

# TM-255A/E

## SERVICE MANUAL

KENWOOD

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PHOTO is TM-255E

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### DESTINATION LIST

| Type    |    | Unit        | Destination    | Freq. range<br>(Guaranteed specification) | Transmit<br>power |
|---------|----|-------------|----------------|-------------------------------------------|-------------------|
| TM-255A | K  | Y52-3190-11 | North America  | 144.0 to 147.999995 MHz                   | 40 W              |
| TM-255A | M  | Y52-3190-21 | General Market | 144.0 to 147.999995 MHz                   | 40 W              |
| TM-255E | E  | Y52-3192-71 | Europe         | 144.0 to 145.999995 MHz                   | 40 W              |
| TM-255E | E9 | Y52-3192-72 | France         | 144.0 to 145.999995 MHz                   | 40 W              |



## CIRCUIT DESCRIPTION

## PLL CIRCUIT

## • Frequency Processing PLL

PLL operation is based on a reference frequency of 10.24 MHz, and allows coverage of the 144 to 146 MHz (E) and the 144 to 148 MHz (K, M) operating band in 5 to 200 Hz steps (50 to 2000 Hz steps for FM), depending on how fast the through-type encoder is turned. When the encoder stops, the selected frequency will be an integral multiple of 5 Hz (50 Hz for FM mode). Figure 2 shows the frequency configuration of the transceiver, and Figure 3, the frequency processing block diagram.

## • Reference frequency uses

The 10.24 MHz reference frequency,  $f_{STD}$ , is generated by temperature-controlled crystal oscillator (TCXO) X201. The reference frequency is used in four main ways:

- It is sent to various other circuits and used, either directly or after multiplication, as a reference frequency.
- It is input to the PLL IC, IC204 (CXD1225M), on the PLL reference frequency.
- It is input to the FM IF HIC, IC3 (KCD04), via Q201 (2SC2712), when it is used as the local oscillator frequency for squelched FM reception.
- It is doubled to 20.48 MHz by Q202 (2SC2714) to produce the DDS reference signal, which is amplified by Q203 (2SC2712) and input to the DDS subunit (X58-4020-00, 01).

## • LO1 (PLL loop)

The VCO subunit (X58-4110-00) generates a signal of 133.305 to 135.305 MHz (E) and 133.305 to 137.305 MHz (K, M). The 10.24 MHz reference signal,  $f_{STD}$ , is input to pin 5 of the PLL IC, IC204 (CXD1225M), where it is divided by 20 to produce a 512 kHz comparison frequency. The VCO output is split into two. One signal is amplified by Q216 (2SC2714) and is output to the RF circuit as LO1. The other signal is amplified by Q215 (2SC2714) and input to the Q352 (2SC2714) mixer.

The DDS2 output is mixed with the 10.24 MHz  $f_{STD}$  by IC201 (SN16913P). The resulting signal is passed through the band-pass filter to generate a 11.321 to 11.833 MHz signal, which is input to IC202 (SN16913P). This signal and  $f_{STD}$  are tripled by Q207 (2SC2714) and Q209 (2SC2714) to generate a 92.16 MHz signal. It is mixed by IC202 and passed through the band-pass filter, amplified by Q211 (2SC2714) to generate a 103.481 to 103.993 MHz signal. The signal is input to Q352 (2SC2714) mixer.

This signal is mixed with the VCO output as the minimum step for the encoder, passed through a band-pass filter to generate a 29.696 to 31.744 MHz signal. It is then passed through Q213 (2SC2714) amplifiers and input to pin 11 of IC204 (CXD1225M). The signal divided by N by the PLL IC is compared with the 512 kHz signal by the phase comparator, and the VCO frequency is locked.

Divide ratio N is transmitted from the control unit as data that covers 144 to 146 MHz (E) and 144 to 148 MHz (K, M) in 512 kHz steps ( $N = 58$  to  $62$ ; a multiple of 2). The divide ratio is changed automatically when the operational frequency is a multiple of 512 kHz, as follows.

When  $f = 144.000$ ,  $N = 58$ ,  $f_{DDS} = 1.209$  MHz

When  $f = 145.000$ ,  $N = 60$ ,  $f_{DDS} = 1.185$  MHz

## • CAR

The DDS1 output is mixed with the 10.24 MHz reference signal  $f_{STD}$  by IC203 (SN16913P) to produce a 10.695 MHz signal for local oscillation and detection in modes other than FM. This signal is passed through the ceramic filter and Q206 (2SC2714) amplifier.

In FM mode, the DDS1 stops, and the Q18 (2SC2712) crystal oscillator circuit is operated in transmit mode, and the modulated 10.695 MHz signal is output.

SSB, CW mode switching, IF shift, carrier point fine adjustment, and CW mode pitch change are performed.

## CIRCUIT DESCRIPTION

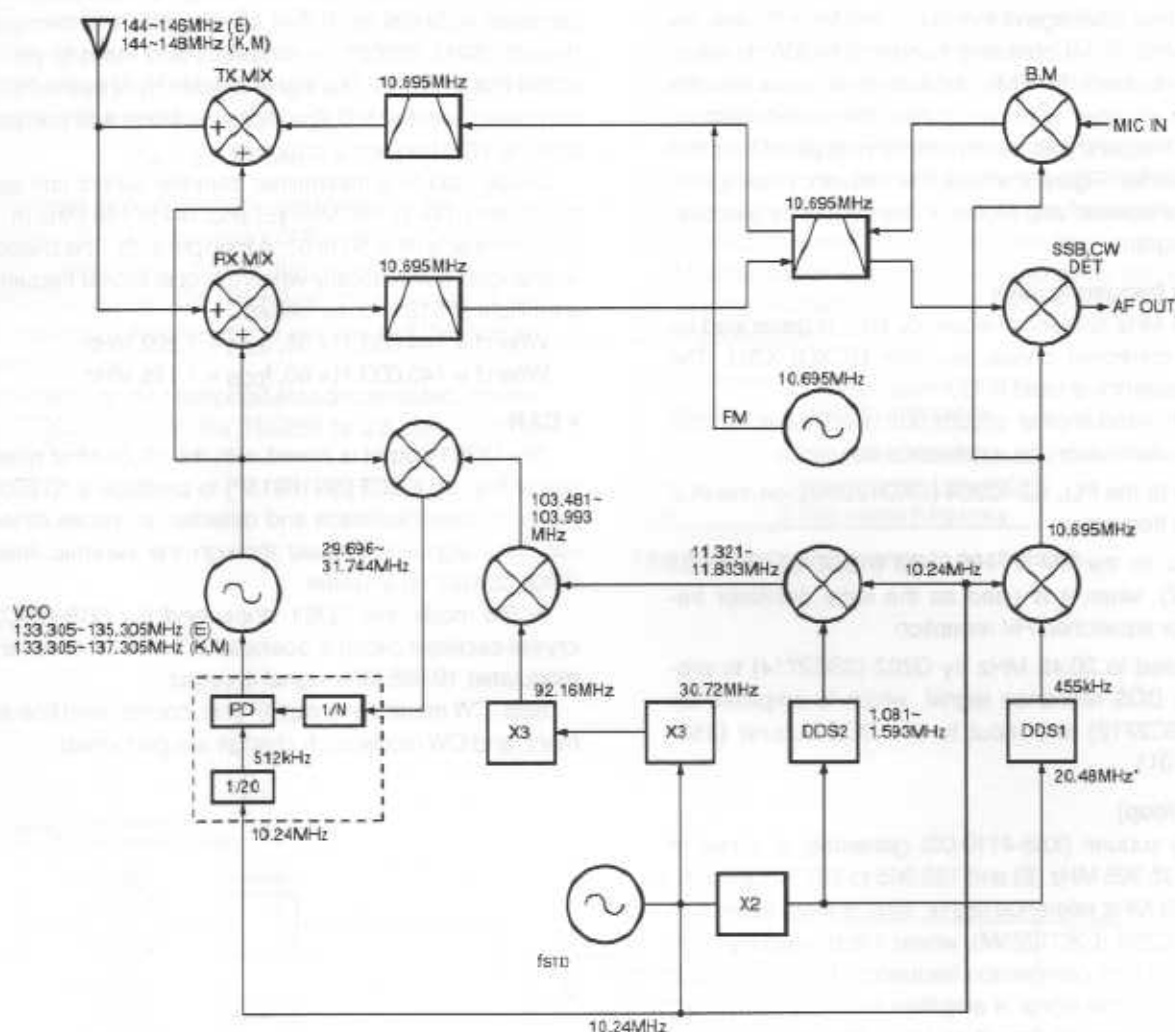
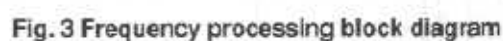


Fig. 2 Transceiver frequency configuration

### DDS1

|     | Receiver | Transmitter |
|-----|----------|-------------|
| USB | -1.5kHz  | -1.5kHz     |
| LSB | +1.5kHz  | +1.5kHz     |
| CW  | -1.5kHz  | +0.7kHz     |





## CIRCUIT DESCRIPTION

### RECEIVER CIRCUIT CONFIGURATION

Except for FM reception, the receiver uses single conversion with a first IF of 41.415 MHz and a second IF of 10.695 MHz. For FM, double conversion is used with a second IF of 455 kHz.

The signal from the antenna passes through a low-pass filter in the final block, and is switched to the front-end of the RF section system via a diode transmit/receive switch. It then passes through a two-stage high-Q band pass filter, a RF amplifier and a three-stage band pass filter tuned with variable capacitor. The signal then enters the mixer, where it is mixed with the LO1 signal [133.305 to 135.305 MHz (E), 133.305 to 137.305 MHz (K, M)] and so converted to the first IF of 10.695 MHz. The first IF signal is then passes through two-stage MCF, and amplified by junction FET, which passes through as MCF to the IF section.

The IF signal is amplified by a MOS FET IF amplifier and split into two to feed the SSB and FM circuits. In the SSB circuit, the IF amplifier output passes through a crystal filter and enters, goes to the SSB hybrid HIC (KCD08), where it is product-detected. In the FM circuit, the IF amplifier output directly enters the FM hybrid HIC (KCD04), where it is converted to the second IF of 455 kHz and detected. Either of the detected audio signals output from the hybrid HIC can be selected with a analog switch. The selected signal is amplified, passes through a muting circuit and electronic volume control, and is input to the AF amplifier, which drives the speaker. (Fig. 4)

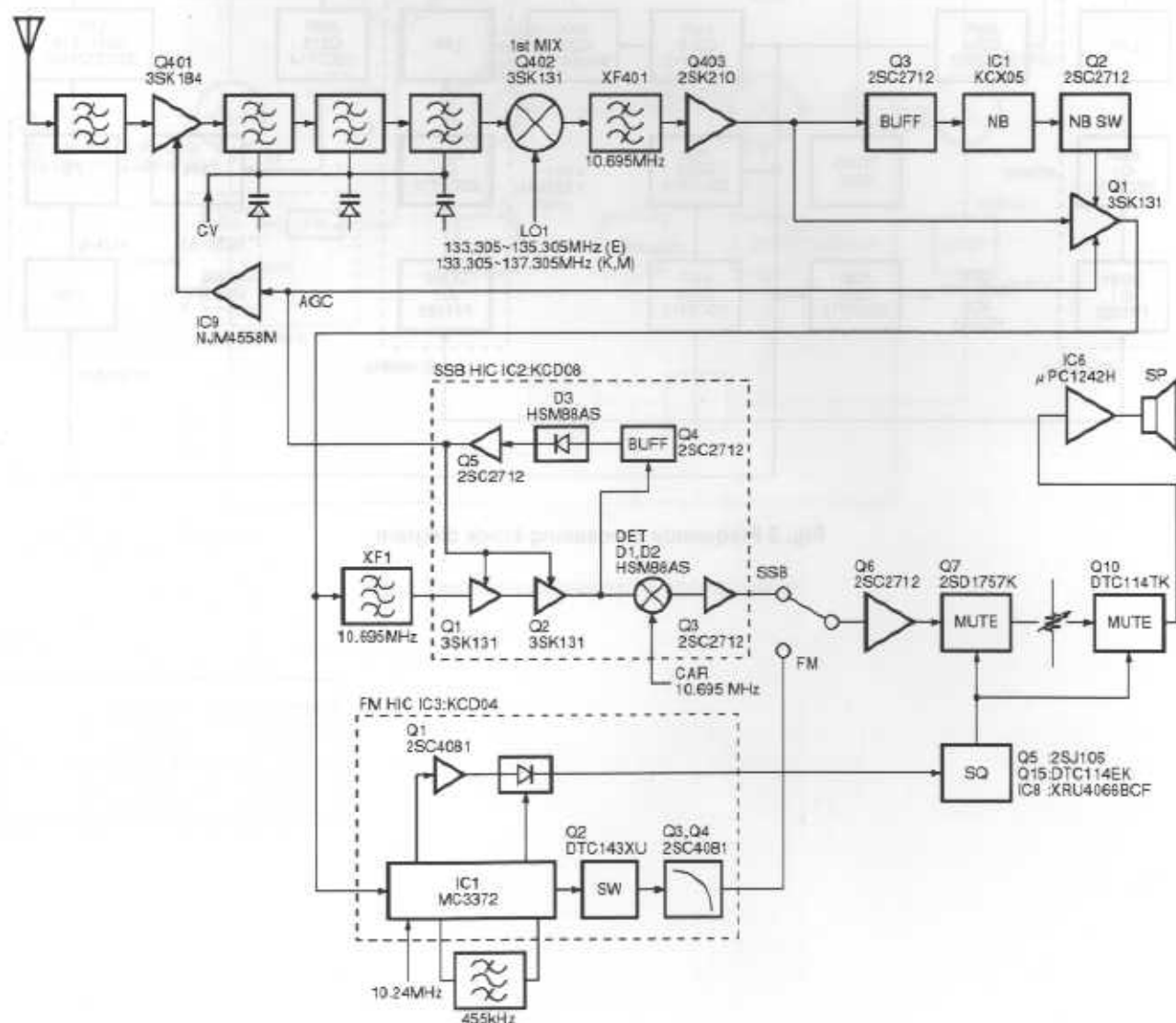


Fig. 4 Receiver circuit block diagram

## CIRCUIT DESCRIPTION

### • Receiver frontend

The receiver frontend consists of a two-stage high-Q band pass filter, an RF amplifier comprising GaAs FET Q401 (3SK184) three-stage band pass filter tuned with variable capacitor, and a mixer Q402 (3SK131(M)) and an IF amplifier consist of J-FET Q403 (2SK210(GR)).

The gain is controlled by applying the AGC voltage to the second gate of Q401. When the AIP signal is on, Q404 (DTC114EK) turns on, decreasing the AGC voltage and so reducing the gain of Q401 to produce the AIP effect.

### • AGC circuit

In the TM-255 the AGC voltage is applied to both Q401 of the RF amplifier and MOS FET Q1 (3SK131) of the IF amplifier. The AGC voltage is detected and amplified by SSB hybrid IC IC2 (KCD08). Since the voltage changes in the positive range only, attenuation is not obtained if it is applied to Q401, which is a GaAs FET. Thus, the AGC voltage is applied directly to the second gate of Q1 as IF AGC, and also applied to the second gate of Q401 by converting the level with the non-inverting amplifier comprising, operational amplifier IC9 (NJM4558M), so that the voltage changes in the negative range as well.

The time constant is automatically switched to SLOW for SSB and FAST for CW by Q17 (2SK208). (Fig. 5)

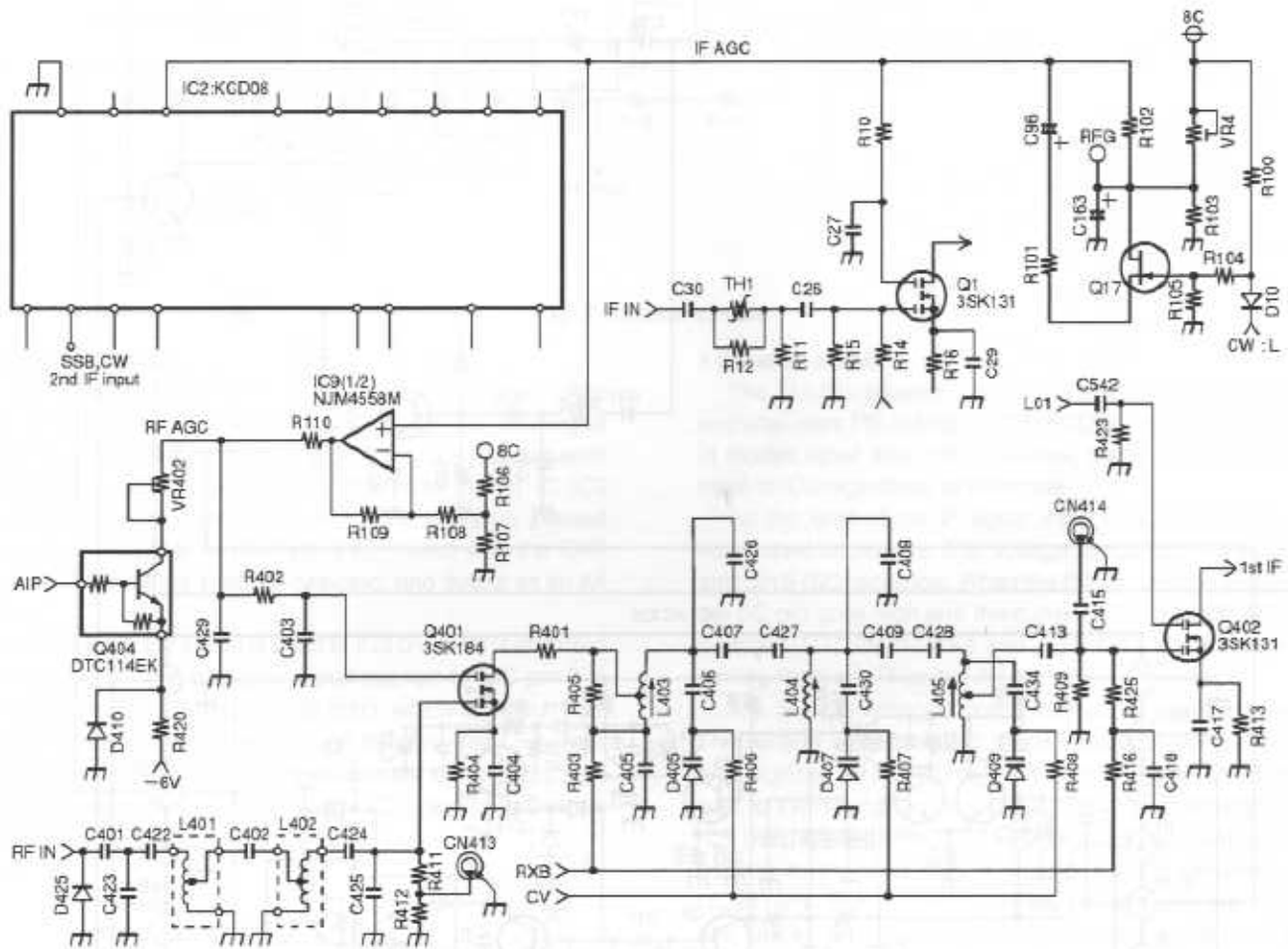


Fig. 5 Receiver front-end and AGC circuit

## CIRCUIT DESCRIPTION

### • Noise Blanker Circuit

The IF signal from the RF section is split into two. The part destined for eventual demodulation goes to the IF amplifier, Q1 (3SK131); the other part goes to pin 5 of the noise blanker HIC, IC1 (KCX05), via noise blanker buffer transistor Q3 (2SC2712). The noise blanker HIC amplifies the noise component in the second IF signal, then detects it to produce a control signal that mirrors the presence or absence of noise. This control signal is output from pin 8 of the noise blanker HIC and turns noise blanker switch Q2 (2SC2712) on or off. Q2, in turn, controls the IF amplifier, Q1, so that when there is a noise spike, Q2 switches Q1 from the source to ground, and the noise is blanked.

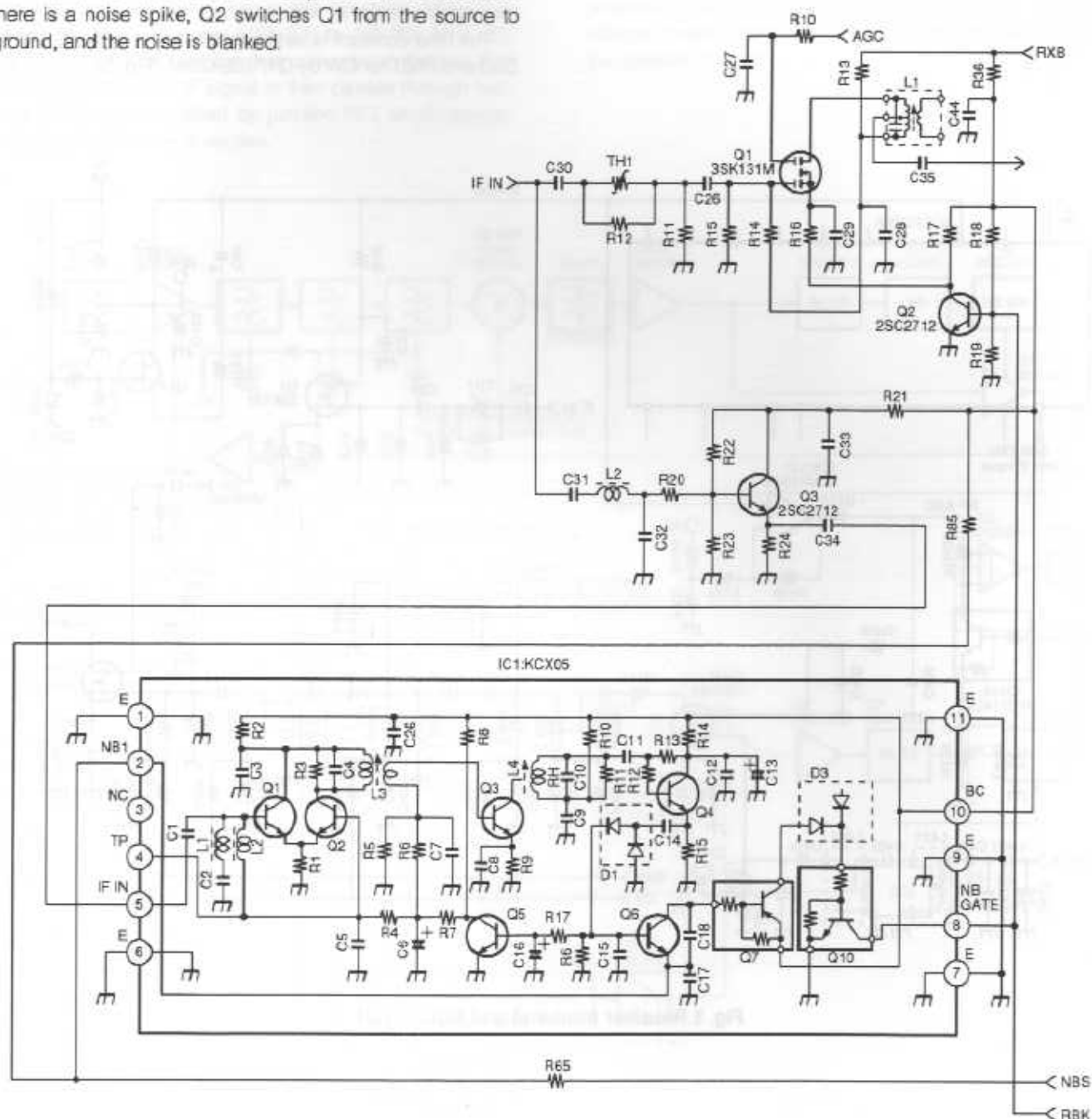


Fig. 6 Noise blanker circuit

## CIRCUIT DESCRIPTION

## • S-meter circuit

In modes other than FM, the S-meter circuit uses the RF AGC voltage produced by applying the AGC voltage (IF AGC voltage) output from IC2 through IC9 (1/2) (NJM4558M). The signal is input to IC9 (2/2) (NJM4558M) and amplified and output.

In FM, the level detection signal from IC3 pin 11 is used without modification. The S-meter output is changed by analog switch IC4 (XRU4066BCF) according to the mode, and output to the control unit.

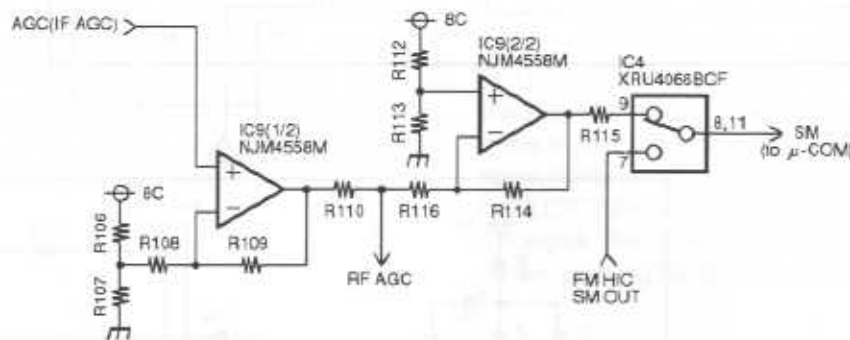


Fig. 7 S meter circuit

## • Detection circuit

The signal input to the IF unit is amplified by IF amplifier Q1. In SSB and CW, this signal is split into two: one signal goes to FM detection hybrid IC IC3 (KCD04) for squelch control; the other goes to SSB detection hybrid IC IC2 (KCD08) through crystal filter XF1. The signal is passed through an amplifier in the hybrid IC, mixed with the CAR signal (10.695 MHz), product-detected, and output as an AF signal.

In FM mode, the signal is input to IC3 only and then mixed with the 10.24 MHz oscillator signal applied to HIC pin 3 to generate the third IF signal (455 kHz), which is output from pin 25. The signal is passed through ceramic filter CF1, input to pin 7 again, detected by the quadrature detector with the signal phase-shifted by discriminator CD1, and output as the AF signal.

## • Squelch circuit

The TM-255 squelch circuit is of the noise squelch type, and also uses FM hybrid IC IC3 (KCD04) for noise detection in modes other than FM. Therefore, the IF signal is always input to IC3 regardless of the mode.

As the level of the IF signal input to IC3 increases, the noise level decreases. The voltage at IC3 pin 10 (SQ) falls, and pin 9 (SC) goes low. When the SQ pin voltage increases, the SC pin goes high and the current flows through AF mute switches Q7 (2SD1757K) and Q10 (DTC114TK) via R62, turning them on. Thus, the AF signal line is muted.

The SQ pin voltage control method is explained below. The voltage corresponding to the squelch VR angle is read and digitized by the microprocessor in the panel unit. Data is sent to the microprocessor in the control unit. Analog switch IC8 (XRU4066BCF) and Q15 (DTC114EK) are switched according to the data sent to serial-to-parallel converter IC7 (TC9174F). The synthesis resistance between the SQ pin and GND is changed stepwise by connecting R92 to R96 in series or bypassing them.



## CIRCUIT DESCRIPTION

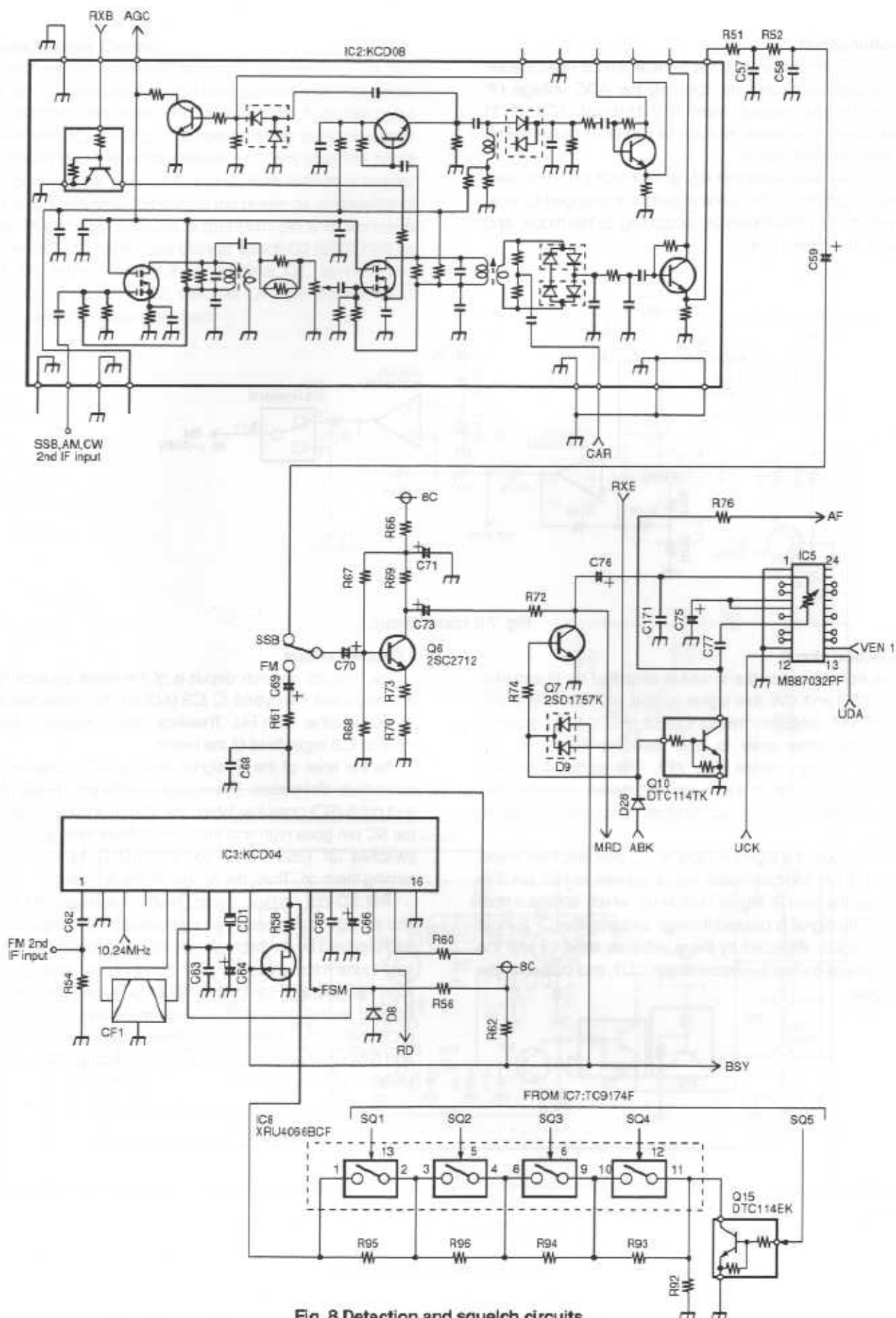


Fig. 8 Detection and squelch circuits

## CIRCUIT DESCRIPTION

## TRANSMITTER CIRCUIT CONFIGURATION

The audio signal from the microphone enters CN5 of the IF unit and is passed through microphone amplifier IC10 ( $\mu$ PC1313HA). Part of the IC10 output is amplified by Q21 (2SC2712), detected by D15 (1SS355), applied to the ALC pin of IC10, and used to control speech processor operation.

The audio signal amplified by IC10 is passed through Q25 (2SC2712) buffer and electronic volume control IC5 (MB87032PF), and is split into two by analog switch IC13 (XRU4066BCF); one signal is directed to the SSB circuit and the other goes to the FM circuit. In the SSB circuit, the signal is balance-modulated by the CAR signal (10.695 MHz) from the PLL unit by IC14 ( $\mu$ PC1037HA), passed through crystal filter XF1, and enters IF amplifier Q28 (3SK131). In the FM circuit, the signal enters FM microphone amplifier IC12 (KCA06). It is passed through the pre-emphasis and IDC circuits and output. The output signal is input to varicap diode D7 (1SV164) in the crystal oscillator by Q18 (2SC2712), modulated to the oscillator frequency of 10.695 MHz, and input to Q28.

The signal modulated by type in this way is amplified by Q28, output from CN3 as the first IF (10.695 MHz), and input to CN403 in the RF unit. It passes through a ceramic filter CF401 and mixed with the LO1 signal (133.305 to 135.305 MHz (E), 133.305 to 137.305 MHz (K, M)) input from CN402 by the first mixer Q409 and Q410 (3SK131). The signal passes through four-stage band pass filter tuned by variable capacitor, then RF amplified by Q405 (3SK131 (M)). It is pre-driven by Q406 (2SC2954) and Q407 (2SC1947), and output from CN406 as the drive output.

The drive output enters the final unit through CN601, is amplified to the appropriate level passed through a low-pass filter, and output from the antenna connector.

In CW, Q31 (DTA124EK) in the IF unit is switched with KEY UP/DOWN, and the signal is input to IC1 in the control unit. The sidetone monitor signal is generated by Q39 (2SC2712) in the IF unit, and output from the speaker. The CW control signal (CKS) is output from IC1 in the control unit to switch Q428 (DTC124EK) and Q416 (DTA143EK) and generate the CW signal. The carrier is produced by turning Q14 in the IF unit on, applying DC to IC14, and breaking the balance.

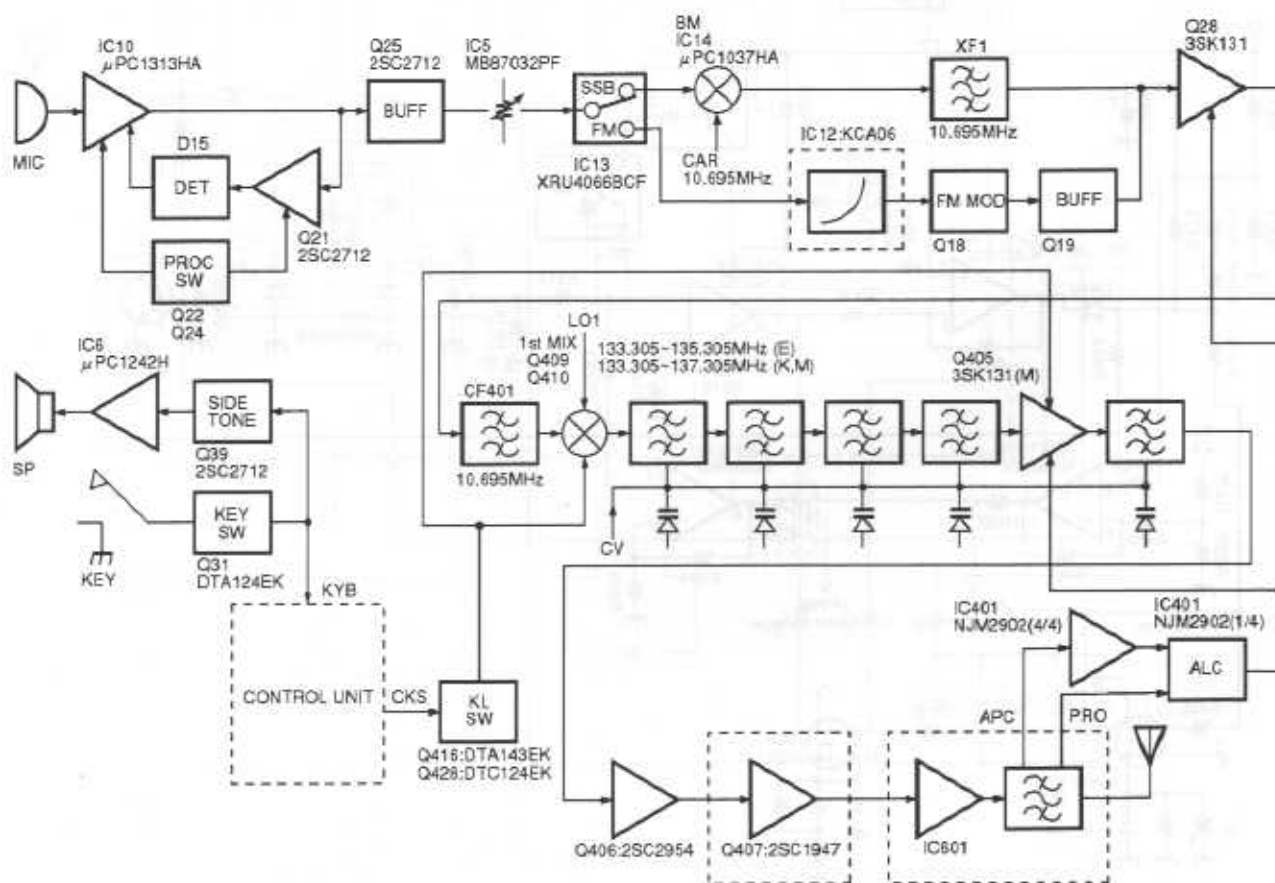


Fig. 9 Transmitter circuit block diagram

## CIRCUIT DESCRIPTION

### • ALC Circuit

The forward wave voltage detected by the CM coupler in the final unit is detected by D605 (HSM88AS), level-adjusted by VR601, and applied to CN408 in the RF unit. The forward wave voltage is then non-reverse-amplified by IC401 (4/4) (NJM2902M), and input to pin 2 of IC401 (1/4). IC401 (1/4) is a differential amplifier with the power control voltage applied to the + pin (pin 3). When transmission output is present, the output voltage at pin 1 begins to decrease. If the output voltage falls below the ALC reference voltage (about 3.4 V), the ALC operates. The ALC voltage is applied to each second gate of Q405 (3SK131) in the RF unit and Q28 (3SK131) in the IF unit. When the ALC voltage decreases, the voltage of each amplifier and the drive output decrease.

For SWR protection, the reflected wave voltage detected in the same way as the forward wave voltage is level-adjusted by VR603 in the final unit, amplified by Q607 (2SC2712), and applied to the ALC reference voltage by CN408 in the RF unit. The gain is reduced by reducing this voltage to protect the power module when the antenna is not matched.

### • Power control circuit

The TM-255 transmission output is switched between high and low. To switch from high to low, press the Low button on the panel. The PH pin of CN409 in the RF unit changes from high to low. Q418 (DTC124EK) and Q417 (DTC124EK) turn off, and VR401 is inserted between the 8 V line and R520, R521. The power control voltage applied to the + pin of IC401 (1/4) decreases and the ALC voltage decreases to reduce the power.

### • RF meter circuit

The RF meter circuit non-reverse-amplifies the forward wave voltage with IC401 (3/4) in the RF unit, digitizes its output in the control unit, and displays it.

The TM-255 does not have an ALC meter, but has a meter amplifier because it is required for the auto microphone gain control function, described later. It is a non-reverse amplifier circuit that inputs the ALC voltage to the + pin (pin 5) of IC401 (2/4) and outputs it from pin 7.

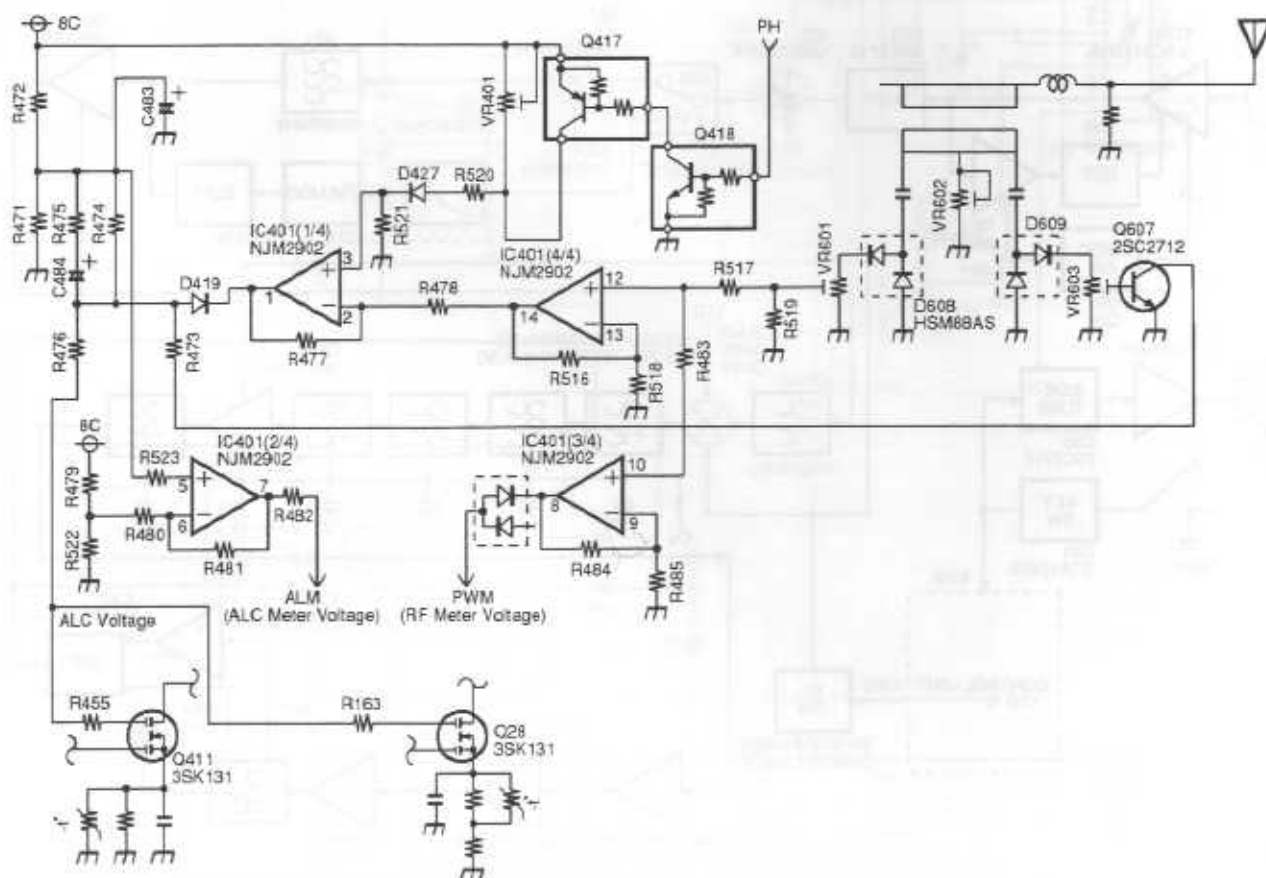


Fig. 10 ALC and power control circuits

## CIRCUIT DESCRIPTION

### • Thermal protection

The TM-255 have fan control and thermal protection, which are controlled by the module unit (X59-4020).

During transmission, Q2 (DTD114EK) in the module unit is always on and the fan runs at medium speed regardless of the temperature. If the final unit temperature rises, IC1 (1/2) (NJM2904M) output (pin 7) goes high and Q3 (DTD114EK) turns on. During transmission, Q2 is on, R611 and R613 are connected in parallel and the fan runs at high speed. When receiving, Q2 is turned off, and only R613 is grounded, and the fan runs at low speed.

If the temperature rises, the output from the IC1 (2/2) goes high and a high signal is output to the power control circuit from the THP pin of CN603. This reduces the transmission output forcibly to protect the transceiver. If the fan fails, Q1 (DTC114EK) is turned off and the THP pin is made high in the same way to reduce the transmission output.

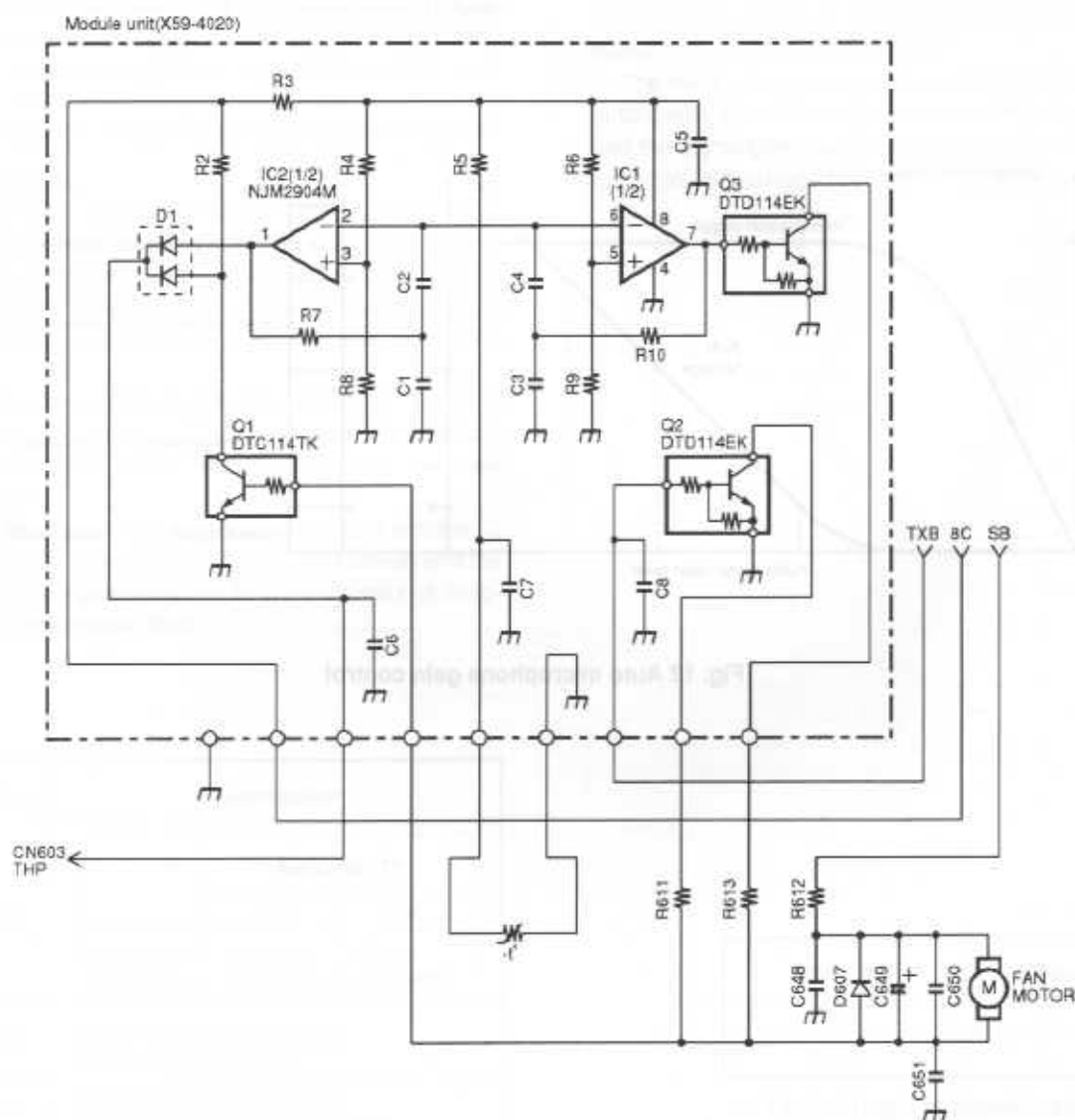


Fig. 11 Thermal protection

## CIRCUIT DESCRIPTION

### • Auto microphone gain control function (SSB mode)

In a conventional SSB transmitter, the microphone gain volume must be adjusted to gain the ALC properly and keep the output constant. The TM-255 uses an electronic volume control as the microphone gain volume, and automatically controls the microphone gain using the microprocessor according to the ALC effect. This function is available when menu item 61 is turned on (default: on). It can be changed manually if automatic control is not desired or required (when the function is menu No.62). In this case, it can be adjusted in the range -6 dB to +6 dB in 3 dB steps.

If other adjustments are performed, the microphone gain changes gradually, so set the microphone gain control to off (0 dB).

The ALC voltage is amplified by IC1 (1/4) operation amplifier for ALC operation, and input to the A/D converter in the microprocessor. If it is kept in a certain range for a certain time according to this voltage, the microphone gain is changed in 3 dB steps. Its change is shown in figure 12. If the ALC effect is low, the gain is increased, and if it is excessive, the gain is decreased.

Since the range of  $\pm 6$  dB is exceeded, it is not followed if the sound is lower than the range, and full power may not be gained. This value has been selected because if the range is extended, the signal-to-noise ratio deteriorates or a sneak path may occur.

The microphone gain can be changed between high and low in FM using this electronic volume control (menu item 60). High: +6dB and Low: 0dB (default:LOW). The gain is also changed even if 9600 bps mode is off.

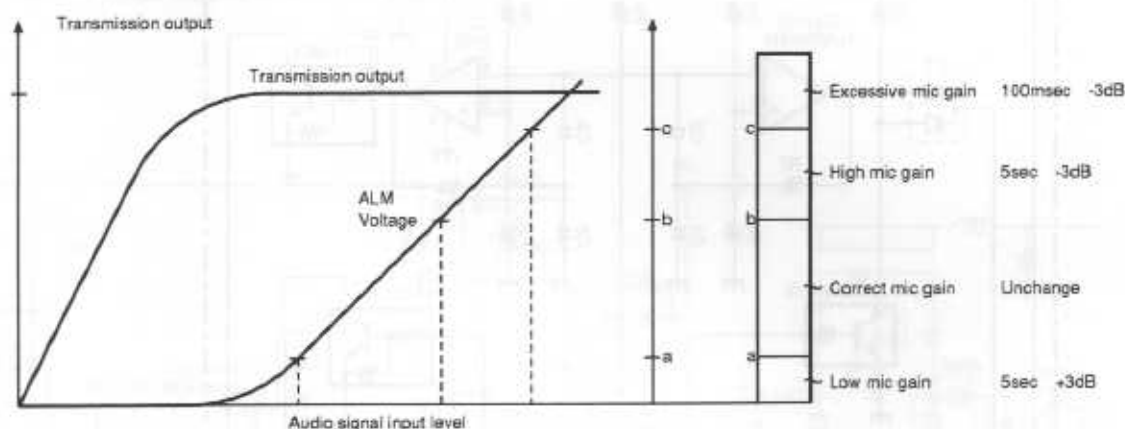


Fig. 12 Auto microphone gain control

## CIRCUIT DESCRIPTION

## DATA TERMINAL, PERIPHERAL CIRCUITS AND USE

The data communication connector is on the rear to handle transmission control, data input/output, squelch signal, and relay output. (Fig. 13)

There are two data communication modes: 9600 bps mode (menu item 77 on) and conventional 1200 bps mode (off).

The 9600 bps mode is mainly used for 9600 bps GMSK G3RUH packet communication. This type of high-speed modulation performs frequency modulation by passing the base band signal (square wave) through a filter for bandwidth limiting. This signal is similar to the digitally modulated 4800 Hz signal (similar to a sine wave because it is passed through a filter) in 9600 bps GMSK mode, and sounds like noise. There are GMSK and G3RUH systems according to the type of bandwidth limiting filter. They do not work in SSB.

