KENWOOD

SERVICE MANUAL

UHF DIGITAL TRANSCEIVER

NX-303

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

This product uses Lead Free solder.

B5B-7215-00

No.RQ077
2016/1

CONTENTS

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.

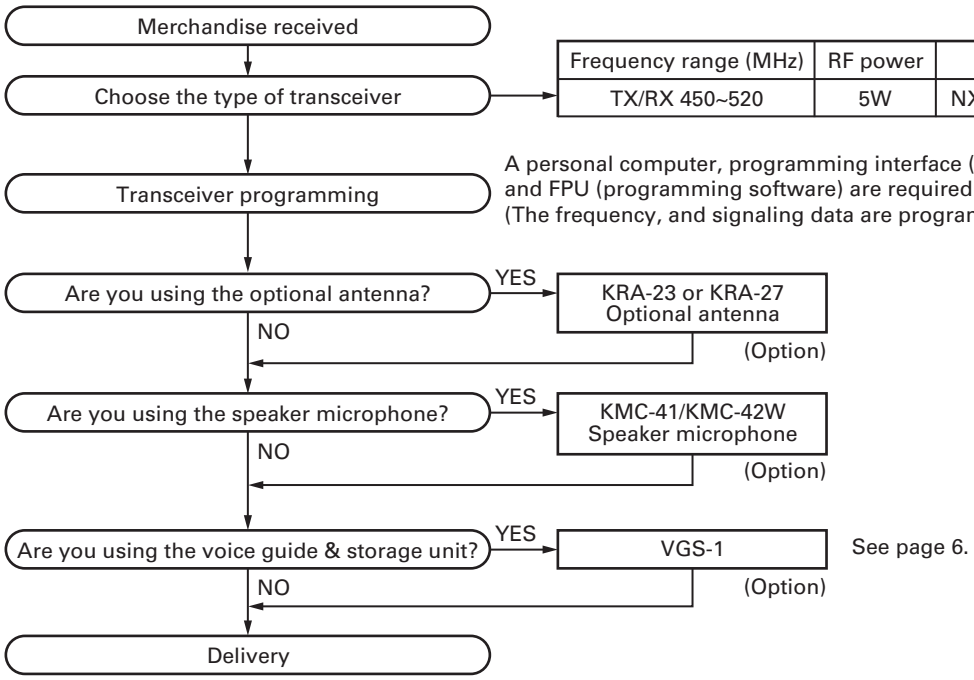
SERVICE

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/111DN version 4.95 or later for this transceiver. KPG-111D/111DN versions earlier than version 4.95 will not work properly.

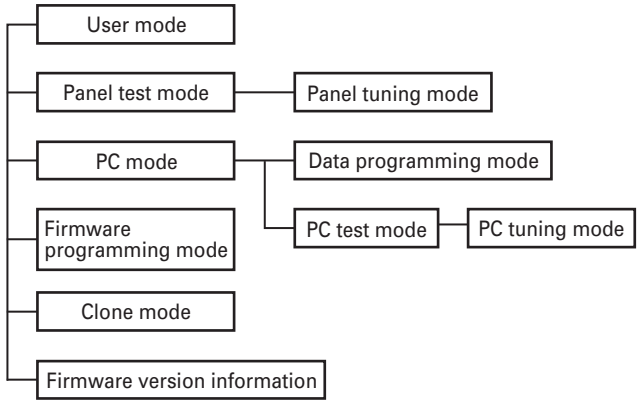
SYSTEM SET-UP



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	Press the [⎙] key, in 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-36A/36U/36X), and FPU (programming software).

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

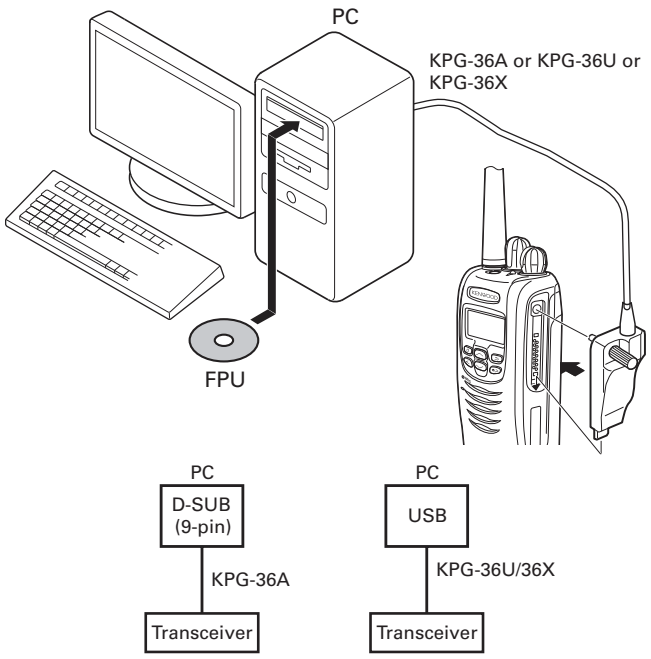


Fig. 1

5-2. Connection procedure

1. Connect the transceiver to the computer using the interface cable (KPG-36A/36U/36X). (Conection is the same as in the PC Mode.)

Note:

- You must install the KPG-36U/36X driver in the computer to use the USB programming interface cable (KPG-36U/36X).

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-36A description (PC programming interface cable: Option)

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

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

5-4. KPG-36U/KPG-36X description (PC programming interface cable: Option)

The KPG-36U/36X is a cable which connects the to a USB port on a computer.

When using the KPG-36U/36X, install the driver software in the computer. The KPG-36U/36X driver runs under Windows XP, Vista, 7, 8 or 8.1.

The latest version of the USB driver is available for download from the following URL:

http://www.kenwood.com/usb-com/

(This URL may change without notice.)

5-5. Programming software : KPG-111D/111DN (Ver.4.95 or later) description

The FPU is the programming software for the transceiver supplied on a CD. This software runs under Windows XP, Vista, 7, 8 or 8.1 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-36A/36U/36X). (Connection is the same as in the PC Mode.)

6-3. Programming

1. Start up the firmware programming software (Fpro.exe (Ver. 6.20 or later)). The Fpro.exe exists in the KPG-111D/111DN installed holder.
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 [∧] 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 this procedure, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.

REALIGNMENT

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.

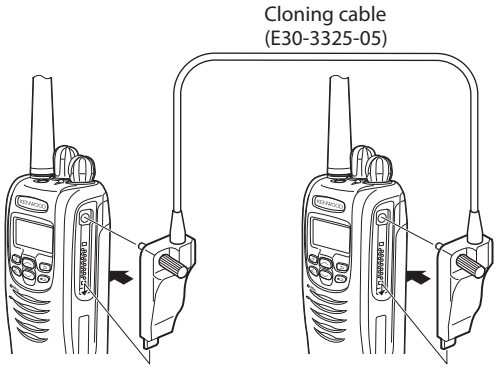


Fig. 2

8. Firmware Version Information

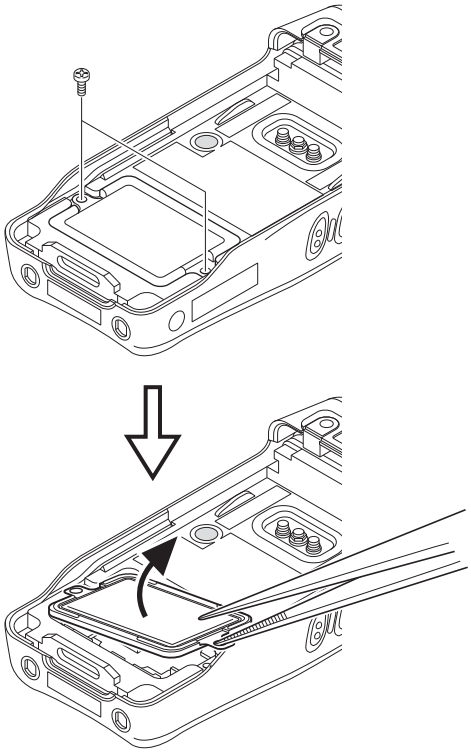
Press and hold the [Side1] key while turning the transceiver power ON and then keep pressing and holding the [Side1] key, the firmware version information appears on the LCD.

INSTALLATION

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

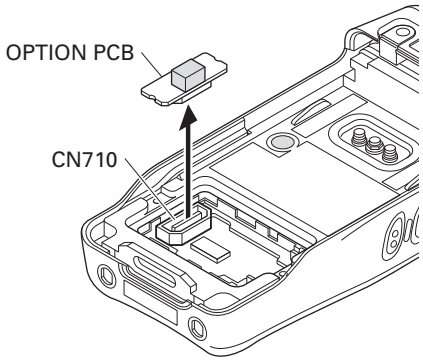
■ Installing the VGS-1 (Voice Guide & Storage Unit) in the transceiver

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.

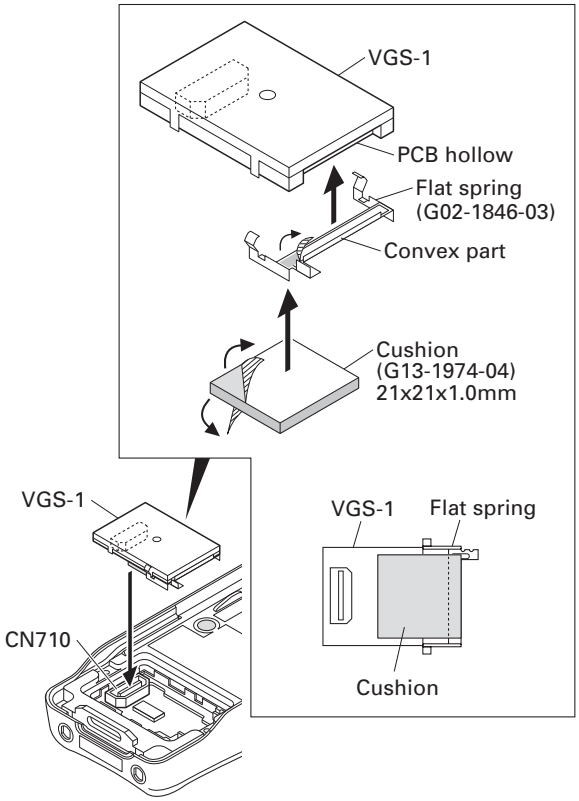


INSTALLATION

3. Remove the OPTION PCB from the connector (CN710) of the Control PCB.



4. Attach the flat spring (G02-1846-03) to the VGS-1 as shown in the figure.
   Note:
   Attach the flat spring so that its convex fits the PCB hollow of the VGS-1.
5. Attach the cushion (G13-1974-04) to the VGS-1 as shown in the figure.
   Note:
   Be sure not to cover the VGS-1 connector with the cushion.
6. Insert the VGS-1 connector into the connector (CN710) of the Control PCB.

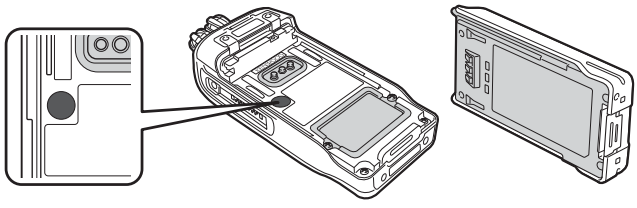


7. Reinstall the cover using the two screws removed in step 1.

DISASSEMBLY FOR REPAIR

1. Precautions for Waterproof

- Do not remove the black sheet from the reverse side of the transceiver (refer to the illustration right). Removal of this sheet decreases the waterproof efficiency of the transceiver and may cause malfunctions if water seeps into the transceiver.
- 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.

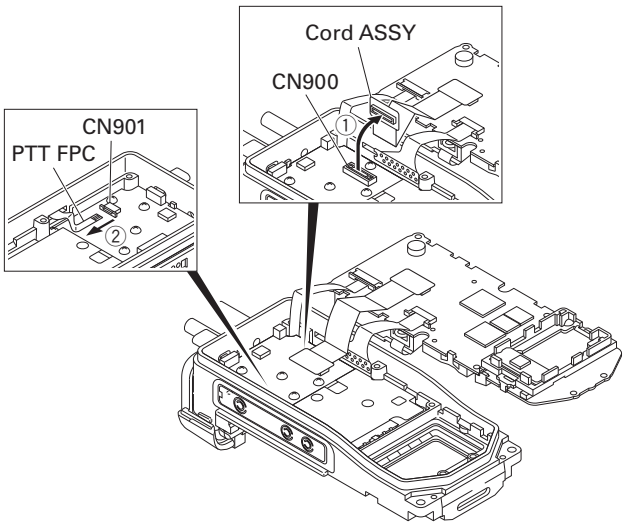


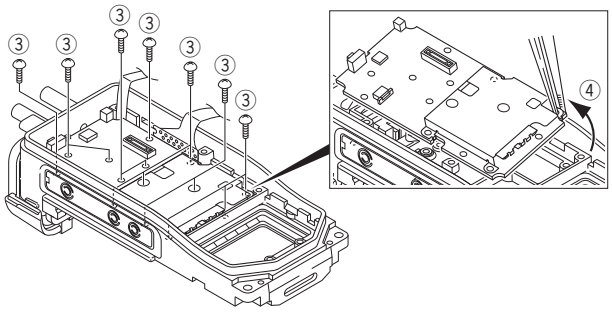
DISASSEMBLY FOR REPAIR

2. Precautions for Disassembly

■ Removing the TX-RX unit from the chassis

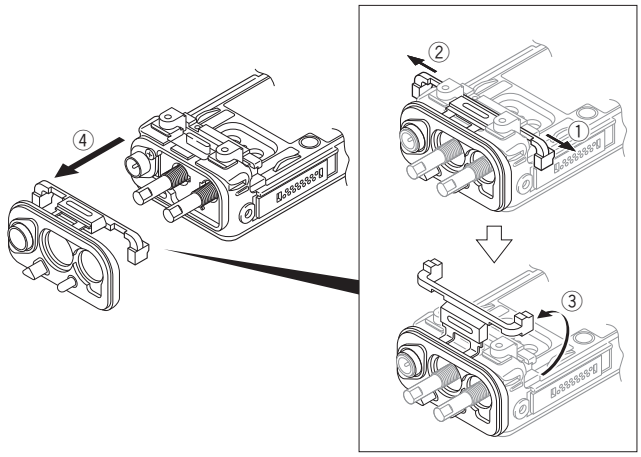
1. Remove the cord ASSY from the connector of the TX-RX unit (CN900) ①.
2. Remove the PTT FPC from the connector of the TX-RX unit (CN901) ②.
3. Remove the 14 screws ③.
4. Anchor the screw hole of the TX-RX unit using the tip of a pair of tweezers as shown in the figure. Then, lift the TX-RX unit to remove it from the chassis ④.





■ Removing the TOP packing (G53-1762-02)

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.

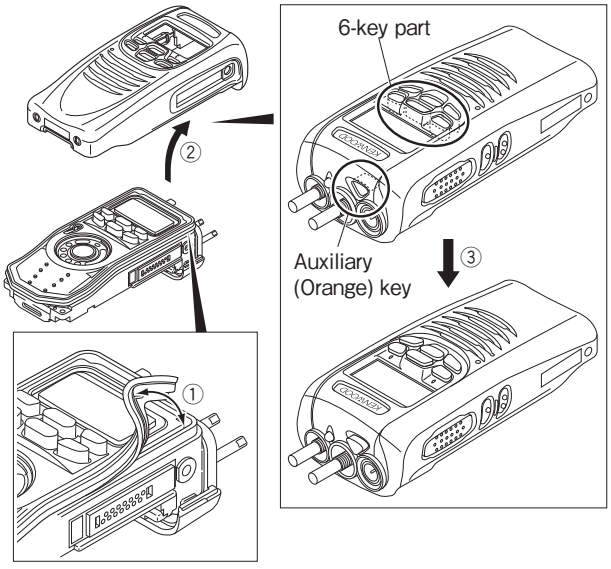


3. Precautions for Reassembly

■ Mounting the 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.

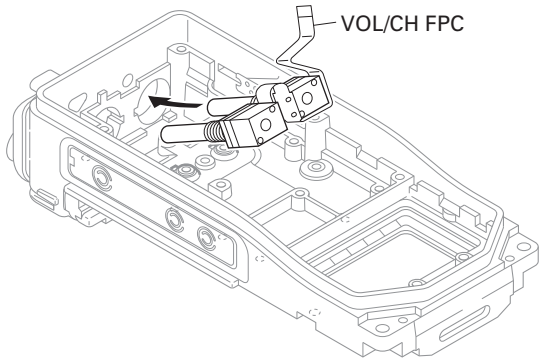
2. Mount the chassis onto the case ②.
   Note:
   After mounting the chassis onto the case, if the Auxiliary (Orange) key part of the VOL/CH packing gets stuck inside the case as shown in the figure, return it to the normal position using a soft tipped item (e.g., finger) ③.
   Prying it with a pointed metal tool such as forceps, may damage the key top or packing.



DISASSEMBLY FOR REPAIR

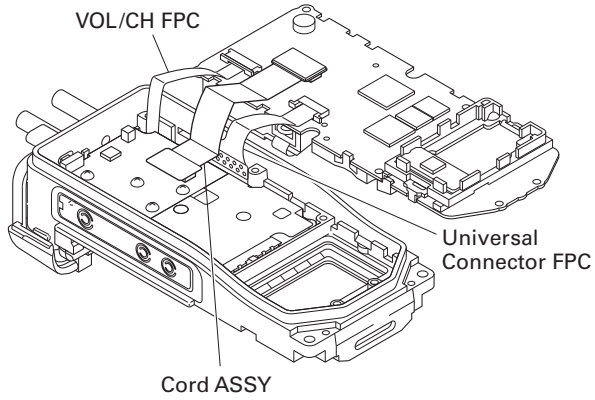
■ Inserting the Volume and Channel switch into the chassis

Insert the volume and channel switch into the chassis with the VOL/CH FPC formed as shown in the figure.



■ Forming the VOL/CH FPC, Cord ASSY and Universal connector FPC

Form the VOL/CH FPC, Cord ASSY and Universal connector FPC as shown in the figure.

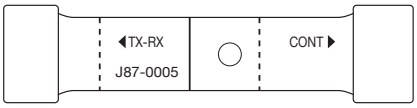


Note:

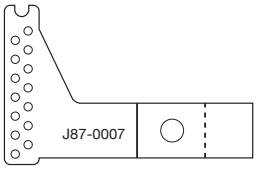
Fold indications are printed on the Cord ASSY and Universal Connector FPC.

"——" line shows creased line on the top.

"- - - -" line shows creased line on the bottom.



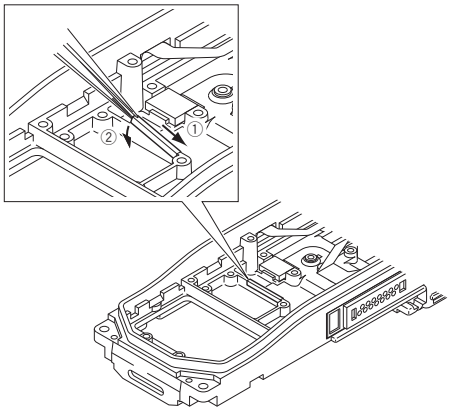
Cord ASSY



Universal Connector FPC

■ Relay hardware (E29-1242-04) installation procedure

1. Fit one side of the relay hardware to a right corner of the chassis using a pair of tweezers ①.
2. Fit the other side of the relay hardware to the rib of the chassis ②.

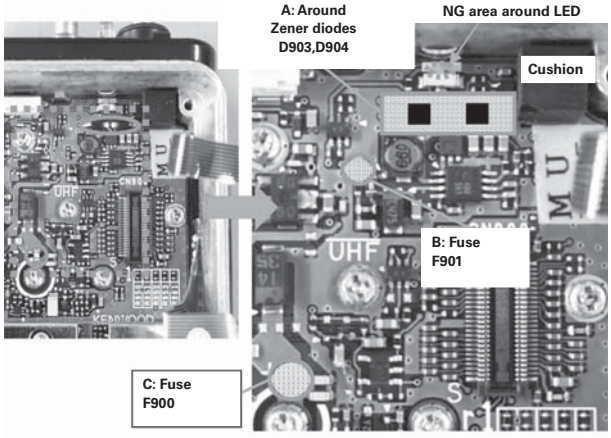


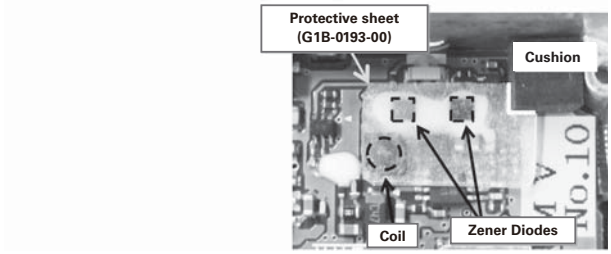
■ Reapply encapsulant and protective sheet on the TX-RX unit as needed

Before repair of this radio, note that there are three areas on the TX-RX unit with encapsulant (special polymer containing silyl group, or a silicone coating) for mandatory continued Safety Protection: Around the protection Zener diodes (D903, D904), and the two fuses (F900, F901).

The coating can be removed for repairs, but a similar (CEMEDINE SX720W) and equal coating material with an electrical rating must be applied after repair, sufficient to cover around these critical components and their soldered leads & pads.

Use enough coating to completely cover the component and solder pads to approximately 1mm, but not too much. Refer to the photo illustrations.

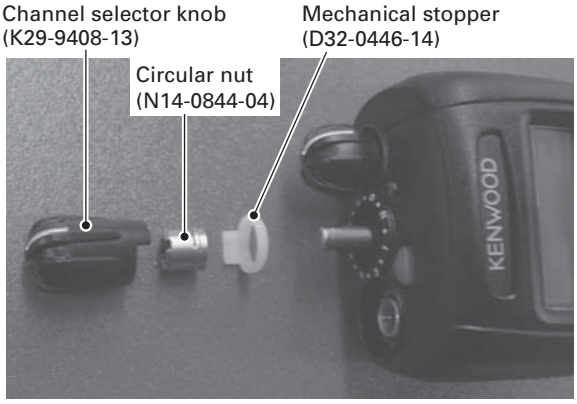




DISASSEMBLY FOR REPAIR

■ Changing the channel selector from 16-channel operation to free

1. Remove the channel selector knob.
2. Remove the circular nut.
3. Remove the mechanical stopper.
4. Reassemble the circular nut and channel selector knob that were removed in steps 1 and 2, in their original positions.



■ 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 "Plastic Cabinet (A02-4002-23 (6-key))" is changed, "Sticker (B42-7296-04)", "Badge (B43-1606-04)" and "Fibrous Sheet (G10-1373-04)" should be ordered and changed together because Sticker (B42-7296-04), Badge (B43-1606-04) and Fibrous Sheet (G10-1373-04) are non-reusable.

Main Parts		Assembled Sheet/ Cushion		
Part Name	**Part Number**	**Part Name**	**Part Number**	**Remark**
Plastic Cabinet (6-key)	A02-4002-23	Sticker	B42-7417-04	"NEXEDGE" is printed.
		Badge	B43-1606-14	"KENWOOD" is printed.
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.
Cord ASSY (50-pin FPC)	X42-3510-10	Cushion (50-pin FPC)	G13-2293-04	
Speaker	T07-0755-25	Rubber Cushion (SP)	G11-4272-14	
		Sheet (SP)	G11-4458-14	Used for stabilizing the waterproof performance. "•" (a hole) on the Sheet (SP) shows the upper side (6-key FPC side).
Switch Unit (6-key FPC)	X41-3840-10	Adhesive Sheet (6-key FPC)	J99-0745-04	Used for fixing the Switch Unit (6-key FPC) from the back side of the Holder (FG-SP) before soldering.
		Adhesive Sheet (6-key FPC)	J99-0712-14	Used for fixing the Switch Unit (6-key FPC) on the Holder (FG-SP).
Switch Unit (PTT FPC)	X41-3830-10	Sheet (PTT)	G11-4428-04	Used for fixing the Push Knob (PTT) on the Switch Unit (PTT FPC) and stabilizing the waterproof performance.
		Adhesive Sheet (PTT FPC)	J99-0711-04	Used for fixing the Switch Unit (PTT FPC) on the Chassis.
Chassis	A10-4111-11	Relay Hardware (VCO-Chassis)	E29-1242-04	Used for stabilizing the shield performance of the VCO.
		Sheet (Air)	G11-4500-04	This sheet is put on the leak check hole. This sheet lets air through, but does not let water through.
		Rubber Sheet (FET)	G11-4429-04	Used for stabilizing the radiation performance of the FET.
		Sheet (Air)	G11-4440-04	This sheet is a protect cover of the sheet (G11-4500-04).
		Cushion (ANT)	G13-2220-04	Used for fixing the Terminal ASSY.
Terminal Block	E72-0425-13	Adhesive Sheet (Terminal Block)	J99-0747-04	Used for fixing the Terminal Block and the Packing (Terminal Block).

CIRCUIT DESCRIPTION

1. Overview

The NX-303 is a UHF portable transceiver designed to operate in the frequency range of 450 to 520MHz. The unit consists of receiver, transmitter, phase-locked loop (PLL) frequency synthesizer, base band 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.

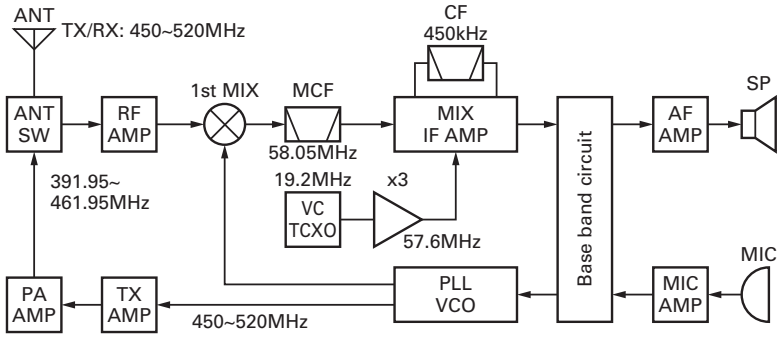


Fig. 1 Frequency configuration

3. Receiver System

3-1. RF Circuit

An incoming RF signal from the antenna terminal is passed through the antenna switch (D606, D607, D709, D711) and then the bandpass filter (L721, L722). The bandpass filter is adjusted by a variable capacitor. The input voltage to the variable capacitor is regulated by the voltage output from the D/A converter (IC703). The signal is amplified by an RF amplifier (Q705), and passed through the bandpass filter (L713, L714, L715). The resulting signal is applied to the first mixer (Q703), 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 (XF700) to reject adjacent channel signals. The filtered first IF signal is amplified by the first IF amplifier (Q701) and then applied to the IF system IC (IC701). 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 second local oscillator output and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF700) 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 (IC108) through the ceramic filter (CF701) and operational amplifier (IC700).

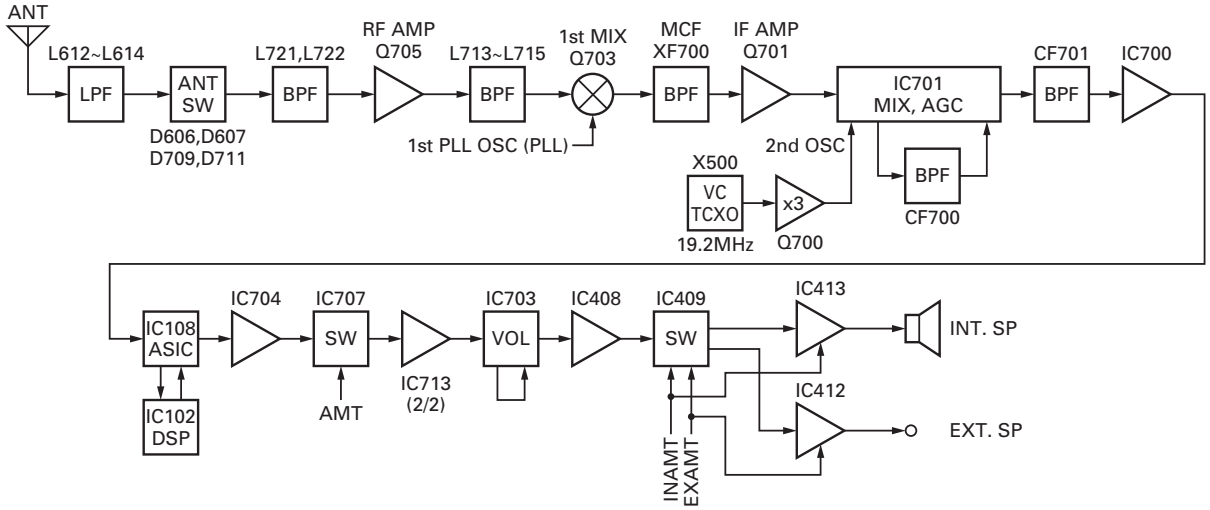


Fig. 2 RF and IF circuit

CIRCUIT DESCRIPTION

3-3. Audio Amplifier Circuit

Audio processing (high-pass filter, low-pass filter, de-emphasized and so on) at FM mode and decoding at NXDN mode are processed by DSP. The audio signal from IC108 and IC102 goes through the amplifier (IC704). The signal then goes through a mute switch (IC707), amplifier (IC713), electronic volume control (IC703), and AF amplifier (IC408).

While busy, AMT becomes Low to turn IC707 on, and the signal is fed to the AF switch. While INAMT is High, the AF switch (IC409) selects the internal speaker, and the audio signal is fed to the internal audio power amplifier (IC413), and output to the internal speaker. While EXAMT is High, the AF switch (IC409) selects the external speaker, and the audio signal is fed to the external audio power amplifier (IC412), and output to the external speaker. The power supply for IC413 and IC412 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. IC108 detects the logic of SSW and activates either INAMT or EXAMT.

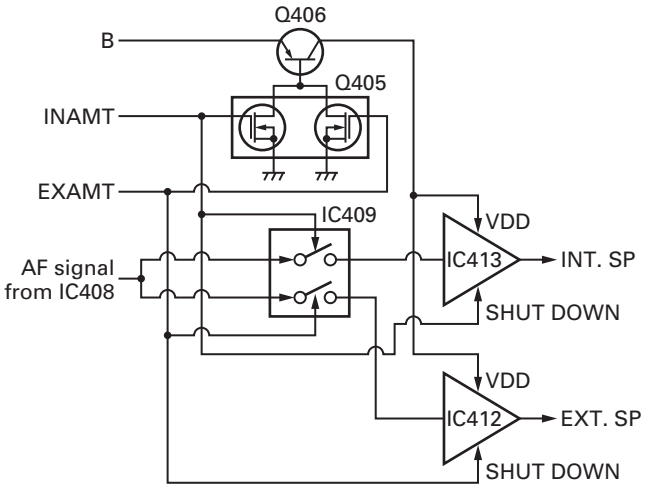


Fig. 3 Audio amplifier circuit

3-4. Squelch Circuit

It amplifies the demodulated noise signal from IC108 after filtering through the BPF circuit. Then, the amplified signal is converted to a DC signal by the detection circuit. The converted signal is fed back to IC108.

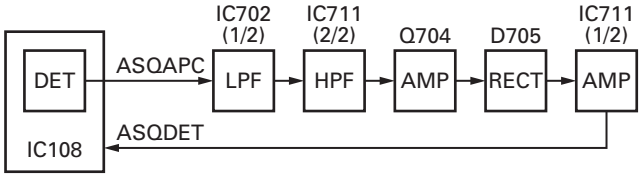


Fig. 4 Squelch circuit

4. Transmitter System

4-1. Audio Band Circuit

The signal from the internal microphone goes through the mute switch (Q5). When the SP-MIC is not attached, the microphone switching terminal (MSW) on the universal connector becomes High, and the mute switch (Q5) is turned on. When the SP-MIC is attached, MSW is connected to GND inside the SP-MIC. For this reason, Q5 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 (Q707), and is amplified by IC716 (1/2) and limited by the AGC circuit which is composed of D703, D704, Q705 and Q706.

4-2. Base Band Circuit

The audio signal output from the base band circuit is converted to digital data with a sampling frequency of 48kHz. This digital data is sent to the DSP (IC102), 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. The audio signal is then pre-emphasized in FM mode and synthesized with the signals, such as QT and DQT, as required, and is then output from IC108. In Digital mode, the audio signal is converted to the 4-Level FSK base band signal and output from IC108. The DTMF and MSK base band signals are also generated by the DSP and output by IC108.

LPF (IC705) works as a smoothing filter. The DAC (IC703) assigns the base band signal to the VCO and VCTCXO (X500). At this time, the level output according to the transmit carrier is fine-adjusted according to each modulation method.

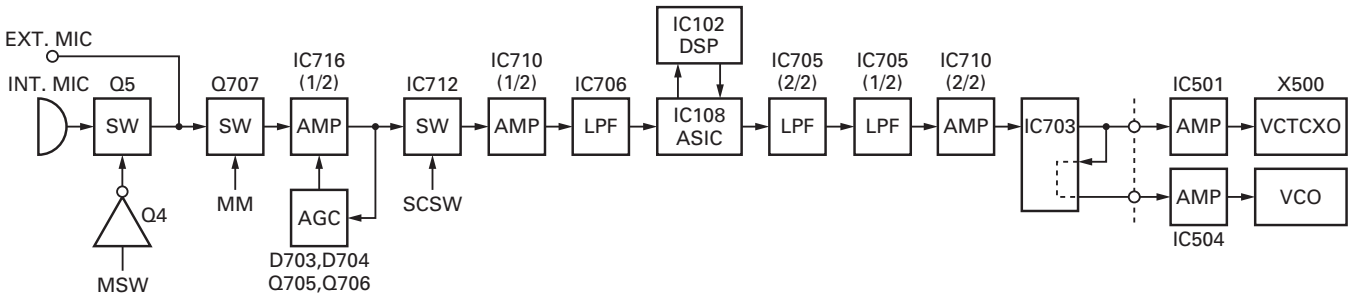


Fig. 5 Audio band and Base band circuit

CIRCUIT DESCRIPTION

4-3. VOX

IC716 (2/2) amplifies the audio signal captured in the microphone. The signal is then converted into the DC voltage, rectified by D706. The DC voltage activates the ASIC (IC108), 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 (Q601,Q602 and Q603) to 25~27dBm. The output of the drive amplifier is amplified by the RF power amplifier (Q606) to 5.0W (1W when the power is low). The RF power amplifier is MOS FET. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D606, D607 are on) and applied to the antenna terminal.

4-5. APC Circuit

The APC circuit always monitors the current flowing through the RF power amplifier (Q606) and keeps a constant current. The voltage drop at R642, R645 and R647 is caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier (IC600 1/2). IC600 (2/2) compares the output voltage of IC600 (1/2) with the reference voltage from IC108, and the output of IC600 (2/2) controls the VGG of Q602, Q603 and Q606 to make the both voltages the same. The change of power high/low is carried out by the change of the reference voltage. Q607, Q608 and Q610 are turned on and Q604 and Q605 are turned off in transmit and the APC circuit is active.

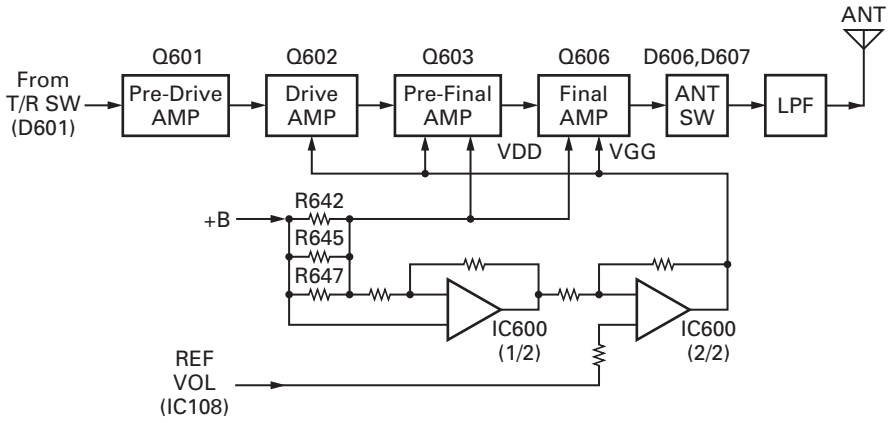


Fig. 6 Drive and final amplifier and APC circuit

5. PLL Frequency Synthesizer

5-1. VCTCXO (X500)

VCTCXO (X500) generates a reference frequency of 19.2MHz for the PLL frequency synthesizer. This reference frequency is applied to pin 9 of the PLL IC (IC502) and connected to the IF circuit as a 2nd local signal through the Tripler (Q700). The VCTCXO oscillation frequency is determined by the DC voltage of the VC terminal. The VC voltage is fixed to 1.65V by R500 and R501, and supplied to the VC terminal through IC501. The modulation signal is also fed to the VC terminal through IC501.

The frequency adjustment is achieved by switching the ratio of the dividing frequency that is not adjusted by the DC voltage impressed to the VC. The resolution of the adjusting frequency is approximately 4Hz.

5-2. VCO

There is a RX VCO and a TX VCO.

The TX VCO (Q509) generates a transmit carrier and the RX VCO (Q508) generates a 1st local signal. For the VCO oscillation frequency, the transmit carrier is 450 to 520MHz and the 1st local signal is 391.95 to 461.95MHz.

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 (IC108). When the /T_R logic is low, the VCO outputs the transmit carrier and when it is high, it outputs a 1st local receive signal.

The voltage control terminals, "CV" and "ASSIST", are controlled by the PLL IC (IC502) and ASIC (IC108) and the output frequency changes continuously according to the applied voltage. For the modulation input terminal, "VCO_MOD", the output frequency changes according to the applied voltage. This is used to modulate the VCO output. "VCO_MOD" works only when "/T_R" is low.

CIRCUIT DESCRIPTION

5-3. PLL IC (IC502)

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 2.5V.

The desired frequency is set for the PLL IC by the ASIC (IC108) 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.

5-4. Local Switch (D600, D601)

The connection destination of the signal output from the buffer amplifier (Q600) is changed with the diode switch (D601) that is controlled by the transmission power supply, 50T, and the diode switch (D600) that is controlled by the receive power supply, 50R. If the 50T logic is high, it is connected to a send-side pre-drive (Q601). If the 50T logic is low, it is connected to a receive-side mixer (Q703).

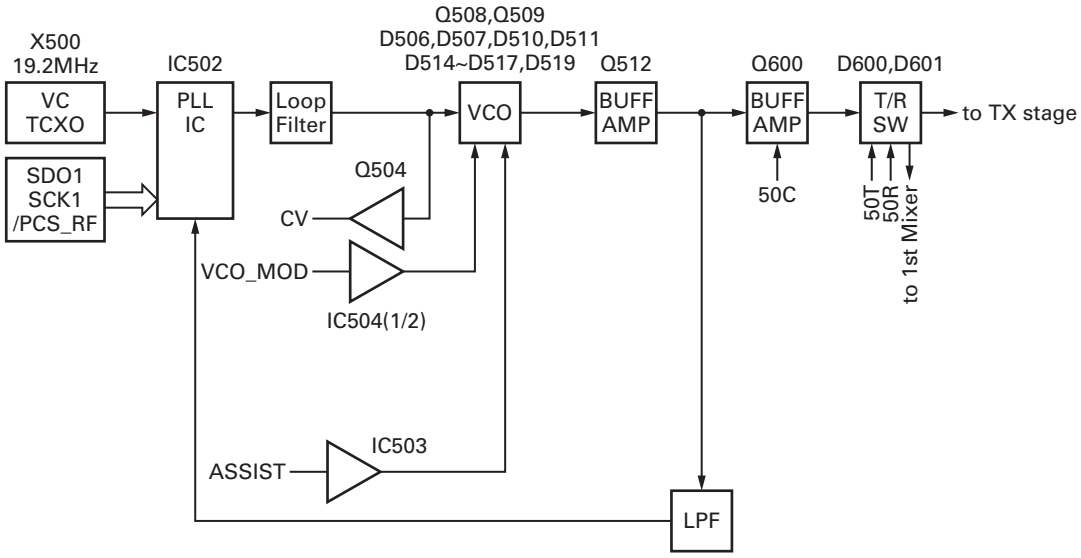


Fig. 7 PLL block diagram

6. Control Circuit

The control circuit consists of the ASIC (IC108) and its peripheral circuits. IC108 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 (IC108) 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, the receive circuit, the transmitter circuit, the control circuit, and the display circuit and transfers data to or from an external device.

CIRCUIT DESCRIPTION

6-2. Memory Circuit

The memory circuit consists of the ASIC (IC108) and the SRAM(IC103) and flash memory (IC101). The flash memory has capacity of 32M-bit that contains the transceiver control program for the ASIC and stores the data. It also stores the data for transceiver channels and operating parameter that are written by the FPU. This program can be easily written from external devices. The SRAM has 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/111DN), 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 temporary data area and work area.

6-3. LCD

The LCD is controlled using the bus lines on the connector (CN1) of the Control unit (X53-459). It corrects the LCD contrast voltage using IC1.

6-4. Key Detection Circuit

Keys are detected using the key scan circuit in IC108. The /KEYI* signals that are normally pulled down go high when any key is pressed.

6-5. Low Battery Warning

The battery voltage is divided using R444 and R445 and is detected by the ASIC (IC108). 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.

6-6. DSP

The DSP circuit consists of a DSP (IC102) and processes the base band signal. The DSP operates on an external clock of 18.432MHz (the same as the IC108), 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
- 2-tone 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 (F900), and goes to the RF final amplifier, AVR ICs (IC902, IC903), and Control unit (X53-459).

In the control unit, +B is connected to the DC/DC (IC407), AVR ICs (IC411, IC708, IC416), and voltage detector IC (IC414). The voltage detector watches the battery voltage. If the battery voltage is 5.6V or higher, the detector outputs High. While the output of IC414 is High, IC416 and Q409 provide 3.1V (31BU) to the backup-section.

When the VOL SW is turned on, SB1 becomes high (battery voltage). The DC/DC (IC407) operates if both SB1 and the output of the detector are high. IC407 outputs 3.8V and it activates IC404 (33M), IC717 (15M), and IC406 (33A). As a result, the ASIC and DSP operate.

The SBC signal becomes High after the ASIC operates, IC708 (5A), Q403 on the Control unit (SB2) and Q901 on the TX-RX unit (SB3) are turned on. IC901 and IC903 operate by turning on these AVR ICs and FET switches.

The 5UC signal becomes High when an option is installed on the universal connector. Then IC411 (50U) operates.

When the /SAVE signal becomes High, IC902 (50C) operates. The output of IC902 is connected to three FET switches (Q902, Q903, Q905). When the SBC signal becomes High, IC903 (33C) operates. The FET switches are controlled by the CPU. Q905 (50T) is turned on in transmit mode. Q902 (50R) and Q903 (50IF) are 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 SBC signal to Low. Then the power supplies except IC416 (31BU) stop.

CIRCUIT DESCRIPTION

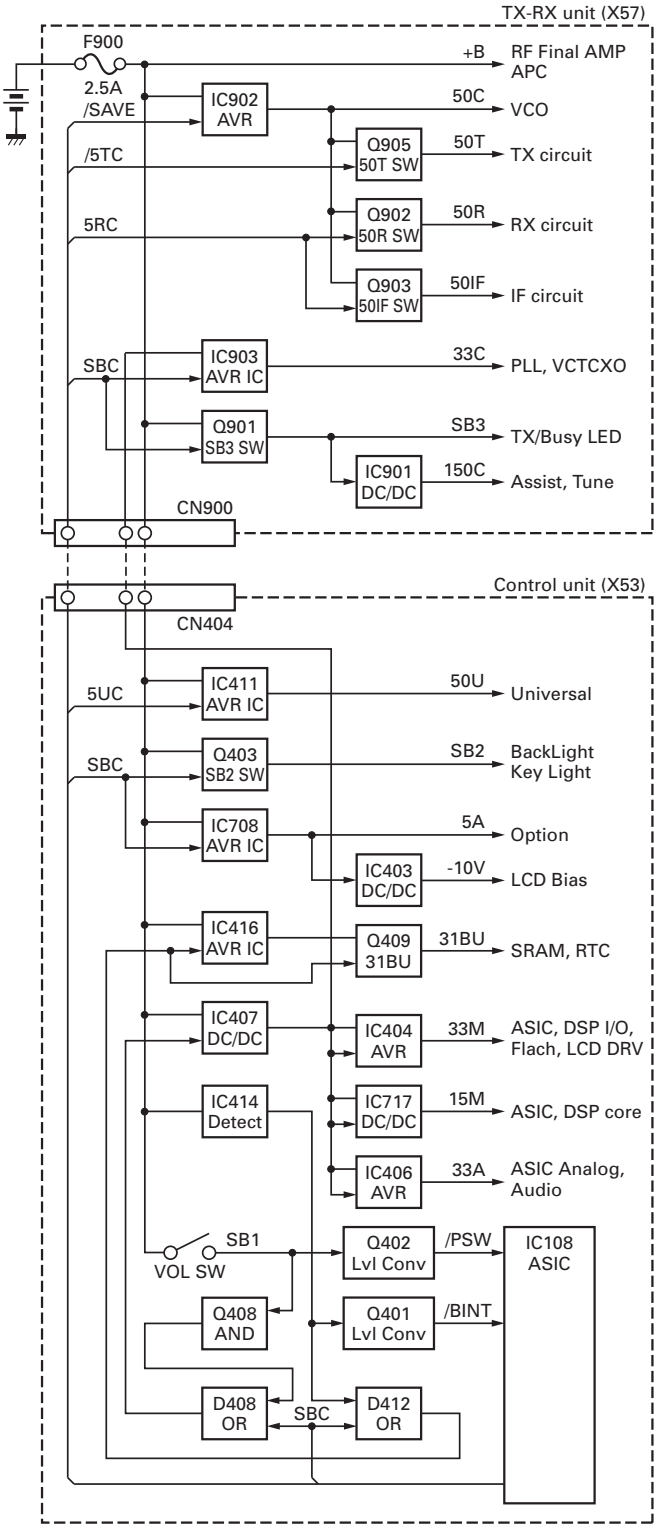


Fig. 8 Power supply circuit

8. Signaling Circuit

8-1. Encode (QT/DQT/LTR/DTMF/2-tone/MSK)

Each signaling data signal of QT, DQT, LTR, DTMF, 2-tone and MSK is generated by the DSP circuit, superposed on a modulation signal and output from IC108. The modulation balance of the QT/DQT/LTR signal is adjusted by the D/A converter (IC703) and the resulting signal is routed to the modulation input of the VCO and VCXO (X500). Each deviation of the TX QT, DQT, LTR, DTMF, 2-tone and MSK tone is adjusted by changing the output level of IC108 and the resulting signal is routed to the VCO and VCXO. The RX DTMF tone is routed to the receive audio signal system, and is output from the speaker.

