 J 1/16W	
R107			RK73HB1J103J	CHIP R 10K J 1/16W		R225-227			RK73HB1J101J	CHIP R 100 J 1/16W	
R108			RK73HB1J104J	CHIP R 100K J 1/16W		R230-284			RK73HB1J101J	CHIP R 100 J 1/16W	
R109,110			RK73HH1J223D	CHIP R 22K D 1/16W		R285			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R111-113			RK73HB1J104J	CHIP R 100K J 1/16W		R287			RK73HB1J333J	CHIP R 33K J 1/16W	
R115			RK73HB1J473J	CHIP R 47K J 1/16W		R288			RK73HB1J393J	CHIP R 39K J 1/16W	
R116			RK73HB1J104J	CHIP R 100K J 1/16W		R291			RK73HB1J822J	CHIP R 8.2K J 1/16W	
R117			RK73HB1J105J	CHIP R 1.0M J 1/16W		R292			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R118			RK73HB1J274J	CHIP R 270K J 1/16W		R293			RK73HB1J473J	CHIP R 47K J 1/16W	
R119			RK73HB1J000J	CHIP R 0.0 J 1/16W		R295			RK73HB1J223J	CHIP R 22K J 1/16W	
R120			RK73HB1J274J	CHIP R 270K J 1/16W		R998			RK73HB1J000J	CHIP R 0.0 J 1/16W	K2
R121,122			RK73HB1J102J	CHIP R 1.0K J 1/16W		R999			RK73HB1J000J	CHIP R 0.0 J 1/16W	K3
R123,124			RK73HB1J474J	CHIP R 470K J 1/16W		D1		UDZW3.9(B)	ZENER DIODE		
R125			RK73HB1J470J	CHIP R 47 J 1/16W		D13-16		1SS388F	DIODE		
R126,127			RK73HB1J154J	CHIP R 150K J 1/16W		D19,20		AVRM1005C270M	VARISTOR		
R128			RK73HB1J273J	CHIP R 27K J 1/16W		D22		AVRM1005C270M	VARISTOR		
R129			RK73HB1J473J	CHIP R 47K J 1/16W		D23		1SS301F	DIODE		
R130,131			RK73HB1J223J	CHIP R 22K J 1/16W		D24		1SS416	DIODE		
R132,133			RK73HB1J473J	CHIP R 47K J 1/16W		D25		1SS301F	DIODE		
R134			RK73HB1J223J	CHIP R 22K J 1/16W							

PARTS LIST

CONTROL UNIT (X53-4390-XX)

TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
D26			1SS388F	DIODE		C134,135			CC73GCH1H0R5B	CHIP C 0.5PF	B
D27			AVRM1005C270M	VARIATOR		C136,137			CC73HCH1H0R5B	CHIP C 0.5PF	B
IC1			Note 1	ROM IC		C139,140			CC73GCH1H040B	CHIP C 4.0PF	B
IC3			Note 1	MICROPROCESSOR IC							
IC4			Note 1	SRAM IC							
IC5			XC6109C29ANN	ANALOGUE IC		C141			CC73GCH1H050B	CHIP C 5.0PF	B
IC6			TC7SH08FU-F	MOS-IC		C142			CC73GCH1H070B	CHIP C 7.0PF	B
IC7			RV5C386A	MOS-IC		C143			CC73GCH1H050B	CHIP C 5.0PF	B
IC8			SM5023CNDH-G	MOS-IC		C144			CS77CPOJ100M	CHIP TNL 10UF	6.3WV
IC9			TC7W66FK-F	MOS-IC		C145			CC73GCH1H060B	CHIP C 6.0PF	B
IC10			Note 1	MOS-IC		C147			CK73GB0J475K	CHIP C 4.7UF	K
IC11,12			TPA6201A1DRBR	ANALOGUE IC		C148-150			CK73HB1H471K	CHIP C 470PF	K
IC13	*		AK2925T	MOS-IC		C151			CC73HCH1H101J	CHIP C 100PF	J
IC15			PCA9535BS	MOS-IC		C153			CC73HCH1H101J	CHIP C 100PF	J
IC16			XC61CC5602NR	MOS-IC		C154			CC73HCH1H0R5B	CHIP C 0.5PF	B
IC17			S-812C31BPI-G	ANALOGUE IC		C155			CC73HCH1H101J	CHIP C 100PF	J
IC18			TC7WZ245FK-F	MOS-IC		C156			CC73HCH1H0R5B	CHIP C 0.5PF	B
IC19			TC74LCX245FK	MOS-IC		C157			CK73HB1H821K	CHIP C 820PF	K
Q1			2SB798AZ(DLDK	TRANSISTOR		C159			CC73HCH1H100B	CHIP C 10PF	B
Q2			2SC4617(S)	TRANSISTOR		C162			CC73HCH1H050B	CHIP C 5.0PF	B
Q3			2SB1132(O,R)	TRANSISTOR		C168			CK73HB1H471K	CHIP C 470PF	K
Q4			SSM3K15TE(F)	FET		C173			CC73HCH1H010C	CHIP C 1.0PF	C
Q5			UMG3N	TRANSISTOR		C174			CC73HCH1H101J	CHIP C 100PF	J
Q6			EMD12	TRANSISTOR		C176			CC73HCH1H040B	CHIP C 4.0PF	B
Q7,8			SSM6N16FE-F	FET		C177,178			CC73HCH1H101J	CHIP C 100PF	J
Q10,11			SSM6L05FU-F	FET		C179			CC73HCH1H020B	CHIP C 2.0PF	B
Q12			EMD12	TRANSISTOR		C180			CC73HCH1H150J	CHIP C 15PF	J
Q13			2SA1955A-F	TRANSISTOR		C181			CC73HCH1H010B	CHIP C 1.0PF	B
Q14,15			SSM3K15TE(F)	FET		C182			CC73HCH1H150J	CHIP C 15PF	J
Q16			2SA1955A-F	TRANSISTOR		C183			CC73HCH1H1R5B	CHIP C 1.5PF	B
						C184			CC73HCH1H101J	CHIP C 100PF	J
						C185			CC73HCH1H100B	CHIP C 10PF	B
						C186			CC73HCH1H101J	CHIP C 100PF	J
						C188			CC73HCH1H101J	CHIP C 100PF	J
						C189			CC73HCH1H080B	CHIP C 8.0PF	B
TX-RX UNIT (X57-7560-10)						C190			CC73HCH1H040B	CHIP C 4.0PF	B
D901			B30-2019-05	LED (RE/GR)		C191			CC73HCH1H101J	CHIP C 100PF	J
C100			CK73HB1E103K	CHIP C 0.010UF	K	C192			CC73HCH1H040B	CHIP C 4.0PF	B
C101			CK73HB1A104K	CHIP C 0.10UF	K	C193			CC73HCH1H120G	CHIP C 12PF	G
C104			CK73HB1E103K	CHIP C 0.010UF	K	C194			CC73HCH1H040B	CHIP C 4.0PF	B
C106,107			CC73HCH1H101J	CHIP C 100PF	J	C195-198			CK73HB1E103K	CHIP C 0.010UF	K
C108			CK73HB1A104K	CHIP C 0.10UF	K	C200			CK73HB1E103K	CHIP C 0.010UF	K
C109			CK73GB1E105K	CHIP C 1.0UF	K	C201,202			CC73HCH1H101J	CHIP C 100PF	J
C110			CC73HCH1H101J	CHIP C 100PF	J	C203			CC73HCH1H040B	CHIP C 4.0PF	B
C111			CK73GB1E105K	CHIP C 1.0UF	K	C204,205			CC73HCH1H101J	CHIP C 100PF	J
C112			CC73HCH1H101J	CHIP C 100PF	J	C206			CK73HB1A104K	CHIP C 0.10UF	K
C113			CK73HB1H471K	CHIP C 470PF	K	C207			CC73HCH1H030B	CHIP C 3.0PF	B
C114,115			CK73HB1A104K	CHIP C 0.10UF	K	C208,209			CC73HCH1H101J	CHIP C 100PF	J
C116,117			CK73HB1E103K	CHIP C 0.010UF	K	C211			CC73HCH1H040B	CHIP C 4.0PF	B
C119			CK73HB1E103K	CHIP C 0.010UF	K	C213			CC73HCH1H101J	CHIP C 100PF	J
C120,121			CK73HB1H471K	CHIP C 470PF	K	C214			CK73HB1E103K	CHIP C 0.010UF	K
C122			CC73HCH1H101J	CHIP C 100PF	J	C215			CK73HB1A104K	CHIP C 0.10UF	K
C124			CS77CA1VR33M	CHIP TNL 0.33UF	35WV	C216,217			CC73HCH1H101J	CHIP C 100PF	J
C125			CK73GB1H104K	CHIP C 0.10UF	K	C218			CK73HB1A104K	CHIP C 0.10UF	K
C126			C93-0787-05	CERAMIC 0.1UF	50WV	C219			CC73HCH1H030B	CHIP C 3.0PF	B
C128			CC73HCH1H470J	CHIP C 47PF	J	C220			CC73GCH1H101J	CHIP C 100PF	J
C130			CC73HCH1H470J	CHIP C 47PF	J	C221			CC73HCH1H050B	CHIP C 5.0PF	B
C131			CC73HCH1H100B	CHIP C 10PF	B	C222			CC73HCH1H150G	CHIP C 15PF	G
C132			CC73HCH1H101J	CHIP C 100PF	J	C223,224			CC73HCH1H101J	CHIP C 100PF	J
C133			CC73HCH1H120G	CHIP C 12PF	G	C225			CC73HCH1H100B	CHIP C 10PF	B
						C226			CC73HCH1H101J	CHIP C 100PF	J

PARTS LIST

TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C228			CC73GCH1H060B	CHIP C 6.0PF B		C355			CC73HCH1H020B	CHIP C 2.0PF B	
C230			CC73HCH1H101J	CHIP C 100PF J		C356			CC73HCH1H330J	CHIP C 33PF J	
C231			CK73HB1E103K	CHIP C 0.010UF K		C357			CC73HCH1H030B	CHIP C 3.0PF B	
C233-236			CC73HCH1H101J	CHIP C 100PF J		C358			CC73HCH1H100B	CHIP C 10PF B	
C238			CK73GB1E105K	CHIP C 1.0UF K		C359			CC73HCH1H101J	CHIP C 100PF J	
C240-242			CC73HCH1H101J	CHIP C 100PF J		C360			CC73HCH1H010B	CHIP C 1.0PF B	
C243			CK73HB1E103K	CHIP C 0.010UF K		C361			CC73HCH1H060B	CHIP C 6.0PF B	
C244-246			CC73HCH1H101J	CHIP C 100PF J		C362			CC73HCH1H010B	CHIP C 1.0PF B	
C248			CC73HCH1H101J	CHIP C 100PF J		C363			CC73HCH1H101J	CHIP C 100PF J	
C249			CK73GB1H104K	CHIP C 0.10UF K		C364			CK73HB1E103K	CHIP C 0.010UF K	
C251			CK73HB1E103K	CHIP C 0.010UF K		C365			CC73HCH1H101J	CHIP C 100PF J	
C254			CC73HCH1H101J	CHIP C 100PF J		C366			CC73HCH1H180G	CHIP C 18PF G	
C256			CK73GB0J475K	CHIP C 4.7UF K		C367			CK73HB0J105K	CHIP C 1.0UF K	
C259			CC73GCH1H101J	CHIP C 100PF J		C368			CK73HB1E103K	CHIP C 0.010UF K	
C260			CC73HCH1H101J	CHIP C 100PF J		C371			CK73HB1E103K	CHIP C 0.010UF K	
C261			CC73GCH1H010B	CHIP C 1.0PF B		C372			CC73HCH1H101J	CHIP C 100PF J	
C262,263			CC73GCH1H101J	CHIP C 100PF J		C373			CK73HB1E103K	CHIP C 0.010UF K	
C264			CC73HCH1H030B	CHIP C 3.0PF B		C381			CC73GCH1H101J	CHIP C 100PF J	
C265			CC73GCH1H010B	CHIP C 1.0PF B		C383,384			CC73HCH1H101J	CHIP C 100PF J	
C266			CC73HCH1H010B	CHIP C 1.0PF B		C385			CK73HB1E103K	CHIP C 0.010UF K	
C267			CC73GCH1H060B	CHIP C 6.0PF B		C387			CK73HB1H471K	CHIP C 470PF K	
C268			CC73GCH1H150G	CHIP C 15PF G		C388			CK73HB1E103K	CHIP C 0.010UF K	
C269			CC73HCH1H060B	CHIP C 6.0PF B		C389			CC73HCH1H220G	CHIP C 22PF G	
C270			CC73HCH1H220G	CHIP C 22PF G		C390			CC73HCH1H120G	CHIP C 12PF G	
C272			C93-0941-05	CHIP C 18PF G		C391,392			CC73HCH1H820J	CHIP C 82PF J	
C273			C93-0937-05	CHIP C 12PF G		C393-396			CK73HB1A104K	CHIP C 0.10UF K	
C274		*	C93-0976-05	CHIP C 3.9PF B		C397			CC73HCH1H680J	CHIP C 68PF J	
C275			C93-0878-05	CHIP C 2.0PF B		C399			CK73HB1E103K	CHIP C 0.010UF K	
C276			CC73HCH1H101J	CHIP C 100PF J		C400-404			CK73HB1A104K	CHIP C 0.10UF K	
C277		*	C93-0974-05	CHIP C 3.3PF G		C405,406			CK73HB1E103K	CHIP C 0.010UF K	
C279			CC73HCH1HR75B	CHIP C 0.75PF B		C407			CK73FB0J106K	CHIP C 10UF K	
C300			CC73HCH1H330J	CHIP C 33PF J		C409			CK73HB1A104K	CHIP C 0.10UF K	
C301,302			CC73HCH1H101J	CHIP C 100PF J		C410			CC73HCH1H390J	CHIP C 39PF J	
C304,305			CC73HCH1H101J	CHIP C 100PF J		C411,412			CC73HCH1H151J	CHIP C 150PF J	
C306			CC73HCH1H080B	CHIP C 8.0PF B		C413			CK73HB1C223K	CHIP C 0.022UF K	
C307			CC73HCH1H101J	CHIP C 100PF J		C414			CC73HCH1H101J	CHIP C 100PF J	
C308			CK73HB1A104K	CHIP C 0.10UF K		C415			CK73HB1H102K	CHIP C 1000PF K	
C309,310			CC73HCH1H020B	CHIP C 2.0PF B		C416			CK73HB1A104K	CHIP C 0.10UF K	
C311			CC73HCH1H101J	CHIP C 100PF J		C418,419			CK73HB1A104K	CHIP C 0.10UF K	
C315			CK73HB1E103K	CHIP C 0.010UF K		C420			CK73GB0J225K	CHIP C 2.2UF K	
C316			CC73HCH1H150J	CHIP C 15PF J		C421			CK73HB1A104K	CHIP C 0.10UF K	
C317			CC73HCH1H101J	CHIP C 100PF J		C423			CC73HCH1H470J	CHIP C 47PF J	
C319			CC73HCH1H101J	CHIP C 100PF J		C425-428			CK73HB1A104K	CHIP C 0.10UF K	
C321,322			CC73HCH1H101J	CHIP C 100PF J		C429			CK73HB1H102K	CHIP C 1000PF K	
C323			CC73HCH1H020B	CHIP C 2.0PF B		C430,431			CC73HCH1H101J	CHIP C 100PF J	
C324,325			CC73HCH1H101J	CHIP C 100PF J		C432			CK73HB1E103K	CHIP C 0.010UF K	
C327			CC73HCH1H101J	CHIP C 100PF J		C433			CC73HCH1H270G	CHIP C 27PF G	
C332			CK73HB1A104K	CHIP C 0.10UF K		C500			CK73HB1E103K	CHIP C 0.010UF K	
C333			CC73HCH1H101J	CHIP C 100PF J		C503			CC73HCH1H101J	CHIP C 100PF J	
C334			CC73HCH1H030B	CHIP C 3.0PF B		C504			CK73HB1A104K	CHIP C 0.10UF K	
C335			CK73HB1E103K	CHIP C 0.010UF K		C505,506			CC73HCH1H151J	CHIP C 150PF J	
C337			CK73HB1E103K	CHIP C 0.010UF K		C507			CK73HB1A104K	CHIP C 0.10UF K	
C339			CC73HCH1H060B	CHIP C 6.0PF B		C508			CK73HB1H102K	CHIP C 1000PF K	
C340-343			CC73HCH1H101J	CHIP C 100PF J		C509			CK73HB0J105K	CHIP C 1.0UF K	
C345			CC73HCH1H101J	CHIP C 100PF J		C510,511			CK73HB1A104K	CHIP C 0.10UF K	
C347			CC73HCH1H101J	CHIP C 100PF J		C512			CK73HB1H102K	CHIP C 1000PF K	
C349-351			CC73HCH1H040B	CHIP C 4.0PF B		C513			CC73HCH1H101J	CHIP C 100PF J	
C352			CK73HB1E103K	CHIP C 0.010UF K		C515			CK73HB1A224K	CHIP C 0.22UF K	
C353			CC73HCH1H101J	CHIP C 100PF J		C516			CK73HB1E103K	CHIP C 0.010UF K	
C354			CC73HCH1H010B	CHIP C 1.0PF B		C518			CK73HB1A224K	CHIP C 0.22UF K	

PARTS LIST

TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C519			CK73HB0J105K	CHIP C 1.0UF K		C618			CK73HB0J105K	CHIP C 1.0UF K	
C520,521			CK73HB1A104K	CHIP C 0.10UF K		C619			CK73GB0J106K	CHIP C 10UF K	
C522			CK73HB0J105K	CHIP C 1.0UF K		C620			CK73HB1H471K	CHIP C 470PF K	
C524,525			CK73HB1A104K	CHIP C 0.10UF K		C621			CK73HB1A393K	CHIP C 0.039UF K	
C527			CK73HB1A104K	CHIP C 0.10UF K		C622			CK73HB0J105K	CHIP C 1.0UF K	
C528			CK73HB1H152K	CHIP C 1500PF K		C674			CC73HCH1H101J	CHIP C 100PF J	
C529			CK73HB1E103K	CHIP C 0.010UF K		C700			CC73HCH1H101J	CHIP C 100PF J	
C532			CK73HB1A104K	CHIP C 0.10UF K		C701			CK73HB1H471K	CHIP C 470PF K	
C533			CK73HB1E103K	CHIP C 0.010UF K		C702			CC73HCH1H101J	CHIP C 100PF J	
C536			CC73HCH1H151J	CHIP C 150PF J		C703			CK73HB1H471K	CHIP C 470PF K	
C537,538			CK73HB1A104K	CHIP C 0.10UF K		C704,705			CK73HB1H102K	CHIP C 1000PF K	
C539,540			CK73HB1E103K	CHIP C 0.010UF K		C706			CK73GB1H104K	CHIP C 0.10UF K	
C542,543			CK73HB1E103K	CHIP C 0.010UF K		C707			CK73GB1E105K	CHIP C 1.0UF K	
C544			CK73HB1A104K	CHIP C 0.10UF K		C709			CK73GB0J106K	CHIP C 10UF K	
C545			CK73HB0J105K	CHIP C 1.0UF K		C711			CK73GB1E105K	CHIP C 1.0UF K	
C546			CK73HB1E103K	CHIP C 0.010UF K		C712			CK73GB1H104K	CHIP C 0.10UF K	
C547			CC73HCH1H100B	CHIP C 10PF B		C713			CK73GB1E105K	CHIP C 1.0UF K	
C551			CK73HB1H102K	CHIP C 1000PF K		C714			CK73HB1H471K	CHIP C 470PF K	
C552			CK73HB1E103K	CHIP C 0.010UF K		C716,717			CK73HB1H471K	CHIP C 470PF K	
C554			CC73HCH1H101J	CHIP C 100PF J		C719,720			CK73GB1E105K	CHIP C 1.0UF K	
C555			CK73HB0J105K	CHIP C 1.0UF K		C721			CC73HCH1H101J	CHIP C 100PF J	
C556			CK73HB1E103K	CHIP C 0.010UF K		C724			CK73GB1E105K	CHIP C 1.0UF K	
C557-560			CK73HB1A104K	CHIP C 0.10UF K		C725			CK73HB1E682K	CHIP C 6800PF K	
C561			CC73HCH1H101J	CHIP C 100PF J		C727			CK73HB1H471K	CHIP C 470PF K	
C562			CK73HB1A104K	CHIP C 0.10UF K		C728			CK73GB1E105K	CHIP C 1.0UF K	
C563			CK73HB1H152K	CHIP C 1500PF K		C730			C92-0822-05	CHIP TNTL 33UF 10WV	
C564			CK73HB1E103K	CHIP C 0.010UF K		C731,732			CK73HB0J105K	CHIP C 1.0UF K	
C565			CC73HCH1H101J	CHIP C 100PF J		C733			CK73HB1A104K	CHIP C 0.10UF K	
C566			CK73HB1H331K	CHIP C 330PF K		C735			CK73HB1E103K	CHIP C 0.010UF K	
C567			CC73HCH1H101J	CHIP C 100PF J		C736			CK73GB1E105K	CHIP C 1.0UF K	
C568			CK73HB1H821K	CHIP C 820PF K		C737			CC73HCH1H820J	CHIP C 82PF J	
C570			CK73HB1H471K	CHIP C 470PF K		C739			CK73GB1E105K	CHIP C 1.0UF K	
C571			CK73HB1E562K	CHIP C 5600PF K		C740			CK73HB0J105K	CHIP C 1.0UF K	
C573			CK73HB1A104K	CHIP C 0.10UF K		C741			CK73FB1E475K	CHIP C 4.7UF K	
C574,575			CK73HB1H471K	CHIP C 470PF K		C742			CK73GB1E105K	CHIP C 1.0UF K	
C576			CK73HB1C223K	CHIP C 0.022UF K		C744			CK73HB1H102K	CHIP C 1000PF K	
C577			CC73HCH1H101J	CHIP C 100PF J		C745			CK73HB0J105K	CHIP C 1.0UF K	
C578			CK73HB1A104K	CHIP C 0.10UF K		C746			CK73FB1E475K	CHIP C 4.7UF K	
C579			CK73HB1E103K	CHIP C 0.010UF K		C748			CC73HCH1H181J	CHIP C 180PF J	
C581			CK73HB1H471K	CHIP C 470PF K		C749			CK73GB0J475K	CHIP C 4.7UF K	
C582			CK73HB1E103K	CHIP C 0.010UF K		C750			CC73HCH1H220G	CHIP C 22PF G	
C583			CK73HB1E682K	CHIP C 6800PF K		C751			CK73HB1H471K	CHIP C 470PF K	
C585-587			CC73HCH1H101J	CHIP C 100PF J		C752			CK73FB1E475K	CHIP C 4.7UF K	
C589			CK73HB1A224K	CHIP C 0.22UF K		C753			CK73GB1E105K	CHIP C 1.0UF K	
C590,591			CK73HB1A104K	CHIP C 0.10UF K		C754			CK73FB1E475K	CHIP C 4.7UF K	
C594			CC73HCH1H101J	CHIP C 100PF J		C755			CK73GB1E105K	CHIP C 1.0UF K	
C595			CK73HB1H471K	CHIP C 470PF K		C756			CK73FB1E475K	CHIP C 4.7UF K	
C598			CK73HB1H332K	CHIP C 3300PF K		C758			CK73GB1E105K	CHIP C 1.0UF K	
C599-601			CC73HCH1H101J	CHIP C 100PF J		C759			CK73HB1H102K	CHIP C 1000PF K	
C602			CK73HB1E103K	CHIP C 0.010UF K		C761,762			CK73FB1E475K	CHIP C 4.7UF K	
C603			CC73HCH1H101J	CHIP C 100PF J		C763			CC73HCH1H101J	CHIP C 100PF J	
C604-606			CK73HB0J105K	CHIP C 1.0UF K		C765			CS77CP1C2R2M	CHIP TNTL 2.2UF 16WV	
C607,608			CC73HCH1H101J	CHIP C 100PF J		C766			CK73HB1A104K	CHIP C 0.10UF K	
C609			CC73HCH1H150G	CHIP C 15PF G		C767-769			CS77CP1C2R2M	CHIP TNTL 2.2UF 16WV	
C610			CC73HCH1H680J	CHIP C 68PF J		C770,771			CK73HB1H102K	CHIP C 1000PF K	
C611-613			CK73HB1A104K	CHIP C 0.10UF K		C772			CK73HB1E103K	CHIP C 0.010UF K	
C614			CK73HB0J105K	CHIP C 1.0UF K		C773-785			CC73HCH1H470J	CHIP C 47PF J	
C615			CK73HB1A393K	CHIP C 0.039UF K		C786			CK73HB1H102K	CHIP C 1000PF K	
C616			CK73HB1E103K	CHIP C 0.010UF K		C787			CC73HCH1H470J	CHIP C 47PF J	
C617			CK73HB1A104K	CHIP C 0.10UF K		C788-791			CK73HB1H102K	CHIP C 1000PF K	

