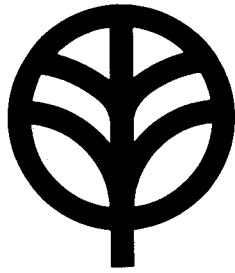


REVISED EDITION



KENWOOD

SERVICE MANUAL

Model TR-9000

PS-20 BO-9

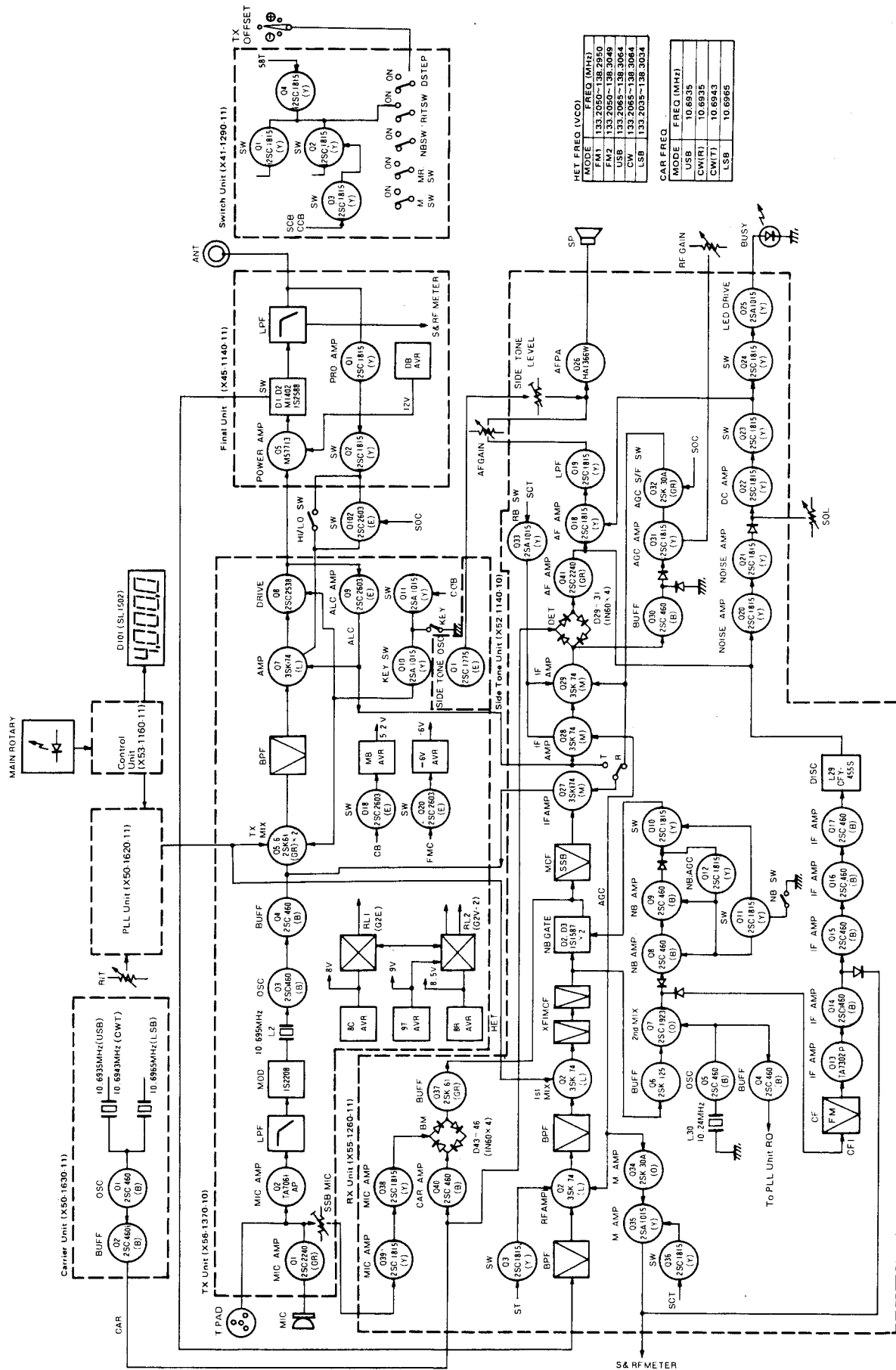


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2m ALL MODE TRANSCEIVER

BLOCK DIAGRAM (K)



| MET FREQ (VCO) | |
|----------------|-------------------|
| MODE | FREQ (MHZ) |
| FM1 | 133.2050~138.2050 |
| FM2 | 133.2050~138.3048 |
| USB | 133.2065~138.3064 |
| CW | 133.2065~138.3064 |
| LSB | 133.2035~138.3034 |

| CAR FREQ | |
|----------|------------|
| MODE | FREQ (MHZ) |
| USB | 10.6935 |
| CW(R) | 10.6935 |
| CW(T) | 10.6943 |
| LSB | 10.6965 |

CIRCUIT DESCRIPTION

RX Section

The front end unit is comprised of a dual gate MOS FET and helical resonator. The 2-stage MCF (Monolithic Crystal Filter) following the 1st mixer Q2 (3SK74) provides excellent 2-signal characteristic and high sensitivity.

The IF signal from the MCF is divided and applied to the SSB and FM circuits. The SSB signal passes through the NB (Noise Blanker) gate crystal filter (10H2.2SD) and is amplified by the transmit/receive IF amplifier, Q27, Q28 and 29, and is then demodulated into an audio signal by the product detector.

In the NB circuit, the signal from the MCF passes through the buffer amplifier Q6 and is fed to the 2nd mixer Q7. This signal is converted 455 kHz and the noise is amplified by two stages for switching the NB gate. The NB is front panel controlled.

In the AGC circuit, the signal from the final IF stage is detected and amplified, and the time constant is automatically select according to the mode of operation, FAST in CW mode and SLOW in SSB mode. The AGC signal is applied to the 3-stage IF amplifier, Q27, 28 and 29 (3SK74), and the RF amplifier Q1. The AGC voltage is also used for meter indication.

In the FM circuit, the signal from the ceramic filter CFW-455E is amplified by the IF amplifier Q13 (TA7302P). The auto scan stop signal is applied to the micro-computer from the squelch circuit.

The detected AF signal is amplified by the AF amplifier Q18, a 2SC1815(Y). The amplified signal passes through the LPF (Low Pass Filter) Q19, a 2SC1815(Y) and is power-amplified by Q26, (HA1366W) via the AF GAIN control to drive the speaker.

| Item | Symbol | Condition (Ta=25°C) | Rating | | | Unit |
|---------------------------------------|----------------|---|--------|------|------|------|
| | | | MIN | TYP | MAX | |
| DC current with no input | I _d | V _{in} = 0 | — | 30.0 | 60.0 | mA |
| Gain in voltage | G _v | V _{in} = -50 dB | 50.0 | 52.5 | 55.0 | dB |
| Output power | P _o | THD = 10% | 4.5 | 5.5 | — | W |
| Distortion | THD | P _o = 0.5W | — | — | 1.5 | % |
| Noise level | WBN | R _g = 10 kΩ, BW = 20 Hz ~ 20 kHz | — | — | 2.0 | mV |
| Hum ratio | HR | f = 500 Hz | 28.0 | — | — | dB |
| Voltage allowance with a shorted load | | f = 500 Hz, V _{in} = 10 mV, t = 5 sec. | 16.0 | — | — | V |

| Rank | 1 | 2 | 3 |
|---------------------|-------------|-------------|-------------|
| G _v (dB) | 50.0 ~ 52.2 | 51.4 ~ 53.6 | 52.8 ~ 55.0 |

Table 1. HA1366W (RX Unit : Q26)

| Item | Rating |
|--|------------------|
| Nominal center frequency | 455 kHz |
| 6 dB bandwidth | ±7.5 kHz or more |
| 50 dB bandwidth | ±15 kHz or less |
| Ripple (within 455 ±5 kHz) | 3 dB or less |
| Loss | 6 dB or less |
| Guaranteed attenuation (within 455 ±100 kHz) | 35 dB or more |
| Input and output impedance | 1.5 kΩ |

Table 2. Ceramic filter (L72-0316-05) CFW455E (RX Unit : CF1)

| Item | Rating |
|-------------------------------|--|
| Nominal center frequency (fo) | 10.695 MHz |
| Center frequency | Within fo ±200 Hz at 6 dB |
| Pass bandwidth | 2.2 kHz or less at 6 dB |
| Attenuation bandwidth | ±1.5 kHz or less at 20 dB ±2.4 kHz or less at 60 dB |
| Ripple | Less than 2 dB |
| Loss | Less than 5 dB |
| Guaranteed attenuation | 60 dB or more within ±40 kHz |
| Input and output impedance | 600Ω ±10%/15 pF ±10% |

Table 3. Crystal filter (L71-0215-05) 10H2.2SD (RX Unit : XF2)

| Item | Rating |
|-------------------------------|---|
| Nominal center frequency (fo) | 10.695 MHz |
| Pass bandwidth | ±7.5 kHz or more at 3 dB |
| Attenuation bandwidth | ±25 kHz or less at 40 dB ±45 kHz or less at 60 dB |
| Guaranteed attenuation | 1. 70 dB or more within ±1 MHz 2. Spurious level = 40 dB or more at fo ~ fo + 500 kHz 3. Spurious level = 80 dB or more at fo - (910 kHz ±10 kHz) |
| Ripple Loss | 1.0 dB or less 1.5 dB or less |
| Impedance | 3 kΩ/0 pF |

Table 4. MCF (L71-0216-05) (RX Unit : XF1)

TX Section

The microphone signal is amplified by the SSB/FM microphone amplifier Q1, a 2SC2240 (GR). This signal is then divided and fed to the SSB and FM circuits. SSB signal passes through the MIC GAIN control and is fed to the RX

CIRCUIT DESCRIPTION

unit where the signal is amplified by two stages and is then applied to the balanced modulator together with the carrier signal (10.695 MHz). The DSB (Double Side Band) signal from the buffer amplifier Q37, a 2SK61 (GR) is fed to the transmit/receive crystal filter to produce an SSB signal. This signal is amplified and applied to the transmit balanced mixer, Q5 and Q6, 2SK61 (GR), in the TX unit. The FM signal is limiter-amplified by Q2 (TA7061AP) and is directly modulated by a 1S2208 diode. The modulated signal is applied to the mixer through the oscillator circuit Q3 (10.695 MHz) and buffer amplifier Q4 a 2SC460 (B). The remaining circuits are common to all the operating modes. The 4-stage BPF (Band Pass Filter) next to the mixer is used to eliminate unwanted spurious signals. After filtering, the signal is amplified by Q7, a 3SK74 (L) to drive the final unit via Q8 (2SC2538).

In the ALC circuit, the drive output from Q8 is amplified by Q9, a 2SC2603 (E) and is applied to the 2nd gates of the predriver Q7 and IF amplifier Q27.

The HI/LOW selection and protection in the FM and CW modes is accomplished by changing the source voltage of Q7, the predriver. In CW mode, the keying circuit controls the transmit balanced mixer B+ line and the base circuit of the predriver Q8 by the switching action of Q10, a 2SC1015 (Y). This signal, fed to the final unit, is power-amplified by the power module (M57713), and is then output to the antenna through, the LPF (Low Pass Filter). The M57713 is designed to provide excellent power, idle current, IMD and "f" characteristics, thus insuring stabilized performance.

| Item | Symbol | Tc (°C) | Rating |
|----------------------------|---------|---------|--------------|
| Operating voltage | Vcc | 25 | 17V |
| DC current | Icc | 25 | 6A |
| Operating case temperature | Tc (op) | — | -30 ~ +110°C |
| Storage temperature | Tstg | — | -40 ~ +110°C |
| Base bias voltage | Vbb | 25 | 10V |

Table 5. Power module (V30-1131-06) M57713 MAX Rating (Final Unit : Q5)

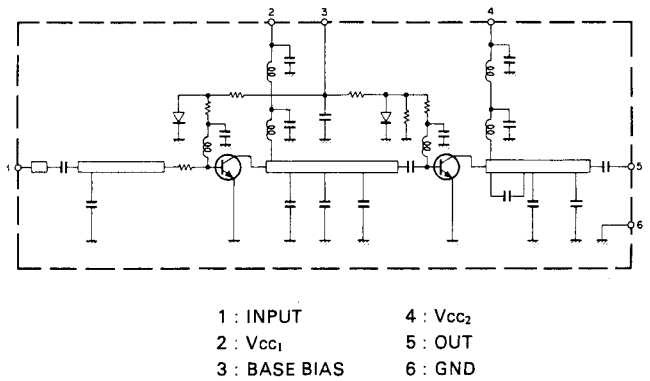
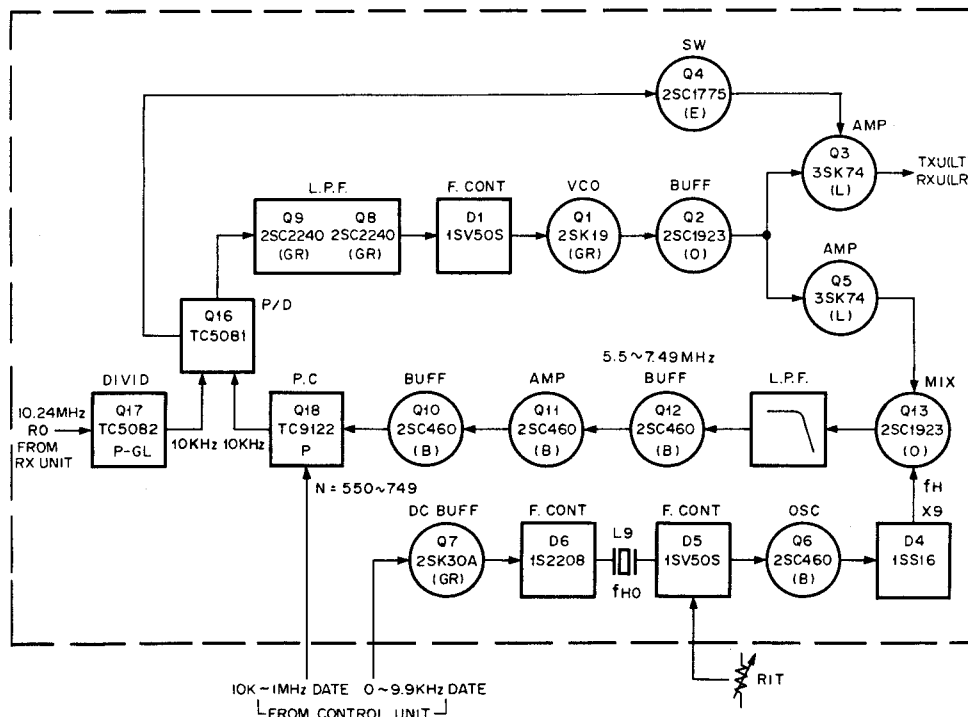


Fig. 1 Power module (V30-1131-06) Equivalent Circuit

PLL Unit (X50-1620-11)



VCO FREQ

| MODE | FREQ (MHz) |
|------|------------------------|
| FM1 | 133.305 ~ 135.285 |
| FM2 | 133.305 ~ 135.3049 |
| USB | 133.3065 |
| CW | ~ 135.3064 |
| LSB | 133.3035 ~ 135.3034 |

HET OSC FREQ fH0

| MODE | FREQ (MHz) |
|------|------------------------|
| FM1 | 14.20055 |
| FM2 | 14.20055 ~ 14.20165 |
| USB | 14.20072 |
| CW | ~ 14.20182 |
| LSB | 14.20039 ~ 14.20149 |

PLL HET FREQ fH

| MODE | FREQ (MHz) |
|------|------------------------|
| FM1 | 127.805 |
| FM2 | 127.805 ~ 127.8149 |
| USB | 127.8065 |
| CW | ~ 127.8164 |
| LSB | 127.8035 ~ 127.8134 |

Fig. 2 PLL Unit Block Diagram

CIRCUIT DESCRIPTION

PLL Unit (X50-1620-11)

Fig. 2 shows a basic block diagram of PLL circuit. The signal from the VCO (Q1, a 2SK19 (GR)) passes through the buffer amplifier formed by Q2, a 2SC1923 (O) and Q5, a 3SK74 (L), and is then mixed with the HET (Heterodyne) signal by Q13, a 2SC1923 (O) to produce 5.5 ~ 7.49 MHz signal. This signal is amplified by Q10, 11 and Q12, 2SC460 (B) and is frequency-divided by Q18 (TC9122P) according to the BCD data (MHz, 100 kHz and 10 kHz order) from the control unit, to produce 10 kHz comparison signal. Simultaneously, the 10.24 MHz signal from the RX unit is frequency-divided to 1/1024 by Q17 (TC5082P-GL) to produce 10 kHz reference signal. These signals are phase-compared by Q16 (TC5081P) and fed to the LPF formed by Q8 and Q9, and the resulting control voltage is applied to the VCO vari-cap tuning diode.

The 14.2 MHz VCO HET signal is generated by crystal oscillator Q6, a 2SC460 (B), and is then multiplied 9 times by D4 (1SS16) to produce a 127.8 MHz signal. This signal is then applied to the mixer, Q13, a 2SC1923 (O).

The crystal oscillator circuit has two vari-cap diodes to control frequency. A DC signal, corresponding to 0 ~ 9.9 kHz produced by the control unit (X53-1160-00), is voltage converted by Q7, a 2SK30A (GR) and is fed to the vari-cap D6 (1S2208) to control the frequency. The other vari-cap D5 (1SV50S) is used to shift the frequency ($f_{USB} = f_{FM} + 1.5$ kHz, $f_{LSB} = f_{FM} - 1.5$ kHz) according to the operating mode and to afford RIT (Receive Incremental Tuning) frequency.

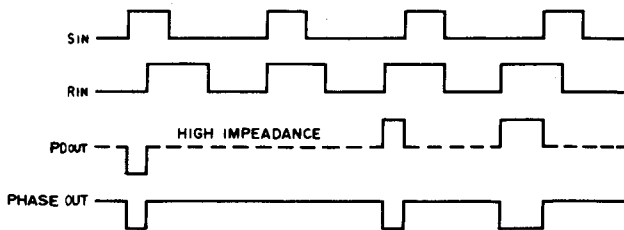


Fig. 3 TC5081P (PLL Unit : Q16)
Phase comparator timing chart

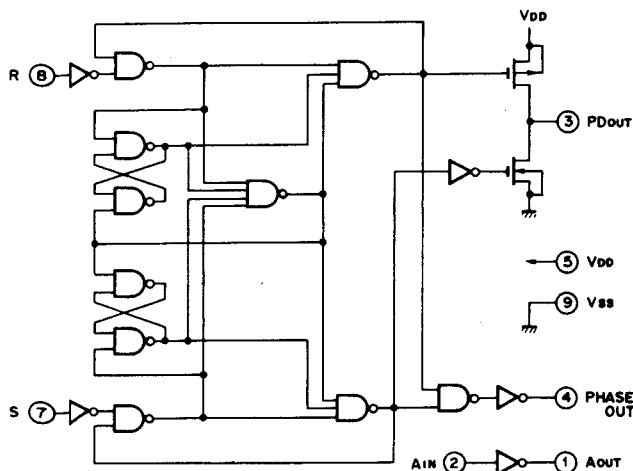


Fig. 4 TC5081P (PLL Unit : Q16)

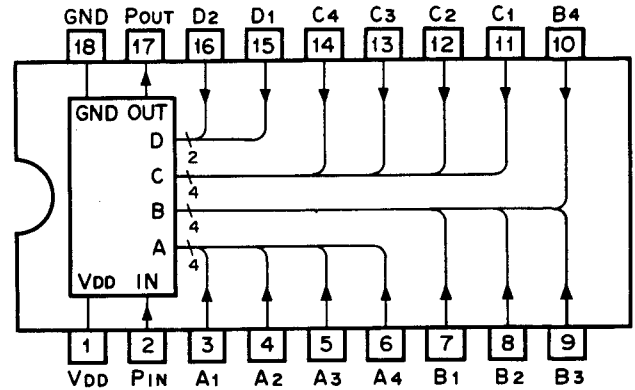


Fig. 5 TC9122P (PLL Unit : Q18)

| Symbol | Name | Content and operation | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Pin | Programmable counter input terminal | Programmable counter input terminal to which the signal to be divided is input. | Built-in bias circuit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pout | Programmable counter output terminal | Programmable counter output terminal. Output is 1/N of the input frequency. The output pulse width equals 5 bit of the input. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A ₁ ~A ₄ B ₁ ~B ₄ C ₁ ~C ₄ D ₁ ~D ₄ | Program input terminals × 1 × 10 × 100 × 1000 | Terminal to set the dividing ratio. The following input combination is prohibited. | Built-in pull-down resistor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <tr> <td>A₁</td><td>A₂</td><td>A₃</td><td>A₄</td><td>B₁</td><td>B₂</td><td>B₃</td><td>B₄</td><td>C₁</td><td>C₂</td><td>C₃</td><td>C₄</td><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td> </tr> <tr> <td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> </table> | A ₁ | A ₂ | A ₃ | A ₄ | B ₁ | B ₂ | B ₃ | B ₄ | C ₁ | C ₂ | C ₃ | C ₄ | D ₁ | D ₂ | D ₃ | D ₄ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A ₁ | A ₂ | A ₃ | A ₄ | B ₁ | B ₂ | B ₃ | B ₄ | C ₁ | C ₂ | C ₃ | C ₄ | D ₁ | D ₂ | D ₃ | D ₄ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 6. Functions of TC 9122P (PLL Unit : Q18)

CONTROL Unit (X53-1160-11)

Fig. 8 shows the basic configuration of control unit. Utilizing the micro-computer to its full advantage, this control circuit has been designed for a minimum of peripheral control circuits.

- Indicator
The indicator is a dynamic lighting (scanning) type, using 5-digit LED's. The BCD code data available at the micro-computer D port (pins 8-11) is converted into 7-segment data by the decoder driver Q18 (TC522BP), so that transistors Q5-9, 2SC1815 (Y) are switched (scanned) in sequence by the digit signal from the E and F ports (pins 12-16) and light the LEDs.
- PLL Data Output
The PLL MHz, 100 kHz and 10 kHz order data outputs are available directly from the BCD code at the G, H and I ports (pins 22-32). For the 1 kHz and 100 Hz order data, only the indicator data (1 kHz and 100 Hz order) are stored in the dual latch, Q16 (MN1201A) to produce the data for each digit.
This 2-digit data is converted to a corresponding DC voltage by the D/A converter, a combination of solid resistors (R6-20).
The MHz, 100 kHz and 10 kHz order data are 550 at 4.00, 650 at 5.00 and 749 at 5.99, respectively (3-digit BCD code).
- Reset Circuit
The reset circuit is a voltage detecting type. When the source voltage of the micro-computer is increased and exceeds about 3.5V, a current flows into D20, causing Q11,

CIRCUIT DESCRIPTION

a 2SC1815 (Y) to turn ON, which in turn sets the collector of Q10, a 2SC1815 (Y) high, and a reset pulse is input to the micro-computer through the CR differentiation circuit.

• Encoder and UP/DOWN Inputs

Fig. 7 shows the output signal from the encoder # (50 steps per rotation). This signal is used to discriminate UP and DOWN counts within the micro-computer. The UP count starts when U/D is H level at the down edge of the clock signal, and the DOWN count when U/D is L level.

• Tone Oscillator Circuit

When the output for the micro-computer tone oscillator is H level, Q12, a 2SC1815 (Y) is energized, allowing a current to flow into the piezo-electric buzzer oscillator, Q13, a 2SC1815 (Y), producing a tone.

• Switching Circuit

Each of the switches in the control unit is used to select the control pulses output from the micro-computer. Fig. 8 shows a block diagram of the control unit. For actual operation of this unit, the micro-computer input and output terminals must be connected. The diodes (see circuit diagram) are used to prevent control pulses from entering the wrong circuits.

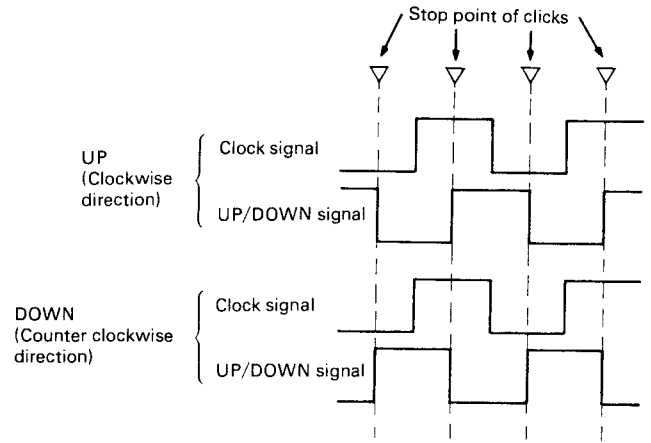


Fig. 6

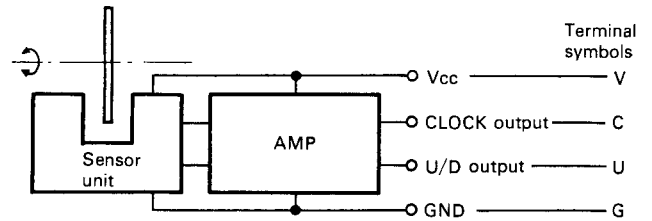


Fig. 7 Rotary encoder (W02-0308-05)

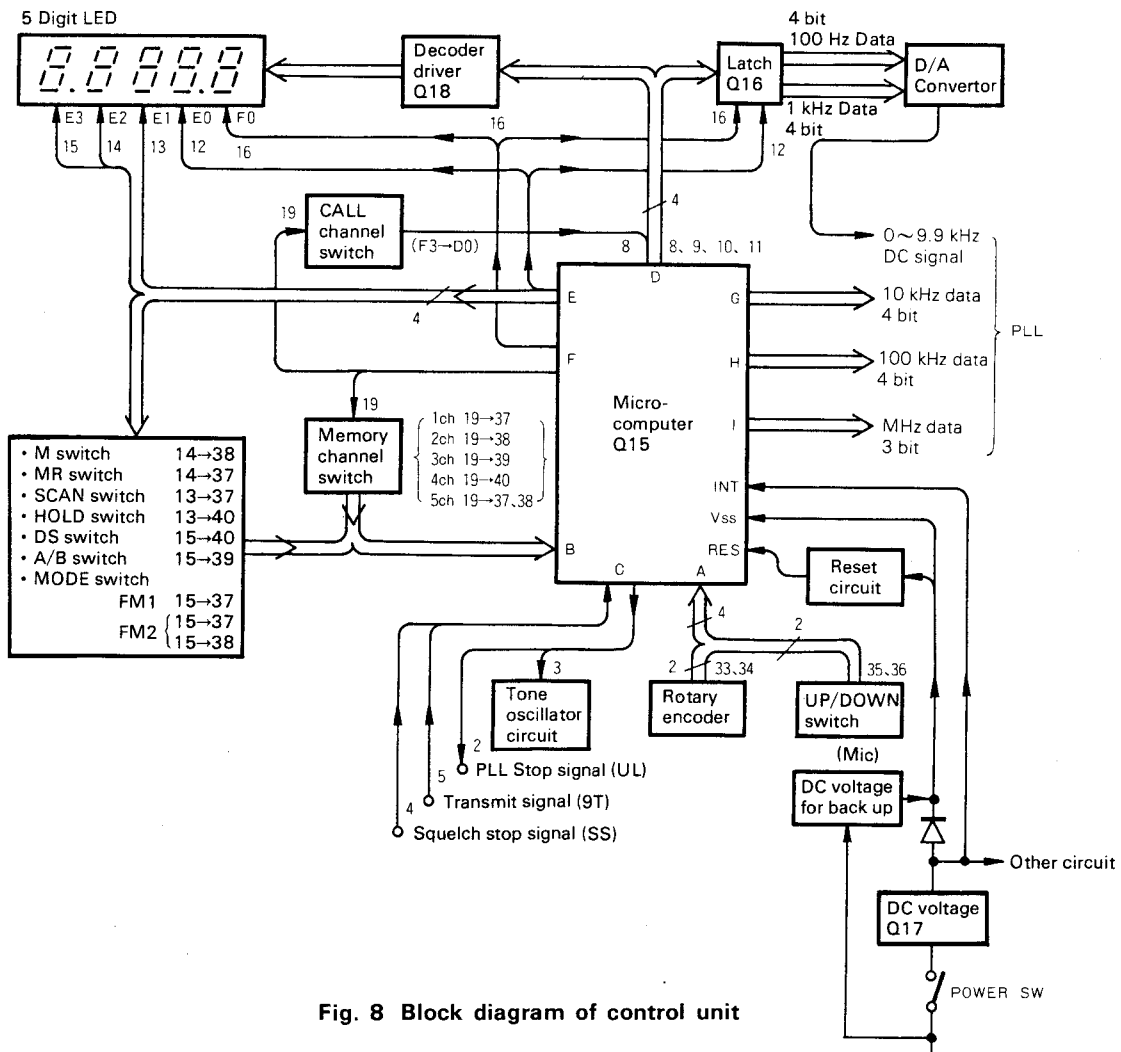


Fig. 8 Block diagram of control unit

CIRCUIT DESCRIPTION

● Scan Circuit

This circuit is active when the SCAN switch is depressed. During operation, counting and all other functions are effected within the micro-computer. The scan stops by pressing the HOLD switch or by setting the transmit signal (9T) to H level. The scan stops for a brief period of time when the squelch stop signal (SS terminal) becomes H level. This signal is used to stop the scan in 10 kHz or 20 kHz step. The changes in the 10 kHz PLL data each are differentiated as is or are inverted by Q19, 20 to obtain OR data so that pulses are output each time the data is changed. These pulses are applied to the micro-computer scan stop terminal (4) to slow down the scan operation.

