800MHz DIGITAL TRANSCEIVER

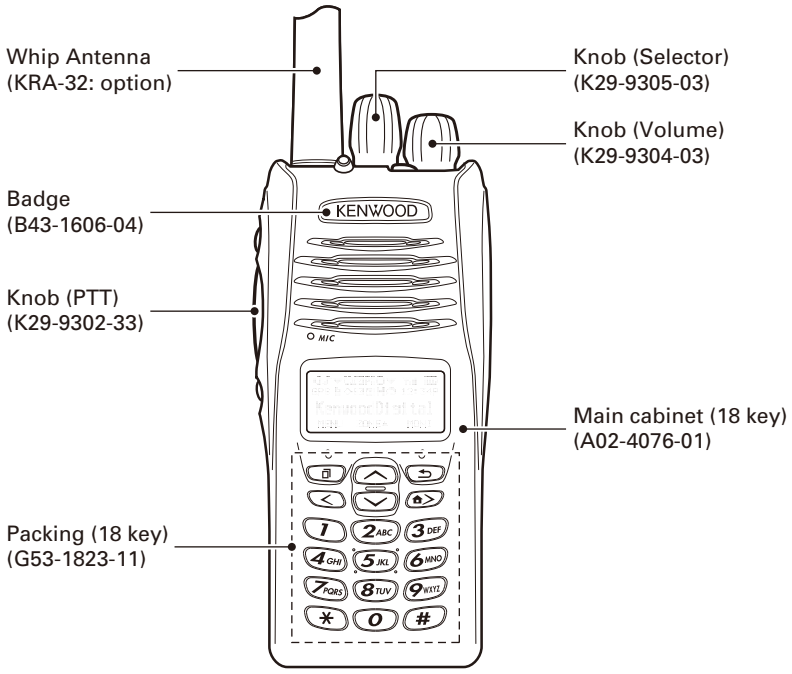
NX-410

SERVICE MANUAL

KENWOOD

Kenwood Corporation

B51-8950-00 (N) 469



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

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This product complies with the **RoHS** directive for the European market.

LF

This product uses Lead Free solder.

Document Copyrights

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Firmware Copyrights

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.

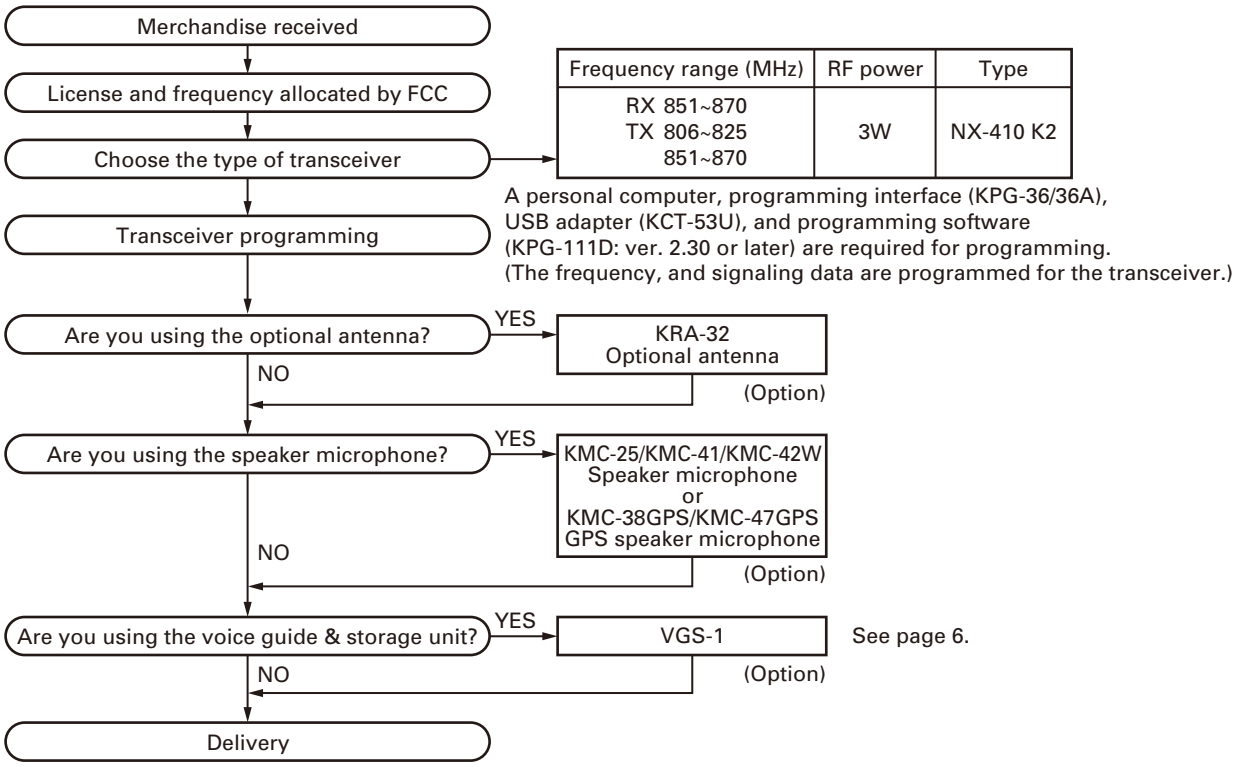
SERVICE

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-111D version 2.30 or later for this transceiver. KPG-111D versions earlier than version 2.30 will not work properly.
- You must use firmware version 2.30 or later for this transceiver. Firmware versions earlier than version 2.30 will not work properly.

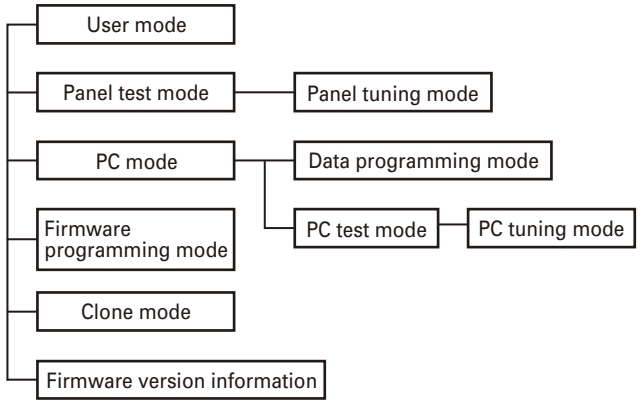
SYSTEM SET-UP



See page 6.

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.
Clone mode	Used to transfer programming data from one transceiver to another.
Firmware version information	Used to confirm the internal firmware version.

REALIGNMENT

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[⮌] + Power ON
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode] + [⎙]
Firmware programming mode	[⎙] + Power ON
Clone mode	[<] + Power ON
Firmware version information	[Side1] + Power ON

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-111D: ver. 2.30 or later).

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

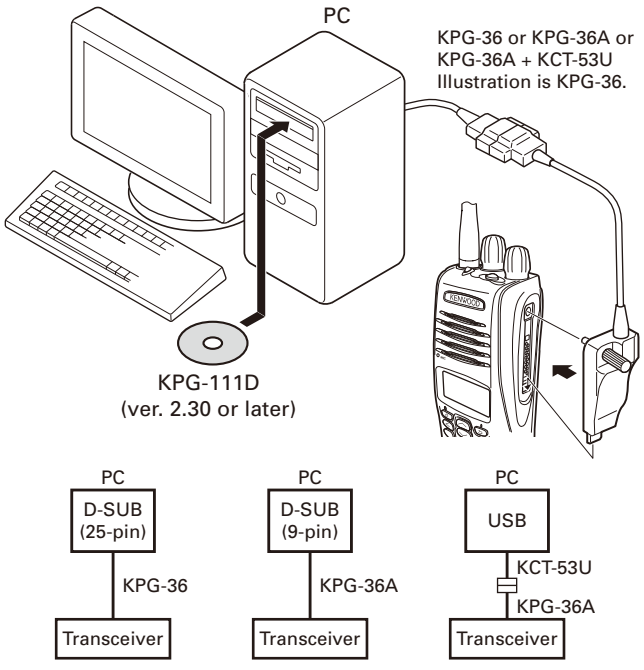


Fig. 1

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 transmitting from transceiver, the red LED is lights.
   When data receiving to transceiver, the green LED is lights.

Note:

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

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-111D description

The KPG-111D is the programming software for the transceiver supplied on a CD-ROM. This software runs under Windows XP, Vista or 7 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.)

REALIGNMENT

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. 6.0 or later)). The Fpro.exe exists in the KPG-111D 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 [▯] key while turning the transceiver power ON. Then, the orange LED on the transceiver lights and "PROGRAM 115200" 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. When the transceiver starts to receive data, the [LOADING] display lights.
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.

6-4. Function

1. If you press the [Side2] key while "PROGRAM 115200" is displayed, the display changes to "PROGRAM 19200" (The LED blinks green) to indicate that the write speed is low speed (19200 bps). If you press the [Side2] key again while "PROGRAM 19200" is displayed, the display changes to "PROGRAM 38400" (The LED lights red and orange alternatively). If you press the [Side2] key again while "PROGRAM 38400" is displayed, the display changes to "PROGRAM 57600" (The LED blinks orange). If you press the [Side2] key again while "PROGRAM 57600" is displayed, the display returns to "PROGRAM 115200" (The LED lights orange).
2. If you press the [Side1] key while "PROGRAM 115200" is displayed, the checksum is calculated, and a result is displayed. If you press the [Side1] key again while the checksum is displayed, "PROGRAM 115200" is redisplayed.

Note:

Normally, write in the high-speed mode.

7. Clone Mode

Programming data can be transferred from one transceiver to another by connecting them via their external universal connectors. The operation is as follows (the transmit transceiver is the source and the receive transceiver is a target).

The following data cannot be cloned.

- Tuning data
- Embedded message with password
- Model name data
- ESN (Electronic Serial Number) data

Note:

The following data can be cloned.

- Fleet (own)/ID (own) for FleetSync
- Unit ID (own) for NXDN

Key guide on the Read authorization password input screen.

- CONFRM ([▯] key): The password confirmation
- DELETE ([⮌] key): Delete the least digit from the current password number (Press and hold to delete all password numbers)
- SELECT ([▯] key): Determine the least digit of the password number

1. Press and hold the [<] key while turning the transceiver power ON. If the Read authorization password is set to the transceiver, the transceiver displays "CLONE LOCK". If the password is not set, the transceiver displays "CLONE MODE".
2. When you enter the correct password, and "CLONE MODE" is displayed, the transceiver can be used as the cloning source. The following describes how to enter the password.
3.

- **How to enter the password using the keypad;**
  If one of keys 0 to 9 is pressed while the "CLONE LOCK" is displayed, the pressed number is displayed on the LCD.
  Each press of the key shifts the display in order to the left.
  When you enter the password and press the [▯] or [*] key, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
- **How to enter the password using the [∧] and [∨] keys;**
  If the [∧] / [∨] key is pressed while "CLONE LOCK" is displayed, the Read authorization password input screen is displayed.
  If the [∧] key or [∨] key is pressed while the Read authorization password input screen is displayed, the number (0 to 9) blinks on the LCD. When you press the [▯] key, the currently selected number is determined. If you press the [▯] key after entering the password in

REALIGNMENT

this procedure, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.

4. Power ON the target transceiver.
5. Connect the cloning cable (part No. E30-3325-05) to the universal connectors on the source and target.
6. Press the [▣] key on the source while the source displays "CLONE MODE". The data of the source is sent to the target. While the target is receiving the data, "PROGRAM" is displayed. When cloning of data is completed, the source displays "END", and the target automatically operates in the User mode. The target can then be operated by the same program as the source.
7. The other target can be continuously cloned. When the [▣] key on the source is pressed while the source displays "END", the source displays "CLONE MODE". Carry out the operation in step 4 to 6.

Note:

- Cannot be cloned if the password (overwrite password) is programmed to the target.
- "Model Name" must be same to clone the transceiver.

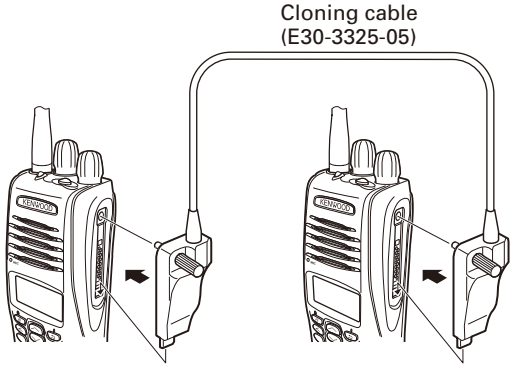


Fig. 2

8. Firmware Version Information

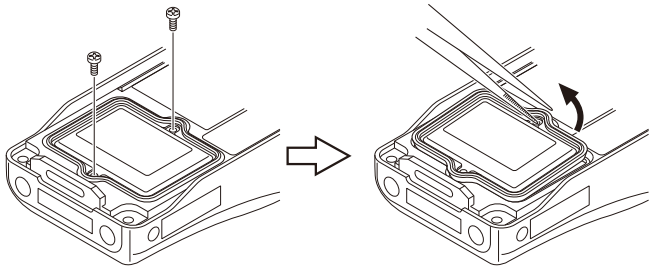
Press and hold the [Side1] key while turning the transceiver power ON and then keep pressing and holding the [Side1] key, the firmware version information appears on the LCD.

INSTALLATION

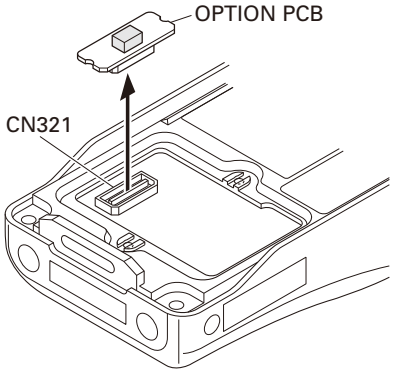
Voice Guide & Storage Unit (VGS-1: Option)

■ Installing the VGS-1 (Voice Guide & Storage Unit) in the transceiver

1. Remove the two 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.
   Note:
   Take care that the tip of tweezers is not inserted into the screw hole of the chassis.
   The tip of tweezers must come in contact with the surface of the chassis.

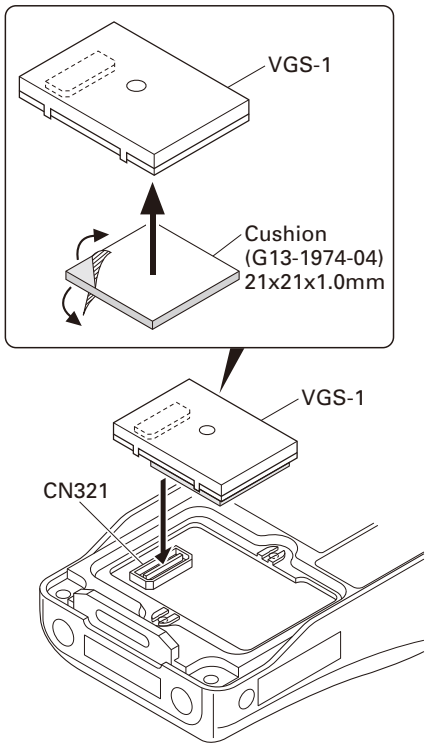


3. Remove the OPTION PCB from the connector (CN321) of the TX-RX PCB.



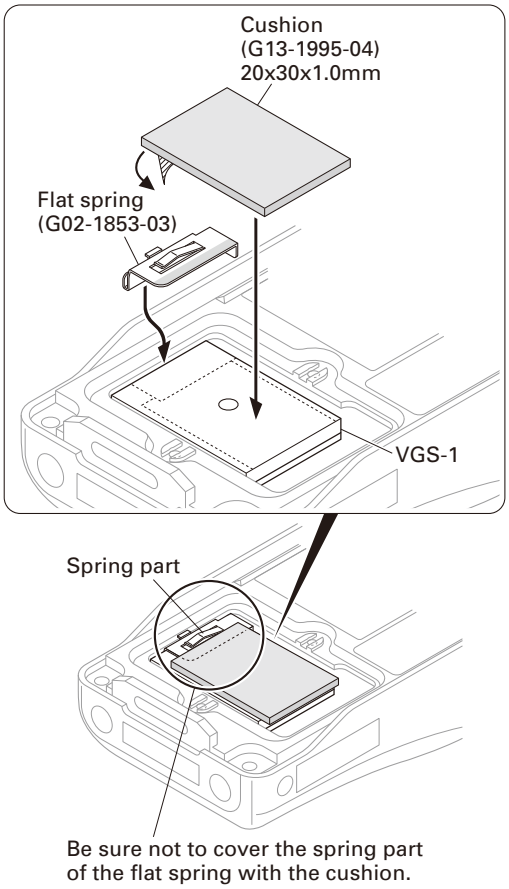
INSTALLATION

4. Attach the cushion (G13-1974-04) to the VGS-1 as shown in the figure.
   Note:
   Be sure to not cover the VGS-1 connector with the cushion.
5. Insert the VGS-1 connector into the connector (CN336) of the TX-RX PCB.



6. Insert the flat spring (G02-1853-03) between the VGS-1 and the chassis as shown in the figure.
7. Attach the cushion (G13-1995-04) on the VGS-1 so that it is attached to a part (shaded region) of the flat spring.

Note:
Be sure not to cover the spring part of the flat spring with the cushion.

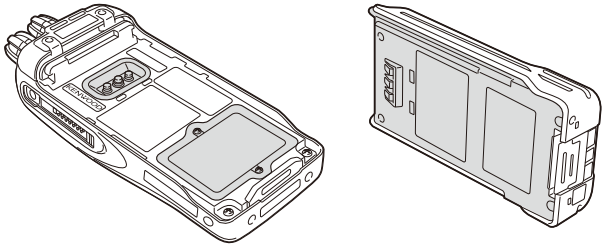


8. Reinstall the cover using the two screws removed in step 1.

DISASSEMBLY FOR REPAIR

1. Precautions for Waterproof

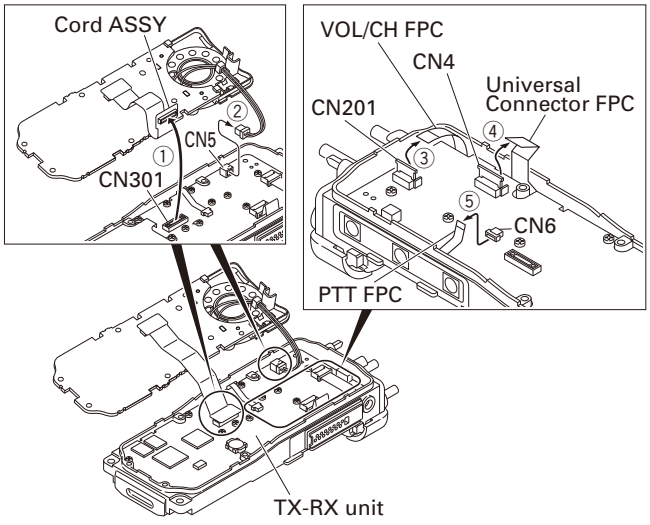
- The orange packing material on the reverse side of the transceiver is important with respect to the waterproof efficiency of the transceiver. Do not place stickers or other materials on or around the packing material shown in the figure, or on the reverse side of the battery pack. Doing so will impair the waterproof efficiency of the transceiver and may cause it to break down. Additionally, in order to prevent damage to the packing material, do not allow it to come in contact with foreign materials.

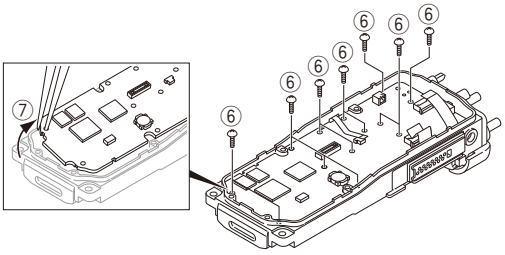


2. Precautions for Disassembly

■ Removing the TX-RX unit from the chassis

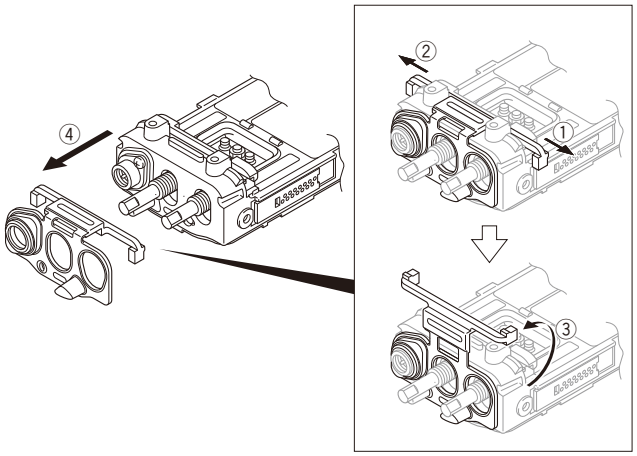
1. Remove the Cord ASSY from the connector (CN301) of the TX-RX unit ①.
2. Remove the Speaker lead wire from the connector (CN5) of the TX-RX unit ②.
3. Remove the VOL/CH FPC from the connector (CN201) of the TX-RX unit ③.
4. Remove the Universal connector FPC from the connector (CN4) of the TX-RX unit ④.
5. Remove the PTT FPC from the connector (CN6) of the TX-RX unit ⑤.
6. Remove the 14 screws ⑥.
7. Anchor the screw hole of the TX-RX unit using the tip of a pair of tweezers as shown in the figure. Then, lift the TX-RX unit to remove it from the chassis ⑦.





■ Removing the TOP packing (G53-1600-12)

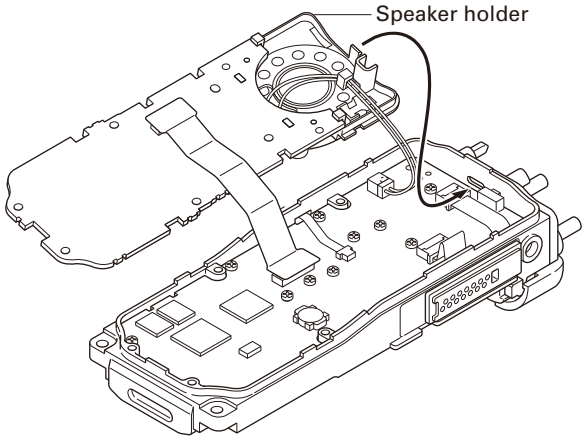
1. Pull the TOP packing to the left to remove the packing that is fit into the left groove of the chassis ①.
2. Pull the TOP packing to the right to remove the packing that is fit into the right groove of the chassis ②.
3. Turn back the TOP packing as shown in the figure ③.
4. Remove the TOP packing ④.



3. Precautions for Reassembly

■ Mounting the Display unit onto the chassis

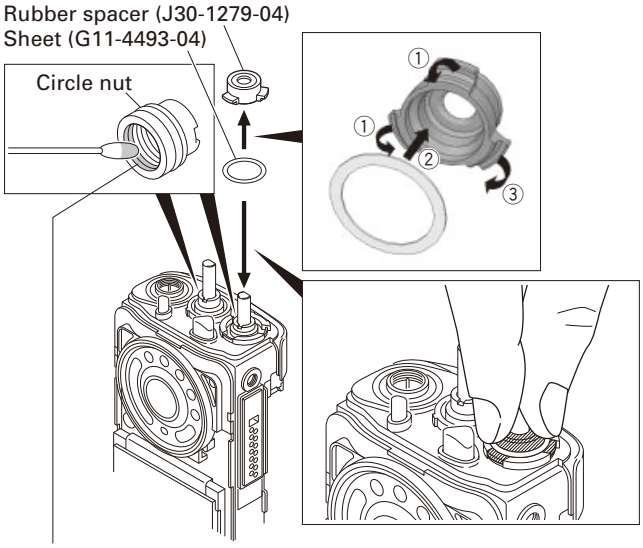
Insert the tab of the speaker holder into the hole in the upper part of the chassis.



DISASSEMBLY FOR REPAIR

■ Inserting the rubber spacer (J30-1279-04) onto the rear panel

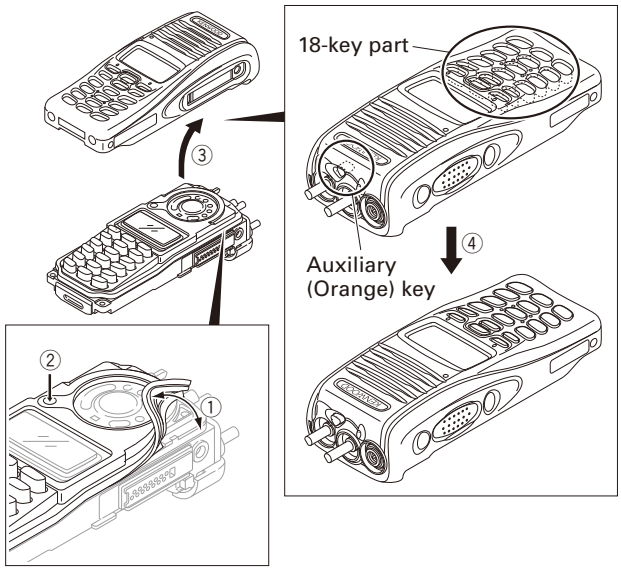
1. Bend the two convex parts of the rubber spacer inward ①, then fit the sheet into the space ②.
   Next, bend the one convex part of the rubber spacer inward ③, and insert the sheet into the rubber spacer.
2. Press the rubber spacer, using your fingers, to insert it between the rubber spacer and the rear panel without crevice.



Apply the bond (W05-0019-00) or "THREE BOND 1401B" around the inside of the circle nut before tightening the circle nut.

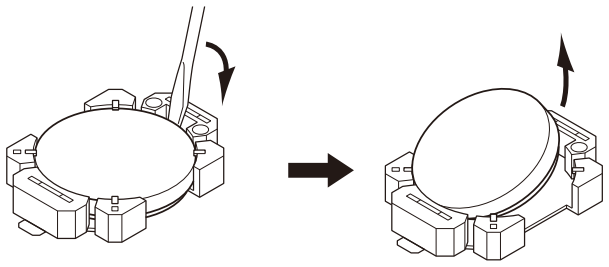
■ Mounting the chassis onto the case

1. Place the key top on the chassis. Then, fit the chassis tightly into the groove of the key top ①.
   Note:
   Confirm that the entire groove of the key top fits to the chassis tightly.
2. Press the microphone part of the key top using your finger ②.
   Note:
   Confirm that the microphone part of the key top fits tightly with the element microphone.
3. Mount the chassis onto the case ③.
   Note:
   After mounting the chassis onto the case, if the 18-key part on the key top or the Auxiliary (Orange) key part of the VOL/CH packing gets stuck inside the case as shown in the figure, return it to the normal position using a soft tipped item (e.g., your finger) ④.
   Prying it with a pointed metal tool such as forceps, may damage the key top or packing.



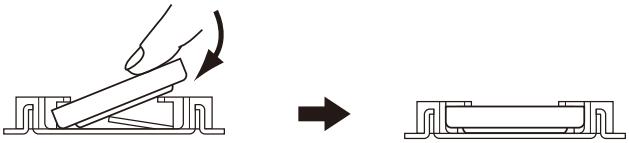
■ Removing the lithium cell (W09-0971-05)

Insert a non-conductive screwdriver to groove of one side of the socket (CN204) and pry the lithium cell up from the socket.



■ Installing the lithium cell (W09-0971-05)

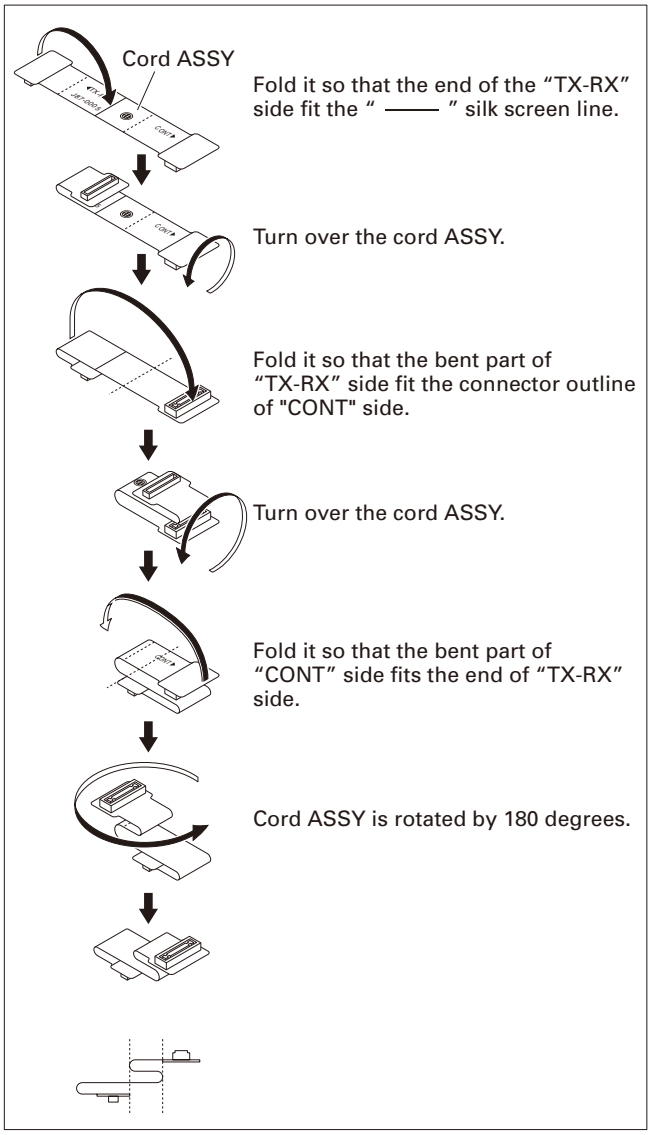
Insert a lithium cell into one side of the socket (CN204). Push the lithium cell to insert the lithium cell into the socket.

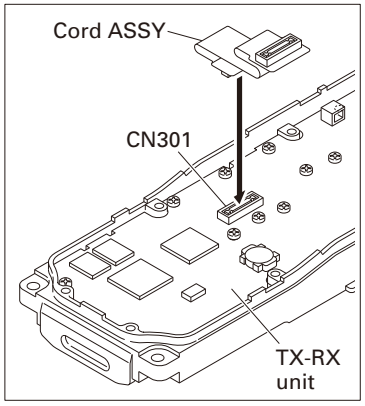


DISASSEMBLY FOR REPAIR

■ Forming the Cord ASSY

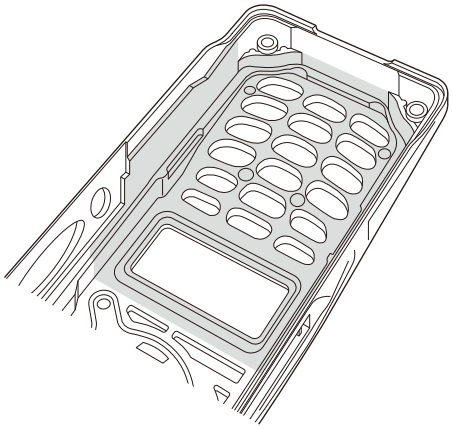
Form the Cord ASSY according to the procedure shown in the figure.





■ Correspondence when replacing the case (A02-4076-01)

Apply the dry-surf (410-0019-05) around the LCD and 18-key part of the case when replacing the case.



DISASSEMBLY FOR REPAIR

■ Assembly information (Sheet/Cushion)

When "Main Parts" is changed (ordered), "Assembled Sheet/Cushion" should also be changed (ordered) together.
The Sticker and Sheet etc are non-reusable parts. It requires the new one to get the radio's performance after repairs.
For example, when "Main Cabinet (A02-4076-01)" is changed, "Sticker (B42-7296-04)", "Badge (B43-1606-04)" and "Fibrous Sheet (G10-1400-04)" should be ordered and changed together because Sticker (B42-7296-04), Badge (B43-1606-04) and Fibrous Sheet (G10-1400-04) are non-reusable.

Main Parts		Assembled Sheet/ Cushion		
Part Name	**Part Number**	**Part Name**	**Part Number**	**Remark**
Main Cabinet	A02-4076-01	Sticker	B42-7296-04	"NXDN" is printed.
		Badge	B43-1606-04	"KENWOOD" is printed.
		Fibrous Sheet (SP)	G10-1400-04	
LCD ASSY	B38-0923-05	Adhesive Sheet (LCD)	J99-0714-04	Used for fixing the LCD ASSY on the Illumination Guide (LCD). Also used for fixing the Illumination Guide (LCD) on the Control Unit.
Speaker	T07-0749-25	Rubber Cushion (SP)	G11-4272-14	
Chassis	A10-4132-03	Rubber Sheet (FET)	G11-4308-24	Used for stabilizing the radiation performance of the FET.
Illumination Guide (LCD)	B11-1854-02	Sheet (LCD-Holder)	G11-4495-14	
Packing (18-key)	G53-1823-11	Sheet (18-key Packing)	G11-4494-04	

CIRCUIT DESCRIPTION

1. Overview

The NX-410 is an 800MHz Portable transceiver designed to operate in the frequency range of 806 to 870MHz.

The unit consists of receiver, transmitter, phase-locked loop (PLL) frequency synthesizer, baseband parts, power supply, and control circuits.

2. Frequency Configuration

The receiver is a double-conversion superheterodyne using the first intermediate frequency (IF) of 58.05MHz and the 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 oscillator output to produce the 450kHz second IF. 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.

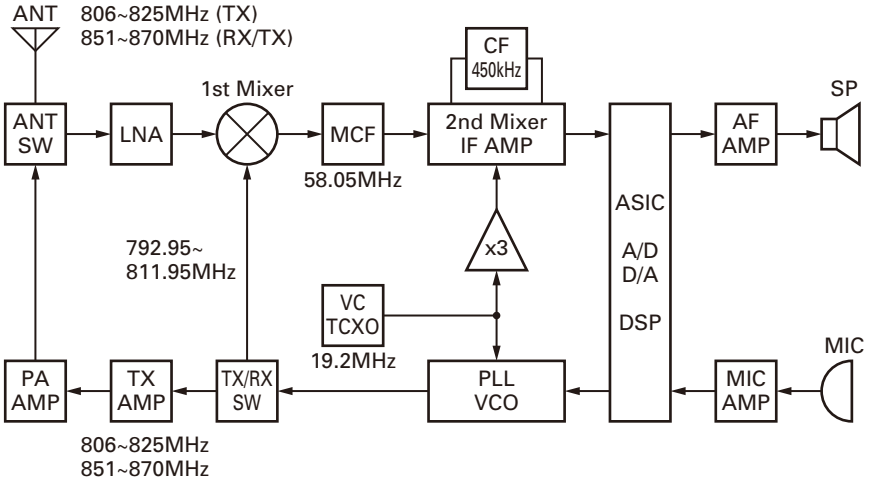


Fig. 1 Frequency configuration

3. Receiver System

3-1. RF Circuit

An incoming RF signal from the antenna terminal is passed through the antenna switch (D605, D606, D607 and D608) and then the band-pass filter (L830).

The signal is amplified by an RF amplifier (Q804), and passed through the band-pass filter (L820). The resulting signal is applied to the first mixer (IC804), where it is mixed with the first local oscillator signal output from the frequency synthesizer to produce the first IF (58.05MHz).

3-2. IF Circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF801) to reject adjacent channel signals. The filtered first IF signal is amplified by the first IF amplifier (Q802) and then applied to the IF system IC (IC802). The IF system IC provides a second mixer, AGC amplifier, and RSSI (Received Signal Strength Indicator).

The second mixer mixes the first IF signal with the 57.6MHz of the second local oscillator output and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF801) to reject the adjacent channel signal. The filtered second IF signal is amplified by the AGC amplifier.

The signal from the AGC amplifier is input to the ASIC (IC309) through the ceramic filter (CF802) and operational amplifier (IC801).

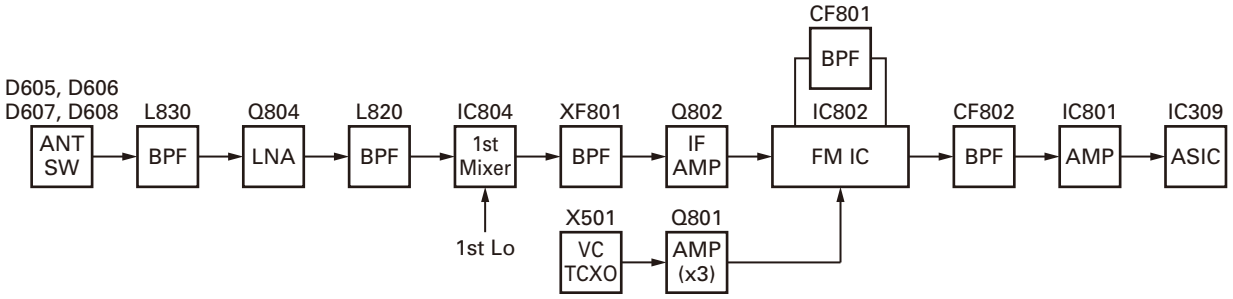


Fig. 2 RF and IF circuit

CIRCUIT DESCRIPTION

3-3. Audio Amplifier Circuit

Audio processing (high-pass filter, low-pass filter, de-emphasis, etc.) at FM mode and decoding at NXDN mode are processed by the DSP. The audio signal from IC309 and IC304 goes through the amplifier (IC2). The signal then goes through a mute switch (IC7), amplifier (IC10), electronic volume control (IC3), and AF amplifier (IC13).

While busy, AMT becomes Low to turn on IC2, and the signal is fed to the AF switch. While INAMT is High, the AF switch (IC15) selects the internal speaker, and the audio signal is fed to the internal audio power amplifier (IC17), and is then output to the internal speaker. While EXAMT is High, the AF switch (IC15) selects the external speaker, and the audio signal is fed to the external audio power amplifier (IC19), and is then output to the external speaker. The power supply for IC17 and IC19 is turned on while INAMT or EXAMT is High.

The speaker is switched by the logic of the speaker switching terminal SSW on the universal connector. When the SP-MIC is not attached, SSW becomes High. IC309 detects the logic of SSW and activates either INAMT or EXAMT.

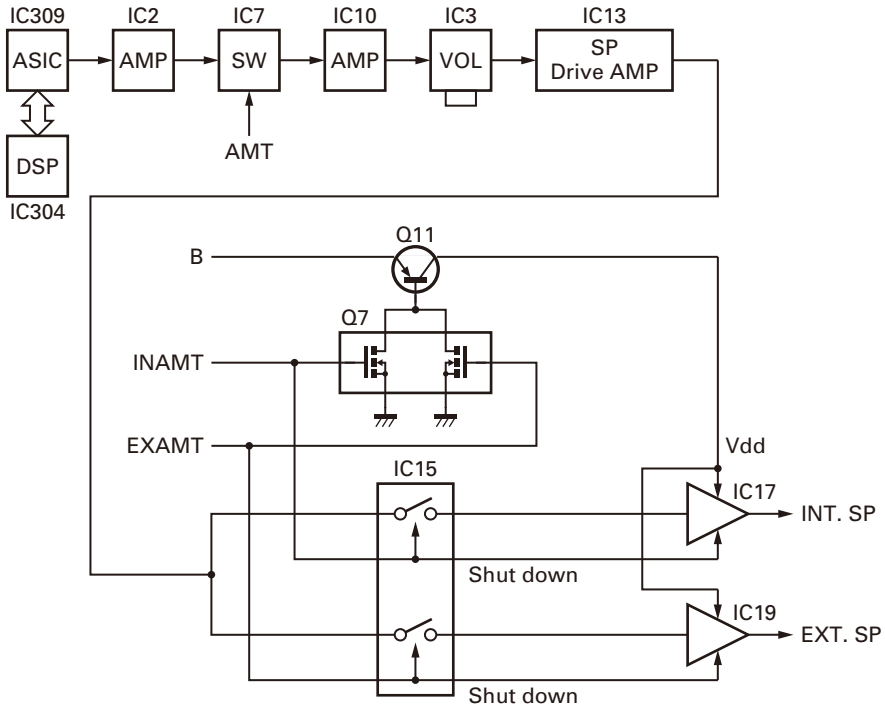


Fig. 3 Audio amplifier circuit

3-4. Squelch Circuit

It amplifies the demodulated noise signal from IC309 after filtering through the BPF circuit. The amplified signal is then converted to a DC signal by the detection circuit. The converted signal is fed back to IC309.

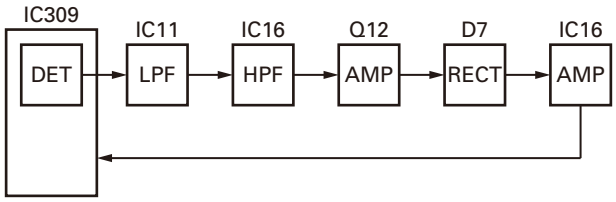


Fig. 4 Squelch circuit

CIRCUIT DESCRIPTION

4. Transmitter System

4-1. Audio Band Circuit

The signal from the internal microphone goes through the mute switch (Q9). When the SP-MIC is not attached, the microphone switching terminal (MSW) on the universal connector becomes High, and the mute switch (Q9) is turned on. When the SP-MIC is attached, MSW is connected to GND inside of the SP-MIC. For this reason, Q8 is turned off, the internal microphone is muted, and only the input of the external microphone is supplied to the microphone amplifier. The signal from the microphone goes through the mute switch (Q6), and is amplified by IC14 and limited by the AGC circuit which is composed of D1, D2, Q3 and Q4.

4-2. Baseband Circuit

The audio signal from the audio band circuit is converted to digital data with a sampling frequency of 48kHz with ASIC (IC309). This digital data is sent to the DSP (IC304), and voice signals of 300Hz or lower and frequencies of 3kHz or higher are cut off and an audio range of 300Hz to 3kHz is extracted.

In FM mode, the audio signal is pre-emphasized and combined with signals, such as QT and DQT, as required.

In Digital mode, the audio signal is converted to the 4-Level FSK baseband signal. The baseband signals of DTMF and MSK are also generated by the DSP.

The processed baseband signal is output from IC304 and IC309. The signal from IC304 deviates the frequency of the PLL IC (IC503). The signal from IC309 is filtered with the LPF (IC1), and adjusts the level with DAC (IC3), and deviates the frequency of the VCO.

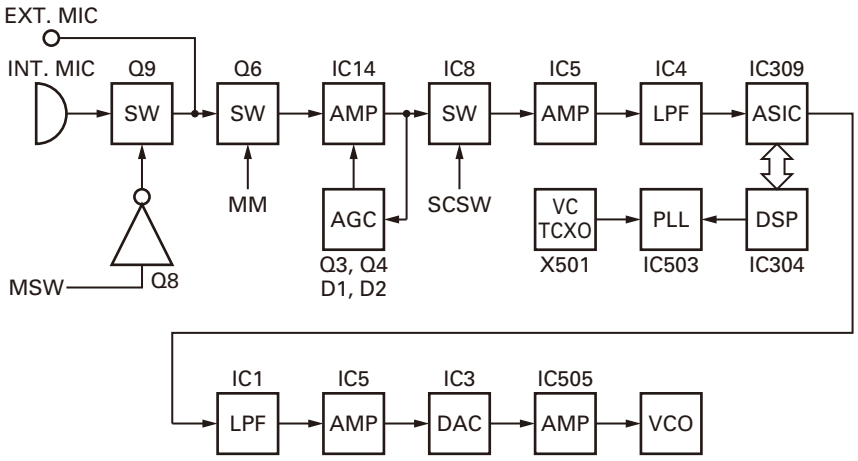


Fig. 5 Audio band and Baseband circuit

CIRCUIT DESCRIPTION

4-3. VOX

IC14 amplifies the audio signal captured in the microphone. The signal is then converted into DC voltage, and is rectified by D3. The DC voltage activates the ASIC (IC309), and the VOX starts.

4-4. Drive and Final Amplifier

The signal from the T/R switch (D601 is on) is amplified by the drive amplifier (Q610, Q601 and Q602) to 23~26dBm. The output of the drive amplifier is amplified by the RF power amplifier (Q604) to 3.0W (1W when the power is low). The RF power amplifier is a MOS FET. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D605 and D606 are on) and applied to the antenna terminal.

4-5. APC Circuit

The APC circuit always monitors the current flowing through the RF power amplifiers (Q604 and Q602) and keeps a constant current. The voltage drop at R650 and R651 is caused by the current flowing through the RF power amplifiers. This voltage is applied to the differential amplifier (IC601 1/2).

IC601 (2/2) compares the output voltage of IC601 (1/2) with the reference voltage from IC505, and the output of IC601 (2/2) controls the VGG of Q601, Q602 and Q604 to make both voltages the same. The change of power high/low is carried out by the change of the reference voltage. Q606, Q608 and Q609 are turned on and Q603 and Q605 are turned off during transmission and the APC circuit is active.