PARTS LIST

TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C792-796			CC73HCH1H470J	CHIP C 47PF J		L216			L40-2263-92	SMALL FIXED INDUCTOR (2.2NH)	
C797			CK73HB1H102K	CHIP C 1000PF K		L219			L40-3975-71	SMALL FIXED INDUCTOR (39NH)	
C798-819			CC73HCH1H470J	CHIP C 47PF J		L300		*	L79-1928-05	FILTER	
C821-846			CC73HCH1H470J	CHIP C 47PF J		L301		*	L79-1927-05	FILTER	
C911			CK73HB1E103K	CHIP C 0.010UF K		L302		*	L79-1928-05	FILTER	
CN201			E04-0403-05	PIN SOCKET		L303		*	L79-1927-05	FILTER	
CN300			E23-0762-05	TERMINAL		L304			L92-0446-05	BEADS CORE	
CN501			E40-6357-05	PIN ASSY		L305		*	L41-3965-45	SMALL FIXED INDUCTOR (3.9NH)	
CN502			E40-6586-05	SOCKET FOR PIN ASSY		L306		*	L41-5165-45	SMALL FIXED INDUCTOR (5.1NH)	
CN505			E41-3167-05	FLAT CABLE CONNECTOR		L307			L92-0446-05	BEADS CORE	
CN707		*	E40-6846-05	PIN ASSY		L308			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)	
CN902		*	E40-6722-05	FLAT CABLE CONNECTOR		L309		*	L41-5165-45	SMALL FIXED INDUCTOR (5.1NH)	
CN903			E40-6464-05	FLAT CABLE CONNECTOR		L310		*	L41-6868-45	SMALL FIXED INDUCTOR (6.8NH)	
CN923			E40-6358-05	SOCKET FOR PIN ASSY		L311,312			L92-0446-05	BEADS CORE	
F500			F53-0360-05	FUSE(0.25A)		L313			L40-1891-86	SMALL FIXED INDUCTOR (1.8UH)	
F700			F53-0372-05	FUSE(3.15A)		L316			L34-4604-15	AIR-CORE COIL	
F701			F53-0360-05	FUSE(0.25A)		L317			L40-6865-92	SMALL FIXED INDUCTOR (6.8NH)	
CD300			L79-1850-05	TUNING COIL		L318			L41-4778-45	SMALL FIXED INDUCTOR (47NH)	
CF300			L72-1017-05	CERAMIC FILTER		L319			L40-1575-92	SMALL FIXED INDUCTOR (15NH)	
CF302			L72-1021-05	CERAMIC FILTER		L320			L40-1885-92	SMALL FIXED INDUCTOR (180NH)	
CF303			L72-1017-05	CERAMIC FILTER		L321			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
CF400		*	L72-1030-05	CERAMIC FILTER		L325			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)	
L100			L92-0446-05	BEADS CORE		L326			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L104			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		L327			L41-4778-45	SMALL FIXED INDUCTOR (47NH)	
L107			L92-0446-05	BEADS CORE		L328			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L109,110			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		L330			L40-1068-71	SMALL FIXED INDUCTOR (1.0NH)	
L115			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		L331		*	L41-5165-45	SMALL FIXED INDUCTOR (5.1NH)	
L119,120			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		L332		*	L41-1578-45	SMALL FIXED INDUCTOR (15NH)	
L127,128			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		L333		*	L41-8768-45	SMALL FIXED INDUCTOR (8.7NH)	
L134,135			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		L335			L41-1278-45	SMALL FIXED INDUCTOR (12NH)	
L139			L40-2763-92	SMALL FIXED INDUCTOR (2.7NH)		L336			L41-7568-45	SMALL FIXED INDUCTOR (7.5NH)	
L140			L41-1078-45	SMALL FIXED INDUCTOR (10NH)		L337		*	L41-8768-45	SMALL FIXED INDUCTOR (8.7NH)	
L142			L40-2775-71	SMALL FIXED INDUCTOR (27NH)		L338			L41-1078-45	SMALL FIXED INDUCTOR (10NH)	
L143			L40-1868-71	SMALL FIXED INDUCTOR (1.8NH)		L500			L92-0140-05	CHIP FERRITE	
L145,146			L40-1075-71	SMALL FIXED INDUCTOR (10NH)		L501			L92-0444-05	CHIP FERRITE	
L147			L40-3963-92	SMALL FIXED INDUCTOR (3.9NH)		L502			L92-0140-05	CHIP FERRITE	
L148			L40-1075-71	SMALL FIXED INDUCTOR (10NH)		L503,504			L92-0467-05	CHIP FERRITE	
L149			L40-1275-71	SMALL FIXED INDUCTOR (12NH)		L505,506			L92-0163-05	BEADS CORE	
L150			L33-0745-05	SMALL FIXED INDUCTOR (33NH)		L700			L92-0136-05	CHIP FERRITE	
L151			L33-1267-05	SMALL FIXED INDUCTOR (27NH)		L701,702			L92-0162-05	BEADS CORE	
L153			L40-1868-71	SMALL FIXED INDUCTOR (1.8NH)		L703			L92-0467-05	CHIP FERRITE	
L154			L40-4775-71	SMALL FIXED INDUCTOR (47NH)		L704			L92-0162-05	BEADS CORE	
L155			L40-1275-71	SMALL FIXED INDUCTOR (12NH)		L705			L33-1462-05	SMALL FIXED INDUCTOR (68UH)	
L200			L40-1075-92	SMALL FIXED INDUCTOR (10NH)		L706			L33-1469-05	SMALL FIXED INDUCTOR (68UH)	
L201			L40-6865-92	SMALL FIXED INDUCTOR (6.8NH)		L707			L33-1494-05	SMALL FIXED INDUCTOR (4.7UH)	
L202			L40-1075-92	SMALL FIXED INDUCTOR (10NH)		L708			L33-1462-05	SMALL FIXED INDUCTOR (68UH)	
L203			L40-5663-92	SMALL FIXED INDUCTOR (5.6NH)		L710			L92-0446-05	BEADS CORE	
L204			L92-0140-05	CHIP FERRITE		X100			L77-3016-05	TCXO (19.2MHZ)	
L205			L40-5667-92	SMALL FIXED INDUCTOR (5.6NH)		XF300			L71-0640-05	MCF (58.05MHZ)	
L206			L40-2263-92	SMALL FIXED INDUCTOR (2.2NH)		CP10,11			R90-0740-05	MULTIPLE RESISTOR	
L207			L41-3978-45	SMALL FIXED INDUCTOR (39NH)		R100			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L208			L92-0149-05	CHIP FERRITE		R102			RK73HB1J473J	CHIP R 47K J 1/16W	
L209			L34-4550-05	AIR-CORE COIL		R103,104			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L210			L92-0149-05	CHIP FERRITE		R105			RK73HB1J560J	CHIP R 56 J 1/16W	
L211		*	L41-6878-43	SMALL FIXED INDUCTOR (68NH)		R106			RK73HB1J101J	CHIP R 100 J 1/16W	
L212			L79-1468-05	FILTER MODULE		R107			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L213			L34-4604-15	AIR-CORE COIL		R108			RK73HB1J104J	CHIP R 100K J 1/16W	
L214			L34-4606-15	AIR-CORE COIL		R109			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L215			L40-3367-92	SMALL FIXED INDUCTOR (3.3NH)		R110			RK73HB1J104J	CHIP R 100K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R111			RK73HB1J101J	CHIP R 100 J 1/16W		R218			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R112			RK73HB1J100J	CHIP R 10 J 1/16W		R219			RK73HB1J103J	CHIP R 10K J 1/16W	
R113			RK73HB1J474J	CHIP R 470K J 1/16W		R220			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R114			RK73HH1J184D	CHIP R 180K D 1/16W		R221			RK73GB2A331J	CHIP R 330 J 1/10W	
R115			RK73HB1J100J	CHIP R 10 J 1/16W		R222,223			RK73EB2HR22F	CHIP R 0.22 F 1/2W	
R116			RK73HH1J333D	CHIP R 33K D 1/16W		R224			RK73HB1J473J	CHIP R 47K J 1/16W	
R117			RK73HB1J682J	CHIP R 6.8K J 1/16W		R225,226			RK73HH1J154D	CHIP R 150K D 1/16W	
R118			RK73HB1J472J	CHIP R 4.7K J 1/16W		R228-231			RK73HH1J154D	CHIP R 150K D 1/16W	
R119			RK73HB1J102J	CHIP R 1.0K J 1/16W		R232			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R120			RK73HB1J106J	CHIP R 10M J 1/16W		R233			RK73HB1J103J	CHIP R 10K J 1/16W	
R121			RK73HB1J104J	CHIP R 100K J 1/16W		R234			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R122			RK73HB1J473J	CHIP R 47K J 1/16W		R235			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R123		*	RN73HH1J221D	CHIP R 220 D 1/16W		R236			RK73HB1J333J	CHIP R 33K J 1/16W	
R124		*	RN73HH1J181D	CHIP R 180 D 1/16W		R237			RK73HB1J474J	CHIP R 470K J 1/16W	
R125		*	RN73HH1J220D	CHIP R 22 D 1/16W		R238			RK73HB1J473J	CHIP R 47K J 1/16W	
R126			RK73HB1J104J	CHIP R 100K J 1/16W		R239			RK73HB1J184J	CHIP R 180K J 1/16W	
R127			RK73HB1J683J	CHIP R 68K J 1/16W		R240			RK73HB1J474J	CHIP R 470K J 1/16W	
R128			RK73HB1J560J	CHIP R 56 J 1/16W		R241			RK73HB1J104J	CHIP R 100K J 1/16W	
R131			RK73HB1J101J	CHIP R 100 J 1/16W		R242			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R134			RK73HB1J104J	CHIP R 100K J 1/16W		R243			RK73HB1J183J	CHIP R 18K J 1/16W	
R135			RK73HB1J101J	CHIP R 100 J 1/16W		R244			RK73FB2B000J	CHIP R 0.0 J 1/8W	
R136			RK73HB1J473J	CHIP R 47K J 1/16W		R245			RK73HB1J153J	CHIP R 15K J 1/16W	
R137			RK73HB1J152J	CHIP R 1.5K J 1/16W		R246,247			RK73HB1J271J	CHIP R 270 J 1/16W	
R138			RK73HB1J104J	CHIP R 100K J 1/16W		R248			RK73EB2E823J	CHIP R 82K J 1/4W	
R139			RK73HB1J474J	CHIP R 470K J 1/16W		R300,301			RK73HB1J474J	CHIP R 470K J 1/16W	
R140,141			RK73HB1J101J	CHIP R 100 J 1/16W		R302			RK73HB1J104J	CHIP R 100K J 1/16W	
R142			RK73HB1J682J	CHIP R 6.8K J 1/16W		R303			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R143			RK73HB1J103J	CHIP R 10K J 1/16W		R304			RK73HB1J474J	CHIP R 470K J 1/16W	
R144			RK73HB1J102J	CHIP R 1.0K J 1/16W		R306,307			RK73HB1J223J	CHIP R 22K J 1/16W	
R145			RN73HH1J104D	CHIP R 100K D 1/16W		R308,309			RK73HB1J474J	CHIP R 470K J 1/16W	
R146			RK73HB1J271J	CHIP R 270 J 1/16W		R310			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R148			RK73HB1J101J	CHIP R 100 J 1/16W		R311,312			RK73HB1J474J	CHIP R 470K J 1/16W	
R150			RK73HB1J222J	CHIP R 2.2K J 1/16W		R319			RK73HB1J271J	CHIP R 270 J 1/16W	
R151			RK73HB1J474J	CHIP R 470K J 1/16W		R320			RK73HB1J333J	CHIP R 33K J 1/16W	
R152			RK73FB2B000J	CHIP R 0.0 J 1/8W		R321			RK73HB1J683J	CHIP R 68K J 1/16W	
R154			RK73HB1J562J	CHIP R 5.6K J 1/16W		R322			RK73HB1J333J	CHIP R 33K J 1/16W	
R155			RK73HB1J122J	CHIP R 1.2K J 1/16W		R323			RK73HB1J683J	CHIP R 68K J 1/16W	
R156			RK73HB1J102J	CHIP R 1.0K J 1/16W		R327			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R173			RK73HB1J106J	CHIP R 10M J 1/16W		R332			RK73HB1J560J	CHIP R 56 J 1/16W	
R178-180			RK73HB1J122J	CHIP R 1.2K J 1/16W		R335			RK73HB1J470J	CHIP R 47 J 1/16W	
R182			RK73HB1J102J	CHIP R 1.0K J 1/16W		R337,338			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R183		*	RN73HH1J220D	CHIP R 22 D 1/16W		R339			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R185			RK73HB1J101J	CHIP R 100 J 1/16W		R340			RK73HB1J822J	CHIP R 8.2K J 1/16W	
R186			RK73GB2A000J	CHIP R 0.0 J 1/10W		R341			RK73HB1J470J	CHIP R 47 J 1/16W	
R200			RK73HB1J332J	CHIP R 3.3K J 1/16W		R342			RK73HB1J684J	CHIP R 680K J 1/16W	
R201			RK73HB1J182J	CHIP R 1.8K J 1/16W		R343,344			RK73HB1J392J	CHIP R 3.9K J 1/16W	
R202			RK73HB1J392J	CHIP R 3.9K J 1/16W		R347			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R203			RK73HB1J330J	CHIP R 33 J 1/16W		R348,349			RK73HB1J220J	CHIP R 22 J 1/16W	
R204			RK73HB1J331J	CHIP R 330 J 1/16W		R352			RK73HB1J474J	CHIP R 470K J 1/16W	
R205			RK73HB1J220J	CHIP R 22 J 1/16W		R353			RK73HB1J154J	CHIP R 150K J 1/16W	
R206,207			RK73HB1J104J	CHIP R 100K J 1/16W		R354,355			RK73HB1J474J	CHIP R 470K J 1/16W	
R208			RK73HB1J390J	CHIP R 39 J 1/16W		R356			RK73HB1J153J	CHIP R 15K J 1/16W	
R209			RK73HB1J152J	CHIP R 1.5K J 1/16W		R357			RK73HB1J563J	CHIP R 56K J 1/16W	
R210			RK73HB1J332J	CHIP R 3.3K J 1/16W		R358			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R211			RK73HB1J331J	CHIP R 330 J 1/16W		R359			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R212			RK73HB1J000J	CHIP R 0.0 J 1/16W		R360			RK73HB1J392J	CHIP R 3.9K J 1/16W	
R213			RK73HB1J471J	CHIP R 470 J 1/16W		R361			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R215			RK73HB1J120J	CHIP R 12 J 1/16W		R362			RK73HB1J272J	CHIP R 2.7K J 1/16W	
R216			RK73HB1J471J	CHIP R 470 J 1/16W		R363			RK73HB1J474J	CHIP R 470K J 1/16W	
R217			RK73HB1J333J	CHIP R 33K J 1/16W		R364			RK73HB1J392J	CHIP R 3.9K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R365			RK73HB1J473J	CHIP R 47K J 1/16W		R553			RK73HB1J563J	CHIP R 56K J 1/16W	
R366			RK73HB1J220J	CHIP R 22 J 1/16W		R554			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R367			RK73HB1J474J	CHIP R 470K J 1/16W		R556			RK73HB1J683J	CHIP R 68K J 1/16W	
R368			RK73HB1J000J	CHIP R 0.0 J 1/16W		R557			RK73HB1J564J	CHIP R 560K J 1/16W	
R369			RK73HB1J473J	CHIP R 47K J 1/16W		R558,559			RK73HB1J104J	CHIP R 100K J 1/16W	
R371			RK73HB1J683J	CHIP R 68K J 1/16W		R560			RK73HB1J103J	CHIP R 10K J 1/16W	
R373,374			RK73HB1J223J	CHIP R 22K J 1/16W		R561			RK73HB1J334J	CHIP R 330K J 1/16W	
R378			RK73HB1J684J	CHIP R 680K J 1/16W		R562-565			RK73HB1J104J	CHIP R 100K J 1/16W	
R380			RK73HB1J271J	CHIP R 270 J 1/16W		R566			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R381			RK73HB1J180J	CHIP R 18 J 1/16W		R567			RK73HB1J104J	CHIP R 100K J 1/16W	
R382			RK73HB1J151J	CHIP R 150 J 1/16W		R568			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R384			RK73HB1J101J	CHIP R 100 J 1/16W		R569			RK73HB1J103J	CHIP R 10K J 1/16W	
R386			RK73HB1J564J	CHIP R 560K J 1/16W		R570			RK73HB1J224J	CHIP R 220K J 1/16W	
R387			RK73HB1J000J	CHIP R 0.0 J 1/16W		R571,572			RK73HB1J334J	CHIP R 330K J 1/16W	
R388			RK73HB1J122J	CHIP R 1.2K J 1/16W		R573			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R389			RK73HB1J221J	CHIP R 220 J 1/16W		R574			RK73HB1J104J	CHIP R 100K J 1/16W	
R390			RK73HB1J000J	CHIP R 0.0 J 1/16W		R575			RK73HB1J473J	CHIP R 47K J 1/16W	
R394			RK73HB1J104J	CHIP R 100K J 1/16W		R576			RK73HB1J103J	CHIP R 10K J 1/16W	
R395			RK73HB1J473J	CHIP R 47K J 1/16W		R577			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R398			RK73GB2A000J	CHIP R 0.0 J 1/10W		R578			RK73HB1J473J	CHIP R 47K J 1/16W	
R401			RK73HB1J102J	CHIP R 1.0K J 1/16W		R579			RK73HB1J103J	CHIP R 10K J 1/16W	
R402			RK73HB1J100J	CHIP R 10 J 1/16W		R580			RK73HB1J104J	CHIP R 100K J 1/16W	
R403			RK73HB1J102J	CHIP R 1.0K J 1/16W		R581,582			RK73HB1J103J	CHIP R 10K J 1/16W	
R404			RK73HB1J333J	CHIP R 33K J 1/16W		R583,584			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R405			RK73HB1J104J	CHIP R 100K J 1/16W		R585			RK73HB1J274J	CHIP R 270K J 1/16W	
R406			RK73HB1J103J	CHIP R 10K J 1/16W		R586,587			RK73HB1J474J	CHIP R 470K J 1/16W	
R407			RK73HB1J000J	CHIP R 0.0 J 1/16W		R588			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R408			RK73HB1J223J	CHIP R 22K J 1/16W		R589,590			RK73HB1J473J	CHIP R 47K J 1/16W	
R409			RK73HB1J104J	CHIP R 100K J 1/16W		R591,592			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R501			RK73HB1J104J	CHIP R 100K J 1/16W		R593			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R503			RK73HB1J121J	CHIP R 120 J 1/16W		R594,595			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R505			RK73HB1J000J	CHIP R 0.0 J 1/16W		R596			RK73HB1J154J	CHIP R 150K J 1/16W	
R506			RK73HB1J104J	CHIP R 100K J 1/16W		R597-601			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R507			RK73HB1J103J	CHIP R 10K J 1/16W		R602			RK73HB1J274J	CHIP R 270K J 1/16W	
R509			RK73HB1J104J	CHIP R 100K J 1/16W		R603-608			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R511			RK73HB1J101J	CHIP R 100 J 1/16W		R610-612			RK73HB1J104J	CHIP R 100K J 1/16W	
R513			RK73HB1J101J	CHIP R 100 J 1/16W		R614			RK73HB1J154J	CHIP R 150K J 1/16W	
R514			RK73HB1J123J	CHIP R 12K J 1/16W		R615			RK73HB1J104J	CHIP R 100K J 1/16W	
R515			RK73HB1J392J	CHIP R 3.9K J 1/16W		R616			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R517			RK73HB1J101J	CHIP R 100 J 1/16W		R617			RK73HB1J473J	CHIP R 47K J 1/16W	
R518			RK73HB1J474J	CHIP R 470K J 1/16W		R618			RK73HB1J103J	CHIP R 10K J 1/16W	
R519			RK73HB1J000J	CHIP R 0.0 J 1/16W		R619,620			RK73HB1J104J	CHIP R 100K J 1/16W	
R520			RK73HB1J472J	CHIP R 4.7K J 1/16W		R621			RK73HB1J124J	CHIP R 120K J 1/16W	
R521			RK73HB1J224J	CHIP R 220K J 1/16W		R622			RK73HB1J223J	CHIP R 22K J 1/16W	
R522			RK73HB1J100J	CHIP R 10 J 1/16W		R623,624			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R525			RK73HB1J473J	CHIP R 47K J 1/16W		R625			RK73HB1J104J	CHIP R 100K J 1/16W	
R526			RK73HB1J474J	CHIP R 470K J 1/16W		R626			RK73HB1J183J	CHIP R 18K J 1/16W	
R527			RK73HB1J473J	CHIP R 47K J 1/16W		R627			RK73HB1J103J	CHIP R 10K J 1/16W	
R528			RK73HB1J332J	CHIP R 3.3K J 1/16W		R628			RK73HB1J183J	CHIP R 18K J 1/16W	
R529			RK73HB1J473J	CHIP R 47K J 1/16W		R629,630			RK73HB1J223J	CHIP R 22K J 1/16W	
R530			RK73HB1J474J	CHIP R 470K J 1/16W		R631			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R531			RK73HB1J104J	CHIP R 100K J 1/16W		R635,636			RK73HB1J471J	CHIP R 470 J 1/16W	
R532,533			RK73HB1J472J	CHIP R 4.7K J 1/16W		R637			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R534			RK73HB1J220J	CHIP R 22 J 1/16W		R638			RK73HB1J273J	CHIP R 27K J 1/16W	
R535			RK73HB1J563J	CHIP R 56K J 1/16W		R640			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R536			RK73HB1J000J	CHIP R 0.0 J 1/16W		R641			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R538			RK73HB1J103J	CHIP R 10K J 1/16W		R642			RK73HB1J473J	CHIP R 47K J 1/16W	
R541			RK73HB1J000J	CHIP R 0.0 J 1/16W		R643,644			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R544-547			RK73HB1J104J	CHIP R 100K J 1/16W		R645			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R550			RK73HB1J563J	CHIP R 56K J 1/16W		R646			RK73HB1J103J	CHIP R 10K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-7560-10)

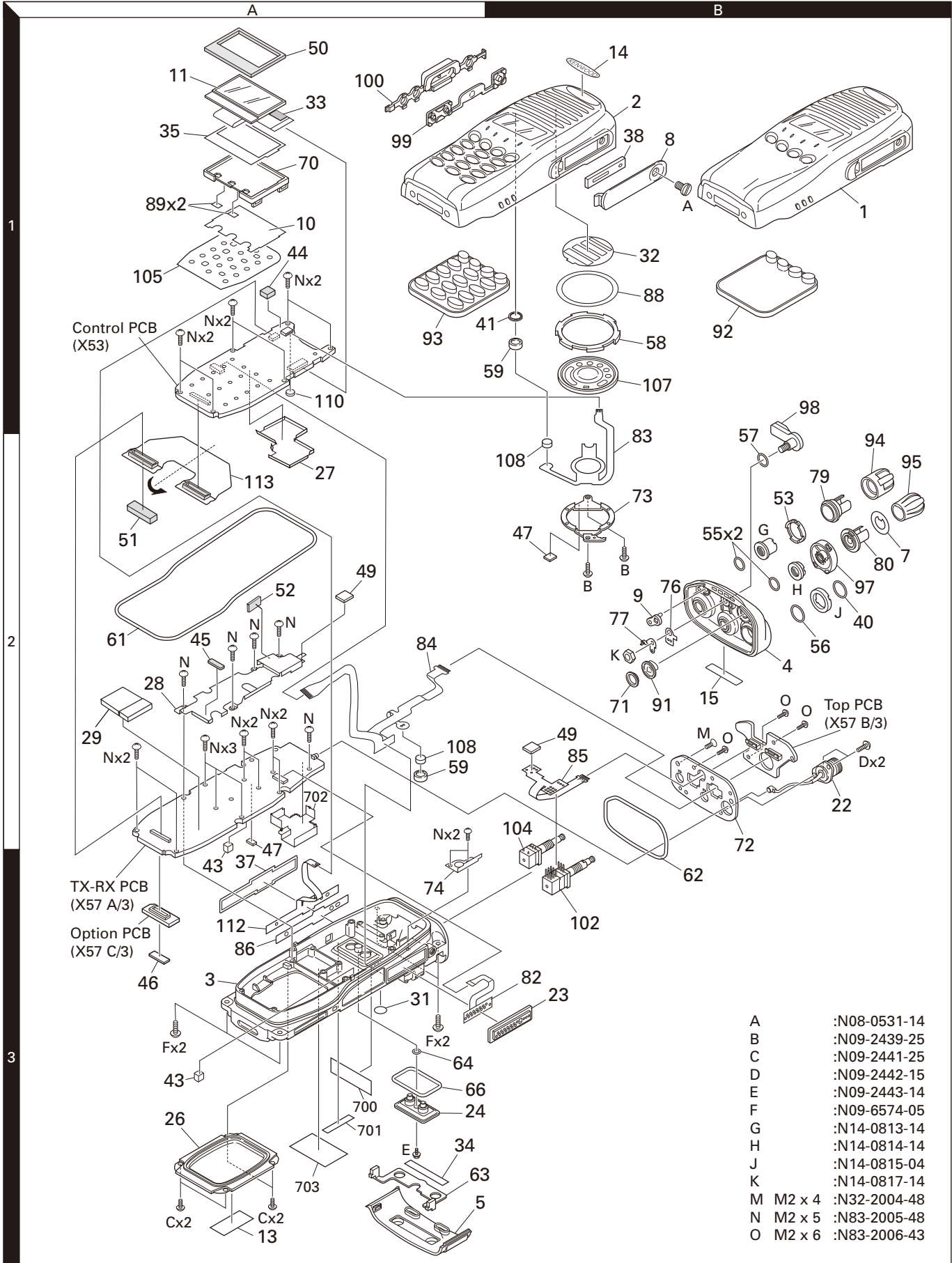
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R647			RK73HB1J471J	CHIP R 470 J 1/16W		R761,762			RK73HB1J474J	CHIP R 470K J 1/16W	
R648			RK73HB1J104J	CHIP R 100K J 1/16W		R907			RK73HB1J333J	CHIP R 33K J 1/16W	
R649			RK73HB1J102J	CHIP R 1.0K J 1/16W		R908			RK73HB1J184J	CHIP R 180K J 1/16W	
R650			RK73HB1J000J	CHIP R 0.0 J 1/16W		R909			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R651			RK73HB1J102J	CHIP R 1.0K J 1/16W		R910			RK73HB1J474J	CHIP R 470K J 1/16W	
R652			RK73HB1J000J	CHIP R 0.0 J 1/16W		R912			RK73HB1J103J	CHIP R 10K J 1/16W	
R653,654			RK73HB1J103J	CHIP R 10K J 1/16W		R913			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R655			RK73HB1J105J	CHIP R 1.0M J 1/16W		R914			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R656,657			RK73HB1J683J	CHIP R 68K J 1/16W		R915			RK73HB1J564J	CHIP R 560K J 1/16W	
R658			RK73HB1J474J	CHIP R 470K J 1/16W		R916			RK73HB1J473J	CHIP R 47K J 1/16W	
R659			RK73HB1J473J	CHIP R 47K J 1/16W		S901			S64-0406-05	LEVER SWITCH	
R660			RK73HB1J000J	CHIP R 0.0 J 1/16W		S902			S70-0496-05	TACT SWITCH	
R661			RK73HB1J684J	CHIP R 680K J 1/16W		D100,101			1SV325F	VARIABLE CAPACITANCE DIODE	
R662			RK73HB1J000J	CHIP R 0.0 J 1/16W		D102,103			1SV282-F	VARIABLE CAPACITANCE DIODE	
R663			RK73HB1J564J	CHIP R 560K J 1/16W		D104-107			1SV278F	VARIABLE CAPACITANCE DIODE	
R664			RK73HB1J473J	CHIP R 47K J 1/16W		D119			DA221	DIODE	
R665			RK73HB1J683J	CHIP R 68K J 1/16W		D200			RN142S	DIODE	
R666			RK73HB1J153J	CHIP R 15K J 1/16W		D201			HZU4CLL	ZENER DIODE	
R667			RK73HB1J333J	CHIP R 33K J 1/16W		D202,203			HVC131	DIODE	
R668			RK73HB1J564J	CHIP R 560K J 1/16W		D303,304			HVC131	DIODE	
R669			RK73HB1J123J	CHIP R 12K J 1/16W		D305			HSM88AS-E	DIODE	
R670			RK73HB1J104J	CHIP R 100K J 1/16W		D308			RN142S	DIODE	
R671			RK73HB1J102J	CHIP R 1.0K J 1/16W		D500			RB706F-40	DIODE	
R672			RK73HB1J472J	CHIP R 4.7K J 1/16W		D501			MA2S111-F	DIODE	
R673			RK73HB1J104J	CHIP R 100K J 1/16W		D502			NNCD6.8G-A	ZENER DIODE	
R674			RK73HB1J471J	CHIP R 470 J 1/16W		D504			NNCD6.8G-A	ZENER DIODE	
R675			RK73HB1J182J	CHIP R 1.8K J 1/16W		D505			1SS416	DIODE	
R676			RK73HB1J104J	CHIP R 100K J 1/16W		D510-512			RB706F-40	DIODE	
R690			RK73HB1J103J	CHIP R 10K J 1/16W		D515,516			AVRM1005C270M	VARISTOR	
R693			RK73HB1J473J	CHIP R 47K J 1/16W		D517			DA221	DIODE	
R694,695			RK73HB1J104J	CHIP R 100K J 1/16W		D518,519			1SS416	DIODE	
R697-699			RK73HB1J104J	CHIP R 100K J 1/16W		D521			1SS416	DIODE	
R700-703			RK73HB1J474J	CHIP R 470K J 1/16W		D700			1SR154-400	DIODE	
R704			RK73HB1J104J	CHIP R 100K J 1/16W		D702			MA2S111-F	DIODE	
R705			RK73HB1J474J	CHIP R 470K J 1/16W		D704			1SS388F	DIODE	
R706			RK73HB1J000J	CHIP R 0.0 J 1/16W		D706			HRB0502A	DIODE	
R707-709			RK73HB1J474J	CHIP R 470K J 1/16W		IC100			TLV2381IDBV	MOS-IC	
R710			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC101			ADF4111BCP7	MOS-IC	
R711			RK73HB1J474J	CHIP R 470K J 1/16W		IC200			TC75W51FK(F)	MOS-IC	
R713			RK73HB1J564J	CHIP R 560K J 1/16W		IC201			TA75W01FUF	MOS-IC	
R714			RK73HB1J154J	CHIP R 150K J 1/16W		IC300			CMY210	MOS-IC	
R716			RK73HB1J471J	CHIP R 470 J 1/16W		IC304			TA31137FNG	MOS-IC	
R720			RK73HB1J224J	CHIP R 220K J 1/16W		IC306,307			TC7W53FK(F)	MOS-IC	
R722			RK73HB1J334D	CHIP R 330K D 1/16W		IC309,310		*	NJG1615HA8	ANALOGUE IC	
R723			RK73HB1J124D	CHIP R 120K D 1/16W		IC400			MCP6021-E/OT	MOS-IC	
R724			RK73GB2A100J	CHIP R 10 J 1/10W		IC500			TC75W51FK(F)	MOS-IC	
R726			RK73HB1J474J	CHIP R 470K J 1/16W		IC501			TC75W51FK(F)	MOS-IC	
R727			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC502			AK2330	MOS-IC	
R729			RK73HB1J123J	CHIP R 12K J 1/16W		IC503			TC75W51FK(F)	MOS-IC	
R730			RK73HB1J334D	CHIP R 330K D 1/16W		IC505			PCA9535BS	MOS-IC	
R731			RK73HB1J223D	CHIP R 22K D 1/16W		IC506			TC75S51FE(F)	MOS-IC	
R749			RK73HB1J104J	CHIP R 100K J 1/16W		IC507-509			TC7W53FK(F)	MOS-IC	
R750			RK73HB1J123J	CHIP R 12K J 1/16W		IC510			TC75W51FK(F)	MOS-IC	
R751			RK73HB1J105J	CHIP R 1.0M J 1/16W		IC511			TC7SH126FU-F	MOS-IC	
R752			RK73HB1J470J	CHIP R 47 J 1/16W		IC512,513			TC75W51FK(F)	MOS-IC	
R753			RK73HB1J473J	CHIP R 47K J 1/16W		IC514			TC75S51FE(F)	MOS-IC	
R754			RK73HB1J100J	CHIP R 10 J 1/16W		IC515			TC7S66FUF	MOS-IC	
R756,757			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC516			TC75W51FK(F)	MOS-IC	
R759			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC517			TC7SET08FU-F	MOS-IC	
R760			RK73HB1J563J	CHIP R 56K J 1/16W							

PARTS LIST

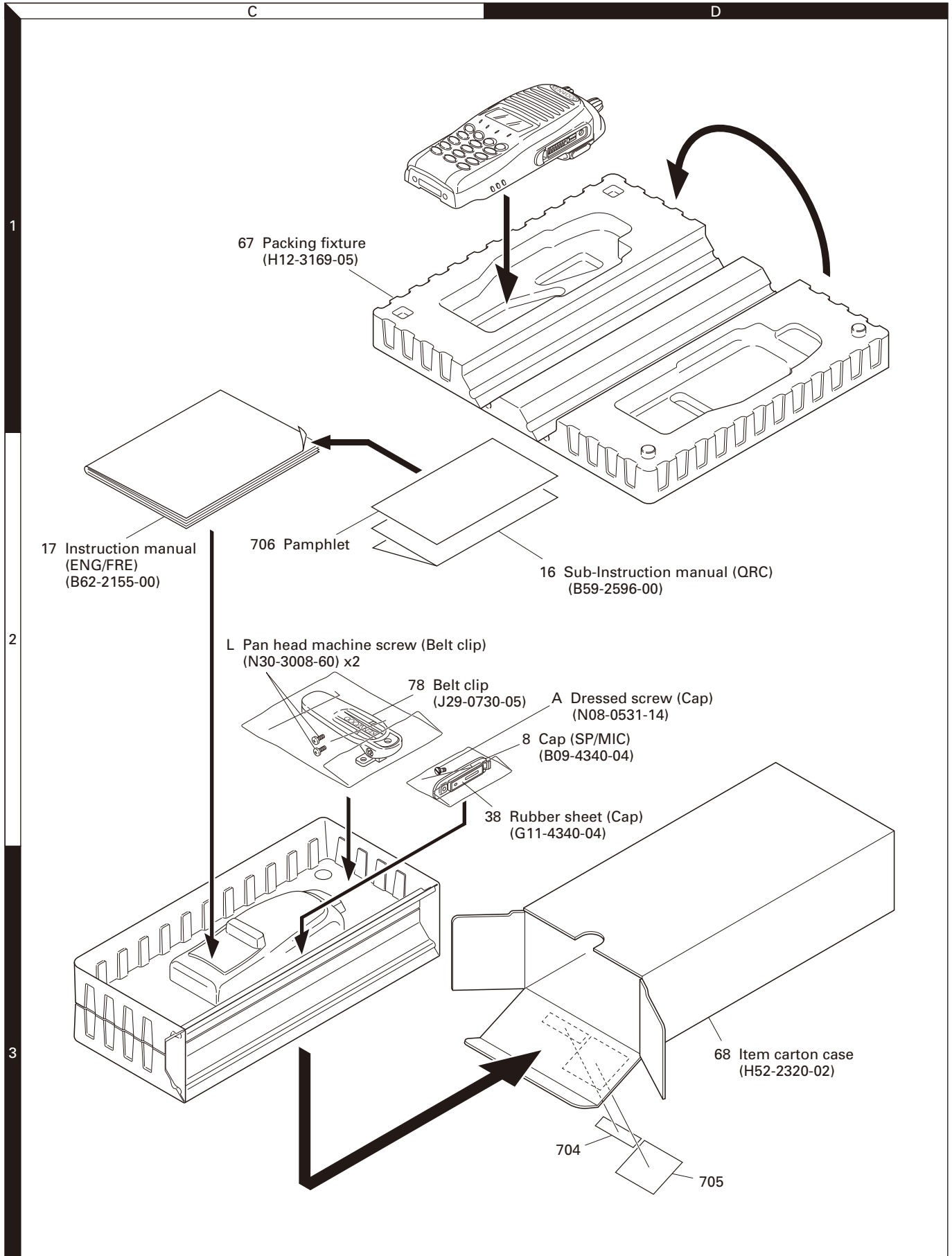
TX-RX UNIT (X57-7560-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
IC700			TK11250CUCB	MOS-IC							
IC701			XC6209B502PR	MOS-IC							
IC702			XC6204B502MR	MOS-IC							
IC704			TK11250CUCB	MOS-IC							
IC705,706			XC6204B332M	MOS-IC							
IC707			XC6365D103M	MOS-IC							
IC708			XC9101D09AKR	ANALOGUE IC							
IC709			XC9235A15CM1	MOS-IC							
IC710			XC6204B332M	MOS-IC							
IC712			NJM2130F3-ZB	BI-POLAR IC							
IC713			LM2682MMX	MOS-IC							
IC714			LM73CIMKX-0	MOS-IC							
Q100			2SC4617(S)	TRANSISTOR							
Q102			SSM6L05FU-F	FET							
Q103			2SK879-F(Y)	FET							
Q104			2SC4617(S)	TRANSISTOR							
Q105			SSM6L05FU-F	FET							
Q106,107			2SK508NV(K52)	FET							
Q108			2SJ347F	FET							
Q109			2SC5636	TRANSISTOR							
Q111,112			2SC5636	TRANSISTOR							
Q200			2SC5636	TRANSISTOR							
Q201			2SK3077F	FET							
Q202			RD01MUS1-T113	FET							
Q203			SSM3K15TE(F)	FET							
Q204		*	RD07MVS1BT132	FET							
Q205			EMD9	TRANSISTOR							
Q206			SSM3K15TE(F)	FET							
Q207			DTA144EEB	DIGITAL TRANSISTOR							
Q208			SSM3K15TE(F)	FET							
Q300			SSM6L05FU-F	FET							
Q302			BB505CES-TL-E	FET							
Q303			2SC5636	TRANSISTOR							
Q304			EMD9	TRANSISTOR							
Q305			BB505CES-TL-E	FET							
Q308			2SJ347F	FET							
Q309			2SC4215-F(Y)	TRANSISTOR							
Q311			2SC4617(S)	TRANSISTOR							
Q312			2SC5636	TRANSISTOR							
Q502			2SC4617(S)	TRANSISTOR							
Q503			SSM3K15TE(F)	FET							
Q504			2SC4738(GR)F	TRANSISTOR							
Q505			2SA1832(GR)F	TRANSISTOR							
Q506			2SJ243-A	FET							
Q507			SSM3K15TE(F)	FET							
Q508			2SJ347F	FET							
Q509			SSM6N16FE-F	FET							
Q700,701			SSM6L05FU-F	FET							
Q703			SSM3K15TE(F)	FET							
Q704			TPC6108-F	FET							
Q705			SSM5H01TU-F	FET							
Q706			TPC6108-F	FET							
Q707			2SJ648-A	FET							
Q708			SSM3K15TE(F)	FET							
Q709			SSM6L05FU-F	FET							
TH102			B57331V2104J	THERMISTOR							
TH200			ERTJ0EV104H	THERMISTOR							

EXPLODED VIEW



PACKING



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

TROUBLE SHOOTING

Fault diagnosis of the BGA (Ball Grid Array) IC

■ Overview

A flowchart for determining whether or not the transceiver can be powered on (the LCD does not function even if the power switch is turned on) due to broken BGA parts.

■ BGA parts

ASIC (IC10), DSP (IC3), FLASH (IC1), SRAM (IC4)

When the BGA IC is problematic, please bring the printed circuit board (X53-4390-14 for 4-key, X53-4390-15 for DTMF key-pad) in for service.

● Checking power supply voltage

Checking voltage	
Points to be checked	Normal voltage
33M IC705 (5 pin)	3.3V
15M IC709 (4 pin)	1.5V
33A IC710 (5 pin)	3.3V
31BU IC17 (3 pin)	3.1V
Power supply of each device is connected through the coil.	
[ASIC]	
33M: L16, 15M: L17, 33A: L19	
[DSP]	
33M: L9, 15M: L5	
[FLASH]	
33A: L4	
[SRAM]	
31BU: L6	

When an abnormal value is confirmed.

Checking for an abnormal point

33M has an abnormal voltage.
[ASIC]
Remove L16 to check the voltage of the 33M.
If the voltage becomes normal, the ASIC is broken.

[DSP]
Remove L9 to check the voltage of the 33M.
If the voltage becomes normal, the DSP is broken.

15M has an abnormal voltage.
[ASIC]
Remove L17 to check the voltage of the 15M.
If the voltage becomes normal, the ASIC is broken.

[DSP]
Remove L5 to check the voltage of the 15M.
If the voltage becomes normal, the DSP is broken.

33A has an abnormal voltage.
[ASIC]
Remove L19 to check the voltage of the 33A.
If the voltage becomes normal, the ASIC is broken.

[FLASH]
Remove L4 to check the voltage of the 33A.
If the voltage becomes normal, the FLASH is broken.

31BU has an abnormal voltage.
[SRAM]
Remove L6 to check the voltage of the 31BU.
If the voltage becomes normal, the SRAM is broken.

If the voltage is not corrected, there is a problem other than the BGA parts.

● Checking the clock

Checking the clock	
Points to be checked	Normal voltage (3.3V)
18.432MHz ASIC side R80	18.432MHz
DSP side R81	18.432MHz
32.768kHz IC7 (1 pin)	32.768kHz

When a normal value is confirmed.