● Control Power Circuit

The indicator operates on 5V available at transistor Q14, a 2SC496 (Y). The micro-computer operates on 6V supplied by the AVR (Automatic Voltage Regulator) IC, Q17 (NJM78L06K), supplied through a reverse current blocking diode, D11.

● Backup Circuit

When the POWER SW is turned OFF, the micro-computer operates from the backup power source when the micro-computer INT terminal (pin 6) is at L level. At this time, all

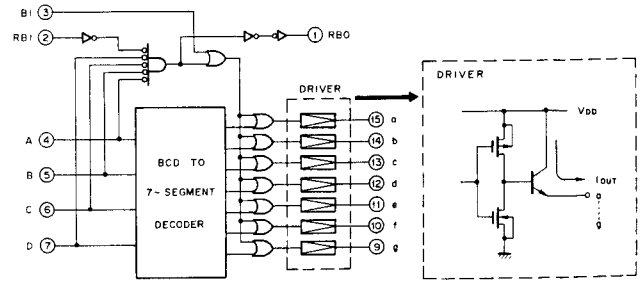


Fig. 9 TC5022BP (Control unit : Q18)

| INPUT | | OUTPUT | | | | | | | | | | | |
|-------|-----|--------|---|---|---|---|---|---|---|---|---|---|---|
| BI | RBT | A | B | C | D | a | b | c | d | e | f | g | |
| H | * | * | * | * | * | L | L | L | L | L | L | L | ☆ |
| L | H | L | L | L | L | L | L | L | L | L | L | L | H |
| L | L | L | L | L | L | H | H | H | H | H | H | L | L |
| L | * | H | L | L | L | L | H | H | L | L | L | L | L |
| L | * | L | H | L | L | H | H | L | H | H | L | H | L |
| L | * | H | H | L | L | H | H | L | H | L | L | H | L |
| L | * | L | L | H | L | L | H | H | L | L | H | H | L |
| L | * | H | L | H | L | H | L | H | H | L | H | H | L |
| L | * | L | H | H | L | H | L | H | H | L | H | H | L |
| L | * | H | H | H | L | H | H | L | L | L | H | L | L |
| L | * | L | L | L | L | H | H | H | H | H | H | H | L |
| L | * | H | L | L | H | H | H | H | H | L | H | H | L |
| L | * | L | H | L | H | H | H | H | H | L | H | L | L |
| L | * | H | H | L | H | L | H | H | L | L | L | L | L |
| L | * | L | L | L | H | H | H | L | L | L | L | H | L |
| L | * | H | L | H | H | H | H | H | L | L | L | H | L |
| L | * | L | H | H | H | L | H | H | L | L | H | H | L |
| L | * | H | H | H | H | H | L | H | L | H | H | L | L |

Table 8 Truth table of TC5022BP (Control unit : Q18) ☆: Undetermined * : Don't Care

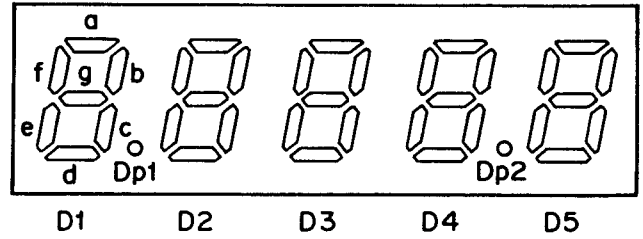
| Pin No. | Pin | Input signal | Output signal | Description | Pulse |
|---------|------|--------------|---------------|---|-------|
| 1 | CL1 | | | Clock signal 400 kHz | |
| 2 | PC0 | ○ | | Normally L, H at prohibited transmitting | |
| 3 | PC1 | ○ | | Normally L, H at Tone ON | |
| 4 | PC2 | ○ | | Squelch signal, H at Busy stop | |
| 5 | PC3 | ○ | | Normally L, H at transmit | |
| 6 | INT | ○ | | Normally H | |
| 7 | RES | ○ | | H at reset | |
| 8 | PD0 | ○ | ○ | Call channel input signal. 100 Hz, 1 kHz order data output. | ○ |
| 9 | PD1 | | ○ | | ○ |
| 10 | PD2 | | ○ | | ○ |
| 11 | PD3 | | ○ | | ○ |
| 12 | PE0 | | ○ | 1 kHz order data output, latch pulse | ○ |
| 13 | PE1 | | ○ | 10 kHz order data output SCAN, HOLD output | ○ |
| 14 | PE2 | | ○ | 100 kHz order data output M, MR output | ○ |
| 15 | PE3 | | ○ | 1 MHz order data output DS, A/B, MODE output | ○ |
| 16 | PF0 | | ○ | 100 Hz order data output Latch pulse | ○ |
| 17 | PF1 | | ○ | Not used (open) | |
| 18 | PF2 | | ○ | Not used (open) | |
| 19 | PF3 | | ○ | CALL, MEMORY output | ○ |
| 20 | TEST | ○ | | Normally H | |
| 21 | Vcc | ○ | | 5V DC supply | |

Table 7. Functions of μPD650C-021 (Control Unit: Q15)

| Pin No. | Pin | Input signal | Output signal | Description | Pulse | |
|---------|-----|--------------|---------------|---|---------------------------------------|-----------------------------------|
| 22 | PG0 | | ○ | A } 10 kHz order data output for PLL | | |
| 23 | PG1 | | ○ | | B } 100 kHz order data output for PLL | |
| 24 | PG2 | | ○ | | | C } MHz order data output for PLL |
| 25 | PG3 | | ○ | | D } MHz order data output for PLL | |
| 26 | PH0 | | ○ | A } MHz order data output for PLL | | |
| 27 | PH1 | | ○ | | B } MHz order data output for PLL | |
| 28 | PH2 | | ○ | | | C } MHz order data output for PLL |
| 29 | PH3 | | ○ | | D } MHz order data output for PLL | |
| 30 | PI0 | | ○ | A } MHz order data output for PLL | | |
| 31 | PI1 | | ○ | | B } MHz order data output for PLL | |
| 32 | PI2 | | ○ | | | C } MHz order data output for PLL |
| 33 | PA0 | ○ | | Encoder input, clock | | |
| 34 | PA1 | ○ | | Encoder input, UP/DOWN | | |
| 35 | PA2 | ○ | | Normally H, L at MIC UP operation | | |
| 36 | PA3 | ○ | | Normally H, L at MIC DOWN operation | | |
| 37 | PB0 | ○ | | MR, SCAN, MODE-FM1, MEMORY 1, 5CH pulse input | ○ | |
| 38 | PB1 | ○ | | M, MODE-FM2, MEMORY 2, 5CH pulse input | ○ | |
| 39 | PB2 | ○ | | VFO-B, MEMORY 3CH pulse input | ○ | |
| 40 | PB3 | ○ | | SEARCH, MEMORY, 4CH pulse input | ○ | |
| 41 | Vss | | | Grounded | | |
| 42 | CLO | | | Clock signal 400 kHz | | |

CIRCUIT DESCRIPTION

output ports become L level, minimizing power consumption. When the POWER SW is turned ON, the INT terminal and UP/DOWN input terminal become H level, and the micro-computer resumes at its original condition. The input port B (pins 37-40) is momentarily set to L level by Q2 and Q4 to insure backup operation even when other switches remain ON. Backup operation is also assured during scan operation, since the scan is stopped by Q3 when the POWER SW is turned OFF.



| Symbol | Pin | Description |
|-----------|---------|--|
| IN1 ~ IN4 | Input | 4-bit input terminal |
| AO1 ~ AO4 | Output | Output terminal for data latched by clock pulse CKA |
| BO1 ~ BO4 | Output | Output terminal for data latched by clock pulse CKB |
| CKA | Clock A | Clock signal terminal for latching 4-bit input signal in 4-bit flip flop A. Input signal is latched at the rising of clock signal. |
| CKB | Clock B | Clock signal terminal for latching 4-bit input signal in 4-bit flip flop B. Input signal is latched at the rising of clock signal. |

| Pin No. | Address | Pin No. | Address |
|---------|-----------------|---------|---------|
| 1 | D5, Dp2 Cathode | 9 | e Anode |
| 2 | D4 Cathode | 10 | d Anode |
| 3 | D3 Cathode | 11 | c Anode |
| 4 | D2 Cathode | 12 | g Anode |
| 5 | D1, Dp1 Cathode | 13 | b Anode |
| 6 | Open | 14 | a Anode |
| 7 | Dp1, Dp2 Anode | 15 | f Anode |
| 8 | Dp1, Dp2 Anode | | |

Table 9. Function of MN 1201A (Control Unit : Q16)

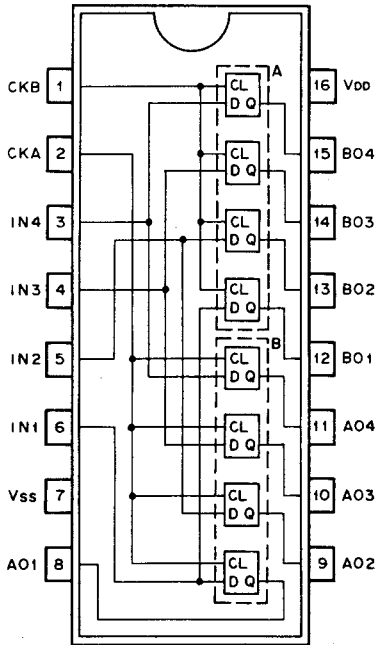


Fig. 10 MN1201A (Control unit : Q16)

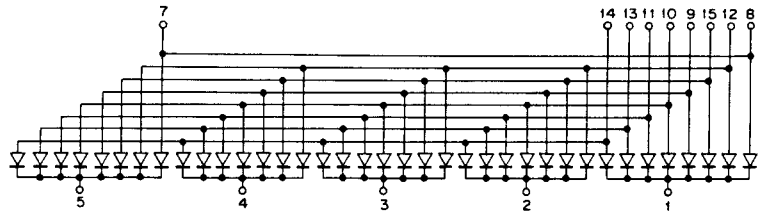
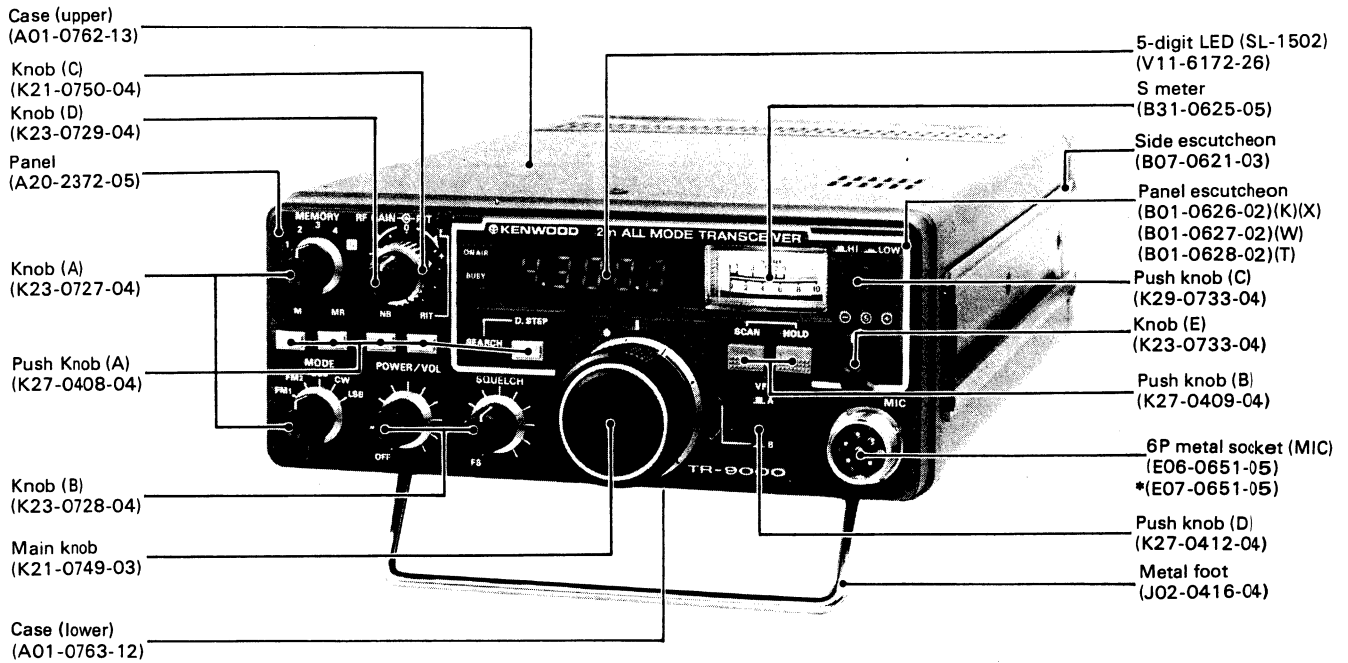


Fig. 11 5 digit LED D101 : SL1502

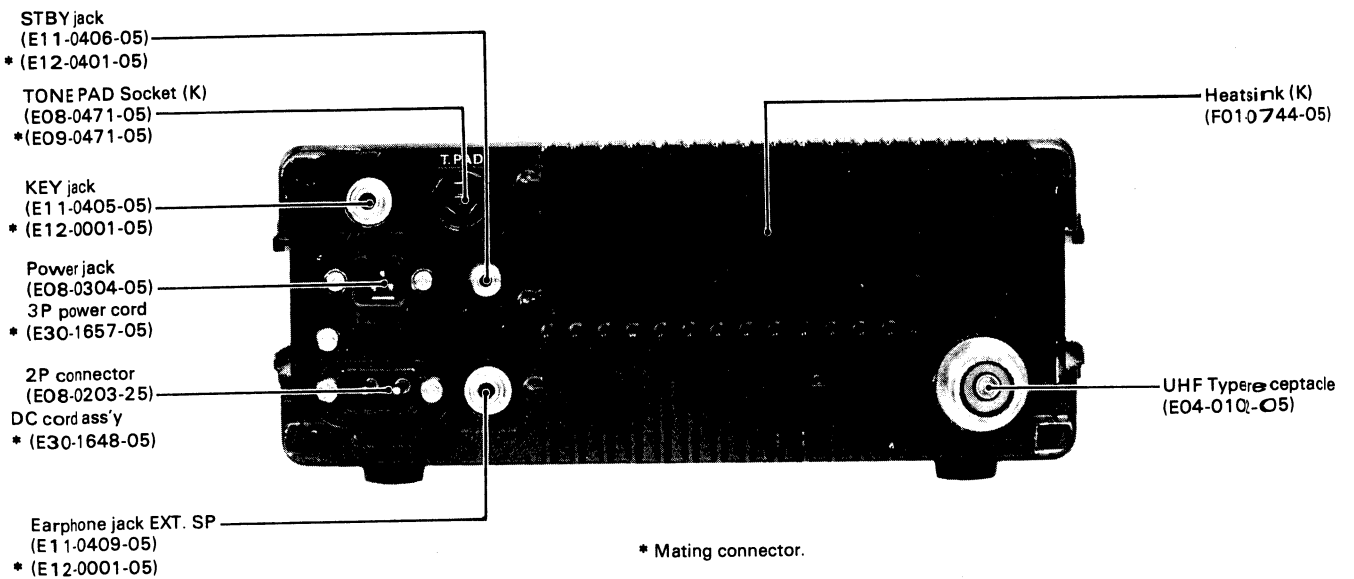
OUTSIDE VIEWS

< FRONT PANEL > TR-9000 (K)



* Mating connector

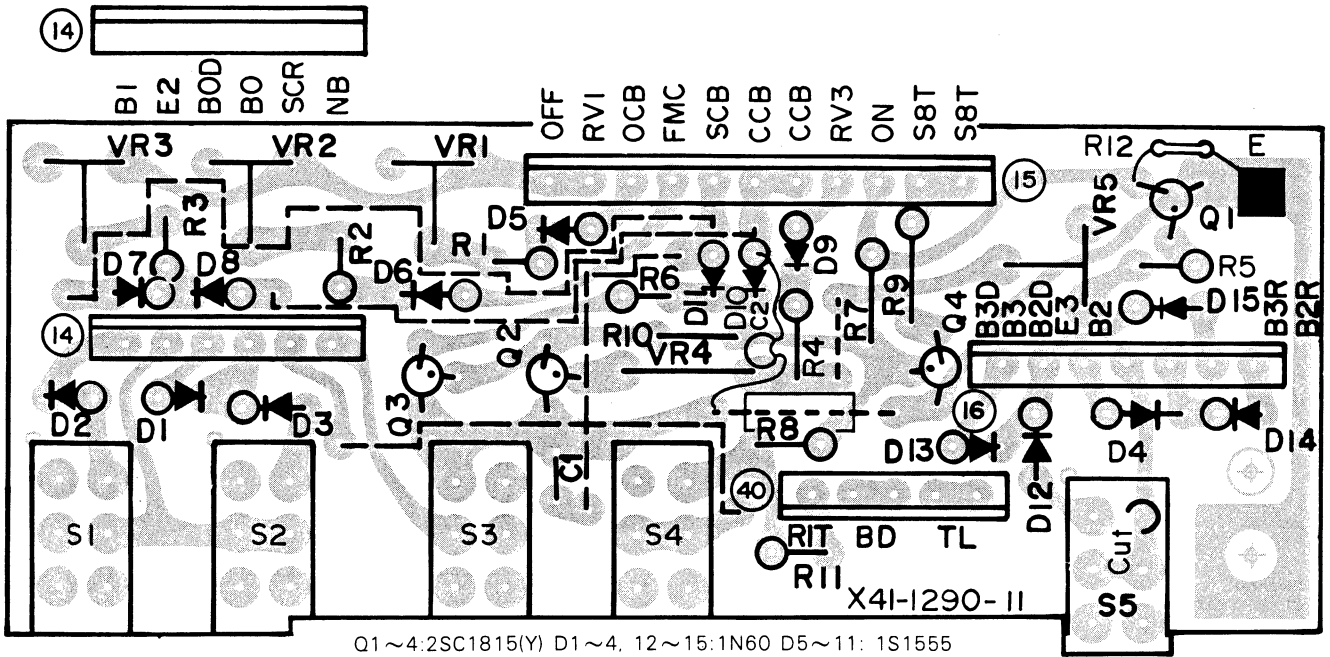
< REAR PANEL > TR-9000 (K)



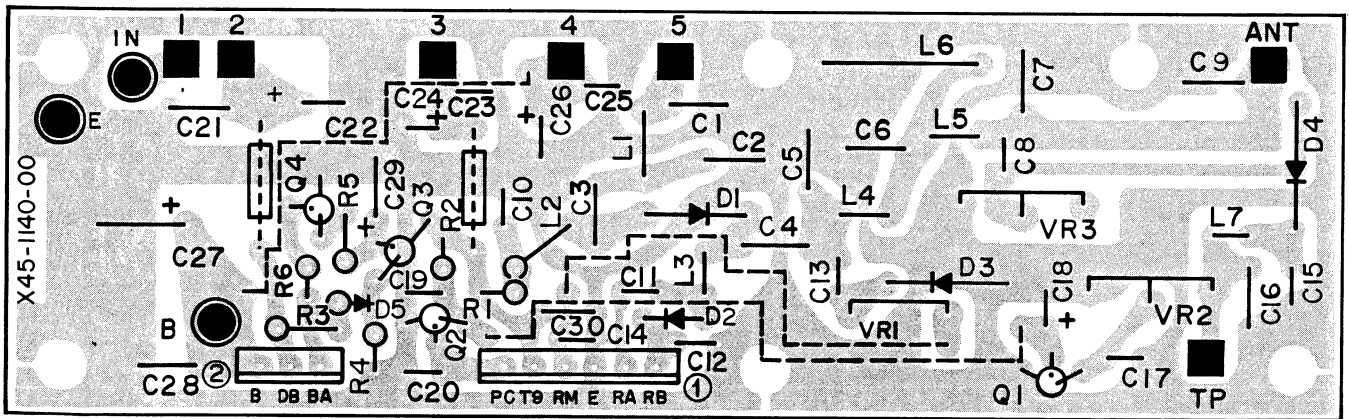
* Mating connector.

PC BOARD VIEWS

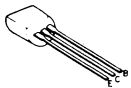
▼ SWITCH UNIT (X41-1290-11) PARTS LIST: Page 19



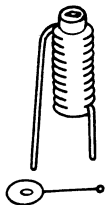
▼ FINAL UNIT (X45-1140-00) (W)(T)(X) PARTS LIST: Page 20 (X45-1140-11) (K)



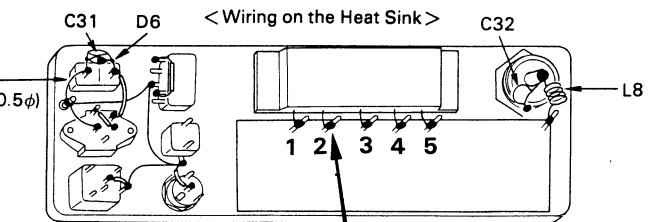
2SA 1015(Y)
2SC 1815(Y)



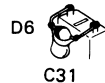
< Attachment direction of L2 >



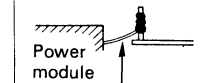
0.8φ wire
(others are 0.5φ)



< Attachment method of D6 and C31 >



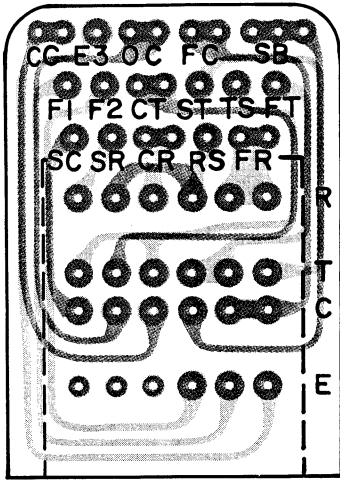
< Attachment method of C32 and L8 >



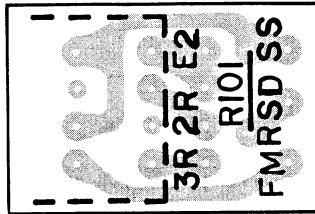
Solder the leads of the power module without applying stress to them.

PC BOARD VIEWS

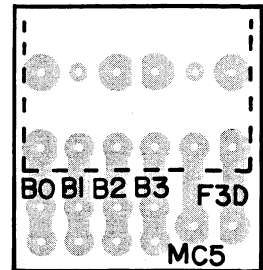
▼ MODE (J25-2714-04)



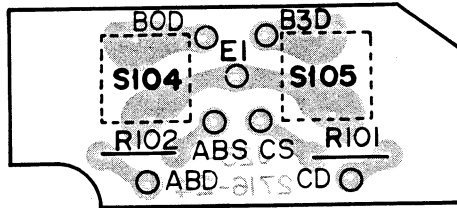
▼ TX OFF SET (J25-2744-04)



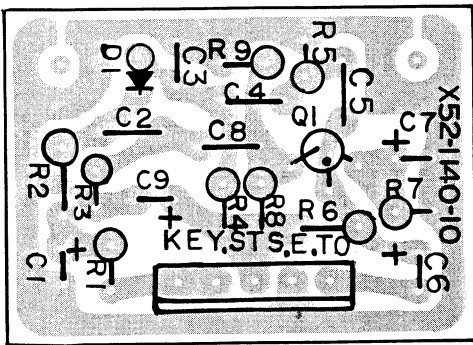
▼ MEMORY (J25-2715-04)



▼ SCAN (J25-2716-24)



▼ SIDE TONE UNIT (X52-1140-10)
PARTS LIST: Page 21

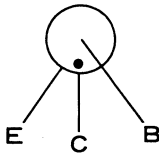


Q1: 2SC1775(E) D1: 1S1555

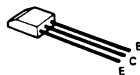
NOTES:

All printed circuit views are component side.

