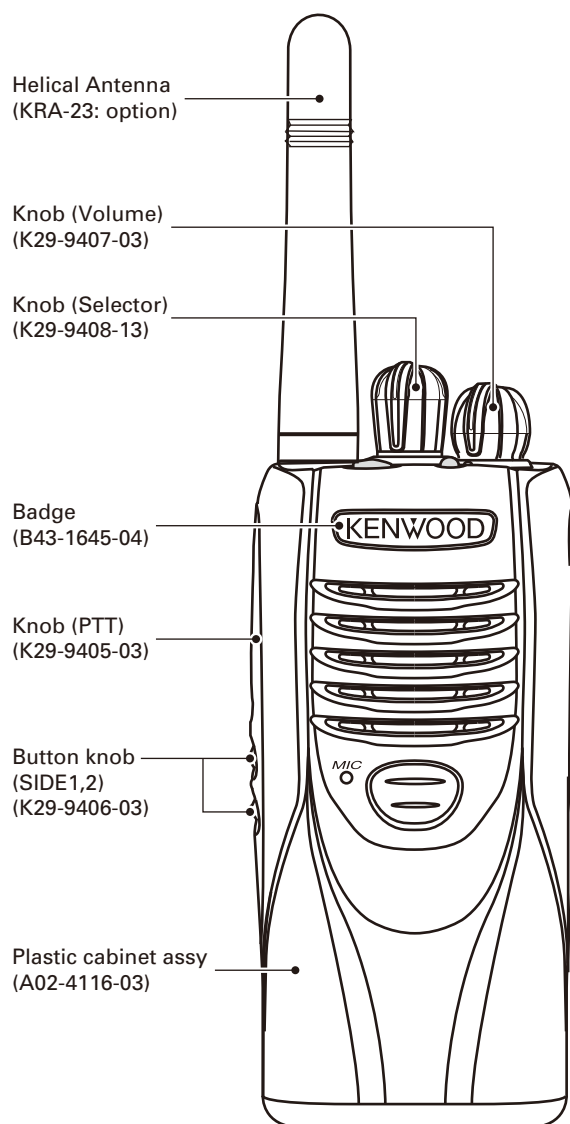


UHF DIGITAL TRANSCEIVER
NX-300S
SERVICE MANUAL
E version

KENWOOD

Kenwood Corporation

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B51-8909-00 (N) PDF



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

NX-300S

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Transceivers containing AMBE+2™ Vocoder:

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

GENERAL

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

PERSONAL SAFETY

The following precautions are recommended for personal safety:

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

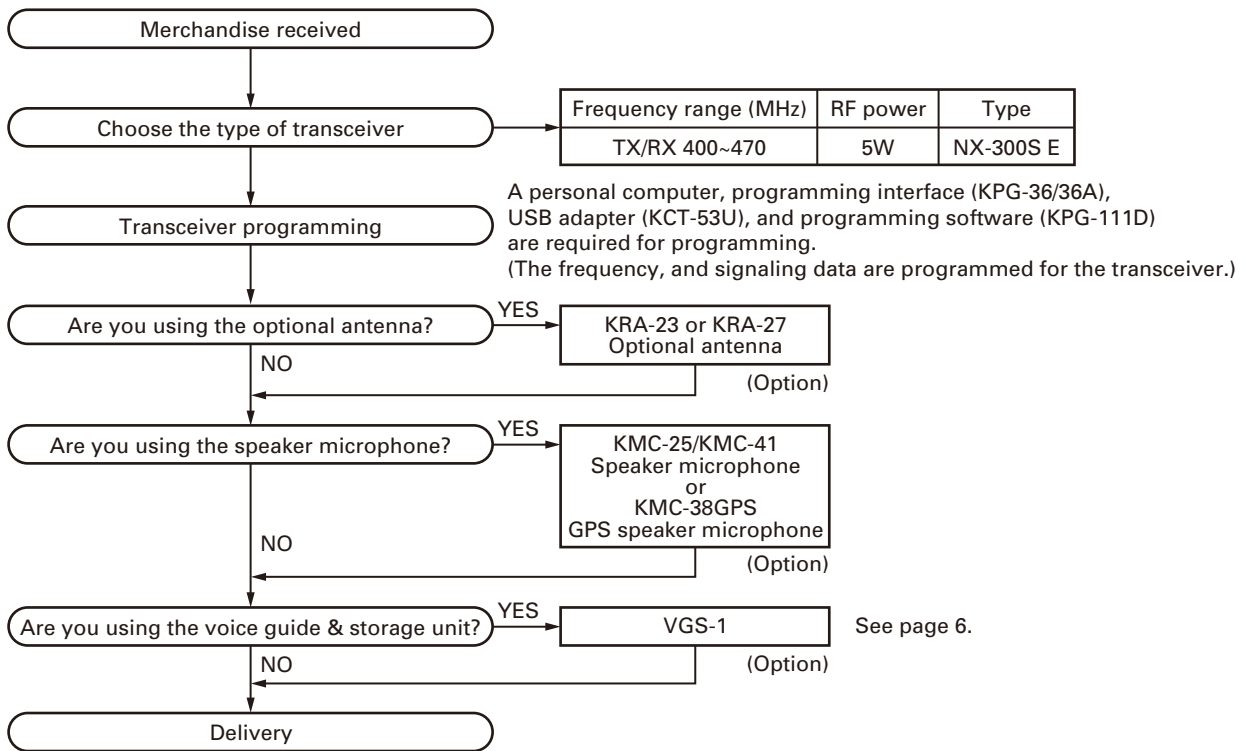
SERVICE

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

NOTE

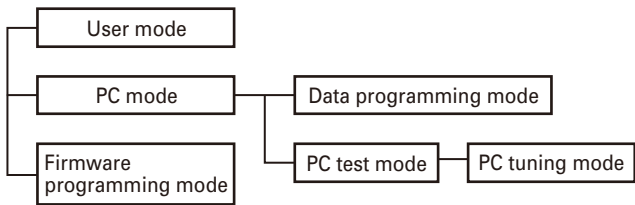
You must use KPG-111D version 2.00 or later for this transceiver. KPG-111D versions earlier than version 2.00 will not work properly.

SYSTEM SET-UP



REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
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.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
PC mode	Received commands from PC
Firmware programming mode	[Orange] + Power ON

3. PC Mode

3-1. Preface

The transceiver is programmed by using a personal computer, programming interface (KPG-36/36A), USB adapter (KCT-53U) and programming software (KPG-111D ver. 2.00 or later).

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

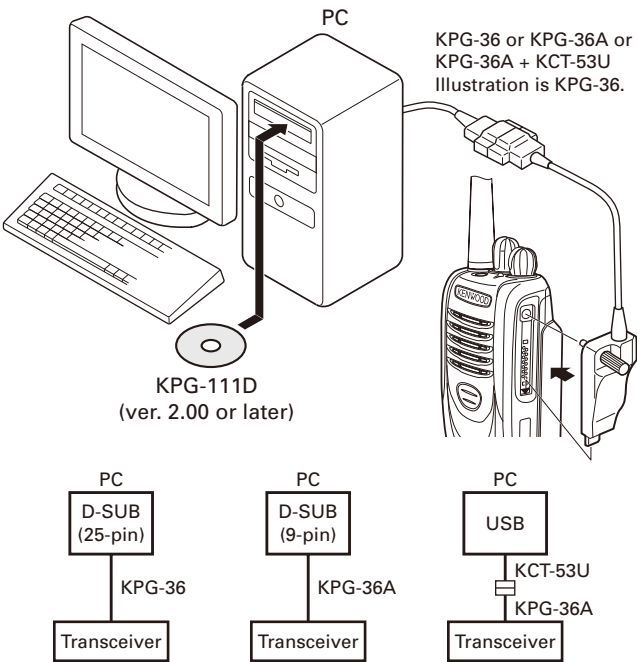


Fig. 1

3-2. Connection procedure

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

Note:

- You must install the KCT-53U driver in the computer to use the USB adapter (KCT-53U).
- When using the USB adapter (KCT-53U) for the first time, plug the KCT-53U into a USB port on the computer with the computer power ON.

2. When the POWER switch on, user mode can be entered immediately.
When 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.

REALIGNMENT

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

(PC programming interface cable: Option)

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

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

3-4. KCT-53U description (USB adapter: Option)

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

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

3-5. Programming software KPG-111D description

The KPG-111D is the programming software for the transceiver supplied on a CD-ROM. This software runs under Windows 2000, XP or Vista (32-bit) on a PC.

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

Note:

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

4-4. Function

1. Each press of the [Side2] key changes the writing speed as shown below. Additionally, the LED color changes according to the writing speed.

19200 bps	LED blinks green
38400 bps	LED alternates between red and orange
57600 bps	LED blinks orange
115200 bps	LED lights orange

Note:

Normally, write in the high-speed mode.

4. Firmware Programming Mode

4-1. 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.)

4-2. Connection procedure

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

4-3. Programming

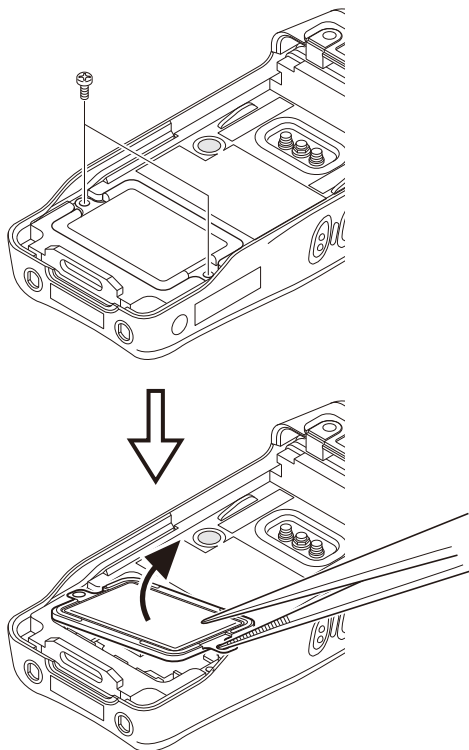
1. Start up the firmware programming software (Fpro.exe (ver. 4.0 or later)). The Fpro.exe exists in the KPG-111D installed holder.
2. Set the communications speed (normally, 115200 bps) and communications port in the configuration item.
3. Set the firmware to be updated by File name item.
4. Press and hold the [Orange] key while turning the transceiver power ON. Then, the orange LED on the transceiver lights.
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 green LED on the transceiver lights.
7. If writing ends successfully, the red LED on the transceiver lights.
8. If you want to continue programming other transceivers, repeat steps 4 to 7.

INSTALLATION

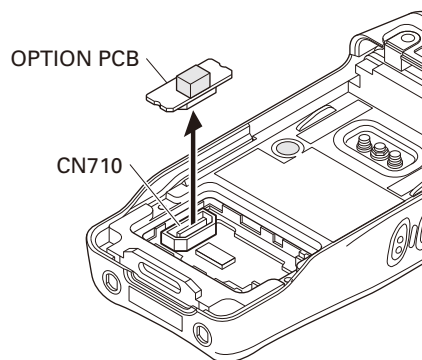
Voice Guide & Storage Unit (VGS-1: Option)

■ 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.



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:

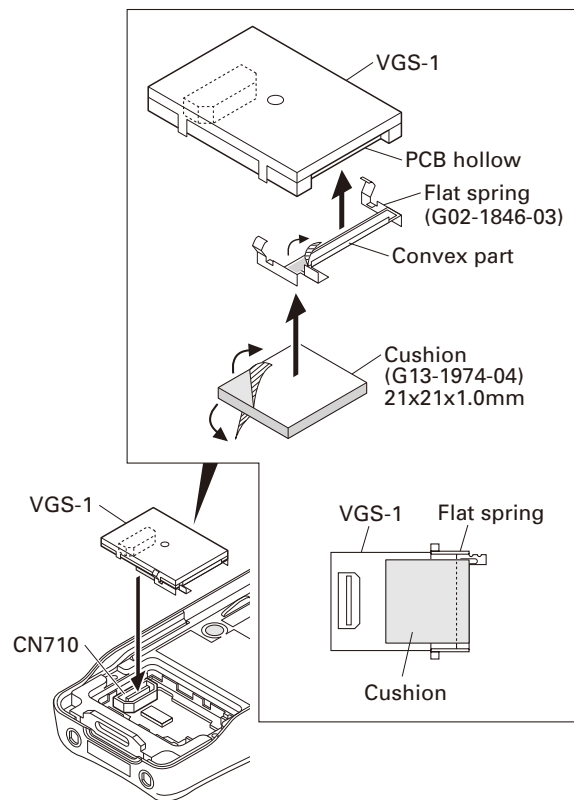
Attach the flat spring so that its convex fits the PCB hollow of the VGS-1.

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.

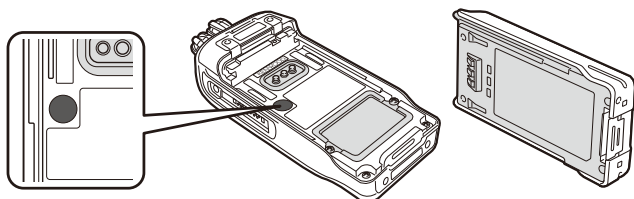


7. Reinstall the cover using the two screws removed in step 2.

DISASSEMBLY FOR REPAIR

1. Precautions for Waterproof

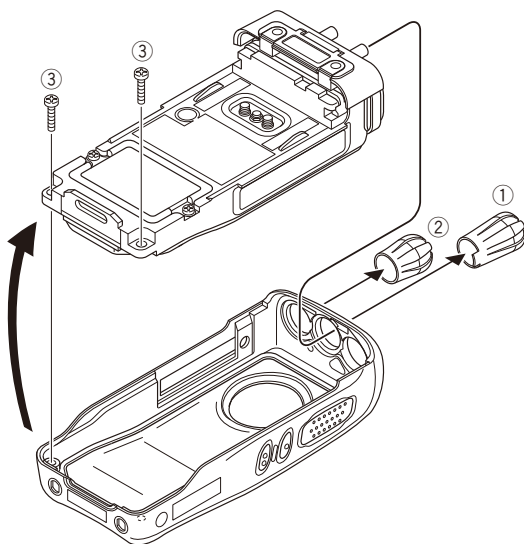
- Do not remove the black sheet from the reverse side of the transceiver (refer to the illustration below). Removal of this sheet decreases the waterproof efficiency of the transceiver and may cause malfunctions if water seeps into the transceiver.
- The orange packing material on the reverse side of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



2. Precautions for Disassembly

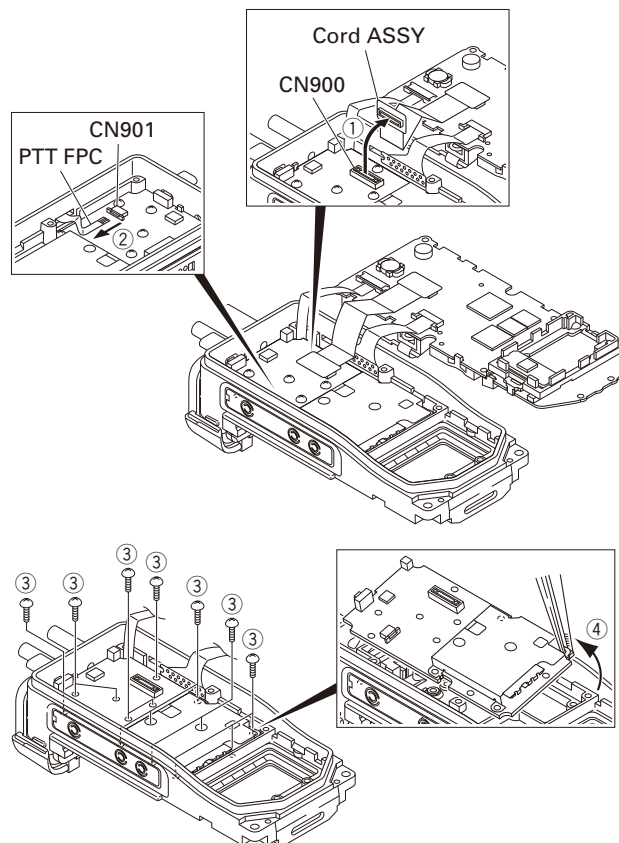
■ Disassembly procedure

1. Remove the channel knob ① and volume knob ②.
2. Remove the two screws ③.
3. Lift and remove the chassis from the case.



■ Removing the TX-RX unit from the chassis

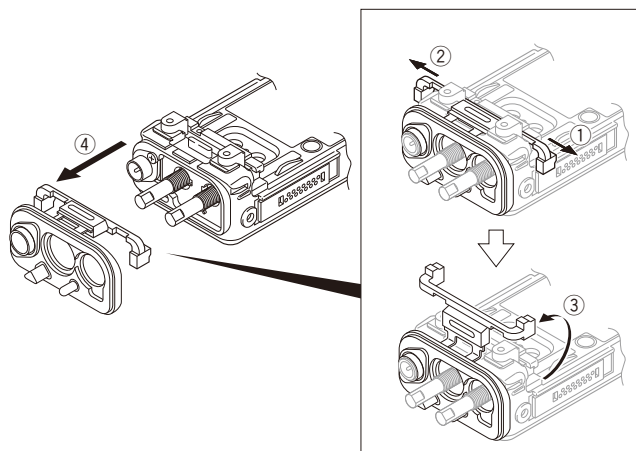
1. Remove the cord ASSY from the connector of the TX-RX unit (CN900) ①.
2. Remove the PTT FPC from the connector of the TX-RX unit (CN901) ②.
3. Remove the 14 screws ③.
4. Anchor the screw hole of the TX-RX unit using the tip of a pair of tweezers as shown in the figure. Then, lift the TX-RX unit to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



DISASSEMBLY FOR REPAIR

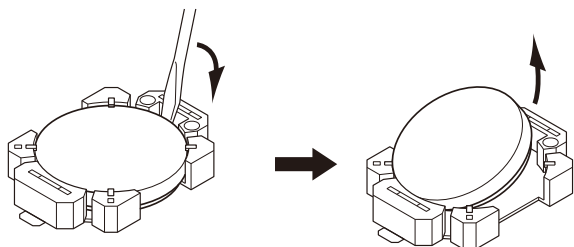
■ Removing the TOP packing (G53-1762-02)

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.



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

Insert a non-conductive screwdriver to groove of one side of the socket (CN401) and pry the lithium cell up from the socket.



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

Insert a lithium cell into one side of the socket (CN401). Push the lithium cell to insert the lithium cell into the socket.



3. Precautions for Reassembly

■ Installing the option board cover onto the chassis

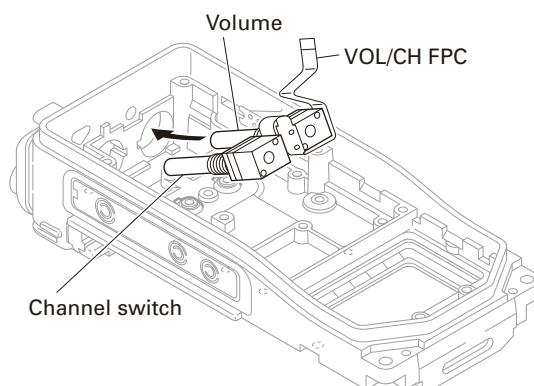
Install the option board cover onto the chassis using the two screws.

Note:

Confirm that there is no foreign matters on the water-proof rib of the option board cover. (Wipe it clean when foreign matters adhere to it.)

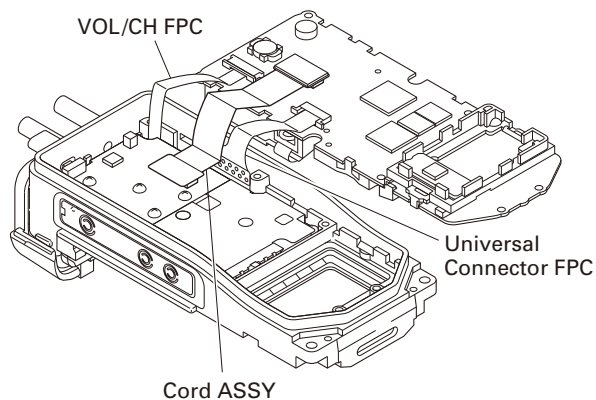
■ Inserting the Volume and Channel switch into the chassis

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.



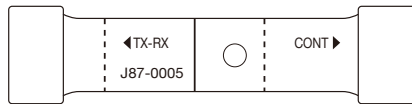
DISASSEMBLY FOR REPAIR

Note:

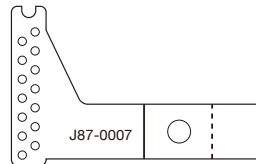
Fold indications are printed on the Cord ASSY and Universal Connector FPC.

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

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

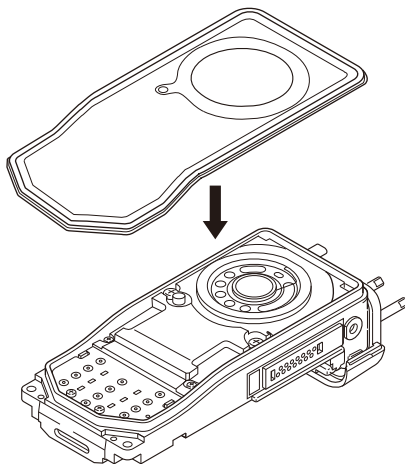


Cord ASSY



Universal Connector FPC

■ Mounting the chassis onto the case



1. Place the packing on the chassis. Then, fit the chassis tightly into the groove of the packing ①.

Note:

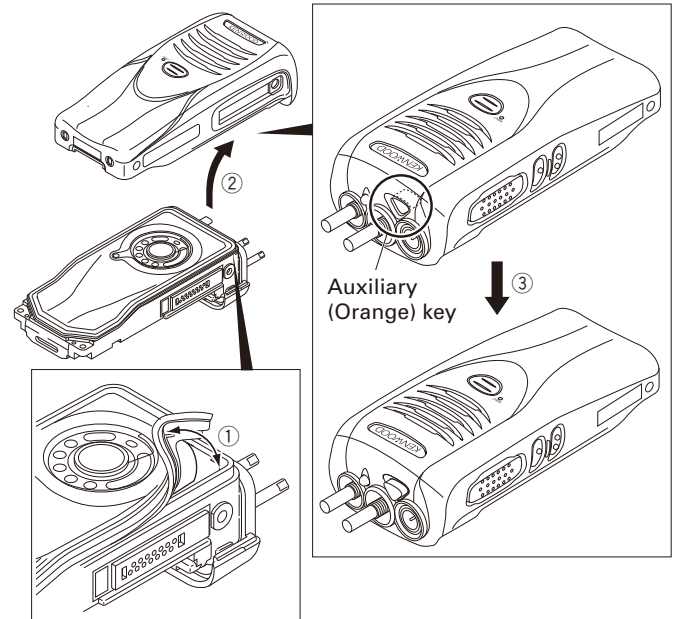
Confirm that the entire groove of the packing fits to the chassis tightly.

2. Mount the chassis onto the case ②.

Note:

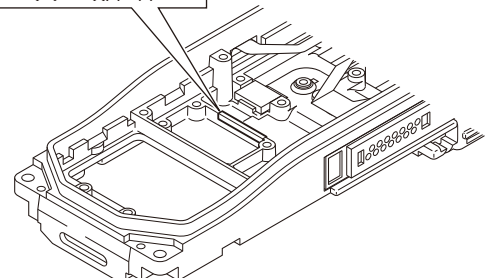
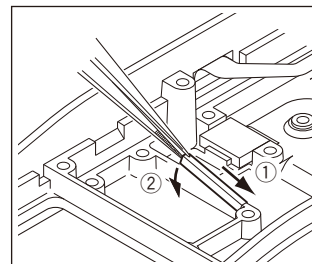
After mounting the chassis onto the case, the Auxiliary (Orange) key part of the VOL/CH packing gets stuck inside the case as shown in the figure, return it to the normal position using a soft tipped item (e.g., finger) ③.

Prying it with a pointed metal tool such as forceps, may damage the key top or packing.



■ Relay hardware (E29-1221-14) 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.



DISASSEMBLY FOR REPAIR

■ Assembly information (Sheet/Cushion)

When "Main Parts" is changed (ordered), "Assembled Sheet/Cushion" should also be changed (ordered) together.

The Sticker and Sheet etc are non-reusable parts. It requires the new one to get the radio's performance after repairs.

For example, when "Plastic Cabinet (A02-4116-03)" is changed, "Sticker (B42-7463-04)", "Badge (B43-1645-04)", "Fibrous Sheet (G10-1806-04)", "Fibrous Sheet (G10-1822-04)" and "Dressing Panel (A21-1664-03)" should be ordered and changed together because Sticker (B42-7463-04), Badge (B43-1645-04), Fibrous Sheet (G10-1806-04), Fibrous Sheet (G10-1822-04) and Dressing Panel (A21-1664-03) are non-reusable.

Main Parts		Assembled Sheet/ Cushion		
Part Name	Part Number	Part Name	Part Number	Remark
Plastic Cabinet	A02-4116-03	Sticker	B42-7463-04	"NXDN" is printed.
		Badge	B43-1645-04	"KENWOOD" is printed.
		Fibrous Sheet (SP)	G10-1806-04	
		Fibrous Sheet (MIC)	G10-1822-04	
		Dressing Panel	A21-1664-03	
Cord ASSY (50-pin FPC)	X42-3380-10	Cushion (50-pin FPC)	G13-2293-04	
Speaker	T07-0749-25	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.
Switch Unit (PTT FPC)	X41-3760-10	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	A10-4111-21	Relay Hardware (VCO-Chassis)	E29-1221-14	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 (G11-4331-04).
		Cushion (ANT)	G13-2220-04	Used for fixing the Terminal ASSY.
		Sheet (Chassis bottom)	G11-4538-04	2 pieces
Terminal Block	E72-0425-03	Adhesive Sheet (Terminal Block)	J99-0747-04	Used for fixing the Terminal Block and the Packing (Terminal Block).

CIRCUIT DESCRIPTION

1. Overview

The NX-300S is a UHF portable transceiver designed to operate in the frequency range of 400 to 470MHz. 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.

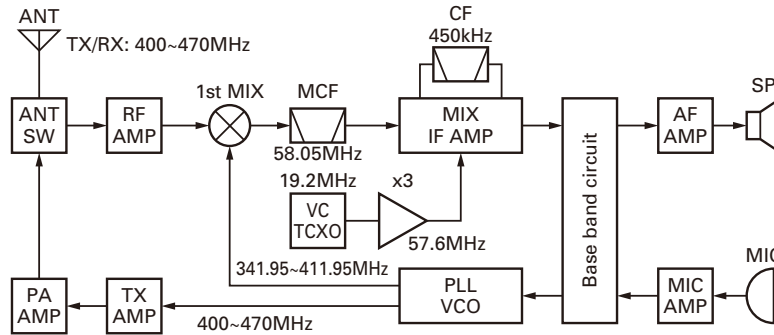


Fig. 1 Frequency configuration

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).

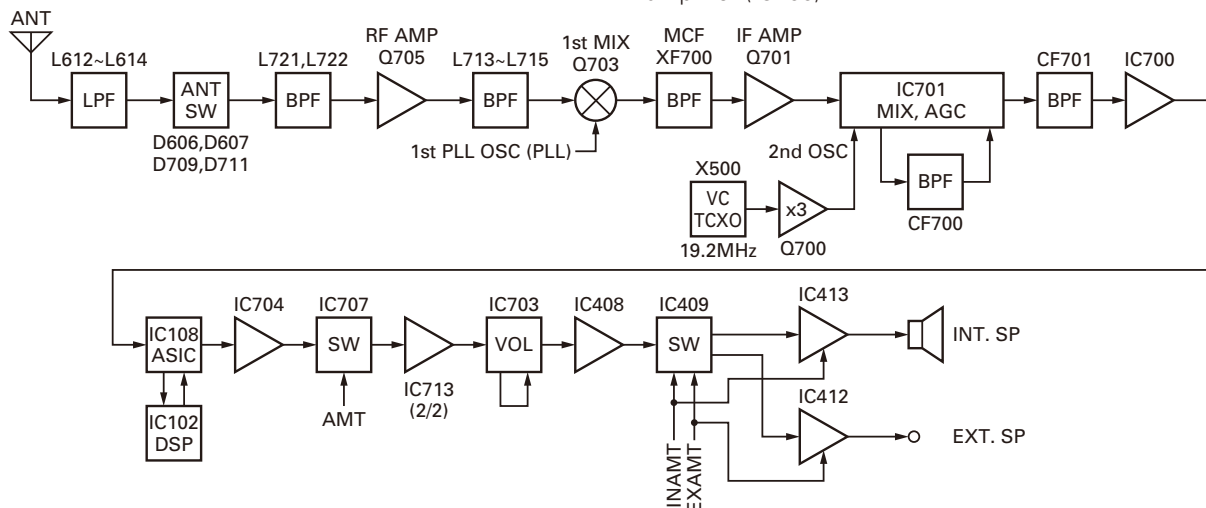


Fig. 2 RF and IF circuit

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 EX-AMT 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 EX-AMT.

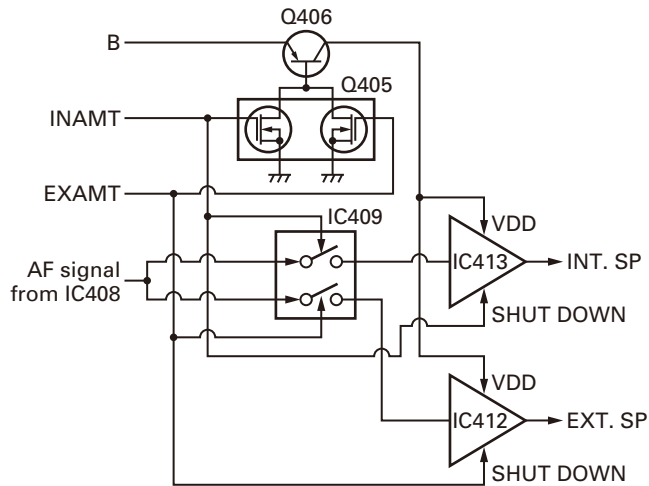


Fig. 3 Audio amplifier circuit

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.

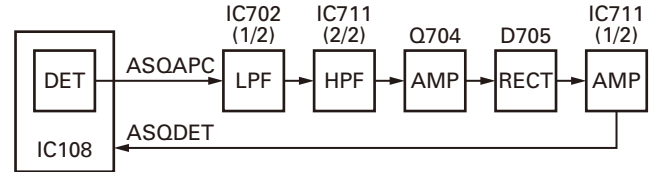


Fig. 4 Squelch circuit

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.

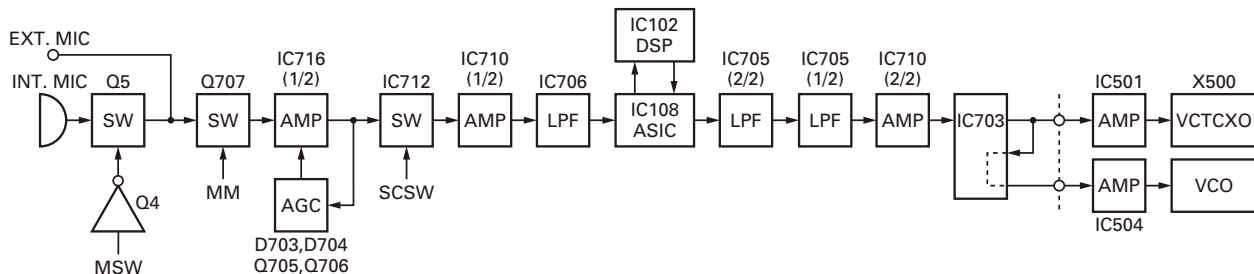


Fig. 5 Audio band and Base band circuit

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.

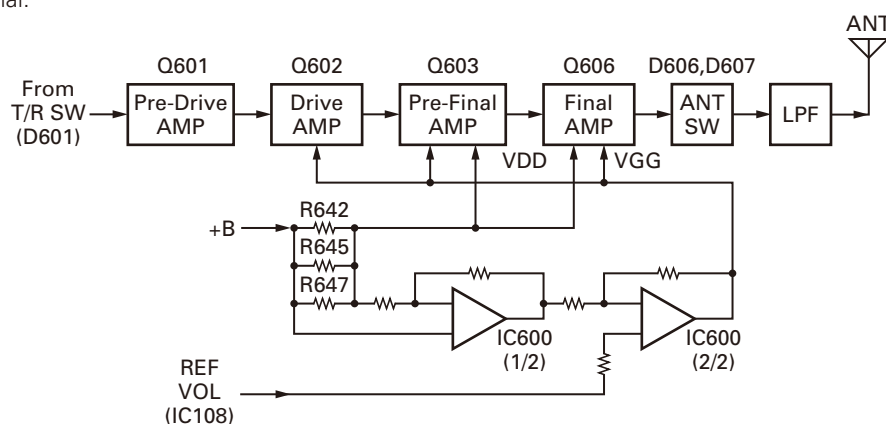


Fig. 6 Drive and final amplifier and APC circuit

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 400 to 470MHz and the 1st local signal is 341.95 to 411.95MHz.

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).

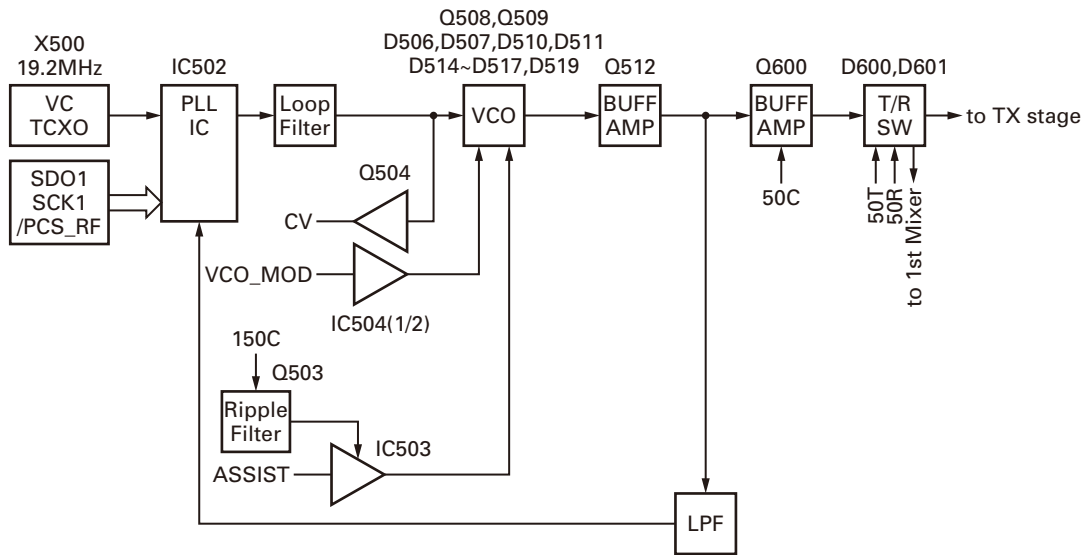


Fig. 7 PLL block diagram

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, and the control 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), 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. When the power supply is off, it is backed up by an internal secondary lithium battery. Therefore, the saved data is not lost.

6-3. Key Detection Circuit

Keys are detected using the key scan circuit in IC108. The /KEY1* signals that are normally pulled down go high when any key is pressed.

6-4. 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.

6-5. 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 (X53-426).

