



# SERVICE MANUAL

## TR-7950/TR-7930 TU-79

### 2m FM TRANSCEIVER



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# TR-7950/TR-7930

## SPECIFICATIONS

**[General]**

|                            |                                               |                             |
|----------------------------|-----------------------------------------------|-----------------------------|
| Semiconductors.....        | MPU                                           | 1                           |
|                            | ICs                                           | 19                          |
|                            | Transistors                                   | 43                          |
|                            | FETs                                          | 5                           |
|                            | Diodes                                        | 61 (K) (M), 60(T),<br>59(w) |
| Frequency range.....       | 144.000 to 147.995 MHz (K) (M)                |                             |
|                            | 144.000 to 145.995 MHz (W) (T)                |                             |
| Frequency synthesizer..... | Digital control, phase locked VCO             |                             |
| Mode.....                  | FM (F3)                                       |                             |
| Antenna impedance.....     | 50 ohms                                       |                             |
| Power requirement.....     | 13.8V DC $\pm$ 15%                            |                             |
| Grounding.....             | Negative                                      |                             |
| Operating temperature..... | -20°C to +50°C                                |                             |
| Current drain.....         | 0.5A in receive mode with no input signal     |                             |
|                            | (TR-7950) (Max.) 9.5A in HI transmit mode     |                             |
|                            | (TR-7930) (Max.) 6.5A in HI transmit mode     |                             |
|                            | (TR-7950) (Approx.) 3.0A in LOW transmit mode |                             |
|                            | (TR-7930) (Approx.) 2.5A in LOW transmit mode |                             |
| Dimensions.....            | 175 mm (6 - 7/8) wide                         |                             |
|                            | 64 mm (2 - 1/2) high                          |                             |
|                            | 220 mm (8 - 11/36") deep                      |                             |
|                            | (TR-7950),                                    |                             |
|                            | 206 mm (8 - 1/16") deep                       |                             |
|                            | (TR-7930)                                     |                             |
|                            | (projections excluded)                        |                             |
| Weight.....                | 1.9 kg (4.18 lb) (TR-7950)                    |                             |
|                            | 1.8 kg (3.96 lb) (TR-7930)                    |                             |

**[Transmitter Section]**

|                                     |                               |
|-------------------------------------|-------------------------------|
| RF output power                     |                               |
| (at 13.8V DC, 50 $\Omega$ load).... | HI 45 Watts min.<br>(TR-7950) |
|                                     | 25 Watts min.<br>(TR-7930)    |
|                                     | LOW 3 ~ 7W (TR-7950)          |
|                                     | 2 ~ 6W (TR-7930)              |

|                         |                                                  |
|-------------------------|--------------------------------------------------|
| Modulation.....         | Phase shift                                      |
| Frequency tolerance     |                                                  |
| (-20°C ~ +50°C).....    | Less than $\pm 15 \times 10^{-6}$                |
| Spurious radiation..... | HI Less than -70 dB                              |
|                         | LOW Less than -60 dB                             |
| Maximum frequency       |                                                  |
| deviation (FM).....     | $\pm 5$ kHz                                      |
| Microphone.....         | Dynamic microphone with PTT switch, 500 $\Omega$ |

**[Receiver Section]**

|                            |                                                      |
|----------------------------|------------------------------------------------------|
| Circuitry.....             | Double superheterodyne                               |
| Intermediate frequency ... | 1st 1F 10.695 MHz                                    |
|                            | 2nd 1F 455 kHz                                       |
| Receiver sensitivity.....  | Better than 30 dB for 0.5 $\mu$ V S+N/N              |
|                            | Better than 12 dB for 0.25 $\mu$ V SINAD             |
| Receiver selectivity.....  | More than 12 kHz (-6 dB)                             |
|                            | Less than 24 kHz (-60 dB)                            |
| Spurious response.....     | Better than 70 dB                                    |
| Squelch sensitivity.....   | Less than 0.16 $\mu$ V (threshold)                   |
| Auto scan step level.....  | Less than 0.2 $\mu$ V (threshold)                    |
| Audio output.....          | More than 2.0 watts across<br>8 ohms load (5% dist.) |

Note: Circuit and ratings are subject to change without notice due to developments in technology.

### SEMI CONDUCTOR

K<sub>1</sub>, M<sub>1</sub>, T<sub>1</sub>, W<sub>1</sub> : TR-7950 (45W Type)

K<sub>2</sub>, M<sub>2</sub>, T<sub>2</sub>, W<sub>2</sub> : TR-7930 (25W Type)

N : New Parts

| Item       | Name        | Re-<br>marks                                                      |
|------------|-------------|-------------------------------------------------------------------|
| Diode      | 1N60        |                                                                   |
|            | 1S1555      |                                                                   |
|            | 1S1587      |                                                                   |
|            | 1S2208      |                                                                   |
|            | 1SV50       |                                                                   |
|            | MI402       | K <sub>1</sub> , M <sub>1</sub> , T <sub>1</sub> , W <sub>1</sub> |
|            | MI303       | K <sub>2</sub> , M <sub>2</sub> , T <sub>2</sub> , W <sub>2</sub> |
|            | U15B        |                                                                   |
|            | UM9401      |                                                                   |
|            | Zener Diode | WZ-120                                                            |
| XZ-043     |             |                                                                   |
| XZ-055     |             | K, M                                                              |
| XZ-060     |             | T, W                                                              |
| Thermistor | 112-102-2   |                                                                   |
| LCD        | FTS1212     | N                                                                 |
| LED        | GL107S12    | N                                                                 |
|            | GL9HY24     | N                                                                 |
|            | PY5532K     |                                                                   |
|            | SLP144B     |                                                                   |
| TR         | 2SA496 (Y)  |                                                                   |

| Item | Name           | Re-<br>marks                                                      |
|------|----------------|-------------------------------------------------------------------|
| FET  | 2SA1015 (Y)    |                                                                   |
|      | 2SA1048 (Y)    |                                                                   |
|      | 2SC496 (Y)     |                                                                   |
|      | 2SC945 (Q)     |                                                                   |
|      | 2SC1675 (L)    |                                                                   |
|      | 2SC1775 (E)    |                                                                   |
|      | 2SC1815 (Y)    |                                                                   |
|      | 2SC1815 (BL)   |                                                                   |
|      | 2SC1959 (Y)    |                                                                   |
|      | 2SC2240 (GR)   |                                                                   |
|      | 2SC2347        |                                                                   |
|      | 2SC2458 (Y)    |                                                                   |
|      | 2SC2458 (BL)   |                                                                   |
|      | 2SC2538-22-A   |                                                                   |
|      |                | K <sub>2</sub> , M <sub>2</sub> , T <sub>2</sub> , W <sub>2</sub> |
|      | 2SC2603 (D, E) |                                                                   |
|      | 2SC2668 (Y)    |                                                                   |
|      | 2SC2787 (L)    |                                                                   |
|      | 2SC3019        | K <sub>1</sub> , M <sub>1</sub> , T <sub>1</sub> , W <sub>1</sub> |
|      | 2SD880 (Y)     |                                                                   |
|      | 2SK125         |                                                                   |
|      | 3SK73 (GR)     |                                                                   |

| Item            | Name         | Re-<br>marks                                                      |
|-----------------|--------------|-------------------------------------------------------------------|
| IC              | 3SK74 (L)    |                                                                   |
|                 | AFG05F1750A2 | T, W                                                              |
|                 | LR4087       | K, M                                                              |
|                 | MB3712       |                                                                   |
|                 | MC14066BCP   |                                                                   |
|                 | MC145155P    |                                                                   |
|                 | MC145151P    | N                                                                 |
|                 | NJM78L06K    |                                                                   |
|                 | MK5087N      | K, M                                                              |
|                 | MSM58292GS   | N                                                                 |
|                 | TA7302P      |                                                                   |
|                 | TA7612AP     |                                                                   |
|                 | TC4011BP     |                                                                   |
|                 | TC4049BP     |                                                                   |
|                 | TC4050BP     | N                                                                 |
|                 | UPC577H      |                                                                   |
|                 | UPC592H2     | N                                                                 |
| UPC78M08H       |              |                                                                   |
| UPC4558C        |              |                                                                   |
| Micro-processor | UPD7508C-017 | N                                                                 |
| Power Module    | M57726       | K <sub>1</sub> , M <sub>1</sub> , T <sub>1</sub> , W <sub>1</sub> |
|                 | M57737       | K <sub>2</sub> , M <sub>2</sub> , T <sub>2</sub> , W <sub>2</sub> |

## CIRCUIT DESCRIPTION

The TR-7950 and TR-7930 are 2 meter high power FM amateur radio mobile transceivers.

The operating frequency is controlled in 5 kHz steps by a microcomputer-controlled PLL (Phase Locked Loop). An LCD (Liquid Crystal Display) indicates various information. Both models have 21 memory channels for storing operating frequencies. Operation is controlled by either the keyboard or memory channel selector. The keyboard is illuminated for night time operation. The memory channel knob perimeter lights memory channel recall operations. Repeater functions include programmable offset, manual offset select, reverse and two paired-channel memories. Types K and M can be equipped with an optional plug-in subtone circuit which allows 3 preset tone signals to be stored and controlled from memory; these types also have a built-in touch tone encoder. Types T and W include a 1750 Hz tone burst circuit. The microcomputer (backed up by a built-in lithium battery) supports all control functions such as scanning and Up/Down tuning. These transceivers are also equipped with a "beep" tone generator and other accessory circuits.

### [RX]

The antenna signal is fed to the RX unit from the diode T/R switch in the Final unit. The RX unit front end consists of a dual gate FET RF amplifier Q1: 3SK74, first mixer Q2, a helical resonator and a 2-stage MCF (Monolithic Crystal Filter). This front end has high dynamic range and sensitivity.

The 10.695 MHz 1st IF signal from the MCF is mixed with the 10.24 MHz 2nd local signal by the 2nd mixer, Q3: 3SK73 and converted to a 455 kHz signal. This 455 kHz signal is applied through ceramic filter CF1 (CFW-455F) to the IF amplifiers Q6: TA7302P, Q7: 2SC2787, and Q8:  $\mu$ PC577H. The amplified and limited signal is detected by ceramic discriminator L11. The 10.24 MHz 2nd local oscillator signal is also sent to the PLL unit for use as the reference signal.

The receiver detector output consists of three components: voice intelligence, noise and direct current.

The voice component, after de-emphasis, is preamplified by Q16: 2SC2240, and is then power amplified by Q17: MB3712 to drive the speaker.

The noise component is applied to a band pass filter to obtain noise at about 30 kHz. This filtered noise component is applied to noise amplifier Q11:  $\mu$ PC592H2, which provides the squelch operating signal. After detection by diodes D7 & D8, the signal is DC amplified by Q12 and Q13 for control of the AF preamplifier, Q16.

