

# KENWOOD

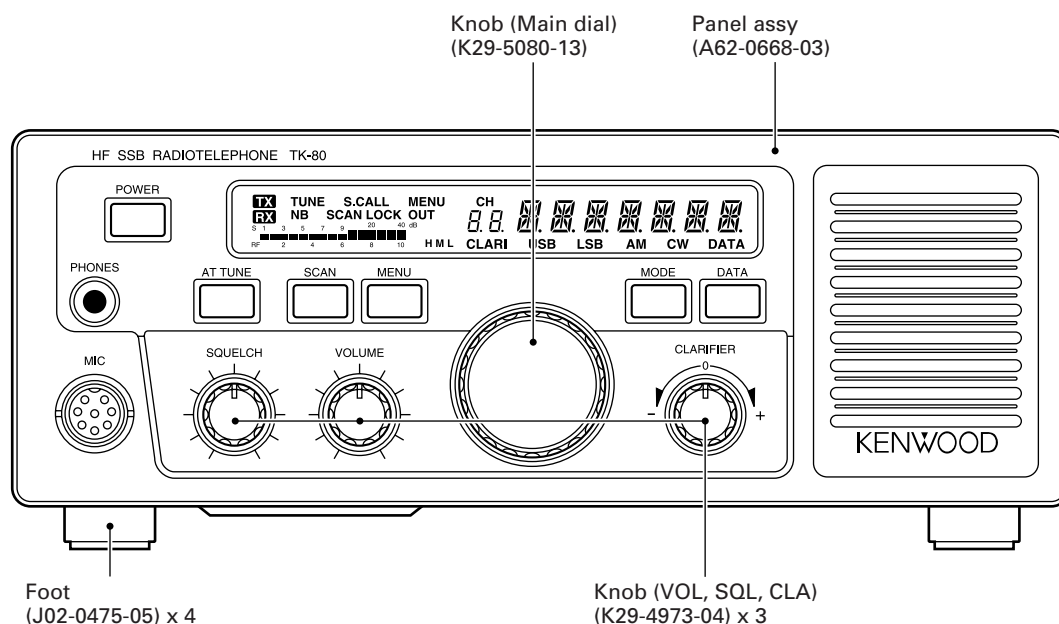
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## GENERAL / REALIGNMENT

### INTRODUCTION

#### SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of the publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions, 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, or chassis. If the part number is not known, include the chassis or kit number of which it is a part, and a sufficient description of the required component for proper identification.

#### PERSONAL SAFETY

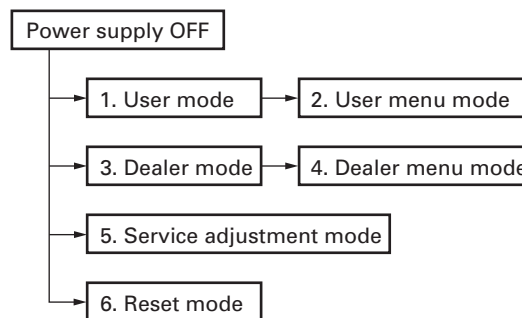
The following precautions are recommended for personal safety:

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

#### SERVICE

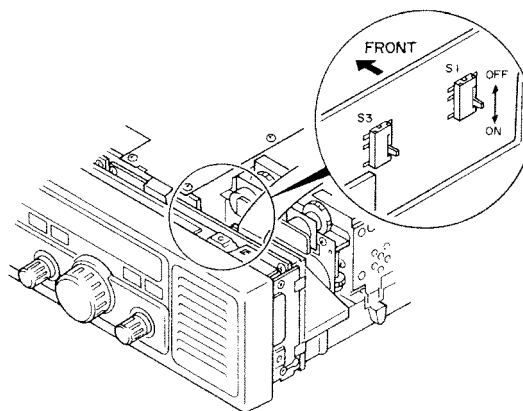
This radiotelephone is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained within.

### 1. Modes



#### Note:

DIP SW1 is set to "ON" when shipped from the factory. If the dealer mode, service adjustment mode, and reset mode fail to function, please check to see that DIP SW1 is set to "ON".

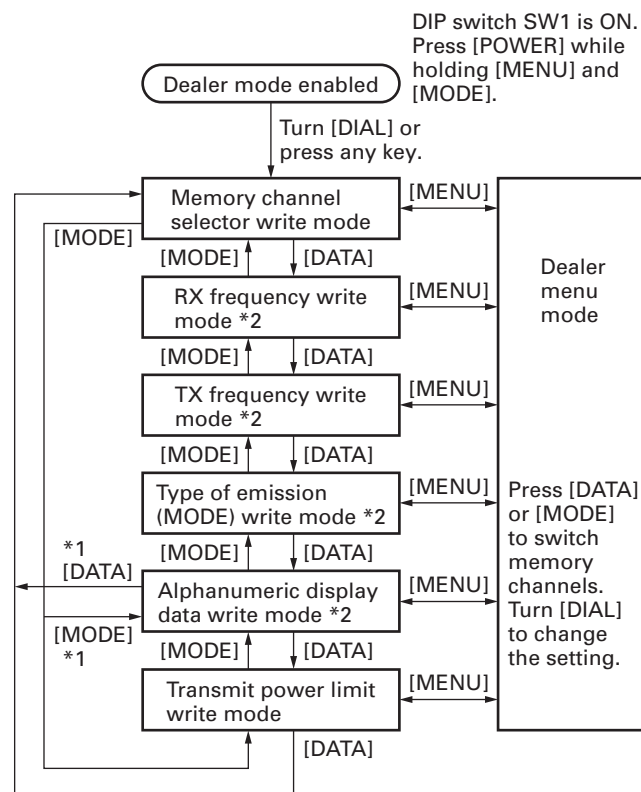
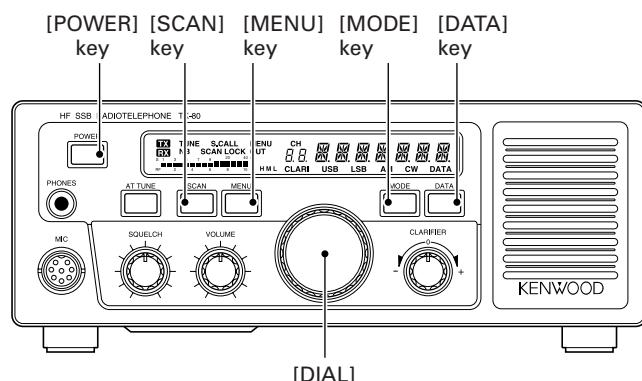


| No. | Mode                    | Function                                                           |
|-----|-------------------------|--------------------------------------------------------------------|
| 1   | User mode               | For normal use.                                                    |
| 2   | User menu mode          | Selects the user menu.                                             |
| 3   | Dealer mode             | Writes the various data settings to the memory channels.           |
| 4   | Dealer menu mode        | Selects the dealer menu.                                           |
| 5   | Service adjustment mode | Selects the adjustment items for the service adjustment mode menu. |
| 6   | Reset mode              | Clears all memory channels and the menu contents.                  |

# REALIGNMENT

## 2. How to Enter Each Mode

| No. | Mode                    | Operation                              |
|-----|-------------------------|----------------------------------------|
| 1   | User mode               | Power ON                               |
| 2   | User menu mode          | [User mode] + [MENU]                   |
| 3   | Dealer mode             | [MENU] + [MODE] + Power ON             |
| 4   | Dealer menu mode        | [Dealer mode] + [MENU]                 |
| 5   | Service adjustment mode | [SCAN] + [DATA] + Power ON             |
| 6   | Reset mode              | [MENU] + [MODE] + [DATA]<br>+ Power ON |



## 3. Reset Mode

### 3-1. All Reset

Restores the factory default settings.

Set DIP SW1 to ON, then press [POWER] while holding [MENU], [MODE], and [DATA].

"HELLO" appears on the display, indicating the system has been reset.

- All reset does not clear adjustment data settings.
- If the power supply is cut off during all reset, the forced all reset is executed as soon as power is restored.

### 3-2. Battery Reset

When the power supply from the backup battery is interrupted, the factory default settings are restored, except for memory channels 01 to 10.

- Battery reset occurs automatically whenever the power backup fails to function.

## 4. Dealer Mode

- This mode allows dealers to select functions for users.
- Dealers can customize the receive frequency, transmit frequency, type of emission (MODE), alphanumeric display, transmission power limit, and set functions.

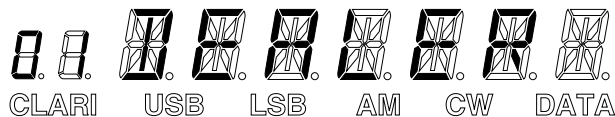
| Contents to be customized | Mode to be used                      | Purpose                     |
|---------------------------|--------------------------------------|-----------------------------|
| Receive frequency         | Receive frequency write mode         | To write to memory channels |
| Transmit frequency        | Transmit frequency write mode        |                             |
| Type of emission (MODE)   | Type of emission (MODE) write mode   |                             |
| Alphanumeric display      | Alphanumeric display data write mode |                             |
| Transmit power limit      | Transmit power limit write mode      |                             |
| Set function              | Menu mode                            | Select function setting     |
| -                         | Memory channel selector mode         | To select memory channels   |

# REALIGNMENT

## 4-1. Procedure ( ): Initial value

- 1) Press [POWER] while holding [MENU] and [MODE].

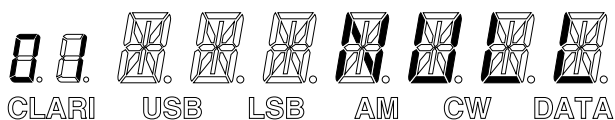
### Dealer mode display



Turn [DIAL] or press any key, and enter Memory channel selector mode.

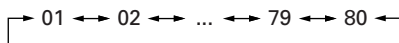
### ■ Memory channel selector mode (01)

This mode is for selector memory channels when writing frequency and other information to memory channels.



Second time: 01 USB only. The others are blank.

- 1) When [DIAL] is turned, channels, including those not entered in memories, are switched continuously.



- 2) Pressing [DATA] enables the receive frequency write mode.

### ■ Receive frequency write mode (00.000.00)

This mode is for writing receive frequencies to memory channels. The frequency is set in single digits starting from the 10MHz to the 10Hz digit. The 1Hz digit is defaulted to "0".



- 1) Turning the [DIAL] changes the digit to its minimum frequency setting.
- 2) When the setting of one digit is completed, press [SCAN] to move to the next digit. Digits are set in order from the 10MHz digit to the 10Hz digit. (When setting the 10Hz digit, for example, the display shows the previously entered digits: 12.345.56)
- 3) Pressing [DATA] enables the transmit frequency write mode.

### Note:

- Setting begins from the 10MHz digit when the receive frequency write mode is first enabled.
- The set frequencies are checked to confirm they are within the specified receive frequency range.
- Setting all digits to "0" initializes the memory channel.
- In the receive frequency write mode, the digit being set flashes as it displays the frequency.

- If the transmit frequency happens to be the default setting (00.000.00), when writing the receive frequency is completed, the receive frequency setting is automatically written to the transmit frequency memory channel as well.
- Leading zeros are not suppressed in the frequency display.

### ■ Transmit frequency write mode (00.000.00)

This mode is for writing transmit frequencies to the memory channels. The frequency is set in single digits starting from the 10MHz digit to the 10Hz digit. The 1Hz digit is defaulted to "0".



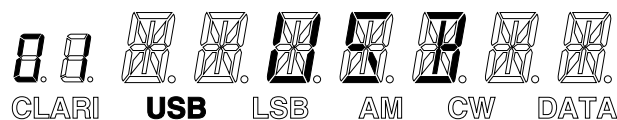
- 1) Turning the [DIAL] changes the digit to its minimum frequency setting.
- 2) When the setting of one digit is completed, press [SCAN] to move to the next digit. Digits are set in order from the 10MHz digit to the 10Hz digit.
- 3) Pressing [DATA] enables the type of emission (MODE) write mode. (When setting the 10Hz digit, for example, the display shows the previously entered digits: 12.345.56)
- 4) When wishing to use the memory channel as a receive-only channel, set all digits to "0", then press [DATA] to enable the type of emission (MODE) write mode.

### Note:

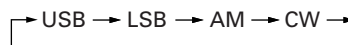
- Setting begins from the 10MHz digit when the transmit frequency write mode is first enabled.
- The set frequencies are checked to confirm they are within the specified transmit frequency range.
- Setting all digits to "0" changes the memory channel to a receive-only channel.
- In the transmit frequency write mode, the digit being set flashes as it displays the frequency.
- Leading zeros are not suppressed in the frequency display.

### ■ Type of emission (MODE) write mode (USB)

This mode is used to write the type of emission to the memory channel.



- 1) Turning the [DIAL] triggers a display that scrolls continuously in the following order:

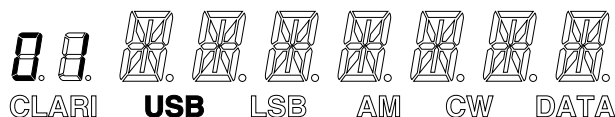


- 2) Pressing [DATA] enables the alphanumeric display data write mode.

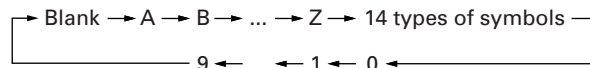
# REALIGNMENT

## ■ Alphanumeric display data write mode (Blank)

This mode is used to write alphanumeric display data (up to 7 digits) to the memory channels.



- 1) Turning the [DIAL] triggers a display that scrolls continuously in the following order:



|       |   |   |     |   |   |   |
|-------|---|---|-----|---|---|---|
| Blank | H | P | X   | , | * | 7 |
| A     | I | Q | Y   | - | 0 | 8 |
| B     | J | R | Z   | / | 1 | 9 |
| C     | K | S | \$  | = | 2 |   |
| D     | L | T | 1/1 | @ | 3 |   |
| E     | M | U | <   | \ | 4 |   |
| F     | N | V | >   | _ | 5 |   |
| G     | O | W | +   | # | 6 |   |

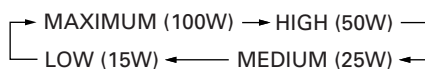
- 2) Digits are set starting from the left side. Pressing [SCAN] moves the cursor one digit position to the right.
- 3) Pressing [DATA] changes control to the:
- Transmit power limit write mode (when specified diode D7 is installed)
  - Memory channel selector mode (when specified diode D7 is not installed)

## ■ Transmit power limit write mode (100W)

This mode is used to write the transmit power limit to the memory channel.



- 1) Turning the [DIAL] triggers a display that scrolls continuously in the following order:



- 2) Press [DATA] to enable the memory channel switching mode.

## 5. Dealer Menu Mode

This mode is used to select functions the dealer sets for the user.

### 5-1. Selecting the dealer menu mode

Press [MENU] while in the dealer mode's memory channel selector mode or any of its write modes.

### 5-2. Menu number selection

To select menu numbers, press the [DATA] or [MODE] keys.

### 5-3. Selecting the setting contents

To change menu settings, turn the [DIAL].

#### Note:

- Menu numbers are designed to scroll in order continuously.
- Menu items are designed to scroll in order continuously.
- If the menu is scrolling, turn the [DIAL] to display the item, then select the desired setting.
- The selective call ON/OFF status and any memory code setting changes from the User menu mode will be reflected in the Dealer menu's settings.

| Menu | Content                                            |
|------|----------------------------------------------------|
| 00   | VFO transmit power and receive-only setting        |
| 01   | MIC gain H/L setting                               |
| 02   | CW/selective call IF filter attachment             |
| 03   | DATA (AFSK) IF filter attachment                   |
| 04   | AIP ON/OFF                                         |
| 05   | AUX ON/OFF                                         |
| 06   | Scan speed setting                                 |
| 07   | BC AM 1/9kHz steps                                 |
| 08   | Clarifier 10/1Hz steps                             |
| 09   | VOX ON/OFF                                         |
| 10   | CW delay time setting (full/semi break-in setting) |
| 11   | CW sidetone/pitch frequency setting                |
| 12   | Power setting (H, M, L) display ON/OFF             |
| 13   | Channel number display ON/OFF                      |
| 14   | DATA mode AFSK/FSK setting                         |
| 15   | DATA (FSK) IF filter selection                     |
| 16   | FSK shift width setting                            |
| 17   | FSK key polarity setting                           |
| 18   | FSK H/L tone setting                               |
| 19   | FSK reverse setting                                |
| 20   | SCAN SW actuation enable/disable                   |
| 21   | MENU SW actuation enable/disable                   |
| 22   | MODE SW actuation enable/disable                   |
| 23   | DATA SW actuation enable/disable                   |
| 30   | Selective call ON/OFF                              |
| 31   | ID (own unit) code setting                         |

## REALIGNMENT

| Menu | Content                                    |
|------|--------------------------------------------|
| 32   | Squelch opening time (unmute time) setting |
| 33   | Memory code A setting (call ID)            |
| 34   | Memory code B setting (call ID)            |
| 35   | Memory code C setting (call ID)            |
| 36   | Memory code D setting (call ID)            |
| 37   | Memory code A setting (character)          |
| 38   | Memory code B setting (character)          |
| 39   | Memory code C setting (character)          |
| 40   | Memory code D setting (character)          |
| 41   | User manu memory code setting ON/OFF       |
| 42   | ID delay time setting                      |

### 6. Transfer Mode

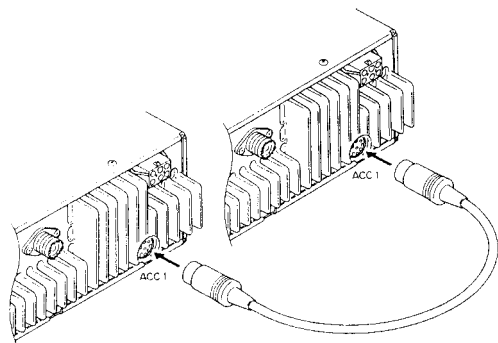
This mode is used to copy the memory and menu data from one TK-80 unit to one or more others to create "TRANS".

#### 6-1. Procedure

- 1) Connect a cross cable (E30-3232-05) to the ACC1 connectors on two TK-80 units, as shown in the figure.
- 2) Turn on the power of the unit receiving the data.
- 3) Enable the Dealer mode in the unit to be transferred, then press [DATA].  
As the unit enters the Dealer mode, it automatically detects the connected second TK-80 unit, displays "TRANS" and begins the transferring transmission.
- 4) When transferring ends normally, the first TK-80 returns to the Dealer mode which is then shown on its display.

#### Note:

- Transfer is not possible when the destination diode (D8, D9, D10, D15) setting of the two units differ.
- Transfer is not possible when neither of the two units is equipped with transmit power setting diode (D7).



### 7. VFO Functions

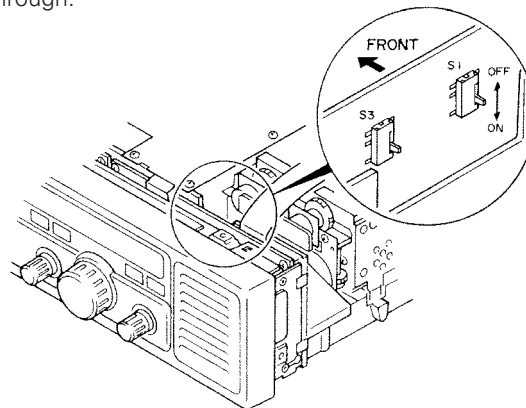
Dip SW3 is set to ON when shipped from the factory. Should the VFO mode fail to function, please check to see that Dip SW3 is set to ON.

#### 7-1. Procedure

- 1) Press [MENU] to enable the user Menu mode.
- 2) Press [DATA] or [MODE] to select No. 00.
- 3) Use [DIAL] to switch the memory to VFO.
- 4) Press [MENU] to select VFO.

#### 7-2. Description

- 1) [DIAL] changes from selecting memory channels to selecting VFO frequencies.
- 2) [SCAN] changes to selecting the step frequency and the F. LOCK function.  
Pressing [SCAN] scrolls through the settings in the following order:  
10Hz → F. LOCK → 100kHz → 1kHz → 10Hz  
Turning the [DIAL] after changing the step frequency rounds the lower digit off to "0".
- 3) When in the user Menu mode, memory channel frequencies and type of emissions (MODE) are set in the VFO at the point control is switched from Memory to VFO.
- 4) [DIAL] and [MENU] are disabled during F. LOCK.
- 5) Even if AT tuning is established during VFO, the changing of the frequency automatically credits the state of AT through.



### 8. Personal Computer Interface

In addition to commands (in the instruction manual) made available to users, the SR (system reset) command is made available only to dealers.

#### Note:

- SRP1 = Reset the user menu  
SRP2 = Reset all
- The reset user Menu command resets all menu settings to the factory defaults.

# REALIGNMENT

## 9. User Menu Mode

This mode enables users to select various settings to suit their individual needs. The items that can be modified are listed below:

| Menu | Content                                  |
|------|------------------------------------------|
| 00   | VFO/M                                    |
| 01   | Transmit power switching                 |
| 02   | NB ON/OFF                                |
| 03   | Display switching frequency/alphanumeric |
| 04   | LOCK OUT ON/OFF                          |
| 05   | Scan busy stop switching TO/CO/OFF       |
| 06   | Selective call ON/OFF                    |
| 07   | ID (own unit) code display               |
| 08   | Memory code A setting (call ID)          |
| 09   | Memory code B setting (call ID)          |
| 10   | Memory code C setting (call ID)          |
| 11   | Memory code D setting (call ID)          |
| 12   | Memory code A setting (character)        |
| 13   | Memory code B setting (character)        |
| 14   | Memory code C setting (character)        |
| 15   | Memory code D setting (character)        |

### 9-1. Selecting settings

- Begin by pressing [MENU] to display the User menu.
- Press [MODE] or [DATA] to select the desired item number.
- Use [DIAL] to change the setting.
- Press [MENU] once more to complete the change.

#### Note:

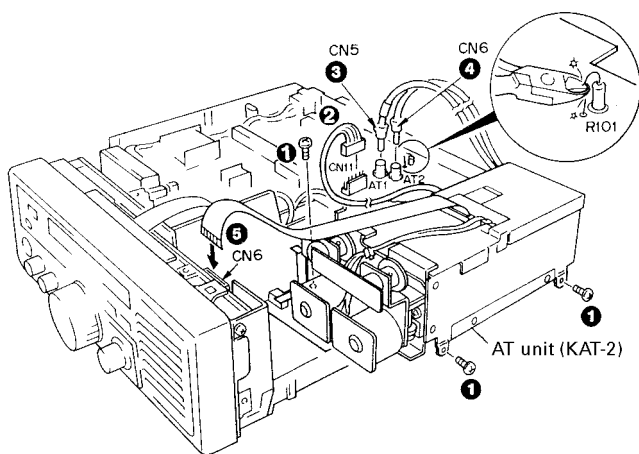
- Menu numbers are designed to scroll in order continuously.
- Menu items are designed to scroll in order continuously.
- Menu item number "00" can only be set when DIP SW3 is set to ON.
- Menu item numbers 08 to 15 can only be set when the user memory code setting in the Dealer menu mode is set to ON.
- Menu item numbers 01 and 04 represent the channels prior to entering the user menu mode.
- If a Selective call kit is not installed, setting item number 06 (user's own office code) to ON will only produce on the display. The selective call mode will not be enabled.
- Switching the [MENU] key ON/OFF can be inhibited from the Dealer menu mode.

## INSTALLATION

### 1. Installing the AT unit (KAT-2: Option)

Remove the case and shielding cover in advance.

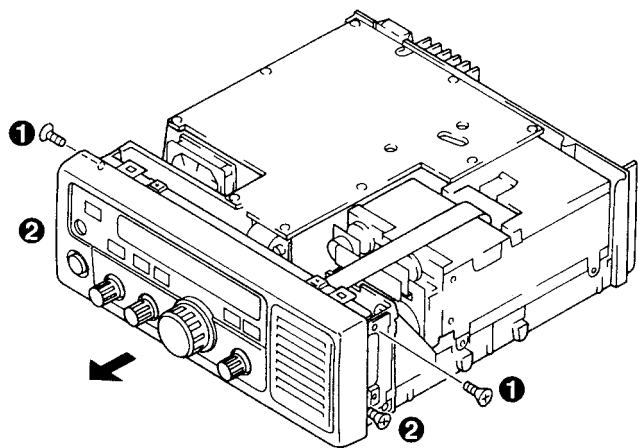
1. Use screws ( ❶ ) to install the Antenna tuner unit (KAT-2).
2. Before inserting the connector, cut the R101 wire.
3. Connect the lead with the connector like pull out to the front side to CN11 ( ❷ ) on X45-3620-21.
4. Connect the coaxial cable's white-marked line to the X45's CN5 ( ❸ ) (AT1) and the other line to CN6 ( ❹ ) (AT2).
5. Insert the flat cable from the tuner unit in CN6 ( ❺ ) of control unit X53-3570-21.
6. Take care not to pinch the lead when reattaching the case.



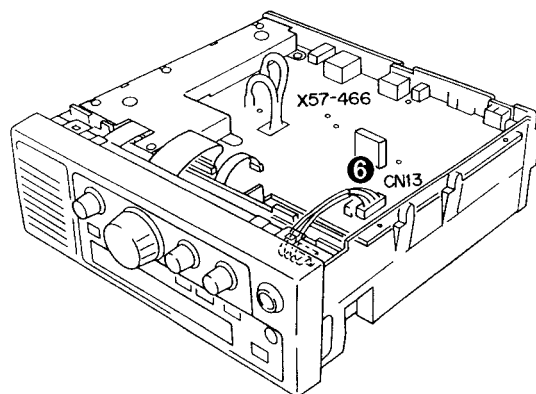
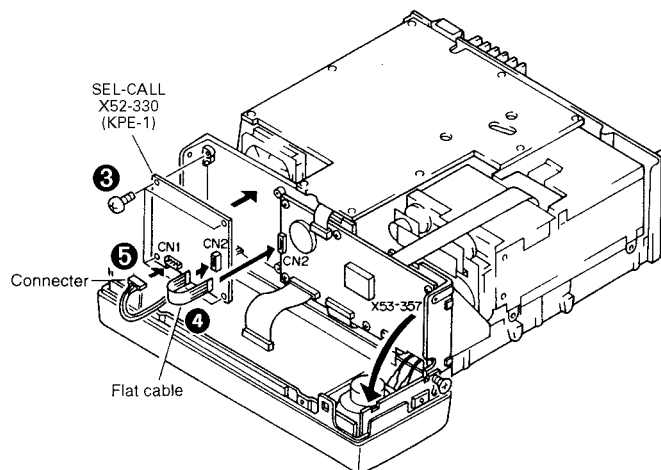
### 2. Installing the selective call unit (KPE-1: Option)

Remove the case in advance.

1. Remove the two screws ( ❶ ) on the upper left and right sides of the front panel, then loosen the two lower screws ( ❷ ) half way and pull the front panel forward.



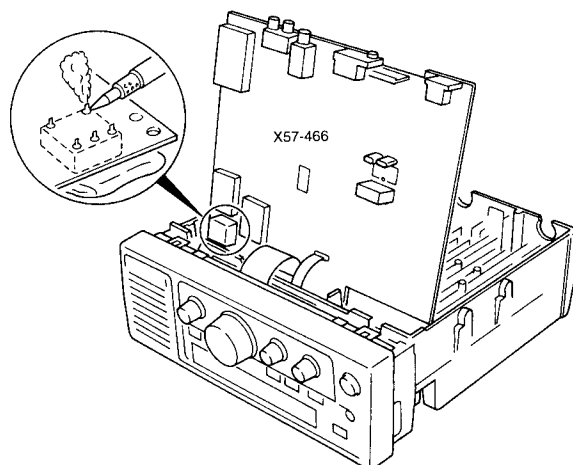
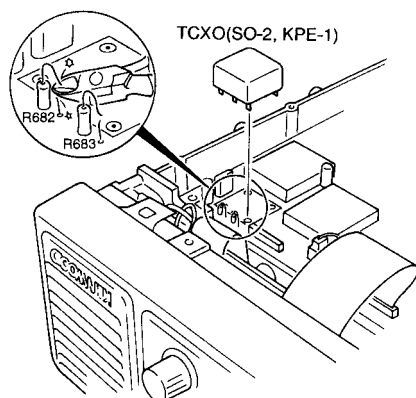
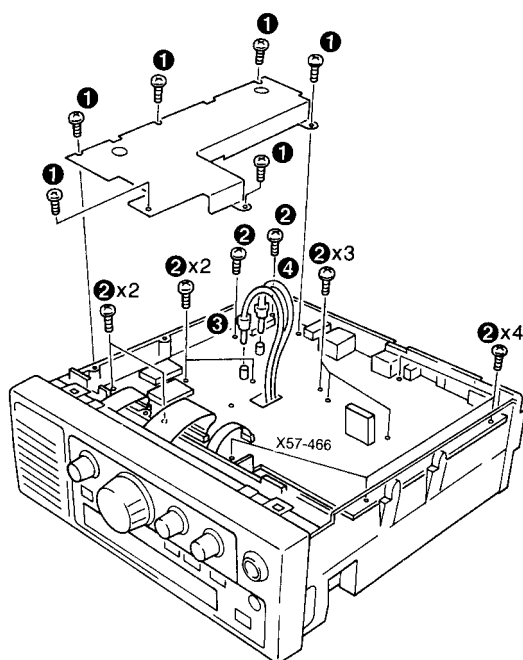
2. As shown in the figure, set the front panel down on its face, mount the optional circuit board X52-330 (selective call) and secure it with the four ( ❸ ) screws.
3. Connect the accessory flat cable ( ❹ ) to CN2 of X53-3570-21 and CN2 on the KPE-1, then connect the accessory lead with the connector ( ❺ ) to CN1 of the KPE-1 and CN13 ( ❻ ) on the X57-4660-21 (bottom side).
4. Take care not to pinch the lead when reattaching the case.



# INSTALLATION

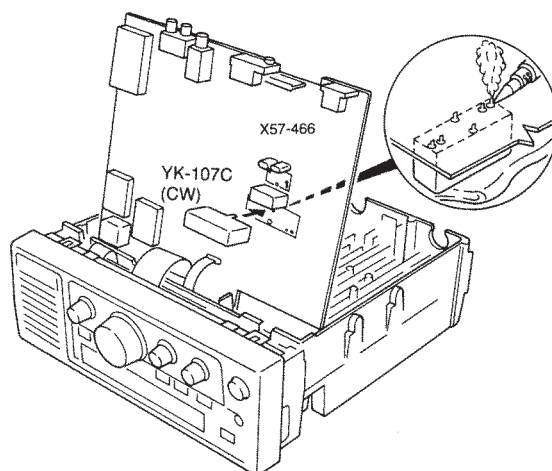
## 3. Installing the optional TCXO (SO-2 or accessory of KPE-1)

1. Remove the screws ( ❶ ) securing the shield plate, then remove the shield plate.
2. Remove the screws ( ❷ ) holding the X57-466 circuit board.
3. Remove the CN19 (black) ( ❸ ) and CN1 (red) ( ❹ ) connectors.
4. Prior to installing the optional TCXO (SO-2 or accessory of KPE-1), cut the lead wires on R682 and R683.
5. Install the optional TCXO (SO-2 or accessory of KPE-1) and apply solder to the soldered side.
6. Take care not to pinch the lead when reattaching the case.



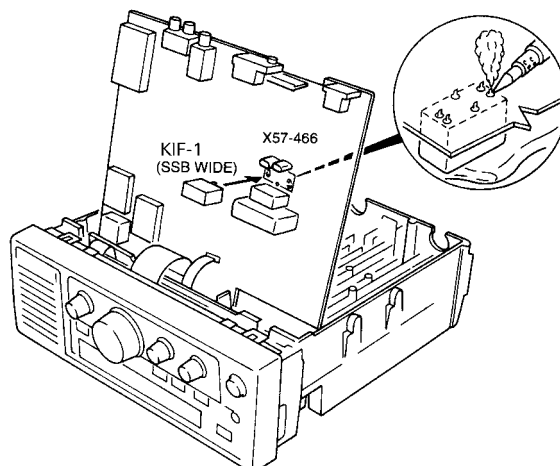
## 4. Installing the IF filter (YK-107C: Option)

1. Install the YK-107C and apply solder to the soldered side.



## 5. Installing the IF filter (KIF-1: Option)

1. Install the optional KIF-1 and apply solder to the soldered side.
2. After installing the IF filter, set the unit to dealer mode.



# CIRCUIT DESCRIPTION

## 1. Frequency Configuration

The TK-80 uses double conversion in all modes.

| Mode    | Display frequency              |
|---------|--------------------------------|
| USB/LSB | Carrier point frequency        |
| CW      | Transmission carrier frequency |
| AM      | Transmission carrier frequency |
| FSK     | Mark transmission frequency    |
| AFSK    | Carrier point frequency        |

**Table 1 Display frequency in each mode**

The receiver frequency in SSB mode is given by the following equation when the receiver tone produced by the input frequency ( $f_{in}$ ) from the antenna is zero beat (when an SSB signal with a carrier point of  $f_{in}$  is zeroed in):

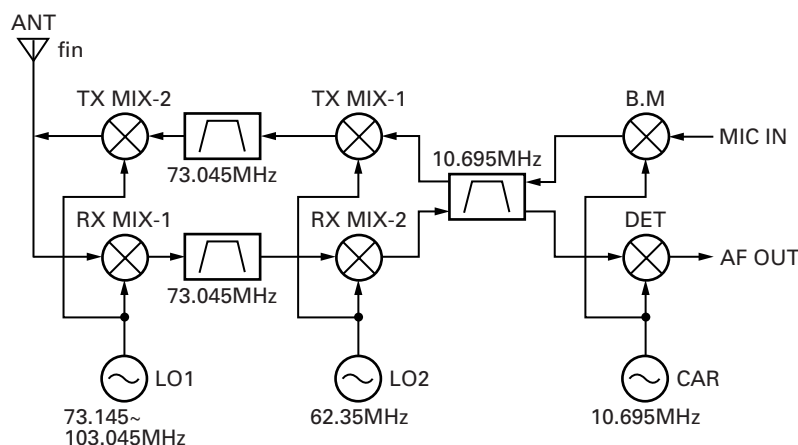
$$f_{in} = f_{LO1} - f_{LO2} - f_{CAR} \dots\dots\dots (1)$$

Since all these frequencies are generated by the PLL circuit, as shown in Figure 2 (PLL circuit frequency configuration), the receiver frequency is determined only by the reference frequency,  $f_{STD}$ , and the PLL divide ratio. This means the accuracy of the reference frequency determines the accuracy of the operating frequency of the transceiver.

The accuracy of the reference crystal oscillator used in the TK-80 is 10ppm ( $-10^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ ). The accuracy of the optional temperature-compensated crystal oscillator (TCXO SO-2) is 0.5ppm ( $-10^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ ).

In SSB transmission mode or in other modes, the frequency is determined by the reference frequency ( $f_{STD}$  and the PLL divide ratio). Table 1 lists the display frequencies in the various modes.

The pitch of the incoming signal in CW mode can be varied in 50Hz steps in the range of 400 or 800Hz without changing the center frequency of the IF filter (variable CW pitch system).



**Fig. 1 Frequency configuration**

## 2. PLL Circuit Configuration

The TK-80 PLL circuit uses a reference frequency of 20MHz, and covers 100kHz to 30MHz. Figure 2 shows a PLL block diagram and frequency configurations.

### 2-1. Reference oscillator circuit

The reference frequency ( $f_{STD}$ ) for frequency control is generated by the 20MHz crystal oscillator, X501 and Q525. The 20MHz reference frequency is supplied to DDS IC500 and IC501 and PLL IC502.

The crystal oscillator circuit can be replaced by an optional TCXO (SO-2 or accessory of KPE-1). The TK-80 can be switched to the TCXO by removing resistors R682 and R683.

### 2-2. LO1 (PLL loop)

Q531, Q533, and Q535 are VCOs.

Q531 (VCO1) generates a signal of 73.145 to 83.544MHz.

Q533 (VCO2) generates a signal of 83.545 to 94.544MHz.

Q535 (VCO3) generates a signal of 94.545 to 103.045MHz.

The 20MHz reference signal of  $f_{STD}$  is input to pin 15 of IC502 and is divided by 40 to produce a 500kHz comparison frequency. The output signal from the VCO is mixed with a 53.545 to 54.045MHz signal from the PLL (described later) and IC503 (Mixer) to produce a 19.5 to 49.5MHz signal. It is then input to pin 6 of IC502, divided, and compared with the 500kHz signal by the phase comparator. The VCO frequency is then locked. The divide ratio data is supplied by the digital unit.

At IC500, a 1.195 to 1.695MHz digital signal is generated and the CP500, CP501 ladder resistor and Q522 D/A converter are used to convert it into an analog signal. That signal is put through a low-pass filter and mixed with 10MHz at mixer IC504 to produce 8.305 to 8.805MHz.

Furthermore, 62.35MHz oscillated by X502 and Q517 is mixed at mixer IC505 to become the above mentioned 53.545 to 54.045MHz signal.

## CIRCUIT DESCRIPTION

### 2-3. LO2 (PLL loop)

The part oscillated by X502 and Q517 is output to LO1 cancel loop after passing through the Q518 buffer and input into mixer IC505. The other part is output from CN502 as LO2.

### 2-4. CAR

A digital signal is generated near 695kHz at IC501, and the analog signal converted by the CP502, CP503 ladder resistors and Q522 D/A converter are mixed with the 10MHz generated from the chop output of IC501 at IC506. This is then output as 10.695MHz through the band-pass filter and the amplifier.

During receiving AM mode, the DDS oscillation is stopped. In FSK mode, the internal register of IC501 is switched for direct FSK modulation by the external RTK signal during selective call mode code transmission by the ABSL signal from the CPU.

### 2-5. DDS circuit configuration

The DDS IC has been developed with standard cells to implement a high-speed circuit and large-capacity ROM at low cost.

### ■ IC configuration

IC configuration is as follows:

- There are two 28 bit registers for setting frequency data, one 28 bit frequency shift register for addition to the frequency registers, a 23 bit parallel signal input section for frequency modulation with parallel signals, and a data entry and selection section.
- There is a frequency-modulation section comprising 28 bit adders for adding frequency data and frequency modulation data, a phase data operation section that adds data from the frequency modulation section and 28 bit phase data register, and a SIN-ROM that converts phase data to sine waves.

### ■ Frequency/shift data setting

Using serial signals synchronized with clock pulses, 30 bits (2 bits that specify the destination for which data is set, and 28 bits of frequency data) are set in the three internal registers.

### ■ Frequency register selection

The data set in the two frequency registers is selected by the SLAB input of the DDS IC. This pin handles the ABSL signal for IC501, and the CASL signal for IC500. This function eliminates the need for the TK-80 to set frequency data for each transmission/reception with the microprocessor.

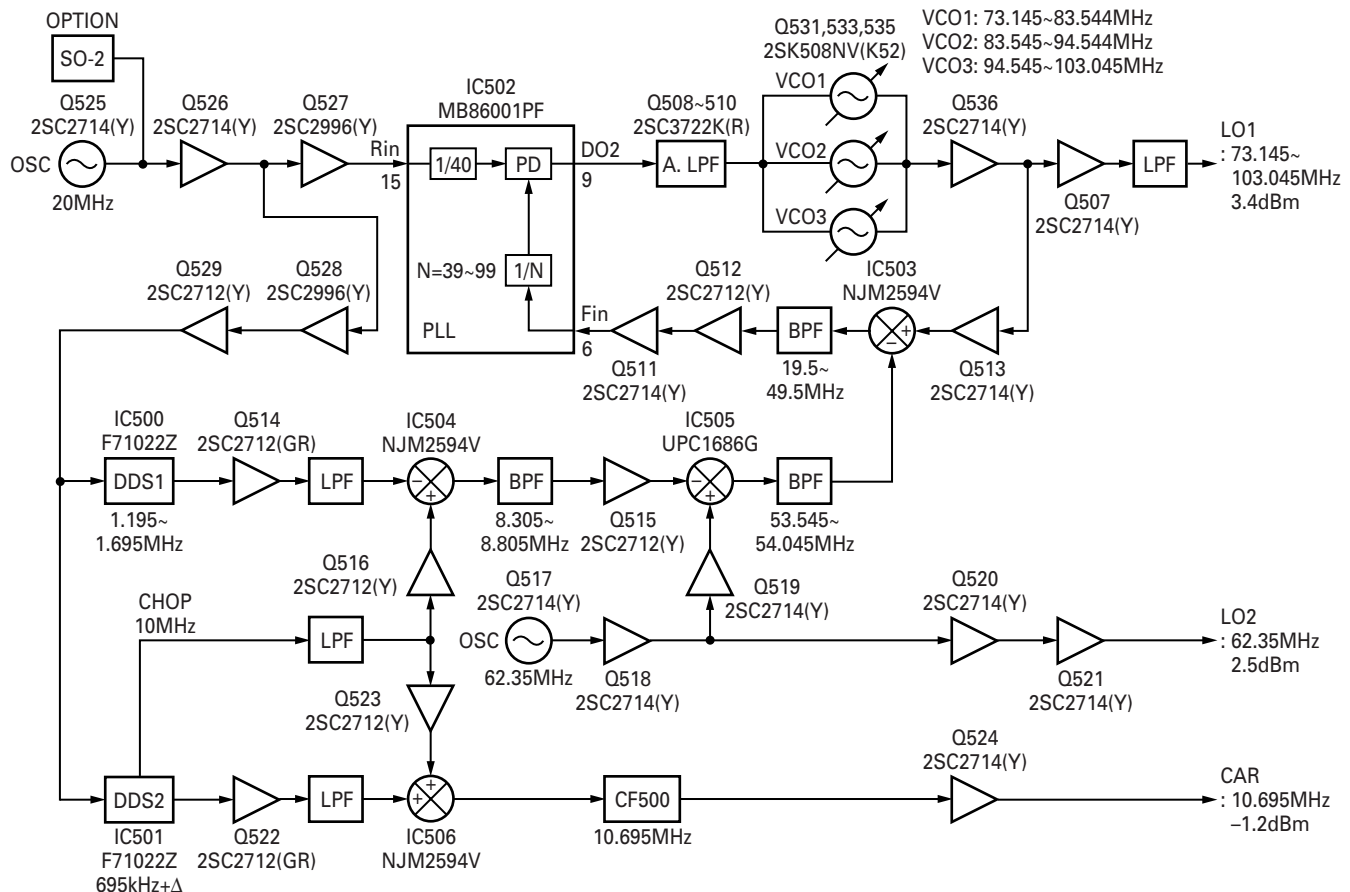


Fig. 2 PLL block diagram and frequency configuration

## CIRCUIT DESCRIPTION

### Frequency data selection

The SPSL input of the DDS IC selects whether to use the data in the internal frequency shift register or the data from the parallel input as frequency modulation data.

### Frequency modulation

The MDEN input of the DDS IC enables or disables frequency modulation. When frequency modulation is enabled, frequency data is added, and the result is input to the phase data operation section.

### Phase data operation

The target frequency phase data is output by accumulating 28 bit frequency data in the 28-bit phase accumulator.

$$F_{OUT} = F_s / 2^{28} \times D_{sum}$$

$F_s$ : DDS IC input frequency/2

$D_{sum}$ : Frequency data + Frequency modulation data

If  $2^{25}$  is set for  $D_{sum}$  when  $1/8 F_s$  is output, the phase data must be increased by  $\pi/8$ .

So far, 28 bit absolute value operation has been used, but a 28 bit signed operation can also be used, assuming that the MSB is a sign. If complement data of 8000000 to FFFFFFFF (hex) is set, the phase moves in the negative direction for positive data.

### SIN-ROM

Phase data from the phase data operation section is converted to sine wave data of 0000 to FFFF (hex) in 16 bit offset binary format (Fig. 3).

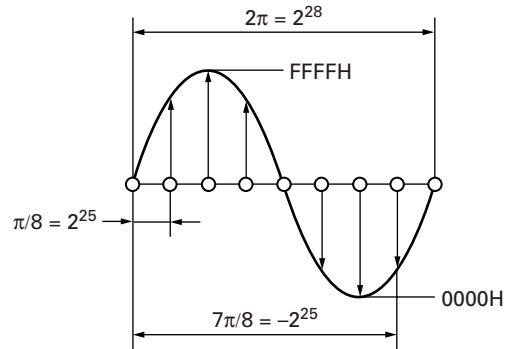


Fig. 3

### 3. Receiver Circuit Configuration

The configuration of the receiver circuit is double conversion with a first IF of 73.045MHz and a second IF of 10.695 MHz in SSB, AM, CW mode.

The incoming signal from the antenna passes through the antenna switch relay of the final unit, then through the 30 MHz low-pass filter, and goes to the TX-RX unit. The signal passes through a 30MHz low-pass filter in the TX-RX unit, and goes through the 8-segmented band-pass filters. If AIP is off, the signal passing through band-pass filter is amplified by the RF amplifier, Q8, Q9, and is input to the first mixer, Q4 to Q7. If AIP is on, the signal bypasses Q8 and Q9 and goes directly to the first mixer. It is mixed with the LO1 signal by the first mixer to produce a first IF signal of 73.045MHz.

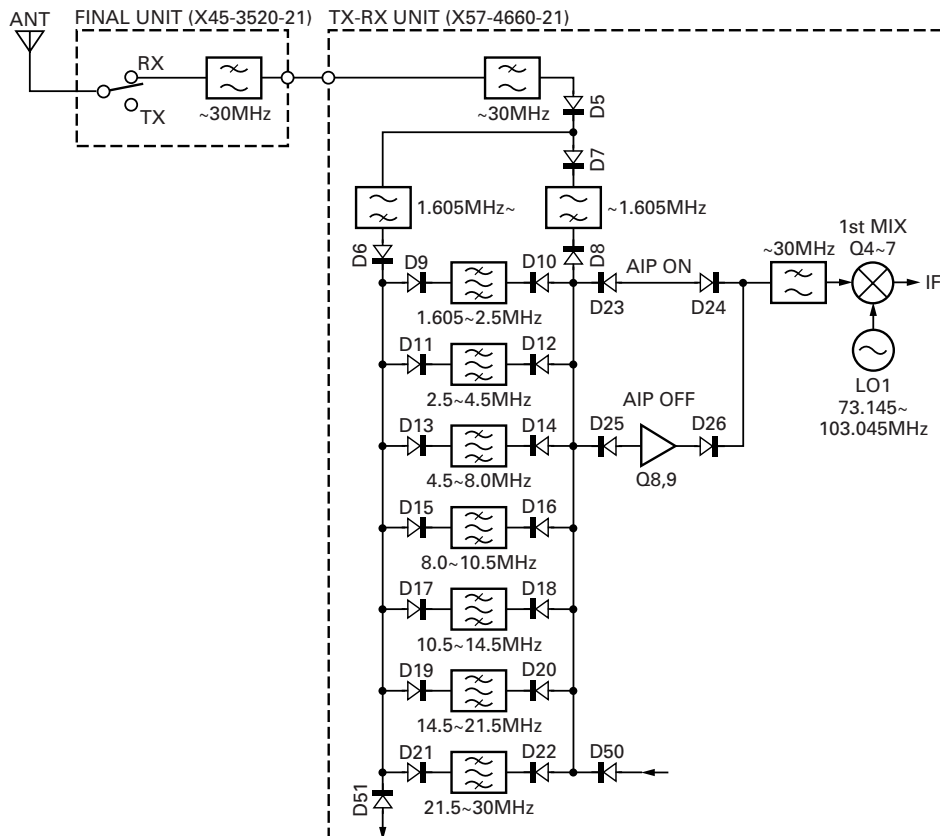


Fig. 4 Receiver front-end

## CIRCUIT DESCRIPTION

The first IF signal of 73.045MHz passes through the MCF (XF1), is amplified by the IF amplifier Q10, and mixed with the 62.35MHz LO2 signal by the second mixer, Q11 and Q12, to produce a second IF signal of 10.695MHz.

The second IF signal of 10.695MHz is split into two. One signal goes to the NB amplifier and the other passes through the NB gate FET Q19. The signal then goes to the IF filter. There are four types of IF filters: 6kHz, 2.7kHz, 2.2kHz, and 500Hz (2.7kHz and 500Hz are optional). The signal passing through the IF filter is amplified Q21 and Q30, Q31 SSB, CW, FSK modes are product-detected in D52, D53 and AM mode envelope-detected in D54 and condenser.

After detection, the AF signal for each mode passes through analog switch IC3 and goes to AF preamplifier Q48.

After the preamplifier, the signal passes through the mute circuit Q49 has the volume controlled at IC6 and is amplified to the necessary electric power level at AF power amplifier IC7.

### 3-1. Receiver front-end

The signal input to the TX-RX unit passes through the 30 MHz low-pass filter, and signal above 1.605MHz goes to seven band-pass filters. When AIP is off, the signal passes through each band-pass filter, D25 and D26 turn on and D23 and D24 turn off, and the signal is amplified by about 13dB by Q8, Q9 and output to the first mixer. If AIP is on, D25 and D26 turn off and D23 and D24 turn on, and the signal is output directly to the first mixer without passing through Q8 and Q9. The first mixer is a quad balanced mixer, Q4 to Q7 (Fig. 4).

### 3-2. Noise blanker circuit

The 10.695MHz IF signal generated from the first IF of 73.045MHz by the second mixer is input to the IF amplifier Q19, sent through Q18 amplified by noise amplifier Q801, Q802 and Q804, sent through buffer Q806 and noise-detected by D800. This signal switches Q805 and Q807, Q808 and controls Q19 in the TX-RX unit. Q19 controls Q20 and blanks the noise (Fig. 5).

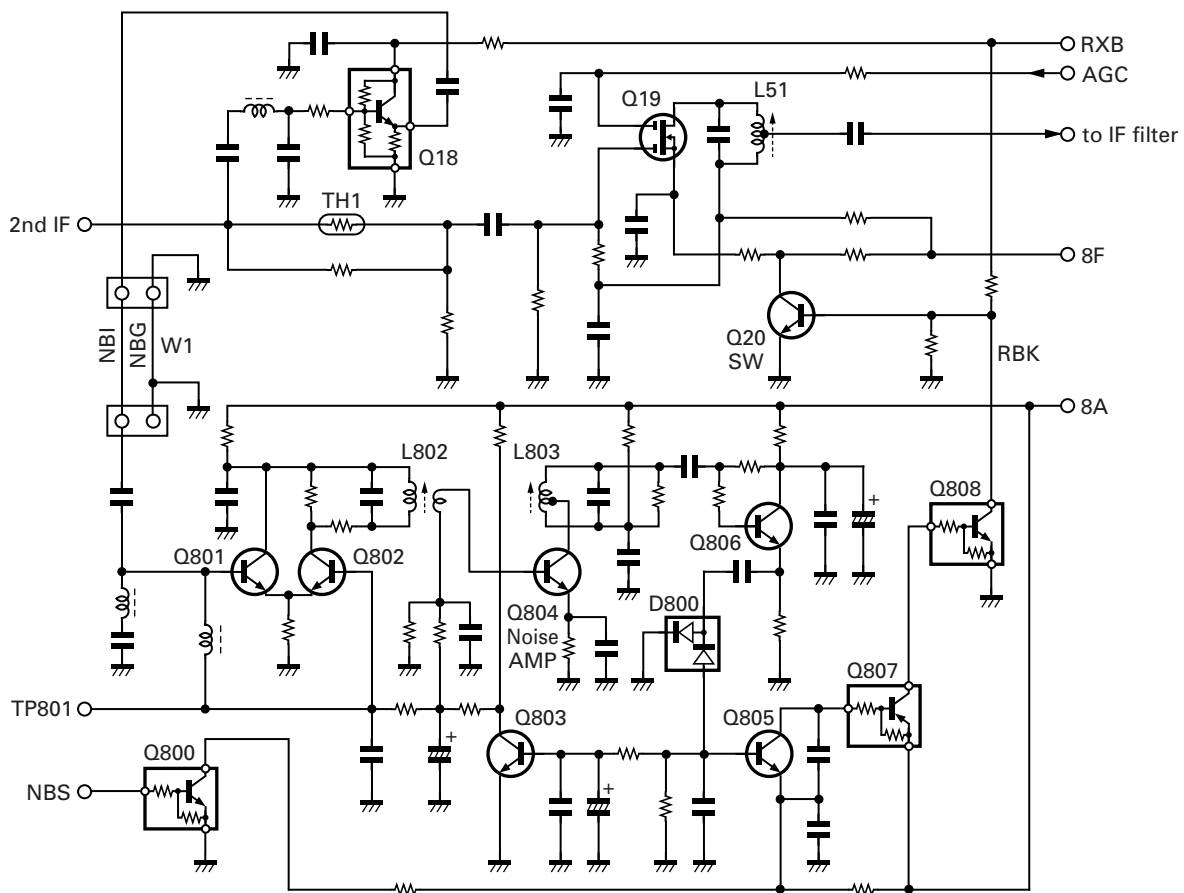


Fig. 5 Noise blanker circuit

## CIRCUIT DESCRIPTION

**3-3. Signal strength meter circuit**

In all mode, the signal strength meter circuit comprises operational amplifier IC2. The signal level detected is input to pin 3 of IC2 (1/2) and amplified by about 8dB by IC2 (2/2), then goes to IC5 of the control unit (Fig. 6).

**3-4. AGC circuit**

The time constant for the signal envelope detected by IC1 is changed in each mode by the analog switch. The effective value, not the peak value, is used in AM mode (Fig. 6).

**3-5. Squelch**

The squelch volume voltage is input to A/D input pin 78 of the CPU IC5. The signal strength meter voltage made by squelch volume voltage and the TX-RX unit is compare processed in the CPU, controlling the ABK signal.

**3-6. IF filter**

There are two internal 10.695MHz IF filters and two optional, so a total of four can be installed.

| 10.695MHz<br>filter  | Part No./<br>name       | Selection of each mode |     |    |                |               |
|----------------------|-------------------------|------------------------|-----|----|----------------|---------------|
|                      |                         | CW                     | SSB | AM | DATA<br>(AFSK) | DATA<br>(FSK) |
| AM                   | L71-0433-15             | -                      | -   | ⊙  | -              | -             |
| SSB-WIDE<br>(Option) | L71-0457-05<br>/KIF-1   | -                      | -   | -  | *              | *             |
| SSB                  | L71-0249-05             | ⊙                      | ⊙   | -  | ⊙              | ⊙             |
| CW<br>(Option)       | L71-0283-15<br>/YK-107C | *                      | -   | -  | -              | *             |

⊙ represents the initial set value

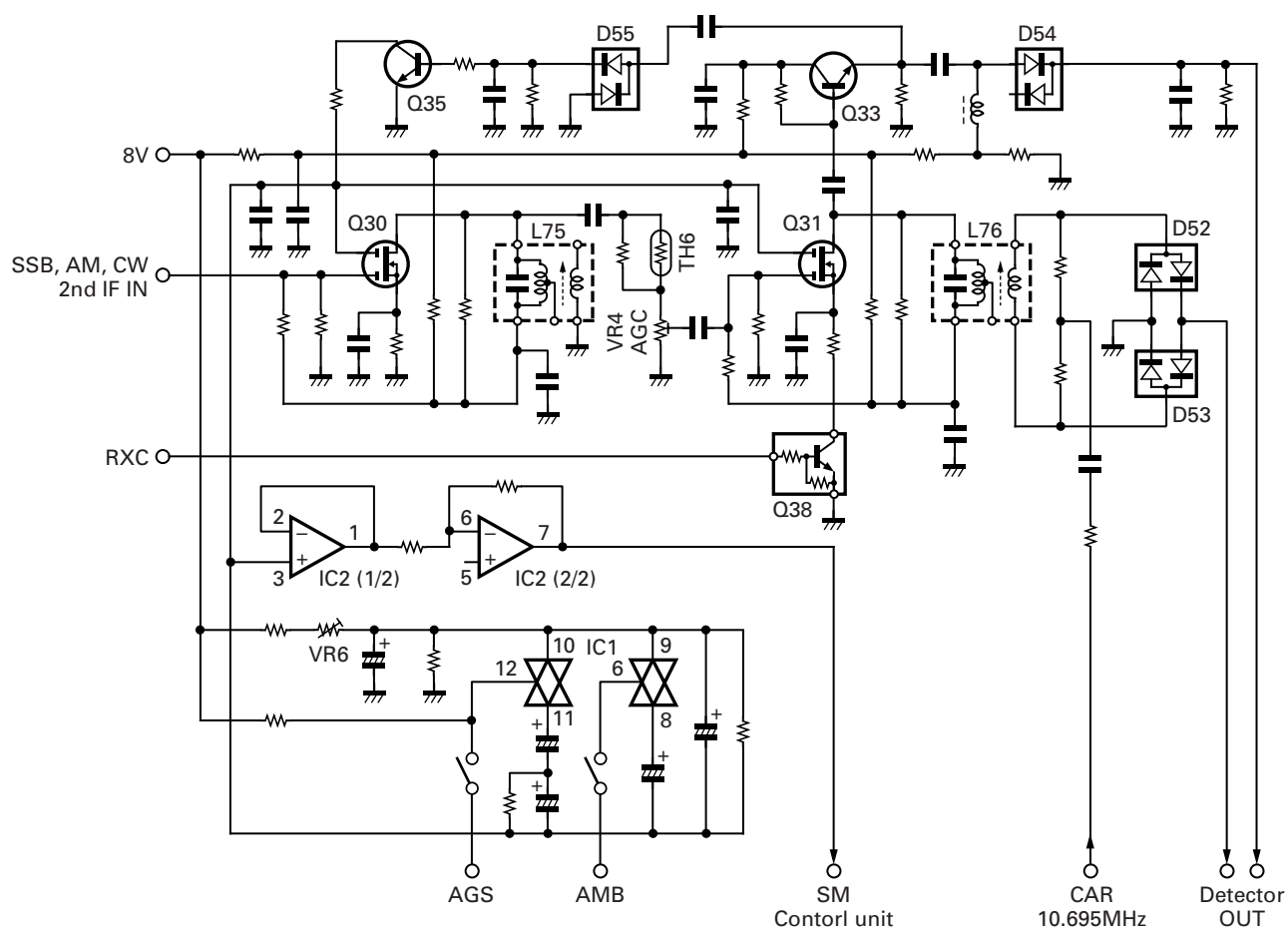
\* represents selections which can be used when the optional filter is attached

DATA (AFSK): SSB+DATA display

DATA (FSK): DATA display

Also, filter selection and DATA key settings are switched in the following dealer mode menu.

|                                    |                 |
|------------------------------------|-----------------|
| CH.02: CW FILTER                   | OUT/IN          |
| CH.03: DATA (AFSK)-SSB WIDE FILTER | OUT/IN          |
| CH.15: DATA (FSK)-IF FILTER FOR    | SSB/SSB-W/AM/CW |
| CH.14: DATA MODE                   | AFSK/FSK        |



**Fig. 6 S-meter and AGC circuits**

## CIRCUIT DESCRIPTION

| Item                   | Rating                               |
|------------------------|--------------------------------------|
| Center frequency (fo)  | 73.045MHz                            |
| Pass bandwidth         | $\pm 7.5\text{kHz}$ or more at 3dB   |
| Attenuation bandwidth  | $\pm 30\text{kHz}$ or less at 20dB   |
| Ripple                 | 1dB or less                          |
| Insertion loss         | 2dB or less                          |
| Guaranteed attenuation | 40dB or more at fo-910kHz            |
| Terminal impedance     | $2\text{k}\Omega \pm 10\%$ // L type |
| Temperature range      | -30°C~+70°C                          |

**Table 2 MCF (XF1) (L71-0432-05)**

| Item                          | Rating                                                |
|-------------------------------|-------------------------------------------------------|
| Nominal center frequency (fo) | 10.695MHz                                             |
| Pass bandwidth                | 6kHz or more at 6dB                                   |
| Attenuation bandwidth         | 40kHz or less at 60dB                                 |
| Ripple                        | 2dB or less                                           |
| Insertion loss                | 3dB or less                                           |
| Guaranteed attenuation        | 60dB or more within fo $\pm 1\text{MHz}$              |
| Terminal impedance            | $1.2\text{k}\Omega \pm 10\%$ // $6\text{pF} \pm 10\%$ |

**Table 3 MCF (XF3) (L71-0433-15)**

| Item                                     | Rating                                                                                                     |
|------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Nominal center frequency (fo)            | 10.695MHz                                                                                                  |
| Center frequency deviation               | Within $\pm 200\text{Hz}$ at 6dB                                                                           |
| Pass bandwidth and Attenuation bandwidth | Width 2.75kHz or more at 6dB<br>$\pm 2.2\text{kHz}$ or less at 20dB<br>$\pm 3.1\text{kHz}$ or less at 60dB |
| Ripple                                   | 2dB or less                                                                                                |
| Insertion loss                           | 6dB or less                                                                                                |
| Terminal impedance                       | $1.2\text{k}\Omega \pm 5\%$ // $8\text{pF} \pm 10\%$                                                       |
| Temperature range                        | -10°C~+60°C                                                                                                |

**Table 4 MCF (L71-0457-05) KIF-1: SSB WIDE (Option)**

| Item                                     | Rating                                                                                              |
|------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Nominal center frequency (fo)            | 10.695MHz                                                                                           |
| Center frequency deviation               | Within $\pm 200\text{Hz}$ at 6dB                                                                    |
| Pass bandwidth and Attenuation bandwidth | 2.2kHz or more at 6dB<br>$\pm 1.5\text{kHz}$ or less at 20dB<br>$\pm 2.4\text{kHz}$ or less at 60dB |
| Ripple                                   | 2dB or less                                                                                         |
| Insertion loss                           | 5dB or less                                                                                         |
| Guaranteed attenuation                   | 60dB or more within fo $\pm 40\text{kHz}$                                                           |
| Terminal impedance                       | $1.2\text{k}\Omega \pm 5\%$ // $6\text{pF} \pm 5\%$                                                 |

**Table 5 MCF (XF2) (L71-0249-05)**

| Item                          | Rating                               |
|-------------------------------|--------------------------------------|
| Nominal center frequency (fo) | 10.695MHz                            |
| Center frequency deviation    | Within $\pm 80\text{Hz}$ (25°C, 6dB) |
| Pass bandwidth                | 500Hz or more (6dB)                  |
| Insertion loss                | 5dB $\pm 2\text{dB}$                 |
| Terminal impedance            | $1200\Omega$ // 6pF                  |

**Table 6 MCF (L71-0283-15) YK-107C: CW (Option)**

### 4. Transmitter Circuit Configuration

The audio signal from the microphone enters CN 12 of the TX-RX unit. The signal then goes to IC9, the microphone amplifier. After amplifying part of IC9's output at Q54, it is detected by D59 and applied to the ALC terminal of IC9. The signal gain is properly adjusted by the D/A converter IC13 and passes through analog switch IC8, is amplified by Q50. The amplified signal is balance-modulated with the CAR signal (10.695MHz) input from CN9 by IC4 passed through Q51, and sent to the crystal filter passing through the filter, is amplified by Q24. The signal is CAR level adjusted by the D48 pin diode, and input to the mixer.

The 62.35MHz LO2 signal from the PLL unit is input from CN3 of the TX-RX unit, and mixed with the 10.695MHz signal which CAR level adjusted amplified by Q25 and Q26 to produce a 73.045MHz signal. The LO1 signal from the PLL unit is input from CN2 of the TX-RX unit, and mixed with the 73.045MHz signal passes through LC three-stage filter by Q27 and Q28 to generate the desired signal. The signal passes through the band-pass filter and is amplified by Q29 to produce the drive output, which goes to the final unit from CN19.

The signal is amplified to about 100W by Q1, Q2, Q3 and Q5, Q6. Harmonic components are attenuated by the filter unit and the signal is output from the antenna connector.

In AM mode, the signal is generated by unbalancing the carrier of SSB balance modulator IC4.

In CW mode, the signal is input to IC5 of the control unit. The sidetone monitor signal is generated by IC5, and amplified by audio amplifier Q79 and IC7, and output from the speaker. The CW control signal is output from IC5 of the control unit, and input to CN14 of the TX-RX unit to switch Q25 and Q26 and generate the CW signal.

#### 4-1. ALC circuit

The forward wave voltage detected in the final unit passes through CN15 in the TX-RX unit, its level is potential dividing and it is applied to the differential amplifier comprising Q60 and Q61. When VSF is applied to the base of Q60, the emitter voltage of Q60 and Q61 increases and the current flowing through the base of Q61 decreases; thus the collector voltage rises. When this voltage exceeds the emitter voltage of Q62 (about 1.8V) plus VBE (about 0.6V), the current flows through the base of Q62 and the collector voltage drops. ALC time constants C and R are connected to this collector.

The collector voltage change is shifted by Q64 and D68 (3.6V), and matched with the voltage for keying by Q65 and D69 to generate the ALC voltage. This ALC voltage activates ALC by lowering the second gate voltage of Q24 of the TX-RX unit (Fig. 7).

## CIRCUIT DESCRIPTION

### 4-2. Power control circuit

Power is controlled by lowering the base voltage of Q61 in the TX-RX unit. As the base voltage of Q61 decreases, the emitter voltage of Q60 and Q61 decreases. This activates ALC and reduces the power even if the base voltage (VSF) of Q60 is low. The power change is shifted by D/A converter IC13 for changing base voltage of Q61 (Fig. 7).

### 4-3. Protection circuit

When the reflected wave voltage (VSR) detected by the filter unit rises, Q63 in TX-RX unit turns on to reduce the voltage of the ALC time constant line. The drive is decreased and the power is reduced to protect the final transistor.

### 4-4. Temperature protection

If the final heat sink temperature rises, Q9 in the final unit turns on and the fan starts running at low speed and during transmission Q10 turns on and starts running a high speed if the final heat sink temperature rises further.

If this is not enough to prevent the temperature from continuing to rise, the control unit CPU IC5 temperature detection port THP becomes "H", forcibly lowering the RF output. Also, if there are any fan troubles or if something happens to get entangled and prevents the fan from turning, the RF output is similarly forced down to prevent overheating.

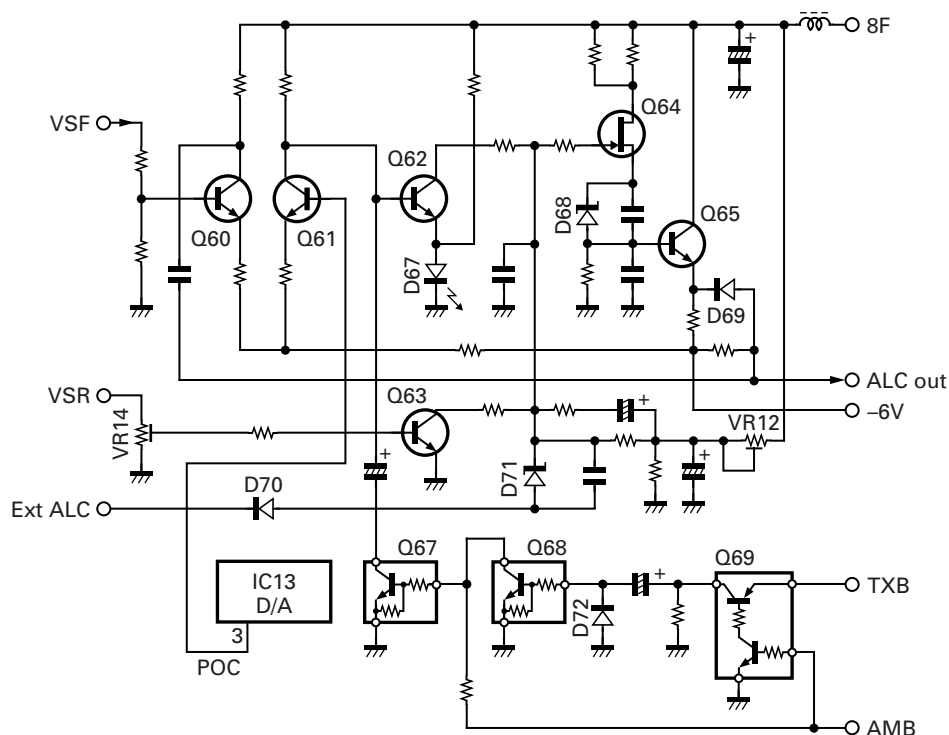


Fig. 7 ALC and power control circuits

## 5. Digital Control Circuit

The TK-80's digital control circuit comprises a 16-bit microcomputer CPU IC5, a reset IC3, an EEPROM IC6. Expander I/O IC7 since there are many control signals for TX-RX unit and filter unit, they are output to the shift register (serial to parallel converter) in series (Fig. 8).

### 5-1. Power switch

With this transceiver, the power is turned on and off by the microcomputer. When the power switch is pressed, the microcomputer detects it and energizes the power relay to supply 14V to the transceiver. When the power switch is pressed to turn the transceiver off, the microcomputer checks it a little longer than when turning the power on and de-energizes the power relay.