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

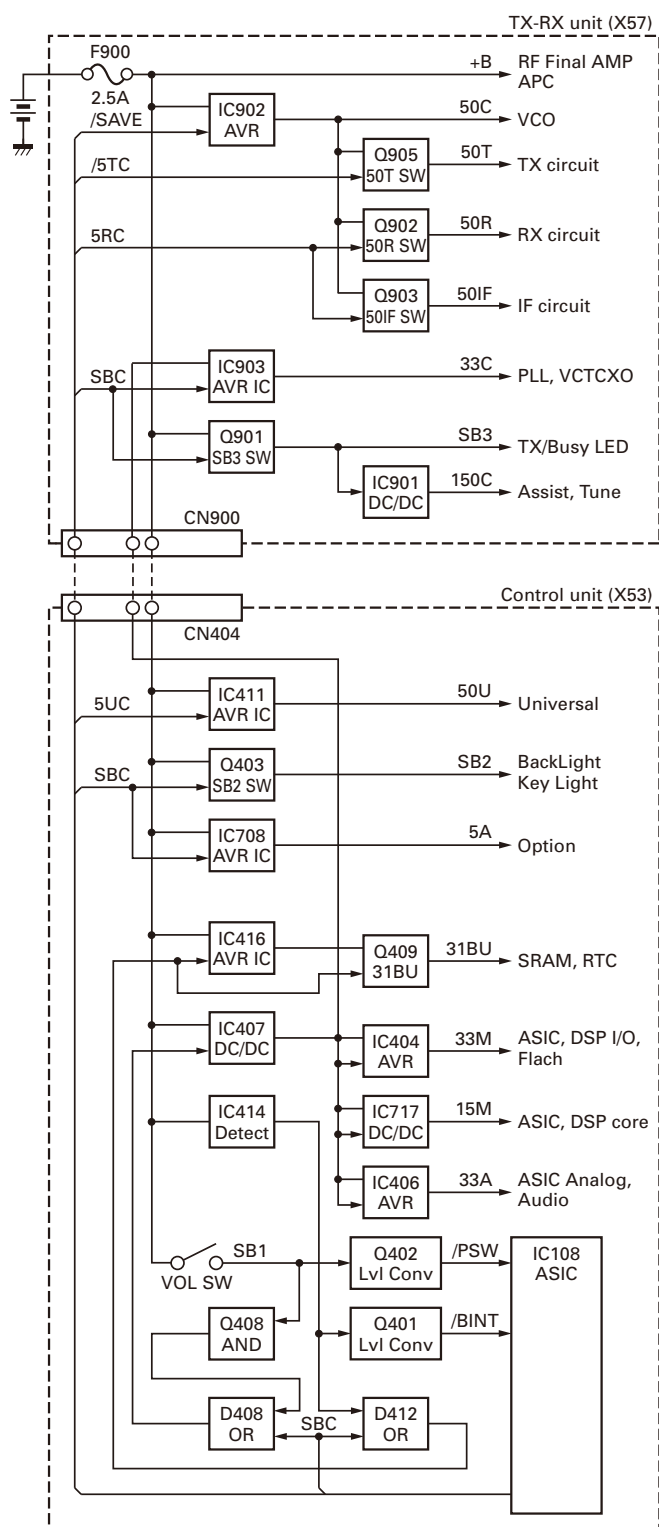


Fig. 8 Power supply circuit

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. Comander Circuit

The term "comander" means compressor and expander. The comander reduces noise by utilizing a compressor and an expander. The transceiver contains a DSP (IC102) to perform this operation. The transceiver comander can be turned on or off using the FPU.

COMPONENTS DESCRIPTION

Control unit (X53-4432-76)

Ref. No.	Part Name	Description
IC101	IC	FLASH ROM
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
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)
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

Ref. No.	Part Name	Description
Q410	FET	DC switch
Q411	FET	Level converter
Q412	FET	DC switch control
Q413~415	Transistor	DC switch
Q701	Transistor	OPT 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
D12~16	Diode	Reverse current prevention
D17~21	Zener diode	Surge absorption
D22,23	Diode	Surge absorption
D102	Diode	Reverse current prevention
D404	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
D411	Diode	RTC BATT control
D412	Diode	DC switch control
D413	Diode	RTC BATT 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 (X57-7830-11)

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)
Q503	Transistor	Ripple filter
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

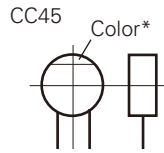
Ref. No.	Part Name	Description
Q704	Transistor	Ripple filter
Q705	FET	RF AMP
Q706	FET	RF AGC
Q900	Transistor	TX/RX LED switch
Q901	FET	SB3 switch
Q902	FET	50R switch
Q903	FET	50IF switch
Q904	FET	DC/DC converter switch
Q905	Transistor	50T switch
D501	Diode	Ripple filter
D505	Diode	Bypass diode
D506,507, D510,511	Variable capaci- tance diode	Frequency control
D514~517	Variable capaci- tance diode	Frequency control
D518	Diode	Ripple filter
D519	Variable capaci- tance diode	TX modulation
D600,601	Diode	Local switch
D604	Zener diode	APC switch
D605	Zener diode	APC protect
D606,607	Diode	Antenna switch
D611,700	Diode	Ripple filter
D702~704	Variable capaci- tance diode	Vari-cap tune
D705	Diode	RF AGC
D706,708	Variable capaci- tance diode	Vari-cap tune
D709	Diode	Antenna switch
D710	Variable capaci- tance diode	Vari-cap tune
D711	Diode	Antenna switch
D900	LED	TX/RX LED
D901	Diode	Reverse protection
D902	Diode	50T control

PARTS LIST

CAPACITORS

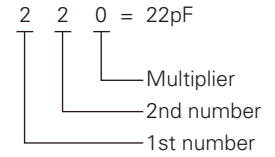
CC 45 TH 1H 220 J
1 2 3 4 5 6

- 1 = Type ... ceramic, electrolytic, etc.
2 = Shape ... round, square, etc.
3 = Temp. coefficient
4 = Voltage rating
5 = Value
6 = Tolerance



• Capacitor value

- 010 = 1pF
100 = 10pF
101 = 100pF
102 = 1000pF = 0.001μF
103 = 0.01μF



• Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = -470±60ppm/°C

• Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10μF : -10~+50 Less than 4.7μF : -10~+75

(Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

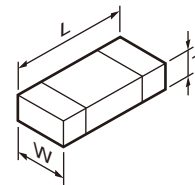
• Voltage rating

2nd word 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	-

• Chip capacitors

- (EX) CC 73 F SL 1H 000 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)
- (EX) CK 73 F F 1H 000 Z
1 2 3 4 5 6 7
(Chip) (B, F)
- Refer to the table above.
1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance

• Dimension



Chip capacitor

Code	L	W	T
Empty	5.6±0.5	5.0±0.5	Less than 2.0
A	4.5±0.5	3.2±0.4	Less than 2.0
B	4.5±0.5	2.0±0.3	Less than 2.0
C	4.5±0.5	1.25±0.2	Less than 1.25
D	3.2±0.4	2.5±0.3	Less than 1.5
E	3.2±0.2	1.6±0.2	Less than 1.25
F	2.0±0.3	1.25±0.2	Less than 1.25
G	1.6±0.2	0.8±0.2	Less than 1.0
H	1.0±0.05	0.5±0.05	0.5±0.05

Chip resistor

Code	L	W	T
E	3.2±0.2	1.6±0.2	1.0
F	2.0±0.3	1.25±0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1
H	1.0±0.05	0.5±0.05	0.35±0.05

• Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

RESISTORS

• Chip resistor (Carbon)

- (EX) RD 73 E B 2B 000 J
1 2 3 4 5 6 7
(Chip) (B, F)

• Carbon resistor (Normal type)

- (EX) RD 14 B B 2C 000 J
1 2 3 4 5 6 7

- 1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Rating wattage
6 = Value
7 = Tolerance

NX-300S

PARTS LIST

* New Parts. Δ indicates safety critical components.

Parts without **Parts No.** are not supplied.

Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.

Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia

Y : PX (Far East, Hawaii)

C : China

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

NX-300S

CONTROL UNIT (X53-4432-76)

Ref. No.	Address	New parts	Parts No.	Description	Destination
NX-300S					
1	1A	*	A02-4116-03	PLASTIC CABINET	
2	3A		A10-4111-21	CHASSIS	
3	1A	*	A21-1664-03	DRESSING PANEL	
4	2B		A62-1156-02	PANEL (TOP)	
6	1B,1D		B09-0712-03	CAP ACCESSORY	
9	3B		B11-1855-04	ILLUMINATION GUIDE (TX/BUSY)	
12	1A	*	B42-7463-04	STICKER (NEXEDGE)	
13	1B	*	B43-1645-04	BADGE (KENWOOD)	
14	2D	*	B62-2252-00	INSTRUCTION MANUAL	
15	2C	*	B62-2253-00	INSTRUCTION MANUAL	
16	2A		CC73GCH1H101J	CHIP C 100PF J	
17	2B		D32-0446-14	STOPPER (16CH)	
19	2A		E29-1220-04	RELAY HARDWARE (VCO-PCB)	
20	3A		E29-1221-14	RELAY HARDWARE (VCO-CHASSIS)	
21	3B		E58-0532-05	RECTANGULAR RECEPTACLE (SP/MIC)	
22	3B		E72-0425-03	TERMINAL BLOCK	
24	3A		F07-1931-04	COVER (OP BOARD)	
25	1A	*	G10-1806-04	FIBROUS SHEET (SP)	
26	2B	*	G10-1807-04	FIBROUS SHEET (TOP PANEL)	
27	1A	*	G10-1822-04	FIBROUS SHEET (MIC)	
30	2A		G11-4272-14	RUBBER CUSHION (SP)	
33	2A		G11-4428-04	SHEET (PTT)	
34	3A		G11-4429-04	RUBBER SHEET (FET)	
35	3A		G11-4440-04	SHEET (AIR)	
36	2A		G11-4458-14	SHEET (SP FRONT)	
37	2A		G11-4459-04	SHEET (TX-RX)	
38	3A	*	G11-4500-04	SHEET (AIR)	
39	3A	*	G11-4538-04	SHEET (CHASSIS)	
40	2A,3B		G13-2220-04	CUSHION (ANT/OP BOARD)	
41	2A		G13-2249-04	CUSHION (TX-RX)	
42	2A	*	G13-2292-04	CUSHION (TX-RX)	
43	2A	*	G13-2293-04	CUSHION (50PIN FPC)	
46	2B		G53-1762-02	PACKING (TOP)	
47	3B		G53-1763-03	PACKING (TERMINAL BLOCK)	
48	3A		G53-1764-03	PACKING (OP BOARD)	
49	2B		G53-1768-04	PACKING (VOL,CH O-RING)	
50	1B,1D		G53-1769-04	PACKING (CAP) ACCESSORY	
51	1A	*	G53-1824-01	PACKING	
57	2B		J19-5506-03	HOLDER (VOL/ENC)	
58	2A		J19-5507-02	HOLDER (OP BOARD)	
59	2A	*	J19-5539-01	HOLDER (SP)	
60	1C		J29-0730-05	BELT CLIP ACCESSORY	
62	2B		J30-1296-04	SPACER (VOL)	
65	3B		J87-0007-15	FPC (LEAD FREE/UNIVERSAL)	
66	2B		J87-0028-05	FPC (LEAD FREE/VOL,CH)	
67	2A	*	J87-0037-05	FPC (LEAD FREE/ECM,SP)	
68	3A		J99-0711-04	ADHESIVE SHEET (PTT,FPC)	
69	2A		J99-0714-04	ADHESIVE SHEET (LCD)	
70	3B		J99-0715-08	ADHESIVE SHEET (UNIVERSAL)	
72	3B	*	J99-0747-04	ADHESIVE SHEET (T-BLOCK)	

Ref. No.	Address	New parts	Parts No.	Description	Destination
77	3A		K25-2001-03	PUSH KNOB (PTT)	
78	1A		K29-9405-03	KNOB (PTT)	
79	1A		K29-9406-03	BUTTON KNOB (SIDE KEY)	
80	1B		K29-9407-03	KNOB (VOL)	
81	1B		K29-9408-13	KNOB (CH)	
A	1B,1D		N08-0564-04	DRESSED SCREW ACCESSORY	
B	3B		N09-2426-14	HEXAGON HEAD SCREW (TERMINAL-)	
C	3A		N09-2440-15	SPECIAL SCREW (CASE/CHASSIS)	
D	2A,2B		N09-6549-04	STEPPED SCREW (SP HOLDER)	
E	2B,3A		N09-6554-05	PAN HEAD SCREW (ANT/OP BOARD)	
F	2B		N14-0844-04	CIRCULAR NUT (VOL/CH)	
G	1C		N30-3008-60	PAN HEAD MACHINE SCREW (BELT CLIP)	
H	1A,2A,2B		N83-2005-48	PAN HEAD TAPTITE SCREW (PCB)	
85	2A		T07-0749-25	SPEAKER	
86	2A		T91-0579-05	MIC ELEMENT	
88	2A		W09-0971-05	LITHIUM CELL	
90	3A		X41-3760-10	SWITCH UNIT (PTT FPC)	
92	2A		X42-3380-10	CORD ASSY (50PIN FPC)	
-		*	X53-4432-78	SERVICE CONTROL UNIT	
93	2B		X60-3910-10	TERMINAL ASSY (SMA)	
CONTROL UNIT (X53-4432-76)					
C13-15			CK73HB1H471K	CHIP C 470PF	K
C16,17			CC73HCH1H101J	CHIP C 100PF	J
C23			CK73HB1H102K	CHIP C 1000PF	K
C24			CC73HCH1H470J	CHIP C 47PF	J
C25-27			CK73HB1H102K	CHIP C 1000PF	K
C28			CC73HCH1H101J	CHIP C 100PF	J
C30-32			CC73HCH1H101J	CHIP C 100PF	J
C35			CK73HB1H102K	CHIP C 1000PF	K
C36			CK73HB1E682K	CHIP C 6800PF	K
C37			CK73HB1H102K	CHIP C 1000PF	K
C38			CC73HCH1H101J	CHIP C 100PF	J
C101-104			CK73HB1A104K	CHIP C 0.10UF	K
C105			CK73HB0J105K	CHIP C 1.0UF	K
C106			CK73HB1E103K	CHIP C 0.010UF	K
C107			CK73HB1A104K	CHIP C 0.10UF	K
C109,110			CK73HB1H102K	CHIP C 1000PF	K
C111-113			CK73HB1A104K	CHIP C 0.10UF	K
C116,117			CK73HB1A104K	CHIP C 0.10UF	K
C118,119			CK73HB0J105K	CHIP C 1.0UF	K
C120,121			CK73HB1A104K	CHIP C 0.10UF	K
C122-124			CK73HB1E103K	CHIP C 0.010UF	K
C130			CK73HB1E103K	CHIP C 0.010UF	K
C131			CK73HB1A104K	CHIP C 0.10UF	K
C133			CS77CPOJ100M	CHIP TNL 10UF	6.3WV
C134			CK73HB1E103K	CHIP C 0.010UF	K
C135			CK73HB1H102K	CHIP C 1000PF	K
C136			CK73HB1E103K	CHIP C 0.010UF	K
C137			CK73GB1E105K	CHIP C 1.0UF	K
C138-140			CK73HB1A104K	CHIP C 0.10UF	K
C141			CC73HCH1H101J	CHIP C 100PF	J

PARTS LIST

CONTROL UNIT (X53-4432-76)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C142			CS77CP0J100M	CHIP TNTL 10UF 6.3WV		C714			CK73HB1H122K	CHIP C 1200PF K	
C143			CK73HB1E103K	CHIP C 0.010UF K		C715			CK73HB1A104K	CHIP C 0.10UF K	
C144			CK73GB1E105K	CHIP C 1.0UF K		C716			CK73HB1H681K	CHIP C 680PF K	
C145-148			CK73HB1A104K	CHIP C 0.10UF K		C717			CK73HB1E103K	CHIP C 0.010UF K	
C149			CK73HB1E103K	CHIP C 0.010UF K		C718			CK73HB1H152K	CHIP C 1500PF K	
C150			CK73GB1E105K	CHIP C 1.0UF K		C719			CK73HB1A104K	CHIP C 0.10UF K	
C151-155			CK73HB1A104K	CHIP C 0.10UF K		C720			CK73HB1E103K	CHIP C 0.010UF K	
C156,157			CK73HB1H102K	CHIP C 1000PF K		C721			CK73HB1A104K	CHIP C 0.10UF K	
C158			CK73HB1E103K	CHIP C 0.010UF K		C722			CK73HB1E103K	CHIP C 0.010UF K	
C159			CK73HB1A104K	CHIP C 0.10UF K		C723			CK73HB1A104K	CHIP C 0.10UF K	
C160,161			CK73HB1E682K	CHIP C 6800PF K		C724			CK73HB1E103K	CHIP C 0.010UF K	
C409			CK73HB0J105K	CHIP C 1.0UF K		C725			CC73HCH1E181J	CHIP C 180PF J	
C411,412			CK73HB0J105K	CHIP C 1.0UF K		C726,727			CK73HB1A104K	CHIP C 0.10UF K	
C414			CK73HB0J105K	CHIP C 1.0UF K		C728			CK73HB1H331K	CHIP C 330PF K	
C415			CS77AP1A100M	CHIP TNTL 10UF 10WV		C730			CK73HB1H331K	CHIP C 330PF K	
C416			CK73FB1A106K	CHIP C 10UF K		C731,732			CK73HB1E103K	CHIP C 0.010UF K	
C417			CC73HCH1H221J	CHIP C 220PF J		C734			CK73HB1H102K	CHIP C 1000PF K	
C418			CK73HB1E103K	CHIP C 0.010UF K		C735			CK73HB1H122K	CHIP C 1200PF K	
C419			CK73FB1E475K	CHIP C 4.7UF K		C736,737			CK73HB1A104K	CHIP C 0.10UF K	
C420			CK73HB1E103K	CHIP C 0.010UF K		C738			CK73HB1H102K	CHIP C 1000PF K	
C421			CK73HB1E682K	CHIP C 6800PF K		C739			CK73HB1E682K	CHIP C 6800PF K	
C422			CC73HCH1H100C	CHIP C 10PF C		C740			CK73HB1H102K	CHIP C 1000PF K	
C424,425			CK73HB1A104K	CHIP C 0.10UF K		C742			CK73GB1E105K	CHIP C 1.0UF K	
C427			CK73HB1E103K	CHIP C 0.010UF K		C743			CK73HB0J105K	CHIP C 1.0UF K	
C428			CC73HCH1H030C	CHIP C 3.0PF C		C744-746			CK73HB1E103K	CHIP C 0.010UF K	
C429,430			CK73HB1A104K	CHIP C 0.10UF K		C747,748			CK73HB1A104K	CHIP C 0.10UF K	
C431			CK73FB1A106K	CHIP C 10UF K		C749,750			CC73HCH1H470J	CHIP C 47PF J	
C433			CK73FB1A106K	CHIP C 10UF K		C751			CK73GB1E105K	CHIP C 1.0UF K	
C435-438			CK73HB1A563K	CHIP C 0.056UF K		C752,753			CC73HCH1H101J	CHIP C 100PF J	
C439,440			CK73HB1A104K	CHIP C 0.10UF K		C755			CC73HCH1H470J	CHIP C 47PF J	
C441			CK73GB1E105K	CHIP C 1.0UF K		C756			CK73HB1A104K	CHIP C 0.10UF K	
C442			CK73HB1H471K	CHIP C 470PF K		C757,758			CK73GB0J475K	CHIP C 4.7UF K	
C443			CK73HB1E103K	CHIP C 0.010UF K		C759,760			CK73HB1E103K	CHIP C 0.010UF K	
C445			CK73HB1H102K	CHIP C 1000PF K		C761			CC73HCH1H100D	CHIP C 10PF D	
C446			CK73GB1E105K	CHIP C 1.0UF K		C762			CK73HB1A104K	CHIP C 0.10UF K	
C447			CK73HB1H102K	CHIP C 1000PF K		C763			CK73HB1E103K	CHIP C 0.010UF K	
C448-450			CK73HB0J105K	CHIP C 1.0UF K		C764			CK73HB1H102K	CHIP C 1000PF K	
C452,453			CK73HB1E103K	CHIP C 0.010UF K		C765-767			CK73HB1A104K	CHIP C 0.10UF K	
C454			CK73GB1E105K	CHIP C 1.0UF K		C768			CK73HB1H102K	CHIP C 1000PF K	
C455-457			CK73HB1H471K	CHIP C 470PF K		C771			CK73HB1A224K	CHIP C 0.22UF K	
C459			CK73HB1H471K	CHIP C 470PF K		C772			CK73HB1E103K	CHIP C 0.010UF K	
C460			CK73HB1E682K	CHIP C 6800PF K		C775			CC73HCH1H470J	CHIP C 47PF J	
C461-463			CK73HB1H471K	CHIP C 470PF K		C777			CK73HB1H102K	CHIP C 1000PF K	
C464			CK73HB1E103K	CHIP C 0.010UF K		C778			CK73HB0J105K	CHIP C 1.0UF K	
C465			CK73HB1H102K	CHIP C 1000PF K		C779			CK73HB1E103K	CHIP C 0.010UF K	
C466			CK73HB1E682K	CHIP C 6800PF K		C780			CK73HB1A224K	CHIP C 0.22UF K	
C467,468			CK73HB1A104K	CHIP C 0.10UF K		C781,782			CK73HB0J105K	CHIP C 1.0UF K	
C469,470			CK73HB1H102K	CHIP C 1000PF K		C785			CK73HB1A224K	CHIP C 0.22UF K	
C480			CK73HB1E103K	CHIP C 0.010UF K		C786			CK73HB1E103K	CHIP C 0.010UF K	
C701			CK73HB1A104K	CHIP C 0.10UF K		C787			CK73HB0J105K	CHIP C 1.0UF K	
C703			CK73GB0J475K	CHIP C 4.7UF K		C788			CC73HCH1H150J	CHIP C 15PF J	
C704,705			CK73HB1A104K	CHIP C 0.10UF K		C789			CC73HCH1H680J	CHIP C 68PF J	
C706			CC73HCH1H680J	CHIP C 68PF J		C790			CK73HB1A104K	CHIP C 0.10UF K	
C707			CC73HCH1H270J	CHIP C 27PF J		C791			CK73HB1A393K	CHIP C 0.039UF K	
C708			CK73HB1A104K	CHIP C 0.10UF K		C792			CK73HB0J105K	CHIP C 1.0UF K	
C709			CK73HB0J105K	CHIP C 1.0UF K		C793,794			CK73HB1A104K	CHIP C 0.10UF K	
C710			CK73HB1E103K	CHIP C 0.010UF K		C795			CK73HB1E103K	CHIP C 0.010UF K	
C711			CK73HB1A104K	CHIP C 0.10UF K		C796			CK73HB1A104K	CHIP C 0.10UF K	
C712			CK73HB1E103K	CHIP C 0.010UF K		C797			CK73HB0J105K	CHIP C 1.0UF K	
C713			CK73HB1H332K	CHIP C 3300PF K		C798			CS77AP1A100M	CHIP TNTL 10UF 10WV	

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CONTROL UNIT (X53-4432-76)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C799			CK73HB1A104K	CHIP C 0.10UF K		R120			RK73HB1J474J	CHIP R 470K J 1/16W	
C800			CK73HB1H152K	CHIP C 1500PF K		R121-123			RK73HB1J104J	CHIP R 100K J 1/16W	
C801			CK73HB1C223K	CHIP C 0.022UF K		R126			RK73HB1J101J	CHIP R 100 J 1/16W	
C802			CK73HB1E103K	CHIP C 0.010UF K		R127,128			RK73HB1J000J	CHIP R 0.0 J 1/16W	
C803			CK73HB1H102K	CHIP C 1000PF K		R129-131			RK73HB1J101J	CHIP R 100 J 1/16W	
C804			CC73HCH1H470J	CHIP C 47PF J		R132,133			RK73HB1J104J	CHIP R 100K J 1/16W	
C805,806			CK73HB1H471K	CHIP C 470PF K		R135-137			RK73HB1J104J	CHIP R 100K J 1/16W	
C808			CK73GB0J475K	CHIP C 4.7UF K		R138			RK73HB1J473J	CHIP R 47K J 1/16W	
C809			CK73FB1A106K	CHIP C 10UF K		R139			RK73HB1J104J	CHIP R 100K J 1/16W	
C812			CK73HB0J105K	CHIP C 1.0UF K		R140			RK73HB1J000J	CHIP R 0.0 J 1/16W	
CN22			E23-1325-05	TERMINAL		R141-143			RK73HB1J104J	CHIP R 100K J 1/16W	
CN23			E40-6758-05	PIN ASSY		R144			RK73HB1J471J	CHIP R 470 J 1/16W	
CN24			E23-1325-05	TERMINAL		R145-147			RK73HB1J104J	CHIP R 100K J 1/16W	
CN403			E40-6813-05	PIN ASSY		R148			RK73HB1J151J	CHIP R 150 J 1/16W	
CN404			E40-6421-15	PIN ASSY		R149			RK73HB1J000J	CHIP R 0.0 J 1/16W	
CN405			E40-6754-05	FLAT CABLE CONNECTOR		R150			RK73HB1J102J	CHIP R 1.0K J 1/16W	
CN710			E40-6757-05	PIN ASSY		R153,154			RK73HB1J104J	CHIP R 100K J 1/16W	
F701			F53-0360-05	FUSE (0.25A)		R155			RK73HB1J473J	CHIP R 47K J 1/16W	
			J99-0719-04	ADHESIVE SHEET		R156,157			RK73HB1J472J	CHIP R 4.7K J 1/16W	
CN401			J19-5386-05	HOLDER		R158,159			RK73HB1J220J	CHIP R 22 J 1/16W	
L1,2			L92-0408-05	CHIP FERRITE		R160,161			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L3			L92-0140-05	CHIP FERRITE		R162			RK73HB1J474J	CHIP R 470K J 1/16W	
L4-7			L92-0408-05	CHIP FERRITE		R163			RK73HH1J104D	CHIP R 100K D 1/16W	
L8			L92-0140-05	CHIP FERRITE		R165			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L101,102			L92-0408-05	CHIP FERRITE		R166			RK73HB1J104J	CHIP R 100K J 1/16W	
L401			L33-1496-05	SMALL FIXED INDUCTOR (22UH)		R167			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L402			L92-0467-05	CHIP FERRITE		R168			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L403			L92-0466-05	CHIP FERRITE		R170			RK73HH1J103D	CHIP R 10K D 1/16W	
L409-411			L92-0467-05	CHIP FERRITE		R171-173			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L701			L92-0140-05	CHIP FERRITE		R174-178			RK73HB1J104J	CHIP R 100K J 1/16W	
L702			L92-0162-05	BEADS CORE		R180,181			RK73HB1J104J	CHIP R 100K J 1/16W	
L704-706			L92-0162-05	BEADS CORE		R182			RK73HB1J474J	CHIP R 470K J 1/16W	
L708,709			L92-0162-05	BEADS CORE		R183			RK73HB1J104J	CHIP R 100K J 1/16W	
L710-712			L92-0444-05	CHIP FERRITE		R184			RK73HB1J473J	CHIP R 47K J 1/16W	
L713			L92-0163-05	BEADS CORE		R185			RK73HB1J105J	CHIP R 1.0M J 1/16W	
L714-717			L92-0444-05	CHIP FERRITE		R186			RK73HB1J473J	CHIP R 47K J 1/16W	
L718			L92-0408-05	CHIP FERRITE		R187			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L719			L33-1494-05	SMALL FIXED INDUCTOR (4.7UH)		R188			RK73HB1J473J	CHIP R 47K J 1/16W	
X101			L77-1802-05	CRYSTAL RESONATOR (32768HZ)		R189			RK73HB1J104J	CHIP R 100K J 1/16W	
X102			L77-3015-05	TCXO (18.432M)		R190			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R18			RK73HB1J822J	CHIP R 8.2K J 1/16W		R191			RK73HB1J474J	CHIP R 470K J 1/16W	
R19			RK73HB1J471J	CHIP R 470 J 1/16W		R192			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R27			RK73HB1J104J	CHIP R 100K J 1/16W		R193,194			RK73HB1J104J	CHIP R 100K J 1/16W	
R28,29			RK73HB1J102J	CHIP R 1.0K J 1/16W		R413			RK73HB1J471J	CHIP R 470 J 1/16W	
R30			RK73HB1J101J	CHIP R 100 J 1/16W		R416			RK73HB1J471J	CHIP R 470 J 1/16W	
R31			RK73HB1J102J	CHIP R 1.0K J 1/16W		R419,420			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R32-35			RK73HB1J101J	CHIP R 100 J 1/16W		R424			RK73HH1J683D	CHIP R 68K D 1/16W	
R40			RK73HB1J000J	CHIP R 0.0 J 1/16W		R425			RK73HH1J333D	CHIP R 33K D 1/16W	
R101,102			RK73HB1J474J	CHIP R 470K J 1/16W		R426-429			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R103			RK73HB1J102J	CHIP R 1.0K J 1/16W		R431			RK73HB1J474J	CHIP R 470K J 1/16W	
R105			RK73HB1J104J	CHIP R 100K J 1/16W		R432,433			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R107			RK73HB1J104J	CHIP R 100K J 1/16W		R434			RK73HB1J393J	CHIP R 39K J 1/16W	
R110,111			RK73HB1J104J	CHIP R 100K J 1/16W		R435,436			RK73HB1J104J	CHIP R 100K J 1/16W	
R113			RK73HB1J104J	CHIP R 100K J 1/16W		R437			RK73HB1J471J	CHIP R 470 J 1/16W	
R115			RK73HB1J104J	CHIP R 100K J 1/16W		R438,439			RK73HB1J104J	CHIP R 100K J 1/16W	
R116			RK73HB1J473J	CHIP R 47K J 1/16W		R440			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R118			RK73HB1J473J	CHIP R 47K J 1/16W		R441			RK73HB1J153J	CHIP R 15K J 1/16W	
R119			RK73HB1J104J	CHIP R 100K 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	

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Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R445			RK73HB1J154J	CHIP R 150K J 1/16W		R723			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R446			RK73HB1J274J	CHIP R 270K J 1/16W		R724			RK73HB1J104J	CHIP R 100K J 1/16W	
R447			RK73HB1J104J	CHIP R 100K J 1/16W		R725			RK73HB1J100J	CHIP R 10 J 1/16W	
R448			RK73HB1J103J	CHIP R 10K J 1/16W		R726			RK73HB1J104J	CHIP R 100K J 1/16W	
R449-452			RK73HB1J474J	CHIP R 470K J 1/16W		R727-729			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R453			RK73HB1J104J	CHIP R 100K J 1/16W		R730			RK73HB1J471J	CHIP R 470 J 1/16W	
R454			RK73HB1J474J	CHIP R 470K J 1/16W		R731,732			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R455			RK73HB1J102J	CHIP R 1.0K J 1/16W		R733			RK73HB1J473J	CHIP R 47K J 1/16W	
R456			RK73HB1J474J	CHIP R 470K J 1/16W		R735			RK73HB1J473J	CHIP R 47K J 1/16W	
R457,458			RK73HB1J104J	CHIP R 100K J 1/16W		R736			RK73HB1J823J	CHIP R 82K J 1/16W	
R459,460			RK73HB1J102J	CHIP R 1.0K J 1/16W		R737			RK73HB1J153J	CHIP R 15K J 1/16W	
R461			RK73HB1J103J	CHIP R 10K J 1/16W		R738			RK73HB1J563J	CHIP R 56K J 1/16W	
R462			RK73HB1J102J	CHIP R 1.0K J 1/16W		R739			RK73HB1J823J	CHIP R 82K J 1/16W	
R463			RK73HB1J104J	CHIP R 100K J 1/16W		R740			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R464			RK73HB1J474J	CHIP R 470K J 1/16W		R741			RK73HB1J474J	CHIP R 470K J 1/16W	
R465,466			RK73HB1J103J	CHIP R 10K J 1/16W		R742,743			RK73HB1J103J	CHIP R 10K J 1/16W	
R467			RK73HB1J104J	CHIP R 100K J 1/16W		R744			RK73HB1J223J	CHIP R 22K J 1/16W	
R468			RK73HB1J000J	CHIP R 0.0 J 1/16W		R745			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R469			RK73HB1J474J	CHIP R 470K J 1/16W		R746			RK73HB1J563J	CHIP R 56K J 1/16W	
R470			RK73HB1J183J	CHIP R 18K J 1/16W		R747			RK73HB1J333J	CHIP R 33K J 1/16W	
R471			RK73HB1J000J	CHIP R 0.0 J 1/16W		R748			RK73HB1J103J	CHIP R 10K J 1/16W	
R472			RK73HB1J223J	CHIP R 22K J 1/16W		R749			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R473			RK73HB1J332J	CHIP R 3.3K J 1/16W		R750			RK73HB1J103J	CHIP R 10K J 1/16W	
R474,475			RK73HB1J333J	CHIP R 33K J 1/16W		R752			RK73HB1J101J	CHIP R 100 J 1/16W	
R477,478			RK73HB1J000J	CHIP R 0.0 J 1/16W		R753			RK73HB1J683J	CHIP R 68K J 1/16W	
R479			RK73HB1J102J	CHIP R 1.0K J 1/16W		R754			RK73HB1J564J	CHIP R 560K J 1/16W	
R481			RK73HB1J474J	CHIP R 470K J 1/16W		R755			RK73HB1J104J	CHIP R 100K J 1/16W	
R483			RK73HB1J473J	CHIP R 47K J 1/16W		R756			RK73HB1J101J	CHIP R 100 J 1/16W	
R484			RK73HB1J223J	CHIP R 22K J 1/16W		R757			RK73HB1J223J	CHIP R 22K J 1/16W	
R485			RK73HB1J103J	CHIP R 10K J 1/16W		R758			RK73HB1J103J	CHIP R 10K J 1/16W	
R487-490			RK73HB1J223D	CHIP R 22K D 1/16W		R759			RK73HB1J101J	CHIP R 100 J 1/16W	
R491			RK73HB1J104J	CHIP R 100K J 1/16W		R761-764			RK73HB1J223J	CHIP R 22K J 1/16W	
R492			RK73HB1J474J	CHIP R 470K J 1/16W		R765			RK73HB1J334J	CHIP R 330K J 1/16W	
R493			RK73HB1J000J	CHIP R 0.0 J 1/16W		R766			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R494-497			RK73HB1J104D	CHIP R 100K D 1/16W		R767			RK73HB1J103J	CHIP R 10K J 1/16W	
R500			RK73HB1J473J	CHIP R 47K J 1/16W		R768			RK73HB1J224J	CHIP R 220K J 1/16W	
R501			RK73HB1J222J	CHIP R 2.2K J 1/16W		R769,770			RK73HB1J334J	CHIP R 330K J 1/16W	
R502,503			RK73HB1J103J	CHIP R 10K J 1/16W		R771			RK73HB1J153J	CHIP R 15K J 1/16W	
R504			RK73HB1J102J	CHIP R 1.0K J 1/16W		R775			RK73HB1J183J	CHIP R 18K J 1/16W	
R506			RK73HB1J222J	CHIP R 2.2K J 1/16W		R777			RK73HB1J473J	CHIP R 47K J 1/16W	
R507-511			RK73HB1J102J	CHIP R 1.0K J 1/16W		R778			RK73HB1J333J	CHIP R 33K J 1/16W	
R512			RK73HB1J101J	CHIP R 100 J 1/16W		R779			RK73HB1J473J	CHIP R 47K J 1/16W	
R513-515			RK73HB1J102J	CHIP R 1.0K J 1/16W		R780			RK73HB1J104J	CHIP R 100K J 1/16W	
R516			RK73HB1J101J	CHIP R 100 J 1/16W		R782			RK73HB1J104J	CHIP R 100K J 1/16W	
R517			RK73HB1J102J	CHIP R 1.0K J 1/16W		R783			RK73HB1J183J	CHIP R 18K J 1/16W	
R518			RK73HB1J101J	CHIP R 100 J 1/16W		R784			RK73HB1J104J	CHIP R 100K J 1/16W	
R519-528			RK73HB1J102J	CHIP R 1.0K J 1/16W		R785			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R529-531			RK73HB1J101J	CHIP R 100 J 1/16W		R786			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R532			RK73HB1J102J	CHIP R 1.0K J 1/16W		R787			RK73HB1J124J	CHIP R 120K J 1/16W	
R533-535			RK73HB1J101J	CHIP R 100 J 1/16W		R788			RK73HB1J473J	CHIP R 47K J 1/16W	
R536-540			RK73HB1J102J	CHIP R 1.0K J 1/16W		R789			RK73HB1J154J	CHIP R 150K J 1/16W	
R541			RK73HB1J101J	CHIP R 100 J 1/16W		R790			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R543			RK73HB1J101J	CHIP R 100 J 1/16W		R791			RK73HB1J474J	CHIP R 470K J 1/16W	
R544			RK73HB1J102J	CHIP R 1.0K J 1/16W		R793			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R545			RK73HB1J101J	CHIP R 100 J 1/16W		R794			RK73HB1J104J	CHIP R 100K J 1/16W	
R546,547			RK73HB1J102J	CHIP R 1.0K J 1/16W		R795			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R548,549			RK73HB1J473J	CHIP R 47K J 1/16W		R796			RK73HB1J333J	CHIP R 33K J 1/16W	
R550			RK73HB1J000J	CHIP R 0.0 J 1/16W		R797			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R716			RK73GB2A000J	CHIP R 0.0 J 1/10W		R798			RK73HB1J104J	CHIP R 100K J 1/16W	
R717-722			RK73HB1J104J	CHIP R 100K J 1/16W		R799			RK73HB1J334J	CHIP R 330K J 1/16W	

