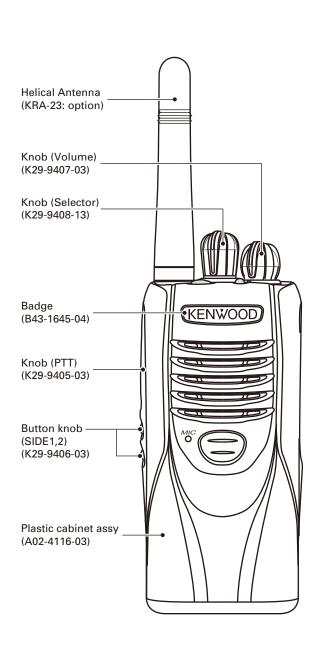
# NX-300S SERVICE MANUAL E version

# **KENWOOD**

**Kenwood Corporation** 

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SPECIFICATIONSBACK C	OVEF

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



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Transceivers containing AMBE+2™ Vocoder:

The AMBE+2 $^{\text{TM}}$  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.

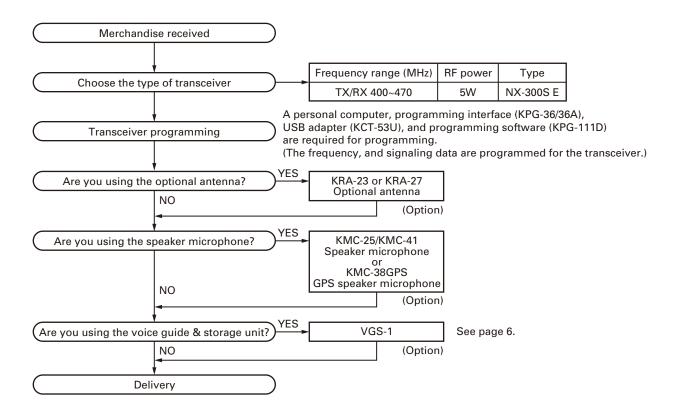
#### **SERVICE**

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

#### NOTE

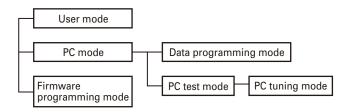
You must use KPG-111D version 2.00 or later for this transceiver. KPG-111D versions earlier than version 2.00 will not work properly.

## **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 program- ming 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.

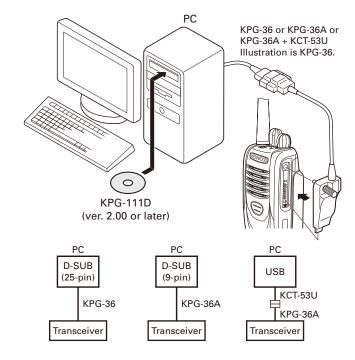


Fig. 1

#### 3-2. Connection procedure

 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.

#### 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

- 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.
- Press and hold the [Orange] key while turning the transceiver power ON. Then, the orange LED on the transceiver lights.
- Check the connection between the transceiver and the personal computer, and make sure that the transceiver is in the Program mode.
- Press "write" button in the window. When the transceiver starts to receive data, the green LED on the transceiver lights.
- 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.

#### Note:

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

#### 4-4. Function

 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 LED lights orange

#### Note:

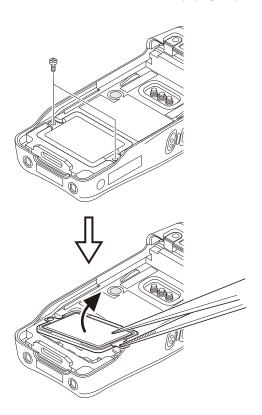
Normally, write in the high-speed mode.

## **INSTALLATION**

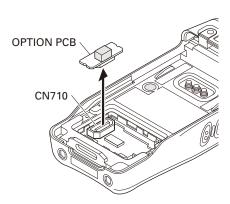
#### **Voice Guide & Storage Unit (VGS-1: Option)**

# ■ 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:

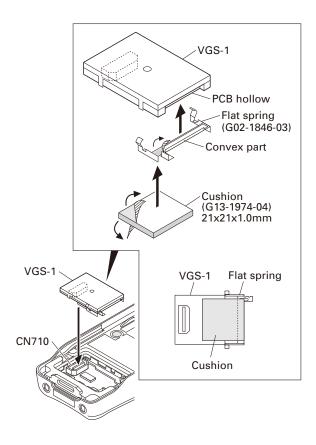
Attach the flat spring so that its convex fits the PCB hollow of the VGS-1.

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.

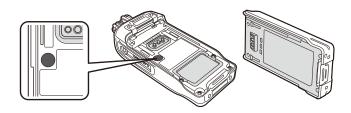


7. Reinstall the cover using the two screws removed in step 2.

## **DISASSEMBLY FOR REPAIR**

#### 1. Precautions for Waterproof

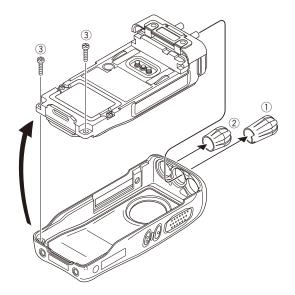
- Do not remove the black sheet from the reverse side of the transceiver (refer to the illustration below). Removal of this sheet decreases the waterproof efficiency of the transceiver and may cause malfunctions if water seeps into the transceiver.
- The orange packing material on the reverse side of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

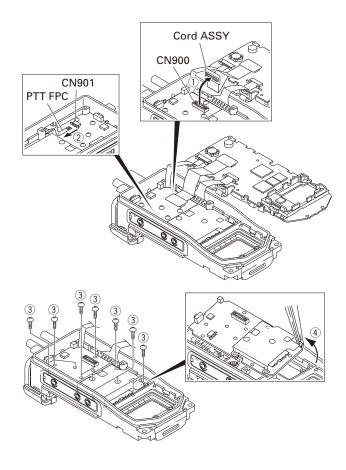
#### **■** Disassembly procedure

- 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

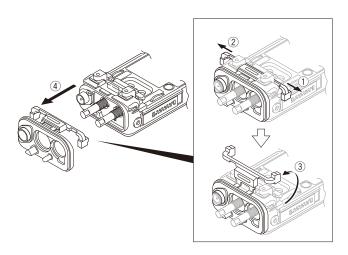
- 1. Remove the cord ASSY from the connector of the TX-RX unit (CN900) ①.
- 2. Remove the PTT FPC from the connector of the TX-RX unit (CN901) ②.
- 3. Remove the 14 screws 3.
- 4. Anchor the screw hole of the TX-RX unit using the tip of a pair of tweezers as shown in the figure. Then, lift the TX-RX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



## **DISASSEMBLY FOR REPAIR**

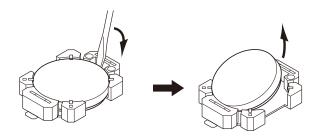
#### ■ Removing the TOP packing (G53-1762-02)

- 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

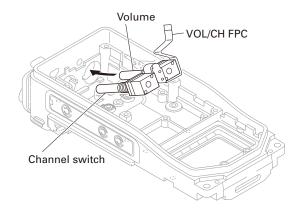
# ■ Installing the option board cover onto the chassis Install the option board cover onto the chassis using the two screws.

#### Note:

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

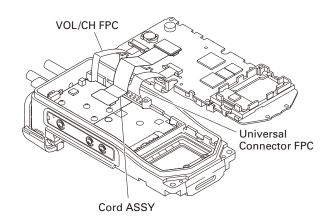
# ■ Inserting the Volume and Channel switch into the chassis

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.

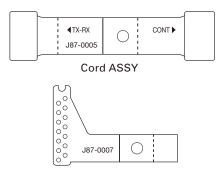


## **DISASSEMBLY FOR REPAIR**

#### Note:

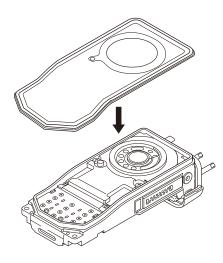
Fold indications are printed on the Cord ASSY and Universal Connector FPC.

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



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.

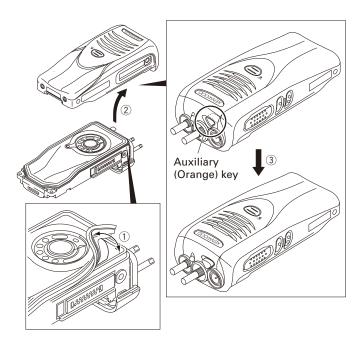
#### Note:

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

2. Mount the chassis onto the case 2.

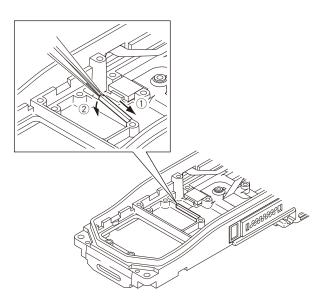
#### Note:

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 Part	s	Assembled Sheet/ Cushion					
Part Name	Part Number	Part Name	Part Number	Remark			
		Sticker	B42-7463-04	"NXDN" is printed.			
		Badge	B43-1645-04	"KENWOOD" is printed.			
Plastic Cabinet	A02-4116-03	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				
		Rubber Cushion (SP)	G11-4272-14				
Speaker	T07-0749-25	Sheet (SP)	G11-4458-14	Used for stabilizing the waterproof performance. "•" (a hole) on the Sheet (SP) shows the upper side.			
C :	V44 0700 40	Sheet (PTT)	G11-4428-04	Used for fixing the Push Knob (PTT) on the Switch Unit (PTT FPC) and stabilizing the waterproof performance.			
Switch Unit (PTT FPC)	X41-3760-10	Adhesive Sheet (PTT FPC)	J99-0711-04	Used for fixing the Switch Unit (PTT FPC) on the Chassis.			
		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.			
Chassis	A10-4111-21	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			
Lerminal Block		Adhesive Sheet (Terminal Block)	J99-0747-04	Used for fixing the Terminal Block and the Packing (Terminal Block).			

#### 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.

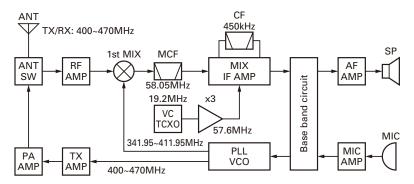


Fig. 1 Frequency configuration

#### 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).

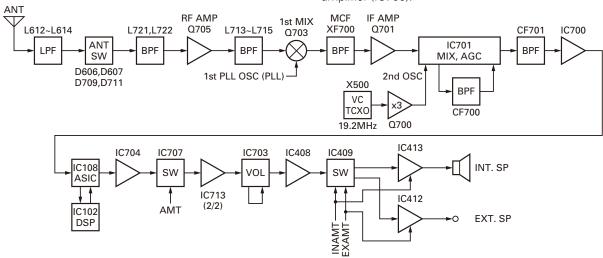


Fig. 2 RF and IF circuit

## CIRCUIT DESCRIPTION

#### 3-3. Audio Amplifier Circuit

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

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

The speaker is switched by the logic of the speaker switching terminal SSW on the universal connector. When the SP-MIC is not attached, SSW becomes High. IC108 detects the logic of SSW and activates either INAMT or EXAMT.

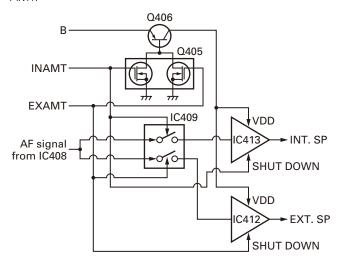


Fig. 3 Audio amplifier circuit

#### 3-4. Squelch Circuit

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

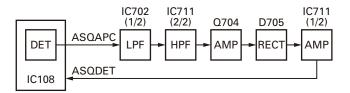


Fig. 4 Squelch circuit

#### 4. Transmitter System

#### 4-1. Audio Band Circuit

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

#### 4-2. Base Band Circuit

The audio signal output from the base band circuit is converted to digital data with a sampling frequency of 48kHz. This digital data is sent to the DSP (IC102), and voice signals of 300Hz or lower and frequencies of 3kHz or higher are cut off and an audio range of 300Hz to 3kHz is extracted. The audio signal is then pre-emphasized in FM mode and synthesized with the signals, such as QT and DQT, as required, and is then output from IC108. In Digital mode, the audio signal is converted to the 4-Level FSK base band signal and output from IC108. The DTMF and MSK base band signals are also generated by the DSP and output by IC108.

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

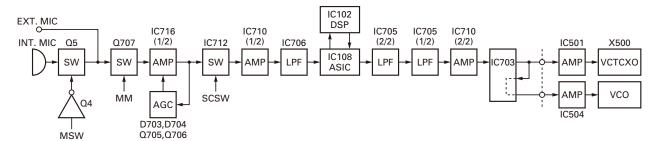


Fig. 5 Audio band and Base band circuit

#### 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.

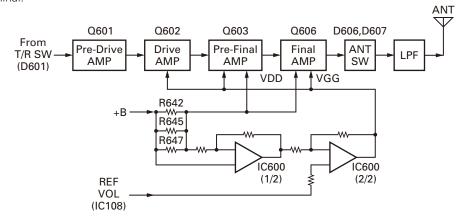


Fig. 6 Drive and final amplifier and APC circuit

#### 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.

#### 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).

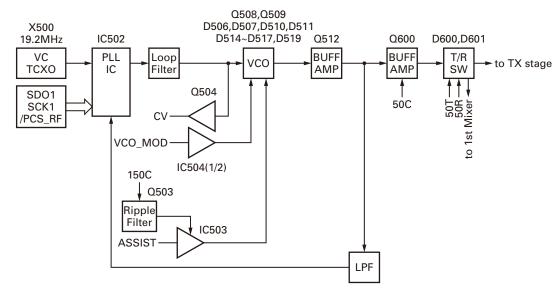


Fig. 7 PLL block diagram

#### 6. Control Circuit

The control circuit consists of the ASIC (IC108) and its peripheral circuits. IC108 mainly performs the following;

- 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.
- 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.

#### 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 /KEYI\* 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**

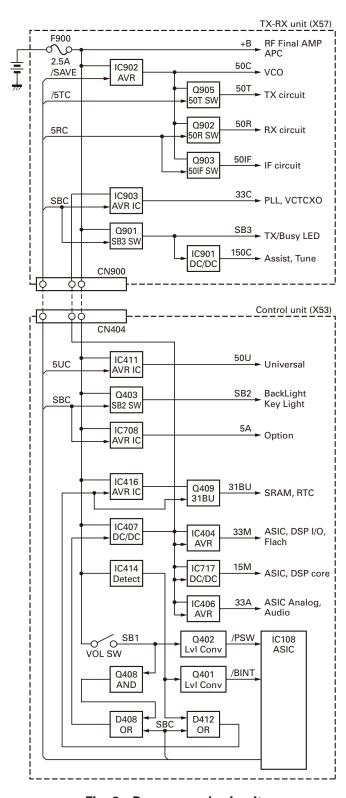


Fig. 8 Power supply circuit

#### 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. Compander Circuit

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

# **COMPONENTS DESCRIPTION**

## Control unit (X53-4432-76)

Ref. No.   Part Name		unit (A55-44					
IC102	Ref. No.	Part Name	Description				
IC103	IC101	IC	FLASH ROM				
IC104	IC102	IC	DSP				
IC105	IC103	IC	SRAM				
IC106	IC104	IC	2 input AND gate				
IC107	IC105	IC	Reset				
IC108	IC106	IC	RTC				
IC109	IC107	IC	Buffer				
IC404	IC108	IC	ASIC				
IC406	IC109	IC	2 input AND gate				
IC407	IC404	IC	Voltage regulator (33M)				
IC408	IC406	IC	Voltage regulator (33A)				
IC409	IC407	IC	DC/DC converter				
IC411	IC408	IC	AF AMP				
IC412,413	IC409	IC	AF switch				
IC414	IC411	IC	Voltage regulator (50U)				
IC415	IC412,413	IC	Audio AMP				
IC416	IC414	IC	Reset				
IC417,418   IC	IC415	IC	2 input AND gate				
IC701	IC416	IC	Voltage regulator				
IC702	IC417,418	IC	Dual bus buffer				
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 control           Q404         FET         AF AMP switch           Q405         FET         AF AMP switch           Q406,407         Transistor         Voltage regulator (AF AMP)	IC701	IC	I/O control				
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 control           Q404         FET         AF AMP switch           Q405         FET         AF AMP switch           Q406,407         Transistor         Voltage regulator (AF AMP)	IC702	IC	APC 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)	IC703	IC	D/A converter				
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)	IC704	IC	RX AF LPF				
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 control           Q404         FET         SB2 switch control           Q405         FET         AF AMP switch           Q406,407         Transistor         Voltage regulator (AF AMP)	IC705	IC	Modulation LPF				
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)	IC706	IC	MIC AMP				
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)	IC707	IC					
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)	IC708	IC					
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)							
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)	IC710	IC	MOD/MIC summing AMP				
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)	IC711	IC	SQL BPF/SQL DC 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)	IC712	IC	MIC 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)	IC713	IC	1.65V REF/RX summing 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)		IC	OPT switch				
Q4FETMIC mute controlQ5FETMIC mute switchQ401,402FETLevel converterQ403TransistorSB2 switchQ404FETSB2 switch controlQ405FETAF AMP switchQ406,407TransistorVoltage regulator (AF AMP)	1						
Q5FETMIC mute switchQ401,402FETLevel converterQ403TransistorSB2 switchQ404FETSB2 switch controlQ405FETAF AMP switchQ406,407TransistorVoltage regulator (AF AMP)	IC717						
Q401,402FETLevel converterQ403TransistorSB2 switchQ404FETSB2 switch controlQ405FETAF AMP switchQ406,407TransistorVoltage regulator (AF AMP)	Q4	FET	MIC mute control				
Q403TransistorSB2 switchQ404FETSB2 switch controlQ405FETAF AMP switchQ406,407TransistorVoltage regulator (AF AMP)	Q5	FET	MIC mute switch				
Q404     FET     SB2 switch control       Q405     FET     AF AMP switch       Q406,407     Transistor     Voltage regulator (AF AMP)	Q401,402	FET					
Q405     FET     AF AMP switch       Q406,407     Transistor     Voltage regulator (AF AMP)	Q403		SB2 switch				
Q406,407 Transistor Voltage regulator (AF AMP)	Q404	FET					
	Q405	FET	AF AMP switch				
O408 409 Transistor DC switch	Q406,407	Transistor	Voltage regulator (AF AMP)				
a 100, 100 Mandiotor Do Switteri	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 capacitance 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**

1 = Type ... ceramic, electrolytic, etc.

2 = Shape ... round, square, etc.

3 = Temp. coefficient

4 = Voltage rating

5 = Value

6 = Tolerance



#### · Capacitor value

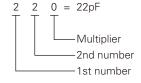
010 = 1pF

100 = 10pF

101 = 100pF

 $102 = 1000 pF = 0.001 \mu F$ 

 $103 = 0.01 \mu F$ 



#### • Temperature coefficient

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

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

Example :  $CC45TH = -470\pm60ppm/^{\circ}C$ 

#### • Tolerance (More than 10pF)

Code	С	D	G	J	K	М	Χ	Z	Р	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40	+80	+100	More than 10μF : -10~+50
							-20	-20	-0	Less than 4.7μF : –10~+75

#### (Less than 10pF)

Code	В	С	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

#### Voltage rating

2nd word	Α	В	С	D	Е	F	G	Н	J	K	V
1st word											
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	2150	4000	5000	6300	8000	-

#### · Chip capacitors

**RESISTORS** 

• Chip resistor (Carbon)

(EX) RD 73 E

1 2 (Chip) (B, F)

(EX)  $\frac{\text{C C}}{1} \frac{73}{2} \frac{\text{F}}{3} \frac{\text{S L}}{4} \frac{1 \text{H}}{5} \frac{000}{6} \frac{\text{J}}{7} + \frac{\text{C Chip}}{1} \text{(Chip) (CH, RH, UJ, SL)}$ 

(EX)  $\frac{C \text{ K}}{1} \frac{73}{2} \frac{F}{3} \frac{F}{4} \frac{1 \text{ H}}{5} \frac{000}{6} \frac{Z}{7} \leftarrow$ (Chip) (B, F)

- Refer to the table above.

1 = Type

2 = Shape

3 = Dimension

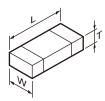
4 = Temp. coefficient

5 = Voltage rating

6 = Value

7 = Tolerance

#### Dimension



#### Chip capacitor

- 1 1			
Code	L	W	Т
Empty	5.6±0.5	5.0±0.5	Less than 2.0
А	4.5±0.5	3.2±0.4	Less than 2.0
В	4.5±0.5	2.0±0.3	Less than 2.0
С	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
Н	1.0±0.05	0.5±0.05	0.5±0.05

#### · Carbon resistor (Normal type)

3

(EX)  $\frac{RD}{1} \frac{14}{2} \frac{B}{2} \frac{B}{4} \frac{2C}{5} \frac{000}{6} \frac{J}{7}$ 

1 = Type 5 = Rating wattage

В

4

 $\frac{2 \text{ B}}{5} \frac{0 0 0}{6} \frac{\text{J}}{7}$ 

2 = Shape 6 = Value 3 = Dimension 7 = Tolerance

4 = Temp. coefficient

#### Chip resistor

Code	L	W	Т
Е	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
Н	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	1/10VV	2E	1/4VV	3D	2W
2B	1/8W	2H	1/2W		

## **PARTS LIST**

\* New Parts. Aindicates safety critical components.

Parts without Parts No. are not supplied.

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

Teile ohne Parts No. werden nicht geliefert.