## CIRCUIT DESCRIPTION

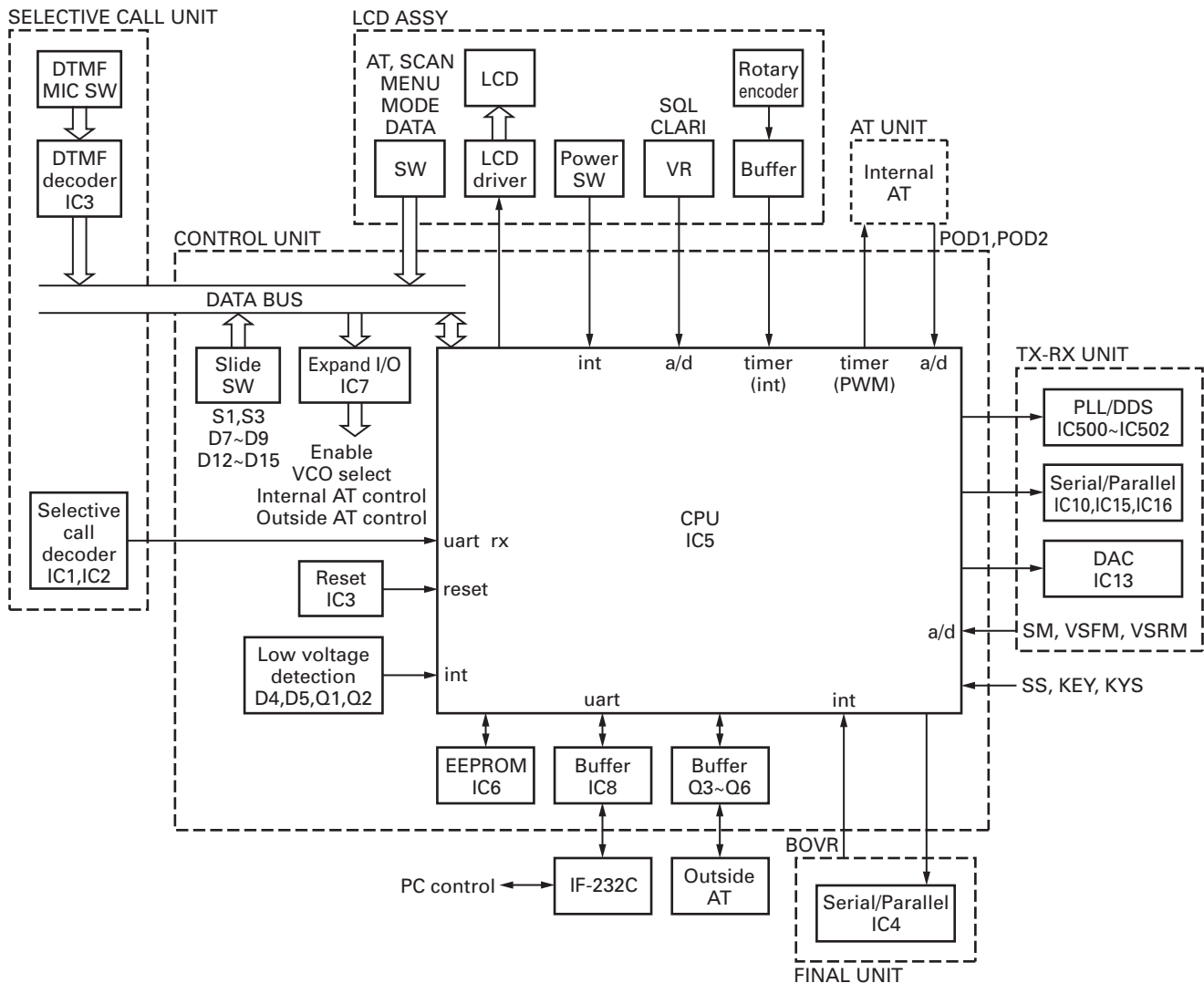


Fig. 8 Control block diagram

### 5-2. Reset circuit

IC3 monitors  $V_{cc}$  applied to the microcomputer. If the voltage falls below 2.15V, the IC outputs a reset signal ("L") to the microcomputer and the CPU initializes all internal data (including memory channel No. 11 to 80). The reset signal is not output when the power is turned on or off or 14V is turned on or off. It is output when the battery voltage level goes low and 14V is turned on or off.

C34 generates the signal width (td) required to reset the microcomputer (Fig. 9).

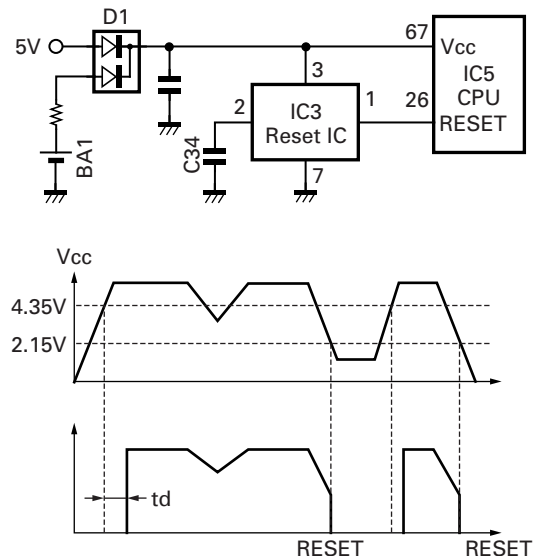
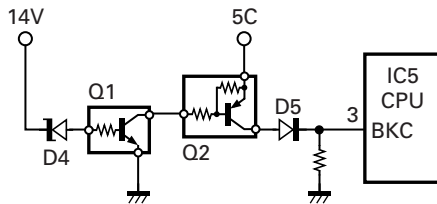


Fig. 9 Reset circuit

## CIRCUIT DESCRIPTION

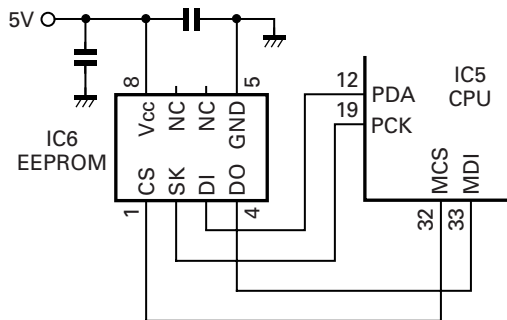
**5-3. Backup circuit**

This transceiver has two kinds of data stored in the microcomputer and EEPROM. Setting value of user and dealer menu data, such as memory channel data No. 01 to 80, is stored in the microcomputer, and memory channel data No. 01 to 10 for adjustment data, is stored in the EEPROM. To backup the CPU a power supply is needed. If 14V is cut off, power is supplied from a lithium battery. To retain data with the lithium battery, the microcomputer must be in backup mode. So, the backup detection circuit detects a voltage drop in the 14V line and outputs a backup request signal to the microcomputer (Fig. 10).

**Fig. 10 Backup detection circuit****5-4. EEPROM**

Adjustment data and memory channel No. 01 to 10 stored in the EEPROM, which consists of 256 16-bit registers. Data can be written to and read from the EEPROM. Each time the power is switched on, data is read from the EEPROM. If corrupt data is detected, the default adjustment data is used and memory channel is cleared. Adjustment data can be written into the EEPROM in servicing mode.

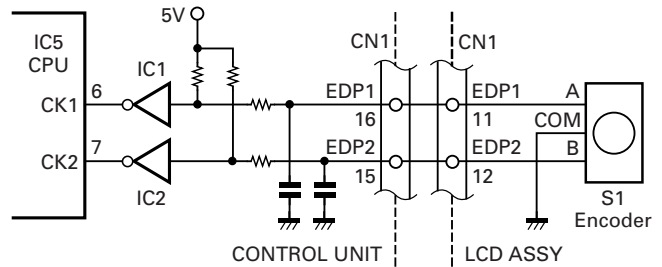
Memory channel is written by dealer mode (Fig. 11).

**Fig. 11 EEPROM circuit****5-5. Busy signal**

The level of the port is monitored in receive mode, and busy indication and busy stop are performed during scan.

**5-6. Encoder circuit**

The encoder is a mechanical one. The waveforms of the encoder pulses are rectified by IC1 and IC2 in the LCD assembly, and the number of pulses is counted by the hardware counter in the microcomputer (Fig. 12).

**Fig. 12 Encoder circuit****5-7. Serial interface**

The CPU has a synchronous serial interface built in, enabling serial communication at the TTL level.

The TK-80 can use this serial port for control via an external personal computer or for transmission of data among two transceiver units.

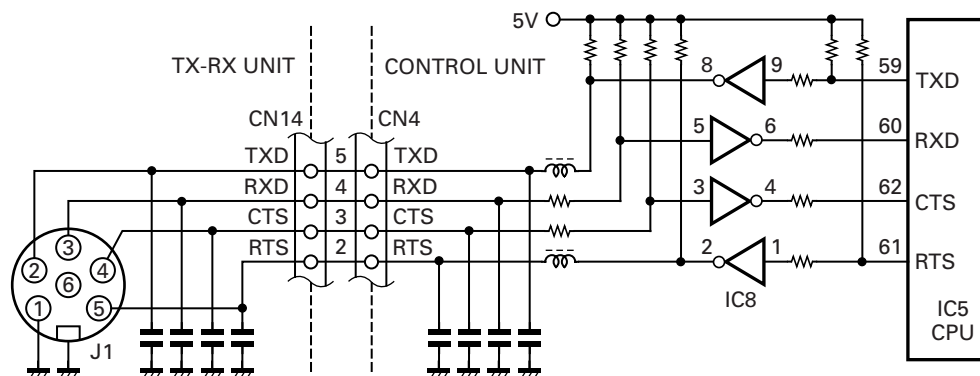
The data format is: TTL level, 8 data bit length, 1 stop bit, no parity, 9600 bps transmission speed (Fig. 13).

**5-8. Key scan**

The key scan consists of the six elements S0 and K0 to K4.

When the panel switch is pressed, the K0 to K4 port becomes "L" level and detection can be done by software.

Also, through the dealer menu settings, software can be used to set actuation enable/disable for each of the switches "SCAN", "MENU", "MODE" and "DATA".

**Fig. 13 Serial interface**

## CIRCUIT DESCRIPTION

### 5-9. Beep

The beep signal is generated using the timer in the micro-computer. A dot lasts about 40ms, a dash about 120ms. The oscillation frequency is about 1.4kHz.

### 5-10. PLL and DDS control circuit

The TK-80 has one PLL and two DDSs. The main micro-computer outputs frequency data to the PLL and DDSs serially according to the display frequency.

### 5-11. TX-RX unit control signal circuit

The microcomputer sends the mode signal, IF filter select signal, power signal, band-pass filter signal, MIC gain, and CAR level data to the TX-RX unit. It receives meter signals and standby switch signals from the TX-RX unit, displays data on the meters, and performs the transmit operation. The output signal from the microcomputer goes to the serial-to-parallel converter IC16, IC15 and IC10, D/A converter IC13 (Fig. 14).

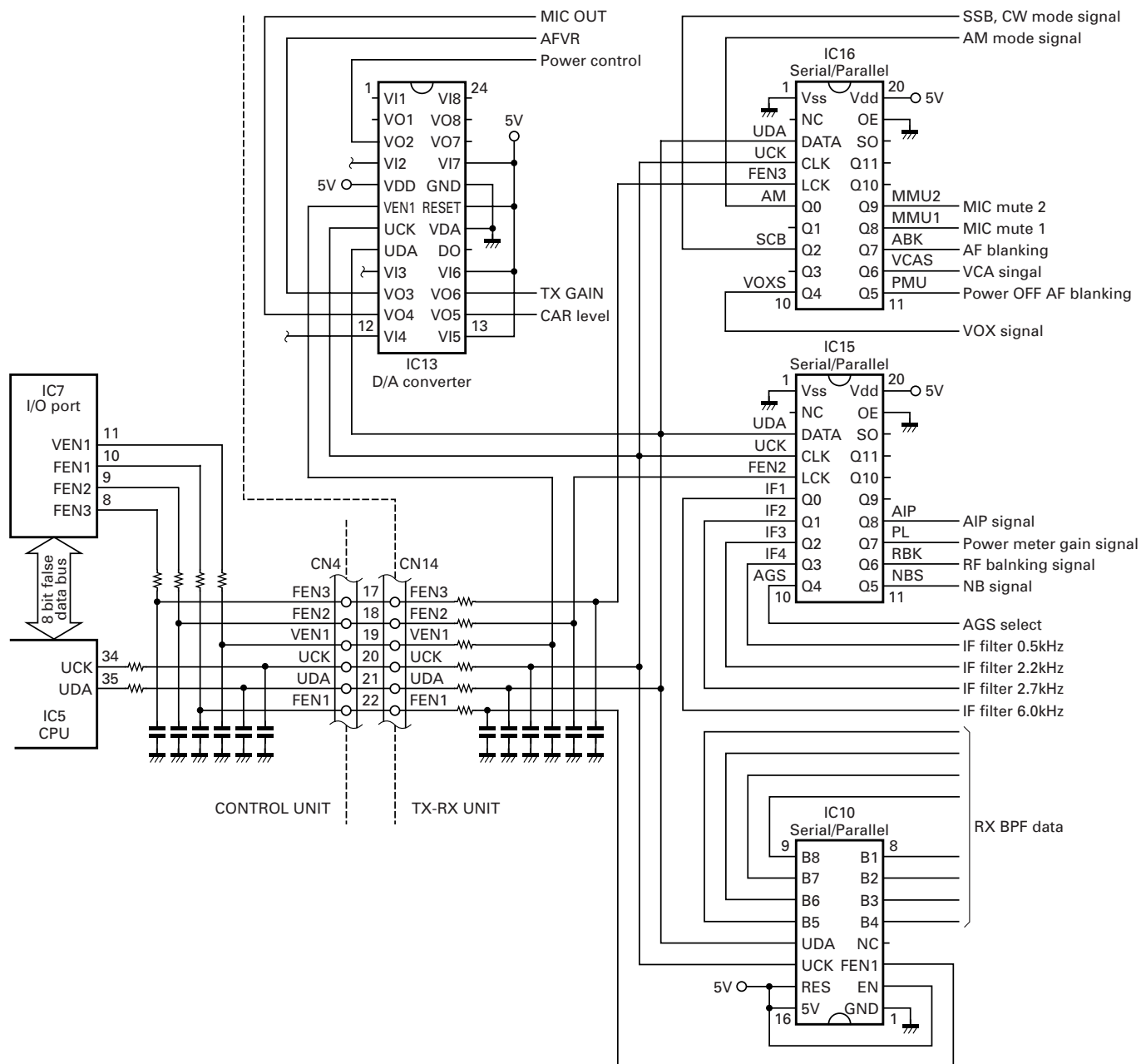


Fig. 14 TX-RX unit control signal

## CIRCUIT DESCRIPTION

**5-12. Final unit control signal**

The transmission LPF section signal and KAT-2 control signal to the final unit are output as serial data (Fig. 15).

**5-13. AT unit control signal**

Concerning the preset AT, based on the KAT-2 installation signal (ATI), variable condenser position data (POD1, POD2) and preset position data, the CPU controls the variable condenser drive motor rotation direction and rotation speed, using feedback control to ensure it stops at preset positions. The tap signal from the tuning circuit is synthesized from the transmit LPF selection signal from the final unit.

The KAT-2 does not tune below 2.0MHz, forcibly entering the AT-through mode (Fig. 16).

The MAT-100 control signal is bi-directional and conducts tuning while handshaking with the MAT-100 (Fig. 17).

**5-14. Selective call unit control signal**

Based on the KPE-1 installation signal, DTMF decode data, FSK decode data and other data, the CPU transmits call codes, turns AF muting on and off, etc.

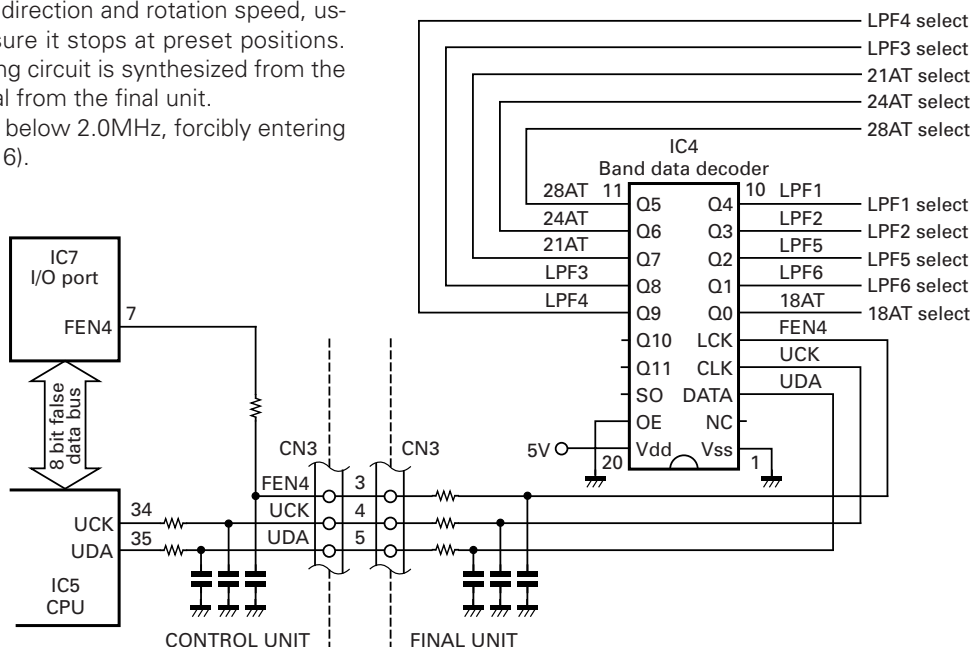


Fig. 15 Final unit control signal

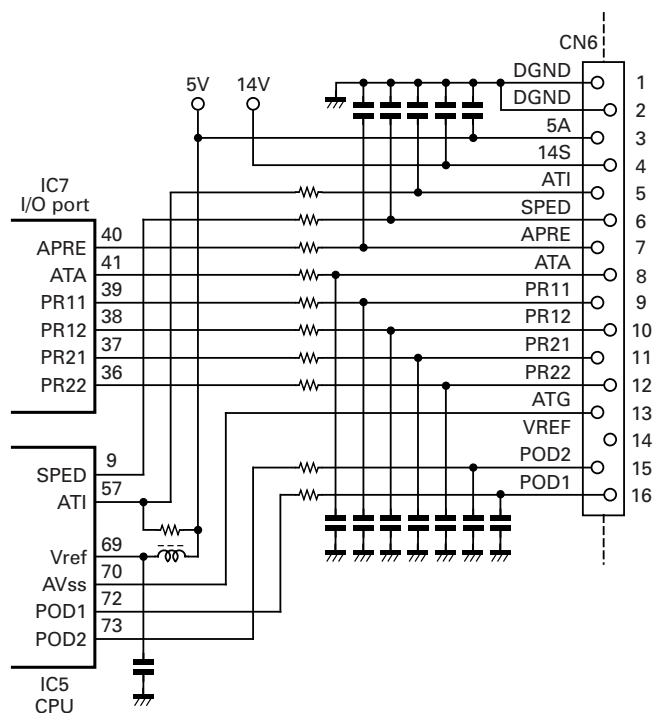


Fig. 16 KAT-2 control circuit

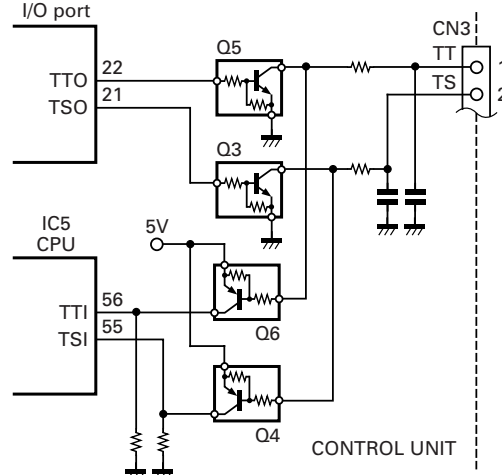


Fig. 17 MAT-100 control circuit

## SEMICONDUCTOR DATA

## Microprocessor: 37702E8LHJMHF (Control unit IC5)

| Pin No. | Pin Name | Port Name | I/O | Description                                                                              |
|---------|----------|-----------|-----|------------------------------------------------------------------------------------------|
| 1       | FSL      | P66       | I   | Selective call lock detect input. H: Detect, L: Normal                                   |
| 2       | PSC      | P65       | O   | Power relay control. H: ON, L: OFF                                                       |
| 3       | BKC      | INT2      | I   | Reduced voltage input. H: Normal, L: Reduced voltage, Rise pulse: Power supply turned on |
| 4       | BOVR     | INT1      | I   | Excess voltage input. H: Normal, L: Excess voltage                                       |
| 5       | PSW      | INT0      | I   | Power SW input. H: Input, L: No input                                                    |
| 6       | CK1      | TA4in     | I   | Encoder input 1                                                                          |
| 7       | CK2      | TA4out    | I   | Encoder input 2                                                                          |
| 8       | MU       | P56       | I   | Microphone UP key input. H: No input, L: Input                                           |
| 9       | SPED     | TA3out    | O   | AT motor drive control. H: Go, L: Stop                                                   |
| 10      | MD       | P55       | I   | Microphone DWN key input. H: No input, L: Input                                          |
| 11      | SIDE     | TA2out    | O   | Sidetone (timer output)                                                                  |
| 12      | PDA      | P53       | O   | PLL serial data, EEPROM serial data, diode matrix selection                              |
| 13      | BZ       | TA1out    | O   | System beep (timer output)                                                               |
| 14      | LDA      | P51       | O   | LCD driver serial data                                                                   |
| 15      | LCK      | P50       | O   | LCD driver serial clock                                                                  |
| 16      | ULK      | P47       | I   | PLL lock decision. H: Lock, L: Unlock                                                    |
| 17      | TOE      | P46       | O   | DTMF IC bus control. H: Enable, L: HighZ                                                 |
|         |          |           | I   | Selective call unit attachment decision. H: Not attached, L: Attached                    |
| 18      | STD      | P45       | I   | DTMF input decision. H: Input, L: No input                                               |
| 19      | PCK      | P44       | O   | For PLL/DDS, serial clock                                                                |
| 20      | SO       | P43       | O   | Key matrix selection. H (HighZ): Normal, L: Select                                       |
| 21      | LBLK     | P42       | O   | LCD all illuminate. H: All illuminate, L: Normal                                         |
| 22      | TXC      | P41       | O   | Transmission control. H: TX, L: Non-TX                                                   |
| 23      | RXC      | P40       | O   | Receiver control. H: RX, L: Non-RX                                                       |
| 24      | BYTE     | BYTE      | I   | (External bus width designated)                                                          |
| 25      | CNVss    | CNVss     | I   | CPU actuation mode designated                                                            |
| 26      | RESET    | RESET     | I   | CPU reset                                                                                |
| 27      | XIN      | XIN       | I   | System clock                                                                             |
| 28      | XOUT     | XOUT      | O   | System clock                                                                             |
| 29      | E        | E         | O   | Not used                                                                                 |
| 30      | Vss      | Vss       | -   | GND                                                                                      |
| 31      | CKY      | P33       | O   | Transmission control CKY output. H: Transmission (carrier output), L: Reception          |
| 32      | MCS      | P32       | O   | EEPROM CS. H: CS                                                                         |
| 33      | MDI      | P31       | I   | EEPROM data read                                                                         |
| 34      | UCK      | P30       | O   | Common serial clock                                                                      |
| 35      | UDA      | P27       | O   | Common serial data                                                                       |
| 36      | CASL     | P26       | O   | Carrier DDS register selection. H: Register B, L: Register A                             |
| 37      | NC       | P25       | I   | Not used                                                                                 |
| 38      | A1       | P24       | O   | Expansion I/O address                                                                    |
| 39      | A0       | P23       | O   | Expansion I/O address                                                                    |
| 40      | IOS      | P22       | O   | Expansion I/O CS signal, H: Normal, L: CS                                                |

## SEMICONDUCTOR DATA

| Pin No. | Pin Name | Port Name | I/O | Description                                                                                           |
|---------|----------|-----------|-----|-------------------------------------------------------------------------------------------------------|
| 41      | RD       | P21       | O   | Expansion I/O RD signal. H: Normal, L: RD                                                             |
| 42      | WR       | P20       | O   | Expansion I/O WR signal. H: Normal, L: WR                                                             |
| 43~50   | D7~D0    | P17~P10   | O   | False data path                                                                                       |
| 51      | BSY      | P07       | O   | Packet busy output. H: Busy, L: Normal                                                                |
| 52      | KEY      | P06       | I   | Key input. H: No input, L: Input                                                                      |
| 53      | KYS      | P05       | I   | Key plug attachment decision. H: Attached, L: Not attached                                            |
| 54      | ODEN     | P04       | O   | Expansion I/O reset output. H: Reset, L: Normal                                                       |
| 55      | TSI      | P03       | I   | External AT control input                                                                             |
| 56      | TTI      | P02       | I   | External AT control input                                                                             |
| 57      | ATI      | P01       | I   | Internal AT attachment decision. H: Not attached, L: Attached                                         |
| 58      | THP      | P00       | I   | Power down request during temperature protection. H: Protection actuation, L: Normal                  |
| 59      | TXD      | TXD1      | O   | Uart data output                                                                                      |
| 60      | RXD      | RXD1      | I   | Uart data input                                                                                       |
| 61      | RTS      | P85       | O   | Uart reception authorization output. H: Reception not allowed, L: Reception allowed                   |
| 62      | CTS      | CTS1      | I   | Uart transmission authorization output. H: Transmission not allowed, L: Transmission allowed          |
| 63      | ABSL     | TXD0      | O   | Selective call code transmission uart data output                                                     |
|         |          | P83       | O   | Local DDS, PLL register selection. H: Register B, latch V1, L: Register A, latch V2                   |
| 64      | FSD      | RXD0      | I   | Selective call uart data input                                                                        |
| 65      | P81      | P81       | I   | GND                                                                                                   |
| 66      | CTS0     | CTS0      | I   | Selective call transmission authorization input. H: Transmission not allowed, L: Transmission allowed |
| 67      | Vcc      | Vcc       | I   | Power supply                                                                                          |
| 68      | AVcc     | AVcc      | I   | A/D power supply                                                                                      |
| 69      | Vref     | Vref      | I   | A/D reference power supply                                                                            |
| 70      | AVss     | AVss      | I   | A/D GND                                                                                               |
| 71      | Vss      | Vss       | I   | GND                                                                                                   |
| 72      | POD1     | AN7       | I   | Variable condenser 1 VR, A/D input                                                                    |
| 73      | POD2     | AN6       | I   | Variable condenser 2 VR, A/D input                                                                    |
| 74      | VSRM     | AN5       | I   | Reflection wave voltage, A/D input                                                                    |
| 75      | VCL      | AN4       | I   | Clarifier VR, A/D input                                                                               |
| 76      | VSQ      | AN3       | I   | Squelch VR, A/D input                                                                                 |
| 77      | VFSM     | AN2       | I   | RF meter voltage (progression wave voltage), A/D input                                                |
| 78      | SM       | AN1       | I   | S-meter voltage, A/D input                                                                            |
| 79      | VDLY     | AN0       | I   | VOX delay VR, A/D input                                                                               |
| 80      | SS       | P67       | I   | Send switch input. H: No input, L: Input                                                              |

## I/O Port: UPD71055GB-3B4 (Control unit IC7)

| Pin No. | Pin Name | Port Name              | I/O | Description       |
|---------|----------|------------------------|-----|-------------------|
| 1       | NC       | NC                     | -   | Not used          |
| 2       | CS       | $\overline{\text{CS}}$ | I   | Chip select input |
| 3       | GND      | GND                    | I   | GND               |

## SEMICONDUCTOR DATA

| Pin No. | Pin Name | Port Name              | I/O | Description                                               |
|---------|----------|------------------------|-----|-----------------------------------------------------------|
| 4       | A1       | A1                     | I   | Port address 1                                            |
| 5       | A0       | A0                     | I   | Port address 0                                            |
| 6       | NC       | P27                    | -   | Not used                                                  |
| 7       | FEN4     | P26                    | O   | Serial parallel enable, final unit IC4                    |
| 8       | FEN3     | P25                    | O   | Serial parallel enable, TX-RX unit IC16                   |
| 9       | FEN2     | P24                    | O   | Serial parallel enable, TX-RX unit IC15                   |
| 10      | FEN1     | P20                    | O   | Serial parallel enable, TX-RX unit IC10                   |
| 11      | VEN1     | P21                    | O   | D/A enable, TX-RX unit IC13                               |
| 12      | LEN1     | P22                    | O   | LCD driver enable, LCD ASSY IC1                           |
| 13      | DEN2     | P23                    | O   | DDS enable, TX-RX unit IC501                              |
| 14      | DEN1     | P10                    | O   | DDS enable, TX-RX unit IC500                              |
| 15      | PLS      | P11                    | O   | FSK key select. H: FSK key, L: Selective call key         |
| 16      | PEN1     | P12                    | O   | PLL enable, TX-RX unit IC502                              |
| 17      | NC       | NC                     | -   | Not used                                                  |
| 18      | VB3      | P13                    | O   | VCO select. H: 21.5MHz≤f, L: Other                        |
| 19      | VB2      | P14                    | O   | VCO select. H: 10.5MHz≤f<21.5MHz, L: Other                |
| 20      | VB1      | P15                    | O   | VCO select. H: f<10.5MHz, L: Other                        |
| 21      | TSO      | P16                    | O   | External AT control output                                |
| 22      | TTO      | P17                    | O   | External AT control output                                |
| 23      | Vcc      | Vcc                    | I   | Power supply                                              |
| 24~31   | D7~D0    | D7~D0                  | I   | Data 7~0                                                  |
| 32      | RES      | RESET                  | I   | Reset input                                               |
| 33,34   | NC       | NC                     | -   | Not used                                                  |
| 35      | WR       | $\overline{\text{WR}}$ | I   | Write control input                                       |
| 36      | PR22     | P07                    | O   | Motor 2 rotation direction control                        |
| 37      | PR21     | P06                    | O   | Motor 2 rotation direction control                        |
| 38      | PR12     | P05                    | O   | Motor 1 rotation direction control                        |
| 39      | PR11     | P04                    | O   | Motor 1 rotation direction control                        |
| 40      | APRE     | P03                    | O   | Internal AT setting. H: Microprocessor, L: Analog circuit |
| 41      | ATA      | P02                    | O   | Internal AT setting. H: Line input, L: Cut away           |
| 42,43   | NC       | P01,P00                | O   | Not used                                                  |
| 44      | RD       | $\overline{\text{RD}}$ | I   | Readout control input                                     |

## I/O Port Expansion: UPD6345GS (TX-RX unit IC10)

| Pin No. | Pin Name | Port Name | Description                                         |
|---------|----------|-----------|-----------------------------------------------------|
| 5       | B4       | O8        | RX band select 4. ON: 4.5MHz≤f<8.0MHz, OFF: Other   |
| 6       | B3       | O7        | RX band select 3. ON: 2.5MHz≤f<4.5MHz, OFF: Other   |
| 7       | B2       | O6        | RX band select 2. ON: 1.605MHz≤f<2.5MHz, OFF: Other |
| 8       | B1       | O5        | RX band select 1. ON: f<1.605MHz, OFF: Other        |
| 9       | B8       | O4        | RX band select 8. ON: 21.5MHz≤f, OFF: Other         |

## SEMICONDUCTOR DATA

| Pin No. | Pin Name | Port Name | Description                                         |
|---------|----------|-----------|-----------------------------------------------------|
| 10      | B7       | O3        | RX band select 7. ON: 14.5MHz≤f<21.5MHz, OFF: Other |
| 11      | B6       | O2        | RX band select 6. ON: 10.5MHz≤f<14.5MHz, OFF: Other |
| 12      | B5       | O1        | RX band select 5. ON: 8.0MHz≤f<10.5MHz, OFF: Other  |

## I/O Port Expansion: BU2099FV (TX-RX unit IC15)

| Pin No. | Pin Name | Port Name | Description                                                    |
|---------|----------|-----------|----------------------------------------------------------------|
| 6       | IF1      | Q0        | IF filter selection. ON: 6.0kHz selection, OFF: Other          |
| 7       | IF2      | Q1        | IF filter selection. ON: 2.7kHz selection, OFF: Other (option) |
| 8       | IF3      | Q2        | IF filter selection. ON: 2.2kHz selection, OFF: Other          |
| 9       | IF4      | Q3        | IF filter selection. ON: 0.5kHz selection, OFF: Other (option) |
| 10      | AGS      | Q4        | Selection of constant during AGC. ON: AGC fast, OFF: AGC slow  |
| 11      | NBS      | Q5        | NB setting. ON: NB off, OFF: NB on                             |
| 12      | RBK      | Q6        | RF blanking. ON: RBK on, OFF: RBK off                          |
| 13      | PL       | Q7        | VFSM, VSRM op-amp gain selection. ON: Low gain, OFF: High gain |
| 14      | AIP      | Q8        | AIP setting. ON: AIP on, OFF: AIP off                          |

## I/O Port Expansion: BU2099FV (TX-RX unit IC16)

| Pin No. | Pin Name | Port Name | Description                                                              |
|---------|----------|-----------|--------------------------------------------------------------------------|
| 6       | AM       | Q0        | Mode selection. ON: During AM mode, OFF: Other                           |
| 7       | SSB      | Q1        | Mode selection. ON: During SSB mode, OFF: Other                          |
| 8       | SCB      | Q2        | Mode selection. ON: During SSB mode or CW mode, OFF: Other               |
| 9       | NC       | Q3        | Not used (usually ON)                                                    |
| 10      | VOXS     | Q4        | VOX setting. ON: VOX on, OFF: VOX off                                    |
| 11      | PMU      | Q5        | AF blanking during power supply OFF. ON: ABK on, OFF: ABK off            |
| 12      | VCAS     | Q6        | VCA selection. ON: VR, OFF: D/A                                          |
| 13      | ABK      | Q7        | AF blanking. ON: ABK on, OFF: ABK off                                    |
| 14      | MMU1     | Q8        | Microphone mute 1 (input side). ON: Normal, OFF: During microphone mute  |
| 15      | MMU2     | Q9        | Microphone mute 2 (output side). ON: During microphone mute, OFF: Normal |

## Band Data Decoder: BU2099FV (Final unit IC4)

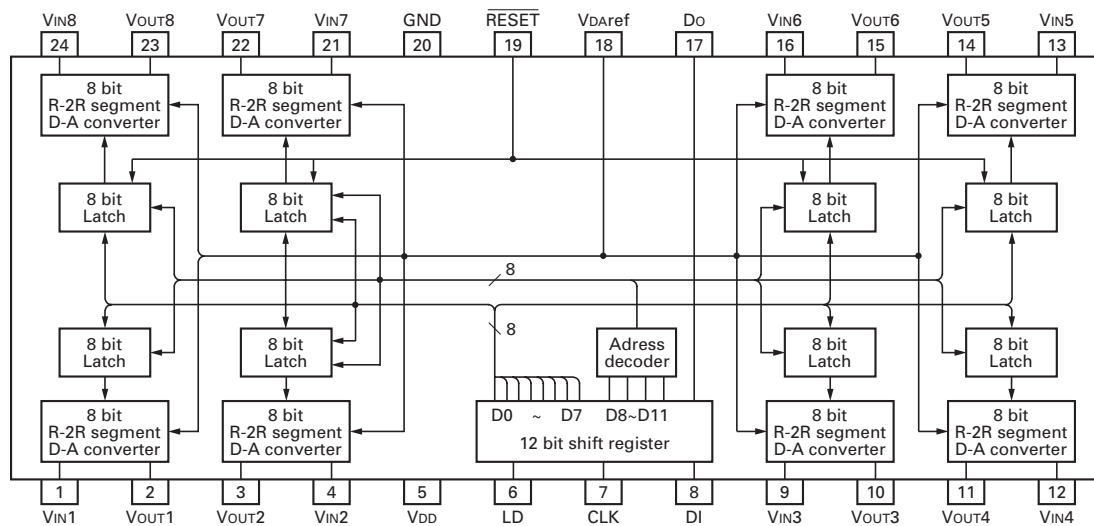
| Pin No. | Pin Name | Port Name | Description                                              |
|---------|----------|-----------|----------------------------------------------------------|
| 6       | 18AT     | Q0        | Selected for 18AT. ON: 14.5MHz≤f<19.0MHz, OFF: Other     |
| 7       | LPF6     | Q1        | Selected for LPF6. ON: 21.5MHz≤f, OFF: Other             |
| 8       | LPF5     | Q2        | Selected for LPF5. ON: 14.5MHz≤f<21.5MHz, OFF: Other     |
| 9       | LPF2     | Q3        | Selected for LPF2/4AT. ON: 2.4MHz≤f<4.5MHz, OFF: Other   |
| 10      | LPF1     | Q4        | Selected for LPF1. ON: f<2.4MHz, OFF: Other              |
| 11      | 28AT     | Q5        | Selected for 28AT. ON: 27.0MHz≤f, OFF: Other             |
| 12      | 24AT     | Q6        | Selected for 24AT. ON: 22.0MHz≤f<27.0MHz, OFF: Other     |
| 13      | 21AT     | Q7        | Selected for 21AT. ON: 19.0MHz≤f<22.0MHz, OFF: Other     |
| 14      | LPF3     | Q8        | Selected for LPF3/7AT. ON: 4.5MHz≤f<8.0MHz, OFF: Other   |
| 15      | LPF4     | Q9        | Selected for LPF4/14AT. ON: 8.0MHz≤f<14.5MHz, OFF: Other |

## SEMICONDUCTOR DATA

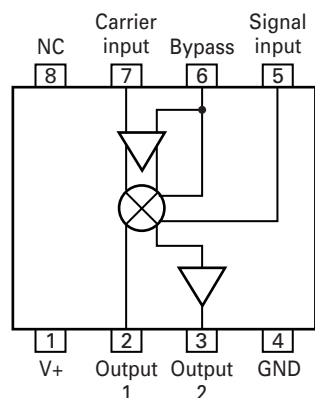
## D/A Converter: M62363FP (TX-RX unit IC13)

| Pin No. | Pin Name | Port Name | Description                                      |
|---------|----------|-----------|--------------------------------------------------|
| 1,2     | NC       | VI1,VO1   | Not used                                         |
| 3       | POC      | VO2       | Power control                                    |
| 4       | (5V)     | VI2       | Created from 14V at zener and resistive division |
| 9       | RAF      | VI3       | AF reference voltage                             |
| 10      | AFC      | VO3       | AF voltage (VCA control voltage)                 |
| 11      | MICOUT   | VO4       | Microphone output (audio), microphone gain       |
| 12      | MICIN    | VI4       | Microphone input (audio)                         |
| 13      | (5V)     | VI5       | Vdd common                                       |
| 14      | CAR      | VO5       | CAR level                                        |
| 15      | TGC      | VO6       | TX gain control                                  |
| 16      | (5V)     | VI6       | Vdd common                                       |
| 21      | (5V)     | VI7       | Vdd common                                       |

## ■ M62363FP Block diagram



## Balanced Modulation: NJM2594V (TX-RX unit IC4)



## COMPONENTS DESCRIPTION

## FINAL UNIT (X45-3520-21)

| Ref. No. | Use / Function           | Operation / Condition                                          |
|----------|--------------------------|----------------------------------------------------------------|
| IC1      | Comparator               | Fan control                                                    |
| IC2      | Regulator                | 14V→5V                                                         |
| IC3      | Regulator                | 14V→8V                                                         |
| IC4      | Band data decoder        | Serial to parallel conversion                                  |
| Q1       | Pre-drive amplifier      | HF band wide band amplification                                |
| Q2,3     | Drive amplifier          | HF band push-pull wide band amplification                      |
| Q4       | Final bias supply        | Final temperature compensation                                 |
| Q5,6     | Final amplifier          | HF band push-pull wide band amplification                      |
| Q7       | Relay drive              | The relay is energized when power is turned on                 |
| Q8       | Switching transistor     | On when over voltage occurs                                    |
| Q9,10    | Fan motor drive          | Runs the fan during transmission or when the temperature rises |
| Q12      | Switching transistor     | Off when the control circuit is troubled                       |
| Q13      | Signal switch            | Transmit/Receive changeover relay drive                        |
| Q14~21   | Signal switch            | Low pass filter changeover relay drive                         |
| D1       | Temperature compensation | Pre-drive temperature detection                                |
| D2       | Temperature compensation | Drive temperature detection                                    |
| D3,4     | Temperature compensation | Final temperature detection                                    |
| D5       | Protection diode         | Reverse power connection                                       |
| D6       | Zener diode              | Over voltage detection                                         |
| D7       | Relay surge absorption   | Relay counter voltage bypass                                   |
| D8       | Protection diode         | Fan counter voltage bypass                                     |
| D9       | Switching                | OR circuit                                                     |
| D10,11   | RF detection             | SWR power detection                                            |
| D12      | Relay surge absorption   | Transmit/Receive changeover relay                              |
| D13      | Spike surge absorption   | Surge absorber                                                 |
| D14      | Switching                | OR circuit                                                     |
| D15      | Surge voltage absorption | 14V line                                                       |

| Ref. No. | Use / Function         | Operation / Condition            |
|----------|------------------------|----------------------------------|
| D701~706 | Relay surge absorption | LPF relay counter voltage bypass |

## CONTROL UNIT (X53-3570-21)

| Ref. No. | Use / Function                      | Operation / Condition             |
|----------|-------------------------------------|-----------------------------------|
| IC1,2    | Inverter                            | Encoder shape wave                |
| IC3      | Reset                               |                                   |
| IC4      | Regulator                           | Constant voltage 6V output        |
| IC5      | CPU                                 | Microprocessor                    |
| IC6      | EEPROM                              | 4k bits                           |
| IC7      | I/O port                            | 8 bit x 3, 24 ports               |
| IC8      | Buffer                              | Buffer of serial interface        |
| Q1,2     | Signal switch                       | Backup judgment                   |
| Q3,4     | Signal switch                       | On during AT tune                 |
| Q5,6     | Signal switch                       | On during AT through              |
| Q7       | Signal switch                       | Off in AF mute                    |
| D1       | Switching (reverse flow prevention) | CPU power supply OR circuit       |
| D2       | Reverse flow prevention             |                                   |
| D3       | Switching                           | Standby switch OR circuit         |
| D4       | Zener diode                         | Backup detection (voltage shift)  |
| D5,6     | Reverse flow prevention             |                                   |
| D7,10~13 | Switching                           | Destination selection             |
| D14      | Zener diode                         | AF mute detection (voltage shift) |
| D15      | Switching                           | Destination selection             |
| D16~18   | Reverse flow prevention             | Key matrix judgment               |

## TX-RX UNIT (X57-4660-21)

| Ref. No. | Use / Function      | Operation / Condition       |
|----------|---------------------|-----------------------------|
| IC1      | Switching           | Analog switch               |
| IC2      | Amplifier           | S-meter level amplification |
| IC3      | Switching           | Analog switch               |
| IC4      | Balanced modulation | SSB AM modulation           |
| IC6      | Electrical volume   |                             |

## COMPONENTS DESCRIPTION

| Ref. No.  | Use / Function     | Operation / Condition                                                                                                                       |
|-----------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| IC7       | Audio amplifier    | Audio power amplification                                                                                                                   |
| IC8       | Switching          | Analog switch                                                                                                                               |
| IC9       | MIC amplifier      | Amplification for MIC input                                                                                                                 |
| IC10      | I/O port expansion | Serial to parallel conversion                                                                                                               |
| IC11      | Regulator          | 8V→5V                                                                                                                                       |
| IC12      | Amplifier          | SWR power amplification                                                                                                                     |
| IC13      | D/A converter      | Level control                                                                                                                               |
| IC14      | Amplifier          | CAR, TGC voltage amplification                                                                                                              |
| IC15,16   | I/O port expansion | Serial to parallel conversion                                                                                                               |
| IC500,501 | DDS                |                                                                                                                                             |
| IC502     | PLL                | 2,3,4: Divide ratio setting input,<br>5: Register select, 6: 19.5~49.5MHz,<br>9: Lock voltage output,<br>11: Unlock output, 15: 20MHz input |
| IC503     | Mixer              | 2: 19.5~49.5MHz output,<br>5: 73.145~103.045MHz input,<br>7: 53.545~54.045MHz input                                                         |
| IC504     | Mixer              | 2: 8.305~8.805MHz output,<br>5: 1.195~1.695MHz input,<br>7: 10MHz input                                                                     |
| IC505     | Mixer              | 2: 62.35MHz input,<br>5: 53.545~54.045MHz output,<br>8: 8.305~8.805MHz input                                                                |
| IC506     | Mixer              | 3: 10.695MHz output,<br>5: 0.695MHz input, 7: 10MHz input                                                                                   |
| IC508     | Switching          | Analog switch                                                                                                                               |
| IC900     | Amplifier          | VOX, ANTI VOX amplifier                                                                                                                     |
| IC901     | NOR circuit        | VOX level comparator                                                                                                                        |
| Q1        | Switching          | TX: ON, RX: OFF                                                                                                                             |
| Q2,3      | Switching          | TX: OFF, RX: ON                                                                                                                             |
| Q4~7      | RX 1st mixer       | IF: 73.045MHz, RF: 100kHz~30MHz,<br>LO1: 73.145~103.045MHz                                                                                  |
| Q8,9      | RF amplifier       | AIP OFF: ON                                                                                                                                 |
| Q10       | IF amplifier       | Amplification for IF frequency<br>73.045MHz                                                                                                 |
| Q11,12    | RX 2nd mixer       | IF1: 73.045MHz, LO2: 62.35MHz,<br>IF2: 10.695MHz                                                                                            |
| Q13       | Amplifier          | LO1 amplification                                                                                                                           |
| Q14       | Switching          | AIP ON: ON                                                                                                                                  |
| Q15       | Switching          | AIP ON/OFF select switch                                                                                                                    |

| Ref. No. | Use / Function         | Operation / Condition                                       |
|----------|------------------------|-------------------------------------------------------------|
| Q17      | Switching              | AIP OFF: ON                                                 |
| Q18      | Amplifier              | Buffer amplifier for NB noise amplifier                     |
| Q19      | Amplifier              | IF2 amplification                                           |
| Q20      | Switching              | For NB                                                      |
| Q21      | Amplifier              | 10.695MHz amplification for receive                         |
| Q22      | Switching              | CKY H: ON                                                   |
| Q23      | DC LPF                 | ALC keying                                                  |
| Q24      | Amplifier              | 10.695MHz amplification for transmit                        |
| Q25,26   | TX 1st mixer           | LO2: 62.35MHz, IN: 10.695MHz,<br>OUT: 73.045MHz             |
| Q27,28   | TX 2nd mixer           | LO1: 73.145~103.045MHz,<br>IN: 73.045MHz, OUT: 100kHz~30MHz |
| Q29      | Amplifier              | Drive amplifier for transmit                                |
| Q30,31   | Amplifier              | IF amplifier for receive                                    |
| Q32      | Amplifier              | AF buffer amplifier for SSB, CW                             |
| Q33      | RX IF buffer amplifier | AM detection, AGC                                           |
| Q34      | Amplifier              | AF buffer amplifier for AM                                  |
| Q35      | Amplifier              | AGC amplifier                                               |
| Q36,38   | Switching              | ON in receive                                               |
| Q39      | Amplifier              | AF amplifier for packet communication                       |
| Q40      | Amplifier              | AF amplifier for selective call                             |
| Q46      | Switching              | ON when BUSY is Hi                                          |
| Q47      | Switching              | VCA volume selection                                        |
| Q48      | Amplifier              | AF preamplifier                                             |
| Q49      | Switching              | AF mute                                                     |
| Q50      | Amplifier              | Buffer for input to balanced modulator                      |
| Q51      | Amplifier              | Amplifier for balanced modulator output                     |
| Q52      | Switching              | ON in CW mode (MIC mute)                                    |
| Q54      | Amplifier              | Detection for MIC amplifier output                          |
| Q55~57   | Switching              | DC/DC converter                                             |
| Q58      | Switching              | Linear amplifier control                                    |
| Q59      | Ripple filter          | Power supply for AF amplifier                               |
| Q60~62   | Amplifier              | ALC amplifier                                               |
| Q63      | Amplifier              | SWR protection                                              |
| Q64,65   | Amplifier              | ALC amplifier                                               |
| Q67      | Switching              | ON in AM mode,<br>OFF while transmitting in AM mode         |
| Q68,69   | Switching              | ON while transmitting in AM mode                            |
| Q70,71   | Switching              | ON when TXC is Hi                                           |

## COMPONENTS DESCRIPTION

| Ref. No. | Use / Function   | Operation / Condition                          |
|----------|------------------|------------------------------------------------|
| Q72      | Switching        | TXB/RXB select switch                          |
| Q74      | Switching        | ON when TXB is Low                             |
| Q75      | Switching        | ON in AF mute                                  |
| Q76      | Switching        | ON when power switch is OFF                    |
| Q77      | Switching        | AF mute/AM mode: ON                            |
| Q78      | Switching        | SSB/CW: ON                                     |
| Q79      | Amplifier        | Amplification for sidetone                     |
| Q80,81   | Switching        | ON when PSK is Low                             |
| Q82,83   | Switching        | ON in low power or AT tune                     |
| Q507     | Amplifier        | LO1 (73.145~103.045MHz) output                 |
| Q508~510 | LPF              | Active LPF                                     |
| Q511     | Amplifier        | 19.5~49.5MHz PLL (IC502) input                 |
| Q512     | Buffer amplifier | 19.5~49.5MHz                                   |
| Q513     | Buffer amplifier | 73.145~103.045MHz mixer (IC503) input          |
| Q514     | Buffer amplifier | D/A buffer, 1.195~1.695MHz mixer (IC504) input |
| Q515     | Buffer amplifier | 8.305~8.805MHz mixer (IC505) input             |
| Q516     | Buffer amplifier | 10MHz mixer (IC504) input                      |
| Q517     | Crystal OSC      | 62.35MHz                                       |
| Q518     | Buffer amplifier | 62.35MHz                                       |
| Q519     | Buffer amplifier | 62.35MHz mixer (IC505) input                   |
| Q520     | Buffer amplifier | LO2 (62.35MHz) output                          |
| Q521     | Amplifier        | LO2 (62.35MHz) output                          |
| Q522     | Buffer amplifier | D/A buffer, 0.695MHz mixer (IC506) input       |
| Q523     | Buffer amplifier | 10MHz mixer (IC506) input                      |
| Q524     | Amplifier        | CAR (10.695MHz) output                         |
| Q525     | Crystal OSC      | 20MHz                                          |
| Q526     | Buffer amplifier | 20MHz                                          |
| Q527     | Buffer amplifier | 20MHz PLL (IC502) input                        |
| Q528     | Buffer amplifier | 20MHz                                          |
| Q529     | Amplifier        | 20MHz DDS (IC500,501) input                    |
| Q530     | Switching        | VCO1 selection                                 |
| Q531     | VCO1             | 73.145~83.544MHz                               |
| Q532     | Switching        | VCO2 selection                                 |
| Q533     | VCO2             | 83.545~94.544MHz                               |
| Q534     | Switching        | VCO3 selection                                 |
| Q535     | VCO3             | 94.545~103.045MHz                              |

| Ref. No. | Use / Function             | Operation / Condition                                   |
|----------|----------------------------|---------------------------------------------------------|
| Q536     | Buffer amplifier           | VCO output 73.145~103.045MHz                            |
| Q800     | Switching                  | NB ON/OFF                                               |
| Q801,802 | Amplifier                  | NB amplifier                                            |
| Q803     | Amplifier                  | AGC for NB                                              |
| Q804     | Amplifier                  | NB amplifier                                            |
| Q805     | Switching                  | NB amplifier                                            |
| Q806     | Buffer amplifier           | NB amplifier                                            |
| Q807,808 | Switching                  | NB amplifier                                            |
| Q900     | VOX amplifier              | MIC amplifier                                           |
| Q901     | Switching                  | ON when IC901 10 pin is Hi                              |
| Q902     | Switching                  | VOX ON/OFF                                              |
| Q903     | Switching                  | VOX input ON/OFF                                        |
| D1~4     | Lightning surge absorption |                                                         |
| D5,6     | Switching                  | ON in receive, OFF in transmit                          |
| D7,8     | Switching                  | ON in 100kHz~1.60499MHz                                 |
| D9,10    | Switching                  | ON in 1.605MHz~2.49999MHz                               |
| D11,12   | Switching                  | ON in 2.500MHz~4.49999MHz                               |
| D13,14   | Switching                  | ON in 4.500MHz~7.99999MHz                               |
| D15,16   | Switching                  | ON in 8.000MHz~10.49999MHz                              |
| D17,18   | Switching                  | ON in 10.500MHz~14.49999MHz                             |
| D19,20   | Switching                  | ON in 14.500MHz~21.49999MHz                             |
| D21,22   | Switching                  | ON in 21.500MHz~29.99999MHz                             |
| D23,24   | Switching                  | ON when AIP is ON                                       |
| D25,26   | Switching                  | ON when AIP is OFF                                      |
| D27      | Switching                  | ON when MMU1 is ON                                      |
| D28      | Switching                  | ON when packet using                                    |
| D29      | Switching                  | AGC time constant                                       |
| D30      | Switching                  | Switch for sending LO1 to the transmit or receive mixer |
| D31      | Switching                  | Switch for sending LO2 to the transmit or receive mixer |
| D32      | Switching                  | 10.695MHz filter select switch                          |
| D33      | Switching                  | ON in transmit                                          |
| D34      | Switching                  | Transmit or receive selection                           |
| D35      | Switching                  | ON in receive                                           |
| D36~43   | Switching                  | 10.695MHz filter select switch                          |
| D44      | Reverse flow prevention    |                                                         |

## COMPONENTS DESCRIPTION

| Ref. No.  | Use / Function          | Operation / Condition                              |
|-----------|-------------------------|----------------------------------------------------|
| D45       | LED                     | Voltage limiter                                    |
| D47       | Reverse flow prevention |                                                    |
| D48       | PIN diode               | Diode of 10.695MHz level variability               |
| D49       | Reverse flow prevention |                                                    |
| D50,51    | Switching               | ON in transmit                                     |
| D52,53    | Detection               | SSB, CW envelope detection                         |
| D54       | Detection               | AM envelope detection                              |
| D55       | Detection               | AGC squelch detection                              |
| D56       | Switching               | ON in transmit                                     |
| D59       | Detection               | Detection of MIC amplifier output                  |
| D60,61,63 | Reverse flow prevention |                                                    |
| D64       | Rectification           | DC/DC converter                                    |
| D65       | Zener diode             | For constant voltage                               |
| D66       | Surge absorption        | Protect for transistor of linear amplifier control |
| D67       | LED                     | Voltage limiting                                   |
| D68       | Zener diode             | 3.6V voltage shift                                 |
| D69,70    | Reverse flow prevention |                                                    |

| Ref. No. | Use / Function          | Operation / Condition                                  |
|----------|-------------------------|--------------------------------------------------------|
| D71      | Zener diode             | 12V voltage shift                                      |
| D72,73   | Reverse flow prevention |                                                        |
| D75      | Zener diode             | Reduce the output power when power supply voltage drop |
| D76,79   | Reverse flow prevention |                                                        |
| D80      | Zener diode             | Reduce the output power when power supply voltage drop |
| D81~87   | Reverse flow prevention |                                                        |
| D88      | Zener diode             | Over voltage protection                                |
| D500,501 | Switching               | DDS register selection                                 |
| D502     | Vari-cap                | VCO1                                                   |
| D503     | Switching               | VCO1 output                                            |
| D504     | Vari-cap                | VCO2                                                   |
| D505     | Switching               | VCO2 output                                            |
| D506     | Vari-cap                | VCO3                                                   |
| D507     | Switching               | VCO3 output                                            |
| D800     | Detection               | Noise detection                                        |
| D900-902 | Reverse flow prevention |                                                        |

PARTS LIST

\* New Parts.    ⚠ 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                      **K** : USA                      **P** : Canada  
**Y** : PX (Far East, Hawaii)        **T** : England                **E** : Europe  
**Y** : AAFES (Europe)                **X** : Australia                **M** : Other Areas

TK-80 (Y52-3210-21)  
FINAL UNIT (X45-3520-21)

| Ref. No. | Address  | New parts | Parts No.   | Description                      | Desti-nation |
|----------|----------|-----------|-------------|----------------------------------|--------------|
| TK-80    |          |           |             |                                  |              |
| 1        | 1A       |           | A01-2099-02 | METALLIC CABINET (UPSIDE)        |              |
| 2        | 3B       |           | A01-2100-02 | METALLIC CABINET (BOTTOM)        |              |
| 3        | 2A       | *         | A62-0668-03 | PANEL ASSY                       |              |
| 6        | 2A       | *         | B38-0739-15 | LCD ASSY                         |              |
| 7        | 1D       | *         | B62-1012-00 | INSTRUCTION MANUAL               |              |
| 8        | 2B       | *         | B72-1493-04 | MODEL NAME-PLATE                 |              |
| 10       | 1B       |           | E04-0167-05 | RF COAXIAL RECEPTACLE (M)        |              |
| 12       | 1B       |           | E23-0992-04 | EARTH LUG                        |              |
| 13       | 1C       |           | E30-3157-15 | DC CORD            ACCESSORY     |              |
| 14       | 1B,3B    |           | E37-0225-05 | LEAD WIRE WITH MINIPIN PLUG (R)  |              |
| 15       | 1B,3B    |           | E37-0497-05 | LEAD WIRE WITH MINIPIN PLUG (B)  |              |
| 16       | 2A,2B    |           | E37-0499-05 | FLAT CABLE (X57CN14-X53CN4)      |              |
| 17       | 1B,2B    |           | E37-0500-05 | FLAT CABLE (X45CN3-X53CN3)       |              |
| 18       | 1B,3B    |           | E37-0501-05 | FLAT CABLE (X45CN10-X57CN15)     |              |
| 19       | 2A,2B    |           | E37-0503-05 | LEAD WIRE WITH CONNECTOR (PHONE) |              |
| 20       | 2A,3B    |           | E37-0505-05 | LEAD WIRE WITH CONNECTOR (MIC)   |              |
| 21       | 3A,2B    |           | E37-0508-05 | LEAD WIRE WITH CONNECTOR (SP)    |              |
| 22       | 1B,2B    |           | E37-0509-05 | LEAD WIRE WITH CONNECTOR (AT)    |              |
| 24       | 1C       |           | F05-2531-05 | FUSE (BLADE TYPE) (25A/32V)      |              |
| 25       | 1B,1C    |           | F06-4027-05 | FUSE (BLADE TYPE) (4A/32V)       |              |
| 26       | 1A       |           | F09-0438-15 | FANMOTOR                         |              |
| 27       | 2A       |           | F20-0521-04 | INSULATING BOARD (BATTERY)       |              |
| -        |          |           | F29-0014-05 | INSULATING BUSH (Q1)             |              |
| 30       | 1B       |           | G02-0575-04 | FLAT SPRING (TX-RX IC7)          |              |
| 31       | 1B       |           | G02-0732-14 | FLAT SPRING (FINAL IC2,3)        |              |
| -        |          |           | G09-0405-05 | KNOB SPRING (MAIN DIAL)          |              |
| 32       | 1A       |           | G10-0676-04 | FIBROUS SHEET (UPSIDE CASE)      |              |
| 23       | 1A,2A,3B | *         | G10-1275-04 | FIBROUS SHEET (UPSIDE CASE)      |              |
| 33       | 2A       |           | G13-1515-04 | CUSHION (SUB PANEL)              |              |
| -        |          |           | G13-1549-04 | CUSHION (PANEL)                  |              |
| 28       | 2A       | *         | G13-1846-04 | CUSHION (SUB PANEL)              |              |
| 29       | 2B       | *         | G13-1848-04 | CUSHION (CONTROL)                |              |
| 36       | 2C       |           | H10-2787-02 | POLYSTYRENE FOAMED FIXTURE (F)   |              |
| 37       | 1D       |           | H10-2788-02 | POLYSTYRENE FOAMED FIXTURE (R)   |              |
| 38       | 2C       |           | H13-0962-04 | CARTON BOARD                     |              |
| 35       | 3D       | *         | H52-1272-02 | ITEM CARTON CASE                 |              |
| 45       | 3B       |           | J02-0475-05 | FOOT                             |              |
| 46       | 2B       |           | J19-1458-05 | HOLDER                           |              |
| 47       | 1A       | *         | J21-4438-14 | MOUNTING HARDWARE (FAN)          |              |
| 48       | 2A       |           | J31-0141-04 | COLLAR (MIC 8P)                  |              |
| 51       | 2A,3A    |           | K29-4973-04 | KNOB (VOL,SQL,CLA)               |              |
| 50       | 3A       | *         | K29-5080-13 | KNOB (MAIN DIAL)                 |              |
| B        | 2A       | *         | N10-2070-46 | HEXAGON NUT (ENCODER)            |              |
| A        | 2B       |           | N15-1040-46 | FLAT WASHER                      |              |
| C        | 2A       |           | N32-3006-46 | FLAT HEAD MACHINE SCREW          |              |
| D        | 1A,3A    |           | N33-3006-45 | OVAL HEAD MACHINE SCREW          |              |
| E        | 1A       |           | N35-3018-46 | BINDING HEAD MACHINE SCREW       |              |
| F        | 2B       |           | N35-4010-46 | BINDING HEAD MACHINE SCREW       |              |
| G        | 3A       |           | N67-3005-46 | PAN HEAD SEMS SCREW              |              |
| H        | 1B       |           | N68-3008-46 | PAN HEAD SEMS SCREW              |              |
| J        | 1B,3B    |           | N87-3006-46 | BRAZIER HEAD TAPTITE SCREW       |              |
| K        | 1B       |           | N87-3008-46 | BRAZIER HEAD TAPTITE SCREW       |              |

| Ref. No.                 | Address | New parts | Parts No.      | Description               | Desti-nation |
|--------------------------|---------|-----------|----------------|---------------------------|--------------|
| M                        | 2A      |           | N90-2605-45    | TP HEAD MACHINE SCREW     |              |
| N                        | 3B      |           | N91-3010-46    | TP HEAD TAPPING SCREW     |              |
| 55                       | 3A      |           | T07-0325-05    | SPEAKER                   |              |
| 56                       | 1C      | *         | T91-0562-25    | MICROPHONE    ACCESSORY   |              |
| 60                       | 2A      |           | W09-0515-05    | LITHIUM CELL              |              |
| FINAL UNIT (X45-3520-21) |         |           |                |                           |              |
| C1                       |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C2                       |         |           | CK73FB1H102K   | CHIP C    1000PF    K     |              |
| C3                       |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C4                       |         |           | CC73FSL1H821J  | CHIP C    820PF    J      |              |
| C5                       |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C6                       |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C7                       |         |           | CK73FB1H102K   | CHIP C    1000PF    K     |              |
| C8                       |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C9                       |         |           | CK73FB1H102K   | CHIP C    1000PF    K     |              |
| C10                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C11                      |         |           | CE04EW1C100M   | ELECTRO    10UF    16WV   |              |
| C12                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C13,14                   |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C15                      |         |           | CK73FB1H102K   | CHIP C    1000PF    K     |              |
| C16                      |         |           | C90-2193-05    | ELECTRO    39UF    25WV   |              |
| C17                      |         |           | CE04EW1C100M   | ELECTRO    10UF    16WV   |              |
| C18                      |         | *         | CC45FSL2H221JN | CERAMIC    220PF    J     |              |
| C19,20                   |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C21                      |         |           | CK73FB1H472K   | CHIP C    4700PF    K     |              |
| C22                      |         |           | CM73F2H102J    | CHIP C    1000PF    J     |              |
| C23                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C24,25                   |         |           | C91-1004-05    | CHIP C    6800PF    J     |              |
| C26                      |         |           | CK73FB1H102K   | CHIP C    1000PF    K     |              |
| C27                      |         |           | CM73F2H561J    | CHIP C    560PF    J      |              |
| C28                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C29                      |         |           | CM73F2H122J    | CHIP C    1200PF    J     |              |
| C30                      |         | *         | CC45FSL2H151JN | CERAMIC    150PF    J     |              |
| C31                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C32                      |         |           | C90-2194-05    | ELECTRO    220UF    25WV  |              |
| C33,34                   |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C35                      |         |           | CE04EW1E471M   | ELECTRO    470UF    25WV  |              |
| C36                      |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C37                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C38                      |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C39                      |         |           | CK73FB1H102K   | CHIP C    1000PF    K     |              |
| C40-43                   |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C44                      |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C45,46                   |         |           | CE04EW1E100M   | ELECTRO    10UF    25WV   |              |
| C47                      |         |           | CE04EW1E102M   | ELECTRO    1000UF    25WV |              |
| C48                      |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C49,50                   |         |           | CE04EW1E100M   | ELECTRO    10UF    25WV   |              |
| C51,52                   |         |           | CK73FB1E104K   | CHIP C    0.10UF    K     |              |
| C53,54                   |         |           | CK73FB1E103K   | CHIP C    0.010UF    K    |              |
| C55                      |         |           | CC73FSL1H221J  | CHIP C    220PF    J      |              |
| C56                      |         |           | CC73FCH1H101J  | CHIP C    100PF    J      |              |