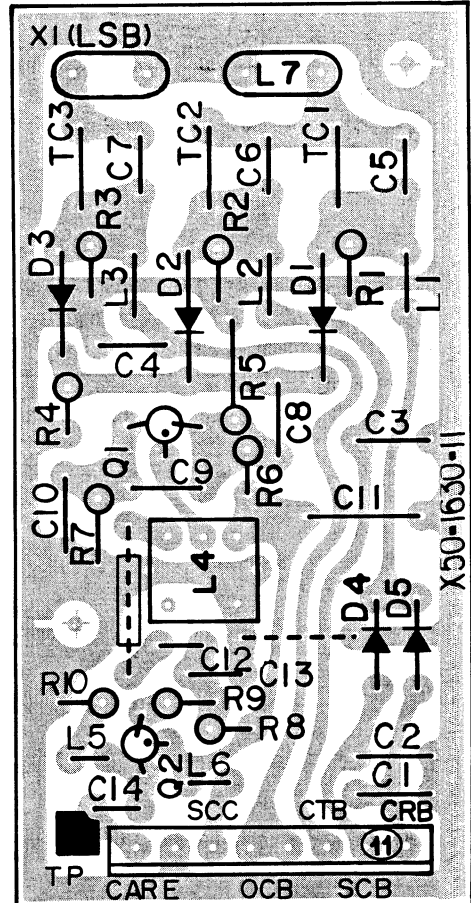
[Transistor Terminal Indication]



2SC460(B)



▼ CAR UNIT (X50-1630-11)
PARTS LIST: Page 21

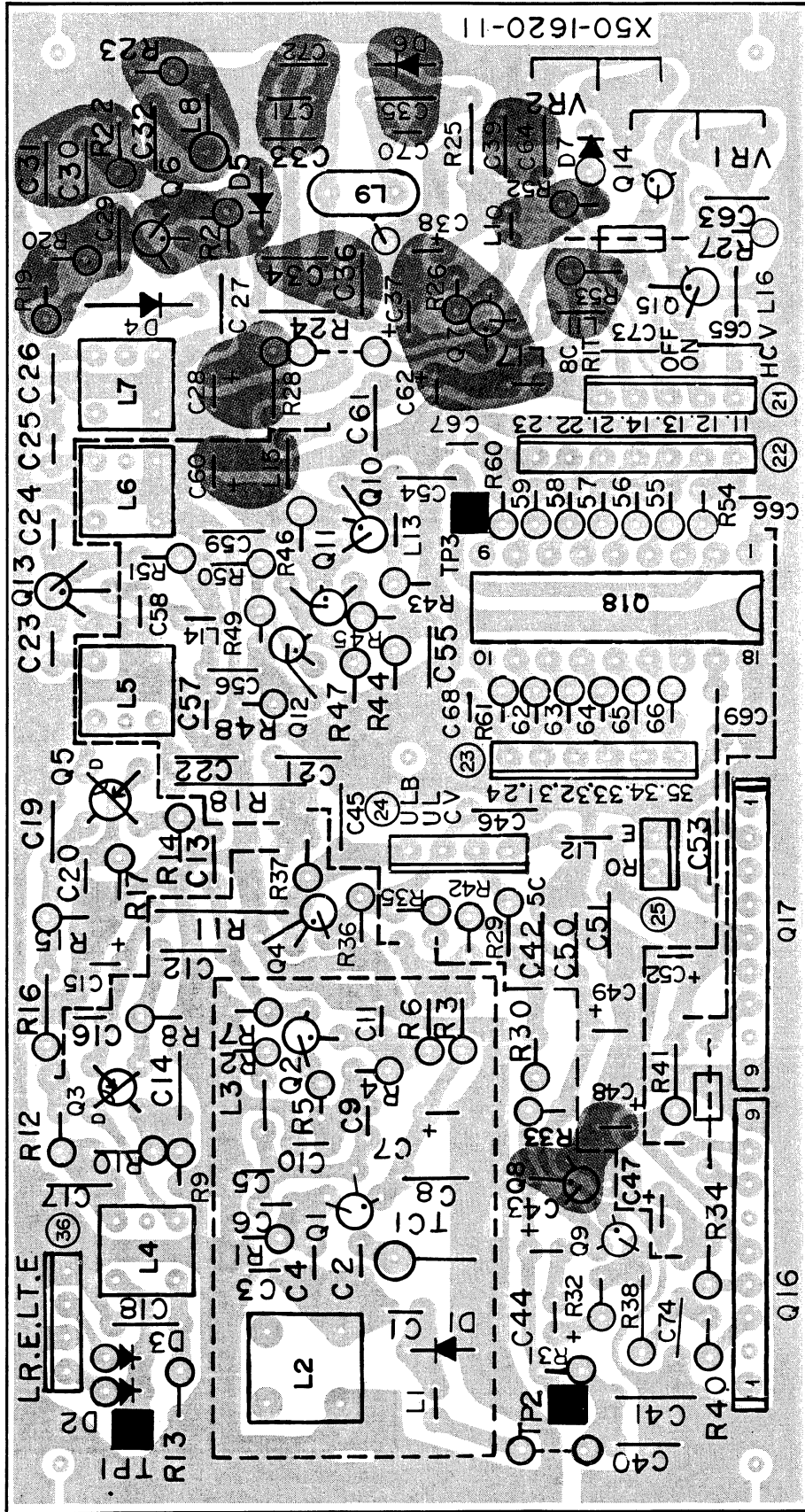


Q1, 2: 2SC460(B) D1~5: 1S1555

PC BOARD VIEW

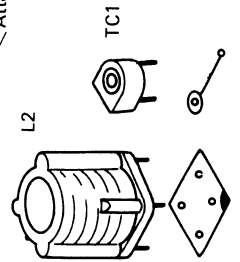
▲ PLL UNIT (X50-1620-00)(W)(T) (X50-1620-11)(K)(X)

- Fix this portion in place with silicone.
- Be careful not put any silicone into the core of the coil.

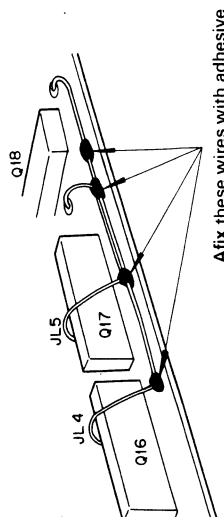
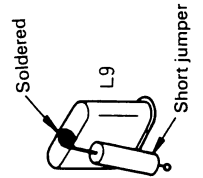


Q1:2SK19(GR) Q2:13:2SC1923(O) Q3:5:3SK74(L) Q4:2SC1775(E) Q6:10-12:2SC460(B) Q7:2SK30A(GR) Q8:9:2SC2240(GR)
 Q14:15:2SC1815(Y) Q16:TC5081P Q17:TC5082P-GL Q18:TC9122P
 D1:5:1SV50S D2:3:1S2588 D4:1S516 D6:1S2208 D7:1S1555

< Attachment direction of TC1 and L2 >



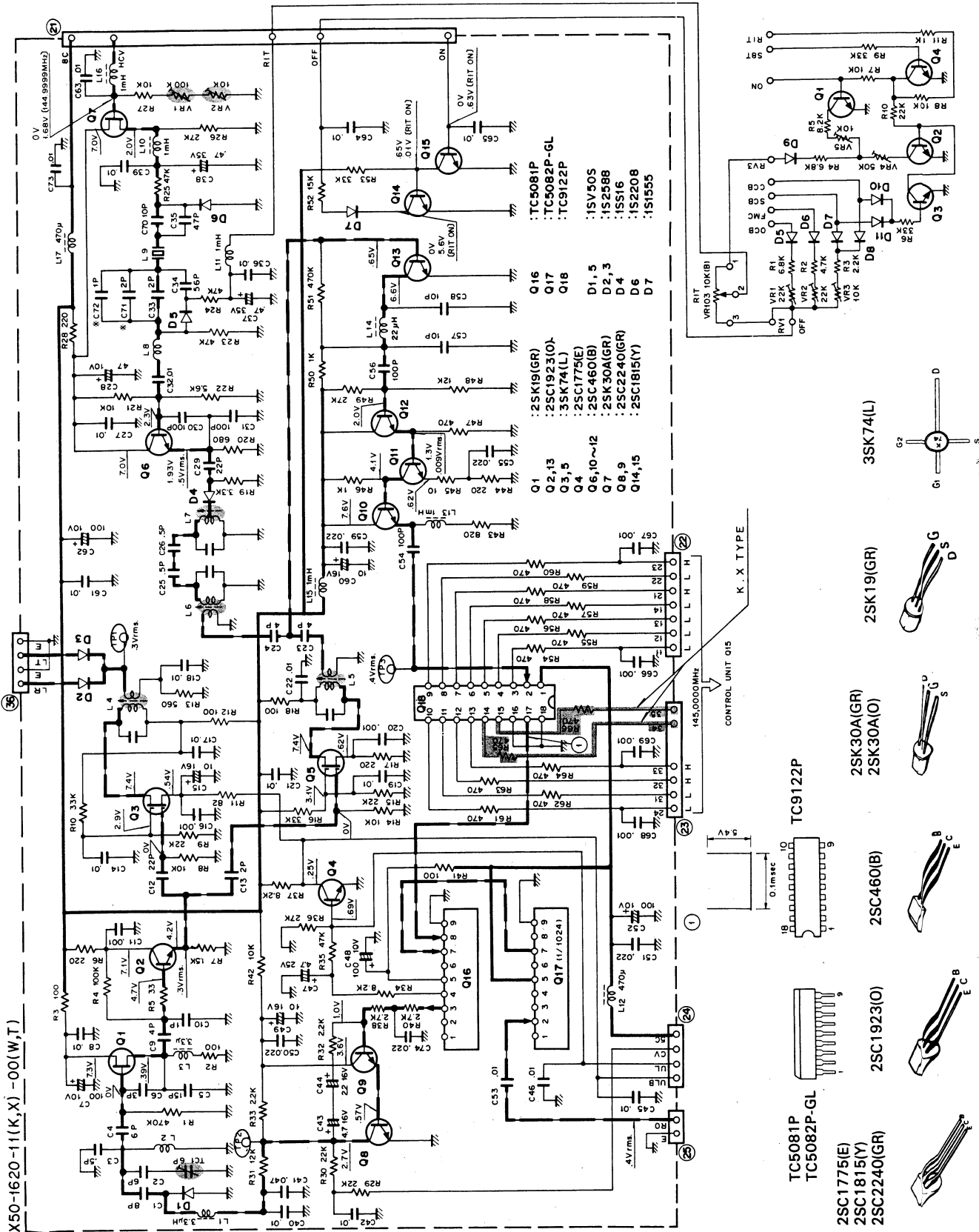
< Attachment method of L9 >



Atfix these wires with adhesive

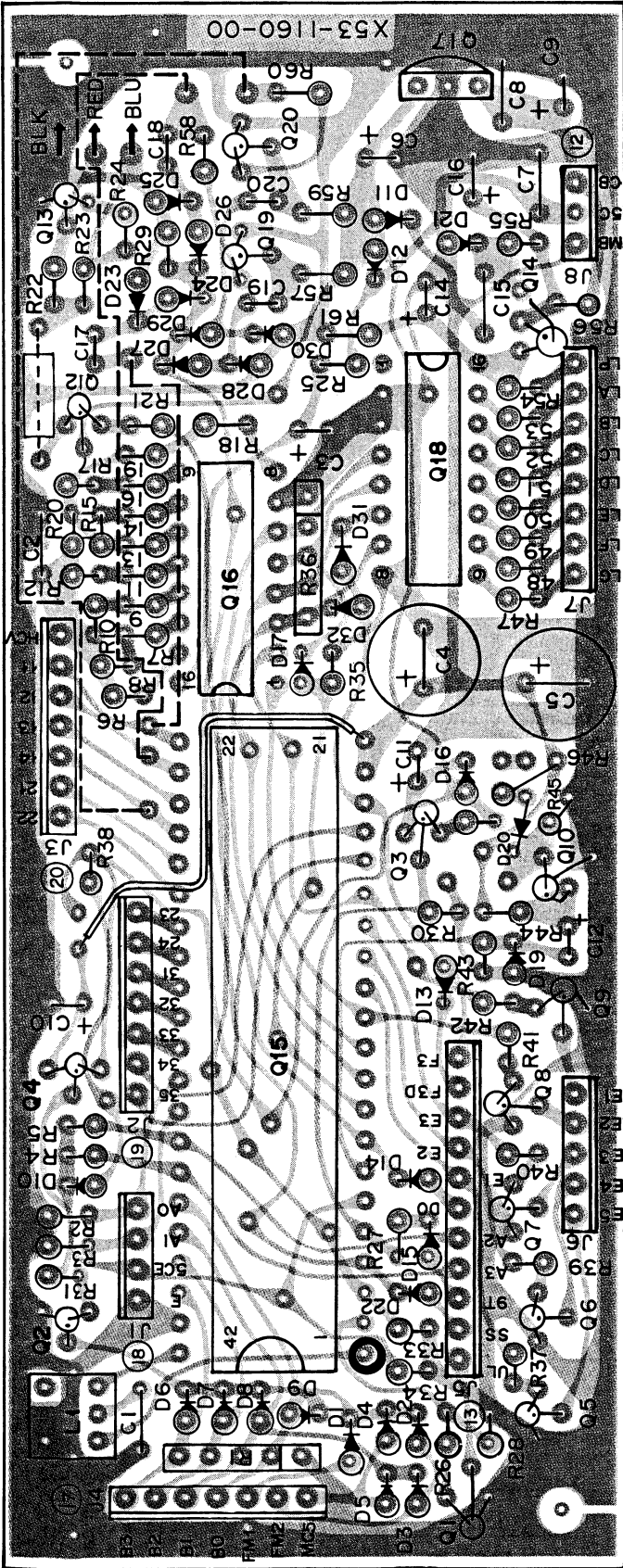
CIRCUIT DIAGRAM

▼ PLL Unit (X50-1620-00)(W)(T) (X50-1620-11)(K)(X) PARTS LIST: Page 20



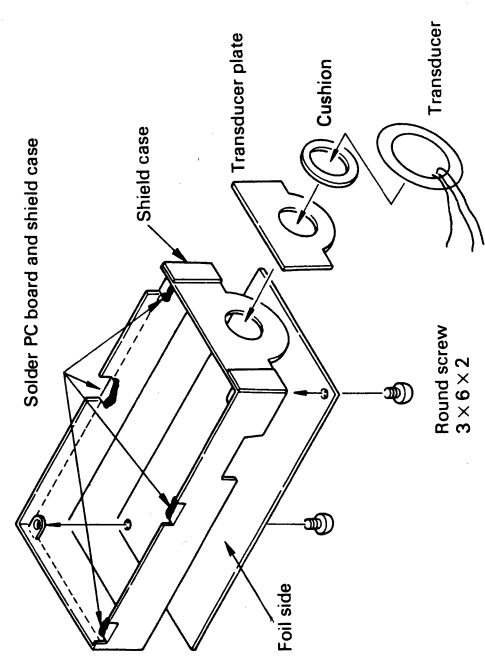
PC BOARD VIEW

▼ CONTROL UNIT (X53-1160-11) (K) (X53-1160-61 (W)(T) (X53-1160-71) (X)

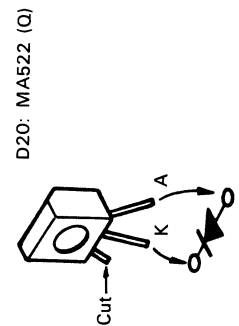


Q1,2,5~13,19,20: 2SC1815(Y) Q3,4: 2SA1015(Y) Q14: 2SC496(Y) Q15: μ PD650C-021 Q16: MN1201A
Q17: NJM78L06K Q18: TC5022BP D1,13,14,17,22~32: 1N60 D2~12,15,16,19: 1S1555
D20: MA522(Q) D21: XZ-057

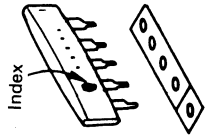
< Attachment method of the shield case and Tone transducer >



< Attachment direction of D20 >



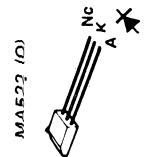
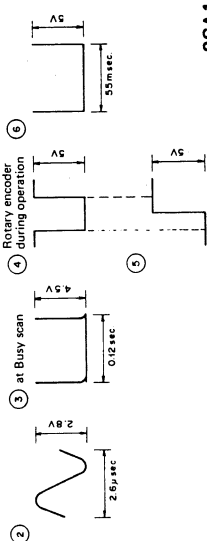
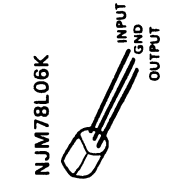
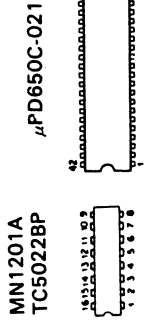
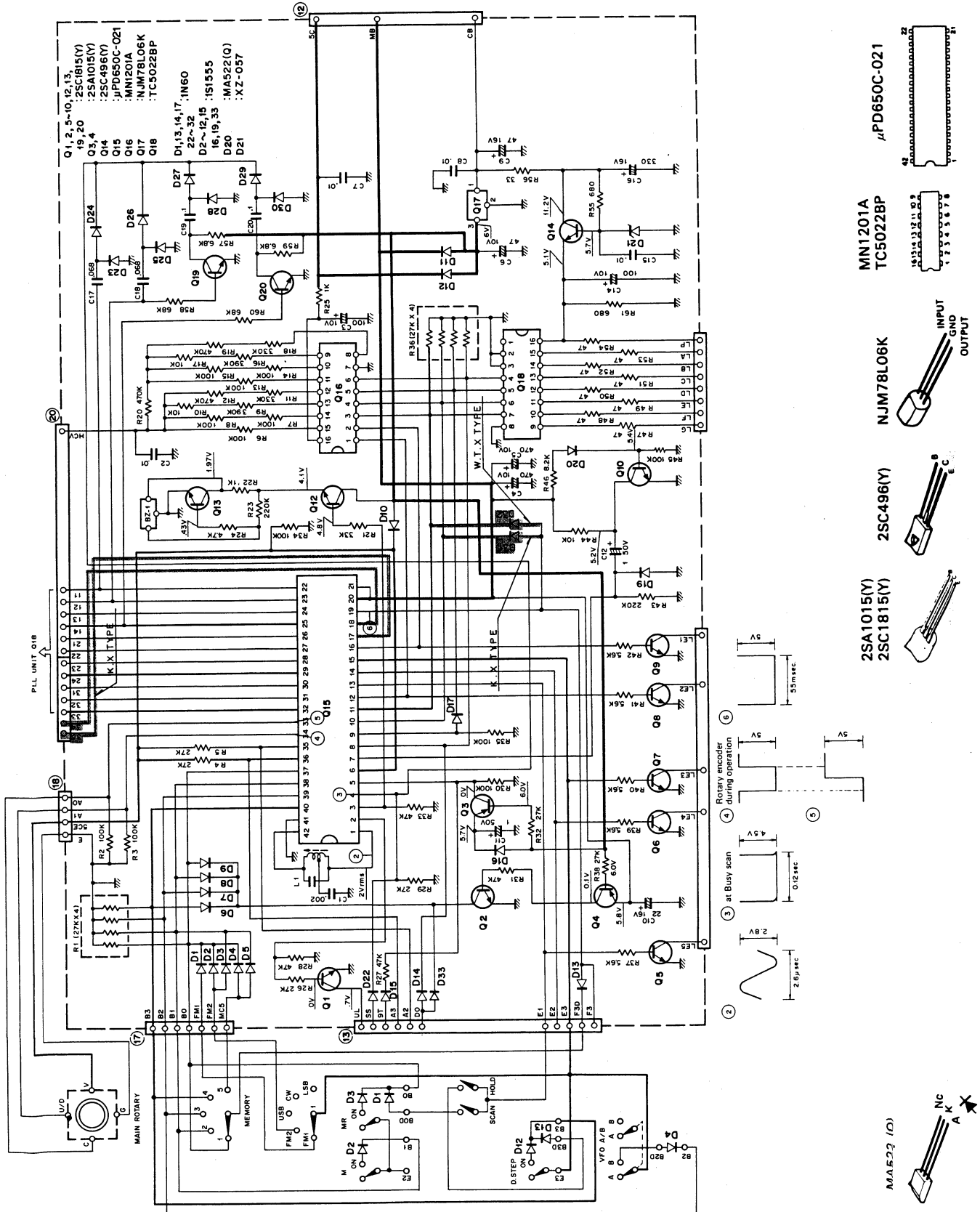
< Attachment direction of R1 and R36 >



CIRCUIT DIAGRAM

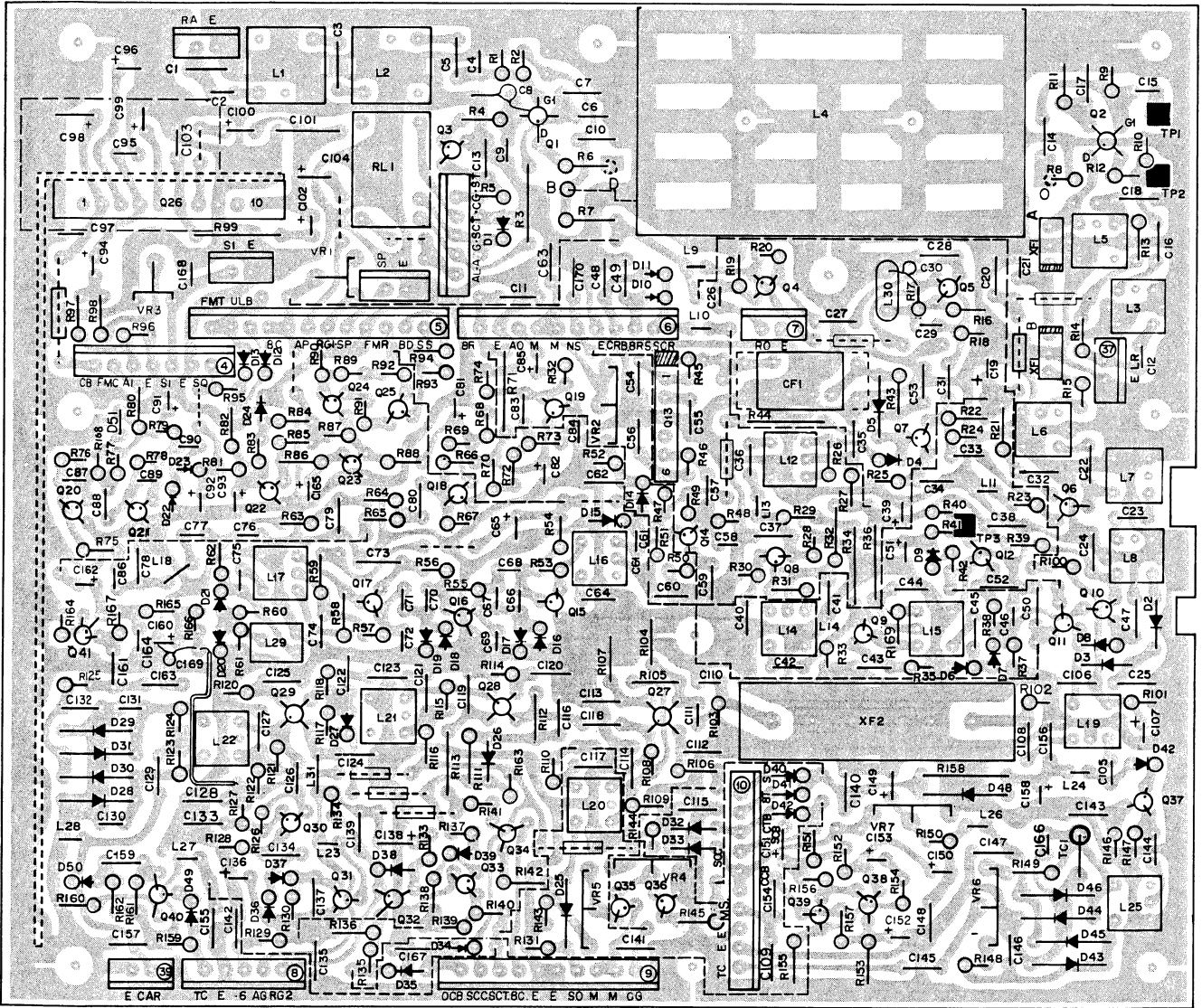
▼ CONTROL UNIT (X53-1160-11) (K) (X53-1160-61) (W)(T) (X53-1160-71)(X)

PARTS LIST: Page 22



PC BOARD VIEW

▼ RX UNIT (X55-1260-11)(K)(X) (X55-1260-61)(W)(T) PARTS LIST: Page 22



Q1:3SK74(L)(K) 3SK76(W) Q2:3SK74(L) Q3:10~12,18,19,22~24,31,36,38,39:2SC1815(Y) Q4:5,8,9,14~17,30,40:2SC460(B)
 Q6:2SK125 Q7:2SC1923(O) Q13:TA7302P Q20,21:2SC1775(E) Q25,33,35:2SA1015(Y) Q26:HA1366W Q27~29:3SK74(M)
 Q32:2SK30A(GR) Q34:2SK30A(O) Q37:2SK61(GR) Q41:2SC2240(GR)
 D1,4,5,10~13,16~19,26,27,32~35,38~41,47~50:1S1555 D2,3,42:1S1587
 D6~8,14,15,20~23,28~31,36,37,43~46:1N60 D9:WZ-032 D24:1S1212 D25:1S2588 D51:D33A

2SA1015(Y)
 2SC1815(Y)
 2SC1775(E)
 2SC2240(GR)

2SC460(B)

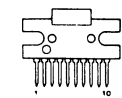
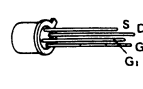
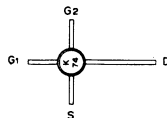
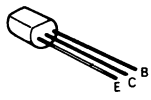
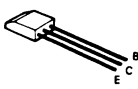
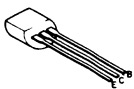
2SC1923(O)

3SK74(L)
 3SK74(M)

3SK76

HA1366W

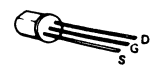
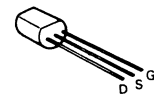
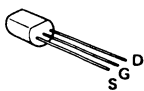
TA7302P



2SK125

2SK61(GR)

2SK30A(GR)
 2SK30A(O)



