VHF P25 TRANSCEIVER

TK-5210(G)

SERVICE MANUAL

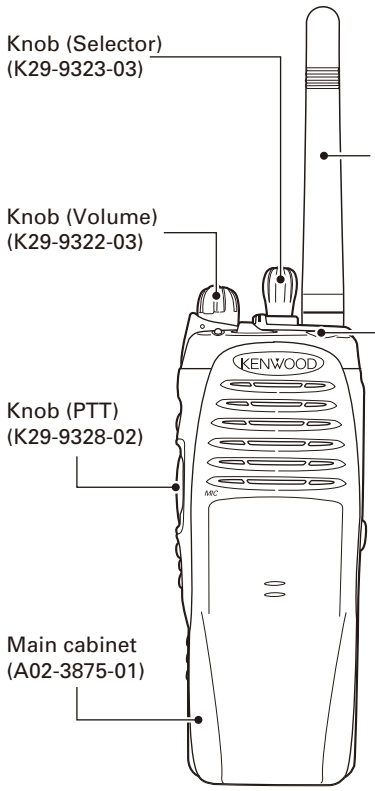
KENWOOD

Kenwood Corporation

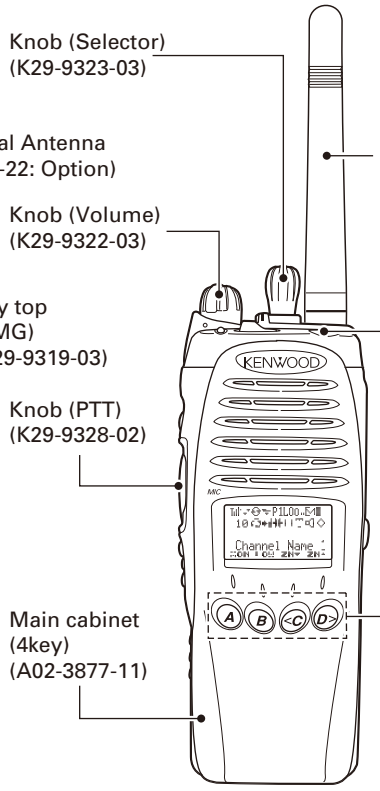
B51-8910-00 (N)

As for the hardware of this transceiver, version 3 is used.
The programming software must use KPG-95DG.

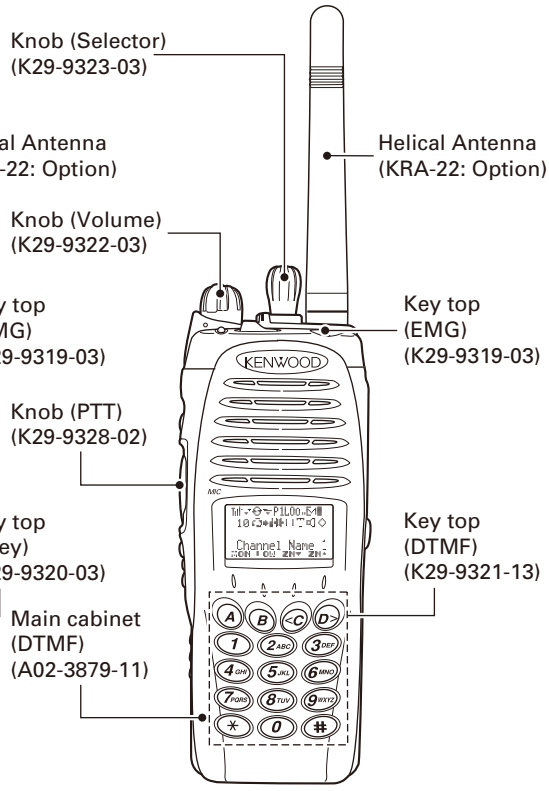
TK-5210(G) K



TK-5210(G) K2, K7



TK-5210(G) K3



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

CONTENTS

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

LF

This product uses Lead Free solder.

Document Copyrights

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Firmware Copyrights

Transceivers containing AMBE+2™ Vocoder:

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

GENERAL

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

PERSONAL SAFETY

The following precautions are recommended for personal safety:

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

SERVICE

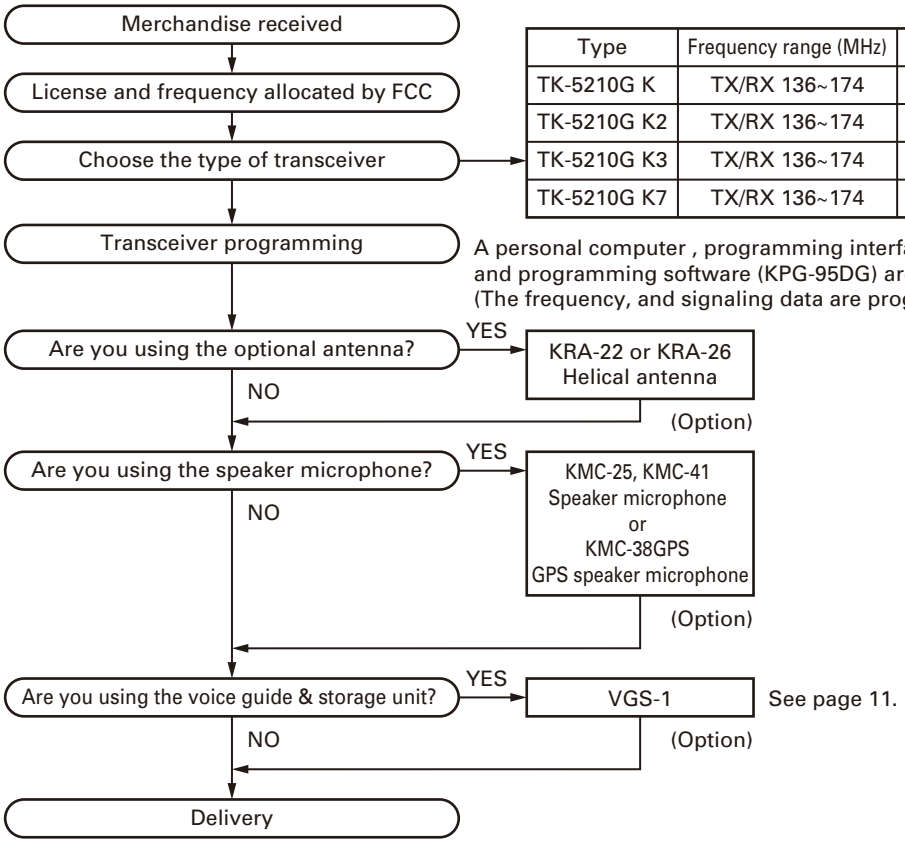
This transceiver is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained within.

NOTE

There are two types of FPU for this series. You must use KPG-95DG version 6.10 or later for transceiver. You can not use KPG-95D for this transceiver.

Model & Destination (Market code)		TX-RX Unit	Control Unit X53-4390-XX			Frequency range	Remarks	LCD	4-key	DTMF keypad
			0-10	0-11	0-12					
TK-5210G	K	X57-7650-10	✓	–	–	136~174MHz	1st IF: 49.95MHz LOC: 50.4MHz	–	–	–
	K2		–	✓	–			✓	✓	–
	K3		–	–	✓			✓	✓	✓
	K7		–	✓	–			✓	✓	–

SYSTEM SET-UP



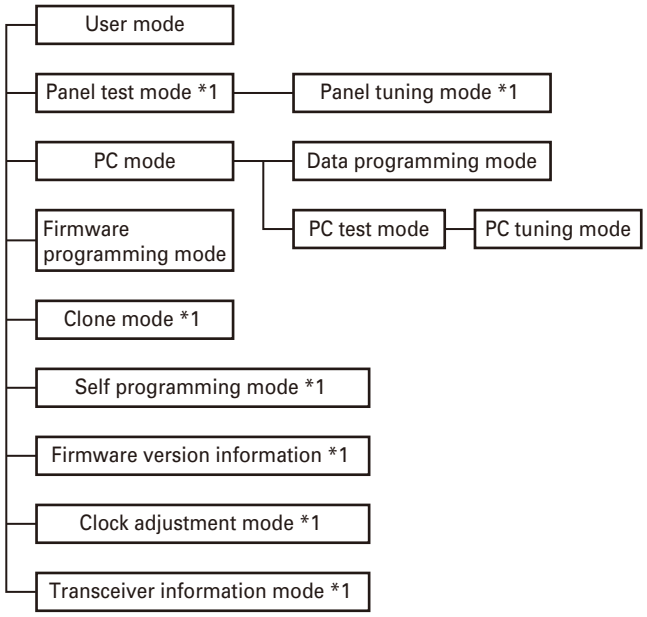
Type	Frequency range (MHz)	RF power	LCD	4-key	DTMF keypad	CH
TK-5210G K	TX/RX 136~174	5W	No	No	No	1024
TK-5210G K2	TX/RX 136~174	5W	Yes	Yes	No	1024
TK-5210G K3	TX/RX 136~174	5W	Yes	Yes	Yes	1024
TK-5210G K7	TX/RX 136~174	5W	Yes	Yes	No	128

A personal computer , programming interface (KPG-36/36A), USB adapter (KCT-53U), and programming software (KPG-95DG) are required for programming.
(The frequency, and signaling data are programmed for the transceiver.)

See page 11.

REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode *1	Used by the dealer to check the fundamental characteristics.
Panel tuning mode *1	Used by the dealer to tune the transceiver.
PC mode	Used for communication between the transceiver and PC.
Data programming mode	Used to read and write frequency data and other features to and from the transceiver.
PC test mode	Used to check the transceiver using the PC. This feature is included in the FPU. See panel tuning.
Firmware programming mode	Used when changing the main program of the flash memory.
Clone mode *1	Used to transfer programming data from one transceiver to another.
Self programming mode *1	Frequency, signaling and features write to the transceiver.
Firmware version information *1	Used to confirm the internal firmware version.
Clock adjustment mode *1	Used by the dealer to adjust date and time.
Transceiver information mode *1	Used to confirm the transceiver firmware version.

*1: K2, K3 and K7 models only

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode *2	Press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first.
PC mode	Received commands from PC.
Panel tuning mode *2	Press the [Side3] key, in Panel test mode.
Firmware programming mode	Press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then release the [Side3] key first.
Clone mode *2	Press and hold the [Side2] and [PTT] keys while turning the transceiver power ON and then release the [Side2] key first.
Self programming mode *2	Press and hold the [Side2] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first. And the "INPUT PASSWORD" is displayed, then release the [Side2] key.
Firmware version information *2	Press and hold the [Side3] key while turning the transceiver power ON.
Clock adjustment mode *2	Press and hold the [Orange] and [PTT] keys while turning the transceiver power ON and then release the [Orange] key first.
Transceiver information mode *2	Press and hold the [Side1] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first.

*2: K2, K3 and K7 models only

3. Panel Test Mode (K2, K3 and K7 models only)

Setting method refer to ADJUSTMENT.

4. Panel Tuning Mode (K2, K3 and K7 models only)

Setting method refer to ADJUSTMENT.

REALIGNMENT

5. PC Mode

5-1. Preface

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

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

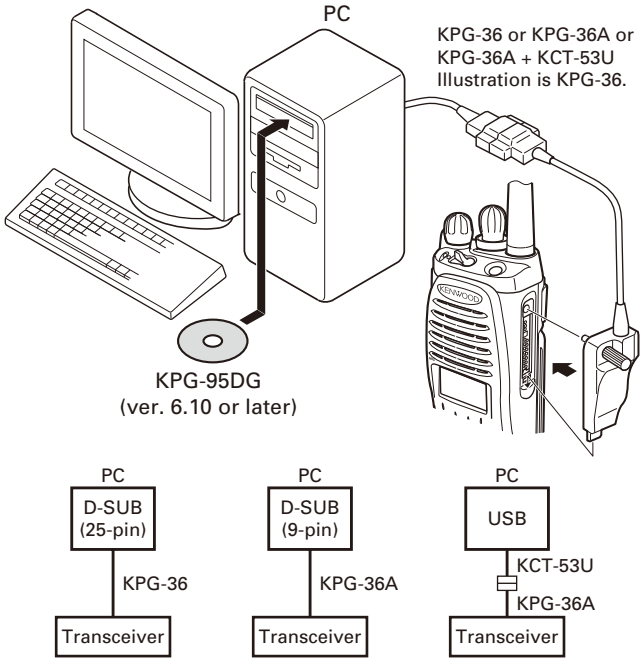


Fig. 1

5-2. Connection procedure

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

Note:

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

2. When the POWER switch on, user mode can be entered immediately. When PC sends command the transceiverenter PC mode, and "PROGRAM" is displayed on the LCD. When data transmitting from transceiver, the red LED is lights.
   When data receiving to transceiver, the green LED is lights.

Note:

- The text message are displayed for K2, K3 and K7 models only.
- The data stored in the computer must match the "Model Name and Market Code" when it is written into the flash memory.

5-3. KPG-36/KPG-36A description (PC programming interface cable: Option)

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

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

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

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

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

5-5. Programming software KPG-95DG description

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

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

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the transceiver. This allows the transceiver to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

6-2. Connection procedure

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

6-3. Programming

1. Start up the firmware programming software (Fpro.exe).
2. Set the communications speed (normally, 115200 bps) and communications port in the configuration item.
3. Set the firmware to be updated by File name item.
4. Press and hold the [Side3] and [PTT] keys while turning the transceiver power ON and then release the [Side3] key first. Then, the orange LED on the transceiver lights. And the "PROGRAM FIRMWARE" is displayed for K2, K3 and K7 models only.
5. Check the connection between the transceiver and the personal computer, and make sure that the transceiver is in the Program mode.
6. Press "write" button in the window. The orange LED turns off while the firmware is being erased, and the green LED turns on when the firmware data is being received.
7. If writing ends successfully, the checksum is calculated and a result is displayed.
8. If you want to continue programming other transceivers, repeat steps 4 to 7.

REALIGNMENT

Note:
- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software.
- The text message are displayed for K2, K3 and K7 models only.
- These transceivers use firmware versions G5.10 or later. When using firmware versions earlier than version G5.10 a "Check connection" error message will appear on the LCD. Firmware versions earlier than version G5.10 will not write to the transceiver.

6-4. Checksum display

1. If you press the [Side1] switch (top of left side) while "PROGRAM FIRMWARE" is displayed, the checksum is calculated, and a result is displayed. If you press the [Side1] switch again while the checksum is displayed, "PROGRAM FIRMWARE" is redisplayed.

Note:
- Normally, write in the high-speed mode.
- The text message are displayed for K2, K3 and K7 models only.

7. Clone Mode (K2, K3 and K7 models only)

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

The following data cannot be cloned.
- Tuning data
- Embedded message with password
- Model name data
- ESN (Electronic Serial Number) data
- Network file data (P25)

Key guide on the "INPUT PASSWORD" display.
- CNF ([A] key): The password confirmation
- DEL ([B] key): Delete the least digit from the current password number (Press and hold to delete all password numbers)
- SET ([D] key): Determine the least digit of the password number

1. Press and hold the [Side2] and [PTT] keys while turning the transceiver power ON and then release the [Side2] key first. If the Read authorization password is set to the transceiver, the transceiver displays "CLONE LOCK". If the password is not set, the transceiver displays "CLONE MODE".
2. When you enter the correct password, and "CLONE MODE" is displayed, the transceiver can be used as the cloning source. The following describes how to enter the password.
3.
- **How to enter the password using the keypad (K3 model only);**
  If the [D] key is pressed while "CLONE LOCK" is displayed, the Read authorization password input screen (INPUT PASSWORD) is displayed.If one of keys 0 to 9 is pressed while "INPUT PASSWORD" is displayed, the pressed number is displayed on the LCD. Each press of the key shifts the display in order to the left. When you enter the password and press the [A] or [∗] key, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
- **How to enter the password using the [Side2] and [Side3] keys (K2, K3 and K7 models);**
  If the [D] key is pressed while "CLONE LOCK" is displayed, the Read authorization password input screen (INPUT PASSWORD) is displayed. If the [Side2] key or [Side3] key is pressed while "INPUT PASSWORD" is displayed, the number (0 to 9) flashes on the LCD. When you press the [D] key, the currently selected number is determined. If you press the [A] key after entering the password in this procedure, "CLONE MODE" is displayed if the entered password is correct. If the password is incorrect, "CLONE LOCK" is redisplayed.
4. Power ON the target transceiver.
5. Connect the cloning cable (part No. E30-3325-05) to the universal connectors on the source and target.
6. Press the [Side1] or [A] key on the source while the source displays "CLONE MODE". The data of the source is sent to the target. While the target is receiving the data, "PROGRAM" is displayed. When cloning of data is completed, the source displays "END", and the target automatically operates in the User mode. The target can then be operated by the same program as the source.
7. The other target can be continuously cloned. When the [Side1] or [A] key on the source is pressed while the source displays "END", the source displays "CLONE MODE". Carry out the operation in step 4 to 6.
8. To return to "User mode" on the source transceiver, you must first turn the transceiver power off and then on again.

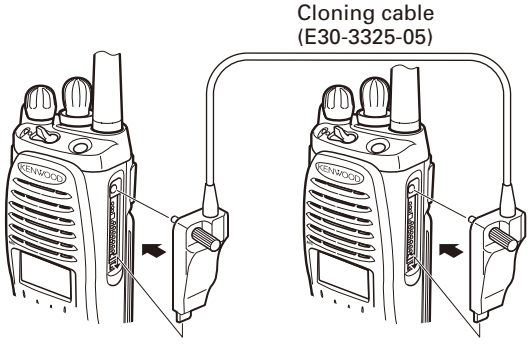


Fig. 2

Note:
- You can not clone transceivers using hardware version 1.0 or 2.0.

REALIGNMENT

- Cloning is only possible when transceivers are using hardware version 3.0.
- You can not clone if the password (overwrite password) is programmed to the target.
- You can not clone if the checksum in the Network File area of the source transceiver and the target transceiver is different.
- "Model Name and Market Code" must be same to clone the transceiver. However, it may be unable to clone the transceiver depending on the enhanced features settings. (Refer to the FPU for the enhanced features details.)
- Under certain conditions, clone mode cannot be activated even if the clone mode of the source transceiver, using Hardware Version 3.0, is set to enable. Refer to the FPU for more details.

8. Self Programming Mode (K2, K3 and K7 models only)

Write mode for frequency data and signaling etc. To be used ONLY by the authorized service person maintaining the user's equipment.

The following setup items in the channels programmed by the FPU can be changed using the "Self-programming" mode. The addition of new channel and the deletion of channel that has already been programmed by the FPU cannot be performed using the self-programming mode.

- RX frequency
- TX frequency
- Channel type
- TX mode (When the channel type is selected "MIXED".)
- Channel spacing (When the channel type is selected "ANALOG" ro "MIXED".)
- RX signaling
- TX signaling
- RX NAC
- TX NAC
- Talkgroup list number

Note:

The personality will be also changed when the above-mentioned items is changed. (Refer to the FPU for the personality details.)

Key guide on the "INPUT PASSWORD" display.

- CNF ([A] key): The password confirmation
- DEL ([B] key): Delete the least digit from the current password number (Press and hold to delete all password numbers)
- SET ([D] key): Determine the least digit of the password number

8-1. Enter to the self programming mode

Press and hold the [Side2] and [PTT] keys while turning the transceiver power ON and then release the [PTT] key first. Ignoring whether the Read authorization password is set or not, "INPUT PASSWORD" appears, then release the [Side2] key.

If the Read authorization password is not set to the transceiver, "SELF PROG MODE" is displayed on the LCD when the [A] key is pressed while "INPUT PASSWORD" is displayed.

If the password is set to the transceiver, "SELF PROG MODE" is displayed on the LCD when you enter the correct password while "INPUT PASSWORD" is displayed.

For the password input method, see "7.Clone Mode" step 3 described on page 6.

Note :

This mode (self programming mode) cannot be set when it has been disabled with the FPU.

8-2. Data Writing

Before moving to the next Zone/Channel, "KEEP THIS CHANGE?" appears on the LCD, if you select "YES", the new data is written to memory. IF you select "NO", the new data will not be written; the new data will be erased.

• The setup items for self programming mode are as follows.

No.	Setup item	Display	Remarks
1	Select Zone/Channel	ZONE [***] -CH *** ZONE *** -CH [***]	Zone: 1~100 CH: 1~512 [K7 model only Zone: 1~32, CH: 1~128]
2	RX frequency	RX Freq	Receive frequency
3	TX frequency	TX Freq	Transmit frequency
4	Channel type	CH Type	ANALOG/P25/MIXED
5	TX mode	TX Mode	ANALOG/P25
6	Channel spacing	CH Space	25.0kHz/12.5kHz (When the Channel type is selected "ANALOG" or "MIXED".) P25 12.5kHz
7	RX Signaling	RX Sig	Receive QT/DQT
8	TX Signaling	TX Sig	Transmit QT/DQT
9	RX NAC	RX NAC ***	000~FFF (Hexadecimal) Note: "F7F" cannot be set.
10	TX NAC	TX NAC ***	000~FFF (Hexadecimal) Note: "F7E" and "F7F" cannot be set.
11	Talkgroup list number	TG List No. ***	1~250

REALIGNMENT

Key operation

Item / Key	Zone-Channel	RX Frequency	TX Frequency	Channel Type	TX Mode	Channel Spacing	RX Signaling	TX Signaling
[A]	Go to the next item							
[B]	Zone/Channel switching	2.5kHz/5kHz/6.25kHz/ 7.5kHz/1MHz step switching		Unused			QT/DQT(N)/DQT(I)/OFF switching	
[C]	Zone/Channel down	1 step down		ANALOG/P25/MIXED switching (Back)	ANALOG/P25 switching (Back)	Channel spacing switching (Back)	Signaling down	
[D]	Zone/Channel up	1 step up		ANALOG/P25/MIXED switching (Forward)	ANALOG/P25 switching (Forward)	Channel spacing switching (Forward)	Signaling up	
[Side3]	Unused	Unused	ON/OFF switching	Unused			1 step/Standard switching	
Keypad [0]~[9] (K3 model only)	Unused	Go to the direct enter mode		Unused			Go to the direct enter mode (After selecting signaling type)	

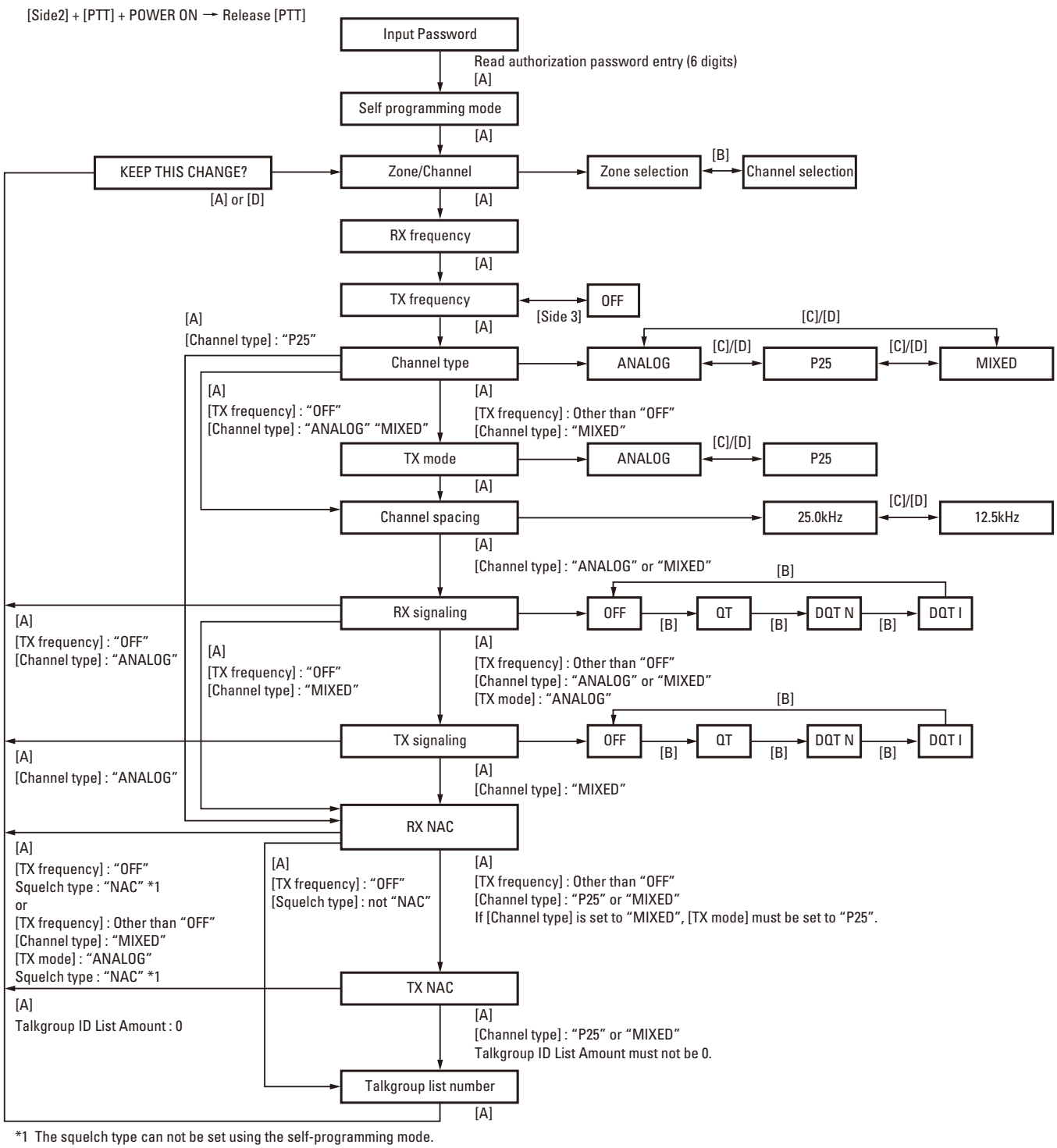
Item / Key	RX NAC	TX NAC	TG List No.
[A]	Go to the next item		
[B]	Delete the least digit from the current number (Press and hold to delete all numbers.)		Unused
[C]	Unused		TG List number down
[D]	Determine the least digit		TG List number up
[Side2]	Increment a number in the specified digit		Unused
[Side3]	Decrement a number in the specified digit		Unused
Keypad (K3 model only)	Add a digit to the current number How to enter the "A" ~ "F" is follows. A: Press [2] with PTT B: Press [5] with PTT C: Press [8] with PTT D: Press [0] with PTT E: Press [#] with PTT F: Press [*] with PTT		Unused

• Direct enter mode

Item / Key	RX Frequency	TX Frequency	RX Signaling	RX Signaling
[A]	Return to non-direct enter mode			
[B]	Unused		Change the type of signaling and return to non-direct enter mode	
[C]	Unused			
[D]	Delete the least digit from the current number (Press and hold to delete all numbers.)			
[Side3]	ON/OFF switching at TX Frequency		Unused	
Keypad [0]~[9]	Add a digit to the current number			
Keypad [*]	Return to non-direct enter mode			
Keypad [#]	Delete the least digit from the current number (Press and hold to delete all numbers.)			

REALIGNMENT

• Self programming mode flow chart



*1 The squelch type can not be set using the self-programming mode.

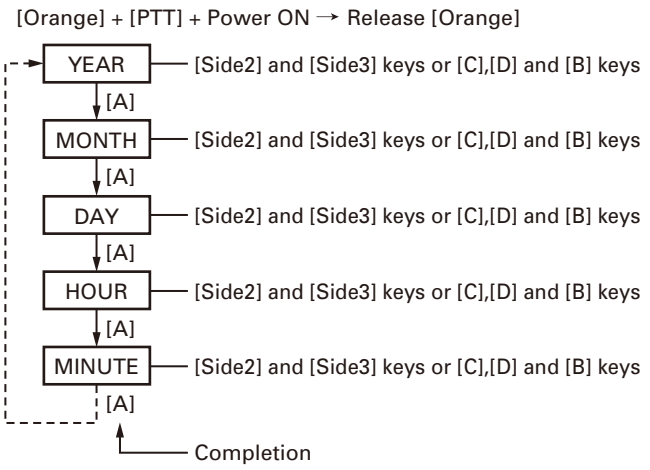
REALIGNMENT

9. Firmware Version Information (K2, K3 and K7 models only)

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

10. Clock Adjustment Mode (K2, K3 and K7 models only)

10-1. Flow chart of operation



11. Transceiver Information Mode (K2, K3 and K7 models only)

Use this function to confirm the transceiver firmware version.

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

INSTALLATION

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

■ Installing the VGS-1 unit in the transceiver

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

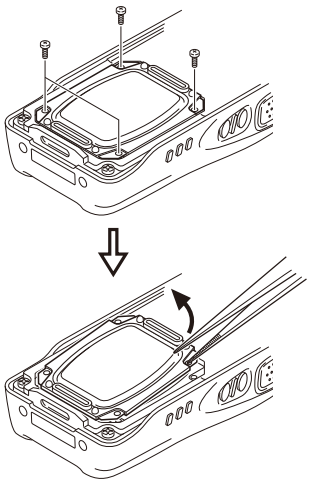


Fig. 1

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

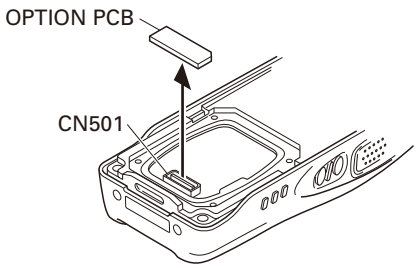


Fig. 2

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

Note:

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

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

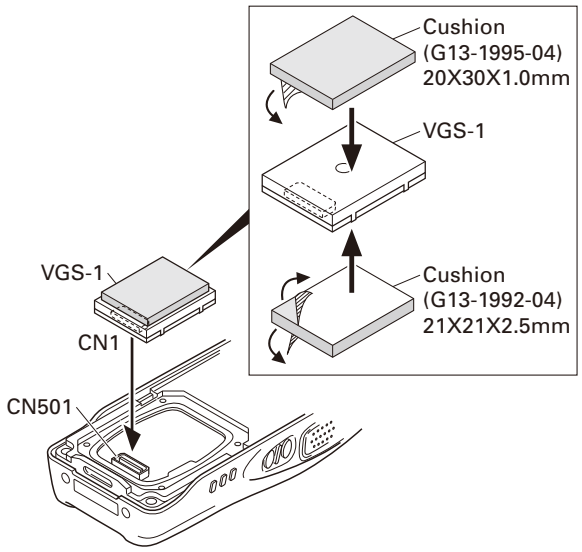


Fig. 3

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

Note:

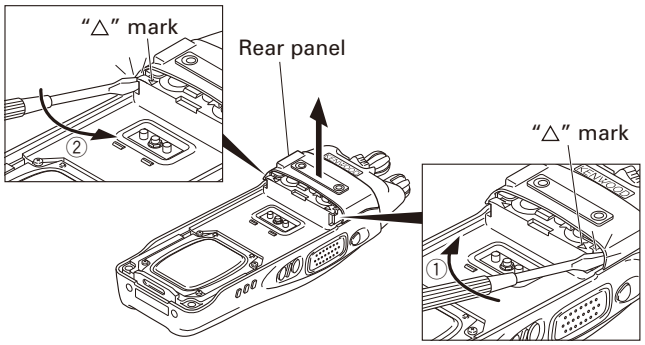
You must setup using the KPG-95DG.

DISASSEMBLY FOR REPAIR

Disassembly Procedure

■ Removing the front case from the chassis

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

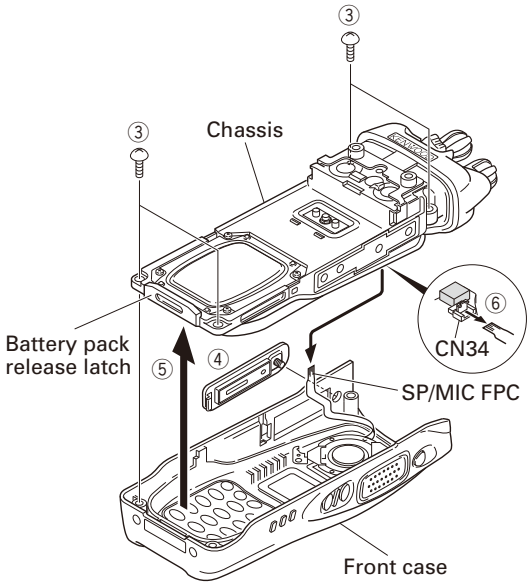


2. Remove the four screws ③ and universal connector cap ④.
3. Lift the battery pack release latch on the bottom of the chassis ⑤ and remove the chassis from the front case.

Note:

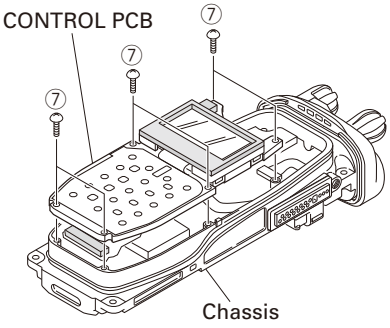
- Lift the chassis from the front case slowly and carefully. If the chassis is lifted suddenly, the SP/MIC FPC may be pulled and the connector may become damaged.
- Handle the main packing with care. It is likely to collect dust and dirt.

4. Remove the SP/MIC FPC from the CONTROL PCB connector (CN34) ⑥.

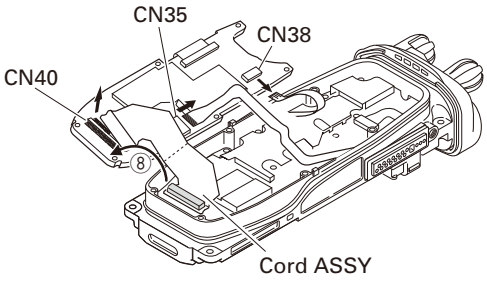


■ Removing the CONTROL PCB (X53-439) from the chassis

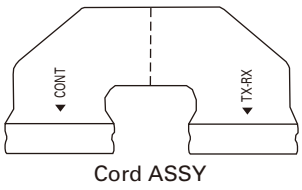
1. Remove the six screws ⑦.



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



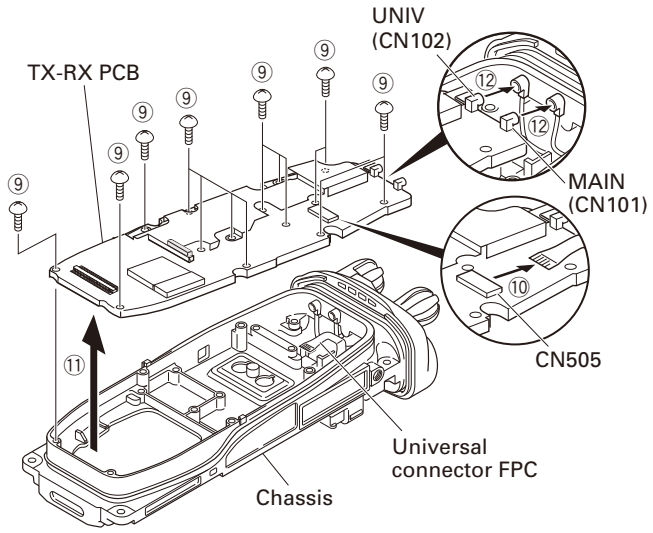
Note:
Fold indications are printed on the Cord ASSY and Universal Connector FPC.
"- - - -" line shows creased line on the bottom.



DISASSEMBLY FOR REPAIR

■ Removing the TX-RX PCB (X57-765 A/3) from the chassis

1. Remove the 14 screws ⑨.
2. Remove the universal connector FPC from the TX-RX PCB connector (CN505) ⑩.
3. Insert the two tips of a pair of tweezers into the two holes in the bottom of the shield plate of the TX-RX PCB, firmly squeeze the tweezers to hold the shield plate, then remove the TX-RX PCB ⑪.
4. Remove the coaxial cables from the connector (MAIN (CN101), UNIV (CN102) of the TX-RX PCB ⑫.

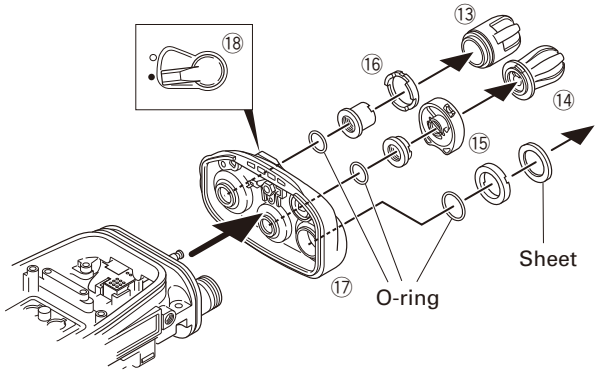


■ Removing the top panel from the chassis

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

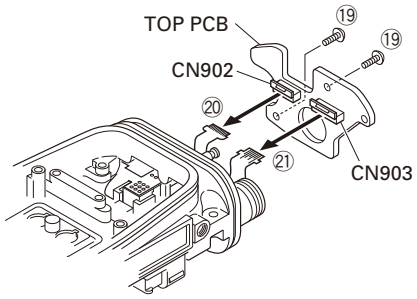
Note:

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



■ Removing the TOP PCB (X57-765 B/3) from the chassis

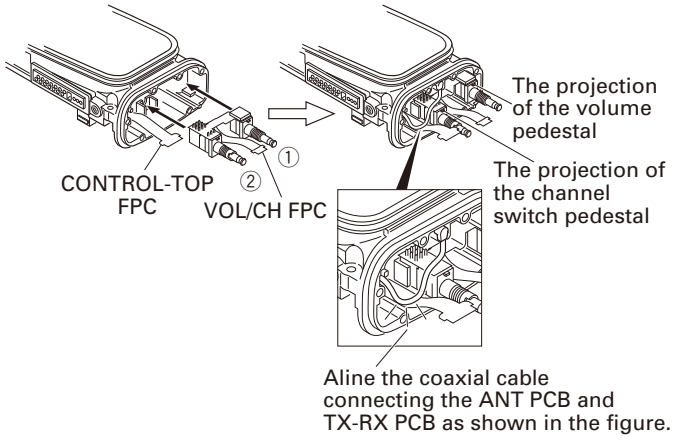
1. Remove the two screws ⑲.
2. Lift the TOP PCB and remove the VOL/CH FPC ⑳ and CONTROL-TOP FPC ㉑ from the two connectors (CN902, CN903) of the TOP PCB.



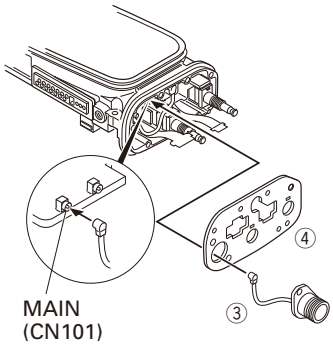
Precautions for Reassembly

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

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



3. Pass the coaxial cable ③ of the antenna receptacle through the round hole of the hardware fixture ④, then insert it into the coaxial connector (MAIN (CN101)) of the TX-RX PCB.

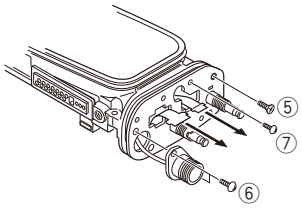


DISASSEMBLY FOR REPAIR

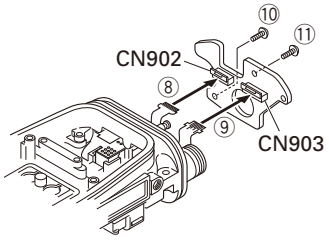
4. Pass the volume, channel switch, VOL/CH FPC and CONTROL-TOP FPC through hardware fixture holes, then bring the hardware fixture into contact with the chassis and fix it with a screw ⑤.

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

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

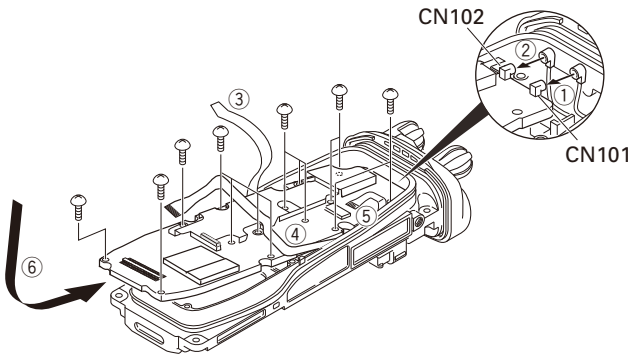


7. Insert the VOL/CH FPC ⑧ and the CONTROL-TOP FPC ⑨. into the connectors (CN902, CN903) of the TOP PCB.
8. Fix the TOP PCB with a screw ⑩.
9. Fix the TOP PCB with a screw ⑪.



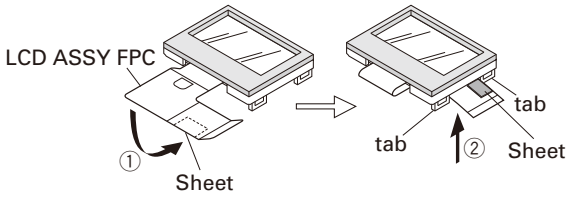
■ TX-RX PCB Installation Procedure

1. Insert the coaxial cable of the antenna receptacle into the coaxial connector (CN101) of the TX-RX PCB ① and the coaxial cable of the ANT PCB into the coaxial connector (CN102) of the TX-RX PCB ②.
2. Grasp both sides of the lower part of the TX-RX PCB, tilt the TX-RX PCB and install the chassis so that the PTT FPC ③, CONTROL-TOP FPC ④ and universal connector FPC ⑤ are not caught ⑥.
3. Fix the TX-RX PCB with the 14 screws.



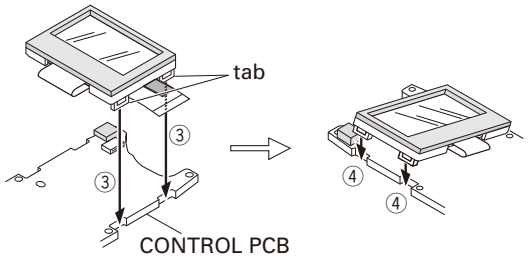
■ LCD ASSY Installation Procedure

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

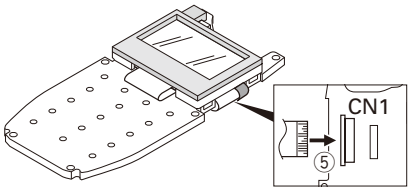


2. Fit the two tabs on the right side of the holder ③ and the two tabs on the left side of the holder ④ into the CONTROL PCB.

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



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



DISASSEMBLY FOR REPAIR

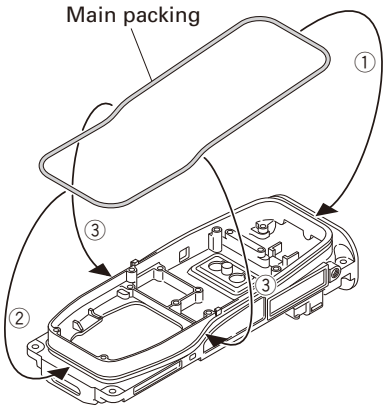
■ Main Packing (G53-1637-04) Installation Procedure

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

Note:

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

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



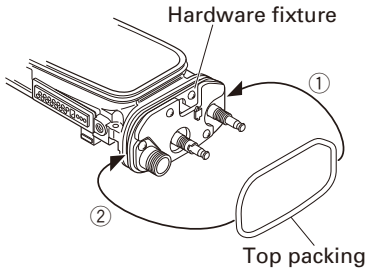
Note:

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

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

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

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



Note:

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

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

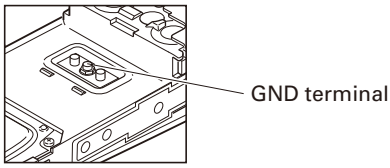
■ Volume Torque-up Packing (G53-1628-04) Installation Procedure

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

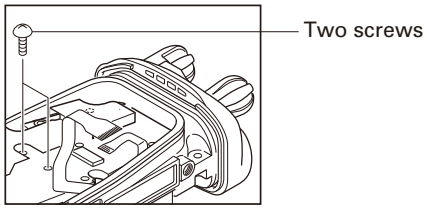
■ Screw sequence for mounting the battery terminal block to the chassis

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

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



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



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

DISASSEMBLY FOR REPAIR

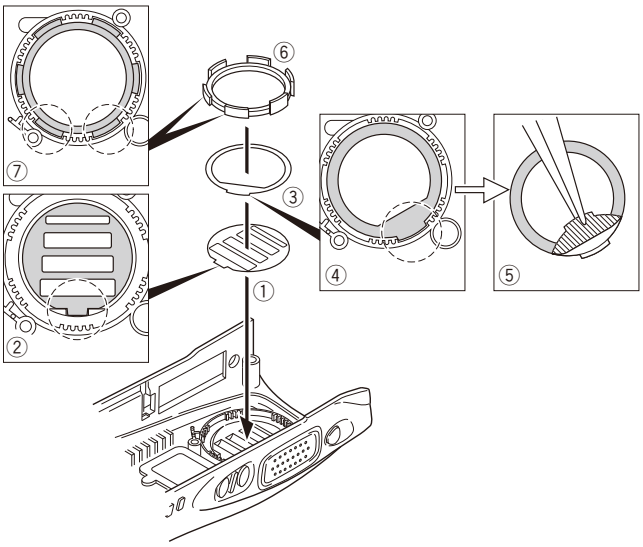
Installation Procedure During Parts Replacement

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

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

Note:

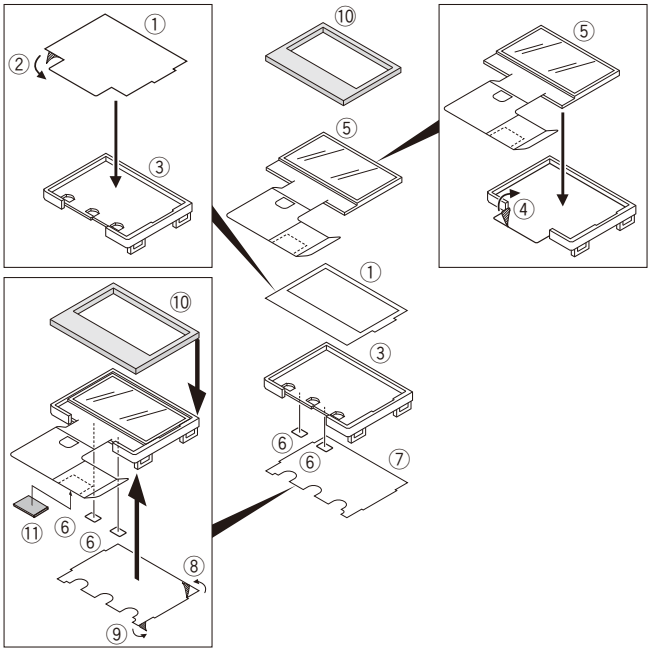
Fit the packing into the hollow of the case so that the two low-height places in the convex of the packing are positioned on the lower side ⑦.