The direct current component is applied to window comparator Q9:  $\mu$ PC4558 which checks whether the signal being received is in the center of the receiver's pass band. An on-channel signal will be detected at or near zero DC volts, while a signal greater than  $\pm 2$  kHz from channel-center will contain a polar DC component sufficient for comparator rejection. Both the comparator and squelch output signals are applied to a logic AND operation (Q14), and the C-TUNE indicator is lit when the resultant is true. The AND output is also sent to the Control unit as the scan stop (SS) signal.

| Item                               | Rating                                                                                                                                                                                      |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal center frequency ( $f_0$ ) | 10.695 MHz                                                                                                                                                                                  |
| Pass bandwidth                     | $\pm 7.5$ kHz or more at 3 dB                                                                                                                                                               |
| Attenuation bandwidth              | $\pm 25$ kHz or less at 40 dB<br>$\pm 45$ kHz or less at 60 dB                                                                                                                              |
| Guaranteed attenuation             | 1. 70 dB or more within $\pm 1$ MHz<br>2. Spurious level = 40 dB or more at $f_0 \sim f_0 \pm 500$ kHz<br>3. Spurious level = 80 dB or more at $f_0 - (910 \text{ kHz} \pm 10 \text{ kHz})$ |
| Ripple Loss                        | 1.0 dB or less<br>1.5 dB or less                                                                                                                                                            |
| Impedance                          | 3 k $\Omega$ /0 pF                                                                                                                                                                          |

Table 1. MCF (L71 - 0216 - 05) RX unit XF 1

| Item                                              | Rating                 |
|---------------------------------------------------|------------------------|
| Nominal center frequency                          | 455 kHz                |
| 6 dB bandwidth                                    | $\pm 6$ kHz or more    |
| 50 dB bandwidth                                   | $\pm 12.5$ kHz or more |
| Ripple (within $455 \pm 5$ kHz)                   | 3 dB or less           |
| Loss                                              | 6 dB or less           |
| Guaranteed attenuation (within $455 \pm 100$ kHz) | 35 dB or more          |
| Input and output impedance                        | 2.0 k $\Omega$         |

Table 2. Ceramic filter (L72 - 0315 - 05) RX unit CF 1

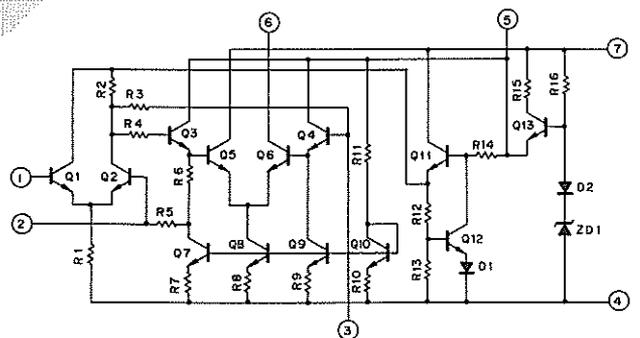


Fig 1. TA7302P Equivalent circuit RX unit Q6)

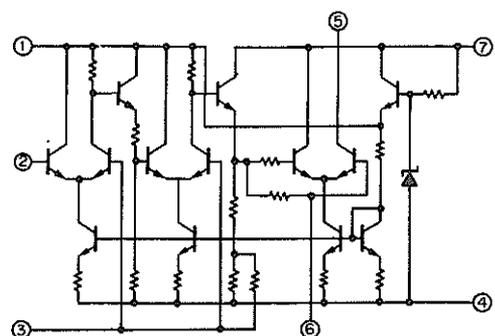


Fig 2.  $\mu$ PC577H Equivalent circuit (RX unit Q8)

# TR-7950/TR-7930

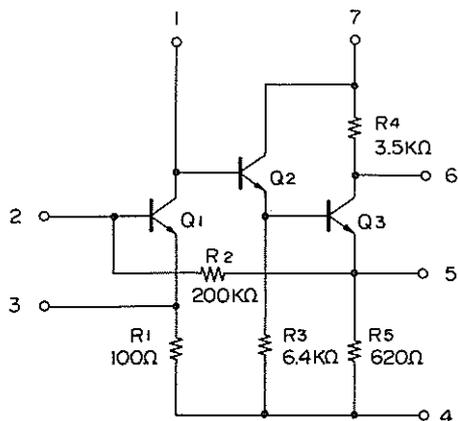


Fig 3.  $\mu$ PC592H2 Equivalent circuit (RX unit Q11)

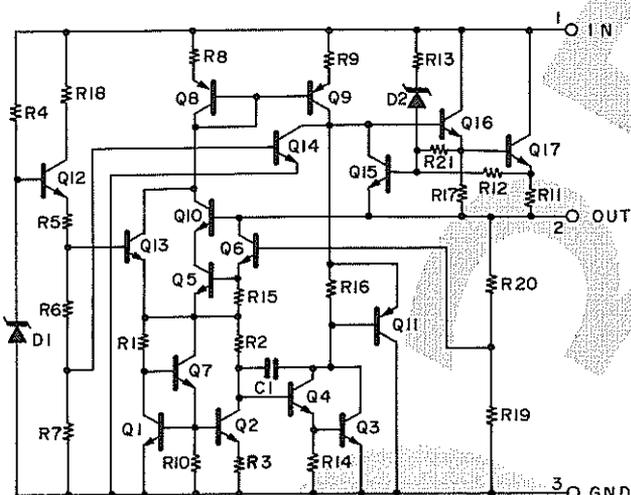


Fig 4.  $\mu$ PC78M08H Equivalent circuit (RX unit Q21)

## [TX]

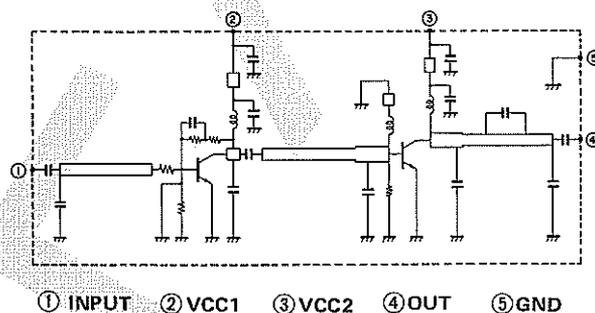
Audio from the microphone is amplified by Q18:  $\mu$ PC4558C (in the RX unit), buffered by Q19: 2SC2458(Y) and limited by diodes D13 ~ D16 (1S1555's). High frequencies which may be included in the limited signal are eliminated by active low pass filter Q20:  $\mu$ PC4558C. The filtered signal is applied to the TX-PLL loop (in the PLL unit) via the MO line to phase modulate the RF signal. The resultant FM signal is amplified by Q22: 2SC2668(Y), Q23: 2SC2347 and Q24: (2SC3019 for the 45W type and 2SC2538 for the 25W type) to drive the Final unit.

The DO input to the Final unit is power amplified by power hybrid Q1: (M57726 for the 45W type and M57737 for the 25W type), then fed to the antenna through the T/R switch (D1 and D2) and low pass filter.

The APC (Automatic Power Control) circuit switches the output power between high and low to protect the final unit as follows. The output from the power hybrid is detected by diode D3, and the detected signal is amplified by Q7: 2SC2458(Y), which is controlled by the Hi/Low switch setting. Q7's output is applied to differential amplifier Q4 and Q5: 2SC2458(Y)'s. The reflected power from the antenna is detected by diode D4, amplified by Q6: 2SC2458(Y), and also applied to the differential amplifier. The differential amplifier's output is applied to regulators Q3: 2SA496(Y) and Q2: 2SD880(Y) and to the collector of Q24 in the PLL unit to control transmitter output by reducing the voltage applied to Q1 pin 2 (DB).

| Item                 | Symbol  | Tc (°C) | Condition    | Rating |
|----------------------|---------|---------|--------------|--------|
| Operating            | Vcc     | 25      |              | 17V    |
| DC current           | Icc     | 25      |              | 7A     |
| Operating case temp. | Tc (op) |         | -30 ~ +110°C |        |
| Storage temp.        | Tstg    |         | -40 ~ +110°C |        |
| Power input          | Pin     | 25      | Zg=Zl=50Ω    | 0.4W   |
| Power output         | Po      | 25      | Zg=Zl=50Ω    | 40W    |

Table 3. Max rating M57737 (TR-7930)



① INPUT ② VCC1 ③ VCC2 ④ OUT ⑤ GND

Fig 5. M57737 Equivalent circuit (TR-7930)

## MAX Rating M57726

| Item                | Symbol  | Tc (°C) | Rating       |
|---------------------|---------|---------|--------------|
| Operating voltage   | Vcc     | 25      | 17V          |
| DC current          | Icc     | 25      | 14A          |
| Operating case temp | Tc (op) |         | -30 ~ +110°C |
| Storage temp        | Tstg    |         | -40 ~ +110°C |

## Electrical characteristic M57726

| Item             | Symbol   | Tc (°C) | Condition                                                   | Value |     |
|------------------|----------|---------|-------------------------------------------------------------|-------|-----|
|                  |          |         |                                                             | Min.  | Typ |
| Power output     | Po       | 25      | Vcc = 12.5V, F = 144 ~ 148 MHz<br>Pin = 0.4W, Zl = Zg = 50Ω | 43W   | 47W |
| Total efficiency | $\eta_T$ | 25      | Vcc = 12.5V, F = 144 ~ 148 MHz<br>Pin = 0.4W, Zl = Zg = 50Ω | 50%   | 54% |

Table 4. M57726 (TR-7950)

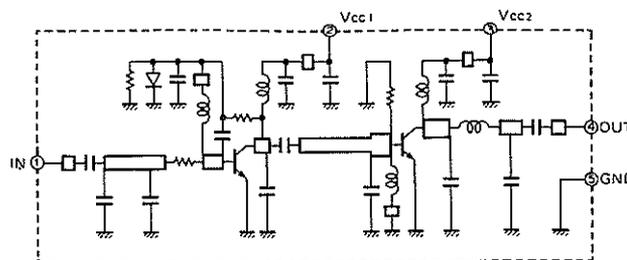


Fig 6. M57726 Equivalent circuit (TR-7950)



## TR-7950/TR-7930

**[Control Unit (X53-1180-10)]**

An LCD (Liquid Crystal Display) indicates both the operating frequency in four digits and the memory channel in one of two digits. This LCD is statically driven.

**(1) LCD data output**

Q4. The microcomputer, sends serial data for the LCD to Q101: MSM58292GS in the LCD unit through three data lines.

**(2) PLL data output**

The microcomputer also sends division serial data for PLL operation to Q5 in the PLL unit through three data lines. Two of these data lines, SERIAL DATA and CLOCK, are also used as LCD data lines.

**(3) Keyboard**

The keyboard switches are scanned by the microcomputer; pulse signals are output from ports P30 ~ P33 and the return pulses are received at ports P10 ~ P13. During transmission, receive ports P10 ~ P13 are disconnected via bilateral switch Q6: MC14066BCP. This allows keyboard control of Q8: LR4087, the DTMF (Dual Tone Multi-Frequency) generator during transmission without disturbing frequency setting. The return pulse signals are shaped by Q5: TC4050BP before being fed back to the microcomputer.

**(4) Switches (Switch unit)**

Switches are scanned by the microcomputer; scan pulse signals are output from ports P22 and P23 and the return pulses are received at ports P10 ~ P12.

**(5) Rotary Encoder (M. CH)**

The rotary encoder signals are applied via the E1 & E2 lines to Q3: TC4049BP, then Q5: TC4050BP. These ICs shape the signal waveform to reduce chattering, etc. These are input to microcomputer ports P72 and P73 for processing.

**(6) Up/Down**

The Up/Down signals from the microphone are inverted by Q3: TC4049BP, then applied to microcomputer ports P70 and P71.

**(7) Scan**

The squelch stop signal from the RX unit is applied to microcomputer port P61. This signal is also applied to R12 and C9, the delay circuit which determines the scan hold time. This is inverted by Q3: TC4049BP and applied to microcomputer port P62. One-half of Q7: TC4011BP is a monostable vibrator used to adjust (with VR1) scan resume timing. The trigger pulse for the vibrator is output from microcomputer port P53.

**(8) "Beep" tone generator**

The "beep" tone is generated by an astable vibrator, the other one half of Q7: TC4011BP. The switching signal for the vibrator is output from microcomputer port P20. Tone frequency is determined by R28 and C24.

**(9) Backup circuit**

The voltage output from Q1, the AVR (Automatic Voltage Regulator) is applied to microcomputer switching input port P00 through Q2: 2SA1048(Y). When the AVR output voltage drops to the lithium backup battery voltage, the level at P00 goes L to start backup and stop the clock signal.

