

# KENWOOD

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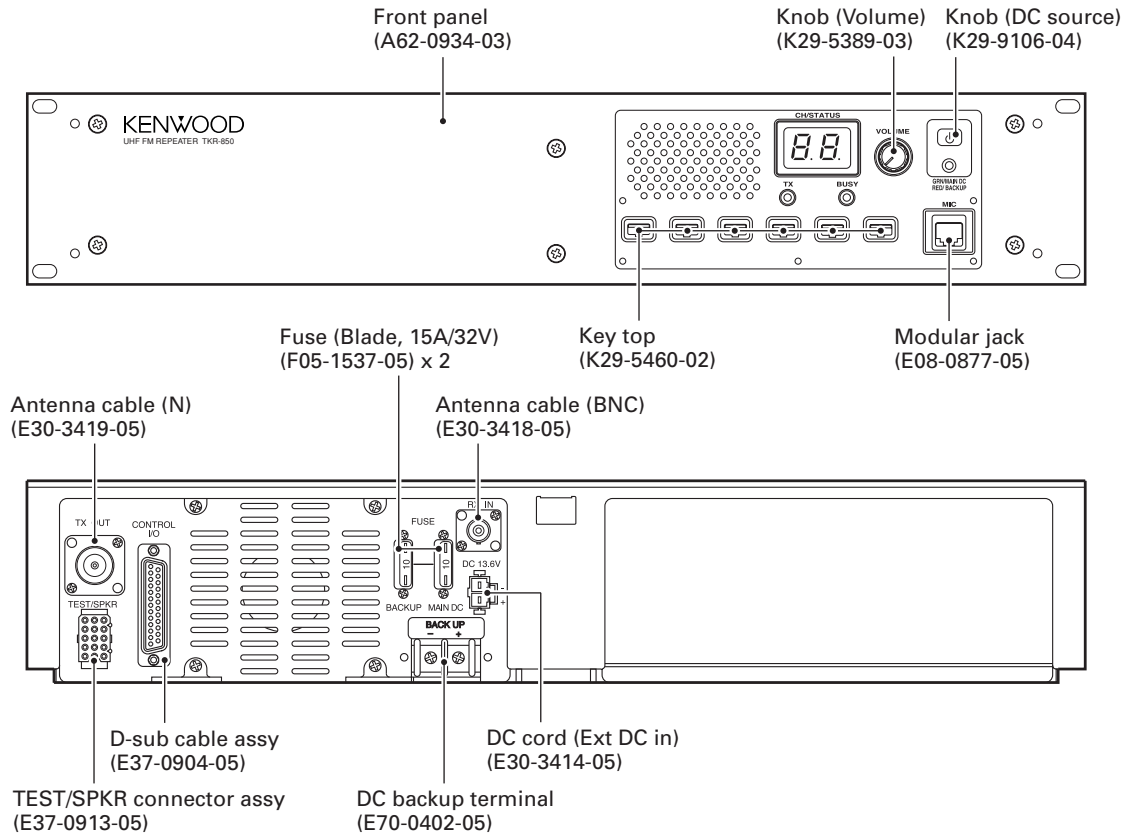
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This service manual applies to products 60700001 or subsequent serial number.  
In terms of the products with the serial numbers earlier than 60700001, refer to the TKR-850 service manual as per part number B51-8557-20 and B51-8676-00.



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# TKR-850

## GENERAL / SYSTEM SET-UP

### 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

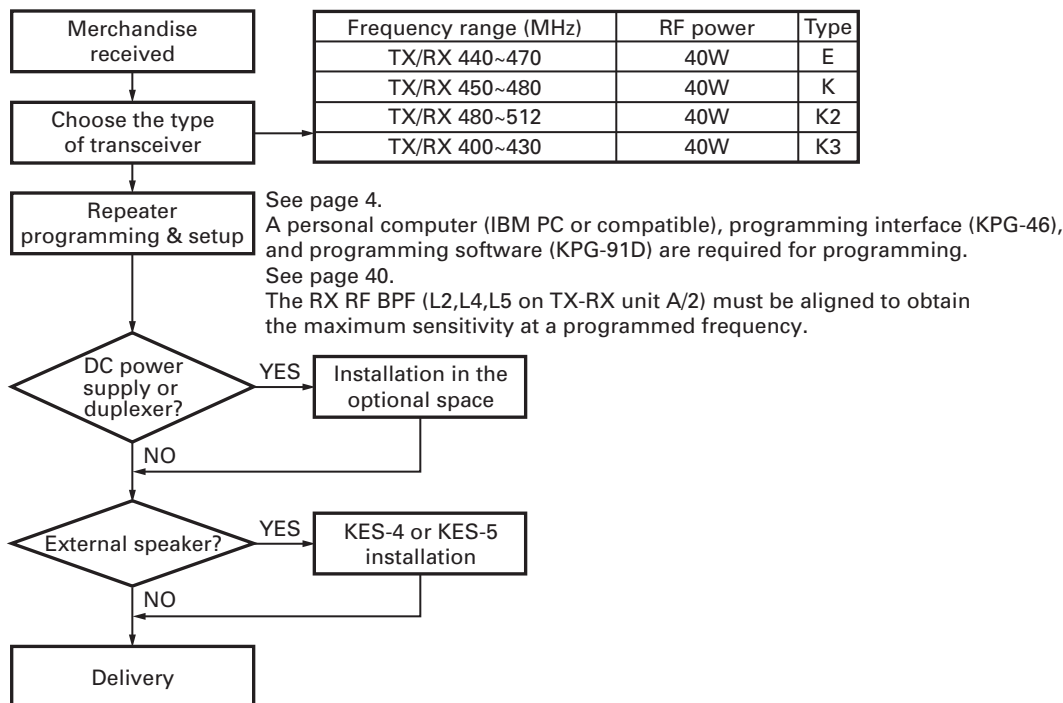
The following precautions are recommended for personal safety :

- DO NOT transmit 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.
- This equipment should be serviced by only qualified technicians.

### SERVICE

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

### SYSTEM SET-UP



## OPERATING FEATURES

### 1. Two 7-segment LED displays

- Channel display (1~16) : While operating normally in user mode.

1 16

- When the displayed channel is contained in scan sequence, the right side decimal point is displayed.

2.

- When the displayed channel is the priority channel, the left side decimal point is displayed.

.3.

- "PC" is displayed while in PC mode.

PC

- "PG" is displayed while in firmware programming mode.  
2 decimal points displayed = 115,200bps  
1 decimal point displayed = 57,600bps  
No decimal = 38,400bps

PG. PG.

- "E1" is displayed when FPU data is not written.

E1

- "E2" is displayed when the channel data is not written.

E2

- "E3" is displayed when PLL is unlocked.  
Receiver PLL unlocked = BUSY LED blinks.  
Transmitter PLL unlocked = TX LED blinks.

E3

- "E4" is displayed when PTT is attempted on a channel number that has no frequency data programmed.

E4

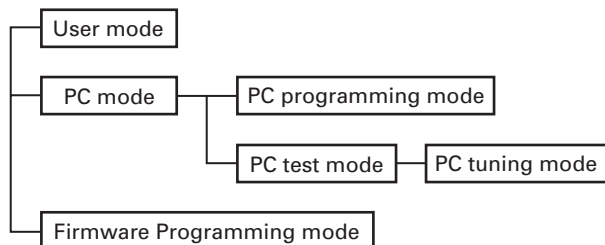
- "SC" is displayed while in scan mode.

SC

# TKR-850

## REALIGNMENT

### 1. Modes



Mode	Function
User mode	Use this mode for normal operation.
PC mode	Use this mode to make various settings by means of the FPU through the RS-232C port.
PC programming mode	Use to read and write frequency data and other features to and from the repeater.
PC test mode	Use to check the repeater using the PC. This feature is included in the FPU.
Firmware programming mode	Use when changing the firmware program of the flash memory.

### 2. How to Enter Each Mode

Mode	Operation
User mode	Power on.
PC mode	Received commands from PC.
Firmware Programming mode	[PF1] key + Power on (one second).

### 3. PC Mode

#### 3-1. Preface

The TKR-850 repeater is programmed by using a personal computer, programming interface and KPG-91D (ver 2.0 or later) software.

#### 3-2. Connection Procedure

1. Connect the TKR-850 to the personal computer with the interface cable.
2. When power is applied, the user mode is entered immediately. When the PC sends a command, the repeater enters the PC mode and displays "PC" on the 7-segment LED. When data is being transmitted to the PC from the repeater, the TX LED flashes. The BUSY LED flashes when data from the PC is being received by the repeater.

#### Note :

- The data stored in the personal computer must match the model type, when it is written into the flash memory.
- Change the TKR-850 to PC mode, then attach the interface cable.

#### 3-3. KPG-46 Description (PC Programming Interface Cable : Option)

The KPG-46 is required to interface the TKR-850 to the computer. It has a circuit in its D-sub connector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-46 connects the microphone connector of the TKR-850 to the computer's RS-232C serial port.

#### 3-4. Programming Software Description

The KPG-91D is the programming software for TKR-850 supplied on a CD-ROM. This software runs under Windows 98, ME, Windows 2000 or XP on an IBM-PC or compatible machine.

The data can be input to or read from TKR-850 and edited on the screen. The programmed or edited data can be printed out. It is also possible to tune the transceiver.

#### 3-5. Programming With IBM PC

Data can be programmed into the flash memory in RS-232C format via the microphone connector.

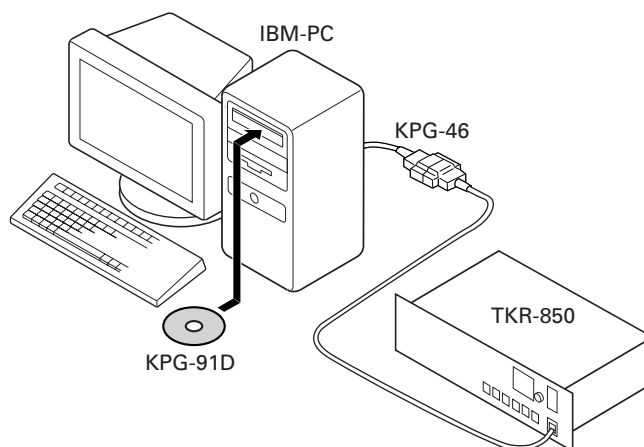


Fig. 1

### 4. Firmware Programming Mode

#### 4-1. Preface

The TKR-850 uses flash memory to allow it to be easily upgraded when new features are released in the future.

#### 4-2. Connection Procedure

Connect the TKR-850 to the personal computer (IBM PC or compatible) with the interface cable (KPG-46). (Connection is the same as in the PC mode.)

#### Notes :

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.

## REALIGNMENT / INSTALLATION

### 4-3. Programming

1. Start up the 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 TKR-850 power on with the [PF1] key held down. Hold the key down for one second until the 7-segment display changes to "P.G.". When "P.G." appears, release your finger from the key.
5. Check the connection between the TKR-850 and the personal computer, and make sure that the TKR-850 is in the program mode.
6. Press write button in the window. A window opens on the display to indicate progress of writing.
7. If writing ends successfully, the TX LED on the TKR-850 lights.
8. If you want to continue programming other TKR-850s, repeat steps 3 to 6.

#### Notes :

This mode cannot be entered if the firmware program mode is set to disable in the programming software (KPG-91D).

### 4-4. Function

If you press the [PF1] key (front panel), both decimal points on the 7-segment display will disappear. The writing speed is 38400 bps (low-speed mode). If you press the [PF1] key again, the right hand decimal points will light. The writing speed is 57600 bps (middle-speed mode).

#### Note :

Normally, write in the high-speed mode (115200 bps).

## INSTALLATION

### 1. External Power Supply Connection (Rear Connectors)

This unit has two external power supply connectors : Main DC and Backup.

If an external DC power supply is connected to the main DC connector and a backup battery is connected to the Backup connector at the same time, the DC power supply switches to the battery automatically if power failure occurs. Therefore, the operation of the repeater can be continued.

If the battery is used, but both the battery and power supply need not be connected (if an external switch is used or if only a solar battery is used), connect it to the Backup connector, not the Main DC connector. Current consumption can be reduced by approx. 120mA because the relay is not used.

If it is installed when the temperature at the repeater site is below freezing, check whether the switch (relay) works properly after installation.

### 2. Voice Scrambler

It operates only during base operation. The voice is not scrambled when it is repeated.

#### 2-1. Modification

- 1) Remove R742 and R653 on the TX-RX unit (B/2) : control section.

#### 2-2. Connection

- 1) The functions of pins of CN601 on the TX-RX unit (B/2) : control section are shown in the figure.
- 2) Join the CN601 connector to the voice scrambler board via the E37-0808-05 connector cable.

When the operation is checked in PC test mode after the modification, and the maximum deviation is adjusted, the voice from the local microphone is not modulated. In this case, remove the CN601 12-pin (PTO) cable and connect it to the land of the display unit (X54-333) from the voice scrambler. The voice from the local microphone can be modulated in PC test mode.

## INSTALLATION

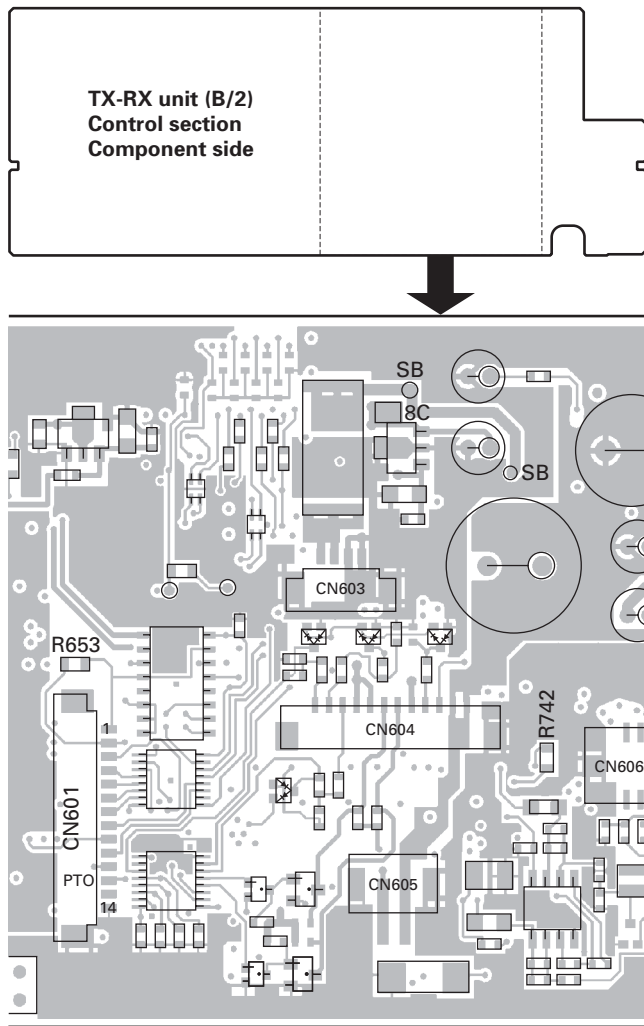


Fig. 1

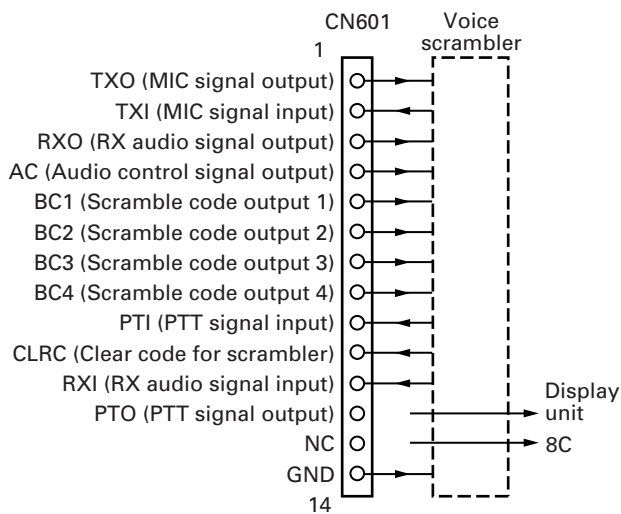


Fig. 2

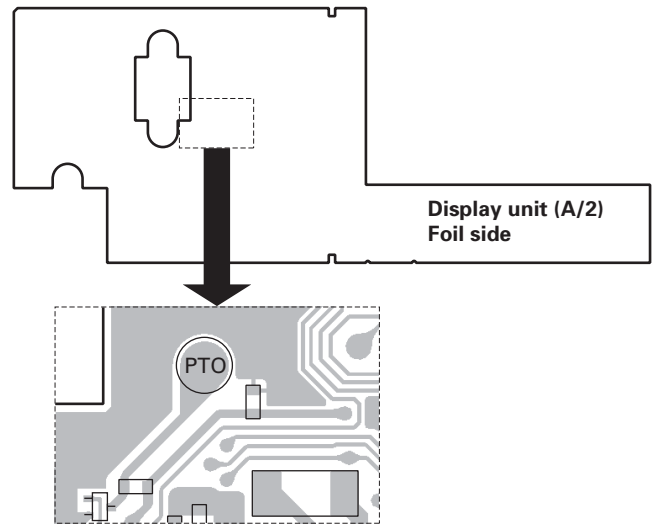


Fig. 3

### 3. External Speaker (KES-4 or KES-5)

The TKR-850 has an internal built-in speaker (5W/8Ω), and the external speaker output from the TEST/SPKR connector (15-pin) on the rear of the radio is 4W/4Ω. Use external speaker KES-4 or KES-5.

#### 3-1. Connection for the KES-4 or KES-5 With the TKR-850

##### ■ When taking the AF output from the TEST/SPKR connector (15-pin) on the rear of the radio

The following tools are required for changing the connector.

##### • Extracting tool

The following extracting tool is recommended:  
Molex Inc. Order No. : J5800-002 (W05-0878-00)

1. Remove the connector with jumper from the external speaker connector on the rear panel of the radio. (Fig. 4-1)  
Note : Save the jumper, which is required when the radio is used without the external speaker.
2. Remove the terminals with the jumper from the connector housing holes number 9 and 12 using the extracting tool.

##### Removing the jumper lead (Fig. 4-2)

- 1) Insert the extracting tool (J5800-002) into the connector while pushing the jumper lead in the direction of (a).
- 2) Push the extracting tool into collapse the barbs of the crimp terminal.
- 3) Pull out the lead while continuing to push the extracting tool in the direction (b).
3. Reinsert the terminal with the black and white stripe lead into hole number 12, and the terminal with the black lead into hole number 6. (Fig. 4-3)
4. Attach the connector to the external speaker connector on the radio.

## INSTALLATION

### Note :

Relationship between TEST/SPKR connector (15-pin) connection and speaker output.

When pins 9 and 12 are shorted : Built-in internal speaker is used.

When pins 9 and 12 are open and output is from pins 6 and 12 : KES-4 or KES-5 is used.

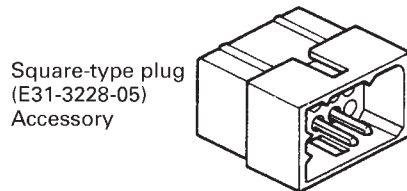


Fig. 4-1

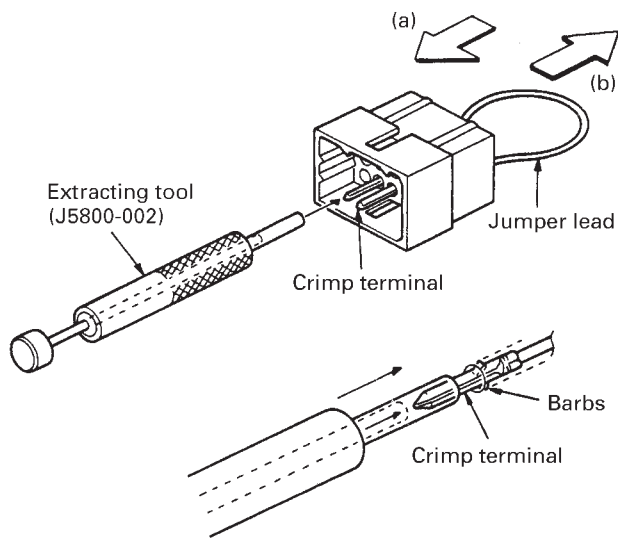


Fig. 4-2

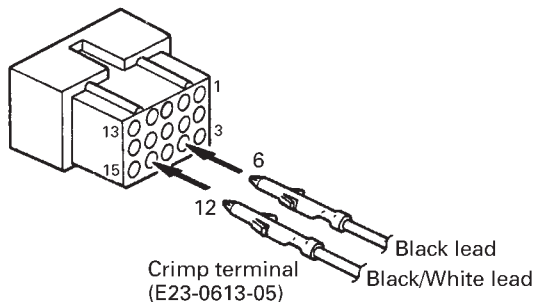


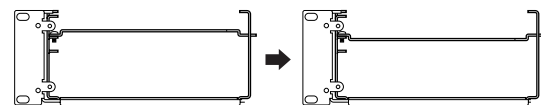
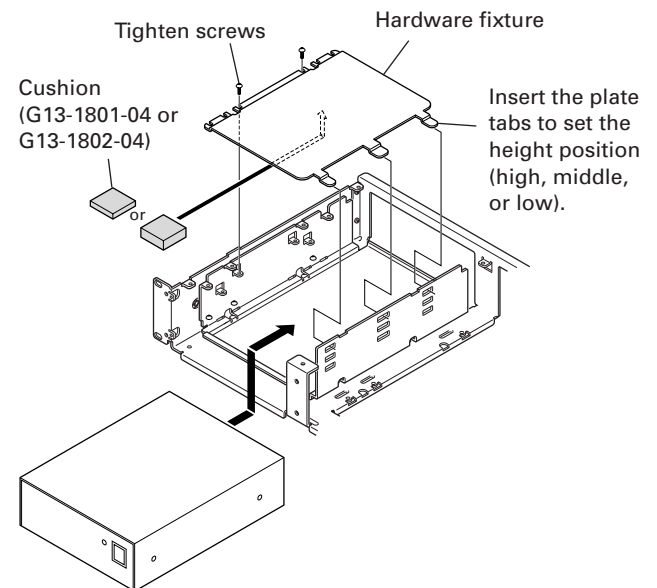
Fig. 4-3

### 4. Accessory Cabinet

You can install optional accessories, such as a DC power supply or duplexers in the accessory cabinet.

1. Place the optional accessory in the cabinet as shown below.
2. If necessary, attach cushions (G13-1801-04 and/or G13-1802-04) to the top plate (J21-8402-04) in order to adjust the space between the cabinet and the top plate. Then, insert the 3 tabs of the plate into the slots in the side of the cabinet. High, middle, or low positions are available. To affix the plate, inset and tighten 2 screws on the other side of the plate.

You can also flip the top plate upside-down to adjust a height of the cabinet space.



The top plate can be inverted to adjust the height of the cabinet space.

Fig. 5



# TKR-850

## INSTALLATION / MODIFICATION

### 5. Key Cover

To avoid accidentally pressing the keys, you can install the key cover.

1. Install and fix the key protector using the 5 supplied screws (N35-3006-45).

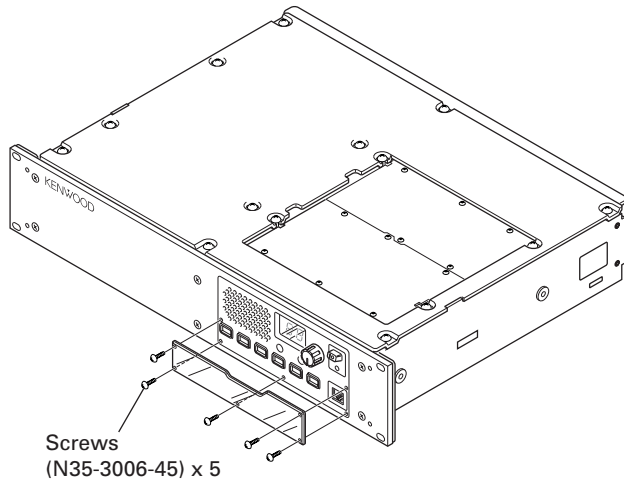


Fig. 6

### 6. Desktop Repeater

When you use the repeater on the desktop, attach the 4 spacers to the base of the repeater as shown in figure. With these spacers attached, the front panel will not touch the desk surface.

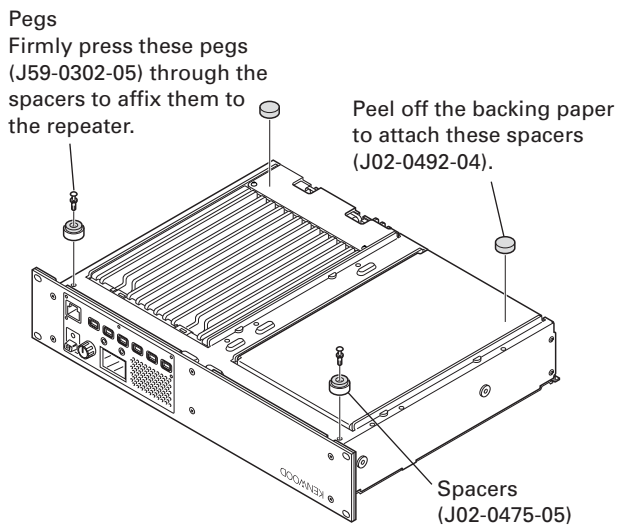


Fig. 7

### 7. Installing Name Plates

Punch out the name plate card. Then insert the plates onto the relative function keys.

You can reconfigure the name plates at any time.

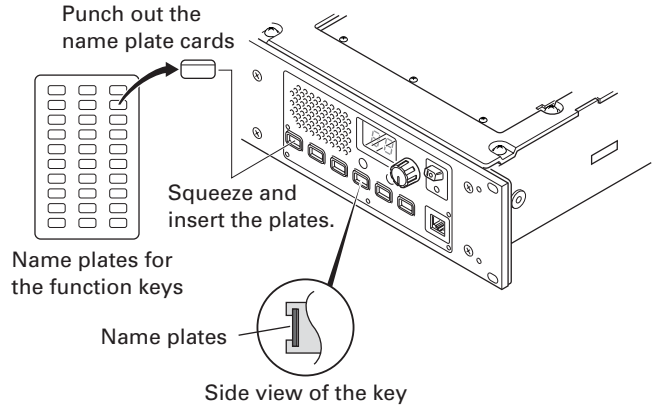


Fig. 8

## MODIFICATION

### 1. DC Source Switch

To prevent the power supply from turning off due to misoperation of the DC source switch on the front panel or accidents (tampering) after installation, the main unit can be kept on regardless of the on/off of the DC source switch on the front panel.

Short the PSW land near K1 relay by soldering.

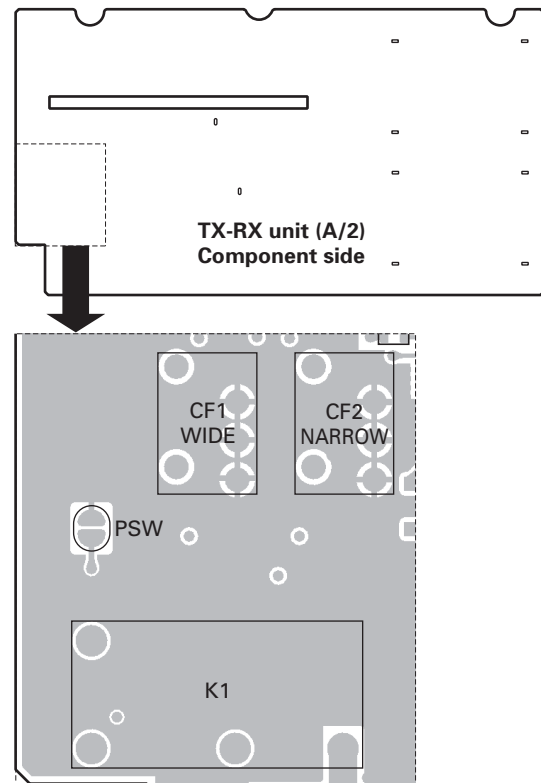


Fig. 1

## MODIFICATION

### 2. Trickle Charge for Backup Battery

If the external DC power supply is connected to the Main DC connector and a backup battery (12V rechargeable type) is connected to the Backup connector at the same time, the battery can be trickle-charged from the external DC power supply with a maximum current of 0.5A.

Short the CHARGE land near R61.

#### Notes :

1. Make this modification after removing the DC power supply and battery for safety.
2. When the DC power supply is connected after the modification, DC voltage is output to the Backup connector. Be careful during setup.
3. When the backup battery is used for a long time, remove the battery from the repeater and recharge it because the trickle charge is not sufficient for recharging a completely discharged battery.

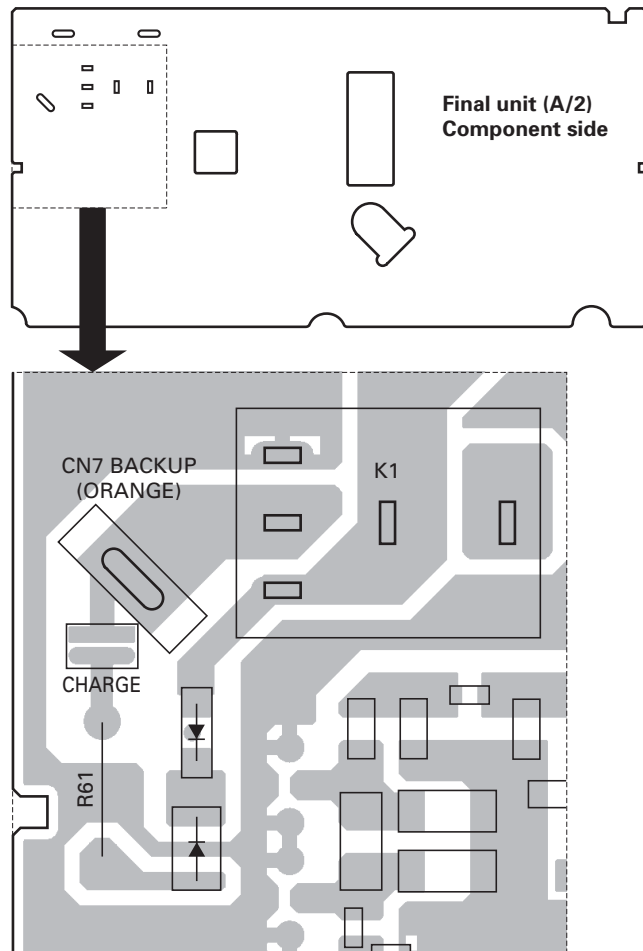


Fig. 2

### 3. Single Antenna

The TKR-850 can be used as a base station by sharing an external antenna connector for both transmitting and receiving data.

#### 3-1. Modification

1. Change the installation position of C81 and C160 of the final unit using a soldering iron.

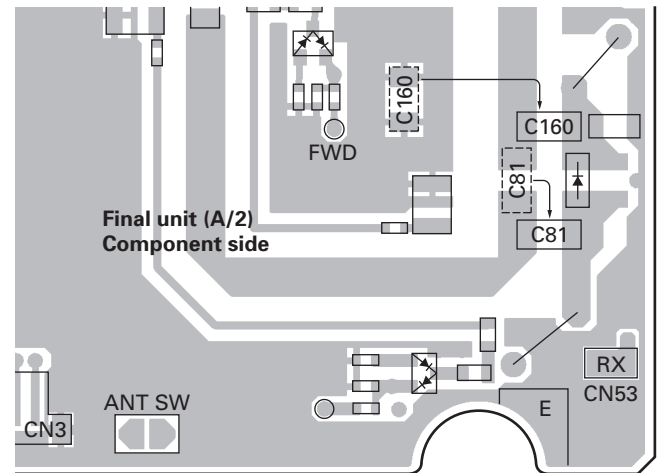


Fig. 3

2. Short-circuit the printed pattern of ANT SW near the CN3 connector by soldering.
3. Disconnect the pin connector from CN18 of the TX-RX unit. Remove the two screws used for securing the BNC connector on the back panel of the unit. Detach the antenna cable assy. (E30-3418-05)
4. Cut off the coaxial cable of the removed antenna cable assy on the BNC connector side. Strip off the insulation of the cut-off coaxial cable to prepare it to be soldered.

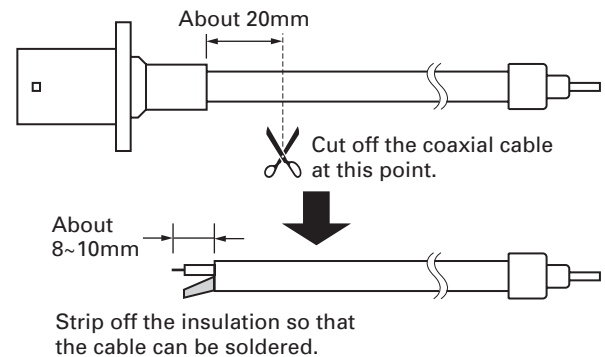


Fig. 4

# TKR-850

## MODIFICATION / DISASSEMBLY FOR REPAIR

### 3-2. Connection

1. Solder the prepared coaxial cable to the final unit.
2. Connect the pin connector of the coaxial cable to CN18 of the TX-RX unit.

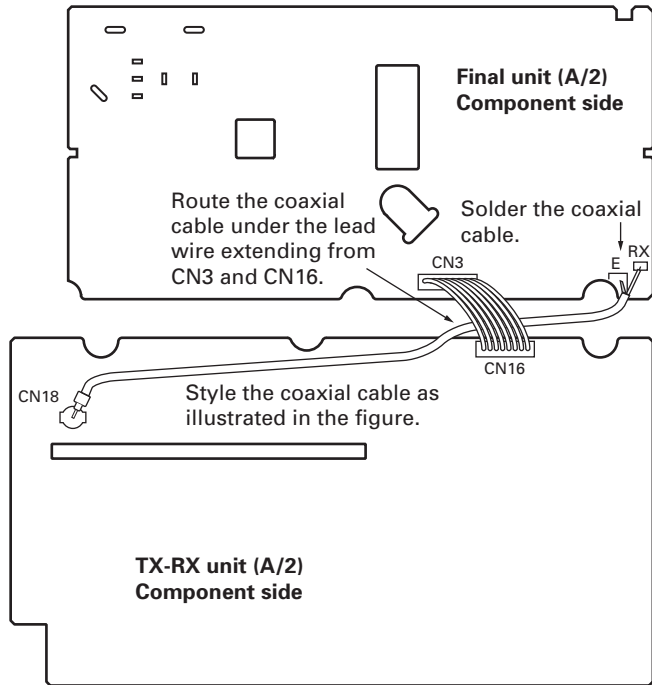


Fig. 5

### 3-3. Setting the FPU

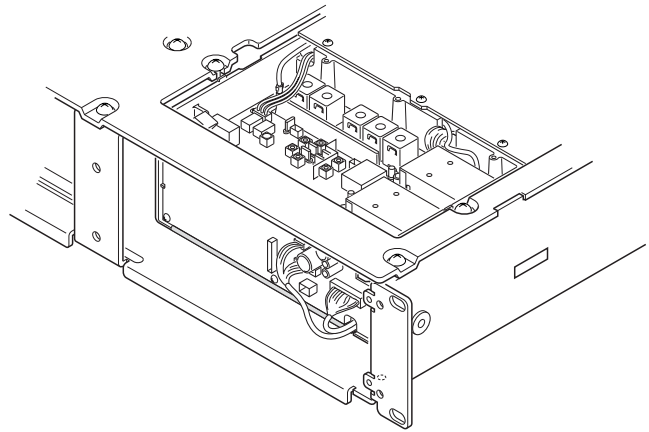
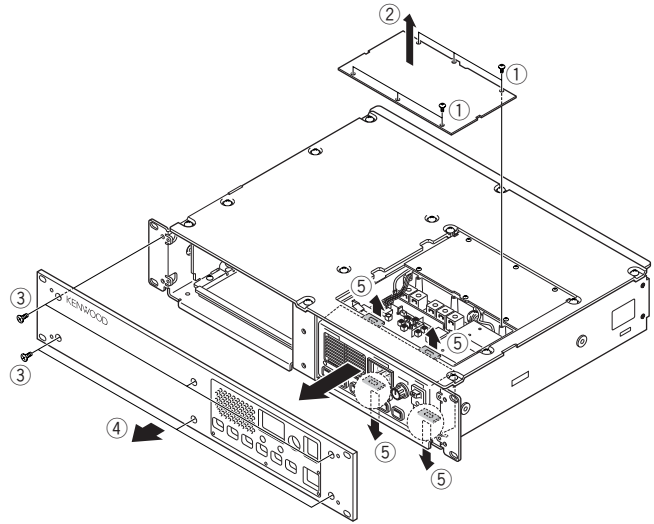
Set the channel to be used as "Simplex" using the FPU.

### DISASSEMBLY FOR REPAIR

#### 1. How to Remove the Panel Assy (ABS)

**Note :** You can remove the panel assembly (ABS) without removing the top panel (A62-0840-03).

1. To remove panel (TX-RX, ②), loose 6 screws (①).
2. To remove panel assembly (Front, ④), loose 6 screws (③).
3. The panel assembly (ABS) is security fastened by 4 tabs (⑤) on top and bottom. You can remove the panel assembly by pulling to front while you are pulling up the tabs.



## CIRCUIT DESCRIPTION

### 1. Outline

The TKR-850 is a UHF/FM repeater designed to operate in the frequency range of 400 to 512MHz.

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

### 2. Receiver Circuit

The receiver is double conversion super-heterodyne, designed to operate in the frequency range of 440 to 470MHz (E), 450 to 480MHz (K), 480 to 512MHz (K2) or 400 to 430 MHz (K3).

The receiver circuit located in TX-RX unit (X57-696 A/2) 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 BPF L2, RF amplifier Q1, and BPF L4/L5. The helical BPF covers frequency ranges 440 to 470MHz (E), 450 to 480MHz (K), 480 to 512MHz (K2) or 400 to 430MHz (K3), with a passband of 5.0MHz.

The BPF L4/L5 attenuates the unwanted signals, and sends only the necessary signal to the first mixer DBM A1.

#### 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 (A1) to become a 44.85MHz first intermediate frequency (IF) signal. The first IF signal is fed through two monolithic crystal filters (XF2; Wide, XF1; Narrow) to further remove spurious signals.

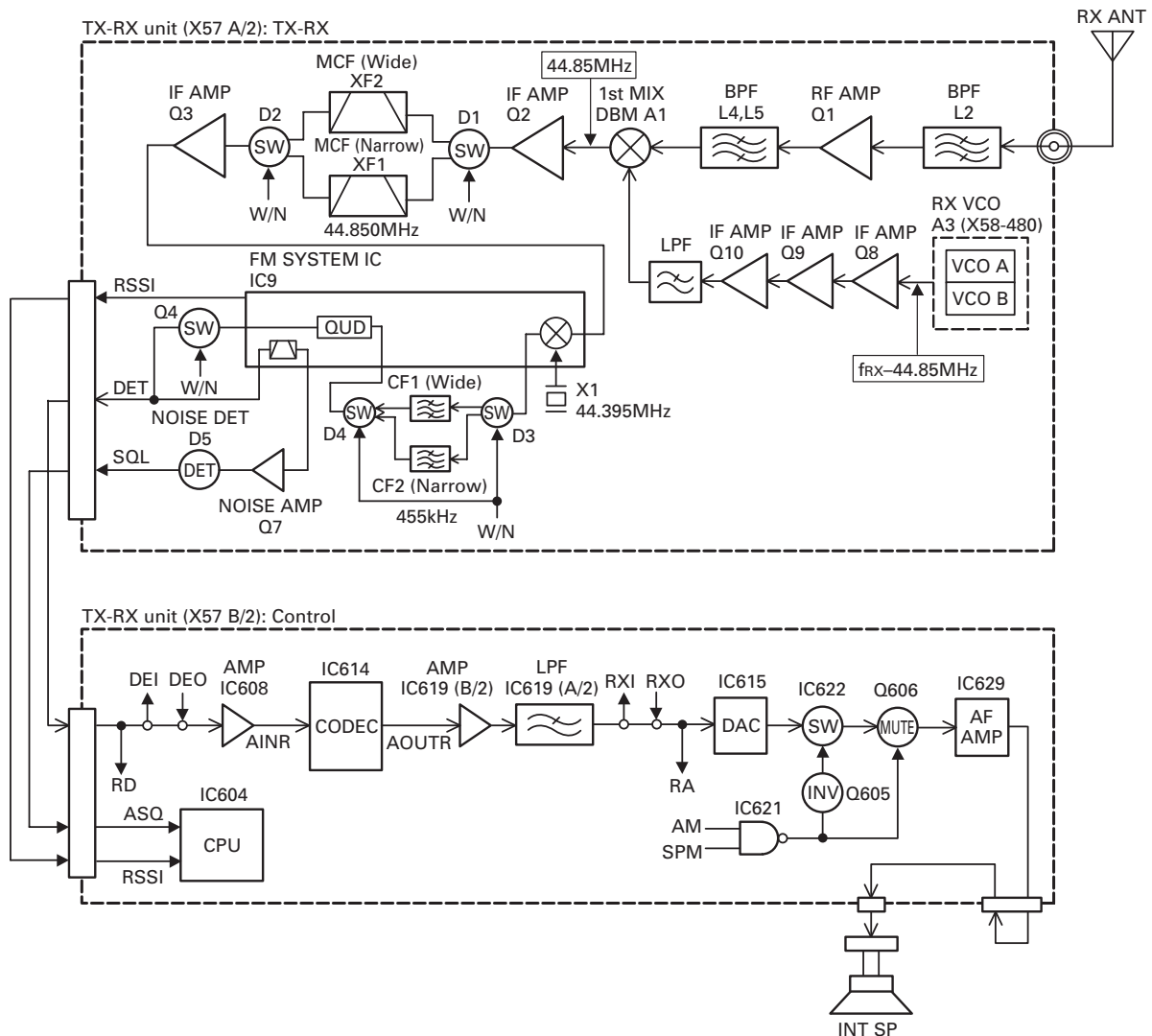


Fig. 1 Receiver circuit

## CIRCUIT DESCRIPTION

### 2-3. IF Amplifier

The first IF signal is amplified by Q2 and Q3, and then enters IC9 (FM system IC). The signal is heterodyned again with a second local oscillator signal (44.395MHz) with in IC9 to become a 455kHz second IF signal. The second IF signal is fed through a 455kHz ceramic filter, CF1 (Wide), CF2 (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 11.

### 2-4. Audio Amplifier

The audio amplifier circuit is located in control section of TX-RX unit (X57-696 B/2). The recovered audio signal obtained from IC9 is amplified by IC608, input to the AINR terminal of CODEC IC (IC614), and audio processed by DSP (IC618).

The processed audio signal from AOUTR terminal of IC614 is amplified by IC619 (B/2) to a sufficient level, anti-aliasing filtered by IC619 (A/2). The audio signal goes to an electronic volume (IC615) V3/V4, to the input of multiplexer IC (IC622), and is amplified to drive a loudspeaker by an audio power amplifier (IC629). The 4W audio output can be provided to external 4 ohms speaker through the 15-pin test connector "SPO, SPG" on the rear panel.

### 2-5. Squelch Circuit

The output signal from IC9 enters FM IC again, then passed through a band-pass filter.

The noise component output from IC9 is amplified by Q7 and rectified by D5 to produce a DC Voltage corresponding to the noise level. The DC voltage is sent to the analog port of the CPU (IC604).

IC9 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, 3-4 automatic power control circuit, 3-5 RF power down detect, and 3-6 fan action control circuit.

#### 3-1. Microphone Circuit

The signal from the microphone is passed through AGC circuit located in display unit (X54-333), so that it does not saturate. This circuit consists of IC501, D501, D502, Q501, and Q502. The AGC is operated by controlling the + and - side levels of amplitude using the current obtained by positive and negative detection of the amplified audio signal. The audio signal goes to control section of TX-RX unit (X57-696 B/2) from display unit (X54-333).

The transmit audio signal goes to the input of the multiplexer IC (IC605) for microphone muting. The audio signal is amplified by IC610, input to the AINL terminal of CODEC IC (IC614), and audio processed by DSP (IC618). The processed audio signal from the AOUTL terminal of IC614 is amplified by IC616 (A/2) to a sufficient level, anti-aliasing filtered by IC616 (B/2), and amplified by the summing amplifier IC611 (A/2).

#### 3-2. Modulation Level Adjustment Circuit

The output of the summing amplifier IC611 (A/2) is passed to an electronic volume (IC615) for maximum deviation adjustment before being applied to a varactor diode in the voltage controlled oscillator (VCO) A2 located in TX-RX unit (X57-696 A/2).

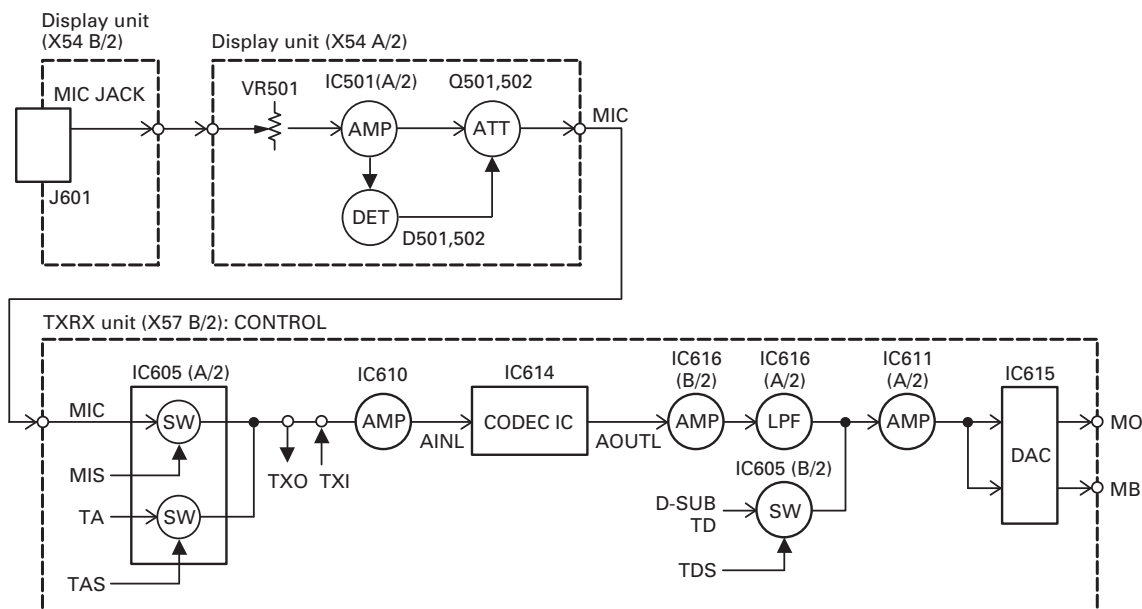


Fig. 2 Microphone circuit

## CIRCUIT DESCRIPTION

### 3-3. Driver and Final Power Amplifier Circuit

The transmit signal is generated by the TX VCO (A2), amplified by Q11, and sent to final unit (X45-374). This amplified signal is amplified by Q1, Q2, Q3 and Q4, and is passed to the FINAL stage. The RF power amplifier consists of MOS FET.

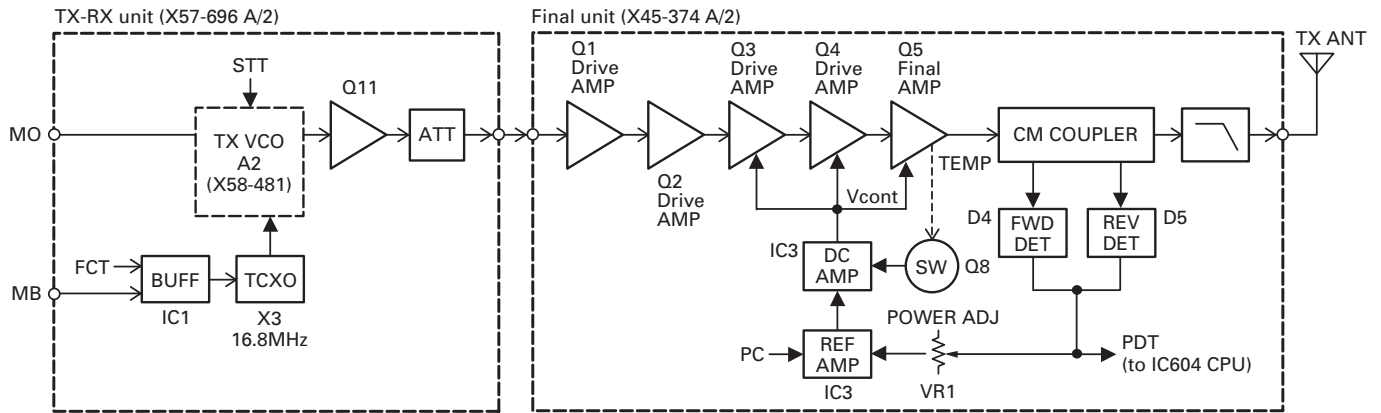


Fig. 3 Driver and final power amplifier circuit

### 3-4. Automatic Power Control Circuit and Transmitter

The automatic power control (APC) circuit stabilizes the transmitter output power at a pre-determined level, and consists of forward/reverse power detector circuits, and switching transistor Q8. The forward/reverse power detector circuits detect forward RF power and reverse RF power to DC voltage, and consists of a CM coupling type detection circuit formed by a strip line, RF detector D4/D5, and DC amplifier IC3 (A/2).

The voltage comparator (IC3 B/2) compares the above detected voltage with a reference voltage, set using the microprocessor and IC6 located in the TX-RX unit. An APC voltage proportional to the difference between the sensed voltage and the reference voltage appears at the output of IC3. This output voltage controls the gate voltage for the drive amplifiers Q3 and Q4 and final amplifier Q5, which keeps the transmitter output power constant.

### 3-5. RF Power Down Detect

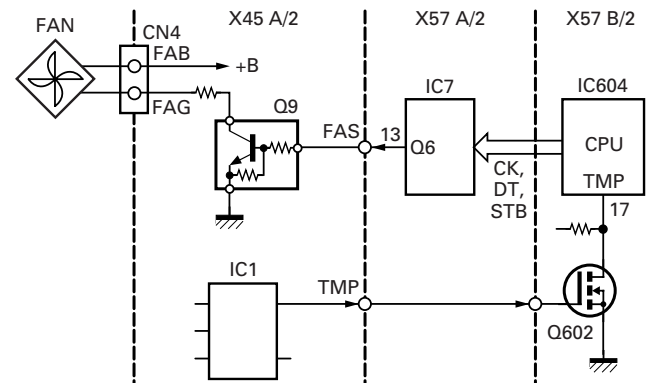
When the transmitter output power has dropped to or below the preset values (High Power : about 16W, Low Power : about 10W) in "RF Power Down Detect" adjustment, IC604 (CPU : X57-696) detects the drop in power and outputs a Low-level (default) signal to the AUX out port.

### 3-6. Fan Action Control Circuit

If fan action is set to "Temperature", the cooling fan is turned ON or OFF according to temperature.

If the ambient temperature of the final unit exceeds approx. 35°C, the output from the temperature detection IC1 changes from H to L. This signal is sent to the CPU (IC604) by Q602 in the TX-RX unit B/2 (control section), and the output from pin 13 (FAS) of IC7 in the TX-RX unit A/2 controlled by the CPU goes H.

This signal turns Q9 in the final unit ON to run the cooling fan. It has a hysteresis of approx. 2°C by IC1. If fan action is set to "Continuous", the fan operates continuously, but Q9 stays ON.



[Fan operation]

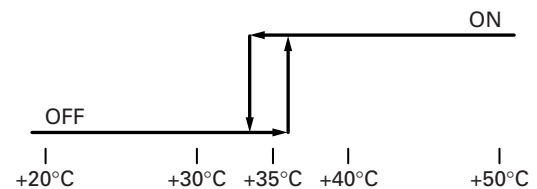


Fig. 4 Fan action control circuit

## CIRCUIT DESCRIPTION

### 4. PLL Frequency Synthesizer

The PLL frequency synthesizer circuit consists of the following circuits : 4-1 receiver PLL circuit, 4-2 transmitter PLL circuit, and 4-3 unlocked detector circuit.

#### 4-1. Receiver PLL

The receiver PLL circuit is located in VCO unit A3 (X58-480) on TX-RX unit (X57-696 A/2), and consists of VCXO X2, VCO's (Q350 and Q351), a single-chip PLL IC IC300, buffer amplifier Q355, and high-frequency amplifier Q302.

The VCXO generates 16.8MHz. The frequency stability is within  $\pm 1.5$ ppm (Temperature range of  $-30$  to  $+60^{\circ}\text{C}$ ). The frequency tuning of the VCXO is done to apply a voltage to pin 1 of the VCXO. The output of the VCXO is applied to pin 8 of the PLL IC through the pin 7 of the VCO.

The first local oscillator is a lower heterodyne local oscillator, and the VCO oscillator frequency is 405.15 to 435.15MHz (K), 395.15 to 425.15MHz (E), 435.15 to 467.15MHz (K2) or 355.15 to 385.15MHz (K3).

The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator to the varactor diodes.

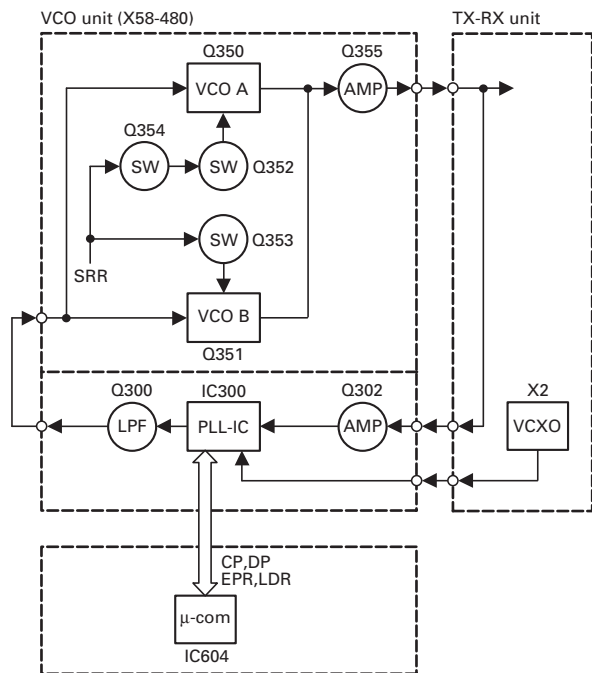


Fig. 5 Receiver PLL

#### 4-2. Transmitter PLL

The transmitter PLL circuit is located in VCO unit A2 (X58-481) on TX-RX unit (X57-696 A/2), and consists of VCXO X3, VCO's (Q350 : K,K2,E, Q351 : K3), a single-chip PLL IC IC300, buffer amplifier Q355, and high-frequency amplifier Q302.