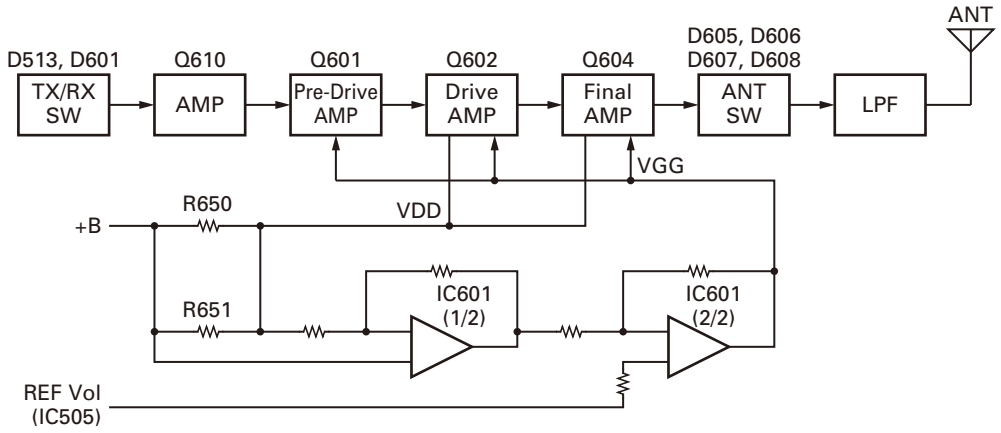


Fig. 6 Drive and final amplifier and APC circuit

5. PLL Frequency Synthesizer

5-1. VCTCXO (X501)

VCTCXO (X501) generates a reference frequency of 19.2MHz for the PLL frequency synthesizer. This reference frequency is applied to pin 9 of the PLL IC (IC503) and is connected to the IF circuit as a 2nd local signal through the Tripler (Q801). The oscillation frequency of VCTCXO is determined by the DC voltage of the VC terminal. The VC voltage is fixed to 1.65V by R501 and R502.

The frequency adjustment is achieved by switching the ratio of dividing frequency that is not adjusted by the DC voltage impressed to VC.

5-2. VCO

There are two VCOs (VCO-A and VCO-B).

VCO-A (Q507) generates the 1st local signal for the receiver and a carrier for the transmitter.

VCO-B (Q504) generates a carrier for the transmitter of TA (Talk Around).

The oscillation frequency of the VCO is half of the carrier or 1st local signal. The VCO oscillates from 403 to 435MHz during transmit, and from 369.475 to 405.975MHz during reception.

The VCO oscillation frequency is determined by one system of operation switching terminal "/T_R" and two systems of voltage control terminals "CV" and "ASSIST".

The operation switching terminal, "/T_R", is controlled by the control line (/T_R) output from the ASIC (IC309). When the /T_R logic is low, VCO-B is activated, and when the /T_R logic is high, VCO-A is activated.

The voltage control terminals, "CV" and "ASSIST", are controlled by the PLL IC (IC503) and ASIC (IC309) 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.

CIRCUIT DESCRIPTION

5-3. PLL IC (IC503)

The PLL IC compares the differences in phases of the VCO oscillation frequency and the VCTCXO 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 is used before control 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 approximately 3.0V.

The desired frequency is set for the PLL IC by the ASIC (IC309) through the 3-line "SDO1", "SCK1", "/PCS_RF" 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.

"PLLMOD" receives the modulation data from the DSP (IC304).

5-4. Doubler (Q509)

The doubler (Q509) extracts the twice harmonic component from the signal from the VCO. This twice harmonic components is fed into the PLL (IC503) and buffer (Q510) through a band-pass filter.

5-5. Local Switch (D513, D601)

The destination of the signal from the buffer amplifier (Q510) is changed with the diode switch (D601) that is controlled by the transmission power supply, 50T, and the diode switch (D513) that is controlled by the receive power supply, 50R. If the 50T logic is high, it is connected to a send-side pre-drive (Q610). If the 50T logic is low, it is connected to a receive-side mixer (IC804).

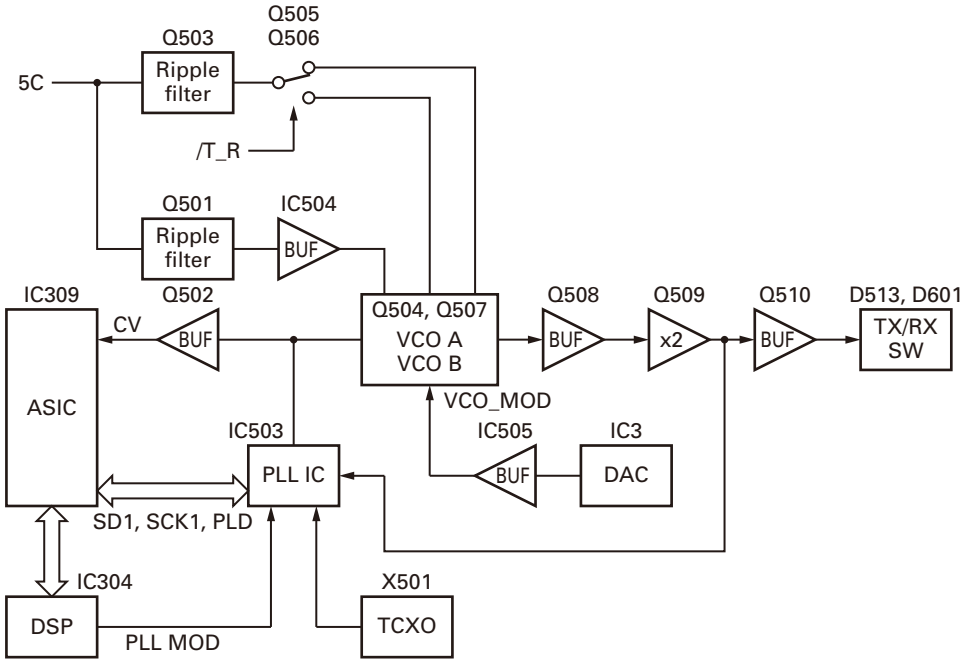


Fig. 7 PLL block diagram

CIRCUIT DESCRIPTION

6. Control Circuit

The control circuit consists of the ASIC (IC309) and its peripheral circuits. IC309 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 (IC309) is a 32-bit RISC processor, equipped with peripheral function and ADC/DAC.

This ASIC operates at 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.

6-2. Memory Circuit

The memory circuit consists of the ASIC (IC309), the SRAM (IC305), and the flash memory (IC303).

The flash memory has a 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-111D), 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 by 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 (IC308). 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 (CN301) of the Display unit (X54-366). It corrects the LCD contrast voltage using IC102.

6-4. Temperature Detection Circuit

The temperature detection circuit detects the temperature using a temperature IC (IC502) 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 IC309. The /KEYI signals that are normally pulled down go high when any key is pressed.

6-6. Low Battery Warning

The battery voltage is divided using R224 and R225 and is detected by the ASIC (IC309). 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 beeps while the PTT switch is pressed.	The battery voltage is low and the transceiver is not usable to make calls.

6-7. DSP

The DSP circuit consists of a DSP (IC304) and processes the baseband signal. The DSP operates on an external clock of 18.432MHz (the same as IC309), the I/O section operates at 3.3V and the core section operates at 1.5V. The DSP carries out the following processes:

- 4 Level FSK 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
- LTR encoding/decoding
- DTMF encoding/decoding
- MSK encoding/decoding
- Compressor/expander processing
- Voice scrambler processing
- Transmit/receive audio filtering processing
- Microphone amplifier AGC processing
- Audio mute processing
- Modulation level processing

7. Power Supply Circuit

The battery voltage (+B) is provided from the battery terminal on the TX/RX unit (X57). The battery voltage passes through the 2.5A fuse (F201), and goes to the RF final amplifier, AVR ICs (IC204, IC205, IC210, IC18), DC/DC (IC206) and voltage detector IC (IC209).

The voltage detector watches the battery voltage. If the battery voltage is 5.6V or higher, the detector outputs High. While the output of IC209 is High, IC210 and Q208 provide 3.1V (31BU) to the backup-section.

When the VOL SW is turned on, SB1 becomes high (battery voltage). The DC/DC (IC206) operates if both SB1 and the output of the detector are high. IC206 outputs 3.8V and activates IC203 (33M), IC202 (15M), and IC201 (33A). As a result, the ASIC and DSP operate.

CIRCUIT DESCRIPTION

The SBC signal becomes High after the ASIC operates, and IC204 (5A) and Q201 (SB2) are turned on. IC207 operates by turning on these AVR ICs and FET switches.

The 5UC signal becomes High when an option is installed on the universal connector. Then IC18 (50U) operates.

When the /SAVE signal becomes High, IC205 (50C) operates. The output of IC205 is connected to two FET switches (Q207, Q205). When the SBC signal becomes High, IC207 (33C) operates. The FET switches are controlled by the ASIC. Q207 (50T) is turned on in transmit mode. Q205 (50R) is turned on in receive mode.

When the VOL SW is turned off, the /PSW signal becomes Low. After detecting the /PSW signal, the ASIC changes the SBC signal to Low. Then the power supplies except IC210 (31BU) stop.

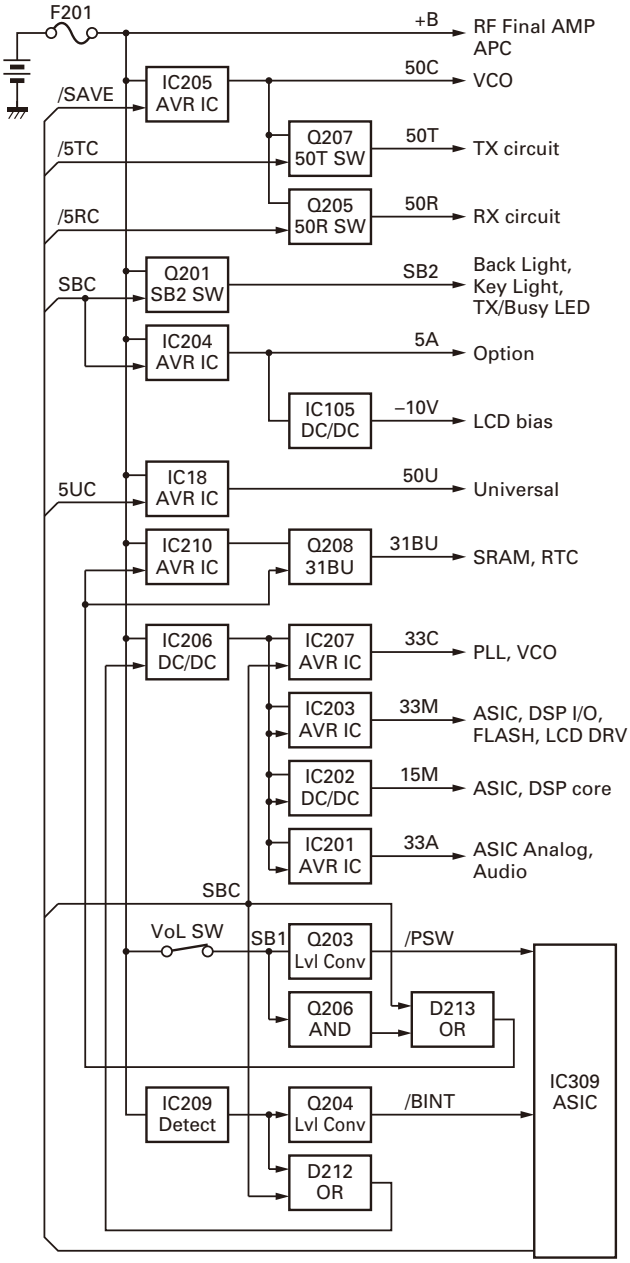


Fig. 8 Power supply circuit

8. Signaling Circuit

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

Each signaling data signal of QT, DQT, LTR, DTMF and MSK is generated by the DSP circuit, superimposed on a modulation signal and output from the DSP (IC304) and ASIC (IC309). The modulation balance of the QT/DQT/LTR signal is adjusted by the D/A converter (IC3) and the resulting signal is routed to the modulation input of the VCO and PLL IC (IC503). Each deviation of the TX QT, DQT, LTR, DTMF and MSK tone is adjusted by changing the output level of IC304 and the resulting signal is routed to the VCO and PLL IC (IC503). The RX DTMF tone is routed to the receive audio signal system, and is output from the speaker.

8-2. Decode (QT/DQT/LTR/DTMF/MSK)

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

9. Compander Circuit

The term "compander" means compressor and expander. The compander reduces noise by utilizing a compressor and an expander. The transceiver contains a DSP (IC304) to perform this operation. The transceiver compander can be turned on or off using the FPU.

COMPONENTS DESCRIPTION

Display unit (X54-3660-10)

Ref. No.	Part Name	Description
IC102	IC	LCD contrast
IC105	IC	Voltage doubling inverter
D1~4	LED	6key backlight
D5~10	LED	12key backlight
D11~14	Diode	12key control
D15~18	LED	LCD backlight

TX-RX unit (X57-8070-10)

Ref. No.	Part Name	Description
IC1,2	IC	OP AMP (AF)
IC3	IC	DA converter
IC4	IC	OP AMP (MIC)
IC5	IC	OP AMP (AF)
IC6,7	IC	Logic switch (AF)
IC8	IC	Logic switch (MIC)
IC9	IC	Logic switch (AF)
IC10	IC	OP AMP (AF)
IC11	IC	OP AMP (RF control)
IC12~14	IC	OP AMP (AF)
IC15	IC	Logic switch (AF)
IC16	IC	OP AMP (AF)
IC17	IC	SP AMP
IC18	IC	AVR (50U)
IC19	IC	SP AMP
IC20	IC	Logic AND
IC21,22	IC	Voltage level conversion
IC201	IC	AVR (33A)
IC202	IC	DC/DC converter (15M)
IC203	IC	AVR (33M)
IC204	IC	AVR (5A)
IC205	IC	AVR (50C)
IC206	IC	DC/DC converter (3.8V)
IC207	IC	AVR (33C)
IC208	IC	OP AMP (50T)
IC209	IC	Voltage detector
IC210	IC	AVR (Backup)
IC301,302	IC	Bus switch (LCD)
IC303	IC	Flash memory
IC304	IC	DSP
IC305	IC	SRAM
IC306	IC	Reset
IC307	IC	Logic AND
IC308	IC	RTC
IC309	IC	ASIC
IC310	IC	Buffer AMP (18.432MHz)
IC311	IC	I/O expander
IC312	IC	Logic AND
IC502	IC	Temperature detection
IC503	IC	PLL IC
IC504	IC	OP AMP (PLL)
IC505	IC	OP AMP (RF control)
IC601	IC	APC AMP
IC801	IC	Buffer AMP (RX)
IC802	IC	IF IC
IC803	IC	OP AMP (RF control)
IC804	IC	Mixer (RX)
Q1	FET	DC switch
Q3,4	Transistor	MIC AGC
Q5	FET	DC switch
Q6	FET	DC switch (MIC)
Q7,8	FET	DC switch
Q9	FET	DC switch (MIC)
Q10,11	Transistor	DC switch
Q12	Transistor	Noise AMP
Q13	FET	DC switch
Q201~205	FET	DC switch
Q206~208	Transistor	DC switch
Q209,210	FET	DC switch
Q211~214	Transistor	DC switch
Q301~303	Transistor	DC switch
Q304	FET	DC switch
Q305	Transistor	DC switch
Q306	FET	DC switch
Q501	Transistor	DC switch
Q502	FET	Buffer AMP (CV)
Q503	Transistor	DC switch
Q504	FET	VCO
Q505	FET	DC switch
Q506	FET	DC switch (VCO)
Q507	FET	VCO
Q508~510	Transistor	Buffer AMP (VCO)

COMPONENTS DESCRIPTION

Ref. No.	Part Name	Description
Q601	FET	Buffer AMP (TX)
Q602	FET	Drive AMP
Q603	Transistor	DC switch
Q604	FET	Final AMP
Q605	FET	DC switch
Q606,607	Transistor	DC switch
Q608	FET	DC switch
Q609	Transistor	DC switch
Q610	Transistor	Buffer AMP (TX)
Q801	Transistor	Buffer AMP (2nd Local)
Q802	Transistor	IF AMP
Q804	FET	Buffer AMP (LNA)
D1,2	Diode	MIC AGC
D3,4	Diode	Speed up diode
D5,6	Diode	Reverse current prevention
D7	Diode	Squelch rectification
D8~15	Diode	Reverse current prevention
D16,17	Zener diode	Surge absorption
D18,19	Diode	Surge absorption
D20~23	Zener diode	Surge absorption
D201,202	Diode	Speed up diode
D204	Diode	Protect of DC power
D205	Diode	Logic OR
D206	Diode	Reverse current prevention
D207	Diode	DC/DC converter
D208	Diode	Reverse current prevention
D209	Diode	Speed up diode
D210,211	Diode	Reverse current prevention
D212,213	Diode	Logic OR
D214	Diode	Reverse current prevention
D215	LED	TX/RX LED
D301,302	Diode	Reverse current prevention
D501,502	Diode	Speed up diode
D504	Diode	Speed up diode
D505~512	Variable capacitance diode	VCO (Frequency control)
D513	Diode	TX/RX RF switch
D601	Diode	TX/RX RF switch
D604	Zener diode	Voltage limiting
D605~608	Diode	TX/RX RF switch
D801	Diode	Protect of RF power

PARTS LIST

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

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

NX-410
DISPLAY UNIT (X54-3660-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
NX-410					
1	1B		A02-4076-01	MAIN CABINET (18KEY)	
2	3A		A10-4132-03	CHASSIS	
3	3B		A62-1093-12	PANEL (TOP)	
5	2D		B09-0625-03	CAP ACCESSORY	
6	1A		B10-2795-02	FRONT GLASS	
7	3B		B11-1820-04	ILLUMINATION GUIDE (TX/BUSY)	
8	2A		B11-1853-24	FILTER (LCD)	
9	2A		B11-1854-02	ILLUMINATION GUIDE (LCD)	
11	1A		B38-0923-05	LCD ASSY	
12	1A		B42-7296-04	STICKER	
13	1B		B43-1606-04	BADGE	
14	2D	✻	B62-2298-00	INSTRUCTION MANUAL	
16	2B		E04-0416-25	RF COAXIAL RECEPTACLE (SMA)	
17	2B		E23-1104-04	TERMINAL (ANT)	
18	2A		E37-1462-05	LEAD WIRE WITH CONNECTOR (SP)	
19	3B		E58-0511-15	RECTANGULAR RECEPTACLE (SP/MIC)	
20	3B		E72-0419-33	TERMINAL BLOCK	
22	3A		F07-1880-04	COVER (OP BOARD)	
23	3B		F20-3350-04	INSULATING SHEET (TX-RX PCB)	
25	1B		G10-1400-04	FIBROUS SHEET (SP)	
26	1A		G11-4272-14	RUBBER CUSHION (SP)	
27	3A		G11-4273-24	SHEET (PTT)	
28	3A		G11-4308-24	RUBBER SHEET (FET)	
29	1A		G11-4458-14	SHEET (SP)	
31	3B		G11-4493-04	SHEET (VOL-RING)	
32	1B		G11-4494-04	SHEET (18KEY PACKING)	
33	2A	✻	G11-4495-14	SHEET (LCD-HOLDER)	
34	3A		G13-2020-04	CUSHION (OP BOARD)	
35	2A		G13-2068-04	CUSHION (DISPLAY PCB)	
37	3A		G13-2288-04	CUSHION (DC-DC)	
38	2A		G13-2293-04	CUSHION (50PIN FPC)	
39	3B		G53-1600-12	PACKING (TOP)	
40	3B		G53-1601-04	PACKING (TERMINAL BLOCK)	
41	3A		G53-1602-14	PACKING (OP BOARD COVER)	
43	2B,3B		G53-1603-04	PACKING (SMA/SELECTOR O-RING)	
44	1B		G53-1823-11	PACKING (18KEY)	
45	1C,3D	✻	H12-4282-02	PACKING FIXTURE	
46	3C	✻	H52-2407-02	ITEM CARTON CASE	
48	2B		J19-5478-03	HOLDER (VOL/SELECTOR)	
49	1A		J19-5529-02	HOLDER (SP)	
50	2C		J29-0730-05	BELT CLIP ACCESSORY	
51	3B		J30-1279-04	SPACER (VOL)	
52	3B		J82-0090-35	FPC (UNIVERSAL)	
54	3A		J82-0091-35	FPC (PTT)	
55	2B		J87-0024-05	FPC (VOL/SELECTOR)	
56	2A		J99-0714-04	ADHESIVE SHEET (LCD)	
58	1A		K29-9302-33	KNOB (PTT)	
59	1B		K29-9303-03	BUTTON KNOB (SIDE)	
60	1B		K29-9304-03	KNOB (VOLUME)	
61	1B		K29-9305-03	KNOB (SELECTOR)	
A	2D		N08-0548-24	DRESSED SCREW ACCESSORY	

Ref. No.	Address	New parts	Parts No.	Description	Destination
B	3B		N09-2426-14	HEXAGON HEAD SCREW (BATT-)	
C	3A		N09-6565-05	PAN HEAD SCREW (CASE/CHASSIS)	
D	3B		N14-0806-04	CIRCULAR NUT (VOL)	
E	3B		N14-0810-04	CIRCULAR NUT (SELECTOR)	
F	2A,3A		N30-2004-43	PAN HEAD MACHINE SCREW (OPB/FET)	
G	2B		N30-2604-48	PAN HEAD MACHINE SCREW (ANT)	
H	2C		N30-3008-60	PAN HEAD MACHINE SCREW (CLIP)	
J	2A,2B		N83-2005-48	PAN HEAD TAPTITE SCREW (PCB)	
K	2B		N83-2006-43	PAN HEAD TAPTITE SCREW (HOLDER)	
63	2B		R31-0652-15	VARIABLE RESISTOR (VOL)	
65	2B		S60-0430-05	ROTARY SWITCH (SELECTOR)	
67	1A		T07-0749-25	SPEAKER	
68	2A		T91-0579-05	MIC ELEMENT	
70	3A		W09-0971-05	LITHIUM CELL	
72	2A		X42-3340-10	CORD ASSY (50PIN FPC)	
-		✻	X57-8070-11	SERVICE TX-RX UNIT	
DISPLAY UNIT (X54-3660-10)					
D1-10			B30-2337-05	LED (YELLOW)	
D15-18			B30-2337-05	LED (YELLOW)	
C1			CK73HB1A104K	CHIP C 0.10UF K	
C6-10			CK73GB1E105K	CHIP C 1.0UF K	
C11,12			CK73HB1A104K	CHIP C 0.10UF K	
C14			CC73HCH1H221J	CHIP C 220PF J	
C15			CK73HB1A104K	CHIP C 0.10UF K	
C16,17			CK73HB1H471K	CHIP C 470PF K	
C20-29			CC73HCH1H470J	CHIP C 47PF J	
C33-44			CC73HCH1H470J	CHIP C 47PF J	
C119			CK73HB1A104K	CHIP C 0.10UF K	
C122			CC73HCH1H101J	CHIP C 100PF J	
C123			CS77CP1C2R2M	CHIP TNTL 2.2UF 16WV	
C125			CS77CP1C2R2M	CHIP TNTL 2.2UF 16WV	
C133			CS77CP1C2R2M	CHIP TNTL 2.2UF 16WV	
C135			CK73HB0J105K	CHIP C 1.0UF K	
C136,137			CK73HB1H102K	CHIP C 1000PF K	
C138			CC73HCH1H470J	CHIP C 47PF J	
CN3			E40-6755-05	FLAT CABLE CONNECTOR	
CN8			E40-6421-15	PIN ASSY	
R1,2			RK73HB1J122J	CHIP R 1.2K J 1/16W	
R3-5			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R6-14			RK73HB1J471J	CHIP R 470 J 1/16W	
R15			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R16-23			RK73HB1J103J	CHIP R 10K J 1/16W	
R24			RK73HB1J104J	CHIP R 100K J 1/16W	
R25			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R26,27			RK73HB1J151J	CHIP R 150 J 1/16W	
R112			RK73HB1J123J	CHIP R 12K J 1/16W	
R113			RK73HB1J105J	CHIP R 1.0M J 1/16W	

PARTS LIST

DISPLAY UNIT (X54-3660-10)
TX-RX UNIT (X57-8070-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R115			RK73HB1J104J	CHIP R 100K J 1/16W	
R133			RK73HB1J470J	CHIP R 47 J 1/16W	
R134			RK73HB1J000J	CHIP R 0.0 J 1/16W	
S1-18			S70-0509-05	TACT SWITCH	
D11-14			1SS388F	DIODE	
IC102			NJM2130F3-ZB	BI-POLAR IC	
IC105			LM2682MMX	MOS-IC	
TH101			ERTJ0EV104H	THERMISTOR	
TX-RX UNIT (X57-8070-10)					
D215			B30-2278-05	LED (RED/YELLOW)	
C1,2			CK73HB1E104K	CHIP C 0.10UF K	
C3,4			CK73HB1H152K	CHIP C 1500PF K	
C5			CK73HB1H331K	CHIP C 330PF K	
C6,7			CK73HB1E104K	CHIP C 0.10UF K	
C8,9			CK73HB1E103K	CHIP C 0.010UF K	
C10-12			CK73HB1E104K	CHIP C 0.10UF K	
C13-15			CK73HB1E103K	CHIP C 0.010UF K	
C16			CK73HB1E104K	CHIP C 0.10UF K	
C17			CC73HCH1H221J	CHIP C 220PF J	
C18			CK73HB1E103K	CHIP C 0.010UF K	
C19			CK73HB1A105K	CHIP C 1.0UF K	
C20			CK73HB1H122K	CHIP C 1200PF K	
C21			CK73HB1E104K	CHIP C 0.10UF K	
C22			CK73HB1H122K	CHIP C 1200PF K	
C23			CK73HB1E104K	CHIP C 0.10UF K	
C24			CK73HB1E682K	CHIP C 6800PF K	
C25,26			CK73HB1E104K	CHIP C 0.10UF K	
C27			CK73HB1H331K	CHIP C 330PF K	
C28			CK73HB1E104K	CHIP C 0.10UF K	
C29			CK73HB1E103K	CHIP C 0.010UF K	
C30,31			CC73HCH1H470J	CHIP C 47PF J	
C32			CK73HB1E103K	CHIP C 0.010UF K	
C34-36			CK73HB1E103K	CHIP C 0.010UF K	
C37			CK73HB1H102K	CHIP C 1000PF K	
C39			CK73HB1H102K	CHIP C 1000PF K	
C40			CK73HB1A105K	CHIP C 1.0UF K	
C41			CK73HB1E103K	CHIP C 0.010UF K	
C42-44			CK73HB1E104K	CHIP C 0.10UF K	
C48			CK73GB0J475K	CHIP C 4.7UF K	
C50			CK73HB1C223K	CHIP C 0.022UF K	
C51			CK73HB1E103K	CHIP C 0.010UF K	
C52			CK73HB1E104K	CHIP C 0.10UF K	
C53			CC73HCH1H100B	CHIP C 10PF B	
C54			CC73HCH1H680J	CHIP C 68PF J	
C55			CK73HB1H332K	CHIP C 3300PF K	
C56			CC73HCH1H270J	CHIP C 27PF J	
C57			CK73HB1H681K	CHIP C 680PF K	
C61,62			CK73HB1A105K	CHIP C 1.0UF K	
C63			CC73HCH1H150J	CHIP C 15PF J	
C64			CK73HB1E103K	CHIP C 0.010UF K	
C65			CC73HCH1H470J	CHIP C 47PF J	
C66			CK73HB1A224K	CHIP C 0.22UF K	
C67			CK73HB1E103K	CHIP C 0.010UF K	
C68			CK73HB1A105K	CHIP C 1.0UF K	
C69			CK73HB1E103K	CHIP C 0.010UF K	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C70			CC73HCH1H100B	CHIP C 10PF B	
C72			CK73HB1H102K	CHIP C 1000PF K	
C73			CK73HB1A105K	CHIP C 1.0UF K	
C74			CK73HB1E103K	CHIP C 0.010UF K	
C75			CK73HB1H102K	CHIP C 1000PF K	
C76			CK73HB1E104K	CHIP C 0.10UF K	
C77			CK73HB1H102K	CHIP C 1000PF K	
C78			CC73HCH1H470J	CHIP C 47PF J	
C79			CK73HB1E104K	CHIP C 0.10UF K	
C80			CK73HB1A105K	CHIP C 1.0UF K	
C81,82			CK73HB1E104K	CHIP C 0.10UF K	
C83			CK73HB1E103K	CHIP C 0.010UF K	
C84			CK73HB1E104K	CHIP C 0.10UF K	
C85			CC73HCH1H680J	CHIP C 68PF J	
C86			CK73HB1A393K	CHIP C 0.039UF K	
C87,88			CK73HB1A563K	CHIP C 0.056UF K	
C89,90			CK73HB1E104K	CHIP C 0.10UF K	
C91			CK73HB1E103K	CHIP C 0.010UF K	
C94,95			CC73HCH1H101J	CHIP C 100PF J	
C96			CC73HCH1H470J	CHIP C 47PF J	
C97			CK73HB1E103K	CHIP C 0.010UF K	
C98			CK73HB1H102K	CHIP C 1000PF K	
C99			CK73HB1A105K	CHIP C 1.0UF K	
C100			CS77CP1A100M	CHIP TNTL 10UF 10WV	
C101			CK73HB1H471K	CHIP C 470PF K	
C102			CK73HB1E104K	CHIP C 0.10UF K	
C103			CK73HB1A105K	CHIP C 1.0UF K	
C104			CK73HB1H102K	CHIP C 1000PF K	
C105			CK73HB1A563K	CHIP C 0.056UF K	
C106			CK73HB1E104K	CHIP C 0.10UF K	
C107			CK73HB1A563K	CHIP C 0.056UF K	
C108-110			CK73HB1E104K	CHIP C 0.10UF K	
C111			CK73HB1H102K	CHIP C 1000PF K	
C112			CK73HB1E103K	CHIP C 0.010UF K	
C113,114			CK73HB1A224K	CHIP C 0.22UF K	
C115			CK73GB1E105K	CHIP C 1.0UF K	
C117			CK73HB1E103K	CHIP C 0.010UF K	
C118			CK73HB1H102K	CHIP C 1000PF K	
C119			CK73HB1A105K	CHIP C 1.0UF K	
C120			CK73GB1E105K	CHIP C 1.0UF K	
C121,122			CK73HB1E103K	CHIP C 0.010UF K	
C123			CK73HB1H102K	CHIP C 1000PF K	
C125			CK73HB1E103K	CHIP C 0.010UF K	
C128			CC73HCH1H101J	CHIP C 100PF J	
C130-132			CC73HCH1H101J	CHIP C 100PF J	
C133			CK73HB1E682K	CHIP C 6800PF K	
C134			CC73HCH1H101J	CHIP C 100PF J	
C135			CC73HCH1H470J	CHIP C 47PF J	
C136-138			CK73HB1H102K	CHIP C 1000PF K	
C139,140			CC73HCH1H101J	CHIP C 100PF J	
C141			CK73HB1H102K	CHIP C 1000PF K	
C143			CK73HB1H102K	CHIP C 1000PF K	
C144,145			CC73HCH1H101J	CHIP C 100PF J	
C146-149			CC73HCH1H470J	CHIP C 47PF J	
C202			CC73HCH1H101J	CHIP C 100PF J	
C203			CK73HB1E682K	CHIP C 6800PF K	
C204			CC73HCH1H101J	CHIP C 100PF J	
C205			CK73HB1A105K	CHIP C 1.0UF K	
C206			CC73HCH1H101J	CHIP C 100PF J	
C208-210			CC73HCH1H101J	CHIP C 100PF J	

PARTS LIST

TX-RX UNIT (X57-8070-10)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C211			CC73GCH1H220J	CHIP C	22PF	J	
C212			CK73HB1A105K	CHIP C	1.0UF	K	
C213			CK73HB1E104K	CHIP C	0.10UF	K	
C214			CK73HB1A105K	CHIP C	1.0UF	K	
C215			CC73HCH1H101J	CHIP C	100PF	J	
C217			CK73GB0J475K	CHIP C	4.7UF	K	
C218			CK73HB1E104K	CHIP C	0.10UF	K	
C219			CK73HB1A105K	CHIP C	1.0UF	K	
C220			CK73GB0J106K	CHIP C	10UF	K	
C221,222			CC73HCH1H101J	CHIP C	100PF	J	
C224			CC73HCH1H101J	CHIP C	100PF	J	
C225			CK73HB1A224K	CHIP C	0.22UF	K	
C226			CK73GB1E105K	CHIP C	1.0UF	K	
C227			CC73HCH1H101J	CHIP C	100PF	J	
C228			CK73HB1A105K	CHIP C	1.0UF	K	
C229			CC73HCH1H101J	CHIP C	100PF	J	
C230			CS77CP1A100M	CHIP TNTL	10UF	10WV	
C231			CK73GB0J106K	CHIP C	10UF	K	
C232			CC73HCH1H221J	CHIP C	220PF	J	
C233			CK73HB1E103K	CHIP C	0.010UF	K	
C234			CK73HB1A105K	CHIP C	1.0UF	K	
C235			CK73GB1E105K	CHIP C	1.0UF	K	
C236,237			CC73HCH1H101J	CHIP C	100PF	J	
C238,239			CK73GB1E105K	CHIP C	1.0UF	K	
C240			CC73HCH1H101J	CHIP C	100PF	J	
C241			CK73FB1E475K	CHIP C	4.7UF	K	
C242			CC73HCH1H101J	CHIP C	100PF	J	
C243-245			CK73HB1A224K	CHIP C	0.22UF	K	
C246			CC73HCH1H101J	CHIP C	100PF	J	
C247			CK73HB1E682K	CHIP C	6800PF	K	
C248			CK73HB1A105K	CHIP C	1.0UF	K	
C249			CK73HB1A224K	CHIP C	0.22UF	K	
C250,251			CK73GB0J106K	CHIP C	10UF	K	
C252			CK73HB1A105K	CHIP C	1.0UF	K	
C254			CC73HCH1H101J	CHIP C	100PF	J	
C255,256			CK73GB1E105K	CHIP C	1.0UF	K	
C257			CC73HCH1H101J	CHIP C	100PF	J	
C258			CK73GB1E105K	CHIP C	1.0UF	K	
C259			CC73HCH1H101J	CHIP C	100PF	J	
C260			CK73HB1A105K	CHIP C	1.0UF	K	
C265,266			CC73HCH1H101J	CHIP C	100PF	J	
C267			CC73HCH1H470J	CHIP C	47PF	J	
C301-310			CC73HCH1H470J	CHIP C	47PF	J	
C315-318			CC73HCH1H470J	CHIP C	47PF	J	
C321			CC73HCH1H470J	CHIP C	47PF	J	
C326			CC73HCH1H470J	CHIP C	47PF	J	
C327,328			CK73HB1E104K	CHIP C	0.10UF	K	
C329			CK73HB1A105K	CHIP C	1.0UF	K	
C330			CK73HB1E103K	CHIP C	0.010UF	K	
C332			CK73HB1H102K	CHIP C	1000PF	K	
C333-339			CK73HB1E104K	CHIP C	0.10UF	K	
C340			CC73HCH1H101J	CHIP C	100PF	J	
C341			CK73HB1E104K	CHIP C	0.10UF	K	
C343			CK73HB1H102K	CHIP C	1000PF	K	
C344			CK73HB1A105K	CHIP C	1.0UF	K	
C345,346			CK73HB1E103K	CHIP C	0.010UF	K	
C347			CK73HB1A105K	CHIP C	1.0UF	K	
C348			CK73HB1E104K	CHIP C	0.10UF	K	
C349			CK73HB1A105K	CHIP C	1.0UF	K	
C350-353			CK73HB1E104K	CHIP C	0.10UF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C354			CK73HB1A105K	CHIP C	1.0UF	K	
C355			CC73HCH1H470J	CHIP C	47PF	J	
C356			CK73HB1E103K	CHIP C	0.010UF	K	
C357			CK73HB1E104K	CHIP C	0.10UF	K	
C361,362			CK73HB1E104K	CHIP C	0.10UF	K	
C363			CS77CP0J100M	CHIP TNTL	10UF	6.3WV	
C364			CK73HB1E682K	CHIP C	6800PF	K	
C365			CK73HB1E103K	CHIP C	0.010UF	K	
C367			CK73HB1A105K	CHIP C	1.0UF	K	
C368,369			CK73HB1H102K	CHIP C	1000PF	K	
C371			CK73HB1E103K	CHIP C	0.010UF	K	
C372			CK73GB1E105K	CHIP C	1.0UF	K	
C373-375			CK73HB1E104K	CHIP C	0.10UF	K	
C376			CK73HB1E682K	CHIP C	6800PF	K	
C377			CK73HB1E104K	CHIP C	0.10UF	K	
C378			CS77CP0J100M	CHIP TNTL	10UF	6.3WV	
C379			CC73HCH1H101J	CHIP C	100PF	J	
C380			CC73HCH1H030B	CHIP C	3.0PF	B	
C381,382			CK73HB1E103K	CHIP C	0.010UF	K	
C383			CK73GB1E105K	CHIP C	1.0UF	K	
C384-388			CK73HB1E104K	CHIP C	0.10UF	K	
C389			CK73HB1E103K	CHIP C	0.010UF	K	
C390			CK73GB1E105K	CHIP C	1.0UF	K	
C391-394			CK73HB1E104K	CHIP C	0.10UF	K	
C396			CK73GB0J475K	CHIP C	4.7UF	K	
C397			CK73HB1E103K	CHIP C	0.010UF	K	
C398,399			CK73HB1H102K	CHIP C	1000PF	K	
C402-405			CK73GB0J106K	CHIP C	10UF	K	
C501			CK73HB1E104K	CHIP C	0.10UF	K	
C502,503			CC73HCH1H101J	CHIP C	100PF	J	
C506			CC73HCH1H101J	CHIP C	100PF	J	
C507			CC73HCH1H100B	CHIP C	10PF	B	
C508,509			CK73HB1E103K	CHIP C	0.010UF	K	
C510			CC73HCH1H100B	CHIP C	10PF	B	
C511			CK73GB1E105K	CHIP C	1.0UF	K	
C512-517			CC73HCH1H101J	CHIP C	100PF	J	
C519			CK73HB1E103K	CHIP C	0.010UF	K	
C520			CC73HCH1H101J	CHIP C	100PF	J	
C521			CK73HB1E103K	CHIP C	0.010UF	K	
C522			C93-0787-05	CHIP C	0.1UF	J	
C523			CK73HB1E104K	CHIP C	0.10UF	K	
C524			CC73HCH1H101J	CHIP C	100PF	J	
C525			CK73HB1H471K	CHIP C	470PF	K	
C526,527			CC73HCH1H101J	CHIP C	100PF	J	
C528			CK73HB1E104K	CHIP C	0.10UF	K	
C529			CC73HCH1H101J	CHIP C	100PF	J	
C530			CK73HB1E682K	CHIP C	6800PF	K	
C532			CC73HCH1H470J	CHIP C	47PF	J	
C533			CK73HB1A105K	CHIP C	1.0UF	K	
C534			CK73HB1E104K	CHIP C	0.10UF	K	
C536			CC73HCH1H101J	CHIP C	100PF	J	
C538			CK73HB1H472K	CHIP C	4700PF	K	
C539			CK73HB1A105K	CHIP C	1.0UF	K	
C540			CK73HB1H471K	CHIP C	470PF	K	
C541			CC73HCH1H101J	CHIP C	100PF	J	
C542			CS77CA1VR15M	CHIP TNTL	0.15UF	35WV	
C543			CS77BA1D100M	CHIP TNTL	10UF	20WV	
C544			C92-0863-05	CHIP TNTL	0.047UF	35WV	
C545,546			CC73HCH1H101J	CHIP C	100PF	J	
C547			CK73HB1E104K	CHIP C	0.10UF	K	

PARTS LIST

TX-RX UNIT (X57-8070-10)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C548			CS77CP0J100M	CHIP TNTL	10UF	6.3WV	
C549,550			CK73HB1H471K	CHIP C	470PF	K	
C551			CC73HCH1H0R5B	CHIP C	0.5PF	B	
C552			CK73HB1H471K	CHIP C	470PF	K	
C553,554			CC73HCH1H080B	CHIP C	8.0PF	B	
C555			CC73HCH1H1R5B	CHIP C	1.5PF	B	
C556			CC73HCH1H040B	CHIP C	4.0PF	B	
C557			CK73GB0J475K	CHIP C	4.7UF	K	
C558			CC73HCH1H050B	CHIP C	5.0PF	B	
C559			CK73HB1H471K	CHIP C	470PF	K	
C560-562			CC73HCH1H101J	CHIP C	100PF	J	
C563,564			CC73HCH1H0R5B	CHIP C	0.5PF	B	
C565,566			CC73HCH1H040B	CHIP C	4.0PF	B	
C567,568			CC73HCH1H050B	CHIP C	5.0PF	B	
C569			CK73HB1H471K	CHIP C	470PF	K	
C570,571			CC73HCH1H0R5B	CHIP C	0.5PF	B	
C572			CC73HCH1H060B	CHIP C	6.0PF	B	
C573			CC73HCH1H101J	CHIP C	100PF	J	
C574			CC73HCH1H040B	CHIP C	4.0PF	B	
C575			CC73HCH1H101J	CHIP C	100PF	J	
C576			CC73HCH1H020B	CHIP C	2.0PF	B	
C577			CC73HCH1H120J	CHIP C	12PF	J	
C578			CC73HCH1H020B	CHIP C	2.0PF	B	
C579			CC73HCH1H101J	CHIP C	100PF	J	
C580			CC73HCH1H150J	CHIP C	15PF	J	
C581			CC73HCH1H1R5B	CHIP C	1.5PF	B	
C582-585			CC73HCH1H101J	CHIP C	100PF	J	
C588			CC73HCH1H020B	CHIP C	2.0PF	B	
C589			CC73HCH1H050B	CHIP C	5.0PF	B	
C590			CC73HCH1H040B	CHIP C	4.0PF	B	
C591			CC73HCH1H120J	CHIP C	12PF	J	
C592			CC73HCH1H050B	CHIP C	5.0PF	B	
C593-595			CC73HCH1H101J	CHIP C	100PF	J	
C596,597			CK73HB1E103K	CHIP C	0.010UF	K	
C601,602			CC73HCH1H101J	CHIP C	100PF	J	
C609			CC73HCH1H101J	CHIP C	100PF	J	
C610			CC73HCH1H040B	CHIP C	4.0PF	B	
C612			CC73HCH1H101J	CHIP C	100PF	J	
C617			CC73HCH1H101J	CHIP C	100PF	J	
C620			CK73HB1E104K	CHIP C	0.10UF	K	
C624			CC73HCH1H030B	CHIP C	3.0PF	B	
C629			CC73HCH1H101J	CHIP C	100PF	J	
C632			CC73HCH1H050B	CHIP C	5.0PF	B	
C641			CC73HCH1H150J	CHIP C	15PF	J	
C643			CC73HCH1H101J	CHIP C	100PF	J	
C645			CC73HCH1H101J	CHIP C	100PF	J	
C649			CK73GB1E105K	CHIP C	1.0UF	K	
C650,651			CC73HCH1H101J	CHIP C	100PF	J	
C652			CK73HB1E104K	CHIP C	0.10UF	K	
C654			CC73GCH1H040B	CHIP C	4.0PF	B	
C656			CK73HB1H471K	CHIP C	470PF	K	
C657			CS77BA1A4R7M	CHIP TNTL	4.7UF	10WV	
C658			CC73HCH1H220G	CHIP C	22PF	G	
C659			CC73HCH1H101J	CHIP C	100PF	J	
C662			C93-0939-05	CHIP C	15PF	G	
C664,665			CC73HCH1H101J	CHIP C	100PF	J	
C666		*	C93-0971-05	CHIP C	2.4PF	B	
C667			CC73HCH1H101J	CHIP C	100PF	J	
C668			CK73HB1E103K	CHIP C	0.010UF	K	
C669			CK73HB1E104K	CHIP C	0.10UF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C670			CK73GB1E105K	CHIP C	1.0UF	K	
C671			C93-0974-05	CHIP C	3.3PF	G	
C673			CK73HB1E103K	CHIP C	0.010UF	K	
C676			CC73HCH1HR75B	CHIP C	0.75PF	B	
C677			CC73HCH1H101J	CHIP C	100PF	J	
C680			CC73HCH1H101J	CHIP C	100PF	J	
C681			CC73HCH1H060B	CHIP C	6.0PF	B	
C684			CC73HCH1H101J	CHIP C	100PF	J	
C687			CC73GCH1H101J	CHIP C	100PF	J	
C689			CC73HCH1H101J	CHIP C	100PF	J	
C690			CC73GCH1H020B	CHIP C	2.0PF	B	
C691			CC73HCH1H020B	CHIP C	2.0PF	B	
C692,693			CC73HCH1H101J	CHIP C	100PF	J	
C694			CC73GCH1H101J	CHIP C	100PF	J	
C697			CC73HCH1H101J	CHIP C	100PF	J	
C698			CC73GCH1H101J	CHIP C	100PF	J	
C700			CC73GCH1H040B	CHIP C	4.0PF	B	
C701			CC73GCH1H101J	CHIP C	100PF	J	
C702,703			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C705			CC73GCH1H060B	CHIP C	6.0PF	B	
C706			CC73GCH1H150G	CHIP C	15PF	G	
C707			CK73HB1E104K	CHIP C	0.10UF	K	
C709,710			CC73HCH1H101J	CHIP C	100PF	J	
C711			CC73HCH1H040B	CHIP C	4.0PF	B	
C712			CC73HCH1H101J	CHIP C	100PF	J	
C714			CC73HCH1H101J	CHIP C	100PF	J	
C715			CK73HB1E104K	CHIP C	0.10UF	K	
C716			CC73HCH1H040B	CHIP C	4.0PF	B	
C717			CC73HCH1H101J	CHIP C	100PF	J	
C801			CK73HB1E104K	CHIP C	0.10UF	K	
C803			CK73GB0J106K	CHIP C	10UF	K	
C804-808			CK73HB1E104K	CHIP C	0.10UF	K	
C809,810			CC73HCH1H270J	CHIP C	27PF	J	
C811			CC73HCH1H070B	CHIP C	7.0PF	B	
C812			CK73HB1E103K	CHIP C	0.010UF	K	
C813			CC73HCH1H100B	CHIP C	10PF	B	
C814			CC73HCH1H680J	CHIP C	68PF	J	
C815			CC73HCH1H101J	CHIP C	100PF	J	
C816			CC73HCH1H680J	CHIP C	68PF	J	
C817			CC73HCH1H100B	CHIP C	10PF	B	
C818			CK73HB1E103K	CHIP C	0.010UF	K	
C819			CK73GB0J106K	CHIP C	10UF	K	
C820,821			CK73HB1E104K	CHIP C	0.10UF	K	
C822			CK73HB1E103K	CHIP C	0.010UF	K	
C824-826			CK73HB1E104K	CHIP C	0.10UF	K	
C827			CC73HCH1H100B	CHIP C	10PF	B	
C828-830			CK73HB1E104K	CHIP C	0.10UF	K	
C831			CK73FB1E474K	CHIP C	0.47UF	K	
C832			CC73HCH1H820J	CHIP C	82PF	J	
C833			CC73HCH1H020B	CHIP C	2.0PF	B	
C834			CK73HB1E103K	CHIP C	0.010UF	K	
C836			CK73HB1E103K	CHIP C	0.010UF	K	
C837			CC73HCH1H050B	CHIP C	5.0PF	B	
C838			CC73HCH1H101J	CHIP C	100PF	J	
C839			CK73HB1E103K	CHIP C	0.010UF	K	
C840			CC73HCH1H101J	CHIP C	100PF	J	
C841			CC73HCH1H470G	CHIP C	47PF	G	
C842			CK73HB1E103K	CHIP C	0.010UF	K	
C843			CC73HCH1H470G	CHIP C	47PF	G	
C844			CK73HB1A105K	CHIP C	1.0UF	K	

