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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 this publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions, which 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, and 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 if someone is within two feet (0.6 meter) of the antenna.
- DO NOT transmit until all RF connectors are secure and any open connectors are properly terminated.
- SHUT OFF this equipment when near electrical blasting caps or while in an explosive atmosphere.
- All equipment should be properly grounded before power-up for safe operation.
- This equipment should be serviced by only qualified technicians.

PRE-INSTALLATION CONSIDERATIONS

1. UNPACKING

Unpack the radio from its shipping container and check for accessory items. If any item is missing, please contact KENWOOD immediately.

2. LICENSING REQUIREMENTS

Federal regulations require a station license for each radio installation (mobile or base) be obtained by the equipment owner. The licensee is responsible for ensuring transmitter power, frequency, and deviation are within the limits permitted by the station license.

Transmitter adjustments may be performed only by a licensed technician holding an FCC first, second or general class commercial radiotelephone operator's license. There is no license required to install or operate the radio.

3. PRE-INSTALLATION CHECKOUT

3-1. Introduction

Each radio is adjusted and tested before shipment. However, it is recommended that receiver and transmitter operation be checked for proper operation before installation.

3-2. Testing

The radio should be tested complete with all cabling and accessories as they will be connected in the final installation. Transmitter frequency, deviation, and power output should be checked, as should receiver sensitivity, squelch operation, and audio output. Signalling equipment operation should be verified.

4. PLANNING THE INSTALLATION

4-1. General

Inspect the vehicle and determine how and where the radio antenna and accessories will be mounted.

Plan cable runs for protection against pinching or crushing wiring, and radio installation to prevent overheating.

4-2. Antenna

The favored location for an antenna is in the center of a large, flat conductive area, usually at the roof center. The trunk lid is preferred, bond the trunk lid and vehicle chassis using ground straps to ensure the lid is at chassis ground.

4-3. Radio

The universal mount bracket allows the radio to be mounted in a variety of ways. Be sure the mounting surface is adequate to support the radio's weight. Allow sufficient space around the radio for air cooling. Position the radio close enough to the vehicle operator to permit easy access to the controls when driving.

4-4. DC Power and wiring

1. This radio may be installed in negative ground electrical systems only. Reverse polarity will cause the cable fuse to blow. Check the vehicle ground polarity before installation to prevent wasted time and effort.
2. Connect the positive power lead directly to the vehicle battery positive terminal. Connecting the Positive lead to any other positive voltage source in the vehicle is not recommended.
3. Connect the ground lead directly to the battery negative terminal.
4. The cable provided with the radio is sufficient to handle the maximum radio current demand. If the cable must be extended, be sure the additional wire is sufficient for the current to be carried and length of the added lead.

5. INSTALLATION PLANNING – CONTROL STATIONS

5-1. Antenna system

Control station. The antenna system selection depends on many factors and is beyond the scope of this manual. Your KENWOOD dealer can help you select an antenna system that will best serve your particular needs.

5-2. Radio location

Select a convenient location for your control station radio which is as close as practical to the antenna cable entry point. Secondly, use your system's power supply (which supplies the voltage and current required for your system). Make sure sufficient air can flow around the radio and power supply to allow adequate cooling.

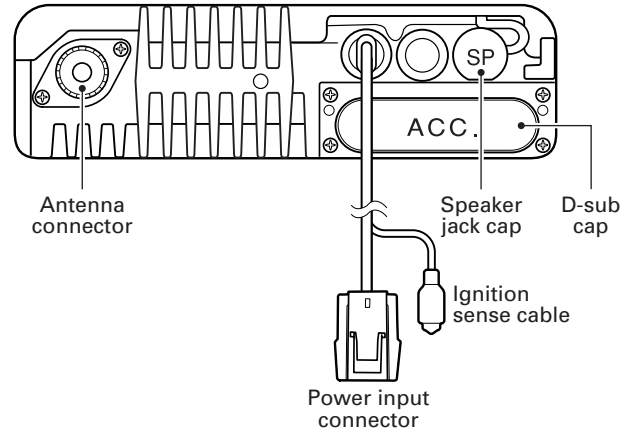
GENERAL / SYSTEM SET-UP

SERVICE

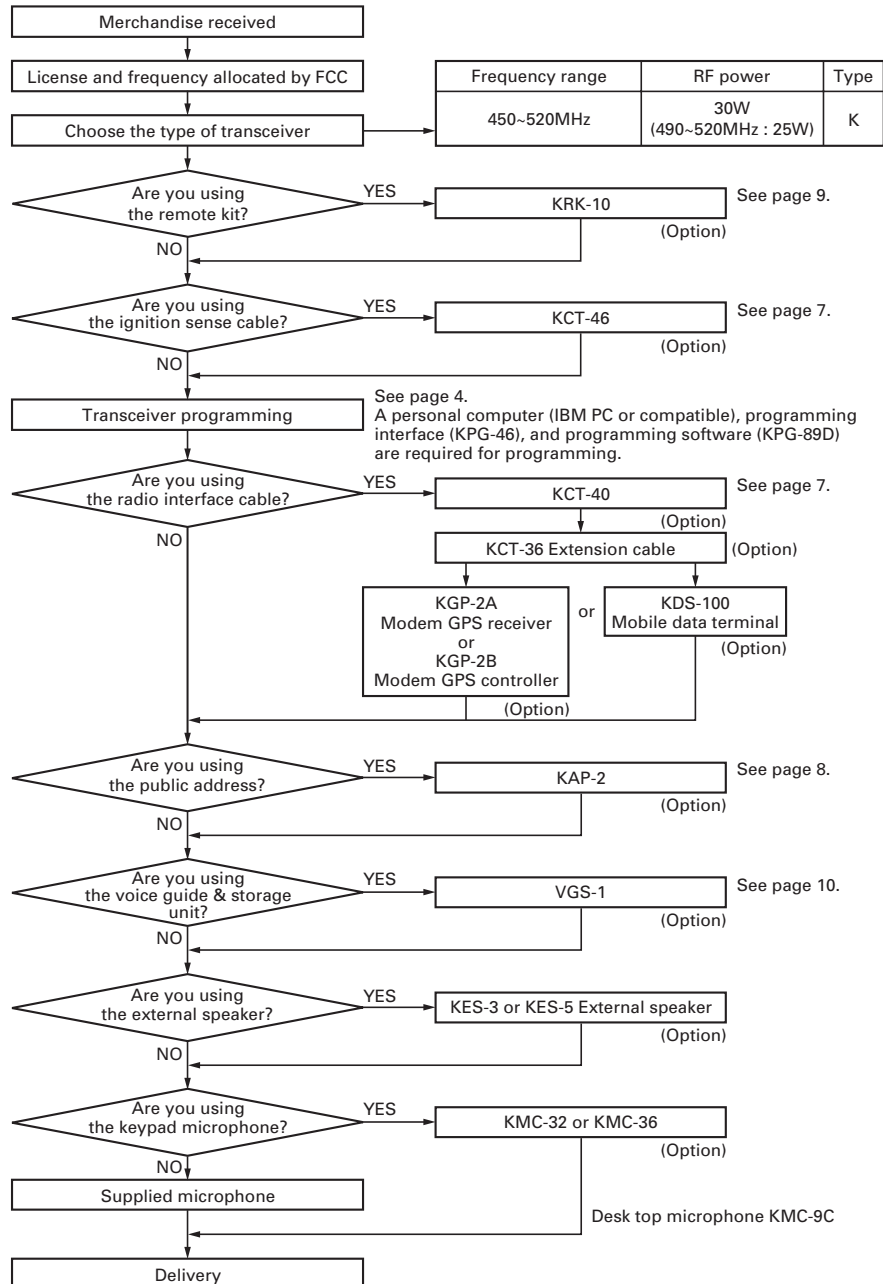
This radio is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained in this manual.

NOTE

- If you do not intend to use the speaker 3.5-mm jack and the D-sub 25-pin connector, fit the supplied speaker-jack cap and D-sub cap to stop dust and sand from getting in.
- If the transceiver is turned ON or OFF when the power-on/off status message is enabled, the transceiver sends the status.

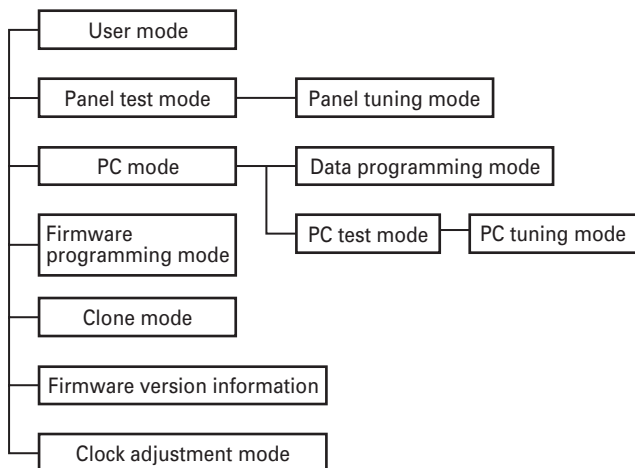


SYSTEM SET-UP



REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the radio.
PC mode	Used for communication between the radio and PC (IBM compatible).
Data programming mode	Used to read and write frequency data and other features to and from the radio.
PC test mode	Used to check the radio using the PC. This feature is included in the FPU. See panel test.
PC tuning mode	Used to tune the radio 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	Used to transfer programming data from one radio to another.
Firmware version information	Used to confirm the internal firmware version.
Clock adjustment mode	Used to adjust date and time.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[A] + Power ON
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode] + [S]
Firmware programming mode	[S] + Power ON
Clone mode	[B] + Power ON
Firmware version information	[▲] + Power ON
Clock adjustment mode	[C] + Power ON

3. Panel Test Mode

Setting method refer to ADJUSTMENT.

4. Panel Tuning Mode

Setting method refer to ADJUSTMENT.

5. PC Mode

5-1. Preface

The transceiver is programmed by using a personal computer, programming interface (KPG-46) and programming software (KPG-89D).

The programming software can be used with an IBM PC or compatible. Figure 1 shows the setup of an IBM PC for programming.

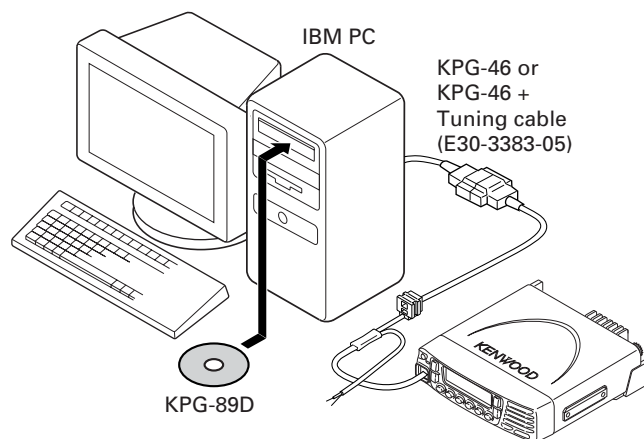


Fig. 1

REALIGNMENT

5-2. Connection procedure

1. Connect the transceiver to the personal computer with the interface cable.
2. When the POWER switch on, user mode can be entered immediately. When PC sends command the radio enter PC mode, and "PROGRAM" is displayed on the LCD. When data transmitting from transceiver, the red LED is lights. When data receiving to transceiver, the green LED is lights.

Note:

- The data stored in the personal computer must match model type, when it is written into the flash memory.

5-3. KPG-46 description

(PC programming interface cable: Option)

The KPG-46 is required to interface the transceiver to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-46 connects the modular microphone jack of the transceiver to the computers RS-232C serial port.

5-4. Programming software KPG-89D description

The KPG-89D is the programming software for the transceiver supplied on a CD-ROM. This software runs under MS-Windows 98, ME, Windows 2000 or XP on an IBM-PC or compatible machine.

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 (IBM PC or compatible) with the interface cable (KPG-46). (Connection is the same as in the PC Mode.)

Note :

You can only program firmware from the 8-pin microphone connector on the front panel. Using the 25-pin logic interface on the rear panel will not work.

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. Turn the transceiver power ON with the [S] key held down. Then, the orange LED on the transceiver lights and "PROG 115200" is displayed.

5. Check the connection between the transceiver and the personal computer, and make sure that the transceiver is in the Program mode.
6. Press write button in the window. When the transceiver starts to receive data, the [PG] display is blinking.
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.

Notes:

- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software.
- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before update the radio firmware. Directly copying from the floppy disk to the radio may not work because the access speed is too slow.

6-4. Function

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

Note:

Normally, write in the high-speed mode.

7. Clone Mode

Programming data can be transferred from one radio to another by connecting them via their 8-pin microphone connectors. The operation is as follows (the transmit radio is the master and the receive radio is a slave).

1. Turn the master transceiver power ON with the [B] key held down. 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 master. The following describes how to enter the password.

REALIGNMENT

- How to enter the password with the microphone keypad; If you press a key while "CLONE LOCK" is displayed, the number that was pressed is displayed on the transceiver. Each press of the key shifts the display in order to the left. When you enter the password and press the [*] 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 with the [^] and [v] keys; If the [^] and [v] keys is pressed while "CLONE LOCK" is displayed, numbers (0 to 9) are displayed flashing. When you press the [C] key, the currently selected number is determined. If you press the [S] 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.

- Power on the slave transceiver.
- Connect the cloning cable (Part No. E30-3382-05) to the modular microphone jacks on the master and slave.
- Press the [S] key on the master while the master displays "CLONE MODE". The data of the master is sent to the slave. While the slave is receiving the data, "PROGRAM" is displayed. When cloning of data is completed, the master displays "END", and the slave automatically operates in the User mode. The slave can then be operated by the same program as the master.
- The other slave can be continuously cloned. When the [S] key on the master is pressed while the master displays "END", the master displays "CLONE MODE". Carry out the operation in step 4 to 6. Can not be cloned if the overwrite password is programmed to the slave.

Note:

Only the same models can be cloned together.

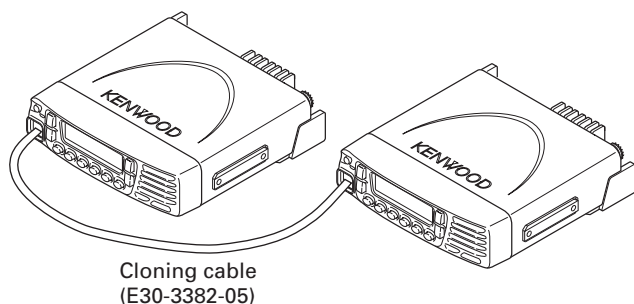


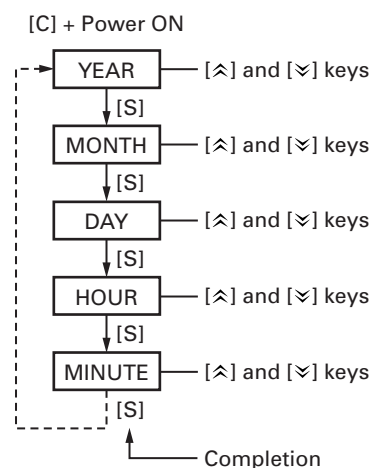
Fig. 2

8. Firmware Version Information

Turn the transceiver ON with the [Δ] key held down. Then, the version is displayed during holding the [Δ] key.

9. Clock Adjustment Mode

9-1. Flow chart of operation



INSTALLATION

1. Ignition Sense Cable (KCT-46 : Option)

The KCT-46 is an optional cable for enabling the ignition function. The ignition function lets you turn the power to the transceiver on and off with the car ignition key.

1-1. Connecting the KCT-46 cable to the transceiver

1. Open the KCT-46 fuse holder and insert a mini blade fuse (3A). (①)
2. While holding a clear protective cover, remove the black cap at the end of the yellow cable (ignition sense cable) of the transceiver. (②)
3. Connect the plug of the KCT-46 to the yellow cable terminal of the transceiver. (③)
4. Connect the other end of the KCT-46 to the ignition line of the car. (④)

Note : You must setup using the KPG-89D.

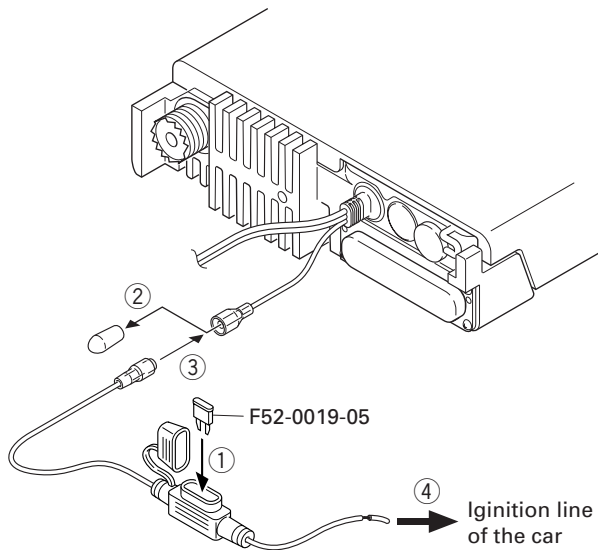


Fig. 1

2. Radio Interface Cable (KCT-40 : Option)

The KCT-40 connection cable kit is used to connect the TK-8180 transceiver to the KDS-100 (Mobile data terminal), KGP-2A (Modem GPS receiver), KGP-2B (Modem GPS controller) or through the KCT-36 extension cable.

2-1. Connecting the KCT-40 cable to the transceiver

1. Remove the D-sub cap on the rear of the transceiver. (①)
2. Connect the D-sub connector of the KCT-40 to the D-sub 25-pin terminal of the transceiver. (②)
3. Connect the 15-pin connector of the KCT-40 to a KDS-100, KGP-2A, KGP-2B or through a KCT-36 extension cable. (③)

Note : You must setup using the KPG-89D.

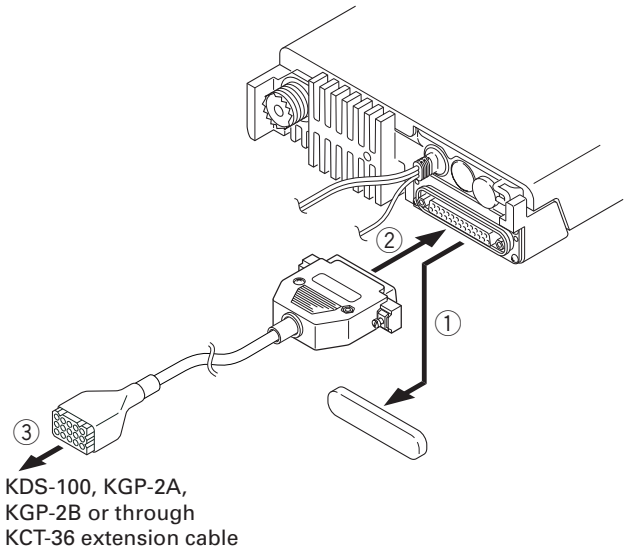


Fig. 2

2-2. Terminal function

D-sub 25-pin Pin No.	TK-7180 Function	Molex 15-pin Pin No.	KDS-100 Function	KGP-2A/2B Function
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	DI	5	DO	DO
6	-	-	-	-
7	GND	3	GND	GND
8	AIO8	9	TXS/LOK	TXS/LOK
9	TXD2	15	RXD	RXD
10	RXD2	14	TXD	TXD
11	-	-	-	-
12	AIO7	11	MM	MM
13	AIO6	6	PTT	PTT
14	SB	1	SB	SB
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	DEO	4	DI	DI
20	AIO5	8	SQ	SQ
21	AIO4	10	AM	AM
22	AIO3	13	-	DISP OFF
23	AIO2	12	-	-
24	AIO1	7	DTC	DTC
25	-	-	-	-

INSTALLATION

3. Horn Alert/P.A. Relay Unit (KAP-2 : Option)

The Horn alert (max. 2A drive), Public address and External speaker function are enabled by installing the KAP-2 in the TK-8180 transceiver.

3-1. Installing the KAP-2 unit in the transceiver

1. Remove the cabinet, top packing and shielding plate of the transceiver.
2. Set the KAP-2 relay unit jumper pins according to the purpose of use.
3. Remove the 6-pin jumper connector inserted in the TX-RX unit (B/3) connector (CN428). (①)
4. Insert one side of the lead wire with connector (E37-1114-05) into the relay unit connector (CN3) (②) and the other side into the TX-RX unit (B/3) connector (CN428) (③).
5. Place the relay unit at the position shown in Figure 3-2 and secure it to the chassis with a screw.
6. Remove the cap on the rear of the chassis by pushing it from the inside with your finger. (④)
7. Pass the 6-pin connector of the cable (E37-1113-05) through the chassis hole (⑤) and insert the bush into the chassis hole.
8. Rotate the bush of the cable 90 degrees counterclockwise as viewed from the rear of the chassis. (⑥)
9. Insert the 6-pin connector of the cable into the connector (CN2) of the KAP-2 relay unit. (⑦)

Note : You must setup using the KPG-89D.

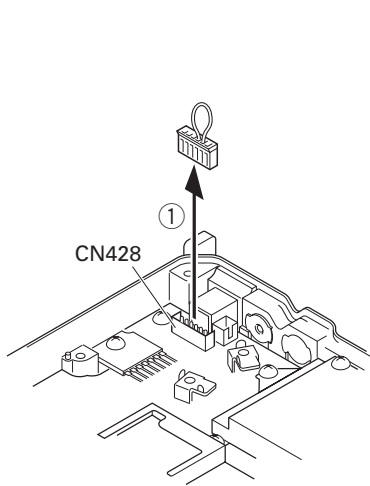


Fig. 3-1

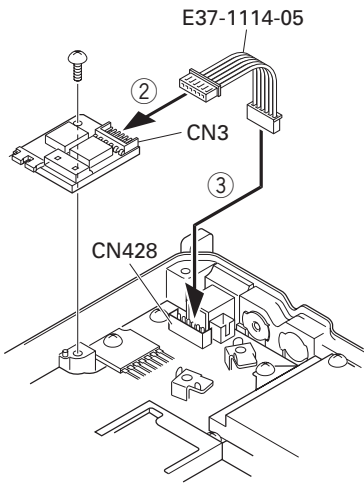


Fig. 3-2

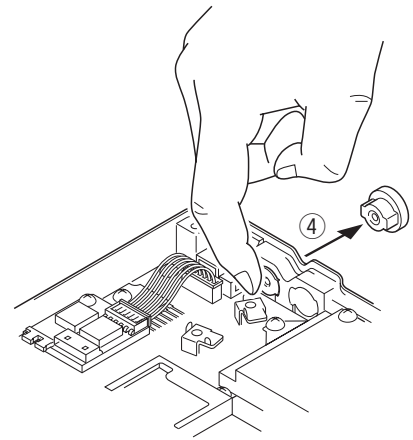


Fig. 3-3

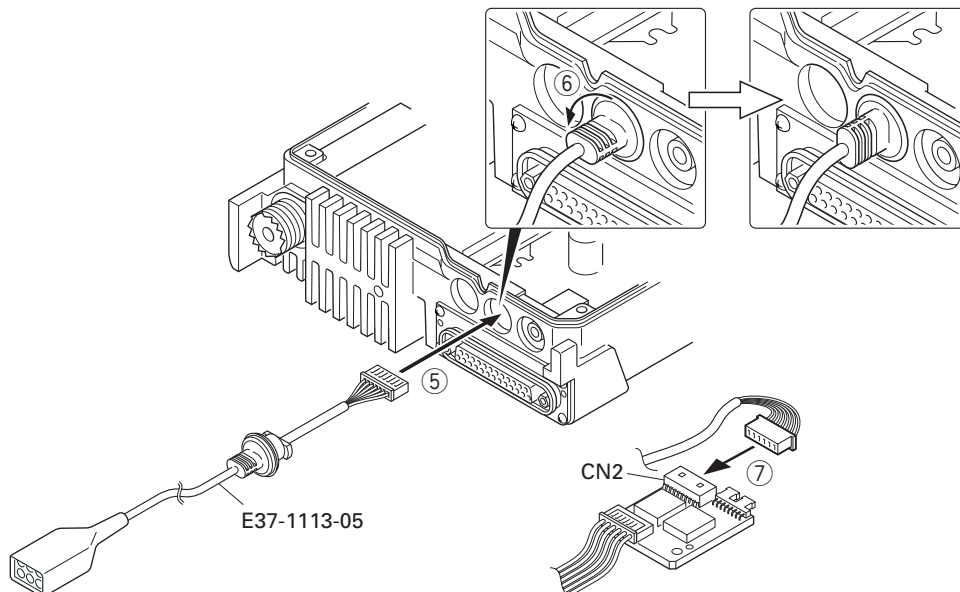


Fig. 3-4

INSTALLATION

4. Control Head Remote Kit (KRK-10 : Option)

The KRK-10 remote kit is used to remotely operate a TK-8180 transceiver.

4-1. Installing the KRK-10 kit to the transceiver

1. Remove the front panel from the transceiver.
2. Install the KRK-10 main panel onto the transceiver.
3. Install the KRK-10 rear panel onto the front panel.
4. Connect the KRK-10 main panel to the rear panel with the cable.

■ Remove the front panel from the transceiver

1. Lift the two tabs of the panel on the bottom of the transceiver with a flat-head screwdriver (①) and remove the panel from the chassis (②).
- Note :** Confirm that the tabs of the speaker hardware fixture and holder is securely fitted in the front panel.
2. Remove the flat cable from the connector (CN902) of the display unit of the panel. (③)
 3. Fold the black line of the flat cable (in three parts) as shown in Figure 4-2. (④, ⑤, ⑥)

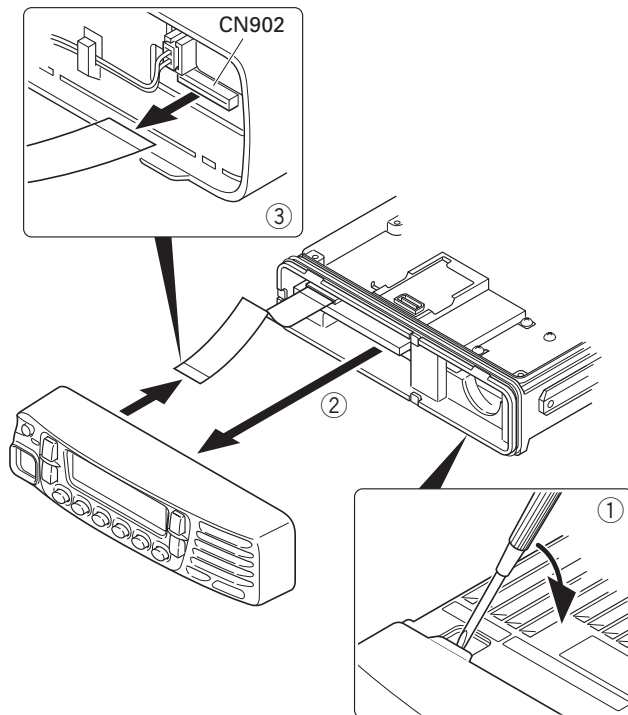


Fig. 4-1

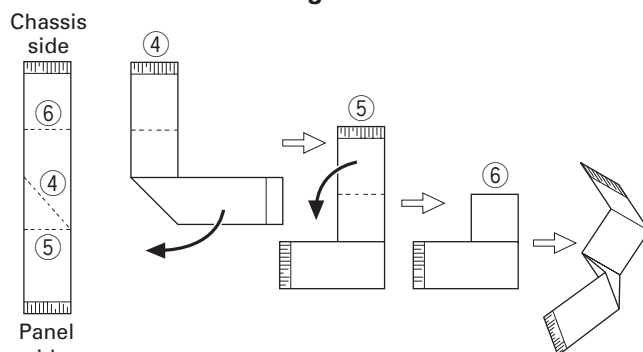


Fig. 4-2

■ Install the KRK-10 main panel onto the transceiver

4. Insert the flat cable that was removed in step 2 above into the connector (CN1) of the interface unit (A/2) of the KRK-10 main panel (A62-1101-01). (⑦)
- Note :** The terminal side of the flat cable must face down when inserting the flat cable into the connector.
5. Fit the main panel with four tabs onto the front of the chassis. (⑧)
- Note :** When installing the main panel onto the front of the chassis, hold down the flat cable with your fingers to prevent it from being caught.

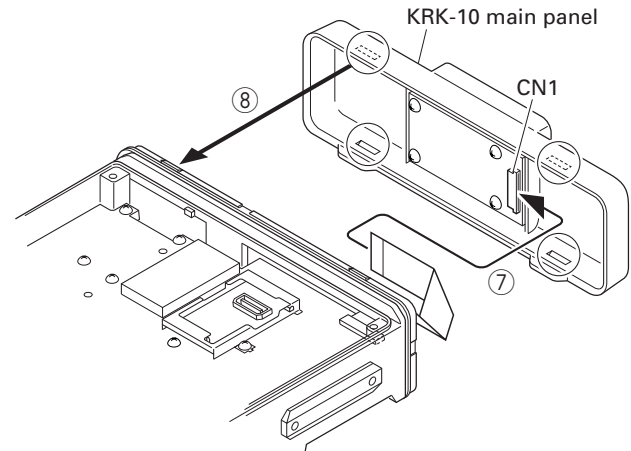


Fig. 4-3

■ Install the KRK-10 rear panel onto the front panel

6. Insert the flat cable attached to the interface unit (B/2) of the KRK-10 rear panel (A82-0056-01) into the connector (CN902) of the display unit of the panel (⑨). (The flat cable has been pre-inserted in the connector (CN2) of the rear panel at the time of shipping.)
- Note :** The terminal side of the flat cable must face down when inserting the flat cable into the connector.
7. Fit the four tabs of the rear panel into the front panel. (⑩)

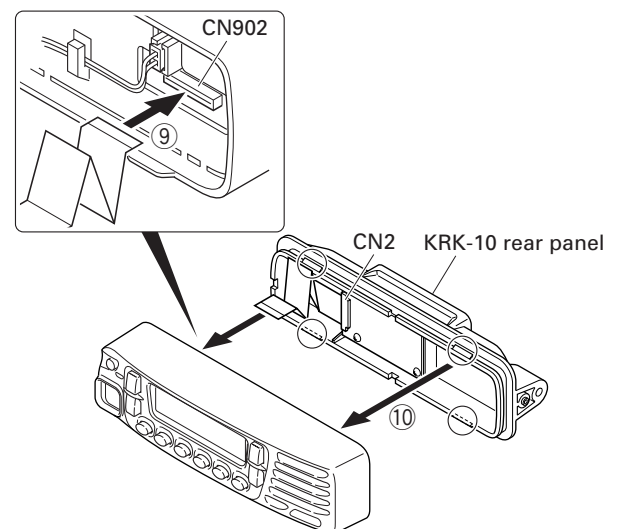
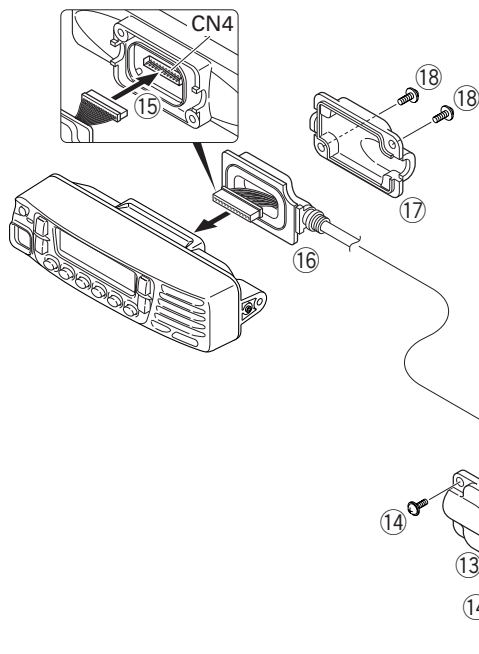


Fig. 4-4

INSTALLATION

■ Connect the KRK-10 main panel to the rear panel with the cable

8. Insert one 14-pin connector of the cable (E30-7514-05) into the connector (CN3) of the interface unit (A/2) of the main panel. (⑪)
9. Secure the cable bush on the main panel and fit the waterproof packing (orange) (⑫) securely over top.



10. Install the molded cover (⑬) over the connector on the main panel and secure it with two screws (⑭).
11. Insert the other 14-pin connector of the cable into the connector (CN4) of the interface unit (B/2) of the rear panel. (⑮)
12. Secure the cable bush on the rear panel and fit the waterproof packing (orange) (⑯) securely over top.
13. Install the molded cover (⑰) over the connector on the rear panel and secure it with two screws (⑱).

Note : A cable can be connected from the left side as shown in the Figure 4-5 or from right side. However, the 14-pin connector must be connected to correct direction.

Fig. 4-5

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

5-1. Installing the VGS-1 unit in the transceiver

1. Remove the cabinet, top packing and shielding plate of the transceiver.
2. Attach two cushions to VGS-1 as shown in Figure 5. (①)
Note : Be sure not to cover the connector with the bottom cushion.
3. Insert the VGS-1 connector (CN1) into the TX-RX unit (B/3) connector (CN403). (②)

Note : You must setup using the KPG-89D.

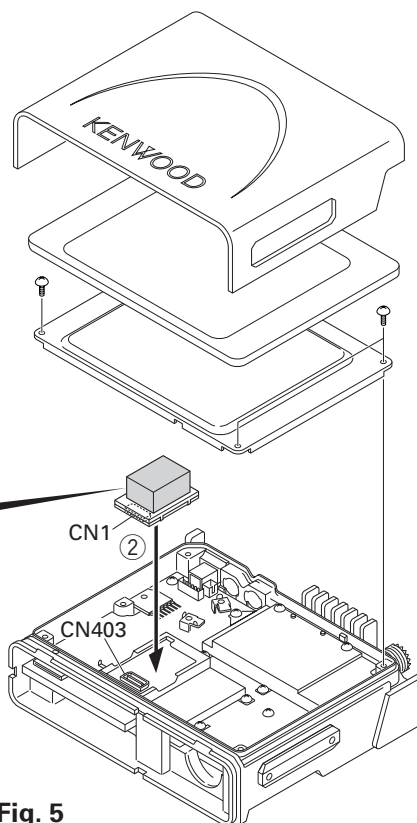
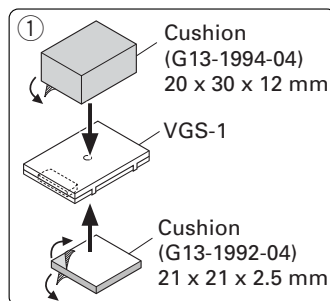


Fig. 5

INSTALLATION

6. Voice Scrambler Board Connection

1. Remove the front panel from the transceiver.
2. Solder each lead of the scrambler board to a necessary location of each landing on the component side of the TX-RX unit (B/3).
3. Wrap the scrambler board in a cushion and install it on the front of the chassis as shown in Figure 7-2.

Note : You must setup using the KPG-89D.

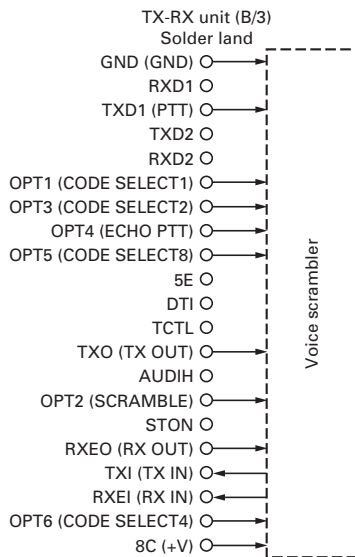


Fig. 6

7. ANI Board Connection

1. Remove the front panel from the transceiver.
2. Solder each lead of the scrambler board to a necessary location of each landing on the component side of the TX-RX unit (B/3).
3. Wrap the scrambler board in a cushion and install it on the front of the chassis as shown in Figure 7-2.

Note : You must setup using the KPG-89D.

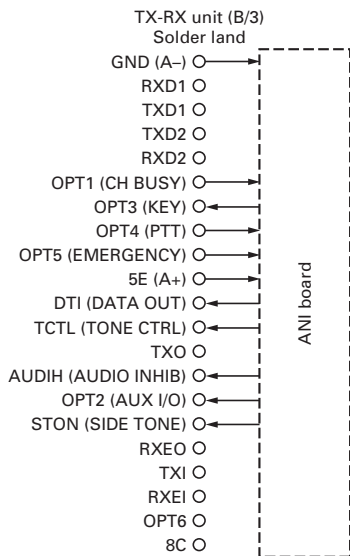


Fig. 7-1

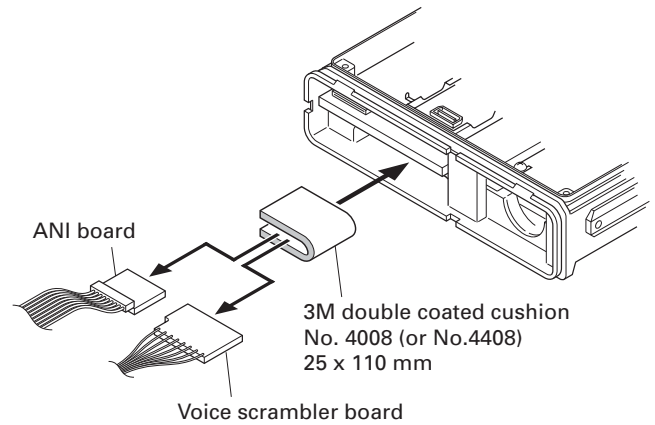


Fig. 7-2

8. GPS Receiver Connection

8-1. Installing the GPS receiver

1. Remove the cabinet, top packing and shielding plate of the transceiver.
2. Remove the front panel from the transceiver.
3. Attach two cushions to the top of the GPS receiver.
4. Attach the GPS receiver to the shield case with two cushions as shown in Figure 8-2.
5. Solder each lead of the GPS receiver to a necessary location of each landing on the component side of the TX-RX unit (B/3).
6. Place the GPS antenna cable in the hollow at the rear of the chassis. (Fig. 8-2 ①)

Note : If the GPS receiver is installed, cut the base of the convex tab of the top packing with a pair of nippers, or similar tool. (Fig. 8-3 ②)

If the convex tab of the top packing is cut off, the water proofing property is no longer guaranteed.