When an abnormal value is confirmed.

● Checking the Reset/Control signal

Checking the control signal input to the ASIC	
Points to be checked	Normal voltage
RESET IC5 (4 pin)	3.3V
/BINT Q7 (6 pin)	3.3V
PSW Q8 (3 pin)	3.3V

When a normal value is confirmed.

When an abnormal value is confirmed.

The BGA parts are not broken.

Checking the control signal output from the ASIC

Points to be checked	Normal voltage
/FRST C22	3.3V

When a normal value is confirmed.

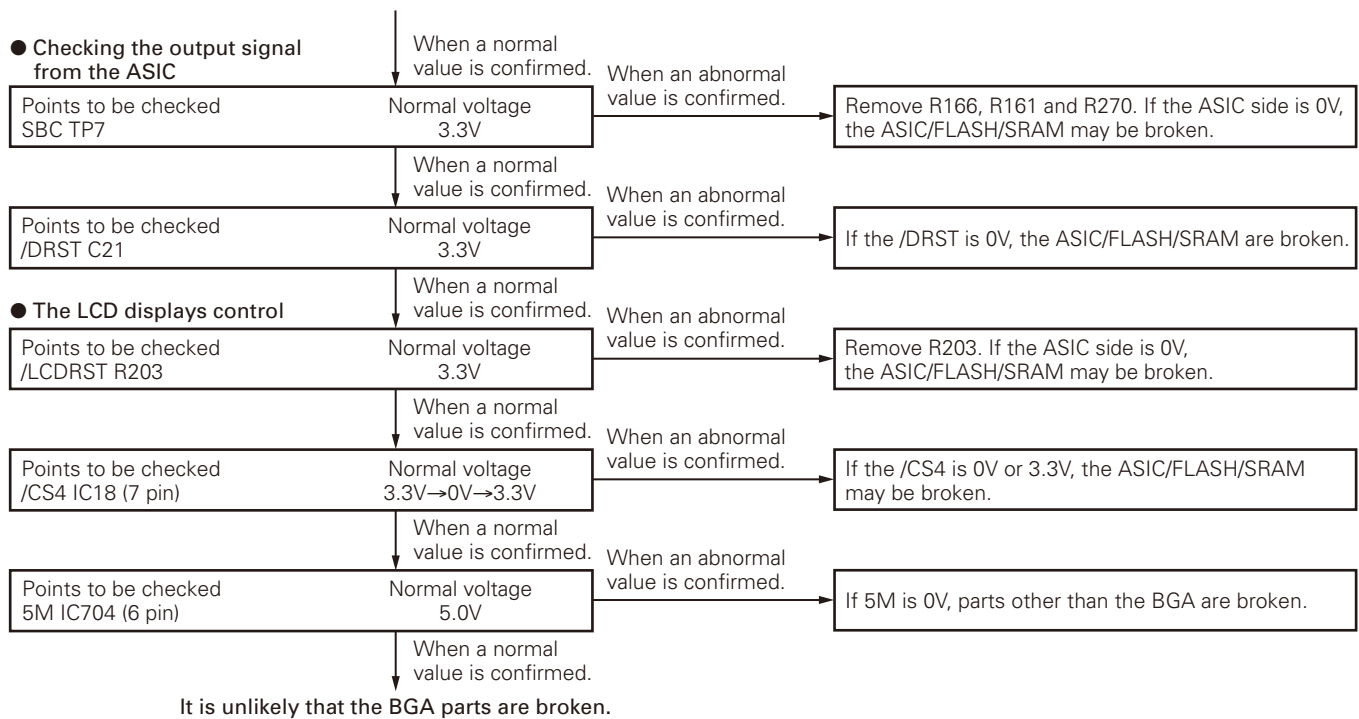
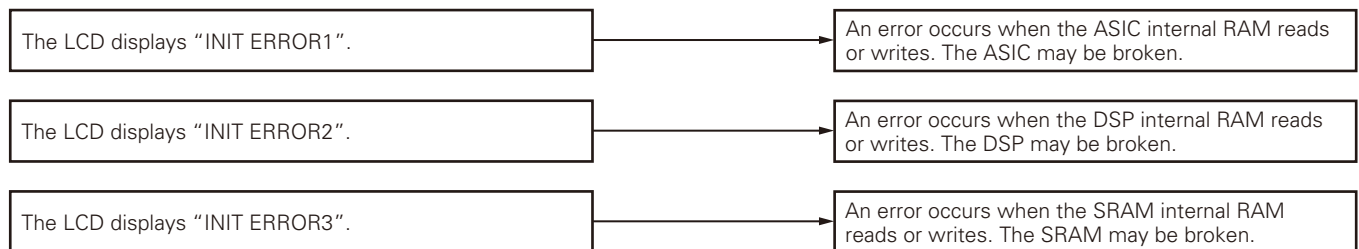
When an abnormal value is confirmed.

If the /FRST is always 0V, the ASIC is broken.

If the /FRST repeats 3.3V and 0V at intervals, the ASIC, FLASH and SRAM may be broken. The BGA parts are not broken.

When a normal value is confirmed.

TROUBLE SHOOTING

● **When an error display appears on the LCD.**■ **Descriptions of signal names**

1) RST (RESET)	: ASIC reset signal	LOW → Reset
2) /BINT	: Battery final voltage monitoring	LOW → Final voltage
3) PSW	: Power switch signal	HIGH → ON
4) /FRST	: FLASH reset signal	LOW → Reset
5) SBC	: Switch B control	HIGH → ON
6) /DRST	: DSP reset signal	LOW → Reset
7) /LCDRST	: LCD reset signal	LOW → Reset
8) /CS4	: LCD controller chip select signal	LOW → Active

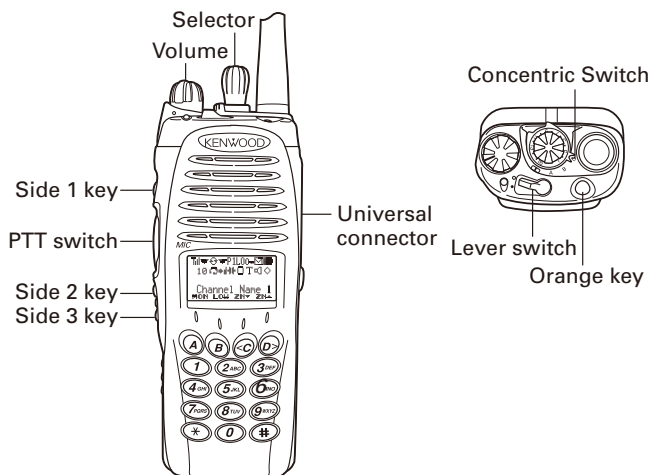
Replacing Control Unit

■ **Control unit Information**

Model Name	Original Control unit Number	For Service Control unit Number
TK-5410 (K2: 4-key)	X53-4390-11	X53-4390-14
TK-5410 (K3: DTMF keypad)	X53-4390-12	X53-4390-15

ADJUSTMENT

Controls



Panel Test Mode

■ Test mode operation features

This transceiver has a test mode. To enter test mode, press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then the [PTT] key first. Test mode can be inhibited by programming. To exit test mode, turn the transceiver power OFF.

- When the panel test mode is activated, the channel selected with the [Selector] knob and the last used signaling number are displayed. When it is activated for the first time, the signaling number is 1.
- If test signaling 26 (Tone Pattern) is selected, the result of Bit Error Rate (BER) calculation is displayed on the LCD. The BER value is also output from the serial port.
- The P25 and analog modes are switched automatically by selecting test signaling. When P25 mode is effective, "A" is displayed on the LCD.

• Key operation

Key	Function	Display
[Selector]	Test frequency channel up/down	Channel No.
[Concentric switch]	Unused	-
[Lever switch]	Talk around switching (○: Talk around on, ●: Talk around off)	On: T icon appears
[PTT]	Transmit	-
[Side1]	Squelch level change (0→1→2→...→9→0→1→2→...)	Squelch level 0: "SQ.LV0" Squelch level 1: "SQ.LV1" Squelch level 9: "SQ.LV9"

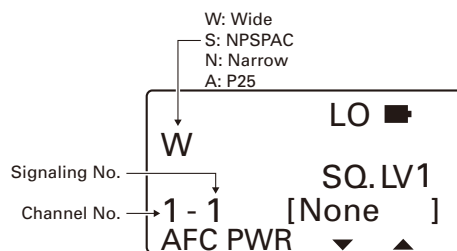
Key	Function	Display
[Side1] Hold	Squelch off	☐
[Side2]	Bandwidth change (Wide→NPSPAC→Narrow→ P25→Wide→...)	Wide: "W" NPSPAC: "S" Narrow: "N" P25: "A"
[Side2] Hold	Unused	-
[Side3]	Shifts to the Panel tuning mode	-
[Side3] Hold	LCD all lights	LCD all point appears
[Orange]	Beat shift on/off	On: ☐ icon appears
[A]	AFC on/off *1	On: ☐ icon appears
[A] Hold	Compander on/off	On: T icon appears
[B]	Transmit power switching (High→Low→Intnerant→ High→...)	High: "HI" Low: "LO" Itinerant: " "
[C]	Test signaling down	Signaling No.
[D]	Test signaling up	Signaling No.
[0] to [9] and [#], [*]	Use as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was presses is sent.	

*1 AFC is normally ON when used.

• LED indicator

- Red LED Lights during transmission.
Blinks at the low battery voltage warning.
- Green LED Lights when there is carrier.

• LCD display in the panel test mode



• Bandwidth

Display	Condition
W	WIDE (5.0kHz/25.0kHz)
S	NPSPAC (4.0kHz/20.0kHz)
N	NARROW (2.5kHz/12.5kHz)
A	P25 (2.5kHz/12.5kHz)

ADJUSTMENT

■ Frequency and Signaling

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

• Test Frequency

CH	RX (MHz)	TX (MHz)
1	763.05000	793.05000
2	769.05000	799.05000
3	775.95000	805.95000
4	763.55000	793.55000
5	769.55000	799.55000
6	775.45000	805.45000
7	851.05000	806.05000
8	860.05000	815.05000
9	869.95000	824.95000
10	851.55000	806.55000
11	860.55000	815.55000
12	869.45000	824.45000
13~16	-	-

• Test Signaling

Signaling No.	RX Signaling	TX Signaling	P25/ 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 754I	DQT 754I	Analog
9	None	DTMF Encode (CODE: 159D)	Analog
10	None	DTMF Encode (CODE: 9)	Analog
11	None	None	Analog
12	None	None	Analog
13	None	None	Analog
14	None	None	Analog
15	None	None	Analog
16	Codec Loop	None	Analog
17	NAC 293	NAC 293	P25
18	NAC 023	NAC 023	P25
19	NAC 5EA	NAC 5EA	P25
20	None	PN9	P25
21	NAC 293	Symbol Rate Pattern	P25
22	NAC 293	1/3 Deviation Pattern	P25

Signaling No.	RX Signaling	TX Signaling	P25/ Analog
23	NAC 293	0 Continuous Pattern	P25
24	NAC 293	Fidelity Pattern	P25
25	None	FSW + PN9	P25
26	NAC 293	NAC 293+1011Hz Tone Pattern	P25
27	Tone Pattern	NAC 293+1011Hz Tone Pattern	P25
28	Silence Pattern (1011Hz Full Rate)	NAC 293 + Silence Pattern	P25
29	Audio Test Pattern (Full Rate)	NAC 293+Audio Test Pattern (Full Rate)	P25
30	Vocoder Loop (Full Rate)	None	P25

Panel Tuning Mode

The transceiver is adjusted in this mode.

■ Preparations for tuning the transceiver

Before attempting to tune the transceiver, connect the unit to a suitable power supply.

Whenever the transmitter is turned, the unit must be connected to a suitable dummy load (i.e. power meter).

The speaker output connector must be terminated with a 8Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

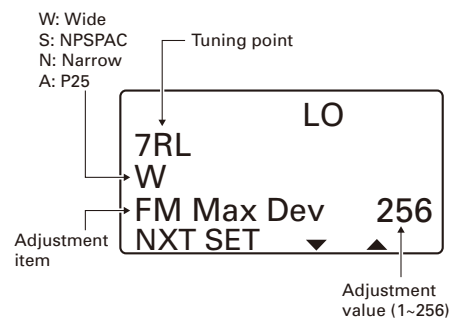
■ To enter the Panel Tuning Mode

Press the [Side3] key in the panel test mode.

Use the [B] key to write tuning data through tuning modes, and the [C] and [D] keys to adjust tuning requirements (1 to 256 appears on the LCD).

Use the [A] key to select the adjustment item through tuning modes. Use the [Side1] key to adjust 4, 6 or 8 reference level adjustments, and use the [Side2] key to switch between Wide/NPSPAC/Narrow/P25.

• LCD display in the panel tuning mode



ADJUSTMENT

• Key operation

Key	Function
[Selector]	Unused
[Concentric switch]	Unused
[Lever switch]	Unused
[PTT]	Transmission. When the battery low voltage is adjusted, the adjustment value is displayed on the LCD.
[Side1]	To enter 4,6 or 8 reference level adjustments
[Side2]	Bandwidth change (Wide→NPSPAC→Narrow→P25→Wide→...)
[Side3]	Exit the panel tuning mode and shift to the panel test mode.
[Orange]	Unused
[A]	Go to the next adjustment item (The current adjustment data is cleared.)
[A] Hold	Back to the last adjustment item (The current adjustment data is cleared.)
[B]	Write the new adjustment value to the transceiver.
[C]	Adjustment value down
[D]	Adjustment value up

■ 4,6 or 8 reference level adjustments frequency

Transmit Assist Voltage

High Transmit Power

Low Transmit Power

Itinerant Frequency Transmit Power

Balance

Max Deviation (Wide,NPSPAC,Narrow)

P25 High Deviation

Tuning point	Display	RX (MHz)	TX (MHz)
700MHz RX/TA Low	7RL	763.10000	763.00000
700MHz RX/TA High	7RH	775.90000	776.00000
700MHz TX Low	7TL	763.10000	793.00000
700MHz TX High	7TH	775.90000	805.99375
800MHz TX Low	8TL	851.10000	806.00000
800MHz TX High	8TH	869.90000	825.00000
800MHz RX/TA Low	8RL	851.10000	851.00000
800MHz RX/TA High	8RH	869.90000	870.00000

Receive Assist Voltage

Tuning point	Display	RX (MHz)	TX (MHz)
700MHz RX/TA Low	7RL	763.10000	763.00000
700MHz RX/TA High	7RH	775.90000	776.00000
800MHz RX/TA Low	8RL	851.10000	851.00000
800MHz RX/TA High	8RH	869.90000	870.00000

QT Fine Deviation (Wide/NPSPAC/Narrow)

DQT Fine Deviation (Wide/NPSPAC/Narrow)

DTMF Deviation (Wide/NPSPAC/Narrow)

Tuning point	Display	RX (MHz)	TX (MHz)
700MHz RX/TA High	7RH	775.90000	776.00000
700MHz TX High	7TH	775.90000	805.99375
800MHz TX High	8TH	869.90000	825.00000
800MHz RX/TA High	8RH	869.90000	870.00000

Squelch Open (Wide/NPSPAC/Narrow/P25)

Squelch Tight (Wide/NPSPAC/Narrow)

RSSI (Reference) (Wide/Narrow/P25)

RSSI (-120dBm) (Wide/Narrow/P25)

RSSI (-70dBm) (Wide/Narrow/P25)

Tuning point	Display	RX (MHz)	TX (MHz)
700MHz RX/TA Low	7RL	763.10000	763.00000
700MHz RX/TA Center	7RC	769.10000	769.00000
700MHz RX/TA High	7RH	775.90000	776.00000
800MHz RX/TA Low	8RL	851.10000	851.00000
800MHz RX/TA Center	8RC	859.90000	860.00000
800MHz RX/TA High	8RH	869.90000	870.00000

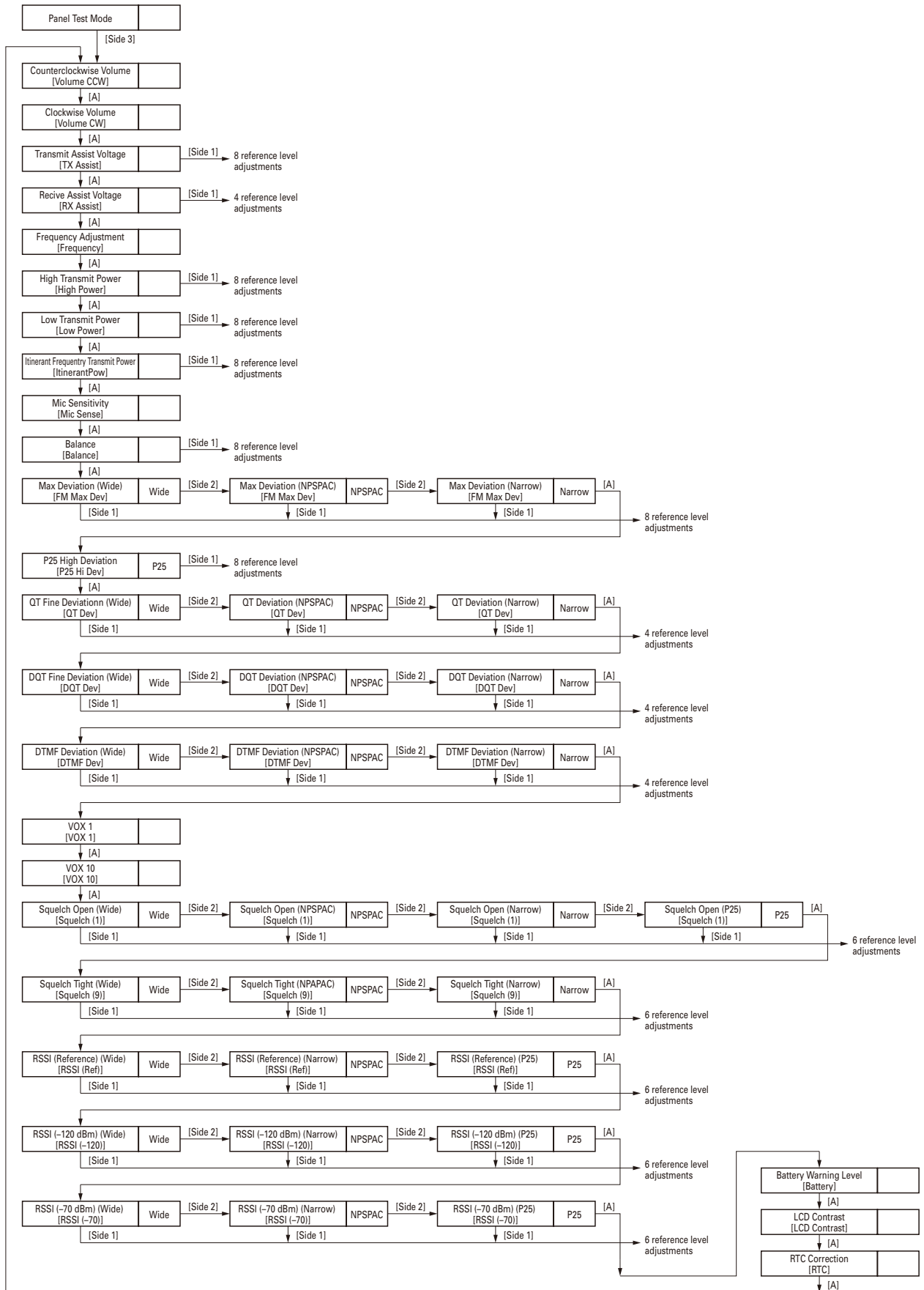
ADJUSTMENT

■ Adjustment item and Display (***: 1~256)

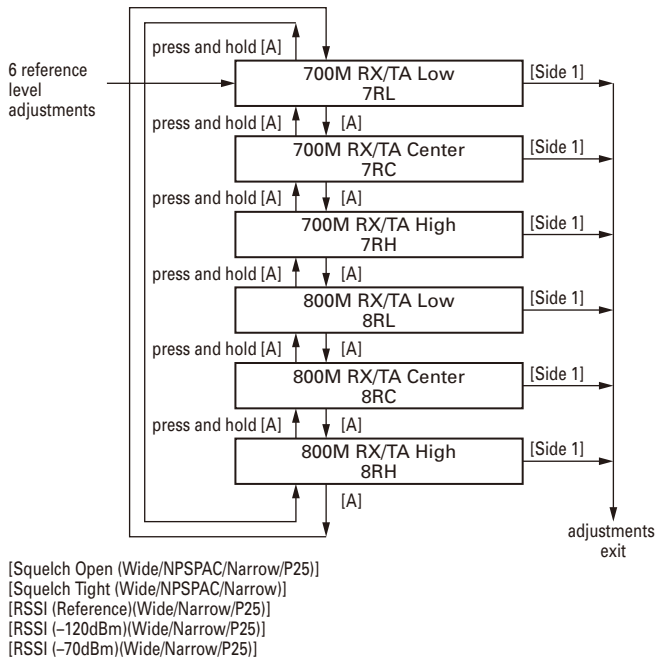
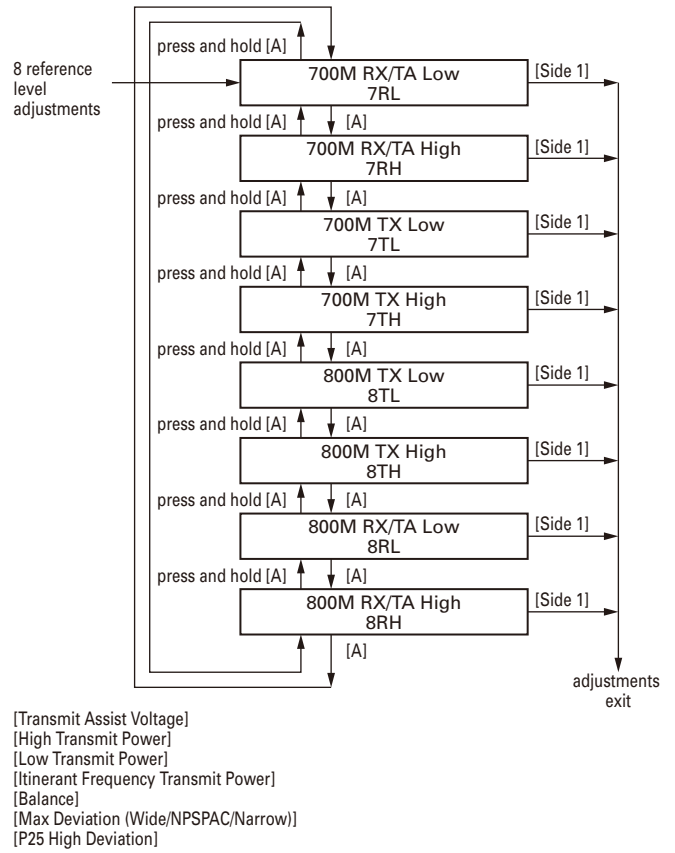
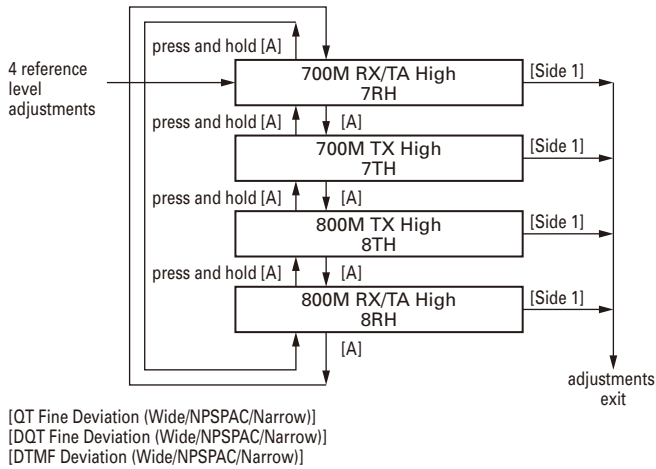
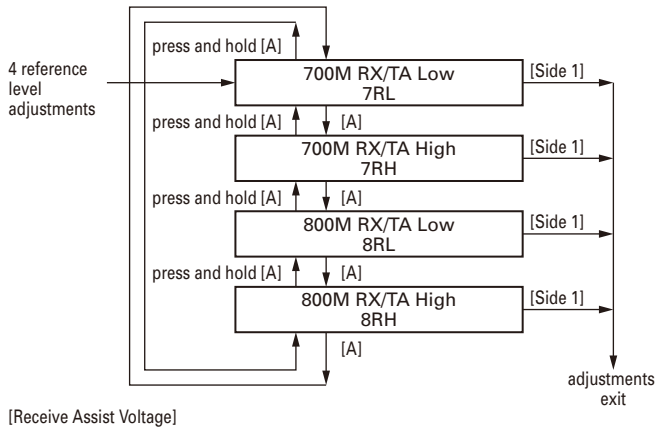
No.	Adjustment item	Display	Wide/NPSPAC/ Narrow/P25	Tuning Point	Note
1	Counterclockwise Volume	Volume CCW ***	-	1	
2	Clockwise Volume	Volume CW ***	-	1	
3	Transmit Assist Voltage	TX Assist ***	-	8	
4	Receive Assist Voltage	RX Assist ***	-	4	
5	Frequency Adjustment	Frequency ***	-	1	
6	High Transmit Power	High Power ***	-	8	
7	Low Transmit Power	Low Power ***	-	8	
8	Itinerant Frequency Transmit Power	ItinerantPow ***	-	8	
9	Mic Sensitivity	Mic Sense ***	-	1	
10	Balance	Balance ***	-	8	100Hz Square Wave
11	Max Deviation	FM Max Dev ***	Wide/NPSPAC/Narrow	W: 8/S: 8/N: 8	
12	P25 High Deviation	P25 High Dev ***	P25	8	Symbol Rate Pattern
13	QT Fine Deviation	QT Dev ***	Wide/NPSPAC/Narrow	W: 4/S: 4/N: 4	QT: 67Hz
14	DQT Fine Deviation	DQT Dev ***	Wide/NPSPAC/Narrow	W: 4/S: 4/N: 4	DQT: 0.23N
15	DTMF Deviation	DTMF Dev ***	Wide/NPSPAC/Narrow	W: 4/S: 4/N: 4	DTMF Code: 9
16	VOX 1	VOX1 ***	-	1	
17	VOX 10	VOX10 ***	-	1	
18	Squelch Open	Squelch (1) ***	Wide/NPSPAC/Narrow/P25	W: 6/S: 6/N: 6/A: 6	AF unmute
19	Squelch Tight	Squelch (9) ***	Wide/NPSPAC/Narrow	W: 6/S: 6/N: 6	AF unmute
20	RSSI (Reference)	RSSI (Ref) ***	Wide/Narrow/P25	W: 6/N: 6/A: 6	
21	RSSI (-120 dBm)	RSSI (-120) ***	Wide/Narrow/P25	W: 6/N: 6/A: 6	
22	RSSI (-70 dBm)	RSSI (-70) ***	Wide/Narrow/P25	W: 6/N: 6/A: 6	
23	Battery Warning Level	Battery ***	-	1	
24	LCD Contrast	LCD Contrast ***	-	1	
25	RTC Correction	RTC ***	-	1	

ADJUSTMENT

Flow Chart



ADJUSTMENT



ADJUSTMENT

BER (Bit Error Rate) Measurement

1. The Panel Test Mode is used to measure the BER (Refer to "Test mode operation features" described on page 38.).
2. Select "26" for test signaling (Refer to "Test Signaling" described on page 39.).
When "26" is selected for the test signaling, the Bandwidth is automatically selected to "P25".
(If there is no RF input signal, the display shows "500000".)
3. Select a filter (Refer to "Bandwidth" described on page 38.).
4. Select a test frequency (Refer to "Test Frequency" described on page 39.).



5. Measure the BER (Bit Error Rate) using the digital radio tester. Enter a standard input signal into the transceiver 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".)



C4FM (P25) Deviation Adjustment

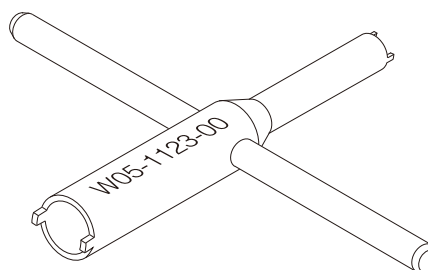
1. The transceiver adjusts the deviation between High Deviation $\pm 1800\text{Hz}$ for the C4FM (P25).
2. The Symbol Rate Pattern is used when adjusting the High Deviation for the C4FM (P25) (Refer to "Test Signaling" described on page 39.). This test signal has a peak deviation equal to $\pi/2$ 1800Hz = 2827Hz.

Service Jig

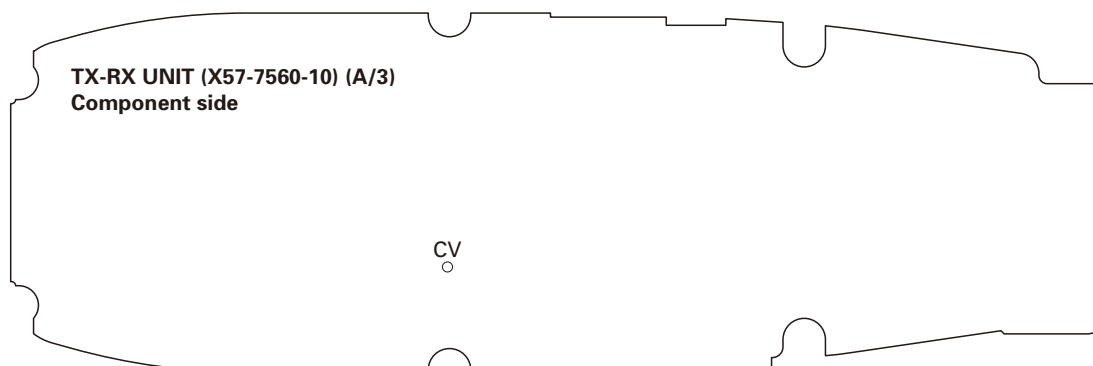
■ Nut wrench

In order to turn the volume nut and the channel selector nut, use a recommendation tool.

KENWOOD part No.: W05-1123-00



Adjustment Points



ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output	700 to 900MHz Frequency modulation and external modulation -127dBm/0.1μV to greater than -47dBm/1mV
2. Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω 700 to 900MHz or more Vicinity of 10W
3. Deviation Meter	Frequency Range	700 to 900MHz
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		5A
8. AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12. Tracking Generator	Center frequency Output Voltage	50kHz to 900MHz 100mV or more
13. 8Ω Dummy Load		Approx. 8Ω, 3W
14. Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped

■ The following parts are required for adjustment

1. Antenna connector adapter

The antenna connector of this transceiver 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:

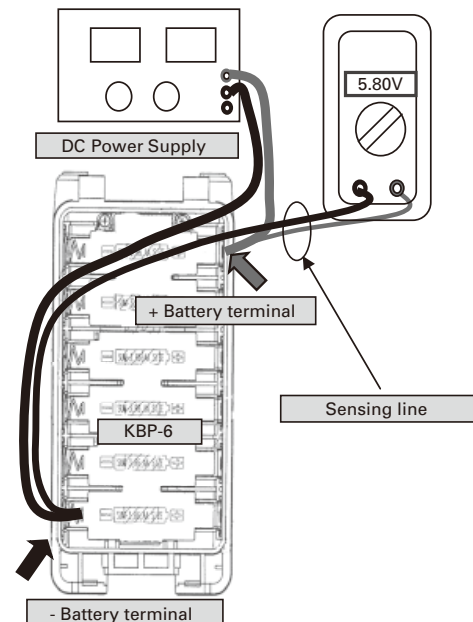
When the antenna connector adapter touches the knob, draw out the knob to mount the connector.

2. Battery Jig

The optional KBP-6 battery case can be used as a battery JIG using the following modification (please refer to the following diagram).

<Recommendation for TX inhibit voltage adjustment and its check method>

We recommend that you increase the DC power supply voltage to about 0.2V higher than the "TX inhibit voltage" before pressing the PTT switch. Then press the PTT switch and decrease the DC power supply voltage to the target level (such as 5.8V) for the adjustment check in TX mode.



Notice:

The battery voltage for TX inhibit should be measured at the "Battery terminal", such as the sensing line, not the DC power supply terminal. Generally, there is approximately a 0.1 to 0.3 V loss through the cable, causing a difference between the DC power supply and the Battery terminal.

ADJUSTMENT

3. Universal connector

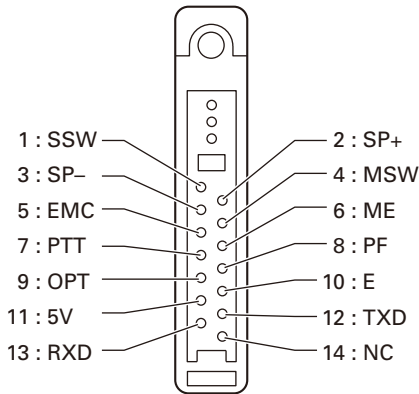
Use the interface cable (KPG-36/36A) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the transceiver and tighten the screw.

The lead wire with plug (E30-3287-28) and screw (N08-0535-08) terminals are as follows. Numbers are universal connector terminal numbers.