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

■ Installing a new LCD ASSY to the holder (K2, K3 and K7 models only)

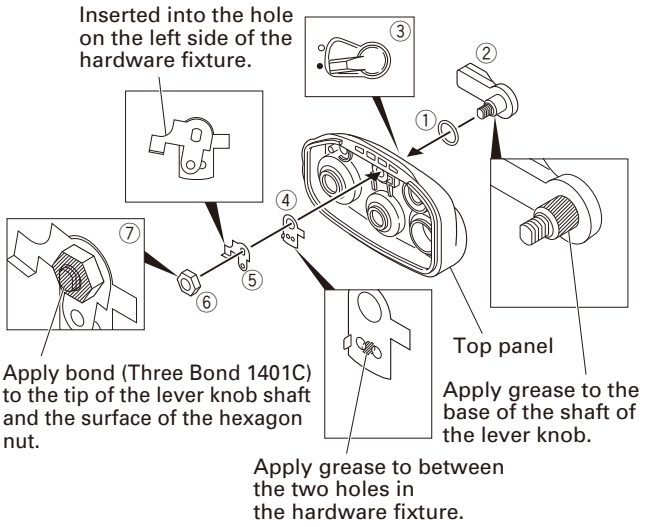
1. Remove the separation paper (brown) from the new sheet ① ②, and attach the sheet to the surface of the holder ③.
2. Remove the protection sheets attached to both sides of the new LCD ASSY.
3. Remove the separation paper (white) from the sheet in step 1 ④, then attach the LCD ASSY ⑤ to the sheet.
4.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



DISASSEMBLY FOR REPAIR

■ Procedures when Replacing the Top Panel

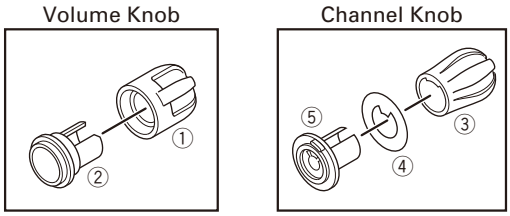
1. Insert the O-ring ① into the lever switch part of the new top panel.
2. Apply grease to the base of the shaft of the lever knob ② and install the lever knob so that it is in the "●" position (circle painted in white) on the top panel ③.
3. Pass the hardware fixture ④ through the shaft and install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



■ Volume Knob and Channel Knob Parts Replacement

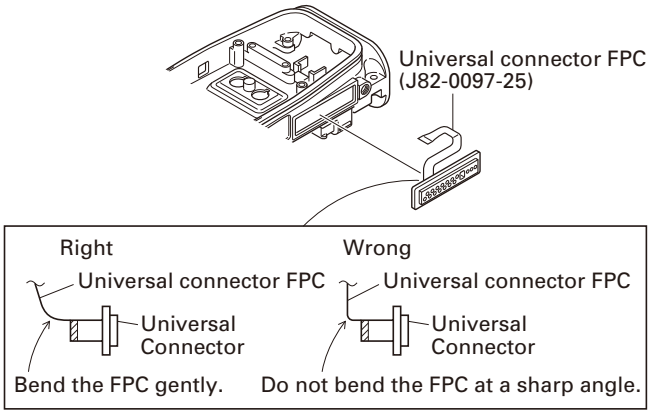
Since the volume knob consists of two components, a knob ① and a spacer ②, replace and reinstall these two parts at the same time.

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



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

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



CIRCUIT DESCRIPTION

1. Overview

The KENWOOD model TK-5210(G) is a VHF/FM/P25 Portable transceiver designed to operate in the frequency range of 136 to 174MHz.

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

2. Frequency Configuration

The receiver is a double-conversion super heterodyne using first intermediate frequency (IF) of 49.95MHz and 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 49.95MHz.

This is then mixed with the 50.4MHz second local signal to produce the 450kHz second IF. This signal is detected to give the demodulated signal in the DSP.

The transmit signal frequency is generated by the PLL VCO, and modulated by the signal from the DSP. It is then amplified and fed to the antenna.

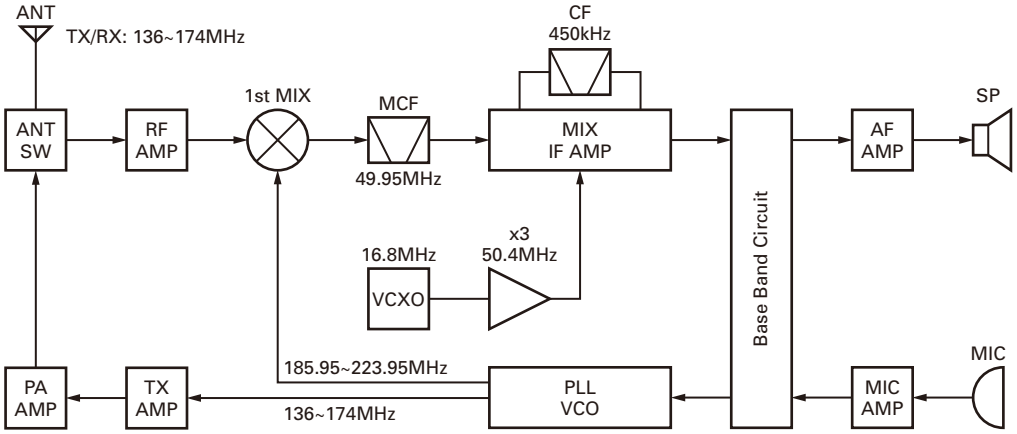


Fig. 1 Frequency configuration

3. Receiver System

3-1. Front-end RF Amplifier

The signal is passed through an antenna matching coil, where the high-frequency components are amplified by a GaAs FET (Q202). The signals are then fed into band-passfilter that uses varactor diode tuning to reject unwanted signal components, and is fed to the 1st mixer.

3-2. 1st Mixer

The 1st mixer is used the GaAs IC (IC202). The 1st mixer mixes the signal with the 1st local oscillator frequency from the VCO, and converts it to the 1st IF (49.95MHz). The signal then passes through monolithic crystal filter (XF201) to remove unnecessary nearby frequency components. The signal from the MCF is used as the 1st IF signal.

3-3. IF Amplifier

The 1st IF signal is amplified by the IF amplifier (Q204) and fed into the FM IC (IC204). The IF signal is then mixed with the 2nd local oscillator frequency of 50.4MHz to generate the 2nd IF of 450kHz. The 450kHz signal is then passed through a ceramic filter (CF201) and fed back into IC204 for additional amplification.

3-4. Wide/Narrow/P25 Switching Circuit

Wide, Narrow, and P25 settings can be made for each channel by switching the ceramic filters CF203 (Wide), CF204 (Narrow, P25), and there are controlled with the multiplexers (IC206, IC207).

When a W_/N Signal line is H, the 450kHz signal is passed through a ceramic filter (CF203).

When a W_/N signal line is L, the 450kHz signal is passed through a ceramic filter (CF204).

After that, the signal throughs ceramic filter (CF250) and is fed into ASIC (IC10). And then, the signal is demodulated in ASIC, the AF signal is dealed with DSP (IC3).

CIRCUIT DESCRIPTION

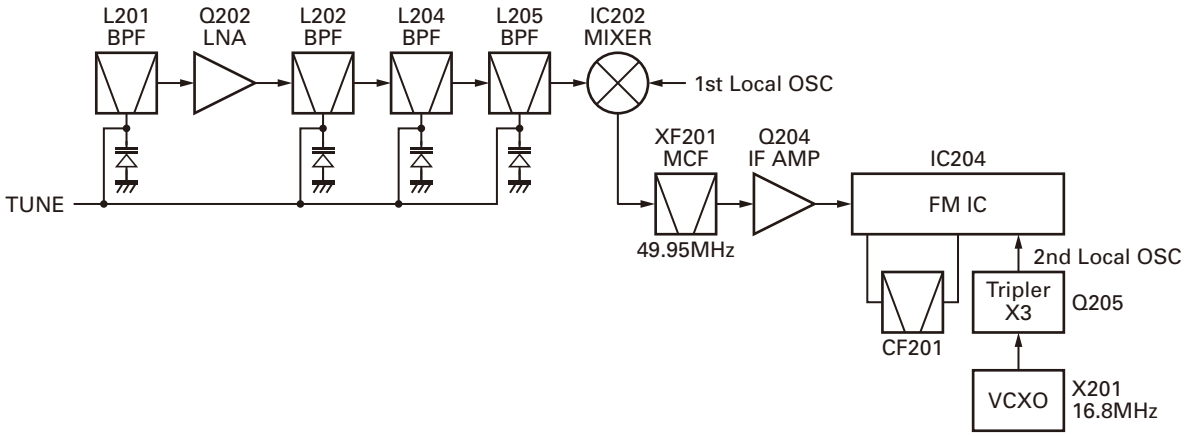


Fig. 2 Receiver section

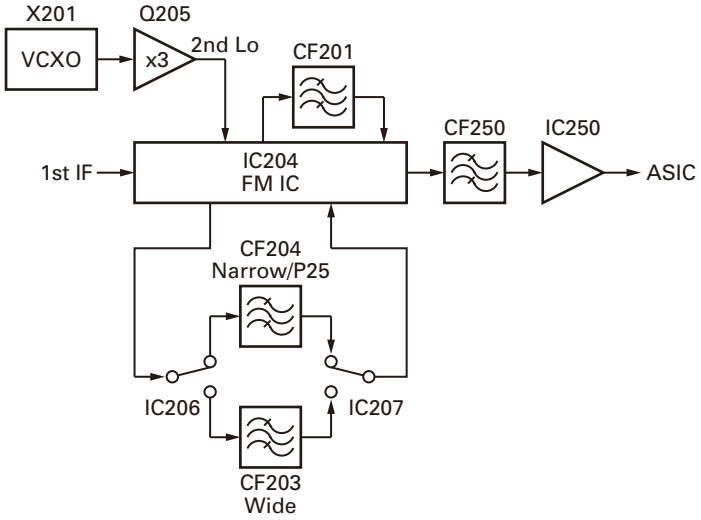


Fig. 3 Wide/Narrow/P25 switching circuit

3-5. Audio Amplifier Circuit

The AF signal from ASIC (IC10) is filtered for anti-aliasing and to eliminate unwanted spectrums to hear. Next, the AF signal goes through an electronic volume control (IC10) to be adjusted its level and a buffering AF amplifier IC506. Finally the AF signal into the audio power amplifier (IC11, 12).

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

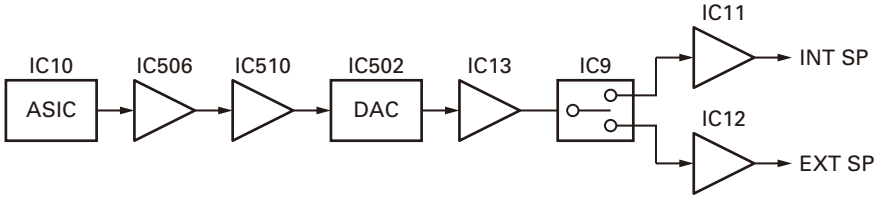


Fig. 4 Audio amplifier circuit

CIRCUIT DESCRIPTION

3-6. Squelch Circuit

It amplifies the demodulated noise signal from FM IC (IC204) after filtering through BPF circuit. Then, the amplified signal is converted to DC signal by the detection circuit. The converted signal is fed to the ASIC (IC10).

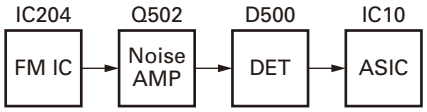


Fig. 5 Squelch circuit

4. Transmitter System

4-1. Audio Band Circuit

The signal from the microphone passes through the mute switch (Q506) and AGC circuit (IC516, D511, D512, Q504, Q505), and goes to the summing amplifier (IC513), then is fed into ASIC (IC10) and converted from analogto digital. The digitalized signal undergoes AGC processing, pre-emphasizing, filtering, vocording (in APCO mode), and returns to the ASIC (IC10). The signal is converted from digital to analog signal is amplified by ASIC (IC10). Then the signal adjusted to appropriate level passes through the buffer (IC512) and DAC (IC502), and goes to the VCO and VCXO in PLL section.

4-2. Base Band Circuit

The audio signal output from the base band circuit is converted to digital data of a sampling frequency of 48kHz.

This digital data is sent to the DSP (IC3), and voice signals of 300Hz or lower and frequencies of 3kHz or higher are cut off and an audio range 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 the ASIC (IC10). In Digital mode, the audio signal is converted to the C4FM base band signal and output from the IC10. The DTMF and MSK base band signals are also generated by the DSP and output by the IC10.

LPF (IC512) works as smoothing filter. The DAC (IC502) assigns the base band signal to the VCO and VCXO (X301). At this time, the level output according to the transmit carrier is fine-adjusted according to each modulation method.

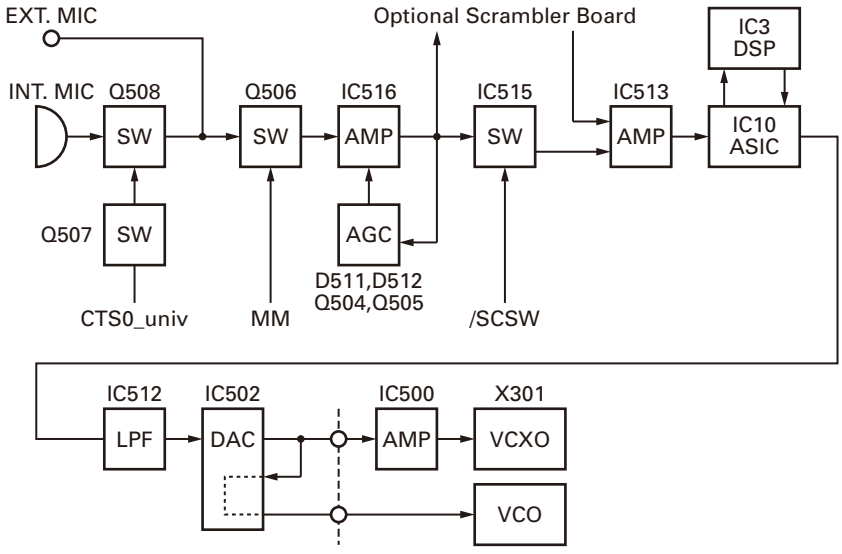


Fig. 6 Audio band and Base band circuit

CIRCUIT DESCRIPTION

4-3. Transmit Signal Amplification Circuit (From T/R switch to Final amplifier)

The transmit signal passing through the T/R switch (D101) is amplified to approx 100mW by the two transistor amplification circuits (Q101, Q102). The transmit signal output from Q102 passes through a 3dB attenuator to improve high-frequency signal matching is amplified by the drive amplifier (Q103) and applied to the final amplifier (Q105). The signal applied to the final amplifier is amplified by the final amplifier so that the antenna output is 5W (1W for Low Power).

4-4. High-Frequency Signal Switch Circuit (From Antenna switch to ANT output)

The transmit signal output from the final amplifier (Q105) passes through the antenna switch (D106, D107) and LPF, and goes into the SPDT switch (IC102, IC103) which changes the antenna connector (CN101) and the universal connector (CN102). The transmit signal passing through the output change switch passes through the surge protection HPF and spurious removing LPF and then goes to the antenna connector (CN101) or the universal connector (CN102), specified by the SPDT switch (IC102, IC103).

4-5. APC circuit

The APC circuit detects the current of the drive amplifier (Q103) and final amplifier (Q105) during transmission and controls the output power by controlling the current. It detects the current using R119 and R120 and applies a drop voltage between both resistors during transmission to APC IC (IC101). It controls the transmission current of the drive amplifier and final amplifier so that it is constant by comparing this current with the reference voltage output from pin 7 of IC104. The reference voltage input to pin 5 of IC104 is output from the DAC (IC502).

High/Low power output is set according to the DAC output voltage.

4-6. Temperature Protection Circuit

The temperature protection circuit reduces the APC voltage when the temperature of Q105 rises, to prevent thermal destruction of the final amplifier (Q105). The ASIC (IC10) detects the temperature with a thermistor (TH101) to control the reference voltage to the APC circuit.

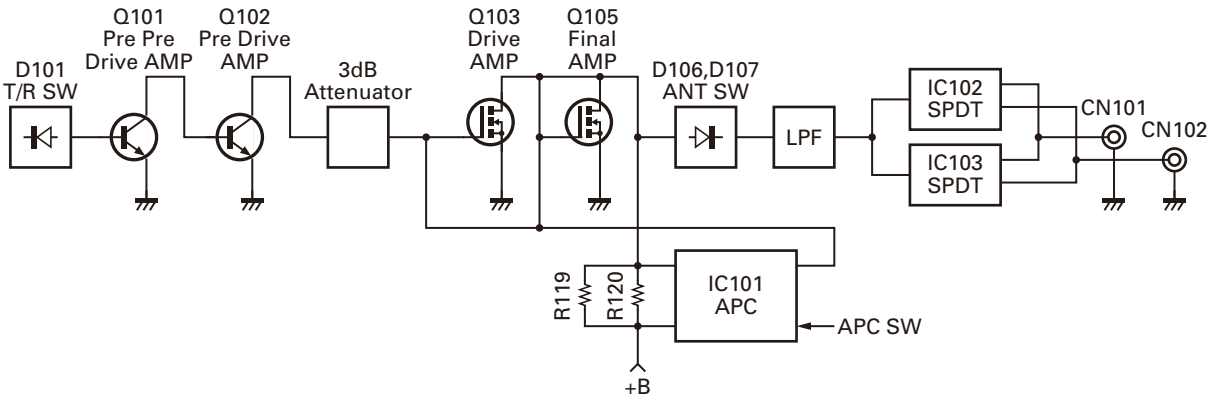


Fig. 7 Transmitter circuit

5. PLL Frequency Synthesizer

5-1. VCXO (X301)

VCXO (X301) generates a reference frequency of 16.8MHz for the PLL frequency synthesizer. This reference frequency is applied to pin 8 of the PLL IC (IC303).

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

5-2. VCO

There is a RX VCO and a TX VCO.

The TX VCO (Q311) generates a transmit carrier and the RX VCO (Q310) generates a 1st local receive signal. For the VCO oscillation frequency, the transmit carrier is 272 to 348MHz and the 1st local receive signal is 371.9 to 447.9MHz.

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

The voltage control terminals, "CV" and "ASSIST", are controlled by the PLL IC (IC303) and rheostat (IC414) 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 transmit is active (user pressed PTT).

CIRCUIT DESCRIPTION

5-3. Rheostat (IC414)

The rheostat (IC414) is connected to the VCO voltage control terminal, "V-assist", and quickly controls the VCO oscillation frequency. However, its accuracy is low and the VCO frequency cannot be matched accurately with the desired transmit carrier or the 1st local receive signal. The rheostat is controlled by the ASIC (IC10) through the 3-lines "PCS_pot", "SDO0", "SCK0" serial bus.

5-4. PLL IC (IC303)

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

When the frequency is controlled by the PLL, the frequency convergence time increases as the frequency difference increases when the set frequency is changed. To supplement this, the ASIC (IC10) is used before 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 approx. 2.0V.

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

5-5. Local Switch (D101, D210)

The connection destination of the signal output from the 1/2 driver (IC304) is changed with the diode switch (D101) that is controlled by the transmission power supply, 5T, and the diode switch (D210) that is controlled by the receive power supply, 5R.

If the 5T logic is high, it is connected to a send-side pre-pre-drive (Q101). If the 5T logic is low, it is connected to a receive-side mixer (IC202).

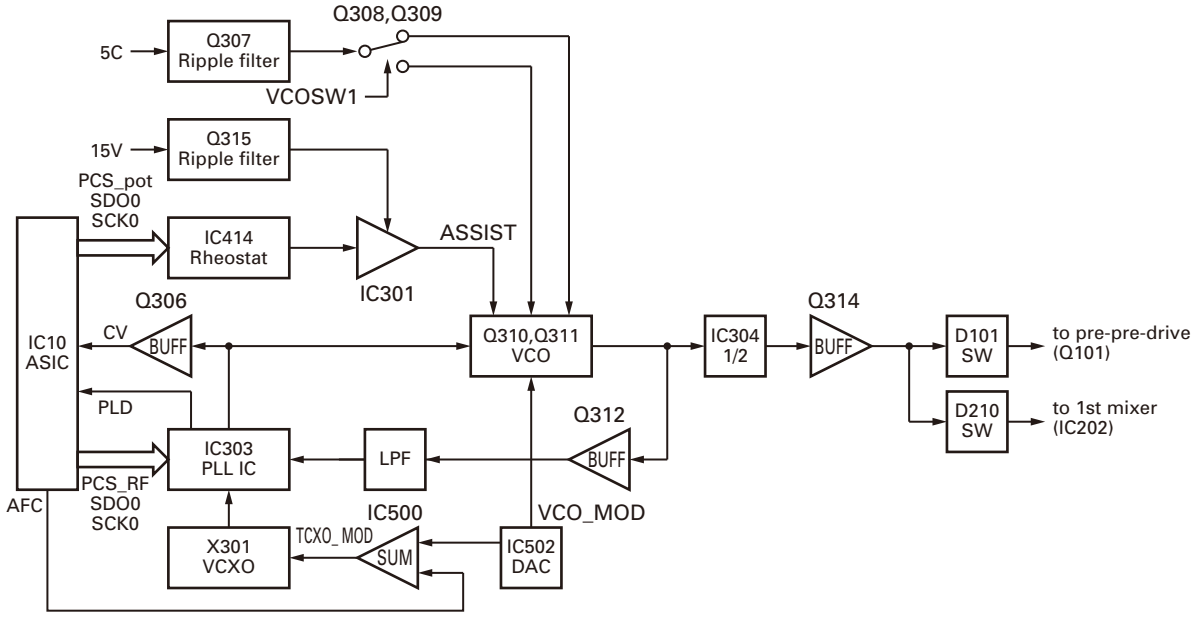


Fig. 8 PLL block diagram

6. Control Circuit

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

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

6-1. ASIC

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

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

CIRCUIT DESCRIPTION

6-2. Memory Circuit

Memory circuit consists of the ASIC (IC10) and the SRAM (IC4), the flash memory (IC1). The flash memory has capacity of 32M-bit that contains the transceiver control program for the ASIC and stores the data. It also stores the data for transceiver channels and operating 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-95DG), 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 save data does not break.

■ Real-time clock

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

6-3. LCD

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

6-4. Temperature Detection Circuit

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

6-5. Key Detection Circuit

Keys are detected using Key scan circuit in IC10.

The /KEYI* signals that are normally pulled down go high when any key is pressed.

6-6. Low Battery Warning

The battery voltage is divided using R712 and R714 and is detected by the ASIC (IC10). When the battery voltage falls below the voltage set by the Low battery warning adjustment, the red LED blinks to notify the operator that it is time to replace the battery. If the battery voltage falls even more (approx. 5.8V), a beep sounds and transmission stops.

Low battery warning	Battery condition
The red LED blinks during transmission.	The battery voltage is low but the transceiver is still usable.
The red LED blinks and the warning tone beeps while the PTT switch is pressed.	The battery voltage is low and the transceiver is not usable to make calls.

6-7. Battery Type Detection

The transceiver automatically detects the battery type, measuring the resistance between the S-terminal and GND terminal on the battery pack and changes the supplied voltage to the S-terminal as below. The ASIC (IC10) then detects the battery type.

Battery type	Input voltage of S-termial	Resistor value
Battery case	0~0.2V	Short
Li-ion battery	0.85~1.02V	47kΩ
Ni-Cd battery	3.23~3.37V	Open
Ni-MH battery	1.71~1.95V	150kΩ

6-8. VOX

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

The VOX (Voice Operated Transmission) function detects voice input to the microphone and automatically switches between transmission and reception. However, if a scrambler board is installed (Extended Function Voice Scrambler is selected with FPU), VOX does not operate.

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

The transceiver realizes this function using DSP (IC8).

6-9. DSP

The DSP circuit consists of a DSP (IC3) and processes the base band signal. The DSP operates on an external clock of 18.432MHz (the same as the X2), the I/O section operates at 3.3V and the core section operates at 1.5V. The DSP carries out the following processes:

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

CIRCUIT DESCRIPTION

7. Power Supply Circuit

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

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

The output from the 3.6V DC/DC converter (IC707) provides the power source for three regulators (IC705, IC706, IC710) and 1.5V DC/DC converter (IC709). After these parts became ON, Flash (IC1), DSP (IC3), SRAM (IC4), ASIC (IC10) start to operate. After the ASIC starts up, it begins controlling three regulators (IC701, IC702, IC704) with the SBC and /SAVE signal. And after that, one regulator (IC700) is controlled by the 5M signal.

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

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

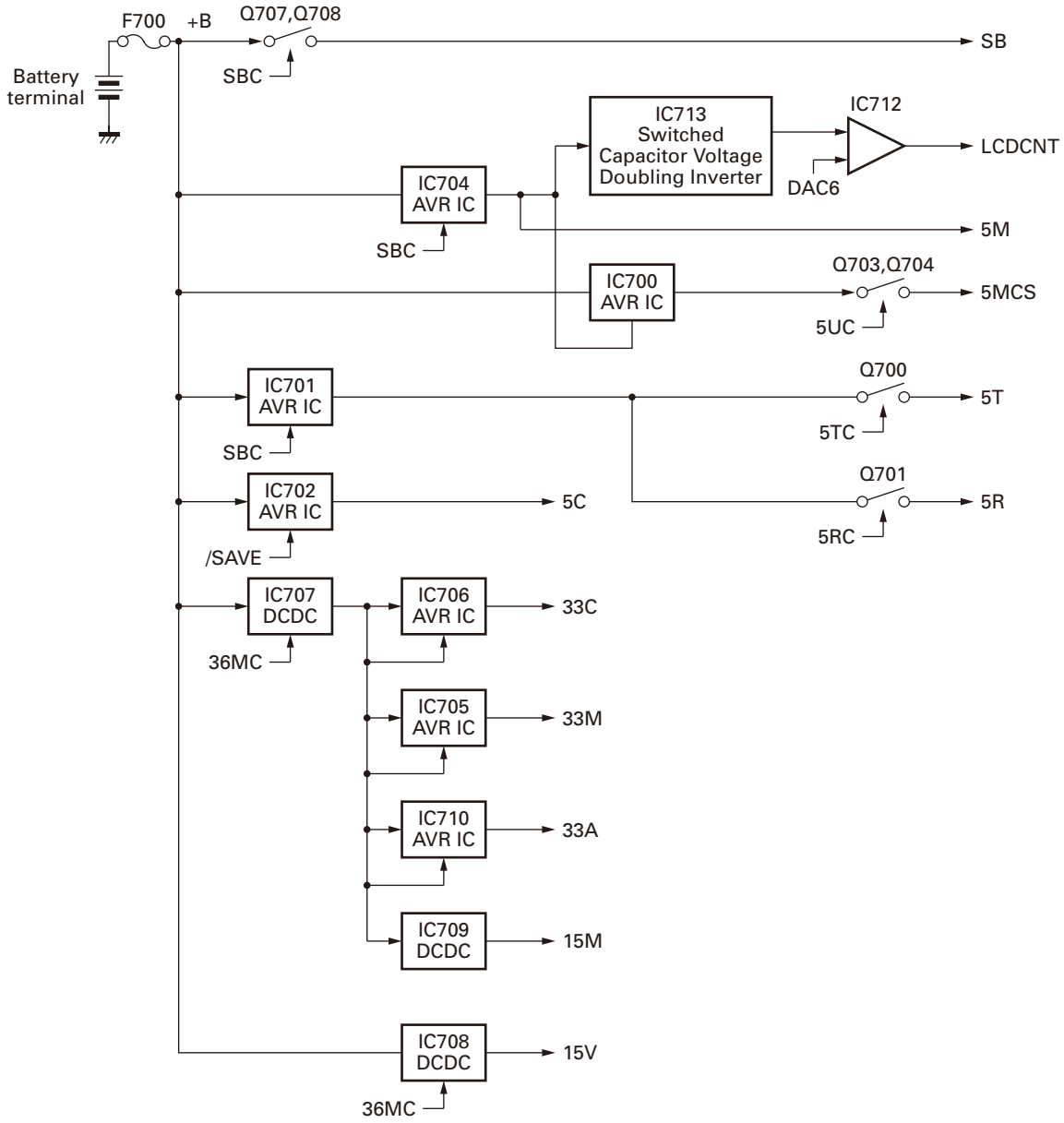


Fig. 9 Power supply circuit

CIRCUIT DESCRIPTION

8. Signaling Circuit

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

Each signaling data signal of QT, DQT, DTMF, 2TONE and MSK is generated by the DSP circuit, superposed on a modulation signal and output from IC10. The modulation balance of the QT/DQT signal is adjusted by the D/A converter (IC502) and the resulting signal is routed to the modulation input of the VCO and VCXO (X301). The each deviation of the TX QT, DQT, DTMF, 2TONE and MSK tone is adjusted by changing the output level of the IC108 and the resulting signal is routed to 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/DTMF/2TONE/MSK)

The audio signal is removed from the FM detection signal by ASIC (IC10), and resulting signal is decoded by DSP (IC3).

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 (IC3) to perform this operation. The transceiver compander can be turned on or off using the FPU.

COMPONENTS DESCRIPTION

Control unit (X53-4390-XX)

Ref. No.	Part Name	Description
IC1	IC	Flash memory
IC3	IC	DSP
IC4	IC	Static memory
IC5	IC	Voltage detector (RST)
IC6	IC	Buffer AMP (Logic)
IC7	IC	Real-time clock
IC8	IC	Clock buffer AMP
IC9	IC	Bus buffer (LCD)
IC10	IC	ASIC
IC11,12	IC	Audio AMP (BTL)
IC13	IC	Audio AMP (1/2 Audio pre-AMP, 2/2 NC MIC AMP)
IC15	IC	I/O Expander
IC16	IC	Voltage Detector (/BINT)
IC17	IC	Voltage regulator (3.1V)
IC18	IC	Bus buffer (LCD)
IC19	IC	5V to 3.3V Level convertor
Q1,2	Transistor	AVR for backlight LED
Q3	Transistor	5A AVR
Q4	FET	DC switch (5AC)
Q5	Transistor	5A AVR
Q6	Transistor	Echo cancel MIC switch
Q7,8	FET	DC switch (/BINT, PSW)
Q10,11	FET	DC switch (BLED, TXLED)
Q12	Transistor	DC switch (36MC)
Q13	Transistor	DC switch
Q14	FET	DC switch (31BU)
Q15	FET	DC switch (STCAMI)
Q16	Transistor	DC switch
D1	Zener diode	AVR for backlight LED
D2~5	LED	Key backlight
D6~8	LED	LCD backlight
D9~12	LED	Key backlight
D13~16	Diode	Reverse current prevention
D19,20,22	Varistor	Surge absorption
D23~26	Diode	Reverse current prevention
D27	Varistor	Surge absorption

TX-RX unit (X57-7650-10 A/4)

Ref. No.	Part Name	Description
IC101	IC	Auto power control
IC102,103	IC	SPDT
IC104	IC	DC AMP for APC
IC201	IC	DC AMP for BPF
IC202	IC	DBM
IC204	IC	FM IC
IC206,207	IC	Multiplexer
IC250	IC	IF AMP
IC301	IC	DC AMP for VCO tune
IC303	IC	PLL IC
IC304	IC	1/2 Divider
IC414	IC	Rheostat
IC500	IC	Buffer AMP (AFC/TCXO_MOD)
IC501	IC	5V to 3.3V Level converter
IC502	IC	DAC
IC503	IC	BPF Amp for SQL voltage
IC505	IC	I/O Expander
IC506	IC	Buffer AMP (AF)
IC507~509	IC	AF pass control
IC510	IC	DC AMP/Summing AMP
IC511	IC	Logic switch
IC512	IC	Buffer AMP (Mod)
IC513	IC	Buffer AMP (MIC)
IC514	IC	Buffer AMP (VOX)
IC515	IC	MIC switch (/SCSW)
IC516	IC	Buffer AMP (MIC/VOX)
IC517	IC	3.3V to 5V Level converter
IC700	IC	AVR (5MCS)
IC701	IC	AVR (5T/5R)
IC702	IC	AVR (5C)
IC704	IC	AVR (5M)
IC705	IC	AVR (33M)
IC706	IC	AVR (33C)
IC707	IC	DC/DC converter (3.6V)
IC708	IC	DC/DC converter (15V)
IC709	IC	DC/DC converter (1.5V)
IC710	IC	AVR (33A)
IC712	IC	DC AMP (LCDCNT)
IC713	IC	DC/DC converter
IC714	IC	Temperature detection

COMPONENTS DESCRIPTION

Ref. No.	Part Name	Description
Q101,102	Transistor	RF AMP
Q103	FET	RF AMP (Drive AMP)
Q104	FET	APC switch
Q105	FET	RF AMP (final AMP)
Q106	Transistor	APC switch
Q107	FET	APC switch
Q110	FET	SPDT EXT/INT switch
Q111	Transistor	3.3V→5V level converter
Q201	Transistor	Ripple filter
Q202	FET	RF AMP (Low Noise Amp)
Q204	FET	IF AMP
Q205	Transistor	2nd local buffer AMP
Q209	Transistor	W/N switch
Q306	FET	Buffer for CV
Q307	Transistor	Ripple filter
Q308,309	FET	T/R switch for VCO
Q310,311	FET	VCO
Q312~314	Transistor	Buffer AMP
Q315	Transistor	Ripple filter
Q316	FET	Switch for PLL IC
Q417	FET	APC switch
Q502	Transistor	SQL AMP
Q503	FET	TONE switch
Q504,505	Transistor	MIC AGC
Q506	FET	MIC mute switch
Q507,508	FET	Int/Ext MIC switch
Q509	FET	DC switch
Q700	FET	5T control switch
Q701	FET	5R control switch
Q703	FET	5MCS control switch
Q704	FET	5MCS control switch
Q705	FET	DC/DC (15V)
Q706	FET	DC/DC (3.6V)
Q707,708	FET	DC switch
Q709	FET	15V switch

Ref. No.	Part Name	Description
D101	Diode	Local switch
D105	Zener diode	Voltage protection
D106~109	Diode	Antenna switch
D110,111	Varistor	Surge absorption
D202~209	Variable capacitance diode	Vari-cap tune
D210	Diode	Local switch
D303,304	Variable capacitance diode	Frequency control
D306~312	Variable capacitance diode	Frequency control
D313	Diode	Ripple filter
D314	Diode	Bypass diode
D500	Diode	Noise Detect
D501	Diode	PLD
D502,504	Zener diode	Surge absorption
D505	Diode	/PTT Terminal Protection
D510	Diode	VOX Detect
D511,512	Diode	MIC AGC
D515,516	Varistor	Surge absorption
D517	Diode	VOX DC
D518,519	Diode	RXD1
D521	Diode	OPT6
D700	Diode	Reverse Battery Protection
D702	Diode	BaTT Terminal Protecrion
D704	Diode	AVR CE (IC705, IC706, IC710)
D706	Diode	DC/DC converter (3.6V)

Top Panel unit (X57-7650-10 B/4)

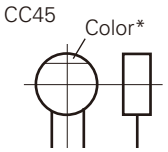
Ref. No.	Part Name	Description
D901	LED	TX/RX LED

PARTS LIST

CAPACITORS

C C 4 5 T H 1 H 2 2 0 J
1 2 3 4 5 6

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



• Capacitor value

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

2 2 0 = 22pF
Multiplier
2nd number
1st number

• Temperature coefficient

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

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

Example : CC45TH = –470±60ppm/°C

• Tolerance (More than 10pF)

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

(Less than 10pF)

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

• Voltage rating

2nd word / 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	–
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	–
3	1000	1250	1600	2000	2500	2150	4000	5000	6300	8000	–

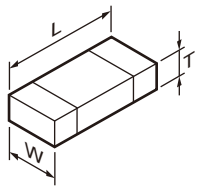
• Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)

(EX) C K 7 3 F F 1 H 0 0 0 Z
1 2 3 4 5 6 7
(Chip) (B, F)

Refer to the table above.
1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance

• Dimension



Chip capacitor

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

RESISTORS

• Chip resistor (Carbon)

(EX) R D 7 3 E B 2 B 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B, F)

• Carbon resistor (Normal type)

(EX) R D 1 4 B B 2 C 0 0 0 J
1 2 3 4 5 6 7

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

Chip resistor

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

• Rating wattage

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

PARTS LIST

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

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

TK-5210(G)

Ref. No.	Address	New parts	Parts No.	Description	Destination
			TK-5210(G)		
1	1B		A02-3875-01	MAIN CABINET	K
2	1D		A02-3877-11	MAIN CABINET (4KEY)	K2K7
3	1D		A02-3879-11	MAIN CABINET (DTMF)	K3
4	3A,3C		A10-4084-51	CHASSIS	
5	2B,2D		A62-1104-02	PANEL (TOP)	
7	3A,3C		A82-0057-02	REAR PANEL	
9	2B,2D		B03-3612-04	DRESSING PLATE (SELECTOR)	
10	1B,1D,1E		B09-0682-13	CAP (SP/MIC) ACCESSOY	
11	2B,2D		B11-1821-03	ILLUMINATION GUIDE (TX-BUSY)	
12	1C		B11-1832-04	FILTER (LCD)	K2K3K7
13	1C		B38-0929-05	LCD	K2K3K7
15	3A,3C		B41-1841-04	CAUTION STICKER	
16	1B,1D		B43-1171-04	BADGE (FRONT)	
17	2B,2D		B43-1172-04	BADGE (REAR)	
18	2F		B59-2596-00	SUB-INSTRUCTION MANUAL (QRC E/F)	
19	2E		B62-2155-00	INSTRUCTION MANUAL (ENG/FRE)	
21	2A,2C		E37-0722-05	LEAD WIRE WITH CONNECTOR (UNIV)	
22	2B,2D		E37-1126-25	LEAD WIRE WITH CONNECTOR (ANT)	
23	3B,3D		E58-0510-15	RECTANGULAR RECEPTACLE (UNIV)	
24	3A,3C		E72-0420-33	TERMINAL BLOCK	
26	3A,3C		F07-1887-22	COVER ASSY	
27	2A,2B		F10-3104-03	SHIELDING CASE (CONT-B)	
28	2A,2B		F10-3114-03	SHIELDING CASE (TXRX-A UPPER)	
29	2A,2B		F10-3115-04	SHIELDING CASE (TXRX-A BOTTOM)	
31	3A,3C		G10-1327-04	FIBROUS SHEET (AIR)	
32	1B,1D		G10-1338-04	FIBROUS SHEET (SP)	
33	1C		G10-1346-04	FIBROUS SHEET (LCD FPC)	K2K3K7
34	3A,3C		G10-1366-04	FIBROUS SHEET (BACKPANEL)	
35	1C		G11-4302-04	SHEET (LCD)	K2K3K7
37	3A,3C		G11-4303-14	SHEET (PTT)	
38	1B,1D,2F		G11-4340-04	RUBBER SHEET (CAP) ACCESSORY	
39	3B,3D		G11-4346-08	SHEET (UNIV)	
40	2B,2D		G11-4490-04	SHEET (ANT)	
41	1B,1D,2A,2C		G11-4526-04	SHEET (MIC)	
43	3A,3C		G13-1941-04	CUSHION (CHASS/PCB)	
44	1A,1C		G13-2036-04	CUSHION (MIC)	
45	2A,2C,3B,3D		G13-2046-04	CUSHION (UNIV)	
46	3A,3C		G13-2070-04	CUSHION (OPB)	
47	2A,2C		G13-2071-04	CONDUCTIVE CUSHION (CHASS/PCB)	
49	2A,2B,2C,2D		G13-2079-04	CUSHION (VOL)	
50	1C		G13-2087-14	CUSHION (LCD)	K2K3K7
51	2A,2C		G13-2284-04	CUSHION (CORD ASSY)	
52	2B,2D		G53-1628-04	PACKING (VOLTORQ-UP)	
53	2B,2D		G53-1629-05	PACKING (VOL,SEL O-RIG)	
55	2B,2D		G53-1630-05	PACKING (ANT O-RIG)	
56	2B,2D		G53-1631-05	PACKING (LEVER SW O-RING)	
57	1B,1D		G53-1633-04	PACKING (SP)	
58	1B,1D,2A,2C		G53-1634-14	PACKING (MAIN MIC,NC MIC)	
59	2A,2C		G53-1637-04	PACKING (MAIN)	
61	2B,2D		G53-1638-04	PACKING (TOP)	
62	3A,3C		G53-1640-03	PACKING (BATT)	
63	3A,3C		G53-1649-05	PACKING (TERMINAL O-RING)	
64	3A,3C		G53-1663-23	PACKING (TERMINAL BLOCK)	
66	1F		H12-3169-05	PACKING FIXTURE	
67	3F	✻	H52-2179-12	ITEM CARTON CASE	
69	1C		J19-5475-12	HOLDER (LCD)	K2K3K7
70	2B,2D		J19-5477-04	HOLDER (EMG)	
71	2B,2D		J21-8482-13	MOUNTING HARDWARE (TOP)	
72	2B,2D		J21-8483-13	MOUNTING HARDWARE (SP)	
73	3A,3C		J21-8484-04	MOUNTING HARDWARE (NC MIC)	
75	2B,2D		J21-8495-04	MOUNTING HARDWARE (LEVER PANEL)	
76	2B,2D		J21-8581-04	MOUNTING HARDWARE (LEVER)	
77	2E		J29-0730-05	BELT CLIP ACCESSORY	
78	2B,2D		J39-0646-03	SPACER (VOL)	
79	2B,2D		J39-0647-03	SPACER (SELECTOR)	
81	3B,3D		J82-0097-25	FPC (UNIV)	
82	2B,2D		J82-0098-05	FPC (SP/MIC)	
83	2A,2C		J87-0011-05	FPC (LEAD FREE/CONT-TOP)	
84	2B,2D	✻	J87-0025-05	FPC (LEAD FREE/VOL.SEL)	
85	3A,3C		J99-0377-14	ADHESIVE SHEET (PTT)	
87	3A,3C		J99-0380-04	ADHESIVE SHEET (ANT PCB)	
88	1B,1D		J99-0383-14	ADHESIVE SHEET (SP)	
89	1C		J99-0390-04	ADHESIVE SHEET (LCD FILTER)	K2K3K7
91	2B,2D		K29-9319-03	KEY TOP (EMG)	
92	1D		K29-9320-03	KEY TOP (4KEY)	K2K7
93	1C		K29-9321-13	KEY TOP (DTMF)	K3
94	2B,2D		K29-9322-03	KNOB (VOL)	
95	2B,2D		K29-9323-03	KNOB (SELECTOR)	
97	2B,2D		K29-9324-13	KNOB (CONCENTRIC SW)	
98	1B,1D		K29-9325-04	KNOB (LEVER SW)	
99	1A,1C		K29-9327-03	KEY TOP (PTT)	
100	1A,1C		K29-9328-02	KNOB (PTT)	
A	1B,1D,2E		N08-0531-14	DRESSED SCREW (CAP) ACCESSORY	
B	2B,2D		N09-2439-25	SPECIAL SCREW (SP)	
C	3A,3C		N09-2441-25	SPECIAL SCREW (COVER ASSY)	
D	2B,2D		N09-2442-15	SPECIAL SCREW (ANT)	
E	3A,3C		N09-2443-14	HEXAGON HEAD SCREW (TERMINAL)	
F	3A,3C		N09-6574-05	SPECIAL SCREW (CASE)	
G	2B,2D		N14-0813-14	CIRCULAR NUT (VOL)	
H	2B,2D		N14-0814-14	CIRCULAR NUT (SEL)	
J	2B,2D		N14-0815-04	CIRCULAR NUT (ANT)	
K	2B,2D		N14-0817-14	HEXAGON NUT (LEVER SW)	
L	2E		N30-3008-60	PAN HEAD MACHINE SCREW (BELT CLIP)	
M	2B,2D		N32-2004-48	FLAT HEAD MACHINE SCREW (TOP)	
N	1A,2A,1C,2C		N83-2005-48	PAN HEAD TAPTITE SCREW (CONT/TXRX)	
O	2B,2D		N83-2006-43	PAN HEAD TAPTITE SCREW (TOP)	
102	3B,3D		R31-0654-05	VARIABLE RESISTOR (VOL)	
104	2B,2D		S60-0431-15	ROTARY SWITCH (SEL)	
105	1C		S79-0454-05	KEYBOARD ASSY (4KEY&DTMF)	K2K3K7
107	1B,1D		T07-0755-15	SPEAKER	
108	2A,2B,2C,2D		T91-0575-05	MIC ELEMENT (MAIN MIC,NC MIC)	
110	1B,1D		W09-0971-05	LITHIUM CELL	
112	3A,3C		X41-3690-10	SWITCH UNIT (FPC (PTT))	
113	2A,2C		X42-3370-10	CORD ASSY (FPC (100P))	