Note : You must setup using the KPG-89D.

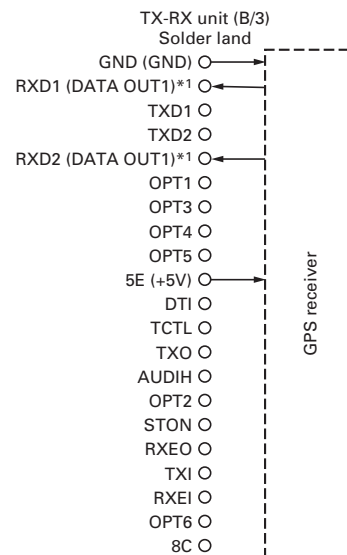


Fig. 8-1

*1 : Depending on the connected optional accessory, the DATA OUT1 may connect to either RXD1 or RXD2.

INSTALLATION

3M Double coated cushion
No. 4016 (or No. 4416)
30 x 25 mm

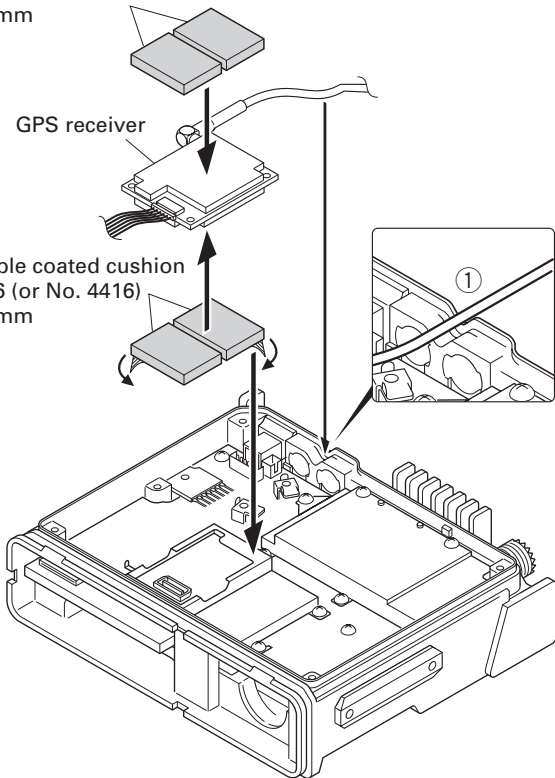


Fig. 8-2

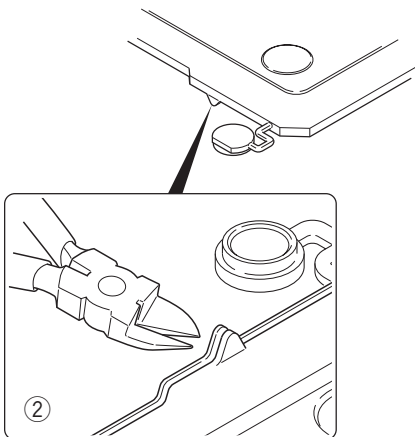


Fig. 8-3

8-2. Installing the GPS receiver together with the VGS-1

1. Remove the cabinet, top packing and shielding plate of the transceiver.
2. Remove the front panel from the transceiver.
3. Attach a cushion to the bottom of the VGS-1 as shown in Figure 8-5.

Note : Be sure not to cover the connector with the cushion.

4. Insert the VGS-1 connector (CN1) into the TX-RX unit (B/3) connector (CN403).
5. Perform step 3 to 6 of "8-1. Installing the GPS receiver" described on page 11.

Note : You must setup using the KPG-89D.

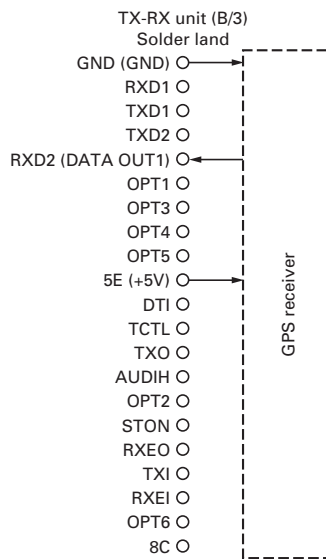


Fig. 8-4

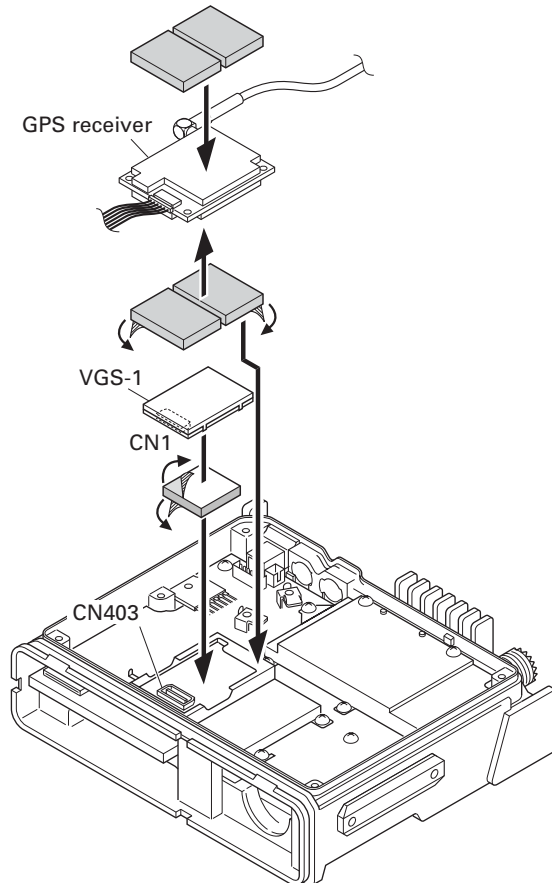


Fig. 8-5

DISASSEMBLY FOR REPAIR

1. Precautions on Disassembly

■ TX-RX PCB (TX-RX unit B/3) Disassembly

1. Remove all screws and antenna terminals on the TX-RX PCB.
2. Rotate the bush of the power supply cable 90 degrees counterclockwise as viewed from the rear of the chassis (①) and remove the power supply cable from the chassis (②).
3. When the speaker phone jack is pushed up, using your finger, from the rear of the chassis (③), the TX-RX PCB is removed from the chassis.

Note : The TX-RX PCB and D-sub PCB (TX-RX unit A/3) are connected with a flat cable. Remove them carefully.

4. Turn the TX-RX PCB over and remove the flat cable from the connector (CN427). (④)
5. Remove the TX-RX PCB from the chassis.

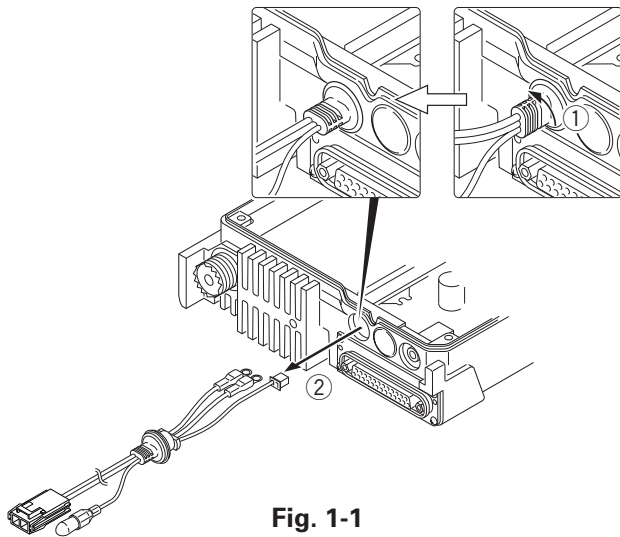


Fig. 1-1

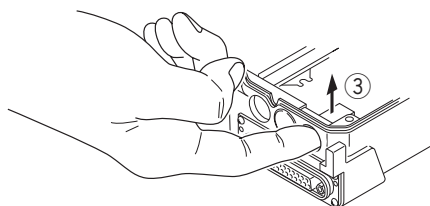


Fig. 1-2

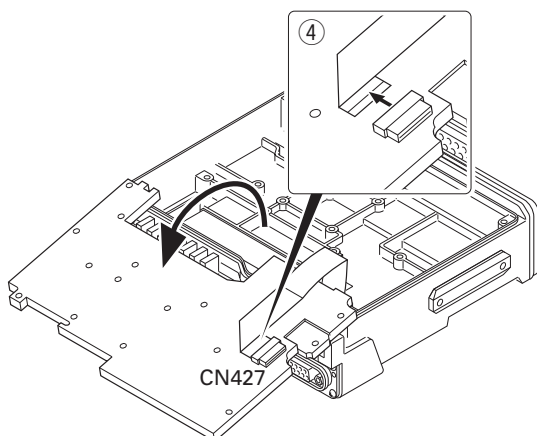


Fig. 1-3

■ Removing the speaker hardware fixture (J21-8481-03) and holder (J19-5468-03)

1. Remove the speaker lead from the holder hook. (①)
2. Remove the speaker connector from the display unit connector (CN901). (②)
3. When removing the speaker hardware fixture, insert a flat-head screwdriver at the position shown in Figure 2-1 and tilt it in the direction shown by the arrow. (③)
4. To remove the holder, insert a flat-head screwdriver into tab of the holder and tilt it in the direction shown by the arrow. (④)

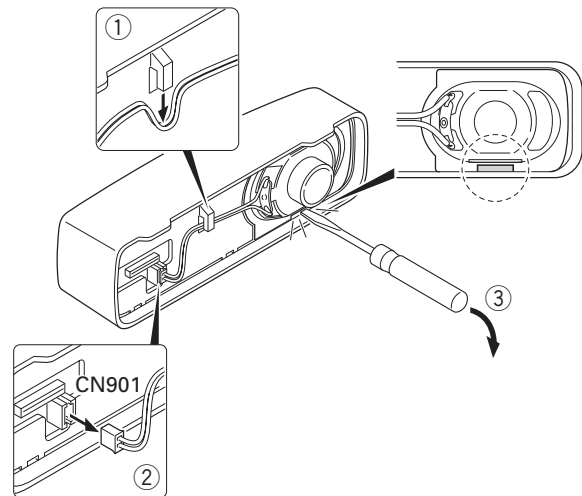


Fig. 2-1

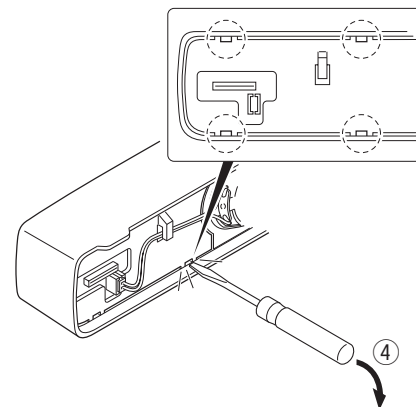


Fig. 2-2

DISASSEMBLY FOR REPAIR

2. Precautions on Reassembly

■ TX-RX PCB (TX-RX unit B/3) Reassembly

1. With the TX-RX PCB turned over, insert the flat cable from the D-sub PCB (TX-RX unit A/3) into the connector (CN427) on the TX-RX PCB.
2. Place the TX-RX PCB at its original position, tilt the TX-RX PCB and install the chassis as shown in Figure 3.

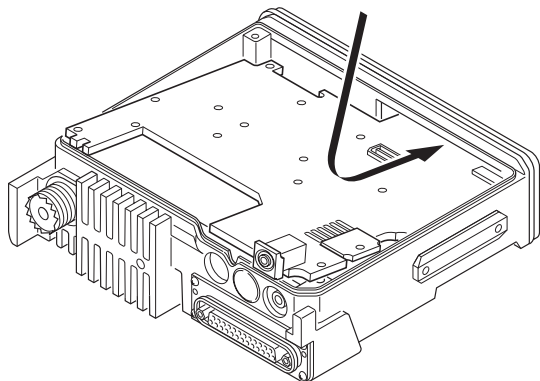


Fig. 3

■ Securing the Audio IC (IC417) with screws

The screws for the audio IC are 8mm screws. These are longer than the other screws, so take care not to confuse them.

■ FINAL shield case (F10-2489-03) installation procedure

1. Place the shield case on the final section of the TX-RX unit (B/3).
2. The shield case is installed on the positioning boss of the chassis by pushing down on "PUSH2" (on the shield case) while pushing "PUSH1" (stamped on two parts on the shield case) to the right.

■ Power supply cable installation procedure

1. Pass the power supply cable through the chassis hole (①) as shown in Figure 4-1 and insert the bush into the chassis hole.
2. Rotate the bush of the power supply cable 90 degrees clockwise as viewed from the rear of the chassis. (②)
3. Align the ignition sense connector (yellow) of the power supply cable around the chemical capacitor (C801) and connect it to the TX-RX unit (B/3) connector (CN804).
4. Align the + (positive) terminal of the power supply cable (red) as shown in Figure 4-2 and fix it to the terminal strip with a screw.
5. Align the - (negative) terminal of the power supply cable (black) as shown in Figure 4-2 and fix it to the terminal strip with a screw.

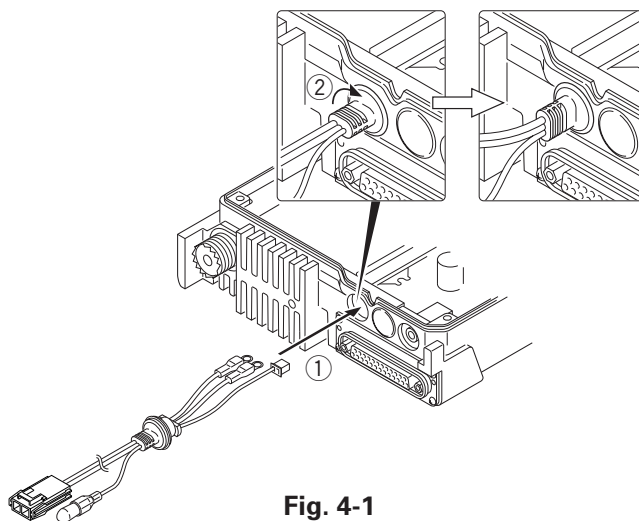


Fig. 4-1

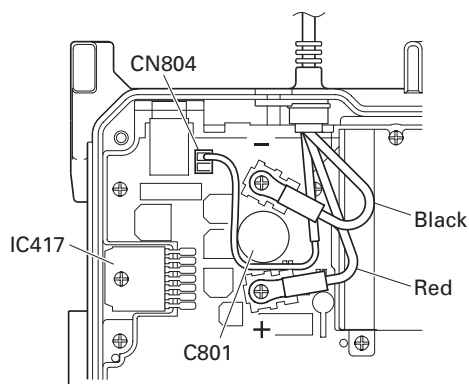


Fig. 4-2

■ Top packing installation procedure

1. Place the top packing over the shielding plate.
2. Fit the convex tab of the top packing into the hollow of the chassis. (①)
3. Fit the chassis into the groove of the top packing. (②)
Verify that the top packing is in close contact with the chassis.

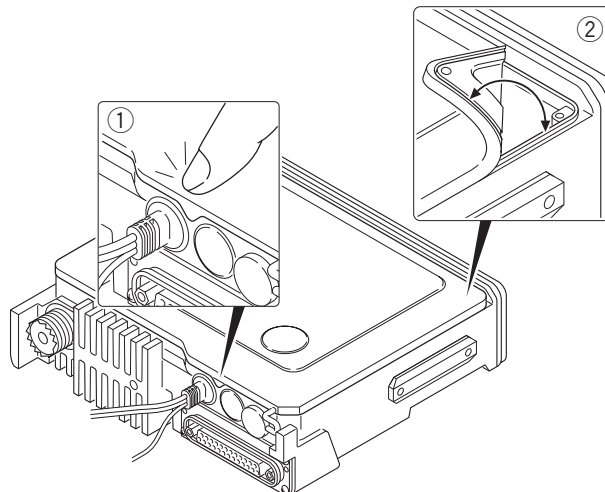


Fig. 5

DISASSEMBLY FOR REPAIR

■ D-sub cap installation procedure

To improve water resistance, fit the D-sub cap into the D-sub terminal hardware fixture of the transceiver in the following order:

1. Fit the left side (①) of the D-sub cap into the hardware fixture.
2. Fit the right side (②) of the D-sub cap into the hardware fixture.
3. Fit the center (③) of the D-sub cap into the hardware fixture.

Verify that the D-sub cap is in close contact with the hardware fixture.

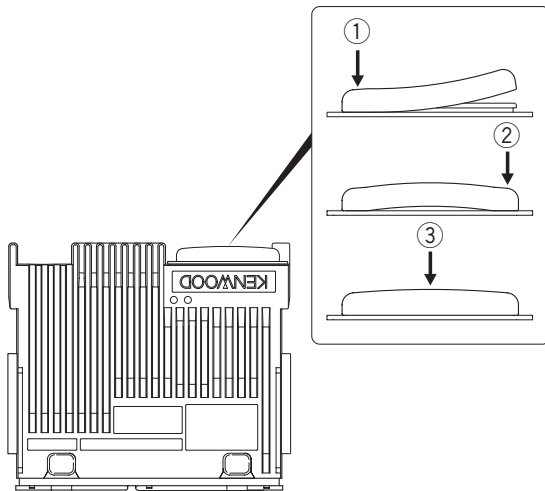


Fig. 6

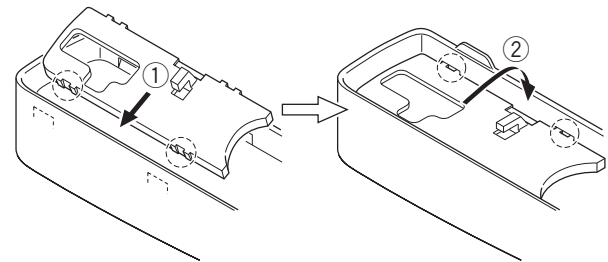


Fig. 7-1

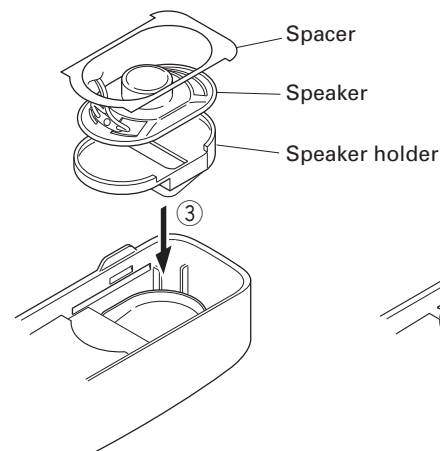


Fig. 7-2

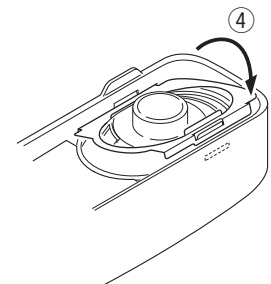


Fig. 7-3

■ Installing the holder (J19-5468-03) and speaker hardware fixture (J21-8481-03)

1. Insert two tabs of the holder (J19-5468-03) into the hollows in the top of the panel. (①)
2. Push the two tabs of the holder in on the opposite side of those in step 1 above and fit them into the hollow in the bottom of the panel. (②)
Note : Push in the holder until it snaps in place.
3. Install the speaker holder onto the panel. (③)
Note : To improve water resistance, fit the panel into the groove of the holder.
4. Place the speaker into the speaker holder.
Note : The speaker must not ride on the holder rib.
5. Place the spacer on the speaker.
6. Insert the hardware fixture (J21-8481-03) into the hollow of the panel as shown in Figure 7-3, then push two parts of the hardware fixture and fit it into the hollow of the top of the panel. (Fig. 7-3 ④)
Note : Push in the hardware fixture until it snaps in place.
7. Insert the speaker connector into the display unit connector (CN901).
8. Place the speaker lead on the holder hook.

CIRCUIT DESCRIPTION

1. Outline

The TK-8180 is a UHF/FM transceiver designed to operate in the frequency range of 450 to 520MHz. Transmission output power is 30 watts (490~520MHz : 25W). The maximum channel capacity is 512.

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

2. Receiver Circuit

The receiver is double conversion superheterodyne, designed to operate in the frequency range of 450MHz to 520MHz.

The receiver circuit consists of the following : 2-1 front-end circuit, 2-2 first mixer, 2-3 IF amplifier circuit, 2-4 audio amplifier circuit, and 2-5 squelch circuit.

2-1. Front-end Circuit

The front-end circuit consists of former HPF (D107, D108, D109 and D110), RF amplifier Q103, and latter BPF (D103, D104, D105 and D106). The BPF covers frequency ranges 450 to 520MHz.

The latter BPF (D103, D104, D105 and D106) attenuates the unwanted signals, and sends only the necessary signal to the first mixer.

2-2. First Mixer

The signal from the BPF is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer DBM (IC171) to become a 44.85MHz first intermediate frequency (IF) signal. The first IF signal is fed through a monolithic crystal filter (XF171) to further remove spurious signals.

2-3. IF Amplifier

The first IF signal is amplified by Q171 and Q172, and then enters IC172 (FM system IC). The signal is heterodyned again with a second local oscillator signal (44.395MHz) with in IC172 to become a 455kHz second IF signal. The second IF signal is fed through a 455kHz ceramic filters (CF172; Wide, CF171; Narrow) to further eliminate unwanted signal, and the quadrature detection circuit FM-detects the signal to produce a base-band signal and output it from pin 9.

2-4. Audio Amplifier

The demodulated audio signal from IC172 goes to IC415 through the AF amplifier (IC412) and IC413. The audio signal goes to an electronic volume (IC410) and is amplified to drive a loudspeaker by an audio power amplifier (IC417). The audio output can be provided to external 4Ω speaker through the speaker jack output (J401) on the rear panel. Q419 is a mute switch.

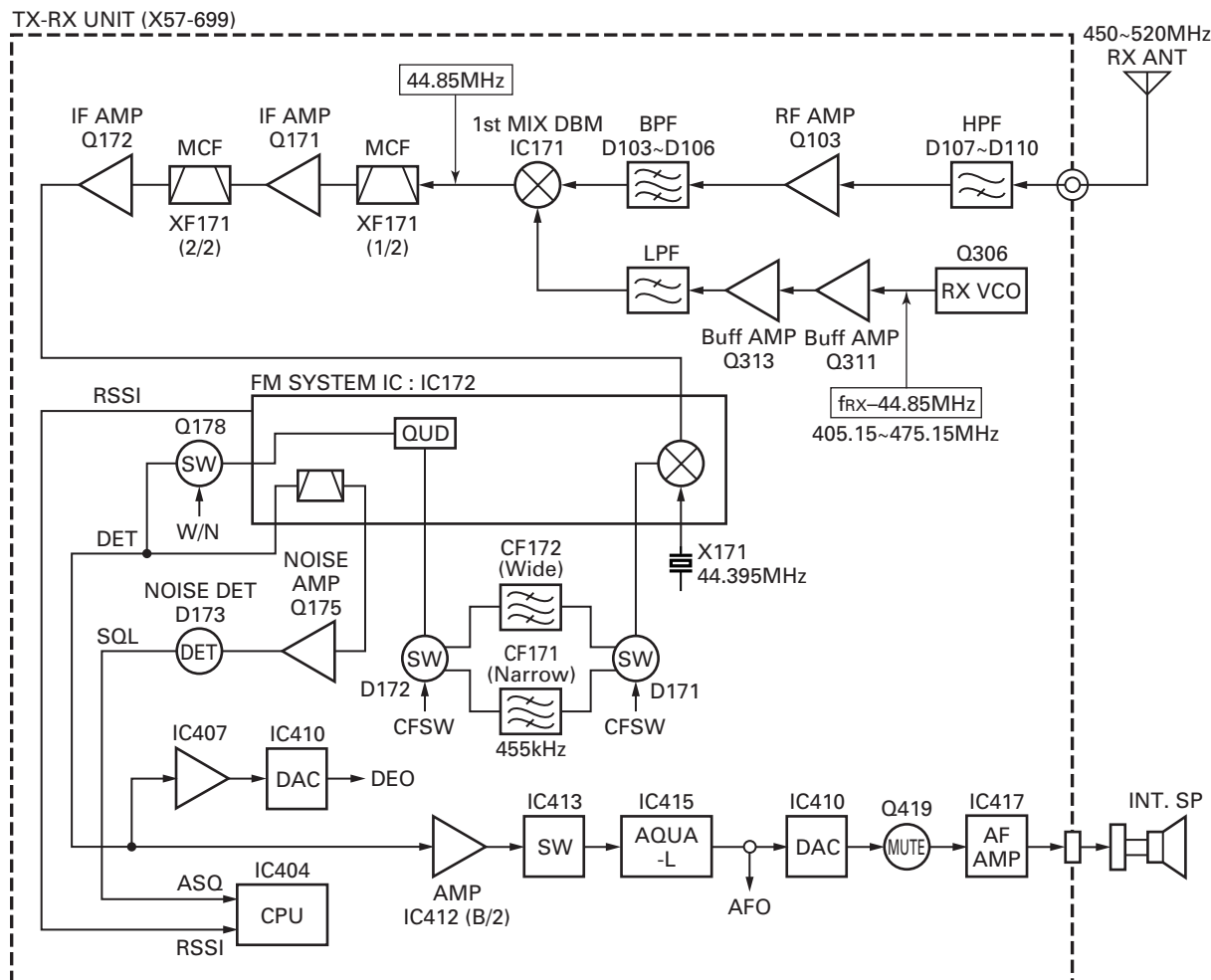


Fig. 1 Receiver circuit

CIRCUIT DESCRIPTION

2-5. Squelch Circuit

The output signal from IC172 enters FM IC again, then passed through a band-pass filter.

The noise component output from IC172 is amplified by Q175 and rectified by D173 to produce a DC Voltage corresponding to the noise level. The DC voltage is sent to the analog port of the CPU (IC404).

IC172 outputs a DC voltage (RSSI) corresponding to the input of the IF amplifier.

3. Transmitter Circuit

The transmitter circuit consists of the following circuits : 3-1 microphone circuit, 3-2 modulation level adjustment circuit, 3-3 driver and final power amplifier circuit, and 3-4 automatic power control circuit.

3-1. Microphone Circuit

The audio signal from the microphone goes into TX-RX unit (X57-699) from the display unit (X54-348) and passes through the mute switch (Q416). The audio signal is amplified by the microphone amplifier (IC414) and is input into the TXIN terminal of the audio processor (IC415) after passing through the multiplexer (IC413).

The input audio signal is output from the MOD terminal of the audio processor (IC415) and is amplified by the audio frequency amplifier (IC412) after passing through the electric volume (IC410).

3-2. Modulation Level Adjustment Circuit

The audio signal amplified by the audio frequency amplifier (IC412) is added to the low speed data LSD passed through the low pass filter (IC409). The combined signals is supplied to the VCO (voltage controlled oscillator) and the VCXO (voltage controlled crystal oscillator) X301, respectively.

3-3. Driver and Final Power Amplifier Circuit

The transmit signal obtained from the TX VCO buffer amplifier Q311, is amplified to approximately +17dBm by the driver amplifiers Q313, Q1 and Q2. This amplified signal is passed to the power amplifier module (power module) IC1, which consists of a MOS-FET amplifier and is capable of transmission output power.

3-4. Automatic Power Control Circuit

The automatic transmission power control (APC) circuit stabilizes the transmitter output power at a predetermined level by detecting the power module output with a diodes D6, D7 and D8. Diodes D6, D7 and D8 apply a voltage to DC amplifier IC72 (A/2). IC72 (B/2) compares the APC control voltage (PC) generated by microprocessor IC404 and DC amplifier IC71 (A/2, B/2) with the detection output voltage from IC72 (A/2) to control the Vgg pin of IC1, and stabilizes transmission output.

The APC circuit is configured to protect over-current of the power module due to fluctuations of the load at the antenna end and to stabilize transmission output at voltage and temperature variations.

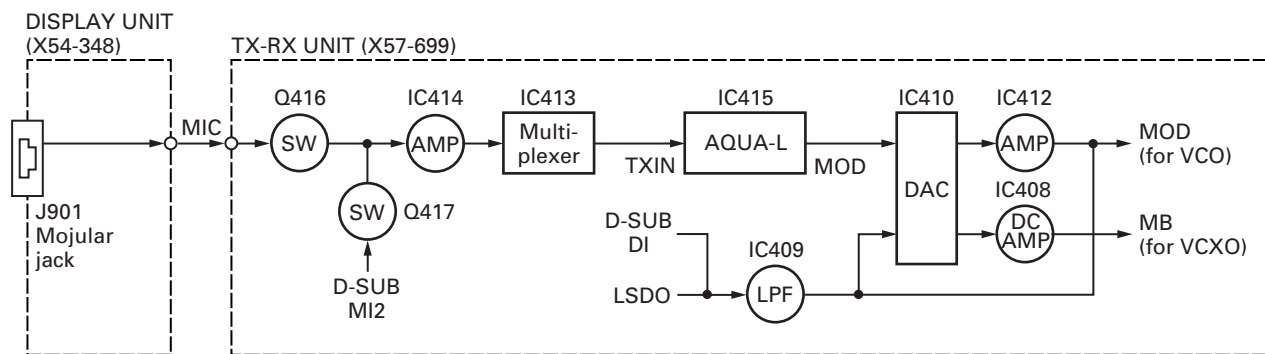


Fig. 2 Microphone and modulation level adjustment circuit

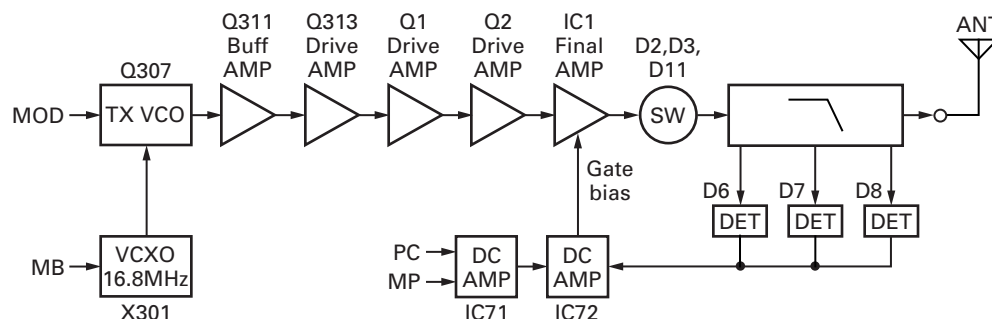


Fig. 3 Drive and Final power amplifier and automatic power control circuit

CIRCUIT DESCRIPTION

4. Frequency Synthesizer Unit

4-1. Frequency Synthesizer

The frequency synthesizer consists of the TCXO (X301), VCO, PLL IC (IC301) and buffer amplifiers.

The TCXO generates 16.8MHz. The frequency stability is 2.5ppm within the temperature range of -30 to +60°C. The frequency tuning and modulation of the TCXO are done to apply a voltage to pin 1 of the TCXO. The output of the TCXO is applied to pin 8 of the PLL IC.

The VCO consists of 2VCO and covers a dual range of the 405.15~475.15MHz and the 450~520MHz. The VCO generates 405.15~475.15MHz for providing to the first local signal in receive. The operating frequency is generated by Q307 in transmit mode and Q306 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator (IC301) to the variable capacitor diodes (D308 and D311 in transmit mode and D309 and D313 in receive mode).

The T/R pin of IC404 goes "high" in receive mode causing Q307 and Q309 to turn off, and Q306, Q308 and Q310 turn on. The T/R pin goes "low" in transmit mode.

The outputs from Q306 and Q307 are amplified by buffer amplifier (Q311) and doubled by Q301 and then sent to PLL IC.

The PLL IC consists of a prescaler, reference divider, phase comparator, charge pump (The frequency step of the PLL circuit is 20 or 25kHz). The input signal from the pins 8 and 5 of the PLL IC is divided down to the 20 or 25kHz and compared at phase comparator. The phase comparator output signal is fed into a low-pass filter (Q302 and Q303) before being applied to the VCO as a frequency control voltage. This low-pass filter's power is supplied by the DC/DC converter (IC251 and Q251). The DC signal is applied to the CV of the VCO and locked to keep the VCO frequency constant.

PLL data is output from DT (pin 112), PCK (pin 82) and PLE (pin 81) of the microprocessor (IC404). The data are input to the PLL IC when the channel is changed or when transmission is changed to reception and vice versa. A PLL lock condition is always monitored by the pin 80 (UL) of the microprocessor. When the PLL is unlocked, the UL goes low.

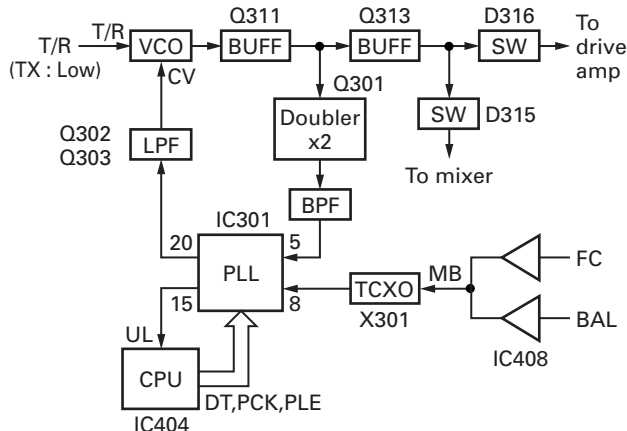


Fig. 4 PLL block diagram

5. Control Circuit

The block diagram of the control circuit is shown in Figure 5.

The CPU (IC404) is a 16-bit microcomputer that contains a 256k-byte Mask ROM and a 20k-byte RAM. This CPU is connected with an external 512k-byte Flash ROM (IC405) and operates in memory expansion mode.

The Firmware Program is stored in the Flash ROM and the user data and adjustment data are stored in the EEPROM (IC401). The CPU and Flash ROM are connected with an 8 bit bus and the EEPROM and RTC IC (IC402) are connected with a I2C bus (*1). The RTC IC (IC402) has a clock function and is controlled by the CPU (IC404).

Serial communication with a PC is performed through two paths: through the 232C Level converter IC (IC416) and through the Display Unit Panel CPU (IC902). The 8 bit Shift Register (IC403) is used as an 8-port Extended Output Port. IC410 is an 8 bit-8ch D/A converter. The channels are set as follows:

- Ch1 : Modulation balance
- Ch2 : Deviation Factor
- Ch3 : Max Power Level
- Ch4 : Reception tuning circuit
- Ch5 : Deviation Factor
- Ch6 : Speaker volume
- Ch7 : VCXO control voltage
- Ch8 : DEO output level

*1: I2C bus is a registered trademark of PHILIPS of the Netherlands.

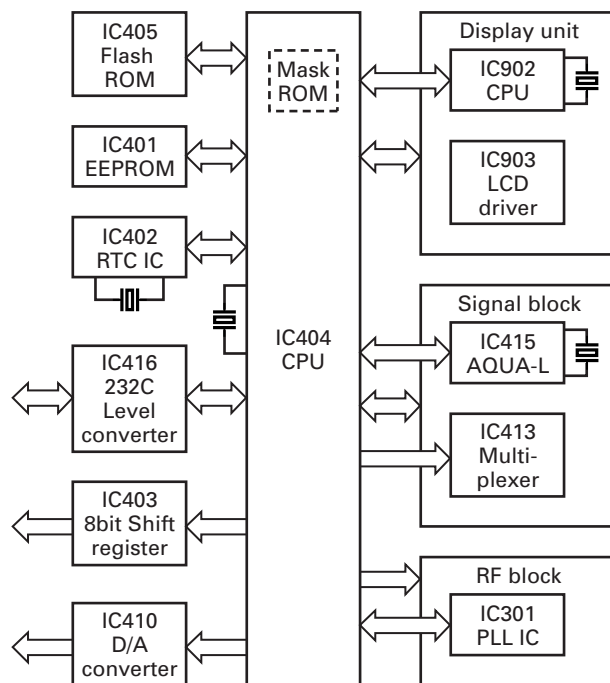


Fig. 5 Control circuit block diagram

CIRCUIT DESCRIPTION

6. Power Supply Circuit

The block diagram of the power supply circuit is shown in Figure 6.

Power is always supplied from +B to the circuit (5M, +B) that is always started and the circuits (SB, 8C, 5E, 8T, 8R, 5C, 5R) controlled by the CPU (IC404). When +B is supplied to the transceiver, Q801, D805 and IC805, regulate the voltage (5M) which is supplied to the circuit around the CPU. The CPU starts.

When the CPU detects that the +B voltage is higher than the voltage prescribed by IC802, the transceiver power (SB) is turned ON by controlling the SBC signal (Low: transceiver power OFF, High: transceiver power ON).

The CPU controls the TXC signal (Low: Transmission system power OFF, High: Transmission system power ON) during transmission to supply power (8T) to the transmission circuit. The CPU controls the RXC signal (Low: Reception system power OFF, High: Reception system power ON) during reception to supply power (8R, 5R) to the reception circuit.

When the CPU detects the PSW (Power Switch) signal, IGN (Ignition Sense) signal or INT signal, it controls the SBC signal and turns the transceiver power (SB) OFF.

If +B is not provided to the transceiver, power is supplied to only the RTC IC (IC402) through the secondary battery connected with CN401 to back up the clock.

7. Display Circuit

The display unit consists of the Panel CPU (IC902), the LCD driver (IC903), the TX/BUSY LED, the KEY detection, the Backlight and the Microphone jack circuits.

The Panel CPU is a 16-bit microcomputer that contains a 64k-byte Mask ROM and a 2k-byte RAM.

The Panel CPU performs serial communication with the Main CPU (IC404) on the TX-RX unit (B/3) and the Panel CPU detects keys and sends data communication contents through the MIC Jack to the Main CPU. The Panel CPU receives commands from the Main CPU and controls the display system.

The LCD operates with 1/9 duty under the LCD driver (IC903) control. The LCD and KEY Backlights are controlled by Q909. The display brightness of the LCD Backlight can be changed.