PARTS LIST

CONTROL UNIT (X53-4432-76)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R800			RK73HB1J474J	CHIP R 470K J 1/16W		D407			MA2S111-F	DIODE	
R801			RK73HB1J473J	CHIP R 47K J 1/16W		D408			1SS301F	DIODE	
R802			RK73HB1J474J	CHIP R 470K J 1/16W		D409,410			MA2S111-F	DIODE	
R803			RK73HB1J103J	CHIP R 10K J 1/16W		D411			1SS416	DIODE	
R804			RK73HB1J000J	CHIP R 0.0 J 1/16W		D412			1SS301F	DIODE	
R805,806			RK73HB1J473J	CHIP R 47K J 1/16W		D413			1SS388F	DIODE	
R807			RK73HB1J102J	CHIP R 1.0K J 1/16W		D414,415			1SS416	DIODE	
R808			RK73HB1J471J	CHIP R 470 J 1/16W		D416,417			1SS388F	DIODE	
R809			RK73HB1J334J	CHIP R 330K J 1/16W		D701			1SS301F	DIODE	
R810			RK73HB1J332J	CHIP R 3.3K J 1/16W		D702			MA2S111-F	DIODE	
R811			RK73HB1J823J	CHIP R 82K J 1/16W		D703-706			RB706F-40	DIODE	
R812			RK73HB1J562J	CHIP R 5.6K J 1/16W		D707			DA221	DIODE	
R813			RK73HB1J273J	CHIP R 27K J 1/16W		IC101			Note 1	ROM IC	
R814			RK73HB1J564J	CHIP R 560K J 1/16W		IC102			Note 1	MICROPROCESSOR IC	
R815			RK73HB1J104J	CHIP R 100K J 1/16W		IC103			Note 1	SRAM IC	
R816			RK73HB1J683J	CHIP R 68K J 1/16W		IC104			TC7SH08FU-F	MOS-IC	
R818			RK73HB1J104J	CHIP R 100K J 1/16W		IC105			XC6109C29ANN	ANALOGUE IC	
R819,820			RK73HB1J103J	CHIP R 10K J 1/16W		IC106			RV5C386A	MOS-IC	
R821			RK73HB1J104J	CHIP R 100K J 1/16W		IC107			SM5023CNDH-G	MOS-IC	
R822,823			RK73HB1J103J	CHIP R 10K J 1/16W		IC108			Note 1	MOS-IC	
R824			RK73HB1J393J	CHIP R 39K J 1/16W		IC109			TC7SH08FU-F	MOS-IC	
R825			RK73HB1J104J	CHIP R 100K J 1/16W		IC404			XC6204B332D	MOS-IC	
R826			RK73HB1J334J	CHIP R 330K J 1/16W		IC406			XC6204B332M	MOS-IC	
R827			RK73HB1J184J	CHIP R 180K J 1/16W		IC407			LT1616ES6-PBF	ANALOGUE IC	
R828,829			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC408			TC75S51FE(F)	MOS-IC	
R830			RK73HB1J105J	CHIP R 1.0M J 1/16W		IC409			TC7W66FK-F	MOS-IC	
R831			RK73HB1J474J	CHIP R 470K J 1/16W		IC411			NJM2880U105ZB	ANALOGUE IC	
R832			RK73HB1J473J	CHIP R 47K J 1/16W		IC412,413			TPA6201A1DRBR	ANALOGUE IC	
R833			RK73HB1J684J	CHIP R 680K J 1/16W		IC414			XC61CC5602NR	MOS-IC	
R834			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC415			TC7SET08FU-F	MOS-IC	
R835			RK73HB1J153J	CHIP R 15K J 1/16W		IC416			S-812C31BPI-G	ANALOGUE IC	
R836			RK73HB1J473J	CHIP R 47K J 1/16W		IC417			TC7WH126FK	MOS-IC	
R837			RK73HB1J683J	CHIP R 68K J 1/16W		IC418			TC7WT125FUF	MOS-IC	
R838			RK73HB1J564J	CHIP R 560K J 1/16W		IC701			PCA9535BS	MOS-IC	
R839			RK73HB1J333J	CHIP R 33K J 1/16W		IC702			TC75W51FK(F)	MOS-IC	
R840			RK73HB1J123J	CHIP R 12K J 1/16W		IC703			M62364FP-F	MOS-IC	
R841			RK73HB1J564J	CHIP R 560K J 1/16W		IC704			TC75S51FE(F)	MOS-IC	
R842			RK73HB1J104J	CHIP R 100K J 1/16W		IC705			TC75W51FK(F)	MOS-IC	
R843			RK73HB1J102J	CHIP R 1.0K J 1/16W		IC706			TC75S51FE(F)	MOS-IC	
R844			RK73HB1J472J	CHIP R 4.7K J 1/16W		IC707			TC7W53FK(F)	MOS-IC	
R845			RK73HB1J104J	CHIP R 100K J 1/16W		IC708			XC6209B502PR	MOS-IC	
R846			RK73HB1J471J	CHIP R 470 J 1/16W		IC709			TC7W53FK(F)	MOS-IC	
R847			RK73HB1J182J	CHIP R 1.8K J 1/16W		IC710,711			TC75W51FK(F)	MOS-IC	
R848-850			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC712			TC7S66FUF	MOS-IC	
R851,852			RK73HB1J683J	CHIP R 68K J 1/16W		IC713			TC75W51FK(F)	MOS-IC	
R853			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC714			TC7W53FK(F)	MOS-IC	
R855			RK73HB1J332J	CHIP R 3.3K J 1/16W		IC715			TC75S51FE(F)	MOS-IC	
R856			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC716			TC75W51FK(F)	MOS-IC	
VR1	2B		R31-0666-05	VARIABLE RESISTOR (VOL)		IC717			XC9235A15CM1	MOS-IC	
S1	2B		S60-0437-05	ROTARY SWITCH (CH)		Q4			SSM3K15TE(F)	FET	
D12-16			1SS416	DIODE		Q5			2SJ347F	FET	
D17			EMZ6.8N	ZENER DIODE		Q401,402			SSM6N16FE-F	FET	
D18,19			HZC6.8-E	ZENER DIODE		Q403			2SJ648-A	FET	
D20,21			NNCD6.8G-A	ZENER DIODE		Q404			SSM3K15TE(F)	FET	
D22,23			DA221	DIODE		Q405			SSM6N16FE-F	FET	
D102			1SS416	DIODE		Q406			2SB1132(Q,R)	TRANSISTOR	
D404,405			1SS388F	DIODE		Q407			UMG3N	TRANSISTOR	
D406			HRB0502A	DIODE		Q408			EMD12	TRANSISTOR	
						Q409			2SA1955A-F	TRANSISTOR	
						Q410			SSM3K15TE(F)	FET	

PARTS LIST

CONTROL UNIT (X53-4432-76)

TX-RX UNIT (X57-7830-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
Q411			SSM6N16FE-F	FET		C565			CC73HCH1H330J	CHIP C 33PF J	
Q412			SSM3K15TE(F)	FET		C566			CC73HCH1H820J	CHIP C 82PF J	
Q413			2SA1955A-F	TRANSISTOR		C567			CC73HCH1H0R5B	CHIP C 0.5PF B	
Q414,415			EMD12	TRANSISTOR		C568			CC73HCH1H1R5B	CHIP C 1.5PF B	
Q701			2SA1832(GR)F	TRANSISTOR		C570			CC73HCH1HR75B	CHIP C 0.75PF B	
Q702,703			SSM3K15TE(F)	FET		C571			CC73HCH1H030B	CHIP C 3.0PF B	
Q704			2SC4617(S)	TRANSISTOR		C572			CK73FB0J106K	CHIP C 10UF K	
Q705			2SC4738(GR)F	TRANSISTOR		C573			CC73HCH1H060B	CHIP C 6.0PF B	
Q706			2SA1832(GR)F	TRANSISTOR		C574			CC73HCH1H020B	CHIP C 2.0PF B	
Q707			2SJ243-A	FET		C575			CC73HCH1H060B	CHIP C 6.0PF B	
TH701			ERTJ0EV104H	THERMISTOR		C576			CC73HCH1H050B	CHIP C 5.0PF B	
TX-RX UNIT (X57-7830-11)						C577			CK73HB1H471K	CHIP C 470PF K	
D900			B30-2278-05	LED (RED/YELLOW)		C578			CK73GB0J475K	CHIP C 4.7UF K	
C500			CK73HB1A104K	CHIP C 0.10UF K		C579			CC73HCH1H050B	CHIP C 5.0PF B	
C501			CC73HCH1H101J	CHIP C 100PF J		C580			CK73HB1H471K	CHIP C 470PF K	
C502			CK73HB1H471K	CHIP C 470PF K		C581			CC73HCH1H0R5B	CHIP C 0.5PF B	
C503			CK73HB1A104K	CHIP C 0.10UF K		C582			CK73HB1H471K	CHIP C 470PF K	
C504			CK73HB1C103K	CHIP C 0.010UF K		C583			CC73HCH1H0R5B	CHIP C 0.5PF B	
C505			CC73HCH1H101J	CHIP C 100PF J		C584,585			CK73HB1H471K	CHIP C 470PF K	
C506			CC73HCH1H100C	CHIP C 10PF C		C586			CC73HCH1H100B	CHIP C 10PF B	
C508			CK73HB1C103K	CHIP C 0.010UF K		C587			CK73HB1H471K	CHIP C 470PF K	
C509			CC73HCH1H100C	CHIP C 10PF C		C588			CC73HCH1H100B	CHIP C 10PF B	
C511			CK73FB0J106K	CHIP C 10UF K		C600			CK73HB1A104K	CHIP C 0.10UF K	
C512			CK73HB1C103K	CHIP C 0.010UF K		C601			CC73HCH1H101J	CHIP C 100PF J	
C513			CC73HCH1H101J	CHIP C 100PF J		C602			CK73HB1A104K	CHIP C 0.10UF K	
C514,515			CK73HB1C103K	CHIP C 0.010UF K		C603			CC73HCH1H100B	CHIP C 10PF B	
C517-519			CC73HCH1H101J	CHIP C 100PF J		C604,605			CK73HB1H471K	CHIP C 470PF K	
C520			CK73GB1E105K	CHIP C 1.0UF K		C607			CC73HCH1H070B	CHIP C 7.0PF B	
C521			CC73HCH1H101J	CHIP C 100PF J		C609			CC73GCH1H010B	CHIP C 1.0PF B	
C522			CK73HB1A104K	CHIP C 0.10UF K		C610-612			CK73HB1H471K	CHIP C 470PF K	
C523,524			CC73HCH1H101J	CHIP C 100PF J		C613			CC73HCH1H040B	CHIP C 4.0PF B	
C525			CC73HCH1H470J	CHIP C 47PF J		C614,615			CK73HB1H471K	CHIP C 470PF K	
C526			CK73HB1A104K	CHIP C 0.10UF K		C617,618			CK73HB1H471K	CHIP C 470PF K	
C527,528			CC73HCH1H101J	CHIP C 100PF J		C619			CK73HB1A104K	CHIP C 0.10UF K	
C533			CK73HB1H471K	CHIP C 470PF K		C621			CC73HCH1H040B	CHIP C 4.0PF B	
C534			CC73HCH1H101J	CHIP C 100PF J		C622			CK73HB1H471K	CHIP C 470PF K	
C535			CS77AA1VR15M	CHIP TNTL 0.15UF 35WV		C623			CC73HCH1H120J	CHIP C 12PF J	
C536			CC73HCH1H470J	CHIP C 47PF J		C625			CK73HB1H471K	CHIP C 470PF K	
C539			CS77BA1D100M	CHIP TNTL 10UF 20WV		C626			CK73HB1A104K	CHIP C 0.10UF K	
C541			C92-0863-05	CHIP TNTL 0.047UF 35WV		C627			CC73HCH1H080B	CHIP C 8.0PF B	
C542			C93-0787-05	CERAMIC 0.1UF 50WV		C628			CC73HCH1H100C	CHIP C 10PF C	
C543			CC73HCH1H040B	CHIP C 4.0PF B		C629			CK73HB1H471K	CHIP C 470PF K	
C545			CK73HB1H471K	CHIP C 470PF K		C630			CK73GB1E105K	CHIP C 1.0UF K	
C546			CK73HB1H472K	CHIP C 4700PF K		C631			CS77AA1A6R8M	CHIP TNTL 6.8UF 10WV	
C547			CK73HB1H471K	CHIP C 470PF K		C632			CK73HB1H471K	CHIP C 470PF K	
C548			CC73HCH1H101J	CHIP C 100PF J		C634-637			CK73HB1H471K	CHIP C 470PF K	
C550			CC73HCH1H050B	CHIP C 5.0PF B		C639			CC73HCH1H330J	CHIP C 33PF J	
C553			CC73HCH1H100B	CHIP C 10PF B		C640			CC73HCH1H470J	CHIP C 47PF J	
C554			CC73HCH1H470J	CHIP C 47PF J		C641			CC73HCH1H100C	CHIP C 10PF C	
C555			CK73HB0J105K	CHIP C 1.0UF K		C642,643			CC73HCH1H151J	CHIP C 150PF J	
C556,557			CK73HB1H471K	CHIP C 470PF K		C645			CK73GB1C104K	CHIP C 0.10UF K	
C561			CK73HB1C103K	CHIP C 0.010UF K		C646			CK73GB1E105K	CHIP C 1.0UF K	
C562			CK73HB0J105K	CHIP C 1.0UF K		C648,649			CK73HB1C103K	CHIP C 0.010UF K	
C563			CC73HCH1H101J	CHIP C 100PF J		C651			CK73HB1H471K	CHIP C 470PF K	
						C653			CK73HB1H471K	CHIP C 470PF K	
						C660			CC73GCH1H101J	CHIP C 100PF J	
						C661			CK73HB1H471K	CHIP C 470PF K	
						C662			CC73GCH1H040B	CHIP C 4.0PF B	
						C663			CC73GCH1H101J	CHIP C 100PF J	
						C664			CC73GCH1H2R5B	CHIP C 2.5PF B	

PARTS LIST

TX-RX UNIT (X57-7830-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C665			CC73GCH1H030B	CHIP C 3.0PF B		C764			CC73HCH1H1R5B	CHIP C 1.5PF B	
C666			CC73GCH1H080B	CHIP C 8.0PF B		C765			CK73HB1H471K	CHIP C 470PF K	
C667			CC73GCH1H2R5B	CHIP C 2.5PF B		C766			CK73GB1H104K	CHIP C 0.10UF K	
C668			CC73GCH1H100C	CHIP C 10PF C		C767			CC73HCH1H120G	CHIP C 12PF G	
C669			CC73GCH1H1R5B	CHIP C 1.5PF B		C768			CC73HCH1H010B	CHIP C 1.0PF B	
C670			CK73HB1H471K	CHIP C 470PF K		C769			CK73HB1H471K	CHIP C 470PF K	
C671			CC73HCH1H100B	CHIP C 10PF B		C770			CC73HCH1H030B	CHIP C 3.0PF B	
C689-691			CK73HB1A104K	CHIP C 0.10UF K		C771			CK73HB1H471K	CHIP C 470PF K	
C692			C93-0951-05	CERAMIC CAP		C772			CC73HCH1H120G	CHIP C 12PF G	
C693			CK73GB1C224K	CHIP C 0.22UF K		C773			CC73HCH1H1R5B	CHIP C 1.5PF B	
C700			CC73HCH1H070B	CHIP C 7.0PF B		C774			CC73HCH1H020B	CHIP C 2.0PF B	
C701			CK73HB1C103K	CHIP C 0.010UF K		C775			CK73HB1H471K	CHIP C 470PF K	
C702			CC73HCH1H820J	CHIP C 82PF J		C776			CC73HCH1H120G	CHIP C 12PF G	
C703			CK73HB1A104K	CHIP C 0.10UF K		C777,778			CK73HB1H471K	CHIP C 470PF K	
C704			CC73HCH1H100B	CHIP C 10PF B		C779			CK73HB1C103K	CHIP C 0.010UF K	
C705			CK73FB1E475K	CHIP C 4.7UF K		C780			CK73GB1H104K	CHIP C 0.10UF K	
C706			CC73HCH1H100B	CHIP C 10PF B		C782			CC73HCH1H0R5B	CHIP C 0.5PF B	
C707			CC73HCH1H680J	CHIP C 68PF J		C783			CK73GB1E105K	CHIP C 1.0UF K	
C708			CC73HCH1H101J	CHIP C 100PF J		C784-786			CK73HB1H471K	CHIP C 470PF K	
C709-711			CK73HB1A104K	CHIP C 0.10UF K		C788			CK73GB1H104K	CHIP C 0.10UF K	
C712			CC73HCH1H680J	CHIP C 68PF J		C789			CK73HB1H471K	CHIP C 470PF K	
C713			CK73FB1A106K	CHIP C 10UF K		C790			CK73HB1A104K	CHIP C 0.10UF K	
C714			CK73GB1H102K	CHIP C 1000PF K		C791			CK73HB1H471K	CHIP C 470PF K	
C715			CC73HCH1H470J	CHIP C 47PF J		C792			CK73HB1A104K	CHIP C 0.10UF K	
C717			CK73HB1C103K	CHIP C 0.010UF K		C794,795			CK73HB1H471K	CHIP C 470PF K	
C718			CK73HB1A104K	CHIP C 0.10UF K		C796			CC73HCH1H110G	CHIP C 11PF G	
C719			CK73FB1A106K	CHIP C 10UF K		C798			CC73HCH1H030B	CHIP C 3.0PF B	
C720			CC73HCH1H100B	CHIP C 10PF B		C799			CK73HB1H471K	CHIP C 470PF K	
C721			CK73HB1A104K	CHIP C 0.10UF K		C800			CC73HCH1H1R5B	CHIP C 1.5PF B	
C722			CC73HCH1H470G	CHIP C 47PF G		C801			CK73HB1H471K	CHIP C 470PF K	
C723,724			CK73HB1A104K	CHIP C 0.10UF K		C802,803			CC73HCH1H040B	CHIP C 4.0PF B	
C725			CK73HB1C103K	CHIP C 0.010UF K		C804			CC73HCH1H110G	CHIP C 11PF G	
C727,728			CK73HB1A104K	CHIP C 0.10UF K		C807			CC73HCH1H030B	CHIP C 3.0PF B	
C729			CK73FB1E474K	CHIP C 0.47UF K		C810			CC73HCH1H040B	CHIP C 4.0PF B	
C730			CK73HB1C103K	CHIP C 0.010UF K		C811			CC73HCH1H070B	CHIP C 7.0PF B	
C732			CK73HB1H471K	CHIP C 470PF K		C813,814			CC73HCH1H270J	CHIP C 27PF J	
C733,734			CK73HB1C103K	CHIP C 0.010UF K		C849			CK73HB1H471K	CHIP C 470PF K	
C735			CC73HCH1H470G	CHIP C 47PF G		C850			CC73HCH1H101J	CHIP C 100PF J	
C736			CK73HB1C103K	CHIP C 0.010UF K		C900			CK73GB1H102K	CHIP C 1000PF K	
C737			CC73HCH1H020B	CHIP C 2.0PF B		C901,902			CK73HB1H471K	CHIP C 470PF K	
C738			CC73HCH1H220G	CHIP C 22PF G		C903			CK73GB1H471K	CHIP C 470PF K	
C739			CC73HCH1H060B	CHIP C 6.0PF B		C904-908			CC73HCH1H470J	CHIP C 47PF J	
C740,741			CK73HB1C103K	CHIP C 0.010UF K		C910			CC73HCH1H470J	CHIP C 47PF J	
C742			CK73FB1A475K	CHIP C 4.7UF K		C912-920			CC73HCH1H470J	CHIP C 47PF J	
C743			CK73HB1C103K	CHIP C 0.010UF K		C922,923			CC73HCH1H470J	CHIP C 47PF J	
C744,745			CK73HB1H471K	CHIP C 470PF K		C925-943			CC73HCH1H470J	CHIP C 47PF J	
C746			CC73HCH1H090B	CHIP C 9.0PF B		C944			CK73HB1H471K	CHIP C 470PF K	
C747			CC73HCH1H100B	CHIP C 10PF B		C945,946			CC73HCH1H470J	CHIP C 47PF J	
C748			CK73HB1H471K	CHIP C 470PF K		C947			CK73HB1H471K	CHIP C 470PF K	
C749			CC73HCH1H040B	CHIP C 4.0PF B		C948,949			CK73GB1E105K	CHIP C 1.0UF K	
C750			CK73HB1C103K	CHIP C 0.010UF K		C950			C92-0765-05	CHIP TNL 4.7UF 16WV	
C751			CC73HCH1H090B	CHIP C 9.0PF B		C951			CK73GB1C224K	CHIP C 0.22UF K	
C752			CK73HB1H471K	CHIP C 470PF K		C952			CK73HB1H102K	CHIP C 1000PF K	
C753			CC73HCH1H040B	CHIP C 4.0PF B		C953			CK73HB1A104K	CHIP C 0.10UF K	
C754			CC73HCH1H090B	CHIP C 9.0PF B		C954			CK73GB1C224K	CHIP C 0.22UF K	
C755			CC73HCH1H050B	CHIP C 5.0PF B		C955,956			CK73HB1H102K	CHIP C 1000PF K	
C756			CK73HB1H471K	CHIP C 470PF K		C957,958			CK73GB1E105K	CHIP C 1.0UF K	
C758			CK73HB1H471K	CHIP C 470PF K		C961			CK73HB1H471K	CHIP C 470PF K	
C759,760			CK73HB1A104K	CHIP C 0.10UF K		C962			CC73HCH1E181J	CHIP C 180PF J	
C761			CK73GB1E105K	CHIP C 1.0UF K		C963			CK73GB1E105K	CHIP C 1.0UF K	

PARTS LIST

TX-RX UNIT (X57-7830-11)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C964,965			CK73GB1C224K	CHIP C 0.22UF K		L713-715			L41-1078-14	SMALL FIXED INDUCTOR (10NH)	
C966			CC73HCH1H220J	CHIP C 22PF J		L716			L92-0138-05	CHIP FERRITE	
C967			CK73HB1H471K	CHIP C 470PF K		L717			L41-2285-14	SMALL FIXED INDUCTOR (220NH)	
C968			CK73GB1C224K	CHIP C 0.22UF K		L721,722			L41-1078-14	SMALL FIXED INDUCTOR (10NH)	
C969			CK73GB1E105K	CHIP C 1.0UF K		L723			L34-4564-05	AIR-CORE COIL	
C970,971			CK73HB1H102K	CHIP C 1000PF K		L725			L40-6865-92	SMALL FIXED INDUCTOR (6.8NH)	
C972-974			CK73GB1E105K	CHIP C 1.0UF K		L726			L41-3978-03	SMALL FIXED INDUCTOR (39NH)	
C975			C93-0899-05	CERAMIC CAP(9.0PF)		L780			L40-1085-57	SMALL FIXED INDUCTOR (100N)	
C976			CC73HCH1H470J	CHIP C 47PF J		L900			L92-0149-05	CHIP FERRITE	
C977			CK73GB1E105K	CHIP C 1.0UF K		L901			L33-1462-05	SMALL FIXED INDUCTOR (68UH)	
C980			CK73GB1E105K	CHIP C 1.0UF K		L902			L40-2702-86	SMALL FIXED INDUCTOR (27UH)	
C981			CK73HB1A474K	CHIP C 0.47UF K		L903			L41-6869-16	SMALL FIXED INDUCTOR (6.8N)	
C987			CC73HCH1H050B	CHIP C 5.0PF B		X500			L77-3016-05	TCXO (19.2M)	
C988			C93-0945-05	CERAMIC CAP		XF700			L71-0640-05	MCF (58.05MHZ)	
C989			C93-0939-05	CERAMIC CAP		R430			RK73GB2A000J	CHIP R 0.0 J 1/10W	
CN600			E23-1326-05	TERMINAL		R431,432			RK73HB1J000J	CHIP R 0.0 J 1/16W	
CN601			E23-1167-05	TERMINAL		R500,501			RN73HH1J104D	CHIP R 100K D 1/16W	
CN737			E40-6358-05	SOCKET FOR PIN ASSY		R503			RK73HB1J100J	CHIP R 10 J 1/16W	
CN900			E40-6422-15	SOCKET FOR PIN ASSY		R504			RK73HB1J104J	CHIP R 100K J 1/16W	
CN901			E40-6752-05	FLAT CABLE CONNECTOR		R505			RK73HB1J000J	CHIP R 0.0 J 1/16W	
CN902			E23-1326-05	TERMINAL		R506			RK73HB1J473J	CHIP R 47K J 1/16W	
F900			F53-0324-15	FUSE (2.5A)		R511-514			RK73HB1J100J	CHIP R 10 J 1/16W	
CF700			L72-1017-05	CERAMIC FILTER (450KHZ)		R515			RK73HB1J472J	CHIP R 4.7K J 1/16W	
CF701			L72-1020-05	CERAMIC FILTER (450KHZ)		R519			RK73HB1J100J	CHIP R 10 J 1/16W	
L500			L41-4795-39	SMALL FIXED INDUCTOR (4.7UF)		R520			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L503			L92-0163-05	BEADS CORE		R522			RK73HB1J100J	CHIP R 10 J 1/16W	
L504			L40-1275-92	SMALL FIXED INDUCTOR (12NH)		R523			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L508,509			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R527			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L514-519			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R529			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L520			L40-2278-67	SMALL FIXED INDUCTOR (22NH)		R530			RK73HB1J473J	CHIP R 47K J 1/16W	
L521			L40-2778-67	SMALL FIXED INDUCTOR (27NH)		R531			RK73HB1J683J	CHIP R 68K J 1/16W	
L522			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R532			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L523			L92-0446-05	BEADS CORE		R533			RK73HH1J224D	CHIP R 220K D 1/16W	
L524-526			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R534			RK73HH1J473D	CHIP R 47K D 1/16W	
L527			L92-0446-05	BEADS CORE		R535			RK73HB1J151J	CHIP R 150 J 1/16W	
L528			L40-3375-71	SMALL FIXED INDUCTOR (33NH)		R536			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L530			L40-5675-57	SMALL FIXED INDUCTOR (56.0N)		R537			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L598,599			L92-0163-05	BEADS CORE		R538			RK73HH1J391D	CHIP R 390 D 1/16W	
L600			L40-2275-92	SMALL FIXED INDUCTOR (22NH)		R539			RK73HB1J106J	CHIP R 10M J 1/16W	
L602			L40-2775-92	SMALL FIXED INDUCTOR (27NH)		R541			RK73HB1J103J	CHIP R 10K J 1/16W	
L603			L40-1875-92	SMALL FIXED INDUCTOR (18NH)		R546			RK73HB1J104J	CHIP R 100K J 1/16W	
L604			L92-0138-05	CHIP FERRITE		R547			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L605			L40-1275-92	SMALL FIXED INDUCTOR (12NH)		R548			RK73HB1J104J	CHIP R 100K J 1/16W	
L606			L41-1875-43	SMALL FIXED INDUCTOR (18NH)		R550			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L607			L92-0149-05	CHIP FERRITE		R552			RK73HB1J104J	CHIP R 100K J 1/16W	
L609			L34-4575-05	AIR-CORE COIL		R554,555			RK73HB1J473J	CHIP R 47K J 1/16W	
L610			L92-0149-05	CHIP FERRITE		R557			RK73HB1J152J	CHIP R 1.5K J 1/16W	
L611			L41-2285-43	SMALL FIXED INDUCTOR (220NH)		R558			RK73HB1J474J	CHIP R 470K J 1/16W	
L612-614			L34-4564-05	AIR-CORE COIL		R559			RK73HH1J221D	CHIP R 220 D 1/16W	
L615			L40-2275-57	SMALL FIXED INDUCTOR (22.0N)		R560			RK73HB1J220J	CHIP R 22 J 1/16W	
L701			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)		R561			RK73HH1J221D	CHIP R 220 D 1/16W	
L703			L41-4778-45	SMALL FIXED INDUCTOR (47NH)		R562			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L704			L40-1891-86	SMALL FIXED INDUCTOR (1.8U)		R563			RK73HB1J473J	CHIP R 47K J 1/16W	
L705,706			L92-0138-05	CHIP FERRITE		R564			RK73HB1J154J	CHIP R 150K J 1/16W	
L707			L41-2785-39	SMALL FIXED INDUCTOR (0.27U)		R565			RK73HB1J101J	CHIP R 100 J 1/16W	
L708			L41-5685-39	SMALL FIXED INDUCTOR (0.56U)		R566			RK73HH1J474D	CHIP R 470K D 1/16W	
L709,710			L40-1575-92	SMALL FIXED INDUCTOR (15NH)		R567			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L711			L40-3375-92	SMALL FIXED INDUCTOR (33NH)		R570,571			RK73HB1J000J	CHIP R 0.0 J 1/16W	
						R572			RK73HB1J100J	CHIP R 10 J 1/16W	

PARTS LIST

TX-RX UNIT (X57-7830-11)

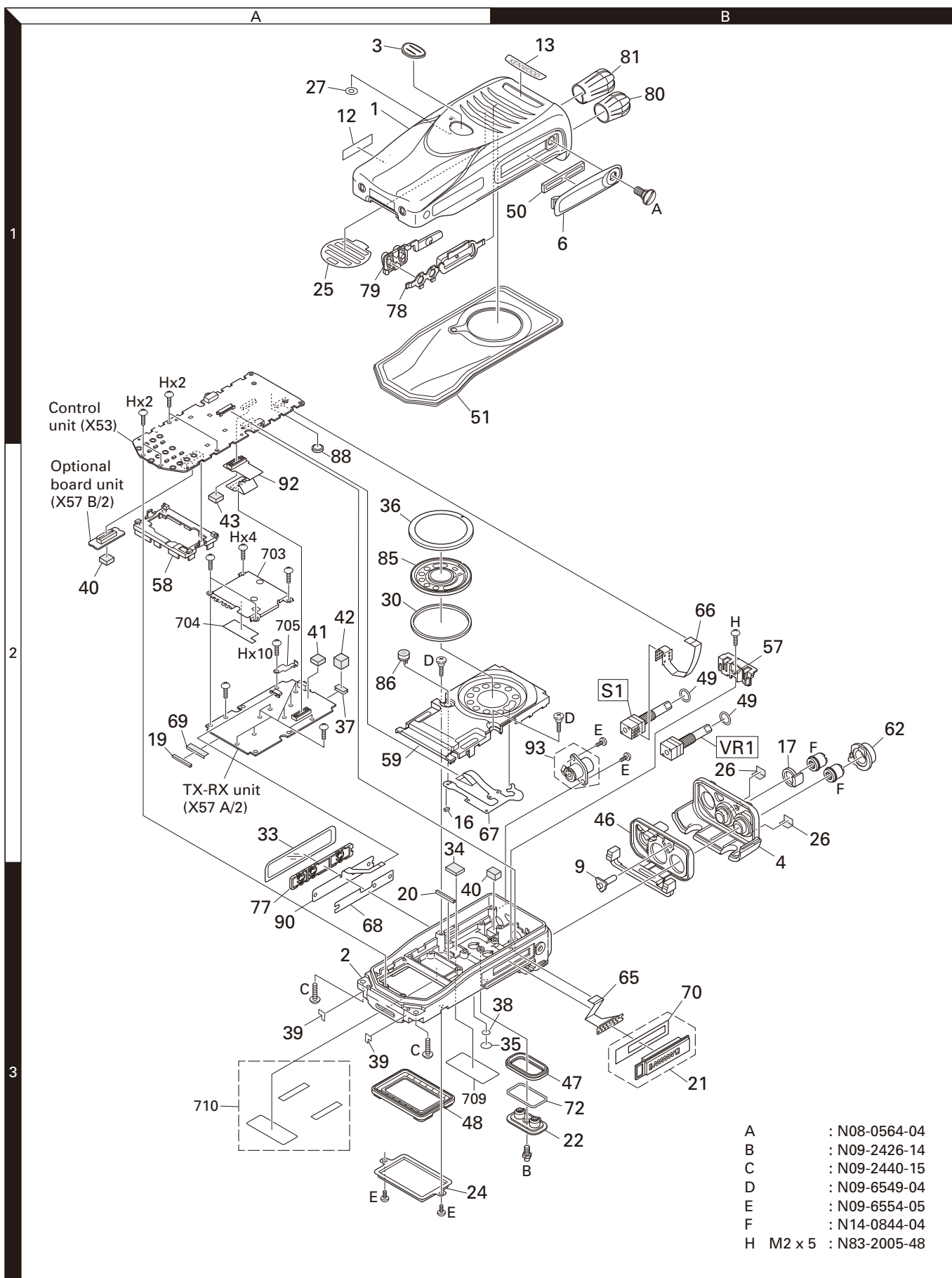
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R573			RK73HB1J124J	CHIP R 120K J 1/16W		R671			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R574-576			RK73HB1J000J	CHIP R 0.0 J 1/16W		R701			RK73HB1J561J	CHIP R 560 J 1/16W	
R577			RK73GB2A000J	CHIP R 0.0 J 1/10W		R702			RK73HB1J334J	CHIP R 330K J 1/16W	
R580,581			RK73HB1J000J	CHIP R 0.0 J 1/16W		R703			RK73HB1J100J	CHIP R 10 J 1/16W	
R583			RK73HB1J000J	CHIP R 0.0 J 1/16W		R704			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R586			RK73HB1J000J	CHIP R 0.0 J 1/16W		R705			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R589,590			RK73HB1J103J	CHIP R 10K J 1/16W		R709			RK73HB1J103J	CHIP R 10K J 1/16W	
R599			RK73HB1J104J	CHIP R 100K J 1/16W		R712			RK73HB1J103J	CHIP R 10K J 1/16W	
R600			RK73HB1J103J	CHIP R 10K J 1/16W		R714			RK73HB1J100J	CHIP R 10 J 1/16W	
R601			RK73HB1J183J	CHIP R 18K J 1/16W		R717			RK73HB1J473J	CHIP R 47K J 1/16W	
R602			RK73HB1J124J	CHIP R 120K J 1/16W		R718			RK73HB1J183J	CHIP R 18K J 1/16W	
R603			RK73HB1J222J	CHIP R 2.2K J 1/16W		R719			RK73HB1J274J	CHIP R 270K J 1/16W	
R604			RK73HB1J682J	CHIP R 6.8K J 1/16W		R720			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R605			RK73HB1J103J	CHIP R 10K J 1/16W		R721			RK73HB1J103J	CHIP R 10K J 1/16W	
R606			RK73HB1J331J	CHIP R 330 J 1/16W		R722			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R607			RK73HB1J222J	CHIP R 2.2K J 1/16W		R724			RK73HB1J104J	CHIP R 100K J 1/16W	
R608			RK73HB1J470J	CHIP R 47 J 1/16W		R725			RK73HB1J223J	CHIP R 22K J 1/16W	
R610			RK73HB1J472J	CHIP R 4.7K J 1/16W		R726			RK73HB1J183J	CHIP R 18K J 1/16W	
R612			RK73HB1J472J	CHIP R 4.7K J 1/16W		R727			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R613			RK73HB1J000J	CHIP R 0.0 J 1/16W		R728			RK73HB1J221J	CHIP R 220 J 1/16W	
R616			RK73HB1J181J	CHIP R 180 J 1/16W		R730			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R617			RK73HB1J331J	CHIP R 330 J 1/16W		R731			RK73HB1J103J	CHIP R 10K J 1/16W	
R618			RK73HB1J220J	CHIP R 22 J 1/16W		R733			RK73HB1J564J	CHIP R 560K J 1/16W	
R619			RK73HB1J821J	CHIP R 820 J 1/16W		R735			RK73HB1J101J	CHIP R 100 J 1/16W	
R620			RK73HB1J5R6J	CHIP R 5.6 J 1/16W		R736			RK73HB1J104J	CHIP R 100K J 1/16W	
R621			RK73HB1J821J	CHIP R 820 J 1/16W		R737			RK73HB1J221J	CHIP R 220 J 1/16W	
R622			RK73HB1J101J	CHIP R 100 J 1/16W		R738			RK73HB1J272J	CHIP R 2.7K J 1/16W	
R623			RK73HB1J123J	CHIP R 12K J 1/16W		R739			RK73HB1J221J	CHIP R 220 J 1/16W	
R624			RK73HB1J333J	CHIP R 33K J 1/16W		R740			RK73HB1J470J	CHIP R 47 J 1/16W	
R626			RK73HB1J221J	CHIP R 220 J 1/16W		R742			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R627,628			RK73HB1J000J	CHIP R 0.0 J 1/16W		R743			RK73HB1J681J	CHIP R 680 J 1/16W	
R629			RK73HB1J273J	CHIP R 27K J 1/16W		R744			RK73HB1J221J	CHIP R 220 J 1/16W	
R630			RK73HB1J103J	CHIP R 10K J 1/16W		R745			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R631			RK73HB1J470J	CHIP R 47 J 1/16W		R746			RK73HB1J104J	CHIP R 100K J 1/16W	
R632			RK73HB1J562J	CHIP R 5.6K J 1/16W		R747			RK73HB1J154J	CHIP R 150K J 1/16W	
R633			RK73HB1J101J	CHIP R 100 J 1/16W		R748			RK73HB1J104J	CHIP R 100K J 1/16W	
R634			RK73HB1J000J	CHIP R 0.0 J 1/16W		R749			RK73HB1J224J	CHIP R 220K J 1/16W	
R635			RK73HB1J561J	CHIP R 560 J 1/16W		R750			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R636			RK73HB1J221J	CHIP R 220 J 1/16W		R752,753			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R639			RK73HB1J103J	CHIP R 10K J 1/16W		R755			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R641			RK73HB1J103J	CHIP R 10K J 1/16W		R757			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R642			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R758			RK73HB1J103J	CHIP R 10K J 1/16W	
R644			RK73HB1J220J	CHIP R 22 J 1/16W		R759,760			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R645			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R761			RK73HB1J101J	CHIP R 100 J 1/16W	
R646			RK73HB1J333J	CHIP R 33K J 1/16W		R762			RK73HB1J103J	CHIP R 10K J 1/16W	
R647			RK73EB2ER39K	CHIP R 0.39 K 1/4W		R763			RK73HB1J824J	CHIP R 820K J 1/16W	
R648,649			RK73HH1J154D	CHIP R 150K D 1/16W		R764			RK73HB1J104J	CHIP R 100K J 1/16W	
R650			RK73GB2A000J	CHIP R 0.0 J 1/10W		R765			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R651-654			RK73HH1J274D	CHIP R 270K D 1/16W		R768			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R655			RK73HB1J103J	CHIP R 10K J 1/16W		R769			RK73HB1J103J	CHIP R 10K J 1/16W	
R656			RK73HB1J563J	CHIP R 56K J 1/16W		R770			RK73HB1J680J	CHIP R 68 J 1/16W	
R657			RK73HB1J000J	CHIP R 0.0 J 1/16W		R771			RK73HB1J151J	CHIP R 150 J 1/16W	
R658			RK73HB1J821J	CHIP R 820 J 1/16W		R772			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R659			RK73HB1J474J	CHIP R 470K J 1/16W		R773			RK73HB1J824J	CHIP R 820K J 1/16W	
R660			RK73HB1J473J	CHIP R 47K J 1/16W		R774,775			RK73HB1J104J	CHIP R 100K J 1/16W	
R661			RK73HB1J104J	CHIP R 100K J 1/16W		R777			RK73HB1J103J	CHIP R 10K J 1/16W	
R664			RK73HB1J000J	CHIP R 0.0 J 1/16W		R778			RK73HB1J104J	CHIP R 100K J 1/16W	
R665,666			RK73HB1J271J	CHIP R 270 J 1/16W		R779			RK73HB1J683J	CHIP R 68K J 1/16W	
R667			RK73EB2E823J	CHIP R 82K J 1/4W		R780			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R670			RK73HB1J224J	CHIP R 220K J 1/16W		R781			RK73HB1J182J	CHIP R 1.8K J 1/16W	