## PARTS LIST

## FINAL UNIT (X45-3520-21)

| Ref. No. | Address | New parts | Parts No.      | Description                      | Destination | Ref. No. | Address | New parts | Parts No.    | Description                         | Destination |
|----------|---------|-----------|----------------|----------------------------------|-------------|----------|---------|-----------|--------------|-------------------------------------|-------------|
| C57      |         | *         | CC45FCH2H030CN | CERAMIC 3.0PF C                  |             | CN7      |         |           | E04-0191-05  | PIN SOCKET                          |             |
| C58      |         |           | CC73FCH1H560J  | CHIP C 56PF J                    |             | CN9      |         |           | E23-0996-05  | TEST TERMINAL                       |             |
| C59      |         |           | CK73FB1E103K   | CHIP C 0.010UF K                 |             | CN10     |         |           | E40-5765-05  | FLAT CABLE CONNECTOR                |             |
| C60      |         |           | CC73FSL1H221J  | CHIP C 220PF J                   |             | CN11     |         |           | E40-3252-05  | PIN ASSY                            |             |
| C62      |         |           | CK73FB1E104K   | CHIP C 0.10UF K                  |             | CN101    |         |           | E23-0996-05  | TEST TERMINAL                       |             |
| C63      |         |           | CC73FCH1H680J  | CHIP C 68PF J                    |             | CN104    |         |           | E23-0996-05  | TEST TERMINAL                       |             |
| C64      |         |           | CC73FCH1H121J  | CHIP C 120PF J                   |             | CN800    |         |           | E40-3238-05  | PIN ASSY                            |             |
| C65      |         |           | CC73FCH1H560J  | CHIP C 56PF J                    |             | J800     |         |           | E11-0431-05  | PHONE JACK(11P)                     |             |
| C66-74   |         |           | CK73FB1H102K   | CHIP C 1000PF K                  |             | W1       |         |           | E37-0493-05  | LEAD WIRE WITH CONNECTOR (DC CABLE) |             |
| C75      |         |           | CK73FB1E103K   | CHIP C 0.010UF K                 |             | W2       |         |           | E37-0445-05  | PROCESSED LEAD WIRE (ANT)           |             |
| C76      |         |           | CK73FB1E104K   | CHIP C 0.10UF K                  |             | F1       |         |           | F06-5023-05  | FUSE (5A/125V)                      |             |
| C77      |         |           | CE04EW1E102M   | ELECTRO 1000UF 25WV              |             | F2       |         |           | F06-4027-05  | FUSE (BLADE TYPE) (4A/32V)          |             |
| C78      |         |           | CK73FB1E104K   | CHIP C 0.10UF K                  |             | A1,2     |         |           | J13-0410-05  | FUSE HOLDER (F2)                    |             |
| C79-81   |         |           | CK73FB1H102K   | CHIP C 1000PF K                  |             | L1       |         |           | L40-3985-48  | SMALL FIXED INDUCTOR (390NH)        |             |
| C84      |         |           | CK73FB1E103K   | CHIP C 0.010UF K                 |             | L2       |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)        |             |
| C85-87   |         |           | CK73FB1H102K   | CHIP C 1000PF K                  |             | L3       |         | *         | L41-3395-32  | SMALL FIXED INDUCTOR (3.3UH)        |             |
| C88, 89  |         |           | C91-2691-05    | CERAMIC 470PF 250WV              |             | L4       |         |           | L39-0481-05  | TOROIDAL COIL                       |             |
| C101     |         |           | CM93D2H821J    | MICA 820PF J                     |             | L5-7     |         |           | L33-0699-05  | CHOKE COIL                          |             |
| C102     |         |           | CC45FSL2H471JN | CERAMIC 470PF J                  |             | L8       |         |           | L39-1257-05  | TOROIDAL COIL                       |             |
| C103     |         |           | CM93D2H182J    | MICA 1800PF J                    |             | L9       |         |           | L40-4795-48  | SMALL FIXED INDUCTOR (4.7UH)        |             |
| C104     |         | *         | CC45FSL2H151JN | CERAMIC 150PF J                  |             | L10      |         |           | L33-0617-15  | CHOKE COIL                          |             |
| C105     |         |           | CM93D2H821J    | MICA 820PF J                     |             | L11,12   |         |           | L33-0699-05  | CHOKE COIL                          |             |
| C201     |         | *         | CC45FSL2H561J  | CERAMIC 560PF J                  |             | L13      |         |           | L39-0480-15  | TOROIDAL COIL                       |             |
| C202     |         |           | CC45FSL2H331JN | CERAMIC 330PF J                  |             | L14      |         |           | L33-0617-15  | CHOKE COIL                          |             |
| C203     |         | *         | CC45FSL2H391JN | CERAMIC 390PF J                  |             | L15      |         |           | L33-0651-05  | CHOKE COIL                          |             |
| C204     |         | *         | CC45FSL2H121JN | CERAMIC 120PF J                  |             | L16      |         |           | L39-1252-15  | TOROIDAL COIL                       |             |
| C205     |         | *         | CC45FSL2H151JN | CERAMIC 150PF J                  |             | L17      |         |           | L40-2221-33  | SMALL FIXED INDUCTOR (22MH)         |             |
| C206     |         | *         | CC45FSL2H121JN | CERAMIC 120PF J                  |             | L18      |         |           | L39-0480-15  | TOROIDAL COIL                       |             |
| C207     |         |           | CC45FSL2H471JN | CERAMIC 470PF J                  |             | L19      |         |           | L40-2221-33  | SMALL FIXED INDUCTOR (22MH)         |             |
| C208     |         | *         | CC45FSL2H151JN | CERAMIC 150PF J                  |             | L20,21   |         |           | L40-2782-15  | SMALL FIXED INDUCTOR (270NH)        |             |
| C301     |         | *         | CC45FSL2H271JN | CERAMIC 270PF J                  |             | L22,23   |         | *         | L41-1005-32  | SMALL FIXED INDUCTOR (10UH)         |             |
| C302     |         | *         | CC45FSL2H151JN | CERAMIC 150PF J                  |             | L24      |         |           | L40-1001-12  | SMALL FIXED INDUCTOR (10UH)         |             |
| C303     |         | *         | CC45FSL2H271JN | CERAMIC 270PF J                  |             | L101     |         |           | L39-1259-05  | TOROIDAL COIL                       |             |
| C304     |         | *         | CC45FSL2H560JN | CERAMIC 56PF J                   |             | L102     |         |           | L39-1260-05  | TOROIDAL COIL                       |             |
| C305     |         | *         | CC45FSL2H271JN | CERAMIC 270PF J                  |             | L201     |         |           | L39-1224-05  | TOROIDAL COIL                       |             |
| C307     |         | *         | CC45FSL2H221JN | CERAMIC 220PF J                  |             | L202     |         |           | L39-1225-05  | TOROIDAL COIL                       |             |
| C401     |         |           | CC45FSL2H181JN | CERAMIC 180PF J                  |             | L301     |         |           | L39-1266-05  | TOROIDAL COIL                       |             |
| C402     |         | *         | CC45FSL2H470JN | CERAMIC 47PF J                   |             | L302     |         |           | L39-1258-05  | TOROIDAL COIL                       |             |
| C403     |         |           | CC45FSL2H331JN | CERAMIC 330PF J                  |             | L401     |         |           | L39-1221-05  | TOROIDAL COIL                       |             |
| C404     |         | *         | CC45FSL2H121JN | CERAMIC 120PF J                  |             | L402     |         |           | L39-1220-05  | TOROIDAL COIL                       |             |
| C405     |         | *         | CC45FSL2H151JN | CERAMIC 150PF J                  |             | L501     |         |           | L34-1279-05  | AIR-CORE COIL                       |             |
| C501     |         | *         | CC45FSL2H121JN | CERAMIC 120PF J                  |             | L502     |         |           | L34-1280-05  | AIR-CORE COIL                       |             |
| C502     |         | *         | CC45FSL2H150JN | CERAMIC 15PF J                   |             | L601     |         |           | L34-1281-05  | AIR-CORE COIL                       |             |
| C503     |         | *         | CC45FSL2H221JN | CERAMIC 220PF J                  |             | L602     |         |           | L34-1282-05  | AIR-CORE COIL                       |             |
| C504     |         | *         | CC45FSL2H470JN | CERAMIC 47PF J                   |             | L701-706 |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)        |             |
| C505     |         | *         | CC45FSL2H101JN | CERAMIC 100PF J                  |             | R1       |         |           | RK73FB2A331J | CHIP R 330 J 1/10W                  |             |
| C601     |         |           | CC45FSL2H680JN | CERAMIC 68PF J                   |             | R2       |         |           | RK73FB2A681J | CHIP R 680 J 1/10W                  |             |
| C602     |         | *         | CC45FSL2H120JN | CERAMIC 12PF J                   |             | R3       |         |           | RK73FB2A101J | CHIP R 100 J 1/10W                  |             |
| C603     |         | *         | CC45FSL2H121JN | CERAMIC 120PF J                  |             | R4       |         |           | RK73FB2A6R8J | CHIP R 6.8 J 1/10W                  |             |
| C604     |         | *         | CC45FSL2H470JN | CERAMIC 47PF J                   |             | R5       |         |           | R92-1221-05  | CHIP R 82 J 1/4W                    |             |
| C605     |         |           | CC45FSL2H680JN | CERAMIC 68PF J                   |             | R6       |         |           | RK73FB2A6R8J | CHIP R 6.8 J 1/10W                  |             |
| C607     |         | *         | CC45FSL2H100DN | CERAMIC 10PF D                   |             | R7       |         |           | R92-1242-05  | CHIP R 6.8 J 1/4W                   |             |
| C701-706 |         |           | CK73FB1H103K   | CHIP C 0.010UF K                 |             | R8       |         |           | R92-1243-05  | CHIP R 8.2 J 1/4W                   |             |
| TC1      |         |           | C05-0030-15    | CERAMIC TRIMMER CAPACITOR (20PF) |             | R9       |         |           | RK73FB2A331J | CHIP R 330 J 1/10W                  |             |
| CN1      |         |           | E04-0191-05    | PIN SOCKET                       |             | R10      |         |           | R92-1318-05  | CHIP R 100 J 1W                     |             |
| CN2      |         |           | E40-3246-05    | PIN ASSY                         |             | R11,12   |         |           | R92-0696-05  | CHIP R 33 J 1/4W                    |             |
| CN3      |         |           | E40-5764-05    | FLAT CABLE CONNECTOR             |             | R13      |         |           | R92-1318-05  | CHIP R 100 J 1W                     |             |
| CN4      |         |           | E40-3249-05    | PIN ASSY                         |             | R14-17   |         |           | RS14CB3A5R6J | FL-PROOF RS 5.6 J 1W                |             |
| CN5,6    |         |           | E04-0154-05    | PIN SOCKET                       |             |          |         |           |              |                                     |             |

PARTS LIST

FINAL UNIT (X45-3520-21)  
CONTROL UNIT (X53-3570-21)

| Ref. No. | Address | New parts | Parts No.     | Description          | Destination |
|----------|---------|-----------|---------------|----------------------|-------------|
| R18      |         |           | RK73FB2A391J  | CHIP R 390 J 1/10W   |             |
| R19,20   |         |           | RS14CB3A150J  | FL-PROOF RS 15 J 1W  |             |
| R21,22   |         |           | RS14CB3A4R7J  | FL-PROOF RS 4.7 J 1W |             |
| R23,24   |         |           | R92-1317-05   | CHIP R 18 J 1W       |             |
| R26      |         |           | RK73FB2A474J  | CHIP R 470K J 1/10W  |             |
| R27      |         |           | RK73FB2A562J  | CHIP R 5.6K J 1/10W  |             |
| R28      |         |           | RK73FB2A272J  | CHIP R 2.7K J 1/10W  |             |
| R29      |         |           | RK73FB2A562J  | CHIP R 5.6K J 1/10W  |             |
| R30      |         |           | RK73FB2A102J  | CHIP R 1.0K J 1/10W  |             |
| R32      |         |           | RK73FB2A562J  | CHIP R 5.6K J 1/10W  |             |
| R33      |         |           | RK73FB2A681J  | CHIP R 680 J 1/10W   |             |
| R34      |         |           | RK73FB2A562J  | CHIP R 5.6K J 1/10W  |             |
| R35      |         |           | RK73FB2A103J  | CHIP R 10K J 1/10W   |             |
| R36      |         |           | RK73FB2A222J  | CHIP R 2.2K J 1/10W  |             |
| R37      |         |           | RK73FB2A4R7J  | CHIP R 4.7 J 1/10W   |             |
| R38      |         |           | R92-0696-05   | CHIP R 33 J 1/4W     |             |
| R39      |         |           | R92-1244-05   | CHIP R 27 J 1/4W     |             |
| R40-43   |         |           | RK73FB2A101J  | CHIP R 100 J 1/10W   |             |
| R101     |         |           | R92-1061-05   | JUMPER REST 0 OHM    |             |
| R800,801 |         |           | R92-1204-05   | CHIP R 100 J 1/4W    |             |
| VR1      |         |           | R12-6730-05   | TRIMMING POT. (220)  |             |
| VR2      |         |           | R12-6737-05   | TRIMMING POT. (3.3K) |             |
| VR3      |         |           | R12-6730-05   | TRIMMING POT. (220)  |             |
| K1       |         |           | S76-0414-05   | RELAY                |             |
| K2       |         |           | S51-1429-05   | RELAY                |             |
| K101,102 |         |           | S51-1420-05   | RELAY                |             |
| K201,202 |         |           | S51-1420-05   | RELAY                |             |
| K301,302 |         |           | S51-1420-05   | RELAY                |             |
| K401,402 |         |           | S51-1420-05   | RELAY                |             |
| K501,502 |         |           | S51-1420-05   | RELAY                |             |
| K601,602 |         |           | S51-1420-05   | RELAY                |             |
| D1       |         |           | MA27T-B       | VARISTOR             |             |
| D2-4     |         |           | MA27-B        | VARISTOR             |             |
| D5       |         |           | SG-5L(R)      | DIODE                |             |
| D6       |         |           | 02CZ18(X)     | ZENER DIODE          |             |
| D7,8     |         |           | LFB01         | DIODE                |             |
| D9       |         |           | DAN202K       | DIODE                |             |
| D10,11   |         |           | 1SS101        | DIODE                |             |
| D12      |         |           | LFB01         | DIODE                |             |
| D13      |         |           | DSA301LA      | DIODE                |             |
| D14      |         |           | DAN202K       | DIODE                |             |
| D15      |         | *         | ERZV10D220    | SURGE ABSORBER       |             |
| D701-706 |         |           | LFB01         | DIODE                |             |
| IC1      |         |           | NJM2904M      | MOS-IC               |             |
| IC2      |         |           | UPC7805H      | BI-POLAR IC          |             |
| IC3      |         |           | UPC7808H      | MOS-IC               |             |
| IC4      |         |           | BU2099FV      | MOS-IC               |             |
| Q1       | 1B      | *         | 2SC1971-B     | TRANSISTOR           |             |
| Q2,3     | 1B      | *         | 2SC3133-B     | TRANSISTOR           |             |
| Q4       | 1B      |           | 2SC3421(Y)    | TRANSISTOR           |             |
| Q5,6     | 1B      |           | 2SC2879A(O,Y) | TRANSISTOR           |             |
| Q7       |         |           | DTC143TK      | DIGITAL TRANSISTOR   |             |
| Q8       |         |           | DTC114EK      | DIGITAL TRANSISTOR   |             |
| Q9       |         |           | DTD123EK      | DIGITAL TRANSISTOR   |             |
| Q12      |         |           | DTC124TK      | DIGITAL TRANSISTOR   |             |
| Q13      |         |           | FMC2          | DIGITAL TRANSISTOR   |             |
| Q14      |         |           | FMA5          | TRANSISTOR           |             |
| Q15,16   |         | *         | FMA7A         | TRANSISTOR           |             |
| Q17,18   |         |           | FMA5          | TRANSISTOR           |             |

| Ref. No.                   | Address | New parts | Parts No.     | Description                   | Destination |
|----------------------------|---------|-----------|---------------|-------------------------------|-------------|
| Q19-21                     |         |           | DTB143EK      | DIGITAL TRANSISTOR            |             |
| TH1                        |         |           | 10KD-5        | THERMISTOR                    |             |
| -                          |         |           | 212-1021-05   | INSULATING TUBE               |             |
| CONTROL UNIT (X53-3570-21) |         |           |               |                               |             |
| C1-6                       |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C7,8                       |         |           | CC73GCH1H101J | CHIP C 100PF J                |             |
| C9-19                      |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C20,21                     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C22                        |         |           | C92-0009-05   | CHIP-TAN 4.7UF 10WV           |             |
| C23                        |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C24,25                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C26                        |         |           | C92-0009-05   | CHIP-TAN 4.7UF 10WV           |             |
| C27-32                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C33                        |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z                |             |
| C34                        |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C35                        |         |           | CK73GB1E223K  | CHIP C 0.022UF K              |             |
| C36                        |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C37                        |         |           | C92-0009-05   | CHIP-TAN 4.7UF 10WV           |             |
| C38,39                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C40-44                     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C45                        |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C46,47                     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C48-52                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C53                        |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z                |             |
| C54                        |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C55,56                     |         |           | CC73GCH1H330J | CHIP C 33PF J                 |             |
| C57-69                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C70                        |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C72-74                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C75-79                     |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C80                        |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C81                        |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C82                        |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C84                        |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C85-87                     |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C88-93                     |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C94,95                     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C96-103                    |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C104-106                   |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C107                       |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z               |             |
| C108                       |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| C110                       |         |           | CK73GB1H102K  | CHIP C 1000PF K               |             |
| C111                       |         |           | CK73GB1H103K  | CHIP C 0.010UF K              |             |
| CN1                        |         |           | E40-5736-05   | FLAT CABLE CONNECTOR          |             |
| CN2                        |         |           | E40-5758-05   | FLAT CABLE CONNECTOR          |             |
| CN3                        |         |           | E40-5762-05   | FLAT CABLE CONNECTOR          |             |
| CN4                        |         |           | E40-5761-05   | FLAT CABLE CONNECTOR          |             |
| CN5                        |         |           | E40-5762-05   | FLAT CABLE CONNECTOR          |             |
| CN6                        |         |           | E40-5381-05   | FLAT CABLE CONNECTOR          |             |
| L1-4                       |         |           | L40-1801-18   | SMALL FIXED INDUCTOR (18UH)   |             |
| L5,6                       |         |           | L40-4705-48   | SMALL FIXED INDUCTOR (47UH)   |             |
| L7-9                       |         |           | L40-1801-18   | SMALL FIXED INDUCTOR (18UH)   |             |
| L10                        |         |           | L40-4705-48   | SMALL FIXED INDUCTOR (47UH)   |             |
| X1                         |         |           | L77-1624-05   | CRYSTAL RESONATOR (7.3728MHZ) |             |
| R1-3                       |         |           | RK73GB1J471J  | CHIP R 470 J 1/16W            |             |

## PARTS LIST

CONTROL UNIT (X53-3570-21)

TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.    | Description          | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|
| R4-8     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R9       |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R10,11   |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R12-19   |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R20-23   |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R24-31   |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R32      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R35,36   |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R40      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R41      |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R42      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R43      |         |           | RK73GB1J474J | CHIP R 470K J 1/16W  |             |
| R44      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R45      |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             |
| R46-48   |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R49      |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R50,51   |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R52,53   |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R54      |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R55,56   |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R57      |         |           | RK73GB1J105J | CHIP R 1.0M J 1/16W  |             |
| R58      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R59,60   |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R61      |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R62,63   |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R64-72   |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R73      |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R74      |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             |
| R75      |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R76,77   |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R78,79   |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R80,81   |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R82      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R83-90   |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             |
| R92-94   |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R95      |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R99-101  |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R102-105 |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R106-117 |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R118     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R119-121 |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R122-124 |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R125     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R126-129 |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R130,131 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R132,133 |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             |
| R134-137 |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R138-141 |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R142     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R143     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R144     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R145     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R146     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R147     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             |
| R148     |         |           | R92-0670-05  | CHIP R 0 OHM         |             |
| R149     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R150     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| S1       |         |           | S62-0412-05  | SLIDE SWITCH         |             |
| S3       |         |           | S62-0412-05  | SLIDE SWITCH         |             |

| Ref. No.                 | Address | New parts | Parts No.      | Description        | Destination |
|--------------------------|---------|-----------|----------------|--------------------|-------------|
| D1                       |         |           | 1SS301         | DIODE              |             |
| D2                       |         |           | 1SS355         | DIODE              |             |
| D3                       |         |           | DAP202U        | DIODE              |             |
| D4                       |         |           | 02CZ8.2(Y)     | ZENER DIODE        |             |
| D5-10                    |         |           | 1SS355         | DIODE              |             |
| D11                      |         |           | 1SS301         | DIODE              |             |
| D12,13                   |         |           | 1SS355         | DIODE              |             |
| D14                      |         | *         | 02CZ9.1(Z)     | ZENER DIODE        |             |
| D15                      |         |           | 1SS355         | DIODE              |             |
| D16                      |         |           | IMN10          | DIODE              |             |
| D17,18                   |         |           | 1SS355         | DIODE              |             |
| IC1,2                    |         |           | TC4S584F       | MOS-IC             |             |
| IC3                      |         |           | M62003FP       | MOS-IC             |             |
| IC4                      |         |           | TA78L06F       | MOS-IC             |             |
| IC5                      |         | *         | 37702E8LHJMHF  | MICROCONTROLLER IC |             |
| IC6                      |         | *         | AT93C66A10SU27 | ROM IC             |             |
| IC7                      |         | *         | UPD71055GB-3B4 | MOS-IC             |             |
| IC8                      |         |           | SN74ALS04BNS   | MOS-IC             |             |
| Q1                       |         |           | DTC143TK       | DIGITAL TRANSISTOR |             |
| Q2                       |         |           | DTA143EK       | DIGITAL TRANSISTOR |             |
| Q3                       |         |           | DTC143EK       | DIGITAL TRANSISTOR |             |
| Q4                       |         |           | DTA143EK       | DIGITAL TRANSISTOR |             |
| Q5                       |         |           | DTC143EK       | DIGITAL TRANSISTOR |             |
| Q6                       |         |           | DTA143EK       | DIGITAL TRANSISTOR |             |
| Q7                       |         |           | DTC143EK       | DIGITAL TRANSISTOR |             |
| TX-RX UNIT (X57-4660-21) |         |           |                |                    |             |
| D45                      |         |           | B30-2001-05    | LED (RED)          |             |
| D67                      |         |           | B30-2001-05    | LED (RED)          |             |
| C1                       |         |           | CC73GCH1H470J  | CHIP C 47PF J      |             |
| C2                       |         |           | CC73FCH1H070D  | CHIP C 7.0PF D     |             |
| C3                       |         |           | CC73GCH1H390J  | CHIP C 39PF J      |             |
| C6                       |         |           | CK73EB1H104K   | CHIP C 0.10UF K    |             |
| C7                       |         |           | CK73FB1H103K   | CHIP C 0.010UF K   |             |
| C8                       |         |           | CK73FF1E104Z   | CHIP C 0.10UF Z    |             |
| C9                       |         |           | CK73FF1C105Z   | CHIP C 1.0UF Z     |             |
| C10                      |         |           | CE04EW1E4R7M   | ELECTRO 4.7UF 25WV |             |
| C11                      |         |           | CK73GB1H103K   | CHIP C 0.010UF K   |             |
| C12                      |         |           | CK73FB1H182K   | CHIP C 1800PF K    |             |
| C13                      |         |           | CK73FF1E104Z   | CHIP C 0.10UF Z    |             |
| C14                      |         |           | CK73GB1H472K   | CHIP C 4700PF K    |             |
| C15                      |         |           | CK73FB1H182K   | CHIP C 1800PF K    |             |
| C16                      |         |           | CK73GB1H222K   | CHIP C 2200PF K    |             |
| C17                      |         |           | CK73GB1H472K   | CHIP C 4700PF K    |             |
| C18                      |         |           | CK73GB1H222K   | CHIP C 2200PF K    |             |
| C19                      |         |           | CK73FB1E104K   | CHIP C 0.10UF K    |             |
| C20                      |         |           | CK73GB1H103K   | CHIP C 0.010UF K   |             |
| C21                      |         |           | CK73FF1C105Z   | CHIP C 1.0UF Z     |             |
| C22                      |         |           | CK73GB1H392K   | CHIP C 3900PF K    |             |
| C23                      |         |           | CK73FF1E104Z   | CHIP C 0.10UF Z    |             |
| C24-26                   |         |           | CK73GB1H102K   | CHIP C 1000PF K    |             |
| C27                      |         |           | CK73GB1H392K   | CHIP C 3900PF K    |             |
| C28                      |         |           | CK73FF1E104Z   | CHIP C 0.10UF Z    |             |
| C29                      |         |           | CK73GB1H182K   | CHIP C 1800PF K    |             |
| C30                      |         |           | CK73FF1E104Z   | CHIP C 0.10UF Z    |             |
| C31                      |         |           | CK73GB1H102K   | CHIP C 1000PF K    |             |
| C32                      |         |           | CC73GCH1H391J  | CHIP C 390PF J     |             |
| C33                      |         |           | CK73GB1H102K   | CHIP C 1000PF K    |             |

## PARTS LIST

## TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.     | Description      | Destination | Ref. No. | Address | New parts | Parts No.     | Description      | Destination |
|----------|---------|-----------|---------------|------------------|-------------|----------|---------|-----------|---------------|------------------|-------------|
| C34      |         |           | CK73GB1H182K  | CHIP C 1800PF K  |             | C101     |         |           | CC73FCH1H060D | CHIP C 6.0PF D   |             |
| C35      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C102-104 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C36      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C105     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C37      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C106     |         |           | CK73FB1H471K  | CHIP C 470PF K   |             |
| C38      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C107     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C39      |         |           | CC73GCH1H271J | CHIP C 270PF J   |             | C108     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C40,41   |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C109     |         |           | CK73GB1H471K  | CHIP C 470PF K   |             |
| C42      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C110     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C43      |         |           | CK73GB1H821K  | CHIP C 820PF K   |             | C111     |         |           | CC73FCH1H270J | CHIP C 27PF J    |             |
| C44      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C112     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C45      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C114     |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             |
| C46      |         |           | CC73GCH1H121J | CHIP C 120PF J   |             | C115     |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z   |             |
| C47      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C116     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C48      |         |           | CK73GB1H821K  | CHIP C 820PF K   |             | C117     |         |           | CC73GCH1H200J | CHIP C 20PF J    |             |
| C49      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C118     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C50      |         |           | CK73GB1H681K  | CHIP C 680PF K   |             | C119     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C51      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C120     |         |           | CC73GCH1H100D | CHIP C 10PF D    |             |
| C52      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C121     |         |           | CC73GCH1H020C | CHIP C 2.0PF C   |             |
| C53      |         |           | CC73GCH1H820J | CHIP C 82PF J    |             | C122-124 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C54      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C125     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C55      |         |           | CK73GB1H681K  | CHIP C 680PF K   |             | C126     |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             |
| C56      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C127,128 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C57      |         |           | CC73GCH1H331J | CHIP C 330PF J   |             | C129     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C58      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C130-133 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C59      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C134     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C60      |         |           | CC73GCH1H680J | CHIP C 68PF J    |             | C135,136 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C61      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C140-142 |         |           | CC73GCH1H100D | CHIP C 10PF D    |             |
| C62      |         |           | CC73GCH1H331J | CHIP C 330PF J   |             | C146,147 |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C63      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C148     |         |           | CC73FCH1H040C | CHIP C 4.0PF C   |             |
| C64      |         |           | CC73GCH1H221J | CHIP C 220PF J   |             | C149     |         |           | CC73FCH1H200J | CHIP C 20PF J    |             |
| C65      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C151-154 |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C66      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C155     |         |           | CC73FCH1H030C | CHIP C 3.0PF C   |             |
| C67      |         |           | CC73GCH1H470J | CHIP C 47PF J    |             | C157-160 |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C68      |         |           | CK73GB1H102K  | CHIP C 1000PF K  |             | C161     |         |           | CC73FCH1H030C | CHIP C 3.0PF C   |             |
| C69      |         |           | CC73GCH1H221J | CHIP C 220PF J   |             | C163-166 |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C70      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C167     |         |           | CC73FCH1H040C | CHIP C 4.0PF C   |             |
| C71      |         |           | CC73GCH1H680J | CHIP C 68PF J    |             | C168     |         |           | CC73FCH1H030C | CHIP C 3.0PF C   |             |
| C72      |         |           | CC73GCH1H060D | CHIP C 6.0PF D   |             | C169,170 |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C73      |         |           | CC73FCH1H151J | CHIP C 150PF J   |             | C171     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C74      |         |           | CC73GCH1H180J | CHIP C 18PF J    |             | C172     |         |           | CK73FF1C474Z  | CHIP C 0.47UF Z  |             |
| C75      |         |           | CC73GCH1H680J | CHIP C 68PF J    |             | C173     |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             |
| C76,77   |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C174     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C78      |         |           | CK73FB1H102K  | CHIP C 1000PF K  |             | C175     |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             |
| C79-81   |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C176     |         |           | CK73GF1E473Z  | CHIP C 0.047UF Z |             |
| C82      |         |           | CK73FB1H471K  | CHIP C 470PF K   |             | C177     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C83      |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             | C178-180 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C84      |         |           | CC73FCH1H220J | CHIP C 22PF J    |             | C181     |         |           | CK73FB1H471K  | CHIP C 470PF K   |             |
| C85      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C182-184 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C86      |         |           | CK73GB1C104K  | CHIP C 0.10UF K  |             | C185     |         |           | CC73GCH1H050C | CHIP C 5.0PF C   |             |
| C87      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C186     |         |           | CK73FB1H332K  | CHIP C 3300PF K  |             |
| C88      |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             | C187     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C89-91   |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C188     |         |           | CC73GCH1H200J | CHIP C 20PF J    |             |
| C92      |         |           | CC73GCH1H020C | CHIP C 2.0PF C   |             | C189,190 |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C93      |         |           | CC73FCH1H030C | CHIP C 3.0PF C   |             | C191     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C94      |         |           | CC73FCH1H010C | CHIP C 1.0PF C   |             | C192     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C95      |         |           | CC73GCH1H100D | CHIP C 10PF D    |             | C193     |         |           | CC73FUJ1H080D | CHIP C 8.0PF D   |             |
| C96      |         |           | CC73FCH1H101J | CHIP C 100PF J   |             | C194,195 |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |
| C97      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z  |             | C196     |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             |
| C98,99   |         |           | CK73GB1H103K  | CHIP C 0.010UF K |             | C197     |         |           | CC73FCH1H010C | CHIP C 1.0PF C   |             |
| C100     |         |           | CC73FCH1H010C | CHIP C 1.0PF C   |             | C198     |         |           | CK73FB1H103K  | CHIP C 0.010UF K |             |

## PARTS LIST

## TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.     | Description         | Destination | Ref. No. | Address | New parts | Parts No.     | Description         | Destination |
|----------|---------|-----------|---------------|---------------------|-------------|----------|---------|-----------|---------------|---------------------|-------------|
| C199     |         |           | CK73GB1H471K  | CHIP C 470PF K      |             | C295     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C201,202 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C296     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             |
| C203     |         |           | CC73FUJ1H080D | CHIP C 8.0PF D      |             | C297     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C204     |         |           | CC73FCH1H010C | CHIP C 1.0PF C      |             | C303     |         |           | CK73GB1H472K  | CHIP C 4700PF K     |             |
| C205     |         |           | CC73FCH1H0R5C | CHIP C 0.5PF C      |             | C304     |         |           | CK73FB1E104K  | CHIP C 0.10UF K     |             |
| C206,207 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C305     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             |
| C208-210 |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z     |             | C306     |         |           | CK73FB1E104K  | CHIP C 0.10UF K     |             |
| C211     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C307     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             |
| C212-215 |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z     |             | C308     |         |           | CE04EW1C101M  | ELECTRO 100UF 16WV  |             |
| C216     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C309     |         |           | CK73GB1H471K  | CHIP C 470PF K      |             |
| C217,218 |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z     |             | C310     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             |
| C219     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C311     |         |           | CK73GB1H222K  | CHIP C 2200PF K     |             |
| C220     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C312     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             |
| C222     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C313     |         |           | CE04EW1C471M  | ELECTRO 470UF 16WV  |             |
| C224     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C314     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C225     |         |           | CC73FCH1H470J | CHIP C 47PF J       |             | C315-317 |         |           | CC73GCH1H101J | CHIP C 100PF J      |             |
| C227,228 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C318     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z     |             |
| C230-232 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C319     |         |           | CE04EW1A101M  | ELECTRO 100UF 10WV  |             |
| C233     |         |           | CK73GB1H392K  | CHIP C 3900PF K     |             | C320     |         |           | CE04EW1H2R2M  | ELECTRO 2.2UF 50WV  |             |
| C234     |         |           | CK73GB1E123K  | CHIP C 0.012UF K    |             | C321,322 |         |           | CE04EW1E4R7M  | ELECTRO 4.7UF 25WV  |             |
| C235     |         |           | CK73GB1H332K  | CHIP C 3300PF K     |             | C323     |         | *         | CS77AA1A2R2M  | CHIP-TAN 2.2UF 10WV |             |
| C236     |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z      |             | C324     |         |           | CE04EW1E4R7M  | ELECTRO 4.7UF 25WV  |             |
| C237     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C325     |         |           | CK73GB1H222K  | CHIP C 2200PF K     |             |
| C238     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C326     |         |           | CE04EW1H2R2M  | ELECTRO 2.2UF 50WV  |             |
| C239     |         |           | CC73GCH1H100D | CHIP C 10PF D       |             | C327     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C240     |         |           | CC73GCH1H030C | CHIP C 3.0PF C      |             | C328     |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z     |             |
| C241     |         |           | CC73GCH1H221J | CHIP C 220PF J      |             | C330     |         |           | CK73FB1H222K  | CHIP C 2200PF K     |             |
| C242     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C331     |         |           | CK73FB1H332K  | CHIP C 3300PF K     |             |
| C243     |         |           | CK73GF1E333Z  | CHIP C 0.033UF Z    |             | C332     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             |
| C244     |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z      |             | C333     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             |
| C245     |         |           | CC73FCH1H470J | CHIP C 47PF J       |             | C334,335 |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             |
| C246     |         |           | CC73FCH1H221J | CHIP C 220PF J      |             | C336,337 |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             |
| C252,253 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C338     |         |           | CE04EW1C101M  | ELECTRO 100UF 16WV  |             |
| C254     |         |           | CE04EW1A101M  | ELECTRO 100UF 10WV  |             | C339     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C255,256 |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C340     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             |
| C257     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             | C341     |         |           | CE04EW1C101M  | ELECTRO 100UF 16WV  |             |
| C258     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C342     |         |           | CK73GB1E223K  | CHIP C 0.022UF K    |             |
| C259     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C343     |         |           | CE04EW1HR47M  | ELECTRO 0.47UF 50WV |             |
| C260     |         |           | CE04EW1E4R7M  | ELECTRO 4.7UF 25WV  |             | C344     |         |           | CK73GF1E473Z  | CHIP C 0.047UF Z    |             |
| C261     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C345     |         |           | CE04EW1E4R7M  | ELECTRO 4.7UF 25WV  |             |
| C262     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             | C346     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C263-267 |         |           | CK73FB1H102K  | CHIP C 1000PF K     |             | C347     |         |           | CC73GCH1H101J | CHIP C 100PF J      |             |
| C270     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C348     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C271     |         |           | CE04EW1H4R7M  | ELECTRO 4.7UF 50WV  |             | C349     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             |
| C272     |         |           | CE04EW1H010M  | ELECTRO 1.0UF 50WV  |             | C350     |         |           | CE04EW1E4R7M  | ELECTRO 4.7UF 25WV  |             |
| C273     |         |           | CE04EW1HR22M  | ELECTRO 0.22UF 50WV |             | C351     |         |           | CE04EW1H010M  | ELECTRO 1.0UF 50WV  |             |
| C274     |         |           | CE04EW1H4R7M  | ELECTRO 4.7UF 50WV  |             | C352,353 |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C275,276 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C354     |         |           | CK73GF1E473Z  | CHIP C 0.047UF Z    |             |
| C277     |         |           | CK73GF1E333Z  | CHIP C 0.033UF Z    |             | C355     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C279     |         |           | CK73GB1H822K  | CHIP C 8200PF K     |             | C356,357 |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z     |             |
| C280     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z     |             | C360-365 |         |           | CC73FCH1H470J | CHIP C 47PF J       |             |
| C281     |         |           | CK73GB1H332K  | CHIP C 3300PF K     |             | C366,367 |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C282     |         |           | CE04EW1C220M  | ELECTRO 22UF 16WV   |             | C368-372 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C283     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C373,374 |         |           | CC73GCH1H101J | CHIP C 100PF J      |             |
| C284     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z     |             | C376,377 |         |           | CK73FB1H102K  | CHIP C 1000PF K     |             |
| C286,287 |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z      |             | C378,379 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             |
| C288     |         |           | CC73GCH1H050C | CHIP C 5.0PF C      |             | C380-383 |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             |
| C289     |         |           | CE04EW1E4R7M  | ELECTRO 4.7UF 25WV  |             | C384,385 |         |           | CC73FUJ1H080D | CHIP C 8.0PF D      |             |
| C290-293 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C386     |         |           | CK73GF1E473Z  | CHIP C 0.047UF Z    |             |
| C294     |         |           | CE04EW1C220M  | ELECTRO 22UF 16WV   |             | C387,388 |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             |

## PARTS LIST

## TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.     | Description         | Destination | Ref. No. | Address | New parts | Parts No.     | Description        | Destination |
|----------|---------|-----------|---------------|---------------------|-------------|----------|---------|-----------|---------------|--------------------|-------------|
| C389     |         |           | CE04EW1H010M  | ELECTRO 1.0UF 50WV  |             | C570     |         |           | CC73GCH1H470J | CHIP C 47PF J      |             |
| C390     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             | C571     |         |           | CK73GB1H561K  | CHIP C 560PF K     |             |
| C391,392 |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV   |             | C572     |         |           | CC73GCH1H470J | CHIP C 47PF J      |             |
| C393-399 |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             | C573     |         |           | CC73GCH1H151J | CHIP C 150PF J     |             |
| C401     |         |           | CE04LW1C331M  | ELECTRO 330UF 16WV  |             | C574     |         |           | CC73GCH1H680J | CHIP C 68PF J      |             |
| C402     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             | C575     |         |           | CC73GCH1H270J | CHIP C 27PF J      |             |
| C403     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C576     |         |           | CC73GCH1H330J | CHIP C 33PF J      |             |
| C404     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             | C577     |         |           | CC73GCH1H101J | CHIP C 100PF J     |             |
| C406     |         |           | CK73GB1H222K  | CHIP C 2200PF K     |             | C578     |         |           | CC73GCH1H100D | CHIP C 10PF D      |             |
| C407     |         |           | CK73GB1E223K  | CHIP C 0.022UF K    |             | C579     |         |           | CC73GCH1H220J | CHIP C 22PF J      |             |
| C408,409 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C580,581 |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C411,412 |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z      |             | C584     |         |           | CK73GB1H102K  | CHIP C 1000PF K    |             |
| C413     |         |           | CC73FCH1H330J | CHIP C 33PF J       |             | C585-587 |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C500,501 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C588     |         |           | CK73GB1H102K  | CHIP C 1000PF K    |             |
| C504,505 |         |           | CC73FCH1H270J | CHIP C 27PF J       |             | C589     |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C506,507 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C590,591 |         |           | CC73GCH1H270J | CHIP C 27PF J      |             |
| C508     |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z      |             | C592     |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C510,511 |         |           | CC73FCH1H270J | CHIP C 27PF J       |             | C594     |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C512,513 |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             | C595     |         |           | CC73FCH1H070D | CHIP C 7.0PF D     |             |
| C514     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C596     |         |           | CC73FCH1H220J | CHIP C 22PF J      |             |
| C515,516 |         |           | CC73GCH1H470J | CHIP C 47PF J       |             | C597     |         |           | CK73FB1H102K  | CHIP C 1000PF K    |             |
| C517     |         |           | CC73GCH1H330J | CHIP C 33PF J       |             | C598     |         |           | CC73FCH1H220J | CHIP C 22PF J      |             |
| C518     |         |           | CC73GCH1H060D | CHIP C 6.0PF D      |             | C599     |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C519     |         |           | CC73GCH1H470J | CHIP C 47PF J       |             | C600     |         |           | CC73GCH1H030C | CHIP C 3.0PF C     |             |
| C520     |         |           | CC73GCH1H110J | CHIP C 11PF J       |             | C601     |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C522     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C602     |         |           | CK73GB1H102K  | CHIP C 1000PF K    |             |
| C523     |         |           | CE04EW1A221M  | ELECTRO 220UF 10WV  |             | C603     |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C524     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C604,605 |         |           | CK73GB1H102K  | CHIP C 1000PF K    |             |
| C526     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             | C606     |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C527     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C607     |         |           | CK73GB1H102K  | CHIP C 1000PF K    |             |
| C528,529 |         | *         | CS77BA1C010M  | CHIP-TAN 1.0UF 16WV |             | C608     |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C530     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C609     |         |           | CK73GB1H102K  | CHIP C 1000PF K    |             |
| C531     |         |           | CE04EW1C470M  | ELECTRO 47UF 16WV   |             | C610     |         |           | CC73FCH1H330J | CHIP C 33PF J      |             |
| C532     |         |           | CC73GCH1H101J | CHIP C 100PF J      |             | C611     |         |           | CC73FCH1H060D | CHIP C 6.0PF D     |             |
| C533     |         |           | CC73GCH1H331J | CHIP C 330PF J      |             | C612     |         |           | CC73FCH1H680J | CHIP C 68PF J      |             |
| C534     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C614     |         |           | CE04EW1H2R2M  | ELECTRO 2.2UF 50WV |             |
| C535     |         |           | CC73GCH1H101J | CHIP C 100PF J      |             | C615     |         |           | CK73FB1H102K  | CHIP C 1000PF K    |             |
| C536,537 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C616     |         |           | CC73GCH1H181J | CHIP C 180PF J     |             |
| C538     |         |           | CC73GCH1H020C | CHIP C 2.0PF C      |             | C617     |         |           | CC73GCH1H100D | CHIP C 10PF D      |             |
| C539     |         |           | CC73GCH1H030C | CHIP C 3.0PF C      |             | C618     |         |           | CC73GCH1H221J | CHIP C 220PF J     |             |
| C540     |         |           | CC73GCH1H020C | CHIP C 2.0PF C      |             | C619     |         |           | CC73GCH1H220J | CHIP C 22PF J      |             |
| C541     |         |           | CC73GCH1H1R5C | CHIP C 1.5PF C      |             | C620     |         |           | CC73GCH1H151J | CHIP C 150PF J     |             |
| C542,543 |         |           | CC73GCH1H270J | CHIP C 27PF J       |             | C621     |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C544     |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C623-625 |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C545,546 |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C626     |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C549     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             | C627     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z    |             |
| C550     |         |           | CK73GB1H103K  | CHIP C 0.010UF K    |             | C629     |         |           | CK73GB1H103K  | CHIP C 0.010UF K   |             |
| C551     |         |           | CK73GB1H102K  | CHIP C 1000PF K     |             | C630     |         |           | CC73GCH1H220J | CHIP C 22PF J      |             |
| C552     |         |           | CC73GCH1H070D | CHIP C 7.0PF D      |             | C632     |         |           | CK73GB1E223K  | CHIP C 0.022UF K   |             |
| C553,554 |         |           | CC73GCH1HR75C | CHIP C 0.75PF C     |             | C633     |         |           | CC73GCH1H101J | CHIP C 100PF J     |             |
| C555     |         |           | CC73GCH1H070D | CHIP C 7.0PF D      |             | C634,635 |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C557     |         |           | CE04EW1H2R2M  | ELECTRO 2.2UF 50WV  |             | C636     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV  |             |
| C558     |         |           | CK73FB1H102K  | CHIP C 1000PF K     |             | C637     |         |           | CC73FCH1H100D | CHIP C 10PF D      |             |
| C559     |         |           | CC73GCH1H181J | CHIP C 180PF J      |             | C638     |         |           | CC73FCH1H390J | CHIP C 39PF J      |             |
| C560     |         |           | CC73GCH1H100D | CHIP C 10PF D       |             | C639     |         |           | CC73FCH1H151J | CHIP C 150PF J     |             |
| C561     |         |           | CC73GCH1H221J | CHIP C 220PF J      |             | C640     |         |           | CC73FCH1H390J | CHIP C 39PF J      |             |
| C562     |         |           | CC73GCH1H220J | CHIP C 22PF J       |             | C641     |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C563     |         |           | CC73GCH1H151J | CHIP C 150PF J      |             | C642     |         |           | CC73FCH1H050C | CHIP C 5.0PF C     |             |
| C564,565 |         |           | CK73FB1H103K  | CHIP C 0.010UF K    |             | C643,644 |         |           | CK73FB1H103K  | CHIP C 0.010UF K   |             |
| C566     |         |           | CK73GF1E104Z  | CHIP C 0.10UF Z     |             | C645     |         |           | CK73FB1H102K  | CHIP C 1000PF K    |             |

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| Ref. No. | Address | New parts | Parts No.     | Description          | Destination | Ref. No.  | Address | New parts | Parts No.     | Description                      | Destination |
|----------|---------|-----------|---------------|----------------------|-------------|-----------|---------|-----------|---------------|----------------------------------|-------------|
| C646     |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | C815,816  |         |           | CK73FB1H103K  | CHIP C 0.010UF K                 |             |
| C647     |         |           | CK73FB1H102K  | CHIP C 1000PF K      |             | C817      |         | *         | CS77BA1C010M  | CHIP-TAN 1.0UF 16WV              |             |
| C648,649 |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | C818      |         |           | CE04EW1A101M  | ELECTRO 100UF 10WV               |             |
| C650     |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV    |             | C819      |         |           | CK73FB1H103K  | CHIP C 0.010UF K                 |             |
| C651,652 |         |           | CC73GCH1H150J | CHIP C 15PF J        |             | C900,901  |         |           | CC73GCH1H101J | CHIP C 100PF J                   |             |
| C653-659 |         |           | CC73FCH1H221J | CHIP C 220PF J       |             | C902      |         |           | CE04EW1A101M  | ELECTRO 100UF 10WV               |             |
| C660     |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             | C903,904  |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z                   |             |
| C663     |         |           | CC73FCH1H221J | CHIP C 220PF J       |             | C905      |         |           | CE04EW1C100M  | ELECTRO 10UF 16WV                |             |
| C668     |         |           | CK73FB1H223K  | CHIP C 0.022UF K     |             | C906      |         |           | CK73GB1H103K  | CHIP C 0.010UF K                 |             |
| C669     |         |           | CE04EW1A221M  | ELECTRO 220UF 10WV   |             | C907      |         |           | CE04EW1A101M  | ELECTRO 100UF 10WV               |             |
| C670     |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | C908      |         |           | CK73GB1E223K  | CHIP C 0.022UF K                 |             |
| C671     |         |           | CK73GCH1H390J | CHIP C 39PF J        |             | C909      |         |           | CK73GB1H102K  | CHIP C 1000PF K                  |             |
| C672     |         |           | CK73FB1H102K  | CHIP C 1000PF K      |             | C910      |         |           | CK73FF1C105Z  | CHIP C 1.0UF Z                   |             |
| C673     |         |           | CC73GCH1H150J | CHIP C 15PF J        |             | TC501     |         | *         | C05-0355-15   | CERAMIC TRIMMER CAPACITOR (30PF) |             |
| C674     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | TC502-505 |         |           | C05-0345-15   | CERAMIC TRIMMER CAPACITOR (10PF) |             |
| C675     |         |           | CC73GCH1H090D | CHIP C 9.0PF D       |             | CN1-3     |         |           | E04-0154-05   | PIN SOCKET                       |             |
| C676     |         |           | CC73GCH1H100D | CHIP C 10PF D        |             | CN4       |         |           | E40-0211-05   | PIN ASSY                         |             |
| C677     |         |           | CC73GCH1H180J | CHIP C 18PF J        |             | CN7       |         |           | E40-0211-05   | PIN ASSY                         |             |
| C678,679 |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | CN9,10    |         |           | E40-3237-05   | PIN ASSY                         |             |
| C680     |         |           | CC73GCH1H050C | CHIP C 5.0PF C       |             | CN11      |         |           | E40-3238-05   | PIN ASSY                         |             |
| C681     |         |           | CC73GCH1H330J | CHIP C 33PF J        |             | CN12      |         |           | E40-3240-05   | PIN ASSY                         |             |
| C682     |         |           | CK73FB1H102K  | CHIP C 1000PF K      |             | CN13      |         |           | E40-3239-05   | PIN ASSY                         |             |
| C683     |         |           | CC73GCH1H100D | CHIP C 10PF D        |             | CN14      |         |           | E40-5797-05   | FLAT CABLE CONNECTOR             |             |
| C684     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | CN15      |         |           | E40-5765-05   | FLAT CABLE CONNECTOR             |             |
| C685     |         |           | CC73GCH1H070D | CHIP C 7.0PF D       |             | CN19      |         |           | E04-0154-05   | PIN SOCKET                       |             |
| C686     |         |           | CC73GCH1H090D | CHIP C 9.0PF D       |             | CN500     |         |           | E40-5764-05   | FLAT CABLE CONNECTOR             |             |
| C687     |         |           | CC73GCH1H160J | CHIP C 16PF J        |             | CN501,502 |         |           | E04-0154-05   | PIN SOCKET                       |             |
| C688,689 |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | CN503     |         |           | E40-3237-05   | PIN ASSY                         |             |
| C690     |         |           | CC73GCH1H050C | CHIP C 5.0PF C       |             | J1        |         |           | E06-0658-05   | DIN SOCKET (ACC1)                |             |
| C691     |         |           | CC73GCH1H200J | CHIP C 20PF J        |             | J2        |         |           | E56-0407-05   | DIN SOCKET (ACC2)                |             |
| C692     |         |           | CK73FB1H102K  | CHIP C 1000PF K      |             | J3,4      |         |           | E13-0166-05   | PIN JACK (RELAY)                 |             |
| C693     |         |           | CC73GCH1H100D | CHIP C 10PF D        |             | J5        |         |           | E11-0414-05   | 3.5D PHONE JACK (3P: EXT SP)     |             |
| C694     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | J6        |         | *         | E11-0705-05   | PHONE JACK (9P: KEY)             |             |
| C695     |         |           | CC73GCH1H050C | CHIP C 5.0PF C       |             | W1        | 3B      |           | E37-0506-05   | LEAD WIRE WITH CONNECTOR         |             |
| C696     |         |           | CC73GCH1H080D | CHIP C 8.0PF D       |             | W2        | 3B      |           | E37-0495-05   | LEAD WIRE WITH MINIPIN PLUG      |             |
| C697     |         |           | CC73GCH1H120J | CHIP C 12PF J        |             | W3        | 3B      |           | E37-0496-05   | LEAD WIRE WITH MINIPIN PLUG      |             |
| C698,699 |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | W4        | 3B      |           | E37-0507-05   | LEAD WIRE WITH CONNECTOR         |             |
| C700     |         |           | CC73GCH1H050C | CHIP C 5.0PF C       |             | -         |         |           | F10-2062-04   | SHIELDING CASE (DDS)             |             |
| C701-704 |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | -         |         |           | F10-2163-14   | SHIELDING CASE (VCO)             |             |
| C705     |         |           | CC73GCH1H391J | CHIP C 390PF J       |             | -         |         |           | F10-2164-04   | SHIELDING COVER (VCO)            |             |
| C706     |         |           | CC73GCH1H270J | CHIP C 27PF J        |             | F1        |         |           | F53-0055-05   | FUSE (0.8A)                      |             |
| C707     |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | -         |         |           | G13-1493-04   | CUSHION (VCO)                    |             |
| C709     |         |           | CC73GCH1H180J | CHIP C 18PF J        |             | -         |         |           | J30-0545-05   | SPACER (XF1)                     |             |
| C710     |         |           | CK73FB1H102K  | CHIP C 1000PF K      |             | -         |         |           |               |                                  |             |
| C711     |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             | -         |         |           |               |                                  |             |
| C712     |         |           | C92-0001-05   | CHIP-TAN 0.1UF 35WV  |             | CF500     |         |           | L72-0391-05   | CERAMIC FILTER                   |             |
| C713     |         |           | CC73GCH1H020C | CHIP C 2.0PF C       |             | L1        |         | *         | L41-2785-32   | SMALL FIXED INDUCTOR (0.27UH)    |             |
| C714     |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | L3,4      |         |           | L33-0695-05   | SMALL FIXED INDUCTOR (1.0MH)     |             |
| C715     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | L5        |         | *         | L41-4795-32   | SMALL FIXED INDUCTOR (4.7UH)     |             |
| C800     |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | L6        |         |           | L33-0695-05   | SMALL FIXED INDUCTOR (1.0MH)     |             |
| C801     |         |           | CC73GCH1H060D | CHIP C 6.0PF D       |             | L7,8      |         | *         | L41-6895-32   | SMALL FIXED INDUCTOR (6.8UH)     |             |
| C802     |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             | L10       |         | *         | L41-1895-32   | SMALL FIXED INDUCTOR (1.8UH)     |             |
| C804     |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             | L11       |         | *         | L41-6895-32   | SMALL FIXED INDUCTOR (6.8UH)     |             |
| C805     |         |           | C92-0003-05   | CHIP-TAN 0.47UF 25WV |             | L12       |         | *         | L41-1895-32   | SMALL FIXED INDUCTOR (1.8UH)     |             |
| C806,807 |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | L13       |         | *         | L41-1295-32   | SMALL FIXED INDUCTOR (1.2UH)     |             |
| C808     |         |           | C92-0003-05   | CHIP-TAN 0.47UF 25WV |             | L14       |         | *         | L41-5695-32   | SMALL FIXED INDUCTOR (5.6UH)     |             |
| C810     |         |           | CK73FB1H103K  | CHIP C 0.010UF K     |             | L15       |         |           | L40-1595-48   | SMALL FIXED INDUCTOR (1.5UH)     |             |
| C811     |         |           | CK73GB1H102K  | CHIP C 1000PF K      |             | L16       |         | *         | L41-8285-32   | SMALL FIXED INDUCTOR (0.82UH)    |             |
| C812     |         |           | CC73GCH1H100D | CHIP C 10PF D        |             | L17       |         |           | L40-2792-18   | SMALL FIXED INDUCTOR (2.7UH)     |             |
| C813,814 |         |           | CK73GB1H103K  | CHIP C 0.010UF K     |             | L18       |         | *         | L41-8285-32   | SMALL FIXED INDUCTOR (0.82UH)    |             |

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## TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.   | Description                   | Destination | Ref. No.  | Address | New parts | Parts No.    | Description                   | Destination |
|----------|---------|-----------|-------------|-------------------------------|-------------|-----------|---------|-----------|--------------|-------------------------------|-------------|
| L19      |         | *         | L41-4785-32 | SMALL FIXED INDUCTOR (0.47UH) |             | L507      |         |           | L40-5675-48  | SMALL FIXED INDUCTOR (56NH)   |             |
| L20      |         |           | L40-2792-18 | SMALL FIXED INDUCTOR (2.7UH)  |             | L508      |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L21      |         | *         | L41-4785-32 | SMALL FIXED INDUCTOR (0.47UH) |             | L509      |         | *         | L41-3395-32  | SMALL FIXED INDUCTOR (3.3UH)  |             |
| L22      |         | *         | L41-2785-32 | SMALL FIXED INDUCTOR (0.27UH) |             | L510      |         |           | L40-1595-48  | SMALL FIXED INDUCTOR (1.5UH)  |             |
| L23      |         | *         | L41-1895-32 | SMALL FIXED INDUCTOR (1.8UH)  |             | L511      |         |           | L40-2295-48  | SMALL FIXED INDUCTOR (2.2UH)  |             |
| L24      |         | *         | L41-2785-32 | SMALL FIXED INDUCTOR (0.27UH) |             | L512      |         | *         | L41-3395-32  | SMALL FIXED INDUCTOR (3.3UH)  |             |
| L25      |         | *         | L41-2285-32 | SMALL FIXED INDUCTOR (0.22UH) |             | L513      |         |           | L34-4398-05  | COIL                          |             |
| L26      |         | *         | L41-1295-32 | SMALL FIXED INDUCTOR (1.2UH)  |             | L514      |         |           | L34-4399-05  | COIL                          |             |
| L27      |         | *         | L41-2285-32 | SMALL FIXED INDUCTOR (0.22UH) |             | L515      |         |           | L34-4398-05  | COIL                          |             |
| L28      |         |           | L40-1585-48 | SMALL FIXED INDUCTOR (150NH)  |             | L516      |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L29      |         | *         | L41-8285-32 | SMALL FIXED INDUCTOR (0.82UH) |             | L517,518  |         | *         | L41-2205-32  | SMALL FIXED INDUCTOR (22UH)   |             |
| L30      |         |           | L40-1585-48 | SMALL FIXED INDUCTOR (150NH)  |             | L522      |         | *         | L41-3395-32  | SMALL FIXED INDUCTOR (3.3UH)  |             |
| L31,32   |         | *         | L41-2785-32 | SMALL FIXED INDUCTOR (0.27UH) |             | L523      |         | *         | L41-3995-32  | SMALL FIXED INDUCTOR (3.9UH)  |             |
| L33      |         |           | L19-0324-05 | TOROIDAL COIL                 |             | L524      |         | *         | L41-5695-32  | SMALL FIXED INDUCTOR (5.6UH)  |             |
| L34      |         |           | L33-0695-05 | SMALL FIXED INDUCTOR (1.0MH)  |             | L525      |         |           | L40-8295-48  | SMALL FIXED INDUCTOR (8.2UH)  |             |
| L35      |         | *         | L41-4705-32 | SMALL FIXED INDUCTOR (47UH)   |             | L527      |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L36      |         |           | L39-1255-15 | TOROIDAL COIL                 |             | L528,529  |         | *         | L41-1005-32  | SMALL FIXED INDUCTOR (10UH)   |             |
| L37      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | L530      |         | *         | L41-1295-32  | SMALL FIXED INDUCTOR (1.2UH)  |             |
| L38      |         |           | L34-4413-05 | COIL                          |             | L531      |         |           | L34-4399-05  | COIL                          |             |
| L39      |         |           | L19-0324-05 | TOROIDAL COIL                 |             | L532      |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L40      |         | *         | L41-3395-32 | SMALL FIXED INDUCTOR (3.3UH)  |             | L533      |         | *         | L41-2285-32  | SMALL FIXED INDUCTOR (0.22UH) |             |
| L41      |         |           | L19-0324-05 | TOROIDAL COIL                 |             | L534      |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L42,43   |         |           | L34-4408-05 | COIL                          |             | L535,536  |         | *         | L41-2205-32  | SMALL FIXED INDUCTOR (22UH)   |             |
| L44      |         |           | L34-4415-05 | COIL                          |             | L539      |         |           | L34-4401-05  | COIL                          |             |
| L45      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | L540,541  |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L46      |         |           | L39-1255-15 | TOROIDAL COIL                 |             | L542      |         | *         | L41-1005-32  | SMALL FIXED INDUCTOR (10UH)   |             |
| L48      |         |           | L34-4406-05 | COIL                          |             | L543      |         | *         | L41-4795-32  | SMALL FIXED INDUCTOR (4.7UH)  |             |
| L49      |         |           | L34-4414-05 | COIL                          |             | L544      |         | *         | L41-1015-32  | SMALL FIXED INDUCTOR (100UH)  |             |
| L50      |         |           | L40-1085-48 | SMALL FIXED INDUCTOR (100NH)  |             | L545      |         |           | L34-4424-05  | COIL                          |             |
| L51      |         |           | L34-4410-05 | COIL                          |             | L546      |         |           | L34-2360-05  | COIL                          |             |
| L52,53   |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | L547      |         |           | L34-4424-05  | COIL                          |             |
| L55      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | L548      |         |           | L34-2359-05  | COIL                          |             |
| L56      |         | *         | L41-5695-32 | SMALL FIXED INDUCTOR (5.6UH)  |             | L549      |         |           | L34-4424-05  | COIL                          |             |
| L57      |         | *         | L41-1005-32 | SMALL FIXED INDUCTOR (10UH)   |             | L550      |         |           | L34-2359-05  | COIL                          |             |
| L58,59   |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | L551      |         | *         | L41-8285-32  | SMALL FIXED INDUCTOR (0.82UH) |             |
| L60      |         |           | L34-4412-05 | COIL                          |             | L800      |         | *         | L41-8285-32  | SMALL FIXED INDUCTOR (0.82UH) |             |
| L61      |         | *         | L34-4464-05 | COIL                          |             | L801      |         | *         | L41-4705-32  | SMALL FIXED INDUCTOR (47UH)   |             |
| L62      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | L802,803  |         |           | L34-4401-05  | COIL                          |             |
| L63      |         |           | L34-4406-05 | COIL                          |             | L804      |         |           | L33-0695-05  | SMALL FIXED INDUCTOR (1.0MHZ) |             |
| L64,65   |         |           | L34-4333-05 | COIL                          |             | X501      |         |           | L77-1521-15  | CRYSTAL RESONATOR (20MHZ)     |             |
| L66      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | X502      |         |           | L77-1598-05  | CRYSTAL RESONATOR (62.35MHZ)  |             |
| L67      |         |           | L34-4333-05 | COIL                          |             | XF1       |         |           | L71-0432-05  | MCF (73.045MHZ)               |             |
| L68      |         |           | L39-1255-15 | TOROIDAL COIL                 |             | XF2       |         |           | L71-0249-05  | CRYSTAL FILTER (10.695MHZ)    |             |
| L69      |         |           | L34-4333-05 | COIL                          |             | XF3       |         |           | L71-0433-15  | MCF (10.695MHZ)               |             |
| L70      |         |           | L19-0324-05 | TOROIDAL COIL                 |             | -         |         |           | N30-2606-46  | PAN HEAD MACHINE SCREW (VCO)  |             |
| L71      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | CP500-503 |         |           | R90-0721-05  | MULTI-COMP 4.7K X16           |             |
| L72      |         | *         | L41-1005-32 | SMALL FIXED INDUCTOR (10UH)   |             | R1        |         |           | R92-0679-05  | CHIP R 0 OHM                  |             |
| L73      |         |           | L19-0324-05 | TOROIDAL COIL                 |             | R2        |         |           | RK73FB2A101J | CHIP R 100 J 1/10W            |             |
| L74      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | R3        |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W           |             |
| L75,76   |         |           | L34-4401-05 | COIL                          |             | R4        |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W           |             |
| L77,78   |         | *         | L41-4705-32 | SMALL FIXED INDUCTOR (47UH)   |             | R5        |         |           | RK73FB2A101J | CHIP R 100 J 1/10W            |             |
| L79      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | R6        |         |           | RK73FB2A222J | CHIP R 2.2K J 1/10W           |             |
| L81      |         |           | L40-1021-13 | SMALL FIXED INDUCTOR (1.0MH)  |             | R7        |         |           | RK73FB2A181J | CHIP R 180 J 1/10W            |             |
| L82      |         |           | L33-0695-05 | SMALL FIXED INDUCTOR (1.0MH)  |             | R8        |         |           | RK73FB2A101J | CHIP R 100 J 1/10W            |             |
| L84      |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | R9        |         |           | RK73EB2B151J | CHIP R 150 J 1/8W             |             |
| L85      |         |           | L40-2281-17 | SMALL FIXED INDUCTOR (0.22UH) |             | R10       |         |           | RK73FB2A330J | CHIP R 33 J 1/10W             |             |
| L500-503 |         | *         | L41-1015-32 | SMALL FIXED INDUCTOR (100UH)  |             | R11       |         |           | RK73EB2B121J | CHIP R 120 J 1/8W             |             |
| L504     |         |           | L40-6885-48 | SMALL FIXED INDUCTOR (680NH)  |             | R12       |         |           | RK73FB2A330J | CHIP R 33 J 1/10W             |             |
| L505     |         |           | L40-1085-48 | SMALL FIXED INDUCTOR (100NH)  |             | R13       |         |           | RK73EB2B121J | CHIP R 120 J 1/8W             |             |
| L506     |         |           | L40-8275-48 | SMALL FIXED INDUCTOR (82NH)   |             |           |         |           |              |                               |             |

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| Ref. No. | Address | New parts | Parts No.    | Description          | Desti-nation | Ref. No. | Address | New parts | Parts No.    | Description          | Desti-nation |
|----------|---------|-----------|--------------|----------------------|--------------|----------|---------|-----------|--------------|----------------------|--------------|
| R14      |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |              | R79      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              |
| R15      |         |           | RK73EB2B121J | CHIP R 120 J 1/8W    |              | R80,81   |         |           | RK73GB1J122J | CHIP R 1.2K J 1/16W  |              |
| R16      |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |              | R83      |         |           | RK73GB1J122J | CHIP R 1.2K J 1/16W  |              |
| R17      |         |           | RK73EB2B121J | CHIP R 120 J 1/8W    |              | R85      |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |              |
| R18      |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |              | R86      |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              |
| R19      |         |           | RK73EB2B121J | CHIP R 120 J 1/8W    |              | R87      |         |           | RK73FB2A270J | CHIP R 27 J 1/10W    |              |
| R20      |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |              | R88      |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R21      |         |           | RK73EB2B121J | CHIP R 120 J 1/8W    |              | R89      |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              |
| R22      |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |              | R90      |         |           | RK73GB1J122J | CHIP R 1.2K J 1/16W  |              |
| R23      |         |           | RK73EB2B121J | CHIP R 120 J 1/8W    |              | R93      |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              |
| R24      |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |              | R94      |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              |
| R25      |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |              | R95      |         |           | R92-0670-05  | CHIP R 0 OHM         |              |
| R26      |         |           | RK73FB2A151J | CHIP R 150 J 1/10W   |              | R96,97   |         |           | RK73FB2A681J | CHIP R 680 J 1/10W   |              |
| R27,28   |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |              | R98      |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R29-32   |         |           | RK73FB2A100J | CHIP R 10 J 1/10W    |              | R100     |         |           | RK73FB2A152J | CHIP R 1.5K J 1/10W  |              |
| R33      |         |           | RK73GB1J271J | CHIP R 270 J 1/16W   |              | R101     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R34      |         |           | RK73FB2A100J | CHIP R 10 J 1/10W    |              | R102     |         |           | RK73FB2A331J | CHIP R 330 J 1/10W   |              |
| R35      |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |              | R103     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R36      |         |           | RK73GB1J152J | CHIP R 1.5K J 1/16W  |              | R105     |         |           | RK73FB2A152J | CHIP R 1.5K J 1/10W  |              |
| R37      |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              | R106     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R38      |         |           | RK73FB2A220J | CHIP R 22 J 1/10W    |              | R107     |         |           | RK73FB2A391J | CHIP R 390 J 1/10W   |              |
| R39      |         |           | RK73FB2A470J | CHIP R 47 J 1/10W    |              | R108     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R40      |         |           | RK73FB2A391J | CHIP R 390 J 1/10W   |              | R110     |         |           | RK73FB2A152J | CHIP R 1.5K J 1/10W  |              |
| R41      |         |           | RK73FB2A332J | CHIP R 3.3K J 1/10W  |              | R111     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R42      |         |           | R92-0679-05  | CHIP R 0 OHM         |              | R112     |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |              |
| R43      |         |           | RK73GB1J474J | CHIP R 470K J 1/16W  |              | R113     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R44      |         |           | RK73GB1J273J | CHIP R 27K J 1/16W   |              | R115     |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |              |
| R45      |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              | R116     |         |           | RK73FB2A122J | CHIP R 1.2K J 1/10W  |              |
| R46      |         |           | RK73FB2A104J | CHIP R 100K J 1/10W  |              | R117     |         |           | RK73GB1J333J | CHIP R 33K J 1/16W   |              |
| R47      |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R118     |         |           | RK73FB2A562J | CHIP R 5.6K J 1/10W  |              |
| R48      |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R119     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |              |
| R49      |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |              | R120     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |              |
| R50      |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R121-123 |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |              |
| R51,52   |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              | R124     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              |
| R53      |         |           | RK73FB2A272J | CHIP R 2.7K J 1/10W  |              | R125     |         |           | RK73GB1J330J | CHIP R 33 J 1/16W    |              |
| R54      |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R126     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R55      |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R127     |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |              |
| R56      |         |           | RK73FB2A560J | CHIP R 56 J 1/10W    |              | R128     |         |           | RK73GB1J682J | CHIP R 6.8K J 1/16W  |              |
| R57      |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R129     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |              |
| R58      |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |              | R130     |         |           | RK73FB2A331J | CHIP R 330 J 1/10W   |              |
| R59      |         |           | RK73FB2A220J | CHIP R 22 J 1/10W    |              | R131     |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |              |
| R60      |         |           | RK73FB2A270J | CHIP R 27 J 1/10W    |              | R132     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |              |
| R61      |         |           | RK73FB2A680J | CHIP R 68 J 1/10W    |              | R133     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R62      |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              | R134     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |              |
| R63      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R135     |         |           | RK73GB1J821J | CHIP R 820 J 1/16W   |              |
| R64      |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |              | R136     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R65      |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R137     |         |           | R92-0670-05  | CHIP R 0 OHM         |              |
| R66      |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              | R138     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R67      |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R139     |         |           | RK73FB2A823J | CHIP R 82K J 1/10W   |              |
| R68      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R140     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |              |
| R69      |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R141-144 |         |           | RK73GB1J330J | CHIP R 33 J 1/16W    |              |
| R70      |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |              | R145     |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W  |              |
| R71      |         |           | RK73GB1J333J | CHIP R 33K J 1/16W   |              | R146,147 |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   |              |
| R72      |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R148,149 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R73      |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              | R150     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |              |
| R74      |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              | R151     |         |           | RK73FB2A390J | CHIP R 39 J 1/10W    |              |
| R75      |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |              | R152     |         |           | RK73FB2A181J | CHIP R 180 J 1/10W   |              |
| R76      |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R153,154 |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              |
| R77      |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R155     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              |
| R78      |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W  |              | R156     |         |           | RK73GB1J273J | CHIP R 27K J 1/16W   |              |