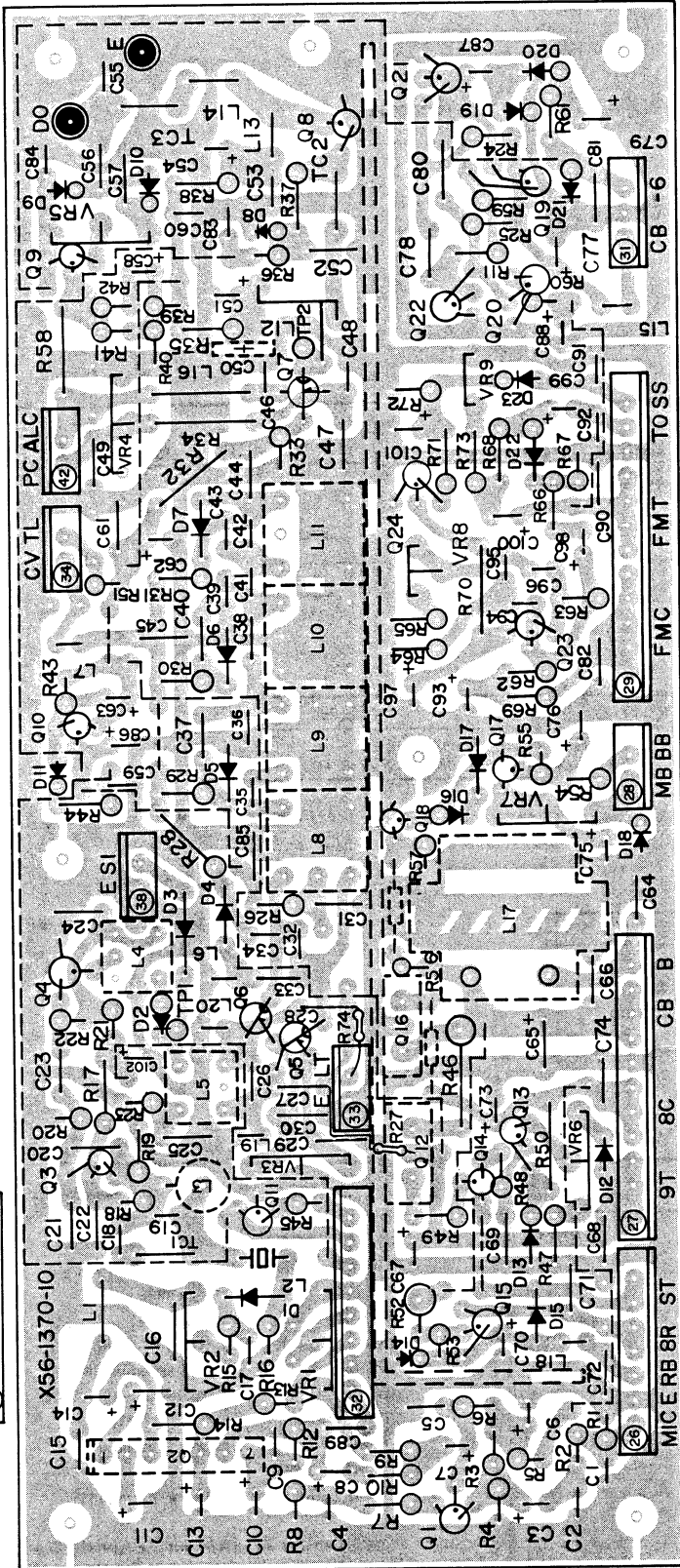
PC BOARD VIEW

▼ TXUNIT (X56-1370-10) (K)(X) (X56-1370-51) (T)
(X56-1370-61) (W)

PARTS LIST: Page 24

Q1:2SC2240 Q2:TA7061AP Q3:4.2SC460(B) Q5:6.2SK61(GR) Q7:3SK74(L) Q8:2SC2538-22-A
Q9:14.17.18.20:2SC2603(E) Q10:11.13.19:2SA1015(Y) Q12:2SA671(B) Q15:2SC496(Y) Q16:FS7808C Q21:22:2SC1815(Y)
Q23:24:2SC458(B) XZ-070
D1:4:1S2208 D2:3:1S2588 D5~7:ITT410 D8.11.15.16.19.20.22.23:1S1555 D9.10:1N60 D12:VD1223
D13:WZ-061 D14:XZ-090 D17.21:XZ-060 D18:XZ-070

32



Parts List:

- 2SA1015(Y)
- 2SC1775(E)
- 2SC1815(Y)
- 2SC2240(GR)
- 2SC2538-22-A
- 2SC460(B)
- 2SC458(B)
- 2SC496(Y)
- 2SC2603(E)
- 2SC2603(E)
- 2SA671(B)
- 2SK61(GR)
- FS7808C
- 3SK74(L)
- TA7061AP

Attachment method of Q12 and Q16 >

MICA Insulator
Apply silicon compound on both sides

Apply silicon compound

Shield plate (A)

Shoulder washer

Round screw 3X6

Round screw 3X4

< Attachment direction of D12 >

Dot

STS TO E

INPUT GND OUTPUT

PARTS LIST

Note 1:

K: U.S.A. T: Britain W: Europe X: Australia

Note 2:

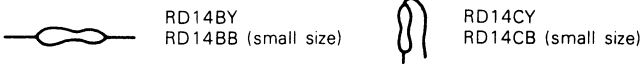
Only special type of resistors (example: cement, metal film, etc.) and capacitors (example: electrolytic, tantalum, mylar, temp. coeff. capacitors) are detailed in the PARTS LIST. For the value of all common type components, refer to the schematic diagram of the P.C. board illustration. Resistors not otherwise detailed are carbon type (1/4W or 1/8W). Order carbon resistors and capacitors according to the following example:

A carbon resistor's part number is RD14BY 2E222J.

A ceramic capacitor's number is CK45F1H103Z, CC45TH1H220J.

RESISTOR

1. Type of the carbon resistor



2. Wattage

1W → 3A 3W → 3F 5W → 3H
2W → 3D 4W → 3G

3' = CC45 ○ ○ ...

Ceramic capacitor (type I) temperature coeff. capacitor 1' 3'.

| 1st word (Color) | C (Black) | L (Red) | P (Orange) | R (Yellow) | S (Green) | T (Blue) | U (Violet) |
|---------------------|--------------|------------|---------------|---------------|--------------|-------------|---------------|
| ppm/°C | 0 | -80 | -150 | -220 | -330 | -470 | -750 |

3 = CK45 ○

Ceramic capacitor (type II) 3

| Cord | B | D | E | F |
|-----------------------------|------------|------------|------------|------------|
| Operating temperature °C | -30 +85 | -30 +85 | -30 +85 | -10 +70 |

6 = Tolerance

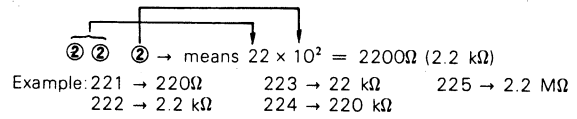
| Cord | C | D | G | J | K | M | X | Z | P | No cord |
|------|-------|------|----|----|-----|-----|------------|------------|------------|---|
| (%) | ±0.25 | ±0.5 | ±2 | ±5 | ±10 | ±20 | +40 -20 | +80 -20 | +100 -0 | More than 10 μF -10 ~ +50 Less than 4.7 μF -10 ~ +75 |

Less than 10 pF

| Cord | B | C | D | F | G |
|------|------|-------|------|----|----|
| (pF) | ±0.1 | ±0.25 | ±0.5 | ±1 | ±2 |

| Abbreviation | | Abbreviation | |
|--------------|--------------|--------------|----------|
| Cap. | Capacitor | ML | Mylar |
| C | Ceramic | S | Styren |
| E | Electrolytic | T | Tantalum |
| MC | Mica | | |

3. Resistance value



4. Tolerance

J = ±5% (Gold) K = ±10% (Silver)

CAPACITORS

Type I

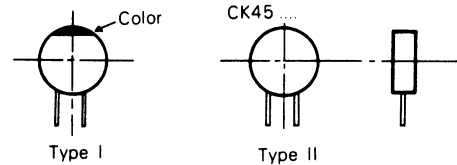
Type II

| CC | 45 | TH | 1H | 220 | J | CK | 45 | F | 1H | 103 | Z |
|-----------------------|-----------------------------|--------------------|----|-----|---|----|----|---|----|-----|---|
| 1' | 2 | 3' | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 = Type | ceramic, electrolytic, etc. | 4 = Voltage rating | | | | | | | | | |
| 2 = Shape | round, square, etc. | 5 = Value | | | | | | | | | |
| 3 = Temp range | | 6 = Tolerance | | | | | | | | | |
| 3' = Temp coefficient | | | | | | | | | | | |

Ex. CC45TH = -470 ±60 ppm/°C

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

CC45 ...



Type I

Type II

5 = Capacitor value

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

GENERAL

☆: New Parts

Ⓐ: from S/N 008 × × × × ~ 012 × × × ×
Ⓑ: from S/N 101 × × × × ~

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|--------------------------|--------------|
| — | A01-0762-13 | Case (upper) | ☆ |
| — | A01-0763-12 | Case (lower) | ☆ |
| — | A13-0612-02 | Angle ass'y (right) | ☆ |
| — | A13-0613-02 | Angle ass'y (left) | ☆ |
| — | A13-0614-04 | Angle (Top) | ☆ |
| — | A20-2372-15 | Panel | ☆ |
| — | B01-0626-02 | Panel escutcheon (K),(X) | ☆ |
| — | B01-0627-02 | Panel escutcheon (W) | ☆ |
| — | B01-0628-02 | Panel escutcheon (T) | ☆ |
| — | B03-0513-14 | Switch mask (B) × 6 | ☆ |
| — | B05-0701-04 | SP grill cloth | ☆ |
| — | B05-0712-14 | Grill cloth 148 × 27 mm | ☆ |

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|----------------------------|--------------|
| — | B05-0713-04 | Grill cloth 32 × 32 mm | ☆ |
| — | B07-0621-03 | Side escutcheon × 2 | ☆ |
| — | B10-0625-04 | Front glass | ☆ |
| — | B31-0625-05 | S meter | ☆ |
| — | B40-2490-04 | Model name plate (T) | ☆ |
| — | B40-2509-04 | Model name plate (K) | ☆ |
| — | B40-2510-04 | Model name plate (W)(X) | ☆ |
| — | B46-0058-00 | Warranty card (K) | ☆ |
| — | B50-2718-00 | Operating manual (K) | ☆ |
| — | B50-2719-00 | Operating manual (W) | ☆ |
| — | B50-2720-00 | Operating manual (T) | ☆ |
| — | E06-0651-05 | 6P Metal socket (MIC jack) | ☆ |

PARTS LIST

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|---|------------------|
| — | E07-0651-05 | 6P Metal consent (MIC plug) | ☆ |
| — | E09-0471-05 | 4P Plug TONE PAD (K) | |
| — | E12-0001-05 | Phone plug | |
| — | E12-0401-05 | STBY plug | ☆ |
| — | E23-0015-04 | Lug terminal | |
| — | E29-0412-05 | 1P Connector (male) | ☆ |
| — | E29-0413-05 | 1P Connector (female) | ☆ |
| — | E30-1648-05 | DC cord ass'y 4A | |
| — | F05-4022-05 | Fuse (4A) × 2 | |
| — | F15-0622-04 | Shadow mask (meter) | |
| — | F15-0627-04 | Shadow mask (LED) | ☆ |
| — | F20-0078-05 | MICA insulator (Q101) | |
| — | F29-0014-05 | Shoulder washer (Q101) | |
| — | G02-0505-05 | Knob spring RIT | |
| — | G09-0412-04 | Eeath spring | ☆ |
| — | G10-0609-04 | Cushion (upper case) | ☆ |
| — | G53-0510-04 | Packing × 4 upper, lower case | ☆ |
| — | H01-2676-03 | Carton (inside)(K)(W)(X) | ☆ |
| — | H01-2677-03 | Carton (inside)(T) | ☆ |
| — | H10-2501-03 | Styrene foam cushion | |
| — | H10-2528-12 | Packing fixture | ☆ |
| — | H25-0049-03 | Protective bag | |
| — | H25-0079-04 | Protective bag (MIC) | |
| — | H25-0103-04 | Protective bag (cord) | |
| — | H25-0106-04 | Protective bag | |
| — | J02-0069-05 | Foot × 2 | |
| — | J02-0416-04 | Metal foot | ☆ |
| — | J25-2714-04 | PC board MODE | ☆ |
| — | J25-2715-04 | PC board Memory | ☆ |
| — | J25-2716-24 | PC board SCAN | ☆ |
| — | J25-2744-04 | PC board TX OFF SET | ☆ |
| — | J30-0509-04 | Spacer | ☆ |
| — | J31-0514-04 | Spacer collar × 2 | ☆ |
| — | J32-0739-14 | Round boss × 5 PLL | ☆ ^(A) |
| — | J32-0739-24 | Round boss × 5 PLL | ☆ ^(B) |
| — | J42-0409-04 | Knob bush | |
| — | J61-0019-05 | Vinyletie × 5 | |
| — | K21-0749-03 | Main knob | ☆ |
| — | K21-0750-04 | Knob (C) RF GAIN | ☆ |
| — | K23-0727-04 | Knob (A) × 2 MODE, MEMORY | ☆ |
| — | K23-0728-04 | Knob (B) × 2 VOL, SQL | ☆ |
| — | K23-0729-04 | Knob (D) RIT | ☆ |
| — | K23-0733-04 | Knob (E) TX OFF SET | ☆ |
| — | K27-0408-04 | Push knob (A) × 5 M,MR,NB,RIT,D,STEP | ☆ |
| — | K27-0409-04 | Push knob (B) × 2 SCAN,HOLD | ☆ |
| — | K27-0412-04 | Push knob (D) VFO A/B | ☆ |
| — | K29-0733-04 | Push knob (C) | ☆ |
| — | K23-0733-04 | Knob (E) TX OFF SET | ☆ |
| — | N09-0008-04 | Screw × 4 (angle) | |
| — | N14-0510-04 | Flange nut × 4 | |
| — | N14-0512-05 | Speed nut × 4 | ☆ |
| — | N15-1040-46 | Flat washer × 4 (angle) | |
| — | N15-1060-46 | Flat washer | |
| — | N16-0060-46 | Spring washer × 4 | |
| — | N33-3006-45 | Round flat screw (case) | |
| — | N35-3006-45 | Bind screw × 4 (Speaker mounting plate) | |
| — | N99-0304-04 | Allen head bolt × 4 (angle) | |

| Ref. No. | Parts No. | Description | Re- marks |
|-----------|--------------|---|--------------|
| R103 | RS14AB3A101J | Metal film 100Ω ±5% 1W | |
| VR101 | R01-3409-05 | Potentiometer 10 kΩ (A) SW VOL | ☆ |
| VR102 | R01-4405-05 | Potentiometer 50 kΩ (B) SW SQL | ☆ |
| VR103,104 | R19-3406-05 | Potentiometer 10 kΩ (B) × 2 RIT, RF GAIN | ☆ |
| S101 | W02-0308-05 | Rotary encoder | ☆ |
| S102 | S01-2421-05 | Rotary switch MODE | ☆ |
| S103 | S01-1420-05 | Rotary switch M.CH | ☆ |
| S104,105 | S59-1405-05 | Key board switch SCAN, HOLD | ☆ |
| S106 | S40-2403-05 | Push switch A/B (W) | |
| S107 | S40-2403-05 | Push switch H/L (K)(T)(X) | |
| S107 | S40-2406-05 | Push switch TONE (W) | |
| S108 | S01-1421-05 | Rotary switch TX OFF SET | ☆ |
| — | S50-1406-05 | Tact switch (MIC) | ☆ |
| — | T03-0027-15 | Speaker | |
| — | T91-0311-05 | Microphone (T) | ☆ |
| — | T91-0313-05 | Microphone (K)(W)(X) | ☆ |
| Q101 | V01-0671-16 | TR 2SA671 (B) | |
| Q102 | V03-2603-06 | TR 2SC2603 (E) | |
| D101 | V11-6172-26 | 5 digit LED SL-1502 | ☆ |
| D102 | V11-7272-36 | LED PR5532K ON AIR | ☆ |
| D103 | V11-7272-46 | LED PY5532K BUSY | ☆ |
| D104 | V11-6172-56 | LED SLP-144B (T) | ☆ |
| D105 | V11-6172-56 | LED SLP-144B | ☆ |
| D106 | V11-6176-66 | LED SLP-244B VFO A/B | ☆ |
| — | W01-0401-04 | Allen key (angle) | |
| — | X41-1290-11 | Switch unit | ☆ |
| — | X45-1140-00 | Final unit (W)(T)(X) | ☆ |
| — | X45-1140-11 | Final unit (K) | ☆ |
| — | X50-1620-00 | PLL unit (W)(T) | ☆ |
| — | X50-1620-11 | PLL unit (K)(X) | ☆ |
| — | X50-1630-11 | CAR unit | ☆ |
| — | X52-1140-10 | Side tone unit | ☆ |
| — | X53-1160-11 | Control unit (K) | ☆ |
| — | X53-1160-61 | Control unit (W)(T) | ☆ |
| — | X53-1160-71 | Control unit (X) | ☆ |
| — | X55-1260-11 | RX unit (K)(X) | ☆ |
| — | X55-1260-61 | RX unit(W)(T) | ☆ |
| — | X56-1370-10 | TX unit (K)(X) | ☆ |
| — | X56-1370-51 | TX unit (T) | ☆ |
| — | X56-1370-61 | TX unit (W) | ☆ |

SWITCH UNIT (X41-1290-11)

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|---|--------------|
| C1 | CC45SL1H220J | C 22 pF ±5% | |
| VR1,2 | R12-3415-05 | Semi-fixed resistor 22 kΩ | |
| VR3 | R12-3421-05 | Semi-fixed resistor 10 kΩ | ☆ |
| VR4 | R12-4020-05 | Semi-fixed resistor 50 kΩ (2 p ₀) | |
| VR5 | R12-3421-05 | Semi-fixed resistor 10 kΩ | ☆ |
| Q1~4 | V03-1815-06 | TR 2SC1815(Y) | |

PARTS LIST

| Ref. No. | Parts No. | Description | Re- marks |
|----------------|-------------|---------------------|--------------|
| D1~4, 12~15 | V11-0051-05 | Diode 1N60 | |
| D5~11 | V11-0076-05 | Diode 1S1555 | |
| S1 | S40-2409-15 | Push switch M | |
| S2 | S40-2405-05 | Push switch MR | |
| S3,4 | S40-2404-05 | Push switch RIT, NB | |
| S5 | S40-2405-05 | Push switch D. STEP | |
| — | E23-0046-04 | Square terminal | |

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|------------------------|--------------|
| — | E08-0471-05 | 4P Socket TONE PAD (K) | |
| — | E11-0405-05 | Key jack | ☆ |
| — | E11-0406-05 | STBY Jack | ☆ |
| — | E11-0409-05 | Earphone jack | ☆ |
| — | E40-0373-05 | Mini connect wafer 3P | |
| — | E40-0673-05 | Mini connect wafer 6P | |
| — | F01-0744-15 | Heat sink (W)(T)(X) | |
| — | F01-0746-05 | Heat sink (K) | ☆ |

FINAL UNIT (X45-1140-00)(W)(T)(X)
(X45-1140-11)(K)

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|-------------------------------------|--------------|
| C1,2 | CC45SL2H070D | C 7pF ±0.5pF | |
| C3,4 | CC45SL2H101J | C 100pF ±5% | |
| C5 | CC45SL2H330J | C 33pF ±5% | |
| C6 | CC45SL2H390J | C 39pF ±5% | |
| C7 | CC45SL2H100D | C 10pF ±5% | |
| C8 | CC45CH1H010C | C 1pF ±0.25pF | |
| C9 | CC45SL2H220J | C 22pF ±5% | |
| C11 | CC45CH1H330J | C 33pF ±5% | |
| C13 | CC45CH1H0R5C | C 0.5pF ±0.25pF | |
| C18 | CS15E1C010M | T 1μF 16V | |
| C22 | CE04W1C101Q | E 100μF 16V | |
| C24 | CE04W1C470Q | E 47μF 16V | |
| C26 | CE04W1C101Q | E 100μF 16V | |
| C27 | C90-0817-05 | E 1000μF 16V <small>(small)</small> | |
| C32 | CC45SL2H120J | C 12pF ±5% | |
| C29 | CS15E1V0R1M | T 0.1μF 35V | |
| VR1 | R12-5024-05 | Semi fixed resistor 100 kΩ (2 pole) | |
| VR2 | R12-4016-05 | Semi-fixed resistor 50 kΩ | |
| VR3 | R12-0048-05 | Semi-fixed resistor 100Ω | |
| Q1,2 | V01-1815-06 | TR 2SC1815(Y) | |
| Q3 | V01-1015-06 | TR 2SA1015(Y) | |
| Q4 | V01-1815-06 | TR 2SC1815(Y) | |
| Q5 | V30-1131-06 | Power module M57713 | ☆ |
| D1 | V11-5260-16 | Diode MI402 | |
| D2 | V11-0414-05 | Diode 1S2588 | |
| D3,4 | V11-0051-05 | Diode 1N60 | |
| D5 | V11-0076-05 | Diode 1S1555 | |
| D6 | V11-0270-05 | Diode U05B | |
| L1 | L34-0823-05 | VHF Coil 5φ3T | |
| L2 | L34-0438-05 | Coil 0.9μH | |
| L3 | L34-0692-05 | VHF Coil 5φ4T | |
| L4,5 | L34-0817-05 | VHF Coil 5φ3T | |
| L6 | L33-0025-05 | Choke coil 1μH | |
| L7 | L40-1001-03 | Ferri-inductor 10μH | |
| L8 | L34-0887-05 | VHF Coil 5φ3T | ☆ |
| — | B42-1682-04 | T. Pad badge (K) | ☆ |
| — | E04-0102-05 | UHF Type receptacle | |
| — | E08-0203-25 | 2P Connector | |
| — | E08-0304-05 | Power jack BACK UP | |

PLL UNIT (X50-1620-00)(W)(T)
(X50-1620-11)(K)(X)

Schematic: Page 13

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|----------------------------|--------------|
| C1 | CC45PG1H080D | C 8pF ±0.5pF | |
| C2 | CC45CH1H060D | C 6pF ±0.5pF | |
| C3 | CC45CH1H0R5C | C 0.5pF ±0.25pF | |
| C4 | CC45CH1H060D | C 6pF ±0.5pF | |
| C5 | CC45CH1H150J | C 15pF ±5% | |
| C6 | CC45CH1H030C | C 3pF ±0.25pF | |
| C7 | CE04W1A101Q | E 100μF 10V | |
| C9 | CC45CH1H040C | C 4pF ±0.25pF | |
| C10 | CC45CH1H010C | C 1pF ±0.25pF | |
| C12 | CC45CH1H220J | C 22pF ±5% | |
| C13 | CC45CH1H020C | C 2pF ±0.25pF | |
| C15 | CE04W1C100Q | E 10μF 16V | |
| C23,24 | CC45CH1H040C | C 4pF ±0.25pF | |
| C25,26 | CC45CH1H0R5C | C 0.5pF ±0.25pF | |
| C28 | CE04W1A470Q | E 47μF 10V | |
| C29 | CC45CH1H220J | C 22pF ±5% | |
| C30,31 | CC45CH1H101J | C 100pF ±5% | |
| C33 | CC45TH1H020C | C 2pF ±0.25pF | |
| C34 | CC45TH1H560J | C 56pF ±5% | |
| C35 | CC45PG1H470J | C 47pF ±5% | |
| C37,38 | CS15E1VR47M | T 0.47μF 35V | |
| C40 | C91-0455-05 | C 0.01μF ±10% | |
| C41 | CQ92M1H473K | ML 0.047μF ±10% | |
| C43 | CS15E1C4R7M | T 4.7μF 16V | |
| C44 | CS15E1C2R2M | T 2.2μF 16V | |
| C47 | CE04W1E4R7Q | E 4.7μF 25V | |
| C48 | CE04W1A101Q | E 100μF 10V | |
| C49 | CE04W1H010Q | E 1μF 50V | |
| C50,51 | C91-0457-05 | C 0.022μF ±10% | |
| C52 | CE04W1A101Q | E 100μF 10V | |
| C54 | CC45SL1H101J | C 100pF ±5% | |
| C55 | CQ92M1H223K | ML 0.022μF ±10% | |
| C56 | CC45SL1H101J | C 100pF ±5% | |
| C57,58 | CC45CH1H100D | C 10pF ±0.5pF | |
| C59 | C91-0457-05 | C 0.022μF ±10% | |
| C60 | CE04W1C100Q | E 10μF 16V | |
| C62 | CE04W1A101Q | E 100μF 10V | |
| C70 | CC45CH1H100D | C 10pF ±0.5pF | |
| C71 | CC45TH1H020C | C 2pF ±0.25pF | |
| C72 | CC45TH1H010C | C 1pF ±0.25pF | |
| C74 | CQ92M1H223K | ML 0.022μF ±10% | |
| VR1 | R12-5014-05 | Semi-fixed resistor 100 kΩ | |
| VR2 | R12-3025-05 | Semi-fixed resistor 10 kΩ | |
| TC1 | C05-0062-05 | Ceramic Trimmer 6pF | |

PARTS LIST

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|---------------------------|--------------|
| Q1 | V09-1001-16 | FET 2SK19(GR)TRI0-5 | |
| Q2 | V03-1923-06 | TR 2SC1923(O) | |
| Q3 | V09-1002-56 | FET 3SK74(L) | |
| Q4 | V03-1775-06 | TR 2SC1775(E) | |
| Q5 | V09-1002-56 | FET 3SK74(L) | |
| Q6 | V03-0079-05 | TR 2SC460(B) | |
| Q7 | V09-0060-05 | FET 2SK30A(GR) | |
| Q8,9 | V03-2240-06 | TR 2SC2240(GR) | |
| Q10~12 | V03-0079-05 | TR 2SC460(B) | |
| Q13 | V03-1923-06 | TR 2SC1923(O) | |
| Q14,15 | V03-1815-06 | TR 2SC1815(Y) | |
| Q16 | V30-1132-06 | IC TC5081P | ☆ |
| Q17 | V30-1147-06 | IC TC5082P-GL | ☆ |
| Q18 | V30-1036-16 | IC TC9122P | |
| D1 | V11-1260-36 | Vari-cap Diode 1SV50S | |
| D2,3 | V11-0414-05 | Diode 1S2588 | |
| D4 | V11-0374-05 | Diode 1S1555 | |
| D5 | V11-1260-36 | Vari cap Diode 1SV50S | |
| D6 | V11-0317-05 | Vari-cap Diode 1S2208 | |
| D7 | V11-0076-05 | Diode 1S1555 | |
| L1 | L40-3391-03 | Ferri-inductor 3.3μH | |
| L2 | L32-0624-05 | Oscillating coil VCO | ☆ |
| L3 | L40-3391-03 | Ferri-inductor 3.3μH | |
| L4 | L34-0820-05 | Tuning coil | |
| L5 | L34-0683-05 | Tuning coil | |
| L6,7 | L34-0901-05 | Tuning coil | ☆ |
| L8 | L33-0631-05 | Choke coil 4.7μH | ☆ |
| L9 | L77-0855-05 | Crystal 14.2005 MHz | ☆ |
| L10,11 | L40-1021-03 | Ferri-inductor 1mH | |
| L12 | L40-4711-03 | Ferri-inductor 470μH | |
| L13 | L40-1021-03 | Ferri-inductor 1mH | |
| L14 | L40-1501-03 | Ferri-inductor 15μH | |
| L15,16 | L40-1021-03 | Ferri-inductor 1mH | |
| L17 | L40-4711-03 | Ferri-inductor 470μH | |
| — | E40-0273-05 | Mini connect wafer 2P | |
| — | E40-0473-05 | Mini connect wafer 4P | |
| — | E40-0573-05 | Mini connect wafer 5P | |
| — | E40-0673-05 | Mini connect wafer 6P (K) | |
| — | E40-0773-05 | Mini connect wafer 7P | |