NX-300S

L : Scandinavia K: USA P : Canada Y : PX (Far East, Hawaii) T : England E : Europe  $\boldsymbol{\mathsf{M}}$  : Other Areas C : China X : Australia

CONTROL Ref. No.	Address	New	Parts No.	Description	Desti- nation
		parts		300S	nation
1	1A	*	A02-4116-03		
1	3A	*	A02-4116-03 A10-4111-21	PLASTIC CABINET 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	ЗА	*	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 50	2B 1B,1D		G53-1768-04 G53-1769-04	PACKING (VOL,CH O-RING) PACKING (CAP) ACCESSORY	
51	1A	*	G53-1824-01	PACKING (CAL) ACCESSOFT	
		"			
57	2B		J19-5506-03	HOLDER (VOL/ENC)	
58	2A		J19-5507-02	HOLDER (OP BOARD)	
59 60	2A	*	J19-5539-01	HOLDER (SP)	
60 62	1C 2B		J29-0730-05 J30-1296-04	BELT CLIP ACCESSORY 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)	
70 72	3B	*	J99-0747-04	ADHESIVE SHEET (T-BLOCK)	
, _	90	**	000 0747-04	A DITEORY E OFFICE (T-DEOOR)	

Ref. No.	Address	New parts	Parts No.	Description	Desti- nation
77 78 79 80 81	3A 1A 1A 1B 1B		K25-2001-03 K29-9405-03 K29-9406-03 K29-9407-03 K29-9408-13	PUSH KNOB (PTT) KNOB (PTT) BUTTON KNOB (SIDE KEY) KNOB (VOL) KNOB (CH)	
A B C D	1B,1D 3B 3A 2A,2B 2B,3A		N08-0564-04 N09-2426-14 N09-2440-15 N09-6549-04 N09-6554-05	DRESSED SCREW ACCESSORY HEXAGON HEAD SCREW (TERMINAL-) SPECIAL SCREW (CASE/CHASSIS) STEPPED SCREW (SP HOLDER) PAN HEAD SCREW (ANT/OP BOARD)	
F G H	2B 1C 1A,2A,2B		N14-0844-04 N30-3008-60 N83-2005-48	CIRCULAR NUT (VOL/CH) PAN HEAD MACHINE SCREW (BELT CLIP) PAN HEAD TAPTITE SCREW (PCB)	
85 86	2A 2A		T07-0749-25 T91-0579-05	SPEAKER MIC ELEMENT	
88	2A		W09-0971-05	LITHIUM CELL	
90 92 -	3A 2A	*	X41-3760-10 X42-3380-10 X53-4432-78	SWITCH UNIT (PTT FPC) CORD ASSY (50PIN FPC) SERVICE CONTROL UNIT	
93	2B		X60-3910-10	TERMINAL ASSY (SMA)	
		C	ONTROL UNI	IT (X53-4432-76)	
C10 1E					
C13-15 C16,17			CK73HB1H471K CC73HCH1H101J	CHIP C 470PF K CHIP C 100PF J	
C23			CK73HB1H102K	CHIP C 1000PF K	
C24 C25-27			CC73HCH1H470J CK73HB1H102K	CHIP C 47PF J CHIP C 1000PF K	
C28			CC73HCH1H101J	CHIP C 100PF J	
C30-32 C35			CC73HCH1H101J CK73HB1H102K	CHIP C 100PF J CHIP C 1000PF K	
C36			CK73HB1F1682K	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 C107			CK73HB1E103K CK73HB1A104K	CHIP C 0.010UF K CHIP C 0.10UF K	
C109,110			CK73HB1H102K	CHIP C 1000PF K	
C111-113			CK73HB1A104K	CHIP C 0.10UF K	
C116,117 C118,119			CK73HB1A104K CK73HB0J105K	CHIP C 0.10UF K CHIP C 1.0UF K	
C120,113			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 C134			CS77CP0J100M CK73HB1E103K	CHIP TNTL 10UF 6.3WV 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**

D-/ 3"		New	D. 4 P.		D '-'		Desti-	D ( 2:	A	New	D			L UNIT (X5	Desti-
Ref. No.	Address	parts	Parts No.		Descriptio	n	nation	Ref. No.	Address	parts	Parts No.		Descriptio	n	nation
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	
			0./==./0.====/												
2160,161			CK73HB1E682K	CHIP C	6800PF	K		C724			CK73HB1E103K	CHIP C	0.010UF	K	
2409			CK73HB0J105K	CHIP C	1.0UF	K		C725			CC73HCH1E181J	CHIP C	180PF	J	
411,412			CK73HB0J105K	CHIP C	1.0UF	K		C726,727			CK73HB1A104K	CHIP C	0.10UF	K	
414			CK73HB0J105K	CHIP C	1.0UF	K		C728			CK73HB1H331K	CHIP C	330PF	K	
415			CS77AP1A100M	CHIP TNTL	10UF	10WV		C730			CK73HB1H331K	CHIP C	330PF	K	
416			CK73FB1A106K	CHIP C	10UF	K		C731,732			CK73HB1E103K	CHIP C	0.010UF	K	
			CC73HCH1H221J	CHIP C	220PF	J		C734			CK73HB1H102K	CHIP C		K	
2417													1000PF		
418			CK73HB1E103K	CHIP C	0.010UF	K		C735			CK73HB1H122K	CHIP C	1200PF	K	
419			CK73FB1E475K	CHIP C	4.7UF	K		C736,737			CK73HB1A104K	CHIP C	0.10UF	K	
2420			CK73HB1E103K	CHIP C	0.010UF	K		C738			CK73HB1H102K	CHIP C	1000PF	K	
421			CK73HB1E682K	CHIP C	6800PF	K		C739			CK73HB1E682K	CHIP C	6800PF	K	
422			CC73HCH1H100C	CHIP C	10PF	C		C740			CK73HB1H102K	CHIP C	1000PF	K	
424,425			CK73HB1A104K	CHIP C	0.10UF	K		C742			CK73GB1E105K	CHIP C	1.0UF	K	
427			CK73HB1E103K	CHIP C	0.010UF	K		C743			CK73HB0J105K	CHIP C	1.0UF	K	
428			CC73HCH1H030C	CHIP C	3.0PF	С		C744-746			CK73HB1E103K	CHIP C	0.010UF	K	
429,430			CK73HB1A104K	CHIP C	0.10UF	K		C747,748			CK73HB1A104K	CHIP C	0.10UF	K	
431			CK73FB1A106K	CHIP C	10UF	K		C749,750			CC73HCH1H470J	CHIP C	47PF	J	
433			CK73FB1A106K	CHIP C	10UF	K		C751			CK73GB1E105K	CHIP C	1.0UF	K	
435-438			CK73HB1A563K	CHIP C	0.056UF	K		C752,753			CC73HCH1H101J	CHIP C	100PF	J	
439,440			CK73HB1A104K	CHIP C	0.10UF	K		C755			CC73HCH1H470J	CHIP C	47PF	J	
3441			CK73GB1E105K	CHIP C	1.0UF	K		C756			CK73HB1A104K	CHIP C	0.10UF	K	
442			CK73HB1H471K	CHIP C	470PF	K		C757,758			CK73GB0J475K	CHIP C	4.7UF	K	
443			CK73HB1E103K	CHIP C	0.010UF	K		C759,760			CK73HB1E103K	CHIP C	0.010UF	K	
445			CK73HB1H102K	CHIP C	1000PF	K		C761			CC73HCH1H100D	CHIP C	10PF	D	
446			CK73GB1E105K	CHIP C	1.0UF	K		C762			CK73HB1A104K	CHIP C	0.10UF	K	
447			01/301104114.001/	OLUB O	4000DE	K		0700			01/70110454001/	OLUB O	0.040115	I/	
447			CK73HB1H102K	CHIP C	1000PF	K		C763			CK73HB1E103K	CHIP C	0.010UF	K	
448-450			CK73HB0J105K	CHIP C	1.0UF	K		C764			CK73HB1H102K	CHIP C	1000PF	K	
452,453			CK73HB1E103K	CHIP C	0.010UF	K		C765-767			CK73HB1A104K	CHIP C	0.10UF	K	
454			CK73GB1E105K	CHIP C	1.0UF	K		C768			CK73HB1H102K	CHIP C	1000PF	K	
455-457			CK73HB1H471K	CHIP C	470PF	K		C771			CK73HB1A224K	CHIP C	0.22UF	K	
459			CK73HB1H471K	CHIP C	470PF	K		C772			CK73HB1E103K	CHIP C	0.010UF	K	
			CK73HB1E682K	CHIP C	6800PF	K		C775			CC73HCH1H470J	CHIP C	47PF	J	
460															
461-463			CK73HB1H471K	CHIP C	470PF	K		C777			CK73HB1H102K	CHIP C	1000PF	K	
464			CK73HB1E103K	CHIP C	0.010UF			C778			CK73HB0J105K	CHIP C	1.0UF	K	
465			CK73HB1H102K	CHIP C	1000PF	K		C779			CK73HB1E103K	CHIP C	0.010UF	K	
466			CK73HB1E682K	CHIP C	6800PF	K		C780			CK73HB1A224K	CHIP C	0.22UF	K	
467,468			CK73HB1A104K	CHIP C	0.10UF	K		C781.782			CK73HB0J105K	CHIP C	1.0UF	K	
467,466 469,470			CK73HB1H102K	CHIP C	1000PF	K		C785			CK73HB1A224K	CHIP C	0.22UF	K	
469,470 480			CK73HB1H1U2K CK73HB1E103K					C785				CHIP C			
480 701			CK73HB1A104K	CHIP C	0.010UF 0.10UF	K K		C786 C787			CK73HB1E103K CK73HB0J105K	CHIP C	0.010UF 1.0UF	K	
			2.0.0.10110110	0	5.1001			1			2.0.220010010	0			
703			CK73GB0J475K	CHIP C	4.7UF	K		C788			CC73HCH1H150J	CHIP C	15PF	J	
704,705			CK73HB1A104K	CHIP C	0.10UF	K		C789			CC73HCH1H680J	CHIP C	68PF	J	
706			CC73HCH1H680J	CHIP C	68PF	J		C790			CK73HB1A104K	CHIP C	0.10UF	K	
707			CC73HCH1H270J	CHIP C	27PF	J		C791			CK73HB1A393K	CHIP C	0.039UF	K	
708			CK73HB1A104K	CHIP C	0.10UF	K		C792			CK73HB0J105K	CHIP C	1.0UF	K	
700			CV7011D0 140EV	CLUB C	1 0115	V		0700 704			CV7011D1 A 10 AV	CLUD C	0.10115	V	
709			CK73HB0J105K	CHIP C	1.0UF	K		C793,794			CK73HB1A104K	CHIP C	0.10UF	K	
710			CK73HB1E103K	CHIP C	0.010UF			C795			CK73HB1E103K	CHIP C		K	
711			CK73HB1A104K	CHIP C	0.10UF	K		C796			CK73HB1A104K	CHIP C	0.10UF	K	
712	1		CK73HB1E103K	CHIP C	0.010UF	K		C797			CK73HB0J105K	CHIP C	1.0UF	K	
712								C798							

# **PARTS LIST**

#### CONTROL UNIT (X53-4432-76)

CONTROL		X53 New				Desti-			New		1				Desti-
Ref. No.	Address	parts	Parts No.	De	scription	nation	Ref. No.	Address	parts	Parts No.		Descri	ption	l	nation
C799			CK73HB1A104K		).10UF K		R120			RK73HB1J474J	CHIP R	470K	J	1/16W	
C800			CK73HB1H152K	CHIP C 1	500PF K	- 1	R121-123			RK73HB1J104J	CHIP R	100K	J	1/16W	
C801			CK73HB1C223K	CHIP C	0.022UF K	- 1	R126			RK73HB1J101J	CHIP R	100	J	1/16W	
C802			CK73HB1E103K	CHIP C (	0.010UF K	- 1	R127,128			RK73HB1J000J	CHIP R	0.0	J	1/16W	
C803			CK73HB1H102K		000PF K		R129-131			RK73HB1J101J	CHIP R	100	J	1/16W	
C804			CC73HCH1H470J		17PF J	- 1	R132,133			RK73HB1J104J	CHIP R	100K	J	1/16W	
C805,806			CK73HB1H471K	CHIP C	170PF K	- 1	R135-137			RK73HB1J104J	CHIP R	100K	J	1/16W	
C808			CK73GB0J475K	CHIP C	1.7UF K	- 1	R138			RK73HB1J473J	CHIP R	47K	J	1/16W	
C809			CK73FB1A106K	CHIP C 1	OUF K	- 1	R139			RK73HB1J104J	CHIP R	100K	J	1/16W	
C812			CK73HB0J105K	CHIP C	.OUF K		R140			RK73HB1J000J	CHIP R	0.0	J	1/16W	
CN22			E23-1325-05	TERMINAL		- 1	R141-143			RK73HB1J104J	CHIP R	100K	J	1/16W	
CN23			E40-6758-05	PIN ASSY		- 1	R144			RK73HB1J471J	CHIP R	470	J	1/16W	
CN24			E23-1325-05	TERMINAL		- 1	R145-147			RK73HB1J104J	CHIP R	100K	J	1/16W	
CN403			E40-6813-05	PIN ASSY		- 1	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 CO	NINIECTOR		R150			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
CN405 CN710			E40-6757-05	PIN ASSY	ININECTON		R153,154			RK73HB1J102J	CHIP R	1.UK 100K		1/16W	
JN/ IU			L4U-U/3/-U3	LIIN WOOL									J		
~701			FF0 0000 0F	FLICE (0.05.4)			R155			RK73HB1J473J	CHIP R	47K	J	1/16W	
701			F53-0360-05	FUSE (0.25A)			R156,157			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
			100 0710 04	A DUFON/F OUF	FT		R158,159			RK73HB1J220J	CHIP R	22	J	1/16W	
CN401			J99-0719-04 J19-5386-05	ADHESIVE SHE HOLDER	LI		R160,161			RK73HB1J000J	CHIP R	0.0	J	1/16W	
			5.5 5000 00				R162			RK73HB1J474J	CHIP R	470K	J	1/16W	
_1,2			L92-0408-05	CHIP FERRITE			R163			RK73HH1J104D	CHIP R	100K	D	1/16W	
							R165				CHIP R				
.3			L92-0140-05	CHIP FERRITE		- 1				RK73HB1J102J		1.0K	J	1/16W	
.4-7			L92-0408-05	CHIP FERRITE		- 1	R166			RK73HB1J104J	CHIP R	100K	J	1/16W	
-8			L92-0140-05	CHIP FERRITE											
.101,102			L92-0408-05	CHIP FERRITE		- 1	R167			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
						- 1	R168			RK73HB1J000J	CHIP R	0.0	J	1/16W	
.401			L33-1496-05	SMALL FIXED I	NDUCTOR (22UH)	- 1	R170			RK73HH1J103D	CHIP R	10K	D	1/16W	
402			L92-0467-05	CHIP FERRITE		- 1	R171-173			RK73HB1J000J	CHIP R	0.0	J	1/16W	
403			L92-0466-05	CHIP FERRITE		- 1	R174-178			RK73HB1J104J	CHIP R	100K	J	1/16W	
409-411			L92-0467-05	CHIP FERRITE		- 1								.,	
L701			L92-0140-05	CHIP FERRITE		- 1	R180,181			RK73HB1J104J	CHIP R	100K	J	1/16W	
_, 0 ,			202 01 10 00	01111 1 21111112		- 1	R182			RK73HB1J474J	CHIP R	470K	J	1/16W	
L702			L92-0162-05	BEADS CORE		- 1	R183			RK73HB1J104J	CHIP R	100K	J	1/16W	
						- 1									
L704-706			L92-0162-05	BEADS CORE		- 1	R184			RK73HB1J473J	CHIP R	47K	J	1/16W	
708,709			L92-0162-05	BEADS CORE		- 1	R185			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
710-712			L92-0444-05	CHIP FERRITE		- 1									
.713			L92-0163-05	BEADS CORE		- 1	R186			RK73HB1J473J	CHIP R	47K	J	1/16W	
						- 1	R187			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
714-717			L92-0444-05	CHIP FERRITE		- 1	R188			RK73HB1J473J	CHIP R	47K	J	1/16W	
718			L92-0408-05	CHIP FERRITE		- 1	R189			RK73HB1J104J	CHIP R	100K	J	1/16W	
719			L33-1494-05	SMALL FIXED I	NDUCTOR (4.7UH)		R190			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
(101			L77-1802-05		NATOR (32768HZ)							•			
X102			L77-3015-05	TCX0 (18.432N			R191			RK73HB1J474J	CHIP R	470K	J	1/16W	
							R192			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R18			RK73HB1J822J	CHIP R 8.2	K J 1/16W		R193,194			RK73HB1J104J	CHIP R	100K	J	1/16W	
R19			RK73HB1J471J	CHIP R 47			R413			RK73HB1J471J	CHIP R	470	J	1/16W	
R27			RK73HB1J104J	CHIP R 10			R416			RK73HB1J471J	CHIP R	470	J	1/16W	
127 R28,29			RK73HB1J102J	CHIP R 1.0			11410			111X/3/10/104/10	01111 11	470	U	1/1044	
120,29 330			RK73HB1J101J	CHIP R 100	·		R419,420			RK73HB1J000J	CHIP R	0.0	J	1/16W	
100			טוטוטוטוטוטיאייו	J 10	5 0 1/1000		R424			RK73HH1J683D	CHIP R	68K	D	1/16W	
R31			RK73HB1J102J	CHIP R 1.0	K J 1/16W		R425			RK73HH1J333D	CHIP R	33K	D	1/16W	
32-35			RK73HB1J101J	CHIP R 100	·		R426-429			RK73HB1J000J	CHIP R	0.0	J	1/16W	
340			RK73HB1J000J	CHIP R 0.0			R431			RK73HB1J474J	CHIP R	470K	J	1/16W	
3101,102			RK73HB1J474J	CHIP R 470											
3103			RK73HB1J102J	CHIP R 1.0	K J 1/16W		R432,433			RK73HB1J000J	CHIP R	0.0	J	1/16W	
			DI/TOLIE:	OLUB 5			R434			RK73HB1J393J	CHIP R	39K	J	1/16W	
R105			RK73HB1J104J	CHIP R 100			R435,436			RK73HB1J104J	CHIP R	100K	J	1/16W	
R107			RK73HB1J104J	CHIP R 100	OK J 1/16W		R437			RK73HB1J471J	CHIP R	470	J	1/16W	
3110,111			RK73HB1J104J	CHIP R 100	OK J 1/16W		R438,439			RK73HB1J104J	CHIP R	100K	J	1/16W	
R113			RK73HB1J104J	CHIP R 100	OK J 1/16W		1								
₹115			RK73HB1J104J	CHIP R 100			R440			RK73HB1J000J	CHIP R	0.0	J	1/16W	
							R441			RK73HB1J153J	CHIP R	15K	J	1/16W	
R116			RK73HB1J473J	CHIP R 47I	< J 1/16W		R442			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
			RK73HB1J473J	CHIP R 47			R443			RK73HB1J474J	CHIP R	470K	J	1/16W	
1118			31.3101700	1				1	1						1
R118 R119			RK73HB1J104J	CHIP R 100	OK J 1/16W		R444			RK73HB1J564J	CHIP R	560K	J	1/16W	

# **PARTS LIST**

		Now	_	1	_			Desti-			Nour					L UNIT (X	Desti-
Ref. No.	Address	New parts	Parts No.		Descr	iptior	1	nation	Ref. No.	Address	New parts	Parts No.		Descr	iptior	1	nation
R445			RK73HB1J154J	CHIP R	150K	J	1/16W		R723			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
3446			RK73HB1J274J	CHIP R	270K	J	1/16W		R724			RK73HB1J104J	CHIP R	100K	J	1/16W	
447			RK73HB1J104J	CHIP R	100K	J	1/16W		R725			RK73HB1J100J	CHIP R	10	J	1/16W	
448			RK73HB1J103J	CHIP R	10K	J	1/16W		R726			RK73HB1J104J	CHIP R	100K	J	1/16W	
449-452			RK73HB1J474J	CHIP R	470K	J	1/16W		R727-729			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
1453			RK73HB1J104J	CHIP R	100K	J	1/16W		R730			RK73HB1J471J	CHIP R	470	J	1/16W	
1455			RK73HB1J474J	CHIP R	470K	J	1/16W		R731,732			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
																•	
1455			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R733			RK73HB1J473J	CHIP R	47K	J	1/16W	
1456			RK73HB1J474J	CHIP R	470K	J	1/16W		R735			RK73HB1J473J	CHIP R	47K	J	1/16W	
457,458			RK73HB1J104J	CHIP R	100K	J	1/16W		R736			RK73HB1J823J	CHIP R	82K	J	1/16W	
3459,460			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R737			RK73HB1J153J	CHIP R	15K	J	1/16W	
3461			RK73HB1J103J	CHIP R	10K	J	1/16W		R738			RK73HB1J563J	CHIP R	56K	J	1/16W	
3462			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	
1407 1468			RK73HB1J1000J	CHIP R	0.0	J	1/16W		R745			RK73HB1J682J	CHIP R	6.8K	J	1/16W	
									1								
3469			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	
3472			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	
3474,475			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	
									1								
1481			RK73HB1J474J	CHIP R	470K	J	1/16W		R755			RK73HB1J104J	CHIP R	100K	J	1/16W	
3483			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			RK73HH1J223D	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			RK73HH1J104D	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	
1500 1501			RK73HB1J222J	CHIP R	2.2K	J	1/16W		R769,770			RK73HB1J334J	CHIP R	330K	J	1/16W	
3502,503			RK73HB1J103J	CHIP R	10K	J	1/16W		R771			RK73HB1J153J	CHIP R	15K	J	1/16W	
1504			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R775			RK73HB1J183J	CHIP R	18K	J	1/16W	
1506			RK73HB1J222J	CHIP R	2.2K	J	1/16W		R777			RK73HB1J473J	CHIP R	47K	J	1/16W	
3507-511			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R778			RK73HB1J333J	CHIP R	33K	J	1/16W	
1512			RK73HB1J101J	CHIP R	100	J	1/16W		R779			RK73HB1J473J	CHIP R	47K	J	1/16W	
513-515			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R780			RK73HB1J104J	CHIP R	100K	J	1/16W	
1516			RK73HB1J101J	CHIP R	100	J	1/16W		R782			RK73HB1J104J	CHIP R	100K	J	1/16W	
517			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R783			RK73HB1J183J	CHIP R	18K	J	1/16W	
518			RK73HB1J101J	CHIP R	100	J	1/16W		R784			RK73HB1J104J	CHIP R	100K	J	1/16W	
1510			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R785			RK73HB1J682J	CHIP R	6.8K	J	1/16W	
1575-526			RK73HB1J101J	CHIP R	100	J	1/16W		R786			RK73HB1J000J	CHIP R	0.0	J	1/16W	
1523-551			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R787			RK73HB1J124J	CHIP R	120K	J	1/16W	
533-535			RK73HB1J101J	CHIP R	100	J	1/16W		R788			RK73HB1J473J	CHIP R	47K	J	1/16W	
E00 E40			DI/7011D4 1400 1	CLUD D	1.01/		1 /1 () () ()		D700			DV70UD4 1454 1	CLUD D	1501/		1/10\4/	
1536-540			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R789			RK73HB1J154J	CHIP R	150K	J	1/16W	
1541			RK73HB1J101J	CHIP R	100	J	1/16W		R790			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
3543			RK73HB1J101J	CHIP R	100	J	1/16W		R791			RK73HB1J474J	CHIP R	470K	J	1/16W	
544			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R793			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
3545			RK73HB1J101J	CHIP R	100	J	1/16W		R794			RK73HB1J104J	CHIP R	100K	J	1/16W	
1546,547			RK73HB1J102J	CHIP R	1.0K	J	1/16W		R795			RK73HB1J000J	CHIP R	0.0	J	1/16W	
548,549			RK73HB1J473J	CHIP R	47K	J	1/16W		R796			RK73HB1J333J	CHIP R	33K	J	1/16W	
550			RK73HB1J000J	CHIP R	0.0	J	1/16W		R797			RK73HB1J102J	CHIP R	1.0K	Ĵ	1/16W	
716			RK73GB2A000J	CHIP R	0.0	J	1/10W		R798			RK73HB1J104J	CHIP R	100K	J	1/16W	
			RK73HB1J104J	CHIP R	100K	J	1/16W		R799			RK73HB1J334J	CHIP R	330K	J	1/16W	
717-722						U	1/1000	1	117 00	1	1	1111/10110100000	I OLIII II	JJUIN	U		

## **PARTS LIST**

Ref. No.	Addrace	New	Parts No.		Descr	iption	1	Desti-	Ref. No.	Address	New	Parts No.	Description	Desti-
	71441000	parts		OLUB B		_		nation		71441000	parts			nation
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	Ĵ	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	RESISTO	R (VO	L)		IC717 Q4			XC9235A15CM1 SSM3K15TE(F)	MOS-IC FET	
S1	2B		S60-0437-05	ROTARY S	SWITCH (0	CH)			Q5			2SJ347F	FET	
									Q401,402			SSM6N16FE-F	FET	
D12-16			1SS416	DIODE					Q403			2SJ648-A	FET	
D17			EMZ6.8N	ZENER DI					Q404			SSM3K15TE(F)	FET	
D18,19			HZC6.8-E	ZENER DI					Q405			SSM6N16FE-F	FET	
D20,21			NNCD6.8G-A	ZENER DI	ODE				1					
D22,23			DA221	DIODE					Q406			2SB1132(Q,R)	TRANSISTOR	
									Q407			UMG3N	TRANSISTOR	
D102			1SS416	DIODE					Q408			EMD12	TRANSISTOR	
D404,405			1SS388F	DIODE					Q409			2SA1955A-F	TRANSISTOR	
D406			HRB0502A	DIODE					Q410			SSM3K15TE(F)	FET	

# **PARTS LIST**

CONTROL UNIT (X53-4432-76) TX-RX UNIT (X57-7830-11)