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| Ref. No. | Address | New parts | Parts No.    | Description          | Destination | Ref. No. | Address | New parts | Parts No.    | Description          | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|----------------------|-------------|
| R157-160 |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |             | R235     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             |
| R161,162 |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R236     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             |
| R163     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             | R237     |         |           | RK73GB1J474J | CHIP R 470K J 1/16W  |             |
| R164     |         |           | RK73GB1J151J | CHIP R 150 J 1/16W   |             | R238     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R165     |         |           | RK73FB2A560J | CHIP R 56 J 1/10W    |             | R239     |         |           | RK73GB1J822J | CHIP R 8.2K J 1/16W  |             |
| R166     |         |           | RK73FB2A820J | CHIP R 82 J 1/10W    |             | R240     |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   |             |
| R167,168 |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             | R241     |         |           | RK73GB1J393J | CHIP R 39K J 1/16W   |             |
| R169     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R242     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R170     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             | R243     |         |           | RK73FB2A823J | CHIP R 82K J 1/10W   |             |
| R171     |         |           | RK73GB1J330J | CHIP R 33 J 1/16W    |             | R244     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R172,173 |         |           | RK73FB2A330J | CHIP R 33 J 1/10W    |             | R245     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R174     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             | R246     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R175     |         |           | RK73GB1J470J | CHIP R 47 J 1/16W    |             | R247     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             |
| R176     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             | R248     |         |           | RK73GB1J273J | CHIP R 27K J 1/16W   |             |
| R177     |         |           | RK73GB1J333J | CHIP R 33K J 1/16W   |             | R249     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R178     |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |             | R250     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R179     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R251     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R180     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R252     |         |           | RK73FB2A272J | CHIP R 2.7K J 1/10W  |             |
| R181     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             | R253     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R182     |         |           | RK73FB2A333J | CHIP R 33K J 1/10W   |             | R254,255 |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R183     |         |           | RK73FB2A104J | CHIP R 100K J 1/10W  |             | R257     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             |
| R184     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R258     |         |           | RK73FB2A184J | CHIP R 180K J 1/10W  |             |
| R185     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R259     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R186     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             | R260     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R187,188 |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |             | R261     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R190     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R262     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             |
| R191     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             | R263,264 |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             |
| R192     |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             | R265     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R193     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R266     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R194     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             | R267     |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   |             |
| R195     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R268     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |             |
| R196     |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             | R269     |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             |
| R197     |         |           | RK73FB2A222J | CHIP R 2.2K J 1/10W  |             | R270     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             |
| R198     |         |           | RK73GB1J562J | CHIP R 5.6K J 1/16W  |             | R271     |         |           | RK73FB2A222J | CHIP R 2.2K J 1/10W  |             |
| R199     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R272     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             |
| R200     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             | R273     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             |
| R201     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             | R274     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             |
| R202     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             | R275     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R203,204 |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             | R276     |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             |
| R205     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             | R277     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R206     |         |           | RK73FB2A104J | CHIP R 100K J 1/10W  |             | R278     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             |
| R207     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             | R279     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R208     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             | R280     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             |
| R209     |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |             | R281     |         |           | RK73GB1J822J | CHIP R 8.2K J 1/16W  |             |
| R210     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R282     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R212     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R283     |         |           | R92-0670-05  | CHIP R 0 OHM         |             |
| R213     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R284     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R214     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             | R285     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             |
| R215     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R286     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             |
| R216     |         |           | RK73GB1J562J | CHIP R 5.6K J 1/16W  |             | R287     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R217     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |             | R288     |         |           | RK73GB1J333J | CHIP R 33K J 1/16W   |             |
| R218     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             | R289     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R219     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R290     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R220     |         |           | RK73FB2A823J | CHIP R 82K J 1/10W   |             | R291     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R221     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R292     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R222     |         |           | RK73GB1J105J | CHIP R 1.0M J 1/16W  |             | R293     |         |           | RK73FB2A332J | CHIP R 3.3K J 1/10W  |             |
| R223     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             | R294     |         |           | RK73GB1J474J | CHIP R 470K J 1/16W  |             |
| R224     |         |           | RK73FB2A181J | CHIP R 180 J 1/10W   |             | R298     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             |
| R225     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R299-306 |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R233     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R307     |         |           | RK73FB2A272J | CHIP R 2.7K J 1/10W  |             |

## PARTS LIST

## TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.    | Description          | Desti-nation | Ref. No. | Address | New parts | Parts No.    | Description          | Desti-nation |
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| R308     |         |           | RK73FB2A473J | CHIP R 47K J 1/10W   |              | R403     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              |
| R309,310 |         |           | RK73FB2A223J | CHIP R 22K J 1/10W   |              | R404     |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W  |              |
| R311     |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |              | R405     |         |           | RK73FB2A273J | CHIP R 27K J 1/10W   |              |
| R312,313 |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |              | R406     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R314,315 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R407     |         |           | RK73FB2A473J | CHIP R 47K J 1/10W   |              |
| R316     |         |           | RK73GB1J822J | CHIP R 8.2K J 1/16W  |              | R408     |         |           | RK73FB2A4R7J | CHIP R 4.7 J 1/10W   |              |
| R317     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              | R413     |         |           | R92-0670-05  | CHIP R 0 OHM         |              |
| R318     |         |           | RK73GB1J153J | CHIP R 15K J 1/16W   |              | R414     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |              |
| R319     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R415     |         |           | RK73FB2A680J | CHIP R 68 J 1/10W    |              |
| R320     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              | R416     |         |           | RK73GB1J562J | CHIP R 5.6K J 1/16W  |              |
| R321     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R417     |         |           | RK73GB1J153J | CHIP R 15K J 1/16W   |              |
| R322,323 |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   |              | R418     |         |           | RK73GB1J105J | CHIP R 1.0M J 1/16W  |              |
| R324     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R419     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R325     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              | R420     |         |           | RK73GB1J562J | CHIP R 5.6K J 1/16W  |              |
| R326,327 |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |              | R421,422 |         |           | R92-0670-05  | CHIP R 0 OHM         |              |
| R328     |         |           | RK73GB1J822J | CHIP R 8.2K J 1/16W  |              | R423     |         |           | RK73GB1J682J | CHIP R 6.8K J 1/16W  |              |
| R329     |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |              | R424     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |              |
| R330     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R535     |         |           | RK73GB1J330J | CHIP R 33 J 1/16W    |              |
| R331     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              | R536     |         |           | RK73GB1J562J | CHIP R 5.6K J 1/16W  |              |
| R332     |         |           | RK73FB2A682J | CHIP R 6.8K J 1/10W  |              | R537     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              |
| R333     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R538     |         |           | RK73GB1J330J | CHIP R 33 J 1/16W    |              |
| R334,335 |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |              | R539     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R336     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R540     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |              |
| R337,338 |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R541     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R339     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |              | R542     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              |
| R340,341 |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R543     |         |           | RK73FB2A100J | CHIP R 10 J 1/10W    |              |
| R342     |         |           | RK73FB2A564J | CHIP R 560K J 1/10W  |              | R544     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              |
| R343,344 |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              | R545     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              |
| R345     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R546     |         |           | RK73GB1J183J | CHIP R 18K J 1/16W   |              |
| R346-349 |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R547     |         |           | RK73GB1J122J | CHIP R 1.2K J 1/16W  |              |
| R350-355 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R548     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R356     |         |           | R92-0679-05  | CHIP R 0 OHM         |              | R549     |         |           | RK73GB1J683J | CHIP R 68K J 1/16W   |              |
| R357     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R550     |         |           | RK73FB2A182J | CHIP R 1.8K J 1/10W  |              |
| R358     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R551     |         |           | RK73GB1J151J | CHIP R 150 J 1/16W   |              |
| R359     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R552     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |              |
| R360     |         |           | RK73GB1J221J | CHIP R 220 J 1/16W   |              | R553     |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |              |
| R361     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R554     |         |           | RK73GB1J122J | CHIP R 1.2K J 1/16W  |              |
| R362     |         |           | RK73GB1J272J | CHIP R 2.7K J 1/16W  |              | R555     |         |           | RK73GB1J331J | CHIP R 330 J 1/16W   |              |
| R366     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R556     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R367     |         |           | RK73FB2A333J | CHIP R 33K J 1/10W   |              | R557     |         |           | RK73GB1J822J | CHIP R 8.2K J 1/16W  |              |
| R368     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |              | R558     |         |           | RK73GB1J272J | CHIP R 2.7K J 1/16W  |              |
| R369     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R559     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              |
| R373     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R560     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R375     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              | R561,562 |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |              |
| R376     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              | R563     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R377     |         |           | RK73GB1J224J | CHIP R 220K J 1/16W  |              | R564     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R378     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              | R565     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R379,380 |         |           | RK73GB1J393J | CHIP R 39K J 1/16W   |              | R566     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |              |
| R381     |         |           | RK73FB2A684J | CHIP R 680K J 1/10W  |              | R567     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |              |
| R382     |         |           | RK73FB2A154J | CHIP R 150K J 1/10W  |              | R568     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              |
| R383     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R569     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |              |
| R384     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              | R570     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |              |
| R385-388 |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              | R571     |         |           | RK73FB2A153J | CHIP R 15K J 1/10W   |              |
| R389-393 |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              | R572     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |              |
| R394     |         |           | RK73GB1J222J | CHIP R 2.2K J 1/16W  |              | R573     |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |              |
| R395-398 |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |              | R574     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |              |
| R399     |         |           | RK73GB1J563J | CHIP R 56K J 1/16W   |              | R575     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |              |
| R400     |         |           | RK73GB1J153J | CHIP R 15K J 1/16W   |              | R576     |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |              |
| R401     |         |           | RK73FB2A4R7J | CHIP R 4.7 J 1/10W   |              | R577     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |              |
| R402     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |              | R578     |         |           | RK73GB1J391J | CHIP R 390 J 1/16W   |              |

## PARTS LIST

## TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.    | Description          | Destination | Ref. No. | Address | New parts | Parts No.    | Description          | Destination |
|----------|---------|-----------|--------------|----------------------|-------------|----------|---------|-----------|--------------|----------------------|-------------|
| R579     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R643     |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |             |
| R580     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R644     |         |           | RK73FB2A681J | CHIP R 680 J 1/10W   |             |
| R581     |         |           | RK73GB1J220J | CHIP R 22 J 1/16W    |             | R645     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             |
| R582     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R646     |         |           | RK73FB2A471J | CHIP R 470 J 1/10W   |             |
| R583     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R647     |         |           | RK73FB2A271J | CHIP R 270 J 1/10W   |             |
| R584     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R648     |         |           | RK73FB2A184J | CHIP R 180K J 1/10W  |             |
| R585     |         |           | RK73GB1J470J | CHIP R 47 J 1/16W    |             | R649     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             |
| R586     |         |           | RK73FB2A222J | CHIP R 2.2K J 1/10W  |             | R650     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             |
| R587     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             | R651-659 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R588     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R661     |         |           | RK73GB1J682J | CHIP R 6.8K J 1/16W  |             |
| R589     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R662     |         |           | RK73GB1J271J | CHIP R 270 J 1/16W   |             |
| R590     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R663     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             |
| R591     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R665     |         |           | RK73GB1J682J | CHIP R 6.8K J 1/16W  |             |
| R592     |         |           | RK73FB2A223J | CHIP R 22K J 1/10W   |             | R666     |         |           | RK73GB1J271J | CHIP R 270 J 1/16W   |             |
| R593     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             | R667     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             |
| R594     |         |           | RK73FB2A821J | CHIP R 820 J 1/10W   |             | R669     |         |           | RK73GB1J682J | CHIP R 6.8K J 1/16W  |             |
| R595     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R670     |         |           | RK73GB1J271J | CHIP R 270 J 1/16W   |             |
| R596     |         |           | RK73FB2A473J | CHIP R 47K J 1/10W   |             | R671,672 |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             |
| R597     |         |           | RK73GB1J473J | CHIP R 47K J 1/16W   |             | R673,674 |         |           | RK73GB1J472J | CHIP R 4.7K J 1/16W  |             |
| R598,599 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R675     |         |           | RK73GB1J470J | CHIP R 47 J 1/16W    |             |
| R600     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             | R676     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             |
| R601     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             | R677     |         |           | RK73FB2A223J | CHIP R 22K J 1/10W   |             |
| R602     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R679     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             |
| R603     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R680     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             |
| R604     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R681     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             |
| R605     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R682,683 |         |           | RD14CB2C100J | RD 10 J 1/6W         |             |
| R606     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             | R684-686 |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R607     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R687     |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |             |
| R608     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R688     |         |           | RK73GB1J123J | CHIP R 12K J 1/16W   |             |
| R609     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R689     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R610     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R690     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             |
| R611     |         |           | RK73GB1J470J | CHIP R 47 J 1/16W    |             | R800     |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |             |
| R612     |         |           | RK73GB1J123J | CHIP R 12K J 1/16W   |             | R801     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             |
| R613     |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W  |             | R802     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R615     |         |           | RK73FB2A681J | CHIP R 680 J 1/10W   |             | R803     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R616     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             | R804     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R617     |         |           | RK73FB2A153J | CHIP R 15K J 1/10W   |             | R805     |         |           | RK73FB2A333J | CHIP R 33K J 1/10W   |             |
| R618     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R806     |         |           | RK73GB1J683J | CHIP R 68K J 1/16W   |             |
| R619     |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |             | R807     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R620     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             | R808     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             |
| R621     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             | R809     |         |           | RK73GB1J152J | CHIP R 1.5K J 1/16W  |             |
| R622     |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |             | R810     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             |
| R623     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             | R811     |         |           | RK73GB1J333J | CHIP R 33K J 1/16W   |             |
| R624     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             | R812     |         |           | RK73FB2A221J | CHIP R 220 J 1/10W   |             |
| R625     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R813     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             |
| R626     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W   |             | R814     |         |           | RK73GB1J102J | CHIP R 1.0K J 1/16W  |             |
| R627     |         |           | RK73GB1J332J | CHIP R 3.3K J 1/16W  |             | R815     |         |           | RK73GB1J563J | CHIP R 56K J 1/16W   |             |
| R628     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             | R816     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R629     |         |           | RK73GB1J271J | CHIP R 270 J 1/16W   |             | R817     |         |           | RK73GB1J681J | CHIP R 680 J 1/16W   |             |
| R630     |         |           | RK73GB1J821J | CHIP R 820 J 1/16W   |             | R818     |         |           | RK73GB1J682J | CHIP R 6.8K J 1/16W  |             |
| R631     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             | R819     |         |           | R92-1252-05  | CHIP R 0 OHM J 1/16W |             |
| R632     |         |           | RK73FB2A223J | CHIP R 22K J 1/10W   |             | R820-823 |         |           | R92-0679-05  | CHIP R 0 OHM         |             |
| R633     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W   |             | R900     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R634     |         |           | RK73FB2A222J | CHIP R 2.2K J 1/10W  |             | R901     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |
| R635     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R902     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W  |             |
| R636,637 |         |           | RK73FB2A473J | CHIP R 47K J 1/10W   |             | R903     |         |           | RK73GB1J223J | CHIP R 22K J 1/16W   |             |
| R638,639 |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R904     |         |           | RK73GB1J562J | CHIP R 5.6K J 1/16W  |             |
| R640     |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W  |             | R905     |         |           | RK73GB1J561J | CHIP R 560 J 1/16W   |             |
| R641     |         |           | RK73FB2A681J | CHIP R 680 J 1/10W   |             | R906     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W   |             |
| R642     |         |           | RK73FB2A101J | CHIP R 100 J 1/10W   |             | R907     |         |           | RK73GB1J101J | CHIP R 100 J 1/16W   |             |

## PARTS LIST

TX-RX UNIT (X57-4660-21)

| Ref. No. | Address | New parts | Parts No.    | Description                         | Destination | Ref. No.  | Address | New parts | Parts No.   | Description                | Destination |
|----------|---------|-----------|--------------|-------------------------------------|-------------|-----------|---------|-----------|-------------|----------------------------|-------------|
| R908     |         |           | RK73GB1J104J | CHIP R 100K J 1/16W                 |             | D80       |         |           | 02CZ4.7(Y)  | ZENER DIODE                |             |
| R909,910 |         |           | RK73GB1J103J | CHIP R 10K J 1/16W                  |             | D81-87    |         |           | 1SS355      | DIODE                      |             |
| R911,912 |         |           | RK73GB1J105J | CHIP R 1.0M J 1/16W                 |             | D500,501  |         |           | 1SS355      | DIODE                      |             |
| R913     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W                  |             | D502      |         |           | 1SV166      | VARIABLE CAPACITANCE DIODE |             |
| R915     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W                  |             | D503      |         |           | RLS135      | DIODE                      |             |
| R916     |         |           | RK73GB1J105J | CHIP R 1.0M J 1/16W                 |             | D504      |         |           | 1SV166      | VARIABLE CAPACITANCE DIODE |             |
| R917     |         |           | RK73GB1J474J | CHIP R 470K J 1/16W                 |             | D505      |         |           | RLS135      | DIODE                      |             |
| R918     |         |           | RK73GB1J103J | CHIP R 10K J 1/16W                  |             | D506      |         |           | 1SV166      | VARIABLE CAPACITANCE DIODE |             |
| R919     |         |           | RK73GB1J471J | CHIP R 470 J 1/16W                  |             | D507      |         |           | RLS135      | DIODE                      |             |
| R920     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W                  |             | D800      |         |           | HSM276S     | DIODE                      |             |
| VR1      |         | *         | R32-0752-05  | SEMI FIXED VARIABLE RESISTOR (4.7K) |             | D900-902  |         |           | 1SS355      | DIODE                      |             |
| VR2      |         |           | R32-0758-05  | SEMI FIXED VARIABLE RESISTOR (47K)  |             | IC1       |         |           | BU4066BCFV  | MOS-IC                     |             |
| VR3      |         | *         | R32-0767-05  | SEMI FIXED VARIABLE RESISTOR (1.0K) |             | IC2       |         |           | NJM2904M    | MOS-IC                     |             |
| VR4      |         |           | R32-0758-05  | SEMI FIXED VARIABLE RESISTOR (47K)  |             | IC3       |         |           | BU4066BCFV  | MOS-IC                     |             |
| VR6-8    |         |           | R32-0754-05  | SEMI FIXED VARIABLE RESISTOR (10K)  |             | IC4       |         | *         | NJM2594V    | ANALOGUE IC                |             |
| VR9,10   |         |           | R12-6744-05  | TRIMMING POT. (47K)                 |             | IC6       |         |           | TA8184F     | MOS-IC                     |             |
| VR11     |         |           | R12-6740-05  | TRIMMING POT. (10K)                 |             | IC7       |         |           | LA4446      | BI-POLAR IC                |             |
| VR12     |         |           | R32-0754-05  | SEMI FIXED VARIABLE RESISTOR (10K)  |             | IC8       |         |           | TC4S66F     | MOS-IC                     |             |
| VR14     |         |           | R12-6744-05  | TRIMMING POT. (47K)                 |             | IC9       |         |           | UPC1313HA   | ANALOGUE IC                |             |
| VR900    |         |           | R12-3127-05  | TRIMMING POT. (10K)                 |             | IC10      |         |           | UPD6345GS   | MOS-IC                     |             |
| VR901    |         |           | R12-1084-05  | TRIMMING POT. (1K)                  |             | IC11      |         |           | TA78L05F    | MOS-IC                     |             |
| VR902    |         |           | R12-3127-05  | TRIMMING POT. (10K)                 |             | IC12      |         |           | NJM2904M    | MOS-IC                     |             |
| D1       |         |           | V08(G)       | DIODE                               |             | IC13      |         |           | M62363FP    | MOS-IC                     |             |
| D2,3     |         |           | RLS245       | DIODE                               |             | IC14      |         |           | NJM2904M    | MOS-IC                     |             |
| D4       |         |           | V08(G)       | DIODE                               |             | IC15,16   |         |           | BU2099FV    | MOS-IC                     |             |
| D5       |         |           | 1SV128       | DIODE                               |             | IC500,501 |         |           | F7102Z      | MOS-IC                     |             |
| D6       |         |           | LFB01        | DIODE                               |             | IC502     |         |           | MB86001PF   | MOS-IC                     |             |
| D7-26    |         |           | RLS135       | DIODE                               |             | IC503,504 |         | *         | NJM2594V    | ANALOGUE IC                |             |
| D27-29   |         |           | 1SS355       | DIODE                               |             | IC505     |         | *         | UPC1686G    | BI-POLAR IC                |             |
| D30,31   |         |           | DAN235K      | DIODE                               |             | IC506     |         | *         | NJM2594V    | ANALOGUE IC                |             |
| D32      |         |           | DAP236K      | DIODE                               |             | IC508     |         |           | TC4S66F     | MOS-IC                     |             |
| D33      |         |           | RLS135       | DIODE                               |             | IC900     |         |           | NJM2904M    | MOS-IC                     |             |
| D34      |         |           | DAN235K      | DIODE                               |             | IC901     |         | *         | TC4001BFT   | MOS-IC                     |             |
| D35      |         |           | RLS135       | DIODE                               |             | Q1        |         |           | 2SD1757K    | TRANSISTOR                 |             |
| D36      |         |           | DAP236K      | DIODE                               |             | Q2        |         |           | 2SA1213(Y)  | TRANSISTOR                 |             |
| D37      |         |           | DAN235K      | DIODE                               |             | Q3        |         |           | DTC143TK    | DIGITAL TRANSISTOR         |             |
| D38-43   |         |           | DAP236K      | DIODE                               |             | Q4-9      |         |           | 2SK520(K44) | FET                        |             |
| D44      |         |           | 1SS355       | DIODE                               |             | Q10       |         |           | 3SK131(M)   | FET                        |             |
| D47      |         |           | 1SS355       | DIODE                               |             | Q11,12    |         |           | 2SK520(K43) | FET                        |             |
| D48      |         |           | RN731H       | DIODE                               |             | Q13       |         |           | 2SC2954     | TRANSISTOR                 |             |
| D49      |         |           | 1SS355       | DIODE                               |             | Q14       |         |           | DTA124EK    | DIGITAL TRANSISTOR         |             |
| D50      |         |           | RLS135       | DIODE                               |             | Q15       |         |           | FMG3A       | DIGITAL TRANSISTOR         |             |
| D51      |         |           | LFB01        | DIODE                               |             | Q17       |         |           | 2SA1213(Y)  | TRANSISTOR                 |             |
| D52-55   |         |           | HSM88AS      | DIODE                               |             | Q18       |         |           | RU201       | TRANSISTOR                 |             |
| D56      |         |           | RLS135       | DIODE                               |             | Q19       |         |           | 3SK131(M)   | FET                        |             |
| D59      |         |           | HSM88AS      | DIODE                               |             | Q20,21    |         |           | 2SC2712(Y)  | TRANSISTOR                 |             |
| D60,61   |         |           | 1SS355       | DIODE                               |             | Q22       |         |           | FMC2        | DIGITAL TRANSISTOR         |             |
| D63      |         |           | HSM88AS      | DIODE                               |             | Q23       |         |           | 2SC2712(Y)  | TRANSISTOR                 |             |
| D64      |         |           | 1SS226       | DIODE                               |             | Q24-28    |         |           | 3SK131(M)   | FET                        |             |
| D65      |         |           | 02CZ6.2(Y)   | ZENER DIODE                         |             | Q29       |         |           | 2SC2954     | TRANSISTOR                 |             |
| D66      |         |           | RLS245       | DIODE                               |             | Q30,31    |         |           | 3SK131(M)   | FET                        |             |
| D68      |         | *         | 02CZ3.6(Z)   | ZENER DIODE                         |             | Q32-35    |         |           | 2SC2712(Y)  | TRANSISTOR                 |             |
| D69,70   |         |           | 1SS355       | DIODE                               |             | Q36       |         |           | DTC114EK    | DIGITAL TRANSISTOR         |             |
| D71      |         | *         | 02CZ12(Y)    | ZENER DIODE                         |             | Q38       |         |           | DTC114EK    | DIGITAL TRANSISTOR         |             |
| D72      |         |           | 1SS355       | DIODE                               |             | Q39       |         |           | 2SC2712(Y)  | TRANSISTOR                 |             |
| D73      |         |           | HSM88AS      | DIODE                               |             | Q40       |         |           | 2SK208(GR)  | FET                        |             |
| D75      |         |           | 02CZ3.3(Z)   | ZENER DIODE                         |             | Q46       |         |           | DTC114EK    | DIGITAL TRANSISTOR         |             |
| D76      |         |           | HSM88AS      | DIODE                               |             | Q47       |         |           | DTA124EK    | DIGITAL TRANSISTOR         |             |
| D79      |         |           | 1SS355       | DIODE                               |             | Q48       |         |           | 2SC2712(Y)  | TRANSISTOR                 |             |
|          |         |           |              |                                     |             | Q49       |         |           | 2SD1757K    | TRANSISTOR                 |             |

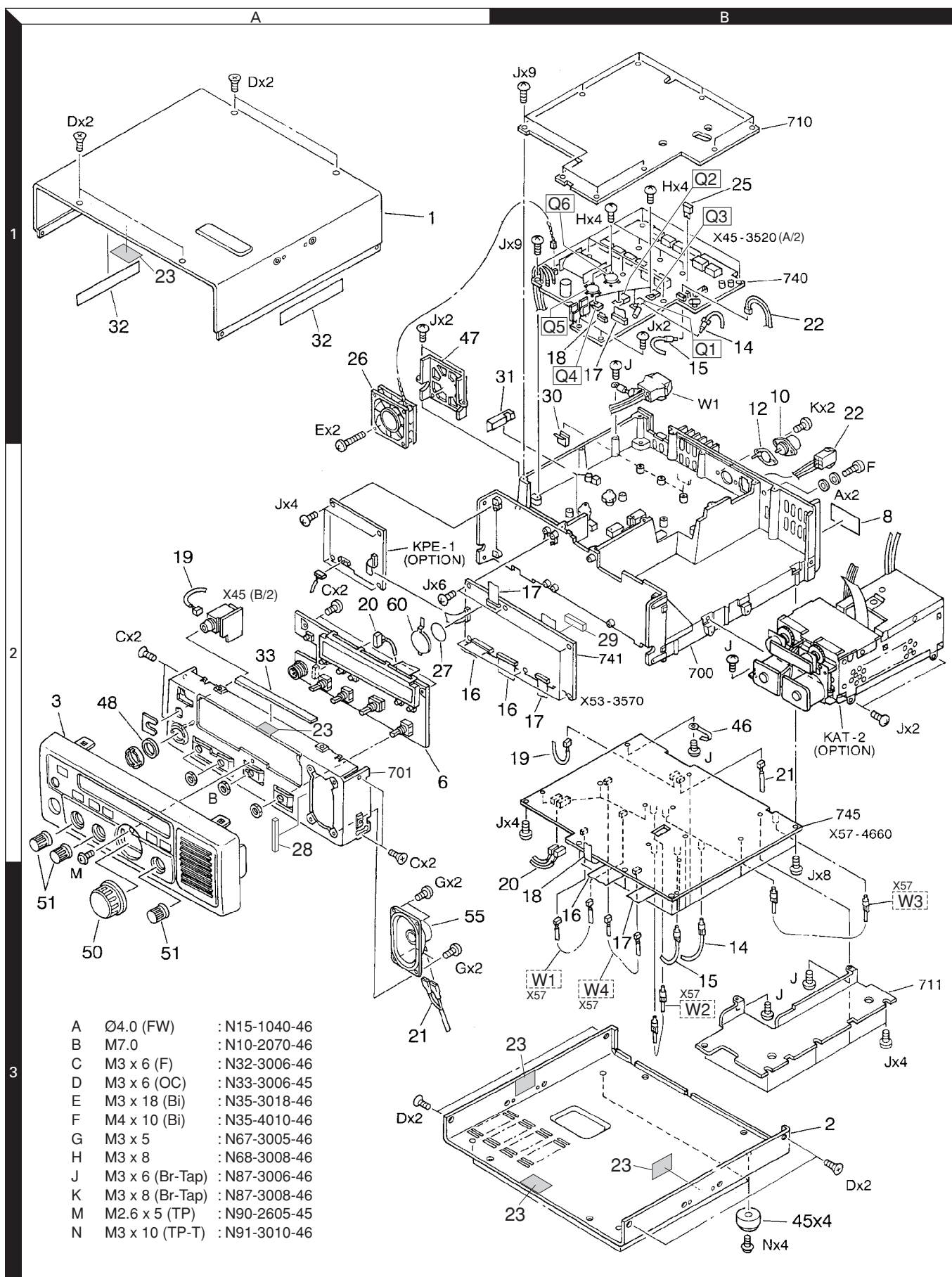
PARTS LIST

TX-RX UNIT (X57-4660-21)  
LCD ASSY (B38-0739-15)

| Ref. No.                                         | Address | New parts | Parts No.                                                                         | Description                                                                                        | Desti-nation |
|--------------------------------------------------|---------|-----------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------|
| Q50,51<br>Q52<br>Q54,55<br>Q56<br>Q57            |         |           | 2SC2712(Y)<br>DTC114EK<br>2SC2712(Y)<br>2SA1162(Y)<br>2SC2712(Y)                  | TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR                         |              |
| Q58<br>Q59<br>Q60-63<br>Q64<br>Q65               |         |           | 2SC3649(S,T)<br>2SD1624(S)<br>2SC2712(Y)<br>2SK208(GR)<br>2SC2712(Y)              | TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>FET<br>TRANSISTOR                                        |              |
| Q67,68<br>Q69<br>Q70<br>Q71<br>Q72               |         |           | DTC114EK<br>FMC1<br>DTC143TK<br>2SA1213(Y)<br>FMG3A                               | DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR<br>DIGITAL TRANSISTOR |              |
| Q74<br>Q75<br>Q76<br>Q77,78<br>Q79               |         |           | 2SA1213(Y)<br>2SC2712(Y)<br>DTA124EK<br>FMA5<br>2SC2712(Y)                        | TRANSISTOR<br>TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR                         |              |
| Q80<br>Q81-84<br>Q85<br>Q507<br>Q508-510         |         |           | DTA114EK<br>DTC114EK<br>DTC143TK<br>2SC2714(Y)<br>2SC3722K(R)                     | DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR         |              |
| Q511<br>Q512<br>Q513<br>Q514<br>Q515,516         |         |           | 2SC2714(Y)<br>2SC2712(Y)<br>2SC2714(Y)<br>2SC2712(GR)<br>2SC2712(Y)               | TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR                                 |              |
| Q517-521<br>Q522<br>Q523<br>Q524-526<br>Q527,528 |         |           | 2SC2714(Y)<br>2SC2712(GR)<br>2SC2712(Y)<br>2SC2714(Y)<br>2SC2996(Y)               | TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR                                 |              |
| Q529<br>Q530<br>Q531<br>Q532<br>Q533             |         |           | 2SC2712(Y)<br>DTC114EK<br>2SK508NV(K52)<br>DTC114EK<br>2SK508NV(K52)              | TRANSISTOR<br>DIGITAL TRANSISTOR<br>FET<br>DIGITAL TRANSISTOR<br>FET                               |              |
| Q534<br>Q535<br>Q536<br>Q800<br>Q801,802         |         |           | DTC114EK<br>2SK508NV(K52)<br>2SC2714(Y)<br>DTC114EK<br>2SC2714(Y)                 | DIGITAL TRANSISTOR<br>FET<br>TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR                        |              |
| Q803<br>Q804<br>Q805<br>Q806<br>Q807             |         |           | 2SC2712(Y)<br>2SC2714(Y)<br>2SC2712(Y)<br>2SC2714(Y)<br>DTA114EK                  | TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>DIGITAL TRANSISTOR                         |              |
| Q808<br>Q900,901<br>Q902<br>Q903<br>TH1          |         |           | DTC114EK<br>2SC2712(Y)<br>DTA114EK<br>DTC114EK<br>157-502-53002                   | DIGITAL TRANSISTOR<br>TRANSISTOR<br>DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR<br>THERMISTOR         |              |
| TH2<br>TH3<br>TH4<br>TH5<br>TH6                  |         |           | 157-501-53009<br>157-302-53008<br>157-102-53003<br>157-302-53008<br>157-502-53002 | THERMISTOR<br>THERMISTOR<br>THERMISTOR<br>THERMISTOR<br>THERMISTOR                                 |              |

| Ref. No.                                       | Address | New parts | Parts No.                                                                    | Description                                                                                                                      | Desti-nation |
|------------------------------------------------|---------|-----------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------|
| TH7<br>TH8,9<br>TH10<br>TH11                   |         |           | 157-103-55001<br>157-102-53003<br>157-502-53002<br>157-104-53001             | THERMISTOR<br>THERMISTOR<br>THERMISTOR<br>THERMISTOR                                                                             |              |
| LCD ASSY (B38-0739-15)                         |         |           |                                                                              |                                                                                                                                  |              |
| PL1-6                                          |         |           | B30-2147-08                                                                  | LAMP                                                                                                                             |              |
| C1<br>C2<br>C3<br>C4,5<br>C6-10                |         |           | CK73FB1H103K<br>C92-0042-05<br>CK73FB1H103K<br>CK73FB1H102K<br>CK73FB1H103K  | CHIP C 0.010UF K<br>CHIP-ELE 22UF 10WV<br>CHIP C 0.010UF K<br>CHIP C 1000PF K<br>CHIP C 0.010UF K                                |              |
| C11<br>C12,13<br>C14-19<br>C23<br>C24          |         |           | C92-0034-05<br>CK73FF1H104Z<br>CK73FB1H103K<br>C92-0040-05<br>C90-2041-05    | CHIP-ELE 22UF 25WV<br>CHIP C 0.10UF Z<br>CHIP C 0.010UF K<br>CHIP-ELE 47UF 16WV<br>CHIP-ELE 10UF 10WV                            |              |
| -<br>CN1<br>CN2<br>J1                          |         |           | E23-0623-04<br>E40-5797-05<br>E40-3240-05<br>E06-0858-15                     | EARTH LUG<br>CONNECTOR<br>CONNECTOR<br>CYLINDRICAL RECEPTACLE                                                                    |              |
| L1,2<br>L3                                     |         |           | L40-1011-18<br>L40-1001-18                                                   | SMALL FIXED INDUCTOR (100MH)<br>SMALL FIXED INDUCTOR (10MH)                                                                      |              |
| R1,2<br>R3<br>R4<br>R5,6<br>R7                 |         |           | RK73FB2A473J<br>RK73FB2A104J<br>RK73FB2A125J<br>RK73FB2A223J<br>RK73FB2A222J | CHIP R 47K J 1/10W<br>CHIP R 100K J 1/10W<br>CHIP R 1.2M J 1/10W<br>CHIP R 22K J 1/10W<br>CHIP R 2.2K J 1/10W                    |              |
| R8<br>R9<br>R10<br>R11<br>R12                  |         |           | RK73FB2A101J<br>RK73FB2A153J<br>RK73FB2A222J<br>RK73FB2A101J<br>RK73FB2A153J | CHIP R 100 J 1/10W<br>CHIP R 15K J 1/10W<br>CHIP R 2.2K J 1/10W<br>CHIP R 100 J 1/10W<br>CHIP R 15K J 1/10W                      |              |
| R13-15<br>R21-23<br>R24-27<br>R28,29<br>R30-32 |         |           | RK73FB2A101J<br>R92-1240-05<br>RK73FB2A470J<br>RK73FB2A122J<br>R92-0670-05   | CHIP R 100 J 1/10W<br>CHIP R 10 J 1/4W<br>CHIP R 47 J 1/10W<br>CHIP R 1.2K J 1/10W<br>CHIP R 0 OHM                               |              |
| R34<br>R35<br>R36,37<br>VR1,3<br>VR2           |         |           | RK73FB2A392J<br>RK73EB2A332J<br>R92-1282-05<br>R31-0609-05<br>R31-0610-05    | CHIP R 3.9K J 1/10W<br>CHIP R 3.3K J 1/10W<br>CHIP R 10 J 1W<br>VARIABLE RESISTOR (50KB:SQL,VOL)<br>VARIABLE RESISTOR (50KB:CLA) |              |
| S2-7                                           |         |           | S40-1428-05                                                                  | TACT SWITCH                                                                                                                      |              |
| D2<br>IC1<br>IC2                               |         |           | IMN10<br>MSM5265GS-V1K<br>TA7809F                                            | DIODE<br>IC (LCD DRIVER)<br>IC (VOLTAGE REGURATOR/+9V)                                                                           |              |
| LCD1                                           |         |           | SLU10098-01                                                                  | LCD                                                                                                                              |              |
| S1                                             |         |           | W02-1873-05                                                                  | ENCODER                                                                                                                          |              |

## EXPLODED VIEW

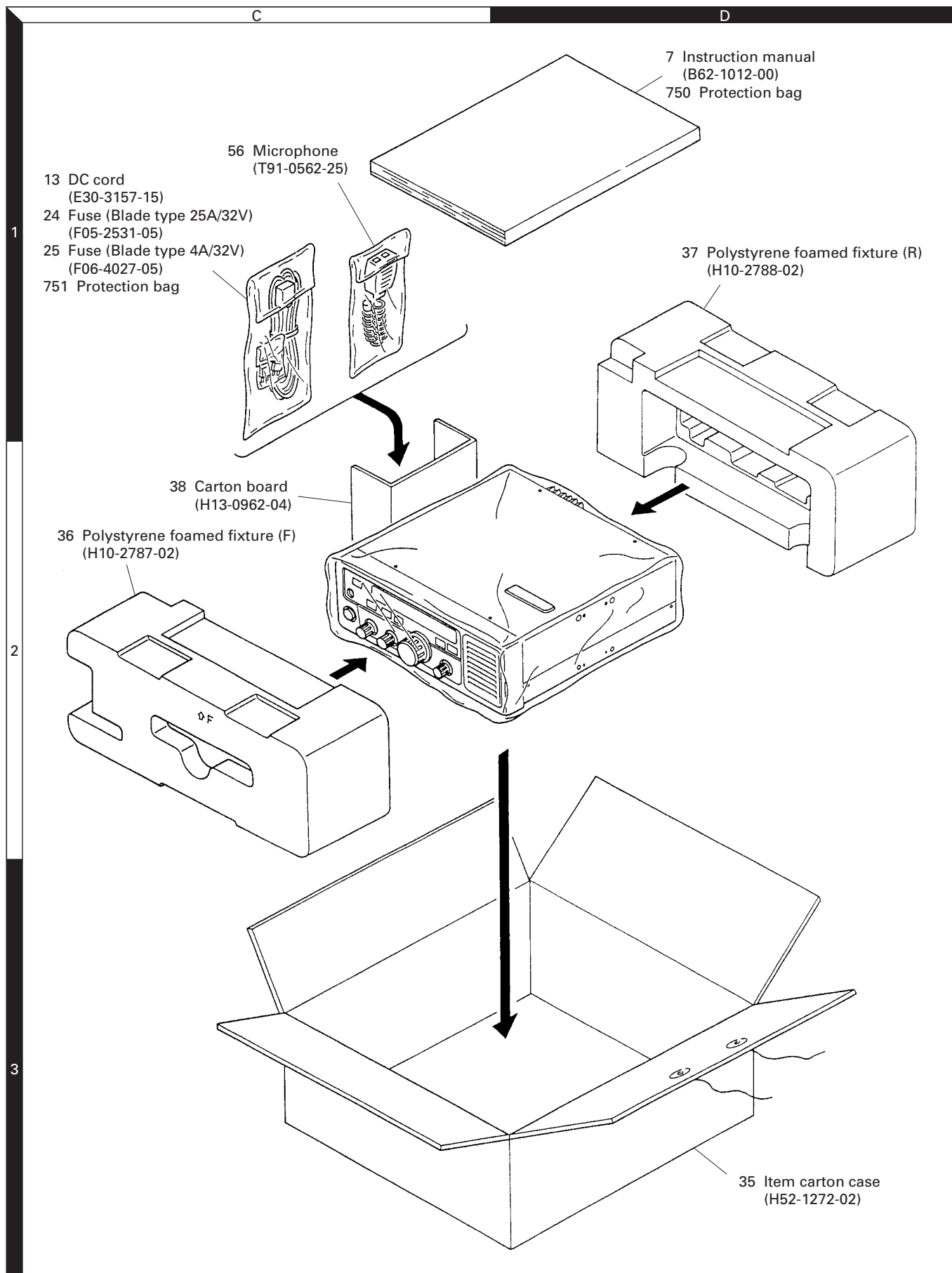


Parts with the exploded numbers larger than 700 are not supplied.

If a part reference number is listed in a box on the exploded view of the PCB, that part does not come with the PCB.

These parts must be ordered separately.

## PACKING



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

# ADJUSTMENT

## Required Test Equipment

### 1. Stabilized Power Supply

- 1) The supply voltage can be changed between 5V and 18V, and the current is 30A or more.
- 2) The standard voltage is 13.6V.

### 2. DC Ammeter

- 1) Class 1 ammeter (17 ranges and other features).
- 2) The full scale can be set to either 3A or 30A.
- 3) A cable of less internal loss must be used.

### 3. Frequency Counter (f. counter)

- 1) Frequencies of up to 1GHz or so can be measured.
- 2) The sensitivity can be changed to 500MHz or below, and measurements are highly stable and accurate (0.2ppm or so).

### 4. Power Meter

- 1) Measurable frequency : Up to 500MHz
- 2) Impedance : 50Ω, unbalanced
- 3) Measuring range : Full scale of 150W or so
- 4) A standard cable (5D2W 1m) must be used.

### 5. RF VTVM (RF V.M)

- 1) Measurable frequency : Up to 500Hz or so

### 6. Digital Voltmeter (D.V.M)

- 1) Voltage range : FS = 18V or so
- 2) Input resistance : 1MΩ or more

### 7. Oscilloscope

- 1) Measuring range : DC to 100MHz
- 2) Provides highly accurate measurements for 5 to 25MHz.

### 8. AF Voltmeter (AF V.M)

- 1) Measurable frequency : 50Hz to 1MHz
- 2) Maximum sensitivity : 1mV or more

### 9. AF Generator (AG)

- 1) Frequency range : 200Hz to 5kHz
- 2) Output : 1mV or less to 1V, low distortion

### 10. Spectrum Analyzer

- 1) Measuring range : DC to 1GHz or more

### 11. Standard Signal Generator (SSG)

- 1) Maximum frequency : 500MHz or more
- 2) Output : -20dB/0.1μV to 120dB/1V
- 3) Output impedance : 50Ω

### 12. Tracking Generator

- 1) Center frequency : 50kHz to 500MHz
- 2) Frequency deviation : ±35MHz
- 3) Output voltage : 100mV or more

### 13. Dummy Load (DM)

- 1) AF Dummy 4Ω, 5W or more
- 2) RF Dummy 150Ω, 150W or more

### 14. Directional Coupler

- Use a non-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils).
- To protect the SSG, do not send out signals while adjusting the receiving unit.
- The indicated SSG output levels are for maximum output.

## Service Adjustment Mode

### 1. Function

- 1) Service adjustment mode is only to set the adjustment items displayed in the service adjustment mode menu.
- 2) Adjusted data is all stored in the EEPROM.
- 3) The EEPROM is only renewed when MENU No. 39 is entered and writing done by means of [MODE] or [DATA].

### 2. Setting

- 1) [POWER] ON while holding [SCAN] and [DATA].
- 2) Use [DIAL] to select the MENU No.
- 3) Set the data using [MODE] or [DATA].
- 4) MENU No. 39 writes data to the EEPROM.  
"RUN" is displayed while writing.  
"GOOD" is displayed when writing has been successfully completed.  
"ERROR" is displayed when a writing error occurs.  
(At this time, press [MODE] or [DATA] once again.)
- 5) This function is turned off by turning [POWER] OFF.

### NOTE:

When repairing X53-3570-21 board, you may find the shortness of the flat cable makes checking the unit difficult. We provide the E37-0572-05 (for control unit) and the E37-0573-05 (for AT) cables as servicing parts which you may order as necessary.

### 3. Adjustment mode menu (Menu No. 00~39)

| No. | Contents                                               |
|-----|--------------------------------------------------------|
| 00  | Checksum display                                       |
| 01  | 100W (MAX) power setting, RF meter 100W point intake   |
| 02  | 50W (HI) power setting, RF meter 50W point intake      |
| 03  | 25W (MID) power setting, RF meter 25W point intake     |
| 04  | 15W (LO) power setting, RF meter 15W point intake      |
| 05  | 12.5W (HI) power setting, RF meter 12.5W point intake  |
| 06  | Power setting during AT                                |
| 07  | 6.25W (MID) power setting, RF meter 6.25W point intake |
| 08  | 3.75W (LO) power setting, RF meter 3.75W point intake  |
| 09  | 100W power setting TX gain, RF meter 100W point intake |
| 10  | 50W power setting TX gain, RF meter 50W point intake   |
| 11  | 25W power setting TX gain, RF meter 25W point intake   |
| 12  | TX gain setting during 15W, RF meter 15W point intake  |
| 13  | TX gain setting during AT                              |
| 14  | TX gain setting during 25W                             |
| 15  | TX gain setting during 12.5W                           |
| 16  | TX gain setting during 6.25W                           |
| 17  | TX gain setting during 3.75W                           |
| 18  | SSB microphone sensitivity setting                     |
| 19  | AM microphone sensitivity setting                      |

## ADJUSTMENT

| No. | Contents                                                      |
|-----|---------------------------------------------------------------|
| 20  | Microphone sensitivity f compensation (f<8.0MHz)              |
| 21  | Microphone sensitivity f compensation (8.0MHz≤f<21.5MHz)      |
| 22  | Microphone sensitivity f compensation (21.5MHz≤f)             |
| 23  | SWR protection setting                                        |
| 24  | SWR, 3 setting (for display, AT control)                      |
| 25  | CW carrier level setting                                      |
| 26  | AM carrier level setting                                      |
| 27  | LSB carrier compensation                                      |
| 28  | USB carrier compensation                                      |
| 29  | S-meter, deflection start level setting (for display)         |
| 30  | S-meter, S9 deflection level setting (for display)            |
| 31  | S-meter, S9+40dB deflection start level setting (for display) |
| 32  | Squelch level setting (threshold)                             |
| 33  | SQL volume center compensation                                |
| 34  | CLARI volume center compensation                              |
| 35  | TX LPF non-selection                                          |
| 36  | LCD total illumination                                        |
| 37  | BEEP level verification                                       |
| 38  | Sidetone level verification                                   |
| 39  | Write to EEPROM                                               |

## 4. Memory frequency configuration

| M CH | Frequency | Mode | M CH | Frequency | Mode |
|------|-----------|------|------|-----------|------|
| 01   | 7.250MHz  | USB  | 25   | 14.250MHz | USB  |
| 02   | 500kHz    | AM   | 26   | 14.200MHz | CW   |
| 03   | 10.499MHz | AM   | 27   | 14.250MHz | CW   |
| 04   | 10.500MHz | AM   | 28   | 1.800MHz  | AM   |
| 05   | 21.499MHz | AM   | 29   | 2.200MHz  | CW   |
| 06   | 21.500MHz | AM   | 30   | 4.000MHz  | CW   |
| 07   | 29.999MHz | USB  | 31   | 7.000MHz  | CW   |
| 08   | 14.150MHz | CW   | 32   | 12.750MHz | LSB  |
| 09   | 100kHz    | CW   | 33   | 18.500MHz | USB  |
| 10   | 14.150MHz | CW   | 34   | 26.000MHz | USB  |
| 11   | 14.250MHz | CW   | 35   | 14.300MHz | USB  |
| 12   | 3.500MHz  | CW   | 36   | 14.300MHz | CW   |
| 13   | 550kHz    | AM   | 37   | 28.800MHz | LSB  |
| 14   | 1.550MHz  | AM   | 38   | 14.050MHz | USB  |
| 15   | 1.800MHz  | LSB  | 39   | 550kHz    | AM   |
| 16   | 3.550MHz  | LSB  | 40   | 2.100MHz  | LSB  |
| 17   | 7.100MHz  | LSB  | 41   | 3.500MHz  | LSB  |
| 18   | 10.100MHz | LSB  | 42   | 6.500MHz  | LSB  |
| 19   | 14.100MHz | USB  | 43   | 10.100MHz | CW   |
| 20   | 21.200MHz | USB  | 44   | 12.100MHz | USB  |
| 21   | 24.800MHz | USB  | 45   | 18.100MHz | USB  |
| 22   | 28.687MHz | USB  | 46   | 28.900MHz | USB  |
| 23   | 29.600MHz | CW   | 47   | 14.050MHz | USB  |
| 24   | 24.900MHz | CW   | 48   | 14.050MHz | AM   |

## Preparation

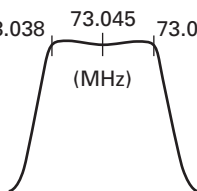
| Item       | Condition                                                                  | Measurement    |      |          | Adjustment |       |        | Specifications/<br>Remarks |
|------------|----------------------------------------------------------------------------|----------------|------|----------|------------|-------|--------|----------------------------|
|            |                                                                            | Test-equipment | Unit | Terminal | Unit       | Parts | Method |                            |
| 1. Setting | 1) DC IN: 13.6V<br>CONT SW 1: ON<br>CLARIFIER VR: Center<br>SQL VR: Center |                |      |          |            |       |        |                            |

# ADJUSTMENT

## PLL and CAR Section

| Item                              | Condition                                                             | Measurement               |       |          | Adjustment |                      |                                                                       | Specifications/Remarks |
|-----------------------------------|-----------------------------------------------------------------------|---------------------------|-------|----------|------------|----------------------|-----------------------------------------------------------------------|------------------------|
|                                   |                                                                       | Test-equipment            | Unit  | Terminal | Unit       | Parts                | Method                                                                |                        |
| 1. Reference frequency adjustment | 1) M CH: 01                                                           | f. counter (probe 10 : 1) | TX-RX | TP501    | TX-RX      | TC501                | 20.00000MHz                                                           | ±20Hz                  |
| 2. 62.35MHz adjustment            | 1) M CH: 01                                                           |                           |       | TP506    |            | TC502                | 62.35000MHz                                                           | ±20Hz                  |
| 3. 10.695MHz adjustment           | 1) M CH: 01                                                           | Oscilloscope              |       | TP503    |            | L539                 | 1.4Vp-p                                                               | ±0.2Vp-p               |
| 4. 54MHz BPF adjustment           | 1) M CH: 01                                                           |                           |       | TP505    |            | L513<br>L514<br>L515 | Repeat adjustment 2 to 3 times as the level of 26.5MHz. Level maximum | 1.0Vp-p or more        |
| 5. VCO1 lock voltage check        | 1) M CH: 02                                                           | D.V.M                     | TX-RX | TP504    | TX-RX      | TC503                | 2.0V                                                                  | ±0.1V                  |
|                                   | 2) M CH: 03                                                           |                           |       |          |            |                      | Check                                                                 | 7.0V or less           |
| 6. VCO2 lock voltage check        | 1) M CH: 04                                                           |                           |       |          | TX-RX      | TC504                | 2.0V                                                                  | ±0.1V                  |
|                                   | 2) M CH: 05                                                           |                           |       |          |            |                      | Check                                                                 | 7.0V or less           |
| 7. VCO3 lock voltage check        | 1) M CH: 06                                                           |                           |       |          | TX-RX      | TC505                | 2.0V                                                                  | ±0.1V                  |
|                                   | 2) M CH: 07                                                           |                           |       |          |            |                      | Check                                                                 | 7.0V or less           |
| 8. LO1 level check                | 1) M CH: 08<br>Pull out CN501 (LO1).<br>Insert CN501 after the check. | RF V.M<br>50Ω terminated  |       | CN501    |            |                      | Level check                                                           | −0.5~+5.0dBm           |
| 9. LO2 (62.35MHz) level check     | 1) M CH: 08<br>Pull out CN502 (LO2).<br>Insert CN502 after the check. |                           |       | CN502    | TX-RX      | (L531)               | Level check<br>0dBm or less:<br>Maximum for L531                      | 0~+3.0dBm              |

## Receiver Section

| Item              | Condition                                                                                                                                                                                               | Measurement                                 |       |                | Adjustment |                   |                                                                                                     | Specifications/Remarks                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------|----------------|------------|-------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                                                                                                                                                                                                         | Test-equipment                              | Unit  | Terminal       | Unit       | Parts             | Method                                                                                              |                                                                                                                                                                            |
| 1. AGC adjustment | 1) M CH: 08                                                                                                                                                                                             | D.V.M                                       | TX-RX | TP2            | TX-RX      | VR6               | 2.9V                                                                                                | ±0.03V                                                                                                                                                                     |
| 2. MCF adjustment | 1) Pull out CN502 (LO2).<br>M CH: 08<br>Spectrum analyzer setting<br>TG level: -30dBm<br>Center f.: 73.045MHz<br>Frequency span: 70kHz<br>ATT: 10dB<br>V. REF: 2dB/DIV<br>Insert CN502 after the check. | Spectrum analyzer<br><br>Tracking generator |       | CN7<br><br>CN4 |            | L38<br>L42<br>L43 | Repeat adjustment 2 to 3 times to obtain a maximum gain. Adjust the waveform as shown to the right. | <div style="text-align: center;">  <p>73.038    73.045    73.052<br/>(MHz)</p> </div> |

## ADJUSTMENT

| Item                        | Condition                                                                                                                                                                                                                                      | Measurement                                 |            |                   | Adjustment  |                                        |                                                      | Specifications/Remarks |       |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------|-------------------|-------------|----------------------------------------|------------------------------------------------------|------------------------|-------|
|                             |                                                                                                                                                                                                                                                | Test-equipment                              | Unit       | Terminal          | Unit        | Parts                                  | Method                                               |                        |       |
| 3. IF AMP adjustment        | 1) M CH: 08<br>[DATA]: 1 push<br>[MODE]: 1 push<br>Mode: USB<br>SSG f.: 14.151MHz<br>SSG OUT: -113~-119dBm<br>(0.501~0.25μV)                                                                                                                   | SSG<br><br>AF V.M<br>Oscilloscope<br>DM. SP | Rear panel | ANT<br><br>EXT.SP | TX-RX       | L44<br>L48<br>L49<br>L51<br>L75<br>L76 | Repeat adjustment<br>2 to 3 times.<br>AF output: MAX |                        |       |
| 4. MIX BAL adjustment       | 1) M CH: 09<br>AIP: OFF<br>SSG OUT: OFF                                                                                                                                                                                                        |                                             |            |                   |             | VR1                                    | Noise minimum                                        |                        |       |
| 5. IF GAIN adjustment       | 1) M CH: 10<br>SSG f.: 14.150MHz<br>SSG OUT: -103dBm (1.58μV)                                                                                                                                                                                  |                                             |            |                   | Front panel | AF VOL                                 | AF output: 0.63V                                     |                        |       |
|                             | 2) SSG OUT: -113dBm (0.501μV)                                                                                                                                                                                                                  |                                             |            |                   | TX-RX       | VR4                                    | AF output: 0.4V                                      | ±0.05V                 |       |
|                             | 3) SSG OUT: -103dBm (1.58μV)                                                                                                                                                                                                                   |                                             |            |                   |             |                                        | Check                                                | 0.63V±0.05V            |       |
| 6. S-meter adjustment<br>S1 | 1) Power ON while holding the<br>[SCAN] and [DATA] keys.<br>(Service adjustment mode)<br>Menu No.: 29<br>SSG f.: 14.101MHz<br>SSG OUT: -107dBm (1μV)                                                                                           |                                             |            |                   | Front panel | [MODE]<br>or<br>[DATA]                 | 1 push                                               |                        |       |
| S9                          | 2) Menu No.: 30<br>SSG OUT: -81dBm (19.9μV)                                                                                                                                                                                                    |                                             |            |                   |             |                                        |                                                      |                        |       |
| Full scale                  | 3) Menu No.: 31<br>SSG OUT: -41dBm (1.99mV)                                                                                                                                                                                                    |                                             |            |                   |             |                                        |                                                      |                        |       |
| 7. SQL threshold adjustment | 1) Menu No.: 32<br>SSG OUT: OFF<br>SQL VR: Center                                                                                                                                                                                              |                                             |            |                   |             |                                        | 1 push                                               |                        |       |
| 8. SQL VR adjustment        | 1) Menu No.: 33<br>SSG OUT: OFF<br>SQL VR: Center                                                                                                                                                                                              |                                             |            |                   |             |                                        |                                                      | 1 push                 |       |
| 9. CLARI VR adjustment      | 1) Menu No.: 34<br>SSG OUT: OFF<br>CRARI VR: Center                                                                                                                                                                                            |                                             |            |                   |             |                                        |                                                      | 1 push                 |       |
| 10. Beep sound adjustment   | 1) Menu No.: 37                                                                                                                                                                                                                                |                                             |            |                   |             |                                        | TX-RX                                                | VR9                    | 0.25V |
| 11. Sidetone adjustment     | 1) Menu No.: 38                                                                                                                                                                                                                                |                                             |            |                   | VR10        | 0.2V                                   |                                                      | ±6dB                   |       |
| 12. ROM data writing        | 1) Turn the [DIAL] to select Menu No. 39. Display (READY) → Press [MODE] or [DATA] → Write → Finish (GOOD)                                                                                                                                     |                                             |            |                   |             |                                        |                                                      |                        |       |
| 13. NB check                | 1) Press [MENU] key one time, set to the menu number “02” by pressing [DATA] or [MODE] key, and NB is ON for turning the [DIAL].<br>Adjust the noise generator to S1, S9 level, then check.<br>After the check, press the [MENU] key one time. | Noise generator<br>D.V.M                    |            |                   |             |                                        | Check                                                | Noise decreases        |       |

## ADJUSTMENT

| Item          | Condition                                                                                             | Measurement                      |            |             | Adjustment |         |                 | Specifications/Remarks                               |
|---------------|-------------------------------------------------------------------------------------------------------|----------------------------------|------------|-------------|------------|---------|-----------------|------------------------------------------------------|
|               |                                                                                                       | Test-equipment                   | Unit       | Terminal    | Unit       | Parts   | Method          |                                                      |
| 14. S/N check | 1) M CH: Following M CH<br>AF VR: 0.45V/4Ω<br>SSG f.: Following frequency<br>(USB: +1kHz, LSB: -1kHz) | Radio tester or SSG              | Rear panel | ANT         |            |         | S/N measurement | 10dB or more<br>AIP ON: Sensitivity down<br>(5~10dB) |
|               |                                                                                                       | AF V.M<br>Oscilloscope<br>DM. SP |            | EXT.SP      |            |         |                 |                                                      |
|               |                                                                                                       | M CH                             |            | Frequency   | Mode       | SSG OUT | SSG MOD         | DEV                                                  |
|               |                                                                                                       | 13                               |            | 550.0kHz    | AM         | -89dBm  | 1kHz            | 60%                                                  |
|               |                                                                                                       | 14                               |            | 1.550.0kHz  | AM         | -89dBm  | 1kHz            | 60%                                                  |
|               |                                                                                                       | 15                               |            | 1.800.0kHz  | LSB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 16                               |            | 3.550.0kHz  | LSB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 17                               |            | 7.100.0kHz  | LSB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 18                               |            | 10.100.0kHz | LSB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 19                               |            | 14.100.0kHz | USB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 20                               |            | 21.200.0kHz | USB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 21                               |            | 24.800.0kHz | USB        | -119dBm | OFF             |                                                      |
|               |                                                                                                       | 22                               |            | 28.687.0kHz | USB        | -119dBm | OFF             |                                                      |

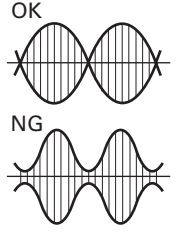
## Transmitter Section

| Item                       | Condition                                                                                                      | Measurement                                               |       |          | Adjustment  |                                               |                                                     | Specifications/Remarks |
|----------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------|----------|-------------|-----------------------------------------------|-----------------------------------------------------|------------------------|
|                            |                                                                                                                | Test-equipment                                            | Unit  | Terminal | Unit        | Parts                                         | Method                                              |                        |
| 1. ALC voltage adjustment  | 1) M CH: 11<br>Transmit                                                                                        | D.V.M                                                     | TX-RX | TP1      | TX-RX       | VR12                                          | 2.7V                                                | +0.05V, -0.10V         |
| 2. TX AMP adjustment       | 1) M CH: 11<br>Insert the measure cable to CN19.<br>Transmit                                                   | 50Ω terminated<br>Oscilloscope<br>or<br>Spectrum analyzer |       | CN19     |             | L60<br>L61<br>L63<br>L64<br>L65<br>L67<br>L69 | Repeat adjustment<br>2 to 3 times.<br>Level maximum | CAR at 14.250MHz: MAX  |
| 3. MIX BIAS adjustment     | 1) M CH: 11<br>Transmit                                                                                        |                                                           |       |          |             | VR2                                           | Level maximum                                       |                        |
| 4. CW/AM CAR level setting | 1) Power ON while holding the [SCAN] and [DATA] keys.<br>(Service adjustment mode)<br>Menu No.: 25<br>Transmit | Spectrum analyzer                                         |       | CN19     | Front panel | [MODE]<br>or<br>[DATA]                        | 9dBm                                                | ±1dB                   |
|                            | 2) Menu No.: 26<br>Transmit                                                                                    |                                                           |       |          |             |                                               | 6.5dBm                                              | ±0.5dB                 |
| 5. TGC adjustment          | 1) Menu No.: 10<br>Transmit                                                                                    |                                                           |       |          |             |                                               | 6dBm                                                | ±0.5dB                 |
|                            | 2) Menu No.: 11<br>Transmit                                                                                    |                                                           |       |          |             |                                               | 3dBm                                                |                        |
|                            | 3) Menu No.: 12<br>Transmit                                                                                    |                                                           |       |          |             |                                               | 0.8dBm                                              |                        |

## ADJUSTMENT

| Item                                      | Condition                                                                                                      | Measurement    |             |          | Adjustment  |                  |                                                                                                 | Specifications/Remarks                           |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------|-------------|----------|-------------|------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------|
|                                           |                                                                                                                | Test-equipment | Unit        | Terminal | Unit        | Parts            | Method                                                                                          |                                                  |
| 6. ROM data writing                       | 1) Turn the [DIAL] to select Menu No. 39. Display (READY) → Press [MODE] or [DATA] → Write → Finish (GOOD)     |                |             |          |             |                  |                                                                                                 |                                                  |
| 7. Idle current adjustment                | 1) M CH: 11<br>VR1, VR2 : MAX to counterclockwise Transmit                                                     | DC ammeter     |             |          |             |                  | Check the default current (I <sub>0</sub> ).                                                    |                                                  |
|                                           |                                                                                                                |                |             |          | Final       | VR1              | I <sub>0</sub> +250mA=I <sub>1</sub>                                                            |                                                  |
|                                           |                                                                                                                |                |             |          |             | VR2              | I <sub>1</sub> +250mA                                                                           |                                                  |
| 8. Fan operation check                    |                                                                                                                |                |             |          | Final       | TH1              | Both ends of TH1 are shorted.                                                                   | Fan starts running, and ventilate to rear panel. |
| 9. NULL adjustment                        | 1) Insert the coaxial cable to CN19.<br>M CH: 12<br>VR3: MAX to counterclockwise<br>Low power<br>Transmit      | D.V.M          | Final       | CN104    | Final       | TC1              | Voltage minimum                                                                                 | Reference value: 50mV                            |
|                                           |                                                                                                                | Power meter    | Rear panel  | ANT      |             |                  |                                                                                                 |                                                  |
| 10. Power adjustment<br>100W              | 1) Power ON while holding the [SCAN] and [DATA] keys.<br>(Service adjustment mode)<br>Menu No.: 01<br>Transmit | Power meter    | Rear panel  | ANT      | Front panel | [MODE] or [DATA] | 100W                                                                                            | ±5.0W                                            |
| 50W                                       | 2) Menu No.: 02<br>Transmit                                                                                    |                |             |          |             |                  | 50W                                                                                             | ±3.0W                                            |
| 25W                                       | 3) Menu No.: 03<br>Transmit                                                                                    |                |             |          |             |                  | 25W                                                                                             | ±2.5W                                            |
| 15W                                       | 4) Menu No.: 04<br>Transmit                                                                                    |                |             |          |             |                  | 15W                                                                                             | ±1.5W                                            |
| 12.5W                                     | 5) Menu No.: 05<br>Transmit                                                                                    |                |             |          |             |                  | 12.5W                                                                                           | ±1.0W                                            |
| 10W                                       | 6) Menu No.: 06<br>Transmit                                                                                    |                |             |          |             |                  | 10W                                                                                             | ±1.0W                                            |
| 6.25W                                     | 7) Menu No.: 07<br>Transmit                                                                                    |                |             |          |             |                  | 6.25W                                                                                           | ±0.5W                                            |
| 3.75W                                     | 8) Menu No.: 08<br>Transmit<br>RF meter data is also written at the same time as the above power adjustment.   |                |             |          |             |                  | 3.75W                                                                                           | ±0.5W                                            |
| 11. SSB microphone sensitivity adjustment | 1) Menu No.: 18<br>AG: 1kHz/5mV<br>Transmit                                                                    | Power meter    | Rear panel  | ANT      |             |                  | 60W                                                                                             | ±5.0W                                            |
|                                           |                                                                                                                | AG AF V.M      | Front panel | MIC      |             |                  |                                                                                                 |                                                  |
| 12. AM microphone sensitivity adjustment  | 1) Menu No.: 19<br>Transmit                                                                                    |                |             |          |             |                  | Set the value, multiplying SSB microphone sensitivity adjustment value by the square root of 2. |                                                  |
| 13. ROM data writing                      | 1) Turn the [DIAL] to select Menu No. 39. Display (READY) → Press [MODE] or [DATA] → Write → Finish (GOOD)     |                |             |          |             |                  |                                                                                                 |                                                  |

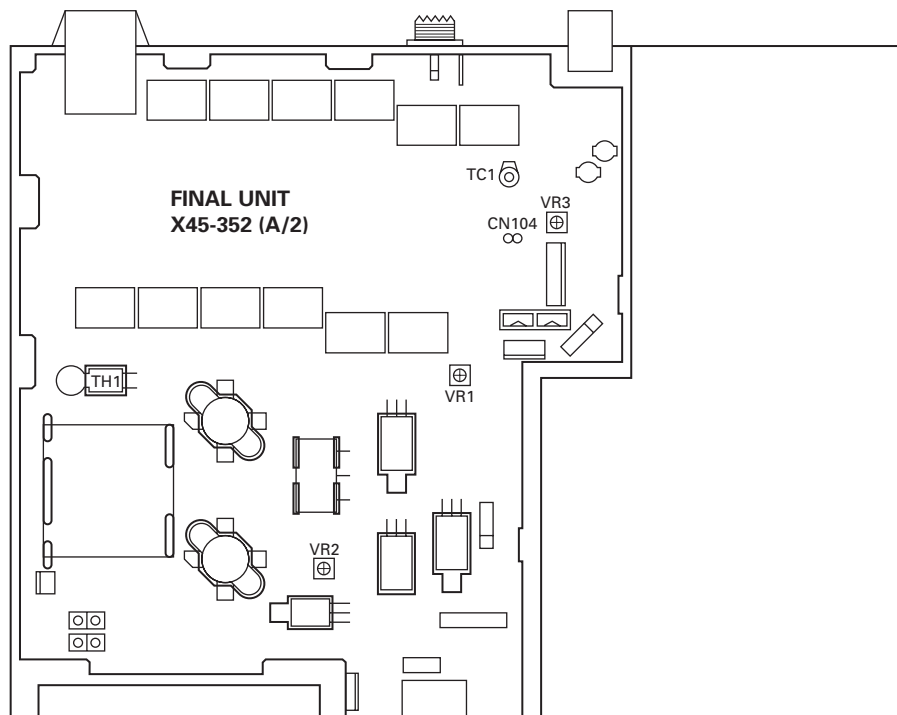
## ADJUSTMENT

| Item                            | Condition                                                                                                                                                            | Measurement                                              |             |          | Adjustment  |                  |                                                                                                                                                                                                 | Specifications/Remarks                                                                                                               |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------|----------|-------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                                                                                                      | Test-equipment                                           | Unit        | Terminal | Unit        | Parts            | Method                                                                                                                                                                                          |                                                                                                                                      |
| 14. Power frequency response    | 1) M CH: 23<br>Transmit                                                                                                                                              | Power meter                                              | Rear panel  | ANT      | Final       | VR3              | Power maximum                                                                                                                                                                                   | 95W or more                                                                                                                          |
| 15. Spurious adjustment         | 1) M CH: 24<br>Transmit                                                                                                                                              | Power meter<br>Spectrum analyzer                         |             |          | TX-RX       | VR3              | Spurious minimum (Near $\pm 1.6$ MHz)                                                                                                                                                           | -50dB or more                                                                                                                        |
| 16. Suppression adjustment      | 1) M CH: 25<br>Set USB/LSB using [MODE] key.<br>Transmit                                                                                                             | Coupler                                                  |             |          |             | VR7<br>VR8       | CAR level minimum<br>Repeat USB and LSB alternately, adjust CAR level to minimum.                                                                                                               | -50dB or more                                                                                                                        |
| 17. SWR protection adjustment   | 1) M CH: 26<br>150 $\Omega$ dummy load connect.<br>Transmit                                                                                                          | 150 $\Omega$ dummy load<br>Pass-through type power meter |             |          |             | VR14             | 40W                                                                                                                                                                                             | $\pm 4.0$ W                                                                                                                          |
| 18. SWR 3.0 (for AT) adjustment | 1) Power ON while holding the [SCAN] and [DATA] keys.<br>(Service adjustment mode)<br>Menu No.: 24<br>150 $\Omega$ dummy load connect.<br>Transmit                   |                                                          |             |          | Front panel | [MODE] or [DATA] | 1 push                                                                                                                                                                                          |                                                                                                                                      |
| 19. CAR point adjustment        | 1) Menu No.: 27 (LSB)<br>Menu No.: 28 (USB)<br>AG1: 300Hz/3mV<br>AG2: 2700Hz/3mV<br>Transmit                                                                         | Power meter<br>AG<br>Oscilloscope<br>Coupler             |             |          |             |                  | While observing the oscilloscope waveforms, adjust so the waveforms cross.<br>At LSB or USB, adjust while pressing [MODE] or [DATA] key.                                                        |                                                  |
| 20. ROM data writing            | 1) Turn the [DIAL] to select Menu No. 39. Display (READY) → Press [MODE] or [DATA] → Write → Finish (GOOD)                                                           |                                                          |             |          |             |                  |                                                                                                                                                                                                 |                                                                                                                                      |
| 21. Display check               | 1) Menu No.: 36                                                                                                                                                      |                                                          |             |          |             |                  | Check                                                                                                                                                                                           | LCD all segments light.                                                                                                              |
| 22. Transmit output power       | 1) Check for following frequency<br>M CH: 28 (1.8MHz, AM)<br>M CH: 31 (7MHz, CW)<br>M CH: 34 (26MHz, USB)<br>SSB: AG 1kHz, 50mV input<br>AM: Unmodulated<br>Transmit | Power meter<br>Spectrum analyzer<br>AG                   | Rear panel  | ANT      |             |                  | Transmit output power (RF meter lights up all)<br><br>Press [MENU] key one time, set to the menu number "01" by pressing [DATA] or [MODE] key.<br>Change to HI, MID, LOW by turning the [DIAL]. | No display<br>: 90~110W (20~30W)<br>HI<br>: 45~55W (10~15W)<br>MID<br>: 22~28W (5~8W)<br>LOW<br>: 13~17W (2~5W)<br><br>*( ): AM mode |
| Current consumption             |                                                                                                                                                                      | Linear detector<br>f. counter                            | Front panel | MIC      |             |                  |                                                                                                                                                                                                 | No display: 20.5A or less<br>HI: 15A or less<br>MID: 12A or less<br>LOW: 9A or less                                                  |
| Spurious (during HI power)      |                                                                                                                                                                      |                                                          |             |          |             |                  |                                                                                                                                                                                                 | Higher harmonic<br>: -50dB or less<br>Other: -40dB or less                                                                           |