PARTS LIST

TK-5210(G)
CONTROL UNIT (X53-4390-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
-		✻	X53-4390-13	SERVICE CONTROL UNIT	K
-			X53-4390-14	SERVICE CONTROL UNIT	K2K7
-			X53-4390-15	SERVICE CONTROL UNIT	K3
CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3					
D2-5			B30-2171-05	LED	K3
D5			B30-2171-05	LED	K2K7
D6-8			B30-2261-05	LED	K2K3K7
D9-12			B30-2171-05	LED	K3
D12			B30-2171-05	LED	K2K7
C12-15			CK73HB1A104K	CHIP C 0.10UF K	
C16			CK73HB0J105K	CHIP C 1.0UF K	
C17			CK73HB1E103K	CHIP C 0.010UF K	
C18,19			CK73HB1A104K	CHIP C 0.10UF K	K2K3K7
C19			CK73HB1A104K	CHIP C 0.10UF K	K
C21,22			CK73HB1H102K	CHIP C 1000PF K	
C23			CK73HB1A104K	CHIP C 0.10UF K	
C24			CC73HCH1H101J	CHIP C 100PF J	K2K3K7
C25			CK73HB1A104K	CHIP C 0.10UF K	
C27			CK73HB1A104K	CHIP C 0.10UF K	
C29			CK73HB1A104K	CHIP C 0.10UF K	
C30			CK73HB1E103K	CHIP C 0.010UF K	
C31			CK73HB1A104K	CHIP C 0.10UF K	
C32			CK73HB1E103K	CHIP C 0.010UF K	
C33			CK73HB0J105K	CHIP C 1.0UF K	
C34			CK73HB1A104K	CHIP C 0.10UF K	
C35			CK73HB0J105K	CHIP C 1.0UF K	
C36			CK73HB1A104K	CHIP C 0.10UF K	
C37			CK73HB1E103K	CHIP C 0.010UF K	
C38,39			CK73HB1A104K	CHIP C 0.10UF K	
C40			CK73HB1E103K	CHIP C 0.010UF K	
C44			CK73HB1E682K	CHIP C 6800PF K	
C47			CK73HB1E103K	CHIP C 0.010UF K	
C48			CK73HB1A104K	CHIP C 0.10UF K	
C49			CK73GB0J106K	CHIP C 10UF K	
C50-55			CK73HB1A104K	CHIP C 0.10UF K	
C56			CK73HB1E103K	CHIP C 0.010UF K	
C57,58			CK73GB1E105K	CHIP C 1.0UF K	
C59,60			CC73HCH1H101J	CHIP C 100PF J	
C61			CK73HB1H102K	CHIP C 1000PF K	
C62			CK73HB1E103K	CHIP C 0.010UF K	
C63			CK73HB0J105K	CHIP C 1.0UF K	
C64,65			CK73HB1A104K	CHIP C 0.10UF K	
C66			CK73HB1E682K	CHIP C 6800PF K	
C67			CK73HB1A104K	CHIP C 0.10UF K	
C68			CK73GB0J106K	CHIP C 10UF K	
C69			CC73HCH1H101J	CHIP C 100PF J	
C70,71			CK73HB1A104K	CHIP C 0.10UF K	
C72			CC73HCH1H030C	CHIP C 3.0PF C	
C73			CK73HB1E103K	CHIP C 0.010UF K	
C74			CK73HB0J105K	CHIP C 1.0UF K	
C75-78			CK73HB1A104K	CHIP C 0.10UF K	
C79			CK73HB1E103K	CHIP C 0.010UF K	
C80			CK73HB0J105K	CHIP C 1.0UF K	
C81-85			CK73HB1A104K	CHIP C 0.10UF K	
C86			CC73HCH1H101J	CHIP C 100PF J	
C87			CK73HB1A104K	CHIP C 0.10UF K	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C88			CK73HB1H102K	CHIP C 1000PF K	
C90			CK73HB1A104K	CHIP C 0.10UF K	
C91			CK73HB1H102K	CHIP C 1000PF K	
C92			CK73HB1A104K	CHIP C 0.10UF K	
C93			CK73HB0J105K	CHIP C 1.0UF K	
C94			CK73HB0J474K	CHIP C 0.47UF K	
C95			CK73HB1H102K	CHIP C 1000PF K	
C96			CK73HB0J474K	CHIP C 0.47UF K	
C97-100			CK73HB1H471K	CHIP C 470PF K	
C101			CK73HB1A104K	CHIP C 0.10UF K	
C102			CK73HB1H471K	CHIP C 470PF K	
C103-111			CK73HB1H472K	CHIP C 4700PF K	
C112			CK73HB1A104K	CHIP C 0.10UF K	
C113,114			CK73GB0J106K	CHIP C 10UF K	
C115			CK73HB1H471K	CHIP C 470PF K	
C116			CK73HB0J105K	CHIP C 1.0UF K	
C117			CK73GB1E105K	CHIP C 1.0UF K	
C118,119			CK73HB1E103K	CHIP C 0.010UF K	
C120			CK73HB1H472K	CHIP C 4700PF K	
C121,122			CK73HB1E103K	CHIP C 0.010UF K	
C136,137			CK73HB1A104K	CHIP C 0.10UF K	
C141			CK73HB1A104K	CHIP C 0.10UF K	
C143			CK73HB1A104K	CHIP C 0.10UF K	K2K3K7
C144			CC73HCH1H221J	CHIP C 220PF J	K2K3K7
C146,147			CK73HB1A104K	CHIP C 0.10UF K	K2K3K7
C148-152			CK73HB0J105K	CHIP C 1.0UF K	K2K3K7
C153			CK73HB1A104K	CHIP C 0.10UF K	K
C153,154			CK73HB1A104K	CHIP C 0.10UF K	K2K3K7
C155			CK73HB1H102K	CHIP C 1000PF K	
C156			CC73HCH1H470J	CHIP C 47PF J	
C157			CC73HCH1H101J	CHIP C 100PF J	
C161			CK73HB1E103K	CHIP C 0.010UF K	
C997			CK73HB1H102K	CHIP C 1000PF K	K
C998			CK73HB1H102K	CHIP C 1000PF K	K2K7
C999			CK73HB1H102K	CHIP C 1000PF K	K3
CN1		✻	E40-6884-05	FLAT CABLE CONNECTOR	K2K3K7
CN34			E41-3183-05	FLAT CABLE CONNECTOR	
CN35			E40-6755-05	FLAT CABLE CONNECTOR	
CN38		✻	E40-6777-05	FLAT CABLE CONNECTOR	
CN40			E40-6846-05	PIN ASSY	
CN37			J19-5386-05	HOLDER	
L4-6			L92-0444-05	CHIP FERRITE	
L7,8			L92-0162-05	BEADS CORE	
L9			L92-0444-05	CHIP FERRITE	
L10			L92-0149-05	CHIP FERRITE	
L11,12			L92-0467-05	CHIP FERRITE	
L13			L92-0163-05	BEADS CORE	
L14,15			L92-0467-05	CHIP FERRITE	
L16,17			L92-0444-05	CHIP FERRITE	
L19			L92-0444-05	CHIP FERRITE	
L20,21			L92-0163-05	BEADS CORE	
L22,23			L92-0446-05	BEADS CORE	
L24,25			L92-0162-05	BEADS CORE	K2K3K7
L25			L92-0162-05	BEADS CORE	K
L27			L92-0446-05	BEADS CORE	
X1			L77-1802-05	CRYSTAL RESONATOR (32.768KHZ)	
X2			L77-3015-05	TCXO (18.432MHZ)	
R5			RK73HB1J474J	CHIP R 470K J 1/16W	

PARTS LIST

CONTROL UNIT (X53-4390-XX)

Ref. No.	Address	New parts	Parts No.	Description				Destination
R6-9			RK73HB1J101J	CHIP R	100	J	1/16W	K3
R9			RK73HB1J101J	CHIP R	100	J	1/16W	K2K7
R11-13			RK73HB1J181J	CHIP R	180	J	1/16W	K2K3K7
R16			RK73HB1J474J	CHIP R	470K	J	1/16W	
R17			RK73HB1J222J	CHIP R	2.2K	J	1/16W	K2K3K7
R18			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R19,20			RK73HB1J104J	CHIP R	100K	J	1/16W	
R21			RK73HB1J474J	CHIP R	470K	J	1/16W	K2K3K7
R25,26			RK73HB1J473J	CHIP R	47K	J	1/16W	
R27			RK73HB1J104J	CHIP R	100K	J	1/16W	
R29			RK73HB1J104J	CHIP R	100K	J	1/16W	
R30			RK73HB1J474J	CHIP R	470K	J	1/16W	
R31			RK73HB1J471J	CHIP R	470	J	1/16W	
R32-34			RK73HB1J104J	CHIP R	100K	J	1/16W	
R35,36			RK73HB1J471J	CHIP R	470	J	1/16W	
R37-39			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R40-42			RK73HB1J101J	CHIP R	100	J	1/16W	
R43			RK73HB1J104J	CHIP R	100K	J	1/16W	
R44			RK73HB1J101J	CHIP R	100	J	1/16W	
R45			RK73HB1J471J	CHIP R	470	J	1/16W	
R46-49			RK73HB1J104J	CHIP R	100K	J	1/16W	
R50			RK73HB1J473J	CHIP R	47K	J	1/16W	
R51			RK73HB1J104J	CHIP R	100K	J	1/16W	
R52			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R53			RK73HB1J104J	CHIP R	100K	J	1/16W	
R54-57			RK73HB1J471J	CHIP R	470	J	1/16W	
R58			RK73HB1J104J	CHIP R	100K	J	1/16W	
R59			RK73HB1J471J	CHIP R	470	J	1/16W	
R60-65			RK73HB1J104J	CHIP R	100K	J	1/16W	
R66			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R67			RK73HB1J151J	CHIP R	150	J	1/16W	
R69			RK73HB1J153J	CHIP R	15K	J	1/16W	
R70			RK73HB1J474J	CHIP R	470K	J	1/16W	
R71			RK73HB1J104J	CHIP R	100K	J	1/16W	
R72			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R74			RK73HB1J470J	CHIP R	47	J	1/16W	
R75			RK73HB1J103J	CHIP R	10K	J	1/16W	
R76			RK73HB1J473J	CHIP R	47K	J	1/16W	
R77,78			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R80,81			RK73HB1J220J	CHIP R	22	J	1/16W	
R82			RK73HB1J470J	CHIP R	47	J	1/16W	
R83,84			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R86			RK73HB1J474J	CHIP R	470K	J	1/16W	
R88			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R90			RK73HH1J104D	CHIP R	100K	D	1/16W	
R92-95			RK73HH1J153D	CHIP R	15K	D	1/16W	
R96,97			RK73HH1J683D	CHIP R	68K	D	1/16W	
R98,99			RK73HH1J473D	CHIP R	47K	D	1/16W	
R100			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R101			RK73HB1J104J	CHIP R	100K	J	1/16W	
R102			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R103			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R105			RK73HB1J104J	CHIP R	100K	J	1/16W	
R106			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R107			RK73HB1J103J	CHIP R	10K	J	1/16W	
R108			RK73HB1J104J	CHIP R	100K	J	1/16W	
R109,110			RK73HH1J223D	CHIP R	22K	D	1/16W	
R111-113			RK73HB1J104J	CHIP R	100K	J	1/16W	
R115			RK73HB1J473J	CHIP R	47K	J	1/16W	
R116			RK73HB1J104J	CHIP R	100K	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description				Destination
R117			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R118			RK73HB1J274J	CHIP R	270K	J	1/16W	
R119			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R120			RK73HB1J274J	CHIP R	270K	J	1/16W	
R121,122			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R123,124			RK73HB1J474J	CHIP R	470K	J	1/16W	
R125			RK73HB1J470J	CHIP R	47	J	1/16W	
R126,127			RK73HB1J154J	CHIP R	150K	J	1/16W	
R128			RK73HB1J273J	CHIP R	27K	J	1/16W	
R129			RK73HB1J473J	CHIP R	47K	J	1/16W	
R130,131			RK73HB1J223J	CHIP R	22K	J	1/16W	
R132,133			RK73HB1J473J	CHIP R	47K	J	1/16W	
R134			RK73HB1J223J	CHIP R	22K	J	1/16W	
R135,136			RK73HB1J182J	CHIP R	1.8K	J	1/16W	
R137-142			RK73HB1J473J	CHIP R	47K	J	1/16W	
R143,144			RK73HB1J104J	CHIP R	100K	J	1/16W	
R145			RK73HB1J473J	CHIP R	47K	J	1/16W	
R146,147			RK73HB1J104J	CHIP R	100K	J	1/16W	
R148			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R151			RK73HB1J104J	CHIP R	100K	J	1/16W	
R152			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R154-156			RK73HB1J474J	CHIP R	470K	J	1/16W	
R157			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R158			RK73HB1J474J	CHIP R	470K	J	1/16W	
R159			RK73HB1J104J	CHIP R	100K	J	1/16W	
R160			RK73HB1J471J	CHIP R	470	J	1/16W	
R161			RK73HB1J103J	CHIP R	10K	J	1/16W	
R162			RK73HB1J474J	CHIP R	470K	J	1/16W	
R163			RK73HB1J471J	CHIP R	470	J	1/16W	
R164,165			RK73HB1J474J	CHIP R	470K	J	1/16W	
R166-168			RK73HB1J103J	CHIP R	10K	J	1/16W	
R169,170			RK73HB1J474J	CHIP R	470K	J	1/16W	
R171			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R172			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R173			RK73HB1J474J	CHIP R	470K	J	1/16W	
R174,175			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R176			RK73HB1J103J	CHIP R	10K	J	1/16W	
R177			RK73HB1J474J	CHIP R	470K	J	1/16W	
R178			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R179			RK73HB1J473J	CHIP R	47K	J	1/16W	
R181			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R182			RK73HB1J473J	CHIP R	47K	J	1/16W	
R184			RK73HB1J473J	CHIP R	47K	J	1/16W	
R185			RK73HB1J100J	CHIP R	10	J	1/16W	
R187			RK73HB1J471J	CHIP R	470	J	1/16W	
R188,189			RK73HB1J104J	CHIP R	100K	J	1/16W	
R190			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R191-199			RK73HB1J104J	CHIP R	100K	J	1/16W	
R201,202			RK73HB1J103J	CHIP R	10K	J	1/16W	K2K3K7
R203			RK73HB1J000J	CHIP R	0.0	J	1/16W	K2K3K7
R204			RK73HB1J104J	CHIP R	100K	J	1/16W	K2K3K7
R205-212			RK73HB1J103J	CHIP R	10K	J	1/16W	K2K3K7
R215			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R219-221			RK73HB1J101J	CHIP R	100	J	1/16W	
R225-227			RK73HB1J101J	CHIP R	100	J	1/16W	
R230-284			RK73HB1J101J	CHIP R	100	J	1/16W	
R285			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R287			RK73HB1J333J	CHIP R	33K	J	1/16W	
R288			RK73HB1J393J	CHIP R	39K	J	1/16W	
R291			RK73HB1J822J	CHIP R	8.2K	J	1/16W	

PARTS LIST

CONTROL UNIT (X53-4390-XX)
TX-RX UNIT (X57-7650-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R292			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R293			RK73HB1J473J	CHIP R 47K J 1/16W	
R295			RK73HB1J223J	CHIP R 22K J 1/16W	
R997			RK73HB1J000J	CHIP R 0.0 J 1/16W	K
R998			RK73HB1J000J	CHIP R 0.0 J 1/16W	K2K7
R999			RK73HB1J000J	CHIP R 0.0 J 1/16W	K3
D1			UDZW3.9(B)	ZENER DIODE	K2K3K7
D13-16			1SS388F	DIODE	
D19,20			AVRM1005C270M	VARISTOR	
D22			AVRM1005C270M	VARISTOR	
D23			1SS301F	DIODE	
D24			1SS416	DIODE	
D25			1SS301F	DIODE	
D26			1SS388F	DIODE	
D27			AVRM1005C270M	VARISTOR	
IC1			**Note 1**	ROM IC	
IC3			**Note 1**	MICROPROCESSOR IC	
IC4			**Note 1**	SRAM IC	
IC5			XC6109C29ANN	ANALOGUE IC	
IC6			TC7SH08FU-F	MOS-IC	
IC7			RV5C386A	MOS-IC	
IC8			SM5023CNDH-G	MOS-IC	
IC9			TC7W66FK-F	MOS-IC	
IC10			**Note 1**	MOS-IC	
IC11,12			TPA6201A1DRBR	ANALOGUE IC	
IC13			AK2925T	MOS-IC	
IC15			PCA9535BS	MOS-IC	
IC16			XC61CC5602NR	MOS-IC	
IC17			S-812C31BPI-G	ANALOGUE IC	
IC18			TC7WZ245FK-F	MOS-IC	K2K3K7
IC19			TC74LCX245FK	MOS-IC	K2K3K7
Q1			2SB798AZ(DLDK	TRANSISTOR	K2K3K7
Q2			2SC4617(S)	TRANSISTOR	K2K3K7
Q3			2SB1132(Q,R)	TRANSISTOR	
Q4			SSM3K15TE(F)	FET	
Q5			UMG3N	TRANSISTOR	
Q6			EMD12	TRANSISTOR	
Q7,8			SSM6N16FE-F	FET	
Q10,11			SSM6L05FU-F	FET	
Q12			EMD12	TRANSISTOR	
Q13			2SA1955A-F	TRANSISTOR	
Q14,15			SSM3K15TE(F)	FET	
Q16			2SA1955A-F	TRANSISTOR	

TX-RX UNIT (X57-7650-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
D901			B30-2019-05	LED (RE/GR)	
C101			CK73HB1E103K	CHIP C 0.010UF K	
C102-106			CK73HB1H102K	CHIP C 1000PF K	
C107			CC73HCH1H330J	CHIP C 33PF J	
C108			CK73HB1H102K	CHIP C 1000PF K	
C110,111			CK73HB1H102K	CHIP C 1000PF K	
C112			CC73HCH1H270J	CHIP C 27PF J	
C113			CK73HB1H102K	CHIP C 1000PF K	
C114			CC73HCH1H180J	CHIP C 18PF J	
C116			CK73HB1H102K	CHIP C 1000PF K	
C118			CK73HB1H471K	CHIP C 470PF K	
C120			CC73GCH1H560J	CHIP C 56PF J	
C121			CK73HB1H102K	CHIP C 1000PF K	
C122			CC73GCH1H040B	CHIP C 4.0PF B	
C123			CC73HCH1H101J	CHIP C 100PF J	
C124			CK73HB1H102K	CHIP C 1000PF K	
C128			CK73HB1H102K	CHIP C 1000PF K	
C130			CK73HB1H102K	CHIP C 1000PF K	
C132			CK73HB1H102K	CHIP C 1000PF K	
C133			CK73GB1E105K	CHIP C 1.0UF K	
C134			CK73HB1E103K	CHIP C 0.010UF K	
C135			CK73GB1H102K	CHIP C 1000PF K	
C136			CK73HB1H102K	CHIP C 1000PF K	
C137			CC73GCH1H330J	CHIP C 33PF J	
C138			CK73GB0J475K	CHIP C 4.7UF K	
C139			CC73GCH1H390J	CHIP C 39PF J	
C140			CK73GB1H102K	CHIP C 1000PF K	
C141			CC73GCH1H220J	CHIP C 22PF J	
C142			CC73GCH1H680J	CHIP C 68PF J	
C144			CK73GB1H102K	CHIP C 1000PF K	
C145			CC73GCH1H270J	CHIP C 27PF J	
C146			CK73HB1E103K	CHIP C 0.010UF K	
C147			CC73GCH1H270J	CHIP C 27PF J	
C148			CK73GB1H102K	CHIP C 1000PF K	
C149			CC73HCH1H050B	CHIP C 5.0PF B	
C150			CC73HCH1H100C	CHIP C 10PF C	
C151			CC73HCH1H270J	CHIP C 27PF J	
C155			CC73HCH1H0R5B	CHIP C 0.5PF B	
C156			CC73HCH1H050B	CHIP C 5.0PF B	
C157			CC73HCH1H120J	CHIP C 12PF J	
C158,159			CK73GB1H102K	CHIP C 1000PF K	
C160			CK73HB1H102K	CHIP C 1000PF K	
C162,163			CK73HB1H102K	CHIP C 1000PF K	
C166,167			CC73HCH1H120J	CHIP C 12PF J	
C168,169			CC73GCH1H040B	CHIP C 4.0PF B	
C170			CC73HCH1H120J	CHIP C 12PF J	
C171			CC73HCH1H100C	CHIP C 10PF C	
C173			CK73HB1E103K	CHIP C 0.010UF K	
C174			CK73HB1H102K	CHIP C 1000PF K	
C176-178			CK73HB1H102K	CHIP C 1000PF K	
C180,181			CK73HB1H102K	CHIP C 1000PF K	
C182,183			CC73HCH1H150J	CHIP C 15PF J	
C184			CC73HCH1H180J	CHIP C 18PF J	
C185			CK73HB1E103K	CHIP C 0.010UF K	
C186			CK73HB1H102K	CHIP C 1000PF K	
C190			CC73GCH1H050B	CHIP C 5.0PF B	
C192			CC73GCH1H390J	CHIP C 39PF J	
C193,194			CC73GCH1H330J	CHIP C 33PF J	
C195			CC73HCH1H0R5B	CHIP C 0.5PF B	
C196,197			CC73GCH1H330J	CHIP C 33PF J	
C201			CK73GB1E105K	CHIP C 1.0UF K	
C203			CK73HB1E104K	CHIP C 0.10UF K	
C204			CK73HB1H102K	CHIP C 1000PF K	
C205			CC73HCH1H100C	CHIP C 10PF C	
C206			CK73HB1H102K	CHIP C 1000PF K	
C207			CC73HCH1H030B	CHIP C 3.0PF B	
C208			CK73HB1A104K	CHIP C 0.10UF K	
C210			CK73HB1H102K	CHIP C 1000PF K	
C212-215			CK73HB1H102K	CHIP C 1000PF K	
C217			CK73GB1E105K	CHIP C 1.0UF K	

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

PARTS LIST

TX-RX UNIT (X57-7650-10)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C218,219			CK73HB1H102K	CHIP C	1000PF	K	
C220			CC73HCH1H060B	CHIP C	6.0PF	B	
C221			CC73HCH1H030B	CHIP C	3.0PF	B	
C222			CC73HCH1H1R5B	CHIP C	1.5PF	B	
C223			CK73HB1H102K	CHIP C	1000PF	K	
C225			CC73GCH1H060B	CHIP C	6.0PF	B	
C227			CC73HCH1H150J	CHIP C	15PF	J	
C228			CC73HCH1H020B	CHIP C	2.0PF	B	
C229			CC73HCH1H180J	CHIP C	18PF	J	
C230			CK73GB1H102K	CHIP C	1000PF	K	
C231			CC73HCH1H1R5B	CHIP C	1.5PF	B	
C232			CK73HB1A104K	CHIP C	0.10UF	K	
C233			CC73HCH1H090D	CHIP C	9.0PF	D	
C235			CK73HB1H471K	CHIP C	470PF	K	
C236			CK73HB1H102K	CHIP C	1000PF	K	
C237			CK73HB1C223K	CHIP C	0.022UF	K	
C238,239			CK73HB1H471K	CHIP C	470PF	K	
C240			CK73GB0J475K	CHIP C	4.7UF	K	
C241			CK73HB1A104K	CHIP C	0.10UF	K	
C242			CK73HB1H102K	CHIP C	1000PF	K	
C243			CK73HB1H471K	CHIP C	470PF	K	
C244,245			CK73HB1A104K	CHIP C	0.10UF	K	
C246			CK73GB1H103K	CHIP C	0.010UF	K	
C248			CC73GCH1H150J	CHIP C	15PF	J	
C250			CC73HCH1H270J	CHIP C	27PF	J	
C252			CC73HCH1H120J	CHIP C	12PF	J	
C253-256			CK73HB1E103K	CHIP C	0.010UF	K	
C257			CK73HB1A104K	CHIP C	0.10UF	K	
C259			CC73HCH1H470J	CHIP C	47PF	J	
C260			CC73HCH1H080D	CHIP C	8.0PF	D	
C261			CK73HB1H471K	CHIP C	470PF	K	
C262			CK73HB1E103K	CHIP C	0.010UF	K	
C263			CC73HCH1H220J	CHIP C	22PF	J	
C264			CC73HCH1H820J	CHIP C	82PF	J	
C265			CC73HCH1H680J	CHIP C	68PF	J	
C266			CK73HB1H102K	CHIP C	1000PF	K	
C267,268			CK73HB1A104K	CHIP C	0.10UF	K	
C270			CK73HB1A104K	CHIP C	0.10UF	K	
C272,273			CK73HB1E103K	CHIP C	0.010UF	K	
C274			CK73FB0J106K	CHIP C	10UF	K	
C275,276			CK73HB1A104K	CHIP C	0.10UF	K	
C277			CC73HCH1H390J	CHIP C	39PF	J	
C278,279			CC73HCH1H151J	CHIP C	150PF	J	
C281-287			CK73HB1A104K	CHIP C	0.10UF	K	
C288			CK73HB1H102K	CHIP C	1000PF	K	
C289			CC73HCH1H101J	CHIP C	100PF	J	
C290			CK73HB1H102K	CHIP C	1000PF	K	
C292,293			CK73HB1A104K	CHIP C	0.10UF	K	
C294			CK73HB1H471K	CHIP C	470PF	K	
C295,296			CC73HCH1H470J	CHIP C	47PF	J	
C301			CK73HB1H102K	CHIP C	1000PF	K	
C304,305			CK73HB1A104K	CHIP C	0.10UF	K	
C309			CK73HB1H471K	CHIP C	470PF	K	
C312			CK73GB1E105K	CHIP C	1.0UF	K	
C313			CK73HB1H102K	CHIP C	1000PF	K	
C315,316			CC73HCH1H101J	CHIP C	100PF	J	
C318			CK73HB1E103K	CHIP C	0.010UF	K	
C320			CK73HB1A104K	CHIP C	0.10UF	K	
C323			CK73HB1H471K	CHIP C	470PF	K	
C325			CK73HB0J105K	CHIP C	1.0UF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C329			CK73HB1H471K	CHIP C	470PF	K	
C330			C93-0787-05	CHIP C	0.1UF	J	
C331			CK73HB1H102K	CHIP C	1000PF	K	
C333			CS77CA1V0R1M	CHIP TNTL	0.1UF	35WV	
C334			CS77BA1E010M	CHIP TNTL	1.0UF	25WV	
C335			CC73HCH1H101J	CHIP C	100PF	J	
C336			CK73EB1H223K	CHIP C	0.022UF	K	
C338			CK73HB1H471K	CHIP C	470PF	K	
C340			CK73HB1H122K	CHIP C	1200PF	K	
C341			CK73HB1H102K	CHIP C	1000PF	K	
C343			CS77CP0J100M	CHIP TNTL	10UF	6.3WV	
C344-346			CK73HB1H471K	CHIP C	470PF	K	
C347			CC73HCH1H560J	CHIP C	56PF	J	
C348			CC73HCH1H100C	CHIP C	10PF	C	
C350			CK73HB1H182K	CHIP C	1800PF	K	
C352			CC73HCH1H010B	CHIP C	1.0PF	B	
C353			CC73HCH1H150J	CHIP C	15PF	J	
C354			CC73GCH1H040B	CHIP C	4.0PF	B	
C355			CC73HCH1H040B	CHIP C	4.0PF	B	
C356			CC73HCH1H0R5B	CHIP C	0.5PF	B	
C357			CC73HCH1H100C	CHIP C	10PF	C	
C358			CK73HB1H471K	CHIP C	470PF	K	
C359			CC73GCH1H040B	CHIP C	4.0PF	B	
C360			CK73HB1H471K	CHIP C	470PF	K	
C361			CC73GCH1H060B	CHIP C	6.0PF	B	
C362			CC73HCH1H080D	CHIP C	8.0PF	D	
C363			CC73GCH1H050B	CHIP C	5.0PF	B	
C364			CC73HCH1H080D	CHIP C	8.0PF	D	
C365			CK73HB1H471K	CHIP C	470PF	K	
C366			CC73GCH1H030B	CHIP C	3.0PF	B	
C367			CK73HB1H471K	CHIP C	470PF	K	
C368			CC73GCH1H040B	CHIP C	4.0PF	B	
C369			CK73GB0J475K	CHIP C	4.7UF	K	
C370			CK73HB1H471K	CHIP C	470PF	K	
C371,372			CC73HCH1H0R5B	CHIP C	0.5PF	B	
C373,374			CK73HB1H471K	CHIP C	470PF	K	
C375			CC73HCH1H060B	CHIP C	6.0PF	B	
C376			CC73HCH1H020B	CHIP C	2.0PF	B	
C377-379			CK73HB1H102K	CHIP C	1000PF	K	
C381-383			CK73HB1H102K	CHIP C	1000PF	K	
C384			CK73HB0J105K	CHIP C	1.0UF	K	
C385			CC73HCH1H150J	CHIP C	15PF	J	
C386			CK73HB1H102K	CHIP C	1000PF	K	
C387			CK73GB1E105K	CHIP C	1.0UF	K	
C388			CK73GB1E153K	CHIP C	0.015UF	K	
C389			CK73GB0J475K	CHIP C	4.7UF	K	
C390			CC73HCH1H101J	CHIP C	100PF	J	
C393			CK73HB1H102K	CHIP C	1000PF	K	
C396,397			CK73HB1H102K	CHIP C	1000PF	K	
C399			CK73HB1H102K	CHIP C	1000PF	K	
C482			CK73FB0J106K	CHIP C	10UF	K	
C487			CC73HCH1H220J	CHIP C	22PF	J	
C500			CK73HB1E103K	CHIP C	0.010UF	K	
C503			CC73HCH1H101J	CHIP C	100PF	J	
C504			CK73HB1A104K	CHIP C	0.10UF	K	
C505,506			CC73HCH1H151J	CHIP C	150PF	J	
C507			CK73HB1A104K	CHIP C	0.10UF	K	
C508			CK73HB1H102K	CHIP C	1000PF	K	
C509			CK73HB0J105K	CHIP C	1.0UF	K	
C510,511			CK73HB1A104K	CHIP C	0.10UF	K	

PARTS LIST

TX-RX UNIT (X57-7650-10)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C512			CK73HB1H102K	CHIP C	1000PF	K	
C513			CC73HCH1H101J	CHIP C	100PF	J	
C515			CK73HB1A224K	CHIP C	0.22UF	K	
C516			CK73HB1E103K	CHIP C	0.010UF	K	
C518			CK73HB1A224K	CHIP C	0.22UF	K	
C519			CK73HB0J105K	CHIP C	1.0UF	K	
C520,521			CK73HB1A104K	CHIP C	0.10UF	K	
C522			CK73HB0J105K	CHIP C	1.0UF	K	
C524,525			CK73HB1A104K	CHIP C	0.10UF	K	
C527			CK73HB1A104K	CHIP C	0.10UF	K	
C528			CK73HB1H152K	CHIP C	1500PF	K	
C529			CK73HB1E103K	CHIP C	0.010UF	K	
C532			CK73HB1A104K	CHIP C	0.10UF	K	
C533			CK73HB1E103K	CHIP C	0.010UF	K	
C536			CC73HCH1H151J	CHIP C	150PF	J	
C537,538			CK73HB1A104K	CHIP C	0.10UF	K	
C539,540			CK73HB1E103K	CHIP C	0.010UF	K	
C542,543			CK73HB1E103K	CHIP C	0.010UF	K	
C544			CK73HB1A104K	CHIP C	0.10UF	K	
C545			CK73HB0J105K	CHIP C	1.0UF	K	
C546			CK73HB1E103K	CHIP C	0.010UF	K	
C547			CC73HCH1H100C	CHIP C	10PF	C	
C551			CK73HB1H102K	CHIP C	1000PF	K	
C552			CK73HB1E103K	CHIP C	0.010UF	K	
C554			CC73HCH1H101J	CHIP C	100PF	J	
C555			CK73HB0J105K	CHIP C	1.0UF	K	
C556			CK73HB1E103K	CHIP C	0.010UF	K	
C557-560			CK73HB1A104K	CHIP C	0.10UF	K	
C561			CC73HCH1H101J	CHIP C	100PF	J	
C562			CK73HB1A104K	CHIP C	0.10UF	K	
C563			CK73HB1H152K	CHIP C	1500PF	K	
C564			CK73HB1E103K	CHIP C	0.010UF	K	
C565			CC73HCH1H101J	CHIP C	100PF	J	
C566			CK73HB1H331K	CHIP C	330PF	K	
C567			CC73HCH1H101J	CHIP C	100PF	J	
C568			CK73HB1H821K	CHIP C	820PF	K	
C570			CK73HB1H471K	CHIP C	470PF	K	
C571			CK73HB1E562K	CHIP C	5600PF	K	
C573			CK73HB1A104K	CHIP C	0.10UF	K	
C574,575			CK73HB1H471K	CHIP C	470PF	K	
C576			CK73HB1C223K	CHIP C	0.022UF	K	
C577			CC73HCH1H101J	CHIP C	100PF	J	
C578			CK73HB1A104K	CHIP C	0.10UF	K	
C579			CK73HB1E103K	CHIP C	0.010UF	K	
C581			CK73HB1H471K	CHIP C	470PF	K	
C582			CK73HB1E103K	CHIP C	0.010UF	K	
C583			CK73HB1E682K	CHIP C	6800PF	K	
C585-587			CC73HCH1H101J	CHIP C	100PF	J	
C589			CK73HB1A224K	CHIP C	0.22UF	K	
C590,591			CK73HB1A104K	CHIP C	0.10UF	K	
C594			CC73HCH1H101J	CHIP C	100PF	J	
C595			CK73HB1H471K	CHIP C	470PF	K	
C598			CK73HB1H332K	CHIP C	3300PF	K	
C599-601			CC73HCH1H101J	CHIP C	100PF	J	
C602			CK73HB1E103K	CHIP C	0.010UF	K	
C603			CC73HCH1H101J	CHIP C	100PF	J	
C604-606			CK73HB0J105K	CHIP C	1.0UF	K	
C607,608			CC73HCH1H101J	CHIP C	100PF	J	
C609			CC73HCH1H150J	CHIP C	15PF	J	
C610			CC73HCH1H680J	CHIP C	68PF	J	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C611-613			CK73HB1A104K	CHIP C	0.10UF	K	
C614			CK73HB0J105K	CHIP C	1.0UF	K	
C615			CK73HB1A393K	CHIP C	0.039UF	K	
C616			CK73HB1E103K	CHIP C	0.010UF	K	
C617			CK73HB1A104K	CHIP C	0.10UF	K	
C618			CK73HB0J105K	CHIP C	1.0UF	K	
C619			CK73GB0J106K	CHIP C	10UF	K	
C620			CK73HB1H471K	CHIP C	470PF	K	
C621			CK73HB1C473K	CHIP C	0.047UF	K	
C622			CK73HB0J105K	CHIP C	1.0UF	K	
C701			CK73HB1H471K	CHIP C	470PF	K	
C703			CK73HB1H471K	CHIP C	470PF	K	
C704,705			CK73HB1H102K	CHIP C	1000PF	K	
C706			CK73GB1H104K	CHIP C	0.10UF	K	
C707			CK73GB1E105K	CHIP C	1.0UF	K	
C709			CK73GB0J106K	CHIP C	10UF	K	
C711			CK73GB1E105K	CHIP C	1.0UF	K	
C712			CK73GB1H104K	CHIP C	0.10UF	K	
C713			CK73GB1E105K	CHIP C	1.0UF	K	
C714			CK73HB1H471K	CHIP C	470PF	K	
C715			CK73HB1H102K	CHIP C	1000PF	K	
C716,717			CK73HB1H471K	CHIP C	470PF	K	
C719,720			CK73GB1E105K	CHIP C	1.0UF	K	
C721			CK73HB1H102K	CHIP C	1000PF	K	
C724			CK73GB1E105K	CHIP C	1.0UF	K	
C725			CK73HB1E682K	CHIP C	6800PF	K	
C727			CK73HB1H471K	CHIP C	470PF	K	
C728			CK73GB1E105K	CHIP C	1.0UF	K	
C730			C92-0822-05	CHIP TNTL	33UF	10WV	
C731,732			CK73HB0J105K	CHIP C	1.0UF	K	
C733			CK73HB1A104K	CHIP C	0.10UF	K	
C735			CK73HB1E103K	CHIP C	0.010UF	K	
C736			CK73GB1E105K	CHIP C	1.0UF	K	
C737			CC73HCH1H820J	CHIP C	82PF	J	
C739			CK73GB1E105K	CHIP C	1.0UF	K	
C740			CK73HB0J105K	CHIP C	1.0UF	K	
C741			CK73FB1E475K	CHIP C	4.7UF	K	
C742			CK73GB1E105K	CHIP C	1.0UF	K	
C744			CK73HB1H102K	CHIP C	1000PF	K	
C745			CK73HB0J105K	CHIP C	1.0UF	K	
C746			CK73FB1E475K	CHIP C	4.7UF	K	
C748			CC73HCH1H181J	CHIP C	180PF	J	
C749			CK73GB0J475K	CHIP C	4.7UF	K	
C750			CC73HCH1H220J	CHIP C	22PF	J	
C751			CK73HB1H471K	CHIP C	470PF	K	
C752			CK73FB1E475K	CHIP C	4.7UF	K	
C753			CK73GB1E105K	CHIP C	1.0UF	K	
C754			CK73FB1E475K	CHIP C	4.7UF	K	
C755			CK73GB1E105K	CHIP C	1.0UF	K	
C756			CK73FB1E475K	CHIP C	4.7UF	K	
C758			CK73GB1E105K	CHIP C	1.0UF	K	
C759			CK73HB1H102K	CHIP C	1000PF	K	
C761,762			CK73FB1E475K	CHIP C	4.7UF	K	
C763			CC73HCH1H101J	CHIP C	100PF	J	
C765			CS77CP1C2R2M	CHIP TNTL	2.2UF	16WV	
C766			CK73HB1A104K	CHIP C	0.10UF	K	
C767-769			CS77CP1C2R2M	CHIP TNTL	2.2UF	16WV	
C770,771			CK73HB1H102K	CHIP C	1000PF	K	
C772			CK73HB1E103K	CHIP C	0.010UF	K	
C773-785			CC73HCH1H470J	CHIP C	47PF	J	

PARTS LIST

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Ref. No.	Address	New parts	Parts No.	Description	Destination
C786			CK73HB1H102K	CHIP C 1000PF K	
C787			CC73HCH1H470J	CHIP C 47PF J	
C788-791			CK73HB1H102K	CHIP C 1000PF K	
C792-796			CC73HCH1H470J	CHIP C 47PF J	
C797			CK73HB1H102K	CHIP C 1000PF K	
C798-819			CC73HCH1H470J	CHIP C 47PF J	
C821-834			CC73HCH1H470J	CHIP C 47PF J	
C836-846			CC73HCH1H470J	CHIP C 47PF J	
CN101,102			E04-0403-05	PIN SOCKET	
CN501			E40-6357-05	PIN ASSY	
CN502			E40-6586-05	SOCKET FOR PIN ASSY	
CN505			E41-3167-05	FLAT CABLE CONNECTOR	
CN707			E40-6846-05	PIN ASSY	
CN902			E40-6722-05	FLAT CABLE CONNECTOR	
CN903			E40-6464-05	FLAT CABLE CONNECTOR	
CN923			E40-6358-05	SOCKET FOR PIN ASSY	
CN941			E04-0403-05	PIN SOCKET	
F500			F53-0360-05	FUSE (0.25A)	
F700			F53-0372-05	FUSE (3.15A)	
F701			F53-0360-05	FUSE (0.25A)	
CD201			L79-1850-05	TUNING COIL	
CF201			L72-1017-05	CERAMIC FILTER	
CF203			L72-1017-05	CERAMIC FILTER	
CF204			L72-1021-05	CERAMIC FILTER	
CF250			L72-1040-05	CERAMIC FILTER	
L101,102			L41-1085-45	SMALL FIXED INDUCTOR (100NH)	
L103			L92-0140-05	CHIP FERRITE	
L104			L40-5675-92	SMALL FIXED INDUCTOR (56NH)	
L105			L40-1863-92	SMALL FIXED INDUCTOR (1.8NH)	
L106			L92-0149-05	CHIP FERRITE	
L107			L40-3975-92	SMALL FIXED INDUCTOR (39NH)	
L108			L40-1575-92	SMALL FIXED INDUCTOR (15NH)	
L109			L92-0149-05	CHIP FERRITE	
L110			L34-4577-05	AIR-CORE COIL	
L111			L34-4650-05	AIR-CORE COIL	
L113			L34-4567-05	AIR-CORE COIL	
L114			L41-2295-39	SMALL FIXED INDUCTOR (2.2UH)	
L115,116			L34-4576-05	AIR-CORE COIL	
L118			L34-4577-05	AIR-CORE COIL	
L119,120			L34-4576-05	AIR-CORE COIL	
L121			L41-8285-14	SMALL FIXED INDUCTOR (820NH)	
L122,123			L92-0446-05	BEADS CORE	
L124			L40-5675-71	SMALL FIXED INDUCTOR (56NH)	
L125,126			L34-4577-05	AIR-CORE COIL	
L201		✻	L34-4820-05	COIL	
L202		✻	L34-4821-05	COIL	
L203			L41-6885-14	SMALL FIXED INDUCTOR (680N)	
L204		✻	L34-4821-05	COIL	
L205		✻	L34-4820-05	COIL	
L206,207			L40-3975-71	SMALL FIXED INDUCTOR (39NH)	
L210			L41-4778-14	SMALL FIXED INDUCTOR (47NH)	
L211,212			L39-1272-15	TOROIDAL COIL	
L213			L92-0163-05	BEADS CORE	
L214			L39-1272-15	TOROIDAL COIL	
L216,217			L41-5685-14	SMALL FIXED INDUCTOR (560NH)	
L218			L40-6881-37	SMALL FIXED INDUCTOR (0.680UH)	
L219			L40-1885-92	SMALL FIXED INDUCTOR (180NH)	
L220			L40-1091-86	SMALL FIXED INDUCTOR (1.0UH)	
L221			L41-1585-14	SMALL FIXED INDUCTOR (150NH)	
L222			L41-1085-14	SMALL FIXED INDUCTOR (100NH)	
L224			L41-2278-14	SMALL FIXED INDUCTOR (22NH)	
L302			L92-0446-05	BEADS CORE	
L303			L41-4795-39	SMALL FIXED INDUCTOR (4.7UH)	
L304-307			L40-1001-86	SMALL FIXED INDUCTOR (10UH)	
L308,309			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L310			L92-0163-05	BEADS CORE	
L311			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L312			L41-3985-20	SMALL FIXED INDUCTOR (390NH)	
L313			L92-0446-05	BEADS CORE	
L314			L33-1267-05	SMALL FIXED INDUCTOR (27NH)	
L315			L40-1875-71	SMALL FIXED INDUCTOR (18NH)	
L316			L33-0751-05	SMALL FIXED INDUCTOR (39UH)	
L317			L40-1575-71	SMALL FIXED INDUCTOR (15NH)	
L318			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L319			L40-1075-71	SMALL FIXED INDUCTOR (10NH)	
L320			L41-3985-20	SMALL FIXED INDUCTOR (390NH)	
L321,322			L40-2285-92	SMALL FIXED INDUCTOR (220NH)	
L323			L40-3975-71	SMALL FIXED INDUCTOR (39NH)	
L324			L92-0446-05	BEADS CORE	
L325			L40-4775-71	SMALL FIXED INDUCTOR (47NH)	
L327			L40-8275-71	SMALL FIXED INDUCTOR (82NH)	
L500			L92-0140-05	CHIP FERRITE	
L501			L92-0444-05	CHIP FERRITE	
L502			L92-0140-05	CHIP FERRITE	
L503,504			L92-0467-05	CHIP FERRITE	
L505,506			L92-0163-05	BEADS CORE	
L700			L92-0136-05	CHIP FERRITE	
L701,702			L92-0162-05	BEADS CORE	
L703			L92-0467-05	CHIP FERRITE	
L704			L92-0162-05	BEADS CORE	
L705			L33-1462-05	SMALL FIXED INDUCTOR (68UH)	
L706			L33-1469-05	SMALL FIXED INDUCTOR (68UH)	
L707			L33-1494-05	SMALL FIXED INDUCTOR (4.7UH)	
L708			L33-1462-05	SMALL FIXED INDUCTOR (68UH)	
L710			L92-0446-05	BEADS CORE	
X201		✻	L77-1961-15	VCXO (16.8MHZ/5PPM)	
X301			L77-1960-15	VCXO (16.8MHZ/1.5PPM)	
XF201			L71-0551-45	MCF (49.95MHZ)	
CP31,32			RK74HA1J101J	CHIP-COM 100 J 1/16W	
R101			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R102			RK73HB1J272J	CHIP R 2.7K J 1/16W	
R103			RK73HB1J103J	CHIP R 10K J 1/16W	
R104			RK73HB1J330J	CHIP R 33 J 1/16W	
R105			RK73HB1J331J	CHIP R 330 J 1/16W	
R106			RK73HB1J220J	CHIP R 22 J 1/16W	
R107			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R108			RK73HB1J471J	CHIP R 470 J 1/16W	
R109			RK73HB1J330J	CHIP R 33 J 1/16W	
R110			RK73HB1J331J	CHIP R 330 J 1/16W	
R111			RK73HB1J271J	CHIP R 270 J 1/16W	
R112			RK73HB1J180J	CHIP R 18 J 1/16W	
R113			RK73HB1J271J	CHIP R 270 J 1/16W	
R114			RK73HB1J101J	CHIP R 100 J 1/16W	
R115			RK73GB2A100J	CHIP R 10 J 1/10W	
R116			RK73HB1J104J	CHIP R 100K J 1/16W	
R117			RK73HB1J103J	CHIP R 10K J 1/16W	
R118			RK73HB1J104J	CHIP R 100K J 1/16W	
R119,120			RK73EB2HR22F	CHIP R 0.22 F 1/2W	

If a part reference number is listed in a shaded box, that part does not come with the PCB.