PARTS LIST

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Ref. No.	Address	New parts	Parts No.	Description	Destination
C845			CC73HCH1H220G	CHIP C 22PF G	
C846			CK73HB1E103K	CHIP C 0.010UF K	
C847			CC73HCH1H060B	CHIP C 6.0PF B	
C848			CK73HB1E103K	CHIP C 0.010UF K	
C849			CC73HCH1H101J	CHIP C 100PF J	
C850			CC73HCH1H060B	CHIP C 6.0PF B	
C851			CK73HB1E103K	CHIP C 0.010UF K	
C852			CC73HCH1H100B	CHIP C 10PF B	
C853			CC73HCH1H330J	CHIP C 33PF J	
C855			CC73HCH1H040B	CHIP C 4.0PF B	
C856			CK73HB1E103K	CHIP C 0.010UF K	
C857			CC73HCH1H101J	CHIP C 100PF J	
C858			CC73HCH1H040B	CHIP C 4.0PF B	
C859			CC73HCH1H330J	CHIP C 33PF J	
C860,861			CC73HCH1H010B	CHIP C 1.0PF B	
C862			CC73HCH1H030B	CHIP C 3.0PF B	
C863			CC73HCH1H020B	CHIP C 2.0PF B	
C864			CC73HCH1H010B	CHIP C 1.0PF B	
C865,866			CC73HCH1H040B	CHIP C 4.0PF B	
C870			CC73HCH1H101J	CHIP C 100PF J	
C872			CC73HCH1H020B	CHIP C 2.0PF B	
C874			CC73HCH1H101J	CHIP C 100PF J	
C880			CC73HCH1H080B	CHIP C 8.0PF B	
C882			CC73HCH1H101J	CHIP C 100PF J	
C885			CC73HCH1H101J	CHIP C 100PF J	
C886			CK73HB1E104K	CHIP C 0.10UF K	
C887			CK73HB1E103K	CHIP C 0.010UF K	
C888			CC73HCH1H101J	CHIP C 100PF J	
C895,896			CC73HCH1H101J	CHIP C 100PF J	
C897			CC73HCH1H020B	CHIP C 2.0PF B	
C899			CC73HCH1H150J	CHIP C 15PF J	
C901			CC73HCH1H101J	CHIP C 100PF J	
C908,909			CC73HCH1H101J	CHIP C 100PF J	
CN4			E41-3167-05	FLAT CABLE CONNECTOR	
CN5			E41-1486-05	PIN ASSY	
CN6			E40-6853-05	FLAT CABLE CONNECTOR	
CN201		✻	E41-3185-05	FLAT CABLE CONNECTOR	
CN202		✻	E23-1263-15	TERMINAL	
CN301			E40-6422-15	SOCKET FOR PIN ASSY	
CN307			E40-6586-05	SOCKET FOR PIN ASSY	
CN321			E40-6389-05	PIN ASSY	
CN601			E23-1262-05	TERMINAL	
CN923			E40-6358-05	SOCKET FOR PIN ASSY	
F201			F53-0324-15	FUSE (2.5A)	
F301			F53-0360-05	FUSE (0.25A)	
CN204			J19-5386-05	HOLDER (LITHIUM CELL)	
CF801			L72-1017-05	CERAMIC FILTER	
CF802			L72-1040-05	CERAMIC FILTER	
L2			L92-0140-05	CHIP FERRITE	
L3-6			L92-0408-05	CHIP FERRITE	
L7			L92-0140-05	CHIP FERRITE	
L8,9			L92-0408-05	CHIP FERRITE	
L203			L92-0408-05	CHIP FERRITE	
L204			L33-1494-05	SMALL FIXED INDUCTOR	
L205,206			L92-0162-05	BEADS CORE	
L207			L92-0466-05	CHIP FERRITE	
L208			L92-0149-05	CHIP FERRITE	
L209,210			L92-0467-05	CHIP FERRITE	

Ref. No.	Address	New parts	Parts No.	Description	Destination
L212			L33-1530-05	SMALL FIXED INDUCTOR	
L213,214			L92-0467-05	CHIP FERRITE	
L306			L92-0444-05	CHIP FERRITE	
L307			L92-0162-05	BEADS CORE	
L308			L92-0444-05	CHIP FERRITE	
L309			L92-0162-05	BEADS CORE	
L310			L92-0444-05	CHIP FERRITE	
L311,312			L92-0162-05	BEADS CORE	
L313			L92-0444-05	CHIP FERRITE	
L314			L92-0163-05	BEADS CORE	
L315			L92-0444-05	CHIP FERRITE	
L316			L92-0140-05	CHIP FERRITE	
L317,318			L92-0444-05	CHIP FERRITE	
L319,320			L92-0162-05	BEADS CORE	
L501			L41-4795-39	SMALL FIXED INDUCTOR (4.7UH)	
L502-504			L92-0163-05	BEADS CORE	
L505-507			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
L508			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L509,510			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
L511,512			L33-0745-05	SMALL FIXED INDUCTOR	
L513			L92-0446-05	BEADS CORE	
L514-516			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
L517			L40-2763-92	SMALL FIXED INDUCTOR (2.7NH)	
L518			L41-1078-45	SMALL FIXED INDUCTOR (10NH)	
L519,520		✻	L40-2263-71	SMALL FIXED INDUCTOR (2.2NH)	
L521,522			L40-1075-71	SMALL FIXED INDUCTOR (10NH)	
L523			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)	
L524-526			L40-1075-71	SMALL FIXED INDUCTOR (10NH)	
L527			L40-2775-71	SMALL FIXED INDUCTOR (27NH)	
L528			L40-2785-92	SMALL FIXED INDUCTOR (270NH)	
L529		✻	L40-3363-71	SMALL FIXED INDUCTOR (3.3NH)	
L601			L40-1075-92	SMALL FIXED INDUCTOR (10NH)	
L602			L40-5663-92	SMALL FIXED INDUCTOR (5.6NH)	
L603			L92-0138-05	CHIP FERRITE	
L604			L40-5667-92	SMALL FIXED INDUCTOR (5.6NH)	
L605			L41-3978-45	SMALL FIXED INDUCTOR (39NH)	
L606			L92-0149-05	CHIP FERRITE	
L607			L40-2263-92	SMALL FIXED INDUCTOR (2.2NH)	
L608			L34-4550-05	AIR-CORE COIL	
L609			L92-0149-05	CHIP FERRITE	
L610			L41-7568-45	SMALL FIXED INDUCTOR (7.5NH)	
L613			L41-6878-43	SMALL FIXED INDUCTOR (68NH)	
L614			L34-4604-15	AIR-CORE COIL	
L615			L79-1468-05	FILTER MODULE	
L616			L34-4604-15	AIR-CORE COIL	
L617			L34-4606-15	AIR-CORE COIL	
L618			L40-1075-92	SMALL FIXED INDUCTOR (10NH)	
L619			L40-1275-92	SMALL FIXED INDUCTOR (12NH)	
L620			L40-2263-92	SMALL FIXED INDUCTOR (2.2NH)	
L621			L40-3963-92	SMALL FIXED INDUCTOR (3.9NH)	
L622			L40-3975-71	SMALL FIXED INDUCTOR (39NH)	
L801			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
L802			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)	
L803			L41-4778-45	SMALL FIXED INDUCTOR (47NH)	
L804			L40-1085-57	SMALL FIXED INDUCTOR (100NH)	
L805			L40-1891-86	SMALL FIXED INDUCTOR (1.8UH)	
L806			L92-0138-05	CHIP FERRITE	
L807			L92-0446-05	BEADS CORE	
L808			L40-1885-92	SMALL FIXED INDUCTOR (180NH)	
L809			L40-1575-92	SMALL FIXED INDUCTOR (15NH)	

PARTS LIST

TX-RX UNIT (X57-8070-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
L810			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
L811			L41-8768-45	SMALL FIXED INDUCTOR (8.7NH)	
L812			L40-1075-92	SMALL FIXED INDUCTOR (10NH)	
L813			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)	
L814			L40-6865-71	SMALL FIXED INDUCTOR (6.8NH)	
L815			L40-5663-71	SMALL FIXED INDUCTOR (5.6NH)	
L816			L40-8265-71	SMALL FIXED INDUCTOR (8.2NH)	
L817			L41-8768-45	SMALL FIXED INDUCTOR (8.7NH)	
L820			L79-1928-05	FILTER	
L822		*	L41-1665-45	SMALL FIXED INDUCTOR (1.6NH)	
L824			L41-1278-45	SMALL FIXED INDUCTOR (12NH)	
L825			L92-0446-05	BEADS CORE	
L828			L41-6868-45	SMALL FIXED INDUCTOR (6.8NH)	
L830			L79-1928-05	FILTER	
L831			L41-5165-45	SMALL FIXED INDUCTOR (5.1NH)	
L833		*	L40-3363-71	SMALL FIXED INDUCTOR (3.3NH)	
X301			L77-1802-05	CRYSTAL RESONATOR (32.768KHZ)	
X302			L77-3015-05	TCXO (18.432MHZ)	
X501			L77-3016-05	TCXO (19.2MHZ)	
XF801			L71-0640-05	MCF (58.05MHZ)	
CP1			RK74HB1J101J	CHIP-COM 100 J 1/16W	
CP21			RK74HB1J101J	CHIP-COM 100 J 1/16W	
R1-6			RK73HB1J223J	CHIP R 22K J 1/16W	
R7			RK73HB1J153J	CHIP R 15K J 1/16W	
R8			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R9			RK73HB1J103J	CHIP R 10K J 1/16W	
R10,11			RK73HB1J473J	CHIP R 47K J 1/16W	
R12			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R13			RK73HB1J103J	CHIP R 10K J 1/16W	
R14			RK73HB1J683J	CHIP R 68K J 1/16W	
R15			RK73HB1J103J	CHIP R 10K J 1/16W	
R16			RK73HB1J104J	CHIP R 100K J 1/16W	
R17			RK73HB1J334J	CHIP R 330K J 1/16W	
R18			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R19,20			RK73HB1J563J	CHIP R 56K J 1/16W	
R21			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R27			RK73HB1J103J	CHIP R 10K J 1/16W	
R28			RK73HB1J183J	CHIP R 18K J 1/16W	
R29,30			RK73HB1J104J	CHIP R 100K J 1/16W	
R31			RK73HB1J183J	CHIP R 18K J 1/16W	
R32			RK73HB1J124J	CHIP R 120K J 1/16W	
R33			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R34			RK73HB1J473J	CHIP R 47K J 1/16W	
R35			RK73HB1J154J	CHIP R 150K J 1/16W	
R36			RK73HB1J104J	CHIP R 100K J 1/16W	
R37			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R38			RK73HB1J104J	CHIP R 100K J 1/16W	
R39			RK73HB1J564J	CHIP R 560K J 1/16W	
R40			RK73HB1J473J	CHIP R 47K J 1/16W	
R41			RK73HB1J224J	CHIP R 220K J 1/16W	
R42,43			RK73HB1J334J	CHIP R 330K J 1/16W	
R44			RK73HB1J473J	CHIP R 47K J 1/16W	
R45			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R46			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R48			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R49			RK73HB1J473J	CHIP R 47K J 1/16W	
R50			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R52			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R53			RK73HB1J273J	CHIP R 27K J 1/16W	
R54,55			RK73HB1J102J	CHIP R 1.0K J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R56			RK73HB1J823J	CHIP R 82K J 1/16W	
R57,58			RK73HB1J473J	CHIP R 47K J 1/16W	
R59,60			RK73HB1J474J	CHIP R 470K J 1/16W	
R61			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R62			RK73HB1J564J	CHIP R 560K J 1/16W	
R63			RK73HB1J823J	CHIP R 82K J 1/16W	
R64			RK73HB1J103J	CHIP R 10K J 1/16W	
R65			RK73HB1J823J	CHIP R 82K J 1/16W	
R66			RK73HB1J474J	CHIP R 470K J 1/16W	
R67			RK73HB1J103J	CHIP R 10K J 1/16W	
R69,70			RK73HB1J103J	CHIP R 10K J 1/16W	
R71,72			RK73HB1J683J	CHIP R 68K J 1/16W	
R73			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R74			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R75			RK73HB1J683J	CHIP R 68K J 1/16W	
R76			RK73HB1J103J	CHIP R 10K J 1/16W	
R77			RK73HB1J104J	CHIP R 100K J 1/16W	
R78			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R79			RK73HB1J474J	CHIP R 470K J 1/16W	
R80			RK73HB1J104J	CHIP R 100K J 1/16W	
R81			RK73HB1J393J	CHIP R 39K J 1/16W	
R82			RK73HB1J274J	CHIP R 270K J 1/16W	
R83			RK73HB1J104J	CHIP R 100K J 1/16W	
R84			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R85			RK73HB1J153J	CHIP R 15K J 1/16W	
R87			RK73HB1J333J	CHIP R 33K J 1/16W	
R90			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R91			RK73HB1J473J	CHIP R 47K J 1/16W	
R92			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R93			RK73HB1J473J	CHIP R 47K J 1/16W	
R94			RK73HB1J683J	CHIP R 68K J 1/16W	
R95			RK73HB1J564J	CHIP R 560K J 1/16W	
R96			RK73HB1J333J	CHIP R 33K J 1/16W	
R97			RK73HB1J104J	CHIP R 100K J 1/16W	
R98			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R99			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R100			RK73HB1J684J	CHIP R 680K J 1/16W	
R101			RK73HB1J153J	CHIP R 15K J 1/16W	
R102			RK73HB1J123J	CHIP R 12K J 1/16W	
R103			RK73HB1J564J	CHIP R 560K J 1/16W	
R104-106			RK73HB1J104J	CHIP R 100K J 1/16W	
R107			RK73HB1J333J	CHIP R 33K J 1/16W	
R108,109			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R110			RK73HB1J153J	CHIP R 15K J 1/16W	
R111			RK73HB1J104J	CHIP R 100K J 1/16W	
R112			RK73HB1J474J	CHIP R 470K J 1/16W	
R113			RK73HB1J104J	CHIP R 100K J 1/16W	
R114,115			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R121			RK73HB1J104J	CHIP R 100K J 1/16W	
R122			RK73HB1J334J	CHIP R 330K J 1/16W	
R125			RK73HB1J103J	CHIP R 10K J 1/16W	
R126			RK73HB1J471J	CHIP R 470 J 1/16W	
R127			RK73HB1J334J	CHIP R 330K J 1/16W	
R129			RK73HB1J104J	CHIP R 100K J 1/16W	
R132			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R133			RK73HB1J104J	CHIP R 100K J 1/16W	
R134			RK73HB1J471J	CHIP R 470 J 1/16W	
R135,136			RK73HH1J223D	CHIP R 22K D 1/16W	
R137,138			RK73HH1J104D	CHIP R 100K D 1/16W	
R139			RK73HB1J223J	CHIP R 22K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-8070-10)

Ref. No.	Address	New parts	Parts No.	Description				Destination
R140			RK73HH1J223D	CHIP R	22K	D	1/16W	
R141			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R142			RK73HB1J333J	CHIP R	33K	J	1/16W	
R143			RK73HH1J223D	CHIP R	22K	D	1/16W	
R144			RK73HB1J223J	CHIP R	22K	J	1/16W	
R145			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R146			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R147			RK73HB1J104J	CHIP R	100K	J	1/16W	
R148			RK73HB1J393J	CHIP R	39K	J	1/16W	
R149			RK73HB1J334J	CHIP R	330K	J	1/16W	
R150			RK73HB1J184J	CHIP R	180K	J	1/16W	
R151			RK73HB1J103J	CHIP R	10K	J	1/16W	
R152-154			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R155			RK73HB1J473J	CHIP R	47K	J	1/16W	
R156			RK73HB1J104J	CHIP R	100K	J	1/16W	
R157			RK73HB1J822J	CHIP R	8.2K	J	1/16W	
R158			RK73HB1J471J	CHIP R	470	J	1/16W	
R159			RK73HH1J104D	CHIP R	100K	D	1/16W	
R160			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R161			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R162			RK73HH1J104D	CHIP R	100K	D	1/16W	
R163			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R164			RK73HB1J473J	CHIP R	47K	J	1/16W	
R165,166			RK73HB1J103J	CHIP R	10K	J	1/16W	
R167-170			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R171			RK73HB1J101J	CHIP R	100	J	1/16W	
R172			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R173-175			RK73HB1J101J	CHIP R	100	J	1/16W	
R176			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R177			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R201,202			RK73HB1J683J	CHIP R	68K	J	1/16W	
R203			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R204,205			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R211,212			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R213			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R214			RK73HB1J100J	CHIP R	10	J	1/16W	
R215			RK73HH1J683D	CHIP R	68K	D	1/16W	
R216			RK73HH1J333D	CHIP R	33K	D	1/16W	
R217			RK73HB1J474J	CHIP R	470K	J	1/16W	
R219			RK73HB1J474J	CHIP R	470K	J	1/16W	
R220			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R221			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R222			RK73HB1J474J	CHIP R	470K	J	1/16W	
R223			RK73HB1J471J	CHIP R	470	J	1/16W	
R224			RK73HB1J564J	CHIP R	560K	J	1/16W	
R225			RK73HB1J154J	CHIP R	150K	J	1/16W	
R226			RK73HB1J103J	CHIP R	10K	J	1/16W	
R227,228			RK73HB1J474J	CHIP R	470K	J	1/16W	
R229-231			RK73HB1J104J	CHIP R	100K	J	1/16W	
R232-235			RK73HB1J474J	CHIP R	470K	J	1/16W	
R236			RK73HB1J104J	CHIP R	100K	J	1/16W	
R237,238			RK73HB1J474J	CHIP R	470K	J	1/16W	
R239			RK73HB1J473J	CHIP R	47K	J	1/16W	
R240			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R241			RK73HB1J103J	CHIP R	10K	J	1/16W	
R242			RK73HB1J474J	CHIP R	470K	J	1/16W	
R243			RK73HB1J103J	CHIP R	10K	J	1/16W	
R244			RK73HB1J474J	CHIP R	470K	J	1/16W	
R245			RK73HB1J103J	CHIP R	10K	J	1/16W	
R246			RK73HB1J474J	CHIP R	470K	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description				Destination
R247			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R248,249			RK73HB1J473J	CHIP R	47K	J	1/16W	
R250			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R251			RK73HB1J103J	CHIP R	10K	J	1/16W	
R252			RK73HB1J474J	CHIP R	470K	J	1/16W	
R253			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R258			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R260			RK73HB1J391J	CHIP R	390	J	1/16W	
R261			RK73HB1J821J	CHIP R	820	J	1/16W	
R263			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R264			RK73HB1J100J	CHIP R	10	J	1/16W	
R269			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R271			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R301,302			RK73HB1J103J	CHIP R	10K	J	1/16W	
R303			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R304,305			RK73HB1J101J	CHIP R	100	J	1/16W	
R306			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R307			RK73HB1J101J	CHIP R	100	J	1/16W	
R308			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R310,311			RK73HB1J104J	CHIP R	100K	J	1/16W	
R313-317			RK73HB1J104J	CHIP R	100K	J	1/16W	
R319			RK73HB1J104J	CHIP R	100K	J	1/16W	
R320			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R321			RK73HB1J474J	CHIP R	470K	J	1/16W	
R322			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R323			RK73HB1J473J	CHIP R	47K	J	1/16W	
R324			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R325			RK73HB1J104J	CHIP R	100K	J	1/16W	
R326			RK73HB1J473J	CHIP R	47K	J	1/16W	
R327			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R328			RK73HB1J331J	CHIP R	330	J	1/16W	
R329			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R330			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R331			RK73HB1J473J	CHIP R	47K	J	1/16W	
R333			RK73HB1J104J	CHIP R	100K	J	1/16W	
R336			RK73HB1J104J	CHIP R	100K	J	1/16W	
R338-340			RK73HB1J104J	CHIP R	100K	J	1/16W	
R342-344			RK73HB1J104J	CHIP R	100K	J	1/16W	
R345			RK73HB1J103J	CHIP R	10K	J	1/16W	
R346			RK73HB1J104J	CHIP R	100K	J	1/16W	
R347			RK73HB1J474J	CHIP R	470K	J	1/16W	
R348			RK73HB1J331J	CHIP R	330	J	1/16W	
R349,350			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R352-359			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R361-363			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R364,365			RK73HB1J104J	CHIP R	100K	J	1/16W	
R366			RK73HB1J473J	CHIP R	47K	J	1/16W	
R367,368			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R369,370			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R372,373			RK73HB1J220J	CHIP R	22	J	1/16W	
R374			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R375-378			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R379			RK73HH1J104D	CHIP R	100K	D	1/16W	
R380			RK73HB1J474J	CHIP R	470K	J	1/16W	
R381			RK73HB1J121J	CHIP R	120	J	1/16W	
R382			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R383			RK73HB1J104J	CHIP R	100K	J	1/16W	
R384			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R386			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R387			RK73HB1J223J	CHIP R	22K	J	1/16W	

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Ref. No.	Address	New parts	Parts No.	Description				Destination
R389			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R390-392			RK73HB1J104J	CHIP R	100K	J	1/16W	
R393			RK73HH1J103D	CHIP R	10K	D	1/16W	
R394,395			RK73HB1J104J	CHIP R	100K	J	1/16W	
R396			RK73HB1J183J	CHIP R	18K	J	1/16W	
R397			RK73HB1J104J	CHIP R	100K	J	1/16W	
R398			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R399-401			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R403-408			RK73HB1J104J	CHIP R	100K	J	1/16W	
R409-411			RK73HB1J473J	CHIP R	47K	J	1/16W	
R412,413			RK73HB1J104J	CHIP R	100K	J	1/16W	
R414-419			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R420-423			RK73HB1J104J	CHIP R	100K	J	1/16W	
R424			RK73HB1J471J	CHIP R	470	J	1/16W	
R426,427			RK73HB1J474J	CHIP R	470K	J	1/16W	
R428			RK73HB1J101J	CHIP R	100	J	1/16W	
R429			RK73HB1J474J	CHIP R	470K	J	1/16W	
R431,432			RK73HB1J104J	CHIP R	100K	J	1/16W	
R433-435			RK73HB1J101J	CHIP R	100	J	1/16W	
R437,438			RK73HB1J104J	CHIP R	100K	J	1/16W	
R440			RK73HB1J103J	CHIP R	10K	J	1/16W	
R442			RK73HB1J104J	CHIP R	100K	J	1/16W	
R443			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R445			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R446			RK73HB1J473J	CHIP R	47K	J	1/16W	
R447			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R501,502			RN73HH1J103D	CHIP R	10K	D	1/16W	
R503,504			RK73HB1J101J	CHIP R	100	J	1/16W	
R508,509			RK73HB1J100J	CHIP R	10	J	1/16W	
R510			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R512			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R513			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R514			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R515			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R516-519			RK73HB1J100J	CHIP R	10	J	1/16W	
R520			RK73HH1J473D	CHIP R	47K	D	1/16W	
R521			RK73HH1J474D	CHIP R	470K	D	1/16W	
R522			RK73HH1J273D	CHIP R	27K	D	1/16W	
R523			RK73HB1J106J	CHIP R	10M	J	1/16W	
R524			RK73HB1J100J	CHIP R	10	J	1/16W	
R525			RK73HB1J473J	CHIP R	47K	J	1/16W	
R526			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R527			RK73HB1J100J	CHIP R	10	J	1/16W	
R528			RK73HB1J104J	CHIP R	100K	J	1/16W	
R529			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R530			RK73HB1J104J	CHIP R	100K	J	1/16W	
R531,532			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R533			RK73HB1J103J	CHIP R	10K	J	1/16W	
R534,535			RK73HB1J473J	CHIP R	47K	J	1/16W	
R536			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R537			RK73HB1J473J	CHIP R	47K	J	1/16W	
R538			RK73HB1J683J	CHIP R	68K	J	1/16W	
R539			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R540			RK73HB1J121J	CHIP R	120	J	1/16W	
R541			RK73HH1J391D	CHIP R	390	D	1/16W	
R542			RK73HB1J103J	CHIP R	10K	J	1/16W	
R543,544			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R545,546			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R547			RK73HB1J183J	CHIP R	18K	J	1/16W	
R548			RK73HB1J124J	CHIP R	120K	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description				Destination
R549			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R550			RK73HB1J224J	CHIP R	220K	J	1/16W	
R551			RK73HB1J152J	CHIP R	1.5K	J	1/16W	
R552			RK73HB1J104J	CHIP R	100K	J	1/16W	
R553			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R554			RK73HB1J474J	CHIP R	470K	J	1/16W	
R555			RK73HB1J104J	CHIP R	100K	J	1/16W	
R556			RK73HB1J474J	CHIP R	470K	J	1/16W	
R557			RK73HB1J473J	CHIP R	47K	J	1/16W	
R558			RK73HB1J221J	CHIP R	220	J	1/16W	
R559			RK73HB1J220J	CHIP R	22	J	1/16W	
R560			RK73HB1J104J	CHIP R	100K	J	1/16W	
R561			RK73HB1J220J	CHIP R	22	J	1/16W	
R562			RK73HB1J101J	CHIP R	100	J	1/16W	
R563			RK73HB1J104J	CHIP R	100K	J	1/16W	
R564-566			RK73HB1J101J	CHIP R	100	J	1/16W	
R567			RK73HB1J682J	CHIP R	6.8K	J	1/16W	
R568			RK73HB1J103J	CHIP R	10K	J	1/16W	
R569			RK73HB1J101J	CHIP R	100	J	1/16W	
R570			RK73HB1J271J	CHIP R	270	J	1/16W	
R571			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R572			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R573			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R574			RK73HB1J106J	CHIP R	10M	J	1/16W	
R575			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R576			RK73HB1J221J	CHIP R	220	J	1/16W	
R577			RK73HB1J100J	CHIP R	10	J	1/16W	
R579-581			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R584			RK73HB1J331J	CHIP R	330	J	1/16W	
R601			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R602			RK73HB1J390J	CHIP R	39	J	1/16W	
R607			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R608			RK73HB1J331J	CHIP R	330	J	1/16W	
R612			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R616			RK73HB1J471J	CHIP R	470	J	1/16W	
R621			RK73HB1J120J	CHIP R	12	J	1/16W	
R627			RK73HB1J471J	CHIP R	470	J	1/16W	
R629			RK73HB1J103J	CHIP R	10K	J	1/16W	
R634			RK73HB1J103J	CHIP R	10K	J	1/16W	
R635			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R636			RK73HB1J273J	CHIP R	27K	J	1/16W	
R638			RK73HB1J331J	CHIP R	330	J	1/16W	
R639,640			RK73HB1J561J	CHIP R	560	J	1/16W	
R642			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R643			RK73HB1J103J	CHIP R	10K	J	1/16W	
R644			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R645			RK73HB1J682J	CHIP R	6.8K	J	1/16W	
R646			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R648			RK73HB1J103J	CHIP R	10K	J	1/16W	
R650,651			RK73EB2HR22F	CHIP R	0.22	F	1/2W	
R652-657			RK73HH1J154D	CHIP R	150K	D	1/16W	
R658			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R659,660			RK73HB1J271J	CHIP R	270	J	1/16W	
R661			RK73HB1J104J	CHIP R	100K	J	1/16W	
R662			RK73HB1J473J	CHIP R	47K	J	1/16W	
R663			RK73FB2B000J	CHIP R	0.0	J	1/8W	
R664			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R665			RK73HB1J473J	CHIP R	47K	J	1/16W	
R666			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R667			RK73HB1J474J	CHIP R	470K	J	1/16W	

PARTS LIST

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Ref. No.	Address	New parts	Parts No.	Description				Destination
R669			RK73HB1J184J	CHIP R	180K	J	1/16W	
R670			RK73HB1J104J	CHIP R	100K	J	1/16W	
R672			RK73EB2E823J	CHIP R	82K	J	1/4W	
R675			RK73HB1J182J	CHIP R	1.8K	J	1/16W	
R676			RK73HB1J392J	CHIP R	3.9K	J	1/16W	
R677			RK73HB1J330J	CHIP R	33	J	1/16W	
R678			RK73HB1J220J	CHIP R	22	J	1/16W	
R680			RK73HB1J331J	CHIP R	330	J	1/16W	
R801			RK73HB1J470J	CHIP R	47	J	1/16W	
R802			RK73HB1J100J	CHIP R	10	J	1/16W	
R803			RK73HB1J123J	CHIP R	12K	J	1/16W	
R804			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R805			RK73HB1J100J	CHIP R	10	J	1/16W	
R806			RK73HB1J182J	CHIP R	1.8K	J	1/16W	
R807			RK73HB1J103J	CHIP R	10K	J	1/16W	
R808			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R809			RK73HB1J103J	CHIP R	10K	J	1/16W	
R810			RK73HB1J561J	CHIP R	560	J	1/16W	
R811			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R812			RK73HB1J334J	CHIP R	330K	J	1/16W	
R813			RK73HB1J103J	CHIP R	10K	J	1/16W	
R814			RK73HB1J473J	CHIP R	47K	J	1/16W	
R815			RK73HB1J183J	CHIP R	18K	J	1/16W	
R816			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R818			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R820			RK73HB1J274J	CHIP R	270K	J	1/16W	
R822			RK73HB1J104J	CHIP R	100K	J	1/16W	
R823			RK73HB1J103J	CHIP R	10K	J	1/16W	
R824			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R825			RK73HB1J223J	CHIP R	22K	J	1/16W	
R826			RK73HB1J103J	CHIP R	10K	J	1/16W	
R827			RK73HB1J183J	CHIP R	18K	J	1/16W	
R828			RK73HB1J473J	CHIP R	47K	J	1/16W	
R829			RK73HB1J123J	CHIP R	12K	J	1/16W	
R830			RK73HB1J103J	CHIP R	10K	J	1/16W	
R832			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R834			RK73HB1J221J	CHIP R	220	J	1/16W	
R835			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R836			RK73HB1J221J	CHIP R	220	J	1/16W	
R838			RK73HB1J564J	CHIP R	560K	J	1/16W	
R839			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R840			RK73HB1J103J	CHIP R	10K	J	1/16W	
R841,842			RK73HB1J104J	CHIP R	100K	J	1/16W	
R843			RK73HB1J272J	CHIP R	2.7K	J	1/16W	
R845			RK73HB1J151J	CHIP R	150	J	1/16W	
R847			RK73HB1J271J	CHIP R	270	J	1/16W	
R848			RK73HB1J180J	CHIP R	18	J	1/16W	
R849			RK73HB1J271J	CHIP R	270	J	1/16W	
R851			RK73HB1J474J	CHIP R	470K	J	1/16W	
R856			RK73HB1J474J	CHIP R	470K	J	1/16W	
R858			RK73HB1J560J	CHIP R	56	J	1/16W	
R859,860			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R866			RK73HB1J333J	CHIP R	33K	J	1/16W	
R867			RK73HB1J683J	CHIP R	68K	J	1/16W	
R868			RK73HB1J104J	CHIP R	100K	J	1/16W	
R869			RK73HB1J683J	CHIP R	68K	J	1/16W	
R870			RK73HB1J474J	CHIP R	470K	J	1/16W	
R873			RK73HB1J474J	CHIP R	470K	J	1/16W	
R874			RK73HB1J270J	CHIP R	27	J	1/16W	
R876			RK73HB1J680J	CHIP R	68	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
S201			S70-0483-05	TACT SWITCH	
D1-3			KDR731	DIODE	
D4			DA221	DIODE	
D5,6			HSC119	DIODE	
D7			KDR731	DIODE	
D8			HSC119	DIODE	
D9-15			1SS416	DIODE	
D16,17			EMZ6.8N	ZENER DIODE	
D18,19			DA221	DIODE	
D20,21			NNCD6.8G-A	ZENER DIODE	
D22,23			HZC6.8-E	ZENER DIODE	
D201,202			1SS388F	DIODE	
D204			1SR154-400	DIODE	
D205			1SS301F	DIODE	
D206			1SS388F	DIODE	
D207			HRB0502A	DIODE	
D208,209			HSC119	DIODE	
D210			1SS416	DIODE	
D211			1SS388F	DIODE	
D212,213			1SS301F	DIODE	
D214			1SS388F	DIODE	
D301,302			HSC119	DIODE	
D501			HSC119	DIODE	
D502			DA221	DIODE	
D504			HSC119	DIODE	
D505			HVC376B	VARIABLE CAPACITANCE DIODE	
D506,507			1SV323F	VARIABLE CAPACITANCE DIODE	
D508,509			1SV325F	VARIABLE CAPACITANCE DIODE	
D510			HVC376B	VARIABLE CAPACITANCE DIODE	
D511,512			1SV278F	VARIABLE CAPACITANCE DIODE	
D513			RN142S	DIODE	
D601			RN142S	DIODE	
D604			UDZW5.1(B)	ZENER DIODE	
D605-608			HVC131	DIODE	
D801			HSB88AS-E	DIODE	
IC1			TC75W51FK(F)	MOS-IC	
IC2			TC75S51FE(F)	MOS-IC	
IC3			R2A20178NP	MICROCONTROLLER IC	
IC4			TC75S51FE(F)	MOS-IC	
IC5			TC75W51FK(F)	MOS-IC	
IC6,7			TC7W53FK(F)	MOS-IC	
IC8			TC7S66FUF	MOS-IC	
IC9			TC7W53FK(F)	MOS-IC	
IC10,11			TC75W51FK(F)	MOS-IC	
IC12,13			TC75S51FE(F)	MOS-IC	
IC14			TC75W51FK(F)	MOS-IC	
IC15			TC7W66FK-F	MOS-IC	
IC16			TC75W51FK(F)	MOS-IC	
IC17			TPA6201A1DRBR	ANALOGUE IC	
IC18			NJM2880U105ZB	ANALOGUE IC	
IC19			TPA6201A1DRBR	ANALOGUE IC	
IC20			TC7SET08FU-F	MOS-IC	
IC21			TC7WH126FK	MOS-IC	
IC22			TC7WT125FUF	MOS-IC	
IC201		✻	XC6204B332D-G	MOS-IC	
IC202		✻	XC9235A15CM-G	MOS-IC	
IC203		✻	XC6204B332D-G	MOS-IC	
IC204		✻	XC6209B502P-G	MOS-IC	
IC205			TK11250CUCB	MOS-IC	

PARTS LIST

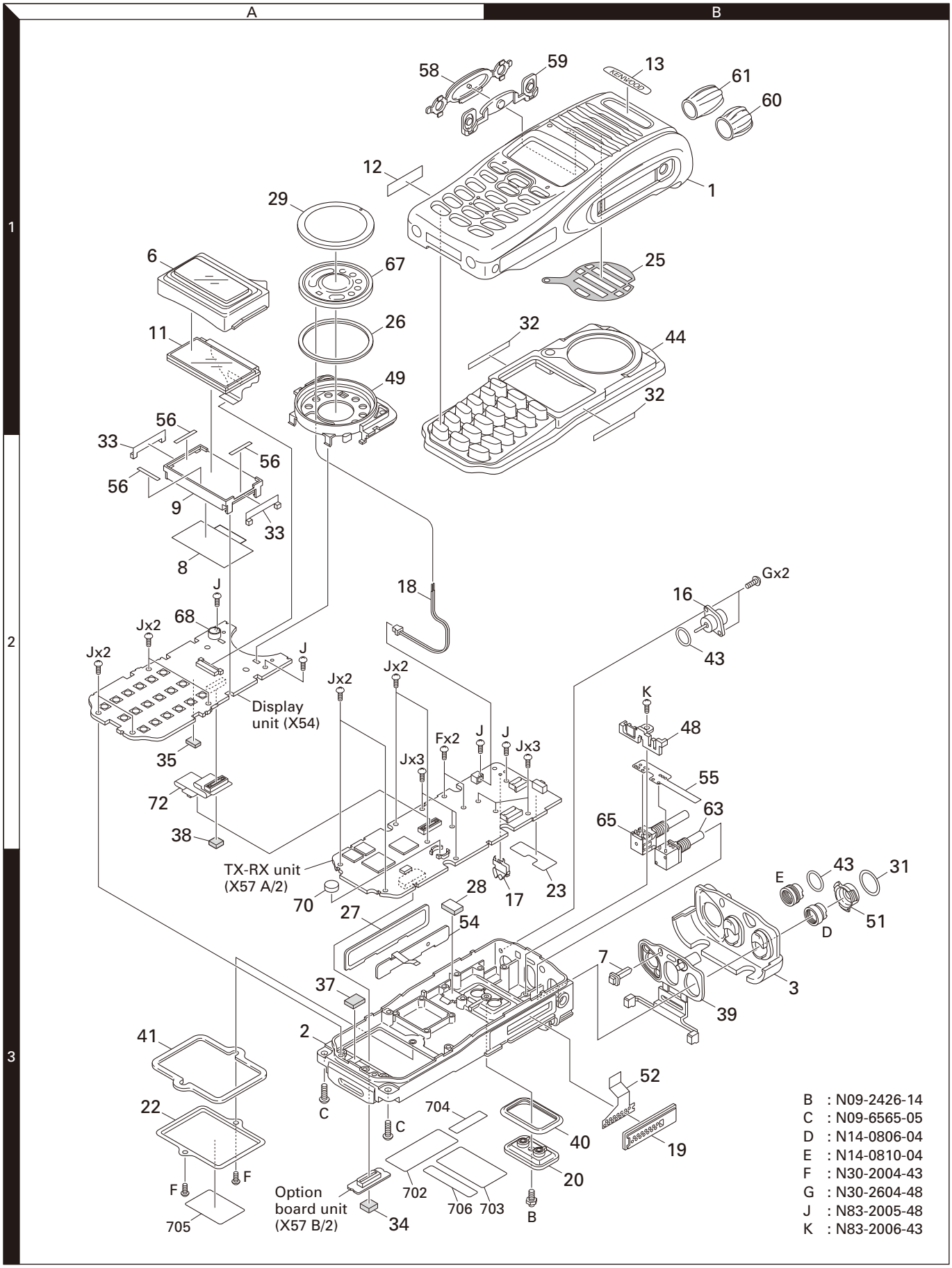
TX-RX UNIT (X57-8070-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
IC206			LT1616ES6-PBF	ANALOGUE IC	
IC207			TK71733S	BI-POLAR IC	
IC208			TC75S51FE(F)	MOS-IC	
IC209		✻	XC61CC5602N-G	MOS-IC	
IC210			S-812C31BPI-G	ANALOGUE IC	
IC301			TC74LCX245FK	MOS-IC	
IC302			TC7WZ245FK-F	MOS-IC	
IC303			**Note 1**	ROM IC	
IC304			**Note 1**	MICROPROCESSOR IC	
IC305			**Note 1**	SRAM IC	
IC306		✻	XC6109C29AN-G	MOS-IC	
IC307			TC7SH08FU-F	MOS-IC	
IC308			RV5C386A	MOS-IC	
IC309			**Note 1**	MOS-IC	
IC310			SM5023CNDH-G	MOS-IC	
IC311			PCA9535BS	MOS-IC	
IC312			TC7SH08FU-F	MOS-IC	
IC502			LM73CIMKX-0	MOS-IC	
IC503			SKY72310-362	MOS-IC	
IC504		✻	XC221A1200MRG	MOS-IC	
IC505			TC75W51FK(F)	MOS-IC	
IC601			NJM12904RB1	MOS-IC	
IC801			MCP6021-E/OT	MOS-IC	
IC802			TK10931VTL-G	ANALOGUE IC	
IC803			TC75W51FK(F)	MOS-IC	
IC804			CMY210	MOS-IC	
Q1			SSM3K15TE(F)	FET	
Q3			2SC4738(GR)F	TRANSISTOR	
Q4			2SA1832(GR)F	TRANSISTOR	
Q5			SSM3K15TE(F)	FET	
Q6			2SJ243-A	FET	
Q7			SSM6N16FE-F	FET	
Q8			SSM3K15TE(F)	FET	
Q9			2SJ347F	FET	
Q10			UMG3N	TRANSISTOR	
Q11			2SB1132(Q,R)	TRANSISTOR	
Q12			2SC5383-T111	TRANSISTOR	
Q13			SSM6N16FE-F	FET	
Q201			2SJ648-A	FET	
Q202			SSM3K15TE(F)	FET	
Q203,204			SSM6N16FE-F	FET	
Q205			SSM6L05FU-F	FET	
Q206			EMD12	TRANSISTOR	
Q207,208			2SA1955A-F	TRANSISTOR	
Q209,210			SSM3K15TE(F)	FET	
Q211			2SA1955A-F	TRANSISTOR	
Q212,213			EMD12	TRANSISTOR	
Q214			UMG9N	TRANSISTOR	
Q301			2SA1362-F(GR)	TRANSISTOR	
Q302			2SC5383-T111	TRANSISTOR	
Q303			2SA1832(GR)F	TRANSISTOR	
Q304			SSM3K15TE(F)	FET	
Q305			2SC5383-T111	TRANSISTOR	
Q306			SSM3K15TE(F)	FET	
Q501			2SC5383-T111	TRANSISTOR	
Q502			2SK879-F(Y)	FET	
Q503			2SC5383-T111	TRANSISTOR	
Q504			MCH3914(8)-H	FET	
Q505			SSM6L05FU-F	FET	
Q506			2SJ347F	FET	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
Q507			MCH3914(8)-H	FET	
Q508-510			2SC5636	TRANSISTOR	
Q601			2SK3077F	FET	
Q602			RD01MUS1-T113	FET	
Q603			2SC5383-T111	TRANSISTOR	
Q604		✻	RD07MUS2BT122	FET	
Q605			SSM3K15TE(F)	FET	
Q606			RT1N441U-T111	TRANSISTOR	
Q607			2SC5383-T111	TRANSISTOR	
Q608			2SK1824-A	FET	
Q609			EMD5	TRANSISTOR	
Q610			2SC5636	TRANSISTOR	
Q801			2SC5636	TRANSISTOR	
Q802			2SC5108(Y)F	TRANSISTOR	
Q804			BB505CES-TL-E	FET	
TH1			ERTJ0EV104H	THERMISTOR	
TH601			ERTJ0EV104H	THERMISTOR	

Note 1: This part cannot be replaced. Therefore, this part is not supplied as a service part.