Data communication in SSB includes 1200 bps/PSK (satellite communication), 300 bps/AFSK packet communication, RTTY, and SSTV. They are used by turning 9600 bps off.

#### • Transmit signals

The transmission modulation signal enters through PKD. The path to the modulator when 9600 bps mode on menu item 77 is on is different from that when it is off. The path when the DATA terminal PKS is low is different from that when PTT is low. Table 2 lists paths A, B, and C and modulation input levels.

When 9600 bps mode is on, the frequency deviation changes according to the input signal level. A protection circuit is provided to inhibit transmission when the level reaches 4 Vp-p.

The input PKD signal is detected by D23, and smoothed by C146 and R134. If it reaches 4 Vp-p, Q36 turns on and the PTT control (Q35) signal goes low. PKS transmission is inhibited if the input reaches 4 Vp-p.

| Pin No. | Name | Specification                                                   |                     |                   |
|---------|------|-----------------------------------------------------------------|---------------------|-------------------|
| 1       | PKD  |                                                                 | Menu No. 77         |                   |
|         |      |                                                                 | OFF                 | ON                |
|         |      | Mod. input<br>Freq. dev.                                        | 40mVp-p<br>3±0.5kHz | 2Vp-p<br>2±0.5kHz |
| 4       | PR9  | Output level 500mVp-p/10kΩ<br>Always output when RX.            |                     |                   |
| 5       | PR1  | Output level 300mVp-p/10kΩ<br>No output when squelch is closed. |                     |                   |

Table 2 Data terminal, I/O level

#### • Receive signals

PR9 is the receive output for high-speed data communication, and the FM detection circuit output (RD signal) is amplified by Q32 and output. The FM detection circuit also operates for SSB/CW squelch in modes other than FM, and the signal is always output regardless of the mode and whether the squelch is open or closed.

PR1 is a signal similar to the conventional speaker output, and output without passing through the electronic volume control. This output is squelch-controlled as in the speaker output.

#### • Squelch signal/relay output

The squelch signal is input to TNC to prevent collision in packet communication. Table 3 lists the logic and the digital transistor output pulled up by 5 V.

The initial setting is squelch and it can be used as relay output with the internal slide switch. The relay is activated and the signal goes low during transmission. It can be used to control vertical type pre-amplifiers and linear amplifiers.

| Squelch | Logic |
|---------|-------|
| Open    | H     |
| Close   | L     |

Table 3 Logic of Squelch signal





## CIRCUIT DESCRIPTION

### DIGITAL CONTROL CIRCUIT

The digital control circuit is divided into two major sections: the LCD assembly containing panel keys, click encoder, VRs, and display circuit and the control unit containing the backup circuit, DTMF circuit, and keys (Fig. 14).

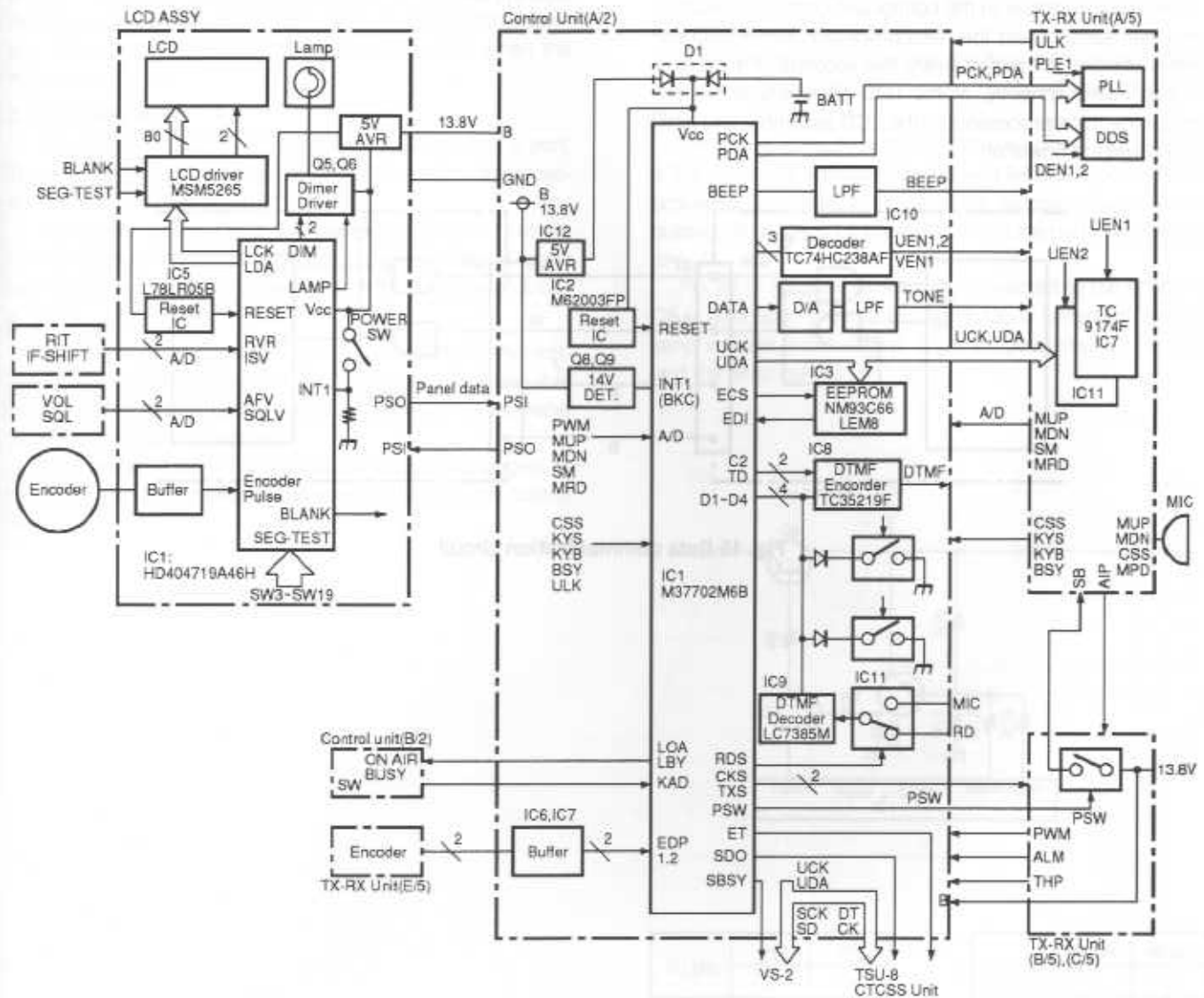


Figure 14 Digital control circuit

## CIRCUIT DESCRIPTION

### LCD ASSEMBLY AND CONTROL UNIT DATA COMMUNICATION CIRCUIT

Fig. 15 shows the LCD assembly and control unit data communication circuit. SO is serial data out and SI, serial data in. There is a NAND gate between them to protect the microprocessor ports. Data communication is based on start-stop synchronization, and the transmission speed is 31250 bps.

The microprocessor in the control unit checks connection every half second and the microprocessor in the LCD assembly checks connection every five seconds. If a cable is not connected correctly, or the LCD assembly is disconnected, the microprocessors in the LCD assembly and control unit turn the power off.

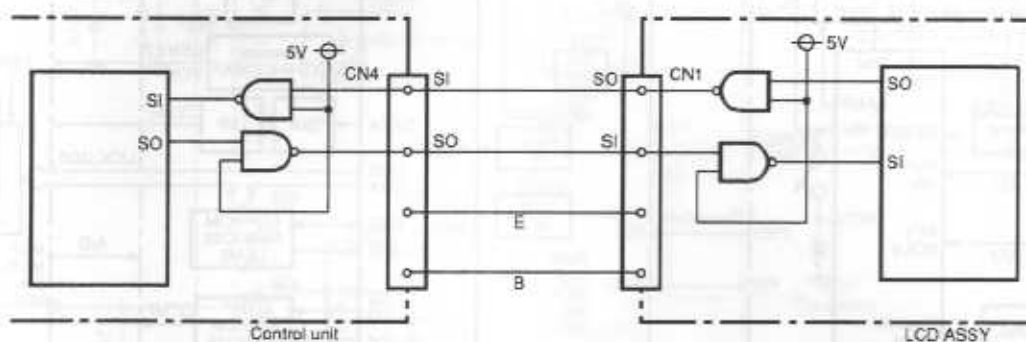


Fig. 15 Data communication circuit

## CIRCUIT DESCRIPTION

### • Panel unit (LCD assembly)

#### 1. Panel (LCD assembly) microprocessor reset circuit

When 14 V is supplied to IC5 (L78LR05B) from CN1, the microprocessor in the panel is reset by the reset signal output from IC5.

The panel does not back it up. When the power switch is off, panel microprocessor IC1 (HD404719A46H) controls the 5 V line in the LCD assembly through pin 11 to clear the LCD display and reduce current consumption in the LCD assembly. The panel microprocessor always operates when the main power is on.

#### 2. Panel key input

The signal from each key on the panel is input to a port. The keys correspond to pins 26 to 42 of panel microprocessor IC1 (HD404719A46H).

The power switch signal is input to pin 56 (INT1) of the microprocessor by edge interrupt. When the signal goes high, the power is on, and when it goes low, the power is off.

#### 3. VR input

With the volume squelch and RIT/IF-SHIFT VRs the voltage output is digitized by dividing 5 V applied to the variable resistor at the analog port of the microprocessor in the panel unit, and reading the change.

The voltage of the VR is read all the time. If it changes, a command corresponding to the value is sent to the control unit.

#### 4. Display circuit

The display circuit is in the panel unit (LCD assembly), and is controlled by the microprocessor of the panel unit. It consists of an LCD driver and its peripheral circuits.

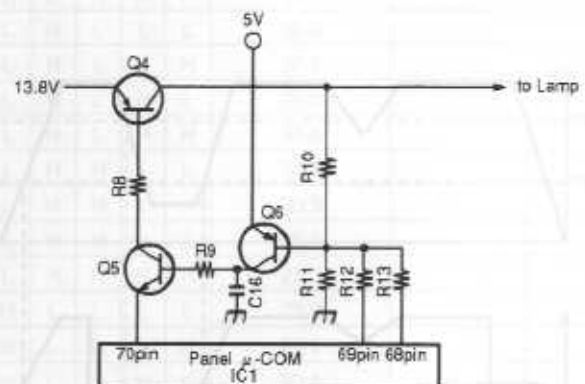
Serial data is transferred from pins 51, 52, and 54 of the microprocessor of the panel unit, IC1 (HD404719A46H), to the LCD driver. There are 159 segments.

#### 5. Dimmer circuit

The dimmer circuit changes the brightness of the lamp in five steps (including OFF). Figure 16 shows the dimmer circuit.

Q6 amplifies the error of the stabilized power supply using a 5 V reference voltage. Pins 68 and 69 of the panel microprocessor are open drain, and the output voltage can be output in four steps by combinations of the ports being mode low.

Pin 70 of the microprocessor connected to the emitter of Q5 is also open drain. If it is open, Q5 is turned off, and the lamp voltage is not output. If pin 70 goes low, Q5 turns on and the lamp lights.



| 70 pin | H | Off |
|--------|---|-----|
|        | L | On  |

| Bright<br>▽<br>Dark | 69 pin | 68 pin |
|---------------------|--------|--------|
|                     | L      | L      |
|                     | H      | L      |
|                     | L      | H      |

Fig. 16 Dimmer circuit

## CIRCUIT DESCRIPTION

### • Control unit

#### 1. Reset circuit

IC7 (M62003FP) monitors  $V_{cc}$  applied to the CPU. If the voltage falls below 2.15 V, the IC outputs a reset signal (low) to the CPU, and the CPU initializes all internal data (including memory channel data). The reset signal is not output when the power switch is turned on or off, or 14 V is turned on or off. It is generated only when the battery (BA1) voltage level goes low and 14 V is turned on or off.

C30 generates the signal width (td) required to reset the CPU. (Fig. 17)

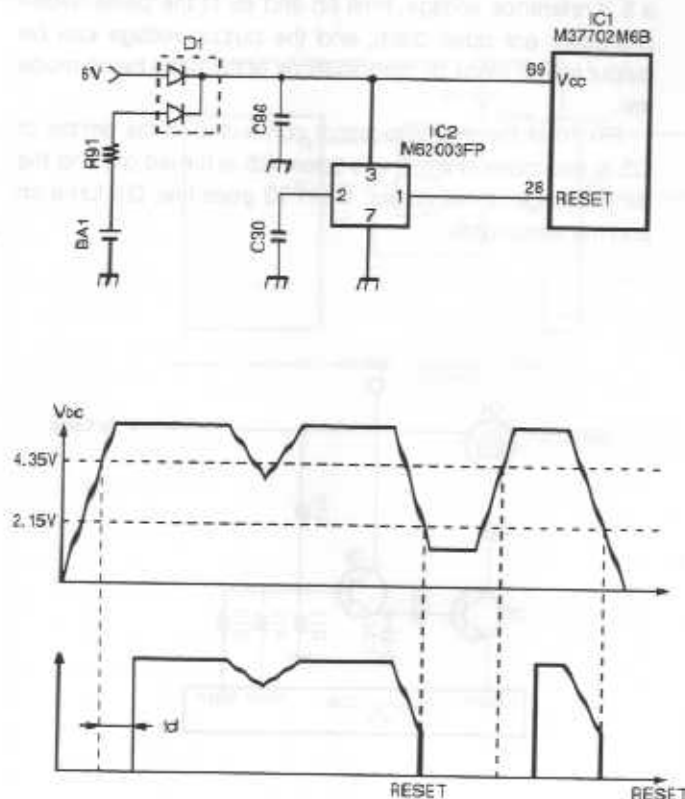


Fig. 17 Reset circuit

#### 2. Backup circuit

The TM-255 has two kinds of backup data stored in the CPU and EEPROM. User data, such as memory channel data, is stored in the CPU, and adjustment data, such as meter curves, is stored in the EEPROM.

The EEPROM is backed up when the power supply voltage is off, but power is required to back up the CPU. If 14 V is not cut power is supplied from the 5 V AVR in the digital unit. If 14 V is cut, power is supplied from a lithium battery. To economise on lithium battery use, the CPU must be in backup mode. So when the backup circuit shown in Figure 18 detects a voltage drop in the 14 V line, it outputs a backup request signal to the CPU.

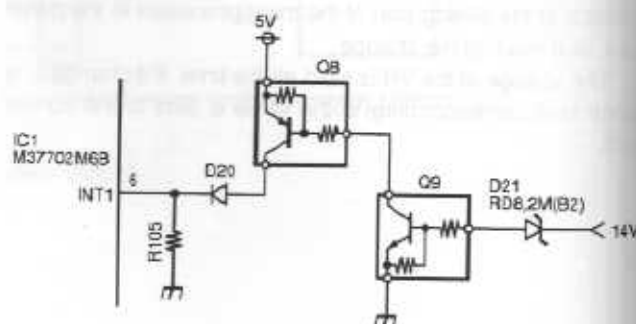


Fig. 18 Backup circuit

## CIRCUIT DESCRIPTION

### 3. EEPROM

Adjustment data is 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. Adjustment data can be written into the EEPROM in service adjustment mode. (Fig. 19)

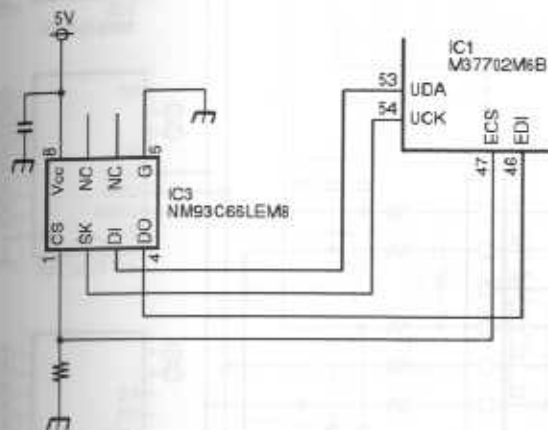


Fig. 19 EEPROM

### 4. PLL and DDS control circuit

The TM-255 has one PLL and two DDSs. The CPU outputs frequency data to the PLLs and DDSs serially according to the display frequency.

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

The CPU sends the mode signal and power signal to the TX-RX unit. The CPU receives meter signals and the standby switch signal from the TX-RX unit, and displays data on the meters and performs a transmit operation. The output signal from the CPU goes to serial-to-parallel converter IC7, IC11 (TC9174F). (Fig. 20)

squelch setting

| Q1 | Q2 | Q3 | Q4 | Q5 | RSQ(kΩ)<br>(SQ-GND) | Remarks                |
|----|----|----|----|----|---------------------|------------------------|
| L  | L  | L  | L  | L  | 50.9                | Fully clockwise        |
| L  | L  | L  | L  | H  | 49.1                |                        |
| L  | L  | L  | H  | L  | 47.6                |                        |
| L  | L  | L  | H  | H  | 45.8                |                        |
| L  | L  | H  | L  | L  | 44.1                |                        |
| L  | L  | H  | L  | H  | 42.3                |                        |
| L  | L  | H  | H  | L  | 40.8                |                        |
| L  | L  | H  | H  | H  | 39.0                |                        |
| L  | H  | L  | L  | L  | 38.9                |                        |
| L  | H  | L  | L  | H  | 37.1                |                        |
| L  | H  | L  | H  | L  | 36.6                |                        |
| L  | H  | L  | H  | H  | 33.8                |                        |
| L  | H  | H  | L  | L  | 32.1                |                        |
| L  | H  | H  | L  | H  | 30.3                |                        |
| L  | H  | H  | H  | L  | 28.8                |                        |
| L  | H  | H  | H  | H  | 27.0                |                        |
| H  | L  | L  | L  | L  | 23.9                |                        |
| H  | L  | L  | L  | H  | 22.1                |                        |
| H  | L  | L  | H  | L  | 20.6                |                        |
| H  | L  | L  | H  | H  | 18.8                |                        |
| H  | L  | H  | L  | L  | 17.1                |                        |
| H  | L  | H  | L  | H  | 15.3                |                        |
| H  | L  | H  | H  | L  | 13.8                |                        |
| H  | L  | H  | H  | H  | 12.0                |                        |
| H  | H  | L  | L  | L  | 11.9                |                        |
| H  | H  | L  | L  | H  | 10.1                |                        |
| H  | H  | L  | H  | L  | 8.6                 |                        |
| H  | H  | L  | H  | H  | 6.8                 |                        |
| H  | H  | H  | L  | L  | 5.1                 |                        |
| H  | H  | H  | L  | H  | 3.3                 |                        |
| H  | H  | H  | H  | L  | 1.8                 |                        |
| H  | H  | H  | H  | H  | 0.0                 | Fully counterclockwise |



## CIRCUIT DESCRIPTION

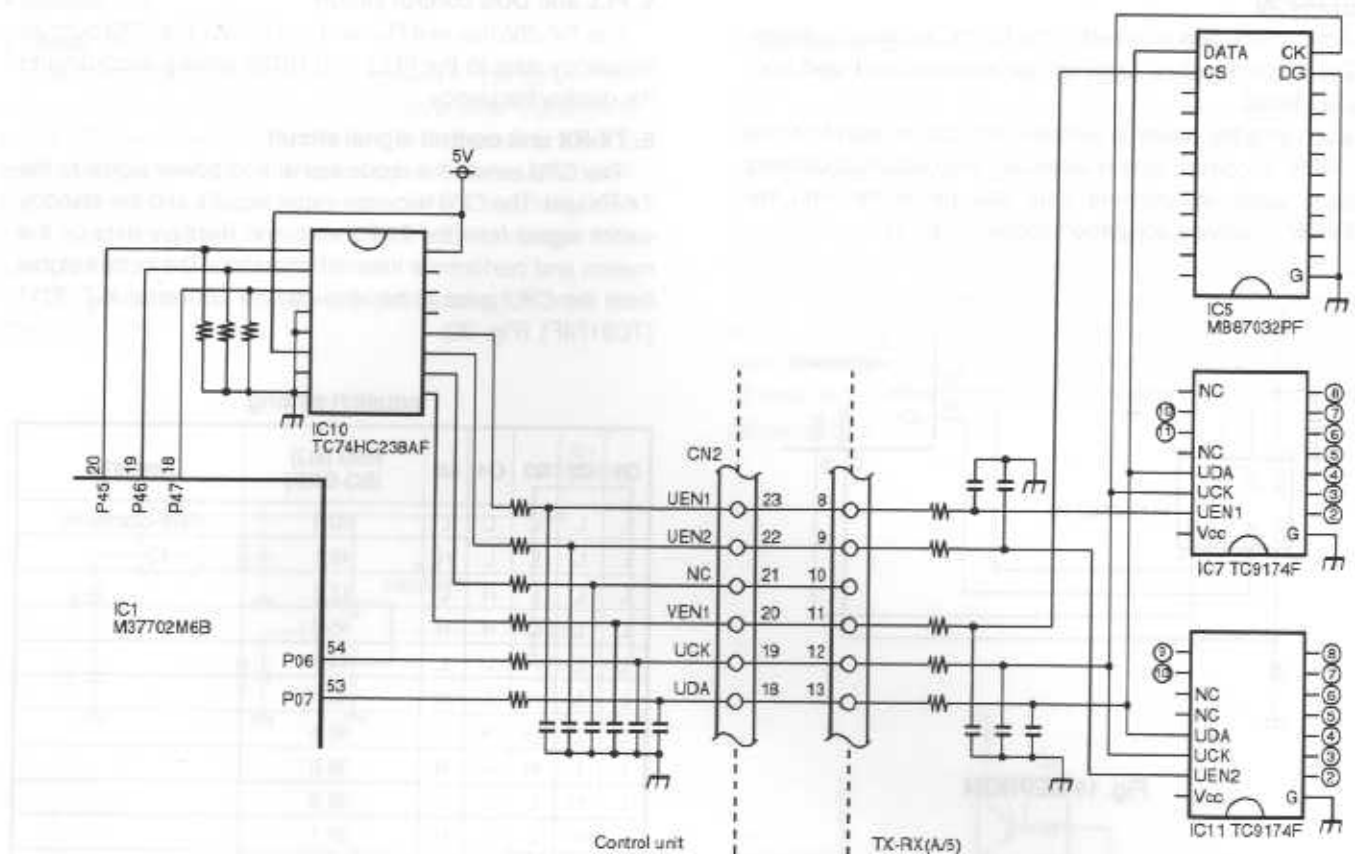


Fig. 20 TX-RX control signal

| IC7 |                         |
|-----|-------------------------|
| 2   | Squelch setter signal 3 |
| 3   | Squelch setter signal 2 |
| 4   | Squelch setter signal 1 |
| 5   | Squelch setter signal 4 |
| 6   | Squelch setter signal 5 |
| 7   | NB                      |
| 8   | RF cut signal           |
| 10  | SSB mode signal         |
| 11  | CW mode signal          |

| IC11 |                                 |
|------|---------------------------------|
| 2    | FM mode signal                  |
| 3    | High-speed packet signal (PK96) |
| 4    | Processor signal                |
| 5    | Microphone mute signal          |
| 6    | AIP                             |
| 7    | PTT line switching              |
| 8    | High-power select signal        |
| 9    | AF cut signal                   |
| 10   | Beep sidetone                   |

## CIRCUIT DESCRIPTION

### 6. Main unit key A/D input

The voltage divided by the four switches S1 S4 is applied to the A/D input pin of the CPU when a button is pressed.

When two or more button in the same group are pressed, only the button with the highest priority is detected (listed below).

| KAD |      | Priority |
|-----|------|----------|
| S1  | PROC | 1        |
| S2  | AIP  | 2        |
| S3  | NB   | 3        |
| S4  | PF   | 4        |

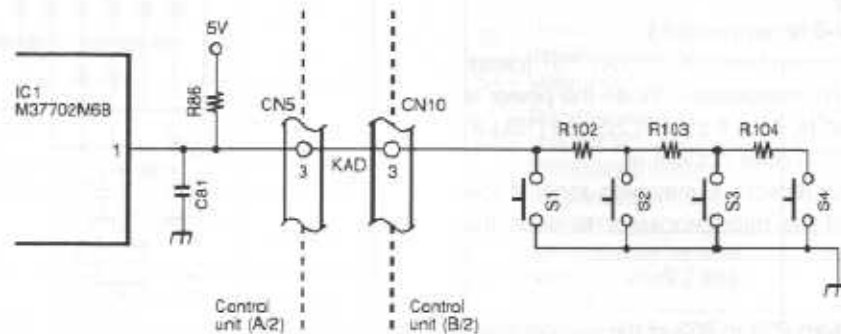


Fig. 21 Key A/D input

### 4. Encoder Circuit

The encoder is a mechanical one. The waveforms of the encoder pulses are rectified by IC6 and IC7 (TC4S584F), and the number of pulses is counted by the hardware counter in the CPU.

When the encoder is rotated slowly, the frequency step is made small; when it is rotated quickly, the step is made large. This ensures smooth tuning and frequency change.

The minimum frequency step is 5 Hz, and the maximum 200 Hz (10 times this value for FM). The frequency step is changed continuously according to the rotational speed. (Fig. 22)

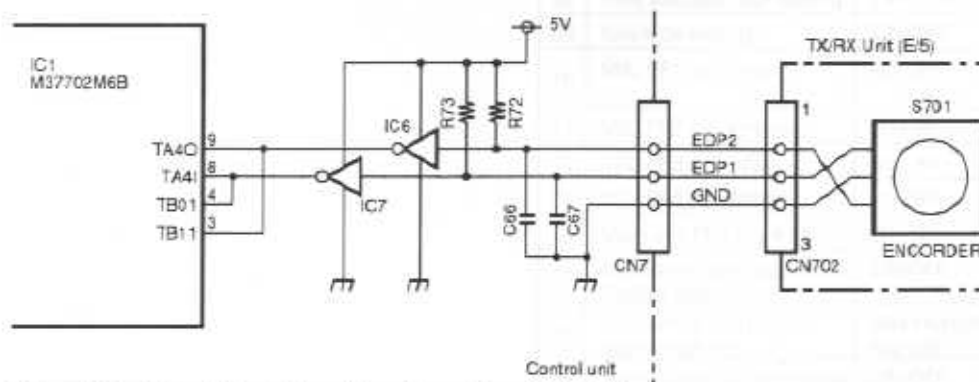


Fig. 22 Encoder circuit



## CIRCUIT DESCRIPTION

### Menu mode

#### • Outline of function

There are two menu modes: A and B.

#### • Functions

##### 1. Menu mode A

In menu mode A, the frequently-used items are set and changed.

Contents of menu mode A

| No. | Description                                      | State (display)         | Initial state |
|-----|--------------------------------------------------|-------------------------|---------------|
| 00  | Dimmer change                                    | OFF/d1/d2/d3/d4         | d2            |
| 01  | CW delay time switching                          | 100 - 1800              | 600           |
| 02  | CW pitch frequency change                        | 400 - 1000              | 800           |
| 03  | Program scan busy stop setting                   | ON/OFF                  | ON            |
| 04  | Busy scan time operate/carrier operate switching | 0/1                     | 0             |
| 05  | All memory scan setting                          | ON/OFF                  | OFF           |
| 06  | Click encoder step frequency switching (SSB/CW)  | See instruction manual. | 10kHz         |
| 07  | Click encoder step frequency switching (FM)      | See instruction manual. | 20kHz         |
| 08  | AF volume setting                                | H/L                     | H             |

##### 2. Menu mode B

In menu mode B, the items are not changed once they are set.

Contents of menu mode B

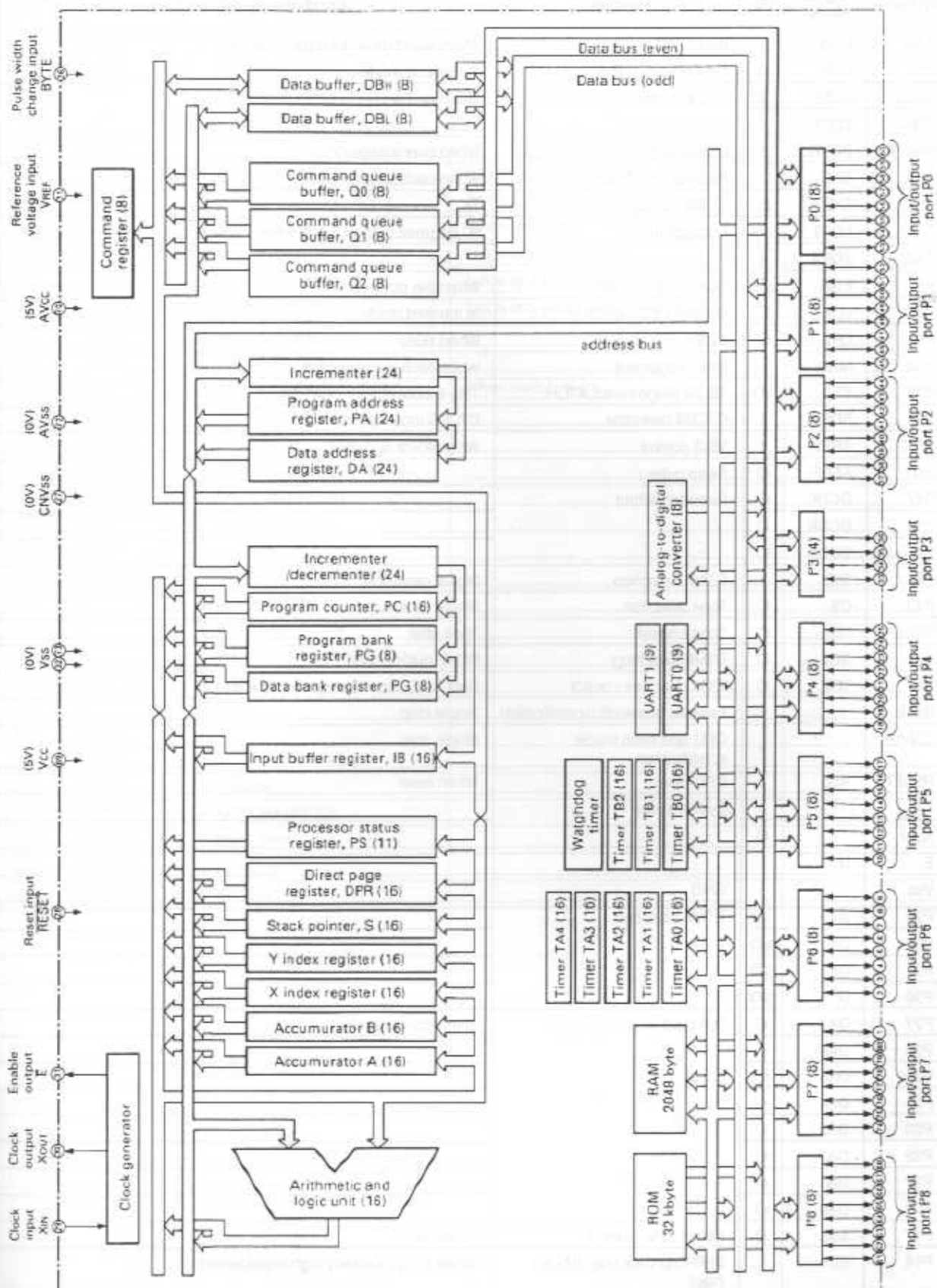
| No. | Description                                         | State (display)         | Initial state   |
|-----|-----------------------------------------------------|-------------------------|-----------------|
| 50  | Beep tone                                           | ON/OFF                  | ON              |
| 51  | Mode Morse setting                                  | ON/OFF                  | ON              |
| 52  | Warning Morse setting                               | ON/OFF                  | ON              |
| 53  | Repeater subtone frequency setting                  | 67 - 250.3Hz            | 88.5Hz          |
| 54  | Meter peak hold                                     | ON/OFF                  | ON              |
| 55  | Standard memory channel frequency temporary change  | ON/OFF                  | OFF             |
| 56  | Program scan hold function                          | ON/OFF                  | OFF             |
| 57  | RIT frequency variable range 1.1 kHz/2.2 kHz change | 1.1kHz/2.2kHz           | 1.1kHz          |
| 58  | Automatic power off                                 | ON/OFF                  | OFF             |
| 59  | TOT setting                                         | 3/5/10/20/30            | OFF             |
| 60  | FM microphone sensitivity change                    | H/L                     | L               |
| 61  | SSB microphone gain control setting                 | ON/OFF                  | ON              |
| 62  | SSB microphone gain setting                         | -6/3/0/3/6              | 0dB             |
| 63  | Paging auto cancel function setting                 | ON/OFF                  | OFF             |
| 64  | Open paging setting                                 | ON/OFF                  | OFF             |
| 65  | DTSS delay setting                                  | See instruction manual. | 350ms           |
| 66  | S meter squelch setting                             | ON/OFF                  | OFF             |
| 67  | S meter squelch delay setting                       | See instruction manual. | 500             |
| 68  | Free encoder lock setting                           | OFF/F3/ALL              | OFF             |
| 69  | Key lock setting                                    | ON/OFF                  | OFF             |
| 70  | MIC PF1 key setting                                 | 00 - 99                 | 83 (Menu start) |
| 71  | MIC PF2 key setting                                 | 00 - 99                 | 33(MR)          |
| 72  | MIC PF3 key setting                                 | 00 - 99                 | 20(A/B)         |
| 73  | MIC PF4 key setting                                 | 00 - 99                 | 24(CALL)        |
| 74  | Main unit PF4 key setting                           | 00 - 99                 | 85(VOICE)       |
| 75  | Memory mode frequency display setting               | ON/OFF                  | ON              |
| 76  | Frequency transverter display setting               | See instruction manual. | OFF             |
| 77  | High-speed packet mode setting                      | ON/OFF                  | OFF             |
| 78  | Auto shift setting                                  | ON/OFF                  | OFF             |



## SEMICONDUCTOR DATA

CPU: M37702M6B\*\*\*FP (Control unit IC1)

### • Block diagram





## SEMICONDUCTOR DATA

### • Functions of pins

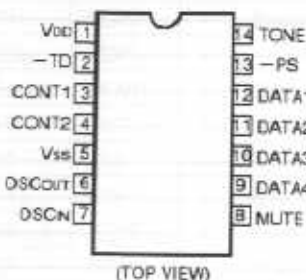
| Pin No. | Pin name | Signal name | I/O | Function                         | Condition for being active                                  | H/L |
|---------|----------|-------------|-----|----------------------------------|-------------------------------------------------------------|-----|
| 1       | ANO      | KAD         | I   | Switch AD input                  | When switch is on (voltage change)                          |     |
| 2       | P67      | CKS         | O   | CKY control signal               | In transmit mode                                            | H   |
| 3       | TB1IN    | EDP2        | I   | Encoder pulse                    | Interrupt $\uparrow\downarrow$                              |     |
| 4       | TB0IN    | EDP1        | I   |                                  |                                                             |     |
| 5       | P64      | BOVR        | I   | Overvoltage protection input     | When overvoltage occurs                                     | L   |
| 6       | INT1     | BKC         | I   | Backup Vcc detection             | When backup is requested                                    | L   |
| 7       | P62      | TXS         | O   | TX/RX control                    | TX                                                          | L   |
| 8       | TA4IN    | EDP1        | I   | Encoder pulse                    | 90 degrees behind EDP2 when the encoder is turned clockwise |     |
| 9       | TA4OUT   | EDP2        | I   |                                  |                                                             |     |
| 10      | P57      | PSW         | O   | Power (SB) control               | When the power is on                                        | H   |
| 11      | P56      | LOA         | O   | ON AIR LED control               | In transmit mode                                            | H   |
| 12      | P55      | LBV         | O   | BUSV LED control                 | When busy                                                   | H   |
| 13      | P54      | MRD         | I   | NKB judgement                    | When NKB is connected                                       | H   |
| 14      | P53      | ET          | I/O | TSU-8 judgement/LATCH            | TSU-8 connection/ $\downarrow$ LATCH                        | L   |
| 15      | P52      | SDO         | I   | CTCSS detection                  | CTCSS tone match                                            | L   |
| 16      | P51      | SBSY        | I   | VS-2 control                     | When voice is output                                        | L   |
| 17      | P50      | BEEP        | O   | Beep pulse                       |                                                             |     |
| 18      | P47      | DCDC        | O   | Decoder output                   |                                                             |     |
| 19      | P46      | DCDB        | O   |                                  |                                                             |     |
| 20      | P45      | DCDA        | O   |                                  |                                                             |     |
| 21      | P44      | STD         | I   | DTMF detection                   | Signal detection                                            | H   |
| 22      | P43      | C2          | O   | Tone selection                   | Single tone output                                          | L   |
| 23      | P42      | TD          | O   | Tone control                     | Tone stop                                                   | L   |
| 24      | P41      | RDS         | O   | DTMF switching                   | DTMF microphone                                             | H   |
| 25      | P40      | TOE         | O   | 7385 data bus control            | Data bus (normally high impedance)                          | H   |
| 26      | BYTE     |             | I   | External bus width specification | Single chip                                                 | L   |
| 27      | CNVss    |             | I   | CPU operation mode specification | Single chip                                                 | L   |
| 28      | RESET    | RES         | I   | CPU reset                        | When reset                                                  | L   |
| 29      | XIN      |             | I   | System clock                     |                                                             |     |
| 30      | XOUT     |             | O   |                                  |                                                             |     |
| 31      | E        | NC          |     |                                  |                                                             |     |
| 32      | Vss      |             | -   | GND                              |                                                             |     |
| 33      | P33      | D4          | I/O | DTMF data bus                    |                                                             |     |
| 34      | P32      | D3          | I/O |                                  |                                                             |     |
| 35      | P31      | D2          | I/O |                                  |                                                             |     |
| 36      | P30      | D1          | I/O |                                  |                                                             |     |
| 37      | P27      | DA7         | O   | D/A data                         | Single tone output                                          |     |
| 38      | P26      | DA6         | O   |                                  |                                                             |     |
| 39      | P25      | DA5         | O   |                                  |                                                             |     |
| 40      | P24      | DA4         | O   |                                  |                                                             |     |
| 41      | P23      | DA3         | O   |                                  |                                                             |     |
| 42      | P22      | DA2         | O   |                                  |                                                             |     |
| 43      | P21      | DA1         | O   |                                  |                                                             |     |
| 44      | P20      | DA0         | O   |                                  |                                                             |     |
| 45      | P17      | S5B         | O   | Power (5 V) control              | Power on                                                    | L   |
| 46      | P16      | EDI         | I   | EEPROM data output/busy input    | When busy (normally high impedance)                         | L   |

## SEMICONDUCTOR DATA

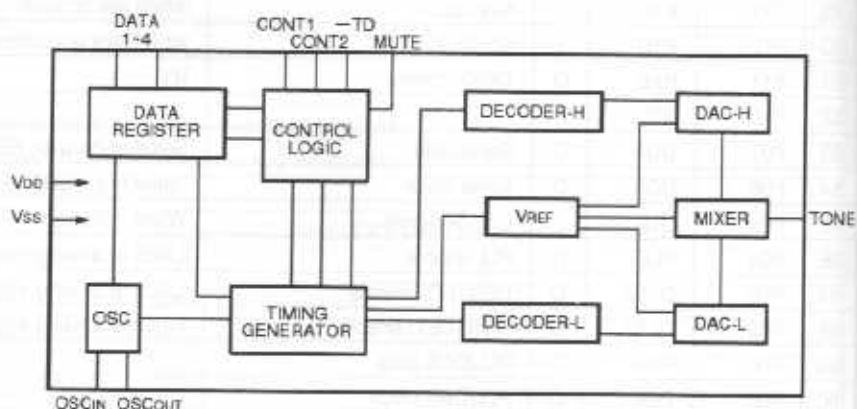
| Pin No. | Pin name | Signal name | I/O | Function                    | Condition for being active     | H/L |
|---------|----------|-------------|-----|-----------------------------|--------------------------------|-----|
| 47      | P15      | ECS         | O   | EEPROM chip select          | When a chip is selected        | H   |
| 48      | P14      | BSY         | I   | Signal busy                 | When busy                      | L   |
| 49      | P13      | KYB         | I   | Key input                   | When key is down               | H   |
| 50      | P12      | KYS         | I   | Key jack input              | When jack is inserted          | H   |
| 51      | P11      | RXE         | O   | TX/RX control               | RX                             | L   |
| 52      | P10      | NC          |     |                             |                                |     |
| 53      | P07      | UDA         | O   | Serial data                 | Serial-to-parallel, EEPROM, VR |     |
| 54      | P06      | UCK         | O   | Serial clock                | Serial-to-parallel, EEPROM, VR |     |
| 55      | P05      | ULK         | I   | Unlock signal               | When unlocked                  | L   |
| 56      | P04      | PLE         | O   | PLL enable                  | Latch at a rising edge         | H   |
| 57      | P03      | DLE2        | O   | DDS (LO) enable             | Latch at a rising edge         | H   |
| 58      | P02      | DLE1        | O   | DDS (DET) enable            | Latch at a rising edge         | H   |
| 59      | P01      | PDA         | O   | PLL/DDS data                |                                |     |
| 60      | P00      | PCK         | O   | PLL/DDS clock               |                                |     |
| 61      | P87      | PTT         | I/O | PTT switch/NKB TX data      | When switch is on              | L   |
| 62      | P86      | RXD1        | I   | NKB RX data                 |                                |     |
| 63      | P85      | CLK1        | I/O | NKB clock                   |                                |     |
| 64      | CTS1     | CTS1        | I   | Serial transmission control |                                | L   |
| 65      | TXD0     | PSO         | O   | Panel data output           |                                |     |
| 66      | RXD0     | PSI         | I   | Panel data input            |                                |     |
| 67      | P81      | NC          | I   |                             |                                | L   |
| 68      | CTS0     | CTS0        | I   | Serial transmission control |                                | L   |
| 69      | Vcc      |             | I   | Power supply                |                                |     |
| 70      | AVcc     |             | I   | A/D power supply            |                                |     |
| 71      | VREF     |             | I   | A/D reference power supply  |                                |     |
| 72      | AVss     |             | -   | A/D ground                  |                                |     |
| 73      | Vss      |             | -   | GND                         |                                |     |
| 74      | AN7      | NC          | I   |                             |                                | L   |
| 75      | AN6      | NC          | I   |                             |                                | L   |
| 76      | AN5      | SM          | I   | S meter                     |                                |     |
| 77      | AN4      | MDN         | I   | MIC DWN/PF SW               |                                |     |
| 78      | AN3      | MUP         | I   | MIC UP/PF SW                |                                |     |
| 79      | AN2      | PWM         | I   | RF meter                    |                                |     |
| 80      | AN1      | ALM         | I   | ALC voltage                 |                                |     |

### DTMF encoder: TC35219F (Control unit IC8)

#### • Pin connection diagram



#### • Block diagram



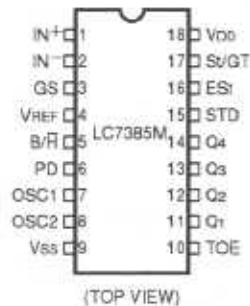
#### • Functions of pins

| Pin code | Pin name | Function                                                                                                                                                    |
|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | VDD      | Power supply pin                                                                                                                                            |
| 5        | VSS      | GND pin                                                                                                                                                     |
| 2        | -TD      | Output system select input pin<br>High: The MUTE and TONE<br>Low: MUTE goes low, and TONE goes high.                                                        |
| 8        | MUTE     | Mute output pin<br>Low: Standby state (when -TD input is low); High: Operating state regardless of whether a valid tone is output or not.                   |
| 14       | TONE     | Tone output pin<br>Dual tone or single tone is output according to each input.                                                                              |
| 6        | OSCOUT   | Oscillator circuit input/output pin                                                                                                                         |
| 7        | OSCIN    |                                                                                                                                                             |
| 3        | CONT1    | Single tone output select input pin<br>Normally high.<br>The single tone can be output by the operation.                                                    |
| 4        | CONT2    |                                                                                                                                                             |
| 12       | DATA1    | Data input pin<br>4 bit data is input.                                                                                                                      |
| 11       | DATA2    |                                                                                                                                                             |
| 10       | DATA3    |                                                                                                                                                             |
| 9        | DATA4    |                                                                                                                                                             |
| 13       | -PS      | Oscillation control input pin.<br>High: The register latches data of DATA1 to 4, and CONT1, 2 on a rising pulse of -TD. When -TD is low, oscillation stops. |

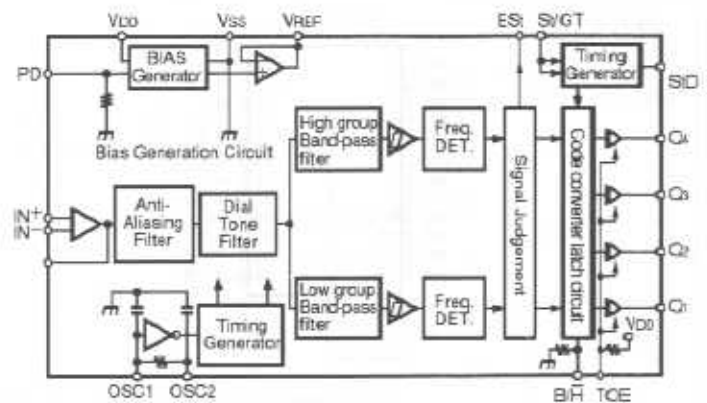
## SEMICONDUCTOR DATA

### DTMF decoder: LC7385M (Control unit IC9)

#### • Pin connection diagram



#### • Block diagram



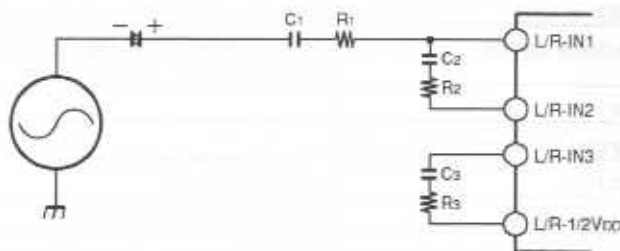
#### • Functions of pins

| Pin No. | Name            | I/O | Description                                                                                   |
|---------|-----------------|-----|-----------------------------------------------------------------------------------------------|
| 1       | IN <sup>+</sup> | I   | Non-inverted input of input amplifier                                                         |
| 2       | IN <sup>-</sup> | I   | Inverted input of input amplifier                                                             |
| 3       | GS              | O   | Output of input amplifier                                                                     |
| 4       | VREF            | O   | VDD/2 reference voltage output                                                                |
| 5       | B/H             | I   | Select the output format for Q1 to Q4.<br>High: Binary (2 of 8) code<br>Low: Hexadecimal code |
| 6       | PD              | I   | High: Power down mode                                                                         |
| 7       | OSC1            | I   | Connect a 3.579545 MHz crystal between these pins to form an oscillation circuit.             |
| 8       | OSC2            | O   |                                                                                               |
| 9       | Vss             |     | Power supply pin. Normally 0 V                                                                |
| 10      | TOE             | I   | Control the three-state output for Q1 to Q4.<br>High: Enable<br>Low: High impedance           |
| 11      | Q1              | O   | Three-state receive data output                                                               |
| 12      | Q2              |     |                                                                                               |
| 13      | Q3              |     |                                                                                               |
| 14      | Q4              |     |                                                                                               |
| 15      | STD             | O   | High when the valid tone pair continuation time exceeds the time set by CR                    |
| 16      | ES              | O   | High when a valid tone pair is detected                                                       |
| 17      | S/GT            | I/O | Set the guard time by connecting CR.                                                          |
| 18      | VDD             |     | Power supply pin. Normally 5 V                                                                |



## SEMICONDUCTOR DATA

### • Functions of pins

| Pin No.                                                                                                                          | Pin name | I/O | Function                                                                                                                                                                             | Remarks                                      |
|----------------------------------------------------------------------------------------------------------------------------------|----------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1                                                                                                                                | AG       | -   | Analog ground pin                                                                                                                                                                    |                                              |
| 2                                                                                                                                | L-IN1    | I   | Analog input pin<br>Drive with low impedance (100 or less).                                                                                                                          | L and R are symmetrical.<br><br>Analog input |
| 23                                                                                                                               | R-IN1    | I   |                                                                                                                                                                                      |                                              |
| 4                                                                                                                                | L-IN2    | I   |                                                                                                                                                                                      |                                              |
| 21                                                                                                                               | R-IN2    | I   |                                                                                                                                                                                      |                                              |
| 5                                                                                                                                | L-IN3    | I   |                                                                                                                                                                                      |                                              |
| 20                                                                                                                               | R-IN3    | I   |                                                                                                                                                                                      |                                              |
|                                                |          |     |                                                                                                                                                                                      |                                              |
| Fig. 1 Connection of each input pin of electronic volume                                                                         |          |     |                                                                                                                                                                                      |                                              |
| The volume, loudness, and tone are determined by the R1, R2, C1, C2, and C3 values (including open and short) shown in Figure 1. |          |     |                                                                                                                                                                                      |                                              |
| 6                                                                                                                                | L-1/2VDD | O   | 1/2VDD output pin.                                                                                                                                                                   | L and R are symmetrical.                     |
| 19                                                                                                                               | R-1/2VDD | O   |                                                                                                                                                                                      |                                              |
| 8                                                                                                                                | L-OUT    | O   | Electronic volume control output pin.<br>Since the output is high impedance, an error occurs if the impedance at the next stage is low.                                              | Analog input                                 |
| 17                                                                                                                               | R-OUT    | O   |                                                                                                                                                                                      |                                              |
| 11                                                                                                                               | DG       | -   | Digital ground pin.                                                                                                                                                                  |                                              |
| 12                                                                                                                               | CK       | I   | Clock signal input pin<br>Clock signal input pin for reading data from DATA pin.                                                                                                     | TTL interface<br><br>Digital input           |
| 13                                                                                                                               | DATA     | I   | Volume, tone, channel select data input pin. 28 bit data is input serially with clock signal.                                                                                        |                                              |
| 14                                                                                                                               | CS       | I   | Strobe signal<br>Read and latch the control data read through the CK and DATA pins on a rising edge of the CS signal. If strobe is not input, the previous control data is retained. |                                              |
| 24                                                                                                                               | VDD      | -   | 8V power connection pin                                                                                                                                                              |                                              |
| -                                                                                                                                | NC       | -   | No connection                                                                                                                                                                        |                                              |

### • Maximum rating

| Item                 | Code | Pin No.        | Standard value |          |         | Unit |
|----------------------|------|----------------|----------------|----------|---------|------|
|                      |      |                | Minimum        | Standard | Maximum |      |
| Power supply voltage | VDD  | 24             | -              | -        | 10      | V    |
| Input voltage        | VIN  | All input pins | GND-0.3        | -        | VDD+0.3 | V    |
| Output voltage       | VOUT | All input pins | GND-0.3        | -        | VDD+0.3 | V    |
| Storing temperature  | Tstg | -              | -50            | -        | 125     | °C   |