The VCXO generates 16.8MHz. The frequency stability is within  $\pm 1.5$ ppm (Temperature range of  $-30$  to  $+60^{\circ}\text{C}$ ). The frequency tuning and modulation of the VCXO are done to apply a voltage to pin 1 of the VCXO. The output of the VCXO is applied to pin 8 of the PLL IC through the pin 7 of the VCO.

The VCO oscillator frequency is 450.00 to 480.00MHz (K), 440.00 to 470.00MHz (E), 480.00 to 512.00MHz (K2) or 400.00 to 430.00MHz (K3).

The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator to the varactor diodes.

#### 4-3. Unlock Detector Circuit

If a pulse signal appears at the LD pin of IC300, an unlock condition occurs, causing the voltage applied to the pin of the microprocessor to go low. The names of this pin are LDT for TX PLL and LDR for RX PLL. When the microprocessor detects this condition, the transmitter is disabled.

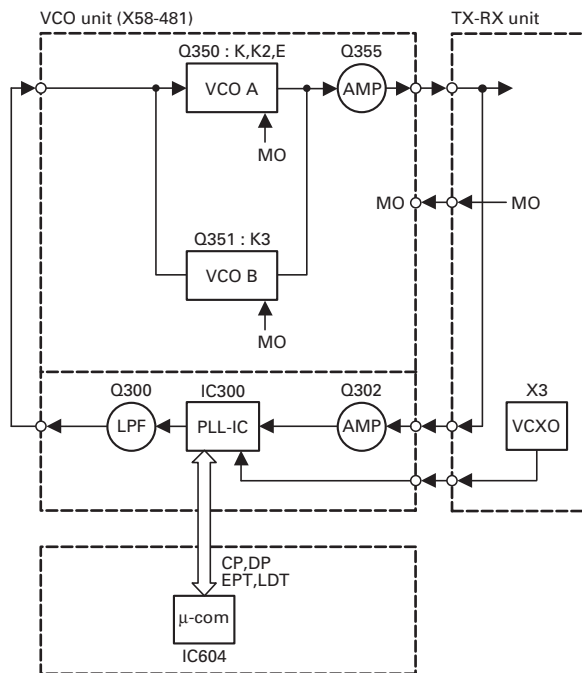


Fig. 6 Transmitter PLL

Top view (MHz)	
TX VCO (X58-481)	<ul style="list-style-type: none"> <li>VCO A : 450-480 (K)</li> <li>480-512 (K2)</li> <li>440-470 (E)</li> <li>VCO B : 400-430 (K3)</li> </ul>
RX VCO (X58-480)	<ul style="list-style-type: none"> <li>VCO A : 440-460 (K,E)</li> <li>480-500 (K2)</li> <li>400-420 (K3)</li> <li>-44.850</li> <li>VCO B : 460-480 (K,E)</li> <li>500-512 (K2)</li> <li>420-430 (K3)</li> <li>-44.850</li> </ul>

Fig. 7 VCO oscillation frequency



## CIRCUIT DESCRIPTION

### 5. Control Circuit

The control circuit mainly located in the control section of TX-RX unit (X57-696 B/2) consists of the following : 5-1 CPU, 5-2 memory circuit, 5-3 CPU clock shift, 5-4 shift register circuit, 5-5 display circuit, 5-6 DSP circuit, 5-7 base-band circuit, 5-8 RS-232C circuit, 5-9 power supply circuit, and 5-10 5-tone decode circuit.

#### 5-1. CPU

The CPU (IC604) is a 16bit single-chip microcomputer containing a 32k ROM and 3k RAM. This CPU controls the flash ROM, the DSP, the receiver circuit, the transmitter circuit, the control circuit, and the display circuit and transfers data to or from an external device.

#### 5-2. Memory Circuit

IC609 has a flash ROM with a capacity of 2M bits that contains the control program for the CPU, the signal processing program for DSP and data such as channels and operating features.

This program can be easily written from an external device. Data such as the operating status are programmed into the EEPROM (IC600).

#### 5-3. CPU Clock Shift

There are the 14.754MHz clock for the CPU (IC604) and the 16.515MHz clock for the DSP (IC618) at the control section of TX-RX unit (X57-696). When these clocks are multiplexed with the reception frequency, they become an internal beat signal. To prevent this, by tuning Q600 and Q604 on the clock frequency is shifted. (Shift on/off can be set through programming.)

#### 5-4. Shift Register Circuit

Serial data is sent to the shift register (IC502 to IC505 located in display unit, IC602, IC623, IC7 located in TX-RX unit) from the CPU (IC604) to control various functions in the unit.

### 5-5. Display Circuit

The display circuit (X54-333) contains two 7-segment LEDs D506, D507 (orange), D503 (red : transmission), two-color D504 (green : busy, orange : selective called), two-color LED D505 (red : backup, green : main DC), LEDs in switches S501 to S506, IC502, IC503, IC504, and IC505 to display this model channels and states.

IC502 to IC505 are shift registers which convert serial data from the CPU to parallel data and light LEDs.

Q507, Q510, and Q511 are switching transistors which control two-color LED D505.

IC506, and IC507 are three-pin power supply ICs which produce power used for the display circuit.

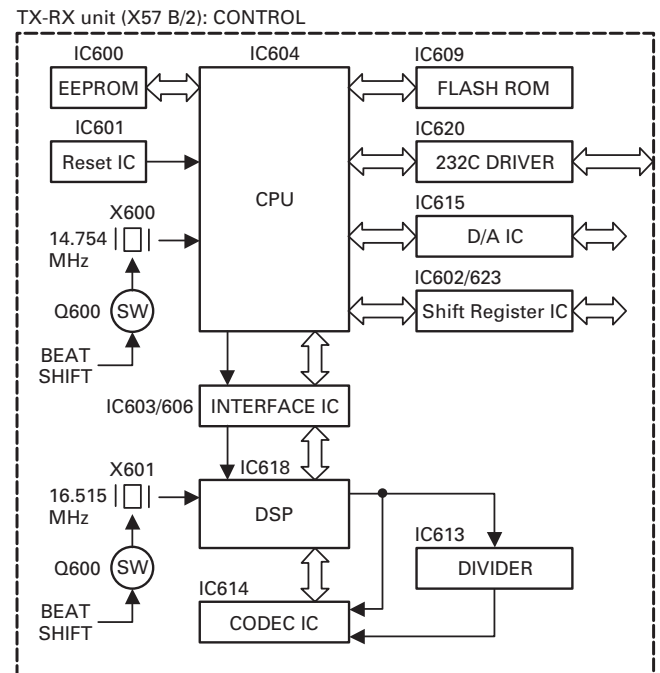


Fig. 8 Control circuit

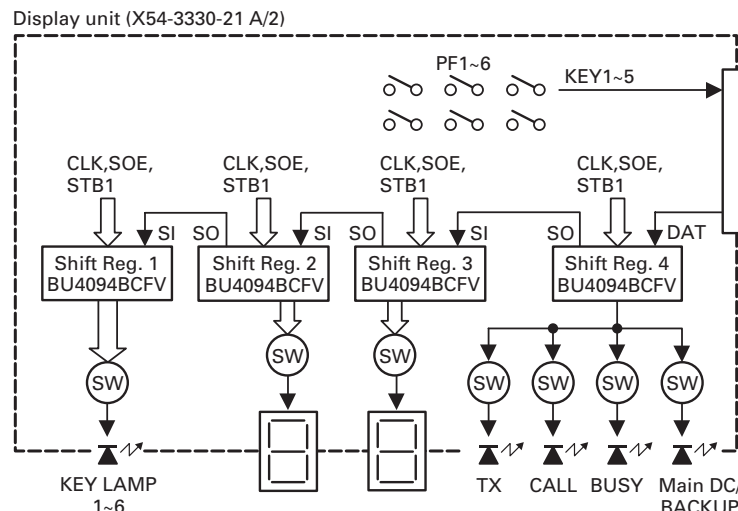


Fig. 9 Display circuit



## CIRCUIT DESCRIPTION

### 5-6. DSP

The DSP circuit filters transmit/receive audio signal and encode/decodes signaling (QT, DQT). This circuit consists of IC618, IC612, IC613, IC614, IC603, IC606, IC608, IC610, IC616, and IC619.

The receive signal DET is converted from analog to digital by IC614 with a sampling frequency of 16.128kHz. The digitized audio signal is sent to DSP IC618 to process the signaling signal and audio signal. The processed digital audio signal is fed to CODEC IC613, converted from digital to analog, and the analog signal is output from pin 16 (AOUTR). Then, the audio signal is amplified by IC619 (B/2), passes through the IC619 (A/2) low-pass filter, and goes to an electronic volume IC615.

The transmit audio signal coming from IC605 is amplified by IC610, fed to pin 3 (AINL) of CODEC IC614, and converted from analog to digital at a sampling frequency of 16.128kHz. The digitized transmit audio signal is AGC-processed, pre-emphasized and filtered at 300Hz to 3kHz by DSP IC618, and the resulting signal is fed back to CODEC IC614, and converted from digital to analog, and the analog signal is output from pin 15 (AOUTL). The transmit signal from AOUTL is amplified by IC616 (B/2), passes through the IC616 (A/2) low-pass filter, and goes to the IC611 (A/2) summing amplifier.

IC613 is a counter IC and the clock required for the CODEC and DSP is generated by dividing the 16.515MHz clock signal produced by DSP IC618.

IC603 and IC606 are interface IC between the CPU operated at 5.0V and the DSP operated at 3.3V.

### 5-7. Base-Band Circuit

The base-band circuit switches between the modulation signal to the transmitter circuit, and remote audio and adjusts their levels. This circuit consists of IC605, IC607, IC611, IC615, and IC617.

Modulation inputs include local microphone input, low-speed data (LSD), high-speed data (HSD), external audio input (TA), and external data input (TD), and demodulation outputs include receive audio output (RA), and receive data output (RD).

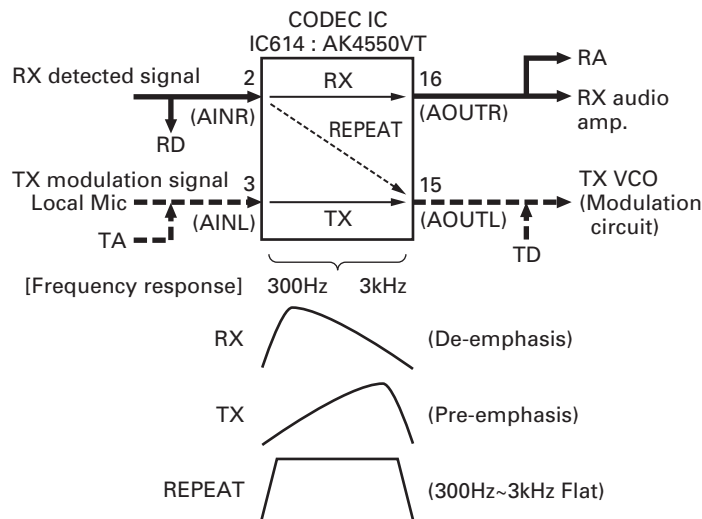
The multiplexer (IC605) changes signals, the electronic volume (IC615) adjusts the level, and the operational amplifier (IC607, IC611, IC617) amplifiers and sums signals.

### 5-8. RS-232C Circuit

The RS-232C circuit connects the RS-232C serial port of a personal computer directly to this model to perform FPU operation. The FPU operation can also be performed by connecting a programming cable (KPG-46) to the local microphone on the front panel. But, if the D-sub connector on the rear panel is used, the programming cable is not required. The 232C driver IC (IC620) changes the TTL-232C level. The firmware can only be rewritten with the local microphone on the front panel.

### 5-9. Power Supply Circuit

The power supply circuit generates power to operate the CPU, DSP, flash ROM, bi-directional buffer, and base-band circuit. This circuit consists of IC624, IC625, IC626, IC627, IC628, and IC630.



**Fig. 10 An audio signal course and the frequency characteristic**

## CIRCUIT DESCRIPTION

### 5-10. 5-tone\* Decode

The 300 to 3000Hz frequency characteristics of the signal that enters the comparator are made flat by the circuit, and the band is made into that band required to detect 5-tone signal by the low-pass filter (IC632 2/2), high-pass filter (IC632 1/2) and BEF filter (IC631 1/2). The signal made into a square wave by the comparator (IC631), and input to the CPU, IC604.

IC604 checks the square wave frequency for the presence of the required tone, and if the tone matches, IC604 performs the subsequent required processing.

\* : The 5-tone signaling is used only the E markets.

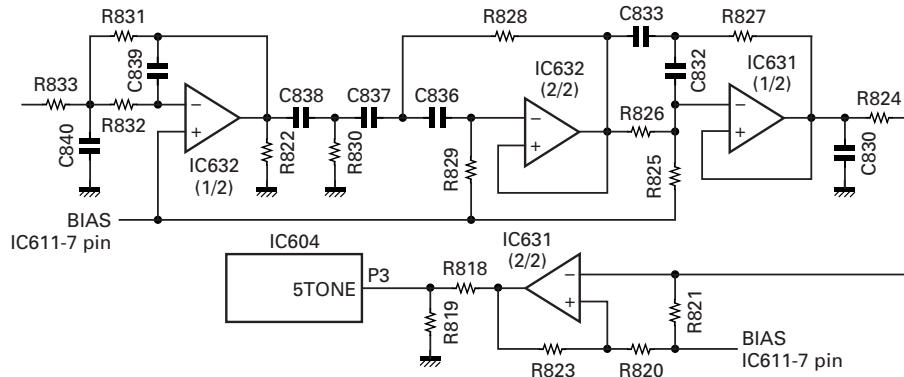


Fig. 11 5-tone decode

## 6. DC Power Supply Circuit

### 6-1. DC Source Switching Relay Circuit

- The final unit contains a relay (K1) for switching between the Main DC and Backup Battery.  
If an external power source is connected to the Main DC terminal, the Backup terminal is isolated by the relay. If the Main DC turns OFF due to power failure, it is switched to the Backup terminal by the relay.  
The CPU monitors which is used, Main DC or Backup Battery.
- Trickle charge circuit  
If both Main DC and Backup Battery are connected, trickle charging of 0.5A max. can be performed from the Main DC power supply to the Battery.  
(The default is OFF. See the Modification section for information on the modification method.)  
The battery is charged from the Main DC with D8, D9 and R61. If it exceeds 0.5A, the charging circuit is turned OFF by D9.

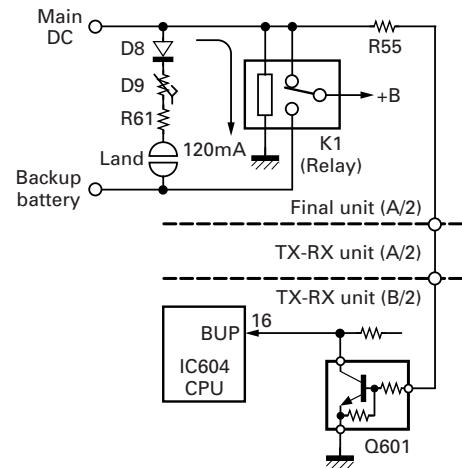


Fig. 12 DC source switching relay circuit

### 6-2. SB Switching Relay Circuit

- SB (Switched +B) is supplied through the relay (K1) in the TX-RX unit A/2.  
When S507 (DC source switch) in the display unit is turned ON, the relay (K1) is turned ON to output SB.
- If +B exceeds 18V, the relay is forcibly turned OFF by D12 and Q25 to interrupt the power and protect the main unit.

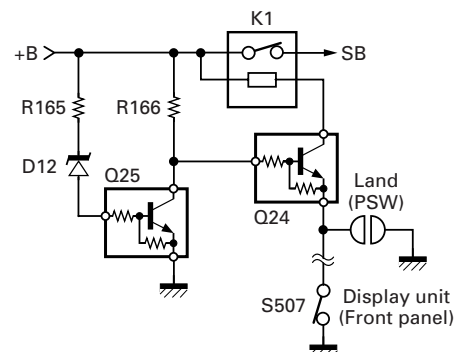


Fig. 13 SB switching relay circuit

## Main CPU : 30622M4A-487GP (TX-RX unit IC604)

## ■ Pin Function

Pin No.	Name	I/O	Function
1	IO5	I/O	Aux I/O No.5 (Acc D-sub 25 pin)
2	IO4	I/O	Aux I/O No.4 (Acc D-sub 25 pin)
3	5TN	I	5-tone input
4	IO2	I/O	Aux I/O No.2 (Acc D-sub 25 pin)
5	IO1	I/O	Aux I/O No.1 (Acc D-sub 25 pin)
6	BYTE	–	5V
7	CNVss	–	GND
8	ENT	O	TX PLL IC enable
9	ENR	O	RX PLL IC enable
10	Reset	I	Microcomputer reset input
11	Xout	–	14.7456MHz
12	Vss	–	GND
13	Xin	–	14.7456MHz
14	Vcc	–	5V
15	NMI	–	Not used
16	BUP	I	Backup battery detect H : Backup, L : Main
17	TEMP	I	Temperature detect for fan action H : Temp high, L : Temp low
18	INTy	I	INT request from DSP
19	CLK	O	Common clock
20	DAT	O	Common data
21	SFT	O	Beat shift H : On, L : Off
22	LD1	O	Control D/A converter LD
23	IO3	I/O	Aux I/O No.3 (Acc D-sub 25 pin)
24	BEEP	O	Beep output
25	LD2	O	D/A converter 2LD
26	RS	O	DSP reset H : Off, L : On
27	EPTT	O	Acc PTT (Acc D-sub 25 pin) H : Off, L : On
28	PTT	I	Mic PTT H : Off, L : On
29	TXD1	O	Mic TXD
30	RXD1	I	Mic HOOK/RXD
31	SCLK	O	EEPROM clock
32	SDAT	I/O	EEPROM data
33	TXD0	O	Acc TXD (Acc D-sub 25 pin)
34	RXD0	I	Acc RXD (Acc D-sub 25 pin)
35	CP	O	PLL IC clock
36	DP	O	PLL IC data
37	RDY	I	CPU ready input

Pin No.	Name	I/O	Function
38	ALE	–	Not used
39	HOLD	–	Not used
40	HLDA	–	Not used
41	BCLK	O	Not used
42	RD	O	Flash ROM WR/DSP HDS1
43	BHE	–	Not used
44	WR	O	Flash ROM WR/DSP HDS2
45	STB2	O	Control shift register STB
46	INTx	O	DSP interrupt H : Off, L : On
47	HCS	O	DSP HCS
48	CS0	O	Flash ROM CS
49	A19	O	Not used
50~59	A18~A9	O	Flash ROM address bus
60	Vcc	–	5V
61	A8	O	Flash ROM address bus
62	Vss	–	GND
63~70	A7~A0	O	Flash ROM address bus
71	EMON	I	Acc monitor (Acc D-sub 25 pin) H : Off, L : On
72	LDR	I	RX VCO lock detect H : Lock, L : Unlock
73	LDT	I	TX VCO lock detect H : Lock, L : Unlock
74,75	KEY5,KEY4	O	Key matrix output
76~78	KEY3~KEY1	I	Key matrix input
79~86	D7~D0	I/O	Flash ROM data bus
87	FWD	I	RF power down level input
88	RSSI	I	RSSI level input
89	ASQ	I	Squelch level input
90	VLI	I	Volume level input
91	BATT	I	Power supply voltage level input
92	A11	I	Aux input No.1 (Acc D-sub 25 pin)
93	A12	I	Aux input No.2 (Acc D-sub 25 pin)
94	AVss	–	GND
95	A13	I	Aux input No.3 (Acc D-sub 25 pin)
96	Vref	–	5V
97	AVcc	–	5V
98	STB1	O	Display shift register STB
99	SOE	O	Shift register common OE
100	IO6	I/O	Aux I/O No.6 (Acc D-sub 25 pin)

## SEMICONDUCTOR DATA

## DSP : 320VC5402PGE (TX-RX unit IC618)

## ■ Pin Function

Pin No.	Name	I/O	Function
1,2	NC1,NC2	-	Not used (No connection)
3	Vss	-	GND
4	DVDD	-	VDD for I/O pins (+3.3V)
5	A0	O	Not used (No connection)
6	HD0	I/O	HPI data bus
7~11	A1~A5	O	Not used (No connection)
12	NC3	-	Not used (No connection)
13	HAS	I	HPI address strobe (Pull up)
14	Vss	-	GND
15	NC4	-	Not used (No connection)
16	CVDD	-	VDD for core CPU (+1.8V)
17	HCS	I	HPI chip select
18	HR/W	I	HPI read/write
19	READY	I	Data ready (Pull up)
20	PS	O	Not used (No connection)
21	DS	O	Not used (No connection)
22	IS	O	Not used (No connection)
23	R/W	O	Not used (No connection)
24	MSTRB	O	Not used (No connection)
25	IOSTRB	O	Not used (No connection)
26	MSC	O	Not used (No connection)
27	XF	O	CODEC control H : Power down, L : Active
28	HOLDA	-	Not used (No connection)
29	IAQ	-	Not used (No connection)
30	HOLD	I	Hold (Pull up)
31	BIO	I	Serial data synchronize input
32	MP/MC	I	Not used (Pull down)
33	DVDD	-	VDD for I/O pins (+3.3V)
34	Vss	-	GND
35~38	NC5~NC8	-	Not used (No connection)
39	HCNTL0	I	HPI control 0
40	Vss	-	GND
41	BCLKR0	I	Receive clock input (SCLK : 516.09375kHz)
42	BCLKR1	-	Not used (No connection)
43	BFSR0	I	Frame sync. for receiver input (LRCK : 16.128kHz)
44	BFSR1	I	Frame sync. for receiver input (LRCK : 16.128kHz)

Pin No.	Name	I/O	Function
45	BDR0	I	Serial data receive input
46	HCNTL1	I	HPI control 1
47	BDR1	-	Not used (No connection)
48	BCLKX0	I	Transmit clock input (SCLK : 516.09375kHz)
49	BCLKX1	O	Master clock output (MCLK : 4.12875MHz)
50	Vss	-	GND
51	HINT/TOUT1	O	Boot mode select (Pull up)
52	CVDD	-	VDD for core CPU (+1.8V)
53	BFSX0	I	Frame sync. for transmitter input (LRCK : 16.128kHz)
54	BFSX1	I	Frame sync. for transmitter input (LRCK : 16.128kHz)
55	HRDY	-	Not used (No connection)
56	DVDD	-	VDD for I/O pins (+3.3V)
57	Vss	-	GND
58	HD1	I/O	HPI data bus
59	BDX0	O	Serial data transmit output
60	BDX1	-	Not used (No connection)
61	IACK	-	Not used (No connection)
62	HBIL	I	Byte identification (HPI)
63	NMI	I	Not used (Pull up)
64	INT0	I	Command interrupt from host CPU
65	INT1	I	Not used (Pull up)
66	INT2	I	Boot mode select (Pull up)
67	INT3	I	Not used (Pull up)
68	CVDD	-	VDD for core CPU (+1.8V)
69	HD2	I/O	HPI data bus
70	Vss	-	GND
71~74	NC9~NC12	-	Not used (No connection)
75	DVDD	-	VDD for I/O pins (+3.3V)
76	Vss	-	GND
77	CLKMD1	I	Clock mode select (Pull down)
78	CLKMD2	I	Clock mode select (Pull up)
79	CLKMD3	I	Clock mode select (Pull down)
80	NC13	-	Not used (No connection)
81	HD3	I/O	HPI data bus
82	TOUT0	-	Not used (No connection)
83	EMU0	I/O	Emulator 0 (to JTAG connector)

# TKR-850

## SEMICONDUCTOR DATA / COMPONENTS DESCRIPTION

Pin No.	Name	I/O	Function
84	EMU1/OFF	I/O	Emulator 1 (to JTAG connector)
85	TDO	O	Test data output (to JTAG connector)
86	TDI	I	Test data input (to JTAG connector)
87	TRST	I	Test reset (to JTAG connector)
88	TCK	I	Test clock (to JTAG connector)
89	TMS	I	Test mode select (to JTAG connector)
90	NC14	-	Not used (No connection)
91	CVDD	-	VDD for core CPU (+1.8V)
92	HPIENA	I	Not used (Pull up)
93	Vss	-	GND
94	CLKOUT	O	Not used (No connection)
95	HD4	I/O	HPI data bus
96	X1	-	16.515MHz (System clock)
97	X2/CLKIN	-	16.515MHz (System clock)
98	RS	I	DSP reset input
99~104	D0~D5	-	Not used (No connection)
105	A6	O	Not used (No connection)
106	Vss	-	GND
107~109	A7~A9	O	Not used (No connection)
110	NC15	-	Not used (No connection)
111	Vss	-	GND
112	DVDD	-	VDD for I/O pins (+3.3V)
113~119	D6~D12	-	Not used (No connection)
120	HD5	I/O	HPI data bus
121~123	D13~D15	-	Not used (No connection)
124	HD6	I/O	HPI data bus
125	CVDD	-	VDD for core CPU (+1.8V)
126	NC16	-	Not used (No connection)
127	HDS1	I	HPI data strobe 1 (Pull up)
128	Vss	-	GND
129	HDS2	I	HPI data strobe 2 (Pull down)
130	DVDD	-	VDD for I/O pins (+3.3V)
131~134	A10~A13	O	Not used (No connection)
135	HD7	I/O	HPI data bus
136~141	A14~A19	O	Not used (No connection)
142	CVDD	-	VDD for core CPU (+1.8V)
143,144	NC17,NC18	-	Not used (No connection)

### Final Unit (X45-374X-XX)

Ref. No.	Part name	Description
IC1	IC	Thermostat
IC2	IC	Voltage regulator
IC3	IC	DC amplifier
Q1,2	Transistor	RF amplifier
Q3,4	FET	TX drive amplifier
Q5	FET	Final amplifier
Q8,9	Transistor	DC switch
D2	Zener diode	Voltage reference
D4,5	Diode	RF detector
D7	Zener diode	Surge protector
D8	Diode	Reverse current protection
D9	Varistor	Current protector
D10	Diode	Surge absorption
D51,52	Diode	Reverse connection protection
D53,55,56	Diode	RF switch

### Display Unit (X54-3330-21)

Ref. No.	Part name	Description
IC501	MOS IC	MIC amplifier
IC502~505	IC	Shift register
IC506,507	IC	Voltage regulator
Q501,502	Transistor	Level controller
Q503,504	FET	DC switch
Q506	Transistor	DC switch
Q507	FET	DC switch
Q508~511	Transistor	DC switch
Q512~514	FET	DC switch
Q516~519	FET	DC switch
Q521~525	FET	DC switch
D501,502	Diode	AF detector
D503~505	LED	LED
D506,507	LED	7 segment
D508~514	Diode	Surge absorption
D601,602	Diode	Surge absorption
D603	Varistor	Current protector

### TX-RX Unit (X57-696X-XX)

Ref. No.	Part name	Description
IC1,2	IC	Buffer amplifier
IC3~5	IC	Voltage regulator

## COMPONENTS DESCRIPTION

Ref. No.	Part name	Description
IC6	IC	D/A converter
IC7	IC	Shift register
IC9	IC	FM IF system
IC10,11	IC	Voltage regulator
IC600	IC	EEPROM
IC601	IC	Voltage detector
IC602	IC	Shift register
IC603	IC	Bus transceiver
IC604	IC	CPU
IC605	IC	Multiplexer
IC606	IC	Bus transceiver
IC607,608	IC	AF amplifier
IC609	IC	Flash ROM
IC610,611	IC	AF amplifier
IC612	IC	Inverter
IC613	IC	Counter
IC614	IC	CODEC
IC615	IC	D/A converter
IC616,617	IC	AF amplifier
IC618	IC	DSP
IC619	IC	AF amplifier
IC620	IC	RS-232C transceiver
IC621	IC	NAND gate
IC622	IC	Multiplexer
IC623	IC	Shift register
IC624~628	IC	Voltage regulator
IC629	IC	AF power amplifier
IC630	IC	Voltage regulator
IC631,632	IC	AF amplifier
Q1~3	Transistor	RF amplifier
Q4	Transistor	Wide/Narrow switch
Q5,6	Transistor	DC switch
Q7	Transistor	Noise amplifier
Q8,9	Transistor	RF amplifier
Q10	Transistor	Current control
Q11	Transistor	RF amplifier
Q12~15	Transistor	Ripple filter
Q16~19	Transistor	DC switch
Q23~26	Transistor	DC switch
Q27	Transistor	Wide 5kHz/Narrow 4kHz switch
Q600	FET	DC switch
Q601	Transistor	DC switch
Q602	FET	DC switch

Ref. No.	Part name	Description
Q603	Transistor	Inverter
Q604	FET	DC switch
Q605	Transistor	Inverter
Q606	Transistor	AF mute switch
Q607~609	Transistor	DC switch
Q610	FET	DC switch
Q611,612	Transistor	DC switch
Q613,614	Transistor	Current control
Q615	Transistor	DC switch
D1~4	Diode	Wide/Narrow switch
D5	Diode	Noise detection
D7	Diode	DC switch
D8	Diode	TX switch
D11	Zener diode	Surge protector
D12	Diode	DC switch
D13	Diode	Noise detection
D600	Diode	Surge protector
D606~612	Diode	Surge protector
D614~616	Diode	Surge protector
D618~623	Diode	Surge protector
D626	Variistor	Current protector
D627,628	Diode	Reverse current protector
D629	Diode	Surge protector

### RX VCO Unit (X58-480X-XX)

Ref. No.	Part name	Description
IC300	IC	PLL
Q300,301	Transistor	Active filter
Q302	Transistor	Buffer amplifier
Q350,351	FET	VCO OSC
Q352~354	Transistor	DC switch
Q355	Transistor	Buffer amplifier
D350~353	Varicap	Frequency control

### TX VCO Unit (X58-481X-XX)

Ref. No.	Part name	Description
IC300	IC	PLL
Q300,301	Transistor	Active filter
Q302	Transistor	Buffer amplifier
Q350,351	FET	VCO OSC
Q355	Transistor	Buffer amplifier
D350~353	Varicap	Frequency control
D354,355	Varicap	Modulation

# TKR-850

## PARTS LIST

\* New Parts.  $\Delta$  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

### TKR-850 (Y54-319X-XX)

#### FINAL UNIT (X45-374X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
<b>TKR-850</b>					
1	2B		A10-4037-21	CHASSIS	
2	1B		A62-0836-04	PANEL (TX/RX)	
3	1B		A62-0837-04	PANEL (FINAL)	
4	1D		A62-0840-03	PANEL (OUTER)	
5	3A		A62-0933-13	PANEL ASSY (INNER)	
6	3C		A62-0934-03	FRONT PANEL	
8	1F		B10-2635-04	FRONT GLASS ACCESSORY	
9	1F		B11-1259-04	FILTER ACCESSORY	
10	3B		B42-7160-04	STICKER (MODEL NAME)	
11	1F	*	B62-1835-00	INSTRUCTION MANUAL	K,K2,K3
11	1F	*	B62-1837-00	INSTRUCTION MANUAL	E
12	2C,3D	*	B72-2301-04	MODEL NAME-PLATE	K
12	2C,3D	*	B72-2302-04	MODEL NAME-PLATE	K2
12	2C,3D	*	B72-2303-04	MODEL NAME-PLATE	E
12	2C,3D	*	B72-2305-04	MODEL NAME-PLATE	K3
14	2C		E30-3414-05	DC CORD(EXT DC IN)	
15	1C		E30-3418-05	ANTENNA CABLE (BNC)	
16	2C		E30-3419-05	ANTENNA CABLE (N)	
17	1E		E30-3427-15	DC CORD ACCESSORY	
18	1E		E31-3228-05	TEST/SPKR PLUG ACCESSORY	
19	1B		E37-0902-05	DC WIRE (RED)	
20	1B		E37-0903-05	DC WIRE (BLACK)	
21	2C		E37-0904-05	D-SUB CABLE ASSY	
22	3B		E37-0905-15	SPEAKER CABLE	
23	3A		E37-0906-05	LEAD WIRE WITH CONNECTOR (CONT-DISP)	
24	3A		E37-0908-05	LEAD WIRE WITH CONNECTOR (11P)	
25	2B		E37-0909-05	LEAD WIRE WITH CONNECTOR (8P)	
26	1B		E37-0911-05	LEAD WIRE WITH CONNECTOR (3P)	
27	2B		E37-0912-05	COAXIAL CABLE	
28	2C		E37-0913-05	TEST/SPKR CONNECTOR ASSY	
29	1B		E37-0934-05	DC WIRE (ORANG)	
30	2C		E37-0964-05	DC BACKUP WIRE (BLACK)	
31	2C		E37-0965-05	DC BACKUP WIRE (RED)	
32	2B		E37-0967-05	FLAT CABLE (36P)	
33	2C		E70-0402-05	DC BACKUP TERMINAL	
35	1C,1E		F05-1537-05	FUSE (BLADE TYPE) (15A/32V)	
36	2C		F09-0445-05	CAP (D-SUB) ACCESSORY	
37	2C		F09-0471-05	FANMOTOR	
-			F10-2374-04	SHIELDING PLATE (TX/RX)	
-			F10-2379-04	SHIELDING CASE (TX/RX COMP)	
-			F10-2409-04	SHIELDING CASE (TX/RX FOIL)	
41	1C		F20-3322-04	INSULATING SHEET (BACKUP)	
43	1B,2B		G02-0576-14	FLAT SPRING	
-			G02-0729-14	FLAT SPRING (TX/RX FOIL)	
44	2B		G02-0829-14	FLAT SPRING	
45	3B		G02-0885-13	EARTH SPRING	
51	1B		G02-0894-04	EARTH SPRING (FINAL FET)	
46	2B,3B		G10-1263-04	FIBROUS SHEET (CHASSIS)	
47	3C,2D		G10-1264-04	FIBROUS SHEET (PANEL)	
50	3B	*	G10-1344-04	FIBROUS SHEET	
58	3B	*	G10-1345-04	FIBROUS SHEET	
48	1F		G13-1801-04	CUSHION ACCESSORY	

Ref. No.	Address	New parts	Parts No.	Description	Destination
49	1F		G13-1802-04	CUSHION ACCESSORY	
50	2B	*	G13-1886-04	CUSHION (BNC)	
52	1E		H25-0029-04	PROTECTION BAG (60/110/0.07)	
53	1F		H25-0747-04	PROTECTION BAG (250X350)	
54	1E		H25-0762-04	PROTECTION BAG (120X300)	
55	1F		H25-2328-04	PROTECTION BAG (80/250/0.07)	
57	3F		H52-1779-02	ITEM CARTON CASE	
59	1E		J02-0475-05	FOOT ACCESSORY	
60	1E		J02-0492-04	FOOT ACCESSORY	
61	1F		J21-8402-04	MOUNTING HARDWARE ACCESSORY	
64	1B		J21-8467-04	MOUNTING HARDWARE (DRIVE FET)	
62	1E		J59-0302-05	GROMMET ACCESSORY	
-			J61-0307-05	BAND	
65	1E		K01-0418-15	HANDLE ACCESSORY	
66	3A		K29-5389-03	KNOB (VOLUME)	
67	3A		K29-5460-02	KEY TOP	
68	3A		K29-9106-04	KNOB (DC SOURCE)	
A	2C		N09-2292-05	HEXAGON HEAD SCREW	
B	1C,2C		N30-2606-46	PAN HEAD MACHINE SCREW	
C	2A,1E		N30-4006-46	PAN HEAD MACHINE SCREW	
D	2B,2C		N30-4014-46	PAN HEAD MACHINE SCREW	
E	1C		N30-4020-45	PAN HEAD MACHINE SCREW	
F	1C,2C		N32-3006-46	FLAT HEAD MACHINE SCREW	
G	3B,3C		N32-4008-45	FLAT HEAD MACHINE SCREW	
H	1B		N33-3006-45	OVAL HEAD MACHINE SCREW	
J	1E		N35-3006-45	BINDING HEAD MACHINE SCREW ACCESSORY	
K	1C		N35-4006-45	BINDING HEAD MACHINE SCREW	
L	1B,3B		N67-3008-46	PAN HEAD SEMS SCREW	
M	1C		N80-2608-45	PAN HEAD TAPTITE SCREW	
N	2C		N87-2606-46	BRAZIER HEAD TAPTITE SCREW	
O	3A		N87-3005-45	BRAZIER HEAD TAPTITE SCREW	
P	2B,3B		N87-3006-46	BRAZIER HEAD TAPTITE SCREW	
R	2C		N90-3014-46	TP HEAD MACHINE SREW	
70	3A		T07-0247-05	SPEAKER	
-			490-0174-05	ADHESIVE TAPE	
<b>FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3</b>					
C1			CC73GCH1H100D	CHIP C 10PF D	K2,K3
C1			CK73GB1H471K	CHIP C 470PF K	K,E
C3			C90-2146-05	ELECTRO 100UF 25WV	
C6,7			CK73GB1H471K	CHIP C 470PF K	
C8			CC73GCH1H030C	CHIP C 3.0PF C	K2
C8			CC73GCH1H080D	CHIP C 8.0PF D	K,E
C8			CC73GCH1H100D	CHIP C 10PF D	K3
C10			CK73GB1H471K	CHIP C 470PF K	
C12-15			CK73GB1H471K	CHIP C 470PF K	
C17			CC73GCH1H050C	CHIP C 5.0PF C	K,K2,E
C17			CC73GCH1H560J	CHIP C 56PF J	K3
C18,19			CK73GB1H471K	CHIP C 470PF K	



## PARTS LIST

FINAL UNIT (X45-374X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C20			CK73FB1H471K	CHIP C 470PF K		C83			C93-0555-05	CHIP C 5.0PF C	K2
C21			CC73FCH1H100D	CHIP C 10PF D	K2	C83			C93-0556-05	CHIP C 6.0PF D	K,E
C21			CC73FCH1H120J	CHIP C 12PF J	K,E	C83			C93-0557-05	CHIP C 7.0PF D	K3
C21			CC73FCH1H220J	CHIP C 22PF J	K3	C86			C93-0558-05	CHIP C 8.0PF D	K2
C22			CC73FCH1H060D	CHIP C 6.0PF D	K,E	C86			C93-0560-05	CHIP C 10PF D	K,E
C22			CC73FCH1H090D	CHIP C 9.0PF D	K2	C86			C93-0561-05	CHIP C 12PF J	K3
C22			CC73FCH1H120J	CHIP C 12PF J	K3	C88			C93-0556-05	CHIP C 6.0PF D	K3
C23			CK73FB1H471K	CHIP C 470PF K		C89			C93-0555-05	CHIP C 5.0PF C	K,K2,E
C24		*	C90-5640-05	ELECTRO 100UF 16WV		C91-98			CK73GB1H471K	CHIP C 470PF K	
C26			CC73GCH1H101J	CHIP C 100PF J	K3	C99			CK73FB1E104K	CHIP C 0.10UF K	
C26			CC73GCH1H471J	CHIP C 470PF J	K,K2,E	C100-102			CK73GB1H471K	CHIP C 470PF K	
C27			CK73GB1H471K	CHIP C 470PF K		C103			C92-0628-05	CHIP-TAN 10UF 10WV	
C28			CK73FB1E104K	CHIP C 0.10UF K		C104			CC73GCH1H101J	CHIP C 100PF J	
C29			CK73GB1H471K	CHIP C 470PF K		C105			CK73GB1H471K	CHIP C 470PF K	
C30			CK73FB1E224K	CHIP C 0.22UF K		C106			CK73FB1E104K	CHIP C 0.10UF K	
C31			C93-0599-05	CHIP C 470PF K		C107			CC73GCH1H101J	CHIP C 100PF J	
C32			C93-0558-05	CHIP C 8.0PF D	K,K3,E	C108			CK73FB1E104K	CHIP C 0.10UF K	
C32			C93-0559-05	CHIP C 9.0PF D	K2	C109			CC73GCH1H101J	CHIP C 100PF J	
C33,34			C93-0565-05	CHIP C 27PF J	K,K2,E	C112			CK73GB1H471K	CHIP C 470PF K	
C33,34			C93-0567-05	CHIP C 39PF J	K3	C113			CK73FB1E104K	CHIP C 0.10UF K	
C35			C93-0599-05	CHIP C 470PF K		C114			CK73GB1H471K	CHIP C 470PF K	
C36			CK73FB1E104K	CHIP C 0.10UF K		C115			CK73FB1E104K	CHIP C 0.10UF K	
C38			CK73GB1H471K	CHIP C 470PF K		C116			CK73GB1H471K	CHIP C 470PF K	
C39			C93-0558-05	CHIP C 8.0PF D	K2	C117			CK73FB1E104K	CHIP C 0.10UF K	
C39			C93-0561-05	CHIP C 12PF J	K,E	C118			C93-0554-05	CHIP C 4.0PF C	K,E
C39			C93-0563-05	CHIP C 18PF J	K3	C119			CK73GB1H471K	CHIP C 470PF K	K,E
C40			C93-0564-05	CHIP C 22PF J	K,E	C120			CK73FB1H223K	CHIP C 0.022UF K	
C40			C93-0565-05	CHIP C 27PF J	K2	C121,122			CM73F2H150J	CHIP C 15PF J	K,E
C41			C93-0599-05	CHIP C 470PF K		C121,122			CM73F2H180J	CHIP C 18PF J	K2,K3
C42			CC73FCH1H220J	CHIP C 22PF J		C123			CM73F2H220J	CHIP C 22PF J	K2
C43			CM73F2H180J	CHIP C 18PF J	K2	C123,124			CM73F2H220J	CHIP C 22PF J	K,E
C43			CM73F2H220J	CHIP C 22PF J	K,K3,E	C123,124			CM73F2H270J	CHIP C 27PF J	K3
C44			C93-0556-05	CHIP C 6.0PF D	K,E	C124			CM73F2H180J	CHIP C 18PF J	K2
C44			C93-0560-05	CHIP C 10PF D	K3	C155			C93-0599-05	CHIP C 470PF K	
C46			C93-0599-05	CHIP C 470PF K		C157			CK73GB1H471K	CHIP C 470PF K	
C48			CK73GB1H471K	CHIP C 470PF K		C160			CM73F2H820J	CHIP C 82PF J	
C49			CC73GCH1H101J	CHIP C 100PF J		C161			CC73GCH1H220J	CHIP C 22PF J	
C50			CK73FB1E104K	CHIP C 0.10UF K		C165,166			CK73FB1H471K	CHIP C 470PF K	
C51			C90-2143-05	ELECTRO 47UF 25WV		C167,168			CC73GCH1H220J	CHIP C 22PF J	
C52			CC73GCH1H101J	CHIP C 100PF J		C169			CC73FCH1H560J	CHIP C 56PF J	
C53			CK73FB1E104K	CHIP C 0.10UF K		C170-172			CC73GCH1H220J	CHIP C 22PF J	
C54			C90-2146-05	ELECTRO 100UF 25WV		C173,174			CC73FCH1H220J	CHIP C 22PF J	
C55			C93-0599-05	CHIP C 470PF K		C177			CC73FCH1H150J	CHIP C 15PF J	
C56			CC73FCH1H220J	CHIP C 22PF J		C178			C93-0553-05	CHIP C 3.0PF C	
C59			CM73F2H080D	CHIP C 8.0PF D	K2	C179			CC73FCH1H030C	CHIP C 3.0PF C	
C59			CM73F2H100D	CHIP C 10PF D	K,E	CN1			E04-0154-05	PIN SOCKET	
C59			CM73F2H120J	CHIP C 12PF J	K3	CN3			E40-5632-05	PIN ASSY	
C60			C93-0556-05	CHIP C 6.0PF D	K2	CN4			E40-3246-05	PIN ASSY	
C60			C93-0558-05	CHIP C 8.0PF D	K3	CN5			E40-5703-05	PIN ASSY	
C61			CM73F2H820J	CHIP C 82PF J		CN6-8			E23-0462-05	TERMINAL	
C68			CK73GB1H471K	CHIP C 470PF K		F1			F53-0217-05	FUSE	
C69			CC73GCH1H101J	CHIP C 100PF J		CN51,52			J13-0071-05	FUSE HOLDER	
C70			CK73FB1E104K	CHIP C 0.10UF K		L1			L40-1075-92	SMALL FIXED INDUCTOR (10NH)	K,K2,3
C71,72			CK73GB1H471K	CHIP C 470PF K		L1			L40-3963-92	SMALL FIXED INDUCTOR (3.9NH)	K3
C75			CK73GB1H471K	CHIP C 470PF K		L2			L40-1075-34	SMALL FIXED INDUCTOR (10NH)	K,E
C77			CC73GCH1H101J	CHIP C 100PF J		L2			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K2
C78			CK73GB1H471K	CHIP C 470PF K		L2			L40-2775-34	SMALL FIXED INDUCTOR (27NH)	K3
C79			CK73FB1E104K	CHIP C 0.10UF K		L3			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	K,K2,E
C80			C92-0777-05	ELECTRO 1000UF 25WV							
C81			CM73F2H820J	CHIP C 82PF J							



## PARTS LIST

### FINAL UNIT (X45-374X-XX)

### DISPLAY UNIT (X54-3330-21)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L3			L40-8265-92	SMALL FIXED INDUCTOR (8.2NH)	K3	R48			RK73GB1J471J	CHIP R 470 J 1/16W	
L5			L41-6865-20	SMALL FIXED INDUCTOR		R49			R92-1217-05	CHIP R 0 OHM	
L6,7			L34-4517-05	AIR-CORE COIL		R50			R92-1317-05	CHIP R 18 J 1W	
L9			L34-4517-05	AIR-CORE COIL		R54			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L11			L34-4517-05	AIR-CORE COIL		R55			RK73GB1J474J	CHIP R 470K J 1/16W	
L12			L34-4523-05	AIR-CORE COIL		R56			RK73GB1J473J	CHIP R 47K J 1/16W	
L14			L40-1575-34	SMALL FIXED INDUCTOR (15NH)	K,E	R57			RK73GB1J471J	CHIP R 470 J 1/16W	
L14,15			L40-1075-34	SMALL FIXED INDUCTOR (10NH)	K2,K3	R58			RK73GB1J474J	CHIP R 470K J 1/16W	
L15			L40-1075-34	SMALL FIXED INDUCTOR (10NH)	K,E	R59			R92-1252-05	CHIP R 0 OHM J 1/16W	
L16			L40-1075-92	SMALL FIXED INDUCTOR (10NH)		R60			RK73GB1J103J	CHIP R 10K J 1/16W	
L17			L40-1875-92	SMALL FIXED INDUCTOR (18NH)		R61			R92-2687-05	RESISTOR 5.6 J 5W	
L19			L34-4667-05	AIR-CORE COIL		R62			RK73GB1J103J	CHIP R 10K J 1/16W	
L20			L34-4758-05	AIR-CORE COIL		R70			R92-1252-05	CHIP R 0 OHM J 1/16W	
R1			RK73GB1J103J	CHIP R 10K J 1/16W		R71			R92-1214-05	CHIP R 120 J 1/2W	
R2			RK73GB1J222J	CHIP R 2.2K J 1/16W	K,E	R72			RK73GB1J184J	CHIP R 180K J 1/16W	
R2			RK73GB1J472J	CHIP R 4.7K J 1/16W	K2,K3	R73			R92-1204-05	CHIP R 100 J 1/4W	
R3			RK73GB1J470J	CHIP R 47 J 1/16W		R77			RK73GB1J154J	CHIP R 150K J 1/16W	
R4			RK73GB1J100J	CHIP R 10 J 1/16W	K2,K3	VR1			R12-6429-05	TRIMMING POT. (100K)	
R4			RK73GB1J220J	CHIP R 22 J 1/16W	K,E	K1			S76-0426-05	RELAY	
R6			RK73GB1J100J	CHIP R 10 J 1/16W	K2,K3	D2			02DZ6.2(Y)	ZENER DIODE	
R6			RK73GB1J470J	CHIP R 47 J 1/16W	K,E	D4,5			HSM88AS	DIODE	
R7			RK73GB1J682J	CHIP R 6.8K J 1/16W		D7			ZSA5A27	ZENER DIODE	
R8			RK73FB2A100J	CHIP R 10 J 1/10W		D8			RB051L-40	DIODE	
R9			RK73FB2A220J	CHIP R 22 J 1/10W		D9			MINISMDC050-02	VARISTOR	
R11			RK73GB1J104J	CHIP R 100K J 1/16W	K,K2,E	D10			1SS355	DIODE	
R11			RK73GB1J333J	CHIP R 33K J 1/16W	K3	D51,52			DSA3A1	DIODE	
R12			RK73GB1J153J	CHIP R 15K J 1/16W	K3	D53			MA4PH633	DIODE	
R12			RK73GB1J183J	CHIP R 18K J 1/16W	K,K2,E	D55,56			MA4PH633	DIODE	
R13			RK73FB2A220J	CHIP R 22 J 1/10W	K3	IC1			MAX6502UKP035	ANALOGUE IC	
R13			RK73FB2A470J	CHIP R 47 J 1/10W	K,K2,E	IC2			NJM78L05UA	BI-POLAR IC	
R14			R92-0365-05	CHIP R 1.0K J 1/2W	KE	IC3			TA75W01FU	MOS-IC	
R14			R92-2571-05	CHIP R 270 J 1/2W	K2,K3	Q1			2SC5110(O)	TRANSISTOR	
R15			R92-1211-05	CHIP R 5.6 J 1/2W	K,E	Q2			2SC3356(R24)	TRANSISTOR	
R15			R92-1259-05	CHIP R 18 J 1/2W	K2,K3	Q3			2SK2596	FET	
R16			R92-0365-05	CHIP R 1.0K J 1/2W	K,E	Q4			PD55008S	DRIVE FET	
R16			R92-2571-05	CHIP R 270 J 1/2W	K2,K3	Q5			RD60HUF1-01	FINAL FET	
R17			RK73FB2A154J	CHIP R 150K J 1/10W		Q8			2SC4116(Y)	TRANSISTOR	
R18			RK73EB2B101J	CHIP R 100 J 1/8W		Q9			DTD123EK	DIGITAL TRANSISTOR	
R19			RK73FB2A104J	CHIP R 100K J 1/10W		TH1			PTH9M04BE471TS	THERMISTOR	
R20,21			R92-1252-05	CHIP R 0 OHM J 1/16W		<b>DISPLAY UNIT (X54-3330-21)</b>					
R22			R92-1215-05	CHIP R 470 J 1/2W		D503-505			B30-2151-05	LED (RED/GREEN)	
R23			RK73FB2A104J	CHIP R 100K J 1/10W	K2	C501			C92-0628-05	CHIP-TAN 10UF 10WV	
R23,24			RK73FB2A104J	CHIP R 100K J 1/10W	K,K3,E	C502,503			C92-0501-05	CHIP-TAN 1.5UF 10WV	
R24			RK73FB2A124J	CHIP R 120K J 1/10W	K2	C504,505			CK73GB1C104K	CHIP C 0.10UF K	
R26			RK73GB1J101J	CHIP R 100 J 1/16W		C506			CC73GCH1H470J	CHIP C 47PF J	
R31			RK73GB1J224J	CHIP R 220K J 1/16W		C507,508			CK73GB1C104K	CHIP C 0.10UF K	
R34			R92-1252-05	CHIP R 0 OHM J 1/16W		C509			CK73GB1H103K	CHIP C 0.010UF K	
R35			RK73GB1J104J	CHIP R 100K J 1/16W		C510			C92-0628-05	CHIP-TAN 10UF 10WV	
R36			R92-1252-05	CHIP R 0 OHM J 1/16W		C511,512			CK73GB1E103K	CHIP C 0.010UF K	
R37			R92-0670-05	CHIP R 0 OHM		C513-518			CC73GCH1H101J	CHIP C 100PF J	
R38			RK73GB1J473J	CHIP R 47K J 1/16W		C519,520			CK73GB1E103K	CHIP C 0.010UF K	
R40			R92-1204-05	CHIP R 100 J 1/4W		C521			C92-0628-05	CHIP-TAN 10UF 10WV	
R41,42			R92-1252-05	CHIP R 0 OHM J 1/16W		C522			CK73GB1C104K	CHIP C 0.10UF K	
R44			R92-0670-05	CHIP R 0 OHM		C523		*	CK73FB1E334K	CHIP C 0.33UF K	
R45			RK73GB1J223J	CHIP R 22K J 1/16W		C524			C92-0628-05	CHIP-TAN 10UF 10WV	
R46			RK73GB1J471J	CHIP R 470 J 1/16W	K,E	C525			CK73GB1C104K	CHIP C 0.10UF K	
R46			R92-1252-05	CHIP R 0 OHM J 1/16W	K2,K3						
R47			RK73GB1J222J	CHIP R 2.2K J 1/16W	K,E						
R47			RK73GB1J332J	CHIP R 3.3K J 1/16W	K2,K3						

## PARTS LIST

DISPLAY UNIT (X54-3330-21)