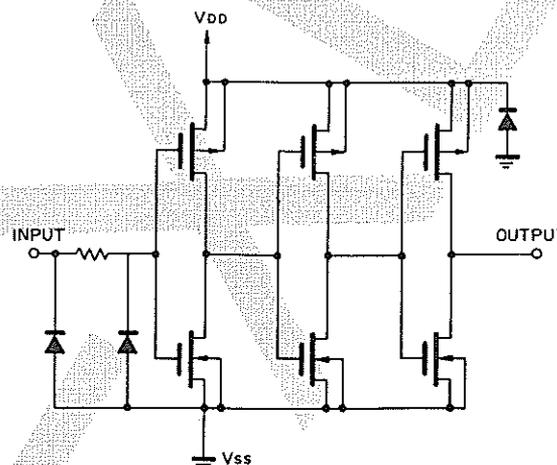


Fig. 9. TC4049BP Equivalent Circuit 1/6 (Control Unit Q3)

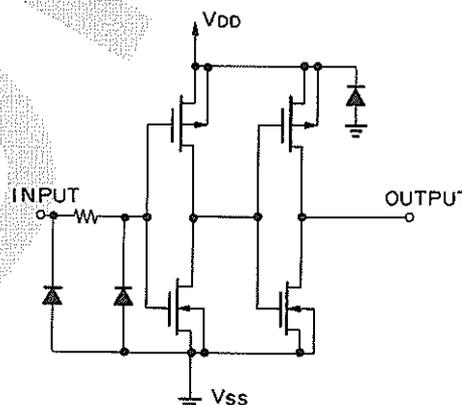


Fig. 10. TC4050BP Equivalent Circuit 1/6 (Control Unit Q5)

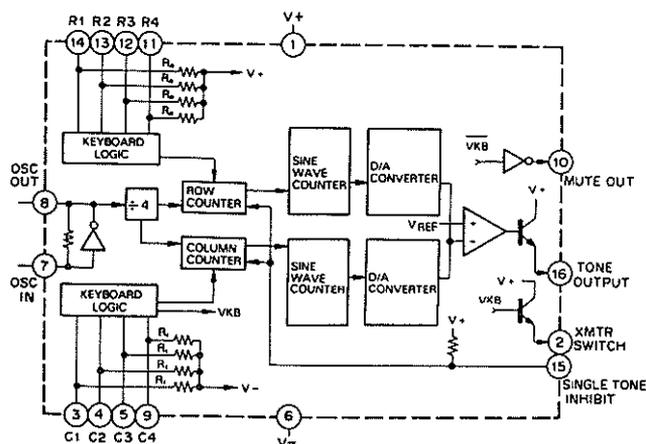


Fig. 11. MK5087N, LR4087 (Control Unit Q8) K only

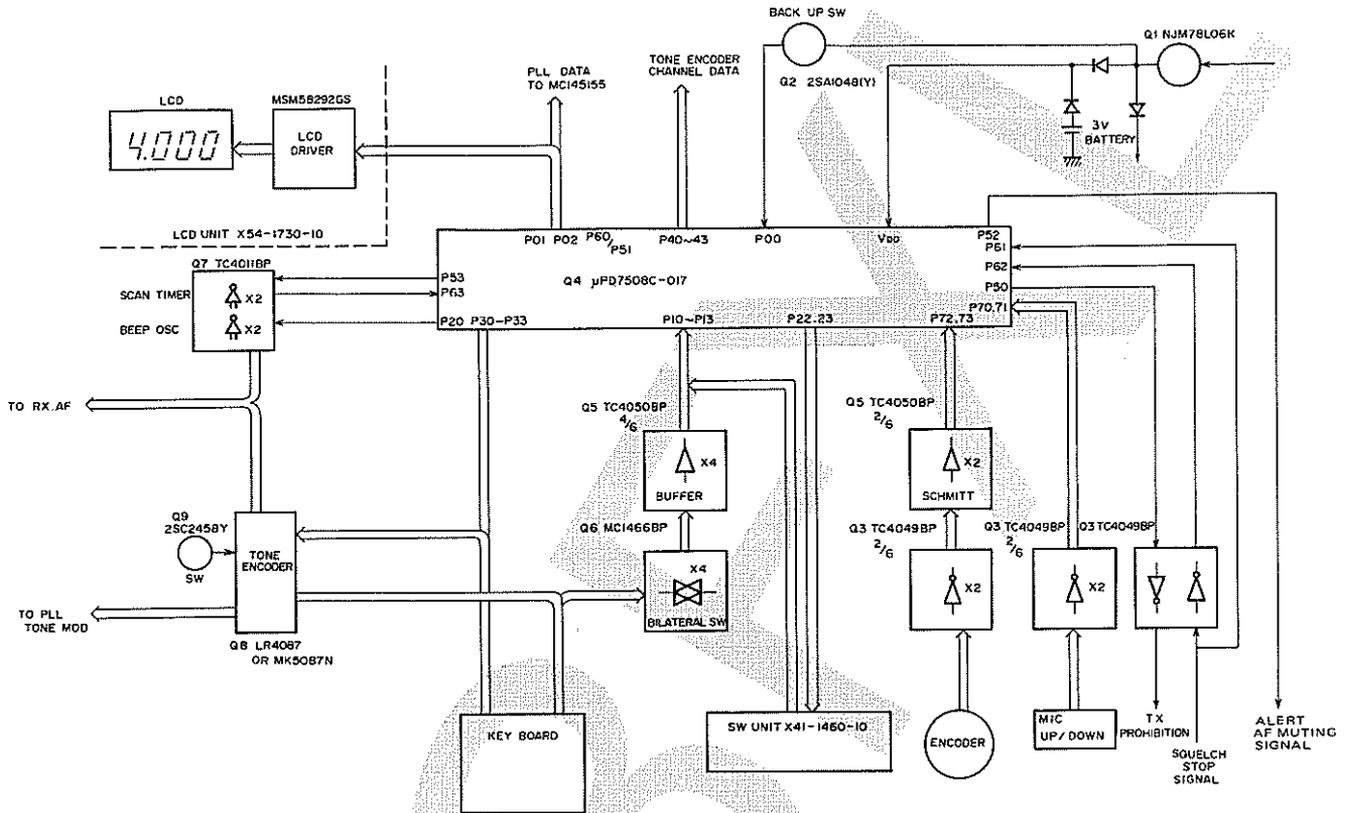


Fig 12. Control Unit Block Diagram

TERMINAL FUNCTION OF μPD 7508C-017

| Terminal No. | Symbol    | Function                      | Input | Output |
|--------------|-----------|-------------------------------|-------|--------|
| 1            | X2        | Open                          |       |        |
| 2            | P20/PSTB  | "Beeper" switching            |       | ○      |
| 3            | P21/PTOUT | SCAN pulse                    |       | ○      |
| 4            | P22       | SW SCAN pulse                 |       | ○      |
| 5            | P23       | SW SCAN pulse                 |       | ○      |
| 6            | P10       | KEY return and SW return (KA) | ○     |        |
| 7            | P11       | KEY return and SW return (KB) | ○     |        |
| 8            | P12       | KEY return and SW return (KC) | ○     |        |
| 9            | P13       | KEY return and SW return (KD) | ○     |        |
| 10           | P30       | KEY scan (K0)                 |       | ○      |
| 11           | P31       | KEY scan (K1)                 |       | ○      |
| 12           | P32       | KEY scan (K2)                 |       | ○      |
| 13           | P33       | KEY scan (K3)                 |       | ○      |
| 14           | P70       | MIC up SW input               | ○     |        |
| 15           | P71       | MIC down SW input             | ○     |        |
| 16           | P72       | Encoder E2                    | ○     |        |
| 17           | P73       | Encoder E1                    | ○     |        |
| 18           | RESET     | Reset input                   | ○     |        |
| 19           | CL1       | Clock                         |       |        |
| 20           | VDD       | Power supply                  |       |        |

| Terminal No. | Symbol    | Function                      | Input | Output |
|--------------|-----------|-------------------------------|-------|--------|
| 21           | CL2       | Clock                         |       |        |
| 22           | INT 1     | GND                           |       |        |
| 23           | P00/INT 0 | Back up information input     | ○     |        |
| 24           | P01/SCK   | PLL Display serial data       |       | ○      |
| 25           | P02/SO    | PLL Display                   |       | ○      |
| 26           | P03/SI    | TX/RX input RX: H, TX: L      | ○     |        |
| 27           | P60       | LCD Driver Load of MSM58292GS |       | ○      |
| 28           | P61       | SCAN stop signal              |       | ○      |
| 29           | P62       | SCAN stop delay signal        |       | ○      |
| 30           | P63       | SCAN timer input signal       | ○     |        |
| 31           | P50       | TX inhibit signal             |       | ○      |
| 32           | P51       | PLL MC145155 Load signal      |       | ○      |
| 33           | P52       | ALERT audio mute signal       |       | ○      |
| 34           | P53       | SCAN Timer trigger pulse      |       | ○      |
| 35           | P40       | TONE ON/OFF data              |       | ○      |
| 36           | P41       | TONE channel data F1          |       | ○      |
| 37           | P42       | TONE channel data F2          |       | ○      |
| 38           | P43       | TONE channel data F3          |       | ○      |
| 39           | VSS       | GND                           |       |        |
| 40           | X1        | GND                           |       |        |

# TR-7950/ TR-7930

## PARTS LIST

### CAPACITORS

$\frac{CC}{1} \frac{45}{2} \frac{TH}{3} \frac{1H}{4} \frac{220}{5} \frac{J}{6}$   
 1 = Type ceramic, electrolytic, etc    4 = Voltage rating  
 2 = Shape round, square, etc        5 = Value  
 3 = Temp coefficient                      6 = Tolerance

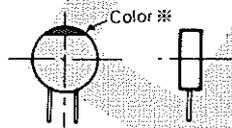
#### ● Temperature coefficient

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

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

Example CC45TH = -470 ± 60ppm/°C

CC45



#### ● Rating voltage

| 2nd word \ 1st word | A    | B    | C    | D    | E    | F    | G    | H    | J    | K    | V  |
|---------------------|------|------|------|------|------|------|------|------|------|------|----|
| 0                   | 1.0  | 1.25 | 1.6  | 2.0  | 2.5  | 3.15 | 4.0  | 5.0  | 6.3  | 8.0  | -  |
| 1                   | 10   | 12.5 | 16   | 20   | 25   | 31.5 | 40   | 50   | 63   | 80   | 35 |
| 2                   | 100  | 125  | 160  | 200  | 250  | 315  | 400  | 500  | 630  | 800  | -  |
| 3                   | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | 5000 | 6300 | 8000 | -  |

#### ● Capacitor value

0 1 0 = 1pF  
 1 0 0 = 10pF  
 1 0 1 = 100pF  
 1 0 2 = 1000pF = 0.001μF

1 0 3 = 0.01μF

$\frac{2}{1st\ number} \frac{2}{2nd\ number} 0 = 22pF$   
 Multiplier

#### ● Tolerance

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

Less than 10 pF

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

Resistors not listed in this parts list are standard, fixed carbon composition, 1/4W or 1/8W. The resistance values, in ohms, are indicated on the schematic diagram.