PARTS LIST

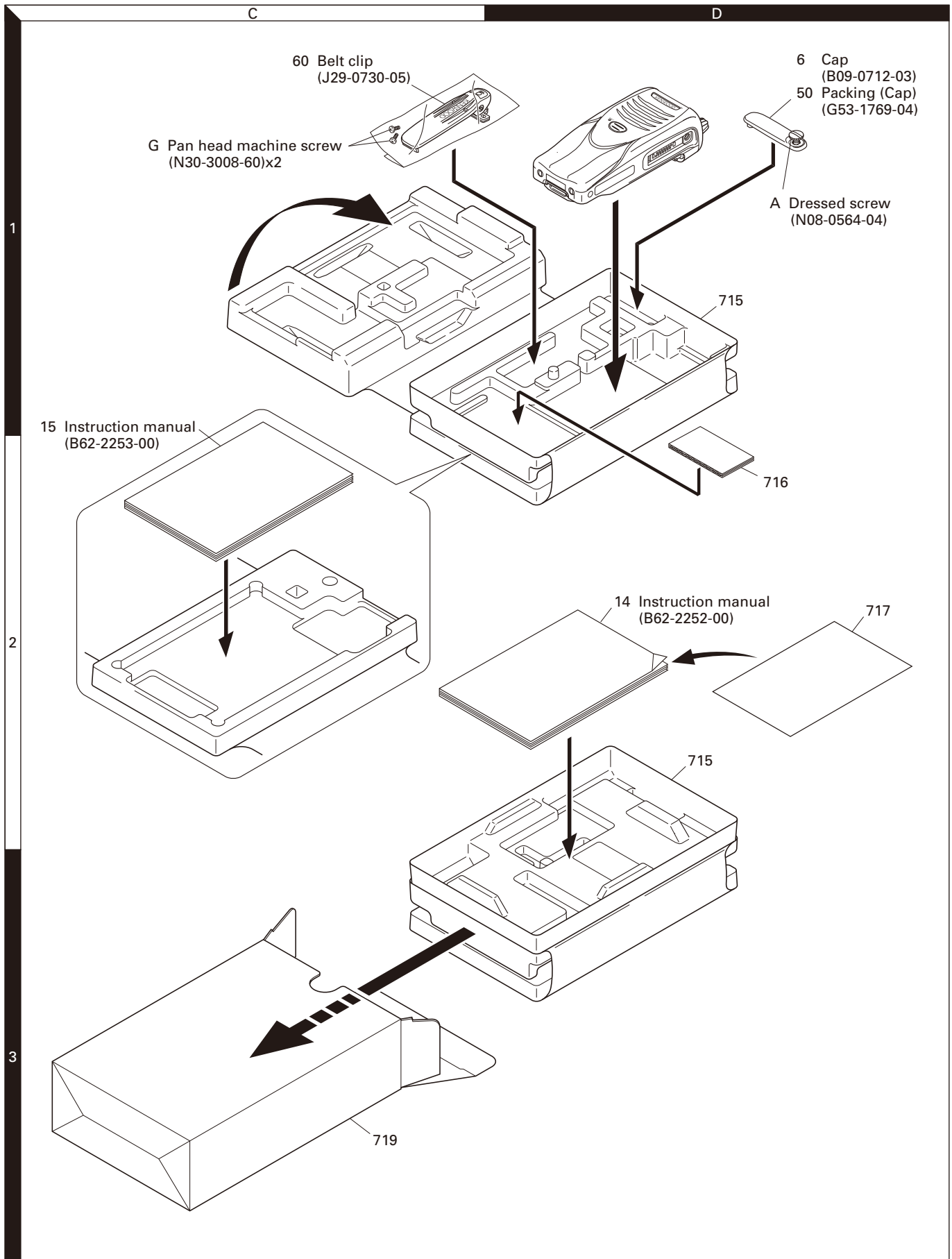
TX-RX UNIT (X57-7830-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R783			RK73HB1J224J	CHIP R 220K J 1/16W		D605			HZU5CLL	ZENER DIODE	
R784			RK73HB1J474J	CHIP R 470K J 1/16W		D606,607			HVC131	DIODE	
R785			RK73HB1J105J	CHIP R 1.0M J 1/16W		D611			HSC119	DIODE	
R786			RK73HB1J000J	CHIP R 0.0 J 1/16W		D700			HSC119	DIODE	
R788			RK73HB1J105J	CHIP R 1.0M J 1/16W		D702-704			1SV286F	VARIABLE CAPACITANCE DIODE	
R790			RK73HB1J105J	CHIP R 1.0M J 1/16W		D705			HSC119	DIODE	
R791			RK73HB1J000J	CHIP R 0.0 J 1/16W		D706			1SV286F	VARIABLE CAPACITANCE DIODE	
R792			RK73HB1J104J	CHIP R 100K J 1/16W		D708			1SV286F	VARIABLE CAPACITANCE DIODE	
R794,795			RK73HB1J103J	CHIP R 10K J 1/16W		D709			HVC131	DIODE	
R796			RK73HB1J000J	CHIP R 0.0 J 1/16W		D710			1SV286F	VARIABLE CAPACITANCE DIODE	
R797			RK73HB1J473J	CHIP R 47K J 1/16W		D711			HVC131	DIODE	
R798			RK73HB1J470J	CHIP R 47 J 1/16W		D901			1SR154-400	DIODE	
R799			RK73HB1J000J	CHIP R 0.0 J 1/16W		D902			HSC119	DIODE	
R800			RK73GB2A000J	CHIP R 0.0 J 1/10W		IC404			TC75W51FUF	MOS-IC	
R900			RK73HB1J391J	CHIP R 390 J 1/16W		IC500			LM73CIMKX-0	MOS-IC	
R901			RK73GB2A000J	CHIP R 0.0 J 1/10W		IC501			TLV2381IDBV	MOS-IC	
R902			RK73HB1J100J	CHIP R 10 J 1/16W		IC502			SKY72300-362	MOS-IC	
R903			RK73HB1J821J	CHIP R 820 J 1/16W		IC503			TLV2381IDBV	MOS-IC	
R904			RK73HB1J000J	CHIP R 0.0 J 1/16W		IC504			TC75W51FUF	MOS-IC	
R905			RK73HB1J330J	CHIP R 33 J 1/16W		IC600			TA75W01FUF	MOS-IC	
R906			RK73HB1J474J	CHIP R 470K J 1/16W		IC700			MCP6021-E/OT	MOS-IC	
R907			RK73GB2A100J	CHIP R 10 J 1/10W		IC701			TK10931VTL-G	ANALOGUE IC	
R908			RK73HB1J473J	CHIP R 47K J 1/16W		IC702,703			TLV2381IDBV	MOS-IC	
R909			RK73GB2A000J	CHIP R 0.0 J 1/10W		IC900			TC75S51FE(F)	MOS-IC	
R910-912			RK73HB1J474J	CHIP R 470K J 1/16W		IC901			XC9101D09AKR	ANALOGUE IC	
R913			RK73HB1J102J	CHIP R 1.0K J 1/16W		IC902			TK11250CUCB	MOS-IC	
R914			RK73HB1J154J	CHIP R 150K J 1/16W		IC903			TK71733S	BI-POLAR IC	
R915-917			RK73HB1J474J	CHIP R 470K J 1/16W		Q503			2SC5383-T111	TRANSISTOR	
R918			RK73HB1J102J	CHIP R 1.0K J 1/16W		Q504			2SK879-F(Y)	FET	
R920,921			RK73HB1J473J	CHIP R 47K J 1/16W		Q507			2SC5383-T111	TRANSISTOR	
R922			RK73HB1J102J	CHIP R 1.0K J 1/16W		Q508,509			2SK508NV(K52)	FET	
R923			RK73HB1J123J	CHIP R 12K J 1/16W		Q510			SSM6L05FU-F	FET	
R925			RK73HH1J334D	CHIP R 330K D 1/16W		Q511			2SJ347F	FET	
R926			RK73HH1J223D	CHIP R 22K D 1/16W		Q512			2SC5636	TRANSISTOR	
R927			RK73HB1J102J	CHIP R 1.0K J 1/16W		Q600,601			2SC5636	TRANSISTOR	
R928			RK73HB1J000J	CHIP R 0.0 J 1/16W		Q602			2SK3077F	FET	
R929			RK73HB1J102J	CHIP R 1.0K J 1/16W		Q603			RD01MUS1-T113	FET	
R931			RK73GB2A000J	CHIP R 0.0 J 1/10W		Q604			2SC5383-T111	TRANSISTOR	
R932			RK73HB1J104J	CHIP R 100K J 1/16W		Q605			SSM3K15TE(F)	FET	
R933			RK73HB1J102J	CHIP R 1.0K J 1/16W		Q606			RD07MVS1BT122	FET	
R934			RK73HB1J273J	CHIP R 27K J 1/16W		Q607			RT1N441U-T111	TRANSISTOR	
R935			RK73HB1J153J	CHIP R 15K J 1/16W		Q608			2SK1824-A	FET	
R951			RK73HB1J000J	CHIP R 0.0 J 1/16W		Q610			EMD5	TRANSISTOR	
R954			RK73GB2A000J	CHIP R 0.0 J 1/10W		Q700			2SC5108(Y)F	TRANSISTOR	
R955-958			RK73HB1J000J	CHIP R 0.0 J 1/16W		Q701			2SC4215-F(Y)	TRANSISTOR	
R959			RK73HB1J104J	CHIP R 100K J 1/16W		Q703			3SK318	FET	
S1			S70-0483-05	TACT SWITCH		Q704			2SC5383-T111	TRANSISTOR	
D501			HSC119	DIODE		Q705			3SK318	FET	
D505			DA221	DIODE		Q706			2SK1830F	FET	
D506,507			1SV325F	VARIABLE CAPACITANCE DIODE		Q900			UMG9N	TRANSISTOR	
D510			1SV290B-F	VARIABLE CAPACITANCE DIODE		Q901-903			SSM6L05FU-F	FET	
D511			1SV282-F	VARIABLE CAPACITANCE DIODE		Q904			SSM5H01TU-F	FET	
D514,515			1SV290B-F	VARIABLE CAPACITANCE DIODE		Q905			2SA1955A-F	TRANSISTOR	
D516,517			1SV282-F	VARIABLE CAPACITANCE DIODE		TH600			ERTJ0EV104H	THERMISTOR	
D518			HSC119	DIODE							
D519			1SV278F	VARIABLE CAPACITANCE DIODE							
D600,601			HSC277	DIODE							
D604			HZU2ALL	ZENER DIODE							

EXPLODED VIEW



PACKING



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

TROUBLE SHOOTING

Fault Diagnosis of the BGA (Ball Grid Array) IC

■ Overview

A flowchart for determining whether or not the transceiver can be powered on 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 (X53-4432-78) 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 34 and 35.)

Button type lithium battery (W09-0971-05) does not belong to the printed circuit board for service. Please use the part which has been attached to the printed circuit board. After the printed circuit board has been readjusted, please attach any ESN stickers to the chassis. When "ESN Validation" is used with NXDN Trunking, you must modify the ESN register.

● Checking power supply voltage

Checking voltage	
Points to be checked	Normal voltage
33M 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.

● 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 a normal value is confirmed.

When an abnormal value is confirmed.

● Checking the Reset/Control signal

Checking the control signal input to the ASIC	
Points to be checked	Normal voltage
RESET IC105 (4 pin)	3.3V
/BINT Q401 (6 pin)	3.3V
/PSW Q402 (3 pin)	3.3V

When a normal value is confirmed.

When an abnormal value is confirmed.

The BGA parts are not broken.

Checking the control signal output from the ASIC	
Points to be checked	Normal voltage
/FRST C110	3.3V

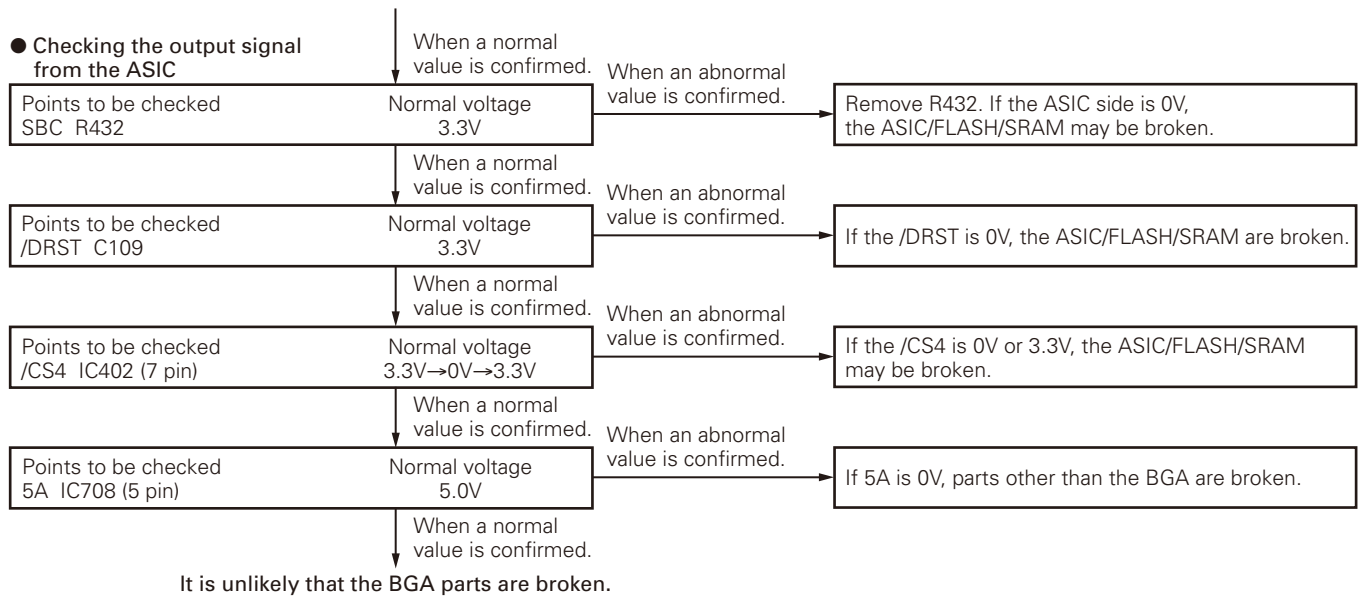
When a normal value is confirmed.

When an abnormal value is confirmed.

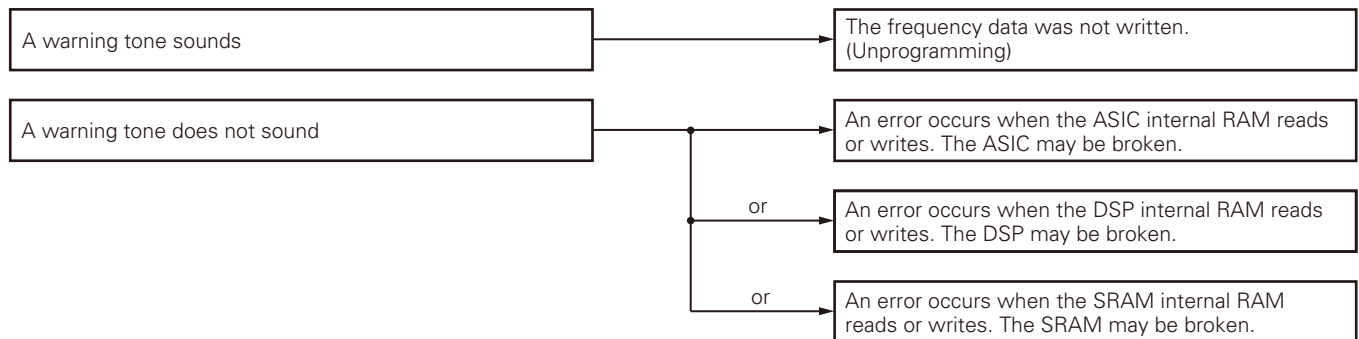
If the /FRST is always 0V, the ASIC is broken.
If the /FRST repeats 3.3V and 0V at intervals, The ASIC, FLASH and SRAM may be broken.

When a normal value is confirmed.

TROUBLE SHOOTING



● **When the LED color changes red and orange alternately.**



■ 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) /CS4 | : LCD controller chip select signal | LOW → Active |
| 8) 5A | : Analog peripheral control 5.0V power supply | |

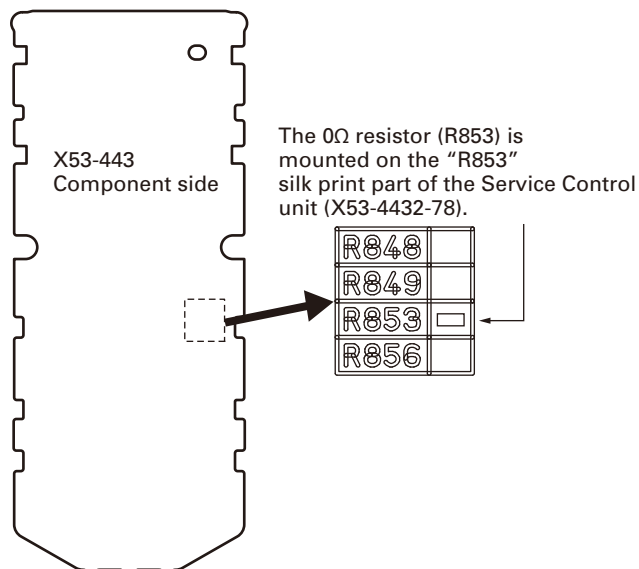
TROUBLE SHOOTING

Replacing Control Unit

■ Control unit Information

Model Name	Original Control unit Number	For Service Control unit Number
NX-300S	X53-4432-76	X53-7732-78

■ Method of confirming “Original Control unit” and “Service Control unit”



X53-443	R848	R849	R853	R856
2-76	0Ω	0Ω	(None)	0Ω
2-78	0Ω	0Ω	0Ω	0Ω

Note:

- The 0Ω resistor (R848, R849, R853 and R856) 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 (X53-4432-78) and the schematic diagram of the original Control unit (X53-4432-76). (R848, R849, R853 and R856 are connected with GND (ground) only.)

■ Supplied Accessories of “Service Control unit”

Item (Including Part Number)	Quantity
	E
Control Unit (X53-443)	1
Kenwood ESN Label	1
NXDN ESN Label	1
MPT ESN Label	1
Addendum (B59-2625-XX)	1

■ “Service Control unit” Data

The following data is written on the service control unit:

Data Type	Description
Firmware	NX-200S/300S Firmware.
FPU Data (PC programming mode)	X53-443 (NX-300S) E type data.
Various Adjustment Data (PC Test mode)	General adjustment values for the X53-443 (NX-300S).
Kenwood ESN	Model Name: [X53-443] NX-300SS Type: E The same number as the Kenwood ESN label is written.
NXDN ESN/ MPT ESN	The same number as the NXDN ESN/ MPT ESN label is written.

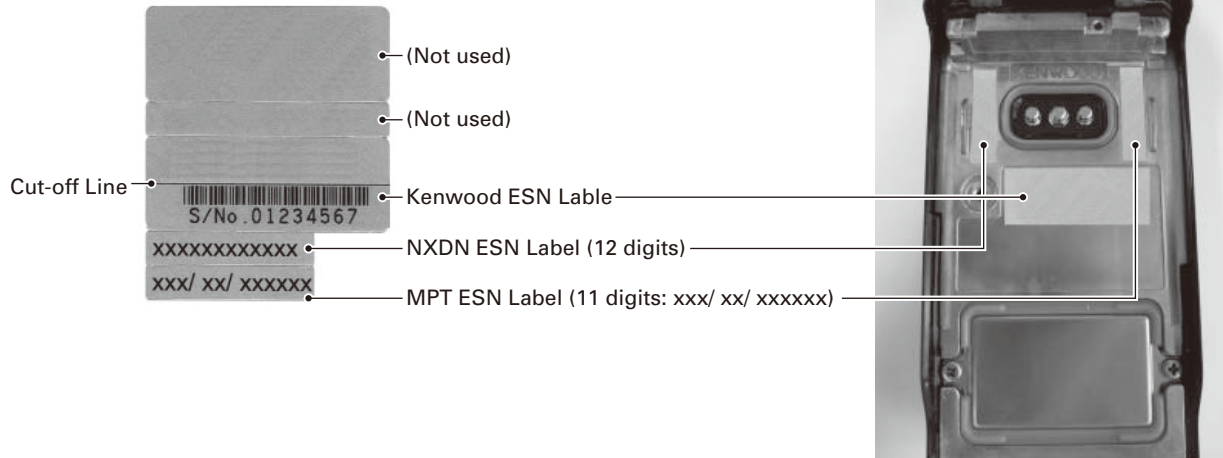
■ After Changing the PCB

- After changing the printed circuit board, write the up-to-date Firmware following the instructions in the “REALIGNMENT - 4.Firmware Programming Mode”.
- Using the KPG-111D, select your desired item (Model Name and Frequency) from the Model> Product Information menu, then use Program> Write Data to the Transceiver to write the FPU data (PC Programming mode). When writing to the transceiver, a Warning Message, corresponding to the item selected, appears. Click [OK] to continue writing the data.
- Enter Program> Test Mode, then adjust the various adjustment data (PC Test Mode) as described in the “ADJUSTMENT”.
- Attach the new labels corresponding to the new printed circuit board. (Refer to the images on page 35 for label placement.)
- If necessary, write the FPU data used by the customer with the KPG-111D.

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, but this does not have any effect on the operation of the transceiver.
- If changing to the original Kenwood ESN, NXDN ESN and MPT ESN, please contact our service center.



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

PC Test Mode

Used to check the transceiver using the PC.
This feature is included in the FPU.

■ 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	435.05000	435.10000
2	400.05000	400.10000
3	469.95000	469.90000
4	435.00000	435.00000
5	435.20000	435.20000
6	435.40000	435.40000
7~16	-	-

• 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

RAN: Radio Access Number

PN9: Pseudo-Random Pattern (for production only)

PC 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.

■ 5 reference level adjustments frequency

Tuning point	RX (MHz)	TX (MHz)
Low	400.05000	400.10000
Low'	417.55000	417.60000
Center	435.05000	435.10000
High'	452.55000	452.60000
High	469.95000	469.90000

ADJUSTMENT

Adjustment item supplement

Adjustment Item	Description
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 5k/Wide 4k/Narrow)	Maximum Deviation of Analog (Wide 5k/Wide 4k/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	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

Order	Adjusutment item	Analog Wide 5k	Analog Wide 4k	Analog Narrow	NXDN Narrow	NXDN Very Narrow	Adjust item Number
		Adjustment range					
1	Counterclockwise Volume	1 point ADJ					Common Section 2
		1~256					
2	Clockwise Volume	1 point ADJ					Common Section 3
		1~256					
3	Receive Assist	5 point ADJ					Common Section 4
		1~4096					
4	Transmit Assist	5 point ADJ					Common Section 4
		1~4096					
5	High Transmit Power	-	-	5	-	-	Transmitter Section 1
		1~1024					
6	Low Transmit Power	-	-	5	-	-	Transmitter Section 2
		1~1024					
7	Balance	-	-	5	-	-	Transmitter Section 3
		1~256					
8	Maximum Deviation (NXDN)	-	-	-	5	5	Transmitter Section 4
		1~1024					
9	Maximum Deviation (Analog)	5	5	5	-	-	Transmitter Section 5
		1~1024					
10	QT Deviation	1	1	1	-	-	Transmitter Section 6
		1~1024					
11	DQT Deviation	1	1	1	-	-	Transmitter Section 7
		1~1024					
12	LTR Deviation	1	-	1	-	-	Transmitter Section 8
		1~1024					
13	DTMF Deviation	1	1	1	-	-	Transmitter Section 9
		1~1024					
14	Single Tone Deviation	1	1	1	-	-	Transmitter Section 10
		1~1024					
15	MSK Deviation	1	1	1	-	-	Transmitter Section 11
		1~1024					
16	CWID Deviation	-	-	-	-	1	Transmitter Section 12
		1~1024					
17	VOX1	1 point ADJ					Transmitter Section 13
		1~256					
18	VOX10	1 point ADJ					Transmitter Section 14
		1~256					
19	Sensitivity 1	-	-	5	-	-	Receiver Section 2
		1~256					
20	Sensitivity 2	-	-	5	-	-	Receiver Section 3
		1~256					
21	RSSI Reference	5	5	5	- *1	5	Receiver Section 4
		1~256					

ADJUSTMENT

Order	Adjusutment item	Analog Wide 5k	Analog Wide 4k	Analog Narrow	NXDN Narrow	NXDN Very Narrow	Adjust item Number
		Adjustment range					
22	Open Squelch	5	5	5	- *1	5	Receiver Section 5
		1~256					
23	Low RSSI	5	5	5	- *1	5	Receiver Section 6
		1~256					
24	High RSSI	5	5	5	- *1	5	Receiver Section 7
		1~256					
25	Tight Squelch	5	5	5	-	-	Receiver Section 8
		1~256					
26	Battery Warning Level	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.

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 VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9. Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10. Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11. 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.)

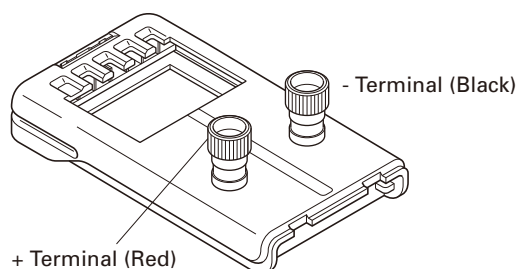
■ Nut wrench

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

KENWOOD part No.: W05-1123-00

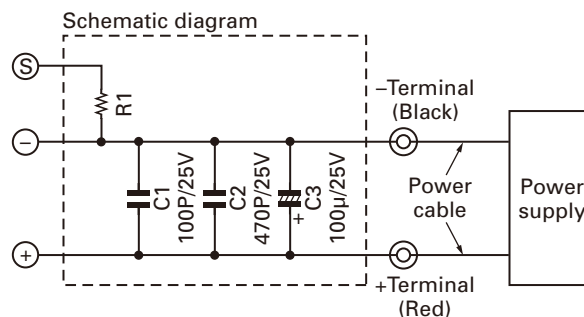
■ Battery jig (W05-1370-00)

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.
- The battery jig is detected as "Li-ion High Capacity Battery".
Li-ion High Capacity Battery: R1=Open
Li-ion Normal Capacity Battery: R1=560kΩ



ADJUSTMENT

■ Universal connector

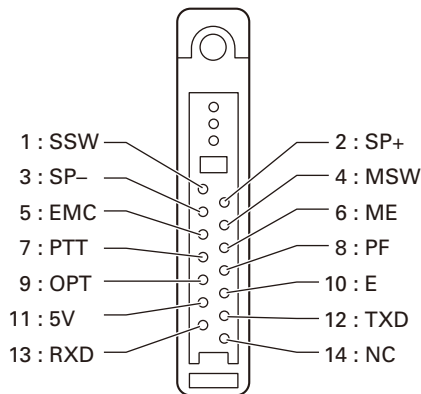
Use the interface cable (KPG-36/36A) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the transceiver and tighten the screw.

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

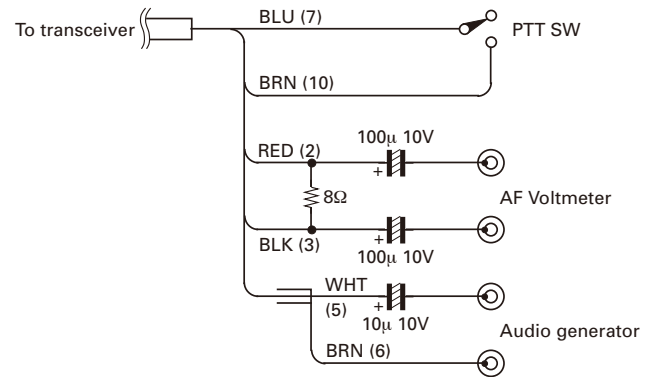
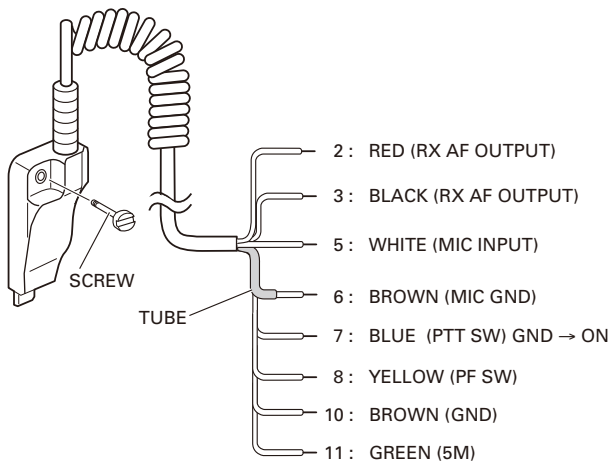
Caution

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

• Universal connector



• Panel tuning

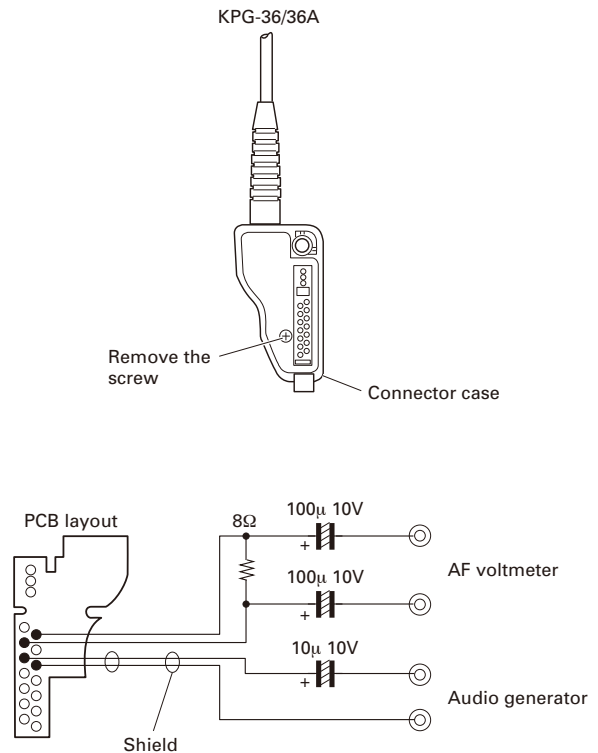


Note: Pin 1 (SSW) and Pin 4 (MSW) are connected to Pin 10 (GND) to active External SP and External MIC.

• PC tuning

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

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



ADJUSTMENT

Radio Check Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks			
		Test-equipment	Unit	Terminal	Unit	Parts	Method				
1. Frequency check	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.	f. counter		ANT			Check an internal temperature of radio within 25°C ± 2°C.	+0.05/+0.55ppm +21.76Hz~+239.31Hz @435.1MHz			
2. High power check (Batt: 7.5V)	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) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.										
	3) Test Channel Channel: 3 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.										
3. Low power check (Batt: 7.5V)	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.										0.7W~1.2W 1.2A or less
	2) Test Channel Channel: 2 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.										
	3) Test Channel Channel: 3 Test Signaling Mode: Analog Signaling: 1 PTT: Press [Transmit] button.										
4. MIC sensitivity check	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 AG: 1kHz PTT: Press [Transmit] button.	Deviation meter Oscilloscope AG AF VTVM		ANT Universal connector			Adjust AG input to get a standard MOD.	12.5mV±5.8mV			

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. Sensitivity check	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 SSG output Wide 5k: -116dBm (0.35μV) (MOD: 1kHz/±3kHz) Wide 4k: -116dBm (0.35μV) (MOD: 1kHz/±2.4kHz) Narrow: -115dBm (0.40μV) (MOD: 1kHz/±1.5kHz)	SSG AF VTVM Oscilloscope Distortion meter 8Ω Dummy load		ANT Universal connector			Check	12dB SINAD or more

Common Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) DC voltage: 7.5V 2) SSG standard modulation [Wide 5k] MOD: 1kHz, DEV: 3kHz [Wide 4k] MOD: 1kHz, DEV: 2.4kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz							
2. Counterclockwise Volume	1) Adj item: [Counterclockwise Volume]						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.
3. Clockwise Volume	1) Adj item: [Clockwise Volume]						Turn the volume knob clockwise fully. Press [Apply] button to store the adjustment value.	
4. Receive Assist	1) Adj item: [Receive Assist] 2) Adj item: [Low], [Low'], [Center], [High'], [High] Press [Apply All] button to store the adjustment value.					[◀],[▶]	[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.	2.5V±0.1V Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
Transmit Assist	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.						Note: Confirm the VCO lock voltage approximately 3 seconds after the adjustment value is changed.	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. Frequency adjust	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.) - Use an accuracy of 0.001ppm for the SSG. (Use a standard oscillator if necessary.)	SSG		ANT			Press [Start] button of "Auto Tuning". Press [Apply] button to store the adjustment value after the automatic adjustment was finished.	The value of "IF20" will become around "0" after the adjustment was finished. Remark: "Frequency" is adjusted under receiving condition with SSG.

Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. High Transmit Power adjust (Batt: 7.5V)	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		ANT		[◀],[▶]	5.0W	±0.2W 2.3A or less 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: [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 Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
3. Balance adjust *2	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. Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.

*2: Refer to the "Necessary Deviation adjustment item for each signaling and mode" table on page 49.

Balance adjustment is common with the adjustment of all signaling deviations.