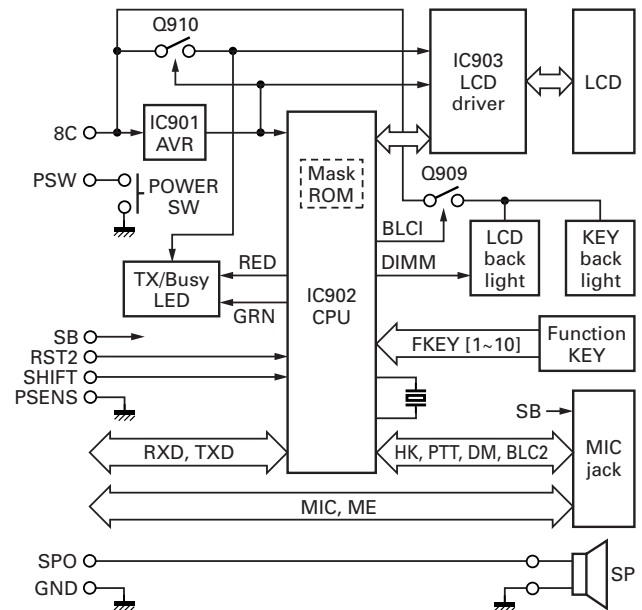


Fig. 7 Display circuit

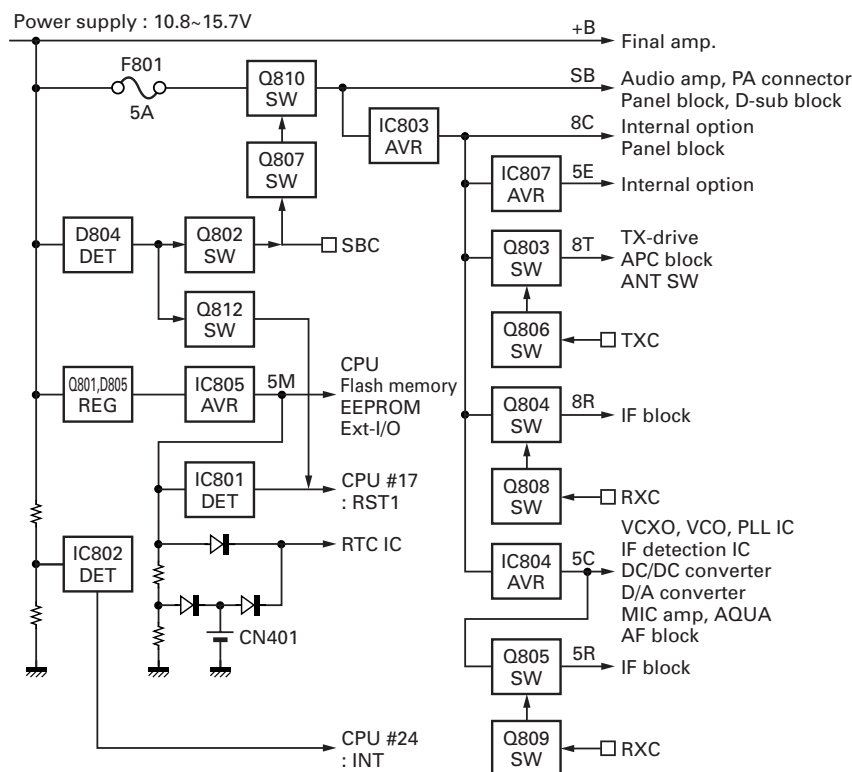


Fig. 6 Power supply circuit

SEMICONDUCTOR DATA

Microprocessor : 30625MGP-169GP (TX-RX unit IC404)

Pin No.	Port Name	I/O	Function
1	VREF	-	+5V
2	AVCC	-	+5V
3	SBC	O	Switched B control
4	RXC	O	RX control
5	TXC	O	TX control
6	PC	O	TX APC adjust
7	HSDO	O	High speed data output
8	STSW	O	Side tone switch
9	RTCL/EEPCL	O	RTC/EEPROM clock
10	HSDIN	I	High speed data input
11	NC	-	Non-connection
12	RTDT/EEPDAT	I/O	RTC/EEPROM data
13	BYTE	-	+5V
14	CNVSS	-	DGND (Vss)
15	DMUTE	O	Det mute
16	AM2	O	Audio mute 2
17	RST	I	Reset
18	Xout	O	11.0592MHz clock output
19	DGND	-	DGND (Vss)
20	Xin	I	11.0592MHz clock input
21	VCC1	-	+5V
22	NMI	-	+5V
23	PSW	I	Power switch input
24	INT	I	BATT voltage INT
25	INTRA	I	RTC INT
26	SHIFT/MODEL	I/O	Beat shift/Model select
27	BEEP	O	Beep output
28	SPSTB	O	Shift register strobe
29	SOE	O	Shift register output enable
30	AIO5	I/O	AUX I/O 5
31	AIO9	I/O	AUX I/O 9
32	DSTB	O	D/A converter LD
33	LSDO	O	Low speed data output
34	RXD2	I	RXD2
35	TXD2	O	TXD2
36	TXD1	O	TXD1/PTT (Scrambler board)
37	Vcc1	-	+5V
38	RXD1	I	RXD1
39	DGND	-	DGND (Vss)
40	MM1	O	MIC mute 1
41	PSENS	I	Panel sense
42	TXD	O	TXD
43	RXD	I	RXD
44	AFDAT	O	BB TDATA and DTRCLK
45	AFDIO	I/O	BB DI/O
46	AFDIR	O	BB DIR
47	DTRLOAD	O	BB DTMF enable
48	AFSTD	I	BB STD

Pin No.	Port Name	I/O	Function
49	LSW	O	BB LIM switch
50	RDY	-	+5V
51	NC	-	Non-connection
52	HOLD	-	+5V
53	NC	-	Non-connection
54~57	AIO4~AIO1	I/O	AUX I/O 4~1
58	NC	-	Non-connection
59	RD	O	Read (RD)
60	NC	-	Non-connection
61	WR	O	Write (WR)
62~64	AIO8~AIO6	I/O	AUX I/O 8~6
65,66	NC	-	Non-connection
67	RST2	O	Display μ -com reset
68	CS0	O	Chip select 0
69	NC	-	Non-connection
70~79	A18~A9	O	Address bus 18~9
80	UL	I	PLL unlock
81	PLE	O	PLL enable
82	PCK	O	PLL clock
83	NC	-	Non-connection
84	OPT6	I/O	Option board I/F 6
85	VCC2	-	+5V
86	A8	O	Address bus 8
87	DGND	-	DGND (Vss)
88~95	A7~A0	O	Address bus 7~0
96	IGN	I	Ignition sense
97	AFRTM	I	BB RDF/FD
98	TCLK/DTRDO	I	BB TCLK and DTRDO
99	MM2	O	MIC mute2
100	T/R	O	TX/RX switch
101	AM1	O	Audio mute 1
102	EMTON	O	EM tone switch
103	NC	-	Non-connection
104~111	D7~D0	I/O	Data bus7~0
112	DT	O	Serial data
113	CK	O	Serial clock
114	W/N	O	Wide/Narrow switch
115~117	OPT 1~OPT 3	I/O	Option board I/F 1~3
118,119	OPT 4, OPT 5	O	Option board I/F 4, 5
120	H/L	O	High/Low power switch
121	THP	I	TX thermal input
122,123	NC	-	Non-connection
124	ASQ	I	RX analog SQ. input
125	RSSI	I	RX RSSI input
126	NC	-	Non-connection
127	AGND	-	AGND (Vss)
128	LSDIN	I	Low speed data input

SEMICONDUCTOR DATA

Microprocessor : 30302M8-8Z7GP (Display unit IC902)

Pin No.	Port Name	I/O	Function
1~4	NC	-	Non-connection
5	SHIFT	O	Beat shift
6	BYTE	-	+5V
7	CNVSS	-	GND
8,9	NC	-	Non-connection
10	RST	I	Reset
11	Xout	O	14.7456MHz clock output
12	GND	-	GND
13	Xin	I	14.7456MHz clock input
14	VCC	-	+5V
15	NMI	-	+5V
16	BLC2	O	MIC backlight control
17	BLC1	O	Key & LCD backlight control
18	DIMM	O	Dimmer control
19	LEDG	O	LED green
20	LEDR	O	LED red
21	NC	-	Non-connection
22	LCDCCK	O	LCD serial clock
23	LCDDT	O	LCD serial data
24	LCDCS	O	LCD chip select
25	LCDRST	O	LCD reset
26	NC	-	Non-connection
27	RXD2	I	RXD2 (Main μ -com)
28	TXD2	O	TXD2 (Main μ -com)
29	PTT/TXD	I/O	PTT/TXD (COM0)
30	NC	-	Non-connection
31	DM	O	MIC DM
32,33	NC	-	Non-connection
34	HK/RXD	I	HOOK/RXD (COM0)
35~44	NC	-	Non-connection
45	TP1	I	LCD check
46~59	NC	-	Non-connection
60	VCC	-	+5V
61	NC	-	Non-connection
62	VSS	-	GND
63~70	NC	-	Non-connection
71~82	S22~S11	I	Non-connection

Pin No.	Port Name	I/O	Function
83	S10	I	Front panel key (R down [↘])
84	S9	I	Front panel key (R up [↗])
85	S8	I	Front panel key (■)
86	S7	I	Front panel key (C)
87	S6	I	Front panel key (B)
88	S5	I	Front panel key (A)
89	S4	I	Front panel key (S)
90	S3	I	Front panel key (▲)
91	S2	I	Front panel key (L down [↙])
92	S1	I	Front panel key (L up [↖])
93	NC	-	Non-connection
94	AVSS	-	GND
95	NC	-	Non-connection
96	VREF	-	+5V
97	AVCC	-	+5V
98~100	NC	-	Non-connection

Shift Register : BU4094BCFV (TX-RX unit IC403)

Pin No.	Port Name	I/O	Function
1	STRB	I	Storage enable input
2	DATA	I	Serial data input
3	CLK	I	Serial clock input
4	Q1	O	AUX output 1
5	Q2	O	Public address
6	Q3	O	Horn alert
7	Q4	O	Scrambler switch
8	Vss	-	
9	Qs	O	
10	Q's	O	
11	Q8	O	Ceramic filter switch
12	Q7	O	Non-connection
13	Q6	O	AUX output 2
14	Q5	O	Gate switch
15	OE	I	Output enable
16	VDD	-	

COMPONENTS DESCRIPTION

Display unit (X54-3480-10)

Ref. No.	Part Name	Description
IC901	IC	Voltage regulator/ 5V
IC902	IC	Microprocessor
IC903	IC	LCD driver
Q901,902	Transistor	HOOK switch
Q904	Transistor	TX indication LED switch
Q905	Transistor	BUSY indication LED switch
Q906	Transistor	Dimmer switch control
Q907	Transistor	Dimmer switch
Q909	Transistor	Backlight control switch
Q910	Transistor	8C switch
Q911	Transistor	8C switch control
Q913	Transistor	Backlight control
D901,902	Zener diode	Voltage protection
D903	Varistor	Current limiter
D904~906	Diode	Surge protection
D907	LED	TX/Busy indication
D909~920	LED	LCD backlight
D921~930	LED	KEY backlight

TX-RX unit (X57-6990-10)

Ref. No.	Part Name	Description
IC1	IC	Power module
IC71,72	IC	DC amp for TX APC
IC171	IC	RX 1st mixer
IC172	IC	FM IF system IC
IC251	IC	DC-DC converter
IC301	IC	PLL system IC
IC302	IC	PLL CP switch
IC401	IC	EEPROM
IC402	IC	RTC processor
IC403	IC	Shift register
IC404	IC	Microprocessor
IC405	IC	Flash memory
IC406	IC	HSD BPF/HSD compalator
IC407	IC	DET amp/Data LPF (DB-25)
IC408	IC	LSD buffer amp/VCXO bias amp
IC409	IC	LSD LPF/Voltage DC-reference
IC410	IC	D/A converter

Ref. No.	Part Name	Description
IC411	IC	RF BPF tuning voltage DC amp
IC412	IC	Modulation LPF/DET amp
IC413	IC	AF switch IC
IC414	IC	MIC amp
IC415	IC	AQUA-L
IC416	IC	Level converter IC (RS-232C)
IC417	IC	Audio IC
IC801	IC	Voltage detector (CPU Reset)
IC802	IC	Voltage detector (INT)
IC803	IC	Voltage regulator/ 8V
IC804,805	IC	Voltage regulator/ 5V
IC807	IC	Voltage regulator/ 5V
Q1	Transistor	TX pre-driver
Q2	Transistor	TX driver
Q3	Transistor	TX gate switch
Q70	Transistor	High/Low power switch
Q72	FET	High/Low power switch
Q103	Transistor	Front-end LNA
Q171,172	Transistor	IF amp
Q173,174	Transistor	W/N CF switch control
Q175	Transistor	Noise Amp
Q176	FET	DET mute switch
Q177	Transistor	W/N CF switch control
Q178	Transistor	W/N discrete switch
Q179	Transistor	W/N CF switch control
Q251	Transistor	Ripple filter
Q301	Transistor	PLL f-in doubler amp
Q302,303	Transistor	PLL LPF
Q306,307	FET	TX/RX VCO
Q308~310	Transistor	TX/RX VCO switch
Q311	Transistor	VCO buffer amp
Q312	Transistor	Ripple filter
Q313	Transistor	VCO buffer amp
Q402	Transistor	Beat shift switch
Q403	FET	AF switch (Voice)
Q405	Transistor	AQUA control switch
Q406	FET	AF switch (LSD)
Q409	Transistor	AF mute switch
Q410,411	Transistor	MIC AGC
Q412	FET	AF mute switch

COMPONENTS DESCRIPTION

Ref. No.	Part Name	Description
Q413,414	FET	AF Switch
Q415	FET	AF Switch (Voice)
Q416,417	FET	MIC mute switch
Q418	Transistor	AF mute control switch
Q419	Transistor	AF mute switch
Q600	Transistor	MIC mute switch
Q701,702	Transistor	Inverter switch
Q801	Transistor	Voltage regulator/ 8.5V
Q802	Transistor	SB control switch
Q803	Transistor	8T switch
Q804	Transistor	8R switch
Q805	Transistor	5R switch
Q806	Transistor	8T control switch
Q807	Transistor	SB control switch
Q808	Transistor	8R control switch
Q809	Transistor	5R control switch
Q810	FET	SB switch
Q811	Transistor	Ignition sense control switch
Q812	Transistor	CPU reset switch
D1	Zener diode	Voltage protection
D2,3	Diode	ANT switch
D6~8	Diode	RF detector
D103~110	Variable capacitance diode	RF BPF tuning
D111	Diode	ANT switch
D171,172	Diode	W/N CF switch
D173	Diode	SQ noise-amp detector
D174	Diode	DET mute switch control

Ref. No.	Part Name	Description
D251	Diode	Reverse voltage protection
D308,309	Variable capacitance diode	Frequency control for TX/RX VCO
D311	Variable capacitance diode	Frequency control for TX/RX VCO
D313	Variable capacitance diode	Frequency control for TX/RX VCO
D314	Variable capacitance diode	Modulation control for TX VCO
D315,316	Diode	TX/RX band switch
D402~404	Diode	RTC battery control
D405,406	Zener diode	Voltage protection
D407	Diode	DC detector
D408,409	Diode	MIC-amp AGC detector
D412~414	Diode	Surge protect
D416	Diode	AF mute control
D417,418	Diode	Isolator
D421~423	Diode	Voltage protection
D600,601	Diode	MIC mute control
D701	Zener diode	Voltage protection
D702,703	Diode	Voltage protection
D704~708	Diode	Surge protect
D709,710	Zener diode	Voltage protection
D711~713	Diode	Surge protect
D714	Zener diode	Voltage protection
D801	Surge absorber	Voltage protection
D802	Diode	DC reverse connection protect
D804,805	Zener diode	Voltage protection

TK-8180

PARTS LIST

* New Parts. Δ indicates safety critical components.

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

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

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

L : Scandinavia

Y : PX (Far East, Hawaii)

Y : AAFES (Europe)

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

TK-8180 (Y51-5030-10)

DISPLAY UNIT (X54-3480-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-8180					
1	1B	*	A01-2194-11	CABINET	
2	3A	*	A62-1094-23	PANEL ASSY	
4	2A	*	B09-0681-03	CAP (KAP-2)	
5	1D	*	B62-1766-10	INSTRUCTION MANUAL	
7	2B		E04-0167-05	RF COAXIAL RECEPTACLE (M)	
8	2B	*	E30-7520-05	DC CORD (PIG TAIL)	
9	2C	*	E30-7523-05	DC CORD ASSY (WATER-PROOF)	
10	2A	*	E37-1110-05	FLAT CABLE (30P/D-SUB)	
11	1A	*	E37-1118-05	LEAD WIRE WITH CONNECTOR (SHORT CABLE)	
12	2A	*	E37-1120-05	FLAT CABLE (30P/TX-RX)	
13	3B	*	E37-1124-05	LEAD WIRE WITH CONNECTOR (2P/SP)	
15	2B	*	F10-2488-02	SHIELDING PLATE (CHASSIS)	
16	1A	*	F10-2489-03	SHIELDING CASE (FINAL)	
17	1A	*	F10-2490-03	SHIELDING CASE (VCO)	
18	1C		F52-0024-05	FUSE (BLADE) 15A/32V	
20	3B	*	G10-1342-04	FIBROUS SHEET (BIRITSUKI)	
21	2A	*	G11-4290-04	RUBBER SHEET (CHASSIS)	
22	1B	*	G11-4343-04	SHEET	
23	1A		G13-2018-04	CUSHION	
24	2B	*	G13-2047-04	CUSHION (DC SCREW)	
25	1B	*	G53-1613-01	PACKING (SHIELD PLATE)	
26	3A	*	G53-1614-23	PACKING (CHASSIS)	
27	1A	*	G53-1616-03	PACKING (PHONE JACK)	
28	2B	*	G53-1626-03	PACKING (D-SUB OUTER)	
29	3B	*	G53-1643-04	PACKING (DC CORD)	
30	3B	*	G53-1645-03	PACKING (D-SUB INNER)	
31	2A	*	G53-1662-04	PACKING (O RING)	
32	2C	*	H02-0624-03	INNER PACKING CASE	
33	2D	*	H12-3170-01	PACKING FIXTURE (LOWER)	
34	1D	*	H12-3171-03	PACKING FIXTURE (UPPER)	
36	2D		H25-2352-04	PROTECTION BAG (250/350/0.07)	
37	3D	*	H52-2069-02	ITEM CARTON CASE	
39	1C		J19-1584-05	HOLDER (ACCESSORY)	
40	3B	*	J19-5464-13	HOLDER (SP)	
41	3B	*	J19-5468-02	HOLDER (PANEL)	
42	2B	*	J21-8479-02	HARDWARE FIXTURE (D-SUB)	
43	3B	*	J21-8481-03	HARDWARE FIXTURE (SP)	
44	2C		J29-0662-03	BRACKET (ACCESSORY)	
45	3B	*	J30-1289-04	SPACER (SP)	
47	3A	*	K29-9312-21	KEY TOP	
A	2B		N09-2409-05	HEXAGON HEAD SCREW (D-SUB)	
B	1A,2A	*	N67-3008-48	PAN HEAD SEMS SCREW W (FINAL IC)	
C	1A,2A,2B	*	N87-2606-48	BRAZIER HEAD TAPTITE SCREW (ANT,PCB)	
D	1A		N87-2608-46	BRAZIER HEAD TAPTITE SCREW (AUDIO IC)	
49	2C	*	N99-2039-05	SCREW SET (ACCESSORY)	
51	3B	*	T07-0750-05	SPEAKER	
52	1C	*	T91-0639-05	MICROPHONE (ACCESSORY)	
54	2A		W09-0971-05	LITHIUM CELL	

Ref. No.	Address	New parts	Parts No.	Description	Destination
DISPLAY UNIT (X54-3480-10)					
101	3B	*	B11-1825-04	FILTER (LCD)	
102	3B	*	B38-0888-05	LCD	
D907			B30-2151-05	LED (R/G)	
D909-920		*	B30-2281-05	LED (Y)	
D921-930		*	B30-2282-05	LED (Y)	
C904			CC73GCH1H101J	CHIP C 100PF	J
C906			CK73GB1H103K	CHIP C 0.010UF	K
C907,908			CK73HB1H102K	CHIP C 1000PF	K
C909-911			CC73GCH1H101J	CHIP C 100PF	J
C912,913			CK73GB1H102K	CHIP C 1000PF	K
C914			CC73GCH1H101J	CHIP C 100PF	J
C915			CK73GB1H102K	CHIP C 1000PF	K
C916,917			CK73GB1C104K	CHIP C 0.10UF	K
C918			C92-0628-05	CHIP-TAN 10UF	10WV
C920			CC73GCH1H101J	CHIP C 100PF	J
C921			CK73GB1H102K	CHIP C 1000PF	K
C922			CK73GB1H103K	CHIP C 0.010UF	K
C924,925			CC73GCH1H100D	CHIP C 10PF	D
C926-928			CK73GB1H102K	CHIP C 1000PF	K
C930			CK73GB1H103K	CHIP C 0.010UF	K
C931			C92-0784-05	CHIP-TAN 4.7UF	10WV
C932-934			CK73GB1H103K	CHIP C 0.010UF	K
C935			CK73GB1H471K	CHIP C 470PF	K
C936			CK73GB1C104K	CHIP C 0.10UF	K
C937			CK73GB1H103K	CHIP C 0.010UF	K
C938			CK73GB1H102K	CHIP C 1000PF	K
103	3B	*	E29-1202-04	INTER CONNECTOR (LCD)	
CN901			E40-5704-05	PIN ASSY	
CN902		*	E40-6372-05	FLAT CABLE CONNECTOR	
J901	3B		E08-0877-05	MODULAR JACK	
104	3B	*	G11-4342-04	SHEET	
105	3B	*	J19-5467-03	HOLDER (LCD)	
106	3B	*	J21-8470-03	HARDWARE FIXTURE (LCD)	
-		*	J31-0551-05	COLLAR	
L901,902			L40-1095-85	SMALL FIXED INDUCTOR (1.0UH)	
L903-907			L92-0140-05	FERRITE CHIP	
L908,909			L92-0163-05	BEADS CORE	
X901		*	L77-1956-05	CRYSTAL RESONATOR (14.7456MHZ)	
CP901-911			RK75HA1J101J	CHIP-COM 100	J 1/16W
R901			RK73GB1J102J	CHIP R 1.0K	J 1/16W
R903			RK73GB1J471J	CHIP R 470	J 1/16W
R904			RK73GB1J102J	CHIP R 1.0K	J 1/16W
R905			RK73GB1J472J	CHIP R 4.7K	J 1/16W
R907			RK73GB1J333J	CHIP R 33K	J 1/16W
R909-911			RK73GB1J473J	CHIP R 47K	J 1/16W
R913-916			RK73HB1J474J	CHIP R 470K	J 1/16W
R917			RK73FB2A471J	CHIP R 470	J 1/10W
R918			RK73FB2A271J	CHIP R 270	J 1/10W
R919			RK73HB1J102J	CHIP R 1.0K	J 1/16W
R920			R92-1368-05	CHIP R 0 OHM	
R925			RK73HB1J471J	CHIP R 470	J 1/16W
R926			RK73HB1J473J	CHIP R 47K	J 1/16W

PARTS LIST

DISPLAY UNIT (X54-3480-10)

TX-RX UNIT (X57-6990-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R927-935			RK73HB1J102J	CHIP R 1.0K J 1/16W		C44			C93-0573-05	CHIP C 120PF J	
R936			RK73HB1J103J	CHIP R 10K J 1/16W		C45			C93-0553-05	CHIP C 3.0PF C	
R939			RK73GB1J472J	CHIP R 4.7K J 1/16W		C47			CC73GCH1H0R5B	CHIP C 0.5PF B	
R940			RK73HB1J101J	CHIP R 100 J 1/16W		C48			CC73GCH1H030B	CHIP C 3.0PF B	
R941			RK73HB1J102J	CHIP R 1.0K J 1/16W		C49			CC73GCH1H101J	CHIP C 100PF J	
R942			RK73EB2B470J	CHIP R 47 J 1/8W		C50			C93-0558-05	CHIP C 8.0PF D	
R943			RK73EB2B101J	CHIP R 100 J 1/8W		C51			CC73GCH1H101J	CHIP C 100PF J	
R944			R92-1368-05	CHIP R 0 OHM		C52			CC73GCH1H0R5B	CHIP C 0.5PF B	
R945			RK73GB1J103J	CHIP R 10K J 1/16W		C53			C93-0560-05	CHIP C 10PF D	
R947-950			RK73FB2A101J	CHIP R 100 J 1/10W		C55			CC73GCH1H020B	CHIP C 2.0PF B	
R951,952			RK73FB2A391J	CHIP R 390 J 1/10W		C56			CC73GCH1H101J	CHIP C 100PF J	
R953,954			RK73FB2A821J	CHIP R 820 J 1/10W		C57			CC73GCH1H0R5B	CHIP C 0.5PF B	
R955-958			RK73HB1J472J	CHIP R 4.7K J 1/16W		C58			CC73GCH1H020B	CHIP C 2.0PF B	
R959			RK73HB1J103J	CHIP R 10K J 1/16W		C59			CC73GCH1H101J	CHIP C 100PF J	
R962,963			RK73GB1J103J	CHIP R 10K J 1/16W		C60			C93-0556-05	CHIP C 6.0PF D	
R967			RK73HB1J271J	CHIP R 270 J 1/16W		C61,62			CC73GCH1H101J	CHIP C 100PF J	
R969			R92-1368-05	CHIP R 0 OHM		C74			CC73GCH1H101J	CHIP C 100PF J	
R970			RK73GB1J103J	CHIP R 10K J 1/16W		C76,77			CK73GB1H471K	CHIP C 470PF K	
R971			RK73HB1J102J	CHIP R 1.0K J 1/16W		C79,80			CK73GB1H471K	CHIP C 470PF K	
D901,902			02DZ18(X,Y)	ZENER DIODE		C119			CC73GCH1H050B	CHIP C 5.0PF B	
D903			MINISMDC020	VARIATOR		C121			CK73GB1H471K	CHIP C 470PF K	
D904-906			DA204U	DIODE		C124			CC73GCH1H100D	CHIP C 10PF D	
IC901			TA78L05F	MOS IC		C125			CK73GB1H471K	CHIP C 470PF K	
IC902		*	30302M8-8Z7GP	MCU		C127			CC73GCH1H220J	CHIP C 22PF J	
IC903		*	LC75810T-8726	MOS IC		C128			CC73GCH1H090B	CHIP C 9.0PF B	
Q901,902			DTC144EE	DIGITAL TRANSISTOR		C129			CK73GB1H471K	CHIP C 470PF K	
Q904-906			DT114EE	DIGITAL TRANSISTOR		C130			CC73GCH1H050B	CHIP C 5.0PF B	
Q907			2SC2873(Y)	TRANSISTOR		C131			CK73GB1H471K	CHIP C 470PF K	
Q909,910		*	12A02CH	TRANSISTOR		C132			CC73GCH1H220J	CHIP C 22PF J	
Q911			DTC114EE	DIGITAL TRANSISTOR		C133			CC73GCH1H060B	CHIP C 6.0PF B	
Q913			DTC114EE	DIGITAL TRANSISTOR		C134			CC73GCH1H030B	CHIP C 3.0PF B	
TH901		*	S1R103J440H	THERMISTOR		C135			CC73GCH1H220J	CHIP C 22PF J	
TX-RX UNIT (X57-6990-10)						C136			CC73GCH1H040B	CHIP C 4.0PF B	
C1			CK73GB1H102K	CHIP C 1000PF K		C137			CK73GB1H471K	CHIP C 470PF K	
C2-5			CC73GCH1H101J	CHIP C 100PF J		C138			CC73GCH1H050B	CHIP C 5.0PF B	
C6			C92-0585-05	CHIP-TAN 4.7UF 16WV		C139			CK73GB1H471K	CHIP C 470PF K	
C7,8			CC73GCH1H101J	CHIP C 100PF J		C140			CC73GCH1H220J	CHIP C 22PF J	
C9			CC73GCH1H060D	CHIP C 6.0PF D		C141			CC73GCH1H090B	CHIP C 9.0PF B	
C10			CC73GCH1H101J	CHIP C 100PF J		C142			CK73GB1H471K	CHIP C 470PF K	
C13-15			CC73GCH1H101J	CHIP C 100PF J		C143			CK73GB1H103K	CHIP C 0.010UF K	
C16			CC73GCH1H060D	CHIP C 6.0PF D		C144			CC73GCH1H070B	CHIP C 7.0PF B	
C17			CC73GCH1H220J	CHIP C 22PF J		C145			CC73GCH1H1R5B	CHIP C 1.5PF B	
C18			CK73GB1H471K	CHIP C 470PF K		C146			CK73GB1H471K	CHIP C 470PF K	
C19			CC73GCH1H470J	CHIP C 47PF J		C147			CC73GCH1H050B	CHIP C 5.0PF B	
C20			CC73GCH1H101J	CHIP C 100PF J		C148			CC73GCH1H010B	CHIP C 1.0PF B	
C21			CK73FB1H471K	CHIP C 470PF K		C149			CK73GB1H471K	CHIP C 470PF K	
C22			CK73GB1H471K	CHIP C 470PF K		C150			CC73GCH1H050B	CHIP C 5.0PF B	
C24			C92-0606-05	CHIP-TAN 4.7UF 10WV		C151			CC73GCH1H010B	CHIP C 1.0PF B	
C25			C93-0550-05	CHIP C 1.0PF C		C152			CK73GB1H471K	CHIP C 470PF K	
C26			CC73GCH1H220J	CHIP C 22PF J		C153			CC73GCH1H050B	CHIP C 5.0PF B	
C27			CC73GCH1H470J	CHIP C 47PF J		C154			CC73GCH1H1R5B	CHIP C 1.5PF B	
C28			CC73GCH1H101J	CHIP C 100PF J		C155,156			CK73GB1H471K	CHIP C 470PF K	
C29-31			CK73GB1H471K	CHIP C 470PF K		C171			CC73GCH1H060B	CHIP C 6.0PF B	
C32		*	C92-0834-05	ELECTRO 47UF 25WV		C173			CC73GCH1H120J	CHIP C 12PF J	
C33-35			CC73GCH1H101J	CHIP C 100PF J		C175			CC73GCH1H060B	CHIP C 6.0PF B	
C38-40			CC73GCH1H220J	CHIP C 22PF J		C176-178			CK73GB1H471K	CHIP C 470PF K	
C42			C93-0555-05	CHIP C 5.0PF C		C181			CK73GB1H471K	CHIP C 470PF K	
C43			CC73FCH1H030C	CHIP C 3.0PF C		C182,183			CK73GB1H103K	CHIP C 0.010UF K	
						C184			CK73GB1H471K	CHIP C 470PF K	
						C185			CK73GB1H103K	CHIP C 0.010UF K	

PARTS LIST

TX-RX UNIT (X57-6990-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C186			CC73GCH1H330J	CHIP C 33PF J		C318			C92-0657-05	CHIP-TAN 2.2UF 20WV	
C187			CC73GCH1H390J	CHIP C 39PF J		C320			C92-0657-05	CHIP-TAN 2.2UF 20WV	
C188,189			CC73GCH1H040B	CHIP C 4.0PF B		C322			CK73GB1E473J	CHIP C 0.047UF J	
C190			CC73GCH1H390J	CHIP C 39PF J		C323			CK73GB1H471K	CHIP C 470PF K	
C192-194			CK73GB1H103K	CHIP C 0.010UF K		C324			CK73GB1C104K	CHIP C 0.10UF K	
C195			CK73GB1H471K	CHIP C 470PF K		C325			CK73GB1H102K	CHIP C 1000PF K	
C196,197			CK73GB1H103K	CHIP C 0.010UF K		C327			CK73FB1E224K	CHIP C 0.22UF K	
C198			CC73GCH1H680J	CHIP C 68PF J		C331			CK73GB1H103K	CHIP C 0.010UF K	
C199			CC73GCH1H390J	CHIP C 39PF J		C333			CC73GCH1H050B	CHIP C 5.0PF B	
C200,201			CC73GCH1H040B	CHIP C 4.0PF B		C334			CK73GB1H102K	CHIP C 1000PF K	
C202			CC73GCH1H390J	CHIP C 39PF J		C335			CK73GB1C223K	CHIP C 0.022UF K	
C204-206			CK73GB1H103K	CHIP C 0.010UF K		C338			C92-0502-05	CHIP-TAN 0.33UF 35WV	
C207			CK73GB1H471K	CHIP C 470PF K		C339			CK73GB1H471K	CHIP C 470PF K	
C208,209			CK73GB1H103K	CHIP C 0.010UF K		C342			CK73GB1H102K	CHIP C 1000PF K	
C210			CC73GCH1H680J	CHIP C 68PF J		C343			C92-0628-05	CHIP-TAN 10UF 10WV	
C211			CC73GCH1H100D	CHIP C 10PF D		C346,347			CC73GCH1H220G	CHIP C 22PF G	
C212			CK73GB1H471K	CHIP C 470PF K		C350			CC73GCH1H080D	CHIP C 8.0PF D	
C213			CK73GB1H103K	CHIP C 0.010UF K		C351			CC73GCH1H0R5B	CHIP C 0.5PF B	
C214			CK73GB1C104K	CHIP C 0.10UF K		C352			CC73GCH1H120J	CHIP C 12PF J	
C215			CC73GCH1H180J	CHIP C 18PF J		C353			CC73GCH1H471J	CHIP C 470PF J	
C216			CC73GCH1H150J	CHIP C 15PF J		C354			CC73GCH1H040B	CHIP C 4.0PF B	
C217			CK73GB1H102K	CHIP C 1000PF K		C355			CC73GCH1H050B	CHIP C 5.0PF B	
C218			CK73GB1H103K	CHIP C 0.010UF K		C356			CC73GCH1H0R5B	CHIP C 0.5PF B	
C219			CK73FB1C105K	CHIP C 1.0UF K		C357			CC73GCH1H060B	CHIP C 6.0PF B	
C220,221			CK73GB1C104K	CHIP C 0.10UF K		C358			CC73GCH1H050B	CHIP C 5.0PF B	
C222			CK73GB1H102K	CHIP C 1000PF K		C359,360			CC73GCH1H070B	CHIP C 7.0PF B	
C223			CK73GB1C104K	CHIP C 0.10UF K		C361-363			CC73GCH1H471J	CHIP C 470PF J	
C224,225			CC73GCH1H271J	CHIP C 270PF J		C364			CC73GCH1H0R5B	CHIP C 0.5PF B	
C226,227			CK73GB1H102K	CHIP C 1000PF K		C365			CC73GCH1H0R3B	CHIP C 0.3PF B	
C228			CK73GB1C104K	CHIP C 0.10UF K		C367			CK73GB1H102K	CHIP C 1000PF K	
C229			CK73GB1C333K	CHIP C 0.033UF K		C368			CC73GCH1H471J	CHIP C 470PF J	
C230			CK73GB1H103K	CHIP C 0.010UF K		C369,370			CK73GB1H471K	CHIP C 470PF K	
C231			CC73GCH1H820J	CHIP C 82PF J		C371			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C232,233			CK73GB1H102K	CHIP C 1000PF K		C372			CC73GCH1H220J	CHIP C 22PF J	
C234			CK73FB1C224K	CHIP C 0.22UF K		C373			CC73GCH1H471J	CHIP C 470PF J	
C235			CK73GB1C104K	CHIP C 0.10UF K		C374			CK73GB1H102K	CHIP C 1000PF K	
C236			CK73GB1H103K	CHIP C 0.010UF K		C375			CC73GCH1H270J	CHIP C 27PF J	
C237			C92-0712-05	CHIP-TAN 22UF 6.3WV		C376-378			CK73GB1H471K	CHIP C 470PF K	
C238			CK73GB1H103K	CHIP C 0.010UF K		C379			CC73GCH1H060D	CHIP C 6.0PF D	
C239,240			CK73GB1C104K	CHIP C 0.10UF K		C380,381			CK73GB1H471K	CHIP C 470PF K	
C241			CK73GB1H102K	CHIP C 1000PF K		C382			CK73GB1H103K	CHIP C 0.010UF K	
C251,252			CK73GB1H471K	CHIP C 470PF K		C383			CK73GB1H102K	CHIP C 1000PF K	
C253			CK73GB1H103K	CHIP C 0.010UF K		C384			CK73GB1H103K	CHIP C 0.010UF K	
C255			C92-0694-05	CHIP-TAN 10UF 16WV		C385			CK73GB1H471K	CHIP C 470PF K	
C256			CK73GB1H103K	CHIP C 0.010UF K		C386			C92-0713-05	CHIP-TAN 10UF 6.3WV	
C257			C92-0519-05	CHIP-TAN 1.0UF 25WV		C387,388			CC73GCH1H050C	CHIP C 5.0PF C	
C258			C92-0516-05	CHIP-TAN 4.7UF 16WV		C389			CC73GCH1H060B	CHIP C 6.0PF B	
C259			C92-0628-05	CHIP-TAN 10UF 10WV		C390			CC73GCH1H120J	CHIP C 12PF J	
C260-262			CC73GCH1H101J	CHIP C 100PF J		C391			CC73GCH1H020B	CHIP C 2.0PF B	
C299			CC73GCH1H0R5B	CHIP C 0.5PF B		C392			CC73GCH1H120J	CHIP C 12PF J	
C302			CC73GCH1H0R5B	CHIP C 0.5PF B		C393			CC73GCH1H060B	CHIP C 6.0PF B	
C306			CC73GCH1H100D	CHIP C 10PF D		C394			CC73GCH1H040B	CHIP C 4.0PF B	
C307			CK73GB1H471K	CHIP C 470PF K		C395			CC73GCH1H020B	CHIP C 2.0PF B	
C308			CC73GCH1H100D	CHIP C 10PF D		C396			CK73GB1H103K	CHIP C 0.010UF K	
C309			CC73GCH1H101J	CHIP C 100PF J		C397			CC73GCH1H120J	CHIP C 12PF J	
C311			CC73GCH1H390J	CHIP C 39PF J		C398			CC73GCH1H010B	CHIP C 1.0PF B	
C312			C92-0555-05	CHIP-TAN 0.047UF 35WV		C400			CK73FB1A105K	CHIP C 1.0UF K	
C314			CK73FB1E104K	CHIP C 0.10UF K		C403			CK73HB1A104K	CHIP C 0.10UF K	
C316			CC73GCH1H080D	CHIP C 8.0PF D		C404			CC73HCH1H050C	CHIP C 5.0PF C	
C317			CC73GCH1H101J	CHIP C 100PF J		C406			CC73GCH1H0R3B	CHIP C 0.3PF B	