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

N: New parts

TR-7950: K<sub>1</sub>,M<sub>1</sub>,T<sub>1</sub>,W<sub>1</sub>  
 TR-7930: K<sub>2</sub>,M<sub>2</sub>,T<sub>2</sub>,W<sub>2</sub>  
 K = K<sub>1</sub>,K<sub>2</sub>    M = M<sub>1</sub>,M<sub>2</sub>  
 T = T<sub>1</sub>,T<sub>2</sub>    W = W<sub>1</sub>,W<sub>2</sub>

| Symbol | Destination    |
|--------|----------------|
| K      | U.S.A.         |
| W      | Europe         |
| T      | Britain        |
| M      | General market |

N: New Parts

| Part No.       | Re-<br>marks | Description         |                                                                |
|----------------|--------------|---------------------|----------------------------------------------------------------|
| <b>GENERAL</b> |              |                     |                                                                |
| A01-0932-03    | N            | Case (A)            |                                                                |
| A01-0933-03    | N            | Case (B)            |                                                                |
| A13-0612-02    |              | Angle Assy (Right)  |                                                                |
| A13-0613-02    |              | Angle Assy (Left)   |                                                                |
| A13-0614-04    |              | Mounting hardware   |                                                                |
| A20-2454-03    | N            | Panel (TR-7950)     | K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> |
| A20-2455-03    | N            | Panel (TR-7930)     | K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> |
| B05-0701-04    |              | Speaker grill cloth |                                                                |
| B05-0713-04    |              | Grill cloth         |                                                                |
| B40-2620-04    | N            | Name plate          | K <sub>1</sub> ,M <sub>1</sub>                                 |
| B40-2621-04    | N            | Name plate          | T <sub>1</sub>                                                 |
| B40-2622-04    | N            | Name plate          | W <sub>1</sub>                                                 |

| Part No.    | Re-<br>marks | Description           |                                |
|-------------|--------------|-----------------------|--------------------------------|
| B40-2623-04 | N            | Name plate            | K <sub>2</sub> ,M <sub>2</sub> |
| B40-2624-04 | N            | Name plate            | T <sub>2</sub>                 |
| B40-2625-04 | N            | Name plate            | W <sub>2</sub>                 |
| B43-0680-04 | N            | Badge                 | K,M,W                          |
| B43-0681-04 | N            | Badge                 | T                              |
| B46-0058-10 |              | Warranty card         | K                              |
| B50-3993-00 | N            | Instruction manual    | K                              |
| B50-3994-00 | N            | Instruction manual    | T                              |
| B50-3995-00 | N            | Instruction manual    | W                              |
| B50-4004-00 | N            | Instruction manual    | M                              |
| E06-0651-05 |              | 6P Metal socket (MIC) |                                |
| E07-0252-05 |              | 2P Connector          |                                |
| E07-0651-05 |              | 6P Metal consent      |                                |
| E12-0001-15 |              | Phone plug            |                                |

# TR-7950/TR-7930

## PARTS LIST

| Part No.    | Re-<br>marks | Description                                           |                                                                |
|-------------|--------------|-------------------------------------------------------|----------------------------------------------------------------|
| E30-1674-05 |              | DC Cord assy (TR-7950)                                | K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> |
| E30-1685-05 |              | DC Cord assy (TR-7930)                                | K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> |
| E31-0456-05 |              | Connector with lead line (SP)                         |                                                                |
| F05-1031-05 |              | Fuse, 10A × 2 (TR-7950)                               | K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> |
| F05-8021-05 |              | Fuse, 8A × 2 (TR-7930)                                | K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> |
| G02-0505-05 |              | Knob fixed spring, (VOL)                              |                                                                |
| G09-0411-05 |              | Knob fixed spring, (SQL)                              |                                                                |
| G53-0511-04 |              | Packing, (Case) × 8                                   |                                                                |
| H01-4437-03 | N            | Packing carton                                        | K <sub>1</sub> ,M <sub>1</sub> ,W <sub>1</sub>                 |
| H01-4438-03 | N            | Packing carton                                        | T <sub>1</sub>                                                 |
| H01-4439-03 | N            | Packing carton                                        | K <sub>2</sub> ,M <sub>2</sub> ,W <sub>2</sub>                 |
| H01-4440-03 | N            | Packing carton                                        | T <sub>2</sub>                                                 |
| H10-2501-03 |              | Packing fixture                                       |                                                                |
| H25-0049-03 |              | Accessory bag                                         |                                                                |
| H25-0079-04 |              | Protective bag, MIC                                   |                                                                |
| H25-0103-04 |              | Protective bag, Cord                                  |                                                                |
| H25-0106-04 |              | Protective bag, TR-7950/30                            |                                                                |
| J02-0069-05 |              | Rubber foot × 2 (Accessory)                           |                                                                |
| J02-0070-05 |              | Foot × 2 (Accessory)                                  |                                                                |
| J21-2504-04 |              | SP mounting hardware                                  |                                                                |
| J61-0401-05 |              | Nylon band × 3                                        |                                                                |
| K21-0767-03 | N            | Main knob, M. CH                                      |                                                                |
| K23-0735-04 |              | Knob, SQL                                             |                                                                |
| K23-0754-04 | N            | Knob, VOL                                             |                                                                |
| K27-0435-04 | N            | Push knob × 6                                         |                                                                |
| N09-0008-04 |              | Ornamental screw × 4 (Accessory)                      |                                                                |
| N09-0256-05 |              | Gnd screw, MIC                                        |                                                                |
| N14-0510-04 |              | Flang nut × 4 (Accessory)                             |                                                                |
| M15-1040-46 |              | Washer × 4 (Accessory)                                |                                                                |
| N15-1060-46 |              | Washer × 4 (Accessory)                                |                                                                |
| N16-0060-46 |              | Spring washer × 4 (Accessory)                         |                                                                |
| N30-2006-46 |              | Round head screw, ON AIR PC board                     |                                                                |
| N30-3006-41 |              | Round head screw × 2 (Accessory foot)                 |                                                                |
| N30-3008-41 |              | Round head screw × 2 (Accessory foot)                 |                                                                |
| N32-3006-46 |              | Flat head screw × 8, Sub panel-Heat sink              |                                                                |
| N33-3006-45 |              | Round flat head screw × 18, Case-Side escu-<br>tation |                                                                |
| N35-3006-46 |              | Bind screw × 4, Panel                                 |                                                                |
| N87-2606-46 |              | Self tapping screw × 4, SW unit                       |                                                                |
| N87-3006-46 |              | Self tapping screw × 20, PC board                     |                                                                |
| N99-0304-04 |              | Hex. head screw × 4                                   |                                                                |
| S50-1406-05 |              | Micro switch × 2                                      |                                                                |
| T03-0027-15 |              | Speaker                                               |                                                                |
| T91-0311-05 |              | Microphone (TRIO)                                     | T                                                              |
| T91-0313-05 |              | Microphone (KENWOOD)                                  | K,M,W                                                          |
| W01-0401-14 |              | Hexagonal wrench (Accessory)                          |                                                                |
| W02-0315-05 |              | Rotary encoder                                        |                                                                |
| W09-0323-05 |              | Lithium battery (CR2032)                              |                                                                |
| X41-1460-10 | N            | Switch unit                                           | K,M                                                            |
| X41-1460-51 | N            | Switch unit                                           | T                                                              |
| X41-1460-61 | N            | Switch unit                                           | W                                                              |
| X45-1270-10 | N            | FINAL unit (TR-7950)                                  | K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> |
| X45-1270-11 | N            | FINAL unit (TR-7930)                                  | K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> |
| X50-1900-10 | N            | PLL unit (TR-7950)                                    | K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> |
| X50-1900-11 | N            | PLL unit (TR-7930)                                    | K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> |

| Part No.    | Re-<br>marks | Description       |     |
|-------------|--------------|-------------------|-----|
| X53-1280-10 | N            | Control unit      | K,M |
| X53-1280-61 | N            | Control unit      | T,W |
| X55-1330-10 | N            | RX unit           | K,M |
| X55-1330-51 | N            | RX unit           | T   |
| X55-1330-61 | N            | RX unit           | W   |
| X60-1230-10 | N            | Display assy unit |     |

| Part No.                                                      | Re-<br>marks | Description                                                                 | Ref. No.                                   | Q'ty |
|---------------------------------------------------------------|--------------|-----------------------------------------------------------------------------|--------------------------------------------|------|
| <b>SWITCH Unit (X41-1460-10, 61, 51) 10 : K,M 51: T 61: W</b> |              |                                                                             |                                            |      |
| B30-0828-05                                                   | N            | Lamp with cap                                                               |                                            | 1    |
| CK45B1H102K                                                   |              | C, 0.001                                                                    | C1                                         | 1    |
| E40-0673-05                                                   |              | Connector (6P)                                                              |                                            | 1    |
| R19-9408-05                                                   | N            | Pot. with SW, 10K(K), 50K(B)                                                | S8                                         | 1    |
| R92-0150-05                                                   |              | Jumper wire                                                                 | K,M,W                                      | 1    |
| S36-2410-05                                                   | N            | See saw switch                                                              | S7                                         | 1    |
| S40-2438-05                                                   | N            | Push switch                                                                 | K,M,W                                      | 5    |
| S40-2438-05                                                   | N            | Push switch                                                                 | T                                          | 6    |
| S40-2439-05                                                   | N            | Push switch                                                                 | K,M,W                                      | 1    |
| <b>FINAL Unit (X45-1270-10, 11) 10: TR-7950 11: TR-7930</b>   |              |                                                                             |                                            |      |
| CC45CH1H020C                                                  |              | C, 2P ±0.25P                                                                | C19,22                                     | 2    |
| CC45CH1H330J                                                  |              | C, 33P                                                                      | C15                                        | 1    |
| CC45SL2H040C                                                  |              | C, 4P ±0.25P K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> | C13                                        | 1    |
| CC45SL2H050C                                                  |              | C, 5P ±0.25P K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> | C13                                        | 1    |
| CC45SL2H100D                                                  |              | C, 10P ±0.5P K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> | C21                                        | 1    |
| CC45SL2H100D                                                  |              | C, 10P ±0.5P K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> | C14,21                                     | 2    |
| CC45SL2H101J                                                  |              | C, 100P                                                                     | C17                                        | 1    |
| CC45SL2H120J                                                  |              | C, 12P K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub>       | C24                                        | 1    |
| CC45SL2H120J                                                  |              | C, 12P K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub>       | C14,24                                     | 2    |
| CC45SL2H150J                                                  |              | C, 15P                                                                      | C16,18                                     | 2    |
| CC45SL2H220J                                                  |              | C, 22P                                                                      | C23                                        | 1    |
| CC45SL2H390J                                                  |              | C, 39P                                                                      | C20                                        | 1    |
| CE04W1C220M                                                   |              | E, 22 16V                                                                   | C3,5                                       | 2    |
| CK45B1H102K                                                   |              | C, 0.001                                                                    | C2,4,6,7,8,9<br>11,12,25,26<br>27,29,31,33 | 14   |
| C90-0820-05                                                   |              | E, 470 16V                                                                  | C1                                         | 1    |
| C91-0105-05                                                   |              | C, 0.0047                                                                   | C10,30                                     | 2    |
| E04-0152-05                                                   |              | UHF type receptacle                                                         |                                            | 1    |
| E06-0252-05                                                   |              | 2P Metal socket<br>(power supply)                                           |                                            | 1    |
| E11-0403-05                                                   |              | Phone jack                                                                  |                                            | 1    |
| E23-0046-04                                                   |              | Square terminal                                                             |                                            | 6    |
| E23-0047-04                                                   |              | Square terminal                                                             |                                            | 1    |
| E31-2065-05                                                   |              | Cable with terminal (B)                                                     |                                            | 1    |
| E40-0373-05                                                   |              | Mini connector, 3P                                                          |                                            | 1    |
| E40-0473-05                                                   |              | Mini connector, 4P                                                          |                                            | 1    |
| F20-0516-05                                                   |              | Insulating sheet                                                            |                                            | 1    |
| F29-0014-03                                                   |              | Shoulder washer                                                             |                                            | 1    |
| L34-0452-05                                                   |              | Coil (3φ, 6T)                                                               | L4                                         | 1    |
| L34-0692-05                                                   |              | VHF coil (5φ, 4T)                                                           | L3                                         | 1    |
| L34-0742-05                                                   |              | Coil (3φ, 5T)                                                               | L6                                         | 1    |
| L34-0822-05                                                   |              | VHF Coil (5φ, 3T)                                                           | L9                                         | 1    |