<b>Ref. No.</b>	Address	New	Davida Na			I	D 4: 1			MI					
0411		parts	Parts No.	L	Descriptio	n	Desti- nation	Ref. No.	Address	New parts	Parts No.		Descriptio	n	Desti- nation
			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	В	
Q414,415			EMD12	TRANSISTOR				C568			CC73HCH1H1R5B	CHIP C	1.5PF	В	
0701			2SA1832(GR)F	TRANSISTOR				C570			CC73HCH1HR75B	CHIP C	0.75PF	В	
Q702,703			SSM3K15TE(F)	FET				C571			CC73HCH1H030B	CHIP C	3.0PF	В	
Q704			2SC4617(S)	TRANSISTOR				C572			CK73FB0J106K	CHIP C	10UF	K	
0705			2SC4738(GR)F	TRANSISTOR				C573			CC73HCH1H060B	CHIP C	6.0PF	В	
0706			2SA1832(GR)F	TRANSISTOR				C574			CC73HCH1H020B	CHIP C	2.0PF	В	
Ω707			2SJ243-A	FET				C575			CC73HCH1H060B	CHIP C	6.0PF	В	
TH701			ERTJ0EV104H	THERMISTOR				C576			CC73HCH1H050B	CHIP C	5.0PF	В	
			2111002710111					C577			CK73HB1H471K	CHIP C	470PF	K	
								C578			CK73GB0J475K	CHIP C	4.7UF	K	
								C578			CC73HCH1H050B	CHIP C	5.0PF	В	
								C579 C580			CK73HB1H471K	CHIP C	470PF	K	
			TX-RX UNIT	(X57-78	30-11)			C581			CC73HCH1H0R5B	CHIP C	0.5PF	В	
			. A HA OIVII	1727-70	JU-11)			C582			CK73HB1H471K	CHIP C	470PF	K	
D900			D20 2270 DE	LED (DED A/F)	10///	T		C582 C583			CC73HCH1H0R5B	CHIP C	0.5PF	В	
טטטע			B30-2278-05	LED (RED/YEL	LUVV)										
0505			01/70115	01115.0	0.4			C584,585			CK73HB1H471K	CHIP C	470PF	K	
C500			CK73HB1A104K	CHIP C	0.10UF	K		C586			CC73HCH1H100B	CHIP C	10PF	В	
C501			CC73HCH1H101J	CHIP C	100PF	J		1							
C502			CK73HB1H471K	CHIP C	470PF	K		C587			CK73HB1H471K	CHIP C	470PF	K	
C503			CK73HB1A104K	CHIP C	0.10UF	K		C588			CC73HCH1H100B	CHIP C	10PF	В	
C504			CK73HB1C103K	CHIP C		K		C600			CK73HB1A104K	CHIP C	0.10UF	K	
0001			OKTONETOTOOK	011111	0.01001	"		C601			CC73HCH1H101J	CHIP C	100PF	J	
CEOE			0070110111111011	CHIP C	10000			C602			CK73HB1A104K			K	
C505			CC73HCH1H101J		100PF	J		C602			CK/3HBTATU4K	CHIP C	0.10UF	K	
C506			CC73HCH1H100C	CHIP C	10PF	C									
C508			CK73HB1C103K	CHIP C	0.010UF	K		C603			CC73HCH1H100B	CHIP C	10PF	В	
C509			CC73HCH1H100C	CHIP C	10PF	C		C604,605			CK73HB1H471K	CHIP C	470PF	K	
C511			CK73FB0J106K	CHIP C	10UF	K		C607			CC73HCH1H070B	CHIP C	7.0PF	В	
								C609			CC73GCH1H010B	CHIP C	1.0PF	В	
C512			CK73HB1C103K	CHIP C	0.010UF	K		C610-612			CK73HB1H471K	CHIP C	470PF	K	
C513			CC73HCH1H101J	CHIP C	100PF	j		0010 012			OK75HBHH7HK	Orini O	47011	K	
				CHIP C				C613			CC7011C1111040D	CHIP C	4 ODE	В	
C514,515			CK73HB1C103K			K					CC73HCH1H040B		4.0PF		
C517-519			CC73HCH1H101J	CHIP C	100PF	J		C614,615			CK73HB1H471K	CHIP C	470PF	K	
C520			CK73GB1E105K	CHIP C	1.0UF	K		C617,618			CK73HB1H471K	CHIP C	470PF	K	
								C619			CK73HB1A104K	CHIP C	0.10UF	K	
C521			CC73HCH1H101J	CHIP C	100PF	J		C621			CC73HCH1H040B	CHIP C	4.0PF	В	
C522			CK73HB1A104K	CHIP C	0.10UF	K									
C523,524			CC73HCH1H101J	CHIP C	100PF	J		C622			CK73HB1H471K	CHIP C	470PF	K	
C525			CC73HCH1H470J	CHIP C	47PF	Ĵ		C623			CC73HCH1H120J	CHIP C	12PF	J	
					0.10UF	K		C625				CHIP C		K	
C526			CK73HB1A104K	CHIP C	U. IUUF						CK73HB1H471K		470PF		
0505 5			007011011111	01115.0	40555	. I		C626			CK73HB1A104K	CHIP C	0.10UF	K	
C527,528			CC73HCH1H101J	CHIP C	100PF	J		C627			CC73HCH1H080B	CHIP C	8.0PF	В	
C533			CK73HB1H471K	CHIP C	470PF	K		1							
C534			CC73HCH1H101J	CHIP C	100PF	J		C628			CC73HCH1H100C	CHIP C	10PF	С	
C535			CS77AA1VR15M	CHIP TNTL	0.15UF	35WV		C629			CK73HB1H471K	CHIP C	470PF	K	
C536			CC73HCH1H470J	CHIP C	47PF	J		C630			CK73GB1E105K	CHIP C	1.0UF	K	
2000			23.3311111700	J 0		·		C631			CS77AA1A6R8M	CHIP TNTL	6.8UF	10WV	
C539			CS77BA1D100M	CHIP TNTL	10UF	20WV		C632			CK73HB1H471K	CHIP C	470PF	K	
				CHIP TNTL				UU32			UN/31101114/1N	OF ITE	4/UFF	ľ	
C541			C92-0863-05		0.047UF	35WV		000:			OV.ZOLIDAL:	OLUB C	47075		
C542			C93-0787-05	CERAMIC	0.1UF	50WV		C634-637			CK73HB1H471K	CHIP C	470PF	K	
C543			CC73HCH1H040B	CHIP C	4.0PF	В		C639			CC73HCH1H330J	CHIP C	33PF	J	
C545			CK73HB1H471K	CHIP C	470PF	K		C640			CC73HCH1H470J	CHIP C	47PF	J	
								C641			CC73HCH1H100C	CHIP C	10PF	C	
C546			CK73HB1H472K	CHIP C	4700PF	K		C642,643			CC73HCH1H151J	CHIP C	150PF	J	
C547			CK73HB1H471K	CHIP C	470PF	K									
C548			CC73HCH1H101J	CHIP C	100PF	J		C645			CK73GB1C104K	CHIP C	0.10UF	K	
			CC73HCH1H050B	CHIP C		В		C646			CK73GB1E105K	CHIP C	1.0UF	K	
C550					5.0PF										
C553			CC73HCH1H100B	CHIP C	10PF	В		C648,649			CK73HB1C103K	CHIP C	0.010UF	K	
								C651			CK73HB1H471K	CHIP C	470PF	K	
C554			CC73HCH1H470J	CHIP C	47PF	J		C653			CK73HB1H471K	CHIP C	470PF	K	
C555			CK73HB0J105K	CHIP C	1.0UF	K									
C556,557			CK73HB1H471K	CHIP C	470PF	K		C660			CC73GCH1H101J	CHIP C	100PF	J	
C561			CK73HB1C103K	CHIP C	0.010UF	K		C661			CK73HB1H471K	CHIP C	470PF	K	
C562															
I hh/			CK73HB0J105K	CHIP C	1.0UF	K		C662			CC73GCH1H040B	CHIP C	4.0PF	В	
0302				1				C663	1		CC73GCH1H101J	CHIP C	100PF	J	1
C563			CC73HCH1H101J	CHIP C	100PF	J		C664			CC73GCH1H2R5B	CHIP C	2.5PF	В	

# **PARTS LIST**

#### TX-RX UNIT (X57-7830-11)

174 1154 014	IIT (X57		00-11)							1	I				
Ref. No.	Address	New parts	Parts No.	D	escription	1	Desti- nation	Ref. No.	Address	New parts	Parts No.		Description	on	Desti- nation
C665			CC73GCH1H030B	CHIP C	3.0PF	В		C764			CC73HCH1H1R5B	CHIP C	1.5PF	В	
C666			CC73GCH1H080B	CHIP C	8.0PF	В		C765			CK73HB1H471K	CHIP C	470PF	K	
C667			CC73GCH1H2R5B	CHIP C	2.5PF	В		C766			CK73GB1H104K	CHIP C	0.10UF	K	
C668			CC73GCH1H100C	CHIP C	10PF	C		C767			CC73HCH1H120G	CHIP C	12PF	G	
C669			CC73GCH1H1R5B		1.5PF	В		C768			CC73HCH1H010B	CHIP C	1.0PF	В	
C009			CC/3dCHIHIN3D	CHIF C	1.3FF	D		6700			GG/3HGHTHUTUB	CHIFC	1.0FF	D	
C670			CK73HB1H471K	CHIP C	470PF	K		C769			CK73HB1H471K	CHIP C	470PF	K	
C671			CC73HCH1H100B	CHIP C	10PF	В		C770			CC73HCH1H030B	CHIP C	3.0PF	В	
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		0.22UF	K		C773			CC73HCH1H1R5B	CHIP C	1.5PF	В	
						_									
C700			CC73HCH1H070B		7.0PF	В		C774			CC73HCH1H020B	CHIP C	2.0PF	В	
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	В		C779			CK73HB1C103K	CHIP C	0.010UF	K	
			01/												
C705			CK73FB1E475K	CHIP C	4.7UF	K		C780			CK73GB1H104K	CHIP C	0.10UF	K	
C706			CC73HCH1H100B	CHIP C	10PF	В		C782			CC73HCH1H0R5B	CHIP C	0.5PF	В	
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			CV79UP1U471V	CHIP C	470PF	K	
						-					CK73HB1H471K				
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	
C710			CK73FB1A106K	CHIP C	10UF	K		C798			CC73HCH1H030B	CHIP C	3.0PF	В	
								1							
C720			CC73HCH1H100B	CHIP C	10PF	В		C799			CK73HB1H471K	CHIP C	470PF	K	
C721			CK73HB1A104K	CHIP C	0.10UF	K		C800			CC73HCH1H1R5B	CHIP C	1.5PF	В	
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	В	
C725			CK73HB1C103K	CHIP C	0.010UF	K		C804			CC73HCH1H110G	CHIP C	11PF	G	
C727,728			CK73HB1A104K		0.10UF	K		C807			CC73HCH1H030B	CHIP C	3.0PF	В	
								1						-	
C729			CK73FB1E474K	CHIP C	0.47UF	K		C810			CC73HCH1H040B	CHIP C	4.0PF	В	
C730			CK73HB1C103K	CHIP C	0.010UF	K		C811			CC73HCH1H070B	CHIP C	7.0PF	В	
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		K		C900			CK73GB1H102K	CHIP C	1000PF	K	
C737			CC73HCH1H020B	CHIP C	2.0PF	В		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	В		C904-908			CC73HCH1H470J	CHIP C	47PF	J	
C740,741			CK73HB1C103K		0.010UF	K		C910			CC73HCH1H470J	CHIP C	47PF	J	
C742			CK73FB1A475K		4.7UF	K		C912-920			CC73HCH1H470J	CHIP C	47PF	J	
C743			CK73HB1C103K			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	В		C944			CK73HB1H471K	CHIP C	470PF	K	
C747			CC73HCH1H100B	CHIP C	10PF	В		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	В		C948,949			CK73GB1E105K	CHIP C	1.0UF	K	
C750			CV73UP1C103V	CHIP C	0.01011	K		C950			C02 0765 05	CHIP TNTL	/ 7HF	16WV	
			CK73HB1C103K		0.010UF						C92-0765-05		4.7UF		
C751			CC73HCH1H090B	CHIP C	9.0PF	В		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	В		C953			CK73HB1A104K	CHIP C	0.10UF	K	
C754			CC73HCH1H090B	CHIP C	9.0PF	В		C954			CK73GB1C224K	CHIP C	0.22UF	K	
C755			CC73HCH1H050B	CHIP C	5.0PF	В		C955,956			CK73HB1H102K	CHIP C	1000PF	K	
C756			CK73HB1H471K	CHIP C	470PF	K		C957,958			CK73GB1E105K	CHIP C	1.0UF	K	
U/ JU															
C7E0	1	I	CK73HB1H471K	CHIP C	470PF	K		C961			CK73HB1H471K	CHIP C	470PF	K	
C758						K	- 1	C962	1	1	CC73HCH1E181J	LITHIP I.	180PF		1
C758 C759,760 C761			CK73HB1A104K CK73GB1E105K		0.10UF 1.0UF	K		C963			CK73GB1E105K	CHIP C	1.0UF	J K	

# **PARTS LIST**

		Name I Day				TX-RX UNIT (X57-						
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	TCX0 (19.2M)		
C988 C989			C93-0945-05 C93-0939-05	CERAMIC CAP CERAMIC CAP		XF700			L71-0640-05	MCF (58.05MHZ)		
						R430			RK73GB2A000J	CHIP R 0.0 J 1/10W		
CN600			E23-1326-05	TERMINAL		R431,432		1	RK73HB1J000J	CHIP R 0.0 J 1/16W		
CN601			E23-1167-05	TERMINAL		R500,501		1	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		
						R511-514			RK73HB1J100J	CHIP R 10 J 1/16W		
F900			F53-0324-15	FUSE (2.5A)		R515			RK73HB1J472J	CHIP R 4.7K J 1/16W		
0====						R519			RK73HB1J100J	CHIP R 10 J 1/16W		
CF700			L72-1017-05	CERAMIC FILTER (450KHZ)		DEGO			DI/7011D4 1400 1	OLUB B. A OK. J. A MOM.		
CF701			L72-1020-05	CERAMIC FILTER (450KHZ)		R520			RK73HB1J102J	CHIP R 1.0K J 1/16W		
L500 L503			L41-4795-39	SMALL FIXED INDUCTOR (4.7UF)		R522 R523			RK73HB1J100J RK73HB1J102J	CHIP R 10 J 1/16W CHIP R 1.0K J 1/16W		
L503 L504			L92-0163-05 L40-1275-92	BEADS CORE SMALL FIXED INDUCTOR (12NH)		R527			RK73HB1J102J	CHIP R 1.0K J 1/16W CHIP R 0.0 J 1/16W		
L304			140-1275-92	SIVIALL FIXED INDUCTOR (12INFI)		R529			RK73HB1J102J	CHIP R 1.0K J 1/16W		
L508,509			L40-2285-92	SMALL FIXED INDUCTOR (220NH)								
L514-519			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R530			RK73HB1J473J	CHIP R 47K J 1/16W		
L520			L40-2278-67	SMALL FIXED INDUCTOR (22NH)		R531			RK73HB1J683J	CHIP R 68K J 1/16W		
L521			L40-2778-67	SMALL FIXED INDUCTOR (27NH)		R532			RK73HB1J000J	CHIP R 0.0 J 1/16W		
L522			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R533			RK73HH1J224D	CHIP R 220K D 1/16W		
L523			L92-0446-05	BEADS CORE		R534			RK73HH1J473D	CHIP R 47K D 1/16W		
L524-526			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R535			RK73HB1J151J	CHIP R 150 J 1/16W		
L527			L92-0446-05	BEADS CORE		R536			RK73HB1J000J	CHIP R 0.0 J 1/16W		
L528			L40-3375-71	SMALL FIXED INDUCTOR (33NH)		R537			RK73HB1J102J	CHIP R 1.0K J 1/16W		
L530			L40-5675-57	SMALL FIXED INDUCTOR (56.0N)		R538			RK73HH1J391D	CHIP R 390 D 1/16W		
1 500 500			102 0162 05	DEADS CODE		R539			RK73HB1J106J	CHIP R 10M J 1/16W		
L598,599 L600			L92-0163-05 L40-2275-92	BEADS CORE   SMALL FIXED INDUCTOR (22NH)		R541			RK73HB1J103J	CHIP R 10K J 1/16W		
L602			L40-2775-92	SMALL FIXED INDUCTOR (27NH)		R546			RK73HB1J104J	CHIP R 100K J 1/16W		
L603			L40-1875-92	SMALL FIXED INDUCTOR (18NH)		R547		1	RK73HB1J000J	CHIP R 0.0 J 1/16W		
L604			L92-0138-05	CHIP FERRITE		R548			RK73HB1J104J	CHIP R 100K J 1/16W		
LENE			140 1275 02	CMALL EIVED INIDIJOTOD (12MI)		R550			RK73HB1J000J	CHIP R 0.0 J 1/16W		
L605 L606			L40-1275-92 L41-1875-43	SMALL FIXED INDUCTOR (12NH) SMALL FIXED INDUCTOR (18NH)		R552		1	RK73HB1J104J	CHIP R 100K J 1/16W		
L606			L92-0149-05	CHIP FERRITE		R554,555			RK73HB1J473J	CHIP R 47K J 1/16W		
L607			L34-4575-05	AIR-CORE COIL		R557			RK73HB1J152J	CHIP R 1.5K J 1/16W		
L610			L92-0149-05	CHIP FERRITE		R558			RK73HB1J474J	CHIP R 470K J 1/16W		
- <del>-</del>						R559			RK73HH1J221D	CHIP R 220 D 1/16W		
L611			L41-2285-43	SMALL FIXED INDUCTOR (220NH)		DEGG			DIVZOLIDA 1000 I	OLUB D. OO I A (40)		
L612-614			L34-4564-05	AIR-CORE COIL		R560			RK73HB1J220J	CHIP R 22 J 1/16W		
L615			L40-2275-57	SMALL FIXED INDUCTOR (22.0N)		R561		1	RK73HH1J221D	CHIP R 220 D 1/16W		
L701 L703			L40-5681-86 L41-4778-45	SMALL FIXED INDUCTOR (0.56UH)		R562 R563			RK73HB1J102J	CHIP R 1.0K J 1/16W CHIP R 47K J 1/16W		
L/US			L41-4//0-40	SMALL FIXED INDUCTOR (47NH)		R564			RK73HB1J473J RK73HB1J154J	CHIP R 47K J 1/16W CHIP R 150K J 1/16W		
L704			L40-1891-86	SMALL FIXED INDUCTOR (1.8U)								
L705,706			L92-0138-05	CHIP FERRITE		R565		1	RK73HB1J101J	CHIP R 100 J 1/16W		
L707			L41-2785-39	SMALL FIXED INDUCTOR (0.27U)		R566			RK73HH1J474D	CHIP R 470K D 1/16W		
L708			L41-5685-39	SMALL FIXED INDUCTOR (0.56U)		R567			RK73HB1J472J	CHIP R 4.7K J 1/16W		
L709,710			L40-1575-92	SMALL FIXED INDUCTOR (15NH)		R570,571			RK73HB1J000J	CHIP R 0.0 J 1/16W		
L711			L40-3375-92	SMALL FIXED INDUCTOR (33NH)		R572			RK73HB1J100J	CHIP R 10 J 1/16W		
-/ 11			210 0070 02	5 (EE 1 // ED 11 (001 (11 (001 (11)		1						

# **PARTS LIST**

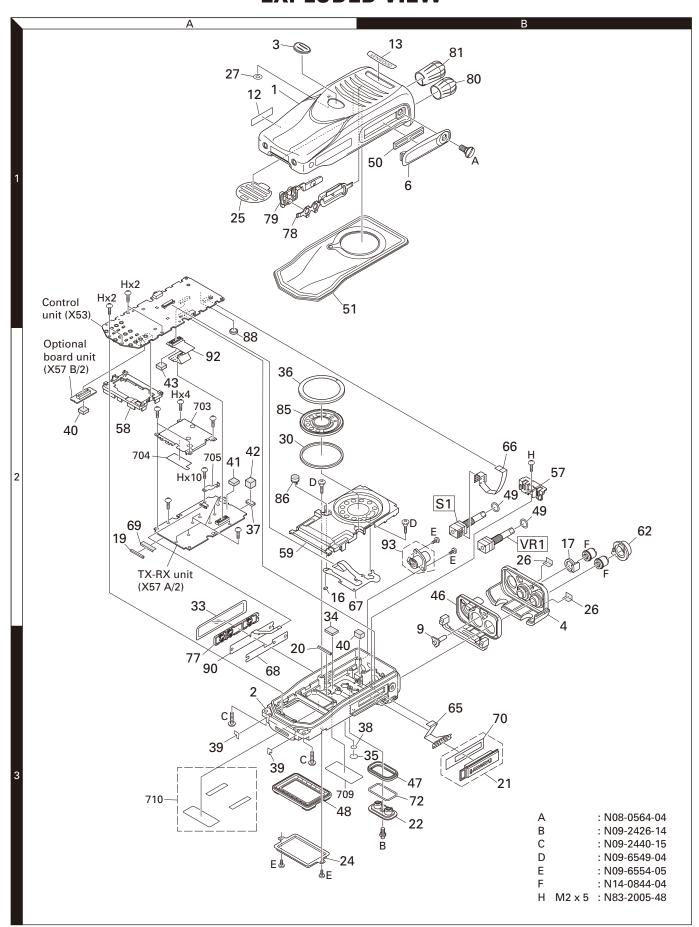
#### TX-RX UNIT (X57-7830-11)

TX-RX UN	III (X57		(0-11)							1	1	T					
Ref. No.	Address	New parts	Parts No.		Descri	ption		Desti- nation	Ref. No.	Address	New parts	Parts No.		Descr	iption	1	Desti- nation
R573		F #1.40	RK73HB1J124J	CHIP R	120K	J	1/16W		R671		F=140	RK73GB2A000J	CHIP R	0.0	J	1/10W	
				CHIP R													
R574-576			RK73HB1J000J		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	
DEOC			DI/701 ID4 1000 I	CLUID D	0.0		1 /1 0\A/		DZOE			DI/701 ID4 1000 I	CLUD D	0.0		1 /1 () () ()	
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	
D007			DIVERSIDA IOOO I	OLUD D	0.01/		4 /4 (0) 4 /		P704			DICTOLIDA IAOA I	OLUB B	1001/		4 (4 0) 4 (	
R607			RK73HB1J222J	CHIP R	2.2K	J	1/16W		R724		1	RK73HB1J104J	CHIP R	100K	J	1/16W	
R608			RK73HB1J470J	CHIP R	47	J	1/16W		R725		1	RK73HB1J223J	CHIP R	22K	J	1/16W	
R610			RK73HB1J472J	CHIP R	4.7K	J	1/16W	<b> </b>	R726		1	RK73HB1J183J	CHIP R	18K	J	1/16W	
R612			RK73HB1J472J	CHIP R	4.7K	J	1/16W		R727		1	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	
DC1C			DV70UD4 1404 1	CLIID D	100	1	1/10\\		D720			RK73HB1J000J	CLUD D	0.0		1 /10\\	
R616			RK73HB1J181J	CHIP R	180	J	1/16W		R730		1		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	
Dean			DV701ID1 I101 I	CHIP R	100		1 /1 () () ()		R748			DV70UD1 1104 I	CHIP R	1001/		1 /1 C\A/	
R633			RK73HB1J101J		100	J	1/16W					RK73HB1J104J		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	101/	J	1/16W		R757			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R642			RK73EB2ER39K	CHIP R	10K	K	1/16VV 1/4W		R758		1	RK73HB1J103J	CHIP R	1.01VI 10K	J	1/16W	
					0.39						1						
R644			RK73HB1J220J	CHIP R	22	J	1/16W		R759,760		1	RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R645			RK73EB2ER39K	CHIP R	0.39	K	1/4W		R761		1	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	1/4VV 1/16W		R764			RK73HB1J104J	CHIP R	100K	J	1/16W	
R650			RK73GB2A000J	CHIP R	0.0	J	1/10W		R765		1	RK73HB1J000J	CHIP R	0.0	J	1/16W	
											1						
R651-654 R655			RK73HH1J274D RK73HB1J103J	CHIP R CHIP R	270K 10K	D J	1/16W 1/16W		R768 R769			RK73HB1J000J RK73HB1J103J	CHIP R CHIP R	0.0 10K	J J	1/16W 1/16W	
11000			1117 0110 10 1000	01111 11	IUN	U	1/ TOVV		11700			11107 01 10 10 10 10 10 10 10 10 10 10 10 10	01111	IUI	U	1/1000	
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	I	R772		1	RK73HB1J000J	CHIP R	0.0	J	1/16W	
R659			RK73HB1J474J	CHIP R	470K	J	1/16W	I	R773		1	RK73HB1J824J	CHIP R	820K	J	1/16W	
R660			RK73HB1J473J	CHIP R	47K	Ĵ	1/16W		R774,775			RK73HB1J104J	CHIP R	100K	Ĵ	1/16W	
Dog:			DI/TOUR :	01								BIGGOTIE	01				
R661			RK73HB1J104J	CHIP R	100K	J	1/16W		R777		1	RK73HB1J103J	CHIP R	10K	J	1/16W	
R664			RK73HB1J000J	CHIP R	0.0	J	1/16W		R778		1	RK73HB1J104J	CHIP R	100K	J	1/16W	
R665,666			RK73HB1J271J	CHIP R	270	J	1/16W		R779		1	RK73HB1J683J	CHIP R	68K	J	1/16W	
R667			RK73EB2E823J	CHIP R	82K	J	1/4W		R780		1	RK73HB1J000J	CHIP R	0.0	J	1/16W	
R670			RK73HB1J224J	CHIP R	220K	J	1/16W		R781		1	RK73HB1J182J	CHIP R	1.8K	J	1/16W	
											1						