TX-RX UNIT (X57-696X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C526		*	CK73FB1E334K	CHIP C 0.33UF K	
C601			CC73GCH1H101J	CHIP C 100PF J	
C602			CK73GB1H102K	CHIP C 1000PF K	
C603			CC73GCH1H101J	CHIP C 100PF J	
C606			CC73GCH1H101J	CHIP C 100PF J	
C607			CK73GB1C104K	CHIP C 0.10UF K	
CN501			E40-6140-05	PIN ASSY	
CN502			E40-6102-05	PIN ASSY	
CN601			E40-6141-05	PIN ASSY	
J601			E08-0877-05	MODULAR JACK	
-			J31-0543-05	COLLAR (LH-5-1.5)	
CP501-504			RK75GB1J471J	CHIP-COM 470 J 1/16W	
R502,503			R92-1252-05	CHIP R 0 OHM J 1/16W	
R505			RK73GB1J683J	CHIP R 68K J 1/16W	
R506			RK73GB1J103J	CHIP R 10K J 1/16W	
R507			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R508			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R509			RK73GB1J103J	CHIP R 10K J 1/16W	
R510			RK73GB1J224J	CHIP R 220K J 1/16W	
R511,512			RK73GB1J103J	CHIP R 10K J 1/16W	
R513			RK73GB1J104J	CHIP R 100K J 1/16W	
R514			RK73GB1J154J	CHIP R 150K J 1/16W	
R516			R92-2565-05	CHIP R 1.2K J 1/2W	
R517			R92-2023-05	CHIP R 820 J 1/2W	
R518,519			R92-2565-05	CHIP R 1.2K J 1/2W	
R520-526			R92-2023-05	CHIP R 820 J 1/2W	
R529-540			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R541-544			RK73GB1J103J	CHIP R 10K J 1/16W	
R601			RK73GB1J681J	CHIP R 680 J 1/16W	
R604,605			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R606			RK73GB1J473J	CHIP R 47K J 1/16W	
VR501			R32-0643-05	SEMI FIXED VARIABLE RESISTOR	
VR601			R31-0630-05	VARIABLE RESISTOR	
S501-506			S70-0410-15	TACT SWITCH	
S507			S68-0410-05	PUSH SWITCH	
D501,502			HSM88AS	DIODE	
D506,507			LA-501DD	LED	
D508-514			DA204U	DIODE	
D601,602			DA204U	DIODE	
D603			MINISMD020	VARISTOR	
IC501			NJM4558E	MOS-IC	
IC502-505			BU4094BCFV	MOS-IC	
IC506,507			TA78L05F	MOS-IC	
Q501			2SC4116(Y)	TRANSISTOR	
Q502			2SA1586(Y,GR)	TRANSISTOR	
Q503,504			UPA672T	FET	
Q506			DTA114EUA	DIGITAL TRANSISTOR	
Q507			UPA672T	FET	
Q508-511			DTA114EUA	DIGITAL TRANSISTOR	
Q512-514			UPA672T	FET	
Q516-519			UPA672T	FET	
Q521-524			UPA672T	FET	
Q525			2SK1824	FET	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
<b>TX-RX UNIT (X57-696X-XX) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E</b>					
C2			CC73GCH1H010C	CHIP C 1.0PF C	K3
C3			CC73GCH1H100D	CHIP C 10PF D	K2,K3
C3			CC73GCH1H120J	CHIP C 12PF J	K,E
C4,5			CK73GB1H471K	CHIP C 470PF K	
C7			CC73GCH1H070D	CHIP C 7.0PF D	K2
C7			CC73GCH1H080D	CHIP C 8.0PF D	K3
C7			CC73GCH1H120J	CHIP C 12PF J	K,E
C8			CC73GCH1H0R5C	CHIP C 0.5PF C	K,E
C8			CC73GCH1H010C	CHIP C 1.0PF C	K2,K3
C13			CK73GB1H471K	CHIP C 470PF K	
C14,15			CC73GCH1H060D	CHIP C 6.0PF D	K,E
C14,15			CC73GCH1H070D	CHIP C 7.0PF D	K3
C14,15			CC73GCH1H080D	CHIP C 8.0PF D	K2
C24			C92-0695-05	CHIP-TAN 10UF 10WV	
C25			C92-0628-05	CHIP-TAN 10UF 10WV	
C28			CC73GCH1H080D	CHIP C 8.0PF D	K3
C28,29			CC73GCH1H020C	CHIP C 2.0PF C	K,K2,E
C29			CC73GCH1H110J	CHIP C 11PF J	K3
C30			CC73GCH1H680J	CHIP C 68PF J	
C31			CC73GCH1H331J	CHIP C 330PF J	
C32			CK73GB1H103K	CHIP C 0.010UF K	
C33			CC73GCH1H330J	CHIP C 33PF J	
C34			CK73GB1H103K	CHIP C 0.010UF K	
C36,37			CK73GB1H103K	CHIP C 0.010UF K	
C38,39			CC73GCH1H680J	CHIP C 68PF J	
C40,41			CK73GB1H103K	CHIP C 0.010UF K	
C42,43			CC73GCH1H030C	CHIP C 3.0PF C	
C44,45			CC73GCH1H040C	CHIP C 4.0PF C	
C46,47			CC73GCH1H030C	CHIP C 3.0PF C	
C48			CK73GB1H103K	CHIP C 0.010UF K	
C49,50			CC73GCH1H680J	CHIP C 68PF J	
C51			CK73GB1H103K	CHIP C 0.010UF K	
C52			CK73GB1H103J	CHIP C 0.010UF J	
C53			CK73GB1H102K	CHIP C 1000PF K	
C54			CK73GB1H103J	CHIP C 0.010UF J	
C55,56			CK73GB1H103K	CHIP C 0.010UF K	
C57			CK73GB1H103J	CHIP C 0.010UF J	
C58			CC73GCH1H180J	CHIP C 18PF J	
C59			CC73GCH1H150J	CHIP C 15PF J	
C60			CK73GB1H103K	CHIP C 0.010UF K	
C61			CC73GCH1H080D	CHIP C 8.0PF D	
C62,63			CK73GB1H103K	CHIP C 0.010UF K	
C64			CK73GB1C104K	CHIP C 0.10UF K	
C65			C92-0628-05	CHIP-TAN 10UF 10WV	
C66,67			CC73GCH1H331J	CHIP C 330PF J	
C68-70			CK73GB1C104K	CHIP C 0.10UF K	
C71			CK73GB1H103K	CHIP C 0.010UF K	
C72			C92-0628-05	CHIP-TAN 10UF 10WV	
C73			CK73GB1C104K	CHIP C 0.10UF K	
C74			CK73GB1H102K	CHIP C 1000PF K	
C75			CK73GB1C104K	CHIP C 0.10UF K	
C76			C92-0696-05	CHIP-TAN 47UF 10WV	
C77			CK73GB1H102K	CHIP C 1000PF K	
C78			CK73GB1C104K	CHIP C 0.10UF K	
C79			CK73FB1C224K	CHIP C 0.22UF K	
C80,81			C92-0628-05	CHIP-TAN 10UF 10WV	
C82-84			CK73GB1H103K	CHIP C 0.010UF K	
C86			CK73GB1H102K	CHIP C 1000PF K	

## PARTS LIST

## TX-RX UNIT (X57-696X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C87			C92-0628-05	CHIP-TAN 10UF 10WV		C178			C92-0606-05	CHIP-TAN 4.7UF 10WV	
C88			CK73GB1H102K	CHIP C 1000PF K		C179			CK73GB1H103K	CHIP C 0.010UF K	
C89,90			CK73GB1H103J	CHIP C 0.010UF J		C184,185			CK73GB1H102K	CHIP C 1000PF K	
C91			CC73GCH1H040C	CHIP C 4.0PF C	K,K2,E	C189,190			CK73GB1H102K	CHIP C 1000PF K	
C91			CC73GCH1H050C	CHIP C 5.0PF C	K3	C191-195			CK73GB1H103K	CHIP C 0.010UF K	
C92,93			CK73GB1H471K	CHIP C 470PF K		C197			CK73FB1H333K	CHIP C 0.033UF K	
C94			CC73GCH1H030C	CHIP C 3.0PF C	K,K2,E	C198			CK73GB1C104K	CHIP C 0.10UF K	
C94,95			CC73GCH1H040C	CHIP C 4.0PF C	K3	C199			CK73GB1H103K	CHIP C 0.010UF K	
C95			CC73GCH1H040C	CHIP C 4.0PF C	K,E	C204-208			CC73GCH1H101J	CHIP C 100PF J	
C95			CC73GCH1H060D	CHIP C 6.0PF D	K2	C210			CC73GCH1H060D	CHIP C 6.0PF D	K2
C96-99			CK73GB1H471K	CHIP C 470PF K		C210			CC73GCH1H080D	CHIP C 8.0PF D	K,E
C100			CC73GCH1H060D	CHIP C 6.0PF D	K3	C210			CC73GCH1H100D	CHIP C 10PF D	K3
C100,101			CC73GCH1H050C	CHIP C 5.0PF C	K,K2,E	C211			CC73GCH1H120J	CHIP C 12PF J	K,E
C101			CC73GCH1H050C	CHIP C 5.0PF C	K3	C212-214			CK73GB1H103K	CHIP C 0.010UF K	
C102			CK73GB1H471K	CHIP C 470PF K		C215			CC73GCH1H050C	CHIP C 5.0PF C	K2
C104			CK73GB1H471K	CHIP C 470PF K		C216			CK73GB1H471K	CHIP C 470PF K	
C105			CC73GCH1H070D	CHIP C 7.0PF D		C217			CK73GB1H102K	CHIP C 1000PF K	
C106			CK73GB1H471K	CHIP C 470PF K		C218			CK73GB1E103K	CHIP C 0.010UF K	
C107			CC73GCH1H060D	CHIP C 6.0PF D		C223			CC73GCH1H101J	CHIP C 100PF J	K,E
C109			CC73GCH1H120J	CHIP C 12PF J		C224			CC73GCH1H030C	CHIP C 3.0PF C	K3
C111			CC73GCH1H060D	CHIP C 6.0PF D		C231			C92-0633-05	CHIP-TAN 22UF 10WV	
C114-117			CC73GCH1H100D	CHIP C 10PF D		C232-234			CK73GB1H103J	CHIP C 0.010UF J	
C120,121			CK73GB1H471K	CHIP C 470PF K		C235			CC73GCH1H101J	CHIP C 100PF J	K3
C122,123			CK73GB1H103K	CHIP C 0.010UF K		C251			CC73GCH1H020C	CHIP C 2.0PF C	K2
C124,125			C92-1341-05	ELECTRO 100UF 16WV		C251			CC73GCH1H030C	CHIP C 3.0PF C	K3
C126,127			C92-0633-05	CHIP-TAN 22UF 10WV		C600			CK73GB1C104K	CHIP C 0.10UF K	
C128,129			CK73GB1H103K	CHIP C 0.010UF K		C602			CK73GB1C104K	CHIP C 0.10UF K	
C130,131			CK73GB1H102K	CHIP C 1000PF K		C605			CK73GB1C104K	CHIP C 0.10UF K	
C132,133			CK73GB1H471K	CHIP C 470PF K		C613,614			CK73GB1E103K	CHIP C 0.010UF K	
C134,135			CK73GB1H103K	CHIP C 0.010UF K		C616			CK73GB1E103K	CHIP C 0.010UF K	
C136-139			C90-4016-05	ELECTRO 47UF 16WV		C623			CK73GB1C104K	CHIP C 0.10UF K	
C140,141			CK73GB1H103K	CHIP C 0.010UF K		C629			CC73GCH1H101J	CHIP C 100PF J	
C142,143			CK73GB1H102K	CHIP C 1000PF K		C634,635			CC73GCH1H220J	CHIP C 22PF J	
C144			CK73GB1H471K	CHIP C 470PF K		C638			CK73GB1C104K	CHIP C 0.10UF K	
C145			C92-0606-05	CHIP-TAN 4.7UF 10WV		C639			CK73GB1E103K	CHIP C 0.010UF K	
C146			CK73GB1H471K	CHIP C 470PF K		C640			C92-0628-05	CHIP-TAN 10UF 10WV	
C147			C92-0633-05	CHIP-TAN 22UF 10WV		C641			CK73GB1C104K	CHIP C 0.10UF K	
C148			CK73GB1H102K	CHIP C 1000PF K		C642			CK73GB1E103K	CHIP C 0.010UF K	
C149			CK73GB1H103K	CHIP C 0.010UF K		C643			C92-0628-05	CHIP-TAN 10UF 10WV	
C150			C92-0633-05	CHIP-TAN 22UF 10WV		C644			CK73GB1E103K	CHIP C 0.010UF K	
C151			C92-0008-05	CHIP-TAN 3.3UF 16WV		C645,646			C92-0628-05	CHIP-TAN 10UF 10WV	
C152			CK73GB1H103K	CHIP C 0.010UF K		C647			CC73GCH1H101J	CHIP C 100PF J	
C153			CK73GB1H471K	CHIP C 470PF K		C648			CK73GB1E103K	CHIP C 0.010UF K	
C154			C92-0560-05	CHIP-TAN 10UF 6.3WV		C649			CC73GCH1H330J	CHIP C 33PF J	
C155			CK73GB1H103K	CHIP C 0.010UF K		C652			CC73GCH1H101J	CHIP C 100PF J	
C156			CK73GB1H102K	CHIP C 1000PF K		C657			CK73GB1E103K	CHIP C 0.010UF K	
C157			CK73GB1H103K	CHIP C 0.010UF K		C662			C92-0628-05	CHIP-TAN 10UF 10WV	
C158			C92-0008-05	CHIP-TAN 3.3UF 16WV		C663			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C159			CK73GB1H471K	CHIP C 470PF K		C670			C92-0003-05	CHIP-TAN 0.47UF 25WV	
C160			CK73GB1H102K	CHIP C 1000PF K		C679			C92-0628-05	CHIP-TAN 10UF 10WV	
C161-163			CK73GB1H103K	CHIP C 0.010UF K		C681			C92-0546-05	CHIP-TAN 68UF 6.3WV	
C164			CK73GB1H471K	CHIP C 470PF K		C684			CC73GCH1H101J	CHIP C 100PF J	
C166,167			CK73GB1H471K	CHIP C 470PF K		C685			CK73GB1E103K	CHIP C 0.010UF K	
C171			CK73GB1H471K	CHIP C 470PF K		C690			CC73GCH1H101J	CHIP C 100PF J	
C172			CK73GB1H102K	CHIP C 1000PF K		C691,692			CK73GB1E103K	CHIP C 0.010UF K	
C173			CK73GB1H103K	CHIP C 0.010UF K		C693,694			C92-0628-05	CHIP-TAN 10UF 10WV	
C174			C92-0008-05	CHIP-TAN 3.3UF 16WV		C695,696			CK73GB1H471K	CHIP C 470PF K	
C175			CK73GB1H102K	CHIP C 1000PF K		C697,698			C92-0628-05	CHIP-TAN 10UF 10WV	
C176			CK73GB1H103K	CHIP C 0.010UF K		C700,701			C92-0628-05	CHIP-TAN 10UF 10WV	
C177			CK73GB1H471K	CHIP C 470PF K		C703,704			CK73GB1C104K	CHIP C 0.10UF K	

## PARTS LIST

TX-RX UNIT (X57-696X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C705			CK73GB1E103K	CHIP C 0.010UF K		C792-794			CK73GB1H102K	CHIP C 1000PF K	
C706			C92-0628-05	CHIP-TAN 10UF 10WV		C795			CC73GCH1H101J	CHIP C 100PF J	
C707-709			CK73GB1E103K	CHIP C 0.010UF K		C796,797			CK73GB1H102K	CHIP C 1000PF K	
C710			C92-0628-05	CHIP-TAN 10UF 10WV		C798			CE04EW1E470M	ELECTRO 47UF 25WV	
C711			CK73GB1H471K	CHIP C 470PF K		C799			CK73GB1H102K	CHIP C 1000PF K	
C712			CK73GB1E103K	CHIP C 0.010UF K		C800			CE04EW1E470M	ELECTRO 47UF 25WV	
C713,714			C92-0628-05	CHIP-TAN 10UF 10WV		C801			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C715			CK73GB1E103K	CHIP C 0.010UF K		C802-805			CK73GB1H102K	CHIP C 1000PF K	
C716,717			CK73GB1H471K	CHIP C 470PF K		C806			CE04EW1E470M	ELECTRO 47UF 25WV	
C718,719			CK73GB1E103K	CHIP C 0.010UF K		C807-810			CK73GB1H102K	CHIP C 1000PF K	
C720			C92-0532-05	CHIP-TAN 1.0UF 10WV		C811			CE04EW1E470M	ELECTRO 47UF 25WV	
C721,722			C92-0628-05	CHIP-TAN 10UF 10WV		C812,813			CK73GB1H102K	CHIP C 1000PF K	
C723			CK73FB1C105K	CHIP C 1.0UF K		C814			C92-0777-05	ELECTRO 1000UF 25WV	
C724			CK73GB1H182K	CHIP C 1800PF K		C815			CK73FB1E104K	CHIP C 0.10UF K	
C725			CC73GCH1H470J	CHIP C 47PF J		C816			CK73GB1H102K	CHIP C 1000PF K	
C726			CC73GCH1H181J	CHIP C 180PF J		C817			CE04EW1E470M	ELECTRO 47UF 25WV	
C727,728			CK73GB1E103K	CHIP C 0.010UF K		C818-820			CK73GB1H102K	CHIP C 1000PF K	
C729			C92-0628-05	CHIP-TAN 10UF 10WV		C821,822			CC73GCH1H101J	CHIP C 100PF J	
C730,731			CK73GB1E103K	CHIP C 0.010UF K		C823			C92-0619-05	CHIP-TAN 47UF 4WV	
C732			CK73GB1H471K	CHIP C 470PF K		C824			CK73GB1H472K	CHIP C 4700PF K	
C733			C92-0628-05	CHIP-TAN 10UF 10WV		C825			CK73GB1C104K	CHIP C 0.10UF K	
C734			CC73GCH1H270J	CHIP C 27PF J		C826			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C735			CC73GCH1H150J	CHIP C 15PF J		C827			C92-0823-05	CHIP-TAN 100UF 10WV	
C736			CK73GB1H182K	CHIP C 1800PF K		C828			C92-0514-05	CHIP-TAN 2.2UF 10WV	
C737			CC73GCH1H270J	CHIP C 27PF J		C829			CK73GB1C104K	CHIP C 0.10UF K	
C738			CK73GB1E103K	CHIP C 0.010UF K		C830			CK73GB1E103K	CHIP C 0.010UF K	
C739			CC73GCH1H181J	CHIP C 180PF J		C831			CK73GB1H102K	CHIP C 1000PF K	
C740			CC73GCH1H101J	CHIP C 100PF J		C832,833			CK73GB1E103K	CHIP C 0.010UF K	
C741			CK73GB1E103K	CHIP C 0.010UF K		C834,835			CK73GB1C104K	CHIP C 0.10UF K	
C742			CK73GB1H471K	CHIP C 470PF K		C836-838			CK73GB1E103K	CHIP C 0.010UF K	
C743			CK73GB1E103K	CHIP C 0.010UF K		C839			CK73GB1H271K	CHIP C 270PF K	
C744-746			C92-0628-05	CHIP-TAN 10UF 10WV		C840			CK73GB1H472K	CHIP C 4700PF K	
C747,748			CK73GB1E103K	CHIP C 0.010UF K		C841			CK73FB1C105K	CHIP C 1.0UF K	
C749			CK73GB1H471K	CHIP C 470PF K		C842			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C750,751			CK73GB1E103K	CHIP C 0.010UF K		C843,844			CK73GB1C104K	CHIP C 0.10UF K	
C752			CK73GB1H471K	CHIP C 470PF K		C851			CK73GB1C104K	CHIP C 0.10UF K	
C753,754			C92-0628-05	CHIP-TAN 10UF 10WV		C852			CK73GB1H102K	CHIP C 1000PF K	
C755			CK73GB1H471K	CHIP C 470PF K		CN1			E04-0154-05	PIN SOCKET	
C756,757			C92-0628-05	CHIP-TAN 10UF 10WV		CN2			E40-5538-05	PIN ASSY	
C758			CK73FB1C105K	CHIP C 1.0UF K		CN3			E04-0154-05	PIN SOCKET	
C759			CK73GB1H471K	CHIP C 470PF K		CN4			E40-5538-05	PIN ASSY	
C760			CK73GB1H102K	CHIP C 1000PF K		CN14			E40-6009-05	FLAT CABLE CONNECTOR	
C761			CK73GB1C104K	CHIP C 0.10UF K		CN15			E40-5703-05	PIN ASSY	
C762,763			CK73GB1H102K	CHIP C 1000PF K		CN16			E40-5632-05	PIN ASSY	
C764,765			CK73GB1E103K	CHIP C 0.010UF K		CN18,19			E04-0154-05	PIN SOCKET	
C766-768			CC73GCH1H101J	CHIP C 100PF J		CN600			E40-6102-05	PIN ASSY	
C769-771			C92-0560-05	CHIP-TAN 10UF 6.3WV		CN601			E40-5701-05	PIN ASSY	
C772			C92-0823-05	CHIP-TAN 100UF 10WV		CN602			E40-6009-05	FLAT CABLE CONNECTOR	
C773			C92-0514-05	CHIP-TAN 2.2UF 10WV		CN603			E40-5887-05	PIN ASSY	
C774			CK73FB1C105K	CHIP C 1.0UF K		CN604			E40-5702-05	PIN ASSY	
C775-779			C92-0519-05	CHIP-TAN 1.0UF 25WV		CN605			E40-5704-05	PIN ASSY	
C780-782			CK73FB1C105K	CHIP C 1.0UF K		CN606			E40-5960-05	PIN ASSY	
C783			CK73GB1H471K	CHIP C 470PF K		F1			F53-0217-05	FUSE	
C784			CK73FB1C105K	CHIP C 1.0UF K		CF1			L72-0366-05	CERAMIC FILTER	
C785,786			CK73GB1C104K	CHIP C 0.10UF K		CF2			L72-0376-05	CERAMIC FILTER	
C787			CK73FB1C105K	CHIP C 1.0UF K		L1			L34-4616-05	AIR-CORE COIL	
C788			CC73GCH1H101J	CHIP C 100PF J		L2			L79-1849-05	HELICAL BLOCK	K,E
C789			CE04EW1E331M	ELECTRO 330UF 25WV		L2		*	L79-1852-05	HELICAL BLOCK	K2
C790			CC73GCH1H101J	CHIP C 100PF J							
C791			CK73GB1H471K	CHIP C 470PF K							

## PARTS LIST

### TX-RX UNIT (X57-696X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L2		*	L79-1853-05	HELICAL BLOCK	K3	R2			RK73GB1J122J	CHIP R 1.2K J 1/16W	
L3			L40-1575-34	SMALL FIXED INDUCTOR (15NH)	K2,K3	R3			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L3			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K,E	R5			RK73GB1J101J	CHIP R 100 J 1/16W	
L4,5			L79-1849-05	HELICAL BLOCK	K,E	R8			RK73GB1J151J	CHIP R 150 J 1/16W	
L4,5		*	L79-1852-05	HELICAL BLOCK	K2	R9			RK73GB1J223J	CHIP R 22K J 1/16W	
L4,5		*	L79-1853-05	HELICAL BLOCK	K3	R10			RK73GB1J180J	CHIP R 18 J 1/16W	
L6			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K,K2,E	R11			RK73GB1J271J	CHIP R 270 J 1/16W	
L6			L40-2275-34	SMALL FIXED INDUCTOR (22NH)	K3	R13			RK73GB1J271J	CHIP R 270 J 1/16W	
L10			L40-1581-37	SMALL FIXED INDUCTOR (0.150UH)		R14			RK73GB1J333J	CHIP R 33K J 1/16W	
L11			L40-1885-34	SMALL FIXED INDUCTOR (180NH)		R17			RK73GB1J824J	CHIP R 820K J 1/16W	
L12			L40-3381-37	SMALL FIXED INDUCTOR (0.330UH)		R18			RK73GB1J684J	CHIP R 680K J 1/16W	
L13			L40-1005-34	SMALL FIXED INDUCTOR (10UH)		R19			RK73GB1J474J	CHIP R 470K J 1/16W	
L14			L34-4527-05	COIL		R20			RK73GB1J224J	CHIP R 220K J 1/16W	
L15			L34-4526-05	COIL		R30			RK73GB1J821J	CHIP R 820 J 1/16W	
L16			L34-4527-05	COIL		R31			RK73GB1J5R6J	CHIP R 5.6 J 1/16W	
L17,18			L34-4526-05	COIL		R32			RK73GB1J821J	CHIP R 820 J 1/16W	
L19			L34-4527-05	COIL		R33			RK73GB1J470J	CHIP R 47 J 1/16W	
L20			L40-1095-34	SMALL FIXED INDUCTOR (1UH)		R34			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L21			L40-1005-34	SMALL FIXED INDUCTOR (10UH)		R35			RK73GB1J182J	CHIP R 1.8K J 1/16W	
L23			L40-1095-34	SMALL FIXED INDUCTOR (1UH)		R36			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L24			L34-4459-05	COIL		R37			RK73GB1J682J	CHIP R 6.8K J 1/16W	
L25			L40-2775-34	SMALL FIXED INDUCTOR (27NH)		R38			R92-1252-05	CHIP R 0 OHM J 1/16W	
L26			L40-1575-34	SMALL FIXED INDUCTOR (15NH)	K,K2,E	R39			RK73GB1J560J	CHIP R 56 J 1/16W	
L26-28			L40-2275-34	SMALL FIXED INDUCTOR (22NH)	K3	R40			RK73GB1J270J	CHIP R 27 J 1/16W	
L27			L40-2275-34	SMALL FIXED INDUCTOR (22NH)	K,E	R41			RK73GB1J222J	CHIP R 2.2K J 1/16W	
L27,28			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K2	R42-45			RK73GB1J223J	CHIP R 22K J 1/16W	
L28			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K,E	R46			RK73GB1J222J	CHIP R 2.2K J 1/16W	
L29,30			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	K,K2,E	R47			RK73GB1J153J	CHIP R 15K J 1/16W	
L29,30			L40-2275-92	SMALL FIXED INDUCTOR (22NH)	K3	R48			RK73GB1J473J	CHIP R 47K J 1/16W	
L31,32			L40-1005-34	SMALL FIXED INDUCTOR (10UH)		R49			RK73GB1J221J	CHIP R 220 J 1/16W	
L33			L40-1575-92	SMALL FIXED INDUCTOR (15NH)	K,E	R50			RK73GB1J153J	CHIP R 15K J 1/16W	
L33			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	K2	R51			R92-1252-05	CHIP R 0 OHM J 1/16W	
L33			L40-2275-92	SMALL FIXED INDUCTOR (22NH)	K3	R52			RK73GB1J223J	CHIP R 22K J 1/16W	
L34			L40-1005-34	SMALL FIXED INDUCTOR (10UH)		R53			RK73GB1J682J	CHIP R 6.8K J 1/16W	
L35-39			L92-0140-05	CHIP FERRITE		R54			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L40			L92-0158-05	CHIP FERRITE		R55			RK73GB1J223J	CHIP R 22K J 1/16W	
L42			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	K3	R56			RK73GB1J682J	CHIP R 6.8K J 1/16W	
L42			L40-6865-92	SMALL FIXED INDUCTOR (6.8NH)	K,K2,E	R57			RK73GB1J332J	CHIP R 3.3K J 1/16W	
L43			L92-0140-05	CHIP FERRITE		R58			RK73GB1J153J	CHIP R 15K J 1/16W	
L45			L40-1875-92	SMALL FIXED INDUCTOR (18NH)	K3	R60			RK73GB1J103J	CHIP R 10K J 1/16W	
L600-608			L92-0140-05	CHIP FERRITE		R61			RK73GB1J274J	CHIP R 270K J 1/16W	
L611-613			L92-0140-05	CHIP FERRITE		R62			RK73GB1J222J	CHIP R 2.2K J 1/16W	
X1			L77-1762-05	CRYSTAL RESONATOR (44.395MHZ)		R63			RK73GB1J183J	CHIP R 18K J 1/16W	
X2,3			L77-1849-05	VCXO (16.8MHZ)		R65			RK73GB1J472J	CHIP R 4.7K J 1/16W	
X600			L78-0431-05	RESONATOR (14.7456MHZ)		R66			RK73GB1J334J	CHIP R 330K J 1/16W	
X601			L77-1799-05	CRYSTAL RESONATOR (16.515MHZ)		R67			RK73GB1J560J	CHIP R 56 J 1/16W	
XF1			L71-0513-05	MCF (44.85MHZ NARR)		R68,69			RK73GB1J332J	CHIP R 3.3K J 1/16W	
XF2			L71-0512-05	MCF (44.85MHZ WIDE)		R70			RK73GB1J102J	CHIP R 1.0K J 1/16W	
XF2			L71-0627-05	MCF (44.85M WIDE S)	K,K2,K3 E	R71			RK73GB1J823J	CHIP R 82K J 1/16W	
CP600,601			R90-0725-05	MULTI-COMP 1K X2		R72			RK73GB1J334J	CHIP R 330K J 1/16W	
CP603			R90-1019-05	MULTI-COMP 100 X2		R73			RK73GB1J474J	CHIP R 470K J 1/16W	
CP604,605			R90-0725-05	MULTI-COMP 1K X2		R74,75			RK73GB1J220J	CHIP R 22 J 1/16W	
CP606			R90-0719-05	MULTI-COMP 4.7K X2		R76			RK73GB1J104J	CHIP R 100K J 1/16W	
CP607,608			R90-0725-05	MULTI-COMP 1K X2		R77,78			RK73GB1J473J	CHIP R 47K J 1/16W	
CP609			R90-1019-05	MULTI-COMP 100 X2		R79			RK73GB1J104J	CHIP R 100K J 1/16W	
CP610,611			R90-0750-05	CHIP COM 10 J 1/16W		R82			RK73GB1J474J	CHIP R 470K J 1/16W	
CP612-614			R90-0725-05	MULTI-COMP 1K X2		R83			R92-1252-05	CHIP R 0 OHM J 1/16W	
CP615-619			R90-0750-05	CHIP COM 10 J 1/16W		R87,88			RK73GB1J102J	CHIP R 1.0K J 1/16W	
CP620			R90-1019-05	MULTI-COMP 100 X2		R90			R92-1252-05	CHIP R 0 OHM J 1/16W	
						R91			RK73GB1J472J	CHIP R 4.7K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-696X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R92			RK73GB1J182J	CHIP R 1.8K J 1/16W		R606			RK73GB1J473J	CHIP R 47K J 1/16W	
R93			RK73GB1J101J	CHIP R 100 J 1/16W	K2	R607-613			R92-1252-05	CHIP R 0 OHM J 1/16W	
R93,94			RK73GB1J101J	CHIP R 100 J 1/16W	K,K3,E	R614			RK73GB1J473J	CHIP R 47K J 1/16W	
R94			RK73GB1J820J	CHIP R 82 J 1/16W	K2	R615			R92-1252-05	CHIP R 0 OHM J 1/16W	
R95			RK73GB1J472J	CHIP R 4.7K J 1/16W		R616			RK73GB1J473J	CHIP R 47K J 1/16W	
R96			RK73GB1J182J	CHIP R 1.8K J 1/16W		R618			R92-1252-05	CHIP R 0 OHM J 1/16W	
R97			RK73GB1J332J	CHIP R 3.3K J 1/16W		R619			RK73GB1J473J	CHIP R 47K J 1/16W	
R98			RK73GB1J102J	CHIP R 1.0K J 1/16W		R620-622			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R99			RK73GB1J101J	CHIP R 100 J 1/16W		R623,624			R92-1252-05	CHIP R 0 OHM J 1/16W	
R100			RK73GB1J680J	CHIP R 68 J 1/16W		R625-627			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R101			RK73GB1J470J	CHIP R 47 J 1/16W		R629			R92-1252-05	CHIP R 0 OHM J 1/16W	
R102			RK73GB1J332J	CHIP R 3.3K J 1/16W		R630,631			RK73GB1J473J	CHIP R 47K J 1/16W	
R103			RK73GB1J102J	CHIP R 1.0K J 1/16W		R633,634			RK73GB1J473J	CHIP R 47K J 1/16W	
R105			RK73GB1J270J	CHIP R 27 J 1/16W		R635			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R106			R92-1252-05	CHIP R 0 OHM J 1/16W		R637			R92-1252-05	CHIP R 0 OHM J 1/16W	
R107			RK73GB1J470J	CHIP R 47 J 1/16W		R638			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R109			RK73GB1J101J	CHIP R 100 J 1/16W		R639			R92-1252-05	CHIP R 0 OHM J 1/16W	
R113			RK73GB1J471J	CHIP R 470 J 1/16W		R640			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R114			R92-1252-05	CHIP R 0 OHM J 1/16W		R641			R92-1252-05	CHIP R 0 OHM J 1/16W	
R120,121			RK73GB1J152J	CHIP R 1.5K J 1/16W		R642			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R122,123			RK73GB1J100J	CHIP R 10 J 1/16W		R643			RK73GB1J473J	CHIP R 47K J 1/16W	
R124,125			RK73GB1J152J	CHIP R 1.5K J 1/16W		R644			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R126,127			RK73GB1J100J	CHIP R 10 J 1/16W		R645,646			RK73GB1J473J	CHIP R 47K J 1/16W	
R128			RK73GB1J472J	CHIP R 4.7K J 1/16W		R647,648			RK73GB1J101J	CHIP R 100 J 1/16W	
R129,130			RK73GB1J473J	CHIP R 47K J 1/16W		R649-651			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R131			RK73GB1J102J	CHIP R 1.0K J 1/16W		R652			RK73GB1J101J	CHIP R 100 J 1/16W	
R134			RK73GB1J821J	CHIP R 820 J 1/16W		R653,654			R92-0670-05	CHIP R 0 OHM	
R135			RK73GB1J5R6J	CHIP R 5.6 J 1/16W		R655			RK73GB1J473J	CHIP R 47K J 1/16W	
R136			RK73GB1J821J	CHIP R 820 J 1/16W		R656			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R137,138			RK73GB1J102J	CHIP R 1.0K J 1/16W		R657-661			RK73GB1J473J	CHIP R 47K J 1/16W	
R139-142			R92-1252-05	CHIP R 0 OHM J 1/16W		R662			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R143			RK73GB1J102J	CHIP R 1.0K J 1/16W		R663-667			RK73GB1J473J	CHIP R 47K J 1/16W	
R144			RK73GB1J472J	CHIP R 4.7K J 1/16W		R668			RK73GB1J183J	CHIP R 18K J 1/16W	
R145			RK73FB2A470J	CHIP R 47 J 1/10W		R669-671			RK73GB1J223J	CHIP R 22K J 1/16W	
R148			RK73GB1J472J	CHIP R 4.7K J 1/16W		R672			RK73GB1J104J	CHIP R 100K J 1/16W	
R150			RK73GB1J180J	CHIP R 18 J 1/16W		R673			RK73GB1J224J	CHIP R 220K J 1/16W	
R151-158			RK73GB1J102J	CHIP R 1.0K J 1/16W		R674			RK73GB1J823J	CHIP R 82K J 1/16W	
R160,161			RK73GB1J471J	CHIP R 470 J 1/16W		R675			RK73GB1J104J	CHIP R 100K J 1/16W	
R162-164			RK73GB1J271J	CHIP R 270 J 1/16W		R676			RK73GB1J823J	CHIP R 82K J 1/16W	
R165			RK73GB1J471J	CHIP R 470 J 1/16W		R678			RK73GB1J104J	CHIP R 100K J 1/16W	
R166			RK73GB1J223J	CHIP R 22K J 1/16W		R679,680			RK73GB1J223J	CHIP R 22K J 1/16W	
R168			RK73GB1J271J	CHIP R 270 J 1/16W	K3	R681			RK73GB1J183J	CHIP R 18K J 1/16W	
R168			R92-1252-05	CHIP R 0 OHM J 1/16W	K,K2,E	R682			RK73GB1J153J	CHIP R 15K J 1/16W	
R169			RK73GB1J392J	CHIP R 3.9K J 1/16W		R683			RK73GB1J124J	CHIP R 120K J 1/16W	
R171			R92-1252-05	CHIP R 0 OHM J 1/16W		R684			RK73GB1J473J	CHIP R 47K J 1/16W	
R173-175			R92-1252-05	CHIP R 0 OHM J 1/16W	K2	R685,686			RK73GB1J104J	CHIP R 100K J 1/16W	
R173,174			R92-1252-05	CHIP R 0 OHM J 1/16W	K3	R687			RK73GB1J223J	CHIP R 22K J 1/16W	
R174,175			R92-1252-05	CHIP R 0 OHM J 1/16W	K,E	R688-690			RK73GB1J473J	CHIP R 47K J 1/16W	
R175			RK73GB1J391J	CHIP R 390 J 1/16W	K3	R691-693			R92-1252-05	CHIP R 0 OHM J 1/16W	
R176			RK73GB1J473J	CHIP R 47K J 1/16W		R694,695			RK73GB1J101J	CHIP R 100 J 1/16W	
R178			R92-1252-05	CHIP R 0 OHM J 1/16W	K3	R696			RK73GB1J103J	CHIP R 10K J 1/16W	
R178,179			R92-1252-05	CHIP R 0 OHM J 1/16W	K,K2,E	R697			RK73GB1J101J	CHIP R 100 J 1/16W	
R181			RK73GB1J182J	CHIP R 1.8K J 1/16W		R698			RK73GB1J103J	CHIP R 10K J 1/16W	
R182			R92-1252-05	CHIP R 0 OHM J 1/16W		R699			R92-1252-05	CHIP R 0 OHM J 1/16W	
R600			RK73GB1J473J	CHIP R 47K J 1/16W		R700			RK73GB1J101J	CHIP R 100 J 1/16W	
R601			R92-0670-05	CHIP R 0 OHM		R701			R92-1252-05	CHIP R 0 OHM J 1/16W	
R602			RK73GB1J472J	CHIP R 4.7K J 1/16W		R702			RK73GB1J473J	CHIP R 47K J 1/16W	
R603			RK73GB1J102J	CHIP R 1.0K J 1/16W		R703			R92-1252-05	CHIP R 0 OHM J 1/16W	
R604			RK73GB1J333J	CHIP R 33K J 1/16W		R704,705			RK73GB1J473J	CHIP R 47K J 1/16W	
R605			RK73GB1J104J	CHIP R 100K J 1/16W		R707-709			RK73GB1J223J	CHIP R 22K J 1/16W	



## PARTS LIST

### TX-RX UNIT (X57-696X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R710			RK73GB1J473J	CHIP R 47K J 1/16W		R794			RK73GB1J473J	CHIP R 47K J 1/16W	
R712			RK73GB1J473J	CHIP R 47K J 1/16W		R795			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R713			RK73GB1J273J	CHIP R 27K J 1/16W		R798			RK73GB1J473J	CHIP R 47K J 1/16W	
R714			RK73GB1J223J	CHIP R 22K J 1/16W		R799			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R715			RK73GB1J103J	CHIP R 10K J 1/16W		R802			RK73FB2A2R2J	CHIP R 2.2 J 1/10W	
R717,718			RK73GB1J473J	CHIP R 47K J 1/16W		R803			RK73GB1J473J	CHIP R 47K J 1/16W	
R719			RK73GB1J154J	CHIP R 150K J 1/16W		R804			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R720			RK73GB1J473J	CHIP R 47K J 1/16W		R805			RK73GB1J473J	CHIP R 47K J 1/16W	
R721			RK73GB1J223J	CHIP R 22K J 1/16W		R806			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R722			RK73GB1J334J	CHIP R 330K J 1/16W		R807			RK73GB1J473J	CHIP R 47K J 1/16W	
R723,724			R92-1252-05	CHIP R 0 OHM J 1/16W		R808			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R726			RK73GB1J473J	CHIP R 47K J 1/16W		R809			RK73GB1J473J	CHIP R 47K J 1/16W	
R727			R92-1252-05	CHIP R 0 OHM J 1/16W		R810			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R728,729			RK73GB1J223J	CHIP R 22K J 1/16W		R811			RK73GB1J473J	CHIP R 47K J 1/16W	
R730			RK73GB1J101J	CHIP R 100 J 1/16W		R812			RK73GB1J223J	CHIP R 22K J 1/16W	
R731			RK73GB1J472J	CHIP R 4.7K J 1/16W		R813,814			RK73GB1J473J	CHIP R 47K J 1/16W	
R732			RK73GB1J473J	CHIP R 47K J 1/16W		R815			RK73GB1J104J	CHIP R 100K J 1/16W	
R733			R92-1252-05	CHIP R 0 OHM J 1/16W		R817			RK73GB1J101J	CHIP R 100 J 1/16W	
R734			RK73GB1J473J	CHIP R 47K J 1/16W		R818			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R735			RK73GB1J333J	CHIP R 33K J 1/16W		R819-822			RK73GB1J103J	CHIP R 10K J 1/16W	
R736,737			RK73GB1J473J	CHIP R 47K J 1/16W		R823			RK73GB1J474J	CHIP R 470K J 1/16W	
R738			RK73GB1J274J	CHIP R 270K J 1/16W		R824			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R739			RK73GB1J103J	CHIP R 10K J 1/16W		R825,826			RK73GB1J824J	CHIP R 820K J 1/16W	
R740			RK73GB1J104J	CHIP R 100K J 1/16W		R827			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R741			RK73GB1J154J	CHIP R 150K J 1/16W		R828			RK73GB1J273J	CHIP R 27K J 1/16W	
R742			R92-0670-05	CHIP R 0 OHM		R829			RK73GB1J224J	CHIP R 220K J 1/16W	
R743			RK73GB1J473J	CHIP R 47K J 1/16W		R830			RK73GB1J563J	CHIP R 56K J 1/16W	
R744			RK73GB1J393J	CHIP R 39K J 1/16W		R831			RK73GB1J154J	CHIP R 150K J 1/16W	
R745			RK73GB1J473J	CHIP R 47K J 1/16W		R832			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R747			RK73GB1J103J	CHIP R 10K J 1/16W		R833			RK73GB1J223J	CHIP R 22K J 1/16W	
R749-752			R92-1252-05	CHIP R 0 OHM J 1/16W		R834			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R753,754			RK73GB1J473J	CHIP R 47K J 1/16W		R836			RK73GB1J473J	CHIP R 47K J 1/16W	
R758			RK73GB1J103J	CHIP R 10K J 1/16W		R837			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R760			RK73GB1J122J	CHIP R 1.2K J 1/16W		R839,840			RK73GB1J561J	CHIP R 560 J 1/16W	
R762			RK73GB1J472J	CHIP R 4.7K J 1/16W		R841,842			R92-0670-05	CHIP R 0 OHM	
R763			RK73GB1J103J	CHIP R 10K J 1/16W		R843			RK73GB1J274J	CHIP R 270K J 1/16W	
R764,765			RK73GB1J102J	CHIP R 1.0K J 1/16W		R844			RK73GB1J334J	CHIP R 330K J 1/16W	
R766			RK73GB1J122J	CHIP R 1.2K J 1/16W		K1			S76-0401-05	RELAY	
R767			RK73GB1J473J	CHIP R 47K J 1/16W		D1-4			DAN235K	DIODE	
R768			RK73GB1J122J	CHIP R 1.2K J 1/16W		D5			MA742	DIODE	
R771			RK73GB1J122J	CHIP R 1.2K J 1/16W		D7			1SS355	DIODE	
R772			RK73GB1J473J	CHIP R 47K J 1/16W		D8			DAN235K	DIODE	
R773			RK73GB1J102J	CHIP R 1.0K J 1/16W		D11			O2DZ5.1(Y)	ZENER DIODE	
R774			RK73GB1J105J	CHIP R 1.0M J 1/16W		D12			O2DZ18(X,Y)	ZENER DIODE	
R775			RK73GB1J473J	CHIP R 47K J 1/16W		D13			MA742	DIODE	
R776			RK73GB1J102J	CHIP R 1.0K J 1/16W		D600			DA204U	DIODE	
R777			RK73GB1J473J	CHIP R 47K J 1/16W		D606-612			DA204U	DIODE	
R778			RK73GB1J102J	CHIP R 1.0K J 1/16W		D614-616			DA204U	DIODE	
R779			RK73GB1J473J	CHIP R 47K J 1/16W		D618-623			DA204U	DIODE	
R780			RK73GB1J102J	CHIP R 1.0K J 1/16W		D626			MINISMDE190	VARISTOR	
R781			RK73GB1J471J	CHIP R 470 J 1/16W		D627,628			1SS355	DIODE	
R782			RK73GB1J473J	CHIP R 47K J 1/16W		D629			DA204U	DIODE	
R783			RK73GB1J102J	CHIP R 1.0K J 1/16W		IC1,2			NJM4558E	MOS-IC	
R785			RK73GB1J102J	CHIP R 1.0K J 1/16W		IC3			NJM78L05UA	BI-POLAR IC	
R786			RK73GB1J473J	CHIP R 47K J 1/16W		IC4			NJM7808FA	BI-POLAR IC	
R787			RK73GB1J102J	CHIP R 1.0K J 1/16W		IC5			AN8009M	MOS-IC	
R789			RK73GB1J102J	CHIP R 1.0K J 1/16W		IC6			M62354GP	MOS-IC	
R790			RK73GB1J473J	CHIP R 47K J 1/16W		IC7			BU4094BCF	MOS-IC	
R791			RK73GB1J102J	CHIP R 1.0K J 1/16W							
R793			RK73GB1J102J	CHIP R 1.0K J 1/16W							

## PARTS LIST

TX-RX UNIT (X57-696X-XX)  
RX VCO UNIT (X58-480X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination		
IC9			TK14489V	BI-POLAR IC		Q611			DTC114EUA	DIGITAL TRANSISTOR			
IC10			TA7808F	ANALOGUE IC		Q612			DTC144EUA	DIGITAL TRANSISTOR			
IC11			NJM78L05UA	BI-POLAR IC		Q613,614			DTD123TK	DIGITAL TRANSISTOR			
IC600			AT24C08A10S118	ROM IC		Q615			DTC144EUA	DIGITAL TRANSISTOR			
IC601			RH5VL42C	MOS-IC		TH1			157-503-53006	THERMISTOR			
IC602			BU4094BCFV	MOS-IC		TH700,701			B57331V2103J	THERMISTOR			
IC603			TC74LVX4245FS	MOS-IC		A1			W02-1939-05	DBM			
IC604			30622M4A-487GP	MICROPROCESSOR IC		A2			X58-4810-10	SUB UNIT	K,E		
IC605			BU4053BCF	MOS-IC		A2			X58-4810-11	SUB UNIT	K2		
IC606			TC74LVX4245FS	MOS-IC		A2			X58-4810-12	SUB UNIT	K3		
IC607			NJM4558E	MOS-IC		A3			X58-4800-10	SUB UNIT	K,E		
IC608			TA75S01F	MOS-IC		A3			X58-4800-11	SUB UNIT	K2		
IC609			AT29C020-90TI	ROM IC		A3			X58-4800-12	SUB UNIT	K3		
IC610			TA75S01F	MOS-IC									
IC611			NJM4558E	MOS-IC									
IC612			TC7S04FU	MOS-IC									
IC613			TC74VHC4040FT	MOS-IC									
IC614			AK4550VT	MOS-IC									
IC615			M62364FP	MOS-IC									
IC616,617			NJM4558E	MOS-IC									
IC618			320VC5402PGE	MICROPROCESSOR IC									
IC619			TC75W51FU	MOS-IC									
IC620			ADM202EARN	MOS-IC									
IC621			TC7S00FU	MOS-IC									
IC622			TC7S66FU	MOS-IC									
IC623			BU4094BCFV	MOS-IC									
IC624			XC62FP1802P	MOS-IC									
IC625,626			XC62FP3302P	MOS-IC									
IC627,628			TA78L05F	MOS-IC									
IC629	3B		LA4422	BI-POLAR IC									
IC630			TA78L05F	MOS-IC									
IC631,632			TA75W01FU	MOS-IC									
Q1,2			2SC3357	TRANSISTOR									
Q3			2SC3356(R24)	TRANSISTOR									
Q4			DTC144EUA	DIGITAL TRANSISTOR									
Q5			DTA144EUA	DIGITAL TRANSISTOR									
Q6			DTC144EUA	DIGITAL TRANSISTOR									
Q7			2SC4617(S)	TRANSISTOR									
Q8,9			2SC3356	TRANSISTOR									
Q10			2SC3357	TRANSISTOR									
Q11			2SC3356(R24)	TRANSISTOR									
Q12-15			2SC4116(GR)	TRANSISTOR									
Q16			2SB1132(Q,R)	TRANSISTOR									
Q17			DTC114EUA	DIGITAL TRANSISTOR									
Q18			2SB1386(R)	TRANSISTOR									
Q19			DTC114EUA	DIGITAL TRANSISTOR									
Q23			DTC114EUA	DIGITAL TRANSISTOR									
Q24			DTD114EK	DIGITAL TRANSISTOR									
Q25,26			DTC114EUA	DIGITAL TRANSISTOR									
Q27			DTC144EUA	DIGITAL TRANSISTOR									
Q600			2SK1824	FET									
Q601			DTC114EUA	DIGITAL TRANSISTOR									
Q602			2SK1824	FET									
Q603			DTC114EUA	DIGITAL TRANSISTOR									
Q604			2SK1824	FET									
Q605			DTC114EUA	DIGITAL TRANSISTOR									
Q606			DTC363EU	DIGITAL TRANSISTOR									
Q607,608			DTC144EUA	DIGITAL TRANSISTOR									
Q609			DTC114EUA	DIGITAL TRANSISTOR									
Q610			2SJ506(S)	FET									
						<b>RX VCO UNIT (X58-480X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3</b>							
						C304,305			CK73GB1H102K	CHIP C	1000PF	K	
						C306			CK73GB1H103K	CHIP C	0.010UF	K	
						C307			CK73GB1H471K	CHIP C	470PF	K	
						C308-310			CK73FB1E104K	CHIP C	0.10UF	K	
						C311			C92-0001-05	CHIP-TAN	0.1UF	35WV	
						C312			CC73GCH1H060D	CHIP C	6.0PF	D	K2
						C312			CC73GCH1H070D	CHIP C	7.0PF	D	K,E
						C312			CC73GCH1H080D	CHIP C	8.0PF	D	K3
						C314			CC73GCH1H120J	CHIP C	12PF	J	K,E
						C314			CC73GCH1H150J	CHIP C	15PF	J	K2
						C314			CC73GCH1H180J	CHIP C	18PF	J	K3
						C315			CK73FB1H473K	CHIP C	0.047UF	K	
						C317			CC73GCH1H060D	CHIP C	6.0PF	D	K2
						C317			CC73GCH1H070D	CHIP C	7.0PF	D	K,E
						C317			CC73GCH1H080D	CHIP C	8.0PF	D	K3
						C318			C92-0514-05	CHIP-TAN	2.2UF	10WV	
						C319			CK73GB1H471K	CHIP C	470PF	K	
						C320			C92-0514-05	CHIP-TAN	2.2UF	10WV	
						C321			CC73GCH1H040C	CHIP C	4.0PF	C	
						C322			CK73GB1H471K	CHIP C	470PF	K	
						C323			CK73FB1E224K	CHIP C	0.22UF	K	
						C324			C92-0002-05	CHIP-TAN	0.22UF	35WV	
						C325			CC73GCH1H040C	CHIP C	4.0PF	C	
						C350,351			CK73GB1H471K	CHIP C	470PF	K	
						C354			CK73GB1H471K	CHIP C	470PF	K	
						C355			CC73GCH1H050B	CHIP C	5.0PF	B	K,K2,E
						C355			CC73GCH1H050B	CHIP C	6.0PF	B	K3
						C356			CC73GCH1H060B	CHIP C	6.0PF	B	K,K2,E
						C356			CC73GCH1H070B	CHIP C	7.0PF	B	K3
						C357			CK73GB1H471K	CHIP C	470PF	K	
						C358,359			CC73GCH1H1R5B	CHIP C	1.5PF	B	
						C360,361			CK73FB1E104K	CHIP C	0.10UF	K	
						C362			CC73GCH1H220G	CHIP C	22PF	G	
						C363			CC73GCH1H150G	CHIP C	15PF	G	K,K3,E
						C363			CC73GCH1H180G	CHIP C	18PF	G	K2
						C364,365			CK73GB1H471K	CHIP C	470PF	K	
						C366-369			CC73GCH1H070B	CHIP C	7.0PF	B	
						C370,371			CC73GCH1H100C	CHIP C	10PF	C	
						C372,373			CK73GB1H471K	CHIP C	470PF	K	
						C374,375			CC73GCH1H0R5B	CHIP C	0.5PF	B	
						C376-378			CK73GB1H471K	CHIP C	470PF	K	



## PARTS LIST

### RX VCO UNIT (X58-480X-XX)

### TX VCO UNIT (X58-481X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C379			CC73GCH1H040C	CHIP C 4.0PF C	
C383			CK73GB1H471K	CHIP C 470PF K	
C386			CC73GCH1H101J	CHIP C 100PF J	K,K3,E
C386			CC73GCH1H220J	CHIP C 22PF J	K2
TC350,351			C05-0396-05	CERAMIC TRIMMER (8PF)	
CN300			E40-5699-05	PIN ASSY	
CN350			E40-5755-05	PIN ASSY	
CN351			E40-6098-05	PIN ASSY	
-			F10-2377-04	SHIELDING CASE	
L300			L92-0148-05	CHIP FERRITE	
L301,302			L40-1575-34	SMALL FIXED INDUCTOR (15NH)	K2
L301,302			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K,K3,E
L303			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K2
L303			L40-2275-34	SMALL FIXED INDUCTOR (22NH)	K,E
L303			L40-2775-34	SMALL FIXED INDUCTOR (27NH)	K3
L350-355			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	
L356,357			L34-4607-05	AIR-CORE COIL	K2
L356,357			L34-4608-05	AIR-CORE COIL	K,E
L356,357			L34-4609-05	AIR-CORE COIL	K3
L358-361			L40-1595-34	SMALL FIXED INDUCTOR (1.5UH)	
L362			L40-2775-34	SMALL FIXED INDUCTOR (27NH)	K2
L362			L40-3371-34	SMALL FIXED INDUCTOR (33NH)	K,K3,E
R300			RK73GB1J100J	CHIP R 10 J 1/16W	
R301-304			RK73GB1J101J	CHIP R 100 J 1/16W	
R305			R92-1252-05	CHIP R 0 OHM J 1/16W	
R306			RK73GB1J220J	CHIP R 22 J 1/16W	
R308			RK73GB1J560J	CHIP R 56 J 1/16W	
R309			RK73GB1J331J	CHIP R 330 J 1/16W	K,K3,E
R309			RK73GB1J391J	CHIP R 390 J 1/16W	K2
R310			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R311			RK73GB1J103J	CHIP R 10K J 1/16W	
R312			RK73GB1J331J	CHIP R 330 J 1/16W	K,K3,E
R312			RK73GB1J391J	CHIP R 390 J 1/16W	K2
R313			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R314			RK73GB1J474J	CHIP R 470K J 1/16W	
R315			RK73GB1J151J	CHIP R 150 J 1/16W	
R316			RK73FB2A152J	CHIP R 1.5K J 1/10W	
R317,318			R92-1252-05	CHIP R 0 OHM J 1/16W	
R319			RK73GB1J330J	CHIP R 33 J 1/16W	
R320			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R321			RK73GB1J273J	CHIP R 27K J 1/16W	
R322			RK73GB1J103J	CHIP R 10K J 1/16W	
R350-353			R92-1252-05	CHIP R 0 OHM J 1/16W	
R354,355			RK73GB1J330J	CHIP R 33 J 1/16W	
R356			RK73GB1J181J	CHIP R 180 J 1/16W	K2
R356			RK73GB1J221J	CHIP R 220 J 1/16W	K,K3,E
R357			RK73GB1J151J	CHIP R 150 J 1/16W	K2
R357			RK73GB1J181J	CHIP R 180 J 1/16W	K,K3,E
R358,359			RK73GB1J470J	CHIP R 47 J 1/16W	
R360-363			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R364			RK73GB1J103J	CHIP R 10K J 1/16W	
R365			RK73GB1J333J	CHIP R 33K J 1/16W	
R366			RK73GB1J103J	CHIP R 10K J 1/16W	
R367			RK73GB1J101J	CHIP R 100 J 1/16W	
R368			RK73GB1J330J	CHIP R 33 J 1/16W	
D350-353			1SV282	VARIABLE CAPACITANCE DIODE	
IC300			CD8468	MOS-IC	
IC300			SA7025DK	MOS-IC	