## TR-7950/ TR-7930

## PARTS LIST

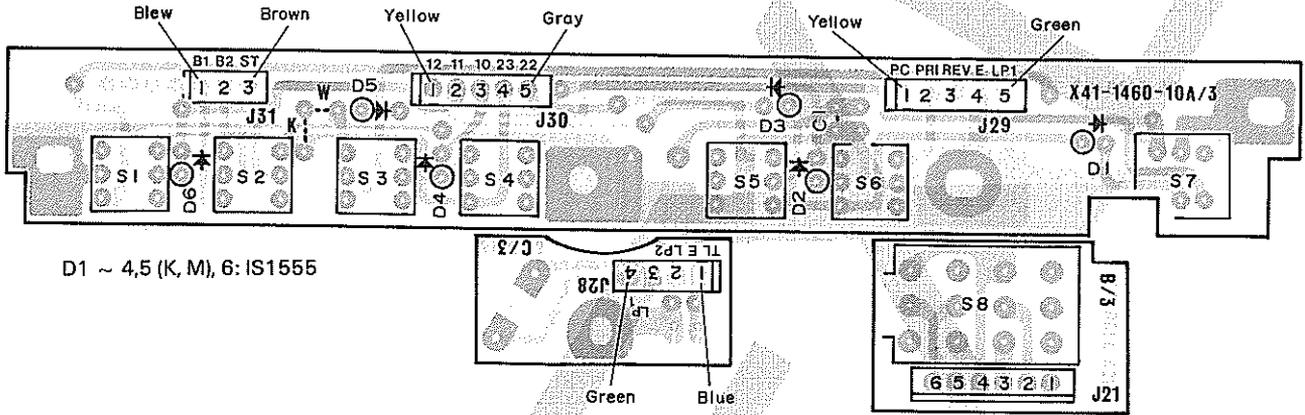
| Part No.                                                      | Re-<br>marks | Description                                                                                           | Ref. No.                                                        | Q'ty | Part No.                                                     | Re-<br>marks | Description                                                                         | Ref. No.            | Q'ty |
|---------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|--------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------|---------------------|------|
| L34-0908-05                                                   |              | Coil (3 $\phi$ )                                                                                      | L2,5                                                            | 2    | L32-0654-05                                                  | N            | VCO coil (4 $\phi$ /4T)                                                             | L8                  | 1    |
| L34-1020-05                                                   |              | Coil (3 $\phi$ , 3.5T)                                                                                | L1                                                              | 1    | L32-0655-05                                                  | N            | VCO coil (3/4T)                                                                     | L14                 | 1    |
| L40-1091-03                                                   |              | Ferri-inductor (1 $\mu$ H)                                                                            | L7,8                                                            | 2    | L33-0002-05                                                  |              | Choke coil (1 $\mu$ H)                                                              | L2,3                | 2    |
| N09-0256-05                                                   |              | Gnd screw                                                                                             |                                                                 | 1    | L33-0605-05                                                  |              | Choke coil (0.47 $\mu$ H)                                                           | L9                  | 1    |
| N30-3006-46                                                   |              | Round Screw                                                                                           |                                                                 | 1    | L34-0452-05                                                  |              | Coil A (3 $\phi$ 6T) K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> | L16                 | 1    |
| N35-3008-46                                                   |              | Bind screw                                                                                            |                                                                 | 2    | L34-0742-05                                                  |              | Coil A (3 $\phi$ 5T) K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> | L17                 | 1    |
| N87-3006-46                                                   |              | Screw                                                                                                 |                                                                 | 5    | L34-0742-05                                                  |              | Coil A (3 $\phi$ 5T) K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> | L16,17              | 2    |
| R12-0408-05                                                   |              | Trim.pot. 100 $\Omega$                                                                                | VR1                                                             | 1    | L34-0902-05                                                  |              | VHF coil                                                                            | L15                 | 1    |
| R12-3054-05                                                   |              | Trim.pot. 47k $\Omega$                                                                                | VR3                                                             | 1    | L34-2035-05                                                  |              | Tuning coil                                                                         | L4,5                | 2    |
| R12-3419-05                                                   |              | Trim.pot. 10k $\Omega$                                                                                | VR2                                                             | 1    | L40-1021-03                                                  |              | Ferri-inductor (1 $\mu$ H)                                                          | L12                 | 1    |
| R92-0150-05                                                   |              | Jumper wire                                                                                           |                                                                 | 4    | L40-3391-03                                                  |              | Ferri-inductor (3.3 $\mu$ H)                                                        | L6,11,13            | 3    |
| RC05GF2H151J                                                  |              | Resister 150 $\Omega$ $\pm$ 5%<br>1/2W K <sub>1</sub> ,M <sub>1</sub> ,T <sub>1</sub> ,W <sub>1</sub> | R7                                                              | 1    | L77-0975-05                                                  | N            | Crystal (40,0966MHz)                                                                | L1                  | 1    |
| RC05GF2H181J                                                  |              | Resister 180 $\Omega$ $\pm$ 5%<br>1/2W K <sub>2</sub> ,M <sub>2</sub> ,T <sub>2</sub> ,W <sub>2</sub> | R7                                                              | 1    | L77-0976-05                                                  | N            | Crystal (10.695MHz)                                                                 | L10                 | 1    |
| <b>PLL Unit (X50-1900-10, 11) 10: TR-7950<br/>11: TR-7930</b> |              |                                                                                                       |                                                                 |      | <b>CONTROL Unit (X53-1280-10, 61) 10: K,M<br/>61: T,W</b>    |              |                                                                                     |                     |      |
| C05-0030-15                                                   |              | Ceramic trimmer, 20P                                                                                  | TC1,3,5,6                                                       | 4    | CC45CH1H330J                                                 |              | C, 33P                                                                              | C6                  | 1    |
| C05-0062-05                                                   |              | Ceramic trimmer, 6P                                                                                   | TC2                                                             | 1    | CE04W1A101M                                                  |              | E, 100 10V                                                                          | C4                  | 1    |
| C05-0308-05                                                   |              | Ceramic trimmer, 4P                                                                                   | TC4                                                             | 1    | CE04W1A470M                                                  |              | E, 47 10V K,M                                                                       | C27                 | 1    |
| CC45CH1H020C                                                  |              | C, 2P $\pm$ 0.25P                                                                                     | C46,69                                                          | 2    | CE04W1C330M                                                  |              | E, 33 16V                                                                           | C9,15               | 2    |
| CC45CH1H030C                                                  |              | C, 3P $\pm$ 0.25P                                                                                     | C1,33,35,69<br>68                                               | 5    | CE04W1C470M                                                  |              | E, 47 16V                                                                           | C2                  | 1    |
| CC45CH1H050C                                                  |              | C, 5P $\pm$ 0.25P                                                                                     | C11,12                                                          | 2    | CE04W1E100M                                                  |              | E, 10 25V                                                                           | C14                 | 1    |
| CC45CH1HOR5C                                                  |              | C, 0.5P $\pm$ 0.25P                                                                                   | C10,62                                                          | 2    | CE04W1H010M                                                  |              | E, 1 50V K,M                                                                        | C26                 | 1    |
| CC45CH1H080D                                                  |              | C, 8P $\pm$ 0.5P                                                                                      | C30,63                                                          | 2    | CK45B1H102K                                                  |              | C, 0.001 T,W                                                                        | C3,5,10,28<br>29,30 | 6    |
| CC45CH1H100D                                                  |              | C, 10P $\pm$ 0.5P                                                                                     | C65                                                             | 1    |                                                              |              | K,MC3,5,10                                                                          | 19 ~ 22,28,29,30    | 10   |
| CC45CH1H101J                                                  |              | C, 100P                                                                                               | C44                                                             | 1    | CK45B1H681K                                                  |              | C, 680P                                                                             | C25                 | 1    |
| CC45CH1H120J                                                  |              | C, 12P                                                                                                | C27                                                             | 1    | CQ92M1H102K                                                  |              | ML, 0.001                                                                           | C24                 | 1    |
| CC45CH1H150J                                                  |              | C, 15P                                                                                                | C34,61                                                          | 2    | CQ92M1H222K                                                  |              | ML, 0.0022                                                                          | C23                 | 1    |
| CC45CH1H180J                                                  |              | C, 18P                                                                                                | C6,13                                                           | 2    | CS15E1A100M                                                  |              | T, 10 10V                                                                           | C7                  | 1    |
| CC45CH1H220J                                                  |              | C, 22P                                                                                                | C14,47,79                                                       | 3    | C91-0131-05                                                  |              | C, 0.01                                                                             | C1                  | 1    |
| CC45CH1H330J                                                  |              | C, 33P                                                                                                | C2,26,37,45<br>73                                               | 5    | C91-0456-05                                                  |              | C, 0.047                                                                            | C31,32              | 2    |
| CC45SH1H560J                                                  |              | C, 56P                                                                                                | C4                                                              | 1    | C91-0457-05                                                  |              | C, 0.022                                                                            | C8,11,12,13<br>16   | 5    |
| CE04W1A470M                                                   |              | E, 47 10V                                                                                             | C17,28,67,72<br>81                                              | 5    | E40-0373-05                                                  |              | Mini connector 3P                                                                   | J7,10               | 2    |
| CE04W1C100M                                                   |              | E, 10 16V                                                                                             | C55,82                                                          | 2    | E40-0473-05                                                  |              | Mini connector 4P                                                                   | J6                  | 1    |
| CE04W1H010M                                                   |              | E, 1 50V                                                                                              | C20,22,57                                                       | 3    | E40-0573-05                                                  |              | Mini connector 5P                                                                   | J3,9                | 2    |
| CE04W1HR47M                                                   |              | E, 0.47 50V                                                                                           | C60                                                             | 1    | E40-0773-05                                                  |              | Mini connector 7P                                                                   | J5                  | 1    |
| CK45B1H102K                                                   |              | C, 0.001                                                                                              | C3,5,8,25,29<br>32,36,38,39<br>42,59,66,70<br>71,74,76,77<br>80 | 18   | E40-0973-05                                                  |              | Mini connector 9P                                                                   | J4,8                | 2    |
| CK45B1H471K                                                   |              | C, 470P                                                                                               | C15,40,43,48                                                    | 4    | L78-0003-05                                                  |              | Ceramic oscillator<br>(3.58MHz) K,M                                                 | X1                  | 1    |
| CQ92M1H223K                                                   |              | ML, 0.022                                                                                             | C21,24                                                          | 2    | R12-2411-05                                                  |              | Trim pot (5k $\Omega$ ) K,M                                                         | VR2                 | 1    |
| CQ92M1H683K                                                   |              | ML, 0.068                                                                                             | C52                                                             | 1    | R12-7406-05                                                  | N            | Trim pot (500k $\Omega$ )                                                           | VR1                 | 1    |
| CS15E1C2R2M                                                   |              | T, 2.2 16V                                                                                            | C23                                                             | 1    | R90-0515-05                                                  |              | Resistor block (10k $\Omega$ $\times$ 4)                                            | R13                 | 1    |
| CS15E1C4R7M                                                   |              | T, 4.7 16V                                                                                            | C31                                                             | 1    | R90-0526-05                                                  |              | Resistor block (27k $\Omega$ $\times$ 4)                                            | R18                 | 1    |
| CS15E1E010M                                                   |              | T, 1 25V                                                                                              | C54,58                                                          | 2    | R90-0557-05                                                  | N            | Resistor block (27k $\Omega$ $\times$ 8)                                            | R19                 | 1    |
| CS15E1VOR1M                                                   |              | T, 0.1 35V                                                                                            | C56                                                             | 2    | R90-0558-05                                                  | N            | Resistor block (27k $\Omega$ $\times$ 10)                                           | R11                 | 1    |
| C90-0804-05                                                   |              | Cap. 0.001                                                                                            | C75,78                                                          | 2    | S59-0415-05                                                  | N            | Key board switch (Reset SW)                                                         | S1                  | 1    |
| C91-0105-05                                                   |              | C, 0.0047                                                                                             | C16,50,51                                                       | 3    | <b>RX Unit (X55-1330-10, 61,51) 10: K, M 51: T<br/>61: W</b> |              |                                                                                     |                     |      |
| C91-0131-05                                                   |              | C, 0.01                                                                                               | C7, 9,19,41<br>49                                               | 5    | CC45CH1H020C                                                 |              | C, 2P $\pm$ 0.25P                                                                   | C14                 | 1    |
| C91-0457-05                                                   |              | C, 0.022                                                                                              | C18,53                                                          | 2    | CC45CH1H030C                                                 |              | C, 3P $\pm$ 0.25P                                                                   | C3                  | 1    |
| E04-0154-05                                                   |              | Coax. connector DO                                                                                    |                                                                 | 1    | CC45CH1H050C                                                 |              | C, 5P $\pm$ 0.25P                                                                   | C17                 | 1    |
| E40-0573-05                                                   |              | Mini connector, 5P                                                                                    |                                                                 | 1    | CC45CH1HOR5C                                                 |              | C, 0.5P $\pm$ 0.25P                                                                 | C12                 | 1    |
| E40-0973-05                                                   |              | Mini connector, 9P                                                                                    |                                                                 | 1    | CC45CH1H150J                                                 |              | C, 15P                                                                              | C11                 | 1    |