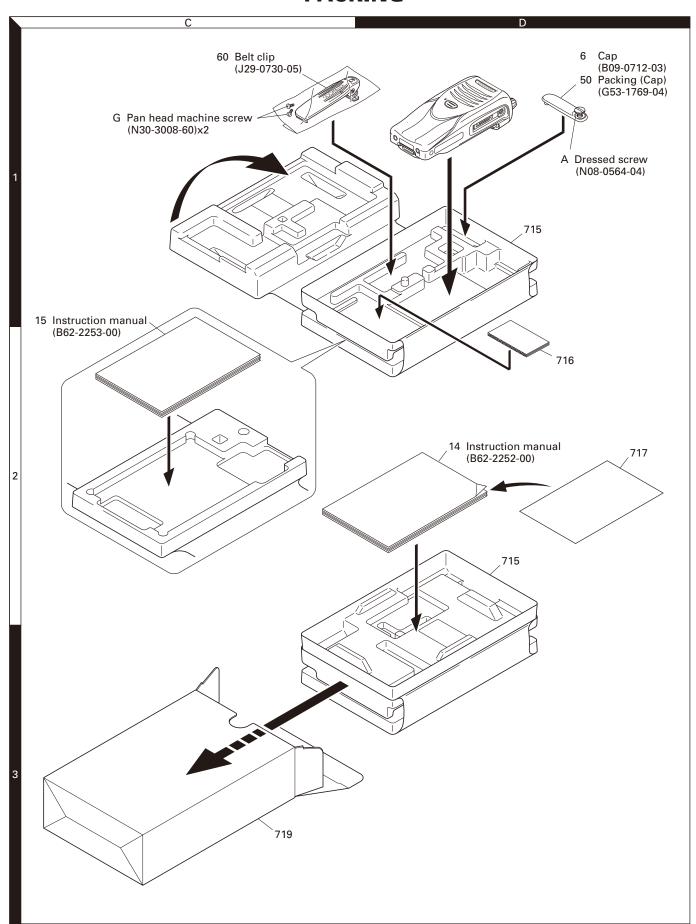
# **PARTS LIST**

													TX-RX UNIT (X	57-7830-11)
Ref. No.	Address	New parts	Parts No.		Descr	iption	ı	Desti- nation	Ref. No.	Address	New parts	Parts No.	Description	Desti- nation
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		IC503			TC75W51FUF	MOS-IC	
R905			RK73HB1J330J	CHIP R	33	J	1/16W		IC600			TA75W01FUF	MOS-IC	
DODE			DV79UD4 1474 1	CLIID D	//OF	,	1/10\\		10700			MCDC021 F/OT	MOC 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		Ω503			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		Ω510			SSM6L05FU-F	FET	
R925			RK73HH1J334D	CHIP R	330K	D	1/16W		Ω511			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	Ĵ	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	
						-			0704			2SC5383-T111	TRANSISTOR	
S1			S70-0483-05	TACT SW	IIUH				Q705 Q706			3SK318 2SK1830F	FET FET	
D501			HSC119	DIODE					Q900			UMG9N	TRANSISTOR	
D505			DA221	DIODE										
D506,507			1SV325F	VARIABLE	CAPACIT	ANCE	DIODE		Q901-903			SSM6L05FU-F	FET	
D510			1SV290B-F	VARIABLE	CAPACIT	ANCE	DIODE		Q904			SSM5H01TU-F	FET	
D511			1SV282-F	VARIABLE	CAPACIT	ANCE	DIODE		Q905 TH600			2SA1955A-F	TRANSISTOR	
D514,515			1SV290B-F	VARIABLE	СДРДСІТ	ANCE	DIODE		ILIOUN			ERTJ0EV104H	THERMISTOR	
D514,513			1SV282-F	VARIABLE										
D510,517			HSC119	DIODE	- 5, 11 AUI I	. 1140L	SIODL							
D510 D519			1SV278F	VARIABLE	СДРДСІТ	ANCE	DIODE		1					
D600,601			HSC277	DIODE	- 5/ 11 /1011	. 1140L	SIODE							
			LI7112 A L I	JENIED DI	ODE									
D604			HZU2ALL	ZENER DI	UDE									

## **EXPLODED VIEW**



## **PACKING**



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

#### 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

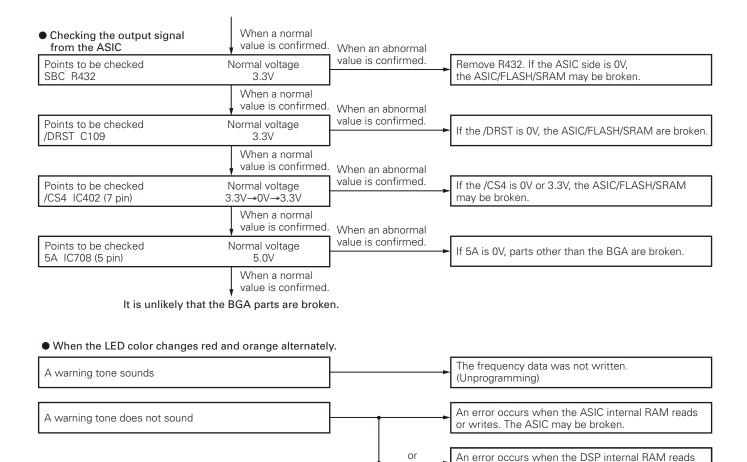
ASIC (IC108), DSP (IC102), FLASH (IC101), SRAM (IC103)

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 Checking for an abnormal point When an abnormal value is confirmed. Points to be checked Normal voltage 33M has an abnormal voltage. 33M IC404 (3 pin) 3.3V [ASIC] 15M IC717 (4 pin) 1.5V Remove L714 to check the voltage of the 33M. 33A IC406 (5 pin) 3.3V If the voltage becomes normal, the ASIC is broken. 31BU IC416 (3 pin) 3.1V Remove L712 to check the voltage of the 33M. Power supply of each device is connected through the coil. If the voltage becomes normal, the DSP is broken. [FLASH] 33M: L714, 15M: L715, 33A: L716 Remove L717 to check the voltage of the 33M. [DSP] If the voltage becomes normal, the FLASH is broken. 33M: L712, 15M: L711 15M has an abnormal voltage. [FLASH] 33M: L717 [SRAM] Remove L715 to check the voltage of the 15M. 31BU: L710 If the voltage becomes normal, the ASIC is broken. [DSP] When a normal Remove L711 to check the voltage of the 15M. Checking the clock value is confirmed. If the voltage becomes normal, the DSP is broken. Checking the clock 33A has an abnormal voltage. When an abnormal Normal voltage (3.3V) value is confirmed. [ASIC] Points to be checked Remove L716 to check the voltage of the 33A. 18.432MHz ASIC side R158 18.432MHz If the voltage becomes normal, the ASIC is broken. ASIC & DSP side R159 18.432MHz 32.768kHz IC106 (1 pin) 32.768kHz 31BU has an abnormal voltage. When a normal [SRAM] Checking the Reset/Control signal value is confirmed Remove L710 to check the voltage of the 31BU. If the voltage becomes normal, the SRAM is broken. Checking the control signal input to the ASIC When an abnormal value is confirmed. If the voltage is not corrected, there is a problem Points to be checked Normal voltage other than the BGA parts. RESET IC105 (4 pin) 3.3V 3.3V /BINT Q401 (6 pin) /PSW Q402 (3 pin) 3 31/ The BGA parts are not broken. When a normal value is confirmed When an abnormal Checking the control signal output from the ASIC If the /FRST is always 0V, the ASIC is broken. value is confirmed. Normal voltage Points to be checked If the /FRST repeats 3.3V and 0V at intervals, /FRST C110 3.3V The ASIC, FLASH and SRAM may be broken. When a normal value is confirmed.



or writes. The DSP may be broken.

An error occurs when the SRAM internal RAM reads or writes. The SRAM may be broken.

#### **■** Descriptions of signal names

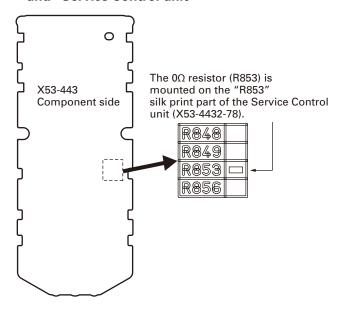
1)	RST(RESET)	: ASIC reset signal	LOW → Reset
2)	/BINT	: Battery final voltage monitoring	LOW → Final voltage
3)	/PSW	: Power switch signal	$LOW \rightarrow ON$
4)	/FRST	: FLASH reset signal	LOW → Reset
5)	SBC	: Switch B control	$HIGH \rightarrow ON$
6)	/DRST	: DSP reset signal	LOW → Reset
7)	/CS4	: LCD controller chip select signal	LOW → Active
8)	5A	: Analog peripheral control 5.0V pov	ver supply

#### **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  $0\Omega$  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"

Itana (Ingludina Part Number)	Quantity
Item (Including Part Number)	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:

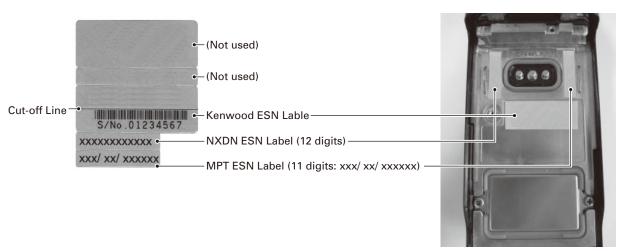
Data Type	Description
Firmware	NX-200S/300S Firmware.
FPU Data (PC programming mode)	X53-443 (NX-300S) E type data.
Various Adjustment Data (PC Test mode)	General adjustment values for the X53-443 (NX-300S).
Kenwood ESN	Model Name: [X53-443] NX-300SS Type: E The same number as the Kenwood ESN label is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

#### ■ After Changing the PCB

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

#### Note:

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



**Note:** A UPC code and UPC barcode is not printed on the Kenwood ESN Label. If necessary, cut the label at the cutoff 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

СН	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  $8\Omega$  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 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.
Clockwise Volume	Both "Counterclockwise Volume" and "Clockwise Volume" must be adjusted. (The curve data of volume is applied.)
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.
High RSSI	(The curve data of RSSI level is applied.)
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	
	,		1	Adjustment rang	je		Number	
1	Counterclockwise Volume			1 point ADJ			Common	
1	Counterclockwise volume			1~256			Section 2	
2	Clockwise Volume			1 point ADJ			Common	
	Ciockwise voluitie			1~256			Section 3	
3	Receive Assist			5 point ADJ			Common	
	Hoodive Assist			1~4096			Section 4	
4	Transmit Assist			5 point ADJ			Common	
	Transmit / Osist		_	1~4096	1		Section 4	
5	High Transmit Power	-	-	5	-	-	Transmitter	
	riigir iranoriici ovvoi		_	1~1024	ı		Section 1	
6	Low Transmit Power	-	-	5	-	-	Transmitter	
	LOW HUNGHILL OWO			1~1024			Section 2	
7	Balance	-	-	5	-	-	Transmitter	
,	Balanco			1~256			Section 3	
8	Maximum Deviation (NXDN)	-	-	-	5	5	Transmitte	
	WidAIITIdiTI Deviation (WADIV)			1~1024			Section 4	
9	Maximum Deviation (Analog)	5	5	5	-	-	Transmitte	
	Maximum Deviation (Analog)			1~1024			Section 5	
10	QT Deviation	1	1	1	-	-	Transmitte	
10	Q1 Deviation	1~1024						
11	DQT Deviation	1	1	1	-	-	Transmitte	
	DQ1 Deviation			1~1024			Section 7	
12	LTR Deviation	1	-	1	-	-	Transmitte	
12	EITT Deviation			1~1024			Section 8	
13	DTMF Deviation	1	1	1	-	-	Transmitte	
13	DTIVII Deviation			1~1024			Section 9	
14	Single Tone Deviation	1	1	1	-	-	Transmitte	
	Single Tone Deviation			1~1024			Section 10	
15	MSK Deviation	1	1	1	-	-	Transmitter	
13	IVISIX Deviation			1~1024			Section 11	
16	CWID Deviation	-	-	-	-	1	Transmitter	
10	CVVID Deviation			1~1024			Section 12	
17	VOX1			1 point ADJ			Transmitte	
17	VOXI			1~256			Section 13	
18	VOX10			1 point ADJ			Transmitte	
10	VOXIO	1~256						
19	Sensitivity 1	-	-	5	-	-	Receiver	
19	Sensitivity I			1~256			Section 2	
20	Sonoitivity 2	-	-	5	-	-	Receiver	
20	Sensitivity 2			1~256			Section 3	
21	DCCI Deference	5	5	5	- *1	5	Receiver	
21	RSSI Reference			1~256			Section 4	

Order	Order Adjusutment item		Analog Wide 4k	Analog Narrow	NXDN Narrow	NXDN Very Narrow	Adjust item					
			Adjustment range									
22	Onen Caueleh	5	5	5	- *1	5	Receiver					
22	Open Squelch			1~256			Section 5					
22	L DCCI	5	5	5	- *1	5	Receiver					
23	Low RSSI		1~256									
0.4	Hi DCCI	5	5	5	- *1	5	Receiver					
24	High RSSI			1~256			Section 7					
25	Tight Cauglah	5	5	5	-	-	Receiver					
25	Tight Squelch		1~256									
26	Datter Marning Lavel			1 point ADJ			Transmitter					
20	Battery Warning Level			1~256			Section 15					

<sup>\*1:</sup> Because NXDN Narrow is adjusted by adjusting Analog Narrow, it is not necessary to adjust NXDN Narrow.

#### **Test Equipment Required for Alignment**

Test Equipment		Major Specifications
Standard Signal Generator (SSG)	Frequency Range Modulation Output When performing the Frequ • 0.001ppm Use a standard oscillator for	400 to 520MHz Frequency modulation and external modulation –127dBm/0.1μV to greater than –20dBm/22.4mV ency adjustment, the following accuracy is necessary.  adjustments, if necessary.
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.)

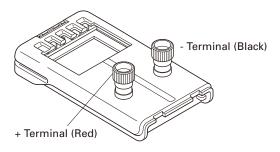
#### ■ Nut wrench

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)

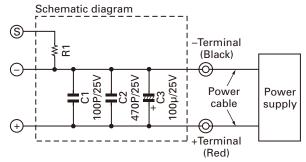
Connect the power cable properly between the battery jig installed in the transceiver and the power supply, and be sure output voltage and the power supply polarity prior to switching the power supply ON, otherwise over voltage and reverse connection may damage the transceiver, or the power supply or 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=560k $\Omega$ 



#### ■ Universal connector

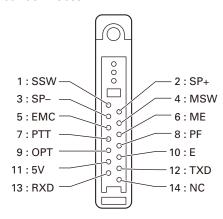
Use the interface cable (KPG-36/36A) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the transceiver and tighten the screw.

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

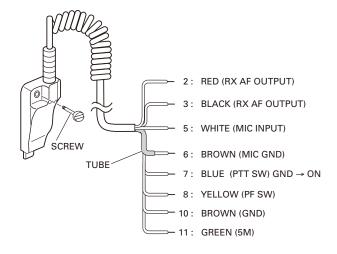
#### Caution

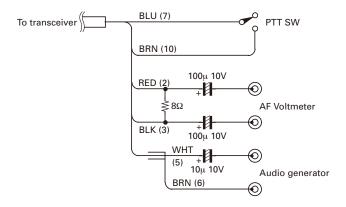
- 1. When connecting the plug to the universal connector of the transceiver, a short circuit may occur. To prevent this, be sure to turn the transceiver POWER switch off.
- 2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the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

#### Universal connector



#### · Panel tuning



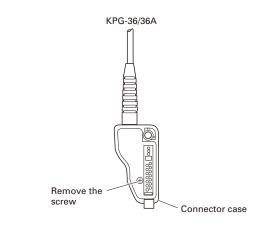


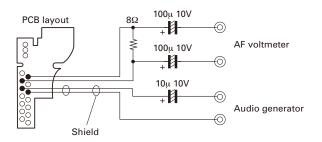
**Note:** Pin 1 (SSW) and Pin 4 (MSW) are connected to Pin 10 (GND) to active External SP and External MIC.

#### 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**

		Mea	sureme	ent		Ad	justment	Specifications /
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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

		Mea	sureme	ent		Ad	justment	Specifications /
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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 8\Omega Dummy load		ANT Universal connector			Check	12dB SINAD or more

#### **Common Section**

		Mea	ent		Adj	ustment	Specifications /	
ltem	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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. Counter- clockwise Volume	1) Adj item: [Counterclockwise Volume]						Turn the volume knob counterclock-wise 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 volt-	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.						Age.  Note: Confirm the VCO lock voltage approximately 3 seconds after the adjustment value is changed.	

### **ADJUSTMENT**

		Mea	sureme	ent		Adj	ustment	Specifications /
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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] but- ton 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**

	Condition	Mea	ent		Ad	justment	Specifications /	
Item		Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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

<sup>\*2:</sup> 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.

		Mea	sureme	ent		Ad	justment	Specifications /
ltem	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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.

		Mea	sureme	ent		Ad	ustment	Specifications /
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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.
	ne "Necessary Deviation adjustment item for ea Maximum Deviation (Analog), it is common with							
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]	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]	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]	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]	Adj item: [DQT Deviation (Analog Wide 5k)]     PTT: Press [Transmit] button.     Press [Apply] button to store the adjustment value.							0.75kHz±0.05kHz

		Mea	sureme	ent		Adj	justment	Specifications /
ltem	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Specifications / Remarks
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]	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

		Mea	sureme	ent		Ad	justment	Specifications /
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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]	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]	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 state of the s	ne "Necessary Deviation adjustment item for each of the "Necessary Deviation" and "Necessary Deviation" adjustment item for each of the "Necessary Deviation" and "Necessary Deviation" adjustment item for each of the "Necessary Deviation" and "Necessary Deviation" an	ch signaling a	and mo	de" table of	on page	49.	After apply signal from AG, press [Apply] button to	
14. VOX10 adjust	1) Adj item: [VOX10] AG: 1kHz/3mV at MIC terminal						store the adjust- ment value.	
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 bat- tery terminal. Confirm that one pre-determined nu- meric in the range 1 to 256 appears. Press [Apply] but- ton 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.

#### ■ 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).

N/11 -	C:		Necessary adjustment and order									
Mode	Signaling	Wide 5k	Wide 4k	Narrow	Very Narrow							
	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)	-							
Analog	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)	-							
	Audio	-	-	Step1. Balance adjust Step2. Maximum Deviation (NXDN Narrow)	Step1. Balance adjust Step2. Maximum Deviation (NXDN Very Narrow)							
NXDN	CWID	-	-	-	Step1. Balance adjust Step2. Maximum Deviation (Analog Narrow) Step3. CWID Deviation (NXDN Very Narrow)							

<sup>•</sup> Balance is common with all the above deviation adjustments. If Balance (Transmitter Section 3) has already adjusted, please skip Step1 and adjust from Step2

<sup>•</sup> 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**

		Mea	sureme	ent		Adj	ustment	Specifications /
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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.  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.	SSG AF VTVM Oscilloscope		ANT Universal connector			Write the value as followings [Low]: 100 [Low]: 115 [Center]: 128 [High']: 142 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	
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	

			sureme	ent		Ad	Specifications /	
Item	Condition	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 F (NXDN Na	 RSSI reference (NXDN Narrow) is adjusted by ad prrow).	usting RSSI	referen	ce (Analog	y Narrow	v), it is n	ot necessary to adjus	t RSSI reference
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 adjust- ment 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)							
1								

		Mea	sureme	ent		Adj	Specifications /	
Item	Condition	Test- equipment	Unit	Terminal	Unit	Parts	Method	Remarks
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 adjust- ment 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 (	ppen Squelch (NXDN Narrow) is adjusted by adj ppen Squelch (NXDN Narrow) is adjusted by adj	usting Open	Squelch	(Analog N	larrow),	it is not	necessary to adjust	Open Squelch
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 adjust- ment 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)							Adjust with the analog signal.

			sureme	ent		Ad	Specifications /	
Item	Condition	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 h	High RSSI (NXDN Narrow) is adjusted by adjustir	ng High RSSI	(Analog	y Narrow),	it is not	necess	ary to adjust High RS	SI (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 adjust- ment 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)							

#### Control unit (X53-4432-76)

Pin No.	Name	I/O	Function
			CN23
1	ME	_	Internal MIC GND
2	EMC	1	Internal MIC input
3	SP+	0	BTL output + for internal speaker
4	SP+	0	BTL output + for internal speaker
5	SP-	0	BTL output – for internal speaker
6	SP-	0	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
	7.01.12		CN403
1	33A	0	3.3V for volume level
2	VOL_GND	-	GND for volume level
3	VOL	1	Volume level input for audio control
4	EN3	1	Rotary switch input
5	AGND	-	GND
6	EN4	1	Rotary switch input
7	EN1	1	Rotary switch input
8	EN2	1	Rotary switch input
9	+B	0	Power output after passing through the fuse
10	SB1	1	Power input after power switch
			CN404
1	LED_G	0	Green LED control output
2	/EMG	I	Emergency (Orange) key input
3	LED_R	0	Red LED control output
4	IFC	1	TX-RX PCB version recognition input
5	/SAVE	0	50C Reg. control output
6	I2CCK	0	TCXO thermometer clock output
7	/5TC	0	50T Reg. switch control output
8	I2CSDA	I/O	TCXO thermometer data input/output
9	SBC	0	SB3 switch control output
10	/T_R	0	TX/RX control output
11	TV2	0	RX tuning voltage 2 output
12	ASSIST	0	VCO tuning voltage output
13	TV1	0	RX tuning voltage 1 output
14	VAGC	ı	AGC voltage input
15	5RC	0	50R switch control output
16	TCXO_MOD	0	TCXO modulation output
17	PGND	-	GND

D: N	B.I	1/0	<u> </u>
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	ı	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	ı	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	0	Key matrix output (SIDE1,2 key)
33	Side_1	I	Key matrix input (SIDE1 key)
34	W_/N	0	W/N control output
35	SDO1	0	PLL serial data output
36	Side_2	I	Key matrix input (SIDE2 key)
37	/PCS_RF	0	PLL enable output
38	/DSW	0	APC voltage discharge switch control output
39	APC	0	APC control voltage output
40	/APCSW	0	APC switch control output
41	VCO_MOD	0	VCO modulation output
42	THP	ı	Thermistor voltage input
43	PLD	ı	PLL lock detect input
44	38M	0	38M output
45	SCK1	0	PLL clock output
46	GND	-	GND
47	S_DET	ı	Battery select input
48	GND	-	GND
49	NC	-	No connection
50	IF_DET	ı	IF input
	_		CN405
1	SSW	1	EXT/INT speaker switch input
2	SP+	0	BTL output + for external speaker
3	SP-	0	BTL output – for external speaker
4	MSW	ı	EXT/INT MIC switch input
5	EMC	i	External MIC input
6	ME	-	External MIC GND
7	PTT	1	External PTT input
8	PF	1	· · · · · · · · · · · · · · · · · · ·
			Programmable function key input
9	OPT	I/O	Option interface I/O
10	E	-	GND
11	5V	0	5V output

Pin No.	Name	I/O	Function
12	TXD	0	Serial data output
13	RXD	1	Serial data input
14	NC	-	No connection
			CN710
1	OPT1	I/O	
2	OPT3	I/O	
3	26P_RD	- 1	
4	26P_TD	0	
5	NC	-	
6	OPT4	0	
7	OPT10	0	
8	OPT5	0	
9	DGND	-	
10	AGND	-	
11	Al	1	
12	AO	0	
13	AGND	-	Refer to "CN710 26-pin connector specification" described on pages
14	5V	0	58 to 60.
15	OPT9	-	
16	DTI	1	
17	OPT8	I/O	
18	OPT11	0	
19	OPT7	I/O	
20	OPT2	I/O	
21	TXO	0	
22	RXEO	0	
23	RXEI	I	
24	TXI	I	
25	OPT6	0	
26	POW	0	

#### TX-RX unit (X57-7830-11 A/2)

			-763U-11 A/Z)
Pin No.	Name	I/O	Function
			CN900
1	LED_G	I	Green LED control input
2	/EMG	0	Emergency (Orange) key output
3	LED_R	I	Red LED control input
4	IFC	0	TX-RX PCB version recognition output
5	/SAVE	I	50C Reg. control input
6	I2CCK	ı	TCXO thermometer clock input
7	/5TC	1	50T Reg. switch control input
8	I2CSDA	I/O	TCXO thermometer data input/output
9	SBC	1	SB3 switch control input
10	/T_R	ı	TX/RX control input
11	TV2	ı	RX tuning voltage 2 input
12	ASSIST	1	VCO tuning voltage input
13	TV1	ı	RX tuning voltage 1 input
14	VAGC	0	AGC voltage output
15	5RC	I	50R switch control input
16	TCXO_MOD	ı	TCXO modulation input
17	GND	-	GND
18	RSSI	0	RSSI voltage output
19	GND	-	GND
20	CV	0	CV voltage output
21	GND	_	GND
22	NC	-	No connection
23	NC	_	No connection
24	+B	0	Power output after passing through the fuse
25	+B	0	Power output after passing through the fuse
26	+B	0	Power output after passing through the fuse
27	+B	0	Power output after passing through the fuse
28	NC	-	No connection
29	NC	-	No connection
30	GND	-	GND
31	/PTT	0	PTT output
32	Side_G	ı	Key matrix input (SIDE1,2 key)
33	Side_1	0	Key matrix output (SIDE1 key)
34	W_/N	ı	No connection
35	SDO1	ı	PLL serial data input
36	Side_2	0	Key matrix output (SIDE2 key)
37	/PCS_RF	ı	PLL enable input
38	/DSW	ı	APC voltage discharge switch control input
39	APC	ı	APC control voltage input
ుల	AFU	1	At C control voltage input

Pin No.	Name	I/O	Function
40	/APCSW	T	APC switch control input
41	VCO_MOD	1	VCO modulation input
42	THP	0	Thermistor voltage output
43	PLD	0	PLL lock detect output
44	38M	1	38M input
45	SCK1	1	PLL clock input
46	GND	-	GND
47	S_DET	0	Battery select output
48	GND	-	GND
49	NC	-	No connection
50	IF_DET	0	IF output
			CN901
1	PTT	1	Internal PTT input
2	GND	-	GND
3	Side_G	0	Key matrix output (SIDE1,2 key)
4	Side_1	-1	Key matrix input (SIDE1 key)
5	Side_2	1	Key matrix input (SIDE2 key)

### **Option board unit (X57-7830-11 B/2)**

Pin No.	Name	I/O	Function
			CN737
1	OPT1	I/O	
2	OPT3	I/O	
3	26P_RD	0	
4	26P_TD	-1	
5	NC	-	
6	OPT4	-1	
7	OPT10	1	
8	OPT5	1	
9	DGND	-	
10	AGND	-	
11	NC	-	
12	NC	-	
13	AGND	-	Refer to "CN737 Option board connector specification" described
14	5V	-1	on page 61.
15	OPT9	0	
16	DTI	0	
17	OPT8	I/O	
18	OPT11	1	
19	OPT7	I/O	
20	OPT2	I/O	
21	TXO	ı	
22	RXEO	1	
23	RXEI	0	
24	TXI	0	
25	OPT6	ı	
26	POW	1	