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. Maximum Deviation (NXDN) adjust *3 [Narrow]	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		ANT		[◀],[▶]	3056Hz	2995~3117Hz Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
[Very Narrow]	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.						1337Hz	1311~1363Hz 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: [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 PTT: Press [Transmit] button	2050~2150Hz Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
[Wide 4k]	1) Adj item: [Maximum Deviation (Analog Wide 4k)] 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 3310Hz and 3410Hz. Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button	3310~3410Hz Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
Maximum Deviation (Analog) adjust *3 [Wide 5k]	1) Adj item: [Maximum Deviation (Analog Wide 5k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] Press [Apply All] button to store the adjustment value.	Deviation meter Oscilloscope		ANT		[◀], [▶]	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 PTT: Press [Transmit] button	4150~4250Hz Press [Apply All] button to store the adjustment value after all adjustment point was adjusted.
*3: Refer to the "Necessary Deviation adjustment item for each signaling and mode" table on page 49. Regarding Maximum Deviation (Analog), it is common with the adjustment of all analog signalings.								
6. QT Deviation adjust *4 [Narrow]	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		ANT		[◀], [▶]	Write the value as followings. 513 (Reference value)	0.35kHz±0.05kHz
[Wide 4k]	1) Adj item: [QT Deviation (Analog Wide 4k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							0.60kHz±0.05kHz
[Wide 5k]	1) Adj item: [QT Deviation (Analog Wide 5k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							0.75kHz±0.05kHz
7. DQT Deviation adjust *4 [Narrow]	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 4k]	1) Adj item: [DQT Deviation (Analog Wide 4k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							0.60kHz±0.05kHz
[Wide 5k]	1) Adj item: [DQT Deviation (Analog Wide 5k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							0.75kHz±0.05kHz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. LTR Deviation adjust *4 [Narrow]	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.	Deviation meter Oscilloscope		ANT		[◀],[▶]	Write the value as followings. 465 (Reference value)	0.75kHz±0.05kHz
	[Wide] 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: [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 4k] 1) Adj item: [DTMF Deviation (Analog Wide 4k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							2.00kHz±0.05kHz
	[Wide 5k] 1) Adj item: [DTMF Deviation (Analog Wide 5k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							2.50kHz±0.05kHz
10. Single Tone Deviation adjust *4 [Narrow]	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.						Write the value as followings. 513 (Reference value)	1.50kHz±0.05kHz
	[Wide 4k] 1) Adj item: [Single Tone Deviation (Analog Wide 4k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							2.40kHz±0.05kHz
	[Wide 5k] 1) Adj item: [Single Tone Deviation (Analog Wide 5k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							3.00kHz±0.05kHz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
11. MSK Deviation adjust *4 [Narrow]	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.	Deviation meter Oscilloscope		ANT		[◀], [▶]	Write the value as followings. 513 (Reference value)	1.50kHz±0.05kHz
[Wide 4k]	1) Adj item: [MSK Deviation (Analog Wide 4k)] PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.							2.40kHz±0.05kHz
[Wide 5k]	1) Adj item: [MSK Deviation (Analog Wide 5k)] 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: [CW ID Deviation (NXDN Very Narrow)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [Apply] button to store the adjustment value.						Write the value as followings. 376 (Reference value)	1.10kHz±0.10kHz
*4: Refer to the “Necessary Deviation adjustment item for each signaling and mode” table on page 49.								
13. VOX1 adjust	1) Adj item: [VOX1] AG: 1kHz/45mV at MIC terminal	AG		Universal connector			After apply signal from AG, press [Apply] button to store the adjustment value.	
14. VOX10 adjust	1) Adj item: [VOX10] AG: 1kHz/3mV at MIC terminal							
15. BATT detection writing	1) Adj item: [Battery Warning Level] PTT: Press [Transmit] button.	Power meter DVM		ANT BATT terminal			[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. Press [Apply] button to store the adjustment value.	
16. BATT detection check	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 BATT terminal voltage: 6.0V while transmitting						Check	The transceiver can transmit with causing the LED to blink.

ADJUSTMENT

■ Necessary Deviation adjustment item for each signaling and mode

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

Mode	Signaling	Necessary adjustment and order			
		Wide 5k	Wide 4k	Narrow	Very Narrow
Analog	Audio	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow)	-
	QT	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. QT Deviation (Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. QT Deviation (Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. QT Deviation (Narrow)	-
	DQT	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. DQT Deviation (Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. DQT Deviation (Wide 4k)	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 5k) Step3. DTMF Deviation (Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. DTMF Deviation (Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. DTMF Deviation (Narrow)	-
	2TONE	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. Single Tone Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. Single Tone Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. Single Tone Deviation (Analog Narrow)	-
	MSK (FleetSync)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 5k) Step3. MSK Deviation (Analog Wide 5k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Wide 4k) Step3. MSK Deviation (Analog Wide 4k)	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. MSK Deviation (Analog Narrow)	-
NXDN	Audio	-	-	Step1. Balance adjust Step2. Maximum Deviation (NXDN Narrow)	Step1. Balance adjust Step2. Maximum Deviation (NXDN Very Narrow)
	CWID	-	-	-	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. 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 5k/Wide 4k/Narrow) is common with all the analog signaling deviations and CWID Deviation (NXDN Very Narrow). If Balance and Maximum Deviation (Analog Wide 5k/Wide 4k/Narrow) (Transmitter Section 5) have already adjusted, please skip Step2 and adjust from Step3.

ADJUSTMENT

Receiver Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. AF level setting	1) Test Channel Channel: 1 Test Signaling Mode: Analog Signaling: 1 Wide 5k/Wide 4k/Narrow: Narrow Beat Shift: Uncheck Compander: Uncheck SSG output: -47dBm (1mV) (MOD: 1kHz/±1.5kHz)	SSG DVM AF VTVM Dummy load		ANT Universal connector		Volume knob	Turn the Volume knob to obtain 0.63V AF output.	0.63V±0.1V
2. Sensitivity 1 adjust	1) Adj item: [Sensitivity 1] 2) Adj item: [Low], [Low'], [Center], [High'] Press [Apply All] button to store the adjustment value.	SSG AF VTVM Oscilloscope		ANT Universal connector		[◀],[▶]	Write the value as followings [Low]: 100 [Low']: 115 [Center]: 128 [High']: 142	
	3) Adj item: [High] Caution: Perform the step 3 adjustments of "3. Sensitivity 2 adjust" before performing the adjustment. SSG output: -118dBm (0.28μV) (MOD: 1kHz/±1.5kHz) Press [Apply All] button to store the adjustment value.						Increase the adjustment value from 1 to get 12dB SINAD. Note: If the SINAD value is less than 12dB SINAD, conduct the following. At first, apply "104" as the temporary value for "Sensitivity 1 [High]". Next, decrease "Sensitivity 2 [High]" from "256" until the SINAD value becomes 13dB SINAD, then apply the adjustment value. (Keep this "Sensitivity 2 [High]" adjustment value and no need to restore the adjustment value to "256".) Finally, increase "Sensitivity 1 [High]" adjustment value from 1 to get 12dB SINAD.	
	3. Sensitivity 2 adjust 1) Adj item: [Sensitivity 2] 2) Adj item: [Low], [Low'], [Center], [High'] SSG output: -118dBm (0.28μV) (MOD: 1kHz/±1.5kHz) Press [Apply All] button to store the adjustment value.						Decrease the adjustment value from 256 to get 12dB SINAD.	
	3) Adj item: [High] Press [Apply All] button to store the adjustment value.						Write the value as followings. [High]: 256	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications /
		Test-equipment	Unit	Terminal	Unit	Parts	Method	Remarks
4. RSSI reference adjust *5 [Analog Narrow]	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		ANT Universal connector			After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [RSSI Reference (Analog Wide 4k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [RSSI Reference (Analog Wide 5k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level -3dB (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	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)							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).								
5. Open Squelch adjust *6 (Squelch level 5 adjust) [Analog Narrow]	1) Adj item: [Open Squelch (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level (MOD: 1kHz/±1.5kHz)	SSG Distortion meter Oscilloscope		ANT Universal connector			After input signal from SSG, press [Apply] button to store the adjustment value.	“Open Squelch” will not be adjusted correctly if MOD and Deviation are wrong.
[Analog Wide 4k]	1) Adj item: [Open Squelch (Analog Wide 4k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [Open Squelch (Analog Wide 5k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level (MOD: 1kHz/±3kHz)							

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
Open Squelch adjust *6 (Squelch level 5 adjust) [NXDN Very Narrow]	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)	SSG Distortion meter Oscilloscope		ANT Universal connector			After input signal from SSG, press [Apply] button to store the adjustment value.	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).								
6. Low RSSI adjust *7 [Analog Narrow]	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		ANT Universal connector			After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [Low RSSI (Analog Wide 4k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: -118dBm (0.28μV) (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [Low RSSI (Analog Wide 5k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: -118dBm (0.28μV) (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	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)							
*7: Because Low RSSI (NXDN Narrow) is adjusted by adjusting Low RSSI (Analog Narrow), it is not necessary to adjust Low RSSI (NXDN Narrow).								

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications /
		Test-equipment	Unit	Terminal	Unit	Parts	Method	Remarks
7. High RSSI adjust *8 [Analog Narrow]	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		ANT Universal connector			After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [High RSSI (Analog Wide 4k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: -80dBm (22.4μV) (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [High RSSI (Analog Wide 5k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: -80dBm (22.4μV) (MOD: 1kHz/±3kHz)							
[NXDN Very Narrow]	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 (NXDN Narrow) is adjusted by adjusting High RSSI (Analog Narrow), it is not necessary to adjust High RSSI (NXDN Narrow).								
8. Tight Squelch adjust (Squelch level 9 adjust) [Analog Narrow]	1) Adj item: [Tight Squelch (Analog Narrow)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±1.5kHz)	SSG		ANT Universal connector			After input signal from SSG, press [Apply] button to store the adjustment value.	
[Analog Wide 4k]	1) Adj item: [Tight Squelch (Analog Wide 4k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±2.4kHz)							
[Analog Wide 5k]	1) Adj item: [Tight Squelch (Analog Wide 5k)] 2) Adj item: [Low], [Low'], [Center], [High'], [High] SSG output: 12dB SINAD level +5dB (MOD: 1kHz/±3kHz)							

TERMINAL FUNCTION

Control unit (X53-4432-76)

Pin No.	Name	I/O	Function
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	-	No connection
8	6_/KEYO2	-	No connection
9	BL_SB	-	No connection
10	6_/KEYO0	-	No connection
11	6_/KEYO1	-	No connection
12	BL_SB	-	No connection
13	6_/KEYI0	-	No connection
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

Pin No.	Name	I/O	Function
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
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

Pin No.	Name	I/O	Function
12	TXD	O	Serial data output
13	RXD	I	Serial data input
14	NC	-	No connection
CN710			
1	OPT1	I/O	Refer to "CN710 26-pin connector specification" described on pages 58 to 60.
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	
20	OPT2	I/O	
21	TXO	O	
22	RXEO	O	
23	RXEI	I	
24	TXI	I	
25	OPT6	O	
26	POW	O	

TX-RX unit (X57-7830-11 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
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

TERMINAL FUNCTION

Pin No.	Name	I/O	Function
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 (X57-7830-11 B/2)

Pin No.	Name	I/O	Function
CN737			
1	OPT1	I/O	Refer to "CN737 Option board connector specification" described on page 61.
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: Activity receiving H: Not activity receiving [TOR] Conv/LTR L: Activity receiving (Sub Tone or LTR ID is OK) H: Not activity receiving [LOK] Conv L: TX Complete H: Not TX Complete LTR L: TX Link Complete (until TX finishes) H: Not TX Link Complete
		VGS-1	I	BUSY	BUSY indication
2	OPT3	ANI board	I	KEY	TX requirement input
		VGS-1	I	PLAY	PLAY indication
3	26P_RD	ANI board	-	-	-
		VGS-1	I	SO	Serial data input

TERMINAL FUNCTION

Pin No.	Name	Device	I/O	Connection	Function
4	26P_TD	ANI board	-	-	-
		VGS-1	O	SI	Serial data output
5	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.

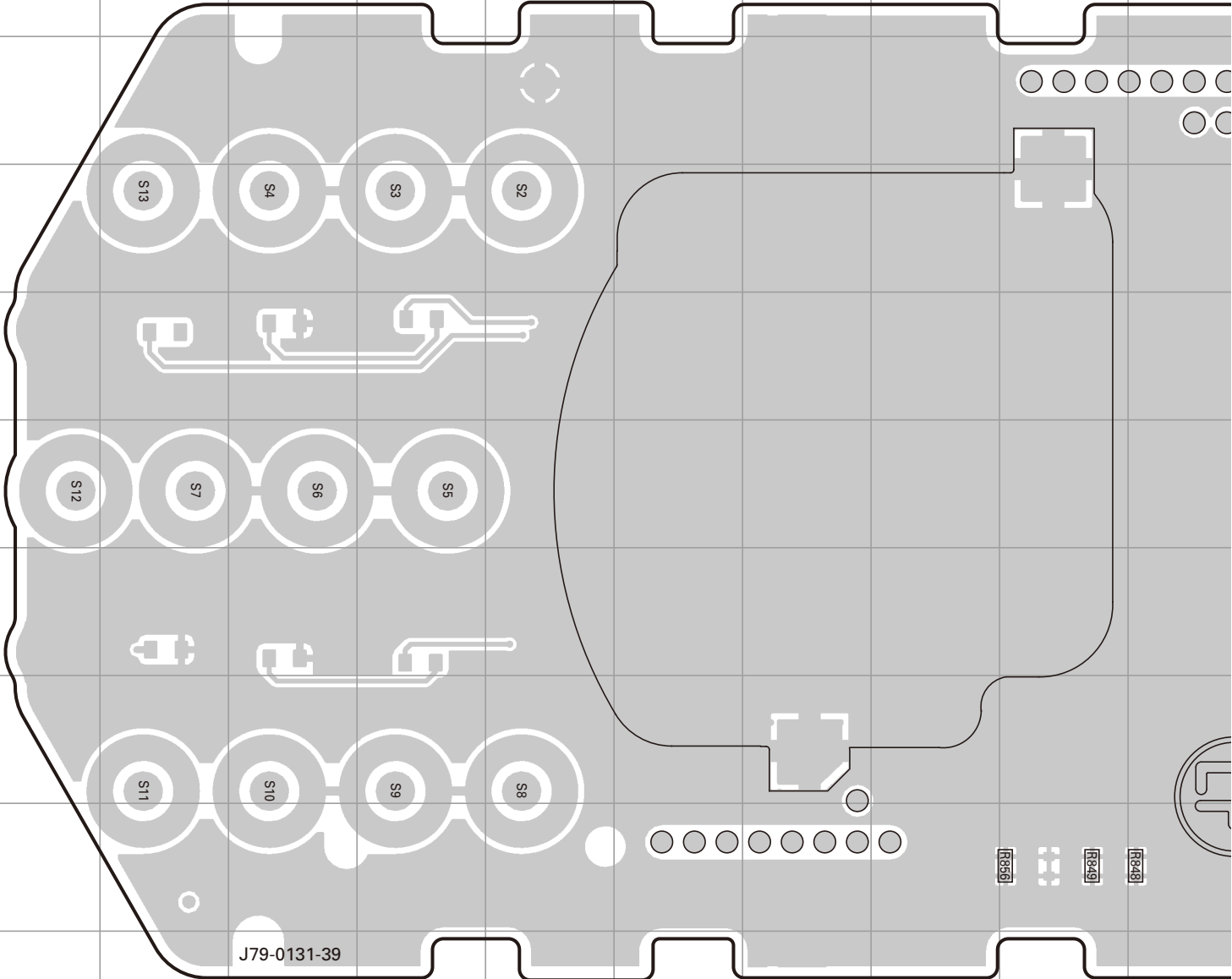
TERMINAL FUNCTION

CN737 Option board connector specification

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

NX-300S PC BOARD

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)



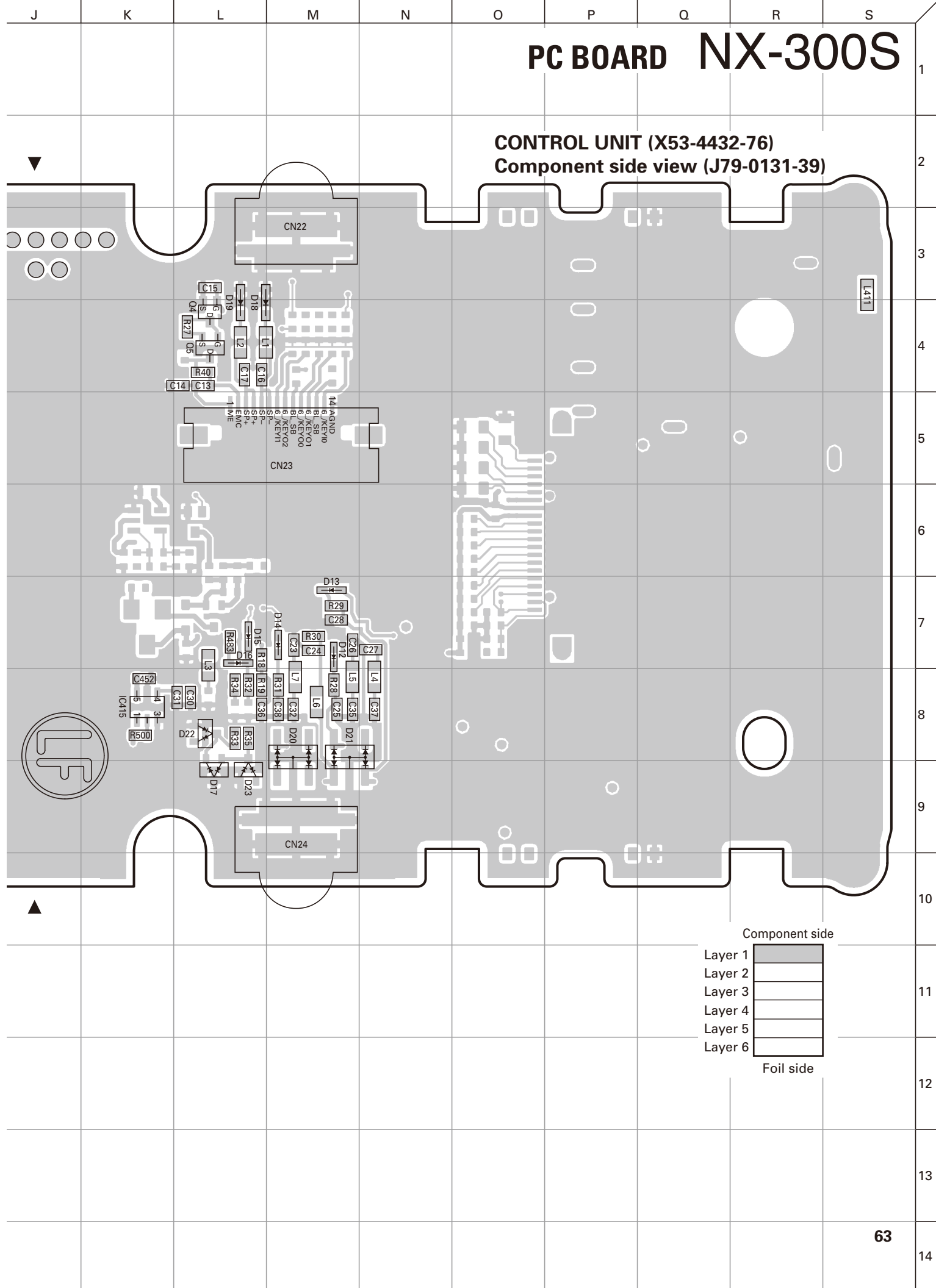
Ref. No.	Address	Ref. No.	Address
IC415	8K	D16	7L
Q4	4L	D17	9L
Q5	4L	D18	4L
D11	7L	D19	4L
D12	7M	D20	8M
D13	7M	D21	8M
D14	7M	D22	8L
D15	7L	D23	9L

PC BOARD NX-300S

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)

Legend:

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



PC BOARD NX-300S

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)

Legend:

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

PC BOARD NX-300S

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)

Legend:

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

PC BOARD NX-300S

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)

Component side

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

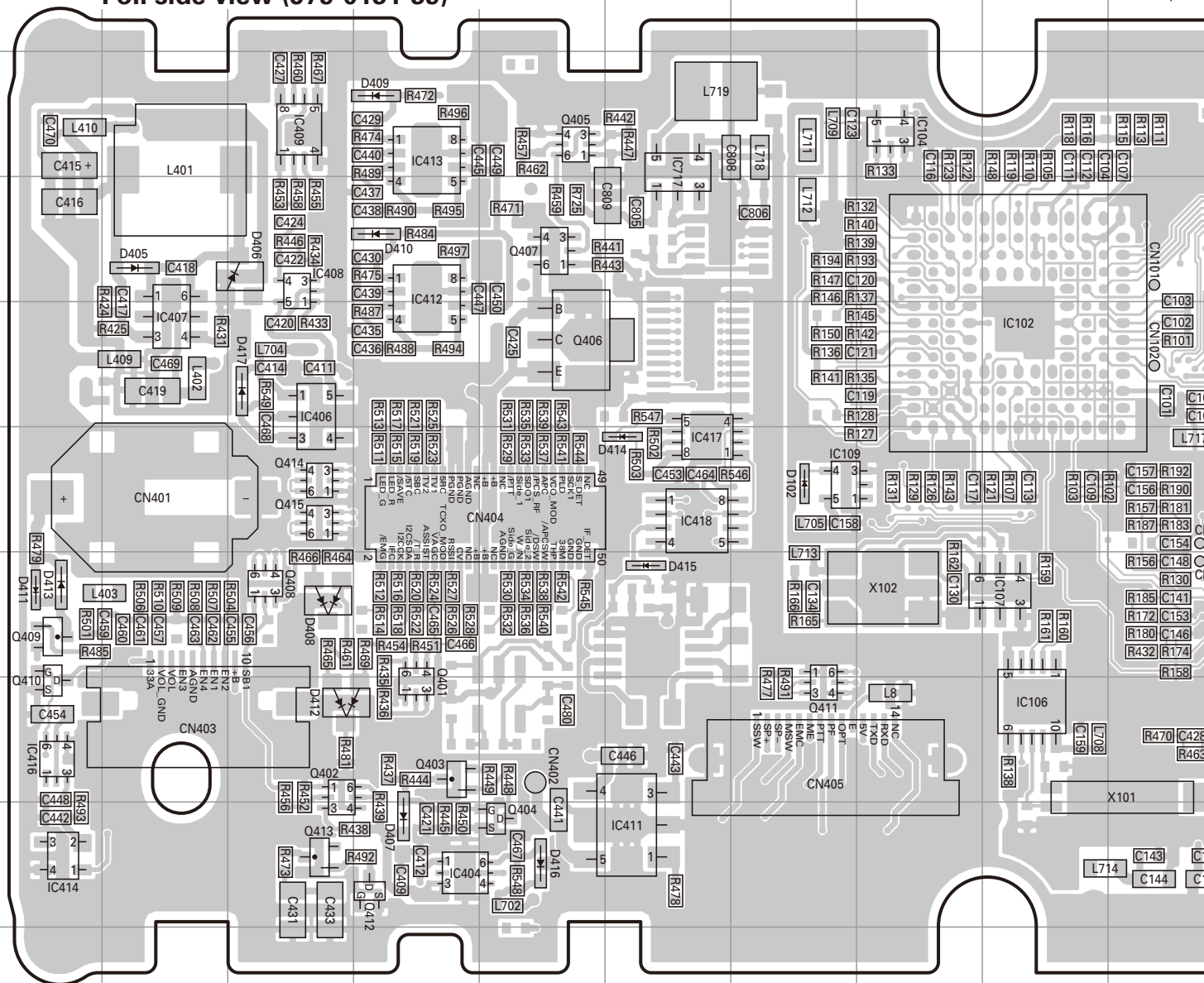
Foil side

63

NX-300S PC BOARD

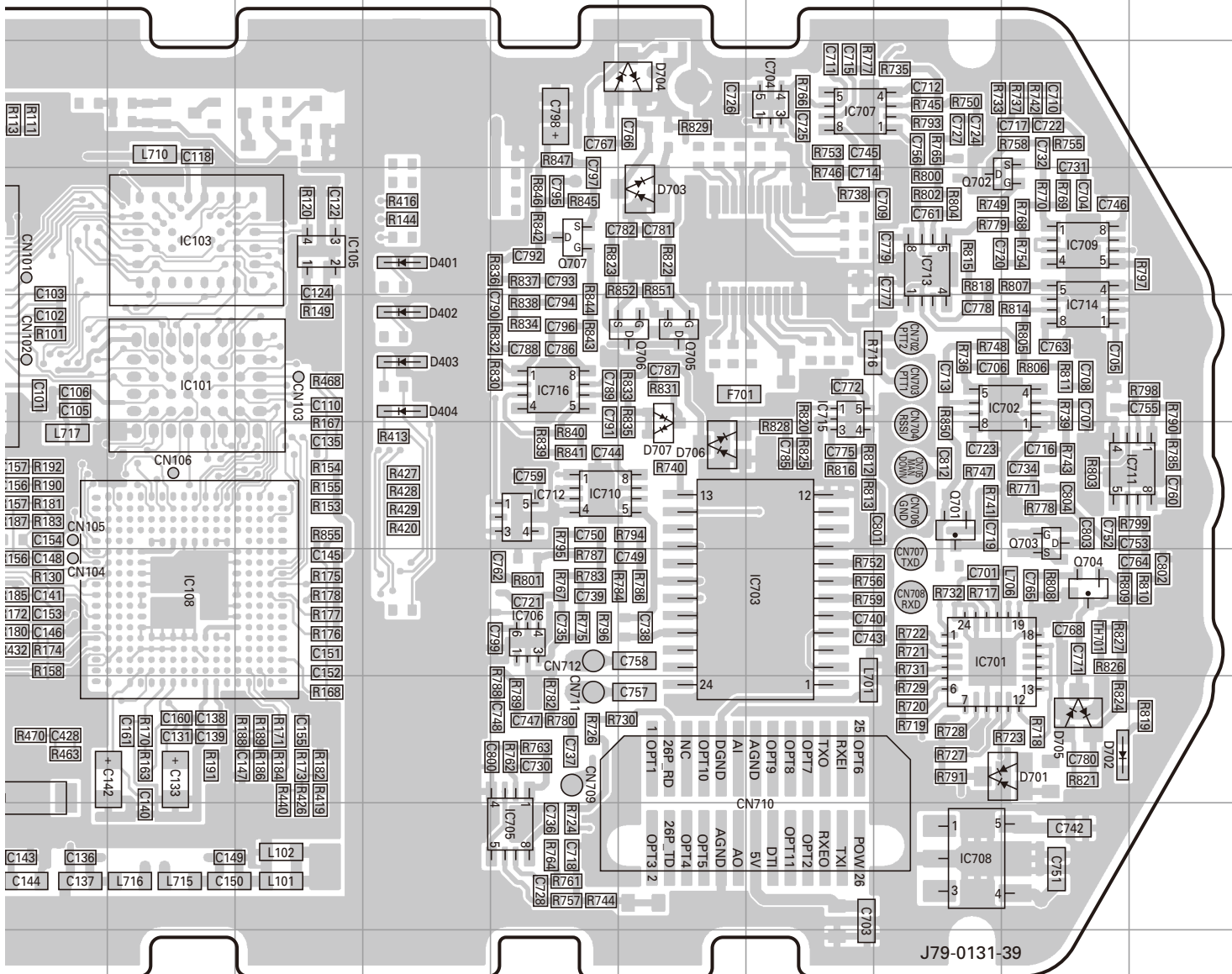
CONTROL UNIT (X53-4432-76)

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
IC101	5K	IC408	4C	IC704	3P	IC716	5N	Q411	8G	D102	6G	D415	7F
IC102	5I	IC409	3C	IC705	9N	IC717	3F	Q412	9D	D404	5M	D416	9E
IC103	4K	IC411	9F	IC706	7N	Q401	8D	Q413	9C	D405	4B	D417	5C
IC104	3H	IC412	4D	IC707	3P	Q402	8C	Q414	6C	D406	4C	D701	8R
IC105	4L	IC413	3D	IC708	9Q	Q403	8D	Q415	6C	D407	9D	D702	8R
IC106	8I	IC414	9A	IC709	4R	Q404	9E	Q701	6Q	D408	7C	D703	4O
IC107	7I	IC416	8A	IC710	6N	Q405	3E	Q702	4R	D409	3D	D704	3O
IC108	7K	IC417	6F	IC711	6S	Q406	5E	Q703	6R	D410	4D	D705	8R
IC109	6G	IC418	6F	IC712	6N	Q407	4E	Q704	7R	D411	7A	D706	6O
IC404	9D	IC701	7Q	IC713	4Q	Q408	7C	Q705	5O	D412	8C	D707	6O
IC406	5C	IC702	5R	IC714	5R	Q409	7A	Q706	5O	D413	7A		
IC407	5B	IC703	7P	IC715	5P	Q410	8A	Q707	4N	D414	6F		

CONTROL UNIT (X53-4432-76)
Foil side view (J79-0131-39)



Component side

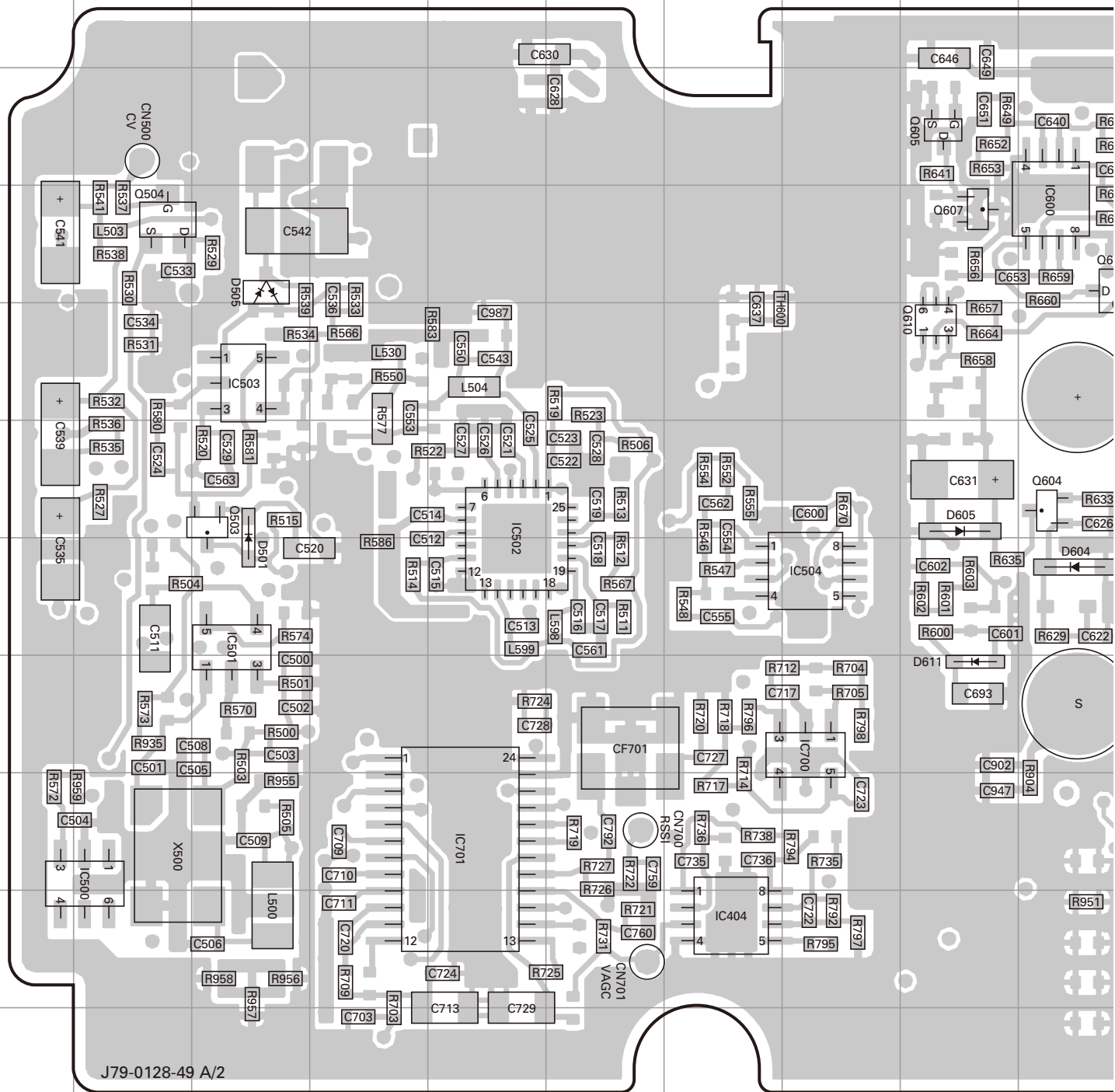
Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	

Foil side

NX-300S PC BOARD

TX-RX UNIT (X57-7830-11) (A/2)

Component side view (J79-0128-49 A/2)

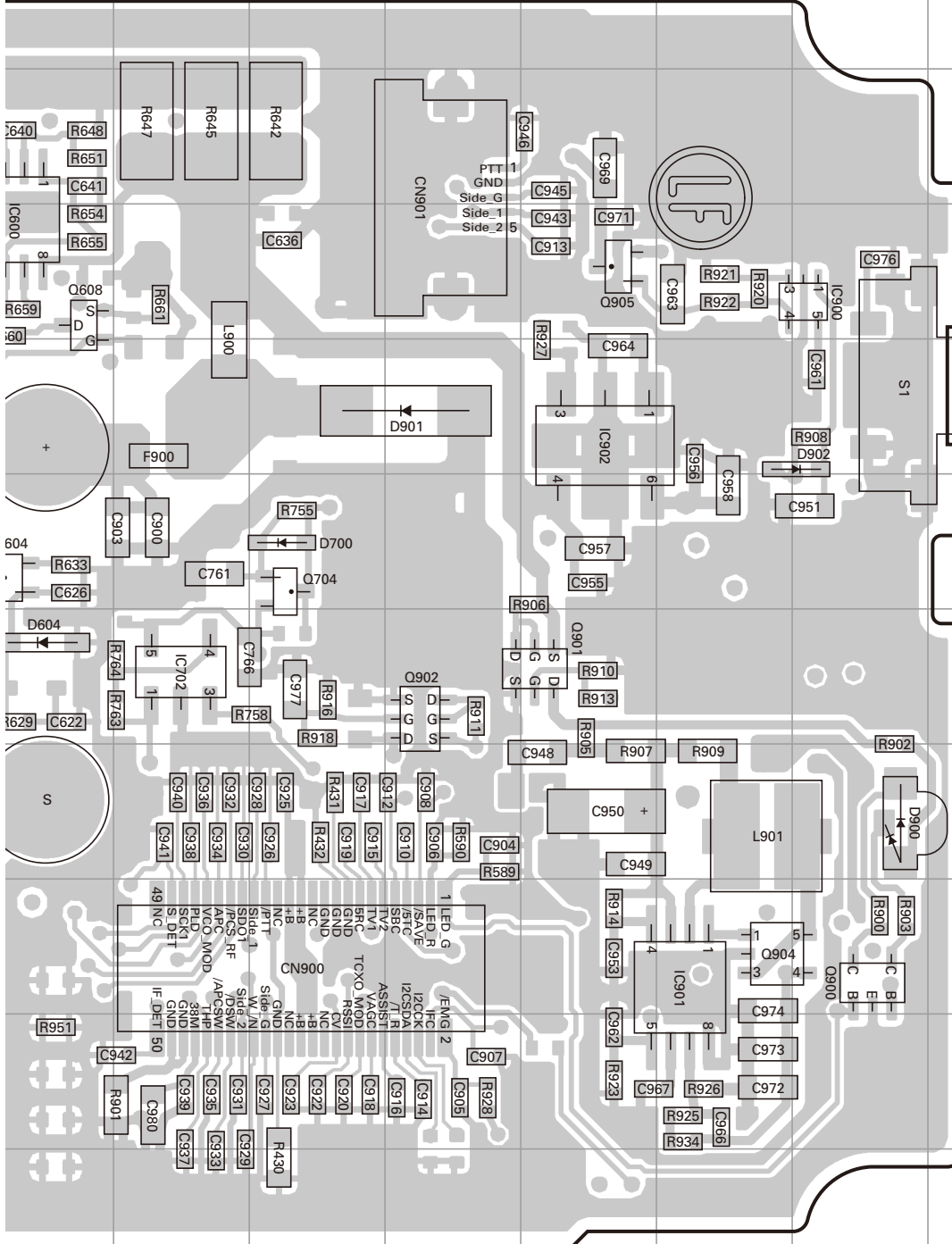


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC404	10G	IC700	8H	Q504	4B	Q900	9P	D604	7J
IC500	9B	IC701	9E	Q604	6J	Q901	7N	D605	6I
IC501	7C	IC702	7K	Q605	3I	Q902	7M	D611	8I
IC502	7E	IC900	4P	Q607	4I	Q904	9O	D700	6L
IC503	5C	IC901	9O	Q608	4J	Q905	4N	D900	8P
IC504	7H	IC902	5N	Q610	5I	D501	7C	D901	5M
IC600	4J	Q503	6C	Q704	6L	D505	4C	D902	5P