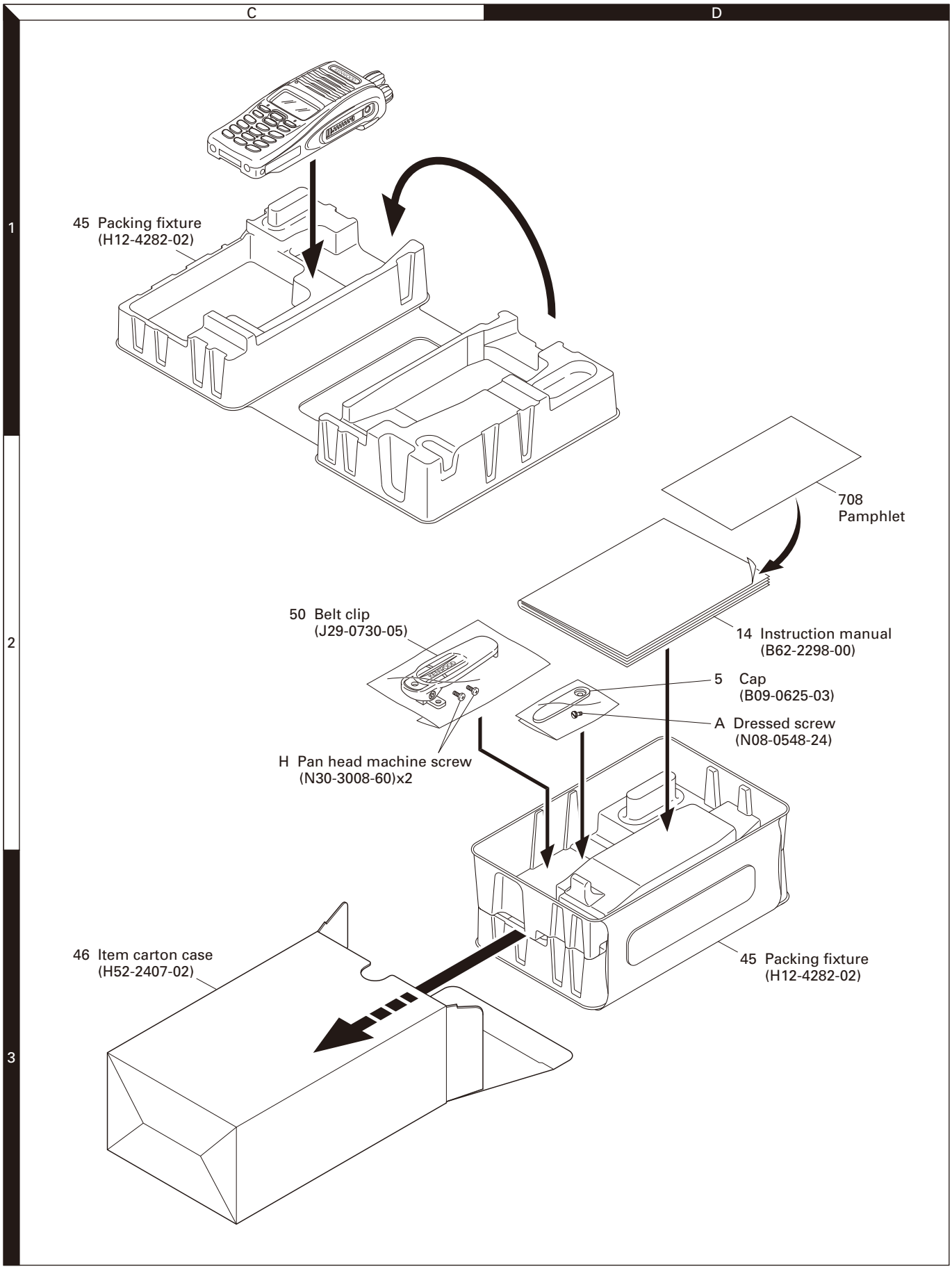
EXPLODED VIEW



B : N09-2426-14
C : N09-6565-05
D : N14-0806-04
E : N14-0810-04
F : N30-2004-43
G : N30-2604-48
J : N83-2005-48
K : N83-2006-43

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

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 (IC309), DSP (IC304), FLASH (IC303), SRAM (IC305)

When the BGA IC is problematic, please bring the printed circuit board (X57-8070-11) in for service. Various ESN/default adjustment values are written on the printed circuit board for service.
Additionally various ESN stickers are included. (Please refer to pages 35 and 36.)
Button type lithium battery (W09-0971-05) does not belong to the printed circuit board for service. Please use the part which has been attached to the printed circuit board. After the printed circuit board has been readjusted, please attach any ESN stickers to the chassis. When "ESN Validation" is used with NXDN Trunking, you must modify the ESN register.

● Checking power supply voltage

Checking voltage

Points to be checked		Normal voltage
33M	IC203 (3 pin)	3.3V
15M	IC202 (4 pin)	1.5V
33A	IC201 (3 pin)	3.3V
31BU	IC210 (3 pin)	3.1V

Power supply of each device is connected through the coil.
[ASIC]
33M: L318, 15M: L317, 33A: L315
[DSP]
33M: L313, 15M: L310
[FLASH]
33M: L306
[SRAM]
31BU: L308

When an abnormal value is confirmed. →

Checking for an abnormal point

33M has an abnormal voltage.
[ASIC]
Remove L318 to check the voltage of the 33M.
If the voltage becomes normal, the ASIC is broken.
[DSP]
Remove L313 to check the voltage of the 33M.
If the voltage becomes normal, the DSP is broken.
[FLASH]
Remove L306 to check the voltage of the 33M.
If the voltage becomes normal, the FLASH is broken.

15M has an abnormal voltage.
[ASIC]
Remove L317 to check the voltage of the 15M.
If the voltage becomes normal, the ASIC is broken.
[DSP]
Remove L310 to check the voltage of the 15M.
If the voltage becomes normal, the DSP is broken.

33A has an abnormal voltage.
[ASIC]
Remove L315 to check the voltage of the 33A.
If the voltage becomes normal, the ASIC is broken.

31BU has an abnormal voltage.
[SRAM]
Remove L308 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.

When a normal value is confirmed. ↓

● Checking the clock

Checking the clock

Points to be checked		Normal voltage (3.3V)
18.432MHz	ASIC side R372	18.432MHz
	ASIC & DSP side R373	18.432MHz
32.768kHz	IC308 (1 pin)	32.768kHz

When an abnormal value is confirmed. →

Parts other than the ASIC/FLASH/SRAM are broken.

When a normal value is confirmed. ↓

● Checking the Reset/Control signal

Checking the control signal input to the ASIC

Points to be checked		Normal voltage
RESET	IC306 (4 pin)	3.3V
/BINT	Q204 (6 pin)	3.3V
/PSW	Q203 (3 pin)	3.3V

When an abnormal value is confirmed. →

Parts other than the ASIC/FLASH/SRAM are broken.

When a normal value is confirmed. ↓

Checking the control signal output from the ASIC

Points to be checked		Normal voltage
/FRST	IC303 side C332	3.3V

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.

When a normal value is confirmed. ↓

TROUBLE SHOOTING

● Checking the output signal from the ASIC

When a normal value is confirmed.

Points to be checked	Normal voltage	When an abnormal value is confirmed.
SBC R213	3.3V	Remove R213. If the ASIC side is 0V, the ASIC/FLASH/SRAM may be broken.

When a normal value is confirmed.

Points to be checked	Normal voltage	When an abnormal value is confirmed.
/DRST IC309 side R324	3.3V	If the /DRST is 0V, the ASIC/FLASH/SRAM are broken.

When a normal value is confirmed.

● The LCD displays control

Points to be checked	Normal voltage	When an abnormal value is confirmed.
/LCDRST IC309 side C326	3.3V	If the /LCDRST is 0V, the ASIC/FLASH/SRAM may be broken.

When a normal value is confirmed.

Points to be checked	Normal voltage	When an abnormal value is confirmed.
/CS4 IC302 (7 pin)	3.3V→0V→3.3V	If the /CS4 is 0V or 3.3V, the ASIC/FLASH/SRAM may be broken.

When a normal value is confirmed.

Points to be checked	Normal voltage	When an abnormal value is confirmed.
5A IC204 (5 pin)	5.0V	If 5A is 0V, parts other than the BGA are broken.

When a normal value is confirmed.

It is unlikely that the BGA parts are broken.

● When an error display appears on the LCD.

The LCD displays "INIT ERROR1".	An error occurs when the ASIC internal RAM reads or writes. The ASIC may be broken.
The LCD displays "INIT ERROR2".	An error occurs when the DSP internal RAM reads or writes. The DSP may be broken. *1
The LCD displays "INIT ERROR3".	An error occurs when the SRAM internal RAM reads or writes. The SRAM may be broken.

*1: When writing firmware version earlier than version 2.30, this error display appears.

■ 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	LOW → 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
9)	5A	: Analog peripheral control 5.0V power supply	

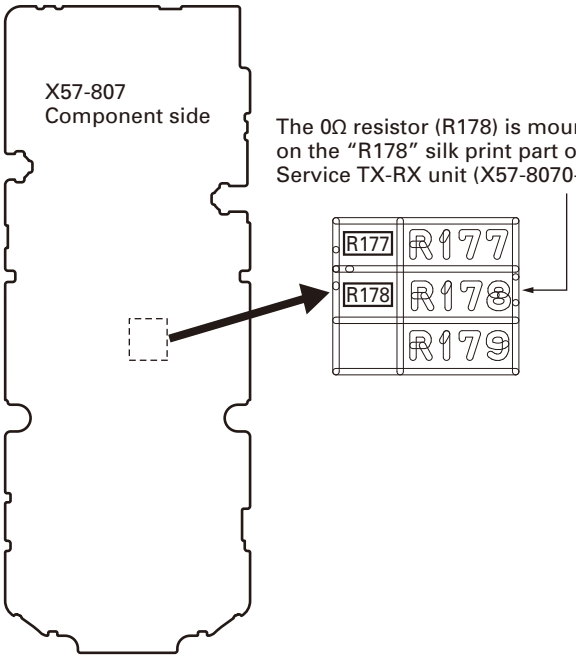
TROUBLE SHOOTING

Replacing TX-RX Unit

■ TX-RX unit Information

Model Name	Original TX-RX unit Number	For Service TX-RX unit Number
NX-410 (K2)	X57-8070-10	X57-8070-11

■ Method of confirming "Original TX-RX unit" and "Service TX-RX unit"



X57-807	R177	R178
0-10	0Ω	(None)
0-11	(None)	0Ω

Note:

- The 0Ω resistor (R177 and R178) is used to differentiate the destination with a visual check. These are not connected with any PCB pattern; they are specifically for production control. There is no need to change the mount of two resistors.
- There is no difference between the schematic diagram of the Service TX-RX unit (X57-8070-11) and the schematic diagram of the original TX-RX unit (X57-8070-10). (R177 and R178 are connected with GND (ground) only.)

■ Supplied Accessories of "Service TX-RX unit"

Item (Including Parts Number)	Quantity
TX-RX Unit (X57-807)	1
Kenwood ESN Label	1
NXDN ESN Label	1
MPT ESN Label	1
Addendum (B59-2650-XX)	1

■ "Service TX-RX unit" Data

The following data is written on the service TX-RX unit:

Data Type	Description
Firmware	NX-410 Firmware.
FPU Data (PC programming mode)	X57-807 (NX-410) K2 type data.
Various Adjustment Data (PC Test mode)	General adjustment values for the X57-807 (NX-410).
Kenwood ESN	Model name: NX-410S Type: K2 The same number as the Kenwood ESN label is written.
NXDN ESN/MPT ESN	The same number as the NXDN ESN/ MPT ESN label is written.

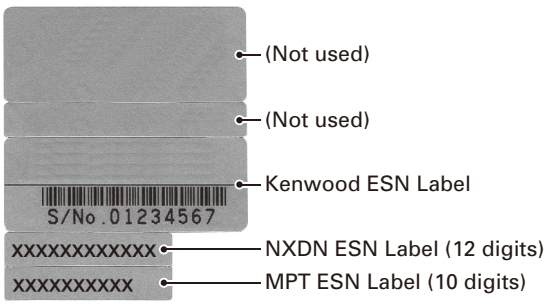
■ After Changing the PCB

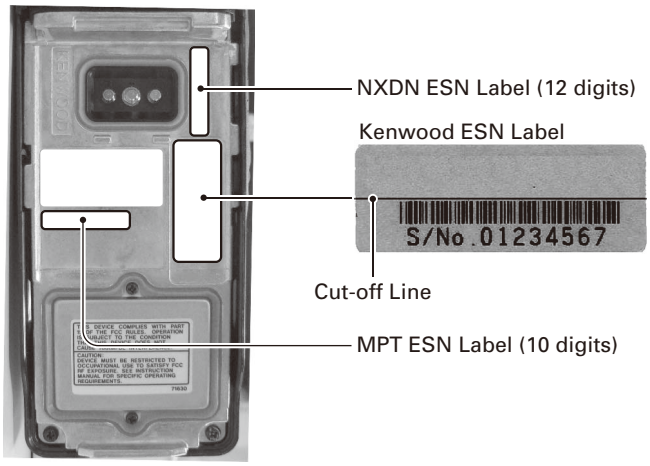
1. After changing the printed circuit board, write the up-to-date Firmware following the instructions in the "RE-ALIGNMENT - 6.Firmware Programming Mode".
2. Using the KPG-111D, select your desired item (Model Name and Frequency) from the Model> Product Information menu, then use Program> Write Data to the Transceiver to write the FPU data (PC Programming mode). When writing to the transceiver, a Warning Message, corresponding to the item selected, appears. Click [OK] to continue writing the data.
3. Enter Program> Test Mode, then adjust the various adjustment data (PC Test Mode) as described in the "AD-JUSTMENT".
4. Attach the new labels corresponding to the new printed circuit board. (Refer to the images on page 36 for label placement.)
5. If necessary, write the FPU data used by the customer with the KPG-111D.

Note:

- When using the ESN Validation function of NXDN Trunking, the NXDN ESN number changes when the circuit board is changed (the number is written on the circuit board); the NXDN Trunking System cannot be accessed. Use the KPG-110SM on the NXDN Trunking System side to reprogram the NXDN ESN number.
- When a new printed circuit board is used, the Kenwood ESN changes, as does the Transceiver Information display of the KPG-111D, but this does not have any effect on the operation of the transceiver.
- If changing to the original Kenwood ESN, NXDN ESN and MPT ESN, please contact our service center.

TROUBLE SHOOTING



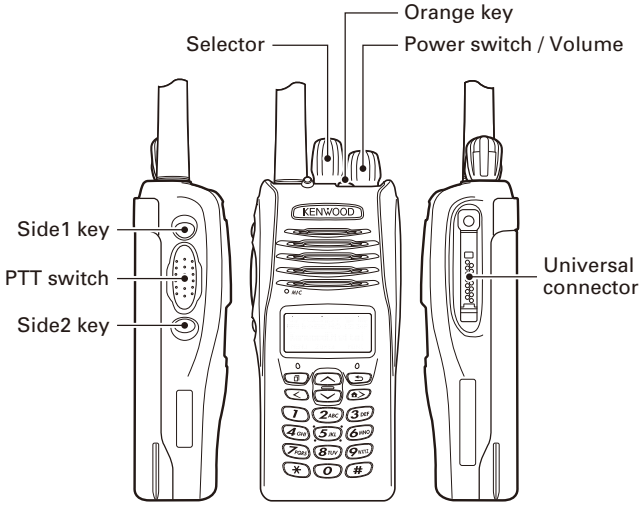


Note:

A UPC code and UPC barcode is not printed on the Kenwood ESN Label. If necessary, cut the label at the cut-off line and attach only the serial number.

ADJUSTMENT

Controls



Panel Test Mode

■ Test mode operation features

This transceiver has a test mode. ***To enter test mode, press and hold the [⊃] key while turning the transceiver power ON. Before the transceiver enters test mode, the frequency version information appears on the LCD momentarily.*** Test mode can be inhibited by programming. To exit test mode, turn the transceiver power OFF. The following functions are available in test mode.

ADJUSTMENT

■ Key operation

Key	"FNC" not appears on the sub LCD display	
	Function	Display
[Selector]	-	-
[∧]	Push: Test channel up Hold: Test channel up continuously	Channel No.
[∨]	Push: Test channel down Hold: Test channel down continuously	Channel No.
[Side1]	Push: Squelch level up Hold: Squelch off	Squelch level Squelch off: icon appears
[Side2]	Wide 5k/Wide 4k/Narrow/ Very narrow	Wide 5k: "w" Wide 4k: "s" Narrow: "n" Very narrow: "v"
[▣]	Shift to panel tuning mode	-
[⮌]	Function on	"FNC" appears on the sub LCD display
[<]	MSK 1200bps and 2400bps	2400bps: icon appears
[☎>]	Push: Test signaling up Hold: Test signaling up continuously	Signaling No.
[Orange]	-	-
[PTT]	Transmit	-
[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.	-

Key	"FNC" appears on the sub LCD display	
	Function	Display
[Selector]	-	-
[∧]	Talk Around on/off	On: icon appears
[∨]	Analog/NXDN	Analog: "A" NXDN: "N"
[Side1]	Function off	-
[Side2]	LCD all lights	LCD all point appears
[▣]	High power/Low power	High: "H" Low: "L"
[⮌]	Function off	-
[<]	Compander on/off	On: icon appears
[☎>]	Beat shift on/off	On: icon appears
[Orange]	Function off	-
[PTT]	Transmit	-
[0] to [9] and [#], [✳]	Function off	-

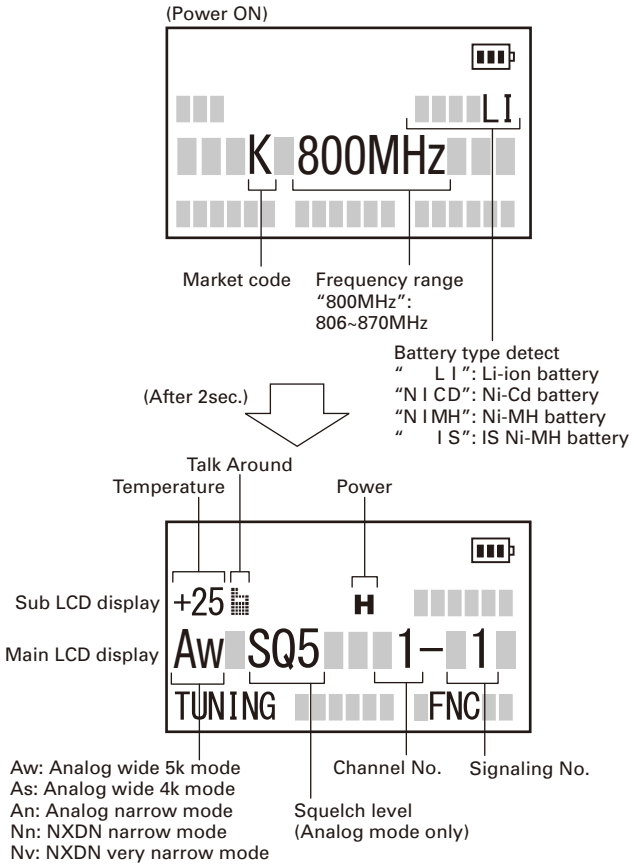
• LED indicator

Red LED Lights during transmission.
Green LED Lights when there is carrier.

• Sub LCD indicator

"FNC" Appears at function on.

• LCD display in panel test mode



■ 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	851.050000	806.050000
2	860.050000	815.050000
3	869.950000	824.950000
4	851.550000	806.550000
5	860.550000	815.550000
6	869.450000	824.450000
7~16	-	-

ADJUSTMENT

• Analog mode signaling

No.	RX	TX
1	None	None
2	None	100Hz Square Wave
3	LTR Data: AREA=0, GOTO=12 HOME=12 ID=47, FREE=25	LTR Data: AREA=0, GOTO=12 HOME=12 ID=47, FREE=25
4	QT: 67.0Hz	QT: 67.0Hz
5	QT: 151.4Hz	QT: 151.4Hz
6	QT: 210.7Hz	QT: 210.7Hz
7	QT: 254.1Hz	QT: 254.1Hz
8	DQT: D023N	DQT: D023N
9	DQT: D754I	DQT: D754I
10	DTMF: 159D	DTMF: 159D
11	None	DTMF Code 9
15	None	MSK
16	MSK	MSK

• NXDN mode signaling

No.	RX	TX
1	RAN1	RAN1
2	None	PN9
3	RAN1	Maximum deviation pattern
7	None	FSW + PN9 (PC test mode only)

RAN: Radio Access Number
PN9: Pseudo-Random Pattern (for production only)

Panel Tuning 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).

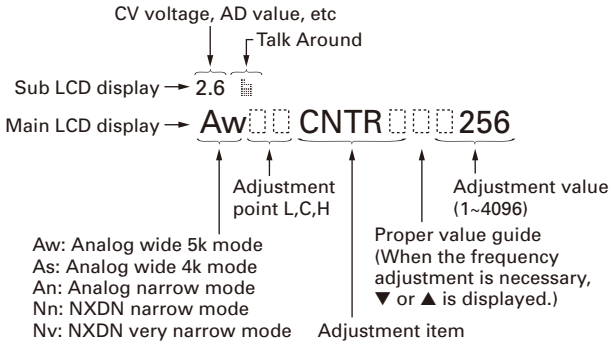
The speaker output connector must be terminated with a 8Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

■ Transceiver tuning (To enter tuning mode)

To enter tuning mode, press the [▯] key while the transceiver is in test mode. Use the [<] key to write tuning data through tuning modes, and the [∧]/[∨] key to adjust tuning requirements (1 to 4096 appears on the LCD).

Use the [▯>] key to select the adjustment item through tuning modes. Use the [⮌] key to adjust 2, 3 or 4 reference level adjustments, and use the [Side2] key to switch between Wide 5k/Wide 4k/Narrow/Very narrow.

• LCD display in panel tuning mode



■ Key operation

Key	Function	
	Push	Hold (1 second)
[Selector]	-	
[∧]	Adjustment value up	Continuation up
[∨]	Adjustment value down	Continuation down
[Side1]	Auto adjustment start	-
[Side2]	Wide 5k/Wide 4k/Narrow/ Very narrow	-
[▯]	Shift to panel test mode	-
[⮌]	To enter 2, 3 or 4 reference level adjustments	-
[<]	Writes the adjustment value	-
[▯>]	Go to next adjustment item	Back to last adjustment item
[Orange]	-	
[PTT]	Transmit	
[0] to [9] and [#], [*]	-	

■ 2 reference level adjustments frequency

Receive Assist

Tuning point	RX (MHz)	TX (MHz)
Low	851.100000	806.000000
High	869.900000	825.000000

QT Deviation
DQT Deviation
LTR Deviation
DTMF Deviation
MSK Deviation

Tuning point	RX (MHz)	TX (MHz)
High	869.900000	825.000000
TA High	869.900000	870.000000

ADJUSTMENT

■ 3 reference level adjustments frequency

Tuning point	RX (MHz)	TX (MHz)
Low	851.100000	806.000000
Center	859.900000	815.000000
High	869.900000	825.000000

■ 4 reference level adjustments frequency

Tuning point	RX (MHz)	TX (MHz)
Low	851.100000	806.000000
High	869.900000	825.000000
TA Low	851.100000	851.000000
TA High	869.900000	870.000000

■ Adjustment item supplement

Adjustment Item	Description
LCD Contrast	The contrast of LCD display can be changed.
Counterclockwise Volume	"Counterclockwise Volume" is adjusted at the minimum volume position. "Clockwise Volume" is adjusted at the maximum volume position. These adjustments can correct the volume variation. Both "Counterclockwise Volume" and "Clockwise Volume" must be adjusted. (The curve data of volume is applied.)
Clockwise Volume	
Receive Assist	The lock voltage of VCO (Receive) is adjusted. This item must be adjusted before all adjustment items for receiver section are adjusted.
Transmit Assist	The lock voltage of VCO (Transmit) is adjusted. This item must be adjusted before all adjustment items for transmitter section are adjusted.
Frequency	Frequency stability is adjusted under receiving condition with SSG. The SSG needs 0.001ppm accuracy so please use a standard oscillator if necessary. This item can be adjusted only in PC Test Mode so that the adjustment value is not changed easily.
RTC	Real-Time Clock (RTC) is adjusted. This item uses the internal clock. (Any measurement equipment is not required.)
High Transmit Power	High Transmit Power is adjusted.
Low Transmit Power	Low Transmit Power is adjusted.
Balance	The transmit audio frequency response is adjusted. This item is adjusted so that the deviation of 2kHz becomes the same deviation of 20Hz. This item must be adjusted before all adjustment items for deviations are adjusted.
Maximum Deviation (NXDN Narrow/Very Narrow)	Maximum Deviation of NXDN (Narrow/Very Narrow) is adjusted.
Maximum Deviation (Analog Wide/Narrow)	Maximum Deviation of Analog (Wide/Narrow) is adjusted. This item must be adjusted before all adjustment items for tone deviations are adjusted. Note: "Maximum Deviation (Analog Narrow)" must be adjusted before "CWID Deviation (NXDN Very Narrow)" is adjusted.
QT Deviation	QT tone deviation is adjusted.
DQT Deviation	DQT tone deviation is adjusted.
LTR Deviation	LTR tone deviation is adjusted.
DTMF Deviation	DTMF tone deviation is adjusted.
MSK Deviation	MSK tone deviation is adjusted.
CWID Deviation	CWID tone deviation is adjusted. CWID is used to inform the others who is transmitting on a 6.25-kHz spacing channel. (In FCC rule, Analog mode or CWID is required for each channel-spacing.)
VOX 1	VOX sensitivity at "VOX 1" is adjusted.
VOX 10	VOX sensitivity at "VOX 10" is adjusted.
RSSI Reference	The minimum RSSI level for scan stop is adjusted.
Open Squelch	The squelch level at level "5" is adjusted.
Low RSSI	RSSI display level "▯▯" is adjusted. Both "Low RSSI" and "High RSSI" must be adjusted. (The curve data of RSSI level is applied.)
High RSSI	
Tight Squelch	The squelch level at level "9" is adjusted.
Battery Warning Level	Battery Warning Level (LED blinking level) is adjusted. Battery Warning Level minus 0.4V is the transmission inhibited level.

ADJUSTMENT

■ Adjustment item and Display

Order	Adjusutment item	Main LCD display	Sub LCD display	Aw (Analog Wide 5k)	As (Analog Wide 4k)	An (Analog Narrow)	Nn (NXDN Narrow)	Nv (NXDN Very Narrow)	Adjust item Number
				Adjustment range					
1	LCD Contrast	CNTR	-	1 point ADJ					Common Section 2
				1~256					
2	Counterclockwise Volume	VOL1	VOL measurement value	1 point ADJ					Common Section 3
				1~256					
3	Clockwise Volume	VOL2	VOL measurement value	1 point ADJ					Common Section 4
				1~256					
4	Receive Assist	RAST	(CV voltage)	2 point ADJ					Common Section 5
				1~4096					
5	Transmit Assist	TAST	(CV voltage)	4 point ADJ					Common Section 6
				1~4096					
6	RTC (Real-time clock)	RTC	-	1 point ADJ					Common Section 7
				–62~–1/0/+1~+62					
7	High Transmit Power	HIPWR	-	4	-	-	-	-	Transmitter Section 1
				1~1024					
8	Low Transmit Power	LOPWR	-	4	-	-	-	-	Transmitter Section 2
				1~1024					
9	Balance	BAL	(Encode frequency)	4	-	-	-	-	Transmitter Section 3
				1~256					
10	Maximum Deviation (NXDN)	NDEV	-	-	-	-	4	4	Transmitter Section 4
				1~1024					
11	Maximum Deviation (Analog)	ADEV	-	4	4	4	-	-	Transmitter Section 5
				1~1024					
12	QT Deviation	QT	-	2	2	2	-	-	Transmitter Section 6
				1~1024					
13	DQT Deviation	DQT	-	2	2	2	-	-	Transmitter Section 7
				1~1024					
14	LTR Deviation	LTR	-	2	2	2	-	-	Transmitter Section 8
				1~1024					
15	DTMF Deviation	DTMF	-	2	2	2	-	-	Transmitter Section 9
				1~1024					
16	MSK Deviation	MSK	-	2	2	2	-	-	Transmitter Section 10
				1~1024					
17	CW ID Deviation	CWID	-	-	-	-	-	1	Transmitter Section 11
				1~1024					
18	VOX 1	VOX1	VOX measurement value	1 point ADJ					Transmitter Section 12
				1~256					
19	VOX 10	VOX10	VOX measurement value	1 point ADJ					Transmitter Section 13
				1~256					
20	RSSI Reference	RRSSI	(RSSI measurement value)	3	3	3	- *1	3	Receiver Section 2
				1~256					
21	Open Squelch	SQL	(ASQDET measurement value)	3	3	3	- *1	3	Receiver Section 3
				1~256					

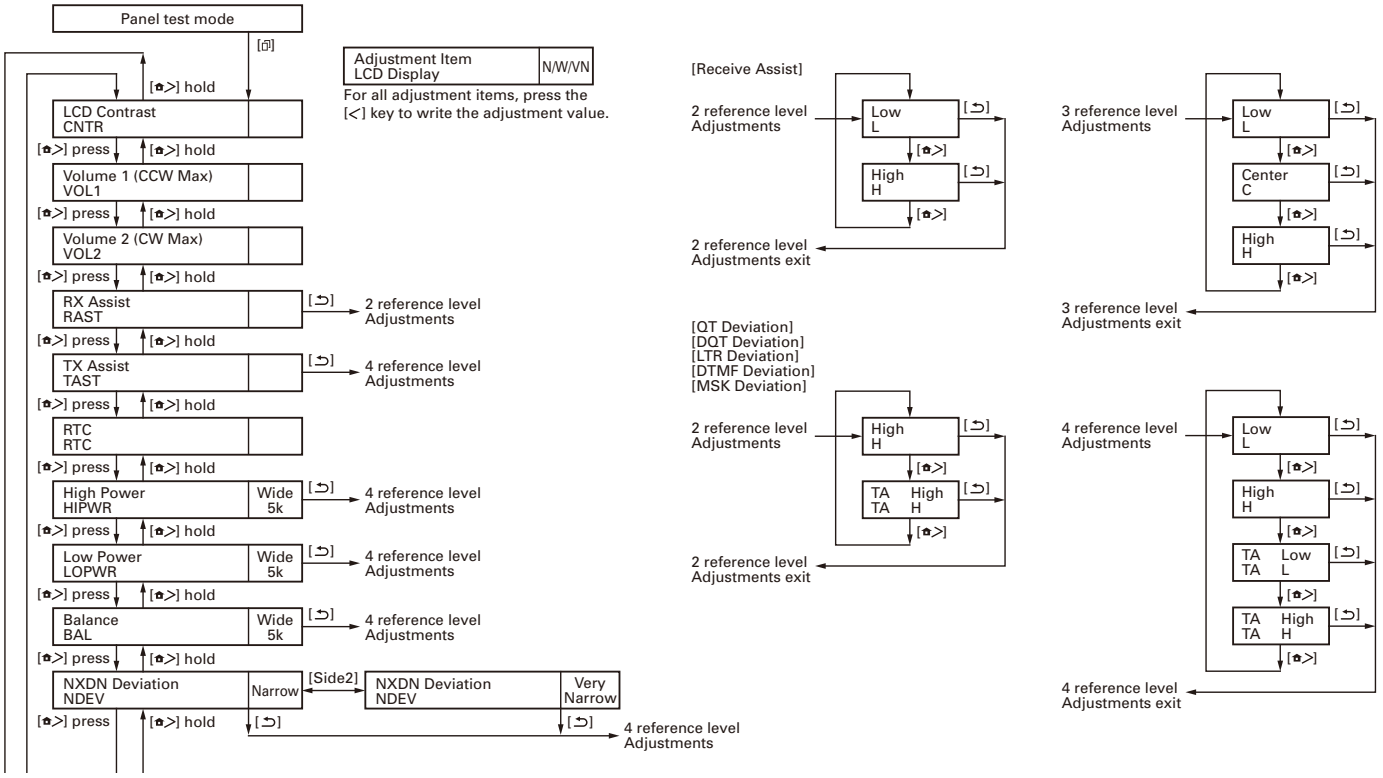
ADJUSTMENT

Order	Adjusutment item	Main LCD display	Sub LCD display	Aw (Analog Wide 5k)	As (Analog Wide 4k)	An (Analog Narrow)	Nn (NXDN Narrow)	Nv (NXDN Very Narrow)	Adjust item Number
				Adjustment range					
22	Low RSSI	LRSSI	(RSSI measurement value)	3	3	3	- *1	3	Receiver Section 4
				1~256					
23	High RSSI	HRSSI	(RSSI measurement value)	3	3	3	- *1	3	Receiver Section 5
				1~256					
24	Tight Squelch	SQLT	(ASQDET measurement value)	3	3	3	-	-	Receiver Section 6
				1~256					
25	Battery Warning Level	BATT	(BATT measurement value)	1 point ADJ					Transmitter Section 14
				1~256					

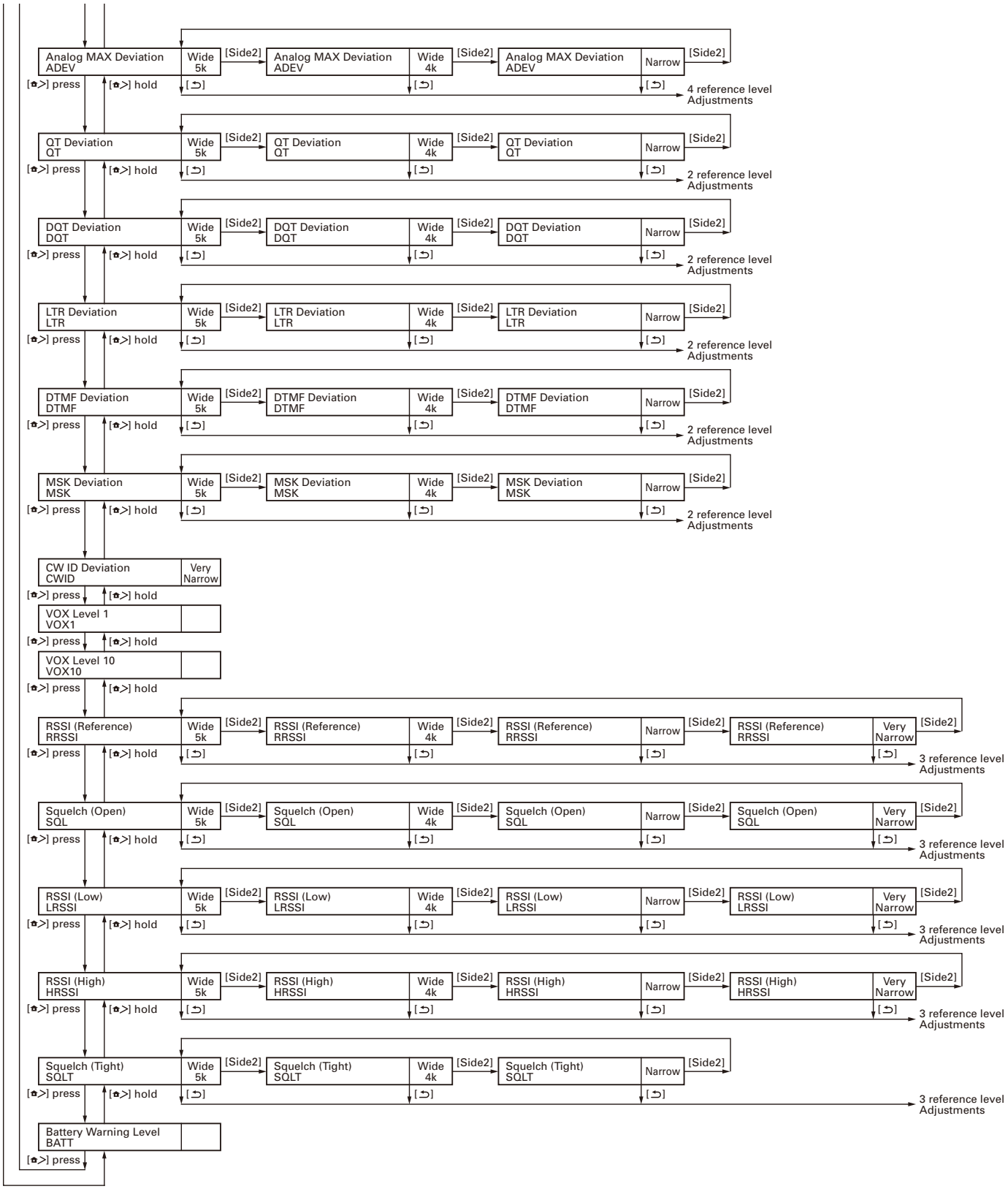
*1: Because NXDN Narrow is adjusted by adjusting Analog Narrow, it is not necessary to adjust NXDN Narrow.

■ Panel tuning mode flow chart

Note: In this Panel tuning mode flow chart, the Adjustment item name is modified.



ADJUSTMENT


Analog MAX Deviation ADEV
Wide 5k
[Side2]
Analog MAX Deviation ADEV
Wide 4k
[Side2]
Analog MAX Deviation ADEV
Narrow
[Side2]
[▲>] press
[▲>] hold
[⮌]
4 reference level Adjustments
QT Deviation QT
Wide 5k
QT Deviation QT
Wide 4k
QT Deviation QT
Narrow
2 reference level Adjustments
DQT Deviation DQT
Wide 5k
DQT Deviation DQT
Wide 4k
DQT Deviation DQT
Narrow
2 reference level Adjustments
LTR Deviation LTR
Wide 5k
LTR Deviation LTR
Wide 4k
LTR Deviation LTR
Narrow
2 reference level Adjustments
DTMF Deviation DTMF
Wide 5k
DTMF Deviation DTMF
Wide 4k
DTMF Deviation DTMF
Narrow
2 reference level Adjustments
MSK Deviation MSK
Wide 5k
MSK Deviation MSK
Wide 4k
MSK Deviation MSK
Narrow
2 reference level Adjustments
CW ID Deviation CWID
Very Narrow
VOX Level 1 VOX1
VOX Level 10 VOX10
RSSI (Reference) RRSSI
Wide 5k
RSSI (Reference) RRSSI
Wide 4k
RSSI (Reference) RRSSI
Narrow
RSSI (Reference) RRSSI
Very Narrow
3 reference level Adjustments
Squelch (Open) SQL
Wide 5k
Squelch (Open) SQL
Wide 4k
Squelch (Open) SQL
Narrow
Squelch (Open) SQL
Very Narrow
3 reference level Adjustments
RSSI (Low) LRSSI
Wide 5k
RSSI (Low) LRSSI
Wide 4k
RSSI (Low) LRSSI
Narrow
RSSI (Low) LRSSI
Very Narrow
3 reference level Adjustments
RSSI (High) HRSSI
Wide 5k
RSSI (High) HRSSI
Wide 4k
RSSI (High) HRSSI
Narrow
RSSI (High) HRSSI
Very Narrow
3 reference level Adjustments
Squelch (Tight) SQLT
Wide 5k
Squelch (Tight) SQLT
Wide 4k
Squelch (Tight) SQLT
Narrow
3 reference level Adjustments
Battery Warning Level BATT

ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications
1. Standard Signal Generator (SSG)	Frequency Range 800 to 900MHz Modulation Frequency modulation and external modulation Output –127dBm/0.1µV to greater than –20dBm/22.4mV When performing the Frequency adjustment, the following accuracy is necessary. • 0.001ppm Use a standard oscillator for adjustments, if necessary.
2. Power Meter	Input Impedance 50Ω Operation Frequency 800 to 900MHz Measurement Capability Vicinity of 10W
3. Deviation Meter	Frequency Range 800 to 900MHz
4. Digital Volt Meter (DVM)	Measuring Range 10mV to 10V DC Input Impedance High input impedance for minimum circuit loading
5. Oscilloscope	DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range 10Hz to 1000MHz Frequency Stability 0.2ppm or less
7. Ammeter	5A
8. AF Volt Meter (AF VTVM)	Frequency Range 50Hz to 10kHz Voltage Range 1mV to 10V
9. Audio Generator (AG)	Frequency Range 50Hz to 5kHz or more Output 0 to 1V
10. Distortion Meter	Capability 3% or less at 1kHz Input Level 50mV to 10Vrms
11. 8Ω Dummy Load	Approx. 8Ω, 3W
12. Regulated Power Supply	5V to 10V, approx. 3A Useful if ammeter equipped

■ 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.)

■ Nut wrench

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

KENWOOD part No.: W05-1123-00

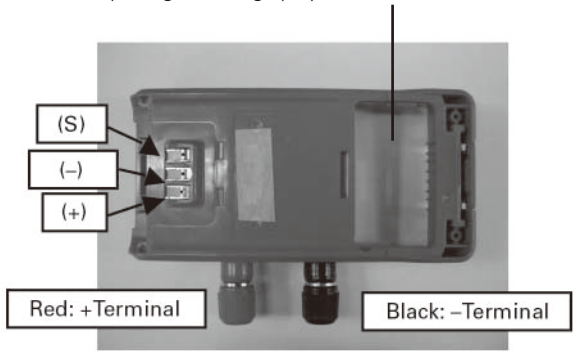
■ Battery jig (W05-1513-00)

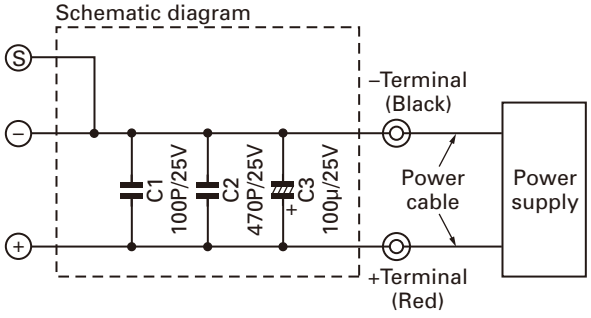
Connect the power cable properly between the battery jig installed in the transceiver and the power supply, and be sure output voltage and the power supply polarity prior to switching the power supply ON, otherwise over voltage and reverse connection may damage the transceiver, or the power supply or both.

Note:

When using the battery jig, you must measure the voltage at the terminals of the battery jig. Otherwise, a slight voltage drop may occur within the power cable, between the power supply and the battery jig, especially while the transceiver transmits.

This W05-1513-00 is prepared a hole on the option board cover position.
And if the temperature of TCXO is too high, it can be down with squirting a cooling splay, etc. from the hole.





ADJUSTMENT

■ Universal connector

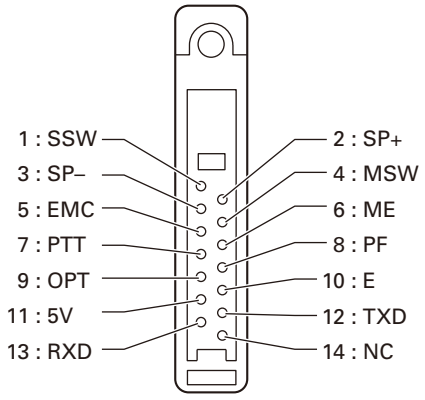
Use the interface cable (KPG-36/36A) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the transceiver and tighten the screw.

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

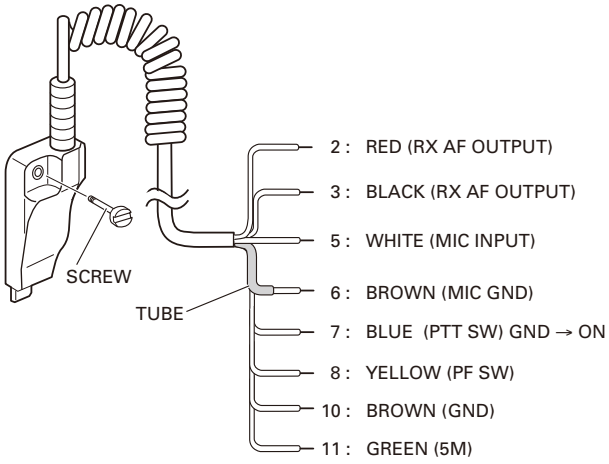
Caution

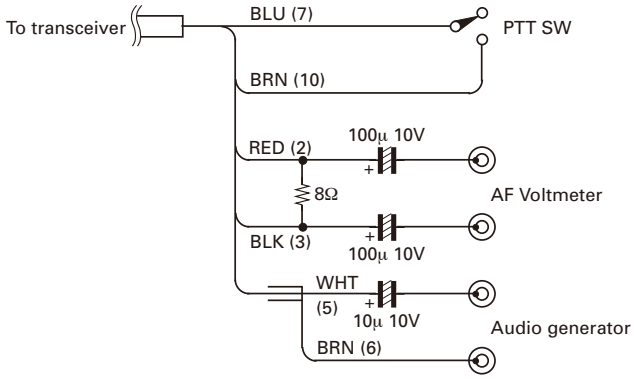
1. When connecting the plug to the universal connector of the transceiver, a short circuit may occur. To prevent this, be sure to turn the transceiver POWER switch off.
2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the figure.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

• Universal connector



• Panel tuning



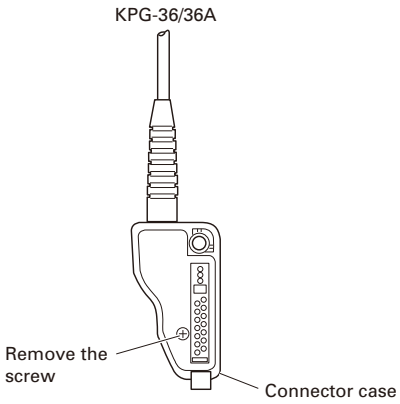


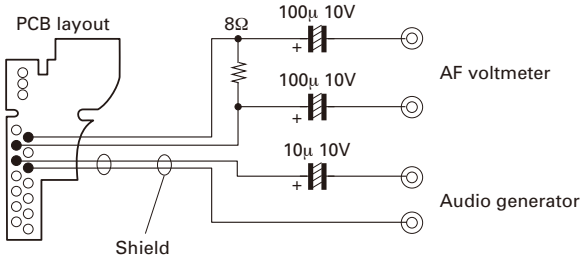
Note: Pin 1 (SSW) and Pin 4 (MSW) are connected to Pin 10 (GND) to active External SP and External MIC.