#### **Solder Pad**

N	.,,	Cianal Tana	F	Rating and Condition						
Name I/C	I/O	Signal Type	Function	Parameter	Min	Тур	Max	Unit		
PTT2	0	Digital	PTT output	[Output] Output Impedance			10k	Ω		
DTT1		Distal	DTT in and	[Input] VIH	2.8		3.3	V		
PTT1		Digital	PTT input	[Input] VIL	0		0.5	V		
NAD CIAY		D: :: 1	NA 1	[Input] VIH	2.8		3.3	V		
MDSW	W I Digital	Man-down switch input	[Input] VIL	0		0.5	V			
GND	-	GND	GND	Allowable current value				mA		
				VOH (Io=-5mA)	4.0	-	5.3	V		
TXD	0	Digital	Serial data output	VOL (Io=5mA)	0	-	0.8	V		
				Baud Rate			19200	bps		
				VIH	2.8	-	5.3	V		
RXD		Digital	Serial data input	VIL	0	-	0.8	V		
				Baud Rate			19200	bps		
RSSI	0	Analog	RSSI output	Output Impedance			10k	Ω		

#### **Universal connector**

D: N	No. Name I/O Signal		Signal		Rating and Condition					
Pin No.	ivame	1/0	Type	Function	Parameter	Min	Тур	Max	Unit	
1	SSW		Digital	EXT/INT speaker switch input L: External speaker ON	VIH	2.8	-	5.3	V	
				H: Internal speaker ON	VIL	0	-	0.7	V	
_					[8 $\Omega$ load] Max output power (1kHz, Batt=7.5V)		1.3	1.8	W	
2	SP+	0	Analog	BTL output + for external speaker	[8Ω load] DC Bias		2.5		V	
					[8Ω load] Allowable Frequency	300		3000	Hz	
					[16Ω load] Max output power (1kHz, Batt=7.5V)		0.9	1.4	W	
3	SP-	0	Analog	BTL output – for external speaker	[16Ω load] DC Bias		2.5		V	
					[16Ω load] Allowable Frequency	300		3000	Hz	
	. 40\.		D: :: -	EXT/INT MIC switch input	VIH	2.8	-	5.3	V	
4	MSW	I	Digital	L: External MIC ON H: Internal MIC ON	VIL	0	-	0.5	V	
					Audio Level (STD deviation)	7.7	12.5	17.3	mV	
_	5 EMC I Analog		F	DC Bias		3.3		V		
5		Analog	External MIC input	Allowable Frequency	300		3000	Hz		
			Input Impedance	-	1.8	-	kΩ			
6	ME	-	-	External MIC GND						
7	PTT		Digital	External PTT input	VIH	2.8	-	5.3	V	
,	ГП	ı	Digital	L: PTT ON	VIL	0	-	0.7	V	
	PF I Analog			V (PF2 key ON)	2.2	-	2.8	V		
8		Analog	Programmable function key input	V (PF1 key ON)	1.7	-	2.2	V		
			V (PF1, PF2 key ON)	1.3	-	1.7	V			
9	OPT		Digital	Man-down input	VIH	2.8	-	5.3	V	
	OII	ı	Digital	Programmable active H/L	VIL	0	-	0.7	V	
10	Е	-	-	GND						
11	5V		Power	5V power supply output	Output Voltage (lout=100mA)	4.9	5.0	5.1	V	
	50	- Power (C		(Output control is FPU programmable)	Maximum Current	-	-	0.2	А	
					VOH (Io=-5mA)	4.0	-	5.3	V	
12	12 TXD	0	Digital	Serial data output	VOL (Io=5mA)	0	-	0.8	V	
					Baud Rate			19200	bps	
					VIH	2.8	-	5.3	V	
13	RXD	1	Digital	Serial data input	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									
PIII INO.	ivaille	1,0	Signal Type	Parameter	Min	Тур	Max	Unit					
1	OPT1			[Input] VIH	2.8		3.3	V					
6	OPT4			[Input] VIL	0		0.5	V					
8	OPT5	1/0	Digital	[Output] VOH	2.8		3.5	V					
17	OPT8	1		· ·									
18	OPT11			[Output] VOL	0		0.5	V					
2	OPT3			[Input] VIH	2.8		3.3	V					
19	OPT7	1/0	Digital	[Input] VIL	0		0.5	V					
20	OPT2	"	2 igita.	[Output] VOH	2.8		3.5	V					
25	OPT6			[Output] VOL	0		0.5	V					
				[Input] VIH	2.8		3.3	V					
3	26P_RD		Digital	[Input] VIL	0		0.5	V					
				Baud Rate			19200	bps					
				[Output] VOH	2.8		3.5	V					
4	26P_TD	0	Digital	[Output] VOL	0		0.5	V					
				Baud Rate			19200	bps					
				Input Amplitude (Square wave)	-	3.3	-	Vp-p					
15	OPT9		Analog	Coupling Capacitor	-	0.01	-	μF					
15 0719	0110	'		Input Impedance	22k	-	-	Ω					
				Allowable Frequency	300	-	3000	Hz					
			Analog/Digital	Output Amplitude (1kHz, 60% deviation)	0.9	1.3	1.7	Vp-p					
7	OPT10	0		Coupling Capacitor		0.1		μF					
,	01110			Output Impedance			22k	Ω					
				Allowable Frequency	300		3000	Hz					
									Input Amplitude (1kHz, 60% deviation)	0.3	0.5	0.7	Vp-p
11	AI		Analog	Coupling Capacitor	-	0.1	-	μF					
11	A	'	Allalog	Input Impedance	-	12k	-	Ω					
				Allowable Frequency	300		3000	Hz					
				Output Amplitude (1kHz, 60% deviation)	30	50	70	mVp-p					
12	AO		Analog	Coupling Capacitor	-	0.1	-	μF					
12	AU	0	Analog	Output Impedance	-	35k	-	Ω					
				Allowable Frequency	300		3000	Hz					
				Input Amplitude (1kHz, 60% deviation)	0.8	1.1	1.4	Vp-p					
16	DTI		Analog	Coupling Capacitor	-	0.1	-	μF					
10		'	Analog	Input Impedance	22k	-	-	Ω					
				Allowable Frequency	300	-	3000	Hz					
				Output Amplitude (1kHz, 60% deviation) while external MIC	160	260	360	mVp-p					
21	TXO	0	Analog	Output Amplitude (1kHz, 60% deviation) while internal MIC	-	130	-	mVp-p					
			Ü	Coupling Capacitor	-	0.1	-	μF					
				Output Impedance	-	-	2.2k	Ω					
				Allowable Frequency	300		3000	Hz					

Pin No.		.,,	O: 1.T	Rating and Condition							
Pin No.	Name	I/O	Signal Type	Parameter	Min	Тур	Max	Unit			
				Output Amplitude (1kHz, 60% deviation)	450	640	830	mVp-p			
22	RXEO			Coupling Capacitor	-	0.1	-	μF			
22	RXEO	0	Analog	Output Impedance	-	-	2.2k	Ω			
				Allowable Frequency	300	-	3000	Hz			
				Input Amplitude (1kHz, 60% deviation)	450	640	830	mVp-p			
23	RXEI		Analog	Coupling Capacitor		0.1		μF			
23	NAEI			Input Impedance	22k			Ω			
				Allowable Frequency	300		3000	Hz			
				Input Amplitude (1kHz, 60% deviation) while external MIC	160	260	360	mVp-p			
24	TXI		Analog	Input Amplitude (1kHz, 60% deviation) while internal MIC	-	130	-	mVp-p			
			Ü	Coupling Capacitor	-	0.1	-	μF			
				Input Impedance	22k	-	-	Ω			
				Allowable Frequency	300	-	3000	Hz			
14	5V	0	Dayyar	Output Voltage		5		V			
14	50		Power	Output Current			78	mA			
26 POW	DOM	0	Power	Output Voltage		7.5		V			
		Power	Output Current			100	mA				
9	DGND										
10	- AGND - GND		GND	Allowable current value (Total current of 3 pins)			100	mA			
13											
5	NC	-	-	-							

#### CN710 26-pin connector specification

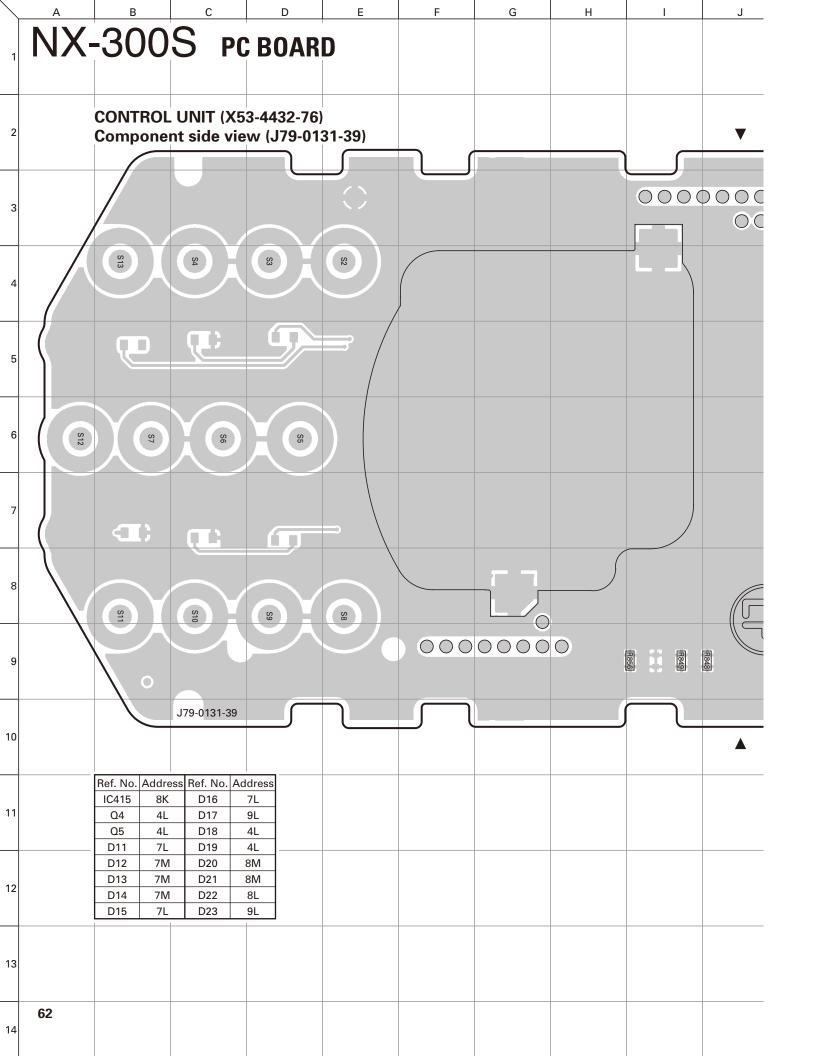
Pin No.	Name	Device	I/O	Connection	Function
1	OPT1	ANI board	0	Aux Input	[COR] Conv/LTR L: Activity receiving H: Not activity receiving [TOR] Conv/LTR L: Activity receiving (Sub Tone or LTR ID is OK) H: Not activity receiving [LOK] Conv L: TX Complete H: Not TX Complete LTR L: TX Link Complete (until TX finishes) H: Not TX Link Complete
		VGS-1	1	BUSY	BUSY indication
2	OPT3	ANI board	1	KEY	TX requirement input
	0713	VGS-1	1	PLAY	PLAY indication
3	26P_RD	ANI board	-	-	-
3	20F_ND	VGS-1	1	SO	Serial data input

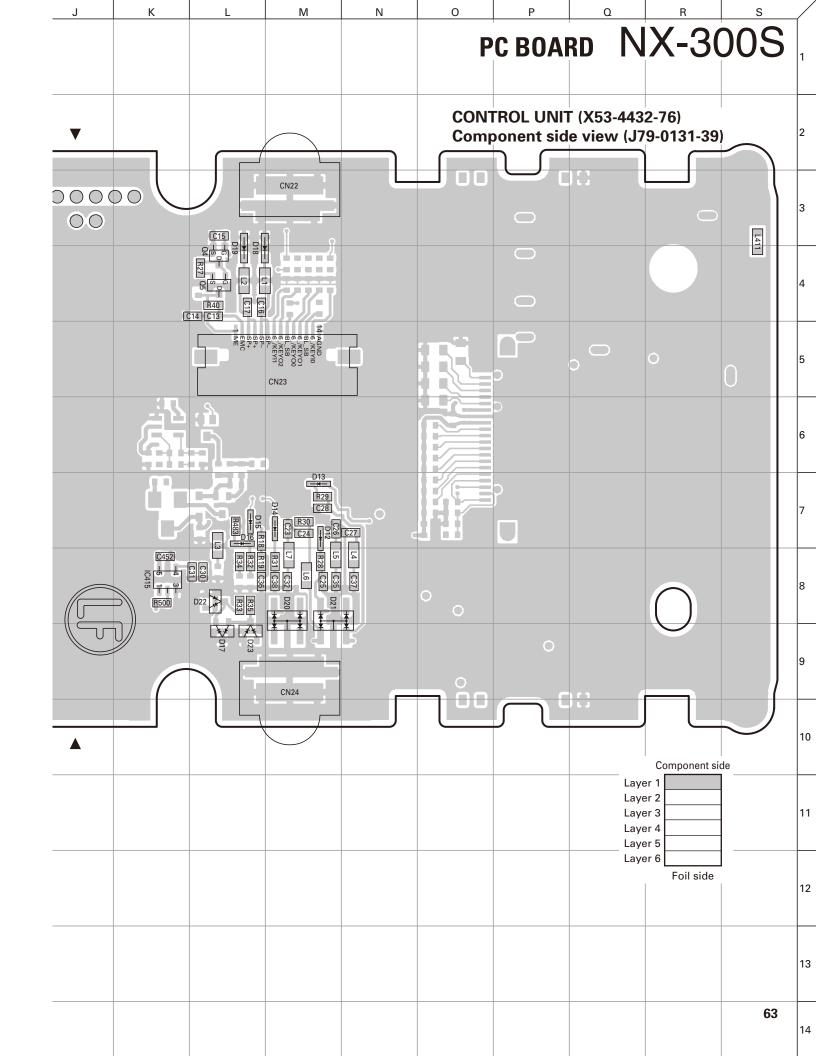
## **TERMINAL FUNCTION**

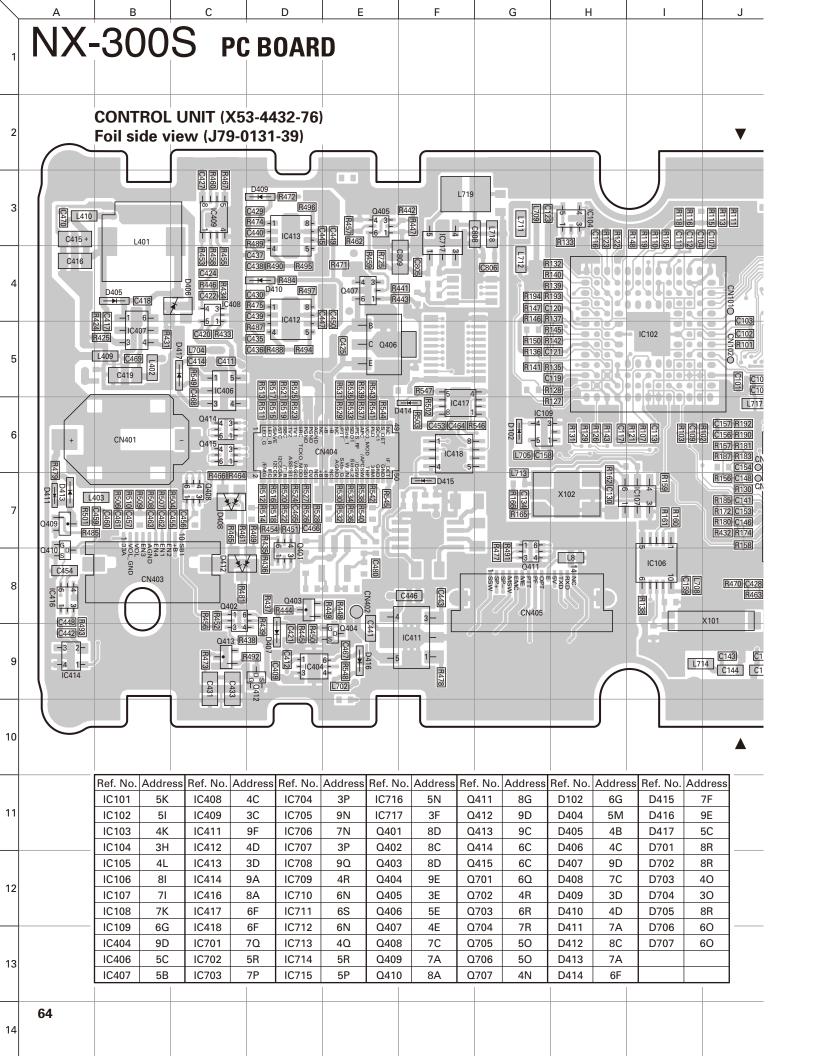
Pin No.	Name	Device	I/O	Connection	Function
_	000 ==	ANI board	-	-	-
4	26P_TD	VGS-1	0	SI	Serial data output
5	NC	-	-	-	-
		ANI board	0	PTT	PTT signal output
6	OPT4	VGS-1	0	EN	Enable
		ANI board	-	-	-
7	OPT10	VGS-1	0	USEL	UART speed select output
		ANI board	0	Emergency	Emergency signal output
8	OPT5	VGS-1	0	RST	Reset output
		ANI board	-	A-	GND
9	DGND	VGS-1	-	DGND	DGND
		ANI board	-	A-	GND
10	AGND	VGS-1	-	AGND	AGND
		ANI board	-	-	-
11	Al	VGS-1		AO	VGS Audio input
		ANI board	-	-	-
12	AO	VGS-1	0	Al	VGS Audio output
		ANI board	-	A-	GND
13	AGND	VGS-1	-	AGND	AGND
		ANI board	-	-	Note: POW and 5V can not be used simultaneously.
14	5V	VGS-1	0	5C	5V power supply
		ANI board		Sidetone	Sidetone input
15	OPT9	VGS-1	-	-	-
		ANI board		Data Out	Data signal input
16	DTI	VGS-1	-	-	_
		ANI board	1	Tone Control	Speaker mute signal input
17	OPT8	VGS-1	-	-	-
		ANI board	0	Man-Down	Man-Down output
18	OPT11	VGS-1	-	-	-
		ANI board	1	MIC Mute	MIC mute signal input
19	OPT7	VGS-1	-	-	-
	0.570	ANI board	1	Aux Output	Emergency signal input
20	OPT2	VGS-1	-	-	-
0.4	T)/O	ANI board	-	-	-
21	TXO	VGS-1	-	-	-
00	DV/EO	ANI board	-	-	-
22	RXEO	VGS-1	-	-	-
00	DVE!	ANI board	-	-	-
23	RXEI	VGS-1	-	-	-
0.4	T\/I	ANI board	-	-	-
24	TXI	VGS-1	-	-	-
25	ODTO	ANI board	-	-	-
25	OPT6	VGS-1	-	-	-
20	DOW	ANI board	0	A+	Switched B output
26	POW	VGS-1	-	-	Note: POW and 5V can not be used simultaneously.

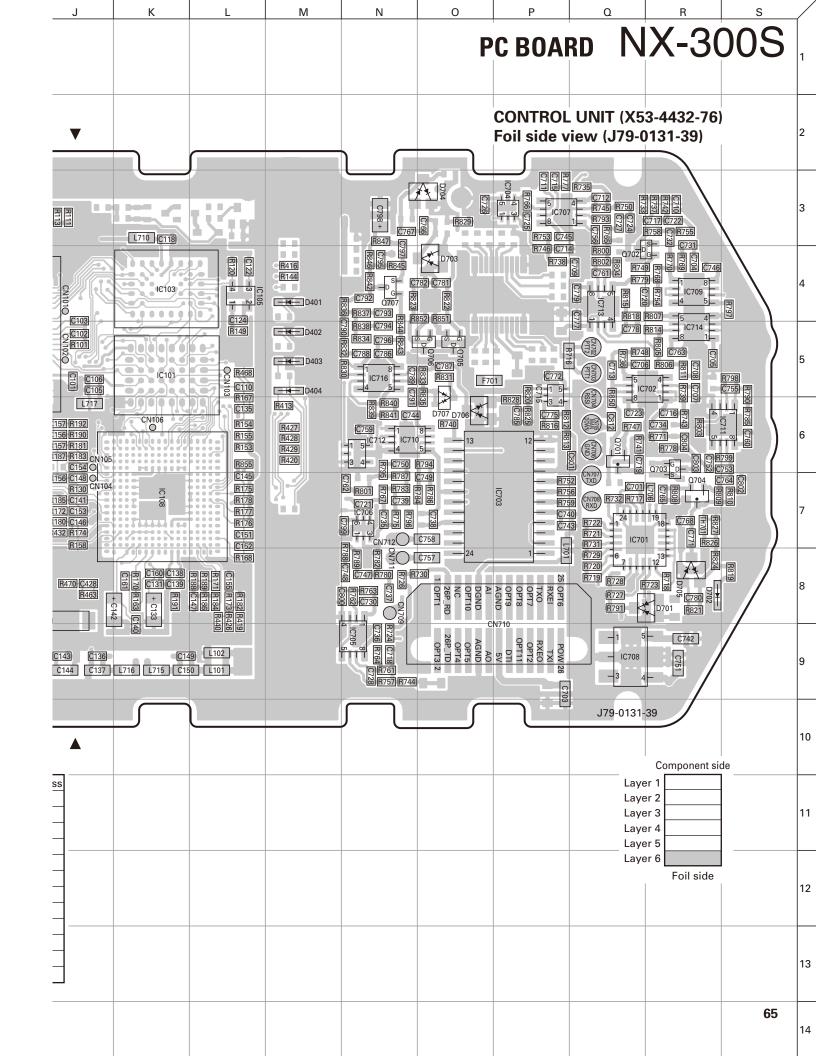
### **CN737 Option board connector specification**

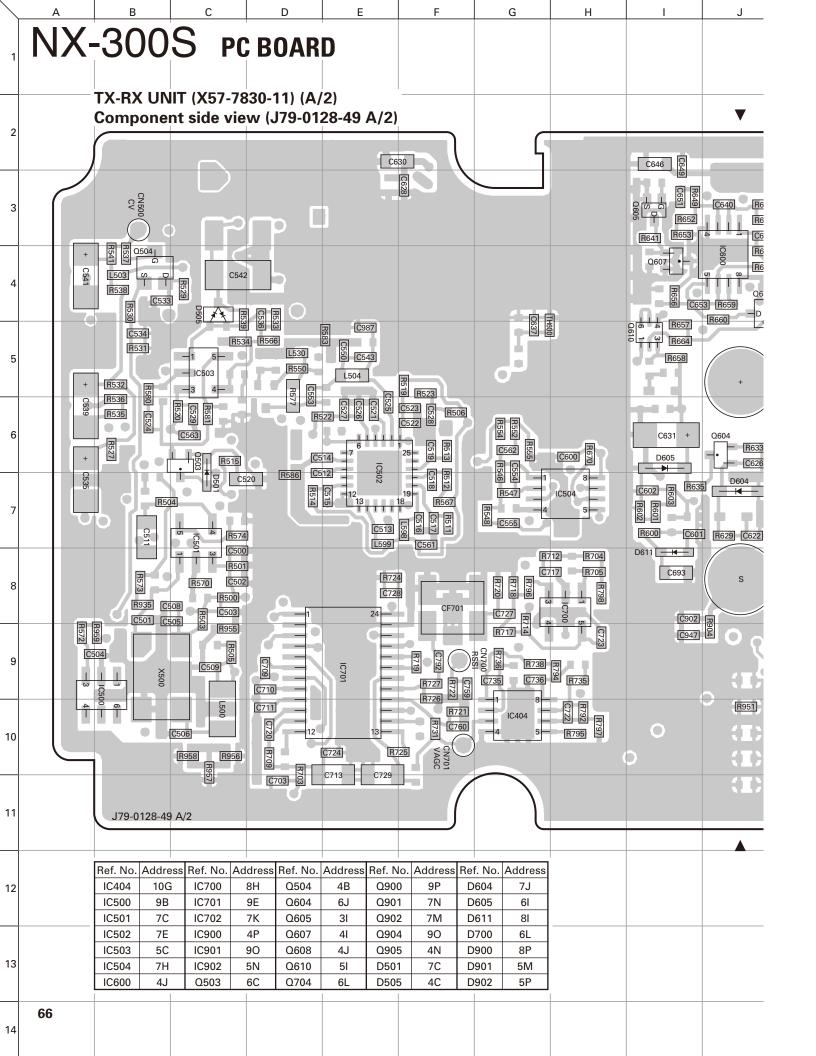
Pin No.	Name	Device	I/O	Connection	Function
1	OPT1	ANI board	ı	Aux Output	[COR] Conv/LTR L: Activity receiving H: Not activity receiving [TOR] Conv/LTR L: Activity receiving (Sub Tone or LTR ID is OK) H: Not activity receiving [LOK] Conv L: TX Complete H: Not TX Complete LTR L: TX Link Complete (until TX finishes) H: Not TX Link Complete
2	OPT3	ANI board	0	KEY	TX requirement output
3	26P_RD	ANI board	-	-	-
4	26P_TD	ANI board	-	-	-
5	NC	-	-	-	-
6	OPT4	ANI board	1	PTT	PTT signal input
7	OPT10	ANI board	-	-	-
8	OPT5	ANI board	1	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	0	Sidetone	Sidetone output
16	DTI	ANI board	0	Data Out	Data signal output
17	OPT8	ANI board	0	Tone Control	Speaker mute signal output
18	OPT11	ANI board	1	Man-Down	Man-Down input
19	OPT7	ANI board	0	MIC Mute	MIC mute signal output
20	OPT2	ANI board	0	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	1	A+	Switched B input