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Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C407			CK73GB1H103K	CHIP C 0.010UF K		C498			CC73HCH1H101J	CHIP C 100PF J	
C408,409			CC73HCH1H150G	CHIP C 15PF G		C499			CK73GB1H821K	CHIP C 820PF K	
C410-412			CK73GB1C104K	CHIP C 0.10UF K		C500			CC73HCH1H101J	CHIP C 100PF J	
C420,421			CC73GCH1H101J	CHIP C 100PF J		C501			CC73GCH1H220J	CHIP C 22PF J	
C422			CK73GB1H102K	CHIP C 1000PF K		C502			CK73HB1H102K	CHIP C 1000PF K	
C423			CK73FF1C105Z	CHIP C 1.0UF Z		C503			CC73GCH1H680J	CHIP C 68PF J	
C424			CK73GB1H102K	CHIP C 1000PF K		C504			CK73HB1H102K	CHIP C 1000PF K	
C425-428			CC73GCH1H101J	CHIP C 100PF J		C505,506			CK73GB1A105K	CHIP C 1.0UF K	
C429			CK73GB1A105K	CHIP C 1.0UF K		C507			CK73GB1C104K	CHIP C 0.10UF K	
C430,431			CC73GCH1H101J	CHIP C 100PF J		C511			CK73GB1C104K	CHIP C 0.10UF K	
C432			CK73GB1H102K	CHIP C 1000PF K		C512,513			CK73GB1H102K	CHIP C 1000PF K	
C433			CK73GB1C104K	CHIP C 0.10UF K		C514			CC73GCH1H820J	CHIP C 82PF J	
C434			CK73GB1H561K	CHIP C 560PF K		C515,516			CK73HB1H102K	CHIP C 1000PF K	
C435			CK73GB1H102K	CHIP C 1000PF K		C517			CK73GB1H103K	CHIP C 0.010UF K	
C436,437			CC73GCH1H101J	CHIP C 100PF J		C518			CK73GB1C104K	CHIP C 0.10UF K	
C438			CK73GB1E103K	CHIP C 0.010UF K		C519,520			CK73GB1H102K	CHIP C 1000PF K	
C439			CK73GB1H102K	CHIP C 1000PF K		C524			CK73GB1H102K	CHIP C 1000PF K	
C440			CK73GB1C104K	CHIP C 0.10UF K		C525,526			CK73GB1C104K	CHIP C 0.10UF K	
C441			CK73FB0J106K	CHIP C 10UF K		C528			CK73GB1H222K	CHIP C 2200PF K	
C442			CK73GB1C104K	CHIP C 0.10UF K		C529			CC73GCH1H470J	CHIP C 47PF J	
C443			CK73GB1H103K	CHIP C 0.010UF K		C530			CK73FB0J106K	CHIP C 10UF K	
C444			CC73GCH1H390J	CHIP C 39PF J		C531			CK73GB1H102K	CHIP C 1000PF K	
C445			CC73GCH1H150J	CHIP C 15PF J		C532			CK73GB1E123K	CHIP C 0.012UF K	
C446			CK73GB1H103K	CHIP C 0.010UF K		C533			CK73GB1E153K	CHIP C 0.015UF K	
C447			CK73HB1A333K	CHIP C 0.033UF K		C534			CK73GB1H102K	CHIP C 1000PF K	
C448			CC73GCH1H101J	CHIP C 100PF J		C535			CK73GB1C683K	CHIP C 0.068UF K	
C450			CK73FB0J106K	CHIP C 10UF K		C536,537			CK73GB1C104K	CHIP C 0.10UF K	
C451			CK73GB1H103K	CHIP C 0.010UF K		C538			CK73GB1H102K	CHIP C 1000PF K	
C452			CC73GCH1H101J	CHIP C 100PF J		C539,540			C92-0628-05	CHIP-TAN 10UF 10WV	
C453			CK73GB1C104K	CHIP C 0.10UF K		C541			CK73GB1C104K	CHIP C 0.10UF K	
C454			CK73GB1H103K	CHIP C 0.010UF K		C542			CK73GB1H102K	CHIP C 1000PF K	
C455			C92-0589-05	CHIP-TAN 47UF 6.3WV		C543,544			C92-0628-05	CHIP-TAN 10UF 10WV	
C457			CK73GB1H471K	CHIP C 470PF K		C545			CK73HB1H102K	CHIP C 1000PF K	
C459			C92-0628-05	CHIP-TAN 10UF 10WV		C546			CK73GB1H103K	CHIP C 0.010UF K	
C460-463			CK73GB1H103K	CHIP C 0.010UF K		C547-549			CK73HB1H102K	CHIP C 1000PF K	
C464			CK73HB1A333K	CHIP C 0.033UF K		C550			CC73HCH1H101J	CHIP C 100PF J	
C465			CC73GCH1H220J	CHIP C 22PF J		C551-553			CK73HB1H102K	CHIP C 1000PF K	
C467,468			CK73GB1H103K	CHIP C 0.010UF K		C554			CC73HCH1H101J	CHIP C 100PF J	
C469			CK73GB1C104K	CHIP C 0.10UF K		C555-557			CK73HB1H102K	CHIP C 1000PF K	
C470			CK73GB1H103K	CHIP C 0.010UF K		C558			CC73HCH1H101J	CHIP C 100PF J	
C472			CK73GB1C104K	CHIP C 0.10UF K		C559			CK73HB1H102K	CHIP C 1000PF K	
C475			CC73GCH1H101J	CHIP C 100PF J		C560,561			CK73GB1C104K	CHIP C 0.10UF K	
C476			CK73GB1C104K	CHIP C 0.10UF K		C562-565			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C477			CK73GB1H102K	CHIP C 1000PF K		C566			CK73FB1C105K	CHIP C 1.0UF K	
C478			CC73HCH1H101J	CHIP C 100PF J		C567			CC73HCH1H101J	CHIP C 100PF J	
C479,480			CK73GB1H102K	CHIP C 1000PF K		C568			CK73HB1H102K	CHIP C 1000PF K	
C481			CK73HB1H102K	CHIP C 1000PF K		C570			CK73FB1C105K	CHIP C 1.0UF K	
C482			CK73FB1A475K	CHIP C 4.7UF K		C572,573			CK73GB1H102K	CHIP C 1000PF K	
C483			CK73GB1H103K	CHIP C 0.010UF K		C574			C92-0672-05	ELECTRO 22UF 16WV	
C484			CK73FB1A475K	CHIP C 4.7UF K		C575	*		C92-0834-05	ELECTRO 47UF 25WV	
C485			CK73FB1A105K	CHIP C 1.0UF K		C576	*		C92-0836-05	ELECTRO 330UF 16WV	
C487			CK73HB1H102K	CHIP C 1000PF K		C577			CK73GB1C104K	CHIP C 0.10UF K	
C488			CC73GCH1H120J	CHIP C 12PF J		C578	*		C92-0834-05	ELECTRO 47UF 25WV	
C489			CK73GB1C104K	CHIP C 0.10UF K		C579			CK73GB1H102K	CHIP C 1000PF K	
C490			CK73HB1H102K	CHIP C 1000PF K		C580	*		C92-0834-05	ELECTRO 47UF 25WV	
C491,492			CK73GB1C104K	CHIP C 0.10UF K		C581,582			CK73GB1H102K	CHIP C 1000PF K	
C493			CK73FB1A475K	CHIP C 4.7UF K		C583			CK73GB1H471K	CHIP C 470PF K	
C495			CC73GCH1H181J	CHIP C 180PF J		C584			CC73GCH1H220J	CHIP C 22PF J	
C496			CK73GB1C104K	CHIP C 0.10UF K		C585-587			CC73GCH1H101J	CHIP C 100PF J	
C497			CK73GB1H102K	CHIP C 1000PF K		C588			CK73GB1H102K	CHIP C 1000PF K	

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Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C591			CK73GB1C104K	CHIP C 0.10UF K		CN401			J19-5386-05	HOLDER	
C592,593			CC73GCH1H070D	CHIP C 7.0PF D		CD171			L79-1701-05	TUNING COIL	
C594			CK73GB1H471K	CHIP C 470PF K		CF171			L72-0986-05	CERAMIC FILTER	
C595			CC73GCH1H101J	CHIP C 100PF J		CF172			L72-0998-05	CERAMIC FILTER	
C701			CK73GB1H102K	CHIP C 1000PF K		L1			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	
C702-704			CC73GCH1H101J	CHIP C 100PF J		L2			L92-0140-05	FERRITE CHIP	
C705-711			CK73GB1H102K	CHIP C 1000PF K		L3			L40-2275-92	SMALL FIXED INDUCTOR (22NH)	
C712			CC73GCH1H101J	CHIP C 100PF J		L4			L92-0140-05	FERRITE CHIP	
C713			CK73GB1H102K	CHIP C 1000PF K		L5,6			L92-0179-05	FERRITE CHIP	
C714,715			CC73GCH1H101J	CHIP C 100PF J		L7			L34-4638-05	AIR-CORE COIL	
C716,717			CK73GB1H102K	CHIP C 1000PF K		L8	*		L34-4758-05	AIR-CORE COIL	
C718-720			CC73GCH1H101J	CHIP C 100PF J		L9,10	*		L34-4743-05	AIR-CORE COIL	
C721			CK73GB1H102K	CHIP C 1000PF K		L12	*		L34-4743-05	AIR-CORE COIL	
C722,723			CC73GCH1H101J	CHIP C 100PF J		L13			L34-4482-05	AIR-CORE COIL	
C801			C92-0777-05	ELECTRO 1000UF 25WV		L101			L41-8268-14	SMALL FIXED INDUCTOR	
C802			CK73GB1H102K	CHIP C 1000PF K		L108			L92-0140-05	FERRITE CHIP	
C803			CK73GB1E473J	CHIP C 0.047UF J		L109			L41-1878-14	SMALL FIXED INDUCTOR	
C804			CC73GCH1H471J	CHIP C 470PF J		L110-113			L34-4565-05	AIR-CORE COIL	
C805			CK73GB1H102K	CHIP C 1000PF K		L114-117			L41-8268-14	SMALL FIXED INDUCTOR	
C806			CC73GCH1H101J	CHIP C 100PF J		L119			L41-3378-14	SMALL FIXED INDUCTOR	
C807			CK73GB1E473J	CHIP C 0.047UF J		L171,172			L41-1578-14	SMALL FIXED INDUCTOR	
C808			CK73GB1C104K	CHIP C 0.10UF K		L173,174			L39-1421-05	TOROIDAL COIL	
C809			CC73GCH1H471J	CHIP C 470PF J		L175			L92-0140-05	FERRITE CHIP	
C810			CK73GB1E473J	CHIP C 0.047UF J		L176			L39-1421-05	TOROIDAL COIL	
C811,812			CK73GB1C104K	CHIP C 0.10UF K		L177	*		L41-2785-14	SMALL FIXED INDUCTOR	
C813,814			CC73GCH1H471J	CHIP C 470PF J		L178,179	*		L41-3988-14	SMALL FIXED INDUCTOR	
C815			C92-0585-05	CHIP-TAN 4.7UF 16WV		L180			L40-6875-92	SMALL FIXED INDUCTOR (68NH)	
C816			C92-0628-05	CHIP-TAN 10UF 10WV		L181			L40-1001-86	SMALL FIXED INDUCTOR (10UH)	
C817			CC73GCH1H471J	CHIP C 470PF J		L182			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
C818			CK73GB1H472K	CHIP C 4700PF K		L183,184	*		L41-3988-14	SMALL FIXED INDUCTOR	
C819,820			CK73GB1C104K	CHIP C 0.10UF K		L185			L40-6875-92	SMALL FIXED INDUCTOR (68NH)	
C821			C92-0585-05	CHIP-TAN 4.7UF 16WV		L186			L40-1001-86	SMALL FIXED INDUCTOR (10UH)	
C822			CC73GCH1H471J	CHIP C 470PF J		L187			L40-1085-92	SMALL FIXED INDUCTOR (100NH)	
C823			CK73GB1H102K	CHIP C 1000PF K		L188			L40-8281-86	SMALL FIXED INDUCTOR (0.82UH)	
C824			CK73GB1H103K	CHIP C 0.010UF K		L189			L40-1091-86	SMALL FIXED INDUCTOR (1.0UH)	
C825			CK73HB1H102K	CHIP C 1000PF K		L251	*		L33-1468-05	SMALL FIXED INDUCTOR	
C826			CK73GB1H471K	CHIP C 470PF K		L301			L40-2295-85	SMALL FIXED INDUCTOR (2.2UH)	
C831,832			C92-0585-05	CHIP-TAN 4.7UF 16WV		L302			L92-0140-05	FERRITE CHIP	
TC301,302			C05-0396-05	CERAMIC TRIMMER CAP (8PF)		L304-306			L92-0140-05	FERRITE CHIP	
CN1-3			E23-1081-05	TERMINAL		L309,310			L40-1095-85	SMALL FIXED INDUCTOR (1.0UH)	
CN13			E23-1081-05	TERMINAL		L311,312			L41-1098-08	SMALL FIXED INDUCTOR	
CN100-102			E23-1081-05	TERMINAL		L314			L34-4607-05	AIR-CORE COIL	
CN202,203			E23-1081-05	TERMINAL		L315-317			L41-1098-08	SMALL FIXED INDUCTOR	
CN301,302		*	E40-6404-05	PIN ASSY		L318,319			L40-2275-92	SMALL FIXED INDUCTOR (22NH)	
CN322,323			E23-1081-05	TERMINAL		L320			L40-1075-92	SMALL FIXED INDUCTOR (10NH)	
CN326			E23-1081-05	TERMINAL		L321			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)	
CN329			E23-1081-05	TERMINAL		L322	*		L41-5668-14	SMALL FIXED INDUCTOR	
CN403		*	E40-6361-05	PIN ASSY		L323			L41-4763-14	SMALL FIXED INDUCTOR	
CN427		*	E40-6371-05	FLAT CABLE CONNECTOR		L324	*		L41-2263-14	SMALL FIXED INDUCTOR	
CN428		*	E40-6373-05	PIN ASSY		L325			L34-4605-05	AIR-CORE COIL	
CN429		*	E40-6412-05	FLAT CABLE CONNECTOR		L326			L41-1098-08	SMALL FIXED INDUCTOR	
CN701		*	E40-6371-05	FLAT CABLE CONNECTOR		L327			L40-3375-92	SMALL FIXED INDUCTOR (33NH)	
CN802,803		*	E23-1260-04	TERMINAL		L328			L40-2275-92	SMALL FIXED INDUCTOR (22NH)	
CN804		*	E40-3246-05	PIN ASSY		L401,402			L92-0138-05	FERRITE CHIP	
CN815			E23-1081-05	TERMINAL		L403-407			L92-0140-05	FERRITE CHIP	
J401			E11-0425-05	3.5D PHONE JACK (3P)		L408			L92-0138-05	FERRITE CHIP	
J701			E58-0494-05	SUB SOCKET (D)		L409			L92-0140-05	FERRITE CHIP	
F401		*	F53-0352-05	FUSE (2A)		L410,411			L92-0179-05	FERRITE CHIP	
F801			F53-0278-05	FUSE (5A)		L701,702			L92-0140-05	FERRITE CHIP	

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TX-RX UNIT (X57-6990-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
X171			L77-1762-05	CRYSTAL RESONATOR (44.395MHZ)		R134			R92-1252-05	CHIP R 0 OHM J 1/16W	
X301			L77-1952-05	TCXO (16.8MHZ)		R171			RK73GB1J271J	CHIP R 270 J 1/16W	
X401			L77-1802-05	CRYSTAL RESONATOR (32768HZ)		R172			RK73GB1J180J	CHIP R 18 J 1/16W	
X403			L77-1965-05	CRYSTAL RESONATOR (3.6864MHZ)		R173			RK73GB1J271J	CHIP R 270 J 1/16W	
X404			L77-1950-05	CRYSTAL RESONATOR (11.0592MHZ)		R174			RK73GB1J680J	CHIP R 68 J 1/16W	
XF171		*	L71-0618-05	MCF (44.85M)		R175			RK73GB1J222J	CHIP R 2.2K J 1/16W	
CP401			R90-0740-05	MULTIPLE RESISTOR		R176			RK73GB1J470J	CHIP R 47 J 1/16W	
CP402-417			RK75HA1J102J	CHIP-COM 1.0K J 1/16W		R177			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R1			RK73GB1J821J	CHIP R 820 J 1/16W		R178			R92-1252-05	CHIP R 0 OHM J 1/16W	
R2			RK73GB1J5R6J	CHIP R 5.6 J 1/16W		R179			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R3			RK73GB1J821J	CHIP R 820 J 1/16W		R180			RK73GB1J821J	CHIP R 820 J 1/16W	
R4			RK73GB1J333J	CHIP R 33K J 1/16W		R181			RK73GB1J331J	CHIP R 330 J 1/16W	
R5			RK73GB1J682J	CHIP R 6.8K J 1/16W		R182			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R6			RK73GB1J221J	CHIP R 220 J 1/16W		R183			RK73GB1J680J	CHIP R 68 J 1/16W	
R7			RK73GB1J100J	CHIP R 10 J 1/16W		R184			RK73GB1J100J	CHIP R 10 J 1/16W	
R8			RK73GB1J471J	CHIP R 470 J 1/16W		R185			RK73GB1J821J	CHIP R 820 J 1/16W	
R9			RK73GB1J220J	CHIP R 22 J 1/16W		R186			RK73GB1J331J	CHIP R 330 J 1/16W	
R10			RK73GB1J561J	CHIP R 560 J 1/16W		R187			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R11			RK73GB1J272J	CHIP R 2.7K J 1/16W		R188			RK73GB1J680J	CHIP R 68 J 1/16W	
R12			RK73GB1J100J	CHIP R 10 J 1/16W		R189			RK73GB1J100J	CHIP R 10 J 1/16W	
R13			RK73GB1J331J	CHIP R 330 J 1/16W		R190			RK73GB1J153J	CHIP R 15K J 1/16W	
R14			R92-1252-05	CHIP R 0 OHM J 1/16W		R191,192			RK73GB1J223J	CHIP R 22K J 1/16W	
R15			RK73FB2A221J	CHIP R 220 J 1/10W		R193			RK73GB1J473J	CHIP R 47K J 1/16W	
R16,17			RK73FB2A470J	CHIP R 47 J 1/10W		R194,195			RK73GB1J223J	CHIP R 22K J 1/16W	
R18			RK73FB2A221J	CHIP R 220 J 1/10W		R196			RK73GB1J153J	CHIP R 15K J 1/16W	
R19			RK73GB1J151J	CHIP R 150 J 1/16W		R197,198			RK73GB1J334J	CHIP R 330K J 1/16W	
R21			RK73GB1J331J	CHIP R 330 J 1/16W		R199			RK73GB1J560J	CHIP R 56 J 1/16W	
R22			RK73GB1J102J	CHIP R 1.0K J 1/16W		R200			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R23			RK73GB1J682J	CHIP R 6.8K J 1/16W		R202			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R24			RK73GB1J104J	CHIP R 100K J 1/16W		R203			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R25			R92-1261-05	CHIP R 150 J 1/2W		R204			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R26			RK73GB1J103J	CHIP R 10K J 1/16W		R205			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R27			RK73GB1J104J	CHIP R 100K J 1/16W		R206			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R28			R92-1252-05	CHIP R 0 OHM J 1/16W		R207			RK73GB1J473J	CHIP R 47K J 1/16W	
R29			RK73GB1J823J	CHIP R 82K J 1/16W		R208			RK73GB1J392J	CHIP R 3.9K J 1/16W	
R30			R92-1061-05	JUMPER REST 0 OHM		R209			RK73GB1J100J	CHIP R 10 J 1/16W	
R31			RK73GB1J332J	CHIP R 3.3K J 1/16W		R210			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R33			R92-1252-05	CHIP R 0 OHM J 1/16W		R212			RK73GB1J104J	CHIP R 100K J 1/16W	
R38			R92-1252-05	CHIP R 0 OHM J 1/16W		R217			R92-1252-05	CHIP R 0 OHM J 1/16W	
R71			RK73GB1J563J	CHIP R 56K J 1/16W		R221			RK73GB1J473J	CHIP R 47K J 1/16W	
R72			RK73GB1J333J	CHIP R 33K J 1/16W		R251			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R75			RK73GB1J473J	CHIP R 47K J 1/16W		R252			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R76-78			RK73GB1J104J	CHIP R 100K J 1/16W		R253			RK73GB1J103J	CHIP R 10K J 1/16W	
R79			RK73GB1J224J	CHIP R 220K J 1/16W		R254,255			R92-1252-05	CHIP R 0 OHM J 1/16W	
R81,82			RK73GB1J104J	CHIP R 100K J 1/16W		R256			RK73GB1J124J	CHIP R 120K J 1/16W	
R84			RK73GB1J124J	CHIP R 120K J 1/16W		R257			RK73GB1J153J	CHIP R 15K J 1/16W	
R85			RK73GB1J104J	CHIP R 100K J 1/16W		R258			RK73GB1J220J	CHIP R 22 J 1/16W	
R86			RK73GB1J824J	CHIP R 820K J 1/16W		R295			R92-1252-05	CHIP R 0 OHM J 1/16W	
R87			RK73GB1J823J	CHIP R 82K J 1/16W		R298			R92-1368-05	CHIP R 0 OHM	
R88,89			RK73GB1J104J	CHIP R 100K J 1/16W		R301			R92-1252-05	CHIP R 0 OHM J 1/16W	
R90			RK73GB1J334J	CHIP R 330K J 1/16W		R302			RK73GB1J100J	CHIP R 10 J 1/16W	
R108			R92-1252-05	CHIP R 0 OHM J 1/16W		R303			RK73GB1J561J	CHIP R 560 J 1/16W	
R109			RK73GB1J102J	CHIP R 1.0K J 1/16W		R305			RK73GB1J560J	CHIP R 56 J 1/16W	
R115,116			RK73GB1J183J	CHIP R 18K J 1/16W		R306			RK73GB1J183J	CHIP R 18K J 1/16W	
R119			R92-1252-05	CHIP R 0 OHM J 1/16W		R307			R92-1252-05	CHIP R 0 OHM J 1/16W	
R120			RK73GB1J221J	CHIP R 220 J 1/16W		R308			RK73GB1J392J	CHIP R 3.9K J 1/16W	
R121-124			RK73GB1J104J	CHIP R 100K J 1/16W		R309,310			RK73GB1J101J	CHIP R 100 J 1/16W	
R126			R92-1252-05	CHIP R 0 OHM J 1/16W		R311			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R129-133			RK73GB1J104J	CHIP R 100K J 1/16W		R312			RK73GB1J102J	CHIP R 1.0K J 1/16W	
						R315			RK73GB1J102J	CHIP R 1.0K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-6990-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R316			RK73GB1J104J	CHIP R 100K J 1/16W		R428			R92-1368-05	CHIP R 0 OHM	
R317			R92-1252-05	CHIP R 0 OHM J 1/16W		R429,430			RK73HB1J471J	CHIP R 470 J 1/16W	
R318			R92-2577-05	METAL-R 1.8K J 1/4W		R431			R92-1368-05	CHIP R 0 OHM	
R319			RK73GB1J100J	CHIP R 10 J 1/16W		R432			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R320			RK73GB1J180J	CHIP R 18 J 1/16W		R434			RK73HB1J473J	CHIP R 47K J 1/16W	
R321			RK73GB1J103J	CHIP R 10K J 1/16W		R435			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R322			R92-1252-05	CHIP R 0 OHM J 1/16W		R437			R92-1368-05	CHIP R 0 OHM	
R323			RK73GB1J102J	CHIP R 1.0K J 1/16W		R439			R92-1368-05	CHIP R 0 OHM	
R325			RK73GB1J154J	CHIP R 150K J 1/16W		R440-444			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R326			RK73GB1J271J	CHIP R 270 J 1/16W		R445,446			RK73GB1J103J	CHIP R 10K J 1/16W	
R327			RK73GB1J100J	CHIP R 10 J 1/16W		R447			RK73HB1J474J	CHIP R 470K J 1/16W	
R330			RK73GB1J100J	CHIP R 10 J 1/16W		R448			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R332			RK73GB1J100J	CHIP R 10 J 1/16W		R449			RK73HB1J474J	CHIP R 470K J 1/16W	
R333-335			R92-1252-05	CHIP R 0 OHM J 1/16W		R450			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R336			RK73GB1J102J	CHIP R 1.0K J 1/16W		R451			RK73HB1J474J	CHIP R 470K J 1/16W	
R337			RK73GB1J103J	CHIP R 10K J 1/16W		R452			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R339			RK73GB1J104J	CHIP R 100K J 1/16W		R453			RK73HB1J474J	CHIP R 470K J 1/16W	
R340			RK73GB1J101J	CHIP R 100 J 1/16W		R454			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R341,342			RK73GB1J181J	CHIP R 180 J 1/16W		R455,456			RK73HB1J471J	CHIP R 470 J 1/16W	
R343			RK73GB1J472J	CHIP R 4.7K J 1/16W		R457			RK73HB1J473J	CHIP R 47K J 1/16W	
R344			RK73GB1J470J	CHIP R 47 J 1/16W		R458,459			RK73HB1J474J	CHIP R 470K J 1/16W	
R345,346			R92-1252-05	CHIP R 0 OHM J 1/16W		R461			RK73HB1J474J	CHIP R 470K J 1/16W	
R347			RK73GB1J472J	CHIP R 4.7K J 1/16W		R465			RK73GB1J473J	CHIP R 47K J 1/16W	
R348			RK73GB1J103J	CHIP R 10K J 1/16W		R466			RK73HB1J473J	CHIP R 47K J 1/16W	
R349,350			RK73GB1J333J	CHIP R 33K J 1/16W		R467			R92-1368-05	CHIP R 0 OHM	
R351			RK73GB1J472J	CHIP R 4.7K J 1/16W		R468			RK73HB1J473J	CHIP R 47K J 1/16W	
R352			RK73GB1J100J	CHIP R 10 J 1/16W		R469			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R353			RK73GB1J472J	CHIP R 4.7K J 1/16W		R470			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R355			RK73GB1J560J	CHIP R 56 J 1/16W		R471,472			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R356,357			RK73GB1J103J	CHIP R 10K J 1/16W		R473,474			R92-1252-05	CHIP R 0 OHM J 1/16W	
R358			RK73GB1J822J	CHIP R 8.2K J 1/16W		R475			RK73GB1J101J	CHIP R 100 J 1/16W	
R359			RK73GB1J101J	CHIP R 100 J 1/16W		R476			RK73HB1J473J	CHIP R 47K J 1/16W	
R360			RK73GB1J121J	CHIP R 120 J 1/16W		R477,478			RK73HB1J474J	CHIP R 470K J 1/16W	
R361			RK73GB1J221J	CHIP R 220 J 1/16W		R481			RK73HB1J474J	CHIP R 470K J 1/16W	
R362			R92-1252-05	CHIP R 0 OHM J 1/16W		R482			RK73HB1J473J	CHIP R 47K J 1/16W	
R365,366			RK73GB1J222J	CHIP R 2.2K J 1/16W		R483-486			R92-1252-05	CHIP R 0 OHM J 1/16W	
R367			RK73GB1J332J	CHIP R 3.3K J 1/16W		R487			RK73GB1J185J	CHIP R 1.8M J 1/16W	
R369			R92-1252-05	CHIP R 0 OHM J 1/16W		R488,489			R92-1252-05	CHIP R 0 OHM J 1/16W	
R370			RK73GB1J103J	CHIP R 10K J 1/16W		R490			RK73GB1J184J	CHIP R 180K J 1/16W	
R371			R92-1252-05	CHIP R 0 OHM J 1/16W		R491			R92-1252-05	CHIP R 0 OHM J 1/16W	
R373			RK73GB1J100J	CHIP R 10 J 1/16W		R492			RK73GB1J684J	CHIP R 680K J 1/16W	
R375			RK73GB1J331J	CHIP R 330 J 1/16W		R493			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R376,377			R92-1252-05	CHIP R 0 OHM J 1/16W		R494,495			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R378			RK73GB1J103J	CHIP R 10K J 1/16W		R496			RK73GB1J104J	CHIP R 100K J 1/16W	
R400			RK73HH1J105D	CHIP R 1.0M D 1/16W		R497			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R401		*	RK73HH1J362D	CHIP R 3.6K D 1/16W		R498			RK73GB1J274J	CHIP R 270K J 1/16W	
R402			RK73HH1J512D	CHIP R 5.1K D 1/16W		R499			RK73GB1J104J	CHIP R 100K J 1/16W	
R403			RK73HH1J105D	CHIP R 1.0M D 1/16W		R500			R92-1252-05	CHIP R 0 OHM J 1/16W	
R405,406			RK73HB1J474J	CHIP R 470K J 1/16W		R501			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R407			RK73HB1J103J	CHIP R 10K J 1/16W		R502			RK73GB1J103J	CHIP R 10K J 1/16W	
R410			RK73HB1J103J	CHIP R 10K J 1/16W		R503			RK73GB1J104J	CHIP R 100K J 1/16W	
R411,412			RK73HB1J474J	CHIP R 470K J 1/16W		R504			RK73GB1J103J	CHIP R 10K J 1/16W	
R414			RK73HB1J103J	CHIP R 10K J 1/16W		R505			RK73GB1J683J	CHIP R 68K J 1/16W	
R415			RK73HB1J474J	CHIP R 470K J 1/16W		R506,507			RK73GB1J224J	CHIP R 220K J 1/16W	
R416			R92-1368-05	CHIP R 0 OHM		R508			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R418,419			RK73HB1J473J	CHIP R 47K J 1/16W		R509			RK73GB1J333J	CHIP R 33K J 1/16W	
R420			RK73HB1J334J	CHIP R 330K J 1/16W		R511			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R421,422			RK73HB1J473J	CHIP R 47K J 1/16W		R512			RK73GB1J153J	CHIP R 15K J 1/16W	
R423			R92-1368-05	CHIP R 0 OHM		R513			RK73GB1J564J	CHIP R 560K J 1/16W	
R424-427			RK73HB1J102J	CHIP R 1.0K J 1/16W		R514			RK73GB1J183J	CHIP R 18K J 1/16W	

PARTS LIST

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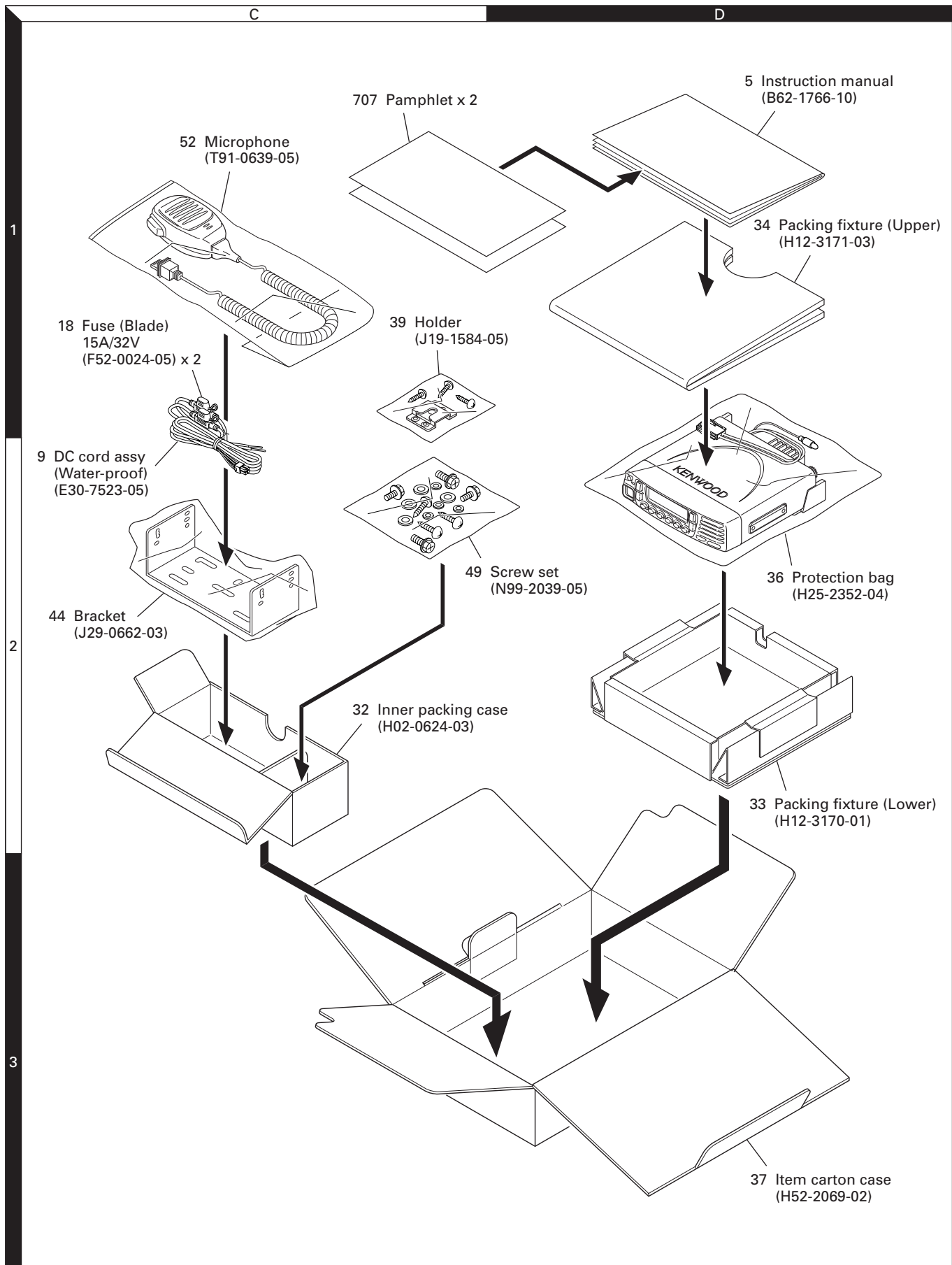
Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R515			RK73GB1J104J	CHIP R 100K J 1/16W		R592			R92-1252-05	CHIP R 0 OHM J 1/16W	
R517			RK73GB1J223J	CHIP R 22K J 1/16W		R594			RK73GB1J681J	CHIP R 680 J 1/16W	
R519			RK73GB1J104J	CHIP R 100K J 1/16W		R595			RK73GB1J274J	CHIP R 270K J 1/16W	
R520			R92-1252-05	CHIP R 0 OHM J 1/16W		R596			R92-1252-05	CHIP R 0 OHM J 1/16W	
R521			RK73GB1J473J	CHIP R 47K J 1/16W		R597			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R522			RK73GB1J104J	CHIP R 100K J 1/16W		R598			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R523			RK73GB1J564J	CHIP R 560K J 1/16W		R599			RK73GB1J184J	CHIP R 180K J 1/16W	
R524			RK73GB1J103J	CHIP R 10K J 1/16W		R600			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R525			RK73HB1J152J	CHIP R 1.5K J 1/16W		R601			RK73GB1J474J	CHIP R 470K J 1/16W	
R526			RK73GB1J274J	CHIP R 270K J 1/16W		R602			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R527			RK73GB1J392J	CHIP R 3.9K J 1/16W		R603,604			R92-1252-05	CHIP R 0 OHM J 1/16W	
R528			RK73GB1J473J	CHIP R 47K J 1/16W		R606			R92-1252-05	CHIP R 0 OHM J 1/16W	
R529			RK73GB1J684J	CHIP R 680K J 1/16W		R607			RK73GB1J274J	CHIP R 270K J 1/16W	
R530			RK73GB1J334J	CHIP R 330K J 1/16W		R608			RK73GB1J184J	CHIP R 180K J 1/16W	
R531			RK73GB1J103J	CHIP R 10K J 1/16W		R609			RK73GB1J223J	CHIP R 22K J 1/16W	
R532			RK73GB1J102J	CHIP R 1.0K J 1/16W		R610			RK73GB1J154J	CHIP R 150K J 1/16W	
R533			RK73GB1J104J	CHIP R 100K J 1/16W		R611			RK73GB1J103J	CHIP R 10K J 1/16W	
R534			RK73GB1J273J	CHIP R 27K J 1/16W		R612,613			RK73GB1J104J	CHIP R 100K J 1/16W	
R535			RK73GB1J394J	CHIP R 390K J 1/16W		R614			R92-1368-05	CHIP R 0 OHM	
R536			RK73GB1J153J	CHIP R 15K J 1/16W		R615,616			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R539			RK73GB1J393J	CHIP R 39K J 1/16W		R617			RK73GB1J104J	CHIP R 100K J 1/16W	
R540			RK73GB1J473J	CHIP R 47K J 1/16W		R618			RK73GB1J224J	CHIP R 220K J 1/16W	
R541,542			R92-1252-05	CHIP R 0 OHM J 1/16W		R619			RK73GB1J104J	CHIP R 100K J 1/16W	
R545			RK73GB1J103J	CHIP R 10K J 1/16W		R620			RK73GB1J224J	CHIP R 220K J 1/16W	
R546			R92-1252-05	CHIP R 0 OHM J 1/16W		R621,622			R92-0670-05	CHIP R 0 OHM	
R548			RK73GB1J823J	CHIP R 82K J 1/16W		R623,624			RK73GB1J473J	CHIP R 47K J 1/16W	
R549			RK73GB1J473J	CHIP R 47K J 1/16W		R625			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R550			RK73GB1J472J	CHIP R 4.7K J 1/16W		R629,630			R92-0670-05	CHIP R 0 OHM	
R552			RK73GB1J103J	CHIP R 10K J 1/16W		R632			RK73GB1J473J	CHIP R 47K J 1/16W	
R553			RK73GB1J472J	CHIP R 4.7K J 1/16W		R633			R92-0670-05	CHIP R 0 OHM	
R554			RK73GB1J563J	CHIP R 56K J 1/16W		R636			R92-0670-05	CHIP R 0 OHM	
R555			RK73GB1J123J	CHIP R 12K J 1/16W		R641,642			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R556			RK73GB1J563J	CHIP R 56K J 1/16W		R643			RK73GB1J471J	CHIP R 470 J 1/16W	
R557			RK73GB1J472J	CHIP R 4.7K J 1/16W		R644			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R558			RK73GB1J394J	CHIP R 390K J 1/16W		R645			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R559			RK73GB1J124J	CHIP R 120K J 1/16W		R646			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R560			RK73GB1J394J	CHIP R 390K J 1/16W		R647			RK73GB1J104J	CHIP R 100K J 1/16W	
R563			RK73GB1J394J	CHIP R 390K J 1/16W		R648			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R565			R92-1252-05	CHIP R 0 OHM J 1/16W		R651			R92-1252-05	CHIP R 0 OHM J 1/16W	
R566			RK73GB1J105J	CHIP R 1.0M J 1/16W		R652			RK73GB1J561J	CHIP R 560 J 1/16W	
R567			RK73GB1J394J	CHIP R 390K J 1/16W		R653			RK73GB1J2R2J	CHIP R 2.2 J 1/16W	
R568			RK73GB1J124J	CHIP R 120K J 1/16W		R654			R92-0670-05	CHIP R 0 OHM	
R569			RK73GB1J104J	CHIP R 100K J 1/16W		R655			R92-1252-05	CHIP R 0 OHM J 1/16W	
R570			RK73GB1J154J	CHIP R 150K J 1/16W		R657			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R571			RK73GB1J124J	CHIP R 120K J 1/16W		R658			R92-1368-05	CHIP R 0 OHM	
R572			R92-1368-05	CHIP R 0 OHM		R659			RK73GB1J333J	CHIP R 33K J 1/16W	
R573			RK73GB1J682J	CHIP R 6.8K J 1/16W		R661			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R574,575			R92-1368-05	CHIP R 0 OHM		R663,664			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R576			RK73GB1J224J	CHIP R 220K J 1/16W		R701-705			RK73GB1J473J	CHIP R 47K J 1/16W	
R578			R92-1368-05	CHIP R 0 OHM		R706-710			RK73GB1J471J	CHIP R 470 J 1/16W	
R579			RK73GB1J223J	CHIP R 22K J 1/16W		R711-713			RK73GB1J473J	CHIP R 47K J 1/16W	
R580,581			RK73GB1J151J	CHIP R 150 J 1/16W		R714-720			RK73GB1J471J	CHIP R 470 J 1/16W	
R582			RK73GB1J105J	CHIP R 1.0M J 1/16W		R800			RK73HH1J105D	CHIP R 1.0M D 1/16W	
R583,584			R92-1252-05	CHIP R 0 OHM J 1/16W		R801			RK73GB1J224J	CHIP R 220K J 1/16W	
R585			RK73GB1J184J	CHIP R 180K J 1/16W		R802			RK73GB1J334J	CHIP R 330K J 1/16W	
R586			RK73GB1J102J	CHIP R 1.0K J 1/16W		R803			RK73GB1J103J	CHIP R 10K J 1/16W	
R587			RK73GB1J154J	CHIP R 150K J 1/16W		R804			RK73HH1J104D	CHIP R 100K D 1/16W	
R588			RK73GB1J472J	CHIP R 4.7K J 1/16W		R805			RK73GB1J471J	CHIP R 470 J 1/16W	
R589,590			R92-1252-05	CHIP R 0 OHM J 1/16W		R806,807			RK73GB1J103J	CHIP R 10K J 1/16W	
R591			R92-1368-05	CHIP R 0 OHM		R808,809			RK73GB1J473J	CHIP R 47K J 1/16W	