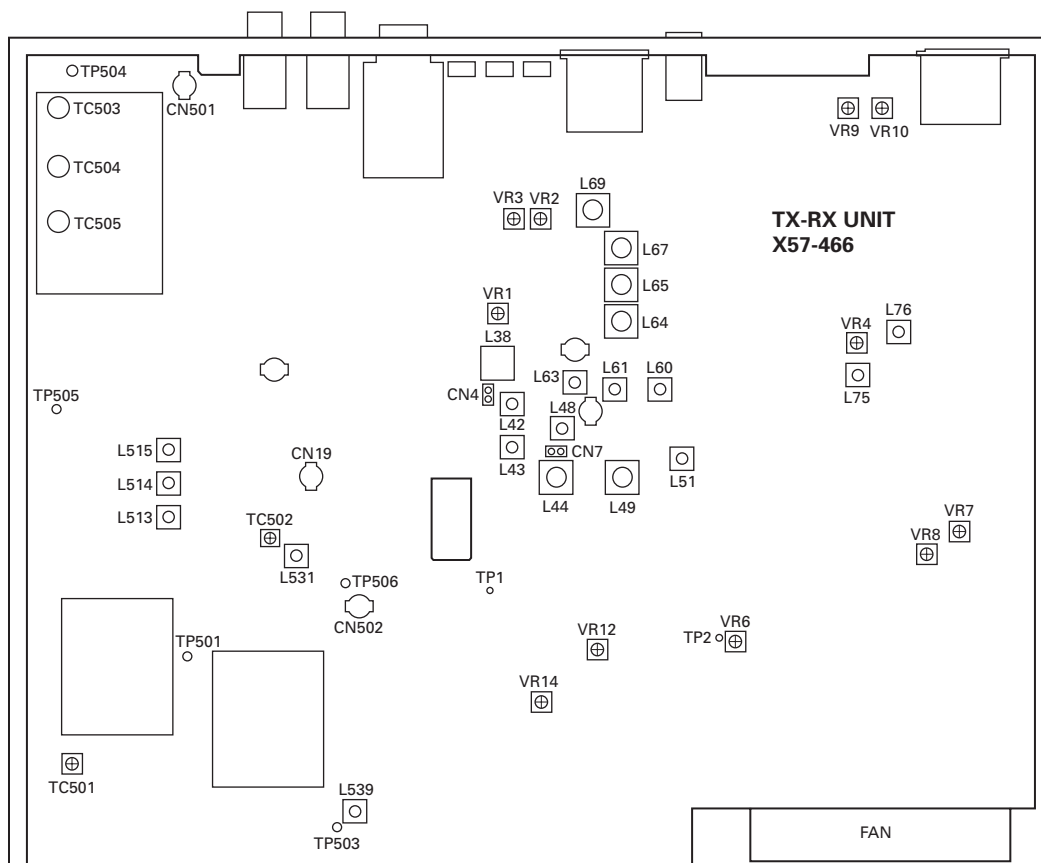
## ADJUSTMENT

### Adjustment Points

#### ■ Final unit (A/2) (Component side view)



#### ■ TX-RX unit (Component side view)



# TERMINAL FUNCTION

## FINAL UNIT (X45-3520-21) (A/2)

| CN No. | Pin No. | Pin Name | Function                                      |
|--------|---------|----------|-----------------------------------------------|
| CN1    | Coax.   | DRV      | Drive input                                   |
| CN2    | 1       | FAN+     | Power supply for fan                          |
|        | 2       | FAN-     | Power supply for fan                          |
| CN3    | 1       | TT       | Antenna tuner control                         |
|        | 2       | TS       | Antenna tuner control                         |
|        | 3       | FEN4     | Shift register 4 enable                       |
|        | 4       | UCK      | Shift register control clock                  |
|        | 5       | UDA      | Shift register control data                   |
|        | 6       | DGND     | Digital GND                                   |
|        | 7       | THP      | Thermal protection.<br>High when it operates  |
|        | 8       | BOVR     | Low: DC over voltage<br>(approx. 19V or more) |
|        | 9       | PSC      | High when power switch is turned              |
|        | 10      | 5A       | 5V                                            |
|        | 11      | 14V      | 14V                                           |
|        | 12      | 14S      | 14V (switched)                                |
|        | 13      | 8A       | Analog 8V                                     |
|        | 14      | GND      | GND                                           |
|        | 15      | NC       | No connection                                 |
|        | 16      | NC       | No connection                                 |
| CN4    | 1       | GND      | GND                                           |
|        | 2       | TS       | Antenna tuner control                         |
|        | 3       | TT       | Antenna tuner control                         |
|        | 4       | AGND     | Analog GND                                    |
|        | 5       | 14S      | 14V (switched)                                |
| CN5    | Coax.   | AT1      | AT signal 1                                   |
| CN6    | Coax.   | AT2      | AT signal 2                                   |
| CN7    | Coax.   | RAT      | Receive signal output                         |
| CN9    |         | ANT.GND  | Antenna GND                                   |
| CN10   | 1       | GND      | GND                                           |
|        | 2       | VSF      | Forward wave voltage                          |
|        | 3       | VSR      | Reflected wave voltage                        |
|        | 4       | TXB      | 8V when transmitting                          |
|        | 5       | 14AG     | 14V (for audio IC) GND                        |
|        | 6       | 14AF     | 14V (for audio IC)                            |
|        | 7       | 8A       | 8V                                            |
|        | 8       | 14S      | 14V (switched)                                |
| CN11   | 1       | GND      | GND                                           |
|        | 2       | 4AT      | AT band data 2.40000~4.49999MHz               |

| CN No. | Pin No. | Pin Name | Function                          |
|--------|---------|----------|-----------------------------------|
| CN11   | 3       | 7AT      | AT band data 4.50000~7.99999MHz   |
|        | 4       | 14AT     | AT band data 8.00000~14.49999MHz  |
|        | 5       | 18AT     | AT band data 14.50000~18.99999MHz |
|        | 6       | 21AT     | AT band data 19.00000~21.99999MHz |
|        | 7       | 24AT     | AT band data 22.00000~26.99999MHz |
|        | 8       | 28AT     | AT band data 27.00000~29.99999MHz |
| W1     |         | 14V      | 14V                               |
|        |         | 14V      | 14V                               |
|        |         | GND      | GND                               |
|        |         | GND      | GND                               |
| W2     |         | ANT      | ANT                               |

## FINAL UNIT (X45-3520-21) (B/2)

| CN No. | Pin No. | Pin Name | Function           |
|--------|---------|----------|--------------------|
| CN800  | 1       | PH1      | Headphone output 1 |
|        | 2       | PH2      | Headphone output 2 |
|        | 3       | PHG      | Headphone GND      |
| J800   |         | PHONES   | Headphone output   |

## CONTROL UNIT (X53-3570-21)

| CN No. | Pin No. | Pin Name | Function                         |
|--------|---------|----------|----------------------------------|
| CN1    | 1       | RAF      | Reference audio voltage          |
|        | 2       | DGND     | Digital GND                      |
|        | 3       | 5C       | 5V for power switch              |
|        | 4       | 5A       | 5V                               |
|        | 5       | 8A       | 8V                               |
|        | 6       | 14S      | 14V (switched)                   |
|        | 7       | LEN1     | LCD control enable               |
|        | 8       | LBLK     | LCD blanking                     |
|        | 9       | SO       | Key matrix select                |
|        | 10      | K4       | Key matrix                       |
|        | 11      | K3       | Key matrix                       |
|        | 12      | K2       | Key matrix                       |
|        | 13      | K1       | Key matrix                       |
|        | 14      | K0       | Key matrix                       |
|        | 15      | EDP2     | Encoder pulse                    |
|        | 16      | EDP1     | Encoder pulse                    |
|        | 17      | PSW      | High when the power switch is on |
|        | 18      | LCK      | LCD control clock                |
|        | 19      | LDA      | LCD control data                 |
|        | 20      | MD       | Microphone DOWN switch           |

# 

| CN No. | Pin No. | Pin Name | Function                                      |
|--------|---------|----------|-----------------------------------------------|
| CN1    | 21      | MU       | Microphone UP switch                          |
|        | 22      | SS       | Standby switch                                |
|        | 23      | VSQ      | Squelch volume voltage                        |
|        | 24      | VCL      | Clarifier volume voltage                      |
|        | 25      | VA       | AF volume voltage                             |
|        | 26      | DGND     | Digital GND                                   |
| CN2    | 1       | DGND     | Digital GND                                   |
|        | 2       | FSL      | Selective call signal detector                |
|        | 3       | FSD      | Selective call data                           |
|        | 4       | 5A       | 5V                                            |
|        | 5       | DGND     | Digital GND                                   |
|        | 6       | STD      | Single tone detector                          |
|        | 7       | Q4       | DTMF decode data                              |
|        | 8       | Q3       | DTMF decode data                              |
|        | 9       | Q2       | DTMF decode data                              |
|        | 10      | Q1       | DTMF decode data                              |
|        | 11      | TOE      | DTMF decoder control                          |
|        | 12      | DGND     | Digital GND                                   |
| CN3    | 1       | TT       | Antenna tuner control                         |
|        | 2       | TS       | Antenna tuner control                         |
|        | 3       | FEN4     | Shift register 4 enable                       |
|        | 4       | UCK      | Shift register control clock                  |
|        | 5       | UDA      | Shift register control data                   |
|        | 6       | DGND     | Digital GND                                   |
|        | 7       | THP      | Thermal protection.<br>High when it operates  |
|        | 8       | BOVR     | Low: DC over voltage<br>(approx. 19V or more) |
|        | 9       | PSC      | High when power switch is turned              |
|        | 10      | 5A       | 5V                                            |
|        | 11      | 14V      | 14V                                           |
|        | 12      | 14S      | 14V (switched)                                |
|        | 13      | 8A       | 8V                                            |
|        | 14      | GND      | GND                                           |
|        | 15      | NC       | No connection                                 |
|        | 16      | NC       | No connection                                 |
| CN4    | 1       | DGND     | Digital GND                                   |
|        | 2       | RTS      | PC I/F (request to send)                      |
|        | 3       | CTS      | PC I/F (clear to send)                        |
|        | 4       | RXD      | PC I/F (RX data)                              |
|        | 5       | TXD      | PC I/F (TX data)                              |

| CN No. | Pin No. | Pin Name | Function                                           |
|--------|---------|----------|----------------------------------------------------|
| CN4    | 6       | AMUT     | Audio mute                                         |
|        | 7       | VA       | AF volume voltage                                  |
|        | 8       | SIDE     | Sidetone                                           |
|        | 9       | BZ       | Beep                                               |
|        | 10      | BSY      | Busy signal                                        |
|        | 11      | CKY      | Keying control                                     |
|        | 12      | RXC      | Receive control                                    |
|        | 13      | TXC      | Transmit control                                   |
|        | 14      | SM       | Signal meter voltage                               |
|        | 15      | VFSM     | Forward wave voltage                               |
|        | 16      | VSRM     | Reflected wave voltage                             |
|        | 17      | FEN3     | Shift register 3 enable                            |
|        | 18      | FEN2     | Shift register 2 enable                            |
|        | 19      | VEN1     | Electronic volume control enable                   |
|        | 20      | UCK      | Shift register, electronic volume<br>control clock |
|        | 21      | UDA      | Shift register, electronic volume<br>control data  |
|        | 22      | FEN1     | Shift register 1 enable                            |
|        | 23      | KYS      | Key jack input. High when jack is inserted         |
|        | 24      | KEY      | CW keying. High: Key down                          |
|        | 25      | SS       | Standby switch                                     |
|        | 26      | GND      | GND                                                |
| CN5    | 1       | GND      | GND                                                |
|        | 2       | ABSL     | DDS2 register selection                            |
|        | 3       | DEN2     | DDS2 enable                                        |
|        | 4       | CASL     | DDS1 & PLL register selection                      |
|        | 5       | DEN1     | DDS1 enable                                        |
|        | 6       | NC       | No connection                                      |
|        | 7       | PLS      | Keying line switch                                 |
|        | 8       | PEN1     | PLL enable                                         |
|        | 9       | PDA      | PLL data                                           |
|        | 10      | PCK      | PLL clock                                          |
|        | 11      | ULK      | Unlock detection signal. Low: Unlock               |
|        | 12      | VB3      | VCO3 selection signal                              |
|        | 13      | VB2      | VCO2 selection signal                              |
|        | 14      | VB1      | VCO1 selection signal                              |
|        | 15      | VDLY     | Delay volume voltage                               |
|        | 16      | GND      | GND                                                |
| CN6    | 1       | DGND     | Digital GND                                        |
|        | 2       | DGND     | Digital GND                                        |

# TERMINAL FUNCTION

| CN No. | Pin No. | Pin Name | Function                         |
|--------|---------|----------|----------------------------------|
| CN6    | 3       | 5A       | 5V                               |
|        | 4       | 14S      | 14V (switched)                   |
|        | 5       | ATI      | Preset AT install. Low: Install  |
|        | 6       | SPED     | Motor speed control              |
|        | 7       | APRE     | Preset control select            |
|        | 8       | ATA      | AUTO/THRU switch                 |
|        | 9       | PR11     | Motor rotate direction control 1 |
|        | 10      | PR12     | Motor rotate direction control 2 |
|        | 11      | PR21     | Motor rotate direction control 3 |
|        | 12      | PR22     | Motor rotate direction control 4 |
|        | 13      | ATG      | AT GND                           |
|        | 14      | VREF     | AT reference voltage (5V)        |
|        | 15      | POD2     | VC102 position detection signal  |
|        | 16      | POD1     | VC101 position detection signal  |

## TX-RX UNIT (X57-4660-21)

| CN No. | Pin No. | Pin Name | Function                    |
|--------|---------|----------|-----------------------------|
| CN1    | Coax.   | RAT      | Receive signal input        |
| CN2    | Coax.   | LO1      | LO1 input 73.145~103.045MHz |
| CN3    | Coax.   | LO2      | LO2 input 62.35MHz          |
| CN9    | 1       | CAR      | CAR input 10.695MHz         |
|        | 2       | GND      | GND                         |
| CN10   | 1       | SP       | Speaker output              |
|        | 2       | SPG      | Speaker GND                 |
| CN11   | 1       | PH1      | Headphone output 1          |
|        | 2       | PH2      | Headphone output 2          |
|        | 3       | PHG      | Headphone GND               |
| CN12   | 1       | MIC      | MIC signal input            |
|        | 2       | MICG     | MIC GND                     |
|        | 3       | NC       | No connection               |
|        | 4       | SPO      | Speaker output              |
|        | 5       | SPOG     | Speaker GND                 |
| CN13   | 1       | AF       | Audio                       |
|        | 2       | AFG      | Audio GND                   |
|        | 3       | MIC      | MIC signal input            |
|        | 4       | MICG     | MIC GND                     |
| CN14   | 1       | DGND     | Digital GND                 |
|        | 2       | RTS      | PC I/F (request to send)    |
|        | 3       | CTS      | PC I/F (clear to send)      |
|        | 4       | RXD      | PC I/F (RX data)            |

| CN No. | Pin No. | Pin Name | Function                                        |
|--------|---------|----------|-------------------------------------------------|
| CN14   | 5       | TXD      | PC I/F (TX data)                                |
|        | 6       | AMUT     | Audio mute                                      |
|        | 7       | VAF      | AF volume voltage                               |
|        | 8       | SIDE     | Sidetone                                        |
|        | 9       | BZ       | Beep                                            |
|        | 10      | BSY      | Busy signal                                     |
|        | 11      | CKY      | Keying control                                  |
|        | 12      | RXC      | Receive control                                 |
|        | 13      | TXC      | Transmit control                                |
|        | 14      | SM       | Signal meter voltage                            |
|        | 15      | VFSM     | Forward wave voltage                            |
|        | 16      | VSRM     | Reflected wave voltage                          |
|        | 17      | FEN3     | Shift register 3 enable                         |
|        | 18      | FEN2     | Shift register 2 enable                         |
|        | 19      | VEN1     | Electronic volume control enable                |
|        | 20      | UCK      | Shift register, electronic volume control clock |
|        | 21      | UDA      | Shift register, electronic volume control data  |
|        | 22      | FEN1     | Shift register 1 enable                         |
|        | 23      | KYS      | Key jack input. High when jack is inserted      |
|        | 24      | KEY      | CW keying. High: Key down                       |
|        | 25      | SS       | Standby switch                                  |
|        | 26      | GND      | GND                                             |
| CN15   | 1       | 14S      | 14V (switched)                                  |
|        | 2       | 8A       | 8V                                              |
|        | 3       | 14AF     | 14V (for audio IC)                              |
|        | 4       | 14AG     | 14V (for audio IC) GND                          |
|        | 5       | TXB      | 8V when transmitting                            |
|        | 6       | VSR      | Reflected wave voltage                          |
|        | 7       | VSF      | Forward wave voltage                            |
|        | 8       | GND      | GND                                             |
| CN19   | Coax.   | DRV      | Drive output                                    |
| W1     | 1       | NBI      | NB amplifier signal input                       |
|        | 2       | NBG      | NB GND                                          |
| J1     | 1       | DGND     | Digital GND                                     |
|        | 2       | TXD      | PC I/F (TX data)                                |
|        | 3       | RXD      | PC I/F (RX data)                                |
|        | 4       | CTS      | PC I/F (clear to send)                          |
|        | 5       | RTS      | PC I/F (request to send)                        |
|        | 6       | NC       | No connection                                   |

# TERMINAL FUNCTION

| CN No. | Pin No. | Pin Name | Function                                                      |
|--------|---------|----------|---------------------------------------------------------------|
| J2     | 1       | NC       | No connection                                                 |
|        | 2       | RTK      | RTTY keying line                                              |
|        | 3       | ANO      | Received data output                                          |
|        | 4       | GND      | GND                                                           |
|        | 5       | PSQ      | Squelch control output                                        |
|        | 6       | PKS      | DATA terminal SEND key<br>(Low: Transmission microphone mute) |
|        | 7       | PKD      | Transmission data input                                       |
|        | 8       | PKDG     | Transmission data GND                                         |
| J3     |         | RELAY    | Linear relay control                                          |
| J4     |         | ALC      | ALC voltage                                                   |
| J5     |         | EXT. SP  | External speaker                                              |
| J6     |         | KEY      | CW key input                                                  |
| CN500  | 1       | GND      | GND                                                           |
|        | 2       | ABSL     | DDS2 register selection                                       |
|        | 3       | DEN2     | DDS2 enable                                                   |
|        | 4       | CASL     | DDS1 & PLL register selection                                 |
|        | 5       | DEN1     | DDS1 enable                                                   |
|        | 6       | NC       | No connection                                                 |
|        | 7       | PLS      | Keying line switch                                            |
|        | 8       | PEN1     | PLL enable                                                    |
|        | 9       | PDA      | PLL data                                                      |
|        | 10      | PCK      | PLL clock                                                     |
|        | 11      | ULK      | Unlock detection signal. Low: Unlock                          |
|        | 12      | VB3      | VCO3 selection signal                                         |
|        | 13      | VB2      | VCO2 selection signal                                         |
|        | 14      | VB1      | VCO1 selection signal                                         |
|        | 15      | VDLY     | Delay volume voltage                                          |
|        | 16      | GND      | GND                                                           |
| CN501  | Coax.   | LO1      | LO1 output 73.145~103.045MHz                                  |
| CN502  | Coax.   | LO2      | LO2 output 62.35MHz                                           |
| CN503  | 1       | CAR      | CAR output 10.695MHz                                          |
|        | 2       | GND      | GND                                                           |
| W1     | 1       | NBI      | NB amplifier signal input                                     |
|        | 2       | NBG      | NB GND                                                        |

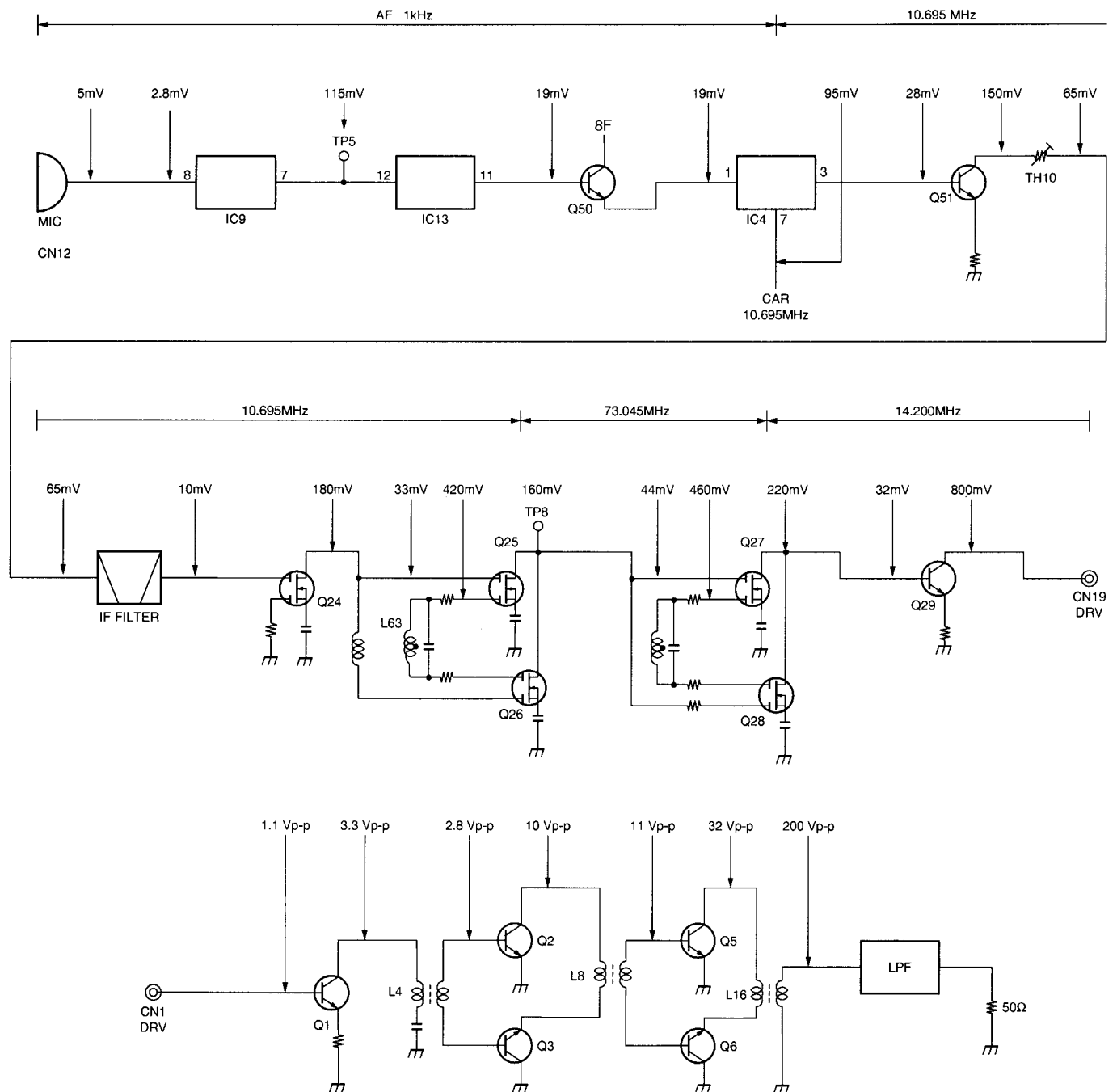
## LCD ASSY

| CN No. | Pin No. | Pin Name | Function          |
|--------|---------|----------|-------------------|
| CN1    | 1       | DGND     | Digital GND       |
|        | 2       | VAF      | AF volume voltage |

| CN No. | Pin No. | Pin Name | Function                         |
|--------|---------|----------|----------------------------------|
| CN1    | 3       | VCL      | Clarifier volume voltage         |
|        | 4       | VSQ L    | Squelch volume voltage           |
|        | 5       | SS       | Standby switch                   |
|        | 6       | MU       | Microphone UP switch             |
|        | 7       | MD       | Microphone DOWN switch           |
|        | 8       | LDA      | LCD control data                 |
|        | 9       | LCK      | LCD control clock                |
|        | 10      | PSW      | High when the power switch is on |
|        | 11      | EDP1     | Encoder pulse                    |
|        | 12      | EDP2     | Encoder pulse                    |
|        | 13      | K0       | Key matrix                       |
|        | 14      | K1       | Key matrix                       |
|        | 15      | K2       | Key matrix                       |
|        | 16      | K3       | Key matrix                       |
|        | 17      | K4       | Key matrix                       |
|        | 18      | SO       | Key matrix select                |
|        | 19      | LBLK     | LCD blanking                     |
|        | 20      | LEN1     | LCD control enable               |
|        | 21      | 14S      | 14V (switched)                   |
|        | 22      | 8A       | 8V                               |
|        | 23      | 5A       | 5V                               |
|        | 24      | 5C       | 5V for power switch              |
|        | 25      | DGND     | Digital GND                      |
|        | 26      | RAF      | Reference audio voltage          |
| CN2    | 1       | MIC      | MIC signal output                |
|        | 2       | MICG     | MIC GND                          |
|        | 3       | AGND     | Analog GND                       |
|        | 4       | SPO      | Speaker output                   |
|        | 5       | SPOG     | Speaker GND                      |
| J1     | 1       | MIC      | MIC signal output                |
|        | 2       | SS       | Standby switch                   |
|        | 3       | DOWN     | Microphone DOWN                  |
|        | 4       | UP       | Microphone UP                    |
|        | 5       | 8A       | 8V                               |
|        | 6       | SPO      | Speaker output                   |
|        | 7       | MICG     | MIC GND                          |
|        | 8       | GND      | GND                              |

## LEVEL DIAGRAM

## TX Section



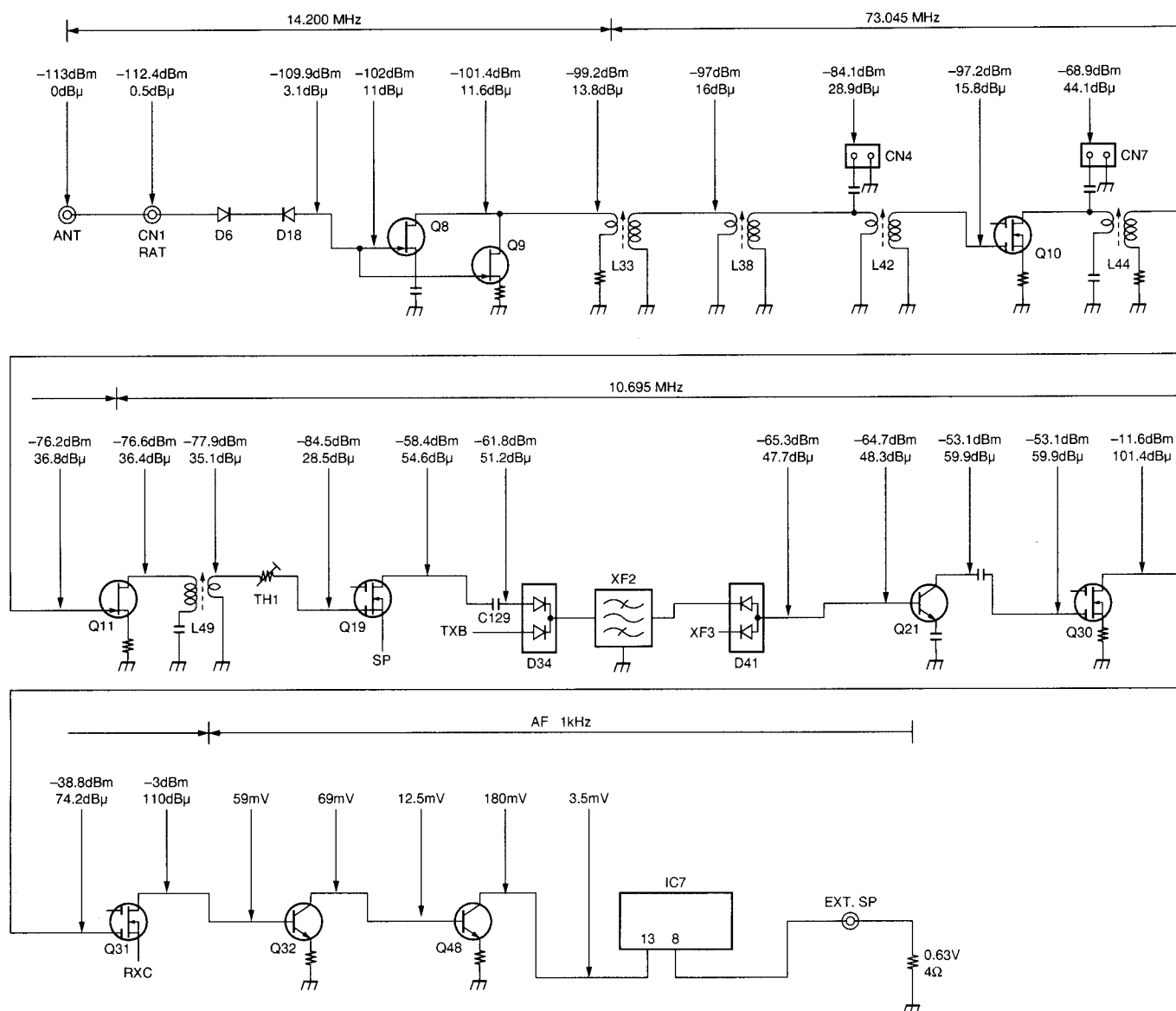
MIC input: 1kHz, 5mV

The AF level is measured by an AF VTVM.

The RF level is measured by an RF VTVM.

## LEVEL DIAGRAM

### RX Section



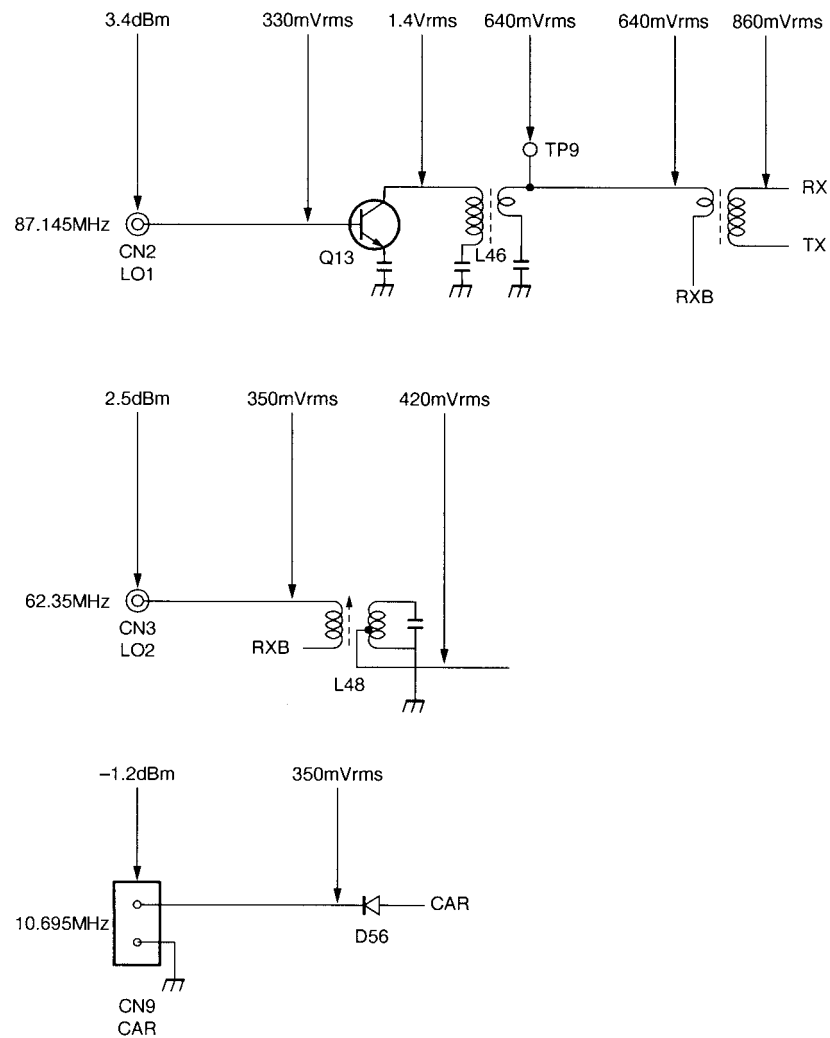
AIP: OFF

1. Connect the signal generator to the ANT terminal at 14.2MHz USB, apply a signal of 0dBμ (EMF), tune so that the AF output beat frequency is 1kHz, and adjust the AF VR so that the AF output is 0.63V/4Ω.
2. Connect the signal generator to each measurement point (cut off the DC), and the AF output in step 1 so that the above EMFs are obtained.  
During measurement, the beat frequency of the AF output is normally 1kHz.

3. The signal type connector, TP, shown by © is measured by removing the coaxial cable inside the set, which is connected to that connector, and connecting the signal generator in its place. The station transmission system connector shown by © is a value measured by connecting the coaxial cable within the set connected to that connector (input must be 50Ω) to the spectrum analyzer.
4. The AF stage level is the level measured at AF V.M for each stage during the conditions indicated in step1.

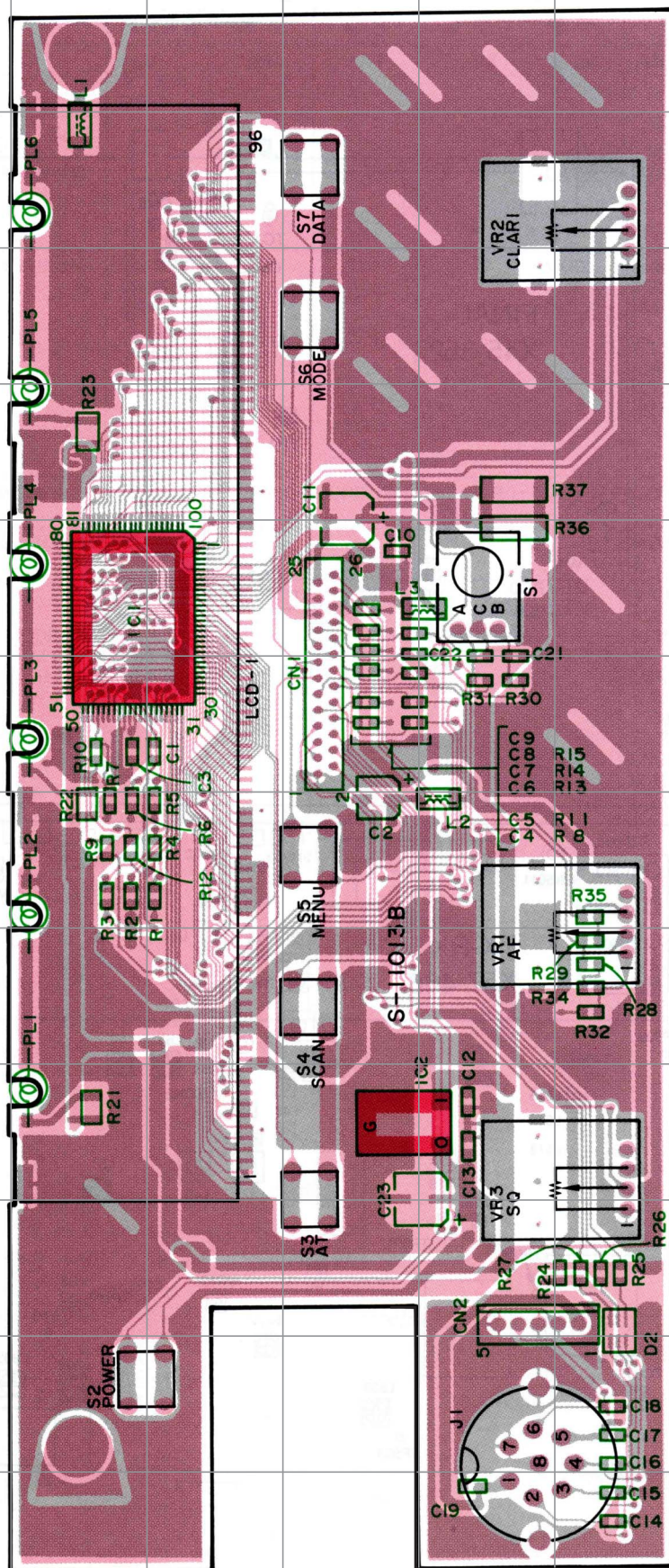
## LEVEL DIAGRAM

## Local Oscillator Section



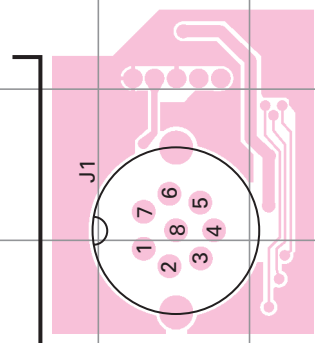
# TK-80 PC BOARD

LCD ASSY (B38-0739-15) Component side view



Component side  
Layer 1  
Layer 2  
Foil side

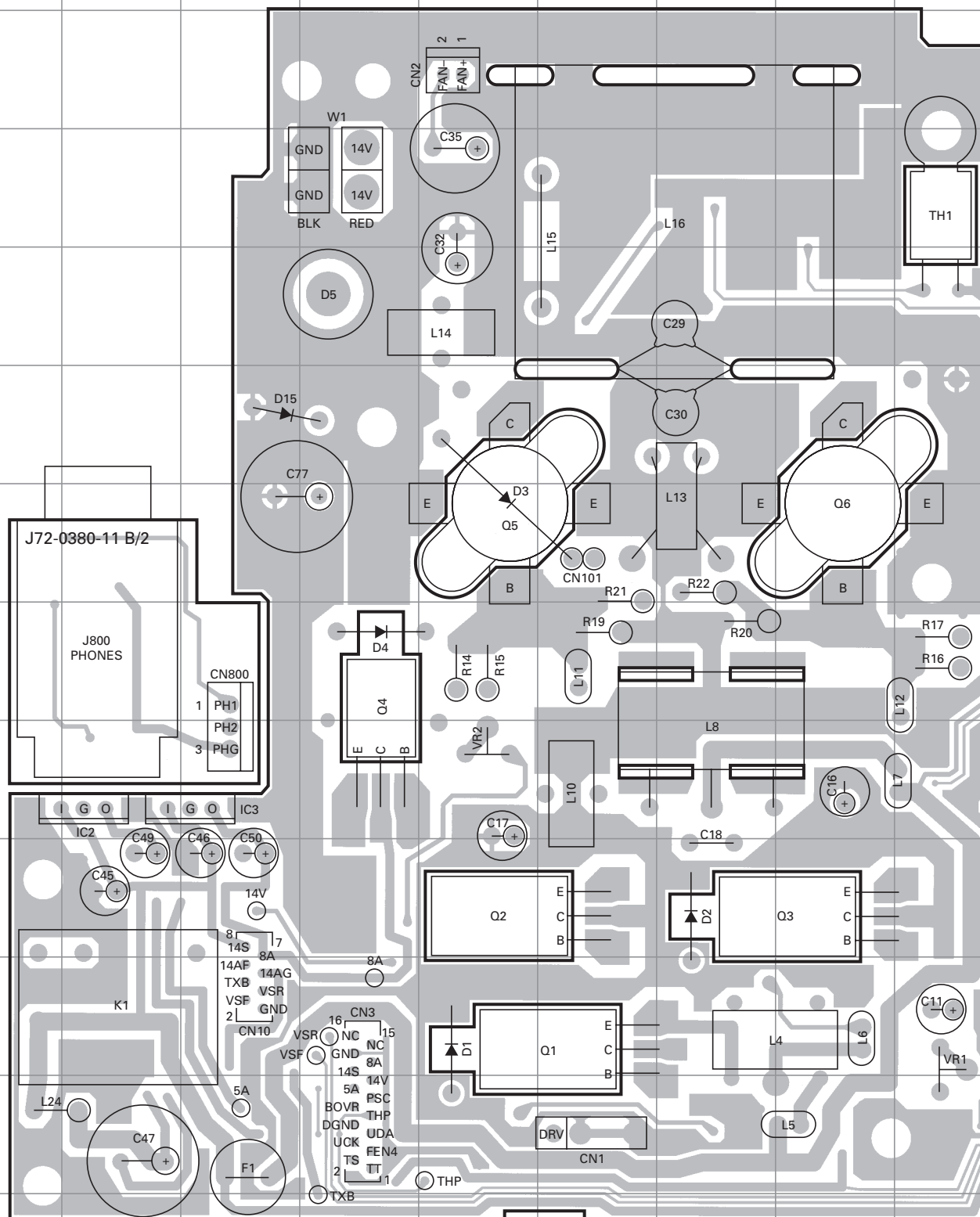
New PCB





# TK-80 PC BOARD

FINAL UNIT (X45-3520-21) Component side view (J72-0380-11)

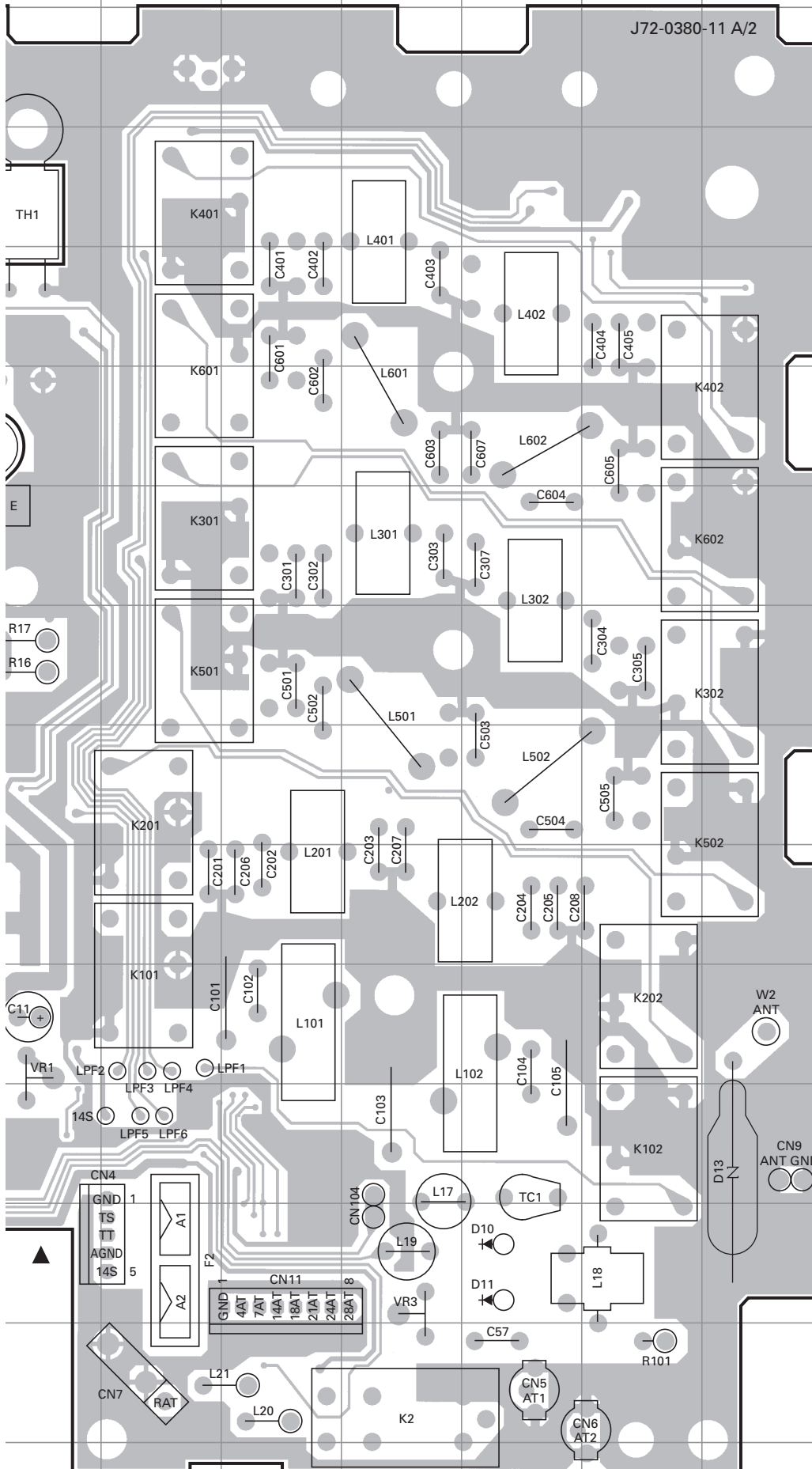


# PC BOARD TK-80

## FINAL UNIT (X45-3520-21) Component side view (J72-0380-11)

J72-0380-11 A/2

| Ref. No. | Address |
|----------|---------|
| IC2      | 8C      |
| IC3      | 8D      |
| Q1       | 0G      |
| Q2       | 9F      |
| Q3       | 9I      |
| Q4       | 7E      |
| Q5       | 6F      |
| Q6       | 6I      |
| D1       | 10F     |
| D2       | 9H      |
| D3       | 6F      |
| D4       | 7E      |
| D5       | 4E      |
| D10      | 12N     |
| D11      | 12N     |
| D13      | 11P     |
| D15      | 5D      |



Component side  
 Layer 1  
 Layer 2  
 Foil side

# TK-80 PC BOARD

FINAL UNIT (X45-3520-21) Component side view (J72-0380-11)

# PC BOARD TK-80

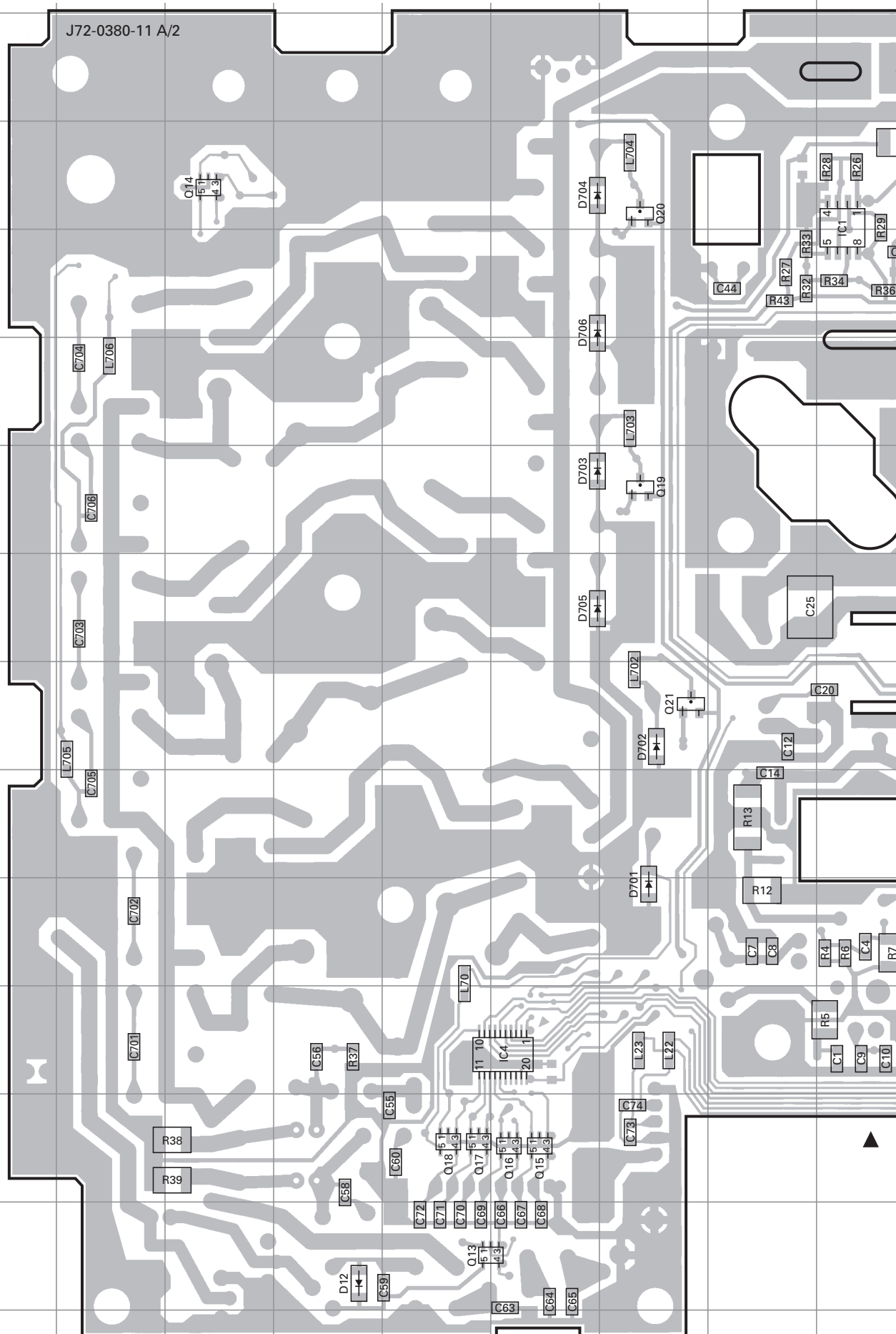
FINAL UNIT (X45-3520-21) Component side view (J72-0380-11)

| Ref. No. | Address |
|----------|---------|
| IC2      | 8C      |
| IC3      | 8D      |
| Q1       | 0G      |
| Q2       | 9F      |
| Q3       | 9I      |
| Q4       | 7E      |
| Q5       | 6F      |
| Q6       | 6I      |
| D1       | 10F     |
| D2       | 9H      |
| D3       | 6F      |
| D4       | 7E      |
| D5       | 4E      |
| D10      | 12N     |
| D11      | 12N     |
| D13      | 11P     |
| D15      | 5D      |

Component side  
Layer 1  
Layer 2  
Foil side

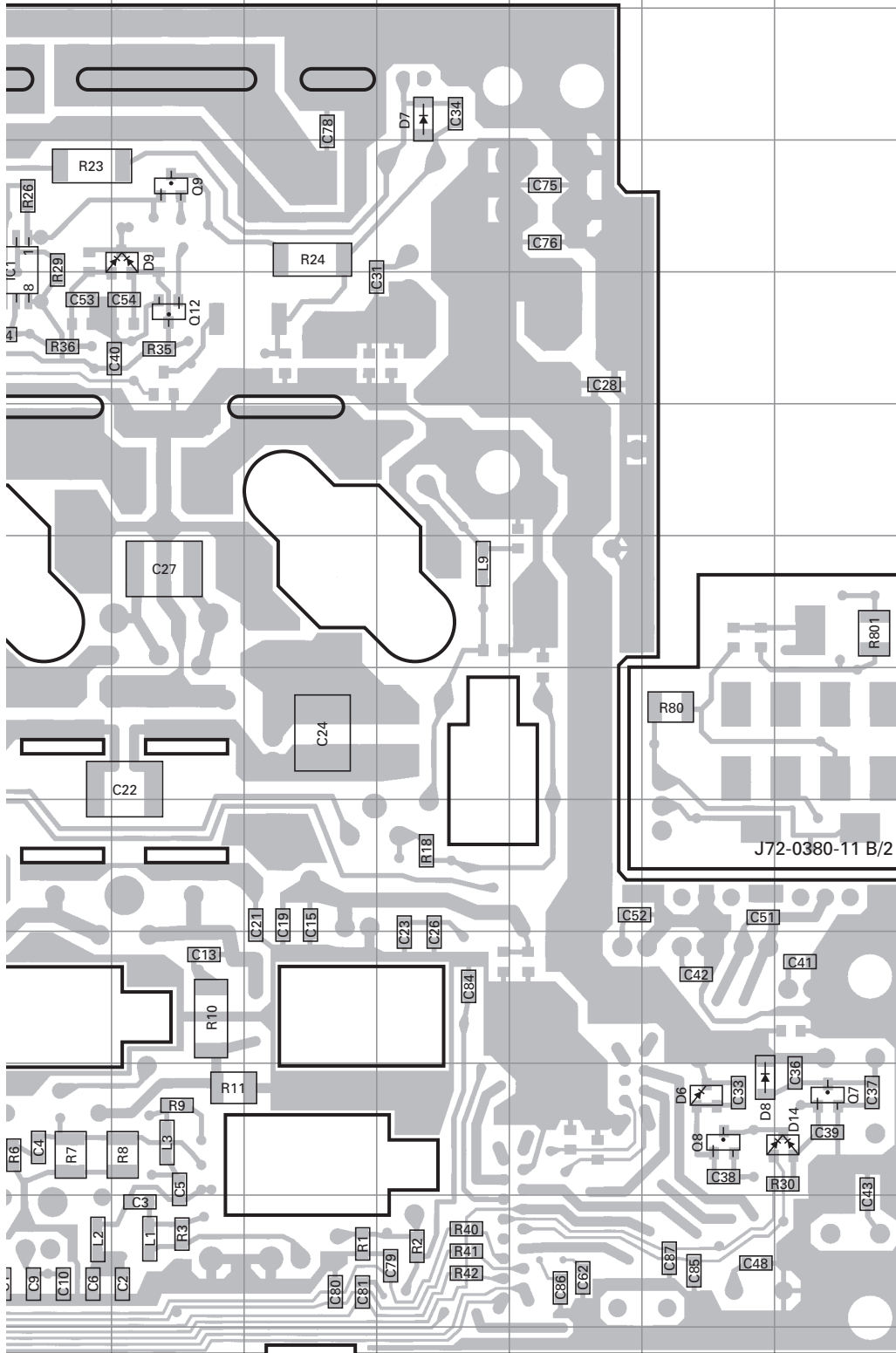
# TK-80 PC BOARD

FINAL UNIT (X45-3520-21) Foil side view (J72-0380-11)

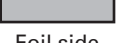


# PC BOARD TK-80

FINAL UNIT (X45-3520-21) Foil side view (J72-0380-11)



| Ref. No. | Address |
|----------|---------|
| IC1      | 3J      |
| IC4      | 11G     |
| Q7       | 10P     |
| Q8       | 10O     |
| Q9       | 3K      |
| Q12      | 4K      |
| Q13      | 13F     |
| Q14      | 3D      |
| Q15      | 12G     |
| Q16      | 12G     |
| Q17      | 12F     |
| Q18      | 12F     |
| Q19      | 6H      |
| Q20      | 3H      |
| Q21      | 8H      |
| D6       | 10O     |
| D7       | 2M      |
| D8       | 10O     |
| D9       | 3K      |
| D12      | 13E     |
| D14      | 10P     |
| D701     | 10H     |
| D702     | 8H      |
| D703     | 6G      |
| D704     | 3G      |
| D705     | 7G      |
| D706     | 4G      |

Component side  
 Layer 1   
 Layer 2   
 Foil side

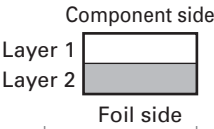
TK-80 PC BOARD

PC BOARD TK-80

FINAL UNIT (X45-3520-21) Foil side view (J72-0380-11)

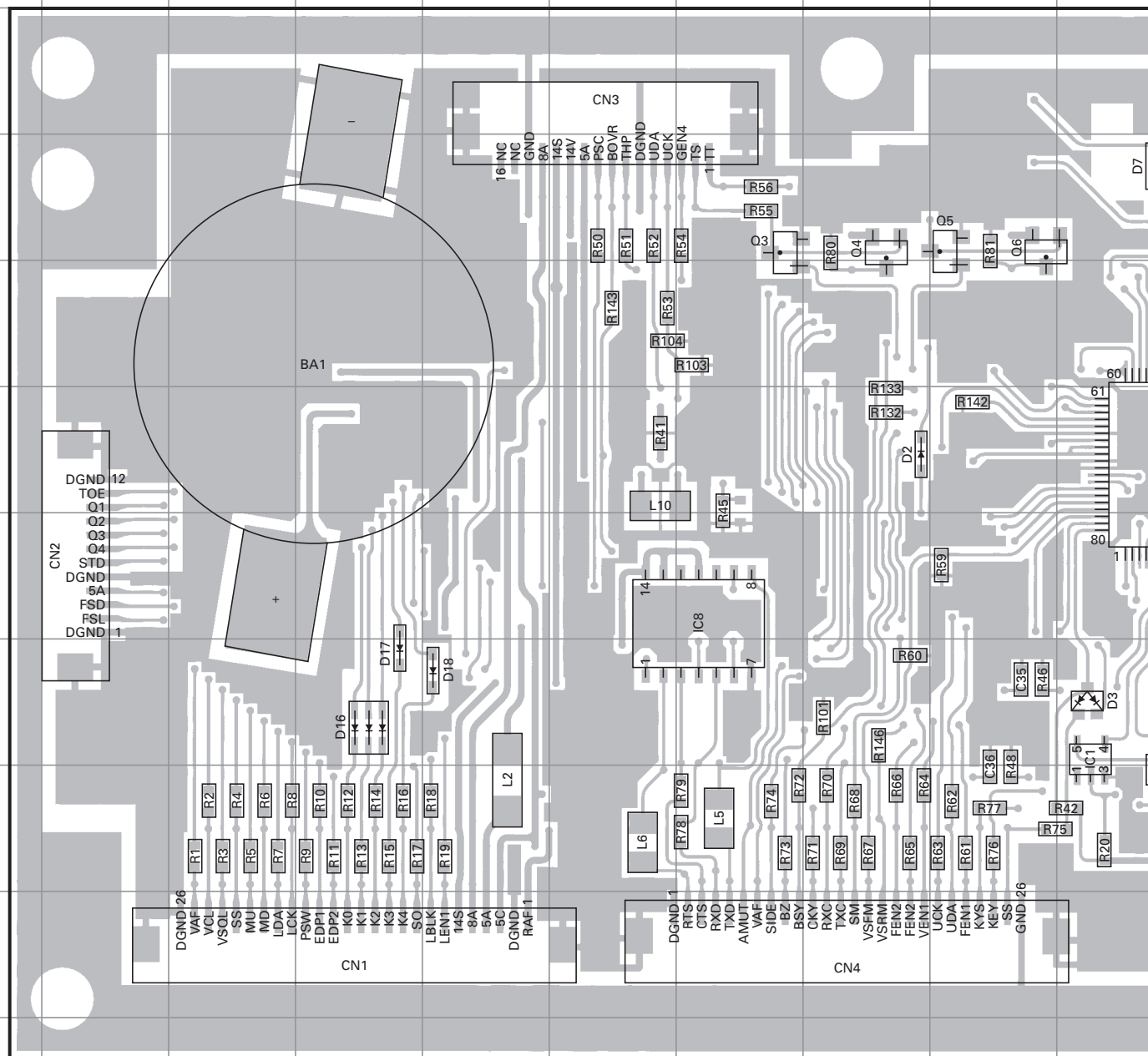
FINAL UNIT (X45-3520-21) Foil side view (J72-0380-11)

| Ref. No. | Address |
|----------|---------|
| IC1      | 3J      |
| IC4      | 11G     |
| Q7       | 10P     |
| Q8       | 10O     |
| Q9       | 3K      |
| Q12      | 4K      |
| Q13      | 13F     |
| Q14      | 3D      |
| Q15      | 12G     |
| Q16      | 12G     |
| Q17      | 12F     |
| Q18      | 12F     |
| Q20      | 3H      |
| Q21      | 8H      |
| D6       | 10O     |
| D7       | 2M      |
| D8       | 10O     |
| D9       | 3K      |
| D12      | 13E     |
| D14      | 10P     |
| D701     | 10H     |
| D702     | 8H      |
| D703     | 6G      |
| D704     | 3G      |
| D705     | 7G      |
| D706     | 4G      |



# TK-80 PC BOARD

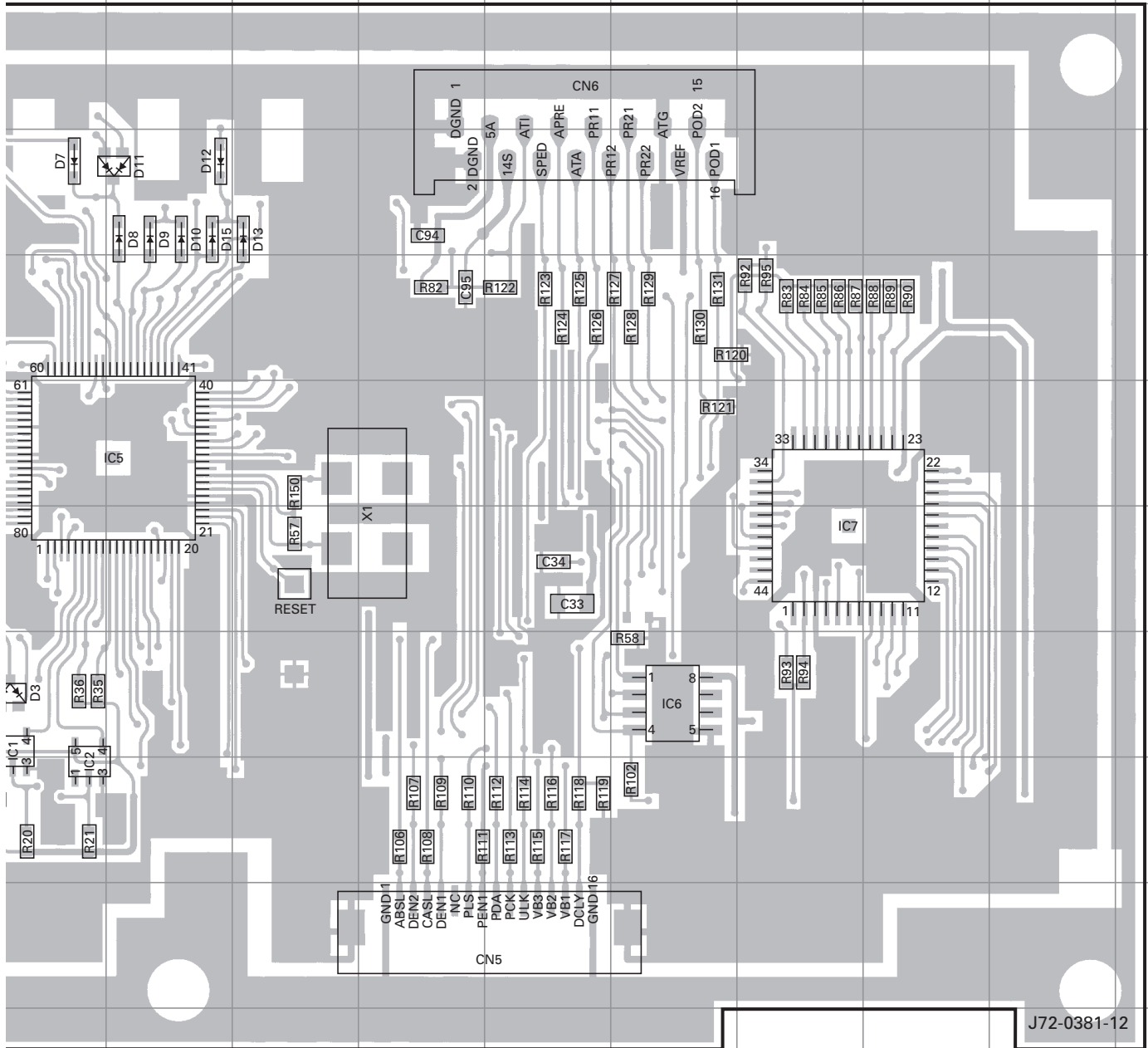
CONTROL UNIT (X53-3570-21) Component side view (J72-0381-12)



| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|
| IC1      | 8J      | Q5       | 4I      | D11      | 4K      |
| IC2      | 9J      | Q6       | 4I      | D12      | 4K      |
| IC5      | 6K      | D2       | 6H      | D13      | 4L      |
| IC6      | 8O      | D3       | 8J      | D15      | 4K      |
| IC7      | 7P      | D7       | 4J      | D16      | 8D      |
| IC8      | 7G      | D8       | 4K      | D17      | 8D      |
| Q3       | 4G      | D9       | 4K      | D18      | 8E      |
| Q4       | 4H      | D10      | 4K      |          |         |

# PC BOARD TK-80

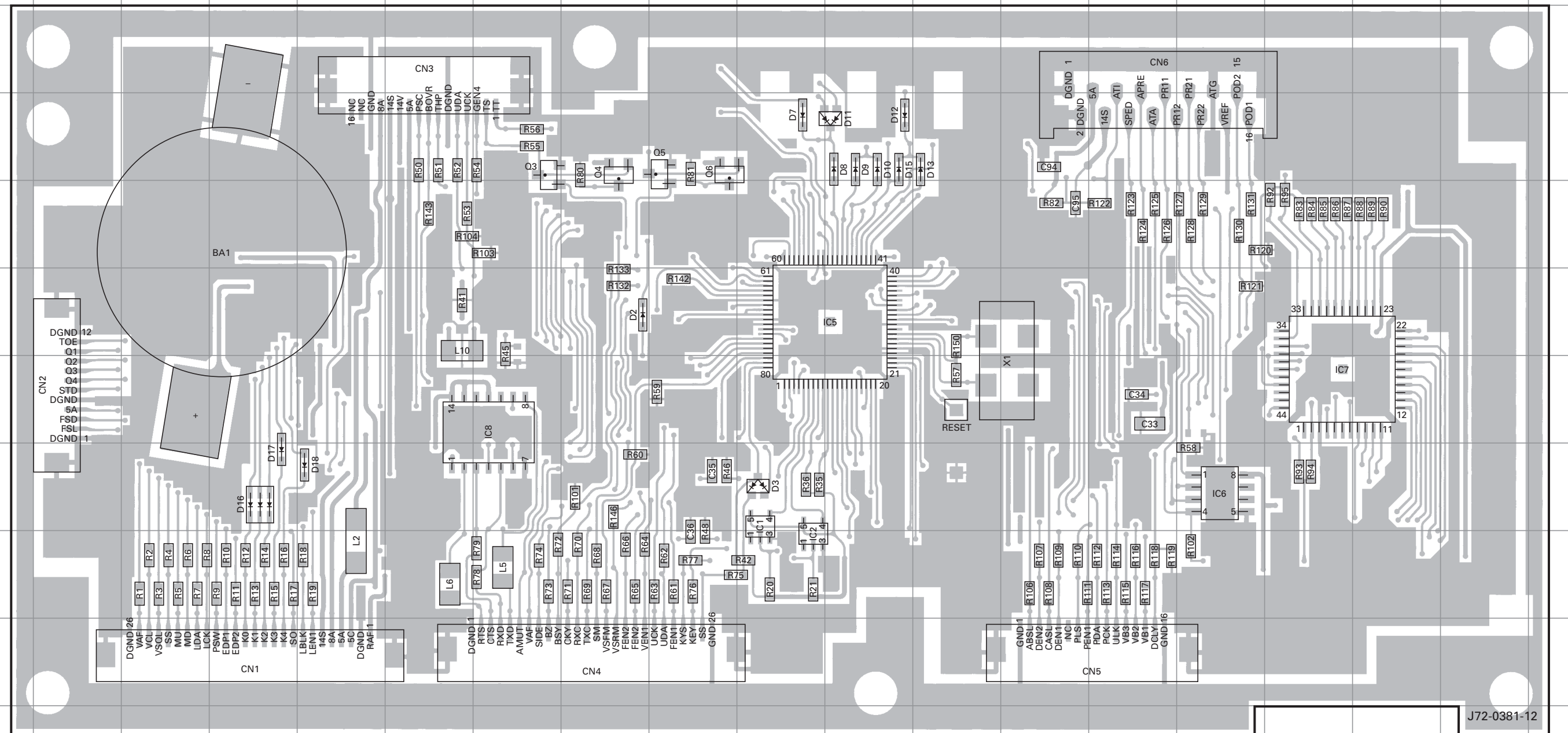
CONTROL UNIT (X53-3570-21) Component side view (J72-0381-12)