Ref. No.	Address	New parts	Parts No.	Description	Destination
Q300,301			2SC4116(GR)	TRANSISTOR	
Q302			2SC4226(R24)	TRANSISTOR	
Q350,351			2SK508NV(K52)	FET	
Q352,353			2SC4116(Y)	TRANSISTOR	
Q354			DTC114EUA	DIGITAL TRANSISTOR	
Q355			2SC4226(R24)	TRANSISTOR	
<b>TX VCO UNIT (X58-481X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3</b>					
C304,305			CK73GB1H102K	CHIP C 1000PF K	
C306			CK73GB1H103K	CHIP C 0.010UF K	
C307			CK73GB1H471K	CHIP C 470PF K	
C308-310			CK73FB1E104K	CHIP C 0.10UF K	
C311			C92-0001-05	CHIP-TAN 0.1UF 35WV	
C312			CC73GCH1H050C	CHIP C 5.0PF C	K2
C312			CC73GCH1H060D	CHIP C 6.0PF D	K,E
C312			CC73GCH1H070D	CHIP C 7.0PF D	K3
C314			CC73GCH1H100D	CHIP C 10PF D	K2
C314			CC73GCH1H120J	CHIP C 12PF J	K,K3,E
C315			CK73FB1H473K	CHIP C 0.047UF K	
C317			CC73GCH1H050C	CHIP C 5.0PF C	K2
C317			CC73GCH1H060D	CHIP C 6.0PF D	K,E
C317			CC73GCH1H070D	CHIP C 7.0PF D	K3
C318			C92-0514-05	CHIP-TAN 2.2UF 10WV	
C319			CK73GB1H471K	CHIP C 470PF K	
C320			C92-0514-05	CHIP-TAN 2.2UF 10WV	
C321			CC73GCH1H040C	CHIP C 4.0PF C	
C322			CK73GB1H471K	CHIP C 470PF K	
C323			CK73FB1E224K	CHIP C 0.22UF K	
C324			C92-0002-05	CHIP-TAN 0.22UF 35WV	K,K2,E
C324			C92-0502-05	CHIP-TAN 0.33UF 35WV	K3
C325			CC73GCH1H040C	CHIP C 4.0PF C	
C329,330			CK73GB1H471K	CHIP C 470PF K	
C350			CK73GB1H471K	CHIP C 470PF K	K,K2,E
C351			CK73GB1H471K	CHIP C 470PF K	
C352			CC73GCH1H101J	CHIP C 100PF J	K,K3,E
C353			CK73GB1H471K	CHIP C 470PF K	K3
C354			CK73GB1H471K	CHIP C 470PF K	K,K2,E
C355			CC73GCH1H100C	CHIP C 10PF C	K3
C356			CC73GCH1H070B	CHIP C 7.0PF B	K2
C356			CC73GCH1H080B	CHIP C 8.0PF B	K,E
C357			CK73GB1H471K	CHIP C 470PF K	K3
C358			CC73GCH1H030B	CHIP C 3.0PF B	K3
C359			CC73GCH1H1R5B	CHIP C 1.5PF B	K,K2,E
C360			CK73FB1E104K	CHIP C 0.10UF K	K,K2,E
C361			CK73FB1E104K	CHIP C 0.10UF K	K3
C362			CC73GCH1H120G	CHIP C 12PF G	K,K2,E
C363			CC73GCH1H180G	CHIP C 18PF G	K3
C364			CK73GB1H471K	CHIP C 470PF K	K,K2,E
C365			CK73GB1H471K	CHIP C 470PF K	K3
C366			CC73GCH1H070B	CHIP C 7.0PF B	K,K2,E
C367			CC73GCH1H070B	CHIP C 7.0PF B	K3
C368			CC73GCH1H070B	CHIP C 7.0PF B	K,K2,E
C369			CC73GCH1H080B	CHIP C 8.0PF B	K3
C370			CC73GCH1H070B	CHIP C 7.0PF B	K,K2,E
C371			CC73GCH1H080B	CHIP C 8.0PF B	K3
C374			CC73GCH1H0R5B	CHIP C 0.5PF B	K,K2,E
C375			CC73GCH1H0R5B	CHIP C 0.5PF B	K3
C377,378			CK73GB1H471K	CHIP C 470PF K	

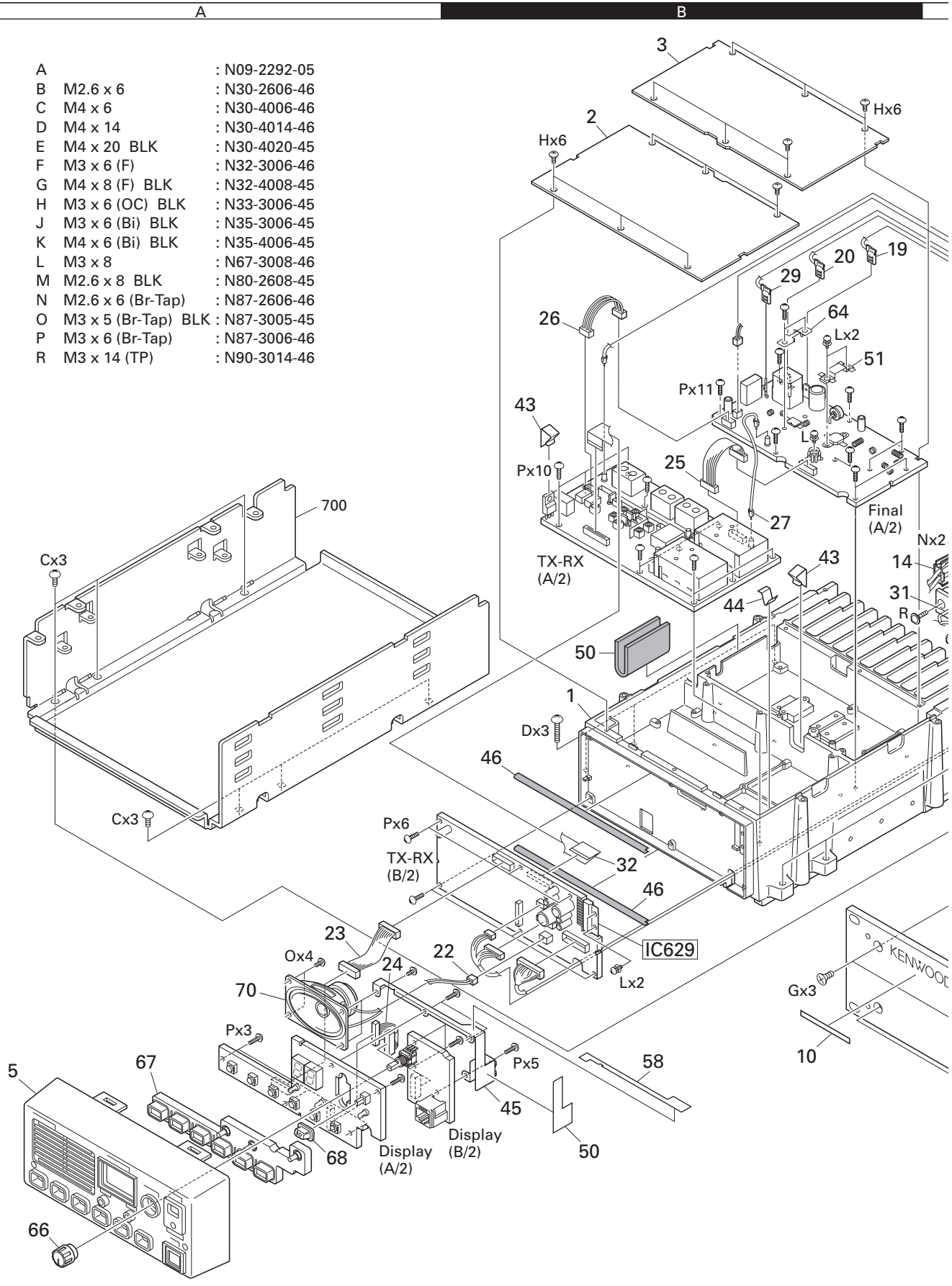
## PARTS LIST

TX VCO UNIT (X58-481X-XX)

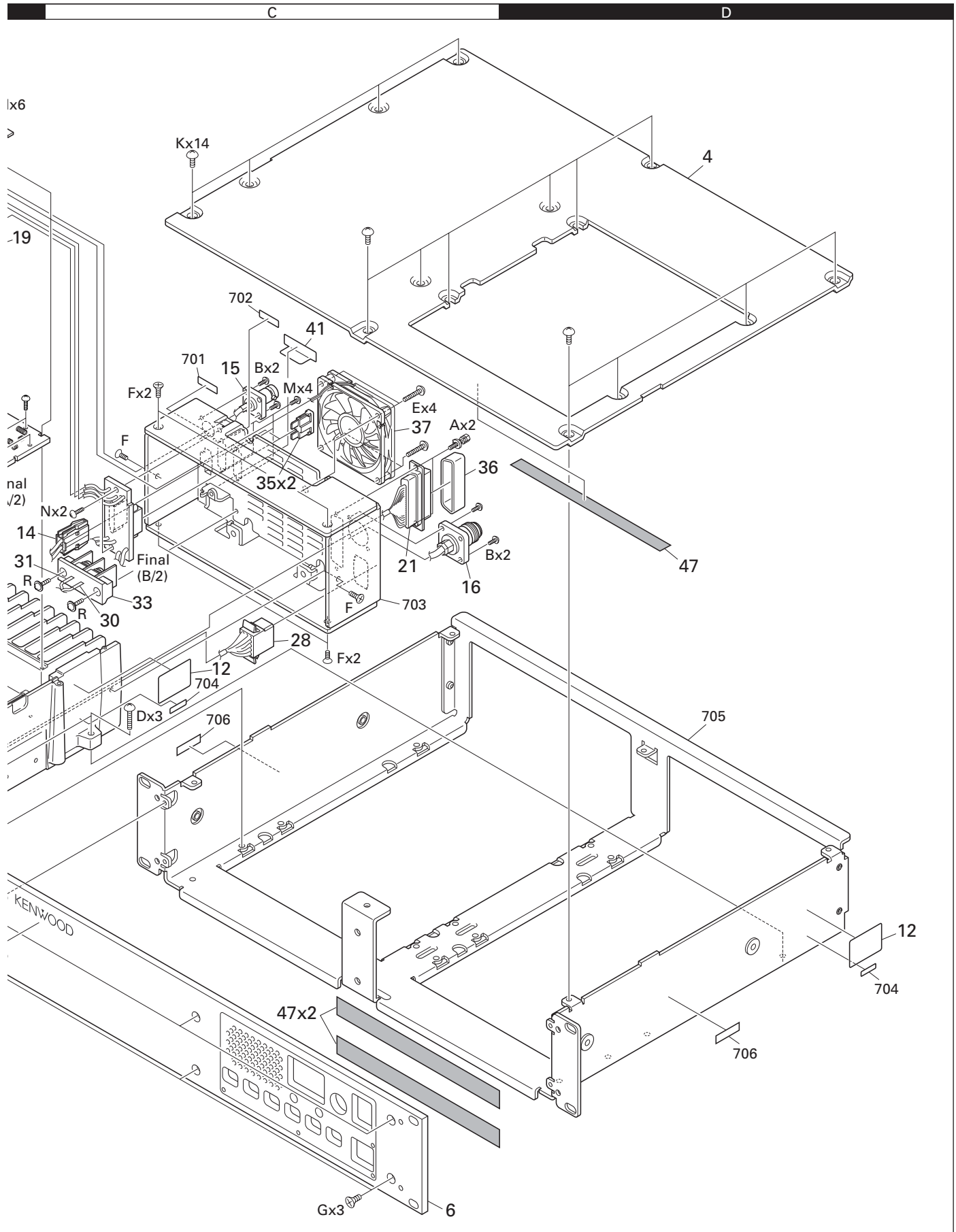
Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C379			CC73GCH1H040C	CHIP C 4.0PF C		R368			RK73GB1J330J	CHIP R 33 J 1/16W	
C380			CC73GCH1H0R5B	CHIP C 0.5PF B	K,K2,E	R372,373			RK73GB1J104J	CHIP R 100K J 1/16W	K,K2,E
C381			CC73GCH1H0R5B	CHIP C 0.5PF B	K3	R374,375			RK73GB1J104J	CHIP R 100K J 1/16W	K3
C382,383			CC73GCH1H471J	CHIP C 470PF J		R376			RK73GB1J151J	CHIP R 150 J 1/16W	K2
TC350			C05-0396-05	CERAMIC TRIMMER (8PF)	K,K2,E	R376			RK73GB1J181J	CHIP R 180 J 1/16W	K,E
TC351			C05-0396-05	CERAMIC TRIMMER (8PF)	K3	R377			RK73GB1J181J	CHIP R 180 J 1/16W	K3
CN300			E40-5699-05	PIN ASSY		D350			1SV282	VARIABLE CAPACITANCE DIODE	K,K2,E
CN350			E40-5755-05	PIN ASSY		D351			1SV282	VARIABLE CAPACITANCE DIODE	K3
CN351			E40-6098-05	PIN ASSY		D352			1SV282	VARIABLE CAPACITANCE DIODE	K,K2,E
-			F10-2377-04	SHIELDING CASE		D353			1SV282	VARIABLE CAPACITANCE DIODE	K3
L300			L92-0148-05	CHIP FERRITE		D354			1SV214	VARIABLE CAPACITANCE DIODE	K,K2,E
L301,302			L40-1575-34	SMALL FIXED INDUCTOR (15NH)	K,K2,E	D355			1SV214	VARIABLE CAPACITANCE DIODE	K3
L301,302			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K3	IC300			CD8468	MOS-IC	
L303			L40-1875-34	SMALL FIXED INDUCTOR (18NH)	K2	IC300			SA7025DK	MOS-IC	
L303			L40-2275-34	SMALL FIXED INDUCTOR (22NH)	K,E	Q300,301			2SC4116(GR)	TRANSISTOR	
L303			L40-2775-34	SMALL FIXED INDUCTOR (27NH)	K3	Q302			2SC4226(R24)	TRANSISTOR	
L304-307			L92-0140-05	CHIP FERRITE		Q350			2SK508NV(K52)	FET	K,K2,E
L350,351			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	K3	Q351			2SK508NV(K52)	FET	K3
L352-354			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	K,K2,E	Q355			2SC4226(R24)	TRANSISTOR	
L355			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	K3						
L356			L34-4605-05	AIR-CORE COIL	K2						
L356			L34-4645-05	AIR-CORE COIL	K,E						
L357			L34-4607-05	AIR-CORE COIL	K3						
L358			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	K,K2,E						
L359			L40-1595-34	SMALL FIXED INDUCTOR (1.5UH)	K3						
L360			L40-1095-34	SMALL FIXED INDUCTOR (1UH)	K,K2,E						
L361			L40-1595-34	SMALL FIXED INDUCTOR (1.5UH)	K3						
L362			L40-2275-34	SMALL FIXED INDUCTOR (22NH)	K2						
L362			L40-3371-34	SMALL FIXED INDUCTOR (33NH)	K,K3,E						
R300			RK73GB1J100J	CHIP R 10 J 1/16W							
R301-304			RK73GB1J101J	CHIP R 100 J 1/16W							
R305			R92-1252-05	CHIP R 0 OHM J 1/16W							
R306			RK73GB1J220J	CHIP R 22 J 1/16W							
R308			RK73GB1J560J	CHIP R 56 J 1/16W							
R309			RK73GB1J331J	CHIP R 330 J 1/16W							
R310			RK73GB1J332J	CHIP R 3.3K J 1/16W							
R311			RK73GB1J103J	CHIP R 10K J 1/16W							
R312			RK73GB1J331J	CHIP R 330 J 1/16W							
R313			RK73GB1J222J	CHIP R 2.2K J 1/16W							
R314			RK73GB1J474J	CHIP R 470K J 1/16W							
R315			RK73GB1J151J	CHIP R 150 J 1/16W							
R316			RK73FB2A152J	CHIP R 1.5K J 1/10W							
R317,318			R92-1252-05	CHIP R 0 OHM J 1/16W							
R319			RK73GB1J330J	CHIP R 33 J 1/16W							
R320			RK73GB1J222J	CHIP R 2.2K J 1/16W							
R321			RK73GB1J273J	CHIP R 27K J 1/16W							
R322			RK73GB1J103J	CHIP R 10K J 1/16W							
R350			R92-1252-05	CHIP R 0 OHM J 1/16W	K3						
R351			R92-1252-05	CHIP R 0 OHM J 1/16W	K,K2,E						
R352			R92-1252-05	CHIP R 0 OHM J 1/16W	K3						
R353			R92-1252-05	CHIP R 0 OHM J 1/16W	K,K2,E						
R354			RK73GB1J330J	CHIP R 33 J 1/16W	K,K2,E						
R355			RK73GB1J330J	CHIP R 33 J 1/16W	K3						
R358			RK73GB1J470J	CHIP R 47 J 1/16W	K3						
R359			RK73GB1J470J	CHIP R 47 J 1/16W	K,K2,E						
R365			RK73GB1J333J	CHIP R 33K J 1/16W							
R366			RK73GB1J103J	CHIP R 10K J 1/16W							
R367			RK73GB1J820J	CHIP R 82 J 1/16W							

## EXPLODED VIEW

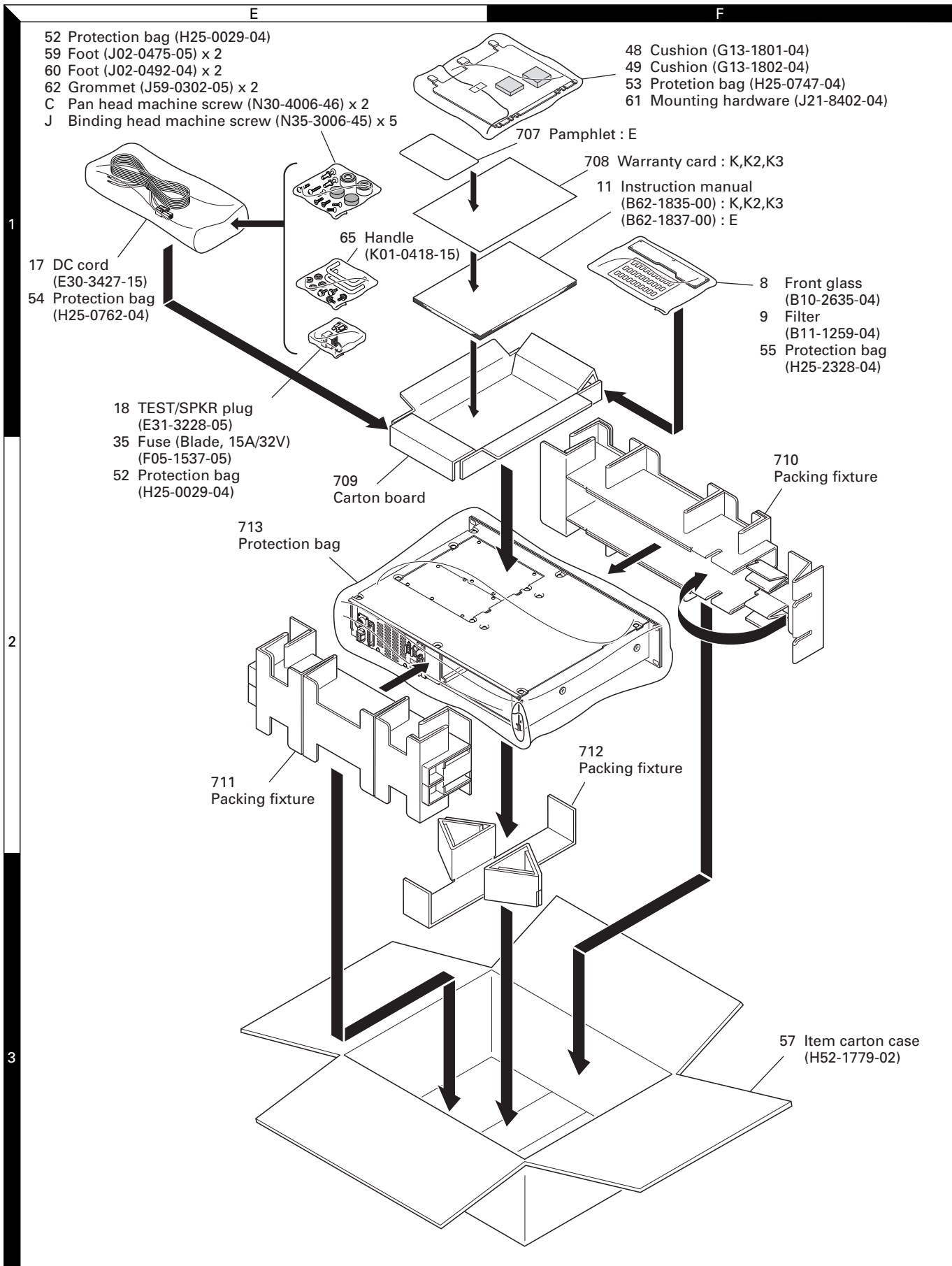
- |   |                     |               |
|---|---------------------|---------------|
| A | :                   | N09-2292-05   |
| B | M2.6 x 6            | : N30-2606-46 |
| C | M4 x 6              | : N30-4006-46 |
| D | M4 x 14             | : N30-4014-46 |
| E | M4 x 20 BLK         | : N30-4020-45 |
| F | M3 x 6 (F)          | : N32-3006-46 |
| G | M4 x 8 (F) BLK      | : N32-4008-45 |
| H | M3 x 6 (OC) BLK     | : N33-3006-45 |
| J | M3 x 6 (Bi) BLK     | : N35-3006-45 |
| K | M4 x 6 (Bi) BLK     | : N35-4006-45 |
| L | M3 x 8              | : N67-3008-46 |
| M | M2.6 x 8 BLK        | : N80-2608-45 |
| N | M2.6 x 6 (Br-Tap)   | : N87-2606-46 |
| O | M3 x 5 (Br-Tap) BLK | : N87-3005-45 |
| P | M3 x 6 (Br-Tap)     | : N87-3006-46 |
| R | M3 x 14 (TP)        | : N90-3014-46 |



## EXPLODED VIEW



## PACKING

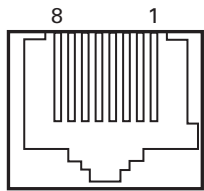


## ADJUSTMENT

### Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range	400 to 512MHz
	Modulation	Frequency modulation and external modulation
	Output	0.1μV to greater than 1mV
2. Power Meter	Input Impedance	50Ω
	Operation Frequency	400 to 512MHz or more
	Measurement Capability	Vicinity of 100W
3. Deviation Meter	Frequency Range	400 to 512MHz
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		15A 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, 5W

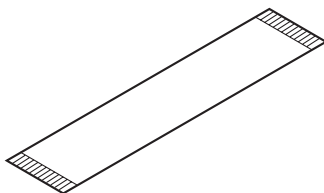
### MIC connector (Front panel view)



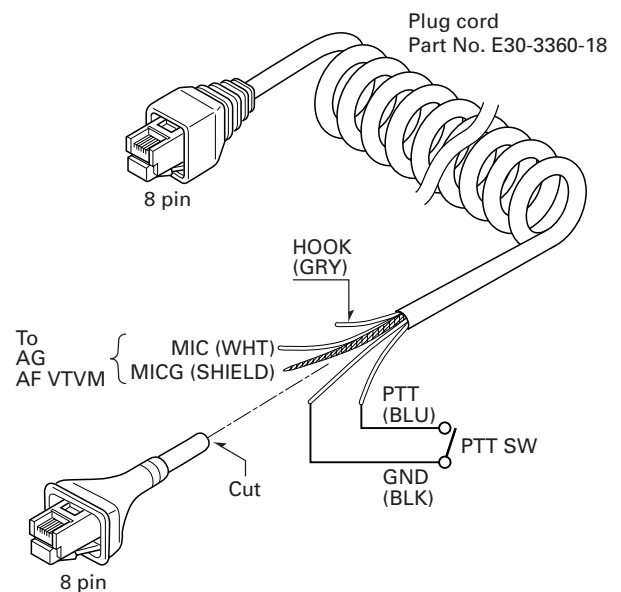
- 1 : NC
- 2 : +B
- 3 : GND
- 4 : PTT/TXD1 (PC serial data from radio)
- 5 : MIC GND
- 6 : MIC
- 7 : HOOK/RXD1 (PC serial data to radio)
- 8 : NC

### Flat cable (36-pin) about 256mm

To connect the TX-RX unit A/2 (CN14) to the TX-RX unit B/2 (CN602) while in servicing, you can use the 36-pin flat cable, E37-0979-05, which is available from the KENWOOD parts center.



### Test cable for microphone input



## ADJUSTMENT

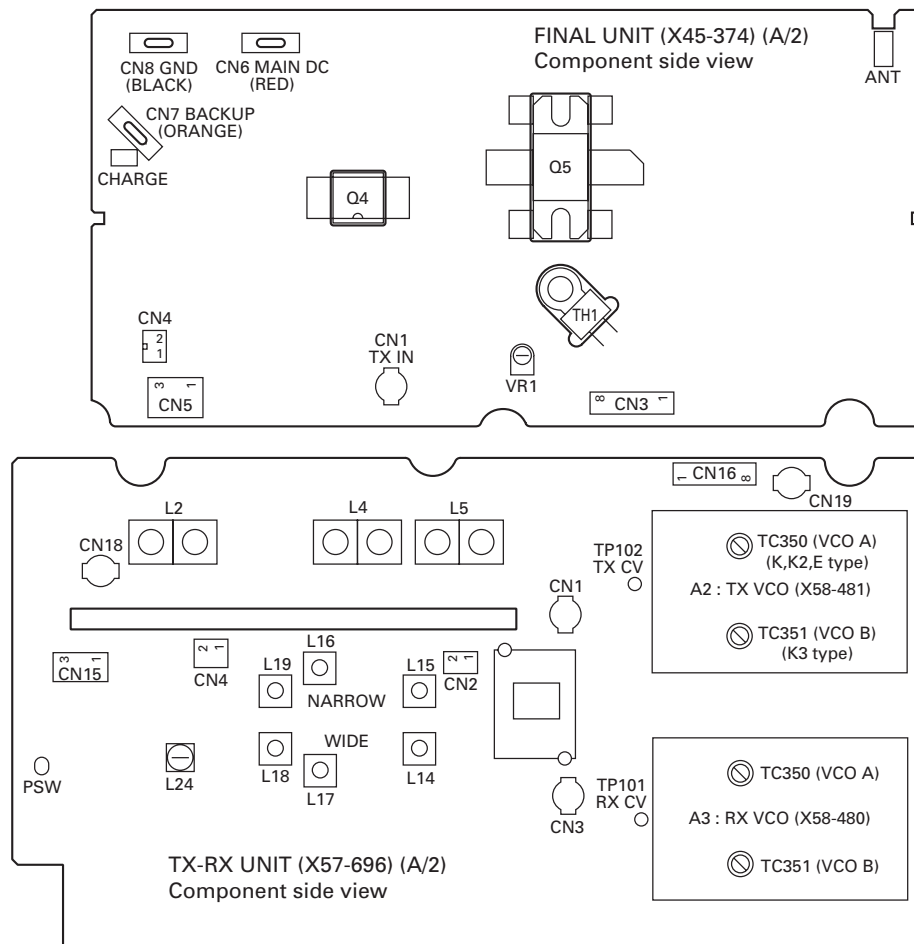
### Test Channel (Default)

No.	K		K2		K3		E	
	RX	TX	RX	TX	RX	TX	RX	TX
1	450.10	450.00	480.10	480.00	400.10	400.00	440.10	440.00
2	465.10	465.00	496.10	496.00	415.10	415.00	455.10	455.00
3	479.90	480.00	511.90	512.00	429.90	430.00	469.90	470.00
4	455.10	455.00	485.10	485.00	405.10	405.00	445.10	445.00
5	460.10	460.00	490.10	490.00	410.10	410.00	450.10	450.00
6	470.10	470.00	500.10	500.00	420.10	420.00	460.10	460.00
7	475.10	475.00	505.10	505.00	425.10	425.00	465.10	465.00
8	462.60	462.50	493.60	493.50	412.60	412.50	452.60	452.50
9	467.60	467.50	498.60	498.50	417.60	417.50	457.60	457.50
10	440.10	440.00	499.90	500.00	419.90	420.00	459.90	460.00
11	459.90	460.00	519.90	520.00	439.90	440.00	479.90	480.00

### Test Signaling

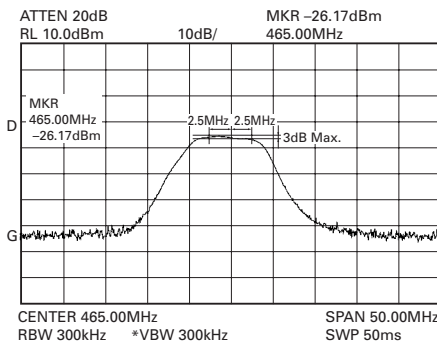
No.	Decode tone	Encode tone
1	None	None
2	None	100Hz square wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 250.3Hz	QT 250.3Hz
7	DQT 023N	DQT D023N
8	DQT 754I	DQT D754I
9	None	CW ID Encode [ID=VVV]
10	None	Single Tone [1000Hz]
11	DTMF 159D	DTMF 159D
12	None	DTMF Tone 9
13	None	Courtesy Tone
14	None	Battery Warning Tone
15	None	Battery Operation Tone
16	5-Tone [12345] (CCIR)	5-Tone [12345] (CCIR)

### Adjustment Points



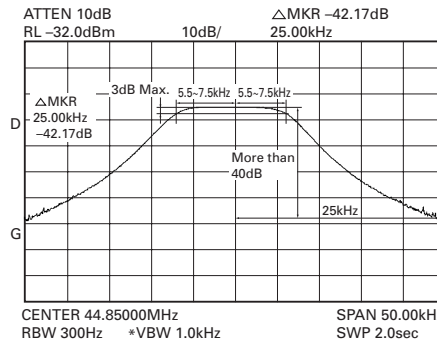


## ADJUSTMENT



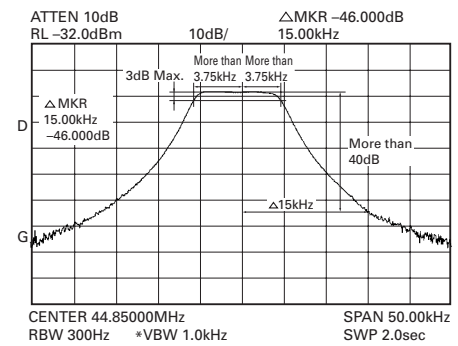
BPF center frequency (Factory-default)  
 K : 465MHz, E : 455MHz, K2 : 496MHz,  
 K3 : 415MHz

Fig. 1



MCF : Wide

Fig. 2



MCF : Narrow

Fig. 3

### Fine-Tuning the TKR-850

“ADJUSTMENT” items described in the Service Manual for the TKR-850 give the factory-default adjustment procedure covering all adjustment items.

However, it is not necessary to adjust all the items when adjusting the power, deviation, receiver sensitivity, etc at the frequency of the channel to be used by the TKR-850.

#### Adjustment procedure at the frequency of the channel to be used

1. Program a channel frequency using the FPU (KPG-91D).
2. From the FPU menu, select in the order of “EDIT”, “Test Frequency” and “CH paste” to rewrite the test frequency from the factory-default to the one to be used for the channel.

Erase all channel frequencies rewritten through this operation and press the ENTER key to retrieve the factory-default test frequency.

Refer to the explanation given under HELP for the FPU (KPG-91D) for details.

3. Check whether the frequency rewritten under the “Test mode” of the FPU (KPG-91D) is correct, then select the item to be adjusted from the FPU (KPG-91D) menu and adjust the set value for the item to an optimum value with the “TEST” tag.

#### Note :

**After adjustment of the “Max. Deviation”, be sure to check the “DQT balance”.**

**The “5-tone” adjustment is required only for the E market products.**

### Alignment

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Connect the unit to a suitable DC power supply.							
2. Write test frequency	1) Turn the DC source switch on after connecting a PC and FPU cable to the radio. 2) Write the test and shipping frequency to the radio. 3) End of test frequency writing.						→ “E1” appears on LED display → Green (BUSY) LED lights up	
3. Setting	1) Connect the unit to a suitable DC power supply. 2) Turn the power switch on after connecting a PC and FPU cable to the radio. 3) Start up the program for the adjustment.							



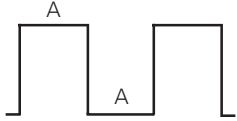
## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. RX PLL lock voltage	1) RX VCO A high CH : 11 <b>K</b> CH : 10 <b>K2,K3,E</b>	DVM	TX-RX (A/2)	RX-CV	RX VCO (A3)	TC350	1.50V	±0.1V
	2) RX VCO A low CH : 10 <b>K</b> CH : 1 <b>K2,K3,E</b>						Check	8V or less
	3) RX VCO B high CH : 3 <b>K,K2</b> CH : 11 <b>K3,E</b>				RX VCO (A3)	TC351	1.50V	±0.1V
	4) RX VCO B low CH : 5 <b>K</b> CH : 6 <b>K2,K3,E</b>						Check	8V or less
5. TX PLL lock voltage	1) TX VCO high CH : 3			TX-CV	TX VCO (A2)	TC350 <b>K,K2,E</b> TC351 <b>K3</b>	1.50V	±0.1V
	2) TX VCO low CH : 1						Check	8V or less
6. RX frequency	1) Connect the frequency counter to CN3, then measure the frequency CH : 2	f. counter		CN3			PC adj. Test CH-44.85MHz	50Hz or less
<p><b>Note :</b> RX frequency means the local frequency of the RX VCO. So its frequency is wanted frequency minus the IF frequency.</p>								
7. Setting	1) Remove 8 pin cable and the coaxial cable from CN16, and CN19 on TX-RX side.							
8. TX frequency	1) Connect the frequency counter to CN19, then measure the frequency CH : 2	f. counter	TX-RX (A/2)	CN19			PC adj.	50Hz or less
9. Setting	1) Insert 8 pin cable and the coaxial cable to CN16, and CN19 on TX-RX side.							
10. Maximum power limiting	1) Measure the RF power at TX ANT. High CH	Power meter	Rear	TX ANT	Final	VR1	Adjust the RF power to 43W.	±1W
11. TX RF high power	1) Measure the RF power at TX ANT. Low CH 2) Center CH 3) High CH						PC adj. 40W (Factory-default)	±1W
12. TX RF low power	1) Measure the power level at TX ANT. Low CH 2) Center CH 3) High CH						PC adj. 25W (Factory-default)	±1W
13. BPF	1) Connect the TG to RX ANT, then connect CN1 to the spectrum analyzer input. Spectrum analyzer setting Span : 50MHz Scale : 10dB to 5dB div Tracking generator setting Output : -30dBm	Tracking generator	Rear	RX ANT	TX-RX (A/2)	L2 L4 L5	Center the frequency you are using, then adjust it to look like the wave Fig. 1. (Page 39)	
		Spectrum analyzer	TX-RX (A/2)	CN1				

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
14. MCF (Wide)	1) Connect the TG to CN2, then connect CN4 to the spectrum analyzer input. CH : 2 (Wide) Spectrum analyzer setting Span : 50kHz to 25kHz Scale : 10dB to 2dB div Center freq' : 44.850MHz Tracking generator setting Output : -30dBm	Tracking generator	Rear	RX ANT	TX-RX (A/2)	L14 L17 L18	Adjust it to look like the wave Fig. 2. (Page 39)	
	(Narrow)	2) CH : 2 (Narrow)	Spectrum analyzer	TX-RX (A/2)				
15. Discriminator	1) Connect the SSG to RX ANT. CH : 2 (Wide) SSG output : -53dBm/501 $\mu$ V SSG MOD : 1kHz SSG DEV : 3kHz AF : 2V/4 $\Omega$	SSG AF VM Distortion meter	Rear	RX ANT TEST/SPKR jack SPO (pin 12)		L24	Adjust the distortion to minimum.	
16. Threshold squelch (Wide)	1) Connect SSG to RX ANT. CH : 2 (Wide) SSG output : 4dB below to 12dB SINAD level SSG MOD : 1kHz SSG DEV : 3kHz AF : 2V/4 $\Omega$	SSG Audio analyzer VTVM Oscilloscope	Rear	RX ANT TEST/SPKR jack SPO (pin 12)			PC adj. Adjust to point of closing squelch	
	2) SSG : OFF						Check	Squelch must be closed.
	(Narrow)	3) CH : 2 (Narrow) SSG output : 4dB below to 12dB SINAD level SSG MOD : 1kHz SSG DEV : 1.5kHz AF : 2V/4 $\Omega$	PC adj. Adjust to point of closing squelch					
	4) SSG : OFF	Check	Squelch must be closed.					
17. Tight squelch (Wide)	1) Connect SSG to RX ANT. CH : 2 (Wide) SSG output : 7dB over to 12dB SINAD level SSG MOD : 1kHz SSG DEV : 3kHz AF : 2V/4 $\Omega$						PC adj. Adjust to point of opening squelch	
	(Narrow)	2) CH : 2 (Narrow) SSG output : 7dB over to 12dB SINAD level SSG MOD : 1kHz SSG DEV : 1.5kHz AF : 2V/4 $\Omega$					PC adj. Adjust to point of opening squelch	

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
18. RD out level (Wide)	1) Connect SSG to RX ANT. CH : 2 (Wide) SSG output : -53dBm/501μV SSG MOD : 1kHz SSG DEV : 3.0kHz	SSG	Rear	RX ANT			PC adj. 80mV	±5mV
(Narrow)	2) CH : 2 (Narrow) SSG output : -53dBm/501μV SSG MOD : 1kHz SSG DEV : 1.5kHz	DVM		CONTROL I/O jack RD (pin 10) 4.7kΩ load				
19. RA out level (Wide)	1) Connect SSG to RX ANT. CH : 2 (Wide) SSG output : -53dBm/501μV SSG MOD : 1kHz SSG DEV : 3.0kHz	SSG	Rear	RX ANT			PC adj. 400mV	±20mV
(Narrow)	2) CH : 2 (Narrow) SSG output : -53dBm/501μV SSG MOD : 1kHz SSG DEV : 1.5kHz	DVM		CONTROL I/O jack RA (pin 11) 4.7kΩ load				
20. Maximum deviation (Wide)	1) Connect AG to the MIC terminal. Low CH (TX VCO low) Center CH (VCO center) High CH (TX VCO high) Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF AG : 1kHz/50mV (Terminal load) Transmission	MOD ANA or Deviation meter Oscilloscope	Rear	TX OUT			PC adj. 4.1kHz	±0.1kHz
(Narrow)	2) Low CH (TX VCO low) Center CH (VCO center) High CH (TX VCO high) Transmission	AG AF VTVM	Front	MIC			PC adj. 2.05kHz	
21. DQT balance (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF Transmission	MOD ANA or Deviation meter Oscilloscope	Rear	TX OUT			PC adj. Make the de-modulated waves into square waves.	Oscilloscope DC range flat "A" part 
(Narrow)	2) CH : 2 Transmission							
22. QT deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF Detector : p-p/2 Transmission			TX ANT			PC adj. 0.75kHz	±0.05kHz
(Narrow)	2) CH : 2 Transmission						PC adj. 0.35kHz	±0.05kHz

**Note :** After adjustment of the "Max. Deviation", be sure to check the "DQT balance".

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
23. DQT deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF Detector : Peak hold Transmission	MOD ANA or Deviation meter Oscilloscope	Rear	TX ANT			PC adj. 0.75kHz	±0.05kHz
	(Narrow)							2) CH : 2 Transmission
24. CW ID deviation (Wide)	1) CH2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission						PC adj. 2kHz	±0.1kHz
	(Narrow)							2) CH : 2 Transmission
25. Test tone deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission						PC adj. 3kHz	±0.1kHz
	(Narrow)							2) CH : 2 Transmission
26. TA (TX audio input) deviation (Wide)	1) Insert AG output into the control I/O TA terminal (pin 9). CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF AG freq' : 1kHz (Sine wave) AG level : 280mV Transmission	MOD ANA or Deviation meter Oscilloscope  AG AF VTVM	Rear	TX ANT  CONTROL I/O jack TA (pin 9)			PC adj. 3.0kHz	±0.1kHz
	(Narrow)							2) CH : 2 Transmission
27. TD deviation (Wide)	1) Insert AG output into the control I/O TD terminal (pin 8). CH : 2 Deviation meter filter HPF : OFF LPF : 3kHz De-emphasis : OFF AG freq' : 100Hz (Sine wave) AG level : 0.5Vp-p (177mVrms) Transmission			CONTROL I/O jack TD (pin 8)			PC adj. 0.75kHz	±0.1kHz
	(Narrow)							2) CH : 2 Transmission

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
28. DTMF deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission	MOD ANA or Deviation meter Oscilloscope	Rear	TX ANT			PC adj. 3.0kHz	±0.1kHz
	(Narrow)							
29. Courtesy tone deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission						PC adj. 1.0kHz	±0.05kHz
	(Narrow)							
30. Battery warning tone deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission						PC adj. 3.0kHz	±0.1kHz
	(Narrow)							
31. Battery operation tone deviation (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission						PC adj. 1.0kHz	±0.05kHz
	(Narrow)							
32. 5-tone deviation (E type only) (Wide)	1) CH : 2 Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission						PC adj. 3.0kHz	±0.1kHz
	(Narrow)							
33. Repeat gain level (Wide)	1) CH : 2 SSG output : -53dBm SSG MOD : 1kHz SSG DEV : 1kHz Deviation meter filter HPF : OFF LPF : 15kHz De-emphasis : OFF Transmission	SSG  MOD ANA or Deviation meter Oscilloscope	Rear	RX ANT			PC adj. 1kHz	±0.1kHz
	(Narrow)			2) CH : 2 Transmission				

When "RF Power Down Detect" is programmed in the AUXO function, threshold of transmission output is set with the following menu.

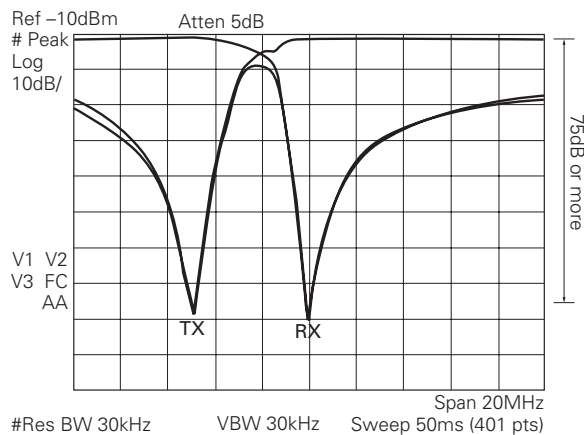
## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
34. Power down detect (High)	1) CH : 2 (High power)	Power meter	Rear	TX ANT			PC adj. About 16W (Factory-default)	
	(Low)						2) CH : 2 (Low power)	

### Confirmation and Alignment of Set-up to Prevent Receiver Desensitization

#### 1. Confirmation of Duplexer alignment

The duplexer allows the Repeater to simultaneously transmit and receive. To accomplish this, in the programmed receive frequency, the transmit frequency must be notched or suppressed by 75dB or more. Additionally, on the programmed transmit frequency, the receive frequency must be notched or suppressed by 75dB or more. The following figures are examples of Duplexer alignment using a spectrum analyzer.

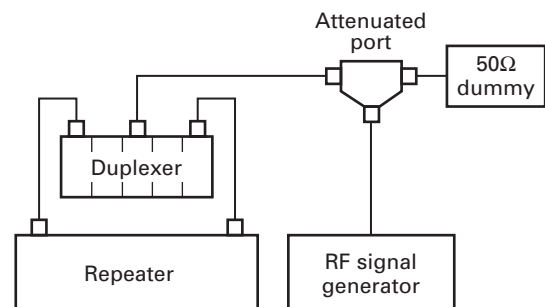


#### 2. Confirmation of Repeater Desensitization

The following figure is a Test set-up for Repeater Desensitization.

After this Test set-up is completed, confirm the Repeater Desensitization as mentioned below.

- 1) Disable the repeater mode.
- 2) Adjust the level of the RF generator until 12dB SINAD is reached.
- 3) Increase the output of the RF generator by 1dB. (This increases the SINAD.)
- 4) Enable the repeater mode.
- 5) Read the SINAD level. It should not drop below 12dB SINAD. If the SINAD is less than 12dB, check the tightness of the connectors and the tuning of duplexer.