PARTS LIST

TX-RX UNIT (X57-6990-10)

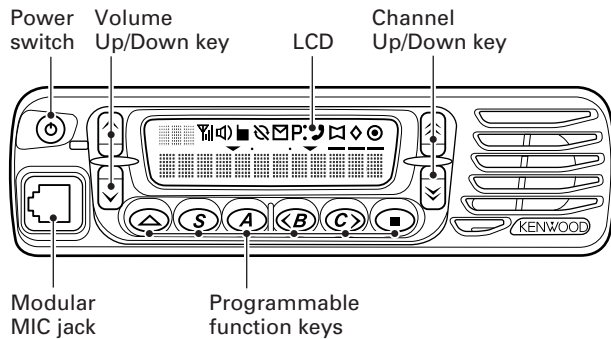
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R811,812			RK73GB1J103J	CHIP R 10K J 1/16W		IC414			TC75W51FU	MOS IC	
R813			RK73GB1J472J	CHIP R 4.7K J 1/16W		IC415		*	AQUA-L	MOS IC	
R814			RK73GB1J473J	CHIP R 47K J 1/16W		IC416			ADM202EARN	MOS IC	
R815			RK73GB1J683J	CHIP R 68K J 1/16W		IC417	2A	*	TA7252AP	ANALOG IC	
R818			RK73GB1J473J	CHIP R 47K J 1/16W		IC801			S-80942CNNBG9C	MOS IC	
R900-903			R92-1368-05	CHIP R 0 OHM		IC802			XC61CN5002NR	MOS IC	
D1			02DZ5.6(X,Y)	ZENER DIODE		IC803			TA7808F	ANALOG IC	
D2			XB15A709	DIODE		IC804			TA7805F	MOS IC	
D3			XB15A407A2GB	DIODE		IC805			NJM78L05UA	BI-POLAR IC	
D6-8			HSM88AS	DIODE		IC807		*	XC6201P502PR	MOS IC	
D103-106			1SV286	VARIABLE CAPACITANCE DIODE		Q1			2SC5108(Y)	TRANSISTOR	
D107-110		*	1SV291	VARIABLE CAPACITANCE DIODE		Q2			2SC5192	TRANSISTOR	
D111			HVC131	DIODE		Q3			DTC114EE	DIGITAL TRANSISTOR	
D171,172			DAN235E	DIODE		Q70			DTC114EE	DIGITAL TRANSISTOR	
D173			RB706F-40	DIODE		Q72			2SK1824	FET	
D174			MA2S111	DIODE		Q103			2SC3357	TRANSISTOR	
D251			1SS388	DIODE		Q171,172			2SC5108(Y)	TRANSISTOR	
D308,309		*	BB664	VARIABLE CAPACITANCE DIODE		Q173			DTA114EE	DIGITAL TRANSISTOR	
D311		*	BB664	VARIABLE CAPACITANCE DIODE		Q174			DTC144EE	DIGITAL TRANSISTOR	
D313		*	BB664	VARIABLE CAPACITANCE DIODE		Q175			2SC4617(Q)	TRANSISTOR	
D314			1SV278	VARIABLE CAPACITANCE DIODE		Q176			2SK1824	FET	
D315,316			HVC131	DIODE		Q177			DTC144EE	DIGITAL TRANSISTOR	
D402-404			1SS388	DIODE		Q178			DTA144EE	DIGITAL TRANSISTOR	
D405			EMZ6.8N	ZENER DIODE		Q179			DTC144EE	DIGITAL TRANSISTOR	
D406			02DZ5.1(Y)	ZENER DIODE		Q251			2SC4617(S)	TRANSISTOR	
D407			RB706F-40	DIODE		Q301			2SC5108(Y)	TRANSISTOR	
D408,409			MA742	DIODE		Q302,303			2SC4116(BL)	TRANSISTOR	
D412-414			DA204U	DIODE		Q306,307			2SK508NV(K52)	FET	
D416			DAN202U	DIODE		Q308,309			2SC4116(GR)	TRANSISTOR	
D417,418			1SS388	DIODE		Q310			DTC114EE	DIGITAL TRANSISTOR	
D421-423			1SS388	DIODE		Q311			2SC5108(Y)	TRANSISTOR	
D600,601			1SS388	DIODE		Q312			2SC4617(S)	TRANSISTOR	
D701			02DZ18(X,Y)	ZENER DIODE		Q313			2SC5108(Y)	TRANSISTOR	
D702,703			1SS355	DIODE		Q402			DTC114YE	DIGITAL TRANSISTOR	
D704-708			DA204U	DIODE		Q405			DTA114EE	DIGITAL TRANSISTOR	
D709,710			02DZ18(X,Y)	ZENER DIODE		Q406			HN1J02FU	FET	
D711-713			DA204U	DIODE		Q409			DTC363EU	DIGITAL TRANSISTOR	
D714			02DZ18(X,Y)	ZENER DIODE		Q410			2SC4116(Y)	TRANSISTOR	
D801			2ZZR-10D	SURGE ABSORBER		Q411			2SA1586(Y,GR)	TRANSISTOR	
D802			DSA3A1	DIODE		Q412			2SK1824	FET	
D804			02DZ18(X,Y)	ZENER DIODE		Q413,414			2SJ243	FET	
D805			02CZ9.1(X,Y)	ZENER DIODE		Q415			HN1L02FU	FET	
IC1	2A	*	RA30H4452M-23	MOS IC		Q416,417			2SJ243	FET	
IC71,72		*	TA75W01FU	MOS IC		Q418			DTC114EE	DIGITAL TRANSISTOR	
IC171		*	SPM5001	MOS IC		Q419			DTC363EU	DIGITAL TRANSISTOR	
IC172			TA31136FN	MOS IC		Q600			DTA144EE	DIGITAL TRANSISTOR	
IC251		*	MAX5026EUT+T	MOS IC		Q701,702			2SD2114K(W)	TRANSISTOR	
IC301			ADF4111BCP7	MOS IC		Q801			2SC2873(Y)	TRANSISTOR	
IC302			TC7S66FU	MOS IC		Q802			DTC114EE	DIGITAL TRANSISTOR	
IC401			AT24256N10SI27	ROM IC		Q803-805		*	12A02CH	TRANSISTOR	
IC402			RV5C386A	MOS IC		Q806-809			DTC114EE	DIGITAL TRANSISTOR	
IC403			BU4094BCFV	MOS IC		Q810		*	2SJ645	FET	
IC404			30625MGP-169GP	MPU		Q811			DTC114TE	DIGITAL TRANSISTOR	
IC405			AT29C040A-90TI	ROM IC		Q812			DTC114EE	DIGITAL TRANSISTOR	
IC406-409			TC75W51FU	MOS IC		TH1			S1R104J475H	THERMISTOR	
IC410			M62364FP	MOS IC		TH171		*	S1R473J475H	THERMISTOR	
IC411			LMC7101BIM5	MOS IC							
IC412			TC75W51FU	MOS IC							
IC413		*	TC7MZ4053FK	MOS IC							

PACKING



ADJUSTMENT

Controls



Panel Test Mode

■ Test mode operation features

This transceiver has a test mode. **To enter test mode, press [A] key and turn power on. Hold [A] key until frequency version appears on LCD.** Test mode can be inhibited by programming. To exit test mode, switch the power on again. The following functions are available in test mode.

■ Key operation

Key	"FNC" not appears	
	Function	Display
[S]	Shifts to Panel tuning mode	-
[A]	Function on	"FNC" appears
[B]	MSK 1200bps and 2400bps	2400bps : icon appears
[C]	Test signaling CH up	Signaling No.
[↗]/[↘]	Test frequency CH up/down	Channel No.
[^]/[v]	Volume up/down	-
[△]	Squelch on/off	
[■]	Narrow/Wide 4k/Wide 5k	Narrow : "n", Wide 4k : "s", Wide 5k : "w"
Microphone key		
[PTT]	Transmit	-
[0] to [9] and [A], [B], [C], [D], [#], [*]	Use as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was presses is sent.	-

Key	"FNC" appears	
	Function	Display
[S]	High power / Low power	Low : icon appears
[A]	Function off	-
[B]	Compander on/off	On : icon appears
[C]	Beat shift on/off	On : icon appears
[↗]/[↘]	Function off	-
[^]/[v]	Function off	-
[△]	Squelch level 0	On : icon appears
[■]	LCD all lights	LCD all point appears
Microphone key		
[PTT]	Transmit	-
[0] to [9] and [A], [B], [C], [D], [#], [*]	Function off	-

Notes :

- If a [S], [A], [B], [C] key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent.
- The "Wide 4k" can not use, please skip it.

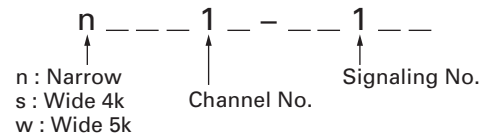
• LED indicator

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

• Sub LCD indicator

"FNC" Appears at function on.

• LCD display in panel test mode



■ Frequency and Signaling

The set has been adjusted for the frequencies shown in the following table. When required, readjust them following the adjustment procedure to obtain the frequencies you want in actual operation.

• Test frequency

CH	RX (MHz)	TX (MHz)
1	485.05000	485.10000
2	450.05000	450.10000
3	519.95000	519.90000
4	485.00000	485.00000
5	485.20000	485.20000
6	485.40000	485.40000
7~16	-	-

ADJUSTMENT

• Test signaling

No.	RX	TX
1	None	None
2	None	100Hz Square Wave
3	LTR Data : AREA=0, GOTO=12 HOME=12 ID=47, FREE=25	LTR Data : AREA=0, GOTO=12 HOME=12 ID=47, FREE=25
4	QT : 67.0Hz	QT : 67.0Hz
5	QT : 151.4Hz	QT : 151.4Hz
6	QT : 210.7Hz	QT : 210.7Hz
7	QT : 254.1Hz	QT : 254.1Hz
8	DQT : D023N	DQT : D023N
9	DQT : D754I	DQT : D754I
10	DTMF : 159D	DTMF : 159D
11	None	DTMF Code 9
12	2-tone : A : 304.7Hz B : 3106.0Hz	2-tone : A : 304.7Hz B : 3106.0Hz
13	Single Tone : 979.9Hz	Single Tone : 979.9Hz
14	None	Single Tone : 1000Hz
15	5-tone (CCIR 12345)	5-tone (CCIR 12345)
16	None	MSK
17	MSK : Preamble : 0xAAAA Sync : 0x23EB Data : 0x230960C6AAAA CRC : 0xC4D7	MSK : Preamble : 0xAAAA Sync : 0x23EB Data : 0x230960C6AAAA CRC : 0xC4D7

Note : The "5-tone signaling" can not use, please skip it.

Panel Tuning Mode

■ Preparations for tuning the transceiver

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

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

The speaker output connector must be terminated with a 4Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

■ Transceiver tuning

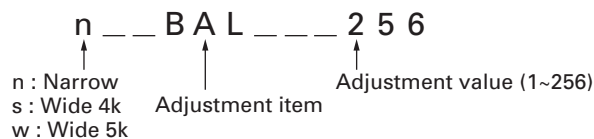
(To place transceiver in tuning mode)

Press [S] key, now in tuning mode. Use [B] key to write tuning data through tuning modes, and [▲]/[▼] to adjust tuning requirements (1 to 256 appears on LCD).

Use [C] key to select the adjustment item through tuning modes. Use [A] key to adjust 3 or 5 reference level adjustments, and use [■] key to switch between Wide 5k/Wide 4k/Narrow.

Channel appears on LCD. Set channel according to tuning requirements.

• LCD display in panel tuning mode



■ Key operation

Key	Function	
	Push	Hold (1 second)
[S]	End of panel tuning mode	-
[A]	To enter 3 or 5 reference level adjustments	-
[B]	Writes the adjustment value	-
[C]	Go to next adjustment item	Back to last adjustment item
[▲]/[▼]	Adjustment value up/down	Continuation up/down
[^]/[v]	Volume level up/down	Continuation up/down
[△]	Squelch on/off	-
[■]	Selects Narrow, Wide 4k, Wide 5k	-

■ 3 or 5 reference level adjustments frequency

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

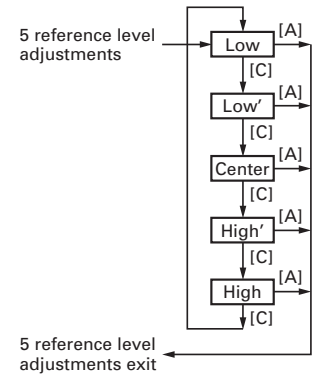
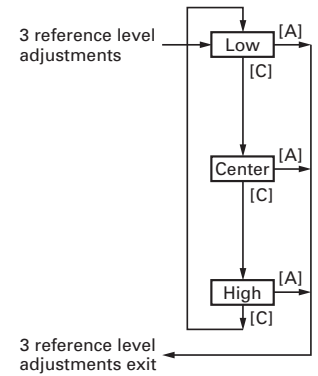
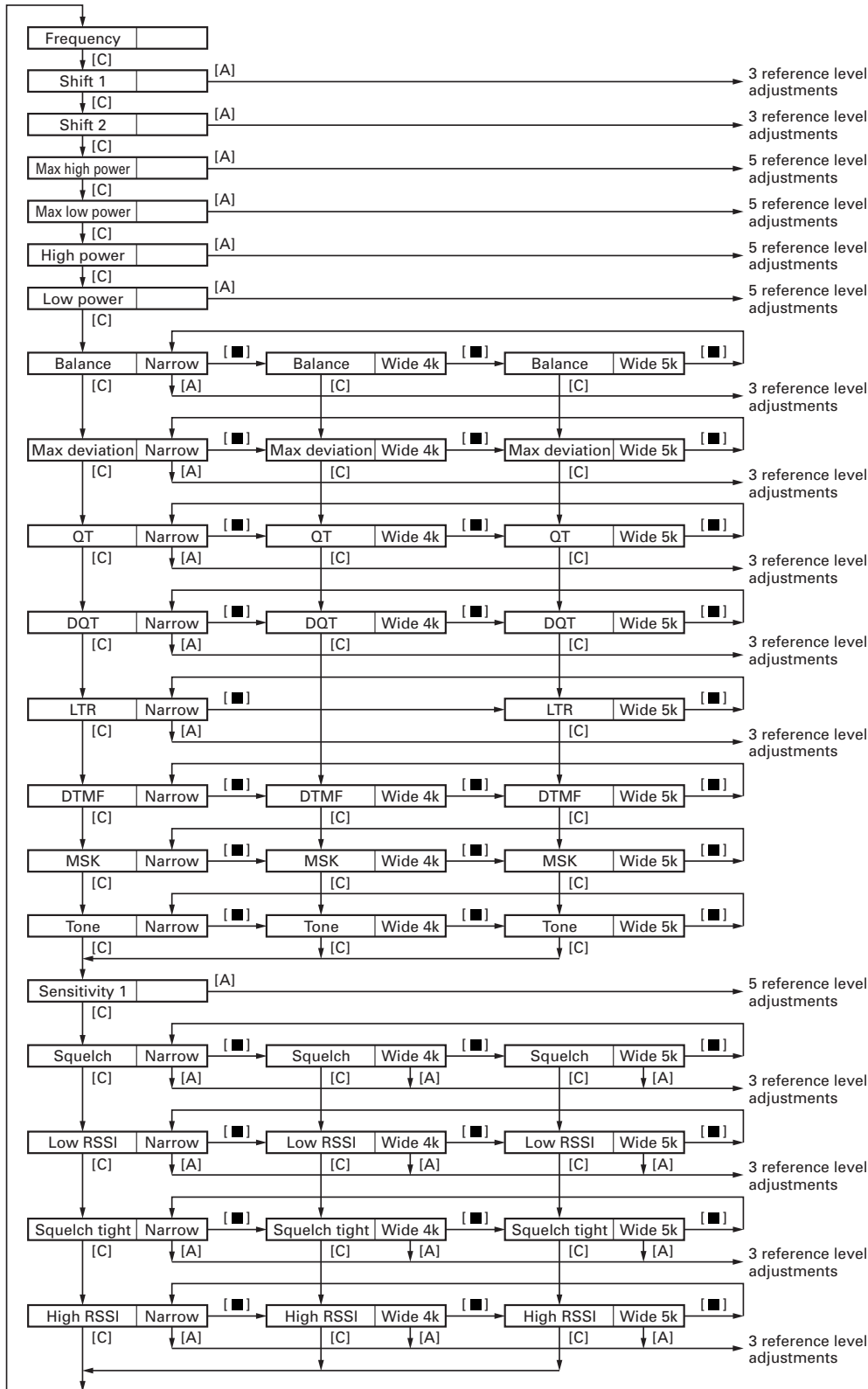
■ Adjustment item and Display (*** : 1~256)

Order	Adjustment item	Display
1	Frequency	FREQ ***
2	Shift 1	SHFT1 ***
3	Shift 2	SHFT2 ***
4	Max high power	MHPWR ***
5	Max low power	MLPWR ***
6	High power	HPWR ***
7	Low power	LPWR ***
8	Balance	BAL ***
9	Max deviation	DEV ***
10	QT	QT ***
11	DQT	DQT ***
12	LTR	LTR ***
13	DTMF	DTMF ***
14	MSK	MSK ***
15	Tone	TONE ***
16	Sensitivity 1	SENS1 ***
17	Squelch	SQL ***
18	Low RSSI	LRSSI ***
19	Squelch tight	SQLT ***
20	High RSSI	HRSSI ***

ADJUSTMENT

■ Flow chart

Note : The "Wide 4k" can not use, please skip it.

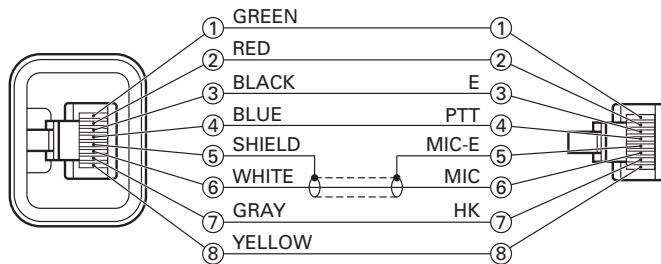


ADJUSTMENT

Test Equipment Required for Alignment

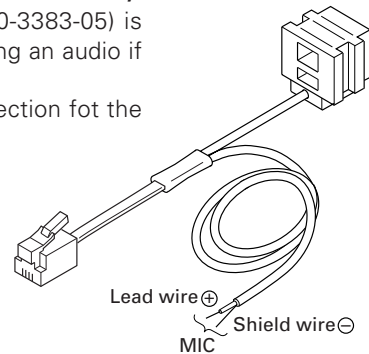
Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range	400 to 520MHz
	Modulation	Frequency modulation and external modulation
	Output	0.1μV to greater than 1mV
2. Power Meter	Input Impedance	50Ω
	Operation Frequency	400 to 520MHz or more
	Measurement Capability	Vicinity of 50W
3. Deviation Meter	Frequency Range	400 to 520MHz
4. Digital Volt Meter (DVM)	Measuring Range	1 to 20V DC
	Accuracy	High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range	10Hz to 600MHz
	Frequency Stability	0.2ppm or less
7. Ammeter		13A or more
8. AF Volt Meter (AF VTVM)	Frequency Range	50Hz to 10kHz
	Voltage Range	3mV to 3V
9. Audio Generator (AG)	Frequency Range	50Hz to 5kHz
	Output	0 to 1V
10. Distortion Meter	Capability	3% or less at 1kHz
	Input Level	50mV to 10Vrms
11. Voltmeter	Measuring Range	10 to 1.5V DC or less
	Input Impedance	50kΩ/V or greater
12. 4Ω Dummy Load		Approx. 4Ω, 20W
13. Regulated Power Supply		13.6V, approx. 20A (adjustable from 9 to 20V) Useful if ammeter reequipped

Test cable for microphone input (E30-3360-08)

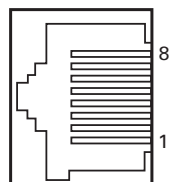


Tuning cable (E30-3383-05)

Adapter cable (E30-3383-05) is required for injecting an audio if PC tuning is used. See "PC Mode" section for the connection.



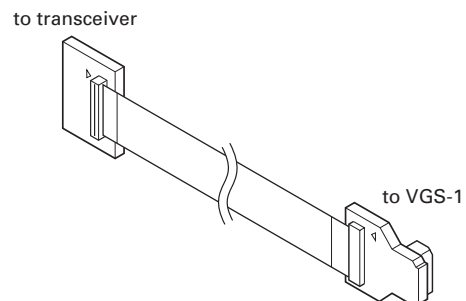
MIC connector (Front panel view)



- 1 : BLC
- 2 : +B
- 3 : GND
- 4 : PTT/TXD
(PC serial data from radio)
- 5 : MICE
- 6 : MIC
- 7 : HOOK/RXD
(PC serial data to radio)
- 8 : DM

Check Jig for the VGS-1

KENWOOD part : W05-1127-00



ADJUSTMENT

Common Section


Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Power supply voltage DC power supply terminal : 13.6V 2) SSG standard modulation [Wide 5k] MOD : 1kHz, DEV : 3kHz [Wide 4k] MOD : 1kHz, DEV : 2.4kHz [Narrow] MOD : 1kHz, DEV : 1.5kHz							
2. VCO lock voltage • RX	[Panel test mode] 1) CH-Sig : 3-1	Power meter	Rear panel	ANT	TX-RX (B/3)	TC301	8.1V	±0.1V
	2) CH-Sig : 2-1	DVM	TX-RX (B/3)	CV			Check	1.5V±0.5V
	[Panel tuning mode] LPWR* 3) CH-Sig : 3-1 PTT : ON				TX-RX (B/3)	TC302	8.1V	±0.1V
	4) CH-Sig : 2-1 PTT : ON						Check	1.5V±0.5V

* TX can be continued on unlock condition in panel tuning mode.

Transmitter Section (K market model skips adjustment of Wide 4k)

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Frequency adjust	1) Adj item : [FREQ] Adjust : [***] PTT : ON	f. counter	Rear panel	ANT	Front panel	[↗],[↘]	Center frequency ±100Hz	Note : After replacing the VCXO (X301) align frequency.
2. Frequency shift 1 adjust	1) Adj item : [SHFT1] Adjust : [***] 2) Adj item : [L SHFT1] → [C SHFT1] → [H SHFT1] Adjust : [***] PTT : ON						[L SHFT1] Low frequency+5.00kHz [C SHFT1] Center frequency+5.00kHz [H SHFT1] High frequency+5.00kHz	±100Hz
3. Frequency shift 2 adjust	1) Adj item : [SHFT2] Adjust : [***] 2) Adj item : [L SHFT2] → [C SHFT2] → [H SHFT2] Adjust : [***] PTT : ON						[L SHFT2] Low frequency+6.25kHz [C SHFT2] Center frequency+6.25kHz [H SHFT2] High frequency+6.25kHz	±100Hz
4. Max high power adjust	1) Adj item : [MHPWR] Adjust : [***] 2) Adj item : [L MHPWR] → [L' MHPWR] → [C MHPWR] → [H' MHPWR] → [H MHPWR] Adjust : [***] PTT : ON	Power meter					[L MHPWR], [L' MHPWR], [C MHPWR] : 33W [H' MHPWR], [H MHPWR] : 28W	±3W

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. Max low power adjust	1) Adj item : [MLPWR] Adjust : [***] 2) Adj item : [L MLPWR] → [L' MLPWR] → [C MLPWR] → [H' MLPWR] → [H MLPWR] Adjust : [***] PTT : ON	Power meter	Rear panel	ANT	Front panel	[↗],[↘]	15W	±1W
6. High power adjust	1) Adj item : [HPWR] Adjust : [***] 2) Adj item : [L HPWR] → [L' HPWR] → [C HPWR] → [H' HPWR] → [H HPWR] Adjust : [***] PTT : ON	Power meter Ammeter					[L HPWR], [L' HPWR], [C HPWR] : 30W [H' HPWR], [H HPWR] : 25W	±1W 9A or less
7. High power check	[Panel test mode] 1) CH-Sig : 1-1 PTT : ON						Check	25~35W 9A or less
	2) CH-Sig : 2-1 PTT : ON							
	3) CH-Sig : 3-1 PTT : ON							21~29W 9A or less
8. Low power adjust	1) Adj item : [LPWR] Adjust : [***] 2) Adj item : [L LPWR] → [L' LPWR] → [C LPWR] → [H' LPWR] → [H LPWR] Adjust : [***] PTT : ON				Front panel	[↗],[↘]	5.0W	±0.5W 5A or less
9. Low power check	[Panel test mode] 1) CH-Sig : 1-1 Set low power (Push [S]) PTT : ON						Check	3.5~6.5W 5A or less
	2) CH-Sig : 2-1 PTT : ON							
	3) CH-Sig : 3-1 PTT : ON							
10. DQT balance adjust	1) Adj item : [n BAL] Adjust : [***] Deviation meter filter LPF : 3kHz HPF : OFF	Power meter	Rear panel	ANT	Front panel	[↗],[↘]	Make the demodulation waves into square waves.	
	• Narrow	Deviation meter	Front panel	Modular MIC jack				
	2) Adj item : [nL BAL] → [nC BAL] → [nH BAL] Adjust : [***] PTT : ON	Oscilloscope						
	• Wide 4k	AF VTVM						
3) Adj item : [s BAL] Adjust : [***] PTT : ON								
• Wide 5k	4) Adj item : [w BAL] Adjust : [***] PTT : ON							

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks	
		Test-equipment	Unit	Terminal	Unit	Parts	Method		
11. Max DEV adjust • Narrow	1) Adj item : [n DEV] Adjust : [***] AG : 1kHz/50mV at MIC terminal Deviation meter filter LPF : 15kHz HPF : OFF	Power meter	Rear panel	ANT	Front panel	[∧],[∨]	2.10kHz (According to the larger +, -)	±0.10kHz	
	2) Adj item : [nL DEV] → [nC DEV] → [nH DEV] Adjust : [***] PTT : ON	Deviation meter Oscilloscope AG AF VTVM	Front panel	Modular MIC jack					
	• Wide 4k	3) Adj item : [s DEV] Adjust : [***] PTT : ON						3.30kHz (According to the larger +, -)	±0.10kHz
• Wide 5k	4) Adj item : [w DEV] Adjust : [***] PTT : ON						4.20kHz (According to the larger +, -)	±0.10kHz	
12. MIC sensitivity check (Wide 5k only)	[Panel test mode] 1) CH-Sig : 1-1 AG : 1kHz/5mV at MIC terminal PTT : ON						Check	2.5~3.5kHz	
13. QT deviation adjust • Narrow	1) Adj item : [n QT] Adjust : [***] Deviation meter filter LPF : 3kHz HPF : OFF				Front panel	[∧],[∨]	0.35kHz	±0.05kHz	
	2) Adj item : [nL QT] → [nC QT] → [nH QT] Adjust : [***] PTT : ON								
	• Wide 4k	3) Adj item : [s QT] Adjust : [***] PTT : ON						0.60kHz	±0.10kHz
• Wide 5k	4) Adj item : [w QT] Adjust : [***] PTT : ON						0.75kHz	±0.10kHz	
14. DQT deviation adjust • Narrow	1) Adj item : [n DQT] Adjust : [***] Deviation meter filter LPF : 3kHz HPF : OFF					[∧],[∨]	0.35kHz	±0.05kHz	
	2) Adj item : [nL DQT] → [nC DQT] → [nH DQT] Adjust : [***] PTT : ON								
	• Wide 4k	3) Adj item : [s DQT] Adjust : [***] PTT : ON						0.60kHz	±0.10kHz
• Wide 5k	4) Adj item : [w DQT] Adjust : [***] PTT : ON						0.75kHz	±0.10kHz	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
15. LTR deviation adjust • Narrow	1) Adj item : [n LTR] Adjust : [***] Deviation meter filter LPF : 3kHz HPF : OFF	Power meter Deviation meter Oscilloscope AG AF VTVM	Rear panel	ANT	Front panel	[↗],[↘]	0.75kHz	±0.10kHz
	2) Adj item : [nL LTR] → [nC LTR] → [nH LTR] Adjust : [***] PTT : ON		Front panel	Modular MIC jack				
	• Wide		3) Adj item : [w LTR] Adjust : [***] PTT : ON					
16. DTMF deviation adjust • Narrow	1) Adj item : [n DTMF] Adjust : [***] Deviation meter filter LPF : 15kHz HPF : OFF PTT : ON						1.5kHz	±0.1kHz
	• Wide 4k	2) Adj item : [s DTMF] Adjust : [***] PTT : ON					2.4kHz	±0.1kHz
	• Wide 5k	3) Adj item : [w DTMF] Adjust : [***] PTT : ON					3.0kHz	±0.1kHz
17. MSK deviation adjust • Narrow	1) Adj item : [n MSK] Adjust : [***] Deviation meter filter LPF : 15kHz HPF : OFF PTT : ON						1.5kHz	±0.1kHz
	• Wide 4k	2) Adj item : [s MSK] Adjust : [***] PTT : ON					2.4kHz	±0.1kHz
	• Wide 5k	3) Adj item : [w MSK] Adjust : [***] PTT : ON					3.0kHz	±0.1kHz
18. TONE deviation adjust • Narrow	1) Adj item : [n TONE] Adjust : [***] Deviation meter filter LPF : 15kHz HPF : OFF PTT : ON						1.5kHz	±0.1kHz
	• Wide 4k	2) Adj item : [s TONE] Adjust : [***] PTT : ON					2.4kHz	±0.1kHz
	• Wide 5k	3) Adj item : [w TONE] Adjust : [***] PTT : ON					3.0kHz	±0.1kHz

ADJUSTMENT

Receiver Section (K market model skips adjustment of Wide 4k)

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity adjust	1) Adj item : [SENS1] Adjust : [***] 2) Adj item : [L SENS1] → [L' SENS1] → [C SENS1] → [H' SENS1] → [H SENS1] Adjust : [***]	SSG AF VTVM Oscilloscope	Rear panel	ANT EXT. SP	Front panel	[↗],[↘]	Enter the following adjustment values to the transceiver by pressing [↗] and [↘] keys. [L SENS1] : 70 [L' SENS1] : 90 [C SENS1] : 115 [H' SENS1] : 138 [H SENS1] : 164 After setting the adjustment value, press [B] key. The adjustment value will be stored in memory.	Note : After replacing the EEPROM (IC401) align sensitivity.
2. Sensitivity check	[Panel test mode] 1) CH-Sig : 1-1 SSG output Wide 5k : -116dBm (0.35μV) (MOD : 1kHz±3kHz) Narrow : -116dBm (0.35μV) (MOD : 1kHz±1.5kHz)						Check	12dB SINAD or more
3. Squelch (Preset) adjust • Narrow	1) Adj item : [n SQL] Adjust : [***] SSG output : 12dB SINAD level (MOD : 1kHz±1.5kHz)						After input signal from SSG, press [B] key. That numeric will be stored in memory.	After adjusting SQL, check SQL open/close. SSG 12dB SINAD level + 4dB : Open SSG 12dB SINAD level - 6dB : Close [nC SQL] MOD 1kHz±1.5kHz [sC SQL] MOD 1kHz±2.4kHz [wC SQL] MOD 1kHz±3.0kHz
	2) Adj item : [nL SQL] → [nC SQL] → [nH SQL] Adjust : [***]							
• Wide 4k	3) Adj item : [s SQL] Adjust : [***] SSG output : 12dB SINAD level (MOD : 1kHz±2.4kHz)							
	4) Adj item : [sL SQL] → [sC SQL] → [sH SQL] Adjust : [***]							
• Wide 5k	5) Adj item : [w SQL] Adjust : [***] SSG output : 12dB SINAD level (MOD : 1kHz±3.0kHz)							
	6) Adj item : [wL SQL] → [wC SQL] → [wH SQL] Adjust : [***]							

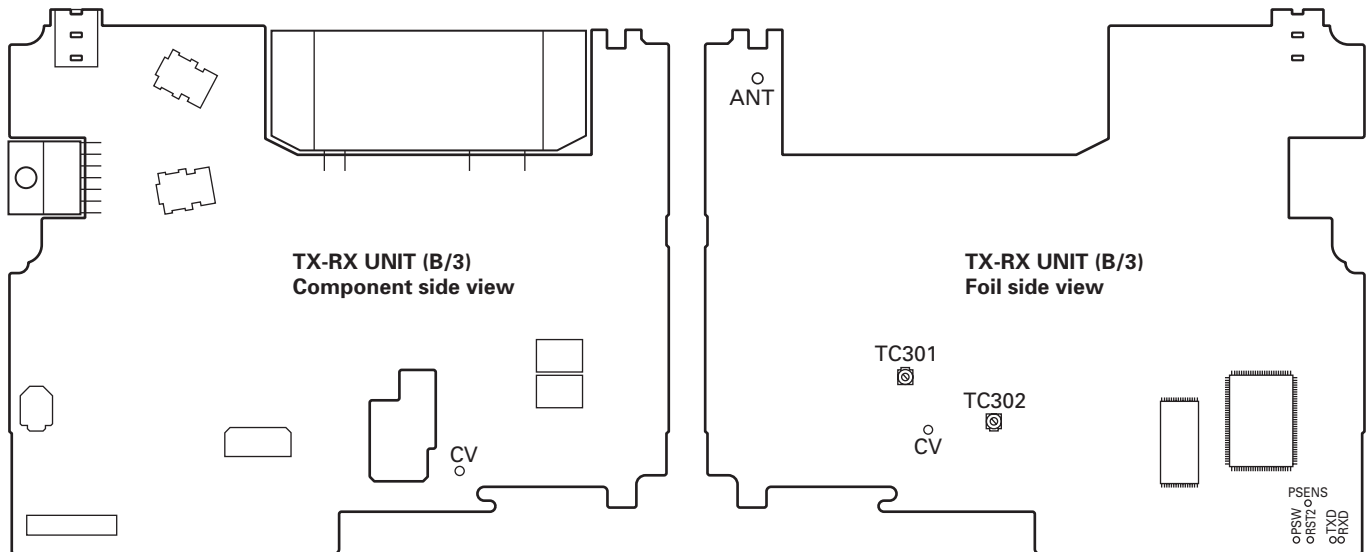
ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks	
		Test-equipment	Unit	Terminal	Unit	Parts	Method		
4. Low RSSI adjust • Narrow	1) Adj item : [n LRSSI] Adjust : [***] SSG output : 12dB SINAD level (MOD : 1kHz±1.5kHz)	SSG AF VTVM Oscilloscope	Rear panel	ANT			After input signal from SSG, press [B] key. That numeric will be stored in memory.	The following erroneous performance may occur if any irregular RSSI adjustment, such as pressing the [B] key assigned for determination when it is the ANT OPEN state, is performed. • The antenna bar (▼) cannot appear correctly. • Scan does not stop.	
	2) Adj item : [nL LRSSI] → [nC LRSSI] → [nH LRSSI] Adjust : [***]			EXT. SP					
	• Wide 4k			3) Adj item : [s LRSSI] Adjust : [***] SSG output : 12dB SINAD level (MOD : 1kHz±2.4kHz)					
	4) Adj item : [sL LRSSI] → [sC LRSSI] → [sH LRSSI] Adjust : [***]								
	• Wide 5k			5) Adj item : [w LRSSI] Adjust : [***] SSG output : 12dB SINAD level (MOD : 1kHz±3.0kHz)					
	6) Adj item : [wL LRSSI] → [wC LRSSI] → [wH LRSSI] Adjust : [***]								
5. Squelch (Tight) adjust • Narrow	1) Adj item : [n SQLT] Adjust : [***] SSG output : 12dB SINAD+5dB level (MOD : 1kHz±1.5kHz)						After input signal from SSG, press [B] key. That numeric will be stored in memory.	After adjusting SQL, check SQL open/close. SSG 12dB SINAD level +10dB : Open SSG 12dB SINAD level : Close [nC SQLT] MOD 1kHz±1.5kHz [sC SQLT] MOD 1kHz±2.4kHz [wC SQLT] MOD 1kHz±3.0kHz	
	2) Adj item : [nL SQLT] → [nC SQLT] → [nH SQLT] Adjust : [***]								
	• Wide 4k								3) Adj item : [s SQLT] Adjust : [***] SSG output : 12dB SINAD+5dB level (MOD : 1kHz±2.4kHz)
	4) Adj item : [sL SQLT] → [sC SQLT] → [sH SQLT] Adjust : [***]								
	• Wide 5k								5) Adj item : [w SQLT] Adjust : [***] SSG output : 12dB SINAD+5dB level (MOD : 1kHz±3.0kHz)
	6) Adj item : [wL SQLT] → [wC SQLT] → [wH SQLT] Adjust : [***]								

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
6. High RSSI adjust • Narrow	1) Adj item : [n HRSSI] Adjust : [***] SSG output : -70dBm (MOD : 1kHz±1.5kHz)	SSG AF VTVM Oscilloscope	Rear panel	ANT			After input signal from SSG, press [B] key. That numeric will be stored in memory.	The following erroneous performance may occur if any irregular RSSI adjustment, such as pressing the [B] key assigned for determination when it is the ANT OPEN state, is performed. • The antenna bar (▼) cannot appear correctly. • Scan does not stop.
	2) Adj item : [nL HRSSI] → [nC HRSSI] → [nH HRSSI] Adjust : [***]			EXT. SP				
	• Wide 4k			3) Adj item : [s HRSSI] Adjust : [***] SSG output : -70dBm (MOD : 1kHz±2.4kHz)				
	4) Adj item : [sL HRSSI] → [sC HRSSI] → [sH HRSSI] Adjust : [***]							
	• Wide 5k			5) Adj item : [w HRSSI] Adjust : [***] SSG output : -70dBm (MOD : 1kHz±3.0kHz)				
	6) Adj item : [wL HRSSI] → [wC HRSSI] → [wH HRSSI] Adjust : [***]							

Adjustment Points



TERMINAL FUNCTION

Display unit (X54-3480-10)

Pin No.	Name	Description
CN901 (to internal speaker)		
1	GND	Ground.
2	SPO	Speaker output.
CN902 (to TX-RX unit B/3 CN429)		
1	SPO	Speaker input.
2	SPO	Speaker input.
3	SPO	Speaker input.
4	SPO	Speaker input.
5	SPO	Speaker input.
6	SPO	Speaker input.
7	GND	Ground.
8	8C	8V input.
9	SB	Power input of switched power supply.
10	SB	Power input of switched power supply.
11	NC	Non-connenction.
12	PSW	Detection signal output of power switch.
13	GND	Ground.
14	GND	Ground.
15	MIC	MIC signal output.
16	ME	MIC ground.
17	GND	Ground.
18	PSENS	Detection signal output of display unit.
19	RST2	Reset signal input.
20	GND	Ground.
21	GND	Ground.
22	GND	Ground.
23	NC	Non-connenction.
24	SHIFT/MODEL	Control signal input of beat-shift function.
25	NC	Non-connenction.
26	5C	5V output.
27	TXD	Serial data signal input.
28	RXD	Serial data signal output.
29	GND	Ground.
30	GND	Ground.
J901 (MIC jack)		
1	BLC	MIC backlight control.
2	SB	DC 13.6V±15%, 200mA typ.
3	E	Ground.