PARTS LIST

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Ref. No.	Address	New parts	Parts No.	Description				Destination
R121,122			RK73HH1J154D	CHIP R	150K	D	1/16W	
R123			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R124			RK73HH1J154D	CHIP R	150K	D	1/16W	
R125			RK73GB2A103J	CHIP R	10K	J	1/10W	
R126			RK73GB2A101J	CHIP R	100	J	1/10W	
R127-129			RK73HH1J154D	CHIP R	150K	D	1/16W	
R130			RK73HB1J333J	CHIP R	33K	J	1/16W	
R131			RK73HB1J103J	CHIP R	10K	J	1/16W	
R132		*	RK73FB2B3R3J	CHIP R	3.3	J	1/8W	
R133			RK73HB1J103J	CHIP R	10K	J	1/16W	
R134			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R135			RK73HB1J473J	CHIP R	47K	J	1/16W	
R136			RK73HB1J184J	CHIP R	180K	J	1/16W	
R137			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R140			RK73GB2A271J	CHIP R	270	J	1/10W	
R142			RK73GB2A271J	CHIP R	270	J	1/10W	
R144			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R147			RK73HB1J183J	CHIP R	18K	J	1/16W	
R149			RK73HB1J103J	CHIP R	10K	J	1/16W	
R150			RK73GB2A272J	CHIP R	2.7K	J	1/10W	
R152			RK73HB1J103J	CHIP R	10K	J	1/16W	
R153			RK73HB1J474J	CHIP R	470K	J	1/16W	
R156			RK73HB1J272J	CHIP R	2.7K	J	1/16W	
R157			RK73HB1J822J	CHIP R	8.2K	J	1/16W	
R158			RK73FB2B000J	CHIP R	0.0	J	1/8W	
R159			RK73HB1J104J	CHIP R	100K	J	1/16W	
R160			RK73HB1J473J	CHIP R	47K	J	1/16W	
R163			RK73FB2B102J	CHIP R	1.0K	J	1/8W	
R164			RK73HB1J104J	CHIP R	100K	J	1/16W	
R201			RK73HB1J473J	CHIP R	47K	J	1/16W	
R202			RK73HB1J103J	CHIP R	10K	J	1/16W	
R203			RK73HH1J104D	CHIP R	100K	D	1/16W	
R204			RK73HH1J124D	CHIP R	120K	D	1/16W	
R205			RK73HB1J103J	CHIP R	10K	J	1/16W	
R207			RK73HB1J100J	CHIP R	10	J	1/16W	
R208			RK73HB1J473J	CHIP R	47K	J	1/16W	
R209			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R212,213			RK73HB1J103J	CHIP R	10K	J	1/16W	
R214			RK73HB1J121J	CHIP R	120	J	1/16W	
R215			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R216			RK73HB1J100J	CHIP R	10	J	1/16W	
R217			RK73HB1J473J	CHIP R	47K	J	1/16W	
R218			RK73HB1J122J	CHIP R	1.2K	J	1/16W	
R219			RK73HB1J330J	CHIP R	33	J	1/16W	
R220,221			RK73HB1J105J	CHIP R	1.0M	J	1/16W	
R222			RK73HB1J271J	CHIP R	270	J	1/16W	
R223			RK73HB1J220J	CHIP R	22	J	1/16W	
R224			RK73HB1J271J	CHIP R	270	J	1/16W	
R228			RK73HB1J271J	CHIP R	270	J	1/16W	
R229			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R231			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R233			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R234			RK73HB1J100J	CHIP R	10	J	1/16W	
R235			RK73FB2B000J	CHIP R	0.0	J	1/8W	
R237			RK73HB1J681J	CHIP R	680	J	1/16W	
R238,239			RK73HB1J470J	CHIP R	47	J	1/16W	
R240			RK73HB1J221J	CHIP R	220	J	1/16W	
R241			RK73GB2A000J	CHIP R	0.0	J	1/10W	
R242			RK73HB1J822J	CHIP R	8.2K	J	1/16W	
R243			RK73HB1J684J	CHIP R	680K	J	1/16W	

Ref. No.	Address	New parts	Parts No.	Description				Destination
R244			RK73HB1J470J	CHIP R	47	J	1/16W	
R247			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R249			RK73HB1J220J	CHIP R	22	J	1/16W	
R252			RK73HB1J154J	CHIP R	150K	J	1/16W	
R255			RK73HB1J153J	CHIP R	15K	J	1/16W	
R256			RK73HB1J563J	CHIP R	56K	J	1/16W	
R258			RK73HB1J474J	CHIP R	470K	J	1/16W	
R259			RK73HB1J272J	CHIP R	2.7K	J	1/16W	
R261			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R264			RK73HB1J100J	CHIP R	10	J	1/16W	
R265			RK73HH1J473D	CHIP R	47K	D	1/16W	
R266			RK73HH1J104D	CHIP R	100K	D	1/16W	
R268			RK73HB1J472J	CHIP R	4.7K	J	1/16W	
R269			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R272			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R273			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R275			RK73HB1J333J	CHIP R	33K	J	1/16W	
R276			RK73HB1J220J	CHIP R	22	J	1/16W	
R278			RK73HB1J332J	CHIP R	3.3K	J	1/16W	
R279			RK73HB1J182J	CHIP R	1.8K	J	1/16W	
R280,281			RK73HB1J392J	CHIP R	3.9K	J	1/16W	
R282			RK73HB1J104J	CHIP R	100K	J	1/16W	
R284			RK73HB1J103J	CHIP R	10K	J	1/16W	
R286			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R287			RK73HB1J223J	CHIP R	22K	J	1/16W	
R288,289			RK73HB1J392J	CHIP R	3.9K	J	1/16W	
R290			RK73HB1J220J	CHIP R	22	J	1/16W	
R294			RK73FB2B000J	CHIP R	0.0	J	1/8W	
R295			RK73HB1J473J	CHIP R	47K	J	1/16W	
R303			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R306			RK73HB1J101J	CHIP R	100	J	1/16W	
R310			RK73HH1J184D	CHIP R	180K	D	1/16W	
R311			RK73HH1J473D	CHIP R	47K	D	1/16W	
R313-315			RK73HB1J100J	CHIP R	10	J	1/16W	
R316			RK73GB2A106J	CHIP R	10M	J	1/10W	
R318			RK73HB1J333J	CHIP R	33K	J	1/16W	
R319			RK73HB1J183J	CHIP R	18K	J	1/16W	
R321			RK73HB1J102J	CHIP R	1.0K	J	1/16W	
R322			RK73HB1J473J	CHIP R	47K	J	1/16W	
R323			RK73HB1J182J	CHIP R	1.8K	J	1/16W	
R325			RK73HB1J683J	CHIP R	68K	J	1/16W	
R327			RK73HB1J222J	CHIP R	2.2K	J	1/16W	
R328,329			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R330			RK73HB1J474J	CHIP R	470K	J	1/16W	
R331			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R334			RK73HB1J000J	CHIP R	0.0	J	1/16W	
R335			RK73HB1J152J	CHIP R	1.5K	J	1/16W	
R336			RK73HB1J560J	CHIP R	56	J	1/16W	
R337			RK73HB1J473J	CHIP R	47K	J	1/16W	
R338			RK73HB1J474J	CHIP R	470K	J	1/16W	
R339			RK73HB1J220J	CHIP R	22	J	1/16W	
R340			RK73HB1J104J	CHIP R	100K	J	1/16W	
R341			RK73HB1J221J	CHIP R	220	J	1/16W	
R342			RK73HB1J121J	CHIP R	120	J	1/16W	
R343			RK73HB1J101J	CHIP R	100	J	1/16W	
R344			RK73HB1J224J	CHIP R	220K	J	1/16W	
R345			RK73HB1J154J	CHIP R	150K	J	1/16W	
R346			RK73HB1J101J	CHIP R	100	J	1/16W	
R350			RK73HB1J822J	CHIP R	8.2K	J	1/16W	
R351			RK73HB1J103J	CHIP R	10K	J	1/16W	

PARTS LIST

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Ref. No.	Address	New parts	Parts No.	Description	Destination
R352			RK73HB1J681J	CHIP R 680 J 1/16W	
R353			RK73HB1J101J	CHIP R 100 J 1/16W	
R355,356			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R359			RK73HB1J561J	CHIP R 560 J 1/16W	
R360			RK73HB1J470J	CHIP R 47 J 1/16W	
R361			RK73HB1J473J	CHIP R 47K J 1/16W	
R363			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R364			RK73HB1J104J	CHIP R 100K J 1/16W	
R366			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R368			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R369			RK73HB1J471J	CHIP R 470 J 1/16W	
R372			RK73HB1J560J	CHIP R 56 J 1/16W	
R373			RK73HB1J473J	CHIP R 47K J 1/16W	
R501			RK73HB1J104J	CHIP R 100K J 1/16W	
R502			RK73HB1J683J	CHIP R 68K J 1/16W	
R503			RK73HB1J121J	CHIP R 120 J 1/16W	
R505			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R506			RK73HB1J104J	CHIP R 100K J 1/16W	
R507			RK73HB1J103J	CHIP R 10K J 1/16W	
R509			RK73HB1J104J	CHIP R 100K J 1/16W	
R511			RK73HB1J101J	CHIP R 100 J 1/16W	
R513			RK73HB1J101J	CHIP R 100 J 1/16W	
R514			RK73HB1J103J	CHIP R 10K J 1/16W	
R515			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R517			RK73HB1J101J	CHIP R 100 J 1/16W	
R518			RK73HB1J474J	CHIP R 470K J 1/16W	
R519			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R520			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R521			RK73HB1J224J	CHIP R 220K J 1/16W	
R522			RK73HB1J100J	CHIP R 10 J 1/16W	
R524			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R525			RK73HB1J473J	CHIP R 47K J 1/16W	
R526			RK73HB1J474J	CHIP R 470K J 1/16W	
R527			RK73HB1J473J	CHIP R 47K J 1/16W	
R528			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R529			RK73HB1J473J	CHIP R 47K J 1/16W	
R530			RK73HB1J474J	CHIP R 470K J 1/16W	
R531			RK73HB1J104J	CHIP R 100K J 1/16W	
R532,533			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R534			RK73HB1J220J	CHIP R 22 J 1/16W	
R535			RK73HB1J563J	CHIP R 56K J 1/16W	
R536			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R538			RK73HB1J103J	CHIP R 10K J 1/16W	
R541			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R544-547			RK73HB1J104J	CHIP R 100K J 1/16W	
R550			RK73HB1J563J	CHIP R 56K J 1/16W	
R553			RK73HB1J563J	CHIP R 56K J 1/16W	
R554			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R556			RK73HB1J683J	CHIP R 68K J 1/16W	
R557			RK73HB1J564J	CHIP R 560K J 1/16W	
R558,559			RK73HB1J104J	CHIP R 100K J 1/16W	
R560			RK73HB1J103J	CHIP R 10K J 1/16W	
R561			RK73HB1J334J	CHIP R 330K J 1/16W	
R562-565			RK73HB1J104J	CHIP R 100K J 1/16W	
R566			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R567			RK73HB1J104J	CHIP R 100K J 1/16W	
R568			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R569			RK73HB1J103J	CHIP R 10K J 1/16W	
R570			RK73HB1J224J	CHIP R 220K J 1/16W	
R571,572			RK73HB1J334J	CHIP R 330K J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R573			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R574			RK73HB1J104J	CHIP R 100K J 1/16W	
R575			RK73HB1J473J	CHIP R 47K J 1/16W	
R576			RK73HB1J103J	CHIP R 10K J 1/16W	
R577			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R578			RK73HB1J473J	CHIP R 47K J 1/16W	
R579			RK73HB1J103J	CHIP R 10K J 1/16W	
R580			RK73HB1J104J	CHIP R 100K J 1/16W	
R581,582			RK73HB1J103J	CHIP R 10K J 1/16W	
R583,584			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R585			RK73HB1J274J	CHIP R 270K J 1/16W	
R586,587			RK73HB1J474J	CHIP R 470K J 1/16W	
R588			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R589,590			RK73HB1J473J	CHIP R 47K J 1/16W	
R591,592			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R593			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R594,595			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R596			RK73HB1J154J	CHIP R 150K J 1/16W	
R597-601			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R602			RK73HB1J274J	CHIP R 270K J 1/16W	
R603-608			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R610-612			RK73HB1J104J	CHIP R 100K J 1/16W	
R614			RK73HB1J154J	CHIP R 150K J 1/16W	
R615			RK73HB1J104J	CHIP R 100K J 1/16W	
R616			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R617			RK73HB1J473J	CHIP R 47K J 1/16W	
R618			RK73HB1J103J	CHIP R 10K J 1/16W	
R619,620			RK73HB1J104J	CHIP R 100K J 1/16W	
R621			RK73HB1J124J	CHIP R 120K J 1/16W	
R622			RK73HB1J223J	CHIP R 22K J 1/16W	
R623,624			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R625			RK73HB1J104J	CHIP R 100K J 1/16W	
R626			RK73HB1J183J	CHIP R 18K J 1/16W	
R627			RK73HB1J103J	CHIP R 10K J 1/16W	
R628			RK73HB1J183J	CHIP R 18K J 1/16W	
R629,630			RK73HB1J223J	CHIP R 22K J 1/16W	
R631			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R635,636			RK73HB1J471J	CHIP R 470 J 1/16W	
R637			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R638			RK73HB1J273J	CHIP R 27K J 1/16W	
R640			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R641			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R642			RK73HB1J473J	CHIP R 47K J 1/16W	
R643,644			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R645			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R646			RK73HB1J103J	CHIP R 10K J 1/16W	
R647			RK73HB1J471J	CHIP R 470 J 1/16W	
R648			RK73HB1J104J	CHIP R 100K J 1/16W	
R649			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R650			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R651			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R652			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R653,654			RK73HB1J103J	CHIP R 10K J 1/16W	
R655			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R656,657			RK73HB1J683J	CHIP R 68K J 1/16W	
R658			RK73HB1J474J	CHIP R 470K J 1/16W	
R659			RK73HB1J473J	CHIP R 47K J 1/16W	
R660			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R661			RK73HB1J684J	CHIP R 680K J 1/16W	
R662			RK73HB1J000J	CHIP R 0.0 J 1/16W	

PARTS LIST

TX-RX UNIT (X57-7650-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R663			RK73HB1J564J	CHIP R 560K J 1/16W	
R664			RK73HB1J473J	CHIP R 47K J 1/16W	
R665			RK73HB1J683J	CHIP R 68K J 1/16W	
R666			RK73HB1J153J	CHIP R 15K J 1/16W	
R667			RK73HB1J333J	CHIP R 33K J 1/16W	
R668			RK73HB1J564J	CHIP R 560K J 1/16W	
R669			RK73HB1J123J	CHIP R 12K J 1/16W	
R670			RK73HB1J104J	CHIP R 100K J 1/16W	
R671			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R672			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R673			RK73HB1J104J	CHIP R 100K J 1/16W	
R674			RK73HB1J471J	CHIP R 470 J 1/16W	
R675			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R676			RK73HB1J104J	CHIP R 100K J 1/16W	
R690			RK73HB1J103J	CHIP R 10K J 1/16W	
R693			RK73HB1J473J	CHIP R 47K J 1/16W	
R694,695			RK73HB1J104J	CHIP R 100K J 1/16W	
R697-699			RK73HB1J104J	CHIP R 100K J 1/16W	
R700-703			RK73HB1J474J	CHIP R 470K J 1/16W	
R704			RK73HB1J104J	CHIP R 100K J 1/16W	
R705			RK73HB1J474J	CHIP R 470K J 1/16W	
R706			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R707-709			RK73HB1J474J	CHIP R 470K J 1/16W	
R710			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R711			RK73HB1J474J	CHIP R 470K J 1/16W	
R712			RK73HB1J564J	CHIP R 560K J 1/16W	
R714			RK73HB1J154J	CHIP R 150K J 1/16W	
R716			RK73HB1J471J	CHIP R 470 J 1/16W	
R717			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R720			RK73HB1J473J	CHIP R 47K J 1/16W	
R722			RK73HH1J334D	CHIP R 330K D 1/16W	
R723			RK73HH1J124D	CHIP R 120K D 1/16W	
R724			RK73GB2A100J	CHIP R 10 J 1/10W	
R726			RK73HB1J474J	CHIP R 470K J 1/16W	
R727			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R729			RK73HB1J123J	CHIP R 12K J 1/16W	
R730			RK73HH1J334D	CHIP R 330K D 1/16W	
R731			RK73HH1J223D	CHIP R 22K D 1/16W	
R749			RK73HB1J104J	CHIP R 100K J 1/16W	
R750			RK73HB1J123J	CHIP R 12K J 1/16W	
R751			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R752			RK73HB1J470J	CHIP R 47 J 1/16W	
R753			RK73HB1J473J	CHIP R 47K J 1/16W	
R754			RK73HB1J100J	CHIP R 10 J 1/16W	
R756,757			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R759			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R761,762			RK73HB1J474J	CHIP R 470K J 1/16W	
R910			RK73HB1J474J	CHIP R 470K J 1/16W	
R912			RK73HB1J103J	CHIP R 10K J 1/16W	
R913			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R915			RK73HB1J564J	CHIP R 560K J 1/16W	
R916			RK73HB1J473J	CHIP R 47K J 1/16W	
S901			S64-0406-05	LEVER SWITCH	
S902			S70-0496-05	TACT SWITCH	
D101			RN142S	DIODE	
D105			HZU5CLL	ZENER DIODE	
D106-109			HVC131	DIODE	
D110,111			EZJZ0V500AA	VARISTOR	
D202-209			1SV281-F	VARIABLE CAPACITANCE DIODE	

Ref. No.	Address	New parts	Parts No.	Description	Destination
D210			RN142S	DIODE	
D303,304			HVC376B	VARIABLE CAPACITANCE DIODE	
D306-311			1SV282-F	VARIABLE CAPACITANCE DIODE	
D312			1SV278F	VARIABLE CAPACITANCE DIODE	
D313			MA2S111-F	DIODE	
D314			DA221	DIODE	
D500			RB706F-40	DIODE	
D501			MA2S111-F	DIODE	
D502			NNCD6.8G-A	ZENER DIODE	
D504			NNCD6.8G-A	ZENER DIODE	
D505			1SS416	DIODE	
D510-512			RB706F-40	DIODE	
D515,516			AVRM1005C270M	VARISTOR	
D517			DA221	DIODE	
D518,519			1SS416	DIODE	
D521			1SS416	DIODE	
D700			1SR154-400	DIODE	
D702			MA2S111-F	DIODE	
D704			1SS388F	DIODE	
D706			HRB0502A	DIODE	
IC101			TA75W01FUF	MOS-IC	
IC102,103			MASWSS0181	ANALOGUE IC	
IC104			TC75W51FK(F)	MOS-IC	
IC201			TLV2381IDBV	MOS-IC	
IC202			SPM5001	MOS-IC	
IC204			TA31137FNG	MOS-IC	
IC206,207			TC7W53FK(F)	MOS-IC	
IC250			MCP6021-E/OT	MOS-IC	
IC301			TLV2381IDBV	MOS-IC	
IC303			ADF4111BCP7	MOS-IC	
IC304			UPB1509GV	BI-POLAR IC	
IC414			MCP41100T	ANALOGUE IC	
IC500			TC75W51FK(F)	MOS-IC	
IC501			TC7MBD3245AFK	MOS-IC	
IC502			AK2330	MOS-IC	
IC503			TC75W51FK(F)	MOS-IC	
IC505			PCA9535BS	MOS-IC	
IC506			TC75S51FE(F)	MOS-IC	
IC507-509			TC7W53FK(F)	MOS-IC	
IC510			TC75W51FK(F)	MOS-IC	
IC511			TC7SH126FU-F	MOS-IC	
IC512,513			TC75W51FK(F)	MOS-IC	
IC514			TC75S51FE(F)	MOS-IC	
IC515			TC7S66FUF	MOS-IC	
IC516			TC75W51FK(F)	MOS-IC	
IC517			TC7SET08FU-F	MOS-IC	
IC700			TK11250CUCB	MOS-IC	
IC701			XC6209B502PR	MOS-IC	
IC702			XC6204B502MR	MOS-IC	
IC704			TK11250CUCB	MOS-IC	
IC705,706			XC6204B332M	MOS-IC	
IC707			XC6365D103M	MOS-IC	
IC708			XC9101D09AKR	ANALOGUE IC	
IC709			XC9235A15CM1	MOS-IC	
IC710			XC6204B332M	MOS-IC	
IC712			NJM2130F3-ZB	BI-POLAR IC	
IC713			LM2682MMX	MOS-IC	
IC714			LM73CIMKX-0	MOS-IC	
Q101			2SC5108(Y)F	TRANSISTOR	
Q102			2SC5455-A	TRANSISTOR	

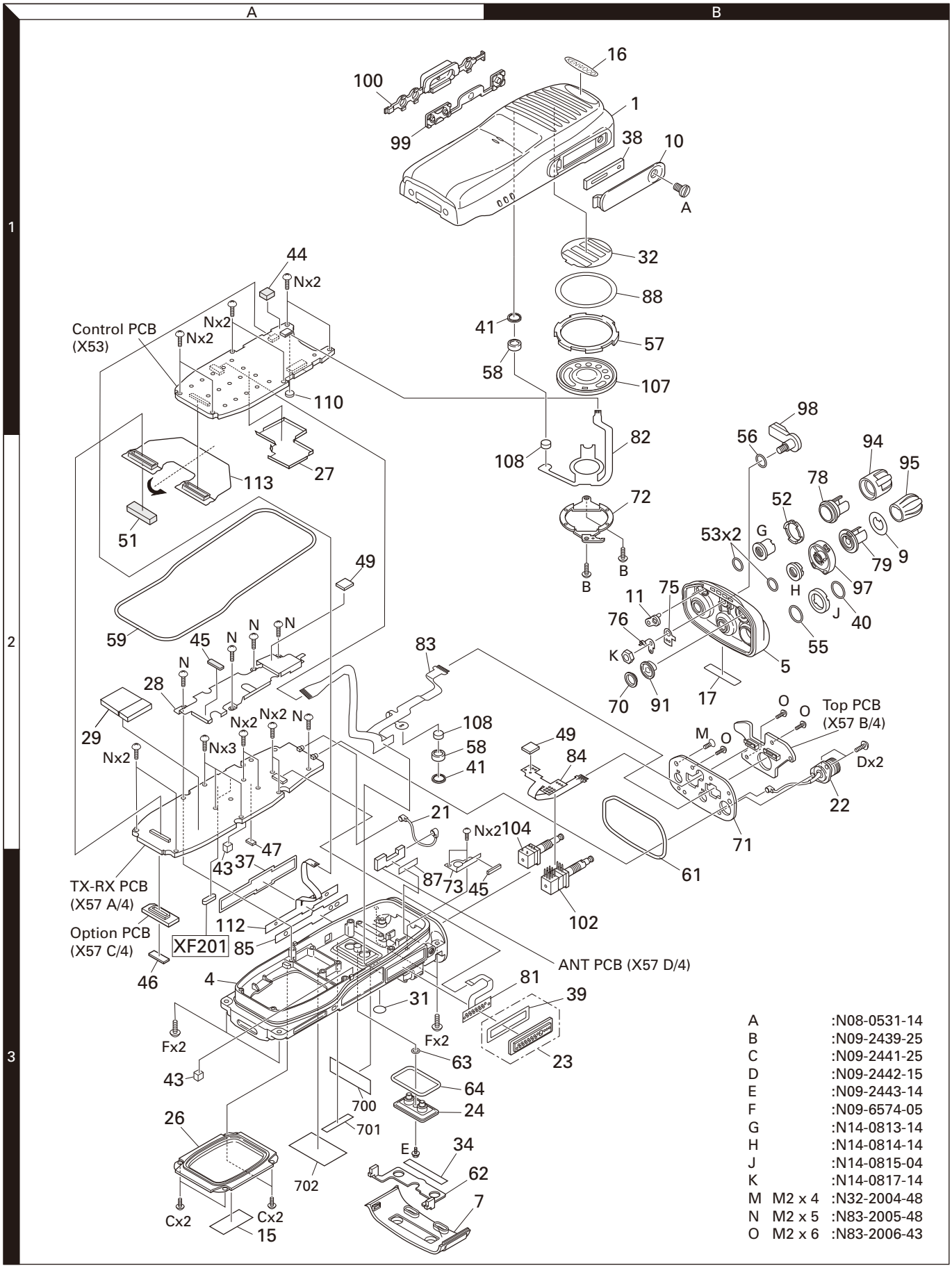
PARTS LIST

TX-RX UNIT (X57-7650-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
Q103			RD01MUS1-T113	FET	
Q104			SSM3K15TE(F)	FET	
Q105			RD07MVS1-T122	FET	
Q106			DTA144EEB	DIGITAL TRANSISTOR	
Q107			SSM3K15TE(F)	FET	
Q110			2SJ243-A	FET	
Q111			EMD9	TRANSISTOR	
Q201			2SC4617(S)	TRANSISTOR	
Q202			3SK274✻J-FP	FET	
Q204			2SK1215-E(E)	FET	
Q205			2SC5108(Y)F	TRANSISTOR	
Q209			EMD9	TRANSISTOR	
Q306			2SK879-F(Y)	FET	
Q307			2SC4617(S)	TRANSISTOR	
Q308			SSM6L05FU-F	FET	
Q309			2SJ347F	FET	
Q310,311			2SK508NV(K52)	FET	
Q312-314			2SC5108(Y)F	TRANSISTOR	
Q315			2SC4617(S)	TRANSISTOR	
Q316			SSM6L05FU-F	FET	
Q417			SSM3K15TE(F)	FET	
Q502			2SC4617(S)	TRANSISTOR	
Q503			SSM3K15TE(F)	FET	
Q504			2SC4738(GR)F	TRANSISTOR	
Q505			2SA1832(GR)F	TRANSISTOR	
Q506			2SJ243-A	FET	
Q507			SSM3K15TE(F)	FET	
Q508			2SJ347F	FET	
Q509			SSM6N16FE-F	FET	
Q700,701			SSM6L05FU-F	FET	
Q703			SSM3K15TE(F)	FET	
Q704			TPC6108-F	FET	
Q705			SSM5H01TU-F	FET	
Q706			TPC6108-F	FET	
Q707			2SJ648-A	FET	
Q708			SSM3K15TE(F)	FET	
Q709			SSM6L05FU-F	FET	
TH101,102			B57331V2104J	THERMISTOR	

Ref. No.	Address	New parts	Parts No.	Description	Destination

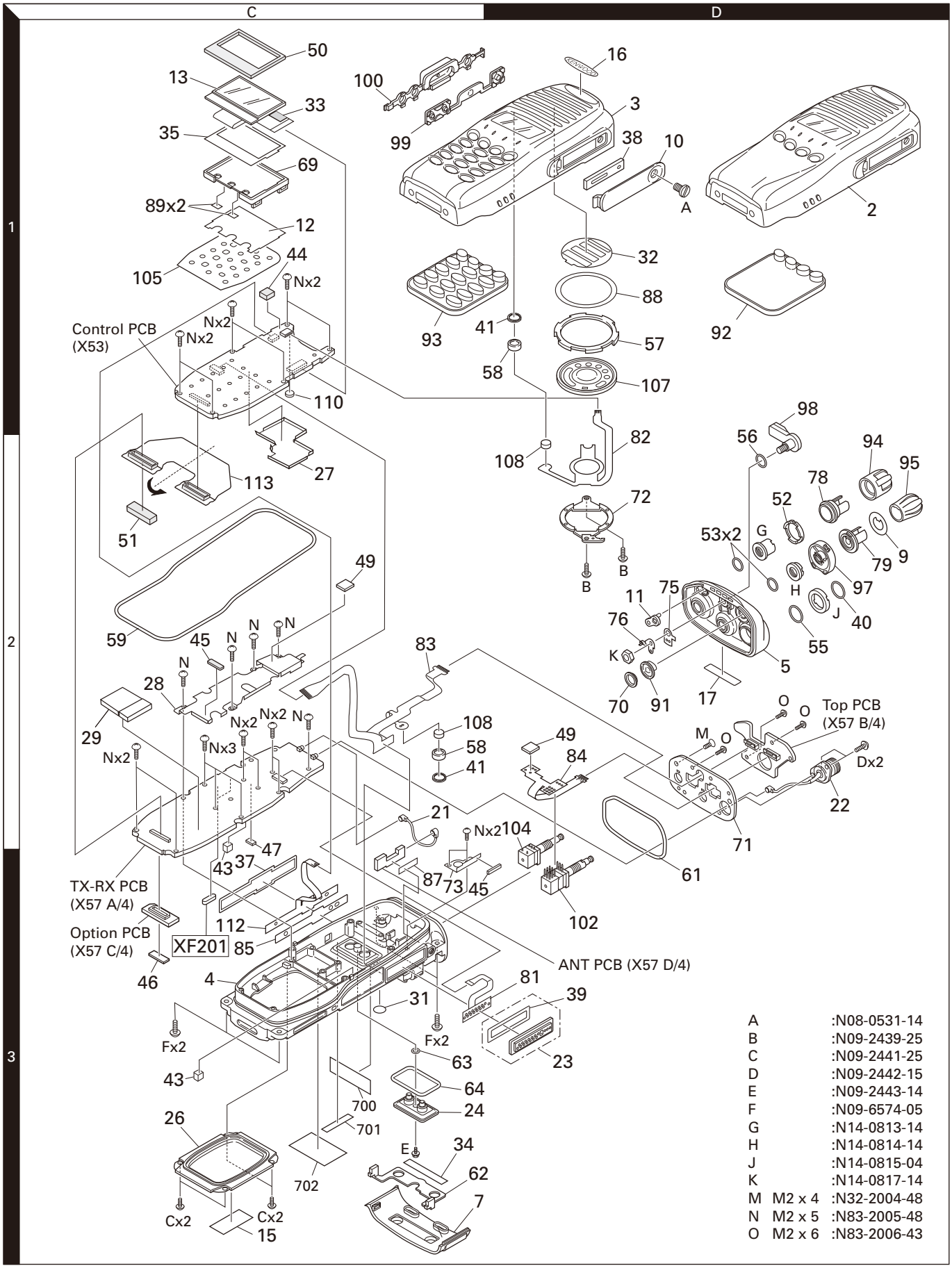
EXPLODED VIEW (TK-5210(G) K)



A		:N08-0531-14
B		:N09-2439-25
C		:N09-2441-25
D		:N09-2442-15
E		:N09-2443-14
F		:N09-6574-05
G		:N14-0813-14
H		:N14-0814-14
J		:N14-0815-04
K		:N14-0817-14
M	M2 x 4	:N32-2004-48
N	M2 x 5	:N83-2005-48
O	M2 x 6	:N83-2006-43

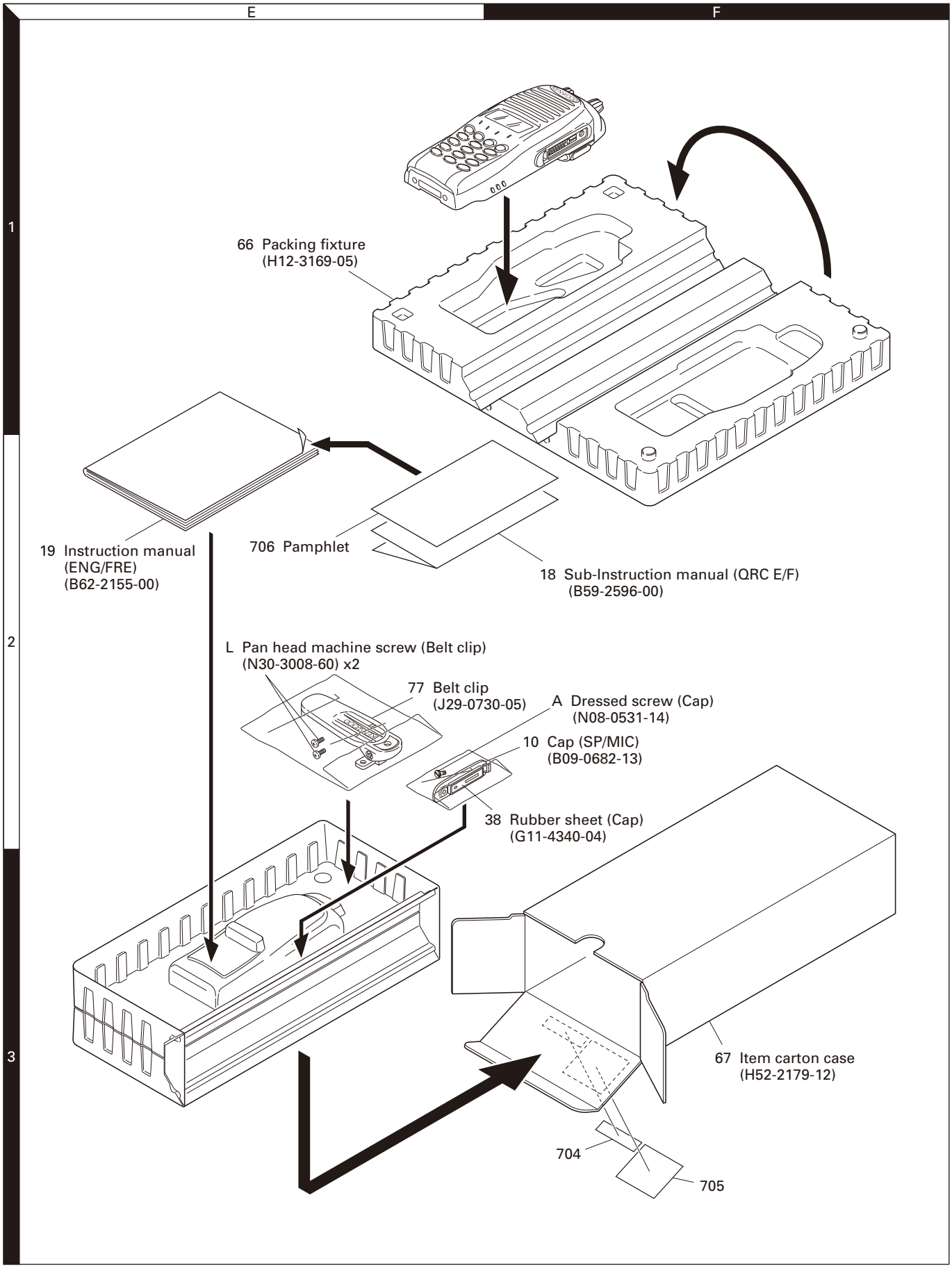
Parts with the exploded numbers larger than 700 are not supplied.
If a part reference number is listed in a box on the exploded view of the PCB, that part does not come with the PCB. These parts must be ordered separately.

EXPLODED VIEW (TK-5210(G) K2, K3, K7)



Parts with the exploded numbers larger than 700 are not supplied.
If a part reference number is listed in a box on the exploded view of the PCB, that part does not come with the PCB.
These parts must be ordered separately.

PACKING



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

TROUBLE SHOOTING

Fault diagnosis of the BGA (Ball Grid Array) IC

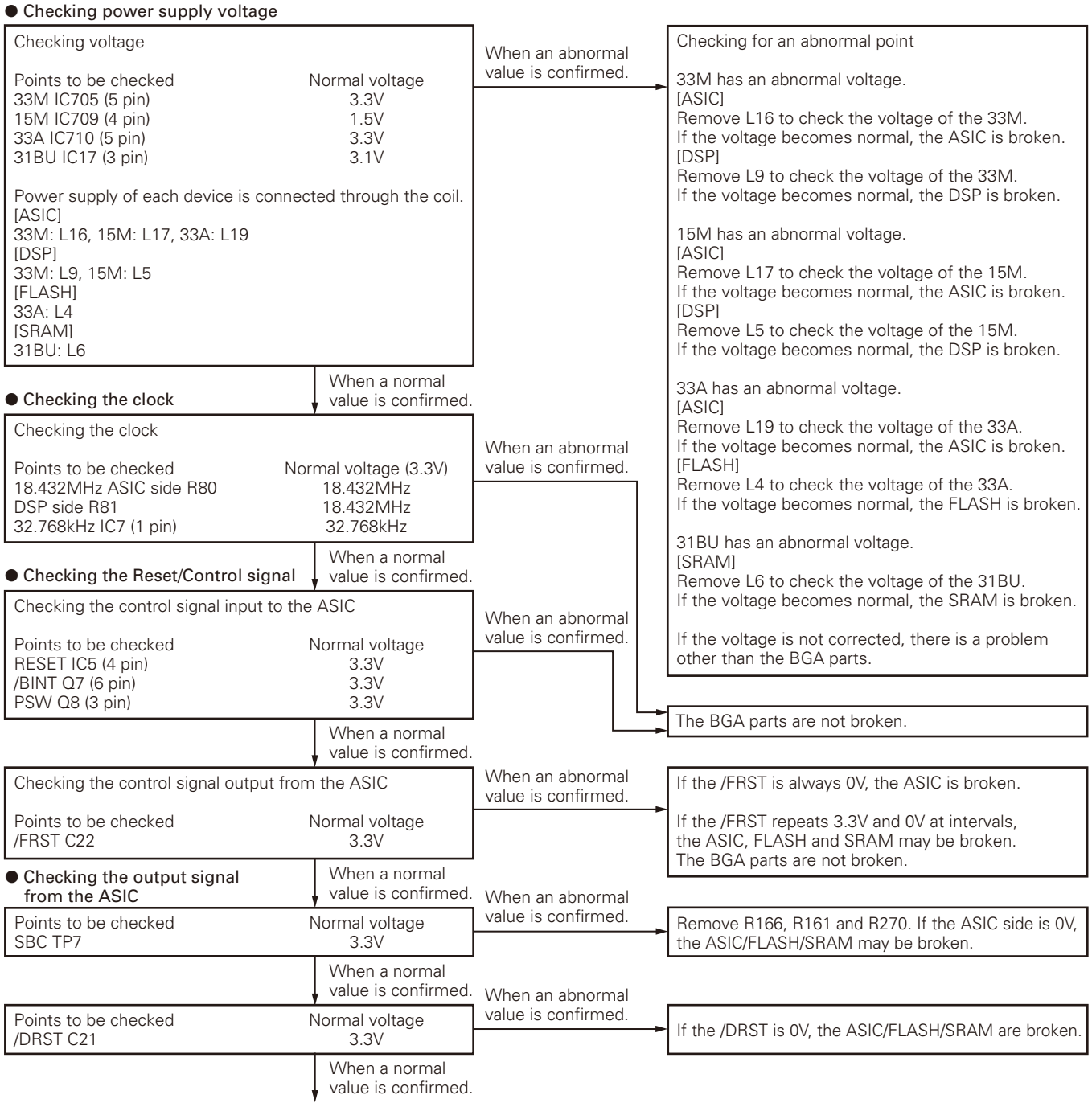
■ Overview

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

■ BGA parts

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

When the BGA IC is problematic, please bring the printed circuit board (X53-4390-13 for basic, X53-4390-14 for 4-key, X53-4390-15 for DTMF keypad) in for service.



TROUBLE SHOOTING

● The LCD displays control (K2, K3 and K7 models only)

Points to be checked	Normal voltage	When an abnormal value is confirmed.	
/LCDRST R203	3.3V	→	Remove R203. If the ASIC side is 0V, the ASIC/FLASH/SRAM may be broken.

↓ When a normal value is confirmed.

Points to be checked	Normal voltage	When an abnormal value is confirmed.	
/CS4 IC18 (7 pin)	3.3V→0V→3.3V	→	If the /CS4 is 0V or 3.3V, the ASIC/FLASH/SRAM may be broken.

↓ When a normal value is confirmed.

Points to be checked	Normal voltage	When an abnormal value is confirmed.	
5M IC704 (6 pin)	5.0V	→	If 5M is 0V, parts other than the BGA are broken.

↓ When a normal value is confirmed.

It is unlikely that the BGA parts are broken.

● When an error display appears on the LCD. (K2, K3 and K7 models only)

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

● When the LED color changes red and orange alternately. (K model only)

A warning tone does not sound.	→	An error occurs when the ASIC internal RAM reads or writes. The ASIC may be broken.
	or →	An error occurs when the DSP internal RAM reads or writes. The DSP may be broken.
	or →	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	HIGH → ON
4)	/FRST	: FLASH reset signal	LOW → Reset
5)	SBC	: Switch B control	HIGH → ON
6)	/DRST	: DSP reset signal	LOW → Reset
7)	/LCDRST	: LCD reset signal	LOW → Reset
8)	/CS4	: LCD controller chip select signal	LOW → Active

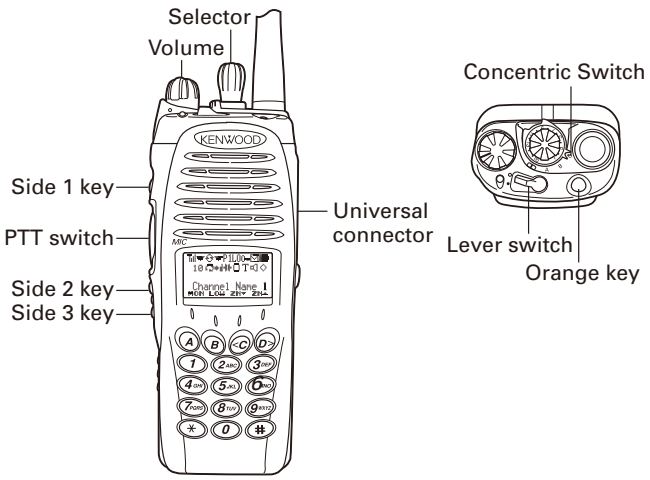
Replacing Control Unit

■ Control unit Information

Model Name	Original Control unit Number	For Service Control unit Number
TK-5210(G) (K)	X53-4390-10	X53-4390-13
TK-5210(G) (K2, K7: 4-key)	X53-4390-11	X53-4390-14
TK-5210(G) (K3: DTMF keypad)	X53-4390-12	X53-4390-15

ADJUSTMENT

Controls



Panel Test Mode

(K2, K3 and K7 models only)

For the K model (without LCD), perform "Test mode" using the KPG-95DG.

■ Test mode operation features

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

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

• Key operation

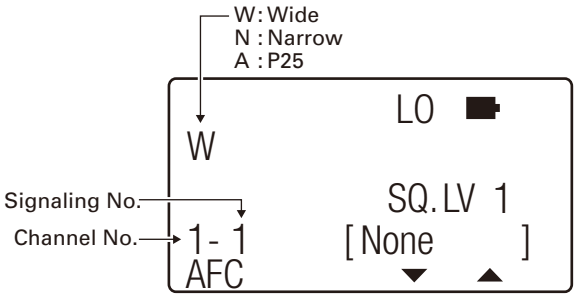
Key	Function	Display
[Selector]	Test frequency channel up/down	Channel No
[Concentric switch]	Channel spacing switching (Position "A": Wide, Position "B": Narrow, Position "C": P25)	Wide: "W" Narrow: "N" P25: "A"
[Lever switch]	RF output power switching (○: Low power, ●: High power)	Low power: "LO" High power: "HI"
[PTT]	Transmit	-
[Side1]	Squelch level change (0→1→2→...→9→0→1→2→...)	Squelch level 0: "SQ.LV0" Squelch level 1: "SQ.LV1" Squelch level 9: "SQ.LV9"
[Side1] Hold	Squelch off	
[Side2]	MSK baud rate change (1200bps/2400bps)	2400bps: icon appears
[Side2] Hold	Compander on/off	On: icon appears
[Side3]	Shifts to the Panel tuning mode	-
[Side3] Hold	LCD all lights	LCD all point appears
[Orange]	Beat shift on/off	On: icon appears
[A]	AFC on/off	On: icon appears
[B]	Unused	-
[C]	Test signaling down	Signaling No.
[D]	Test signaling up	Signaling No.
[0] to [9] and [#], [*]	Use as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was presses is sent.	-

• LED indicator

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

ADJUSTMENT

• LCD display in the panel test mode



• Bandwidth

Display	Condition	Key
W	WIDE (5.0kHz/25.0kHz)	Concentric switch "A"
N	NARROW (2.5kHz/12.5kHz)	Concentric switch "B"
A	P25 (2.5kHz/12.5kHz)	Concentric switch "C"

■ 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

Channel No.	RX (MHz)	TX (MHz)
1	155.10000	155.00000
2	136.10000	136.00000
3	173.90000	173.95000
4	155.00000	155.00000
5	155.20000	155.20000
6	155.40000	155.40000
7~16	-	-

• Test Signaling

Signaling No.	RX Signaling	TX Signaling	P25/ Analog
1	None	None	Analog
2	None	100Hz Square wave	Analog
3	QT 67.0Hz	QT 67.0Hz	Analog
4	QT 151.4Hz	QT 151.4Hz	Analog
5	QT 210.7Hz	QT 210.7Hz	Analog
6	QT 254.1Hz	QT 254.1Hz	Analog
7	DQT 023N	DQT 023N	Analog
8	DQT 754I	DQT 754I	Analog
9	DTMF Code "159D"	DTMF Code "159D"	Analog
10	None	DTMF Code "9"	Analog
11	2-tone A: 304.7Hz, B: 3106.0Hz	2-tone A: 304.7Hz, B: 3106.0Hz	Analog
12	Single Tone: 979.9Hz	Single Tone: 979.9Hz	Analog
13	None	Single Tone 1000Hz	Analog
14	None	MSK PN9 Pattern	Analog
15	MSK Data Preamble=0xAAAA, Sync=0x23EB, Data=0x230960C6AAAA	MSK Data Preamble=0xAAAA, Sync=0x23EB, Data=0x230960C6AAAA	Analog
16	Codec Loop	None	Analog
17	NAC 293	NAC 293	P25
18	NAC 023	NAC 023	P25
19	NAC 5EA	NAC 5EA	P25
20	None	PN9	P25
21	NAC 293	Symbol Rate Pattern	P25
22	NAC 293	1/3 Deviation Pattern	P25
23	NAC 293	0 Continuous Pattern	P25
24	NAC 293	Fidelity Pattern	P25
25	None	FSW + PN9	P25
26	NAC293	NAC293 + 1011Hz Tone Pattern	P25
27	Tone Pattern	NAC293 + 1011Hz Tone Pattern	P25
28	Silence Pattern (1011Hz Full Rate)	NAC293 + Silence Pattern	P25
29	Audio Test Pattern (Full Rate)	NAC 293+Audio Test Pattern (Full Rate)	P25
30	Vocoder Loop	None	P25

ADJUSTMENT

Panel Tuning Mode
(K2, K3 and K7 models only)

The transceiver is adjusted in this mode.

For the K model (without LCD), perform "Tuning mode" using the KPG-95DG.