## TERMINAL FUNCTION

### Final Unit (X45-374X-XX)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN1		DRV	I	TX driver input signal (Coaxial)
CN3 To X57 (A/2) TX-RX unit	1	TMP	O	High temperature detector signal output for fan action
	2	BUP	O	Main DC/BACKUP status output
	3	PDT	O	RF power down signal output
	4	FAS	I	Fan control signal input
	5	PC	I	TX power control signal input
	6	8T	I	8V input during transmission
	7	NC	-	Reserved
	8	GND	-	Ground
CN4		FAB	O	Power supply output for cooling fan
		FAG	O	Fan ground
CN5	1	E	-	Ground
	2	B	O	Power supply output
	3	B	O	Power supply output
CN6	1	Main DC	I	Power supply input (from Main DC terminal)
CN7	1	BACKUP	I	Power supply input (from BACKUP terminal)
CN8	1	GND	-	Ground

### Display Unit (X54-3330-21) (A/2)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN501 To X54 (B/2) display unit	1	HK	I	Hook detection input/RXD input
	2	MIC	I	MIC signal input
	3	MIG	-	MIC ground
	4	PTT	I/O	PTT input/TXD output
	5	GND	-	Ground
	6	NC	-	No connection
	7	SB	O	Power supply output after power switch
	8	NC	-	No connection
	9	GND	-	Ground
	10	5M	O	Common 5V output
	11	VLI	I	Volume control input for AF signal
CN502 To X57 (B/2) TX-RX control section	1	MIG	-	MIC ground
	2	MIC	O	MIC signal output
	3	VLI	O	Volume control output for AF signal
	4	5C	I	Common 5V input
	5	K4	I	KEY input 4
	6	K5	I	KEY input 5
	7	K2	O	KEY output 2
	8	K3	O	KEY output 3
	9	K1	O	KEY output 1
	10	HK/RXD	O	Hook detection output/RXD output
	11	SOE	I	Output enable for shift register
	12	PTT/TXD	I/O	PTT output/TXD input

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	13	STB1	I	Strobe data for shift register
	14	CLK	I	Clock data input
	15	DAT	I	Serial data input
	16	PSW	O	Power switch output
	17	GND	-	Ground
	18	NC	-	No connection
	19	SB	I	Power supply input after power switch
	20	SB	I	Power supply input after power switch

### Display Unit (X54-3330-21) (B/2)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN601 To X54 (A/2) display unit	1	VLI	O	Volume control output for AF signal
	2	5M	I	Common 5V input
	3	GND	-	Ground
	4	NC	-	No connection
	5	SB	I	Power supply input after power switch
	6	NC	-	No connection
	7	GND	-	Ground
	8	PTT	I/O	PTT output/TXD input
	9	MIG	-	MIC ground
	10	MIC	O	MIC signal output
	11	HK	O	Hook detection output/RXD output
J601 (Mic jack)	1	NC	-	No connection
	2	SB	O	Power supply output after power switch
	3	GND	-	Ground
	4	PTT/TXD	I/O	PTT input/TXD output
	5	MIG	-	MIC ground
	6	MIC	I	MIC signal input
	7	HK/RXD	I	Hook detection input/RXD input
	8	NC	-	No connection

### TX-RX Unit (X57-696X-XX) (A/2) : TX-RX Section

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN1	-	-	O	Use for RX helical BPF tuning (Coaxial)
CN2	-	-	I	Use for RX MCF tuning
CN3	-	-	O	Use for RX frequency adjustment (Coaxial)
CN4	-	-	O	Use for RX MCF tuning
CN14 To X57 (B/2) control section of TX-RX unit	1	NC	-	No connection
	2	DET	O	Detection signal output
	3	NC	-	No connection
	4	GND	-	Ground
	5	ASQ	O	Squelch signal output
	6	RSSI	O	RSSI signal output
	7	SC	O	Squelch control signal output
	8	DP	I	Data input for PLL
	9	CP	I	Clock input for PLL



## TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	10	EPR	I	Enable input for RX PLL
	11	EPT	I	Enable input for TX PLL
	12	LDR	O	Lock detector for RX PLL
	13	LDT	O	Lock detector for TX PLL
	14	DT	I	Data input
	15	CK	I	Clock input
	16	STB	I	Strobe input for shift register
	17	FWD	O	RF power down signal output
	18	LD2	I	Latch data input for DA converter
	19	BUP	O	Backup signal output
	20	PSW	I	Power switch input
	21	TMP	O	High temperature detector signal output for fan action
	22	SOE	I	Output enable for shift register
	23	GND	-	Ground
	24	MB	I	Modulation signal input for VCXO
	25	MO	I	Modulation signal input for VCO
	26	GND	-	Ground
	27	GND	-	Ground
	28	QS	I	Data
	29	NC	-	No connection
	30	SB	O	Power supply output after power switch
	31	SB	O	Power supply output after power switch
	32	SB	O	Power supply output after power switch
	33	SB	O	Power supply output after power switch
	34	NC	-	No connection
	35	8C	O	Common 8V output
	36	8C	O	Common 8V output
CN15	1	E	-	Earth
	2	B	I	Power supply input
	3	B	I	Power supply input
CN16	1	GND	-	Ground
	2	NC	-	No connection
To X45 final unit	3	8T	O	8V output during transmission
	4	PC	O	TX power control signal output
	5	FAS	O	Fan control signal output
	6	PDT	I	RF power down signal input
	7	BUP	I	Main DC/BACKUP status input
	8	TMP	I	High temperature detector signal input for fan action
CN18	1	RX IN	I	Receive signal input (Coaxial)
CN19	1	DO	O	Transmission signal output (Coaxial)
	4	NC	-	No Connection
display unit	5	DAT	O	Serial data output
	6	PSW	I	Power switch input
	7	STB1	O	Strobe data for shift register
	8	CLK	O	Clock data output
	9	SOE	O	Output enable for shift register
	10	TXD1	I/O	PTT input/TXD output
	11	K1	I	KEY input 1
	12	RXD1	I	Hook detection input/RXD input
	13	K2	I	KEY input 2
	14	K3	I	KEY input 3
	15	K4	O	KEY output 4
	16	K5	O	KEY output 5
	17	VLI	I	Volume control input for AF signal.
	18	5C	O	Common 5V output
	19	MIG	-	Mic ground
	20	MIC	I	MIC signal input
CN601	1	TXO	O	MIC signal output to the board
	2	TXI	I	MIC signal input from the board
To optional board	3	RXO	O	RX audio signal output to the board
	4	AC	O	Audio control signal output
	5	BC1	O	Scramble code output.
	6	BC2	O	Scramble code output.
	7	BC3	O	Scramble code output.
	8	BC4	O	Scramble code output.
	9	PTI	I	PTT signal input
	10	CLRC	O	Clear code for scramble
	11	RXI	I	RX audio signal input from the board
	12	PTO	O	PTT signal output
	13	NC	O	No connection
	14	GND	-	Ground
CN602	1	8C	I	Common 8V input
	2	8C	I	Common 8V input
To X57 (A/2) TX-RX unit	3	NC	-	No connection
	4	SB	I	Power supply input after power switch
	5	SB	I	Power supply input after power switch
	6	SB	I	Power supply input after power switch
	7	SB	I	Power supply input after power switch
	8	NC	-	No connection
	9	QS	O	Data
	10	GND	-	Ground
	11	GND	-	Ground
	12	MO	O	Modulation signal output for VCO
	13	MB	O	Modulation signal output for VCXO
	14	GND	-	Ground
	15	SOE	O	Output enable for shift register
	16	TMP	I	High temperature detector signal input
	17	PSW	O	Power switch output
	18	BUP	I	Backup signal input

### TX-RX Unit (X57-696X-XX) (B/2) : Control Section

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN600	1	SB	O	Power supply output after power switch
To X54 (B/2)	2	SB	O	Power supply output after power switch
	3	GND	-	Ground

## TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	19	LD2	O	Latch data output for DA converter
	20	FWD	I	RF power down signal input
	21	STB	O	Strobe output for shift register
	22	CK	O	Clock output
	23	DT	O	Data output
	24	LDT	I	Lock detector for TX PLL
	25	LDR	I	Lock detector for RX PLL
	26	EPT	O	Enable output for TX PLL
	27	EPR	O	Enable output for RX PLL
	28	CP	O	Clock output for PLL
	29	DP	O	Data output for PLL
	30	SC	I	Squelch control signal input
	31	RSSI	I	RSSI signal input
	32	ASQ	I	Squelch signal input
	33	GND	-	Ground
	34	NC	-	No connection
	35	DET	I	Detection signal input
	36	NC	-	No connection
CN603 To ACC 15 pin connector	1	SB	O	Power supply output after power switch
	2	SB	O	Power supply output after power switch
	3	GND	-	Ground
	4	GND	-	Ground
CN604 To ACC 15 pin connector	1	AO5	O	Auxiliary output 5 (FPU selectable)
	2	AO4	O	Auxiliary output 4 (FPU selectable)
	3	AO3	O	Auxiliary output 3 (FPU selectable)
	4	SPO	O	External speaker output
	5	SPO	O	External speaker output
	6	AO2	O	Auxiliary output 2 (FPU selectable)
	7	AO1	O	Auxiliary output 1 (FPU selectable)
	8	SPI	I	Internal speaker input
	9	RSSI	O	RSSI signal output
	10	RD	O	RX data output
	11	SPG	-	External speaker ground
	12	SPG	-	External speaker ground
CN605	1	SPO	O	Internal speaker AF output
	2	SPG	-	Internal speaker ground
CN606 To ACC 25 pin D-sub connector	1	NC	-	No connection
	2	NC	-	No connection
	3	SPM	I	Speaker mute signal input
	4	IO6	I/O	Programable I/O 6
	5	RXG	-	RX signal ground
	6	IO5	I/O	Programable I/O 5
	7	RA	O	RX audio output (voice)
	8	IO4	I/O	Programable I/O 4
	9	RD	O	RX data output (voice & data)
	10	IO3	I/O	Programable I/O 3
	11	TA	I	TX audio input (voice)
	12	IO2	I/O	Programable I/O 2
	13	TD	I	TX data input (data or signaling)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	14	IO1	I/O	Programable I/O 1
	15	DG	-	Control line ground
	16	TXG	-	TX signal ground
	17	AI3	I	Auxiliary input 3 (FPU selectable)
	18	NC	-	No connection
	19	AI2	I	Auxiliary input 2 (FPU selectable)
	20	SC	O	Squelch control output
	21	AI1	I	Auxiliary input 1 (FPU selectable)
	22	EPTT	I	External press-to-talk switch input
	23	TXD2	O	RS-232C output signal (for FPU)
	24	EMON	I	External monitor switch input
	25	RXD2	I	RS-232C input signal (for FPU)
	26	NC	-	No connection
	27	NC	-	No connection
	28	NC	-	No connection
	29	NC	-	No connection
	30	NC	-	No connection

### RX VCO Unit (X58-480X-XX)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN300	1	FIN	I	Prescaler RF signal input
	2	5C	I	Common 5V input
	3	LDR	O	Lock detector for RX PLL
	4	EPR	I	Enable input for RX PLL
	5	DP	I	Data input for PLL
	6	CP	I	Clock input for PLL
	7	REF	I	Reference frequency signal input
CN350	1	GND	-	Ground
	2	SRR	I	Switching signal input for RX VCO
	3	8CL	I	8V input through the ripple filter
	4	CV	I	RX PLL lock voltage
	5	9CL	I	9V input through the ripple filter
	6	NC	-	No connection
CN351	1	VO	O	RX VCO output
	2	GND	-	Ground

### TX VCO Unit (X58-481X-XX)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
CN300	1	FIN	I	Prescaler RF signal input
	2	5C	I	Common 5V input
	3	LDT	O	Lock detector for TX PLL
	4	EPT	I	Enable input for TX PLL
	5	DP	I	Data input for PLL
	6	CP	I	Clock input for PLL
	7	REF	I	Reference frequency signal input
CN350	1	GND	-	Ground
	2	STT	I	Switching signal input for TX VCO

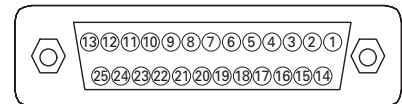
## TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	3	8CL	I	8V input through the ripple filter
	4	CV	I	RX PLL lock voltage
	5	9CL	I	9V input through the ripple filter
	6	MO	I	Modulation signal input
CN351	1	VO	O	TX VCO output
	2	GND	-	Ground

### ACC 25 pin D-sub Connector

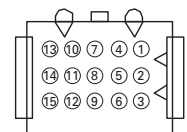
Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	1	NC	-	No connection
	2	RXD2	I	Serial data to radio
	3	TXD2	O	Serial data from radio
	4	AI1	I	Programmable function input 1
	5	AI2	I	Programmable function input 2
	6	AI3	I	Programmable function input 3
	7	DG	-	Control line ground
	8	TD	I	TX data input (data or signalling) Input impedance: 600Ω Coupling: AC coupling Deviation: 0.75kHz (wide)/ 0.35kHz (Narrow) (100Hz 0.5Vp-p input)
	9	TA	I	TX audio input (voice) Input impedance: 600Ω Coupling: AC coupling Frequency response: Pre-emphasis curve Deviation: 60% deviation (1kHz 280mVrms ±25mV input)
	10	RD	O	RX data output (voice & data) Output impedance: 1kΩ or less Coupling: AC coupling Non-squelched Frequency response: ±2.5dB at 10~3000Hz Output level: 70~90mVrms (standard modulation)
	11	RA	O	RX audio output (voice) Output impedance: 1kΩ or less Coupling: AC coupling Squelched Frequency response: De-emphasis curve Output level: 360~440mVrms (standard modulation)
	12	RXG	-	RX signal ground (for RA, RD ground only)

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	13	SPM	I	Speaker mute signal input "L": Mute on
	14	NC	-	No connection
	15	EMON	I	External monitor switch input "L": Monitor on, "H": Monitor off
	16	EPTT	I	External press-to-talk switch input "L": PTT on, "H": PTT off
	17	SC	O	Squelch control output "L": Busy, "H": Not busy
	18	NC	-	No connection
	19	TXG	-	TX signal ground (for TA, TD ground only)
	20	AIO1	I/O	Programmable function input/output 1
	21	AIO2	I/O	Programmable function input/output 2
	22	AIO3	I/O	Programmable function input/output 3
	23	AIO4	I/O	Programmable function input/output 4
	24	AIO5	I/O	Programmable function input/output 5
	25	AIO6	I/O	Programmable function input/output 6



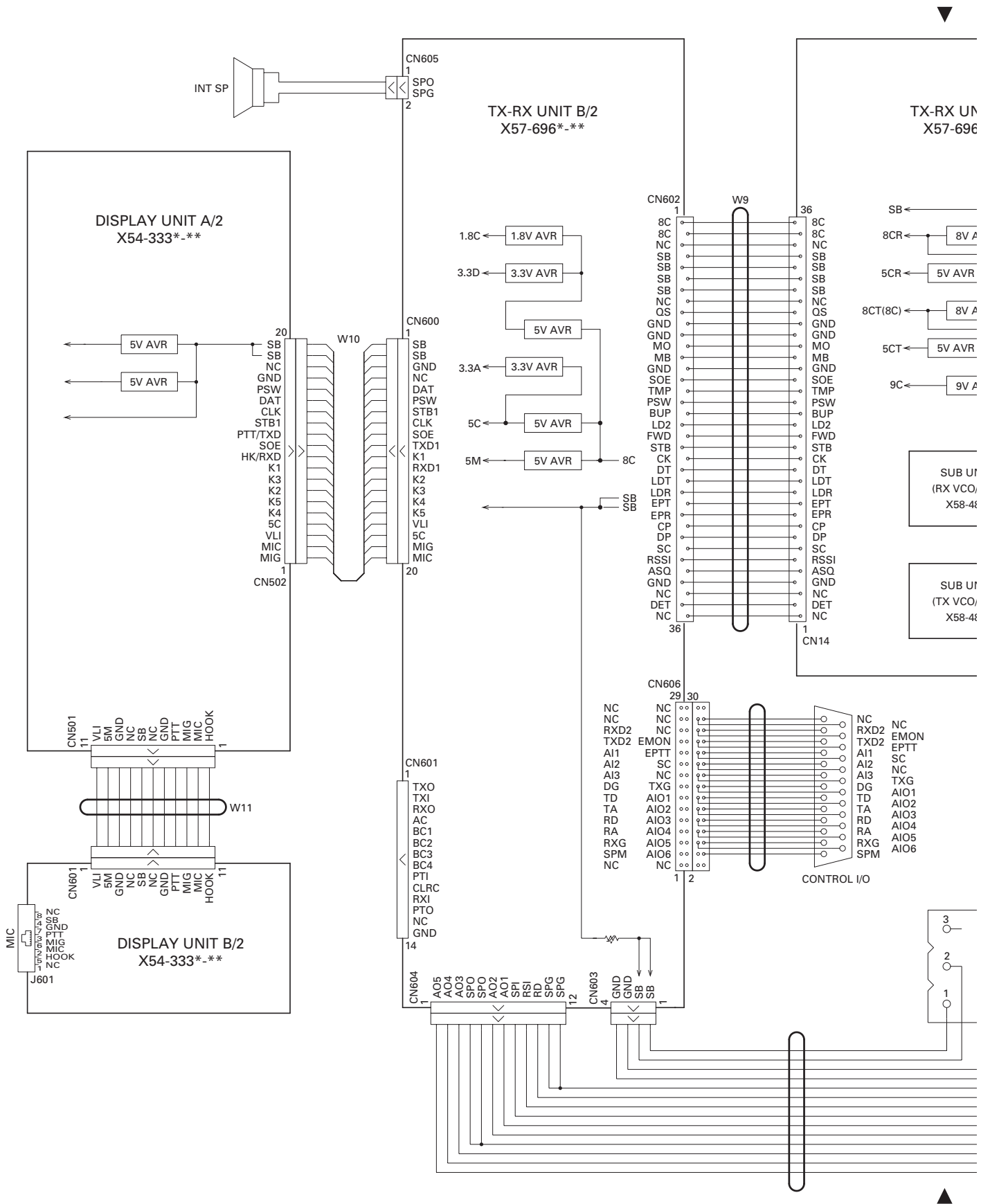
### ACC 15 pin Connector

Connector No.	Terminal No.	Terminal Name	I/O	Terminal function
	1	SB	O	Power supply output after power switch; 1A maximum
	2	SB	O	Power supply output after power switch; 1A maximum
	3	NC	-	No connection
	4	GND	-	Ground
	5	GND	-	Ground
	6	SPG	-	Speaker ground
	7	RD	O	RX data output (Equal to D-sub connector terminal No. 10.)
	8	RSSI	O	RSSI output (Analog signal output)
	9	SPI	I	Internal speaker input
	10	AO1	O	Auxiliary output 1 Open collector. Low : 150mA max.
	11	AO2	O	Auxiliary output 2 Open collector. Low : 150mA max.
	12	SPO	O	External speaker output
	13	AO3	O	Auxiliary output 3
	14	AO4	O	Auxiliary output 4
	15	AO5	O	Auxiliary output 5

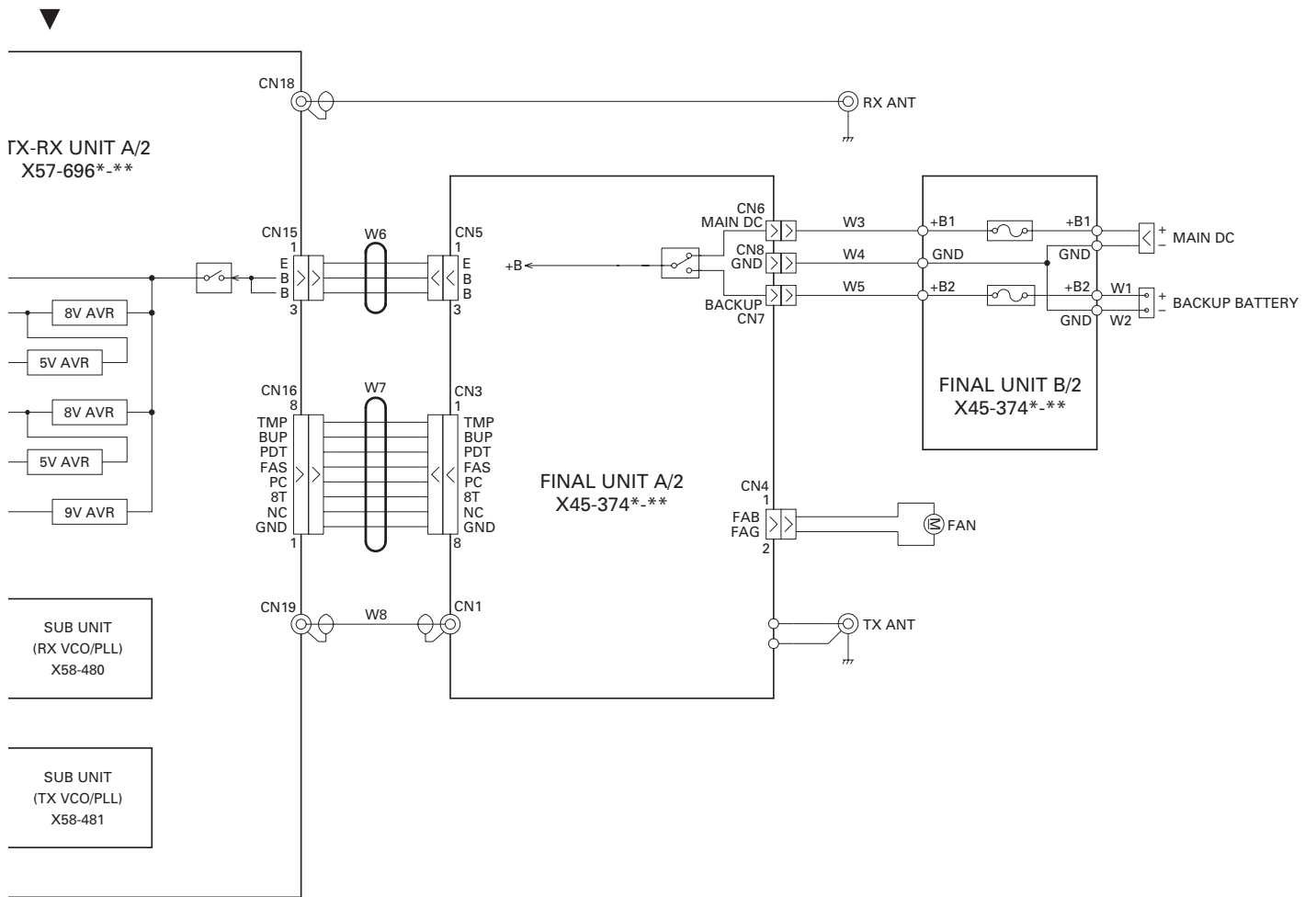


# TKR-850

## INTERCONNECTION DIAGRAM

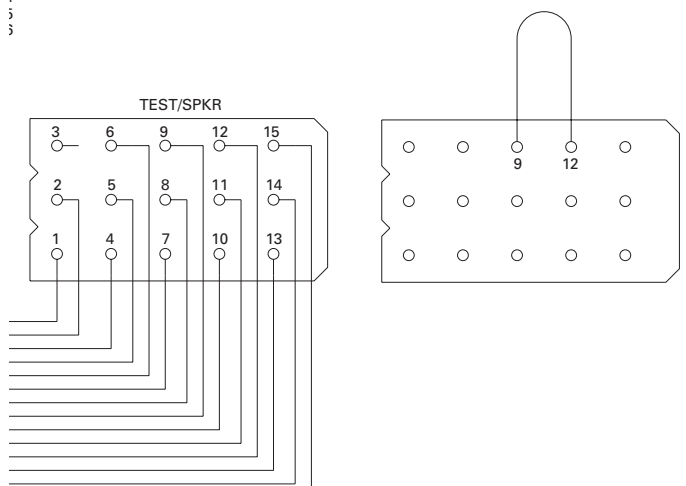


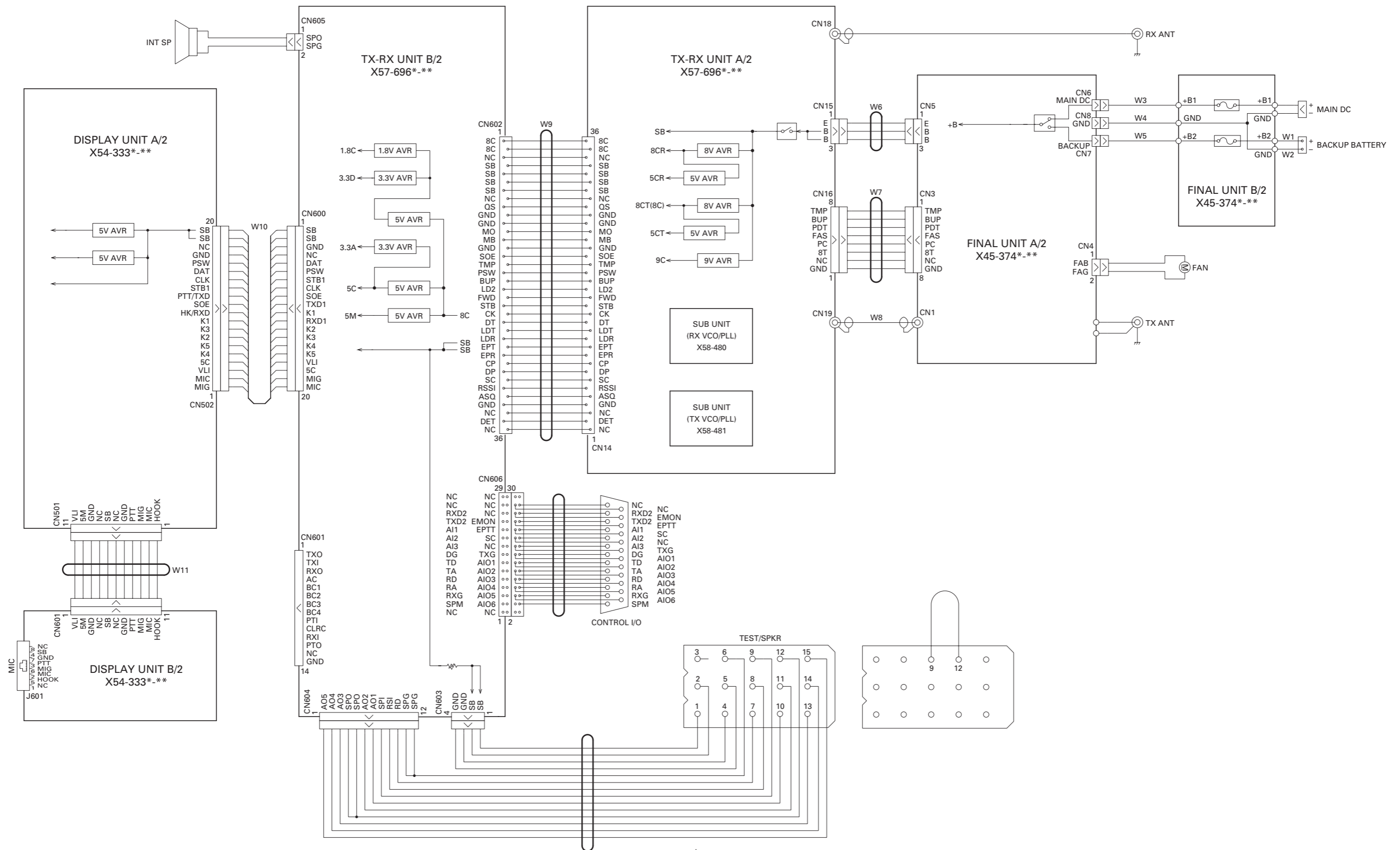
## INTERCONNECTION DIAGRAM



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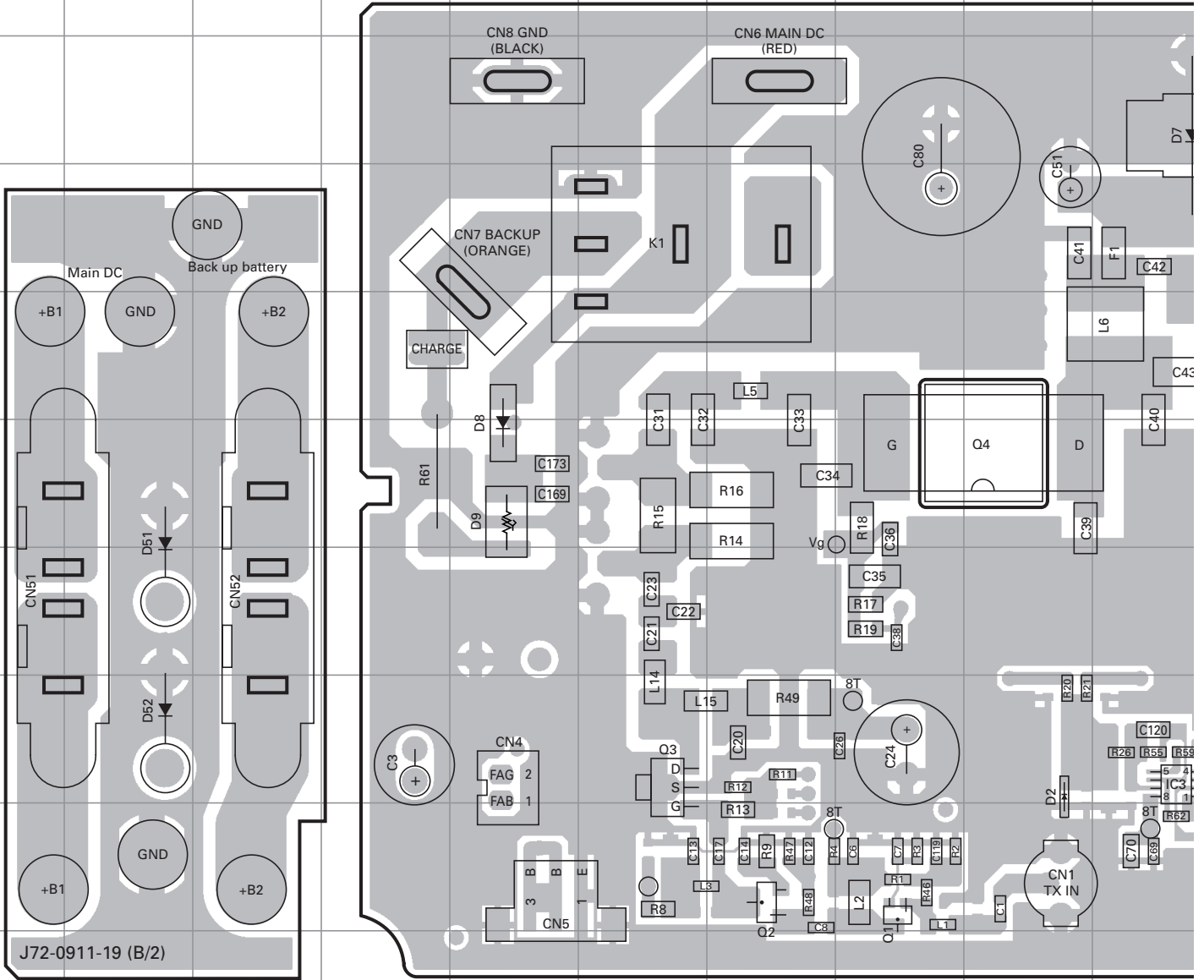
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- 2
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- 5





# TKR-850 PC BOARD

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
 Component side view (J72-0911-19)

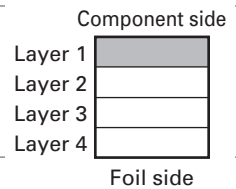
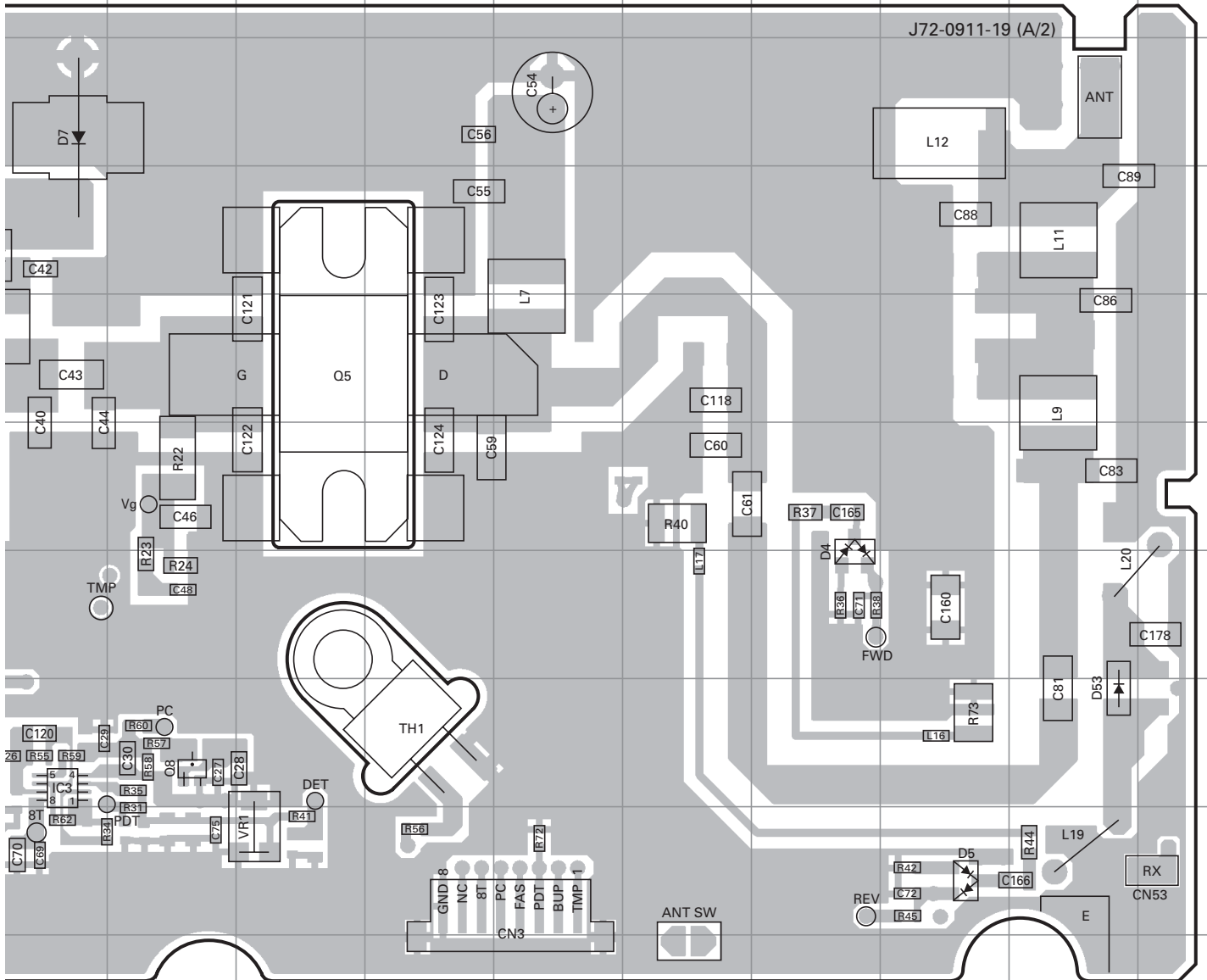


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC3	8J	Q4	6I	D4	7P	D9	6E
Q1	9H	Q5	5L	D5	9Q	D51	7B
Q2	9G	Q8	8K	D7	3J	D52	8B
Q3	8F	D2	8I	D8	6E	D53	8R



# PC BOARD TKR-850

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
 Component side view (J72-0911-19)

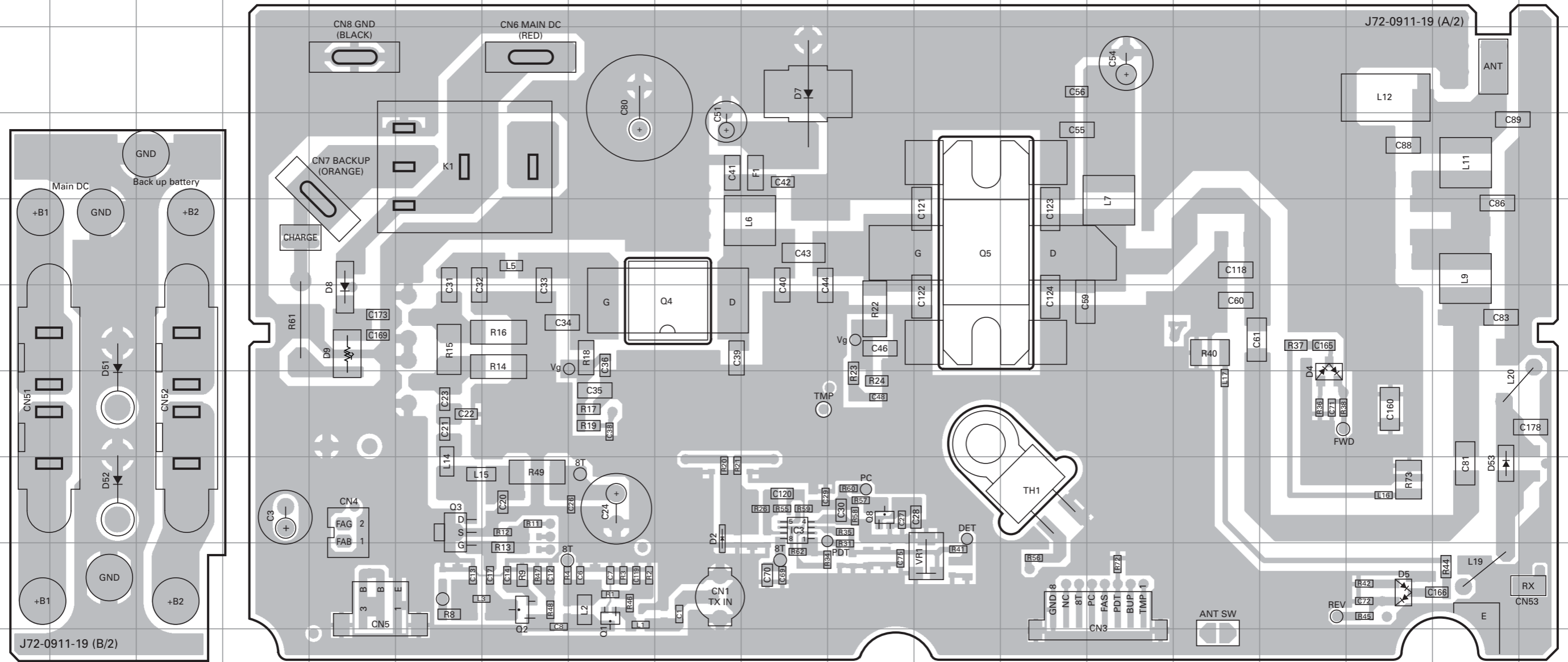


# TKR-850 PC BOARD

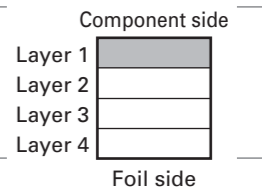
# PC BOARD TKR-850

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
Component side view (J72-0911-19)

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
Component side view (J72-0911-19)

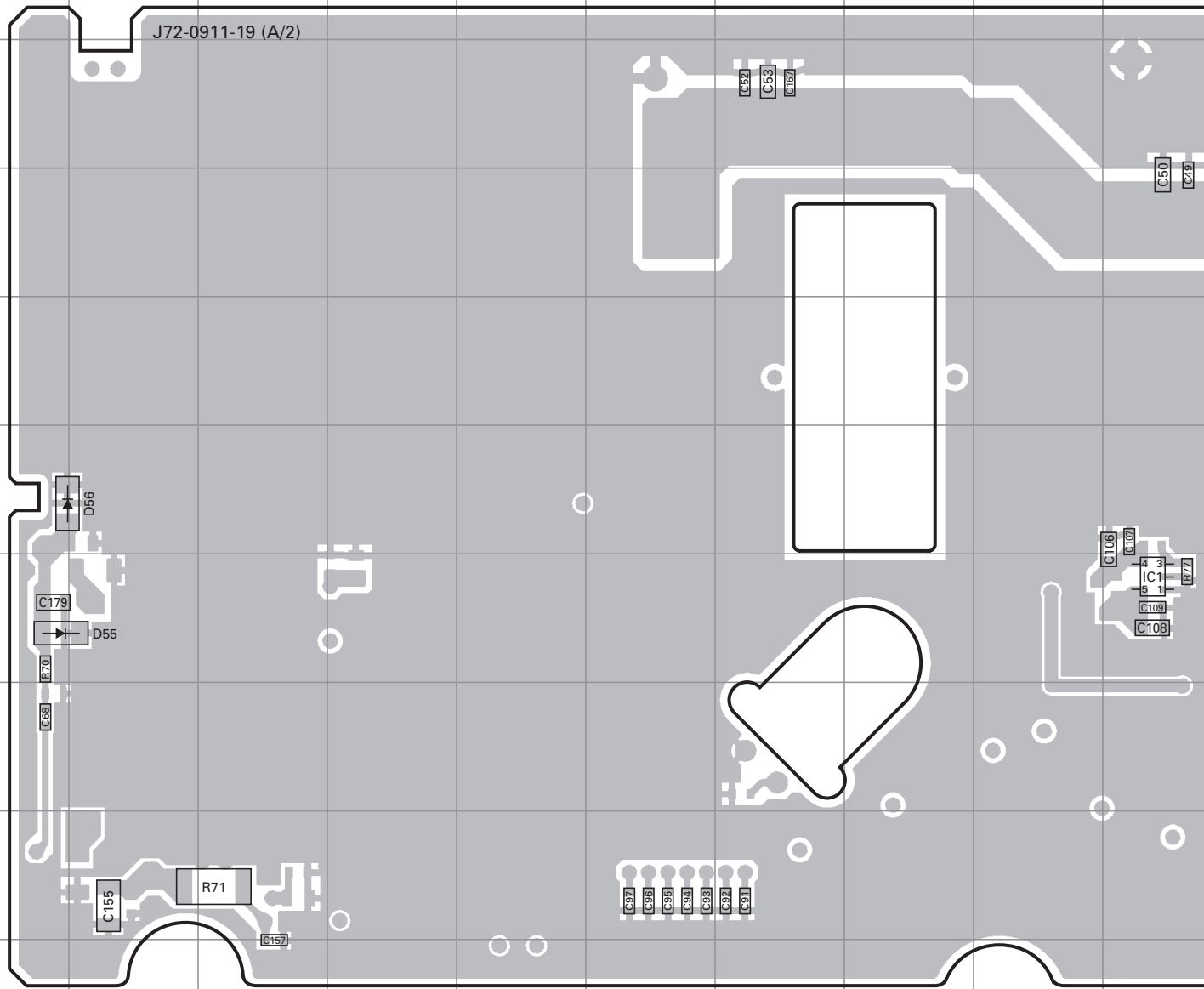


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC3	8J	Q4	6I	D4	7P	D9	6E
Q1	9H	Q5	5L	D5	9Q	D51	7B
Q2	9G	Q8	8K	D7	3J	D52	8B
Q3	8F	D2	8I	D8	6E	D53	8R



# TKR-850 PC BOARD

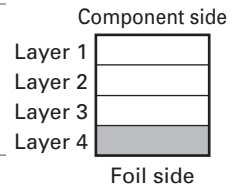
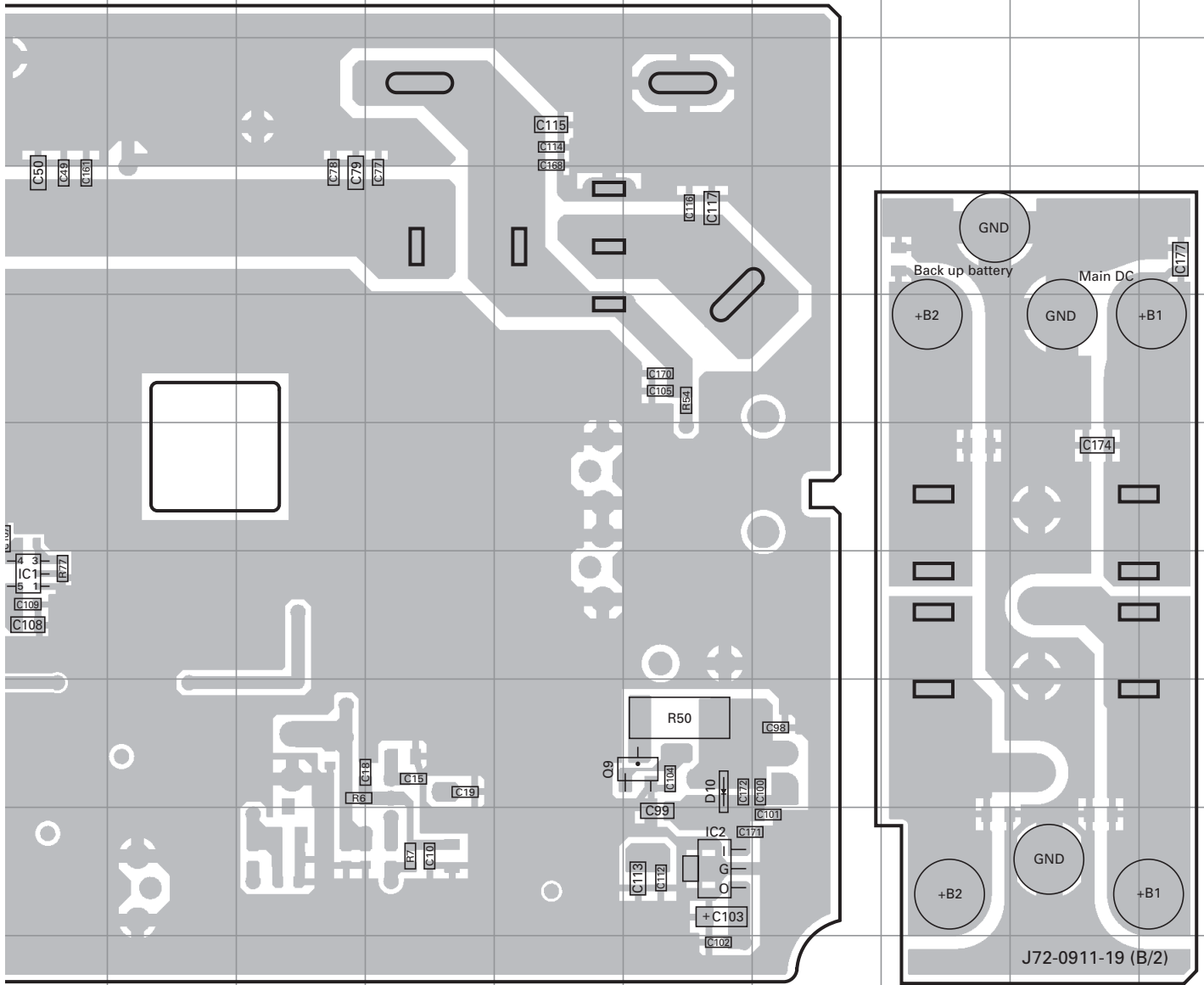
FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
 Foil side view (J72-0911-19)



Ref. No.	Address	Ref. No.	Address
IC1	7J	D55	6A
IC2	9O	D56	7A
Q9	8O		
D10	8O		

# PC BOARD TKR-850

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
Foil side view (J72-0911-19)

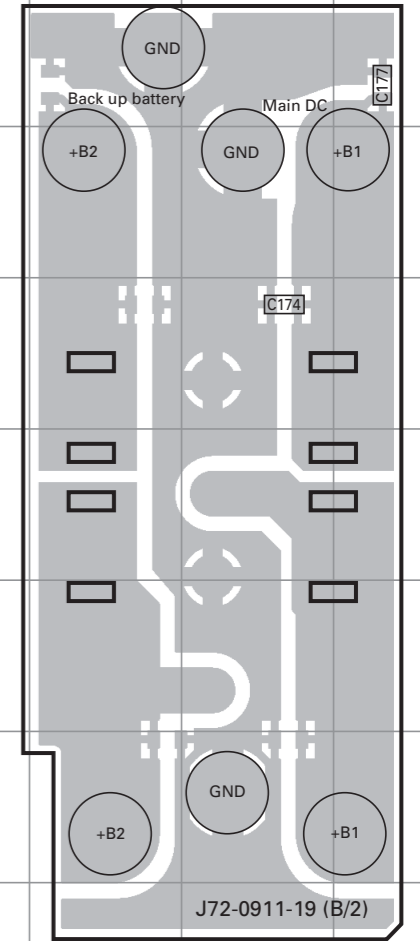
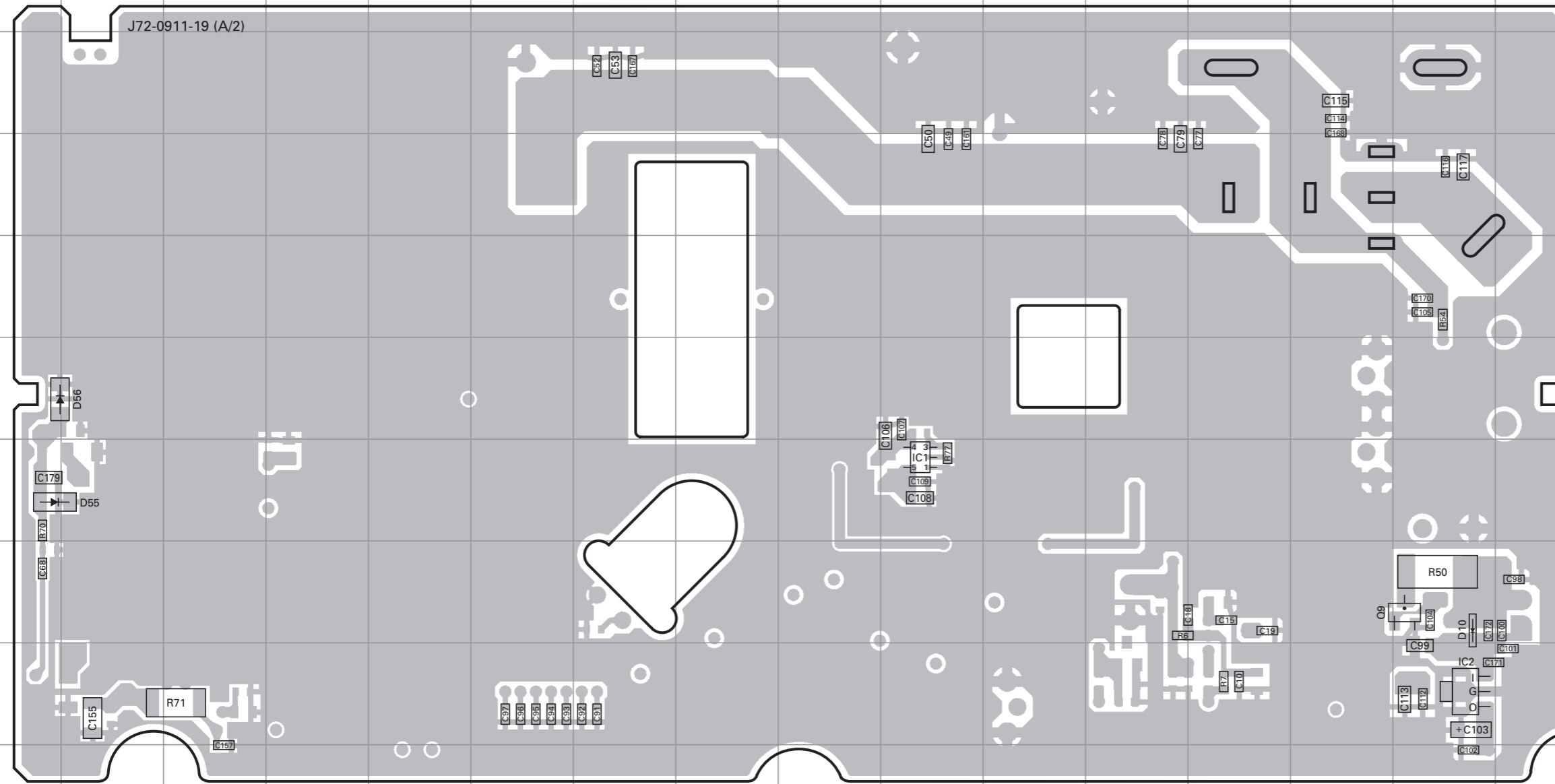


# TKR-850 PC BOARD

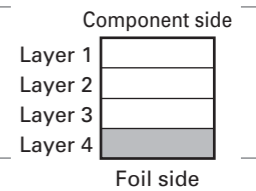
# PC BOARD TKR-850

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
Foil side view (J72-0911-19)

FINAL UNIT (X45-374X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3  
Foil side view (J72-0911-19)

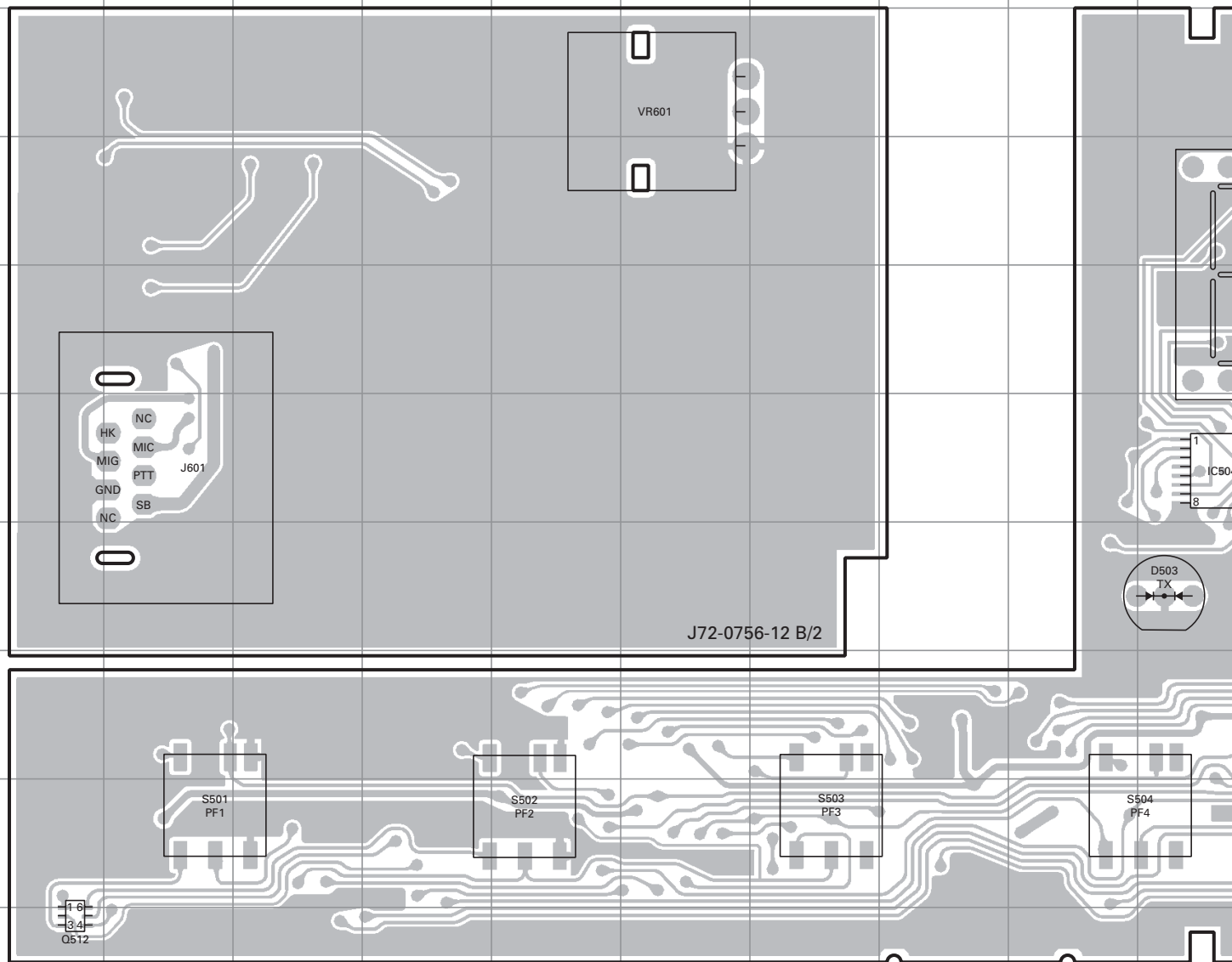


Ref. No.	Address	Ref. No.	Address
IC1	7J	D55	6A
IC2	9O	D56	7A
Q9	8O		
D10	8O		



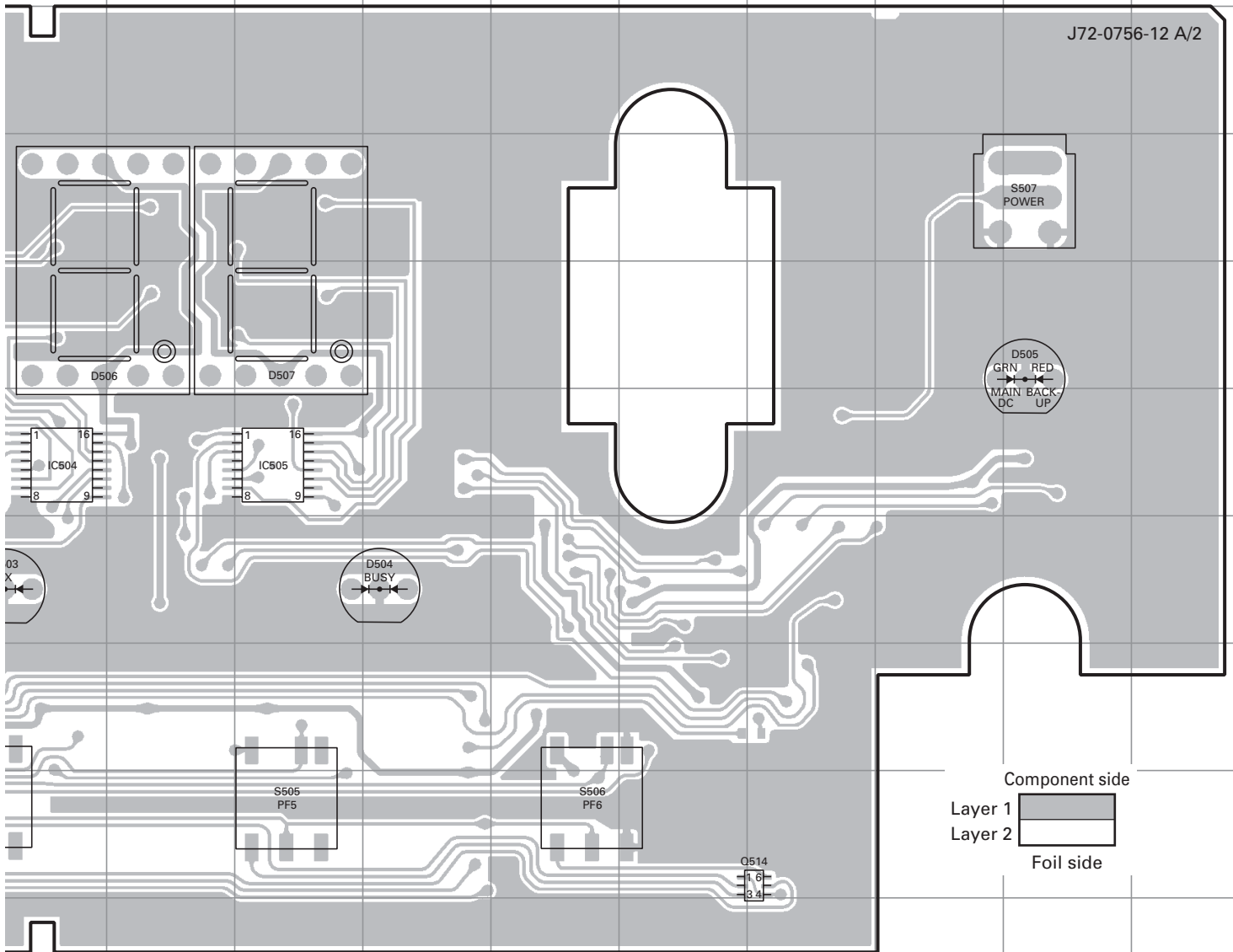
# TKR-850 PC BOARD

## DISPLAY UNIT (X54-3330-21) Component side view (J72-0756-12)



# PC BOARD TKR-850

## DISPLAY UNIT (X54-3330-21) Component side view (J72-0756-12)



Ref. No.	Address
IC504	6J
IC505	6L
Q512	10A
Q514	9P
D503	7J
D504	7M
D505	5R
D506	5J
D507	5L