Pin No.	Name	Description
4	PTT/TXD	PTT : PTT input, TXD : Serial data output.
5	ME	MIC ground.
6	MIC	MIC signal input.
7	HOOK/RXD	HOOK : Hook detection, RXD : Serial data input.
8	DM	MIC data detection.

TX-RX unit (X57-6990-10) (A/3)

Pin No.	Name	Description
CN701 (to TX-RX unit B/3 CN427)		
1	AUXIO6	AUX input/output 6.
2	AUXIO7	AUX input/output 7.
3	AUXIO1	AUX input/output 1.
4	AUXIO2	AUX input/output 2.
5	RXD2	Serial data output 2.
6	AUXIO3	AUX input/output 3.
7	TXD2	Serial data input 2.
8	AUXIO4	AUX input/output 4.
9	AUXIO8	AUX input/output 8.
10	AUXIO5	AUX input/output 5.
11	AUXIO9	AUX input/output 9.
12	AUXO1	AUX input 1.
13	TXD1	Serial data input 1.
14	AUXO2	AUX input 2.
15	RXD1	Serial data output 1.
16	GND	Ground.
17	ME	MIC ground.
18	MI2	External MIC output.
19	DEO	Detected signal input.
20	GND	Ground.
21	5C	5V.
22	DI	Data signal output.
23	AFO	RX filtered audio input.
24	SB	Power input after power switch.
25	SB	Power input after power switch.
26	SB	Power input after power switch.
27	SB	Power input after power switch.
28	SB	Power input after power switch.
29	SB	Power input after power switch.
30	NC	Non-connenction.

TERMINAL FUNCTION

Pin No.	Name	Description
J701 (ACC 25-pin)		
1	NC	Non-connection.
2	RXD1	Serial data input 1. RS-232C level. Input voltage range : $\pm 30V$ max. $L \leq 0.4V$, $H \geq 2.4V$, $Z_i \geq 5k\Omega$
3	TXD1	Serial data output 1. RS-232C level. $L \leq -5V$, $H \geq 5V/3k\Omega$ load, $Z_o \leq 2k\Omega$
4	AUXI/O9	AUX input/output 9. Active low with $47k\Omega$ pull-up to 5V
5	DI	Data signal input. Data input level adjustable ($2.0V_{p-p}$ typ.)
6	MI2	External MIC input. DC-coupled
7	GND	Ground.
8	AUXI/O8	AUX input/output 8. Same as AUXI/O9
9	TXD2	Serial data output 2. TTL level. $L \leq 0.7V$, $H \geq 4.2V/25k\Omega$ load, $Z_o \leq 1k\Omega$
10	RXD2	Serial data input 2. TTL level. Input voltage range : $+5/0V$ max. $L \leq 0.8V$, $H \geq 4.2V$
11	GND	Ground.
12	AUXI/O7	AUX input/output 7. Same as AUXI/O9
13	AUXI/O6	AUX input/output 6. Same as AUXI/O9
14	SB	Power output after power switch. $DC 13.6V \pm 15\%$, $2.0A$ max.
15	AUXO2	AUX output 2. Open collector ($500mA$ max.) (Default none) $L \leq 0.3V$
16	AUXO1	AUX Output 1. Same as AUXO2
17	AFO	RX filtered audio output (DC-coupled). AF low level output. Wide : $700mV_{p-p}$ typ. Narrow : $700mV_{p-p}$ typ. (Standard modulation)
18	GND	Ground.
19	DEO	Detected signal output (DC-coupled). AF output level adjustable ($740mV_{p-p}$ typ.)
20	AUXI/O5	AUX input/output 5. Same as AUXI/O9
21	AUXI/O4	AUX input/output 4. Same as AUXI/O9
22	AUXI/O3	AUX input/output 3. Same as AUXI/O9
23	AUXI/O2	AUX input/output 2. Same as AUXI/O9
24	AUXI/O1	AUX input/output 1. Same as AUXI/O9
25	ME	MIC ground.

TX-RX unit (X57-6990-10) (B/3)

Pin No.	Name	Description
CN301 (to TX-RX unit C/3)		
1	REF	Reference signal output to the PLL IC.
2	Fin	Complementary signal output to the PLL IC.
3	CPGND	Ground.
4	5C	5V output.
5	GND	Ground
6	CP	Signal input from charge pump block in the PLL IC.
CN302 (to TX-RX unit C/3)		
1	UL	Control signal input from the PLL IC.
2	PLE	Control signal output to the PLL IC.
3	DT	Control signal output to the PLL IC.
4	PCK	Control signal output to the PLL IC.
5	GND	Ground.
6	DGND	Ground.
CN403 (to VGS-1)		
1	OPT1	VGS busy signal input. Option board I/F 1. Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load Input : $L \leq 1.0V$, $H \geq 4.0V$, Input voltage : $0V \sim 5.0V$
2	OPT3	VGS playback signal input. Option board I/F 3. Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load Input : $L \leq 1.0V$, $H \geq 4.0V$, Input voltage : $0V \sim 5.0V$
3	RXD1	Serial data input. Input : $L \leq 1.0V$, $H \geq 4.0V$, Input voltage : $0V \sim 5.0V$
4	TXD1	Serial data output / PTT signal output (SC20-460). Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load
5	CLK	Serial clock output.
6	OPT4	VGS enable output. Option board I/F 4. Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load
7	USEL	UART speed select output. L : $19200bps$ fixed
8	OPT5	VGS reset signal output. Option board I/F 5. Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load
9	DGND	Ground.
10	AGND	Ground.
11	AO	VGS audio input. $Z_{in} \geq 10k\Omega$, $1V_{p-p}$ max, Input Voltage : $0V \sim 5.0V$
12	AI	VGS audio output. $Z_o \geq 10k\Omega$
13	AGND	Ground.
14	5E	5V power supply output. $78mA$ max
15	STON	Side tone input. $1kHz$, $5V_{p-p}$

TERMINAL FUNCTION

Pin No.	Name	Description
16	DTI	Data signal input. $Z_{in} \geq 22k\Omega$, $600 \pm 200mV_{p-p}$
17	TCTL	Speaker mute signal input. Input : $L \leq 1.0V$, $H \geq 4.0V$, Input voltage : $0V \sim 5.0V$
18	NC	Non-connection.
19	AUDIH	MIC mute signal input.
20	OPT2	Option board I/F 2. Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load Input : $L \leq 1.0V$, $H \geq 4.0V$, Input voltage : $0V \sim 5.0V$
21	TXO	MIC signal output (AC coupled) before pre-emphasis. $Z_o > 2.2k\Omega$, $130 \pm 50mV_{p-p}$ typ.
22	RXEO	Audio signal output (DC coupled) after de-emphasis. $Z_o > 30k\Omega$, $1 \pm 0.3V_{p-p}$ typ.
23	RXEI	Audio signal input (DC coupled) after de-emphasis. $Z_{in} > 15k\Omega$, $1 \pm 0.3V_{p-p}$ typ.
24	TXI	MIC signal input (AC coupled) before pre-emphasis. $Z_{in} > 22k\Omega$, $500 \pm 50mV_{p-p}$ typ.
25	OPT6	Option board I/F 6. Output : $L \leq 0.45V$, $H \geq 4.7V/25k\Omega$ load
26	8C	Power input after power switch. 8.0V typ, 100mA max
CN427 (to TX-RX unit A/3 CN701)		
1	NC	Non-connection.
2	SB	Power output after power switch.
3	SB	Power output after power switch.
4	SB	Power output after power switch.
5	SB	Power output after power switch.
6	SB	Power output after power switch.
7	SB	Power output after power switch.
8	AFO	RX filtered audio output.
9	DI	Data signal input.
10	5C	5V.
11	GND	Ground.
12	DEO	Detected signal output.
13	MI2	External MIC input.
14	ME	MIC ground.
15	GND	Ground.
16	RXD1	Serial data input 1.
17	AUXO2	AUX output 2.
18	TXD1	Serial data output 1.

Pin No.	Name	Description
19	AUXO1	AUX output 1.
20	AUXIO9	AUX input/output 9.
21	AUXIO5	AUX input/output 5.
22	AUXIO8	AUX input/output 8.
23	AUXIO4	AUX input/output 4.
24	TXD2	Serial data output 2.
25	AUXIO3	AUX input/output 3.
26	RXD2	Serial data input 2.
27	AUXIO2	AUX input/output 2.
28	AUXIO1	AUX input/output 1.
29	AUXIO7	AUX input/output 7.
30	AUXIO6	AUX input/output 6.
CN428		
1	SB	Power output of switched power supply.
2	SPI	Speaker output.
3	SPO	Speaker input.
4	PA	Control signal output of PA function.
5	HOR	Control signal output of Horn alert function.
6	GND	Ground.
CN429 (to Display unit CN902)		
1	(DM)	Reserve.
2	GND	Ground.
3	RXD	Serial data signal input.
4	TXD	Serial data signal output.
5	NC	Non-connection.
6	5C	5V output.
7	SHIFT/MODEL	Control signal output of beat-shift function.
8	(CLK)	Reserve.
9	(LCDDO)	Reserve.
10	(LCDDI)	Reserve.
11	(LCDRST)	Reserve.
12	RST2	Reset signal output.
13	PSENS	Detection signal input of display unit.
14	GND	Ground.
15	ME	MIC ground.
16	MIC	MIC signal input.
17	GND	Ground.
18	GND	Ground.
19	PSW	Detection signal input of power switch.
20	NC	Non-connection.

TERMINAL FUNCTION

Pin No.	Name	Description
21	SB	Power output of switched power supply.
22	SB	Power output of switched power supply.
23	8C	8V output.
24	GND	Ground.
25	SPO	Speaker output.
26	SPO	Speaker output.
27	SPO	Speaker output.
28	SPO	Speaker output.
29	SPO	Speaker output.
30	SPO	Speaker output.
CN804		
1	IGN	Ignition sense input.
2	GND	Ground.

Solder Land

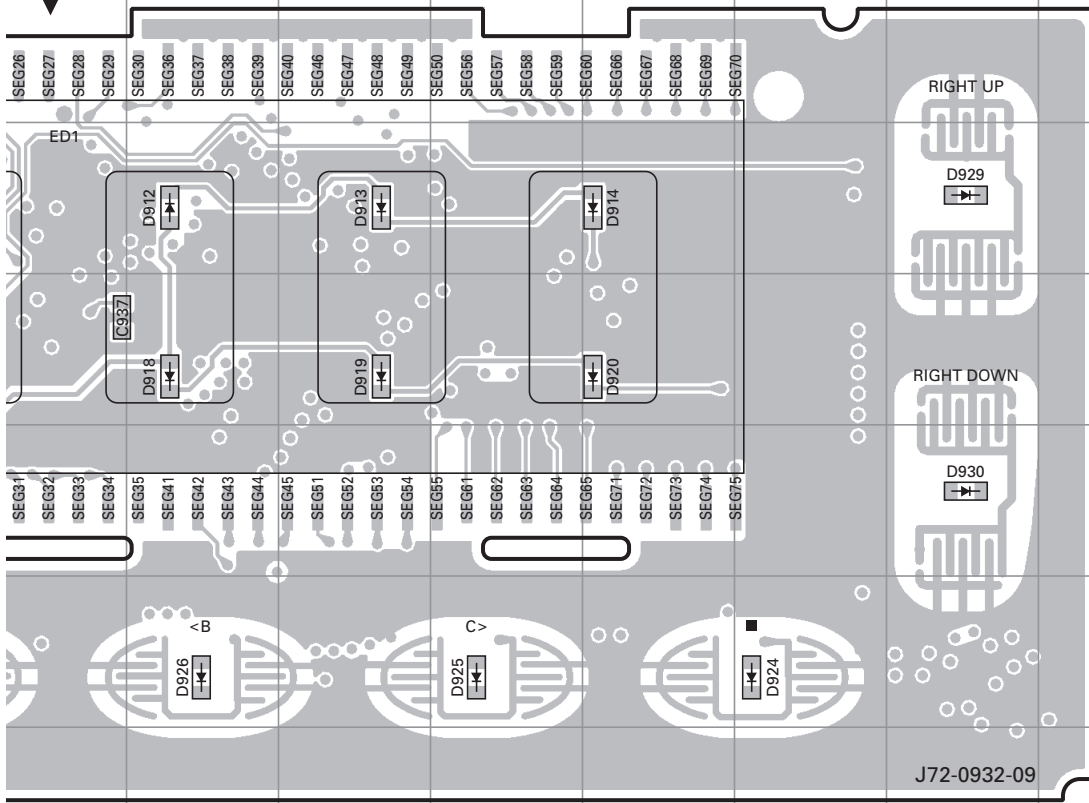
Name	Description
to ANI board	
GND (A-)	Ground.
OPT1 (CH BUSY)	TX sens signal output. Conv. L : TX, H : Not TX LTR L : Link complete, H : Not link complete L≤0.45V, H≥4.7V/25kΩ load
OPT3 (KEY)	TX control signal input. Active low. L≤1.0V, H≥ 4.0V, Input voltage 0V~5.0V
OPT4 (PTT)	PTT signal output. L : TX, H : Not TX L≤0.45V, H≥4.7V/25kΩ load
OPT5 (EMERGENCY)	Emergency signal output. L : Emergency function is operated, H : Emergency function is not operated L≤0.45V, H≥4.7V/25kΩ load
5E (A+)	5V power supply (78mA max.).
DTI (DATA OUT)	Data signal input. Zin>22kΩ, 600±200mVp-p (Standard modulation)
TCTL (TONE CTRL)	Speaker mute signal input. H : Unmute L≤0.8V, H≥4.2V, Input voltage : 0V~5.0V
AUDI H (AUDIO INHIB)	MIC mute signal input. L : Mute
OPT2 (AUX I/O)	Emergency signal input. Active low. L≤1.0V, H≥ 4.0V, Input voltage 0V~5.0V
STON (SIDE TONE)	Side tone input. 1kHz, 5Vp-p

Name	Description
to Scrambler board	
GND (GND)	Ground.
TXD1 (PTT)	PTT signal output. L : TX, H : Not TX L≤0.45V, H≥4.7V/25kΩ load (PTT signal input) Active low. L≤1.0V, H≥4.0V, Inut voltage : 0V~5.0V
OPT1 (DODE SELECT1)	Scramble code signal output 1. L≤0.45V, H≥4.7V/25kΩ load
OPT3 (CODE SELECT2)	Scramble code signal output 2. L≤0.45V, H≥4.7V/25kΩ load
OPT4 (ECHO PTT)	Echo PTT signal output. L : TX, H : Not TX L≤0.45V, H≥4.7V/25kΩ load
OPT5 (CODE SELECT8)	Scramble code signal output 4. L≤0.45V, H≥4.7V/25kΩ load
TXO (TX OUT)	MIC signal output (AC coupled) before pre-emphasis. Zo>2.2kΩ, 130±50mVp-p typ. (Standard modulation)
OPT2 (SCRAMBLE)	Scrambler control signal output. L : ON, H : OFF. L≤0.45V, H≥4.7V/25kΩ load
RXEO (RX OUT)	Audio signal output (DC coupled) after de-emphasis. Zo>30kΩ, 1±0.3Vp-p typ. (Standard modulation)
TXI (TX IN)	MIC signal input (AC coupled) before pre-emphasis. Zin>2.2kΩ, 130±50mVp-p typ. (Standard modulation)
RXEI (RX IN)	Audio signal input (DC coupled) after de-emphasis. Zin>15kΩ, 1±0.3Vp-p typ. (Standard modulation)
OPT6 (CODE SELECT4)	Scramble code signal output 3. L≤0.45V, H≥4.7V/25kΩ load
8C (+V)	8V AVR output. 8.0V typ, 100mA max.
to GPS receiver	
GND (GND)	Ground.
RXD1*1 (DATA OUT1)	Data output.
RXD2*1 (DATA OUT1)	Data output.
5E (+5V)	5V

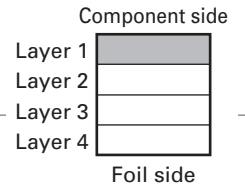
*1 : Depending on the connected optional accessory, the DATA OUT1 may connect to either RXD1 or RXD2.

PC BOARD TK-8180

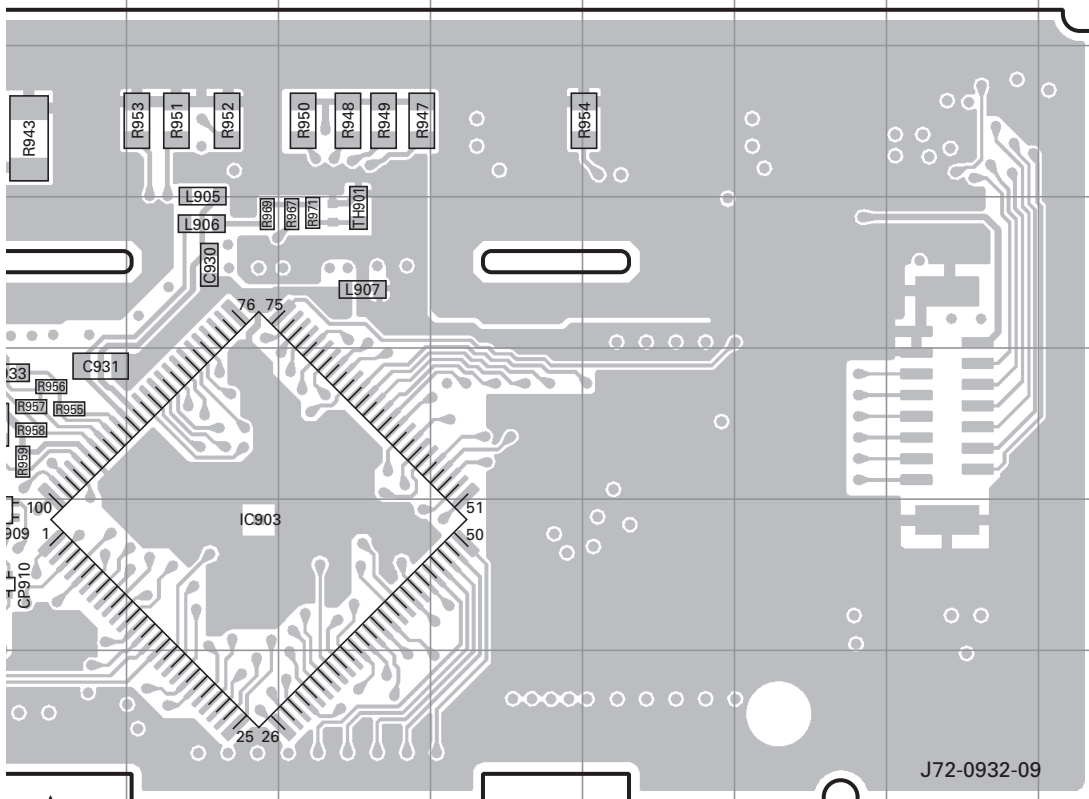
DISPLAY UNIT (X54-3480-10) Component side view (J72-0932-09)



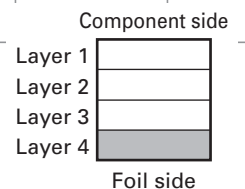
Ref. No.	Address	Ref. No.	Address
D907	3C	D920	4N
D909	3G	D921	6F
D910	3H	D922	6G
D911	3I	D923	6I
D912	3K	D924	6O
D913	3L	D925	6M
D914	3N	D926	6K
D915	4G	D927	3D
D916	4H	D928	5D
D917	4I	D929	3P
D918	4K	D930	5P
D919	4L		



DISPLAY UNIT (X54-3480-10) Foil side view (J72-0932-09)



Ref. No.	Address	Ref. No.	Address
IC901	10C	Q910	10D
IC902	12H	Q911	9D
IC903	12K	Q913	9H
Q901	10D	D901	10C
Q902	10D	D902	12D
Q904	12B	D903	9F
Q905	12C	D904	9C
Q906	10I	D905	10C
Q907	9I	D906	10C
Q909	9H		

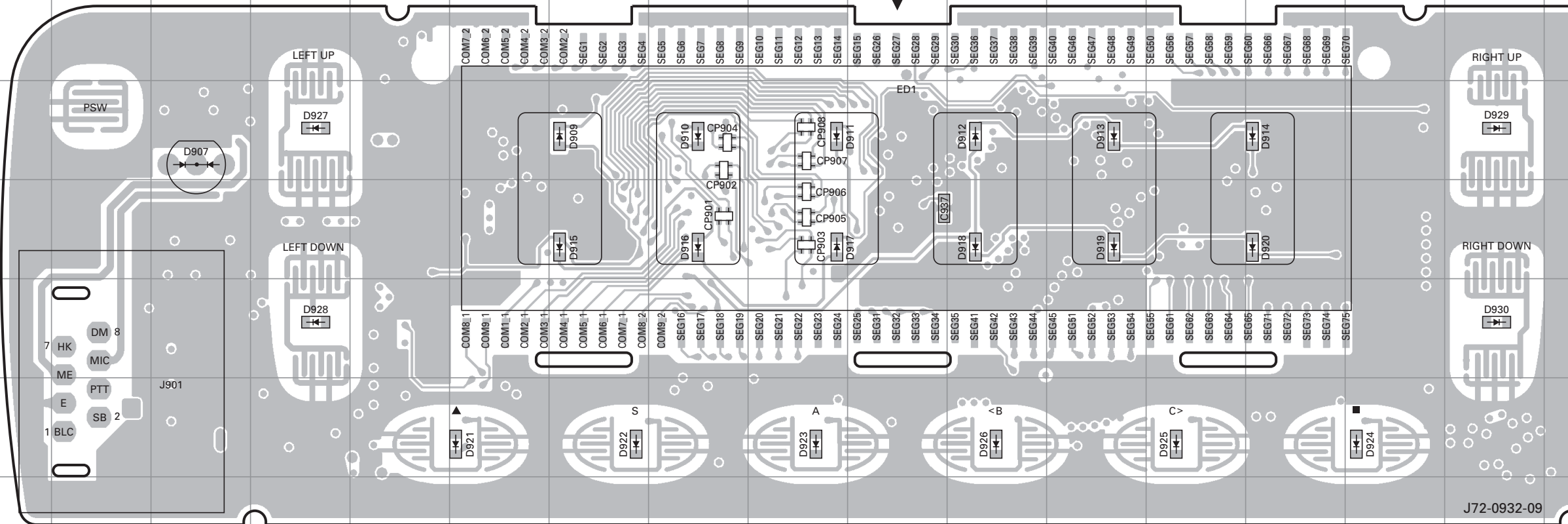


TK-8180 PC BOARD

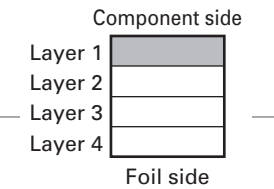
PC BOARD TK-8180

DISPLAY UNIT (X54-3480-10) Component side view (J72-0932-09)

DISPLAY UNIT (X54-3480-10) Component side view (J72-0932-09)

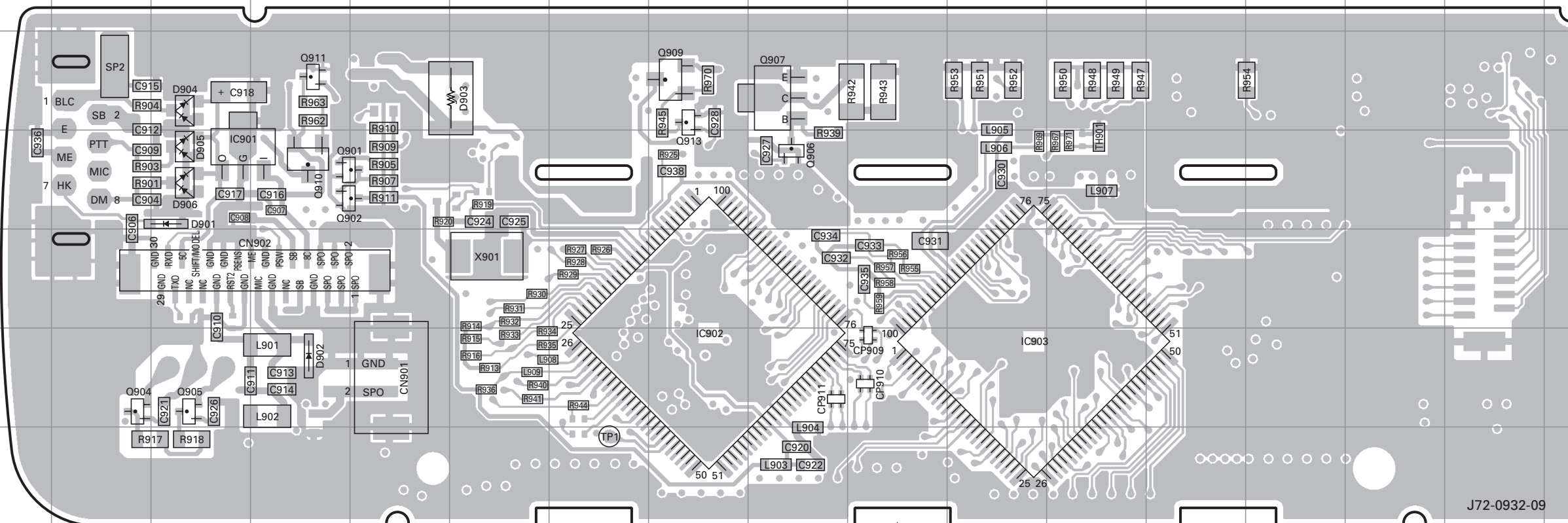


Ref. No.	Address	Ref. No.	Address
D907	3C	D920	4N
D909	3G	D921	6F
D910	3H	D922	6G
D911	3I	D923	6I
D912	3K	D924	6O
D913	3L	D925	6M
D914	3N	D926	6K
D915	4G	D927	3D
D916	4H	D928	5D
D917	4I	D929	3P
D918	4K	D930	5P
D919	4L		

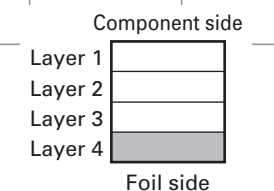


DISPLAY UNIT (X54-3480-10) Foil side view (J72-0932-09)

DISPLAY UNIT (X54-3480-10) Foil side view (J72-0932-09)

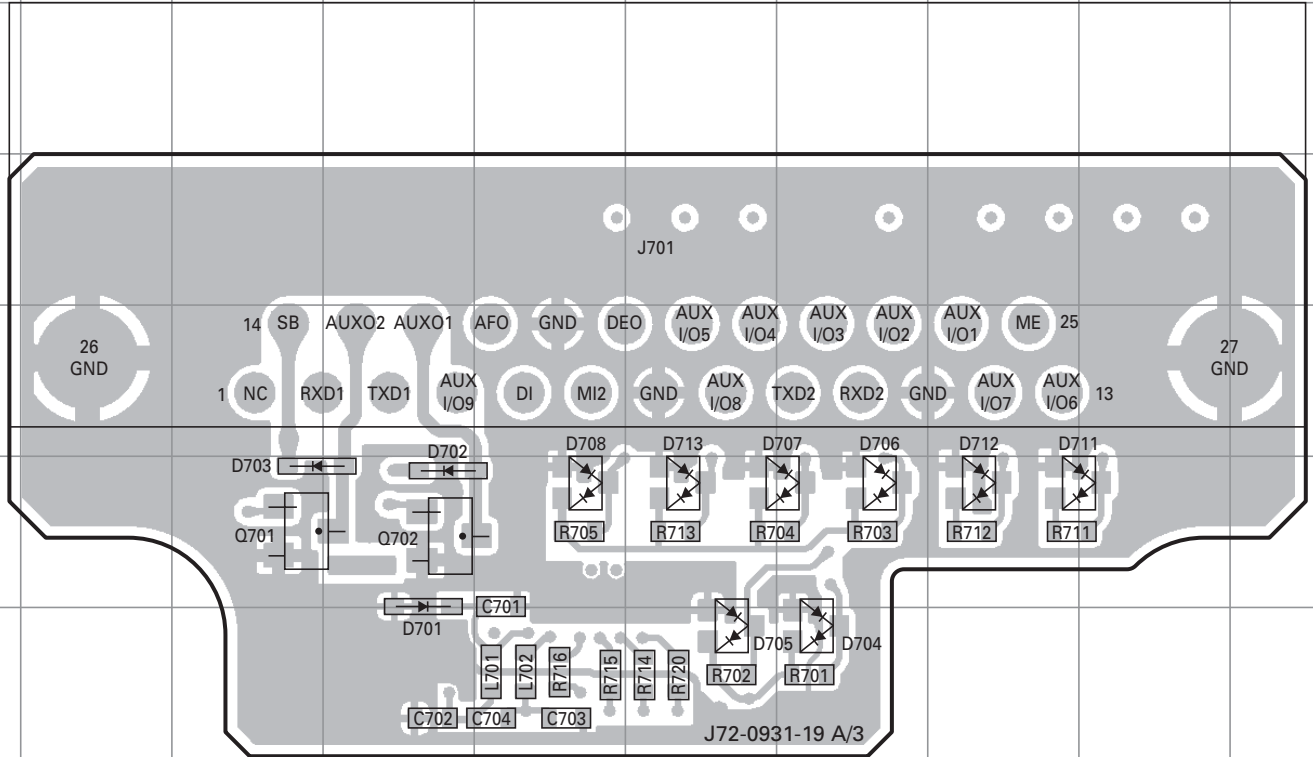


Ref. No.	Address	Ref. No.	Address
IC901	10C	Q910	10D
IC902	12H	Q911	9D
IC903	12K	Q913	9H
Q901	10D	D901	10C
Q902	10D	D902	12D
Q904	12B	D903	9F
Q905	12C	D904	9C
Q906	10I	D905	10C
Q907	9I	D906	10C
Q909	9H		

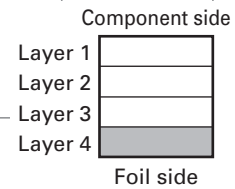


PC BOARD TK-8180

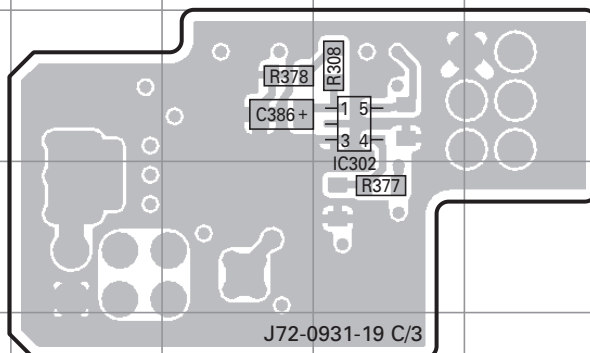
TX-RX UNIT (X57-6990-10) (A/3) Foil side view (J72-0931-19 A/3)



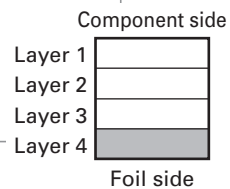
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
Q701	6C	D704	7G	D711	6H
Q702	6D	D705	7F	D712	6H
D701	7D	D706	6G	D713	6F
D702	6D	D707	6G		
D703	6C	D708	6E		



TX-RX UNIT (X57-6990-10) (C/3) Foil side view (J72-0931-19 C/3)