• 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

Radio Check Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel test mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency check	1) CH-Sig: 1-1 PTT: ON	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.	f. counter	Panel	ANT			Check	806.049194~ 806.050806MHz (±1.0ppm @806.05MHz)
2. High power check (Batt: 7.5V)	1) CH-Sig: 2-1 PTT: ON	1) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.	Power meter Ammeter					Check	2.7W~3.3W 2.0A or less
	2) CH-Sig: 2-1 (TA) PTT: ON	2) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 Talk Around: Check PTT: Press [Transmit] button.							
3. Low power check (Batt: 7.5V)	1) CH-Sig: 2-1 PTT: ON	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.							0.7W~1.2W 1.0A or less
	2) CH-Sig: 2-1 (TA) PTT: ON	2) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 Talk Around: Check PTT: Press [Transmit] button.							
4. MIC sensitivity check	1) CH-Sig: 1-1 AG: 1kHz PTT: ON	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 AG: 1kHz PTT: Press [Transmit] button.	Deviation meter Oscilloscope AG AF VTVM		ANT Universal connector			Adjust AG input to get a standard MOD.	12.5mV±5.8mV

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel test mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. Sensitivity check	1) CH-Sig: 1-1 SSG output Wide 5k: –117dBm (0.32µV) (MOD: 1kHz/±3kHz) Wide 4k: –117dBm (0.32µV) (MOD: 1kH/±2.4kHz) Narrow: –117dBm (0.32µV) (MOD: 1kH/±1.5kHz)	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 SSG output Wide 5k: –117dBm (0.32µV) (MOD: 1kHz/±3kHz) Wide 4k: –117dBm (0.32µV) (MOD: 1kH/±2.4kHz) Narrow: –117dBm (0.32µV) (MOD: 1kH/±1.5kHz)	SSG AF VTVM Oscilloscope Distortion meter 8Ω Dummy load		ANT Universal connector			Check	12dB SINAD or more

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 5k] MOD: 1kHz, DEV: 3kHz [Wide 4k] MOD: 1kHz, DEV: 2.4kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz								
2. LCD Contrast	1) Adj item: [CNTR] Adjust: [✳✳✳] Press [<] key to store the adjustment value.	1) Adj item: [LCD Contrast] Press [Apply] button to store the adjustment value.				Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	Adjust the LCD contrast by looking.	This item is needed when the LCD ASSY (B38-0923-05) is replaced.
3. Counter-clockwise Volume	1) Adj item: [VOL1] Adjust: [✳✳✳]	1) Adj item: [Counterclockwise Volume]						[Panel tuning mode] Turn the volume knob counterclockwise fully. Press [<] key to store the adjustment value. [PC test mode] Turn the volume knob counterclockwise fully. Press [Apply] button to store the adjustment value.	This item is needed when the variable resistor (R31-0652-15) is replaced.
4. Clockwise Volume	1) Adj item: [VOL2] Adjust: [✳✳✳]	1) Adj item: [Clockwise Volume]						[Panel tuning mode] Turn the volume knob clockwise fully. Press [<] key to store the adjustment value. [PC test mode] Turn the volume knob clockwise fully. 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	
5. Receive Assist	1) Adj item: [RAST] Adjust: [✳✳✳] 2) Adj item: [L RAST]→[H RAST] Adjust: [✳✳✳] Press [<] key to store the adjustment value.	1) Adj item: [Receive Assist] 2) Adj item: [Low], [High] Press [Apply All] button to store the adjustment value.				Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	The sub LCD display and [V] 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. **Note:** Confirm the VCO lock voltage approximately 3 seconds after the adjusment value is changed.	3.0V±0.1V [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
6. Transmit Assist	1) Adj item: [TAST] Adjust: [✳✳✳] 2) Adj item: [L TAST]→[H TAST]→[L TAST] (TA)→[H TAST] (TA) Adjust: [✳✳✳] PTT: ON (RF power Is not output.) Press [<] key to store the adjustment value.	1) Adj item: [Transmit Assist] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							
7. RTC (Real-time clock) oscillation frequency	1) Adj item: [RTC] Adjust: [✳✳✳]	1) Adj item: [RTC (Real-time clock)]					[Side1]	[Panel tuning mode] Press [Side1] key. After automatic adjustment adjusted value is displayed on the LCD. Press [<] key to store the adjustment value. [PC test mode] Press [Start] button of "Auto Tuning". Press [Apply] button to store the adjustment value after the automatic adjustment was finished.	
8. Frequency	* The Frequency adjustment can be performed only in PC test mode.	1) Adj item: [Frequency] 2) CH-Sig: 3-1 SSG output : –20dBm (22.4mV) (CW (without modulation)) **Caution:** Perform the frequency adjustment under the following conditions. • Temperature range of +23˚C to +27˚C (+73.4˚F to +80.6˚F). (The temperature is displayed on the Frequency adjustment screen of the KPG-111D and the LCD of the transceiver.) • Use an accuracy of 0.001ppm for the SSG. (Use a standard oscillator if necessary.)	SSG	Panel	ANT			[PC test mode] Press [Start] button of "Auto Tuning". Press [Apply] button to store the adjustment value after the automatic adjustment was finished.	[PC test mode] "IF20" value = Within 0±12 digits. The value of "IF20" will become around "0" after the adjustment was finished. Remark: "Frequency" is adjusted under receiving condition with SSG.

ADJUSTMENT

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 (Batt: 7.5V)	1) Adj item: [HIPWR] Adjust: [✱✱✱✱] 2) Adj item: [AwL HIPWR]→ [AwH HIPWR]→ [AwL HIPWR] (TA)→ [AwH HIPWR] (TA) Adjust: [✱✱✱✱] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [High Transmit Power] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Power meter Ammeter	Panel	ANT	Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	3.0W	±0.2W 2.0A or less [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
2. Low Transmit Power (Batt: 7.5V)	1) Adj item: [LOPWR] Adjust: [✱✱✱✱] 2) Adj item: [AwL LOPWR]→ [AwH LOPWR]→ [AwL LOPWR] (TA)→ [AwH LOPWR] (TA) Adjust: [✱✱✱✱] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Low Transmit Power] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						1.0W	±0.1W 1.0A or less [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
3. Balance *2	1) Adj item: [BAL] Adjust: [✱✱✱] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [AwL BAL]→ [AwH BAL]→ [AwL BAL] (TA)→ [AwH BAL] (TA) Adjust: [✱✱✱] PTT: ON Press [<] key to store the adjustment value. Sub LCD: Tone frequency [Side1] key: Press while transmitting to change 20Hz and 2kHz.	1) Adj item: [Balance] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value. [2kHz Sine Wave Check box]: Check while transmitting change to 2kHz.	Deviation meter Oscilloscope					The Deviation of 20Hz frequency is fixed. Change the 2kHz adjustment value to become the same deviation of 20Hz within the specified range. Sub LCD: Tone frequency [Side1] key: Press while transmitting to change 20Hz and 2kHz.	2kHz Tone deviation is within ±1.0% of 20Hz tone deviation. [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.

*2: Refer to the "Necessary Deviation adjustment item for each signaling and mode" table on page 55.
Balance adjustment is common with the adjustment of all signaling deviations.

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. Maximum Deviation (NXDN) *3 [Narrow]	1) Adj item: [Nn NDEV] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [NnL NDEV]→ [NnH NDEV]→ [NnL NDEV] (TA)→ [NnH NDEV] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (NXDN Narrow)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [◿], [◺] [PC test mode] [◀], [▶]	3056Hz Write the value as followings. 501 (Reference value)	2995~3117Hz [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
[Very Narrow]	1) Adj item: [Nv NDEV] Adjust: [✳✳✳✳] 2) Adj item: [NvL NDEV]→ [NvH NDEV]→ [NvL NDEV] (TA)→ [NvH NDEV] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (NXDN Very Narrow)] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						1337Hz Write the value as followings. 496 (Reference value)	1311~1363Hz [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
5. Maximum Deviation (Analog) *3 [Narrow]	1) Adj item: [An ADEV] Adjust: [✳✳✳✳] 2) Adj item: [AnL ADEV]→ [AnH ADEV]→ [AnL ADEV] (TA)→ [AnH ADEV] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (Analog Narrow)] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						2100Hz Write the value as followings. 491 (Reference value) Deviation meter LPF: 15kHz HPF: OFF [Panel tuning mode] PTT: ON [PC test mode] PTT: Press [Transmit] button	2050~2150Hz [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
Maximum Deviation (Analog) *3 [Wide 4k]	1) Adj item: [As ADEV] Adjust: [✳✳✳✳] 2) Adj item: [AsL ADEV]→ [AsH ADEV]→ [AsL ADEV] (TA)→ [AsH ADEV] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (Analog Wide 4k)] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	3350Hz Write the value as followings. 497 (Reference value) Deviation meter LPF: 15kHz HPF: OFF [Panel tuning mode] PTT: ON [PC test mode] PTT: Press [Transmit] button	3300~3400Hz [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
[Wide 5k]	1) Adj item: [Aw ADEV] Adjust: [✳✳✳✳] 2) Adj item: [AwL ADEV]→ [AwH ADEV]→ [AwL ADEV] (TA)→ [AwH ADEV] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (Analog Wide 5k)] 2) Adj item: [Low], [High], [Low (TA)], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						4200Hz Write the value as followings. 498 (Reference value) Deviation meter LPF: 15kHz HPF: OFF [Panel tuning mode] PTT: ON [PC test mode] PTT: Press [Transmit] button	4150~4250Hz [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
*3: Refer to the "Necessary Deviation adjustment item for each signaling and mode" table on page 55. Regarding Maximum Deviation (Analog), it is common with the adjustment of all analog signalings.									
6. QT Deviation *4 [Analog Narrow	1) Adj item: [An QT] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [AnH QT]→ [AnH QT] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [QT Deviation (Analog Narrow)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	Write the value as followings. 513 (Reference value)	0.35kHz±0.05kHz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
QT Deviation *4 [Analog Wide 4k]	1) Adj item: [As QT] Adjust: [✳✳✳✳] 2) Adj item: [AsH QT]→ [AsH QT] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [QT Deviation (Analog Wide 4k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [◿], [◺] [PC test mode] [◀], [▶]	Write the value as followings. 513 (Reference value)	0.60kHz±0.05kHz
[Analog Wide 5k]	1) Adj item: [Aw QT] Adjust: [✳✳✳✳] 2) Adj item: [AwH QT]→ [AwH QT] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [QT Deviation (Analog Wide 5k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							0.75kHz±0.05kHz
7. DQT Deviation *4 [Analog Narrow]	1) Adj item: [Aw DQT] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [AnH DQT]→ [AnH QT] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [DQT Deviation (Analog Narrow)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						Write the value as followings. 415 (Reference value)	0.35kHz±0.05kHz
[Analog Wide 4k]	1) Adj item: [As DQT] Adjust: [✳✳✳✳] 2) Adj item: [AsH DQT]→ [AsH QT] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [DQT Deviation (Analog Wide 4k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							0.60kHz±0.05kHz
[Analog Wide 5k]	1) Adj item: [Aw DQT] Adjust: [✳✳✳✳] 2) Adj item: [AwH DQT]→ [AwH DQT] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [DQT Deviation (Analog Wide 5k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							0.75kHz±0.05kHz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. LTR Deviation *4 [Analog Narrow]	1) Adj item: [An LTR] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [AnH LTR]→ [AnH LTR] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [LTR Deviation (Analog Narrow)] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	Write the value as followings. 465 (Reference value)	0.75kHz±0.05kHz
[Analog Wide 4k]	1) Adj item: [As LTR] Adjust: [✳✳✳✳] 2) Adj item: [AsH LTR]→ [AsH LTR] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [LTR Deviation (Analog Wide 4k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						Write the value as followings. 523 (Reference value)	0.90kHz±0.05kHz
[Analog Wide 5k]	1) Adj item: [Aw LTR] Adjust: [✳✳✳✳] 2) Adj item: [AwH LTR]→ [AwH LTR] (TA) Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [LTR Deviation (Analog Wide 5k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						Write the value as followings. 465 (Reference value)	1.00kHz±0.05kHz
9. DTMF Deviation *4 [Analog Narrow]	1) Adj item: [An DTMF] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [AnH DTMF]→ [AnH DTMF] (TA) PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [DTMF Deviation (Analog Narrow)] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						Write the value as followings. 540 (Reference value)	1.25kHz±0.05kHz
[Analog Wide 4k]	1) Adj item: [As DTMF] Adjust: [✳✳✳✳] 2) Adj item: [AsH DTMF]→ [AsH DTMF] (TA) PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [DTMF Deviation (Analog Wide 4k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							2.00kHz±0.05kHz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
DTMF Deviation *4 [Analog Wide 5k]	1) Adj item: [Aw DTMF] Adjust: [✳✳✳✳] 2) Adj item: [AwH DTMF]→ [AwH DTMF] (TA) PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [DTMF Deviation (Analog Wide 5k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [∧], [∨] [PC test mode] [◀],[▶]	Write the value as followings. 540 (Reference value)	2.50kHz±0.05kHz
10. MSK Deviation *4 [Analog Narrow]	1) Adj item: [An MSK] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [AnH MSK]→ [AnH MSK] (TA) PTT: ON Press [<] key to store the adjustment value.	1)Adj item: [MSK Deviation (Analog Narrow)] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						Write the value as followings. 513 (Reference value)	1.50kHz±0.05kHz
[Analog Wide 4k]	1) Adj item: [As MSK] Adjust: [✳✳✳✳] 2) Adj item: [AsH MSK]→ [AsH MSK] (TA) PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [MSK Deviation (Analog Wide 4k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							2.40kHz±0.05kHz
[Analog Wide 5k]	1) Adj item: [Aw MSK] Adjust: [✳✳✳✳] 2) Adj item: [AwH MSK]→ [AwH MSK] (TA) PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [MSK Deviation (Analog Wide 5k)] 2) Adj item: [High], [High (TA)] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							3.00kHz±0.05kHz
11. CW ID Deviation *4 [NXDN Very Narrow]	1) Adj item: [Nv CWID] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [CW ID Deviation (NXDN Very Narrow)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.						Write the value as followings. 376 (Reference value)	1.10kHz±0.10kHz

*4: Refer to the "Necessary Deviation adjustment item for each signaling and mode" table on page 55.

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
12. VOX 1	1) Adj item: [VOX1] Adjust: [✳✳✳] AG: 1kHz/45mV at MIC terminal	1) Adj item: [VOX 1] AG: 1kHz/45mV at MIC terminal	AG	Panel	Universal connector			[Panel tuning mode] After apply signal from AG, press [<] key to store the adjustment value. [PC test mode] After apply signal from AG, press [Apply] button to store the adjustment value.	
13. VOX 10	1) Adj item: [VOX10] Adjust: [✳✳✳] AG: 1kHz/3mV at MIC terminal	1) Adj item: [VOX 10] AG: 1kHz/3mV at MIC terminal							
14. Battery Warning Level writing	1) Adj item: [BATT] Adjust: [✳✳✳] PTT: ON	1) Adj item: [Battery Warning Level)] PTT: Press [Transmit] button.	Power meter DVM	Panel	ANT BATT terminal			Press the PTT switch or [Transmit] button on the PC window. Apply 6.20V to battery terminal. Confirm that one pre-determined numeric in the range 1 to 256 appears. [Panel tuning mode] Press [<] key to store the adjustment value. [PC test mode] Press [Apply] button to store the adjustment value.	
15. Battery Warning Level check	[Panel test mode] 1) CH-Sig: 1-1 BATT terminal voltage: 6.0V while transmitting	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 BATT terminal voltage: 6.0V while transmitting						Check	The transceiver can transmit with causing the LED to blink.

ADJUSTMENT

■ Necessary Deviation adjustment item for each signaling and mode

The following shows the necessary adjustment items for each signaling deviation. Please read the following table like the following example. In the case of the signaling "QT (Wide 5k)", this signaling is composed of three elements [Balance, Maximum Deviation (Analog Wide 5k) and QT Deviation (Wide 5k)]. Please adjust Balance and Maximum Deviation (Analog Wide 5k) before adjusting QT Deviation (Wide 5k).

Mode	Signaling	Necessary adjustment and order			
		Wide 5k	**Wide 4k**	**Narrow**	**Very Narrow**
Analog	Audio	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k)	Step1.Balance adjust Step2. Maximum Deviation (Analog Narrow)	-
	QT	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. QT Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. QT Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. QT Deviation (Analog Narrow)	-
	DQT	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. DQT Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. DQT Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. DQT Deviation (Analog Narrow)	-
	LTR	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. LTR Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. LTR Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. LTR Deviation (Analog Narrow)	-
	DTMF	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. DTMF Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. DTMF Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. DTMF Deviation (Analog Narrow)	-
	MSK (FleetSync)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. MSK Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. MSK Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. MSK Deviation (Analog Narrow)	-
NXDN	Audio	-	-	Step1. Balance adjust Step2. Maximum Deviation (NXDN Narrow)	Step1. Balance adjust Step2. Maximum Deviation (NXDN Very Narrow)
	CWID	-	-	-	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. CW ID Deviation (NXDN Very Narrow)

- Balance is common with all the above deviation adjustments. If Balance (Transmitter Section 3) has already adjusted, please skip Step1 and adjust from Step2.
- Maximum Deviation (Analog Wide 5k/Wide 4k/Narrow) is common with all the analog signaling deviations and CWID Deviation (NXDN Very Narrow). If Balance and Maximum Deviation (Analog Wide 5k/Wide 4k/Narrow) (Transmitter Section 5) have already adjusted, please skip Step2 and adjust from Step3.

ADJUSTMENT

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) Wide 5k/Wide 4k/ Narrow: Narrow Beat Shift: Uncheck Compander: Uncheck	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 Wide 5k/Wide 4k/ Narrow: Narrow Beat Shift: Uncheck Compander: Uncheck 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. RSSI Reference *5 [Analog Narrow]	1) Adj item: [An RRSSI] Adjust: [✳✳✳] 2) Adj item: [AnL RRSSI]→ [AnC RRSSI]→ [AnH RRSSI] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI Reference (Analog Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [As RRSSI] Adjust: [✳✳✳] 2) Adj item: [AsL RRSSI]→ [AsC RRSSI]→ [AsH RRSSI] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±2.4kHz)	1) Adj item: [RSSI Reference (Analog Wide 4k)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [Aw RRSSI] Adjust: [✳✳✳] 2) Adj item: [AwL RRSSI]→ [AwC RRSSI]→ [AwH RRSSI] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI Reference (Analog Wide 5k)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	1) Adj item: [Nv RRSSI] Adjust: [✳✳✳] 2) Adj item: [NvL RRSSI]→ [NvC RRSSI]→ [NvH RRSSI] SSG output: 12dB SINAD level for analog Narrow –3dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI Reference (NXDN Very Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level for analog Narrow –3dB (MOD: 1kHz/±1.5kHz)							Adjust with the analog signal

*5: Because RSSI Reference (NXDN Narrow) is adjusted by adjusting RSSI Reference (Analog Narrow), it is not necessary to adjust RSSI Reference (NXDN Narrow).

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. Open Squelch *6 [Analog Narrow]	1) Adj item: [An SQL] Adjust: [✳✳✳] 2) Adj item: [AnL SQL]→ [AnC SQL]→ [AnH SQL] SSG output: 12dB SINAD level (MOD: 1kHz/±1.5kHz)	1) Adj item: [Open Squelch (Analog Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	"Open Squelch" will not be adjusted correctly if MOD and Deviation are wrong.
[Analog Wide 4k]	1) Adj item: [As SQL] Adjust: [✳✳✳] 2) Adj item: [AsL SQL]→ [AsC SQL]→ [AsH SQL] SSG output: 12dB SINAD level (MOD: 1kHz/±2.4kHz)	1) Adj item: [Open Squelch (Analog Wide 4k)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [Aw SQL] Adjust: [✳✳✳] 2) Adj item: [AwL SQL]→ [AwC SQL]→ [AwH SQL] SSG output: 12dB SINAD level (MOD: 1kHz/±3kHz)	1) Adj item: [Open Squelch (Analog Wide 5k)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	1) Adj item: [Nv SQL] Adjust: [✳✳✳] 2) Adj item: [NvL SQL]→ [NvC SQL]→ [NvH SQL] SSG output: 12dB SINAD level for analog Narrow –4dB (MOD: 400Hz/±1.1kHz)	1) Adj item: [Open Squelch (NXDN Very Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level for analog Narrow –4dB (MOD: 400Hz/±1.1kHz)							Adjust with the analog signal. This item is adjusted under the condition that MOD is "400Hz" and Deviation is "±1.1kHz" due to the circuit configuration.
*6: Because Open Squelch (NXDN Narrow) is adjusted by adjusting Open Squelch (Analog Narrow), it is not necessary to adjust Open Squelch (NXDN Narrow).									
4. Low RSSI at –118dBm *7 [Analog Narrow]	1) Adj item: [An LRSSI] Adjust: [✳✳✳] 2) Adj item: [AnL LRSSI]→ [AnC LRSSI]→ [AnH LRSSI] SSG output: –118dBm (0.28µv) (MOD: 1kHz/±1.5kHz)	1) Adj item: [Low RSSI (Analog Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: –118 dBm (0.28µv) (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, 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	
Low RSSI at –118dBm *7 [Analog Wide 4k]	1) Adj item: [As LRSSI] Adjust: [✳✳✳] 2) Adj item: [AsL LRSSI]→ [AnC LRSSI]→ [AnH LRSSI] SSG output: –118 dBm (0.28µv) (MOD: 1kHz/±2.4kHz)	1) Adj item: [Low RSSI (Analog Wide 4k) 2) Adj item: [Low], [Center], [High] SSG output: –118 dBm (0.28µv) (MOD: 1kHz/±2.4kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 5k]	1) Adj item: [Aw LRSSI] Adjust: [✳✳✳] 2) Adj item: [AwL LRSSI]→ [AwC LRSSI]→ [AwH LRSSI] SSG output: –118dBm (0.28µv) (MOD: 1kHz/±3kHz)	1) Adj item: [Low RSSI (Analog Wide 5k)] 2) Adj item: [Low], [Center], [High] SSG output: –118dBm (0.28µv) (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	1) Adj item: [Nv LRSSI] Adjust: [✳✳✳] 2) Adj item: [NvL LRSSI]→ [NvC LRSSI]→ [NvH LRSSI] SSG output: –118dBm (0.28µv) (MOD: 1kHz/±1.5kHz)	1) Adj item: [Low RSSI (NXDN Very Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: –118dBm (0.28µv) (MOD: 1kHz/±1.5kHz)							Adjust with the analog signal.
*7: Because Low RSSI at –118dBm (NXDN Narrow) is adjusted by adjusting Low RSSI at –118dBm (Analog Narrow), it is not necessary to adjust Low RSSI at –118dBm (NXDN Narrow).									
5. High RSSI at –80dBm *8 [Analog Narrow]	1) Adj item: [An HRSSI] Adjust: [✳✳✳] 2) Adj item: [AnL HRSSI]→ [AnC HRSSI]→ [AnH HRSSI] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±1.5kHz)	1) Adj item: [High RSSI (Analog Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [As HRSSI] Adjust: [✳✳✳] 2) Adj item: [AsL HRSSI]→ [AnC HRSSI]→ [AnH HRSSI] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±2.4kHz)	1) Adj item: [High RSSI (Analog Wide 4k)] 2) Adj item: [Low], [Center], [High] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±2.4kHz)							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
High RSSI at –80dBm *8 [Analog Wide 5k]	1) Adj item: [Aw HRSSI] Adjust: [✳✳✳] 2) Adj item: [AwL HRSSI]→ [AwC HRSSI]→ [AwH HRSSI] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±3kHz)	1) Adj item: [High RSSI (Analog Wide 5k)] 2) Adj item: [Low], [Center], [High] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[NXDN Very Narrow]	1) Adj item: [Nv HRSSI] Adjust: [✳✳✳] 2) Adj item: [NvL HRSSI]→ [NvC HRSSI]→ [NvH HRSSI] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±1.5kHz)	1) Adj item: [High RSSI (NXDN Very Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: –80dBm (22.4µv) (MOD: 1kHz/±1.5kHz)							Adjust with the analog signal.
*8: Because High RSSI at –80dBm (NXDN Narrow) is adjusted by adjusting High RSSI at –80dBm (Analog Narrow), it is not necessary to adjust High RSSI at –80dBm (NXDN Narrow).									
6. Tight Squelch [Analog Narrow]	1) Adj item: [An SQLT] Adjust: [✳✳✳] 2) Adj item: [AnL SQLT]→ [AnC SQLT]→ [AnH SQLT] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Tight Squelch (Analog Narrow)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscpoe	Panel	ANT Universal connector			[Panel tuning mode] After input signal from SSG, press [<] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [As SQLT] Adjust: [✳✳✳] 2) Adj item: [AsL SQLT]→ [AsC SQLT]→ [AsH SQLT] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±2.4kHz)	1) Adj item: [Tight Squelch (Analog Wide 4k)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [Aw SQLT] Adjust: [✳✳✳] 2) Adj item: [AwL SQLT]→ [AwC SQLT]→ [AwH SQLT] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±3kHz)	1) Adj item: [Tight Squelch (Analog Wide 5k)] 2) Adj item: [Low], [Center], [High] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±3kHz)							

TERMINAL FUNCTION

Display unit (X54-3660-10)

Pin No.	Name	I/O	Function
CN3			
1	/CS	O	Chip select output
2	/RES	O	LCD reset output
3	A0	O	Address bus 0 output
4	/WR	O	WR bus output
5	D0	I/O	Data bus 0
6	D1	I/O	Data bus 1
7	D2	I/O	Data bus 2
8	D3	I/O	Data bus 3
9	D4	I/O	Data bus 4
10	D5	I/O	Data bus 5
11	D6	I/O	Data bus 6
12	D7	I/O	Data bus 7
13	VDD	O	3.3V LCD power supply output
14	VSS	-	GND
15	VDD	O	3.3V LCD power supply output
16	V1	-	LCD drive power supply
17	V2	-	LCD drive power supply
18	V3	-	LCD drive power supply
19	V4	-	LCD drive power supply
20	V5	O	LCD drive power supply
CN8			
1	GND	-	GND
2	GND	-	GND
3	NC	-	No connection
4	/LCDRST	I	LCD reset input
5	VLCDLED	I	6key backlight voltage (SB2)
6	/WR	I	WR bus input
7	VLCDLED	I	6key backlight voltage (SB2)
8	A0	I	Address bus 0 input
9	33M	I	3.3V input
10	33M	I	3.3V input
11	NC	-	No connection
12	D0	I/O	Data bus 0
13	NC	-	No connection
14	D1	I/O	Data bus 1
15	NC	-	No connection
16	D2	I/O	Data bus 2
17	NC	-	No connection
18	D3	I/O	Data bus 3
19	NC	-	No connection
20	D4	I/O	Data bus 4
21	NC	-	No connection
22	D5	I/O	Data bus 5
23	NC	-	No connection
24	D6	I/O	Data bus 6
25	NC	-	No connection
26	D7	I/O	Data bus 7
27	NC	-	No connection
28	LCDCNT	I	LCD contrast input
29	KEYO1	I	Key matrix input (Ko1)
30	KEYO0	I	Key matrix input (Ko0)
31	KEYO3	I	Key matrix input (Ko3)
32	KEYO2	I	Key matrix input (Ko2)
33	/KEYI1	O	Key matrix output (Ki1)
34	/KEYI0	O	Key matrix output (Ki0)
35	/KEYI3	O	Key matrix output (Ki3)
36	/KEYI2	O	Key matrix output (Ki2)
37	NC	-	No connection
38	KEYI4	O	Key matrix output (Ki4)
39	VKEY	I	12key backlight voltage (SB2)
40	VKEY	I	12key backlight voltage (SB2)
41	NC	-	No connection
42	NC	-	No connection
43	5A	I	5V input
44	5A	I	5V input
45	NC	-	No connection
46	INTMIC	O	Internal MIC output
47	NC	-	No connection
48	ME	-	Internal MIC GND
49	GND	-	GND
50	GND	-	GND

TX-RX unit (X57-8070-10 A/2)

Pin No.	Name	I/O	Function
CN4			
1	NC	-	No connection
2	RXD	I	Serial data input
3	TXD	O	Serial data output
4	5V	O	5V output
5	E	-	GND
6	OPT	I/O	Option interface I/O
7	PF	I	Programmable function key input
8	PTT	I	External PTT input
9	ME	-	External MIC GND
10	EMC	I	External MIC input
11	MSW	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
CN5			
1	SP-	O	BTL output – for internal speaker
2	SP+	O	BTL output + for internal speaker
CN6			
1	SW1	I	Key matrix input (SIDE1 key)
2	PTT	I	Internal PTT input
3	GND	-	GND
4	Side_G	O	Key matrix output (SIDE1,2 key)
5	SW2	I	Key matrix input (SIDE2 key)
CN201			
1	SB1	I	Power input afuter power switch
2	+B	O	Power output after passing through the fuse
3	EN3	I	Encoder pulse input
4	EN4	I	Encoder pulse input
5	GND	-	GND
6	EN2	I	Encoder pulse input
7	EN1	I	Encoder pulse input
8	VOL-	-	GND
9	VOL	I	Volume level input for audio control
10	VOL+	O	3.3V
CN301			
1	GND	-	GND
2	GND	-	GND
3	NC	-	No connection
4	/LCDRST	O	LCD reset output
5	VLCDLED	O	6key backlight voltage (SB2)
6	/WR	O	WR bus output
7	VLCDLED	O	6key backlight voltage (SB2)
8	A0	O	Address bus 0 output
9	33M	O	3.3V output
10	33M	O	3.3V output
11	NC	-	No connection
12	D0	I/O	Data bus 0
13	NC	-	No connection
14	D1	I/O	Data bus 1
15	NC	-	No connection
16	D2	I/O	Data bus 2
17	NC	-	No connection
18	D3	I/O	Data bus 3
19	NC	-	No connection
20	D4	I/O	Data bus 4
21	NC	-	No connection
22	D5	I/O	Data bus 5
23	NC	-	No connection
24	D6	I/O	Data bus 6

Pin No.	Name	I/O	Function
25	NC	-	No connection
26	D7	I/O	Data bus 7
27	NC	-	No connection
28	LCDCNT	O	LCD contrast output
29	KEYO1	O	Key matrix output (Ko1)
30	KEYO0	O	Key matrix output (Ko0)
31	KEYO3	O	Key matrix output (Ko3)
32	KEYO2	O	Key matrix output (Ko2)
33	/KEYI1	I	Key matrix input (Ki1)
34	/KEYI0	I	Key matrix input (Ki0)
35	/KEYI3	I	Key matrix input (Ki3)
36	/KEYI2	I	Key matrix input (Ki2)
37	/PTT	O	PTT output
38	KEYI4	I	Key matrix input (Ki4)
39	VKEY	O	12key backlight voltage (SB2)
40	VKEY	O	12key backlight voltage (SB2)
41	NC	-	No connection
42	NC	-	No connection
43	5A	O	5V output
44	5A	O	5V output
45	NC	-	No connection
46	INTMIC	I	Internal MIC input
47	NC	-	No connection
48	ME	-	Internal MIC GND
49	GND	-	GND
50	GND	-	GND
CN307 (for production)			
1~20			

TERMINAL FUNCTION

Pin No.	Name	I/O	Function
CN321			
1	OPT1	I/O	Refer to "CN321 26-pin connector specification" described on pages 64 to 66.
2	OPT3	I/O	
3	26P_RD	I	
4	26P_TD	O	
5	CK	-	
6	OPT4	O	
7	OPT10	O	
8	OPT5	O	
9	DGND	-	
10	AGND	-	
11	AI	I	
12	AO	O	
13	AGND	-	
14	5V	O	
15	OPT9	I	
16	DTI	I	
17	OPT8	I/O	
18	OPT11	O	
19	OPT7	I/O	
20	OPT2	I/O	
21	TXO	O	
22	RXEO	O	
23	RXEI	I	
24	TXI	I	
25	OPT6	O	
26	POW	O	

Option board unit (X57-8070-10 B/2)

Pin No.	Name	I/O	Function
CN923			
1	OPT1	I/O	Refer to "CN923 Option board connector specification" described on page 67.
2	OPT3	I/O	
3	26P_RD	O	
4	26P_TD	I	
5	NC	-	
6	OPT4	I	
7	OPT10	I	
8	OPT5	I	
9	DGND	-	
10	AGND	-	
11	NC	-	
12	NC	-	
13	AGND	-	
14	5V	I	
15	OPT9	O	
16	DTI	O	
17	OPT8	I/O	
18	OPT11	I	
19	OPT7	I/O	
20	OPT2	I/O	
21	TXO	I	
22	RXEO	I	
23	RXEI	O	
24	TXI	O	
25	OPT6	I	
26	POW	I	

Solder Pad

Name	I/O	Signal Type	Function	Rating and Condition				
				Parameter	Min	Typ	Max	Unit
PTT2	O	Digital	PTT output	[Output] Output Impedance			10k	Ω
PTT1	I	Digital	PTT input	[Input] VIH	2.8		3.3	V
				[Input] VIL	0		0.5	V
MDSW	I	Digital	Man-down switch input	[Input] VIH	2.8		3.3	V
				[Input] VIL	0		0.5	V
GND	-	GND	GND	Allowable current value				mA
TXD	O	Digital	Serial data output	VOH (Io=-5mA)	4.0	-	5.3	V
				VOL (Io=5mA)	0	-	0.8	V
				Baud Rate			19200	bps
RXD	I	Digital	Serial data input	VIH	2.8	-	5.3	V
				VIL	0	-	0.8	V
				Baud Rate			19200	bps
RSSI	O	Analog	RSSI output	Output Impedance			10k	Ω

TERMINAL FUNCTION

Universal connector

Pin No.	Name	I/O	Signal Type	Function	Rating and Condition				
					Parameter	Min	Typ	Max	Unit
1	SSW	I	Digital	EXT/INT speaker switch input L: External speaker ON H: Internal speaker ON	VIH	2.8	-	5.3	V
					VIL	0	-	0.7	V
2	SP+	O	Analog	BTL output + for external speaker	[8Ω load] Max output power (1kHz, Batt=7.5V)		1.3	1.8	W
					[8Ω load] DC Bias		2.5		V
					[8Ω load] Allowable Frequency	300		3000	Hz
3	SP–	O	Analog	BTL output – for external speaker	[16Ω load] Max output power (1kHz, Batt=7.5V)		0.9	1.4	W
					[16Ω load] DC Bias		2.5		V
					[16Ω load] Allowable Frequency	300		3000	Hz
4	MSW	I	Digital	EXT/INT MIC switch input L: External MIC ON H: Internal MIC ON	VIH	2.8	-	5.3	V
					VIL	0	-	0.5	V
5	EMC	I	Analog	External MIC input	Audio Level (STD deviation)	7.7	12.5	17.3	mV
					DC Bias		3.3		V
					Allowable Frequency	300		3000	Hz
					Input Impedance	-	1.8	-	kΩ
6	ME	-	-	External MIC GND					
7	PTT	I	Digital	External PTT input L: PTT ON	VIH	2.8	-	5.3	V
					VIL	0	-	0.7	V
8	PF	I	Analog	Programmable function key input	V (PF2 key ON)	2.2	-	2.8	V
					V (PF1 key ON)	1.7	-	2.2	V
					V (PF1, PF2 key ON)	1.3	-	1.7	V
9	OPT	I	Digital	Man-down input Programmable active H/L	VIH	2.8	-	5.3	V
					VIL	0	-	0.7	V
10	E	-	-	GND					
11	5V	-	Power	5V power supply output (Output control is FPU programmable)	Output Voltage (Iout=100mA)	4.9	5.0	5.1	V
					Maximum Current	-	-	0.2	A
12	TXD	O	Digital	Serial data output	VOH (Io=–5mA)	4.0	-	5.3	V
					VOL (Io=5mA)	0	-	0.8	V
					Baud Rate			19200	bps
13	RXD	I	Digital	Serial data input	VIH	2.8	-	5.3	V
					VIL	0	-	0.8	V
					Baud Rate			115200	bps
14	NC	-	-	Not used (reserved for future option)					

TERMINAL FUNCTION

CN321 26-pin connector specification

Pin No.	Name	I/O	Signal Type	Rating and Condition				
				Parameter	Min	Typ	Max	Unit
1	OPT1	I/O	Digital	[Input] VIH	2.8		3.3	V
6	OPT4			[Input] VIL	0		0.5	V
8	OPT5			[Output] VOH	2.8		3.5	V
17	OPT8			[Output] VOL	0		0.5	V
18	OPT11							
2	OPT3	I/O	Digital	[Input] VIH	2.8		3.3	V
19	OPT7			[Input] VIL	0		0.5	V
20	OPT2			[Output] VOH	2.8		3.5	V
25	OPT6			[Output] VOL	0		0.5	V
3	26P_RD	I	Digital	[Input] VIH	2.8		3.3	V
				[Input] VIL	0		0.5	V
				Baud Rate			19200	bps
4	26P_TD	O	Digital	[Output] VOH	2.8		3.5	V
				[Output] VOL	0		0.5	V
				Baud Rate			19200	bps
15	OPT9	I	Analog	Input Amplitude (Square wave)	-	3.3	-	Vp-p
				Coupling Capacitor	-	0.01	-	µF
				Input Impedance	22k	-	-	Ω
				Allowable Frequency	300	-	3000	Hz
7	OPT10	O	Analog/Digital	Output Amplitude (1kHz, 60% deviation)	0.9	1.3	1.7	Vp-p
				Coupling Capacitor		0.1		µF
				Output Impedance			22k	Ω
				Allowable Frequency	300		3000	Hz
11	AI	I	Analog	Input Amplitude (1kHz, 60% deviation)	0.3	0.5	0.7	Vp-p
				Coupling Capacitor	-	0.1	-	µF
				Input Impedance	-	12k	-	Ω
				Allowable Frequency	300		3000	Hz
12	AO	O	Analog	Output Amplitude (1kHz, 60% deviation)	30	50	70	mVp-p
				Coupling Capacitor	-	0.1	-	µF
				Output Impedance	-	35k	-	Ω
				Allowable Frequency	300		3000	Hz
16	DTI	I	Analog	Input Amplitude (1kHz, 60% deviation)	0.8	1.1	1.4	Vp-p
				Coupling Capacitor	-	0.1	-	µF
				Input Impedance	22k	-	-	Ω
				Allowable Frequency	300	-	3000	Hz
21	TXO	O	Analog	Output Amplitude (1kHz, 60% deviation) while external MIC	160	260	360	mVp-p
				Output Amplitude (1kHz, 60% deviation) while internal MIC	-	130	-	mVp-p
				Coupling Capacitor	-	0.1	-	µF
				Output Impedance	-	-	2.2k	Ω
				Allowable Frequency	300		3000	Hz

TERMINAL FUNCTION

Pin No.	Name	I/O	Signal Type	Rating and Condition				
				Parameter	Min	Typ	Max	Unit
22	RXEO	O	Analog	Output Amplitude (1kHz, 60% deviation)	450	640	830	mVp-p
				Coupling Capacitor	-	0.1	-	µF
				Output Impedance	-	-	2.2k	Ω
				Allowable Frequency	300	-	3000	Hz
23	RXEI	I	Analog	Input Amplitude (1kHz, 60% deviation)	450	640	830	mVp-p
				Coupling Capacitor		0.1		µF
				Input Impedance	22k			Ω
				Allowable Frequency	300		3000	Hz
24	TXI	I	Analog	Input Amplitude (1kHz, 60% deviation) while external MIC	160	260	360	mVp-p
				Input Amplitude (1kHz, 60% deviation) while internal MIC	-	130	-	mVp-p
				Coupling Capacitor	-	0.1	-	µF
				Input Impedance	22k	-	-	Ω
				Allowable Frequency	300	-	3000	Hz
14	5V	O	Power	Output Voltage		5		V
				Output Current			78	mA
26	POW	O	Power	Output Voltage		7.5		V
				Output Current			100	mA
9	DGND	-	GND	Allowable current value (Total current of 3 pins)			100	mA
10	AGND							
13								
5	NC	-	-	-				

CN321 26-pin connector specification

Pin No.	Name	Device	I/O	Connection	Function
1	OPT1	ANI board	O	Aux Input	[COR] Conv/LTR L: Activity receiving H: Not activity receiving [TOR] Conv/LTR L: Activity receiving (Sub Tone or LTR ID is OK) H: Not activity receiving [LOK] Conv L: TX Complete H: Not TX Complete LTR L: TX Link Complete (until TX finishes) H: Not TX Link Complete
		VGS-1	I	BUSY	BUSY indication
2	OPT3	ANI board	I	KEY	TX requirement input
		VGS-1	I	PLAY	PLAY indication
3	26P_RD	ANI board	-	-	-
		VGS-1	I	SO	Serial data input

TERMINAL FUNCTION

Pin No.	Name	Device	I/O	Connection	Function
4	26P_TD	ANI board	-	-	-
		VGS-1	O	SI	Serial data output
5	CK	-	-	-	-
6	OPT4	ANI board	O	PTT	PTT signal output
		VGS-1	O	EN	Enable
7	OPT10	ANI board	-	-	-
		VGS-1	O	USEL	UART speed select output
8	OPT5	ANI board	O	Emergency	Emergency signal output
		VGS-1	O	RST	Reset output
9	DGND	ANI board	-	A–	GND
		VGS-1	-	DGND	DGND
10	AGND	ANI board	-	A–	GND
		VGS-1	-	AGND	AGND
11	AI	ANI board	-	-	-
		VGS-1	I	AO	VGS Audio input
12	AO	ANI board	-	-	-
		VGS-1	O	AI	VGS Audio output
13	AGND	ANI board	-	A–	GND
		VGS-1	-	AGND	AGND
14	5V	ANI board	-	-	Note: POW and 5V can not be used simultaneously.
		VGS-1	O	5C	5V power supply
15	OPT9	ANI board	I	Sidetone	Sidetone input
		VGS-1	-	-	-
16	DTI	ANI board	I	Data Out	Data signal input
		VGS-1	-	-	-
17	OPT8	ANI board	I	Tone Control	Speaker mute signal input
		VGS-1	-	-	-
18	OPT11	ANI board	O	Man-Down	Man-Down output
		VGS-1	-	-	-
19	OPT7	ANI board	I	MIC Mute	MIC mute signal input
		VGS-1	-	-	-
20	OPT2	ANI board	I	Aux Output	Emergency signal input
		VGS-1	-	-	-
21	TXO	ANI board	-	-	-
		VGS-1	-	-	-
22	RXEO	ANI board	-	-	-
		VGS-1	-	-	-
23	RXEI	ANI board	-	-	-
		VGS-1	-	-	-
24	TXI	ANI board	-	-	-
		VGS-1	-	-	-
25	OPT6	ANI board	-	-	-
		VGS-1	-	-	-
26	POW	ANI board	O	A+	Switched B output
		VGS-1	-	-	Note: POW and 5V can not be used simultaneously.