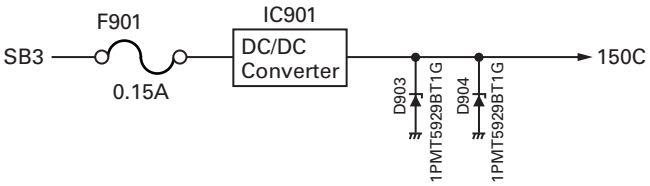
8-2. Decode (QT/DQT/LTR/DTMF/2-tone/MSK)

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 (IC102) to perform this operation. The transceiver compander can be turned on or off using the FPU.

10. 150C DC/DC Converter Protect



COMPONENTS DESCRIPTION

Control unit (X53-4590-14)

Ref. No.	Part Name	Description
IC1	IC	LCD contrast
IC101	IC	Flash memory
IC102	IC	DSP
IC103	IC	SRAM
IC104	IC	2 input AND gate
IC105	IC	Reset
IC106	IC	RTC
IC107	IC	Buffer
IC108	IC	ASIC
IC109	IC	2 input AND gate
IC401,402	IC	Bus switch
IC403	IC	Voltage doubling inverter
IC404	IC	Voltage regulator (33M)
IC406	IC	Voltage regulator (33A)
IC407	IC	DC/DC converter
IC408	IC	AF AMP
IC409	IC	AF switch
IC411	IC	Voltage regulator (50U)
IC412,413	IC	Audio AMP
IC414	IC	Reset
IC415	IC	2 input AND gate
IC416	IC	Voltage regulator
IC417,418	IC	Dual bus buffer
IC701	IC	I/O control
IC702	IC	APC LPF
IC703	IC	D/A converter
IC704	IC	RX AF LPF
IC705	IC	Modulation LPF
IC706	IC	MIC AMP
IC707	IC	RX AF switch
IC708	IC	Voltage regulator (5A)
IC709	IC	Sidetone mute
IC710	IC	MOD/MIC summing AMP
IC711	IC	SQL BPF/SQL DC AMP
IC712	IC	MIC switch
IC713	IC	1.65V REF/RX summing AMP
IC714	IC	OPT switch
IC715,716	IC	VOX AMP
IC717	IC	DC/DC converter (15M)
Q1,2	Transistor	LCD backlight switch
Q3	FET	LCD backlight switch
Q4	FET	MIC mute control
Q5	FET	MIC mute switch
Q401,402	FET	Level converter
Q403	Transistor	SB2 switch
Q404	FET	SB2 switch control
Q405	FET	AF AMP switch
Q406,407	Transistor	Voltage regulator (AF AMP)
Q408,409	Transistor	DC switch
Q410	FET	DC switch
Q411	FET	Level converter
Q412	FET	DC switch control
Q413~415	Transistor	DC switch
Q702	FET	Tone switch
Q703	FET	W/N noise switch
Q704	Transistor	SQL noise AMP
Q705,706	Transistor	MIC AGC
Q707	FET	MIC mute
D3,4	LED	LCD backlight
D7,8	LED	LCD backlight
D11	Diode	LCD backlight switch
D12~16	Diode	Reverse current prevention
D17~21	Zener diode	Surge absorption
D22,23	Diode	Surge absorption
D102	Diode	Reverse current prevention
D401~404	Diode	Key control
D405,406	Diode	DC/DC converter
D407	Diode	Over voltage prevention
D408	Diode	DC/DC converter control
D409,410	Diode	SP control
D412	Diode	DC switch control
D414,415	Diode	Reverse current prevention
D416	Diode	33M control
D417	Diode	33A control
D701	Diode	5A switch
D702	Diode	PLD control
D703,704	Diode	Detector
D705	Diode	Noise detector
D706	Diode	VOX detector
D707	Diode	VOX

COMPONENTS DESCRIPTION

TX-RX unit (X57-8960-13)

Ref. No.	Part Name	Description
IC404	IC	OP AMP (RSSI/VAGC)
IC500	IC	Temperature sensor
IC501	IC	AF AMP for TCXO MOD
IC502	IC	PLL IC
IC503	IC	DC AMP for VCO tune
IC504	IC	OP AMP (VCO MOD/APC)
IC600	IC	Auto power control
IC700	IC	Buffer
IC701	IC	FM IC
IC702,703	IC	DC AMP for BPF
IC900	IC	50T control
IC901	IC	DC/DC converter
IC902	IC	Voltage regulator (50C)
IC903	IC	Voltage regulator (33C)
Q504	FET	Buffer AMP
Q507	Transistor	Ripple filter
Q508,509	FET	VCO oscillation
Q510,511	FET	T/R switch
Q512,600	Transistor	Buffer AMP
Q601	Transistor	Pre-drive AMP
Q602	FET	Drive AMP
Q603	FET	Pre-final AMP
Q604	Transistor	APC switch
Q605	FET	APC switch
Q606	FET	RF final AMP
Q607	Transistor	APC switch
Q608	FET	APC switch
Q610	Transistor	APC switch
Q700	Transistor	2nd Local tripler
Q701	Transistor	IF AMP
Q703	FET	Mixer
Q705	FET	RF AMP

Ref. No.	Part Name	Description
Q706	FET	RF AGC
Q900	Transistor	TX/RX LED switch
Q901	FET	SB3 switch
Q902	FET	50R switch
Q903	FET	50IF switch
Q904	FET	DC/DC converter switch
Q905	Transistor	50T switch
D505	Diode	Bypass diode
D506,507, D510,511	Variable capacitance diode	Frequency control
D514~517	Variable capacitance diode	Frequency control
D518	Diode	Ripple filter
D519	Variable capacitance diode	TX modulation
D600,601	Diode	Local switch
D604	Zener diode	APC switch
D605	Zener diode	APC protect
D606,607	Diode	Antenna switch
D608	Diode	APC Timing adjustment
D611	Diode	APC Timing adjustment
D702~704	Variable capacitance diode	Vari-cap tune
D705	Diode	RF AGC
D706,708	Variable capacitance diode	Vari-cap tune
D709	Diode	Antenna switch
D710	Variable capacitance diode	Vari-cap tune
D711	Diode	Antenna switch
D900	LED	TX/RX LED
D901	Diode	Reverse protection
D902	Diode	50T control
D903,904	Zener Diode	15V DC/DC Converter protect

PARTS LIST

⚠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-303
CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
NX-303				
1	1A	A02-4002-23	PLASTIC CABINET(6KEY)	
3	3A	A10-4111-21	CHASSIS	
4	2B	A62-1156-02	PANEL(TOP)	
6	1B,1D	B09-0712-03	CAP ACCESSORY	
7	1A	B11-1853-34	FILTER(LCD)	
8	1A	B11-1854-02	ILLUMINATION GUIDE(LCD)	
9	3B	B11-1855-04	ILLUMINATION GUIDE(TX/BUSY)	
10	1A	B38-0923-05	LCD ASSY	
11	1A	B42-7417-04	STICKER	
12	1B	B43-1606-14	BADGE	
13	2D	B62-2601-00	INSTRUCTION MANUAL	
15	2B	D32-0446-14	STOPPER(16CH)	
17	2A	E29-1241-04	RELAY HARDWARE(VCO-PCB)	
18	3A	E29-1242-04	RELAY HARDWARE(VCO-CHASS)	
19	3B	E58-0532-05	RECTANGULAR RECEPTACLE(SP/MIC)	
20	3B	E72-0425-13	TERMINAL BLOCK	
22	3A	F07-1959-14	COVER(OP BOARD)	
23	2A	F10-3162-13	SHIELDING CASE ASSY	
24	2A	G02-1865-13	EARTH SPRING(SP)	
25	1A	G10-1373-04	FIBROUS SHEET(SP)	
26	2B	G10-1807-04	FIBROUS SHEET(TOP PANEL)	
27	2A	G11-4272-14	RUBBER CUSHION(SP)	
28	3A	G11-4500-04	SHEET(AIR)	
29	2A	G11-4428-04	SHEET(PTT)	
30	3A	G11-4429-04	RUBBER SHEET(FET)	
31	3A	G11-4440-04	SHEET(AIR)	
32	2A	G11-4458-14	SHEET(SP)	
33	2A	G11-4459-04	SHEET(TX-RX PCB)	
34	1A	G11-4497-04	SHEET(LCD)	
35	2A	G11-4501-04	SHEET(MIC ELEMENT)	
36	1B	G11-4540-04	SHEET(CABINET)	
37	2A	G13-2292-04	CUSHION(TX-RX PCB)	
38	2A,3B	G13-2220-04	CUSHION(ANT/OP BOARD)	
39	2A	G13-2293-04	CUSHION(50PIN FPC)	
40	2A	G13-2294-04	CUSHION(BATT-)	
41	3B	G53-1762-02	PACKING(TOP)	
42	3B	G53-1763-03	PACKING(TERMINAL BLOCK)	
43	3A	G53-1764-03	PACKING(OP BOARD COVER)	
44	1A	G53-1765-11	PACKING(6KEY)	
45	2B	G53-1768-04	PACKING(VOL,SELECTOR O-RING)	
46	1B,1D	G53-1769-04	PACKING(CAP)	
47	2B	G53-1792-04	PACKING(SMA O-RING)	
81	1D,2D	H12-4293-02	PACKING FIXTURE	
82	2D	H13-2135-04	CARTON BOARD	
83	3C	H52-2842-02	ITEM CARTON CASE	
49	2A	J19-5505-11	HOLDER(FG-SP)	
50	2B	J19-5506-03	HOLDER(VOL/ENC)	
51	2A	J19-5507-02	HOLDER(OP BOARD)	
52	2B	J21-8638-14	MOUNTING HARDWARE(HOLDER)	
53	1C	J29-0730-05	BELT CLIP ACCESSORY	
54	2B	J30-1296-04	SPACER(VOL)	
55	2B	J87-0028-05	FPC(VOL,SELECTOR)	
56	3B	J87-0007-25	FPC(UNIVERSAL)	
57	2B	J99-0745-04	ADHESIVE SHEET(6KEY FPC)	
58	3A	J99-0711-04	ADHESIVE SHEET(PTT FPC)	
59	2B	J99-0712-14	ADHESIVE SHEET(6KEY FPC)	
60	1A,2A	J99-0714-04	ADHESIVE SHEET(LCD)	
62	3B	J99-0715-08	ADHESIVE SHEET(UNIVERSAL)	
63	3B	J99-0747-04	ADHESIVE SHEET(TERMINAL BLOCK)	
64	3A	K25-2001-03	PUSH KNOB(PTT)	
65	1A	K29-9405-03	KNOB(PTT)	
66	1A	K29-9406-03	BUTTON KNOB(SIDE KEY)	
67	1B	K29-9407-03	KNOB(VOL)	
68	1B	K29-9408-13	KNOB(SELECTOR)	
A	1B,1D	N08-0564-04	DRESSED SCREW ACCESSORY	
B	3B	N0Z-0001-00	HEXAGON HEAD SCREW(BATT-)	
C	3A	N09-2440-15	SPECIAL SCREW(CASE)	
D	2A,2B	N09-6549-04	STEPPED SCREW(FG-SP HOLDER)	
E	2B,3A	N09-6554-05	PAN HEAD SCREW(ANT/OP BOARD)	
G	1C	N09-6585-15	PAN HEAD MACHINE SCREW ACCESSORY	
F	2B	N14-0844-04	CIRCULAR NUT(VOL,SELECTOR)	
H	1A,2A,2B	N83-2005-48	PAN HEAD TAPTITE SCREW(PCB)	
S1	2B	S60-0437-05	ROTARY SWITCH	
72	2A	T07-0755-25	SPEAKER	
73	2A	T91-0575-05	MIC ELEMENT	
VR1	2B	R31-0666-15	V RESISTOR	
77	3A	X41-3830-10	SWITCH UNIT(PTT FPC)	
78	2B	X41-3840-10	SWITCH UNIT(6KEY FPC)	
79	2B	X42-3510-10	CORD ASSY(50PIN FPC)	
-		X53-4590-15	SERVICE CONTROL UNIT	
-		X57-8960-13	TX-RX UNIT	
80	2B	X60-4080-10	TERMINAL ASSY(SMA)	
81	2A	G1B-0193-00	SHEET	
82	1B	B42-9686-04	STICKER(CASE)	
83	1A	B42-9687-04	STICKER(YELLOW)	
84	3A	B42-9688-04	STICKER(CHASSIS)	
CONTROL UNIT (X53-4590-14)				
C1		CK73HBB1A104K	CHIP C 0.10UF K	
C2		CK73GB1E105K	CHIP C 1.0UF K	
C3		CK73GB1E105K	CHIP C 1.0UF K	
C4		CK73GB1E105K	CHIP C 1.0UF K	
C5		CK73GB1E105K	CHIP C 1.0UF K	
C6		CK73GB1E105K	CHIP C 1.0UF K	
C7		CK73HBB1A104K	CHIP C 0.10UF K	
C8		CK73HBB1A104K	CHIP C 0.10UF K	
C10		CK73HBB1A104K	CHIP C 0.10UF K	
C11		CK73HXR0J105K	CHIP C 1.0UF K	
C12		CK73HBB1H471K	CHIP C 470PF K	
C13		CK73HBB1H471K	CHIP C 470PF K	
C14		CK73HBB1H471K	CHIP C 470PF K	
C15		CK73HBB1H471K	CHIP C 470PF K	
C16		CC73HCH1H101J	CHIP C 100PF J	
C17		CC73HCH1H101J	CHIP C 100PF J	
C23		CK73HBB1H102K	CHIP C 1000PF K	
C24		CC73HCH1H470J	CHIP C 47PF J	
C25		CK73HBB1H102K	CHIP C 1000PF K	
C26		CK73HBB1H102K	CHIP C 1000PF K	
C27		CK73HBB1H102K	CHIP C 1000PF K	
C28		CC73HCH1H101J	CHIP C 100PF J	
C29		CC73HCH1H101J	CHIP C 100PF J	
C30		CC73HCH1H101J	CHIP C 100PF J	
C31		CC73HCH1H101J	CHIP C 100PF J	

PARTS LIST

CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
C32		CC73HCH1H101J	CHIP C 100PF J	
C33		CC73HCH1H101J	CHIP C 100PF J	
C34		CC73HCH1H101J	CHIP C 100PF J	
C35		CK73HBB1H102K	CHIP C 1000PF K	
C36		CK73HB1E682K	CHIP C 6800PF K	
C37		CK73HBB1H102K	CHIP C 1000PF K	
C38		CC73HCH1H101J	CHIP C 100PF J	
C40		CC73HCH1H221J	CHIP C 220PF J	
C41		CC73HCH1H101J	CHIP C 100PF J	
C101		CK73HBB1A104K	CHIP C 0.10UF K	
C102		CK73HBB1A104K	CHIP C 0.10UF K	
C103		CK73HBB1A104K	CHIP C 0.10UF K	
C104		CK73HBB1A104K	CHIP C 0.10UF K	
C105		CK73HXR0J105K	CHIP C 1.0UF K	
C106		CK73HBB1E103K	CHIP C 0.010UF K	
C107		CK73HBB1A104K	CHIP C 0.10UF K	
C109		CK73HBB1H102K	CHIP C 1000PF K	
C110		CK73HBB1H102K	CHIP C 1000PF K	
C111		CK73HBB1A104K	CHIP C 0.10UF K	
C112		CK73HBB1A104K	CHIP C 0.10UF K	
C113		CK73HBB1A104K	CHIP C 0.10UF K	
C116		CK73HBB1A104K	CHIP C 0.10UF K	
C117		CK73HBB1A104K	CHIP C 0.10UF K	
C118		CK73HXR0J105K	CHIP C 1.0UF K	
C119		CK73HXR0J105K	CHIP C 1.0UF K	
C120		CK73HBB1A104K	CHIP C 0.10UF K	
C121		CK73HBB1A104K	CHIP C 0.10UF K	
C122		CK73HBB1E103K	CHIP C 0.010UF K	
C123		CK73HBB1E103K	CHIP C 0.010UF K	
C124		CK73HBB1E103K	CHIP C 0.010UF K	
C130		CK73HBB1E103K	CHIP C 0.010UF K	
C131		CK73HBB1A104K	CHIP C 0.10UF K	
C133		CS77MP0J100M	CHIP TNTL 10UF 6.3WV	
C134		CK73HBB1E103K	CHIP C 0.010UF K	
C135		CK73HBB1H102K	CHIP C 1000PF K	
C136		CK73HBB1E103K	CHIP C 0.010UF K	
C137		CK73GB1E105K	CHIP C 1.0UF K	
C138		CK73HBB1A104K	CHIP C 0.10UF K	
C139		CK73HBB1A104K	CHIP C 0.10UF K	
C140		CK73HBB1A104K	CHIP C 0.10UF K	
C141		CC73HCH1H101J	CHIP C 100PF J	
C142		CS77MP0J100M	CHIP TNTL 10UF 6.3WV	
C143		CK73HBB1E103K	CHIP C 0.010UF K	
C144		CK73GB1E105K	CHIP C 1.0UF K	
C145		CK73HBB1A104K	CHIP C 0.10UF K	
C146		CK73HBB1A104K	CHIP C 0.10UF K	
C147		CK73HBB1A104K	CHIP C 0.10UF K	
C148		CK73HBB1A104K	CHIP C 0.10UF K	
C149		CK73HBB1E103K	CHIP C 0.010UF K	
C150		CK73GB1E105K	CHIP C 1.0UF K	
C151		CK73HBB1A104K	CHIP C 0.10UF K	
C152		CK73HBB1A104K	CHIP C 0.10UF K	
C153		CK73HBB1A104K	CHIP C 0.10UF K	
C154		CK73HBB1A104K	CHIP C 0.10UF K	
C155		CK73HBB1A104K	CHIP C 0.10UF K	
C156		CK73HBB1H102K	CHIP C 1000PF K	
C157		CK73HBB1H102K	CHIP C 1000PF K	
C158		CK73HBB1E103K	CHIP C 0.010UF K	
C159		CK73HBB1A104K	CHIP C 0.10UF K	
C160		CK73HB1E682K	CHIP C 6800PF K	

Ref. No.	Address	Parts No.	Description	Destination
C161		CK73HB1E682K	CHIP C 6800PF K	
C401		CK73HBB1A104K	CHIP C 0.10UF K	
C402		CK73HBB1A104K	CHIP C 0.10UF K	
C403		CS77MP1C2R2M	CHIP TNTL 2.2UF 16WV	
C404		CS77MP1C2R2M	CHIP TNTL 2.2UF 16WV	
C405		CS77MP1C2R2M	CHIP TNTL 2.2UF 16WV	
C406		CK73HXR0J105K	CHIP C 1.0UF K	
C407		CK73HBB1H102K	CHIP C 1000PF K	
C408		CK73HBB1H102K	CHIP C 1000PF K	
C409		CK73HXR0J105K	CHIP C 1.0UF K	
C411		CK73HXR0J105K	CHIP C 1.0UF K	
C412		CK73HXR0J105K	CHIP C 1.0UF K	
C414		CK73HXR0J105K	CHIP C 1.0UF K	
C415		CS77BP1A100M	CHIP TNTL 10UF 10WV	
C416		CK73FB1A106K	CHIP C 10UF K	
C417		CC73HCH1H221J	CHIP C 220PF J	
C418		CK73HBB1E103K	CHIP C 0.010UF K	
C419		CK73FB1E475K	CHIP C 4.7UF K	
C420		CK73HBB1E103K	CHIP C 0.010UF K	
C421		CK73HB1E682K	CHIP C 6800PF K	
C422		CC73HCH1H100C	CHIP C 10PF C	
C424		CK73HBB1A104K	CHIP C 0.10UF K	
C425		CK73HBB1A104K	CHIP C 0.10UF K	
C427		CK73HBB1E103K	CHIP C 0.010UF K	
C428		CC73HCH1H030C	CHIP C 3.0PF C	
C429		CK73HBB1A104K	CHIP C 0.10UF K	
C430		CK73HBB1A104K	CHIP C 0.10UF K	
C431		CK73FB1A106K	CHIP C 10UF K	
C433		CK73FB1A106K	CHIP C 10UF K	
C435		CK73HB1A563K	CHIP C 0.056UF K	
C436		CK73HB1A563K	CHIP C 0.056UF K	
C437		CK73HB1A563K	CHIP C 0.056UF K	
C438		CK73HB1A563K	CHIP C 0.056UF K	
C439		CK73HBB1A104K	CHIP C 0.10UF K	
C440		CK73HBB1A104K	CHIP C 0.10UF K	
C441		CK73GB1E105K	CHIP C 1.0UF K	
C442		CK73HBB1H471K	CHIP C 470PF K	
C443		CK73HBB1E103K	CHIP C 0.010UF K	
C445		CK73HBB1H102K	CHIP C 1000PF K	
C446		CK73GB1E105K	CHIP C 1.0UF K	
C447		CK73HBB1H102K	CHIP C 1000PF K	
C448		CK73HXR0J105K	CHIP C 1.0UF K	
C449		CK73HXR0J105K	CHIP C 1.0UF K	
C450		CK73HXR0J105K	CHIP C 1.0UF K	
C452		CK73HBB1E103K	CHIP C 0.010UF K	
C453		CK73HBB1E103K	CHIP C 0.010UF K	
C454		CK73GB1E105K	CHIP C 1.0UF K	
C455		CK73HBB1H471K	CHIP C 470PF K	
C456		CK73HBB1H471K	CHIP C 470PF K	
C457		CK73HBB1H471K	CHIP C 470PF K	
C459		CK73HBB1H471K	CHIP C 470PF K	
C460		CK73HB1E682K	CHIP C 6800PF K	
C461		CK73HBB1H471K	CHIP C 470PF K	
C462		CK73HBB1H471K	CHIP C 470PF K	
C463		CK73HBB1H471K	CHIP C 470PF K	
C464		CK73HBB1E103K	CHIP C 0.010UF K	
C465		CK73HBB1H102K	CHIP C 1000PF K	
C466		CK73HB1E682K	CHIP C 6800PF K	
C467		CK73HBB1A104K	CHIP C 0.10UF K	
C468		CK73HBB1A104K	CHIP C 0.10UF K	

PARTS LIST

CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
C469		CK73HBB1H102K	CHIP C 1000PF K	
C470		CK73HBB1H102K	CHIP C 1000PF K	
C471		CK73HBB1C473K	CHIP C 0.047UF K	
C480		CK73HBB1E103K	CHIP C 0.010UF K	
C701		CK73HBB1A104K	CHIP C 0.10UF K	
C703		CK73GXR0J475K	CHIP C 4.7UF K	
C704		CK73HBB1A104K	CHIP C 0.10UF K	
C705		CK73HBB1A104K	CHIP C 0.10UF K	
C706		CC73HCH1H680J	CHIP C 68PF J	
C707		CC73HCH1H270J	CHIP C 27PF J	
C708		CK73HBB1A104K	CHIP C 0.10UF K	
C709		CK73HXR0J105K	CHIP C 1.0UF K	
C710		CK73HBB1E103K	CHIP C 0.010UF K	
C711		CK73HBB1A104K	CHIP C 0.10UF K	
C712		CK73HBB1E103K	CHIP C 0.010UF K	
C713		CK73HBB1H332K	CHIP C 3300PF K	
C714		CK73HB1H122K	CHIP C 1200PF K	
C715		CK73HBB1A104K	CHIP C 0.10UF K	
C716		CK73HBB1H681K	CHIP C 680PF K	
C717		CK73HBB1E103K	CHIP C 0.010UF K	
C718		CK73HBB1H152K	CHIP C 1500PF K	
C720		CK73HBB1E103K	CHIP C 0.010UF K	
C721		CK73HBB1A104K	CHIP C 0.10UF K	
C722		CK73HBB1E103K	CHIP C 0.010UF K	
C723		CK73HBB1A104K	CHIP C 0.10UF K	
C724		CK73HBB1E103K	CHIP C 0.010UF K	
C725		CC73HCH1E181J	CHIP C 180PF J	
C726		CK73HBB1A104K	CHIP C 0.10UF K	
C727		CK73HBB1A104K	CHIP C 0.10UF K	
C728		CK73HB1H331K	CHIP C 330PF K	
C730		CK73HB1H331K	CHIP C 330PF K	
C731		CK73HBB1E103K	CHIP C 0.010UF K	
C732		CK73HBB1E103K	CHIP C 0.010UF K	
C734		CK73HBB1H102K	CHIP C 1000PF K	
C735		CK73HB1H122K	CHIP C 1200PF K	
C736		CK73HBB1A104K	CHIP C 0.10UF K	
C737		CK73HBB1A104K	CHIP C 0.10UF K	
C738		CK73HBB1H102K	CHIP C 1000PF K	
C739		CK73HB1E682K	CHIP C 6800PF K	
C740		CK73HBB1H102K	CHIP C 1000PF K	
C742		CK73GB1E105K	CHIP C 1.0UF K	
C743		CK73HXR0J105K	CHIP C 1.0UF K	
C744		CK73HBB1E103K	CHIP C 0.010UF K	
C745		CK73HBB1E103K	CHIP C 0.010UF K	
C746		CK73HBB1E103K	CHIP C 0.010UF K	
C747		CK73HBB1A104K	CHIP C 0.10UF K	
C748		CK73HBB1A104K	CHIP C 0.10UF K	
C749		CC73HCH1H470J	CHIP C 47PF J	
C750		CC73HCH1H470J	CHIP C 47PF J	
C751		CK73GB1E105K	CHIP C 1.0UF K	
C752		CC73HCH1H101J	CHIP C 100PF J	
C753		CC73HCH1H101J	CHIP C 100PF J	
C755		CC73HCH1H470J	CHIP C 47PF J	
C756		CK73HBB1A104K	CHIP C 0.10UF K	
C757		CK73GXR0J475K	CHIP C 4.7UF K	
C758		CK73GXR0J475K	CHIP C 4.7UF K	
C759		CK73HBB1E103K	CHIP C 0.010UF K	
C760		CK73HBB1E103K	CHIP C 0.010UF K	
C761		CC73HCH1H100D	CHIP C 10PF D	
C762		CK73HBB1A104K	CHIP C 0.10UF K	

Ref. No.	Address	Parts No.	Description	Destination
C763		CK73HBB1E103K	CHIP C 0.010UF K	
C764		CK73HBB1H102K	CHIP C 1000PF K	
C765		CK73HBB1A104K	CHIP C 0.10UF K	
C766		CK73HBB1A104K	CHIP C 0.10UF K	
C767		CK73HBB1A104K	CHIP C 0.10UF K	
C768		CK73HBB1H102K	CHIP C 1000PF K	
C771		CK73HB1A224K	CHIP C 0.22UF K	
C772		CK73HBB1E103K	CHIP C 0.010UF K	
C775		CC73HCH1H470J	CHIP C 47PF J	
C777		CK73HBB1H102K	CHIP C 1000PF K	
C778		CK73HXR0J105K	CHIP C 1.0UF K	
C779		CK73HBB1E103K	CHIP C 0.010UF K	
C780		CK73HB1A224K	CHIP C 0.22UF K	
C781		CK73HXR0J105K	CHIP C 1.0UF K	
C782		CK73HXR0J105K	CHIP C 1.0UF K	
C785		CK73HB1A224K	CHIP C 0.22UF K	
C786		CK73HBB1E103K	CHIP C 0.010UF K	
C787		CK73HXR0J105K	CHIP C 1.0UF K	
C788		CC73HCH1H150J	CHIP C 15PF J	
C789		CC73HCH1H680J	CHIP C 68PF J	
C790		CK73HBB1A104K	CHIP C 0.10UF K	
C791		CK73HB1A393K	CHIP C 0.039UF K	
C792		CK73HXR0J105K	CHIP C 1.0UF K	
C793		CK73HBB1A104K	CHIP C 0.10UF K	
C794		CK73HBB1A104K	CHIP C 0.10UF K	
C795		CK73HBB1E103K	CHIP C 0.010UF K	
C796		CK73HBB1A104K	CHIP C 0.10UF K	
C797		CK73HXR0J105K	CHIP C 1.0UF K	
C798		CS77BP1A100M	CHIP TNTL 10UF 10WV	
C799		CK73HBB1A104K	CHIP C 0.10UF K	
C800		CK73HBB1H152K	CHIP C 1500PF K	
C801		CK73HB1C223K	CHIP C 0.022UF K	
C802		CK73HBB1E103K	CHIP C 0.010UF K	
C803		CK73HBB1H102K	CHIP C 1000PF K	
C804		CC73HCH1H470J	CHIP C 47PF J	
C805		CK73HBB1H471K	CHIP C 470PF K	
C806		CK73HBB1H471K	CHIP C 470PF K	
C808		CK73GXR0J475K	CHIP C 4.7UF K	
C809		CK73FB1A106K	CHIP C 10UF K	
C812		CK73HXR0J105K	CHIP C 1.0UF K	
CN1		E40-6755-05	FLAT CABLE CONNECTOR	
CN22		E23-1325-05	TERMINAL	
CN23		E40-6758-05	PIN ASSY	
CN24		E23-1325-05	TERMINAL	
CN403		E40-6813-05	PIN ASSY	
CN404		E40-6421-15	PIN ASSY	
CN405		E40-6754-05	FLAT CABLE CONNECTOR	
CN701		E40-6586-05	SOCKET FOR PIN ASSY	
CN710		E40-6757-05	PIN ASSY	
D3		B30-2337-05	LED(YELLOW)	
D4		B30-2337-05	LED(YELLOW)	
D7		B30-2337-05	LED(YELLOW)	
D8		B30-2337-05	LED(YELLOW)	
D11		DA2S101	DIODE	
D12		KDR720F-P	SCHOTTKY BARRIER DIODE	
D13		KDR720F-P	SCHOTTKY BARRIER DIODE	
D14		KDR720F-P	SCHOTTKY BARRIER DIODE	
D15		KDR720F-P	SCHOTTKY BARRIER DIODE	
D16		KDR720F-P	SCHOTTKY BARRIER DIODE	
D17		EMZ6.8N	ZENER DIODE	

PARTS LIST

CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
D18		HZC6.8-E	ZENER DIODE	
D19		HZC6.8-E	ZENER DIODE	
D20		NNCD6.8G-A	ZENER DIODE	
D21		NNCD6.8G-A	ZENER DIODE	
D22		KDS123E-P	DIODE	
D23		KDS123E-P	DIODE	
D102		KDR720F-P	SCHOTTKY BARRIER DIODE	
D401		1SS388F	SCHOTTKY BARRIER DIODE	
D402		1SS388F	SCHOTTKY BARRIER DIODE	
D403		1SS388F	SCHOTTKY BARRIER DIODE	
D404		1SS388F	SCHOTTKY BARRIER DIODE	
D405		1SS388F	SCHOTTKY BARRIER DIODE	
D406		HRB0502A	DIODE	
D407		DA2S101	DIODE	
D408		KDS121-P	DIODE	
D409		DA2S101	DIODE	
D410		DA2S101	DIODE	
D412		KDS121-P	DIODE	
D414		KDR720F-P	SCHOTTKY BARRIER DIODE	
D415		KDR720F-P	SCHOTTKY BARRIER DIODE	
D416		1SS388F	SCHOTTKY BARRIER DIODE	
D417		1SS388F	SCHOTTKY BARRIER DIODE	
D701		KDS121-P	DIODE	
D702		DA2S101	DIODE	
D703		KDR731	DIODE	
D704		KDR731	DIODE	
D705		KDR731	DIODE	
D706		KDR731	DIODE	
D707		KDS123E-P	DIODE	
F701		F53-0360-05	FUSE	
IC1		NJM2130F3-ZB	BI-POLAR IC	
IC101		**Note 1**	ROM IC	
IC102		**Note 1**	MPU IC	
IC103		**Note 1**	SRAM IC	
IC104		TC7SH08FU-F	MOS-IC	
IC105		XC6109C29AN-G	MOS-IC	
IC106		RV5C386A	MOS-IC	
IC107		SM5023CNDH-G	MOS-IC	
IC108		**Note 1**	MOS-IC	
IC109		TC7SH08FU-F	MOS-IC	
IC401		TC74LCX245FK	MOS-IC	
IC402		TC7WZ245FK-F	MOS-IC	
IC403		LM2682MMX	MOS-IC	
IC404		XC6204B332D-G	MOS-IC	
IC406		XC6204B332M-G	MOS-IC	
IC407		LT1616ES6-PBF	ANALOGUE IC	
IC408		TC75S51FE(F)	MOS-IC	
IC409		TC7W66FK-F	MOS-IC	
IC411		NJM2880U105ZB	ANALOGUE IC	
IC412		TPA6201A1DRBR	ANALOGUE IC	
IC413		TPA6201A1DRBR	ANALOGUE IC	
IC414		XC61CC5602N-G	MOS-IC	
IC415		TC7SET08FU-F	MOS-IC	
IC416		S-812C31BPI-G	ANALOGUE IC	
IC417		TC7WH126FK	MOS-IC	
IC418		TC7WT125FUF	MOS-IC	
IC701		PCA9535BS	MOS-IC	
IC702		TC75W51FK(F)	MOS-IC	
IC703		M62364FP-F	MOS-IC	
IC704		TC75S51FE(F)	MOS-IC	

Ref. No.	Address	Parts No.	Description	Destination
IC705		TC75W51FK(F)	MOS-IC	
IC706		TC75S51FE(F)	MOS-IC	
IC707		TC7W53FKF	MOS-IC	
IC708		XC6209B502P-G	MOS-IC	
IC709		TC7W53FKF	MOS-IC	
IC710		TC75W51FK(F)	MOS-IC	
IC711		TC75W51FK(F)	MOS-IC	
IC712		TC7S66FUF	MOS-IC	
IC713		TC75W51FK(F)	MOS-IC	
IC714		TC7W53FKF	MOS-IC	
IC715		TC75S51FE(F)	MOS-IC	
IC716		TC75W51FK(F)	MOS-IC	
IC717		XC9235A15CM-G	MOS-IC	
L1		L92-0408-05	CHIP FERRITE	
L2		L92-0408-05	CHIP FERRITE	
L3		LB73G0BA-004	CHIP FERRITE	
L4		L92-0408-05	CHIP FERRITE	
L5		L92-0408-05	CHIP FERRITE	
L6		L92-0408-05	CHIP FERRITE	
L7		L92-0408-05	CHIP FERRITE	
L8		LB73G0BA-004	CHIP FERRITE	
L101		L92-0408-05	CHIP FERRITE	
L102		L92-0408-05	CHIP FERRITE	
L401		L33-1496-05	SMALL FIXED INDUCTOR(22UH)	
L402		LB73G0AK-001	CHIP FERRITE	
L403		L92-0466-05	CHIP FERRITE	
L409		LB73G0AK-001	CHIP FERRITE	
L410		LB73G0AK-001	CHIP FERRITE	
L411		LB73G0AK-001	CHIP FERRITE	
L701		LB73G0BA-004	CHIP FERRITE	
L702		LB73H0AV-002	BEADS CORE	
L704		LB73H0AV-002	BEADS CORE	
L705		LB73H0AV-002	BEADS CORE	
L706		LB73H0AV-002	BEADS CORE	
L707		LB73H0AV-002	BEADS CORE	
L708		LB73H0AV-002	BEADS CORE	
L709		LB73H0AV-002	BEADS CORE	
L710		LB73G0BJ-002	CHIP FERRITE	
L711		LB73G0BJ-002	CHIP FERRITE	
L712		LB73G0BJ-002	CHIP FERRITE	
L713		LB73H0AV-003	BEADS CORE	
L714		LB73G0BJ-002	CHIP FERRITE	
L715		LB73G0BJ-002	CHIP FERRITE	
L716		LB73G0BJ-002	CHIP FERRITE	
L717		LB73G0BJ-002	CHIP FERRITE	
L718		L92-0408-05	CHIP FERRITE	
L719		L33-1494-05	SMALL FIXED INDUCTOR(4.7UH)	
Q1		2SA1362-F(GR)	TRANSISTOR	
Q2		KTC4075E(Y,GR)	TRANSISTOR	
Q3		SSM3K15TE(F)	FET	
Q4		SSM3K15TE(F)	FET	
Q5		2SJ347F	FET	
Q401		SSM6N16FE-F	FET	
Q402		SSM6N16FE-F	FET	
Q403		2SJ648-A	FET	
Q404		SSM3K15TE(F)	FET	
Q405		SSM6N16FE-F	FET	
Q406		2SB798AZ(DLDK	TRANSISTOR	
Q407		KRC660U-P	DIGITAL TRANSISTOR	
Q408		EMD12	TRANSISTOR	

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

PARTS LIST

CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
Q409		2SA1955A-F	TRANSISTOR	
Q410		SSM3K15TE(F)	FET	
Q411		SSM6N16FE-F	FET	
Q412		SSM3K15TE(F)	FET	
Q413		2SA1955A-F	TRANSISTOR	
Q414		EMD12	TRANSISTOR	
Q415		EMD12	TRANSISTOR	
Q702		SSM3K15TE(F)	FET	
Q703		SSM3K15TE(F)	FET	
Q704		KTC4075E(Y,GR)	TRANSISTOR	
Q705		2SC4738(GR)F	TRANSISTOR	
Q706		2SA1832(GR)F	TRANSISTOR	
Q707		2SJ243-A	FET	
R1		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R2		RK73HB1J104J	CHIP R 100K J 1/16W	
R3		RK73HB1J123J	CHIP R 12K J 1/16W	
R4		RK73HB1J103J	CHIP R 10K J 1/16W	
R5		RK73HB1J103J	CHIP R 10K J 1/16W	
R6		RK73HB1J103J	CHIP R 10K J 1/16W	
R7		RK73HB1J103J	CHIP R 10K J 1/16W	
R8		RK73HB1J103J	CHIP R 10K J 1/16W	
R9		RK73HB1J103J	CHIP R 10K J 1/16W	
R10		RK73HB1J103J	CHIP R 10K J 1/16W	
R11		RK73HB1J104J	CHIP R 100K J 1/16W	
R12		RK73HB1J103J	CHIP R 10K J 1/16W	
R14		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R15		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R16		RK73HB1J331J	CHIP R 330 J 1/16W	
R17		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R18		RK73HB1J822J	CHIP R 8.2K J 1/16W	
R19		RK73HB1J471J	CHIP R 470 J 1/16W	
R20		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R21		RK73HB1J122J	CHIP R 1.2K J 1/16W	
R22		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R23		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R24		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R25		RK73HB1J122J	CHIP R 1.2K J 1/16W	
R26		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R27		RK73HB1J104J	CHIP R 100K J 1/16W	
R28		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R29		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R30		RK73HB1J101J	CHIP R 100 J 1/16W	
R31		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R32		RK73HB1J101J	CHIP R 100 J 1/16W	
R33		RK73HB1J101J	CHIP R 100 J 1/16W	
R34		RK73HB1J101J	CHIP R 100 J 1/16W	
R35		RK73HB1J101J	CHIP R 100 J 1/16W	
R40		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R101		RK73HB1J474J	CHIP R 470K J 1/16W	
R102		RK73HB1J474J	CHIP R 470K J 1/16W	
R103		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R105		RK73HB1J104J	CHIP R 100K J 1/16W	
R107		RK73HB1J104J	CHIP R 100K J 1/16W	
R110		RK73HB1J104J	CHIP R 100K J 1/16W	
R111		RK73HB1J104J	CHIP R 100K J 1/16W	
R113		RK73HB1J104J	CHIP R 100K J 1/16W	
R115		RK73HB1J104J	CHIP R 100K J 1/16W	
R116		RK73HB1J473J	CHIP R 47K J 1/16W	
R118		RK73HB1J473J	CHIP R 47K J 1/16W	
R119		RK73HB1J104J	CHIP R 100K J 1/16W	

Ref. No.	Address	Parts No.	Description	Destination
R120		RK73HB1J474J	CHIP R 470K J 1/16W	
R121		RK73HB1J104J	CHIP R 100K J 1/16W	
R122		RK73HB1J104J	CHIP R 100K J 1/16W	
R123		RK73HB1J104J	CHIP R 100K J 1/16W	
R126		RK73HB1J101J	CHIP R 100 J 1/16W	
R127		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R128		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R129		RK73HB1J101J	CHIP R 100 J 1/16W	
R130		RK73HB1J101J	CHIP R 100 J 1/16W	
R131		RK73HB1J101J	CHIP R 100 J 1/16W	
R132		RK73HB1J104J	CHIP R 100K J 1/16W	
R133		RK73HB1J104J	CHIP R 100K J 1/16W	
R135		RK73HB1J104J	CHIP R 100K J 1/16W	
R136		RK73HB1J104J	CHIP R 100K J 1/16W	
R137		RK73HB1J104J	CHIP R 100K J 1/16W	
R138		RK73HB1J473J	CHIP R 47K J 1/16W	
R139		RK73HB1J104J	CHIP R 100K J 1/16W	
R140		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R141		RK73HB1J104J	CHIP R 100K J 1/16W	
R142		RK73HB1J104J	CHIP R 100K J 1/16W	
R143		RK73HB1J104J	CHIP R 100K J 1/16W	
R144		RK73HB1J471J	CHIP R 470 J 1/16W	
R145		RK73HB1J104J	CHIP R 100K J 1/16W	
R146		RK73HB1J104J	CHIP R 100K J 1/16W	
R147		RK73HB1J104J	CHIP R 100K J 1/16W	
R148		RK73HB1J151J	CHIP R 150 J 1/16W	
R149		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R150		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R153		RK73HB1J104J	CHIP R 100K J 1/16W	
R154		RK73HB1J104J	CHIP R 100K J 1/16W	
R155		RK73HB1J473J	CHIP R 47K J 1/16W	
R156		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R157		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R158		RK73HB1J220J	CHIP R 22 J 1/16W	
R159		RK73HB1J220J	CHIP R 22 J 1/16W	
R160		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R161		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R162		RK73HB1J474J	CHIP R 470K J 1/16W	
R163		RK73HH1J104D	CHIP R 100K D 1/16W	
R165		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R166		RK73HB1J104J	CHIP R 100K J 1/16W	
R167		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R168		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R170		RK73HH1J103D	CHIP R 10K D 1/16W	
R171		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R172		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R173		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R174		RK73HB1J104J	CHIP R 100K J 1/16W	
R175		RK73HB1J104J	CHIP R 100K J 1/16W	
R176		RK73HB1J104J	CHIP R 100K J 1/16W	
R177		RK73HB1J104J	CHIP R 100K J 1/16W	
R178		RK73HB1J104J	CHIP R 100K J 1/16W	
R180		RK73HB1J104J	CHIP R 100K J 1/16W	
R181		RK73HB1J104J	CHIP R 100K J 1/16W	
R182		RK73HB1J474J	CHIP R 470K J 1/16W	
R183		RK73HB1J104J	CHIP R 100K J 1/16W	
R184		RK73HB1J473J	CHIP R 47K J 1/16W	
R185		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R186		RK73HB1J473J	CHIP R 47K J 1/16W	
R187		RK73HB1J102J	CHIP R 1.0K J 1/16W	

PARTS LIST

CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
R188		RK73HB1J473J	CHIP R 47K J 1/16W	
R189		RK73HB1J104J	CHIP R 100K J 1/16W	
R190		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R191		RK73HB1J474J	CHIP R 470K J 1/16W	
R192		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R193		RK73HB1J104J	CHIP R 100K J 1/16W	
R194		RK73HB1J104J	CHIP R 100K J 1/16W	
R402		RK73HB1J151J	CHIP R 150 J 1/16W	
R404		RK73HB1J151J	CHIP R 150 J 1/16W	
R406		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R407		RK73HB1J103J	CHIP R 10K J 1/16W	
R408		RK73HB1J103J	CHIP R 10K J 1/16W	
R409		RK73HB1J470J	CHIP R 47 J 1/16W	
R410		RK73HB1J471J	CHIP R 470 J 1/16W	
R411		RK73HB1J471J	CHIP R 470 J 1/16W	
R412		RK73HB1J471J	CHIP R 470 J 1/16W	
R413		RK73HB1J471J	CHIP R 470 J 1/16W	
R414		RK73HB1J471J	CHIP R 470 J 1/16W	
R415		RK73HB1J471J	CHIP R 470 J 1/16W	
R416		RK73HB1J471J	CHIP R 470 J 1/16W	
R417		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R418		RK73HB1J471J	CHIP R 470 J 1/16W	
R419		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R420		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R424		RK73HH1J683D	CHIP R 68K D 1/16W	
R425		RK73HH1J333D	CHIP R 33K D 1/16W	
R426		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R427		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R428		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R429		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R431		RK73HB1J474J	CHIP R 470K J 1/16W	
R432		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R433		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R434		RK73HB1J393J	CHIP R 39K J 1/16W	
R435		RK73HB1J104J	CHIP R 100K J 1/16W	
R436		RK73HB1J104J	CHIP R 100K J 1/16W	
R437		RK73HB1J471J	CHIP R 470 J 1/16W	
R438		RK73HB1J104J	CHIP R 100K J 1/16W	
R439		RK73HB1J104J	CHIP R 100K J 1/16W	
R440		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R441		RK73HB1J153J	CHIP R 15K J 1/16W	
R442		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R443		RK73HB1J474J	CHIP R 470K J 1/16W	
R444		RK73HB1J564J	CHIP R 560K J 1/16W	
R445		RK73HB1J154J	CHIP R 150K J 1/16W	
R446		RK73HB1J274J	CHIP R 270K J 1/16W	
R447		RK73HB1J104J	CHIP R 100K J 1/16W	
R448		RK73HB1J103J	CHIP R 10K J 1/16W	
R449		RK73HB1J474J	CHIP R 470K J 1/16W	
R450		RK73HB1J474J	CHIP R 470K J 1/16W	
R451		RK73HB1J474J	CHIP R 470K J 1/16W	
R452		RK73HB1J474J	CHIP R 470K J 1/16W	
R453		RK73HB1J104J	CHIP R 100K J 1/16W	
R454		RK73HB1J474J	CHIP R 470K J 1/16W	
R455		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R456		RK73HB1J474J	CHIP R 470K J 1/16W	
R457		RK73HB1J104J	CHIP R 100K J 1/16W	
R458		RK73HB1J104J	CHIP R 100K J 1/16W	
R459		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R460		RK73HB1J102J	CHIP R 1.0K J 1/16W	