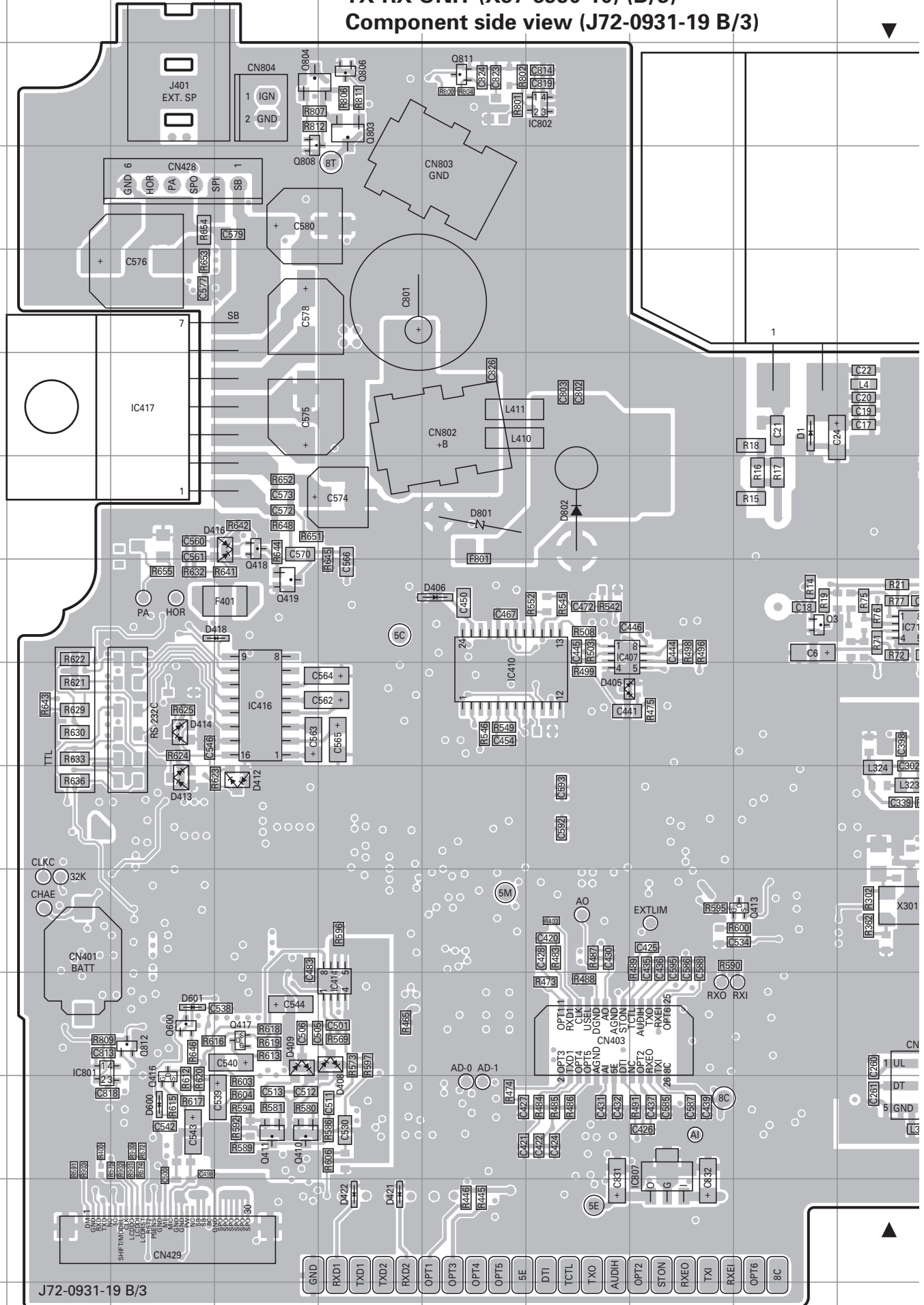


Ref. No.	Address
IC302	11E



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TX-RX UNIT (X57-6990-10) (B/3)
Component side view (J72-0931-19 B/3)

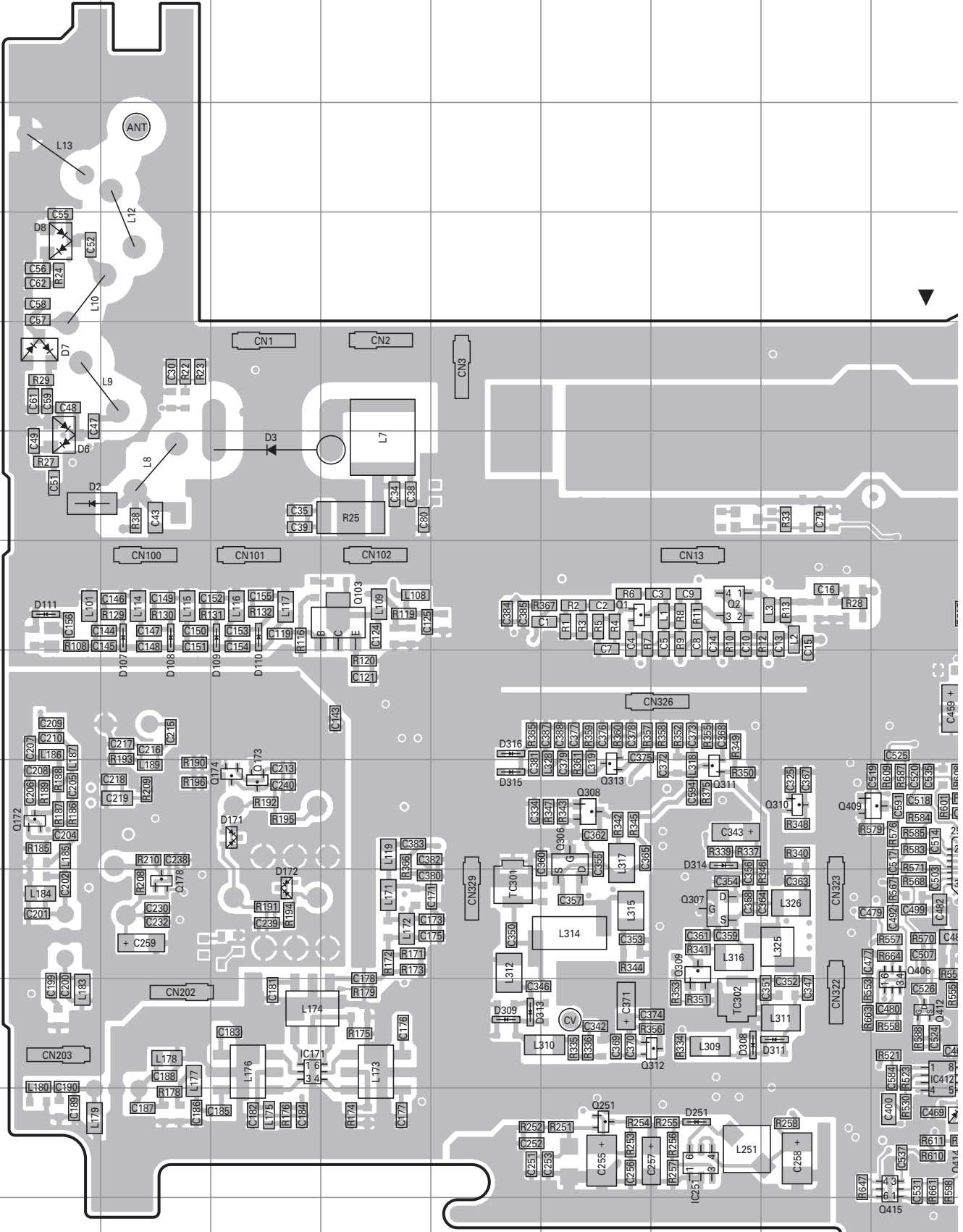


J72-0931-19 B/3



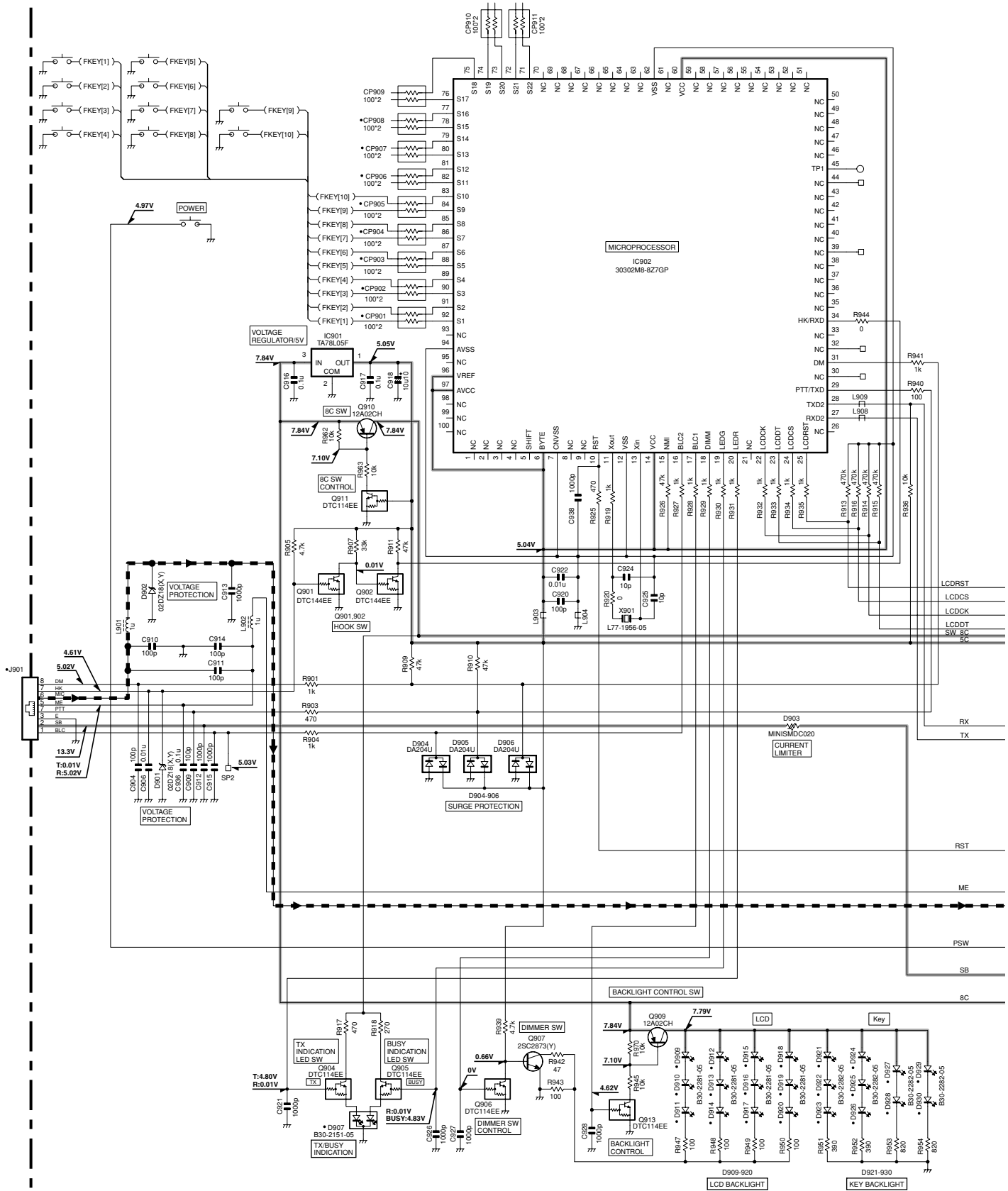
TK-8180 PC BOARD

TX-RX UNIT (X57-6990-10) (B/3)
Foil side view (J72-0931-19 B/3)



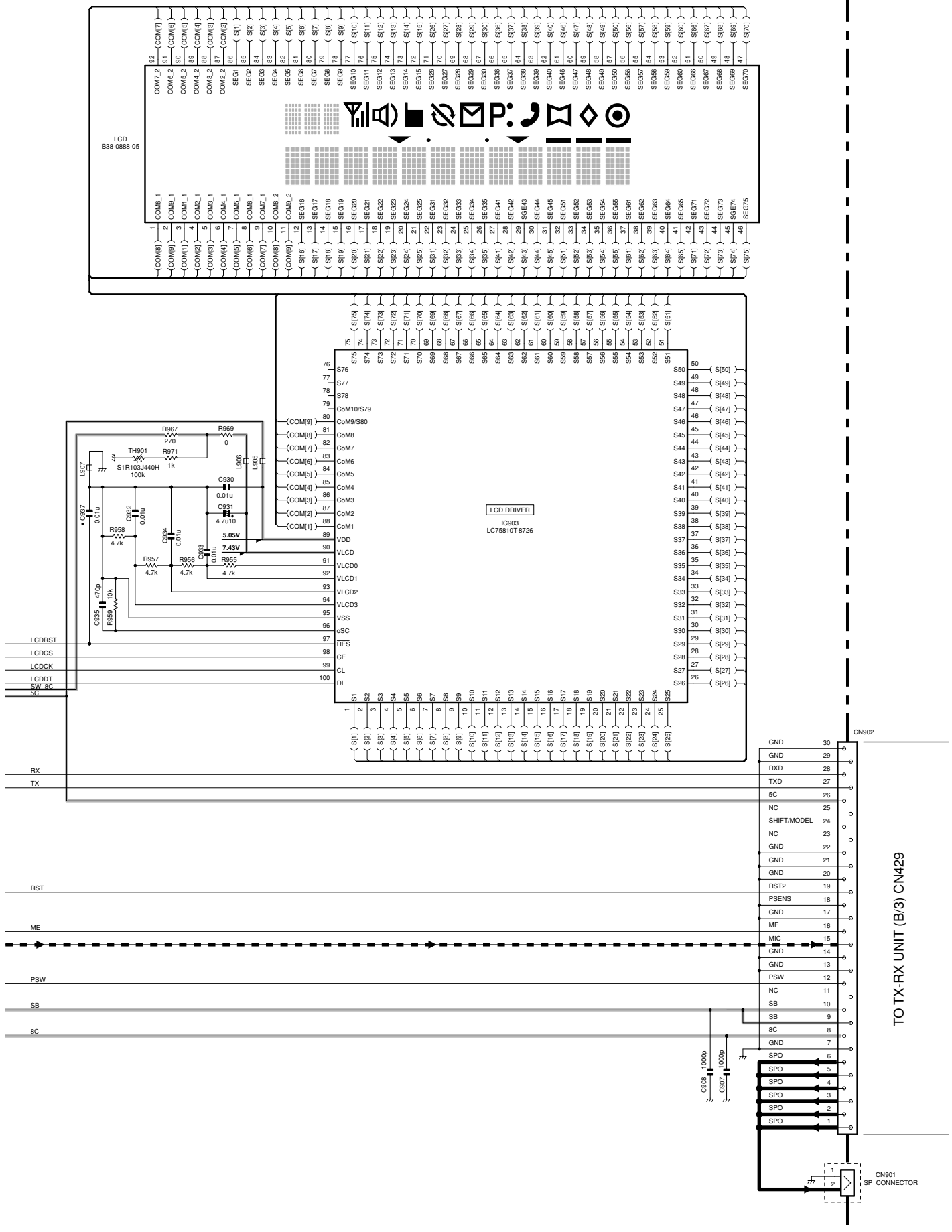
TK-8180 SCHEMATIC DIAGRAM

DISPLAY UNIT (X54-3480-10)



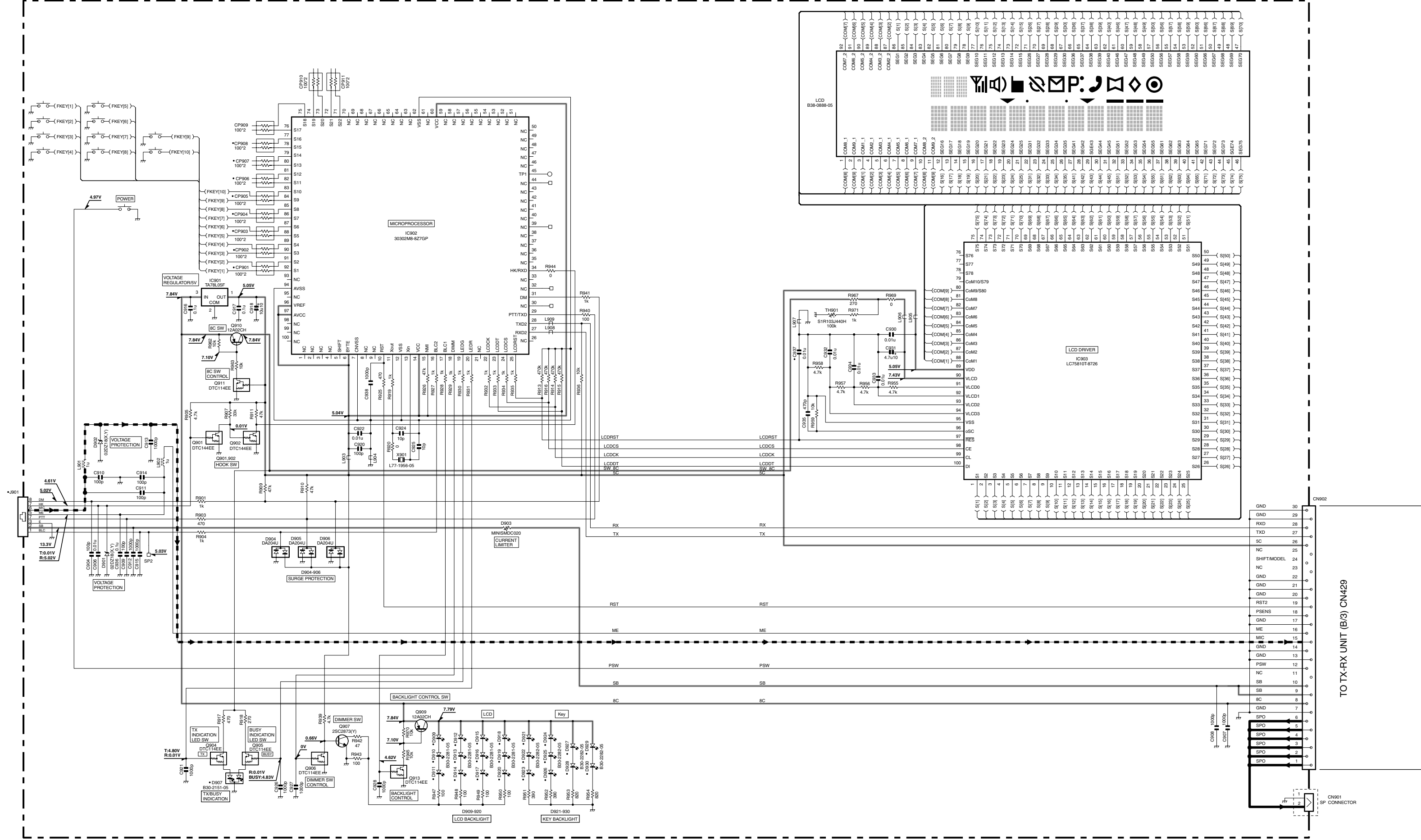
SCHEMATIC DIAGRAM TK-8180

DISPLAY UNIT (X54-3480-10)



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

DISPLAY UNIT (X54-3480-10)

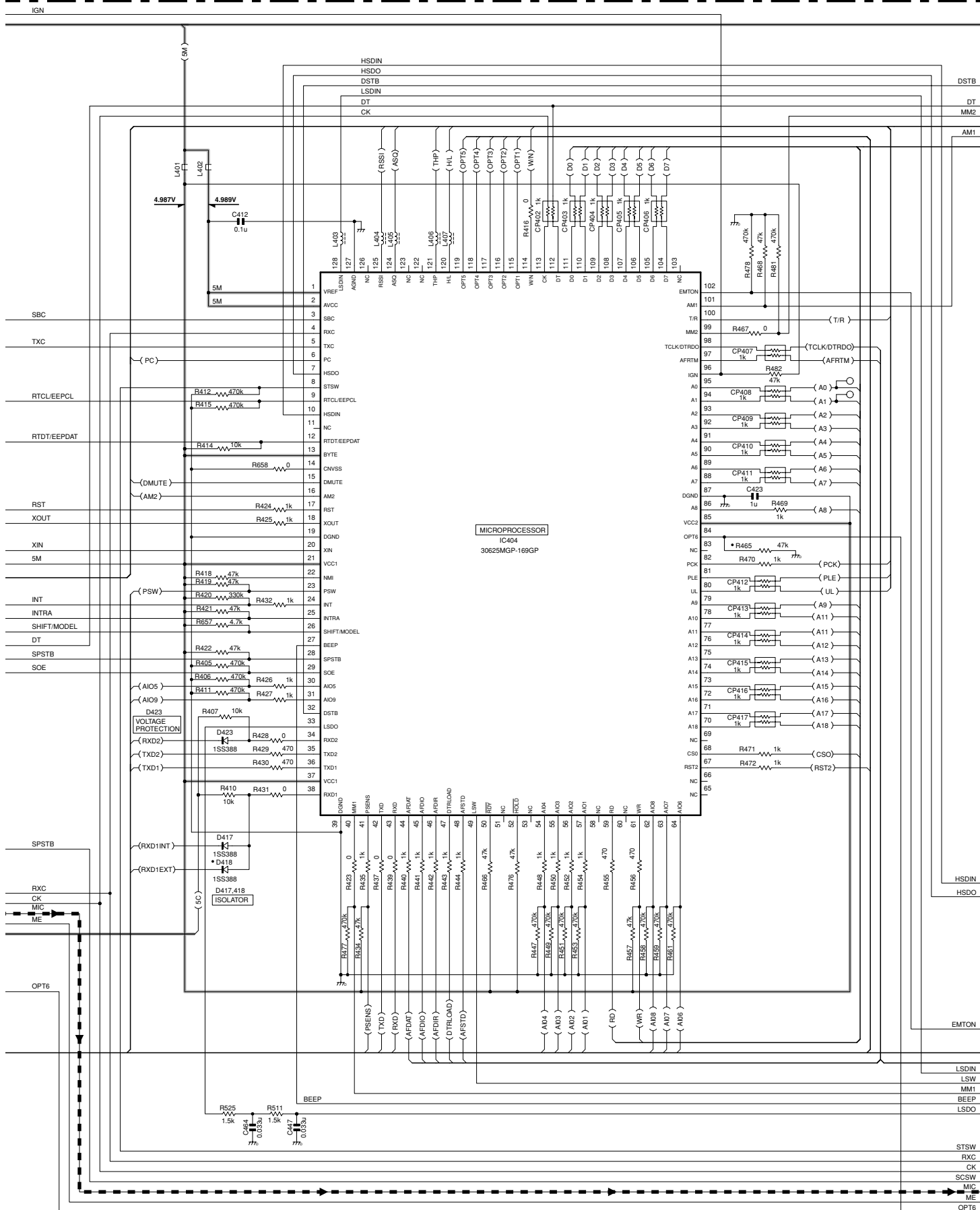


TO TX-RX UNIT (B/3) CN429

CN901
SP CONNECTOR

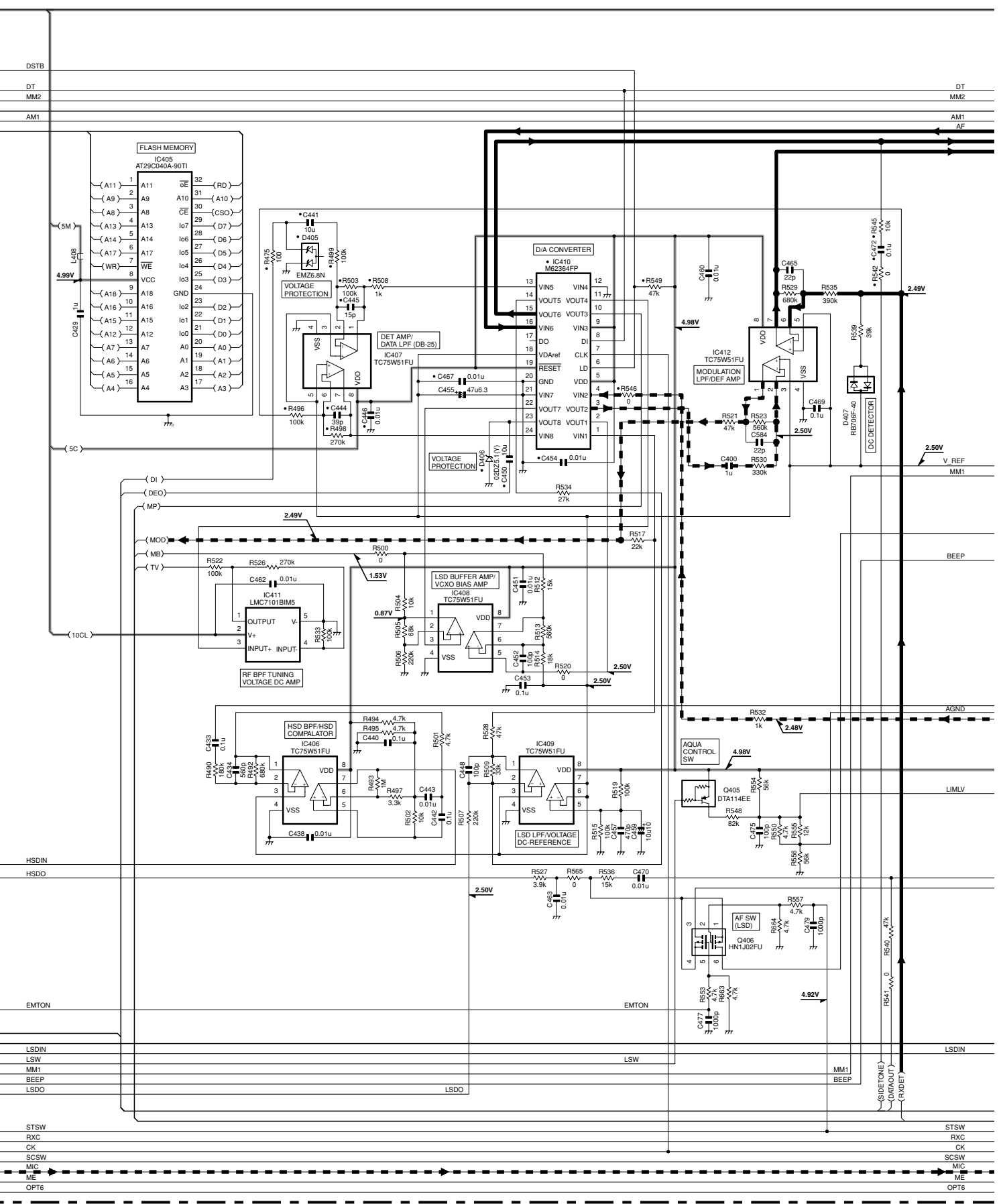
SCHEMATIC DIAGRAM TK-8180

TX-RX UNIT (X57-6990-10) (B/3)



TK-8180 SCHEMATIC DIAGRAM

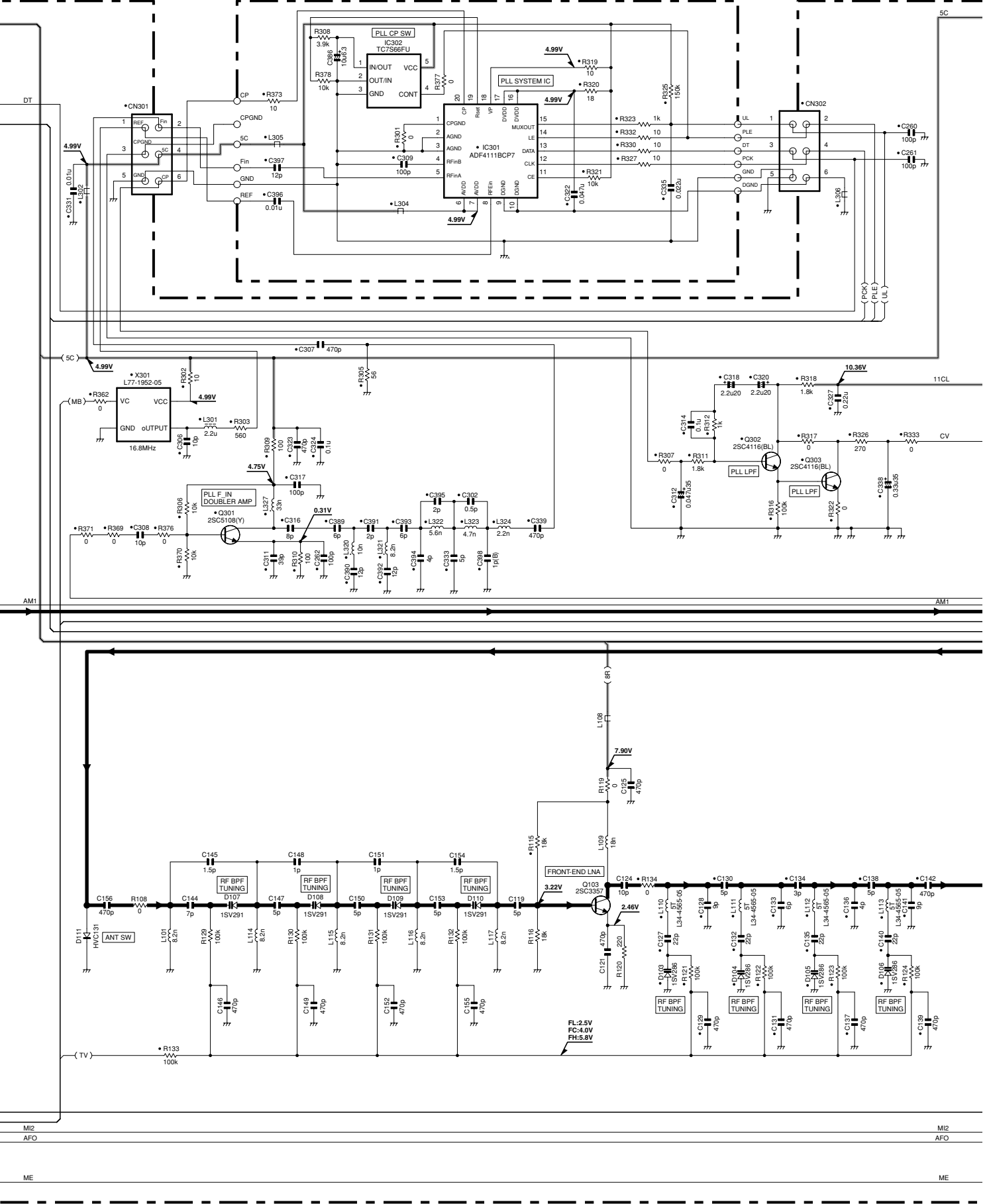
TX-RX UNIT (X57-6990-10) (B/3)



TK-8180 SCHEMATIC DIAGRAM

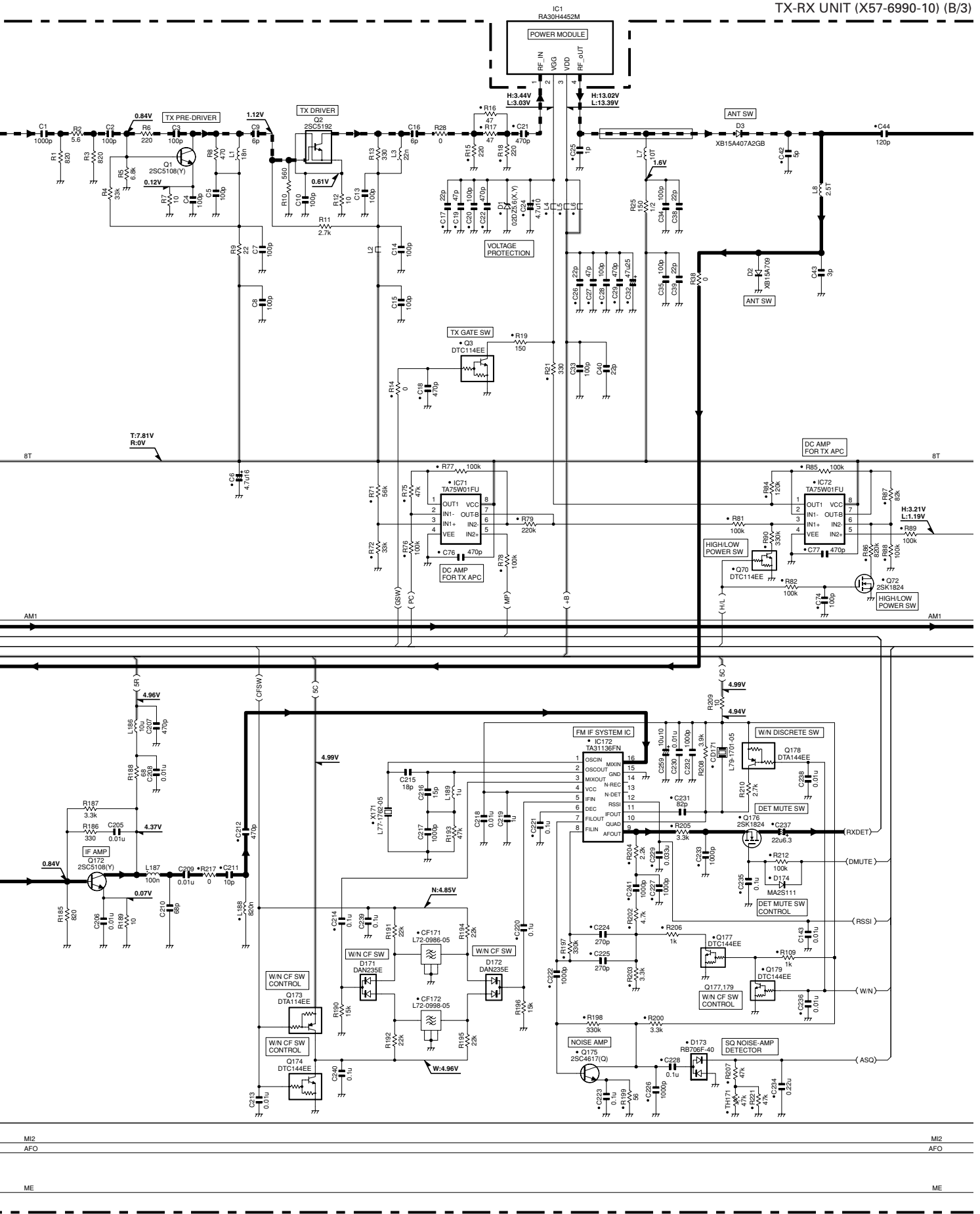
TX-RX UNIT (X57-6990-10)(C/3)

TX-RX UNIT (X57-6990-10) (B/3)



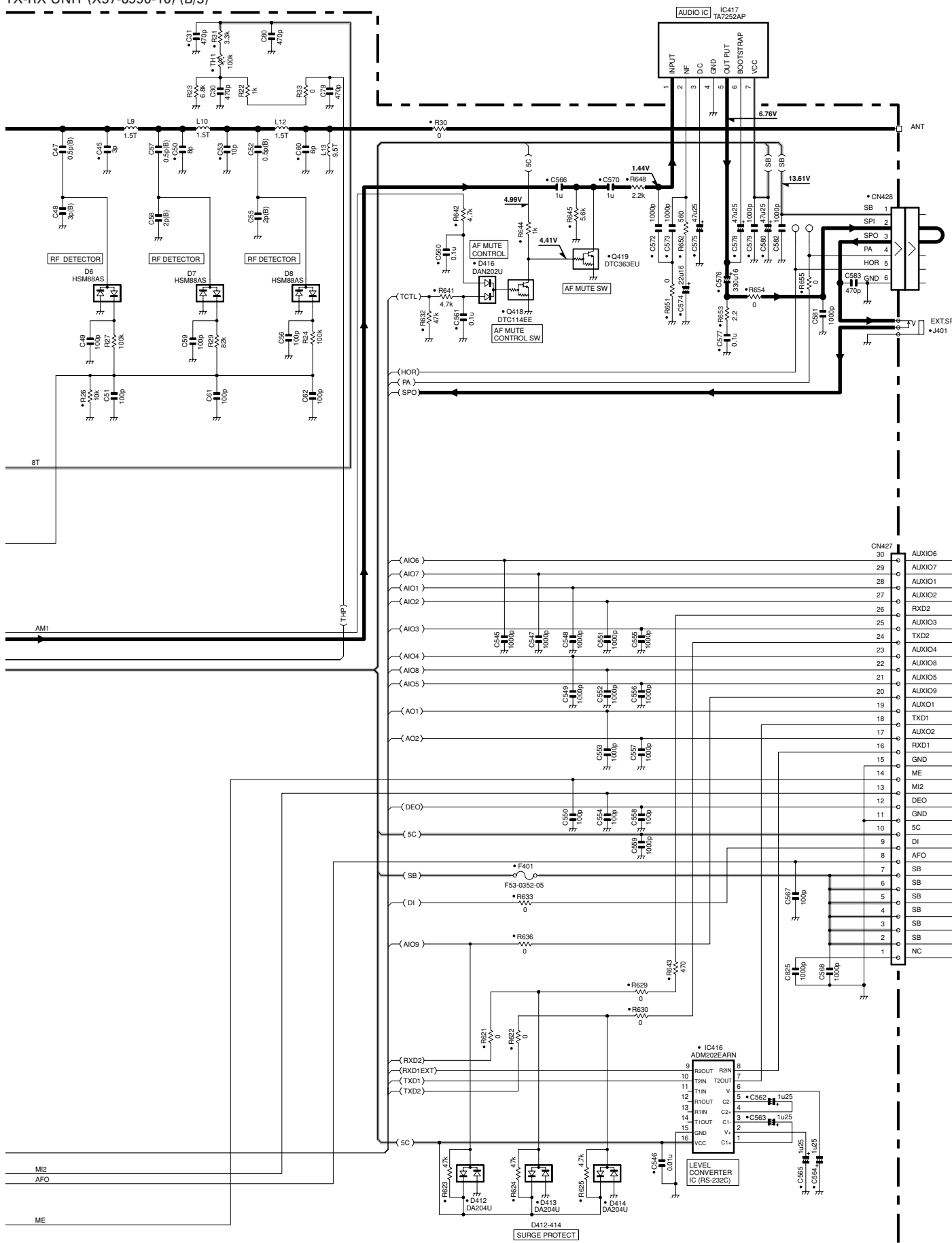
TK-8180 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-6990-10) (B/3)



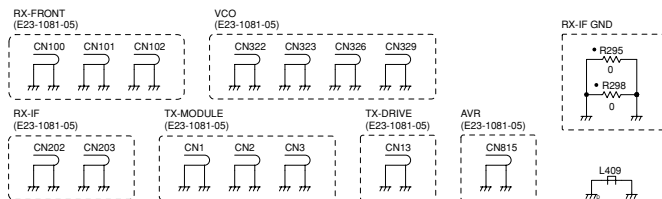
SCHEMATIC DIAGRAM TK-8180

TX-RX UNIT (X57-6990-10) (B/3)