■ Preparations for tuning the transceiver

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

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

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

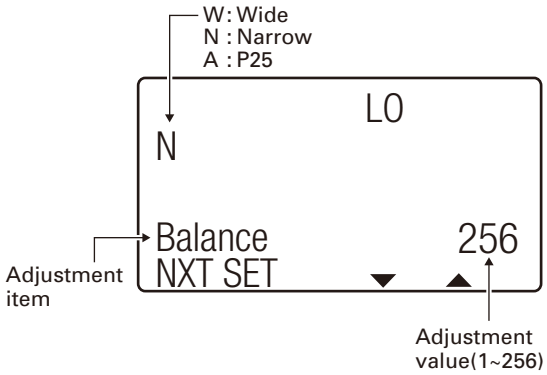
■ To enter the Panel Tuning Mode

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

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

Use the [A] key to select the adjustment item through tuning modes. Use the [Side1] key to adjust 3 or 5 reference level adjustments, and use the [Concentric switch] to switch between Wide/Narrow/P25. (Position "A": Wide, Position "B": Narrow, Position "C": P25)

• LCD display in the panel tuning mode



• Key operation

Key	Function
[Selector]	Unused
[Concentric switch]	Channel spacing switching (Position "A": Wide, Position "B": Narrow, Position "C": P25)
[Lever switch]	Unused
[PTT]	Transmission. When the battery low voltage is adjusted, the adjustment value is displayed on the LCD.
[Side1]	To enter 3 or 5 reference level adjustments
[Side2]	Unused
[Side3]	Exit the panel tuning mode and shift to the panel test mode.
[Orange]	Unused
[A]	Go to the next adjustment item (The current adjustment data is cleared.)
[A] Hold	Back to the last adjustment item (The current adjustment data is cleared.)
[B]	Write the new adjustment value to the transceiver.
[C]	Adjustment value down
[D]	Adjustment value up

■ 3 or 5 reference level adjustments frequency

Tuning point	Display	RX (MHz)	TX (MHz)
Low	L	136.10000	136.00000
Low'	LC	145.60000	145.50000
Center	C	155.10000	155.00000
High '	CH	164.60000	164.50000
High	H	173.90000	174.00000

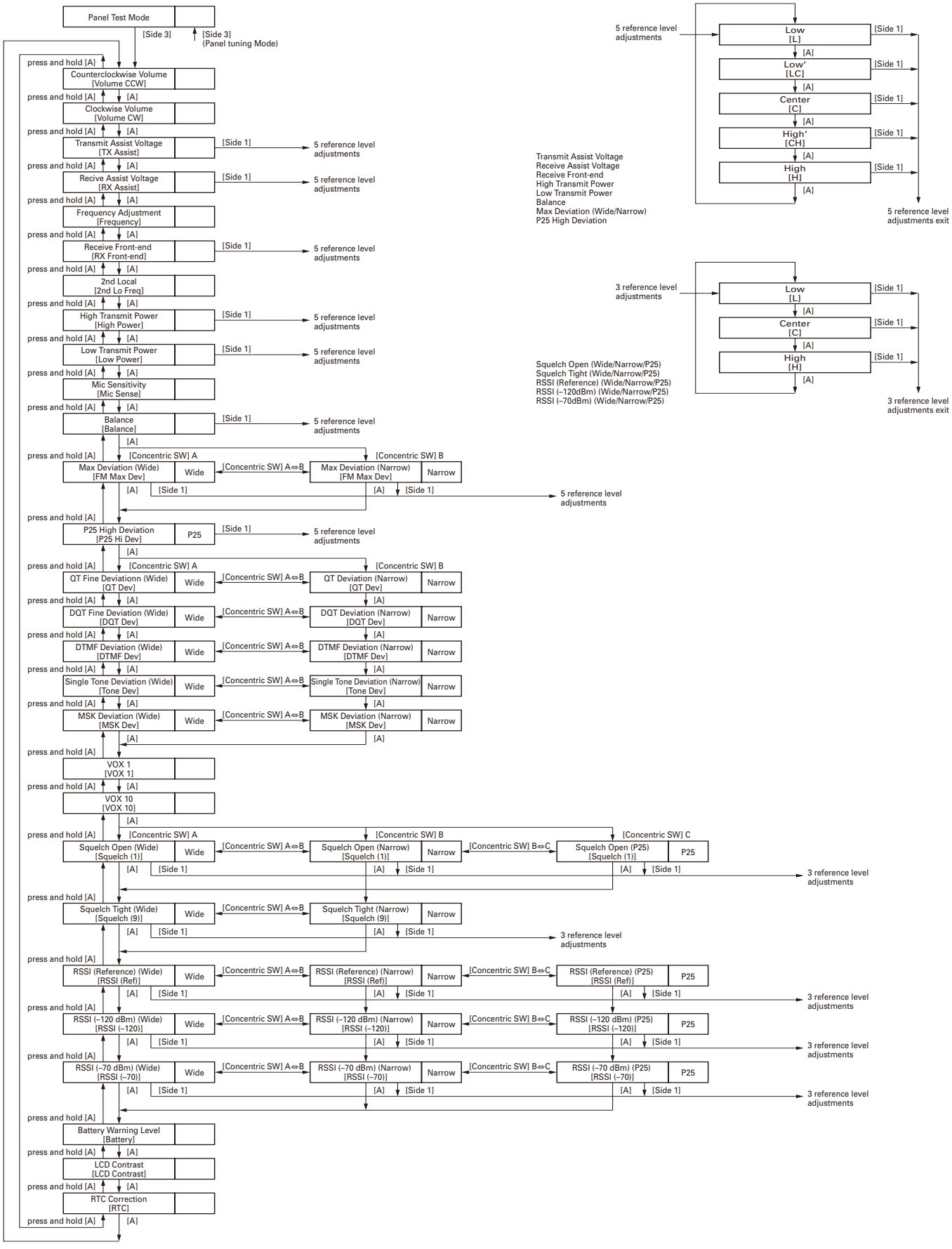
ADJUSTMENT

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

No.	Adjustment item	Display		Wide/Narrow/P25	Tuning Point	Note
1	Counterclockwise Volume	Volume CCW	***	-	1	
2	Clockwise Volume	Volume CW	***	-	1	
3	Transmit Assist Voltage	TX Assist	***	-	5	
4	Receive Assist Voltage	RX Assist	***	-	5	
5	Frequency Adjustment	Frequency	***	-	1	
6	Receive Front-end	RX Front-end	***	-	5	AF unmute
7	2nd Local	2nd Lo Freq	***	-	1	
8	High Transmit Power	High Power	***	-	5	
9	Low Transmit Power	Low Power	***	-	5	
10	Mic Sensitivity	Mic Sense	***	-	1	
11	Balance	Balance	***	Narrow	5	50Hz Square Wave
12	Max Deviation	FM Max Dev	***	Wide/Narrow	5	
13	P25 High Deviation	P25 Hi Dev	***	P25	5	Symbol Rate Pattern
14	QT Fine Deviation	QT Dev	***	Wide/Narrow	1	QT: 151.4Hz
15	DQT Fine Deviation	DQT Dev	***	Wide/Narrow	1	DQT: 023N
16	DTMF Deviation	DTMF Dev	***	Wide/Narrow	1	DTMF Code: 9
17	Single Tone Deviation	Tone Dev	***	Wide/Narrow	1	Single Tone 1000Hz
18	MSK Deviation	MSK Dev	***	Wide/Narrow	1	MSK PN Pattern
19	VOX 1	VOX 1	***	-	1	
20	VOX 10	VOX 10	***	-	1	
21	Squelch Open	Squelch (1)	***	Wide/Narrow/P25	3	AF unmute
22	Squelch Tight	Squelch (9)	***	Wide/Narrow	3	AF unmute
23	RSSI (Reference)	RSSI (Ref)	***	Wide/Narrow/P25	3	
24	RSSI (–120dBm)	RSSI (–120)	***	Wide/Narrow/P25	3	
25	RSSI (–70dBm)	RSSI (–70)	***	Wide/Narrow/P25	3	
26	Battery Warning Level	Battery	***	-	1	
27	LCD Contrast	LCD Contrast	***	-	1	
28	RTC Correction	RTC	***	-	1	–62~+62

ADJUSTMENT

■ Flow Chart



ADJUSTMENT

BER (Bit Error Rate) Measurement

1. The Panel Test Mode is used to measure the BER (Refer "Test mode operation features" described on page 45.).
2. Select "26" for test signaling (Refer to "Test Signaling" described on page 46.).
   When "26" is selected for the test signaling, the Bandwidth is automatically selected to "P25".
   (If there is no RF input signal, the display shows "500000".)
3. Select a filter (Refer to "Bandwidth" described on page 46.).
4. Select a test frequency (Refer to "Test Frequency" described on page 46.).

5. Measure the BER (Bit Error Rate) using the digital radio tester. Enter a standard input signal into the transceiver as a standard tone test pattern.
6. Adjust the input signal level to achieve the standard bit error rate (BER).
   (For example, if the BER is 5%, the display shows "050000".)

C4FM (P25) Deviation Adjustment

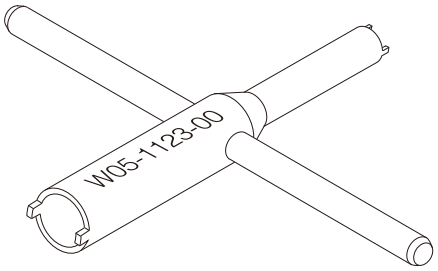
1. The transceiver adjusts the deviation between High Deviation ±1800Hz for the C4FM (P25).
2. The Symbol Rate Pattern is used when adjusting the High Deviation for the C4FM (P25) (Refer to "Test Signaling" described on page 46.). This test signal has a peak deviation equal to π/2 1800Hz = 2827Hz.

Service Jig

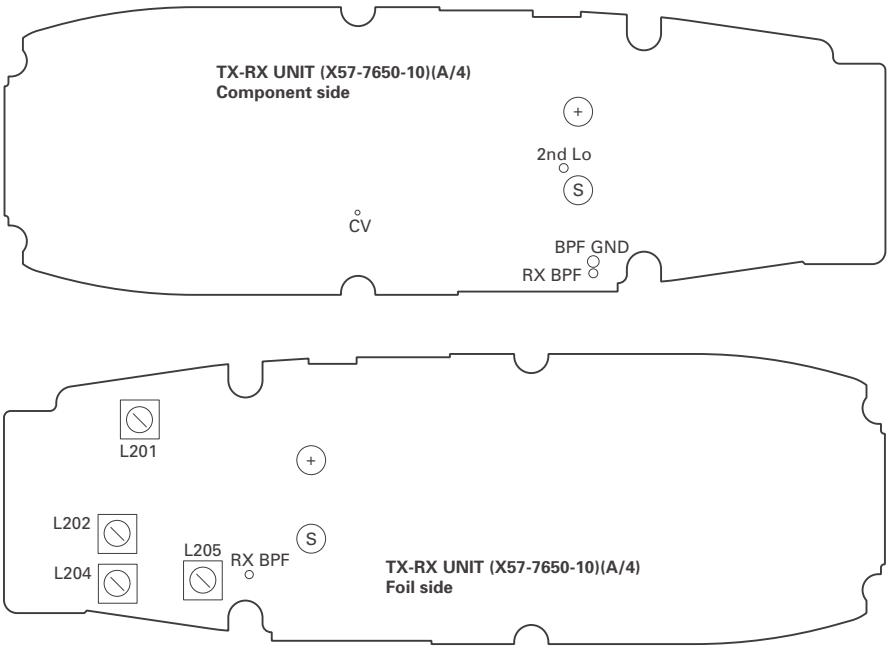
■ Nut wrench

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

KENWOOD part No.: W05-1123-00



Adjustment Points



ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment		Major Specifications	
1.	Standard Signal Generator (SSG)	Frequency Range Modulation Output	136 to 174MHz Frequency modulation and external modulation –127dBm/0.1µV to greater than –47dBm/1mV
2.	Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω 136 to 174MHz or more Vicinity of 10W
3.	Deviation Meter	Frequency Range	136 to 174MHz
4.	Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading
5.	Oscilloscope		DC through 30MHz
6.	High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz 0.2ppm or less
7.	Ammeter		5A
8.	AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz 1mV to 10V
9.	Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more 0 to 1V
10.	Distortion Meter	Capability Input Level	3% or less at 1kHz 50mV to 10Vrms
11.	Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12.	Tracking Generator	Center frequency Output Voltage	50kHz to 600MHz 100mV or more
13.	8Ω Dummy Load		Approx. 8Ω, 3W
14.	Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped

■ The following parts are required for adjustment

1. Antenna connector adapter

The antenna connector of this transceiver uses an SMA terminal.

Use an antenna connector adapter [SMA (f) – BNC (f) or SMA (f) – N (f)] for adjustment. (The adapter is not provided as an option, so buy a commercially-available one.)

Note:

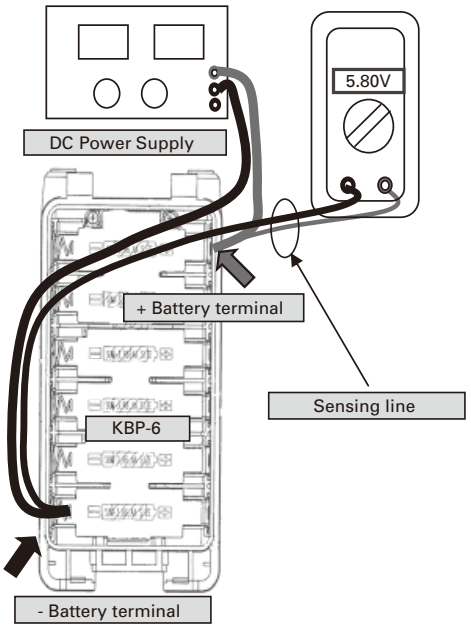
When the antenna connector adapter touches the knob, draw out the knob to mount the connector.

2. Battery Jig

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

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

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



Notice:

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

ADJUSTMENT

3. Universal connector

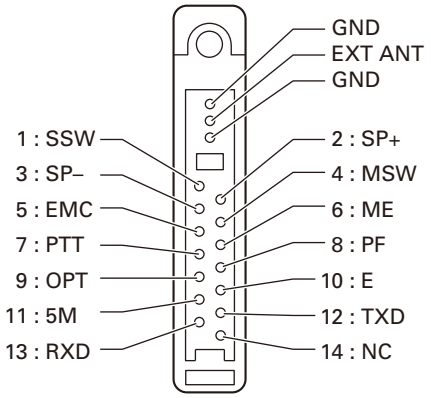
Use the interface cable (KPG-36/36A) for PC tuning or the lead wire with plug (E30-3287-28) and screw (N08-0535-08) for panel tuning. Connect the plug to the universal connector of the transceiver and tighten the screw.

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

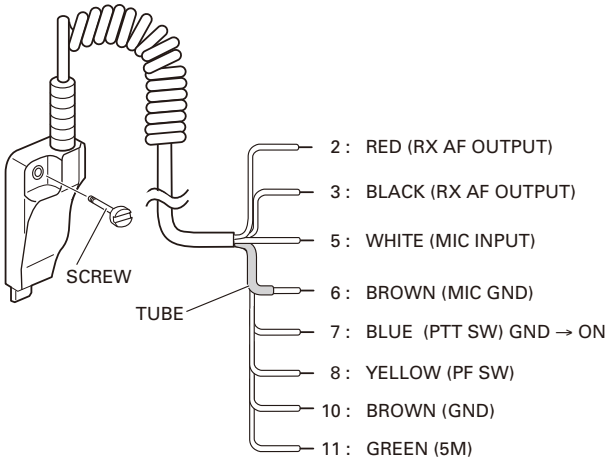
Caution

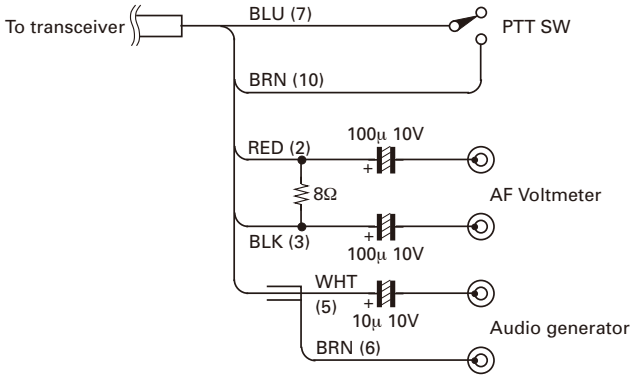
1. When connecting the plug to the universal connector of the transceiver, a short circuit may occur. To prevent this, be sure to turn the transceiver POWER switch off.
2. Since the RX AF output is a BTL output, there is a DC component. Isolate this with a capacitor or transformer as shown in the figure.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

• Universal connector



• Panel tuning



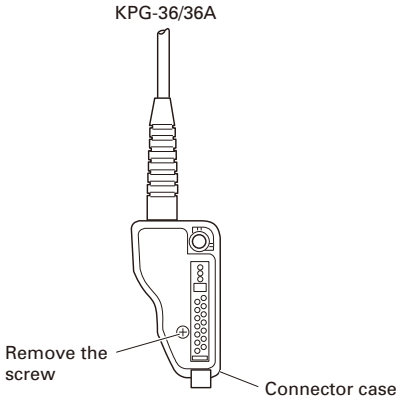


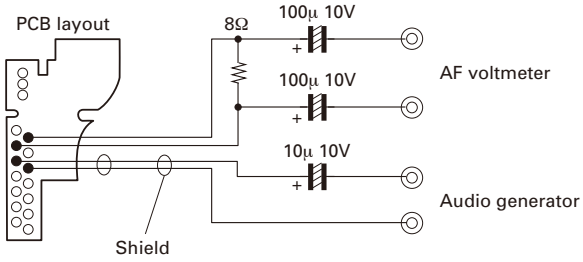
Note: Pin 1 (SSW) and Pin 4 (MSW) are connected to Pin 10 (GND) to active External SP and External MIC.

• PC tuning

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

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

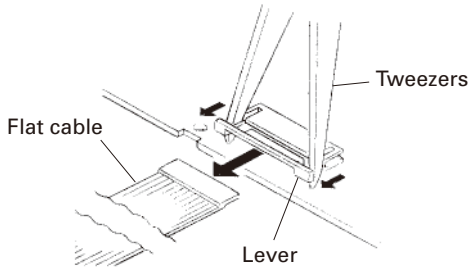




ADJUSTMENT

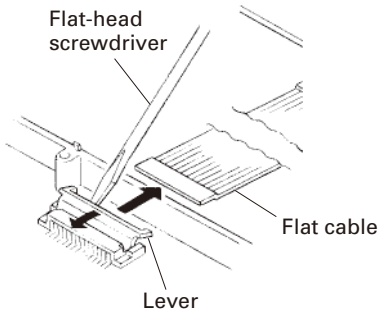
How to Remove the Flat Cable

1. Gently draw out both sides of the connector lever uniformly in the direction of the arrow with tweezers.
   (CN1, CN35, CN38, CN505)
   CN1: K2, K3 and K7 models only

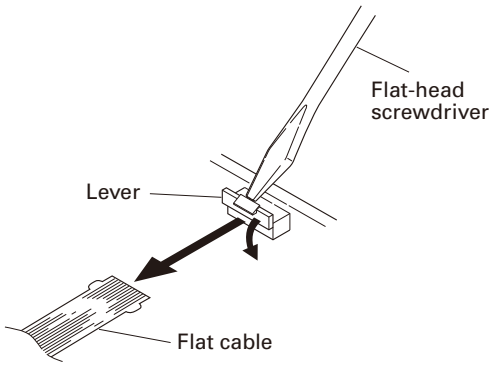


2. Gently rise up the connector lever in the direction of the arrow with a flat-head screwdriver or tweezers.
   (CN34)

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



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



ADJUSTMENT

Common Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) BATT terminal voltage: 7.5V 2) SSG standard modulation [Wide] MOD: 1kHz, DEV: 3kHz [Narrow] MOD: 1kHz, DEV: 1.5kHz								
2. Counter-clockwise Volume	1) Adj item: [Volume CCW] Adjust: [***]	1) Adj item: [Counter-clockwise Volume]				Panel		[Panel tuning mode] Turn the volume knob counterclockwise fully. Press [B] key to store the adjustment value. [PC test mode] Turn the volume knob counterclockwise fully. Press [Apply] button to store the adjustment value.	This item is needed when the variable resistor (R31-0654-05) is replaced.
3. Clockwise Volume	1) Adj item: [Volume CW] Adjust: [***]	1) Adj item: [Clock-wise Volume]						[Panel tuning mode] Turn the volume knob clockwise fully. Press [B] key to store the adjustment value. [PC test mode] Turn the volume knob clockwise fully. Press [Apply] button to store the adjustment value.	
4. Transmit Assist Voltage	1) Adj item: [TX Assist] Adjust: [***] 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	[Manual Adjustment] 1) Adj item: [Transmit Assist Voltage] 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Power meter DVM	Panel TX/RX (A/4)	ANT CV	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	[Automatic Adjustment] 1) Press [Tune Assist Voltage (Auto)] button. 2) [Assist Voltage Result] window shows result of assist voltage after the automatic adjustment was finished. *This mode adjust [TX], [RX] Assist voltage at once. [Manual Adjustment] Adjustment] The display on the left of LCD and [V] indicator on the PC window shows VCO lock voltage. Change the adjustment value to get VCO lock voltage within the limit of the specified voltage.	2.01V±0.1V (CV) [PC test mode] [Manual Adjustment] When adjusting the assist voltage in PC tuning mode, slide the bar to indicate "VCO Lock Voltage" within 2.0V±0.1V on Meter window.

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
Receive Assist Voltage	1) Adj item: [RX Assist] Adjust: [***] 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [***] Press [B] key to store the adjustment value.	[Manual Adjustment] 1) Adj item: [Receive Assist Voltage] 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] Press [OK] button to store the adjustment value.	Power meter DVM	Panel TX/RX (A/4)	ANT CV	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	[Automatic Adjustment] 1) Press [Tune Assist Voltage (Auto)] button. 2) [Assist Voltage Result] window shows result of assist voltage after the automatic adjustment was finished. *This mode adjust [TX], [RX] Assist voltage at once. [Manual Adjustment] Adjustment] The display on the left of LCD and [V] indicator on the PC window shows VCO lock voltage. Change the adjustment value to get VCO lock voltage within the limit of the specified voltage.	2.01V±0.1V (CV) [PC test mode] [Manual Adjustment] When adjusting the assist voltage in PC tuning mode, slide the bar to indicate "VCO Lock Voltage" within 2.0V±0.1V on Meter window.
5. Frequency Adjustment *1	[Panel test mode] 1) CH-Sig: 1-1 [Panel tuning mode] 1) Adj item: [Frequency] Adjust: [***] PTT: ON Press [B] key to store the adjustment value after adjustment.	1) Adj item: [Frequency Adjustment] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	f. counter	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	154.999970~ 155.000030MHz	fc±30Hz **Note:** After replacing the VCXO (X301) align frequency.
6. 2nd Local	[Panel test mode] 1) Adjust item: [2nd Lo Freq] Adjust: [***] Press [B] key to store the adjustment value.	1) Adj item: [2nd Local] Press [OK] button to store the adjustment value.		Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 98 (Fixed value)	

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

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
7. LCD Contrast	1) Adj item: [LCD Contrast] Adjust: [∗∗∗] Press [B] key to store the adjustment value.	1) Adj item: [LCD Contrast] Press [OK] button to store the adjustment value.				Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Adjust the LCD contrast by looking.	
8. RTC Correction	1) Adj item: [RTC] Adjust: [∗∗∗]	1) Adj item: [RTC Correction]				Panel	[Orange]	[Panel tuning mode] Press [Orange] key. After automatic adjustment adjusted value is displayed on LCD. Press [B] key to store the adjustment value. [PC test mode] Press [Start] button of "Auto Tuning". Press [Apply] button to store the adjustment value after the automatic adjustment was finished.	

Transmitter Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. High Transmit Power	1) Adj item: [Hi Power] Adjust: [∗∗∗] 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [∗∗∗] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [High Transmit Power] 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Power meter Ammeter	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	4.8W	+0.2W/–0.1W 2.5A or less
2. Low Transmit Power	1) Adj item: [Low Power] Adjust: [∗∗∗] 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [∗∗∗] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Low Transmit Power] 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						1.0W	±0.2W 1.4A or less

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. Balance *2	1) Adj item: [Balance] Adjust: [***] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Balance] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Make the demodulation waves into square waves.	
4. Mic Sensitivity	1) Adj item: [Mic Sense] Adjust: [***] PTT: ON Press [B] key to store the adjustment value	1) Adj item: [Mic Sensitivity] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope AG AF VTVM	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 48 (Reference value) Adjust AG input to get a standard MOD., 3.0kHz.	Mic sensitivity check: 15mV±3.5mV
5. Max Deviation *2 [Narrow]	[Concentric SW]: B 1) Adj item: [N FM Max Dev] Adjust: [***] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [L] → [LC] → [C] → [CH] → [H] PTT: ON Adjust: [***] Press [B] key to store the adjustment value.	1) Adj item: [Max Deviation (Narrow)] Deviation meter LPF: 15kHz HPF: OFF 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	2.0kHz (According to the larger +, –)	±15Hz
[Wide]	[Concentric SW]: A 1) Adj item: [W FM Max Dev] Adjust: [***] 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Max Deviation (Wide)] 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						4.0kHz Set it the adjustment value obtained from the [Max Deviation Adjust [Narrow]] adjustment of step 2).	±50Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. P25 High Deviation *2	[Concentric SW]: C 1) Adj item: [A P25 Hi Dev] Adjust: [***] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [L] → [LC] → [C] → [CH] → [H] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [P25 High Deviation] Deviation meter LPF: 3kHz HPF: OFF 2) Adj item: [Frequency] [Low] → [Low'] → [Center] → [High'] → [High] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	2827kHz Set it the adjustment value obtained from the [Max Deviation Adjust [Narrow]] adjustment of step 2).	2771~2883Hz
7. QT Fine Deviation *2 [Wide]	[Concentric SW]: A 1) Adj item: [W QT Dev] Adjust: [***] Deviation meter LPF: 3kHz HPF: OFF PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [QT Fine Deviation (Wide)] Deviation meter LPF: 3kHz HPF: OFF PTT: Press [Transmit] button. Press [OK] button to store the adjustment value	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 132 (Reference value)	0.75kHz±50Hz
[Narrow]	[Concentric SW]: B 1) Adj item: [N QT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [QT Fine Deviation (Narrow)] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						Write the value as followings. 135 (Reference value)	0.375kHz±50Hz
8. DQT Fine Deviation *2 [Wide]	[Concentric SW]: A 1) Adj item: [W DQT Dev] Adjust: [***] Deviation meter LPF: 3kHz HPF: OFF PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DQT Fine Deviation (Wide)] Deviation meter LPF: 3kHz HPF: OFF PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 113 (Reference value)	0.75kHz±50Hz
[Narrow]	[Concentric SW]: B 1) Adj item: [N DQT Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DQT Fine Deviation (Narrow)] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.						Write the value as followings. 123 (Reference value)	0.375kHz±50Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
9. DTMF Deviation *2 [Wide]	[Concentric SW]: A 1) Adj item: [W DTMF Dev] Adjust: [***] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DTMF Deviation (Wide)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 172 (Reference value)	3.0kHz±50Hz
[Narrow]	[Concentric SW]: B 1) Adj item: [N DTMF Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [DTMF Deviation (Narrow)] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.							1.5kHz±50Hz
10. Single Tone Deviation *2 [Wide]	[Concentric SW]: A 1) Adj item: [W Tone Dev] Adjust: [***] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Single Tone Deviation (Wide)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 135 (Reference value)	3.0kHz±50Hz
[Narrow]	[Concentric SW]: B 1) Adj item: [N Tone Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [Single Tone Deviation (Narrow)] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.							1.5kHz±50Hz
11. MSK Deviation *2 [Wide]	[Concentric SW]: A 1) Adj item: [W MSK Dev] Adjust: [***] Deviation meter LPF: 15kHz HPF: OFF PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [MSK Deviation (Wide)] Deviation meter LPF: 15kHz HPF: OFF PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.	Deviation meter Oscilloscope	Panel	ANT	Panel	[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Write the value as followings. 133 (Reference value)	3.0kHz±50Hz
[Narrow]	[Concentric SW]: B 1) Adj item: [N MSK Dev] Adjust: [***] PTT: ON Press [B] key to store the adjustment value.	1) Adj item: [MSK Deviation (Narrow)] PTT: Press [Transmit] button. Press [OK] button to store the adjustment value.							1.5kHz±50Hz

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
12. VOX 1	1) Adj item: [VOX1] Adjust: [***] AG: 1kHz/45mV at MIC terminal	1) Adj item: [VOX1] AG: 1kHz/45mV at MIC terminal	AG	Panel	Universal connector	Panel		[Panel tuning mode] After apply signal from AG, press [B] key to store the adjustment value. [PC test mode] After apply signal from AG, press [Apply] button to store the adjustment value.	
13. VOX 10	1) Adj item: [VOX10] Adjust: [***] AG: 1kHz/3mV at MIC terminal	1) Adj item: [VOX10] AG: 1kHz/3mV at MIC terminal							
14. Battery Warning Level writing	1) Adj item: [Battery] Adjust: [***] PTT: ON	1) Adj item: [Battery Warning Level] PTT: Press [Transmit] button.	Power meter DVM	Panel	ANT BATT terminal	Panel		[Panel tuning mode] After pressing the PTT switch, confirm that one predetermined numeric in the range 1 to 256 appears and then press [B] key That numeric will be stored in memory. [PC test mode] After pressing the PTT switch, confirm that one predetermined numeric in the range 1 to 256 appears and then press [Apply] key That numeric will be stored in memory.	BATT terminal voltage: 5.8V
15. Battery Warning Level check	[Panel test mode] 1) CH-Sig: 1-1 BATT terminal voltage: 6.0V PTT: ON	1) Test Channel: Channel 1 Test Signaling Mode: Analog Signaling: 1 BATT terminal voltage: 6.0V PTT: Press [Transmit] button.							The transceiver can transmit with causing the LED to blink.

ADJUSTMENT

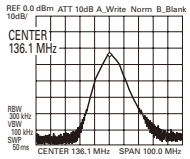
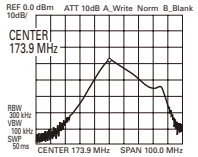
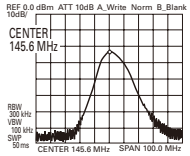
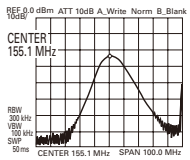
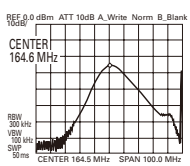
*2: Necessary adjustment and order for each signaling is shown as below.

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

Receiver Section

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. AF level setting	[Panel test mode] 1) CH-Sig: 1-1 SSG output: –47dBm (1mV) (MOD: 1kHz/±1.5kHz) [Concentric SW]: B	1) Test Channel: Channel 1 Test Signaling Mode: Analog Bandwith: 2.5kHz/12.5kHz Signaling: 1 SSG output: –47dBm (1mV) (MOD: 1kHz/±1.5kHz)	SSG DVM AF VTVM Dummy load	Panel	ANT Universal connector	Panel	Volume knob	Turn the Volume knob to obtain 0.63V AF output.	0.63V±0.1V
2. Sensitivity check	1) CH-Sig: 2-1 SSG output Wide: –118dBm (0.28µV) (MOD: 1kHz/±3kHz) Narrow: –118dBm (0.28µV) (MOD: 1kHz/±1.5kHz) 2) CH-Sig: 6-1 Other conditions are same as 1).	1) Test Channel: Channel 2 Test Signaling Mode: Analog Signaling: 1 SSG output Wide: –118dBm (0.28µV) (MOD: 1kHz/±3kHz) Narrow: –118dBm (0.28µV) (MOD: 1kHz/±1.5kHz) 2) Test Channel: Channel 6 Other conditions are same as 1).	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector			Check	12dB SINAD or more

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. Receive Front-end	1) Adj item: [RX Front-end] Adjust: [***] 2) Adj item: [L RX Front-end] Spectrum analyzer setting Center-f: 136.1MHz Span: 100MHz RBW: 300kHz VBW: 100kHz SWP: 50ms TG level: –30dBm XdB/div: 10dB Press [B] to store the adjustment value after adjustment.	1) Adj item: [Receive Front-end] 2) Adj item: [Frequency] [Low] Spectrum analyzer setting Center-f: 136.1MHz Span: 100MHz RBW: 300kHz VBW: 100kHz SWP: 50ms TG level: –30dBm XdB/div: 10dB Press [OK] button to store the adjustment value.	Spectrum analyzer Tracking generator	Panel TX-RX (A/4)	ANT RX BPF BPF GND	Panel TX-RX (A/4)	L201	After setting the adjustment value to 245, adjust coil to get the waveform as shown to the right.	
	3) Adj item: [H RX Front-end] Spectrum analyzer setting Center-f: 173.9MHz Press [B] to store the adjustment value after adjustment.	3) Adj item: [Frequency] [High] Spectrum analyzer setting Center-f: 173.9MHz Press [OK] button to store the adjustment value.					L202 L204 L205	After setting the adjustment value to 90, adjust each coil to get the highest peak points. Furthermore, change the adjustment values to get waveform as shown to the right.	
	4) Adj item: [LC RX Front-end] Spectrum analyzer setting Center-f: 145.6MHz Press [B] to store the adjustment value after adjustment.	4) Adj item: [Frequency] [Low'] Spectrum analyzer setting Center-f: 145.6MHz Press [OK] button to store the adjustment value.					[Panel tuning mode] [C],[D] [PC test mode] [◀],[▶]	Change the adjustment values to get the Waveform as shown to the right.	
	5) Adj item: [C RX Front-end] Spectrum analyzer setting Center-f: 155.1MHz Press [B] to store the adjustment value after adjustment.	5) Adj item: [Frequency] [Center] Spectrum analyzer setting Center-f: 155.1MHz Press [OK] button to store the adjustment value.							
	6) Adj item: [CH RX Front-end] Spectrum analyzer setting Center-f: 164.6MHz Press [B] to store the adjustment value after adjustment.	6) Adj item: [Frequency] [High'] Spectrum analyzer setting Center-f: 164.6MHz Press [OK] button to store the adjustment value.							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. RSSI reference [Wide]	[Concentric SW]: A 1) Adj item: [W RSSI (Ref)] Adjust: [***] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI Reference (Wide)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	[Concentric SW]: B 1) Adj item: [N RSSI (Ref)] Adjust: [***] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI Reference (Narrow)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)							
[P25]	[Concentric SW]: C 1) Adj item: [A RSSI (Ref)] Adjust: [***] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI Reference (P25)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±1.5kHz)							
5. Squelch Open [Wide]	[Concentric SW]: A 1) Adj item: [W Squelch (1)] Adjust: [***] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)	1) Adj item: [Squelch Open (Wide)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level –3dB (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	[Concentric SW]: B 1) Adj item: [N Squelch (1)] Adjust: [***] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level –4dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Squelch Open (Narrow)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level –4dB (MOD: 1kHz/±1.5kHz)							
[P25]	[Concentric SW]: C 1) Adj item: [A Squelch (1)] Adjust: [***] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level of [Wide] (MOD: 1kHz/±3kHz)	1) Adj item: [Squelch Open (P25)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level of [Wide] (MOD: 1kHz/±3kHz)							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. Squelch Tight [Wide]	[Concentric SW]: A 1) Adj item: [W Squelch (9)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±3kHz)	1) Adj item: [Squelch Tight (Wide)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	[Concentric SW]: B 1) Adj item: [N Squelch (9)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±1.5kHz)	1) Adj item: [Squelch Tight (Narrow)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: 12dB SINAD level +6dB (MOD: 1kHz/±1.5kHz)							
7. RSSI (–120dBm) [Wide]	[Concentric SW]: A 1) Adj item: [W RSSI (–120)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: –120dBm (0.22µV) (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI (–120dBm) (Wide)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: –120dBm (0.22µV) (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	[Concentric SW]: B 1) Adj item: [N RSSI (–120)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: –120dBm (0.22µV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI (–120dBm) (Narrow)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: –120dBm (0.22µV) (MOD: 1kHz/±1.5kHz)							
[P25]	[Concentric SW]: C 1) Adj item: [A RSSI (–120)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: –120dBm (0.22µV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI (–120dBm) (P25)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: –120dBm (0.22µV) (MOD: 1kHz/±1.5kHz)							

ADJUSTMENT

Item	Condition		Measurement			Adjustment			Specifications / Remarks
	Panel tuning mode	PC test mode	Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. RSSI (–70dBm) [Wide]	Concentric SW]: A 1) Adj item: [W RSSI (–70)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: –70dBm (70.7µV) (MOD: 1kHz/±3kHz)	1) Adj item: [RSSI (–70dBm) (Wide)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: –70dBm (70.7µV) (MOD: 1kHz/±3kHz)	SSG AF VTVM Oscilloscope	Panel	ANT Universal connector	Panel		[Panel tuning mode] After input signal from SSG, press [B] key to store the adjustment value. [PC test mode] After input signal from SSG, press [Apply] button to store the adjustment value.	
[Narrow]	Concentric SW]: B 1) Adj item: [N RSSI (–70)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: –70dBm (70.7µV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI (–70dBm) (Narrow)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: –70dBm (70.7µV) (MOD: 1kHz/±1.5kHz)							
[P25]	Concentric SW]: C 1) Adj item: [A RSSI (–70)] Adjust: [∗∗∗] 2) Adj item: [L] → [C] → [H] SSG output: –70dBm (70.7µV) (MOD: 1kHz/±1.5kHz)	1) Adj item: [RSSI (–70dBm) (P25)] 2) Adj item: [Frequency] [Low] → [Center] → [High] SSG output: –70dBm (70.7µV) (MOD: 1kHz/±1.5kHz)							

TERMINAL FUNCTION

Control unit (X53-4390-XX)

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

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

TERMINAL FUNCTION

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

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

TERMINAL FUNCTION

TX-RX unit (X57-7650-10 A/4)

Pin No	Name	I/O	Function
CN501			
1	OPT1	I	Refer to "CN501 26-pin connector specification" described on pages 72.
2	OPT3	O	
3	RXD1	I	
4	TXD1	O	
5	NC	-	
6	OPT4	O	
7	USEL	-	
8	OPT5	O	
9	DGND	-	
10	AGND	-	
11	AI	I	
12	AO	O	
13	AGND	-	
14	5A	-	
15	STON	-	
16	DI/ANI	-	
17	TCONT	-	
18	MANDOWN	-	
19	INH	-	
20	OPT2	-	
21	TX0	-	
22	RXEO	-	
23	RXEI	-	
24	TXI	-	
25	C3	-	
26	SB2	I	

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

TERMINAL FUNCTION

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

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

TERMINAL FUNCTION

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

Top panel unit (X57-7650-10 B/4)

Pin No	Name	I/O	Function
CN902			
1	36M	-	3.1V
2	S36M	-	3.1V
3	GND	-	GND
4	VoL	I	Volume level input
5	33M	-	3.3V
6	CH_A	I	Rotary switch input 1
7	TGL2	I	Concentric switch input 2
8	TGL1	I	Concentric switch input 1
9	C	-	GND
10	CH_B	I	Rotary switch input 2
11	CH_D	I	Rotary switch input 4
12	CH_C	I	Rotary switch input 3
CN903			
1	GND	-	GND
2	CH_A	O	Rotary switch output 1
3	CH_B	O	Rotary switch output 2
4	CH_C	O	Rotary switch output 3
5	CH_D	O	Rotary switch output 4
6	31BU	-	3.1V
7	S31BUS	-	3.1V
8	33M	-	3.3V
9	TGL0	O	Lever switch output 0
10	TGL1	O	Concentric switch output 1
11	TGL2	O	Concentric switch output 2
12	BLED	-	Busy LED control
13	TXLED	-	TX LED control
14	ORG	O	Orange key detect
15	VoL	O	Volume level output
16	KIN	I	Orange key detect
17	GND	-	GND

TERMINAL FUNCTION

Option board unit (X57-7650-10 C/4)

Pin No	Name	I/O	Function
CN923			
1	OPT1	I	Refer to "CN923 26-pin connector specification" described on pages 73.
2	OPT3	O	
3	RXD1	I	
4	TXD1	O	
5	NC	-	
6	OPT4	O	
7	NC	-	
8	OPT5	O	
9	DGND	-	
10	AGND	-	
11	NC	I	
12	NC	O	
13	AGND	-	
14	5A	-	
15	STON	-	
16	DI/ANI	-	
17	TCONT	-	
18	MANDOWN	-	
19	INH	-	
20	OPT2	-	
21	TX0	-	
22	RXEO	-	
23	RXEI	-	
24	TXI	-	
25	C3	-	
26	SB	O	

Universal Connector

Pin No	Name	I/O	Function
1	SSW	I	EXT/INT speaker switch input L: External speaker ON H: Internal speaker ON
2	SP+	O	BTL output + for external speaker Standard load 8Ω
3	SP-	O	BTL output - for external speaker Standard load 8Ω
4	MSW/CTS	I	EXT/INT MIC switch input L: External MIC ON H: Internal MIC ON
5	EMC	I	External MIC input Impedance: 1.8kΩ
6	MICE	-	External MIC GND
7	PTT	I	External PTT input L: PTT ON
8	PF	I	Programmable function key input Input voltage: 0V~3.3V
9	OPT	I/O	Aux I/O port (for EXT option) Input: L≤0.66V H≥2.65V Output: L≤0.6V (Io=5mA) H≥4.0V (Io=15uA)
10	E	-	GND
11	5M	O	5V power supply output (Output control is FPU programmable) Max output current: 140mA
12	TXD	O	Serial data output Baud rate: 115200 bps max
13	RXD	I	Serial data input Baud rate: 115200 bps max
14	NC	-	Not used

TERMINAL FUNCTION

CN501 26-pin connector specification

Pin No.	Name	Device	I/O	Function	Specification
1	OPT1	SCRAMBLER	O	SCRAMBLE CODE SIGNAL OUTPUT	L≤0.45V, H≥4.7V/25kΩ load
		ANI board	O	TX SENS SIGNAL output	L≤0.45V, H≥4.7V/25kΩ load
		VGS-1	I	BUSY indication	H: Active, L≤1.41V, H≥3.29V
2	OPT3	SCRAMBLER	O	SCRAMBLE CODE SIGNAL OUTPUT	L≤0.45V, H≥4.7V/25kΩ load
		ANI board	I	TX CONTROL SIGNAL INPUT	Active "L", L≤1.0V, H≥4.0V
		VGS-1	I	PLAY indication	H: Active, L≤1.41V, H≥3.29V
3	RXD1	VGS-1	I	Serial Data input	L≤0.7V, H≥2.8V
4	TXD1	SCRAMBLER	O	PTT SIGNAL OUTPUT	L: TX "H": Not TX, L≤0.45V, H≥4.7V/25kΩ load
		VGS-1		Serial Data output	L≤0.33V (io=6mA) H≥4.18V (io=–6mA)
5	NC	-	-	-	-
6	OPT4	ANI board	O	PTT SIGNAL OUTPUT	L: TX "H": Not TX, L≤0.45V, H≥4.7V/25kΩ load
		VGS-1		Enable	L≤0.7V (io=10mA), H≥4.0V (io=–10mA)
7	USEL	VGS-1	O	UART speed select output	L: 19200bps fixed
8	OPT5	SCRAMBLER	O	SCRAMBLE CODE SIGNAL OUTPUT	L≤0.45V, H≥4.7V/25kΩ load
		ANI board		EMERGENCY SIGNAL OUTPUT	L: Emergency function is operated, L≤0.45V, H≥4.7V/25kΩ load
		VGS-1		RESET output	L≤0.7V (io=10mA), H≥4.0V (io=–10mA)
9	DGND	SCRAMBLER	-	GND	-
		ANI board		GND	-
		VGS-1		DGND	-
10	AGND	SCRAMBLER	-	GND	-
		ANI board		GND	-
		VGS-1		AGND	-
11	AI	VGS-1	I	VGS-1 Audio input	Zin≥10kΩ 1Vp-p max, Input Voltage: 0V~5.0V
12	AO	VGS-1	O	VGS-1 Audio output	Zo=10kΩ (load Z≥25kΩ)
13	AGND	SCRAMBLER	-	GND	-
		ANI board		GND	-
		VGS-1		AGND	-
14	5A	ANI board	O	5V power supply	78mAmax
		VGS-1		5V power supply	78mAmax
15	STON	ANI board	I	SIDE TONE INPUT	1kHz 5Vp-p
16	DI/ANI	ANI board	I	DATA SIGNAL INPUT	Zin≥22kΩ, 1.1Vp-p typ.
17	TCONT	ANI board	I	SPEAKER MUTE SIGNAL INPUT	L: Unmute L≤0.8V, H≥4.2V
18	MAN DOWN	ANI board	O	Man-Down out put	L: Active
19	INH	ANI board	I	MIC MUTE SIGNAL INPUT	L: Mute
20	OPT2	SCRAMBLER	O	SCRAMBLER CONTROL SIGNAL OUTPUT	"L": ON "H": OFF, L≤0.45V, H≥4.7V/25kΩ load
		ANI board		CONTROL SIGNAL OUTPUT	L: SLEEP, output: L≤0.45V, H≥4.7V/25kΩ load
21	TXO	SCRAMBLER	O	MIC SIGNAL OUTPUT	Zo≤2.2kΩ 260mVp-p typ. (Standard modulation)
22	RXEO	SCRAMBLER	O	AUDIO SIGNAL OUTPUT	Zo≤2.2kΩ 640mVp-p typ. (Standard modulation)
23	RXEI	SCRAMBLER	I	AUDIO SIGNAL INTPUT	Zin=22kΩ 640mVp-p typ. (Standard modulation)
24	TXI	SCRAMBLER	I	MIC SIGNAL INTPUT	Zin=22kΩ 260mVp-p typ. (Standard modulation)
25	C3	SCRAMBLER	O	SCRAMBLE CODE SIGNAL OUTPUT	L≤0.45V, H≥4.7V/25kΩ load
26	SB2	SCRAMBLER	O	Switched B output	7.5V typ, 100mAmax

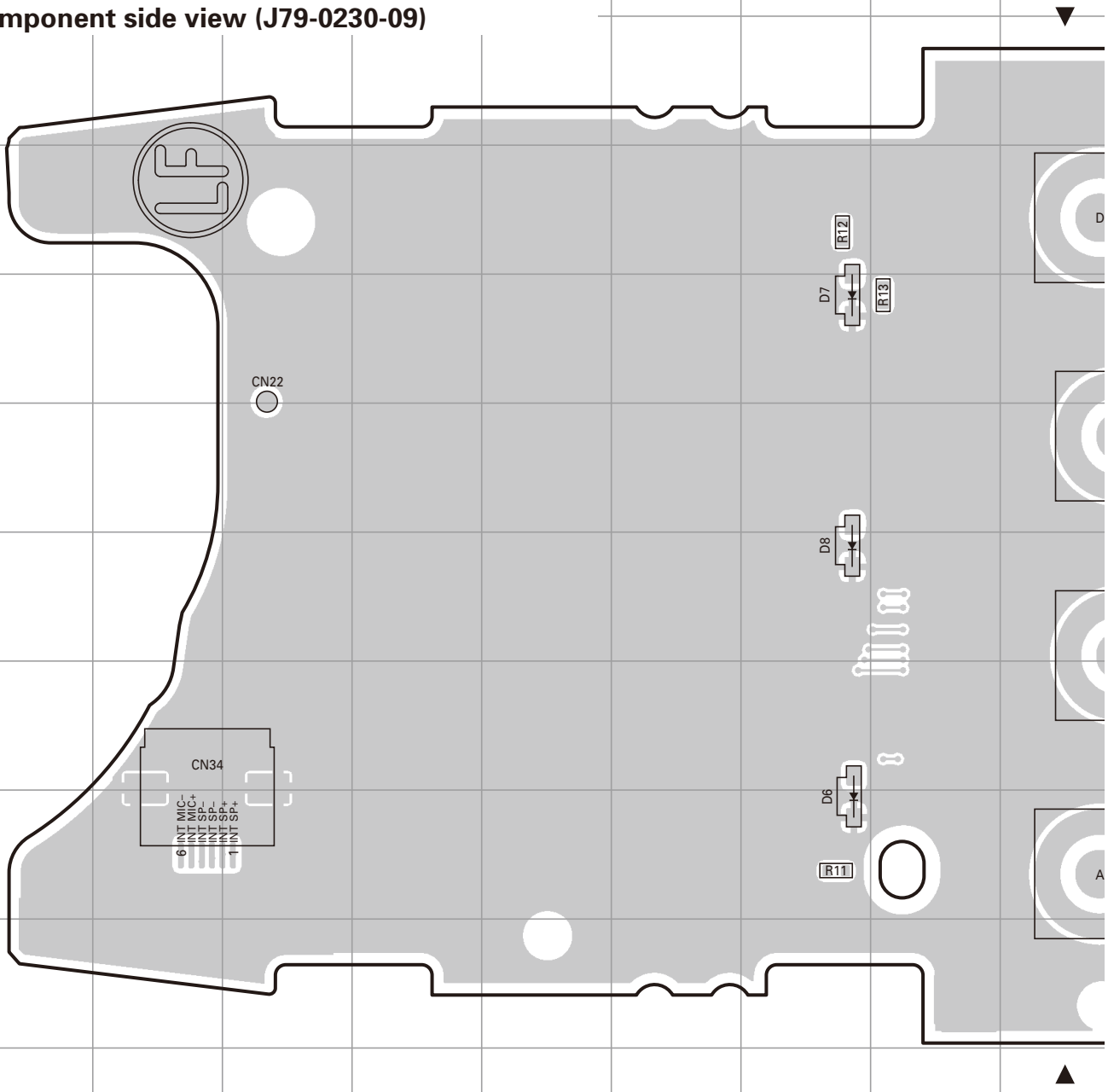
TERMINAL FUNCTION

CN923 26-pin connector specification

Pin No.	Name	Device	I/O	Function	Specification
1	OPT1	SCRAMBLER	I	SCRAMBLE CODE SIGNAL INPUT	L≤0.45V, H≥4.7V/25kΩ load
		ANI board	I	TX SENS SIGNAL input	L≤0.45V, H≥4.7V/25kΩ load
2	OPT3	SCRAMBLER	I	SCRAMBLE CODE SIGNAL INPUT	L≤0.45V, H≥4.7V/25kΩ load
		ANI board	O	TX CONTROL SIGNAL OUTPUT	Active "L", L≤1.0V, H≥4.0V
3	RXD1	-	-	-	-
4	TXD1	SCRAMBLER	I	PTT SIGNAL INPUT	L: TX "H": Not TX, L≤0.45V, H≥4.7V/25kΩ load
5	NC	-	-	-	-
6	OPT4	ANI board	I	PTT SIGNAL INPUT	L: TX "H": Not TX, L≤0.45V, H≥4.7V/25kΩ load
7	USEL	-	-	-	-
8	OPT5	SCRAMBLER	I	SCRAMBLE CODE SIGNAL INPUT	L≤0.45V, H≥4.7V/25kΩ load
		ANI board		EMERGENCY SIGNAL INPUT	L: Emergency function is operated, L≤0.45V, H≥4.7V/25kΩ load
9	DGND	SCRAMBLER	-	GND	-
		ANI board		GND	-
10	AGND	SCRAMBLER	-	GND	-
		ANI board		GND	-
11	AI	-	-	-	-
12	AO	-	-	-	-
13	AGND	SCRAMBLER	-	GND	-
		ANI board		GND	-
14	5A	ANI board	I	5V power supply	78mAmax
15	STON	ANI board	O	SIDE TONE OUTPUT	1kHz 5Vp-p
16	DI/ANI	ANI board	O	DATA SIGNAL OUTPUT	Zin≥22kΩ, 1.1Vp-p typ.
17	TCONT	ANI board	O	SPEAKER MUTE SIGNAL OUTPUT	L: Unmute L≤0.8V, H≥4.2V
18	MAN DOWN	ANI board	I	Man-Down input	L: Active
19	INH	ANI board	O	MIC MUTE SIGNAL OUTPUT	L: Mute
20	OPT2	SCRAMBLER	I	SCRAMBLER CONTROL SIGNAL INPUT	"L": ON "H": OFF, L≤0.45V, H≥4.7V/25kΩ load
		ANI board		CONTROL SIGNAL INPUT	L: SLEEP, output: L≤0.45V, H≥4.7V/25kΩ load
21	TXO	SCRAMBLER	I	MIC SIGNAL INPUT	Zo≤2.2kΩ 260mVp-p typ. (Standard modulation)
22	RXEO	SCRAMBLER	I	AUDIO SIGNAL INPUT	Zo≤2.2kΩ 640mVp-p typ. (Standard modulation)
23	RXEI	SCRAMBLER	O	AUDIO SIGNAL OUTPUT	Zin=22kΩ 640mVp-p typ. (Standard modulation)
24	TXI	SCRAMBLER	O	MIC SIGNAL OUTPUT	Zin=22kΩ 260mVp-p typ. (Standard modulation)
25	C3	SCRAMBLER	I	SCRAMBLE CODE SIGNAL INPUT	L≤0.45V, H≥4.7V/25kΩ load
26	SB2	SCRAMBLER	I	Switched B input	7.5V typ, 100mAmax