Component side  
Layer 1  
Layer 2  
Foil side

CONTROL UNIT (X53-3570-21) Component side view (J72-0381-12)

CONTROL UNIT (X53-3570-21) Component side view (J72-0381-12)

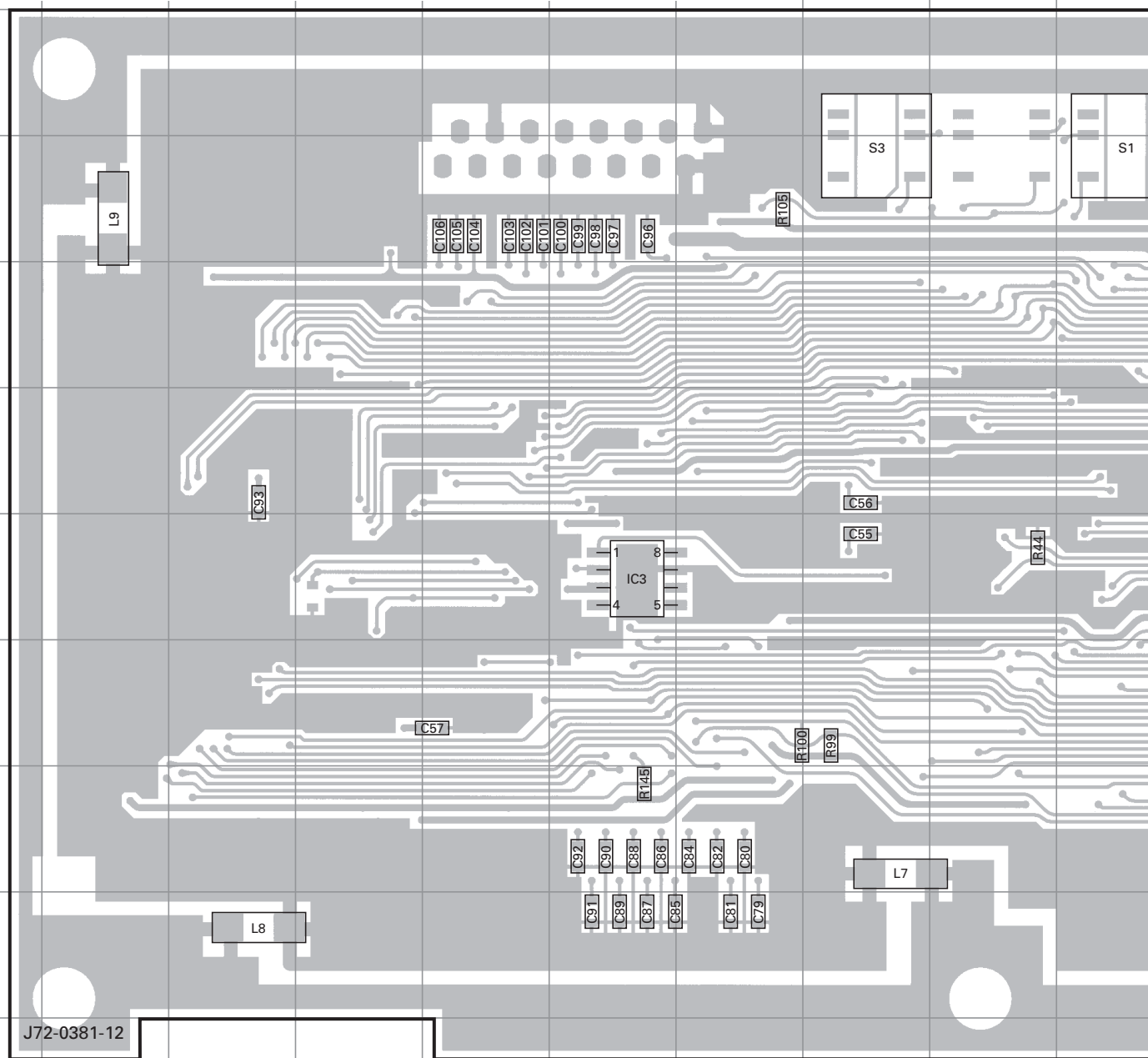


| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|
| IC1      | 8J      | Q5       | 4I      | D11      | 4K      |
| IC2      | 9J      | Q6       | 4I      | D12      | 4K      |
| IC5      | 6K      | D2       | 6H      | D13      | 4L      |
| IC6      | 8O      | D3       | 8J      | D15      | 4K      |
| IC7      | 7P      | D7       | 4J      | D16      | 8D      |
| IC8      | 7G      | D8       | 4K      | D17      | 8D      |
| Q3       | 4G      | D9       | 4K      | D18      | 8E      |
| Q4       | 4H      | D10      | 4K      |          |         |

Component side  
Layer 1  
Layer 2  
Foil side

# TK-80 PC BOARD

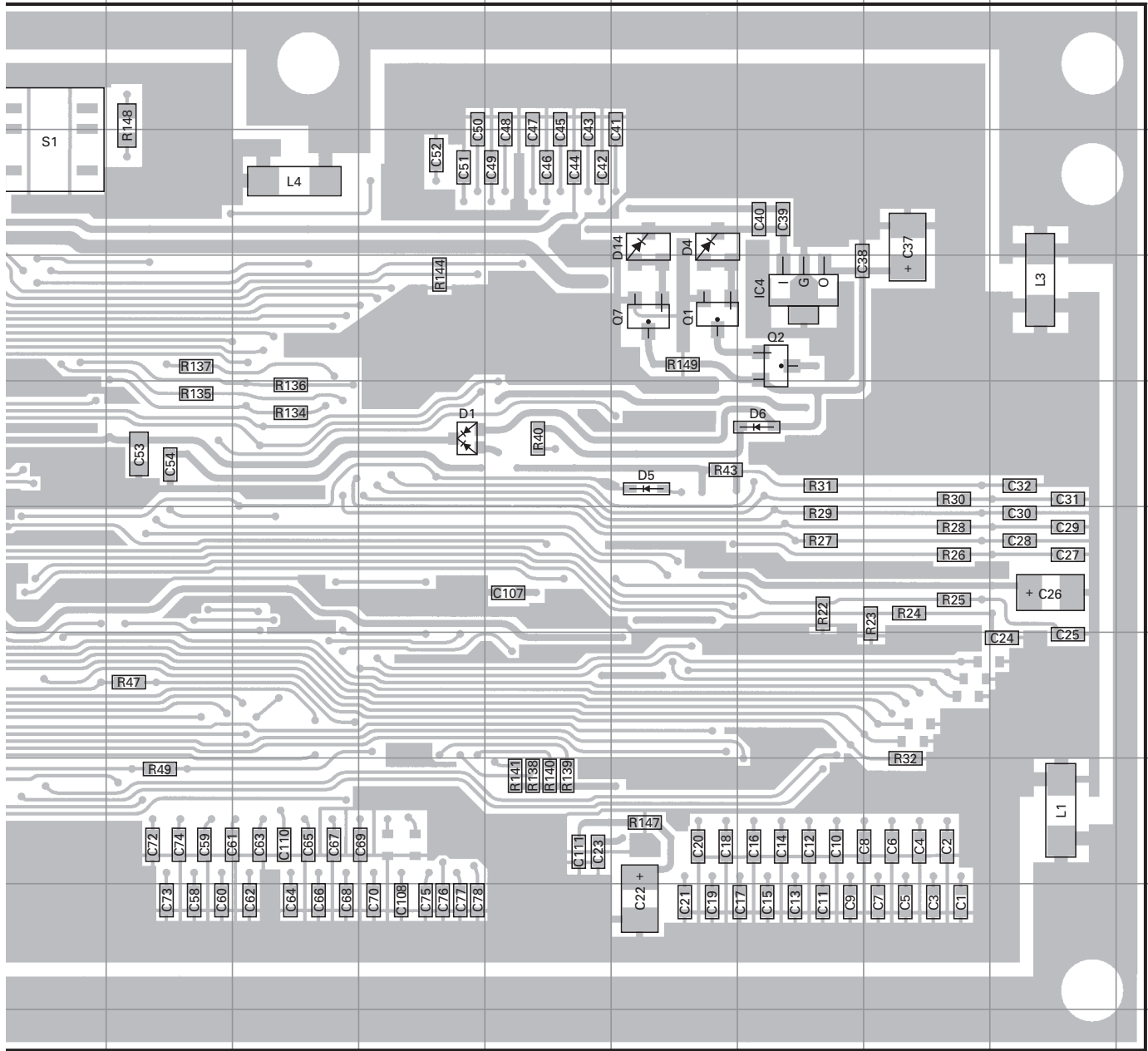
CONTROL UNIT (X53-3570-21) Foil side view (J72-0381-12)



| Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|
| IC3      | 7F      | D1       | 6M      |
| IC4      | 5P      | D4       | 4O      |
| Q1       | 5O      | D5       | 6O      |
| Q2       | 5P      | D6       | 6P      |
| Q7       | 5O      | D14      | 4O      |

# PC BOARD TK-80

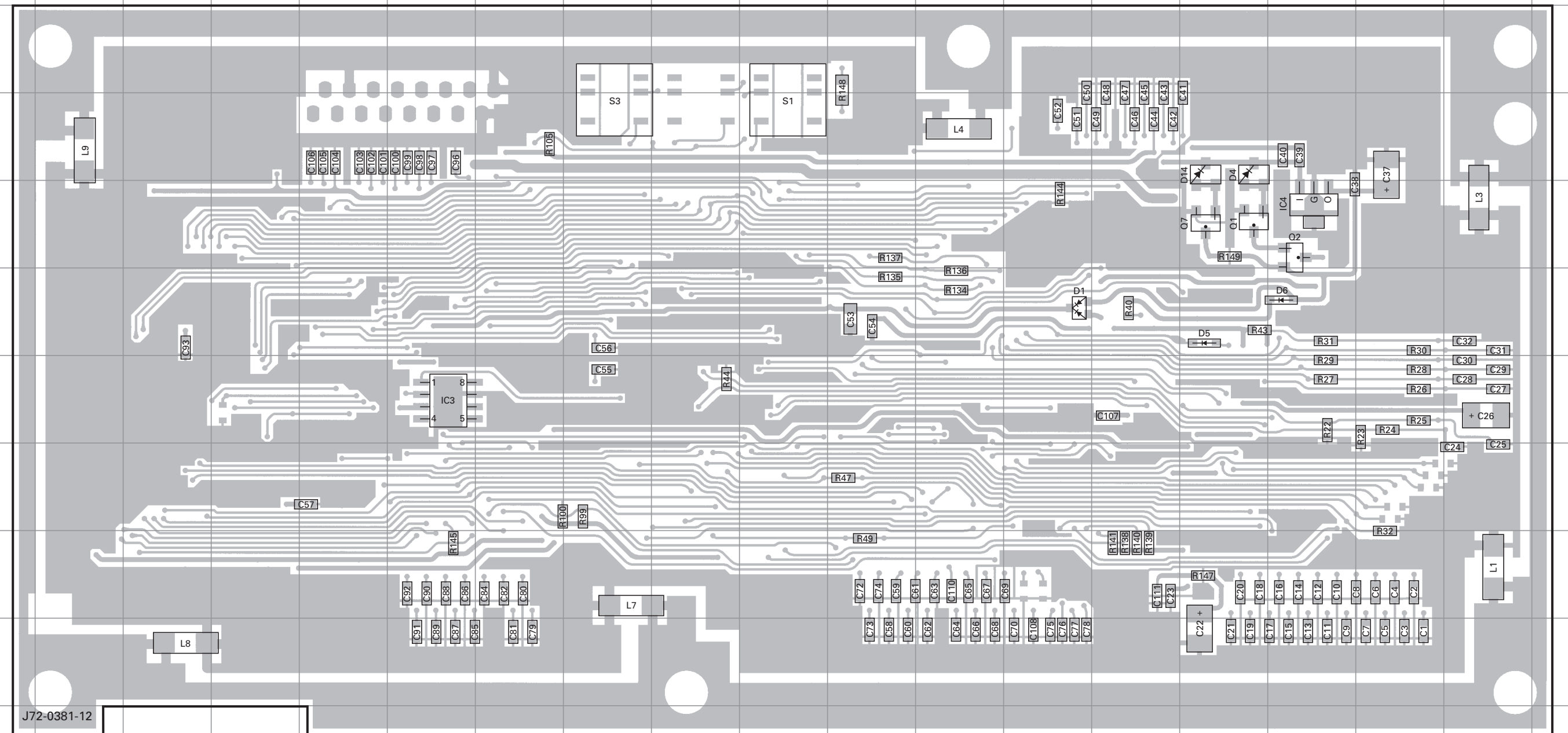
CONTROL UNIT (X53-3570-21) Foil side view (J72-0381-12)



Component side  
 Layer 1   
 Layer 2   
 Foil side

CONTROL UNIT (X53-3570-21) Foil side view (J72-0381-12)

CONTROL UNIT (X53-3570-21) Foil side view (J72-0381-12)



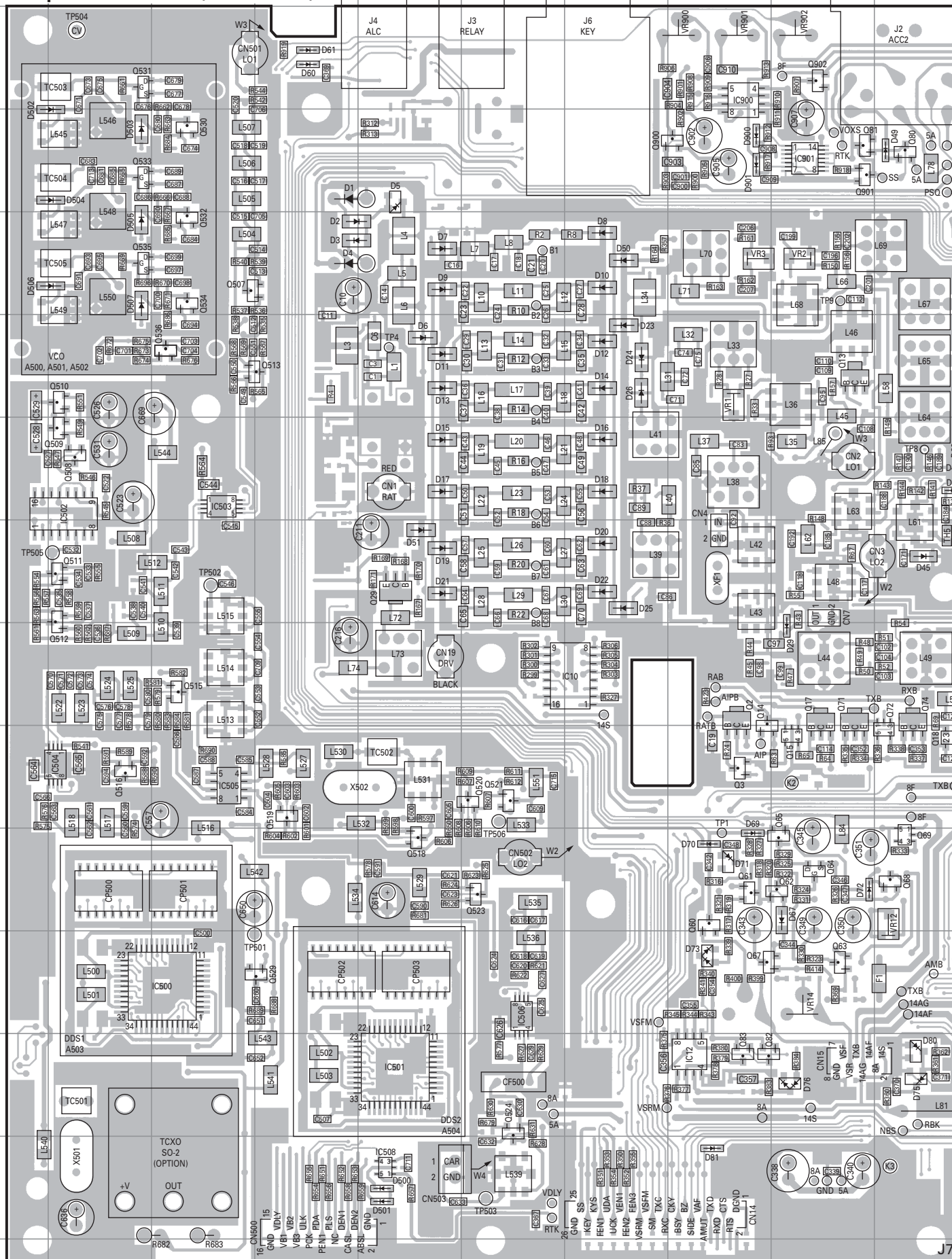
| Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|
| IC3      | 7F      | D1       | 6M      |
| IC4      | 5P      | D4       | 4O      |
| Q1       | 5O      | D5       | 6O      |
| Q2       | 5P      | D6       | 6P      |
| Q7       | 5O      | D14      | 4O      |

Component side  
Layer 1  
Layer 2  
Foil side

# TK-80 PC BOARD

TX-RX UNIT (X57-4660-21)

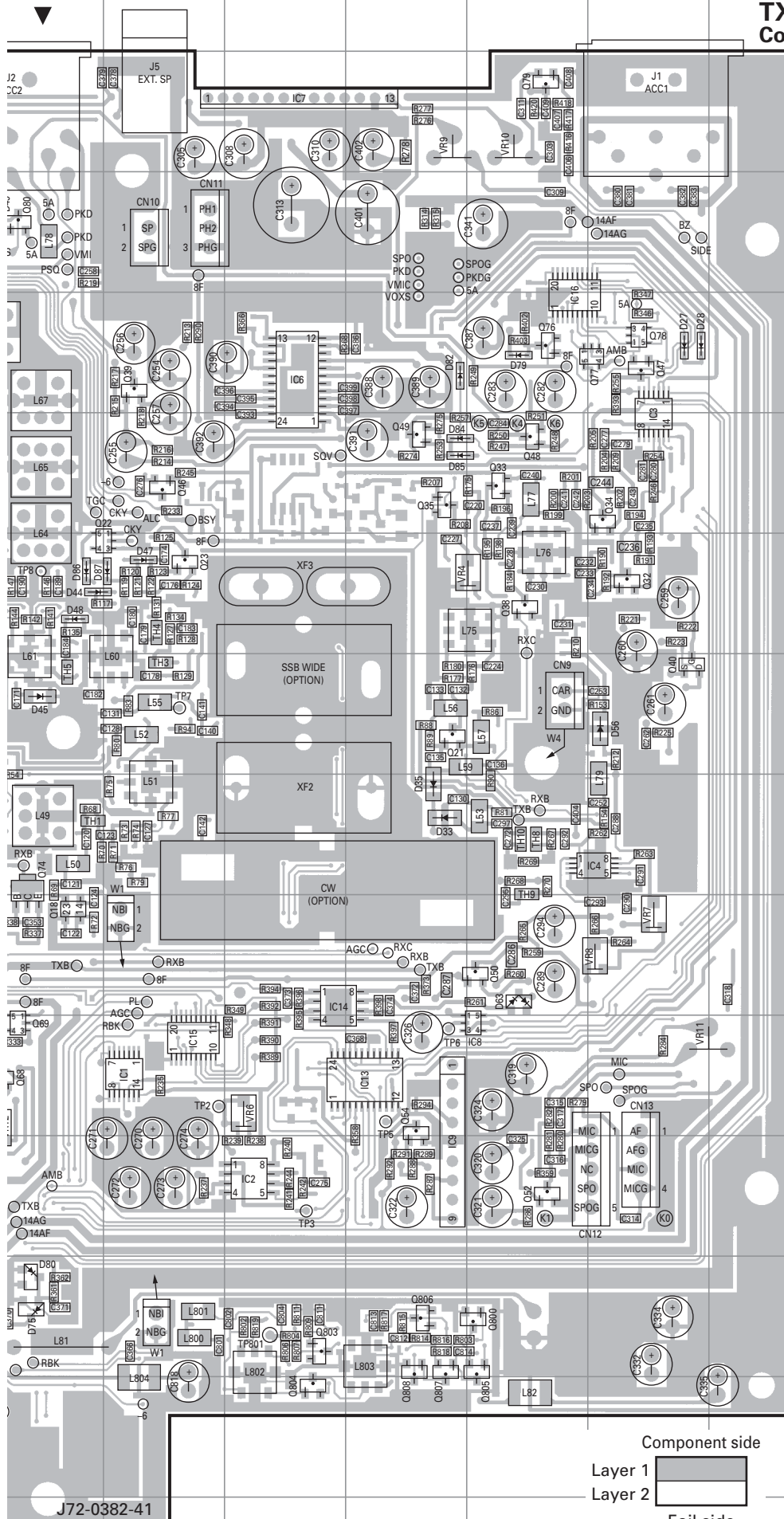
Component side view (J72-0382-41)



# PC BOARD TK-80

## TX-RX UNIT (X57-4660-21)

### Component side view (J72-0382-41)



| Ref. No. | Address | Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|----------|---------|
| IC1      | 10K     | Q69      | 10J     | D13      | 5E      |
| IC2      | 11L     | Q71      | 8I      | D14      | 5G      |
| IC3      | 50      | Q72      | 9J      | D15      | 6E      |
| IC4      | 80      | Q74      | 8J      | D16      | 6G      |
| IC6      | 4L      | Q76      | 4N      | D17      | 6E      |
| IC7      | 2L      | Q77      | 4O      | D18      | 6G      |
| IC8      | 10N     | Q78      | 4O      | D19      | 7E      |
| IC9      | 11M     | Q79      | 2N      | D20      | 7G      |
| IC10     | 8G      | Q80      | 3J      | D21      | 7E      |
| IC12     | 12H     | Q81      | 3I      | D22      | 7G      |
| IC13     | 10M     | Q82      | 12H     | D23      | 5G      |
| IC14     | 9L      | Q83      | 12H     | D24      | 5G      |
| IC15     | 10K     | Q507     | 4C      | D25      | 7G      |
| IC16     | 4N      | Q508     | 6B      | D26      | 5G      |
| IC500    | 11C     | Q509     | 6B      | D27      | 4O      |
| IC501    | 12E     | Q510     | 5B      | D28      | 4O      |
| IC502    | 6B      | Q511     | 7B      | D29      | 8I      |
| IC503    | 6C      | Q512     | 8B      | D33      | 8M      |
| IC504    | 9B      | Q513     | 5D      | D35      | 8M      |
| IC505    | 9C      | Q515     | 8C      | D44      | 6J      |
| IC506    | 11F     | Q516     | 9B      | D45      | 7J      |
| IC508    | 13E     | Q518     | 10E     | D47      | 6K      |
| IC900    | 2H      | Q519     | 9D      | D48      | 6J      |
| IC901    | 3I      | Q520     | 9F      | D49      | 3J      |
| Q2       | 8H      | Q521     | 9F      | D50      | 4G      |
| Q3       | 9H      | Q523     | 10F     | D51      | 7E      |
| Q13      | 5I      | Q524     | 12F     | D56      | 7O      |
| Q14      | 9H      | Q529     | 11D     | D60      | 2D      |
| Q15      | 9I      | Q530     | 3C      | D61      | 2D      |
| Q17      | 8I      | Q531     | 2B      | D63      | 9N      |
| Q18      | 9J      | Q532     | 4C      | D67      | 10I     |
| Q21      | 7M      | Q533     | 3B      | D69      | 10H     |
| Q22      | 6K      | Q534     | 4C      | D70      | 10H     |
| Q23      | 6K      | Q535     | 4B      | D71      | 10H     |
| Q29      | 7E      | Q536     | 5C      | D72      | 10I     |
| Q32      | 6O      | Q800     | 12N     | D73      | 11H     |
| Q33      | 5N      | Q803     | 12L     | D75      | 12J     |
| Q34      | 5O      | Q804     | 13L     | D76      | 12I     |
| Q35      | 5M      | Q805     | 12N     | D79      | 4N      |
| Q38      | 6N      | Q806     | 12M     | D80      | 12J     |
| Q39      | 4K      | Q807     | 12M     | D81      | 13H     |
| Q40      | 7O      | Q808     | 12M     | D82      | 4M      |
| Q46      | 5K      | Q900     | 3H      | D84      | 5M      |
| Q47      | 4O      | Q901     | 3I      | D85      | 5M      |
| Q48      | 5N      | Q902     | 2I      | D86      | 6J      |
| Q49      | 5M      | D1       | 3D      | D87      | 6K      |
| Q50      | 9N      | D2       | 4D      | D500     | 13E     |
| Q52      | 11N     | D3       | 4D      | D501     | 13E     |
| Q54      | 10M     | D4       | 4D      | D502     | 3B      |
| Q60      | 10H     | D5       | 3E      | D503     | 3B      |
| Q61      | 10H     | D6       | 5E      | D504     | 3B      |
| Q62      | 10I     | D7       | 4E      | D505     | 4B      |
| Q63      | 11I     | D8       | 4G      | D506     | 4B      |
| Q64      | 10I     | D9       | 4E      | D507     | 4B      |
| Q65      | 10I     | D10      | 4G      | D900     | 3H      |
| Q67      | 11H     | D11      | 5E      | D901     | 3H      |
| Q68      | 10J     | D12      | 5G      |          |         |

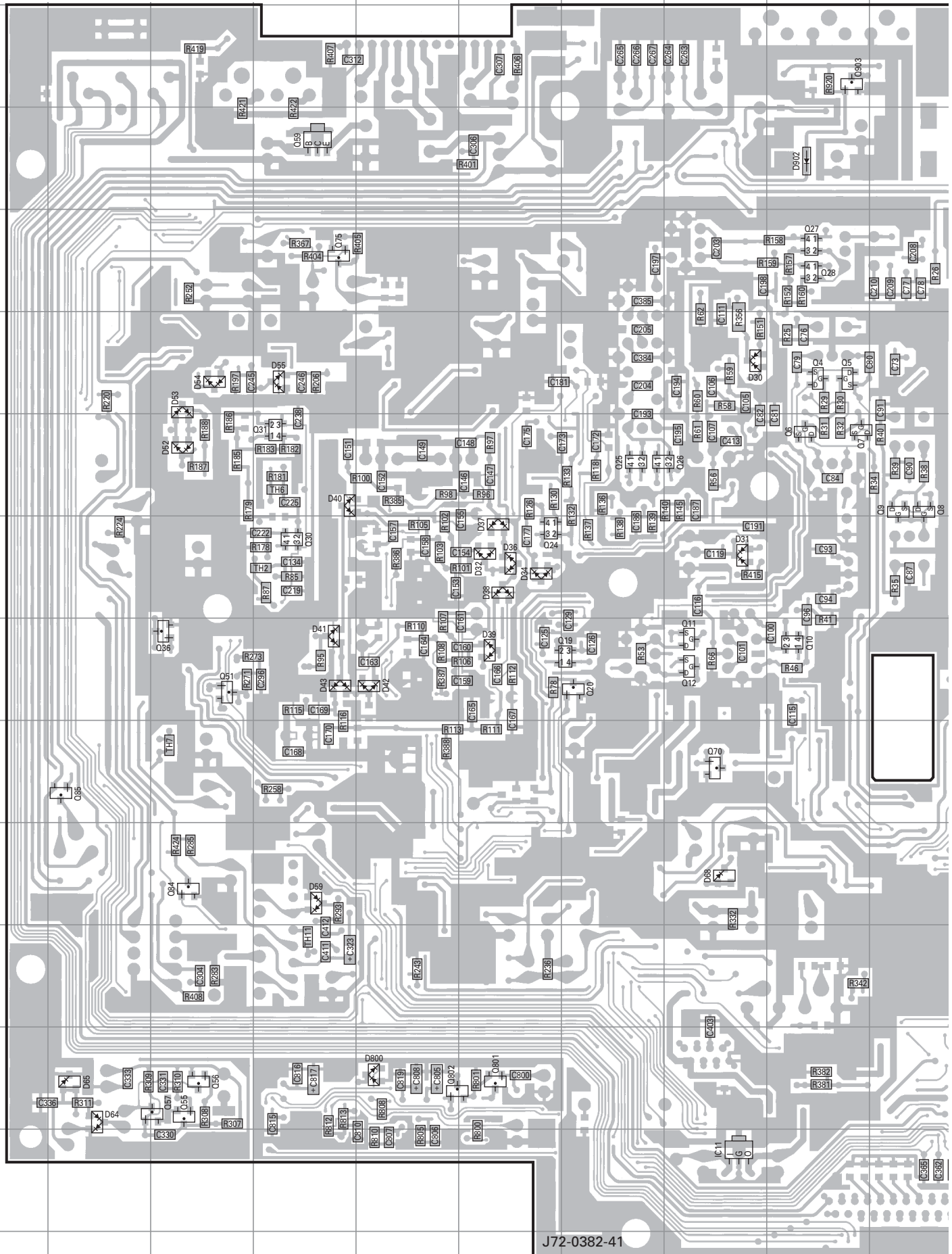
Component side  
 Layer 1  
 Layer 2  
 Foil side



# TK-80 PC BOARD

TX-RX UNIT (X57-4660-21)

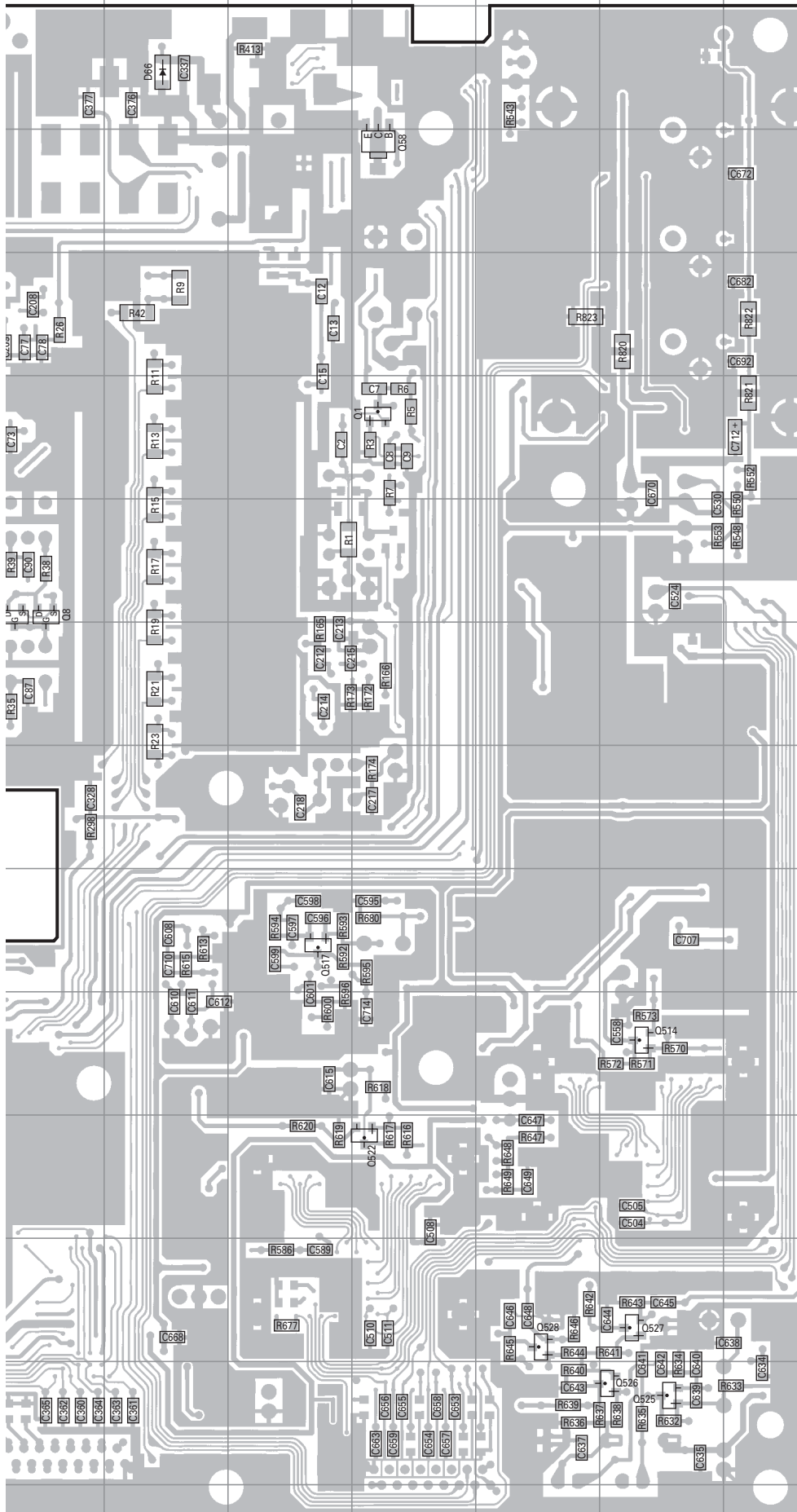
Foil side view (J72-0382-41)



# PC BOARD TK-80

TX-RX UNIT (X57-4660-21)

Foil side view (J72-0382-41)



| Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|
| IC11     | 13H     | Q517     | 9L      |
| Q1       | 5M      | Q522     | 11M     |
| Q4       | 5I      | Q525     | 13O     |
| Q5       | 5I      | Q526     | 13O     |
| Q6       | 6I      | Q527     | 12O     |
| Q7       | 6I      | Q528     | 12N     |
| Q8       | 6J      | Q801     | 12F     |
| Q9       | 6J      | Q802     | 12E     |
| Q10      | 8I      | Q903     | 2I      |
| Q11      | 8H      | D30      | 5H      |
| Q12      | 8H      | D31      | 7H      |
| Q19      | 8G      | D32      | 7F      |
| Q20      | 8G      | D34      | 7F      |
| Q24      | 7F      | D36      | 7F      |
| Q25      | 5G      | D37      | 7F      |
| Q26      | 6H      | D38      | 7F      |
| Q27      | 4I      | D39      | 8F      |
| Q28      | 4I      | D40      | 6D      |
| Q30      | 7D      | D41      | 8D      |
| Q31      | 6D      | D42      | 8E      |
| Q36      | 8C      | D43      | 8D      |
| Q51      | 8C      | D52      | 6C      |
| Q55      | 12C     | D53      | 5C      |
| Q56      | 12C     | D54      | 5C      |
| Q57      | 12C     | D55      | 5D      |
| Q58      | 3M      | D59      | 10D     |
| Q59      | 3D      | D64      | 12B     |
| Q70      | 9H      | D65      | 12B     |
| Q75      | 4D      | D66      | 2K      |
| Q84      | 10C     | D68      | 10H     |
| Q85      | 9B      | D800     | 12E     |
| Q514     | 10O     | D902     | 3I      |

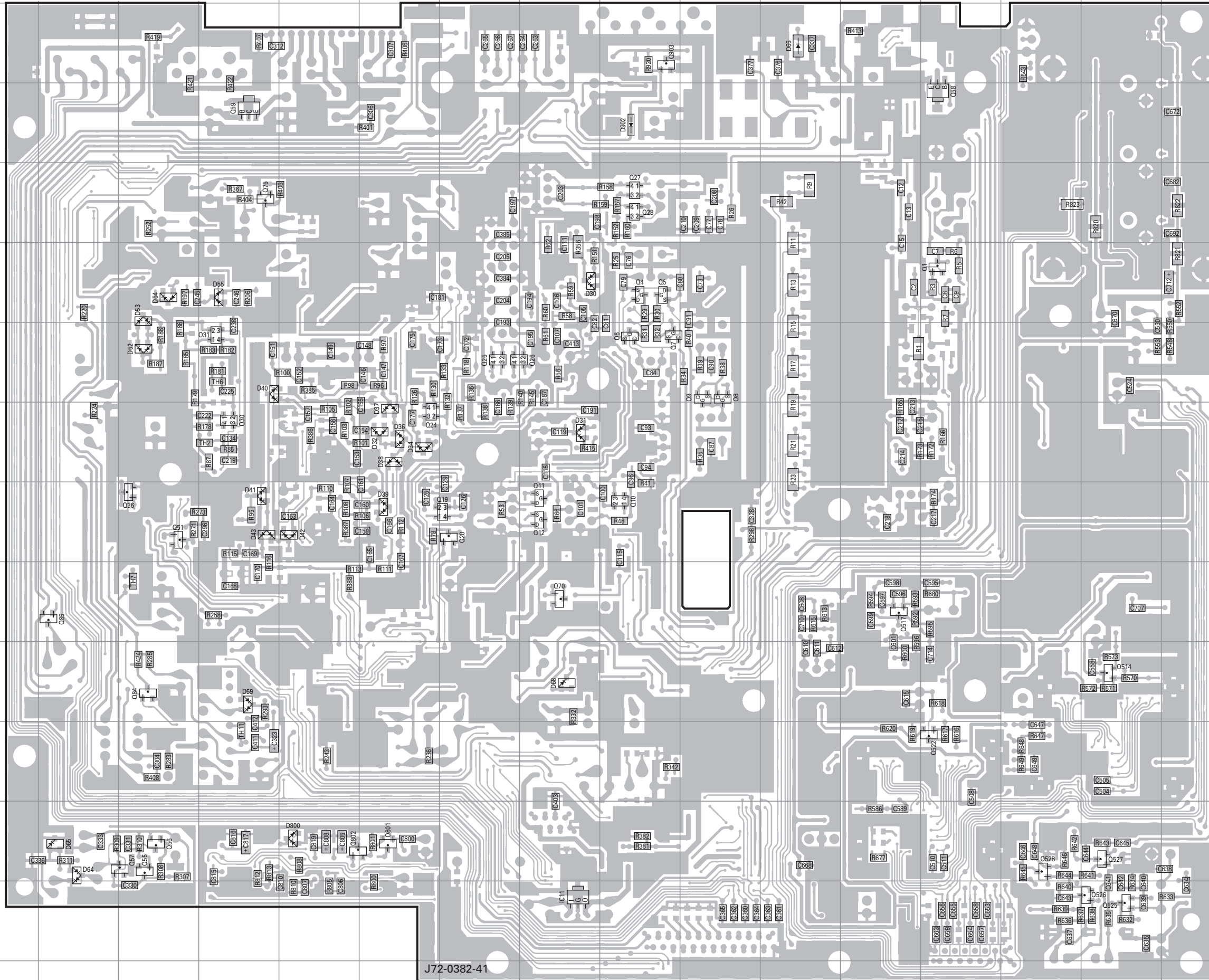
Component side  
Layer 1  
Layer 2  
Foil side

# TK-80 PC BOARD

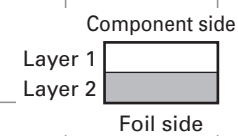
TX-RX UNIT (X57-4660-21)  
Foil side view (J72-0382-41)

# PC BOARD TK-80

TX-RX UNIT (X57-4660-21)  
Foil side view (J72-0382-41)

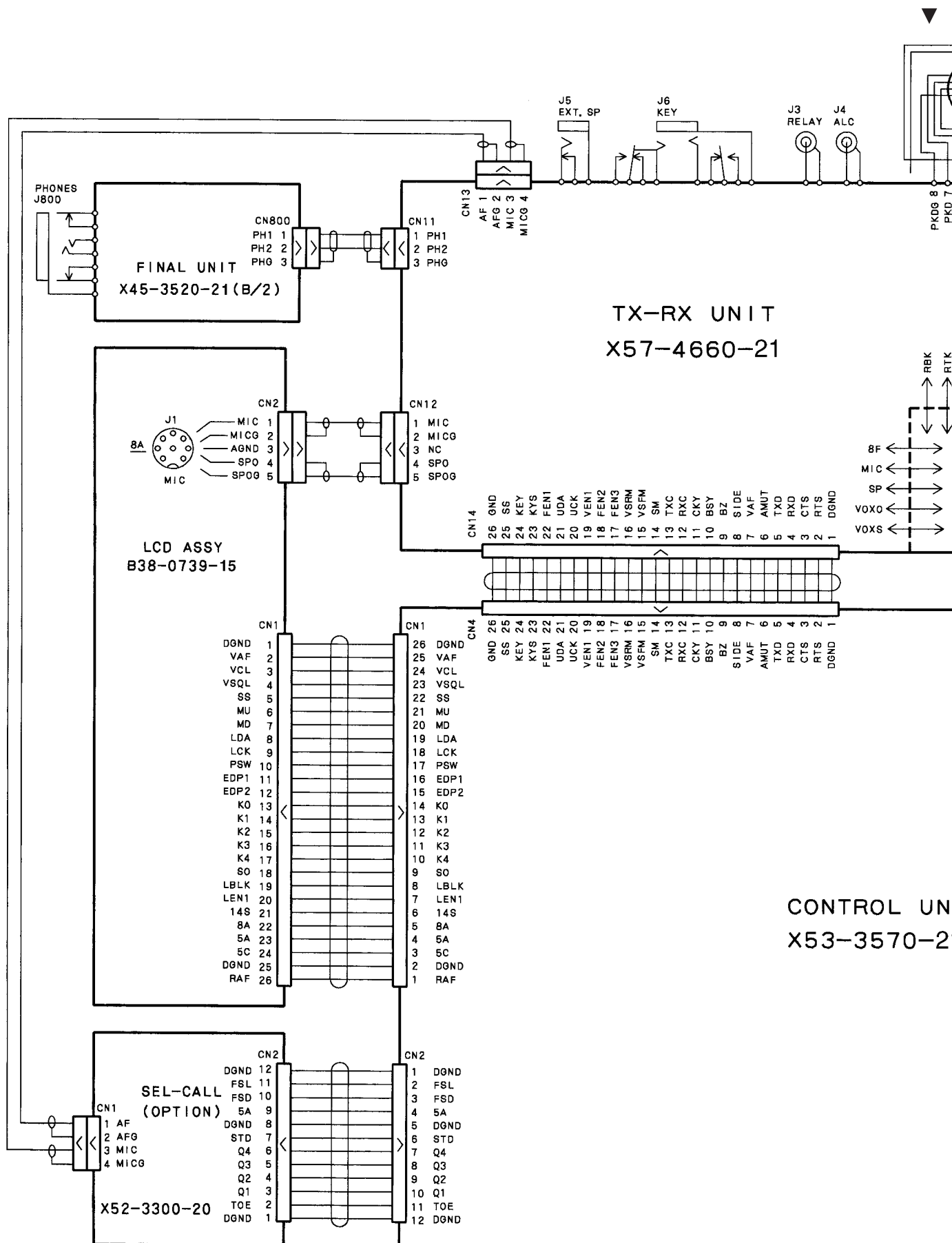


| Ref. No. | Address | Ref. No. | Address |
|----------|---------|----------|---------|
| IC11     | 13H     | Q517     | 9L      |
| Q1       | 5M      | Q522     | 11M     |
| Q4       | 5I      | Q525     | 13O     |
| Q5       | 5I      | Q526     | 13O     |
| Q6       | 6I      | Q527     | 12O     |
| Q7       | 6I      | Q528     | 12N     |
| Q8       | 6J      | Q801     | 12F     |
| Q9       | 6J      | Q802     | 12E     |
| Q10      | 8I      | Q903     | 2I      |
| Q11      | 8H      | D30      | 5H      |
| Q12      | 8H      | D31      | 7H      |
| Q19      | 8G      | D32      | 7F      |
| Q20      | 8G      | D34      | 7F      |
| Q24      | 7F      | D36      | 7F      |
| Q25      | 5G      | D37      | 7F      |
| Q26      | 6H      | D38      | 7F      |
| Q27      | 4I      | D39      | 8F      |
| Q28      | 4I      | D40      | 6D      |
| Q30      | 7D      | D41      | 8D      |
| Q31      | 6D      | D42      | 8E      |
| Q36      | 8C      | D43      | 8D      |
| Q51      | 8C      | D52      | 6C      |
| Q55      | 12C     | D53      | 5C      |
| Q56      | 12C     | D54      | 5C      |
| Q57      | 12C     | D55      | 5D      |
| Q58      | 3M      | D59      | 10D     |
| Q59      | 3D      | D64      | 12B     |
| Q70      | 9H      | D65      | 12B     |
| Q75      | 4D      | D66      | 2K      |
| Q84      | 10C     | D68      | 10H     |
| Q85      | 9B      | D800     | 12E     |
| Q514     | 10O     | D902     | 3I      |

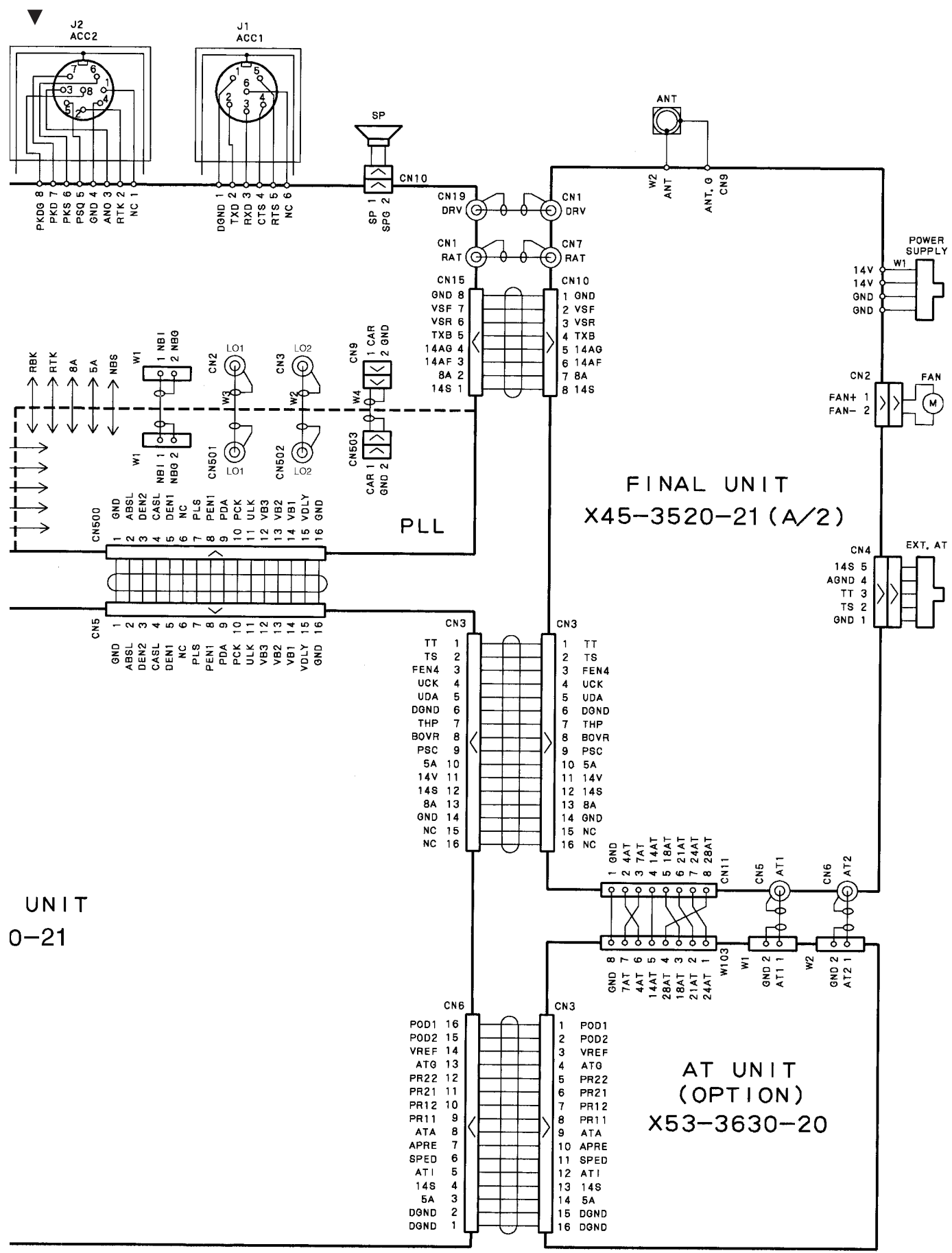


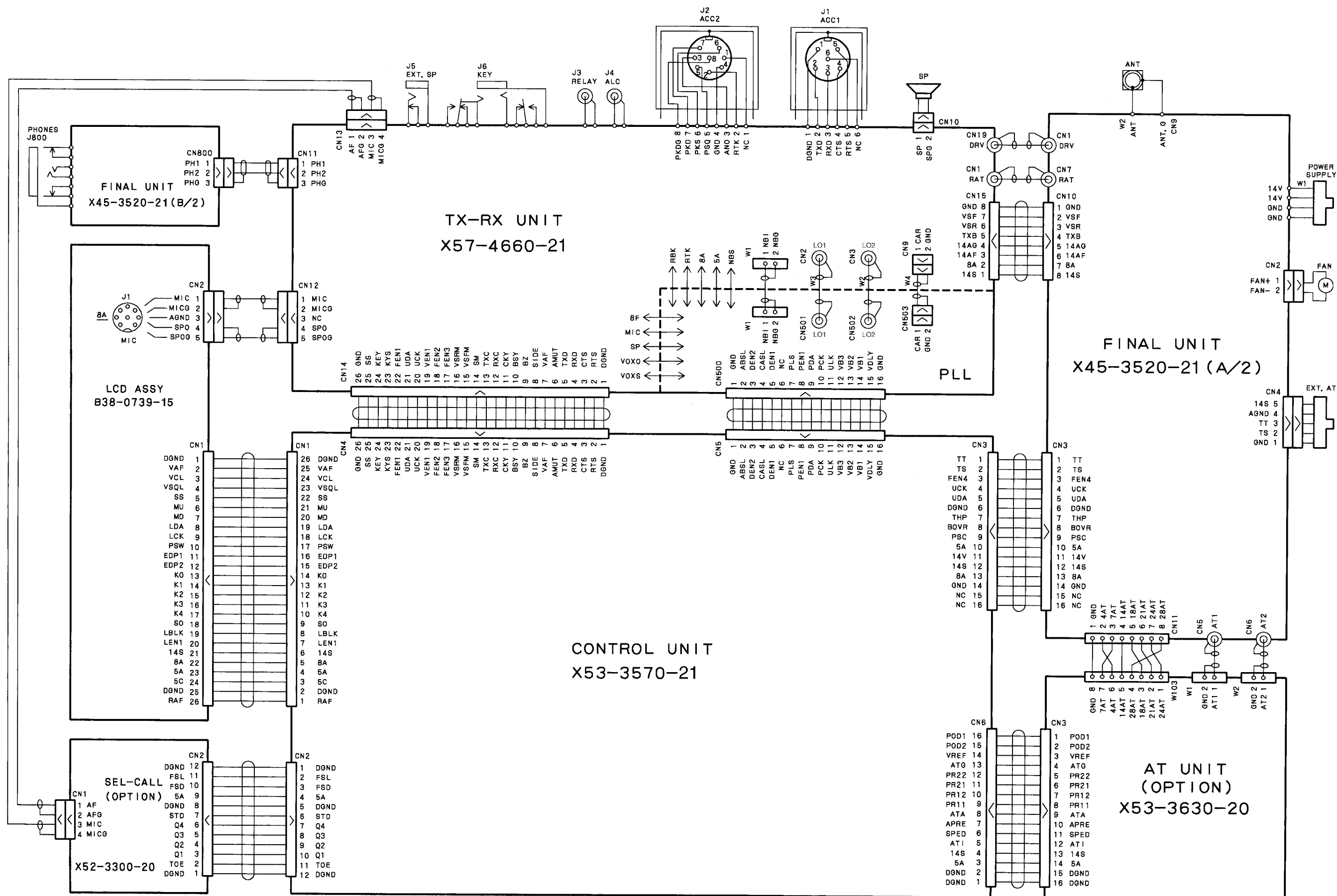
J72-0382-41

## INTERCONNECTION DIAGRAM



## INTERCONNECTION DIAGRAM





A

B

C

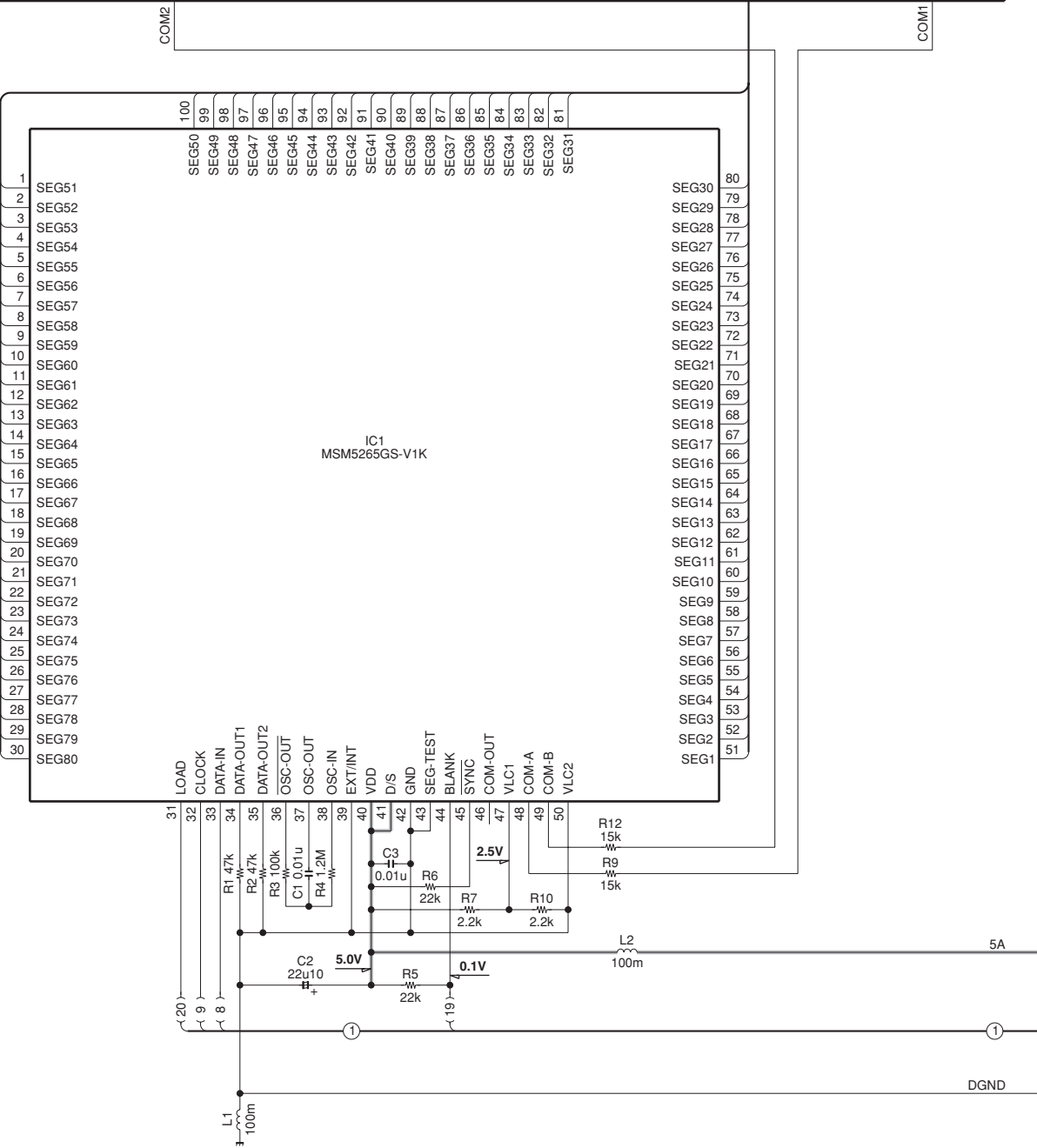
D

E

# TK-80 SCHEMATIC DIAGRAM

LCD ASSY (B38-0739-15)

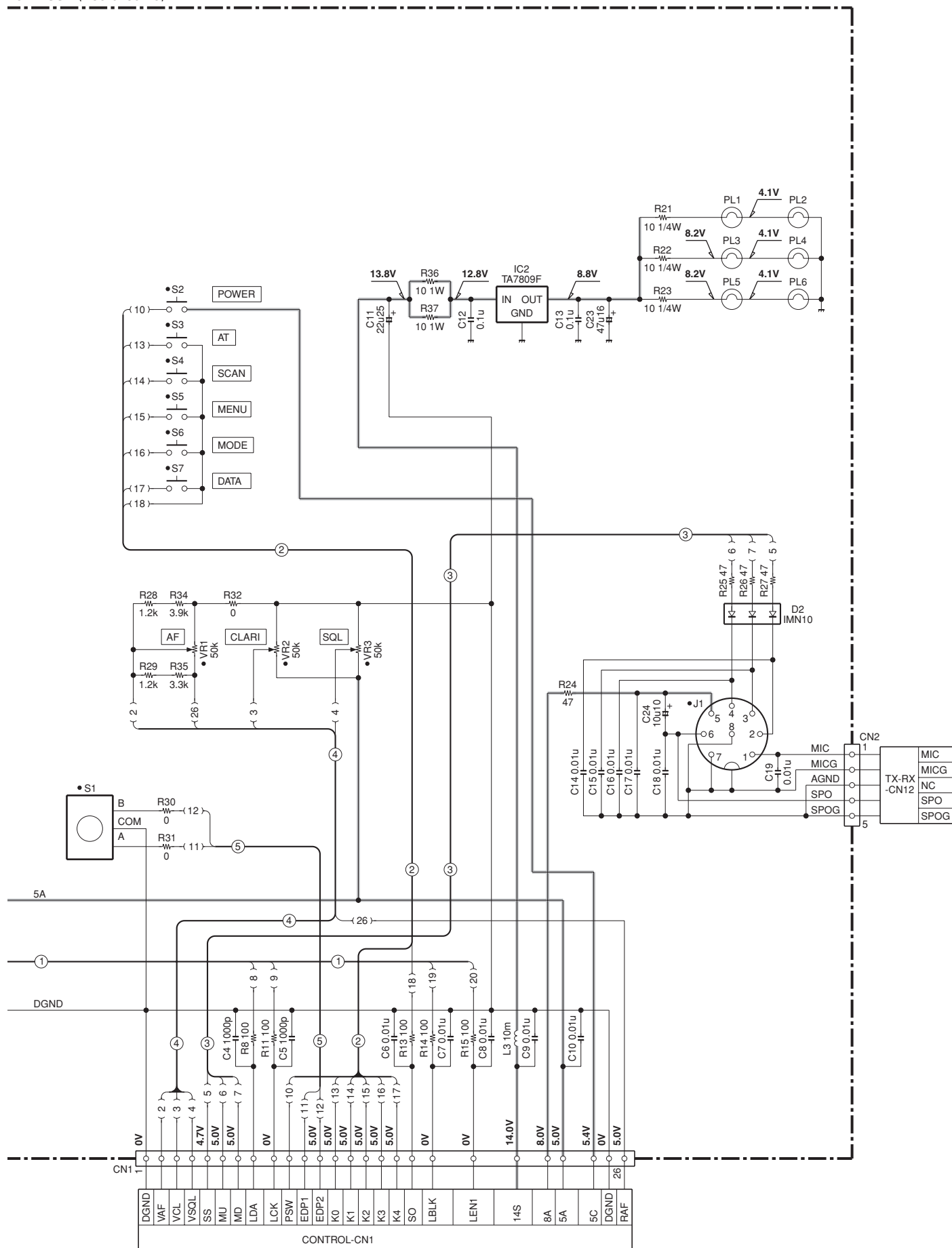
•LCD1 SLU10098-01

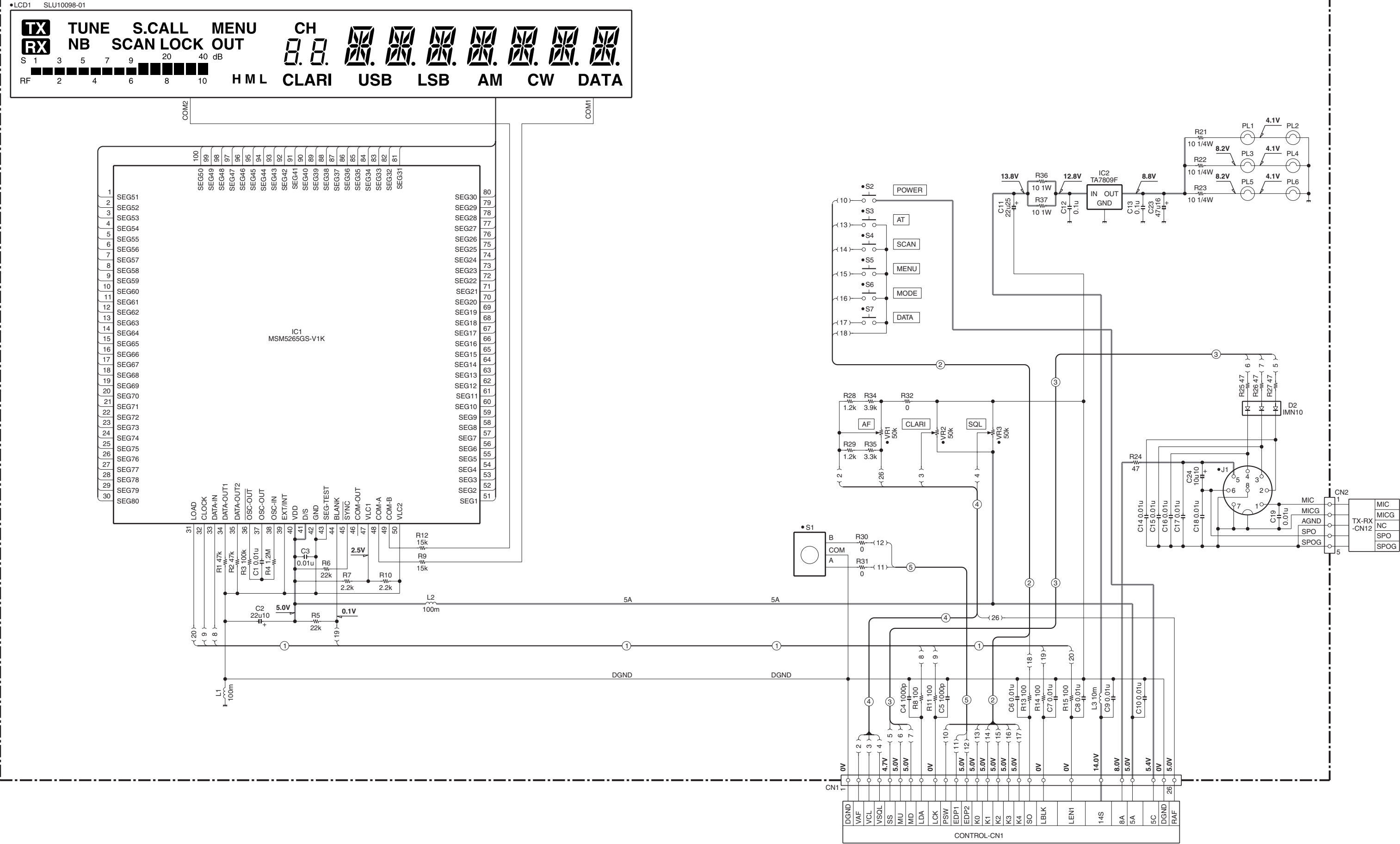


Note : The components marked with a dot (•) are parts of layer 1.