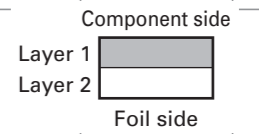
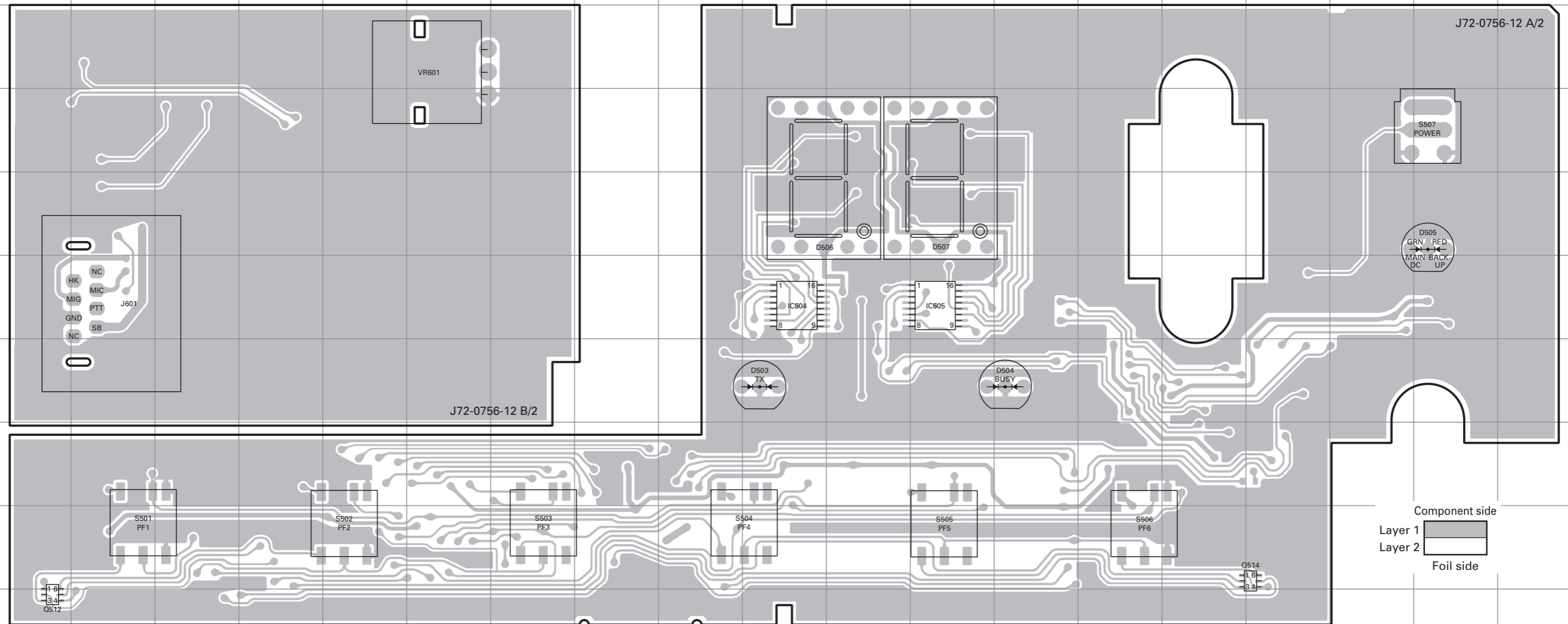


# TKR-850 PC BOARD

# PC BOARD TKR-850

DISPLAY UNIT (X54-3330-21) Component side view (J72-0756-12)

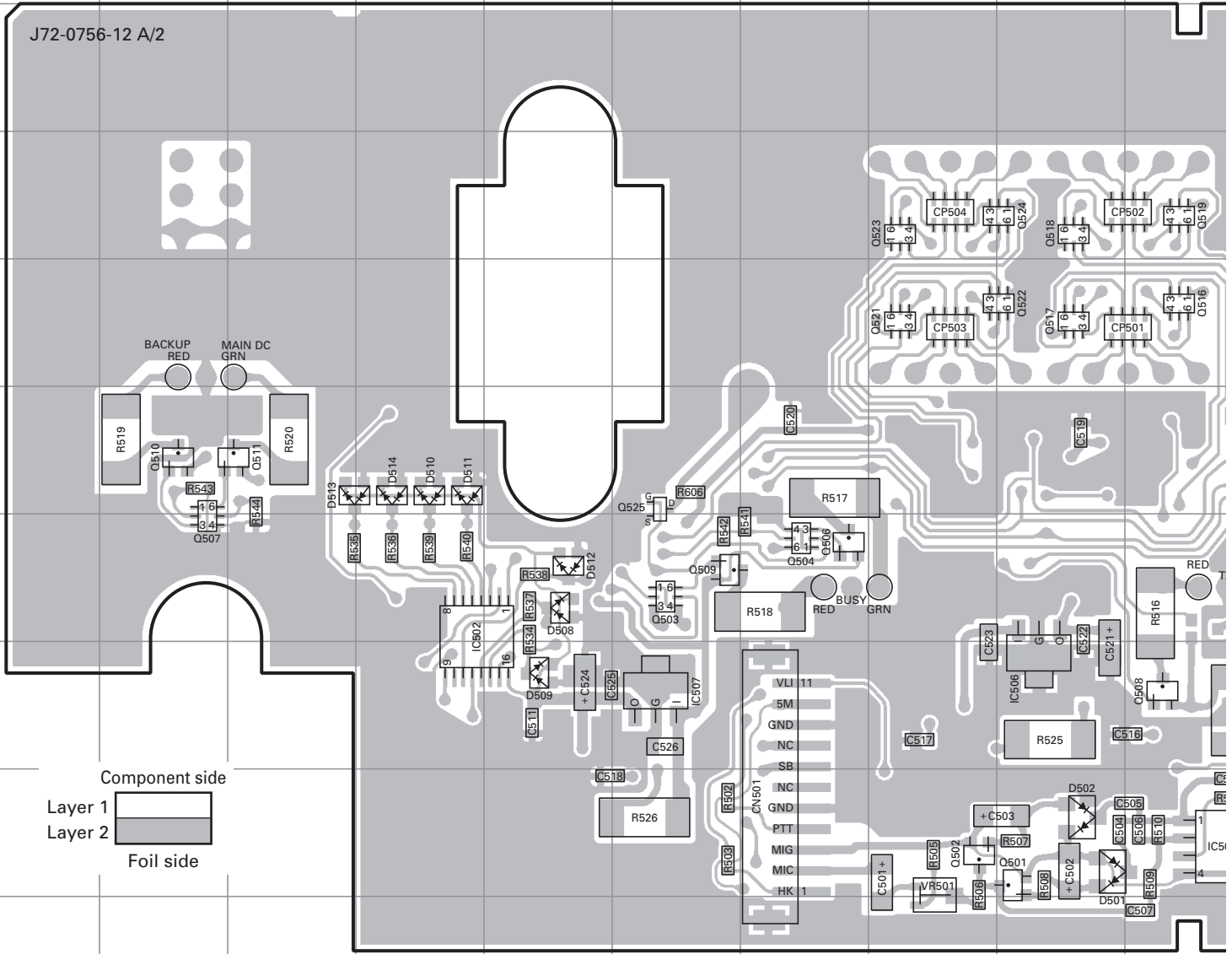
DISPLAY UNIT (X54-3330-21) Component side view (J72-0756-12)



Ref. No.	Address
IC504	6J
IC505	6L
Q512	10A
Q514	9P
D503	7J
D504	7M
D505	5R
D506	5J
D507	5L

# TKR-850 PC BOARD

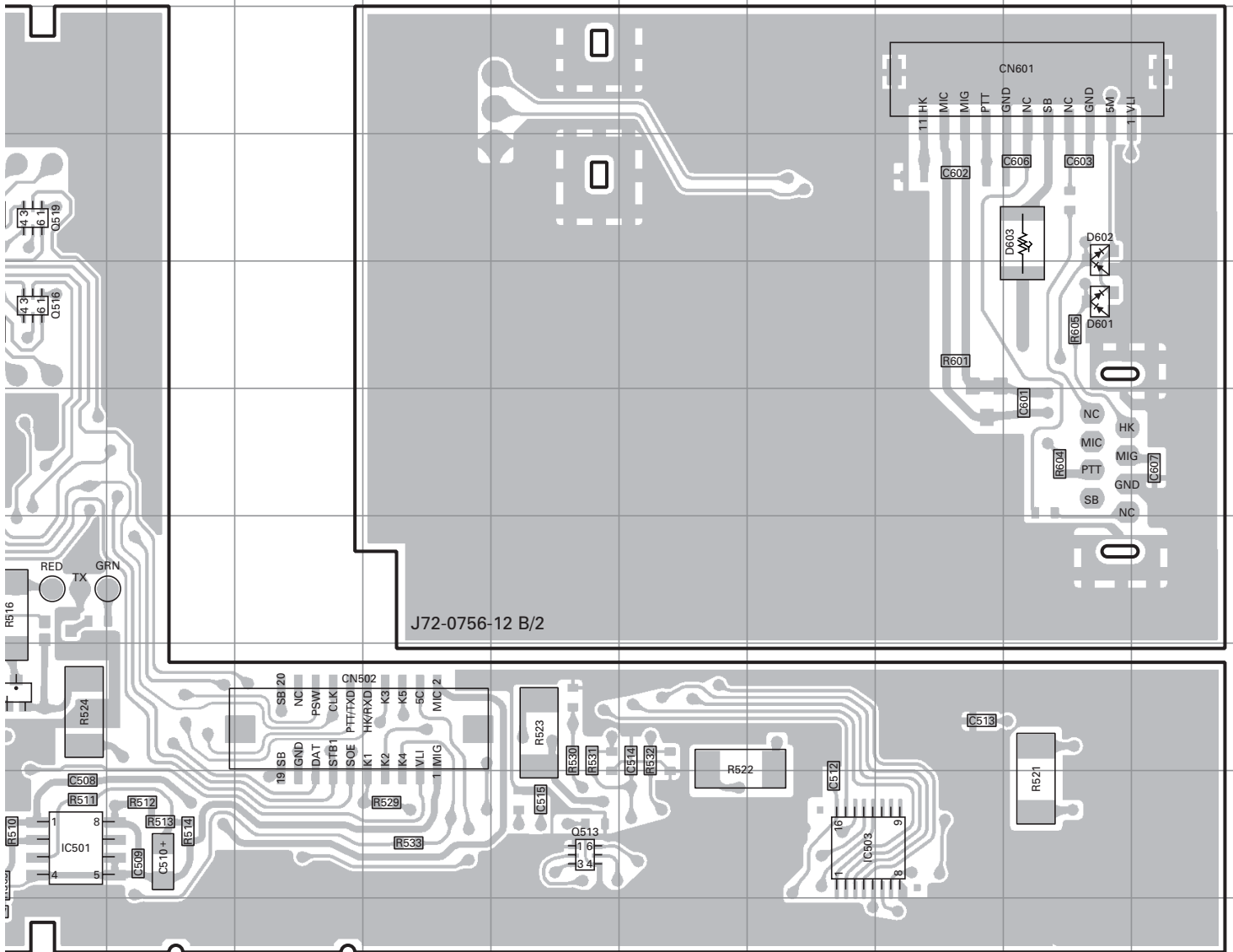
## DISPLAY UNIT (X54-3330-21) Foil side view (J72-0756-12)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC501	9J	Q507	7B	Q521	5H	D511	6D
IC502	7D	Q508	8J	Q522	5I	D512	7E
IC503	9P	Q509	7F	Q523	4H	D513	6C
IC506	8I	Q510	6B	Q524	4I	D514	6D
IC507	8F	Q511	6C	Q525	6F	D601	5R
Q501	9I	Q513	9N	D501	9I	D602	4R
Q502	9H	Q516	5J	D502	9I	D603	4R
Q503	7F	Q517	5I	D508	7E		
Q504	7G	Q518	4I	D509	8E		
Q506	7G	Q519	4J	D510	6D		

# PC BOARD TKR-850

## DISPLAY UNIT (X54-3330-21) Foil side view (J72-0756-12)

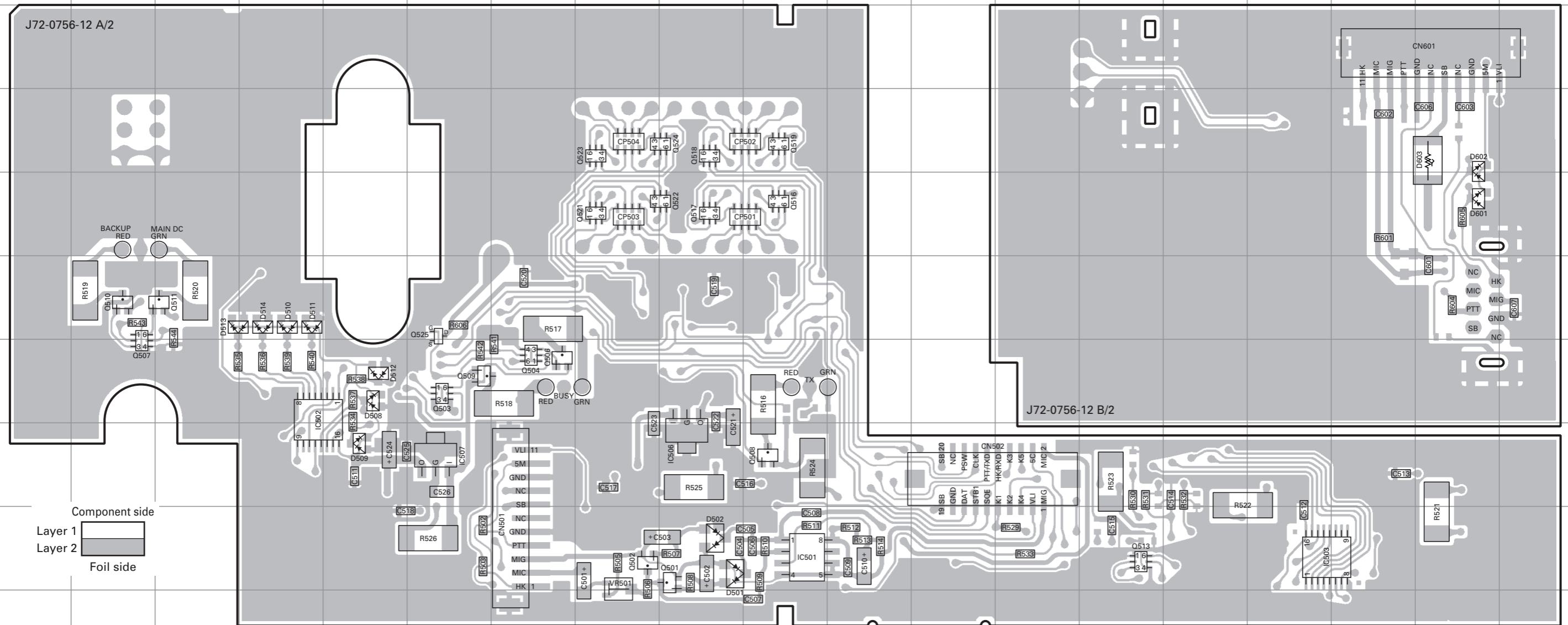


# TKR-850 PC BOARD

# PC BOARD TKR-850

DISPLAY UNIT (X54-3330-21) Foil side view (J72-0756-12)

DISPLAY UNIT (X54-3330-21) Foil side view (J72-0756-12)



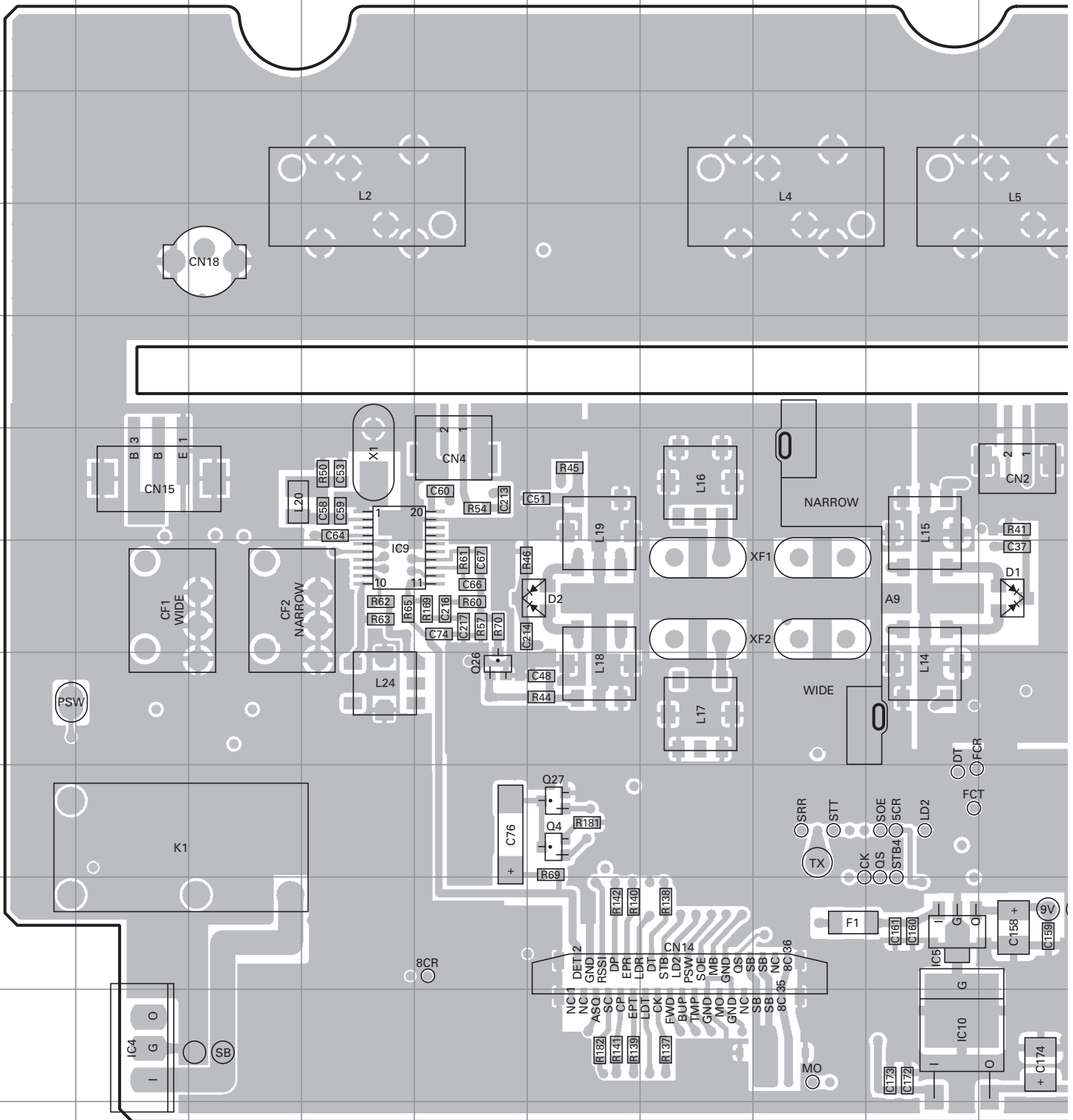
Component side  
 Layer 1  
 Layer 2  
 Foil side

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC501	9J	Q507	7B	Q521	5H	D511	6D
IC502	7D	Q508	8J	Q522	5I	D512	7E
IC503	9P	Q509	7F	Q523	4H	D513	6C
IC506	8I	Q510	6B	Q524	4I	D514	6D
IC507	8F	Q511	6C	Q525	6F	D601	5R
Q501	9I	Q513	9N	D501	9I	D602	4R
Q502	9H	Q516	5J	D502	9I	D603	4R
Q503	7F	Q517	5I	D508	7E		
Q504	7G	Q518	4I	D509	8E		
Q506	7G	Q519	4J	D510	6D		

# TKR-850 PC BOARD

TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E

Component side view (J72-0924-19 A/2)

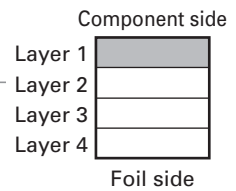
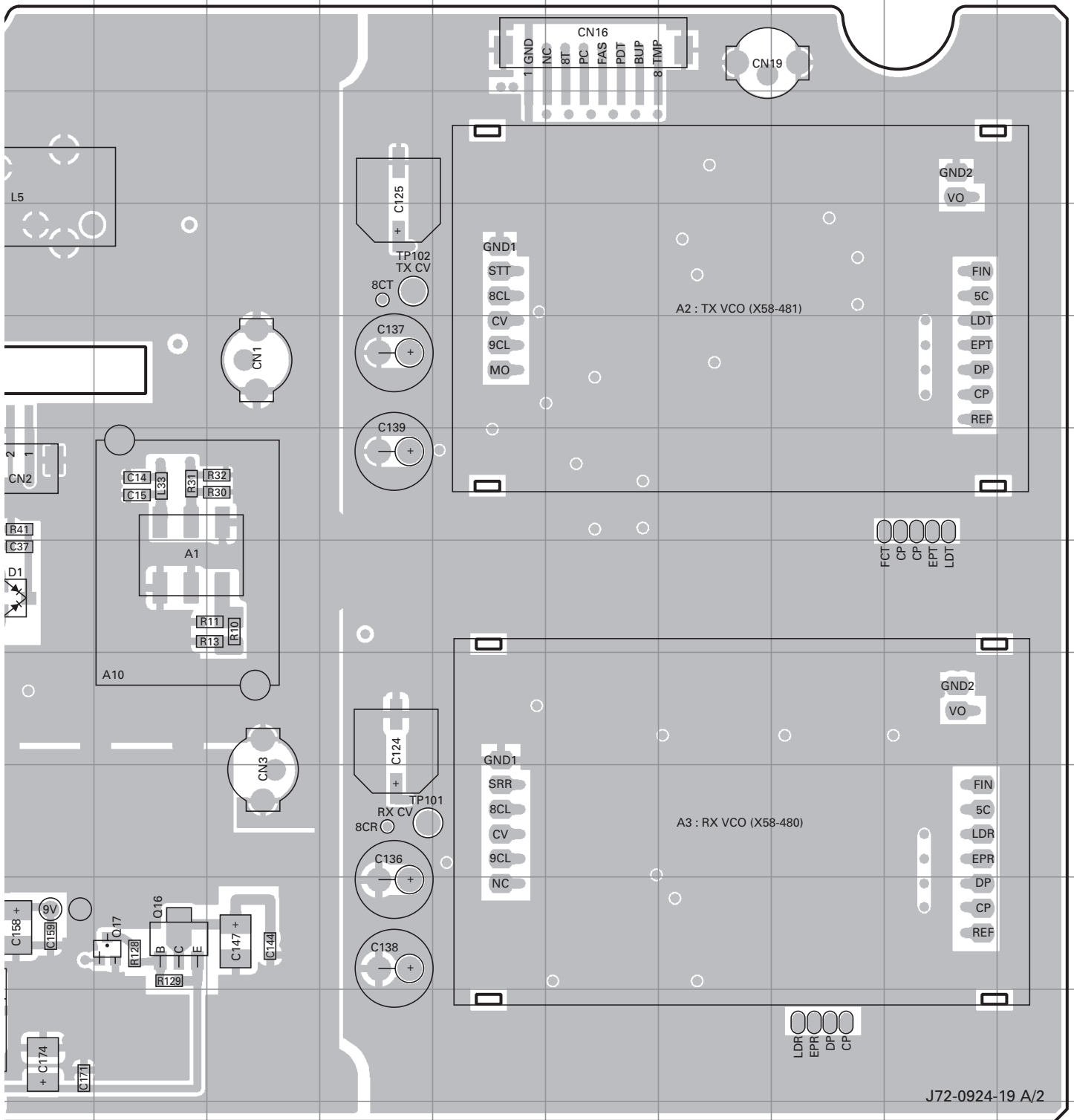


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC4	11B	Q4	9F	Q27	9F
IC5	10I	Q16	10K	D1	7J
IC9	7D	Q17	10K	D2	7F
IC10	11I	Q26	8E		

# PC BOARD TKR-850

TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E

Component side view (J72-0924-19 A/2)

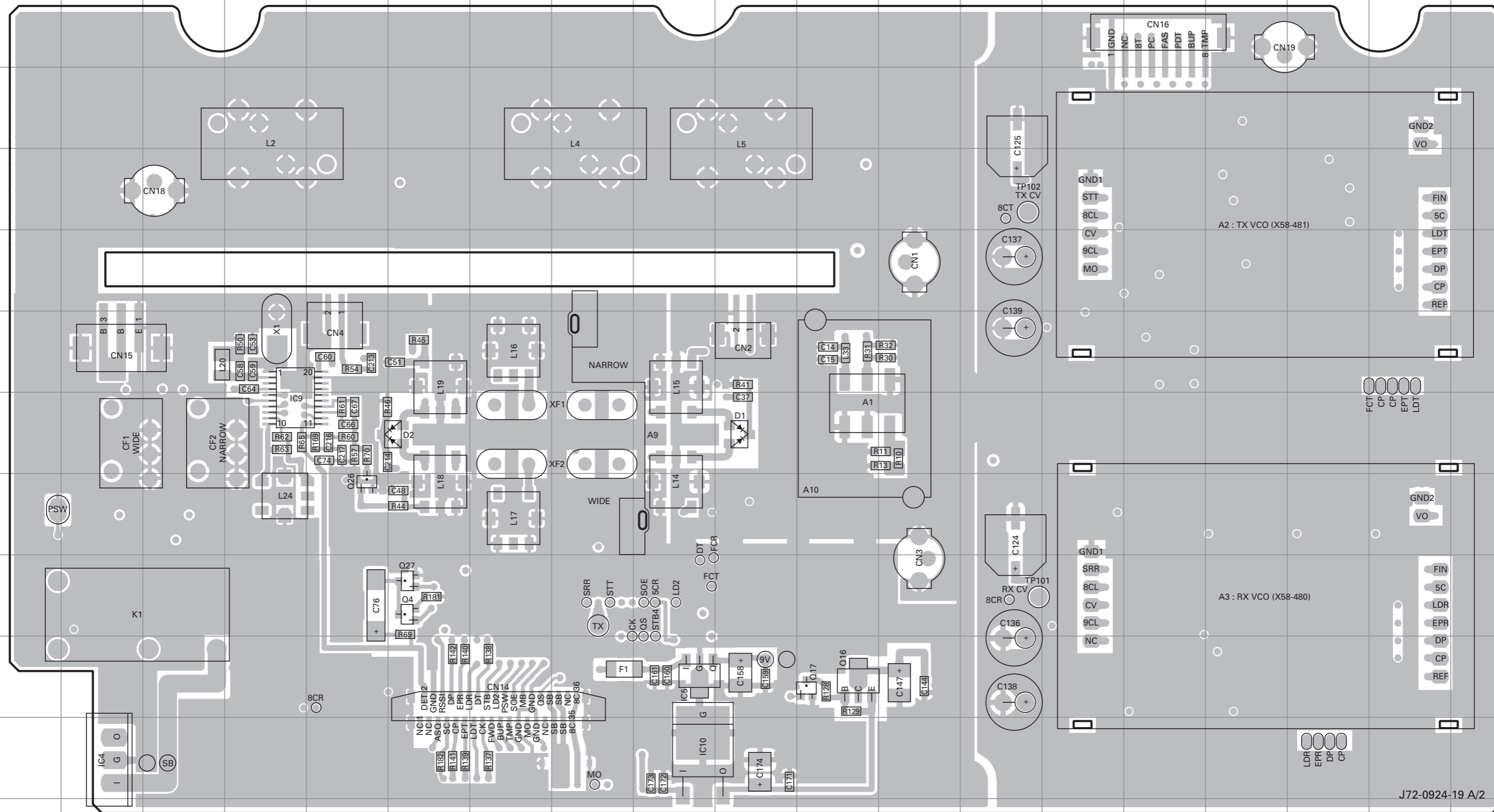


# TKR-850 PC BOARD

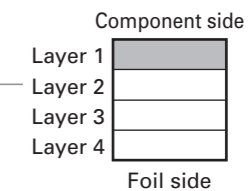
TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
Component side view (J72-0924-19 A/2)

# PC BOARD TKR-850

TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
Component side view (J72-0924-19 A/2)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC4	11B	Q4	9F	Q27	9F
IC5	10I	Q16	10K	D1	7J
IC9	7D	Q17	10K	D2	7F
IC10	11I	Q26	8E		



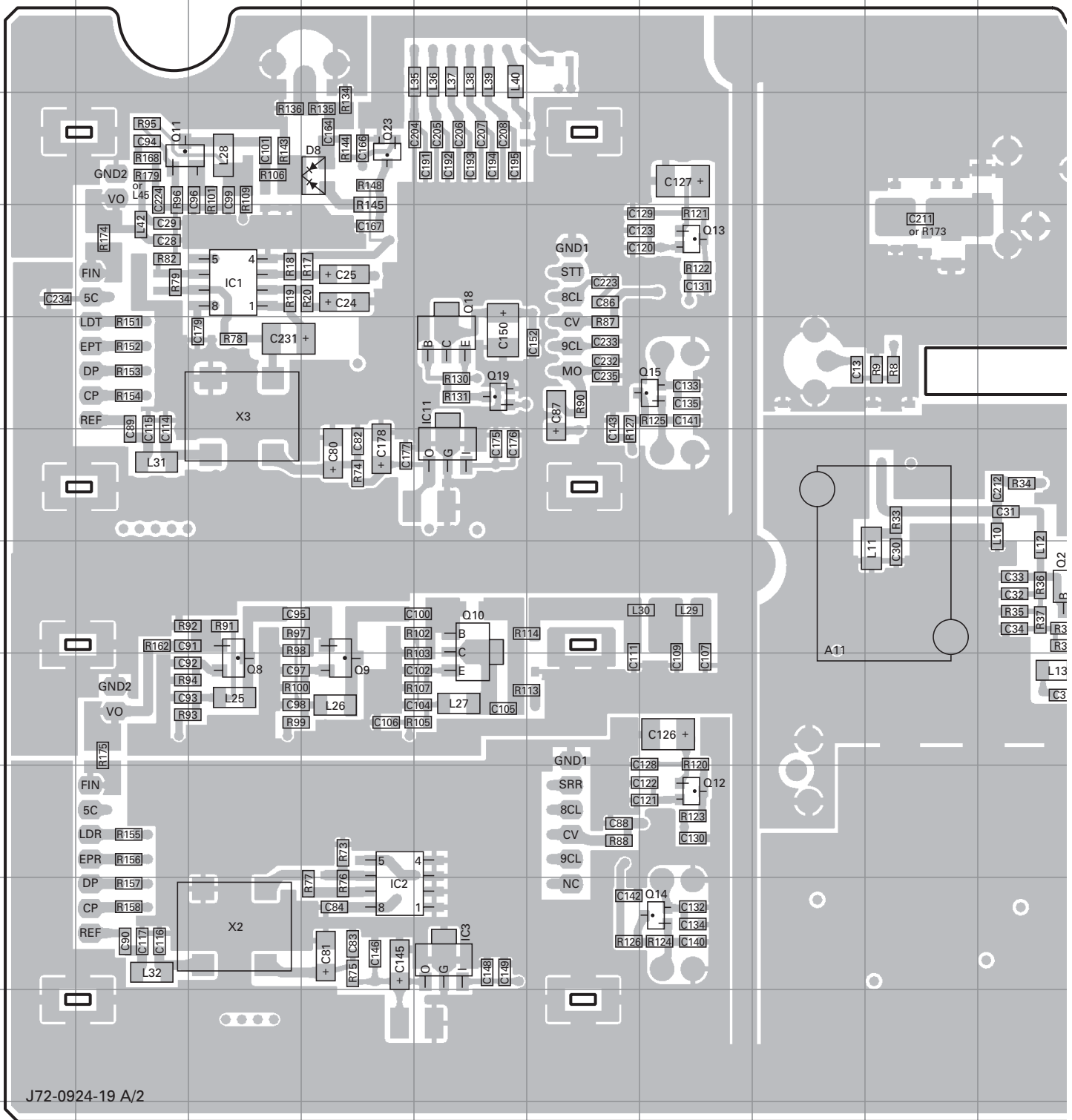
J72-0924-19 A/2



# TKR-850 PC BOARD

TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E

Foil side view (J72-0924-19 A/2)



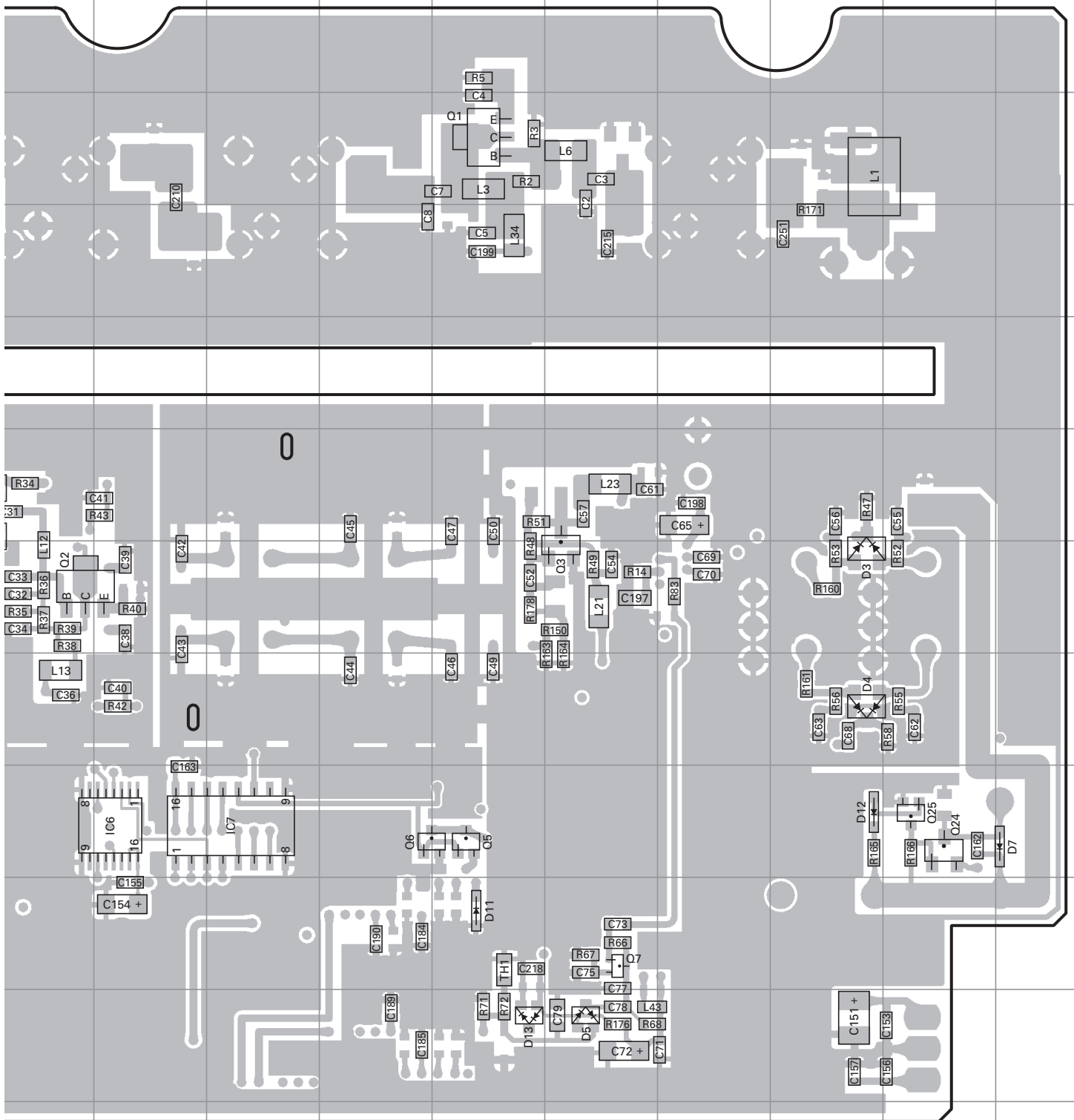
J72-0924-19 A/2

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	4C	Q1	3N	Q8	8C	Q14	10G	Q25	9R	D11	10N
IC2	10D	Q2	7J	Q9	8D	Q15	5G	D3	7Q	D12	9Q
IC3	10E	Q3	7O	Q10	7E	Q18	5E	D4	8Q	D13	11N
IC6	9K	Q5	9N	Q11	3B	Q19	5E	D5	11O		
IC7	9L	Q6	9M	Q12	9G	Q23	3D	D7	9S		
IC11	6E	Q7	10O	Q13	4G	Q24	9R	D8	3D		

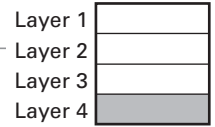
# PC BOARD TKR-850

TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E

Foil side view (J72-0924-19 A/2)



Component side



Foil side

# TKR-850 PC BOARD

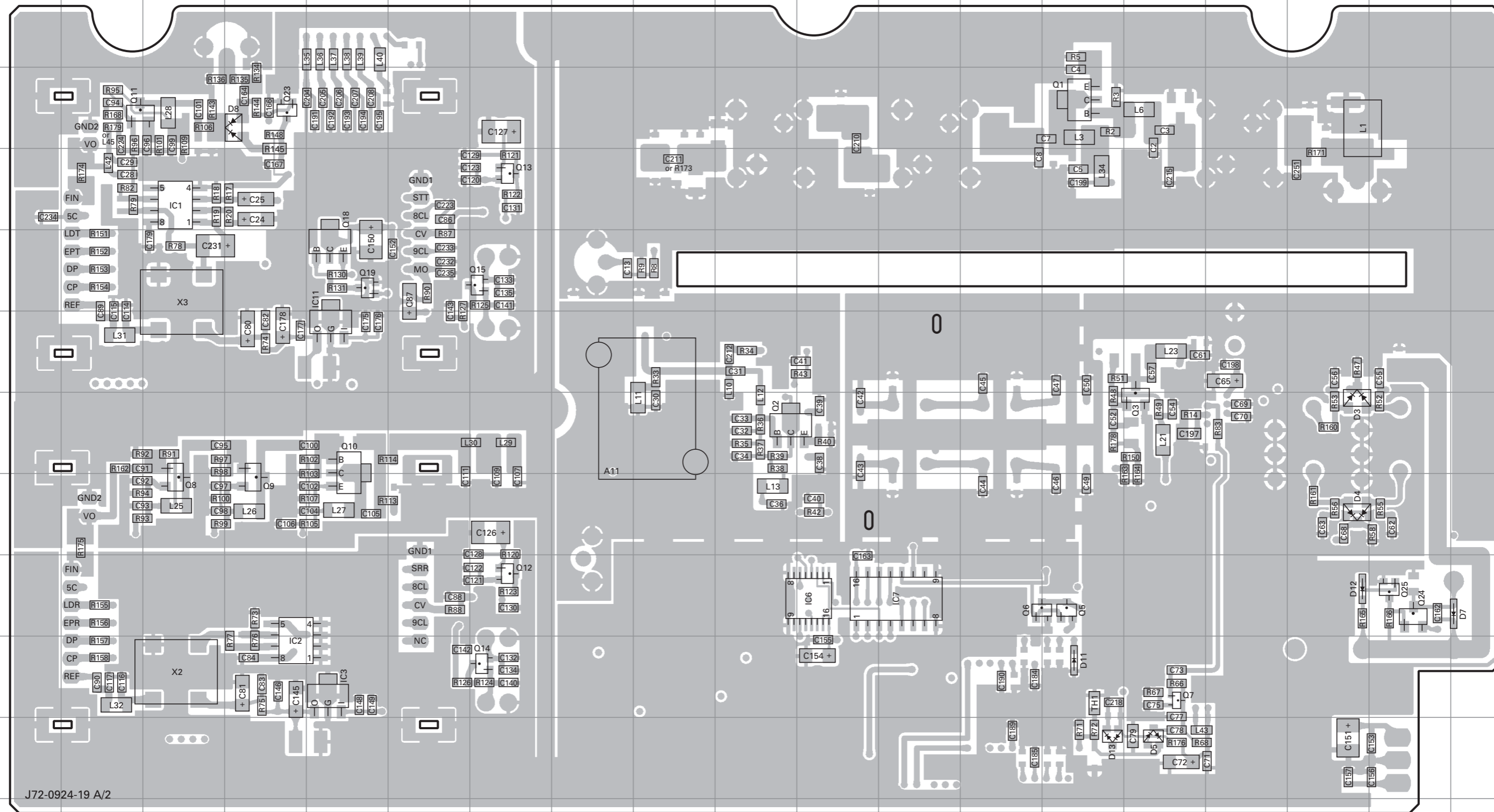
TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E

Foil side view (J72-0924-19 A/2)

# PC BOARD TKR-850

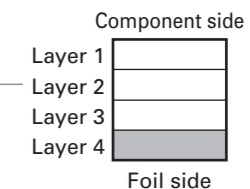
TX-RX UNIT (X57-696X-XX) (A/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E

Foil side view (J72-0924-19 A/2)



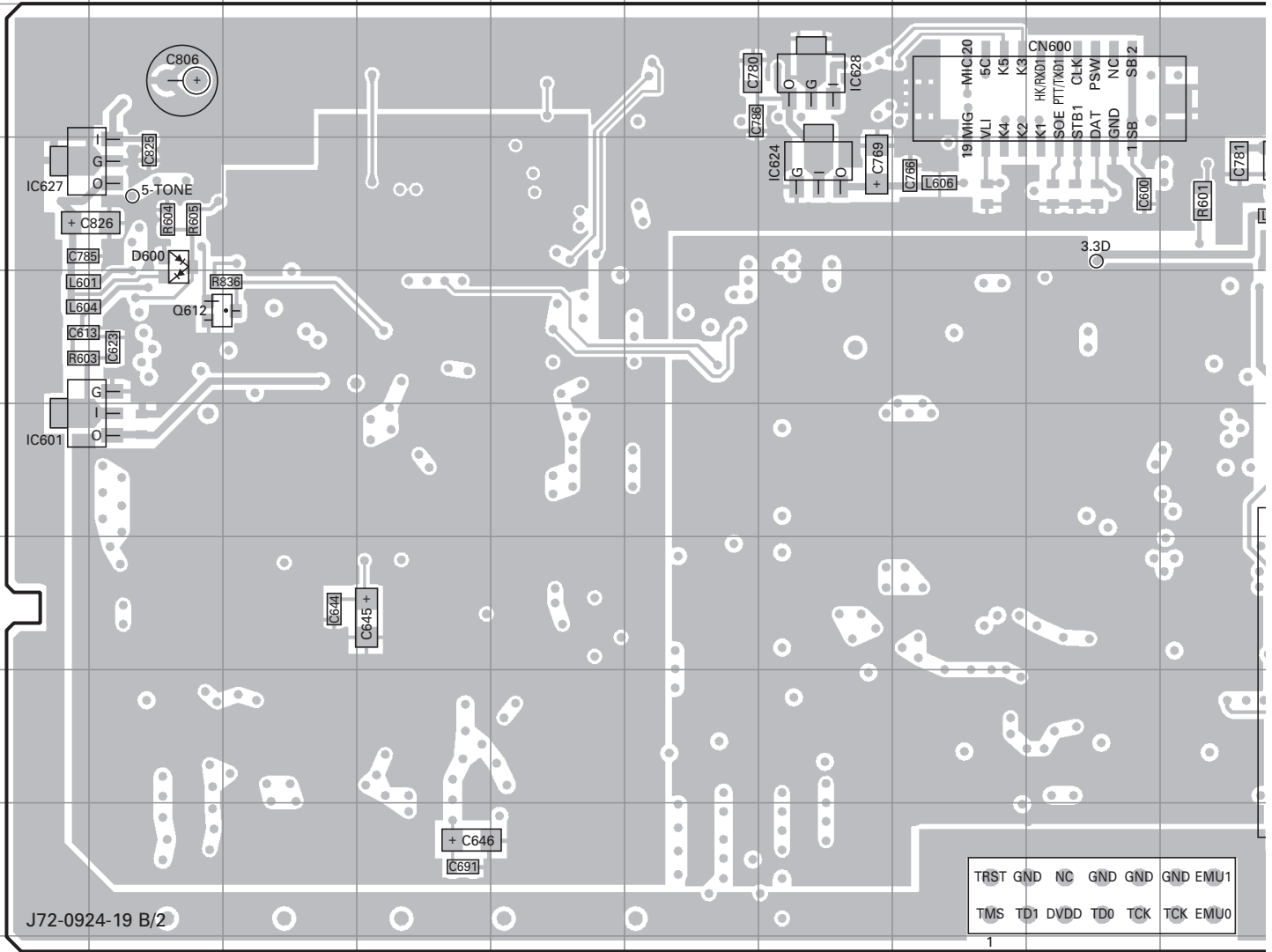
J72-0924-19 A/2

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	4C	Q1	3N	Q8	8C	Q14	10G	Q25	9R	D11	10N
IC2	10D	Q2	7J	Q9	8D	Q15	5G	D3	7Q	D12	9Q
IC3	10E	Q3	7O	Q10	7E	Q18	5E	D4	8Q	D13	11N
IC6	9K	Q5	9N	Q11	3B	Q19	5E	D5	11O		
IC7	9L	Q6	9M	Q12	9G	Q23	3D	D7	9S		
IC11	6E	Q7	10O	Q13	4G	Q24	9R	D8	3D		



# TKR-850 PC BOARD

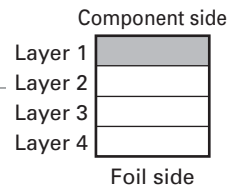
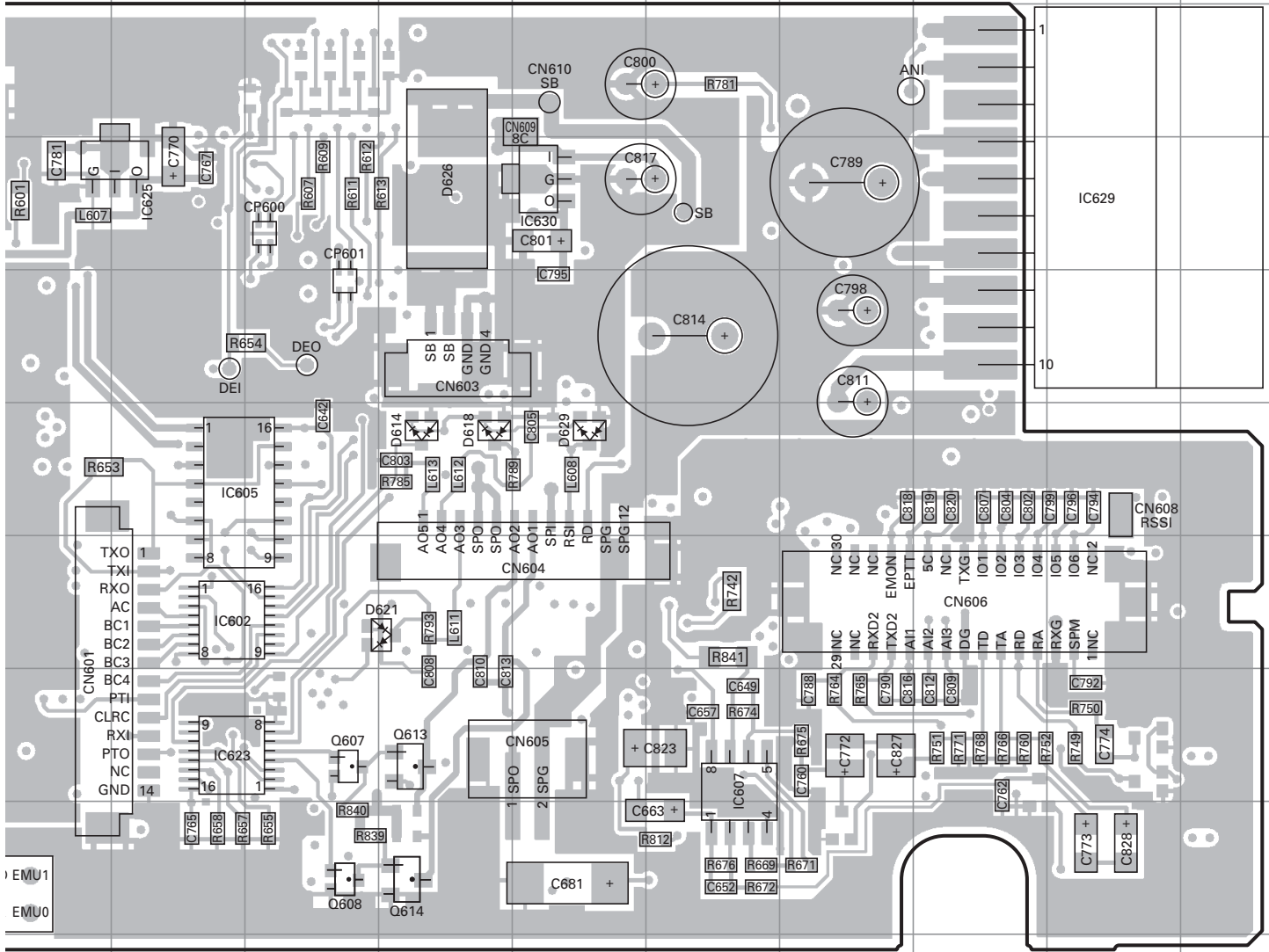
TX-RX UNIT (X57-696X-XX) (B/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
 Component side view (J72-0924-19 B/2)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC601	6A	IC628	3G	D600	4B
IC602	7K	IC629	4R	D614	6M
IC605	6K	IC630	4N	D618	6M
IC607	8O	Q607	8L	D621	7M
IC623	8K	Q608	9L	D626	4M
IC624	4G	Q612	5B	D629	6N
IC625	4K	Q613	8M		
IC627	4A	Q614	9M		

# PC BOARD TKR-850

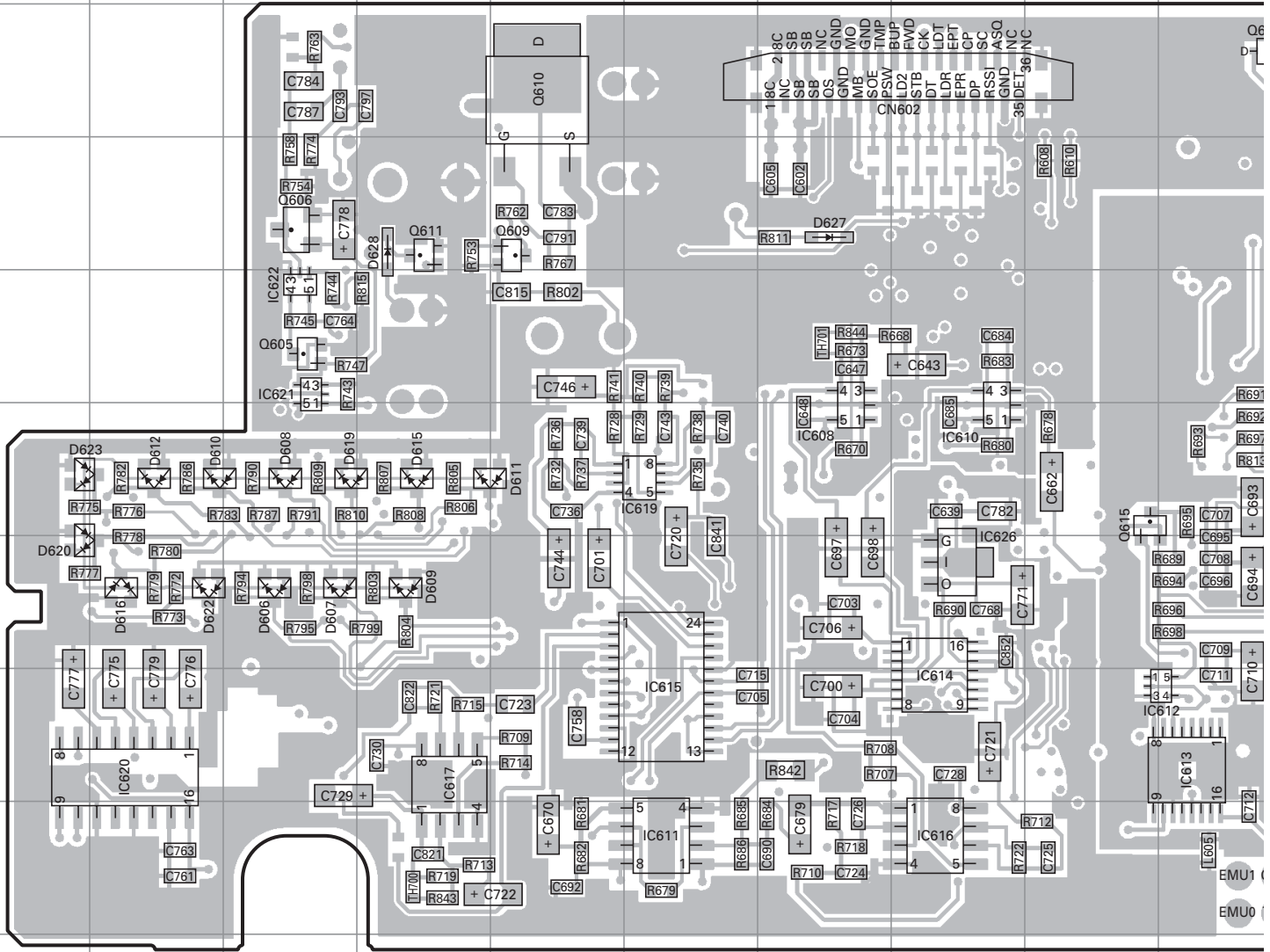
TX-RX UNIT (X57-696X-XX) (B/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
Component side view (J72-0924-19 B/2)





# TKR-850 PC BOARD

TX-RX UNIT (X57-696X-XX) (B/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
 Foil side view (J72-0924-19 B/2)