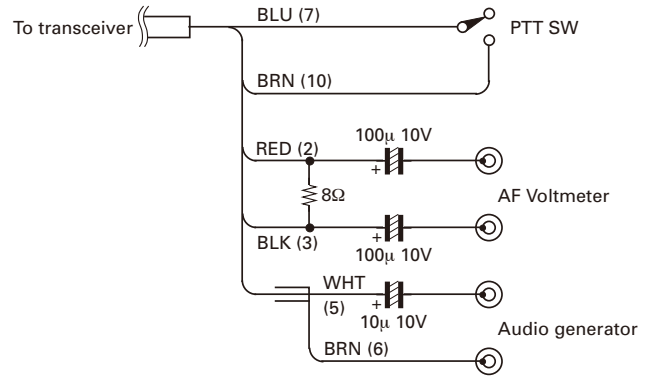
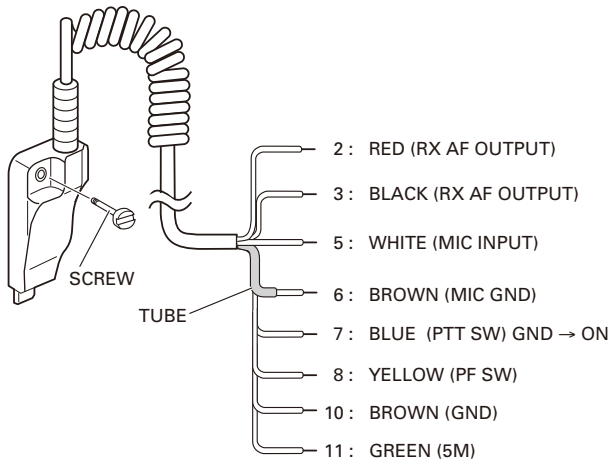
Caution

1. When connecting the plug to the universal connector of the transceiver, a short circuit may occur. To prevent this, be sure to turn the transceiver 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 connect an instrument between red or black and GND.

• Universal connector



• Panel tuning

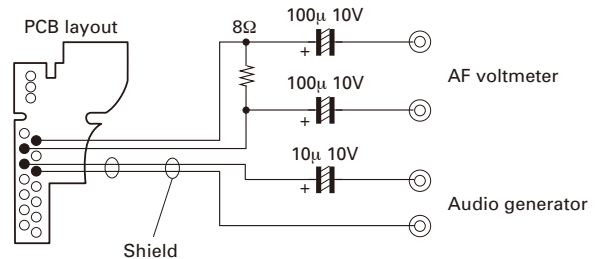
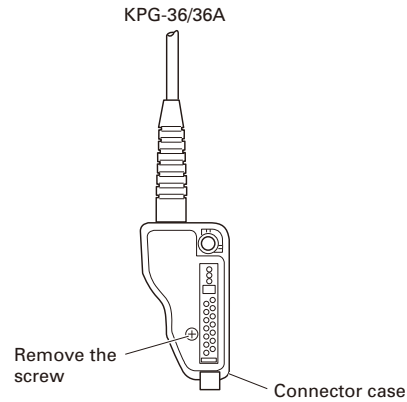


Note: Pin 1 (SSW) and Pin 4 (MSW) are connected to Pin 10 (GND) to active External SP and External MIC.

• PC tuning

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

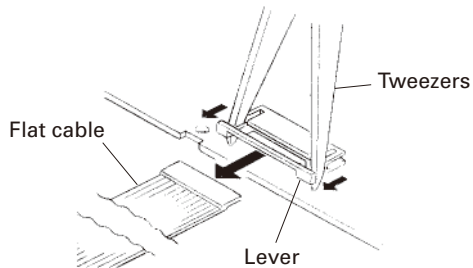
For output the wires out of the connector case, need to process the connector case.



ADJUSTMENT

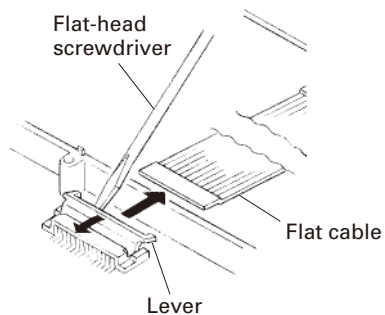
How to Remove the Flat Cable

1. Gently draw out both sides of the connector lever uniformly in the direction of the arrow with tweezers.
(CN1, CN35, CN38, CN505)

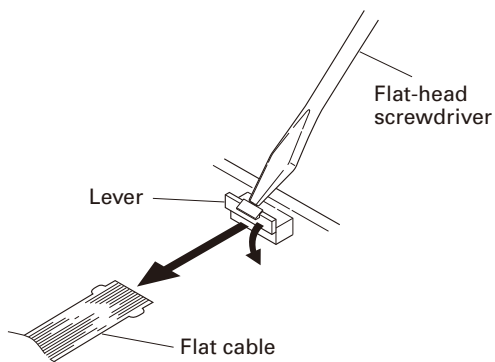


2. Gently rise up the connector lever in the direction of the arrow with a flat-head screwdriver or tweezers.
(CN34)

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



3. Gently depress the connector lever in the direction of the arrow with a flat-head screwdriver or tweezers.
(CN902, CN903)



ADJUSTMENT

Common Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) BATT terminal voltage: 7.5V 2) SSG standard modulation [Wide] MOD: 1kHz, DEV: 3kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz								
2. Counterclockwise Volume	1) Adj item: [Volume CCW] Adjust: [***]	1) Adj item: [Counterclockwise Volume]				Panel		<p>[Panel tuning mode] Turn the volume knob counterclockwise fully. Press [B] key to store the adjustment value.</p> <p>[PC test mode] Turn the volume knob counterclockwise fully. Press [Apply] button to store the adjustment value.</p>	This item is needed when the variable resistor (R31-0654-05) is replaced.
3. Clockwise Volume	1) Adj item: [Volume CW] Adjust: [***]	1) Adj item: [Clockwise Volume]						<p>[Panel tuning mode] Turn the volume knob clockwise fully. Press [B] key to store the adjustment value.</p> <p>[PC test mode] Turn the volume knob clockwise fully. Press [Apply] button to store the adjustment value.</p>	
4. Transmit Assist Voltage	1) Adj item: [TX Assist] Adjust: [***] 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	<p>[Manual Adjustment] 1) Adj item: [Transmit Assist Voltage] 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.</p>	Power meter DVM	Panel TX/RX (A/3)	ANT CV	Panel	<p>[Panel tuning mode] [C][D]</p> <p>[PC test mode] [◀][▶]</p> <p>[PC test mode] 1) Press [*Tune Assist Voltage (Auto)] button. 2) [Assist Voltage Result] window shows result of assist voltage after the automatic adjustment was finished. *This mode adjust [TX], [RX] Assist voltage at once. [Manual Adjustment] 1) Press [Meter] button. 2) The display on the [VCO Lock Voltage] indicator on the PC window shows VCO lock voltage. Change the adjustment value to get VCO lock voltage within the limit of the specified voltage.</p>	2.3V±0.06V (CV) [PC test mode] [Manual Adjustment] When adjusting the assist voltage in PC tuning mode, slide the bar to indicate "VCO Lock Voltage" within 2.5V±0.1V on Meter window. Remark: Because the assist voltage in the PC tuning mode divides the voltage through the buffer amplifier, it is different from the voltage of the CV terminal.	

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
Receive Assist Voltage	1) Adj item: [RX Assist] Adjust: [***] 2) Adj item: [7RL]→[7RH]→[8RL]→[8RH] Adjust: [***] Press [B] key to store the adjustment value.	[Manual Adjustment] 1) Adj item:[Receive Assist Voltage] 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→[RX/TA High] [Frequency: 800MHz Band] [RX/TA Low]→[RX/TA High]	Power meter DVM	Panel TX/RX (A/3)	ANT CV	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	[PC test mode] [Automatic Adjustment] 1) Press [*Tune Assist Voltage (Auto)] button. 2) [Assist Voltage Result] window shows result of assist voltage after the automatic adjustment was finished. *This mode adjust [TX], [RX] Assist voltage at once. [Manual Adjustment] 1) Press [Meter] button. 2) The display on the [VCO Lock Voltage] indicator on the PC window shows VCO lock voltage. Change the adjustment value to get VCO lock voltage within the limit of the specified voltage.	2.3V±0.06V (CV) [PC test mode] [Manual Adjustment] When adjusting the assist voltage in PC tuning mode, slide the bar to indicate "VCO Lock Voltage" within 2.5V±0.1V on Meter window. Remark: Because the assist voltage in the PC tuning mode divides the voltage through the buffer amplifier, it is different from the voltage of the CV terminal.
5. Frequency Adjustment *1	[Panel test mode] 1) CH-Sig: 1-1 [Panel tuning mode] 1) Adj item: [Frequency] Adjust: [***] PTT: ON Press [B] key to store the adjustment value after adjustment.	1) Adj item: [Frequency Adjustment] Press [OK] button to store the adjustment value.	f. counter	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	870.000210~870.000310MHz	Note: After replacing the TCXO (X100) align frequency.
6. LCD Contrast	1) Adj item: [LCD Contrast] Adjust: [***] Press [B] key to store the adjustment value.	1) Adj item: [LCD Contrast] Press [OK] button to store the adjustment value.				Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	Adjust the LCD contrast by looking.	This item is needed when the LCD (B38-0929-05) is replaced.

*1 The reference oscillator frequency may drift due to shock (jarring the radio) or operating conditions. We recommend that the Frequency adjustment be checked each time the radio is serviced, or at least once per year. Maintenance should only be performed normal temperatures.


ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
7. RTC Correction	1) Adj item: [RTC] Adjust: [***]	1) Adj item: [RTC Cor- rection]				Panel	[Orange]	<p>[Panel tuning mode] Press [Orange] key. After au- tomatic adjustment adjusted value is displayed on LCD. Press [B] key to store the adjustment value.</p> <p>[PC test mode] Press [Start] button of "Auto Tuning". Press [Apply] but- ton to store the adjustment value after the automatic adjustment was finished.</p>	

Transmitter Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. High Transmit Power adjust	1) Adj item: [Hi Power] Adjust: [***] 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjust- ment value.	1) Adj item: [High Transmit Power] 2) Adj item: [Frequen- cy: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Trans- mit] button. Press [OK] button to store the adjust- ment value.	Power meter Ammeter	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀][▶]	700MHz Band: 2.95W 800MHz Band: 3.0W	<p><700MHz Band> ±0.05W 2.0A or less</p> <p><800MHz Band> ±0.1W 2.0A or less</p>
2. Low Transmit Power adjust	1) Adj item: [Low Power] Adjust: [***] 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjust- ment value.	1) Adj item: [Low Transmit Power] 2) Adj item: [Frequen- cy: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Trans- mit] button. Press [OK] button to store the adjust- ment value.						0.95W	±0.05W 1.0A or less

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. Itinerant Frequency Transmit Power adjust	1) Adj item: [Itinerant Pow] Adjust: [***] 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Itinerant Frequency Transmit Power] 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Power meter Ammeter	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	0.95W	±0.05W 1.0A or less [PC test mode] As a simple adjustment method, set it the adjustment value obtained from the [Low Transmit Power adjust] adjustment of step 2).
4. Mic Sensitivity adjust	1) Adj item: [Mic Sens] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Mic Sensitivity] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	Write the value as followings. 48 (Reference value)	Mic sensitivity check: 15mV±3.5mV
5. Balance adjust *2	1) Adj item: [Balance] Adjust: [***] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Balance] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	Make the demodulation waves into square waves.	

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. Max Deviation adjust *2 [Wide]	1) Adj item: [W FM Max Dev] Adjust: [***] 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Max Deviation (Wide)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀][▶]	4.0kHz (According to the larger +, -)	4.2kHz or less Remark: As a simple adjustment method, set it the adjustment value obtained from the [Max Deviation adjust [Narrow]] adjustment of step 2).
[NPSPAC]	1) Adj item: [S FM Max Dev] Adjust: [***] 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Max Deviation (NPSPAC)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						3.2kHz (According to the larger +, -)	±50Hz Remark: As a simple adjustment method, set it the adjustment value obtained from the [Max Deviation adjust [Narrow]] adjustment of step 2).
[Narrow]	1) Adj item: [N FM Max Dev] Adjust: [***] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Max Deviation (Narrow)] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						2.0kHz (According to the larger +, -)	±50Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
7. P25 High Deviation adjust *2	1) Adj item: [A P25 High Dev] Adjust: [***] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [7RL]→ [7RH]→[7TL]→ [7TH]→[8TL]→ [8TH]→[8RL]→ [8RH] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [P25 High Deviation] 2) Adj item: [Frequency: 700MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] [Frequency: 800MHz Band] [RX/TA Low]→ [RX/TA High]→ [TA Low]→ [TA High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Power meter Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	2827Hz	2771~2883Hz Remark: As a simple adjustment method, set it the adjustment value obtained from the [Max Deviation adjust [Narrow]] adjustment of step 2).
8. QT Fine Deviation adjust *2 [Wide]	1) Adj item: [W QT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [QT Fine Deviation (Wide)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀ ▶]	Write the value as followings. 136 (Reference value)	0.75kHz±50Hz
[NPSPAC]	1) Adj item: [S QT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [QT Fine Deviation (NPSPAC)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.							0.60kHz±50Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
QT Fine Deviation adjust *2 [Narrow]	1) Adj item: [N QT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [QT Fine Deviation (Narrow)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀][▶]	Write the value as followings. 136 (Reference value)	0.375kHz±50Hz
9. DQT Fine Deviation adjust *2 [Wide]	1) Adj item: [W DQT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DQT Fine Deviation (Wide)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						Write the value as followings. 114 (Reference value)	0.75kHz±50Hz
[NPSPAC]	1) Adj item: [S DQT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DQT Fine Deviation (NPSPAC)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						Write the value as followings. 126 (Reference value)	0.60kHz±50Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
DQT Fine Deviation adjust *2 [Narrow]	1) Adj item: [N DQT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DQT Fine Deviation (Narrow)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀][▶]	Write the value as followings. 116 (Reference value)	0.375kHz±50Hz
10. DTMF Deviation adjust *2 [Wide]	1) Adj item: [W DTMF Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DTMF Fine Deviation (Wide)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						Write the value as followings. 173 (Reference value)	3.0kHz±100Hz
[NPS PAC]	1) Adj item: [S DTMF Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DTMF Fine Deviation (NPS PAC)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.							2.4kHz±100Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
DTMF Deviation adjust *2 [Narrow]	1) Adj item: [N DTMF Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DTMF Fine Deviation (Narrow)] 2) Adj item: [Frequency: 700MHz Band] [RX/TA High]→ [TX High] [Frequency: 800MHz Band] [RX/TA High]→ [TX High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C][D] [PC test mode] [◀][▶]	Write the value as followings. 173 (Reference value)	1.5kHz±100Hz
11. VOX 1 adjust	1) Adj item: [VOX1] Adjust: [***] AG: 1kHz/45mV at MIC terminal	1) Adj item: [VOX1] AG: 1kHz/45mV at MIC terminal	AG	Panel	Universal connector	Panel	[Panel tuning mode] After apply signal from AG, press [B] key to store the adjustment value. [PC test mode] After apply signal from AG, press [Apply] button to store the adjustment value.		
12. VOX 10 adjust	1) Adj item: [VOX10] Adjust: [***] AG: 1kHz/3mV at MIC terminal	1) Adj item: [VOX10] AG: 1kHz/3mV at MIC terminal	AG	Panel	Universal connector	Panel	[Panel tuning mode] After apply signal from AG, press [B] key to store the adjustment value. [PC test mode] After apply signal from AG, press [Apply] button to store the adjustment value.		

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
13. Battery Warning Level writing	1) Adj item: [Battery] Adjust: [***] PTT: ON	1) Adj item: [Battery Warning Level] PTT: Press [Transmit] button.	Power meter DVM	Panel	ANT BATT terminal	Panel		<p>[Panel tuning mode] After pressing the PTT switch, confirm that one predetermined numeric in the range 1 to 256 appears and then press [B] key That numeric will be stored in memory.</p> <p>[PC test mode] After pressing the PTT switch, confirm that one predetermined numeric in the range 1 to 256 appears and then press [Apply] key That numeric will be stored in memory.</p>	BATT terminal voltage: 5.8V
14. Battery Warning Level check	<p>[Panel test mode]</p> 1) CH-Sig: 1-1 BATT terminal voltage: 6.0V PTT: ON	1) Test Channel: Channel 1 Test Signaling Mode: Analog Signaling: 1 BATT terminal voltage: 6.0V PTT: Press [Transmit] button.							The transceiver can transmit without causing the LED to blink.

ADJUSTMENT

*2 Necessary adjustment and order for each signaling is shown as below.

Mode	Signaling	Necessary adjustment and order	
		Wide	Narrow
Analog	Audio	1. Balance adjust 2. Max Deviation adjust [Wide]	1. Balance adjust 2. Max Deviation adjust [Narrow]
	QT	1. Balance adjust 2. Max Deviation adjust [Wide] 3. QT Fine Deviation adjust [Wide]	1. Balance adjust 2. Max Deviation adjust [Narrow] 3. QT Fine Deviation adjust [Narrow]
	DQT	1. Balance adjust 2. Max Deviation adjust [Wide] 3. DQT Fine Deviation adjust [Wide]	1. Balance adjust 2. Max Deviation adjust [Narrow] 3. DQT Fine Deviation adjust [Narrow]
	DTMF	1. Balance adjust 2. Max Deviation adjust [Wide] 3. DTMF Deviation adjust [Wide]	1. Balance adjust 2. Max Deviation adjust [Narrow] 3. DTMF Deviation adjust [Narrow]
P25		–	1. Balance adjust 2. P25 High Deviation adjust

Receiver Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. AF level setting	[Panel test mode] 1) CH-Sig: 1-1 SSG output: –47dBm (1mV) (MOD: 1kHz±1.5kHz)	1) Test Ch: Channel 1 Test Signaling Mode: Analog Signaling: 1 SSG output: –47dBm (1mV) (MOD: 1kHz±1.5kHz)	SSG DVM AF VTVM Dummy load	Panel	ANT Universal connector	Panel	Volume knob	Turn the Volume knob to obtain 0.63V AF output.	0.63V±0.1V
2. Sensitivity check	1) CH-Sig: 2-1 SSG output Wide: –118dBm (0.28μV) (MOD: 1kHz±3kHz) Narrow: –118dBm (0.28μV) (MOD: 1kHz±1.5kHz) 2) CH-Sig: 8-1 Other conditions are same as 1.	1) Test Channel: Channel 2 Test Signaling Mode: Analog Signaling: 1 SSG output Wide: –118dBm (0.28μV) (MOD: 1kHz±3kHz) Narrow: –118dBm (0.28μV) (MOD: 1kHz±1.5kHz) 2) Test Channel: Channel 8 Other conditions are same as 1.	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector			Check	12dB SINAD or more

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. RSSI reference adjust [Wide]	1) Adj item: [W RSSI (Ref)] Adjust: [***] 2) Adj item: [7RL]→[7RC]→[7RH]→[8RL]→[8RC]→[8RH] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI Reference (Wide)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	1) Adj item: [N RSSI (Ref)] Adjust: [***] 2) Adj item: [7RL]→[7RC]→[7RH]→[8RL]→[8RC]→[8RH] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI Reference (Narrow)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High]→[Frequency: 800 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±1.5kHz)							
[P25]	1) Adj item: [A RSSI (Ref)] Adjust: [***] 2) Adj item: [7RL]→[7RC]→[7RH]→[8RL]→[8RC]→[8RH] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI Reference (P25)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High]							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. Open Squelch adjust (Squelch level 1 adjust) [Wide]	1) Adj item: [W Squelch (1)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±3kHz)	1) Adj item: [Squelch Open (Wide)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[NPSPAC]	1) Adj item: [S Squelch (1)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±2.4kHz)	1) Adj item: [Squelch Open (NPSPAC)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±2.4kHz)							
[Narrow]	1) Adj item: [N Squelch (1)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level -4dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Squelch Open (Narrow)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level -4dB (MOD: 1kHz/±1.5kHz)							
[P25]	1) Adj item: [A Squelch (1)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level of [Wide] (MOD: 1kHz/±3kHz)	1) Adj item: [Squelch Open (P25)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level of [Wide] (MOD: 1kHz/±3kHz)							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. Tight Squelch adjust (Squelch level 9 adjust) [Wide]	1) Adj item: [W Squelch (9)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±3kHz)	1) Adj item: [Squelch Tight (Wide)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[NPSPAC]	1) Adj item: [S Squelch (9)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±2.4kHz)	1) Adj item: [Squelch Tight (NPSPAC)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±2.4kHz)							
[Narrow]	1) Adj item: [N Squelch (9)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Squelch Tight (Narrow)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±1.5kHz)							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. RSSI at -120dBm adjust [Wide]	1) Adj item: [W RSSI (-120)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: -120dBm (0.22μV) (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI (-120dBm) (Wide)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: -120dBm (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	1) Adj item: [N RSSI (-120)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: -120dBm (0.22μV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI (-120dBm) (Narrow)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] SSG output: -120dBm (MOD: 1kHz/±1.5kHz)							
[P25]	1) Adj item: [A RSSI (-120)] Adjust: [***] 2) Adj item: [7RL]→ [7RC]→[7RH]→ [8RL]→[8RC]→ [8RH] SSG output: -120dBm (0.22μV) (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI (-120dBm) (P25)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→ [RX/TA Center]→ [RX/TA High]							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
7. RSSI at -70dBm adjust [Wide]	1) Adj item: [W RSSI (-70)] Adjust: [***] 2) Adj item: [7RL]→[7RC]→[7RH]→[8RL]→[8RC]→[8RH] SSG output: -70dBm (70.7μV) (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI (-70dBm) (Wide)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] SSG output: -70dBm (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	1) Adj item: [N RSSI (-70)] Adjust: [***] 2) Adj item: [7RL]→[7RC]→[7RH]→[8RL]→[8RC]→[8RH] SSG output: -70dBm (70.7μV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI (-70dBm) (Narrow)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] SSG output: -70dBm (MOD: 1kHz/±1.5kHz)							
[P25]	1) Adj item: [A RSSI (-70)] Adjust: [***] 2) Adj item: [7RL]→[7RC]→[7RH]→[8RL]→[8RC]→[8RH] SSG output: -70dBm (70.7μV) (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI (-70dBm) (P25)] 2) Adj item: [Frequency: 700 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High] [Frequency: 800 MHz Band] [RX/TA Low]→[RX/TA Center]→[RX/TA High]							

TERMINAL FUNCTION

Control unit (X53-4390-XX)

Pin No	Name	I/O	Function
CN1			
1	NC	-	No connection
2	LCDCNT	O	LCD reset output
3	V4	-	Step up capacitor connecting terminal
4	V3	-	Step up capacitor connecting terminal
5	V2	-	Step up capacitor connecting terminal
6	V1	-	Step up capacitor connecting terminal
7	NC	-	No connection
8	NC	-	No connection
9	NC	-	No connection
10	NC	-	No connection
11	NC	-	No connection
12	NC	-	No connection
13	GND	-	GND
14	GND	-	GND
15	NC	-	No connection
16	33M	O	3.3V LCD power supply output
17	33M	O	3.3V LCD power supply output
18	D7	I/O	Data bus 7
19	D6	I/O	Data bus 6
20	D5	I/O	Data bus 5
21	D4	I/O	Data bus 4
22	D3	I/O	Data bus 3
23	D2	I/O	Data bus 2
24	D1	I/O	Data bus 1
25	D0	I/O	Data bus 0
26	33M	O	3.3V LCD power supply output
27	/WR	I/O	WR bus
28	A0	O	Address bus 0 output
29	/LCDRST	O	LCD reset output
30	/WR	I/O	WR bus
CN34			
1	INT SP+	O	BTL output + for internal spaker
2	INT SP+	O	BTL output + for internal spaker
3	INT SP-	O	BTL output - for internal spaker
4	INT SP-	O	BTL output - for internal spaker
5	INT MIC+	I	Internal MIC input
6	INT MIC-	-	Internal MIC GND

Pin No	Name	I/O	Function
CN35			
1	NC	-	No connection
2	L_MIC	I	Noise canceler MIC
3	MICE	-	MIC GND
4	GND	-	GND
5	CH_A	I	Rotary switch input 1
6	CH_B	I	Rotary switch input 2
7	CH_C	I	Rotary switch input 3
8	CH_D	I	Rotary switch input 4
9	31BU	-	3.1V
10	S31BUS	-	3.1V
11	33M	-	3.3V
12	TGL0	I	Lever switch input 0
13	TGL1	I	Concentric switch input 1
14	TGL2	I	Concentric switch input 2
15	BLED	-	Busy LED control
16	TXLED	-	TX LED control
17	ORG	O	Key scan signal output
18	VoL	I	Volume level input
19	GND	-	GND
20	GND	-	GND
CN38			
1	PF2	O	Key output (Side2 key)
2	PF3	O	Key output (Side3 key)
3	KoPF	I	Key input
4	L_PTTG	I	PTT GND
5	L_PTT	I	PTT input
6	PF1	O	Key output (Side1 key)
CN40			
1	GND	-	GND
2	GND	-	GND
3	I2CSDA	I/O	I3C bus data
4	I2CCK	O	I2C bus clock
5	GND	-	GND
6	GND	-	GND
7	RXAF	O	AF from ASIC
8	AF	I	AF after passing through the DAC (IC502)
9	MICE	-	MIC GND
10	MIC	I	MIC signal input
11	33C	-	3.3V
12	MICmain	O	INT MIC signal output
13	AFC	O	AFC signal
14	GND	-	GND
15	MOD	O	Modulation signal from ASIC

TERMINAL FUNCTION

Pin No	Name	I/O	Function
16	AUD_VREFC	O	VREF for AF signal
17	GND	-	GND
18	GND	-	GND
19	CGND	-	GND
20	ASSIST	O	VCO tuning voltage control output
21	RSSI	I	RSSI voltage input
22	GND	-	GND
23	/SCSW	O	RSSI voltage input
24	THP	I	Temperature data input
25	MM	O	MIC mute switch
26	ASQDET	I	Analog Squelch signal input
27	VOX	I	MIC input level
28	TONESW	I	TONE switch
29	BEEP	O	BEEP output
30	W_N	O	Wide/Narrow switch
31	VADAC	O	Voice announce
32	TONE	O	Tone signal output
33	STSW	O	Sidetone output switch
34	AMT	I	SP mute control
35	LCDCNT	I	LCD Contrast Control Voltage
36	VCOSW	O	VCO switch
37	APCSW	I	APC switch control input
38	VCOSW2	-	No connection
39	/EVCS	O	DAC CE
40	CV	I	CV voltage input
41	PCS_RF	O	PLL enable output
42	PLD	I	1st PLL lock detect input
43	PCS_Pot	-	No connection
44	DACRST	O	DAC reset
45	SCK0	O	DAC serial clock
46	SDO0	O	DAC data
47	HD7	-	for production
48	BFSR2	-	for production
49	BER_EN	-	for production
50	INT3	-	for production
51	HD5	-	for production
52	PSRPLL	-	for production
53	BDR2	-	for production
54	BCLKR2	-	for production
55	BDX2	-	for production
56	BCLKX2	-	for production
57	GND	-	GND
58	BFSX2	-	for production
59	IFDET	I	IF input
60	GND	-	GND

Pin No	Name	I/O	Function
61	GND	-	GND
62	GND	-	GND
63	5TC	O	50T output switch
64	5RC	O	50R output switch
65	5UC	I	5U Reg. control input
66	/SAVE	O	50C Reg. control output
67	S_DET	I	Battery select input
68	SBC	O	SB SW control output
69	BATT	I	Battery level
70	DSR	I/O	DSR signal
71	5M	-	5.0V
72	33A	-	3.3V
73	+B	-	Power input after passing through the fuse
74	33A	-	3.3V
75	+B	-	Power input after passing through the fuse
76	33M	-	3.3V
77	+B	-	Power input after passing through the fuse
78	33M	-	3.3V
79	+B	-	Power input after passing through the fuse
80	15M	-	1.5V
81	SCTAMI		for production
82	15M	-	1.5V
83	SPuniv-	I	BTL output - for external speaker
84	SPuniv+	I	BTL output + for external speaker
85	SPuniv+	I	BTL output + for external speaker
86	SPuniv-	I	BTL output - for external speaker
87	/UDET	O	Universal connector detect input
88	RTS0	O	RTS signal input
89	PFKEY	I	PF key interrupt signal for KMC-25
90	RXD0	I	Serial data input
91	RXD1	I	Request to send
92	TXD0	O	Serial data output
93	/PTT	I	PTT signal output
94	CTS0	I	CTS signal input and MIC switch
95	RXD2	I	Serial data input (VGS-1)
96	36MC	O	36M Reg. control output
97	/OINT	O	Option board interrupt signal
98	TXD2	O	Serial data output (VGS-1)
99	GND	-	GND
100	GND	-	GND

TERMINAL FUNCTION

TX-RX unit (X57-7560-10 A/3)

Pin No	Name	I/O	Function
CN501			
1	OPT1	I	Busy (VGS-1)
2	OPT3	I	Play (VGS-1)
3	26P_RD	I	Serial data input (VGS-1)
4	26P_TD	O	Serial data output (VGS-1)
5	NC	-	No connection
6	OPT4	O	Enable (VGS-1)
7	OPT10	-	GND (VGS-1)
8	OPT5	O	Reset output (VGS-1)
9	DGND	-	DGND
10	AGND	-	GND
11	AI	I	VGS Audio input (VGS-1)
12	AO	O	VGS Audio output (VGS-1)
13	AGND	-	GND
14	5V	-	5V
15	OPT9	-	No connection
16	DTI	-	No connection
17	OPT8	-	No connection
18	OPT11	-	No connection
19	OPT7	-	No connection
20	OPT2	-	No connection
21	TXO	-	No connection
22	RXEO	-	No connection
23	RXEI	-	No connection
24	TXI	-	No connection
25	OPT6	-	No connection
26	POW	O	Switched B output

Pin No	Name	I/O	Function
CN502 (for production)			
1~20	-	-	-
CN505			
1	DSR	I	Data set ready
2	E	-	GND
3	RXD	I	Serial data input
4	TXD	O	Serial data output
5	5M	-	5V
6	RTS1	O	Request to send
7	REM	I	Programmable function key input
8	PTT	I	External PTT input
9	MICE	-	External MIC GND
10	EMC	I	External MIC input
11	MSW/CTS	I	EXT/INT MIC switch input
12	SP-	O	BTL output - for external speaker
13	SP+	O	BTL output + for external speaker
14	SSW	I	EXT/INT speaker switch input

TERMINAL FUNCTION

Pin No	Name	I/O	Function
CN707			
1	GND	-	GND
2	GND	-	GND
3	I2CCK	I	I2C bus clock
4	I2CSDA	I/O	I3C bus data
5	GND	-	GND
6	GND	-	GND
7	AF	O	AF after passing through the DAC (IC502)
8	RXAF	I	AF from ASIC
9	MIC	O	MIC signal output
10	MICE	-	MIC GND
11	MICmain	I	INT MIC signal input
12	33C	-	3.3V
13	GND	-	GND
14	AFC	I	AFC signal
15	AUD_VREFC	I	VREF for AF signal
16	MOD	I	Modulation signal from ASIC
17	GND	-	GND
18	GND	-	GND
19	ASSIST	I	VCO tuning voltage control input
20	CGND	-	GND
21	GND	-	GND
22	RSSI	O	RSSI voltage output
23	THP	O	Temperature data output
24	/SCSW	I	Scrambler switch
25	ASQDET	O	Analog Squelch signal output
26	MM	I	MIC mute switch
27	TONESW	O	TONE switch
28	VOX	O	MIC input level
29	W_N	I	Wide/Narrow switch
30	BEEP	I	BEEP input
31	TONE	I	Tone signal input
32	VADAC	I	Voice announce
33	AMT	O	SP mute control
34	STSW	I	Sidetone input switch
35	VCOSW	I	VCO switch
36	LDCNT	-	LCD Contrast Control Voltage
37	NC	-	No connection
38	APCSW	O	APC switch control output
39	CV	O	CV voltage output
40	/EVCS	I	DAC CE
41	PLD	O	1st PLL lock detect output
42	PCS_RF	I	PLL enable input
43	DACRST	I	DAC reset

Pin No	Name	I/O	Function
44	NC	-	No connection
45	SDO0	I	DAC data
46	SCK0	I	DAC serial clock
47	BFSR2	O	for production
48	HD7	O	for production
49	INT3	I	for production
50	BER_EN	O	for production
51	PSRPLL	O	for production
52	HD5	O	for production
53	BCLKR2	O	for production
54	BDR2	O	for production
55	BCLKX2		for production
56	BDX2		for production
57	BFSX2		for production
58	GND	-	GND
59	GND	-	GND
60	IFDET	O	IF output
61	GND	-	GND
62	GND	-	GND
63	5RC	I	50R output switch
64	5TC	I	50T output switch
65	/SAVE	I	50C Reg. control input
66	5UC	O	5U Reg. control input
67	SBC	I	SB SW control input
68	S_DET	O	Battery select output
69	DSR	I/O	DSR signal
70	BATT	O	Battery level
71	33A	-	3.3V
72	5M	-	5.0V
73	33A	-	3.3V
74	+B	-	Power input after passing through the fuse
75	33M	-	3.3V
76	+B	-	Power input after passing through the fuse
77	33M	-	3.3V
78	+B	-	Power input after passing through the fuse
79	15M	-	1.5V
80	+B	-	Power input after passing through the fuse
81	15M	-	1.5V
82	SCTAMI		for production
83	SPuniv+	O	BTL output + for external speaker
84	SPuniv-	O	BTL output - for external speaker
85	SPuniv-	O	BTL output - for external speaker