Ref. No.	Address	Parts No.	Description	Destination
R461		RK73HB1J103J	CHIP R 10K J 1/16W	
R462		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R463		RK73HB1J104J	CHIP R 100K J 1/16W	
R465		RK73HB1J103J	CHIP R 10K J 1/16W	
R466		RK73HB1J104J	CHIP R 100K J 1/16W	
R467		RK73HB1J104J	CHIP R 100K J 1/16W	
R468		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R469		RK73HB1J474J	CHIP R 470K J 1/16W	
R470		RK73HB1J183J	CHIP R 18K J 1/16W	
R471		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R472		RK73HB1J223J	CHIP R 22K J 1/16W	
R473		RK73HB1J332J	CHIP R 3.3K J 1/16W	
R474		RK73HB1J333J	CHIP R 33K J 1/16W	
R475		RK73HB1J333J	CHIP R 33K J 1/16W	
R477		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R478		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R481		RK73HB1J474J	CHIP R 470K J 1/16W	
R483		RK73HB1J473J	CHIP R 47K J 1/16W	
R484		RK73HB1J223J	CHIP R 22K J 1/16W	
R485		RK73HB1J103J	CHIP R 10K J 1/16W	
R487		RK73HH1J223D	CHIP R 22K D 1/16W	
R488		RK73HH1J223D	CHIP R 22K D 1/16W	
R489		RK73HH1J223D	CHIP R 22K D 1/16W	
R490		RK73HH1J223D	CHIP R 22K D 1/16W	
R491		RK73HB1J104J	CHIP R 100K J 1/16W	
R492		RK73HB1J474J	CHIP R 470K J 1/16W	
R493		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R494		RK73HH1J104D	CHIP R 100K D 1/16W	
R495		RK73HH1J104D	CHIP R 100K D 1/16W	
R496		RK73HH1J104D	CHIP R 100K D 1/16W	
R497		RK73HH1J104D	CHIP R 100K D 1/16W	
R500		RK73HB1J473J	CHIP R 47K J 1/16W	
R501		RK73HB1J222J	CHIP R 2.2K J 1/16W	
R502		RK73HB1J103J	CHIP R 10K J 1/16W	
R503		RK73HB1J103J	CHIP R 10K J 1/16W	
R504		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R506		RK73HB1J222J	CHIP R 2.2K J 1/16W	
R507		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R508		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R509		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R510		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R511		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R512		RK73HB1J101J	CHIP R 100 J 1/16W	
R513		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R514		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R515		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R516		RK73HB1J101J	CHIP R 100 J 1/16W	
R517		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R518		RK73HB1J101J	CHIP R 100 J 1/16W	
R519		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R520		RK73HB1J560J	CHIP R 56 J 1/16W	
R521		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R522		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R523		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R524		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R525		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R526		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R527		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R528		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R529		RK73HB1J101J	CHIP R 100 J 1/16W	

PARTS LIST

CONTROL UNIT (X53-4590-14)

Ref. No.	Address	Parts No.	Description	Destination
R530		RK73HB1J101J	CHIP R 100 J 1/16W	
R531		RK73HB1J101J	CHIP R 100 J 1/16W	
R532		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R533		RK73HB1J101J	CHIP R 100 J 1/16W	
R534		RK73HB1J101J	CHIP R 100 J 1/16W	
R535		RK73HB1J101J	CHIP R 100 J 1/16W	
R536		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R537		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R538		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R539		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R540		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R541		RK73HB1J101J	CHIP R 100 J 1/16W	
R543		RK73HB1J101J	CHIP R 100 J 1/16W	
R544		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R545		RK73HB1J101J	CHIP R 100 J 1/16W	
R546		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R547		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R548		RK73HB1J473J	CHIP R 47K J 1/16W	
R549		RK73HB1J473J	CHIP R 47K J 1/16W	
R550		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R701		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R702		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R703		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R704		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R705		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R706		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R707		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R709		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R710		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R711		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R712		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R713		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R714		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R715		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R716		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R717		RK73HB1J104J	CHIP R 100K J 1/16W	
R718		RK73HB1J104J	CHIP R 100K J 1/16W	
R719		RK73HB1J104J	CHIP R 100K J 1/16W	
R720		RK73HB1J104J	CHIP R 100K J 1/16W	
R721		RK73HB1J104J	CHIP R 100K J 1/16W	
R722		RK73HB1J104J	CHIP R 100K J 1/16W	
R723		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R724		RK73HB1J104J	CHIP R 100K J 1/16W	
R725		RK73HB1J100J	CHIP R 10 J 1/16W	
R726		RK73HB1J104J	CHIP R 100K J 1/16W	
R727		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R728		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R729		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R730		RK73HB1J471J	CHIP R 470 J 1/16W	
R731		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R732		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R733		RK73HB1J473J	CHIP R 47K J 1/16W	
R735		RK73HB1J473J	CHIP R 47K J 1/16W	
R736		RK73HB1J823J	CHIP R 82K J 1/16W	
R737		RK73HB1J153J	CHIP R 15K J 1/16W	
R738		RK73HB1J563J	CHIP R 56K J 1/16W	
R739		RK73HB1J823J	CHIP R 82K J 1/16W	
R740		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R741		RK73HB1J474J	CHIP R 470K J 1/16W	
R742		RK73HB1J103J	CHIP R 10K J 1/16W	
R743		RK73HB1J103J	CHIP R 10K J 1/16W	
R744		RK73HB1J223J	CHIP R 22K J 1/16W	
R745		RK73HB1J682J	CHIP R 6.8K J 1/16W	
R746		RK73HB1J563J	CHIP R 56K J 1/16W	
R748		RK73HB1J103J	CHIP R 10K J 1/16W	
R749		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R750		RK73HB1J103J	CHIP R 10K J 1/16W	
R752		RK73HB1J101J	CHIP R 100 J 1/16W	
R753		RK73HB1J683J	CHIP R 68K J 1/16W	
R754		RK73HB1J564J	CHIP R 560K J 1/16W	
R755		RK73HB1J104J	CHIP R 100K J 1/16W	
R756		RK73HB1J101J	CHIP R 100 J 1/16W	
R757		RK73HB1J223J	CHIP R 22K J 1/16W	
R758		RK73HB1J103J	CHIP R 10K J 1/16W	
R759		RK73HB1J101J	CHIP R 100 J 1/16W	
R761		RK73HB1J223J	CHIP R 22K J 1/16W	
R762		RK73HB1J223J	CHIP R 22K J 1/16W	
R763		RK73HB1J223J	CHIP R 22K J 1/16W	
R764		RK73HB1J223J	CHIP R 22K J 1/16W	
R765		RK73HB1J334J	CHIP R 330K J 1/16W	
R766		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R767		RK73HB1J103J	CHIP R 10K J 1/16W	
R768		RK73HB1J224J	CHIP R 220K J 1/16W	
R769		RK73HB1J334J	CHIP R 330K J 1/16W	
R770		RK73HB1J334J	CHIP R 330K J 1/16W	
R771		RK73HB1J153J	CHIP R 15K J 1/16W	
R775		RK73HB1J183J	CHIP R 18K J 1/16W	
R777		RK73HB1J473J	CHIP R 47K J 1/16W	
R778		RK73HB1J333J	CHIP R 33K J 1/16W	
R779		RK73HB1J473J	CHIP R 47K J 1/16W	
R780		RK73HB1J104J	CHIP R 100K J 1/16W	
R782		RK73HB1J104J	CHIP R 100K J 1/16W	
R783		RK73HB1J183J	CHIP R 18K J 1/16W	
R784		RK73HB1J104J	CHIP R 100K J 1/16W	
R785		RK73HB1J682J	CHIP R 6.8K J 1/16W	
R786		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R787		RK73HB1J124J	CHIP R 120K J 1/16W	
R788		RK73HB1J473J	CHIP R 47K J 1/16W	
R789		RK73HB1J154J	CHIP R 150K J 1/16W	
R790		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R791		RK73HB1J474J	CHIP R 470K J 1/16W	
R793		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R794		RK73HB1J104J	CHIP R 100K J 1/16W	
R795		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R796		RK73HB1J333J	CHIP R 33K J 1/16W	
R797		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R798		RK73HB1J104J	CHIP R 100K J 1/16W	
R799		RK73HB1J334J	CHIP R 330K J 1/16W	
R800		RK73HB1J474J	CHIP R 470K J 1/16W	
R801		RK73HB1J473J	CHIP R 47K J 1/16W	
R802		RK73HB1J474J	CHIP R 470K J 1/16W	
R803		RK73HB1J103J	CHIP R 10K J 1/16W	
R804		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R805		RK73HB1J473J	CHIP R 47K J 1/16W	
R806		RK73HB1J473J	CHIP R 47K J 1/16W	
R807		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R808		RK73HB1J471J	CHIP R 470 J 1/16W	
R809		RK73HB1J334J	CHIP R 330K J 1/16W	
R810		RK73HB1J332J	CHIP R 3.3K J 1/16W	
R811		RK73HB1J823J	CHIP R 82K J 1/16W	

PARTS LIST

CONTROL UNIT (X53-4590-14)
TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
R812		RK73HB1J562J	CHIP R 5.6K J 1/16W	
R813		RK73HB1J273J	CHIP R 27K J 1/16W	
R814		RK73HB1J564J	CHIP R 560K J 1/16W	
R815		RK73HB1J104J	CHIP R 100K J 1/16W	
R816		RK73HB1J683J	CHIP R 68K J 1/16W	
R818		RK73HB1J104J	CHIP R 100K J 1/16W	
R819		RK73HB1J103J	CHIP R 10K J 1/16W	
R820		RK73HB1J103J	CHIP R 10K J 1/16W	
R821		RK73HB1J104J	CHIP R 100K J 1/16W	
R822		RK73HB1J103J	CHIP R 10K J 1/16W	
R823		RK73HB1J103J	CHIP R 10K J 1/16W	
R824		RK73HB1J393J	CHIP R 39K J 1/16W	
R825		RK73HB1J104J	CHIP R 100K J 1/16W	
R826		RK73HB1J334J	CHIP R 330K J 1/16W	
R827		RK73HB1J184J	CHIP R 180K J 1/16W	
R828		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R829		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R830		RK73HB1J105J	CHIP R 1.0M J 1/16W	
R831		RK73HB1J474J	CHIP R 470K J 1/16W	
R832		RK73HB1J473J	CHIP R 47K J 1/16W	
R833		RK73HB1J684J	CHIP R 680K J 1/16W	
R834		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R835		RK73HB1J153J	CHIP R 15K J 1/16W	
R836		RK73HB1J473J	CHIP R 47K J 1/16W	
R837		RK73HB1J683J	CHIP R 68K J 1/16W	
R838		RK73HB1J564J	CHIP R 560K J 1/16W	
R839		RK73HB1J333J	CHIP R 33K J 1/16W	
R840		RK73HB1J123J	CHIP R 12K J 1/16W	
R841		RK73HB1J564J	CHIP R 560K J 1/16W	
R842		RK73HB1J104J	CHIP R 100K J 1/16W	
R843		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R844		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R845		RK73HB1J104J	CHIP R 100K J 1/16W	
R846		RK73HB1J471J	CHIP R 470 J 1/16W	
R847		RK73HB1J182J	CHIP R 1.8K J 1/16W	
R850		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R851		RK73HB1J683J	CHIP R 68K J 1/16W	
R852		RK73HB1J683J	CHIP R 68K J 1/16W	
TH1		ERTJ0V104H	THERMISTOR	
TH701		ERTJ0V104H	THERMISTOR	
X101		L77-1802-05	CRYSTAL RESONATOR(32768HZ)	
X102		L77-3015-05	TCXO (18.432M)	

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
C500		CK73HBB1A104K	CHIP C 0.10UF K	
C501		CC73HCH1H101J	CHIP C 100PF J	
C502		CK73HBB1H471K	CHIP C 470PF K	
C503		CK73HBB1A104K	CHIP C 0.10UF K	
C504		CK73HB1C103K	CHIP C 0.010UF K	
C505		CC73HCH1H101J	CHIP C 100PF J	
C506		CC73HCH1H100C	CHIP C 10PF C	
C508		CK73HB1C103K	CHIP C 0.010UF K	
C509		CC73HCH1H100C	CHIP C 10PF C	
C511		CK73FB0J106K	CHIP C 10UF K	
C512		CK73HB1C103K	CHIP C 0.010UF K	
C513		CC73HCH1H101J	CHIP C 100PF J	
C514		CK73HB1C103K	CHIP C 0.010UF K	
C515		CK73HB1C103K	CHIP C 0.010UF K	
C516		CK73HB1C103K	CHIP C 0.010UF K	
C517		CC73HCH1H101J	CHIP C 100PF J	
C518		CC73HCH1H101J	CHIP C 100PF J	
C519		CC73HCH1H101J	CHIP C 100PF J	
C520		CK73GXR1C225K	CHIP C 2.2UF K	
C521		CC73HCH1H101J	CHIP C 100PF J	
C522		CK73HBB1A104K	CHIP C 0.10UF K	
C523		CC73HCH1H101J	CHIP C 100PF J	
C524		CC73HCH1H101J	CHIP C 100PF J	
C525		CC73HCH1H470J	CHIP C 47PF J	
C526		CK73HBB1A104K	CHIP C 0.10UF K	
C527		CC73HCH1H101J	CHIP C 100PF J	
C528		CC73HCH1H101J	CHIP C 100PF J	
C529		CC73HCH1H101J	CHIP C 100PF J	
C533		CK73HBB1H471K	CHIP C 470PF K	
C534		CC73HCH1H101J	CHIP C 100PF J	
C535		CS77MA1VR15M	CHIP TNTL 0.15UF 35WV	
C536		CC73HCH1H470J	CHIP C 47PF J	
C537		CC73HCH1H050B	CHIP C 5.0PF B	
C539		CS77ABE1D100M	CHIP TNTL 10UF 20WV	
C541		C93-1906-05	CERAMIC 0.047UF 35WV	
C542		CC730AD1H104J	CHIP C 0.1UF J	
C543		CC73HCH1H030B	CHIP C 3.0PF B	
C546		CK73HBB1H472K	CHIP C 4700PF K	
C547		CC73HCH1H101J	CHIP C 100PF J	
C548		CC73HCH1H101J	CHIP C 100PF J	
C550		CC73HCH1H050B	CHIP C 5.0PF B	
C553		CC73HCH1H050B	CHIP C 5.0PF B	
C554		CC73HCH1H470J	CHIP C 47PF J	
C555		CK73HXR0J105K	CHIP C 1.0UF K	
C556		CK73HBB1H471K	CHIP C 470PF K	
C557		CC73HCH1H101J	CHIP C 100PF J	
C562		CK73HXR0J105K	CHIP C 1.0UF K	
C565		CC73HCH1H330J	CHIP C 33PF J	
C566		CC73HCH1H680J	CHIP C 68PF J	
C570		CC73HCH1HR75B	CHIP C 0.75PF B	
C571		CC73HCH1H030B	CHIP C 3.0PF B	
C572		CK73FB0J106K	CHIP C 10UF K	
C573		CC73HCH1H040B	CHIP C 4.0PF B	
C574		CC73HCH1H010B	CHIP C 1.0PF B	
C575		CC73HCH1H030B	CHIP C 3.0PF B	
C576		CC73HCH1H050B	CHIP C 5.0PF B	
C577		CK73HBB1H471K	CHIP C 470PF K	
C578		CK73GXR0J475K	CHIP C 4.7UF K	
C579		CC73HCH1H050B	CHIP C 5.0PF B	
C580		CK73HBB1H471K	CHIP C 470PF K	
C581		CC73HCH1H0R5B	CHIP C 0.5PF B	
C582		CK73HBB1H471K	CHIP C 470PF K	
C583		CC73HCH1H0R5B	CHIP C 0.5PF B	
C584		CK73HBB1H471K	CHIP C 470PF K	
C585		CK73HBB1H471K	CHIP C 470PF K	
C586		CC73HCH1H070B	CHIP C 7.0PF B	
C587		CK73HBB1H471K	CHIP C 470PF K	
C588		CC73HCH1H100B	CHIP C 10PF B	
C600		CK73HBB1A104K	CHIP C 0.10UF K	
C601		CC73HCH1H101J	CHIP C 100PF J	
C602		CK73HBB1A104K	CHIP C 0.10UF K	
C603		CC73HCH1H100B	CHIP C 10PF B	
C604		CK73HBB1H471K	CHIP C 470PF K	
C605		CK73HBB1H471K	CHIP C 470PF K	
C607		CC73HCH1H070B	CHIP C 7.0PF B	

PARTS LIST

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
C610		CK73HBB1H471K	CHIP C 470PF K	
C611		CK73HBB1H471K	CHIP C 470PF K	
C612		CK73HBB1H471K	CHIP C 470PF K	
C613		CC73HCH1H070B	CHIP C 7.0PF B	
C614		CK73HBB1H471K	CHIP C 470PF K	
C615		CK73HBB1H471K	CHIP C 470PF K	
C617		CK73HBB1H471K	CHIP C 470PF K	
C618		CK73HBB1H471K	CHIP C 470PF K	
C619		CK73HBB1A104K	CHIP C 0.10UF K	
C621		CC73HCH1H150J	CHIP C 15PF J	
C622		CK73HBB1H471K	CHIP C 470PF K	
C623		CC73HCH1H150J	CHIP C 15PF J	
C625		CK73HBB1H471K	CHIP C 470PF K	
C626		CK73HBB1A104K	CHIP C 0.10UF K	
C627		CC73HCH1H080B	CHIP C 8.0PF B	
C628		CC73HCH1H100C	CHIP C 10PF C	
C629		CK73HBB1H471K	CHIP C 470PF K	
C630		CK73GB1E105K	CHIP C 1.0UF K	
C631		CS77MA1A6R8M	CHIP TNTL 6.8UF 10WV	
C632		CK73HBB1H471K	CHIP C 470PF K	
C634		CK73HBB1H471K	CHIP C 470PF K	
C635		CK73HBB1H471K	CHIP C 470PF K	
C636		CK73HBB1H471K	CHIP C 470PF K	
C637		CK73HBB1H471K	CHIP C 470PF K	
C639		CC73HCH1H390J	CHIP C 39PF J	
C640		CC73HCH1H470J	CHIP C 47PF J	
C641		CC73HCH1H100C	CHIP C 10PF C	
C642		CC73HCH1H151J	CHIP C 150PF J	
C643		CC73HCH1H151J	CHIP C 150PF J	
C645		CK73GBB1C104K	CHIP C 0.10UF K	
C646		CK73GB1E105K	CHIP C 1.0UF K	
C647		C93-0943-05	CHIP C 22PF G	
C648		CK73HB1C103K	CHIP C 0.010UF K	
C649		CK73HB1C103K	CHIP C 0.010UF K	
C651		CK73HBB1H471K	CHIP C 470PF K	
C653		CK73HBB1H471K	CHIP C 470PF K	
C660		CC73GCH1H470J	CHIP C 470PF J	
C661		CK73HBB1H471K	CHIP C 470PF K	
C662		CC73GCH1H010B	CHIP C 1.0PF B	
C663		CC73GCH1H220J	CHIP C 22PF J	
C664		CC73GCH1H040B	CHIP C 4.0PF B	
C665		CC73GCH1H020B	CHIP C 2.0PF B	
C666		CC73GCH1H050B	CHIP C 5.0PF B	
C667		CC73GCH1H020B	CHIP C 2.0PF B	
C668		CC73GCH1H080B	CHIP C 8.0PF B	
C669		CC73GCH1H040B	CHIP C 4.0PF B	
C670		CK73HBB1H471K	CHIP C 470PF K	
C671		CC73HCH1H070B	CHIP C 7.0PF B	
C672		CK73HBB1H471K	CHIP C 470PF K	
C689		CK73HBB1A104K	CHIP C 0.10UF K	
C690		CK73HBB1A104K	CHIP C 0.10UF K	
C691		CK73HBB1A104K	CHIP C 0.10UF K	
C692		C93-0949-05	CHIP C 35PF G	
C693		CK73GBB1C224K	CHIP C 0.22UF K	
C700		CC73HCH1H070B	CHIP C 7.0PF B	
C701		CK73HB1C103K	CHIP C 0.010UF K	
C703		CK73HBB1A104K	CHIP C 0.10UF K	
C704		CC73HCH1H470J	CHIP C 47PF J	
C705		CK73FB1E475K	CHIP C 4.7UF K	
C706		CC73HCH1H100B	CHIP C 10PF B	

Ref. No.	Address	Parts No.	Description	Destination
C707		CC73HCH1H680J	CHIP C 68PF J	
C708		CC73HCH1H101J	CHIP C 100PF J	
C709		CK73HBB1A104K	CHIP C 0.10UF K	
C710		CK73HBB1A104K	CHIP C 0.10UF K	
C711		CK73HBB1A104K	CHIP C 0.10UF K	
C712		CC73HCH1H680J	CHIP C 68PF J	
C713		CK73FB1A106K	CHIP C 10UF K	
C714		CK73GBB1H102K	CHIP C 1000PF K	
C715		CK73HB1C103K	CHIP C 0.010UF K	
C716		CC73HCH1H820J	CHIP C 82PF J	
C717		CK73HB1C103K	CHIP C 0.010UF K	
C718		CK73HBB1A104K	CHIP C 0.10UF K	
C719		CK73FB1A106K	CHIP C 10UF K	
C720		CC73HCH1H100B	CHIP C 10PF B	
C721		CK73HBB1A104K	CHIP C 0.10UF K	
C722		CC73HCH1H470G	CHIP C 47PF G	
C723		CK73HBB1A104K	CHIP C 0.10UF K	
C724		CK73HBB1A104K	CHIP C 0.10UF K	
C725		CK73HB1C103K	CHIP C 0.010UF K	
C727		CK73HBB1A104K	CHIP C 0.10UF K	
C728		CK73HBB1A104K	CHIP C 0.10UF K	
C729		CK73FBB1E474K	CHIP C 0.47UF K	
C730		CK73HB1C103K	CHIP C 0.010UF K	
C732		CK73HBB1H471K	CHIP C 470PF K	
C733		CK73HB1C103K	CHIP C 0.010UF K	
C734		CK73HB1C103K	CHIP C 0.010UF K	
C735		CC73HCH1H470G	CHIP C 47PF G	
C736		CK73HB1C103K	CHIP C 0.010UF K	
C737		CC73HCH1H020B	CHIP C 2.0PF B	
C738		CC73HCH1H220G	CHIP C 22PF G	
C739		CC73HCH1H060B	CHIP C 6.0PF B	
C740		CK73HB1C103K	CHIP C 0.010UF K	
C741		CK73HB1C103K	CHIP C 0.010UF K	
C742		CK73FB1A475K	CHIP C 4.7UF K	
C743		CK73HB1C103K	CHIP C 0.010UF K	
C744		CK73HBB1H471K	CHIP C 470PF K	
C745		CK73HBB1H471K	CHIP C 470PF K	
C746		CC73HCH1H090B	CHIP C 9.0PF B	
C747		CC73HCH1H100B	CHIP C 10PF B	
C748		CK73HBB1H471K	CHIP C 470PF K	
C749		CC73HCH1H020B	CHIP C 2.0PF B	
C750		CK73HB1C103K	CHIP C 0.010UF K	
C751		CC73HCH1H100B	CHIP C 10PF B	
C752		CK73HBB1H471K	CHIP C 470PF K	
C753		CC73HCH1H020B	CHIP C 2.0PF B	
C754		CC73HCH1H030B	CHIP C 3.0PF B	
C755		CC73HCH1H040B	CHIP C 4.0PF B	
C756		CC73HCH1H090B	CHIP C 9.0PF B	
C758		CK73HBB1H471K	CHIP C 470PF K	
C759		CK73HBB1A104K	CHIP C 0.10UF K	
C760		CK73HBB1A104K	CHIP C 0.10UF K	
C761		CK73GXR1C225K	CHIP C 2.2UF K	
C764		CC73HCH1H1R5B	CHIP C 1.5PF B	
C765		CK73HBB1H471K	CHIP C 470PF K	
C766		CK73GB1H104K	CHIP C 0.10UF K	
C767		CC73HCH1H090B	CHIP C 9.0PF B	
C768		CC73HCH1H010B	CHIP C 1.0PF B	
C769		CK73HBB1H471K	CHIP C 470PF K	
C770		CC73HCH1H040B	CHIP C 4.0PF B	
C771		CK73HBB1H471K	CHIP C 470PF K	

PARTS LIST

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
C772		CC73HCH1H090B	CHIP C 9.0PFB	
C773		CC73HCH1H010B	CHIP C 1.0PFB	
C774		CC73HCH1H030B	CHIP C 3.0PFB	
C775		CK73HBB1H471K	CHIP C 470PF K	
C776		CC73HCH1H090B	CHIP C 9.0PFB	
C777		CK73HBB1H471K	CHIP C 470PF K	
C778		CK73HBB1H471K	CHIP C 470PF K	
C779		CK73HB1C103K	CHIP C 0.010UF K	
C780		CK73GB1H104K	CHIP C 0.10UF K	
C782		CC73HCH1H0R5B	CHIP C 0.5PFB	
C783		CK73GB1E105K	CHIP C 1.0UF K	
C784		CK73HBB1H471K	CHIP C 470PF K	
C785		CK73HBB1H471K	CHIP C 470PF K	
C786		CK73HBB1H471K	CHIP C 470PF K	
C788		CK73GB1H104K	CHIP C 0.10UF K	
C789		CK73HBB1H471K	CHIP C 470PF K	
C790		CK73HBB1A104K	CHIP C 0.10UF K	
C791		CK73HBB1H471K	CHIP C 470PF K	
C792		CK73HBB1A104K	CHIP C 0.10UF K	
C794		CK73HBB1H471K	CHIP C 470PF K	
C795		CK73HBB1H471K	CHIP C 470PF K	
C796		CC73HCH1H090B	CHIP C 9.0PFB	
C798		CC73HCH1H1R5B	CHIP C 1.5PFB	
C799		CK73HBB1H471K	CHIP C 470PF K	
C800		CC73HCH1H020B	CHIP C 2.0PFB	
C801		CK73HBB1H471K	CHIP C 470PF K	
C802		CC73HCH1H040B	CHIP C 4.0PFB	
C803		CC73HCH1H040B	CHIP C 4.0PFB	
C804		CC73HCH1H090B	CHIP C 9.0PFB	
C807		CC73HCH1H050B	CHIP C 5.0PFB	
C809		CC73GCH1H180J	CHIP C 18PF J	
C810		CC73HCH1H020B	CHIP C 2.0PFB	
C811		CC73HCH1H090B	CHIP C 9.0PFB	
C849		CK73HBB1H471K	CHIP C 470PF K	
C850		CC73HCH1H101J	CHIP C 100PF J	
C900		CK73GBB1H102K	CHIP C 1000PF K	
C901		CK73HBB1H471K	CHIP C 470PF K	
C902		CK73HBB1H471K	CHIP C 470PF K	
C903		CK73GB1H471K	CHIP C 470PF K	
C904		CC73HCH1H470J	CHIP C 47PF J	
C905		CC73HCH1H470J	CHIP C 47PF J	
C906		CC73HCH1H470J	CHIP C 47PF J	
C907		CC73HCH1H470J	CHIP C 47PF J	
C908		CC73HCH1H470J	CHIP C 47PF J	
C910		CC73HCH1H470J	CHIP C 47PF J	
C912		CC73HCH1H470J	CHIP C 47PF J	
C913		CC73HCH1H470J	CHIP C 47PF J	
C914		CC73HCH1H470J	CHIP C 47PF J	
C915		CC73HCH1H470J	CHIP C 47PF J	
C916		CC73HCH1H470J	CHIP C 47PF J	
C917		CC73HCH1H470J	CHIP C 47PF J	
C918		CC73HCH1H470J	CHIP C 47PF J	
C919		CC73HCH1H470J	CHIP C 47PF J	
C920		CC73HCH1H470J	CHIP C 47PF J	
C922		CC73HCH1H470J	CHIP C 47PF J	
C923		CC73HCH1H470J	CHIP C 47PF J	
C925		CC73HCH1H470J	CHIP C 47PF J	
C926		CC73HCH1H470J	CHIP C 47PF J	
C927		CC73HCH1H470J	CHIP C 47PF J	
C928		CC73HCH1H470J	CHIP C 47PF J	

Ref. No.	Address	Parts No.	Description	Destination
C929		CC73HCH1H470J	CHIP C 47PF J	
C930		CC73HCH1H470J	CHIP C 47PF J	
C931		CC73HCH1H470J	CHIP C 47PF J	
C932		CC73HCH1H470J	CHIP C 47PF J	
C933		CC73HCH1H470J	CHIP C 47PF J	
C934		CC73HCH1H470J	CHIP C 47PF J	
C935		CC73HCH1H470J	CHIP C 47PF J	
C936		CC73HCH1H470J	CHIP C 47PF J	
C937		CC73HCH1H470J	CHIP C 47PF J	
C938		CC73HCH1H470J	CHIP C 47PF J	
C939		CC73HCH1H470J	CHIP C 47PF J	
C940		CC73HCH1H470J	CHIP C 47PF J	
C941		CC73HCH1H470J	CHIP C 47PF J	
C942		CC73HCH1H470J	CHIP C 47PF J	
C943		CC73HCH1H470J	CHIP C 47PF J	
C944		CK73HBB1H471K	CHIP C 470PF K	
C945		CC73HCH1H470J	CHIP C 47PF J	
C946		CC73HCH1H470J	CHIP C 47PF J	
C947		CK73HBB1H471K	CHIP C 470PF K	
C948		CK73GB1E105K	CHIP C 1.0UF K	
C949		CK73GB1E105K	CHIP C 1.0UF K	
C950		C92-0765-05	CHIP TNTL 4.7UF 16WV	
C951		CK73GBB1C224K	CHIP C 0.22UF K	
C952		CK73HBB1H102K	CHIP C 1000PF K	
C953		CK73HBB1A104K	CHIP C 0.10UF K	
C954		CK73GBB1C224K	CHIP C 0.22UF K	
C955		CK73HBB1H102K	CHIP C 1000PF K	
C956		CK73HBB1H102K	CHIP C 1000PF K	
C957		CK73GB1E105K	CHIP C 1.0UF K	
C958		CK73GB1E105K	CHIP C 1.0UF K	
C961		CK73HBB1H471K	CHIP C 470PF K	
C962		CC73HCH1E181J	CHIP C 180PF J	
C963		CK73GB1E105K	CHIP C 1.0UF K	
C964		CK73GBB1C224K	CHIP C 0.22UF K	
C965		CK73GBB1C224K	CHIP C 0.22UF K	
C966		CC73HCH1H220J	CHIP C 22PF J	
C967		CK73HBB1H471K	CHIP C 470PF K	
C968		CK73GBB1C224K	CHIP C 0.22UF K	
C969		CK73GB1E105K	CHIP C 1.0UF K	
C970		CK73HBB1H102K	CHIP C 1000PF K	
C971		CK73HBB1H102K	CHIP C 1000PF K	
C972		CK73GB1E105K	CHIP C 1.0UF K	
C973		CK73GB1E105K	CHIP C 1.0UF K	
C974		CK73GB1E105K	CHIP C 1.0UF K	
C975		C93-0983-05	CHIP C 6.0PFG	
C976		CC73HCH1H470J	CHIP C 47PF J	
C977		CK73GB1E105K	CHIP C 1.0UF K	
C980		CK73GB1E105K	CHIP C 1.0UF K	
C981		CK73HB1A474K	CHIP C 0.48UF K	
C988		C93-0939-05	CHIP C 15PF G	
C989		C93-0935-05	CHIP C 10PF G	
C992		CC73HCH1H050B	CHIP C 5.0PFB	
CF700		L72-1017-05	CERAMIC FILTER	
CF701		L72-1020-05	CERAMIC FILTER	
CN600		E23-1326-05	TERMINAL	
CN737		E40-6358-05	SOCKET FOR PIN ASSY	
CN900		E40-6422-15	SOCKET FOR PIN ASSY	
CN901		E40-6752-05	FLAT CABLE CONNECTOR	
CN902		E23-1326-05	TERMINAL	
D505		KDS123E-P	DIODE	

PARTS LIST

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
D506		1SV325F	VARIABLE CAPACITANCE DIODE	
D507		1SV325F	VARIABLE CAPACITANCE DIODE	
D510		1SV282-F	VARIABLE CAPACITANCE DIODE	
D511		1SV282-F	VARIABLE CAPACITANCE DIODE	
D514		1SV282-F	VARIABLE CAPACITANCE DIODE	
D515		1SV282-F	VARIABLE CAPACITANCE DIODE	
D516		1SV282-F	VARIABLE CAPACITANCE DIODE	
D517		1SV282-F	VARIABLE CAPACITANCE DIODE	
D518		HSC119	DIODE	
D519		1SV278F	VARIABLE CAPACITANCE DIODE	
D600		HSC277	DIODE	
D601		HSC277	DIODE	
D604		HZU2ALL	ZENER DIODE	
D605		HZU5CLL	ZENER DIODE	
D606		HVC131	DIODE	
D607		HVC131	DIODE	
D608		HSC119	DIODE	
D611		HSC119	DIODE	
D702		1SV286F	VARI CAP DIODE	
D703		1SV286F	VARI CAP DIODE	
D704		1SV286F	VARI CAP DIODE	
D705		HSC119	DIODE	
D706		1SV286F	VARI CAP DIODE	
D708		1SV286F	VARI CAP DIODE	
D709		HVC131	DIODE	
D710		1SV286F	VARI CAP DIODE	
D711		HVC131	DIODE	
D900		B30-2278-05	LED(RED/YELLOW)	
D901		1SR154-400	DIODE	
D902		HSC119	DIODE	
D903		1PMT5929BT1G	ZENER DIODE	
D904		1PMT5929BT1G	ZENER DIODE	
F900		F53-0324-15	FUSE(2.5A)	
F901		F53-0479-05	FUSE(0.15A)	
IC404		TC75W51FUF	MOS-IC	
IC500		LM73CIMKX-0	MOS-IC	
IC501		TLV2381IDBV	MOS-IC	
IC502		SKY72310362LF	MOS-IC	
IC503		TLV2381IDBV	MOS-IC	
IC504		TC75W51FUF	MOS-IC	
IC600		TA75W01FUF	BIPOLAR IC	
IC700		MCP6021-E/OT	MOS-IC	
IC701		TK10931VTL-G	ANALOGUE IC	
IC702		TLV2381IDBV	MOS-IC	
IC703		TLV2381IDBV	MOS-IC	
IC900		TC75S51FE(F)	MOS-IC	
IC901		XC9101D09AK-G	MOS-IC	
IC902		TK11250CUCB	MOS-IC	
IC903		TK71733S	BI-POLAR IC	
L500		LR77Z0AE4R7J	SMALL FIXED INDUCTOR(4.7UH)	
L503		LB73H0AV-003	BEADS CORE	
L504		LK73G0AF12NJ	SMALL FIXED INDUCTOR(12NH)	
L508		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L509		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L514		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L515		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L516		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L517		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L518		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L519		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	

Ref. No.	Address	Parts No.	Description	Destination
L520		L40-1878-67	CHIP INDUCTOR	
L521		L40-2278-67	CHIP INDUCTOR	
L522		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L523		L92-0446-05	SMALL FIXED INDUCTOR(220NH)	
L524		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L525		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L526		LK73G0AFR22J	SMALL FIXED INDUCTOR(220NH)	
L527		L92-0446-05	SMALL FIXED INDUCTOR(220NH)	
L528		LK73H0AM27NJ	SMALL FIXED INDUCTOR(27NH)	
L530		L40-5675-57	CHIP INDUCTOR	
L598		LB73H0AV-003	BEADS CORE	
L599		LB73H0AV-003	BEADS CORE	
L600		LK73G0AF22NJ	SMALL FIXED INDUCTOR(22NH)	
L602		LK73G0AF18NJ	SMALL FIXED INDUCTOR(18NH)	
L603		LK73G0AF12NJ	SMALL FIXED INDUCTOR(12NH)	
L604		LB73G0BD-005	CHIP FERRITE	
L605		L40-6865-92	CHIP INDUCTOR	
L606		L41-1875-43	CHIP INDUCTOR	
L607		LB73F0AW-002	CHIP FERRITE	
L609		L34-4575-05	AIR CORE COIL	
L610		LB73F0AW-002	CHIP FERRITE	
L611		L41-2285-14	SMALL FIXED INDUCTOR(220NH)	
L612		LR79Z0DD16N9J	AIR-CORE COIL	
L613		LR79Z0DD16N9J	AIR-CORE COIL	
L614		LR79Z0DD16N9J	AIR-CORE COIL	
L615		L40-1575-57	CHIP INDUCTOR	
L701		L40-5681-86	SMALL FIXED INDUCTOR(0.56UH)	
L703		L41-4778-45	SMALL FIXED INDUCTOR(47NH)	
L704		L40-1891-86	SMALL FIXED INDUCTOR(1.8U)	
L705		LB73G0BD-005	CHIP FERRITE	
L706		LB73G0BD-005	CHIP FERRITE	
L707		LR77Z0AER27J	SMALL FIXED INDUCTOR(270NH)	
L708		LR77Z0AER56J	SMALL FIXED INDUCTOR(560NH)	
L709		LK73G0AF18NJ	SMALL FIXED INDUCTOR(18NH)	
L710		LK73G0AF18NJ	SMALL FIXED INDUCTOR(18NH)	
L711		LK73G0AF22NJ	SMALL FIXED INDUCTOR(22NH)	
L713		L41-8268-14	CHIP INDUCTOR	
L714		L41-8268-14	CHIP INDUCTOR	
L715		L41-8268-14	CHIP INDUCTOR	
L716		LB73G0BD-005	CHIP FERRITE	
L717		L41-2285-14	SMALL FIXED INDUCTOR(220NH)	
L720		LK73G0AF10NJ	SMALL FIXED INDUCTOR(10NH)	
L721		L41-8268-14	CHIP INDUCTOR	
L722		L41-8268-14	CHIP INDUCTOR	
L723		LR79Z0DD16N9J	AIR-CORE COIL	
L725		L40-8265-92	CHIP INDUCTOR	
L726		L41-3378-03	CHIP INDUCTOR	
L780		L40-1085-57	SMALL FIXED INDUCTOR(100NH)	
L900		LB73F0AW-002	CHIP FERRITE	
L901		L33-1462-05	SMALL FIXED INDUCTOR	
L903		L41-6869-16	CHIP INDUCTOR	
Q504		2SK879-F(Y)	CHIP INDUCTOR	
Q507		2SC5383-T111	TRANSISTOR	
Q508		2SK508NV(K52)	FET	
Q509		2SK508NV(K52)	FET	
Q510		SSM6L05FU-F	FET	
Q511		2SJ347F	FET	
Q512		2SC5636	TRANSISTOR	
Q600		2SC5636	TRANSISTOR	
Q601		2SC5636	TRANSISTOR	

PARTS LIST

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
Q602		2SK3077F	FET	
Q603		RD01MUS1-T113	FET	
Q604		2SC5383-T111	TRANSISTOR	
Q605		SSM3K15TE(F)	FET	
Q606		RD07MVS1BT122	FET	
Q607		LTC044EEBFS8	DIGITAL TRANSISTOR	
Q608		2SK1824-A	FET	
Q610		EMD5	DIGITAL TRANSISTOR ARRAY	
Q700		2SC5108F/Y/	TRANSISTOR	
Q701		2SC4215-F(Y)	TRANSISTOR	
Q703		3SK318	FET	
Q705		3SK318	FET	
Q706		2SK1830F	FET	
Q900		UMG9N	DIGITAL TRANSISTOR ARRAY	
Q901		SSM6L05FU-F	FET	
Q902		SSM6L05FU-F	FET	
Q903		SSM6L05FU-F	FET	
Q904		SSM5H01TU-F	FET	
Q905		2SA1955A-F	TRANSISTOR	
R430		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R431		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R432		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R500		RN73HH1J104D	CHIP R 100K D 1/16W	
R501		RN73HH1J104D	CHIP R 100K D 1/16W	
R502		RK73HB1J124J	CHIP R 120K J 1/16W	
R503		RK73HB1J100J	CHIP R 10 J 1/16W	
R504		RK73HB1J104J	CHIP R 100K J 1/16W	
R505		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R506		RK73HB1J473J	CHIP R 47K J 1/16W	
R511		RK73HB1J100J	CHIP R 10 J 1/16W	
R512		RK73HB1J100J	CHIP R 10 J 1/16W	
R513		RK73HB1J100J	CHIP R 10 J 1/16W	
R514		RK73HB1J100J	CHIP R 10 J 1/16W	
R515		RK73HB1J470J	CHIP R 47 J 1/16W	
R519		RK73HB1J100J	CHIP R 10 J 1/16W	
R520		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R522		RK73HB1J100J	CHIP R 10 J 1/16W	
R523		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R527		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R529		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R530		RK73HB1J473J	CHIP R 47K J 1/16W	
R531		RK73HB1J683J	CHIP R 68K J 1/16W	
R532		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R533		RK73HH1J184D	CHIP R 180K D 1/16W	
R534		RK73HH1J473D	CHIP R 47K D 1/16W	
R535		RK73HB1J151J	CHIP R 150 J 1/16W	
R536		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R537		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R538		RK73HH1J391D	CHIP R 390 D 1/16W	
R539		RK73HB1J106J	CHIP R 10M J 1/16W	
R541		RK73HB1J103J	CHIP R 10K J 1/16W	
R546		RK73HB1J104J	CHIP R 100K J 1/16W	
R547		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R548		RK73HB1J104J	CHIP R 100K J 1/16W	
R550		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R552		RK73HB1J124J	CHIP R 120K J 1/16W	
R554		RK73HB1J473J	CHIP R 47K J 1/16W	
R555		RK73HB1J473J	CHIP R 47K J 1/16W	
R557		RK73HB1J152J	CHIP R 1.5K J 1/16W	
R558		RK73HB1J474J	CHIP R 470K J 1/16W	

Ref. No.	Address	Parts No.	Description	Destination
R559		RK73HH1J181D	CHIP R 180 D 1/16W	
R560		RK73HB1J220J	CHIP R 22 J 1/16W	
R561		RK73HH1J181D	CHIP R 180 D 1/16W	
R562		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R563		RK73HB1J473J	CHIP R 47K J 1/16W	
R564		RK73HB1J154J	CHIP R 150K J 1/16W	
R565		RK73HB1J101J	CHIP R 100 J 1/16W	
R566		RK73HH1J474D	CHIP R 470K D 1/16W	
R567		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R570		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R571		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R572		RK73HB1J100J	CHIP R 10 J 1/16W	
R574		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R575		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R576		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R577		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R580		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R581		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R586		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R589		RK73HB1J103J	CHIP R 10K J 1/16W	
R590		RK73HB1J103J	CHIP R 10K J 1/16W	
R591		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R599		RK73HB1J104J	CHIP R 100K J 1/16W	
R600		RK73HB1J103J	CHIP R 10K J 1/16W	
R601		RK73HB1J183J	CHIP R 18K J 1/16W	
R602		RK73HB1J124J	CHIP R 120K J 1/16W	
R603		RK73HB1J222J	CHIP R 2.2K J 1/16W	
R604		RK73HB1J682J	CHIP R 6.8K J 1/16W	
R605		RK73HB1J103J	CHIP R 10K J 1/16W	
R606		RK73HB1J331J	CHIP R 330 J 1/16W	
R607		RK73HB1J222J	CHIP R 2.2K J 1/16W	
R608		RK73HB1J470J	CHIP R 47 J 1/16W	
R610		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R612		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R613		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R616		RK73HB1J181J	CHIP R 180 J 1/16W	
R617		RK73HB1J331J	CHIP R 330 J 1/16W	
R618		RK73HB1J220J	CHIP R 22 J 1/16W	
R620		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R622		RK73HB1J101J	CHIP R 100 J 1/16W	
R623		RK73HB1J103J	CHIP R 10K J 1/16W	
R624		RK73HB1J473J	CHIP R 47K J 1/16W	
R626		RK73HB1J331J	CHIP R 330 J 1/16W	
R627		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R628		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R629		RK73HB1J273J	CHIP R 27K J 1/16W	
R630		RK73HB1J103J	CHIP R 10K J 1/16W	
R631		RK73HB1J470J	CHIP R 47 J 1/16W	
R632		RK73HB1J562J	CHIP R 5.6K J 1/16W	
R633		RK73HB1J101J	CHIP R 100 J 1/16W	
R634		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R635		RK73HB1J561J	CHIP R 560 J 1/16W	
R636		RK73HB1J221J	CHIP R 220 J 1/16W	
R639		RK73HB1J103J	CHIP R 10K J 1/16W	
R641		RK73HB1J103J	CHIP R 10K J 1/16W	
R642		RK73EB2ER39J	CHIP R 0.39J 1/4W	
R644		RK73HB1J270J	CHIP R 27 J 1/16W	
R645		RK73EB2ER39J	CHIP R 0.39J 1/4W	
R646		RK73HB1J333J	CHIP R 33K J 1/16W	
R647		RK73EB2ER39J	CHIP R 0.39J 1/4W	