**PARTS LIST**

| Part No.     | Re-<br>marks | Description        | Ref. No.                            | Q'ty | Part No.                               | Re-<br>marks | Description                | Ref. No.      | Q'ty           |
|--------------|--------------|--------------------|-------------------------------------|------|----------------------------------------|--------------|----------------------------|---------------|----------------|
| CC45CH1H220J |              | C, 22P             | C4                                  | 1    | G09-0407-14                            |              | Gnd spring                 |               | 1              |
| CC45CH1H330J |              | C, 33P             | C1,13                               | 2    | L15-0016-05                            |              | Choke coil (Low frequency) | L14           | 1              |
| CC45RH1H100D |              | C, 10P ±0.5P       | C5                                  | 1    | L30-0005-05                            |              | IFT 10.7MHz                | L5,6          | 2              |
| CC45RH1H120J |              | C, 12P             | C2                                  | 1    | L30-0199-05                            |              | IFT 455kHz                 | L9            | 1              |
| CC45SL1H101J |              | C, 100P            | C18,20,71                           | 3    | L30-0503-05                            |              | IFT 455kHz                 | L7,10         | 2              |
| CC45SL1H121J |              | C, 120P            | C51                                 | 1    | L31-0267-05                            |              | ANT coil                   | L1,2          | 2              |
| CC45SL1H221J |              | C, 220P            | C23,90                              | 2    | L34-0683-05                            |              | Tuning coil                | L4            | 1              |
| CC45SL1H331J |              | C, 330P            | C86                                 | 1    | L40-1021-03                            |              | Ferri-inductor, 1mH        | L12           | 1              |
| CC45SL1H390J |              | C, 39P             | C88                                 | 1    | L40-1021-25                            |              | Ferri-inductor, 1mH        | L13           | 1              |
| CC45SL1H561J |              | C, 560P            | C85                                 | 1    | L71-0216-05                            |              | MCF, 10.695MHz             | XF1           | 1              |
| CE04W1A101M  |              | E, 100 10V         | C70,75                              | 2    | L72-0315-05                            |              | Ceramic filter, CFW455F    | CF1           | 1              |
| CE04W1A470M  |              | E, 47 10V          | C41,65,74,91<br>97                  | 5    | L77-0858-05                            |              | Crystal, 10.24MHz          | L8            | 1              |
| CE04W1E220M  |              | E, 22 25V          | K,M<br>C64                          | 1    | L79-0446-05                            |              | Ceramic disc, CFY455S      | L11           | 1              |
| CE04W1H010M  |              | E, 1 50V           | T,W<br>C64,201,202                  | 3    | L79-0468-05                            |              | Helical block              | T,W<br>L3     | 1              |
| CE04W1H100M  |              | E, 10 50V          | C44,61,67,84<br>89                  | 5    | L79-0483-05                            |              | Helical block              | K,M<br>L3     | 1              |
| CE04W1HR47M  |              | E, 0.47 50V        | K,M<br>C55,56                       | 2    | N30-3004-46                            |              | Round screw                |               | 2              |
| CE04W1H4R7M  |              | E, 4.7 50V         | T,W<br>C78,79,80,82,<br>83          | 5    | R12-1426-05                            | N            | Trim. pot. 2kΩ             | VR2           | 1              |
| CK45B1H102K  |              | C, 0.001           | C78,79,80,82,<br>83,203             | 6    | R12-3436-05                            |              | Trim. pot. 10kΩ            | VR1,4         | 2              |
| CK45B1H222K  |              | C, 0.0022          | C36                                 | 1    | R12-3439-05                            | N            | Trim. pot. 20kΩ            | T,W<br>VR5    | 1              |
| CK45B1H471K  |              | C, 470P            | C6,7,8,9,10<br>15,26,77,100         | 9    | R12-4412-05                            |              | Trim. pot. 50kΩ            | VR3           | 1              |
| CK45B1H681K  |              | C, 680P            | C69                                 | 1    | R92-0150-05                            |              | Jumper wire                | K,M<br>T<br>W | 22<br>27<br>28 |
| CK45F1H103Z  |              | C, 0.01            | K,M<br>C49,92,93,95<br>98,99        | 6    | <b>Display assy Unit (X60-1230-10)</b> |              |                            |               |                |
| CQ92M1H102K  |              | ML, 0.001          | T,W<br>C49,92,93,95<br>98,99,205    | 7    | B10-0652-04                            | N            | Front glass                |               | 1              |
| CQ92M1H103K  |              | ML, 0.01           | C42,45                              | 2    |                                        | N            | LCD plate                  |               | 1              |
| CQ92M1H122K  |              | ML, 0.0012         | C30                                 | 1    |                                        | N            | Connector with lead line   |               | 1              |
| CQ92M1H152K  |              | ML, 0.0015         | C72                                 | 1    |                                        | N            | Shadow mask                |               | 2              |
| CQ92M1H222K  |              | ML, 0.0022         | C87                                 | 1    | J21-2775-04                            | N            | Mounting plate             |               | 1              |
| CQ92M1H223K  |              | ML, 0.0022         | C53                                 | 1    | N89-2005-46                            |              | Tap tight screw            |               | 7              |
| CQ92M1H333K  |              | ML, 0.022          | C62,63,66                           | 3    | S59-0412-05                            | N            | Key board assy             |               | 1              |
| CQ92M1H333K  |              | ML, 0.033          | K,M<br>C52,68                       | 2    | X54-1700-10                            | N            | Display unit               |               | 1              |
| CQ92M1H472K  |              | ML, 0.0047         | T,W<br>C52,68,204                   | 3    | X54-1730-10                            | N            | LCD unit                   |               | 1              |
| CQ92M1H473K  |              | ML, 0.047          | C50,81                              | 2    | <b>Display Unit (X54-1700-10)</b>      |              |                            |               |                |
| CS15E1A100M  |              | T, 10 10V          | K,M,W<br>C46,47,52                  | 2    | B30-0827-05                            | N            | Lamp                       |               | 1              |
| CS15E1A220M  |              | T, 22 10V          | C60                                 | 1    | B30-0828-05                            |              | Lamp with cap              |               | 2              |
| CS15E1A3R3M  |              | T, 3.3 10V         | T<br>C60,207                        | 2    | CK45B1H102K                            |              | C, 0.001                   | C1            | 1              |
| CS15E1A4R7M  |              | T, 4.7 10V         | T<br>C206                           | 1    | CK45F1H103Z                            |              | C, 0.01                    |               | 1              |
| CS15E1VR47M  |              | T, 0.47 35V        | C48                                 | 1    | CS15E1VR47M                            |              | T, 0.47 35V                | C2            | 1              |
| C90-0820-05  |              | E, 470 16V         | C54                                 | 1    | C90-0560-05                            |              | Inline block 0.022 x 5     | C5            | 1              |
| C90-0834-05  |              | C, 0.15            | C58,59                              | 2    | C91-0457-05                            |              | C, 0.022                   | C3,4          | 2              |
| C91-0131-05  |              | C, 0.01            | C76,94                              | 2    | E40-0473-05                            |              | Mini connector 4P          | J24           | 1              |
| C91-0456-05  |              | C, 0.047           | C73                                 | 1    | E40-0573-05                            |              | Mini connector 5P          | J23           | 1              |
| C91-0457-05  |              | C, 0.022           | C73                                 | 1    | E40-0673-05                            |              | Mini connector 6P          | J25           | 1              |
| E40-0273-05  |              | Mini connector 2P  | C25,35                              | 2    | RC05GF2H100J                           |              | Resistor 10Ω, 1/2W         | R13,14        | 2              |
| E40-0373-05  |              | Mini connector 3P  | C27,28,29,32,<br>33,37,38,39,<br>40 | 9    | <b>LCD Unit (X54-1730-10)</b>          |              |                            |               |                |
| E40-0473-05  |              | Mini connector 4P  | C16,19,21,43<br>96                  | 5    | CS15E1V0R1M                            |              | T, 0.1 35V                 | C101          | 1              |
| E40-0673-05  |              | Mini connector 6P  | J11,12,19                           | 4    | E40-0573-05                            |              | Mini connector, 5P         | J22           | 1              |
| E40-0973-05  |              | Mini connector 9P  | T,W<br>J11,12,19,20                 | 5    |                                        |              |                            |               |                |
| E40-1073-05  |              | Mini connector 10P | J13,18                              | 2    |                                        |              |                            |               |                |
|              |              |                    | J14                                 | 1    |                                        |              |                            |               |                |
|              |              |                    | J17                                 | 1    |                                        |              |                            |               |                |
|              |              |                    | J16                                 | 1    |                                        |              |                            |               |                |
|              |              |                    | J15                                 | 1    |                                        |              |                            |               |                |

## PC BOARD VIEWS

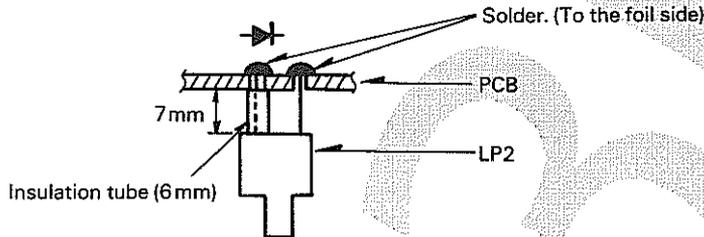
### SWITCH UNIT (X41 - 1460 - 10,61,51) Component Side View



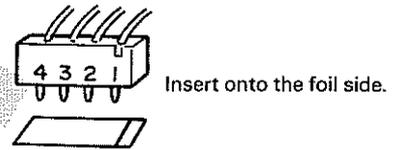
D1 ~ 4,5 (K, M), 6: IS1555

J31: W, T only

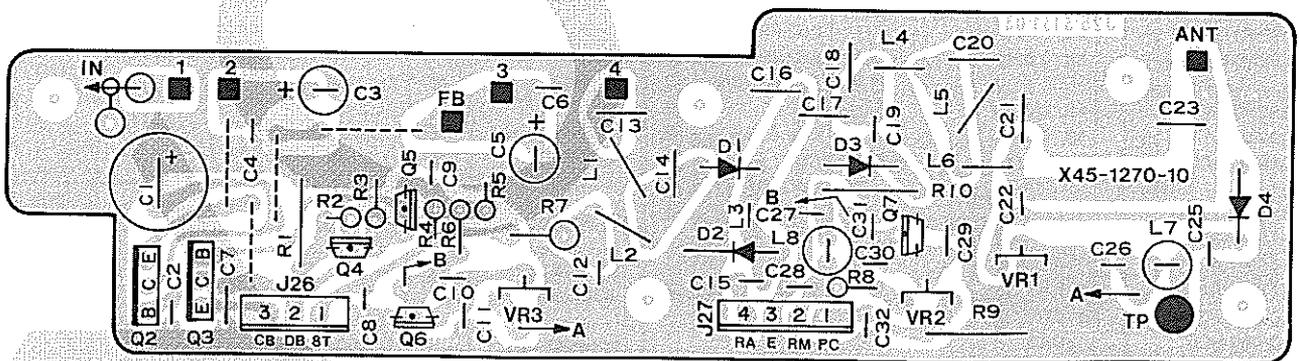
1. Installation of D7 (Use a jig.)