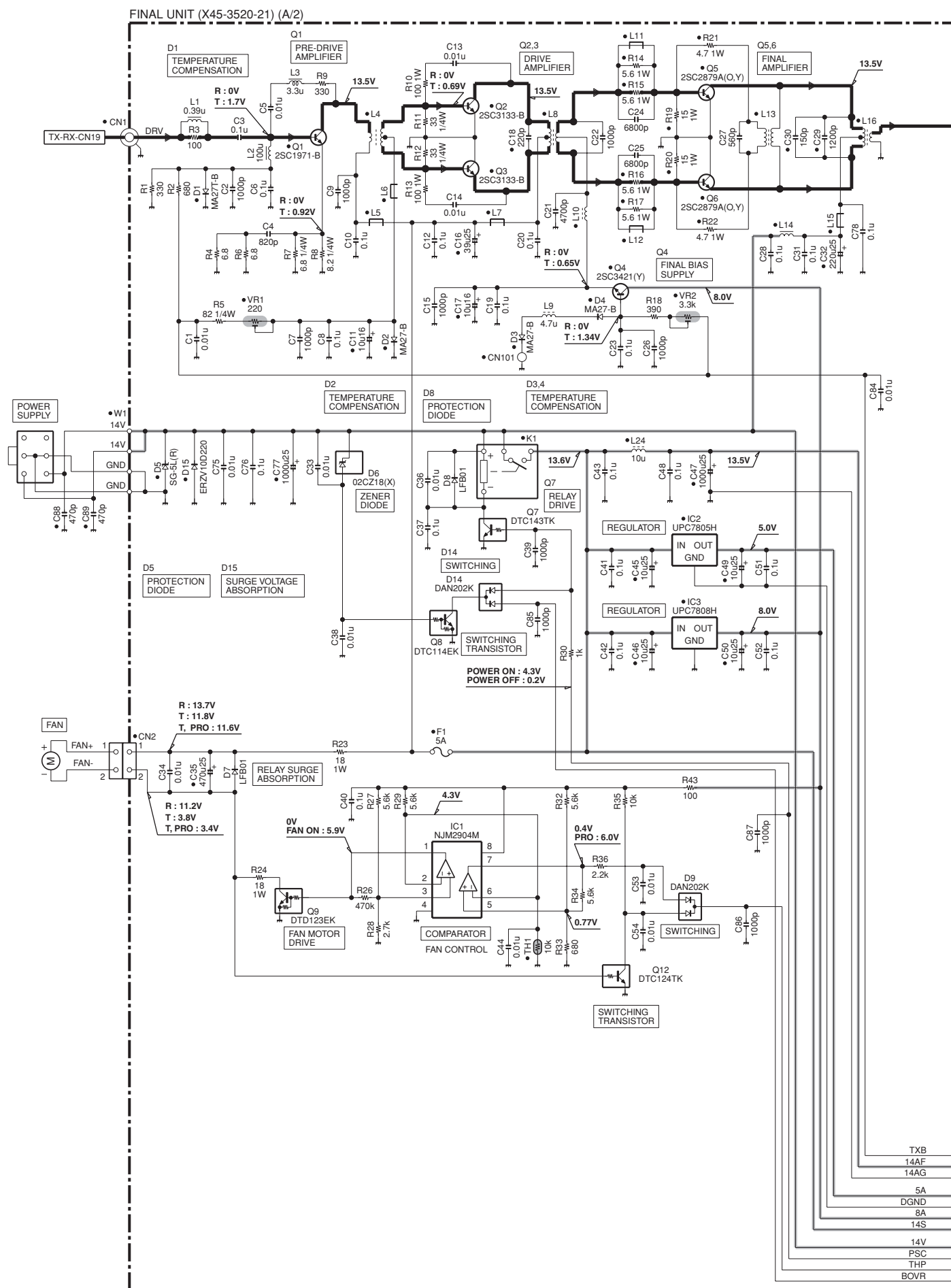
# SCHEMATIC DIAGRAM TK-80

LCD ASSY (B38-0739-15)



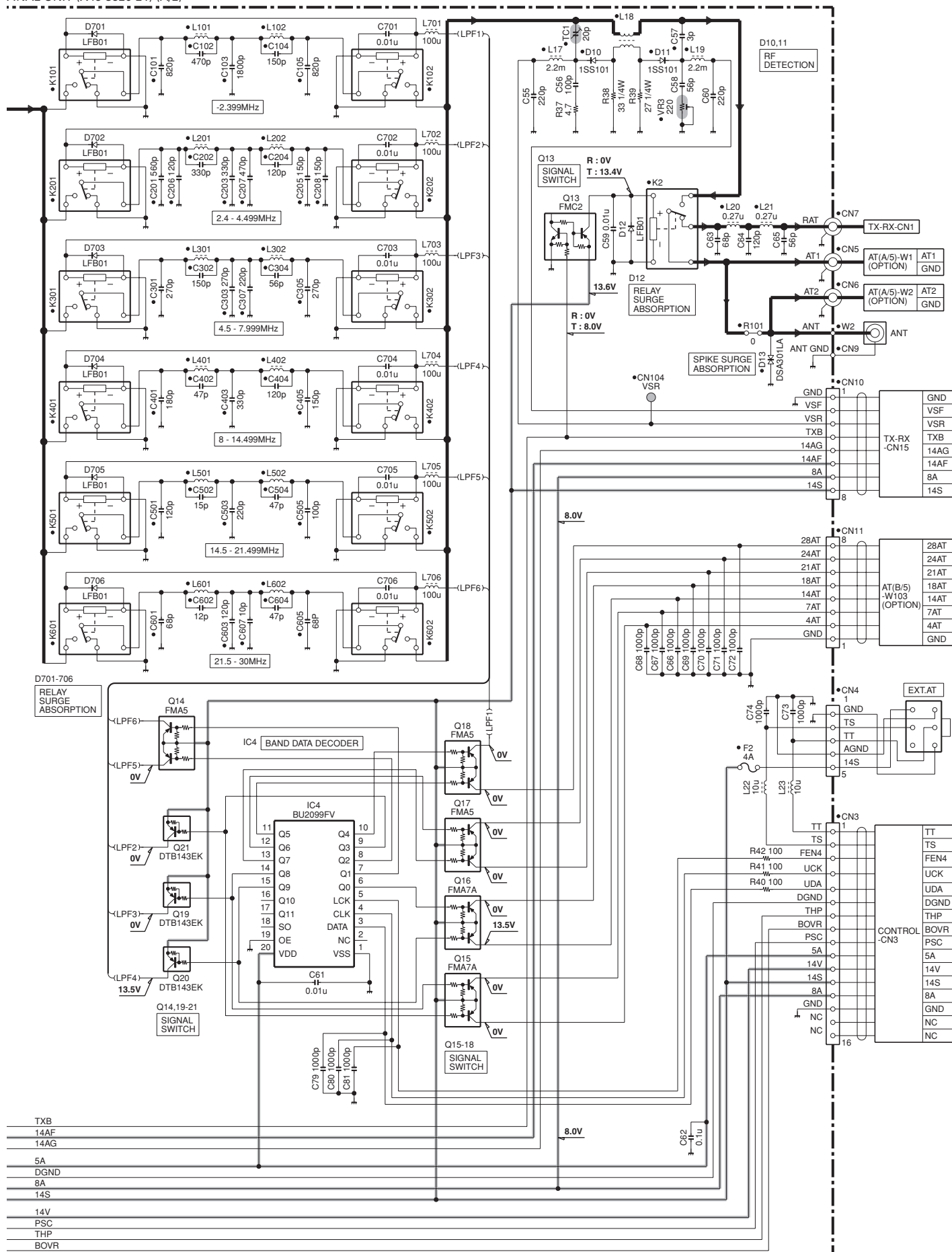


# TK-80 SCHEMATIC DIAGRAM

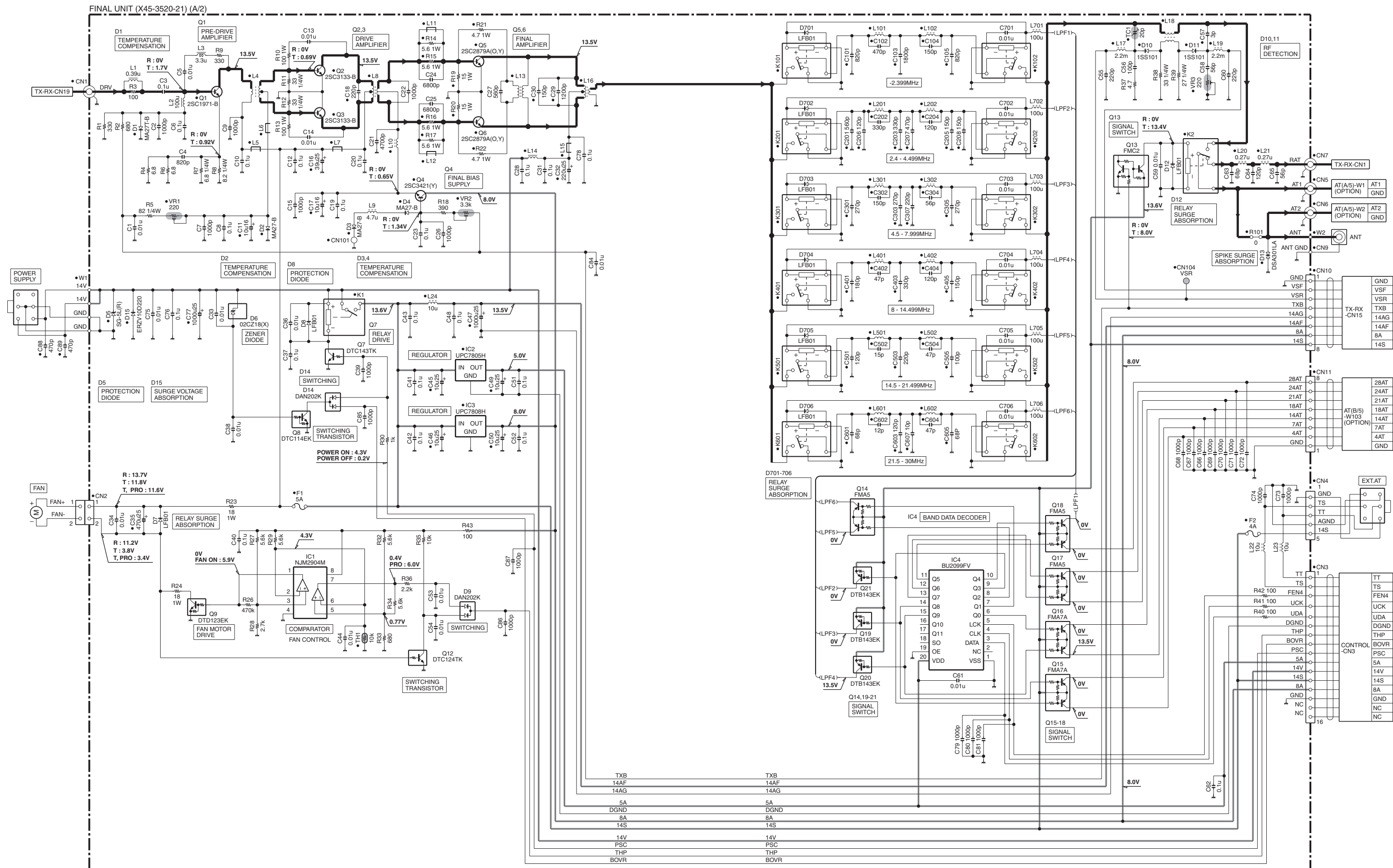


# TK-80

FINAL UNIT (X45-3520-21) (A/2)



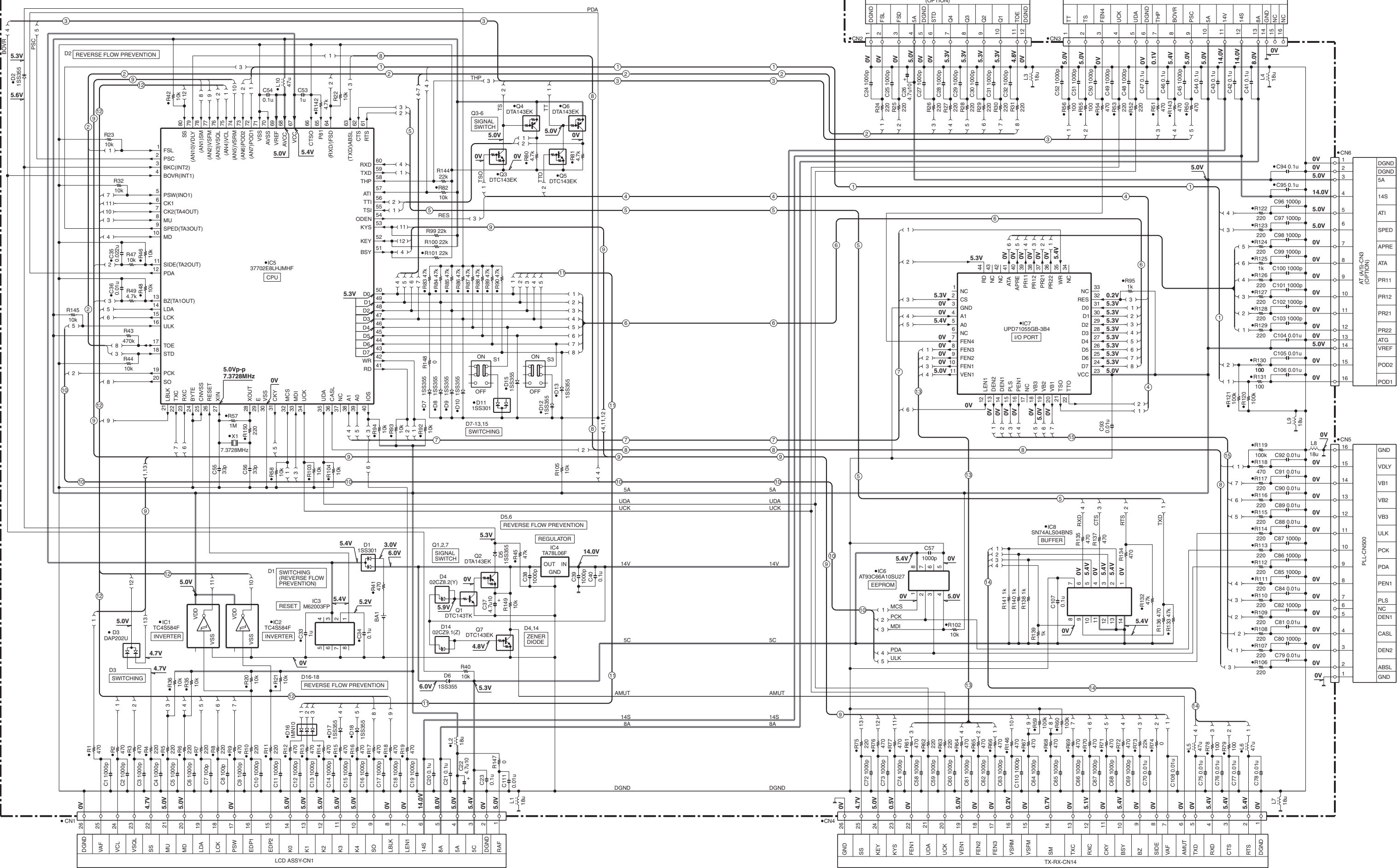
**Note :** The components marked with a dot (•) are parts of layer 1.



CONTROL UNIT (X53-3570-21)

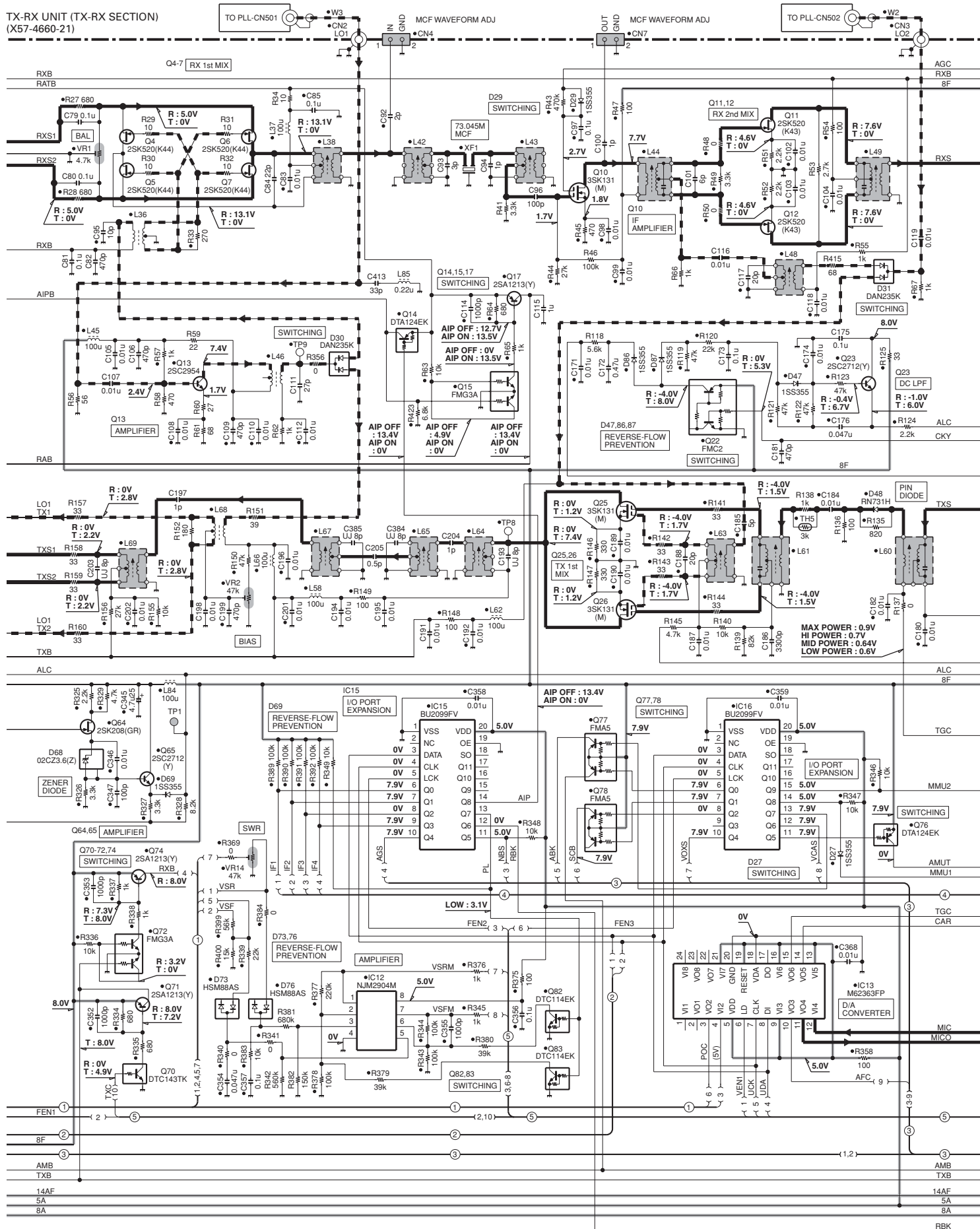


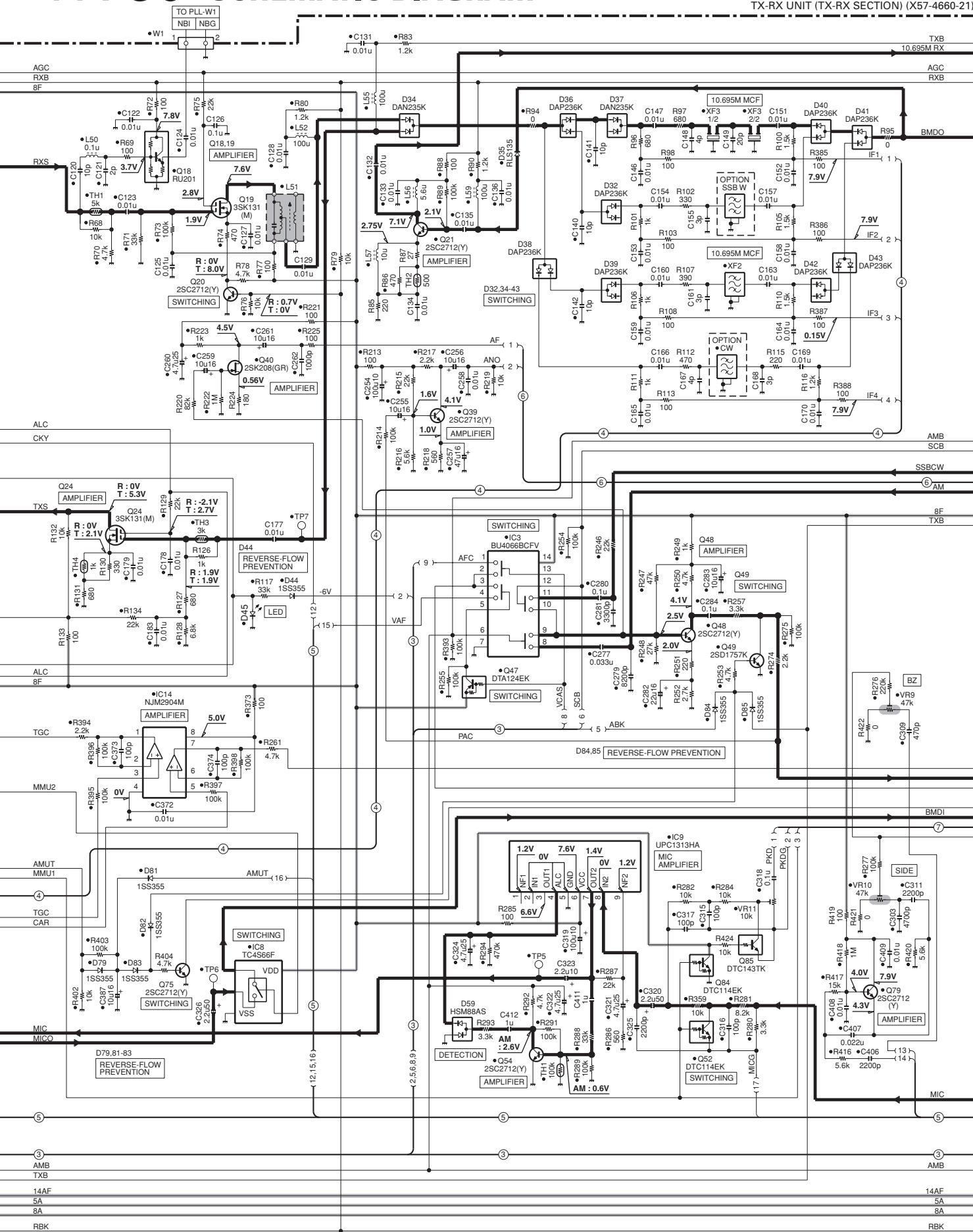




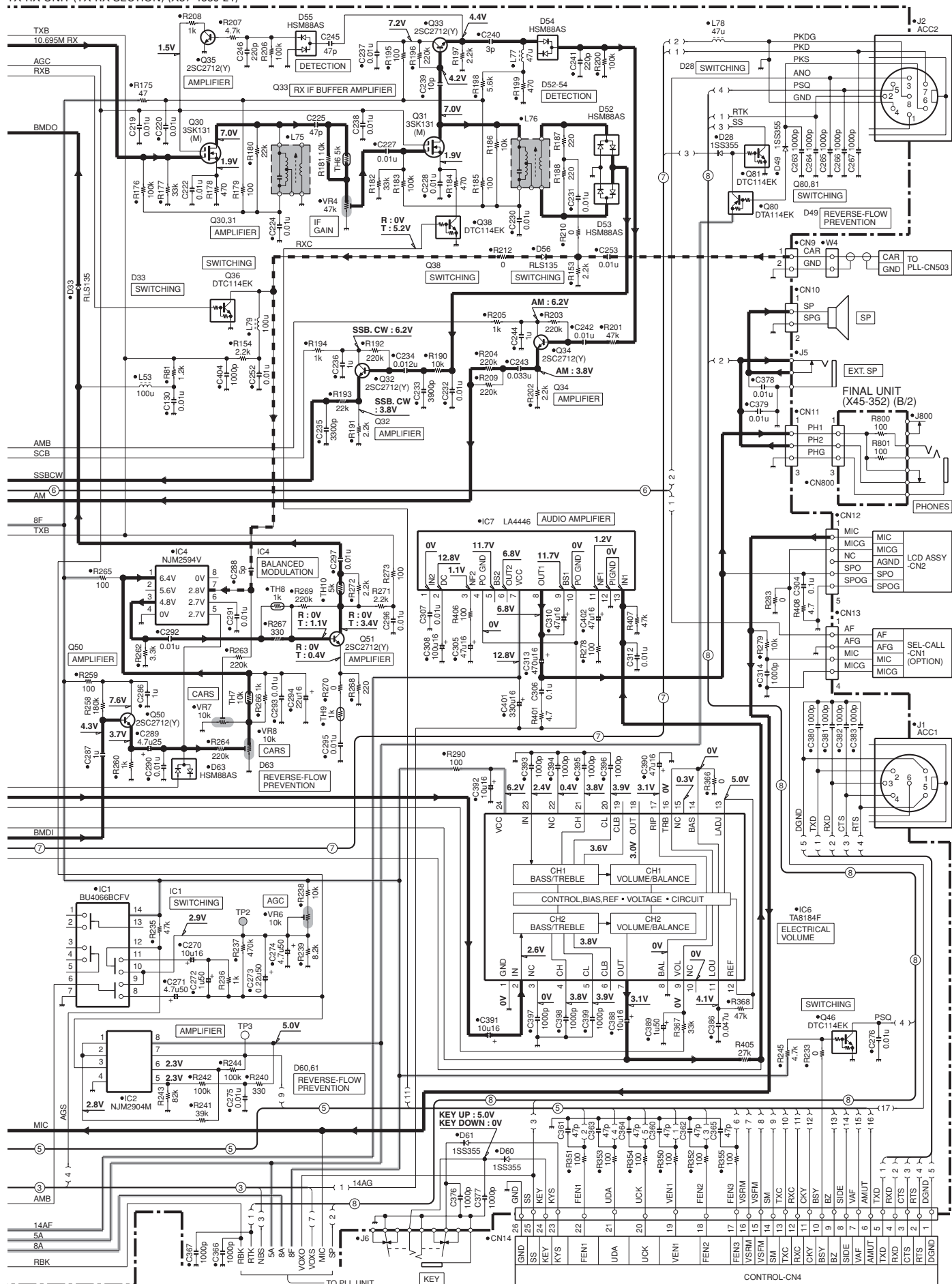


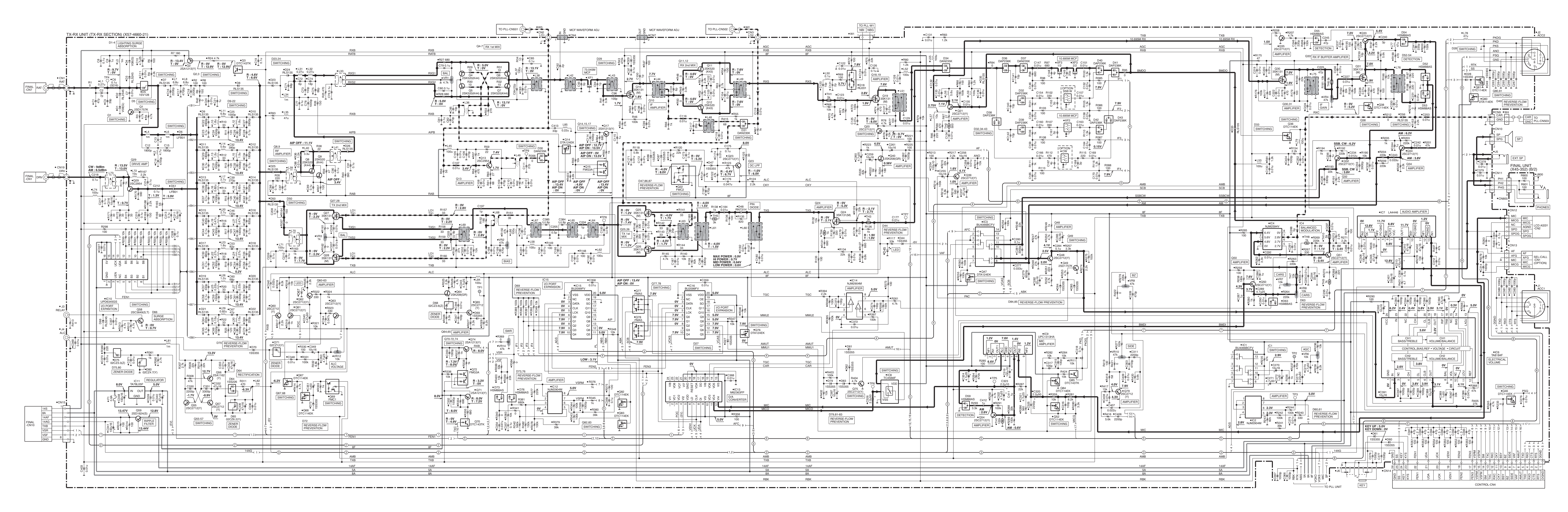
# TK-80

TX-RX UNIT (TX-RX SECTION)  
(X57-4660-21)

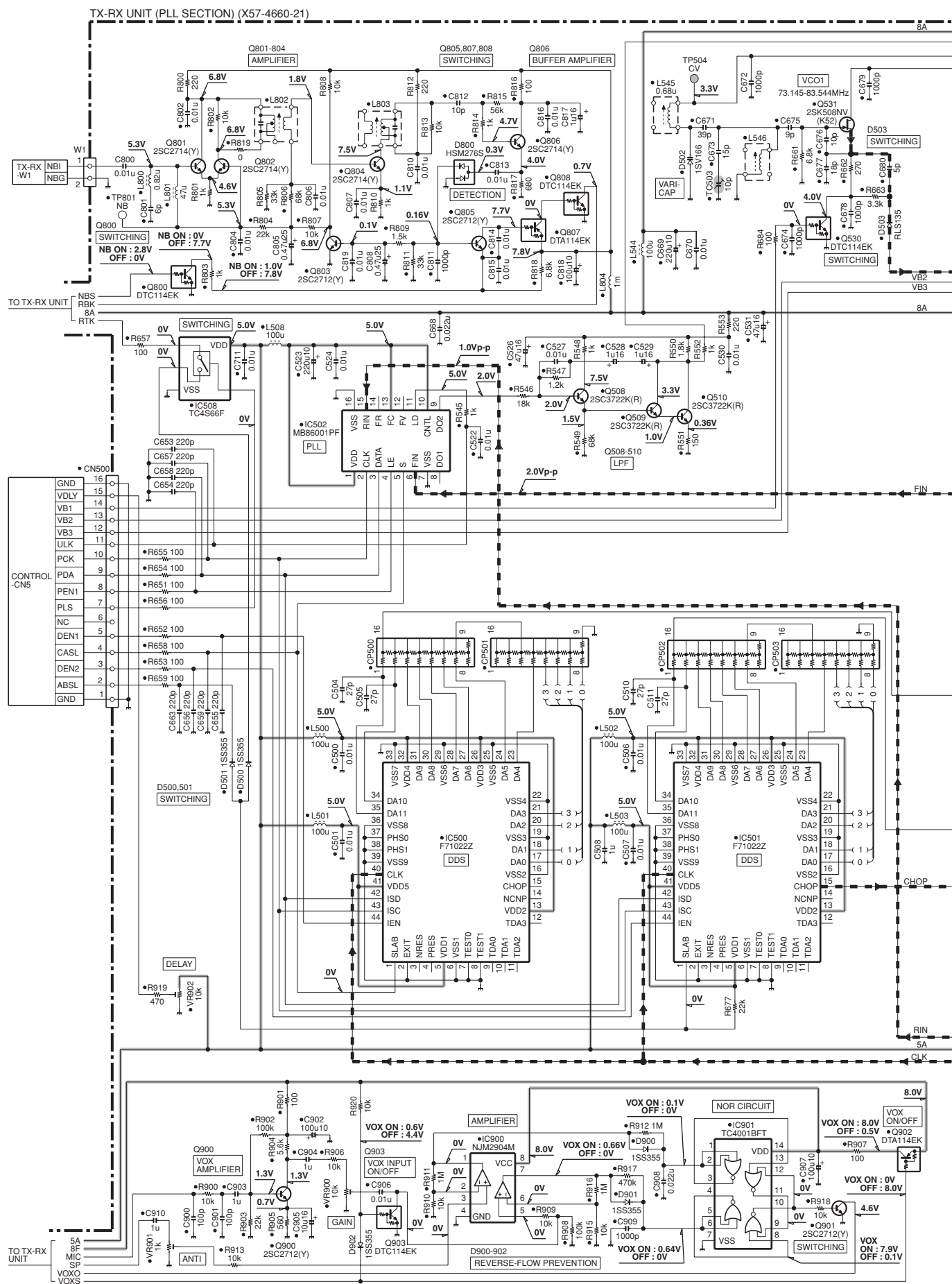


TX-RX UNIT (TX-RX SECTION) (X57-4660-21)



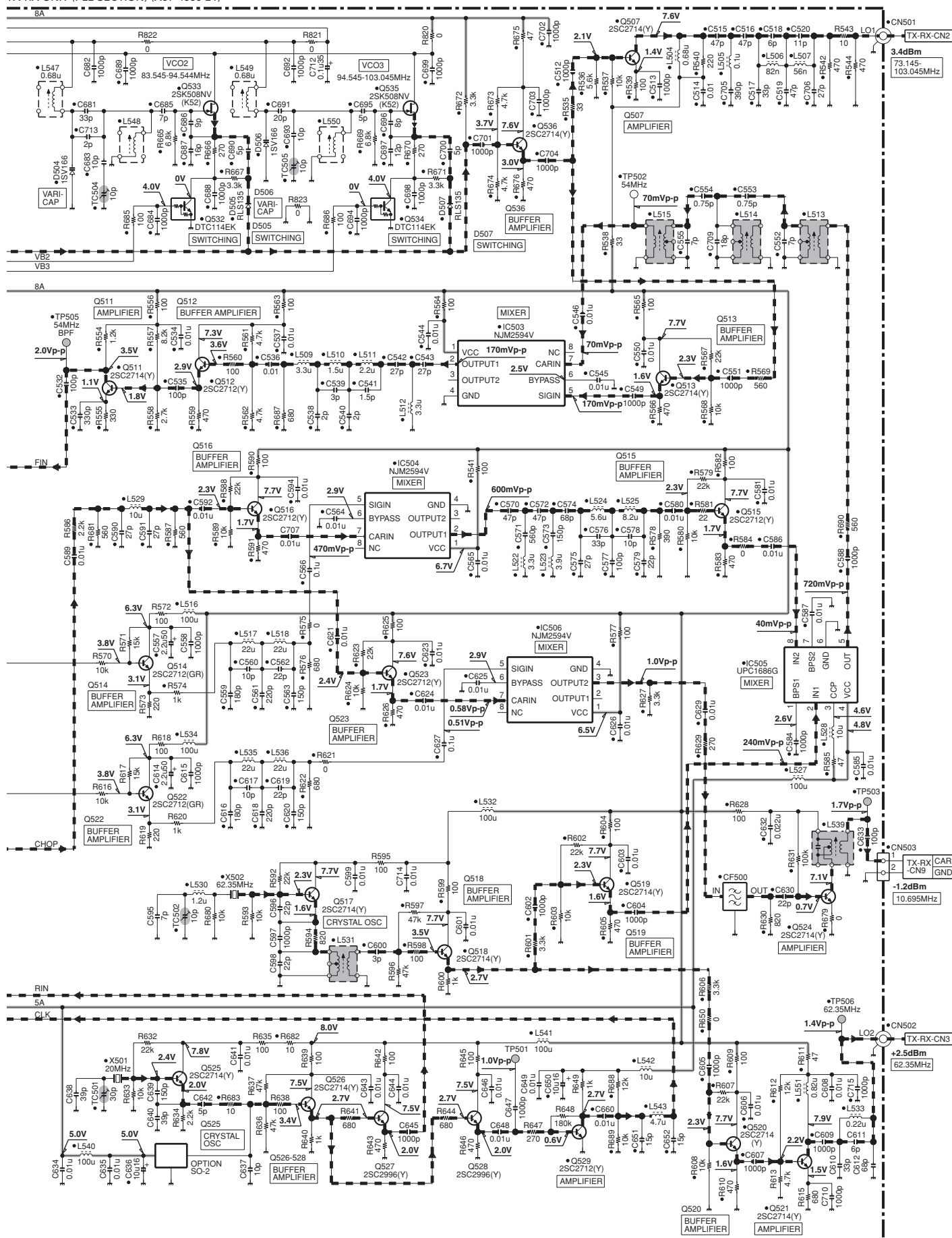


# TK-80 SCHEMATIC DIAGRAM

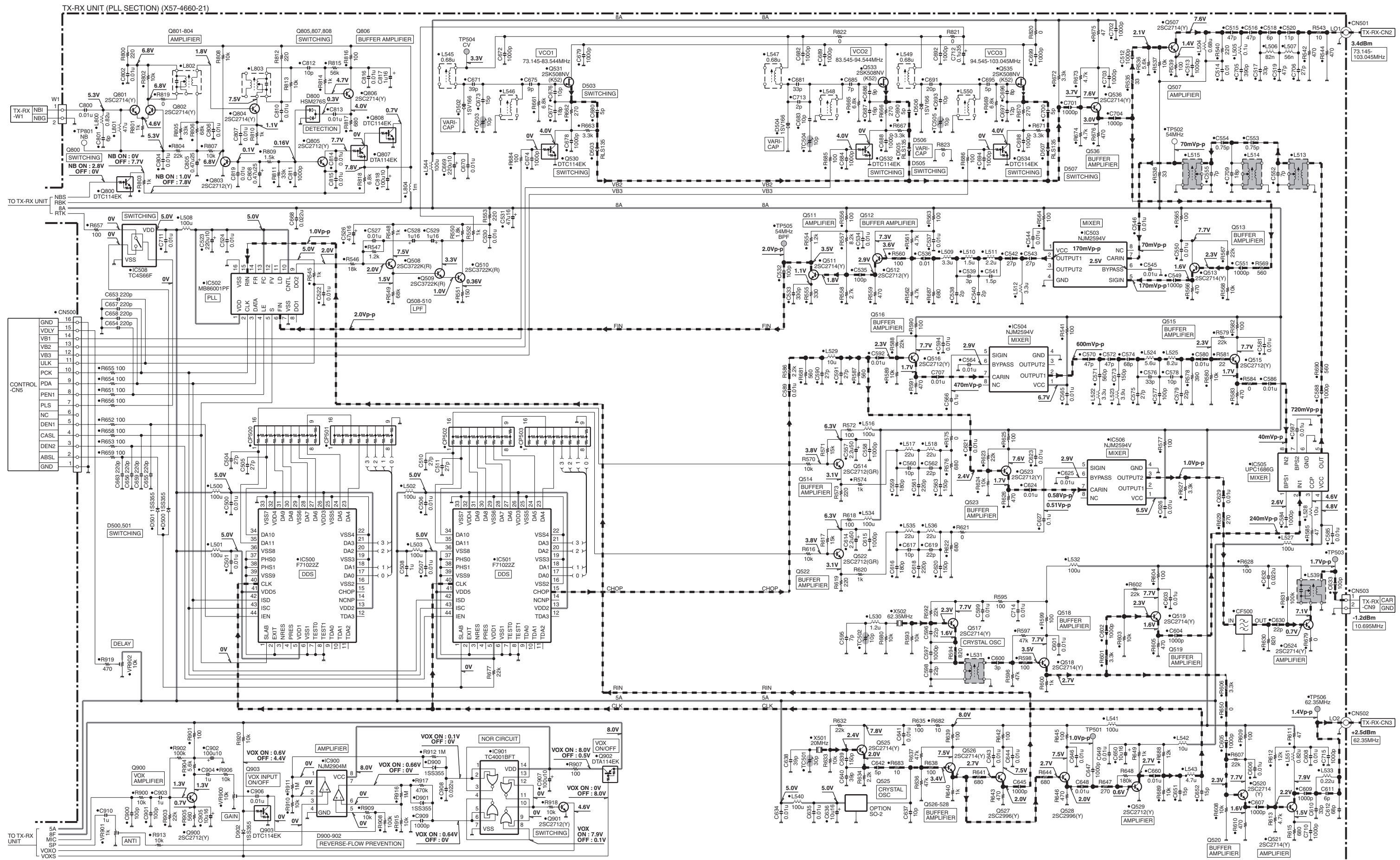


# SCHEMATIC DIAGRAM TK-80

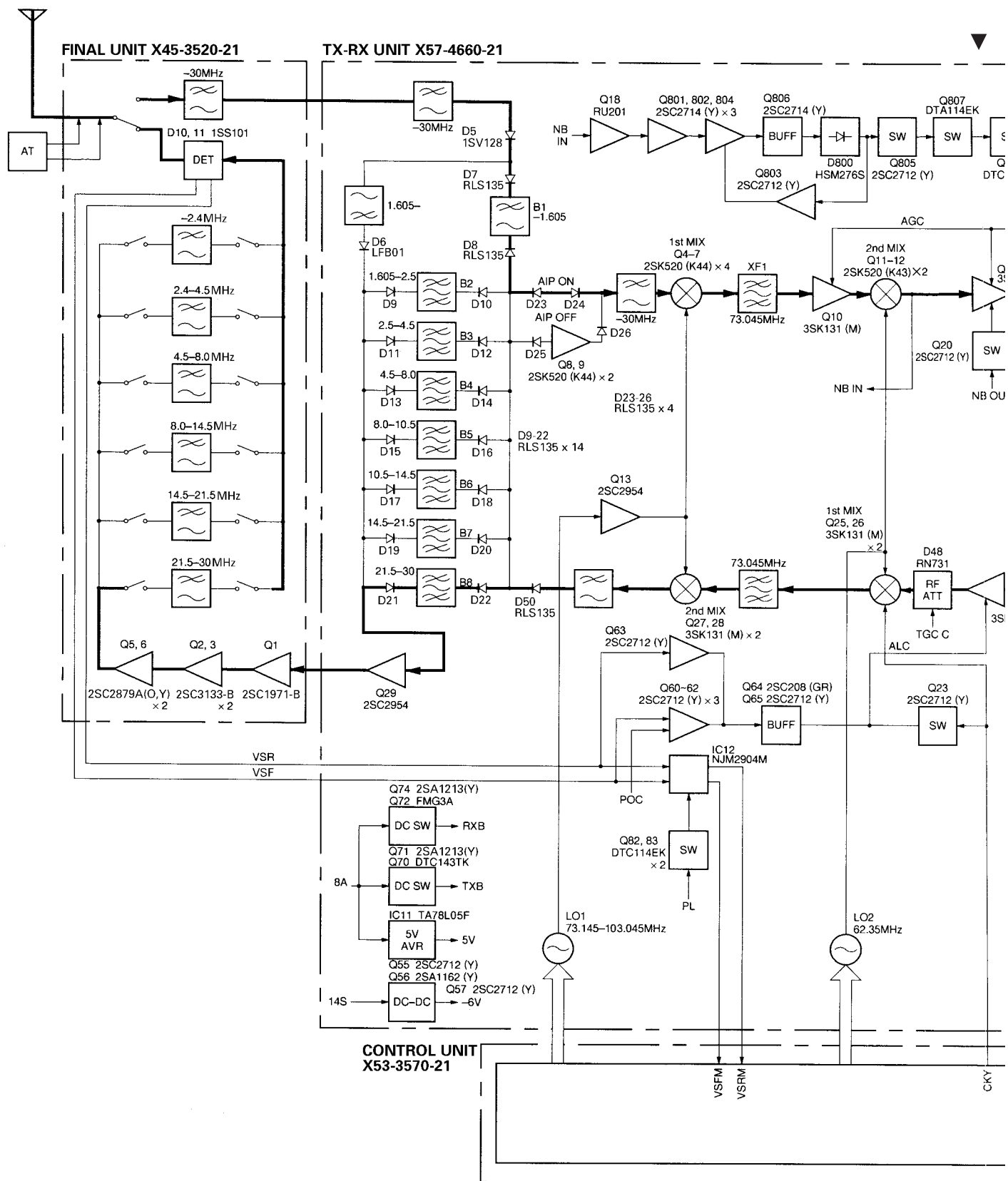
TX-RX UNIT (PLL SECTION) (X57-4660-21)



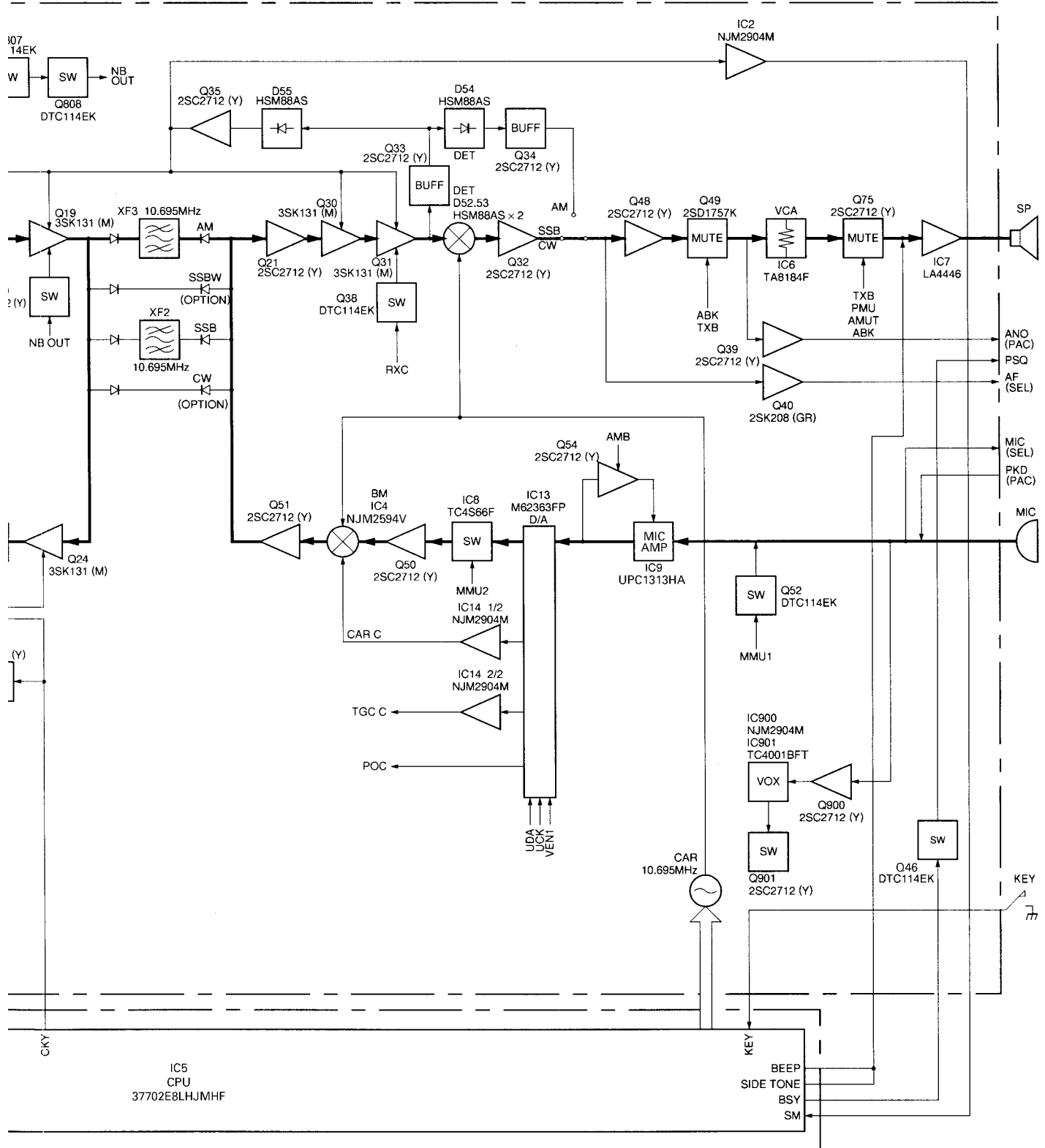
Note : The components marked with a dot (•) are parts of layer 1.

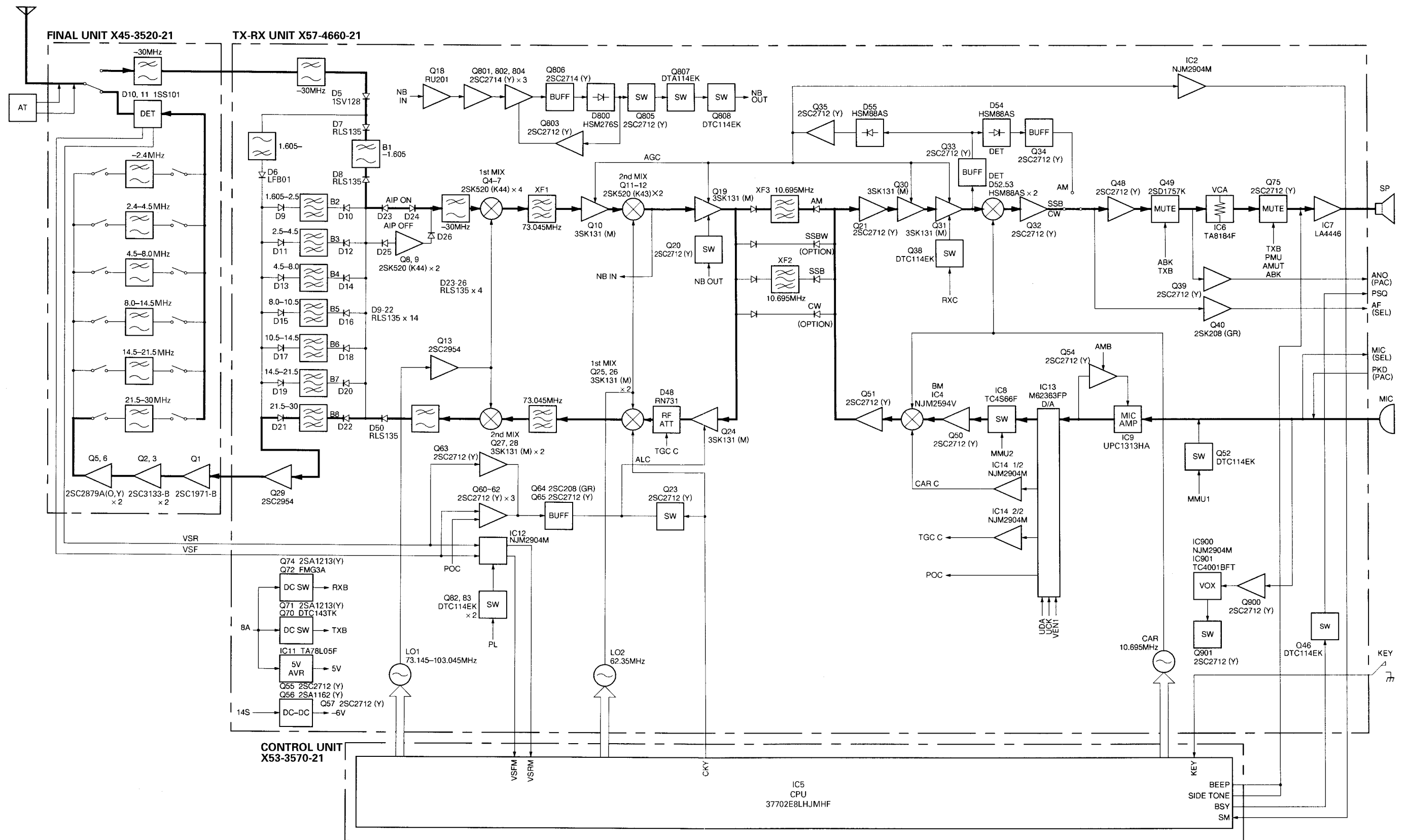


## BLOCK DIAGRAM



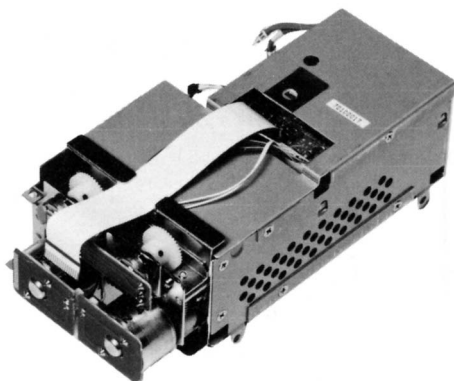
## BLOCK DIAGRAM





## KAT-2 (Internal Automatic Antenna Tuner)

### External View



### Circuit Description

#### 1. Auto antenna tuner

When the AT TUNE switch is pressed, ATA goes high. AUTO/THRU switching relay K1 closes, and the AT is inserted. The CW mode is entered, and the transmission output becomes about 10W. If the VSWR is less than 1.1, tuning is regarded as complete, and the AT TUNE operation stops. If the VSWR is greater than 1.1, the duty cycle of the motor control pulse (described later) is controlled according to the VSWR. If tuning is not complete after more than 20 seconds, AT TUNE operation stops at below VSWR 1.3.

The motor speed is determined by the microprocessor, and the direction is determined by the phase comparator IC1 and amplitude comparator IC6 if the APRE is low, and by the microprocessor if the APRE is high (Fig. 1).

#### 2. Auto tuning

The transmitter power from the final unit passes through current/voltage detection transformers L1 and L2, which have toroidal cores. The current and voltage components detected here are rectified by a waveform rectification circuit consisting of D3 to D5, Q1, D6 to D8, and Q2, and are then phase-compared by IC1. The output signals (Q and  $\bar{Q}$ ) from pins 5 and 6 of IC1 passes from IC2 through the switch, and are applied to the motor drive IC, IC4. Variable capacitor VC101 is turned by motor M1 so that the phase difference of the voltage and current components decreases.

The voltage and current components detected by L1 and L2 are rectified by diode's D1 and D2, and are applied to voltage comparison circuit IC6 as the amplitude component of the signal. The comparator output passes from IC3 through the switch. Motor M2 is driven by another motor drive IC, IC5, which turns variable capacitor VC102 in the direction that decreases the amplitude difference of the voltage and current components.

Thus, variable capacitor VC101 adjusts the capacitance of the circuit so that the current and voltage phases match, and variable capacitor VC102 adjusts the resistance of the circuit so that the current and voltage amplitude difference decreases. If the phases match and the amplitude difference is zero, the VSWR is 1.0.

The speed of motors M1 and M2 is determined by the duty cycle of the pulse input to pin 8 of IC4 and IC5. It is controlled according to the VSWR calculated by the CPU in the control unit and the speed corresponding to preset or manual antenna tuning.

Pulse signal SPED from the control unit passes through Q5, and is amplified by Q4 to produce a control pulse input to IC4 and IC5.

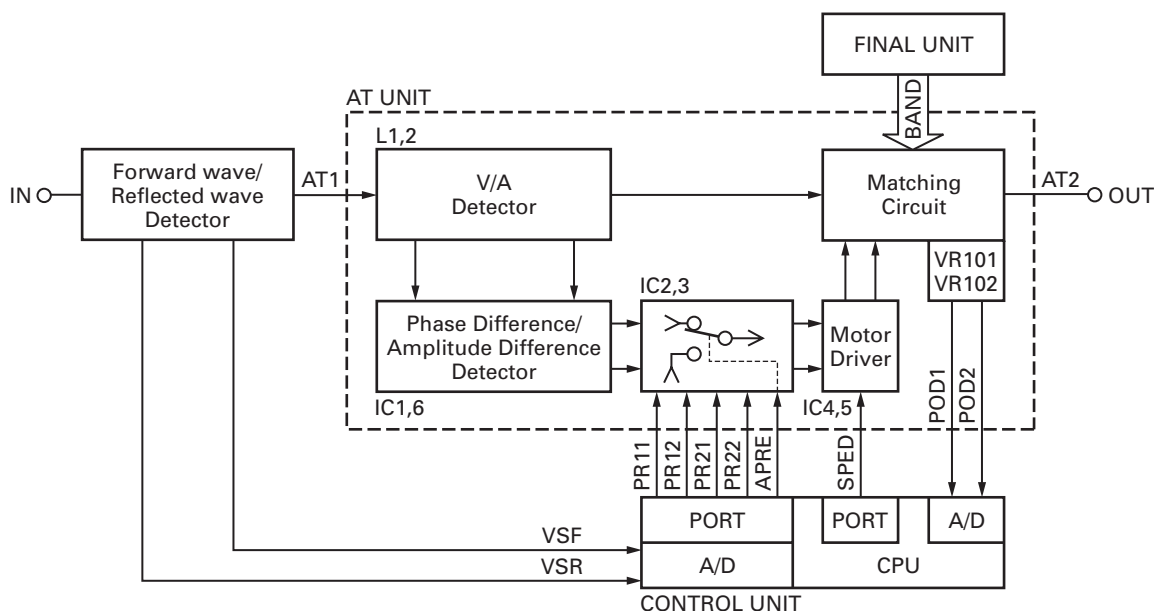


Fig. 1 Auto antenna tuner block diagram

## KAT-2 (Internal Automatic Antenna Tuner)

When this control, when the VSWR is 1.6 or more, the motor runs fast since the duty cycle of the motor drive voltage pulse is 100%. When the VSWR is 1.1, the duty cycle becomes about 60% and the motor runs slowly.

The matching circuit is a T type. The tap position from 2.0 to 30MHz is controlled by seven relays, K101 to K107.

Position detection potentiometers VR101 and VR102 are linked to the spindles of variable capacitors VC101 and VC102 with a gear ratio of 1:1. Voltages of 0 to 5V (POD1 and POD2) are produced according to the positions of the variable capacitors. This position data is input to the CPU through the A/D converter by the control unit, and is used as the reference voltage in the feedback control system. That is used for preset antenna tuning. The same signal is also used for preset data and to signal the completion of antenna tuning.

The potentiometers used here are not ones that rotate through 360 degrees. Since the TK-80 limits the rotation angle of each potentiometer, the rotation range is from the minimum capacitance to the maximum capacitance, plus a little extra for headroom.

Through this control, like preset antenna tuning, which will be described later, POD1 and POD2 are monitored by the microprocessor. If the lower limit voltage of 1.0V or the upper limit voltage of 4.0V is reached, the microprocessor recognizes that a variable capacitor is close to one of its limits. To return the voltage to the opposite side, APRE is switched high. For VC101, if the voltage is close to the lower limit with respect to PRE1, the voltage near the upper limit is output. If the voltage is close to the upper limit with respect to PRE1, the voltage near the lower limit is output.

The other variable capacitor, VC102, should be fixed. If the variable capacitor voltage exceeds the specified limit, the variable capacitor is returned to the opposite limit. The other variable capacitor remains in the same position.

The motor direction is determined by the CPU, unless auto antenna tuning is performed with high APRE.

The logic of PR11 to PR22 is the same as that of IC4 and IC5. The signal output from the control unit passes through IC2 and IC3 and is input to IC4 and IC5.

|         |                  | PR11 | PR12 | PR21 | PR22 |
|---------|------------------|------|------|------|------|
| Motor 1 | Forward rotation | H    | L    | -    | -    |
|         | Reverse rotation | L    | H    | -    | -    |
| Motor 2 | Forward rotation | -    | -    | H    | L    |
|         | Reverse rotation | -    | -    | L    | H    |

### 3. Preset tuning

When auto antenna tuning ends, the position of the variable capacitors is stored in memory by the microprocessor as preset data for each channel.

When a memory channel that has been tuned once changed back from another memory channel, APRE goes high, the motors are controlled by the microprocessor, and preset antenna tuning takes place. During preset antenna tuning, transmission is inhibited even if the transceiver is ready to transmit.

The initial preset data when writes a memory by dealer includes standard data for 50Ω load on 1MHz step from 2.0 MHz.

## Components Description

### AT UNIT (X53-3630-20)

| Ref. No. | Use / Function | Operation / Condition                     |
|----------|----------------|-------------------------------------------|
| IC1      | D-FF           |                                           |
| IC2      | Analog switch  | For control changeover motor 1            |
| IC3      | Analog switch  | For control changeover motor 2            |
| IC4      | Motor driver   | For motor 1                               |
| IC5      | Motor drive    | For motor 2                               |
| IC6      | Comparator     | Amplification difference detection        |
| Q1,2     | Amplifier      | Waveform shaping                          |
| Q3       | Switching      | ON when APRE "H"                          |
| Q4,5     | Switching      | Motor speed control pulse                 |
| Q6       | Switching      | K1 relay changeover                       |
| D1,2     | Detection      | Current component amplification detection |
| D3~8     | Switching      | Clipper                                   |
| D9       | Switching      | Spike absorption                          |
| D101~107 | Switching      | Spike absorption                          |

KAT-2 (Internal Automatic Antenna Tuner)

Parts List

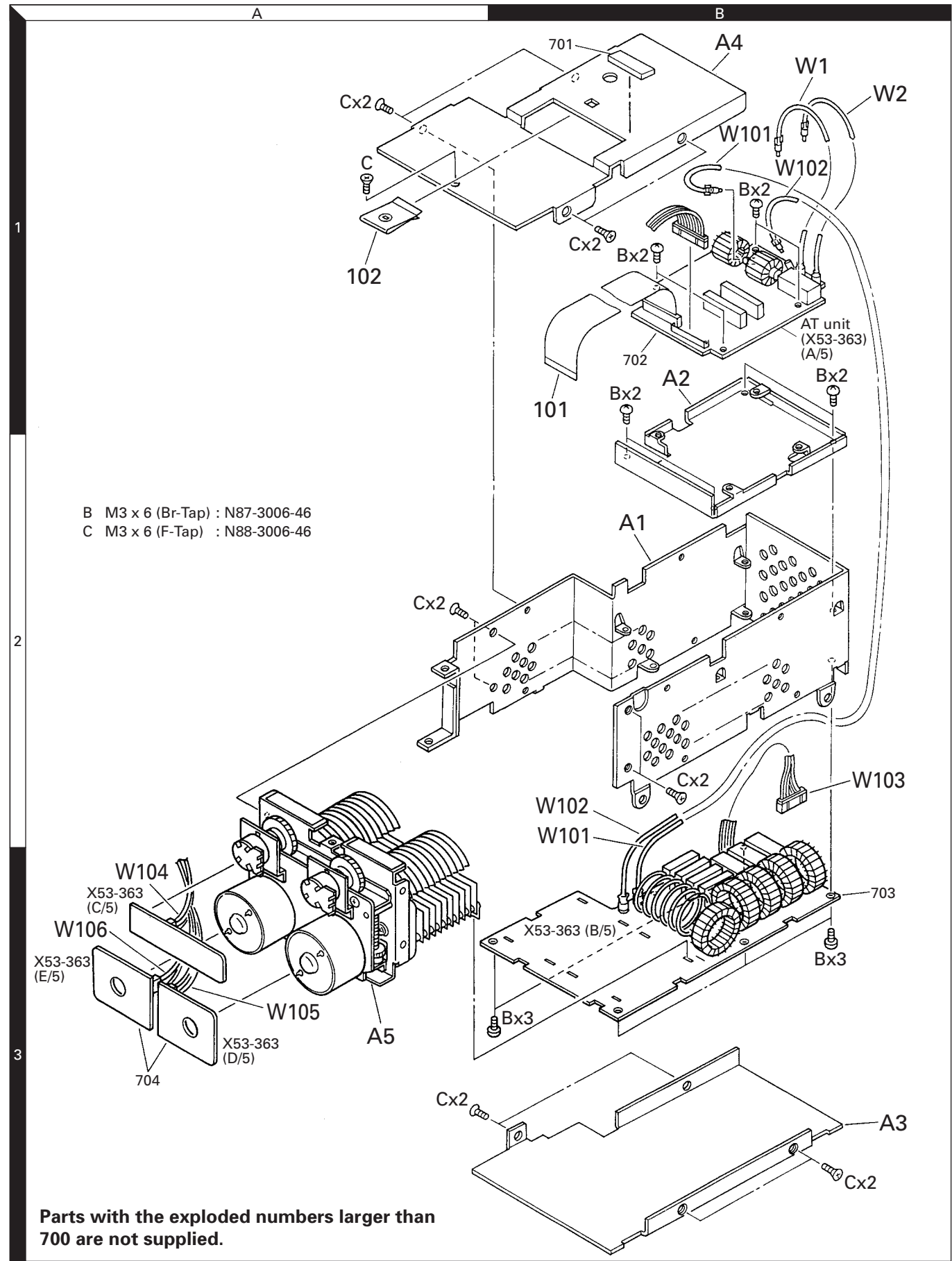
\* New Parts.

| Ref. No.              | Address | New parts | Parts No.    | Description                      | Desti-nation |
|-----------------------|---------|-----------|--------------|----------------------------------|--------------|
| KAT-2                 |         |           |              |                                  |              |
| 1                     | 1C      | *         | B62-0530-10  | INSTRUCTION MANUAL               |              |
| A                     | 1D      |           | N87-3006-46  | BRAZIER HEAD TAPTITE SCREW       |              |
| -                     |         |           | 490-0093-05  | ADHESIVE TAPE                    |              |
| AT UNIT (X53-3630-20) |         |           |              |                                  |              |
| C1                    |         |           | CM93D2H560J  | MICA 56PF J                      |              |
| C2-8                  |         |           | CK73FB1H103K | CHIP C 0.010UF K                 |              |
| C9,10                 |         |           | CK73FB1H102K | CHIP C 1000PF K                  |              |
| C11                   |         |           | CK73FB1H103K | CHIP C 0.010UF K                 |              |
| C12                   |         |           | CE04EW1A470M | ELECTRO 47UF 10WV                |              |
| C13-19                |         |           | CK73FB1H103K | CHIP C 0.010UF K                 |              |
| C20                   |         |           | CE04EW1E101M | ELECTRO 100UF 25WV               |              |
| C21-35                |         |           | CK73FB1H103K | CHIP C 0.010UF K                 |              |
| C101-107              |         |           | CK73FB1H103K | CHIP C 0.010UF K                 |              |
| TC1                   |         |           | C05-0031-15  | CERAMIC TRIMMER CAPACITOR (10PF) |              |
| VC101,102             |         |           | C02-0025-05  | VARIABLE CAPACITOR               |              |
| A5                    | 3A      | *         | D40-0638-15  | GEAR ASSY                        |              |
| 101                   | 1B      |           | E37-0558-05  | FLAT CABLE                       |              |
| CN1,2                 |         |           | E04-0191-05  | PIN SOCKET                       |              |
| CN3                   |         |           | E40-5349-05  | FLAT CABLE CONNECTOR             |              |
| CN4                   |         |           | E40-3243-05  | PIN ASSY                         |              |
| W1                    | 1B      |           | E37-0562-05  | LEAD WIRE WITH MINIPIN PLUG      |              |
| W2                    | 1B      |           | E37-0563-05  | LEAD WIRE WITH MINIPIN PLUG      |              |
| W101                  | 1B,3B   |           | E31-6038-05  | LEAD WIRE WITH MINIPIN PLUG      |              |
| W102                  | 1B,3B   |           | E31-6083-05  | LEAD WIRE WITH MINIPIN PLUG      |              |
| W103-W106             | 3A,2B   |           | E33-1983-05  | PROCESSED WIRE KIT               |              |
| A1                    | 2B      | *         | F10-2184-12  | SHIELDING PLATE                  |              |
| A2                    | 1B      | *         | F10-1499-14  | SHIELDING PLATE                  |              |
| A3                    | 3B      | *         | F10-1500-13  | SHIELDING PLATE                  |              |
| A4                    | 1B      | *         | F10-2001-13  | SHIELDING PLATE                  |              |
| 102                   | 1A      |           | G02-0717-04  | FLAT SPRING                      |              |
| -                     |         |           | J61-0307-05  | BAND                             |              |
| L1                    |         |           | L39-0496-05  | TOROIDAL COIL                    |              |
| L2                    |         |           | L39-0415-25  | TOROIDAL COIL                    |              |
| L3-8                  |         |           | L40-1011-13  | SMALL FIXED INDUCTOR (100UH)     |              |
| L9-11                 |         |           | L40-1011-17  | SMALL FIXED INDUCTOR (100UH)     |              |
| L12-15                |         |           | L40-1011-14  | SMALL FIXED INDUCTOR (100UH)     |              |
| L101                  |         |           | L34-4425-05  | AIR-CORE COIL                    |              |
| L102                  |         |           | L39-1265-05  | TOROIDAL COIL                    |              |
| L103                  |         |           | L39-1262-05  | TOROIDAL COIL                    |              |
| L104                  |         |           | L39-1263-05  | TOROIDAL COIL                    |              |
| L105                  |         |           | L39-1264-05  | TOROIDAL COIL                    |              |
| L106                  |         |           | L39-1268-05  | TOROIDAL COIL                    |              |
| L107                  |         |           | L40-1011-14  | SMALL FIXED INDUCTOR (100UH)     |              |
| L108                  |         |           | L40-1011-15  | SMALL FIXED INDUCTOR (100UH)     |              |
| L109-113              |         |           | L40-1011-14  | SMALL FIXED INDUCTOR (100UH)     |              |
| B                     | 1B,3B   |           | N87-3006-46  | BRAZIER HEAD TAPTITE SCREW       |              |
| C                     | 1A,3B   |           | N88-3006-46  | FLAT HEAD TAPTITE SCREW          |              |
| R1,2                  |         |           | RD14CB2E101J | RD 100 J 1/4W                    |              |

| Ref. No.  | Address | New parts | Parts No.    | Description         | Desti-nation |
|-----------|---------|-----------|--------------|---------------------|--------------|
| R3        |         |           | RK73FB2A102J | CHIP R 1.0K J 1/10W |              |
| R4        |         |           | RD14CB2E470J | RD 47 J 1/4W        |              |
| R5,6      |         |           | RK73FB2A181J | CHIP R 180 J 1/10W  |              |
| R7-10     |         |           | RK73FB2A103J | CHIP R 10K J 1/10W  |              |
| R11       |         |           | RK73FB2A563J | CHIP R 56K J 1/10W  |              |
| R12       |         |           | RK73FB2A121J | CHIP R 120 J 1/10W  |              |
| R13       |         |           | RK73FB2A101J | CHIP R 100 J 1/10W  |              |
| R14       |         |           | RK73FB2A563J | CHIP R 56K J 1/10W  |              |
| R15       |         |           | RK73FB2A121J | CHIP R 120 J 1/10W  |              |
| R16       |         |           | RK73FB2A101J | CHIP R 100 J 1/10W  |              |
| R17       |         |           | RK73FB2A330J | CHIP R 33 J 1/10W   |              |
| R18       |         |           | RK73FB2A103J | CHIP R 10K J 1/10W  |              |
| R19       |         |           | RK73FB2A330J | CHIP R 33 J 1/10W   |              |
| R20-23    |         |           | RK73FB2A103J | CHIP R 10K J 1/10W  |              |
| R24,25    |         |           | RD14BB2E100J | RD 10 J 1/4W        |              |
| R26       |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W |              |
| R27-32    |         |           | RK73FB2A103J | CHIP R 10K J 1/10W  |              |
| R33       |         |           | RK73FB2A472J | CHIP R 4.7K J 1/10W |              |
| R34-42    |         |           | R92-0670-05  | CHIP R 0 OHM        |              |
| VR101,102 |         |           | R01-3435-05  | POTENTIOMETER (10K) |              |
| K1        |         |           | S51-2417-05  | RELAY               |              |
| K101-104  |         |           | S76-0415-05  | RELAY               |              |
| K105-107  |         |           | S76-0401-05  | RELAY               |              |
| M1,2      |         |           | T42-0453-05  | MOTOR               |              |
| D1,2      |         |           | 1SS101       | DIODE               |              |
| D3-8      |         |           | 1SS226       | DIODE               |              |
| D9        |         |           | LFB01        | DIODE               |              |
| D101-107  |         |           | LFB01        | DIODE               |              |
| IC1       |         |           | SN74S74NS    | MOS-IC              |              |
| IC2,3     |         |           | TC4066BF     | MOS-IC              |              |
| IC4,5     |         |           | BA6109U2     | MOS-IC              |              |
| IC6       |         |           | NJM2903M     | MOS-IC              |              |
| Q1,2      |         |           | 2SC2714(Y)   | TRANSISTOR          |              |
| Q3        |         |           | DTC114EKA    | DIGITAL TRANSISTOR  |              |
| Q4        |         |           | 2SA1204(Y)   | TRANSISTOR          |              |
| Q5        |         |           | DTC114EKA    | DIGITAL TRANSISTOR  |              |
| Q6        |         |           | DTD143EK     | DIGITAL TRANSISTOR  |              |
| W5-19     |         |           | 001-0002-05  | COATING WIRE        |              |