PARTS LIST

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Destination
R648		RK73HH1J154D	CHIP R 150K D 1/16W	
R649		RK73HH1J154D	CHIP R 150K D 1/16W	
R650		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R651		RK73HH1J274D	CHIP R 270K D 1/16W	
R652		RK73HH1J274D	CHIP R 270K D 1/16W	
R653		RK73HH1J274D	CHIP R 270K D 1/16W	
R654		RK73HH1J274D	CHIP R 270K D 1/16W	
R655		RK73HB1J103J	CHIP R 10K J 1/16W	
R656		RK73HB1J563J	CHIP R 56K J 1/16W	
R657		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R658		RK73HB1J182J	CHIP R 1.8K J 1/16W	
R659		RK73HB1J474J	CHIP R 470K J 1/16W	
R660		RK73HB1J473J	CHIP R 47K J 1/16W	
R661		RK73HB1J104J	CHIP R 100K J 1/16W	
R664		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R665		RK73HB1J271J	CHIP R 270 J 1/16W	
R666		RK73HB1J271J	CHIP R 270 J 1/16W	
R667		RK73EB2E823J	CHIP R 82K J 1/4W	
R669		RK73HB1J471J	CHIP R 470 J 1/16W	
R670		RK73HB1J224J	CHIP R 220K J 1/16W	
R671		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R701		RK73HB1J561J	CHIP R 560 J 1/16W	
R702		RK73HB1J334J	CHIP R 330K J 1/16W	
R703		RK73HB1J100J	CHIP R 10 J 1/16W	
R704		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R705		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R709		RK73HB1J103J	CHIP R 10K J 1/16W	
R710		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R712		RK73HB1J103J	CHIP R 10K J 1/16W	
R714		RK73HB1J100J	CHIP R 10 J 1/16W	
R717		RK73HB1J473J	CHIP R 47K J 1/16W	
R718		RK73HB1J183J	CHIP R 18K J 1/16W	
R719		RK73HB1J274J	CHIP R 270K J 1/16W	
R720		RK73HB1J222J	CHIP R 2.2K J 1/16W	
R721		RK73HB1J103J	CHIP R 10K J 1/16W	
R722		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R724		RK73HB1J104J	CHIP R 100K J 1/16W	
R725		RK73HB1J223J	CHIP R 22K J 1/16W	
R726		RK73HB1J183J	CHIP R 18K J 1/16W	
R727		RK73HB1J222J	CHIP R 2.2K J 1/16W	
R728		RK73HB1J221J	CHIP R 220 J 1/16W	
R730		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R731		RK73HB1J103J	CHIP R 10K J 1/16W	
R733		RK73HB1J564J	CHIP R 560K J 1/16W	
R735		RK73HB1J101J	CHIP R 100 J 1/16W	
R736		RK73HB1J104J	CHIP R 100K J 1/16W	
R737		RK73HB1J221J	CHIP R 220 J 1/16W	
R738		RK73HB1J272J	CHIP R 2.7K J 1/16W	
R739		RK73HB1J221J	CHIP R 220 J 1/16W	
R740		RK73HB1J470J	CHIP R 47 J 1/16W	
R742		RK73HB1J472J	CHIP R 4.7K J 1/16W	
R743		RK73HB1J681J	CHIP R 680 J 1/16W	
R744		RK73HB1J221J	CHIP R 220 J 1/16W	
R745		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R746		RK73HB1J104J	CHIP R 100K J 1/16W	
R747		RK73HB1J154J	CHIP R 150K J 1/16W	
R748		RK73HB1J104J	CHIP R 100K J 1/16W	
R749		RK73HB1J184J	CHIP R 180K J 1/16W	
R750		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R752		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R753		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R755		RK73HB1J470J	CHIP R 47 J 1/16W	
R757		RK73HB1J104J	CHIP R 100K J 1/16W	
R758		RK73HB1J103J	CHIP R 10K J 1/16W	
R759		RK73HB1J104J	CHIP R 100K J 1/16W	
R760		RK73HB1J104J	CHIP R 100K J 1/16W	
R761		RK73HB1J101J	CHIP R 100 J 1/16W	
R762		RK73HB1J103J	CHIP R 10K J 1/16W	
R763		RK73HB1J824J	CHIP R 820K J 1/16W	
R764		RK73HB1J104J	CHIP R 100K J 1/16W	
R765		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R768		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R769		RK73HB1J103J	CHIP R 10K J 1/16W	
R770		RK73HB1J680J	CHIP R 68 J 1/16W	
R771		RK73HB1J181J	CHIP R 180 J 1/16W	
R772		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R773		RK73HB1J824J	CHIP R 820K J 1/16W	
R774		RK73HB1J104J	CHIP R 100K J 1/16W	
R775		RK73HB1J104J	CHIP R 100K J 1/16W	
R777		RK73HB1J103J	CHIP R 10K J 1/16W	
R778		RK73HB1J104J	CHIP R 100K J 1/16W	
R779		RK73HB1J683J	CHIP R 68K J 1/16W	
R780		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R781		RK73HB1J182J	CHIP R 1.8K J 1/16W	
R783		RK73HB1J224J	CHIP R 220K J 1/16W	
R784		RK73HB1J474J	CHIP R 470K J 1/16W	
R785		RK73HB1J104J	CHIP R 100K J 1/16W	
R786		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R788		RK73HB1J104J	CHIP R 100K J 1/16W	
R790		RK73HB1J104J	CHIP R 100K J 1/16W	
R791		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R792		RK73HB1J104J	CHIP R 100K J 1/16W	
R794		RK73HB1J103J	CHIP R 10K J 1/16W	
R795		RK73HB1J103J	CHIP R 10K J 1/16W	
R796		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R797		RK73HB1J473J	CHIP R 47K J 1/16W	
R798		RK73HB1J470J	CHIP R 47 J 1/16W	
R799		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R803		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R900		RK73HB1J391J	CHIP R 390 J 1/16W	
R901		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R902		RK73HB1J100J	CHIP R 10 J 1/16W	
R903		RK73HB1J821J	CHIP R 820 J 1/16W	
R904		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R905		RK73HB1J330J	CHIP R 33 J 1/16W	
R906		RK73HB1J474J	CHIP R 470K J 1/16W	
R907		RK73GB2A100J	CHIP R 10 J 1/10W	
R908		RK73HB1J473J	CHIP R 47K J 1/16W	
R909		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R910		RK73HB1J474J	CHIP R 470K J 1/16W	
R911		RK73HB1J474J	CHIP R 470K J 1/16W	
R912		RK73HB1J474J	CHIP R 470K J 1/16W	
R913		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R914		RK73HB1J154J	CHIP R 150K J 1/16W	
R915		RK73HB1J474J	CHIP R 470K J 1/16W	
R916		RK73HB1J474J	CHIP R 470K J 1/16W	
R917		RK73HB1J474J	CHIP R 470K J 1/16W	
R918		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R920		RK73HB1J473J	CHIP R 47K J 1/16W	
R921		RK73HB1J473J	CHIP R 47K J 1/16W	

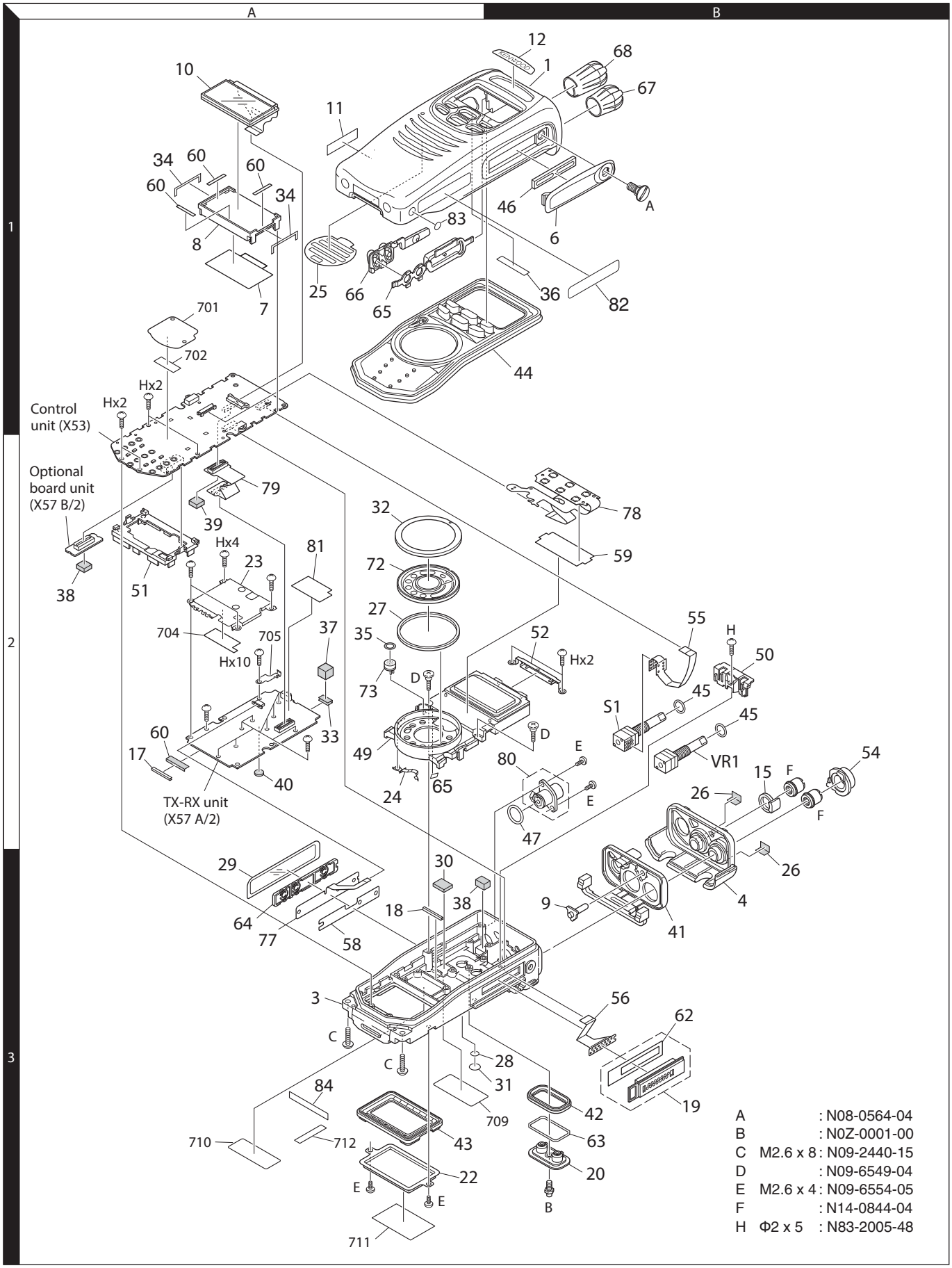
PARTS LIST

TX-RX UNIT (X57-8960-13)

Ref. No.	Address	Parts No.	Description	Desti-nation
R922		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R923		RK73HB1J123J	CHIP R 12K J 1/16W	
R925		RK73HH1J274D	CHIP R 270K D 1/16W	
R926		RK73HH1J223D	CHIP R 22K D 1/16W	
R927		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R928		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R929		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R931		RK73GB2A000J	CHIP R 0.0 J 1/10W	
R933		RK73HB1J102J	CHIP R 1.0K J 1/16W	
R934		RK73HH1J183D	CHIP R 18K D 1/16W	
R936		RK73HB1J474J	CHIP R 470K J 1/16W	
R950		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R952		RK73HB1J000J	CHIP R 0.0 J 1/16W	
R959		RK73HB1J104J	CHIP R 100K J 1/16W	
S1		S70-0483-05	TACT SWITCH	
TH600		ERTJ0V104H	THERMISTOR	
X500		L77-3016-05	TCXO(19.2M)	
XF700		L71-0640-05	MCF(58.05MHZ)	

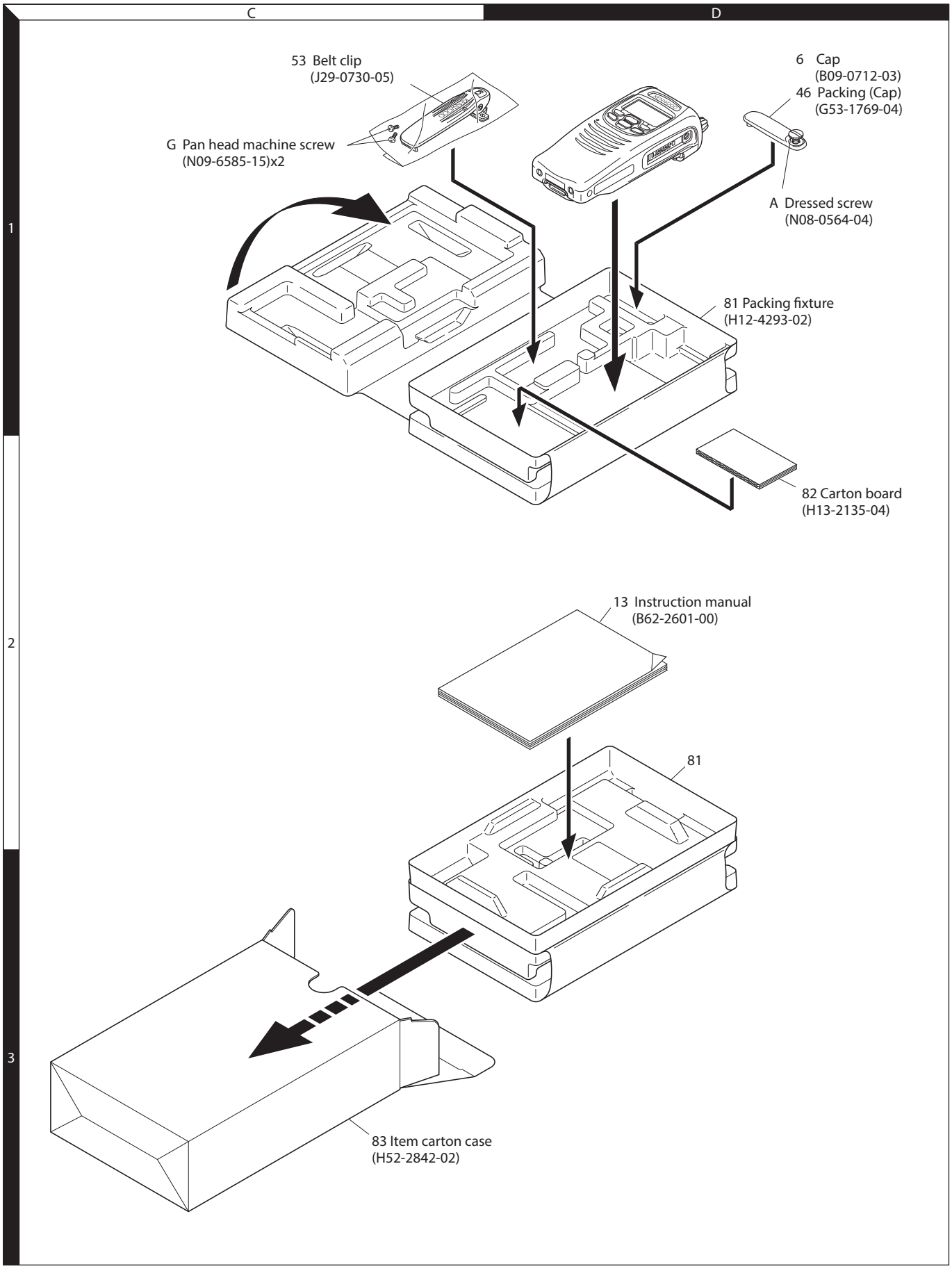
Ref. No.	Address	Parts No.	Description	Desti-nation

EXPLODED VIEW



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 (IC108), DSP (IC102), FLASH (IC101), SRAM (IC103)

When the BGA IC is problematic, please bring the printed circuit board (X53-4590-15 for 6-key) 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 37 and 38.)
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	IC404 (3 pin)	3.3V
15M	IC717 (4 pin)	1.5V
33A	IC406 (5 pin)	3.3V
31BU	IC416 (3 pin)	3.1V

Power supply of each device is connected through the coil.
[ASIC]
33M: L714, 15M: L715, 33A: L716
[DSP]
33M: L712, 15M: L711
[FLASH]
33M: L717
[SRAM]
31BU: L710

When an abnormal value is confirmed. →

Checking for an abnormal point

33M has an abnormal voltage.
[ASIC]
Remove L714 to check the voltage of the 33M.
If the voltage becomes normal, the ASIC is broken.
[DSP]
Remove L712 to check the voltage of the 33M.
If the voltage becomes normal, the DSP is broken.
[FLASH]
Remove L717 to check the voltage of the 33M.
If the voltage becomes normal, the FLASH is broken.

15M has an abnormal voltage.
[ASIC]
Remove L715 to check the voltage of the 15M.
If the voltage becomes normal, the ASIC is broken.
[DSP]
Remove L711 to check the voltage of the 15M.
If the voltage becomes normal, the DSP is broken.

33A has an abnormal voltage.
[ASIC]
Remove L716 to check the voltage of the 33A.
If the voltage becomes normal, the ASIC is broken.

31BU has an abnormal voltage.
[SRAM]
Remove L710 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 R158	18.432MHz
	ASIC & DSP side R159	18.432MHz
32.768kHz	IC106 (1 pin)	32.768kHz

When an abnormal value is confirmed. →

The BGA parts are not 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	IC105 (4 pin)	3.3V
/BINT	Q401 (6 pin)	3.3V
/PSW	Q402 (3 pin)	3.3V

When an abnormal value is confirmed. →

The BGA parts are not broken.

When a normal value is confirmed. ↓

Checking the control signal output from the ASIC

Points to be checked	Normal voltage
/FRST C110	3.3V

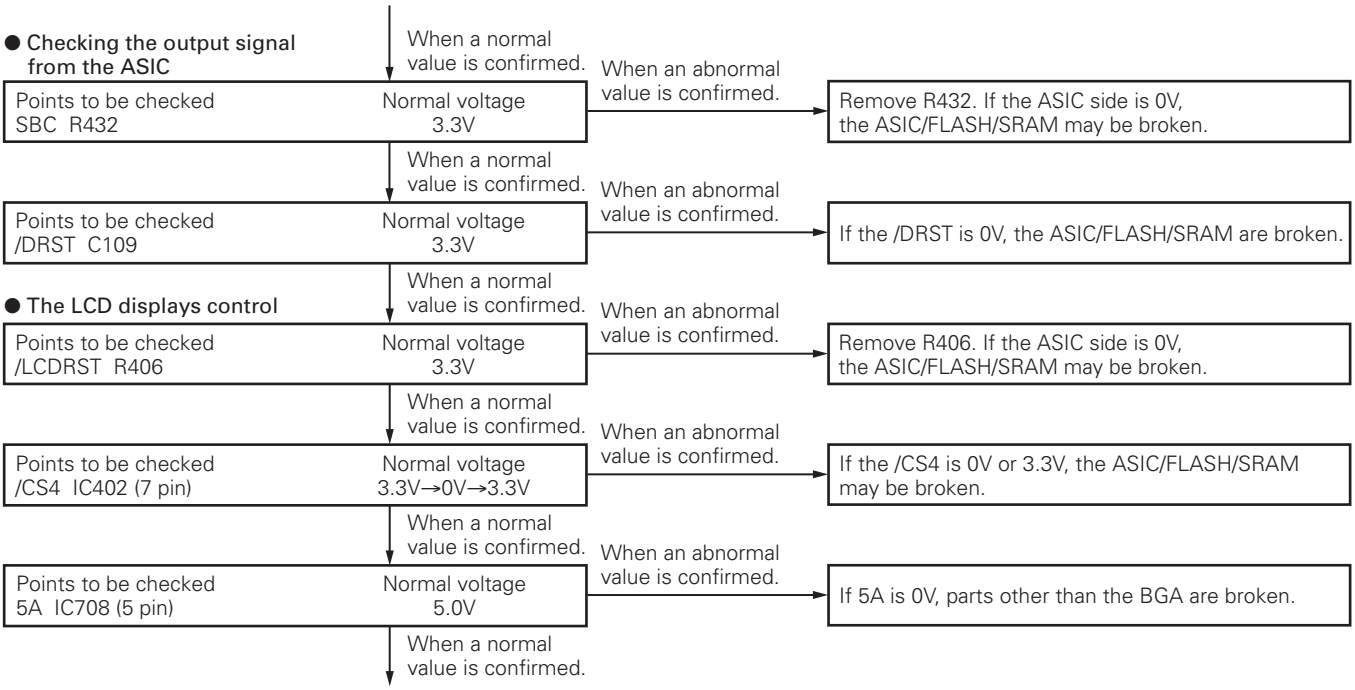
When an abnormal value is confirmed. →

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

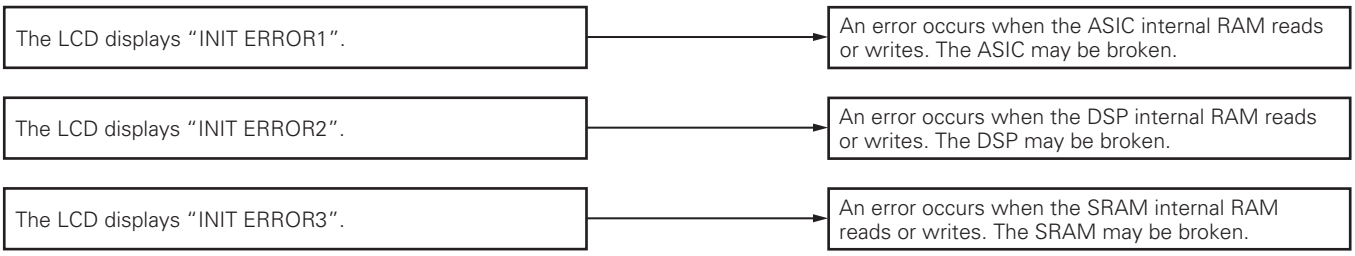
If the /FRST repeats 3.3V and 0V at intervals, The ASIC, FLASH and SRAM may be broken.

When a normal value is confirmed. ↓

TROUBLE SHOOTING



● When an error display appears on the LCD.



■ Descriptions of signal names

1) RST(RESET)	: ASIC reset signal	LOW → Reset
2) /BINT	: Battery final voltage monitoring	LOW → Final voltage
3) /PSW	: Power switch signal	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	

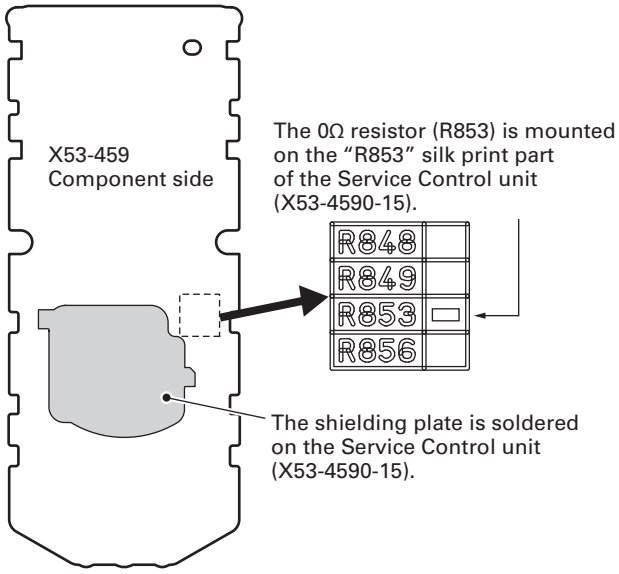
TROUBLE SHOOTING

Replacing Control Unit

■ Control unit Information

Model Name	Original Control unit Number	For Service Control unit Number
NX-303 (K: 6-key)	X53-4590-14	X53-4590-15

■ Method of confirming "Original Control unit" and "Service Control unit"



X53-459	R849	R853	R856
0-14	(None)	(None)	(None)
0-15	(None)	0Ω	(None)

Note:

- The 0Ω resistor (R853) 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 these resistors.
- There is no difference between the schematic diagram of the Service Control unit (X53-4590-15) is connected with GND (ground) only.)

■ Supplied Accessories of "Service Control unit"

Item (Including Parts Number)	Quantity
Control Unit (X53-459)	1
KENWOOD ESN Label	1
NXDN ESN Label	1

■ "Service Control unit" Data

The following data is written on the service unit:

Data Type	Description
Firmware	NX-203/303 Firmware.
FPU Data (PC programming mode)	X53-459 (NX-303) K type data.
Various Adjustment Data (PC Test mode)	General adjustment values for the X53-459 (NX-303).
KENWOOD ESN	Model name: [X53-459] NX-203/303S Type: K The same number as the KENWOOD ESN label is written.
NXDN ESN	The same number as the NXDN ESN label is written.

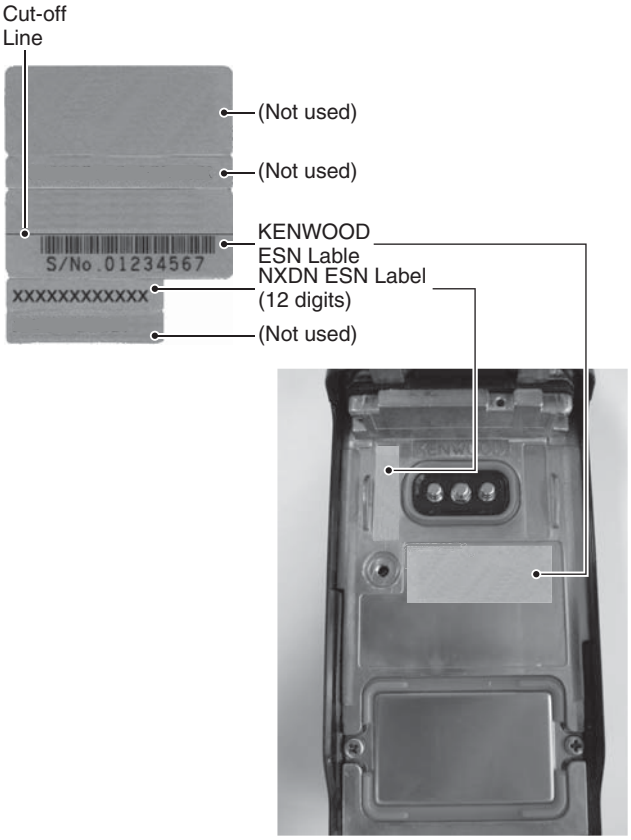
■ After Changing the PCB

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/111DN, select your desired item (Model Name and Frequency) from the Model> Product Information menu, then use Program> Write 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 "ADJUSTMENT".
4. Attach the new labels corresponding to the new printed circuit board. (Refer to the images on page 38 for label placement.)
5. If necessary, write the FPU data used by the customer with the KPG-111D/111DN.

TROUBLE SHOOTING

Note:

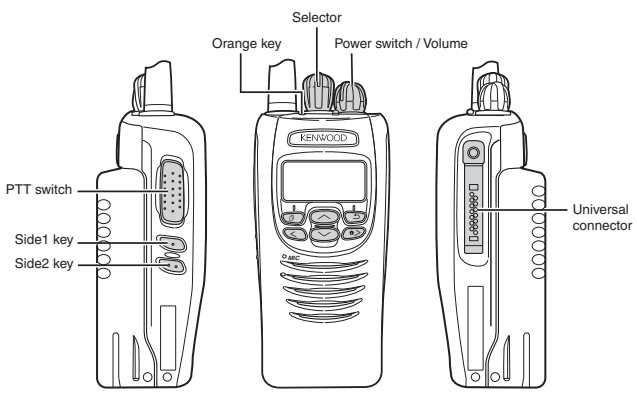
- When using the ESN Validation function of NXDN Trunking, the NXDN ESN number changes when the circuit board is changed (the number is written on the circuit board); the NXDN Trunking System cannot be accessed. Use the KPG-110SM on the NXDN Trunking System side to reprogram the NXDN ESN number.
- When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



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/Narrow/Very narrow	Wide: "w" 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	-

Key	"FNC" appears on the sub LCD display	
	Function	Display
[Selector]	-	
[∧]	Function off	-
[∨]	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	-

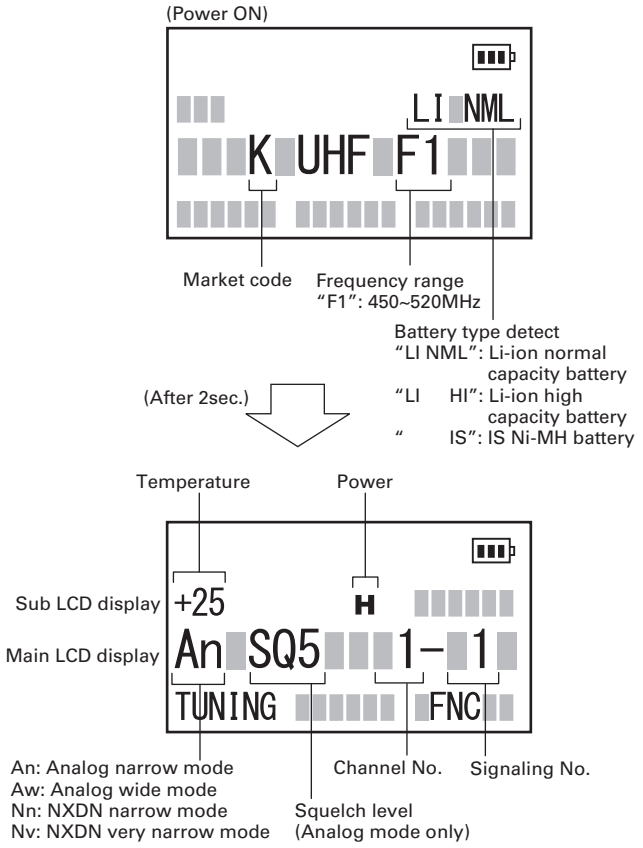
• LED indicator

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	485.05000	485.10000
2	450.05000	450.10000
3	519.95000	519.90000
4	485.00000	485.00000
5	485.20000	485.20000
6	485.40000	485.40000
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
12	2-tone: A: 304.7Hz B: 3106.0Hz	2-tone: A: 304.7Hz B: 3106.0Hz
13	Single Tone: 979.9Hz	Single Tone: 979.9Hz
14	None	Single Tone: 1000Hz
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
9	Tone Pattern (1031Hz)	Tone Pattern (1031Hz)

RAN: Radio Access Number
PN9: Pseudo-Random Pattern (for production only)
No.7,9 item: PC test mode 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).

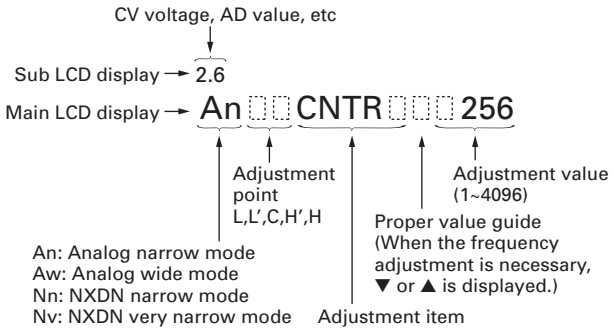
The speaker output connector must be terminated with a 8Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

■ 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 5 reference level adjustments, and use the [Side2] key to switch between Wide/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/Narrow/Very narrow	-
[▣]	Shift to panel test mode	-
[⮌]	To enter 5 reference level adjustments	-
[<]	Writes the adjustment value	-
[☎>]	Go to next adjustment item	Back to last adjustment item
[Orange]	-	
[PTT]	Transmit	

■ 5 reference level adjustments frequency

Tuning point	RX (MHz)	TX (MHz)
Low	450.05000	450.10000
Low'	467.55000	467.60000
Center	485.05000	485.10000
High'	502.55000	502.60000
High	519.95000	519.90000

ADJUSTMENT

■ 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.
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.
Single Tone Deviation	The deviation of Single Tone used in "2-tone" 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.
Sensitivity 1	Notch filter is adjusted. The performance of Receive Spurious Response is improved.
Sensitivity 2	Band-Pass Filter is adjusted. The performance of Receive Sensitivity is improved.
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)	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)	5 point ADJ				Common Section 5
				1~4096				
5	Transmit Assist	TAST	(CV voltage)	5 point ADJ				Common Section 5
				1~4096				
6	High Transmit Power	HIPWR	-	-	5	-	-	Transmitter Section 1
				1~1024				
7	Low Transmit Power	LOPWR	-	-	5	-	-	Transmitter Section 2
				1~1024				
8	Balance	BAL	(Encode frequency)	-	5	-	-	Transmitter Section 3
				1~256				
9	Maximum Deviation (NXDN)	NDEV	-	-	-	5	5	Transmitter Section 4
				1~1024				
10	Maximum Deviation (Analog)	ADEV	-	5	5	-	-	Transmitter Section 5
				1~1024				
11	QT Deviation	QT	-	1	1	-	-	Transmitter Section 6
				1~1024				
12	DQT Deviation	DQT	-	1	1	-	-	Transmitter Section 7
				1~1024				
13	LTR Deviation	LTR	-	1	1	-	-	Transmitter Section 8
				1~1024				
14	DTMF Deviation	DTMF	-	1	1	-	-	Transmitter Section 9
				1~1024				
15	Single Tone Deviation	TONE	-	1	1	-	-	Transmitter Section 10
				1~1024				
16	MSK Deviation	MSK	-	1	1	-	-	Transmitter Section 11
				1~1024				
17	CWID Deviation	CWID	-	-	-	-	1	Transmitter Section 12
				1~1024				
18	VOX1	VOX1	VOX measurement value	1 point ADJ				Transmitter Section 13
				1~256				
19	VOX10	VOX10	VOX measurement value	1 point ADJ				Transmitter Section 14
				1~256				
20	Sensitivity 1	SENS1	(RSSI measurement value)	-	5	-	-	Receive Section 2
				1~256				

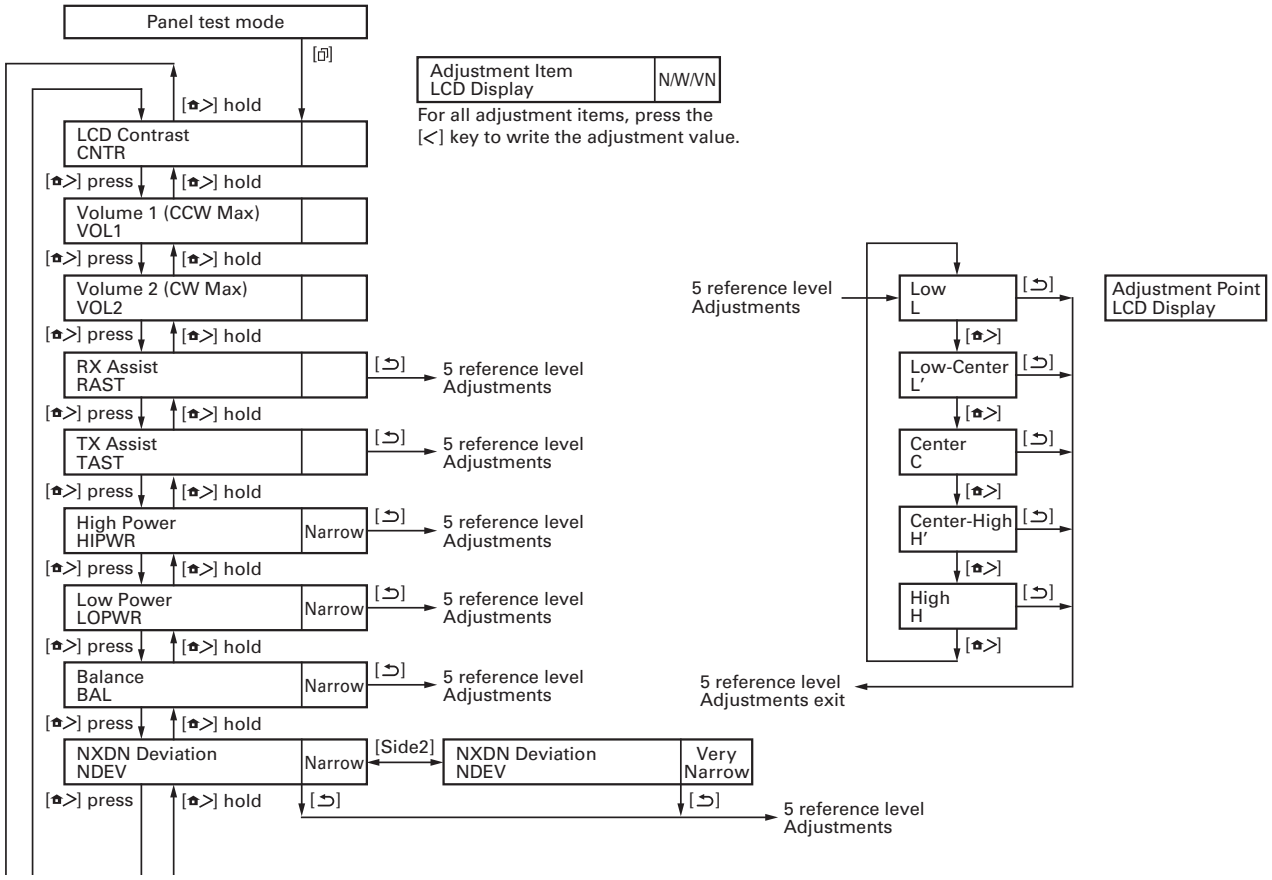
ADJUSTMENT

Order	Adjusutment item	Main LCD display	Sub LCD display	Aw (Analog Wide)	An (Analog Narrow)	Nn (NXDN Narrow)	Nv (NXDN Very Narrow)	Adjust item Number
				Adjustment range				
21	Sensitivity 2	SENS2	(RSSI measurement value)	-	5	-	-	Receive Section 3
				1~256				
22	RSSI Reference	RRSSI	(RSSI measurement value)	5	5	- *1	5	Receive Section 4
				1~256				
23	Open Squelch	SQL	(ASQDET measurement value)	5	5	- *1	5	Receive Section 5
				1~256				
24	Low RSSI	LRSSI	(RSSI measurement value)	5	5	- *1	5	Receive Section 6
				1~256				
25	High RSSI	HRSSI	(RSSI measurement value)	5	5	- *1	5	Receive Section 7
				1~256				
26	Tight Squelch	SQLT	(ASQDET measurement value)	5	5	-	-	Receive Section 8
				1~256				
27	Battery Warning Level	BATT	(BATT measurement value)	1 point ADJ				Transmitter Section 15
				1~256				

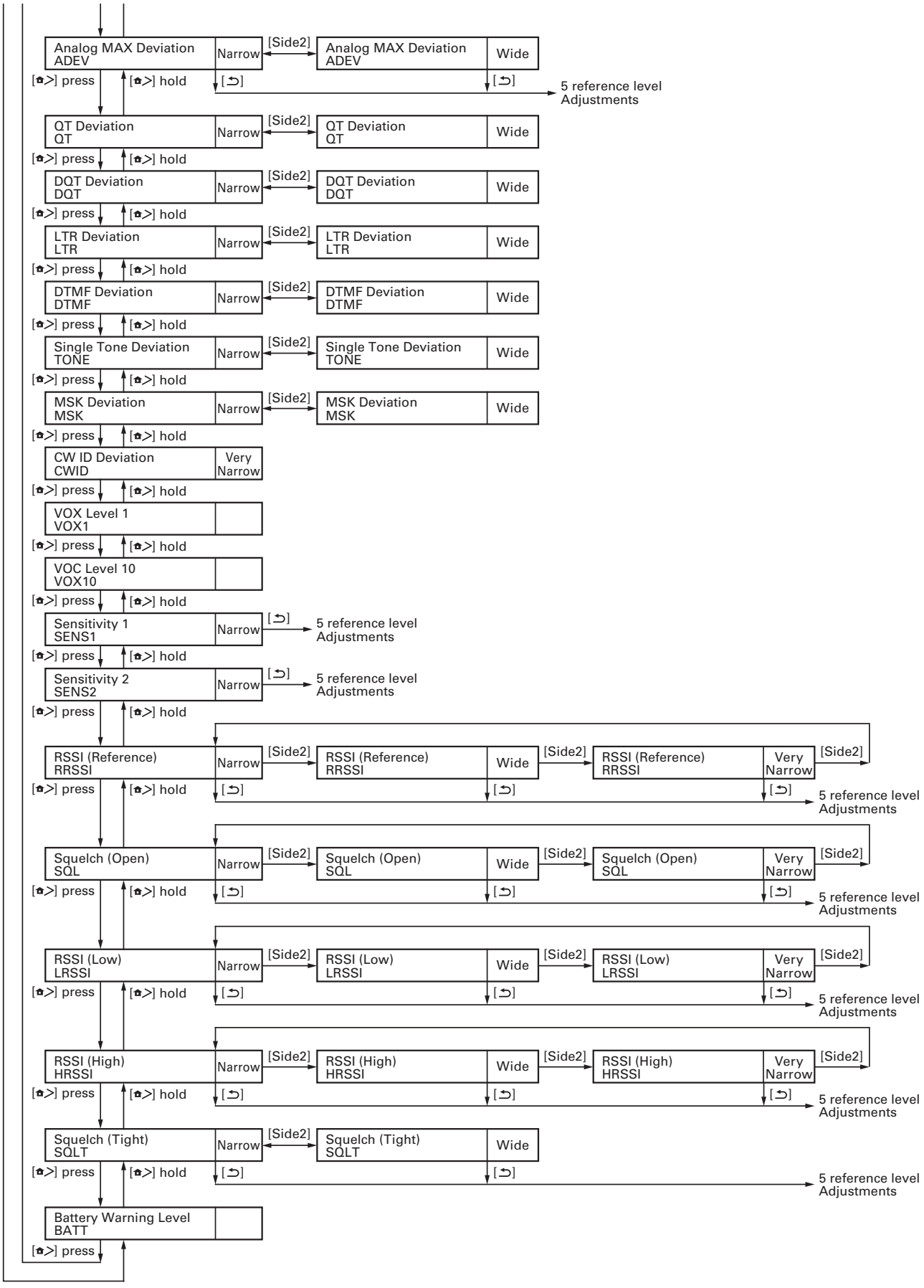
*1: Because NXDN Narrow is adjusted by adjusting Analog Narrow, it is not necessary to adjust NXDN Narrow.

■ Panel tuning mode flow chart

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



ADJUSTMENT


Analog MAX Deviation ADEV
Narrow
[Side2]
Analog MAX Deviation ADEV
Wide
[▲>] press
[▲>] hold
[⮌]
5 reference level Adjustments
QT Deviation QT
DQT Deviation DQT
LTR Deviation LTR
DTMF Deviation DTMF
Single Tone Deviation TONE
MSK Deviation MSK
CW ID Deviation CWID
Very Narrow
VOX Level 1 VOX1
VOC Level 10 VOX10
Sensitivity 1 SENS1
Sensitivity 2 SENS2
RSSI (Reference) RRSSI
RSSI (Low) LRSSI
RSSI (High) HRSSI
Squelch (Open) SQL
Squelch (Tight) SQLT
Battery Warning Level BATT

ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range Modulation Output When performing the Frequency adjustment, the following accuracy is necessary. • 0.001ppm Use a standard oscillator for adjustments, if necessary.	400 to 520MHz Frequency modulation and external modulation –127dBm/0.1µV to greater than –20dBm/22.4mV
2. Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω 400 to 520MHz Vicinity of 10W
3. Deviation Meter	Frequency Range	400 to 520MHz
4. Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7. Ammeter		5A
8. AF Volt Meter (AF VM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. 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.)

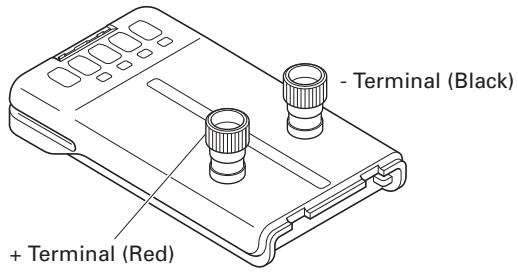
■ Nut wrench

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

KENWOOD part No.: W05-1123-00

■ Battery jig (W05-1370-00)

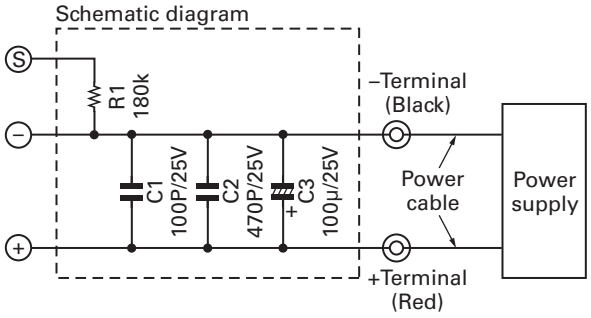
Connect the power cable properly between the battery jig installed in the transceiver and the power supply, and be sure output voltage and the power supply polarity prior to switching the power supply ON, otherwise over voltage and reverse connection may damage the transceiver, or the power supply or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

Schematic diagram



ADJUSTMENT

■ Universal connector

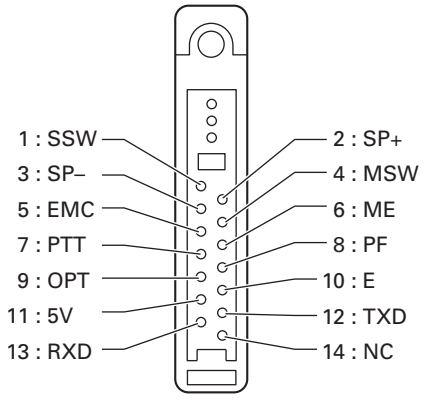
Use the interface cable (KPG-36A/36U/36X) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the transceiver and tighten the screw.

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

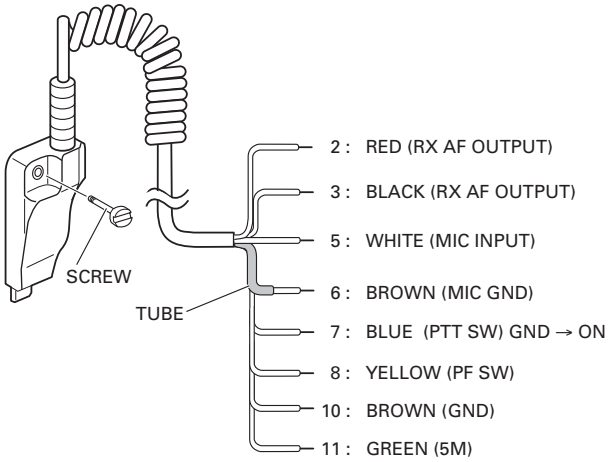
Caution

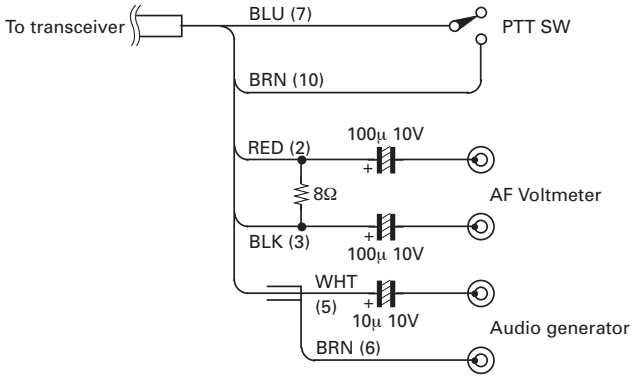
1. When connecting the plug to the universal connector of the transceiver, a short circuit may occur. To prevent this, be sure to turn the transceiver POWER switch off.
2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the figure.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

• Universal connector



• Panel tuning



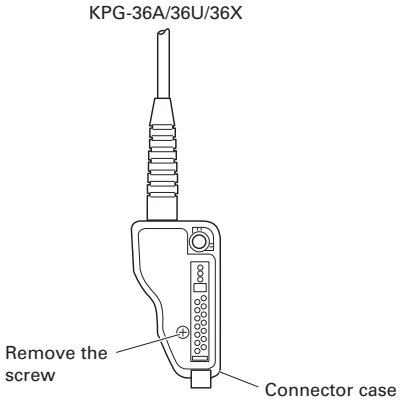


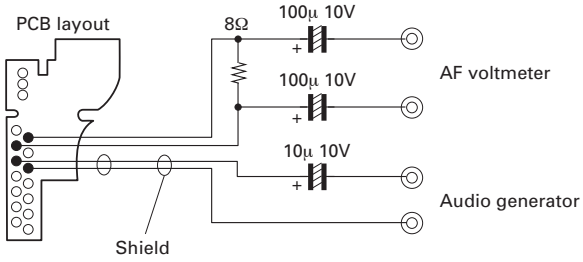
Note: Pin 1 (SSW) and Pin 4 (MSW) are connected to Pin 10 (GND) to active External SP and External MIC.