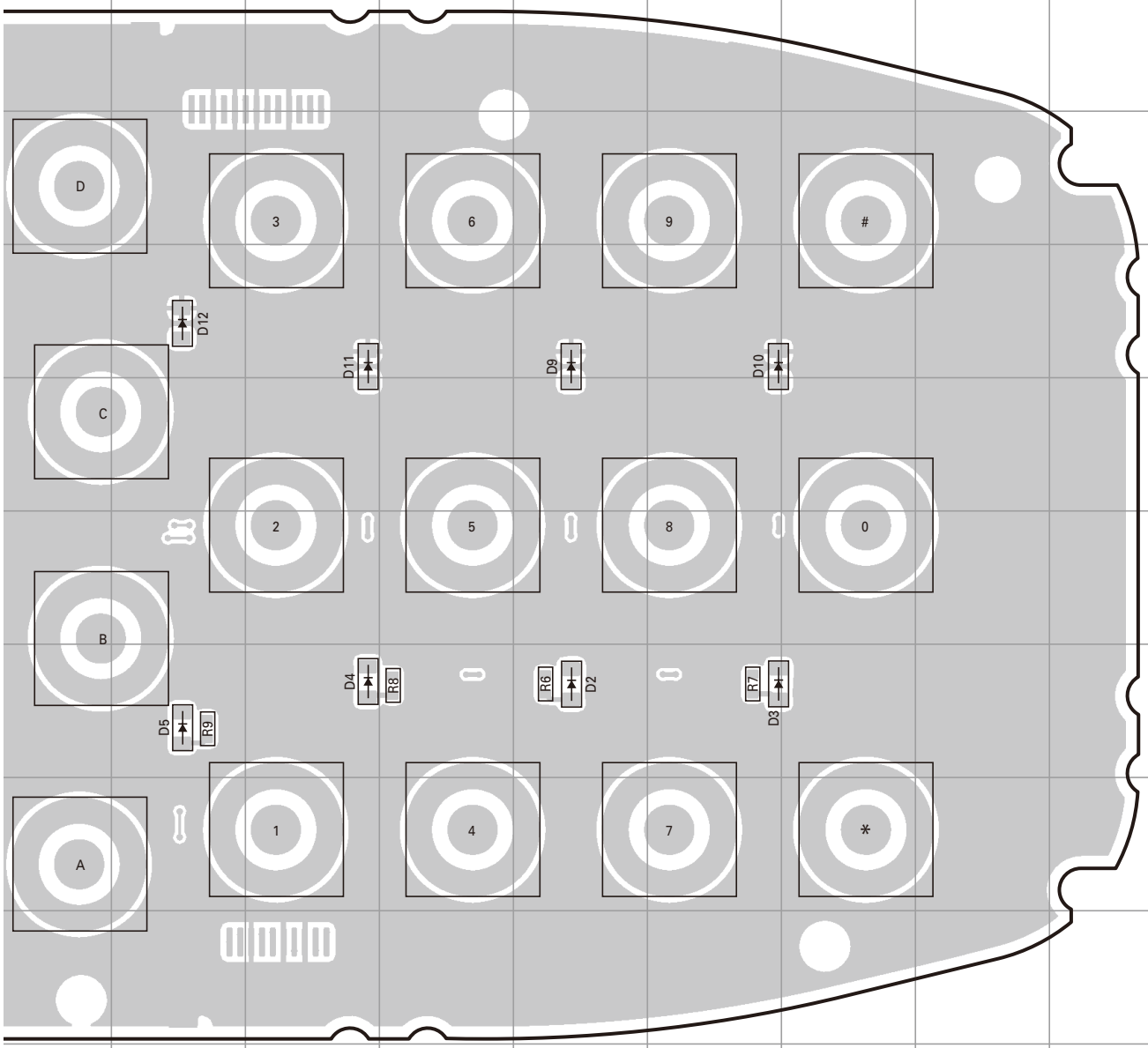
TK-5210(G) PC BOARD

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Component side view (J79-0230-09)



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

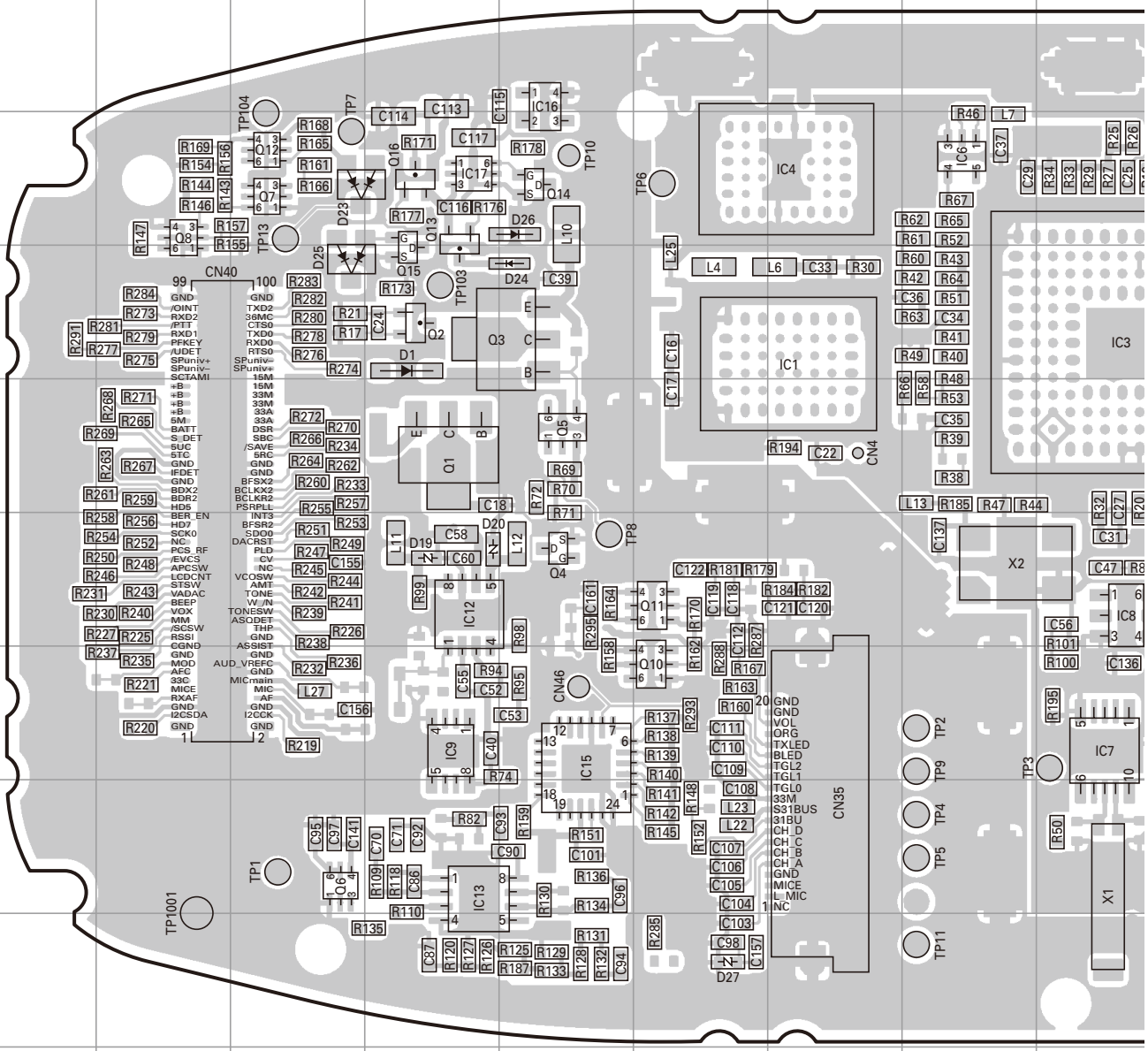
CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Component side view (J79-0230-09)



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

TK-5210(G) PC BOARD

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Foil side view (J79-0230-09)

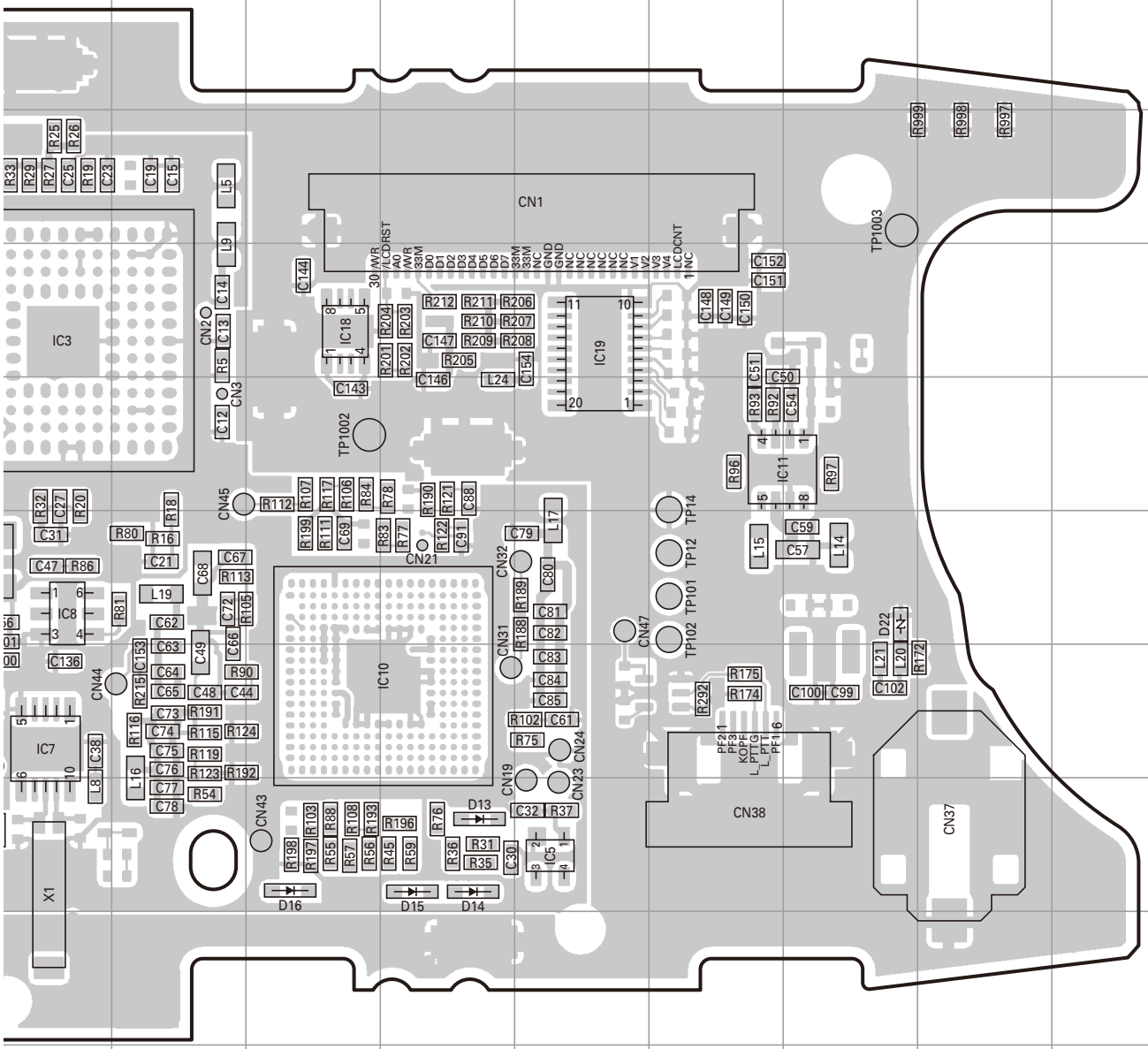


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	5H	IC12	7E	Q4	7F	Q15	5E	D23	4D
IC3	5J	IC13	9E	Q5	6F	Q16	4E	D24	5F
IC4	4H	IC15	8F	Q6	9D	D1	5E	D25	5D
IC5	9N	IC16	3F	Q7	4D	D13	9M	D26	4F
IC6	4I	IC17	4E	Q8	4C	D14	9M	D27	10G
IC7	8J	IC18	5L	Q10	8G	D15	9M		
IC8	7J	IC19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

PC BOARD TK-5210(G)

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3

Foil side view (J79-0230-09)



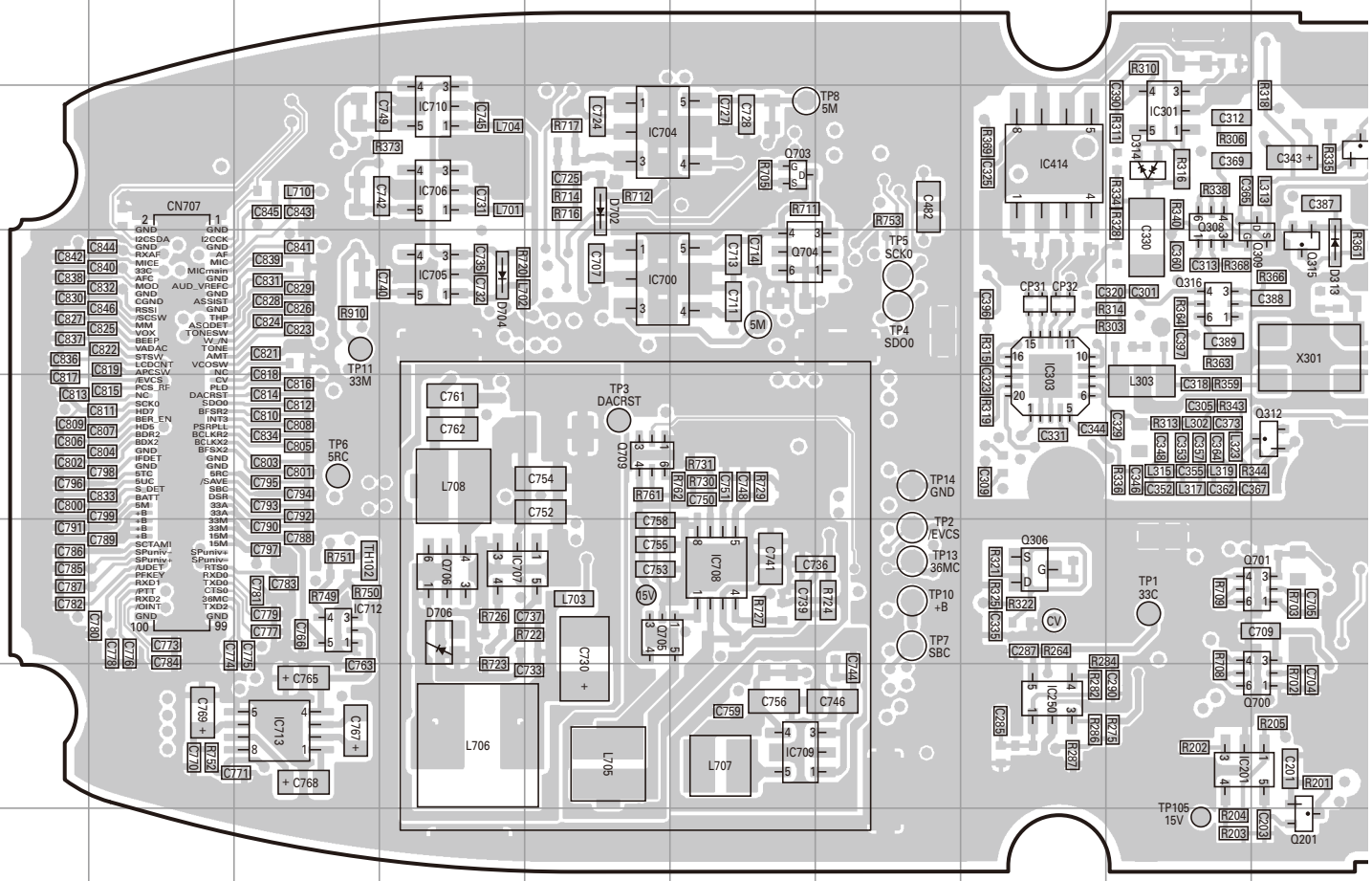
Component side

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

Foil side

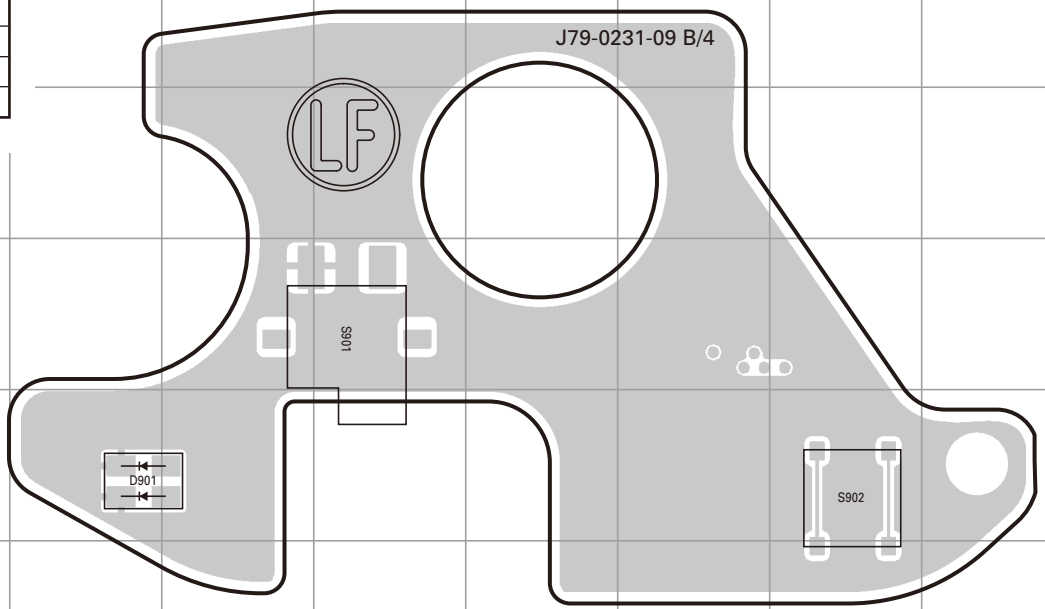
TK-5210(G) PC BOARD

TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Component side view (J79-0231-09 A/4)



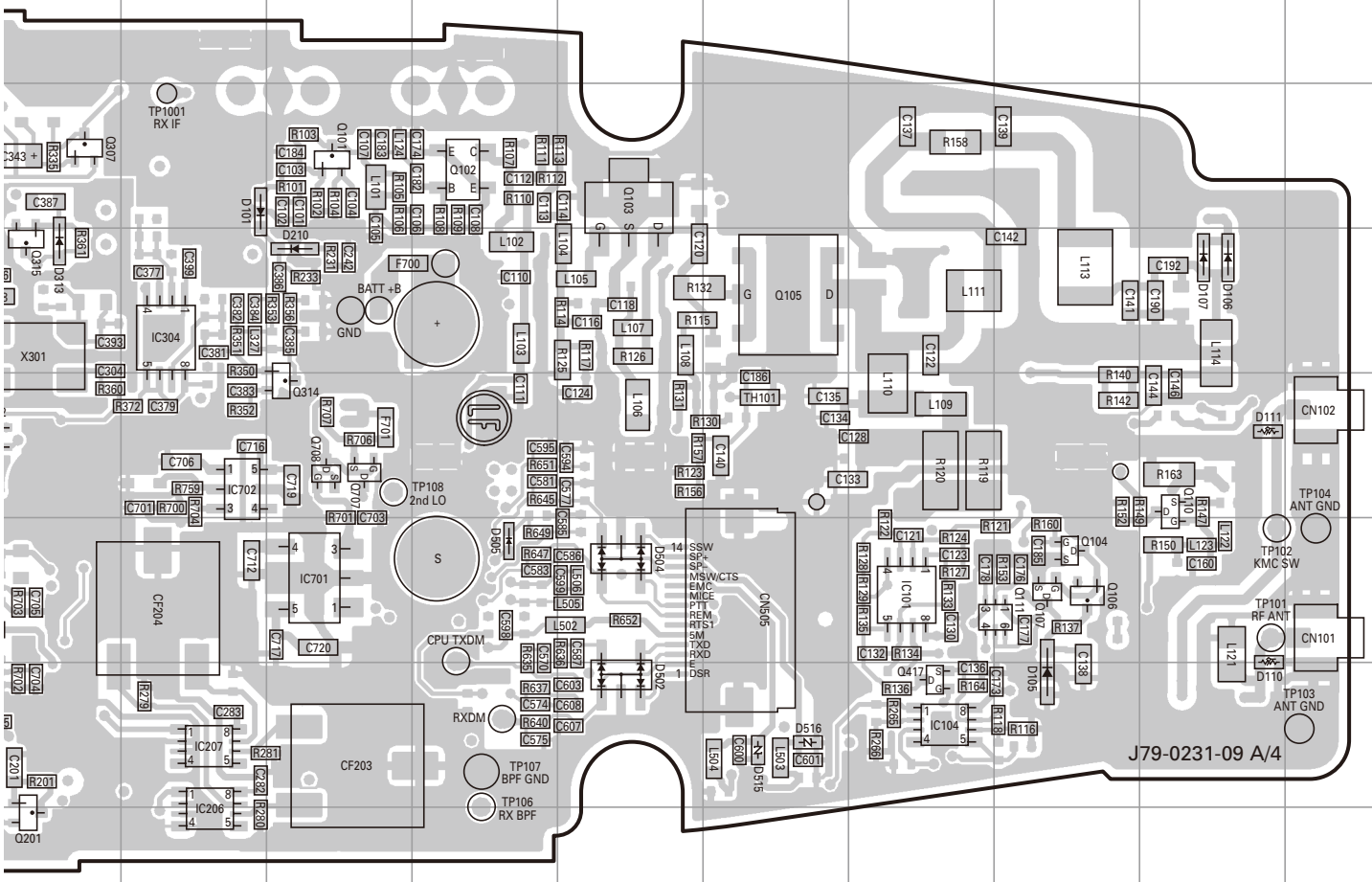
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

TX-RX UNIT (X57-7650-10) (B/4): TOP SECTION
Component side view (J79-0231-09 B/4)

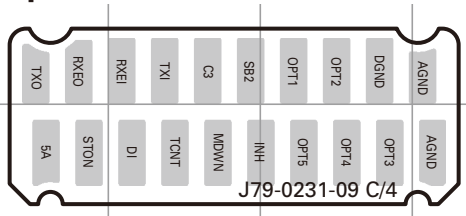


PC BOARD TK-5210(G)

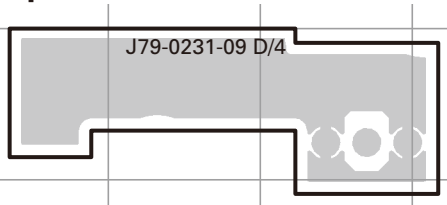
TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Component side view (J79-0231-09 A/4)



TX-RX UNIT (X57-7650-10) (C/4): OPTION SECTION
Component side view (J79-0231-09 C/4)



TX-RX UNIT (X57-7650-10) (D/4): ANT SECTION
Component side view (J79-0231-09 D/4)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC101	6P	Q102	3M	Q706	6D
IC104	7P	Q103	3N	Q707	5L
IC201	7I	Q104	6Q	Q708	5L
IC206	8K	Q105	4O	Q709	5E
IC207	7K	Q106	6Q	D101	3K
IC250	7H	Q107	6Q	D105	7Q
IC301	3I	Q110	5R	D106	4R
IC303	5H	Q111	6Q	D107	4R
IC304	4K	Q201	8J	D110	7R
IC414	3H	Q306	6H	D111	5R
IC700	4E	Q307	3J	D210	4L
IC701	6L	Q308	3I	D313	4J
IC702	5K	Q309	4J	D314	3I
IC704	3E	Q312	5J	D502	7N
IC705	4D	Q314	5L	D504	6N
IC706	3D	Q315	4J	D505	6M
IC707	6D	Q316	4I	D515	7O
IC708	6F	Q417	7P	D516	7O
IC709	7F	Q700	7J	D702	3E
IC710	3D	Q701	6J	D704	4D
IC712	6C	Q703	3F	D706	6D
IC713	7C	Q704	4F	D901	12C
Q101	3L	Q705	6E		

TK-5210(G) PC BOARD

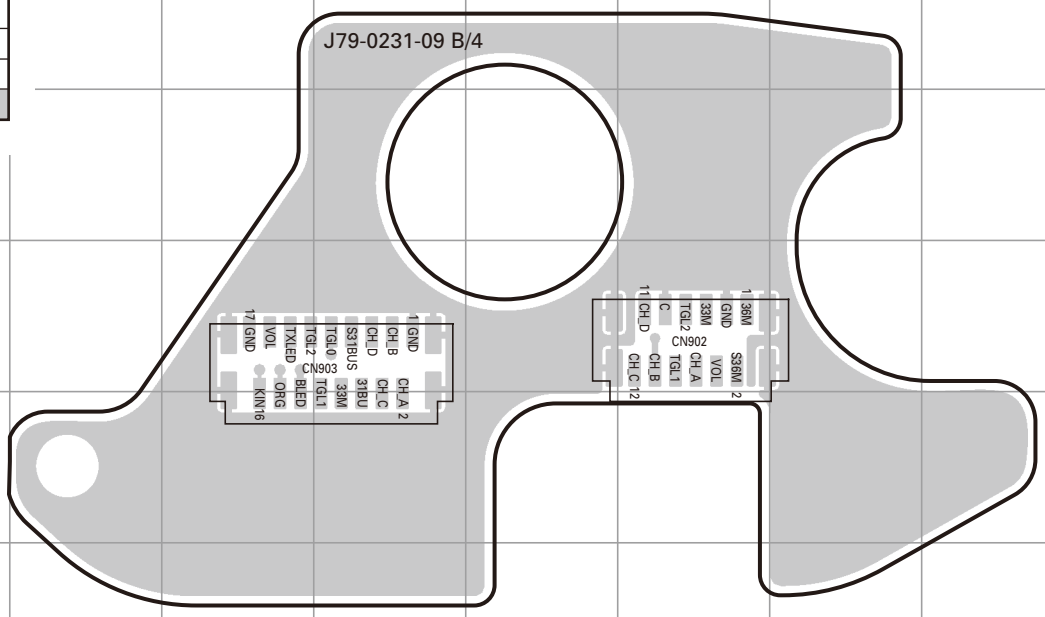
TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Foil side view (J79-0231-09 A/4)

Component side

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

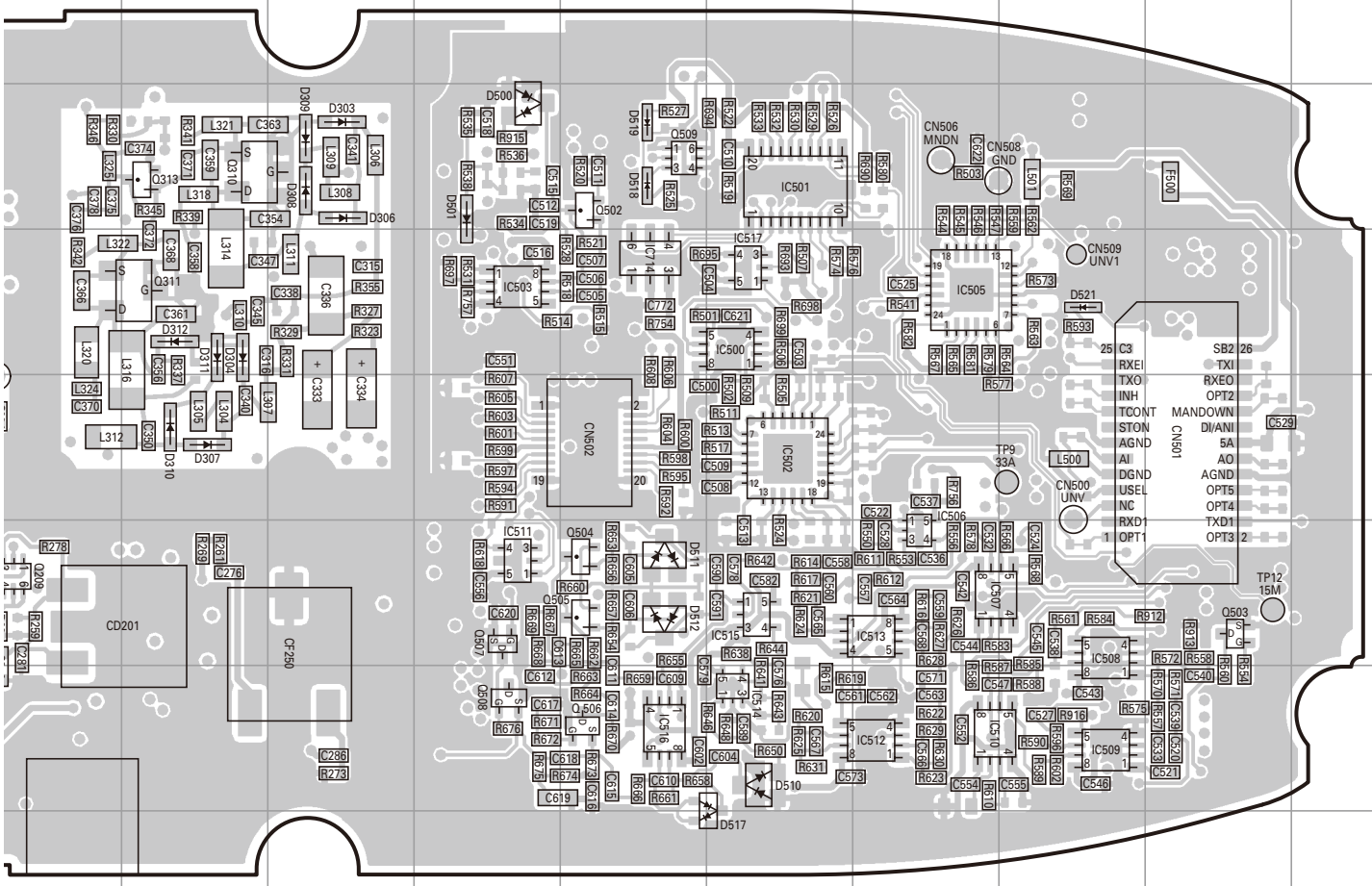
Foil side

TX-RX UNIT (X57-7650-10) (B/4): TOP SECTION
Foil side view (J79-0231-09 B/4)

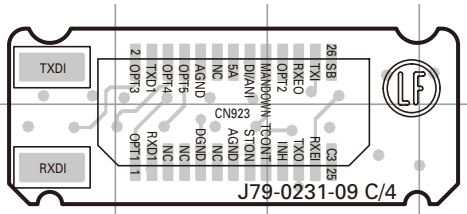


PC BOARD TK-5210(G)

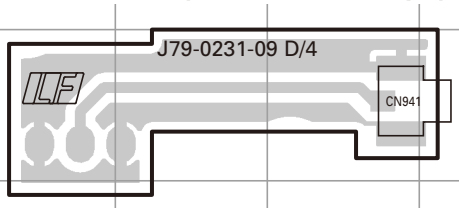
TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Foil side view (J79-0231-09 A/4)



TX-RX UNIT (X57-7650-10) (C/4): OPTION SECTION
Foil side view (J79-0231-09 C/4)

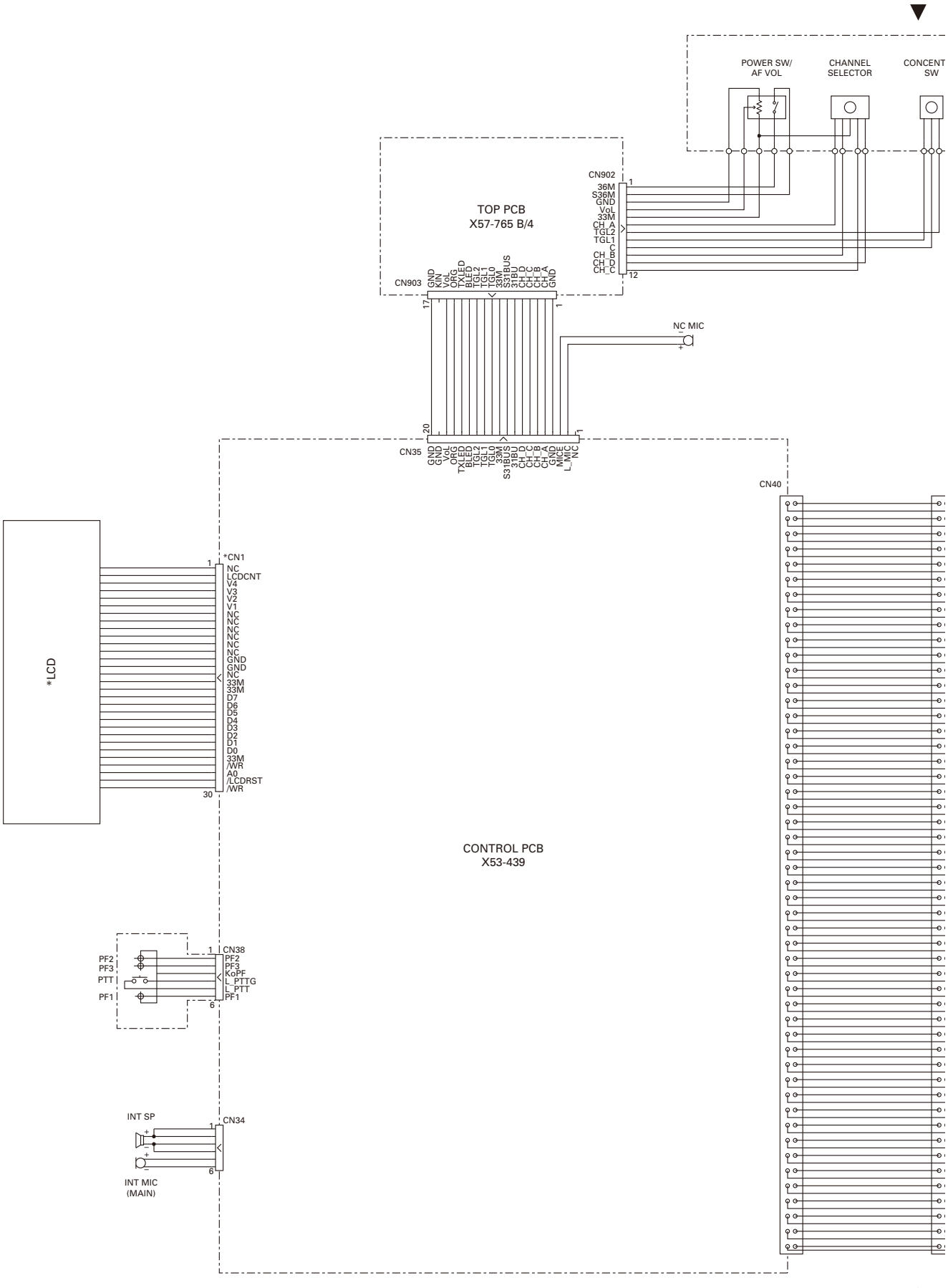


TX-RX UNIT (X57-7650-10) (D/4): ANT SECTION
Foil side view (J79-0231-09 D/4)



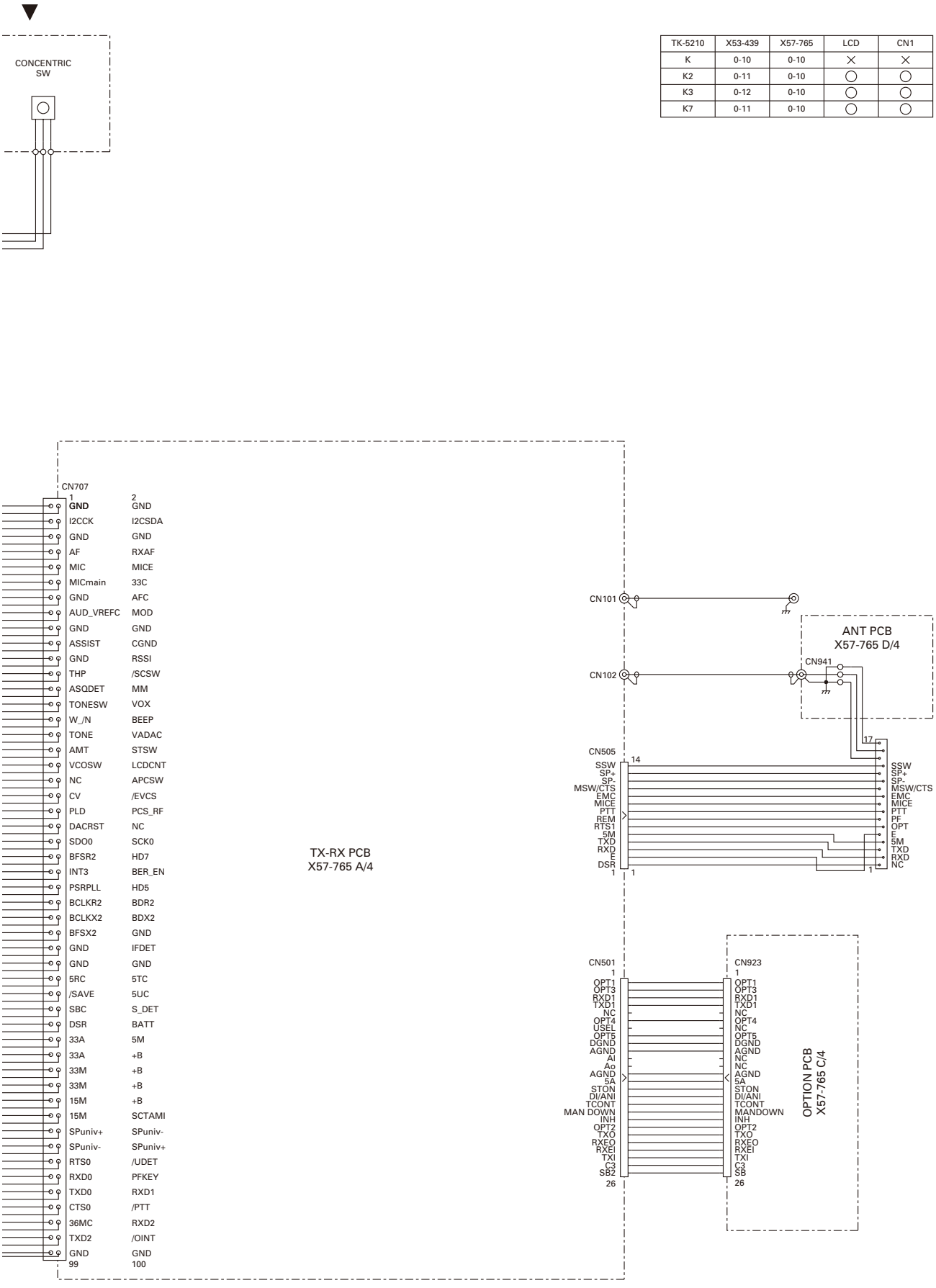
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC102	5B	Q202	5D	D207	7D
IC103	5B	Q204	4I	D208	7D
IC202	5F	Q205	6H	D209	7D
IC204	5I	Q209	6J	D303	3L
IC500	4O	Q310	3K	D304	4K
IC501	3O	Q311	4K	D306	3L
IC502	5O	Q313	3K	D307	5K
IC503	4M	Q502	3N	D308	3L
IC505	4P	Q503	6R	D309	3L
IC506	6P	Q504	6N	D310	5K
IC507	6P	Q505	6N	D311	4K
IC508	6Q	Q506	7N	D312	4K
IC509	7Q	Q507	6M	D500	3M
IC510	7P	Q508	7M	D501	3M
IC511	6M	Q509	3N	D510	7O
IC512	7P	D108	4C	D511	6N
IC513	6P	D109	3C	D512	6N
IC514	7O	D202	4D	D517	8O
IC515	6O	D203	4D	D518	3N
IC516	7N	D204	5D	D519	3N
IC517	4O	D205	5D	D521	4Q
IC714	4N	D206	7D	D700	4H