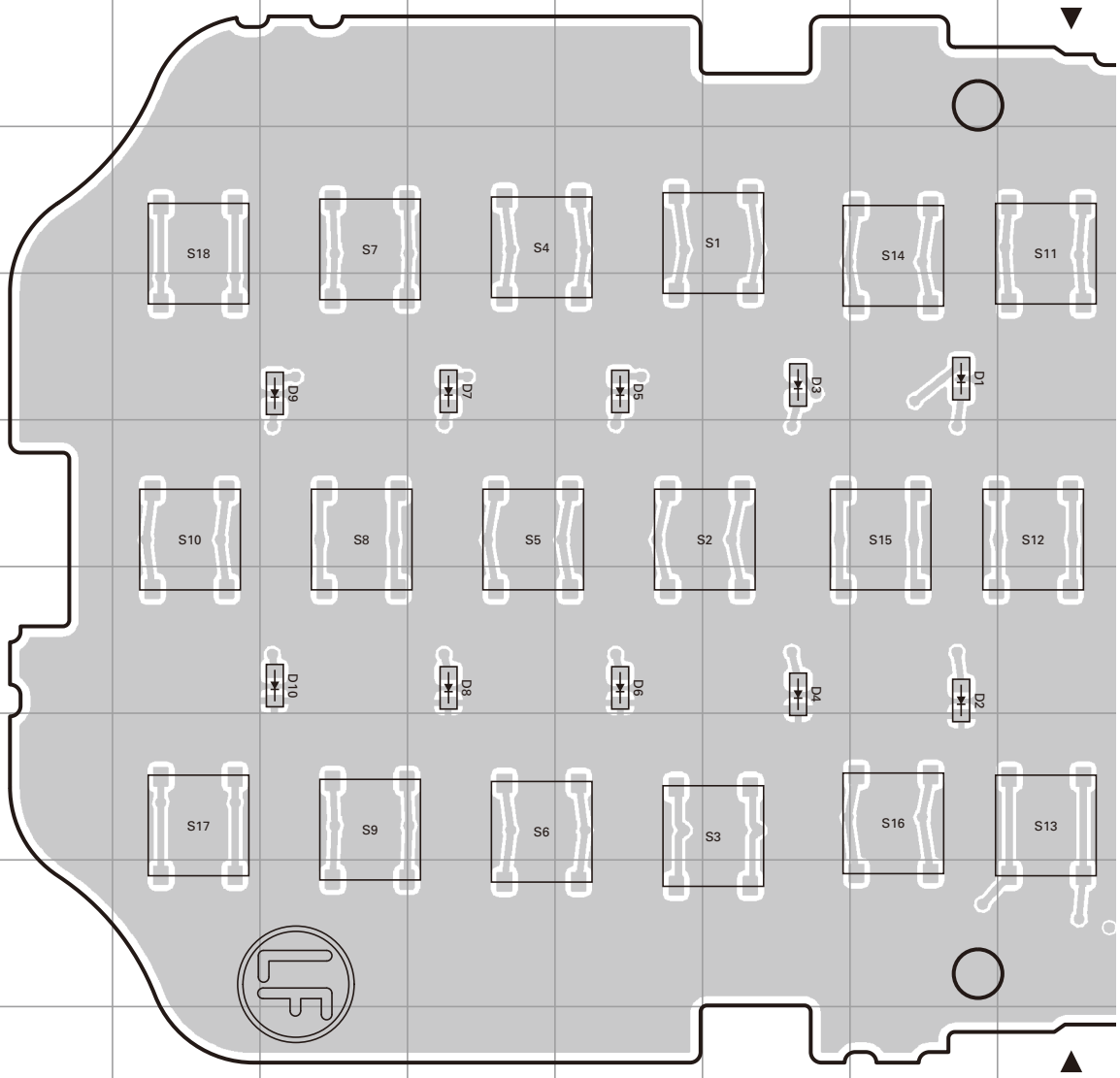
TERMINAL FUNCTION

CN923 Option board connector specification

Pin No.	Name	Device	I/O	Connection	Function
1	OPT1	ANI board	I	Aux Output	[COR] Conv/LTR L: Activity receiving H: Not activity receiving [TOR] Conv/LTR L: Activity receiving (Sub Tone or LTR ID is OK) H: Not activity receiving [LOK] Conv L: TX Complete H: Not TX Complete LTR L: TX Link Complete (until TX finishes) H: Not TX Link Complete
2	OPT3	ANI board	O	KEY	TX requirement output
3	26P_RD	ANI board	-	-	-
4	26P_TD	ANI board	-	-	-
5	NC	-	-	-	-
6	OPT4	ANI board	I	PTT	PTT signal input
7	OPT10	ANI board	-	-	-
8	OPT5	ANI board	I	Emergency	Emergency signal input
9	DGND	ANI board	-	A–	GND
10	AGND	ANI board	-	A–	GND
11	NC	-	-	-	-
12	NC	-	-	-	-
13	AGND	ANI board	-	A–	GND
14	5V	ANI board	-	-	Note: POW and 5V can not be used simultaneously.
15	OPT9	ANI board	O	Sidetone	Sidetone output
16	DTI	ANI board	O	Data Out	Data signal output
17	OPT8	ANI board	O	Tone Control	Speaker mute signal output
18	OPT11	ANI board	I	Man-Down	Man-Down input
19	OPT7	ANI board	O	MIC Mute	MIC mute signal output
20	OPT2	ANI board	O	Aux Output	Emergency signal output
21	TXO	ANI board	-	-	-
22	RXEO	ANI board	-	-	-
23	RXEI	ANI board	-	-	-
24	TXI	ANI board	-	-	-
25	OPT6	ANI board	-	-	-
26	POW	ANI board	I	A+	Switched B input

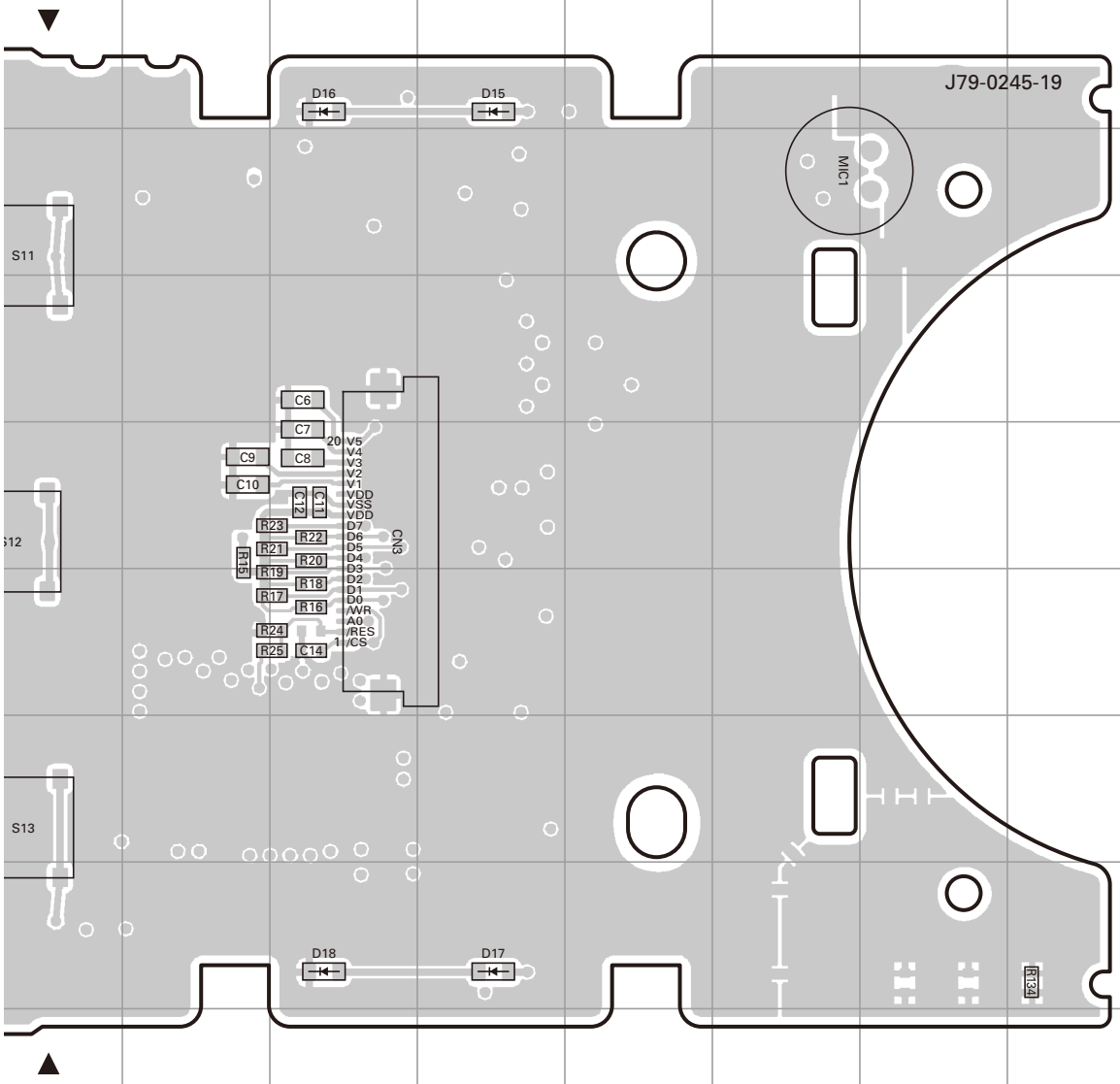
NX-410 PC BOARD

DISPLAY UNIT (X54-3660-10)
Component side view (J79-0245-19)



Ref. No.	Address	Ref. No.	Address
D1	5I	D8	7F
D2	7I	D9	5E
D3	5H	D10	7E
D4	7H	D15	3M
D5	5G	D16	3L
D6	7G	D17	9M
D7	5F	D18	9L

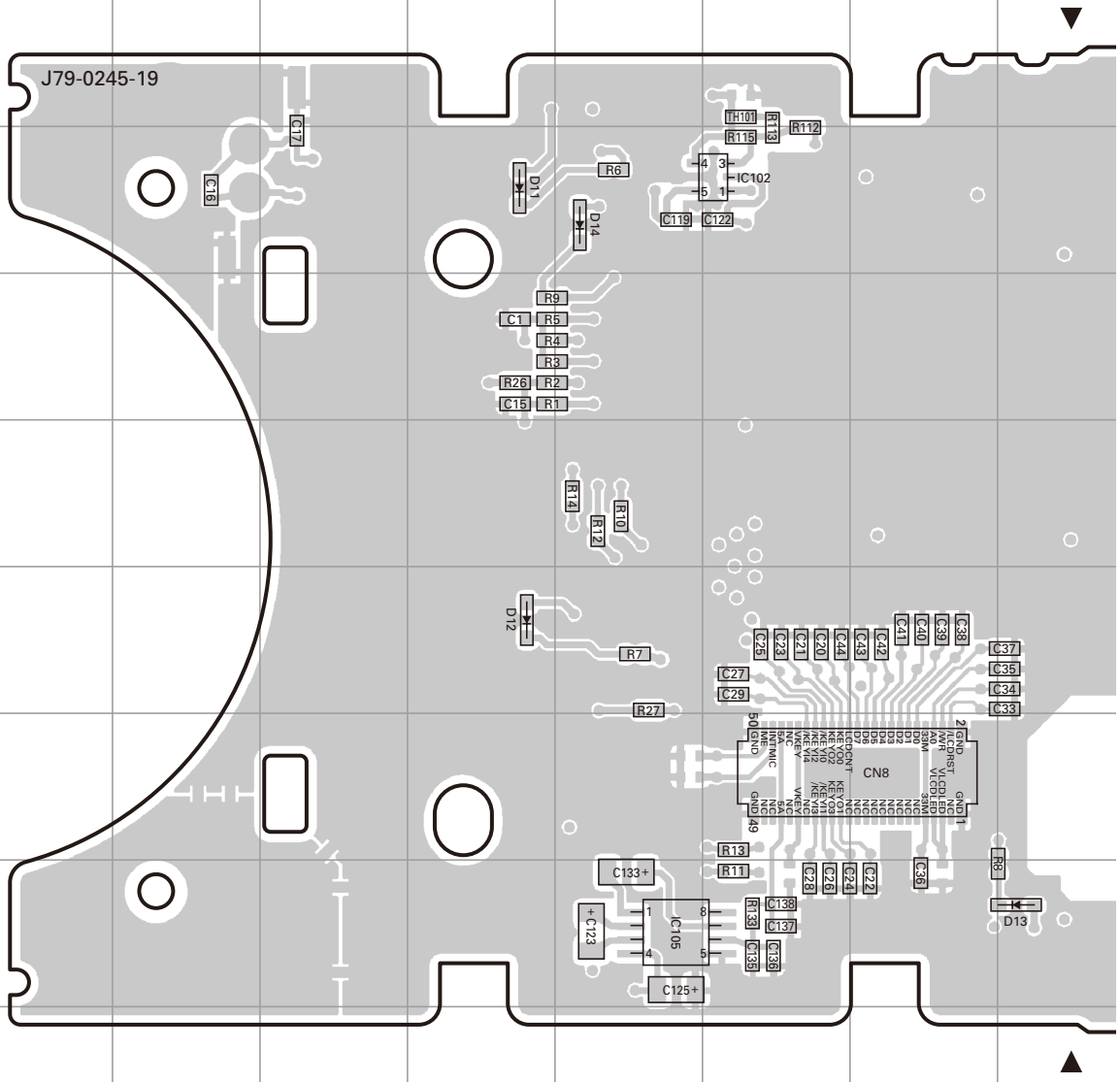
DISPLAY UNIT (X54-3660-10)
Component side view (J79-0245-19)



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

NX-410 PC BOARD

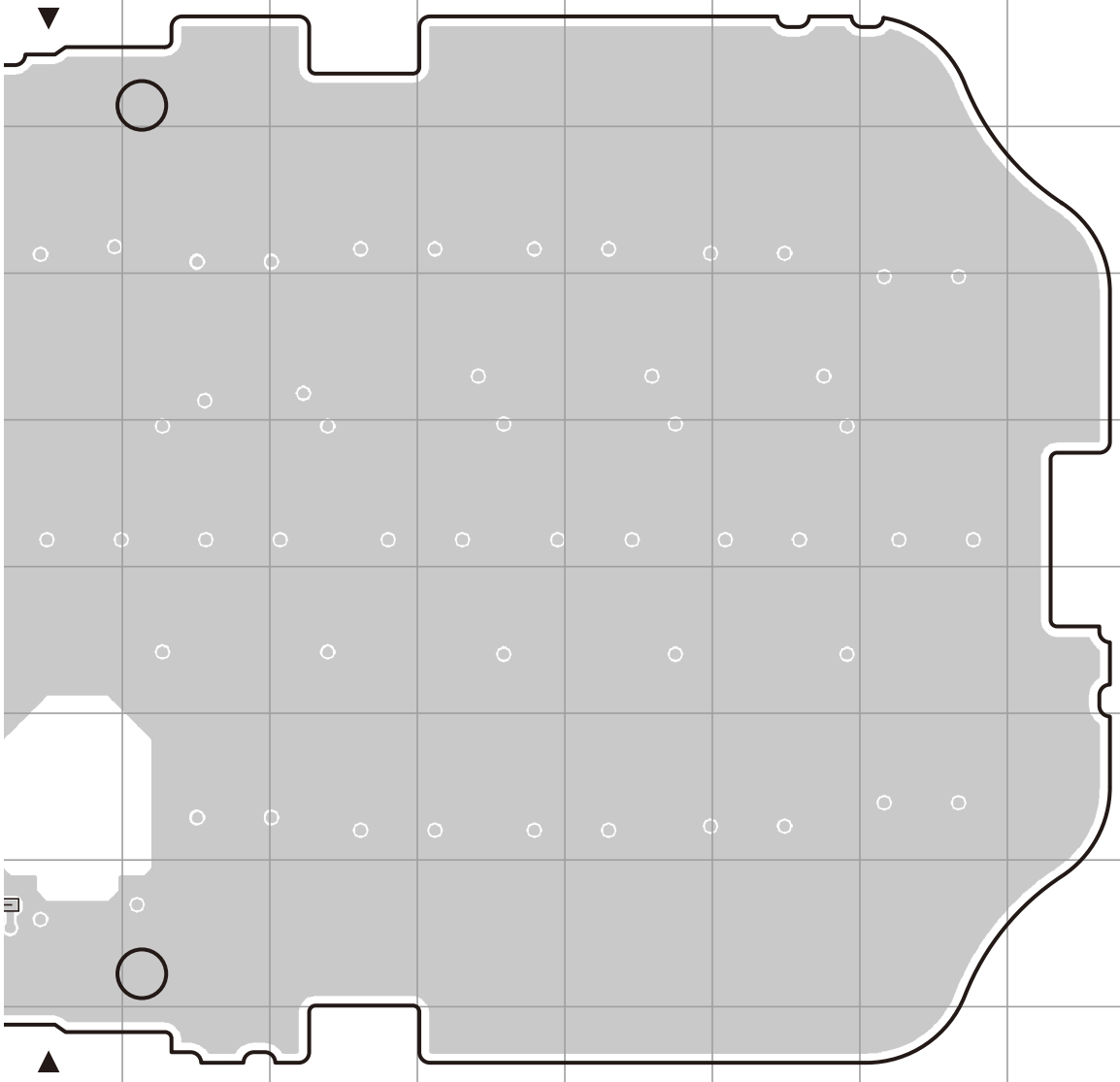
DISPLAY UNIT (X54-3660-10)
Foil side view (J79-0245-19)



Ref. No.	Address	Ref. No.	Address
IC102	4H	D12	7F
IC105	9G	D13	9J
D11	4F	D14	4G

PC BOARD NX-410

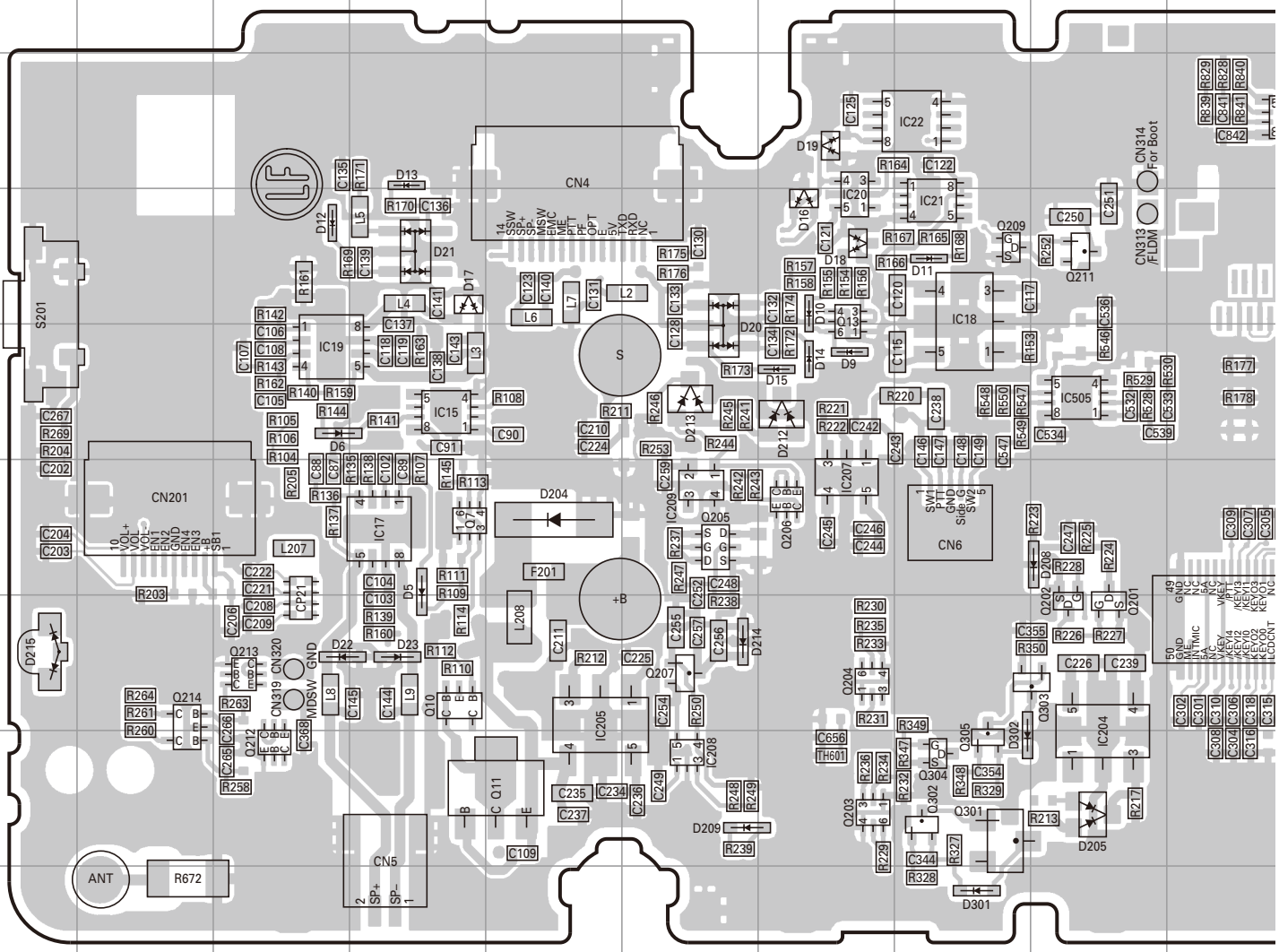
DISPLAY UNIT (X54-3660-10)
Foil side view (J79-0245-19)



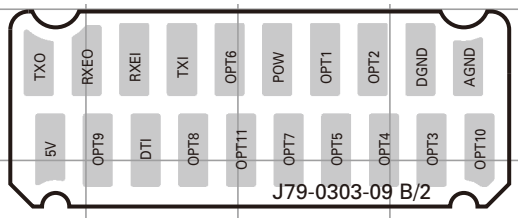
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Foil side

NX-410 PC BOARD

TX-RX UNIT (X57-8070-10) (A/2)
Component side view (J79-0303-09 A/2)



TX-RX UNIT (X57-8070-10) (B/2)

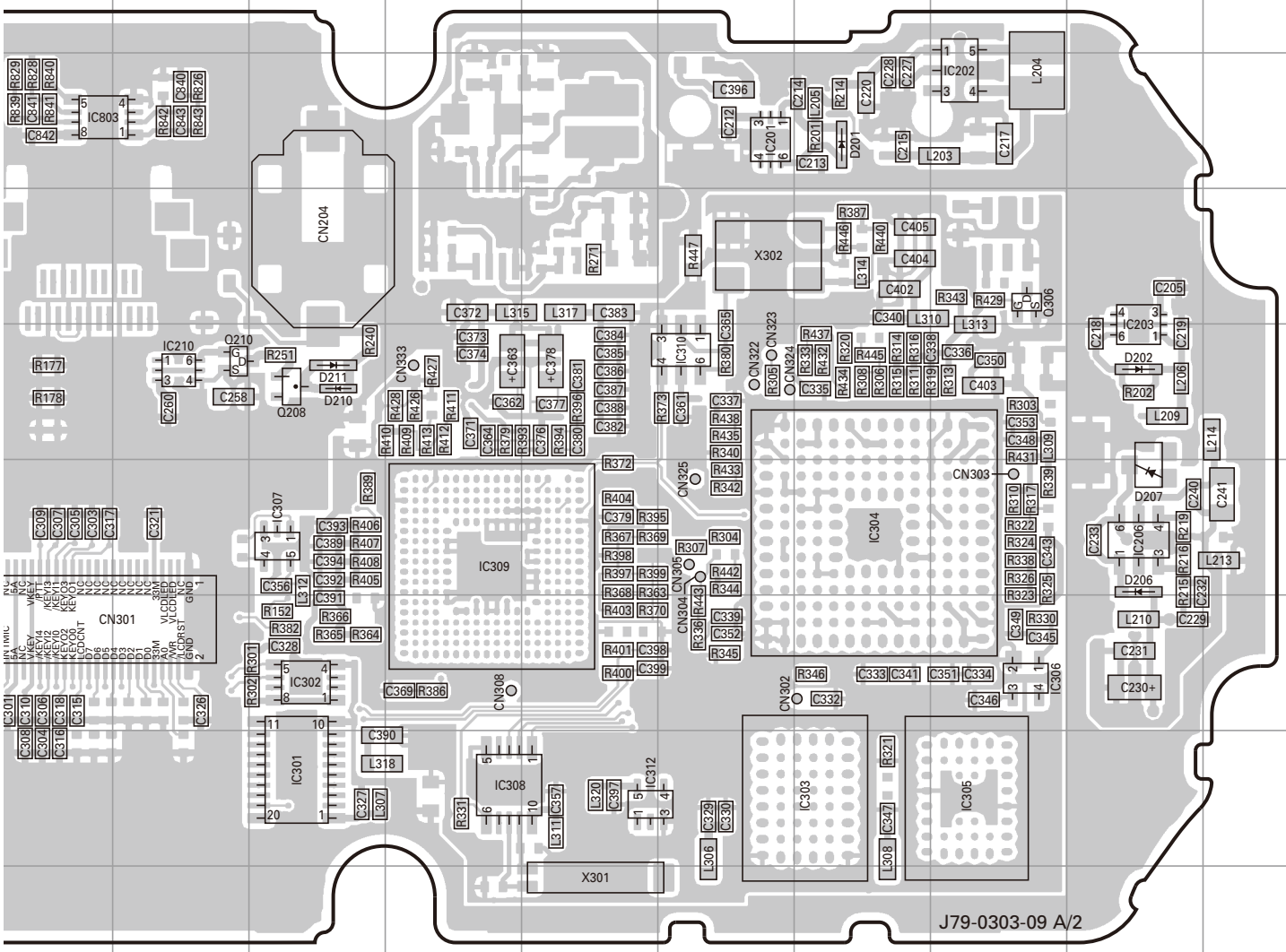


J79-0303-09 B/2

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref.
IC15	5D	IC204	8I	IC304	6P	Q7	6D	Q2
IC17	6D	IC205	7E	IC305	8Q	Q10	7D	Q2
IC18	4H	IC206	6R	IC306	7Q	Q11	8E	Q2
IC19	5C	IC207	6G	IC307	6L	Q13	4G	Q2
IC20	4G	IC208	8F	IC308	8M	Q201	7I	Q2
IC21	4H	IC209	6F	IC309	6M	Q202	7I	Q2
IC22	3H	IC210	5K	IC310	5O	Q203	8G	Q2
IC201	3O	IC301	8L	IC312	8N	Q204	7G	Q2
IC202	3Q	IC302	7L	IC505	5I	Q205	6F	Q3
IC203	5R	IC303	8P	IC803	3J	Q206	6G	Q3

PC BOARD NX-410

TX-RX UNIT (X57-8070-10) (A/2)
Component side view (J79-0303-09 A/2)



ress	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
D	Q207	7F	Q303	7I	D13	3D	D23	7D	D211	5L
D	Q208	5L	Q304	8H	D14	5G	D201	3P	D212	5G
E	Q209	4H	Q305	8H	D15	5G	D202	5R	D213	5F
G	Q210	5K	Q306	4Q	D16	4G	D204	6E	D214	7F
'I	Q211	4I	D5	6D	D17	4D	D205	8I	D215	7A
'I	Q212	8C	D6	5C	D18	4G	D206	6R	D301	9H
G	Q213	7C	D9	5G	D19	3G	D207	6R	D302	8H
G	Q214	7B	D10	4G	D20	5F	D208	6I		
F	Q301	8H	D11	4H	D21	4D	D209	8F		
G	Q302	8H	D12	4C	D22	7C	D210	5L		

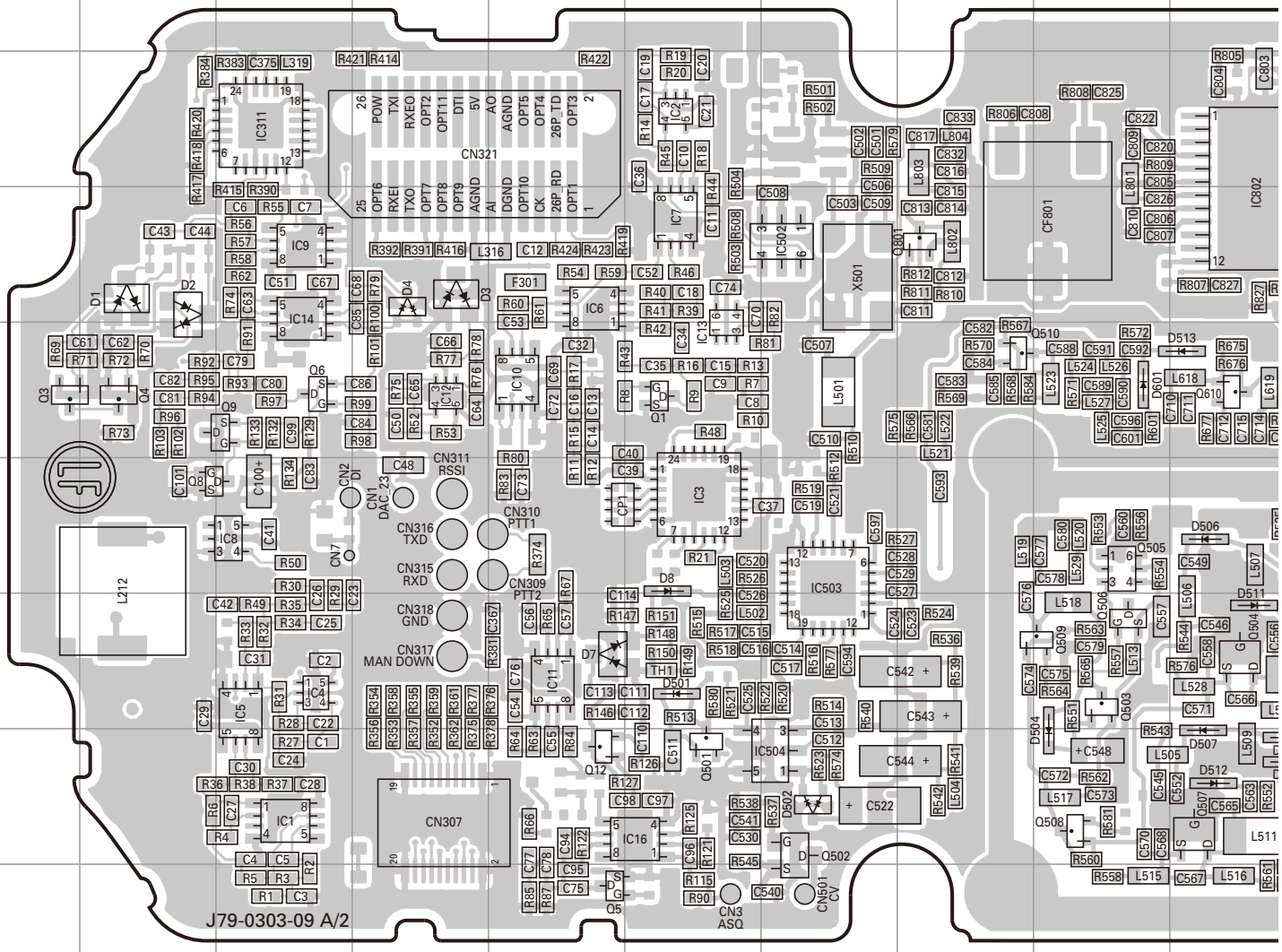
Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	
Layer 7	
Layer 8	

Foil side

NX-410 PC BOARD

TX-RX UNIT (X57-8070-10) (A/2)
Foil side view (J79-0303-09 A/2)



Component side

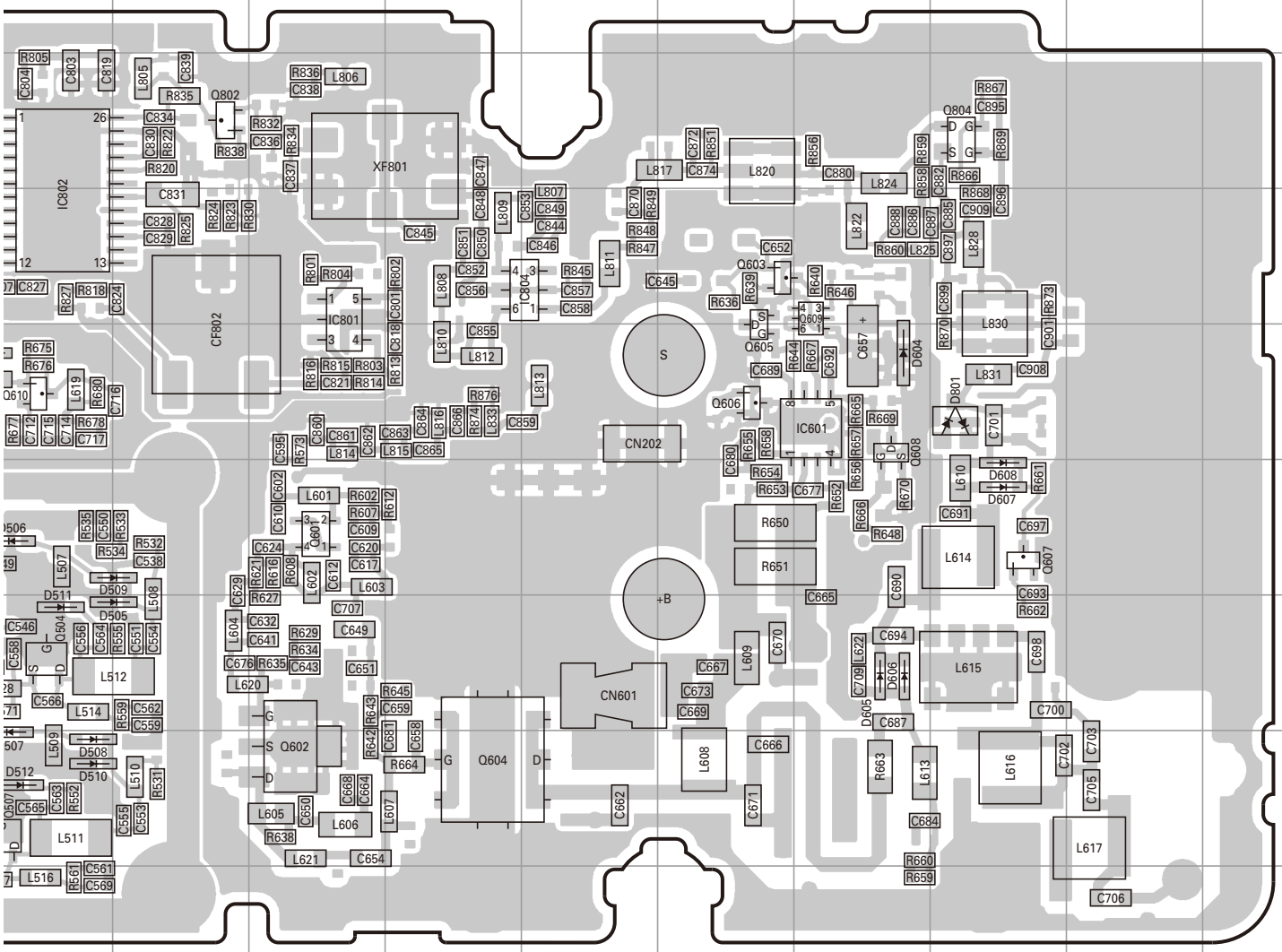
Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	
Layer 7	
Layer 8	

Foil side

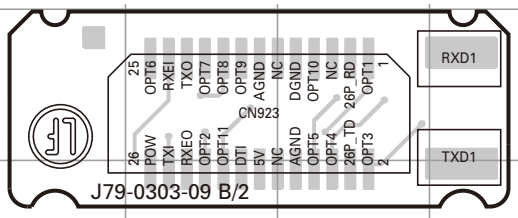
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref.
IC1	8C	IC11	7E	IC801	4L	Q12	8E	Q510	5H	Q6
IC2	3F	IC12	5D	IC802	4J	Q501	8F	Q601	6L	Q8
IC3	6F	IC13	5F	IC804	4N	Q502	8G	Q602	8L	Q8
IC4	7C	IC14	4C	Q1	5F	Q503	7I	Q603	4O	Q8
IC5	7C	IC16	8F	Q3	5A	Q504	7J	Q604	8M	D
IC6	4E	IC311	3C	Q4	5B	Q505	6I	Q605	5O	D
IC7	4F	IC502	4G	Q5	9E	Q506	7I	Q606	5O	D
IC8	6C	IC503	6G	Q6	5C	Q507	8J	Q607	6Q	D
IC9	4C	IC504	8G	Q8	6B	Q508	8I	Q608	5P	D
IC10	4E	IC601	5P	Q9	5C	Q509	7I	Q609	4P	D

PC BOARD NX-410

TX-RX UNIT (X57-8070-10) (A/2)
Foil side view (J79-0303-09 A/2)

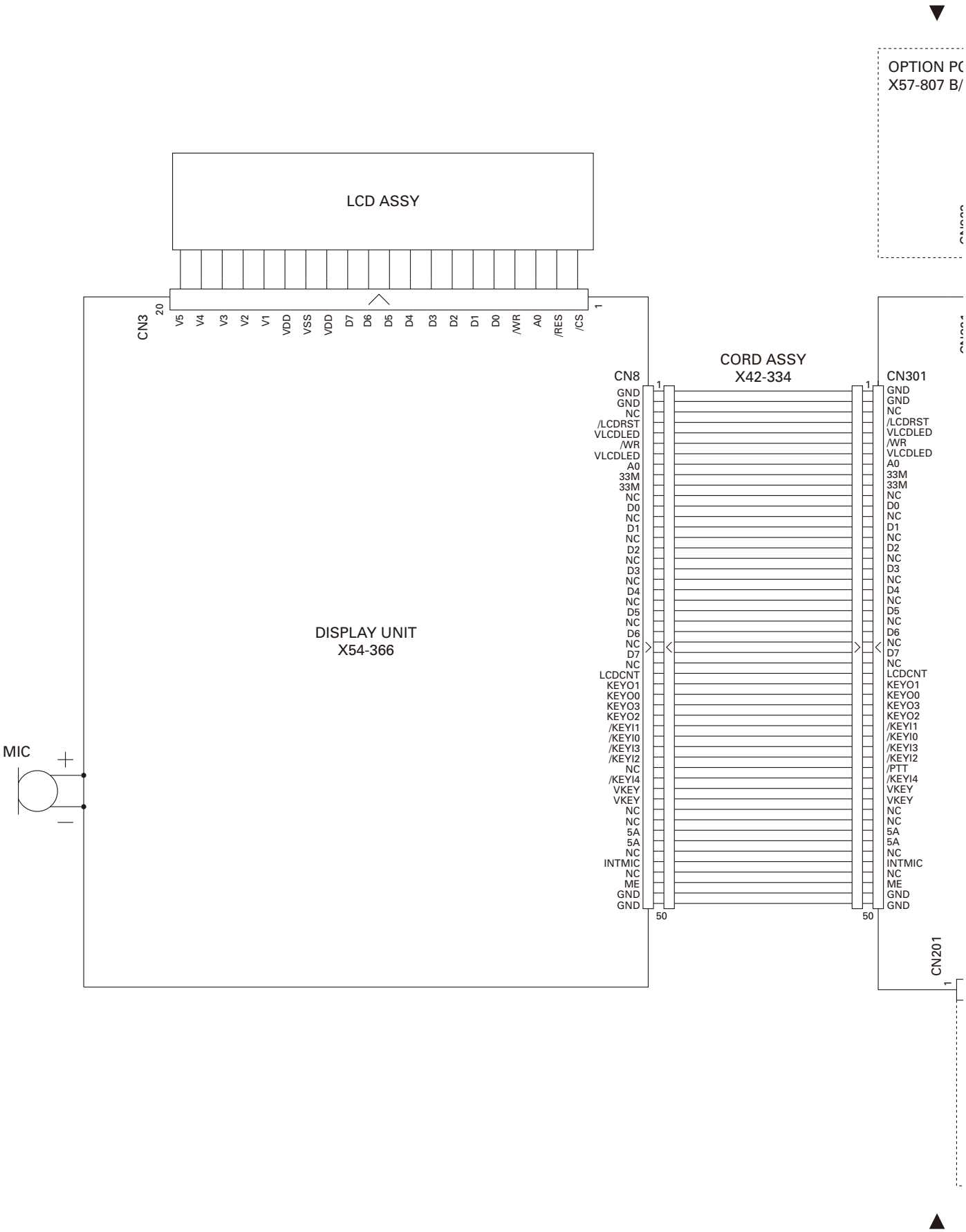


TX-RX UNIT (X57-8070-10) (B/2)

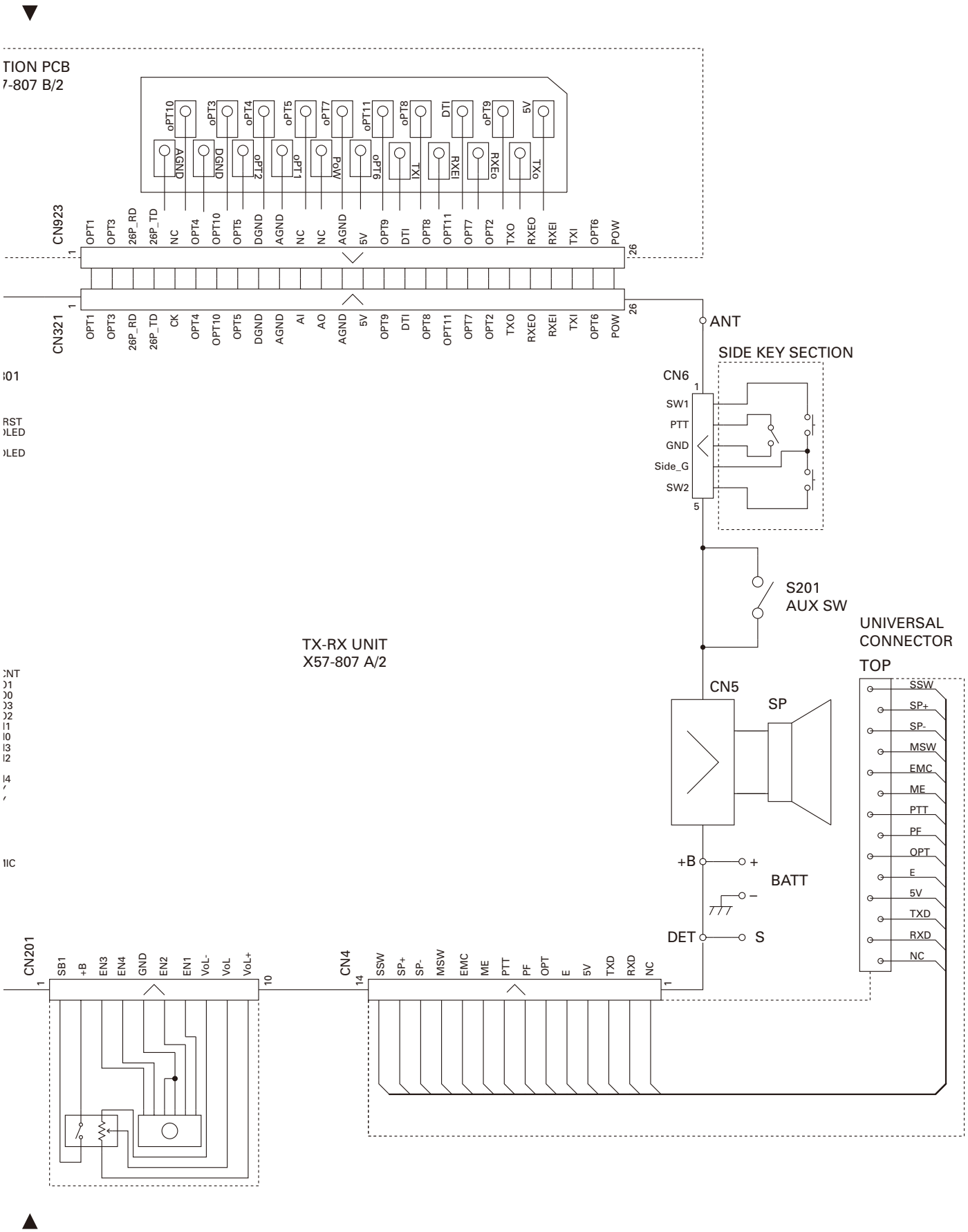


ress	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
H	Q610	5J	D501	7F	D512	8J
L	Q801	4H	D502	8G	D513	5J
L	Q802	3K	D504	8I	D601	5I
O	Q804	3Q	D505	7K	D604	5P
M	D1	4B	D506	6J	D605	7P
O	D2	4B	D507	8J	D606	7P
O	D3	4D	D508	8J	D607	6Q
Q	D4	4D	D509	6K	D608	6Q
P	D7	7E	D510	8J	D801	5Q
P	D8	6F	D511	7J		