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|---------------------------|--------------|
| L5,6 | L40-1511-03 | Ferri-inductor 150μH | |
| L7 | L77-0856-05 | Crystal 10.6943 MHz | ☆ |
| X1 | L77-0857-05 | Crystal (LSB) 10.6965 MHz | ☆ |
| — | E23-0046-04 | Square terminal | |

SIDE TONE UNIT (X52-1140-10)

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|-----------------------|--------------|
| C1 | CS15E1V0R1M | T 0.1μF 35V | |
| C2 | CQ92M1H123K | ML 0.012μF ±10% | |
| C3 | CC45SL1H101J | C 100pF ±5% | |
| C4,5 | CQ92M1H103K | ML 0.01μF ±10% | |
| C6 | CS15E1V0R1M | T 0.1μF 35V | |
| C7 | CS15E1A100M | T 10μF 10V | |
| C8 | CQ92M1H123K | ML 0.012μF ±10% | |
| C9 | CE04W1A470Q | E 47μF 10V | |
| Q1 | V03-1775-06 | TR 2SC1775(E) | |
| D1 | V11-0076-05 | Diode 1S1555 | |
| — | E40-0574-05 | Mini connect wafer 5P | |

CAR UNIT (X50-1630-11)

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|----------------------|--------------|
| C5 | CC45SL1H330J | C 33pF ±5% | |
| C6,7 | CC45SL1H220J | C 22pF ±5% | |
| C9,10 | CC45SL1H221J | C 220pF ±5% | |
| C12 | CC45CH1H030C | C 3pF ±0.25pF | |
| C13 | CC45SL1H470J | C 47pF ±5% | |
| TC1~3 | C05-0067-05 | Ceramic trimmer 25pF | |
| Q1,2 | V03-0079-05 | TR 2SC460(B) | |
| D1~5 | V11-0076-05 | Diode 1S1555 | |
| L1~3 | L40-1021-03 | Ferri-inductor 1mH | |
| L4 | L30-0281-05 | IFT | |

PARTS LIST

**CONTROL UNIT (X53-1160-11)(K)
(X53-1160-61)(T)
(X53-1160-71)(X)**

Schematic: Page 15

**RX UNIT (X55-1260-11)(K)(X)
(X55-1260-61)(W)(T)**

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|----------------------------|--------------|
| C1 | CQ92M1H223K | ML 0.022μF | |
| C3 | CE04W1A101Q | E 100μF 10V | |
| C4.5 | CE04W1A471Q | E 470μF 10V | |
| C6 | CE04W1A470Q | E 47μF 10V | |
| C9 | CE04W1C470Q | E 47μF 16V | |
| C10 | CE04W1C220Q | E 22μF 16V | |
| C11,12 | CE04W1H010Q | E 1μF 50V | |
| C14 | CE04W1A101Q | E 100μF 10V | |
| C16 | C90-0811-05 | E 330μF 16V | |
| C17,18 | C91-0460-05 | Laminated cap. 0.068μF | ☆ |
| C19,20 | C91-0460-05 | Laminated cap. 0.1μF | |
| R1 | R90-0526-05 | Resistor 27kΩ × 4 | ☆ |
| R36 | R90-0526-05 | Resistor 27kΩ × 4 | ☆ |
| Q1.2 | V03-1815-06 | TR 2SC1815(Y) | |
| Q3.4 | V01-1015-06 | TR 2SA1015(Y) | |
| Q5~13 | V03-1815-06 | TR 2SC1815(Y) | |
| Q14 | V03-0336-05 | TR 2SC496(Y) | |
| Q15 | V30-1136-06 | Micro computer μPD650C-021 | ☆ |
| Q16 | V30-1008-66 | IC MN1201A | |
| Q17 | V30-1067-06 | IC NJM78L06K | |
| Q18 | V30-1054-06 | IC TC5022BP | |
| Q19,20 | V30-1815-06 | TR 2SC1815(Y) | |
| D1 | V11-0051-05 | Diode 1N60 | |
| D2~12 | V11-0076-05 | Diode 1S1555 | |
| D13,14 | V11-0051-05 | Diode 1N60 | |
| D15,16 | V11-0076-05 | Diode 1S1555 | |
| D17 | V11-0051-05 | Diode 1N60 | |
| D19 | V11-0076-05 | Diode 1S1555 | |
| D20 | V11-1162-16 | Diode MA522(Q) | |
| D21 | V11-4176-76 | Zener diode XZ-057 | |
| D22~30 | V11-0051-05 | Diode 1N60 | |
| D31 | V11-0051-05 | Diode 1N60 (K)(X) | |
| D32 | V11-0051-05 | Diode | |
| L1 | L30-0503-05 | IFT | |
| — | E40-0373-05 | Mini connect wafer 3P | |
| — | E40-0473-05 | Mini connect wafer 4P | |
| — | E40-0573-05 | Mini connect wafer 5P | |
| — | E40-0773-05 | Mini connect wafer 7P | |
| — | E40-0873-05 | Mini connect wafer 8P | |
| — | E40-1173-05 | Mini connect wafer 11P | |
| — | G11-0605-04 | Cushion (Transducer) | ☆ |
| — | J29-0403-04 | Transducer plate | ☆ |
| — | T95-0051-05 | Transducer | |

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|------------------|--------------|
| C1 | CC45CH1H330J | C 33pF ±5% | |
| C2 | CC45RH1H120J | C 12pF ±5% | |
| C3 | CC45CH1H030C | C 3pF ±0.25pF | |
| C4 | CC45RH1H100D | C 10pF ±0.5pF | |
| C5 | CC45CH1H220J | C 22pF ±5% | |
| C7 | C91-0456-05 | C 0.047μF ±10% | |
| C12 | CC45CH1H330J | C 33pF ±5% | |
| C14 | CC45CH1H150J | C 15pF ±5% | |
| C15 | CC45CH1H0R5C | C 0.5pF ±0.25pF | |
| C16 | CC45CH1H020C | C 2pF ±0.25pF | |
| C19 | CE04W1A470Q | E 47μF 10V | |
| C21 | CC45CH1H050C | C 5pF ±0.25pF | |
| C22 | CC45CH1H470J | C 47pF ±5% | |
| C23 | CC45CH1H030C | C 3pF ±0.25pF | |
| C24 | C91-0456-05 | C 0.047μF ±10% | |
| C25 | CC45CH1H470J | C 470pF ±5% | |
| C27 | CC45CH1H220J | C 22pF ±5% | |
| C28 | CC45SL1H451J | C 450pF ±5% | |
| C31 | CC45CH1H180J | C 18pF ±5% | |
| C34 | CQ92M1H393K | ML 0.039μF ±10% | |
| C35 | CQ92M1H223K | ML 0.022μF ±10% | |
| C36 | CQ92M1H103K | ML 0.01μF ±10% | |
| C37 | CC45SL1H101J | C 100pF ±5% | |
| C39 | CE04W1C100Q | E 10μF 16V | |
| C40 | CQ92M1H393K | ML 0.039μF ±10% | |
| C41 | CQ92M1H223K | ML 0.022μF ±10% | |
| C43 | CQ92M1H393K | ML 0.039μF ±10% | |
| C44 | CQ92M1H223K | ML 0.022μF ±10% | |
| C45 | CQ92M1H222K | ML 0.0022μF ±10% | |
| C51 | CE04W1H010Q | E 1μF 50V | |
| C53 | CQ92M1H393K | ML 0.039μF ±10% | |
| C54.55 | CQ92M1H473K | ML 0.047μF ±10% | |
| C56 | CQ92M1H393K | ML 0.039μF ±10% | |
| C57 | CQ92M1H103K | ML 0.01μF ±10% | |
| C59.60 | CQ92M1H223K | ML 0.022μF ±10% | |
| C64 | CQ92M1H223K | ML 0.022μF ±10% | |
| C65 | CE04W1A101Q | E 100μF 10V | |
| C68 | CC45SL1H470J | C 47pF ±5% | |
| C69 | CQ92M1H222K | ML 0.0022μF ±10% | |
| C72 | CQ92M1H222K | ML 0.0022μF ±10% | |
| C73 | CQ92M1H473K | ML 0.047μF ±10% | |
| C74 | CQ92M1H223K | ML 0.022μF ±10% | |
| C75 | CQ92M1H102K | ML 0.001μF ±10% | |
| C76 | CQ92M1H332K | ML 0.0033μF ±10% | |
| C77 | CQ92M1H222K | ML 0.0022μF ±10% | |
| C78 | CQ92M1H393K | ML 0.039μF ±10% | |
| C79 | CQ92M1H223K | ML 0.022μF ±10% | |
| C80 | CQ92M1H473K | ML 0.047μF ±10% | |
| C81.82 | CE04W1C220Q | E 22μF 16V | |
| C83 | CQ92M1H103K | ML 0.01μF ±10% | |
| C84 | CQ92M1H332K | ML 0.0033μF ±10% | |
| C85 | CS15E1VOR1M | T 0.1μF 35V | |
| C86 | CQ92M1H222K | ML 0.0022μF ±10% | |
| C87 | CC45SL1H220J | C 22pF ±5% | |
| C88 | CQ92M1H103K | ML 0.01μF ±10% | |
| C89 | CC45SL1H390J | C 39pF ±5% | |
| C90 | CQ92M1H222K | ML 0.0022μF ±10% | |
| C91 | CE04W1A470Q | E 47μF 10V | |
| C92.93 | CS15E1A3R3M | T 3.3μF 10V | |
| C94 | CE04W1H010Q | E 1μF 50V | |
| C95 | CQ92M1H332K | ML 0.0033μF ±10% | |
| C96 | CE04W1A101Q | E 100μF 10V | |
| C98 | CE04W1C471Q | E 470μF 16V | |
| C99.100 | CE04W1A470Q | E 47μF 10V | |

PARTS LIST

| Ref. No. | Parts No. | Description | Re- marks | Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|----------------------------|--------------|-----------|-------------|-----------------------|--------------|
| C101 | CQ92M1H104K | ML 0.1μF ±10% | | Q3 | V03-1815-06 | TR 2SC1815(Y) | |
| C102 | CE04W1H010Q | E 1μF 50V | | Q4.5 | V03-0079-05 | TR 2SC460(B) | |
| C103 | CC45SL1H101J | C 100pF ±5% | | Q6 | V09-0136-10 | FET 2SK125 | |
| C104 | CE04W1A101Q | E 100μF 10V | | Q7 | V03-1923-06 | TR 2SC1923(O) | |
| C105 | CC45CH1H050C | C 5pF ±0.25pF | | Q8.9 | V03-0079-05 | TR 2SC460(B) | |
| C106 | C91-0455-05 | C 0.01μF ±10% | | Q10~12 | V03-1815-06 | TR 2SC1815(Y) | |
| C107 | CE04W1C100Q | E 10μF 16V | | Q13 | V30-1134-06 | IC TA7302P | ☆ |
| C108 | C91-0455-05 | C 0.01μF ±10% | | Q14~17 | V03-0079-05 | TR 2SC460(B) | |
| C109 | CC45SL1H101J | C 100pF ±5% | | Q18,19,22 | V03-1815-06 | TR 2SC1815(Y) | |
| C110 | CC45CH1H100D | C 10pF ±0.5pF | | ~24 | | | |
| C112~114 | C91-0457-05 | C 0.022μF ±10% | | Q20.21 | V03-1175-06 | TR 2SC1775(E) | |
| C115,116 | C91-0455-05 | C 0.01μF ±10% | | Q25 | V01-1015-06 | TR 2SA1015(Y) | |
| C117,119 | C91-0457-05 | C 0.022μF ±10% | | Q26 | V30-1045-06 | IC HA1366W | |
| C118 | CC45CH1H470J | C 47pF ±5% | | Q27~29 | V09-1013-06 | FET 2SK74(M) | |
| C120~122 | C91-0457-05 | C 0.022μF ±10% | | Q30 | V03-0079-05 | TR 2SC460(B) | |
| C123 | CC45CH1H100D | C 10pF ±0.5pF | | Q31 | V03-1815-06 | TR 2SC1815(Y) | |
| C124,125 | C91-0457-05 | C 0.022μF ±10% | | Q32 | V09-0060-05 | FET 2SK30A(GR) | |
| C126 | CC45CH1H100D | C 10pF ±0.5pF | | Q33 | V01-1015-06 | TR 2SA1015(Y) | |
| C127 | C91-0457-05 | C 0.022μF ±10% | | Q34 | V09-0056-05 | FET 2SK30A(O) | |
| C128,129 | C91-0455-05 | C 0.01μF ±10% | | Q35 | V01-1015-06 | TR 2SA1015(Y) | |
| C130 | CC45CH1H180J | C 18pF ±5% | | Q36 | V03-1815-06 | TR 2SC1815(Y) | |
| C131 | CC45CH1H100D | C 10pF ±0.5pF | | Q37 | V09-1014-06 | FET 2SK61(GR) | ☆ |
| C132,133 | C91-0455-05 | C 0.01μF ±10% | | Q38,39 | V03-1815-06 | TR 2SC1815(Y) | |
| C134 | CC45CH1H470J | C 47pF ±5% | | Q40 | V03-0079-05 | TR 2SC460(B) | |
| C135 | C91-0455-05 | C 0.01μF ±10% | | Q41 | V03-2240-06 | TR 2SC2240(GR) | |
| C136 | CE04W1C100Q | E 10μF 16V | | D1 | V11-0076-05 | Diode 1S1555 | |
| C137 | CC45SL1H221J | C 220pF ±5% | | D2.3 | V11-0370-05 | Diode 1S1587 | |
| C138 | CE04W1H010Q | E 1μF 50V | | D4.5 | V11-0076-05 | Diode 1S1555 | |
| C143 | C91-0457-05 | C 0.022μF ±10% | | D6~8 | V11-0051-05 | Diode 1N60 | |
| C144 | CC45CH1H040C | C 4pF ±0.25pF | | D9 | V11-4172-26 | Zener diode WZ-032 | |
| C145 | C91-0455-05 | C 0.01μF ±10% | | D10~13 | V11-0076-05 | Diode 1S1555 | |
| C146 | CC45CH1H330J | C 33pF ±5% | | D14,15 | V11-0051-05 | Diode 1N60 | |
| C147,148 | C91-0455-05 | C 0.01μF ±10% | | D16~19 | V11-0076-05 | Diode 1S1555 | |
| C149 | CE04W1H010Q | E 1μF 50V | | D20~23 | V11-0051-05 | Diode 1N60 | |
| C150 | CE04W1H3R3Q | E 3.3μF 50V | | D24 | V11-1262-06 | Varistor 1S1212 | |
| C151 | CE04W1A470Q | E 47μF 10V | | D25 | V11-0414-05 | Diode 1S2588 | |
| C152 | CE04W1E4R7Q | E 4.7μF 25V | | D26,27 | V11-0076-05 | Diode 1S1555 | |
| C153 | CE04W1H010Q | E 1μF 50V | | D28~31 | V11-0051-05 | Diode 1N60 | |
| C154 | CQ92M1H473K | ML 0.047μF ±10% | | D32~35 | V11-0076-05 | Diode 1S1555 | |
| C155 | C91-0455-05 | C 0.01μF ±10% | | D36,37 | V11-0051-05 | Diode 1N60 | |
| C156,157 | C91-0457-05 | C 0.022μF ±10% | | D38~41 | V11-0076-05 | Diode 1S1555 | |
| C158 | CE04W1E4R7Q | E 4.7μF 25V | | D42 | V11-0370-05 | Diode 1S1587 | |
| C159 | CC45SL1H221J | C 220pF ±5% | | D43~46 | V11-0051-05 | Diode 1N60 | |
| C160 | CE04W1C100Q | E 10μF 16V | | D47~50 | V11-0076-05 | Diode 1S1555 | |
| C161 | CQ92M1H473K | ML 0.047μF ±10% | | D51 | V11-3161-86 | Thermistor D33A | |
| C162 | CE04W1H010Q | E 1μF 50V | | L1.2 | L31-0267-05 | Tuning coil | |
| C163 | C91-0455-05 | C 0.01μF ±10% | | L3 | L34-0683-05 | Tuning coil | |
| C164 | CQ92M1H682K | ML 0.0068μF ±10% | | L4 | L79-0457-05 | Helical block (W) (T) | ☆ |
| C165 | CS15E1C4R7M | T 4.7μF 16V | | | L79-0460-05 | Helical block (K) (X) | ☆ |
| C166 | CC45CH1H120J | C 12pF ±5% | | L5~8 | L30-0281-05 | IFT | |
| TC1 | C05-0031-05 | Ceramic trimmer 10pF | | L9 | L40-1511-03 | Ferri-inductor 150μH | |
| VR1 | R12-3415-05 | Semi-fixed resistor 22 kΩ | | L10 | L40-4711-03 | Ferri-inductor 470μH | |
| VR2 | R12-4016-05 | Semi-fixed resistor 50 kΩ | | L11 | L40-4701-03 | Ferri-inductor 47μH | |
| VR3 | R12-3416-05 | Semi-fixed resistor 47 kΩ | | L12 | L30-0503-05 | IFT | |
| VR4 | R12-1016-05 | Semi-fixed resistor 3 kΩ | | L13 | L40-1011-03 | Ferri-inductor 100μH | |
| VR5 | R12-7013-05 | Semi-fixed resistor 500 kΩ | | L14 | L30-0503-05 | IFT | |
| VR6 | R12-0048-05 | Semi-fixed resistor 100Ω | | L15,16 | L30-0504-05 | IFT | |
| VR7 | R12-4016-05 | Semi-fixed resistor 50 kΩ | | L17 | L30-0503-05 | IFT | |
| | | | | L18 | L40-6825-04 | Ferri-inductor 6.8mH | |
| Q1 | V09-1002-56 | FET 3SK74(L) (K)(X) | | L19 | L30-0507-05 | IFT | ☆ |
| | V09-1012-06 | FET 3SK76 (W)(T) | | L20~22 | L30-0005-05 | IFT | |
| Q2 | V09-1002-56 | FET 3SK74(L) | | L23 | L40-1021-03 | Ferri-inductor 1mH | |

PARTS LIST

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|-------------------------------|--------------|
| L24 | L40-1511-03 | Ferri-inductor 150μH | |
| L25 | L30-0005-05 | IFT | |
| L26 | L40-1021-03 | Ferri-inductor 1mH | |
| L27 | L40-4711-03 | Ferri-inductor 470μH | |
| L28 | L40-1511-03 | Ferri-inductor 150μH | |
| L29 | L79-0446-05 | Ceramic discri CFY455S | |
| L30 | L77-0858-05 | Crystal 10.24 MHz | ☆ |
| L31 | L40-1021-03 | Ferri-inductor 1mH | |
| CF1 | L72-0315-05 | Ceramic filter CFW455F | |
| XF1(A.B) | L71-0216-05 | MCF 10.695 MHz | ☆ |
| XF2 | L71-0215-05 | Crystal filter 10.695 MHz SSB | ☆ |
| RL1 | S51-1407-05 | Relay G2E9V | ☆ |
| — | E40-0273-05 | Mini connect wafer 2P | |
| — | E40-0573-05 | Mini connect wafer 5P | |
| — | E40-0773-05 | Mini connect wafer 7P | |
| — | E40-1073-05 | Mini connect wafer 10P | |
| — | E40-1273-05 | Mini connect wafer 12P | |
| — | J31-0502-04 | PC Board collar | |
| — | J42-0404-05 | PC Board bush | |

| Ref. No. | Parts No. | Description | Re- marks |
|-----------|---------------|---------------------------------|--------------|
| C41 | CC45CH1H0R5C | C 0.5pF ±0.25pF | |
| C42.43 | CC45TH1H050C | C 5pF ±0.25pF | |
| C44 | CC45CH1H220J | C 22pF ±5% | |
| C50 | C90-0804-05 | C 0.001μF | |
| C51 | CE04W1E4R7Q | E 4.7μF 25V | |
| C54 | CE04W1E4R7Q | E 4.7μF 25V | |
| C55 | CC45CH1H100D | C 10pF ±0.5pF | |
| C56 | CC45CH1H010C | C 1pF ±0.25pF | |
| C58 | CE04W1HR47Q | E 0.47μF 50V | |
| C62.63 | CE04W1C100Q | E 10μF 16V | |
| C65 | C90-0820-05 | E 470μF 16V(small) | |
| C67 | CE04W1C100Q | E 10μF 16V | |
| C70 | CE04W1C220Q | E 22μF 16V | |
| C73 | CE04W1A470Q | E 47μF 10V | |
| C75 | CE04W1A470Q | E 47μF 10V | |
| C76 | CE04W1C470Q | E 47μF 16V | |
| C77 | CE04W1C101Q | E 100μF 16V | |
| C78 | CQ92M1H223K | ML 0.022μF ±10% | |
| C79 | CE04W1C101Q | E 100μF 16V | |
| C80 | CQ92M1H473K | ML 0.047μF ±10% | |
| C86 | CS15E1A3R3M | T 3.3μF 10V | |
| C87 | CE04W1C470Q | E 47μF 16V | |
| C88 | CE04W1C330Q | E 33μF 16V | |
| C89 | CQ92M1H472K | ML 0.0047μF ±10% | |
| C91.92 | | not used (K) | |
| C93 | CE04W1C220Q | E 22μF 16V | |
| C94~96 | C91-0433-05 | Laminated cap. 0.0039μF ±5% 50V | |
| C94~96 | | not used (K) | |
| C97 | CE04W1C220Q | E 22μF 16V | |
| C98.99 | CE04W1H010Q | E 1μF 50V | |
| C100.101 | CS15E1A150M | T 15μF 10V | |
| C102 | CE04W1C220Q | E 22μF 16V | |
| C93.97~99 | | Not used (K) | |
| C100.101 | | Not used (K)(W) | |
| R46 | RC05GF2H2R2J | Solid 2Ω 5%/1/2W | |
| R52 | RC05GF2H100J | Solid 10Ω ±5%/1/2W | |
| R62 | R92-0616-05 | Metal film 10kΩ ±1%/1/4W | |
| R62 | | Not used (K) | |
| R63 | RN14BK2E4703F | Metal film 470kΩ ±1%/1/4W | |
| R63 | | Not used (K) | |
| R64 | R92-0616-05 | Metal film 10kΩ ±1%/1/4W | |
| R64 | | Not used (K) | |
| R65 | R92-0617-05 | Metal film 7.5kΩ ±1%/1/4W | |
| R65 | | Not used (K) | |
| TC1 | C05-0062-05 | Ceramic trimmer 6pF | |
| TC2.3 | C05-0030-15 | Ceramic trimmer 20pF | |
| VR1 | R12-4016-05 | Semi-fixed resistor 50kΩ | |
| VR2 | R12-2015-05 | Semi-fixed resistor 5kΩ | |
| VR3 | R12-0042-05 | Semi-fixed resistor 500Ω | |
| VR4 | R12-1016-05 | Semi-fixed resistor 3kΩ | |
| VR5 | R12-4016-05 | Semi-fixed resistor 50kΩ | |
| VR6.7 | R12-1050-05 | Semi-fixed resistor 1kΩ | |
| VR8 | R12-2405-05 | Semi-fixed resistor 5kΩ | |
| VR9 | R12-4403-05 | Semi-fixed resistor 50kΩ | |
| Q1 | V03-2240-06 | TR 2SC2240 (GR) | |
| Q2 | V30-0039-05 | IC TA7061AP | |
| Q3.4 | V03-0079-05 | TR 2SC460(B) | |
| Q5.6 | V09-1014-06 | FET 2SK61 (GR) | |
| Q7 | V09-1002-56 | FET 3SK74(L) | |
| Q8 | V03-2538-16 | TR 2SC2538-22-A | |
| Q9 | V03-2603-06 | TR 2SC2603(E) | |

**TX UNIT (X56-1370-10)(K)(X)
(X56-1370-51)(T)
(X56-1370-61)(W)**

| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|---------------------|--------------|
| C1.2 | CC45SL1H101J | C 100pF ±5% | |
| C3 | CS15E1C010M | T 1μF 16V | |
| C4 | CE04W1E4R7Q | E 4.7μF 25V | |
| C5 | CQ92M1H682K | ML 0.0068μF ±10% | |
| C6 | CE04W1A470Q | E 47μF 10V | |
| C7 | CE04W1H010Q | E 1μF 50V | |
| C8 | CQ92M1H472K | ML 0.0047μF ±10% | |
| C10 | CE04W1A470Q | E 47μF 10V | |
| C11 | CE04W1E4R7Q | E 4.7μF 25V | |
| C12 | CE04W1A470Q | E 47μF 10V | |
| C13 | CE04W1C220Q | E 22μF 16V | |
| C14 | CE04W1H010Q | E 1μF 50V | |
| C15 | CQ92M1H103K | ML 0.01μF ±10% | |
| C16 | CQ92M1H393K | ML 0.039μF ±10% | |
| C18 | CC45TH1H100D | C 10pF ±0.5pF | |
| C19 | CC45UJ1H020C | C 2pF ±0.25pF | |
| C20.21 | CC45SL1H221J | C 220pF ±5% | |
| C23 | CC45CH1H100D | C 10pF ±0.5pF | |
| C26 | CC45CH1H330J | C 33pF ±5% | |
| C27.28 | CC45CH1H220J | C 22pF ±5% | |
| C32 | CC45TH1H020C | C 2pF ±0.25pF | |
| C33.34 | CC45TH1H080D | C 8pF ±0.5pF | |
| C35 | CC45CH1H070D | C 7pF 0.5pF(W)(T) | |
| C35 | CC45CH1H080D | C 8pF 0.5pF(K) | |
| C36 | CC45TH1H030C | C 3pF ±0.25pF(K) | |
| C36 | CC45TH1H040C | C 4pF ±0.25pF(W)(T) | |
| C37 | CC45TH1H060D | C 6pF ±0.5pF(K) | |
| C37 | CC45TH1H050C | C 5pF ±0.25pF(W)(T) | |
| C38 | CC45CH1H0R5C | C 0.5pF ±0.25pF | |
| C39 | CC45TH1H040C | C 4pF ±0.25pF(K) | |
| C39 | CC45TH1H050C | C 5pF ±0.25pF(W)(T) | |
| C40 | CC45TH1H050C | C 5pF ±0.25pF | |