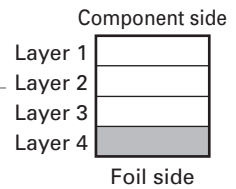
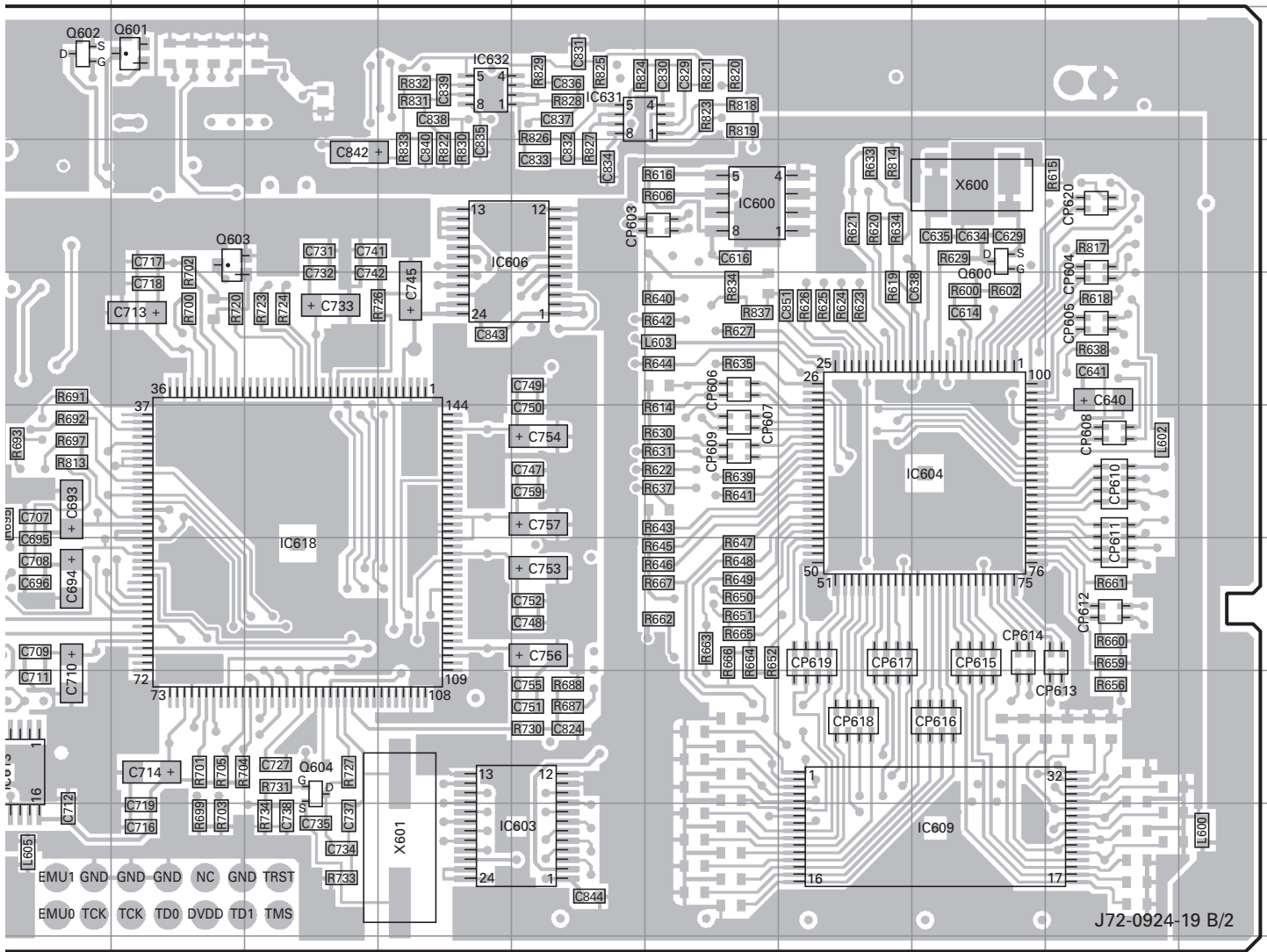


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC600	4O	IC612	8J	IC620	8B	Q602	3J	Q615	6I	D615	6D
IC603	9N	IC613	8J	IC621	5C	Q603	4K	D606	7C	D616	7B
IC604	6Q	IC614	8H	IC622	5C	Q604	8L	D607	7C	D619	6C
IC606	4M	IC615	8F	IC626	7H	Q605	5C	D608	6C	D620	7A
IC608	6G	IC616	9H	IC631	3N	Q606	4C	D609	7D	D622	7B
IC609	9Q	IC617	8D	IC632	3M	Q609	4E	D610	6B	D623	6A
IC610	6H	IC618	7L	Q600	4Q	Q610	3E	D611	6E	D627	4G
IC611	9F	IC619	6F	Q601	3K	Q611	4D	D612	6B	D628	4D



# PC BOARD TKR-850

TX-RX UNIT (X57-696X-XX) (B/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
Foil side view (J72-0924-19 B/2)



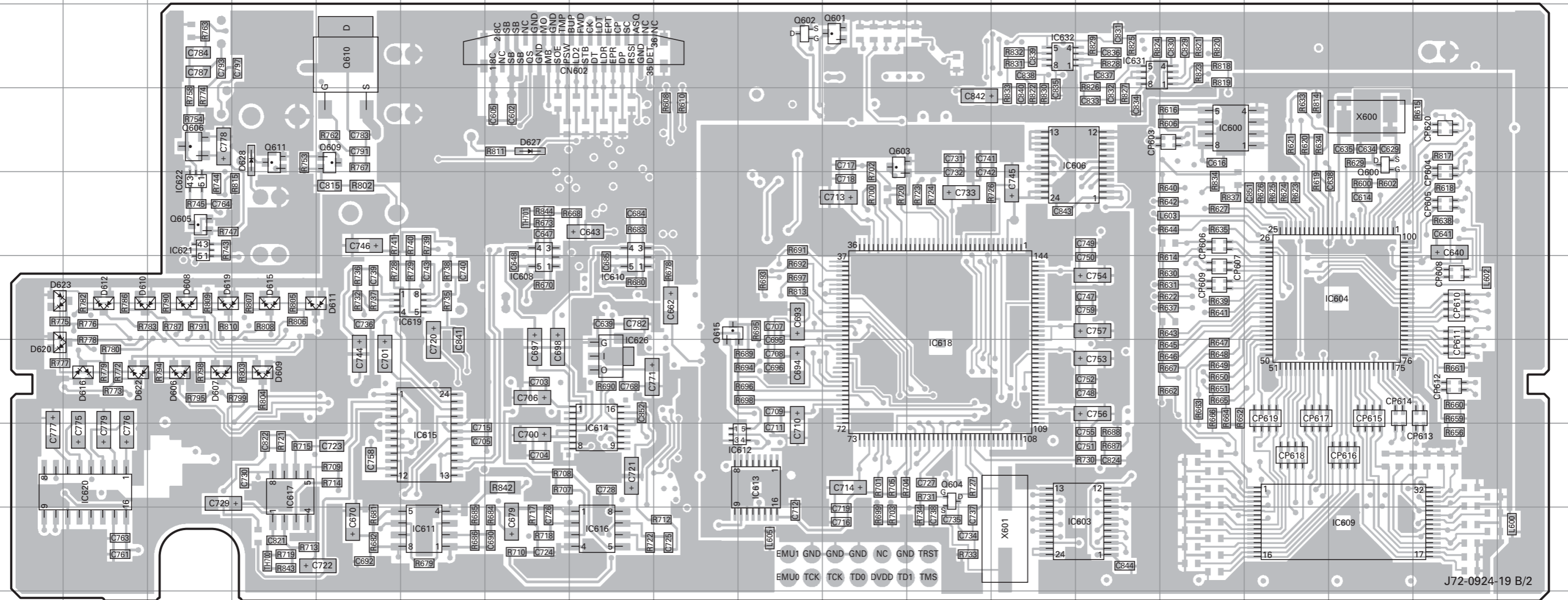


# TKR-850 PC BOARD

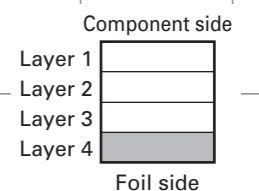
# PC BOARD TKR-850

TX-RX UNIT (X57-696X-XX) (B/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
Foil side view (J72-0924-19 B/2)

TX-RX UNIT (X57-696X-XX) (B/2) 0-11 : K 0-12 : K2 0-13 : K3 2-70 : E  
Foil side view (J72-0924-19 B/2)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC600	4O	IC612	8J	IC620	8B	Q602	3J	Q615	6I	D615	6D
IC603	9N	IC613	8J	IC621	5C	Q603	4K	D606	7C	D616	7B
IC604	6Q	IC614	8H	IC622	5C	Q604	8L	D607	7C	D619	6C
IC606	4M	IC615	8F	IC626	7H	Q605	5C	D608	6C	D620	7A
IC608	6G	IC616	9H	IC631	3N	Q606	4C	D609	7D	D622	7B
IC609	9Q	IC617	8D	IC632	3M	Q609	4E	D610	6B	D623	6A
IC610	6H	IC618	7L	Q600	4Q	Q610	3E	D611	6E	D627	4G
IC611	9F	IC619	6F	Q601	3K	Q611	4D	D612	6B	D628	4D

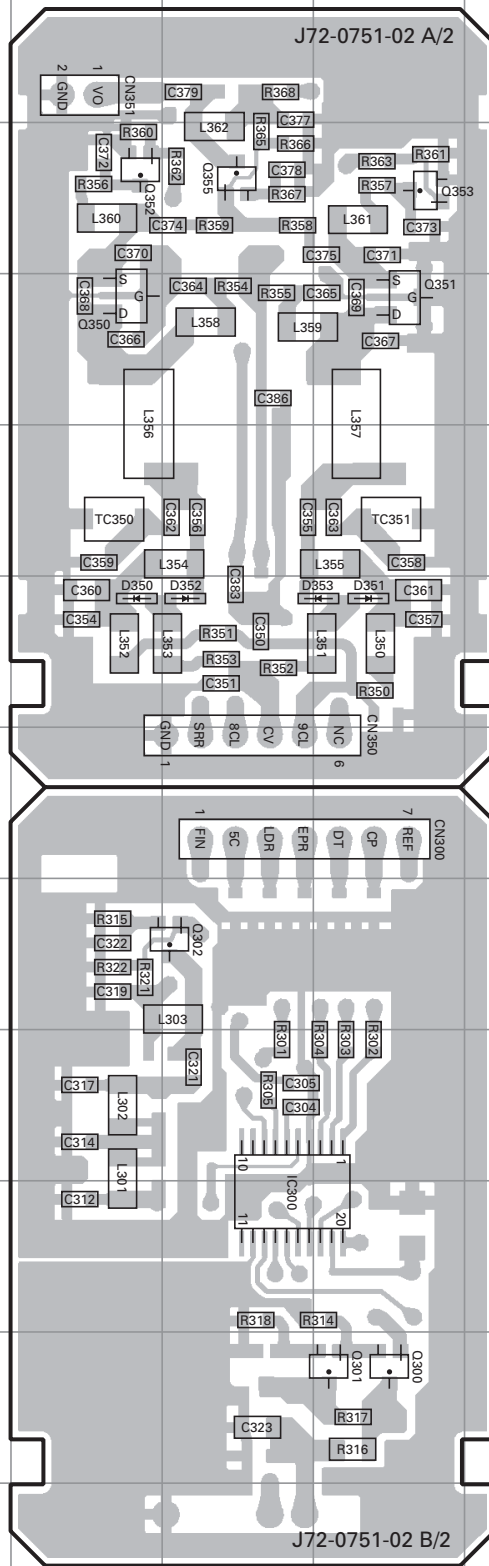
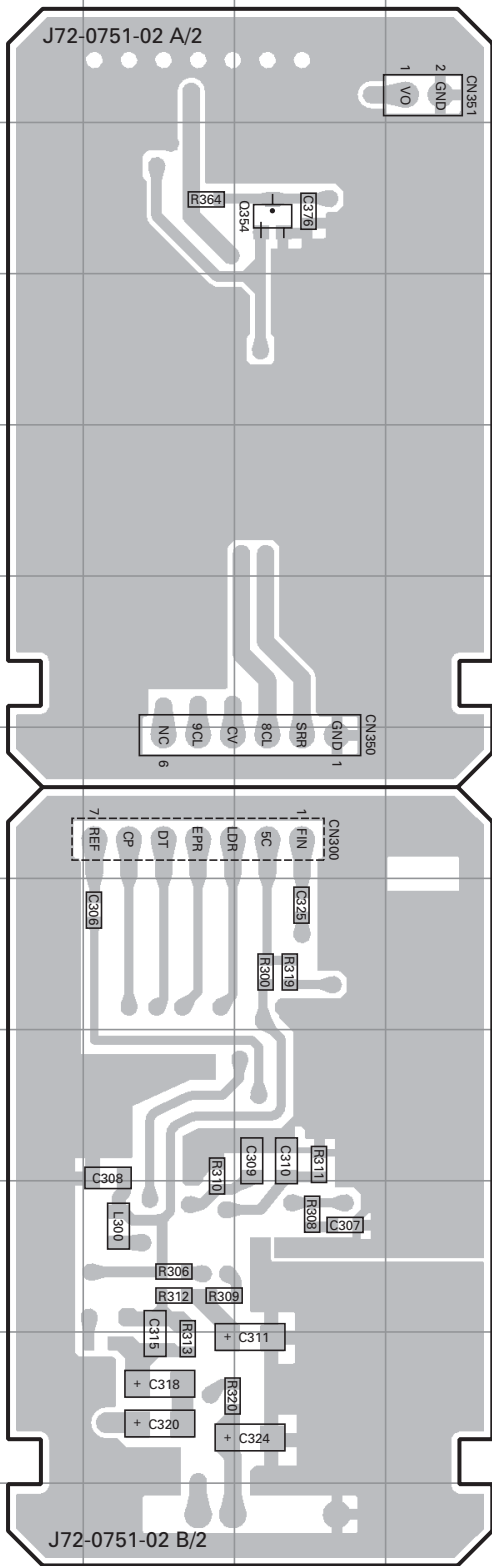


# TKR-850 PC BOARD

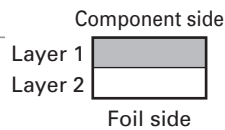
RX VCO UNIT (X58-480X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3 (J72-0751-02)

Component side view

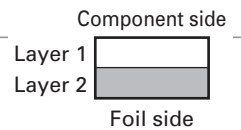
Foil side view



Ref. No.	Address
Q354	3C



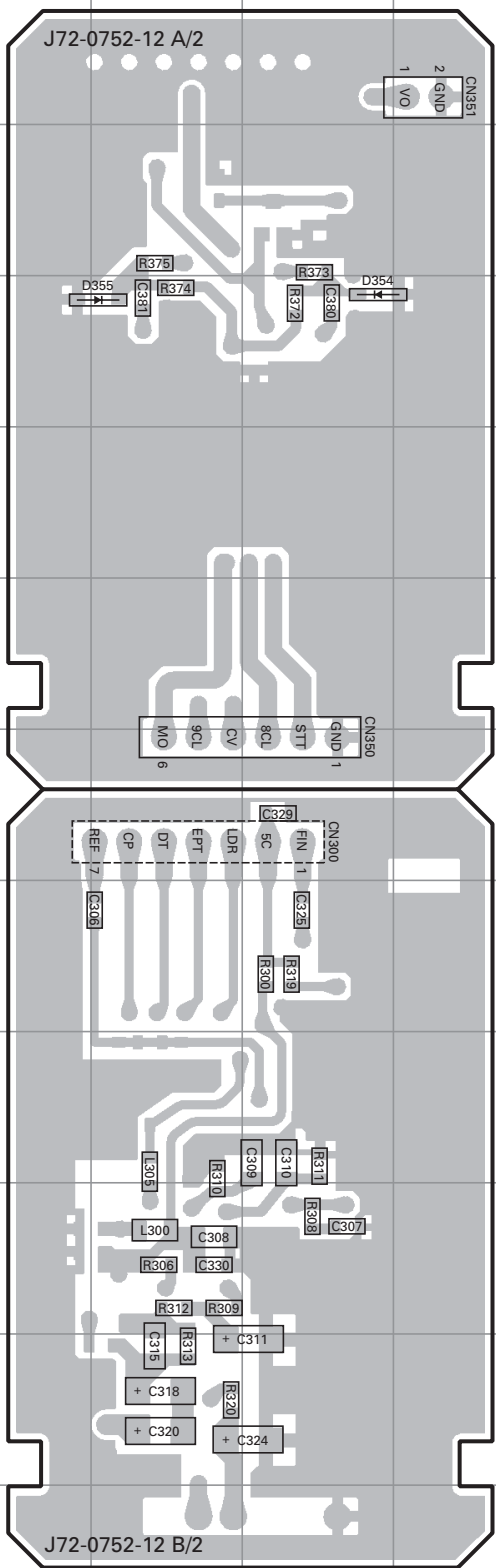
Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	10G	Q351	4H	D351	6H
Q300	11H	Q352	3F	D352	6G
Q301	11H	Q353	3H	D353	6H
Q302	8G	Q355	3G		
Q350	4F	D350	6F		



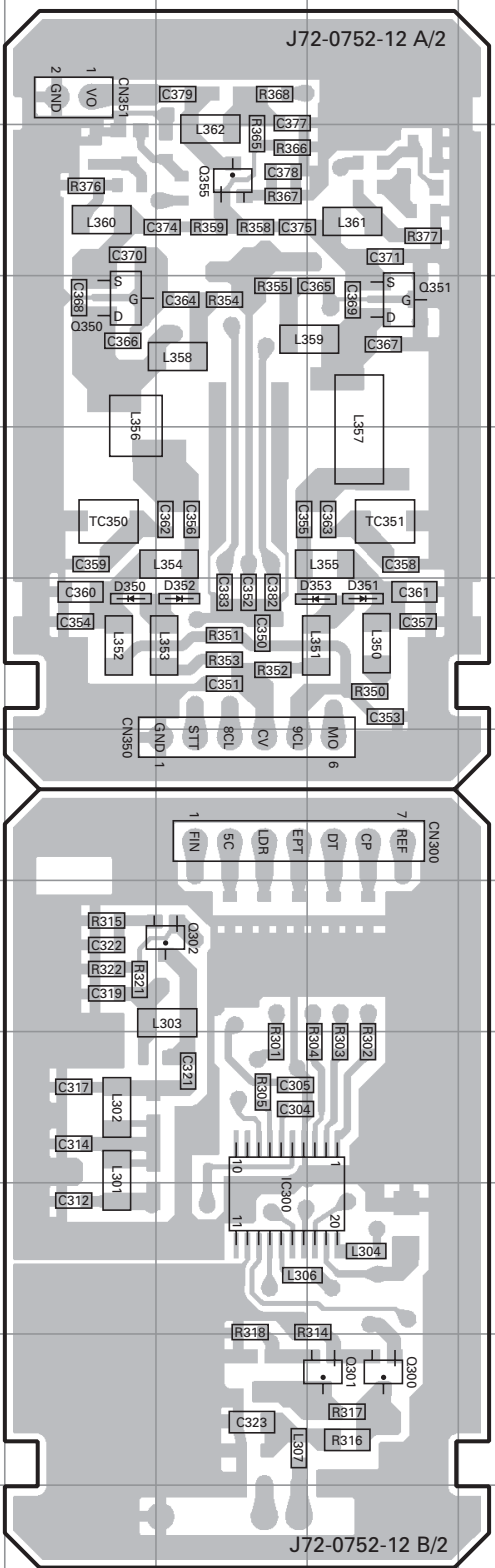
# PC BOARD TKR-850

TX VCO UNIT (X58-481X-XX) 0-10 : K,E 0-11 : K2 0-12 : K3 (J72-0752-12)

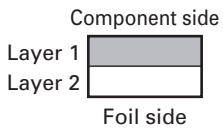
Component side view



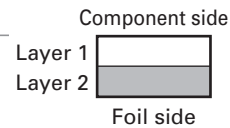
Foil side view



Ref. No.	Address
D354	4C
D355	4B

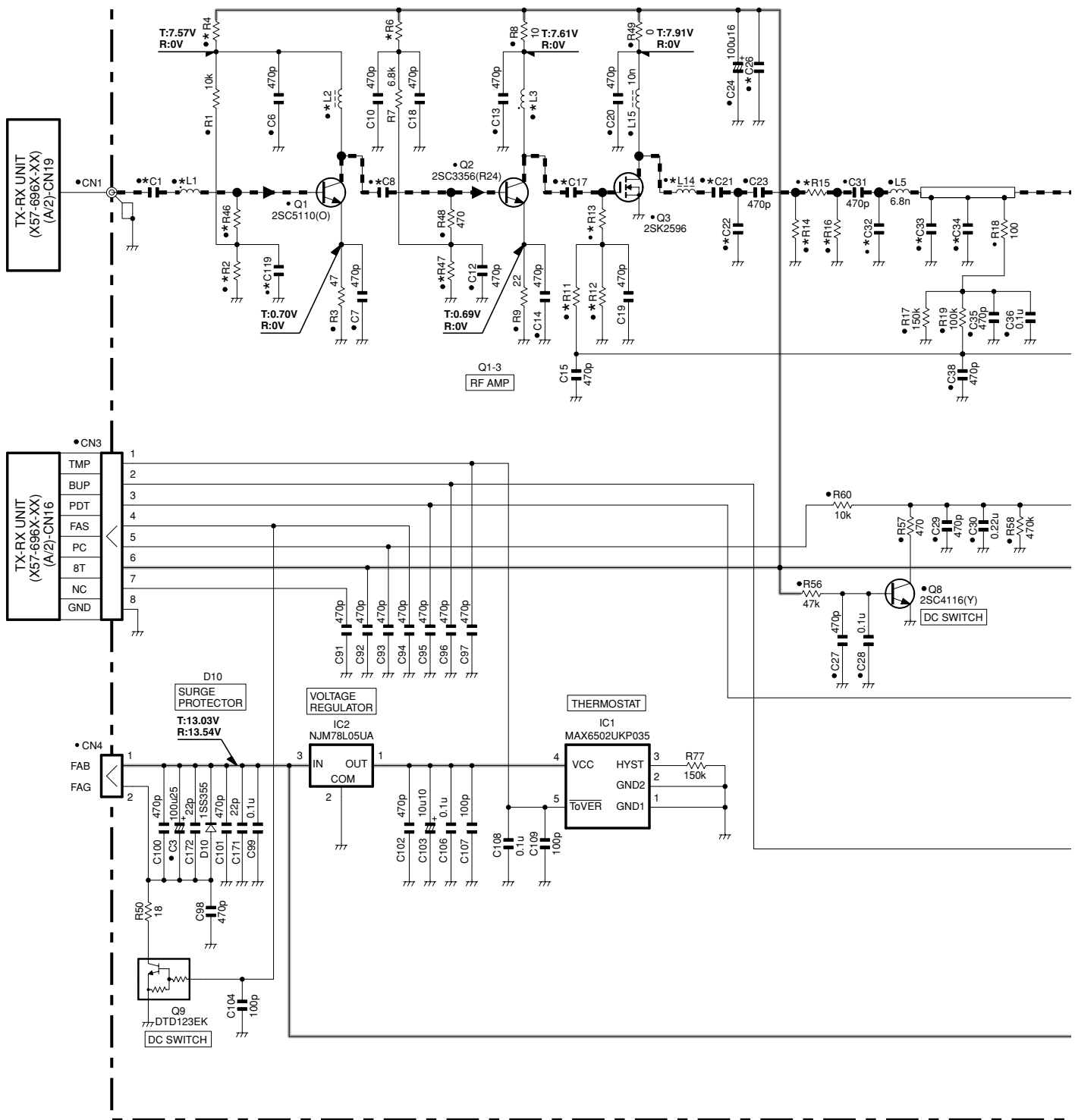


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC300	10G	Q350	4F	D351	6H
Q300	11H	Q351	4H	D352	6G
Q301	11H	Q355	3G	D353	6H
Q302	8G	D350	6F		



# TKR-850 SCHEMATIC DIAGRAM

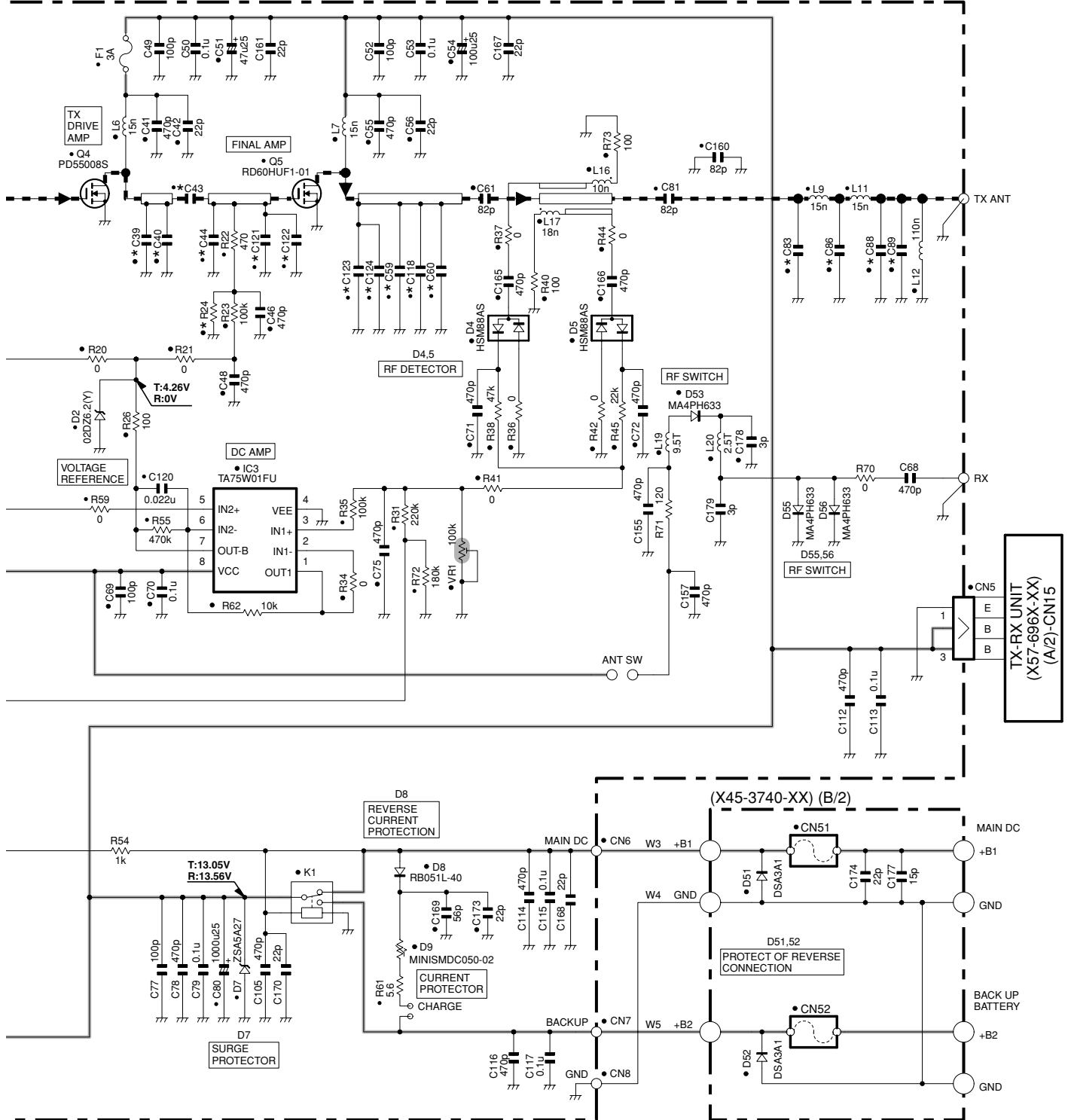
## FINAL UNIT (X45-3740-XX) (A/2)



X45-3740-XX	L1	L2	L3	L14	R2	R4	R6	R11	R12	R13	R14	R15	R16	R46	R47	C1	C8	C17	C21	C22	C26	C32	C33	C34	C119	
0-10	K.E	10n	10n	18n	15n	2.2k	22	47	100k	18k	47	1k	5.6	1k	470	2.2k	470p	8p	5p	12p	6p	470p	8p	27p	27p	470p
0-11	K2	10n	18n	18n	10n	4.7k	10	10	100k	18k	47	270	18	270	0	3.3k	10p	3p	5p	10P	9p	470p	9p	27p	27p	NO
0-12	K3	3.9n	27n	8.2n	10n	4.7k	10	10	33k	15k	22	270	18	270	0	3.3k	10p	10p	56p	22p	12p	100p	8p	39p	39p	NO

# SCHEMATIC DIAGRAM TKR-850

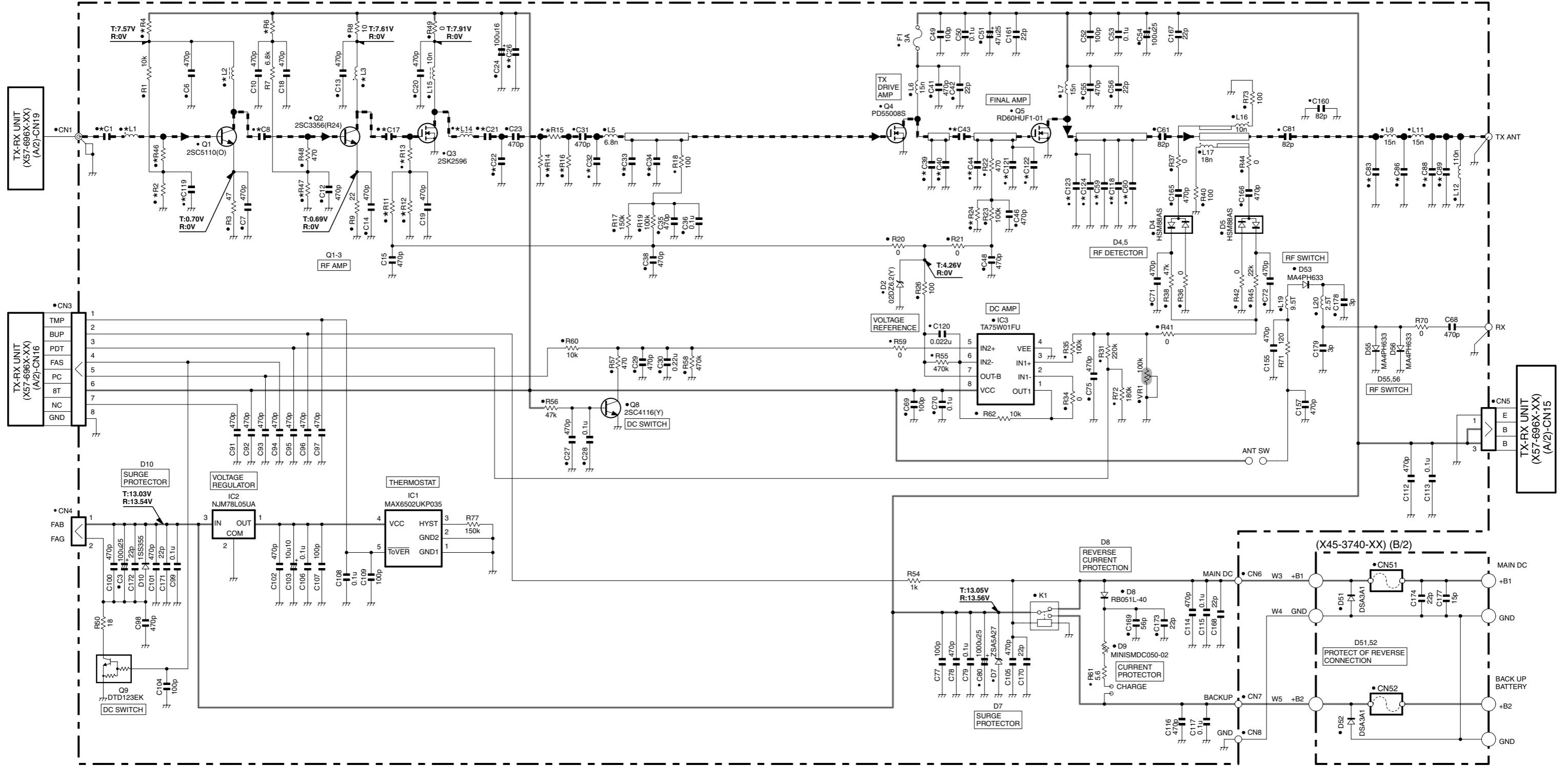
FINAL UNIT (X45-3740-XX) (A/2)



X45-3740-XX	R24	C39	C40	C43	C44	C59	C60	C83	C86	C88	C89	C118	C121	C122	C123	C124	
0-10	K.E	100k	12p	22p	22p	6p	10p	NO	6p	10p	NO	5p	4p	15p	15p	22p	22p
0-11	K2	120k	8p	27p	18p	NO	8p	6p	5p	8p	NO	5p	NO	18p	18p	22p	18p
0-12	K3	100k	18p	NO	22p	10p	12p	8p	7p	12p	6p	NO	NO	18p	18p	27p	27p

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

FINAL UNIT (X45-3740-XX) (A/2)



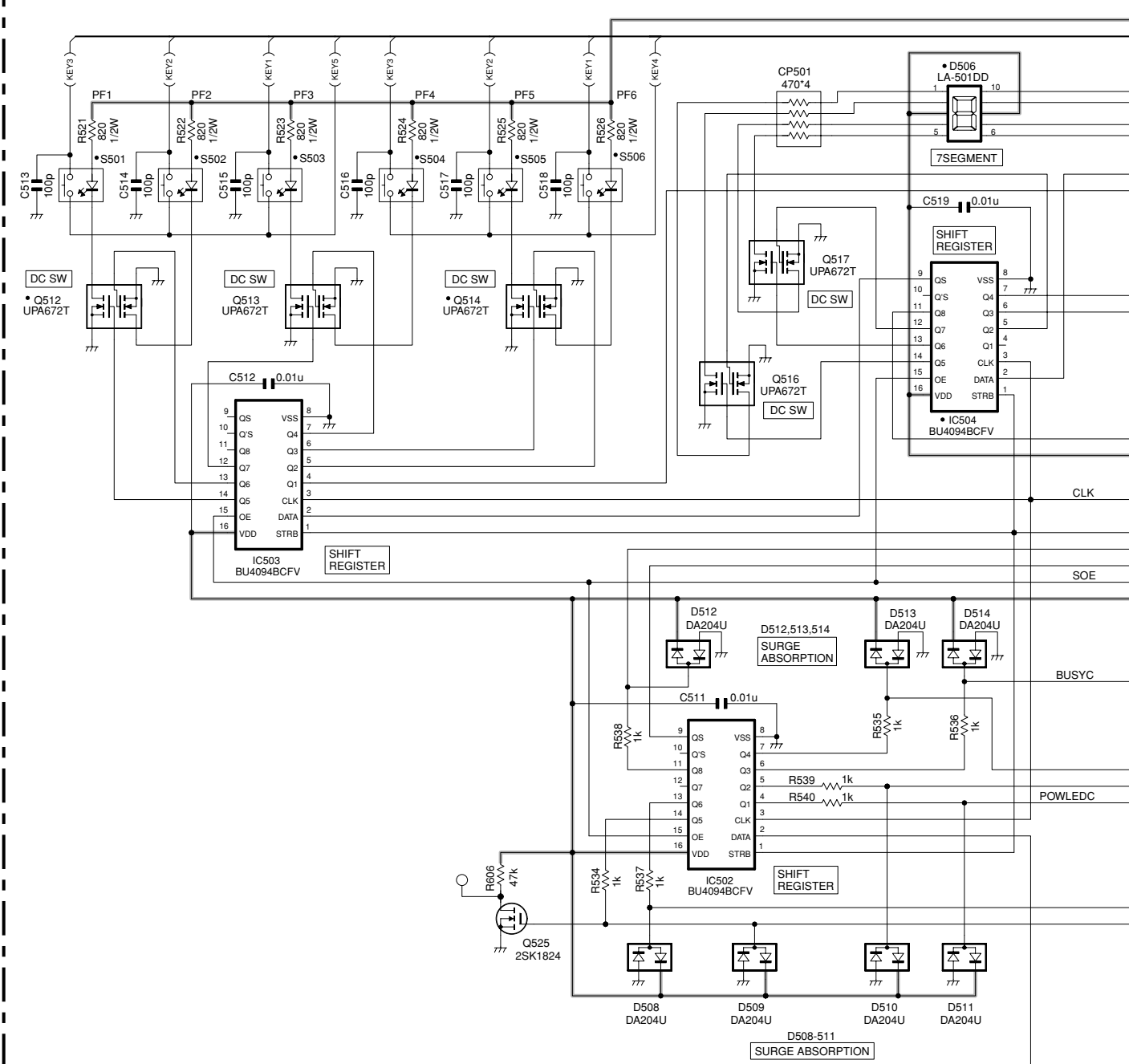
X45-3740-XX	L1	L2	L3	L14	R2	R4	R6	R11	R12	R13	R14	R15	R16	R46	R47	C1	C8	C17	C21	C22	C26	C32	C33	C34	C119	
0-10	K.E	10n	10n	18n	15n	2.2k	22	47	100k	18k	47	1k	5.6	1k	470	2.2k	470p	8p	5p	12p	6p	470p	8p	27p	27p	470p
0-11	K2	10n	18n	18n	10n	4.7k	10	10	100k	18k	47	270	18	270	0	3.3k	10p	3p	5p	10p	9p	470p	9p	27p	27p	18p
0-12	K3	3.9n	27n	8.2n	10n	4.7k	10	10	33k	15k	22	270	18	270	0	3.3k	10p	10p	56p	22p	12p	100p	8p	39p	39p	NO

X45-3740-XX	R24	C39	C40	C43	C44	C59	C60	C83	C86	C88	C89	C118	C121	C122	C123	C124
0-10	K.E	100k	12p	22p	22p	6p	10p	NO	6p	10p	NO	5p	4p	15p	15p	22p
0-11	K2	120k	8p	27p	18p	NO	8p	6p	5p	8p	NO	27p	NO	18p	18p	22p
0-12	K3	100k	18p	NO	22p	10p	12p	8p	7p	12p	6p	NO	NO	18p	18p	27p

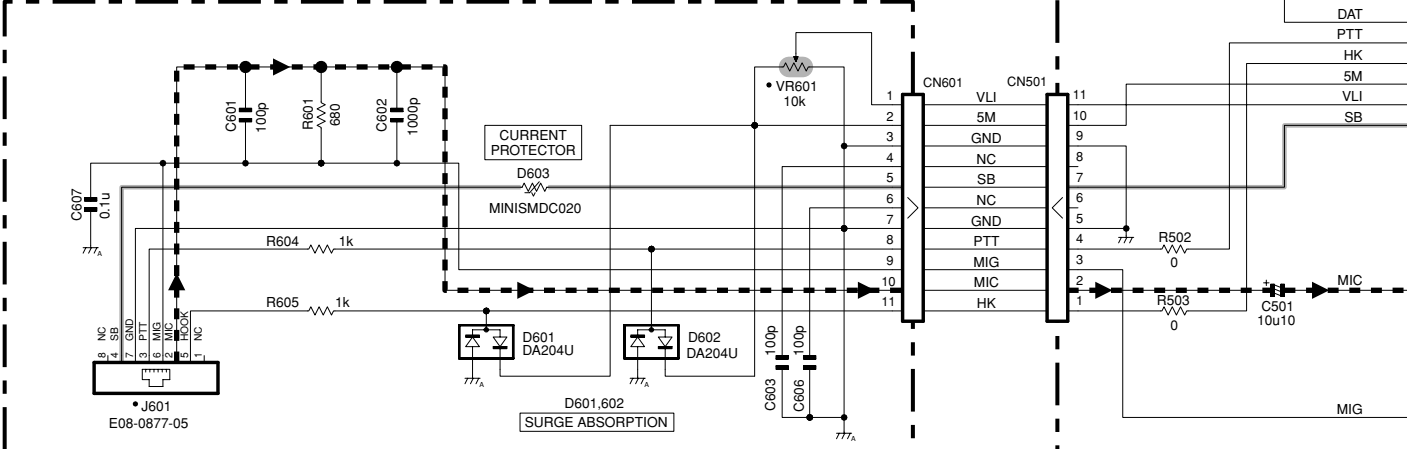
# TKR-850 SCHEMATIC DIAGRAM

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

## DISPLAY UNIT (X54-3330-21) (A/2)

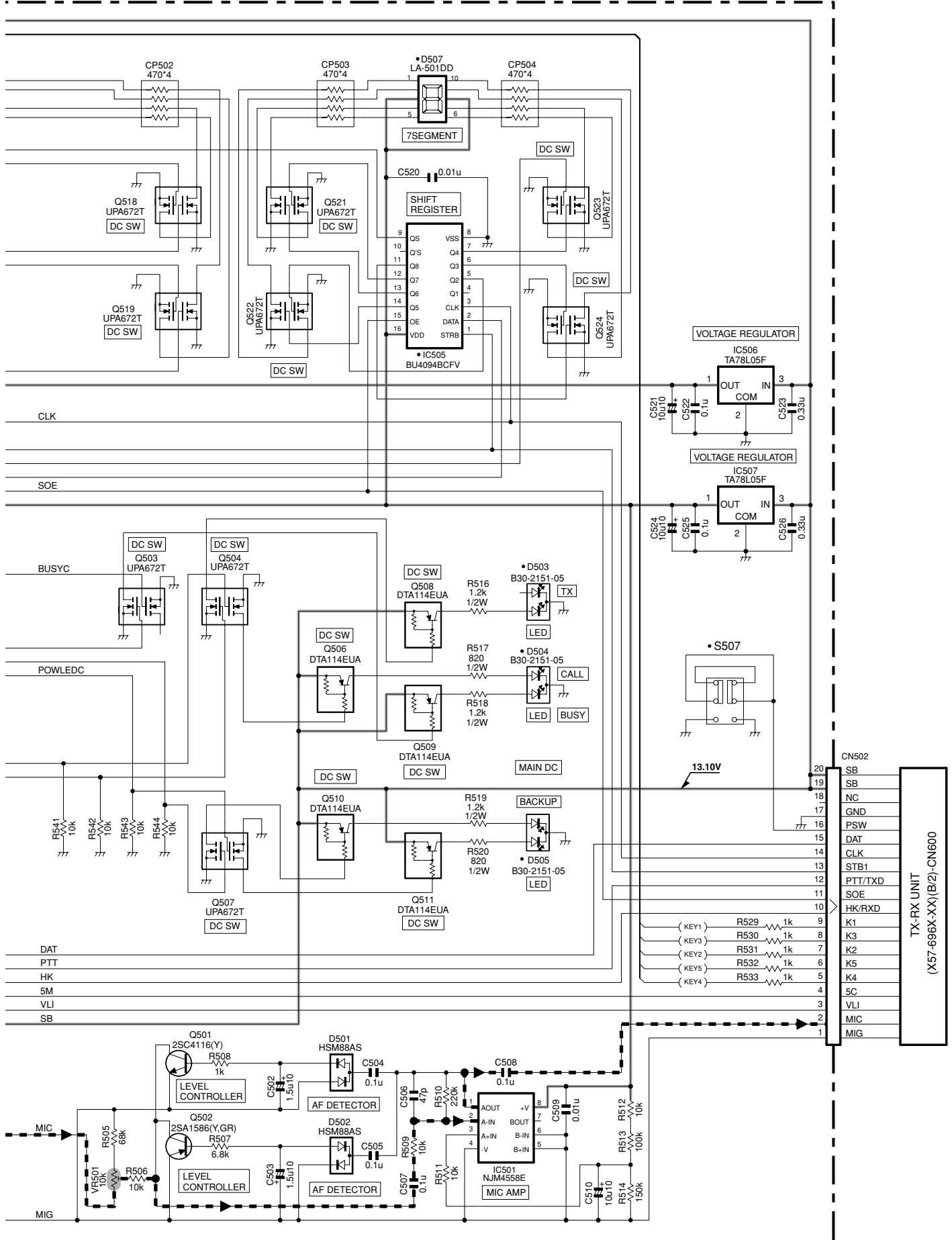


## DISPLAY UNIT (X54-3330-21) (B/2)



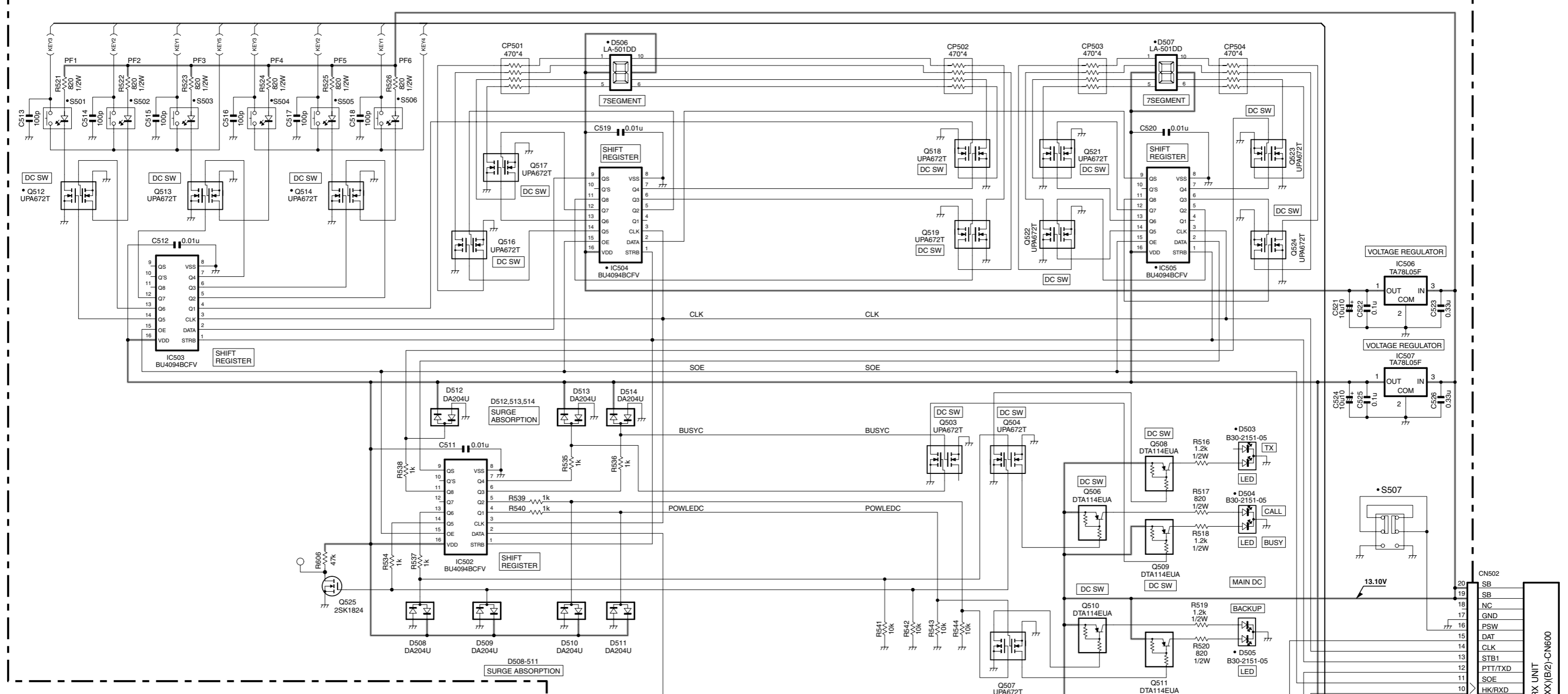
# SCHEMATIC DIAGRAM TKR-850

DISPLAY UNIT (X54-3330-21) (A/2)

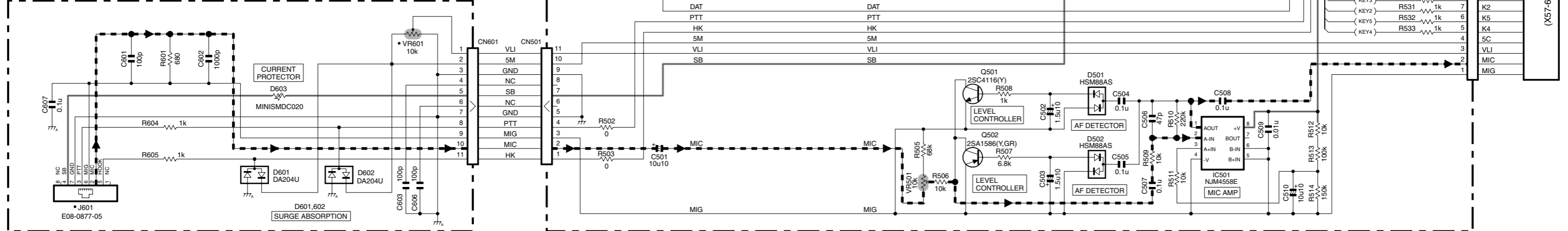




DISPLAY UNIT (X54-3330-21) (A/2)

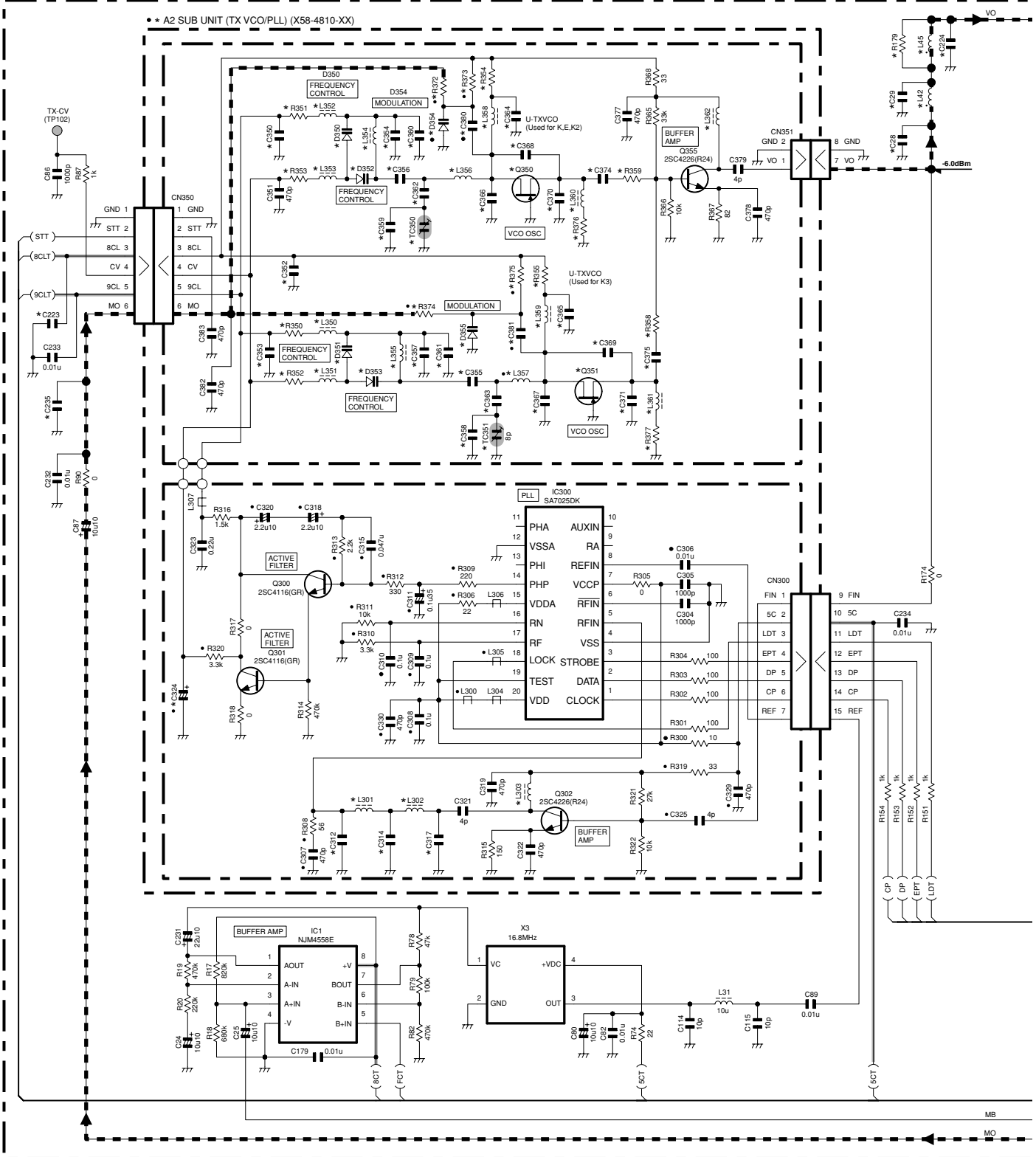


DISPLAY UNIT (X54-3330-21) (B/2)



# TKR-850 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-696X-XX) (A/2)



A2 SUB UNIT (TX VCO/PLL)

X58-4810-XX	C312	C314	C317	C324	C350	C352	C353	C354	C355	C356	C357	C358	C359	C360	C361	C362	C363	C364	C365	C366	C367	C368	C369	C370	C371	C374	C375	C380	C381	
-10	K,E	8p	12p	6p	0.22u/35V	470p	100p	NO	470p	NO	8p	NO	NO	1.5p	0.1u	NO	12p	NO	470p	NO	NO	7p	NO	NO	7p	NO	0.5p	NO	0.5p	NO
-11	K2	5p	10p	5p	0.22u/35V	470p	NO	470p	NO	7p	NO	NO	NO	NO	NO	470p	NO	NO	7p	NO	NO	7p	NO	NO	0.5p	NO	0.5p	NO	NO	NO
-12	K3	7p	12p	7p	0.33u/35V	NO	100p	470p	NO	10p	NO	470p	3p	NO	NO	0.1u	NO	18p	NO	470p	NO	7p	NO	NO	8p	NO	0.5p	NO	NO	0.5p

A2 SUB UNIT (TX VCO/PLL)

X58-4810-XX	D350	D351	D352	D353	D354	D355	L301	L302	L303	L350	L351	L352	L353	L354	L355	L356	L357	L358	L359	L360	L361	L362	TC350	TC351	
-10	K,E	1SV282	NO	1SV282	NO	1SV214	NO	15n	15n	22n	NO	NO	1u	1u	1u	NO	L34-4645-05	NO	1u	NO	1u	NO	33n	C05-0396-05	NO
-11	K2	1SV282	NO	1SV282	NO	1SV214	NO	15n	15n	18n	NO	NO	1u	1u	1u	NO	L34-4605-05	NO	1u	NO	1u	NO	22n	C05-0396-05	NO
-12	K3	NO	1SV282	NO	1SV282	NO	1SV214	18n	18n	27n	1u	1u	NO	NO	NO	1u	NO	L34-4607-05	NO	1.5u	NO	1.5u	33n	NO	C05-0396-05

A2 SUB UNIT (TX VCO/PLL)