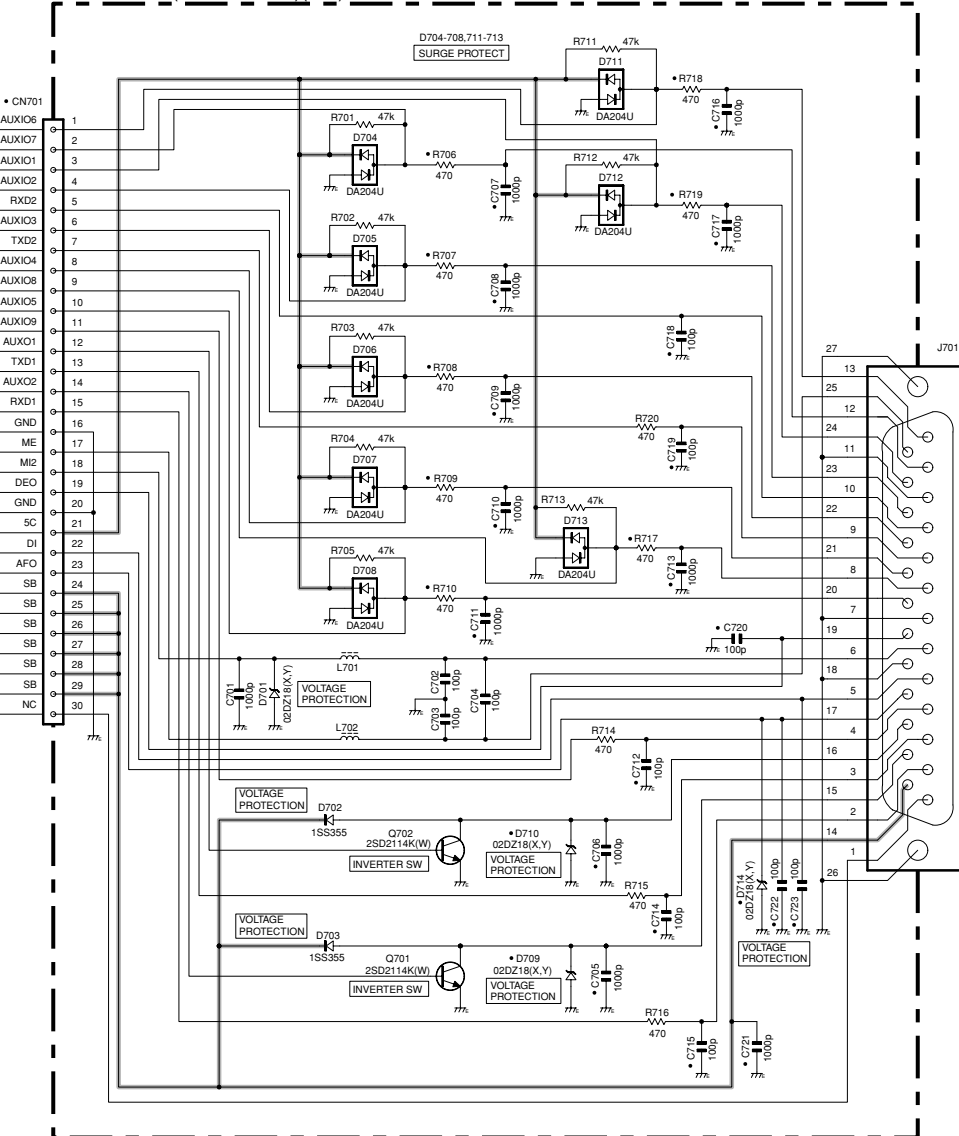


TK-8180 SCHEMATIC DIAGRAM

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



TX-RX UNIT (X57-6990-10)(A/3)

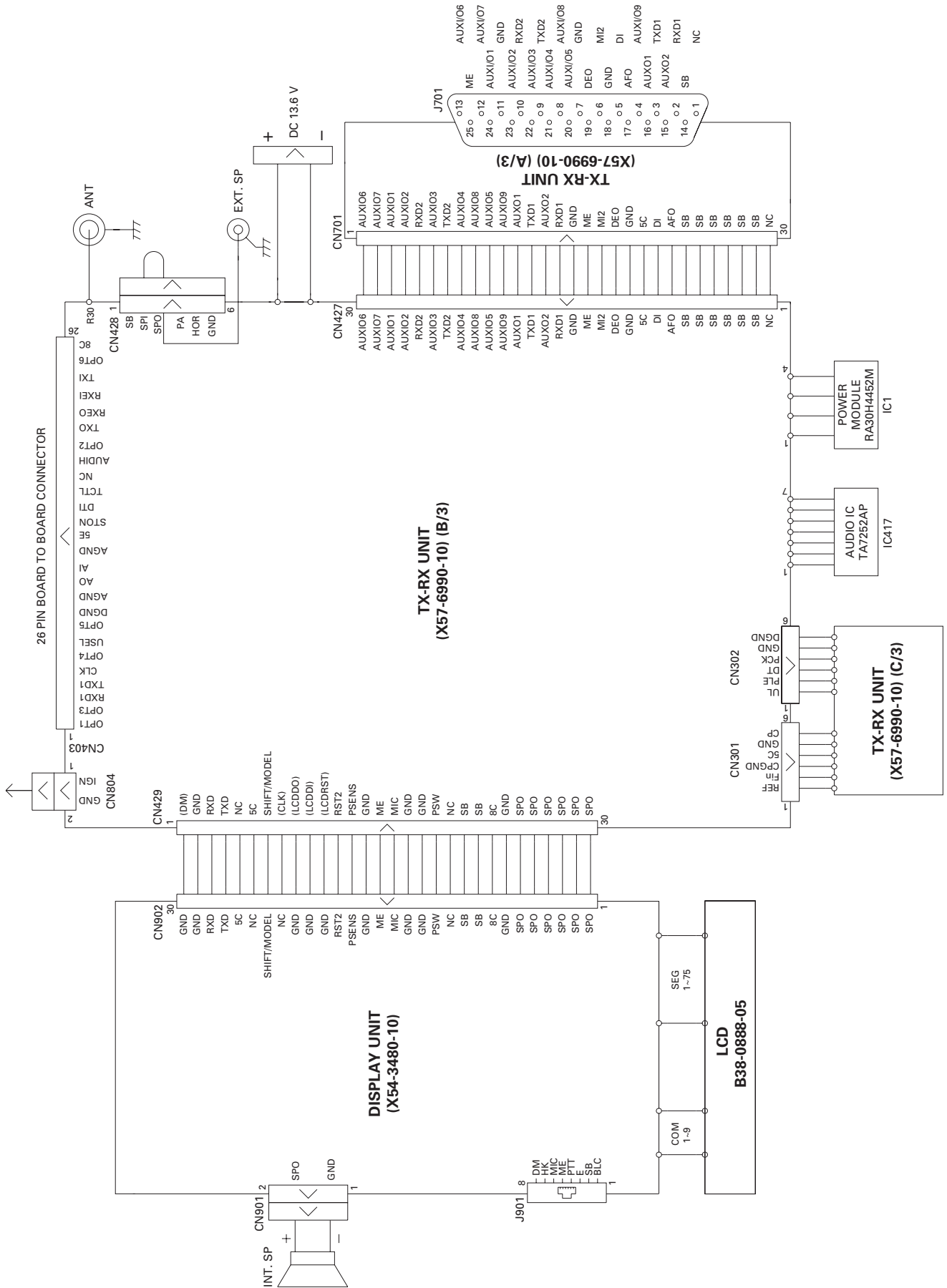


TTL SPECIFICATION (DEFAULT)

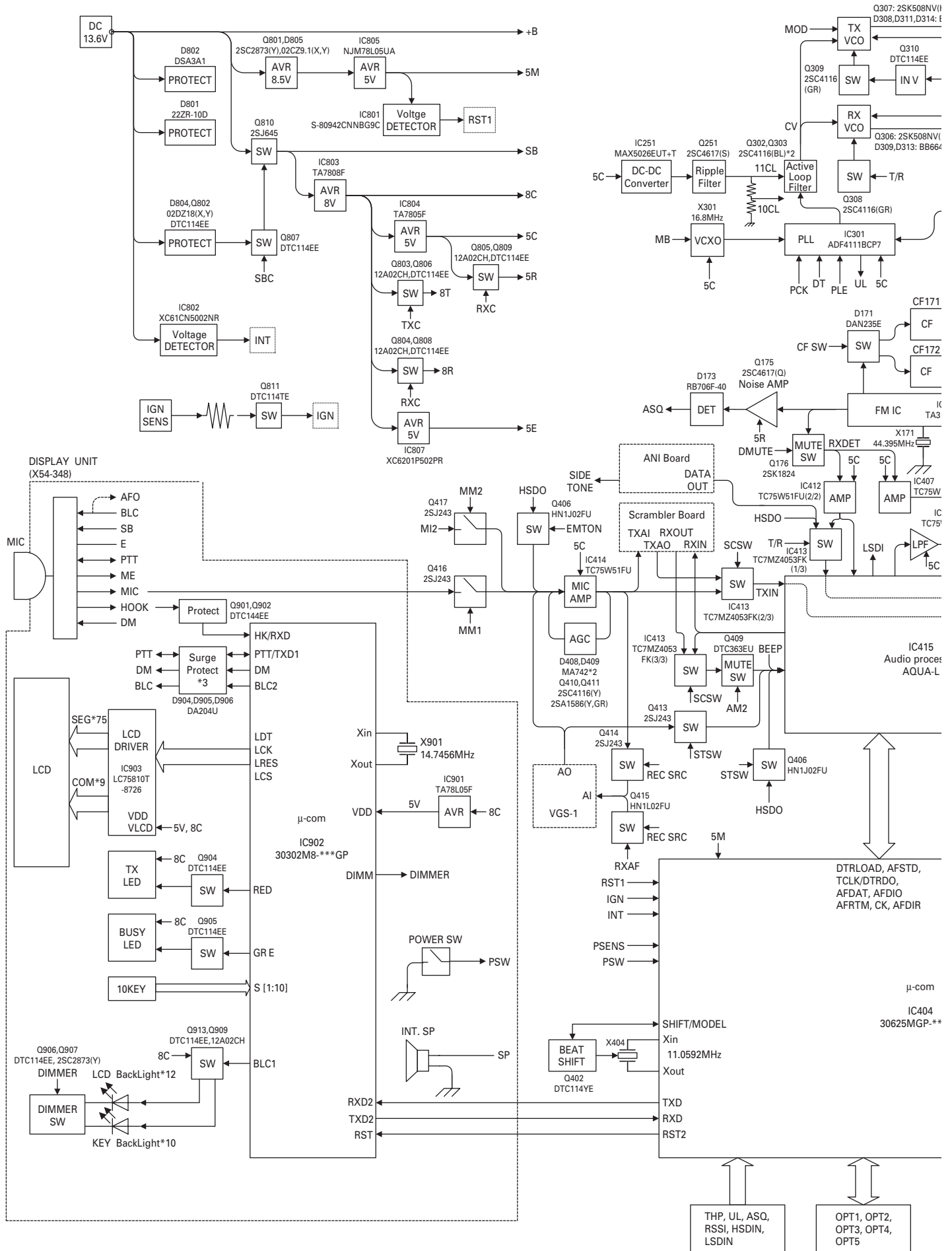
ME	AUXIO6
AUXIO1	AUXIO7
AUXIO2	GND
AUXIO3	RXD2
AUXIO4	TXD2
AUXIO5	AUXIO8
DEO	GND
GND	M12
AFO	DI
AUXO1	AUXIO9
AUXO2	TXD1
SB	RXD1
	NC

1
2
3
4
5
6
7

INTERCONNECTION DIAGRAM

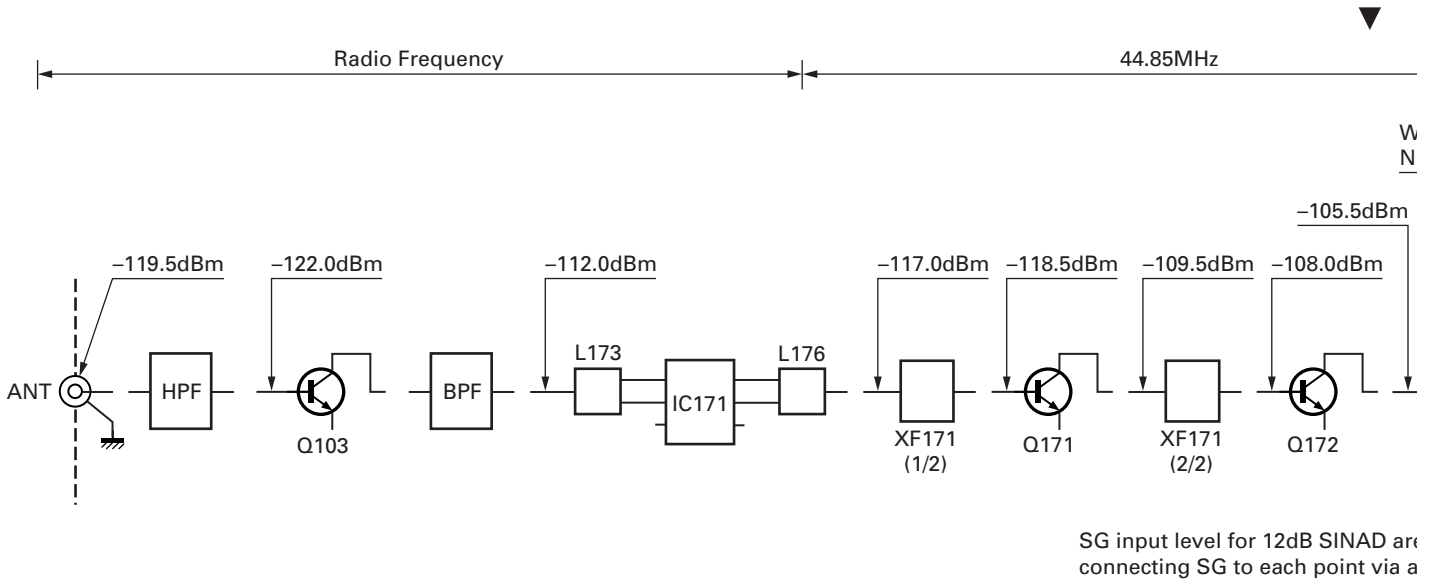


TK-8180 BLOCK DIAGRAM

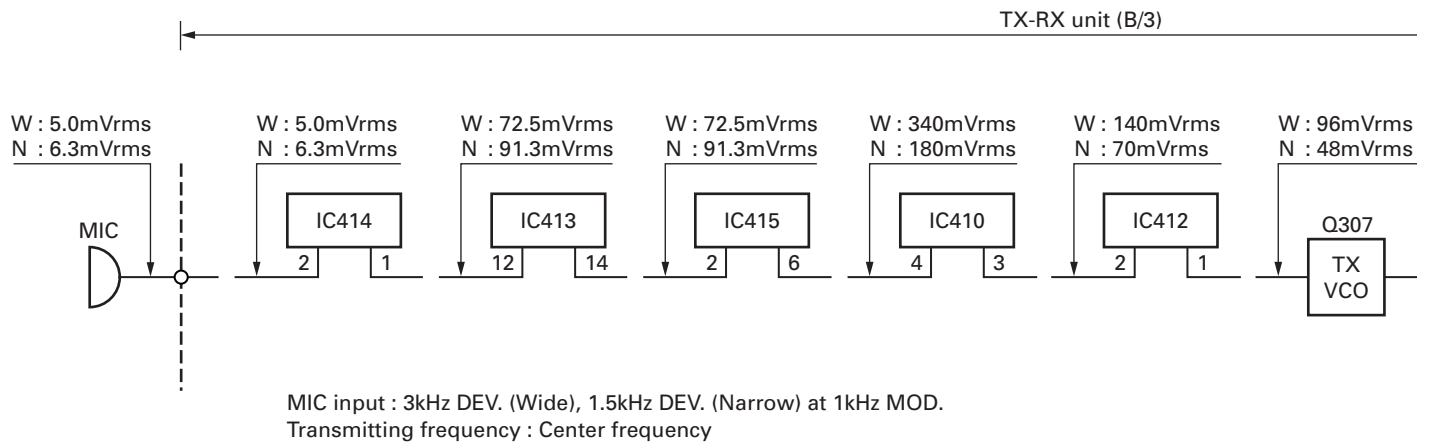


LEVEL DIAGRAM

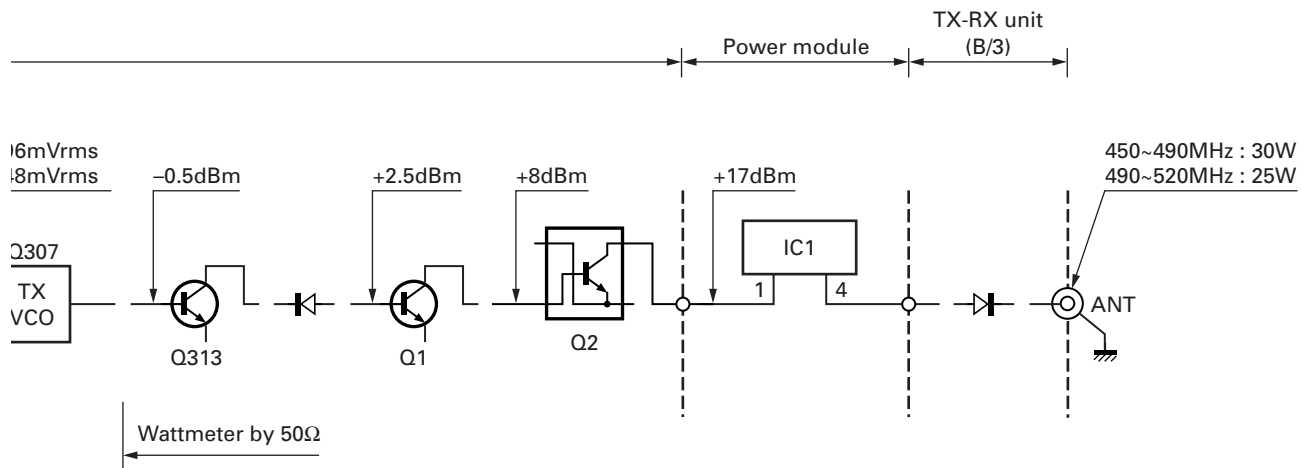
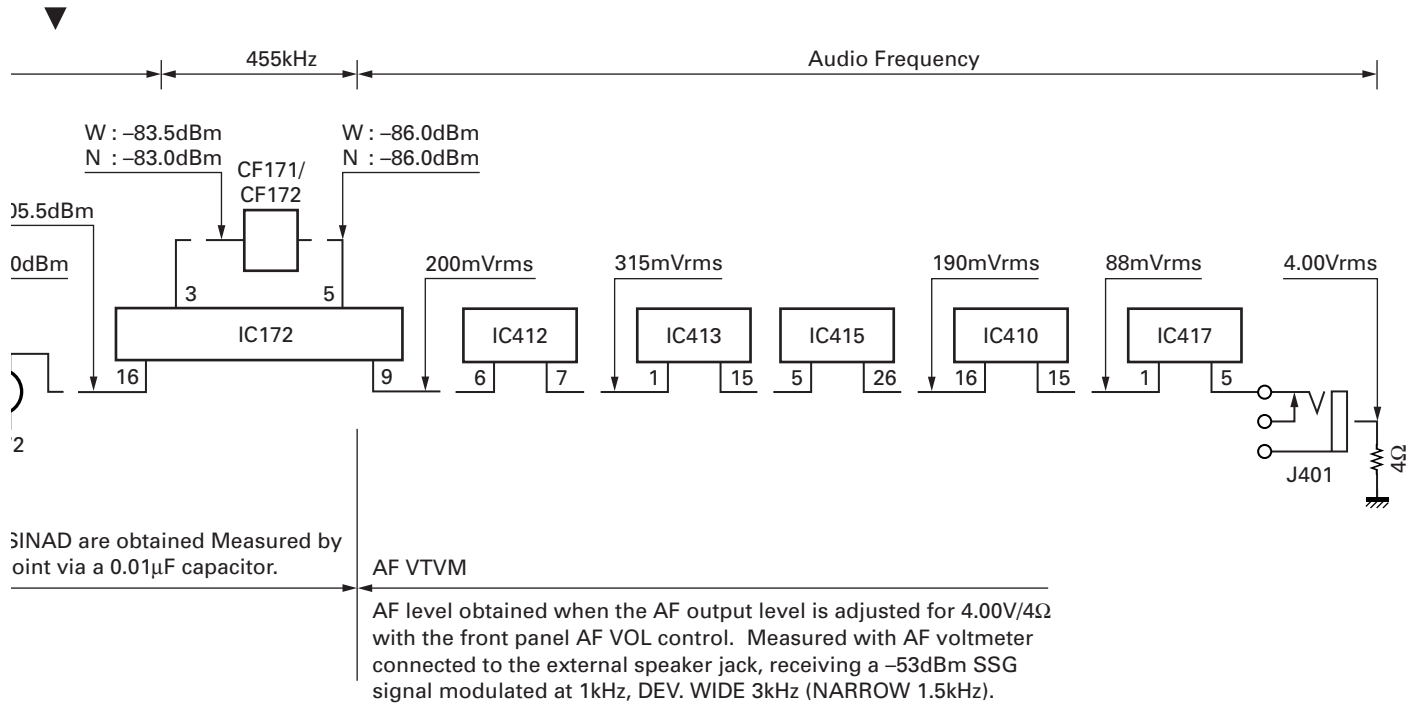
Receiver Section



Transmitter Section



LEVEL DIAGRAM



TK-8180

OPTIONAL ACCESSORIES: KRK-10 (Control Head Remote Kit: 23ft/7m)

External View



Components Description

Ref. No.	Part Name	Description
IC1,2	IC	Buffer amp
D2	Varistor	Current limiter
D3~6	Diode	Surge protect
D9~11	Diode	Surge protect
D12~20	Varistor	Surge protect

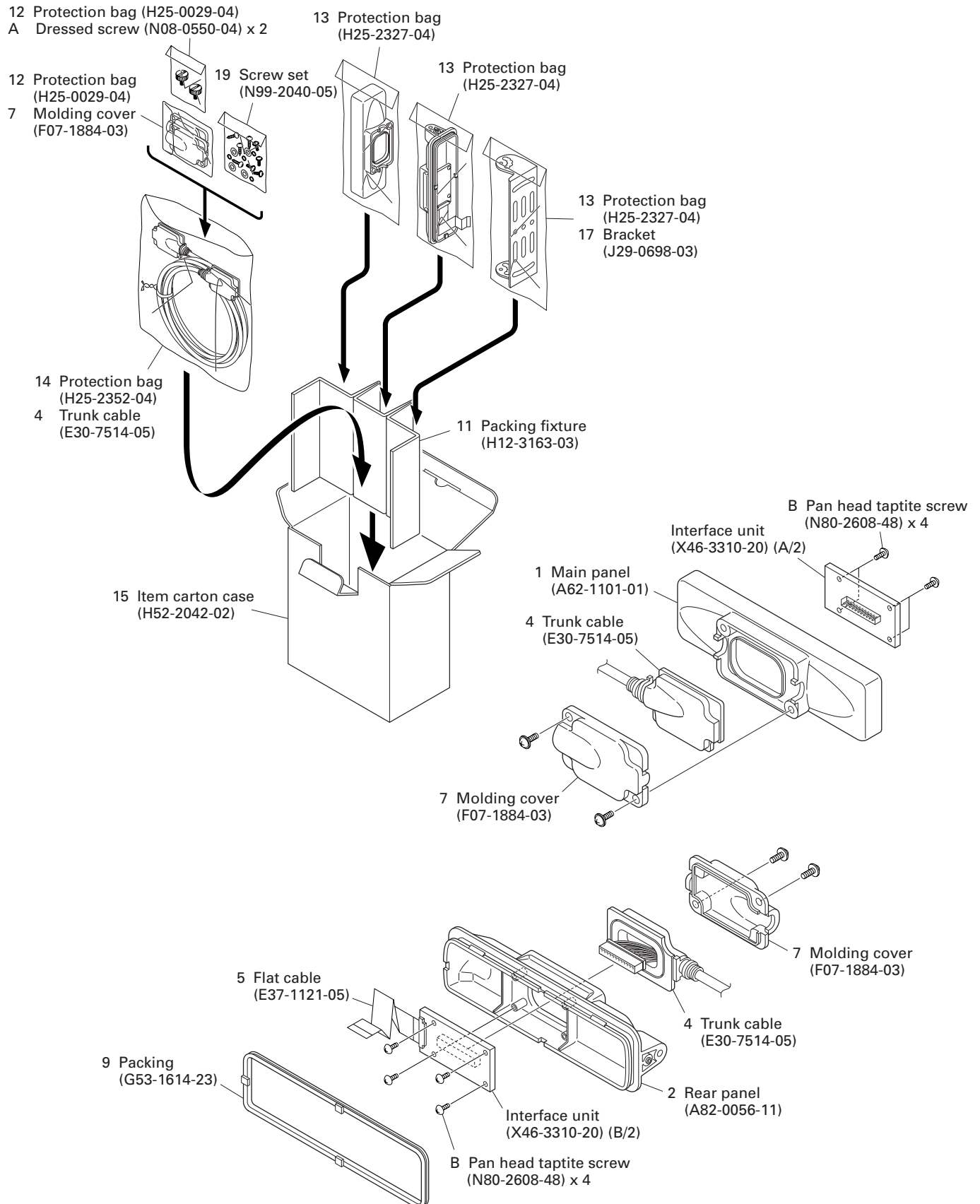
Parts List

* : New Parts

Ref. No.	Address	New parts	Parts No.	Description
KRK-10				
1		*	A62-1101-01	MAIN PANEL
2		*	A82-0056-11	REAR PANEL
4		*	E30-7514-05	TRUNK CABLE
5		*	E37-1121-05	FLAT CABLE
7		*	F07-1884-03	MOLDING COVER
9		*	G53-1614-23	PACKING
11		*	H12-3163-03	PACKING FIXTURE
12			H25-0029-04	PROTECTION BAG (60/110/0.07)
13			H25-2327-04	PROTECTION BAG (100/250/0.07)
14			H25-2352-04	PROTECTION BAG (250/350/0.07)
15		*	H52-2042-02	ITEM CARTON CASE
17			J29-0698-03	BRACKET
A			N08-0550-04	DRESSED SCREW
B		*	N80-2608-48	PAN HEAD TAPTITE SCREW
19		*	N99-2040-05	SCREW SET
INTERFACE UNIT (X46-3310-20)				
C14			CK73GB1H102K	CHIP C 1000PF K
C41			CK73GB1H102K	CHIP C 1000PF K
CN1			E40-6371-05	FLAT CABLE CONNECTOR
CN2			E40-6412-05	FLAT CABLE CONNECTOR
CN3,4			E40-6377-05	PIN ASSY
L2,3			L40-1091-86	SMALL FIXED INDUCTOR (1.0UH)
L5,6			L40-1091-86	SMALL FIXED INDUCTOR (1.0UH)
R1			RK73GB1J473J	CHIP R 47K J 1/16W
D2			MINISMDM075/24	VARISTOR
D3-6			DA204U	DIODI
D9-11			DA204U	DIODE
D12-20		*	AVRM1608080MAA	VARISTOR
IC1,2			TC7WT125FU	MOS IC

OPTIONAL ACCESSORIES: KRK-10 (Control Head Remote Kit: 23ft/7m)

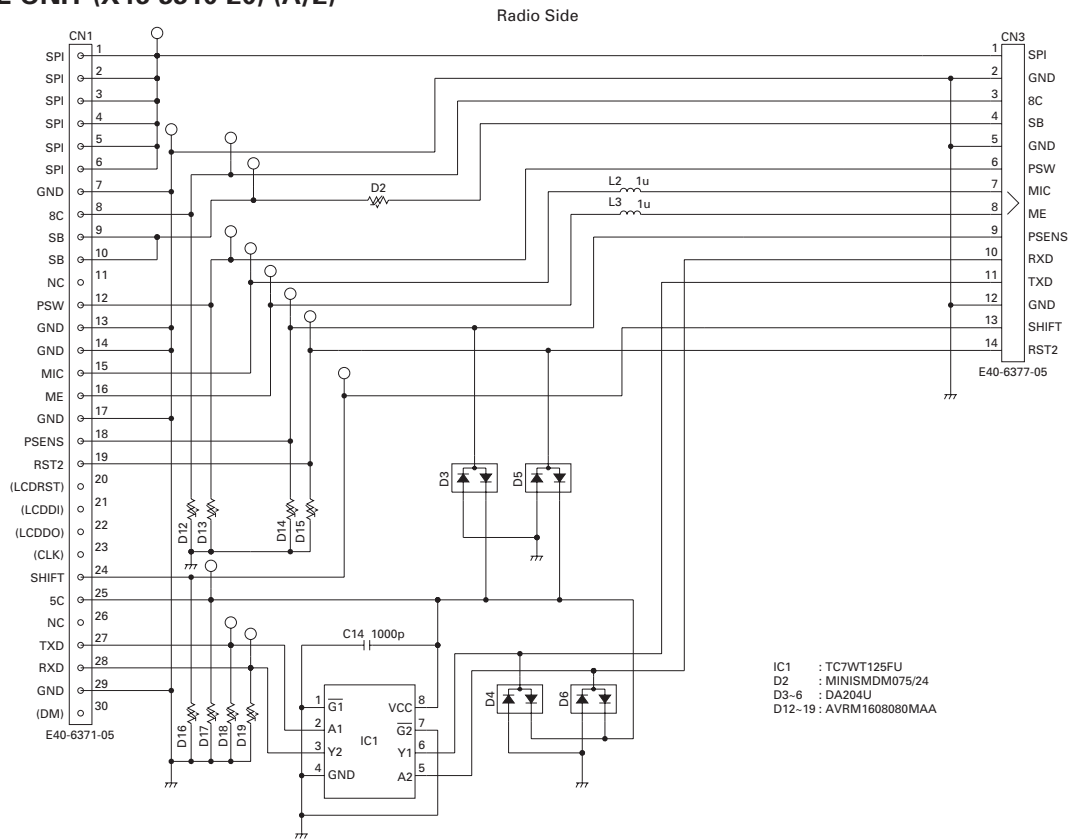
■ Exploded View and Packing



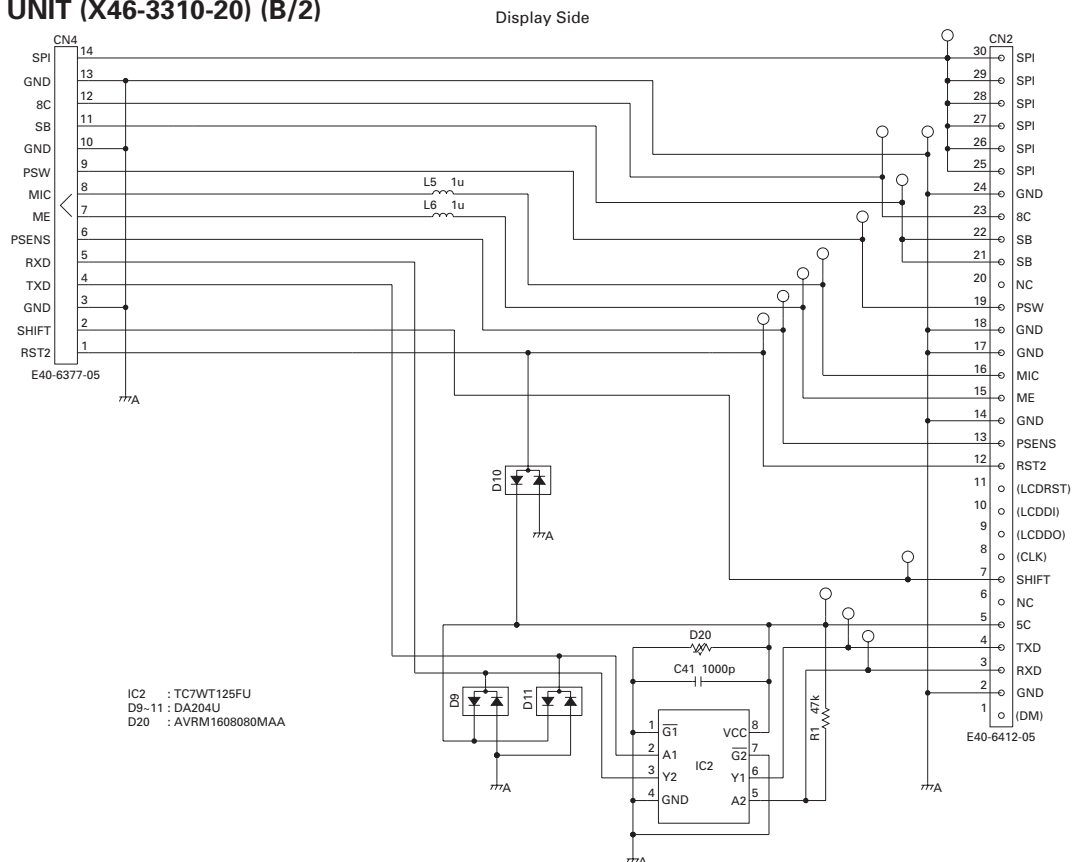
OPTIONAL ACCESSORIES: KRK-10 (Control Head Remote Kit: 23ft/7m)

■ Schematic Diagram

INTERFACE UNIT (X46-3310-20) (A/2)



INTERFACE UNIT (X46-3310-20) (B/2)



TK-8180

OPTIONAL ACCESSORIES: KRK-10 (Control Head Remote Kit: 23ft/7m)

Terminal Function

Pin No.	Name	Description
CN1 (Radio side)		
1	SPI	Speaker input.
2	SPI	Speaker input.
3	SPI	Speaker input.
4	SPI	Speaker input.
5	SPI	Speaker input.
6	SPI	Speaker input.
7	GND	Ground.
8	8C	8V input.
9	SB	Power input of switched power supply.
10	SB	Power input of switched power supply.
11	NC	-
12	PSW	Detection signal output of Power switch.
13	GND	Ground.
14	GND	Ground.
15	MIC	MIC signal output.
16	ME	MIC ground.
17	GND	Ground.
18	PSENS	Detection signal output of Display unit.
19	RST2	Reset signal input.
20	(LCDRST)	Reserve.
21	(LCDDI)	Reserve.
22	(LCDDO)	Reserve.
23	(CLK)	Reserve.
24	SHIFT	Control signal input of Beat-Shift function.
25	5C	5V input.
26	NC	-
27	TXD	Serial data signal input.
28	RXD	Serial data signal output.
29	GND	Ground.
30	(DM)	Reserve.
CN2 (Display side)		
1	(DM)	Reserve.
2	GND	Ground.
3	RXD	Serial data signal input.
4	TXD	Serial data signal output.
5	5C	5V input.
6	NC	-
7	SHIFT	Control signal output of Beet-Shift function.
8	(CLK)	Reserve.
9	(LCDDO)	Reserve.
10	(LCDDI)	Reserve.
11	(LCDRST)	Reserve.
12	RST2	Reset signal output.
13	PSENS	Detection signal input of Display unit.
14	GND	Ground.

Pin No.	Name	Description
15	ME	MIC ground.
16	MIC	MIC signal input.
17	GND	Ground.
18	GND	Ground.
19	PSW	Detection signal input of Power switch.
20	NC	-
21	SB	Power output of switched power supply.
22	SB	Power output of switched power supply.
23	8C	8V output.
24	GND	Ground.
25	SPI	Speaker output.
26	SPI	Speaker output.
27	SPI	Speaker output.
28	SPI	Speaker output.
29	SPI	Speaker output.
30	SPI	Speaker output.
CN3 (Radio side)		
1	SPI	Speaker output.
2	GND	Ground.
3	8C	8V output.
4	SB	Power output of switched power supply.
5	GND	Ground.
6	PSW	Detection signal input of Power switch.
7	MIC	MIC signal input.
8	ME	MIC ground.
9	PSENS	Detection signal input of Display unit.
10	RXD	Serial data signal input.
11	TXD	Serial data signal output.
12	GND	Ground.
13	SHIFT	Control signal output of Beat-Shift function.
14	RST2	Reset signal output.
CN4 (Display side)		
1	RST2	Reset signal input.
2	SHIFT	Control signal input of Beat-Shift function.
3	GND	Ground.
4	TXD	Serial data signal input.
5	RXD	Serial data signal output.
6	PSENS	Detection signal output of Display unit.
7	ME	MIC ground.
8	MIC	MIC signal output.
9	PSW	Detection signal output of Power switch.
10	GND	Ground.
11	SB	Power input of switched power supply.
12	8C	8V input.
13	GND	Ground.
14	SPI	Speaker input.

OPTIONAL ACCESSORIES

KAP-2 (Horn Alert/P.A. Relay Unit)

■ External View



KMC-35 (Microphone)

■ External View



KMC-36 (Keypad Microphone)

■ External View



KCT-40 (Radio Interface Cable)

■ External View



KCT-46 (Ignition Sense Cable)

■ External View



SPECIFICATIONS

GENERAL

Frequency range	450~520MHz
Number of channels	Zone : Max. 128 per radio Ch/GID : Max. 250 per zone (Max. 512 [Conv. Ch's + GID's] total per radio)
Channel spacing	Wide : 25kHz Narrow : 12.5kHz
Operating voltage	13.6V DC \pm 15%
Current drain	
Standby	0.4A
Receive	1.0A
Transmit	9.0A
Duty cycle	Transmit : 20%
Operating temperature range	-22°F~+140°F (-30°C~+60°C)
Frequency stability	\pm 0.00025% (-22°F~+140°F)
Antenna impedance	50 Ω
Channel frequency spread	70MHz
Dimensions (W x H x D)	6-5/16 x 1-3/4 x 6-3/16 in. (160 x 45 x 157 mm) (Projections not included)
Weight (net)	3.31lbs. (1.5kg)

RECEIVER (Measurements made per EIA/TIA-603)

Sensitivity (12dB SINAD)	Wide : 0.25 μ V Narrow : 0.28 μ V
Selectivity	Wide : 80dB Narrow : 67dB
Intermodulation distortion	W/N : 75dB (\pm 50, 100kHz)
Spurious response	85dB
Audio output (4 Ω impedance)	4W with less than 5% distortion

TRANSMITTER (Measurements made per EIA/TIA-603)

RF power output	30 to 1W (490~520MHz : 25 to 1W)
Spurious response	70dB
Type of emission	Wide : 16K0F3E Narrow : 11K0F3E
FM hum & noise	Wide : 50dB Narrow : 45dB
Audio distortion	W/N : 3%
Microphone impedance	600 Ω

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