INTERCONNECTION DIAGRAM

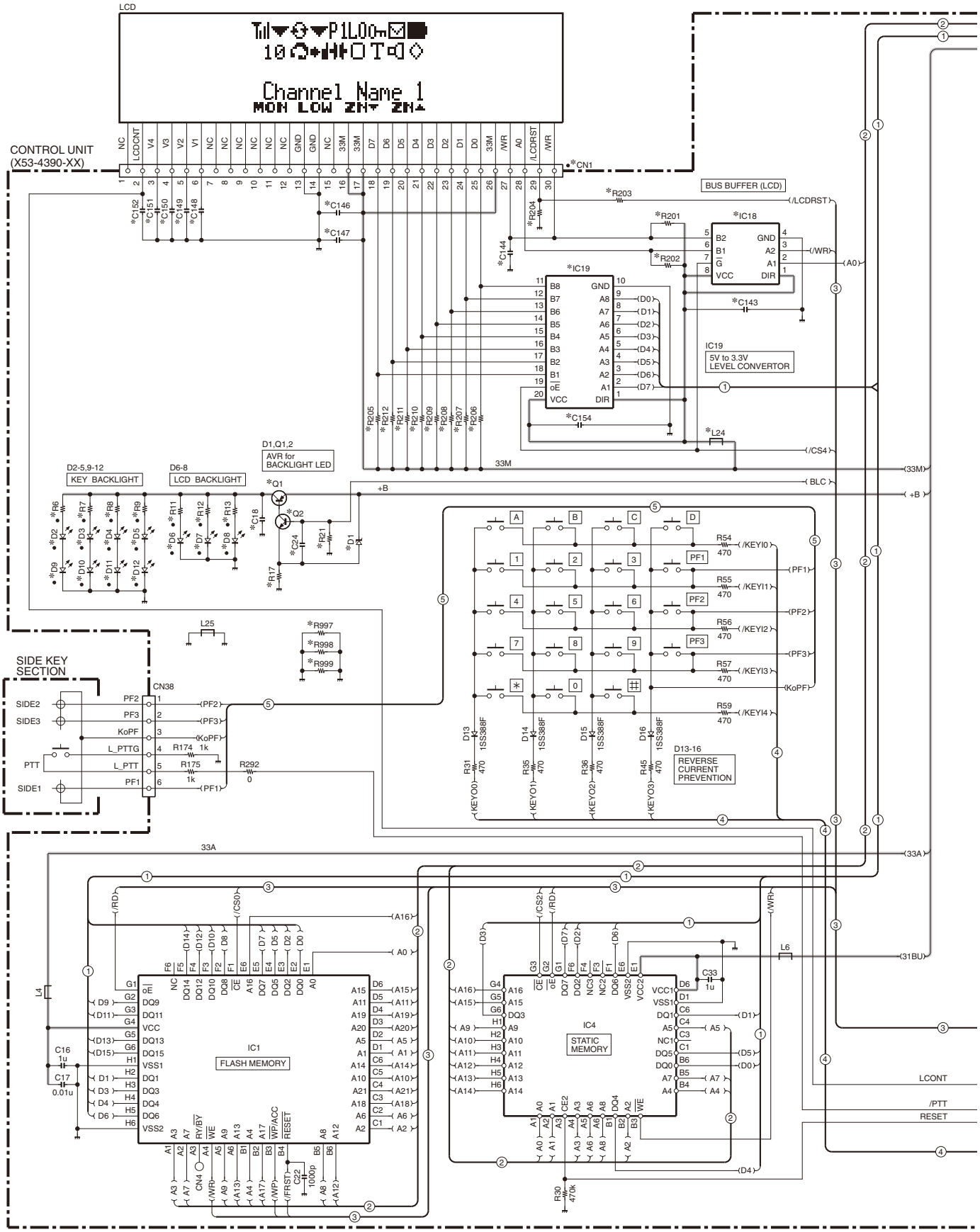


INTERCONNECTION DIAGRAM

TK-5210	X53-439	X57-765	LCD	CN1
K	0-10	0-10	×	×
K2	0-11	0-10	○	○
K3	0-12	0-10	○	○
K7	0-11	0-10	○	○



TK-5210(G) SCHEMATIC DIAGRAM

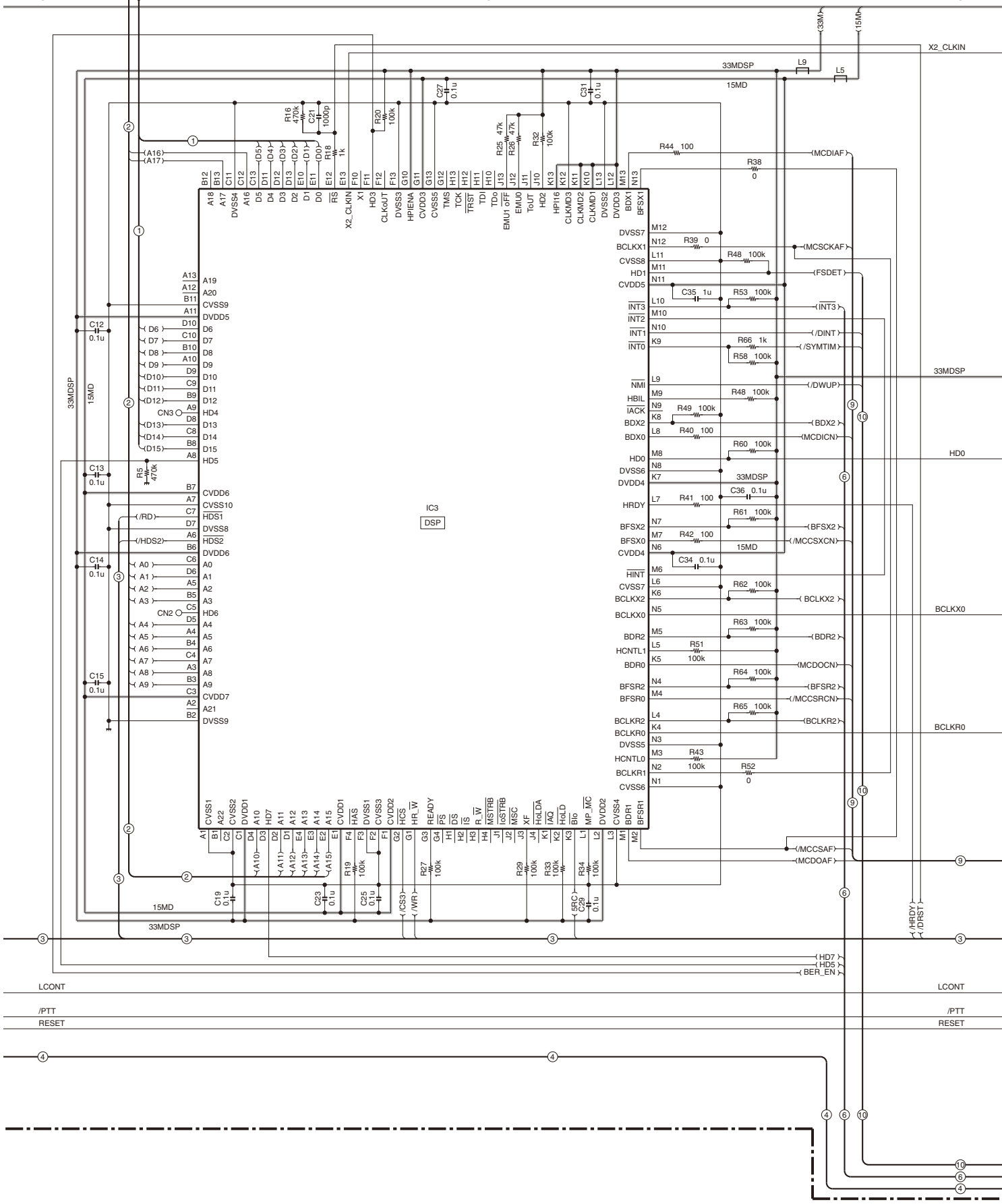


X53-4390-XX	CN1	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	IC18	IC19	Q1
-10	K	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
-11	K2,K7	E40-6884-05	UDZW3.9(B)	NO	NO	NO	B30-2171-05	B30-2261-05	B30-2261-05	B30-2261-05	NO	NO	B30-2171-05	TC7WZ245FK-F	TC74LCX245FK	2SB798AZ(DLDK
-12	K3	E40-6884-05	UDZW3.9(B)	B30-2171-05	B30-2171-05	B30-2171-05	B30-2171-05	B30-2261-05	B30-2261-05	B30-2261-05	B30-2171-05	B30-2171-05	B30-2171-05	TC7WZ245FK-F	TC74LCX245FK	2SB798AZ(DLDK

X53-4390-XX	Q2	L24	R6	R7	R8	R9	R11	R12	R13	R17	R21	R201	R202	R203	R204	R205	R206	R207	R208	R209	R210	R211	R212	R997	R998	R999	C18	C24	C143	C144	C146	C147	C148	C149	C150	C151	C152	C154
-10	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
-11	K2,K7	2SC4617(S)	L92-0162-05	NO	NO	NO	100	180	180	180	2.2k	470k	10k	10k	0	100k	10k	10k	10k	10k	10k	10k	10k	10k	NO	0	NO	0.1u	100p	0.1u	220p	0.1u	0.1u	1u	1u	1u	1u	1u	0.1u
-12	K3	2SC4617(S)	L92-0162-05	100	100	100	100	180	180	180	2.2k	470k	10k	10k	0	100k	10k	10k	10k	10k	10k	10k	10k	10k	NO	NO	0	0.1u	100p	0.1u	220p	0.1u	0.1u	1u	1u	1u	1u	1u	0.1u

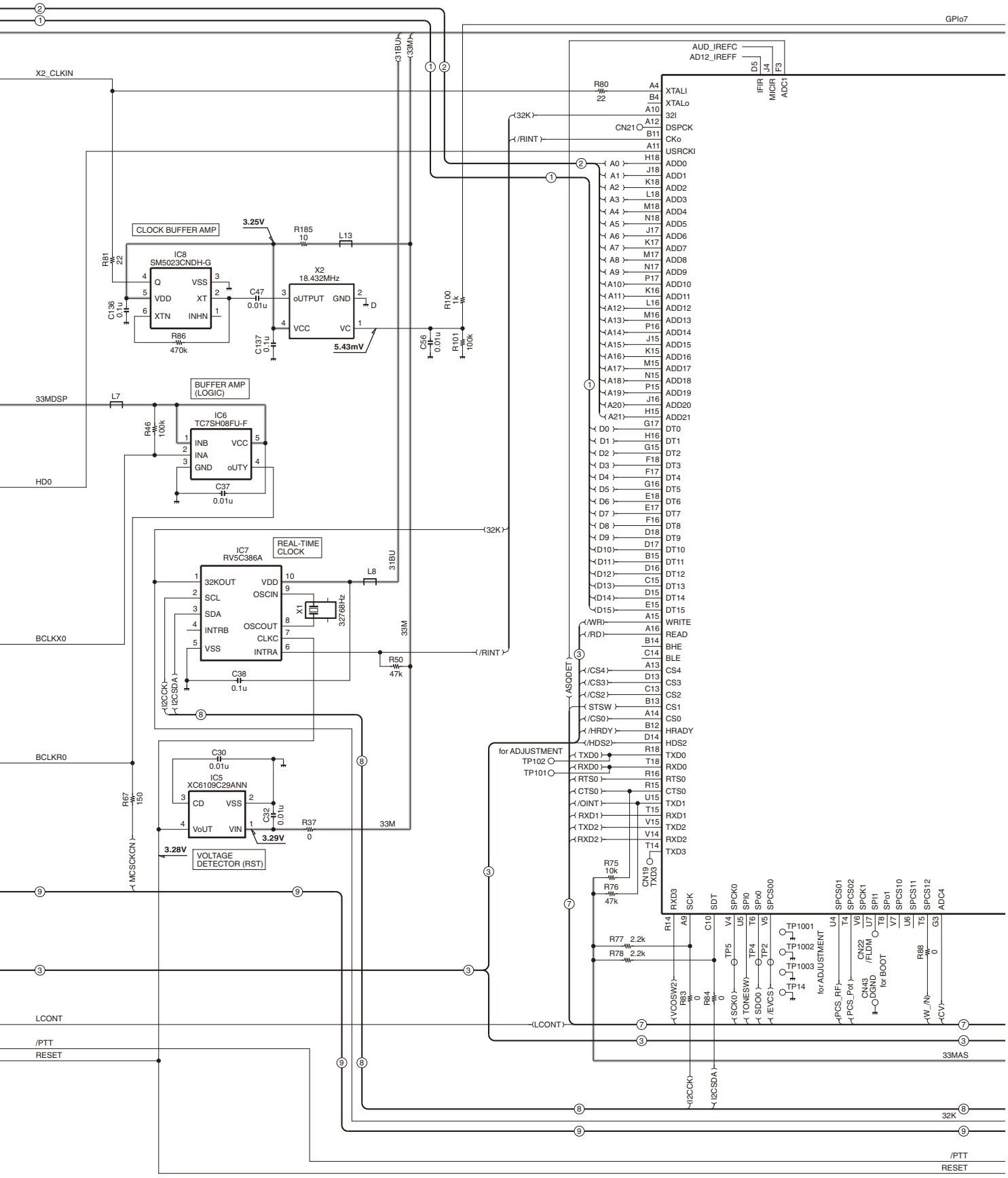
SCHEMATIC DIAGRAM TK-5210(G)

CONTROL UNIT (X53-4390-XX)



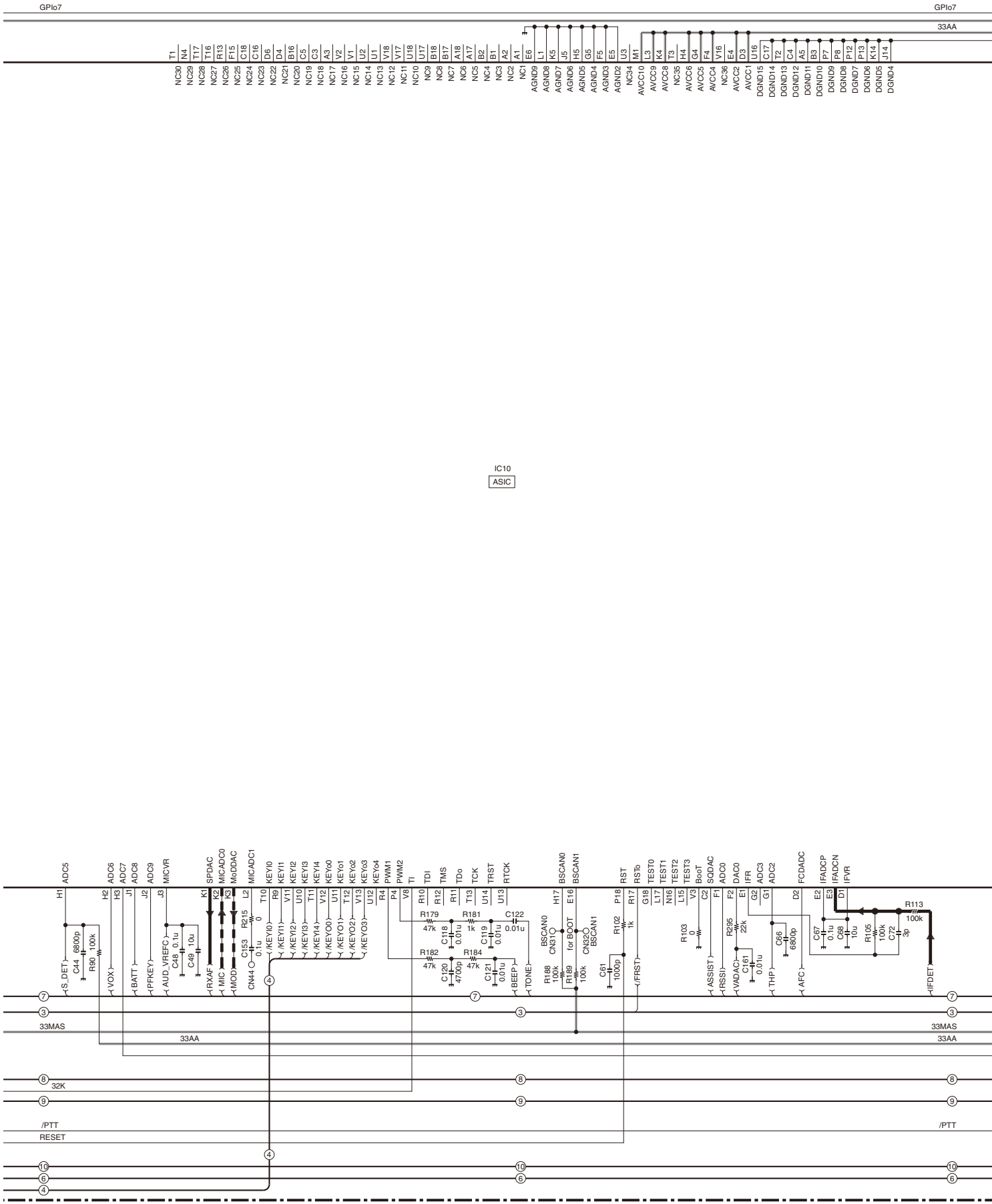
TK-5210(G) SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4390-XX)



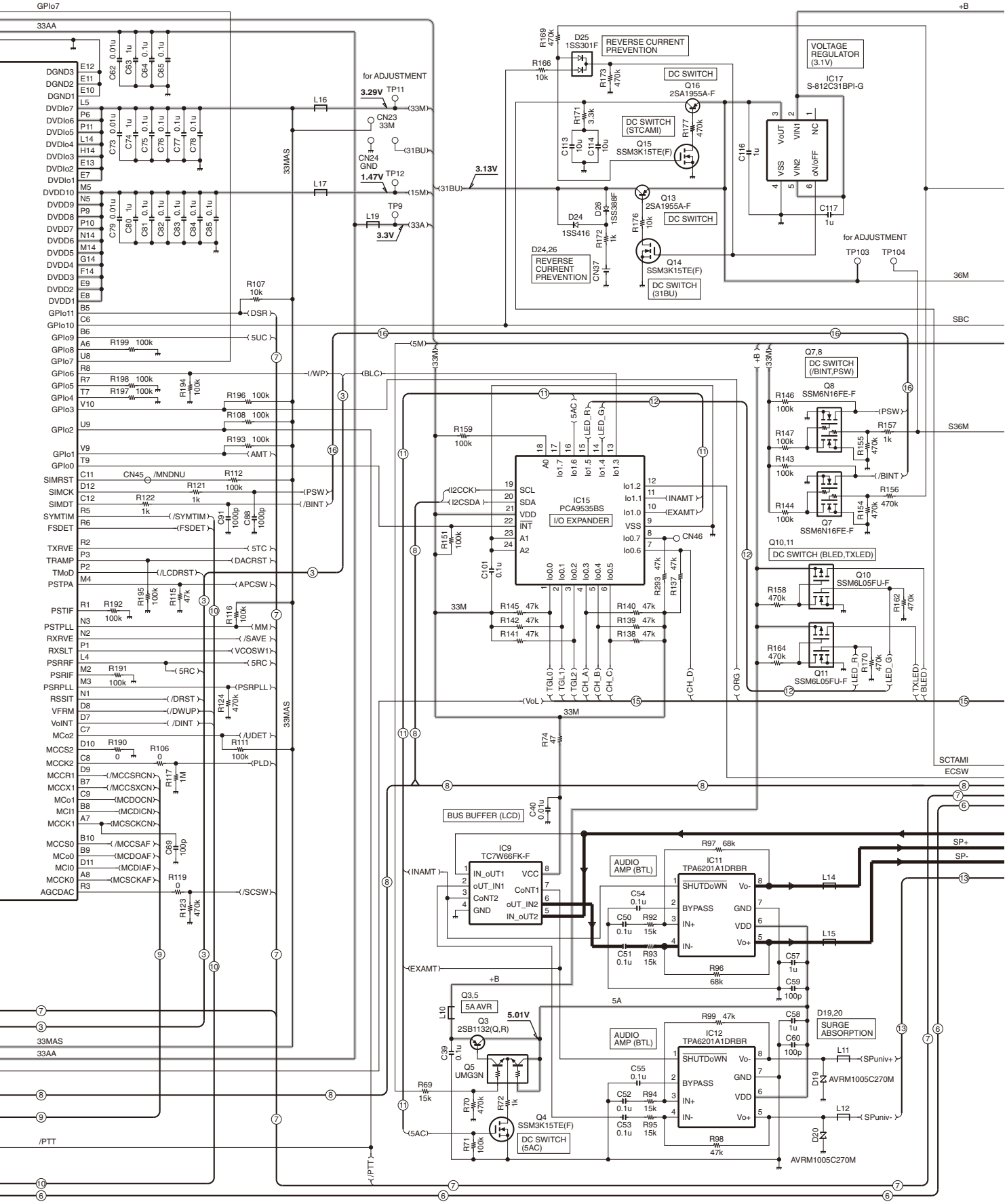
SCHEMATIC DIAGRAM TK-5210(G)

CONTROL UNIT (X53-4390-XX)

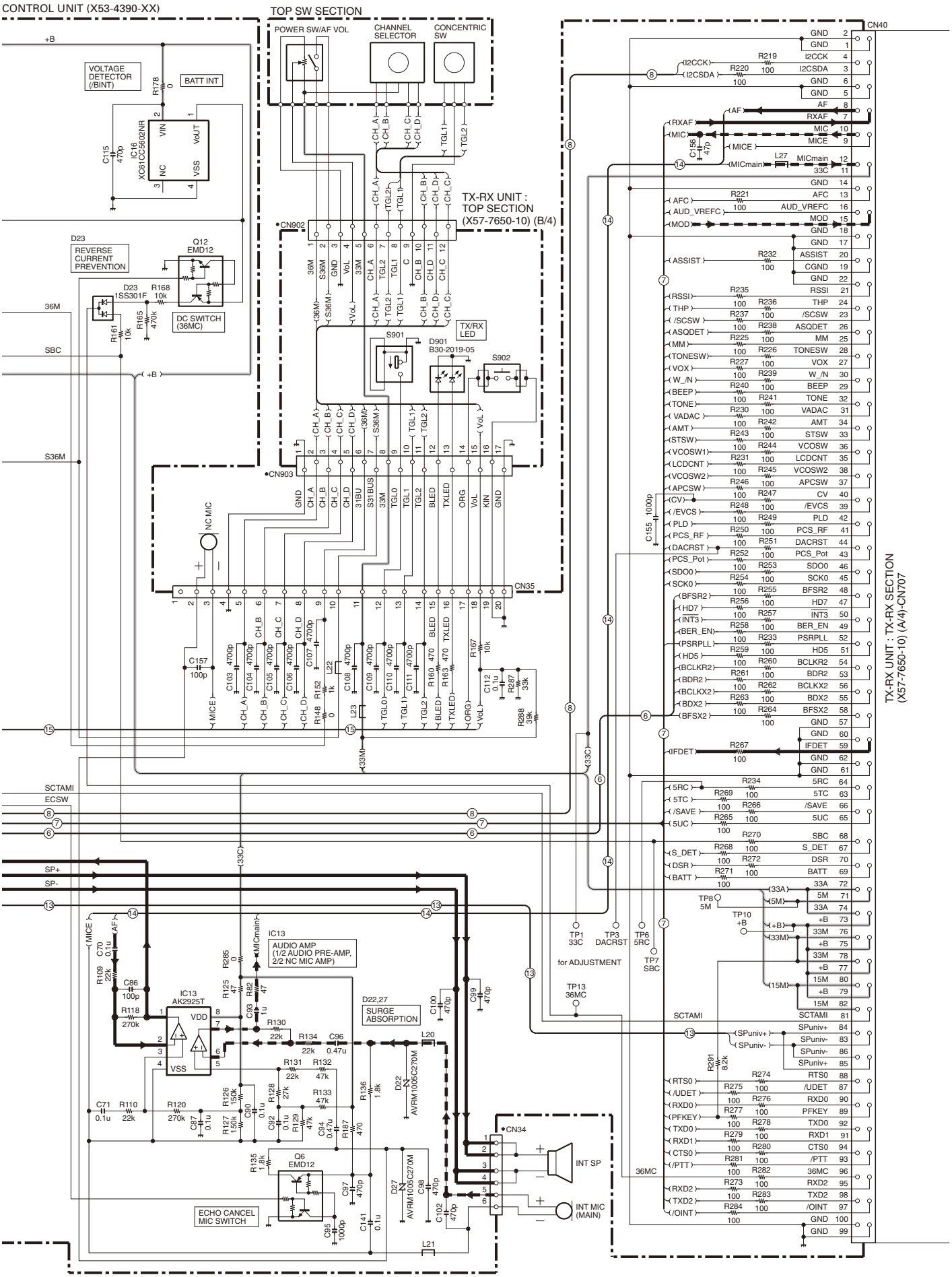


TK-5210(G) SCHEMATIC DIAGRAM

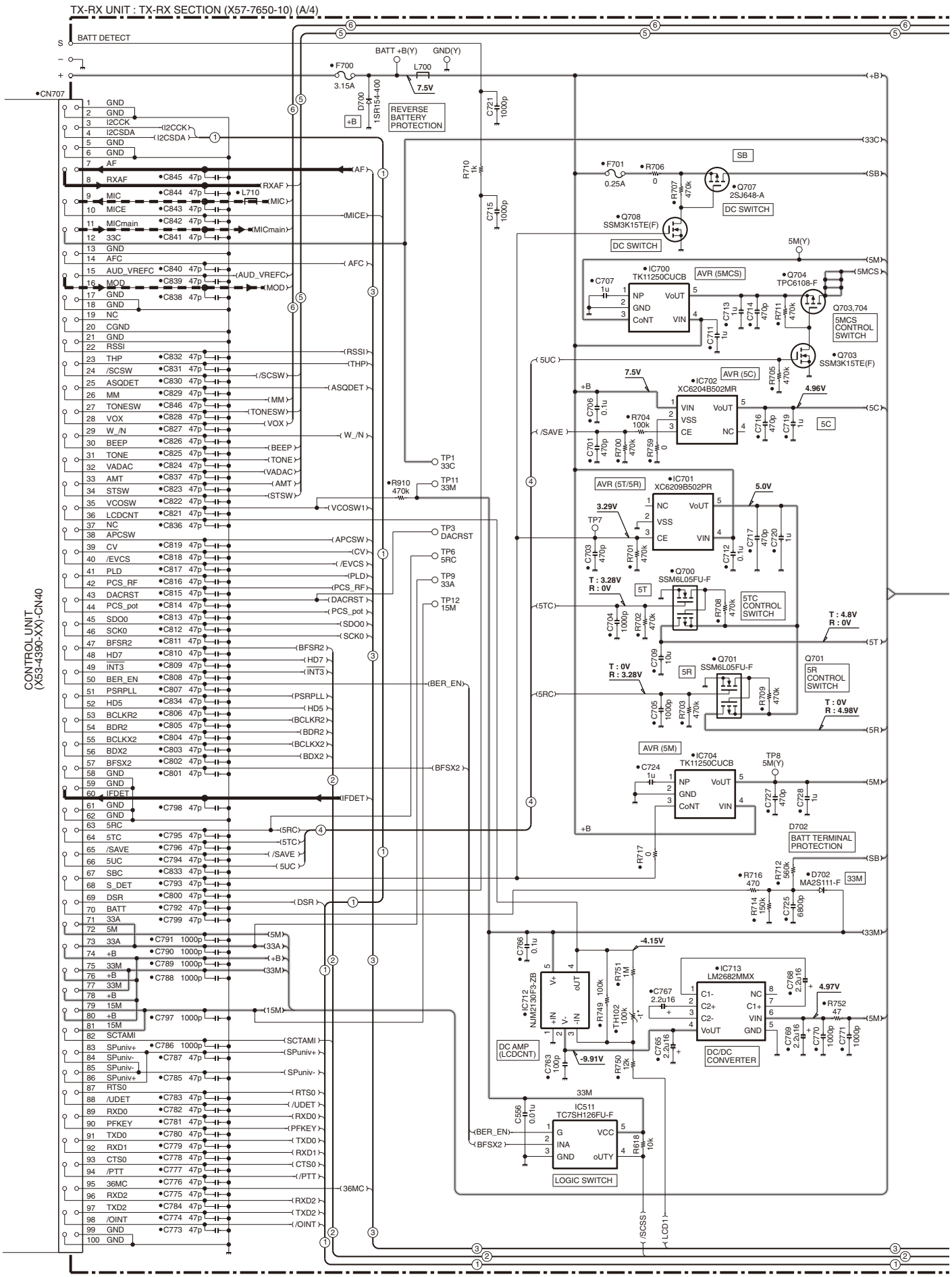
CONTROL UNIT (X53-4390-XX)



SCHEMATIC DIAGRAM TK-5210(G)

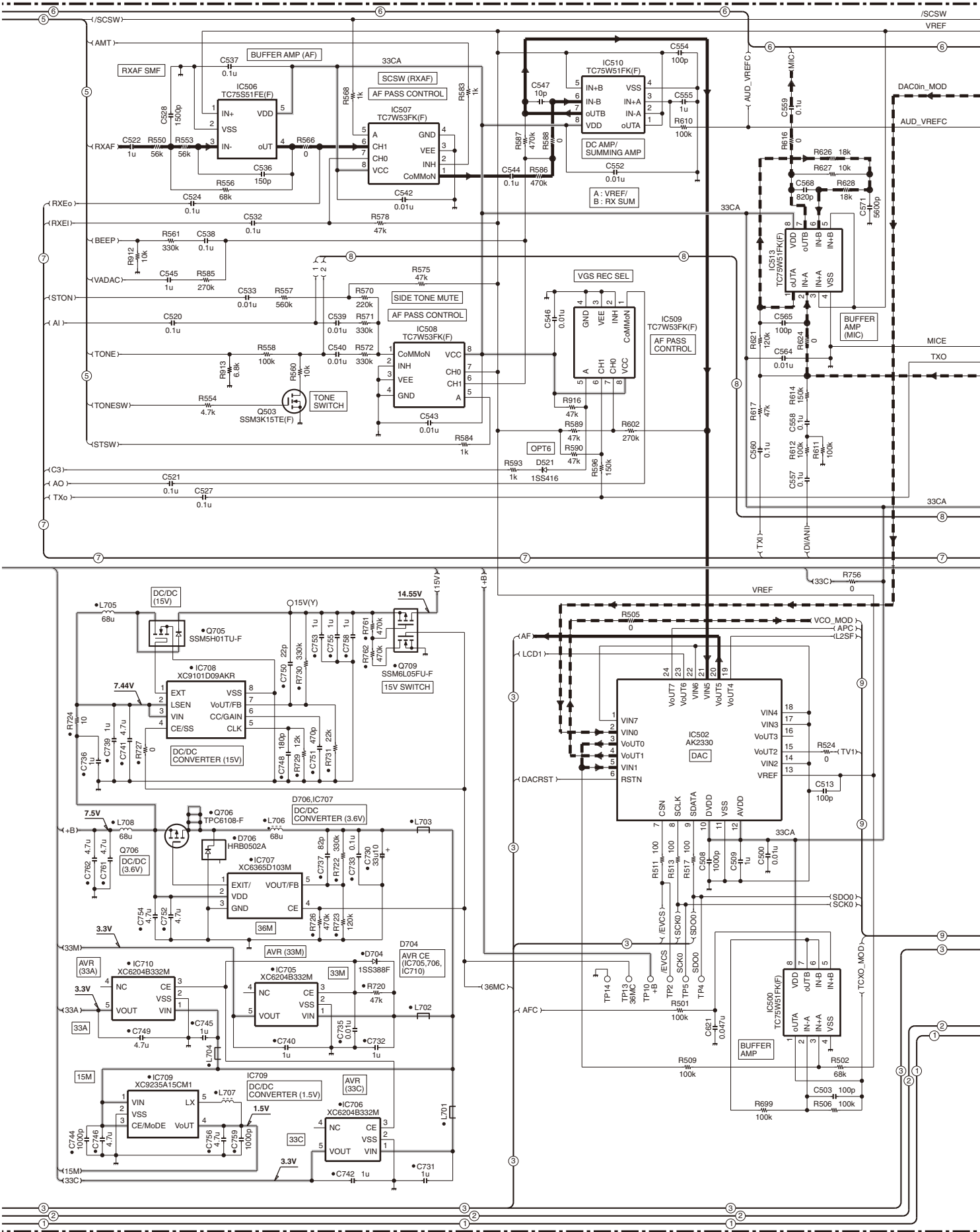


TK-5210(G) SCHEMATIC DIAGRAM



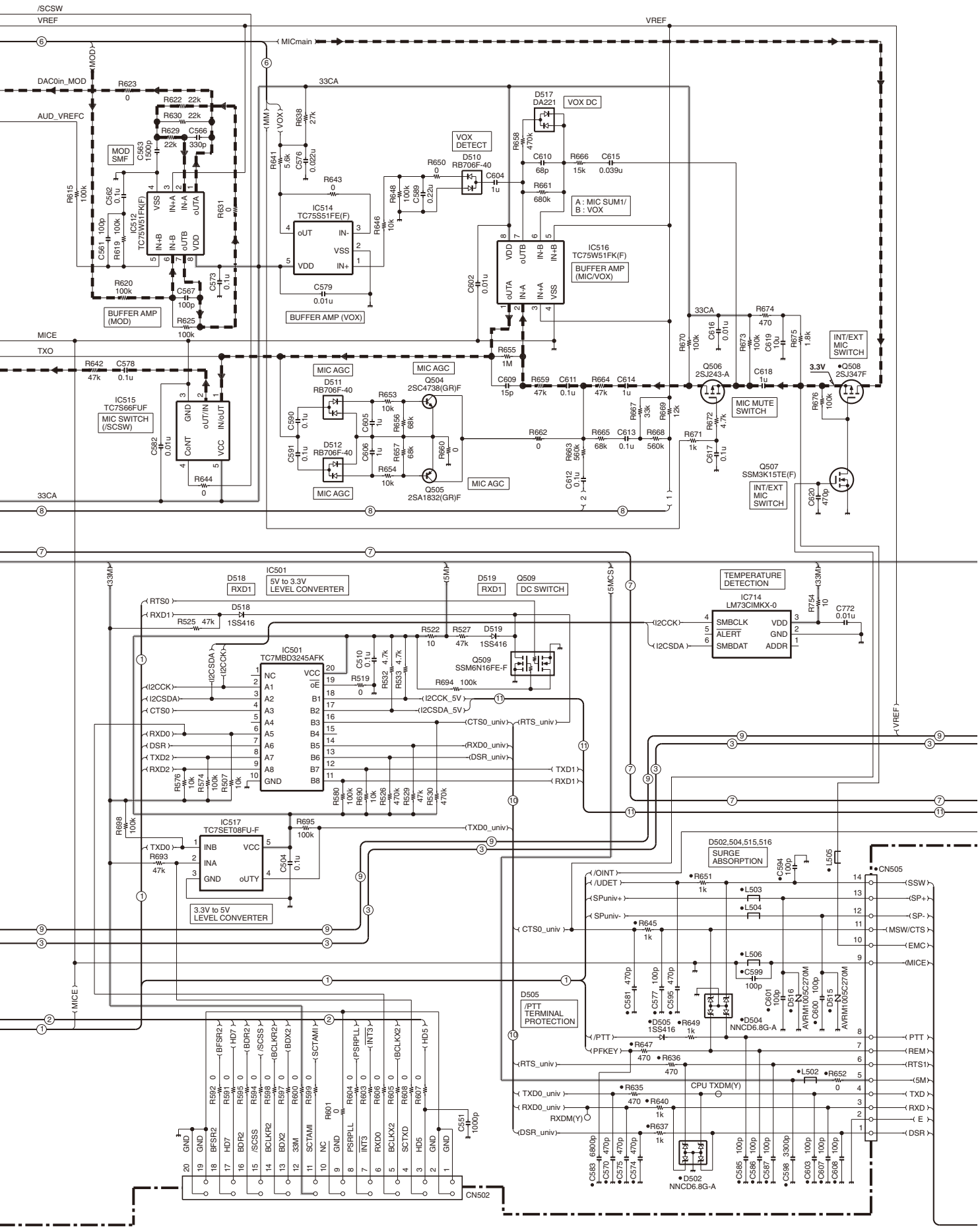
SCHEMATIC DIAGRAM TK-5210(G)

TX-RX UNIT: TX-RX SECTION (X57-7650-10) (A/4)



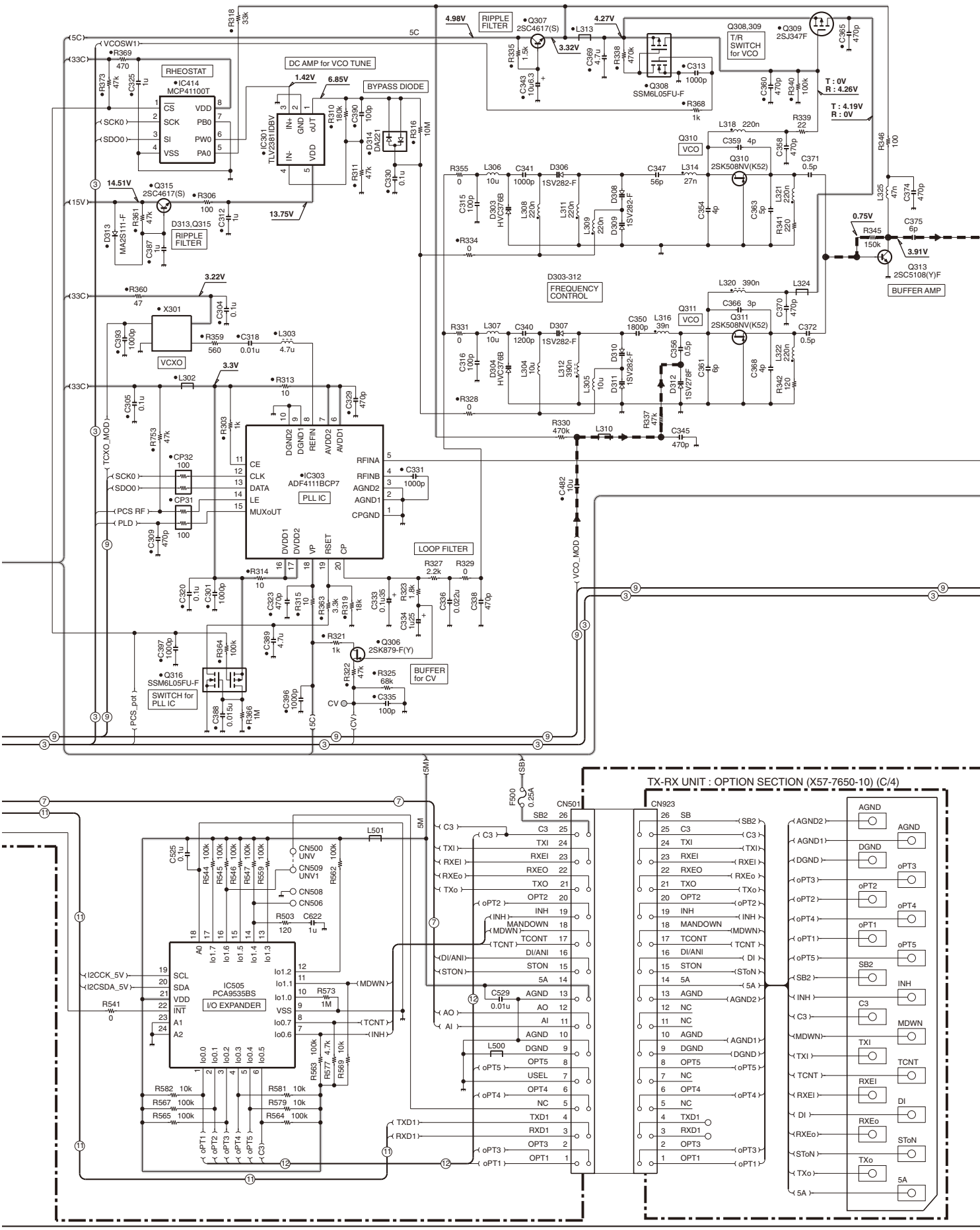
TK-5210(G) SCHEMATIC DIAGRAM

TX-RX UNIT: TX-RX SECTION (X57-7650-10) (A/4)



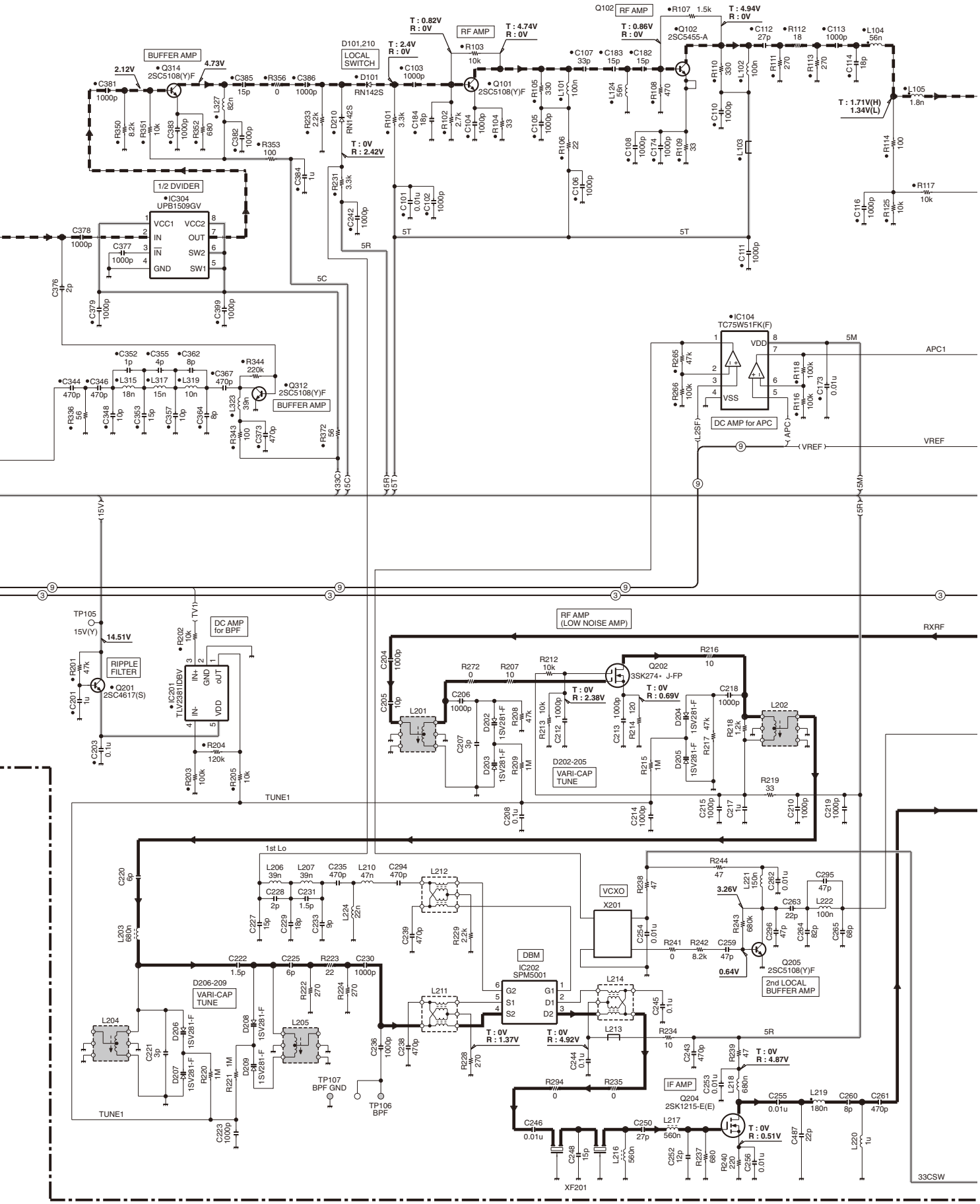
SCHEMATIC DIAGRAM TK-5210(G)

TX-RX UNIT: TX-RX SECTION (X57-7650-10) (A/4)



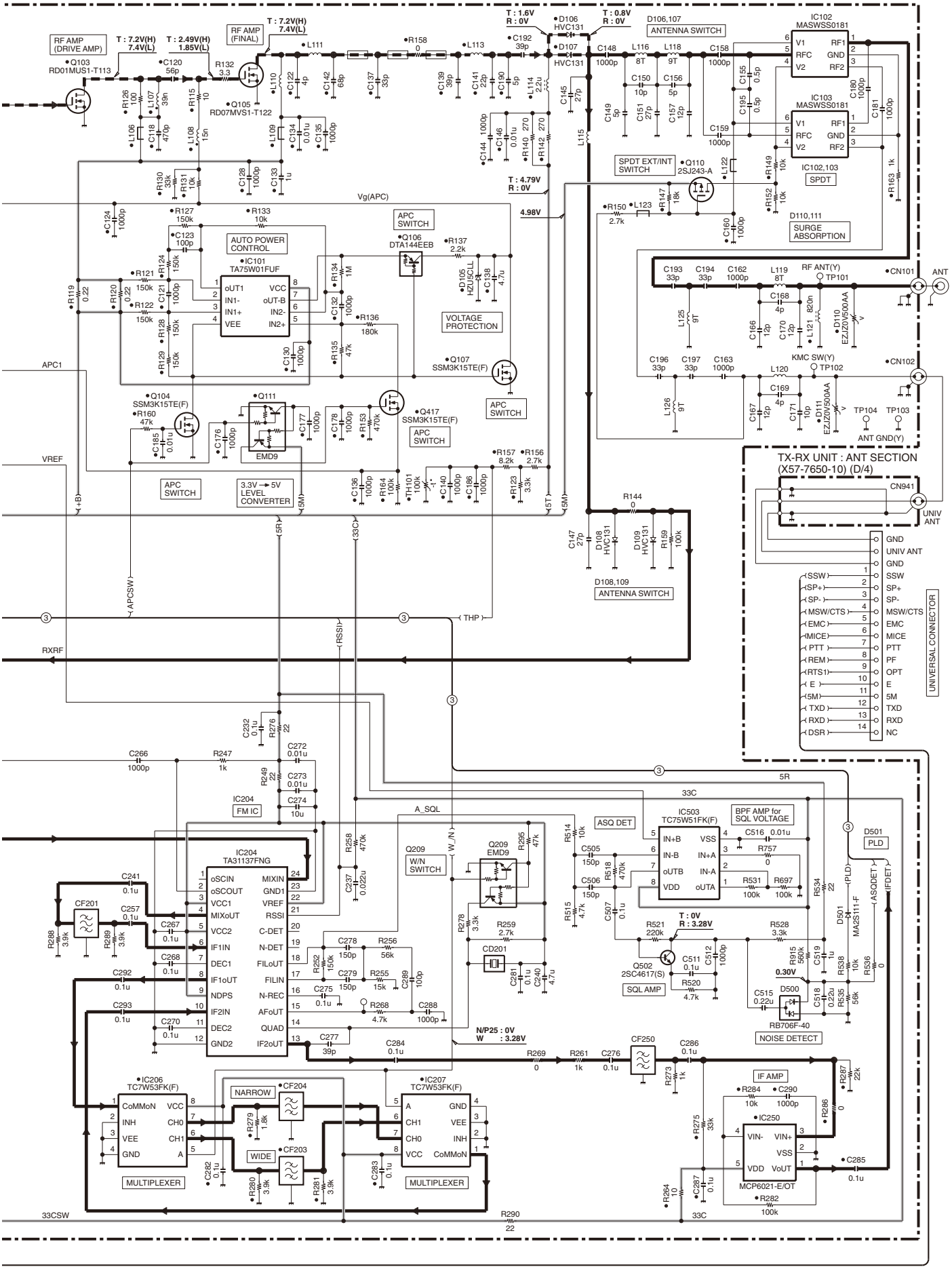
TK-5210(G) SCHEMATIC DIAGRAM

TX-RX UNIT: TX-RX SECTION (X57-7650-10) (A/4)



SCHEMATIC DIAGRAM TK-5210(G)

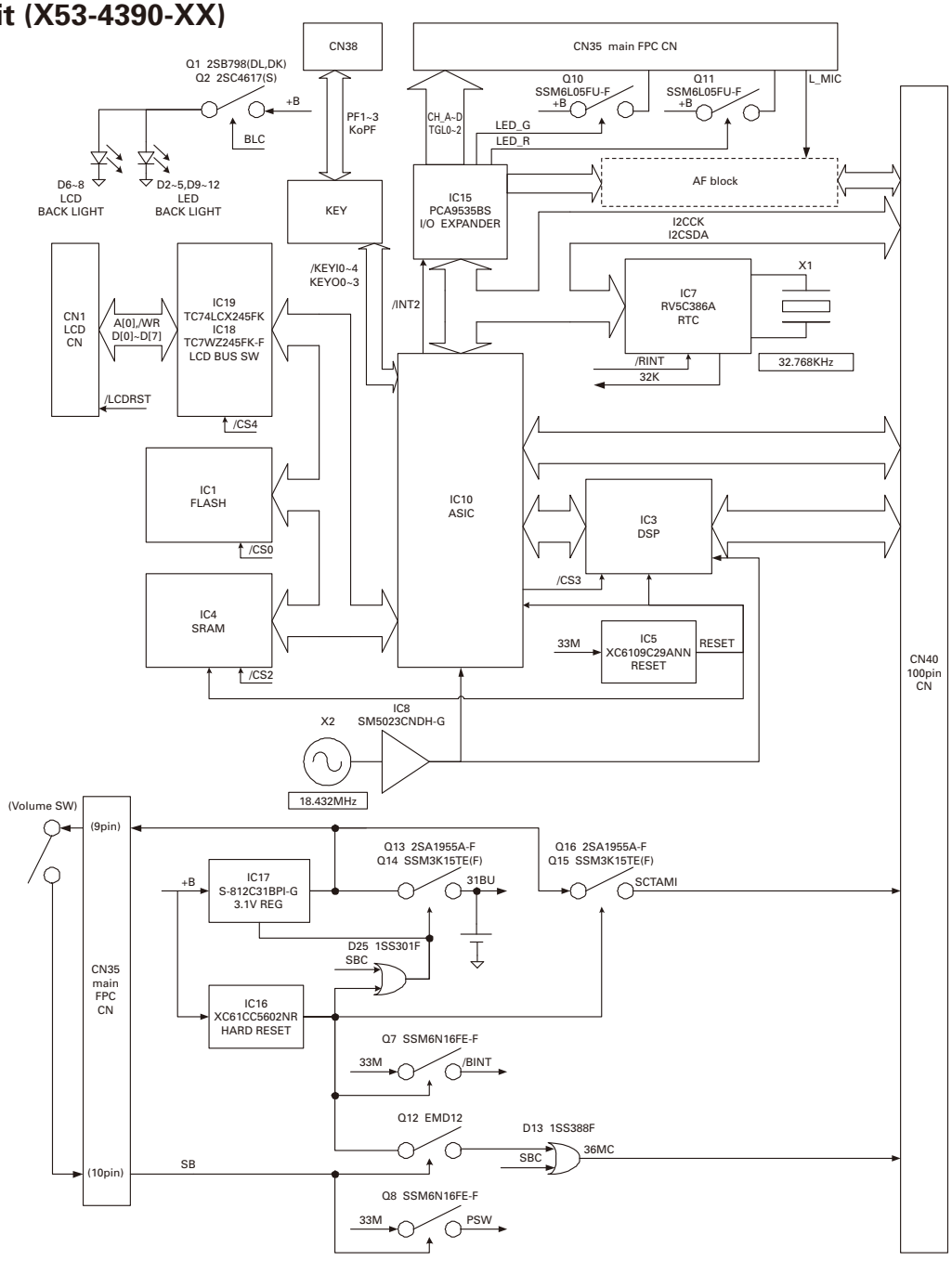
TX-RX UNIT: TX-RX SECTION (X57-7650-10) (A/4)

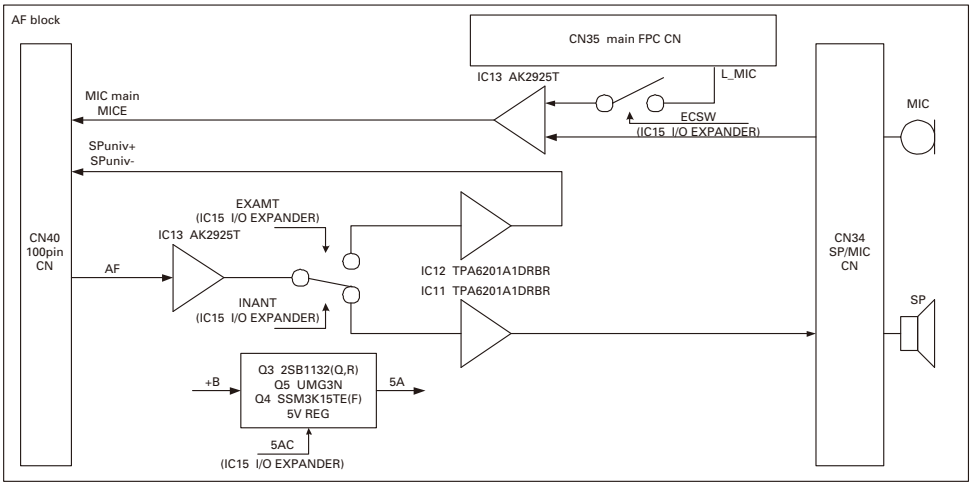


Note: The components marked with a dot (•) are parts of layer 1.