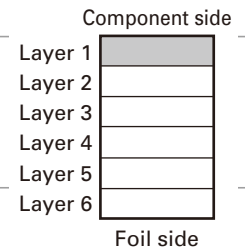
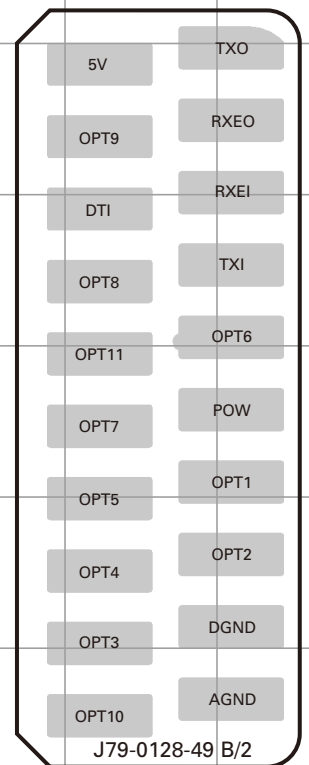
PC BOARD NX-300S

TX-RX UNIT (X57-7830-11) (A/2)

Component side view (J79-0128-49 A/2)



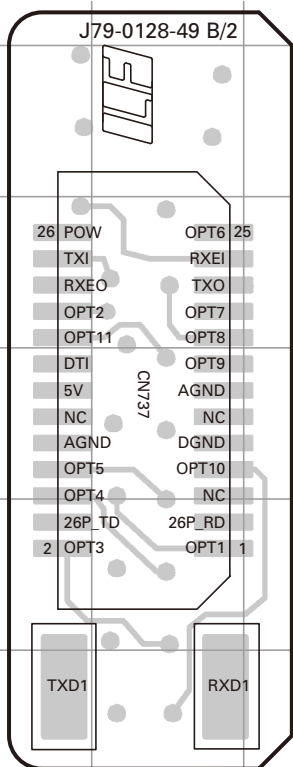
TX-RX UNIT (X57-7830-11) (B/2)



NX-300S PC BOARD

TX-RX UNIT (X57-7830-11) (A/2)
Foil side view (J79-0128-49 A/2)

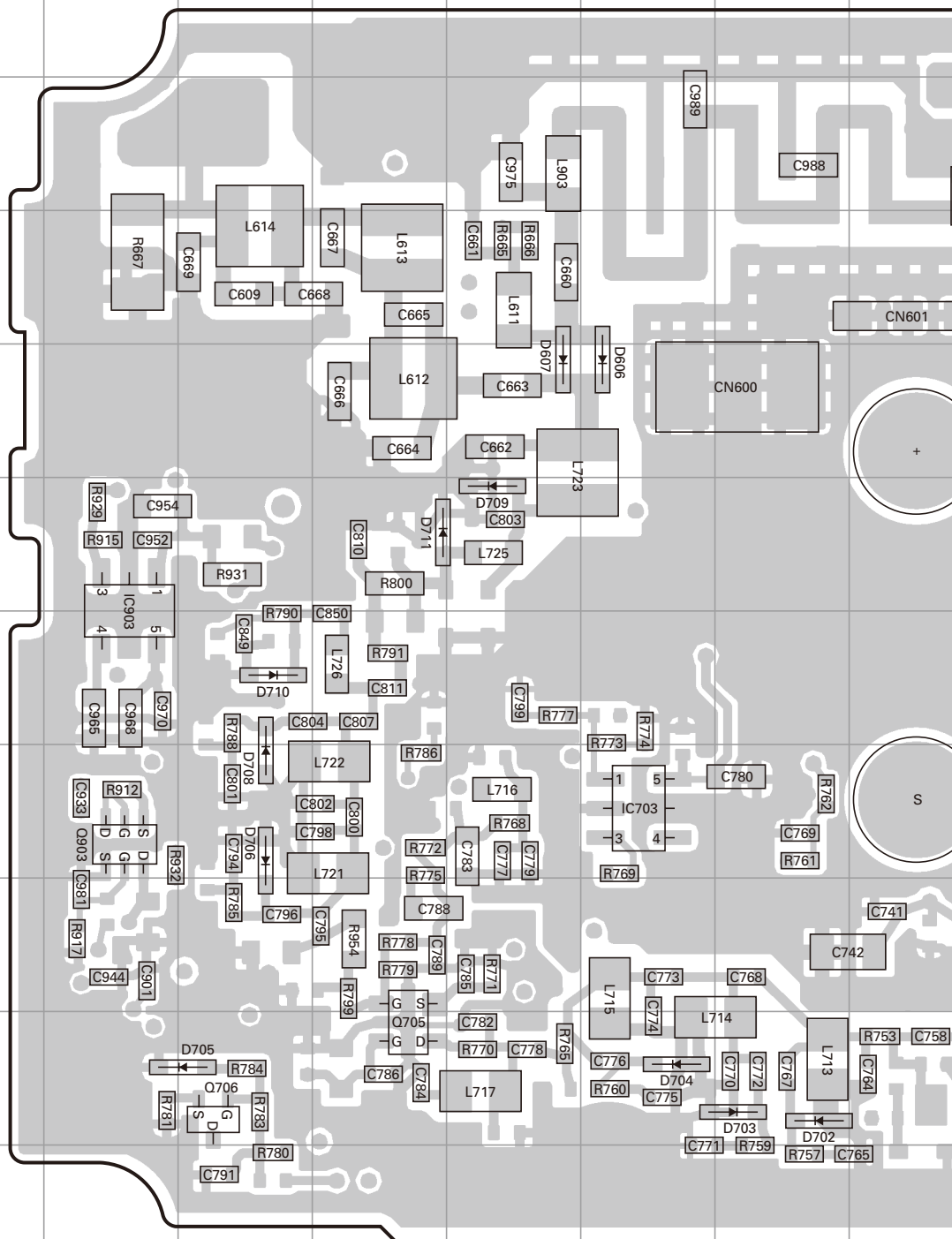
TX-RX UNIT
(X57-7830-11) (B/2)



Component side

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

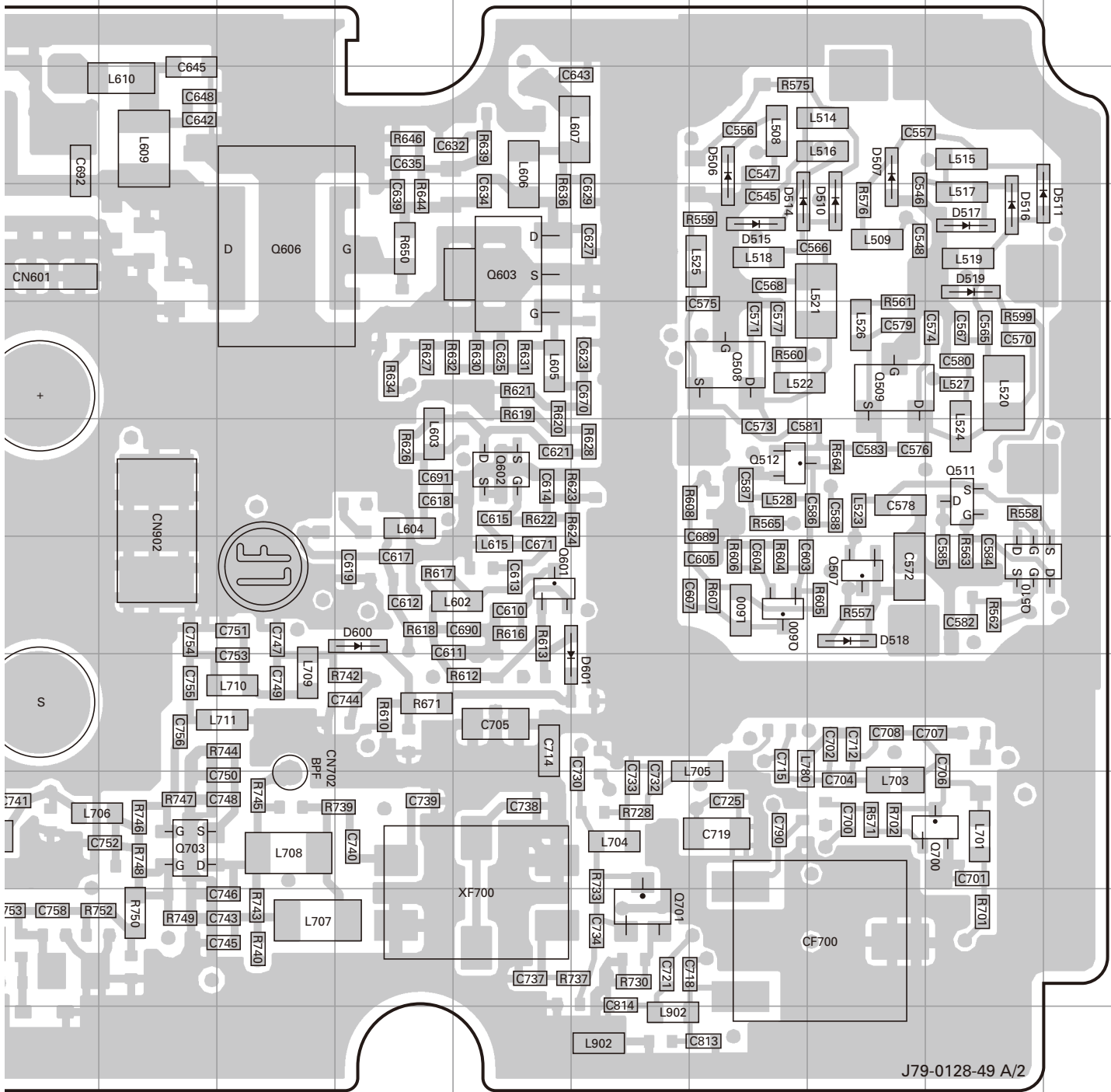
Foil side



PC BOARD NX-300S

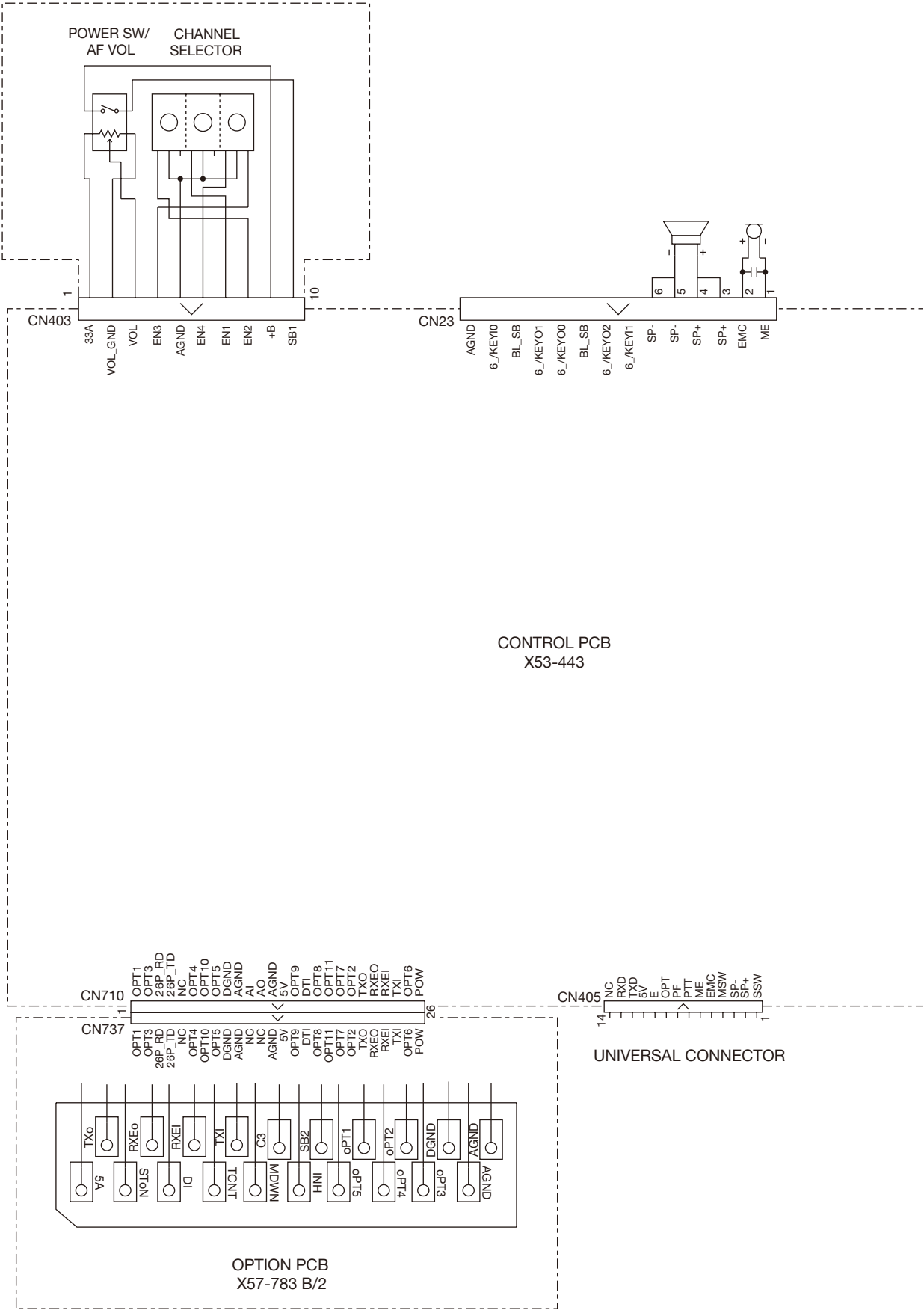
TX-RX UNIT (X57-7830-11) (A/2)

Foil side view (J79-0128-49 A/2)

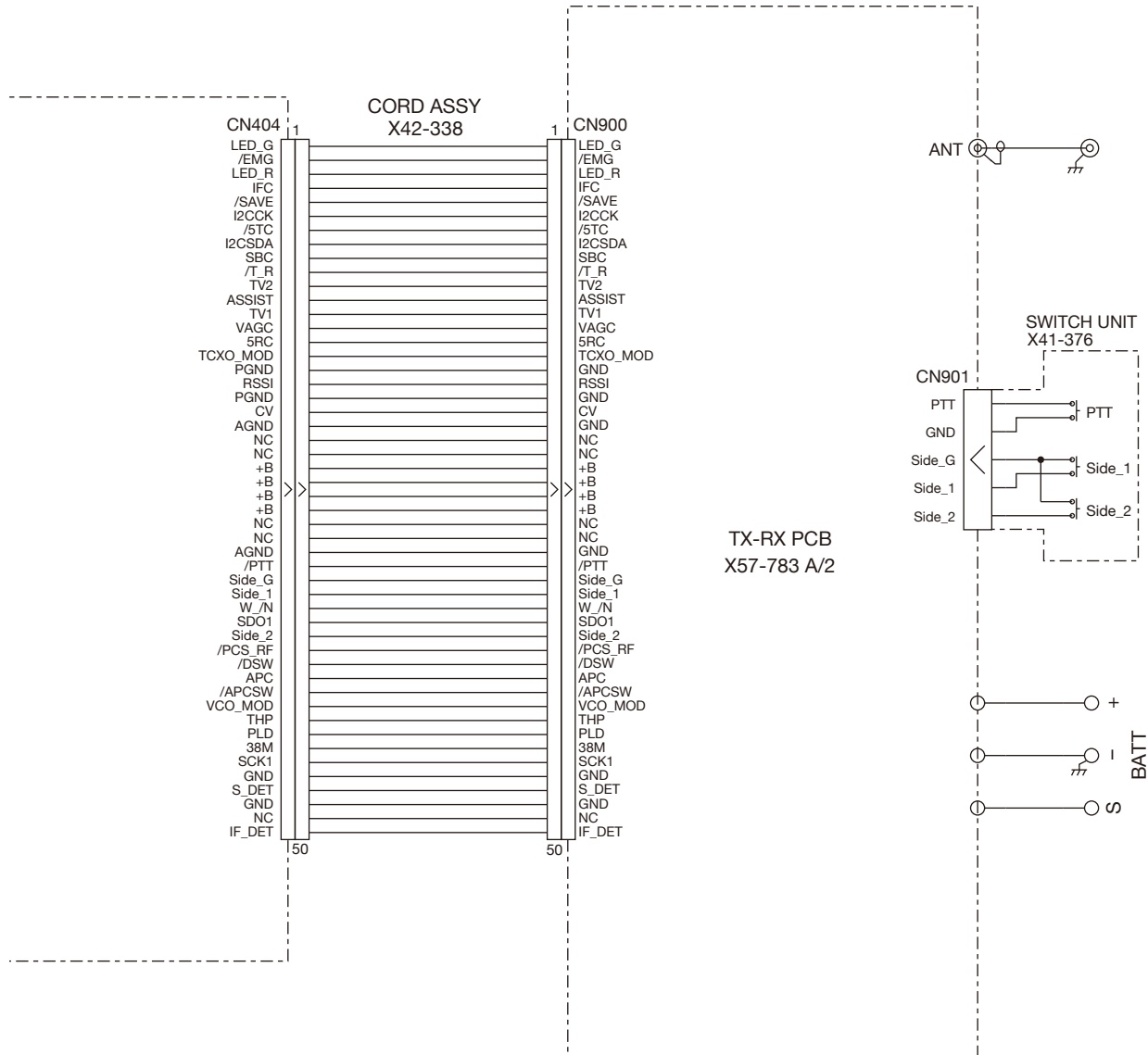


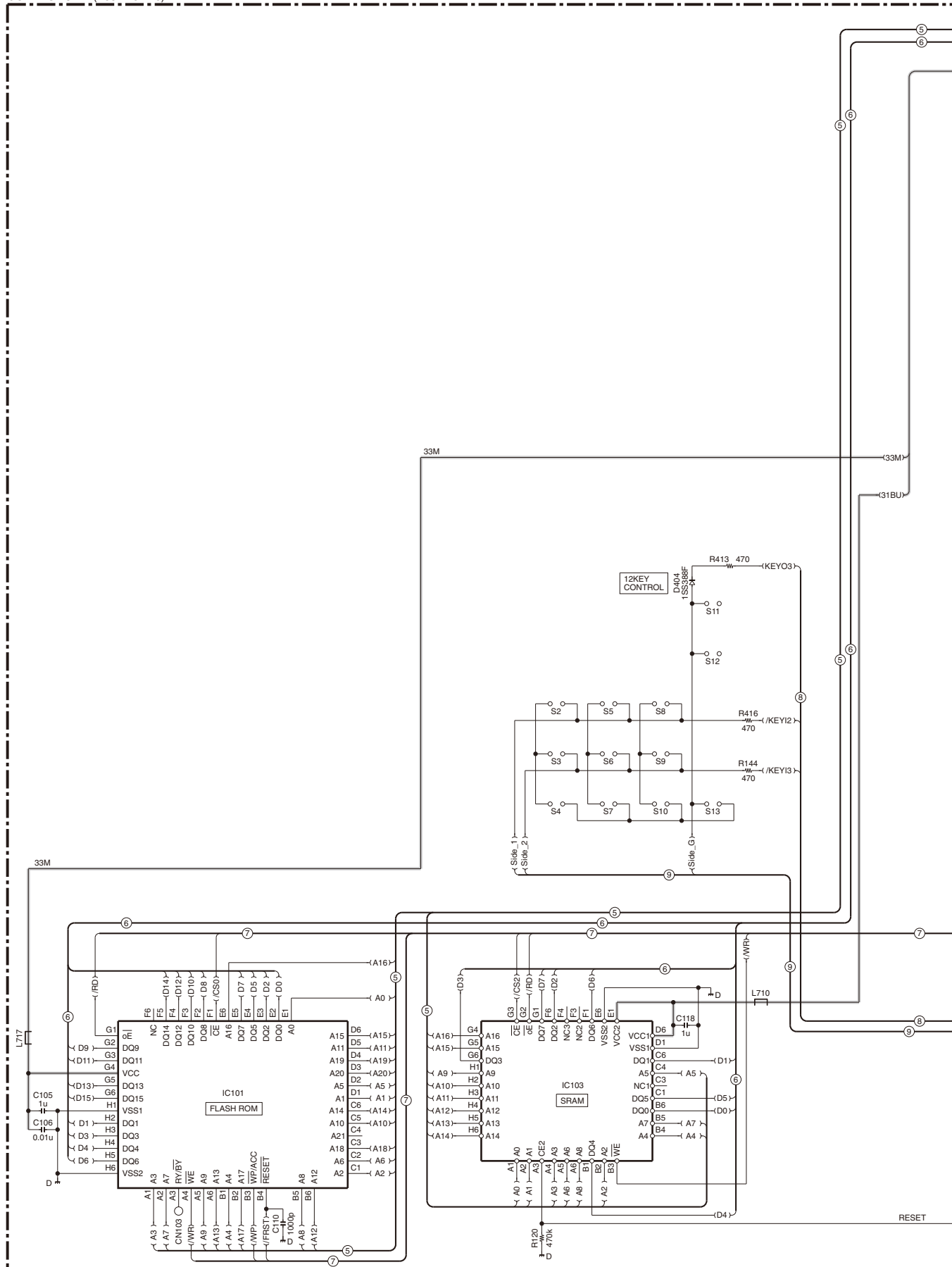
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
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IC903	7D	Q600	7P	Q703	9K	D511	4S	D600	7M	D705	10E
Q507	7Q	Q601	7N	Q705	10F	D514	4P	D601	8O	D706	8E
Q508	5P	Q602	6N	Q706	10E	D515	4P	D606	5H	D708	8E
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



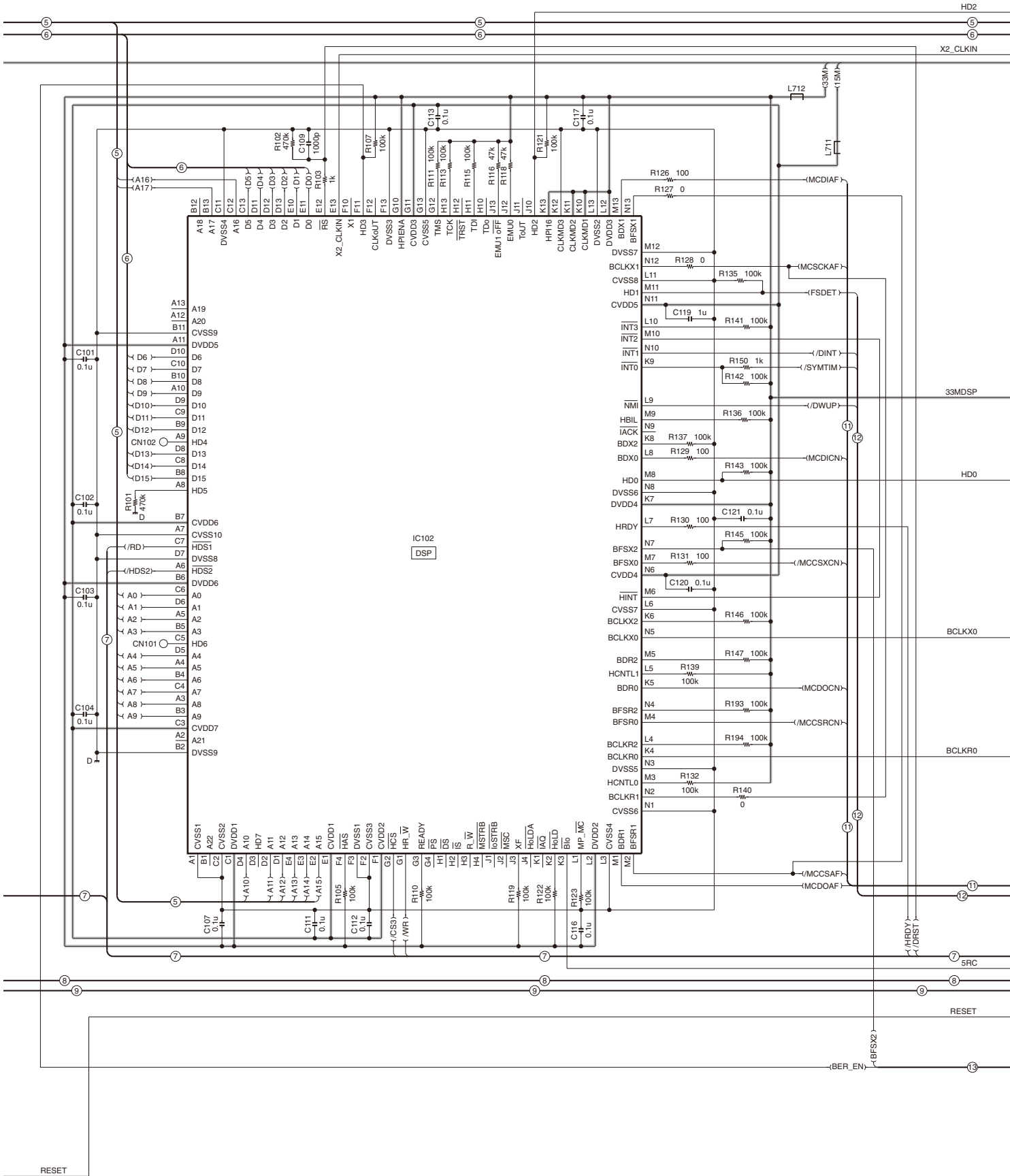
INTERCONNECTION DIAGRAM



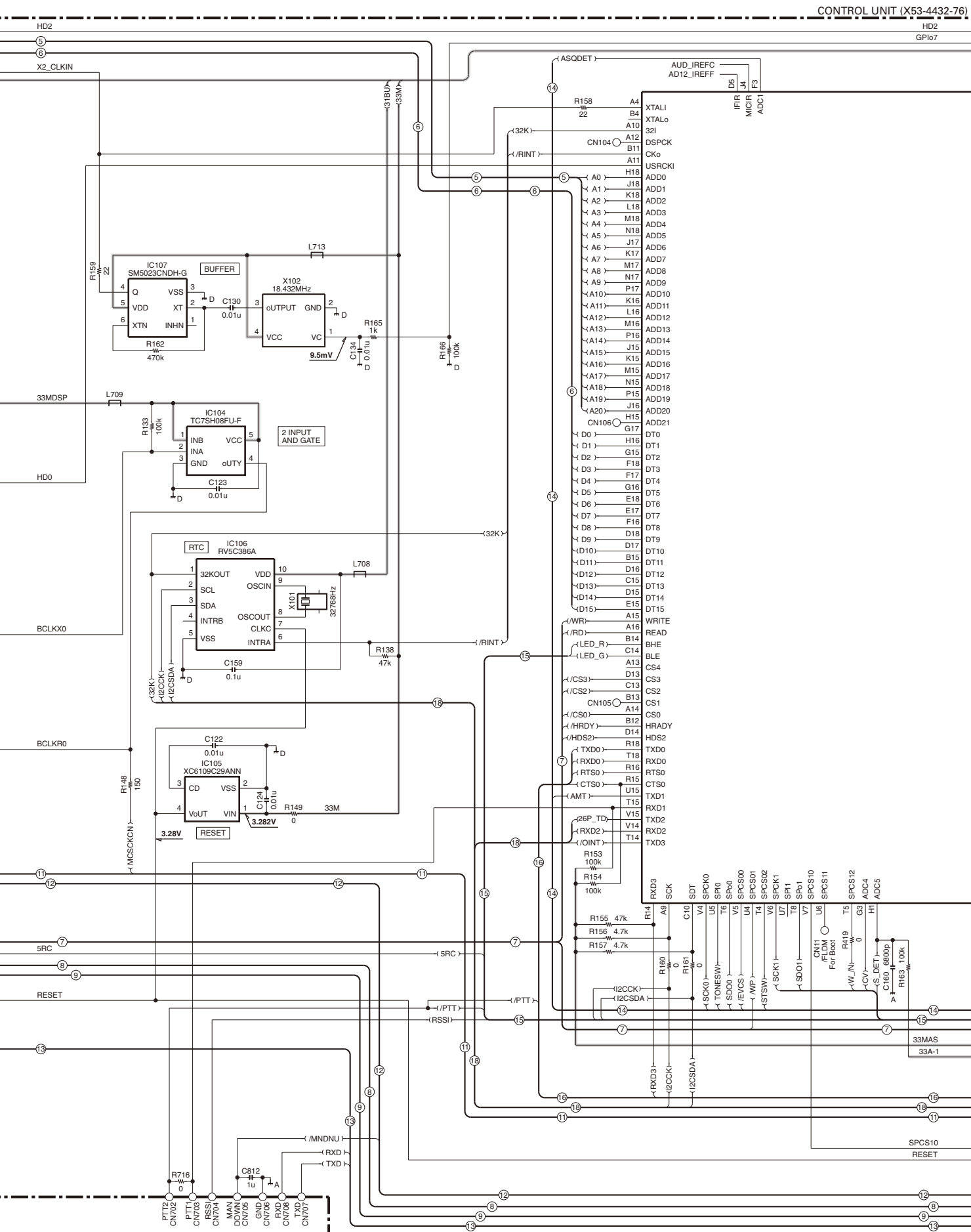


NX-300S

CONTROL UNIT (X53-4432-76)



NX-300S SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM NX-300S

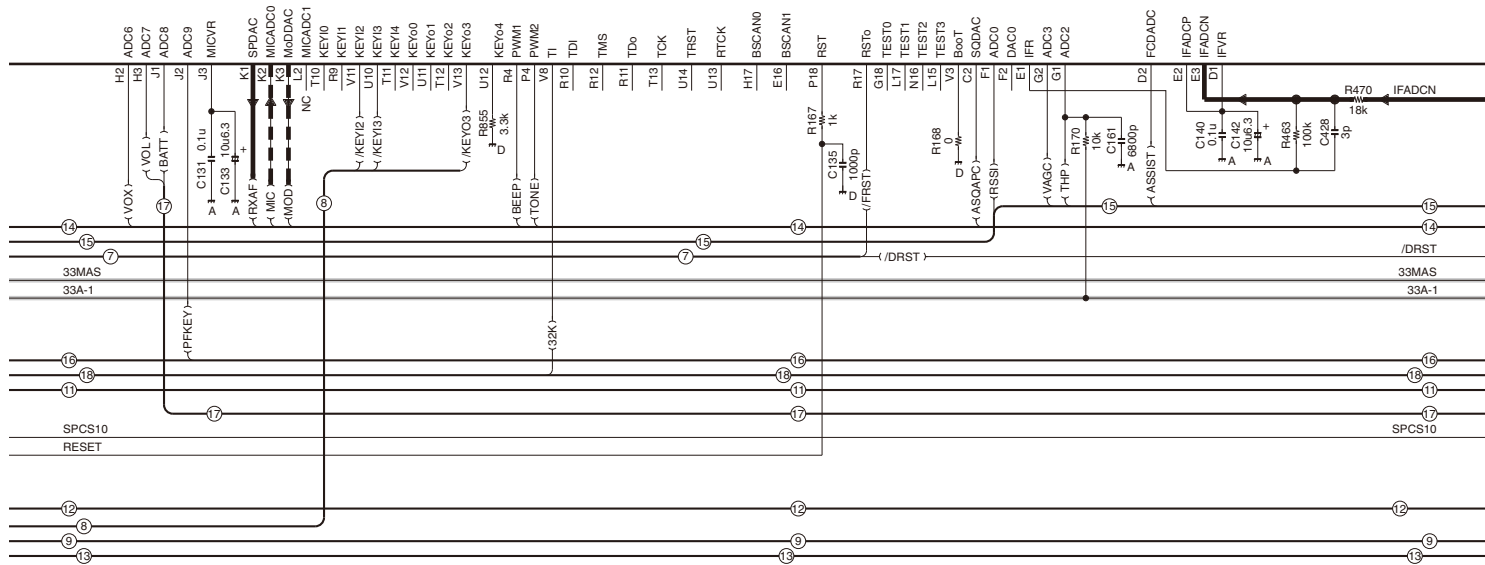
CONTROL UNIT (X53-4432-76)

HD2
GPIo7HD2
GPIo7

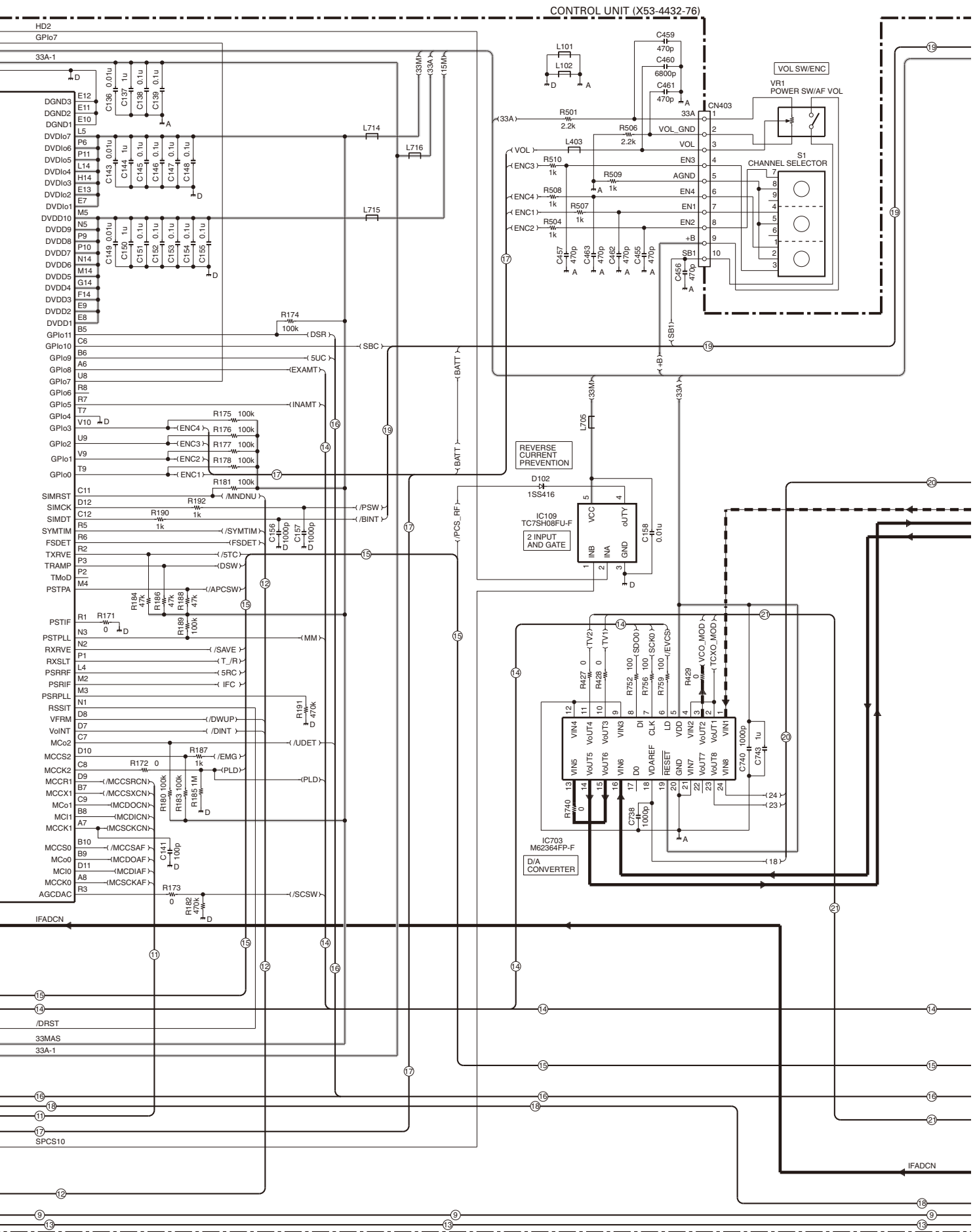
33A-1

T1 NC30
 T4 NC29
 T17 NC28
 T16 NC27
 R13 NC26
 F15 NC25
 C18 NC24
 C16 NC23
 D6 NC22
 D4 NC21
 B16 NC20
 C5 NC19
 C3 NC18
 A3 NC17
 V2 NC16
 V1 NC15
 U2 NC14
 U1 NC13
 V18 NC12
 V17 NC11
 U18 NC10
 U17 NC9
 B18 NC8
 B17 NC7
 A18 NC6
 A17 NC5
 B2 NC4
 B1 NC3
 A2 NC2
 A1 NC1
 E6 AGND9
 L1 AGND8
 K5 AGND7
 J5 AGND6
 H5 AGND5
 G5 AGND4
 F5 AGND3
 E5 AGND2
 U3 NC34
 M1 NC33
 L3 AVCC10
 K4 AVCC9
 J3 AVCC8
 H4 NC35
 G4 AVCC6
 F4 AVCC5
 V16 AVCC4
 E4 NC36
 D3 AVCC2
 U16 AVCC1
 C17 DGND15
 T2 DGND14
 C4 DGND13
 A5 DGND12
 B3 DGND11
 P7 DGND10
 P8 DGND9
 P6 DGND8
 P12 DGND7
 P13 DGND6
 K14 DGND5
 J14 DGND4