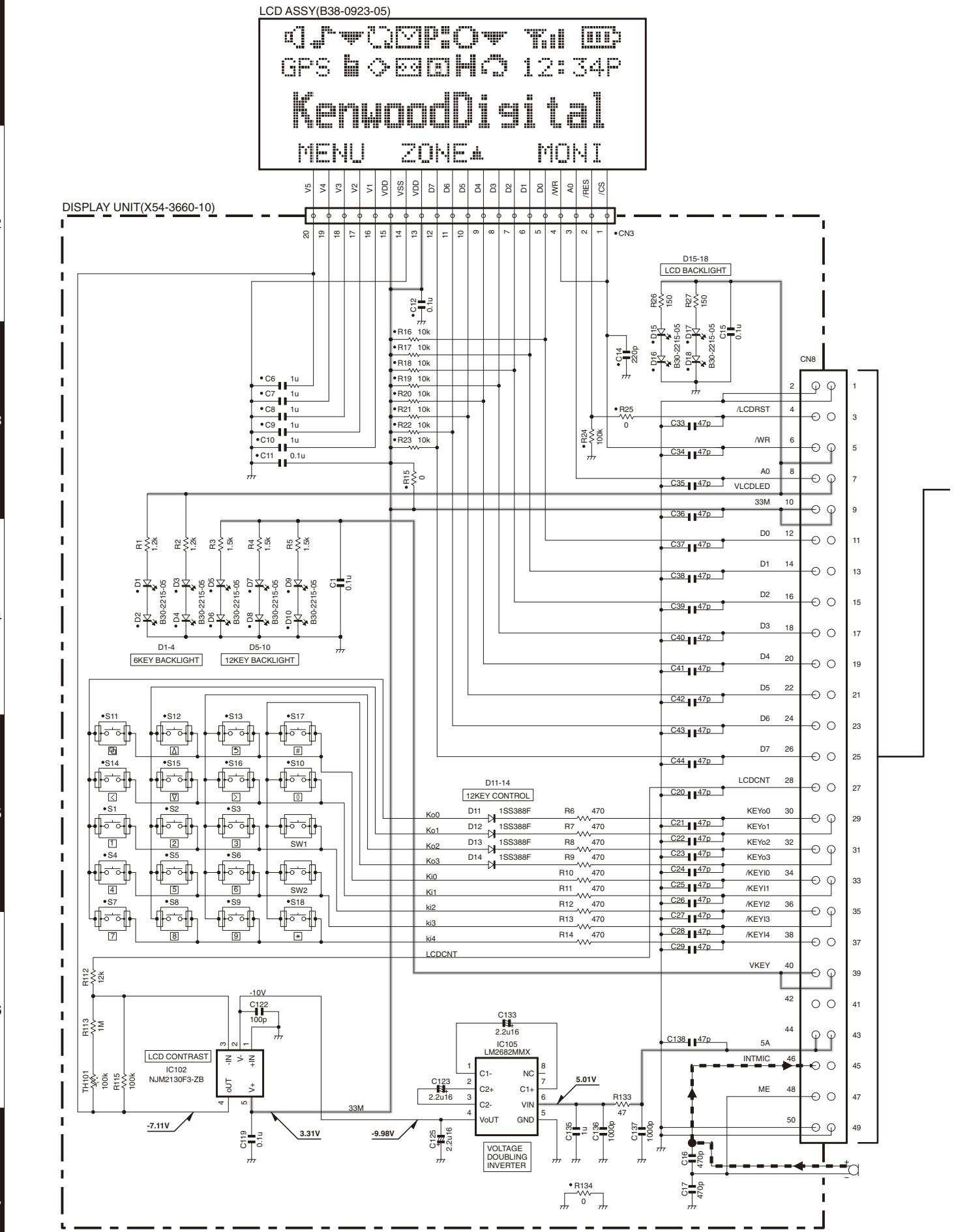
INTERCONNECTION DIAGRAM



INTERCONNECTION DIAGRAM

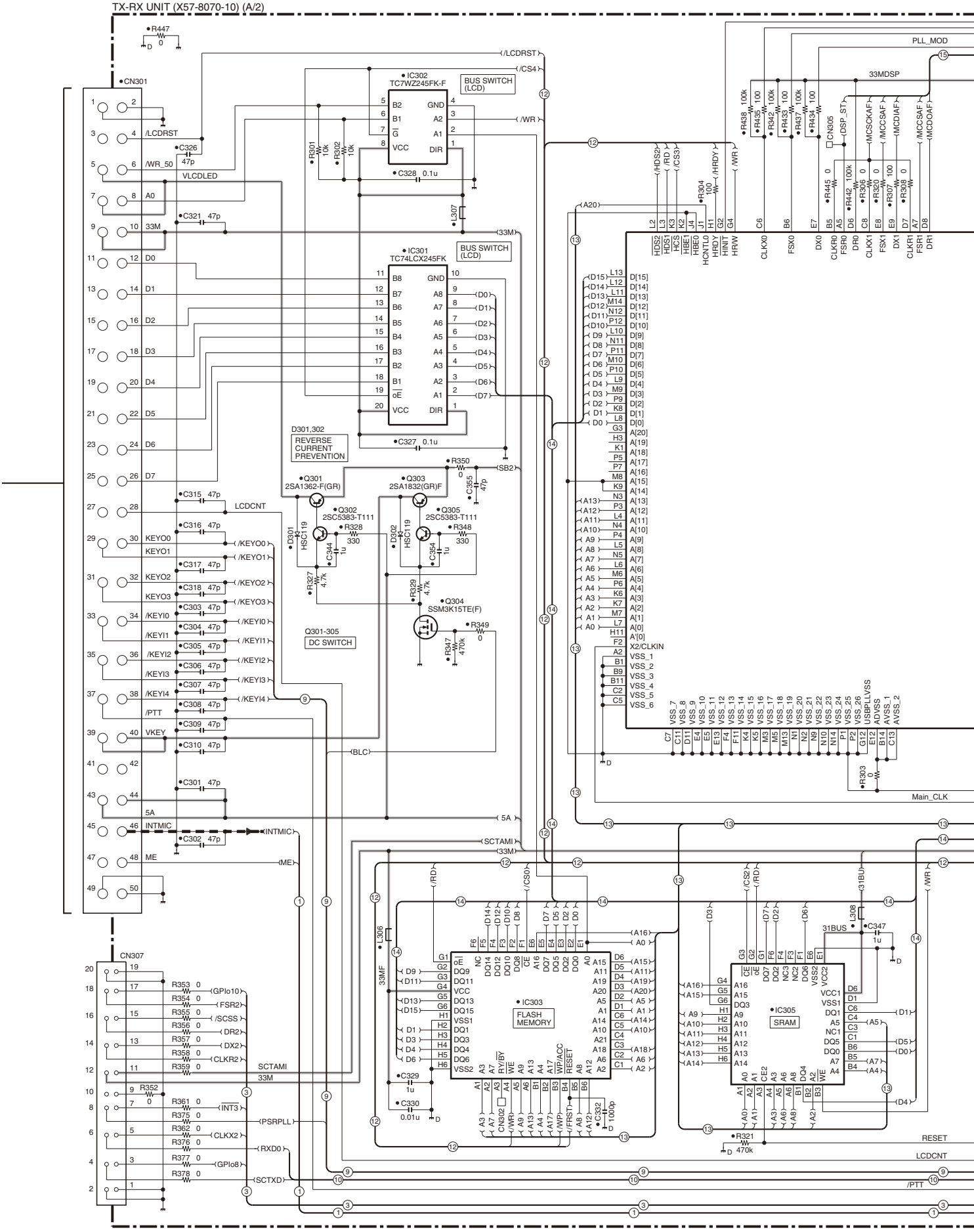


NX-410 SCHEMATIC DIAGRAM



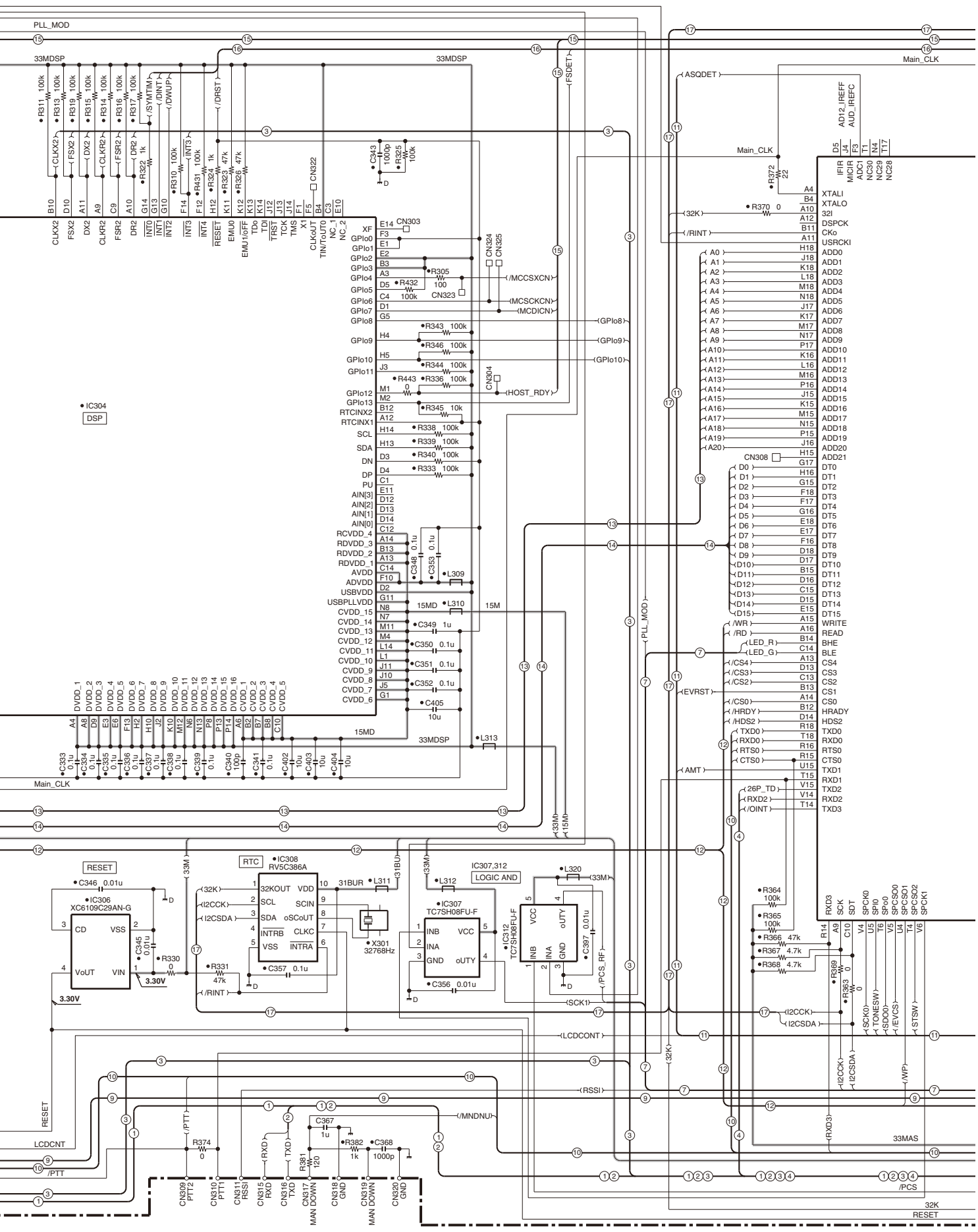
SCHEMATIC DIAGRAM NX-410

TX-RX UNIT (X57-8070-10) (A/2)



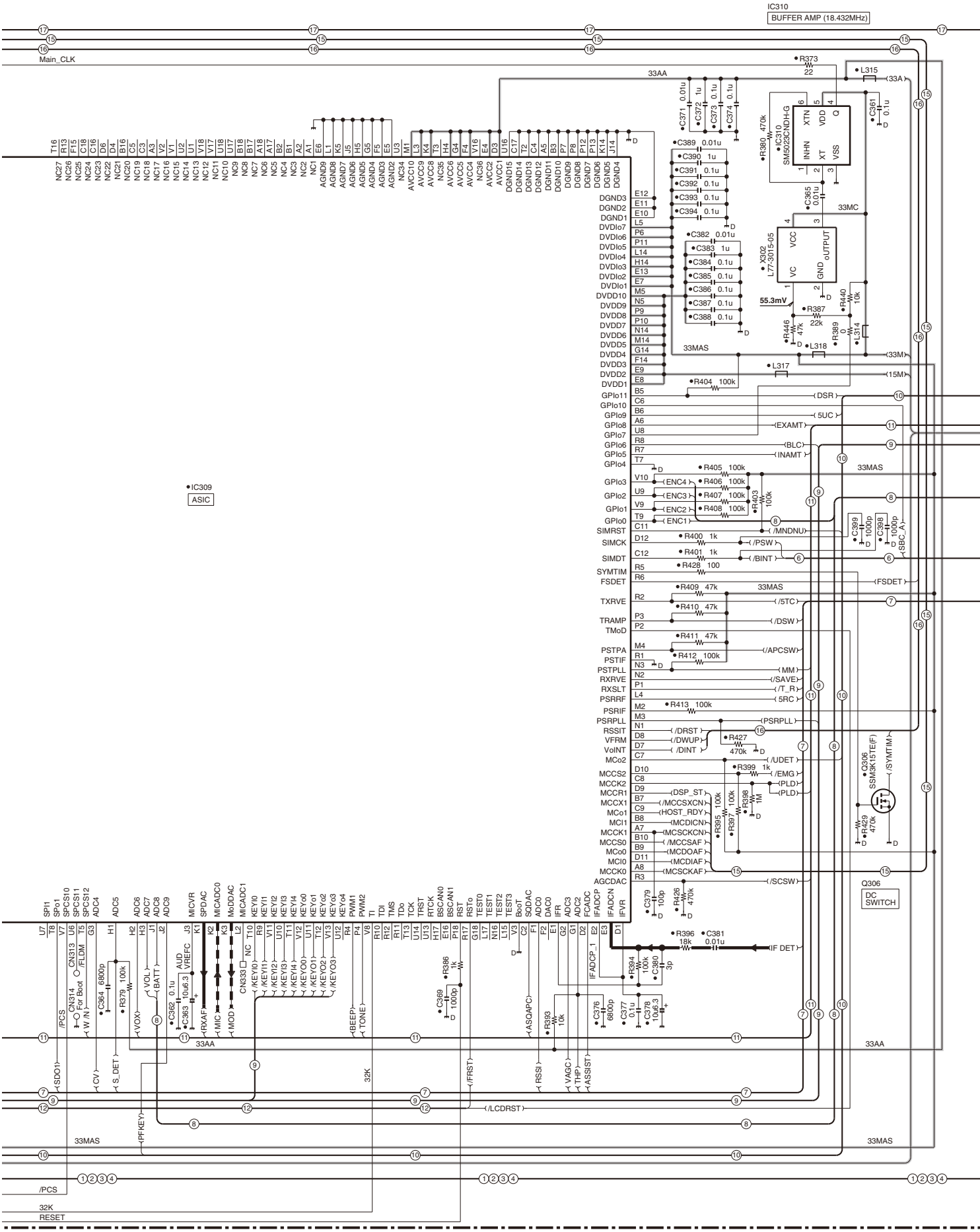
NX-410 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-8070-10) (A/2)



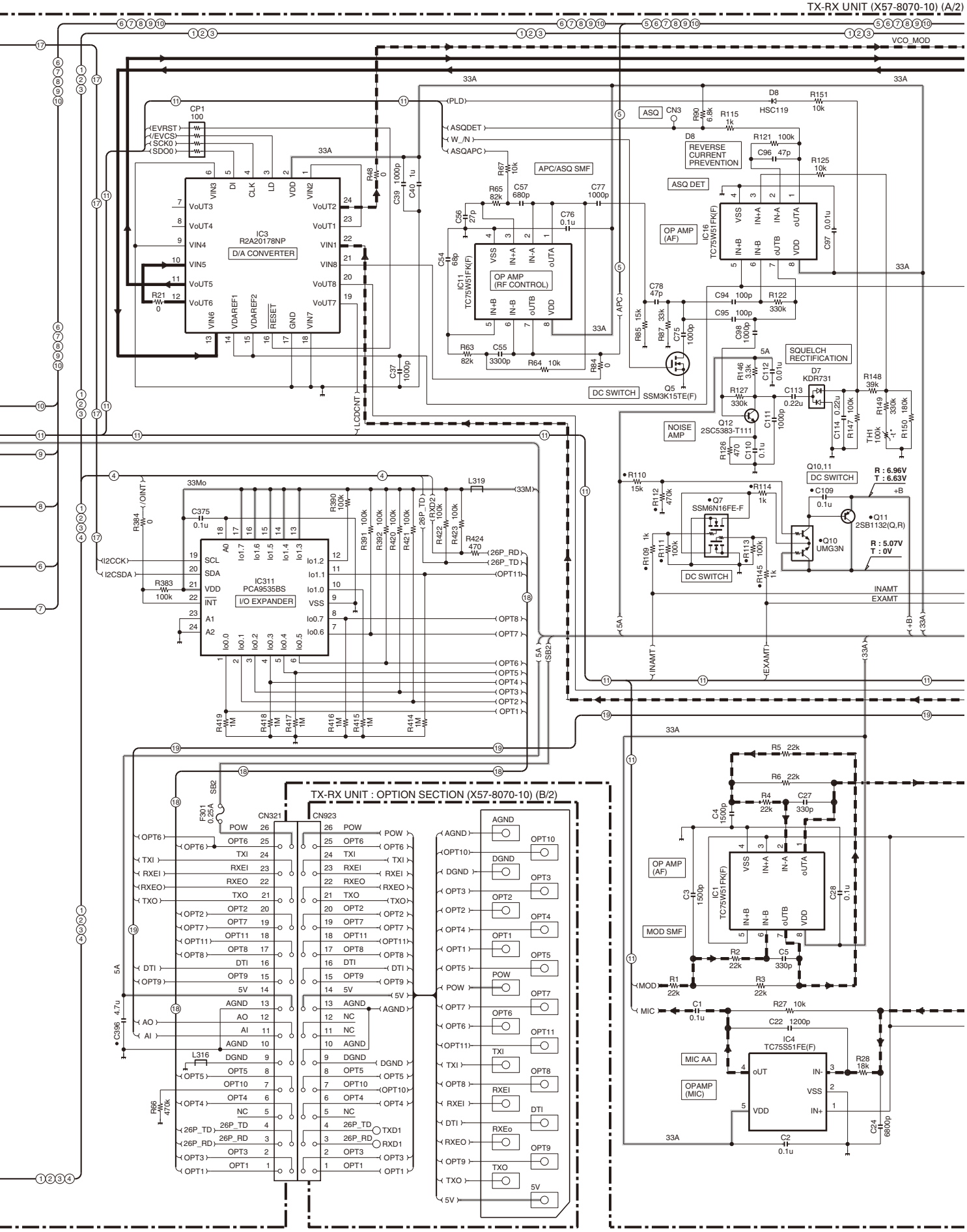
SCHEMATIC DIAGRAM NX-410

TX-RX UNIT (X57-8070-10) (A/2)



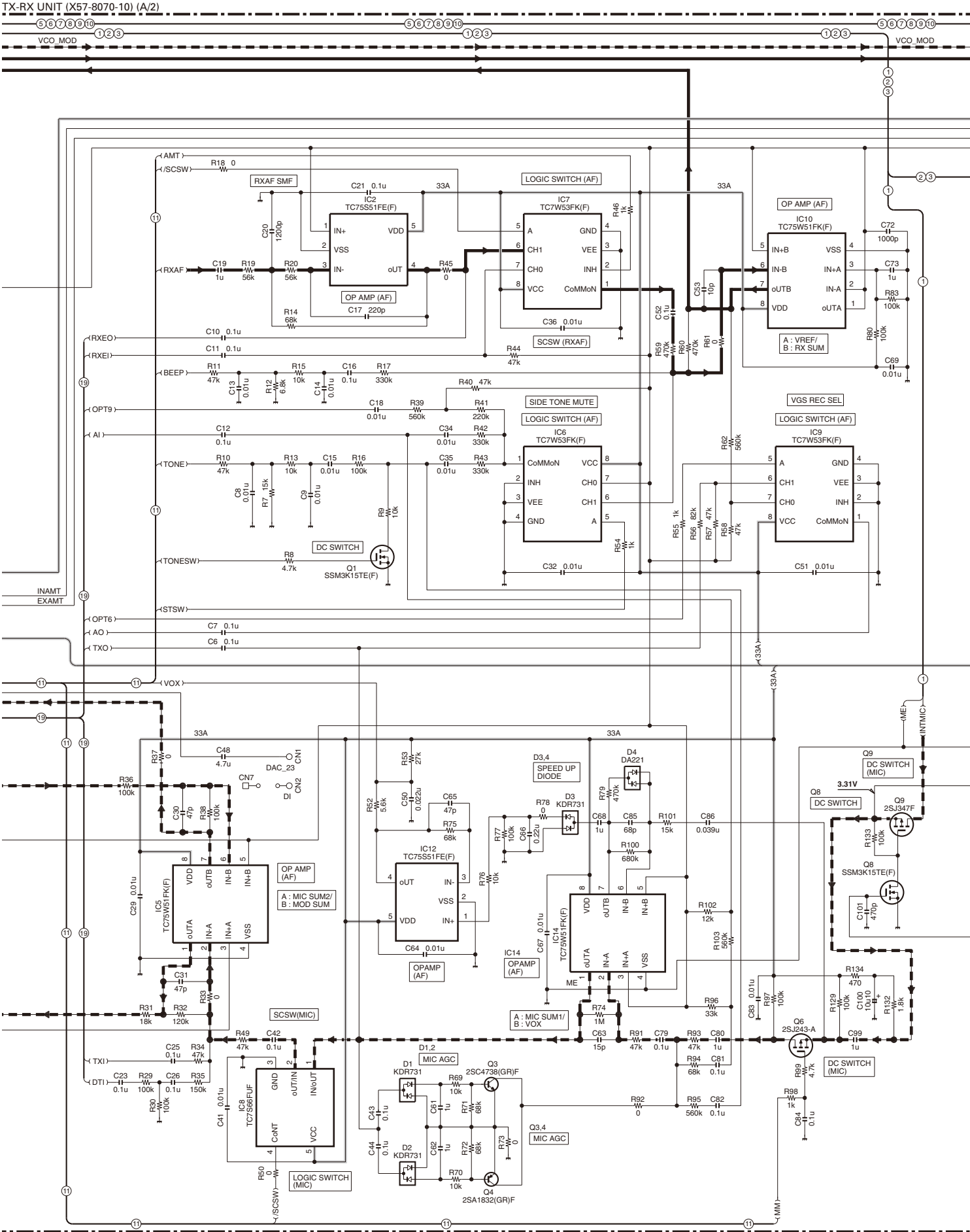
NX-410 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-8070-10) (A/2)



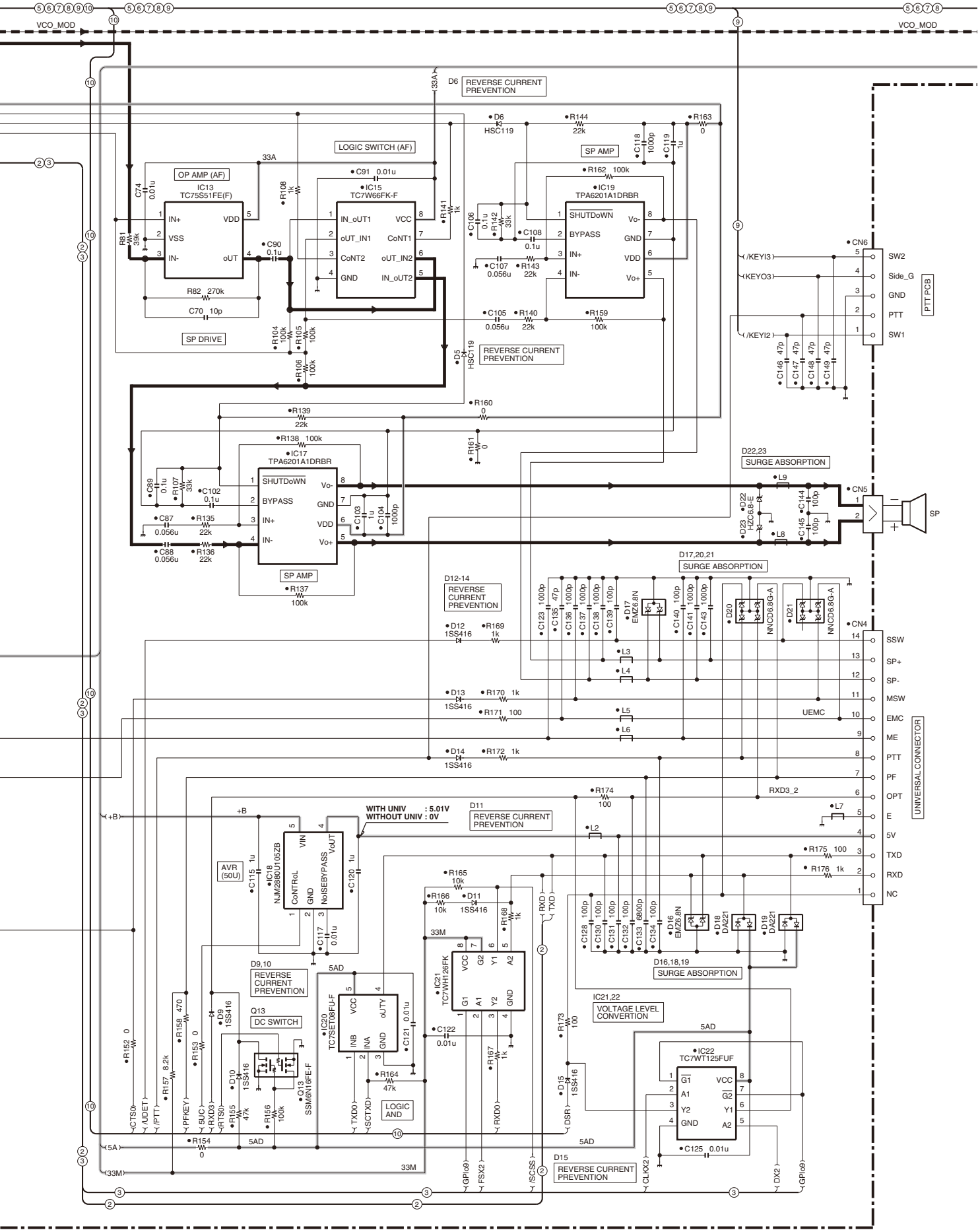
SCHEMATIC DIAGRAM NX-410

TX-RX UNIT (X57-8070-10) (A/2)



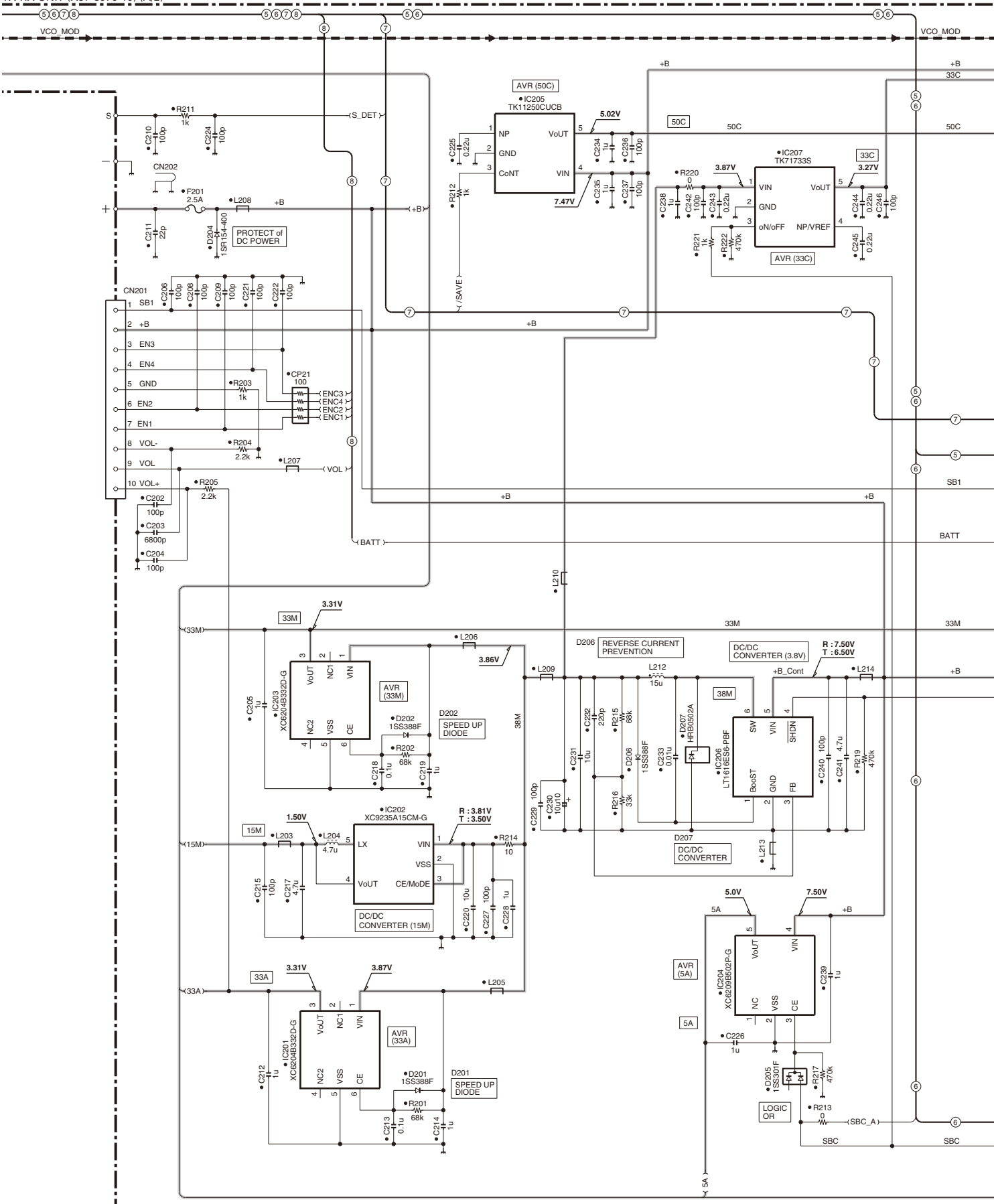
NX-410 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-8070-10) (A/2)



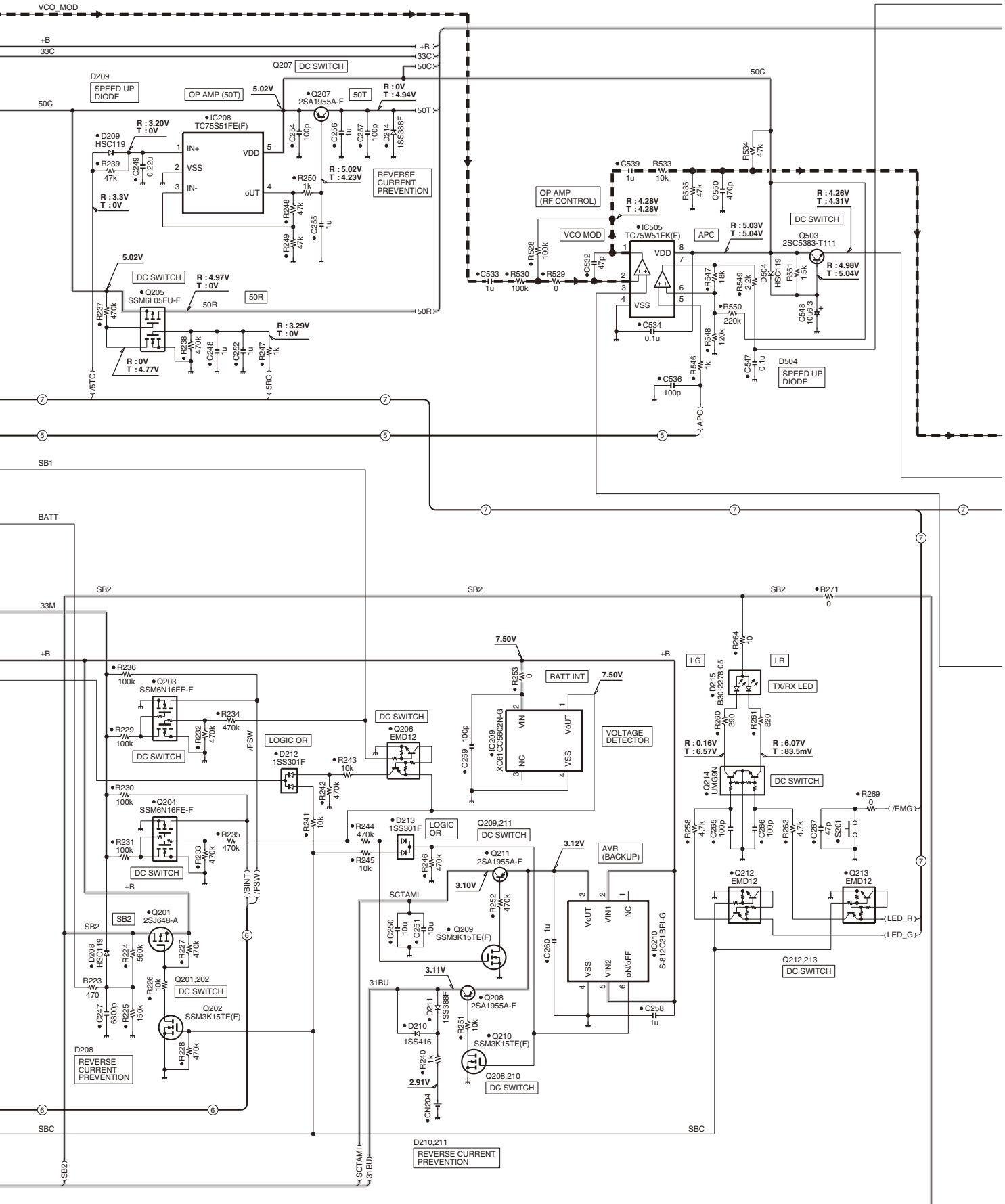
SCHEMATIC DIAGRAM NX-410

TX-RX UNIT (X57-8070-10) (A/2)



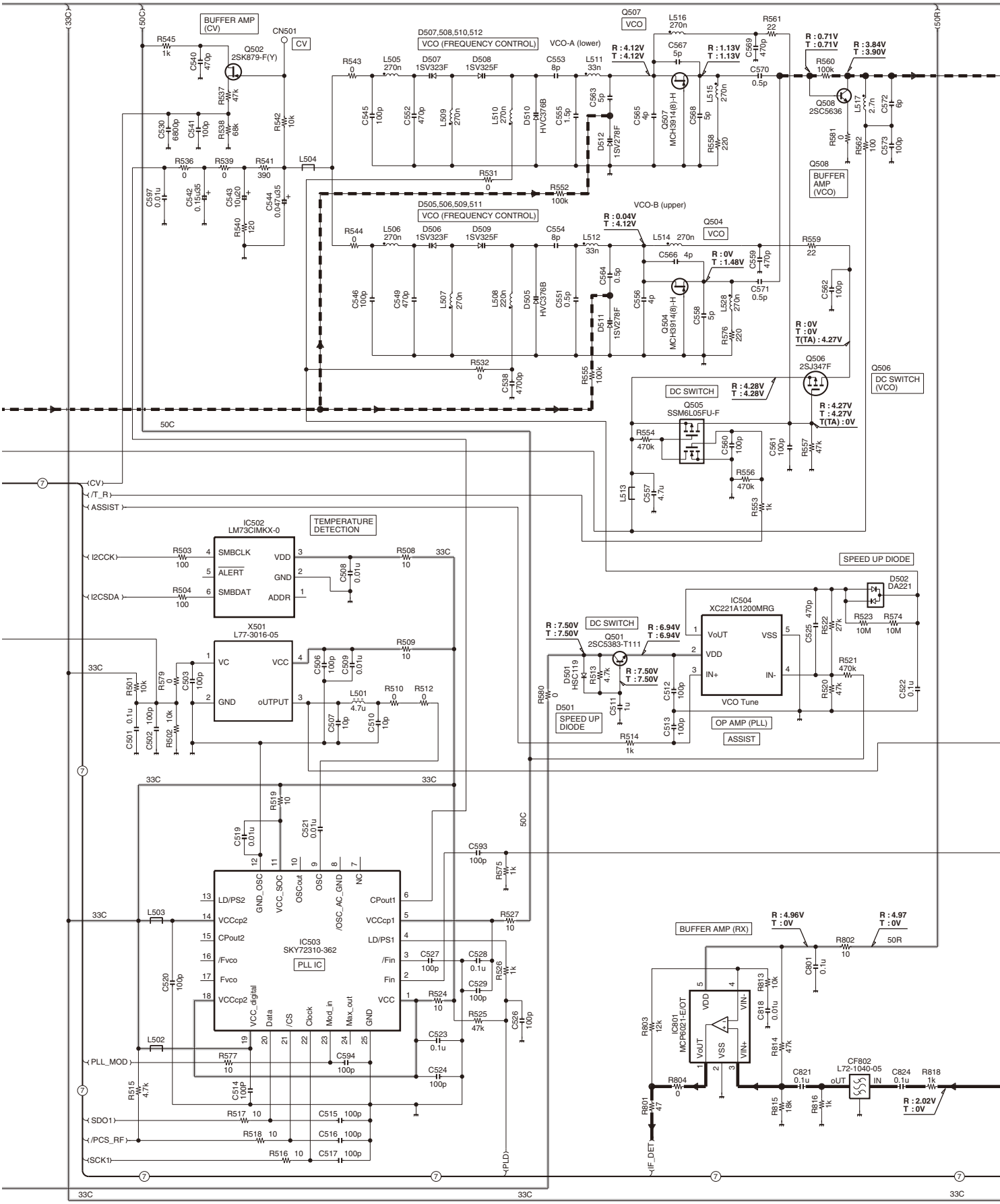
NX-410 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-8070-10) (A/2)



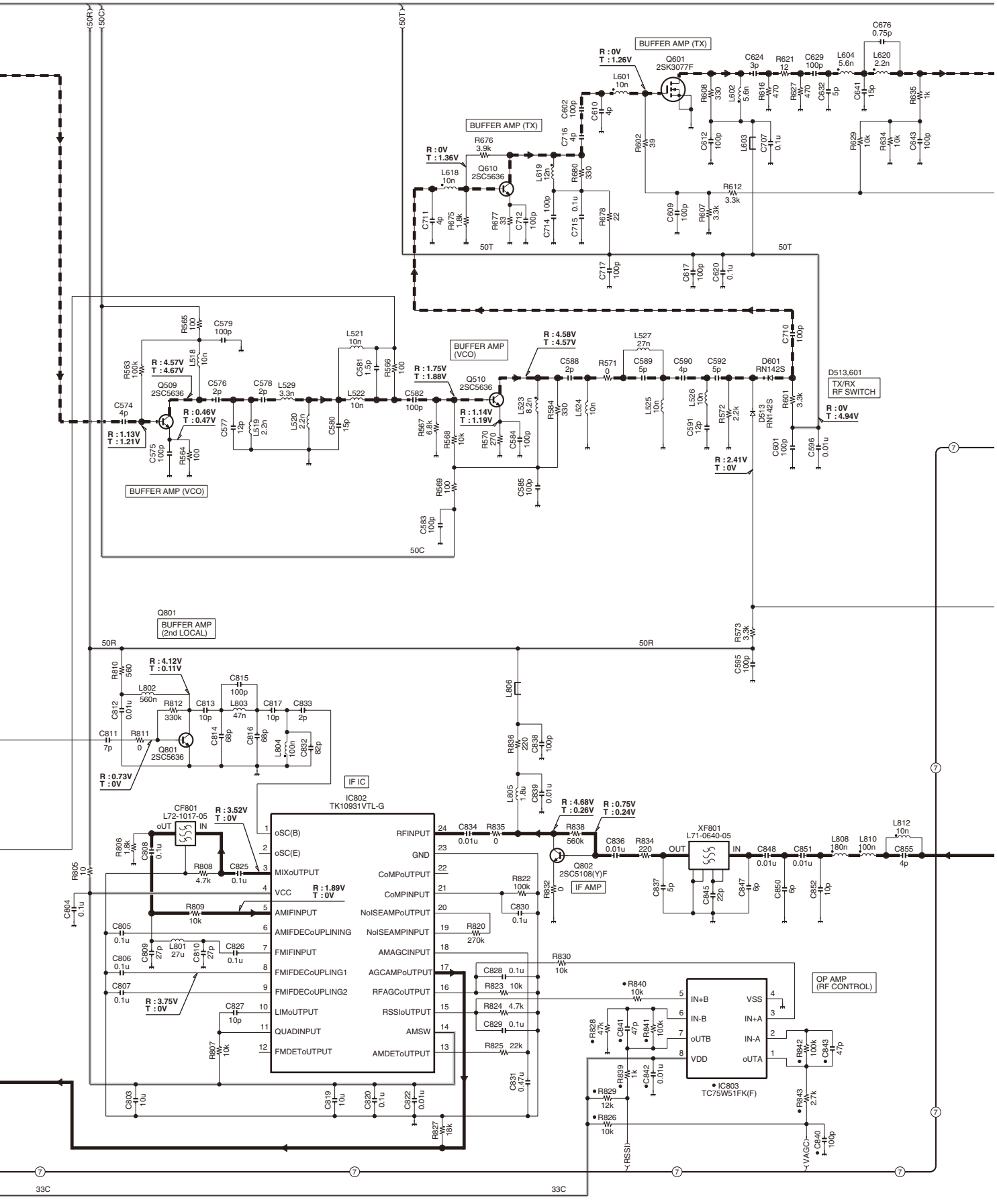
SCHEMATIC DIAGRAM NX-410

TX-RX UNIT (X57-8070-10) (A/2)



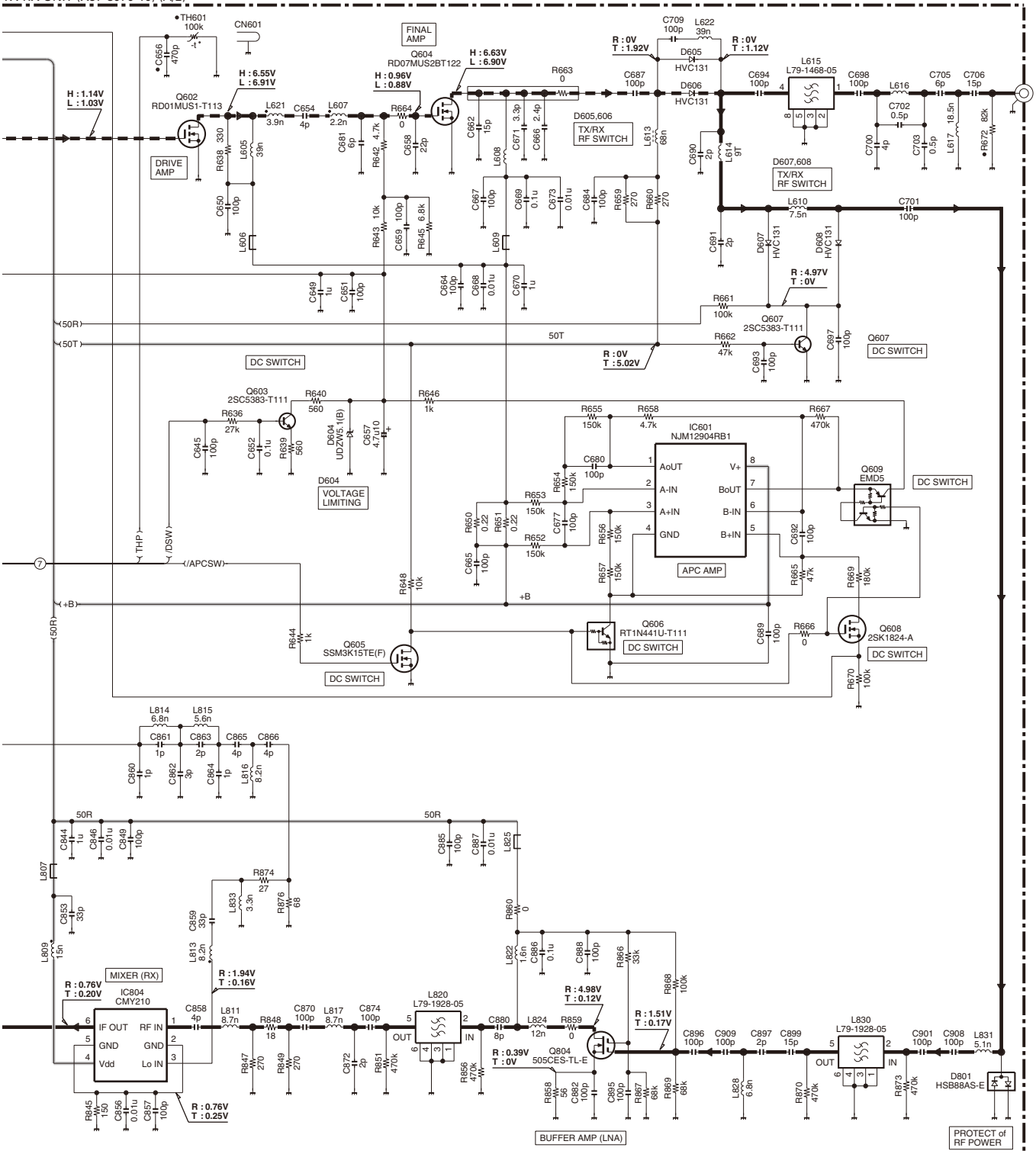
NX-410 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-8070-10) (A/2)



SCHEMATIC DIAGRAM NX-410

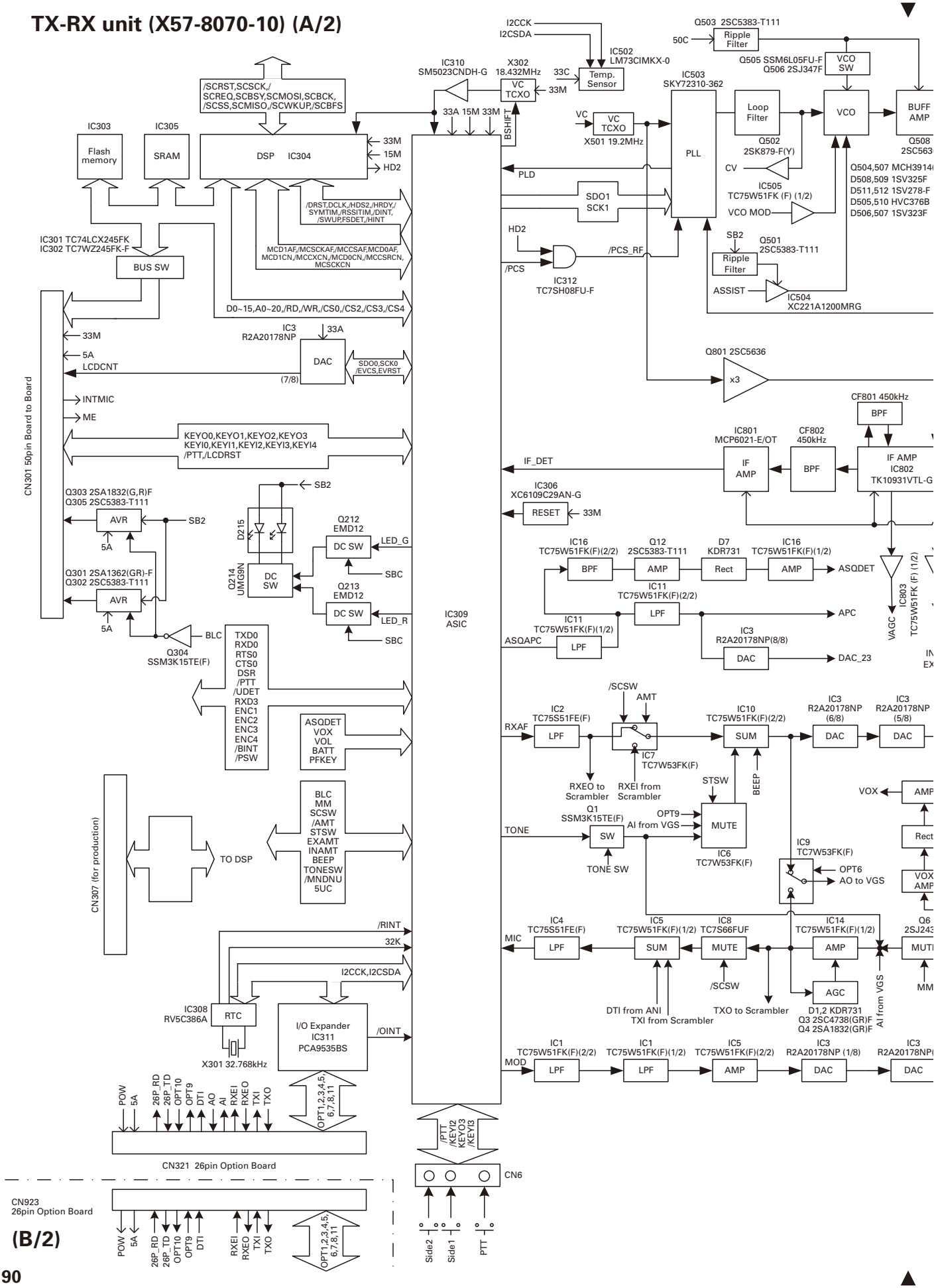
TX-RX UNIT (X57-8070-10) (A/2)

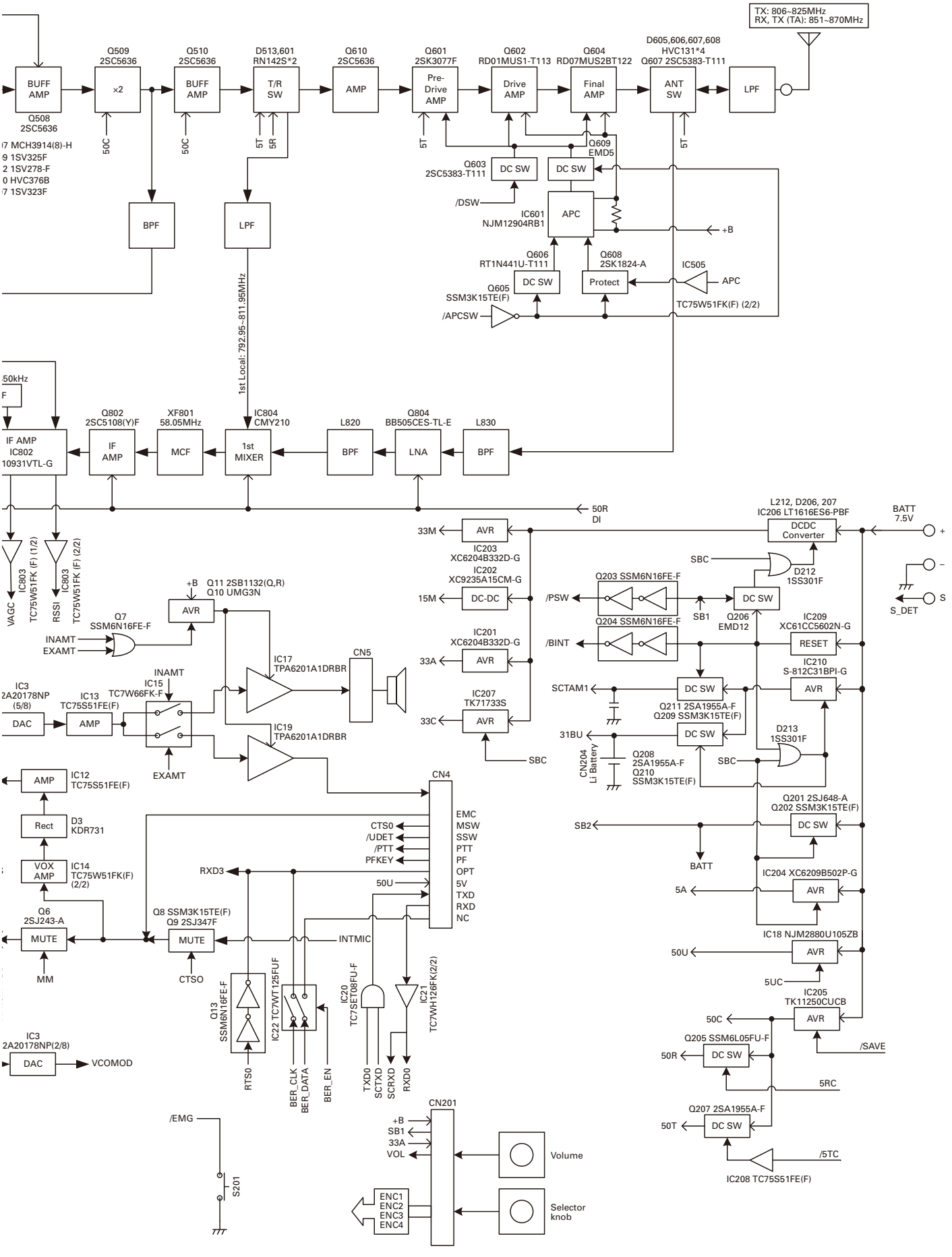


Note : The components marked with a dot (•) are parts of layer 1.