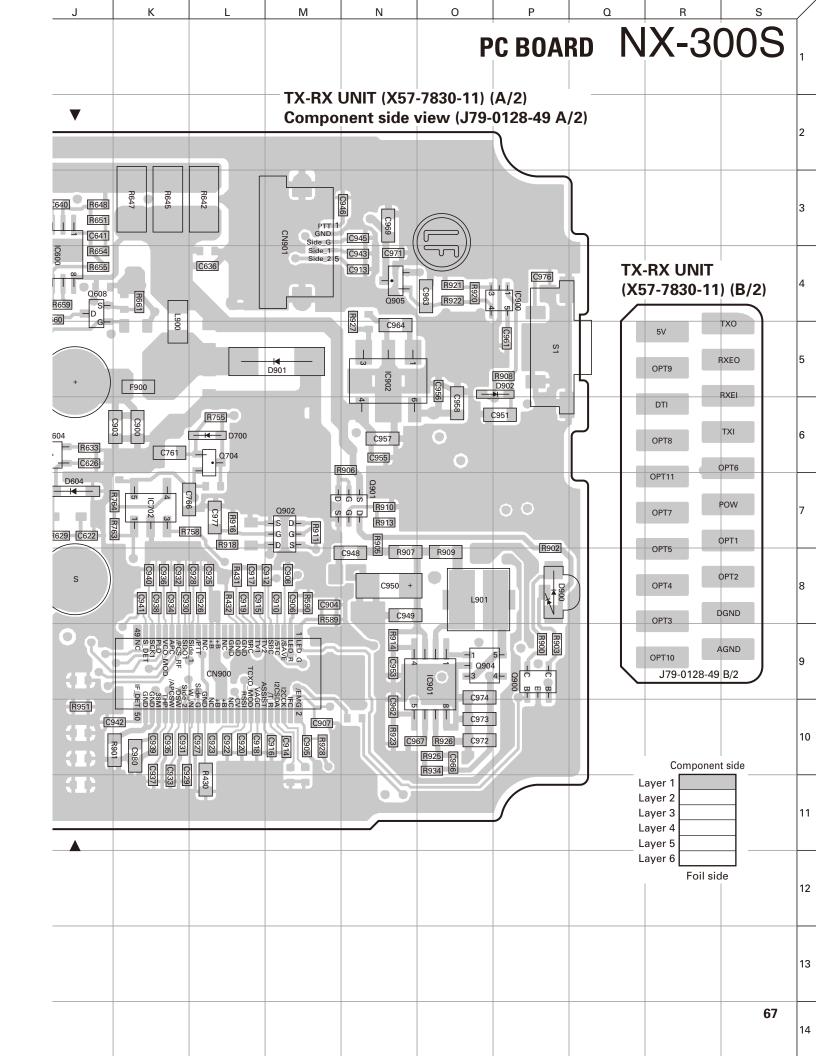


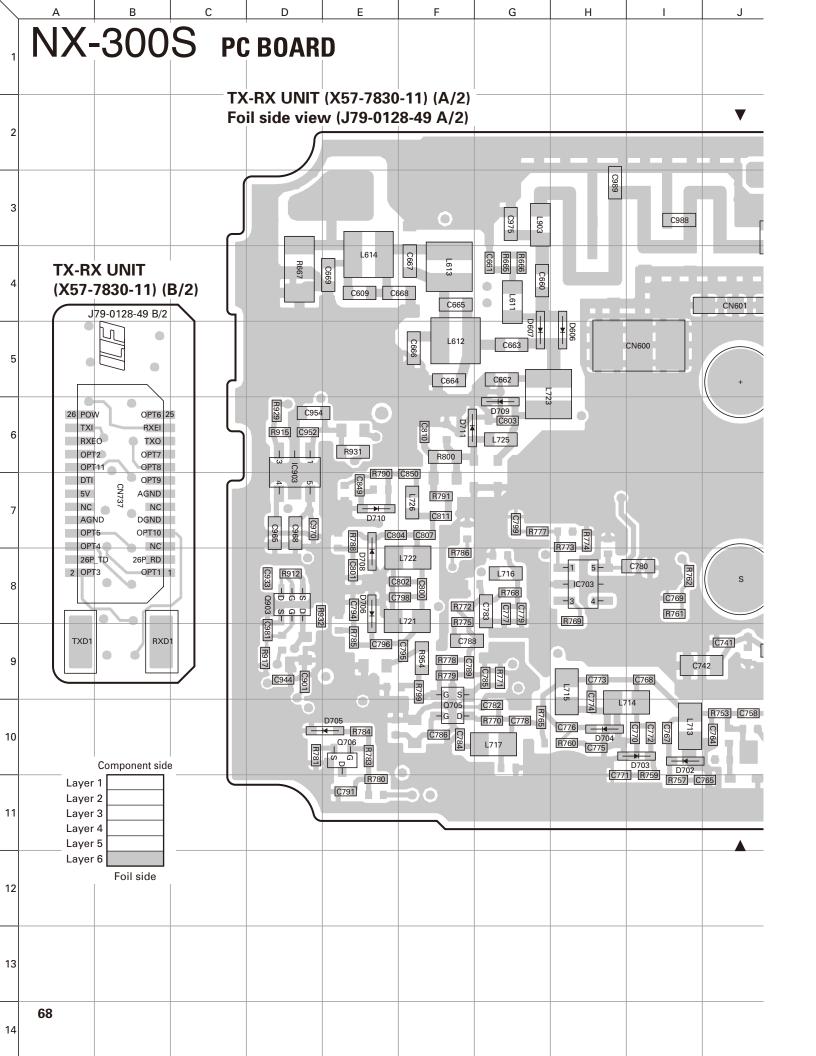


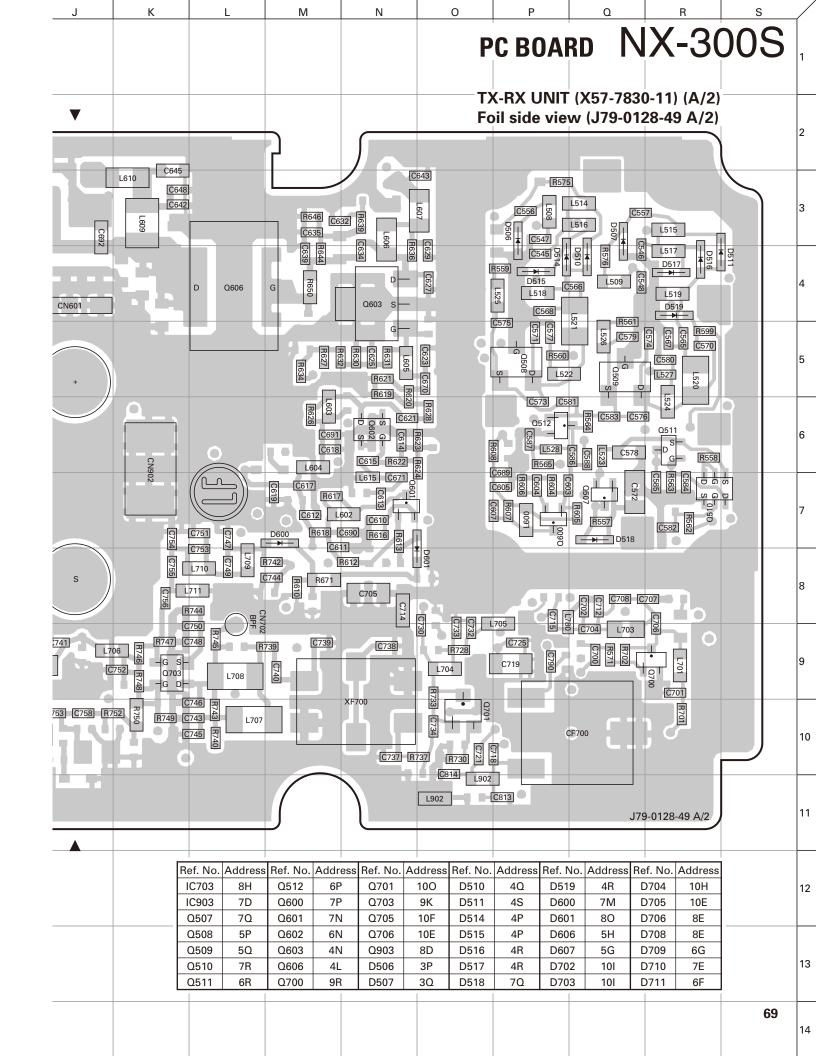




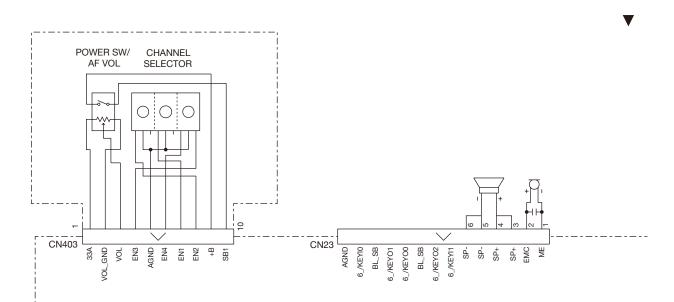




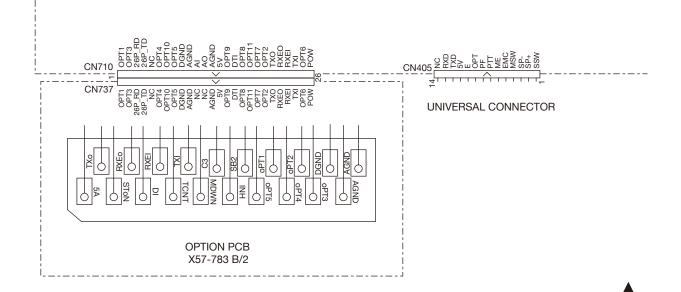




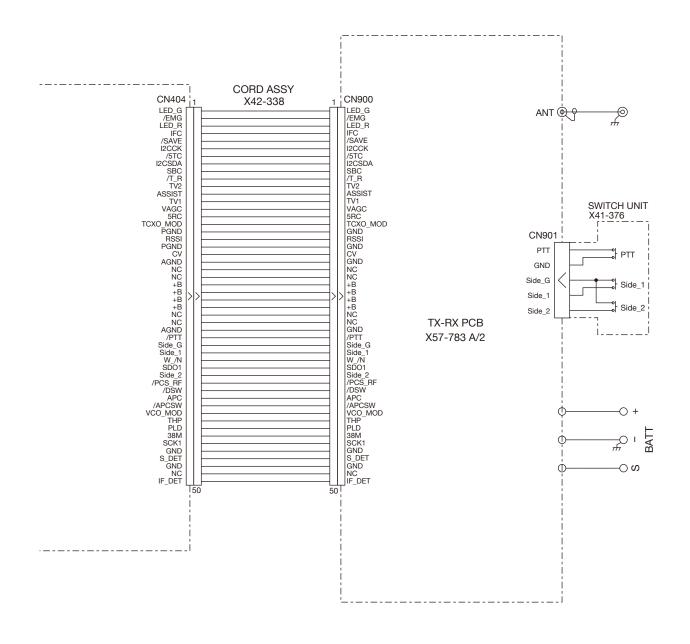
### **INTERCONNECTION DIAGRAM**



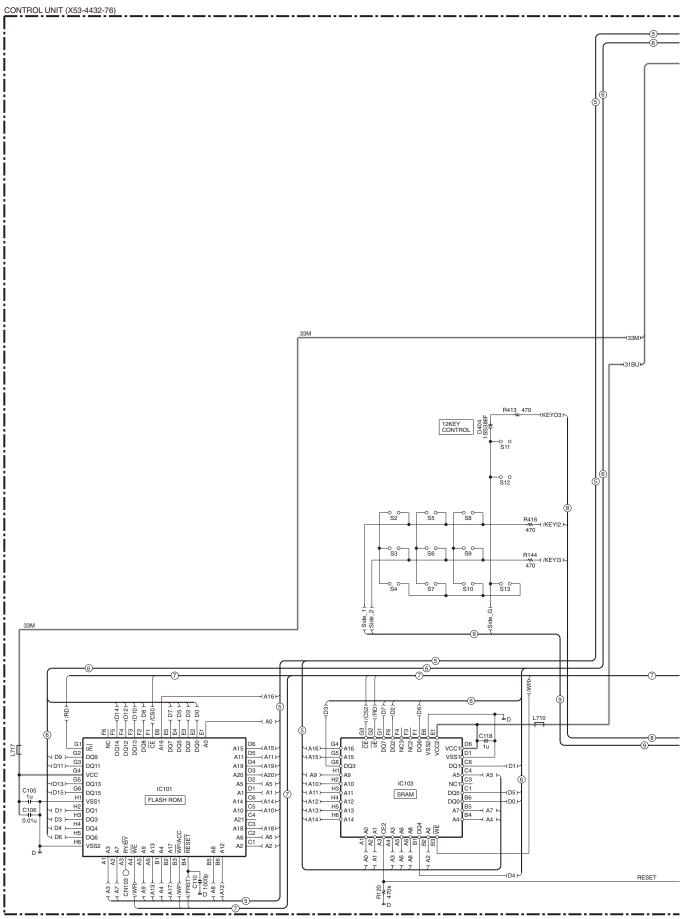
CONTROL PCB X53-443



### **INTERCONNECTION DIAGRAM**

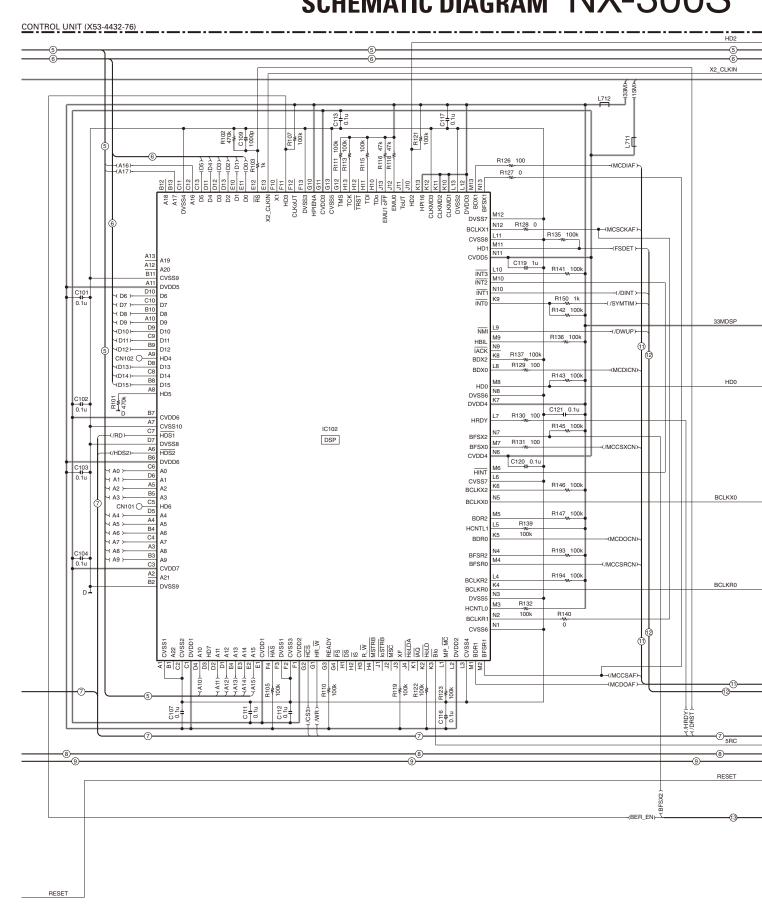


# NX-300S schematic diagram



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# SCHEMATIC DIAGRAM NX-300S



# NX-300S SCHEMATIC DIAGRAM

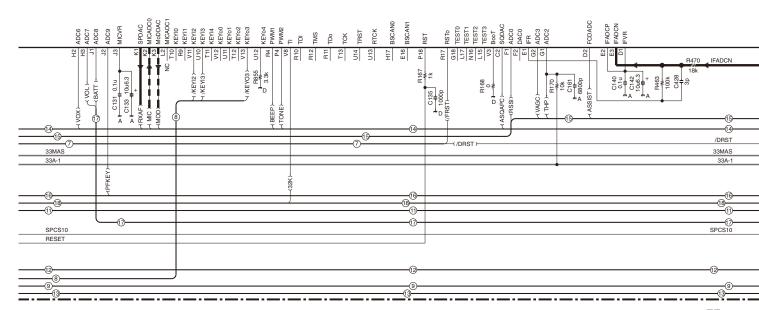
CONTROL UNIT (X53-4432-76) HD2 X2\_CLKIN 원 <sup>4</sup> 또 IFIR MICIR ADC1 XTALI B4 A10 XTALo 321 A12 B11 CN104 ○ DSPCK (RINT) A11 USRCKI ADD0 J18 ( A1 ) ADD1 K18 ADD2 L18 ( A3 )-ADD3 M18 ADD4 N18 ( A5 )-ADD5 ( A7 )-ADD7 IC107 SM5023CNDH-G BUFFER ADD8 N17 ADD9 ADD10 K16 ADD11 ADD12 (A12) R165 1k INHN M16 ADD13 ADD14 P16 R162 ≺A14)-R166 100k (A15) ADD15 9.5mV ADD16 ≺A16≻ M15 ADD17 N15 (A18) ADD18 P15 33MDSP ADD19 J16 (A20)-ADD20 CN106 H15 2 INPUT AND GATE ≺ D0 ≻ DT0 INB INA H16 G15 ( D2 ) DT2 GND oUTY ≺ D3 F17 Y D4 > DT4 ( D5 ) DT5 E18 DT6 ( D6 ) E17 DT7 ( D7 ) ≺ D8 > DT8 D18 DT9 ( D9 ) RTC IC106 RV5C386A D17 ≺D10) DT10 B15 (D11)-L708 DT11 D16 32KOUT ≺D12)-DT12 OSCIN ≺D13≻ DT13 SCL D15 章 章 章 (D14)-(D15)-DT14 SDA E15 DT15 INTRB WRITE A16 CLKC ≺/RD≻ READ VSS B14 (LED\_R)-(LED\_G)-INTRA R138 W 47k C14 BLF A13 D13 (/CS3) CS3 (/CS2)-CN105 A14 CS1 CS0 B12 (/HRDY) HRADY HDS2 (/HDS2)-C122 BCLKR0 R18 (TXD0)-(RXD0)-(RTS0)-(CTS0)-TXD0 0.01u RXD0 R16 RTS0 R15 R148 150 CTS0 CD ≺AMT)— TXD1 RXD1 V15 (26P\_TD) V15 (RXD2) V14 (RXD2) RXD2 3.282V RESET MCSCKCN 3.28V (/OINT) R153 100k SDT
SPCK0
SP10
SP00
SPCS00
SPCS01
SPCK1
SP11
SP01
SPCS10
SPCS10 SPCS12 R154 SCK 100k R156 4.7k CN11 /FLDM C For Boot R157 4.7k B160 0 8161 ≺ SCK1 } ( SD00 )— ( /EVCS )— ( /EVCS )— ( /WP )— ( STSW)— C160 R163 -(I2CSDA)-(/PTT) -13--(RSSI) 33MAS 33A-1 -(I2CCK)-18 11 -18-(RXD) RESET -( TXD ) C812 CN702 CN702 CN703 CN704 CN704 CN706 CN706 CN706 CN706 CN706 CN706 CN707 CN706 -8-9

0

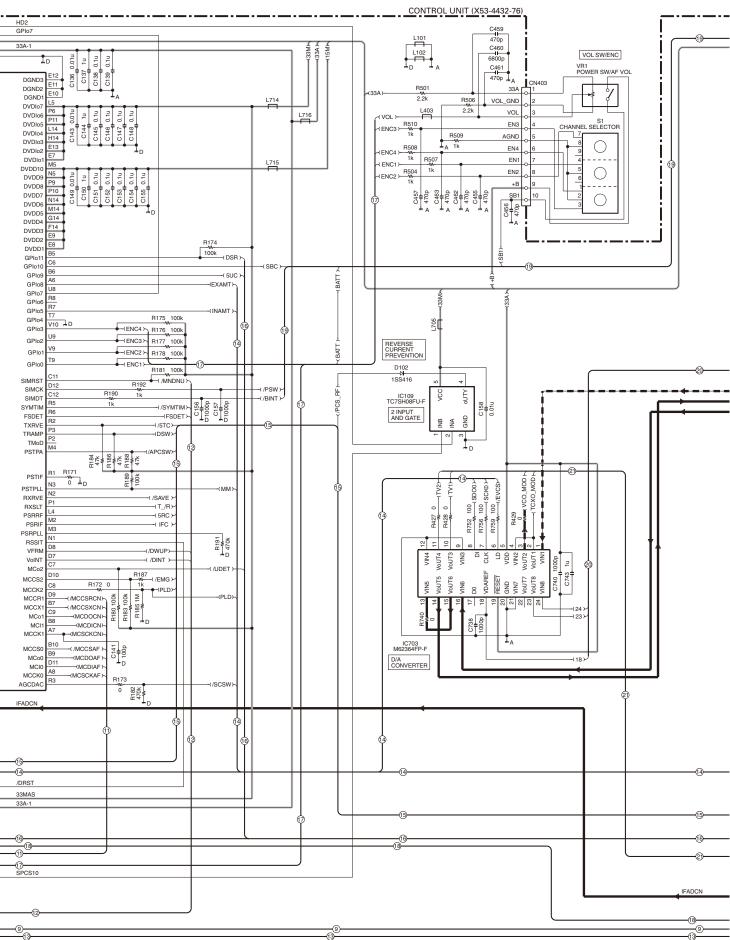
P Q R S T

# SCHEMATIC DIAGRAM NX-300S

IC108

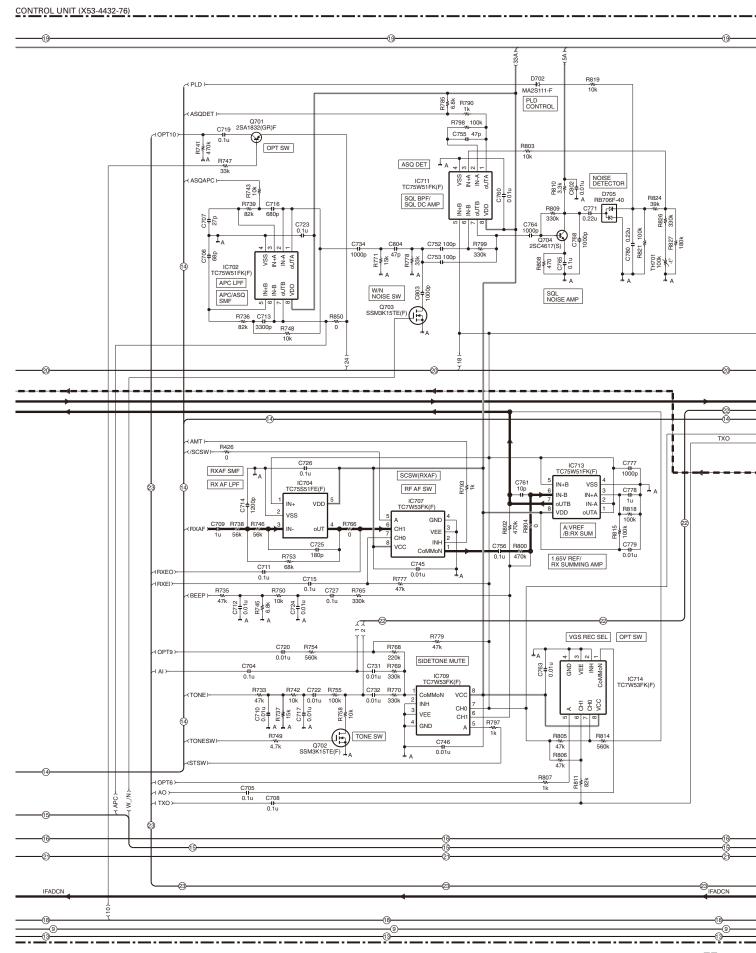


# NX-300S schematic diagram



Z AA AB AC AD

# SCHEMATIC DIAGRAM NX-300S



AE AF AG AH AI

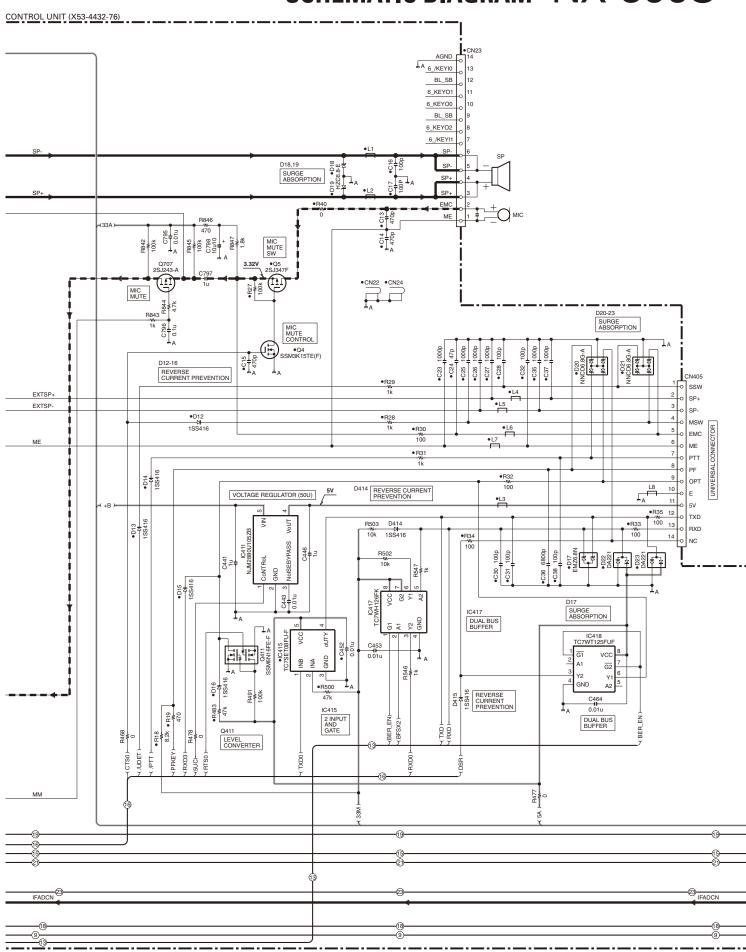
# NX-300S schematic diagram

CONTROL UNIT (X53-4432-76) Q406 2SB1132(Q,R) R471 VOLTAGE REGULATOR (AF AMP)  $\Theta$ 2445 000p 12445 ₹ ₹ R496 100k 74 22 2× 2× 3× AUDIO AMP AF AMP SW R443 0.1u R474 33K Q405 SSM6N16FE-F C437 R489 11 W 0.056u 22k ÎŧI VDD SP CONTROL R495 W 100k (INAMT)-1000p 12477 12 C450 SP DRIVE