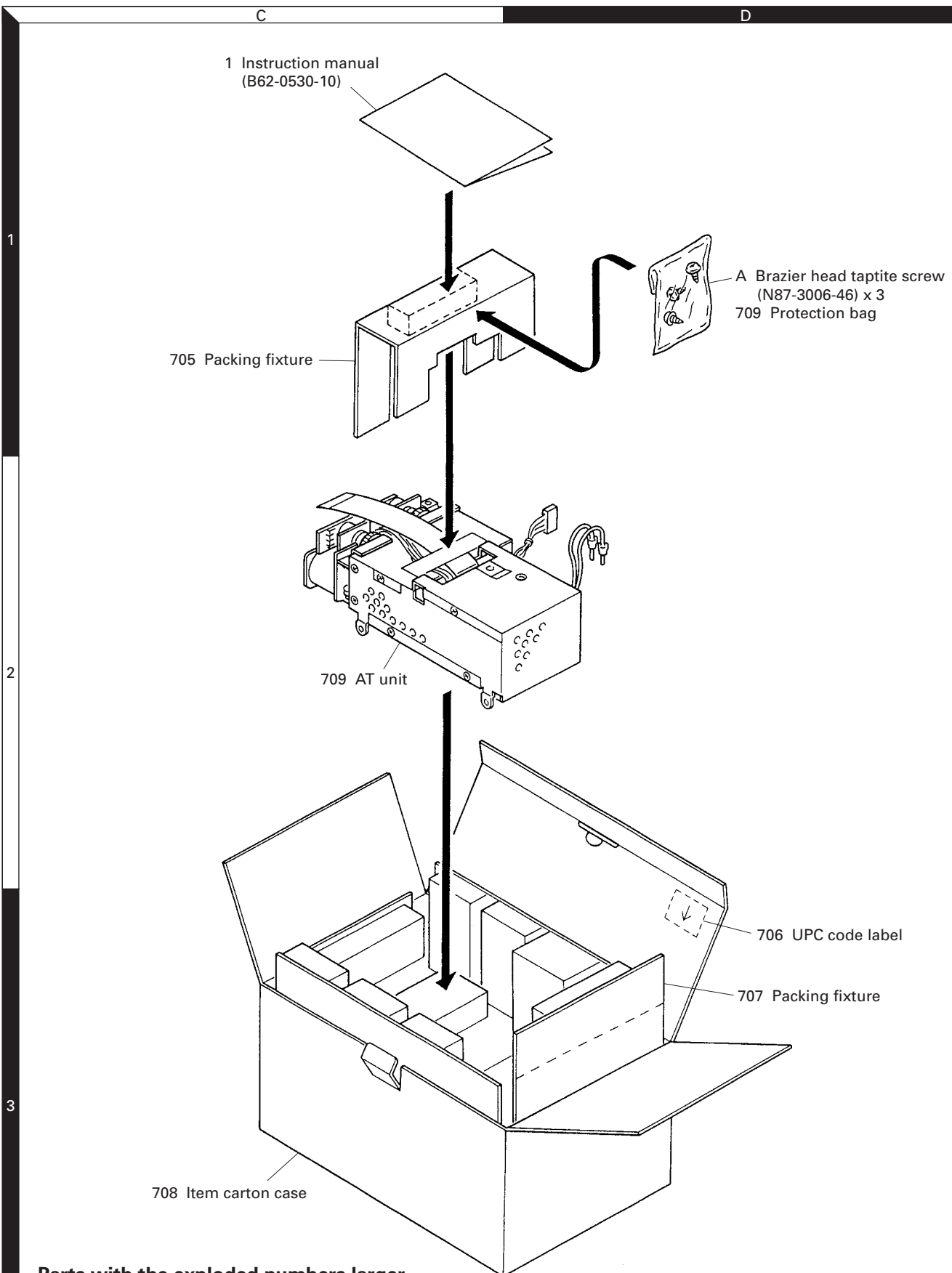
## KAT-2 (Internal Automatic Antenna Tuner)

### Exploded View



## KAT-2 (Internal Automatic Antenna Tuner)

## Packing



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

## KAT-2 (Internal Automatic Antenna Tuner)

### Adjustment

| Item                             | Condition                                                                                                                                                                                                                                                      | Measurement                |      |          | Adjustment |       |        | Specifications/<br>Remarks           |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------|----------|------------|-------|--------|--------------------------------------|
|                                  |                                                                                                                                                                                                                                                                | Test-equipment             | Unit | Terminal | Unit       | Parts | Method |                                      |
| 1. Automatic antenna tuner check | 1) Display: 2MHz<br>Mode: CW<br>Dummy load: 20Ω<br>Set silver-point of TC1 to 45°<br><br><div style="text-align: center;">  <p>Silver-point</p> </div><br>Press [AT TUNE] key | Oscilloscope<br>Dummy load |      |          | AT         | TC1   | Check  | SW meter decreases, then AT is stop. |
|                                  | 2) Dummy load: 150Ω<br>Press [AT TUNE] key                                                                                                                                                                                                                     |                            |      |          |            |       |        |                                      |
|                                  | 3) Dummy load: 50Ω<br>Press [AT TUNE] key                                                                                                                                                                                                                      |                            |      |          |            |       |        |                                      |

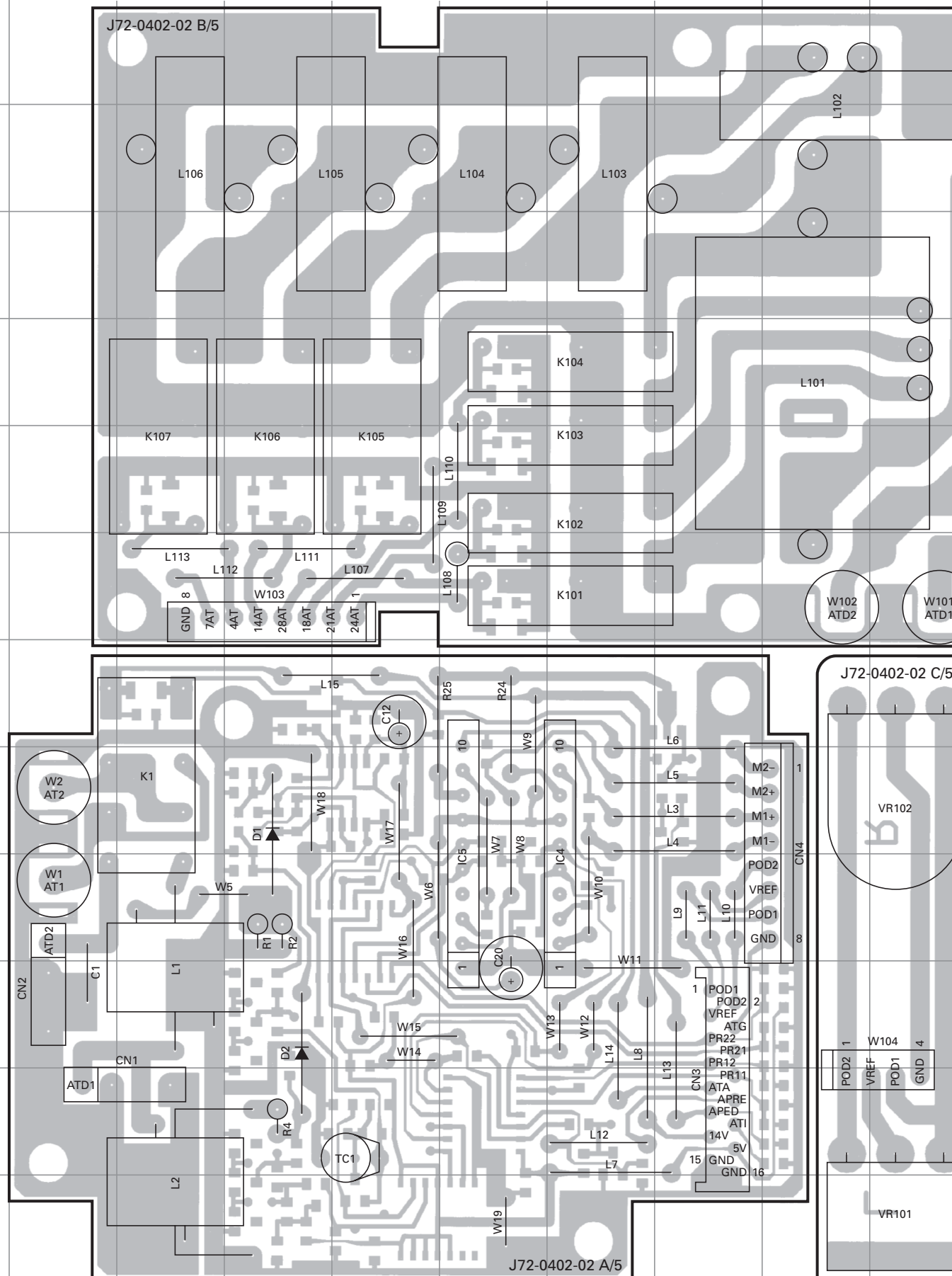
### Terminal Function

| CN No. | Pin No. | Pin Name | Function                           |
|--------|---------|----------|------------------------------------|
| CN3    | 1       | POD1     | VC101 position detection signal    |
|        | 2       | POD2     | VC102 position detection signal    |
|        | 3       | VREF     | AT reference voltage (5V)          |
|        | 4       | ATG      | AT GND                             |
|        | 5       | PR22     | Motor rotation direction control 4 |
|        | 6       | PR21     | Motor rotation direction control 3 |
|        | 7       | PR12     | Motor rotation direction control 2 |
|        | 8       | PR11     | Motor rotation direction control 1 |
|        | 9       | ATA      | AUTO/THRU switch                   |
|        | 10      | APRE     | Preset control select              |
|        | 11      | SPED     | Motor speed control                |
|        | 12      | ATI      | Preset AT install. "L": Install    |
|        | 13      | 14S      | 14V (switched)                     |
|        | 14      | 5A       | 5V                                 |
|        | 15      | DGND     | Digital GND                        |
|        | 16      | DGND     | Digital GND                        |

| CN No. | Pin No. | Pin Name | Function                          |
|--------|---------|----------|-----------------------------------|
| W1     | 1       | AT1      | AT signal 1                       |
|        | 2       | GND      | GND                               |
| W2     | 1       | AT2      | AT signal 2                       |
|        | 2       | GND      | GND                               |
| W103   | 1       | 24AT     | AT band bata 22.00000~26.99999MHz |
|        | 2       | 21AT     | AT band bata 19.00000~21.99999MHz |
|        | 3       | 18AT     | AT band bata 14.50000~18.99999MHz |
|        | 4       | 28AT     | AT band bata 27.00000~29.99999MHz |
|        | 5       | 14AT     | AT band bata 8.00000~14.49999MHz  |
|        | 6       | 4AT      | AT band bata 2.40000~4.49999MHz   |
|        | 7       | 7AT      | AT band bata 4.50000~7.99999MHz   |
|        | 8       | GND      | GND                               |

# TK-80 KAT-2 (PC BOARD)

## AT UNIT (X53-3630-20) Component side view (J72-0402-02)



**AT UNIT (X53-3630-20) Component side view (J72-0402-02)**

| Ref. No. | Address |
|----------|---------|
| IC4      | 10G     |
| IC5      | 10F     |
| D1       | 9D      |
| D2       | 11D     |

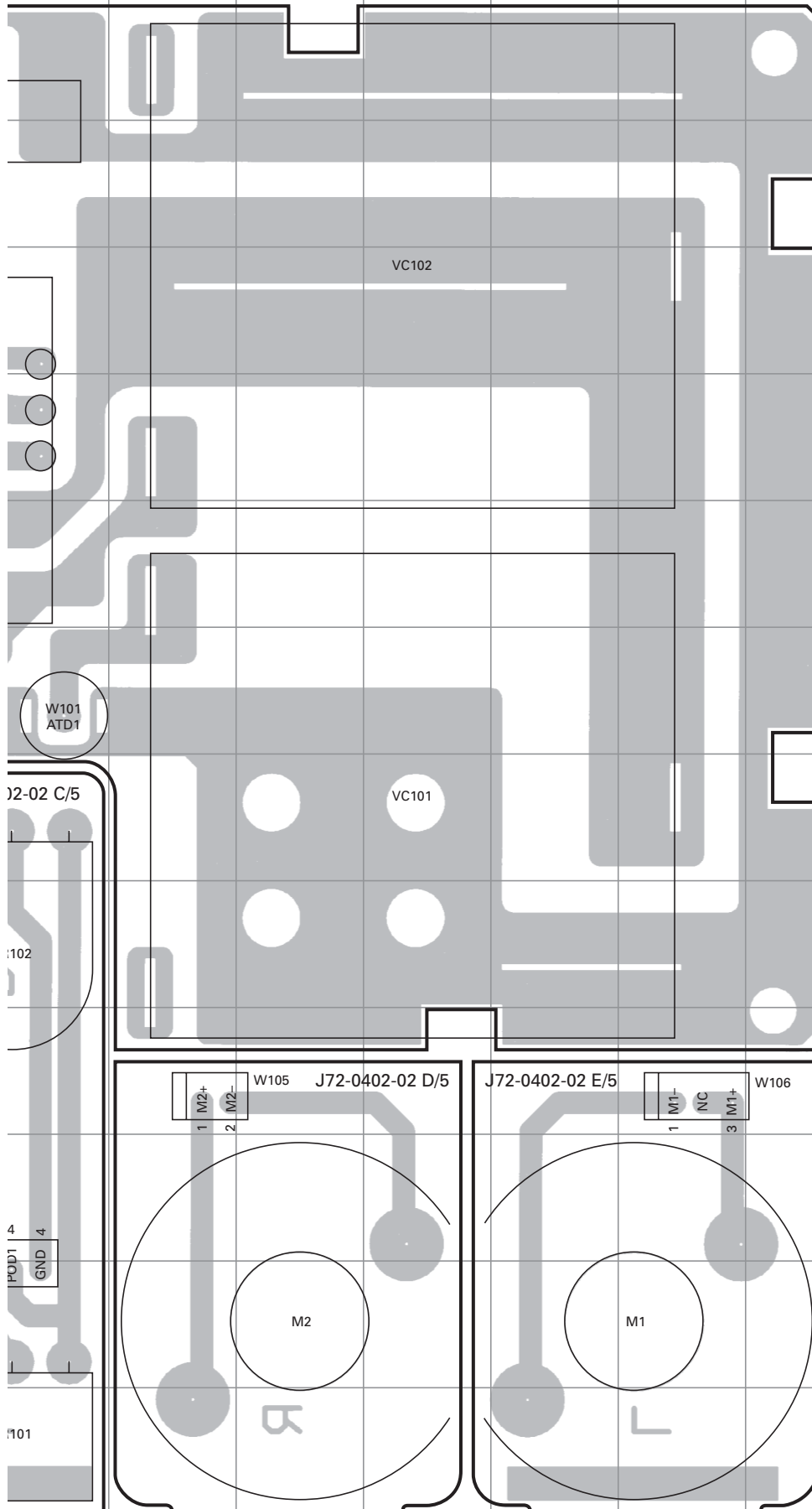


Diagram illustrating the cross-section of a two-layer material. The top layer is labeled "Layer 1" and the bottom layer is labeled "Layer 2". The top surface is labeled "Component side" and the bottom surface is labeled "Foil side".

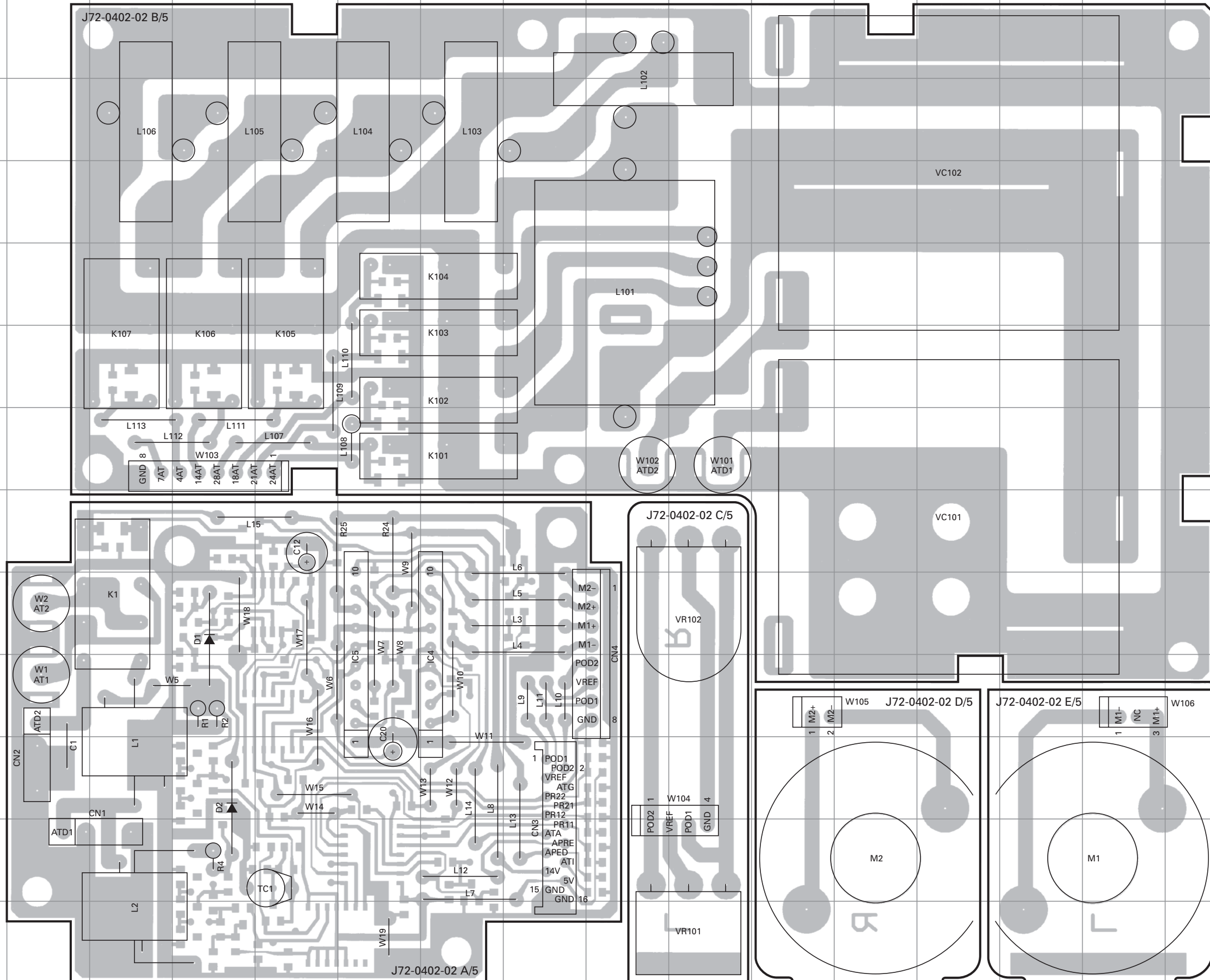
TK-80 KAT-2 (PC BOARD)

KAT-2 (PC BOARD) TK-80

AT UNIT (X53-3630-20) Component side view (J72-0402-02)

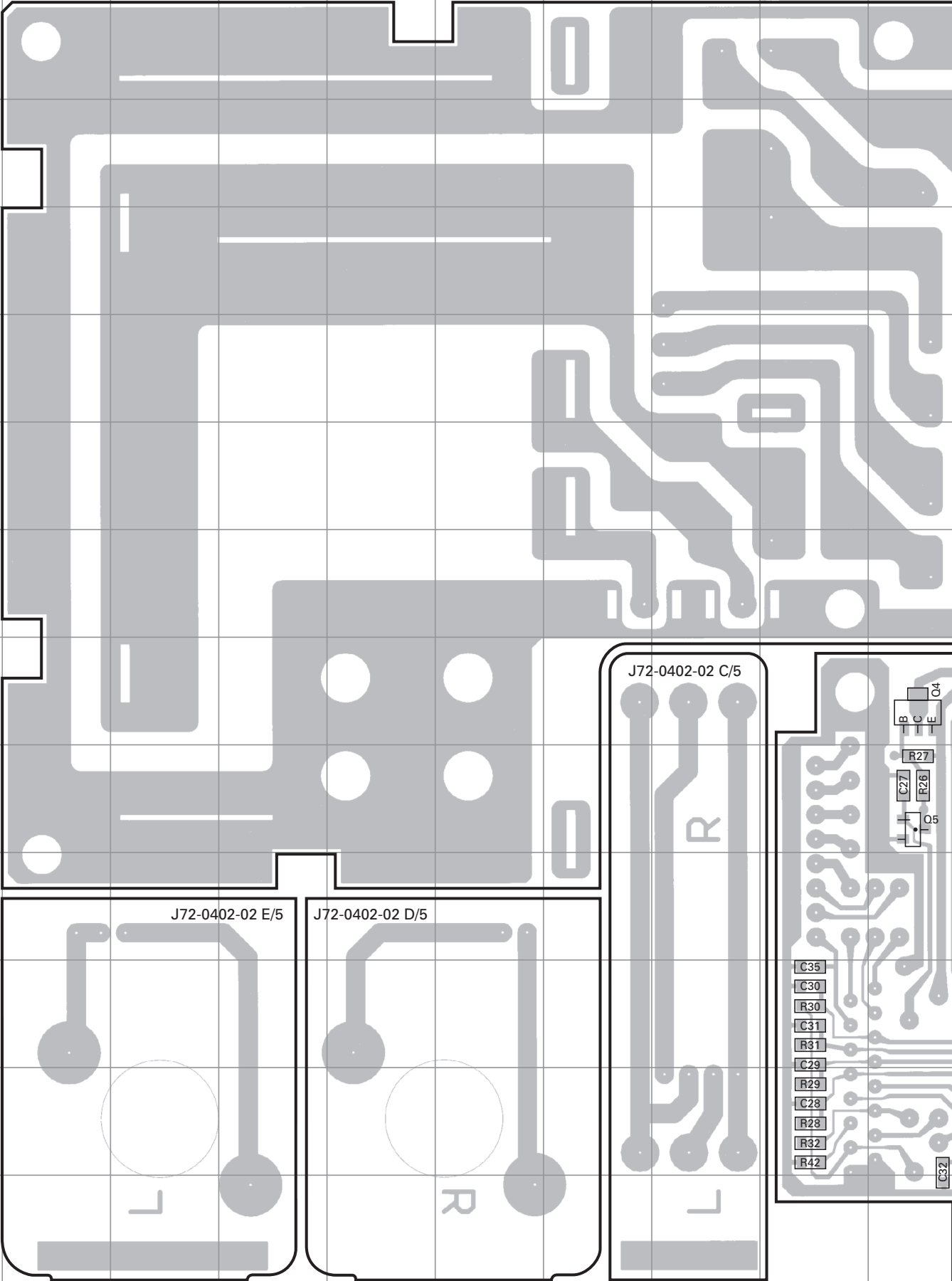
AT UNIT (X53-3630-20) Component side view (J72-0402-02)

| Ref. No. | Address |
|----------|---------|
| IC4      | 10G     |
| IC5      | 10F     |
| D1       | 9D      |
| D2       | 11D     |



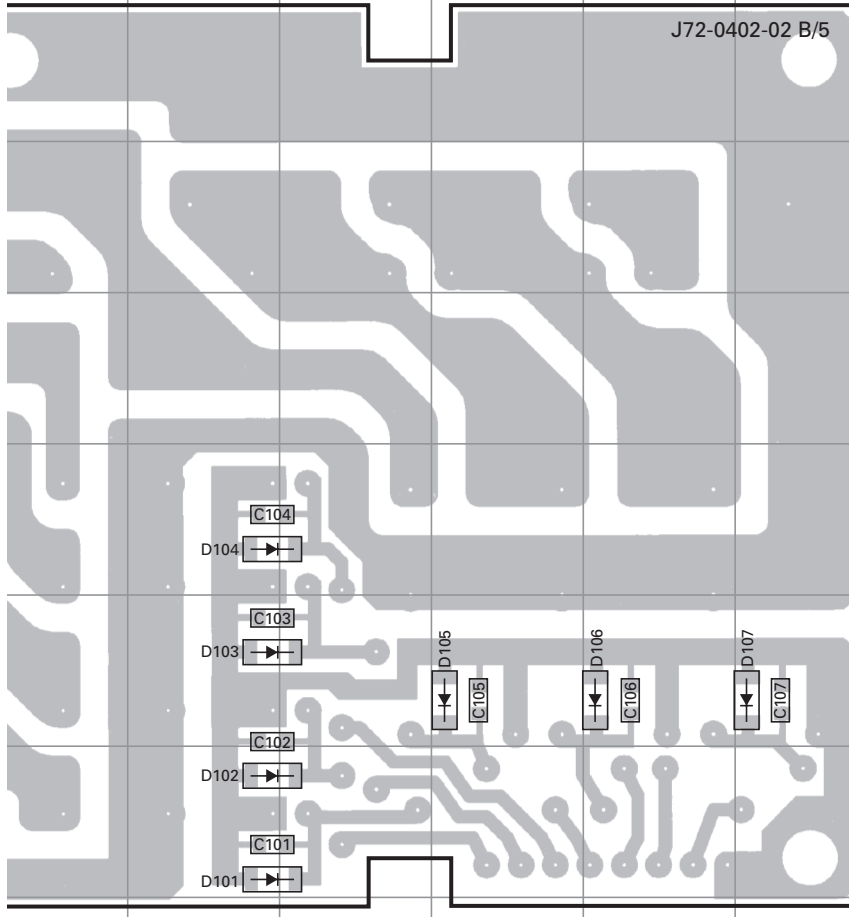
# TK-80 KAT-2 (PC BOARD)

AT UNIT (X53-3630-20) Foil side view (J72-0402-02)

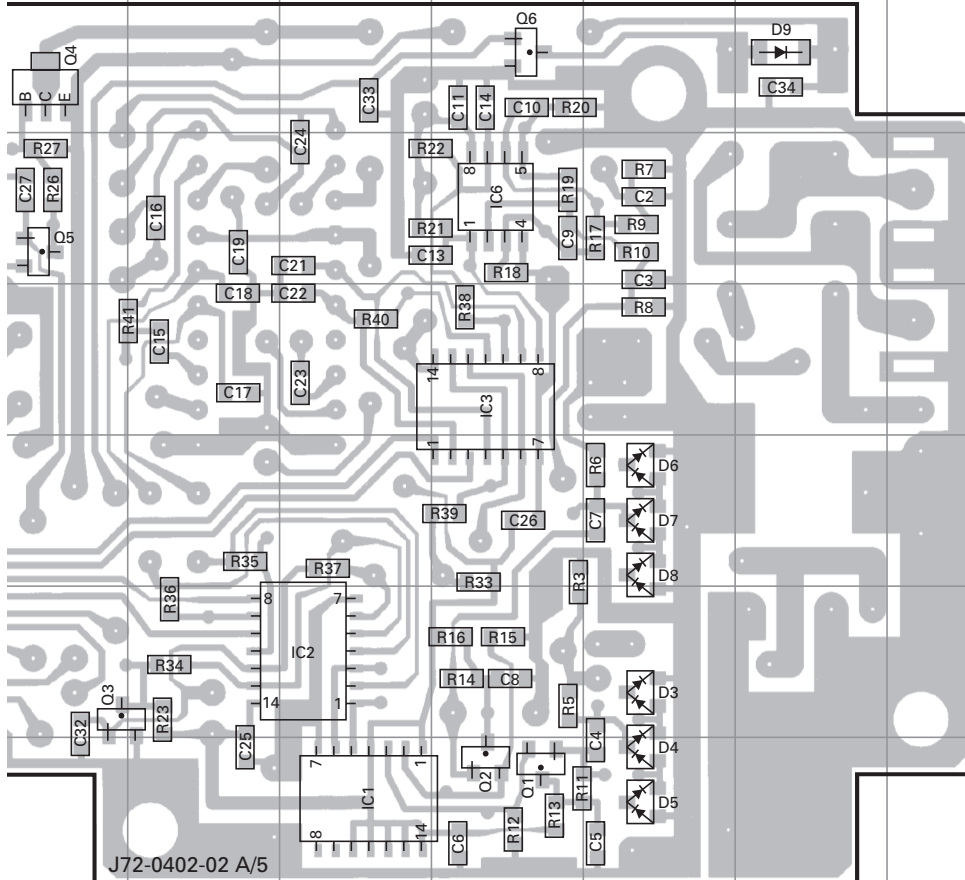


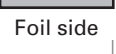
# KAT-2 (PC BOARD) TK-80

AT UNIT (X53-3630-20) Foil side view (J72-0402-02)



| Ref. No. | Address |
|----------|---------|
| IC1      | 13L     |
| IC2      | 12L     |
| IC3      | 10M     |
| IC6      | 9M      |
| Q1       | 13M     |
| Q2       | 13M     |
| Q3       | 12J     |
| Q4       | 8J      |
| Q5       | 9J      |
| Q6       | 8M      |
| D3       | 12N     |
| D4       | 13N     |
| D5       | 13N     |
| D6       | 11N     |
| D7       | 11N     |
| D8       | 11N     |
| D9       | 8O      |
| D101     | 7K      |
| D102     | 7K      |
| D103     | 6K      |
| D104     | 5K      |
| D105     | 6M      |
| D106     | 6N      |
| D107     | 6O      |



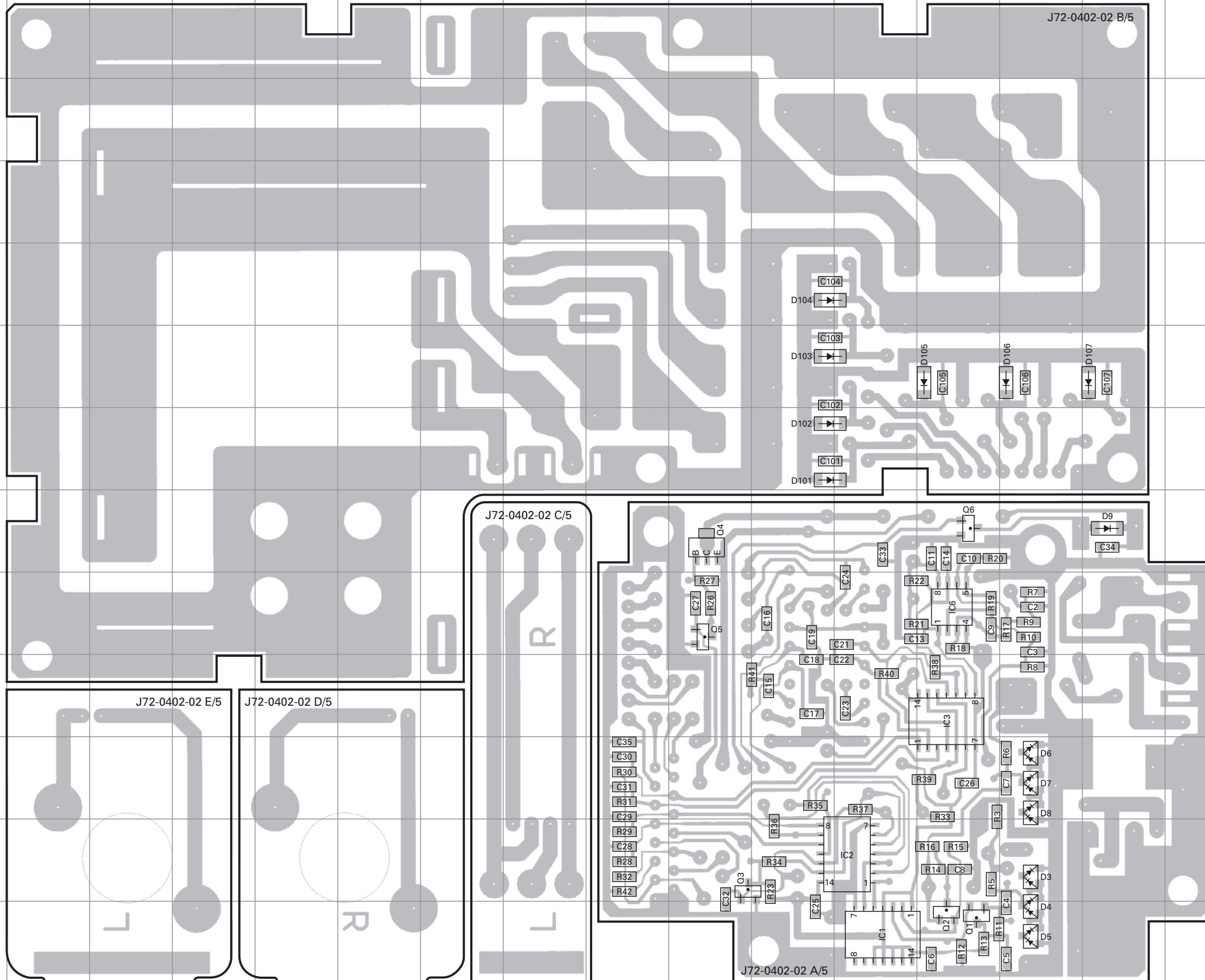
Component side  
 Layer 1   
 Layer 2   
 Foil side

TK-80 KAT-2 (PC BOARD)

KAT-2 (PC BOARD) TK-80

AT UNIT (X53-3630-20) Foil side view (J72-0402-02)

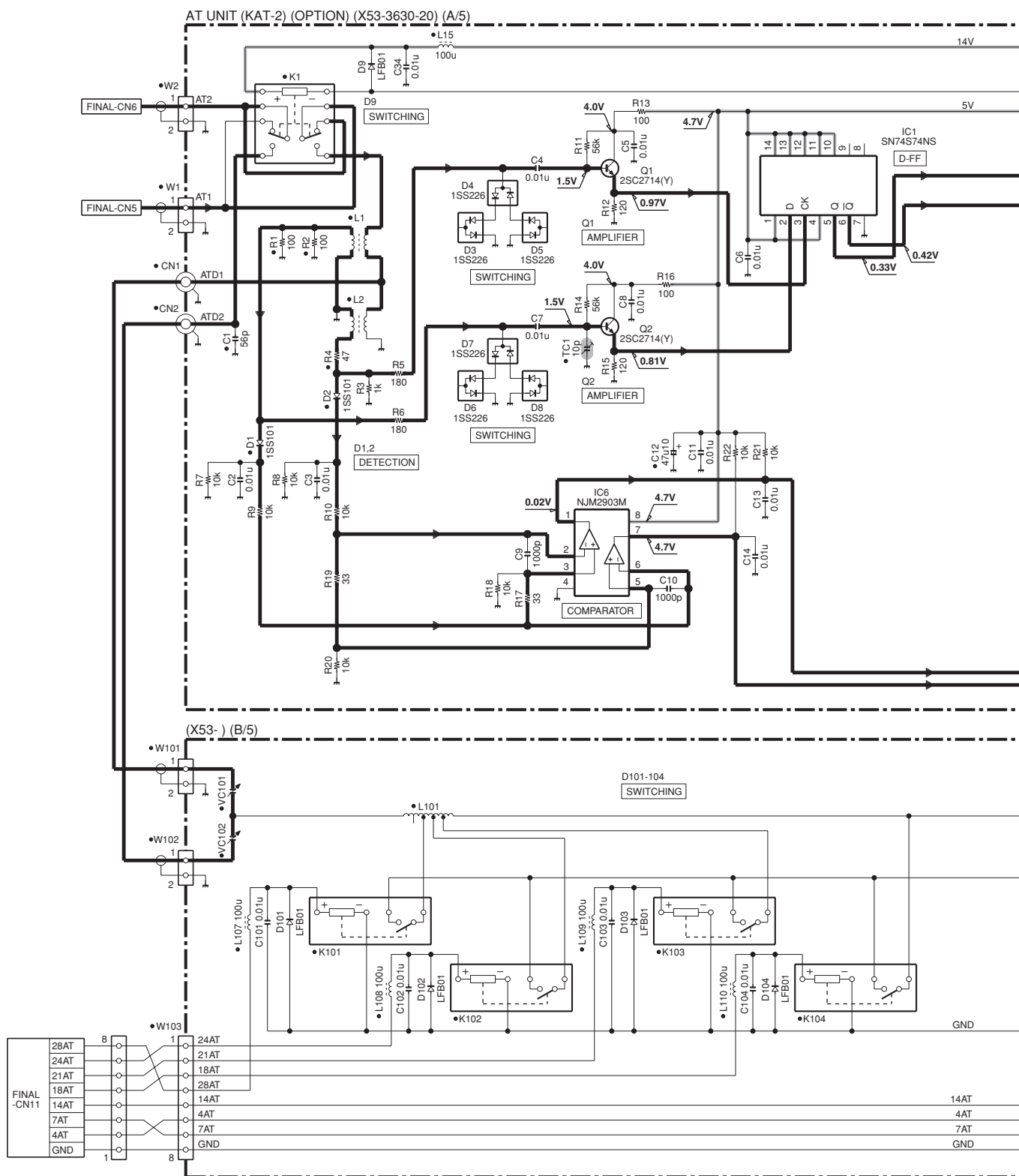
AT UNIT (X53-3630-20) Foil side view (J72-0402-02)



| Ref. No. | Address |
|----------|---------|
| IC1      | 13L     |
| IC2      | 12L     |
| IC3      | 10M     |
| IC6      | 9M      |
| Q1       | 13M     |
| Q2       | 13M     |
| Q3       | 12J     |
| Q4       | 8J      |
| Q5       | 9J      |
| Q6       | 8M      |
| D3       | 12N     |
| D4       | 13N     |
| D5       | 13N     |
| D6       | 11N     |
| D7       | 11N     |
| D8       | 11N     |
| D9       | 8O      |
| D101     | 7K      |
| D102     | 7K      |
| D103     | 6K      |
| D104     | 5K      |
| D105     | 6M      |
| D106     | 6N      |
| D107     | 6O      |

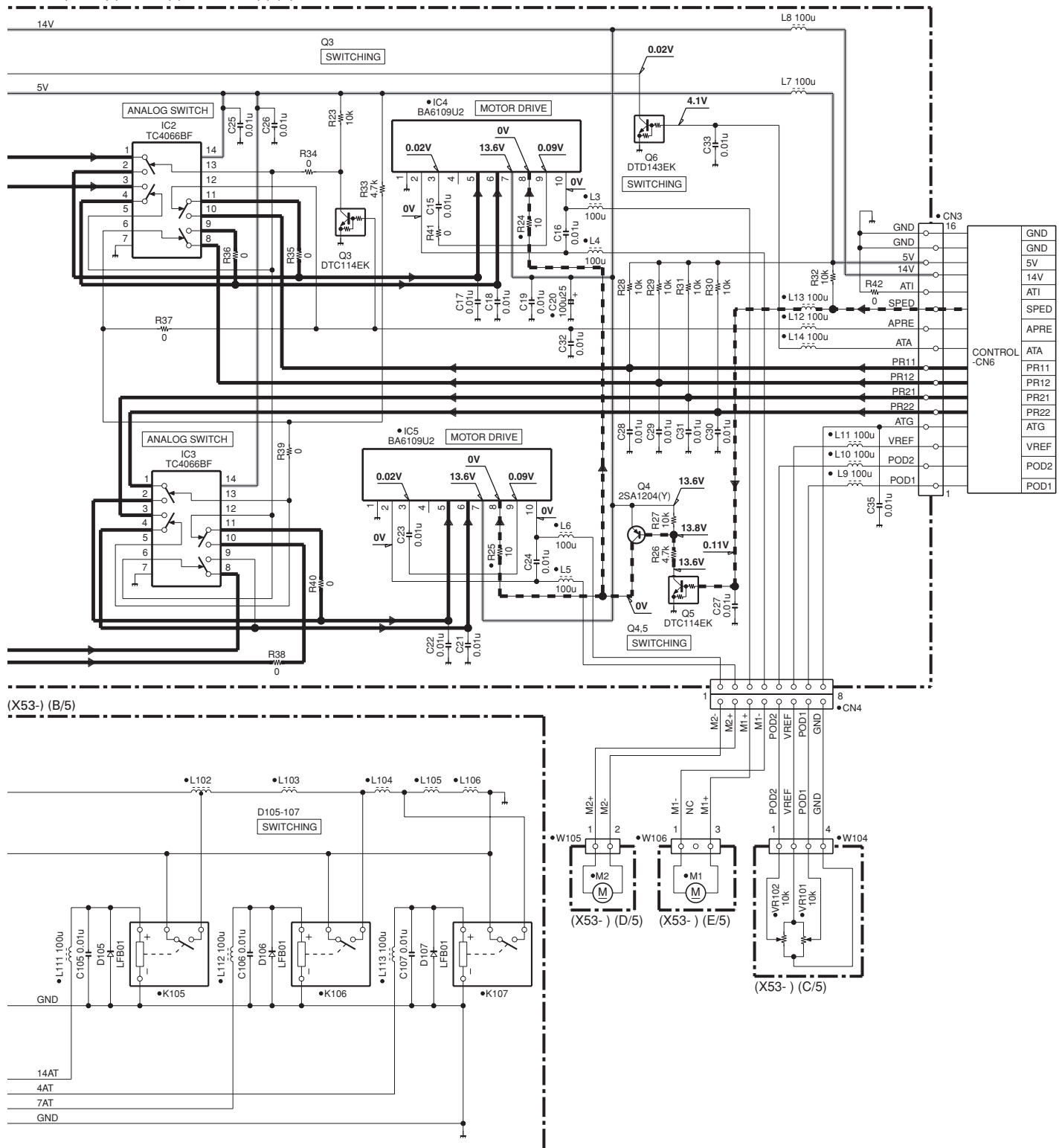
Component side  
Layer 1  
Layer 2  
Foil side

## 7

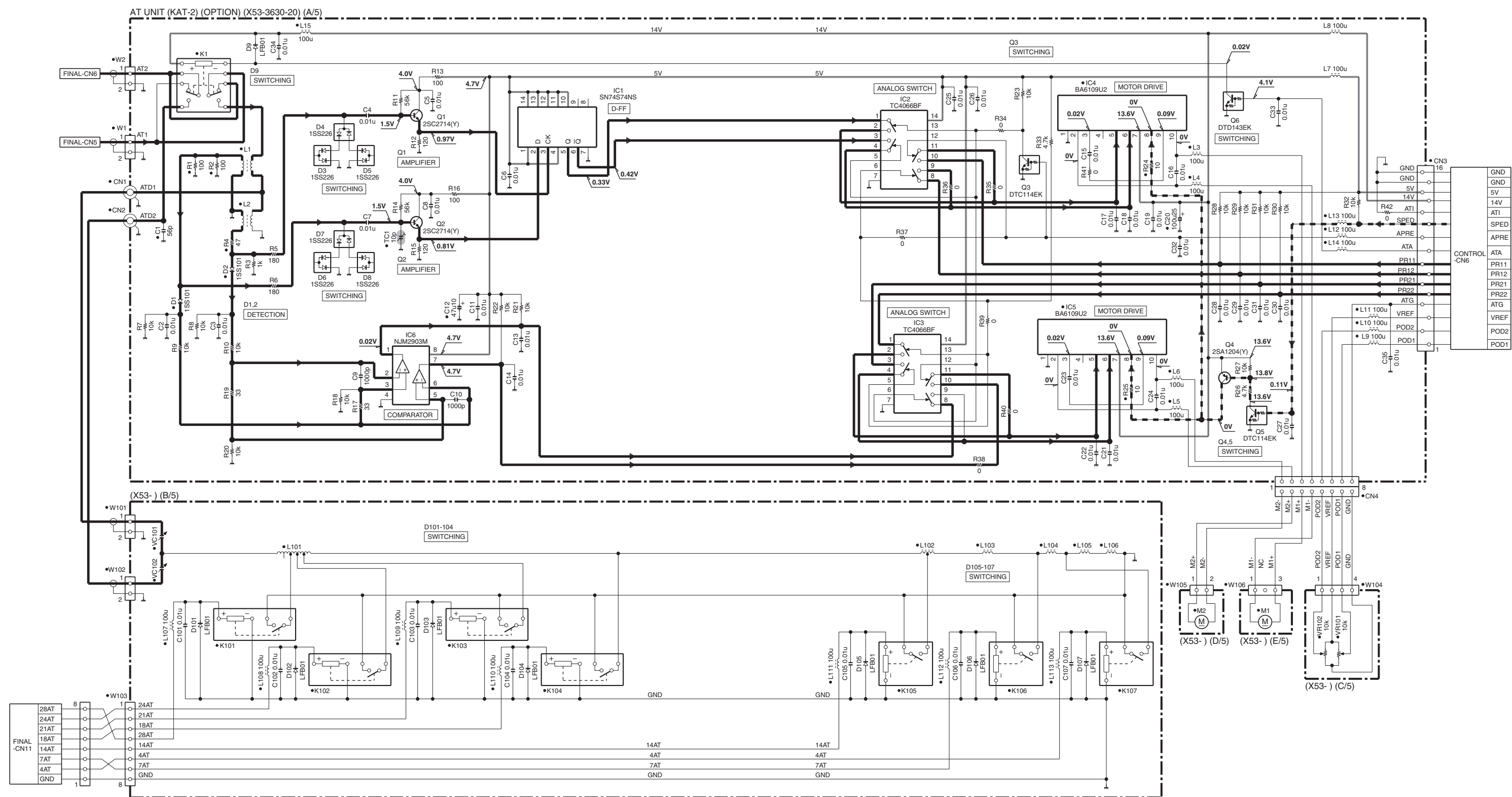


# KAT-2 (SCHEMATIC DIAGRAM) TK-80

AT UNIT (KAT-2) (OPTION) (X53-3630-20) (A/5)



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



## KPE-1 (Selective Call Kit)

### External View



### Components Description

#### SELECTIVE CALL UNIT (X52-3300-20)

| Ref. No. | Use / Function  | Operation / Condition            |
|----------|-----------------|----------------------------------|
| IC1      | FSK demodulator |                                  |
| IC2      | Buffer          |                                  |
| IC3      | DTMF decoder    |                                  |
| D4       | LED             | Lights when "MARK" signal input  |
| D5       | LED             | Lights when "SPACE" signal input |
| D6       | LED             | Lights when "FSK" signal input   |

### Circuit Description

The selective call unit consists of the DTMF decoder section and the FSK decoder section circuits.

#### 1. DTMF decoder

The DTMF tone input from the LCD assembly microphone input connector is input to IC3 via the TX-RX unit. When an effective tone is detected, the STD terminal becomes "H" and an enable TOE is output from the control unit's CPU. This in turn causes DTMF decode data to be output from IC3 and Q1 to Q4. The control unit's CPU reads in this DTMF decode data, converts it to FSK data and transmits.

#### 2. FSK decoder

The AF signal detected at the TX-RX unit is input to pin 2 of IC1. If it is an effective tone, the tone detect signal is output through buffer IC2 and FSL is sent to the control CPU. FSK decode data is sent from pin 7 of IC1 through buffer IC2 as the FSD to the control unit's internal CPU. The CPU detects conformity with code set for that unit and changes the mode clears AF muting, etc.

The IC1 internal VCO central frequency ( $f_0$ ) is determined by C5, R9 and VR1 and adjusted to 2210Hz. The tracking bandwidth ( $\Delta f$ ) is determined by R6, R9, and VR1.

### Terminal Function

| CN No. | Pin No. | Pin Name | Function                       |
|--------|---------|----------|--------------------------------|
| CN1    | 1       | AF       | Audio                          |
|        | 2       | AFG      | Audio GND                      |
|        | 3       | MIC      | MIC signal input               |
|        | 4       | MICG     | MIC GND                        |
| CN2    | 1       | DGND     | Digital GND                    |
|        | 2       | TOE      | DTMF decoder control           |
|        | 3       | Q1       | DTMF decode data               |
|        | 4       | Q2       | DTMF decode data               |
|        | 5       | Q3       | DTMF decode data               |
|        | 6       | Q4       | DTMF decode data               |
|        | 7       | STD      | Single tone detector           |
|        | 8       | DGND     | Digital GND                    |
|        | 9       | 5A       | 5V                             |
|        | 10      | FSD      | Selective call data            |
|        | 11      | FSL      | Selective call signal detector |
|        | 12      | DGND     | Digital GND                    |

### Adjustment

| Item                    | Condition              | Measurement    |                |          | Adjustment     |       |        | Specifications/<br>Remarks |
|-------------------------|------------------------|----------------|----------------|----------|----------------|-------|--------|----------------------------|
|                         |                        | Test-equipment | Unit           | Terminal | Unit           | Parts | Method |                            |
| 1. Frequency adjustment | 1) S1 changes to TEST. | f. counter     | Selective call | TP1      | Selective call | VR1   | 2210Hz | $\pm 2\text{Hz}$           |

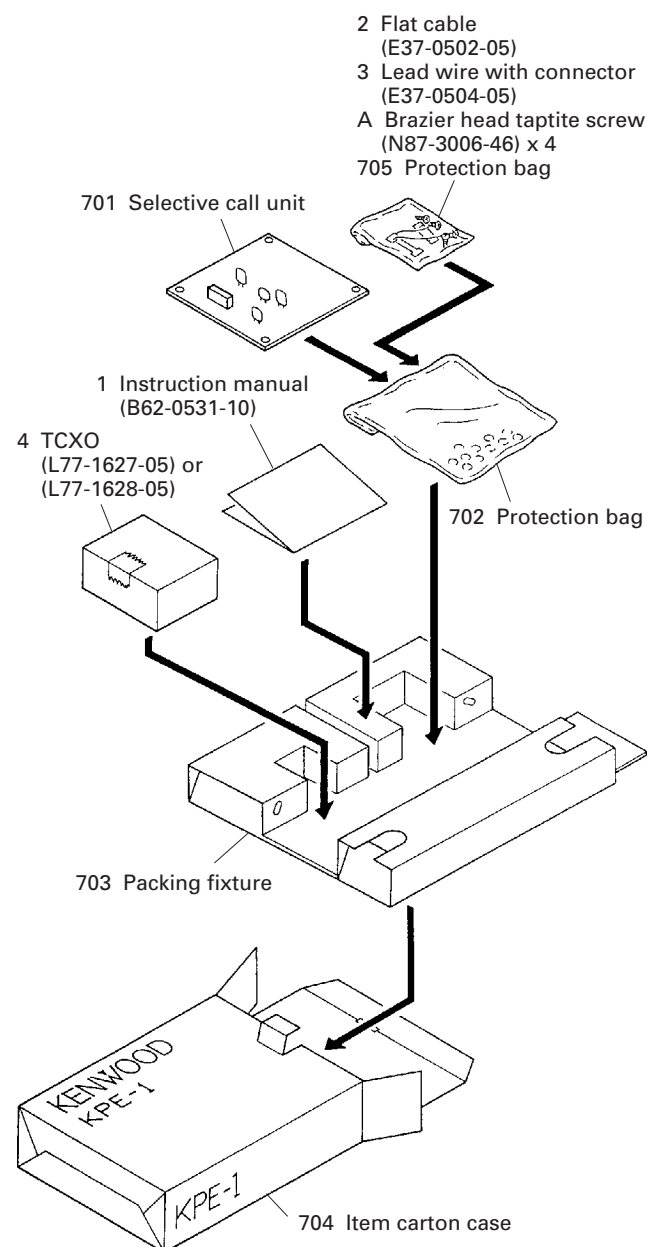
## KPE-1 (Selective Call Kit)

## Parts List

\* New Parts.

| Ref. No.                                 | Address | New parts | Parts No.     | Description                        | Destination |
|------------------------------------------|---------|-----------|---------------|------------------------------------|-------------|
| <b>KPE-1</b>                             |         |           |               |                                    |             |
| 1                                        |         | *         | B62-0531-10   | INSTRUCTION MANUAL                 |             |
| 2                                        |         |           | E37-0502-05   | FLAT CABLE                         |             |
| 3                                        |         |           | E37-0504-05   | LEAD WIRE WITH CONNECTOR           |             |
| 4                                        |         |           | L77-1627-05   | TCXO ACCESSORY                     |             |
| 4                                        |         |           | L77-1628-05   | TCXO ACCESSORY                     |             |
| A                                        |         |           | N87-3006-46   | BRAZIER HEAD TAPTITE SCREW         |             |
| <b>SELECTIVE CALL UNIT (X52-3300-20)</b> |         |           |               |                                    |             |
| D4-6                                     |         |           | B30-2004-05   | LED (RED)                          |             |
| C1                                       |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z                    |             |
| C2                                       |         |           | C92-0009-05   | CHIP-TAN 4.7UF 10WV                |             |
| C3                                       |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z                    |             |
| C4                                       |         |           | CQ92M1H184J   | MYLAR 0.18UF J                     |             |
| C5                                       |         |           | C91-1167-05   | LAMINATED C 0.015UF J              |             |
| C6                                       |         |           | CQ92M1H104J   | MYLAR 0.10UF J                     |             |
| C7                                       |         |           | CQ92M1H822J   | MYLAR 8200PF J                     |             |
| C8                                       |         |           | CQ92M1H392J   | MYLAR 3900PF J                     |             |
| C9                                       |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z                    |             |
| C10                                      |         |           | CK73FB1H103K  | CHIP C 0.010UF K                   |             |
| C11,12                                   |         |           | CC73FCH1H330J | CHIP C 33PF J                      |             |
| C13                                      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z                    |             |
| C14                                      |         |           | C92-0009-05   | CHIP-TAN 4.7UF 10WV                |             |
| C15                                      |         |           | CK73FF1E104Z  | CHIP C 0.10UF Z                    |             |
| C16                                      |         |           | CQ92M1H153J   | MYLAR 0.015UF J                    |             |
| CN1                                      |         |           | E40-3239-05   | PIN ASSY                           |             |
| CN2                                      |         |           | E40-5758-05   | FLAT CABLE CONNECTOR               |             |
| L1-4                                     |         |           | L40-1801-18   | SMALL FIXED INDUCTOR (18UH)        |             |
| X1                                       |         |           | L78-0301-05   | RESONATOR (3.5795MHZ)              |             |
| R1                                       |         |           | RK73FB2A474J  | CHIP R 470K J 1/10W                |             |
| R2,3                                     |         |           | RK73FB2A472J  | CHIP R 4.7K J 1/10W                |             |
| R4                                       |         |           | RK73FB2A474J  | CHIP R 470K J 1/10W                |             |
| R5                                       |         |           | RK73FB2A393J  | CHIP R 39K J 1/10W                 |             |
| R6                                       |         |           | RK73FB2A394J  | CHIP R 390K J 1/10W                |             |
| R7                                       |         |           | R92-0670-05   | CHIP R 0 OHM                       |             |
| R8                                       |         |           | RK73FB2A104J  | CHIP R 100K J 1/10W                |             |
| R9                                       |         |           | RK73FB2A223J  | CHIP R 22K J 1/10W                 |             |
| R10                                      |         |           | RK73FB2A332J  | CHIP R 3.3K J 1/10W                |             |
| R11-13                                   |         |           | RK73FB2A471J  | CHIP R 470 J 1/10W                 |             |
| R14                                      |         |           | RK73FB2A473J  | CHIP R 47K J 1/10W                 |             |
| R15                                      |         |           | RK73FB2A684J  | CHIP R 680K J 1/10W                |             |
| R16                                      |         |           | RK73FB2A334J  | CHIP R 330K J 1/10W                |             |
| R17                                      |         |           | RK73FB2A473J  | CHIP R 47K J 1/10W                 |             |
| VR1                                      |         |           | R32-0754-05   | SEMI FIXED VARIABLE RESISTOR (10K) |             |
| S1                                       |         |           | S62-0412-05   | SLIDE SWITCH                       |             |
| IC1                                      |         |           | NJM2211M      | MOS-IC                             |             |
| IC2                                      |         |           | SN74ALS04BNS  | MOS-IC                             |             |
| IC3                                      |         |           | LC7385M       | MOS-IC                             |             |

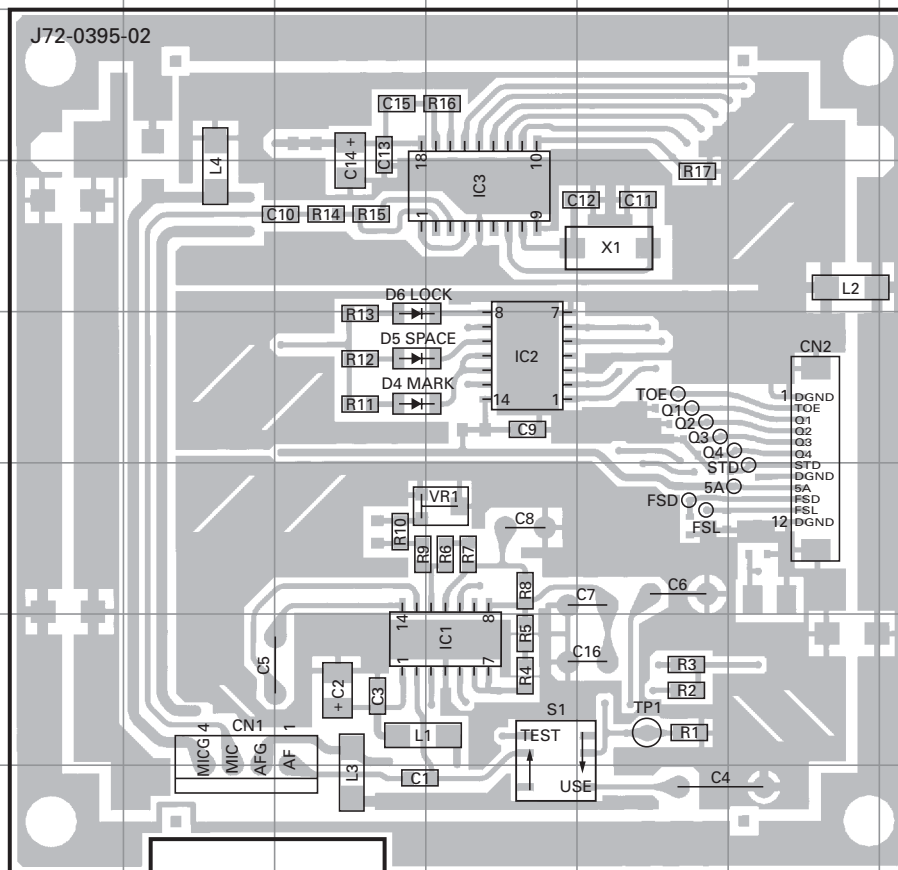
## Packing



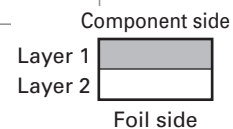
Parts with the exploded numbers larger than 700 are not supplied.

# TK-80 KPE-1 (PC BOARD)

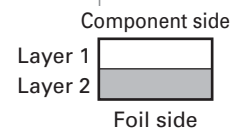
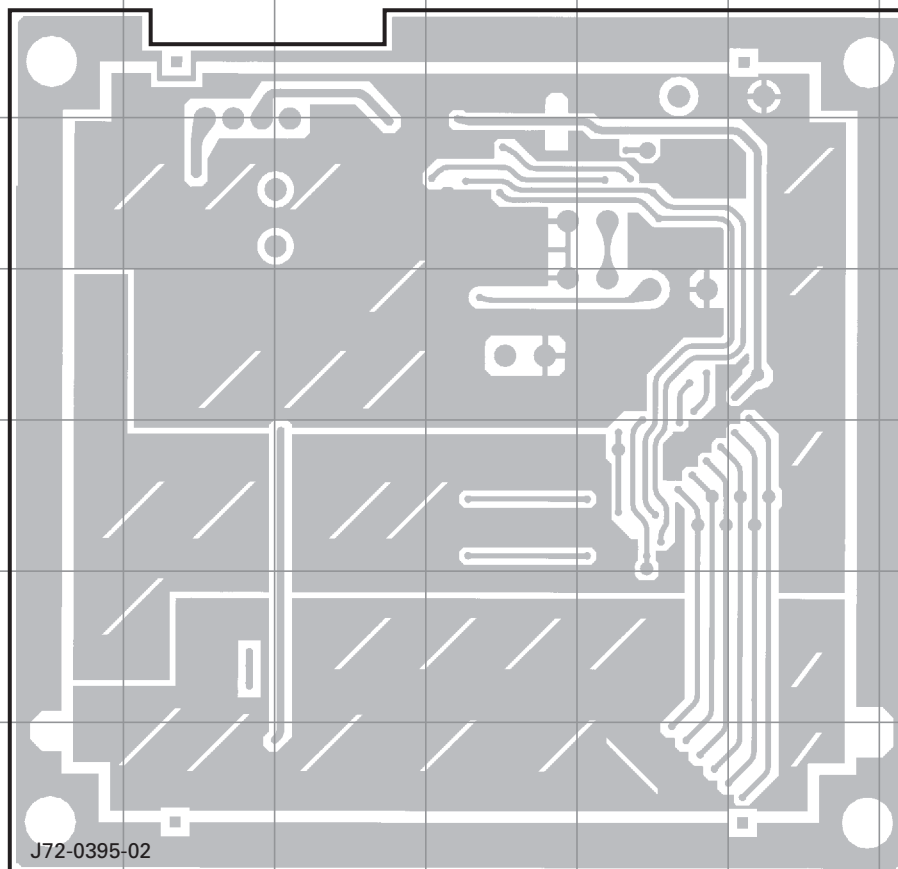
## SELECTIVE CALL UNIT (X52-3300-20) Component side view



| Ref. No. | Address |
|----------|---------|
| IC1      | 6E      |
| IC2      | 4E      |
| IC3      | 3E      |
| D4       | 4D      |
| D5       | 4D      |
| D6       | 4D      |

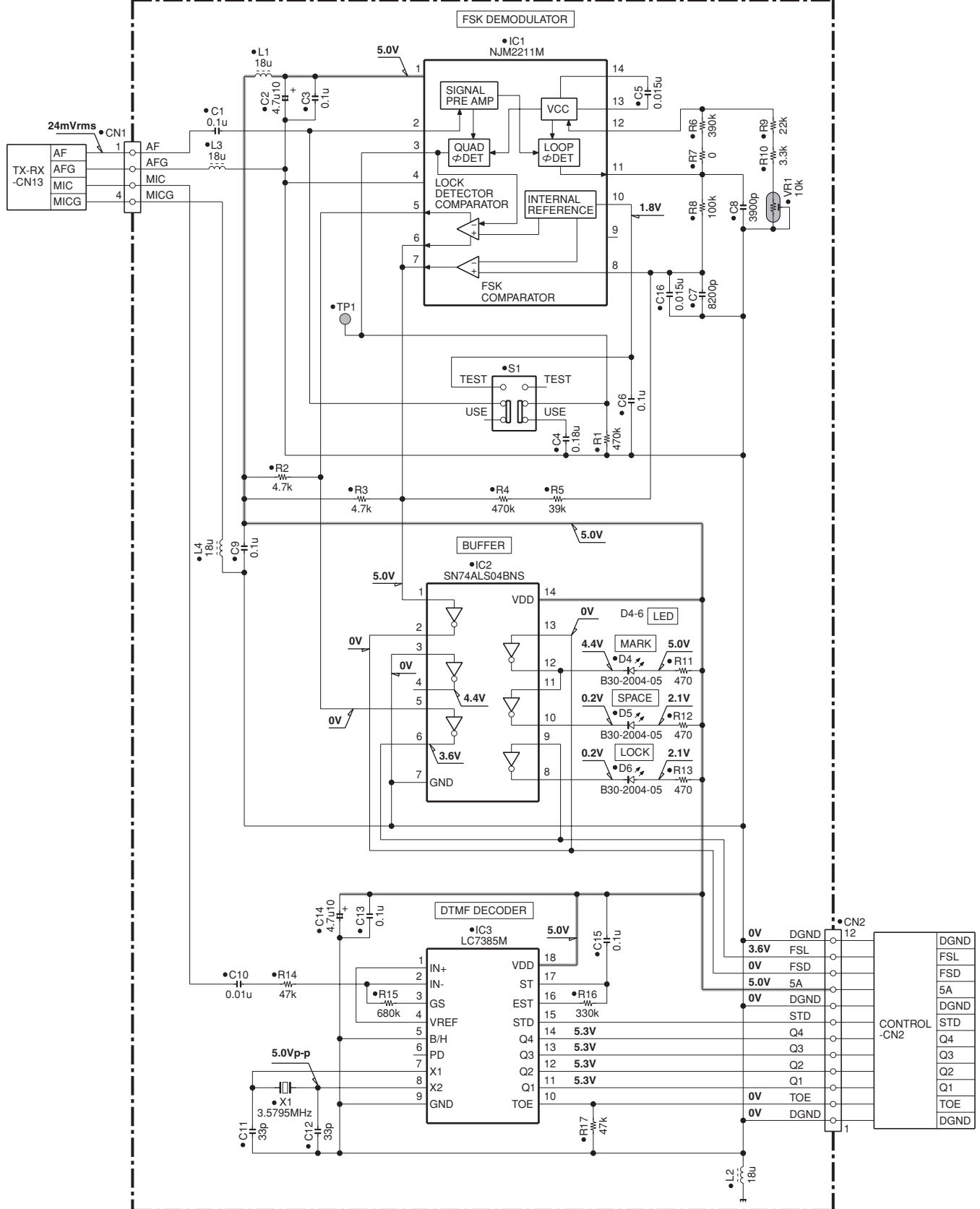


## SELECTIVE CALL UNIT (X52-3300-20) Foil side view



# KPE-1 (SCHEMATIC DIAGRAM) TK-80

SELECTIVE CALL UNIT (KPE-1) (OPTION) (X52-3300-20)



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

## SPECIFICATIONS

## General

|                                                                  |                  |
|------------------------------------------------------------------|------------------|
| Transmitter frequency range                                      |                  |
| TK-80 only .....                                                 | 1.8~2.39999MHz   |
|                                                                  | 3.5~4.49999MHz   |
|                                                                  | 6.0~7.99999MHz   |
|                                                                  | 11.0~14.49999MHz |
|                                                                  | 16.0~21.49999MHz |
|                                                                  | 24.0~29.99999MHz |
| TK-80 + KAT-2 .....                                              | 2.0~2.39999MHz   |
|                                                                  | 3.5~4.49999MHz   |
|                                                                  | 6.0~7.99999MHz   |
|                                                                  | 11.0~14.49999MHz |
|                                                                  | 16.0~21.49999MHz |
|                                                                  | 24.0~29.99999MHz |
| Receiver frequency range .....                                   |                  |
| 0.5~29.99999MHz                                                  |                  |
| Modes ..... J3E (SSB), A1A (CW), A3E (AM), F1B (FSK), J2B (AFSK) |                  |
| Operating temperature .....                                      |                  |
| -20°C~+60°C                                                      |                  |
| Power requirement .....                                          |                  |
| 13.6V DC $\pm$ 15% (negative ground)                             |                  |
| Current drain                                                    |                  |
| Receive .....                                                    | Less than 1.45A  |
| Transmit .....                                                   | Less than 20.5A  |
| Frequency stability .....                                        |                  |
| -10°C~+50°C, within $\pm$ 10ppm                                  |                  |
| -20°C~+60°C, within $\pm$ 15ppm                                  |                  |
| -10°C~+50°C, within $\pm$ 0.5ppm (with SO-2)                     |                  |
| -20°C~+60°C, within $\pm$ 1.0ppm (with KPE-1)                    |                  |
| Applicable MIL-STD .....                                         |                  |
| MIL-STD 810D: Vibration,                                         |                  |
| Method 514.3, Category 10, Procedure 1                           |                  |
| Antenna impedance .....                                          |                  |
| 50 $\Omega$                                                      |                  |
| Dimensions (W x H x D)                                           |                  |
| ..... 270 (10-5/8) x 96 (3-3/4) x 271 (10-11/16) mm (inch)       |                  |
| Weight (net) .....                                               |                  |
| 5.2kg (11.5 lbs)                                                 |                  |

## Receiver

|                                   |           |
|-----------------------------------|-----------|
| Circuitry .....                   |           |
| Double conversion superheterodyne |           |
| Intermediate frequencies          |           |
| 1st IF .....                      | 73.045MHz |
| 2nd IF .....                      | 10.695MHz |

## Sensitivity

|                             |                                          |
|-----------------------------|------------------------------------------|
| SSB/CW/FSK (10dB S/N) ..... | Less than 1 $\mu$ V (0.5~1.79999MHz)     |
|                             | Less than 0.25 $\mu$ V (1.8~29.99999MHz) |
| AM (10dB S/N) .....         | Less than 7.94 $\mu$ V (0.5~1.79999MHz)  |
|                             | Less than 2.5 $\mu$ V (1.8~29.99999MHz)  |

## Spurious response

|                      |                |
|----------------------|----------------|
| IF image ratio ..... | More than 70dB |
| IF rejection .....   | More than 80dB |

## Selectivity

|                         |                           |
|-------------------------|---------------------------|
| SSB/CW/FSK .....        | More than 2.2kHz (-6dB)   |
|                         | Less than 4.8kHz (-60dB)  |
| AM .....                | More than 5.0kHz (-6dB)   |
|                         | Less than 40.0kHz (-60dB) |
| CW (with YK-107C) ..... | More than 0.5kHz (-6dB)   |
|                         | Less than 2.0kHz (-50dB)  |

|                                |                                        |
|--------------------------------|----------------------------------------|
| Clarifier variable range ..... | $\pm$ 1.1kHz (10Hz step)               |
|                                | Dealer setting: $\pm$ 110Hz (1Hz step) |

|                              |                                              |
|------------------------------|----------------------------------------------|
| Audio output .....           | More than 3.5W (4 $\Omega$ , 10% distortion) |
| Audio output impedance ..... | 4 $\Omega$                                   |

## Transmitter

|                                     |                         |
|-------------------------------------|-------------------------|
| RF power output                     |                         |
| SSB/CW/FSK .....                    | 100W                    |
| AM (unmodulated signal) .....       | 25W                     |
| Carrier suppression .....           | More than 40dB          |
| Unwanted sideband suppression ..... | More than 50dB (1.0kHz) |
| Microphone impedance .....          | 600 $\Omega$            |

## Optional accessories

|                                                        |
|--------------------------------------------------------|
| KAT-2 (Internal automatic antenna tuner)               |
| KAT-1 (External automatic antenna tuner)               |
| MC-60A (Desktop microphone)                            |
| KPE-1 (Selective call kit)                             |
| KIF-1 (SSB filter 2.7kHz)                              |
| YK-107C (CW filter 500Hz)                              |
| SO-2 (Temperature controlled crystal oscillator; TCXO) |
| PC-1A (Phone patch interface)                          |
| MB-430 (Mobile mount bracket)                          |
| PS-53 (DC power supply 22.5A)                          |
| PS-33 (DC power supply 20.5A)                          |
| HS-6 (Headphones)                                      |

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