• 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 an internal temperature of radio within 25˚C ± 2˚C.	+0.05/+0.55ppm +24.25Hz~+266.81Hz @485.1MHz
2. High power check (Batt: 7.5V)	1) CH-Sig: 1-1 PTT: ON	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.	Power meter Ammeter					Check	4.5W~5.5W 2.3A or less
	2) CH-Sig: 2-1 PTT: ON	2) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.							
	3) CH-Sig: 3-1 PTT: ON	3) Test Channel Channel: 3 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.							
3. Low power check (Batt: 7.5V)	1) CH-Sig: 1-1 PTT: ON	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.							0.7W~1.2W 1.2A or less
	2) CH-Sig: 2-1 PTT: ON	2) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.							
	3) CH-Sig: 3-1 PTT: ON	3) Test Channel Channel: 3 Test Signaling Mode: Analog Signaling: 1 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 VM		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: –117dBm (0.32µV) (MOD: 1kHz/±3kHz) Narrow: –117dBm (0.32µV) (MOD: 1kH/±1.5kHz)	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 SSG output Wide: –117dBm (0.32µV) (MOD: 1kHz/±3kHz) Narrow: –117dBm (0.32µV) (MOD: 1kH/±1.5kHz)	SSG AF VM 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) DC voltage: 7.5V 2) SSG standard modulation [Wide] MOD: 1kHz, DEV: 3kH [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: [Counter-clockwise 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 (R31-0666-05) is replaced.
4. Clockwise Volume	1) Adj item: [VOL2] Adjust: [✳✳✳]	1) Adj item: [Clock-wise 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]→[L' RAST]→[C RAST]→[H' RAST]→[H RAST] Adjust: [✳✳✳✳] Press [<] key to store the adjustment value.	1) Adj item: [Receive Assist] 2) Adj item: [Low], [Low'], [Center], [High'], [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 adjustment value is changed.	2.5V±0.1V [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
Transmit Assist	1) Adj item: [TAST] Adjust: [✳✳✳✳] 2) Adj item: [L TAST]→[L' TAST]→[C TAST]→[H' TAST]→[H TAST] Adjust: [✳✳✳✳] PTT : ON (RF power is not output.) Press [<] key to store the adjustment value.	1) Adj item: [Transmit Assist] 2) Adj item: [Low], [Low'], [Center], [High'], [High] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.							
6. Frequency adjust	* The Frequency adjustment can be performed only in PC test mode.	1) Adj item: [Frequency] 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/111DN and the LCD of the transceiver.) • Use an accuracy of 0.001ppm for the SSG. (Use a standard oscillator if necessary.)	SSG	Panel	ANT		[Side1]	[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] 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 adjust (Batt: 7.5V)	1) Adj item: [HIPWR] Adjust: [✳✳✳✳] 2) Adj item: [L HIPWR]→ [L' HIPWR]→ [C HIPWR]→ [H' HIPWR]→ [H HIPWR] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [High Transmit Power] 2) Adj item: [Low], [Low'], [Center], [High'], [High] 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] [◀],[▶]	5.0W	±0.2W 2.3A or less [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
2. Low Transmit Power adjust (Batt: 7.5V)	1) Adj item: [LOPWR] Adjust: [✳✳✳✳] 2) Adj item: [L LOPWR]→ [L' LOPWR]→ [C LOPWR]→ [H' LOPWR]→ [H LOPWR] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Low Transmit Power] 2) Adj item: [Low], [Low'], [Center], [High'], [High] PTT: Press [Transmit] button. Press [Apply All] button to store the adjustment value.						0.8W	±0.1W 1.2A or less [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
3. Balance adjust *2	1) Adj item: [BAL] Adjust: [✳✳✳] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [L BAL]→ [L' BAL]→[C BAL]→ [H' BAL]→[H BAL] 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], [Low'], [Center], [High'], [High] 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.	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 pages 54 and 55. Balance adjustment is common with the adjustment of all signaling deviations.									
4. Maximum Deviation (NXDN) adjust *3 [Narrow]	1) Adj item: [Nn NDEV] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [NnL NDEV]→ [NnL' NDEV]→ [NnC NDEV]→ [NnH' NDEV]→ [NnH NDEV] 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], [Low'], [Center], [High'], [High] 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	2995~3117Hz [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 (NXDN) adjust *3 [Very Narrow]	1) Adj item: [Nv NDEV] Adjust: [✳✳✳✳] 2) Adj item: [NvL NDEV]→ [NvL' NDEV]→ [NvC NDEV]→ [NvH' NDEV]→ [NvH NDEV] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (NXDN Very Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] 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] [◀],[▶]	1337Hz	1311~1363Hz [PC test mode] Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
5. Maximum Deviation (Analog) adjust *3 [Narrow]	1) Adj item: [An ADEV] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [AnL ADEV]→ [AnL' ADEV]→ [AnC ADEV]→ [AnH' ADEV]→ [AnH ADEV] Adjust: [✳✳✳✳] Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (Analog Narrow)] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [Low], [Low'], [Center], [High'], [High] Press [Apply All] button to store the adjustment value.						Write the same adjustment value of "NXDN Deviation [Narrow]" for each adjustment point. Transmit at each adjustment point and check that the Analog deviation is between 2050Hz and 2150Hz. 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.
[Wide]	1) Adj item: [Aw ADEV] Adjust: [✳✳✳✳] 2) Adj item: [AwL ADEV]→ [AwL' ADEV]→ [AwC ADEV]→ [AwH' ADEV]→ [AwH ADEV] Adjust: [✳✳✳✳] Press [<] key to store the adjustment value.	1) Adj item: [Maximum Deviation (Analog Wide)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] Press [Apply All] button to store the adjustment value.						Write the same adjustment value of "NXDN Deviation [Narrow]" for each adjustment point. Transmit at each adjustment point and check that the Analog deviation is between 4150Hz and 4250Hz. 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 pages 54 and 55. Regarding Maximum Deviation (Analog), it is common with the adjustment of all analog signalings.									
6. QT Deviation adjust *4 [Narrow]	1) Adj item: [An QT] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [QT Deviation (Analog Narrow)] Deviation meter LPF: 3kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] 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 adjust *4 [Wide]	1) Adj item: [Aw QT] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [QT Deviation (Analog Wide)] PTT: Press [Transmit] button. Press [Apply] 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)	0.75kHz±0.05kHz
7. DQT Deviation adjust *4 [Narrow]	1) Adj item: [An DQT] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [DQT Deviation (Analog Narrow)] Deviation meter LPF: 3kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.						Write the value as followings. 415 (Reference value)	0.35kHz±0.05kHz
[Wide]	1) Adj item: [Aw DQT] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [DQT Deviation (Analog Wide)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							0.75kHz±0.05kHz
8. LTR Deviation adjust *4 [Narrow]	1) Adj item: [An LTR] Adjust: [✳✳✳✳] Deviation meter LPF: 3kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [LTR Deviation (Analog Narrow)] Deviation meter LPF: 3kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.						Write the value as followings. 465 (Reference value)	0.75kHz±0.05kHz
[Wide]	1) Adj item: [Aw LTR] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [LTR Deviation (Analog Wide)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							1.00kHz±0.05kHz
9. DTMF Deviation adjust *4 [Narrow]	1) Adj item: [An DTMF] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [DTMF Deviation (Analog Narrow)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.						Write the value as followings. 540 (Reference value)	1.25kHz±0.05kHz
[Wide]	1) Adj item: [Aw DTMF] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [DTMF Deviation (Analog Wide)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							2.50kHz±0.05kHz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
10. Single Tone Deviation adjust *4 [Narrow]	1) Adj item: [An TONE] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Single Tone Deviation (Analog Narrow)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] 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)	1.50kHz±0.05kHz
[Wide]	1) Adj item: [Aw TONE] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [Single Tone Deviation (Analog Wide)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							3.00kHz±0.05kHz
11. MSK Deviation adjust *4 [Narrow]	1) Adj item: [An MSK] Adjust: [✳✳✳✳] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [MSK Deviation (Analog Narrow)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.						Write the value as followings. 513 (Reference value)	1.50kHz±0.05kHz
[Wide]	1) Adj item: [Aw MSK] Adjust: [✳✳✳✳] PTT: ON Press [<] key to store the adjustment value.	1) Adj item: [MSK Deviation (Analog Wide)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							3.00kHz±0.05kHz
12. CWID Deviation adjust *4 [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 pages 54 and 55.									
13. VOX1 adjust	1) Adj item: [VOX1] Adjust: [✳✳✳] AG: 1kHz/45mV at MIC terminal	1) Adj item: [VOX1] AG: 1kHz/45mV at MIC terminal	AG	Panel	Universal connector			[Panel 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.	
14. VOX10 adjust	1) Adj item: [VOX10] Adjust: [✳✳✳] AG: 1kHz/3mV at MIC terminal	1) Adj item: [VOX10] AG: 1kHz/3mV at MIC terminal							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
15. BATT detection 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.	
16. BATT detection 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.

■ 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)", this signaling is composed of three elements [Balance, Maximum Deviation (Analog Wide) and QT Deviation (Wide)]. Please adjust Balance and Maximum Deviation (Analog Wide) before adjusting QT Deviation (Wide).

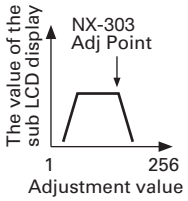
Mode	Signaling	Necessary adjustment and order		
		Wide	Narrow	Very Narrow
Analog	Audio	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow)	-
	QT	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide) Step3. QT Deviation (Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. QT Deviation (Narrow)	-
	DQT	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide) Step3. DQT Deviation (Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. DQT Deviation (Narrow)	-
	LTR	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide) Step3. LTR Deviation (Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. LTR Deviation (Narrow)	-
	DTMF	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide) Step3. DTMF Deviation (Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. DTMF Deviation (Narrow)	-
	2TONE	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide) Step3. Single Tone Deviation (Analog Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. Single Tone Deviation (Analog Narrow)	-
	MSK (FleetSync)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide) Step3. MSK Deviation (Analog Wide)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. MSK Deviation (Analog Narrow)	-

ADJUSTMENT

Mode	Signaling	Necessary adjustment and order		
		Wide	Narrow	Very 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. CWID 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/Narrow) is common with all the analog signaling deviations and CWID Deviation (NXDN Very Narrow). If Balance and Maximum Deviation (Analog Wide/Narrow) (Transmitter Section 5) have already adjusted, please skip Step2 and adjust from Step3.

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/Narrow: Narrow Beat Shift: Uncheck Compander: Uncheck	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 Wide/Narrow: Narrow Beat Shift: Uncheck Compander: Uncheck SSG output: –47dBm (1mV) (MOD: 1kHz/±1.5kHz)	SSG DVM AF VM Dummy load	Panel	ANT Universal connector	Panel	Volume knob	Turn the Volume knob to obtain 0.63V AF output.	0.63V±0.1V
Sensitivity adjust									
2. Sensitivity 1 adjust	1) Adj item: [SENS1] Adjust: [✳✳✳] 2) Adj item: [L SENS1]→ [L' SENS1]→ [C SENS1]→ [H' SENS1]→ [H SENS1] Adjust: [✳✳✳] Press [<] key to store the adjustment value.	1) Adj item: [Sensitivity 1] 2) Adj item: [Low], [Low'], [Center], [High'], [High] Press [Apply All] button to store the adjustment value.	SSG AF VM Oscilloscope	Panel	ANT Universal connector	Panel	[Panel tuning mode] [◜◝], [◟◞] [PC test mode] [◀],[▶]	Write the value as followings [L SENS1] / [Low] : 120 [L' SENS1] / [Low'] : 135 [C SENS1] / [Center] : 145 [H' SENS1] / [High'] : 160 [H SENS1] / [High] : 173	
3. Sensitivity 2 adjust	1) Adj item: [SENS2] Adjust: [✳✳✳] 2) Adj item: [L SENS2]→ [L' SENS2]→ [C SENS2]→ [H' SENS2] Adjust: [✳✳✳] SSG output: –90dBm (7.08µV) (MOD: 1kHz/±1.5kHz) Press [<] key to store the adjustment value.	1) Adj item: [Sensitivity 2] 2) Adj item: [Low], [Low'], [Center], [High'] SSG output: –90dBm (7.08µV) (MOD: 1kHz/±1.5kHz) Press [Apply All] button to store the adjustment value.						(The RSSI level is shown on the sub LCD display and PC window.) 1. Change the adjustment value to get the maximum RSSI level. 2. Increase the adjustment value to seek "NX-303 ADJ Point" of RSSI level. (Refer to right.)	
	3) Adj item: [H SENS2] Adjust: [✳✳✳] SSG output: Press [<] key to store the adjustment value.	3) Adj item: [High] Press [Apply All] button to store the adjustment value.						Write the value as followings. [H SENS2]/[High] : 245	

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. RSSI reference adjust *5 [Analog Narrow]	1) Adj item: [An RRSSI] Adjust: [✳✳✳] 2) Adj item: [AnL RRSSI]→ [AnL' RRSSI]→ [AnC RRSSI]→ [AnH' RRSSI]→ [AnH RRSSI] Adjust: [✳✳✳] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI Reference (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)	SSG Distortion meter Oscilloscope	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]	1) Adj item: [Aw RRSSI] Adjust: [✳✳✳] 2) Adj item: [AwL RRSSI]→ [AwL' RRSSI]→ [AwC RRSSI]→ [AwH' RRSSI]→[AwH RRSSI] Adjust: [✳✳✳] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI Reference (Analog Wide)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)							
RSSI reference adjust *5 [NXDN Very Narrow]	1) Adj item: [Nv RRSSI] Adjust: [✳✳✳] 2) Adj item: [NvL RRSSI]→ [NvL' RRSSI]→ [NvC RRSSI]→ [NvH' RRSSI]→ [NvH RRSSI] Adjust: [✳✳✳] 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], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level for Analog Narrow –3dB (MOD: 1kHz/±1.5kHz)						[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.	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	
5. Open Squelch adjust *6 (Squelch level 5 adjust) [Analog Narrow]	1) Adj item: [An SQL] Adjust: [✳✳✳] 2) Adj item: [AnL SQL]→ [AnL' SQL]→ [AnC SQL]→ [AnH' SQL]→ [AnH SQL] Adjust: [✳✳✳] SSG output: 12dB SINAD level +1dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Open Squelch (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +1dB (MOD: 1kHz/±1.5kHz)	SSG Distortion meter Oscilloscope	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]	1) Adj item: [Aw SQL] Adjust: [✳✳✳] 2) Adj item: [AwL SQL]→ [AwL' SQL]→ [AwC SQL]→ [AwH' SQL]→ [AwH SQL] Adjust: [✳✳✳] SSG output: 12dB SINAD level +1dB (MOD: 1kHz/±3kHz)	1) Adj item: [Open Squelch (Analog Wide)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +1dB (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	1) Adj item: [Nv SQL] Adjust: [✳✳✳] 2) Adj item: [NvL SQL]→ [NvL' SQL]→ [NvC SQL]→ [NvH' SQL]→ [NvH SQL] Adjust: [✳✳✳] 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], [Low'], [Center], [High'], [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).

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. Low RSSI at –118dBm adjust *7 [Analog Narrow]	1) Adj item: [An LRSSI] Adjust: [✳✳✳] 2) Adj item: [AnL LRSSI]→ [AnL' LRSSI]→ [AnC LRSSI]→ [AnH' LRSSI]→ [AnH LRSSI] Adjust: [✳✳✳] SSG output: –118dBm (0.28μV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [Low RSSI (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: –118dBm (0.28μV) (MOD: 1kHz/±1.5kHz)	SSG	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]	1) Adj item: [Aw LRSSI] Adjust: [✳✳✳] 2) Adj item: [AwL LRSSI]→ [AwL' LRSSI]→ [AwC LRSSI]→ [AwH' LRSSI]→ [AwH LRSSI] Adjust: [✳✳✳] SSG output: –118dBm (0.28μV) (MOD: 1kHz/±3kHz)	1) Adj item: [Low RSSI (Analog Wide)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: –118dBm (0.28μV) (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	1) Adj item: [Nv LRSSI] Adjust: [✳✳✳] 2) Adj item: [NvL LRSSI]→ [NvL' LRSSI]→ [NvC LRSSI]→ [NvH' LRSSI]→ [NvH LRSSI] Adjust: [✳✳✳] SSG output: –118dBm (0.28μV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [Low RSSI (NXDN Very Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [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).									
7. High RSSI at –80dBm adjust *8 [Analog Narrow]	1) Adj item: [An HRSSI] Adjust: [✳✳✳] 2) Adj item: [AnL HRSSI]→ [AnL' HRSSI]→ [AnC HRSSI]→ [AnH' HRSSI]→ [AnH HRSSI] Adjust: [✳✳✳] SSG output: –80dBm (22.4μV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [High RSSI (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: –80dBm (22.4μV) (MOD: 1kHz/±1.5kHz)	SSG	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	
High RSSI at –80dBm adjust *8 [Analog Wide]	1) Adj item: [Aw HRSSI] Adjust: [✳✳✳] 2) Adj item: [AwL HRSSI]→ [AwL' HRSSI]→ [AwC HRSSI]→ [AwH' HRSSI]→ [AwH HRSSI] Adjust: [✳✳✳] SSG output: –80dBm (22.4µV) (MOD: 1kHz/±3kHz)	1) Adj item: [High RSSI (Analog Wide)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: –80dBm (22.4µV) (MOD: 1kHz/±3kHz)	SSG	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]→ [NvL' HRSSI]→ [NvC HRSSI]→ [NvH' HRSSI]→ [NvH HRSSI] Adjust: [✳✳✳] SSG output: –80dBm (22.4µV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [High RSSI (NXDN Very Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [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).									
8. Tight Squelch adjust (Squelch level 9 adjust) [Analog Narrow]	1) Adj item: [An SQLT] Adjust: [✳✳✳] 2) Adj item: [AnL SQLT]→ [AnL' SQLT]→ [AnC SQLT]→ [AnH' SQLT]→ [AnH SQLT] Adjust: [✳✳✳] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Tight Squelch (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±1.5kHz)	SSG	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]	1) Adj item: [Aw SQLT] Adjust: [✳✳✳] 2) Adj item: [AwL SQLT]→ [AwL' SQLT]→ [AwC SQLT]→ [AwH' SQLT]→ [AwH SQLT] Adjust: [✳✳✳] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±3kHz)	1) Adj item: [Tight Squelch (Analog Wide)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±3kHz)							

TERMINAL FUNCTION

Control unit (X53-4590-14)

Pin No.	Name	I/O	Function
CN1			
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
CN23			
1	ME	-	Internal MIC GND
2	EMC	I	Internal MIC input
3	SP+	O	BTL output + for internal speaker
4	SP+	O	BTL output + for internal speaker
5	SP-	O	BTL output – for internal speaker
6	SP-	O	BTL output – for internal speaker
7	6_/KEYI1	I	Key matrix input (KEYI1 for 6-key)
8	6_/KEYO2	O	Key matrix output (KEYO2 for 6-key)
9	BL_SB	O	LCD backlight voltage output
10	6_/KEYO0	O	Key matrix output (KEYO0 for 6-key)
11	6_/KEYO1	O	Key matrix output (KEYO1 for 6-key)
12	BL_SB	O	LCD backlight voltage output
13	6_/KEYI0	I	Key matrix input (KEYI0 for 6-key)
14	AGND	-	GND
CN403			
1	33A	O	3.3V for volume level
2	VOL_GND	-	GND for volume level
3	VOL	I	Volume level input for audio control
4	EN3	I	Rotary switch input
5	AGND	-	GND
6	EN4	I	Rotary switch input
7	EN1	I	Rotary switch input
8	EN2	I	Rotary switch input
9	+B	O	Power output after passing through the fuse
10	SB1	I	Power input after power switch
CN404			
1	LED_G	O	Green LED control output
2	/EMG	I	Emergency (Orange) key input
3	LED_R	O	Red LED control output
4	IFC	I	TX-RX PCB version recognition input
5	/SAVE	O	50C Reg. control output
6	I2CCK	O	TCXO thermometer clock output
7	/5TC	O	50T Reg. switch control output
8	I2CSDA	I/O	TCXO thermometer data input/output
9	SBC	O	SB3 switch control output
10	/T_R	O	TX/RX control output
11	TV2	O	RX tuning voltage 2 output
12	ASSIST	O	VCO tuning voltage output
13	TV1	O	RX tuning voltage 1 output
14	VAGC	I	AGC voltage input
15	5RC	O	50R switch control output
16	TCXO_MOD	O	TCXO modulation output
17	PGND	-	GND
18	RSSI	I	RSSI voltage input
19	PGND	-	GND
20	CV	I	CV voltage input
21	AGND	-	GND
22	NC	-	No connection
23	NC	-	No connection
24	+B	I	Power input after passing through the fuse
25	+B	I	Power input after passing through the fuse
26	+B	I	Power input after passing through the fuse
27	+B	I	Power input after passing through the fuse
28	NC	-	No connection
29	NC	-	No connection
30	AGND	-	GND
31	/PTT	I	PTT input
32	Side_G	O	Key matrix output (SIDE1,2 key)
33	Side_1	I	Key matrix input (SIDE1 key)
34	W_/N	O	W/N control output
35	SDO1	O	PLL serial data output
36	Side_2	I	Key matrix input (SIDE2 key)
37	/PCS_RF	O	PLL enable output
38	/DSW	O	APC voltage discharge switch control output
39	APC	O	APC control voltage output
40	/APCSW	O	APC switch control output
41	VCO_MOD	O	VCO modulation output

TERMINAL FUNCTION

Pin No.	Name	I/O	Function
42	THP	I	Thermistor voltage input
43	PLD	I	PLL lock detect input
44	38M	O	38M output
45	SCK1	O	PLL clock output
46	GND	-	GND
47	S_DET	I	Battery select input
48	GND	-	GND
49	NC	-	No connection
50	IF_DET	I	IF input
CN405			
1	SSW	I	EXT/INT speaker switch input
2	SP+	O	BTL output + for external speaker
3	SP-	O	BTL output – for external speaker
4	MSW	I	EXT/INT MIC switch input
5	EMC	I	External MIC input
6	ME	-	External MIC GND
7	PTT	I	External PTT input
8	PF	I	Programmable function key input
9	OPT	I/O	Option interface I/O
10	E	-	GND
11	5V	O	5V output
12	TXD	O	Serial data output
13	RXD	I	Serial data input
14	NC	-	No connection
CN701 (for production)			
1~20			
CN710			
1	OPT1	I/O	Refer to "CN710 26-pin connector specification" described on pages 64 to 66.
2	OPT3	I/O	
3	26P_RD	I	
4	26P_TD	O	
5	NC	-	
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	

Pin No.	Name	I/O	Function
20	OPT2	I/O	Refer to "CN710 26-pin connector specification" described on pages 64 to 66.
21	TXO	O	
22	RXEO	O	
23	RXEI	I	
24	TXI	I	
25	OPT6	O	
26	POW	O	

TX-RX unit (X57-8960-13 A/2)

Pin No.	Name	I/O	Function
CN900			
1	LED_G	I	Green LED control input
2	/EMG	O	Emergency (Orange) key output
3	LED_R	I	Red LED control input
4	IFC	O	TX-RX PCB version recognition output
5	/SAVE	I	50C Reg. control input
6	I2CCK	I	TCXO thermometer clock input
7	/5TC	I	50T Reg. switch control input
8	I2CSDA	I/O	TCXO thermometer data input/output
9	SBC	I	SB3 switch control input
10	/T_R	I	TX/RX control input
11	TV2	I	RX tuning voltage 2 input
12	ASSIST	I	VCO tuning voltage input
13	TV1	I	RX tuning voltage 1 input
14	VAGC	O	AGC voltage output
15	5RC	I	50R switch control input
16	TCXO_MOD	I	TCXO modulation input
17	GND	-	GND
18	RSSI	O	RSSI voltage output
19	GND	-	GND
20	CV	O	CV voltage output
21	GND	-	GND
22	NC	-	No connection
23	NC	-	No connection
24	+B	O	Power output after passing through the fuse
25	+B	O	Power output after passing through the fuse
26	+B	O	Power output after passing through the fuse
27	+B	O	Power output after passing through the fuse
28	NC	-	No connection
29	NC	-	No connection
30	GND	-	GND
31	/PTT	O	PTT output

TERMINAL FUNCTION

Pin No.	Name	I/O	Function
32	Side_G	I	Key matrix input (SIDE1,2 key)
33	Side_1	O	Key matrix output (SIDE1 key)
34	W_/N	I	No connection
35	SDO1	I	PLL serial data input
36	Side_2	O	Key matrix output (SIDE2 key)
37	/PCS_RF	I	PLL enable input
38	/DSW	I	APC voltage discharge switch control input
39	APC	I	APC control voltage input
40	/APCSW	I	APC switch control input
41	VCO_MOD	I	VCO modulation input
42	THP	O	Thermistor voltage output
43	PLD	O	PLL lock detect output
44	38M	I	38M input
45	SCK1	I	PLL clock input
46	GND	-	GND
47	S_DET	O	Battery select output
48	GND	-	GND
49	NC	-	No connection
50	IF_DET	O	IF output
CN901			
1	PTT	I	Internal PTT input
2	GND	-	GND
3	Side_G	O	Key matrix output (SIDE1,2 key)
4	Side_1	I	Key matrix input (SIDE1 key)
5	Side_2	I	Key matrix input (SIDE2 key)

Option Board unit (X57-8960-13 B/2)

Pin No.	Name	I/O	Function
CN737			
1	OPT1	I/O	Refer to "CN737 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

CN710 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	-	-	-				

CN710 26-pin Connector Specification

Pin No.	Name	Device	I/O	Connection	Function
1	OPT1	ANI board	O	Aux Input	[COR] Conv/LTR L: Not activity receiving H: Activity receiving [TOR] Conv/LTR L: Not activity receiving H: Activity receiving (Sub Tone or LTR ID is OK) [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	NC	-	-	-	-
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.

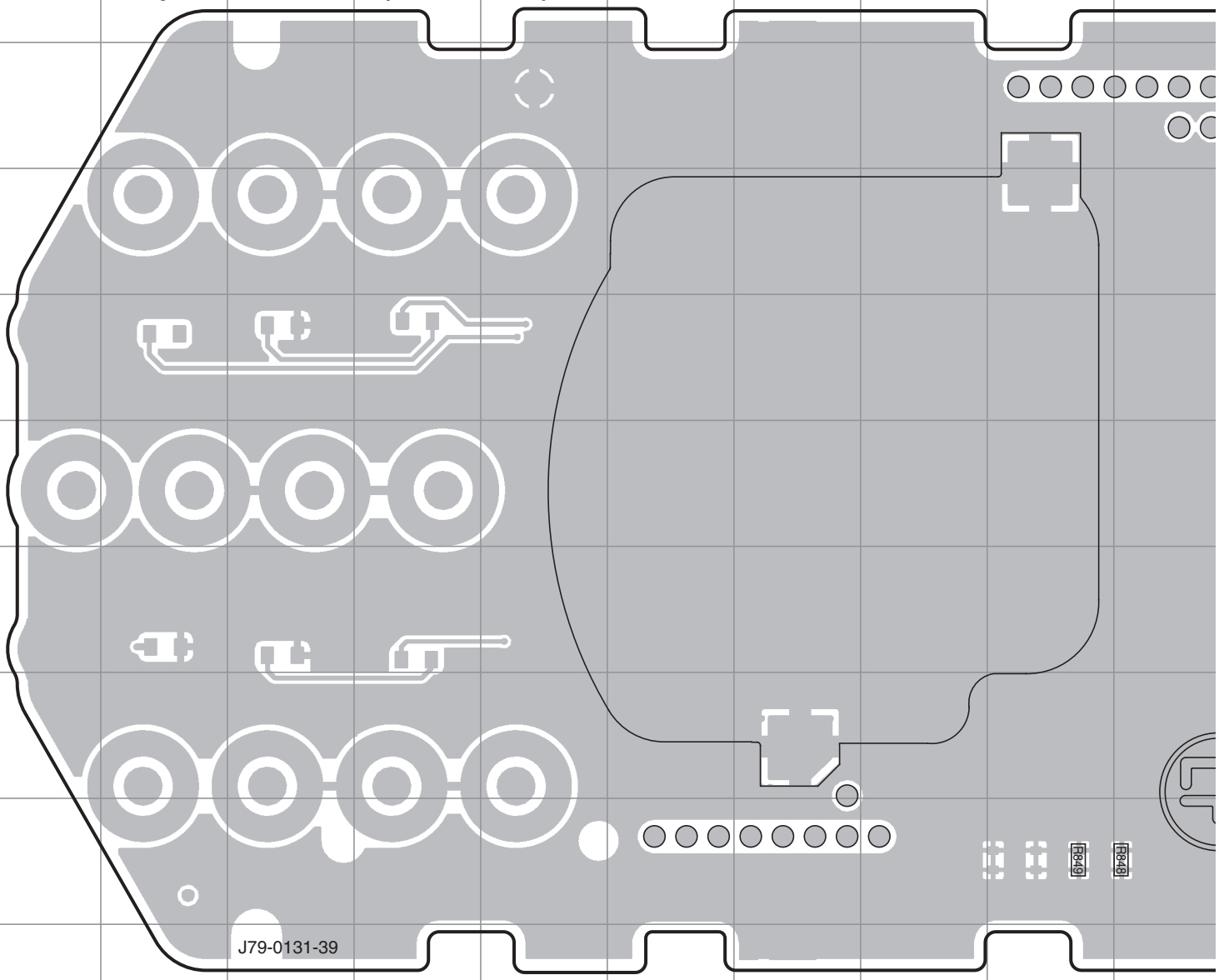
TERMINAL FUNCTION

CN737 Option Board Connector Specification

Pin No.	Name	Device	I/O	Connection	Function
1	OPT1	ANI board	I	Aux Output	[COR] Conv/LTR L: Not activity receiving H: Activity receiving [TOR] Conv/LTR L: Not activity receiving H: Activity receiving (Sub Tone or LTR ID is OK) [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

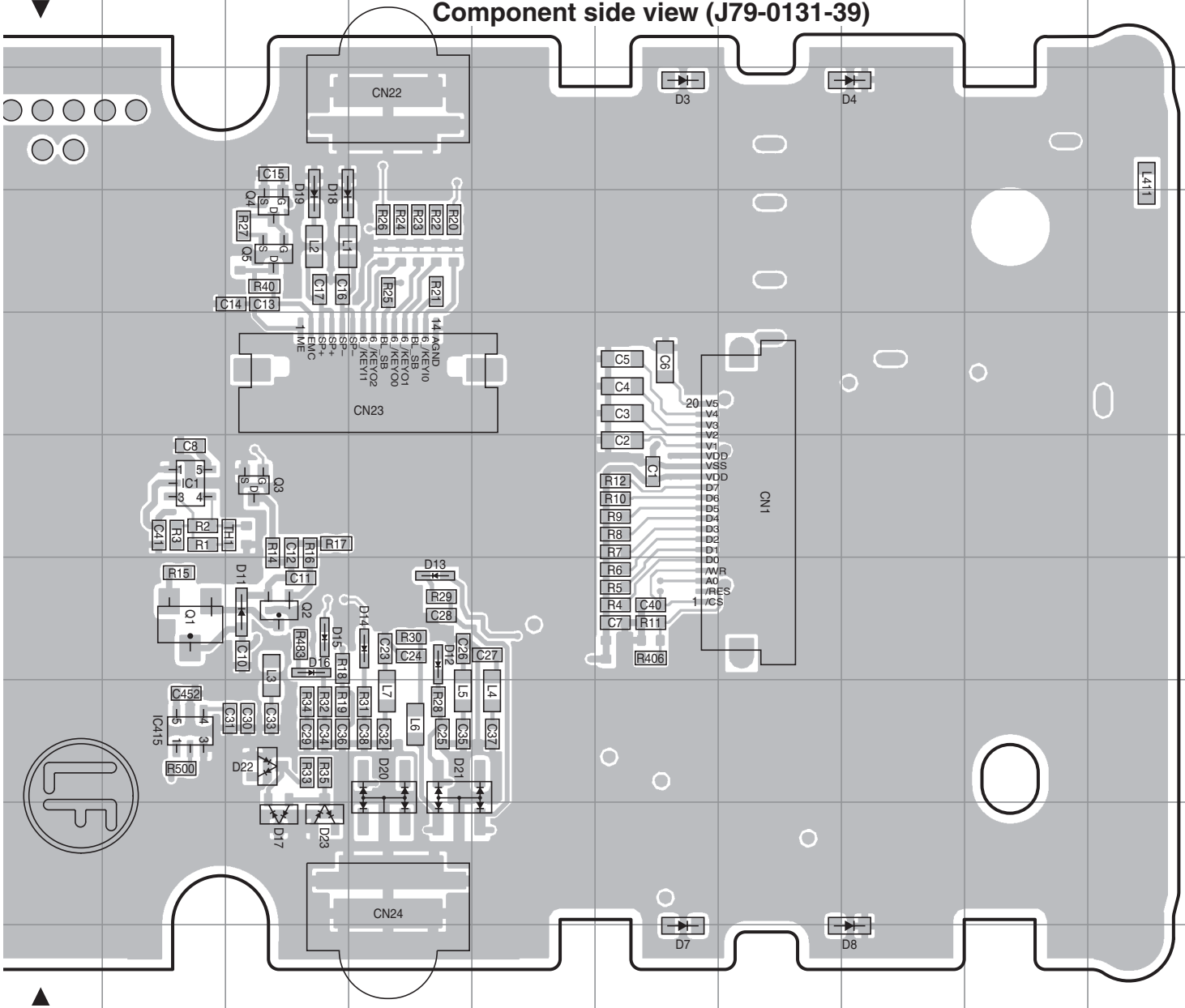
NX-303 PC BOARD

CONTROL UNIT (X53-4590-14)
Component side view (J79-0131-39)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	6K	D8	10Q	D20	8M
IC415	8K	D11	7L	D21	8M
Q1	7K	D12	7M	D22	8L
Q2	7L	D13	7M	D23	9L
Q3	6L	D14	7M		
Q4	4L	D15	7L		
Q5	4L	D16	7L		
D3	3O	D17	9L		
D4	3Q	D18	4L		
D7	10O	D19	4L		

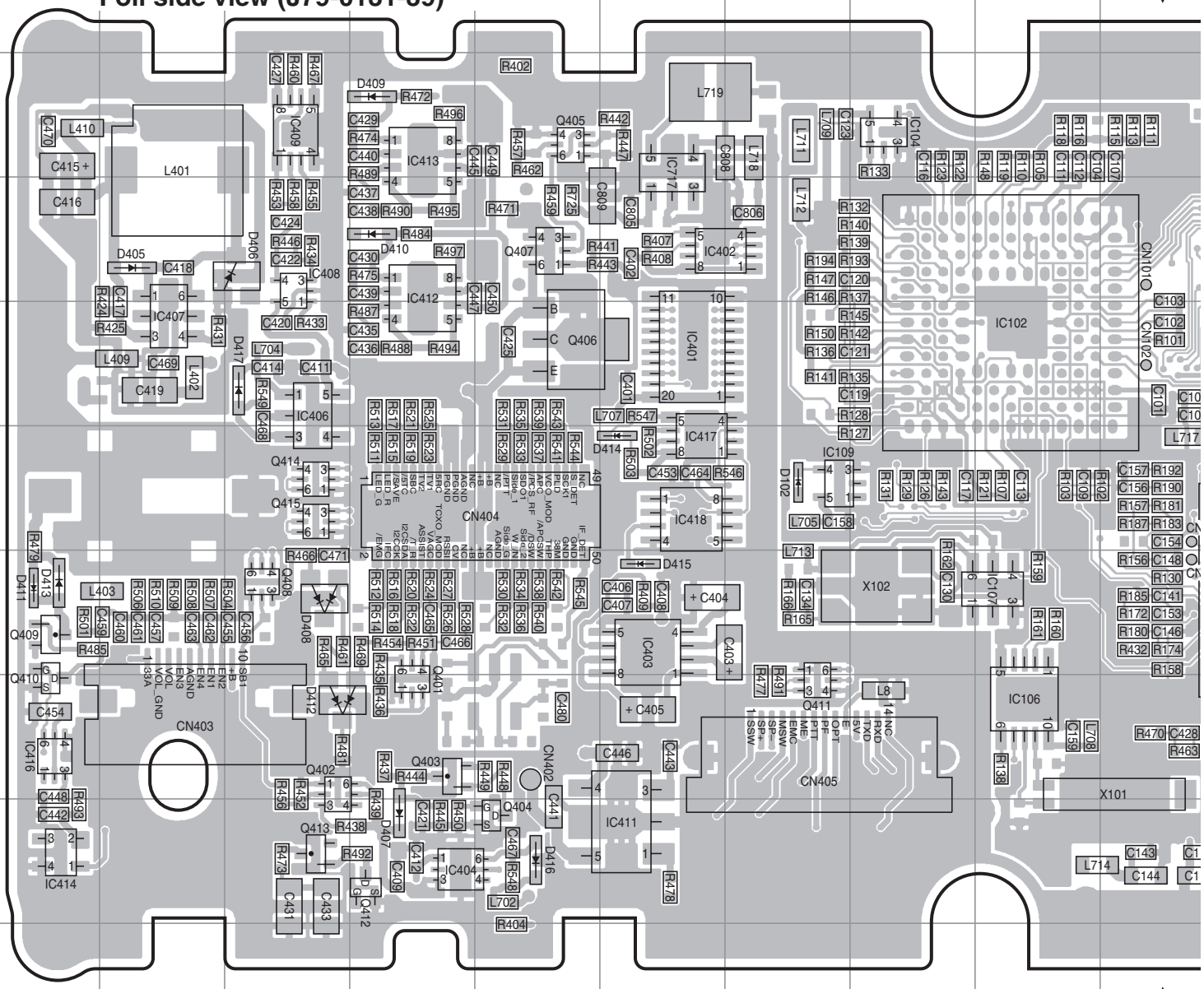
CONTROL UNIT (X53-4590-14)
Component side view (J79-0131-39)



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

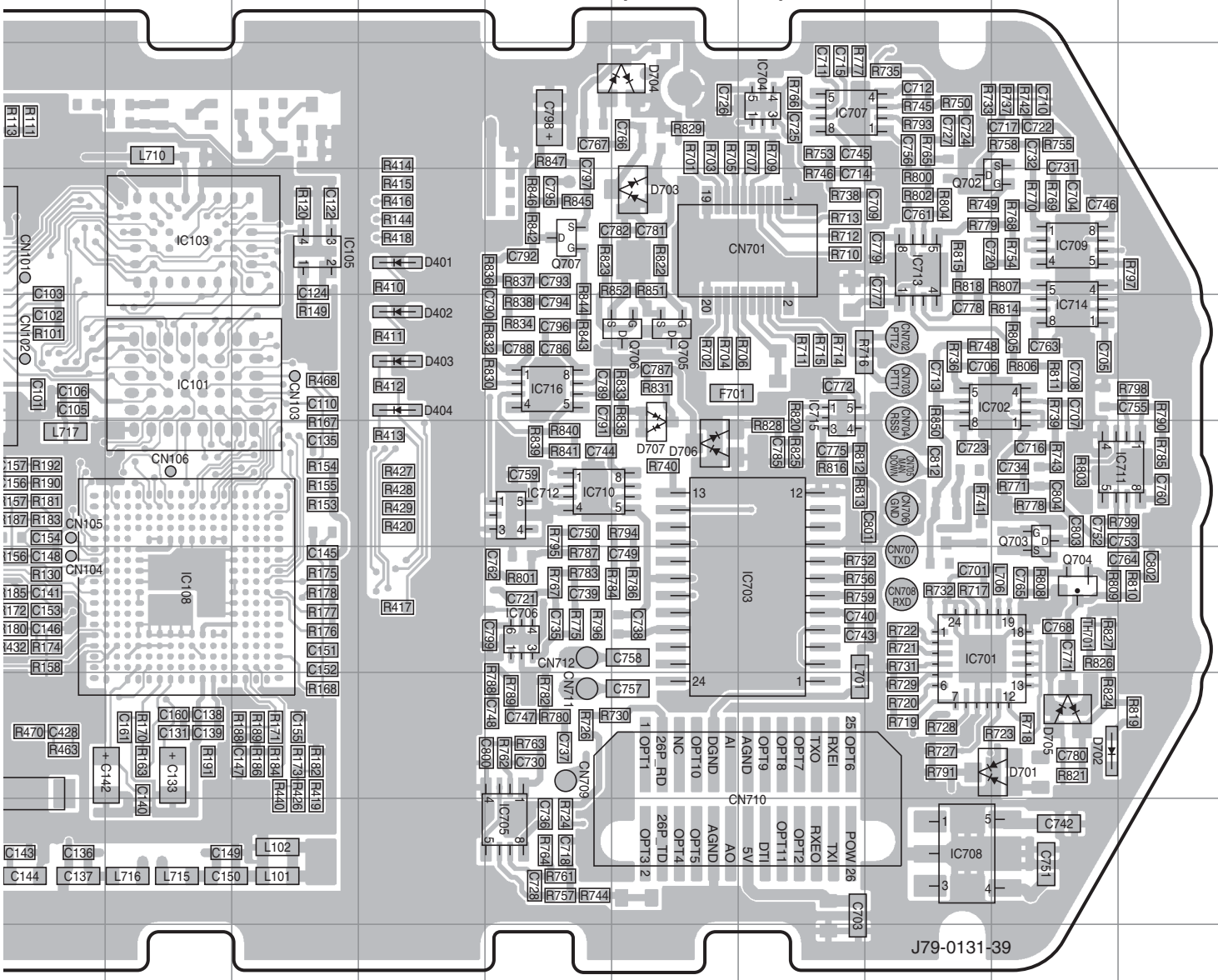
NX-303 PC BOARD

CONTROL UNIT (X53-4590-14)
Foil side view (J79-0131-39)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.
IC101	5K	IC404	9D	IC701	7Q	IC713	4Q	Q408	7C	Q706	5O	D410	4D	D705
IC102	5I	IC406	5C	IC702	5R	IC714	5R	Q409	7A	Q707	4N	D411	7A	D706
IC103	4K	IC407	5B	IC703	7P	IC715	5P	Q410	8A	D102	6G	D412	8C	D707
IC104	3H	IC408	4C	IC704	3P	IC716	5N	Q411	8G	D401	4M	D413	7A	
IC105	4L	IC409	3C	IC705	9N	IC717	3F	Q412	9D	D402	5M	D414	6F	
IC106	8I	IC411	9F	IC706	7N	Q401	8D	Q413	9C	D403	5M	D415	7F	
IC107	7I	IC412	4D	IC707	3P	Q402	8C	Q414	6C	D404	5M	D416	9E	
IC108	7K	IC413	3D	IC708	9Q	Q403	8D	Q415	6C	D405	4B	D417	5C	
IC109	6G	IC414	9A	IC709	4R	Q404	9E	Q702	4R	D406	4C	D701	8R	
IC401	5F	IC416	8A	IC710	6N	Q405	3E	Q703	6R	D407	9D	D702	8R	
IC402	4F	IC417	6F	IC711	6S	Q406	5E	Q704	7R	D408	7C	D703	4O	
IC403	7F	IC418	6F	IC712	6N	Q407	4E	Q705	5O	D409	3D	D704	3O	

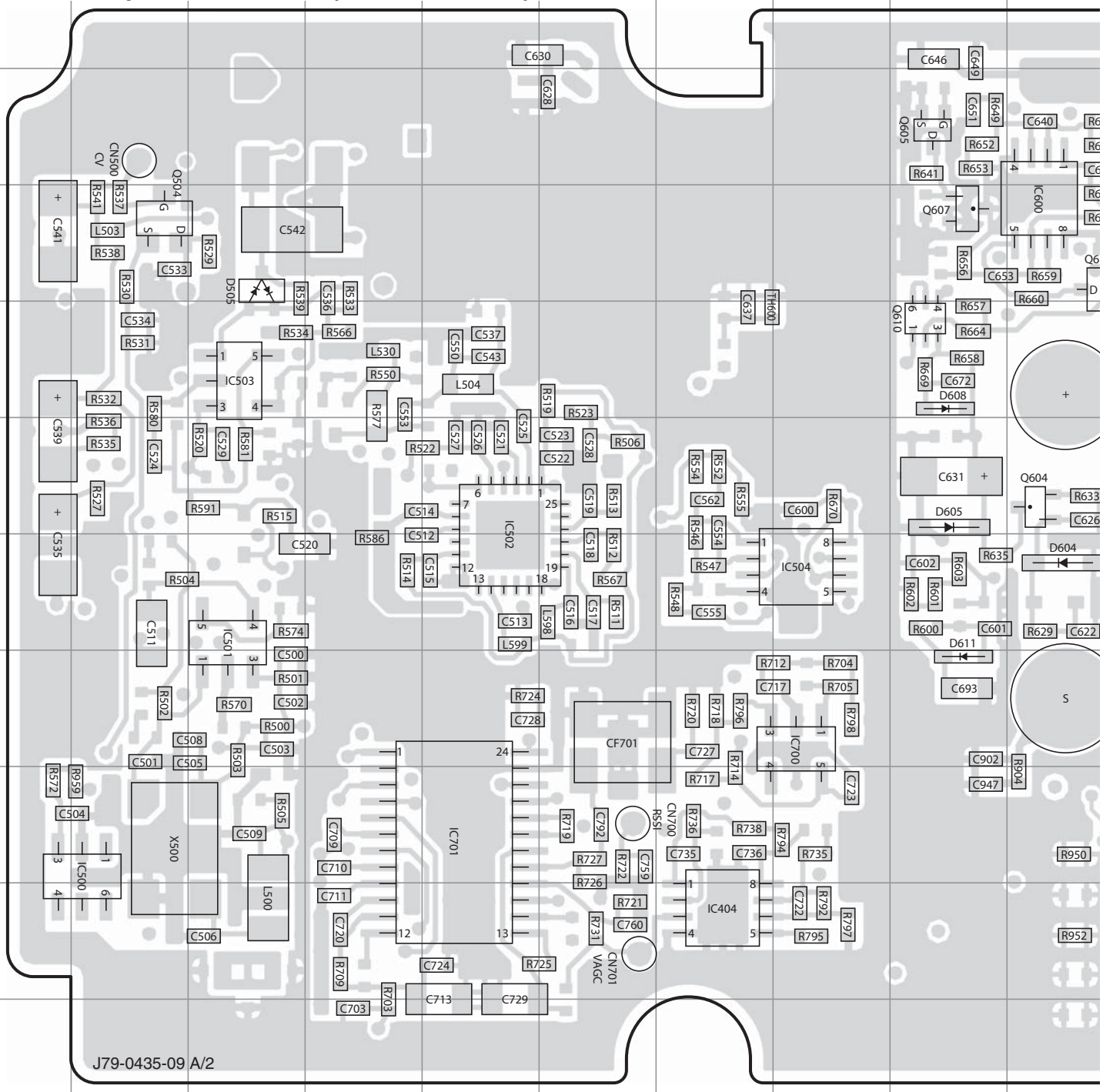
CONTROL UNIT (X53-4590-14)
Foil side view (J79-0131-39)



ss	Ref. No.	Address
	D705	8R
	D706	6O
	D707	6O

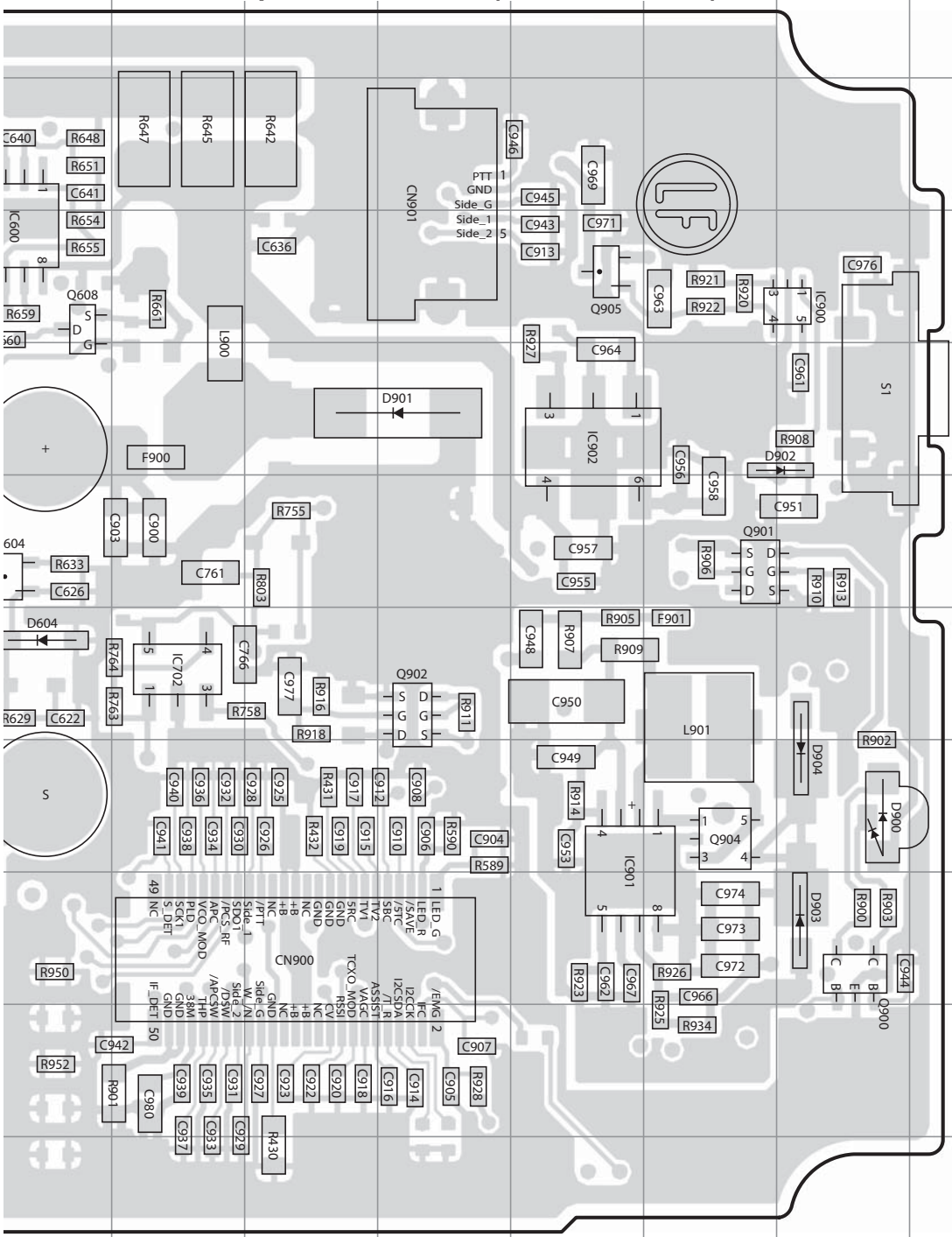
NX-303 PC BOARD

TX-RX UNIT (X57-8960-13) (A/2)
Component side view (J79-0435-09 A/2)