PARTS LIST

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|----------------------------|--------------|
| Q10,11 | V01-1015-06 | TR 2SA1015(Y) | |
| Q12 | V01-0671-16 | TR 2SA671(B) | |
| Q13 | V01-1015-06 | TR 2SA1015(Y) | |
| Q14 | V03-2603-06 | TR 2SC2603(E) | |
| Q15 | V03-0336-05 | TR 2SC496(Y) | |
| Q16 | V30-1135-06 | IC FS7808C | |
| Q17,18 | V03-2603-06 | TR 2SC2603(E) | |
| Q19 | V01-1015-06 | TR 2SA1015(Y) | |
| Q20 | V03-2603-06 | TR 2SC2603(E) | |
| Q21,22 | V03-1815-06 | TR 2SC1815(Y) | |
| Q23,24 | V03-0093-05 | TR 2SC458(B) | |
| D1 | V11-0317-05 | Vari-cap diode 1S2208 | |
| D2,3 | V11-0414-05 | Diode 1S2588 | |
| D4 | V11-0317-05 | Vari-cap diode 1S2208 | |
| D5~7 | V11-7761-86 | Vari-cap diode ITT410 | |
| D8 | V11-0076-05 | Vari-cap diode 1S1555 | |
| D9,10 | V11-0051-05 | Diode 1N60 | |
| D11 | V11-0076-05 | Diode 1S1555 | |
| D12 | V11-1262-46 | Diode VD1223 | |
| D13 | V11-0243-05 | Zener diode WZ-061 | |
| D14 | V11-4167-06 | Zener diode XZ-090 | |
| D15,16 | V11-0076-05 | Diode 1S1555 | |
| D17 | V11-4101-20 | Zener diode XZ-060 | |
| D18 | V11-4161-96 | Zener diode XZ-070 | |
| D19,20 | V11-0076-05 | Diode 1S1555 | |
| D21 | V11-4101-20 | Zener diode XZ-060 | |
| D22 | V11-0076-05 | Diode 1S1555 (W)(T) | |
| D22 | | not used (K) | |
| D23 | V11-0076-05 | Diode 1S1555 (T) | |
| D23 | | not used (K)(W) | |
| L1 | L40-1545-06 | Ferri-inductor 150mH | |
| L2 | L77-0859-05 | Crystal 10.710 MHz | |
| L3 | L33-0615-05 | Choke 15 μ H | |
| L4 | L30-0005-05 | Tuning coil | |
| L5 | L31-0313-05 | Tuning coil | |
| L6 | L40-1001-03 | Ferri-inductor 10 μ H | |
| L7 | L40-1511-03 | Ferri-inductor 150 μ H | |
| L8 | L34-0886-05 | Tuning coil MIX | |
| L9 | L31-0180-05 | Tuning coil | |
| L10 | L31-0266-05 | Tuning coil | |
| L11 | L31-0267-05 | Tuning coil | |
| L12 | L34-0885-15 | VHF Coil 5 ϕ 5T | ☆ |
| L13 | L34-0452-05 | VHF Coil 3 ϕ 6T | |
| L14 | L34-0691-05 | VHF Coil 5 ϕ 5T | |
| L15 | L40-6825-04 | Ferri-inductor 6.8mH | |
| L16 | L33-0026-05 | Choke 1 μ H | |
| L17 | L15-0016-05 | Choke trans. | |
| L18 | L40-1511-03 | Ferri-inductor 150 μ H | |
| L19,20 | L40-1011-03 | Ferri-inductor 100 μ H | |
| — | E40-0273-05 | Mini connect wafer 2P | |
| — | E40-0373-05 | Mini connect wafer 3P | |
| — | E40-0773-05 | Mini connect wafer 7P | |
| — | E40-0873-05 | Mini connect wafer 8P | |
| — | E40-1173-05 | Mini connect wafer 11P | |
| — | E40-1273-05 | Mini connect wafer 12P | |

PACKING/DISASSEMBLY

< PACKING >

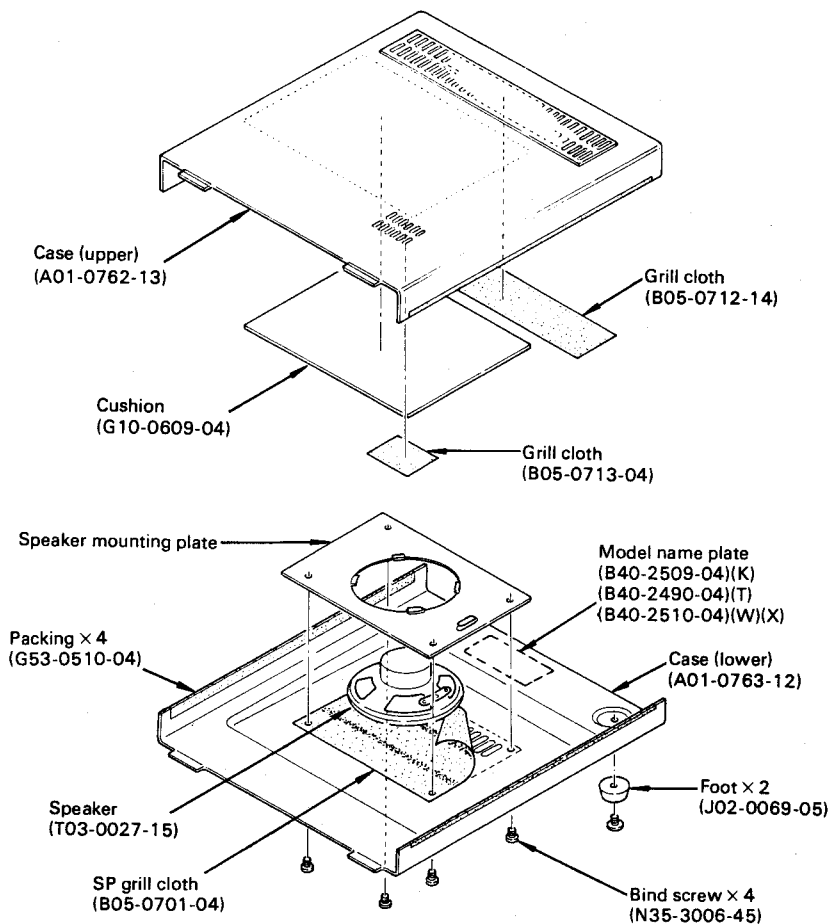
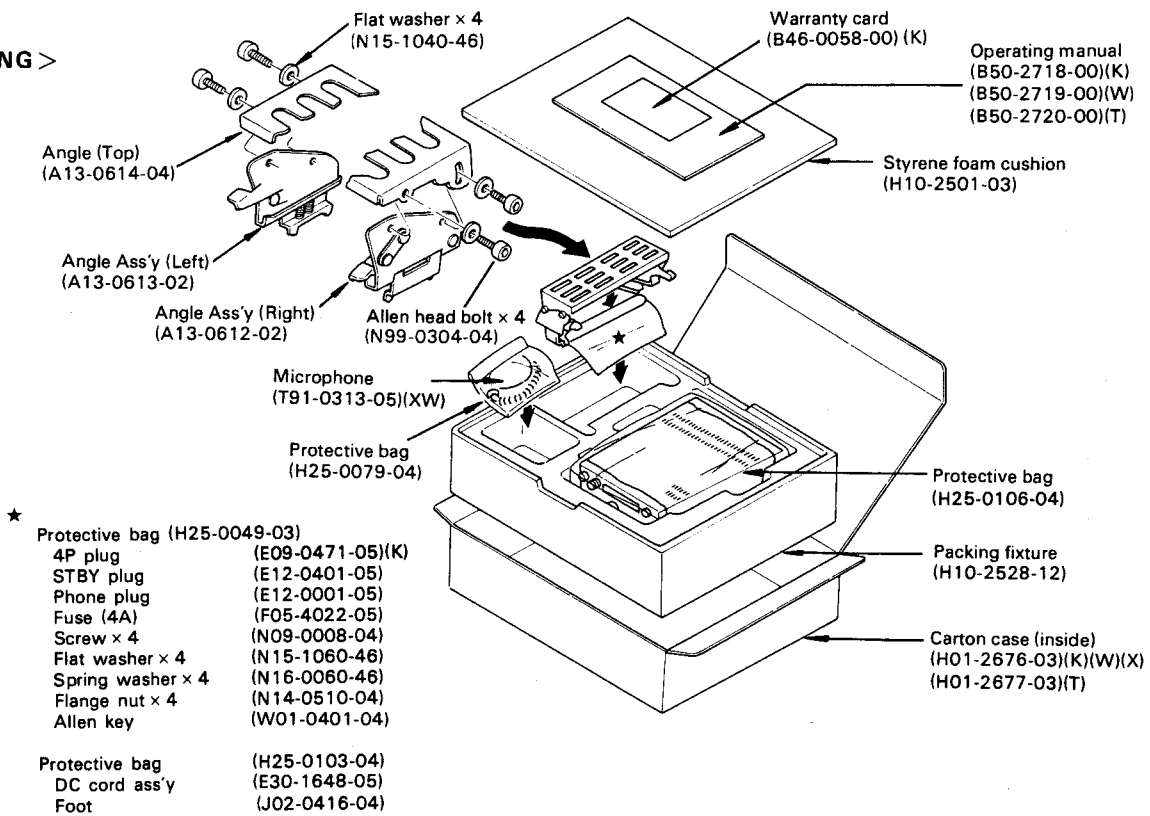
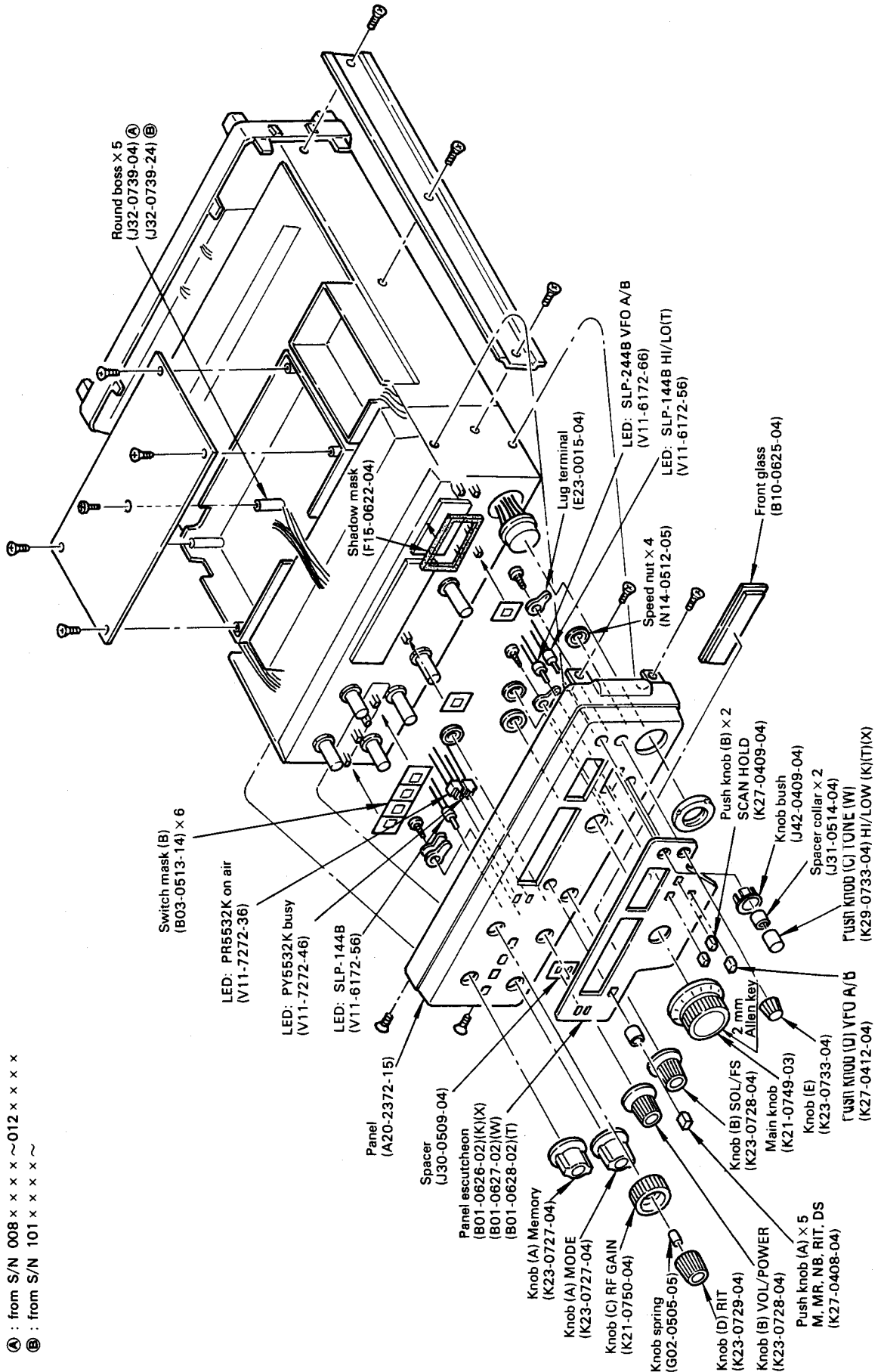


Fig. 12 Case disassembly

DISASSEMBLY



(A) : from S/N 008 x x x x ~ 012 x x x x x
 (B) : from S/N 101 x x x x x ~

Fig. 13 Front panel disassembly

DISASSEMBLY

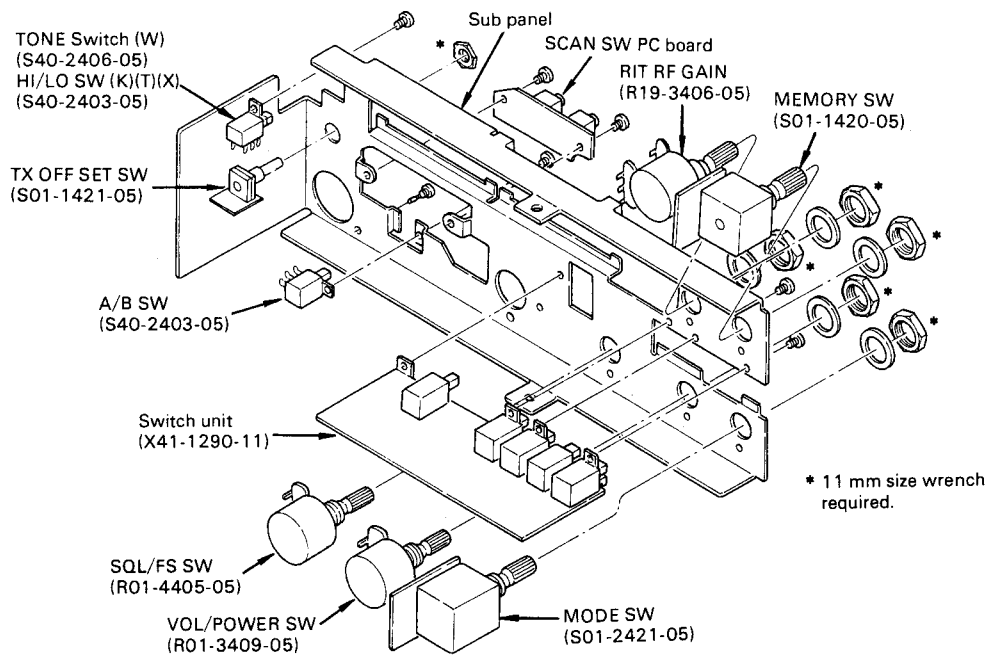


Fig. 14 Sub panel disassembly

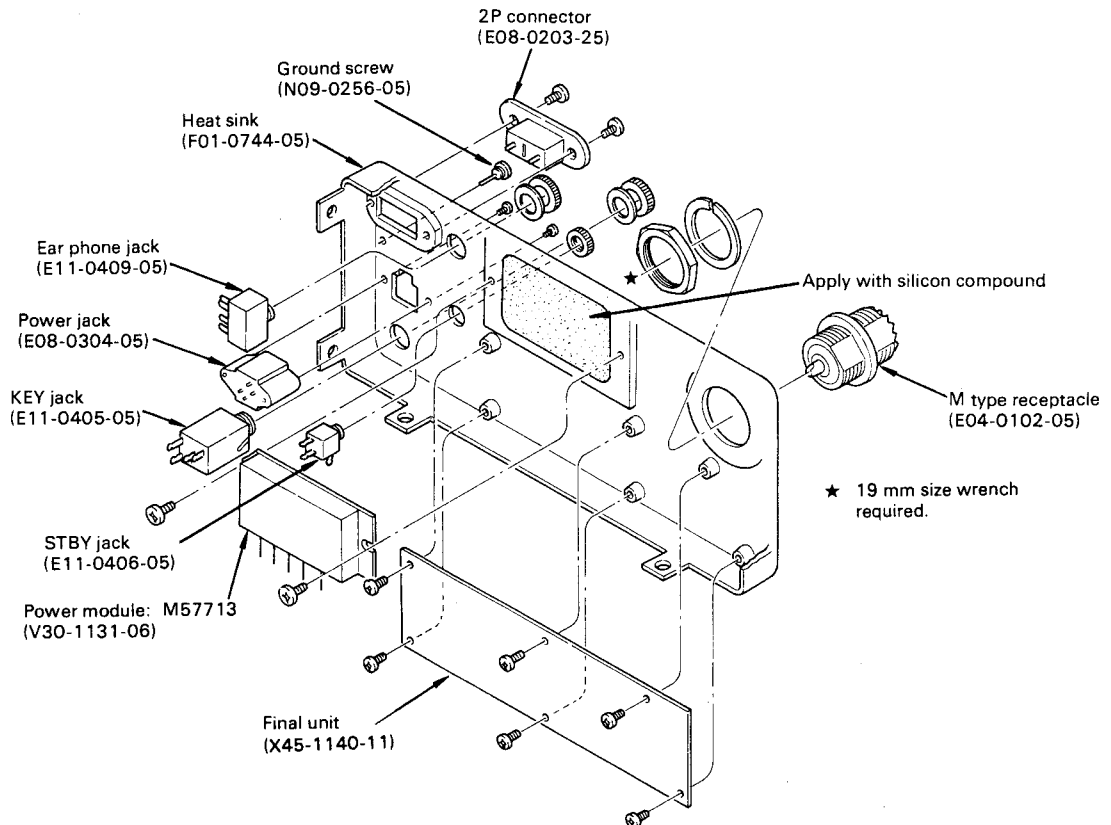


Fig. 15 Heat sink ass'y/disassembly

DISASSEMBLY

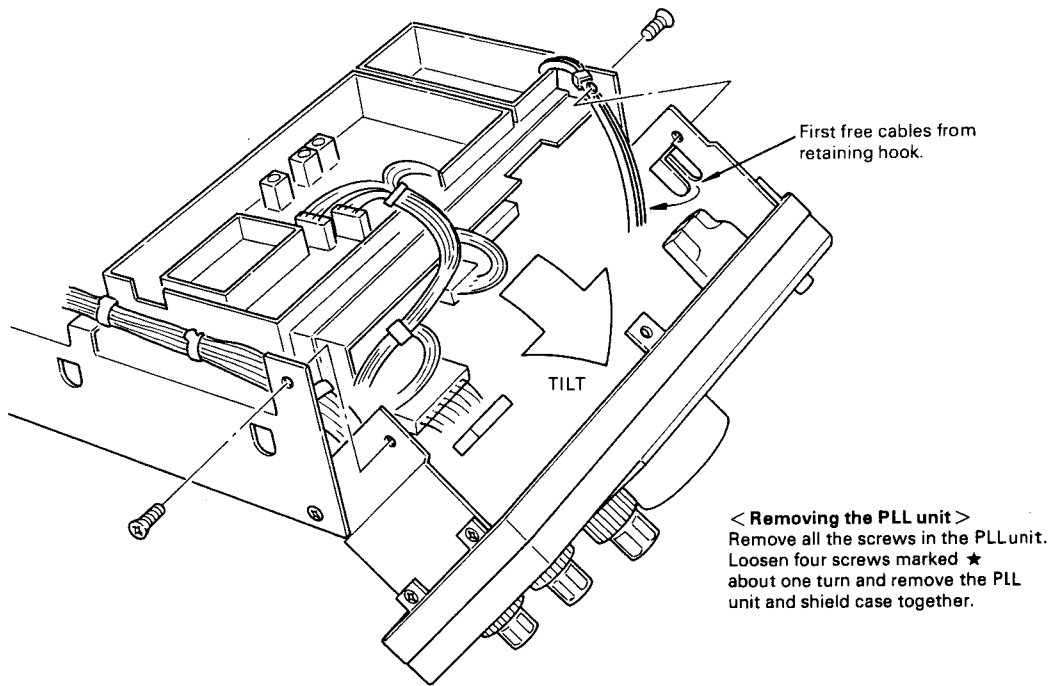


Fig. 16 Inspection of the PLL and switch unit

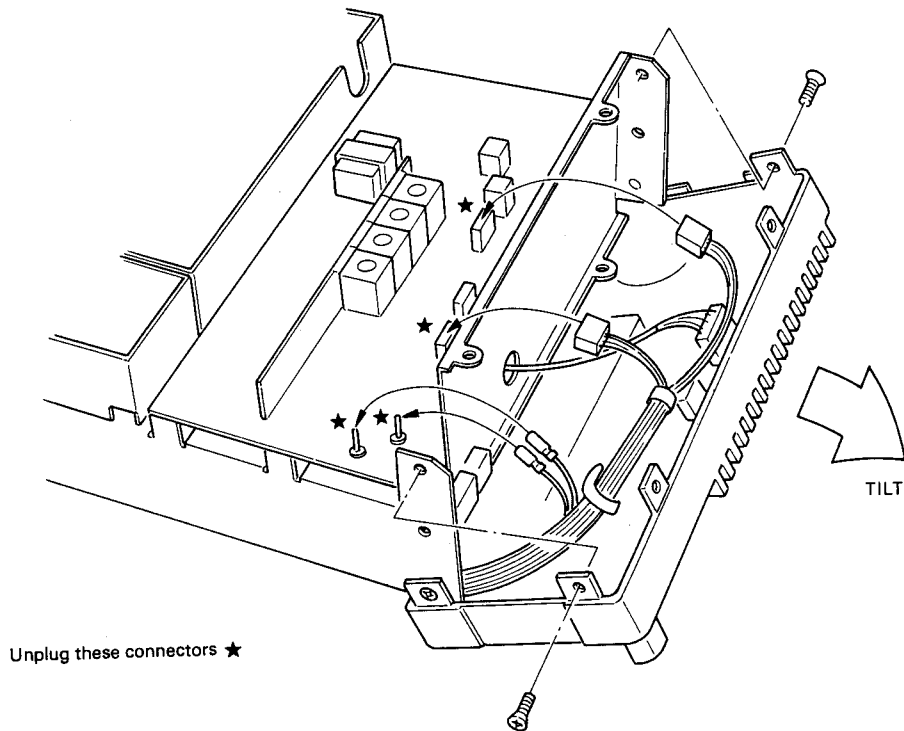
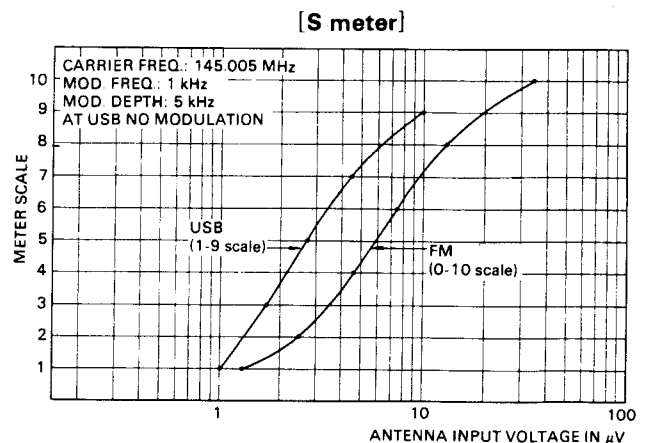
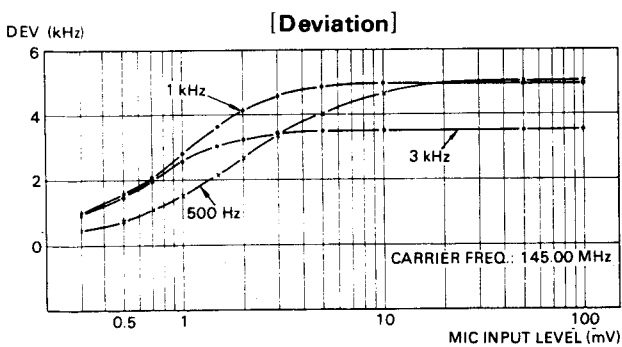
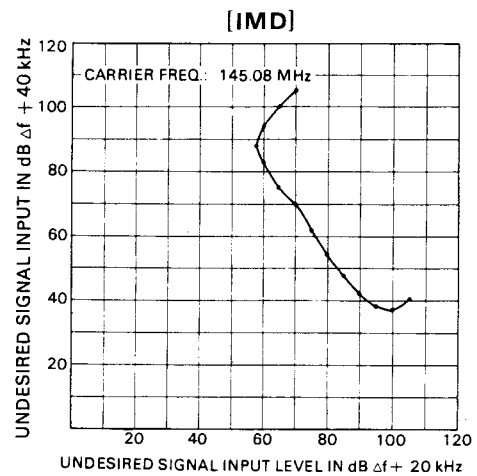
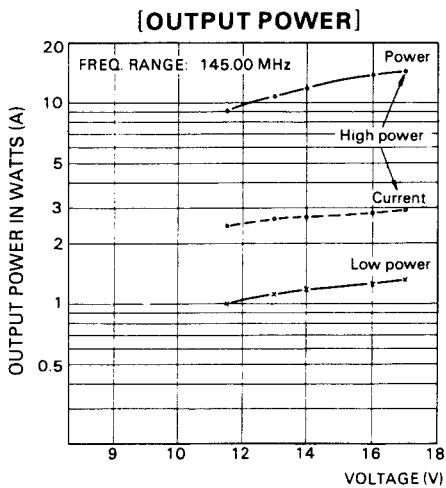
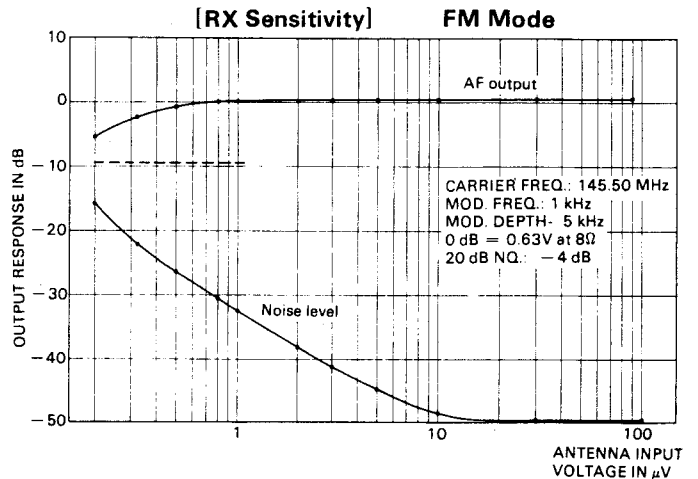
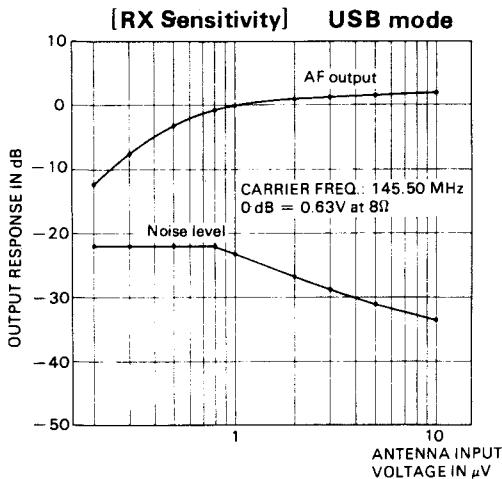
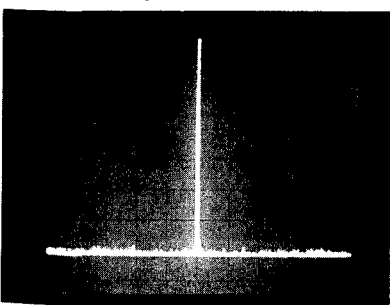


Fig. 17 Heat sink access

REFERENCE DATA

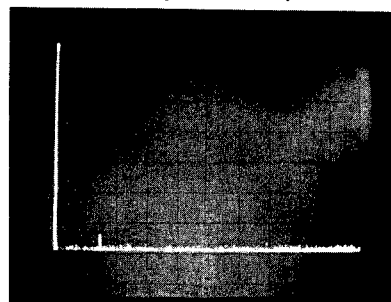


[Near spurious response]



CARRIER FREQ.: 145.02 MHz
RF POWER: 10.5W
SCAN WIDTH: 5 MHz/DIV
BAND WIDTH: 10 kHz
SCAN TIME: 0.5 sec.
VIDEO FILTER: 10 kHz
INPUT ATT.: 20 dB
LOG REF LEVEL: -5 dBm
10 dB/DIV

[Harmonics spurious response]



CARRIER FREQ.: 145.02 MHz
RF POWER: 10.5W
SCAN WIDTH: 100 MHz/DIV
BAND WIDTH: 30 kHz
SCAN TIME: 2 sec.
VIDEO FILTER: 10 kHz
INPUT ATT.: 20 dB
LOG REF LEVEL: -5 dBm
10 dB/DIV

PS-20

PS-20 SPECIFICATIONS

[POWER SUPPLY SECTION]

Input voltage AC 120/220/240V $\pm 10\%$, 50/60 Hz
Output voltage DC 13.8V (standard voltage)
Output current 4.5A (intermittent load 50% duty cycle)
Continuous load current 4A max.
Output voltage fluctuation Within ± 50 mV at AC120/220/240V $\pm 10\%$
 (at load current 4A)
 Within 0.1V at 0~4A of load current
 (at AC 120/220/240V)
Ripple voltage Less than 5 mV at 13.8V, 4A
 (at AC 120/220/240V)
Power consumption Approx. 100W
 (at AC 120/220/240V, DC 13.8V, 4A)

[GENERAL]

Dimensions 123 (4-27/32") W \times 96 (3-25/32") H \times 235
 (9-17/64") D mm (inch)
Weight Approx. 3.8 kg (8.4 lbs)

[ACCESSORIES]

Operating manual 1
DC Power cord 1
Fuse (1A) 1
Crimp style terminal 2

NOTE: The circuit and ratings may change without notice due to development in technology.