### • Recommended operating conditions

| Item                  | Code | Pin No.    | Standard value |          |         | Unit |
|-----------------------|------|------------|----------------|----------|---------|------|
|                       |      |            | Minimum        | Standard | Maximum |      |
| Power supply voltage  | VDD  | 24         | 6              | 8        | 10      | V    |
| Digital input voltage | VDI  | 12, 13, 14 | 0              | -        | VDD     | V    |
| Analog input voltage  | VAI  | 23         | -              | 1        | 1.4     | Vrms |
| Operating temperature | Ta   | -          | 0              | -        | 70      | °C   |



# TM-255A/E

## DESCRIPTION OF COMPONENTS

### X57-4530-00, -11 TX-RX unit (A/5 IF)

| Component No. | Use/function                  | Operation/condition/compatibility                                                  |
|---------------|-------------------------------|------------------------------------------------------------------------------------|
| IC1           | HIC                           | NB                                                                                 |
| IC2           | HIC                           | SSB, CW detection, AGC voltage output                                              |
| IC3           | HIC                           | FM detection, noise squelch, FM S meter                                            |
| IC4           | Analog switch                 | Switching of detection output and S meter output between FM and other mode         |
| IC5           | Electronic volume control     | Right channel: Transmission (microphone gain); Left channel: Reception (AF volume) |
| IC6           | AF amplifier                  |                                                                                    |
| IC7           | Serial-to-parallel conversion |                                                                                    |
| IC8           | Analog switch                 | Squelch setting                                                                    |
| IC9           | Operational amplifier         | RF AGC, SSB, CW S meter                                                            |
| IC10          | Microphone amplifier          | SSB, FM common/speech processor                                                    |
| IC11          | Serial-to-parallel conversion |                                                                                    |
| IC12          | HIC                           | FM microphone amplifier                                                            |
| IC13          | Analog switch                 | MIC signal switching                                                               |
| IC14          | Balanced modulator            | SSB modulation                                                                     |
| Q1            | IF amplifier                  | Receive operation                                                                  |
| Q2            | Switching                     | NB gate                                                                            |
| Q3            | Buffer amplifier              | NB HIC (IC1) input                                                                 |
| Q5            | Switching                     | Squelch hysteresis                                                                 |
| Q6            | Amplifier                     | Receive audio signal                                                               |
| Q7            | Switching                     | AF mute, squelch                                                                   |
| Q8            | Switching                     | AF level down (-6 dB)                                                              |
| Q10           | Switching                     | AF mute, squelch                                                                   |
| Q11           | Switching                     | On for SSB, CW                                                                     |
| Q12           | Switching                     | On for FM                                                                          |
| Q13           | Switching                     | On for SSB                                                                         |
| Q14           | Switching                     | On for CW                                                                          |
| Q15           | Switching                     | Squelch setting                                                                    |
| Q16           | Switching                     | On when transmitting FM (frequency modulation circuit power switch)                |
| Q17           | AGC time-constant switching   | On for SSB                                                                         |
| Q18           | Crystal oscillator circuit    | For frequency modulation                                                           |
| Q19           | Buffer amplifier              | Frequency modulation circuit output                                                |
| Q20           | Switching                     | On: 9600 bps (PK96 "high")                                                         |
| Q21           | Amplifier                     | Microphone amplifier output detection                                              |
| Q22           | Switching                     | On: PROC on                                                                        |
| Q23           | Switching                     | Microphone mute (on when DTMF is sent or received)                                 |
| Q24           | Switching                     | PROC on (microphone amplifier gain switching)                                      |
| Q25           | Amplifier                     | Microphone amplifier output                                                        |
| Q26           | Switching                     | 9600 bps on/PKS low off                                                            |
| Q27           | Switching                     | Off when PKS is low                                                                |
| Q28           | IF amplifier                  | Operates when transmitting (ALC)                                                   |
| Q29           | Switching                     | On when transmitting                                                               |
| Q30           | Relay driver                  | On when Q29 is on                                                                  |
| Q31           | Switching                     | On: Key down                                                                       |
| Q32           | Amplifier                     | PR9 (FM detection output without squelch control)                                  |

## DESCRIPTION OF COMPONENTS

## X57-4530-00, -11 TX-RX unit (A/5 IF)

| Component No. | Use/function                        | Operation/condition/compatibility                                                                                                          |
|---------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Q33           | Amplifier                           | PR1 (demodulated output with squelch control)                                                                                              |
| Q34           | Switching                           | On when PKS is low                                                                                                                         |
| Q35           | Switching                           | On when PKS is low and Q36 is off                                                                                                          |
| Q36           | Switching                           | On when PKD input is excessive (4 Vp-p)                                                                                                    |
| Q37           | Switching                           | On when squelch is closed                                                                                                                  |
| Q38           | Switching                           | RD mute. On when transmitting                                                                                                              |
| Q39           | Oscillator                          | Sidetone generation                                                                                                                        |
| Q40           | Ripple filter                       | AF amplifier power supply                                                                                                                  |
| D1            | Reverse flow prevention             |                                                                                                                                            |
| D2            | Reverse flow prevention             | MRD input protection                                                                                                                       |
| D3, 4         | Switching                           | Crystal filter transmission/reception switching (operates in SSB and CW)                                                                   |
| D5, 6         | Switching                           | Crystal filter pass prevention (operates in FM)                                                                                            |
| D7            | Varicap diode                       | Frequency modulation                                                                                                                       |
| D8            | Voltage stabilization               | 5V                                                                                                                                         |
| D9            | Switching                           | RXE and BSY OR circuit                                                                                                                     |
| D10           | Reverse flow prevention             |                                                                                                                                            |
| D11           | Switching                           | PTT and PKS OR circuit                                                                                                                     |
| D12           | Switching                           | SSB, SW mode signal OR circuit                                                                                                             |
| D13, 14       | Reverse flow prevention             |                                                                                                                                            |
| D15           | Detection                           | Microphone amplifier output detection, PROC control                                                                                        |
| D16           | Switching                           | PTT change signal and mute OR circuit                                                                                                      |
| D17           | Switching                           | PTT and mute OR circuit                                                                                                                    |
| D18           | Switching                           | PK96 and PKS OR circuit                                                                                                                    |
| D19           | Reverse flow prevention             |                                                                                                                                            |
| D20           | Relay surge absorption              |                                                                                                                                            |
| D21           | Reverse flow prevention             |                                                                                                                                            |
| D22           | Switching                           | KYS and sidetone generator power supply OR circuit                                                                                         |
| D23           | Detection                           | PKD                                                                                                                                        |
| D24           | Reverse flow prevention             |                                                                                                                                            |
| D25           | Temperature compensation            |                                                                                                                                            |
| D26           | Switching                           |                                                                                                                                            |
| D27           | Reverse flow prevention             |                                                                                                                                            |
| D28           | Switching (Reverse flow prevention) |                                                                                                                                            |
| IC201         | Mixer                               | 1: 11.321-11.833 MHz output; 2: 10.24 MHz input; 5: 1.081-1.593 MHz input                                                                  |
| IC202         | Mixer                               | 1: 103.481-103.993 MHz output; 2: 92.16 MHz input; 5: 11.321-11.833 MHz input                                                              |
| IC203         | Mixer                               | 1: 10.695 MHz output; 2: 0.455 MHz input; 5: 10.24 MHz input                                                                               |
| IC204         | PLL                                 | 2, 3, 4: Divide ratio setting input; 5: 10.24 MHz input; 7: Lock voltage output; 8: Unlock output; High: UL; 11: 29.696 - 31.744 MHz input |
| IC205         | Three-pin regulator                 | Constant-voltage 8 V output                                                                                                                |
| IC206         | Three-pin regulator                 | Constant-voltage 5 V output                                                                                                                |
| Q201          | Buffer amplifier                    | 10.24 MHz                                                                                                                                  |
| Q202          | Double circuit                      | 10.24 MHz * 2                                                                                                                              |
| Q203          | Amplifier                           | 20.48 MHz, DDS (A201, 202) CLK input                                                                                                       |
| Q204          | Buffer amplifier                    | 10.24 MHz, mixer (IC203) input                                                                                                             |
| Q206          | Amplifier                           | 10.695 MHz                                                                                                                                 |

# TM-255A/E

## DESCRIPTION OF COMPONENTS

X57-4530-00, -11 TX-RX unit (A/5 IF)

| Component No. | Use/function           | Operation/condition/compatibility                                                                               |
|---------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
| Q207          | Triple circuit         | 10.24 MHz * 3                                                                                                   |
| Q209          | Triple circuit         | 30.72 MHz * 3                                                                                                   |
| Q210          | Buffer amplifier       | 10.24 MHz, mixer (IC201) input                                                                                  |
| Q211          | Amplifier              | 103.481-103.993 MHz, mixer (Q352) input                                                                         |
| Q213          | Amplifier              | 29.696-31.744 MHz, PLL (IC204) input                                                                            |
| Q214          | Amplifier              | VCO (133.305 - 135.305 MHz (E), 133.305 -137.305 MHz (K, M)) output                                             |
| Q215          | Amplifier              | 133.305 - 135.305 MHz (E), 133.305 -137.305 MHz (K, M), mixer (Q352) input                                      |
| Q216          | Amplifier              | LO1 (133.305 - 135.305 MHz (E), 133.305 -137.305 MHz (K, M)) output                                             |
| Q217-Q219     | Active low-pass filter | PLL                                                                                                             |
| Q220          | Switching              | On: Unlock                                                                                                      |
| Q352          | Mixer                  | IN1: 103.481-103.993 MHz; IN2: 133.305 - 135.305 MHz (E), 133.305 -137.305 MHz (K, M); OUT: 29.696 - 31.744 MHz |

## DESCRIPTION OF COMPONENTS

## X57-4530-00, -11 TX-RX unit (B/5 RF)

| Component No.            | Use/function                 | Operation/condition/compatibility                                                                                          |
|--------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| IC401                    | Operational amplifier        | ALC, power meter                                                                                                           |
| IC402                    | Three-pin regulator          | Constant-voltage 8 V output                                                                                                |
| Q401                     | RF amplifier                 | Operates when receiving (145 MHz)                                                                                          |
| Q402                     | RX first mixer               | IN: 144 - 146 MHz (E), 144 - 148 MHz (K, M) OUT: 10.695 MHz, LO1: 133.305 - 135.305 MHz (E), 133.305 - 137.305 MHz (K, M)  |
| Q403                     | 2nd IF amplifier             | Operates when transmitting (10.695 MHz)                                                                                    |
| Q404                     | Switching                    | On when A/P is on                                                                                                          |
| Q405                     | TX IF amplifier              | Operates when transmitting (ALC)                                                                                           |
| Q406, 407                | Drive, predrive amplifier    | Operates when transmitting                                                                                                 |
| Q409, 410                | TX first mixer               | IN: 10.695 MHz, OUT: 144 - 146 MHz (E), 144 - 148 MHz (K, M), LO1: 133.305 - 135.305 MHz (E), 133.305 - 137.305 MHz (K, M) |
| Q416                     | Key switch                   | On when Q428 is on                                                                                                         |
| Q417, 418                | High/low changeover switch   | On: High power                                                                                                             |
| Q419-Q421                | Multivibrator                | DC/DC converter (-6 V)                                                                                                     |
| Q422                     | RXB switching                | On when receiving                                                                                                          |
| Q423                     | TXB switching                | On when transmitting                                                                                                       |
| Q424                     | Switching                    | On when receiving                                                                                                          |
| Q425                     | Switching                    | On when transmitting                                                                                                       |
| Q426                     | Switching                    | On when receiving                                                                                                          |
| Q427                     | Switching                    | On when temperature rises excessively (power-down control)                                                                 |
| Q428                     | Key switch                   | On: Key down in CW                                                                                                         |
| Q429                     | TX IF gain switching         | On: High power                                                                                                             |
| D425                     | RF amplifier protection      |                                                                                                                            |
| D405, 407, 409, 426      | Varicap                      | Operates when receiving                                                                                                    |
| D410                     | Voltage stabilization        | -0.6 V                                                                                                                     |
| D411                     | Switching                    | LO1 transmission/reception switching                                                                                       |
| D412, 413, 414, 415, 416 | Varicap                      | Operates when transmitting                                                                                                 |
| D417                     | Temperature compensation     |                                                                                                                            |
| D419                     | Rectification                | ALC voltage                                                                                                                |
| D422                     | Double-voltage rectification |                                                                                                                            |
| D423                     | Voltage stabilization        | -6 V                                                                                                                       |
| D424                     | Reverse flow prevention      |                                                                                                                            |
| D427                     | Reverse flow prevention      |                                                                                                                            |

# TM-255A/E

## DESCRIPTION OF COMPONENTS

### X57-4530-00, -11 TX-RX unit (C/5 FINAL)

| Component No. | Use/function                    | Operation/condition/compatibility          |
|---------------|---------------------------------|--------------------------------------------|
| Q601          | Switching                       | On when over-voltage occurs                |
| Q602          | Power switch control            | On when Q608 is off and PSW is high        |
| Q603          | Power switch                    | On when Q602 is on                         |
| Q604-606      | DB AVR                          | 12 V output when transmitting              |
| Q607          | SWR protection control          |                                            |
| D601, 607     | Antenna switch                  | On when transmitting                       |
| D602          | Protection diode                | Power supply reverse connection prevention |
| D603          | Surge voltage absorption        | +B line                                    |
| D604          | DC over-voltage detection       |                                            |
| D605          | Reverse flow prevention         |                                            |
| D606          | DB AVR temperature compensation |                                            |
| D608, 609     | RF power detection              |                                            |
| D610          | Surge voltage absorption        | Fan motor                                  |
| IC601         | Final amplifier                 |                                            |

### X57-4110-00 VCO

| Component No. | Use/function     | Operation/condition/compatibility                                   |
|---------------|------------------|---------------------------------------------------------------------|
| Q1            | VCO              |                                                                     |
| Q2            | Buffer amplifier | VCO output, 133.305 - 135.305 MHz (E), 133.305 - 137.305 MHz (K, M) |
| D1            | Varicap diode    |                                                                     |

### X57-4020-00 FAN

| Component No. | Use/function    | Operation/condition/compatibility |
|---------------|-----------------|-----------------------------------|
| IC1           | Comparator      | Fan control                       |
| Q1            | Switching       | On when the fan runs              |
| Q2            | Fan motor drive | On when transmitting              |
| Q3            | Fan motor drive | On when the temperature rises     |
| D1            | Switching       | OR circuit                        |

## DESCRIPTION OF COMPONENTS

## X53-3510-12, -21, 2-72 CONTROL unit

| Component No.      | Use/function                        | Operation/condition/compatibility                        |
|--------------------|-------------------------------------|----------------------------------------------------------|
| IC1                | CPU                                 | See circuit description and semiconductor data.          |
| IC2                | Reset                               | When the power is on                                     |
| IC3                | EEPROM                              | 4K byte                                                  |
| IC4, 5             | Serial data inverter buffer         | When the control unit communicates with the LCD assembly |
| IC6, 7             | Encoder pulse waveform shaping      | When the encoder is turned                               |
| IC8                | DTMF encoder                        | See circuit description.                                 |
| IC9                | DTMF decoder                        | See circuit description.                                 |
| IC10               | 3-to-8-line decoder                 | Serial-to-parallel conversion                            |
| IC11               | Analog switch                       | DTMF receiver                                            |
| IC12               | Three-pin regulator                 | Constant-voltage 6 V output                              |
| Q1                 | Switching                           | Switch DTMF signal between dual and single tones.        |
| Q2, 3              | Switching                           | Destination judgement                                    |
| Q4, 5              | Switching                           | ON AIR LED, BUSY LED lighting control                    |
| Q6                 | Switching                           | Unit 5 V control                                         |
| Q7                 | Amplifier                           | DTMF monitor                                             |
| Q8, 9              | Switching                           | Backup judgement                                         |
| D1                 | Switching (Reverse flow prevention) | CPU power supply OR circuit                              |
| D3, 4, 5           | Protection diode                    | Input port protection                                    |
| D9, 10, 11, 12, 15 | Switching                           | Destination selection                                    |
| D16, 17            | Reverse flow prevention             |                                                          |
| D18                | LED                                 | Lights when busy (green).                                |
| D19                | LED                                 | Lights when on air (red).                                |
| D20                | Reverse flow prevention             |                                                          |
| D21                | Voltage shift                       | Backup detection                                         |



# TM-255A/E

## PARTS LIST

\* New Parts

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.

TM-255A/E

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名/規格          | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|--------------------------------|------------------------|--------------------|
| TM-255A/E        |               |                   |                   |                                |                        |                    |
| 1                | 1B            |                   | A01-2077-02       | METALLIC CABINET(UPPER)        |                        |                    |
| 2                | 3A            |                   | A01-2078-02       | METALLIC CABINET(LOWER)        |                        |                    |
| 3                | 2A            |                   | A22-0766-13       | SUB PANEL                      |                        |                    |
| 700              | 3A            |                   | A62-0264-03       | PANEL ASSY(BASE)               |                        |                    |
| 5                | 3A            |                   | A62-0265-03       | PANEL (BASE)                   |                        |                    |
| 701              | 3C            | *                 | A62-0336-03       | PANEL ASSY(255A)               | KM                     |                    |
| 701              | 3C            | *                 | A62-0337-03       | PANEL ASSY(255B)               | EE9                    |                    |
| 7                | 3D            | *                 | A62-0339-03       | PANEL (255A)                   | KM                     |                    |
| 7                | 3D            | *                 | A62-0340-03       | PANEL (255B)                   | EE9                    |                    |
| 702              | 1B            |                   | A82-0015-02       | BACK PANEL(REAR)               |                        |                    |
| 9                | 3C            |                   | B10-1198-04       | FRONT GLASS                    |                        |                    |
| 10               | 2A            |                   | B11-1090-04       | FILTER                         |                        |                    |
| 11               | 1D            |                   | B41-0696-04       | CAUTION LABEL                  |                        |                    |
| 12               | 1B            |                   | B42-2455-04       | LABEL (MAX8MAX)                |                        |                    |
| 703              | 2B            |                   | B42-3343-04       | LABEL (S/N0)                   |                        |                    |
| -                | -             |                   | B42-3394-14       | LABEL (FCC)                    | K                      |                    |
| 14               | -             |                   | B42-5526-04       | LABEL (HYATT)                  | K                      |                    |
| 15               | -             |                   | B46-0310-03       | USER & WARRANTY CARD           | EE9                    |                    |
| 15               | -             |                   | B46-0410-30       | USER & WARRANTY CARD           | K                      |                    |
| 16               | -             | *                 | B62-0415-10       | INSTRUCTION MANUAL             | KME                    |                    |
| 16               | -             |                   | B62-0416-10       | INSTRUCTION MANUAL             | MEE9                   |                    |
| 16               | -             |                   | B62-0417-10       | INSTRUCTION MANUAL             | B                      |                    |
| 17               | 2B            | *                 | B72-0696-04       | MODEL NAME PLATE(TM-255A)      | KM                     |                    |
| 17               | 2B            | *                 | B72-0697-04       | MODEL NAME PLATE(TM-255B)      | EE9                    |                    |
| 18               | 1B            |                   | E04-0167-05       | RF COAXIAL CABLE RECEPTACLE(M) |                        |                    |
| 19               | 1B            |                   | E23-0677-04       | TERMINAL (GND)                 |                        |                    |
| 20               | -             |                   | E30-2111-05       | DC POWER CORD ASSY             | *ACSY                  |                    |
| -                | -             |                   | E30-3006-08       | CUAL CARD ASSY (MIC)           |                        |                    |
| 22               | 1B            |                   | E30-3187-05       | DC POWER CORD (BASE)           |                        |                    |
| 23               | 1D            |                   | E30-3197-05       | CONNECTING WIRE(SEP-BASE)      |                        |                    |
| 24               | 3B            |                   | E31-6118-05       | CONNECTING WIRE(IF-RF)         |                        |                    |
| 25               | 2A, 2B        |                   | E33-1975-15       | FINISHED WIRE SET              |                        |                    |
| 26               | 1A            |                   | E37-0067-05       | CONNECTING WIRE(RF-PIN)        |                        |                    |
| 27               | 3B            |                   | E37-0172-05       | FLAT CABLE (CON-IF)            |                        |                    |
| 28               | 1A            |                   | E37-0225-05       | CONNECTING WIRE(RF-PIN)        |                        |                    |
| 29               | 1A, 3B        |                   | E37-0234-05       | FLAT CABLE                     |                        |                    |
| 30               | 3B            |                   | E37-0420-05       | FLAT CABLE (IF-RF)             |                        |                    |
| 31               | 1A            |                   | E37-0446-05       | CONNECTING WIRE(SP)            |                        |                    |
| 32               | 3A, 1D        |                   | F07-1345-04       | COVER (SEP/PANEL)              |                        |                    |
| -                | -             |                   | F07-1389-04       | COVER                          |                        |                    |
| 34               | 3B            |                   | F09-0438-05       | FAN MOTOR                      |                        |                    |
| 704              | 1B            |                   | F10-2090-03       | SHIELDING PLATE (FIN)          |                        |                    |
| 36               | 2B            |                   | F20-1088-04       | INSULATING BOARD(LITHIUM)      |                        |                    |
| 37               | 1B            |                   | F51-0017-05       | FUSE (15A)                     |                        |                    |
| 38               | -             |                   | F51-0017-05       | FUSE (15A)                     | *ACSY                  |                    |
| -                | -             |                   | F51-0018-05       | FUSE (20A)                     |                        |                    |
| 40               | 1D            |                   | G01-0864-14       | LEAF SPRING(RELEASE)           |                        |                    |
| 41               | 1A            |                   | G02-0721-14       | FLAT SPRING(PIN)               |                        |                    |
| 42               | 3B            |                   | G02-0752-04       | FLAT SPRING(TX-RX)             |                        |                    |
| 43               | 1A            |                   | G02-0753-04       | SPRING (RF)                    |                        |                    |
| 44               | 2B            |                   | G02-0754-04       | FLAT SPRING(DC)                |                        |                    |
| 45               | 2C            |                   | G09-0405-05       | KNOB SPRING(M.CH)              |                        |                    |

L:Scandinavia

K:USA

P:Canada

Y:PX(Far East, Hawaii)

T:England

E:Europe

Y:AFES(Europe)

X:Australia

M:Other Areas

⚠ indicates safety critical components.

## PARTS LIST

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TM-255A/E

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名/規格         | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|-------------------------------|------------------------|--------------------|
| 46               | 1B            |                   | G10-0656-04       | AUXILIARY PART(SP)            |                        |                    |
| 47               | 3A, 3B        |                   | G10-0692-04       | AUXILIARY PART(SIDE)          |                        |                    |
| 48               | 1B            |                   | G10-0700-04       | AUXILIARY PART(UPPER CASE)    |                        |                    |
| 49               | 3A, 3B        |                   | G10-0708-04       | AUXILIARY PART(SIDE)          |                        |                    |
| 50               | 2A            |                   | G10-0756-04       | AUXILIARY PART(SP)            |                        |                    |
| 51               | 3B            |                   | G11-0706-04       | SHEET (DDS/VS2)               |                        |                    |
| 52               | 3D            |                   | G13-1399-04       | CUSION                        |                        |                    |
| 53               | 3D            |                   | G13-1400-04       | CUSION                        |                        |                    |
| 54               | 2A            |                   | G13-1401-04       | CUSION                        |                        |                    |
| 55               | 2D            |                   | G13-1421-04       | CUSION                        |                        |                    |
| 56               | 3D            |                   | G13-1424-04       | CUSION                        |                        |                    |
| 57               | 2B            |                   | G13-1434-14       | CUSION (FAN)                  |                        |                    |
| 58               | 2B            |                   | G13-1435-04       | CUSION (FAN)                  |                        |                    |
| 59               | 1B            |                   | G13-1444-04       | CUSION (SHIELD)               |                        |                    |
| 60               | -             |                   | H02-0606-04       | INNER PACKING CASE            |                        |                    |
| 61               | -             |                   | H10-2781-02       | POLYSTYRENE FOAMED FIXTURE(F) |                        |                    |
| 62               | -             |                   | H10-2782-02       | POLYSTYRENE FOAMED FIXTURE(R) |                        |                    |
| 63               | -             |                   | H13-0922-04       | CARTON BOARD                  |                        |                    |
| 64               | -             |                   | H13-0923-04       | CARTON BOARD                  |                        |                    |
| 65               | -             |                   | H13-0941-04       | CARTON BOARD                  | X                      |                    |
| 66               | -             |                   | H25-0079-04       | BAG (200X200)                 |                        |                    |
| 67               | -             |                   | H25-0747-04       | BAG (250X350)                 |                        |                    |
| 68               | -             | *                 | H52-0570-04       | ITEM CARTON BOX (TM-255A)     | KM                     |                    |
| 68               | -             | *                 | H52-0571-04       | ITEM CARTON BOX (TM-255B)     | EE9                    |                    |
| 69               | 3A            |                   | J02-0441-05       | FOOT&INSULATION               |                        |                    |
| 70               | 1D            |                   | J19-1554-04       | HOLDER(RELEASE)               |                        |                    |
| 71               | -             |                   | J20-0319-24       | HOOK : ACSV                   | X                      |                    |
| 72               | 2B            |                   | J21-4438-04       | HARDWARE FIXTURE(FAN)         |                        |                    |
| 73               | 2A            |                   | J21-4439-04       | HARDWARE FIXTURE(SP)          |                        |                    |
| 74               | 3B            |                   | J21-4454-04       | HARDWARE FIXTURE(VS-2)        |                        |                    |
| 75               | -             |                   | J29-0422-13       | BRACKET : ACSV                |                        |                    |
| 76               | 3A            |                   | K21-0793-04       | KN08 (MAIN)                   |                        |                    |
| 77               | 3C            |                   | K27-3091-04       | KN08 (POWER)                  |                        |                    |
| 78               | 1D            |                   | K27-3119-14       | KN08 (RELEASE)                |                        |                    |
| 79               | 2C            |                   | K29-3156-04       | KN08 (M.CH)                   |                        |                    |
| 80               | 3C            |                   | K29-4809-04       | KN08 (AF VOL/RT)              |                        |                    |
| 81               | 3C            |                   | K29-4810-04       | KN08 (SQL/SHIFT)              |                        |                    |
| 82               | 3C            |                   | K29-4858-14       | KN08 (MR)                     |                        |                    |
| 83               | 3C            |                   | K29-4859-14       | KN08 (A/B)                    |                        |                    |
| 84               | 3C            |                   | K29-4860-14       | KN08 (MHZ)                    |                        |                    |
| 85               | 3C            |                   | K29-4861-14       | KN08 (RT)                     |                        |                    |
| 86               | 3D            |                   | K29-4862-04       | KN08 ( F )                    |                        |                    |
| 87               | 3C            |                   | K29-4864-14       | KN08 (M.TN)                   |                        |                    |
| 88               | 3C            |                   | K29-4865-14       | KN08 (M<V)                    |                        |                    |
| 89               | 3C            |                   | K29-4866-14       | KN08 (SCAN)                   |                        |                    |
| 90               | 3C            |                   | K29-4867-14       | KN08 (CLR)                    |                        |                    |
| 91               | 3D            |                   | K29-4868-04       | KN08 (TONE)                   |                        |                    |
| 92               | 3D            |                   | K29-4869-04       | KN08 (RCV)                    |                        |                    |
| 93               | 3C            |                   | K29-4870-04       | KN08 (MODE)                   |                        |                    |
| 94               | 3A            |                   | K29-4871-04       | KN08 (FUNCTION)               |                        |                    |
| 95               | 3D            |                   | K29-4916-04       | KN08 (SHIFT)                  |                        |                    |
| A                | 1A            |                   | N09-2021-05       | SCREW (M4X10)                 |                        |                    |
| C                | 2B            |                   | N15-1040-46       | FLAT WASHER(GND)              |                        |                    |
| D                | 2A, 2B        |                   | N32-2606-46       | FLAT HEAD MACHIN. SCREW       |                        |                    |

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# TM-255A/E

## PARTS LIST

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TM-255A/E  
CONTROL UNIT (X53-351X-XX)

| Ref. No.<br>参照番号                                         | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名/規格          | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|----------------------------------------------------------|---------------|-------------------|-------------------|--------------------------------|------------------------|--------------------|
| E                                                        | 1B, 3A        |                   | N33-2606-45       | OVAL HEAD MACHIN SCREW         |                        |                    |
| F                                                        | 3B            |                   | N35-3018-46       | BINDING HEAD MACHINE SCREW     |                        |                    |
| G                                                        | 1B            |                   | N35-4008-46       | BINDING HEAD MACHINE SCREW     |                        |                    |
| 96                                                       | -             |                   | N46-3010-46       | PAN HEAD TAPPING SCREW :ACSY   | K                      |                    |
| H                                                        | 1D            |                   | N78-2030-45       | PAN HEAD TAPPING SCREW         |                        |                    |
| I                                                        | 1D            |                   | N80-2008-45       | SCREW                          |                        |                    |
| J                                                        | 2B, 3B        |                   | N87-2606-46       | BRAZIER HEAD TAPTITE SCREW     |                        |                    |
| K                                                        | 1B            |                   | N87-3008-46       | BRAZIER HEAD TAPTITE SCREW     |                        |                    |
| L                                                        | 2A, 3A        |                   | N90-3006-45       | TP HEAD MACHIN SCREW           |                        |                    |
| 97                                                       | -             |                   | N99-0383-05       | SCREW SET :ACSY                |                        |                    |
| SP                                                       | 1A            |                   | T07-0241-05       | LOUDSPEAKER(8 ohm 1W))         |                        |                    |
| MIC                                                      | -             |                   | T91-0396-05       | MICROPHONE :ACSY               | M                      |                    |
| MIC                                                      | -             |                   | T91-0397-05       | MICROPHONE (DTMF) :ACSY        | K                      |                    |
| MIC                                                      | -             |                   | T91-0398-05       | MICROPHONE                     | EE9                    |                    |
| 98                                                       | -             |                   | W01-0414-04       | SPANNER :ACSY                  |                        |                    |
| 705                                                      | 2A, 2B        | *                 | X53-3510-12       | CONTROL CIRCUIT UNIT(A/2, B/2) | K                      |                    |
| 705                                                      | -             | *                 | X53-3510-21       | CONTROL CIRCUIT UNIT(A/2, B/2) | M                      |                    |
| 705                                                      | -             | *                 | X53-3512-72       | CONTROL CIRCUIT UNIT(A/2, B/2) | EE9                    |                    |
| 706                                                      | 1A, 3B        | *                 | X57-4530-00       | TX-RX UNIT (A/5...E/5)         | EE9                    |                    |
| 706                                                      | 2A, 2B        | *                 | X57-4530-11       | TX-RX UNIT (A/5...E/5)         | KM                     |                    |
| 711                                                      | 2C            |                   | B38-0701-25       | LCD ASSY                       |                        |                    |
| CONTROL UNIT (X53-351X-XX) 0-12: K, 0-21: M, 2-72: E, E9 |               |                   |                   |                                |                        |                    |
| C1 -3                                                    |               |                   | C92-0009-05       | CHIP TAN 4.7UF 10WV            |                        |                    |
| C4                                                       |               |                   | CK73FB1H104Z      | CHIP C 0.1UF Z                 |                        |                    |
| C5                                                       |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C6                                                       |               |                   | CK73FB1H332K      | CHIP C 3300PF K                |                        |                    |
| C8 -11                                                   |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C12 ,13                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C15 -18                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C19 -25                                                  |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C26 ,27                                                  |               |                   | CC73FCH1H151J     | CHIP C 150PF J                 |                        |                    |
| C28 ,29                                                  |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z                 |                        |                    |
| C30                                                      |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z                 |                        |                    |
| C31                                                      |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z                 |                        |                    |
| C32 ,33                                                  |               |                   | CC73FCH1H330J     | CHIP C 33PF J                  |                        |                    |
| C39 -57                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C58                                                      |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C61                                                      |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C63                                                      |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C65                                                      |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C66 -68                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C70 -72                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C75 -84                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C85 ,86                                                  |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C87 ,88                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C89 -91                                                  |               |                   | CC73FCH1H101J     | CHIP C 100PF J                 |                        |                    |
| C92                                                      |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| C93 ,94                                                  |               |                   | CC73FCH1H330J     | CHIP C 33PF J                  |                        |                    |
| C95 -98                                                  |               |                   | CK73FB1H102K      | CHIP C 1000PF K                |                        |                    |
| C99                                                      |               |                   | CK73FB1E103K      | CHIP C 0.01UF K                |                        |                    |
| CN1                                                      |               |                   | E40-3264-05       | PIN CONNECTOR FOR INSIDE(6P)   |                        |                    |
| CN2                                                      |               |                   | E40-5384-05       | PIN CONNECTOR FOR INSIDE(30P)  |                        |                    |
| CN3                                                      |               |                   | E40-5618-05       | PIN CONNECTOR FOR INSIDE(8P)   |                        |                    |

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## CONTROL UNIT (X53-351X-XX)

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名/規格        | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|------------------------------|------------------------|--------------------|
| CN4              |               |                   | E40-3262-05       | PIN CONNECTOR FOR INSIDE(4P) |                        |                    |
| CN5              |               |                   | E40-3263-05       | PIN CONNECTOR FOR INSIDE(5P) |                        |                    |
| CN6              |               |                   | E40-5477-05       | PIN CONNECTOR FOR INSIDE(8P) |                        |                    |
| CN7              |               |                   | E40-3261-05       | PIN CONNECTOR FOR INSIDE(3P) |                        |                    |
| CN10             |               |                   | E40-3249-05       | PIN CONNECTOR FOR INSIDE(5P) |                        |                    |
| L1 ,2            |               |                   | L40-1001-48       | SMALL FIXED INDUCTOR         |                        |                    |
| L3 -7            |               |                   | L92-0131-05       | CORE                         |                        |                    |
| X1               |               |                   | L77-1522-05       | CRYSTAL RESONATOR(7.9MHZ)    |                        |                    |
| X2               |               |                   | L78-0089-05       | RESONATOR (480KHZ)           |                        |                    |
| X3               |               |                   | L78-0301-05       | RESONATOR (3.5795MHZ)        |                        |                    |
| CP1              |               |                   | R90-0711-05       | MULTI-COMP R                 |                        |                    |
| R1               |               |                   | RK73F82A472J      | CHIP R 4.7K J 1/10W          |                        |                    |
| R2               |               |                   | RK73F82A273J      | CHIP R 27K J 1/10W           |                        |                    |
| R3               |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R4               |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R5               |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W          |                        |                    |
| R6               |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R7 ,8            |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R11              |               |                   | RK73F82A221J      | CHIP R 220 J 1/10W           |                        |                    |
| R12              |               |                   | RK73F82A474J      | CHIP R 470K J 1/10W          |                        |                    |
| R13              |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W          |                        |                    |
| R14              |               |                   | R92-0670-05       | CHIP R 0 OHM                 |                        |                    |
| R15              |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R16              |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R17              |               |                   | RK73F82A473J      | CHIP R 47K J 1/10W           |                        |                    |
| R18              |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R19              |               |                   | RK73F82A274J      | CHIP R 270K J 1/10W          |                        |                    |
| R20              |               |                   | RK73F82A682J      | CHIP R 6.8K J 1/10W          |                        |                    |
| R22              |               |                   | RK73F82A684J      | CHIP R 680K J 1/10W          |                        |                    |
| R23              |               |                   | RK73F82A334J      | CHIP R 330K J 1/10W          |                        |                    |
| R24              |               |                   | RK73F82A473J      | CHIP R 47K J 1/10W           |                        |                    |
| R25              |               |                   | RK73F82A474J      | CHIP R 470K J 1/10W          |                        |                    |
| R26              |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R27              |               |                   | R92-0670-05       | CHIP R 0 OHM                 |                        |                    |
| R28 -31          |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R32              |               |                   | RK73F82A105J      | CHIP R 1.0M J 1/10W          |                        |                    |
| R33 ,34          |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R35              |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R36 -38          |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W          |                        |                    |
| R39 -44          |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R45              |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W          |                        |                    |
| R46 -50          |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R51 ,52          |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R53 -55          |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R56              |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R57 -59          |               |                   | RK73F82A473J      | CHIP R 47K J 1/10W           |                        |                    |
| R60              |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R61 -66          |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R67 ,68          |               |                   | RK73F82A473J      | CHIP R 47K J 1/10W           |                        |                    |
| R69 -71          |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R72 ,73          |               |                   | RK73F82A104J      | CHIP R 100K J 1/10W          |                        |                    |
| R74 -77          |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W          |                        |                    |
| R78 ,79          |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W           |                        |                    |
| R80              |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W           |                        |                    |
| R81              |               |                   | RK73F82A221J      | CHIP R 220 J 1/10W           |                        |                    |

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CONTROL UNIT (X53-351X-XX)  
TX-RX UNIT (X57-4530-XX)

| Ref. No.<br>参照番号                               | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名 / 規格     | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------------------------------------|---------------|-------------------|-------------------|-----------------------------|------------------------|--------------------|
| R82                                            |               |                   | RK73F82A271J      | CHIP R 270 J 1/10W          |                        |                    |
| R83                                            |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W          |                        |                    |
| R84 ,85                                        |               |                   | RK73F82A105J      | CHIP R 1.0M J 1/10W         |                        |                    |
| R86                                            |               |                   | RK73F82A123J      | CHIP R 12K J 1/10W          |                        |                    |
| R87 ,88                                        |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W          |                        |                    |
| R89                                            |               |                   | RK73F82A472J      | CHIP R 4.7K J 1/10W         |                        |                    |
| R90                                            |               |                   | RK73F82A154J      | CHIP R 150K J 1/10W         |                        |                    |
| R91                                            |               |                   | RK73F82A471J      | CHIP R 470 J 1/10W          |                        |                    |
| R92                                            |               |                   | RK73F82A105J      | CHIP R 1.0M J 1/10W         |                        |                    |
| R93                                            |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W         |                        |                    |
| R94                                            |               |                   | R92-0670-05       | CHIP R 0 OHM                |                        |                    |
| R95 ,96                                        |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W         |                        |                    |
| R97                                            |               |                   | RK73F82A474J      | CHIP R 470K J 1/10W         |                        |                    |
| R102                                           |               |                   | RK73F82A392J      | CHIP R 3.9K J 1/10W         |                        |                    |
| R103                                           |               |                   | RK73F82A822J      | CHIP R 8.2K J 1/10W         |                        |                    |
| R104                                           |               |                   | RK73F82A223J      | CHIP R 22K J 1/10W          |                        |                    |
| R105                                           |               |                   | RK73F82A472J      | CHIP R 4.7K J 1/10W         |                        |                    |
| S1 -4                                          |               |                   | S40-1086-05       | PUSH SWITCH                 |                        |                    |
| D1                                             |               |                   | 1SS184            | DI0RD                       |                        |                    |
| D3 -5                                          |               |                   | ROS.1M(B2)        | DI0RD                       |                        |                    |
| D9                                             |               |                   | LFB01             | DI0RD                       |                        |                    |
| D10                                            |               |                   | LFB01             | DI0RD                       |                        |                    |
| D11                                            |               |                   | LFB01             | DI0RD                       |                        |                    |
| D12                                            |               |                   | LFB01             | DI0RD                       |                        |                    |
| D16 ,17                                        |               |                   | LFB01             | DI0RD                       |                        |                    |
| D18                                            |               |                   | B30-0897-05       | LED (GREEN)                 |                        |                    |
| D19                                            |               |                   | B30-2001-05       | LED (RED)                   |                        |                    |
| D20                                            |               |                   | 1SS355            | DI0RD (or NA110)            |                        |                    |
| D21                                            |               |                   | RD8.2M(B2)        | DI0RD                       |                        |                    |
| IC1                                            |               |                   | M37702M68085FP    | IC (MPU)                    |                        |                    |
| IC2                                            |               |                   | M62003FP          | IC                          |                        |                    |
| IC3                                            |               |                   | AT93C66-10SI2.7   | IC (or NM93C66LEMB)         |                        |                    |
| IC4 ,5                                         |               |                   | SC14S11F          | IC                          |                        |                    |
| IC6 ,7                                         |               |                   | SC14S584F         | IC (or TC4S584F)            |                        |                    |
| IC8                                            |               |                   | TC35219F          | IC                          |                        |                    |
| IC9                                            |               |                   | LC7385M           | IC(DTMF DECODER)            |                        |                    |
| IC10                                           |               |                   | TC74HC238AF       | IC                          |                        |                    |
| IC11                                           |               |                   | KRU4066BCF        | IC (or BU4066BCF)           |                        |                    |
| IC12                                           |               |                   | TA78L06F          | IC                          |                        |                    |
| Q1 -5                                          |               |                   | DT0114EK          | DIGITAL TRANSISTOR          |                        |                    |
| Q6                                             |               |                   | 2SA1519           | TRANSISTOR                  |                        |                    |
| Q7                                             |               |                   | 2SC4116(Y)        | TRANSISTOR                  |                        |                    |
| Q8                                             |               |                   | DTA143EK          | DIGITAL TRANSISTOR          |                        |                    |
| Q9                                             |               |                   | DT0143EK          | DIGITAL TRANSISTOR          |                        |                    |
| BA1                                            |               |                   | W09-0599-05       | LITHIUM BATTERY (3V 210mAh) |                        |                    |
| TX-RX UNIT (X57-4530-XX) -00: E, E9, -11: K, M |               |                   |                   |                             |                        |                    |
| C1 -5                                          |               |                   | CC73FCH1H101J     | CHIP C 100PF J              |                        |                    |
| C6 ,7                                          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K             |                        |                    |
| C8                                             |               |                   | CK73FB1H102K      | CHIP C 1000PF K             |                        |                    |
| C9                                             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K             |                        |                    |
| C10                                            |               |                   | CK73FB1H102K      | CHIP C 1000PF K             |                        |                    |
| C11                                            |               |                   | CC73FCH1H101J     | CHIP C 100PF J              |                        |                    |

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TX-RX UNIT (X57-4530-XX)

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|------------------|---------------|-------------------|-------------------|-----------------------|------------------------|--------------------|
| C12              |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C13              |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C14              |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C16              |               |                   | CK73FB1E393K      | CHIP C 0.039UF K      |                        |                    |
| C17 -22          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C23              |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C25 ,26          |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C27              |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z        |                        |                    |
| C28 -30          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C31              |               |                   | CC73FCH1H0600     | CHIP C 6PF 0          |                        |                    |
| C32              |               |                   | CC73FCH1H0R5C     | CHIP C 0.5PF C        |                        |                    |
| C33 -40          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C42              |               |                   | C92-0520-05       | TANTAL 22UF 49V       |                        |                    |
| C43              |               |                   | CK73FB1E153K      | CHIP C 0.015UF K      |                        |                    |
| C44              |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C45              |               |                   | CC73FCH1H1000     | CHIP C 10PF 0         |                        |                    |
| C46              |               |                   | CC73FCH1H030C     | CHIP C 3PF C          |                        |                    |
| C47 -49          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C50              |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z        |                        |                    |
| C51              |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C52              |               |                   | CC73FUJ1H020C     | 2.0PF C               |                        |                    |
| C53              |               |                   | CC73FUJ1H120J     | CHIP C 12PF J         |                        |                    |
| C54              |               |                   | CC73FCH1H101J     | CHIP C 100PF J        |                        |                    |
| C55              |               |                   | CC73FCH1H151J     | CHIP C 150PF J        |                        |                    |
| C56              |               |                   | CC73FCH1H030C     | CHIP C 3PF C          |                        |                    |
| C57 ,58          |               |                   | CK73FB1H472K      | CHIP C 4700PF K       |                        |                    |
| C59              |               |                   | C92-0004-05       | ELECTR0 1.0UF 16WV    |                        |                    |
| C60 -62          |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C63              |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C64              |               |                   | CE04EW1A470M      | ELECTR0 47UF 10WV     |                        |                    |
| C65              |               |                   | CK73FB1H471K      | CHIP C 470PF K        |                        |                    |
| C66              |               |                   | C92-0002-05       | CHIP TAN 0.22UF 35WV  |                        |                    |
| C67              |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z        |                        |                    |
| C68              |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C69 ,70          |               |                   | C92-0004-05       | ELECTR0 1.0UF 16WV    |                        |                    |
| C71              |               |                   | C92-0009-05       | CHIP TAN 4.7UF 10WV   |                        |                    |
| C72              |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C73              |               |                   | C92-0004-05       | ELECTR0 1.0UF 16WV    |                        |                    |
| C74              |               |                   | CE04EW1A470M      | ELECTR0 47UF 10WV     |                        |                    |
| C75              |               |                   | CE04EW1C220M      | ELECTR0 22UF 16WV     |                        |                    |
| C76              |               |                   | C92-0004-05       | ELECTR0 1.0UF 16WV    |                        |                    |
| C77              |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z        |                        |                    |
| C78              |               |                   | CK73FB1E223K      | CHIP C 0.022UF K      |                        |                    |
| C79              |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C80 ,81          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C82              |               |                   | C92-0004-05       | ELECTR0 1.0UF 16WV    |                        |                    |
| C83              |               |                   | CE04EW1C331M      | ELECTR0 330UF 16WV    |                        |                    |
| C84 ,85          |               |                   | CE04EW1C470M      | ELECTR0 47UF 16WV     |                        |                    |
| C86              |               |                   | C90-4016-05       | ELECTR0 47UF 16WV     |                        |                    |
| C87              |               |                   | C90-2022-05       | OS 22UF 16WV          |                        |                    |
| C88              |               |                   | CE04EW1A471M      | ELECTR0 470UF 10WV    |                        |                    |
| C89              |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z        |                        |                    |
| C90              |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C91 -95          |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C96              |               |                   | C92-0004-05       | ELECTR0 1.0UF 16WV    |                        |                    |

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|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| C97              |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C98              |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C99              |               |                   | CK73FB1H222K      | CHIP C 2200PF K         |                        |                    |
| C100             |               |                   | CE04EW1A101M      | ELECTRO 100UF 10WV      |                        |                    |
| C101             |               |                   | CE04EW1E4R7M      | ELECTRO 4.7UF 25WV      |                        |                    |
| C102             |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C103             |               |                   | CE04EW1E4R7M      | ELECTRO 4.7UF 25WV      |                        |                    |
| C104             |               |                   | CE04EW1C100M      | ELECTRO 10UF 16WV       |                        |                    |
| C105             |               |                   | CE04EW1E4R7M      | ELECTRO 4.7UF 25WV      |                        |                    |
| C106             |               |                   | CK73FB1E104K      | CHIP C 0.10UF K         |                        |                    |
| C107, 108        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C109             |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C110             |               |                   | CE04EW1C100M      | ELECTRO 10UF 16WV       |                        |                    |
| C111             |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C112             |               |                   | CE04EW1C220M      | ELECTRO 22UF 16WV       |                        |                    |
| C113             |               |                   | C92-0004-05       | ELECTRO 1.0UF 16WV      |                        |                    |
| C114             |               |                   | CE04EW1A470M      | ELECTRO 47UF 10WV       |                        |                    |
| C115, 116        |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C117, 118        |               |                   | C92-0004-05       | ELECTRO 1.0UF 16WV      |                        |                    |
| C119             |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C120             |               |                   | CC73FCH1H050C     | CHIP C 5PF C            |                        |                    |
| C121             |               |                   | C92-0004-05       | ELECTRO 1.0UF 16WV      |                        |                    |
| C122             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C123             |               |                   | CE04EW1C100M      | ELECTRO 10UF 16WV       |                        |                    |
| C124-129         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C130, 131        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C133             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C134             |               |                   | CK73FB1H103K      | CHIP C 0.010UF K        |                        |                    |
| C135             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C136             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C137             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C138             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C139             |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C140             |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z          |                        |                    |
| C141             |               |                   | C92-0004-05       | ELECTRO 1.0UF 16WV      |                        |                    |
| C142, 143        |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z          |                        |                    |
| C144, 145        |               |                   | CK73FF1C105Z      | CHIP C 1.0UF Z          |                        |                    |
| C146             |               |                   | C92-0009-05       | CHIP TAN 4.7UF 10WV     |                        |                    |
| C147-151         |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C152             |               |                   | C92-0009-05       | CHIP TAN 4.7UF 10WV     |                        |                    |
| C153             |               |                   | C92-0509-05       | TANTAL 10UF 6.3WV       |                        |                    |
| C154             |               |                   | CK73FB1E223K      | CHIP C 0.022UF K        |                        |                    |
| C155-158         |               |                   | CK73FB1E123K      | CHIP C 0.012UF K        |                        |                    |
| C159-161         |               |                   | CK73FB1E223K      | CHIP C 0.022UF K        |                        |                    |
| C162             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C163             |               |                   | C92-0009-05       | CHIP TAN 4.7UF 10WV     |                        |                    |
| C164-167         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C169             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C170             |               |                   | CE04EW1C470M      | ELECTRO 47UF 16WV       |                        |                    |
| C173, 174        |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C201             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C202             |               |                   | CE04EW1A470M      | ELECTRO 47UF 10WV       |                        |                    |
| C203             |               |                   | CC73FCH1H220J     | CHIP C 22PF J           |                        |                    |
| C205             |               |                   | CC73FCH1H220J     | CHIP C 22PF J           |                        |                    |
| C206-210         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |

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|------------------|---------------|-------------------|-------------------|-----------------------|------------------------|--------------------|
| C211             |               |                   | CC73FCH1H330J     | CHIP C 33PF J         |                        |                    |
| C212             |               |                   | CC73FCH1H100D     | CHIP C 10PF D         |                        |                    |
| C213             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C214             |               |                   | CC73FCH1H220J     | CHIP C 22PF J         |                        |                    |
| C215             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C216             |               |                   | CC73FCH1H100D     | CHIP C 10PF D         |                        |                    |
| C217             |               |                   | CC73FCH1H050C     | CHIP C 5PF C          |                        |                    |
| C218, 219        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C220             |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z        |                        |                    |
| C221             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C223             |               |                   | CC73FCH1H180J     | CHIP C 18PF J         |                        |                    |
| C225, 226        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C227             |               |                   | CC73FCH1H180J     | CHIP C 18PF J         |                        |                    |
| C228             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C229             |               |                   | CC73FCH1H050C     | CHIP C 0.5PF C        |                        |                    |
| C234-236         |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C237             |               |                   | CC73FCH1H050C     | CHIP C 0.5PF C        |                        |                    |
| C238             |               |                   | CC73FCH1H220J     | CHIP C 22PF J         |                        |                    |
| C239             |               |                   | CC73FCH1H050C     | CHIP C 5PF C          |                        |                    |
| C240, 241        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C242             |               |                   | CK73FF1E104Z      | CHIP C 0.1UF Z        |                        |                    |
| C243-247         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C248             |               |                   | CC73FSL1H221J     | CHIP C 220PF J        |                        |                    |
| C249             |               |                   | CC73FCH1H040C     | CHIP C 4PF C          |                        |                    |
| C250             |               |                   | CC73FSL1H271J     | CHIP C 270PF J        |                        |                    |
| C251             |               |                   | CC73FCH1H040C     | CHIP C 4PF C          |                        |                    |
| C252             |               |                   | CC73FSL1H221J     | CHIP C 220PF J        |                        |                    |
| C253             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C254-259         |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C260             |               |                   | CC73FCH1H050C     | CHIP C 0.5PF C        |                        |                    |
| C261, 262        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C263             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C264             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C265             |               |                   | CC73FCH1H050C     | CHIP C 5PF C          |                        |                    |
| C267             |               |                   | CC73FCH1H060D     | CHIP C 6PF D          |                        |                    |
| C269             |               |                   | CC73FCH1H120J     | CHIP C 12PF J         |                        |                    |
| C271             |               |                   | CC73FCH1H060D     | CHIP C 6PF D          |                        |                    |
| C279             |               |                   | CC73FCH1H101J     | CHIP C 100PF J        |                        |                    |
| C280             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C281             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C282, 283        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C284             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C285             |               |                   | CE04EW1A101M      | ELECTRO 100UF 10WV    |                        |                    |
| C286-289         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C290             |               |                   | CE04EW1A101M      | ELECTRO 100UF 10WV    |                        |                    |
| C291             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C292             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C293             |               |                   | CE04NW1A101M      | ELECTRO 100UF 10WV    |                        |                    |
| C295             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C296, 297        |               |                   | C92-0007-05       | CHIP TAN 2.2UF 10WV   |                        |                    |
| C298             |               |                   | C92-0001-05       | CHIP TAN 0.1UF 35WV   |                        |                    |
| C299             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C300             |               |                   | CE04EW1A221M      | ELECTRO 220UF 10WV    |                        |                    |
| C301, 302        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C308             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |

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|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| C310             |               |                   | CC73FCH1H470J     | CHIP C 47PF J           |                        |                    |
| C311             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C312             |               |                   | CC73FCH1H101J     | CHIP C 100PF J          |                        |                    |
| C313             |               |                   | CC73FCH1H050C     | CHIP C 5PF C            |                        |                    |
| C314             |               |                   | CC73FCH1H220J     | CHIP C 22PF J           |                        |                    |
| C315, 316        |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C318             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C319             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C322             |               |                   | CC73FCH1H200J     | CHIP C 20PF J           |                        |                    |
| C323             |               |                   | CC73FCH1H030C     | CHIP C 3PF C            |                        |                    |
| C324             |               |                   | CC73FCH1H220J     | CHIP C 22PF J           |                        |                    |
| C325-327         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C328             |               |                   | CR04EW1A101M      | ELECTR 100UF 10WV       |                        |                    |
| C329, 330        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C331-335         |               |                   | CC73FCH1H101J     | CHIP C 100PF J          |                        |                    |
| C336             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C352, 353        |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C354             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C355             |               |                   | CE04EW1C470M      | ELECTR 47UF 16WV        |                        |                    |
| C356-358         |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C359             |               |                   | C92-0002-05       | CHIP TAN 0.22UF 35WV    |                        |                    |
| C401             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C402             |               |                   | CC73FCH1H030C     | CHIP C 3PF C            |                        |                    |
| C402             |               |                   | CC73FCH1H040C     | CHIP C 4PF C            |                        |                    |
| C403-405         |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C406             |               |                   | CC73FCH1H150J     | CHIP C 15PF J           |                        |                    |
| C407             |               |                   | CC73FCH1HR75C     | CHIP C 0.75PF C         |                        |                    |
| C408             |               |                   | CC73FCH1H050C     | CHIP C 5PF C            |                        |                    |
| C409             |               |                   | CC73FCH1HR75C     | CHIP C 0.75PF C         |                        |                    |
| C410             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C411             |               |                   | CC73FCH1H040C     | CHIP C 4PF C            |                        |                    |
| C412             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C413             |               |                   | CC73FCH1H270J     | CHIP C 27PF J           |                        |                    |
| C414             |               |                   | CC73FCH1H060D     | CHIP C 6PF D            |                        |                    |
| C415, 416        |               |                   | CC73FCH1H010C     | CHIP C 1PF C            |                        |                    |
| C417, 418        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C419             |               |                   | CC73FCH1H040C     | CHIP C 4PF C            |                        |                    |
| C420             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C421             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C422             |               |                   | CC73FCH1H110J     | CHIP C 11PF J           |                        |                    |
| C423, 424        |               |                   | CC73FCH1H330J     | CHIP C 33PF J           |                        |                    |
| C425             |               |                   | CC73FCH1H110J     | CHIP C 11PF J           |                        |                    |
| C426             |               |                   | CC73FCH1H020C     | CHIP C 2.0PF C          |                        |                    |
| C427, 428        |               |                   | CC73FCH1HR75C     | CHIP C 0.75PF C         |                        |                    |
| C429             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C430             |               |                   | CC73FCH1H150J     | CHIP C 15PF J           |                        |                    |
| C431             |               |                   | CC73FCH1H470J     | CHIP C 47PF J           |                        |                    |
| C432             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C433             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C434             |               |                   | CC73FCH1H150J     | CHIP C 15PF J           |                        |                    |
| C435-437         |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C438             |               |                   | CK73FB1H102K      | CHIP C 1000PF K         |                        |                    |
| C439, 440        |               |                   | CK73FB1E103K      | CHIP C 0.01UF K         |                        |                    |
| C441             |               |                   | CC73FCH1H180J     | CHIP C 18PF J           |                        |                    |
| C442             |               |                   | CC73FCH1H010C     | CHIP C 1PF C            |                        |                    |

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|------------------|---------------|-------------------|-------------------|-----------------------|------------------------|--------------------|
| C443             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C444             |               |                   | CC73FCH1H0800     | CHIP C 8PF D          |                        |                    |
| C445             |               |                   | CC73FCH1H040C     | CHIP C 4PF C          |                        |                    |
| C446             |               |                   | CC73FTH1H120J     | CHIP C 12PF J         |                        |                    |
| C447, 448        |               |                   | CC73FCH1H0R5C     | CHIP C 0.5PF C        |                        |                    |
| C449             |               |                   | CC73FCH1H040C     | CHIP C 4PF C          |                        |                    |
| C450             |               |                   | CC73FTH1H120J     | CHIP C 12PF J         |                        |                    |
| C451, 452        |               |                   | CC73FCH1H0R5C     | CHIP C 0.5PF C        |                        |                    |
| C453             |               |                   | CC73FTH1H120J     | CHIP C 12PF J         |                        |                    |
| C454             |               |                   | CC73FCH1H040C     | CHIP C 4PF C          |                        |                    |
| C455             |               |                   | CC73FCH1H270J     | CHIP C 27PF J         |                        |                    |
| C456             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C456, 457        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C458             |               |                   | CC73FTH1H220J     | CHIP C 22PF J         |                        |                    |
| C460             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C461             |               |                   | CC73FCH1H470J     | CHIP C 47PF J         |                        |                    |
| C462, 463        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C464             |               |                   | CE04NW1H010M      | ELECTOR 1.0UF 50WV    |                        |                    |
| C465             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C466             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C467, 468        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C469             |               |                   | CC73FCH1H150J     | CHIP C 15PF J         |                        |                    |
| C470, 471        |               |                   | CC73FCH1H330J     | CHIP C 33PF J         |                        |                    |
| C472             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C473             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C474-481         |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C482             |               |                   | CK73FB1C224K      | CHIP C 0.22UF K       |                        |                    |
| C483             |               |                   | C92-0009-05       | CHIP TAN 4.7UF 10WV   |                        |                    |
| C484             |               |                   | CE04NW1H010M      | ELECTOR 1.0UF 50WV    |                        |                    |
| C485             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C488             |               |                   | CK73FB1E104K      | CHIP C 0.10UF K       |                        |                    |
| C489             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C490, 491        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C492             |               |                   | CK73FP1C474Z      | CHIP C 0.47UF Z       |                        |                    |
| C493             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C494             |               |                   | CE04NW1C470M      | ELECTOR 47UF 16WV     |                        |                    |
| C495             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C496, 497        |               |                   | CK73FB1H222K      | CHIP C 2200PF K       |                        |                    |
| C498             |               |                   | CE04NW1C330M      | ELECTOR 33UF 16WV     |                        |                    |
| C499             |               |                   | CE04NW1C101M      | ELECTOR 100UF 16WV    |                        |                    |
| C500             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C502             |               |                   | CE04NW1C100M      | ELECTOR 10UF 16WV     |                        |                    |
| C503             |               |                   | CC73FCH1H220J     | CHIP C 22PF J         |                        |                    |
| C506             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C507             |               |                   | CE04NW1C470M      | ELECTOR 47UF 16WV     |                        |                    |
| C508, 509        |               |                   | CK73FB1E104K      | CHIP C 0.10UF K       |                        |                    |
| C511             |               |                   | CE04NW1C100M      | ELECTOR 10UF 16WV     |                        |                    |
| C512             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C513             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C514             |               |                   | CE04NW1C101M      | ELECTOR 100UF 16WV    |                        |                    |
| C516-523         |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C525             |               |                   | CK73FB1E103K      | CHIP C 0.01UF K       |                        |                    |
| C530             |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |
| C531             |               |                   | CC73FCH1H010C     | CHIP C 1PF C          |                        |                    |
| C533, 534        |               |                   | CK73FB1H102K      | CHIP C 1000PF K       |                        |                    |

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|----------------------------------------------------|---------------|-------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| C535, 536<br>C537-540<br>C541<br>C542<br>C543      |               |                   | CK73F81E103K<br>CK73F81H102K<br>CK73F81C224K<br>CC73FCH1H030C<br>CC73FCH1H150J | CHIP C 0.01UF K<br>CHIP C 1000PF K<br>CHIP C 0.22UF K<br>CHIP C 3PF C<br>CHIP C 15PF J                                                                       |                        |                    |
| C544<br>C548<br>C549<br>C601<br>C602               |               |                   | CK73F81H102K<br>CK73F81H102K<br>CK73F81E103K<br>C90-2039-05<br>CK73F81H102K    | CHIP C 1000PF K<br>CHIP C 1000PF K<br>CHIP C 0.01UF K<br>ELECTRO 15UF 16WV<br>CHIP C 1000PF K                                                                |                        |                    |
| C603<br>C604<br>C605<br>C606<br>C607               |               |                   | CE04NW1C101M<br>CK73F81H102K<br>CE04NW1C220M<br>CK73F81H102K<br>CC45SL2H080D   | ELECTRO 100UF 16WV<br>CHIP C 1000PF K<br>ELECTRO 22UF 16WV<br>CHIP C 1000PF K<br>CERAMIC 8.0PF D                                                             |                        |                    |
| C608<br>C609<br>C610<br>C611<br>C612               |               |                   | CC45SL2H220J<br>CK45B2H102K<br>CC45SL2H220J<br>CC45SL2H390J<br>CC45SL2H220J    | CERAMIC 22PF J<br>CERAMIC 1000PF K<br>CERAMIC 22PF J<br>CERAMIC 39PF J<br>CERAMIC 22PF J                                                                     |                        |                    |
| C613, 614<br>C615<br>C616<br>C617<br>C618          |               |                   | CK73F81H102K<br>CC45SL2H100D<br>CC45SL2H150J<br>CK73F81H102K<br>CC73FCH1H180J  | CHIP C 1000PF K<br>CERAMIC 10PF D<br>CERAMIC 15PF J<br>CHIP C 1000PF K<br>CHIP C 18PF J                                                                      |                        |                    |
| C620-622<br>C623, 624<br>C625<br>C627<br>C628      |               |                   | CK73F81H102K<br>CK73F81H472K<br>CK73F81H102K<br>CE04EW1C471M<br>CK45F1H473Z    | CHIP C 1000PF K<br>CHIP C 4700PF K<br>CHIP C 1000PF K<br>ELECTRO 470UF 16WV<br>CERAMIC 0.047UF Z                                                             |                        |                    |
| C629<br>C630<br>C631-643<br>C644<br>C645-649       |               |                   | C92-0003-05<br>CK73F81H102K<br>CK73F81H102K<br>CE04EW1C471M<br>CK73F81H102K    | CHIP TAN 0.47UF 25WV<br>CHIP C 1000PF K<br>CHIP C 1000PF K<br>ELECTRO 470UF 16WV<br>CHIP C 1000PF K                                                          |                        |                    |
| C701-703<br>C704, 705<br>TC1<br>TC201<br>TC401-404 |               |                   | CC73FCH1H101J<br>CK73F81H102K<br>C05-0346-05<br>C05-0356-05<br>C05-0344-05     | CHIP C 100PF J<br>CHIP C 1000PF K<br>TRIM CAP 6PF<br>TRIM CAP 20PF<br>TRIM CAP 30PF                                                                          |                        |                    |
| CN1<br>CN2<br>CN3<br>CN4                           |               |                   | E72-0405-04<br>E40-5474-05<br>E40-5469-05<br>E40-3239-05<br>E40-3238-05        | DC TERMINAL BOARD (+)(-)<br>PIN CONNECTOR FOR INSIDE(30P)<br>PIN CONNECTOR FOR INSIDE(12P)<br>PIN CONNECTOR FOR INSIDE(4P)<br>PIN CONNECTOR FOR INSIDE(3P)   |                        |                    |
| CN5<br>CN6<br>CN8<br>CN401, 402<br>CN403           |               |                   | E40-5347-05<br>E04-0154-05<br>E40-3237-05<br>E04-0191-05<br>E40-3239-05        | PIN CONNECTOR FOR INSIDE(8P)<br>RF COAXIAL CABLE RECEPTACLE<br>PIN CONNECTOR FOR INSIDE(2P)<br>RF COAXIAL CABLE RECEPTACLE<br>PIN CONNECTOR FOR INSIDE(4P)   |                        |                    |
| CN405<br>CN406<br>CN407, 408<br>CN409<br>CN410     |               |                   | E40-3264-05<br>E04-0190-05<br>E40-5347-05<br>E40-5469-05<br>E40-3300-05        | PIN CONNECTOR FOR INSIDE(6P)<br>RF COAXIAL CABLE RECEPTACLE<br>PIN CONNECTOR FOR INSIDE(8P)<br>PIN CONNECTOR FOR INSIDE(12P)<br>PIN CONNECTOR FOR INSIDE(3P) |                        |                    |

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|-----------------------------------------------------|---------------|-------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| CN411<br>CN413, 414<br>CN601, 602<br>CN603<br>CN604 |               |                   | E40-3299-05<br>E04-0154-05<br>E04-0191-05<br>E40-5347-05<br>E40-3246-05 | PIN CONNECTOR FOR INSIDE(2P)<br>RF COAXIAL CABLE RECEPTACLE<br>RF COAXIAL CABLE RECEPTACLE<br>PIN CONNECTOR FOR INSIDE(8P)<br>PIN CONNECTOR FOR INSIDE(2P) |                        |                    |
| CN605<br>CN606-608<br>CN701<br>CN702<br>J1          |               |                   | E40-3250-05<br>E23-0465-05<br>E40-5347-05<br>E40-3247-05<br>E56-0405-05 | PIN CONNECTOR FOR INSIDE(6P)<br>TERMINAL( TEST POINT)<br>PIN CONNECTOR FOR INSIDE(8P)<br>PIN CONNECTOR FOR INSIDE(3P)<br>CYLINDRICAL RECEPTACLE (6P)       |                        |                    |
| J2<br>J3<br>J701<br>W1<br>W2                        |               |                   | E11-0456-05<br>E11-0455-05<br>E08-0876-05<br>E37-0436-05<br>E37-0440-05 | PHONE JACK (2P)<br>PHONE JACK (3P)<br>RECTANGULAR RECEPTACLE<br>CONNECTING WIRE<br>CONNECTING WIRE                                                         |                        |                    |
| -<br>-<br>F601<br>F602                              |               |                   | F02-0414-05<br>F10-2091-04<br>F53-0056-05<br>F53-0095-05                | HEAT SINK<br>SHIELDING PLATE(ODS)<br>FUSE (1.0A)<br>FUSE (1.2A)                                                                                            |                        |                    |
| C01<br>CF1<br>CF201<br>CF401<br>L1                  |               |                   | L79-1013-05<br>L72-0366-05<br>L72-0369-05<br>L72-0391-05<br>L30-0281-15 | FILTER (455K)<br>CERAMIC FILTER(455K)<br>CERAMIC FILTER(10.7MHZ)<br>CERAMIC FILTER<br>IFT                                                                  |                        |                    |
| L2<br>L3 -5<br>L6<br>L7 .8<br>L9                    |               |                   | L40-1081-48<br>L40-1011-48<br>L33-0691-05<br>L40-1011-48<br>L30-0281-15 | SMALL FIXED INDUCTOR(100NH)<br>SMALL FIXED INDUCTOR<br>CHOKE COIL<br>SMALL FIXED INDUCTOR<br>IFT                                                           |                        |                    |
| L201<br>L202<br>L204<br>L205<br>L206                |               |                   | L40-1011-48<br>L40-1501-48<br>L34-4085-05<br>L40-1011-48<br>L34-4204-15 | SMALL FIXED INDUCTOR<br>SMALL FIXED INDUCTOR<br>COIL<br>SMALL FIXED INDUCTOR<br>COIL                                                                       |                        |                    |
| L207, 208<br>L210, 211<br>L212<br>L213<br>L214      |               |                   | L34-2038-05<br>L34-4366-05<br>L40-8285-48<br>L40-3301-48<br>L40-6885-48 | COIL<br>COIL<br>SMALL FIXED INDUCTOR(820NH)<br>SMALL FIXED INDUCTOR<br>SMALL FIXED INDUCTOR(680NH)                                                         |                        |                    |
| L215<br>L216<br>L217, 218<br>L219<br>L223, 224      |               | *                 | L40-3301-48<br>L40-8285-48<br>L34-2042-05<br>L40-4785-48<br>L40-1895-48 | SMALL FIXED INDUCTOR<br>SMALL FIXED INDUCTOR(820NH)<br>COIL<br>SMALL FIXED INDUCTOR(470NH)<br>SMALL FIXED INDUCTOR(1.8UH)                                  |                        |                    |
| L229<br>L230<br>L234<br>L237<br>L351                |               |                   | L40-1011-48<br>L40-1001-48<br>L34-1026-05<br>L34-1025-05<br>L40-1095-48 | SMALL FIXED INDUCTOR<br>SMALL FIXED INDUCTOR<br>COIL (7.5T)<br>COIL (5.5T)<br>SMALL FIXED INDUCTOR(1UH)                                                    |                        |                    |
| L401, 402<br>L403-405<br>L407<br>L408<br>L410       |               | *                 | L34-4080-05<br>L34-4252-05<br>L34-4251-05<br>L30-0281-15<br>L34-4375-05 | COIL<br>COIL<br>COIL<br>IFT<br>COIL                                                                                                                        |                        |                    |

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|---------------------------------------------|---------------|-------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| L411<br>L412-414<br>L415<br>L416<br>L417    |               | *                 | L34-4376-05<br>L31-0180-05<br>L34-4373-05<br>L34-4025-05<br>L34-4374-05      | COIL<br>COIL<br>COIL<br>COIL<br>COIL                                                                                |                        |                    |
| L418<br>L419<br>L421<br>L422<br>L423        |               |                   | L40-1095-48<br>L34-0452-05<br>L34-1079-05<br>L40-1095-48<br>L40-1011-48      | SMALL FIXED INDUCTOR(1UH)<br>COIL (6T)<br>COIL (1.5T)<br>SMALL FIXED INDUCTOR(1UH)<br>SMALL FIXED INDUCTOR          |                        |                    |
| L424<br>L425<br>L426<br>L427<br>L428        |               |                   | L40-3385-48<br>L34-0894-05<br>L40-2295-48<br>L34-0895-05<br>L40-1585-48      | SMALL FIXED INDUCTOR(330NH)<br>COIL (5T)<br>SMALL FIXED INDUCTOR(2.2UH)<br>COIL (6T)<br>SMALL FIXED INDUCTOR(150NH) |                        |                    |
| L436<br>L438<br>L601<br>L602<br>L603        |               |                   | L40-1011-48<br>L40-8295-48<br>L34-1019-05<br>L34-0908-05<br>L34-0894-05      | SMALL FIXED INDUCTOR<br>SMALL FIXED INDUCTOR(8.2UH)<br>COIL (2.5T)<br>COIL (9.5T)<br>COIL (5T)                      |                        |                    |
| L604<br>L605<br>L606<br>L607<br>L608        |               |                   | L34-0452-05<br>L34-0908-05<br>L34-0742-05<br>L34-0823-05<br>L40-1095-48      | COIL (6T)<br>COIL (9.5T)<br>COIL (5T)<br>COIL (3T)<br>SMALL FIXED INDUCTOR(1UH)                                     |                        |                    |
| L701-708<br>X1<br>X201<br>XF1<br>XF401      |               | *                 | L92-0131-05<br>L77-1305-15<br>L77-1558-05<br>L71-0249-05<br>L71-0216-05      | CORE<br>CRYSTAL RESONATOR(10.705MHZ)<br>TCXO (10.24MHZ)<br>CRYSTAL FILTER (10.695MHZ)<br>MCF (10.695MHZ)            |                        |                    |
| R1 -5<br>R6<br>R9<br>R9<br>R10              |               |                   | RK73FB2A221J<br>RK73FB2A332J<br>RK73FB2A103J<br>RK73FB2A153J<br>RK73FB2A273J | CHIP R 220 J 1/10W<br>CHIP R 3.3K J 1/10W<br>CHIP R 10K J 1/10W<br>CHIP R 15K J 1/10W<br>CHIP R 27K J 1/10W         | KM<br>EE9              |                    |
| R11<br>R12<br>R13<br>R14<br>R15             |               |                   | RK73FB2A472J<br>RK73FB2A103J<br>RK73FB2A101J<br>RK73FB2A104J<br>RK73FB2A333J | CHIP R 4.7K J 1/10W<br>CHIP R 10K J 1/10W<br>CHIP R 100 J 1/10W<br>CHIP R 100K J 1/10W<br>CHIP R 33K J 1/10W        | EE9                    |                    |
| R16<br>R17<br>R18 ,19<br>R20 ,21<br>R22 ,23 |               |                   | RK73FB2A101J<br>RK73FB2A472J<br>RK73FB2A103J<br>RK73FB2A101J<br>RK73FB2A473J | CHIP R 100 J 1/10W<br>CHIP R 4.7K J 1/10W<br>CHIP R 10K J 1/10W<br>CHIP R 100 J 1/10W<br>CHIP R 47K J 1/10W         |                        |                    |
| R24<br>R25<br>R26<br>R27<br>R28             |               |                   | RK73FB2A152J<br>RK73FB2A222J<br>RK73FB2A472J<br>RK73FB2A101J<br>RK73FB2A472J | CHIP R 1.5K J 1/10W<br>CHIP R 2.2K J 1/10W<br>CHIP R 4.7K J 1/10W<br>CHIP R 100 J 1/10W<br>CHIP R 4.7K J 1/10W      |                        |                    |
| R29 ,30<br>R31<br>R32<br>R33<br>R34         |               |                   | RK73FB2A101J<br>RK73FB2A183J<br>RK73FB2A103J<br>RK73FB2A102J<br>RK73FB2A334J | CHIP R 100 J 1/10W<br>CHIP R 18K J 1/10W<br>CHIP R 10K J 1/10W<br>CHIP R 1.0K J 1/10W<br>CHIP R 330K J 1/10W        |                        |                    |

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| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名 / 規格 | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| R35              |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R36              |               |                   | RK73FB2A470J      | CHIP R 47 J 1/10W       |                        |                    |
| R37 ,38          |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R39              |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R40 ,41          |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R42              |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R43              |               |                   | RK73FB2A155J      | CHIP R 1.5M J 1/10W     |                        |                    |
| R44              |               |                   | RK73FB2A683J      | CHIP R 68K J 1/10W      |                        |                    |
| R45              |               |                   | RK73FB2A271J      | CHIP R 270 J 1/10W      |                        |                    |
| R46              |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R47              |               |                   | RK73FB2A470J      | CHIP R 47 J 1/10W       |                        |                    |
| R48              |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R49              |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R50              |               |                   | RK73FB2A224J      | CHIP R 220K J 1/10W     |                        |                    |
| R51 ,52          |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R53              |               |                   | RK73FB2A392J      | CHIP R 3.9K J 1/10W     |                        |                    |
| R54              |               |                   | RK73FB2A681J      | CHIP R 680 J 1/10W      |                        |                    |
| R55              |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R58              |               |                   | RK73FB2A683J      | CHIP R 68K J 1/10W      |                        |                    |
| R59              |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R60              |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R61              |               |                   | RK73FB2A333J      | CHIP R 33K J 1/10W      |                        |                    |
| R62              |               |                   | RK73FB2A152J      | CHIP R 1.5K J 1/10W     |                        |                    |
| R63 ,64          |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R65              |               |                   | RK73FB2A391J      | CHIP R 390 J 1/10W      |                        |                    |
| R66              |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R67              |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R68              |               |                   | RK73FB2A273J      | CHIP R 27K J 1/10W      |                        |                    |
| R69              |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R70              |               |                   | RK73FB2A272J      | CHIP R 2.7K J 1/10W     |                        |                    |
| R71              |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R72              |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R73              |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R74              |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R75              |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R76              |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R77              |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R78              |               |                   | RK73FB2A562J      | CHIP R 5.6K J 1/10W     |                        |                    |
| R79              |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R80              |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R81              |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R82              |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R83              |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R84              |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R85              |               |                   | RK73FB2A682J      | CHIP R 6.8K J 1/10W     |                        |                    |
| R86              |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R87 -91          |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R92              |               |                   | RK73FB2A182J      | CHIP R 1.8K J 1/10W     |                        |                    |
| R93              |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R94              |               |                   | RK73FB2A682J      | CHIP R 6.8K J 1/10W     |                        |                    |
| R95              |               |                   | RK73FB2A273J      | CHIP R 27K J 1/10W      |                        |                    |
| R96              |               |                   | RK73FB2A123J      | CHIP R 12K J 1/10W      |                        |                    |
| R97              |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R98 -101         |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R102             |               |                   | RK73FB2A474J      | CHIP R 470K J 1/10W     |                        |                    |

L:Scandinavia

K:USA

P:Canada

Y:PX(Far East, Hawaii)

T:England

E:Europe

Y:AAFES(Europe)

X:Australia

M:Other Areas

⚠ indicates safety critical components.

## PARTS LIST

× New Parts

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TX-RX UNIT (X57-4530-XX)

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名 / 規格 | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| R103             |               |                   | RK73FB2A822J      | CHIP R 8.2K J 1/10W     |                        |                    |
| R104             |               |                   | RK73FB2A224J      | CHIP R 220K J 1/10W     |                        |                    |
| R105             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R106             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R107             |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R108             |               |                   | RK73FB2A224J      | CHIP R 220K J 1/10W     |                        |                    |
| R109             |               |                   | RK73FB2A334J      | CHIP R 330K J 1/10W     |                        |                    |
| R110             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R111             |               |                   | RK73FB2A154J      | CHIP R 150K J 1/10W     |                        |                    |
| R112             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R113             |               |                   | RK73FB2A563J      | CHIP R 56K J 1/10W      |                        |                    |
| R114             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R115             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R116             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R117             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R118             |               |                   | RK73FB2A105J      | CHIP R 1.0M J 1/10W     |                        |                    |
| R119-121         |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R122             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R123             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R124             |               |                   | RK73FB2A821J      | CHIP R 820 J 1/10W      |                        |                    |
| R125             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R126             |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R127             |               |                   | RK73FB2A474J      | CHIP R 470K J 1/10W     |                        |                    |
| R128             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R129, 130        |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R131             |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R132             |               |                   | RK73FB2A474J      | CHIP R 470K J 1/10W     |                        |                    |
| R133             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R134             |               |                   | RK73FB2A124J      | CHIP R 120K J 1/10W     |                        |                    |
| R135-137         |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R138             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R139             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R141             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R142             |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R143             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R144             |               |                   | RK73FB2A823J      | CHIP R 82K J 1/10W      |                        |                    |
| R145             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R146             |               |                   | RK73FB2A561J      | CHIP R 560 J 1/10W      |                        |                    |
| R147             |               |                   | RK73FB2A181J      | CHIP R 180 J 1/10W      |                        |                    |
| R148             |               |                   | RK73FB2A682J      | CHIP R 6.8K J 1/10W     |                        |                    |
| R149             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R150             |               |                   | RK73FB2A124J      | CHIP R 120K J 1/10W     |                        |                    |
| R151, 152        |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R153             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R154             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R155             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R156, 157        |               |                   | RK73FB2A224J      | CHIP R 220K J 1/10W     |                        |                    |
| R158             |               |                   | RK73FB2A821J      | CHIP R 820 J 1/10W      |                        |                    |
| R159             |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R160             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R161             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R162             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R163             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R164             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R165             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |

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|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| R166             |               |                   | RK73FB2A682J      | CHIP R 6.8K J 1/10W     |                        |                    |
| R167             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R169             |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R170             |               |                   | RK73FB2A681J      | CHIP R 680 J 1/10W      |                        |                    |
| R171             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R172             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R173             |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R174             |               |                   | RK73FB2A823J      | CHIP R 82K J 1/10W      |                        |                    |
| R175             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R176             |               |                   | RK73FB2A105J      | CHIP R 1.0M J 1/10W     |                        |                    |
| R177             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R178             |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R179, 180        |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R181             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R182, 183        |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R184             |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R185, 186        |               |                   | RK73FB2A823J      | CHIP R 82K J 1/10W      |                        |                    |
| R187             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R188             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R189             |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R190             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R191             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R192-194         |               |                   | RK73FB2A333J      | CHIP R 33K J 1/10W      |                        |                    |
| R195             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R196             |               |                   | RK73FB2A183J      | CHIP R 18K J 1/10W      |                        |                    |
| R197             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R198             |               |                   | RK73FB2A392J      | CHIP R 3.9K J 1/10W     |                        |                    |
| R199             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R200             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R201             |               |                   | R92-0670-05       | CHIP R 0 0HM            |                        |                    |
| R202             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R203             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R204             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R205             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R206             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R207             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R208             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R209             |               |                   | RK73FB2A334J      | CHIP R 330K J 1/10W     |                        |                    |
| R210             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R211             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R212             |               |                   | RK73FB2A184J      | CHIP R 180K J 1/10W     |                        |                    |
| R213             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R214             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R215             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R216             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R217             |               |                   | R92-0670-05       | CHIP R 0 0HM            |                        |                    |
| R218             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R221             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R222             |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R223             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R224             |               |                   | RK73FB2A334J      | CHIP R 330K J 1/10W     |                        |                    |
| R225             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R226             |               |                   | RK73FB2A334J      | CHIP R 330K J 1/10W     |                        |                    |
| R231             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R232             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |

L:Scandinavia

K:USA

P:Canada

Y:PX(Far East, Hawaii)

T:England

E:Europe

Y:AAFES(Europe)

X:Australia

M:Other Areas

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TX-RX UNIT (X57-4530-XX)

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名 / 規格 | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| R233             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R234             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R235             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R236             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R237             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R238             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R239-241         |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R242             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R243             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R244             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R254             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R256             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R257             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R258             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R259             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R260             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R261-265         |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R267             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R268             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R269             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R270             |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R271             |               |                   | RK73FB2A681J      | CHIP R 680 J 1/10W      |                        |                    |
| R272             |               |                   | RK73FB2A154J      | CHIP R 150K J 1/10W     |                        |                    |
| R273             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R275             |               |                   | RK73FB2A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R280             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R281             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R282             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R284             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R286             |               |                   | RK73FB2A470J      | CHIP R 47 J 1/10W       |                        |                    |
| R287             |               |                   | RK73FB2A330J      | CHIP R 33 J 1/10W       |                        |                    |
| R288             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R289             |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R290             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R292             |               |                   | RK73FB2A561J      | CHIP R 560 J 1/10W      |                        |                    |
| R293             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R294             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R295             |               |                   | RK73FB2A153J      | CHIP R 15K J 1/10W      |                        |                    |
| R351             |               |                   | RK73FB2A105J      | CHIP R 1.0M J 1/10W     |                        |                    |
| R352             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R353             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R354             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R355             |               |                   | RK73FB2A821J      | CHIP R 820 J 1/10W      |                        |                    |
| R356             |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R357             |               |                   | RK73FB2A394J      | CHIP R 390K J 1/10W     |                        |                    |
| R358             |               |                   | RK73FB2A560J      | CHIP R 56 J 1/10W       |                        |                    |
| R359, 360        |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R361             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R362             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R401             |               |                   | RK73FB2A271J      | CHIP R 270 J 1/10W      |                        |                    |
| R402             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R403             |               |                   | RK73FB2A470J      | CHIP R 47 J 1/10W       |                        |                    |
| R404             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R405             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R406-409         |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |

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TX-RX UNIT (X57-4530-XX)

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名 / 規格 | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| R410             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R411             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R412             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R413             |               |                   | RK73FB2A271J      | CHIP R 270 J 1/10W      |                        |                    |
| R416             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R417, 418        |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R420             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R421             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R423             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R424, 425        |               |                   | RK73FB2A224J      | CHIP R 220K J 1/10W     |                        |                    |
| R426             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R429             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R430             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R433             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R439             |               |                   | RK73FB2A683J      | CHIP R 68K J 1/10W      |                        |                    |
| R440             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R441             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R442-445         |               |                   | RK73FB2A470J      | CHIP R 47 J 1/10W       |                        |                    |
| R446, 447        |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R448             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R449             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R450-452         |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R453             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R454             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R454             |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R455             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R456             |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R457             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R458             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R459             |               |                   | RK73FB2A561J      | CHIP R 560 J 1/10W      |                        |                    |
| R460             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R461             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R462             |               |                   | RK73FB2A820J      | CHIP R 82 J 1/10W       |                        |                    |
| R463             |               |                   | RK73FB2A181J      | CHIP R 180 J 1/10W      |                        |                    |
| R464             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R465             |               |                   | R92-0699-05       | SOLD 10 1/2W            |                        |                    |
| R467             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R468             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R469             |               |                   | RK73FB2A333J      | CHIP R 33K J 1/10W      |                        |                    |
| R470             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R471             |               |                   | RK73FB2A822J      | CHIP R 8.2K J 1/10W     |                        |                    |
| R472             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R473             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R474             |               |                   | RK73FB2A474J      | CHIP R 470K J 1/10W     |                        |                    |
| R475             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R476             |               |                   | RK73FB2A100J      | CHIP R 10 J 1/10W       |                        |                    |
| R477             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R478             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R479             |               |                   | RK73FB2A682J      | CHIP R 6.8K J 1/10W     |                        |                    |
| R480             |               |                   | RK73FB2A474J      | CHIP R 470K J 1/10W     |                        |                    |
| R481             |               |                   | RK73FB2A333J      | CHIP R 33K J 1/10W      |                        |                    |
| R482             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R483             |               |                   | RK73FB2A273J      | CHIP R 27K J 1/10W      |                        |                    |
| R484, 485        |               |                   | RK73FB2A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R489             |               |                   | RK73FB2A272J      | CHIP R 2.7K J 1/10W     |                        |                    |

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TX-RX UNIT (X57-4530-XX)

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|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| R490,491         |               |                   | RK73FB2A273J      | CHIP R 27K J 1/10W      |                        |                    |
| R492             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R494             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R495,496         |               |                   | RK73FB2A681J      | CHIP R 680 J 1/10W      |                        |                    |
| R497,498         |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R501             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R511             |               |                   | RK73FB2A221J      | CHIP R 220 J 1/10W      |                        |                    |
| R512             |               |                   | RK73FB2A150J      | CHIP R 15 J 1/10W       |                        |                    |
| R513             |               |                   | RK73FB2A100J      | CHIP R 10 J 1/10W       |                        |                    |
| R516             |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R517             |               |                   | RK73FB2A473J      | CHIP R 47K J 1/10W      |                        |                    |
| R518,519         |               |                   | RK73FB2A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R520,521         |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R522             |               |                   | RK73FB2A332J      | CHIP R 3.3K J 1/10W     |                        |                    |
| R523             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R524             |               |                   | RK73FB2A820J      | CHIP R 82 J 1/10W       |                        |                    |
| R525             |               |                   | RK73FB2A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R526             |               |                   | RK73FB2A680J      | CHIP R 68 J 1/10W       |                        |                    |
| R527             |               |                   | RK73FB2A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R532             |               |                   | RK73FB2A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R533             |               |                   | RK73FB2A393J      | CHIP R 39K J 1/10W      |                        |                    |
| R601             |               |                   | RK73FB2A821J      | CHIP R 820 J 1/10W      |                        |                    |
| R602             |               |                   | RK73FB2A5R6J      | CHIP R 5.6 J 1/10W      |                        |                    |
| R603             |               |                   | RK73FB2A821J      | CHIP R 820 J 1/10W      |                        |                    |
| R604             |               |                   | RK73FB2A561J      | CHIP R 560 J 1/10W      |                        |                    |
| R605             |               |                   | RD14DB2H121J      | SMALL-RO 120 J 1/2W     |                        |                    |
| R606             |               |                   | RK73FB2A471J      | CHIP R 470 J 1/10W      |                        |                    |
| R607             |               |                   | RD14DB2R151J      | RD 150 J 1/4W           |                        |                    |
| R608             |               |                   | RK73FB2A472J      | CHIP R 4.7K J 1/10W     |                        |                    |
| R609             |               |                   | RK73FB2A561J      | CHIP R 560 J 1/10W      |                        |                    |
| R610             |               |                   | RK73FB2A122J      | CHIP R 1.2K J 1/10W     |                        |                    |
| R611             |               |                   | R92-1316-05       | FIXED RESISTOR 39 1W    |                        |                    |
| R612             |               |                   | R92-1292-05       | FIXED RESISTOR 68 1W    |                        |                    |
| R613             |               |                   | R92-1282-05       | FIXED RESISTOR 10 1W    |                        |                    |
| R614             |               |                   | R92-0670-05       | CHIP R 0 OHM            |                        |                    |
| R701-703         |               |                   | RK73FB2A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| VR1              |               |                   | R12-6413-05       | TRIMMING POT 220        |                        |                    |
| VR2              |               |                   | R12-6744-05       | TRIMMING POT 47K        |                        |                    |
| VR3              |               |                   | R12-6740-05       | TRIMMING POT 10K        |                        |                    |
| VR4              |               |                   | R12-6425-05       | TRIM POT. 22K           |                        |                    |
| VR6              |               |                   | R12-6427-05       | TRIM POT. 47K           |                        |                    |
| VR7,8            |               |                   | R12-6423-05       | TRIM POT. 10K           |                        |                    |
| VR9              |               |                   | R12-6740-05       | TRIMMING POT 10K        |                        |                    |
| VR401            |               |                   | R12-6740-05       | TRIMMING POT 10K        |                        |                    |
| VR402            |               |                   | R12-6715-05       | TRIMMING POT 22K        |                        |                    |
| VR601            |               |                   | R12-6744-05       | TRIMMING POT 47K        |                        |                    |
| VR602            |               |                   | R12-0091-05       | TRIMMING POT 100        |                        |                    |
| VR603            |               |                   | R12-6744-05       | TRIMMING POT 47K        |                        |                    |
| K1               |               |                   | S51-1436-05       | RELAY                   |                        |                    |
| S1               |               |                   | S31-1411-05       | SLIDE SWITCH            |                        |                    |
| D1               |               |                   | 1FB01             | DIORD                   |                        |                    |
| D2               |               |                   | 1SS226            | DIORD                   |                        |                    |
| D3 -6            |               |                   | DAN235K           | DIORD                   |                        |                    |
| D7               |               |                   | 1SV164            | DIORD                   |                        |                    |

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|------------------|---------------|-------------------|-------------------|------------------------------|------------------------|--------------------|
| D8               |               |                   | RD5.1M(B2)        | DIORD                        |                        |                    |
| D9               |               |                   | DAN202K           | DIORD                        |                        |                    |
| D10              |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D11              |               |                   | DAN202K           | DIORD                        |                        |                    |
| D12              |               |                   | DAP202K           | DIORD                        |                        |                    |
| D13 -15          |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D16 -18          |               |                   | DAN202K           | DIORD                        |                        |                    |
| D19              |               |                   | HSM88AS           | DIORD                        |                        |                    |
| D20              |               |                   | LFB01             | DIORD                        |                        |                    |
| D21              |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D22              |               |                   | DAN202K           | DIORD                        |                        |                    |
| D23 -28          |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D405             |               |                   | 1SV164            | DIORD                        |                        |                    |
| D407             |               |                   | 1SV164            | DIORD                        |                        |                    |
| D409             |               |                   | 1SV164            | DIORD                        |                        |                    |
| D410             |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D411             |               |                   | MA862             | DIORD                        |                        |                    |
| D412-416         |               |                   | 1SV164            | DIORD                        |                        |                    |
| D417-419         |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D422             |               |                   | 1SS226            | DIORD                        |                        |                    |
| D423             |               |                   | RD6.2M(B2)        | DIORD                        |                        |                    |
| D424             |               |                   | HSM88AS           | DIORD                        |                        |                    |
| D425             |               |                   | MA77              | DIORD                        |                        |                    |
| D426             |               |                   | 1SV164            | DIORD                        |                        |                    |
| D427             |               |                   | 1SS355            | DIORD                        | (or MA110)             |                    |
| D601             |               |                   | UM9401            | DIORD                        |                        |                    |
| D602             |               |                   | 0SA341            | DIORD                        |                        |                    |
| D603             |               |                   | SZ27(LC3)         | DIORD                        |                        |                    |
| D604             |               |                   | RD18M(B1)         | DIORD                        |                        |                    |
| D605             |               |                   | DAN202K           | DIORD                        |                        |                    |
| D606             |               |                   | LFB01             | DIORD                        |                        |                    |
| D607             |               |                   | MI308             | DIORD                        |                        |                    |
| D608, 609        |               |                   | HSM88AS           | DIORD                        |                        |                    |
| D610             |               |                   | LFB01             | DIORD                        |                        |                    |
| IC1              |               |                   | KCX05             | HIC                          |                        |                    |
| IC2              |               |                   | KC008             | HIC                          |                        |                    |
| IC3              |               |                   | KC004             | HIC(FM IF)                   |                        |                    |
| IC4              |               |                   | KRU4066BCF        | IC                           | (or BU4066BCF)         |                    |
| IC5              |               |                   | MB87032PF         | IC                           |                        |                    |
| IC6              |               |                   | UPC1242H          | IC(AMP POWER AMP)            |                        |                    |
| IC7              |               |                   | TC9174F           | IC(CMOS I/O EXTENSION)       |                        |                    |
| IC8              |               |                   | KRU4066BCF        | IC                           | (or BU4066BCF)         |                    |
| IC9              |               |                   | NJM4558M          | IC(OP AMP X2)                |                        |                    |
| IC10             |               |                   | UPC1313HA         | IC(PRE AMP)                  |                        |                    |
| IC11             |               |                   | TC9174F           | IC(CMOS I/O EXTENSION)       |                        |                    |
| IC12             |               |                   | KCA06             | HIC                          |                        |                    |
| IC13             |               |                   | KRU4066BCF        | IC                           | (or BU4066BCF)         |                    |
| IC14             |               |                   | UPC1037HA         | IC(DOUBLE BALANCE MODULATOR) |                        |                    |
| IC201-203        |               |                   | SN16913P          | IC(DOUBLE BALANCED MIXERS)   |                        |                    |
| IC204            |               |                   | CXD1225M          | IC(PLL SYNTHESIZER)          |                        |                    |
| IC205            |               |                   | TA78L08F          | IC(VOLTAGE REGULATOR)        |                        |                    |
| IC206            |               |                   | TA78L05F          | IC(5V VOLTAGE REGULATOR)     |                        |                    |
| IC401            |               |                   | NJM2902M          | IC(OP AMP X4)                |                        |                    |
| IC402            |               |                   | TA7808F           | IC                           |                        |                    |
| IC601            |               |                   | M67727            | IC(POWER MODULE)             |                        |                    |

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|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| Q1               |               |                   | 3SK131(M)         | FET                     |                        |                    |
| Q2, 3            |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q4               |               |                   | DTC124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q5               |               |                   | 2SJ106(GR)        | FET                     |                        |                    |
| Q6               |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q7               |               |                   | 2SD1757K(S)       | TRANSISTOR              |                        |                    |
| Q8               |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q10              |               |                   | DTC114TK          | DIGITAL TRANSISTOR      |                        |                    |
| Q11, 14          |               |                   | DTA124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q15              |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q16              |               |                   | DTA124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q17              |               |                   | 2SK208(Y)         | FET                     |                        |                    |
| Q18, 19          |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q20              |               |                   | DTA124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q21              |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q22              |               |                   | FNC1              | TRANSISTOR              |                        |                    |
| Q23, 24          |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q25              |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q26, 27          |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q28              |               |                   | 3SK131(M)         | TRANSISTOR              |                        |                    |
| Q29              |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q30, 31          |               |                   | DTA124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q32, 33          |               |                   | 2SK210(Y)         | FET                     |                        |                    |
| Q34              |               |                   | DTA124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q35              |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q36, 37          |               |                   | DTC114TK          | DIGITAL TRANSISTOR      |                        |                    |
| Q38              |               |                   | DTC124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q39              |               |                   | 2SC2712(GR)       | TRANSISTOR              |                        |                    |
| Q40              |               |                   | 2SD1624(S)        | TRANSISTOR              |                        |                    |
| Q201             |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q202             |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q203, 204        |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q206, 207        |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q209             |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q210             |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |
| Q211             |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q213             |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q215, 216        |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q217-219         |               |                   | 2SC3324(G)        | TRANSISTOR              |                        |                    |
| Q220             |               |                   | DTC114TK          | DIGITAL TRANSISTOR      |                        |                    |
| Q351             |               |                   | 2SK208(Y)         | FET                     |                        |                    |
| Q352             |               |                   | 2SC2714(Y)        | TRANSISTOR              |                        |                    |
| Q401             |               |                   | 3SK184(S)         | FET                     |                        |                    |
| Q402             |               |                   | 3SK131(M)         | FET                     |                        |                    |
| Q403             |               |                   | 2SK210(GR)        | FET                     |                        |                    |
| Q404             |               |                   | DTC114EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q405             |               |                   | 3SK131(M)         | FET                     |                        |                    |
| Q406             |               |                   | 2SC2954           | TRANSISTOR              |                        |                    |
| Q407             |               |                   | 2SC1947           | TRANSISTOR              |                        |                    |
| Q409, 410        |               |                   | 3SK131(M)         | FET                     |                        |                    |
| Q416             |               |                   | DTA143EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q417             |               |                   | DTA124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q418             |               |                   | DTC124EK          | DIGITAL TRANSISTOR      |                        |                    |
| Q419             |               |                   | 2SA1162(Y)        | TRANSISTOR              |                        |                    |
| Q420, 421        |               |                   | 2SC2712(Y)        | TRANSISTOR              |                        |                    |

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△ indicates safety critical components.

## PARTS LIST

\* New Parts

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.