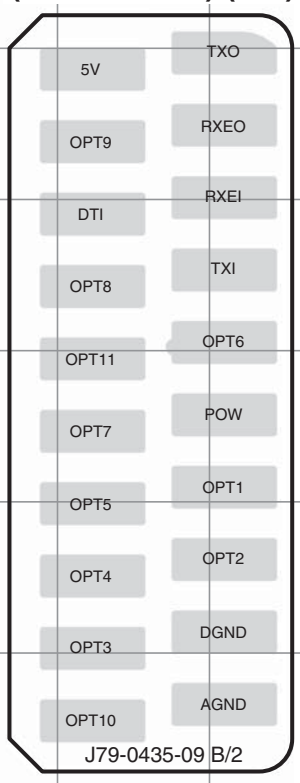


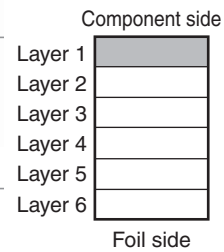
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC404	10G	IC700	8H	Q604	6J	Q902	7M	D611	8I
IC500	9B	IC701	9E	Q605	3I	Q904	9O	D900	8P
IC501	7C	IC702	7K	Q607	4I	Q905	4N	D901	5M
IC502	7E	IC900	4P	Q608	4J	D505	4C	D902	5P
IC503	5C	IC901	9O	Q610	5I	D604	7J	D903	9P
IC504	7H	IC902	5N	Q900	9P	D605	6I	D904	8P
IC600	4J	Q504	4B	Q901	7N	D608	5I		

TX-RX UNIT (X57-8960-13) (A/2)
Component side view (J79-0435-09 A/2)



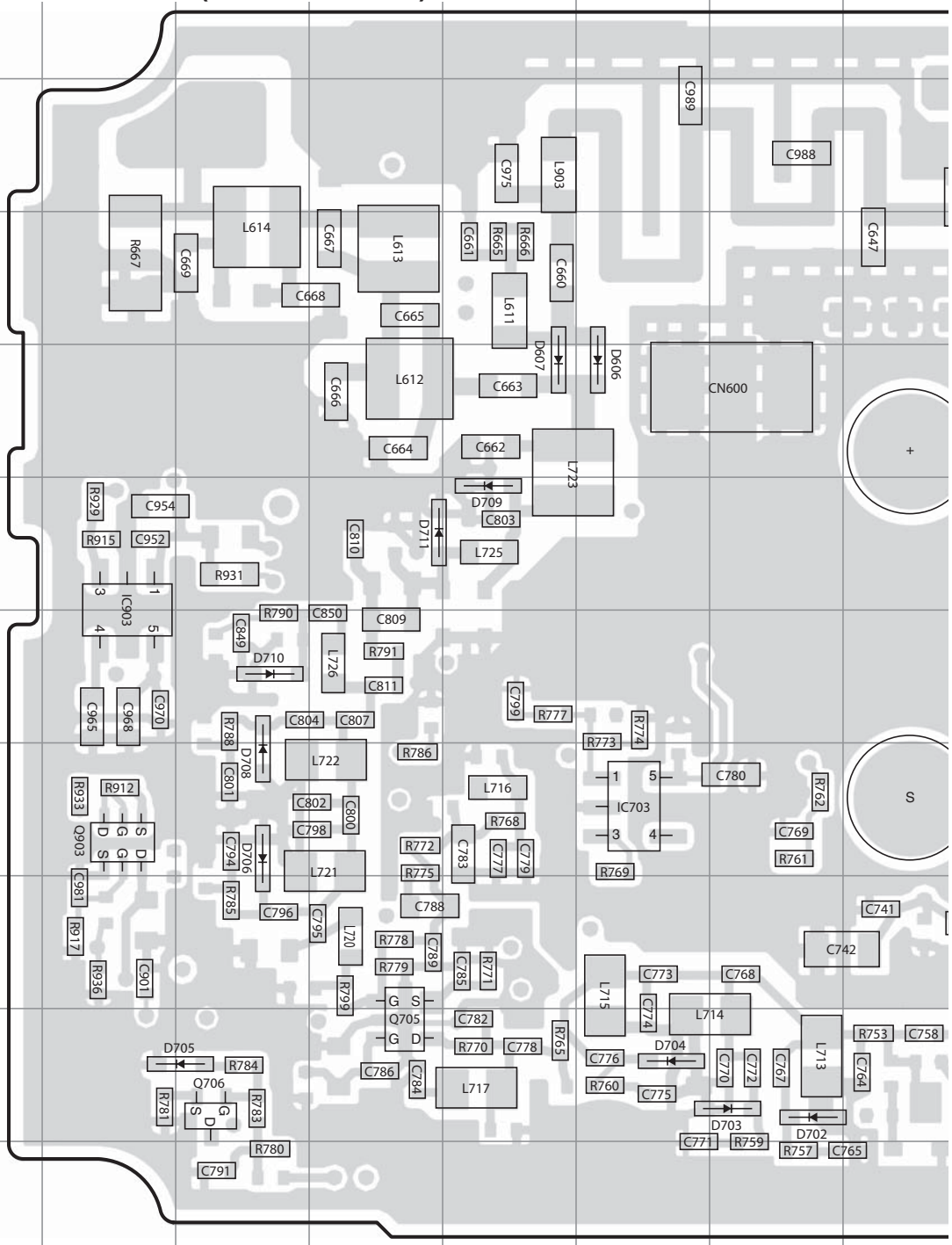
TX-RX UNIT (X57-8960-13) (B/2)



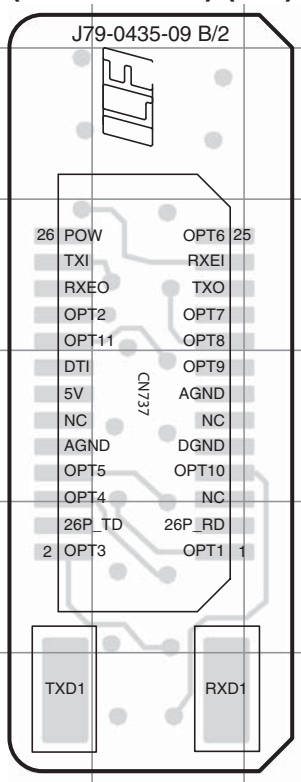


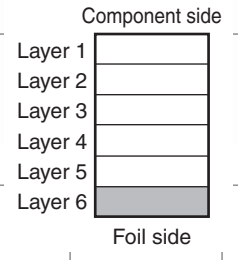
NX-303 PC BOARD

TX-RX UNIT (X57-8960-13) (A/2)
Foil side view (J79-0435-09 A/2)

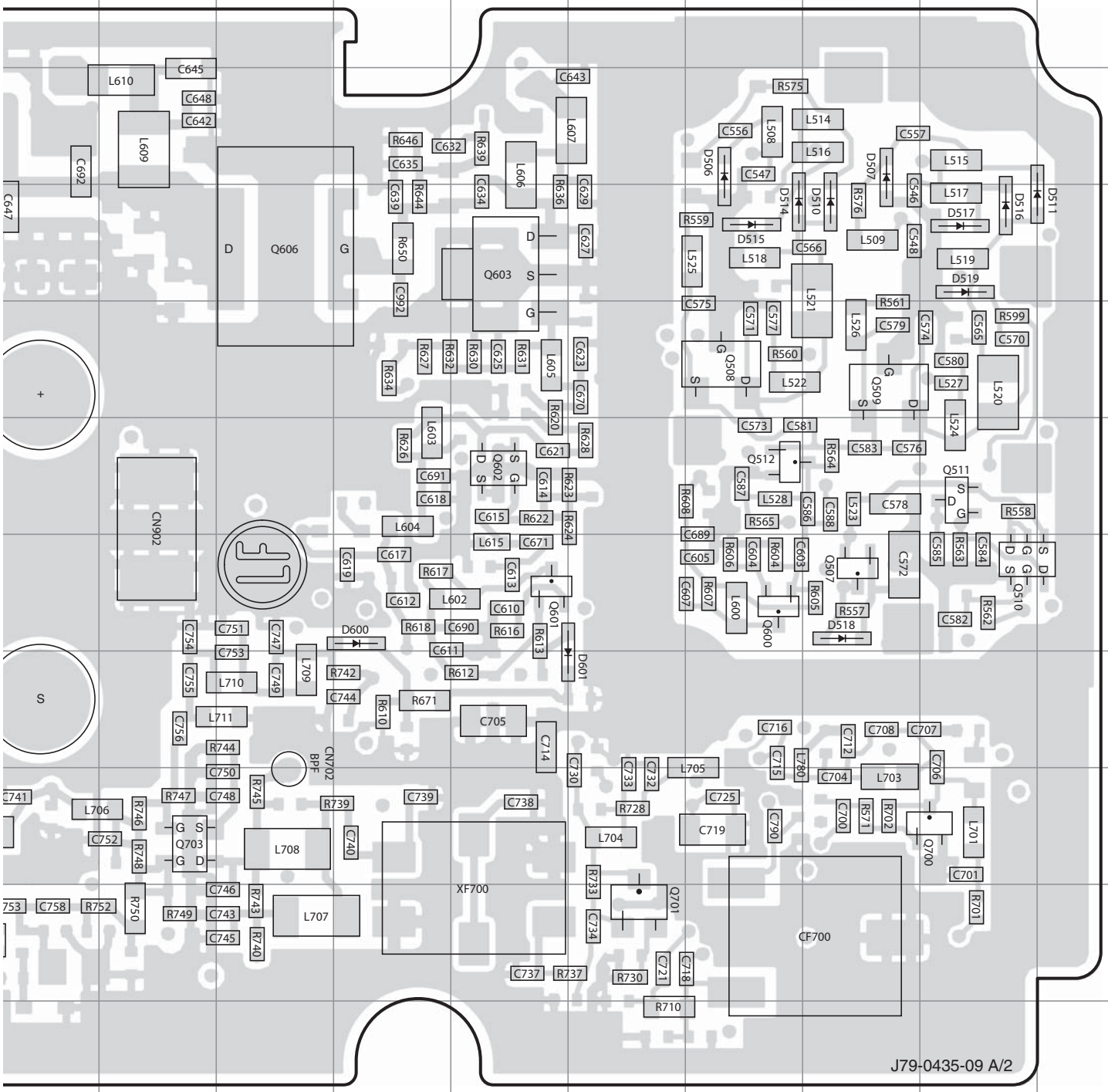


TX-RX UNIT (X57-8960-13) (B/2)



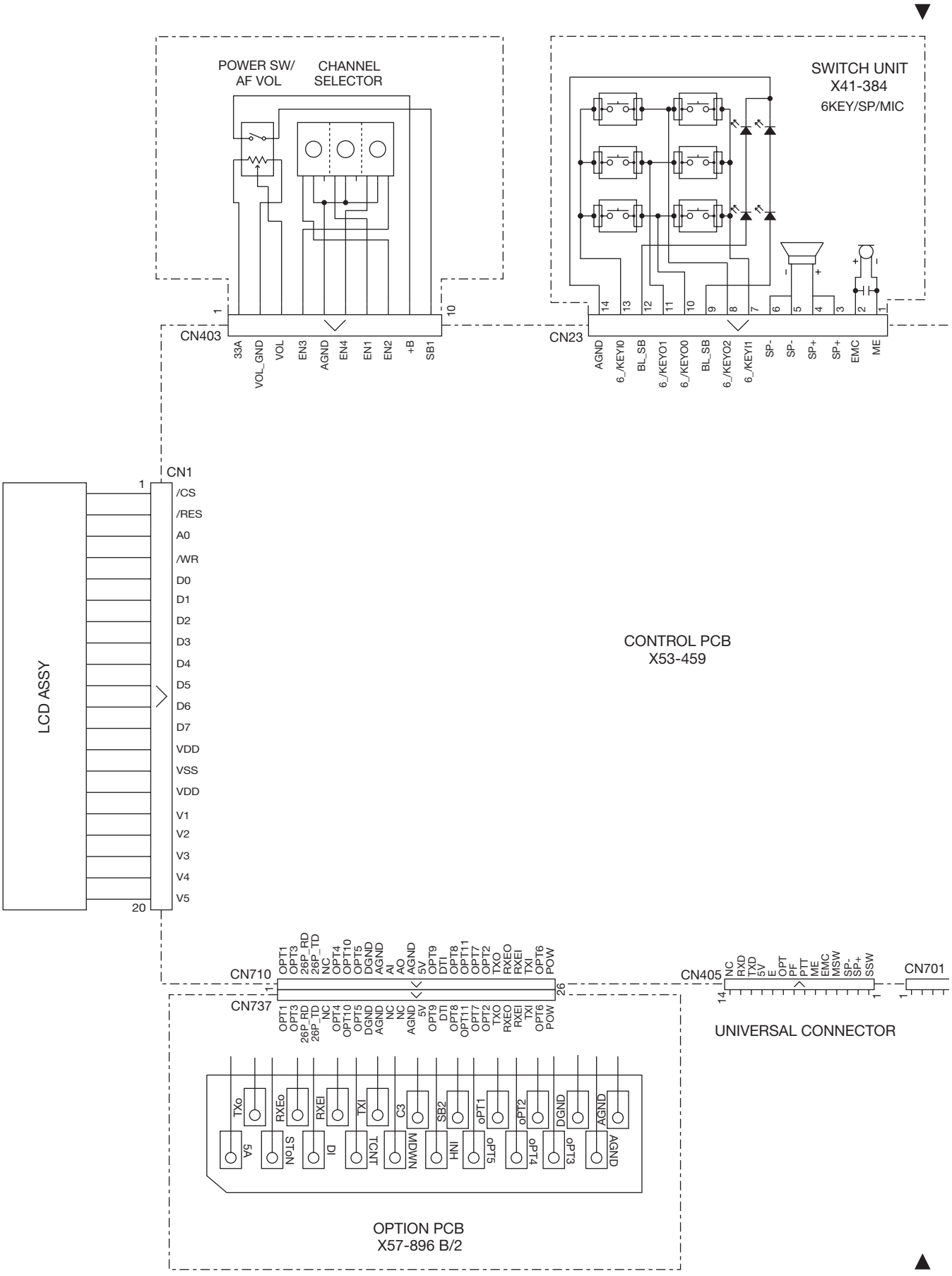


TX-RX UNIT (X57-8960-13)
Foil side view (J79-0435-09 A/2)

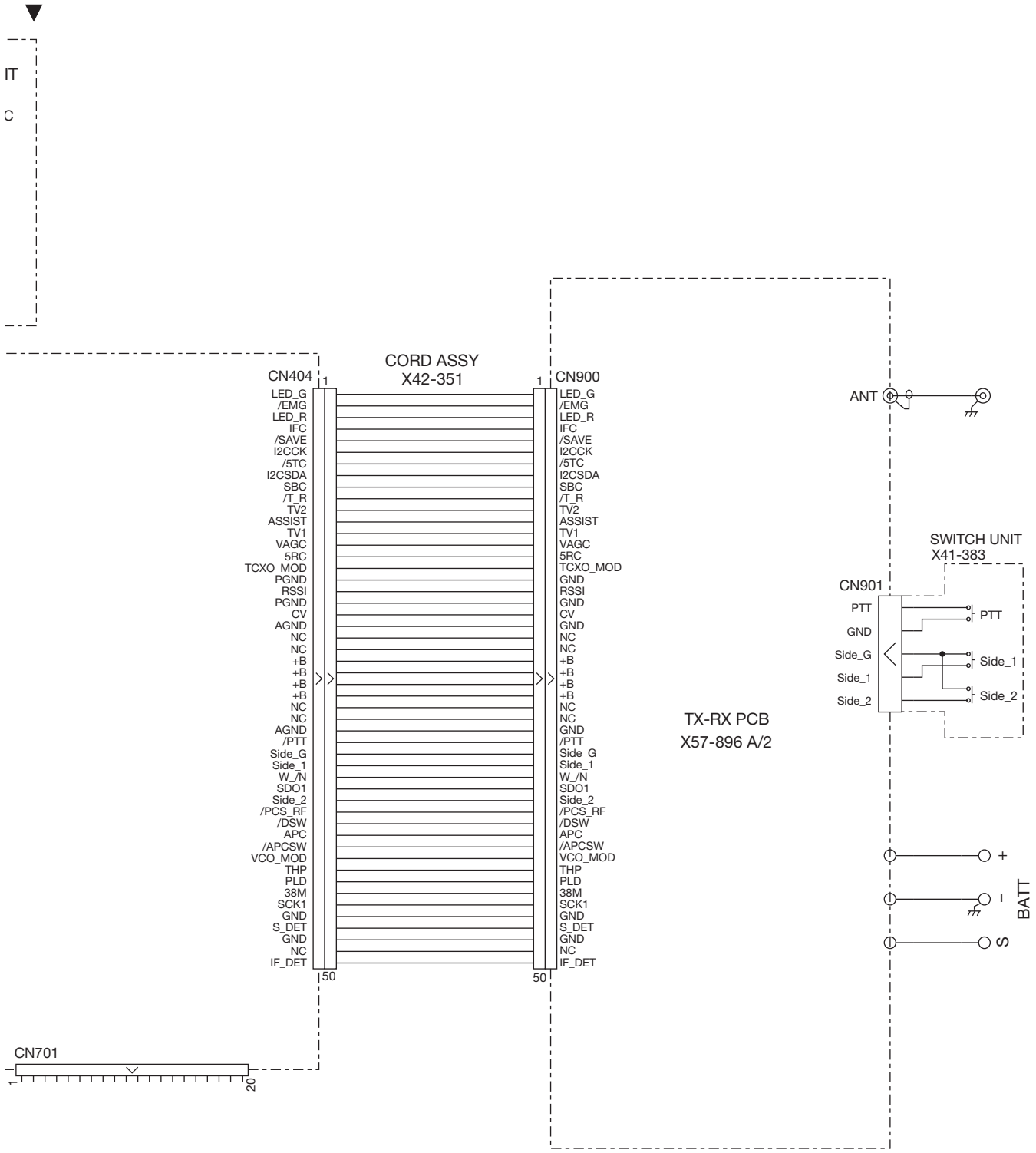


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC703	8H	Q512	6P	Q701	10O	D510	4Q	D519	4R	D704	10H
IC903	7D	Q600	7P	Q703	9K	D511	4S	D600	7M	D705	10E
Q507	7Q	Q601	7N	Q705	10F	D514	4P	D601	8O	D706	8E
Q508	5P	Q602	6N	Q706	10E	D515	4P	D606	5H	D708	8E
Q509	5Q	Q603	4N	Q903	8D	D516	4R	D607	5G	D709	6G
Q510	7R	Q606	4L	D506	3P	D517	4R	D702	10I	D710	7E
Q511	6R	Q700	9R	D507	3Q	D518	7Q	D703	10I	D711	6F

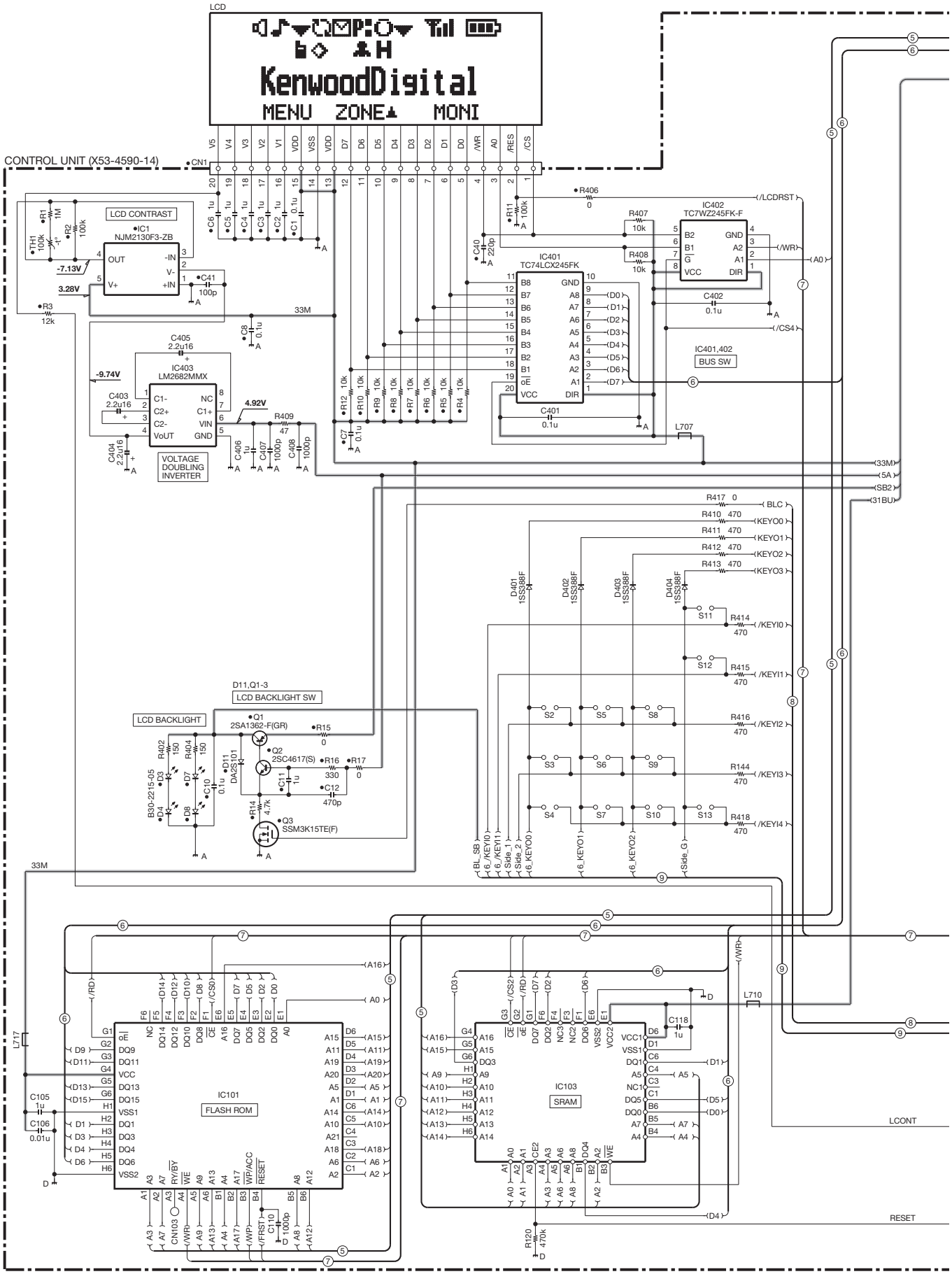
INTERCONNECTION DIAGRAM



INTERCONNECTION DIAGRAM

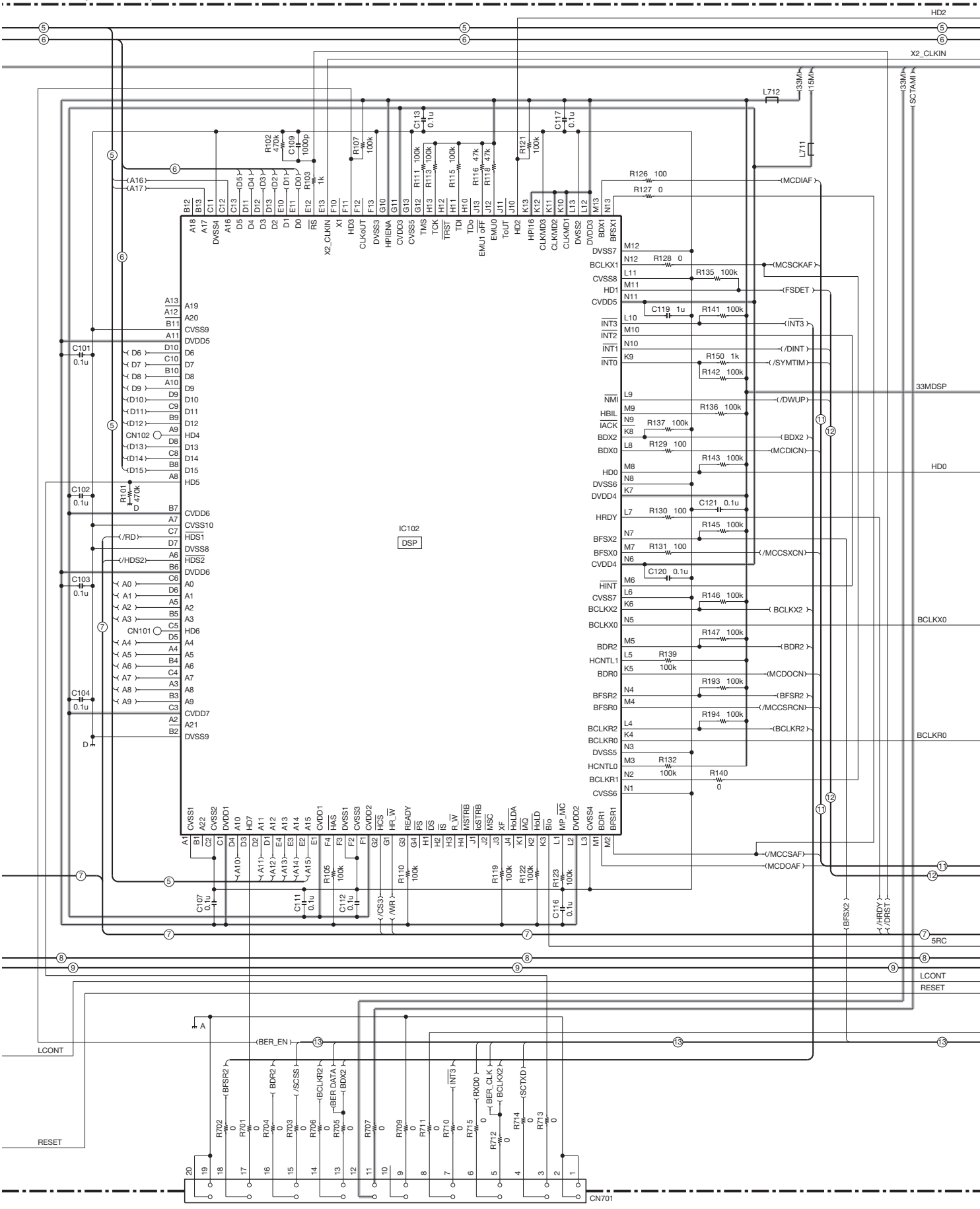


NX-303 SCHEMATIC DIAGRAM



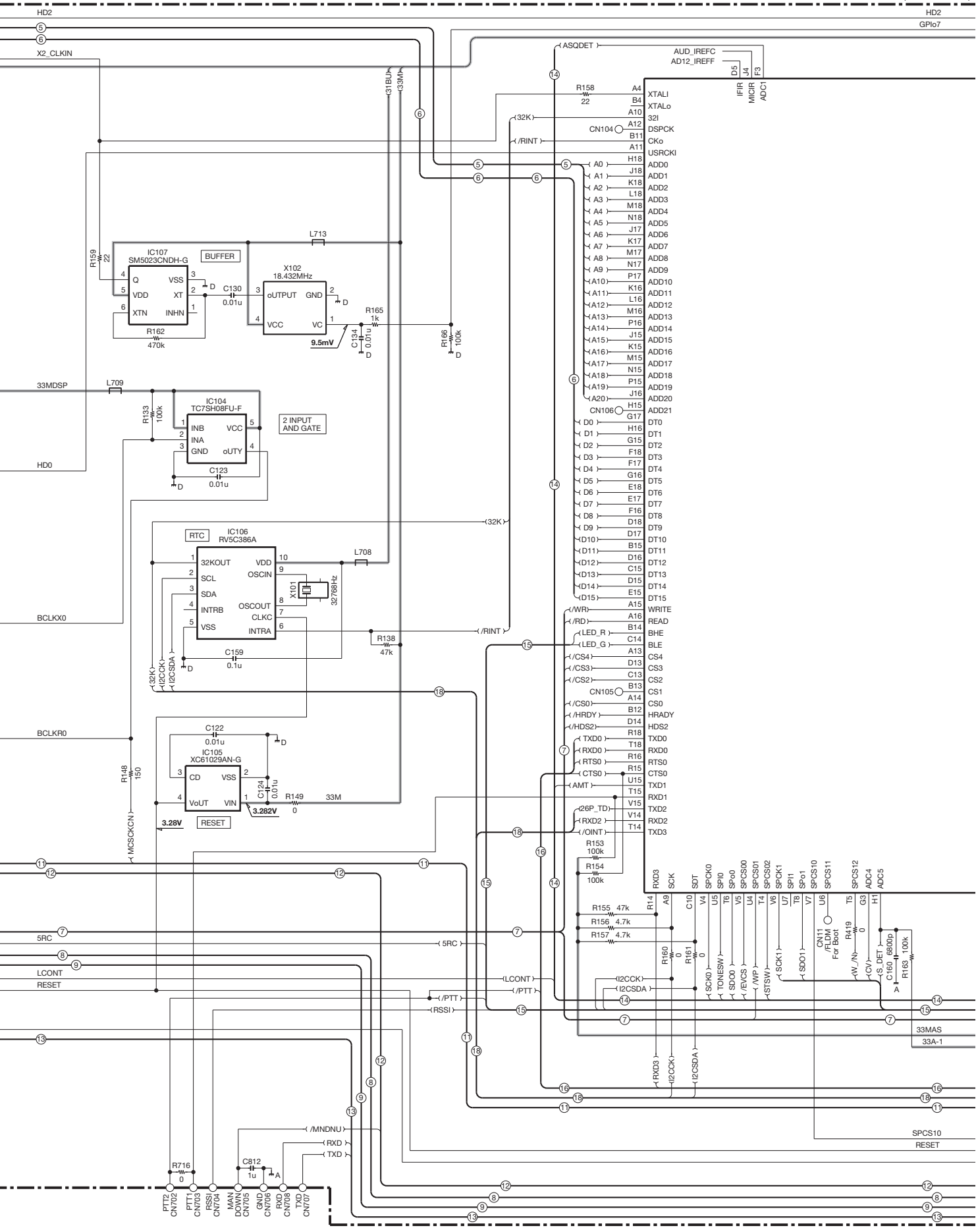
SCHEMATIC DIAGRAM NX-303

CONTROL UNIT (X53-4590-14)



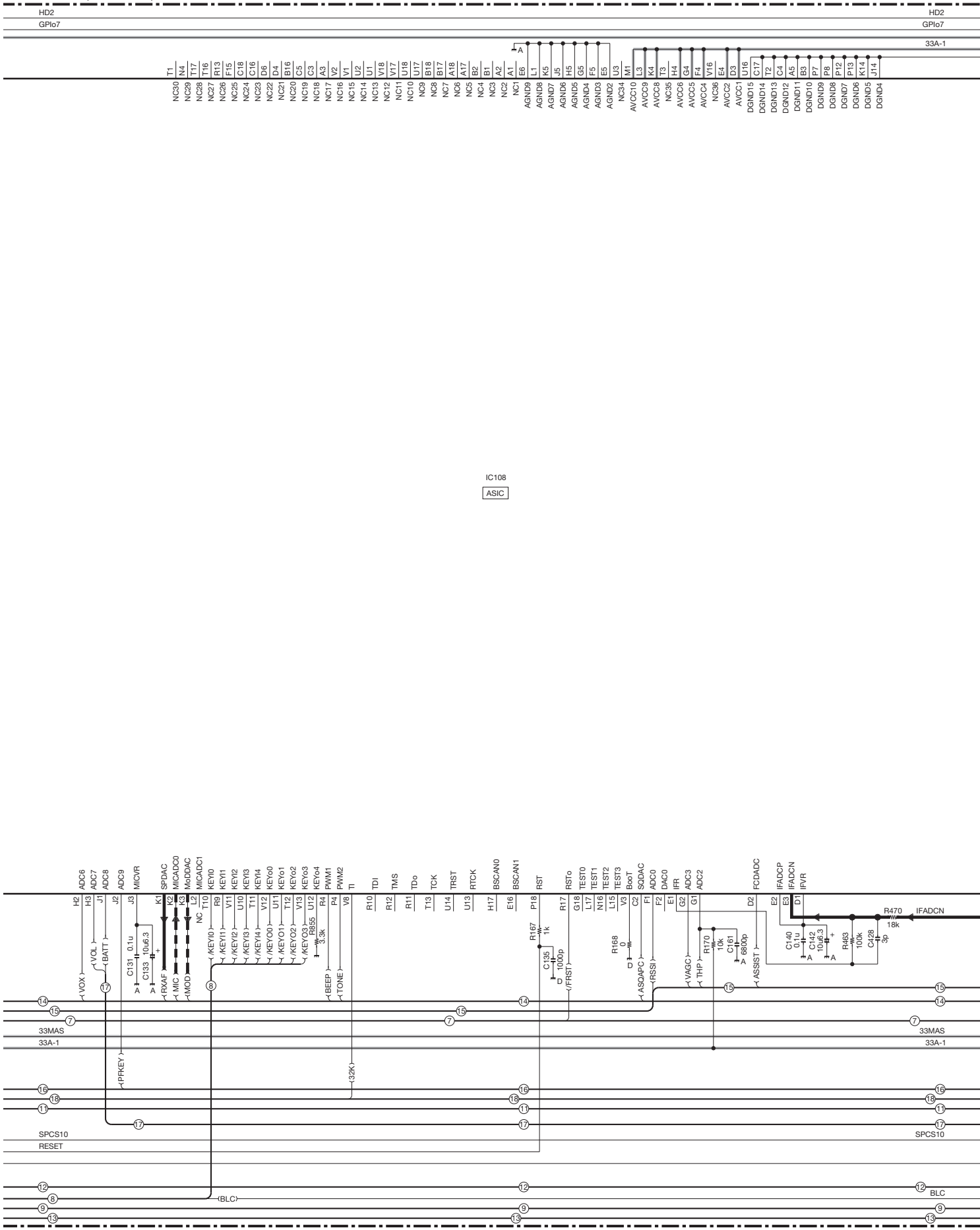
NX-303 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4590-14)

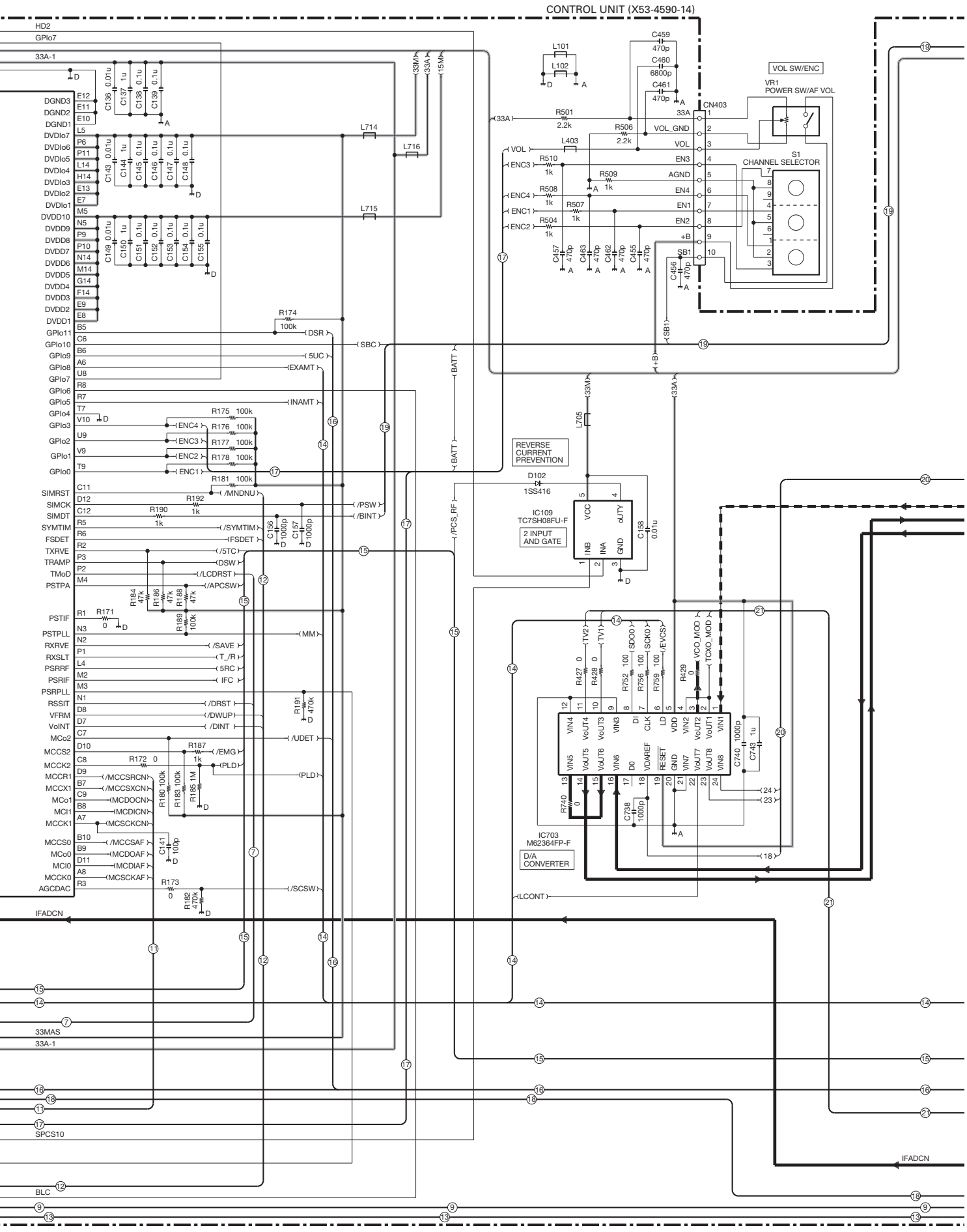


SCHEMATIC DIAGRAM NX-303

CONTROL UNIT (X53-4590-14)

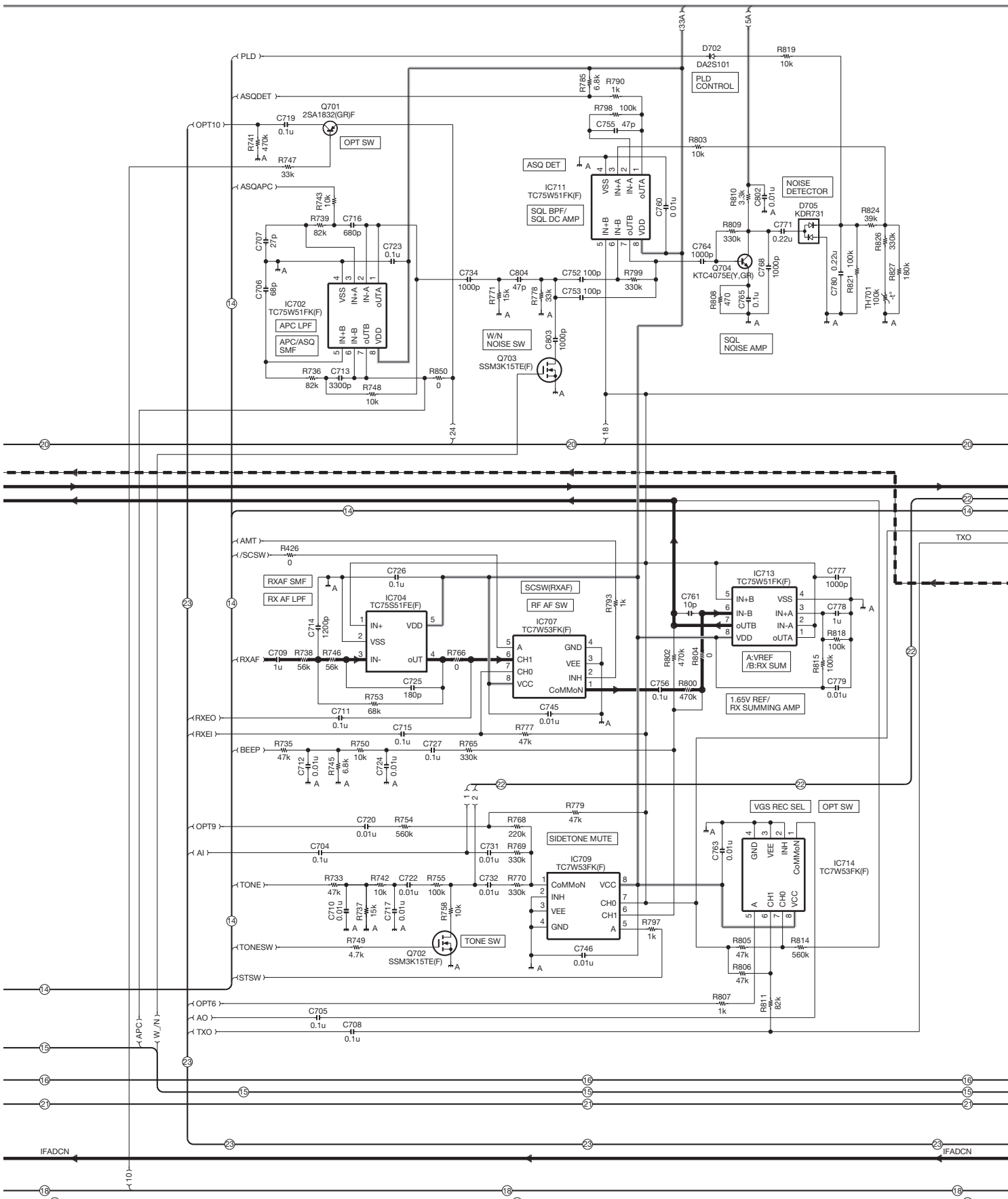


NX-303 SCHEMATIC DIAGRAM



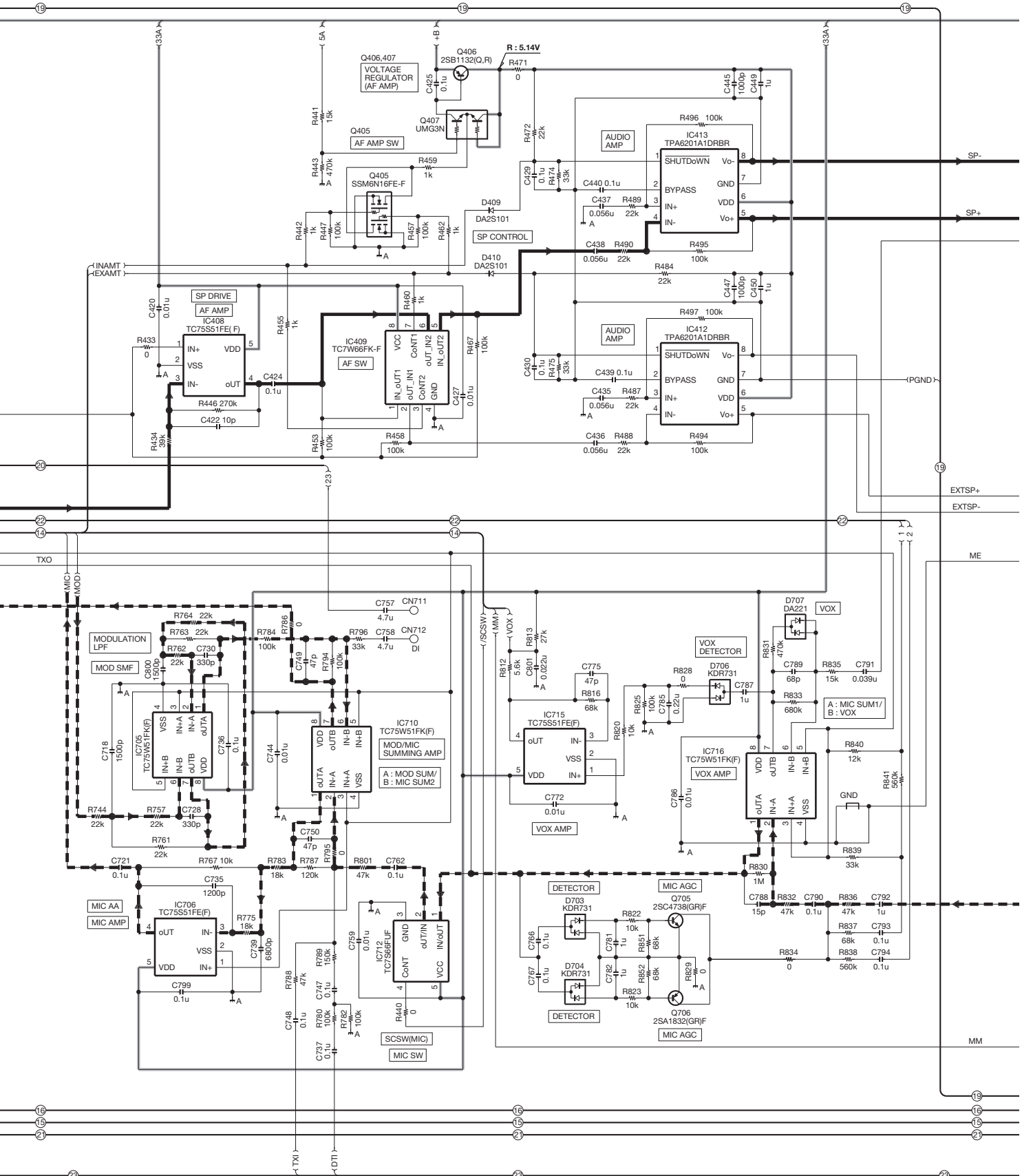
SCHEMATIC DIAGRAM NX-303

CONTROL UNIT (X53-4590-14)