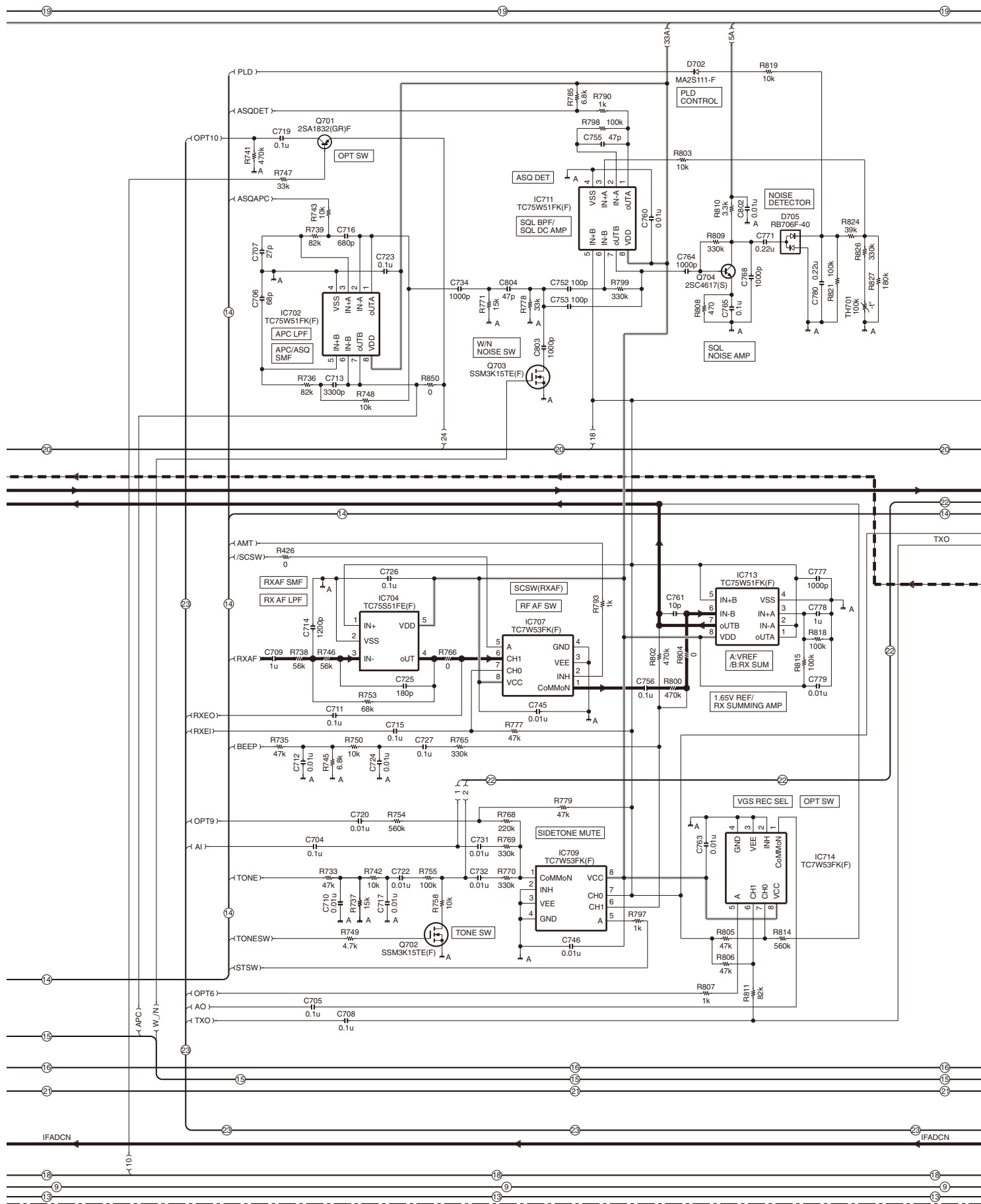
IC108
ASIC



NX-300S SCHEMATIC DIAGRAM

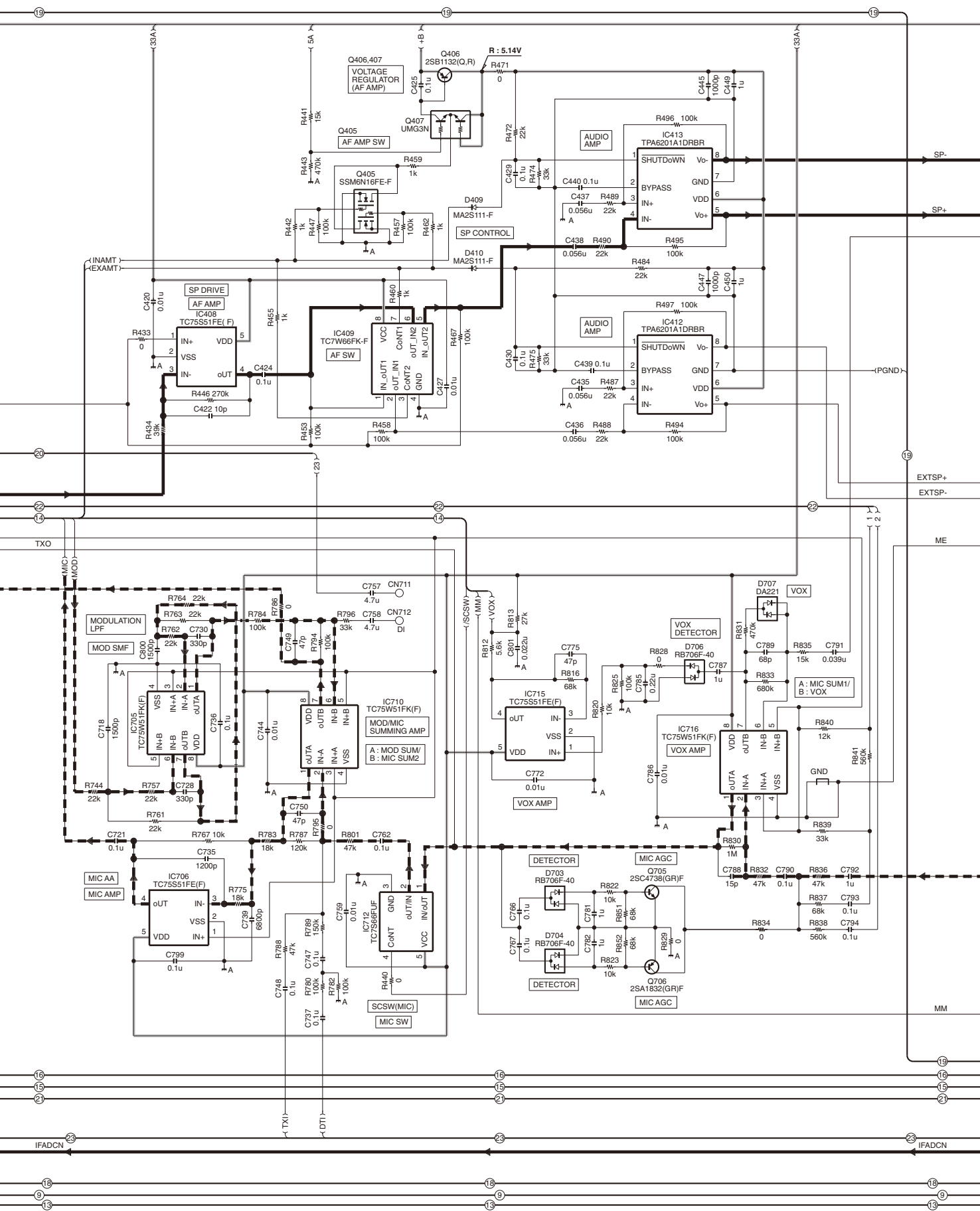


CONTROL UNIT (X53-4432-76)



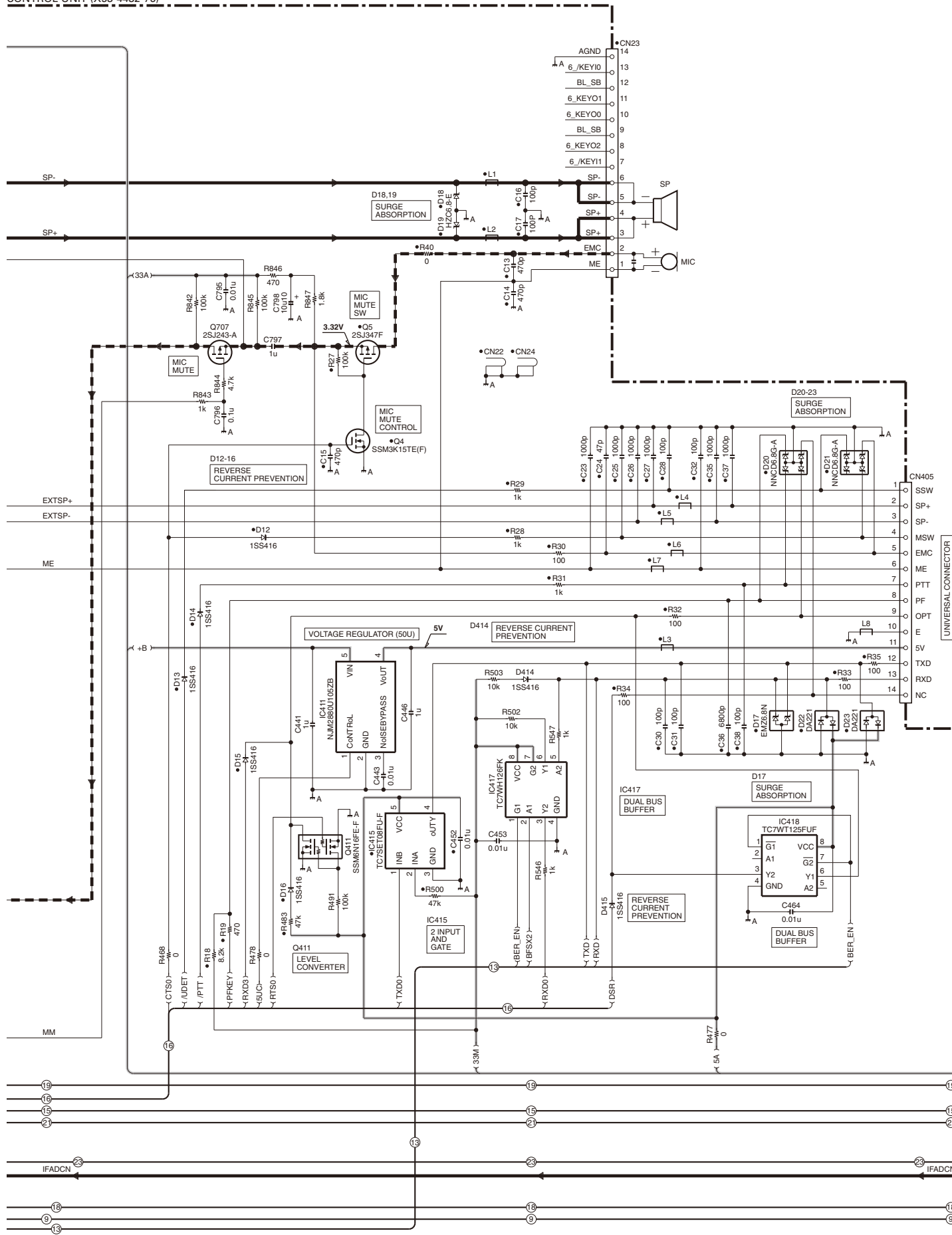
NX-300S SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4432-76)



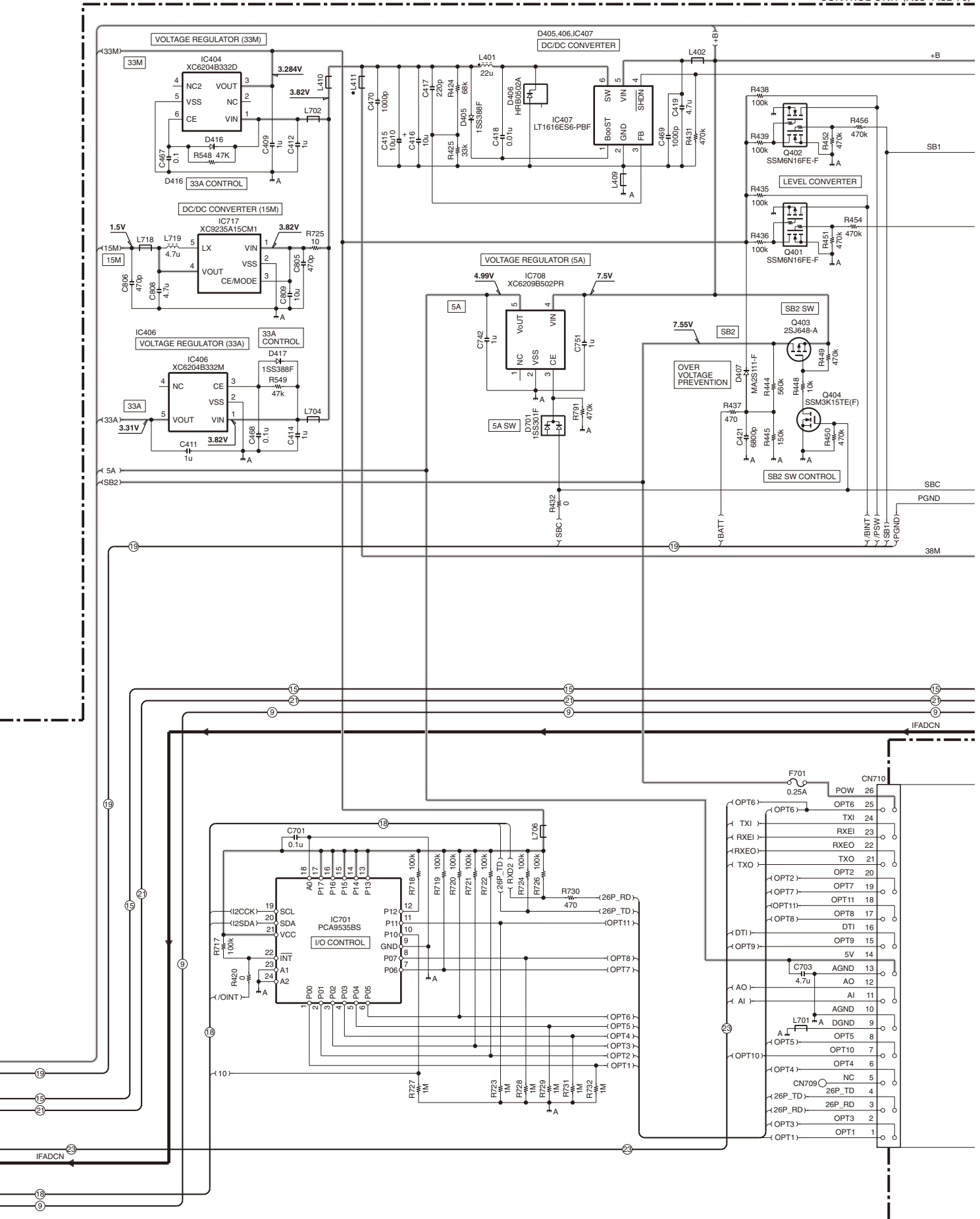
SCHEMATIC DIAGRAM NX-300S

CONTROL UNIT (X53-4432-76)



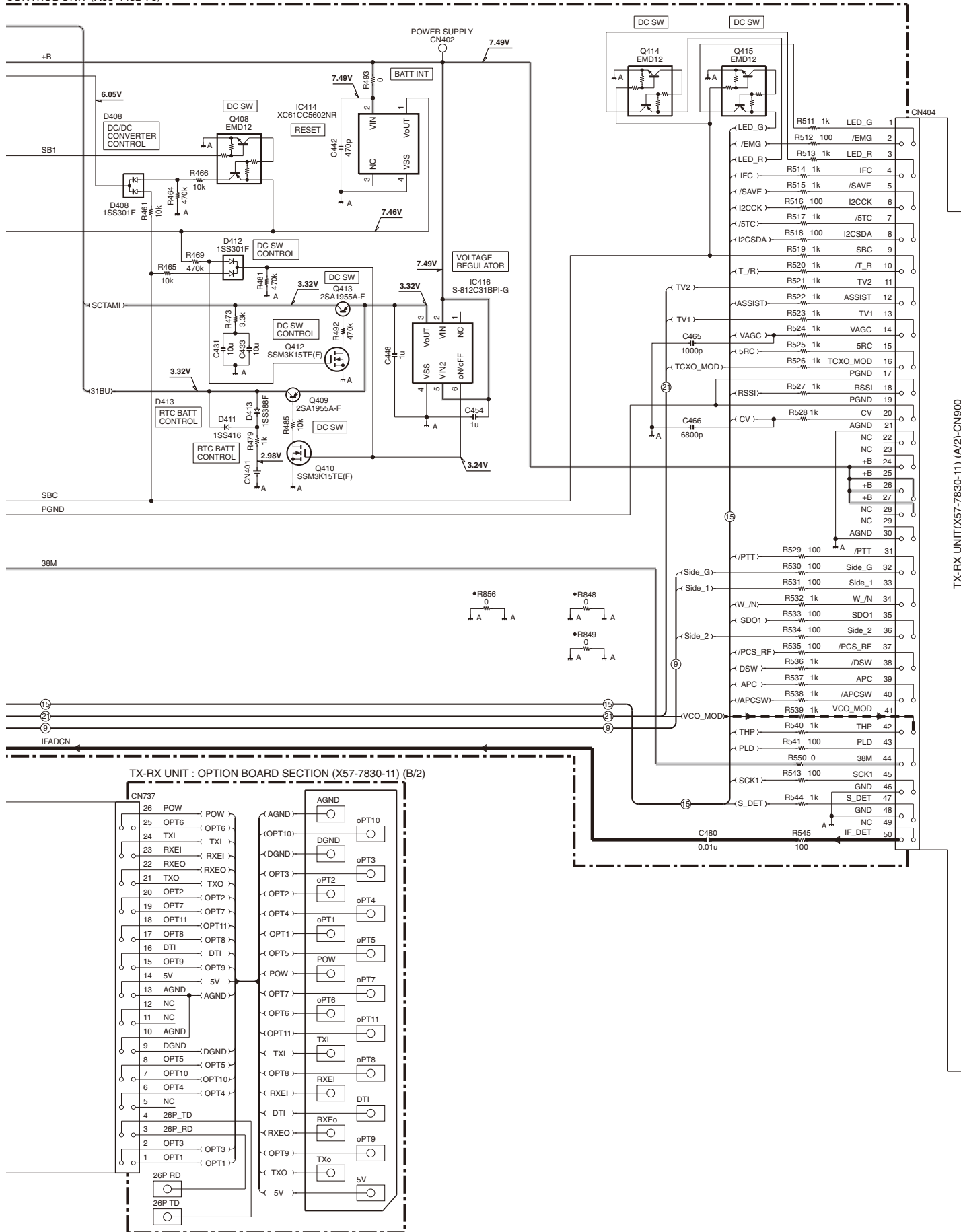
NX-300S SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4432-76)

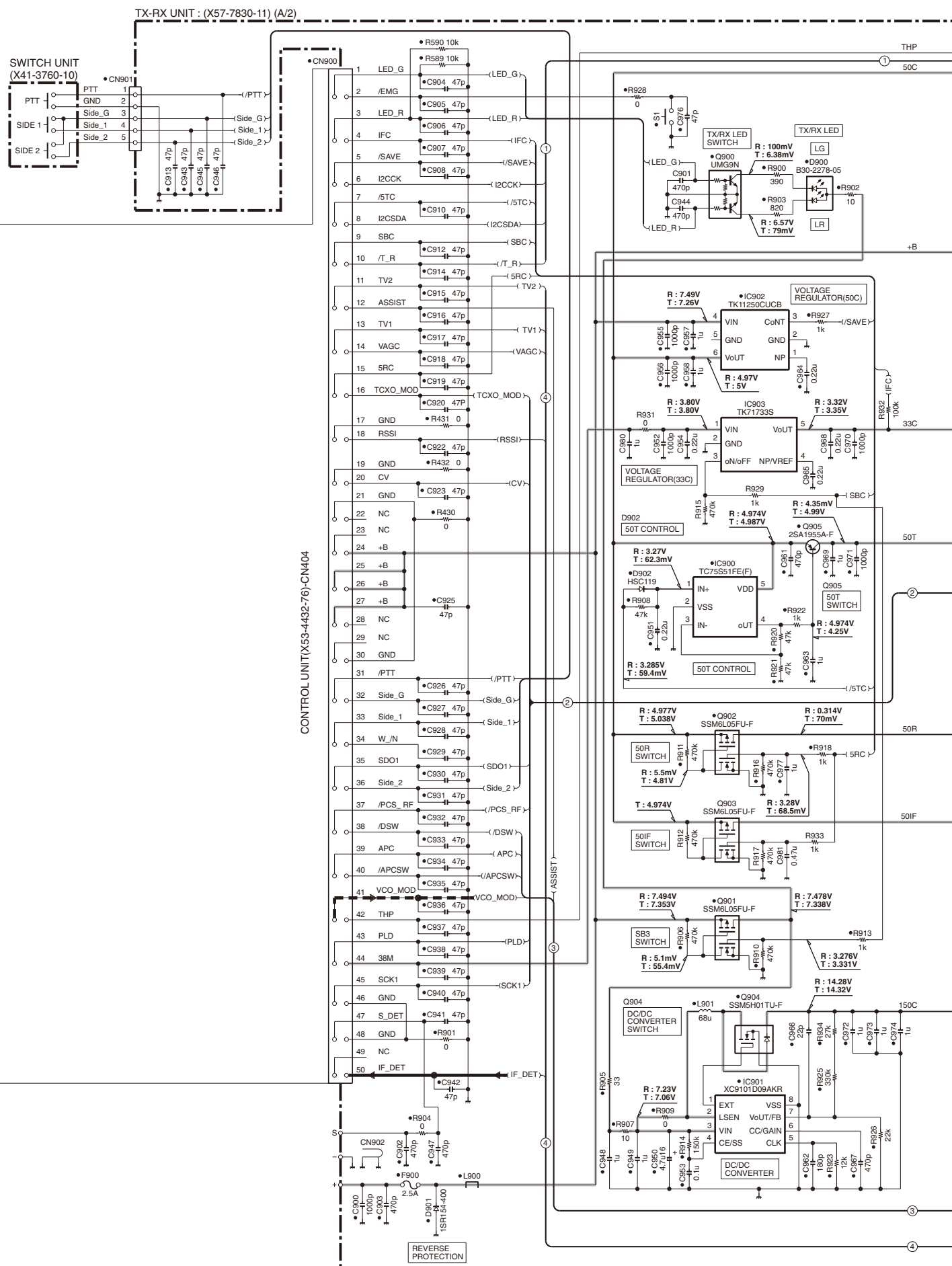


SCHEMATIC DIAGRAM NX-300S

CONTROL UNIT (X53-4432-76)

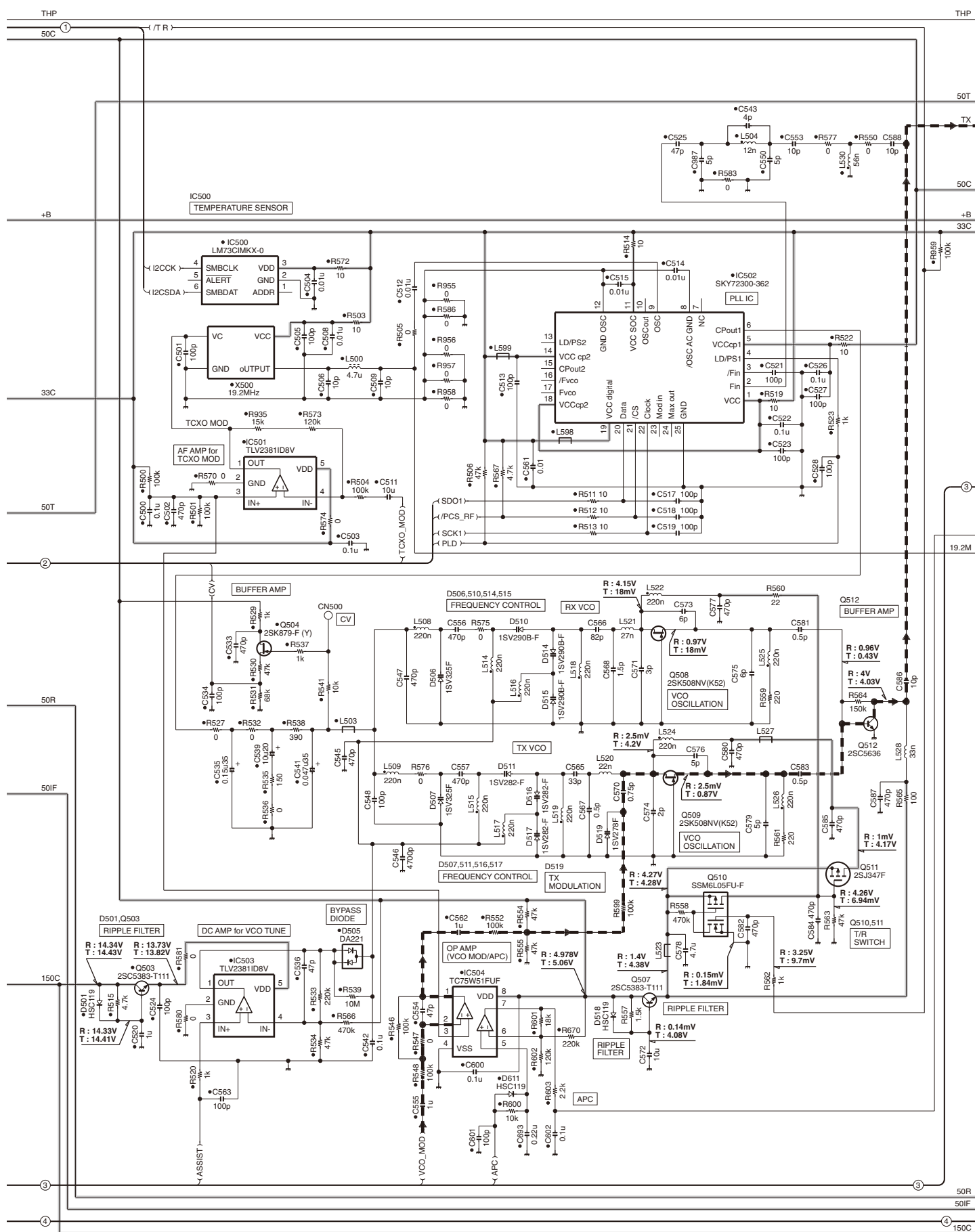


NX-300S SCHEMATIC DIAGRAM



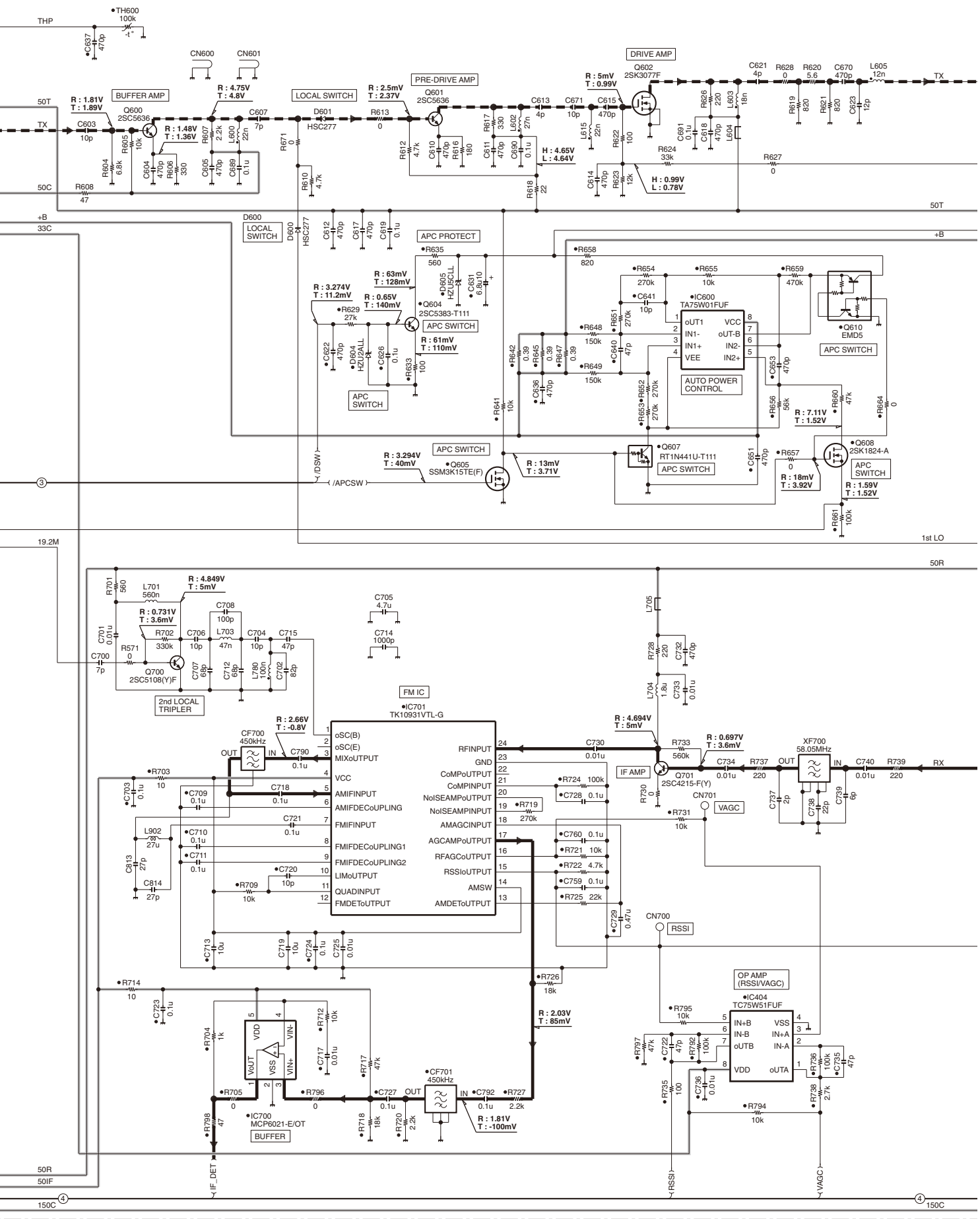
SCHEMATIC DIAGRAM NX-300S

TX-RX UNIT (X57-7830-11) (A/2)



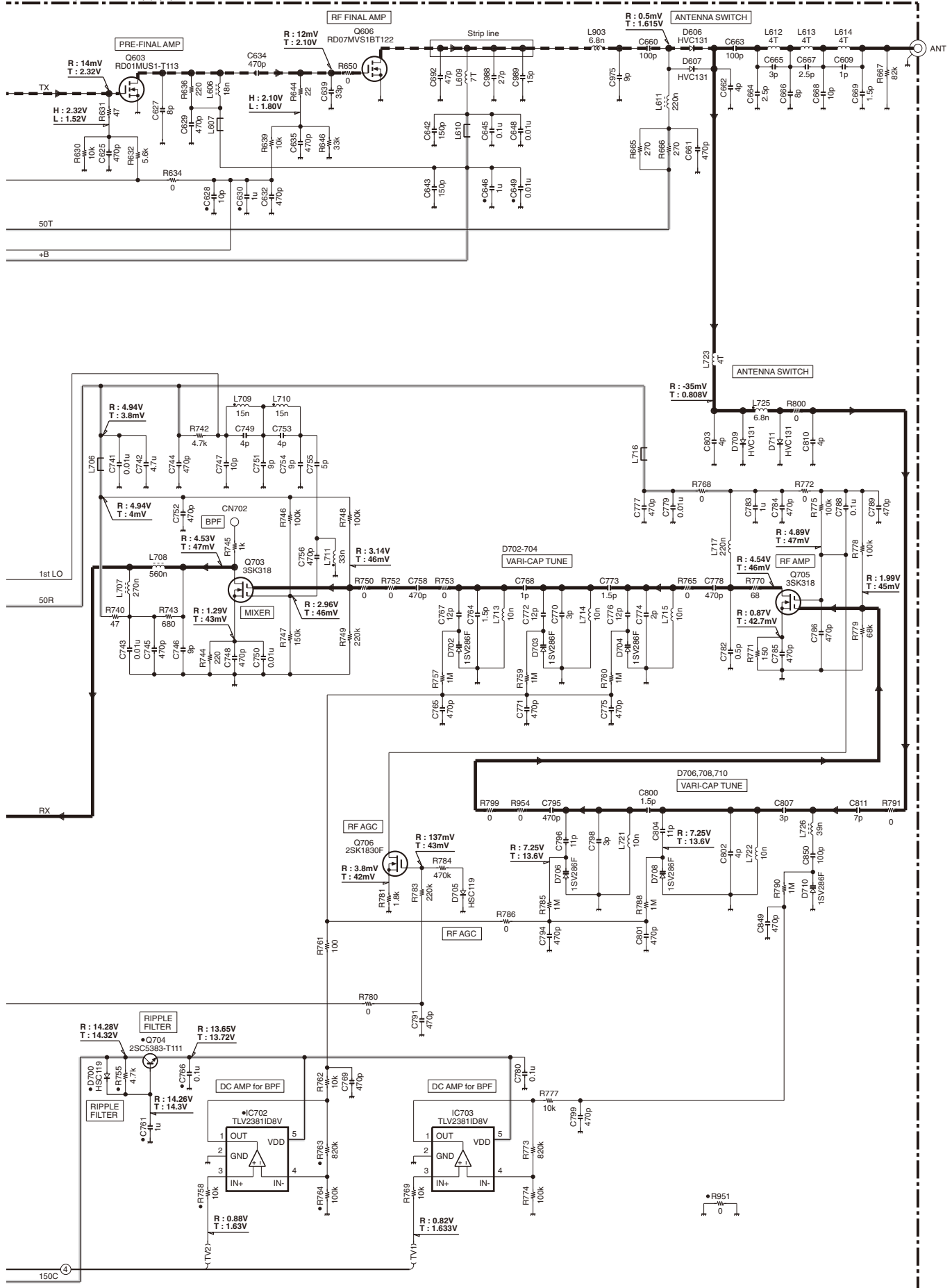
NX-300S SCHEMATIC DIAGRAM

TX-RX UNIT (X57-7830-11) (A/2)



SCHEMATIC DIAGRAM NX-300S

TX-RX UNIT (X57-7830-11) (A/2)



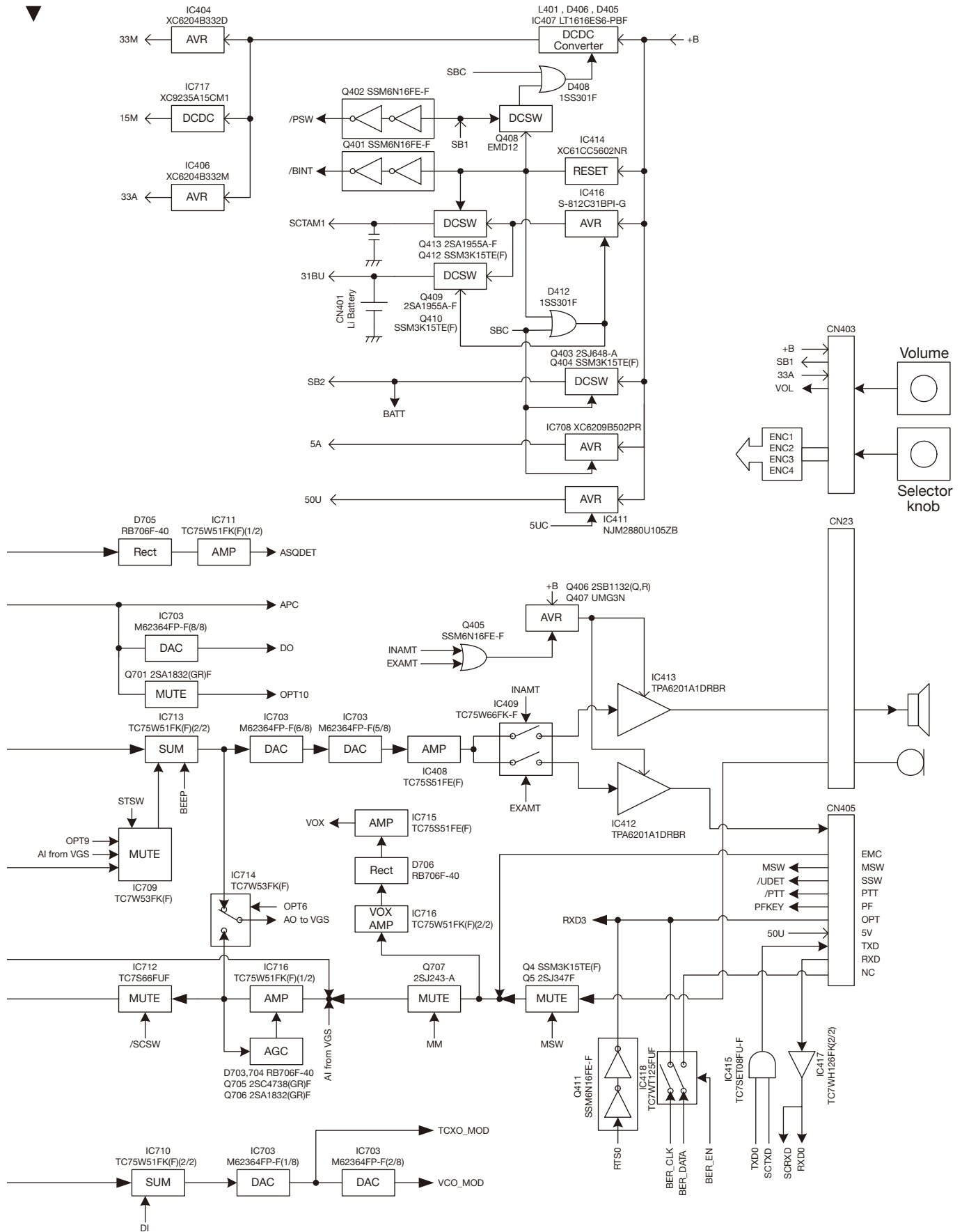
Note : The components marked with a dot (•) are parts of layer 1.