TX-RX UNIT (X57-4530-XX)  
SUB UNIT (DDS) (X58-4020-0X)  
SUB UNIT (VCO) (X58-4110-00)

| Ref. No.<br>参照番号                              | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号                                                                                  | Description<br>部品名/規格                                                                                                                     | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|-----------------------------------------------|---------------|-------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| Q422, 423<br>Q424-427<br>Q428<br>Q429<br>Q601 |               |                   | 2SA1213(Y)<br>DTC114EK<br>DTC124EK<br>2SC2714(Y)<br>DTC114EK                                       | TRANSISTOR<br>DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR<br>TRANSISTOR<br>DIGITAL TRANSISTOR                                                |                        |                    |
| Q602<br>Q603<br>Q604<br>Q605<br>Q606          |               |                   | DTC124EK<br>2SB1302(S)<br>2SA1824(S)<br>2SC2673(Y)<br>2SA1162(Y)                                   | DIGITAL TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR<br>TRANSISTOR                                                                |                        |                    |
| Q607<br>TH1<br>TH2, 3<br>TH401<br>TH601       |               |                   | 2SC2712(Y)<br>157-502-53002<br>157-102-55008<br>157-102-55008<br>5TP-415                           | TRANSISTOR<br>THERMISTOR<br>THERMISTOR<br>THERMISTOR<br>THERMISTOR                                                                        |                        |                    |
| S701                                          |               |                   | W02-1809-05                                                                                        | ENCODER                                                                                                                                   |                        |                    |
| A201<br>A202<br>A203<br>A601                  |               | *                 | X58-4020-00<br>X58-4020-01<br>X58-4110-00<br>X59-4020-00                                           | SUB UNIT (DDS-1)<br>SUB UNIT (DDS-2)<br>SUB UNIT (VCO)<br>MODULE UNIT (PAN)                                                               |                        |                    |
| SUB UNIT (DDS) (X58-4020-0X)                  |               |                   |                                                                                                    |                                                                                                                                           |                        |                    |
| C1<br>C2<br>C3, 4<br>C5<br>C6                 |               |                   | CK73FB1E223K<br>CK73FB1H102K<br>C92-0007-05<br>CK73FB1H102K<br>CC73FCH1H101J                       | CHIP C 0.022UF K<br>CHIP C 1000PF K<br>CHIP TAN 2.2UF 10WV<br>CHIP C 1000PF K<br>CHIP C 180PF J                                           |                        |                    |
| C7<br>C8<br>C9<br>C10<br>C12, 13<br>C14 -17   |               |                   | CC73FCH1H100D<br>CC73FCH1H221J<br>CC73FCH1H220J<br>CC73FCH1H151J<br>CC73FCH1H270J<br>CC73FCH1H101J | CHIP C 10PF D<br>CHIP C 220PF J<br>CHIP C 22PF J<br>CHIP C 150PF J<br>CHIP C 27PF J<br>CHIP C 100PF J                                     |                        |                    |
| CN1<br>CN1<br>CN2<br>CN2                      |               |                   | E40-5612-05<br>E40-5676-05<br>E40-5611-05<br>E40-5675-05                                           | PIN CONNECTOR (2P:DDS-1)<br>PIN CONNECTOR (8P:DDS-2)<br>PIN CONNECTOR (2P:DDS-1)<br>PIN CONNECTOR (8P:DDS-2)                              |                        |                    |
| L1 -3<br>L4, 5                                |               |                   | L40-1011-48<br>L40-2201-48                                                                         | SMALL FIXED INDUCTOR<br>SMALL FIXED INDUCTOR                                                                                              |                        |                    |
| CP1, 2<br>R1<br>R2<br>R3<br>R4<br>R5          |               |                   | R90-0721-05<br>RK73FB2A103J<br>RK73FB2A153J<br>RK73FB2A221J<br>RK73FB2A101J<br>RK73FB2A471J        | MULTIPLE COMPONENTS (C,R,L)<br>CHIP R 10K J 1/10W<br>CHIP R 15K J 1/10W<br>CHIP R 220 J 1/10W<br>CHIP R 100 J 1/10W<br>CHIP R 470 J 1/10W |                        |                    |
| IC1<br>Q1                                     |               |                   | P71022<br>2SC2712(GR)                                                                              | IC(DDS)<br>TRANSISTOR                                                                                                                     |                        |                    |
| SUB UNIT (VCO) (X58-4110-00)                  |               |                   |                                                                                                    |                                                                                                                                           |                        |                    |
| C1<br>C2<br>C3<br>C4<br>C5                    |               |                   | CK73FB1H102K<br>CC73FSL1H101J<br>CC73FCH1H160J<br>CC73FCH1H080D<br>CC73FCH1H070D                   | CHIP C 1000PF K<br>CHIP C 100PF J<br>CHIP C 16PF J<br>CHIP C 8PF D<br>CHIP C 7PF D                                                        |                        |                    |

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SUB UNIT (VCO) (X58-4110-00)  
MODULE UNIT (FAN) (X59-4020-00)  
LCD ASSY (B38-0701-25)

| Ref. No.<br>参照番号                | Address<br>位置       | New<br>Parts<br>差 | Parts No.<br>部品番号                                                               | Description<br>部品名/規格                                                                              | Desti-<br>nation<br>仕向                                             | Re-<br>marks<br>備考 |
|---------------------------------|---------------------|-------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|
| C6<br>C7<br>C8<br>C10<br>C11    | 9                   |                   | CC73FCH1H080D<br>CC73FCH1H030C<br>CK73FB1H102K<br>CC73FCH1H030C<br>CK73FB1H102K | CHIP C<br>8PF<br>CHIP C<br>3PF<br>CHIP C<br>1000PF<br>CHIP C<br>3PF<br>CHIP C<br>1000PF            | D<br>C<br>K<br>C<br>K                                              |                    |
| TC1                             |                     |                   | CD5-0346-05                                                                     | TRIM CAP                                                                                           |                                                                    |                    |
| CN1                             |                     |                   | B40-5677-05                                                                     | PIN CONNECTOR FOR INSIDE                                                                           |                                                                    |                    |
| -                               |                     |                   | F10-2092-04                                                                     | SHIELDING PLATE                                                                                    |                                                                    |                    |
| -                               |                     |                   | F11-1086-04                                                                     | SHIELDING CASE                                                                                     |                                                                    |                    |
| -                               |                     |                   | G13-0904-04                                                                     | FORMED PLATE                                                                                       |                                                                    |                    |
| L1<br>L2                        |                     | *                 | L40-6895-48<br>L34-4356-05                                                      | SMALL FIXED INDUCTOR<br>COIL                                                                       |                                                                    |                    |
| -                               |                     |                   | N30-2604-41                                                                     | PAN HEAD MACHIN SCREW                                                                              |                                                                    |                    |
| R1<br>R2<br>R3<br>R4<br>R6      | 5                   |                   | RK73FB2A682J<br>RK73FB2A271J<br>RK73FB2A330J<br>RK73FB2A472J<br>RK73FB2A471J    | CHIP R<br>6.8K<br>CHIP R<br>270<br>CHIP R<br>33<br>CHIP R<br>4.7K<br>CHIP R<br>470                 | J<br>1/10W<br>J<br>1/10W<br>J<br>1/10W<br>J<br>1/10W<br>J<br>1/10W |                    |
| R7                              |                     |                   | RK73FB2A560J                                                                    | CHIP R<br>56                                                                                       | J<br>1/10W                                                         |                    |
| D1<br>Q1<br>Q2                  |                     |                   | 1SV166<br>2SK508NV(K52)<br>2SC2714(Y)                                           | DIORD<br>FET<br>TRANSISTOR                                                                         |                                                                    |                    |
| MODULE UNIT (FAN) (X59-4020-00) |                     |                   |                                                                                 |                                                                                                    |                                                                    |                    |
| C1<br>-                         | 8                   |                   | CK73FB1H102K<br>E23-0471-05                                                     | CHIP C<br>1000PF<br>TERMINAL                                                                       | K                                                                  |                    |
| R2<br>R3<br>R4<br>R7<br>R8      | 6                   |                   | RK73GB1J103J<br>RK73FB2A101J<br>RK73GB1J562J<br>RK73GB1J472J<br>RK73GB1J821J    | CHIP R<br>10K<br>CHIP R<br>100<br>CHIP R<br>5.6K<br>CHIP R<br>4.7K<br>CHIP R<br>820                | J<br>1/16W<br>J<br>1/10W<br>J<br>1/16W<br>J<br>1/16W<br>J<br>1/16W |                    |
| R9<br>R10                       |                     |                   | RK73GB1J472J<br>RK73GB1J333J                                                    | CHIP R<br>4.7K<br>CHIP R<br>33K                                                                    | J<br>1/16W<br>J<br>1/16W                                           |                    |
| D1<br>IC1<br>Q1<br>Q2           | 3                   |                   | DAN202K<br>NJM2904M<br>DTC114TK<br>DT0114BK                                     | DIORD<br>IC(OP AMP X2)<br>DIGITAL TRANSISTOR<br>DIGITAL TRANSISTOR                                 |                                                                    |                    |
| LCD ASSY (B38-0701-25)          |                     |                   |                                                                                 |                                                                                                    |                                                                    |                    |
| C1<br>C3<br>C5<br>C6<br>C13     | 2<br>4<br>-12<br>14 |                   | CC73FSL1H101J<br>CK73FB1H103K<br>C92-0552-05<br>CK73FB1H103K<br>CC73FSL1H330J   | CHIP C<br>100PF<br>CHIP C<br>0.010UF<br>ELECTRO<br>4.7UF<br>CHIP C<br>0.010UF<br>CHIP C<br>33PF    | J<br>K<br>10WV<br>K<br>J                                           |                    |
| C15<br>C16<br>C17<br>C19<br>C23 | 18<br>-22           |                   | CK73FB1E104Z<br>CK73FB1H223K<br>CK73FB1H102K<br>CK73FB1H103K<br>C92-0607-08     | CHIP C<br>0.10UF<br>CHIP C<br>0.022UF<br>CHIP C<br>1000PF<br>CHIP C<br>0.010UF<br>ELECTRO<br>4.7UF | Z<br>K<br>K<br>K<br>10WV                                           |                    |
| C24                             |                     |                   | CK73FB1H103K                                                                    | CHIP C<br>0.010UF                                                                                  | K                                                                  |                    |

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## PARTS LIST

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LCD ASSY (B38-0701-25)

| Ref. No.<br>参照番号 | Address<br>位置 | New<br>Parts<br>新 | Parts No.<br>部品番号 | Description<br>部品名 / 規格 | Desti-<br>nation<br>仕向 | Re-<br>marks<br>備考 |
|------------------|---------------|-------------------|-------------------|-------------------------|------------------------|--------------------|
| CN1              |               |                   | E40-3262-05       | CONNECTOR (4 P)         |                        |                    |
| CN2 ,3           |               |                   | E40-5392-05       | CONNECTOR (5 P)         |                        |                    |
| CN8 ,9           |               |                   | E40-5409-05       | CONNECTOR (5 P)         |                        |                    |
| -                |               |                   | F07-1389-04       | COVER                   |                        |                    |
| -                |               |                   | J21-4473-08       | MOUNTING HARDWARE       |                        |                    |
| XT1              |               |                   | L77-1504-05       | CRYSTAL RESONATOR(4MHZ) |                        |                    |
| R1               |               |                   | RK73F82A105J      | CHIP R 1.0M J 1/10W     |                        |                    |
| R2               |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R3               |               |                   | RK73F82A331J      | CHIP R 330 J 1/10W      |                        |                    |
| R4 -7            |               |                   | RK73F82A101J      | CHIP R 100 J 1/10W      |                        |                    |
| R8               |               |                   | RK73F82A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R9               |               |                   | RK73F82A102J      | CHIP R 1.0K J 1/10W     |                        |                    |
| R10              |               |                   | RK73F82A222J      | CHIP R 2.2K J 1/10W     |                        |                    |
| R11              |               |                   | RK73B82A392J      | CHIP R 3.9K J 1/10W     |                        |                    |
| R12              |               |                   | RK73F82A123J      | CHIP R 12K J 1/10W      |                        |                    |
| R13              |               |                   | RK73F82A272J      | CHIP R 2.7K J 1/10W     |                        |                    |
| R14 ,15          |               |                   | R92-1240-05       | CHIP R 10 J 1/4W        |                        |                    |
| R17 ,18          |               |                   | RK73F82A104J      | CHIP R 100K J 1/10W     |                        |                    |
| R19              |               |                   | RK73F82A103J      | CHIP R 10K J 1/4W       |                        |                    |
| R20              |               |                   | RK73F82A470J      | CHIP R 47 J 1/10W       |                        |                    |
| R21              |               |                   | RK73F82A100J      | CHIP R 10 J 1/10W       |                        |                    |
| R22              |               |                   | RK73F82A105J      | CHIP R 1.0M J 1/10W     |                        |                    |
| R23              |               |                   | R92-0670-05       | CHIP R 0.0M             |                        |                    |
| R24 -41          |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R42 ,43          |               |                   | RK73F82A100J      | CHIP R 10 J 1/10W       |                        |                    |
| R44 -46          |               |                   | RK73F82A103J      | CHIP R 10K J 1/10W      |                        |                    |
| R47 ,48          |               |                   | RK73F82A223J      | CHIP R 22K J 1/10W      |                        |                    |
| R49              |               |                   | RK73B82A105J      | CHIP R 1.0M J 1/10W     |                        |                    |
| R50              |               |                   | RK73F82A104J      | CHIP R 100K J 1/10W     |                        |                    |
| VR1              |               |                   | R23-3410-08       | TRIM POT 10K(B)         |                        |                    |
| VR2              |               |                   | R23-3411-08       | TRIM POT 10K(B)         |                        |                    |
| S1               |               |                   | W02-1762-05       | ENCODER                 |                        |                    |
| S2               |               |                   | S40-2458-05       | PUSH SWICH              |                        |                    |
| S3 -19           |               |                   | S70-0408-05       | TACT SWICH              |                        |                    |
| D1               |               |                   | MA112             | DIORD                   |                        |                    |
| D2               |               |                   | RLS73             | DIORD                   |                        |                    |
| IC1              |               |                   | HD404719A46H      | IC(CPU)                 |                        |                    |
| IC2              |               |                   | MSM5265GS-V1K     | IC                      |                        |                    |
| IC3 ,4           |               |                   | TC4S11F           | IC(2 INPUT NAND GATE)   |                        |                    |
| IC5              |               |                   | L78LR05B-FA       | IC                      |                        |                    |
| IC6 ,7           |               |                   | TC4S584F          | IC                      |                        |                    |
| LCD1             |               |                   | B38-0727-08       | LCD ELEMENT             |                        |                    |
| PL1 -4           |               |                   | B30-0865-15       | LAMP (6.3V 75mA)        |                        |                    |
| Q1               |               |                   | DTC114EK          | DIGITAL TR              |                        |                    |
| Q2               |               |                   | 2SA1745           | TR                      |                        |                    |
| Q3               |               |                   | DTC114EK          | DIGITAL TR              |                        |                    |
| Q4               |               |                   | 2SA1307(Y)        | TR                      |                        |                    |
| Q5               |               |                   | 2SC2712(Y)        | TR                      |                        |                    |
| Q6               |               |                   | 2SA1162(Y)        | TR                      |                        |                    |

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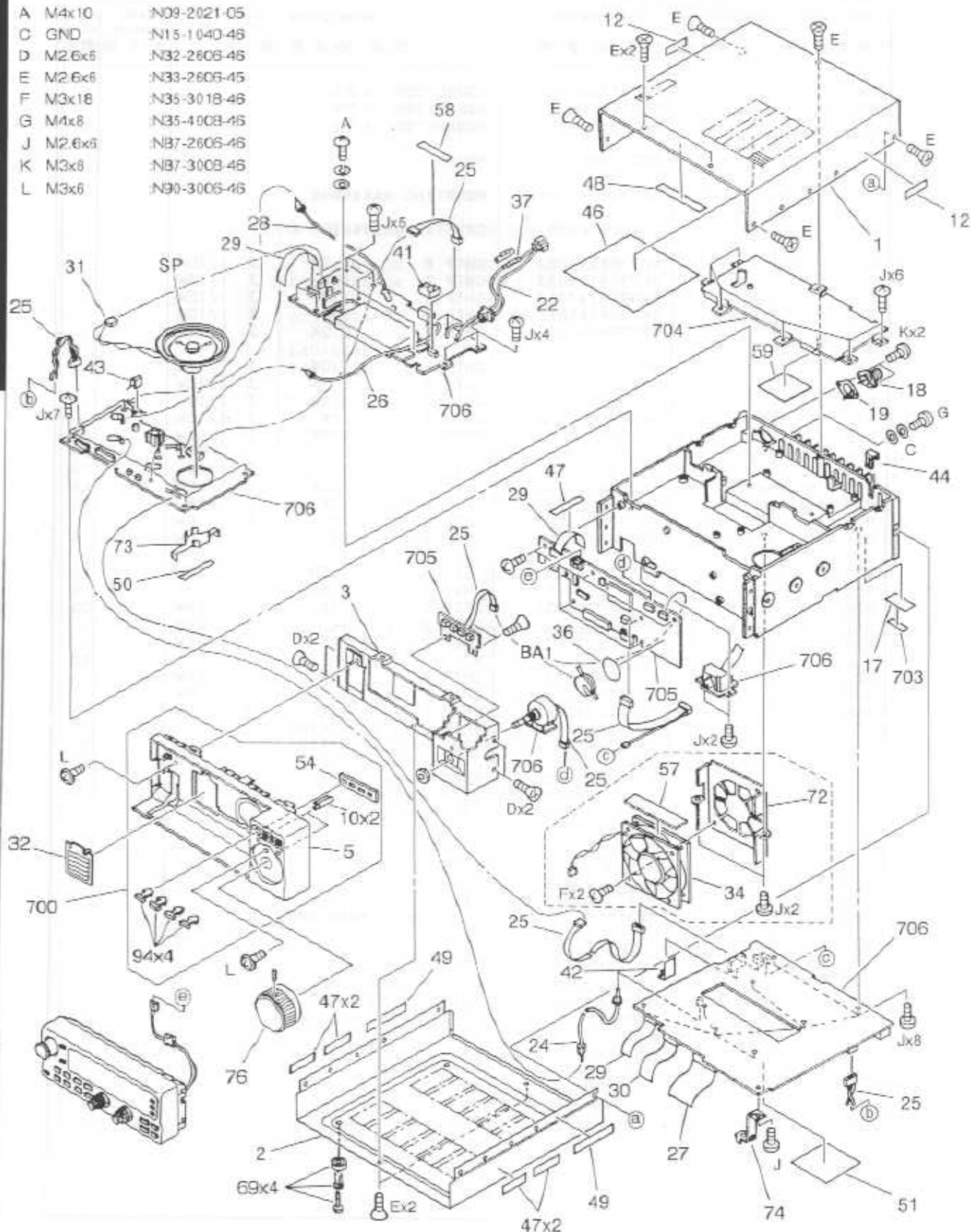
⚠ Indicates safety critical components.



# TM-255A/E

## EXPLODED VIEW

- |   |        |             |
|---|--------|-------------|
| A | M4x10  | N09-2021-05 |
| C | GND    | N15-1040-46 |
| D | M2.6x6 | N32-2606-46 |
| E | M2.6x6 | N33-2606-45 |
| F | M3x18  | N36-3018-46 |
| G | M4x8   | N35-4008-46 |
| J | M2.6x6 | N37-2606-46 |
| K | M3x8   | N37-3008-46 |
| L | M3x6   | N30-3006-46 |



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

### EXPLODED VIEW (CONTROL)

This exploded view diagram illustrates the assembly of the LCD unit. The components are numbered as follows:

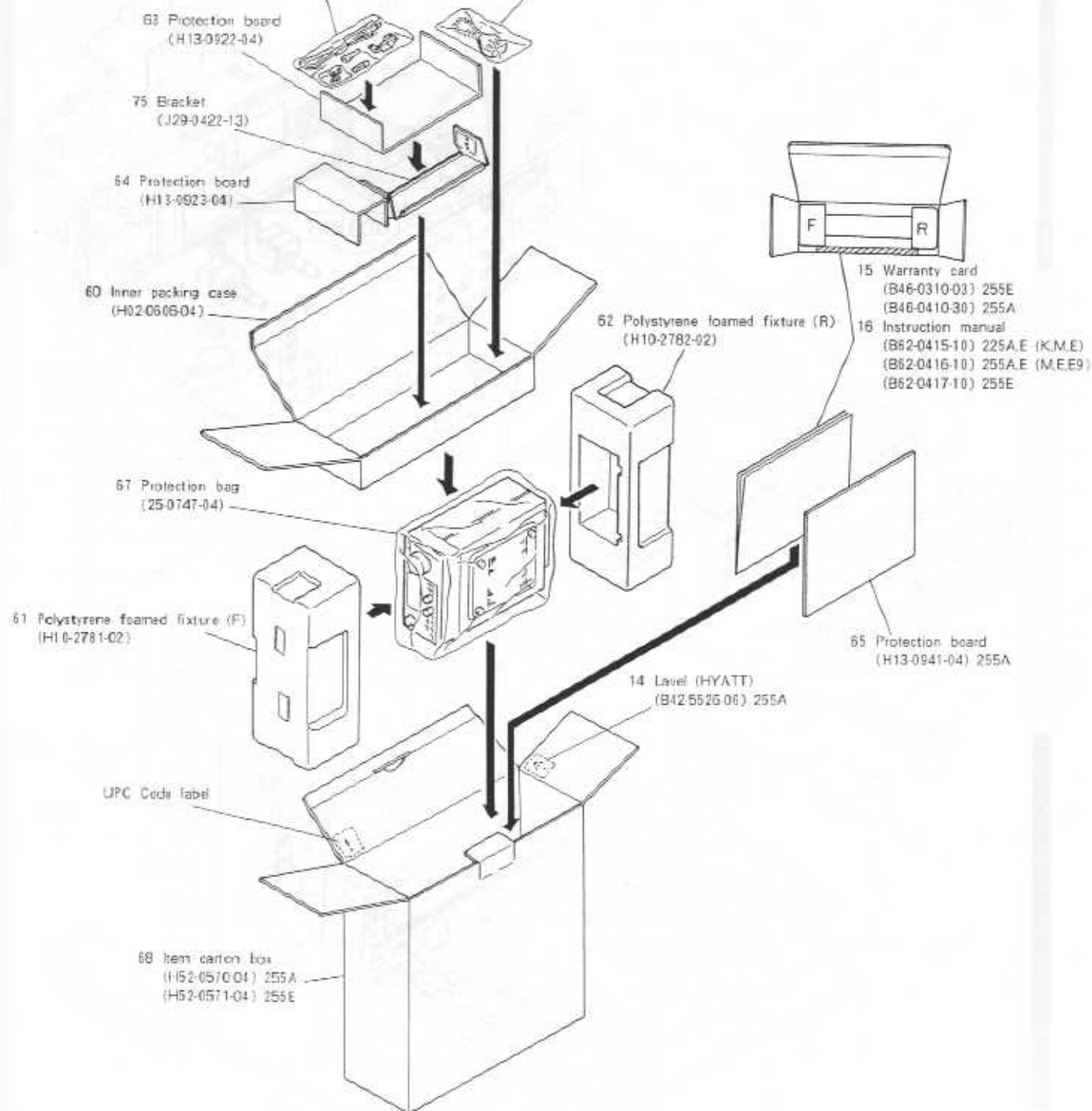
- 78**: Screws (Hx2) for the LCD unit frame.
- 40**: Screws (Hx2) for the LCD unit frame.
- 702**: Screws (I x 3) for the LCD unit frame.
- 32**: Screws (I x 2) for the LCD unit frame.
- 23**: Screws (I x 2) for the LCD unit frame.
- 11**: Screws (I x 2) for the LCD unit frame.
- 70**: Screws (Hx2) for the LCD unit frame.
- Hx2**: Screws (Hx2) for the LCD unit frame.
- I x 3**: Screws (I x 3) for the LCD unit frame.
- I x 2**: Screws (I x 2) for the LCD unit frame.
- LCD UNIT**: The central LCD unit component.
- 711**: Screws (Hx2) for the LCD unit frame.
- 79**: Screws (Hx2) for the LCD unit frame.
- 45**: Screws (Hx2) for the LCD unit frame.
- 77**: Screws (Hx2) for the LCD unit frame.
- 55**: Screws (Hx2) for the LCD unit frame.
- 53**: Screws (Hx2) for the LCD unit frame.
- 52**: Screws (Hx2) for the LCD unit frame.
- 56**: Screws (Hx2) for the LCD unit frame.
- 93**: Screws (Hx2) for the LCD unit frame.
- 82**: Screws (Hx2) for the LCD unit frame.
- 83**: Screws (Hx2) for the LCD unit frame.
- 84**: Screws (Hx2) for the LCD unit frame.
- 85**: Screws (Hx2) for the LCD unit frame.
- 87**: Screws (Hx2) for the LCD unit frame.
- 88**: Screws (Hx2) for the LCD unit frame.
- 89**: Screws (Hx2) for the LCD unit frame.
- 90**: Screws (Hx2) for the LCD unit frame.
- 81x2**: Screws (Hx2) for the LCD unit frame.
- 80x2**: Screws (Hx2) for the LCD unit frame.
- 93x3**: Screws (Hx2) for the LCD unit frame.
- 91**: Screws (Hx2) for the LCD unit frame.
- 92**: Screws (Hx2) for the LCD unit frame.
- 95**: Screws (Hx2) for the LCD unit frame.
- 86**: Screws (Hx2) for the LCD unit frame.
- 7**: Screws (Hx2) for the LCD unit frame.
- 9**: Screws (Hx2) for the LCD unit frame.

65

## PACKING

- 20 DC cord  
(E30-2111-05)
- 38 Fuse (15A)  
(F51-0017-05)
- 66 Protection bag  
(H25-0079-04)
- 71 Hook  
(J20-0319-21) 255A (K)
- 96 Screw  
(N46-3010-46) 255A (K)
- 97 Screw set  
(N99-0383-05)
- 98 Spanner  
(W01-0414-04)

- MIC Microphone  
(T91-0396-05) 255A (M)  
(T91-0397-05) 255A (K)  
(T91-0398-05) 255E



## ADJUSTMENT

### OUTLINE OF ADJUSTMENT MODE

The adjustment items on the service adjustment mode menu are set in service adjustment mode. The data is updated when a write operation is performed with the switch on menu No. B3, Write into EEPROM. The following items must be set as shown to adjust correctly:

#### • Settings for adjustment

| Item                           | Setting      |
|--------------------------------|--------------|
| IF-SHIFT                       | Center (0Hz) |
| RIT                            | OFF          |
| AIP                            | OFF          |
| NB                             | OFF          |
| Power                          | HIGH         |
| Microphone gain control by ALC | OFF          |

#### • Frequencies and modes for adjustment

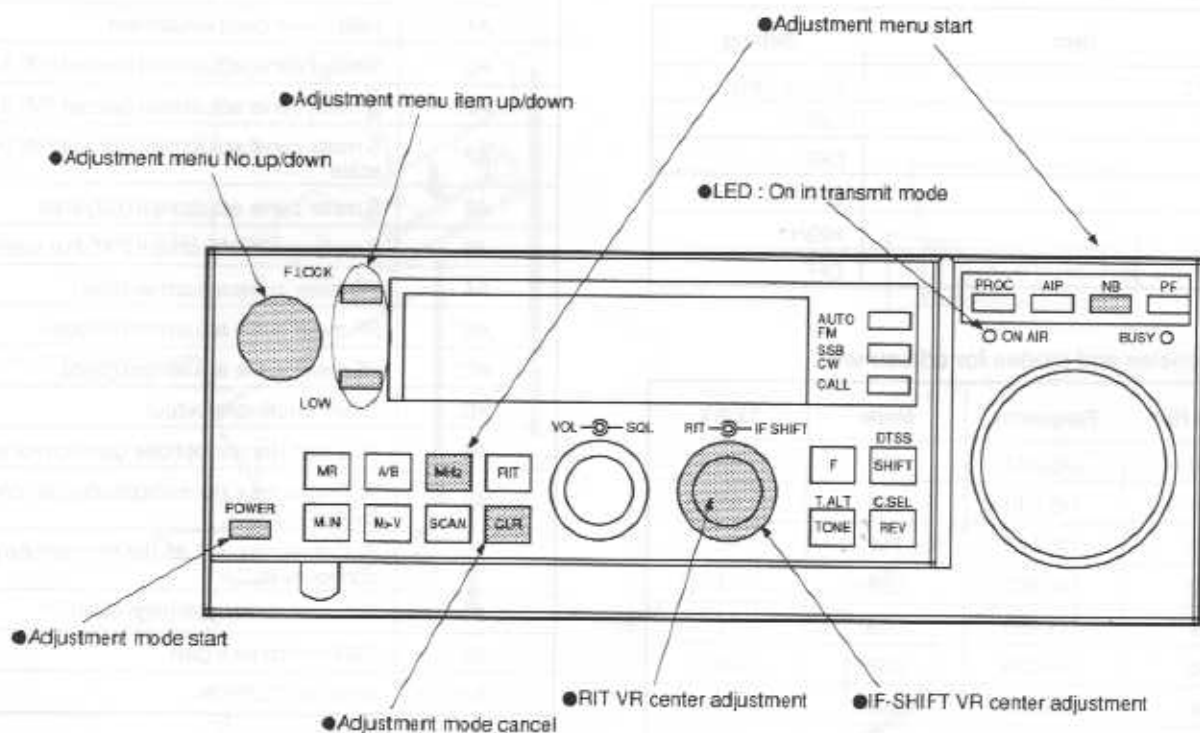
| Menu No. | Frequency | Mode | TX/RX |
|----------|-----------|------|-------|
| A0       | 145.040   | FM   | RX    |
| A1       | 145.040   | FM   | RX    |
| A2       | 145.040   | FM   | RX    |
| A3       | 144.950   | LSB  | TX    |
| A4       | 144.950   | USB  | TX    |
| A5       | 144.039   | USB  | RX    |
| A6       | 144.039   | USB  | RX    |
| A7       | 144.039   | USB  | RX    |
| A8       | 145.040   | FM   | RX    |
| A9       | 145.040   | FM   | RX    |
| AA       | 144.950   | USB  | TX    |
| AB       | 144.950   | USB  | TX    |
| AC       | 144.950   | USB  | TX    |
| AD       | 144.780   | FM   | TX    |
| AE       | 144.950   | USB  | TX    |
| AF       | 144.950   | USB  | TX    |
| B0       | 144.950   | USB  | TX    |
| B1       | 144.980   | FM   | TX    |
| B2       | 144.950   | USB  | TX    |
| B3       | 145.040   | FM   | RX    |

### SERVICE ADJUSTMENT MODE MENU

| Menu No. | Menu contents                                             |
|----------|-----------------------------------------------------------|
| A0       | Checksum display                                          |
| A1       | RIT VR mechanical center correction                       |
| A2       | IF-SHIFT VR mechanical center correction                  |
| A3       | LSB carrier point adjustment                              |
| A4       | USB carrier point adjustment                              |
| A5       | S meter curve adjustment (except FM) S1                   |
| A6       | S meter curve adjustment (except FM) S9                   |
| A7       | S meter curve adjustment (except FM) Full scale           |
| A8       | S meter curve adjustment (FM) Start                       |
| A9       | S meter curve adjustment (FM) Full scale                  |
| AA       | RF meter curve adjustment (low)                           |
| AB       | RF meter curve adjustment (middle)                        |
| AC       | RF meter curve adjustment (high)                          |
| AD       | DTMF single tone output                                   |
| AE       | ALC start (for microphone gain control by ALC)            |
| AF       | ALC zone max. (for microphone gain control by ALC)        |
| B0       | ALC zone max. + 6 dB (for microphone gain control by ALC) |
| B1       | FM microphone gain (high level)                           |
| B2       | SSB microphone gain                                       |
| B3       | Write into EEPROM                                         |

## ADJUSTMENT

### PANEL OPERATION IN ADJUSTMENT MODE



### Setting

- 1) Hold down the NB and MHz keys and switch the power on. (Turn the encoder to change the menu number.)
- 2) When the UP or DOWN key is pressed, the menu number is set.
- 3) Menu numbers A1 to A9 and AA to AC can be used in adjustment mode.
- 4) Press the CLR key to cancel adjustment mode. (It is also canceled when the power is turned off.)

## ADJUSTMENT

### A0 CHECKSUM DISPLAY

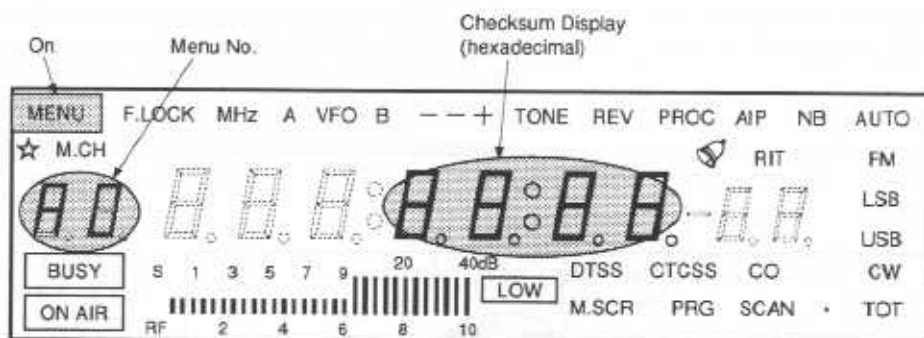
#### • Adjustment function

Displays the version of the installed program. Displays the two low-order bytes of the checksum obtained by adding all the program codes.

#### • Display

#### • Adjustment procedure

None



### A1 RIT VR MECHANICAL CENTER CORRECTION

#### • Adjustment function

Input the RIT control center position to the microcomputer so that the RIT frequency is zero when the RIT control is at the center position on the panel.

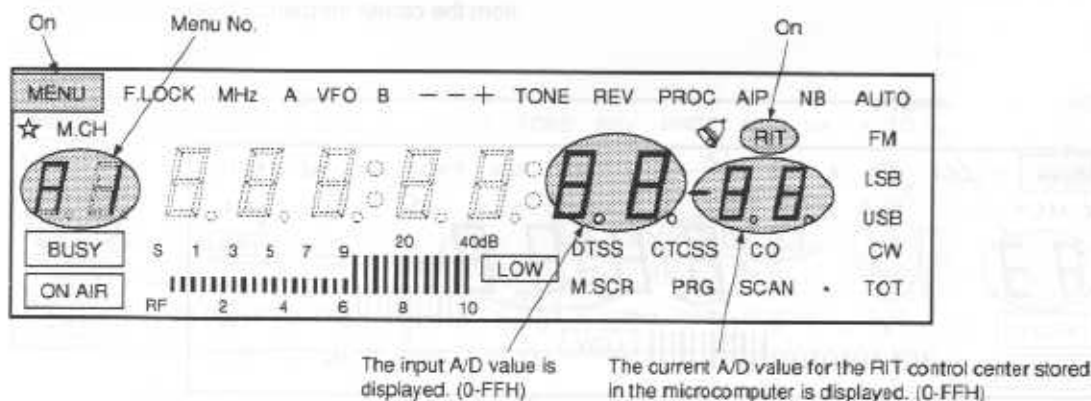
#### • Display

#### • Adjustment procedure

1. Set the RIT control to the center position on the panel.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Remarks

The center position can be input unconditionally without pressing the key. However, the key must be pressed to prevent this menu item data from being modified accidentally when the RIT control is not at the center. When the key is pressed, data is updated and the two displays match.





## ADJUSTMENT

### A2 IF-SHIFT VR MECHANICAL CENTER CORRECTION

#### • Adjustment function

Input the IF-SHIFT control center position to the microcomputer so that the IF-SHIFT frequency is zero when the IF-SHIFT control is at the center position on the panel.

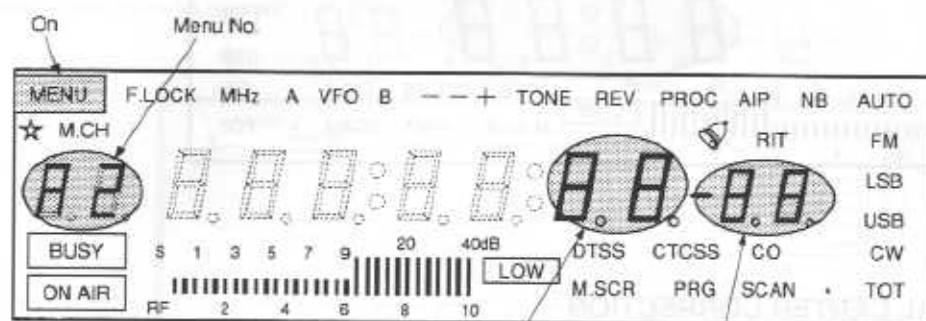
#### • Adjustment procedure

1. Set the IF-SHIFT control to the center position on the panel.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Remarks

The center position can be input unconditionally without pressing the key. However, the key must be pressed to prevent this menu item data from being modified accidentally when the IF-SHIFT control is not at the center. When the key is pressed, data is updated and the two displays match.

#### • Display



The input A/D value is displayed. (0-FFH)

The current A/D value for the IF-SHIFT control center stored in the microcomputer is displayed. (0-FFH)

### A3 LSB CARRIER POINT ADJUSTMENT

#### • Adjustment function

Adjust the carrier point in 10 Hz steps to correct variations of the IF filter center frequency in LSB mode.

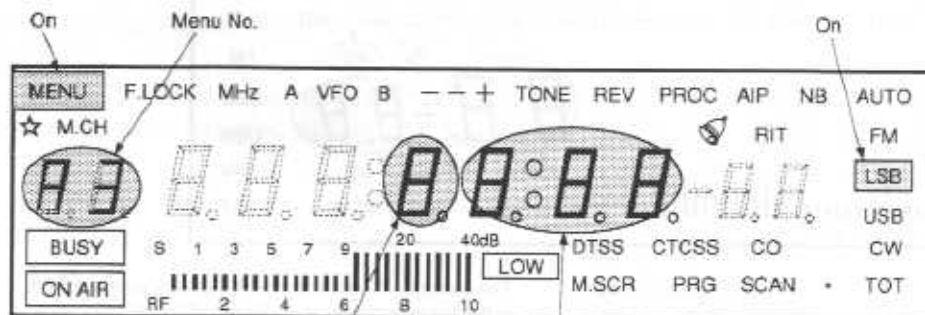
#### • Adjustment procedure

1. Transmit.
2. Change the correction frequency with the F.LOCK/LOW key or MIC UP/DOWN key.

#### • Remarks

The plus sign (+) indicates the frequency is moving away from the carrier frequency. (Same as IF-SHIFT)

#### • Display



Sign (+: blank)

The correction frequency (Hz) for the center frequency is displayed.

## ADJUSTMENT

### A4 USB CARRIER POINT ADJUSTMENT

#### • Adjustment function

Adjust the carrier point in 10 Hz steps to correct variations of the IF filter center frequency in USB mode.

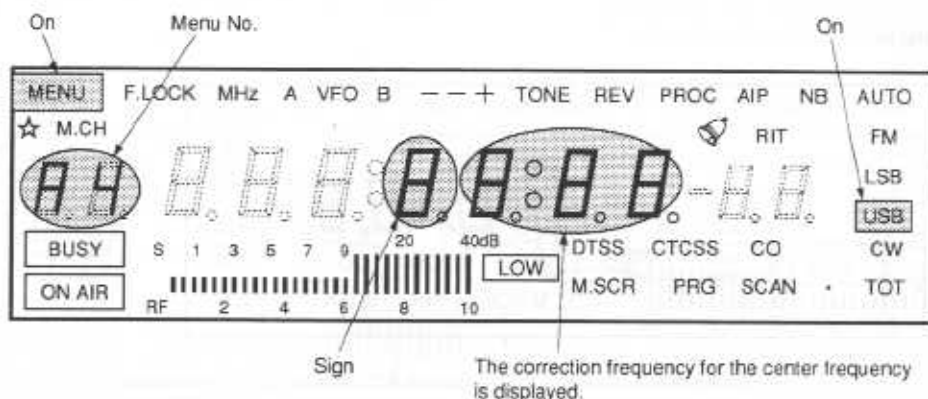
#### • Adjustment procedure

1. Transmit.
2. Change the correction frequency with the F.LOCK/LOW key or MIC UP/DOWN key.

#### • Remarks

The plus sign (+) indicates the frequency is moving away from the carrier frequency. (Same as IF-SHIFT)

#### • Display



### A5 S METER CURVE ADJUSTMENT (S1) (ANY MODE EXCEPT FM)

#### • Adjustment function

Input the S meter voltage at which two bars of the S meter light to the microcomputer to correct variations of the S1 level of the S meter.

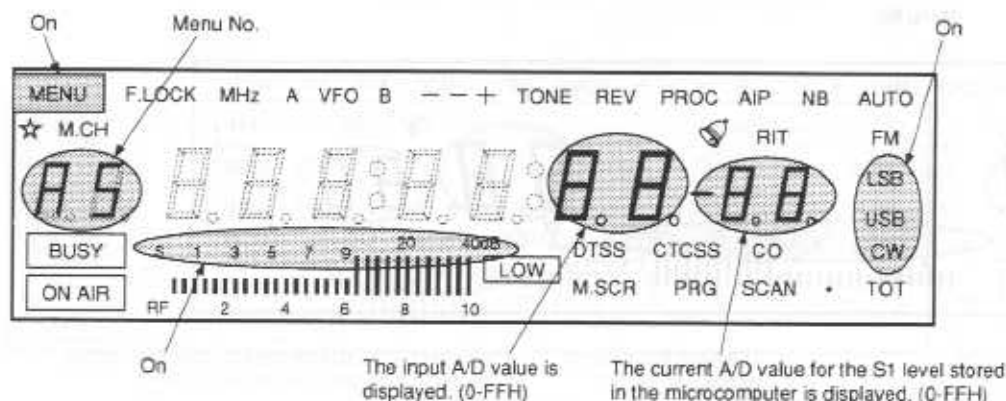
#### • Adjustment procedure

1. Input the specified level at which S9 begins to light with the SG.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display

#### • Remarks

The threshold is the input level minus the fixed value (9 approximately 0.18 V). When the input signal exceeds the threshold, one bar of the S meter lights. The curve between S1 and S9 is obtained from the levels of menus A5 and A6 by line approximation. Only the A/D values of the S1, S9, and full-scale levels are stored in the EEPROM. The meter bars operate according to the currently set curve. The curve is calculated when the key is pressed. The default for S1 is 63, approximately 1.24 V.



## ADJUSTMENT

### A6 S METER CURVE ADJUSTMENT (S9) (ANY MODE EXCEPT FM)

#### • Adjustment function

Input the S meter voltage that indicates S9 (the first large segment) to correct variations of the S9 level of the S meter.

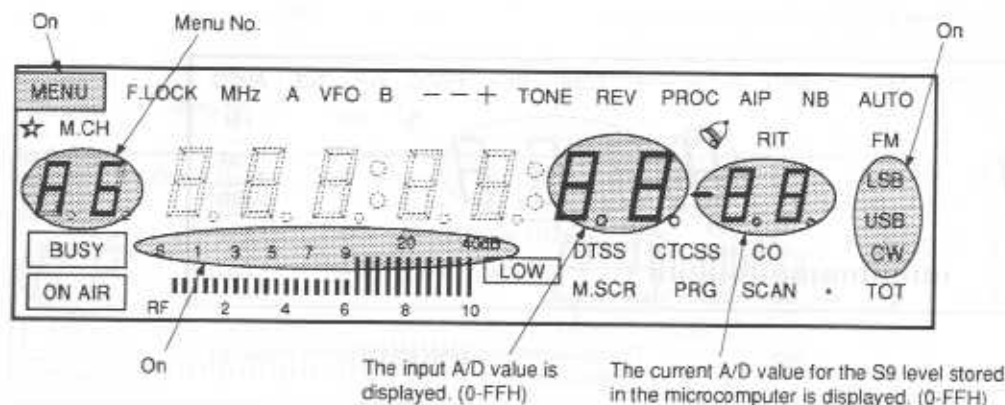
#### • Adjustment procedure

1. Input the specified level at which S9 begins to light with the SG.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display

#### • Remarks

The curve between S1 and S9 is obtained from the level of menus A5 and A6 by line approximation. The curve between S9 and full scale is obtained from the levels of menus A6 and A7 by line approximation. The meter bars operate according to the currently set curve. The curve is calculated when the UP/DOWN key is pressed. The default for S1 is 121, approximately 2.37 V.



### A7 S METER CURVE ADJUSTMENT (FULL SCALE) (ANY MODE EXCEPT FM)

#### • Adjustment function

Input the S meter voltage at which all the segments of the S meter light to correct variations of the full-scale level of the S meter.

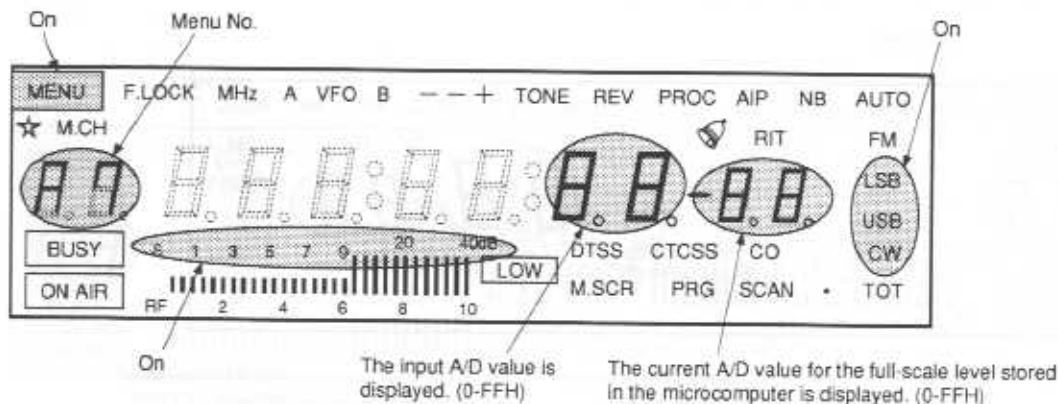
#### • Adjustment procedure

1. Input the specified level at which S9+40 dB begins to light with the SG.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display

#### • Remarks

The curve between S9 and full scale is obtained from the levels of menus A6 and A7 by line approximation. The meter bars operate according to the currently set curve. The curve is calculated when the key is pressed. The default for full scale is 158, approximately 3.10 V.



## ADJUSTMENT

### A8 S METER CURVE ADJUSTMENT (S1) (FM)

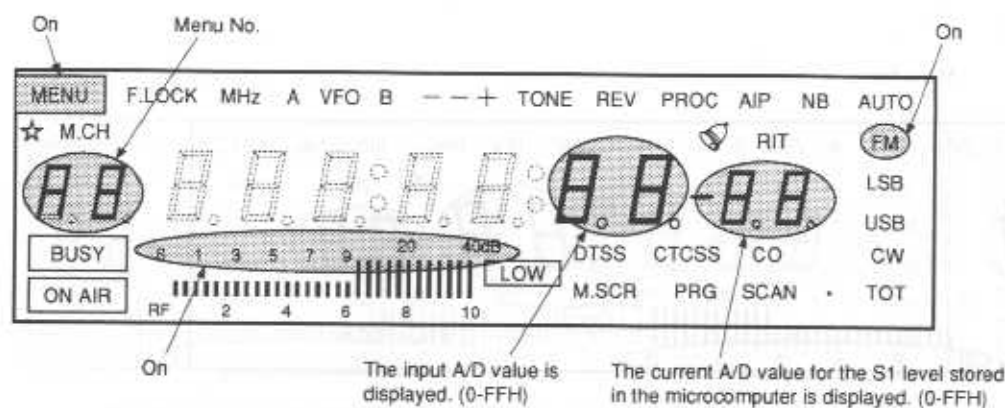
- Adjustment function

Input the S meter voltage at which two bars of the S meter light to the microcomputer to correct variations of the S1 level of the S meter.

- Adjustment procedure

1. Input the specified level at key S1 begins to light with the SG.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

- **Display**



### A9 S METER CURVE ADJUSTMENT (FULL SCALE) (FM)

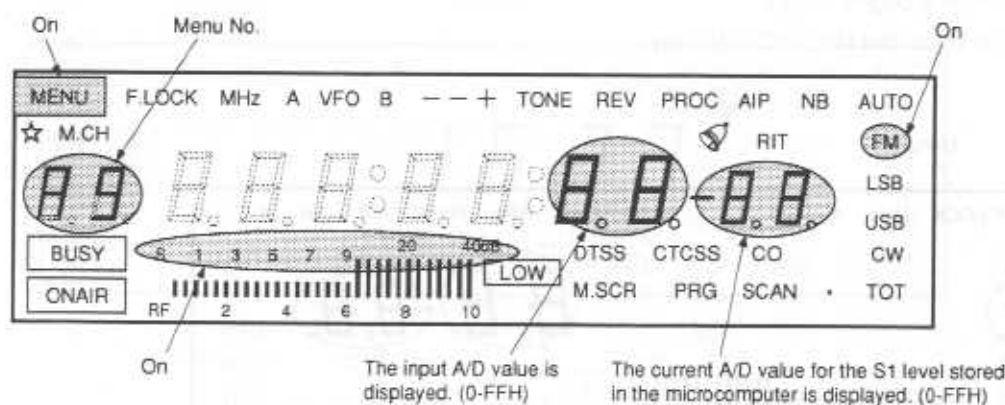
- Adjustment function

Input the voltage at which all the segments of the S meter light to correct variations of the full-scale level of the S meter.

- Adjustment procedure

1. Input the specified level at which S9+40 dB begins to light from the SG.
2. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

- **Display**



## ADJUSTMENT

### AA RF METER CURVE ADJUSTMENT (LOW)

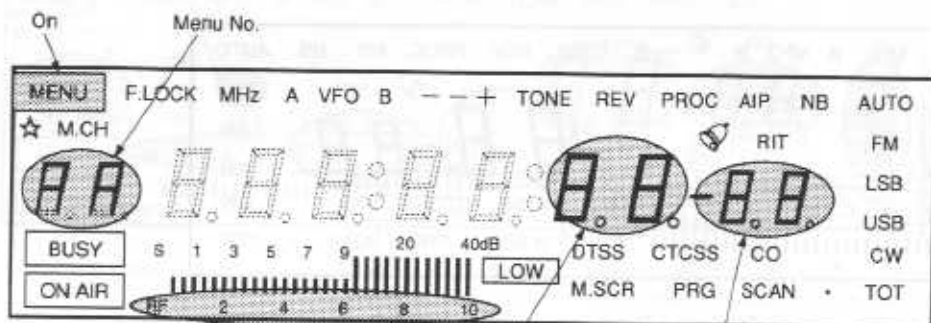
#### • Adjustment function

Input the voltage at which the RF meter indicates scale 2 to the microcomputer to correct variations of the low level of the RF meter.

#### • Adjustment procedure

1. Transmit.
2. Connect the AG to the microphone socket and input the specified level at which RF 2 begins to light.
3. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display



#### • Remarks

The threshold for the RF meter start is the input level minus the fixed value (19; approximately 0.37 V). The curve is obtained from the levels of menu AA and the start level by line approximation. The curve between 2 and 6 is obtained from the levels of menus AA and AB by line approximation. Only the A/D values for 2, 6, and full scale are stored in the EEPROM. The meter bars operate according to the currently set curve. The curve is calculated when the key is pressed. The default is 56, approximately 1.10 V.

### AB RF METER CURVE ADJUSTMENT (MIDDLE)

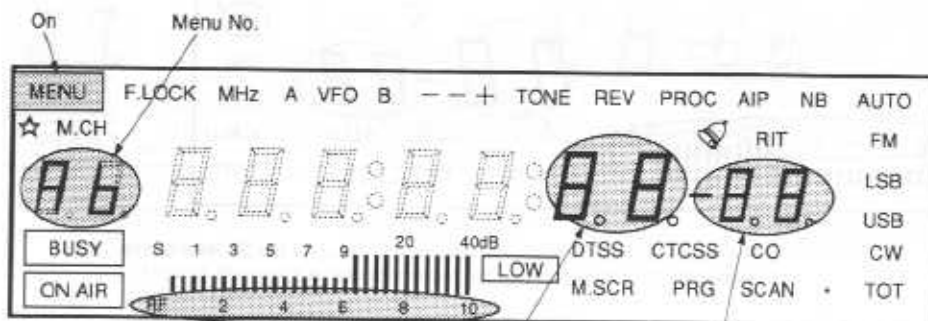
#### • Adjustment function

Input the voltage at which the RF meter indicates scale 6 to the microcomputer to correct variations of the middle level of the RF meter.

#### • Adjustment procedure

1. Transmit.
2. Connect the AG to the microphone socket and input the specified level at which RF 6 begins to light.
3. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display



#### • Remarks

The curve between 2 and 6 is obtained from the levels of menus AA and AB by line approximation. The curve between 6 and full scale is obtained from the levels of menus AB and AC by line approximation. Only the A/D values for 2, 6, and full scale are stored in the EEPROM. The meter bars operate according to the currently set curve. The curve is calculated when the key is pressed. The default is 114, approximately 2.24 V.