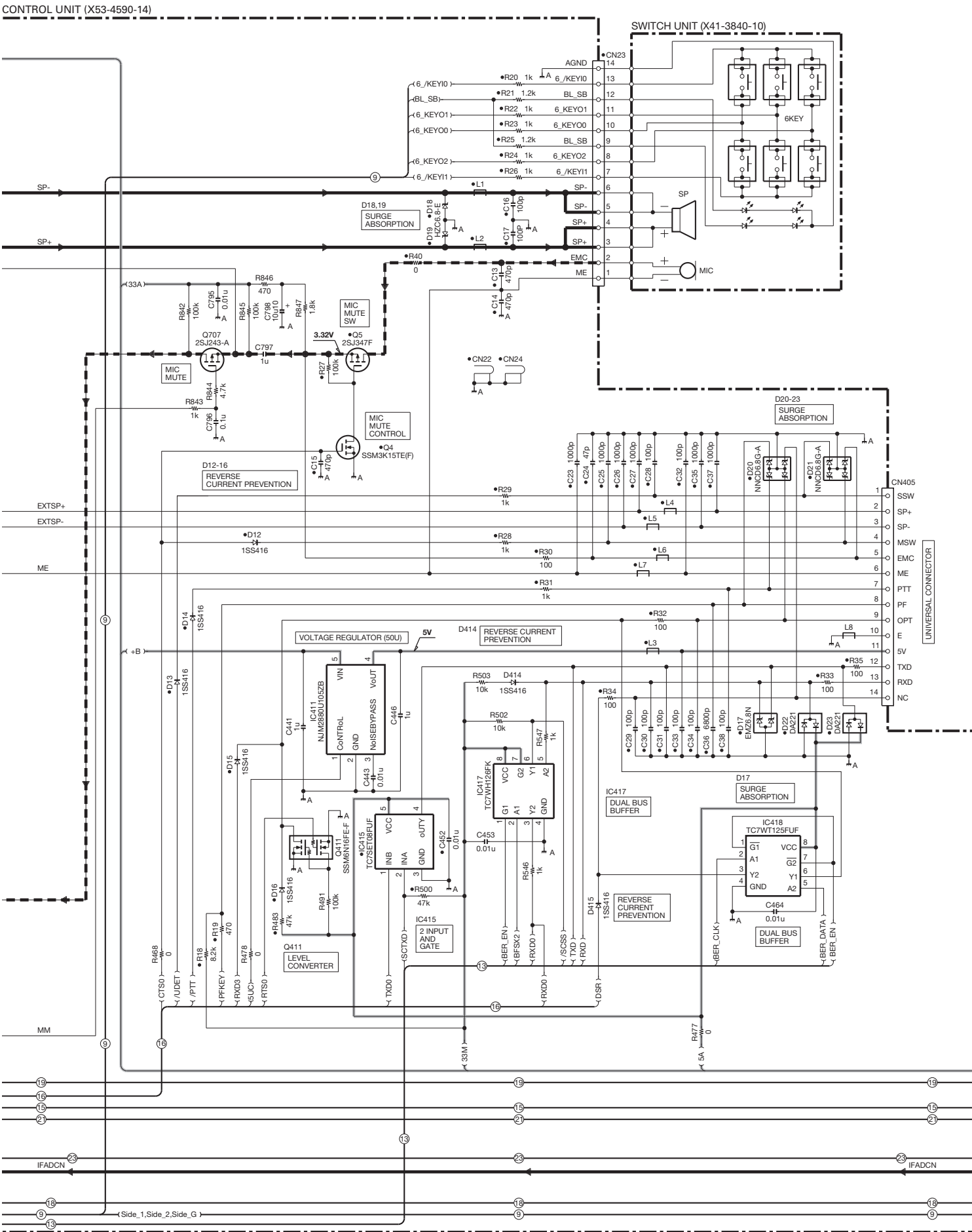


NX-303 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4590-14)

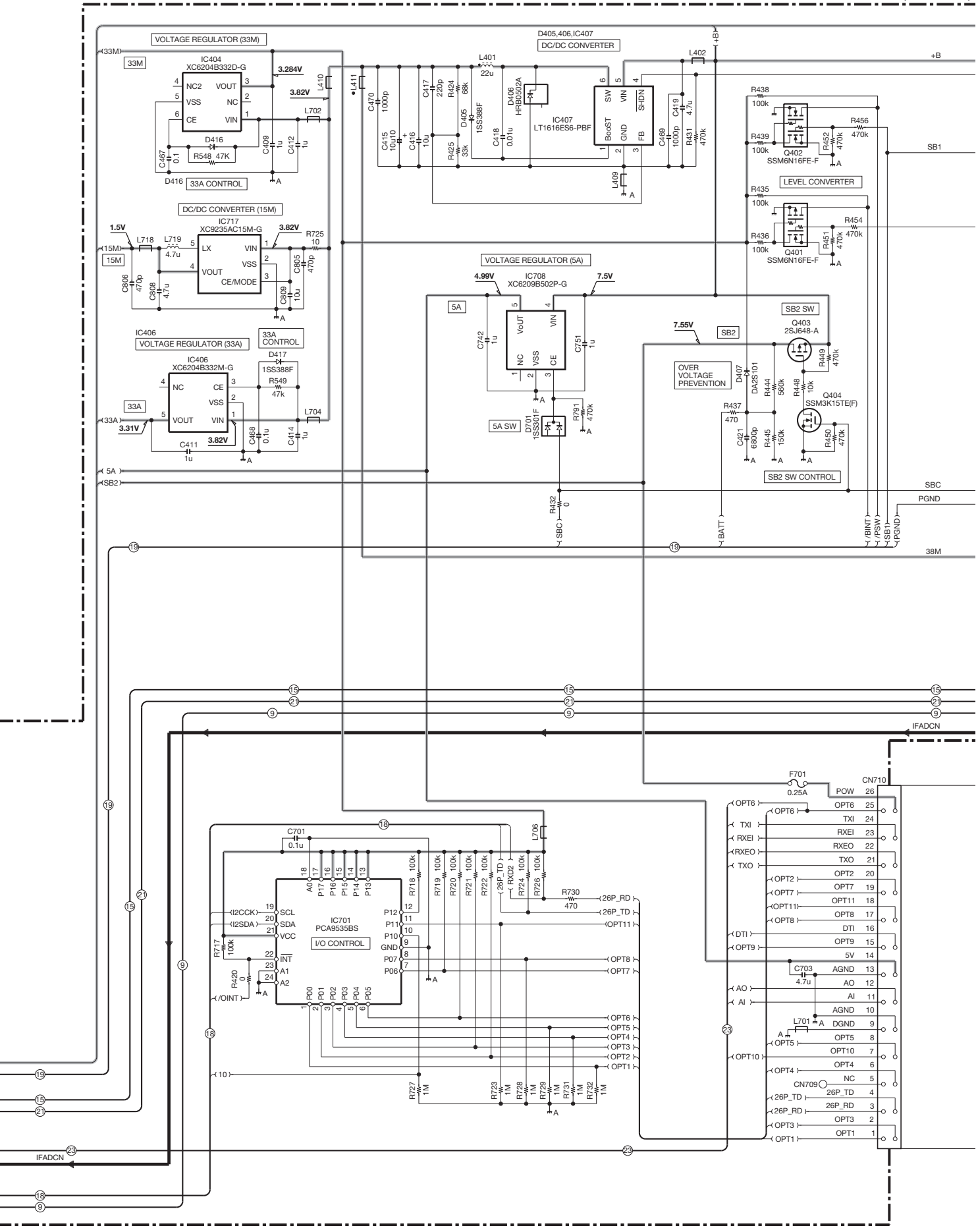


SCHEMATIC DIAGRAM NX-303



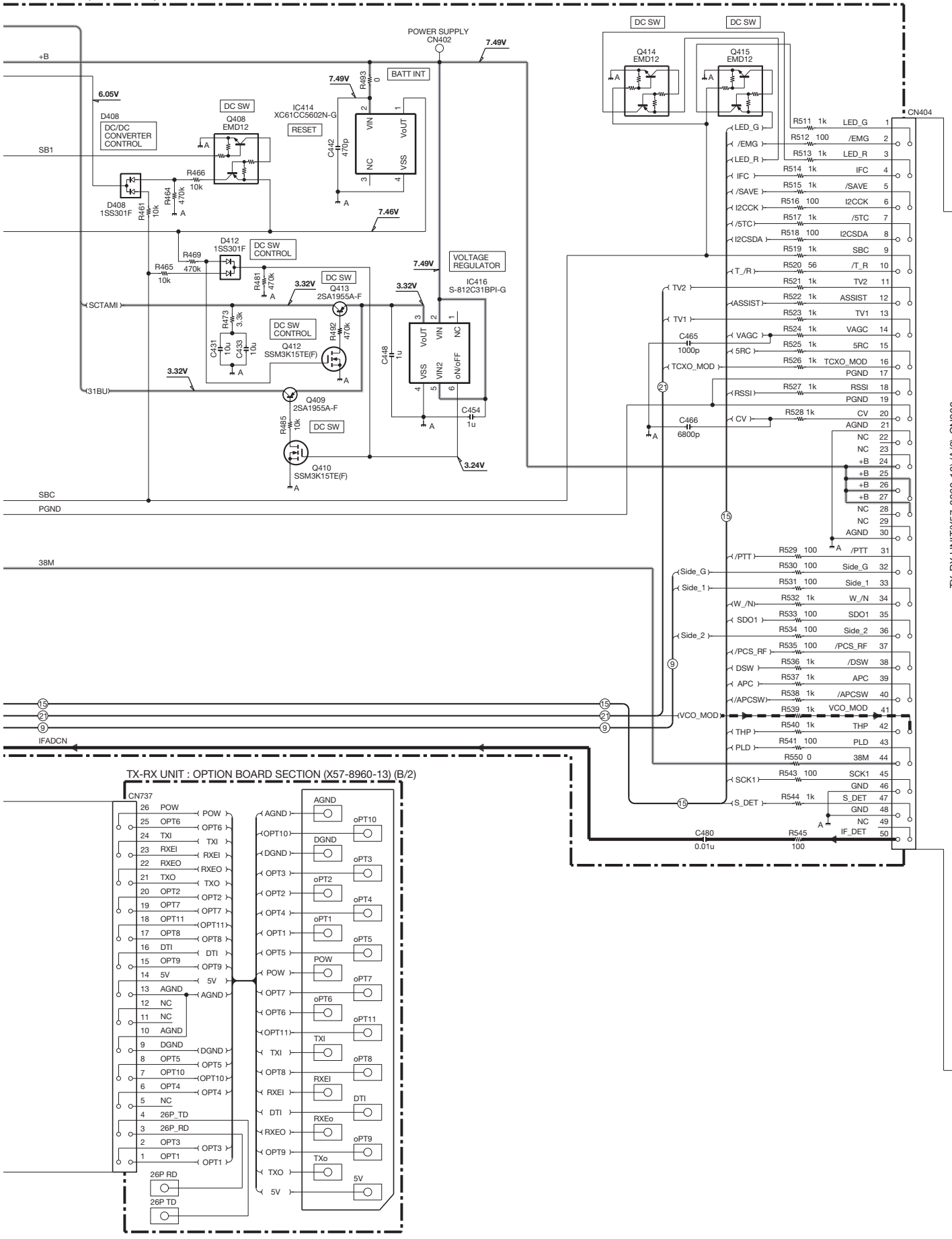
NX-303 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4590-14)



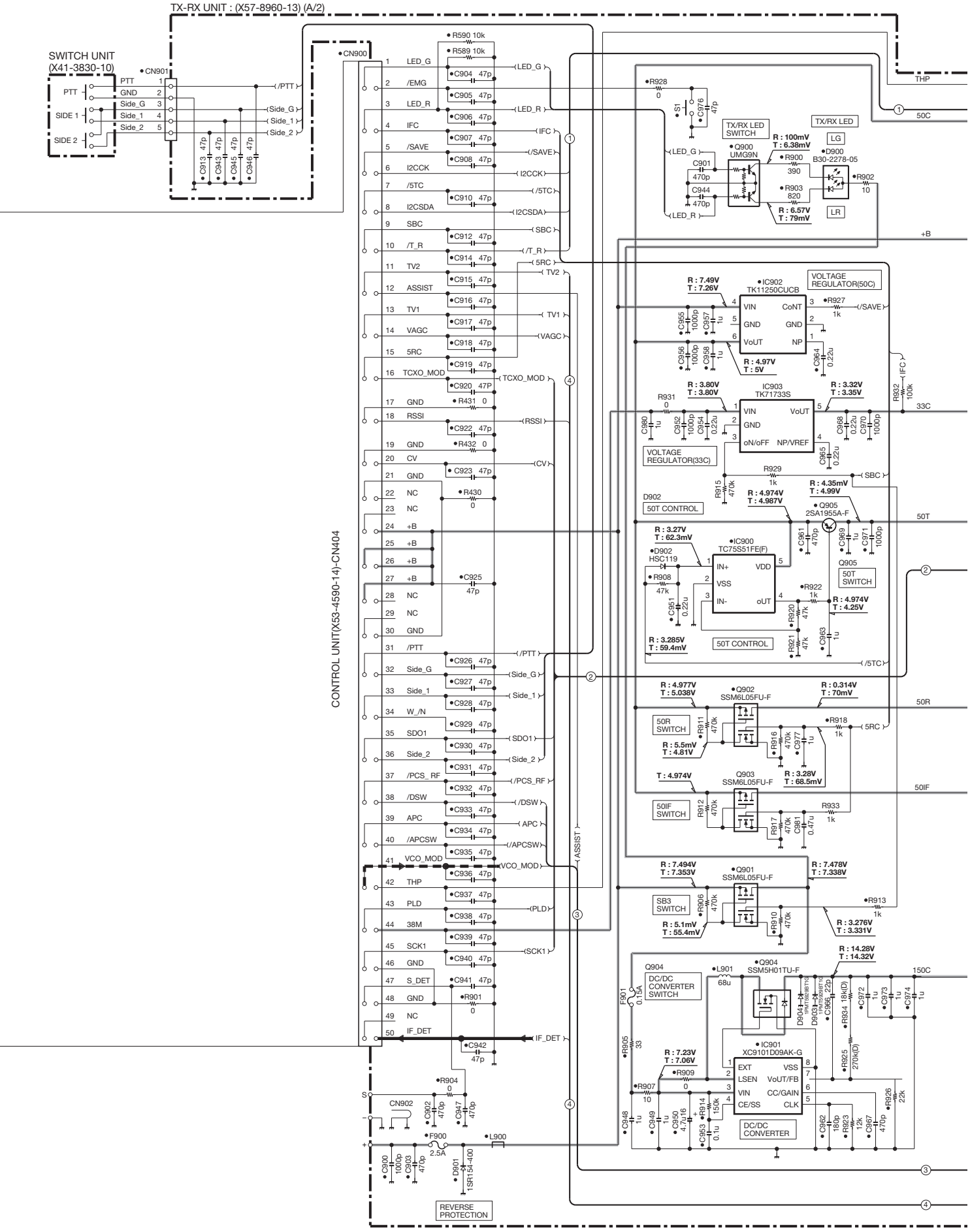
SCHEMATIC DIAGRAM NX-303

CONTROL UNIT (X53-4590-14)



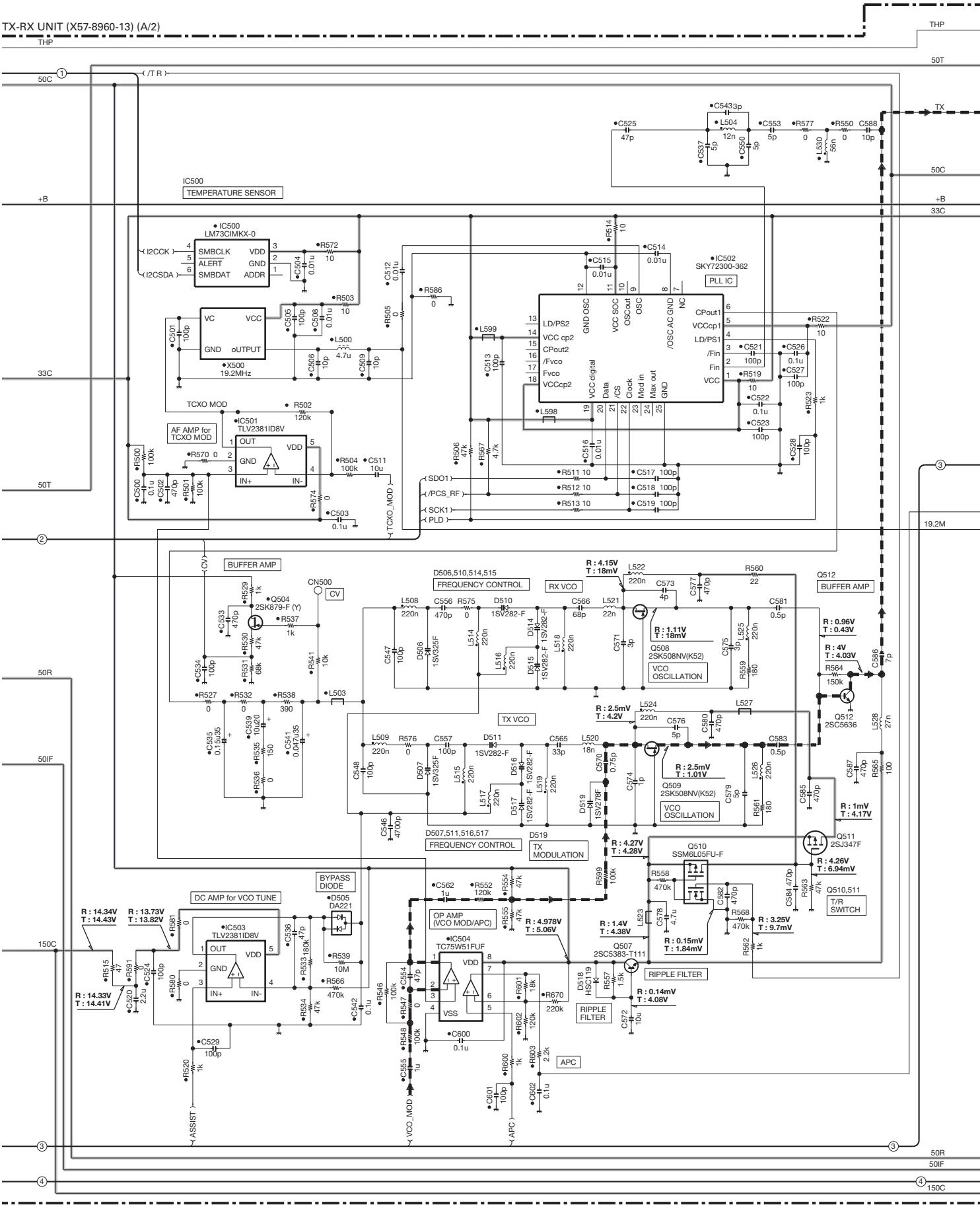
TX-RX UNIT : OPTION BOARD SECTION (X57-8960-13) (B/2)

NX-303 SCHEMATIC DIAGRAM

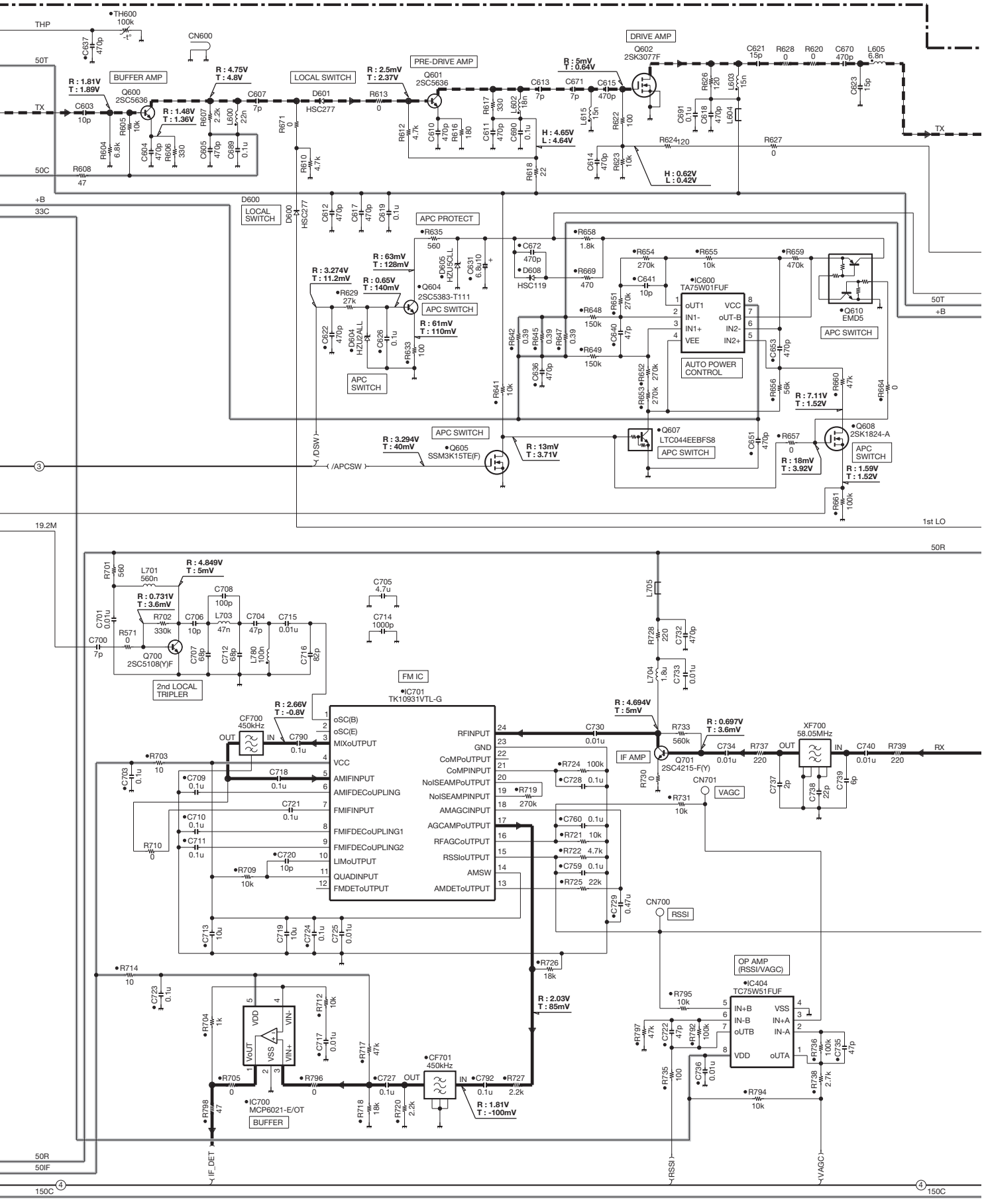


SCHEMATIC DIAGRAM NX-303

TX-RX UNIT (X57-8960-13) (A/2)

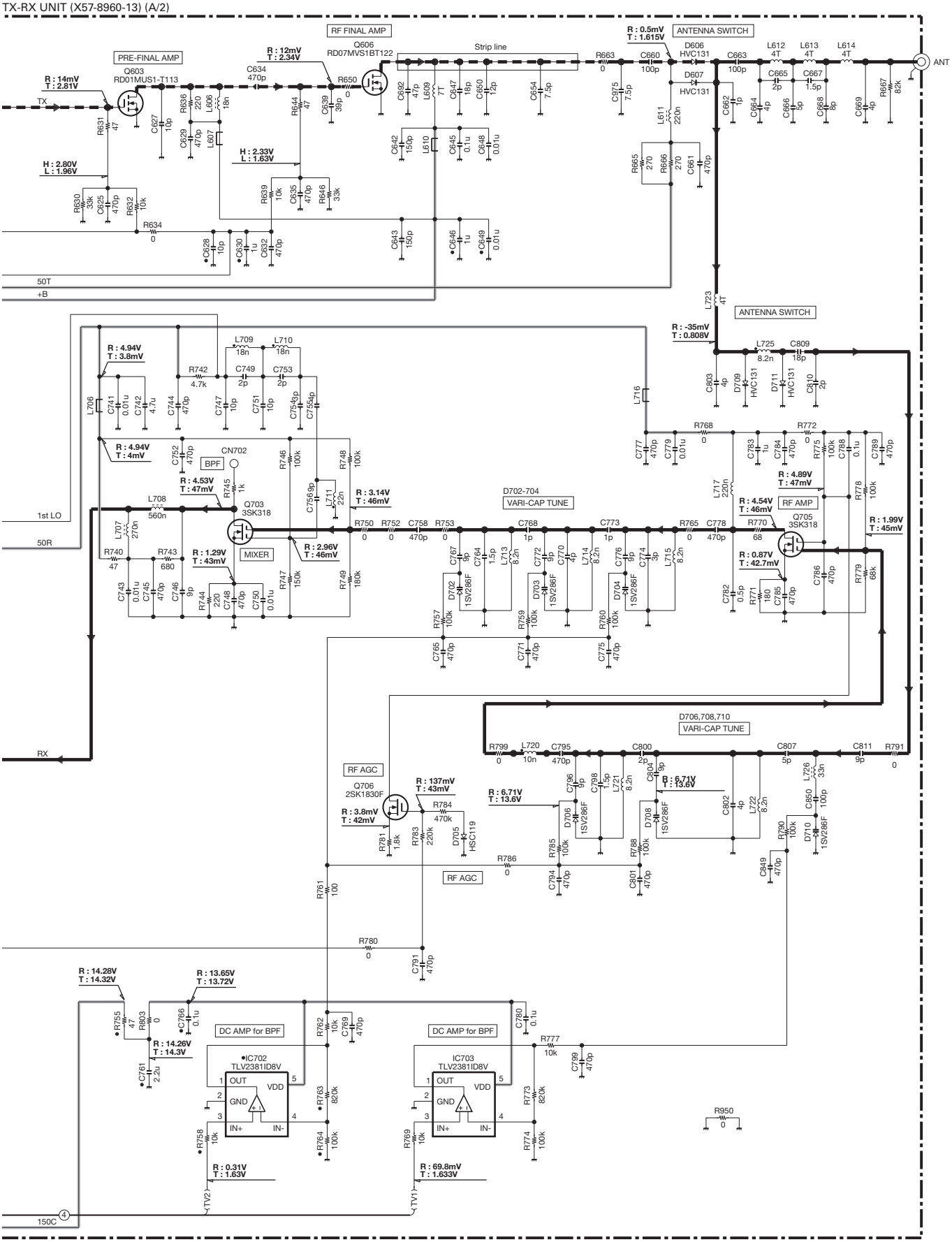


NX-303 SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM NX-303

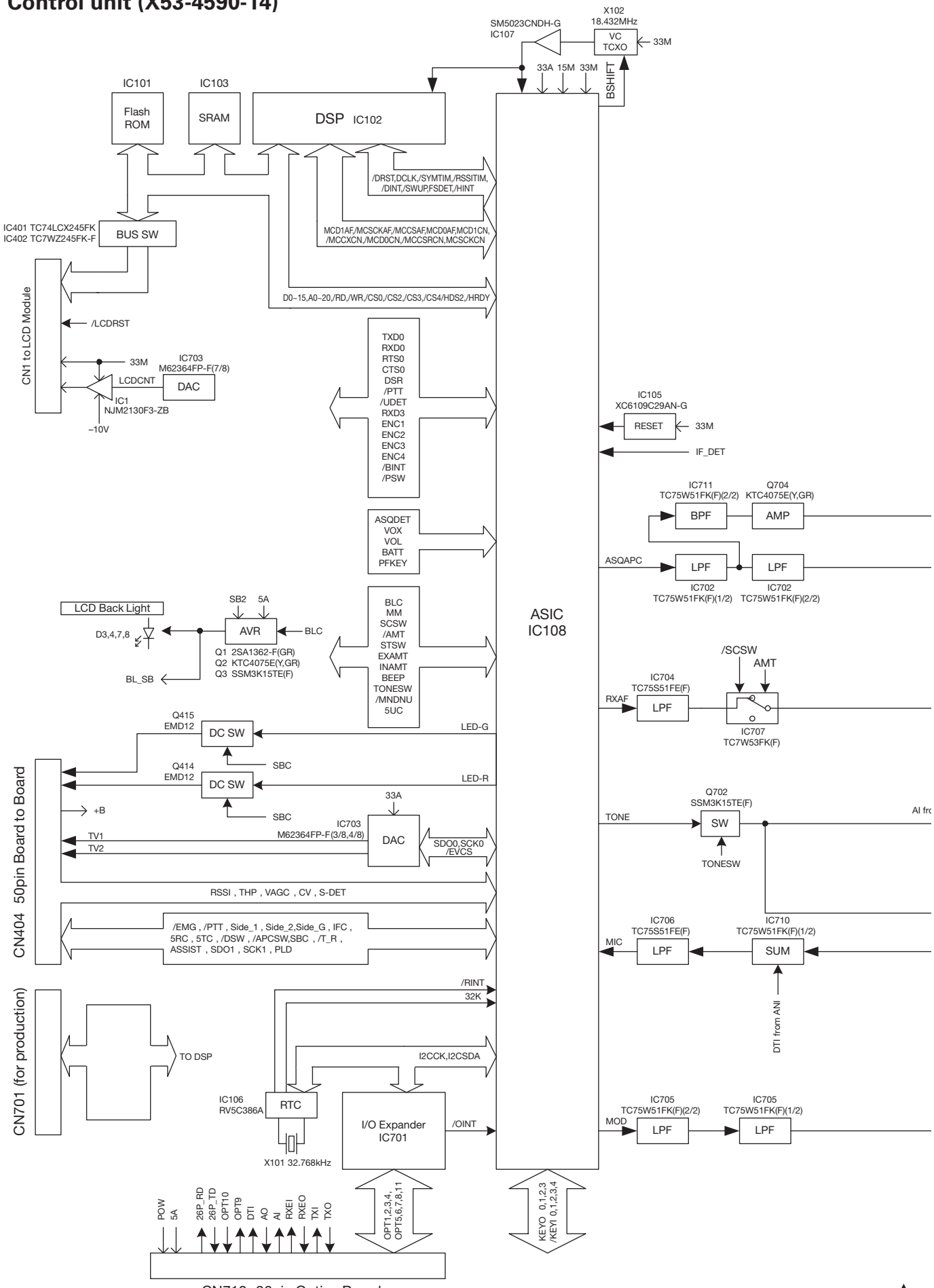
TX-RX UNIT (X57-8960-13) (A/2)

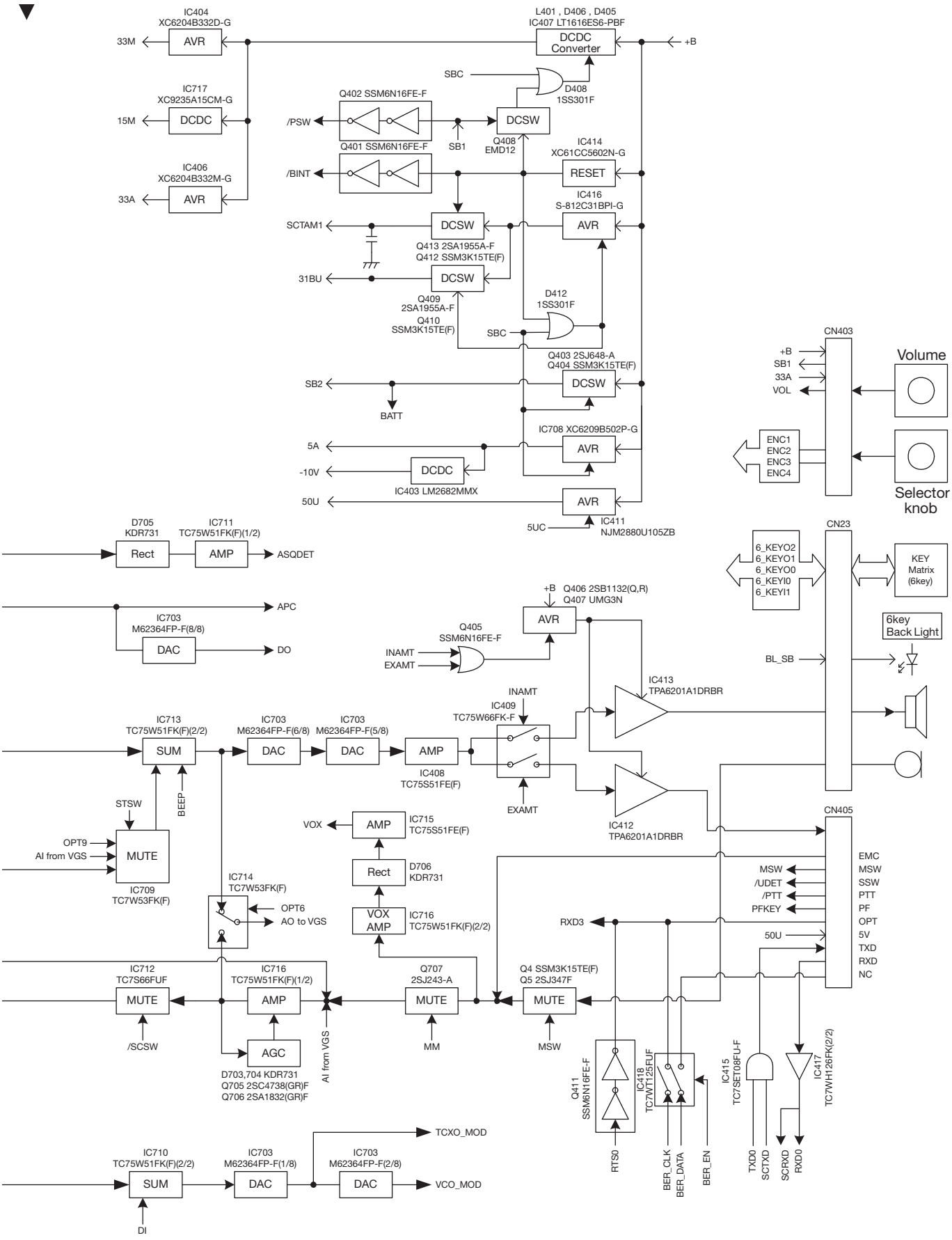


Note : The components marked with a dot (•) are parts of layer 1.

NX-303 BLOCK DIAGRAM

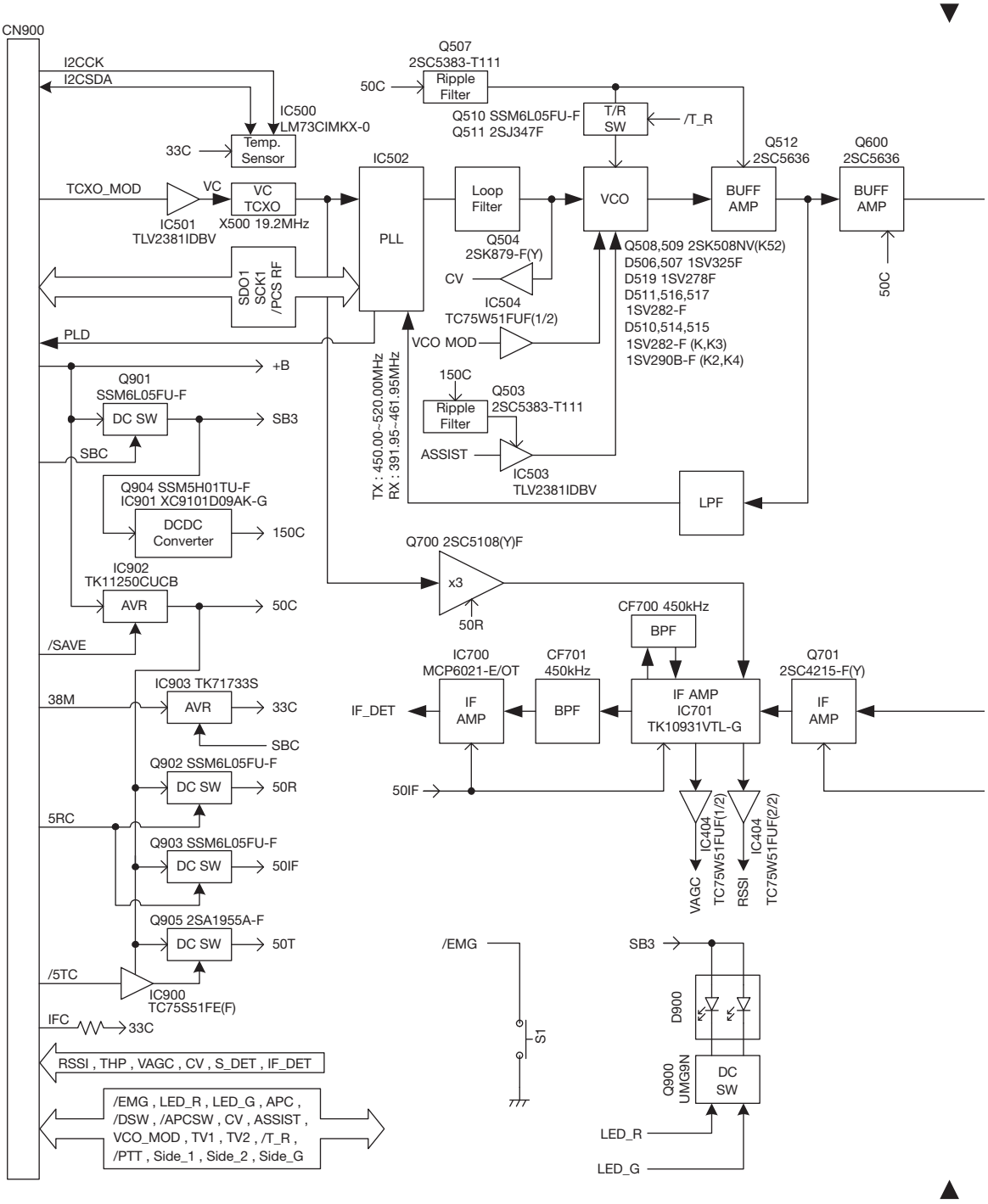
Control unit (X53-4590-14)



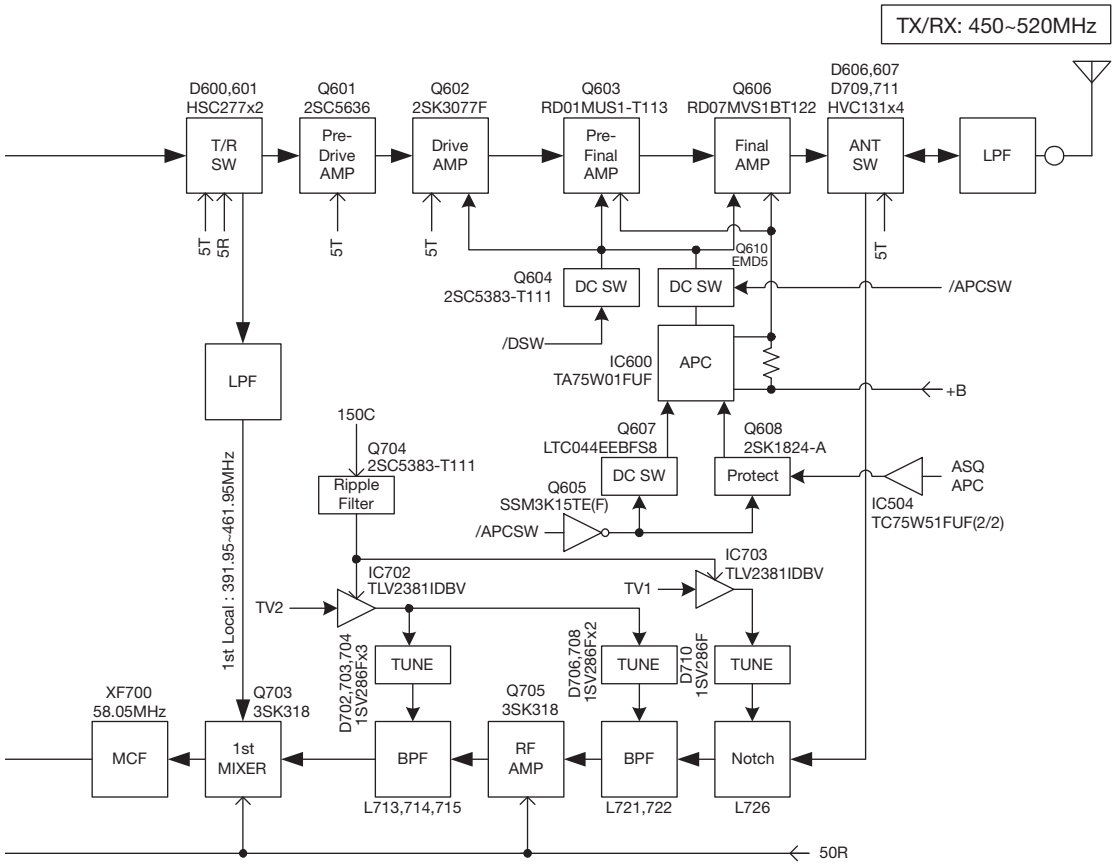

IC404
XC6204B332D-G
AVR
33M
L401 , D406 , D405
IC407 LT1616ES6-PBF
DCDC Converter
+B
SBC
D408
1SS301F
IC717
XC9235A15CM-G
DCDC
15M
Q402 SSM6N16FE-F
/PSW
SB1
DCSW
Q408
EMD12
Q401 SSM6N16FE-F
/BINT
IC414
XC61CC5602N-G
RESET
IC406
XC6204B332M-G
AVR
33A
IC416
S-812C31BPI-G
AVR
SCTAM1
DCSW
Q413 2SA1955A-F
Q412 SSM3K15TE(F)
31BU
DCSW
Q409
2SA1955A-F
Q410
SSM3K15TE(F)
D412
1SS301F
SBC
Q403 2SJ648-A
Q404 SSM3K15TE(F)
SB2
DCSW
BATT
IC708 XC6209B502P-G
5A
AVR
-10V
DCDC
IC403 LM2682MMX
50U
AVR
5UC
IC411
NJM2880U105ZB
CN403
+B
SB1
33A
VOL
Volume
ENC1
ENC2
ENC3
ENC4
Selector knob
D705
KDR731
IC711
TC75W51FK(F)(1/2)
Rect
AMP
ASQDET
CN23
6_KEYO2
6_KEYO1
6_KEYO0
6_KEYI0
6_KEYI1
KEY Matrix (6key)
6key Back Light
BL_SB
APC
IC703
M62364FP-F(8/8)
DAC
DO
+B
Q406 2SB1132(Q,R)
Q407 UMG3N
AVR
Q405
SSM6N16FE-F
INAMT
EXAMT
IC413
TPA6201A1DRBR
INAMT
IC409
TC75W66FK-F
IC713
TC75W51FK(F)(2/2)
SUM
IC703
M62364FP-F(6/8)
DAC
IC703
M62364FP-F(5/8)
DAC
AMP
IC408
TC75S51FE(F)
EXAMT
IC412
TPA6201A1DRBR
CN405
STSW
BEEP
OPT9
AI from VGS
MUTE
IC709
TC7W53FK(F)
VOX
AMP
IC715
TC75S51FE(F)
Rect
D706
KDR731
VOX AMP
IC716
TC75W51FK(F)(2/2)
IC714
TC7W53FK(F)
OPT6
AO to VGS
RXD3
EMC
MSW
/UDET
/PTT
PFKEY
PF
OPT
50U
5V
TXD
RXD
NC
IC712
TC7S66FUF
MUTE
/SCSW
IC716
TC75W51FK(F)(1/2)
AMP
AGC
D703,704 KDR731
Q705 2SC4738(GR)F
Q706 2SA1832(GR)F
AI from VGS
Q707
2SJ243-A
MUTE
MM
Q4 SSM3K15TE(F)
Q5 2SJ347F
MUTE
MSW
Q411
SSM6N16FE-F
RTS0
IC418
TC7WT125FUF
BER_CLK
BER_DATA
BER_EN
IC415
TC7SET08FU-F
IC417
TC7WH126FK(2/2)
TXD0
SCTXD
SCRXD
RXD0
TCXO_MOD
IC710
TC75W51FK(F)(2/2)
SUM
DI
IC703
M62364FP-F(1/8)
DAC
IC703
M62364FP-F(2/8)
DAC
VCO_MOD

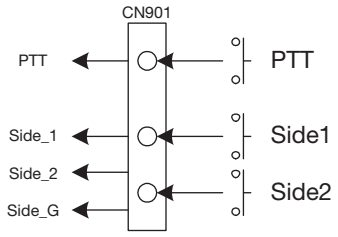
BLOCK DIAGRAM

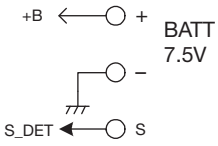
TX-RX unit (X57-8960-13)



BLOCK DIAGRAM

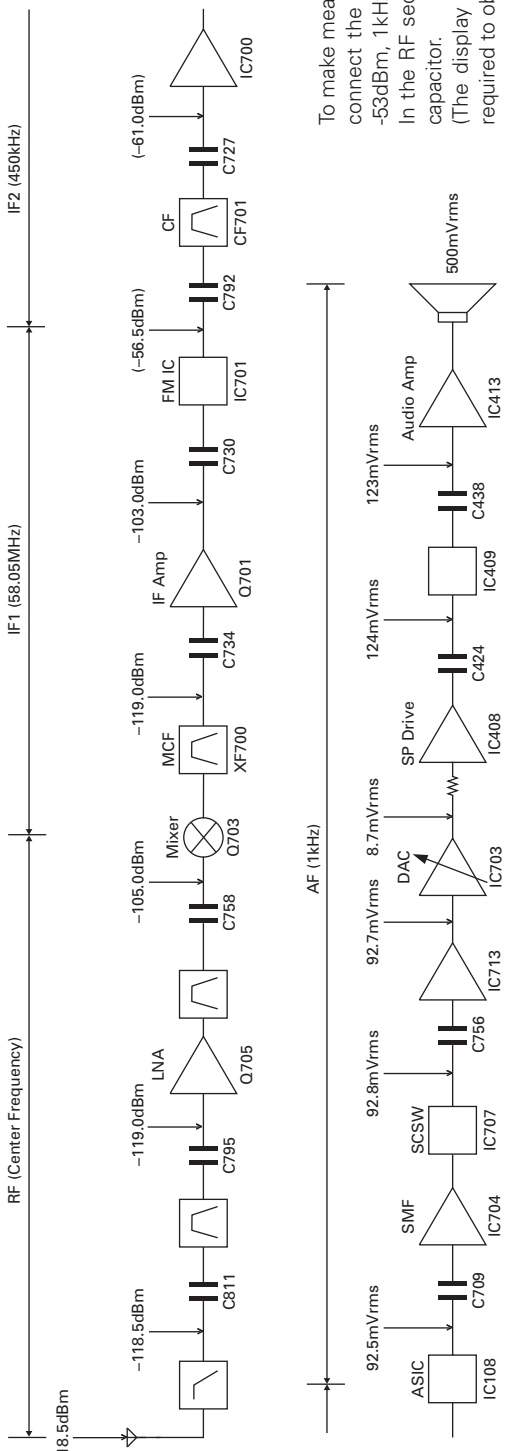






LEVEL DIAGRAM

Receiver Section



To make measurements in the AF section, connect the AC level meter. (ANT input: -53dBm, 1kHz FM, 3kHz DEV (Wide)
In the RF section, use a 1000pF coupling capacitor.
(The display shows the SSG input value required to obtain 12dB SINAD without local level.)