2. Installation of J28, J29 and J30



### FINAL UNIT (X45 - 1270 - 10,11) Component Side View



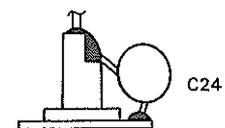
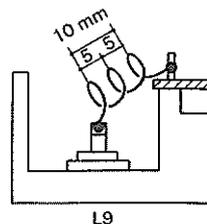
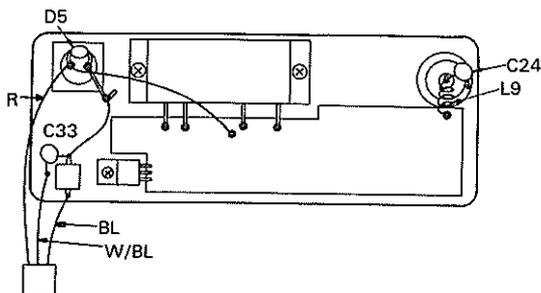
2SD880(Y)

2SA496(Y)

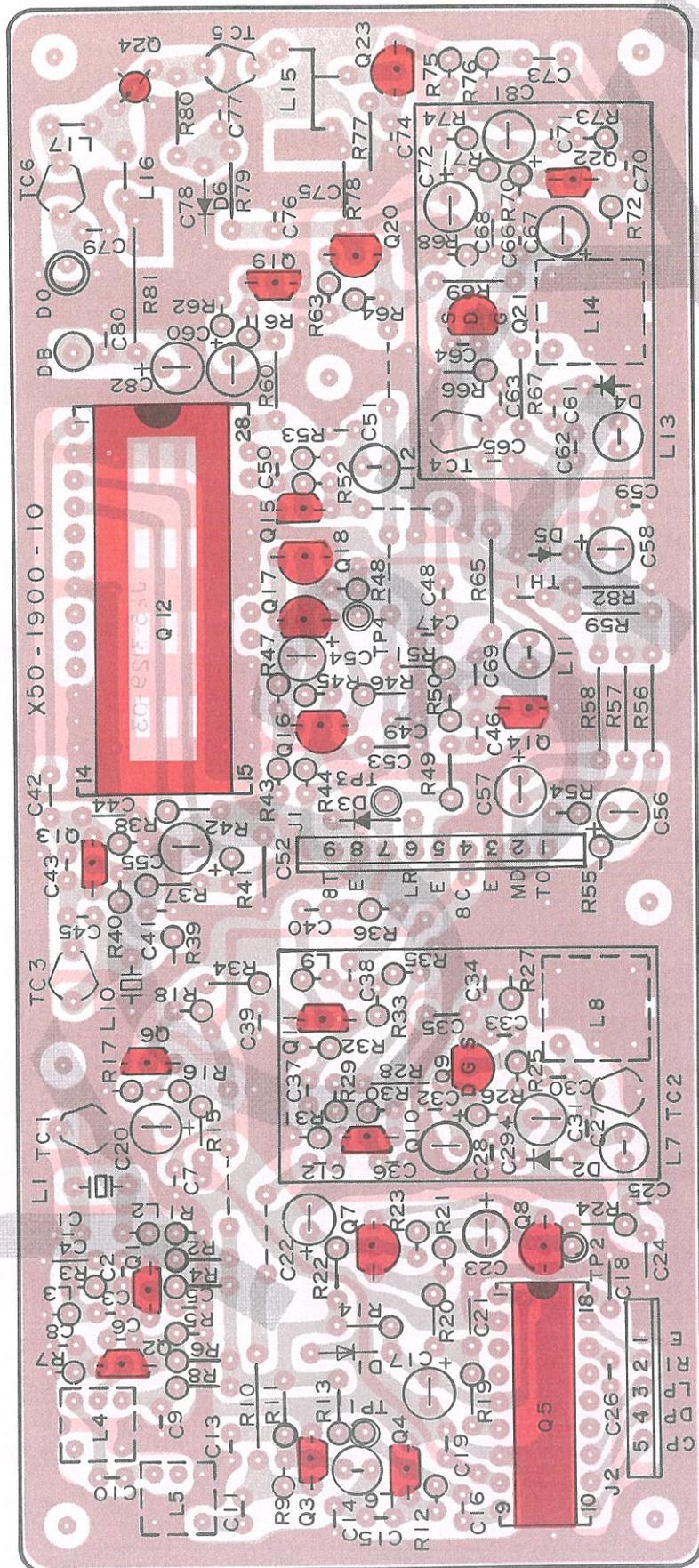
2SC2458(Y)

- Q1: M57726(TR-7950), M57733(TR-7930)  
 Q2: 2SD880(Y), Q3: 2SA496(Y)  
 Q4~7: 2SC2458(Y)  
 D1: UM9401 D2: MI402(TR-7950), MI303(TR-7930) D3,4: 1S1587  
 D5: U15B

1. Apply heat sinker to the power module and heat sink.
2. Tighten screw Q2, then others, to fix PCB.
3. Connect L9 and C24 as short as possible.
4. Expand the distance between coils L9 to about 5mm.



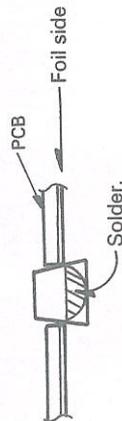
PLL UNIT (X50-1900-10, 11) Component Side View



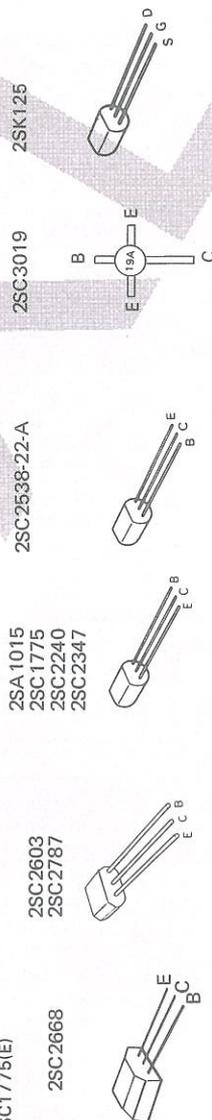
PC BOARD VIEW

- Q1,2,13: 2SC2787(L) Q3,4,10,11,14,15,22: 2SC2668(Y)
- Q5: MC145155P Q6,19:2SC2603(D,E)
- Q7,8: 2SC2240(G,R) Q9:2SK125 Q12: MC145151P Q16~18: 2SC1775(E)
- Q20: 2SA1015(Y) Q21:2SK125 Q22:2SC2668(Y) Q23:2SC2347
- Q24: 2SC2538(T,R-7930), 2SC3019(T,R-7950)
- D1: XZ-055 D2,5-1S2208 D3,6: 1S1555 D4: 1SV50

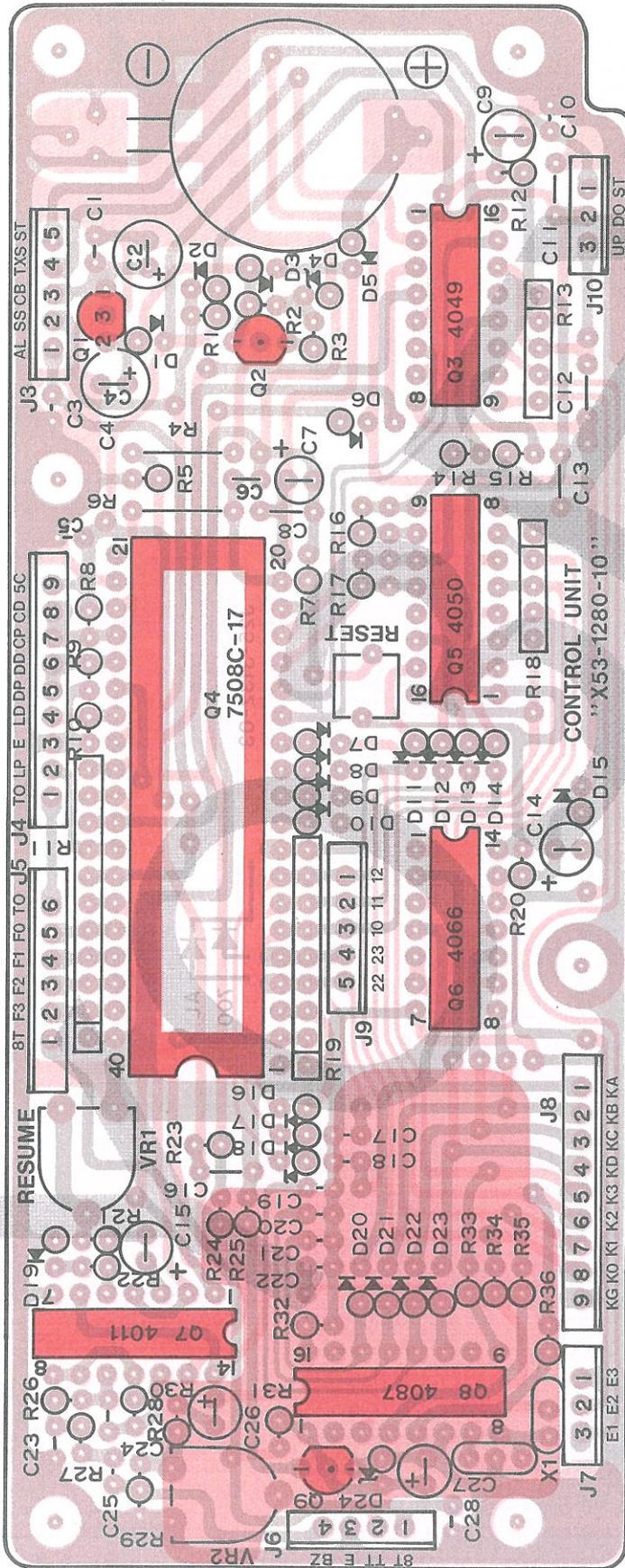
1. Installation of C75 and C78.



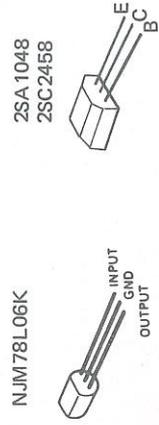
2. Incline C30 to L8, and L7 to shield case.