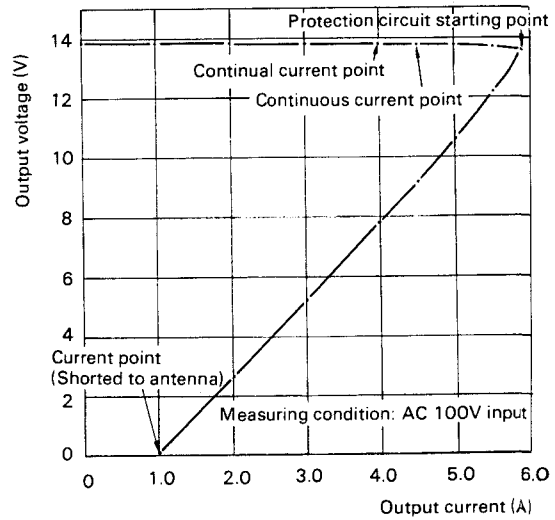


Fig. 19 Output voltage characteristic

PS-20

☆: New Parts

| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|---|--------------|
| C1 | C90-0808-05 | E 15000 μ F 25V | ☆ |
| — | A01-0732-03 | Case (A) | ☆ |
| — | A01-0733-02 | Case (B) | ☆ |
| — | A20-2333-03 | Panel (T) | ☆ |
| — | A20-2336-03 | Panel (K)(W) | ☆ |
| — | B39-0407-04 | Spacer (assistance leg) | |
| — | B46-0058-00 | Warranty card (K) | |
| — | B50-2616-10 | Operating manual (K)(W) | ☆ |
| — | B50-2617-10 | Operating manual (T) | ☆ |
| — | E07-0252-05 | 2P Metal plug | |
| — | E20-0282-05 | 2P Terminal plate | ☆ |
| — | E23-0412-05 | Crimp style terminal \times 2 | ☆ |
| — | E30-0181-05 | AC cord with plug (K) | |
| — | E30-0585-05 | AC cord with plug (W) | |
| — | E30-0602-05 | AC cord with plug (T) | |
| — | E30-1620-05 | DC power cord | ☆ |
| — | F05-1023-05 | Fuse (1A) \times 1 (K) \times 2(W)(T) | |
| — | F05-2023-05 | Fuse (2A) \times 2(K) | |
| — | F29-0014-05 | Shoulder washer \times 4 | |
| — | H01-2592-14 | Carton (inside) (K)(W) | ☆ |
| — | H01-2593-14 | Carton (inside) (T) | ☆ |
| — | H10-2513-02 | Styren foam cushion (front) | ☆ |
| — | H10-2514-02 | Styren foam cushion (rear) | ☆ |
| — | H12-0460-04 | Cushion | ☆ |
| — | H20-1407-03 | Protective cover | ☆ |
| — | H25-0029-04 | Accessories bag 60 \times 110 mm | |
| — | H25-0117-04 | Accessories bag 80 \times 250 mm | |
| — | J02-0323-05 | Foot \times 4 | |
| — | J02-0409-04 | Foot supporter | ☆ |
| — | J21-2573-04 | Foot stopper \times 2 | |
| — | J32-0133-04 | Hex boss \times 4 | |
| — | J41-0006-05 | Cord bush (K) | |
| — | J41-0024-15 | Cord bush (W)(T) | |
| — | L01-8056-05 | Power trans. | ☆ |

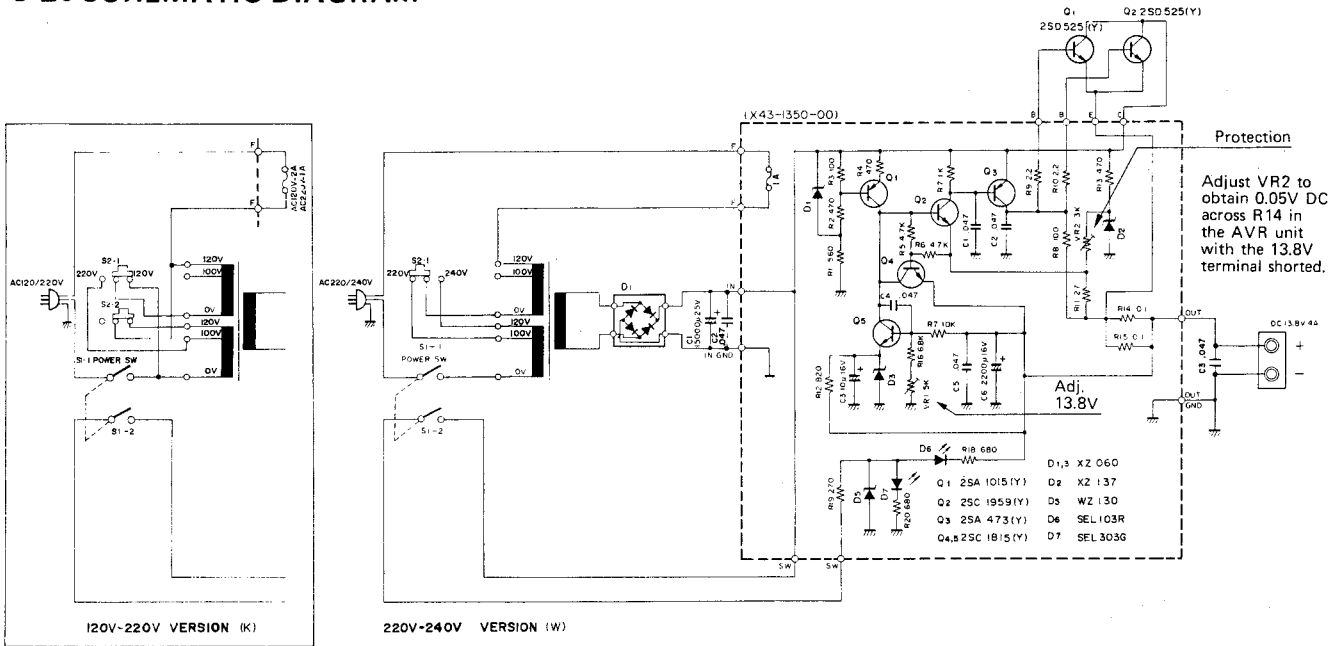
| Ref. No. | Parts No. | Description | Re- marks |
|----------|-------------|---------------------------|--------------|
| S1 | S36-2402-05 | Seesaw switch (power) | |
| S2 | S31-2027-05 | Slide switch (AC voltage) | |
| Q1,2 | V04-0525-26 | TR 2SD525(O) or (Y) | ☆ |
| D1 | V11-2164-06 | Rectifier stack M4B51-11 | ☆ |
| — | X43-1350-00 | AVR unit | ☆ |

AVR UNIT (X43-1350-00)

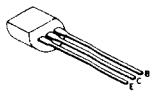
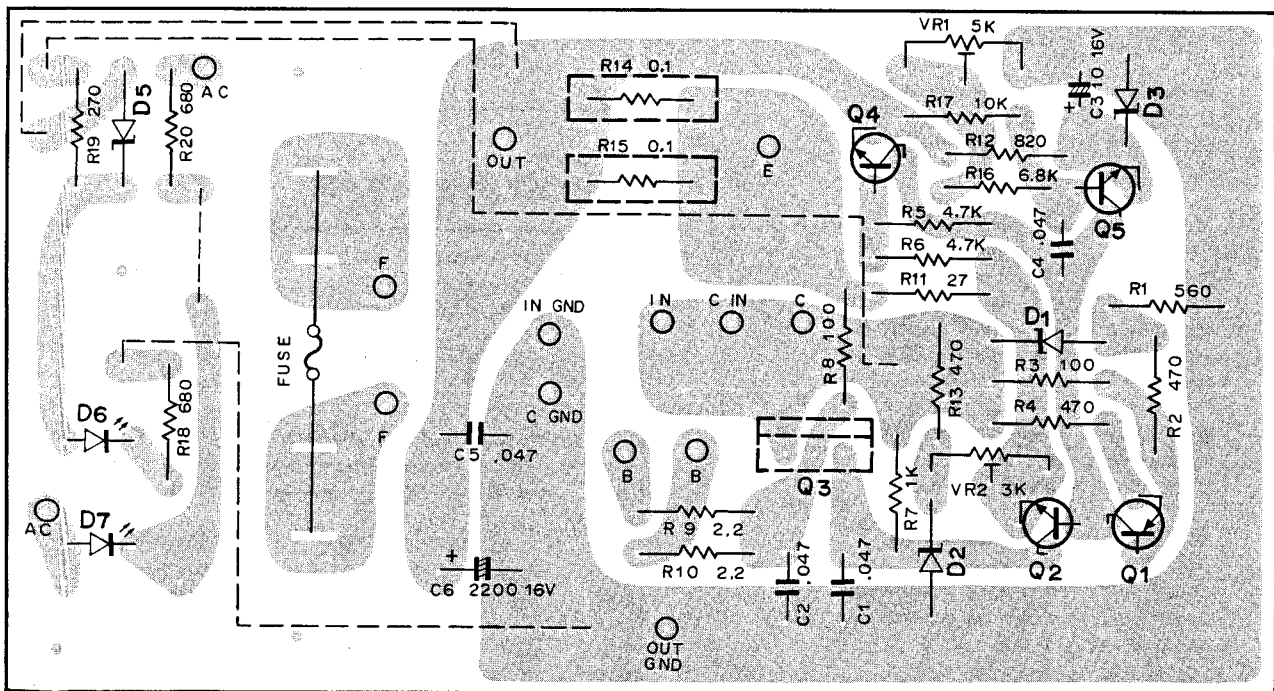
| Ref. No. | Parts No. | Description | Re- marks |
|----------|--------------|---------------------------------|--------------|
| C1,2 | C91-0456-05 | C 0.047 μ F 25V | |
| C3 | CE04W1C100 | E 10 μ F 16V | |
| C4,5 | C91-0456-05 | C 0.047 μ F 25V | |
| C6 | CE04W1C222MA | E 2200 μ F 16V | ☆ |
| R14,15 | R92-0618-05 | Metal film 0.1 Ω | ☆ |
| VR1 | R12-2015-05 | Semi-fixed resistor 5k Ω | |
| VR2 | R12-1016-05 | Semi-fixed resistor 3k Ω | |
| Q1 | V01-1015-06 | TR 2SA1015(Y) | |
| Q2 | V03-1959-06 | TR 2SC1959 (Y) | |
| Q3 | V01-0473-06 | TR 2SA473(Y) | |
| Q4,5 | V03-1815-06 | TR 2SC1815(Y) | |
| D1 | V11-4101-20 | Zener diode XZ-060 | |
| D2 | V11-4161-76 | Zener diode XZ-137 | |
| D3 | V11-4101-20 | Zener diode XZ-060 | |
| D4 | | not used | |
| D5 | V11-0297-05 | Zener diode WZ-130 | |
| D6 | V11-5160-66 | LED SEL103R | ☆ |
| D7 | V11-5160-76 | LED SEL303G | ☆ |
| — | E23-0047-04 | Square terminal \times 10 | |
| — | J31-0503-05 | Beads \times 4 | |

PS-20

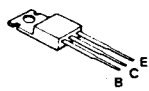
PS-20 SCHEMATIC DIAGRAM



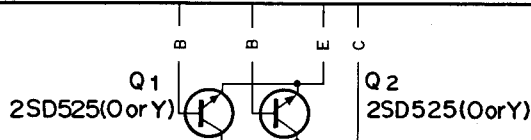
PS-20 PC BOARD ▼ AVR UNIT (X43-1350-00)



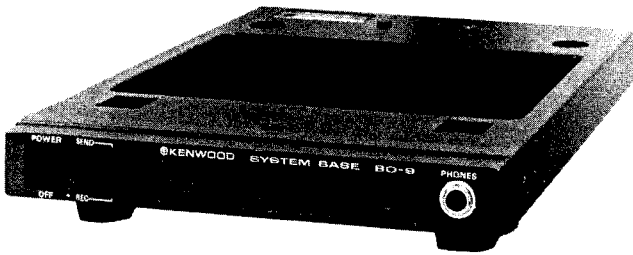
- 2SA1015(Y)
- 2SC1815(Y)
- 2SC1959(Y)



- 2SA473(Y)
- 2SD525(Y)

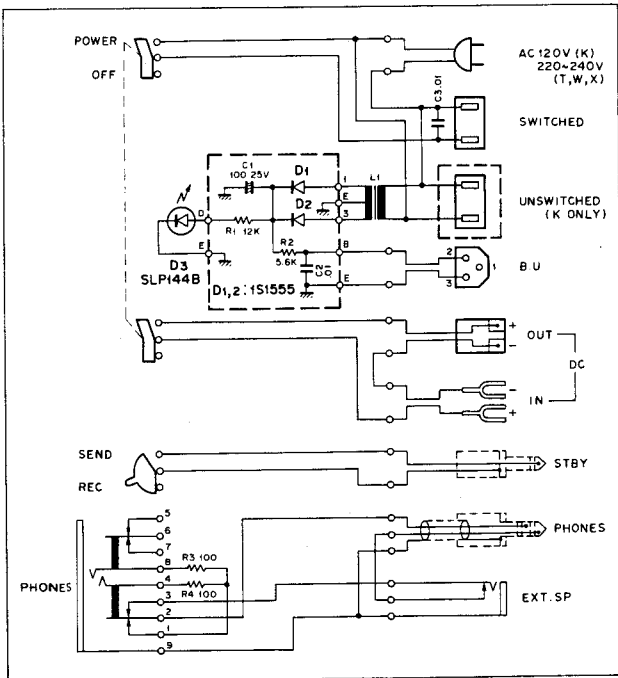


SYSTEM BASE BO-9



BO-9 SPECIFICATIONS

Input voltage AC120V (K) $\pm 10\%$, 50 ~ 60 Hz
 220~240V(T)(W)(X)
Buck up output DC13.8V, 1.5 mA
AC outlet output AC120V (K) 200W (MAX)
 220~240V(T)(W)(X)
Dimensions 170 (6-11/16") \times 25 (1") \times 232 (9-9/64") mm
 (inch)
Weights Approx. 1.0 kg (2.2 lbs)

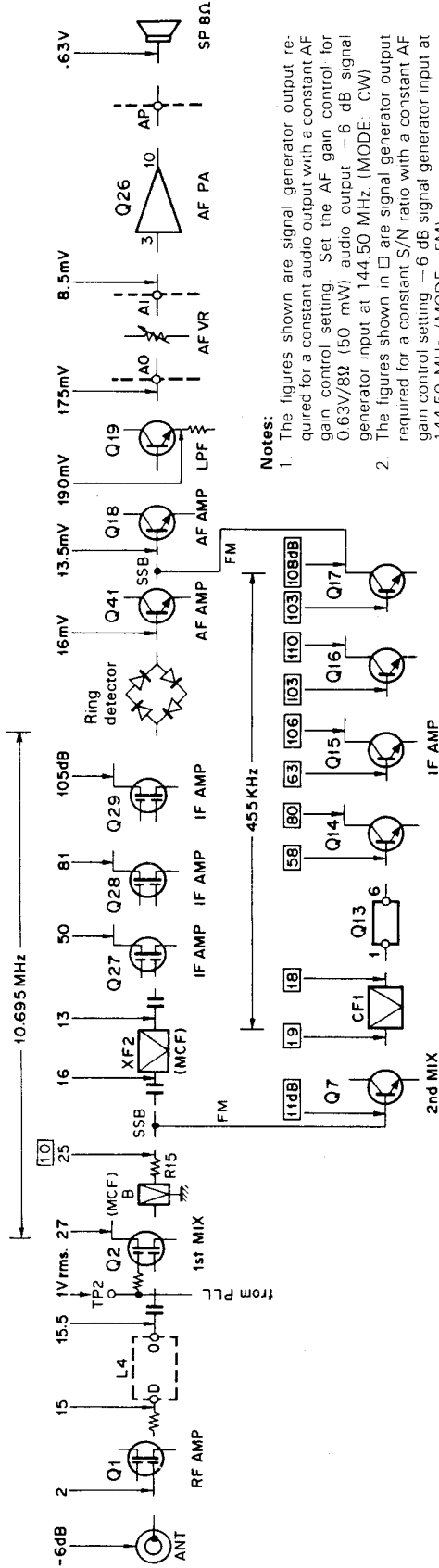


BO-9 PARTS LIST

| Ref. No. | Parts No. | Description | Remarks |
|----------|--------------|------------------------------------|---------|
| C1 | CE04W1E101Q | E 100 μ F 25V | |
| C2,3 | CK45F1H103Z | C 0.01 μ F +80,-20% | |
| R3,4 | RC05GF2H101J | Solid 100 Ω $\pm 5\%$ 1/2W | |
| D1,2 | V11-0076-05 | Diode 1S1555 | |
| D3 | V11-6172-56 | LED SLP144B | |
| — | A01-0767-02 | Case (upper)(K) | ☆ |
| — | A01-0768-03 | Case (bottom) | ☆ |
| — | A01-0769-02 | Case (upper)(W)(T)(X) | ☆ |
| — | A20-2374-05 | Panel (T) | ☆ |
| — | A20-2375-05 | Panel (K)(W)(X) | ☆ |
| — | B46-0058-00 | Warranty card (K) | |
| — | B50-2708-00 | Operating manual (K) | ☆ |
| — | B50-2709-00 | Operating manual (W)(T)(X) | ☆ |
| — | E03-0153-05 | AC Outlet | ☆ |
| — | E03-0154-05 | AC Plug (W)(T)(X) | ☆ |
| — | E11-0404-05 | Phone jack | |
| — | E11-0410-05 | Phone jack | ☆ |
| — | E22-0306-05 | Lug plate | |
| — | E30-0181-05 | AC cord (K) | |
| — | E30-0185-05 | AC cord (X) | |
| — | E30-0585-05 | AC cord (W) | |
| — | E30-0602-05 | AC cord (T) | |
| — | E30-1653-15 | DC cord | ☆ |
| — | E30-1654-05 | Cord with $\phi 2.5$ plug | ☆ |
| — | E30-1655-05 | Cord with ST plug | ☆ |
| — | E30-1656-05 | DC cord ass'y | ☆ |
| — | E30-1657-05 | 3P power cord BACK UP | ☆ |
| — | H01-2665-04 | Carton (inside)(T) | ☆ |
| — | H01-2667-04 | Carton (inside)(K)(W)(X) | ☆ |
| — | H10-2532-04 | Cushion foam $\times 4$ | ☆ |
| — | H12-0467-03 | Cushion | ☆ |
| — | H25-0029-04 | Protective bag (W)(T)(X) | |
| — | H25-0103-04 | Protective bag 125 \times 250 mm | |
| — | H25-0106-04 | Protective bag 250 \times 350 mm | |
| — | J02-0323-05 | Foot $\times 4$ | |
| — | J19-1325-04 | Stopper plate $\times 4$ | |
| — | J25-2732-04 | PC board | ☆ |
| — | J41-0006-05 | Cord bush | |
| — | L01-0150-05 | Transformer (K) | |
| — | L01-8022-05 | Transformer (W)(T)(X) | ☆ |
| — | N35-3004-45 | Bind screw | |
| — | N35-3006-45 | Bind screw | |
| — | S36-2405-05 | Power switch | ☆ |
| — | S44-2404-05 | STBY switch | ☆ |

LEVEL DIAGRAM

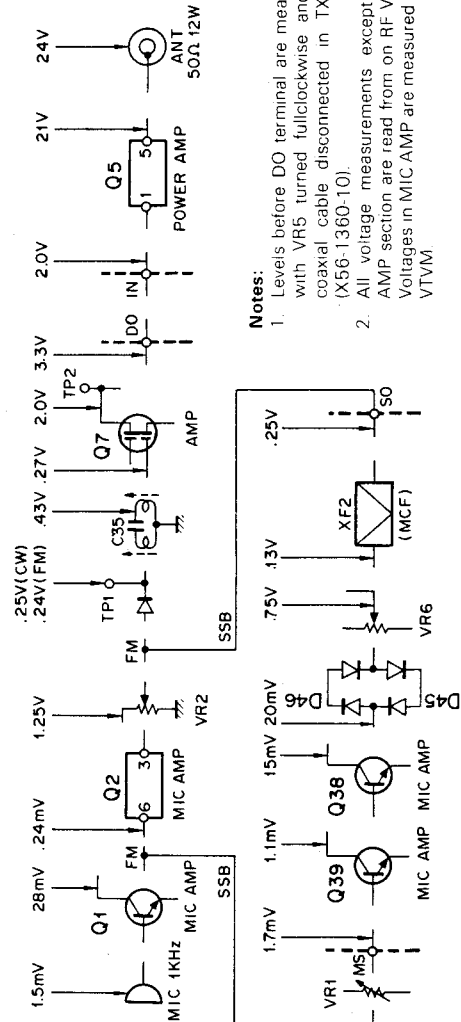
< RECEIVER SECTION >



Notes:

1. The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting. Set the AF gain control for 0.63V/8Ω (50 mW) audio output -6 dB signal generator input at 144.50 MHz. (MODE: CW)
2. The figures shown in □ are signal generator output required for a constant S/N ratio with a constant AF gain control setting -6 dB signal generator input at 144.50 MHz. (MODE: FM)
3. The figures shown after the ring detector are audio output levels.
4. To inject signal generator output connect a 0.01 μF 500V capacitor between the signal generator and the check point.

< TRANSMITTER SECTION >



Notes:

1. Levels before DO terminal are measured with VR5 turned fullclockwise and DO coaxial cable disconnected in TX unit (X56-1360-10).
2. All voltage measurements except MIC AMP section are read from on RF-VTVM. Voltages in MIC AMP are measured by AF VTVM.

< REFERENCE >

| Japanese "SG" | American "SG" |
|---------------|---------------|
| -6 dB | 0.25 μV |
| 0 dB | 0.5 μV |
| 6 dB | 1 μV |
| 12 dB | 2 μV |
| 24 dB | 8 μV |
| 30 dB | 15.8 μV |
| 40 dB | 50 μV |
| 50 dB | 158 μV |
| 60 dB | 500 μV |
| 70 dB | 1.58 mV |
| 80 dB | 5 mV |
| 90 dB | 15.8 mV |
| 100 dB | 50 mV |
| 120 dB | 0.5V |

ADJUSTMENTS

< Test Equipment >

1. Tester
 - Input: Sufficient
 2. RF VTVM (RF V.M.)
 - Input impedance: 1 M Ω and less than 2 pF
 - Voltage range: F.S. = 10 mV to 300V
 - Frequency range: 150 MHz or greater
 3. Frequency counter (F count)
 - Minimum input voltage: 50 mV
 - Frequency range: 150 MHz or greater
 4. DC power supply
 - Voltage 10V to 17V variable
 - Current: 6A min.
 5. RF Dummy Load
 - Dissipation: 20W
 - Impedance: 50 Ω
 - Frequency range: 144 MHz
 6. AF VTVM (AF V.M.)
 - Input impedance: 1 M Ω or greater
 - Voltage range: F.S = 1 mV to 30V
 - Frequency range: 50 Hz to 10 kHz
 7. AF Generator (AG)
 - Frequency range: 100 Hz to 10 kHz
 - Output: 0.5 mV to 1V
 8. Linear detector
 - Frequency range: 144 MHz
 9. Field strength tester
 - Frequency range: 144 MHz
 10. Directional coupler
 11. Oscilloscope
 - With horizontal input and high sensitivity
 12. Standard signal generator (SSG)
 - Frequency range: 144 ~ 149 MHz
 - Modulation: amplitude and frequency modulation
 - Output: -20 dB ~ 100 dB
 13. AF Dummy load
 - 8 Ω , 5W (approx.)
- Noise generator
- Must generate ignition-like noise containing harmonics beyond 144 MHz
15. Sweep generator
 - Frequency range: 144 ~ 149 MHz

< Preparation >

Unless otherwise specified, set the controls as follows.

| | |
|---------------|----------------------|
| POWER/VOL SW | ON |
| SEND/REC | REC |
| RF GAIN VOL | MAX (Full Clockwise) |
| SQUELCH VOL | MIN |
| MODE SW | USB |
| VFO A/B SW | A |
| TX OFF SET SW | S |
| HI/LOW SW | HI |
| RIT VOL | Centered |
| RIT SW | OFF |
| NB SW | OFF |
| SCAN SW | OFF |
| D.STEP/SEARCH | OFF |
| MR | OFF |

Notes:

- When adjusting the trimmers or coils, use a non-induced adjusting rod of bakelite, etc.
- When adjusting the RX section never transmit to prevent SSG damage.
- Connect MIC connector as shown in Fig. 18.