TERMINAL FUNCTION

Pin No	Name	I/O	Function
86	SPuniv+	O	BTL output + for external speaker
87	RTS0	I	RTS signal input
88	/UDET	I	universal connector detect input
89	RXD0	O	Serial Data Output
90	PFKEY	O	PF key interrupt signal for KMC-25
91	TXD0	I	Serial Data input
92	RXD1	O	Request to send
93	CTS0	O	CTS signal input and MIC switch
94	/PTT	O	PTT signal output
95	36MC	I	36M Reg. control input
96	RXD2	O	Serial data input (VGS-1)
97	TXD2	I	Serial data output (VGS-1)
98	/OINT	I	Option board interrupt signal
99	GND	-	GND
100	GND	-	GND

Top panel unit (X57-7560-10 B/3)

Pin No	Name	I/O	Function
CN902			
1	36M	-	3.1V
2	S36M	-	3.1V
3	GND	-	GND
4	VoL	I	Volume level input
5	33M	-	3.3V
6	CH_A	I	Rotary switch input 1
7	TGL2	I	Concentric switch input 2
8	TGL1	I	Concentric switch input 1
9	C	-	GND
10	CH_B	I	Rotary switch input 2
11	CH_D	I	Rotary switch input 4
12	CH_C	I	Rotary switch input 3
CN903			
1	GND	-	GND
2	CH_A	O	Rotary switch output 1
3	CH_B	O	Rotary switch output 2
4	CH_C	O	Rotary switch output 3
5	CH_D	O	Rotary switch output 4
6	36M	-	3.1V
7	S36M	-	3.1V
8	33M	-	3.3V
9	TGL0	O	Lever switch output 0
10	TGL1	O	Concentric switch output 1
11	TGL2	O	Concentric switch output 2
12	BLED	-	Busy LED control
13	TXLED	-	TX LED control
14	ORG	I	Key scan signal input
15	VoL	O	Volume level output
16	KIN	I	Key scan signal input
22	GND	-	GND

TERMINAL FUNCTION

Option board unit (X57-7560-10 C/3)

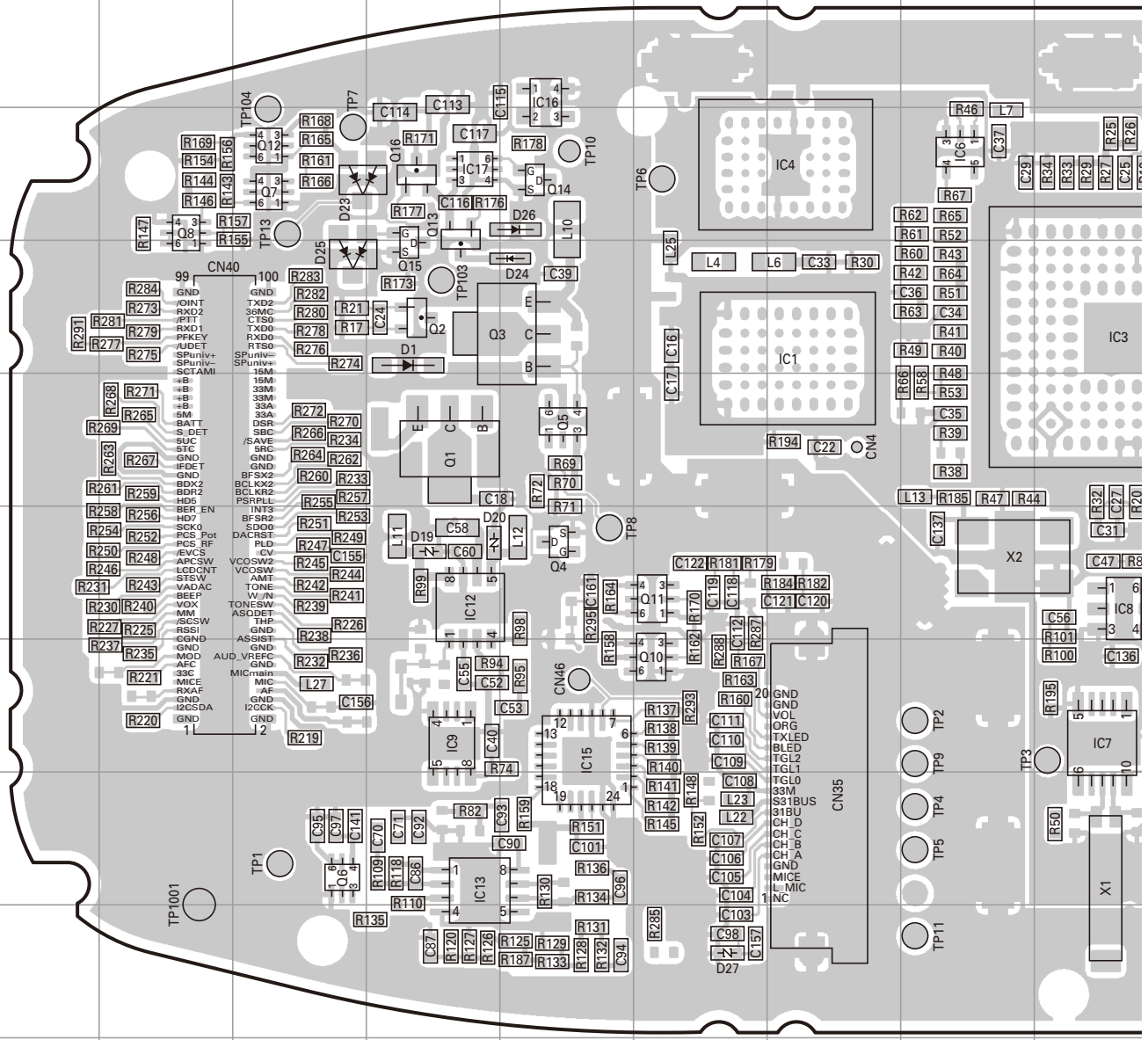
Pin No	Name	I/O	Function
CN923			
1	OPT1	O	Busy (VGS-1)
2	OPT3	O	Play (VGS-1)
3	RXD1	O	Serial data output (VGS-1)
4	TXD1	I	Serial data input (VGS-1)
5	NC	-	No connection
6	OPT4	I	Enable (VGS-1)
7	NC	-	No connection
8	OPT5	I	Reset input (VGS-1)
9	DGND	-	DGND
10	AGND1	-	GND
11	NC	-	No connection
12	NC	-	No connection
13	AGND2	-	GND
14	5A	-	5V
15	STON	-	No connection
16	DI	-	No connection
17	TCONT	-	No connection
18	MANDOWN	-	No connection
19	INH	-	No connection
20	OPT2	-	No connection
21	TXO	-	No connection
22	RXEO	-	No connection
23	RXEI	-	No connection
24	TXI	-	No connection
25	C3	-	No connection
26	SB	I	Switched B input

Universal Connector

Pin No	Name	I/O	Function
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	I	EXT/INT MIC switch input
5	EMC	I	External MIC input
6	ME	-	External MIC GND
7	PTT	I	External PTT input
8	PF	I	Programmable function key input
9	OPT	I/O	Aux I/O port (for EXT option)
10	E	-	GND
11	5M	O	5V
12	TXD	O	Serial data output
13	RXD	I	Serial data input
14	NC	-	Not used

TK-5410 PC BOARD

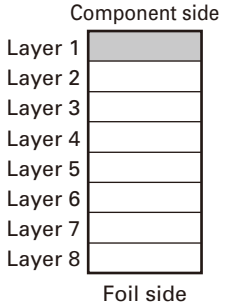
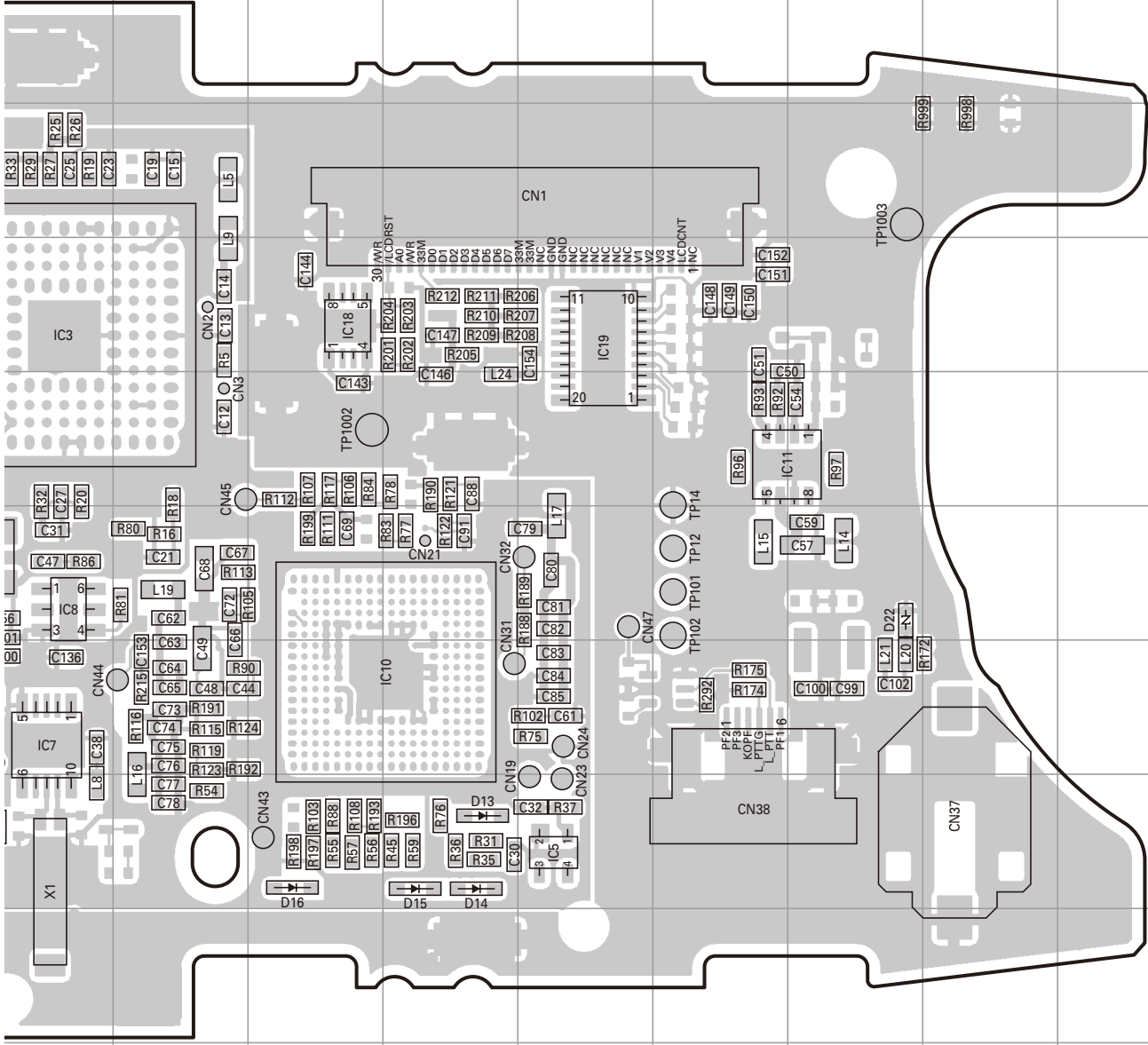
CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Component side view (J79-0230-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	5H	IC12	7E	Q4	7F	Q15	5E	D23	4D
IC3	5J	IC13	9E	Q5	6F	Q16	4E	D24	5F
IC4	4H	IC15	8F	Q6	9D	D1	5E	D25	5D
IC5	9N	IC16	3F	Q7	4D	D13	9M	D26	4F
IC6	4I	IC17	4E	Q8	4C	D14	9M	D27	10G
IC7	8J	IC18	5L	Q10	8G	D15	9M		
IC8	7J	IC19	5N	Q11	7G	D16	9L		
IC9	8E	Q1	6E	Q12	4D	D19	7E		
IC10	8M	Q2	5E	Q13	4E	D20	7E		
IC11	6O	Q3	5F	Q14	4F	D22	7P		

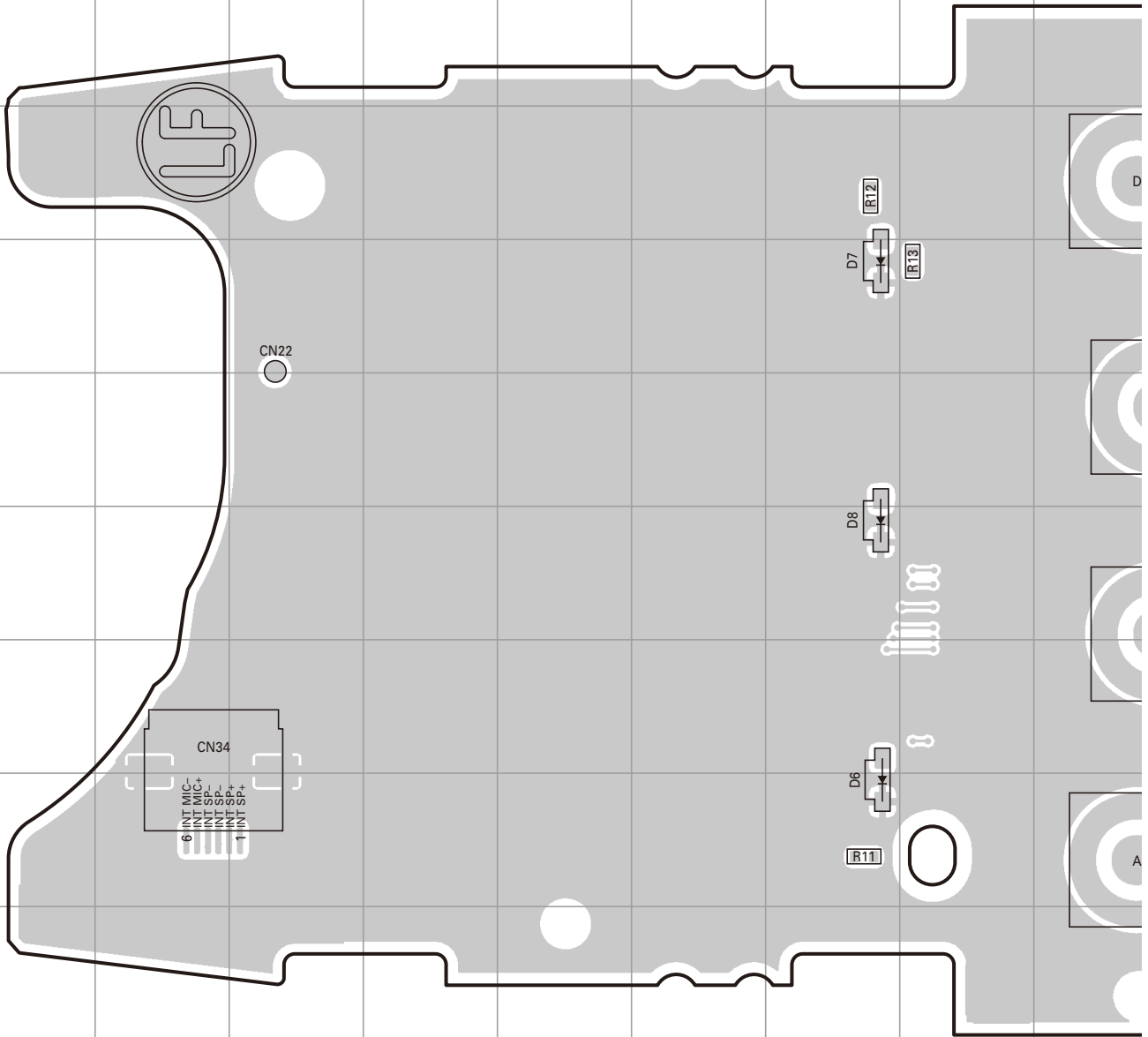
PC BOARD TK-5410

CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Component side view (J79-0230-09)



TK-5410 PC BOARD

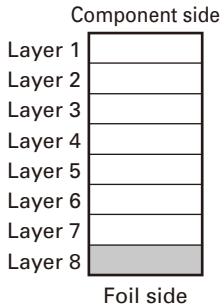
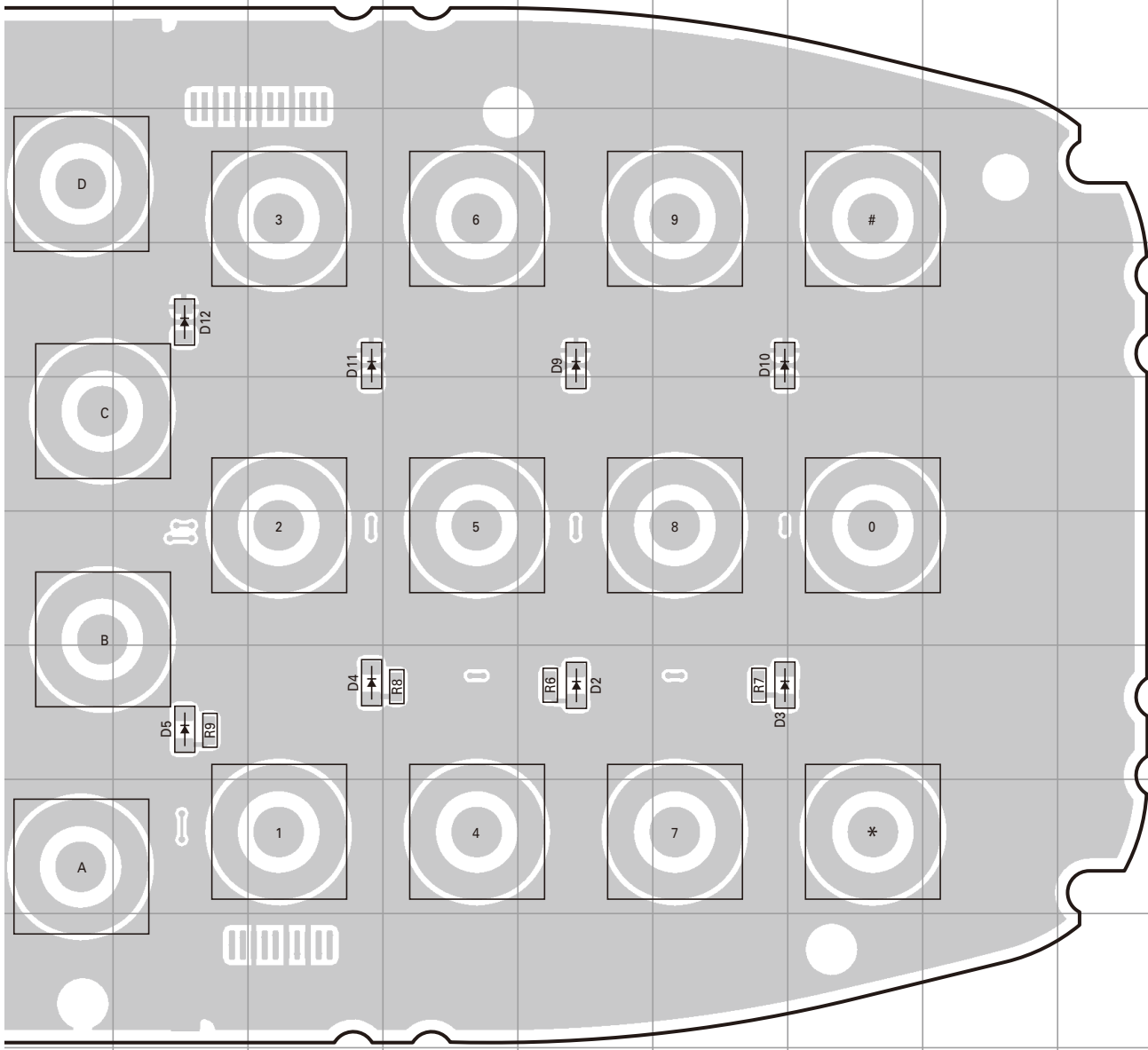
CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Foil side view (J79-0230-09)



Ref. No.	Address	Ref. No.	Address
D2	8N	D8	7H
D3	8O	D9	5N
D4	8L	D10	5O
D5	8K	D11	5L
D6	9H	D12	5K
D7	5H		

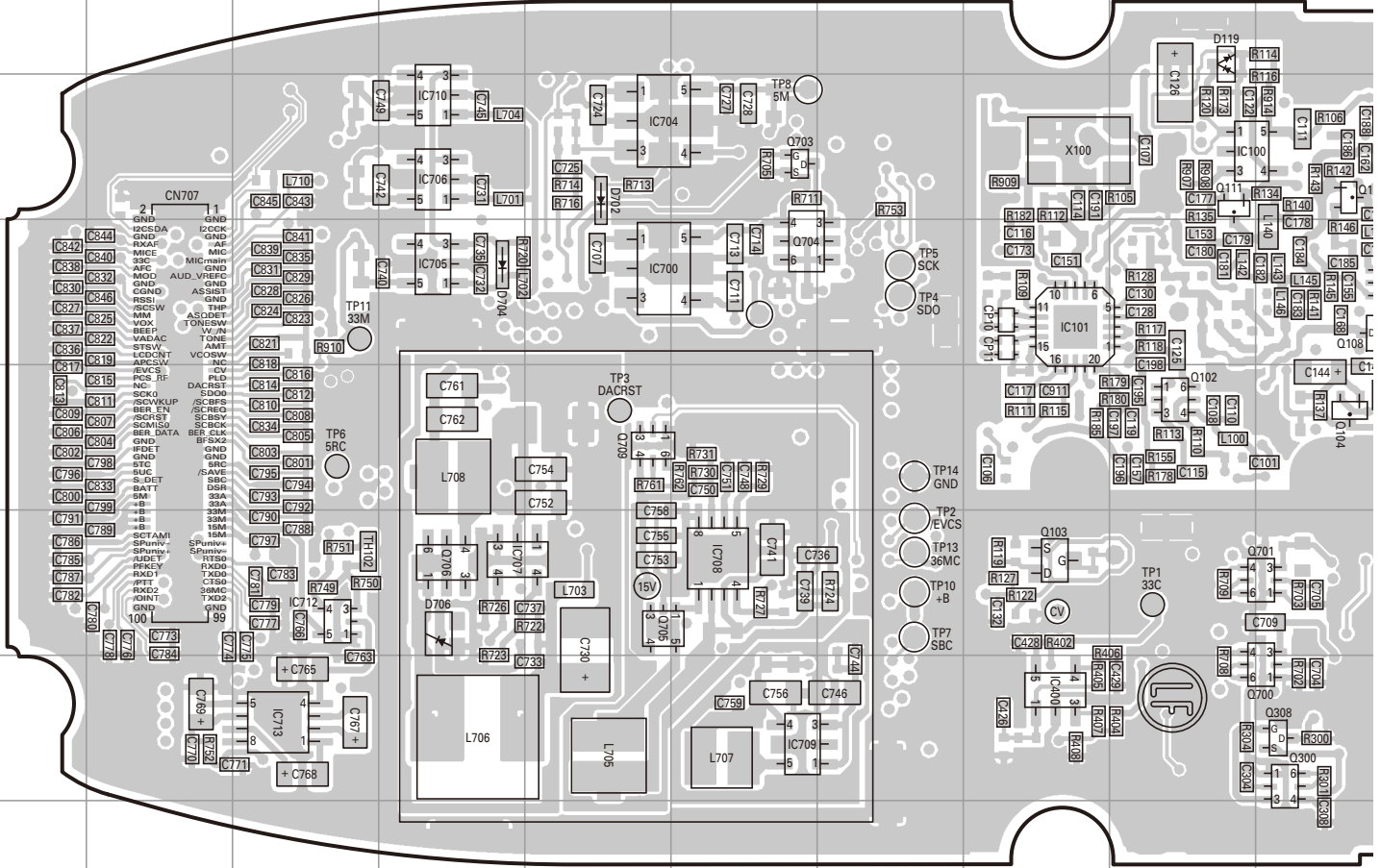
PC BOARD TK-5410

CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Foil side view (J79-0230-09)

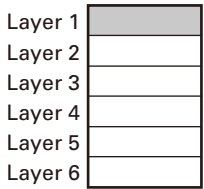


TK-5410 PC BOARD

TX-RX UNIT (X57-7560-10) (A/3): TX-RX SECTION Component side view (J79-0233-09 A/3)

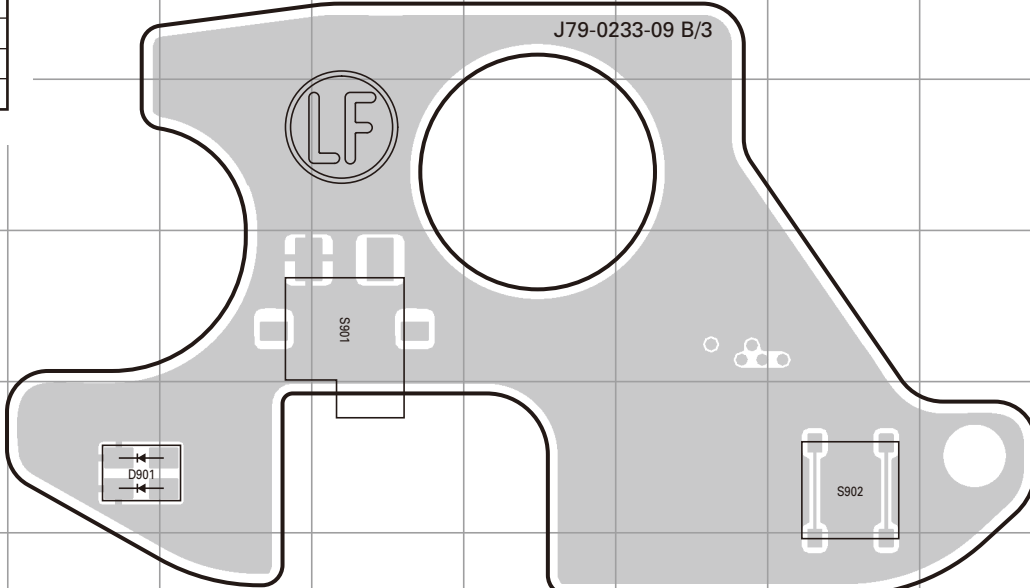


Component side



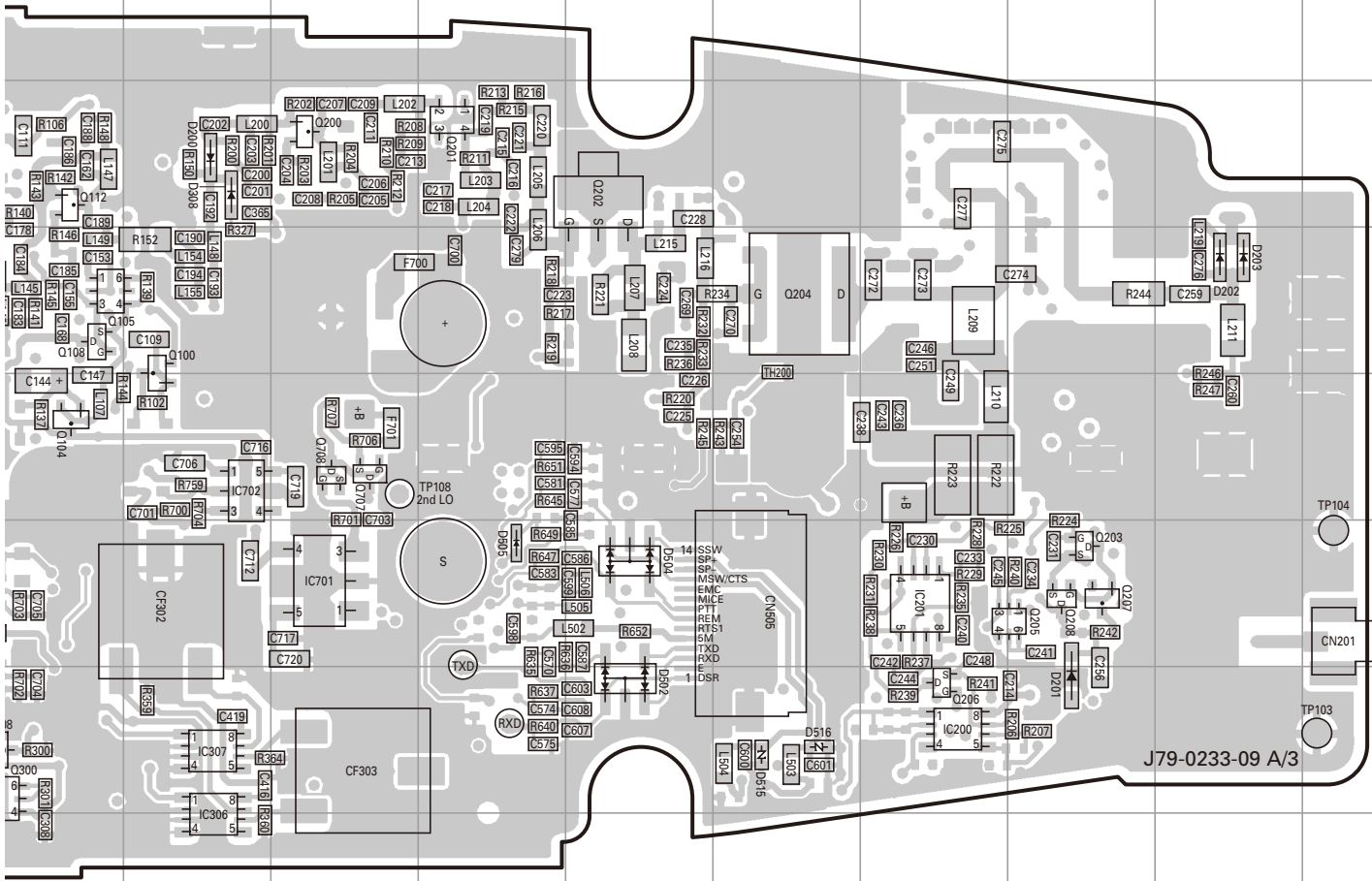
Foil side

TX-RX UNIT (X57-7560-10) (B/3): TOP SECTION Component side view (J79-0233-09 B/3)

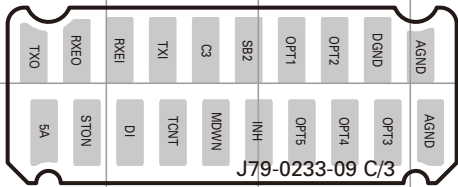


PC BOARD TK-5410

TX-RX UNIT (X57-7560-10) (A/3): TX-RX SECTION Component side view (J79-0233-09 A/3)



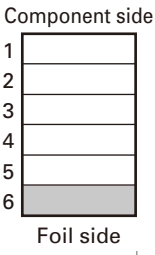
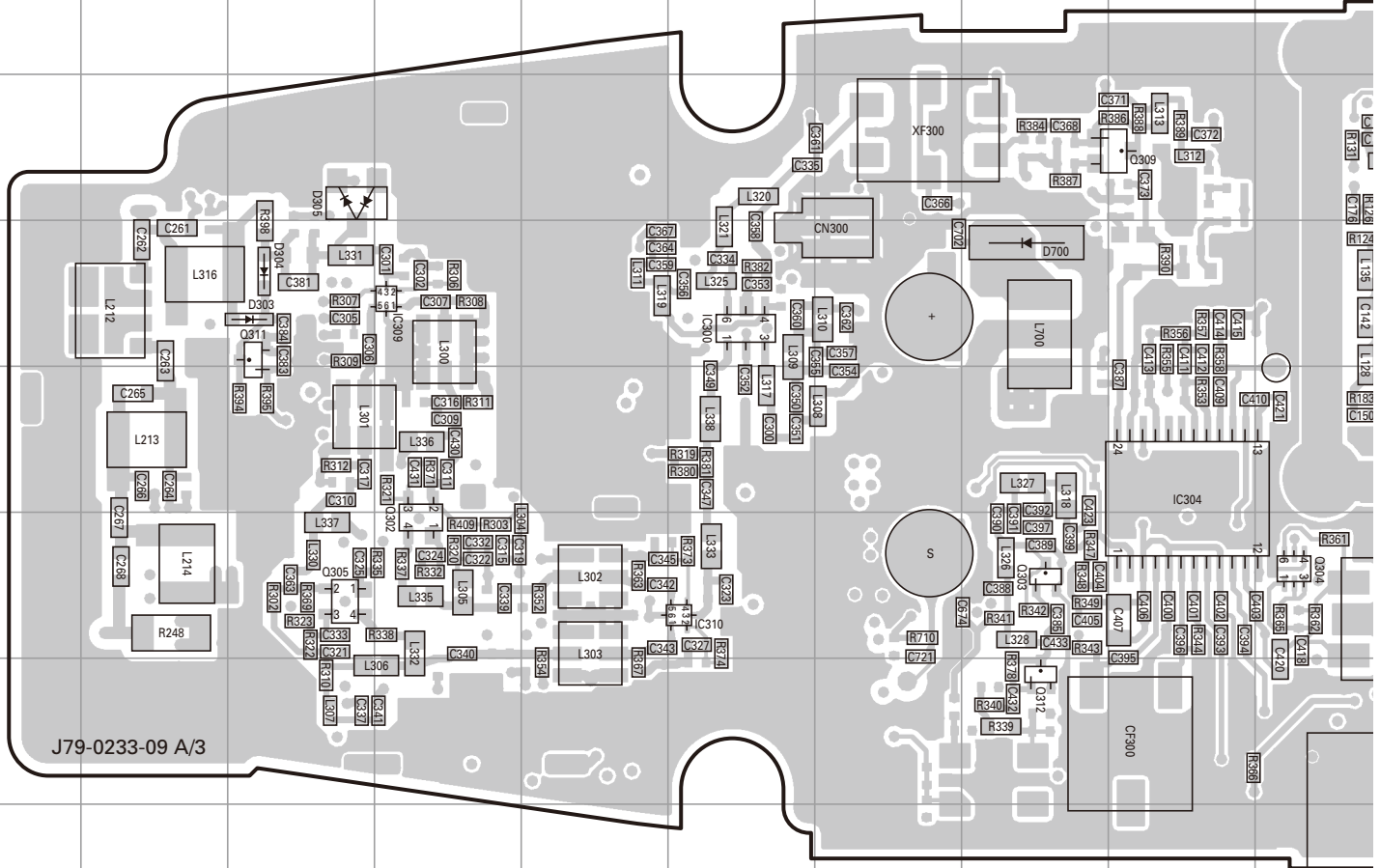
TX-RX UNIT (X57-7560-10) (C/3): OPTION SECTION Component side view (J79-0233-09 C/3)