## ADJUSTMENT

### AC RF METER CURVE ADJUSTMENT (HIGH)

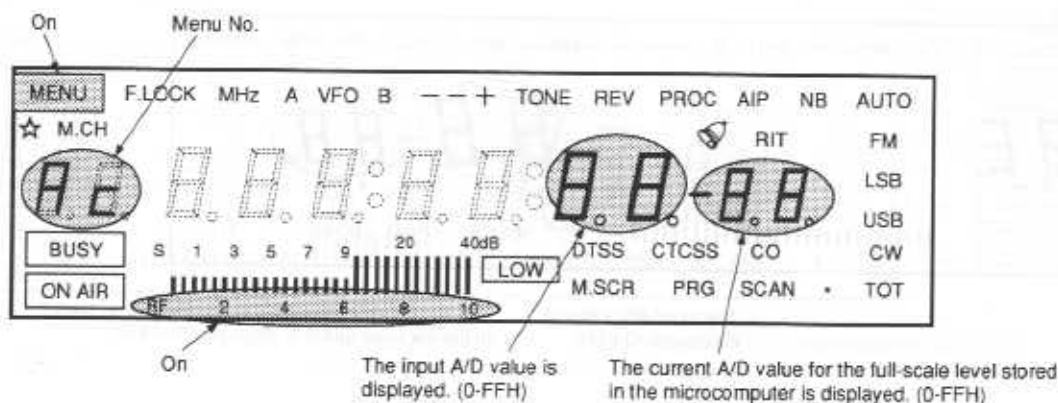
#### • Adjustment function

Input the voltage at which all the segments of the RF meter light to the microcomputer to correct variations of the full-scale level of the RF meter.

#### • Adjustment procedure

1. Transmit.
2. Connect the AG to the microphone socket and input the specified level at which RF 10 begins to light.
3. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display

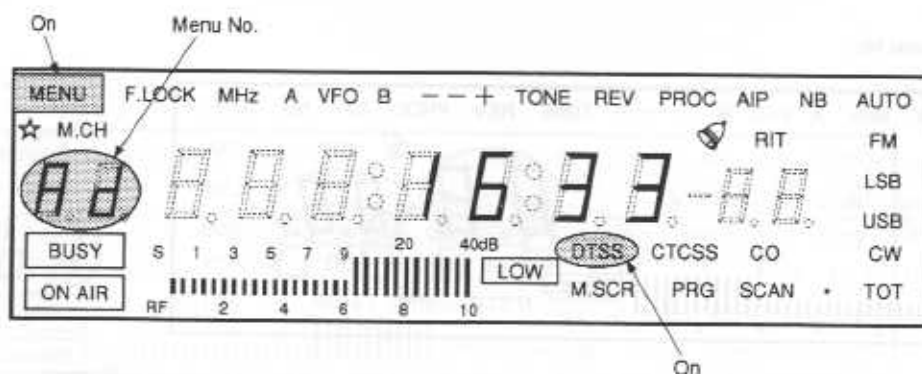


### AD DTMF SINGLE TONE OUTPUT

#### • Adjustment function

Output a single tone to check the DTMF deviation.

#### • Display



#### • Remarks

The curve between 6 and full scale is obtained from the levels of menus AB and AC by line approximation. Only the A/D values for 2, 6, and full scale are stored in the EEPROM. The meter bars operate according to the currently set curve. The curve is calculated when the UP/DOWN key is pressed. The default is 171, approximately 3.35 V.

#### • Adjustment procedure

1. Confirm that "1633" is displayed.  
If "OFF" is displayed, press the F.LOCK/LOW key or the MIC UP/DOWN key to display "1633".
2. Transmit.
3. Check the deviation with a tester.



## ADJUSTMENT

**AE ALC START READ**

- Adjustment function

Read the threshold voltage for microphone gain control by ALC.

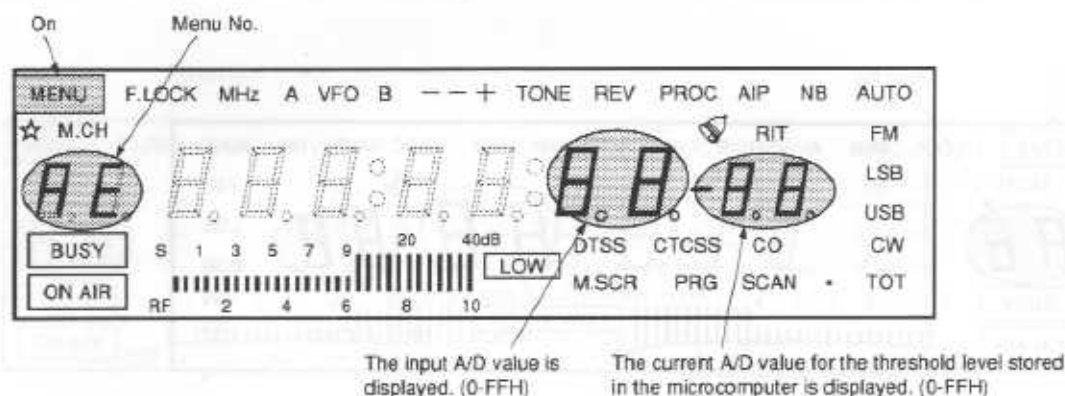
- **Adjustment procedure**

1. Transmit
2. Input the level at which the ALC starts from the AG.
3. Press the F LOCK/LOW key or the MIC UP/DOWN key.

- **Display**

- Remarks

The level read in this menu is used as a threshold for the low and correct microphone gain. The default is 224, approximately 4.40 V.



## AF ALC ZONE MAX. READ

- Adjustment function

Read the threshold voltage for microphone gain control by ALC.

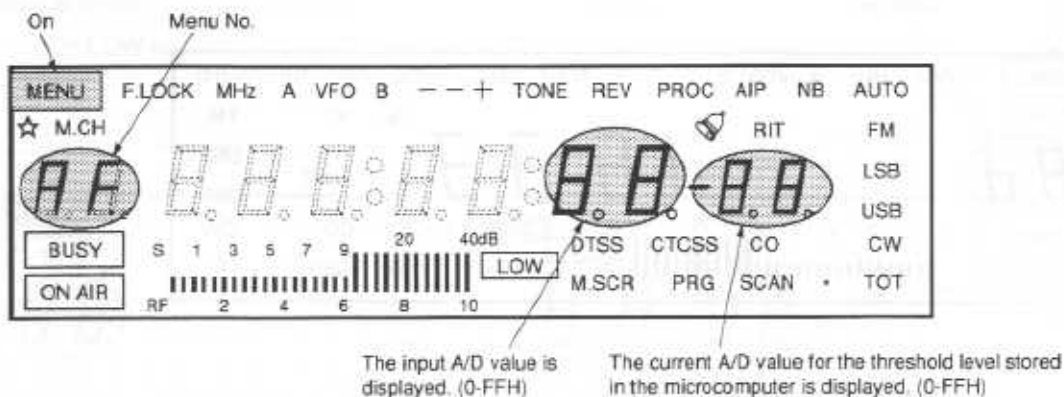
- Adjustment procedure

1. Transmit.
2. Input the maximum level of the ALC zone from the AG.
3. Press the FLOCK/LOW key or the MIC UP/DOWN key.

- **Display**

- Remarks

The level read in this menu is used as a threshold for the correct and high microphone gain. The default is 82, approximately 1.60 V.



## ADJUSTMENT

### B0 ALC FULL SCALE READ

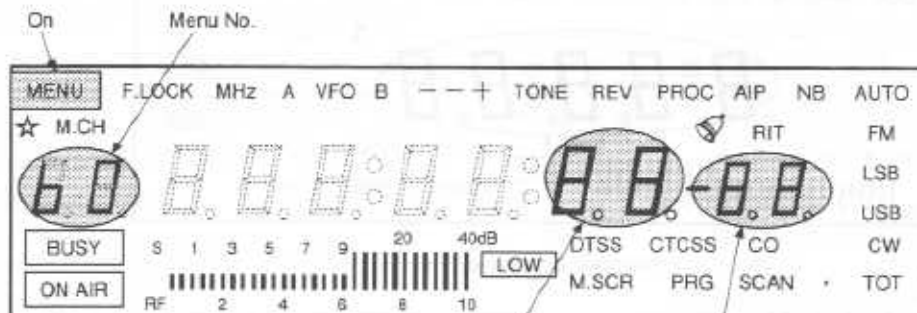
#### • Adjustment function

Read the threshold voltage for microphone gain control by ALC.

#### • Adjustment procedure

1. Transmit
2. Input the maximum + 6 dB level of the ALC zone from the AG.
3. Press the F.LOCK/LOW key or the MIC UP/DOWN key.

#### • Display



The input A/D value is displayed. (0-FFH)

The current A/D value for the threshold level stored in the microcomputer is displayed. (0-FFH)

### B1 FM MICROPHONE GAIN

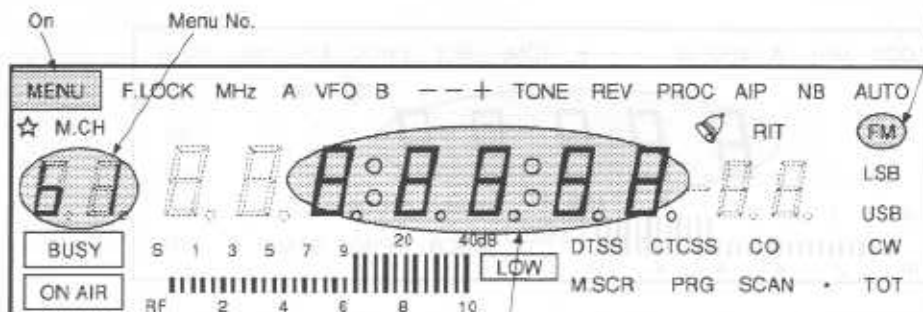
#### • Adjustment function

Set the low level for FM microphone gain.

#### • Adjustment procedure

1. Transmit.
2. Input the specified level from the AG.
3. Press the F.LOCK/LOW key or the MIC UP/DOWN key to change the microphone gain and obtain the specified deviation.

#### • Display



Microphone gain level

#### • Remarks

The high level is the level set in this menu + 6 dB.

## ADJUSTMENT

### B2 SSB MICROPHONE GAIN

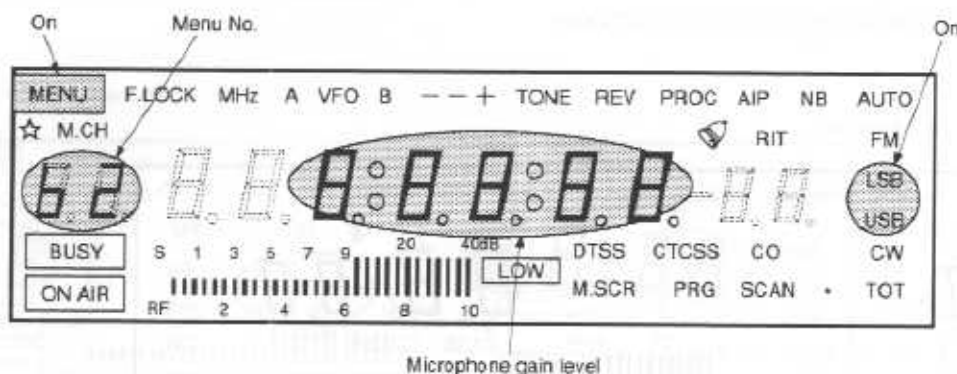
#### • Adjustment function

Set the SSB microphone gain.

#### • Adjustment procedure

1. Transmit
2. Input the specified level from the AG.
3. Press the F.LOCK/LOW key or the MIC UP/DOWN key to change the microphone gain and obtain the specified output.

#### • Display



### B3 WRITE INTO EEPROM

#### • Adjustment function

Write setting values into the EEPROM.

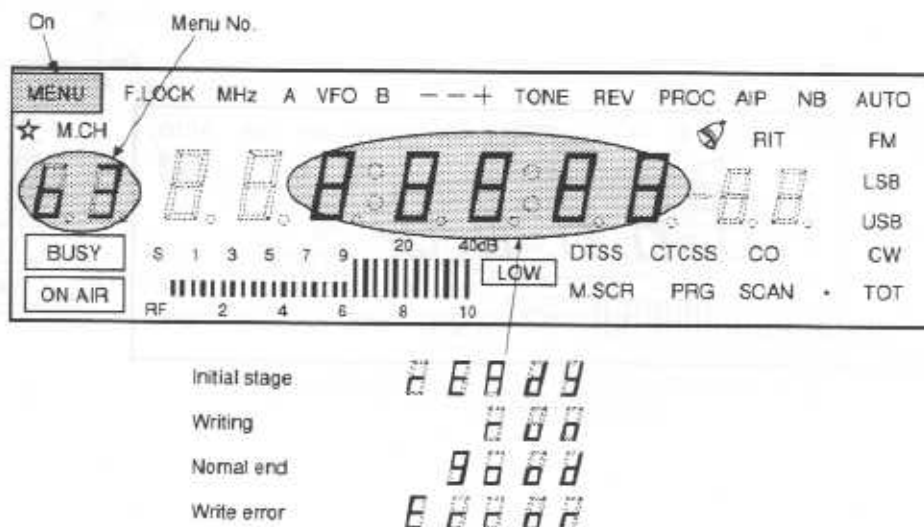
#### • Adjustment procedure

1. Press the F.LOCK/LOW key or UP/DOWN key.
2. While data is being written "run" is displayed.
3. If the data is written correctly, "good" is displayed.
4. If a write error occurs, "error" is displayed. If "error" is displayed repeatedly, press the key again. If "error" is still displayed repeatedly, check the EEPROM or other hardware for defects.

#### • Display

#### • Remarks

When this menu is selected and the key is pressed, the setting is written unconditionally even if it is not changed. Two sets of the same data are written into the EEPROM.



## ADJUSTMENT

### Test equipment for adjustment

#### 1. Tester or Digital Volt Meter

- 1) Input resistance:  $1M\Omega$
- 2) Voltage range: FS = 1.5 to 1000V AC/DC  
A tester with high accuracy is acceptable, but beware that a precise reading is not possible when measuring high impedance circuits.

#### 2. DC Ammeter

- 1) Voltage range: 5A, 10A, 20A

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

- 1) Input impedance:  $1M\Omega$  or more, 3pF or less
- 2) Voltage range: FS = 10mV to 300V
- 3) Measurable frequency: 500MHz or more

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

- 1) Measurable frequency: 50Hz to 10kHz
- 2) Input resistance:  $1M\Omega$  or more
- 3) Voltage range: FS = 10mV to 30 V

#### 5. AF Generator (AG)

- 1) Frequency range: 100Hz to 10kHz
- 2) Output: Can limit range between a maximum of 1V and minimum of 1mV.  
Low distortion factor

#### 6. AF Dummy Load (AF DM)

- 1) Impedance:  $8\Omega$
- 2) Capacity: 3W or more

#### 7. Oscilloscope (oscillo, synchro)

Something that can get vertical amp frequency characteristics of 100MHz or more; external cycles with as much high sensitivity as possible.

#### 8. Tracking Generator

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

#### 9. SSG (Standard Signal Generator)

- 1) Oscillation frequency: 50kHz to 500MHz
- 2) Output: -127dBm/0.1 $\mu$ V to 7dBm/0.5V
- 3) Output impedance:  $50\Omega$
- 4) Should get AM and FM  
Something with oscillation frequency that is stable at non-modulation and has small frequency modulation component.

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

- 1) Minimum input voltage: 50mV
- 2) Measurable frequency: 500MHz or more

#### 11. Noise Generator

Something that generates noise that includes a high frequency component of up to 450MHz or more that is close to ignition noise.

#### 12. RF Dummy Load (Dummy Load)

- 1) Impedance:  $50\Omega$
- 2) Capacity: 50W or more

#### 13. Power Meter (transit type and terminal type)

- 1) Measurable frequency: 500MHz or more
- 2) Impedance:  $50\Omega$
- 3) Measuring range: 50W or more  
When there is a  $50\Omega$  dummy load for RF use, only transit type is acceptable.

#### 14. Spectrum Analyzer

- 1) Frequency measuring range: 100kHz to 500MHz or more
- 2) Resolution range: 1kHz to 3MHz  
When there is no spectrum analyzer, an electric intensity measuring device is acceptable (measuring range: 10 to 500MHz)  
Voltage: Something with 10 to 17V variability  
Current: 20A or more

#### 15. Linear Detector (LD)

Measurable Frequency: 500MHz or more

#### 16. DC Power Source

Voltage: Something with 10 to 17 V variability  
Current: 20A or more

#### 17. Microphone with UP/DOWN

MC-47

#### 18. Service Tools

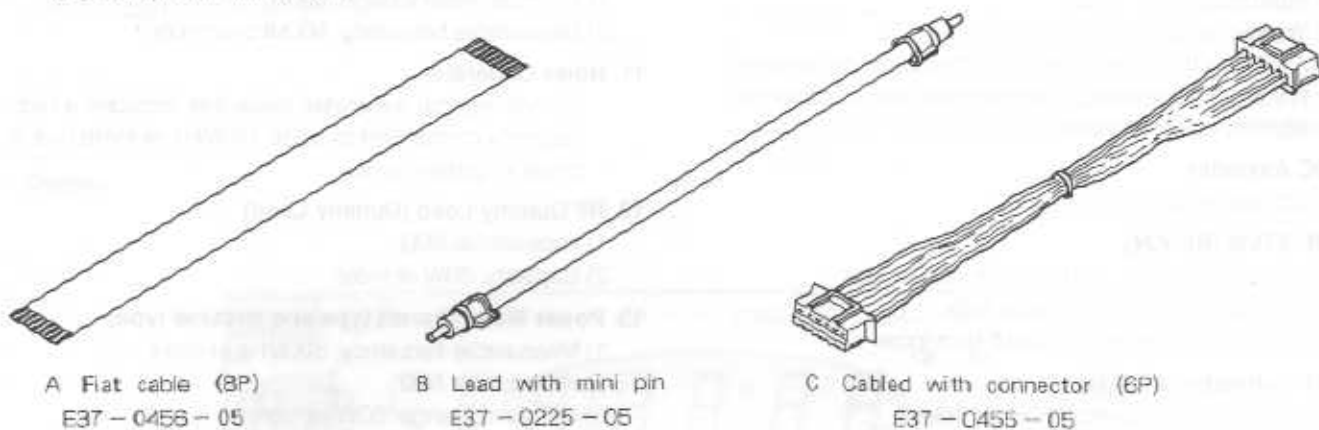
Extension cables (3)

# TM-255A/E

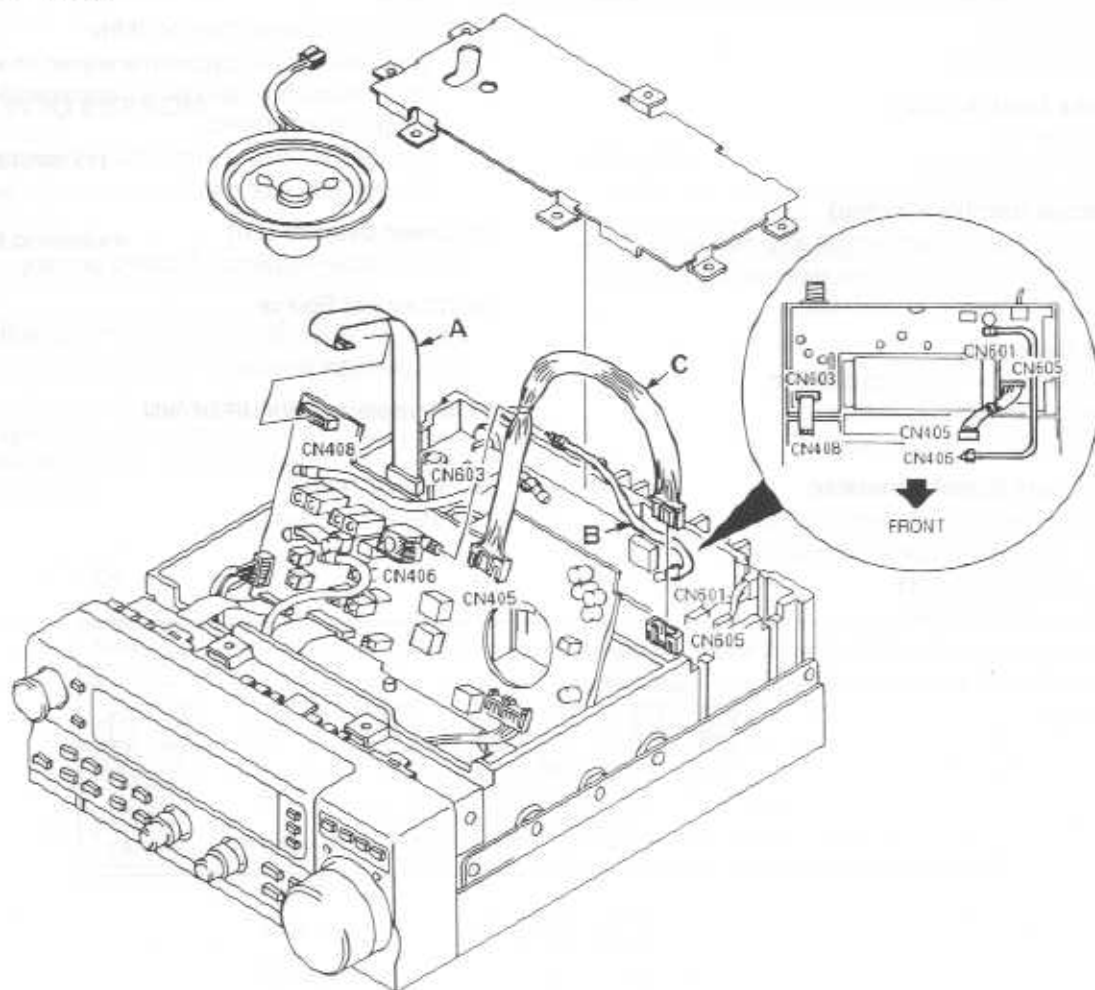
## ADJUSTMENT

### Adjustment service jig

(Extension Cable .... 15 cm)



### Service jigs usage



## ADJUSTMENT

### TX/RX Common Adjustment

| Item       | Condition                                                                                            | Measurement    |      |          | Adjustment                                                                                                                                                                                                                                                |       |        | Specifications/Remarks                                                     |
|------------|------------------------------------------------------------------------------------------------------|----------------|------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|----------------------------------------------------------------------------|
|            |                                                                                                      | Test-equipment | Unit | Terminal | Unit                                                                                                                                                                                                                                                      | Parts | Method |                                                                            |
| 1. Setting | 1) Supply DC 13.8V                                                                                   |                |      |          | After all LCDs are lighted, A VFO 144.000.0 CW is displayed.                                                                                                                                                                                              |       |        |                                                                            |
|            | 2) Reset<br>POWER OFF<br>While pressing MR key<br>POWER ON                                           |                |      |          |                                                                                                                                                                                                                                                           |       |        |                                                                            |
|            | 3) Auto Mic Gain Control: OFF<br>The lock setting for main unit key is ON.                           |                |      |          | (1) F key: Press for 1.5 sec will go MENU mode.<br>(2) A/B key: press once<br>(3) Turn encoder and set MENU No. to 61.<br>(4) F LOCK key: press once<br>(5) Turn encoder and set MENU No. to 69.<br>(6) F LOCK key: press once<br>(7) CLR key: press once |       |        | MENU A→B<br>MENU 61<br>ON→OFF<br>MENU 69<br>OFF→ON<br>returns to VFO mode. |
|            | 4) Center calibration of RIT and IF SHIFT<br>RIT VR: Center<br>IF SHIFT: Center<br>(Adjustment Mode) |                |      |          | (1) Setting Method<br>While pressing NB key and MHz key at same time, turn POWER: ON.<br>(2) Adjustment Mode<br>(About operations, refer to P67 to P78)<br>(3) Cancellation Method<br>After saving in EEPROM, press CLR key once or POWER: OFF.           |       |        |                                                                            |

### PLL/CAR Adjustment

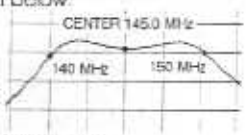
| Item                                 | Condition                                                    | Measurement                  |             |               | Adjustment  |              |                                     | Specifications/Remarks                          |
|--------------------------------------|--------------------------------------------------------------|------------------------------|-------------|---------------|-------------|--------------|-------------------------------------|-------------------------------------------------|
|                                      |                                                              | Test-equipment               | Unit        | Terminal      | Unit        | Parts        | Method                              |                                                 |
| 1. Reference Oscillation (TCXO)      | 1) MODE: FM                                                  | f. counter Oscillo or RF V.M | TX-RX (A/5) | TP3           | TX-RX (A/5) |              | Check.                              | 20.480.000MHz±20Hz                              |
| 2. CAR Oscillation level (10.695MHz) | 1) MODE: USB                                                 | Oscillo or RF V.M            |             | TP4           |             | L204         | Level MAX                           | (Ref.) Align with 2 times standard oscillation. |
| 3. 30.72MHz level                    | 1) MODE: FM                                                  |                              |             | TP9           |             | L207<br>L208 | Level MAX                           | (Ref.)Align with 3 times standard oscillation.  |
| 4. 92.16MHz level                    | 1) MODE: FM                                                  |                              |             | IC202 (Pin 2) |             | L210<br>L211 | Level MAX                           |                                                 |
| 5. 103.625MHz level                  | 1) MODE: FM                                                  |                              |             | TP5           |             | L217<br>L218 | Level MAX                           |                                                 |
| 6. Lock voltage                      | 1) Frequency: 144.000MHz<br>MODE: USB                        | DC V.M                       | TP6         | (VCO)         | TC1         | 3.5V         | ±0.1V                               |                                                 |
|                                      | 2) Frequency: 145.999MHz: E<br>147.799MHz: K, M<br>MODE: USB |                              |             |               |             | Check.       | 4.0 to 5.0V: E<br>5.0 to 6.5V: K, M |                                                 |

### RX Adjustment

| Item   | Condition                             | Measurement    |             |          | Adjustment  |       |        | Specifications/Remarks |
|--------|---------------------------------------|----------------|-------------|----------|-------------|-------|--------|------------------------|
|        |                                       | Test-equipment | Unit        | Terminal | Unit        | Parts | Method |                        |
| 1. RFG | 1) Frequency: 145.039MHz<br>MODE: USB | DC V.M         | TX-RX (A/5) | TP1      | TX-RX (A/5) | VR4   | 3.0V   | ±0.03V                 |



## ADJUSTMENT

| Item                                                                                            | Condition                                                                                                                                                                                                       | Measurement                                |                           |                        | Adjustment                 |                              |                                                                                                                                                                                                                                                                                                          | Specifications/Remarks                                           |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------|------------------------|----------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
|                                                                                                 |                                                                                                                                                                                                                 | Test-equipment                             | Unit                      | Terminal               | Unit                       | Parts                        | Method                                                                                                                                                                                                                                                                                                   |                                                                  |
| 2. Helical                                                                                      | 1) Remove CN402 of TX-RX (B/5)<br>2) Frequency: 145.040MHz<br>MODE: FM<br>Tracking Generator output: -10dBm<br>Spectrum Analyzer Setting<br>fc: 145.000MHz: E<br>146.000MHz: K, M<br>SPAN: 25MHz<br>REF: -40dBm | Trk. Gen.<br>Spectrum Analyzer             | Rear panel<br>TX-RX (B/5) | ANT<br>CN413           | TX-RX (B/5)                | L401<br>L402                 | Repeat adjustment 2 to 3 times and with gain at maximum, adjust waveform to figure at below.<br><br>REF: -30.0 dBm, ATT 10 dB<br>MKR 145.00 MHz -44.45 dBm, 5 dB/CAL OFF, REW 300 kHz, PCS PK, VBW 100 kHz, SWP 50 ms |                                                                  |
| 3. MCF (10.695MHz)                                                                              | 1) Remove CN402 of TX-RX (B/5)<br>2) Frequency: 145.040MHz<br>MODE: FM<br>Tracking Generator output: -10dBm<br>Spectrum Analyzer Setting<br>REF: -30dBm<br>fc: 10.695MHz<br>SPAN: 50kHz                         |                                            | TX-RX (B/5)               | CN414<br>CN403 (Pin 4) |                            | L407<br>L408                 | <br>REF: -10.0 dBm, ATT 10 dB<br>MKR 10.6950 MHz -35.1 dBm, 10 dB/CAL OFF, FBW 1 kHz, PCS PK, VBW 1 kHz, SWP 30 ms                                                                                                    |                                                                  |
| Attach CN402                                                                                    |                                                                                                                                                                                                                 |                                            |                           |                        |                            |                              |                                                                                                                                                                                                                                                                                                          |                                                                  |
| 4. BPF                                                                                          | 1) Frequency: 145.039MHz: E<br>146.039MHz: K, M<br>MODE: USB<br>SSG output: -123dBm<br>(0.16μV)                                                                                                                 | SSG<br>SP<br>(AF D.M)<br>Oscillo<br>AF V.M | Rear panel                | ANT<br>EXT<br>SP       | TX-RX (B/5)                | L403<br>L404<br>L405<br>L410 | AF output MAX                                                                                                                                                                                                                                                                                            |                                                                  |
| 5. IF AMP                                                                                       | 1) Frequency: 145.039MHz: E<br>146.039MHz: K, M<br>MODE: USB<br>SSG output: -123dBm<br>(0.16μV)<br>IC2 VR: 9 o'clock                                                                                            |                                            |                           |                        | TX-RX (A/5)                | L1<br>IC2 (L 2pcs.)          | AF output MAX                                                                                                                                                                                                                                                                                            |                                                                  |
| 6. LO1                                                                                          | 1) Frequency: 145.039MHz: E<br>146.039MHz: K, M<br>MODE: USB<br>SSG output: -123dBm<br>(0.16μV)                                                                                                                 |                                            |                           |                        |                            | TC201                        | AF output MAX                                                                                                                                                                                                                                                                                            |                                                                  |
| 7. NB                                                                                           | 1) Frequency: 145.039MHz: E<br>146.039MHz: K, M<br>MODE: USB<br>SSG output: -93dBm<br>(5.0μV)<br>2) SSG output: OFF                                                                                             | SSG<br>Oscillo<br>or DC<br>V.M             | Rear panel<br>TX-RX (A/5) | ANT<br>IC1 (Pin 4)     |                            | IC1 (L 2pcs.)                | Voltage: MIN<br>Check                                                                                                                                                                                                                                                                                    | (Ref.) Approx. 3.1V<br>4.0 to 5.0V                               |
| 8. IF GAIN                                                                                      | 1) Frequency: 145.039MHz: E<br>146.039MHz: K, M<br>MODE: USB<br>SSG output: -109dBm<br>(0.8μV)<br>2) SSG output: -119dBm<br>(0.25μV)<br>3) SSG output: -109dBm<br>(0.8μV)                                       | SSG<br>SP<br>(AF D.M)<br>Oscillo<br>AF V.M | Rear panel                | ANT<br>EXT<br>SP       | Front panel<br>TX-RX (A/5) | AF VOL<br>IC2 (VR)           | Set AF output to 0.63V<br>Adjust AF output to 0.4V<br>Check                                                                                                                                                                                                                                              | AF output 0.63V                                                  |
| When adjusting items 9 to 11, set to Adjustment mode and refer to menu operations (P67 to P78). |                                                                                                                                                                                                                 |                                            |                           |                        |                            |                              |                                                                                                                                                                                                                                                                                                          |                                                                  |
| 9. SSB S meter (S1)                                                                             | 1) MENU No.: A5<br>SSG freq: 145.040MHz<br>output: -113dBm<br>(0.5μV)                                                                                                                                           | SSG<br>SP<br>(AF D.M)<br>Oscillo<br>AF V.M | Rear panel                | ANT<br>EXT<br>SP       | Front panel                |                              | F.LOCK key: press once                                                                                                                                                                                                                                                                                   | Note: AF output is 1kHz sine wave. (Fine tune the SSG frequency) |
| (S9)                                                                                            | 2) MENU No.: A6<br>SSG output: -93dBm<br>(5.0μV)                                                                                                                                                                |                                            |                           |                        |                            |                              | F.LOCK key: press once                                                                                                                                                                                                                                                                                   |                                                                  |
| (FULL)                                                                                          | 3) MENU No.: A7<br>SSG output: -53dBm<br>(500μV)                                                                                                                                                                |                                            |                           |                        |                            |                              | F.LOCK key: press once                                                                                                                                                                                                                                                                                   |                                                                  |

## ADJUSTMENT

| Item                    | Condition                                                                                                                     | Measurement                              |            |            | Adjustment  |        |                                                | Specifications/Remarks                                           |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------|------------|-------------|--------|------------------------------------------------|------------------------------------------------------------------|
|                         |                                                                                                                               | Test-equipment                           | Unit       | Terminal   | Unit        | Parts  | Method                                         |                                                                  |
| 10. FM S meter (S1)     | 1) MENU No.: A8<br>SSG Freq.: 145.040MHz<br>MOD Freq.: 1kHz<br>DEV: 3kHz<br>SSG output: -119dBm<br>(0.25μV)                   | SSG SP<br>(AF D.M)<br>Oscillo<br>AF V.M  | Rear panel | ANT EXT SP | Front panel |        | F LOCK key: press once                         | Note: AF output is 1kHz sine wave. (Fine tune the SSG frequency) |
|                         | (FULL)<br>2) MENU No.: A9<br>SSG output: -93dBm<br>(5.0μV)                                                                    |                                          |            |            |             |        | F LOCK key: press once                         |                                                                  |
| 11. ROM DATA Writing    | 1) MENU No.: B3                                                                                                               | LCD                                      |            |            |             |        | LCD display: "ready"<br>F LOCK key: press once |                                                                  |
|                         |                                                                                                                               |                                          |            |            |             |        | LCD display: "good"<br>CLR key: press once     |                                                                  |
| 12. BEEP                | 1) AF VR: MIN<br>Continuously ON and OFF<br>SSB/CW key.                                                                       | AF D.M<br>Oscillo                        | Rear panel | EXT SP     | TX-RX (A/5) | VR2    | 0.4Vp-p                                        | ±0.1V                                                            |
| 13. RX Sensitivity(S/N) | 1) Frequency: 145.039MHz<br>MODE: USB<br>AIP: OFF<br>SSG output: -125dBm<br>(0.126μV)<br><br>AF VR: 0.63V<br>(1kHz sine wave) | SSG SP<br>(AF D.M)<br>Oscillo<br>AF V.M) |            | ANT EXT SP |             |        | AF output of SSG output is turned off.         | S/N 10dB or more                                                 |
|                         | 2) AIP: ON<br>SSG output: ON                                                                                                  |                                          |            |            | TX-RX (B/5) | VR402  |                                                | 0.2V (-10dB)                                                     |
|                         | 3) Frequency: 145.040MHz<br>MODE: FM<br>SSG output: -121dBm<br>(0.2μV)<br><br>MOD Freq.: 1kHz<br>DEV: 3kHz                    |                                          |            |            |             |        | Measuring SINAD                                | 12dB SINAD or more                                               |
| 14. Squelch (FM)        | 1) Frequency: 145.040MHz<br>MODE: FM<br>SSG output: OFF                                                                       |                                          |            |            | Front panel | SQL VR | Adjust where squelch is closing                | SQL VR position: 8.00 to 11.00                                   |
|                         | 2) SSG output: -128dBm<br>(0.09μV)<br><br>MOD Freq.: 1kHz<br>DEV: 3kHz                                                        |                                          |            |            |             |        |                                                | Squelch open.                                                    |
|                         | 3) SQL VR: MAX                                                                                                                |                                          |            |            |             |        |                                                | Squelch close.                                                   |
|                         | 4) SSG output: -118dBm<br>(0.28μV)                                                                                            |                                          |            |            |             |        |                                                | Squelch open.                                                    |
| 15. Squelch (SSB)       | 1) Frequency: 145.039MHz<br>MODE: USB<br>SSG output: OFF                                                                      |                                          |            |            |             |        | Adjust where squelch is closing                | SQL VR position: 8.00 to 11.00                                   |
|                         | 2) SSG output: -125dBm<br>(0.126μV)<br><br>MOD Freq.: 1kHz<br>DEV: 3kHz                                                       |                                          |            |            |             |        |                                                | Squelch open.                                                    |
|                         | 3) SQL VR: MAX                                                                                                                |                                          |            |            |             |        |                                                | Squelch close.                                                   |
|                         | 4) SSG output: -115dBm<br>(0.4μV)                                                                                             |                                          |            |            |             |        |                                                | Squelch open.                                                    |

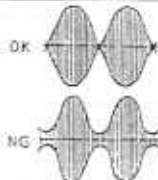
## ADJUSTMENT

| Item                          | Condition                                                                             | Measurement                                  |            |                  | Adjustment |       |                                                | Specifications/Remarks                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------|------------|------------------|------------|-------|------------------------------------------------|------------------------------------------------------------------------------|
|                               |                                                                                       | Test-equipment                               | Unit       | Terminal         | Unit       | Parts | Method                                         |                                                                              |
| 16. S Meter Sensitivity Check | 1) Frequency: 145.039MHz<br>MODE: USB<br>SSG output: ON                               | SSG<br>SP<br>(AF D.M)<br>Oscillo<br>(AF V.M) | Rear panel | ANT<br>EXT<br>SP |            |       | SSG output check<br>S1 lights<br><br>S9 lights | -119dBm to -107dBm<br>(0.25 to 1.0μV)<br>-99dBm to -87dBm<br>(2.5μV to 10μV) |
|                               | 2) Frequency: 145.040MHz<br>MODE: FM<br>SSG output: ON<br>MOD Freq: 1kHz<br>DEV: 3kHz |                                              |            |                  |            |       | All lights                                     |                                                                              |

### TX Adjustment

Note: When adjusting (items 8 to 10) TX-RX unit (A/5), first attach case (upper) to TX-RX unit (B/5, C/5) side or stand set up.

Note: When adjusting items 6 to 10, TX-RX unit (A/5), first attach case (upper) to TX-RX unit (B/5, C/5) side or stand set up.

| Item                                                                              | Condition                                                                                                                                                                                               | Measurement       |             |                           | Adjustment                                           |                                                          |                                                                                  | Specifications/Remarks                                                                |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|---------------------------|------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                   |                                                                                                                                                                                                         | Test-equipment    | Unit        | Terminal                  | Unit                                                 | Parts                                                    | Method                                                                           |                                                                                       |
| 1. FM TX Freq.                                                                    | 1) Remove CN406 of TX-RX unit (B/5)                                                                                                                                                                     | Counter           | TX-RX (A/5) | VR1 right bottom terminal | TX-RX (A/5)                                          | TC1                                                      | 10.6950MHz                                                                       | ±50Hz                                                                                 |
|                                                                                   | 2) MODE: FM                                                                                                                                                                                             |                   |             |                           |                                                      |                                                          |                                                                                  |                                                                                       |
|                                                                                   | 3) Transmit                                                                                                                                                                                             |                   |             |                           |                                                      |                                                          |                                                                                  |                                                                                       |
| 2. TX IF AMP                                                                      | 1) Frequency: 144.950MHz: E<br>145.950MHz: K, M<br>MODE: CW<br>Set to the center VR7, 8 and 9 of TX-RX(A/5).<br>fc: 144.950MHz: E<br>145.950MHz: K, M<br>(Use 10dB ATT)<br>SPAN: 500kHz<br>2) Transmit. | Spectrum Analyzer | TX-RX (B/5) | CN406                     | TX-RX (B/5)                                          | L415<br>L416<br>L411-<br>L414<br>L417<br>TC401-<br>TC404 | Repeat adjustment 2 to 3 times and with level at maximum.                        | Note: If the level is over 10dBm, adjust VR9 of TX-RX (A/5).                          |
|                                                                                   |                                                                                                                                                                                                         |                   |             |                           | TX-RX (A/5)                                          | VR9                                                      |                                                                                  |                                                                                       |
|                                                                                   |                                                                                                                                                                                                         |                   |             |                           | When adjusting items 3 to 5, set to Adjustment mode. |                                                          |                                                                                  |                                                                                       |
| 3. MIC sensitivity setting                                                        | 1) MENU No.: B2                                                                                                                                                                                         | LCD               |             |                           | Front panel                                          |                                                          | With F LOCK and LOW key, set characters displayed by LCD.                        | Display: "-7dB"                                                                       |
| 4. CAR point                                                                      | 1) LSB CAR Point MENU No.: A3<br>USB CAR Point MENU No.: A4                                                                                                                                             | Oscillo           | TX-RX (B/5) | CN403 (Pin 2)             |                                                      |                                                          | Adjust oscilloscope waves so that they cross by pressing F LOCK key and LOW key. |  |
|                                                                                   | 2) From MIC terminal<br>AG1: 300Hz 2mV<br>AG2: 2700Hz 2mV                                                                                                                                               | AG AF V.M         | TX-RX (D/5) | MIC                       |                                                      |                                                          |                                                                                  |                                                                                       |
|                                                                                   | 3) Transmit                                                                                                                                                                                             |                   |             |                           |                                                      |                                                          |                                                                                  |                                                                                       |
| 5. ROM DATA Writing                                                               | 1) MENU No.: B3                                                                                                                                                                                         | LCD               |             |                           |                                                      |                                                          | LCD Display: "ready"<br>F LOCK key: press once                                   |                                                                                       |
|                                                                                   |                                                                                                                                                                                                         |                   |             |                           |                                                      |                                                          | LCD Display: "good"<br>CLR key: press once                                       |                                                                                       |
| Attach CN406. When adjusting items 6 to 10, turn VR401 and VR603 fully clockwise. |                                                                                                                                                                                                         |                   |             |                           |                                                      |                                                          |                                                                                  |                                                                                       |
| 6. NULL                                                                           | 1) Frequency: 144.980MHz: E<br>146.980MHz: K, M<br>MODE: FM                                                                                                                                             | Power meter       | Rear panel  | ANT                       | TX-RX (C/5)                                          | VR601                                                    | 45W                                                                              | ±3.0W                                                                                 |
|                                                                                   | 2) Transmit                                                                                                                                                                                             | Oscillo or DC V.M | TX-RX (C/5) | ANT CN608                 |                                                      | VR602                                                    | Voltage: MIN                                                                     | 0.6V or less                                                                          |

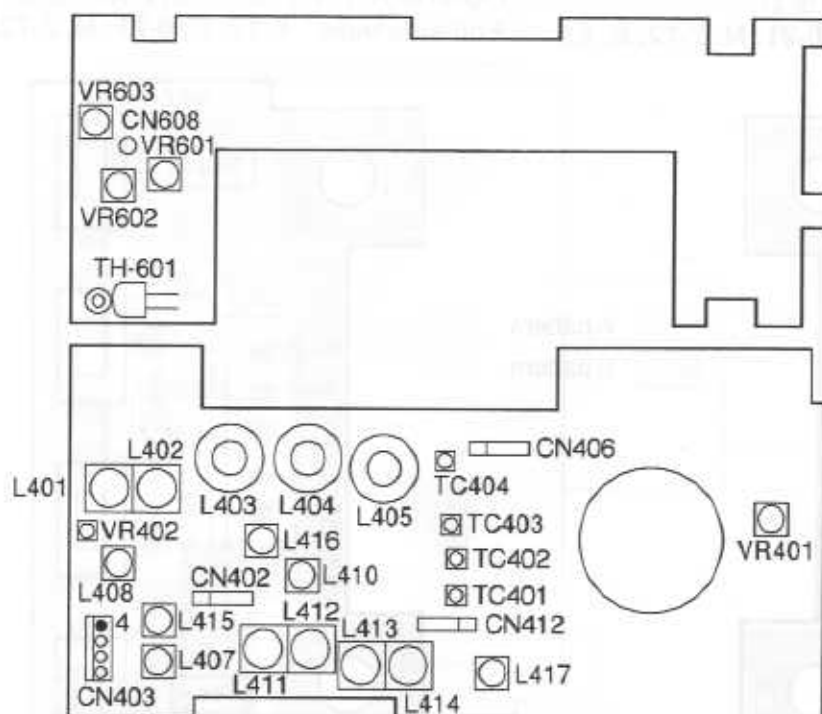
## ADJUSTMENT

| Item                                                                                             | Condition                                                                                       | Measurement                              |                               |              | Adjustment     |                                                          |                                                 | Specifications/Remarks |
|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------|--------------|----------------|----------------------------------------------------------|-------------------------------------------------|------------------------|
|                                                                                                  |                                                                                                 | Test-equipment                           | Unit                          | Terminal     | Unit           | Parts                                                    | Method                                          |                        |
| 7. SSB MIC sensitivity                                                                           | 1) Frequency: 144.950MHz: E<br>145.950MHz: K, M<br>MODE: USB                                    | Power meter<br>AG<br>AF V.M              | Rear panel<br>TX-RX<br>(D/5)  | ANT<br>MIC   | TX-RX<br>(A/5) | VR1                                                      | 24W                                             | ±1.0W                  |
|                                                                                                  | 2) MIC terminal<br>AG: 1kHz 2.8mV :E<br>AG: 1kHz 5mV :K, M                                      |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 3) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| 8. Carrier level                                                                                 | 1) Frequency: 144.950MHz: E<br>146.950MHz: K, M<br>MODE: CW, LOW SW: ON                         | Power meter                              | Rear panel                    | ANT          | TX-RX<br>(A/5) | VR9                                                      | 42W                                             | ±1.0W                  |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| 9. FM MAX <sup>o</sup> DEV.                                                                      | 1) Frequency: 144.980MHz                                                                        | Power meter<br>LD<br>AG<br>AF V.M        | Front panel<br>TX-RX<br>(D/5) | ANT<br>MIC   | TX-RX<br>(A/5) | VR6                                                      | Check ±.<br>Larger Value<br>should be<br>4.4kHz | ±100Hz                 |
|                                                                                                  | 2) MIC terminal<br>AG: 1kHz 30mV :E<br>AG: 1kHz 50mV :K, M                                      |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 3) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| 10. POWER                                                                                        | 1) Frequency:<br>144.0000MHz(FM): E<br>145.950MHz(FM): K, M                                     | Power meter                              | Rear panel                    | ANT          | TX-RX<br>(C/5) | VR601                                                    | 42W                                             | ±1W                    |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              | TX-RX<br>(B/5) | VR401                                                    | 5W                                              | ±0.2W                  |
|                                                                                                  | 3) POWER: LOW                                                                                   |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 4) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| 11. Protection                                                                                   | 1) Frequency: 144.980MHz: E<br>145.980MHz: K, M<br>MODE: FM<br>Open ANT terminal.               | Ammeter                                  |                               | Power supply | TX-RX<br>(C/5) | VR603                                                    | 5.0A                                            | ±0.1A                  |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| When adjusting items 12 to 16, set to Adjustment mode and refer to menu operations (P67 to P78). |                                                                                                 |                                          |                               |              |                |                                                          |                                                 |                        |
| 12. RF meter<br>LOW (RF-2)<br><br>MID (RF-6)<br><br>HI (FULL)                                    | 1) MENU No.: AA<br>Adjust AG input to set transmit<br>output levels shown below                 | Power meter<br>AG<br>AF V.M<br>LCD       | Rear panel<br>TX-RX<br>(D/5)  | ANT<br>MIC   | Front panel    | F LOCK key:<br>press once                                |                                                 |                        |
|                                                                                                  | 2) Transmit<br>5W                                                                               |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 3) MENU No.: AB                                                                                 |                                          |                               |              |                | F LOCK key:<br>press once                                |                                                 |                        |
|                                                                                                  | 4) Transmit<br>24W                                                                              |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 5) MENU No.: AC                                                                                 |                                          |                               |              |                | F LOCK key:<br>press once                                |                                                 |                        |
|                                                                                                  | 6) Transmit<br>37W                                                                              |                                          |                               |              |                |                                                          |                                                 |                        |
| 13. ALC Meter<br>Start Point<br><br>Zone MAX<br><br>FULL                                         | 1) MENU No.: AE<br>AG: 1kHz 7mV :K, M<br>AG: 1kHz 4.0mV :E                                      |                                          |                               |              |                | F LOCK key:<br>press once                                |                                                 |                        |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 1) MENU No.: AF<br>AG: 1kHz 14mV :K, M<br>AG: 1kHz 8.0mV :E                                     |                                          |                               |              |                | F LOCK key:<br>press once                                |                                                 |                        |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
|                                                                                                  | 1) MENU No.: B0<br>AG: 1kHz 28mV :K, M<br>AG: 1kHz 16mV :E                                      |                                          |                               |              |                | F LOCK key:<br>press once                                |                                                 |                        |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| 14. FM MIC Sensitivity                                                                           | 1) MENU No.: B1<br>AG: 1kHz 5mV :K, M<br>AG: 1kHz 3mV :E                                        | Power meter<br>LD<br>AG<br>AF V.M<br>LCD |                               |              |                | Adjust to<br>±3.0kHz using<br>F LOCK key<br>and LOW key. |                                                 | ±100Hz                 |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |
| 15. DTMF DEV                                                                                     | 1) MENU No.: AD<br>LCD Display: 1633<br>If the display is "OFF", then<br>F LOCK key press once. |                                          |                               |              |                | Check DEV.                                               |                                                 | ±2.5kHz or more        |
|                                                                                                  | 2) Transmit                                                                                     |                                          |                               |              |                |                                                          |                                                 |                        |