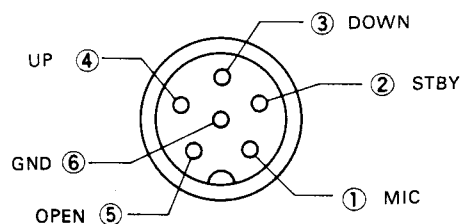


Fig. 18 MIC terminals
(view from front panel side)

ADJUSTMENTS

| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|------------------------------|--|----------------|------|----------|------------|--------|--|--|--|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| 1. Voltage check in RX mode. | 1 8C | DC V.M | TX | 8C | | | | 7.7~8.3V | Check |
| | 2 8R | | | 8R | | | | 7.9~8.9V | |
| | 3 9T | | | 9T | | | | Less than 0.1V | |
| | 4 -6 Mode SW : FM1 | | | -6 -6 | | | | -5.8~-6.2V 0V (Voltage drops) | |
| | 5 5C | | | PLL | 5C | | | 5.1~5.7V | |
| 2. Voltage check in TX mode | • Disconnect TX unit DO-E cable • Set in transmit mode. | DC V.M | TX | 9T | TX | VR6 | Set to 9.0±0.1V | | Check |
| | 1 9T | | | 8R | | | | Less than 0.5V | |
| | 2 8R | | | Final | DB | | | 11.7~12.1V | |
| 3. Back up voltage check | 1 POWER/VOL SW: OFF | DC V.M | TX | MB | TX | VR7 | Set to 5.2±0.1V | | |
| 4. PLL | 1 MODE SW: FM1 VFO dial: 8.99 (K.X) 5.98 (W.T) | RF V.M | PLL | TP3 | PLL | L5,6,7 | MAX | | Reference 0.5V |
| | 2 VFO dial: 4.00 (W.T) 8.99 (K.X) | DC V.M | PLL | TP2 | PLL | TC1 | 2.0V (W.T) 7.0V (K.X) | ±0.05V | |
| | 3 VFO dial: 8.99 (K.X) 5.98 (W.T) | RF V.M | PLL | TP3 | PLL | L5,6,7 | MAX | | Readjust 1 |
| | 4 VFO dial: 5.98 (W.T) 4.00 (K.X) | DC V.M | PLL | TP2 | | | | 3.5~4.5V (W.T) More than 2.0V (K.X) | Check |
| | 5 VFO dial: 5.00 Set in transmit mode MODE SW: USB | RF V.M | PLL | TP1 | PLL | L4 | MAX | | Reference 0.2V |
| 5. HET frequency adjustment | 1 Set in receive mode. MODE SW: FM2 VFO dial: 6,000.0 (K.X) 5,000.0 (W.T) | F.counter | PLL | TP1 | Switch | VR2 | 135,305 MHz (K.X) 134,305 MHz (W.T) | ±20 Hz | |
| | 2 MODE SW: USB VFO dial: 6,000.0 (K.X) 5,000.0 (W.T) | F. counter | PLL | TP1 | Switch | VR3 | 135,306.5 MHz (K.X) 134,306.5 MHz (W.T) | ±10 Hz | |
| | 3 VFO dial: 5,999.9 (K.X) 4,999.9 (W.T) | F.counter | PLL | TP1 | PLL | VR1,2 | 135,306.4 MHz (K.X) 134,306.4 MHz (W.T) | ±10 Hz | VR1: Coarse VR2: Fine |
| | 4 MODE SW: LSB VFO dial: 6,000.0 (K.X) 5,000.0 (W.T) | F.counter | PLL | TP1 | Switch | VR1 | 135,303.5 MHz (K.X) 134,303.5 MHz (W.T) | ±20 Hz | |
| 6. RIT | 1 MODE SW: LSB VFO dial: 5,000.0 RIT SW: ON | F.counter | PLL | TP1 | Switch | VR4 | 134,303.5 MHz | ±10 Hz | |
| | 2 MODE SW: USB | F.counter | PLL | TP1 | Switch | VR5 | 134,306.5 MHz | ±10 Hz | |
| | 3 RIT control: Full clockwise RIT control: Full counterclockwise | F.counter | PLL | TP1 | | | | More than 134,307.5 MHz Less than 134,305.5 MHz | More than ±1.0 kHz Less than -1.0 kHz |
| | 4 RIT SW: OFF RIT control: Centered | DC V.M | PLL | RIT | | | | 5.0±0.3V | Check |

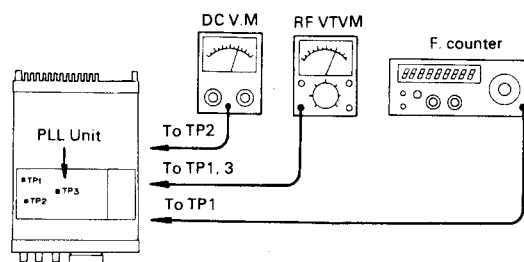


Fig. 19 4. PLL, 5. HET, 6. RIT

ADJUSTMENTS

| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|--------|--|----------------|------|----------|------------|-------|--------------|---------------------|-----------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| 7. CAR | 1 Set knobs in Table 10. | RF V.M | CAR | TP | CAR | L4 | MAX | | Reference 0.28V |
| | 2 | F.counter | CAR | TP | CAR | TC1 | 10.693.5 MHz | ±50 Hz | |
| | 3 MODE SW: CW | F.counter | CAR | TP | | | | Same frequency as 2 | Check |
| | 4 Set in transmit mode. | F.counter | CAR | TP | CAR | TC2 | 10.694.3 MHz | ±50 Hz | |
| | 5 Set in receive mode. MODE SW: LSB | F.counter | CAR | TP | CAR | TC3 | 10.696.5 MHz | ±50 Hz | |

< RX SECTION >

| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|-----------------|--|--|------|----------|--------------------------|--------|--------|--|----------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| 1. RG 1 voltage | 1 MODE SW: FM2 VFO dial: 6.000.0 (K.X) 5.000.0 (W.T) | DC V.M | RX | RG1 | RX | VR1 | 4.0V | | |
| 2. Helical | 1 VFO dial: 5.000.0 (W.T) | RF V.M | RX | TP2 | RX | L3 | MAX | 146 MHz(K.X) 145 MHz(W.T) | Reference 1.0V |
| | 2 ANT terminal on rear panel: Connect sweep generator. TP1 on RF unit: Connect detector. LR-E connector: Disconnect. Reconnect after adjustment. | Oscilloscope < Detector > RX To RF unit TP1 To Oscilloscope vertical | | | L1,2 TC101 102.103 | Repeat | | 144MHz 148 MHz(K.X) 146 MHz(W.T) | |

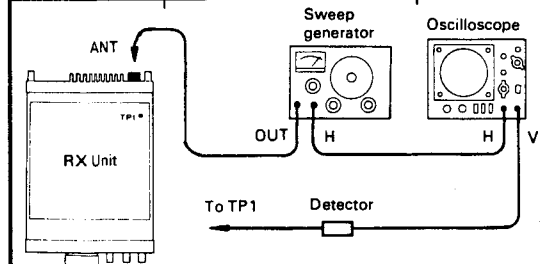
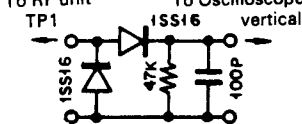


Fig. 20 RX 2. Helical

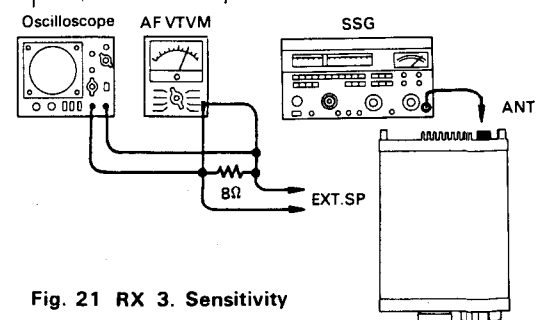


Fig. 21 RX 3. Sensitivity

| | | | | | | | | | |
|---------------------------|---|--------------------|------------|--------|----|-----------------|--|--|--|
| 3. Sensitivity adjustment | 1 ANT terminal on rear panel: Connect SSG. VFO dial: 6.005.0 (K.X) 5.005.0 (W.T) Set SSG to 146.005 MHz (K.X), 145.005 MHz (W.T), 10 dBμ (unmodulated). Adjust the level so that the S meter deflects. AF GAIN: 0.63V/8Ω (50 mW) | S meter or AF V.M. | Rear panel | EXT.SP | RX | L5,6,8,19 | MAX (Repeat) | | Repeat this adjustment as L6, 8 and 19 intert. |
| | 2 | AF V.M. | Rear panel | EXT.SP | RX | L8 | Turn core counter-clockwise to reduce AF output by 2 dB. | | |
| | 3 | AF V.M. | Rear panel | EXT.SP | RX | L19,20 21,22 | MAX | | |
| | 4 SSG OUT: -8 dBμ | AF V.M. | Rear panel | EXT.SP | | | | | S/N more than 10 dB Check |
| | 5 MODE: FM2 VFO dial: 6.005.0 (K.X) 5.005.0 (W.T) Adjust SSG signal so the S meter indicates "3". | S meter or AF V.M. | Rear panel | EXT.SP | RX | L3,5~7 | MAX (Repeat) | | Repeat this adjustment as L6 and 7 intert. |



ADJUSTMENTS

| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|------------|---|----------------|------------|----------|------------|--------|---|--------------------------------|--|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| | 6 SSG OUT: 50 dB μ | AF V.M. | Rear panel | EXT.SP | RX | L17 | MAX | | |
| | 7 SSG OUT: -7 dB μ | AF V.M. | Rear panel | EXT.SP | | | | S/N more than 20 dB | Check |
| | 8 SSG OUT: 40 dB μ | AF V.M. | Rear panel | EXT.SP | | | | S/N more than 50 dB | Check |
| 4. S meter | 1 MODE SW: FM2 SSG OUT: 30 dB μ | S meter | | | RX | VR2 | Set RF meter to "10" | | Lower scale |
| | 2 MODE SW: USB No signal | S meter | | | RX | VR4 | Set RF meter to "0" | | Lower scale |
| | 3 VFO dial: 4.500.0 SSG OUT: 20 dB μ | S meter | | | RX | VR5 | Set S meter to "9" | | Upper scale |
| | 4 SSG OUT: 0 dB μ | S meter | | | RX | L21 | After adjusting to MAX, turn the core counter-clockwise to set S meter to "1" | | Upper scale |
| | 5 Again SSG OUT: 20 dB μ | S meter | | | RX | VR5 | Set S meter to "9" | | Upper scale |
| 5. NB | 1 SSG OUT: 20 dB | DC V.M. | RX | TP3 | RX | L12.14 | MIN (Repeat) | | When TP3 voltage is less than 5V adjust L14 counter-clockwise to get 5V. |
| | 2 Pulse noise | | | | | | | Pulse noise should be reduced. | Check |

< TX SECTION >

| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|-------------------------|---|----------------|------|----------|------------|------------|--------------|---------------|-----------------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| 1. CAR level | 1 TX unit VR5: Full clockwise (ALC OFF) DO terminal: Disconnect coaxial cable. VFO dial: 5.005.0 Set in transmit mode. | RF V.M. | RX | SO | RX | L25 | MAX | | |
| | | | | | RX | VR7 | 0.25V | | |
| 2. FM 10.695 MHz | 1 Follow the above procedures. | RF V.M. | TX | TP1 | TX | L5 | MAX | | Reference 0.25V |
| | 2 MODE SW: FM1 | RF V.M. | TX | TP1 | TX | L4 | MAX | | Reference 0.25V |
| | 3 | F.counter | TX | TP1 | TX | TC1 | 10.695 MHz | ± 200 Hz | |
| 3. Drive adjustment. | 1 Follow the above procedures. | RF V.M. | TX | TP2 | TX | L8~11 | MAX (Repeat) | | Reference 2.3V |
| 4. Power adjustment. | 1 ANT terminal on rear panel: Connect power meter. DO terminal: Connect coaxial cable. Set in transmit mode. | Power meter | | | TX | L11 TC2 | MAX (Repeat) | | |
| | | Power meter | | | TX | TC3 | MAX | | More than 15W |

ADJUSTMENTS

| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|-----------------|---|-----------------|-------|----------|------------|-------|---------------------|---------------------------|---|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| | 2 | DC V.M | Final | TP | Final | VR3 | MIN | | Reference 0.3V |
| | 3 | Power meter | | | TX | VR5 | Set to 11W | | |
| 5. RF meter | 1 Follow the above procedures. | RF meter | | | Final | VR1 | Set RF meter to "8" | | Lower scale |
| 6. LOW power | 1 Follow the above procedures. HI/LOW SW: LOW MODE SW: FM1-FM2-CW | Power meter | | | TX | VR4 | Set to 1.2W | | |
| 7. Protection | 1 MODE SW: FM1 HI/LOW SW: HI ANT terminal on rear panel: open | DC V.M | TX | PC | Final | VR2 | 1.25V | Current less than 1.8A | RF meter deflection should be below that at 50 ohm termination. |
| | 2 Current above 1.8A. | | | | Final | VR2 | Set to 1.8A. | | |
| 8. FM deviation | 1 MODE SW: FM1 MIC terminal: Connect AG signal of 1 kHz, 15mV. | Linear detector | | | TX | VR2 | Set to 5 kHz | | |
| | 2 AG: Adjust AG output to obtain 3.5 kHz deviation. | AF.V.M. | | | | | | AG output: less than 3 mV | Check |

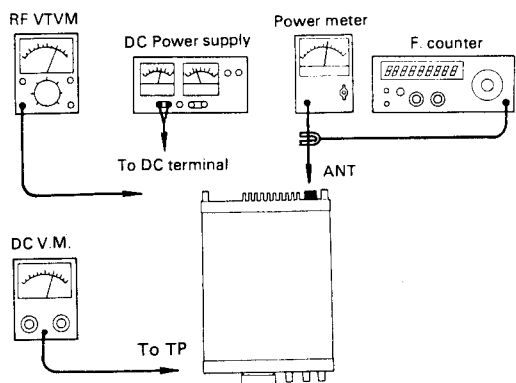


Fig. 22 TX 4. Power adjustment

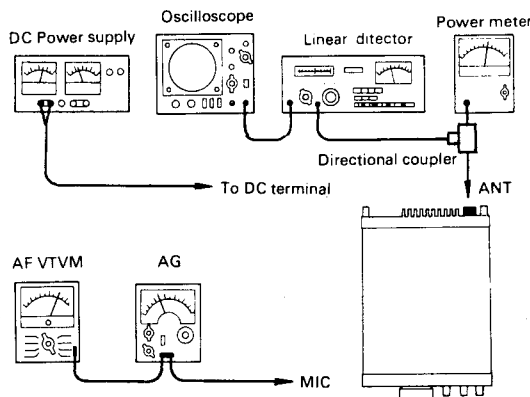


Fig. 23 TX 8. FM deviation

| | | | | | | | | | |
|-------------------------------|---|----------------------|-----|--------|-----|------------|---|--|-------|
| 9. SSB MIC gain | 1 MODE SW: USB VFO dial: 4,500.0 AG: 1.5 kHz, 1.5 mV | Power meter | | | TX | VR1 | 10W | $\pm 0.5W$ | |
| 10. Carrier point | 1 Adjust AUDIO output level for 5W of transmit output | Power meter | | | | | | | |
| | 2 AG: 400 Hz or 2,600 Hz | Power meter | | | CAR | TC1 | 400/2,600 Hz alternate | Same output | |
| | 3 MODE SW: LSB | Power | | | CAR | TC3 | 400/2,600 Hz alternate | Same output | |
| 11. CAR Suppression | 1 MODE SW: USB MIC terminal: Terminated with 470 ohm | Field strength meter | | | RX | TC1 VR6 | Adjust alternately to minimize the field strength meter deflection. | Less than -40 dB | |
| 12. Side tone level | 1 MODE SW: CW AF VOL: Centered Key jack: Connect key and depress. | AF V.M | | EXT.SP | RX | VR3 | 50 mW (0.63V/8 Ω) | | |
| Check of operating frequency. | 1 MODE SW: FM2 VFO dial: 6,000.0 (K.X) 5,000.0 (W.T) | F.counter | PLL | TP1 | | | | 135,305.0 MHz ± 20 Hz (K.X) 134,305.0 MHz ± 20 Hz (W.T) | Check |

ADJUSTMENTS

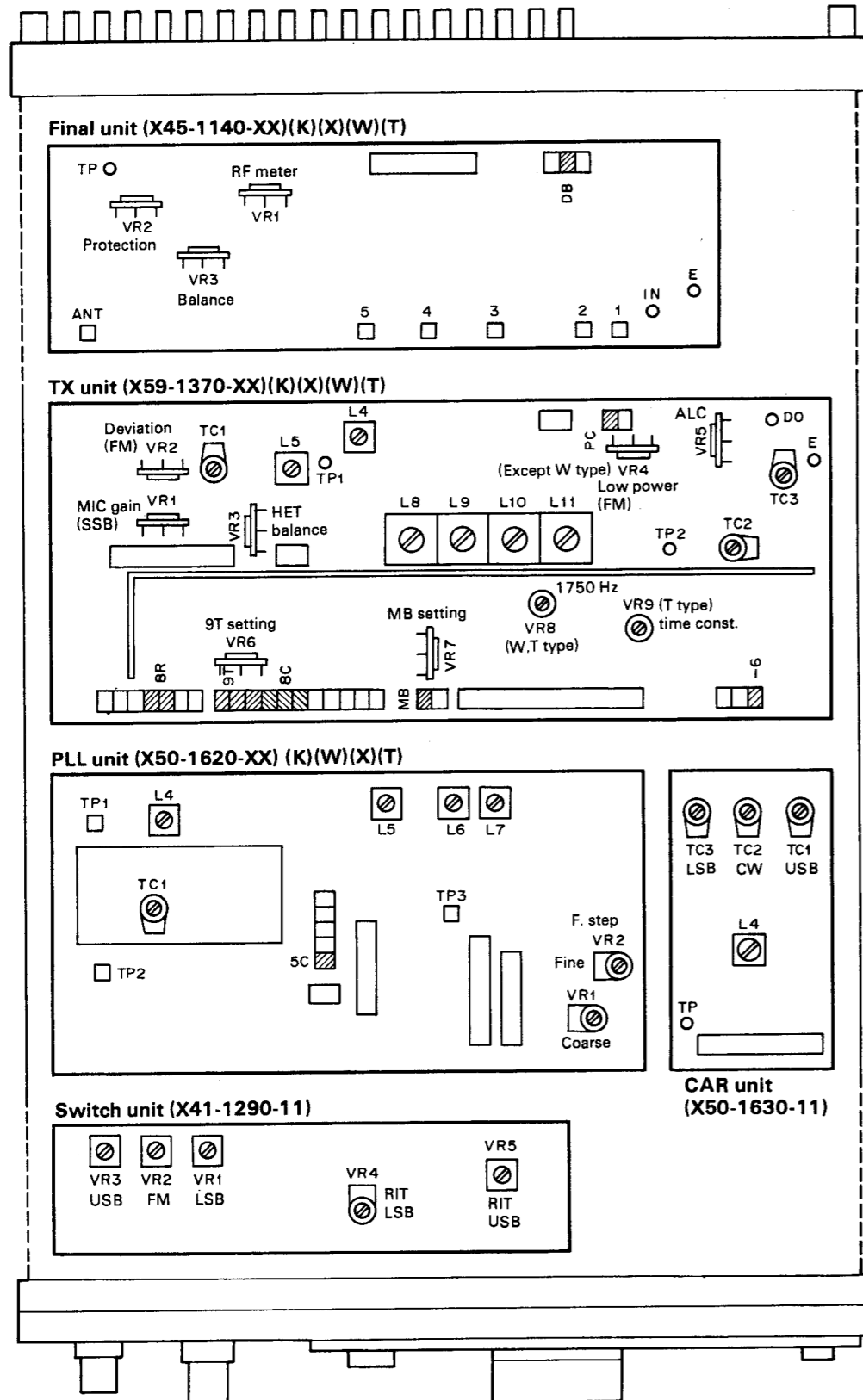
| Item | Condition | Measurement | | | Adjustment | | | Specification | Remarks |
|------------------------------|--|----------------|------|----------|------------|-------|--------|--|---------|
| | | Test equipment | Unit | Terminal | Unit | Parts | Method | | |
| Check of operating frequency | 2 MODE SW: USB VFO dial: 6,000.0 (K,X) 5,000.0 (W,T) | F.counter | PLL | TP1 | | | | 135.306.5 MHz ±10 Hz (K,X) 134.306.5 MHz ±10 Hz (W,T) | Check |
| | 3 MODE SW: LSB VFO dial: 6,000.0 (K,X) 5,000.0 (W,T) | F.counter | PLL | TP1 | | | | 135.303.5 MHz ±10 Hz (K,X) 134.303.5 MHz ±10 Hz (W,T) | Check |
| | 4 VFO dial: 5,999.9 (K,X) 4,999.9 (W,T) | F.counter | PLL | TP1 | | | | 135.303.4 MHz ±10 Hz (K,X) 134.303.4 MHz ±10 Hz (W,T) | Check |
| | 5 Set in receive mode | | | | | | | | |

< Micro-computer operational check >

| Control functions | Micro-computer functions | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|---|---|--|--|---|---|---|--|---|---|--|---|---|--|--|---|---|---|
| 1. VFO A/B 1 Disconnect power plug and re-connect after a 20 second delay. 2 VFO A/B SW: B 3 MR SW: ON MEMORY: 1 ~ 5 4 VFO A/B SW: A MR SW: OFF 2. Dial step and indicator digits <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="text-align: center;">Destination Display, dial step</th> <th style="text-align: center;">K</th> <th style="text-align: center;">X</th> <th style="text-align: center;">W</th> <th style="text-align: center;">T</th> </tr> </thead> <tbody> <tr> <td>MODE SW: USB-CW-LSB-FM2 Turn VFO dial</td> <td style="text-align: center;">5 digits indication Indication changes in 100 Hz steps.</td> <td style="text-align: center;">←</td> <td style="text-align: center;">←</td> <td style="text-align: center;">←</td> </tr> <tr> <td>MODE SW: FM2 D. STEP SW: ON Turn VFO dial.</td> <td style="text-align: center;">4 digits indication Indication changes in 5 kHz steps.</td> <td style="text-align: center;">←</td> <td style="text-align: center;">4 digits indication Indication changes in 12.5 kHz steps.</td> <td style="text-align: center;">←</td> </tr> <tr> <td>MODE SW: FM1 D. STEP SW: ON, OFF Turn VFO dial.</td> <td style="text-align: center;">3 digits indication Indication changes in 10 kHz steps.</td> <td style="text-align: center;">4 digits indication Indication changes in 25 kHz steps.</td> <td style="text-align: center;">←</td> <td style="text-align: center;">←</td> </tr> </tbody> </table> | Destination Display, dial step | K | X | W | T | MODE SW: USB-CW-LSB-FM2 Turn VFO dial | 5 digits indication Indication changes in 100 Hz steps. | ← | ← | ← | MODE SW: FM2 D. STEP SW: ON Turn VFO dial. | 4 digits indication Indication changes in 5 kHz steps. | ← | 4 digits indication Indication changes in 12.5 kHz steps. | ← | MODE SW: FM1 D. STEP SW: ON, OFF Turn VFO dial. | 3 digits indication Indication changes in 10 kHz steps. | 4 digits indication Indication changes in 25 kHz steps. | ← | ← | Indicates 6,000.0 (K,X) Indicates 5,000.0 (W,T) Indicates 4,000.0. VFO B indicator lights. Indicates 4,000.0. |
| Destination Display, dial step | K | X | W | T | | | | | | | | | | | | | | | | | |
| MODE SW: USB-CW-LSB-FM2 Turn VFO dial | 5 digits indication Indication changes in 100 Hz steps. | ← | ← | ← | | | | | | | | | | | | | | | | | |
| MODE SW: FM2 D. STEP SW: ON Turn VFO dial. | 4 digits indication Indication changes in 5 kHz steps. | ← | 4 digits indication Indication changes in 12.5 kHz steps. | ← | | | | | | | | | | | | | | | | | |
| MODE SW: FM1 D. STEP SW: ON, OFF Turn VFO dial. | 3 digits indication Indication changes in 10 kHz steps. | 4 digits indication Indication changes in 25 kHz steps. | ← | ← | | | | | | | | | | | | | | | | | |
| 3. Memory 1 Write Set the controls as in Table 10. MEMORY SW: 1 ~ 5 2 Call MEMORY SW: 1 ~ 5 3 MEMORY SW: 5 | By pressing M SW, tone should be heard and the 5-digit data indicated should be stored in memory. By pressing MR SW, the 5-digit frequency should be displayed. Transmit and receive frequencies should be stored and called individually. | | | | | | | | | | | | | | | | | | | | |
| 4. UP/DOWN 1 Set the controls as in Table 10. | Press the MIC UP/DOWN switch once, the tone should be heard and the frequency will shift up or down step by step. Press and hold the switch, and the frequency will change rapidly with continuous tone. | | | | | | | | | | | | | | | | | | | | |
| 5. Search 1 MODE SW: USB-CW-LSB D. STEP SW: ON(SEARCH) 2 Turn VFO dial. 3 Set in transmit mode. 4 D. STEP SW: OFF Set in receive mode. | The frequency is searched between 0 and 9.9 kHz in 100 Hz steps. The frequency is shifted up or down in 10 kHz steps (quick shift). The search function stops. | | | | | | | | | | | | | | | | | | | | |
| 6. Scan 1 MODE SW: FM2 Squelch control: ON SCAN SW: ON 2 D. STEP SW: ON (SEARCH) 3 Squelch control: Turn counterclockwise. 4 Squelch control: F.S. 5 Set in transmit mode. 6 Set in receive mode. | The frequency is shifted up in 100 Hz steps. The frequency is shifted up in 5 kHz (K,X), 12.5 kHz (W,T) steps. BUSY indicator lights. Scan stops. Scan restarts. Scan stops. | | | | | | | | | | | | | | | | | | | | |

ADJUSTMENTS

< TOP INTERNAL VIEW >



ADJUSTMENTS

RX unit (X55-1260-XX)(K)(X)(W)(T)