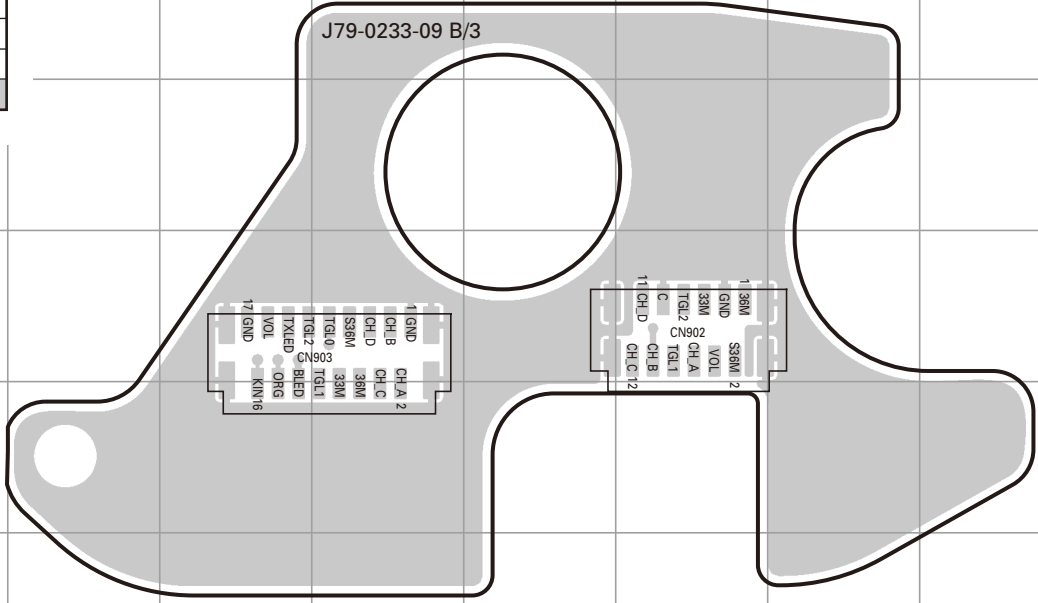
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC100	3I	IC710	3D	Q205	6Q	D200	3K
IC101	4H	IC712	6C	Q206	7P	D201	7Q
IC200	7P	IC713	7C	Q207	6Q	D202	4R
IC201	6P	Q100	4K	Q208	6Q	D203	4R
IC306	8K	Q102	5I	Q300	7J	D308	3K
IC307	7K	Q103	6H	Q308	7J	D502	7N
IC400	7H	Q104	5J	Q700	7J	D504	6N
IC700	4E	Q105	4J	Q701	6J	D505	6M
IC701	6L	Q108	4J	Q703	3F	D515	7O
IC702	5K	Q111	3I	Q704	4F	D516	7O
IC704	3E	Q112	3J	Q705	6E	D702	3E
IC705	4D	Q200	3L	Q706	6D	D704	4D
IC706	3D	Q201	3M	Q707	5L	D706	6D
IC707	6D	Q202	3N	Q708	5L	D901	12C
IC708	6F	Q203	6Q	Q709	5E		
IC709	7F	Q204	4O	D119	2I		

TK-5410 PC BOARD

TX-RX UNIT (X57-7560-10) (A/3): TX-RX SECTION Foil side view (J79-0233-09 A/3)

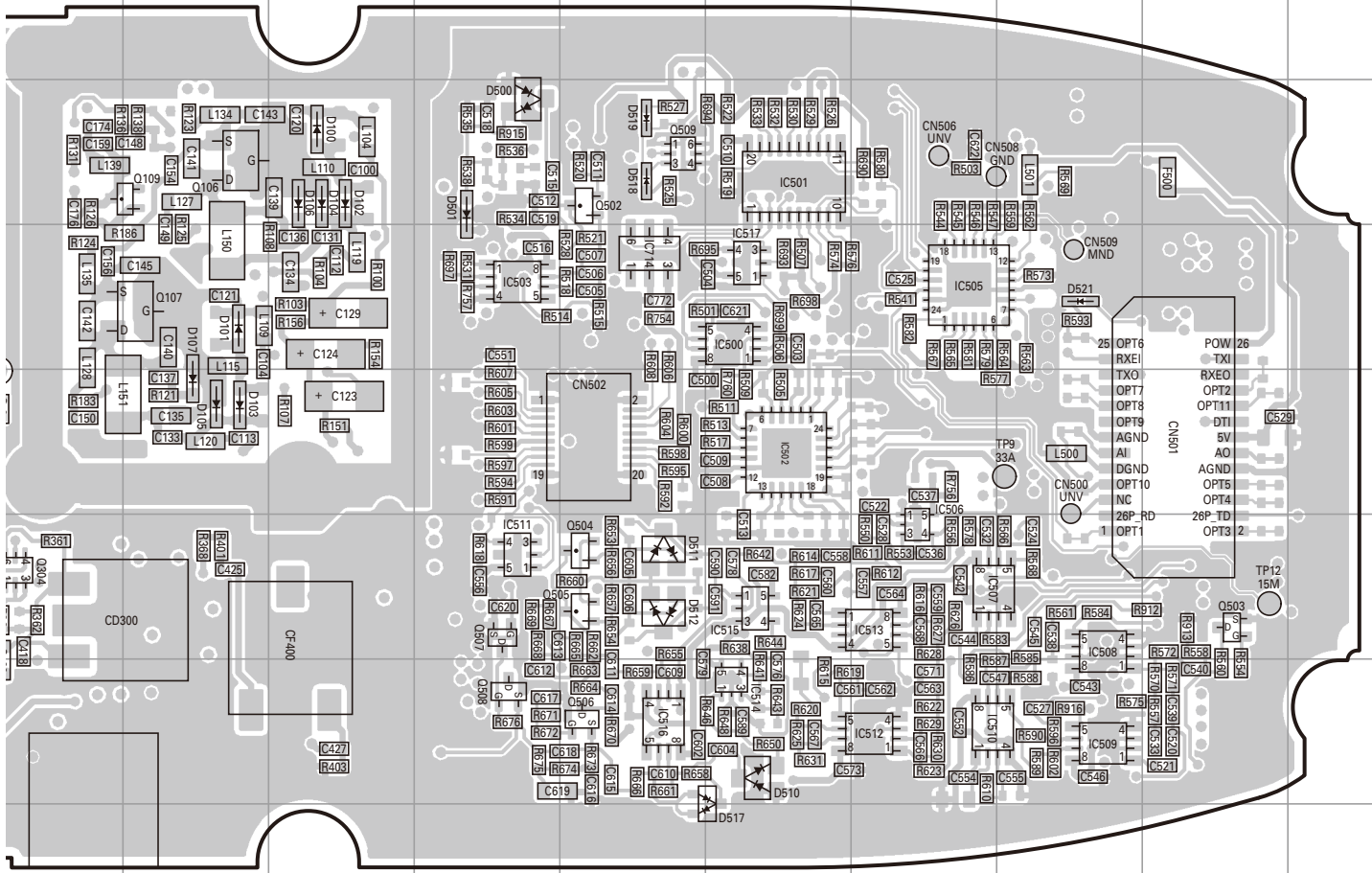


TX-RX UNIT (X57-7560-10) (B/3): TOP SECTION Foil side view (J79-0233-09 B/3)

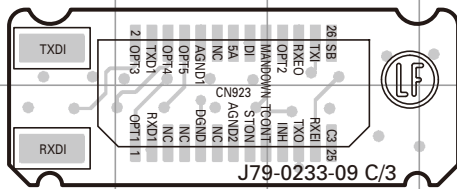


PC BOARD TK-5410

TX-RX UNIT (X57-7560-10) (A/3): TX-RX SECTION Foil side view (J79-0233-09 A/3)

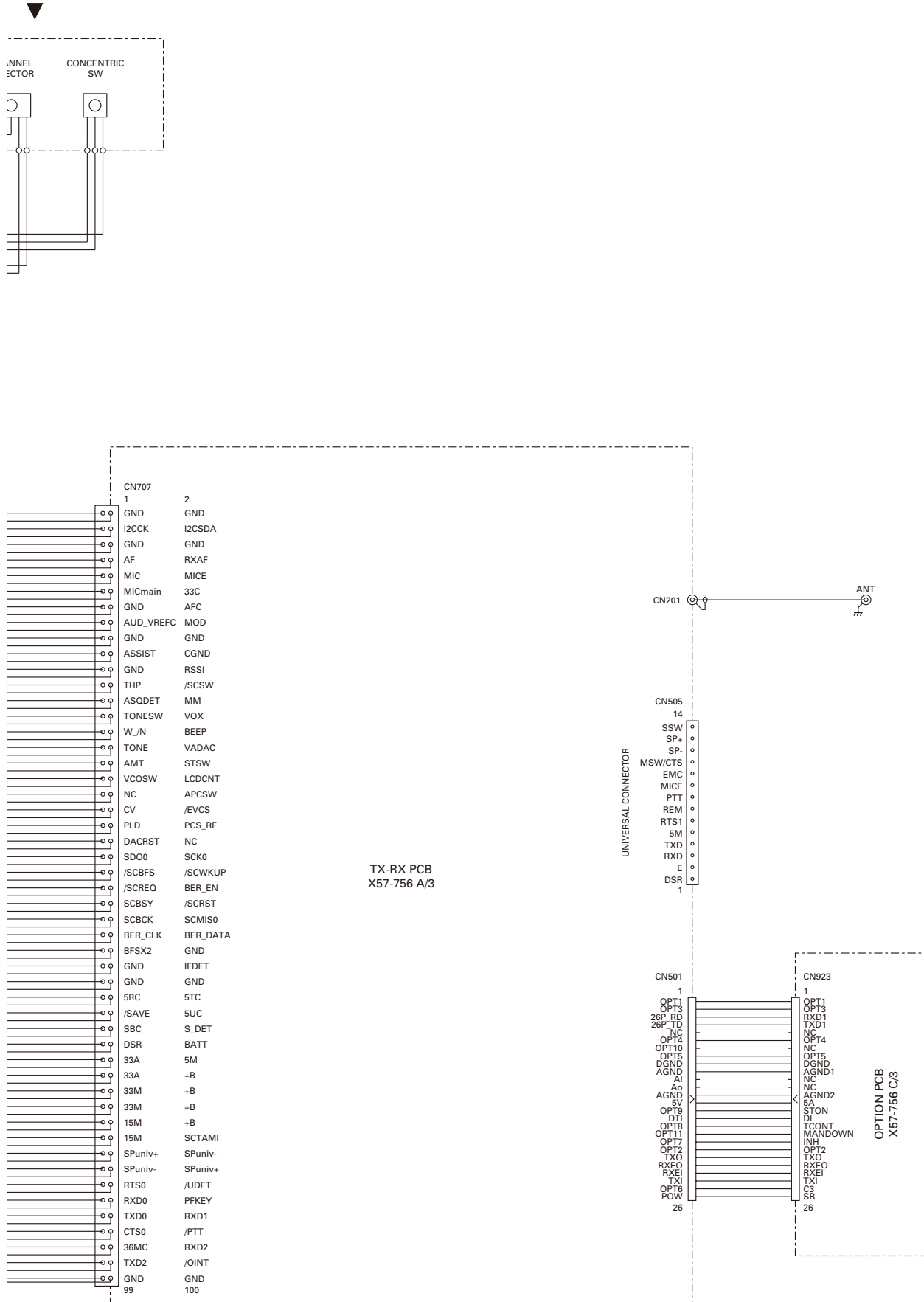


TX-RX UNIT (X57-7560-10) (C/3): OPTION SECTION Foil side view (J79-0233-09 C/3)

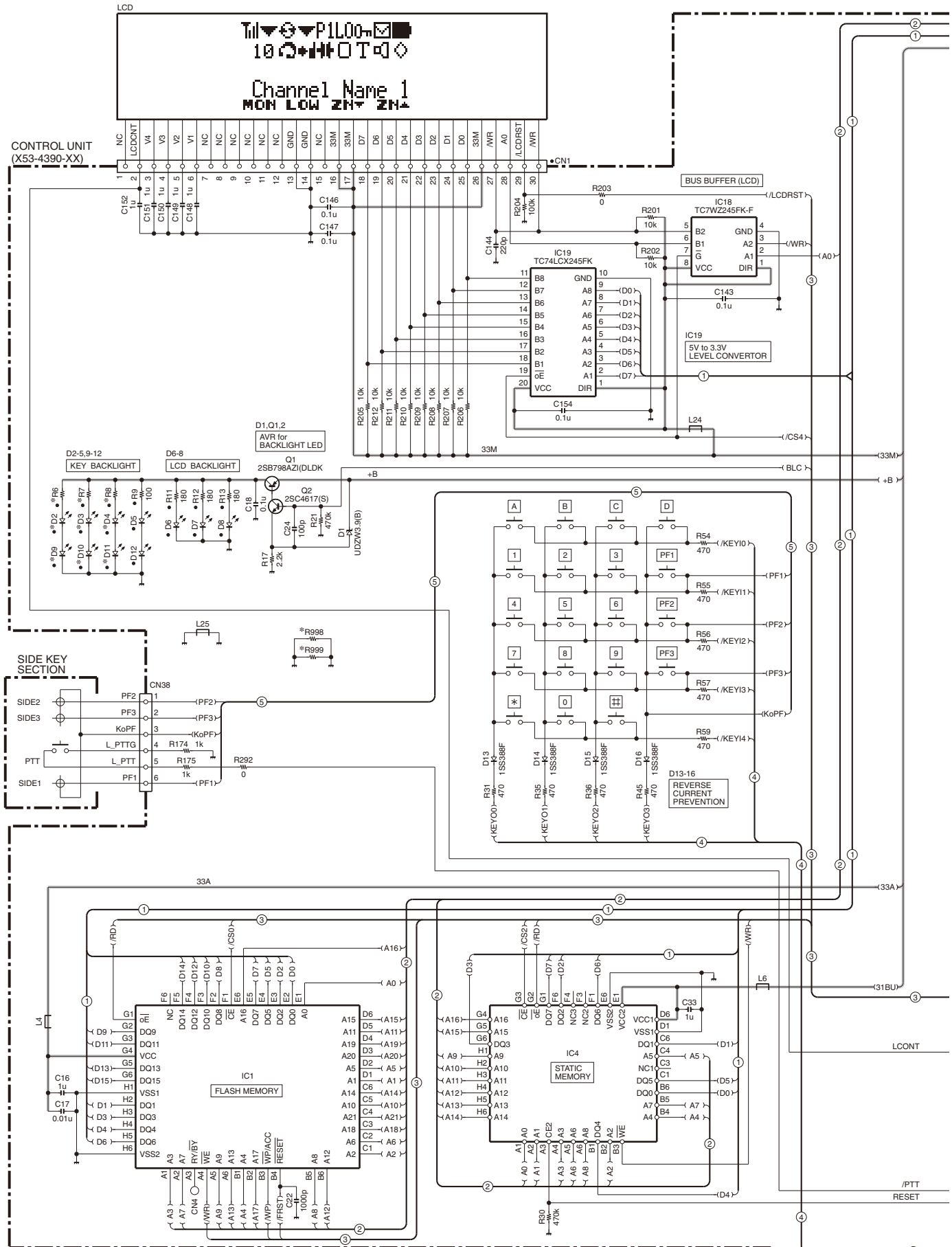


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	4F	IC513	6P	Q502	3N	D303	4C
IC304	5I	IC514	7O	Q503	6R	D304	4C
IC309	4D	IC515	6O	Q504	6N	D305	3C
IC310	6F	IC516	7N	Q505	6N	D500	3M
IC500	4O	IC517	4O	Q506	7N	D501	3M
IC501	3O	IC714	4N	Q507	6M	D510	7O
IC502	5O	Q106	3K	Q508	7M	D511	6N
IC503	4M	Q107	4K	Q509	3N	D512	6N
IC505	4P	Q109	3K	D100	3L	D517	8O
IC506	6P	Q302	6D	D101	4K	D518	3N
IC507	6P	Q303	6H	D102	3L	D519	3N
IC508	6Q	Q304	6J	D103	5K	D521	4Q
IC509	7Q	Q305	6C	D104	3L	D700	4H
IC510	7P	Q309	3I	D105	5K		
IC511	6M	Q311	4C	D106	3L		
IC512	7P	Q312	7H	D107	5K		

INTERCONNECTION DIAGRAM



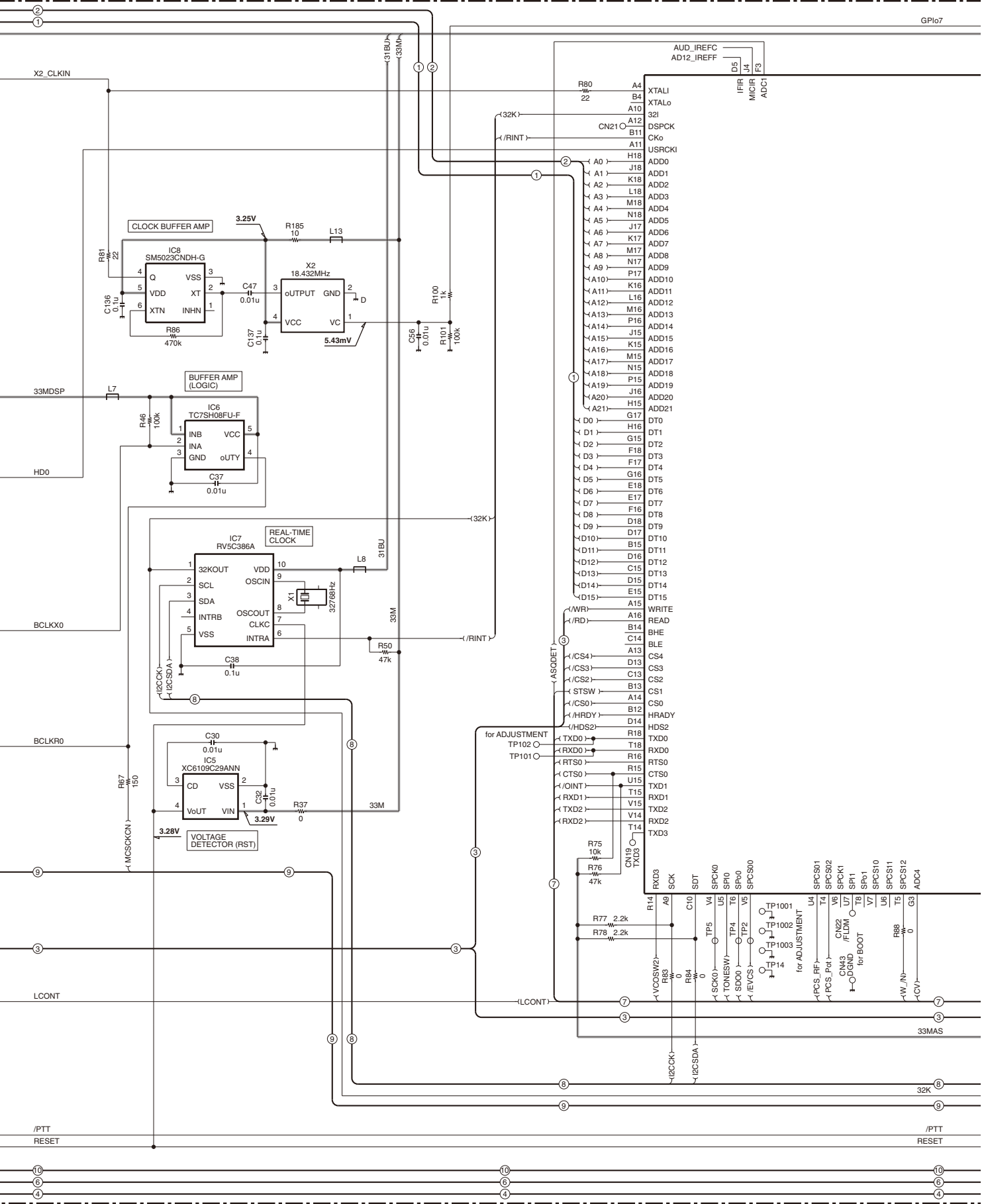
TK-5410 SCHEMATIC DIAGRAM



X53-4390-XX	D2	D3	D4	D9	D10	D11	R6	R7	R8	R998	R999
-11	K2	NO	NO	NO	NO	NO	NO	NO	NO	0	NO
-12	K3	B30-2171-05	B30-2171-05	B30-2171-05	B30-2171-05	B30-2171-05	100	100	100	NO	0

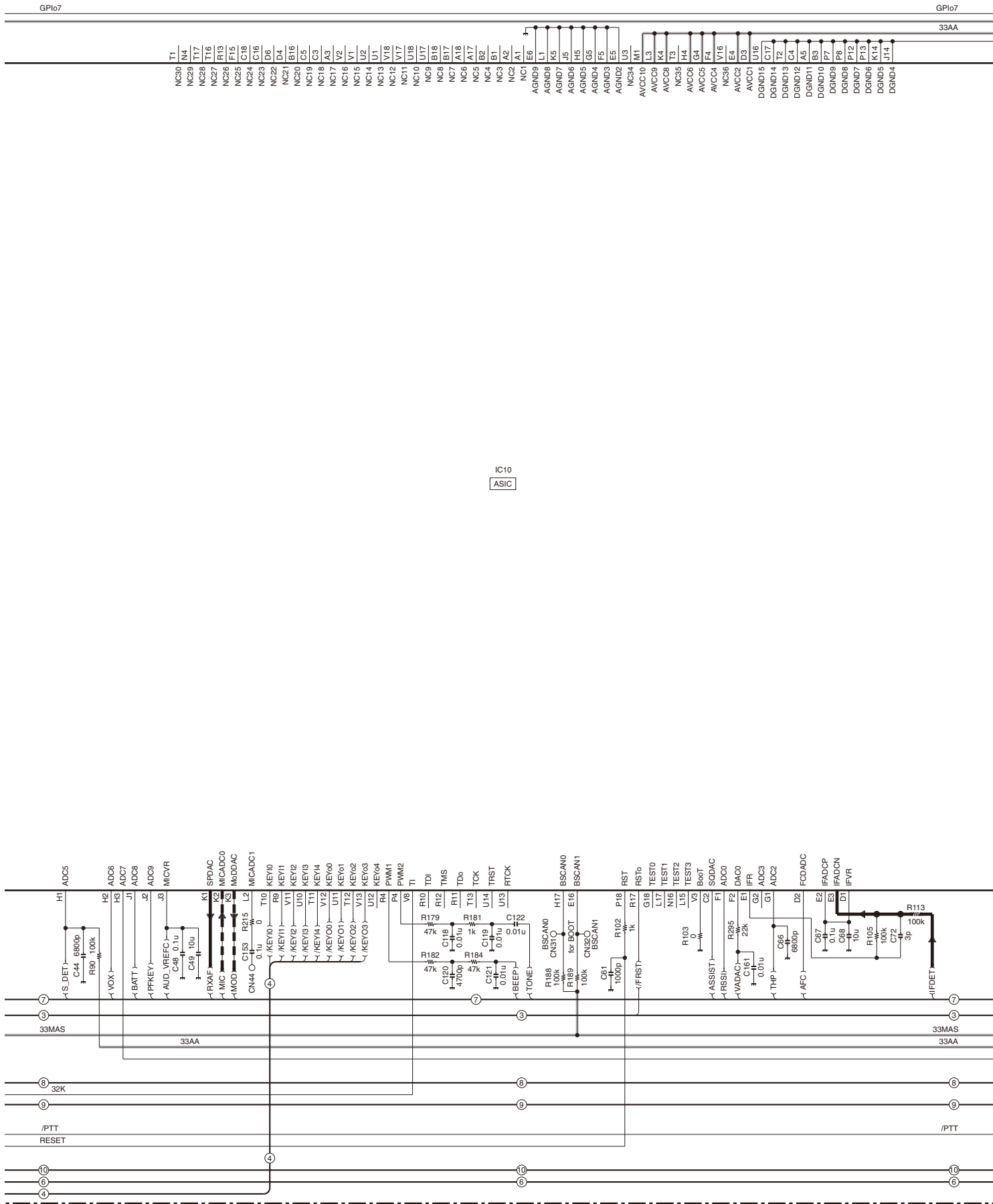
TK-5410 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4390-XX)



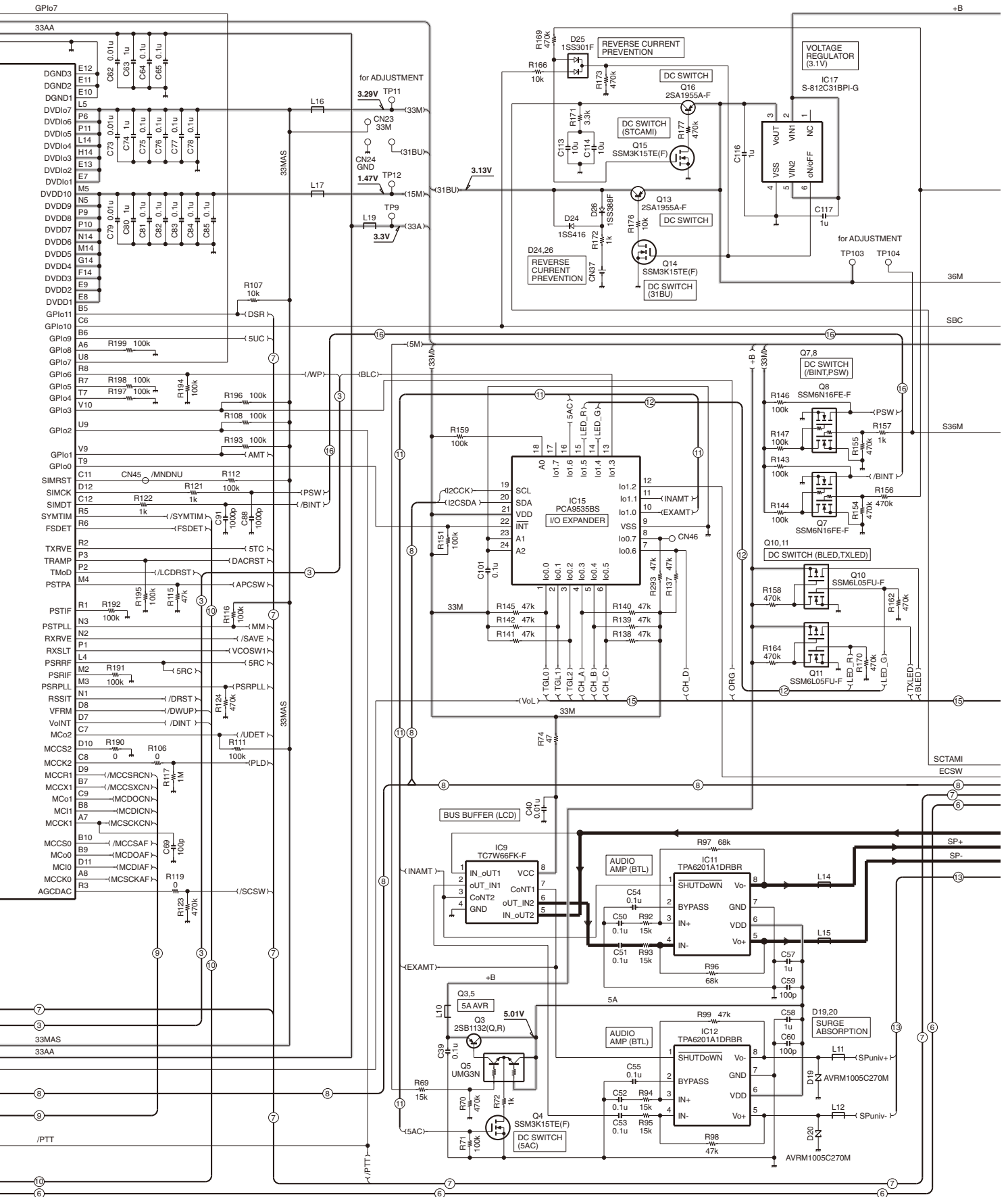
SCHEMATIC DIAGRAM TK-5410

CONTROL UNIT (X53-4390-XX)



TK-5410 SCHEMATIC DIAGRAM

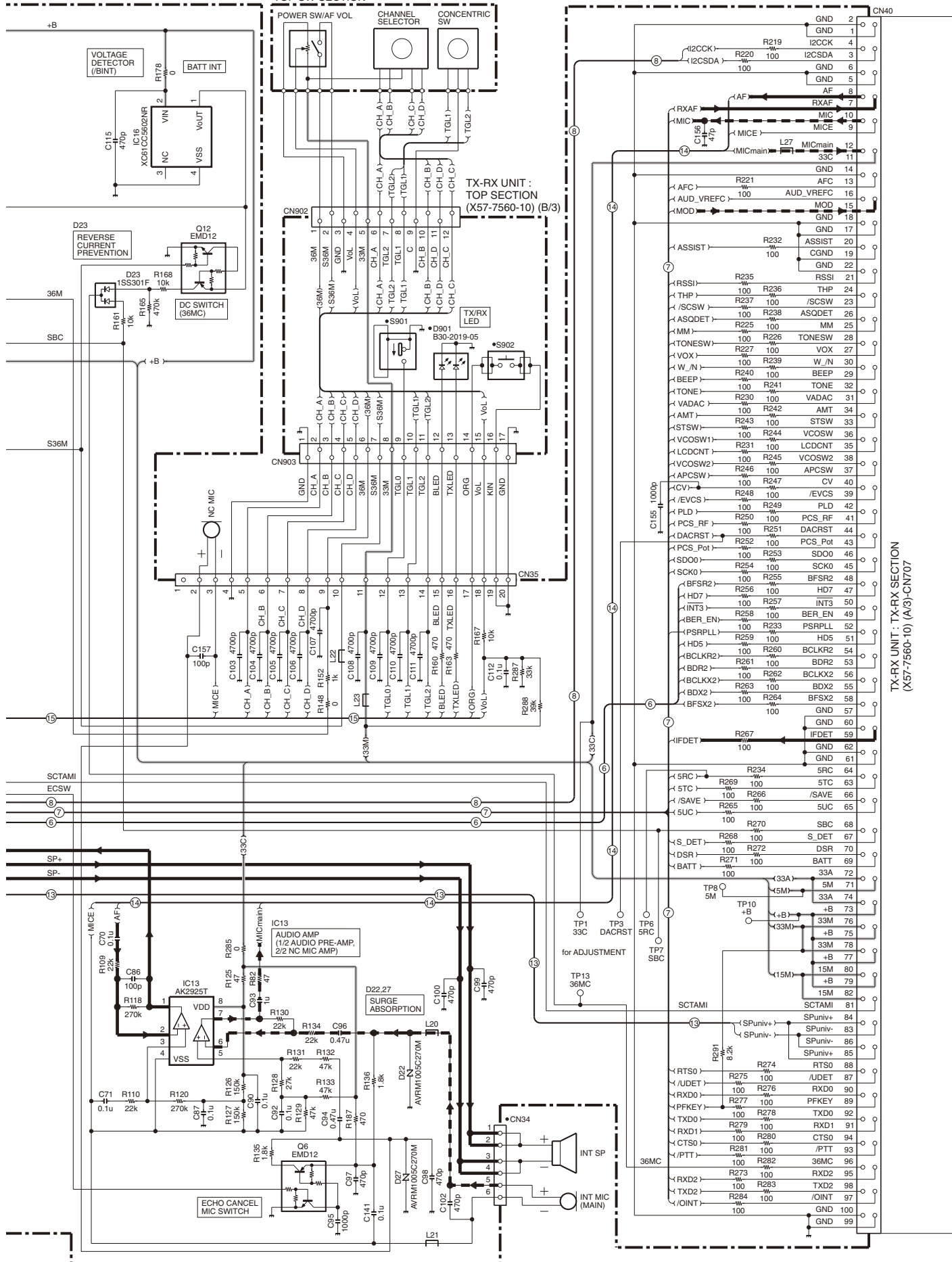
CONTROL UNIT (X53-4390-XX)