AF AMP

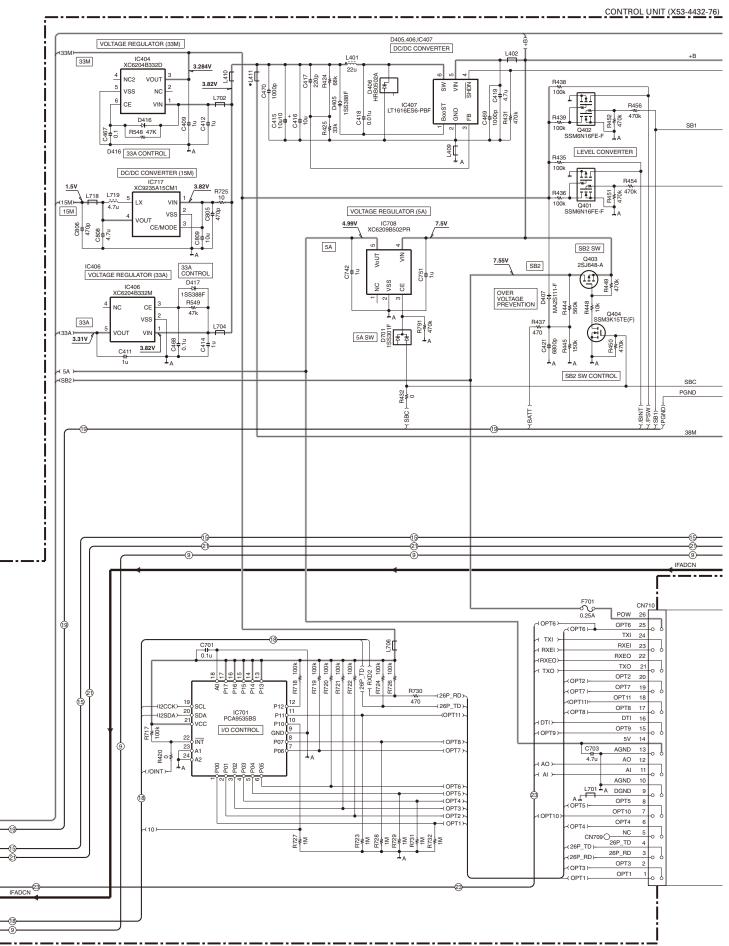
IC408
TC75S51FE(F) 0.01 0.01 R497 100k #¥55 IC412 TPA6201A1DRBR OUT\_IN2 IN\_OUT2 200 Sont1 R433 R467 IC409 TC7W66FK-F AF SW 0.1u 0.1u R475 33k OUT\_IN1 CONT2 GND C439 0.1u GNE C435 R487 0.056u 22k VDD R446 270k 4 A Vo+ C422 10p 7453 100k 8434 39K EXTSP+ EXTSP-ME TXO D707 DA221 VOX ) XOX R813 27k VOX DETECTOR 5.6k C801 C791 0.039u R828 RB706F-40 0 C787 C775 47p R816 R833 680k A: MIC SUM1/ B: VOX IC710 TC75W51FK(F) oUT C718 1500p MOD/MIC SUMMING AMP IC716 TC75W51FK(F) VOX AMP A A VSS N'A N'A N'S A : MOD SUM/ B : MIC SUM2 IN-F841 560k A+NI VSS 0.01u C750 47p VOX AMP 47p 56 R839 R767 10k 1M MIC AGC DETECTOR D703 RB706F-40 Q705 2SC4738(GR)F MIC AA MIC AMP oUT GND IN-R851 68K C739 6800p VSS H789 150k R838 C794 IN-VDD R788 47k C747 0.1u C799 0.1u €) C748 0.1u H780 100k 100k Q706 2SA1832(GR)F DETECTOR MIC AGC SCSW(MIC) C737 0.1u MIC SW Ê <del>(</del>9AJ AK AL AM AN

# SCHEMATIC DIAGRAM NX-300S



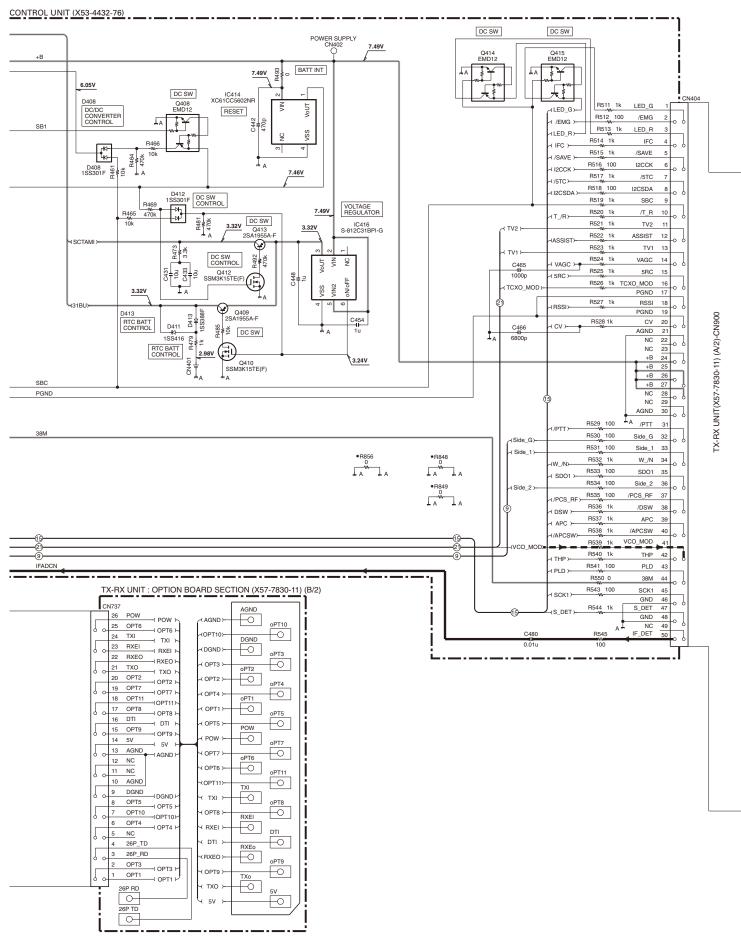
AO AP AQ AR AS

# NX-300S schematic diagram



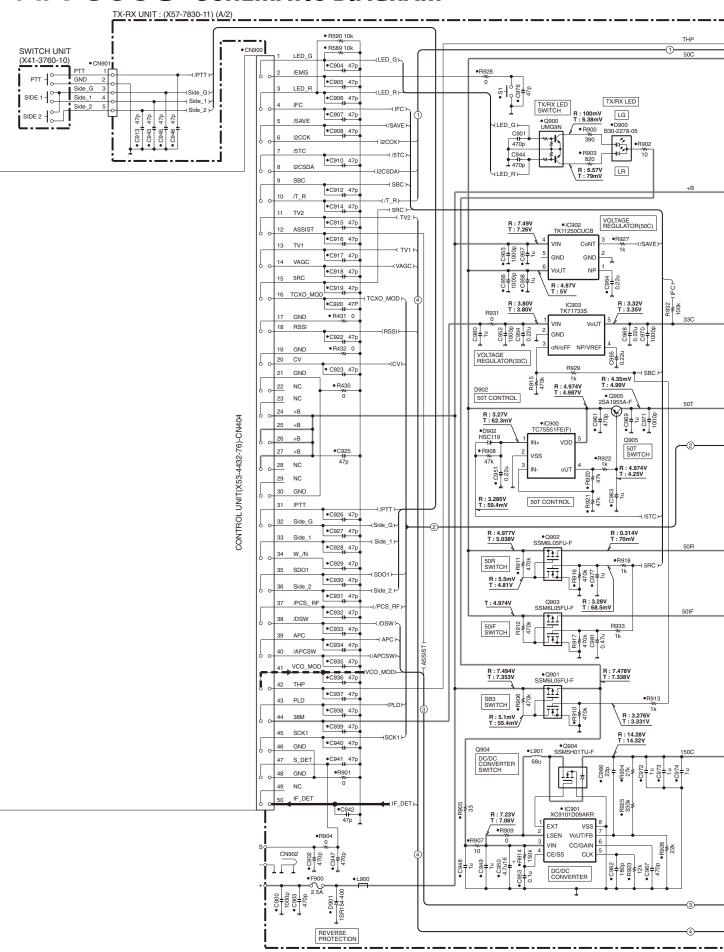
AT AU AV AW

# SCHEMATIC DIAGRAM NX-300S



AY BA BB BC

# NX-300S schematic diagram

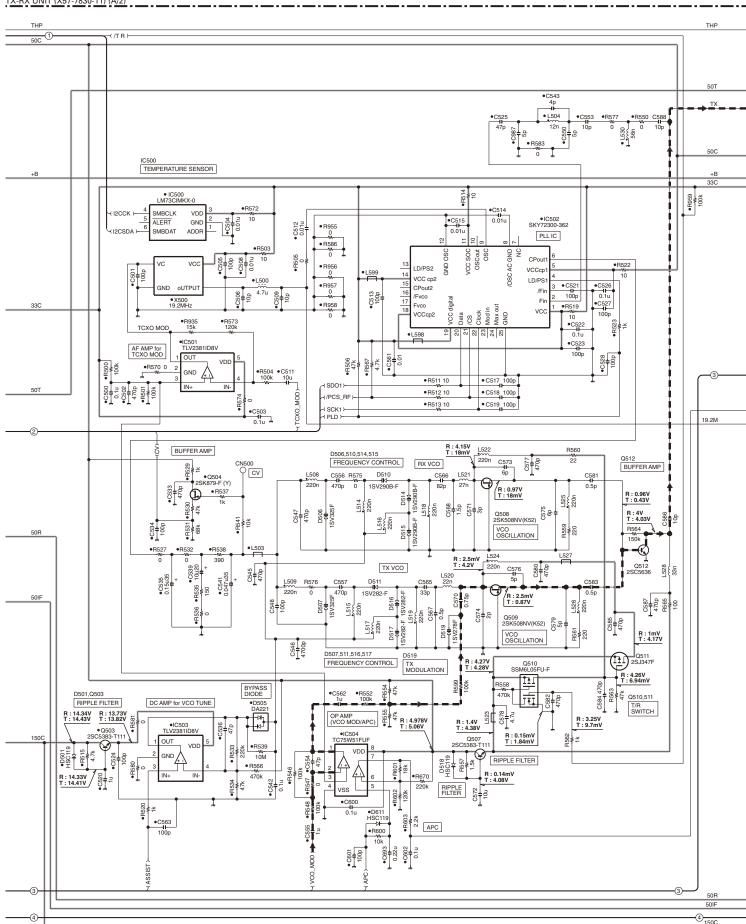


BD BF ВG ΒE

# SCHEMATIC DIAGRAM NX-300S

ВН

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

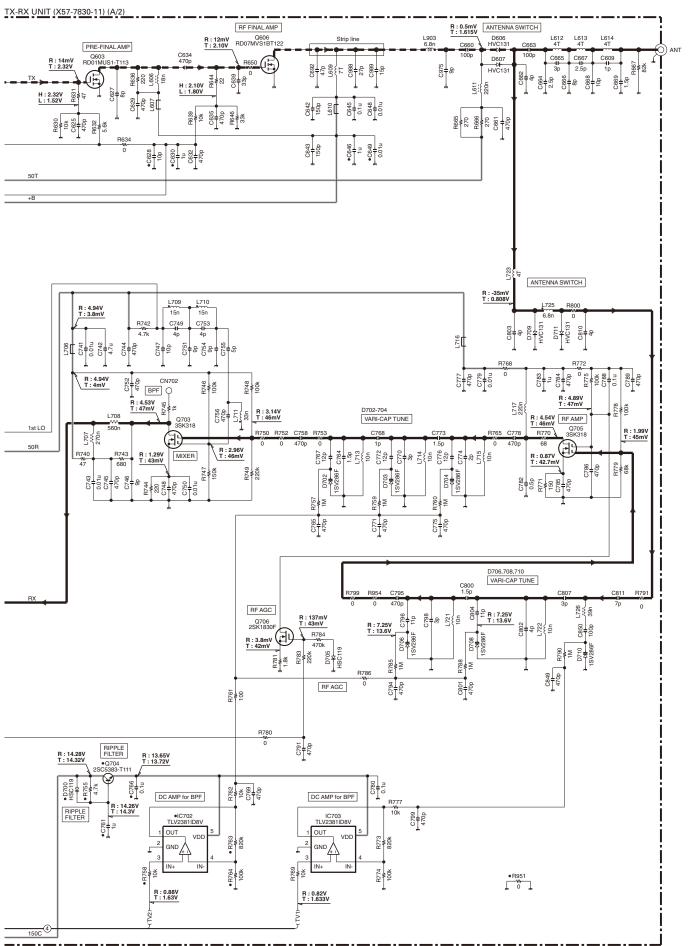


BI BJ BK BL BM

# NX-300S schematic diagram

TX-RX UNIT (X57-7830-11) (A/2) 470p DRIVE AMP  $\square$  $\square$ PRE-DRIVE AMP R : 5mV T : 0.99V R: 1.81V T: 1.89V BUFFER AMP R: 4.75V T: 4.8V LOCAL SWITCH R: 2.5mV T: 2.37V 50T 88 820 12p 12p C611 R617 470p 330 C690 L602 0.1u 27n ZZ ZZ R627 W R610 4.7k 0.1u APC PROTECT •R658 W 820 ●R654 270k R: 63mV T: 128mV ●IC600 A75W01FU •Q604 \_\_\_\_ 2SC5383-T111 oUT1 APC SWITCH •Q610 EMD5 oUT-B IN1-R : 61mV T : 110mV IN1+ APC SWITCH VEE IN2+ AUTO POWER CONTROL ●R653●R652 270k 270k APC SWITCH •Q608 2SK1824-A APC SWITCH •Q607 RT1N441U-T111 • Q605 SSM3K15TE(F) R : 13mV T : 3.71V APC SWITCH R : 1.59V T : 1.52V 1st LO 19.2M R : 4.849V T : 5mV R701 ž¢ C708 100p L703 R : 0.731\ T : 3.6mV 0.0 1.0.0 R728 220 2732 4700 330k C700 7p € C707 Q700 2SC5108(Y)F FM IC 2nd LOCAL TRIPLER •IC701 TK10931VTL-G R: 4.694V T: 5mV oSC(B) oSC(E) RFINPUT MIXOUTPUT GND CoMPoUTPUT •R724\_ 100k 0.1u CoMPINPUT ●C728 0.1u •C709 0.1u NoISEAMPoUTPUT CN701 19 •R719 Q VAGC AMIFDECoUPLING NoISEAMPINPUT • R731 C721 0.1u L902 •C710 0.1u •C711 ●C760 0.1u \_∕w 27u AGCAMPoUTPUT •R721 10k RFAGCoUTPUT 27p •R722 4.7k •C720 10 10p \_IMoUTPUT ●C759 0.1u C814 27p AMSW QUADINPUT •R725 22k MDET<sub>0</sub>UTPUT AMDEToUTPUT •C729 0.47u CN700 RSSI C779 10u 10u 0.1u 0.0tu -C713 OP AMP (RSSI/VAGC) ●R726 0.1u •R712 10k IN+B H704 478 478 479 479 100k oUTB IN-A vss 🐴 47k 0.01u 100 100 • R794 BUFFER

## SCHEMATIC DIAGRAM NX-300S

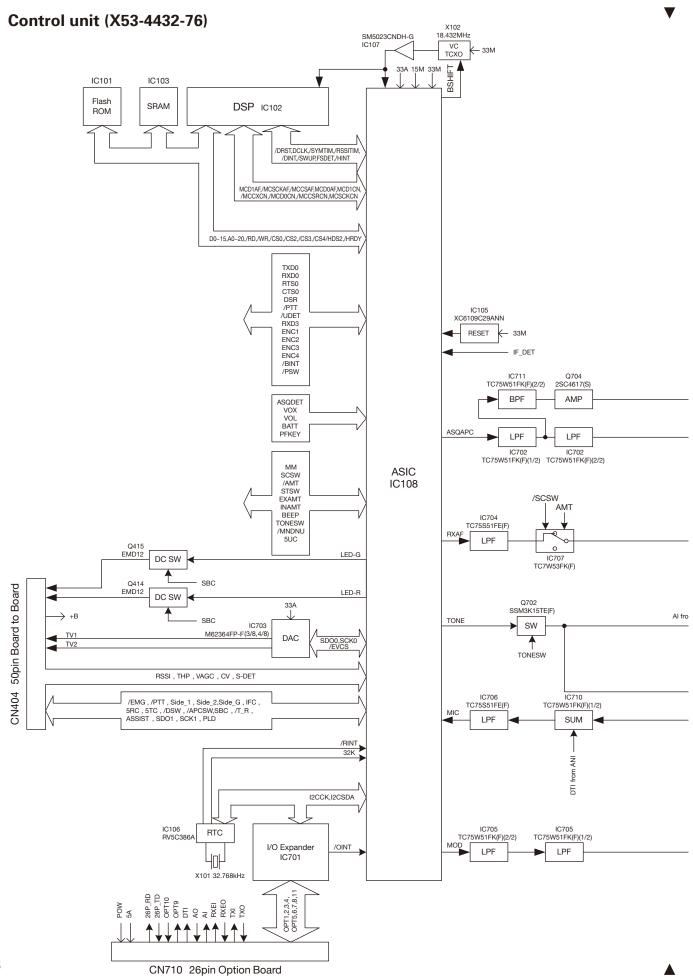


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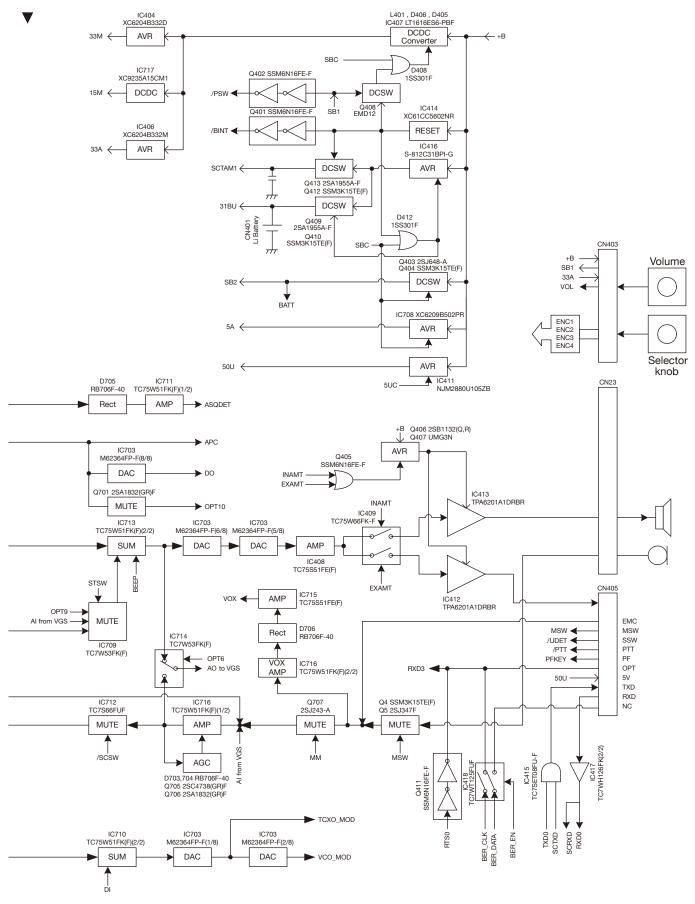
4

6

# NX-300S BLOCK DIAGRAM



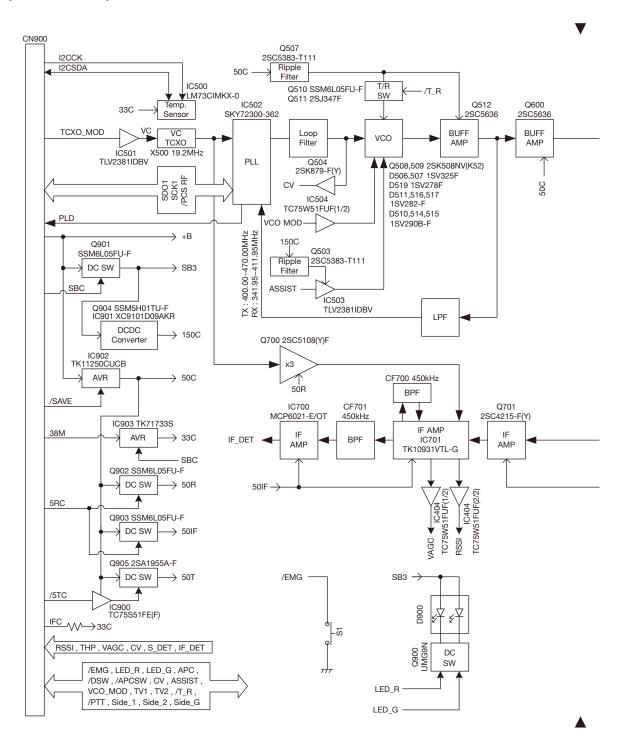
# BLOCK DIAGRAM NX-300S



# NX-300S

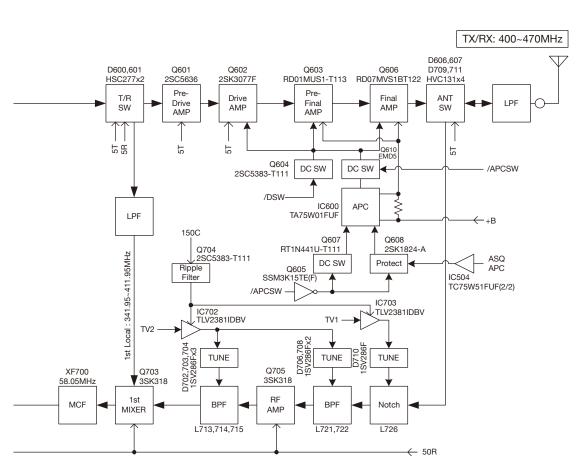
## **BLOCK DIAGRAM**

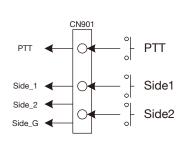
## TX-RX unit (X57-7830-11)