Transmitter Section

AG is set to the MIC input becomes (3kHz/1.5kHz) at 1kHz MOD (Wide/Narrow).
To make measurements in the AF section, connect the AC level meter.
In the RF section, use a 1000pF coupling capacitor.

OPTIONAL ACCESSORIES

KNB-50NC (Ni-MH Battery Pack)

■ **External View**

■ **Specifications**

Voltage 7.2V
Battery capacity 2000mAh

SPECIFICATIONS

GENERAL

Frequency Range	450~520 MHz
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 (with KNB-50NC)	5-5-90 duty cycle: more than 11 hours 10-10-80 duty cycle: more than 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 5.02 x 1.63 in. (58 x 127.5 x 41.3 mm)
with KNB-50NC	2.28 x 5.02 x 2.01 in. (58 x 127.5 x 51.1 mm)
Weight	
Radio only	8.82 oz (250 g)
with KNB-50NC	18.70 oz (530 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	5W/1W
Spurious Response	70dB
FM Hum and Noise	Analog @25kHz: 45dB Analog @12.5kHz: 40dB
Audio Distortion	Less than 3%
Modulation	16K0F3E, 11K0F3E, 8K30F1E, 8K30F1D, 8K30F7W, 4K00F1E, 4K00F1D, 4K00F7W, 4K00F2D

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

MEMO

KENWOOD

JVCKENWOOD Corporation
Communications Systems Business Unit

No.RQ077

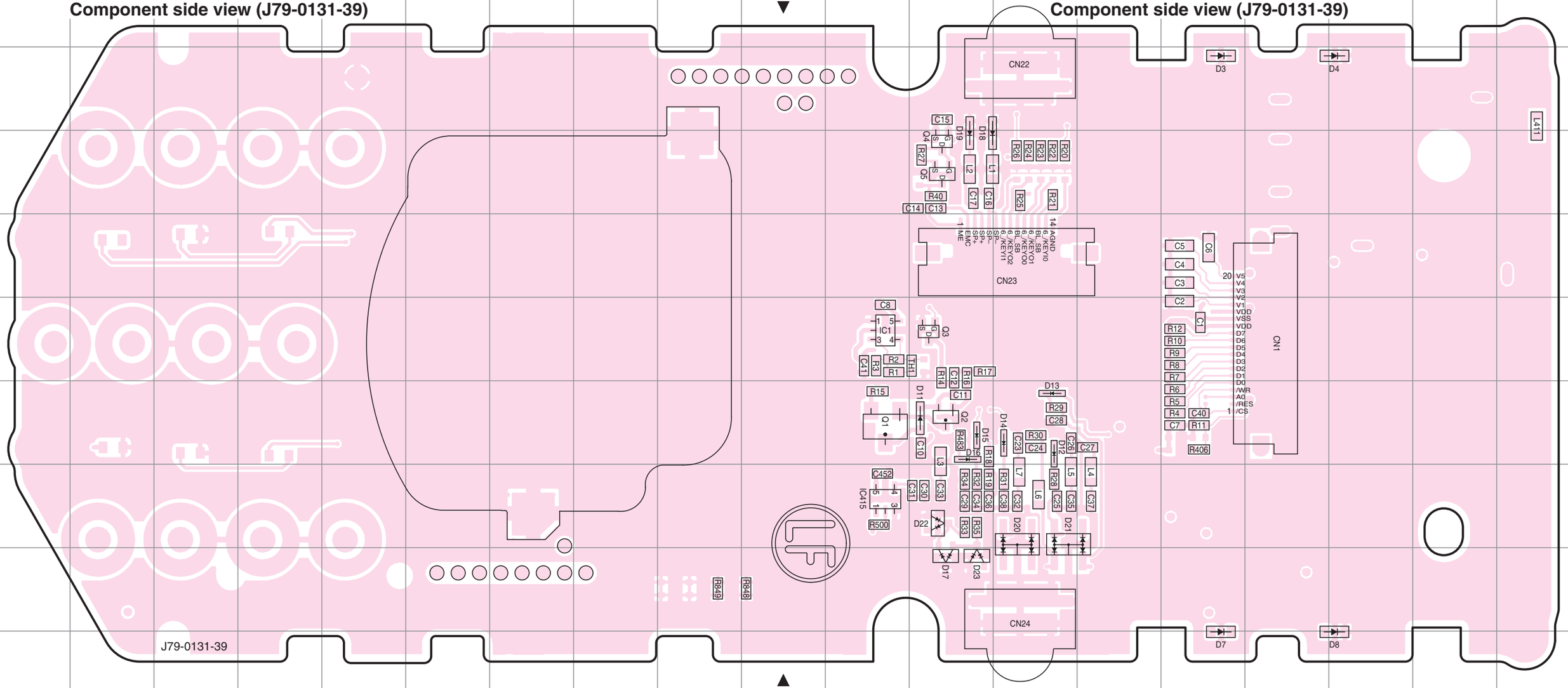
Printed in Japan

NX-303 PC BOARD

PC BOARD NX-303

CONTROL UNIT (X53-4590-14)
Component side view (J79-0131-39)

CONTROL UNIT (X53-4590-14)
Component side view (J79-0131-39)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	6K	D8	10Q	D20	8M
IC415	8K	D11	7L	D21	8M
Q1	7K	D12	7M	D22	8L
Q2	7L	D13	7M	D23	9L
Q3	6L	D14	7M		
Q4	4L	D15	7L		
Q5	4L	D16	7L		
D3	3O	D17	9L		
D4	3Q	D18	4L		
D7	10O	D19	4L		

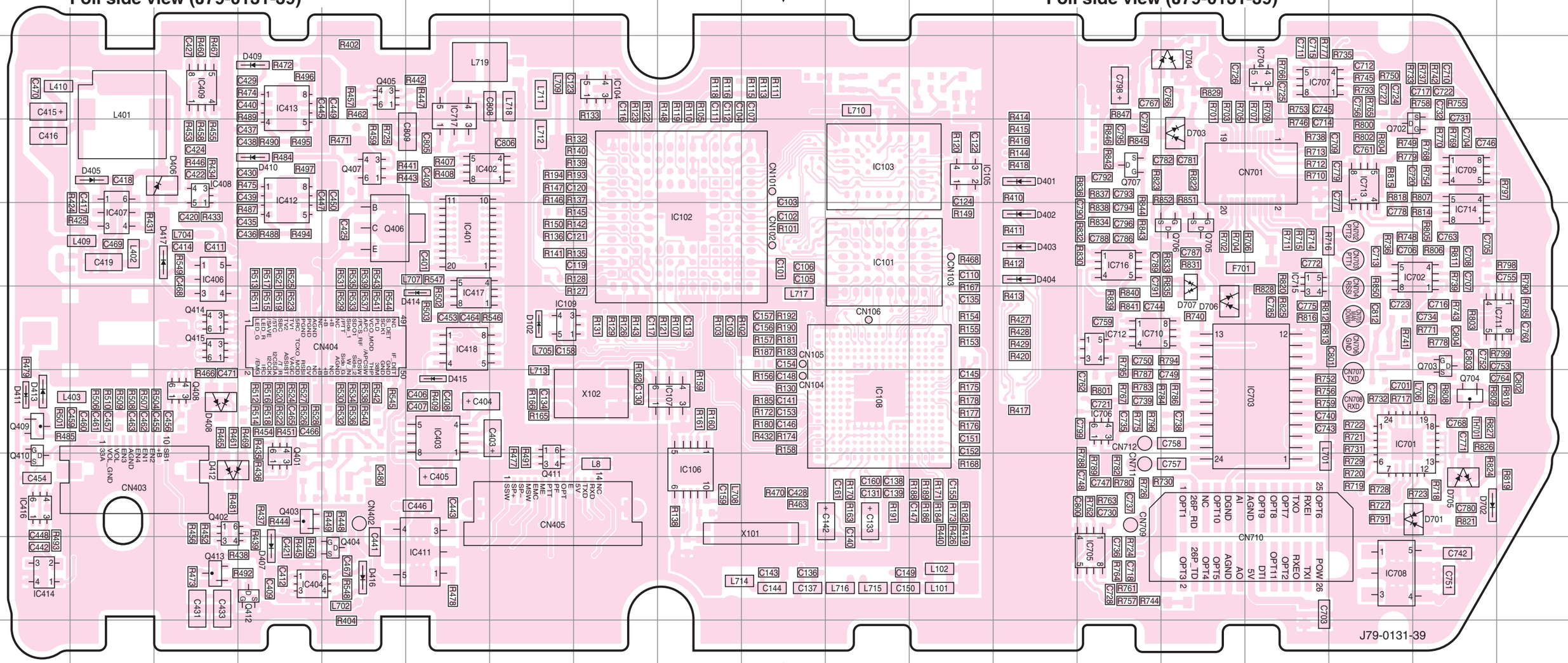
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

NX-303 PC BOARD

PC BOARD NX-303

CONTROL UNIT (X53-4590-14)
Foil side view (J79-0131-39)

CONTROL UNIT (X53-4590-14)
Foil side view (J79-0131-39)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC101	5K	IC404	9D	IC701	7Q	IC713	4Q	Q408	7C	Q706	5O	D410	4D	D705	8R
IC102	5I	IC406	5C	IC702	5R	IC714	5R	Q409	7A	Q707	4N	D411	7A	D706	6O
IC103	4K	IC407	5B	IC703	7P	IC715	5P	Q410	8A	D102	6G	D412	8C	D707	6O
IC104	3H	IC408	4C	IC704	3P	IC716	5N	Q411	8G	D401	4M	D413	7A		
IC105	4L	IC409	3C	IC705	9N	IC717	3F	Q412	9D	D402	5M	D414	6F		
IC106	8I	IC411	9F	IC706	7N	Q401	8D	Q413	9C	D403	5M	D415	7F		
IC107	7I	IC412	4D	IC707	3P	Q402	8C	Q414	6C	D404	5M	D416	9E		
IC108	7K	IC413	3D	IC708	9Q	Q403	8D	Q415	6C	D405	4B	D417	5C		
IC109	6G	IC414	9A	IC709	4R	Q404	9E	Q702	4R	D406	4C	D701	8R		
IC401	5F	IC416	8A	IC710	6N	Q405	3E	Q703	6R	D407	9D	D702	8R		
IC402	4F	IC417	6F	IC711	6S	Q406	5E	Q704	7R	D408	7C	D703	4O		
IC403	7F	IC418	6F	IC712	6N	Q407	4E	Q705	5O	D409	3D	D704	3O		

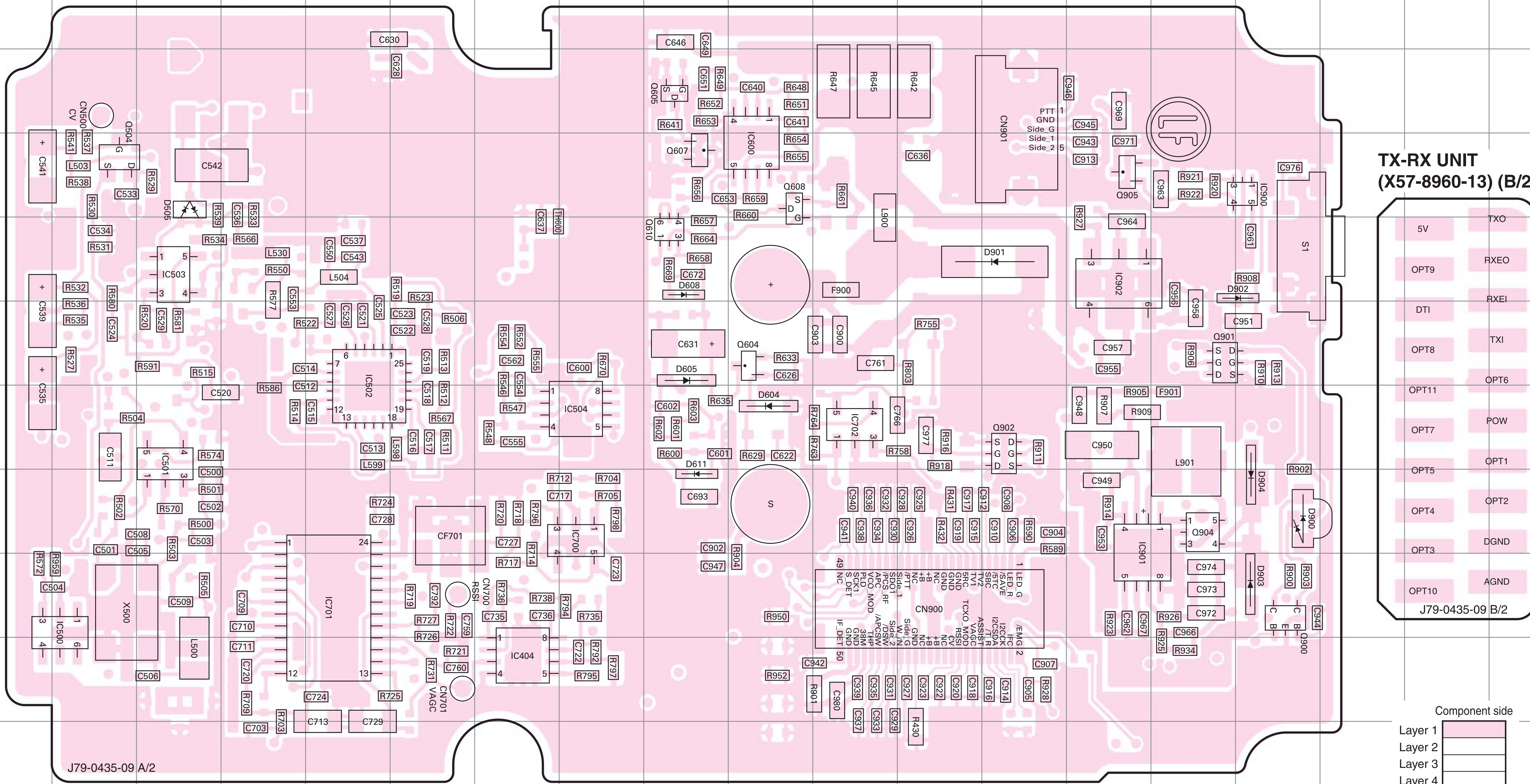
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

PC BOARD NX-303

TX-RX UNIT (X57-8960-13) (A/2)
Component side view (J79-0435-09 A/2)

TX-RX UNIT (X57-8960-13) (A/2)
Component side view (J79-0435-09 A/2)

TX-RX UNIT (X57-8960-13) (B/2)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC404	10G	IC700	8H	Q604	6J	Q902	7M	D611	8I
IC500	9B	IC701	9E	Q605	3I	Q904	9O	D900	8P
IC501	7C	IC702	7K	Q607	4I	Q905	4N	D901	5M
IC502	7E	IC900	4P	Q608	4J	D505	4C	D902	5P
IC503	5C	IC901	9O	Q610	5I	D604	7J	D903	9P
IC504	7H	IC902	5N	Q900	9P	D605	6I	D904	8P
IC600	4J	Q504	4B	Q901	7N	D608	5I		

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

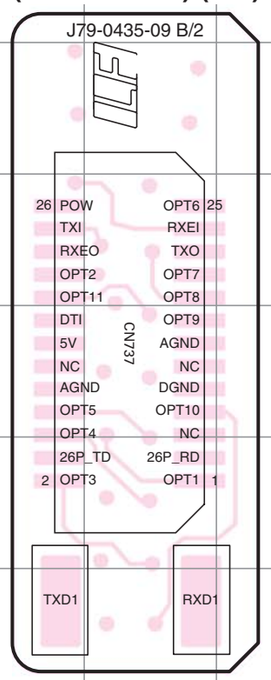
PC BOARD NX-303

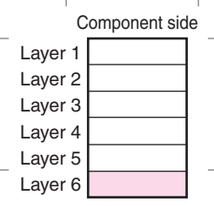
TX-RX UNIT (X57-8960-13) (A/2)
Foil side view (J79-0435-09 A/2)

TX-RX UNIT (X57-8960-13)
Foil side view (J79-0435-09 A/2)

TX-RX UNIT (X57-8960-13) (B/2)

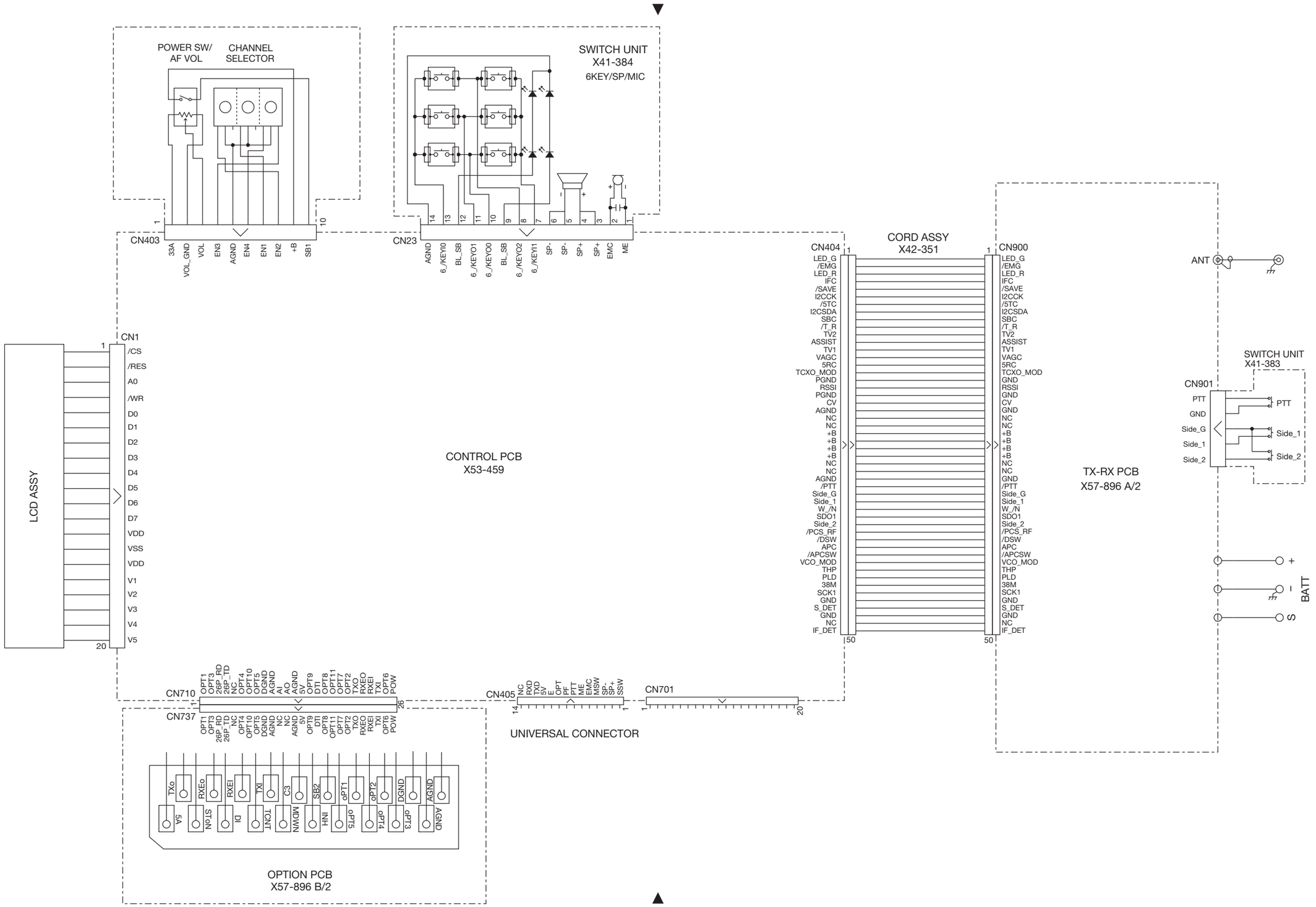
J79-0435-09 B/2

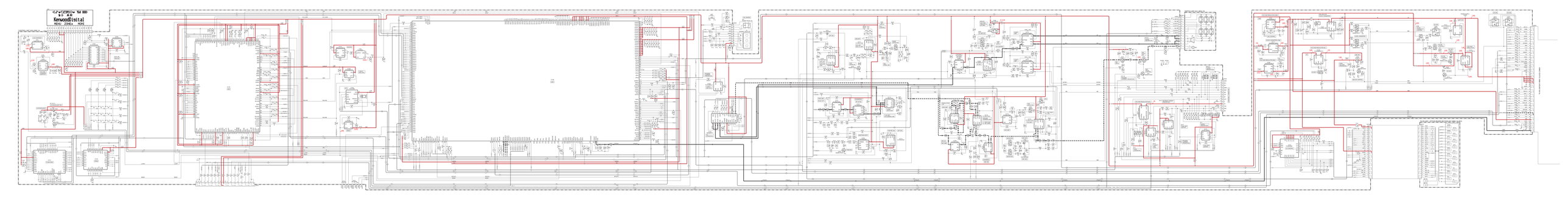


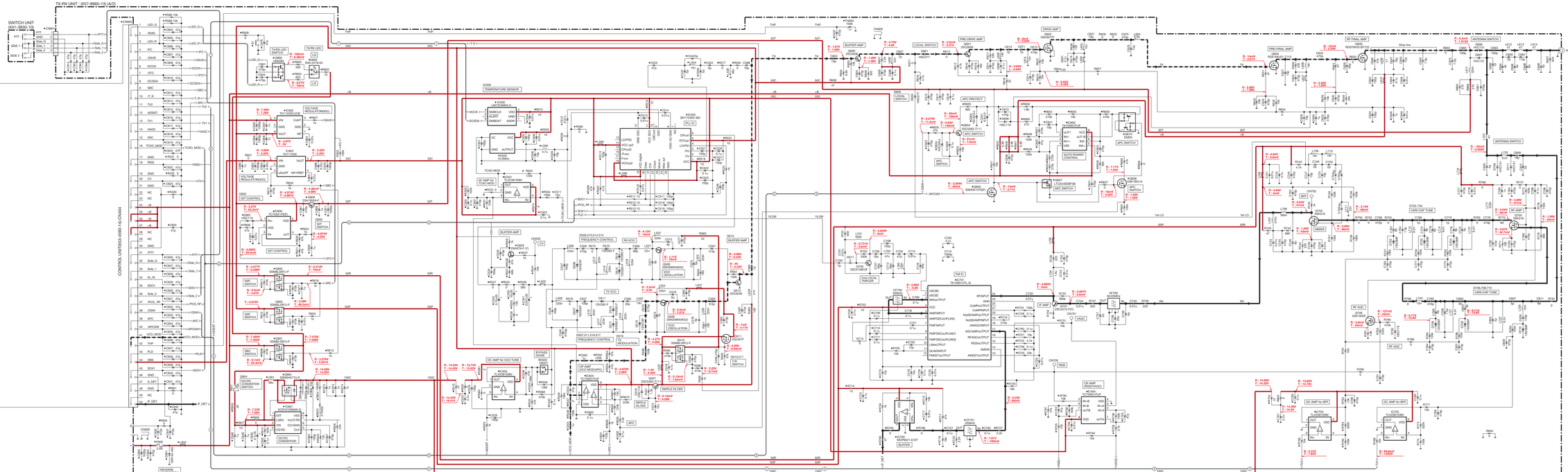


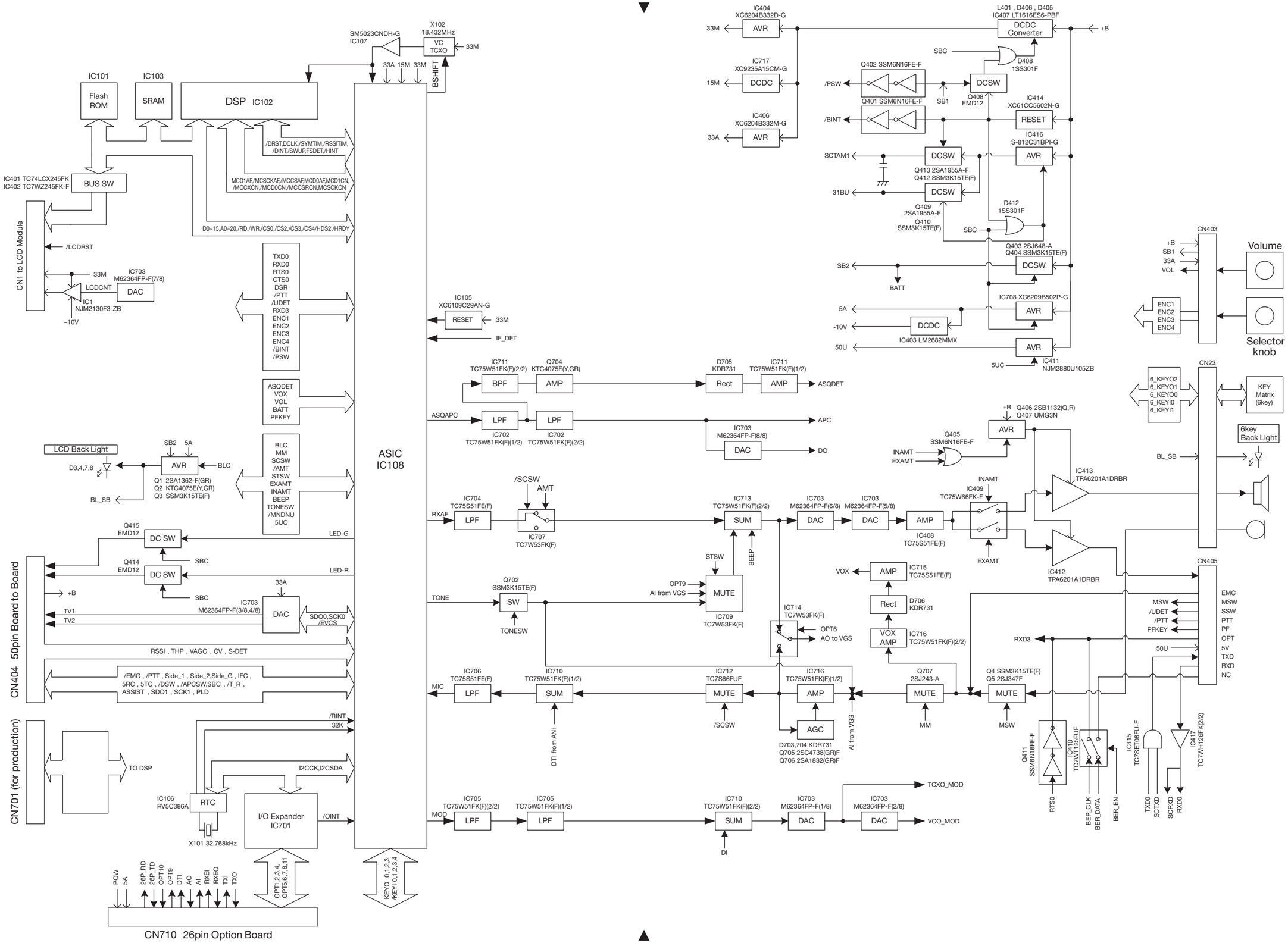
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC703	8H	Q512	6P	Q701	10O	D510	4Q	D519	4R	D704	10H
IC903	7D	Q600	7P	Q703	9K	D511	4S	D600	7M	D705	10E
Q507	7Q	Q601	7N	Q705	10F	D514	4P	D601	8O	D706	8E
Q508	5P	Q602	6N	Q706	10E	D515	4P	D606	5H	D708	8E
Q509	5Q	Q603	4N	Q903	8D	D516	4R	D607	5G	D709	6G
Q510	7R	Q606	4L	D506	3P	D517	4R	D702	10I	D710	7E
Q511	6R	Q700	9R	D507	3Q	D518	7Q	D703	10I	D711	6F

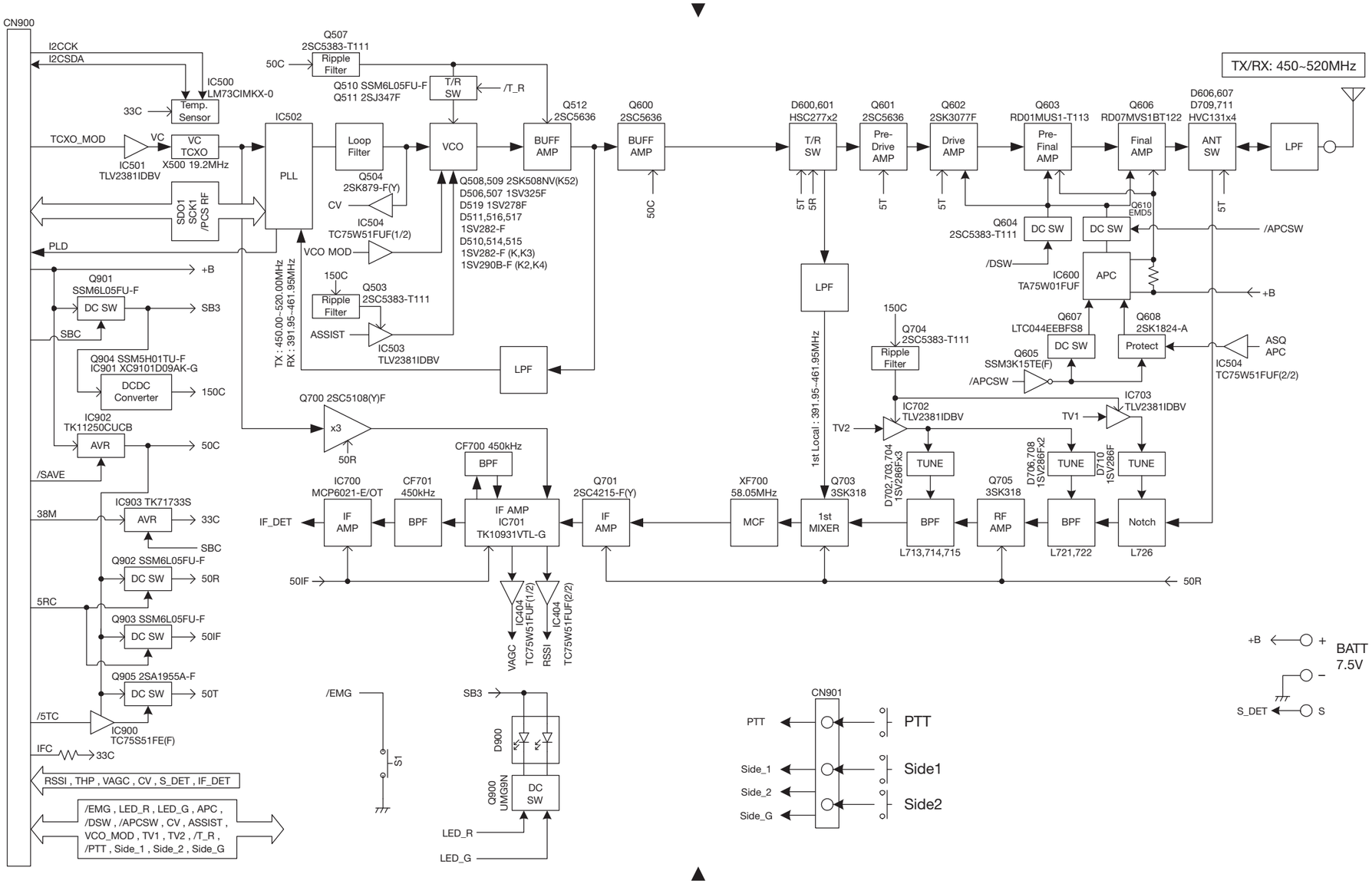
4


POWER SW/
AF VOL
CHANNEL
SELECTOR
SWITCH UNIT
X41-384
6KEY/SP/MIC
CN403
33A
VOL_GND
VOL
EN3
AGND
EN4
EN1
EN2
+B
SB1
CN23
AGND
6_/KEY10
BL_SB
6_/KEY01
6_/KEY00
BL_SB
6_/KEY02
6_/KEY11
SP-
SP-
SP+
SP+
EMC
ME
CN404
CORD ASSY
X42-351
CN900
LED_G
/EMG
LED_R
IFC
/SAVE
I2CCK
/5TC
I2CSDA
SBC
/T_R
TV2
ASSIST
TV1
VAGC
5RC
TCXO_MOD
PGND
RSSI
PGND
CV
AGND
NC
NC
+B
+B
+B
+B
NC
NC
AGND
/PTT
Side_G
Side_1
W_/N
SDO1
Side_2
/PCS_RF
/DSW
APC
/APCSW
VCO_MOD
THP
PLD
38M
SCK1
GND
S_DET
GND
NC
IF_DET
ANT
SWITCH UNIT
X41-383
CN901
PTT
GND
Side_G
Side_1
Side_2
PTT
Side_1
Side_2
TX-RX PCB
X57-896 A/2
BATT
+
-
S
LCD ASSY
CN1
/CS
/RES
A0
/WR
D0
D1
D2
D3
D4
D5
D6
D7
VDD
VSS
VDD
V1
V2
V3
V4
V5
CONTROL PCB
X53-459
CN710
CN737
OPT1
OPT3
26P_RD
26P_TD
NC
OPT4
OPT10
OPT5
DGND
AGND
AI
AO
AGND
5V
OPT9
DTI
OPT8
OPT11
OPT7
OPT2
TXO
RXEO
RXEI
TXI
OPT6
POW
CN405
NC
RXD
TXD
5V
E
OPT
PF
PTT
ME
EMIC
MSW
SP+
SSW
CN701
UNIVERSAL CONNECTOR
TXo
RXEo
RXEI
TXI
C3
SB2
oPT1
oPT2
DGND
AGND
5A
ST-ON
DI
TCNT
MDWN
HNI
oPT5
oPT4
oPT3
AGND
OPTION PCB
X57-896 B/2




TX-RX UNIT : (X57-8960-13) (A/2)
SWITCH UNIT (X61-3830-10)
CONTROL UNIT(X53-4960-14) (CH404)
TX/RX LED SWITCH
TX/RX LED
VOLTAGE REGULATOR(5VSC)
VOLTAGE REGULATOR(3VSC)
SOT CONTROL
SOT SWITCH
SIR SWITCH
SOT SWITCH
DC/DC CONVERTER SWITCH
DC/DC CONVERTER
REVERSE PROTECTION
TEMPERATURE SENSOR
TCXO MOD.
AF AMP for TCXO MOD.
BUFFER AMP
FREQUENCY CONTROL
RX VCO
TX VCO
VCO OSCILLATION
OP AMP LPCC MOD/APC
APC
RIPPLE FILTER
DC AMP for VCO TUNE
SWITCH
LOCAL SWITCH
PRE-DRIVE AMP
DRIVE AMP
APC PROTECT
APC SWITCH
AUTO POWER CONTROL
PRE-FINAL AMP
RF FINAL AMP
ANTENNA SWITCH
FM IC
FM LOCAL TANK
IF AMP
OP AMP (RSSI/VAGC)
DC AMP for BPF
RF AGC
VARI-CAP TUNE
BUFFER


IC101
Flash ROM
IC103
SRAM
DSP IC102
SM5023CNDH-G
IC107
X102
18.432MHz
VC TCXO
33M
33A 15M 33M
BSHIFT
/DRST,DCLK,/SYMTIM,/RSSITIM, /DINT,/SWUP,FSDET,/HINT
MCD1AF,/MCSCKAF,/MCCSAF,MCD0AF,MCD1CN, /MCCXCN,/MCD0CN,/MCCSRCN,MCSCKCN
D0-15,A0-20,/RD,/WR,/CS0,/CS2,/CS3,/CS4/HDS2,/HRDY
IC401 TC74LCX245FK
IC402 TC7WZ245FK-F
BUS SW
CN1 to LCD Module
/LCDRST
33M
LCDCNT
IC703
M62364FP-F(7/8)
DAC
IC1
NJM2130F3-ZB
-10V
TXD0
RXD0
RTS0
CTS0
DSR
/PTT
/UDET
RXD3
ENC1
ENC2
ENC3
ENC4
/BINT
/PSW
ASQDET
VOX
VOL
BATT
PFKEY
BLC
MM
SCSW
/AMT
STSW
EXAMT
INAMT
BEEP
TONESW
/MNDNU
5UC
LCD Back Light
D3,4,7,8
SB2 5A
AVR
BLC
Q1 2SA1362-F(GR)
Q2 KTC4075E(Y,GR)
Q3 SSM3K15TE(F)
BL_SB
Q415
EMD12
DC SW
LED-G
Q414
EMD12
DC SW
LED-R
SBC
33A
+B
TV1
TV2
IC703
M62364FP-F(3/8,4/8)
DAC
SDO0,SCK0
/EVCS
RSSI , THP , VAGC , CV , S-DET
/EMG , /PTT , Side_1 , Side_2,Side_G , IFC , 5RC , 5TC , /DSW , /APCSW,SBC , /T_R , ASSIST , SDO1 , SCK1 , PLD
CN404 50pin Board to Board
CN701 (for production)
TO DSP
/RINT
32K
I2CCK,I2CSDA
IC106
RV5C386A
RTC
X101 32.768kHz
I/O Expander
IC701
/OINT
POW
5A
26P_RD
26P_TD
OPT10
OPT9
DTI
AO
AI
RXEI
RXEO
TXI
TXO
OPT1,2,3,4, OPT5,6,7,8,11
KEY0 0,1,2,3
/KEY1 0,1,2,3,4
CN710 26pin Option Board
ASIC
IC108
IC105
XC6109C29AN-G
RESET
33M
IF_DET
IC711
TC75W51FK(F)(2/2)
Q704
KTC4075E(Y,GR)
BPF
AMP
D705
KDR731
Rect
IC711
TC75W51FK(F)(1/2)
AMP
ASQDET
ASQAPC
LPF
LPF
IC702
TC75W51FK(F)(1/2)
IC702
TC75W51FK(F)(2/2)
APC
IC703
M62364FP-F(8/8)
DAC
DO
/SCSW
AMT
IC704
TC75S51FE(F)
RXAF
LPF
IC707
TC7W53FK(F)
IC713
TC75W51FK(F)(2/2)
SUM
BEEP
IC703
M62364FP-F(6/8)
DAC
IC703
M62364FP-F(5/8)
DAC
AMP
IC408
TC75S51FE(F)
INAMT
IC409
TC75W66FK-F
EXAMT
IC413
TPA6201A1DRBR
IC412
TPA6201A1DRBR
STSW
Q702
SSM3K15TE(F)
TONE
SW
TONESW
OPT9
AI from VGS
MUTE
IC709
TC7W53FK(F)
IC714
TC7W53FK(F)
OPT6
AO to VGS
VOX
AMP
IC715
TC75S51FE(F)
Rect
D706
KDR731
VOX
AMP
IC716
TC75W51FK(F)(2/2)
IC706
TC75S51FE(F)
MIC
LPF
IC710
TC75W51FK(F)(1/2)
SUM
DTI from ANI
IC712
TC7S66FUF
MUTE
/SCSW
IC716
TC75W51FK(F)(1/2)
AMP
AGC
D703,704 KDR731
Q705 2SC4738(GR)F
Q706 2SA1832(GR)F
AI from VGS
Q707
2SJ243-A
MUTE
MM
Q4 SSM3K15TE(F)
Q5 2SJ347F
MUTE
MSW
RXD3
Q411
SSM6N16FE-F
IC418
TC7WT125FUF
RTS0
BER_CLK
BER_DATA
BER_EN
IC415
TC7SET08FU-F
IC417
TC7WH126FK(2/2)
TXD0
SCTXD
SCRXD
RXD0
IC705
TC75W51FK(F)(2/2)
MOD
LPF
IC705
TC75W51FK(F)(1/2)
LPF
IC710
TC75W51FK(F)(2/2)
SUM
DI
IC703
M62364FP-F(1/8)
DAC
IC703
M62364FP-F(2/8)
DAC
TCXO_MOD
VCO_MOD
IC404
XC6204B332D-G
33M
AVR
IC717
XC9235A15CM-G
15M
DCDC
IC406
XC6204B332M-G
33A
AVR
L401 , D406 , D405
IC407 LT1616ES6-PBF
DCDC Converter
+B
SBC
D408
1SS301F
Q402 SSM6N16FE-F
/PSW
Q401 SSM6N16FE-F
/BINT
SB1
DCSW
Q408
EMD12
IC414
XC61CC5602N-G
RESET
IC416
S-812C31BPI-G
AVR
SCTAM1
DCSW
Q413 2SA1955A-F
Q412 SSM3K15TE(F)
31BU
DCSW
Q409
2SA1955A-F
Q410
SSM3K15TE(F)
D412
1SS301F
SBC
Q403 2SJ648-A
Q404 SSM3K15TE(F)
DCSW
SB2
BATT
IC708 XC6209B502P-G
AVR
5A
-10V
DCDC
IC403 LM2682MMX
50U
AVR
5UC
IC411
NJM2880U105ZB
+B Q406 2SB1132(Q,R)
Q407 UMG3N
AVR
Q405
SSM6N16FE-F
INAMT
EXAMT
CN403
+B
SB1
33A
VOL
ENC1
ENC2
ENC3
ENC4
Volume
Selector knob
CN23
6_KEYO2
6_KEYO1
6_KEYO0
6_KEYI0
6_KEYI1
KEY Matrix (6key)
6key Back Light
BL_SB
CN405
EMC
MSW
SSW
PTT
PF
OPT
5V
TXD
RXD
NC
MSW
/UDET
/PTT
PFKEY
50U


CN900
I2CCK
I2CSDA
IC500
LM73CIMKX-0
Temp. Sensor
33C
TCXO_MOD
VC
VC TCXO
IC501
TLV2381IDBV
X500 19.2MHz
IC502
PLL
SDO1
SCK1
/PCS RF
PLD
+B
Q901
SSM6L05FU-F
DC SW
SB3
SBC
Q904 SSM5H01TU-F
IC901 XC9101D09AK-G
DCDC Converter
150C
IC902
TK11250CUCB
AVR
50C
/SAVE
IC903 TK71733S
38M
33C
SBC
Q902 SSM6L05FU-F
50R
5RC
Q903 SSM6L05FU-F
50IF
Q905 2SA1955A-F
50T
/5TC
IC900
TC75S51FE(F)
IFC
33C
RSSI , THP , VAGC , CV , S_DET , IF_DET
/EMG , LED_R , LED_G , APC ,
/DSW , /APCSW , CV , ASSIST ,
VCO_MOD , TV1 , TV2 , /T_R ,
/PTT , Side_1 , Side_2 , Side_G
Q507
2SC5383-T111
50C
Ripple Filter
Q510 SSM6L05FU-F
Q511 2SJ347F
T/R SW
/T_R
Q512
2SC5636
Q600
2SC5636
Loop Filter
VCO
BUFF AMP
Q504
2SK879-F(Y)
CV
IC504
TC75W51FUF(1/2)
VCO MOD
Q508,509 2SK508NV(K52)
D506,507 1SV325F
D519 1SV278F
D511,516,517
1SV282-F
D510,514,515
1SV282-F (K,K3)
1SV290B-F (K2,K4)
TX : 450.00~520.00MHz
RX : 391.95~461.95MHz
150C
Ripple Filter
Q503
2SC5383-T111
ASSIST
IC503
TLV2381IDBV
LPF
Q700 2SC5108(Y)F
x3
50R
CF700 450kHz
BPF
IC700
MCP6021-E/OT
IF AMP
CF701
450kHz
BPF
IF AMP
IC701
TK10931VTL-G
Q701
2SC4215-F(Y)
IF AMP
IF_DET
50IF
IC404
TC75W51FUF(1/2)
VAGC
IC404
TC75W51FUF(2/2)
RSSI
XF700
58.05MHz
MCF
Q703
3SK318
1st MIXER
1st Local : 391.95~461.95MHz
D702,703,704
1SV286Fx3
TUNE
BPF
L713,714,715
Q705
3SK318
RF AMP
D706,708
1SV286Fx2
TUNE
BPF
L721,722
D710
1SV286F
TUNE
Notch
L726
50R
IC702
TLV2381IDBV
TV2
IC703
TLV2381IDBV
TV1
D600,601
HSC277x2
T/R SW
5T
5R
50C
LPF
Q601
2SC5636
Pre-Drive AMP
5T
Q602
2SK3077F
Drive AMP
5T
Q603
RD01MUS1-T113
Pre-Final AMP
Q606
RD07MVS1BT122
Final AMP
Q610
EMD5
D606,607
D709,711
HVC131x4
ANT SW
5T
LPF
TX/RX: 450~520MHz
Q604
2SC5383-T111
DC SW
/DSW
DC SW
/APCSW
IC600
TA75W01FUF
APC
+B
Q607
LTC044EEBFS8
DC SW
Q605
SSM3K15TE(F)
/APCSW
Q608
2SK1824-A
Protect
ASQ
APC
IC504
TC75W51FUF(2/2)
150C
Q704
2SC5383-T111
Ripple Filter
/EMG
S1
SB3
D900
Q900
UMG9N
DC SW
LED_R
LED_G
CN901
PTT
Side_1
Side_2
Side_G
PTT
Side1
Side2
+B
BATT
7.5V
–
S_DET
S