SCHEMATIC DIAGRAM TK-5410

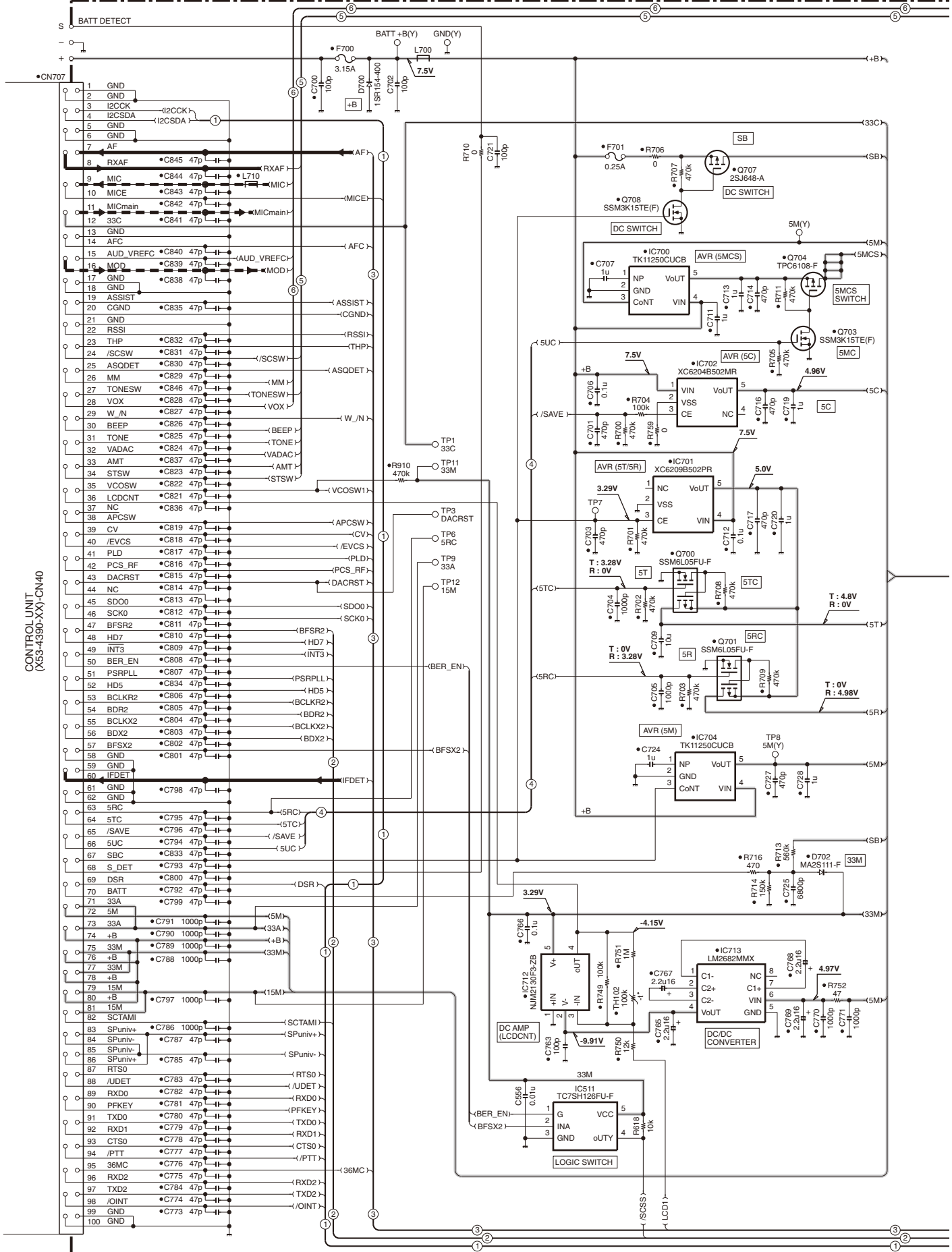
CONTROL UNIT (X53-4390-XX)

TOP SW SECTION



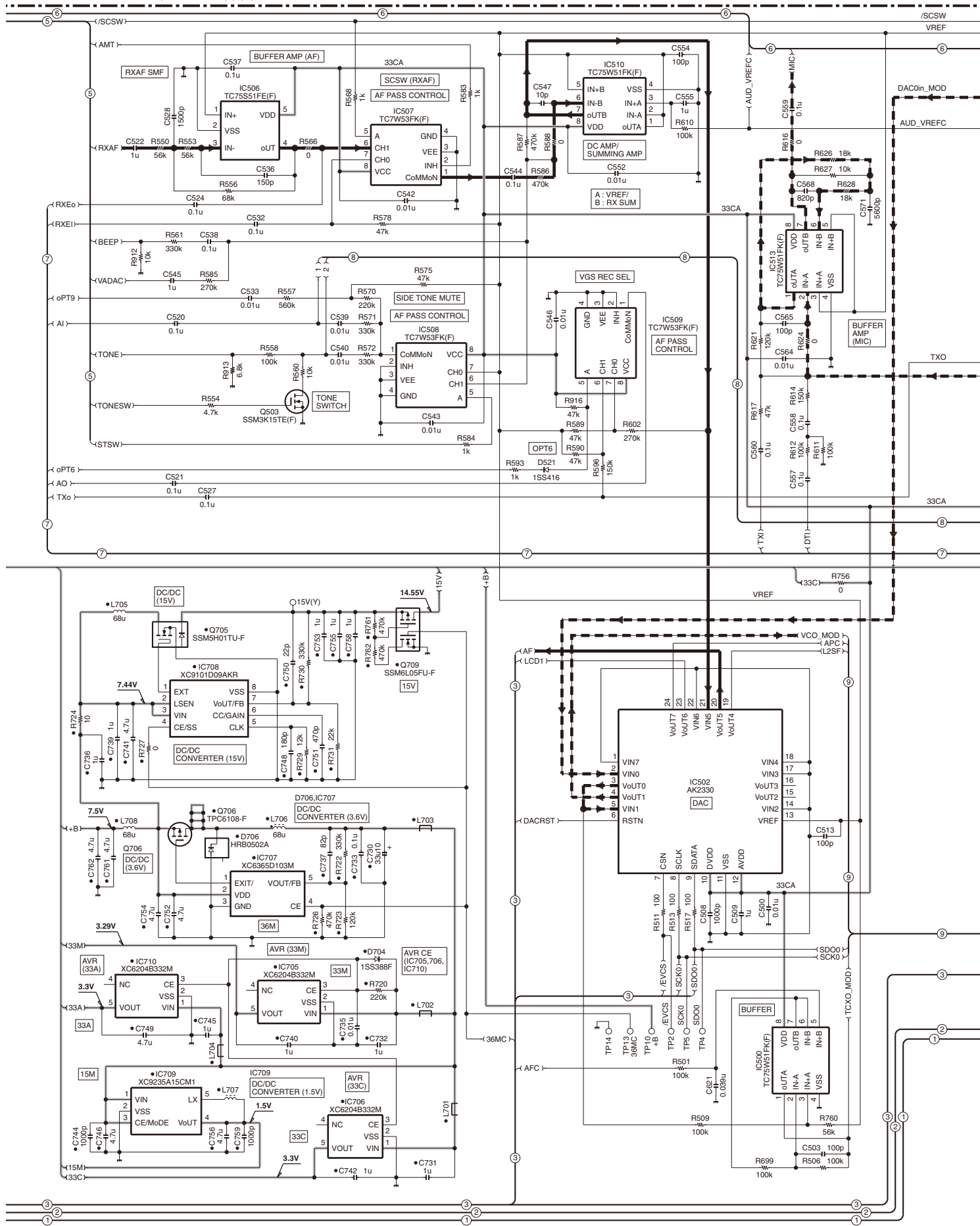
TK-5410 SCHEMATIC DIAGRAM

TX-RX UNIT : TX-RX SECTION (X57-7560-10) (A/3)



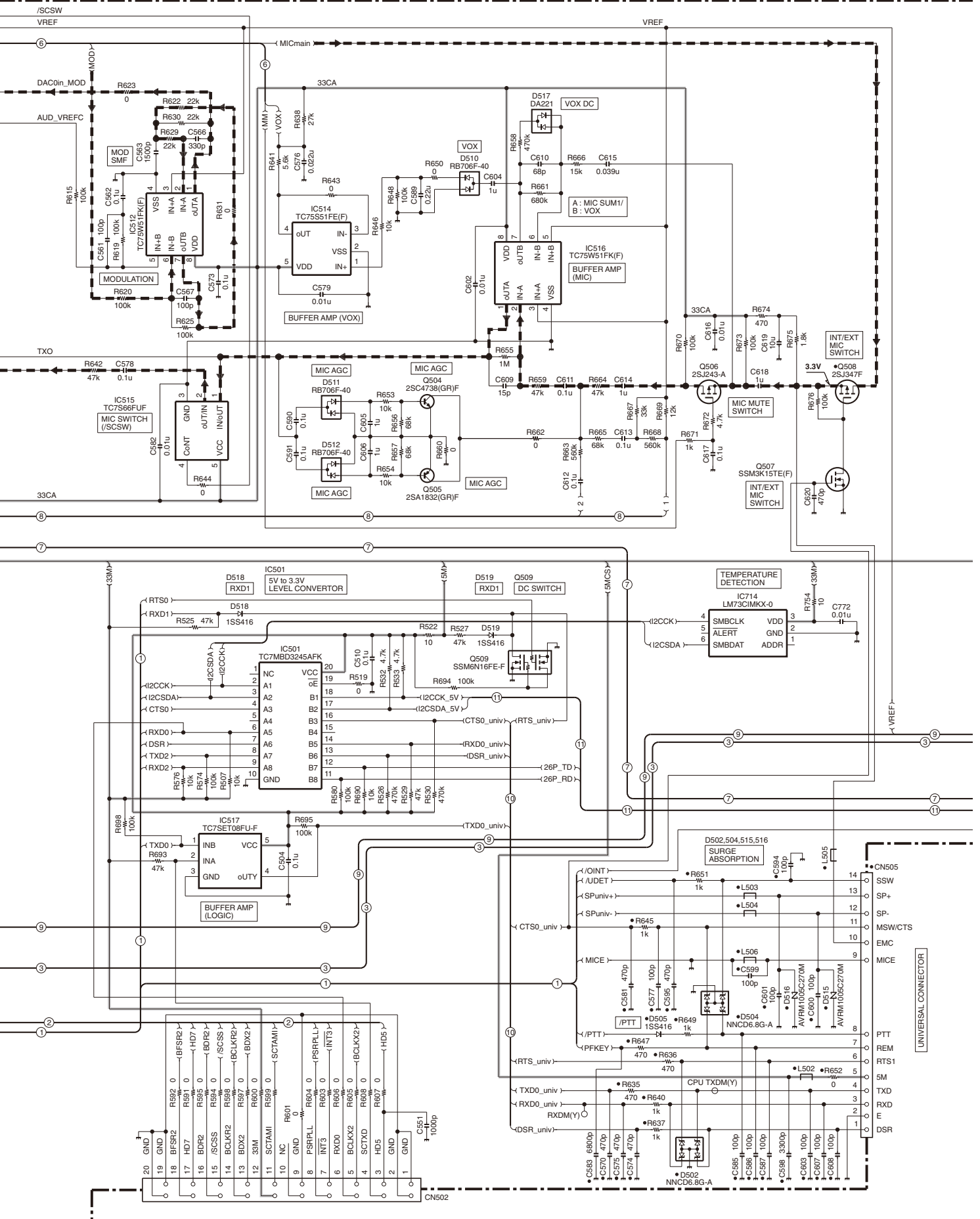
SCHEMATIC DIAGRAM TK-5410

TX-RX UNIT : TX-RX SECTION (X57-7560-10) (A/3)



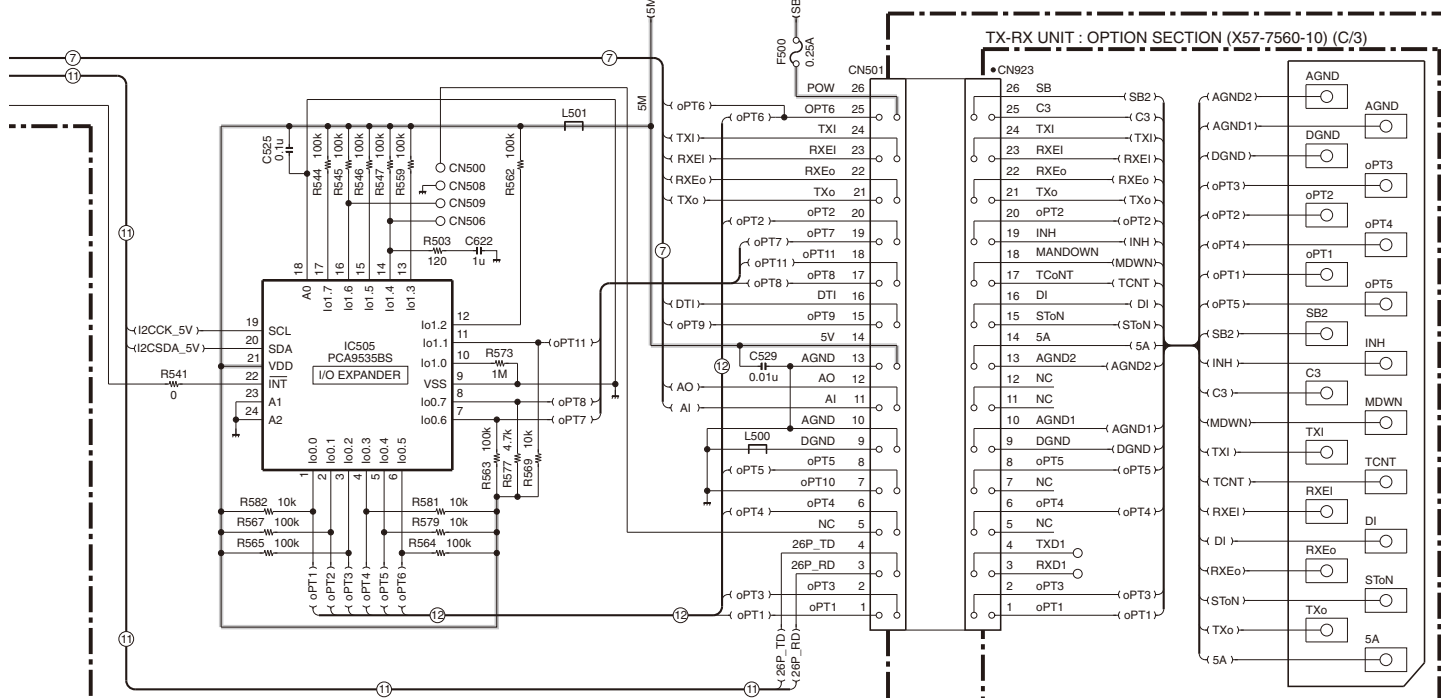
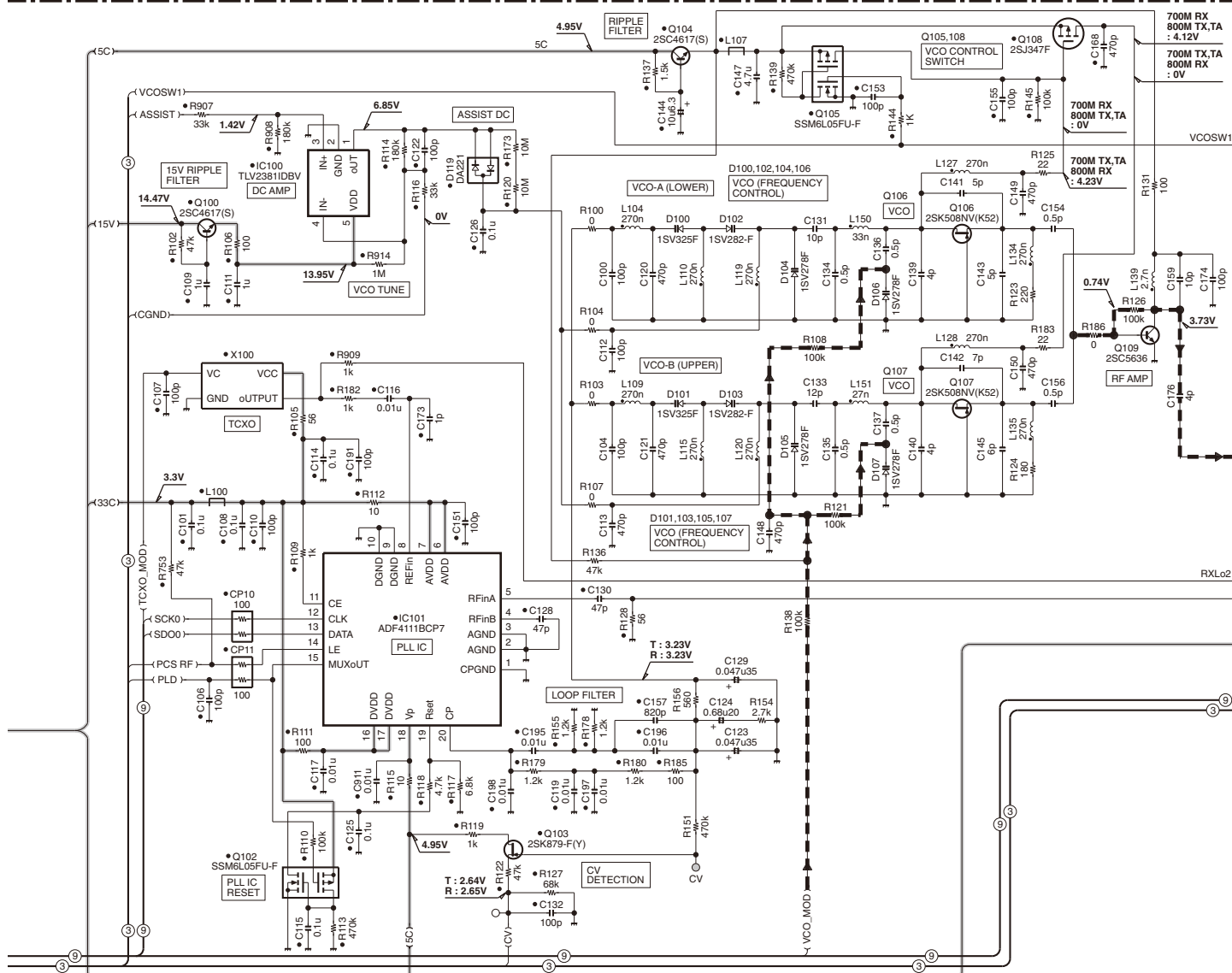
TK-5410 SCHEMATIC DIAGRAM

TX-RX UNIT : TX-RX SECTION (X57-7560-10) (A/3)



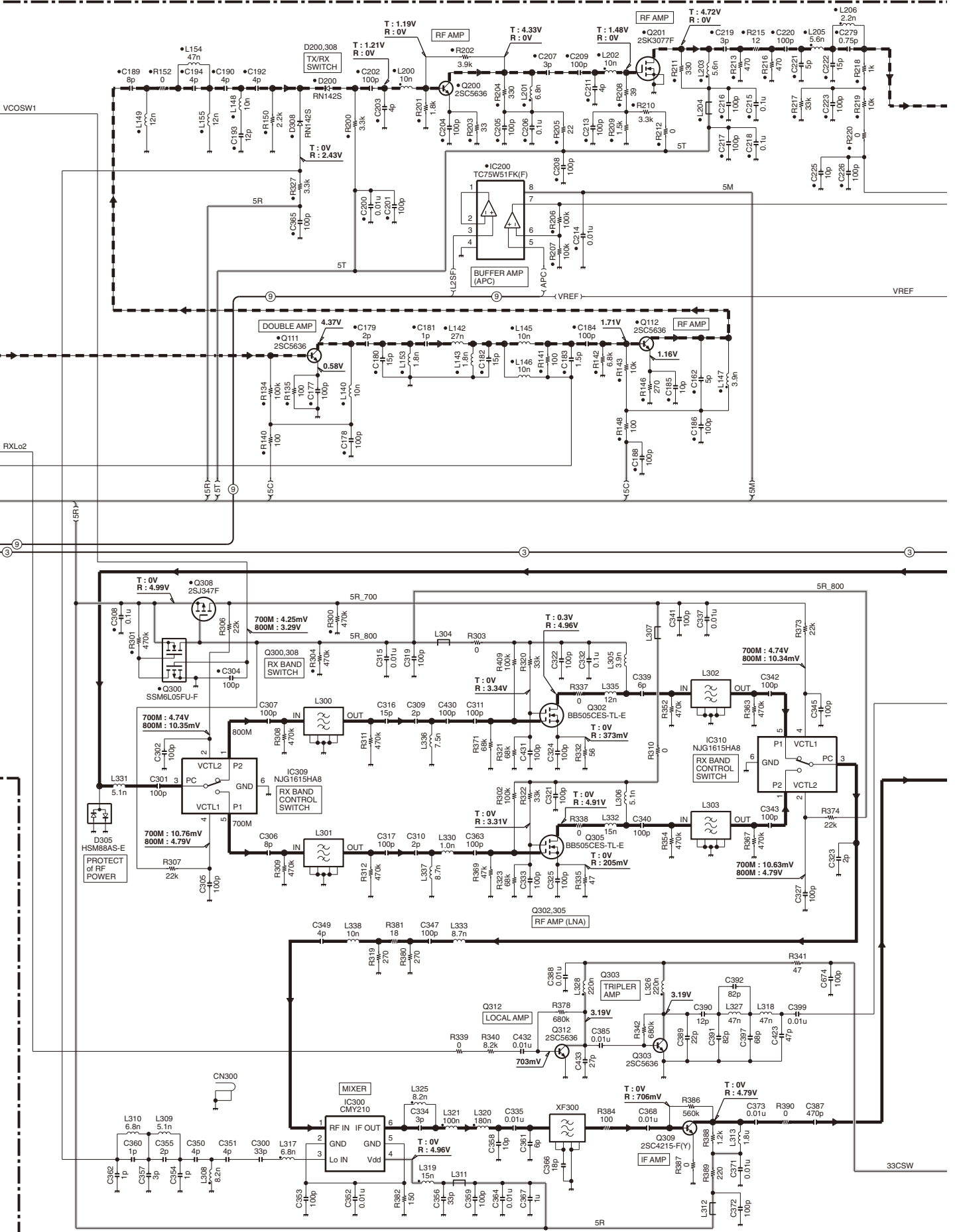
SCHEMATIC DIAGRAM TK-5410

TX-RX UNIT : TX-RX SECTION (X57-7560-10) (A/3)



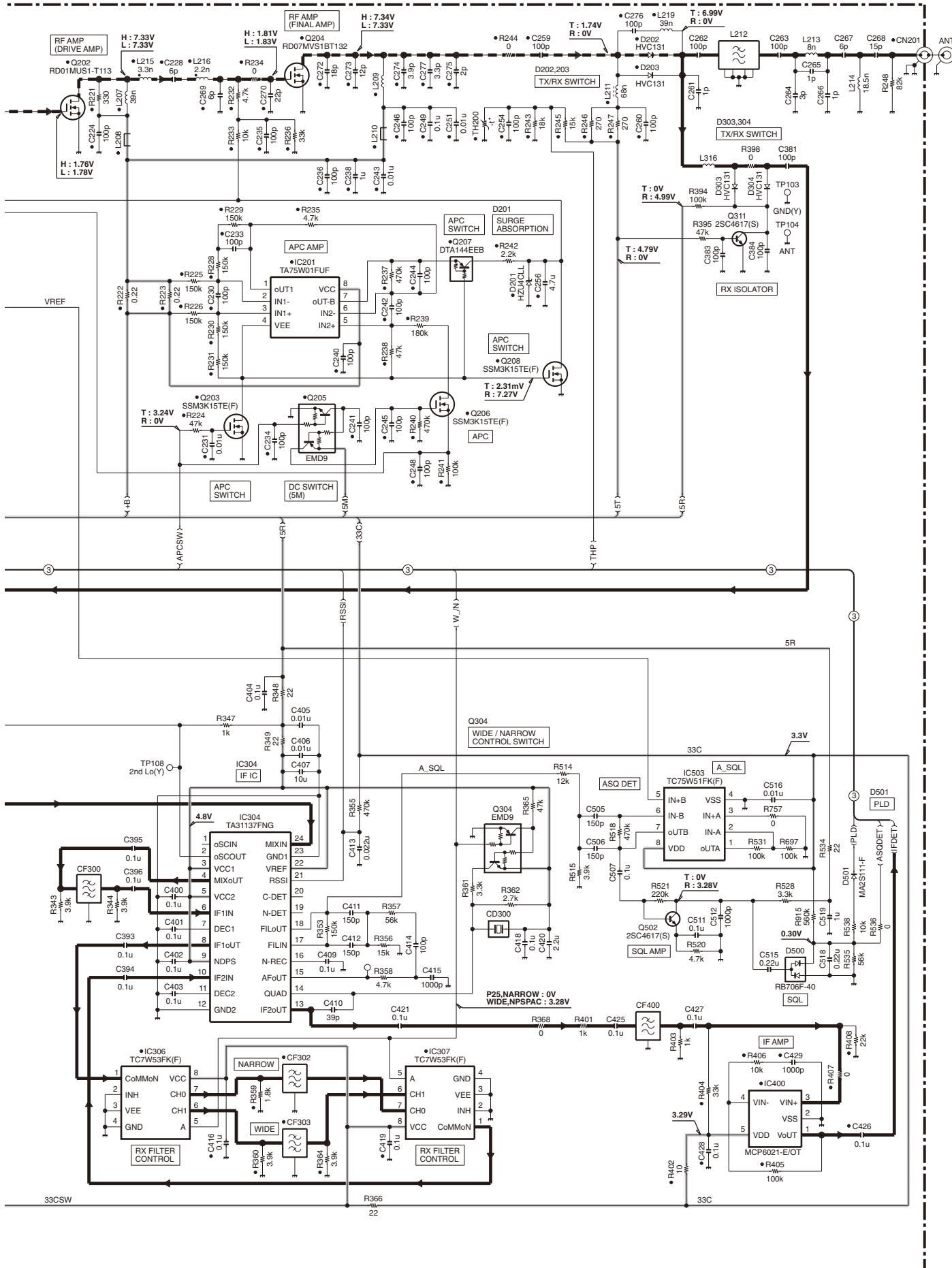
TK-5410 SCHEMATIC DIAGRAM

TX-RX UNIT : TX-RX SECTION (X57-7560-10) (A/3)



SCHEMATIC DIAGRAM TK-5410

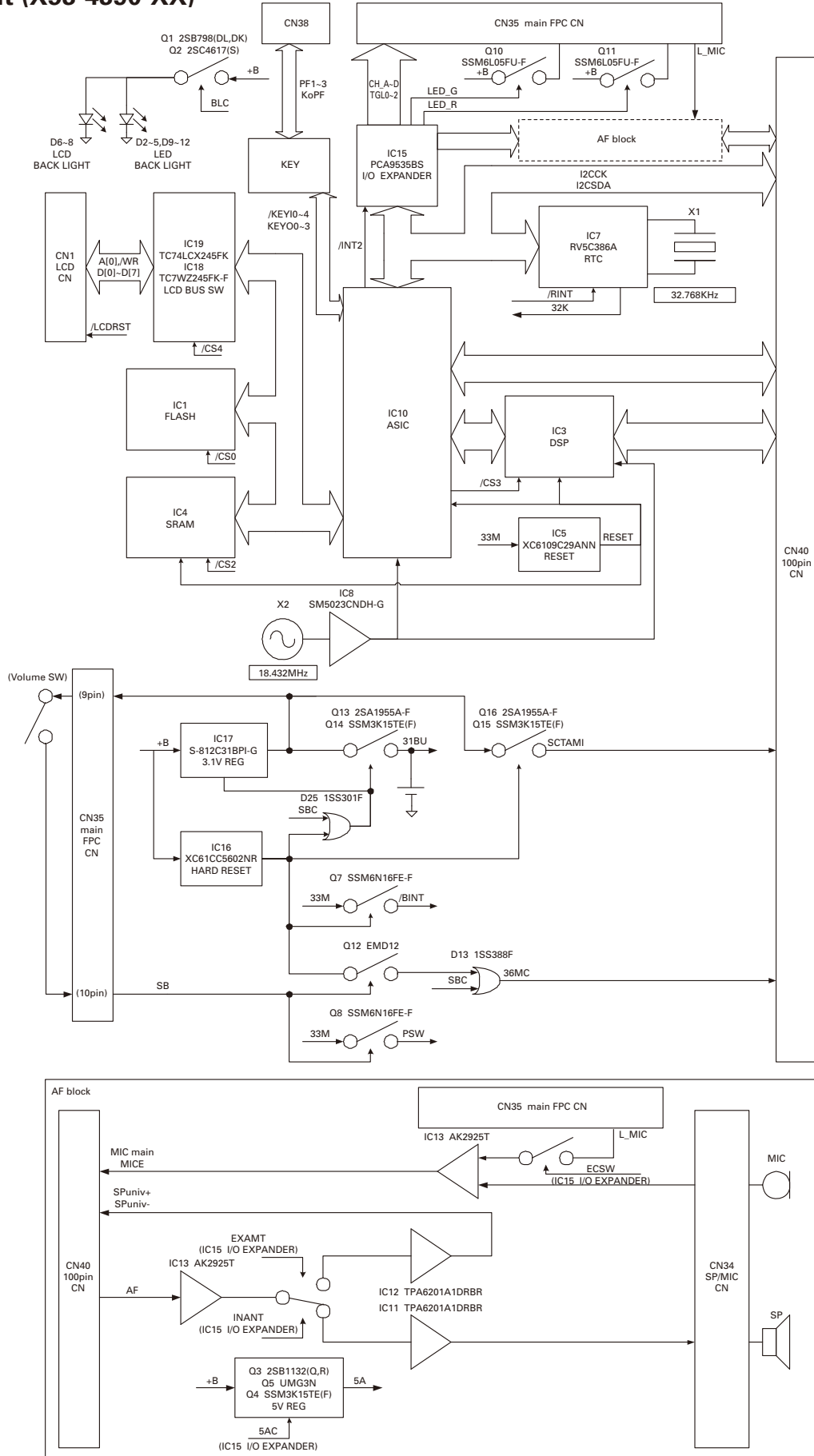
TX-RX UNIT : TX-RX SECTION (X57-7560-10) (A/3)



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

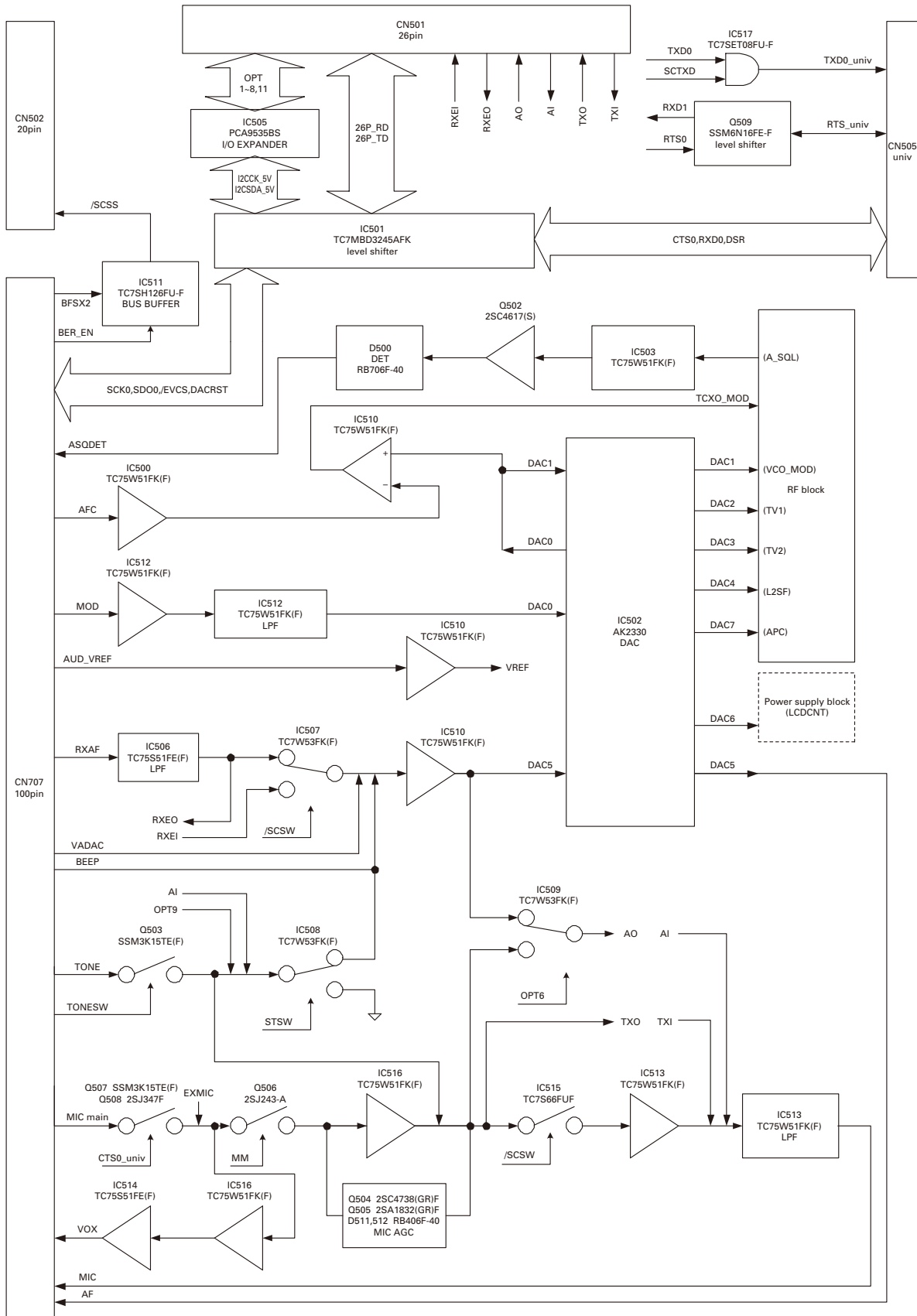
BLOCK DIAGRAM

Control unit (X53-4390-XX)