NX-300S BLOCK DIAGRAM

Control unit (X53-4432-76)

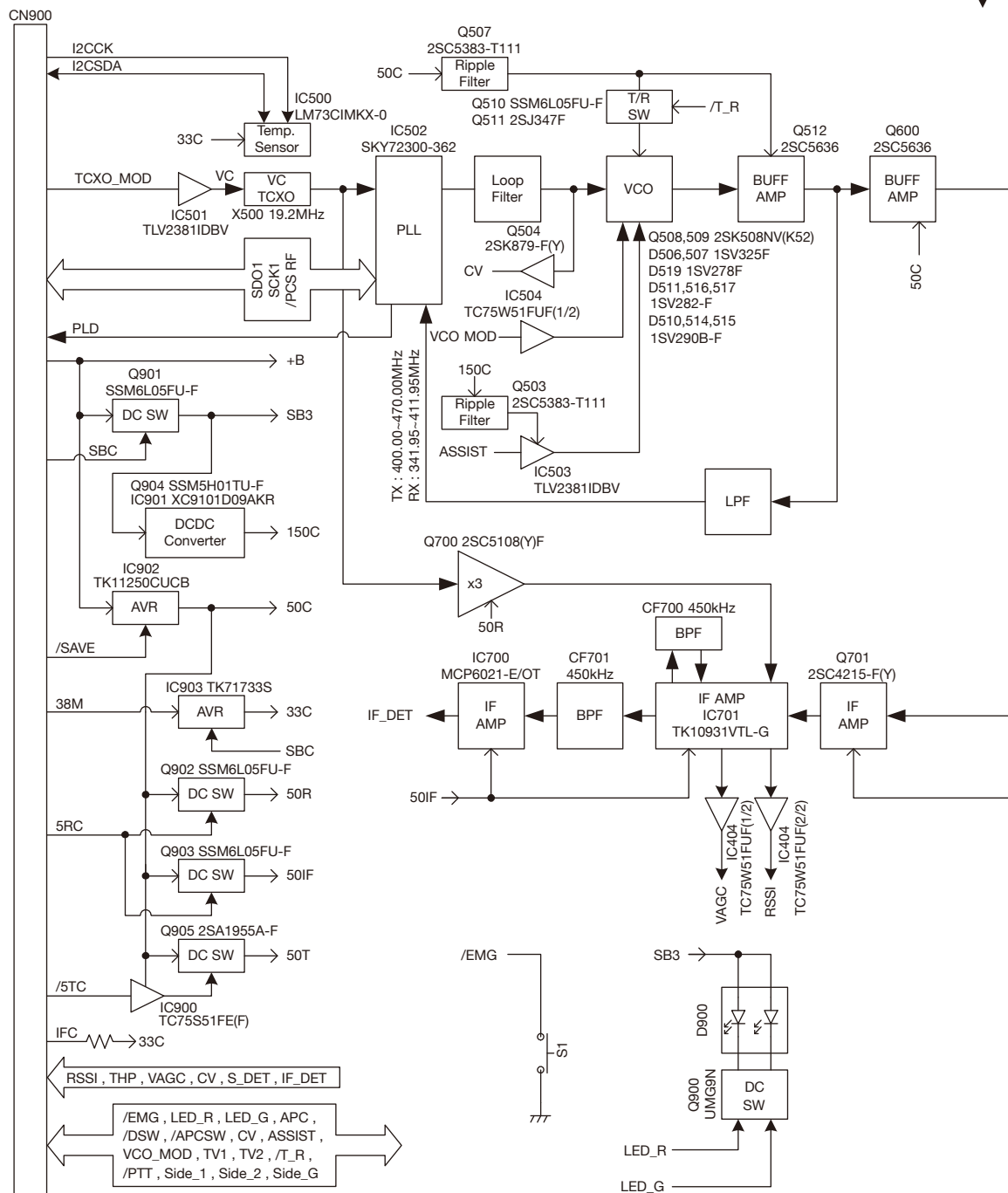


BLOCK DIAGRAM NX-300S

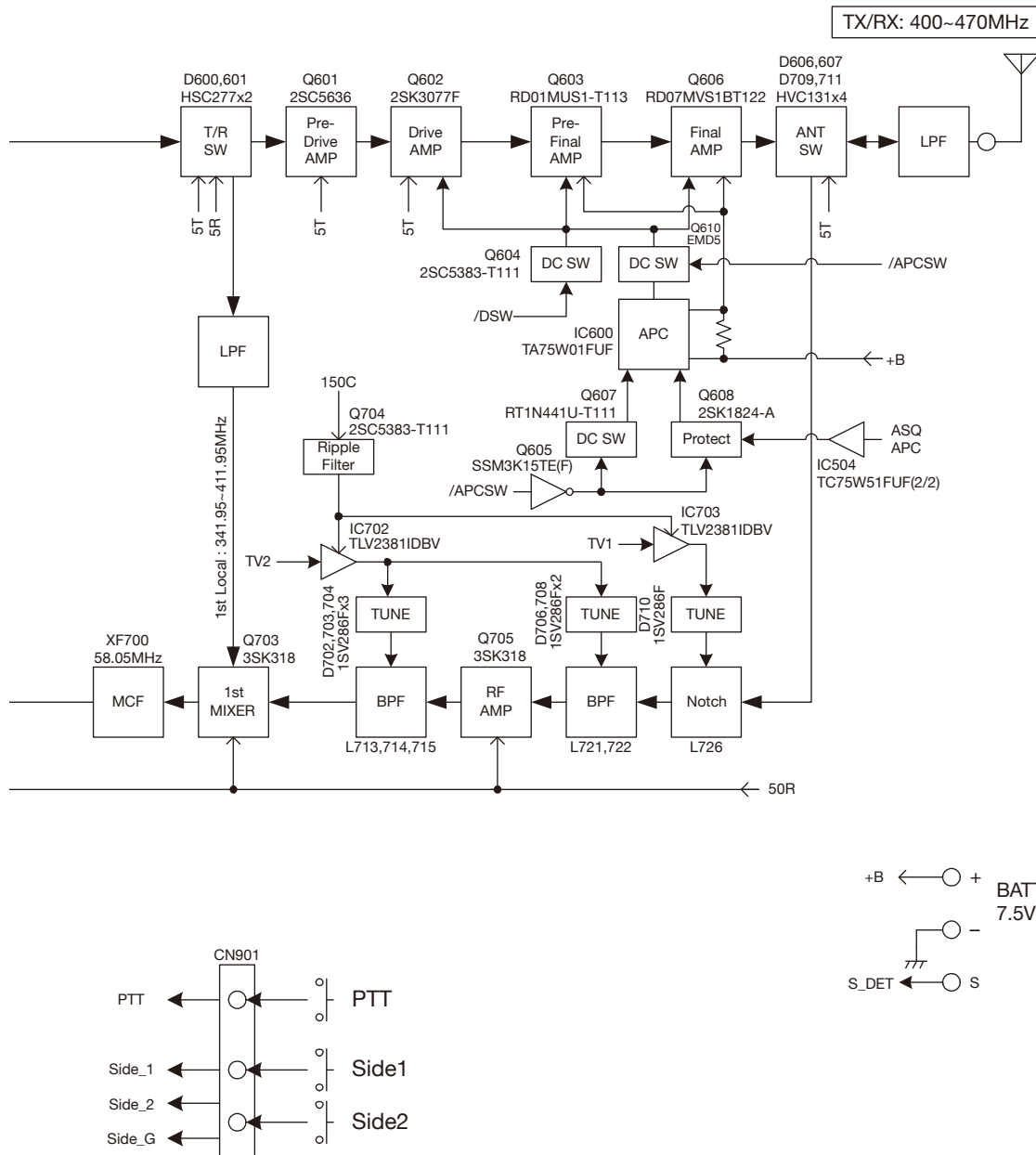


BLOCK DIAGRAM

TX-RX unit (X57-7830-11)

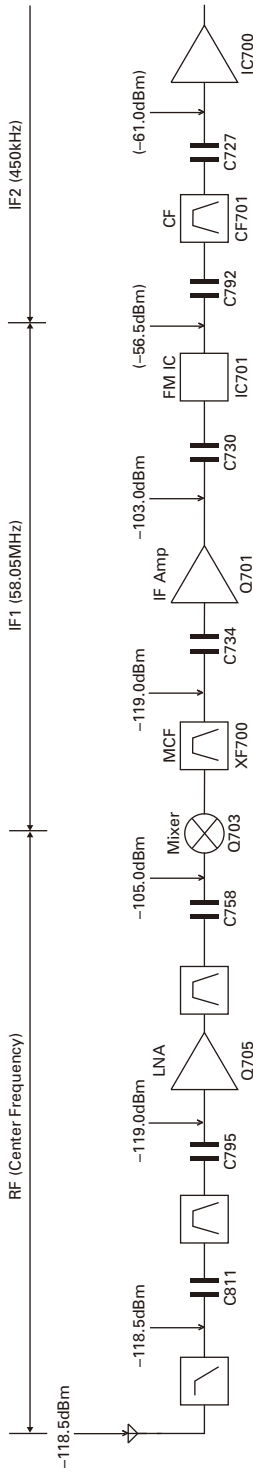


BLOCK DIAGRAM



LEVEL DIAGRAM

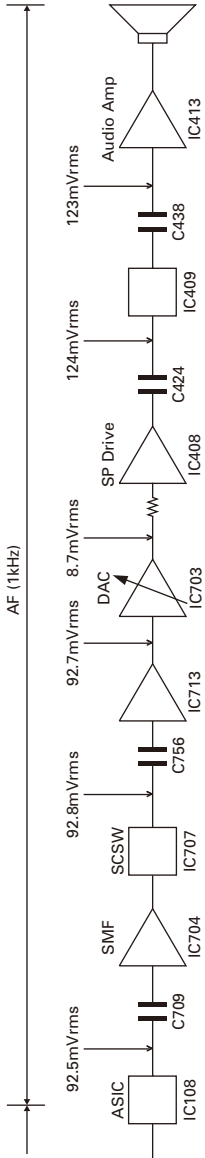
Receiver Section



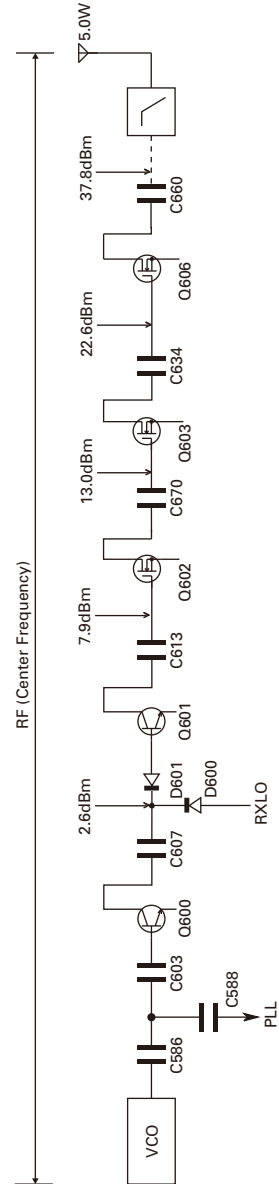
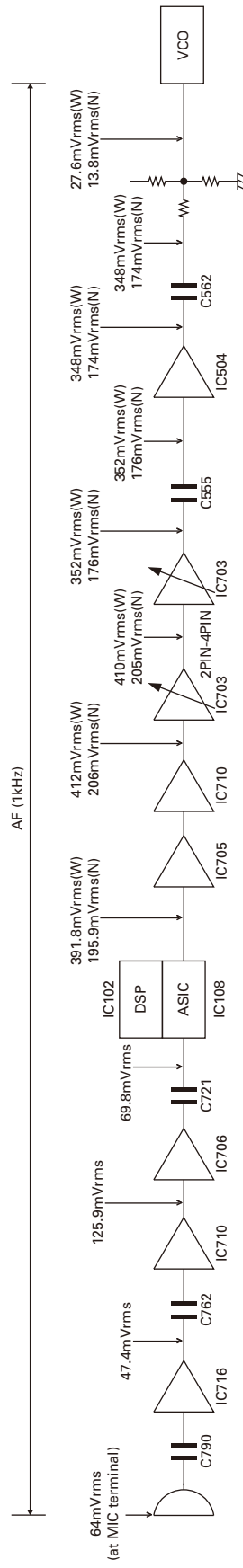
To make measurements in the AF section, connect the AC level meter. (ANT input: -53dB, 1kHz FM, 3kHz DEV (Wide))

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-47L (Li-ion Battery Pack)

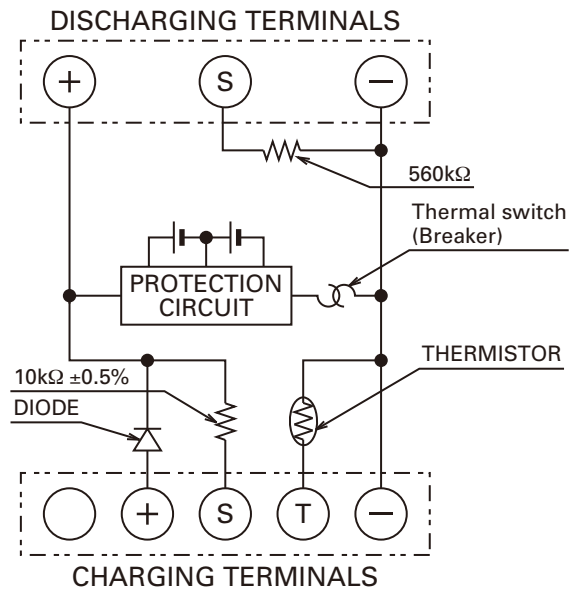
■ External View



■ Specifications

Voltage.....7.4V
Battery capacity..... 1950mAh

■ Schematic Diagram



KNB-48L (Li-ion Battery Pack)

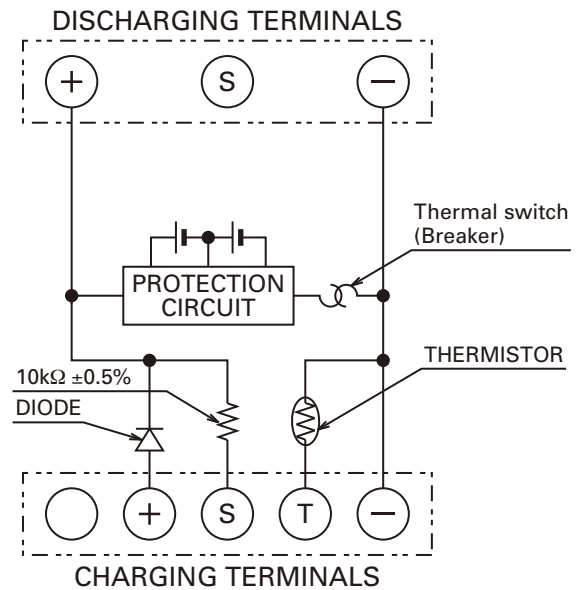
■ External View



■ Specifications

Voltage.....7.4V
Battery capacity..... 2550mAh

■ Schematic Diagram



NX-300S

SPECIFICATIONS

GENERAL

Frequency Range.....	400~470 MHz
Number of Channels.....	64
Zones.....	4
Max. Channels per Zone.....	16
Channel Spacing.....	Analogue: 12.5/20/25 kHz Digital: 6.25/12.5 kHz
Operating Voltage.....	7.5V DC $\pm$ 20%
Battery Life (with KNB-48L).....	5-5-90 duty cycle: More than 14.5 hours 10-10-80 duty cycle: More than 9.0 hours
Operating Temperature Range	-30°C to +60°C
Frequency Stability	$\pm$ 1.0ppm
Antenna Impedance	50 Ω
Dimensions (W x H x D) (Projections not included)	
Radio only.....	58 x 128.3 x 41.7 mm
with KNB-47L	58 x 128.3 x 41.7 mm
with KNB-48L	58 x 128.3 x 49.1 mm
Weight (net)	
Radio only.....	255 g
with KNB-47L	370 g
with KNB-48L	400 g

RECEIVER

Sensitivity (Analogue)			
EIA 12dB SINAD.....	25kHz: 0.28 μ V	20kHz: 0.28 μ V	12.5kHz: 0.32 μ V
EN 20dB SINAD	25kHz: -3dB μ V	20kHz: -3dB μ V	12.5kHz: -1dB μ V
Sensitivity (Digital)			
3% BER.....	12.5kHz: 0.32 μ V	6.25kHz: 0.25 μ V	
1% BER.....	12.5kHz: -1dB μ V	6.25kHz: -4dB μ V	
Adjacent Channel Selectivity (Analogue)	25kHz: 76dB	20kHz: 74dB	12.5kHz: 68dB
Intermodulation (Analogue)	65dB		
Spurious Response Rejection (Analogue).....	75dB		
Audio Distortion.....	Less than 3%		
Audio Output	500mW/8 Ω		

TRANSMITTER

RF Power Output High/Low.....	5W/1W		
Modulation Limiting (Analogue).....	$\pm$ 5.0kHz at 25kHz	$\pm$ 4.0kHz at 20kHz	$\pm$ 2.5kHz at 12.5kHz
Spurious Emission	-36dBm $\leq$ 1GHz, -30dBm > 1GHz		
FM Noise (EIA) (Analogue)	25kHz: 45dB	20kHz: 45dB	12.5kHz: 40dB
Modulation Distortion	Less than 3%		
Microphone Impedance.....	1.8k Ω		
Modulation.....	16K0F3E, 14K0F3E, 14K0F2D, 12K0F2D, 8K50F3E, 7K50F2D, 8K30F1E, 8K30F1D, 8K30F7W, 4K00F1E, 4K00F1D, 4K00F7W, 4K00F2D		

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

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Kenwood Ibérica, S.A.

Bolivia, 239-08020 Barcelona, Spain

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North Ryde NSW 2113 Australia

Kenwood Electronics (Hong Kong) Ltd.

Unit 3712-3724, Level 37, Tower one Metroplaza, 223 Hing Fong Road,
Kwai Fong, N.T., Hong Kong

Kenwood Electronics Singapore Pte Ltd

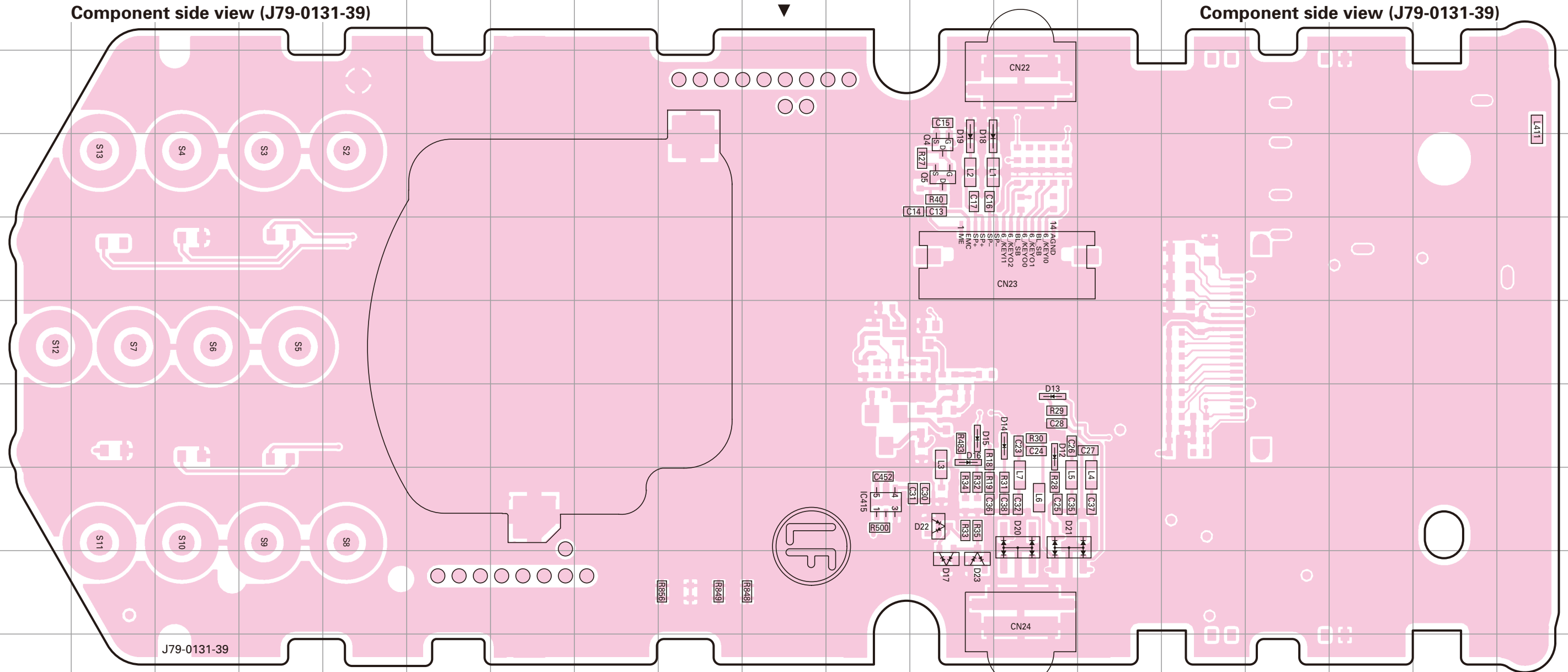
1 Ang Mo Kio Street 63, Singapore 569110

NX-300S PC BOARD

PC BOARD NX-300S

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)

CONTROL UNIT (X53-4432-76)
Component side view (J79-0131-39)



Ref. No.	Address	Ref. No.	Address
IC415	8K	D16	7L
Q4	4L	D17	9L
Q5	4L	D18	4L
D11	7L	D19	4L
D12	7M	D20	8M
D13	7M	D21	8M
D14	7M	D22	8L
D15	7L	D23	9L

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

PC BOARD NX-300S

CONTROL UNIT (X53-4432-76)
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
IC101	5K	IC408	4C	IC704	3P	IC716	5N	Q411	8G	D102	6G	D415	7F
IC102	5I	IC409	3C	IC705	9N	IC717	3F	Q412	9D	D404	5M	D416	9E
IC103	4K	IC411	9F	IC706	7N	Q401	8D	Q413	9C	D405	4B	D417	5C
IC104	3H	IC412	4D	IC707	3P	Q402	8C	Q414	6C	D406	4C	D701	8R
IC105	4L	IC413	3D	IC708	9Q	Q403	8D	Q415	6C	D407	9D	D702	8R
IC106	8I	IC414	9A	IC709	4R	Q404	9E	Q701	6Q	D408	7C	D703	4O
IC107	7I	IC416	8A	IC710	6N	Q405	3E	Q702	4R	D409	3D	D704	3O
IC108	7K	IC417	6F	IC711	6S	Q406	5E	Q703	6R	D410	4D	D705	8R
IC109	6G	IC418	6F	IC712	6N	Q407	4E	Q704	7R	D411	7A	D706	6O
IC404	9D	IC701	7Q	IC713	4Q	Q408	7C	Q705	5O	D412	8C	D707	6O
IC406	5C	IC702	5R	IC714	5R	Q409	7A	Q706	5O	D413	7A		
IC407	5B	IC703	7P	IC715	5P	Q410	8A	Q707	4N	D414	6F		

Component side

- | | |
|---------|--|
| Layer 1 | |
| Layer 2 | |
| Layer 3 | |
| Layer 4 | |
| Layer 5 | |
| Layer 6 | |
- Foil side

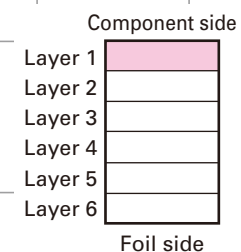
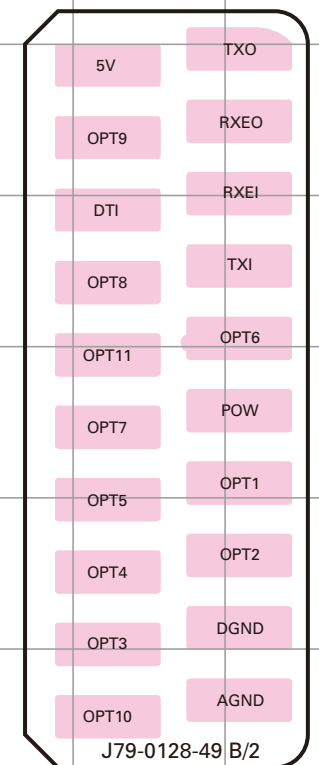
NX-300S PC BOARD

PC BOARD NX-300S

TX-RX UNIT (X57-7830-11) (A/2)
Component side view (J79-0128-49 A/2)

TX-RX UNIT (X57-7830-11) (A/2)
Component side view (J79-0128-49 A/2)

TX-RX UNIT
(X57-7830-11) (B/2)

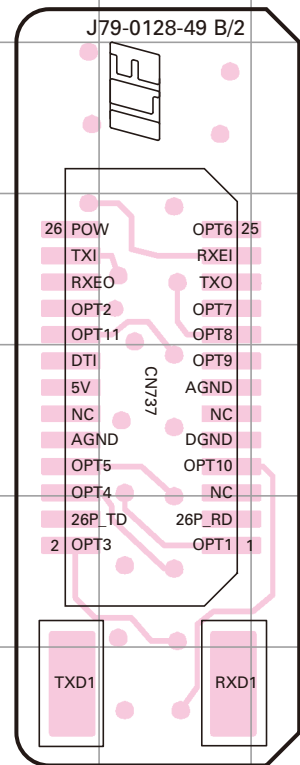


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC404	10G	IC700	8H	Q504	4B	Q900	9P	D604	7J
IC500	9B	IC701	9E	Q604	6J	Q901	7N	D605	6I
IC501	7C	IC702	7K	Q605	3I	Q902	7M	D611	8I
IC502	7E	IC900	4P	Q607	4I	Q904	9O	D700	6L
IC503	5C	IC901	9O	Q608	4J	Q905	4N	D900	8P
IC504	7H	IC902	5N	Q610	5I	D501	7C	D901	5M
IC600	4J	Q503	6C	Q704	6L	D505	4C	D902	5P

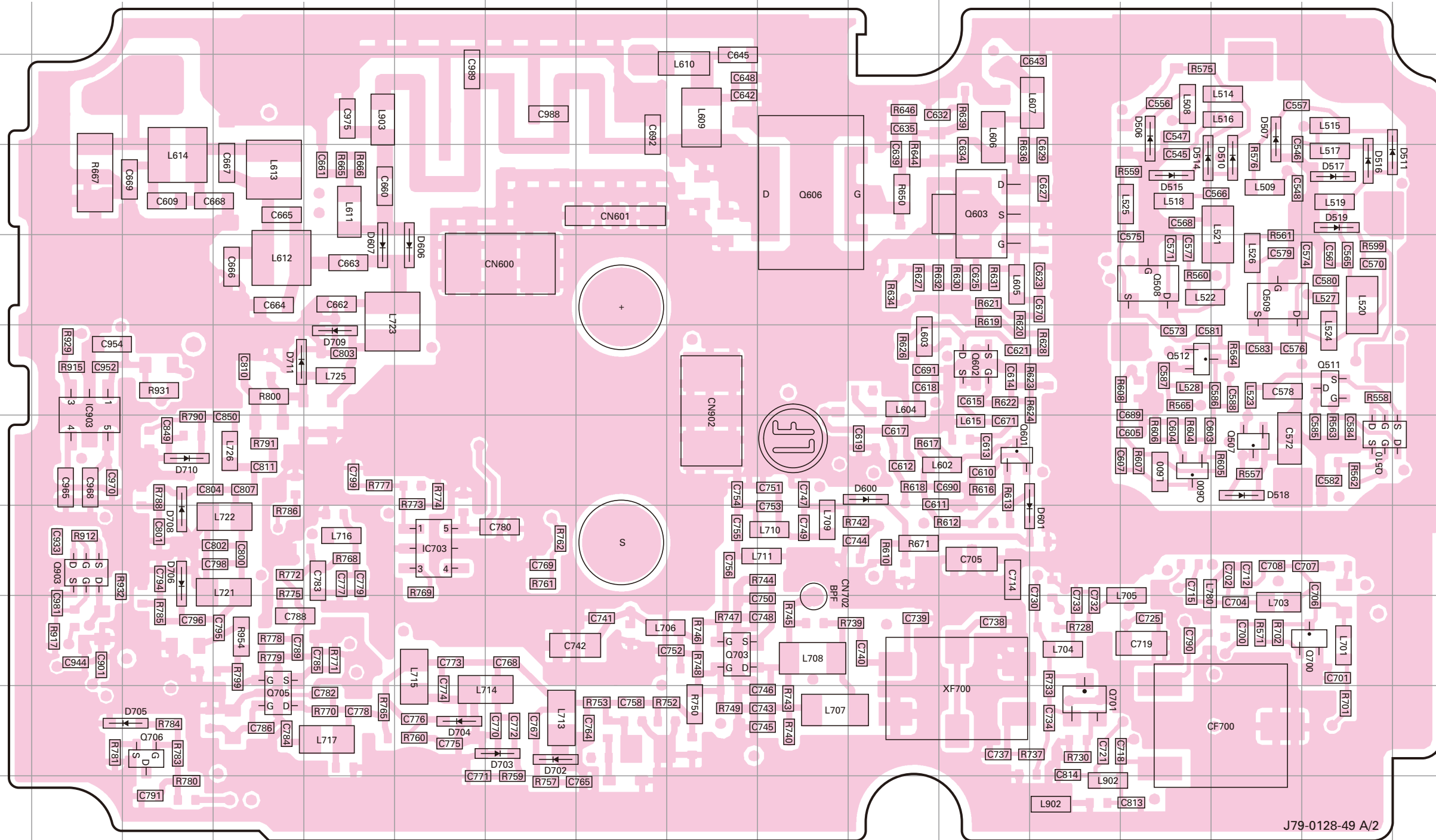
NX-300S PC BOARD

TX-RX UNIT (X57-7830-11) (A/2)
Foil side view (J79-0128-49 A/2)

TX-RX UNIT
(X57-7830-11) (B/2)

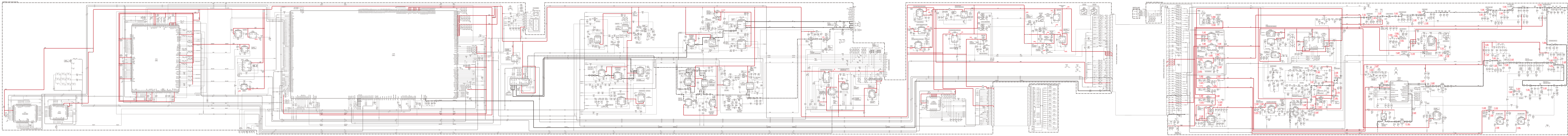


Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

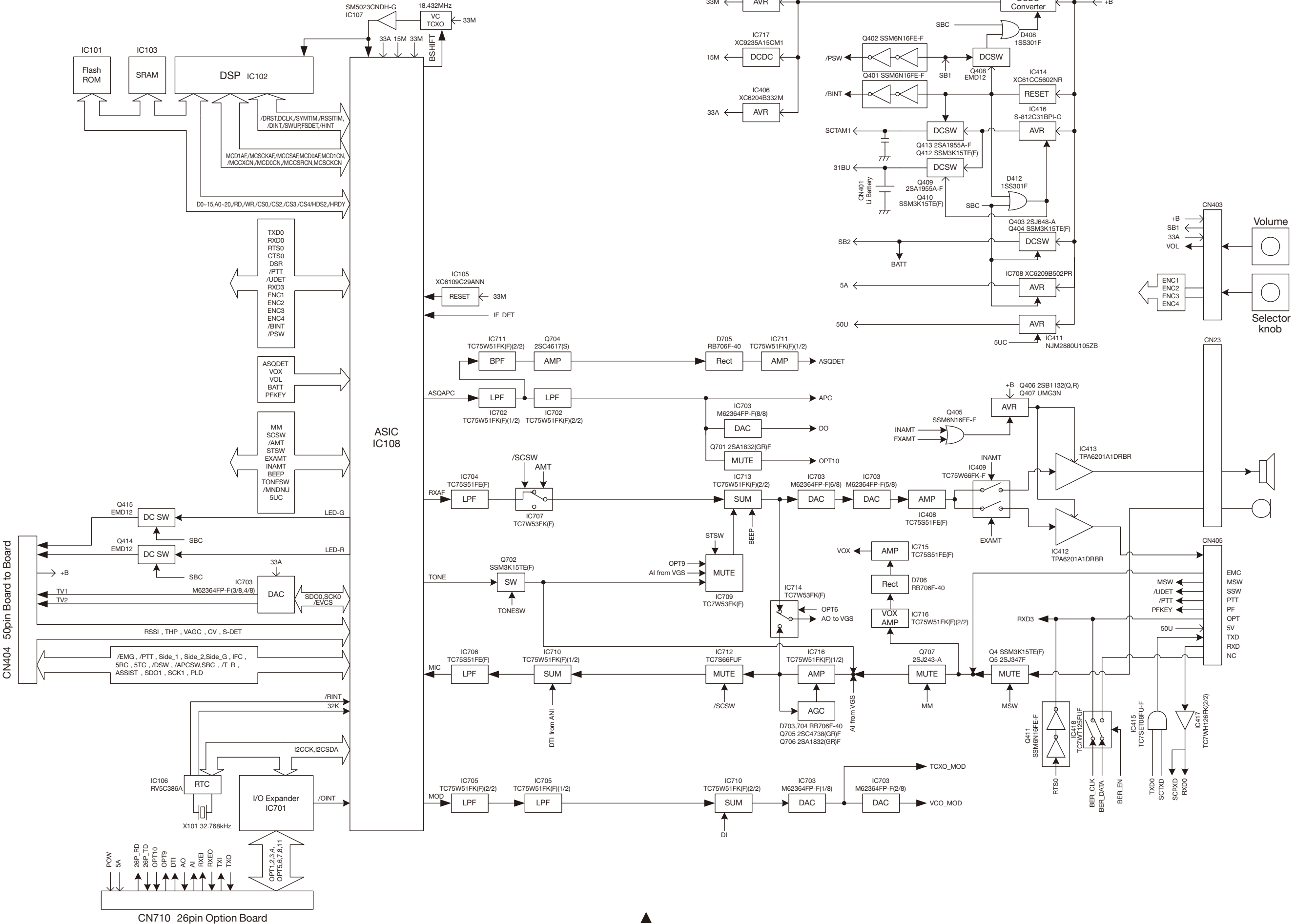


TX-RX UNIT (X57-7830-11) (A/2)
Foil side view (J79-0128-49 A/2)

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



Control unit (X53-4432-76)



TX-RX unit (X57-7830-11)