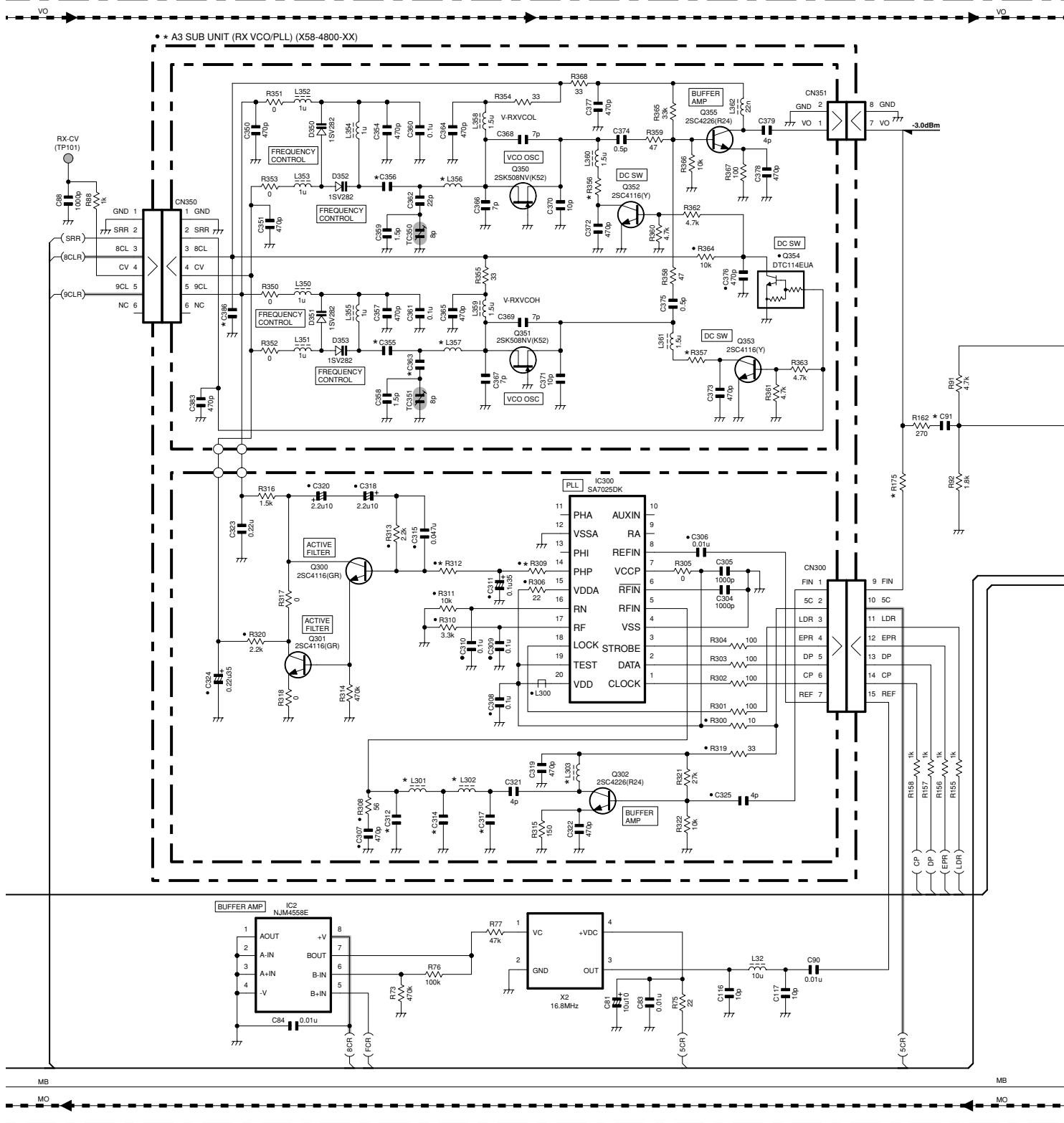
X58-4810-XX	R350	R351	R352	R353	R354	R355	R358	R359	R372	R373	R374	R375	R376	R377	Q350	Q351	
-10	K,E	NO	0	NO	0	33	NO	NO	47	100k	100k	NO	NO	180	NO	2SK508NV(K52)	NO
-11	K2	NO	NO	0	33	NO	NO	NO	47	100k	100k	NO	NO	150	NO	2SK508NV(K52)	NO
-12	K3	0	NO	0	NO	33	47	NO	NO	NO	100k	100k	NO	180	NO	2SK508NV(K52)	NO

TX-RX UNIT

X57-696X-XX	A2	C28	C29	C223	C224	C235	L42	L45	R179	
0-11-2,70	K,E	X58-4810-10	2P	2P	100P	NO	NO	6.8n	NO	0
0-12	K2	X58-4810-11	2P	2P	NO	NO	NO	6.8n	NO	0
0-13	K3	X58-4810-12	8P	11P	NO	3p	100p	18n	18n	NO

# SCHEMATIC DIAGRAM TKR-850

TX-RX UNIT (X57-696X-XX) (A/2)



A3 SUB UNIT (RX VCO/PLL)

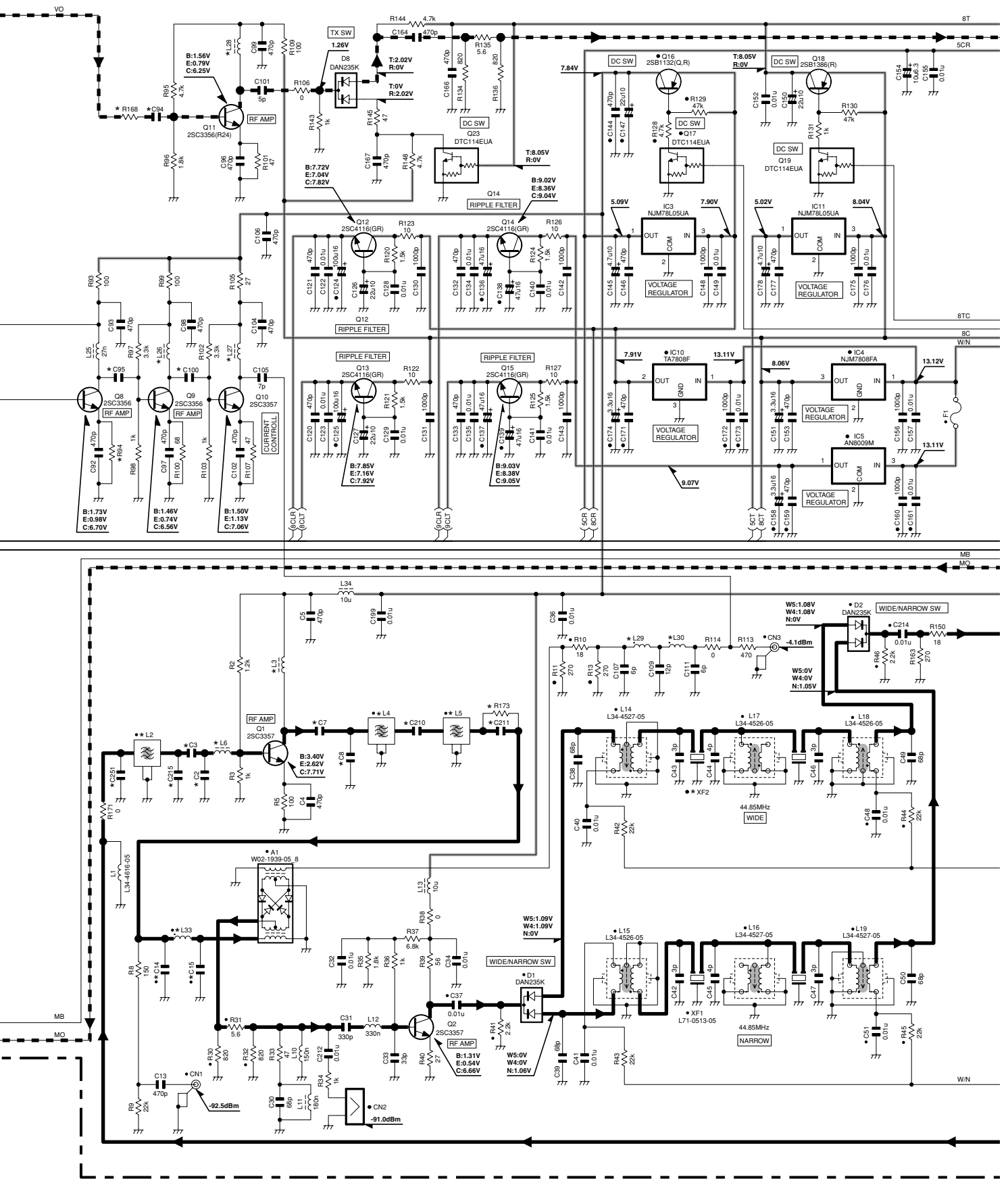
X58-4800-XX	C312	C314	C317	C355	C356	C363	C386	L301	L302	L303	L356	L357	R309	R312	R356	R357	
-10	K.E	7p	12p	7p	5p	6p	15p	100p	18n	18n	22n	L34-4608-05	L34-4608-05	330	330	220	180
-11	K2	6p	15p	6p	5p	6p	18p	22p	15n	15n	18n	L34-4607-05	L34-4607-05	390	390	180	150
-12	K3	8p	18p	8p	6p	7p	15p	100p	18n	18n	27n	L34-4609-05	L34-4609-05	330	330	220	180

TX-RX UNIT

X57-696X-XX	A3	C91	R175	
0-11,2-70	K.E	X58-4800-10	4P	0
0-12	K2	X58-4800-11	4P	0
0-13	K3	X58-4800-12	5P	390

# TKR-850 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-696X-XX) (A/2)

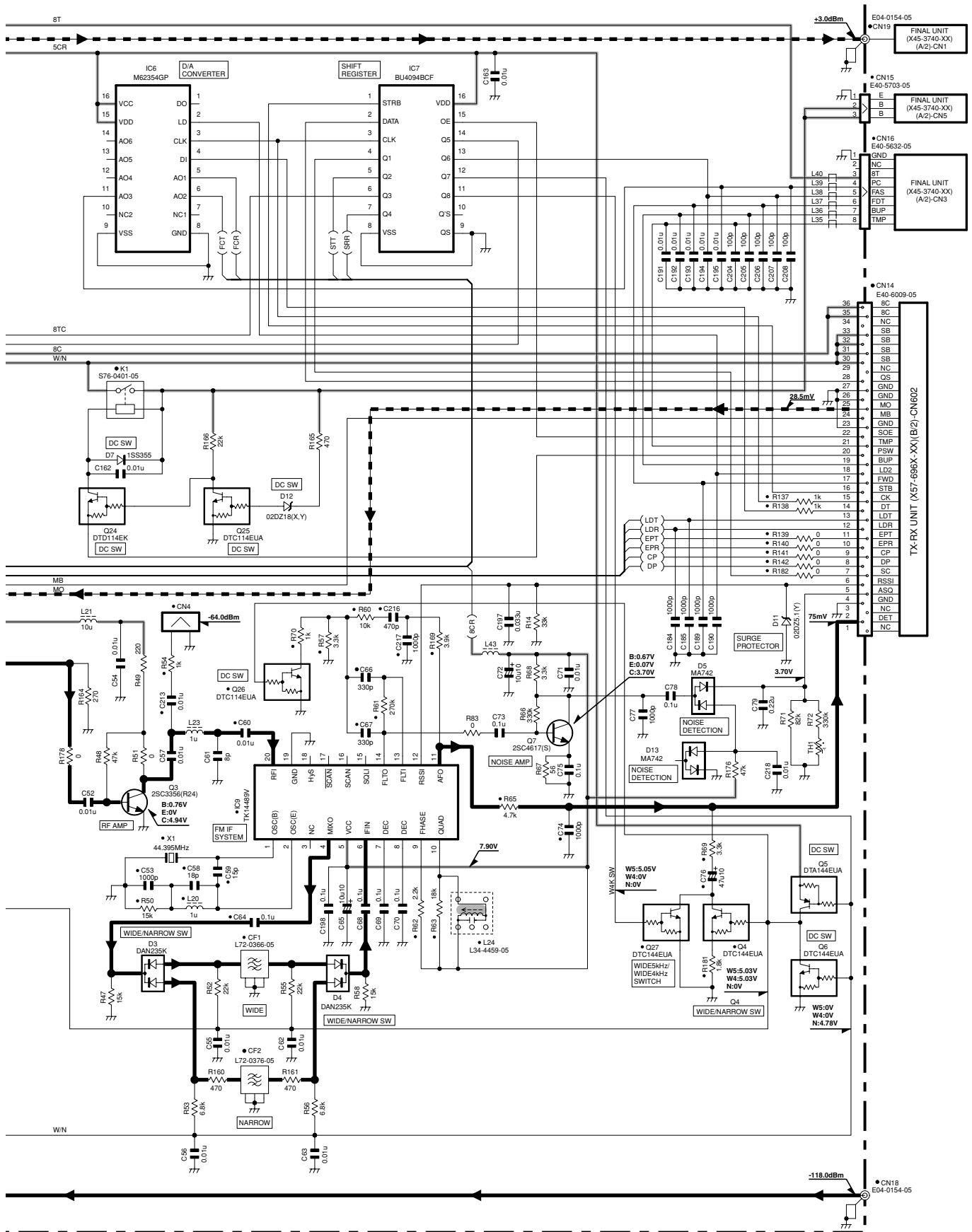


TX-RX UNIT

X57-696X-XX	C2	C3	C7	C8	C14	C15	C94	C95	C100	C210	C211	C215	C251	L2	L3	L4	L5	L6	L26	L27	L28	L29	L30	L33	R94	R168	R173	XF2	
2-70	E	NO	12P	12P	0.5P	6P	6P	3P	4P	5P	8P	12P	NO	NO	L79-1849-05	18n	L79-1849-05	L79-1849-05	18n	15n	22n	18n	18n	18n	15n	100	0	NO	L71-0627-05
0-11	K	NO	12P	12P	0.5P	6P	6P	3P	4P	5P	8P	12P	NO	NO	L79-1849-05	18n	L79-1849-05	L79-1849-05	18n	15n	22n	18n	18n	18n	15n	100	0	NO	L71-0512-05
0-12	K2	NO	10P	7P	1P	6P	6P	3P	6P	5P	8P	NO	5P	2P	L79-1852-05	18n	L79-1852-05	L79-1852-05	18n	15n	18n	18n	18n	18n	82	0	0	NO	L71-0512-05
0-13	K3	1P	10P	6P	1P	7P	7P	4P	4P	6P	10P	NO	NO	3P	L79-1853-05	15n	L79-1853-05	L79-1853-05	22n	22n	22n	22n	22n	22n	100	270	0	NO	L71-0512-05

# SCHEMATIC DIAGRAM TKR-850

TX-RX UNIT (X57-696X-XX) (A/2)

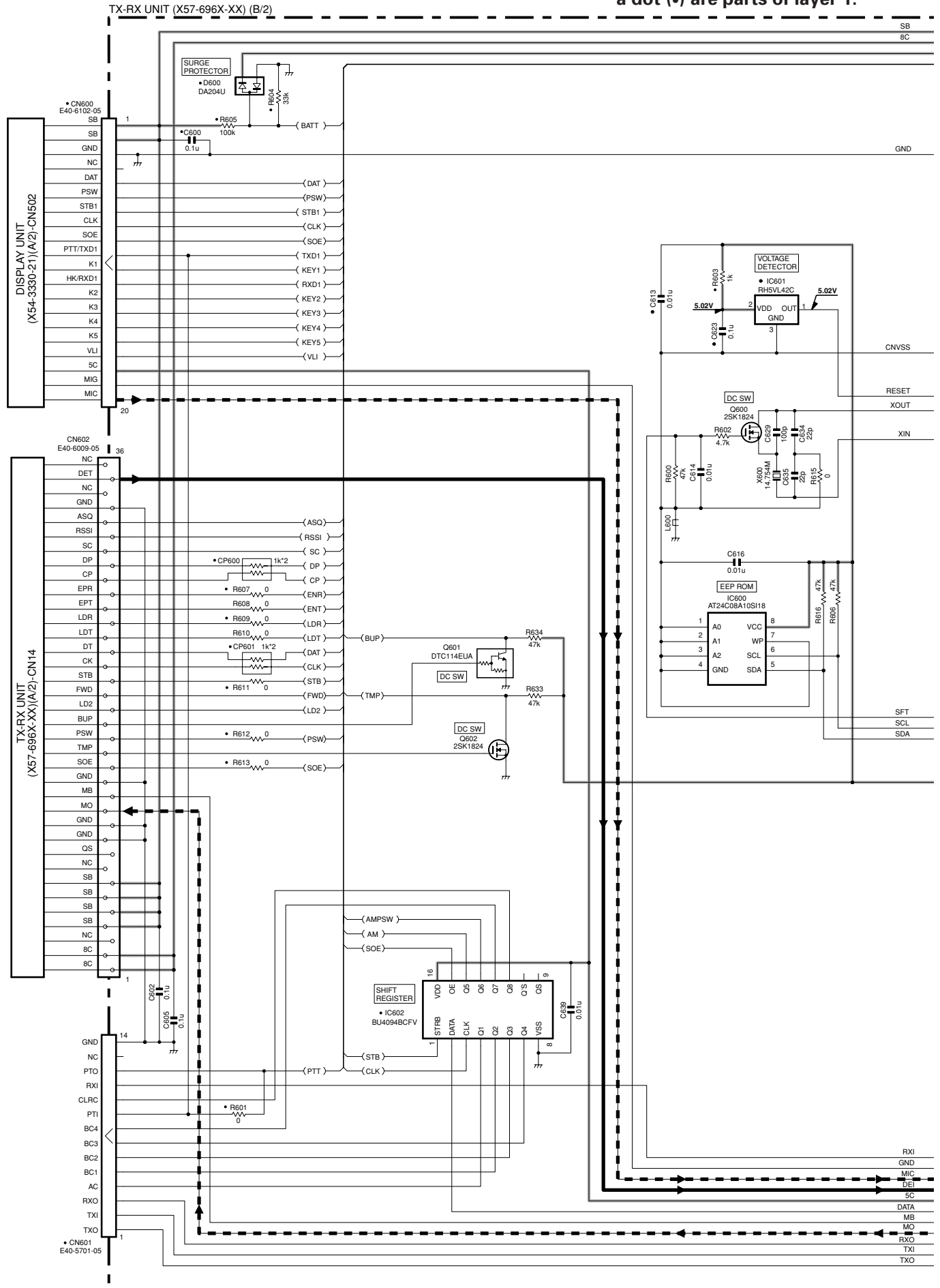


Note : The components marked with a dot (•) are parts of layer 1.



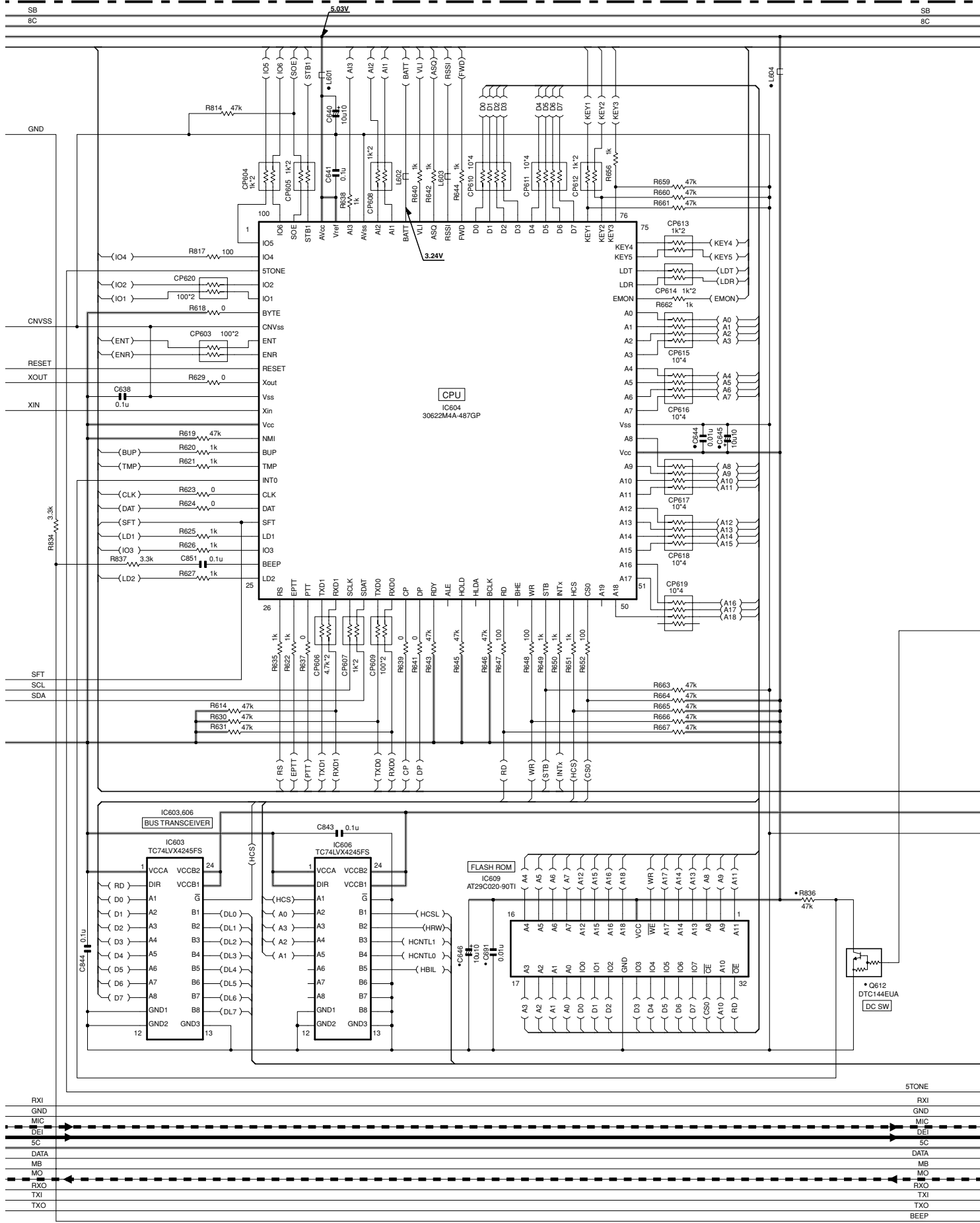
# TKR-850 SCHEMATIC DIAGRAM

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



# SCHEMATIC DIAGRAM TKR-850

TX-RX UNIT (X57-696X-XX) (B/2)

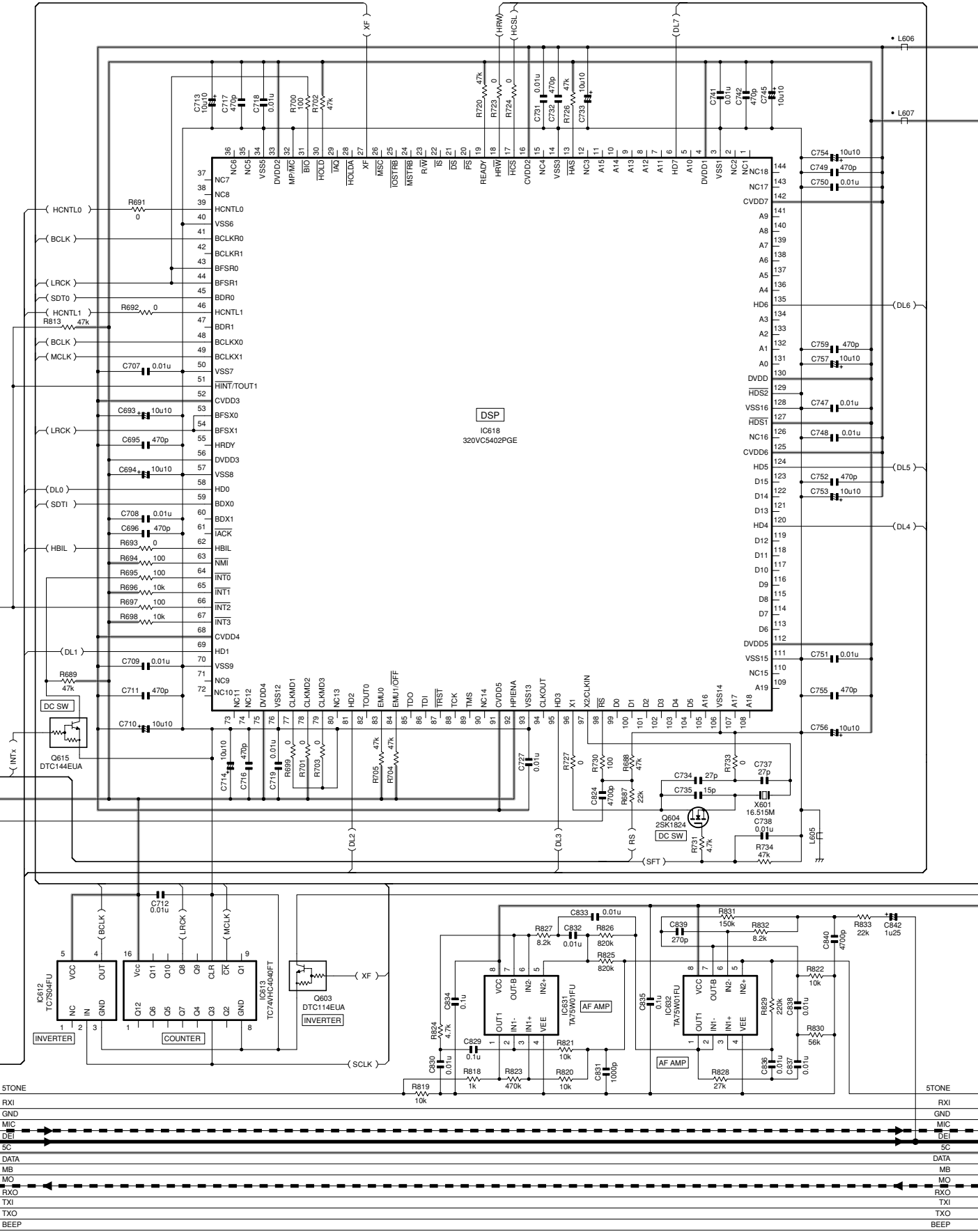




# TKR-850 SCHEMATIC DIAGRAM

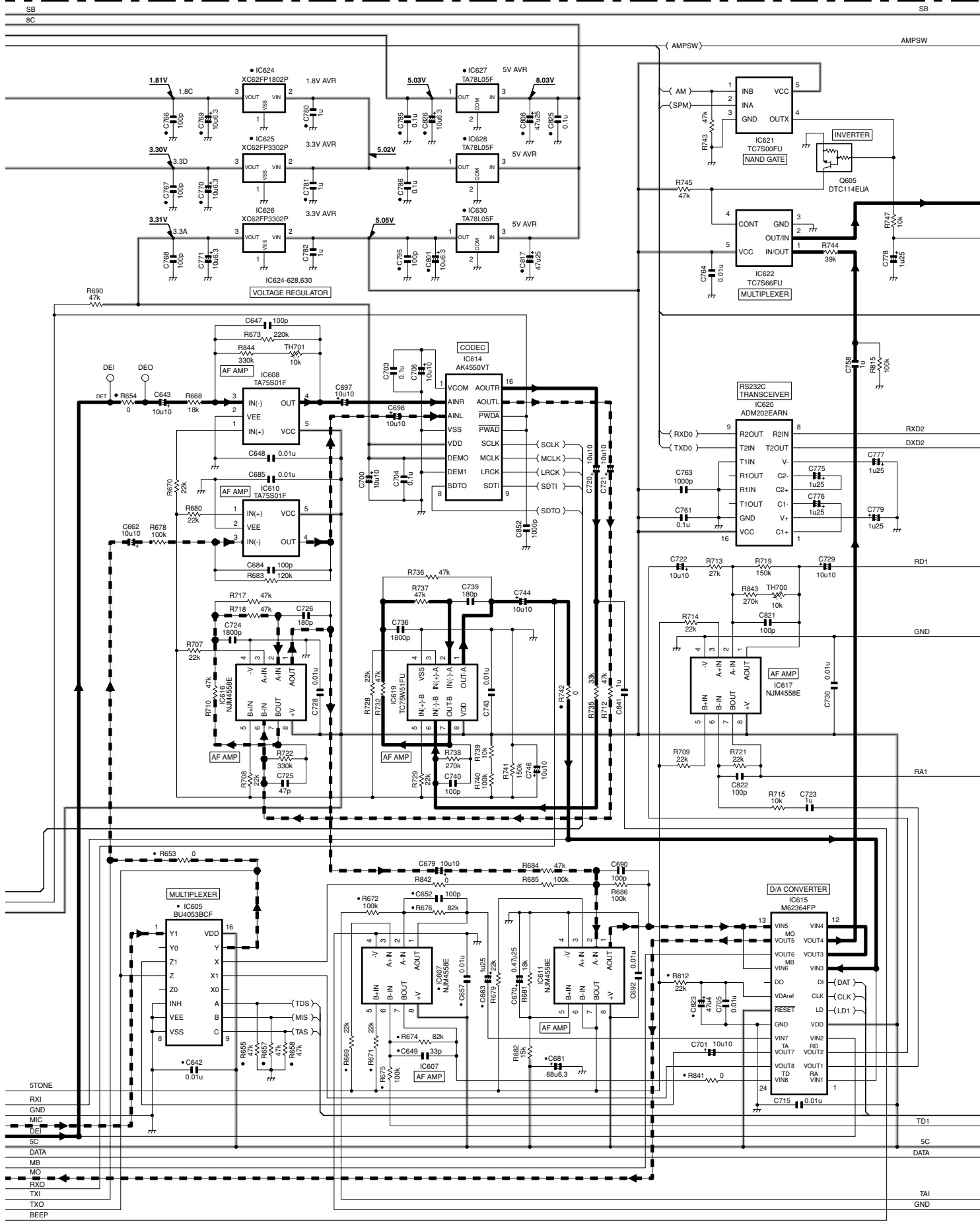
TX-RX UNIT (X57-696X-XX) (B/2)

SB SB  
8C 8C



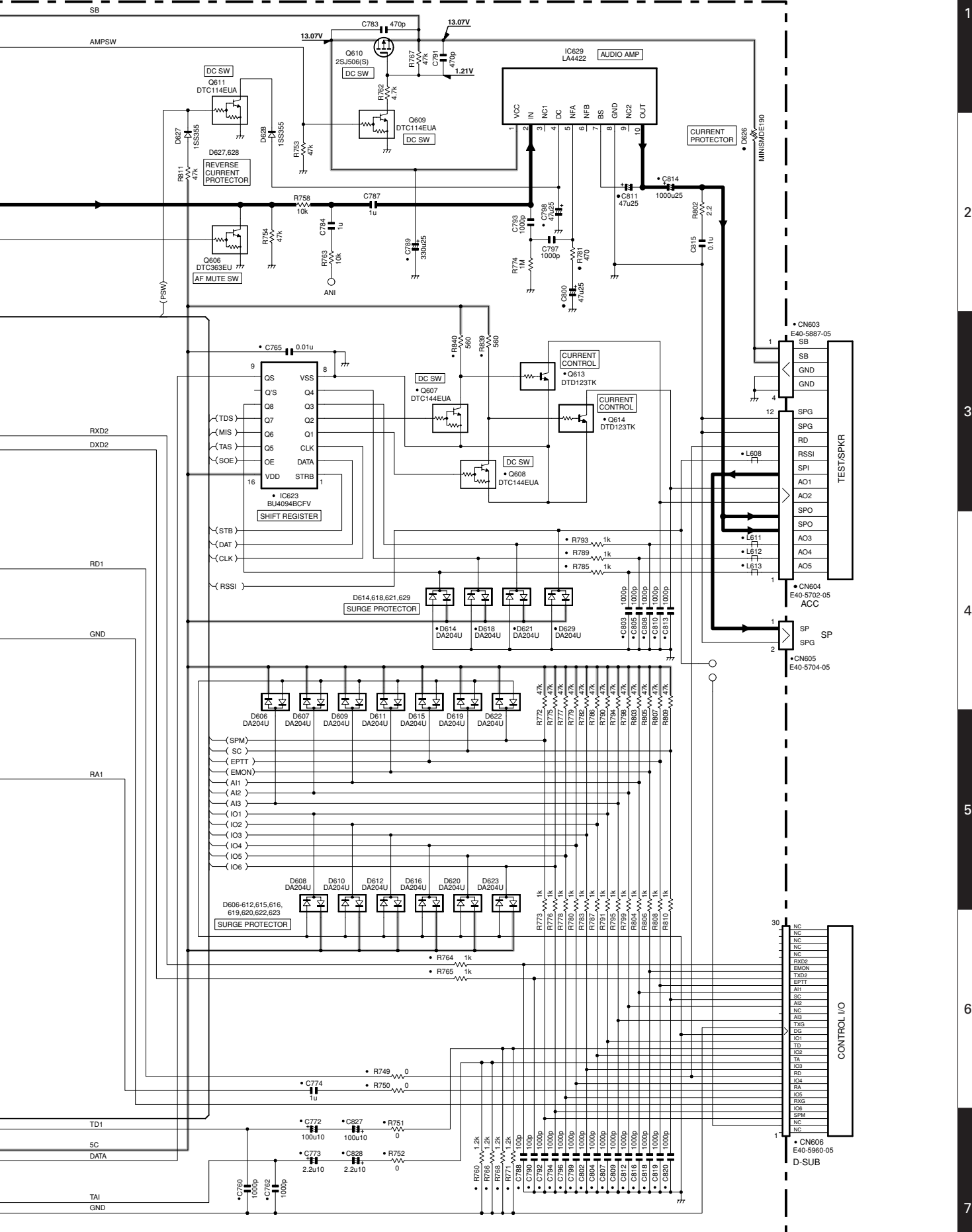
# SCHEMATIC DIAGRAM TKR-850

TX-RX UNIT (X57-696X-XX) (B/2)

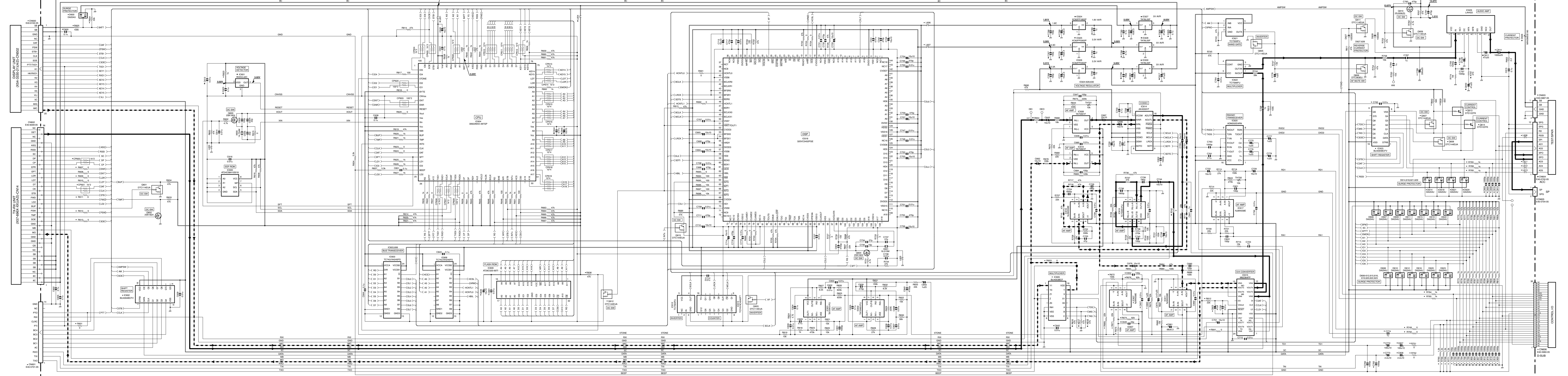


# TKR-850 SCHEMATIC DIAGRAM

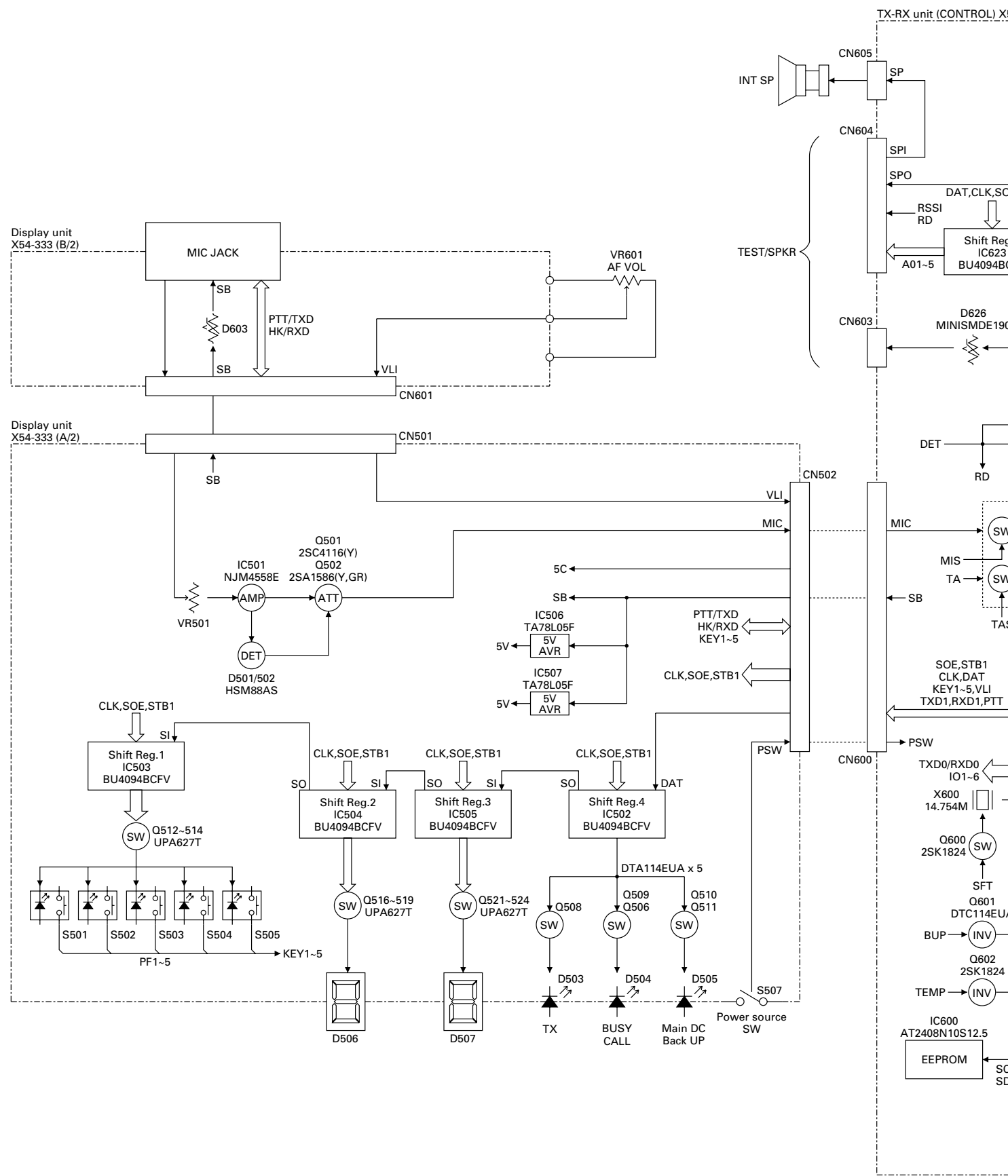
TX-RX UNIT (X57-696X-XX) (B/2)



1  
2  
3  
4  
5  
6  
7

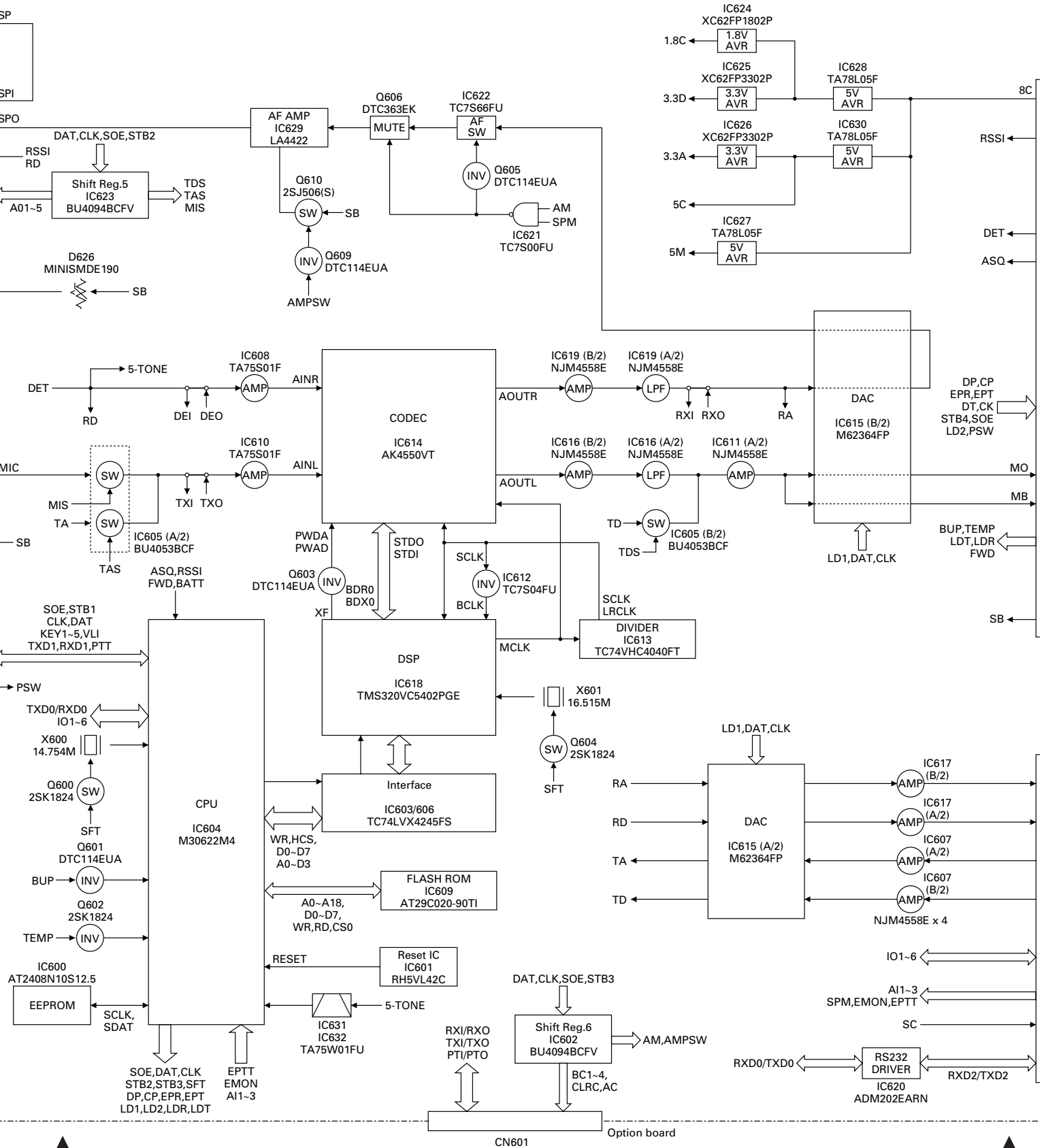


## BLOCK DIAGRAM

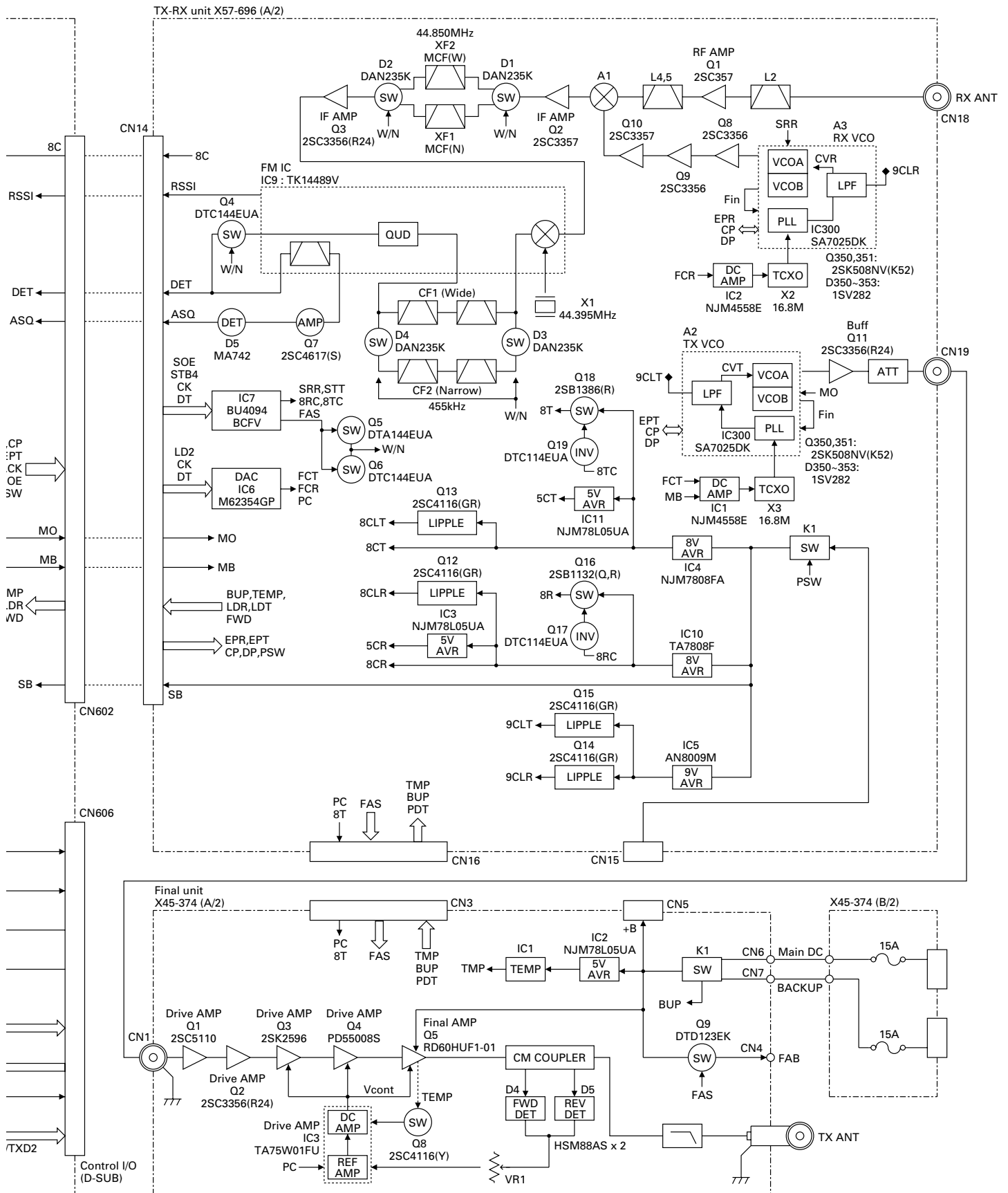


## BLOCK DIAGRAM

RX unit (CONTROL) X57-696 (B/2)



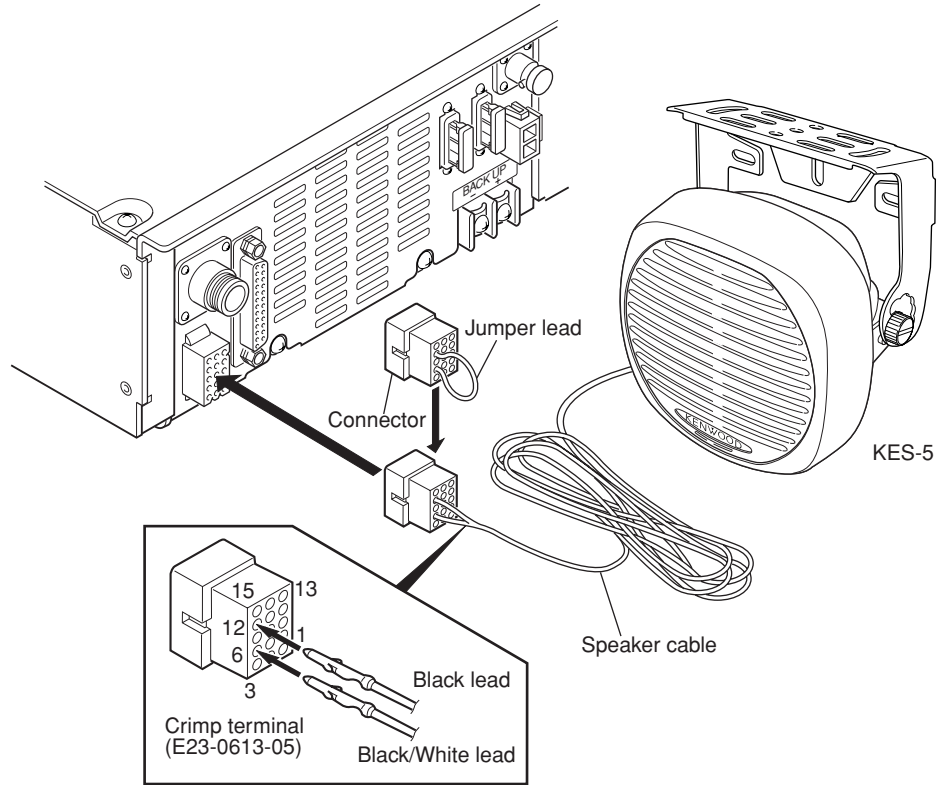
## BLOCK DIAGRAM



## KES-5 (EXTERNAL SPEAKER)

### When Using an External Speaker

1. Make sure the unit's power is tuned off.
2. When using the external speaker, remove the jumper lead from the connector, and attach the speaker cable.
3. When not using the external speaker, replace the jumper lead and insert the connector into the speaker jack (pin9 and 12).



### Specifications

Maximum input power .....	40W
Impedance .....	4Ω
Dimensions (W x H x D) .....	129 x 129 x 77 mm
projection not included .....	5-1/16 x 5-1/16 x 3 inches
Weight .....	820g / 1.81 lbs



## SPECIFICATIONS (K,K2,K3 TYPE)

### GENERAL

Frequency Range .....	K : 450 to 480MHz	K2 : 480 to 512MHz	K3 : 400 to 430MHz
Number of Channels .....	16 channel		
Channel Spacing .....	Wide : 25kHz    Narrow : 12.5kHz (PLL channel stepping 5kHz/6.25kHz)		
Operating Voltage .....	13.6V DC $\pm$ 15% (10.8~15.6V)		
Current Drain			
Standby .....	0.8A		
Standby w/power save .....	0.3A (Operating mode DC-IN : Backup, FAN : Temp, SAVE : ON, DISP : OFF)		
Receive .....	1.2A		
Transmit/Receive .....	Less than 13A		
Duty Cycle			
Receive .....	100%		
Transmit .....	100% (100% @25W)		
Frequency Stability .....	Less than $\pm 0.00015\%$ $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $-22^{\circ}\text{F}$ to $+140^{\circ}\text{F}$ )		
Antenna Impedance .....	50 $\Omega$		
Operating Temperature Range .....	$-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $-22^{\circ}\text{F}$ to $+140^{\circ}\text{F}$ )		
Dimensions .....	483 (19) W x 88 (3-1/2) H x 340 (13-1/3) D mm (inch)		
Weight .....	9.7kg (21.4 lbs.)		

### RECEIVER (Measured by TIA/EIA-603)

Sensitivity		
12dB SINAD .....	0.35 $\mu\text{V}$ ( $-116\text{dBm}$ )	
20dB Quieting .....	0.45 $\mu\text{V}$ ( $-114\text{dBm}$ )	
Selectivity .....	Wide : 83dB ( $\pm 25\text{kHz}$ )	Narrow : 75dB (12.5kHz)
Intermodulation .....	Wide : 78dB ( $\pm 25\text{kHz}/\pm 50\text{kHz}$ )	Narrow : 75dB ( $\pm 12.5\text{kHz}/\pm 25\text{kHz}$ )
Hum and Noise .....	Wide : 50dB	Narrow : 45dB
Spurious & Image Rejection .....	90dB	
Audio Output (Ext. Speaker) .....	4W at 4 $\Omega$ less than 5% distortion	
Audio Distortion (Ext. Speaker) .....	Less than 2.5% at 1000Hz	
Band Spread .....	5MHz	

### TRANSMITTER (Measured by TIA/EIA-603)

RF Power Output .....	40W adjustable to 15W (100% duty @25W)	
Type of Emission .....	Wide : 16K0F3E	Narrow : 11K0F3E
Spurious Response .....	Harmonics : 80dB	Others : 75dB
FM Hum and Noise .....	Wide : 50dB	Narrow : 45dB
Audio Distortion .....	Less than 3% at 1000Hz	
Microphone Impedance .....	600 $\Omega$	
Band Spread .....	30MHz	

# TKR-850

## SPECIFICATIONS (E TYPE)

### GENERAL

Frequency Range .....	440 to 470MHz
Number of Channels .....	16 channel
Channel Spacing .....	Wide : 25kHz    Narrow : 12.5kHz
.....	(PLL channel stepping 5kHz/6.25kHz)
Operating Voltage .....	13.2V DC
Current Drain	
Standby .....	0.8A
Standby w/power save .....	0.3A (Operating mode DC-IN : Backup, FAN : Temp, SAVE : ON, DISP : OFF)
Receive .....	1.2A
Transmit/Receive .....	Less than 13A
Duty Cycle .....	Receive : 100%    Transmit : 100% (100% @25W)
Frequency Stability .....	Less than $\pm 0.00015\%$ $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$
Antenna Impedance .....	50 $\Omega$
Operating Temperature Range .....	$-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$
Dimensions .....	483 W x 88 H x 340 D mm
Weight .....	9.7kg

### RECEIVER (Measured by EN 300 086)

Sensitivity .....	0.45 $\mu\text{V}$
Adjucent Channel Selectivity .....	83dB ( $\pm 25\text{kHz}$ )    75dB ( $\pm 12.5\text{kHz}$ )
Intermodulation .....	72dB
Spurious & Image Rejection .....	90dB
Audio Output (Ext. Speaker) .....	4W at 4 $\Omega$ less than 5% distortion
Audio Distortion (Ext. Speaker) .....	Less than 2.5% at 1000Hz
Band Spread .....	5MHz

### TRANSMITTER (Measured by EN 300 086)

RF Power Output .....	40W adjustable to 25W (100% duty @25W)
Type of Emission .....	16K0F3E, 8K50F3E, 14K0F2D, 7K50F2D
Modulation Limiting .....	$\pm 5\text{kHz}$ at $\pm 25\text{kHz}$ $\pm 2.5\text{kHz}$ at $\pm 12.5\text{kHz}$
Spurious Emission .....	$-36\text{dBm} \leq 1\text{GHz}$ $-30\text{dBm} > 1\text{GHz}$
FM Noise (EIA) .....	25kHz : 50dB    12.5kHz : 45dB
Modulation Distortion .....	Less than 3% at 1000Hz
Microphone Impedance .....	600 $\Omega$
Band Spread .....	30MHz

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