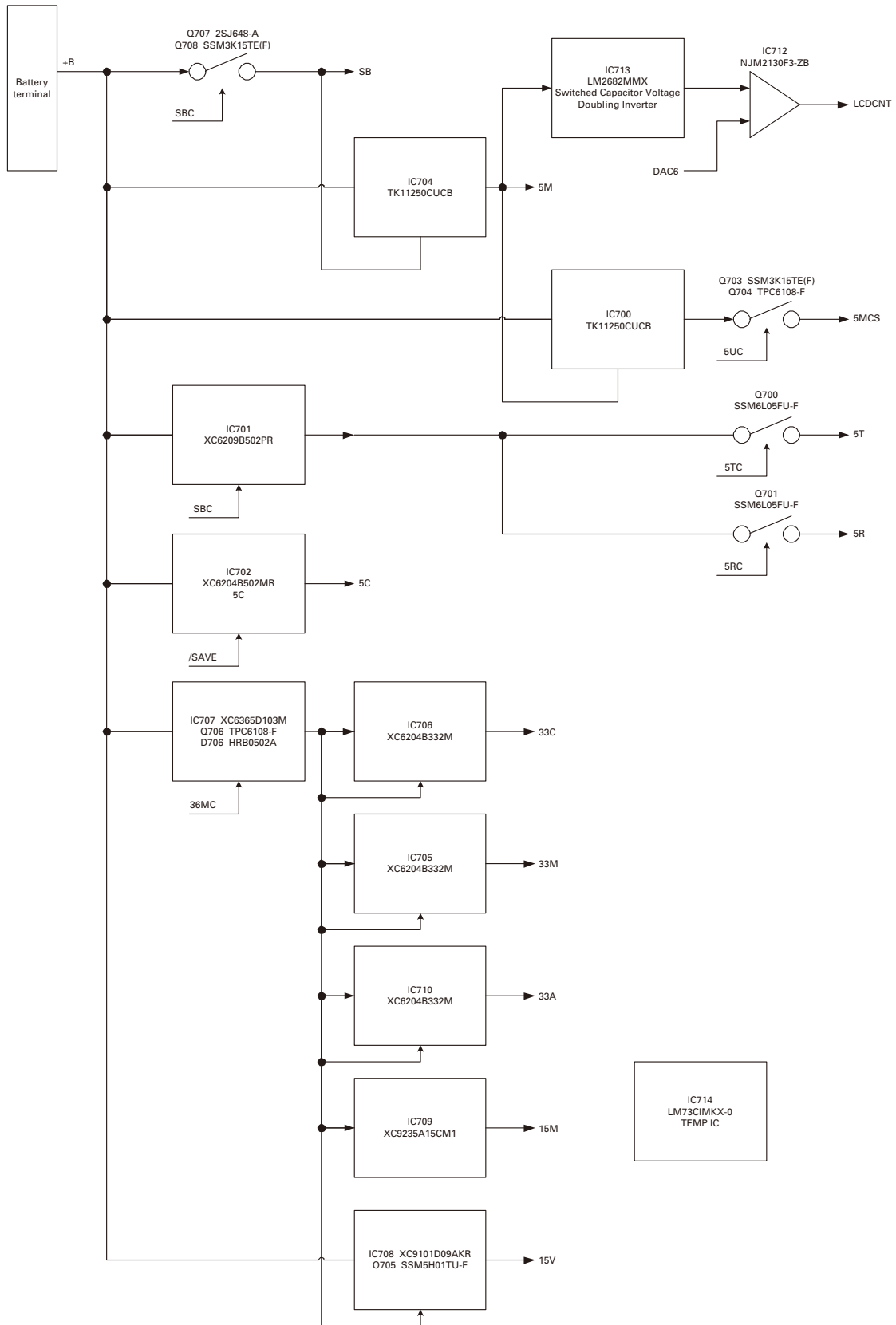


BLOCK DIAGRAM

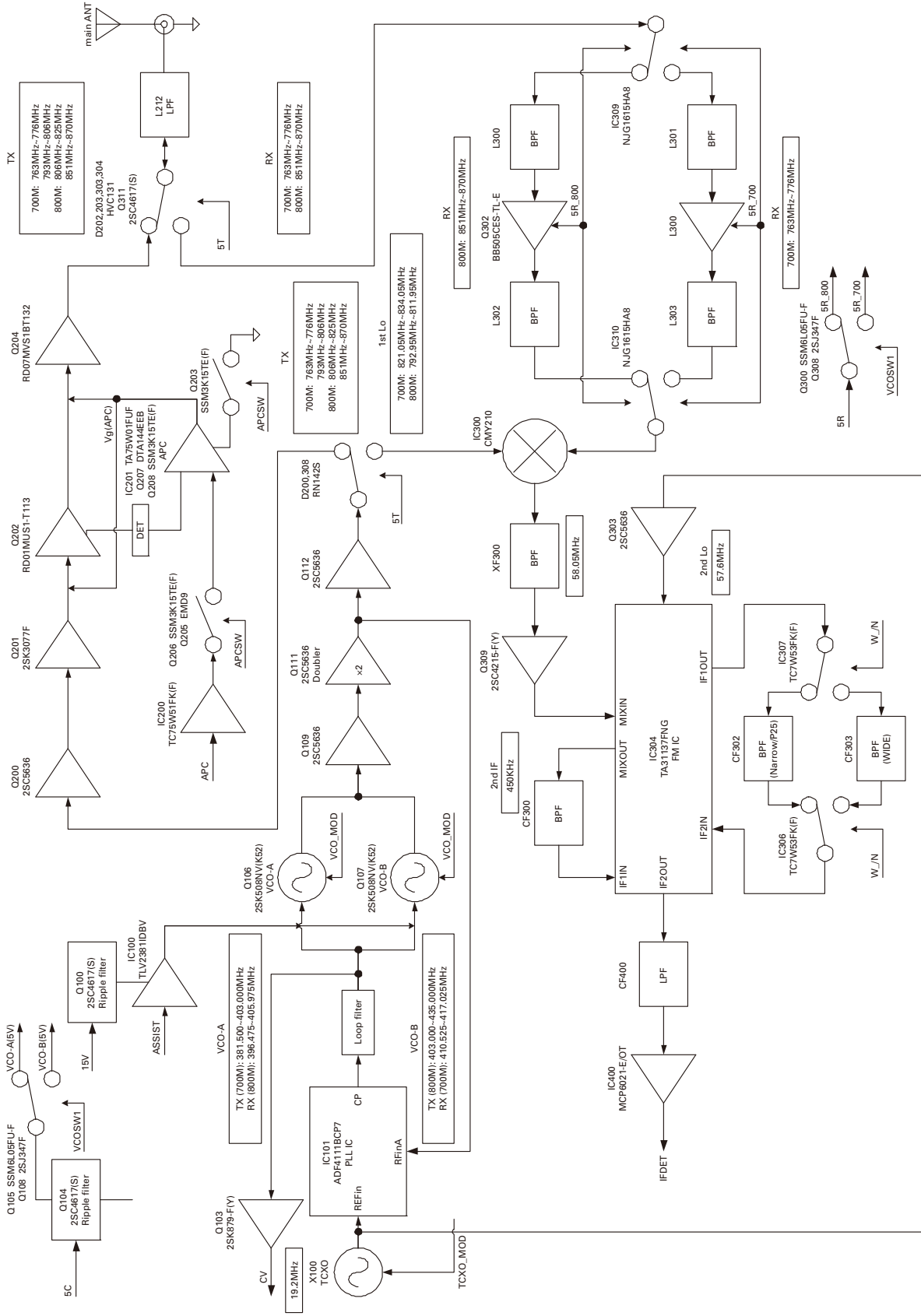
TX-RX unit (X57-7560-10)



BLOCK DIAGRAM



BLOCK DIAGRAM



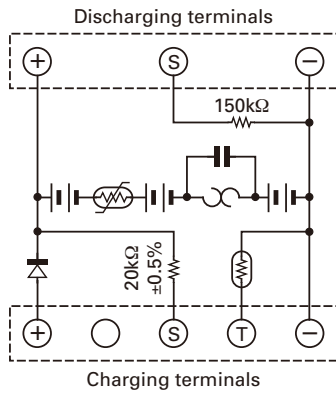
OPTIONAL ACCESSORIES

KNB-32N (Ni-MH Battery Pack): 7.2V 2500mAh

■ External View



■ Schematic Diagram

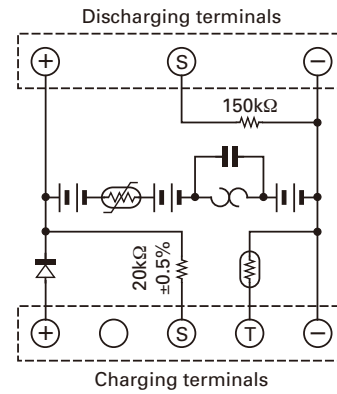


KNB-54N (Ni-MH Battery Pack): 7.2V 2500mAh

■ External View



■ Schematic Diagram

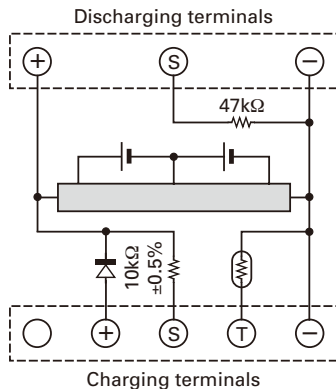


KNB-33L (Li-ion Battery Pack): 7.4V 2000mAh

■ External View



■ Schematic Diagram



KSC-32 (Rapid Charger)

■ External View



KBP-6 (Battery Case)

■ External View



TK-5410

SPECIFICATIONS

GENERAL

Models.....	K2: 4-Key w/LCD Model	K3: Full Key w/LCD Model
Frequency Range.....	763~776 MHz (TX/RX), 793~806 MHz (TX), 806~825 MHz (TX), 851~870 MHz (TX/RX)	
Number of Channels.....	1024	
Zones.....	100	
Max. Channels per Zone.....	512	
Channel Spacing.....	Analog: 12.5/25 kHz	Digital: 12.5 kHz
Operating Voltage.....	7.5V DC \pm 20%	
Battery Life: 5-5-90 (10-10-80) duty cycle.....	KNB-32N or KNB-54N, 7.5VDC, 2500 mAh: 12 hours (8 hours) KNB-33L, 7.5VDC, 2000 mAh: 8 hours (5 hours) KBP-6, AA Alkaline x 6 Batteries: 8 hours (5 hours)	
Operating Temperature Range.....	-22°F to +140°F (-30°C to +60°C)	
Frequency Stability (-22°F to +140°F).....	\pm 1.5 ppm	
Antenna Impedance.....	50 Ω	
Dimensions (W x H x D).....	2.28 x 6.10 x 1.80 in. (58 x 155 x 45.7 mm) with KNB-32N or KNB-54N battery (Projections not included).....	
	2.28 x 6.10 x 1.54 in. (58 x 155 x 39.2 mm) with KNB-33L battery 2.36 x 6.10 x 1.84 in. (60 x 155 x 46.7 mm) with KBP-6 battery	
Weight		
Radio only.....	TK-5410 K2: 11.64 oz. (330g) TK-5410 K3: 11.64 oz. (330g)	
TK-5410 K2 with battery, antenna (KRA-32) and belt clip (KBH-11)	23.28 oz. (660g) with KNB-32N or KNB-54N battery 17.64 oz. (500g) with KNB-54N battery	

RECEIVER

Sensitivity.....	Digital (5% BER): 0.25 μ V	Digital (1% BER): 0.40 μ V	
	Analog 12dB SINAD: 0.25 μ V		
Selectivity.....	Digital: -60dB	Analog @25kHz: -75dB	Analog @12.5kHz: -64dB
Intermodulation Distortion.....	-75dB		
Spurious and Image.....	-75dB		
Audio Distortion.....	Digital: Less than 1.0%	Analog: Less than 2.0%	
Audio Output.....	500mW/8 Ω		

TRANSMITTER

RF Output Power.....	3W/1W		
Spurious & Harmonics.....	70dB		
FM Hum & Noise.....	Analog @25kHz: 45dB	Analog @12.5kHz: 40dB	
Audio Distortion.....	Less than 2.0%		
Modulation Limiting.....	Analog @25kHz: \pm 5kHz	Analog @NPSPEC: \pm 4kHz	
	Analog @12.5kHz: \pm 2.5kHz		
Modulation.....	16K0F3E, 11K0F3E, 8K10F1E, 8K10F1D, 14K0F3E		

Analog measurements made per TIA/EIA-603 and specifications shown are typical.

Digital measurements made per TIA/EIA-102CAAA

KENWOOD reserves the right to change specifications without prior notice or obligation.

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Kenwood Electronics Singapore Pte Ltd

1 Ang Mo Kio Street 63, Singapore 569110

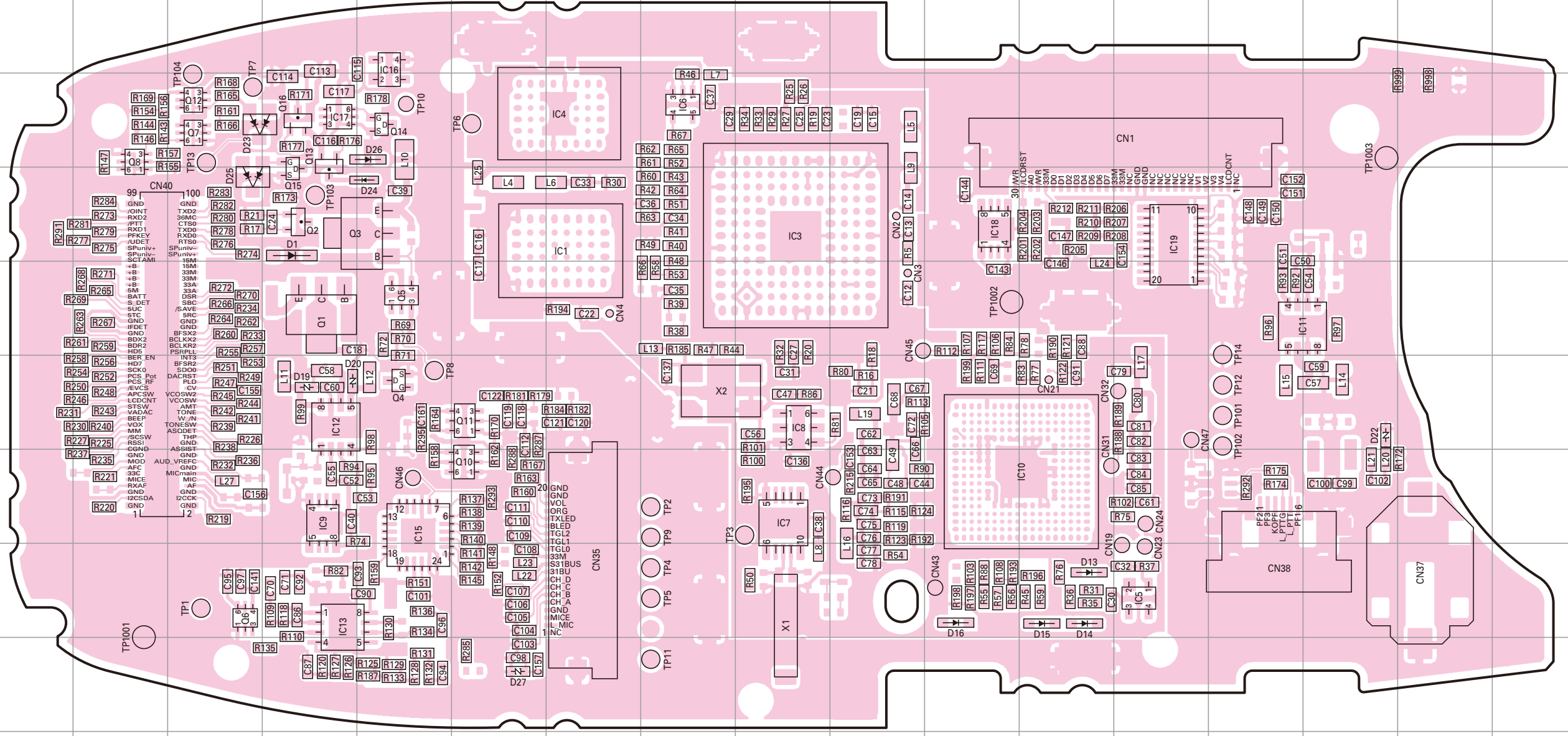


TK-5410 PC BOARD

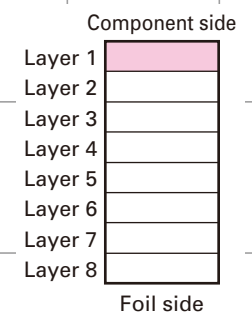
PC BOARD TK-5410

CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Component side view (J79-0230-09)

CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Component side view (J79-0230-09)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	5H	IC12	7E	Q4	7F	Q15	5E	D23	4D
IC3	5J	IC13	9E	Q5	6F	Q16	4E	D24	5F
IC4	4H	IC15	8F	Q6	9D	D1	5E	D25	5D
IC5	9N	IC16	3F	Q7	4D	D13	9M	D26	4F
IC6	4I	IC17	4E	Q8	4C	D14	9M	D27	10G
IC7	8J	IC18	5L	Q10	8G	D15	9M		
IC8	7J	IC19	5N	Q11	7G	D16	9L		
IC9	8E	Q1	6E	Q12	4D	D19	7E		
IC10	8M	Q2	5E	Q13	4E	D20	7E		
IC11	6O	Q3	5F	Q14	4F	D22	7P		

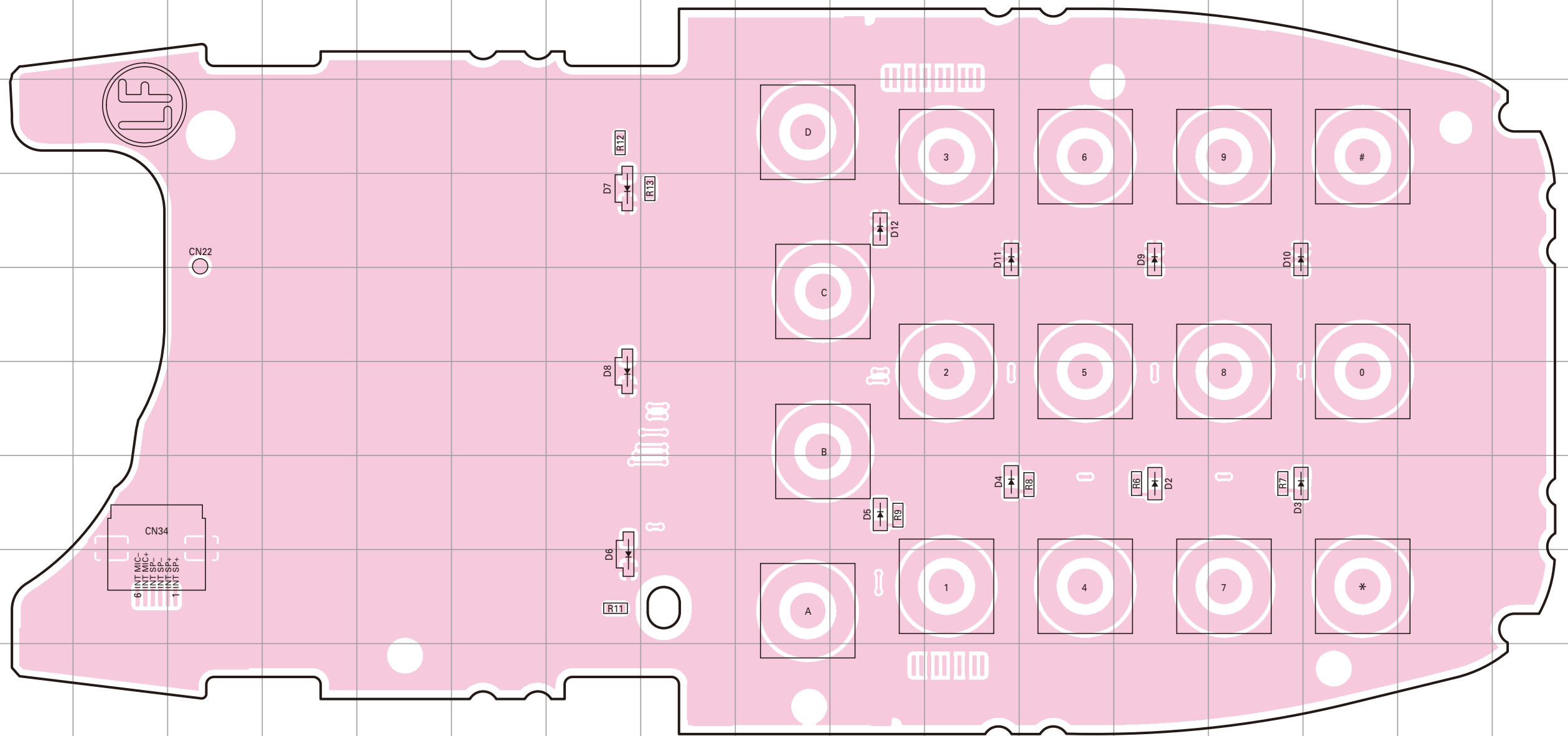


TK-5410 PC BOARD

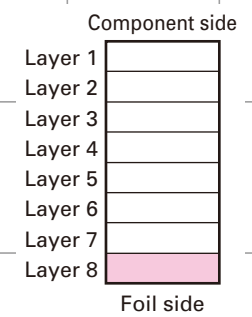
PC BOARD TK-5410

CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Foil side view (J79-0230-09)

CONTROL UNIT (X53-4390-XX) -11 : K2 -12 : K3
Foil side view (J79-0230-09)



Ref. No.	Address	Ref. No.	Address
D2	8N	D8	7H
D3	8O	D9	5N
D4	8L	D10	5O
D5	8K	D11	5L
D6	9H	D12	5K
D7	5H		

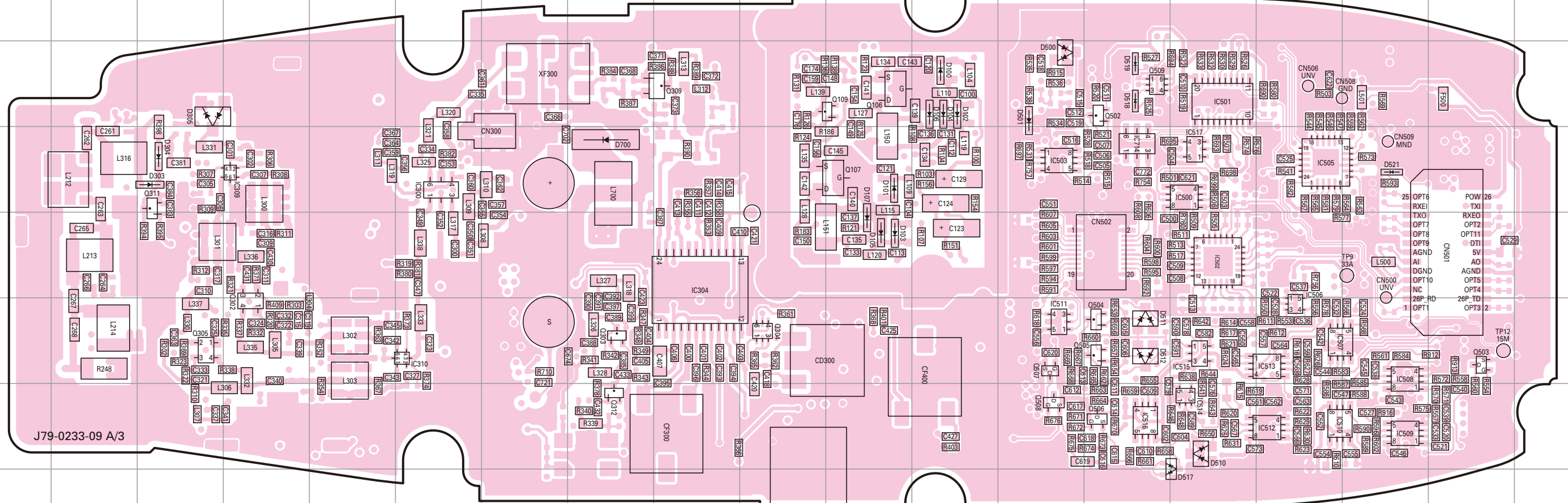


TK-5410 PC BOARD

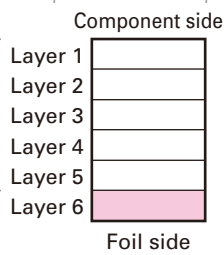
PC BOARD TK-5410

TX-RX UNIT (X57-7560-10) (A/3): TX-RX SECTION
Foil side view (J79-0233-09 A/3)

TX-RX UNIT (X57-7560-10) (A/3): TX-RX SECTION
Foil side view (J79-0233-09 A/3)

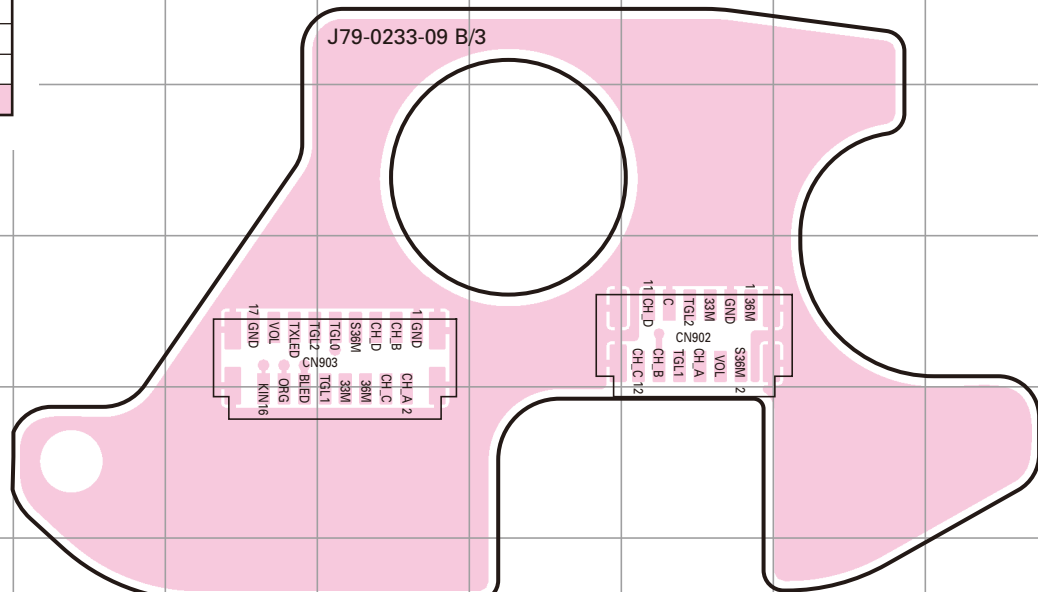


J79-0233-09 A/3

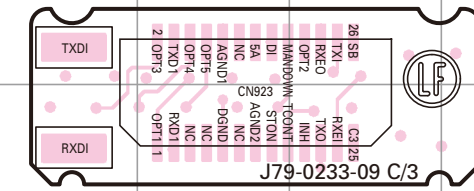


TX-RX UNIT (X57-7560-10) (B/3): TOP SECTION
Foil side view (J79-0233-09 B/3)

TX-RX UNIT (X57-7560-10) (C/3): OPTION SECTION
Foil side view (J79-0233-09 C/3)

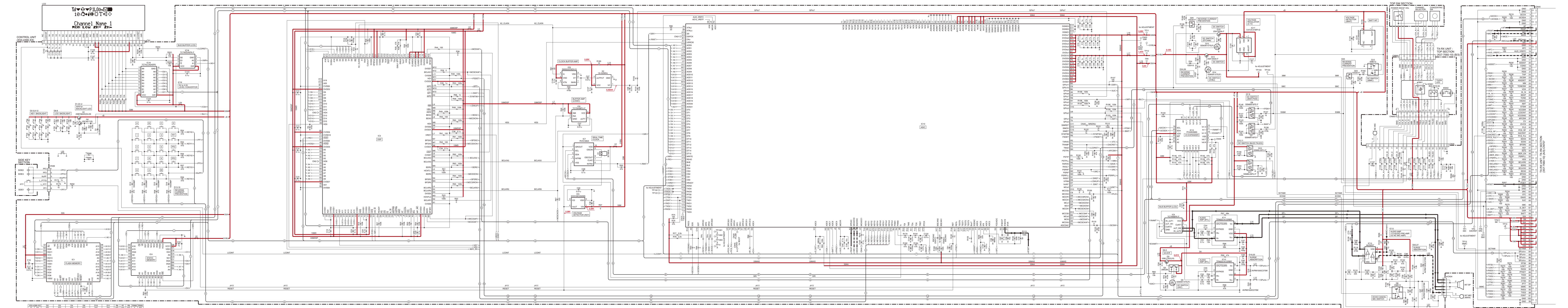


J79-0233-09 B/3

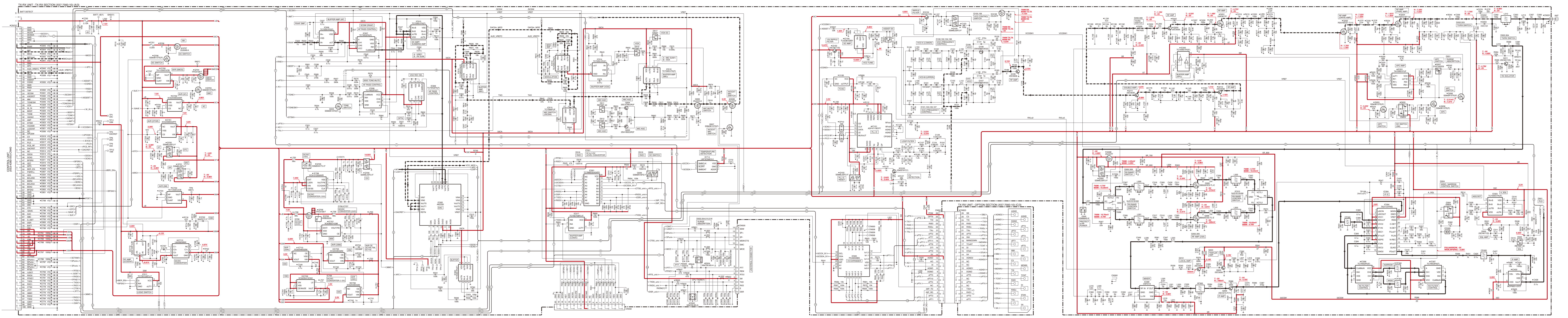


J79-0233-09 C/3

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	4F	IC513	6P	Q502	3N	D303	4C
IC304	5I	IC514	7O	Q503	6R	D304	4C
IC309	4D	IC515	6O	Q504	6N	D305	3C
IC310	6F	IC516	7N	Q505	6N	D500	3M
IC500	4O	IC517	4O	Q506	7N	D501	3M
IC501	3O	IC714	4N	Q507	6M	D510	7O
IC502	5O	Q106	3K	Q508	7M	D511	6N
IC503	4M	Q107	4K	Q509	3N	D512	6N
IC505	4P	Q109	3K	D100	3L	D517	8O
IC506	6P	Q302	6D	D101	4K	D518	3N
IC507	6P	Q303	6H	D102	3L	D519	3N
IC508	6Q	Q304	6J	D103	5K	D521	4Q
IC509	7Q	Q305	6C	D104	3L	D700	4H
IC510	7P	Q309	3I	D105	5K		
IC511	6M	Q311	4C	D106	3L		
IC512	7P	Q312	7H	D107	5K		



533-4390-XX	D2	D3	D4	D5	D10	D11	R6	R7	R8	R98	R99
-11	K2	NO	NO	NO	NO	NO	NO	NO	NO	0	NO
12	X2	RES21	RES22	RES23	RES24	RES25	RES26	RES27	RES28	RES29	RES30



TX-RX UNIT - TX-RX SECTION (X57-7560-10) (A/B)

TX-RX UNIT - OPTION SECTION (X57-7560-10) (C/D)

CONTROL UNIT
X57-5500-00-00

UNIVERSAL CONNECTION