## ADJUSTMENT

| Item                            | Condition                                                                                          | Measurement                   |             |            | Adjustment  |            |                                                    | Specifications/Remarks                          |
|---------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------|-------------|------------|-------------|------------|----------------------------------------------------|-------------------------------------------------|
|                                 |                                                                                                    | Test equipment                | Unit        | Terminal   | Unit        | Parts      | Method                                             |                                                 |
| 16. ROM DATA Writing            | 1) MENU No.: B3                                                                                    | LCD                           |             |            | Front panel |            | LCD display: "ready"<br>F.LOCK key: press once     |                                                 |
|                                 |                                                                                                    |                               |             |            |             |            | LCD Display: "good"<br>CLR key: press once         |                                                 |
| 17. Check TONE DEV.             | 1) 144.980MHz<br>MODE: FM<br>TONE: ON                                                              | Power meter LD                | Rear panel  | ANT        |             |            | Check DEV.                                         | 0.5 to 1.5kHz                                   |
|                                 | 2) Transmit                                                                                        |                               |             |            |             |            |                                                    |                                                 |
|                                 | 3) TONE: OFF                                                                                       |                               |             |            |             |            |                                                    |                                                 |
| 18. Suppression                 | 1) Frequency: 144.980MHz<br>MODE: USB or LSB<br>Spectrum Analyzer<br>fc: 145.000MHz<br>SPAN: 10MHz | Power meter Spectrum analyzer | Rear panel  | ANT        | TX-RX (A/5) | VR7<br>VR8 | Repeat USB, LSB alternately, CAR level: MIN        | -40dB or more for level at CW.                  |
|                                 | 2) Transmit                                                                                        |                               |             |            |             |            |                                                    |                                                 |
| 19. SIDE TONE                   | 1) Frequency: 144.950MHz<br>MODE: USB<br>AF VR: MIN<br>KEY: ON                                     | Oscillo AF V.M                | Rear panel  | EXT SP KEY | TX-RX (A/5) | VR3        | 0.2V                                               | ±0.1V                                           |
| 20. Check Processor operation   | 1) Release the lock of main unit key<br>MENU No. 69: ON→OFF                                        | Power meter AG AF V.M         | Front panel | ANT MIC    | Front panel |            | Check by ON and OFF of PROC key.                   | Power value at ON should be higher than at OFF. |
|                                 | 2) Frequency: 144.950MHz: E<br>145.950MHz: K, M<br>MODE: USB                                       |                               |             |            |             |            |                                                    |                                                 |
|                                 | 3) MIC terminal<br>AG: 1kHz 2mV                                                                    |                               |             |            |             |            |                                                    |                                                 |
|                                 | 4) Transmit                                                                                        |                               |             |            |             |            |                                                    |                                                 |
| 21. Auto MIC Gain control check | 1) Frequency: 144.950MHz: E<br>145.950MHz: K, M<br>MODE: USB                                       |                               |             |            |             |            | Set F.LOCK key OFF to ON, check after few seconds. | Power value at ON should be higher than at OFF. |
|                                 | 2) MIC terminal<br>AG: 1kHz 2mV                                                                    |                               |             |            |             |            |                                                    |                                                 |
|                                 | 3) Set to MENU No. 61, then transmit.                                                              |                               |             |            |             |            |                                                    |                                                 |
| 22. TX Freq. Check              | 1) Frequency: 144.950MHz: E<br>145.950MHz: K, M<br>MODE: FM                                        | Power meter f counter         | ANT         | Rear panel |             |            | 144.950MHz: E<br>145.950MHz: K, M                  | ±1kHz or less                                   |
|                                 | 2) Transmit                                                                                        |                               |             |            |             |            |                                                    |                                                 |
| 23. TX Output Check             | 1) Frequency: 144.950MHz<br>MODE: CW and FM                                                        | Power meter                   |             |            |             |            | Check                                              | [HI]<br>37 to 47 W<br>[LOW]<br>3 to 8 W         |

## ADJUSTMENT

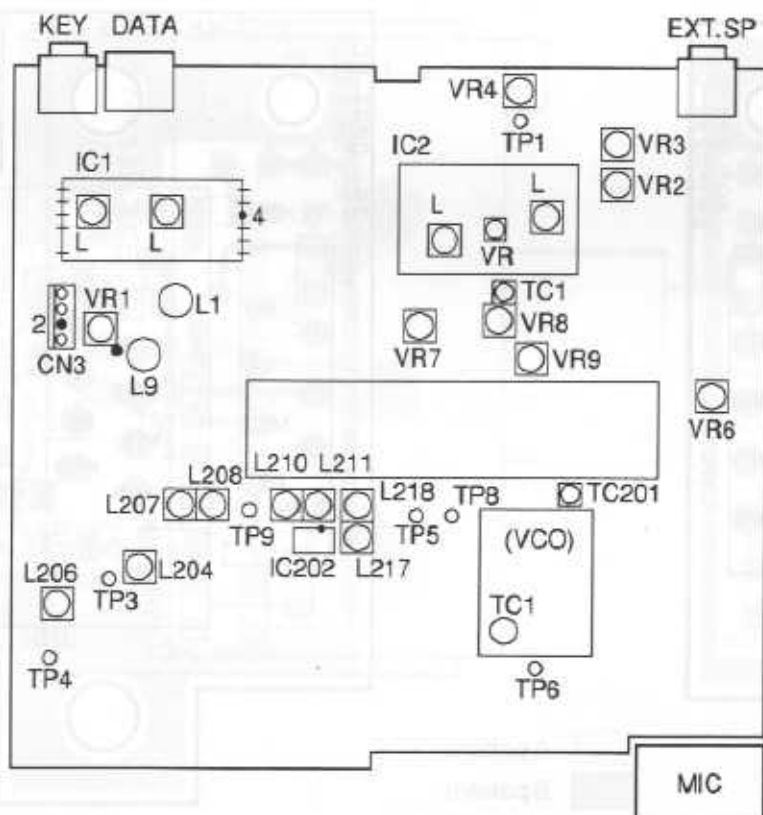


### TX-RX UNIT (C/5)

TX RX UNIT (C/5)  
 VR601: NULL and HI POWER  
 VR602: NULL  
 VR603: PROTECTION

### TX-RX UNIT (B/5)

TX-RX UNIT (B/5)  
 TC401: TX IF AMP  
 TC402: TX IF AMP  
 TC403: TX IF AMP  
 TC404: TX IF AMP  
 VR401: LOW POWER  
 VR402: RX S/N  
 L401: Helical (BPF)  
 L402: Helical (BPF)  
 L403: BPF  
 L404: BPF  
 L405: BPF  
 L407: MCF (10.695MHz)  
 L408: MCF (10.695MHz)  
 L410: BPF  
 L411: TX IF AMP  
 L412: TX IF AMP  
 L413: TX IF AMP  
 L414: TX IF AMP  
 L415: TX IF AMP  
 L416: TX IF AMP  
 L417: TX IF AMP



### TX-RX UNIT (A/5)

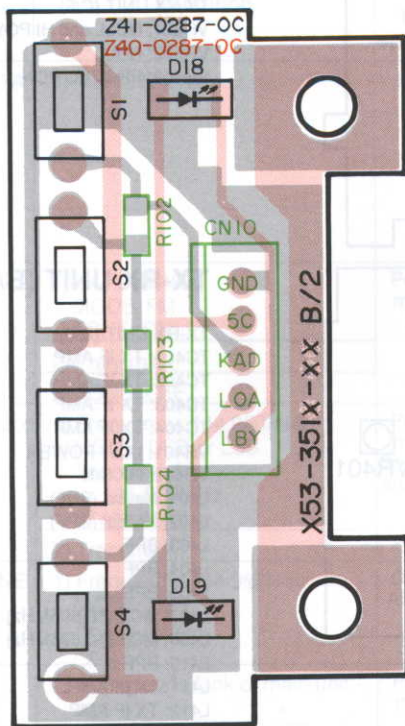
TC1: FM TX Frequency  
 TC1 (VCO): Lock Voltage  
 VR1: SS8 MIC Sensitivity  
 VR2: BEEP  
 VR3: SIDE TONE  
 VR4: RFG  
 VR6: FM MAX DEV  
 VR7: Carrier Suppression  
 VR8: Carrier Suppression  
 VR9: Carrier Level  
 VR (IC2): IF Gain  
 L (IC1): Noise Blanker  
 L (IC2): IF AMP  
 L1: IF AMP  
 L9: TX IF AMP  
 L204: Ref. Oscillation Level  
 L206: CAR Oscillation Level  
 L207: 30.72MHz Level  
 L208: 30.72MHz Level  
 L210: 92.16MHz Level  
 L211: 92.16MHz Level  
 L217: 103.625MHz Level  
 L218: 103.625MHz Level  
 TC201: L91

### (D/5)



CONTROL UNIT (X53-351X-XX) (B/2)

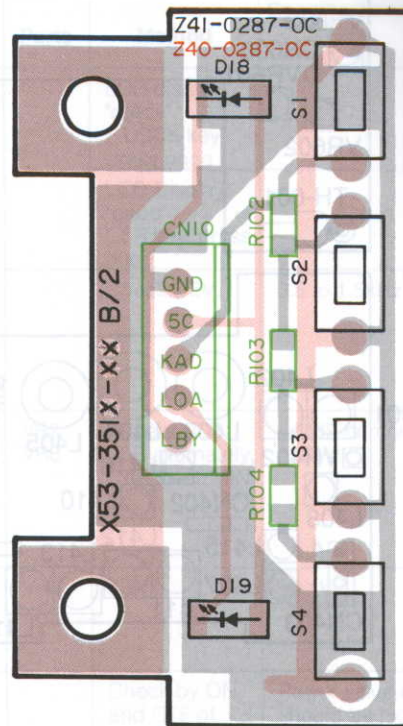
Component side view 0-12: K, 0-21: M, 2-72: E, E9



A pattern  
B pattern

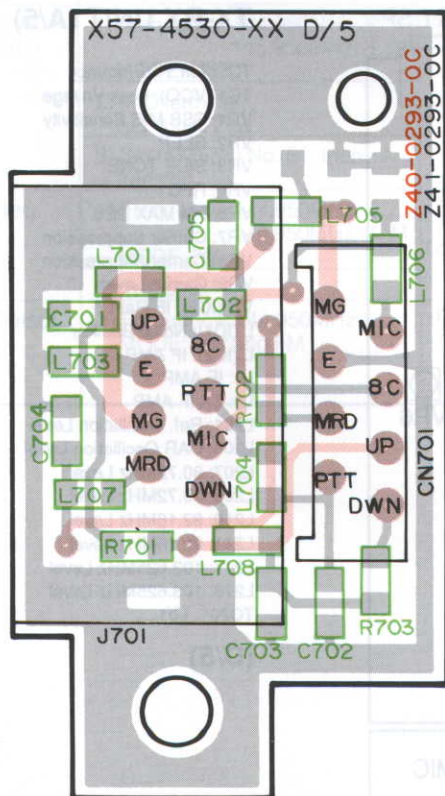
CONTROL UNIT (X53-351X-XX) (B/2)

Foil side view 0-12: K, 0-21: M, 2-72: E, E9



TX-RX UNIT (X57-4530-XX) (D/5)

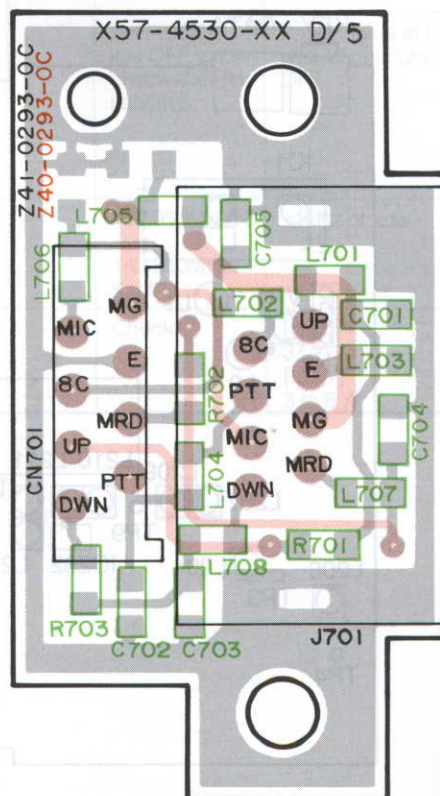
Component side view 0-00: E, E9, -11: K, M



A pattern  
B pattern

TX-RX UNIT (X57-4530-XX) (D/5)

Foil side view 0-00: E, E9, -11: K, M



A

B

C

D

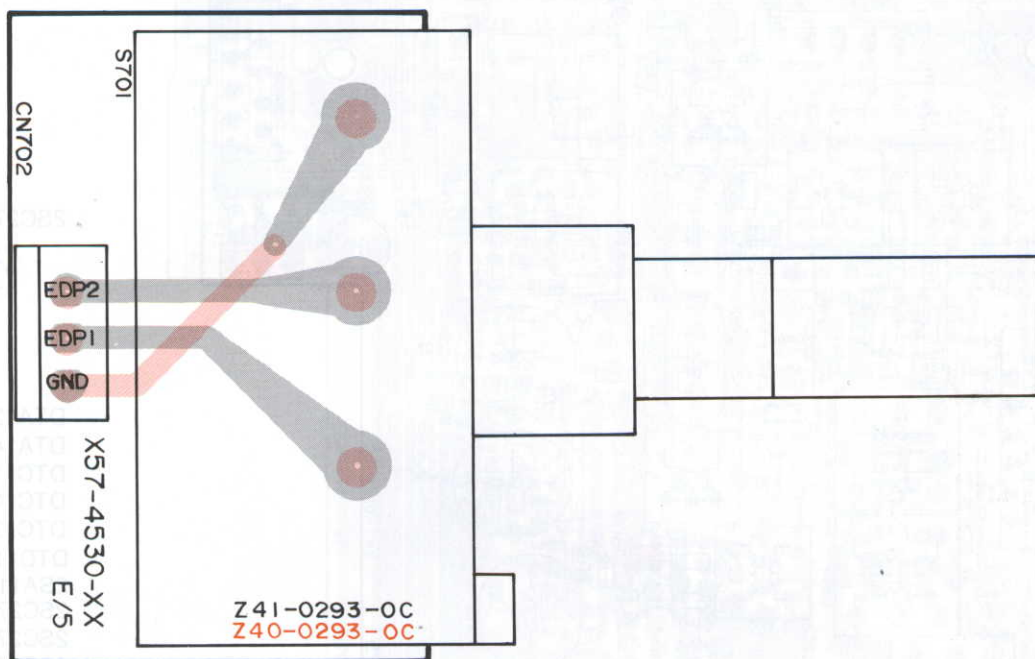
E

F

## PC BOARD VIEWS

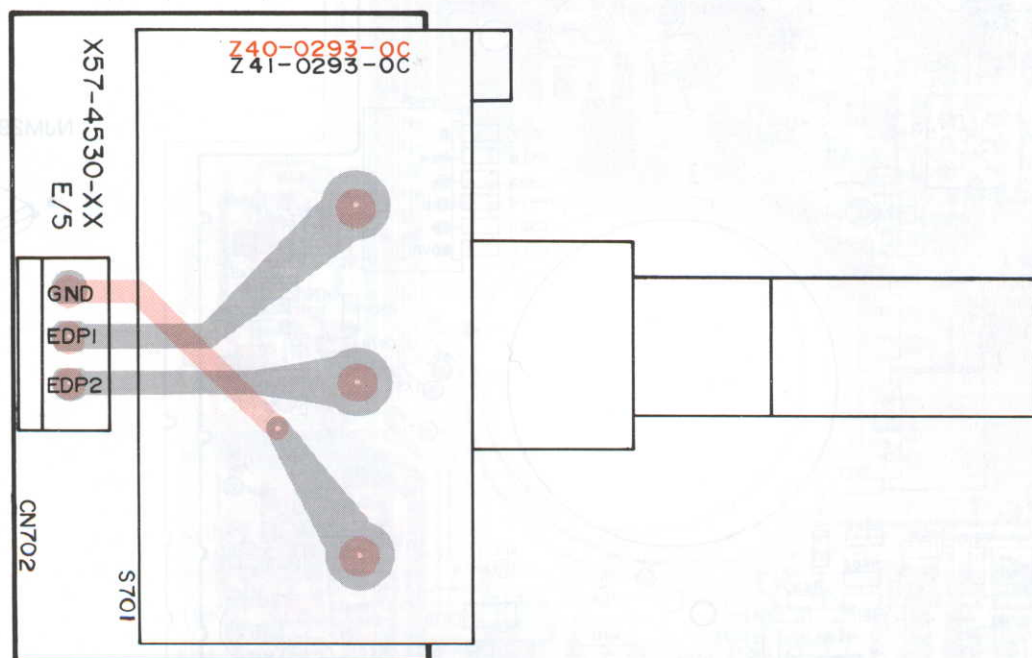
TM-255A/E

TX-RX UNIT (X57-4530-XX) (E/5) Component side view  
 0-00: E, E9, -11: K, M



A pattern  
 B pattern

TX-RX UNIT (X57-4530-XX) (E/5) Foil side view  
 0-00: E, E9, -11: K, M





[illegible]

A diagram of a 3-pin transistor package, likely a TO-18 package. The package is shown in perspective, with three pins extending from the bottom. The pins are labeled from left to right as E (Emitter), B (Base), and C (Collector).

A 3D perspective drawing of a rectangular block. The top surface is labeled 'B'. The front-left vertical edge is labeled 'E'. The front-right vertical edge is labeled 'C'. A small hook is attached to the right side of the block.

90



# TM-255A/E

1



A 3D perspective drawing of a rectangular block. The top surface is labeled 'D'. The front-left vertical edge is labeled 'G'. The front-right vertical edge is labeled 'S'.

A diagram of a battery with three terminals labeled S, D, and G. Terminal S is at the top, D is on the left, and G is on the right.

3

4

5

6

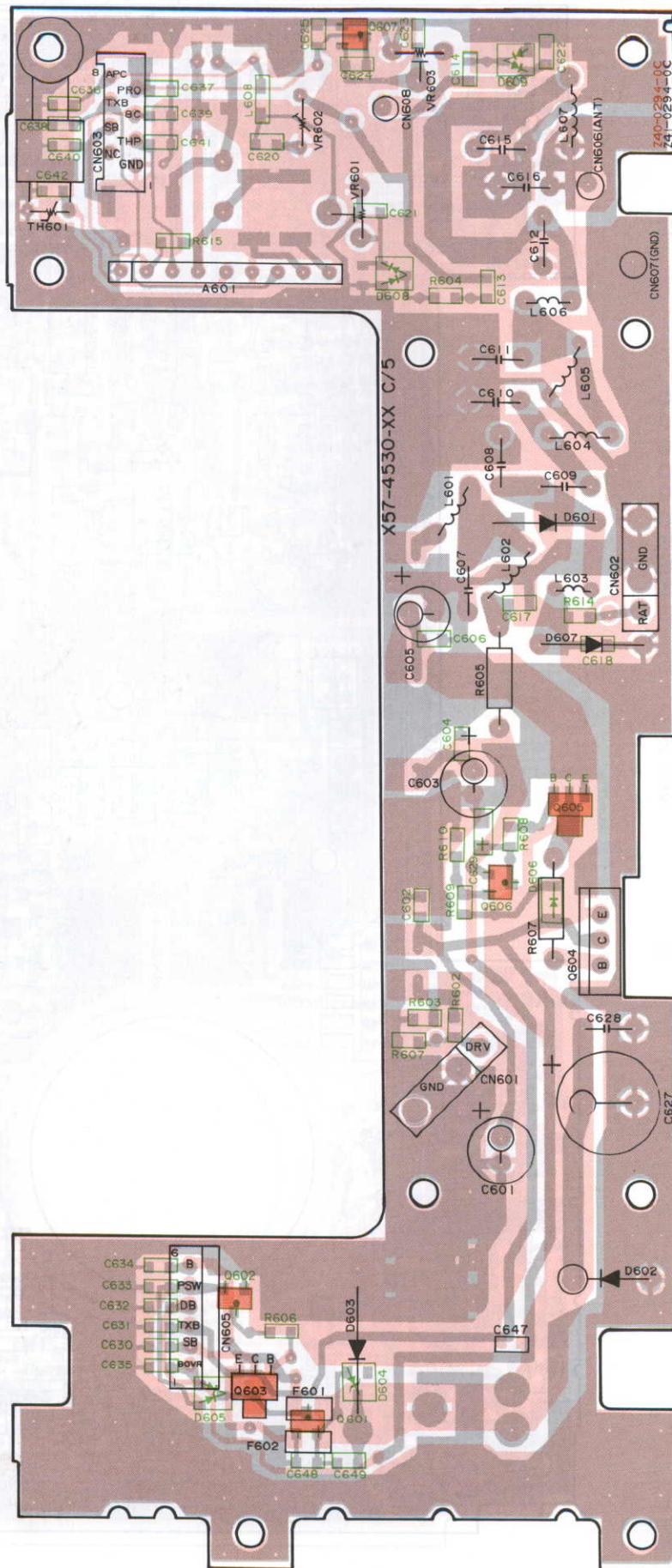
7

A pattern  
B pattern



TX-RX UNIT (X57-4530-XX) (C/5) Component side view  
-00: E, E9, -11: K, M

A pattern  
 B pattern





TX-RX UNIT (X57-4530-XX) (C/5) Foil side view  
-00: E, E9, -11: K, M

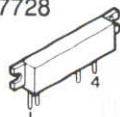
DTC114EK  
DTC124EK  
2SA1162  
2SC2712



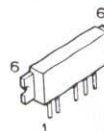
2SB1302



M67728



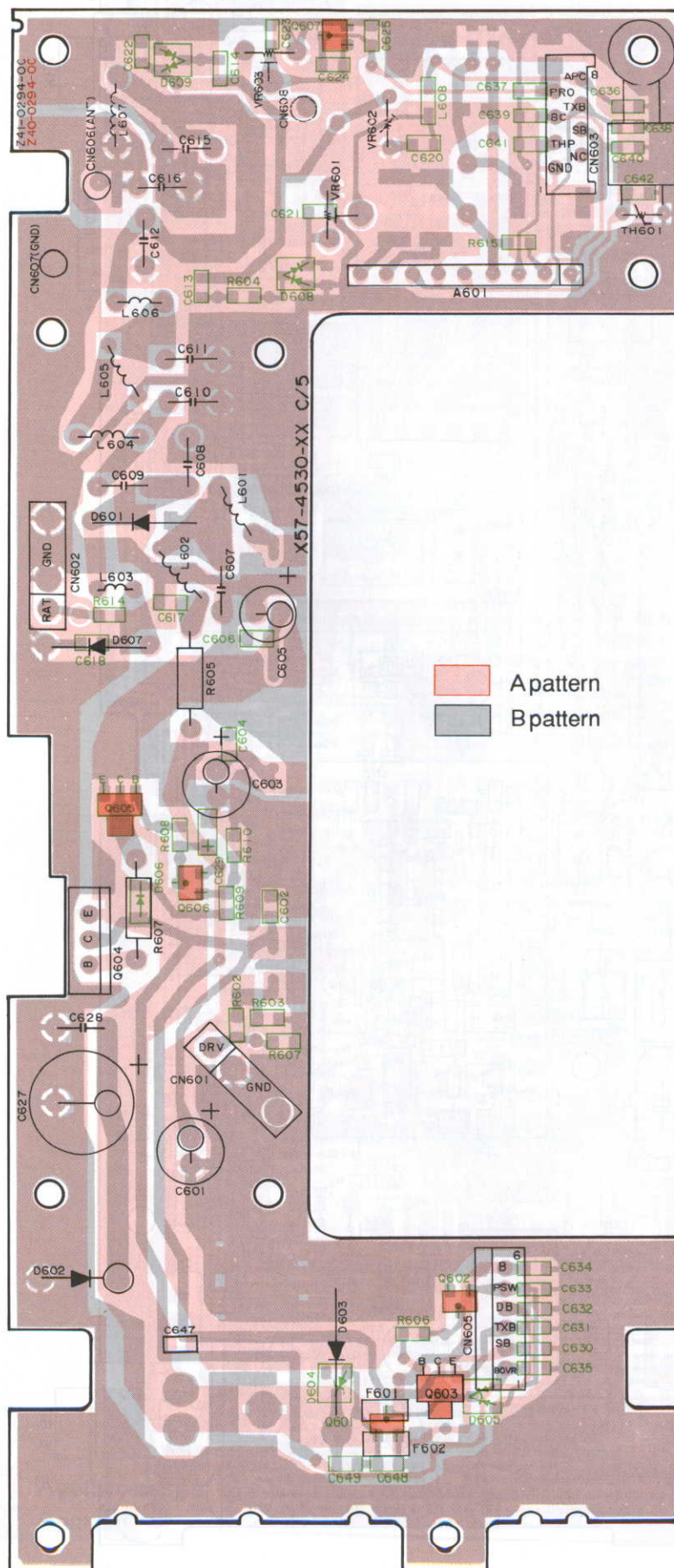
M57716



2SC2873



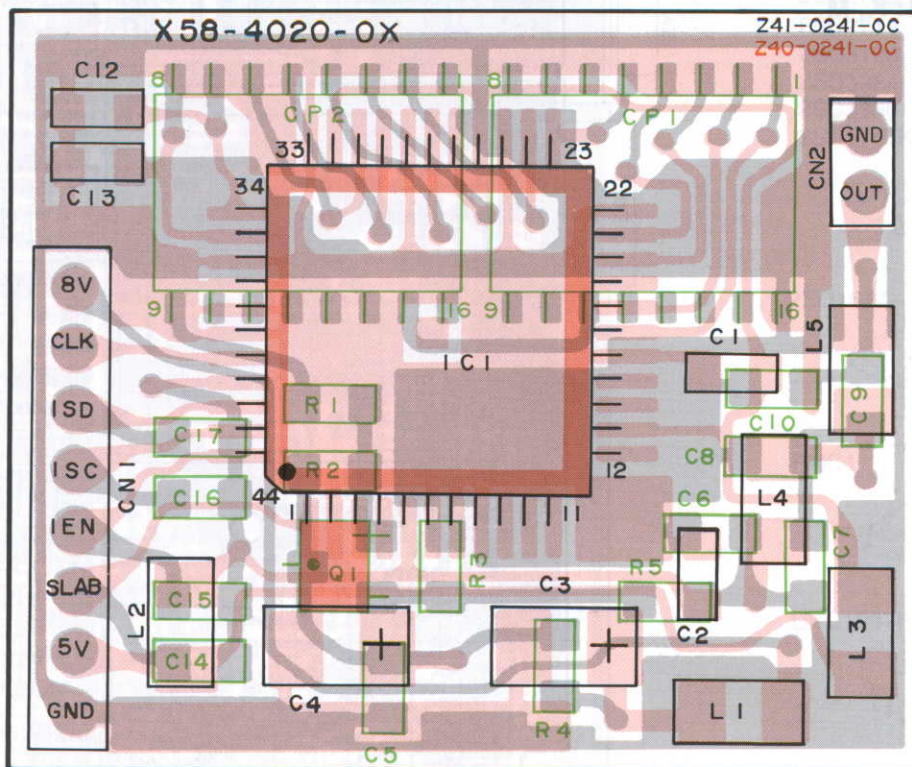
2SA1824





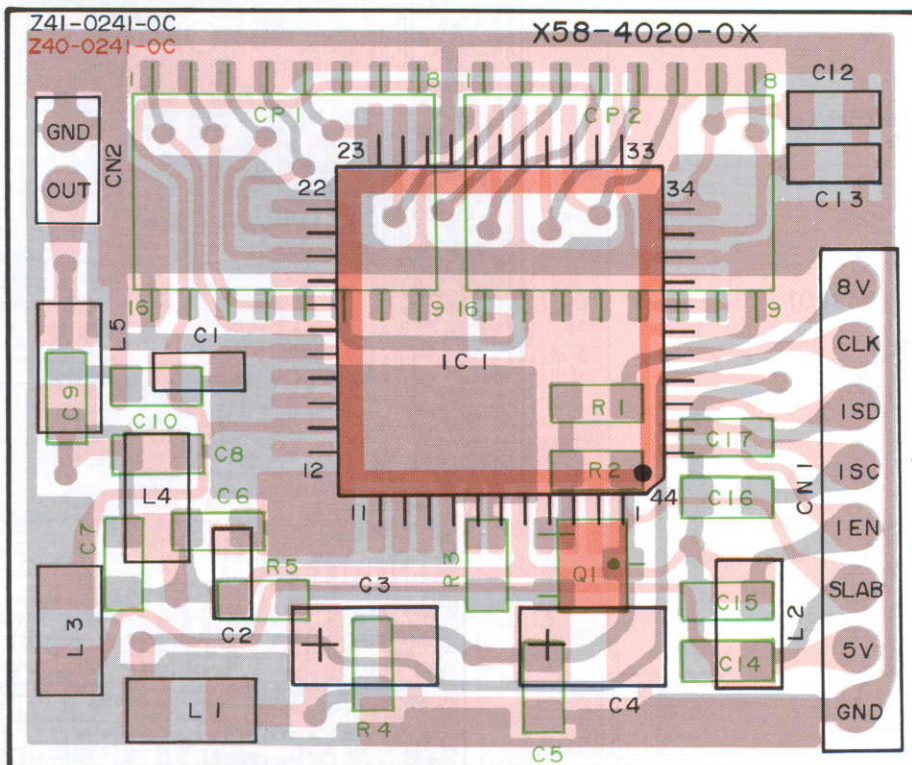
# PC BOARD VIEWS TM-255A/E

SUB UNIT (DDS) (X58-4020-0X) Component side view



Apattern  
 Bpattern

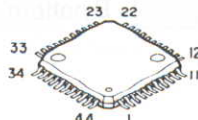
SUB UNIT (DDS) (X58-4020-0X) Foil side view



2SC2712



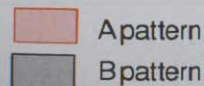
F71022





## PC BOARD VIEWS

**Component side view**  
0-00: E, E9, -11: K, M



A diagram of a 5-pin DIN connector, showing the pins numbered 1 to 5 from left to right.

Diagram of a single tooth in a gear set, labeled '1'.

A perspective view of a 16-pin DIP package. The package is rectangular with two rows of pins. The pins on the right side are numbered 1 through 8, and the pins on the left side are numbered 16 through 9.



## TX-RX UNIT (X57-4530-XX) (A/5) Foil side view 0-00: E, E9, -11: K, M

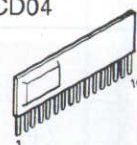
## PC BOARD VIEWS

## TM-255A/E

3SK131



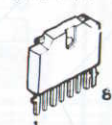
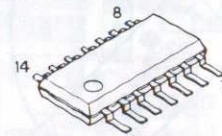
KCD04



2SJ106



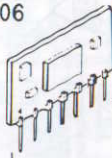
UPC1242H

CXD1225M  
BU4066BCF  
XRU4066BCF

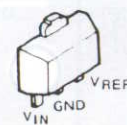
TA78L08F



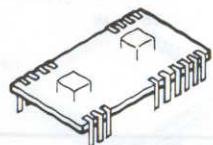
KCA06



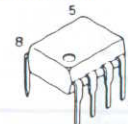
TA78L05F



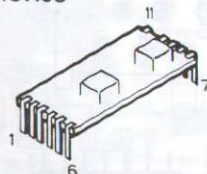
KCD08



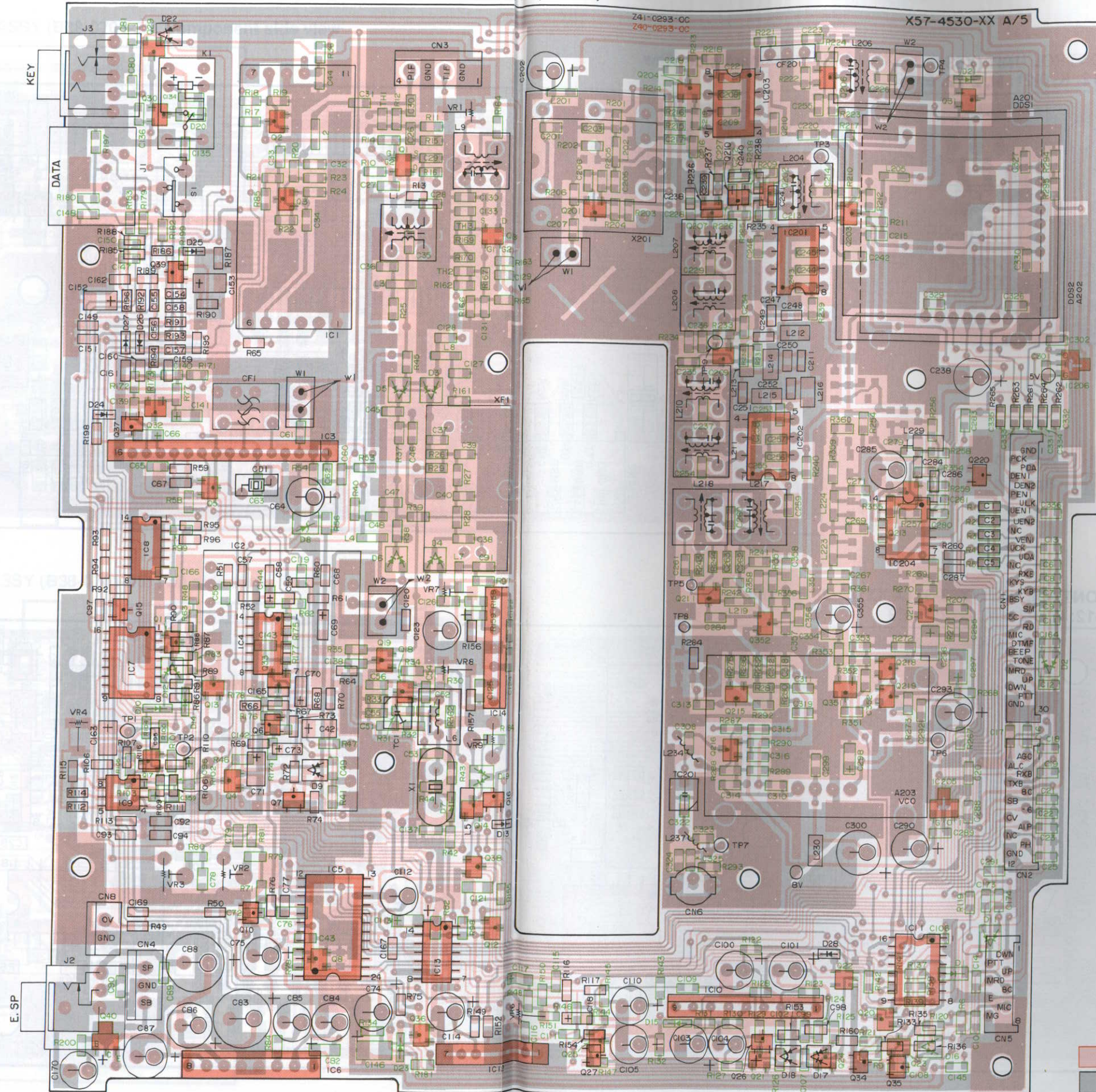
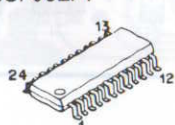
SN16913P



KCX05



MB87032PF





# TM-255A/E PC BOARD VIEWS

CONTROL UNIT (X53-351X-XX) (A/2) Component side view  
0-12: K, 0-21: M, 2-72: E, E9

DTA143EK  
DTC143EK

2SA1519  
DTC114EK

TC4S584F  
SC14S11F

LC7385M

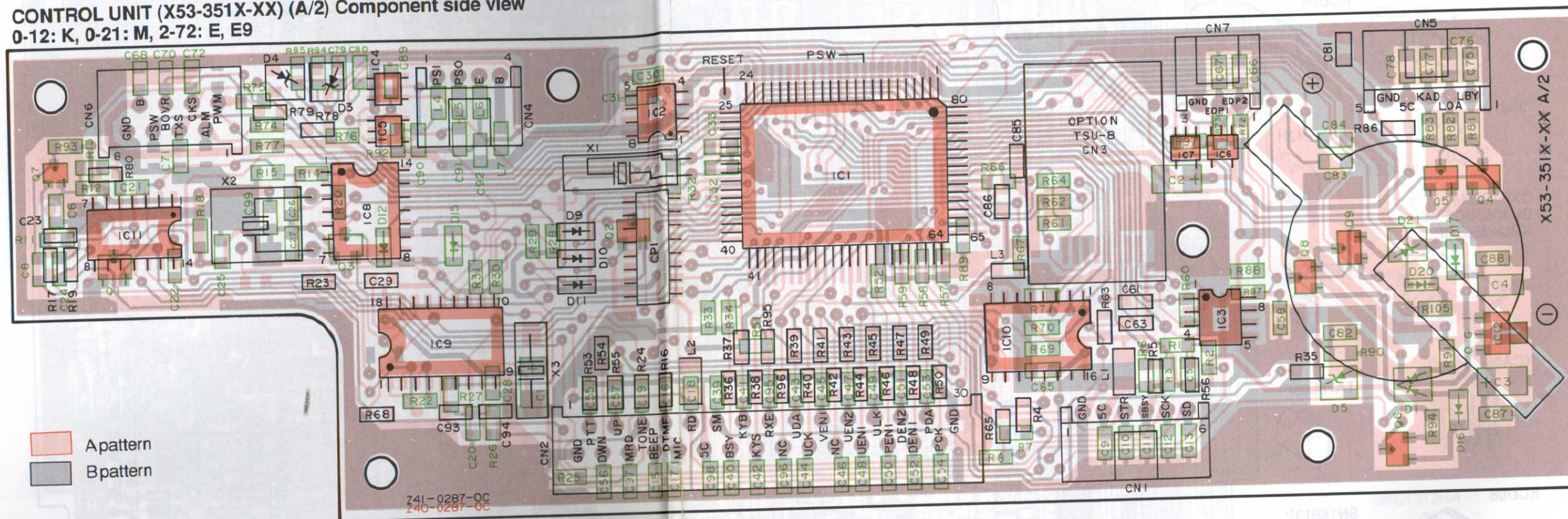
TA78L06F

AT93C66-10SI2.7  
M62003FP  
NM93C66LEM8

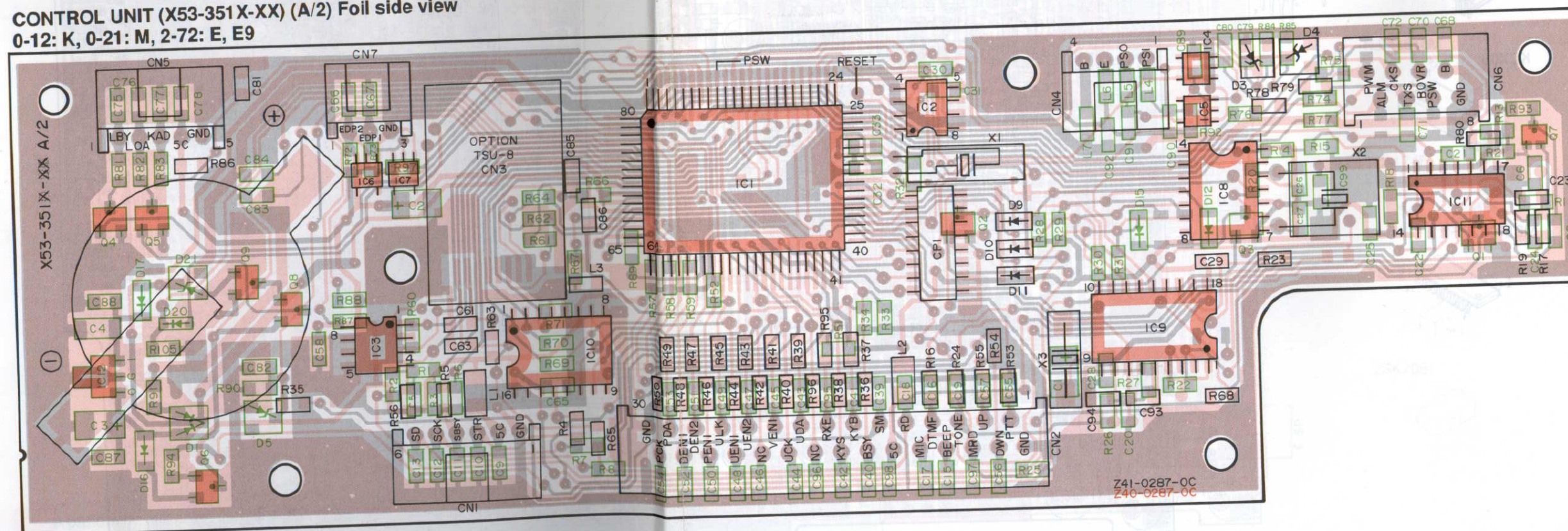
M37702M6B084FP

TC35219F  
XRU4066BCF

TC74HC238AF



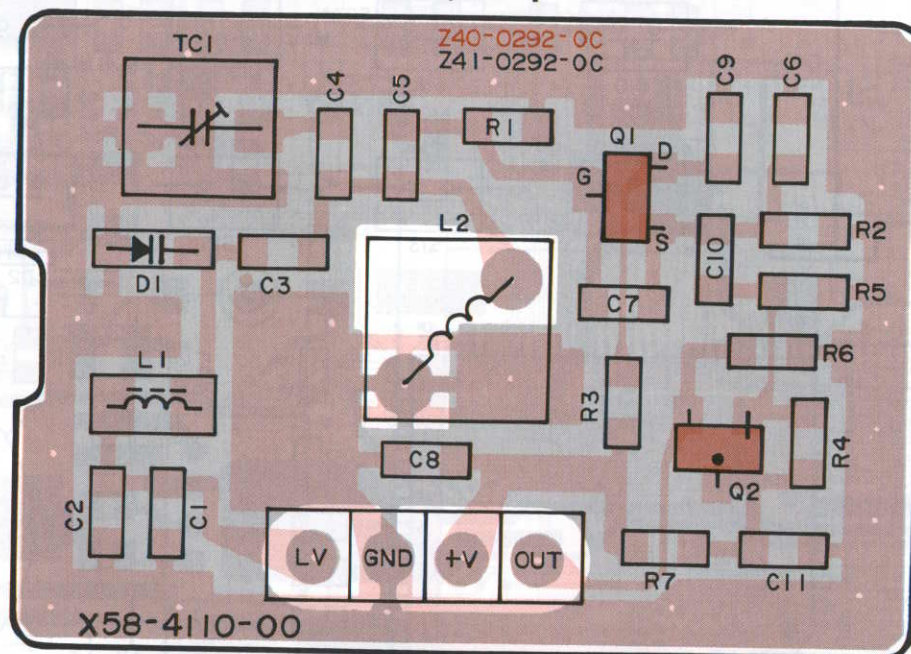
CONTROL UNIT (X53-351X-XX) (A/2) Foil side view  
0-12: K, 0-21: M, 2-72: E, E9





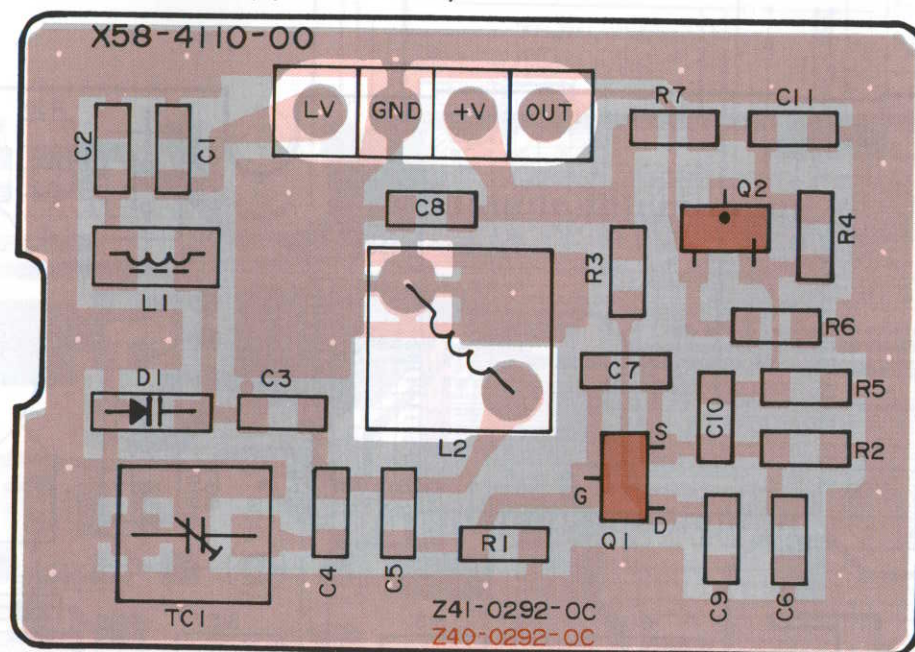
## PC BOARD VIEWS TM-255A/E

SUB UNIT (VCO) (X58-4110-00) Component side view

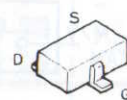


A pattern  
 B pattern

SUB UNIT (VCO) (X58-4110-00) Foil side view



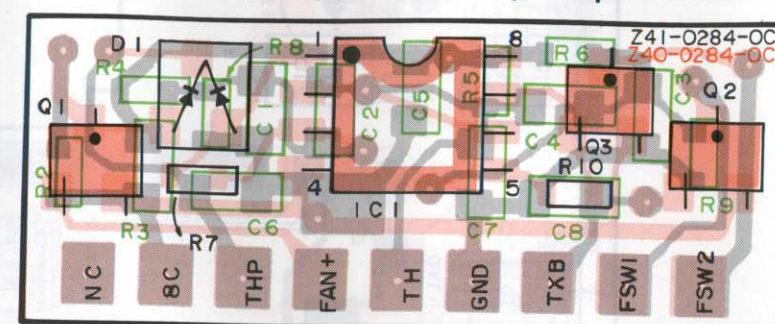
2SK508NV



2SC3356

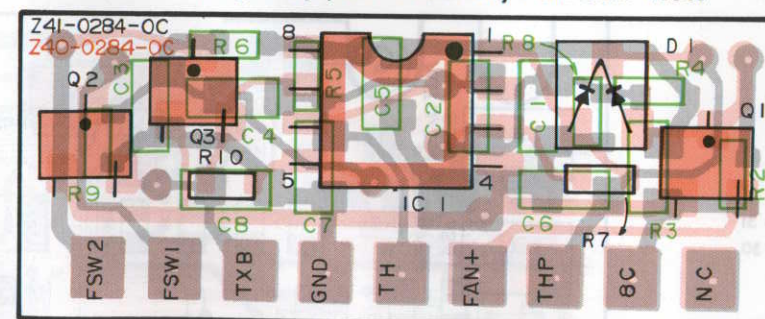


MODULE UNIT (FAN) (X59-4020-00) Component side view



A pattern  
 B pattern

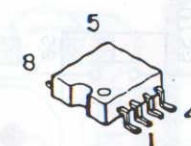
MODULE UNIT (FAN) (X59-4020-00) Foil side view



A pattern  
 B pattern

DTC114TK  
DTD114EK

NJM2904M

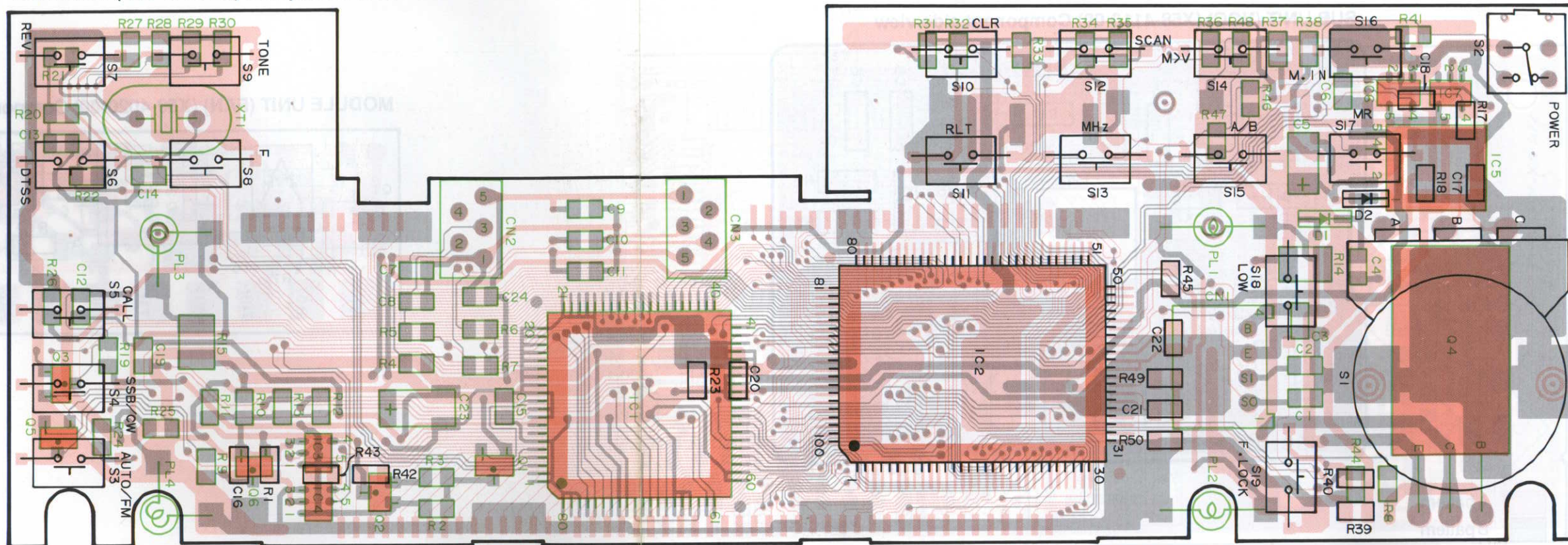


A pattern  
 B pattern

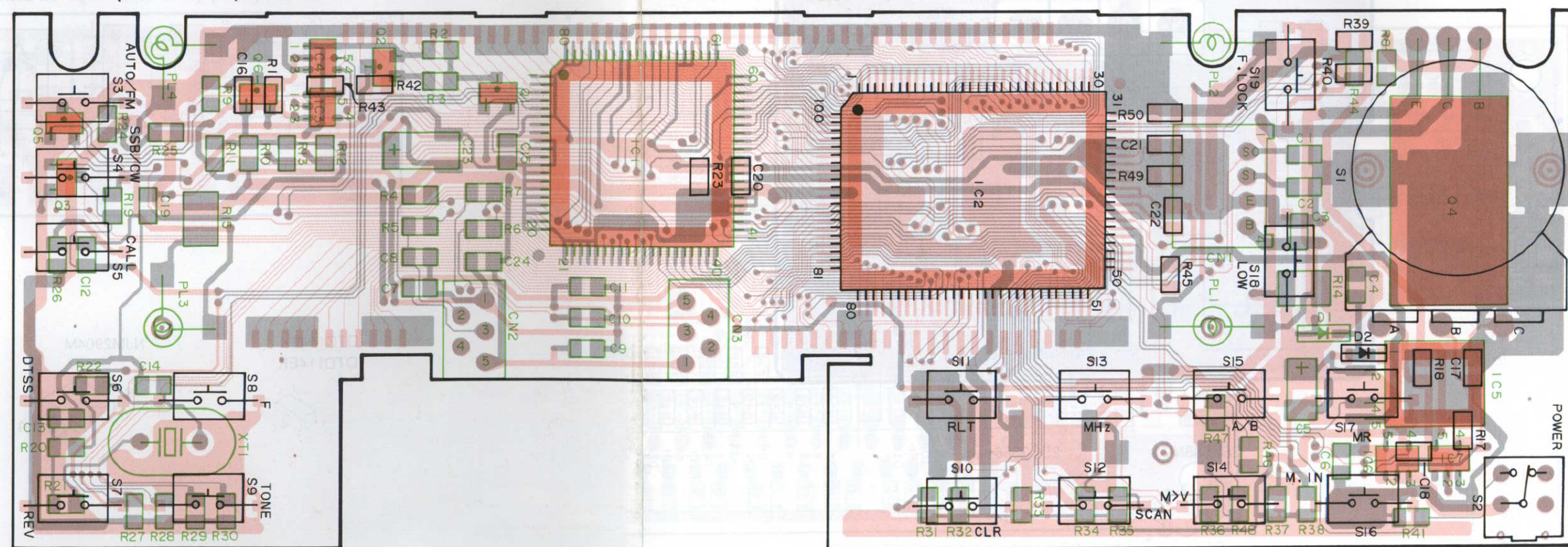


# M-255A/E PC BOARD VIEWS

LCD ASSY (B38-0701-25) Component side view



LCD ASSY (B38-0701-25) Foil side view



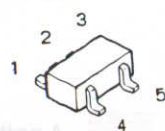
DTC114EK  
2SA1162  
2SC2712  
2SA1745



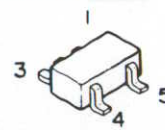
2SA1307



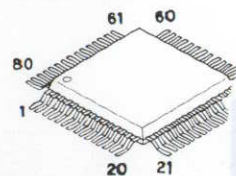
TC4S11F



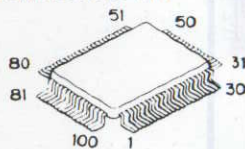
TC4S584F



HD404719A46H



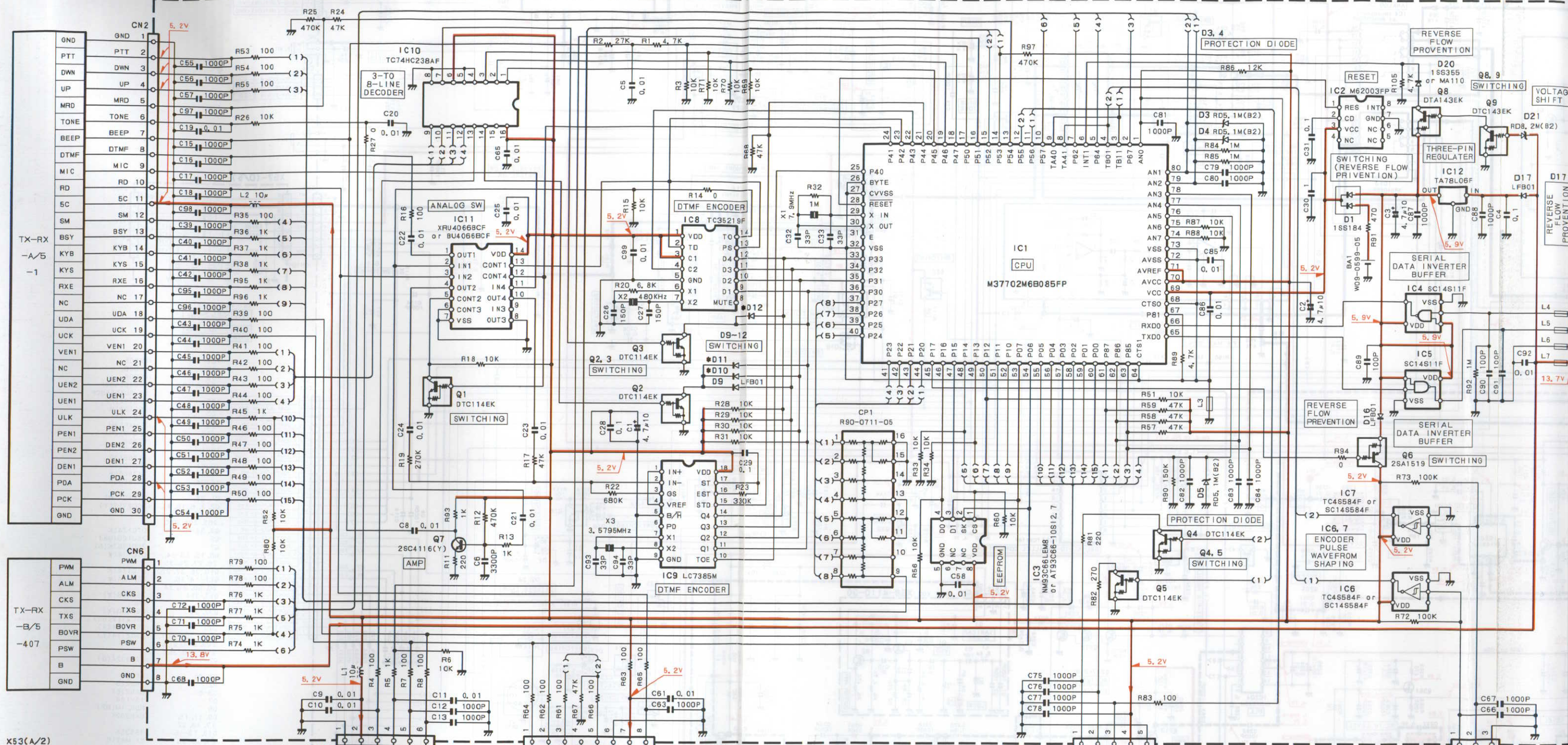
MSM5265GS-VIK



Apattern  
Bpattern

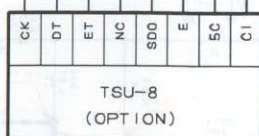
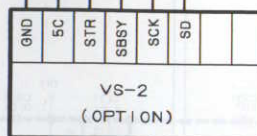