NX-410 BLOCK DIAGRAM

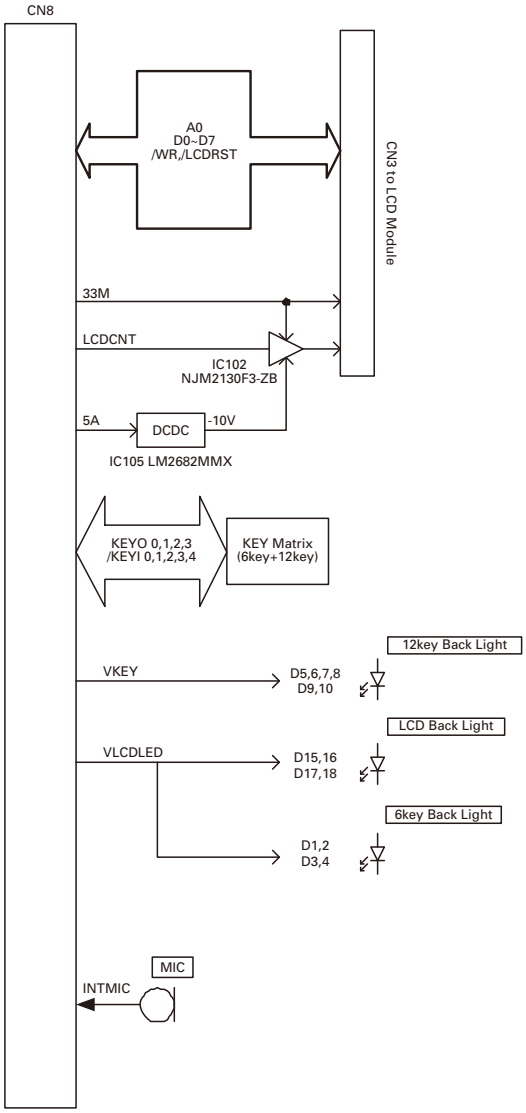
TX-RX unit (X57-8070-10) (A/2)



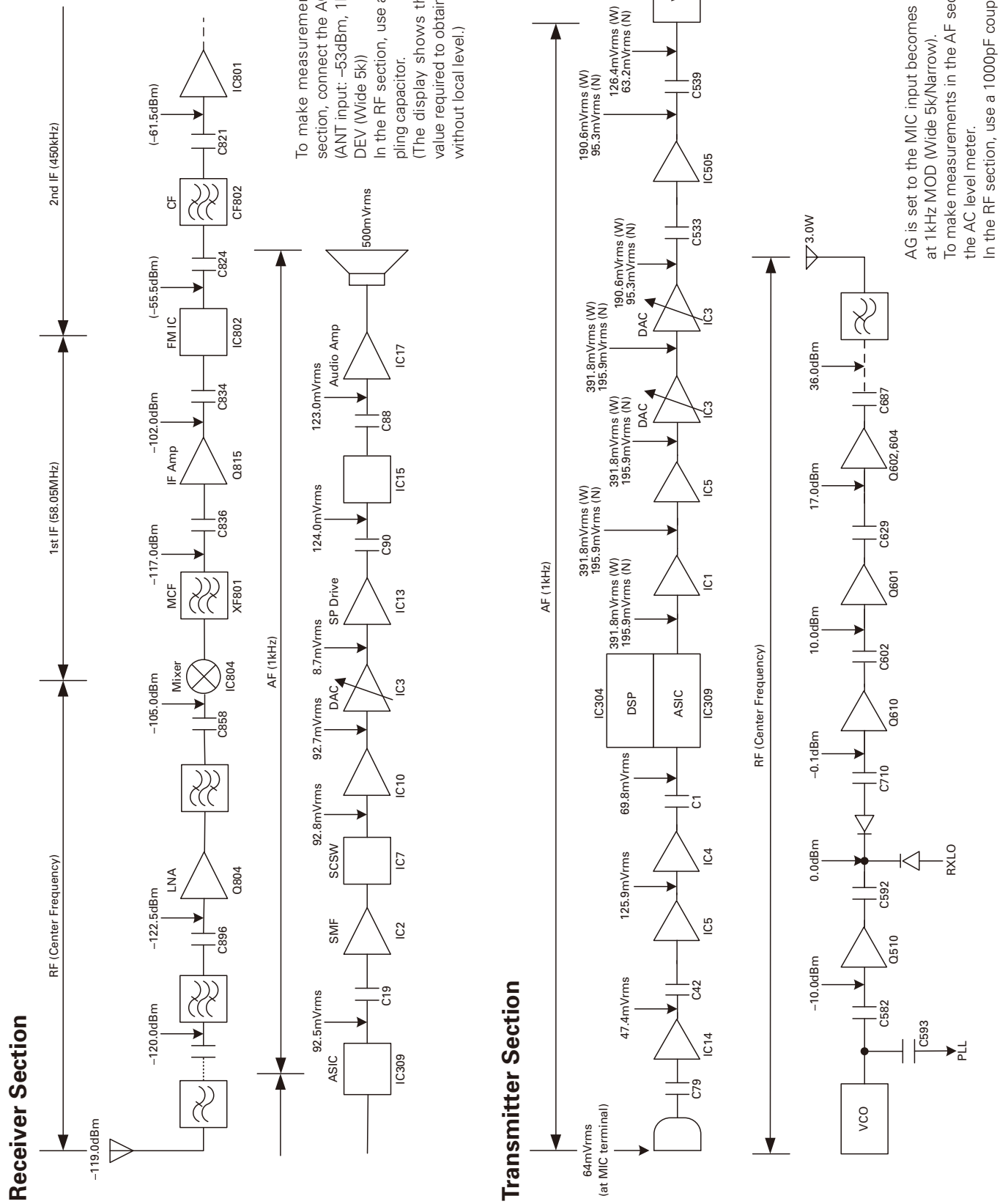

TX: 806~825MHz
RX, TX (TA): 851~870MHz
BUFF AMP
Q508 2SC5636
Q509 2SC5636
×2
Q510 2SC5636
BUFF AMP
D513,601 RN142S*2
T/R SW
Q610 2SC5636
AMP
Q601 2SK3077F
Pre-Drive AMP
Q602 RD01MUS1-T113
Drive AMP
Q604 RD07MUS2BT122
Final AMP
D605,606,607,608 HVC131*4
Q607 2SC5383-T111
ANT SW
LPF
50C
5T
5R
Q609 EMD5
Q603 2SC5383-T111
DC SW
/DSW
IC601 NJM12904RB1
APC
+B
Q606 RT1N441U-T111
Q608 2SK1824-A
Protect
IC505
Q605 SSM3K15TE(F)
/APCSW
TC75W51FK(F) (2/2)
BPF
LPF
1st Local: 792.95~811.95MHz
IF AMP IC802
IF AMP
Q802 2SC5108(Y)F
XF801 58.05MHz
MCF
IC804 CMY210
1st MIXER
L820
BPF
Q804 BB505CES-TL-E
LNA
L830
BPF
50R
DI
IC803 TC75W51FK (F) (1/2)
IC803 TC75W51FK (F) (2/2)
VAGC
RSSI
+B
Q11 2SB1132(Q,R)
Q10 UMG3N
AVR
Q7 SSM6N16FE-F
INAMT
EXAMT
IC17 TPA6201A1DRBR
IC19 TPA6201A1DRBR
CN5
IC3 2A20178NP (5/8)
DAC
IC13 TC75S51FE(F)
AMP
IC15 TC7W66FK-F
EXAMT
IC12 TC75S51FE(F)
AMP
Rect
D3 KDR731
VOX AMP
IC14 TC75W51FK(F) (2/2)
Q6 2SJ243-A
MUTE
MM
Q8 SSM3K15TE(F)
Q9 2SJ347F
MUTE
CTSO
RXD3
50U
INTMIC
CN4
EMC
MSW
SSW
PTT
PF
OPT
5V
TXD
RXD
NC
CTS0
/UDET
/PTT
PFKEY
Q13 SSM6N16FE-F
IC22 TC7WT125FUF
IC20 TC7SET08FU-F
IC21 TC7WH126FK(2/2)
RTS0
BER_CLK
BER_DATA
BER_EN
TXD0
SCTXD
SCRXD
RXD0
IC3 2A20178NP(2/8)
DAC
VCOMOD
/EMG
S201
CN201
+B
SB1
33A
VOL
Volume
Selector knob
ENC1
ENC2
ENC3
ENC4
33M
IC203 XC6204B332D-G
15M
IC202 XC9235A15CM-G
DC-DC
33A
IC201 XC6204B332D-G
33C
IC207 TK71733S
SBC
L212, D206, 207
IC206 LT1616ES6-PBF
DCDC Converter
BATT 7.5V
S_DET
D212 1SS301F
/PSW
Q203 SSM6N16FE-F
Q204 SSM6N16FE-F
/BINT
SB1
Q206 EMD12
IC209 XC61CC5602N-G
RESET
IC210 S-812C31BPI-G
SCTAM1
Q211 2SA1955A-F
Q209 SSM3K15TE(F)
31BU
CN204 Li Battery
Q208 2SA1955A-F
Q210 SSM3K15TE(F)
D213 1SS301F
SB2
BATT
Q201 2SJ648-A
Q202 SSM3K15TE(F)
IC204 XC6209B502P-G
5A
IC18 NJM2880U105ZB
50U
5UC
IC205 TK11250CUCB
50C
/SAVE
Q205 SSM6L05FU-F
50R
5RC
Q207 2SA1955A-F
50T
/5TC
IC208 TC75S51FE(F)

BLOCK DIAGRAM

Display unit (X54-3660-10)



LEVEL DIAGRAM

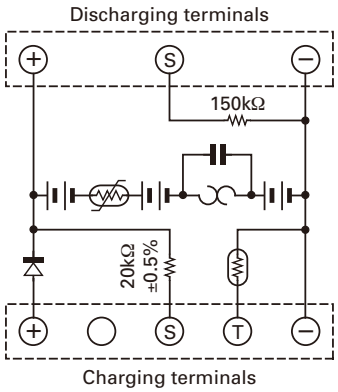


OPTIONAL ACCESSORIES

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

■ **External View**

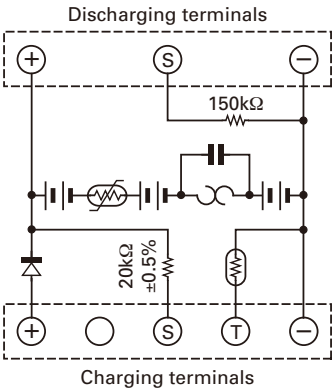
■ **Schematic Diagram**



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

■ **External View**

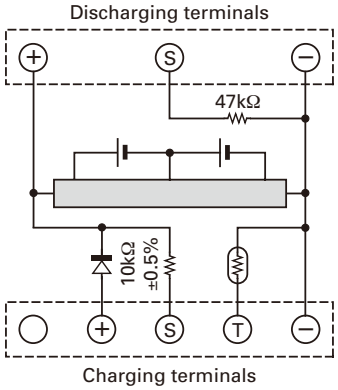
■ **Schematic Diagram**



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**

SPECIFICATIONS

GENERAL

Frequency Range	RX: 851~870MHz TX: 806~825MHz, 851~870MHz
Number of Channels	512
Zones	128
Max. Channels per Zone	250
Channel Spacing	Analog: 12.5/25 kHz Digital: 6.25/12.5 kHz
Operating Voltage	7.5V DC ± 20%
Battery Life (5-5-90)	
with KNB-32/KNB-54N	14 hours
with KNB-33L	11 hours
Battery Life (10-10-80)	
with KNB-32N/KNB-54N	9 hours
with KNB-33L	7 hours
Operating Temperature Range	–22°F to +140°F (–30°C to +60°C)
Frequency Stability	±1.0ppm
Antenna Impedance	50Ω
Dimensions (W x H x D) (Projections not included)	
Radio only	2.28 x 5.46 x 0.88 in (58 x 138.8 x 22.4 mm)
with KNB-32N/KNB-54N	2.28 x 5.46 x 1.60 in (58 x 138.8 x 40.7 mm)
with KNB-33L	2.28 x 5.46 x 1.35 in (58 x 138.8 x 34.2 mm)
Weight (net)	
Radio only	9.52 oz (270 g)
with KNB-32N/KNB-54N	19.58 oz (555 g)
with KNB-33L	13.93 oz (395 g)

RECEIVER

Sensitivity	Digital @6.25kHz (3% BER): 0.20µV Digital @12.5kHz (3% BER): 0.25µV Analog (12dB SINAD): 0.25µV
Selectivity	Analog @25kHz: 72dB Analog @12.5kHz: 65dB
Intermodulation Distortion	Analog: 70dB (±50, 100kHz)
Spurious Response	Analog: 70dB
Audio Distortion	Less than 3%
Audio Output	500mW/8Ω

TRANSMITTER

RF Power Output	3W/1W
Spurious Response	70dB
FM Hum and Noise	Analog @25kHz: 45dB Analog @12.5kHz: 40dB
Audio Distortion	Less than 3%
Modulation	16K0F3E, 14K0F3E, 11K0F3E, 8K30F1E, 8K30F1D, 8K30F7W, 4K00F1E, 4K00F1D, 4K00F7W, 4K00F2D

Analog measurements made per TIA/EIA 603 and specifications shown are typical.
Kenwood reserves the right to change specifications without prior notice or obligation.

NX-410

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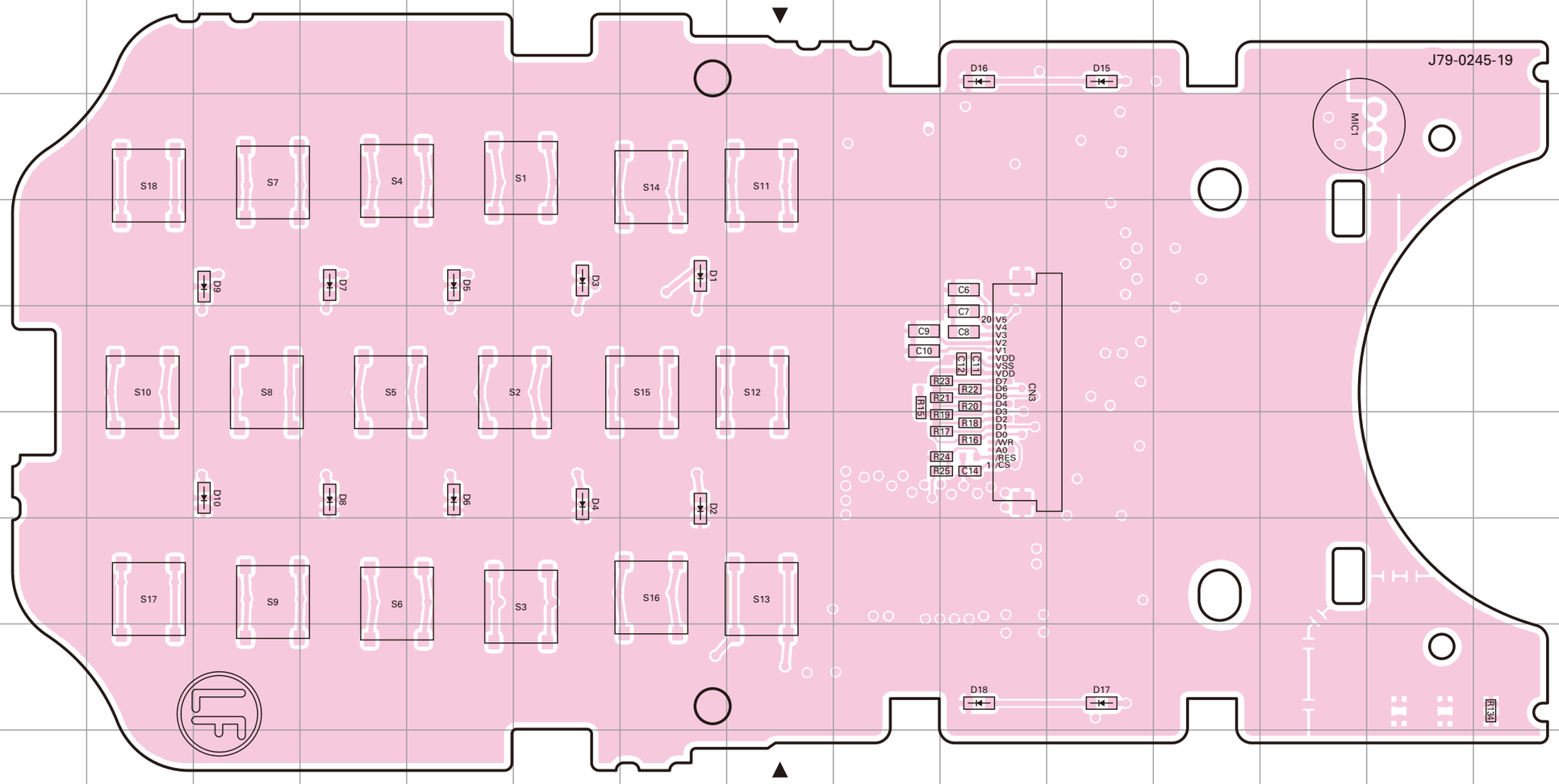
NX-410 PC BOARD

PC BOARD NX-410

DISPLAY UNIT (X54-3660-10)
Component side view (J79-0245-19)

DISPLAY UNIT (X54-3660-10)
Component side view (J79-0245-19)



Ref. No.	Address	Ref. No.	Address
D1	5I	D8	7F
D2	7I	D9	5E
D3	5H	D10	7E
D4	7H	D15	3M
D5	5G	D16	3L
D6	7G	D17	9M
D7	5F	D18	9L

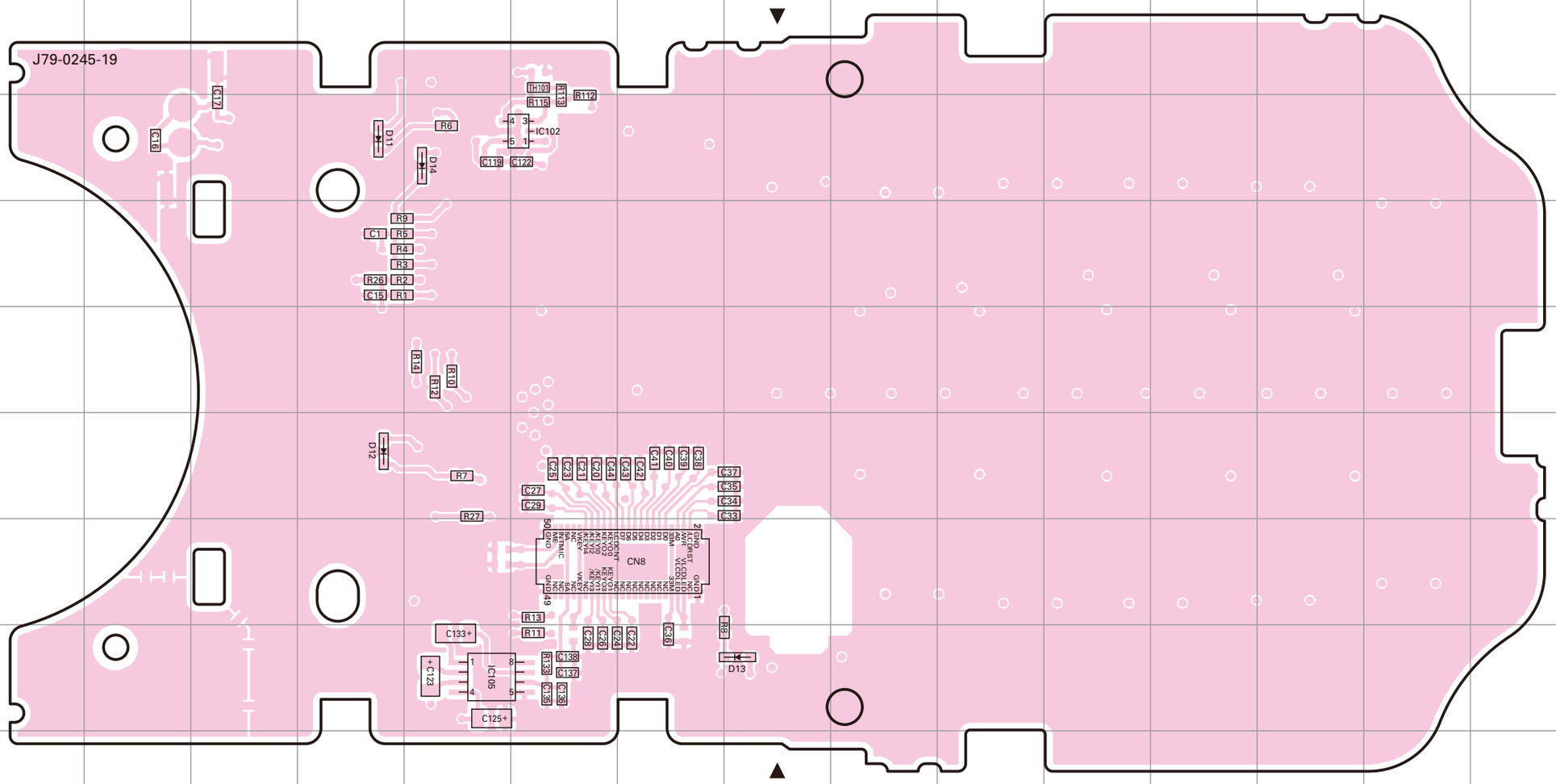
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Foil side

NX-410 PC BOARD

PC BOARD NX-410

DISPLAY UNIT (X54-3660-10)
Foil side view (J79-0245-19)

DISPLAY UNIT (X54-3660-10)
Foil side view (J79-0245-19)



Ref. No.	Address	Ref. No.	Address
IC102	4H	D12	7F
IC105	9G	D13	9J
D11	4F	D14	4G

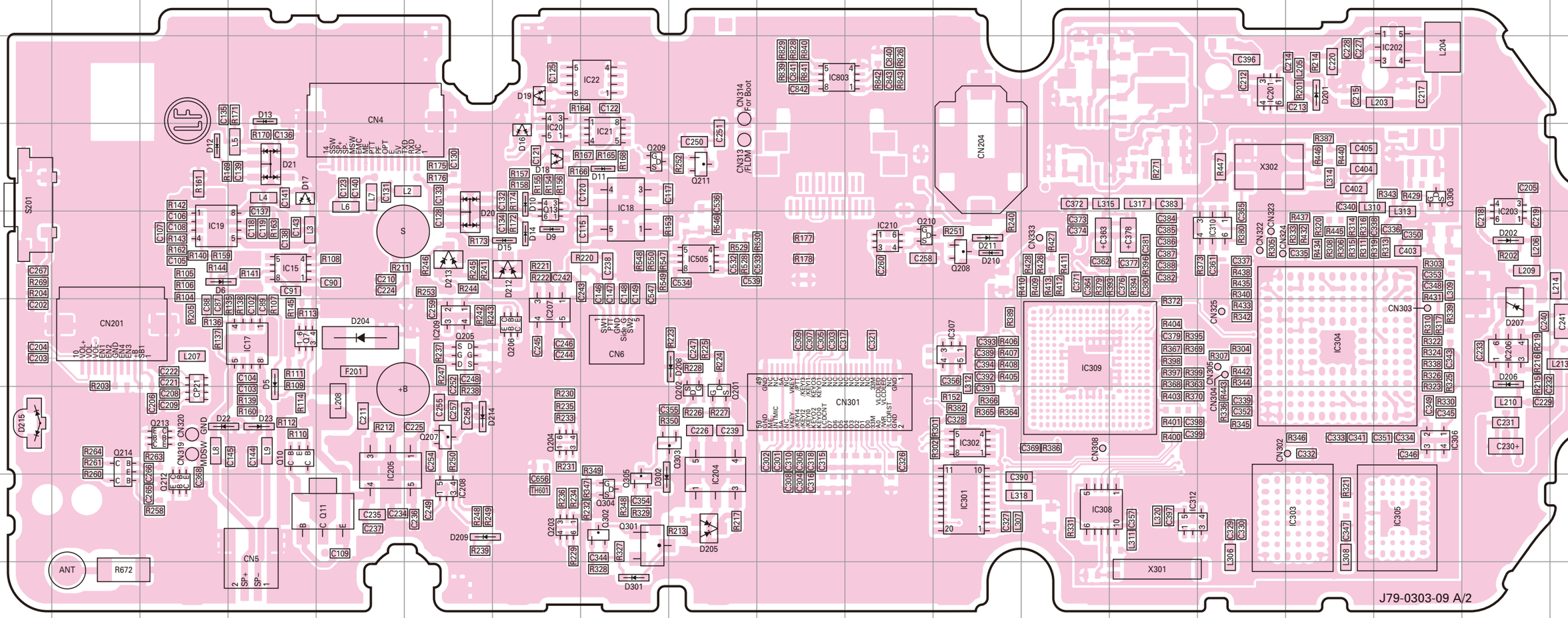
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Foil side

NX-410 PC BOARD

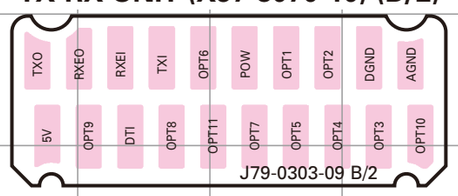
PC BOARD NX-410

TX-RX UNIT (X57-8070-10) (A/2)
Component side view (J79-0303-09 A/2)

TX-RX UNIT (X57-8070-10) (A/2)
Component side view (J79-0303-09 A/2)



TX-RX UNIT (X57-8070-10) (B/2)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC15	5D	IC204	8I	IC304	6P	Q7	6D	Q207	7F	Q303	7I	D13	3D	D23	7D	D211	5L
IC17	6D	IC205	7E	IC305	8Q	Q10	7D	Q208	5L	Q304	8H	D14	5G	D201	3P	D212	5G
IC18	4H	IC206	6R	IC306	7Q	Q11	8E	Q209	4H	Q305	8H	D15	5G	D202	5R	D213	5F
IC19	5C	IC207	6G	IC307	6L	Q13	4G	Q210	5K	Q306	4Q	D16	4G	D204	6E	D214	7F
IC20	4G	IC208	8F	IC308	8M	Q201	7I	Q211	4I	D5	6D	D17	4D	D205	8I	D215	7A
IC21	4H	IC209	6F	IC309	6M	Q202	7I	Q212	8C	D6	5C	D18	4G	D206	6R	D301	9H
IC22	3H	IC210	5K	IC310	5O	Q203	8G	Q213	7C	D9	5G	D19	3G	D207	6R	D302	8H
IC201	3O	IC301	8L	IC312	8N	Q204	7G	Q214	7B	D10	4G	D20	5F	D208	6I		
IC202	3Q	IC302	7L	IC505	5I	Q205	6F	Q301	8H	D11	4H	D21	4D	D209	8F		
IC203	5R	IC303	8P	IC803	3J	Q206	6G	Q302	8H	D12	4C	D22	7C	D210	5L		

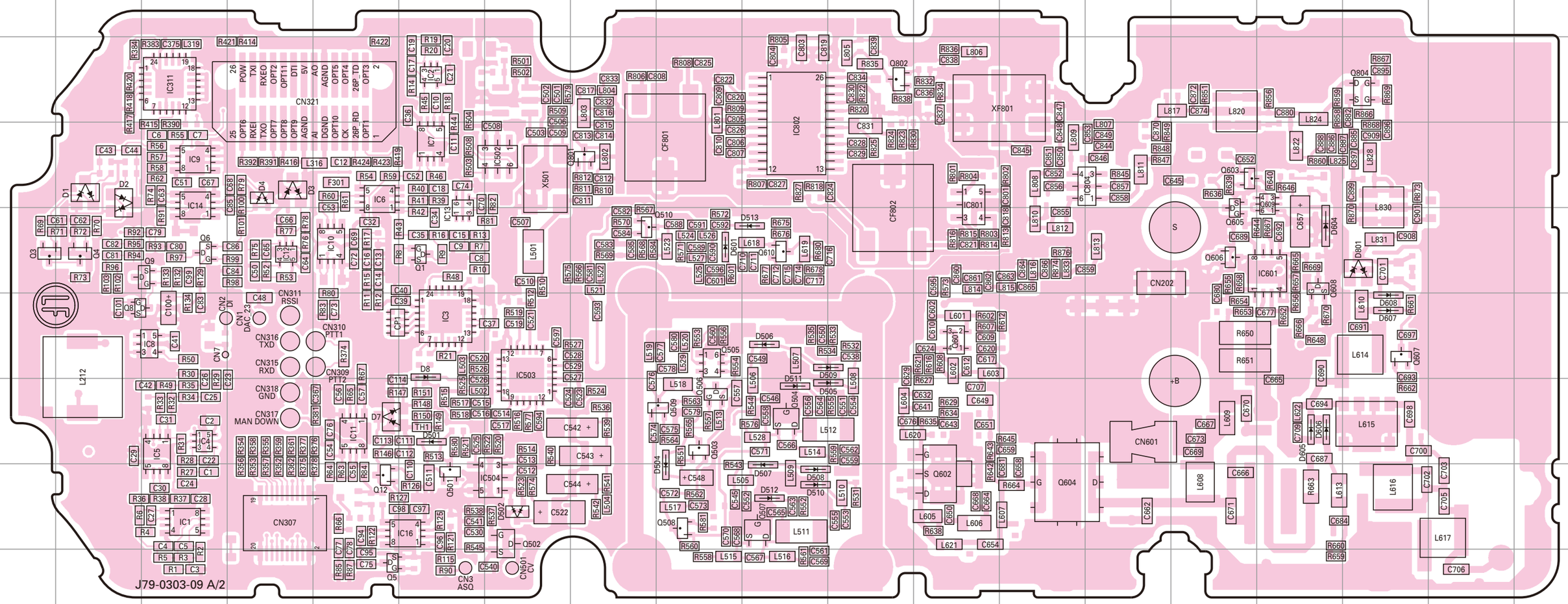
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Layer 7
Layer 8
Foil side

NX-410 PC BOARD

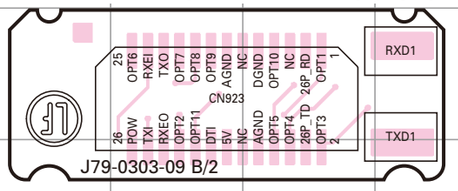
PC BOARD NX-410

TX-RX UNIT (X57-8070-10) (A/2)
Foil side view (J79-0303-09 A/2)

TX-RX UNIT (X57-8070-10) (A/2)
Foil side view (J79-0303-09 A/2)



TX-RX UNIT (X57-8070-10) (B/2)

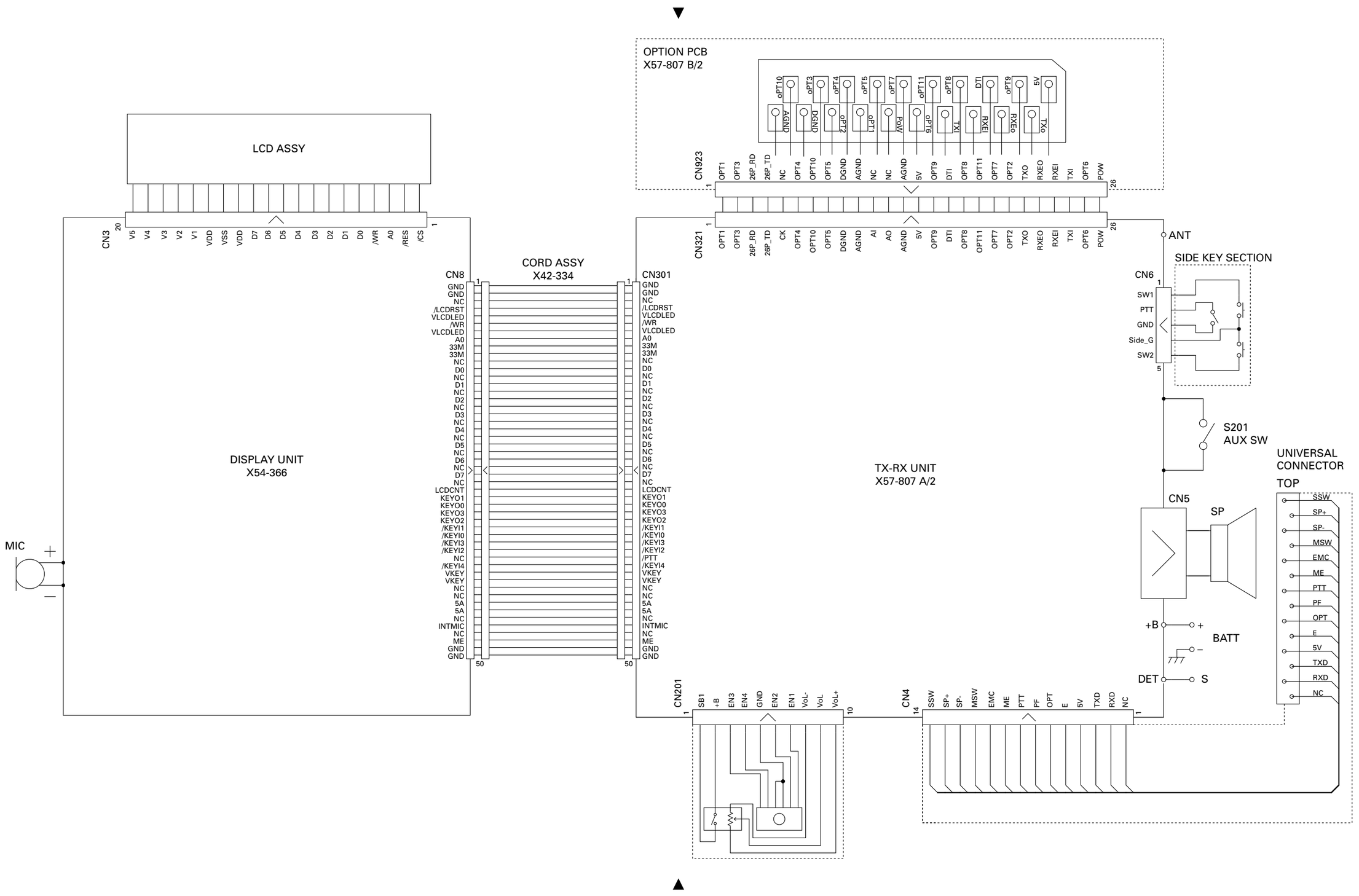


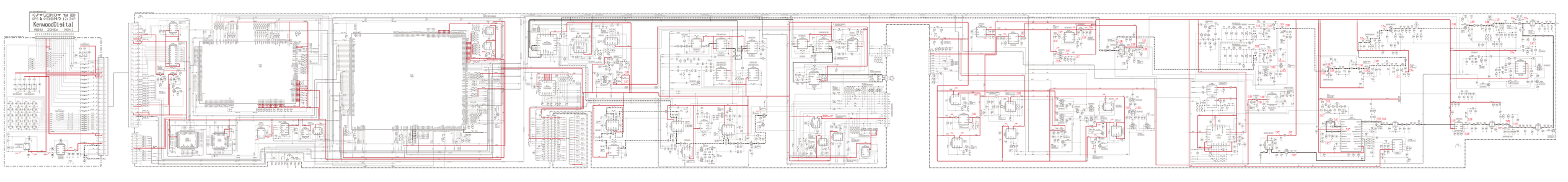
Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	
Layer 7	
Layer 8	

Foil side

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	8C	IC11	7E	IC801	4L	Q12	8E	Q510	5H	Q610	5J	D501	7F	D512	8J
IC2	3F	IC12	5D	IC802	4J	Q501	8F	Q601	6L	Q801	4H	D502	8G	D513	5J
IC3	6F	IC13	5F	IC804	4N	Q502	8G	Q602	8L	Q802	3K	D504	8I	D601	5I
IC4	7C	IC14	4C	Q1	5F	Q503	7I	Q603	4O	Q804	3Q	D505	7K	D604	5P
IC5	7C	IC16	8F	Q3	5A	Q504	7J	Q604	8M	D1	4B	D506	6J	D605	7P
IC6	4E	IC311	3C	Q4	5B	Q505	6I	Q605	5O	D2	4B	D507	8J	D606	7P
IC7	4F	IC502	4G	Q5	9E	Q506	7I	Q606	5O	D3	4D	D508	8J	D607	6Q
IC8	6C	IC503	6G	Q6	5C	Q507	8J	Q607	6Q	D4	4D	D509	6K	D608	6Q
IC9	4C	IC504	8G	Q8	6B	Q508	8I	Q608	5P	D7	7E	D510	8J	D801	5Q
IC10	4E	IC601	5P	Q9	5C	Q509	7I	Q609	4P	D8	6F	D511	7J		


LCD ASSY
CN3
20
V5 V4 V3 V2 V1 VDD VSS VDD D7 D6 D5 D4 D3 D2 D1 D0 /WR A0 /RES /CS
1
DISPLAY UNIT
X54-366
CN8
GND GND NC /LCDRST VLCDLED /WR VLCDLED A0 33M 33M NC D0 NC D1 NC D2 NC D3 NC D4 NC D5 NC D6 NC D7 NC LCDCNT KEYO1 KEYO0 KEYO3 KEYO2 /KEYI1 /KEYI0 /KEYI3 /KEYI2 NC /KEYI4 VKEY VKEY NC NC 5A 5A NC INTMIC NC ME GND GND
1
50
CORD ASSY
X42-334
CN301
GND GND NC /LCDRST VLCDLED /WR VLCDLED A0 33M 33M NC D0 NC D1 NC D2 NC D3 NC D4 NC D5 NC D6 NC D7 NC LCDCNT KEYO1 KEYO0 KEYO3 KEYO2 /KEYI1 /KEYI0 /KEYI3 /KEYI2 /PTT /KEYI4 VKEY VKEY NC NC 5A 5A NC INTMIC NC ME GND GND
1
50
MIC
OPTION PCB
X57-807 B/2
oPT10 oPT3 oPT4 oPT5 oPT7 oPT11 oPT8 DTI oPT9 5V
AGND DGND oPT2 oPT1 P0W oPT6 TXI RXEI RXEo TXo
CN923
1
OPT1 OPT3 26P_RD 26P_TD NC OPT4 OPT10 OPT5 DGND AGND NC NC AGND 5V OPT9 DTI OPT8 OPT11 OPT7 OPT2 TXO RXEO RXEI TXI OPT16 POW
26
CN321
1
OPT1 OPT3 26P_RD 26P_TD CK OPT4 OPT10 OPT5 DGND AGND AI AO AGND 5V OPT9 DTI OPT8 OPT11 OPT7 OPT2 TXO RXEO RXEI TXI OPT16 POW
26
TX-RX UNIT
X57-807 A/2
ANT
SIDE KEY SECTION
CN6
1
SW1 PTT GND Side_G SW2
5
S201
AUX SW
UNIVERSAL
CONNECTOR
TOP
SSW SP+ SP- MSW EMC ME PTT PF OPT E 5V TXD RXD NC
CN5
SP
+B
+
BATT
–
DET
S
CN201
1
SB1 +B EN3 EN4 GND EN2 EN1 VoL- VoL VoL+
10
CN4
14
SSW SP+ SP- MSW EMC ME PTT PF OPT E 5V TXD RXD NC
1


Kenwood Digital
MENU ZOOM DISP

TX-RX unit (X57-8070-10) (A/2)