BLOCK DIAGRAM

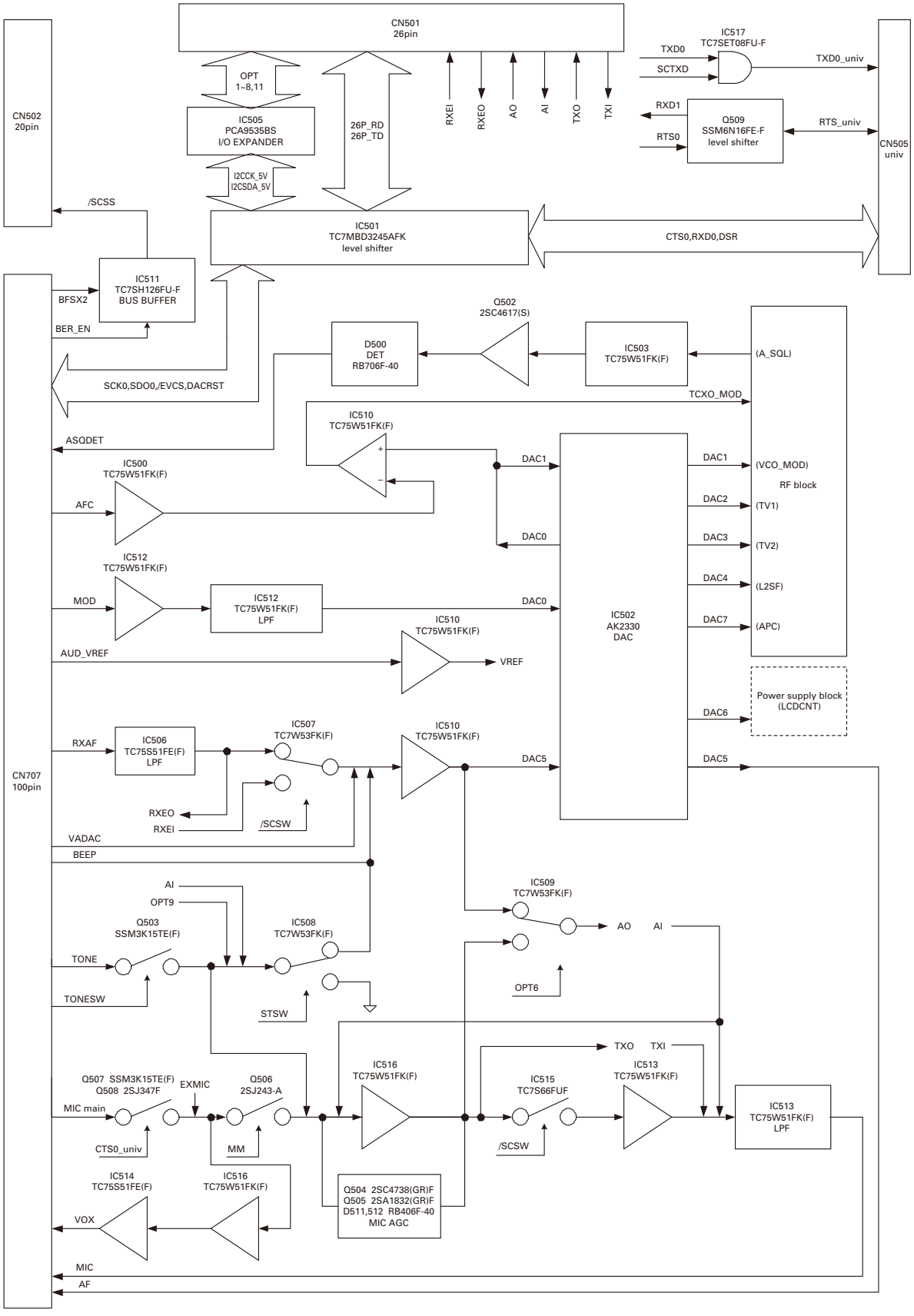
Control unit (X53-4390-XX)



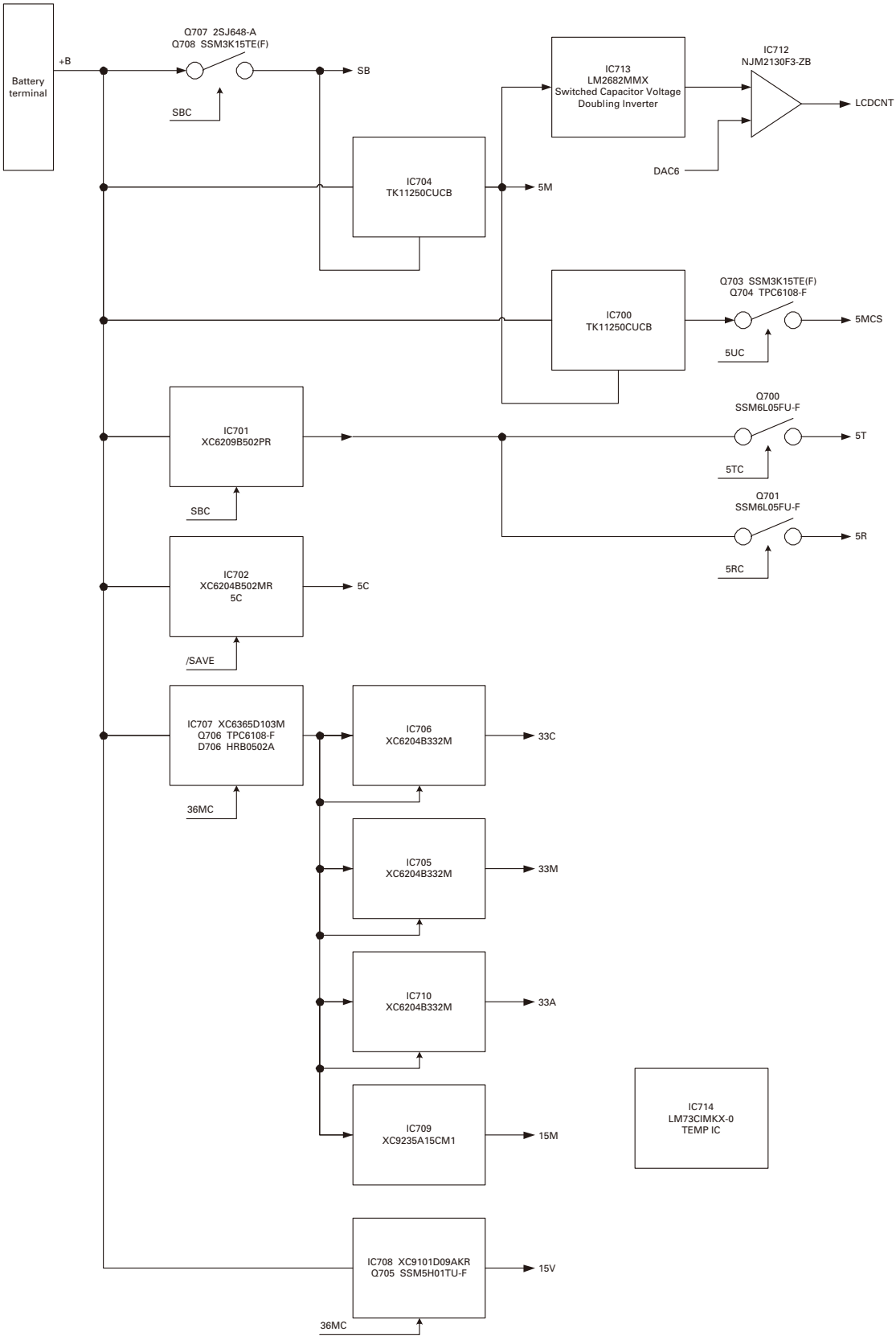


BLOCK DIAGRAM

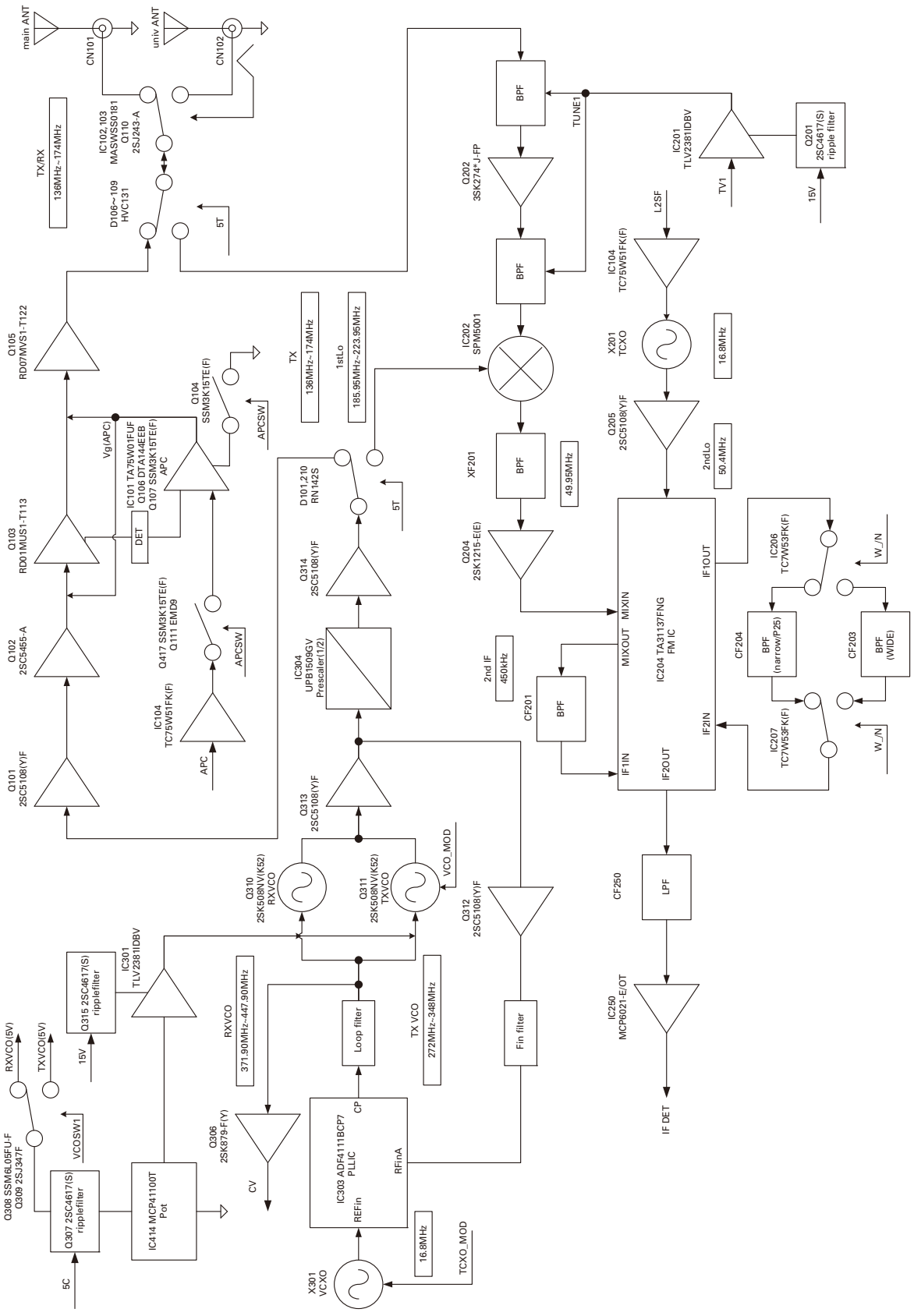
TX-RX unit (X57-7650-10)



BLOCK DIAGRAM

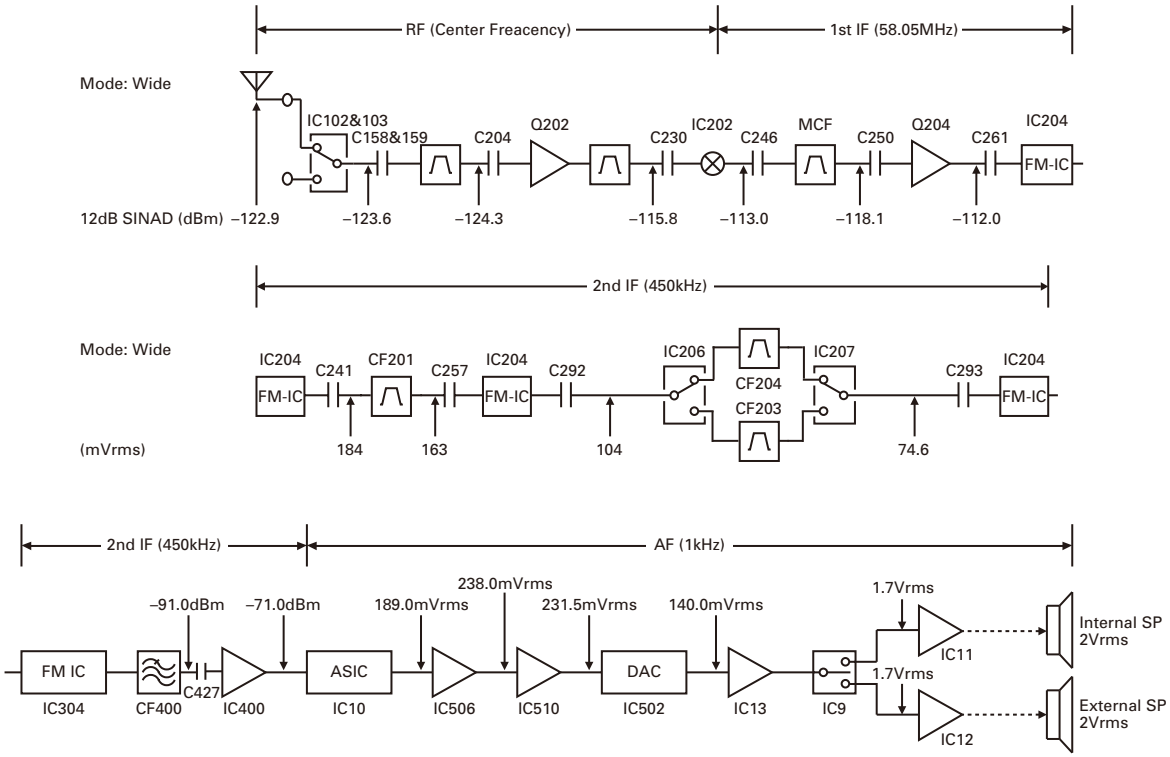


BLOCK DIAGRAM



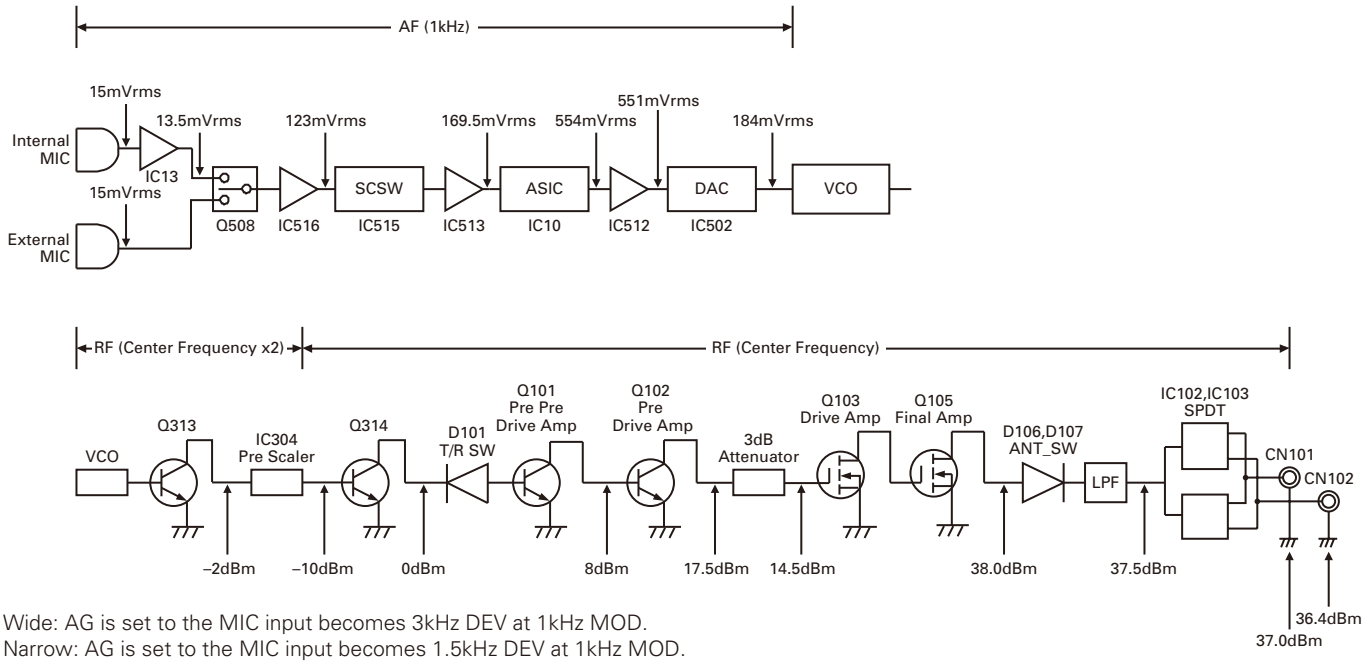
LEVEL DIAGRAM

Receiver Section



To make measurements in the AF section, connect the AC level meter.
(ANT input: –53dBm, 1kHz FM, 3kHz DEV (Wide).)
In the RF section, use 470pF coupling capacitor.
(The display shows the SSG input value required to obtain 12dB SINAD without local level.)

Transmitter Section



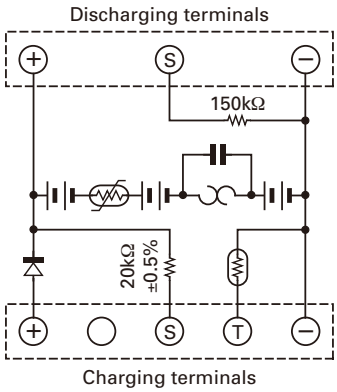
Wide: AG is set to the MIC input becomes 3kHz DEV at 1kHz MOD.
Narrow: AG is set to the MIC input becomes 1.5kHz DEV at 1kHz MOD.
To make measurements in the AF section, connect the AC level meter.
In the RF section, use 1000pF coupling capacitor.

OPTIONAL ACCESSORIES

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

■ **External View**

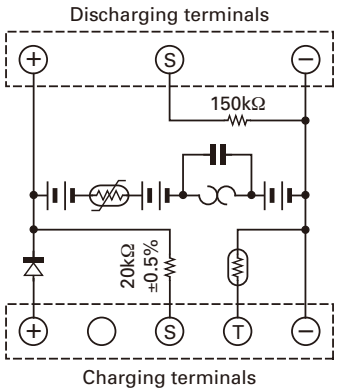
■ **Schematic Diagram**



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

■ **External View**

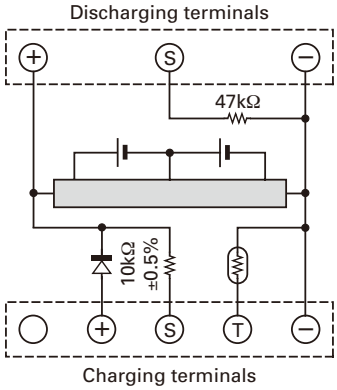
■ **Schematic Diagram**



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

■ **External View**

■ **Schematic Diagram**



KSC-32 (Rapid Charger)

■ **External View**

KBP-6 (Battery Case)

■ **External View**

TK-5210(G)

SPECIFICATIONS

GENERAL

Models	K: Basic Model K2, K7: 4-Key w/LCD Model K3: Full Key w/LCD Model
Frequency Range	136~174 MHz
Number of Channels	K~K3: 1024 K7: 128
Zones	K~K3: 100 K7: 32
Max. Channels per Zone	K~K3: 512 K7: 128
Channel Spacing	Analog: 12.5/15/20/25/30 kHz Digital: 12.5 kHz
Operating Voltage	7.5V DC ± 20%
Battery Life (5-5-90 duty cycle)	KNB-32N or KNB-54N, 7.5VDC, 2500 mAh: 12 hours KNB-33L, 7.5VDC, 2000 mAh: 8 hours KBP-6, AA Alkaline x 6 Batteries: 8 hours (5 hours)
Operating Temperature Range	–22°F to +140°F (–30°C to +60°C)
Frequency Stability (–22°F to +140°F)	±2.0 ppm
Antenna Impedance	50Ω
Dimensions (W x H x D)	2.28 x 6.10 x 1.80 in. (58 x 155 x 45.7 mm) with KNB-32N or KNB-54N battery
(Projections not included)	2.28 x 6.10 x 1.54 in. (58 x 155 x 39.2 mm) with KNB-33L battery 2.36 x 6.10 x 1.84 in. (60 x 155 x 46.7 mm) with KBP-6 battery
Weight	
Radio only	TK-5210(G) K: 11.11 oz. (315g) TK-5210(G) K2, K7: 11.64 oz. (330g) TK-5210(G) K3: 11.64 oz. (330g)
TK-5210(G) K2 with battery, antenna (KRA-22) and belt clip (KBH-11)	23.28 oz. (660g) with KNB-32N or KNB-54N battery 17.64 oz. (500g) with KNB-33L battery

RECEIVER

Sensitivity	Digital (5% BER): 0.25µV Digital(1% BER): 0.40µV Analog 12dB SINAD: 0.25µV
Selectivity	Digital: –60dB Analog @25/30kHz: –78dB Analog @12.5kHz: –67dB
Intermodulation Distortion	Digital: –75dB Analog @25/30kHz: –75dB Analog @12.5kHz: –68dB
Spurious and Image	Digital: –80dB Analog: –80dB
Audio Distortion	Digital: Less than 1.5% Analog: Less than 2%
Audio Output	500mW/8Ω

TRANSMITTER

RF Output Power	5W/1W
Spurious and Harmonics	70dB
FM Hum and Noise	Analog @25kHz: 50dB Analog @12.5kHz: 45dB
Audio Distortion	Less than 2%
Modulation	16K0F3E, 11K0F3E, 8K10F1E, 8K10F1D

Analog measurements made per TIA/EIA-603 and specifications shown are typical.
Digital measurements made per TIA/EIA-102CAAA
KENWOOD reserves the right to change specifications without prior notice or obligation.

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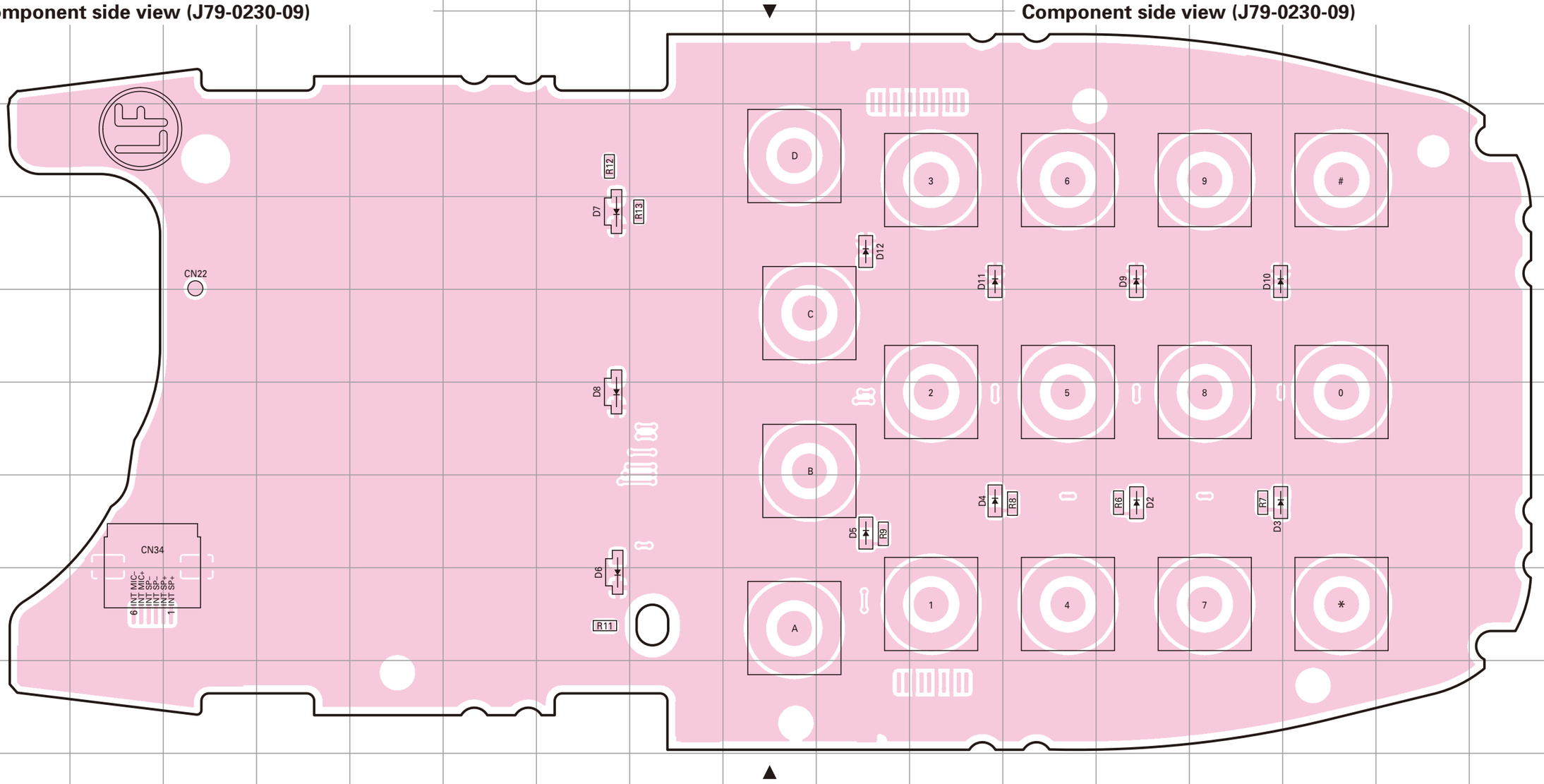
TK-5210(G) PC BOARD

PC BOARD TK-5210(G)

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Component side view (J79-0230-09)

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Component side view (J79-0230-09)



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

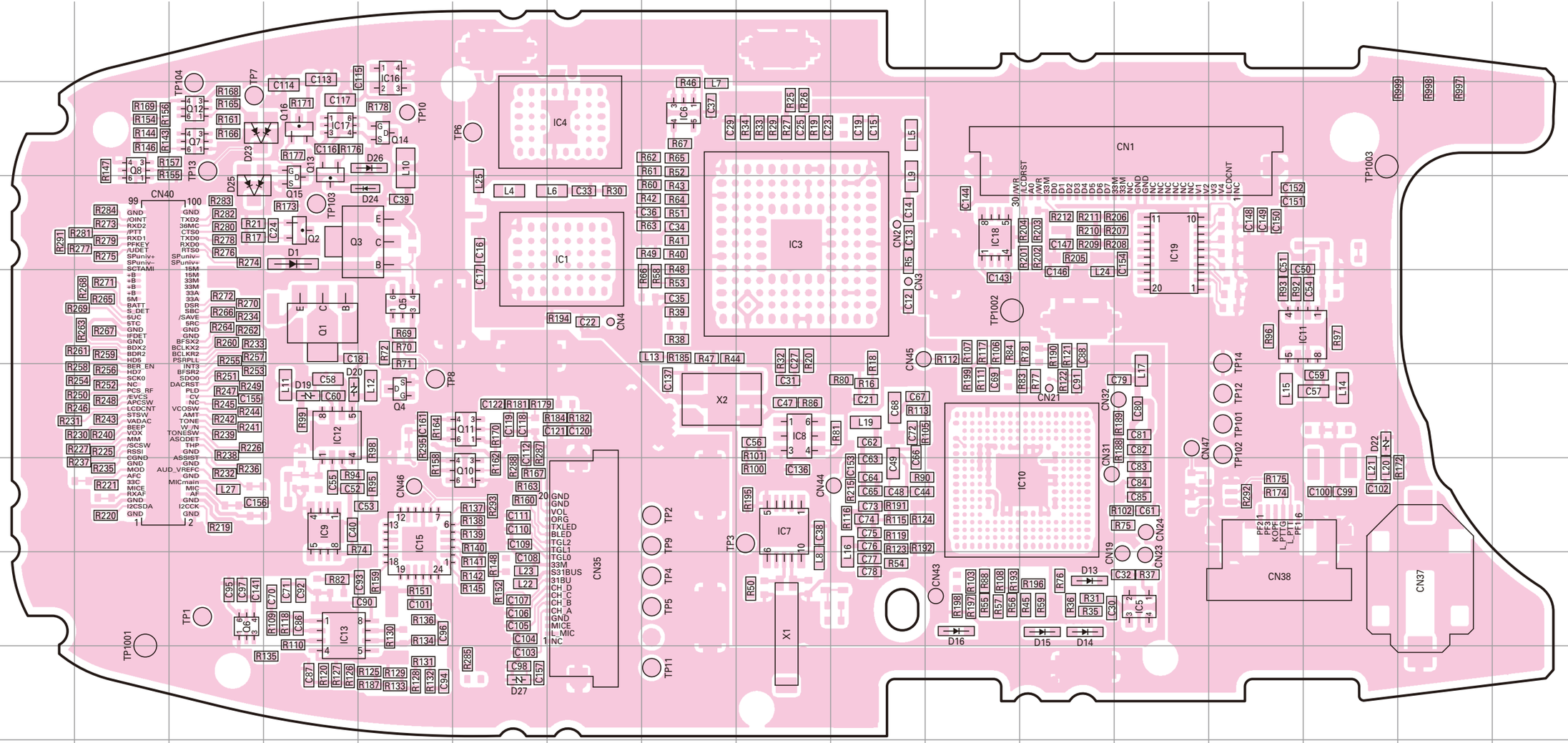
Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Layer 7
Layer 8
Foil side

TK-5210(G) PC BOARD

PC BOARD TK-5210(G)

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Foil side view (J79-0230-09)

CONTROL UNIT (X53-4390-XX) -10: K -11: K2,K7 -12: K3
Foil side view (J79-0230-09)



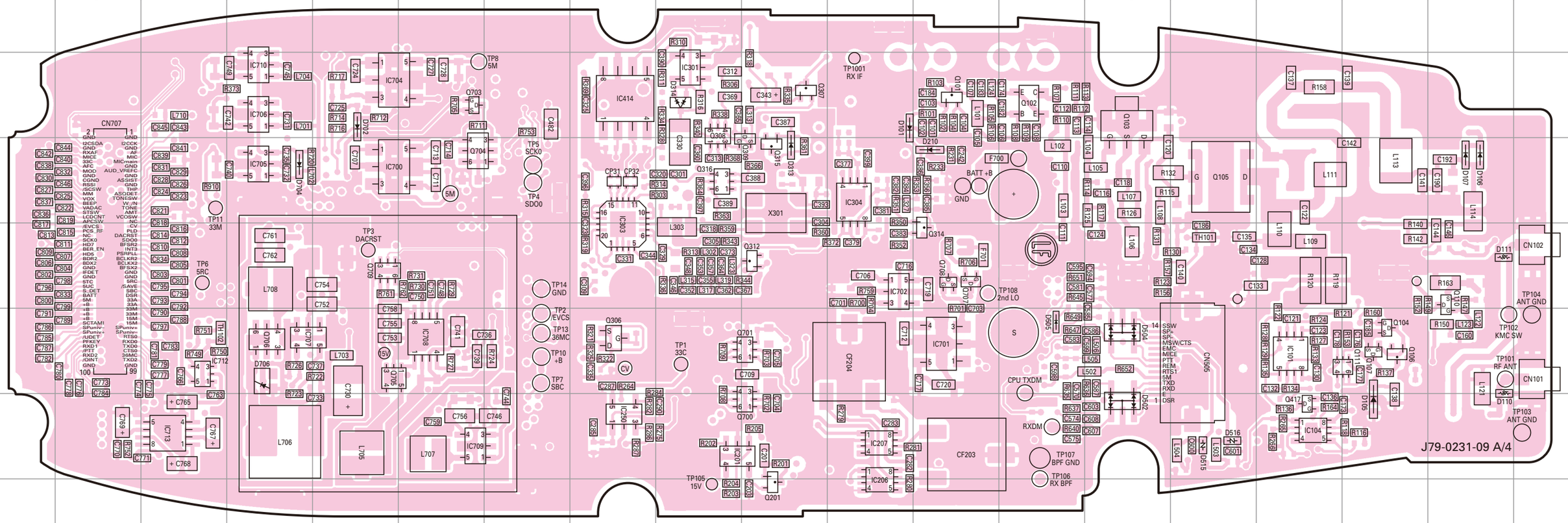
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	5H	IC12	7E	Q4	7F	Q15	5E	D23	4D
IC3	5J	IC13	9E	Q5	6F	Q16	4E	D24	5F
IC4	4H	IC15	8F	Q6	9D	D1	5E	D25	5D
IC5	9N	IC16	3F	Q7	4D	D13	9M	D26	4F
IC6	4I	IC17	4E	Q8	4C	D14	9M	D27	10G
IC7	8J	IC18	5L	Q10	8G	D15	9M		
IC8	7J	IC19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

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

TK-5210(G) PC BOARD

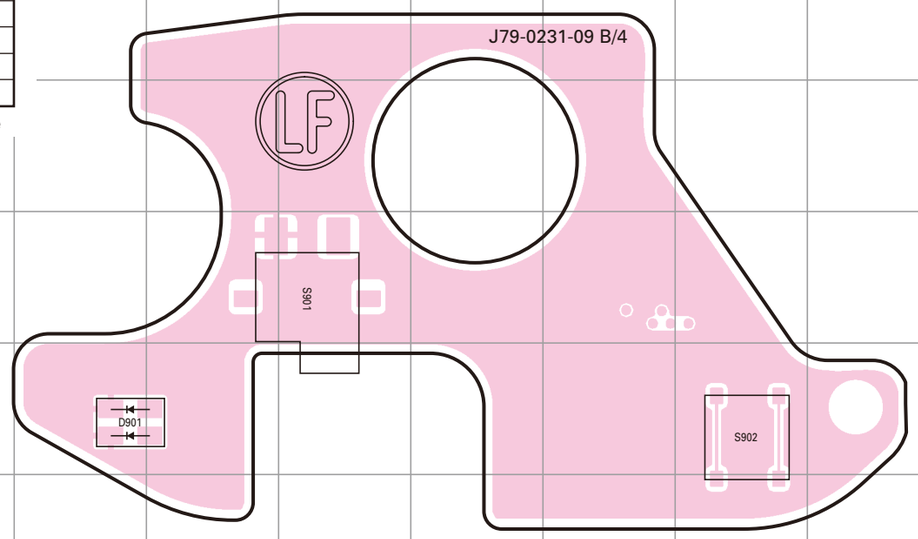
PC BOARD TK-5210(G)

TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Component side view (J79-0231-09 A/4)

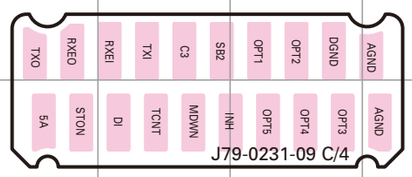


Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

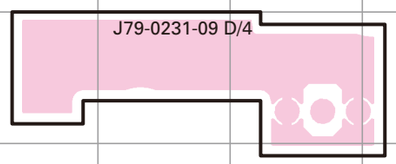
TX-RX UNIT (X57-7650-10) (B/4): TOP SECTION
Component side view (J79-0231-09 B/4)



TX-RX UNIT (X57-7650-10) (C/4): OPTION SECTION
Component side view (J79-0231-09 C/4)



TX-RX UNIT (X57-7650-10) (D/4): ANT SECTION
Component side view (J79-0231-09 D/4)



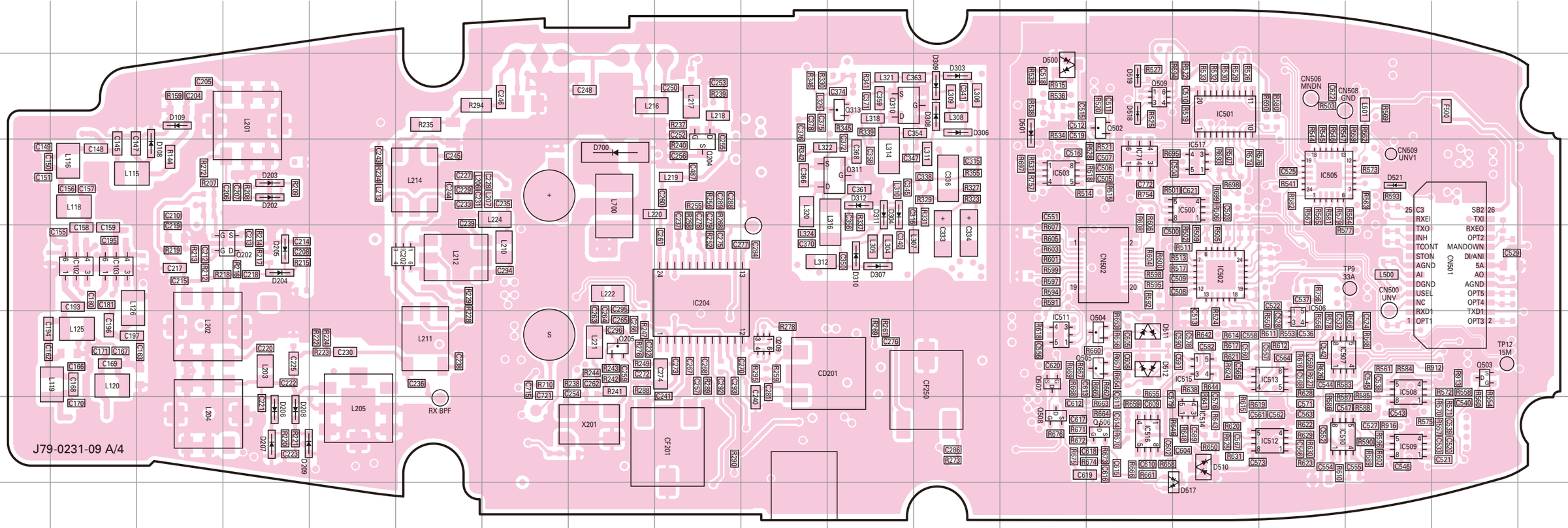
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC101	6P	Q102	3M	Q706	6D
IC104	7P	Q103	3N	Q707	5L
IC201	7I	Q104	6Q	Q708	5L
IC206	8K	Q105	4O	Q709	5E
IC207	7K	Q106	6Q	D101	3K
IC250	7H	Q107	6Q	D105	7Q
IC301	3I	Q110	5R	D106	4R
IC303	5H	Q111	6Q	D107	4R
IC304	4K	Q201	8J	D110	7R
IC414	3H	Q306	6H	D111	5R
IC700	4E	Q307	3J	D210	4L
IC701	6L	Q308	3I	D313	4J
IC702	5K	Q309	4J	D314	3I
IC704	3E	Q312	5J	D502	7N
IC705	4D	Q314	5L	D504	6N
IC706	3D	Q315	4J	D505	6M
IC707	6D	Q316	4I	D515	7O
IC708	6F	Q417	7P	D516	7O
IC709	7F	Q700	7J	D702	3E
IC710	3D	Q701	6J	D704	4D
IC712	6C	Q703	3F	D706	6D
IC713	7C	Q704	4F	D901	12C
Q101	3L	Q705	6E		

TK-5210(G) PC BOARD

PC BOARD TK-5210(G)

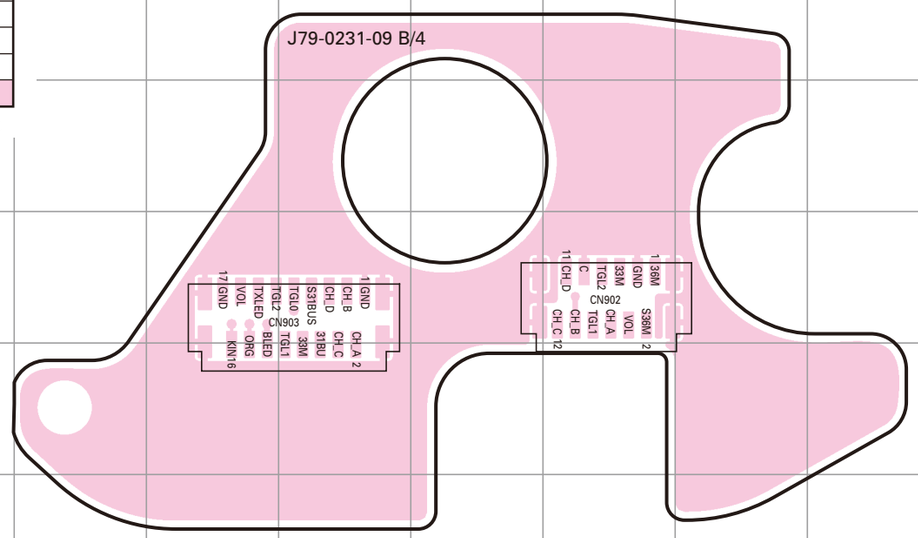
TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Foil side view (J79-0231-09 A/4)

TX-RX UNIT (X57-7650-10) (A/4): TX-RX SECTION
Foil side view (J79-0231-09 A/4)

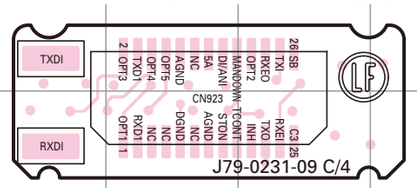


Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Foil side

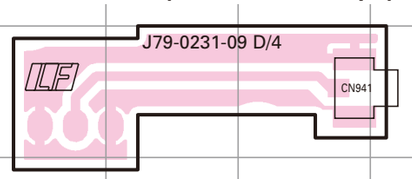
TX-RX UNIT (X57-7650-10) (B/4): TOP SECTION
Foil side view (J79-0231-09 B/4)



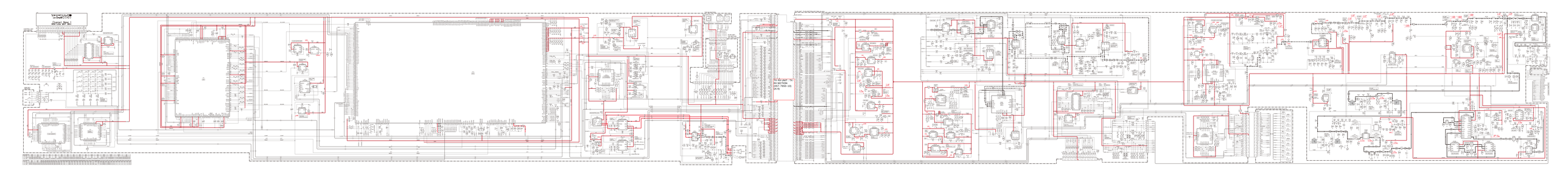
TX-RX UNIT (X57-7650-10) (C/4): OPTION SECTION
Foil side view (J79-0231-09 C/4)



TX-RX UNIT (X57-7650-10) (D/4): ANT SECTION
Foil side view (J79-0231-09 D/4)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC102	5B	Q202	5D	D207	7D
IC103	5B	Q204	4I	D208	7D
IC202	5F	Q205	6H	D209	7D
IC204	5I	Q209	6J	D303	3L
IC500	4O	Q310	3K	D304	4K
IC501	3O	Q311	4K	D306	3L
IC502	5O	Q313	3K	D307	5K
IC503	4M	Q502	3N	D308	3L
IC505	4P	Q503	6R	D309	3L
IC506	6P	Q504	6N	D310	5K
IC507	6P	Q505	6N	D311	4K
IC508	6Q	Q506	7N	D312	4K
IC509	7Q	Q507	6M	D500	3M
IC510	7P	Q508	7M	D501	3M
IC511	6M	Q509	3N	D510	7O
IC512	7P	D108	4C	D511	6N
IC513	6P	D109	3C	D512	6N
IC514	7O	D202	4D	D517	8O
IC515	6O	D203	4D	D518	3N
IC516	7N	D204	5D	D519	3N
IC517	4O	D205	5D	D521	4Q
IC714	4N	D206	7D	D700	4H



TK-5210	X53-439	X57-765	LCD	CN1
K	0-10	0-10	×	×
K2	0-11	0-10	○	○
K3	0-12	0-10	○	○
K7	0-11	0-10	○	○