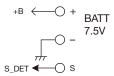


## **BLOCK DIAGRAM**





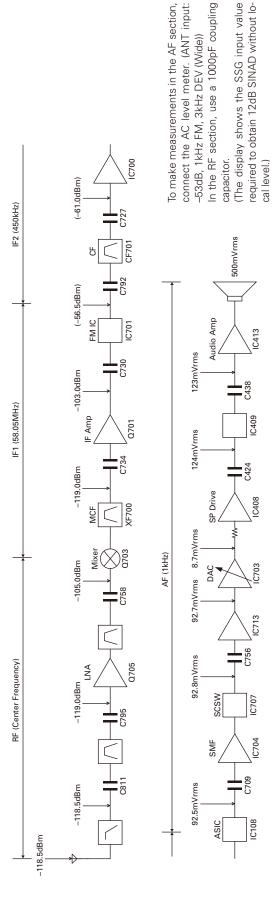




# NX-300S

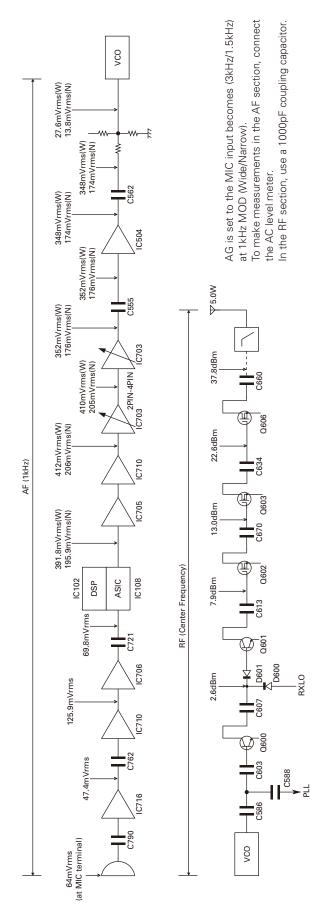
## **LEVEL DIAGRAM**

# **Receiver Section**



connect the AC level meter. (ANT input: To make measurements in the AF section, -53dB, 1kHz FM, 3kHz DEV (Wide)) (The display shows the SSG input value required to obtain 12dB SINAD without lo-

# **Transmitter Section**



## **OPTIONAL ACCESSORIES**

## **KNB-47L (Li-ion Battery Pack)**

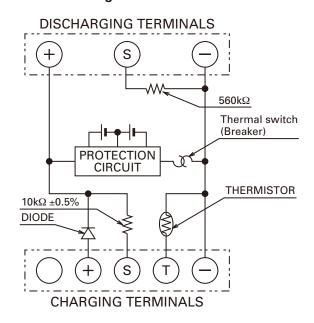
#### **■** External View



## ■ Specifications

Voltage	7.4V
Battery capacity	1950mAh

## **■** Schematic Diagram



## **KNB-48L (Li-ion Battery Pack)**

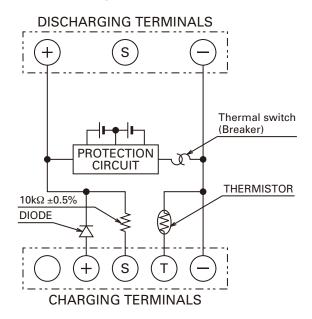
## **■** External View



## **■** Specifications

Voltage	7.4V
Battery capacity	2550mAh

## **■** Schematic Diagram



## NX-300S

## **SPECIFICATIONS**

GENERAL Frequency Range Number of Channels Zones Max. Channels per Zone Channel Spacing Operating Voltage	64 4 16 Analogue: 12.5/20/25 kHz Digital: 6.25/12.5 kHz
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 –30°C to +60°C ±1.0ppm 50Ω uded)
with KNB-47L with KNB-48L Weight (net) Radio only with KNB-47L with KNB-47L	58 x 128.3 x 41.7 mm 58 x 128.3 x 49.1 mm 255 g 370 g
RECEIVER Sensitivity (Analogue) EIA 12dB SINAD EN 20dB SINAD Sensitivity (Digital) 3% BER	25kHz: -3dBµV 20kHz: -3dBµV 12.5kHz: -1dBµV 12.5kHz: 0.32µV 6.25kHz: 0.25µV 12.5kHz: -1dBµV 6.25kHz: -4dBµV 25kHz: 76dB 20kHz: 74dB 12.5kHz: 68dB 65dB 75dB Less than 3%
TRANSMITTER RF Power Output High/Low Modulation Limiting (Analogue) Spurious Emission FM Noise (EIA) (Analogue) Modulation Distortion	±5.0kHz at 25kHz ±4.0kHz at 20kHz ±2.5kHz at 12.5kHz –36dBm ≤ 1GHz, –30dBm > 1GHz 25kHz: 45dB 20kHz: 45dB 12.5kHz: 40dB

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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8K30F1D, 8K30F7W, 4K00F1E, 4K00F1D, 4K00F7W, 4K00F2D

Bolivia, 239-08020 Barcelona, Spain

### Kenwood Electronics Australia Pty. Ltd.

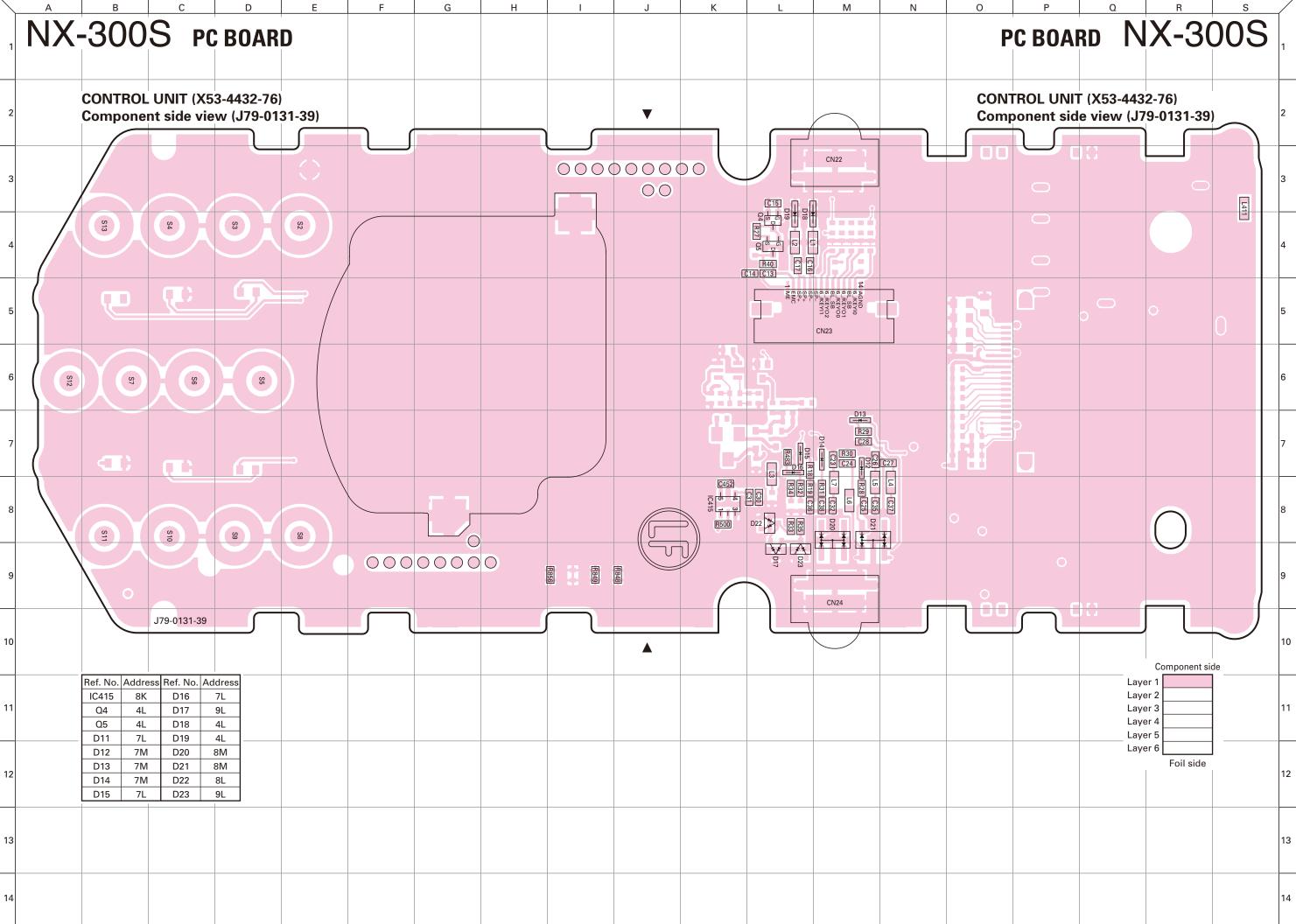
Talavera Business Park Building A, 4 Talavera Road, North Ryde NSW 2113 Australia

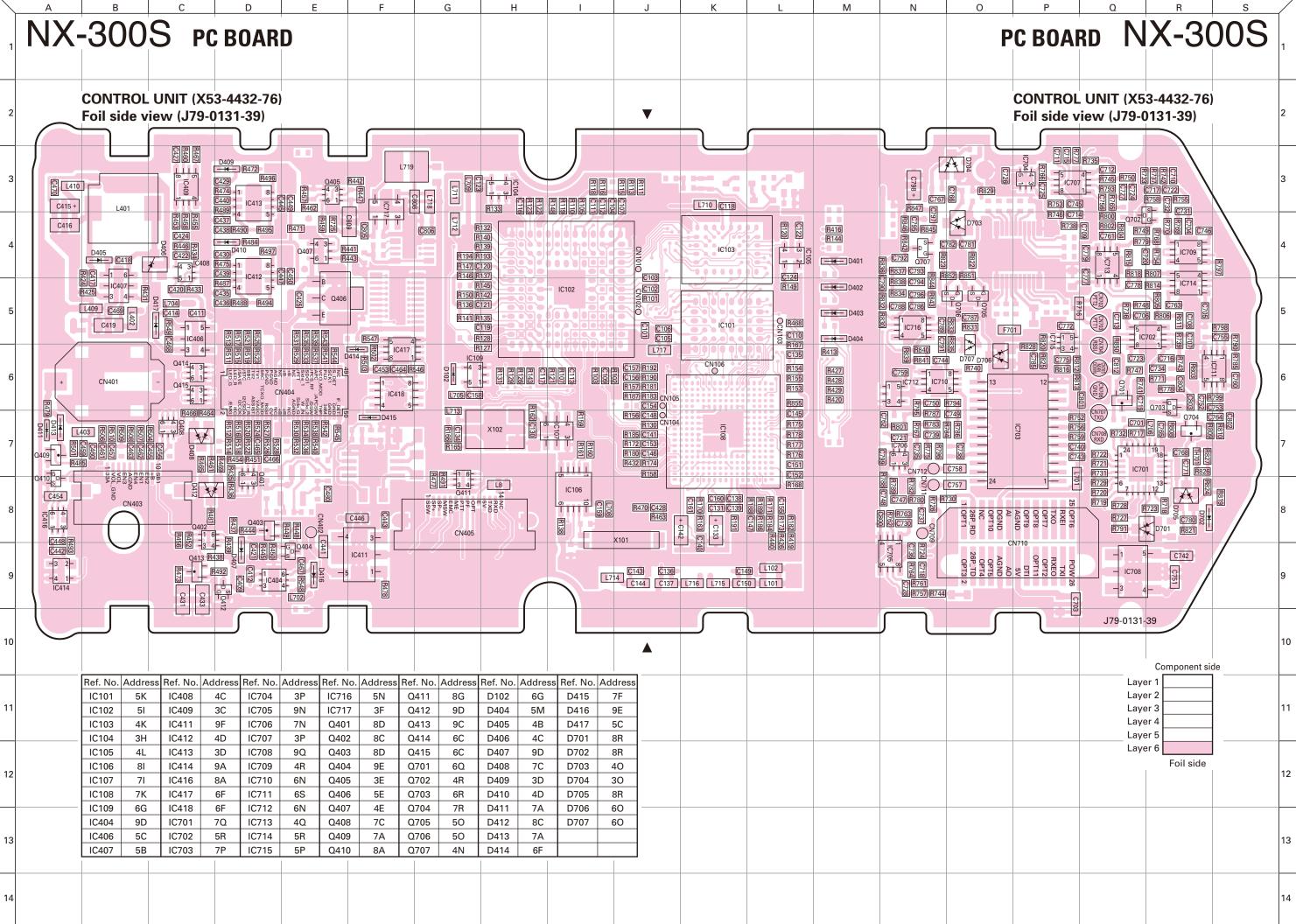
## Kenwood Electronics (Hong Kong) Ltd.

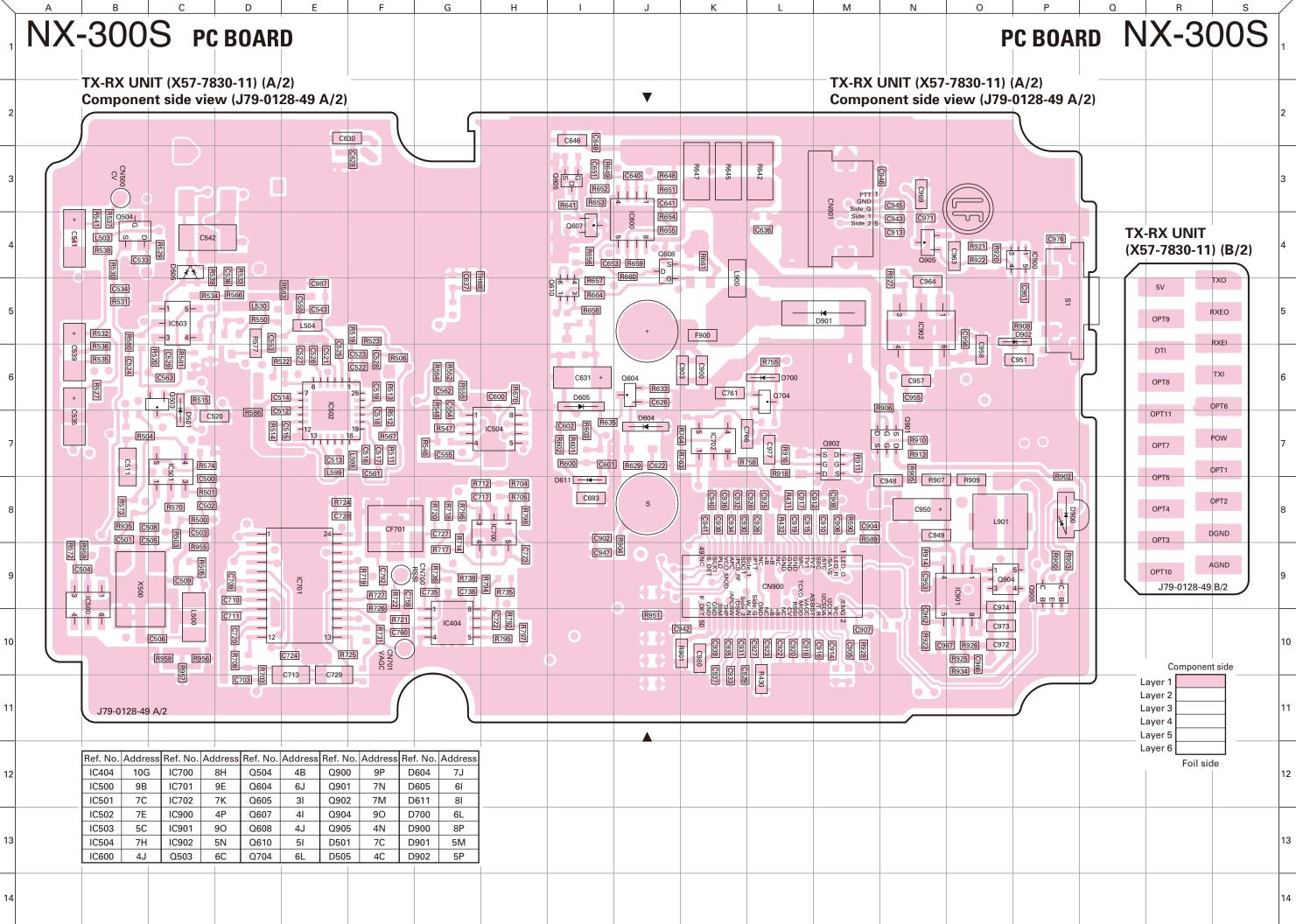
Unit 3712-3724, Level 37, Tower one Metroplaza, 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong

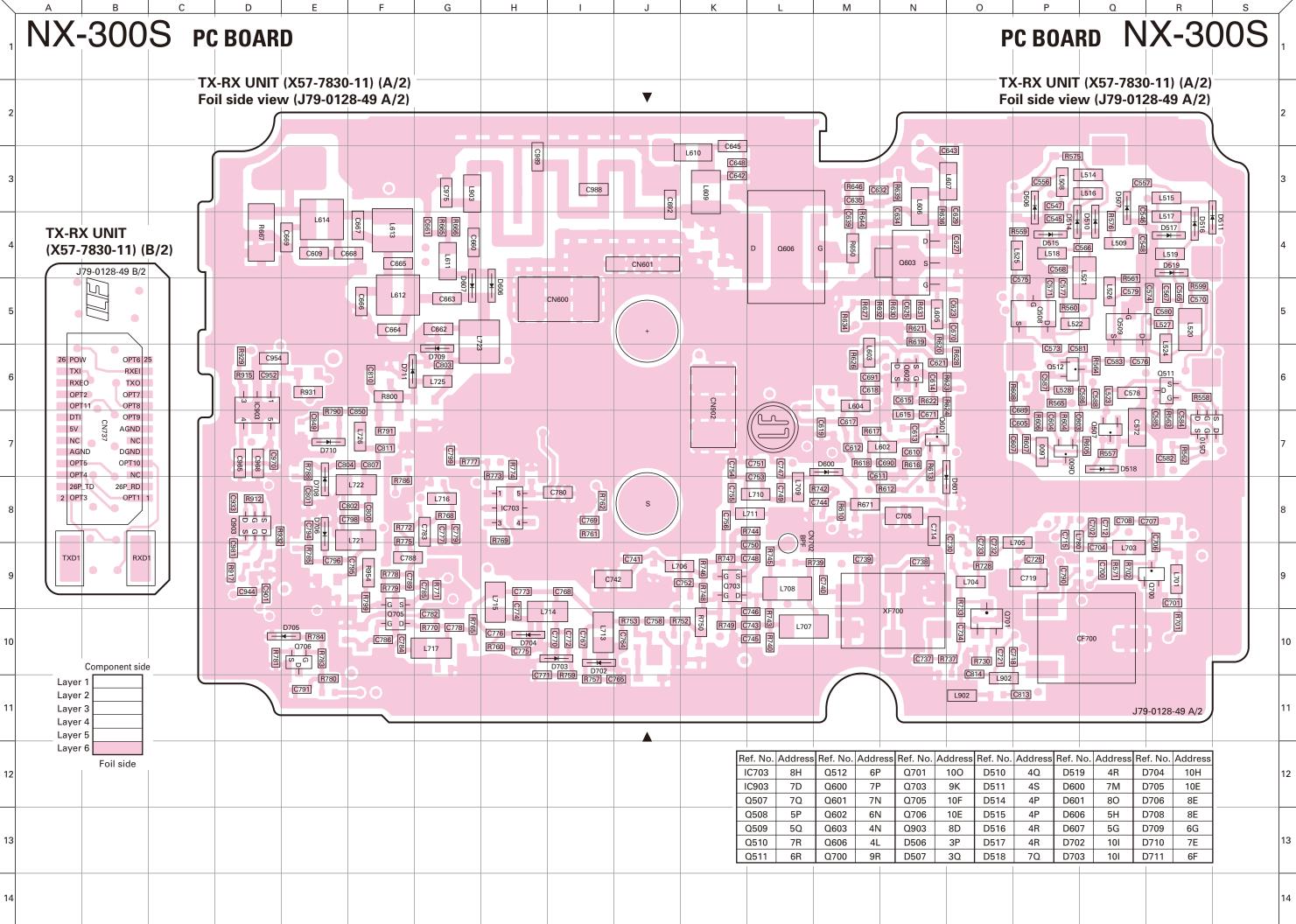
#### Kenwood Electronics Singapore Pte Ltd

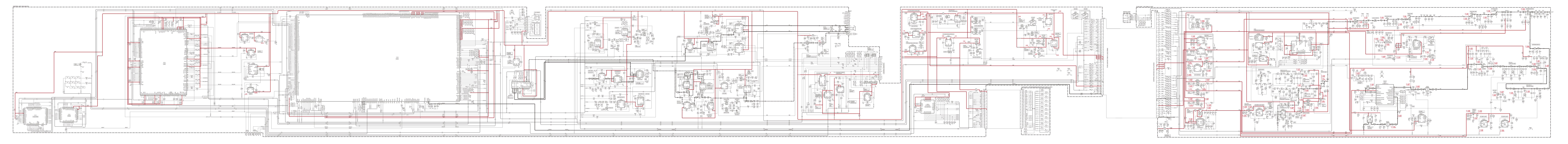
1 Ang Mo Kio Street 63, Singapore 569110

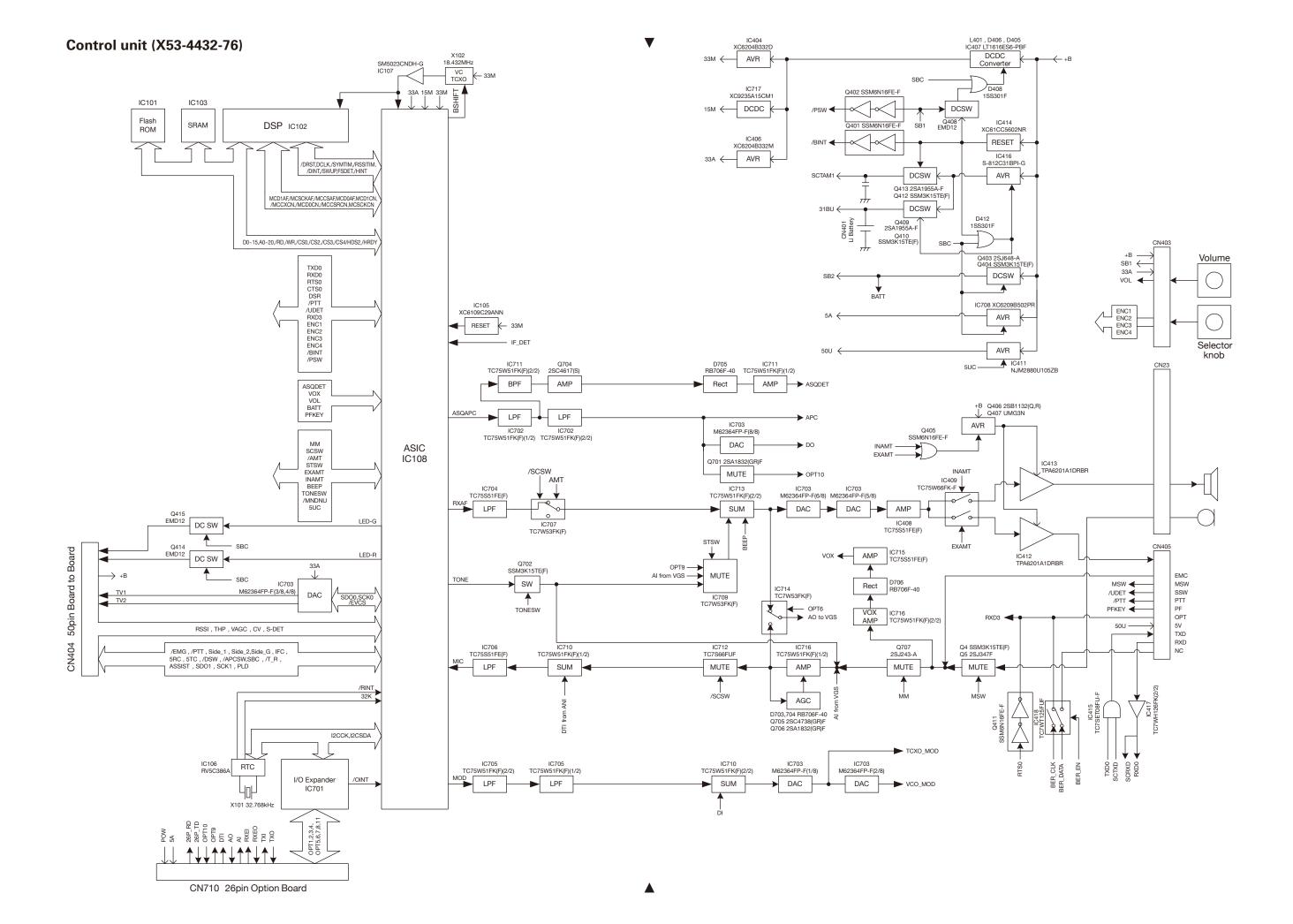












## TX-RX unit (X57-7830-11)