# CONTROL UNIT X53-3510-12(A/2)(K) X53-3510-21(A/2)(M) X53-3512-72(A/2)(E, E9)



X53(A/2)

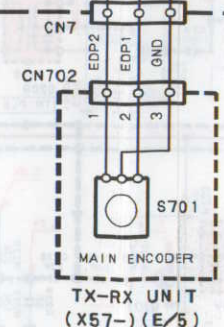
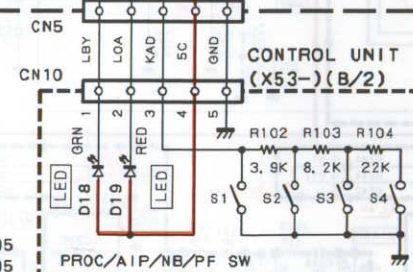
|        |                                 |      |                  |
|--------|---------------------------------|------|------------------|
| IC1    | :M37702M6B085FP                 | Q1-5 | :DTC114EK        |
| IC2    | :M62003FP                       | Q6   | :2SA1519         |
| IC3    | :NM93C66LEMB or AT93C66-10S12.7 | Q7   | :2SC4116(Y)      |
| IC4, 5 | :SC14S11F                       | Q8   | :DTA143EK        |
| IC6, 7 | :TC45584F or SC14S584F          | Q9   | :DTC143EK        |
| IC8    | :TC35219F                       | D1   | :1SS184          |
| IC9    | :LC7385M                        | D3-5 | :RD5, 1M(B2)     |
| IC10   | :TC74HC238AF                    | D9   | :LFB01           |
| IC11   | :XRU4066BCF or BU4066BCF        | D10  | :LFB01 (0-12)    |
| IC12   | :TA78L06F                       | D11  | :LFB01 (2-72)    |
|        |                                 | D12  | :LFB01 (0-21)    |
|        |                                 | D20  | :1SS355 or MA110 |
|        |                                 | D21  | :RD8, 2M(B2)     |



| Ref. NO | PARTS NAME | X53-351X-XX |
|---------|------------|-------------|
| D10     | LFB01      | YES NO NO   |
| D11     | LFB01      | NO NO YES   |
| D12     | LFB01      | NO YES NO   |

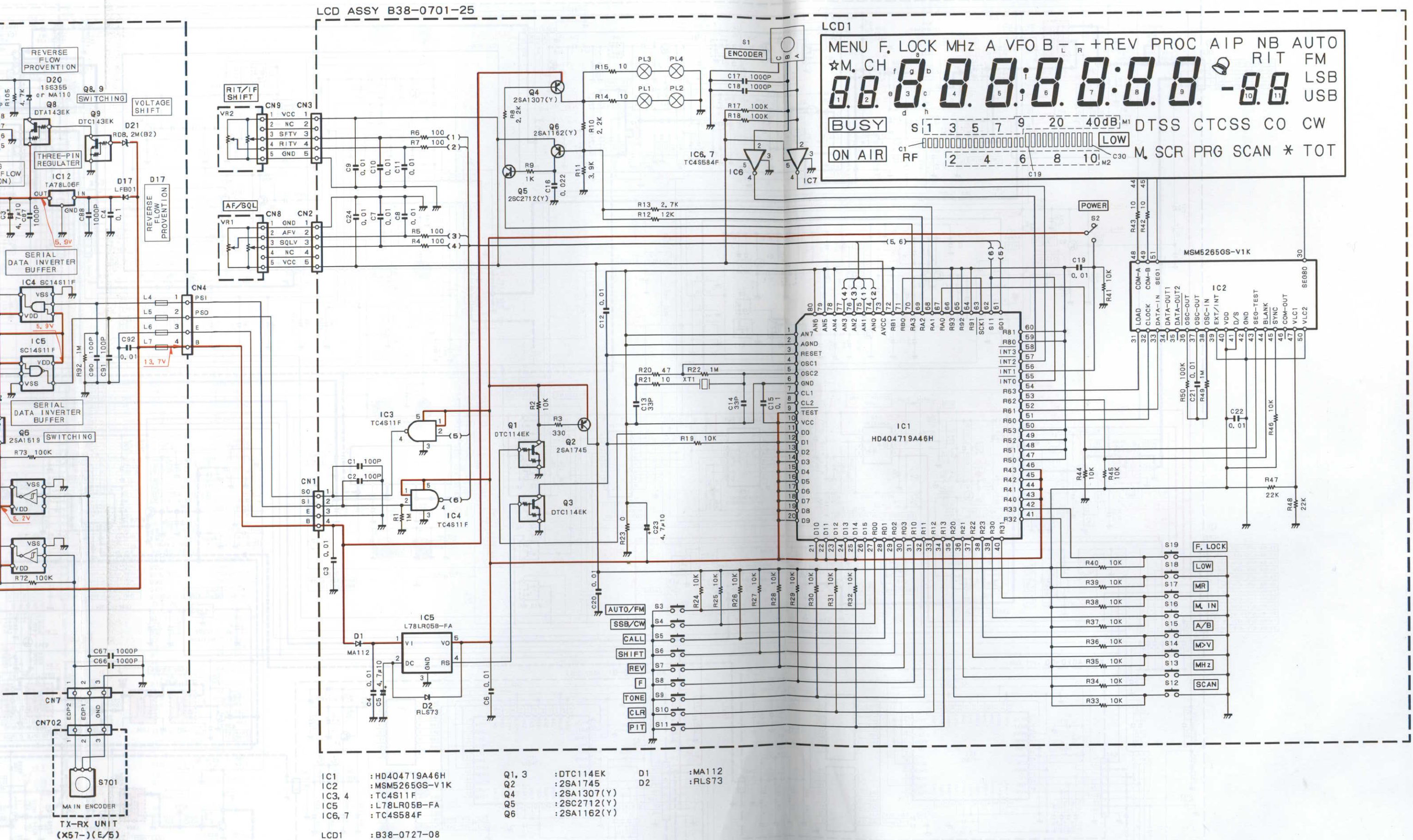
X53(B/2)

|     |              |
|-----|--------------|
| D18 | :B30-0897-05 |
| D19 | :B30-2001-05 |





# SCHEMATIC DIAGRAM TM-255A/E

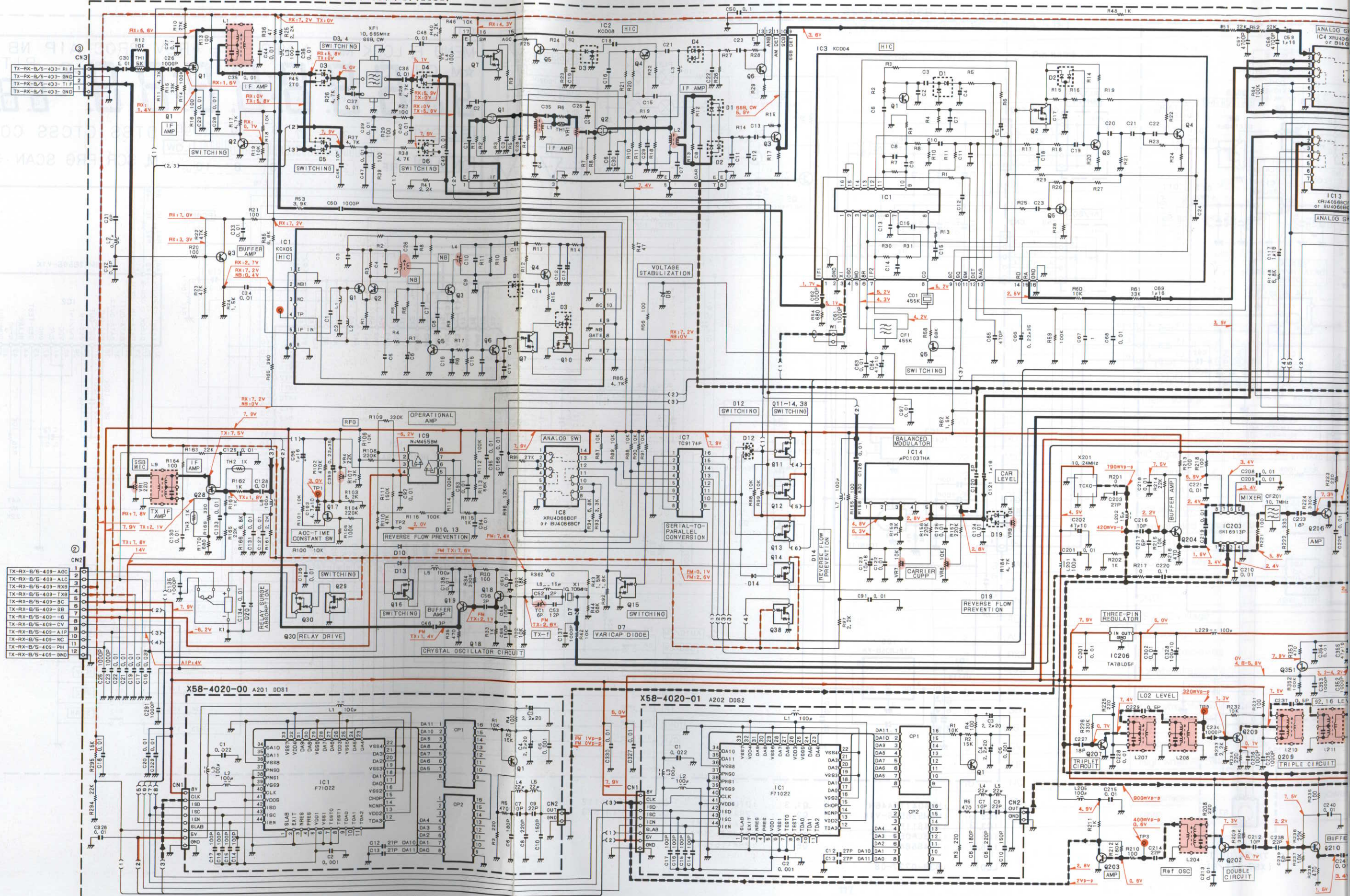




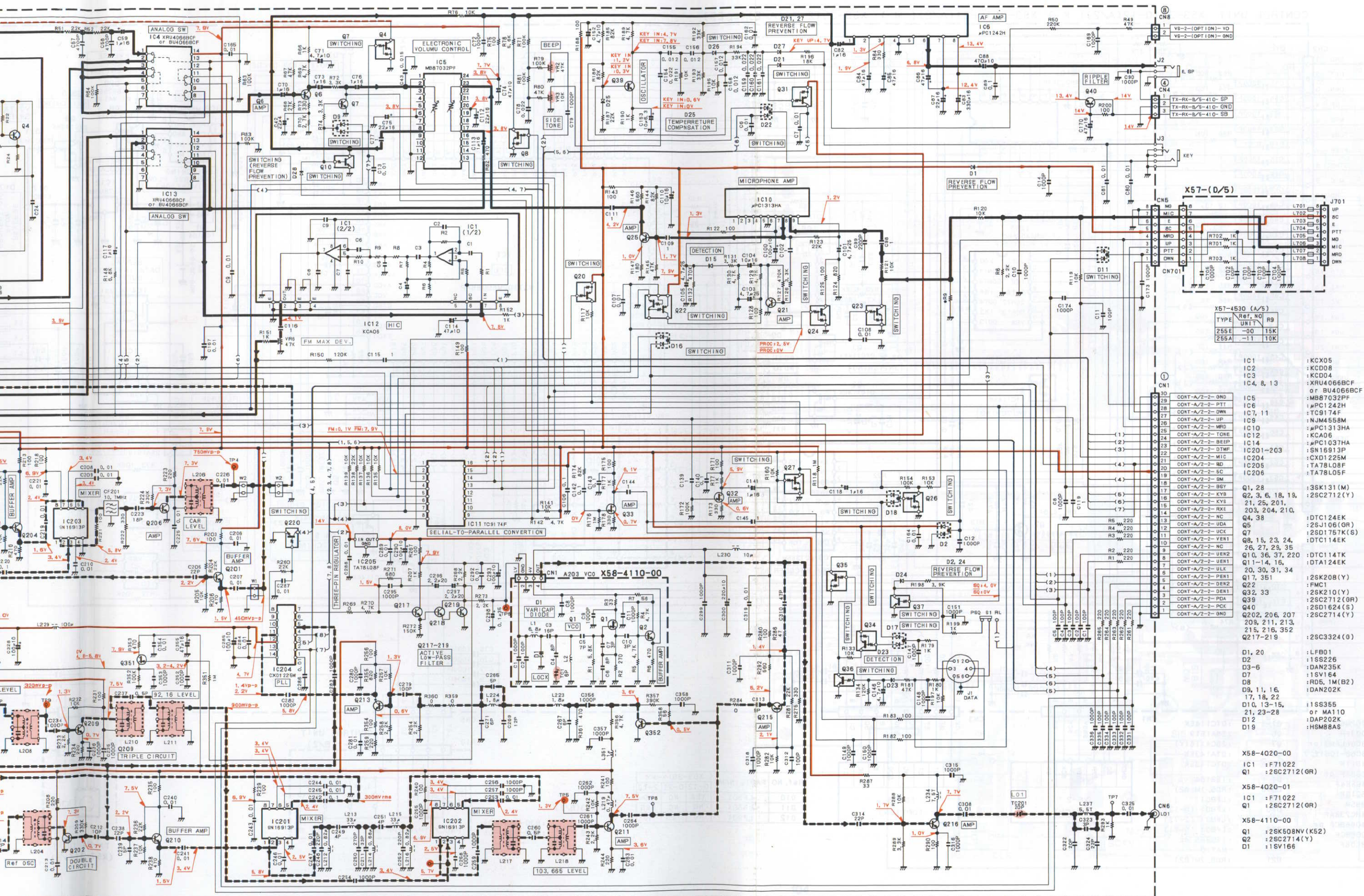
# TM-255A/E

## SCHEMATIC DIAGRAM

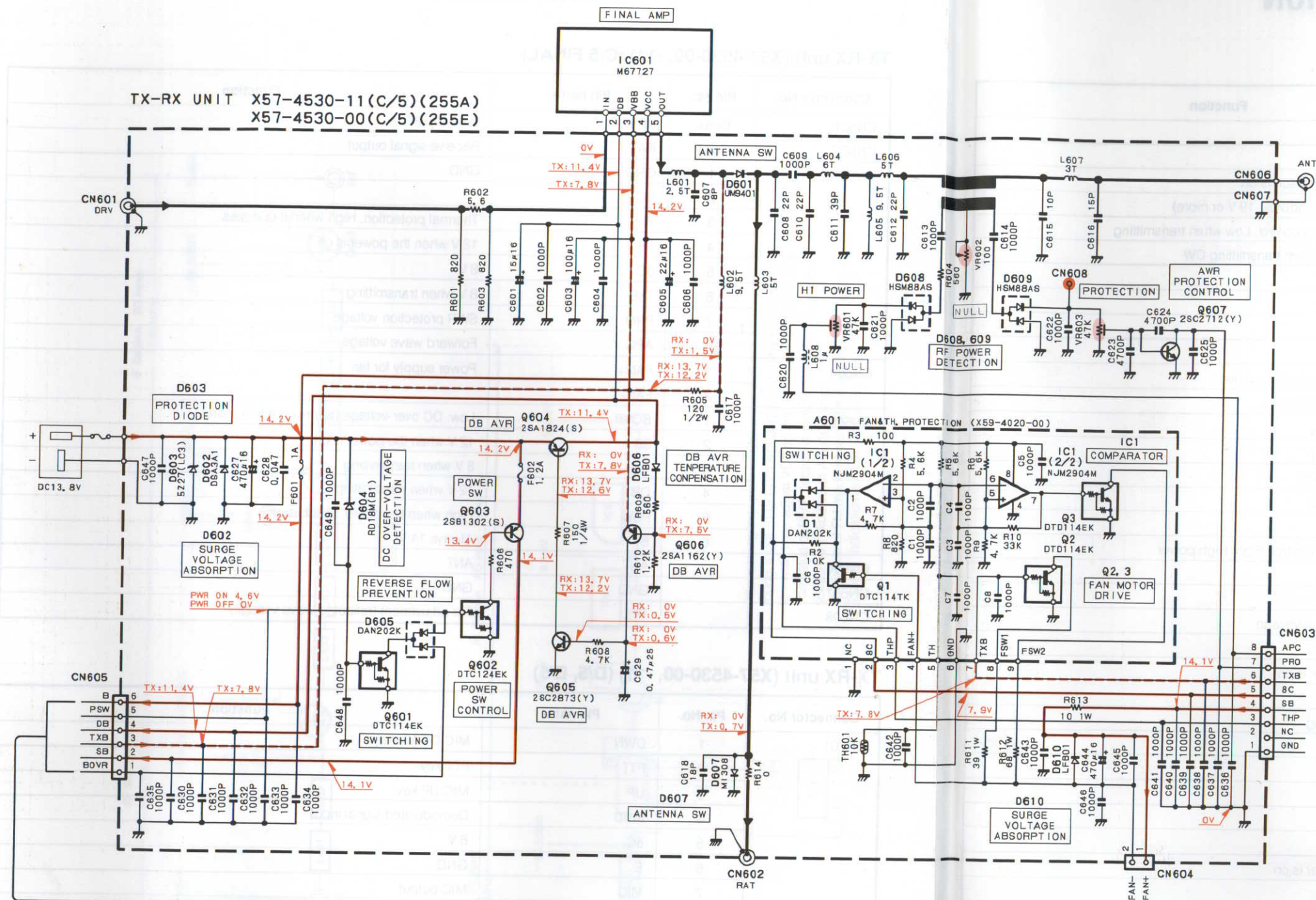
TX-RX UNIT X57-4530-11(A/5)(255A) X57-4530-00(A/5)(255E)











X57-(C/5)

IC601 : M67727  
Q601 : DTC114EK  
Q602 : DTC124EK  
Q603 : 2SB1302(S)  
Q604 : 2SA1824(S)  
Q605 : 2SC2873(Y)  
Q606 : 2SA1162(Y)  
Q607 : 2SC2712K

D601 : UM9401  
D602 : DSA3A1  
D603 : 5Z27(LC3)  
D604 : RD18M(B1)  
D605 : DAN202K  
D606, 610 : LFB01  
D607 : MI308  
D608, 609 : HSM88AS

X59-4020-00

IC1 : NJM2904M  
Q1 : DTC114TK  
Q2, 3 : DTC114EK  
D1 : DAN202K

X57-(B/5)

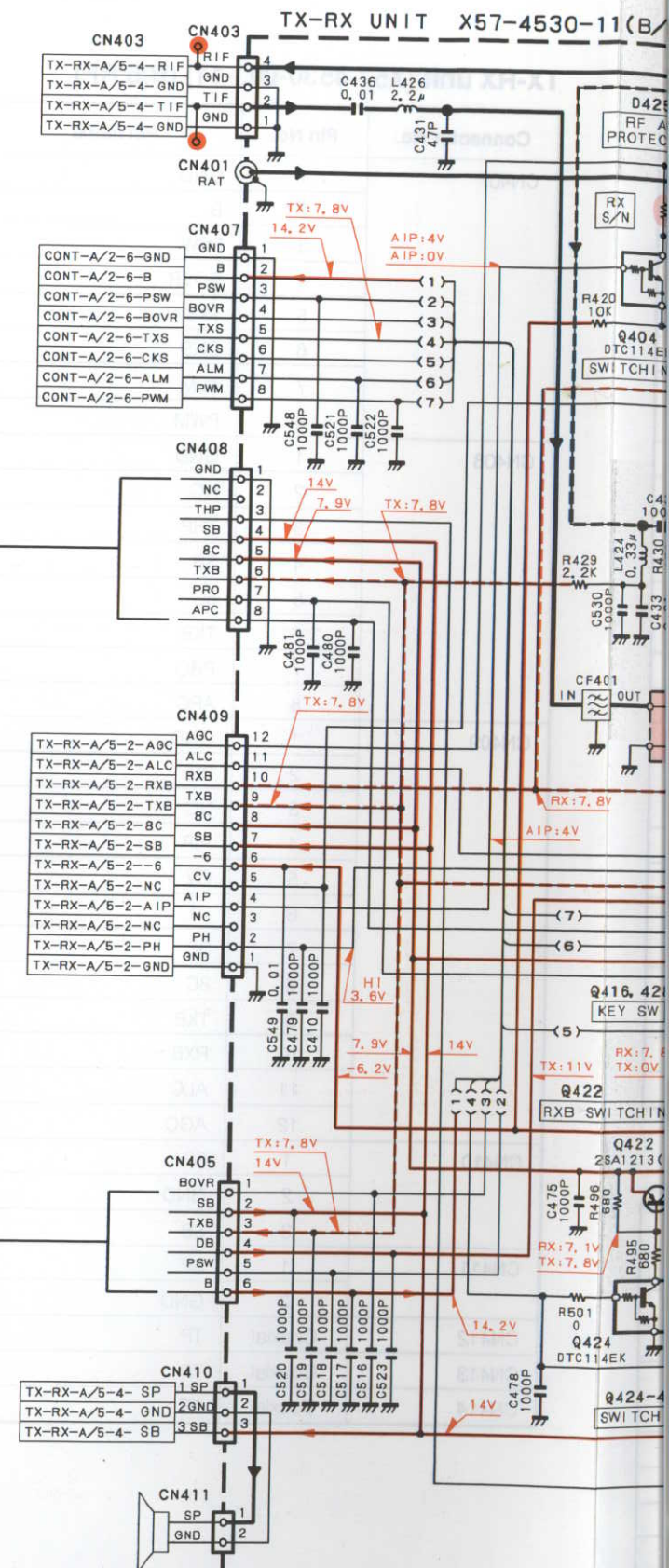
IC401 : NJM2902M  
IC402 : TA7808F  
Q401 : 3SK184(S)  
Q402, 405 : 3SK131(M)  
Q403 : 2SK210(GR)  
Q404, 424-427 : DTC114EK  
Q406 : 2SC2954  
Q407 : 2SC1947

Q416 : DTA143EK  
Q417 : DTA124EK  
Q418, 428 : DTC124EK  
Q419 : 2SA1162(Y)  
Q420, 421 : 2SC2712(Y)  
Q422, 423 : 2SA1213(Y)  
Q429 : 2SC2714(Y)

D405 : 1SV166  
D407, 409 : 1SV164  
412-416 : 426  
D410, 417-419 : 1SS355  
427 : or MA110  
D411 : MA862  
D422 : 1SS226  
D423 : RD6, 2M(B2)  
D424 : HSM88AS  
D425 : MA77

X57-(B/5)

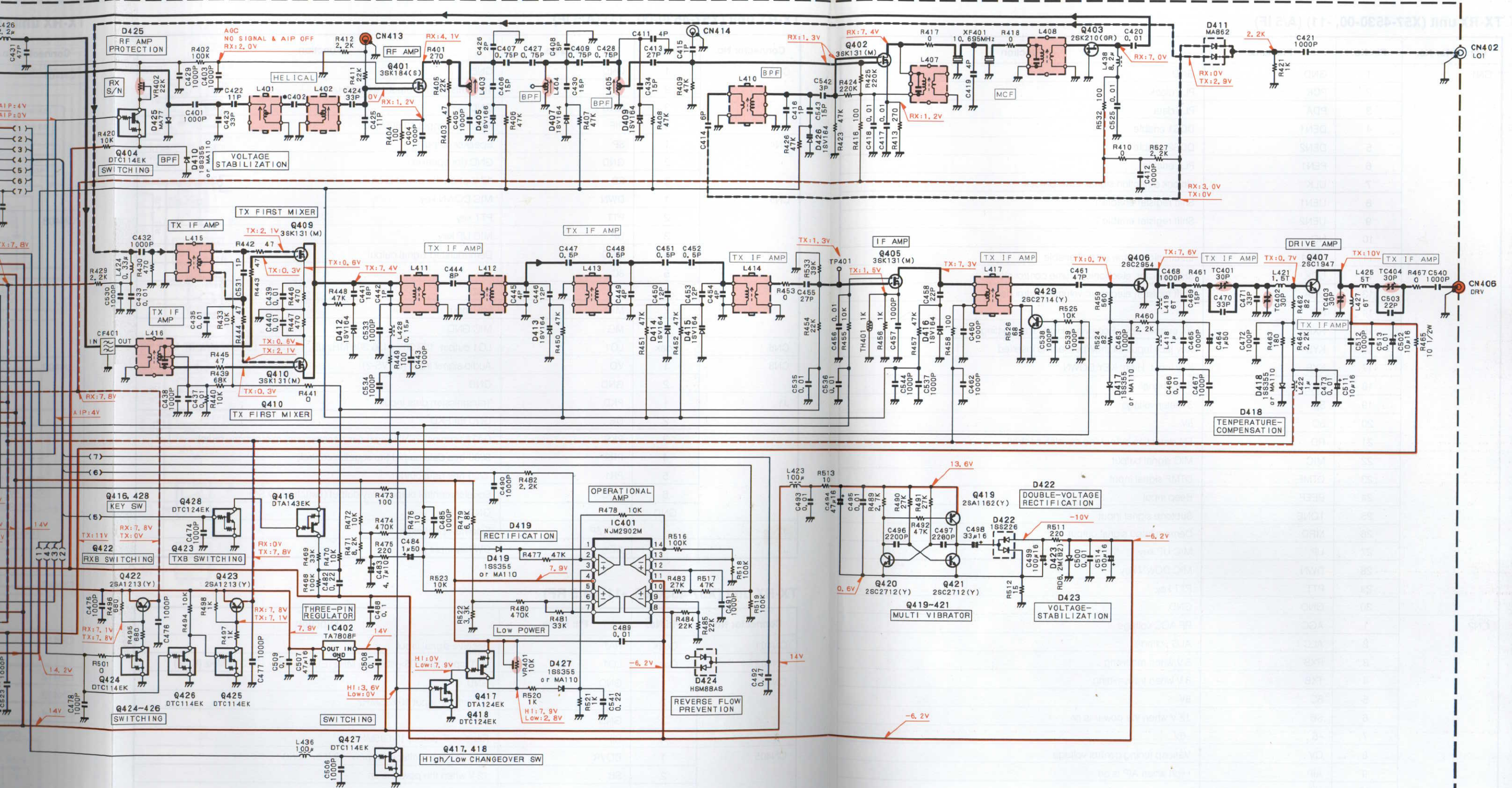
| TYPE | Ref. NO | C402 |
|------|---------|------|
| 255A | 30-11   | 4P   |
| 255E | 30-00   | 3P   |





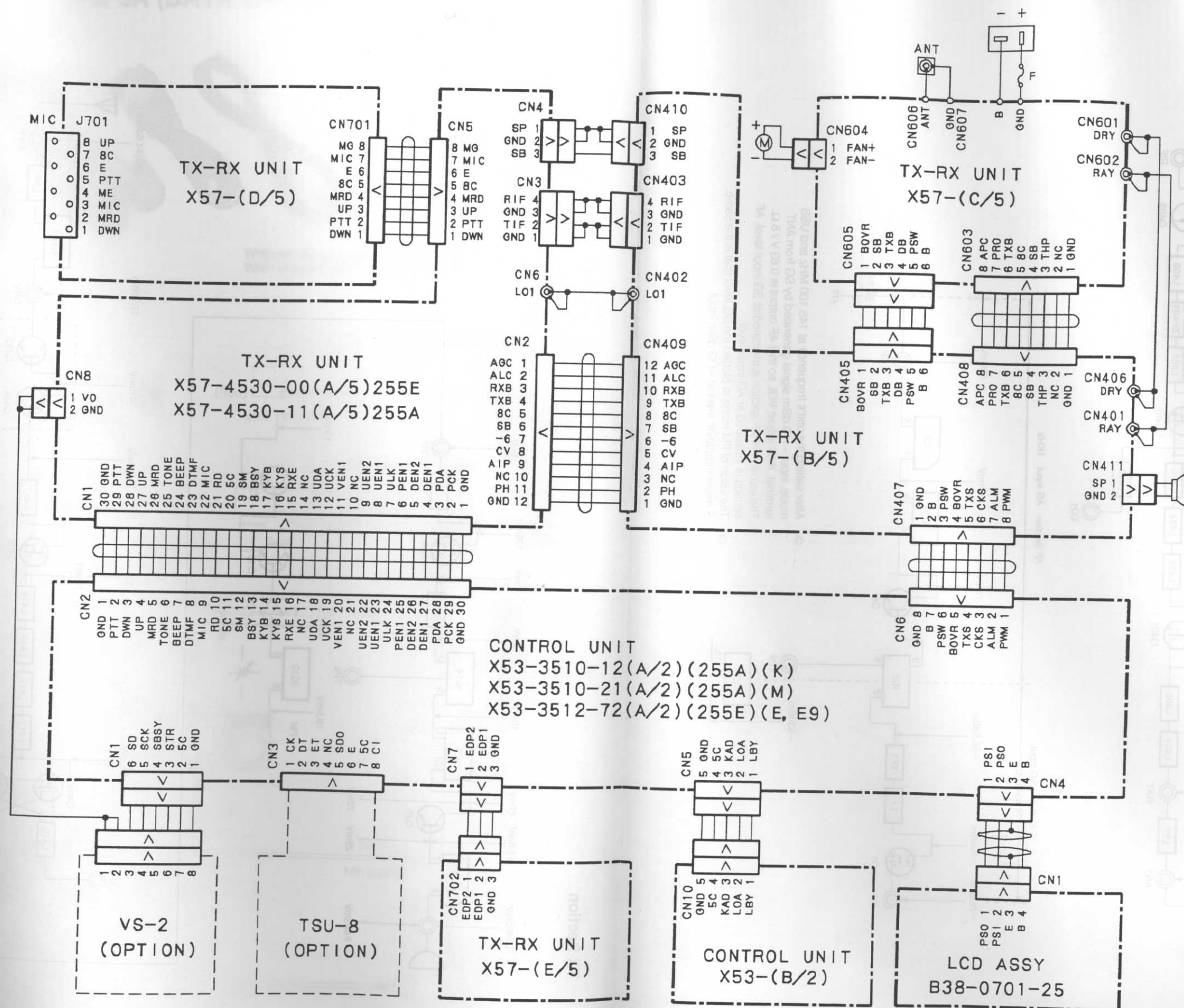
# SCHEMATIC DIAGRAM TM-255A/E

IT X57-4530-11(B/5)(255A) X57-4530-00(B/5)(255E)

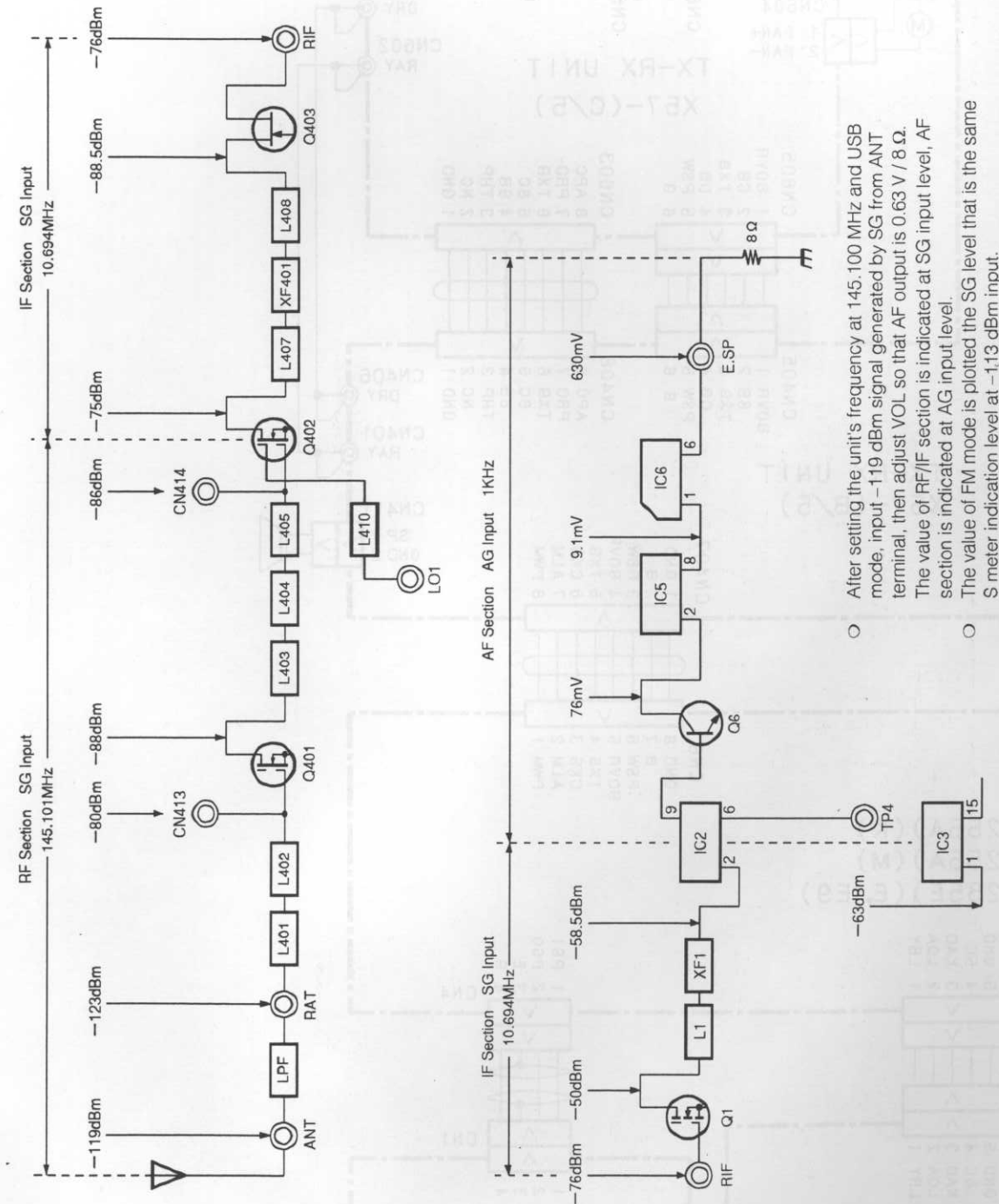




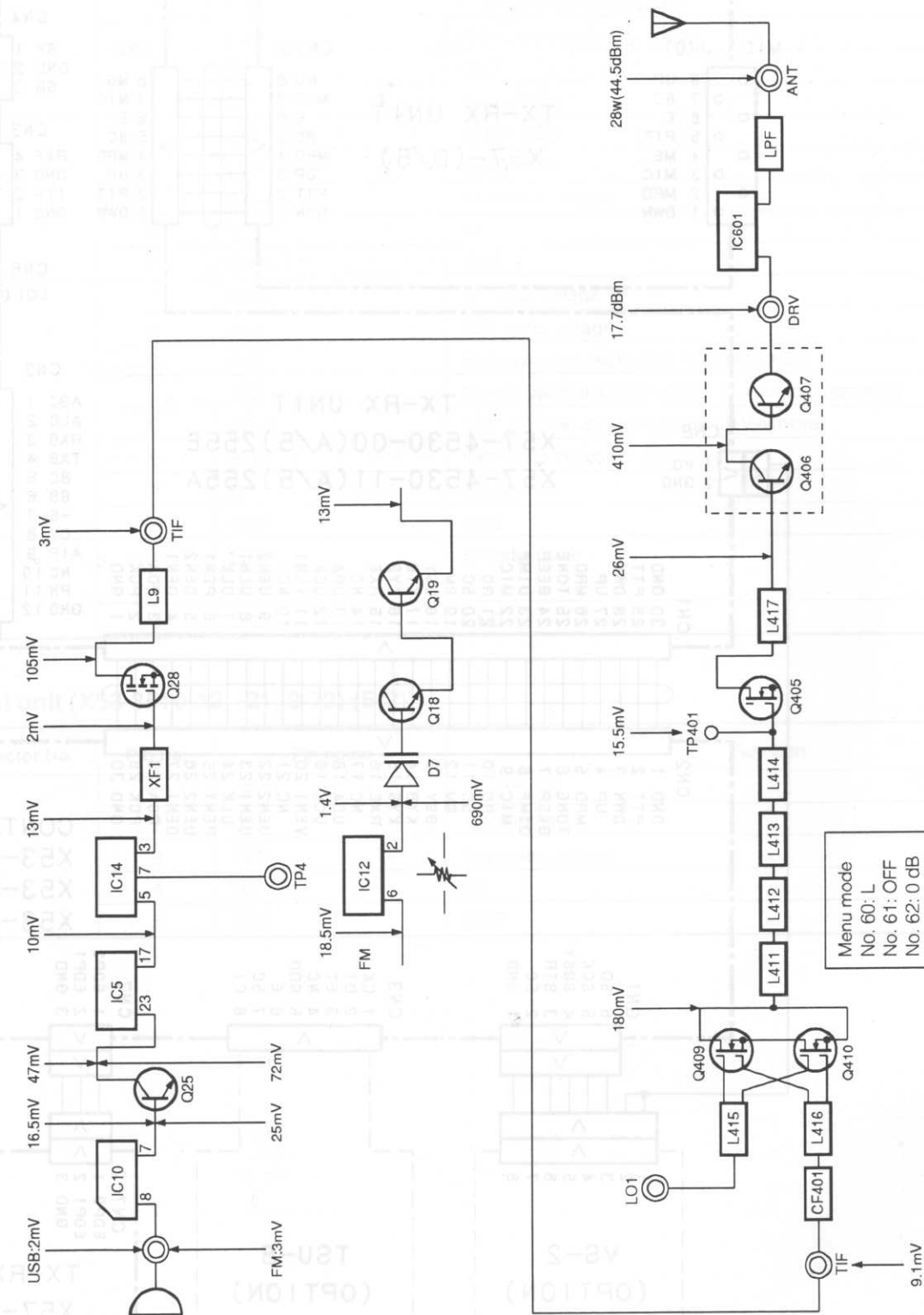
WIRING DIAGRAM



# LEVEL DIAGRAM



# LEVEL DIAGRAM



The transmitting frequency is 145.00 MHz. MIC input level is 2 mV (FM: 3 mV)  
The AF level is measured by an AF VTVM. The DRV and the FINAL level are measured by a power meter. Other levels are measured by an RF VTVM.

## DFK-7A (PANEL SEPARATE KIT) PG-5A (DATA CABLE)

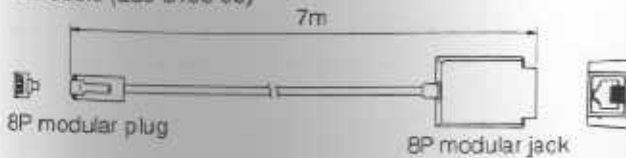
### DFK-7A External View



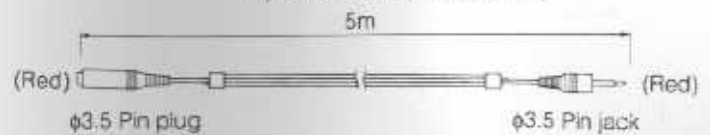
With screw set (N99-0378-05)  
With bracket (J29-0475-05)

### SPECIFICATION

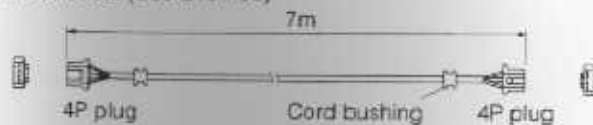
Mic cable (E30-3153-05)



Speaker cable (E30-3200-05)



Panel cable (E30-3154-05)

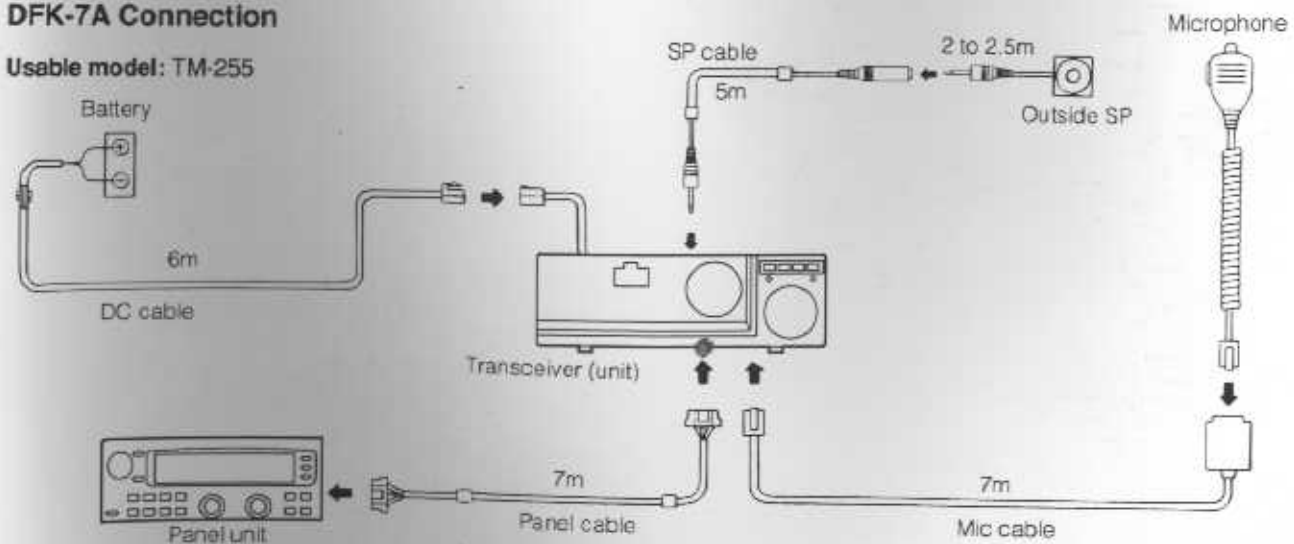


DC cable (E30-3199-05)

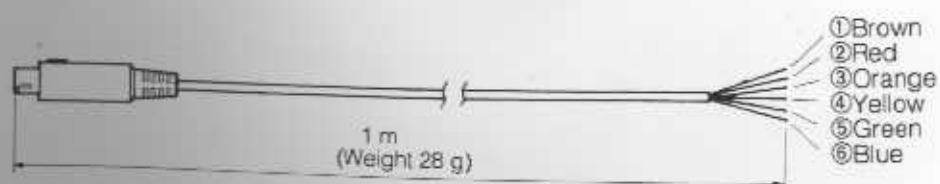


### DFK-7A Connection

Usable model: TM-255



### PG-5A External View





# TM-255A/E

## SPECIFICATIONS

### General

|                                                  | TM-255A                                                  | TM-255E                         |
|--------------------------------------------------|----------------------------------------------------------|---------------------------------|
| Frequency range                                  | 144 MHz - 148 MHz                                        | 144 MHz - 146 MHz               |
| Mode                                             | J3E (LSB/USB), A1A (CW), F3E (FM)                        |                                 |
| Number of memory channels                        | 100                                                      |                                 |
| Antenna impedance                                | 50 $\Omega$                                              |                                 |
| Usable temperature range                         | -20°C - +60°C                                            |                                 |
| Power supply                                     | DC 13.8 V $\pm$ 15%                                      |                                 |
| Grounding method                                 | Negative ground                                          |                                 |
| Current                                          | Transmit (max.)                                          | 13.0 A or less                  |
|                                                  | Receive (no signal)                                      | 0.9 A or less                   |
| Frequency stability                              | -20°C - +60°C                                            | Within $\pm 2.5 \times 10^{-6}$ |
|                                                  | -20°C - +60°C (FM transmit)                              | Within $\pm 10 \times 10^{-6}$  |
| Dimensions (W x H x D)<br>(projections included) | 180 mm x 60 mm x 215.5 mm<br>(180 mm x 68.5 mm x 250 mm) |                                 |
| Weight                                           | Approx. 2.7 kg                                           |                                 |

### Transmitter

|                                          | TM-255A                             | TM-255E      |
|------------------------------------------|-------------------------------------|--------------|
| Power output                             | High                                | Approx. 40 W |
|                                          | Low                                 | Approx. 5 W  |
| Modulation                               | SSB                                 | Balanced     |
|                                          | FM                                  | Reactance    |
| Spurious emissions                       | -60 dB or less                      |              |
| Carrier suppression                      | 40 dB or more                       |              |
| Unwanted sideband suppression            | 40 dB or more                       |              |
| Maximum frequency deviation (FM)         | $\pm 5$ kHz or less                 |              |
| Transmit frequency characteristics (SSB) | 400 Hz to 2600 Hz<br>(Within -6 dB) |              |
| Audio distortion (at 60 % modulation)    | 7% or less                          |              |
| Microphone impedance                     | 600 $\Omega$                        |              |

### Receiver

|                                      | TM-255A                    | TM-255E                           |
|--------------------------------------|----------------------------|-----------------------------------|
| Circuitry                            | SSB/CW                     | Single conversion superheterodyne |
|                                      | FM                         | Double conversion superheterodyne |
| Intermediate frequency               | 1st                        | 10.695 MHz                        |
|                                      | 2nd                        | 455 kHz (FM only)                 |
| Sensitivity                          | SSB, CW<br>(10 dB (S+N)/N) | 0.13 $\mu$ V or less              |
|                                      | FM (12 dB SINAD)           | 0.20 $\mu$ V or less              |
| Selectivity (-6 dB)                  | SSB, CW                    | 2.1 kHz or more                   |
|                                      | FM                         | 12 kHz or more                    |
| Selectivity (-60 dB)                 | SSB, CW                    | 4.8 kHz or less                   |
|                                      | FM                         | 28 kHz or less                    |
| Squelch sensitivity                  | SSB, CW                    | 0.13 $\mu$ V or less              |
|                                      | FM                         | 0.09 $\mu$ V or less              |
| Audio output (8 ohms, 5% distortion) | 2W or more                 |                                   |
| Audio output impedance               | 8 $\Omega$                 |                                   |
| RIT shift frequency range            | 10 Hz steps                | $\pm 1.1$ kHz or more             |
|                                      | 20 Hz steps                | $\pm 2.2$ kHz or more             |

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