CONTROL UNIT (X53 - 1280 - 10,61) Component Side View



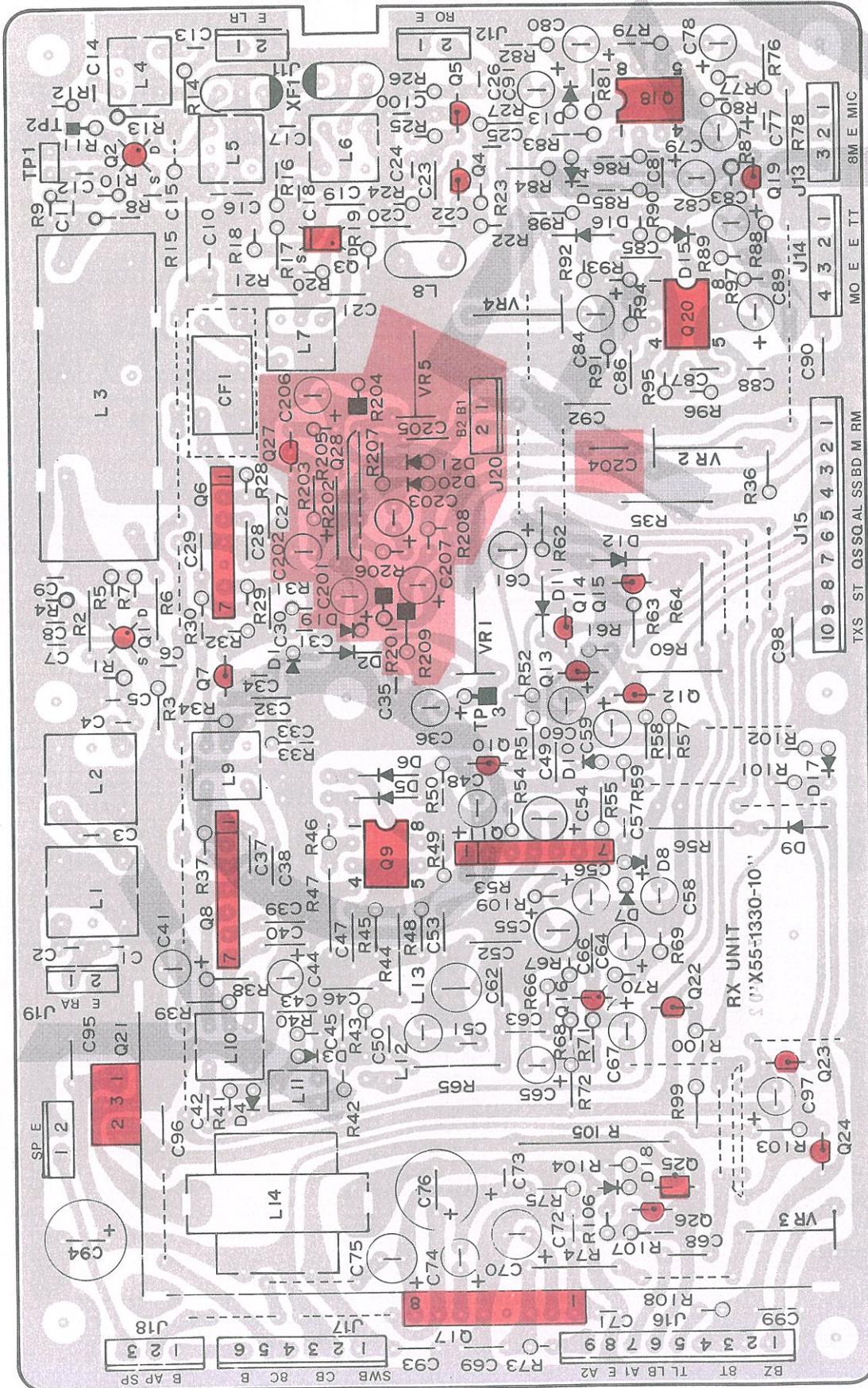
- Q1: NJM78L06K Q2:2SA1048(Y) Q3: TC4049BP Q4: μPD7508C-017
- Q5: TC4050BP Q6:MC1466BCP Q7: TC4011BP Q8(K,M): LR4087
- Q9(K,M)- 2SC2458
- D1 ~ 3.5 ~ 15, 16(W, T), 17(W, T), 19, 20 ~ 23(K, M):IS1555



PC BOARD VIEW

# PC BOARD VIEW

RX UNIT (X55 - 1330 - 10,61,51) Component Side View



D21  
C206,207 } T only  
R208,209

MO E E TT 9M E MIC  
10 9 8 7 6 5 4 3 2 1

TXS ST QSSQAL SSB D M RM  
10 9 8 7 6 5 4 3 2 1

μPC78M08H

μPC577H  
μPC592H2  
TA7302P

μPC577H  
μPC592H2  
TA7302P

2SC2458

3SK73

3SK74

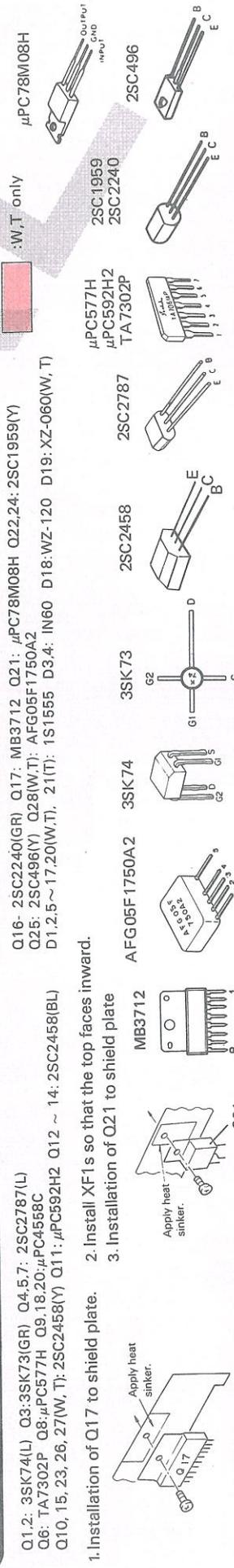
AFG05F1750A2

MB3712

Q21

Apply heat sinker.

Apply heat sinker.



:W,T only

Q16- 2SC2240(GR) Q17: MB3712 Q21: μPC78M08H Q22,24: 2SC1959(Y)

Q25: 2SC496(Y) Q28(W,T): AFG05F1750A2

D1,2,5~17,20(W,T), 21(T): 1S1555 D3,4: IN60 D18:WZ-120 D19: XZ-060(W,T)

Q1,2: 3SK74(L) Q3:3SK73(GR) Q4,5,7: 2SC2787(L)

Q6: TA7302P Q8:μPC577H Q9,18,20:μPC4558C

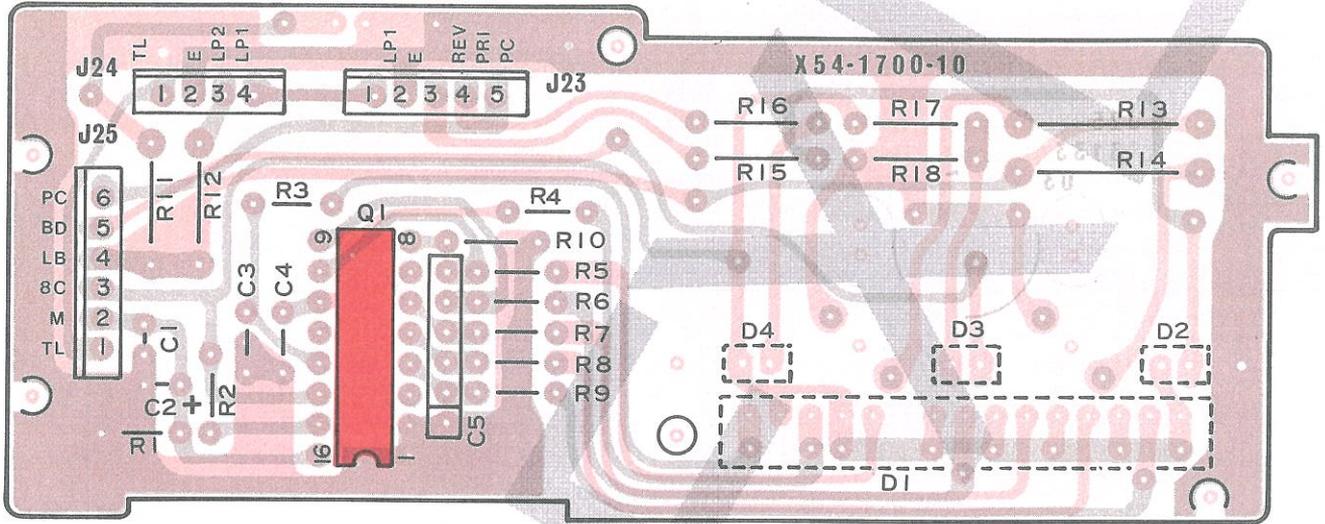
Q10,15,23,26,27(W,T): 2SC2458(Y) Q11: μPC592H2 Q12 ~ 14: 2SC2458(BL)

1. Installation of Q17 to shield plate.
2. Install XF1s so that the top faces inward.
3. Installation of Q21 to shield plate

A B C D E F G

# DISPLAY ASSY UNIT (X60-1230-10) PC BOARD VIEWS

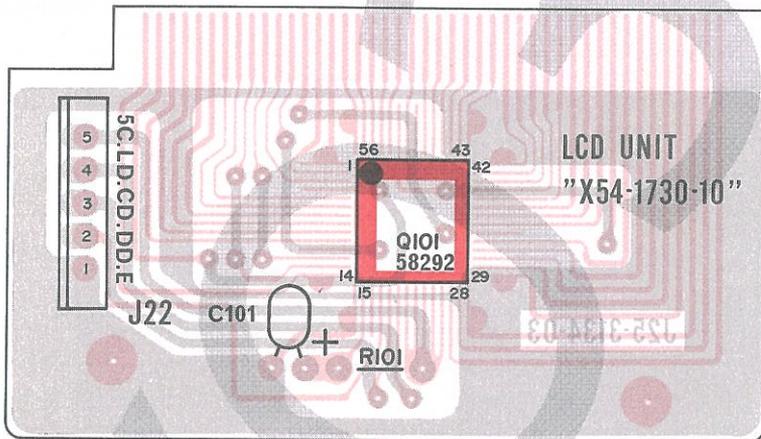
## DISPLAY UNIT (X54 - 1700 - 10) Component Side View



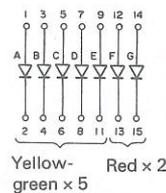
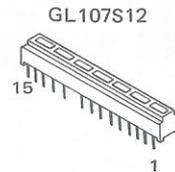
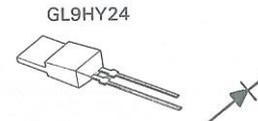
Q1: TA7612AP  
D1: GL107S12 D2, 4: GL9HY24 D3: PY5532K

Attach D1, D2, D3 and D4 to the foil side and solder them using a jig.

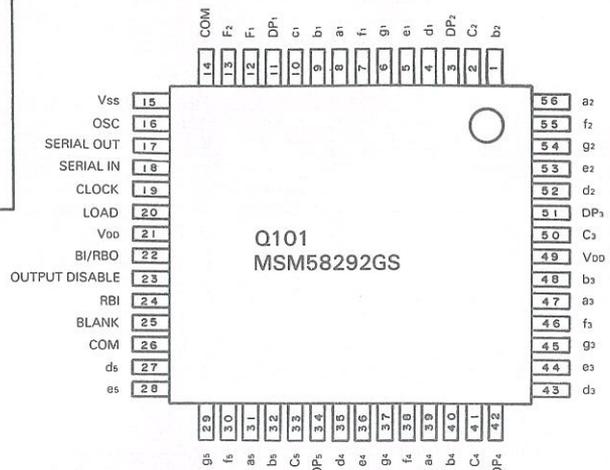
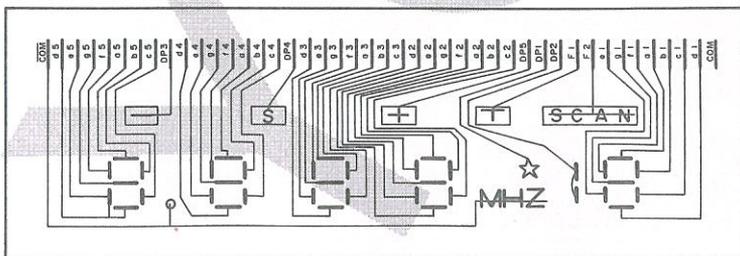
## LCD UNIT (X54 - 1730 - 10) Component Side View



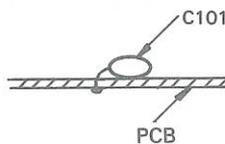
Q101 : MSM58292GS



| No. | FUNCTION      |
|-----|---------------|
| 1   | Dot A Anode   |
| 2   | Dot A Cathode |
| 3   | Dot B Anode   |
| 4   | Dot B Cathode |
| 5   | Dot C Anode   |
| 6   | Dot C Cathode |
| 7   | Dot D Anode   |
| 8   | Dot D Cathode |
| 9   | Dot E Anode   |
| 10  | NO PIN        |
| 11  | Dot E Cathode |
| 12  | Dot F Anode   |
| 13  | Dot F Cathode |
| 14  | Dot G Anode   |
| 15  | Dot G Cathode |



1. Install C101 as shown below.



2. Install Q101 with mark aligned.

2

3

4

5

6

# TR-7950/TR-7930

## DISASSEMBLY

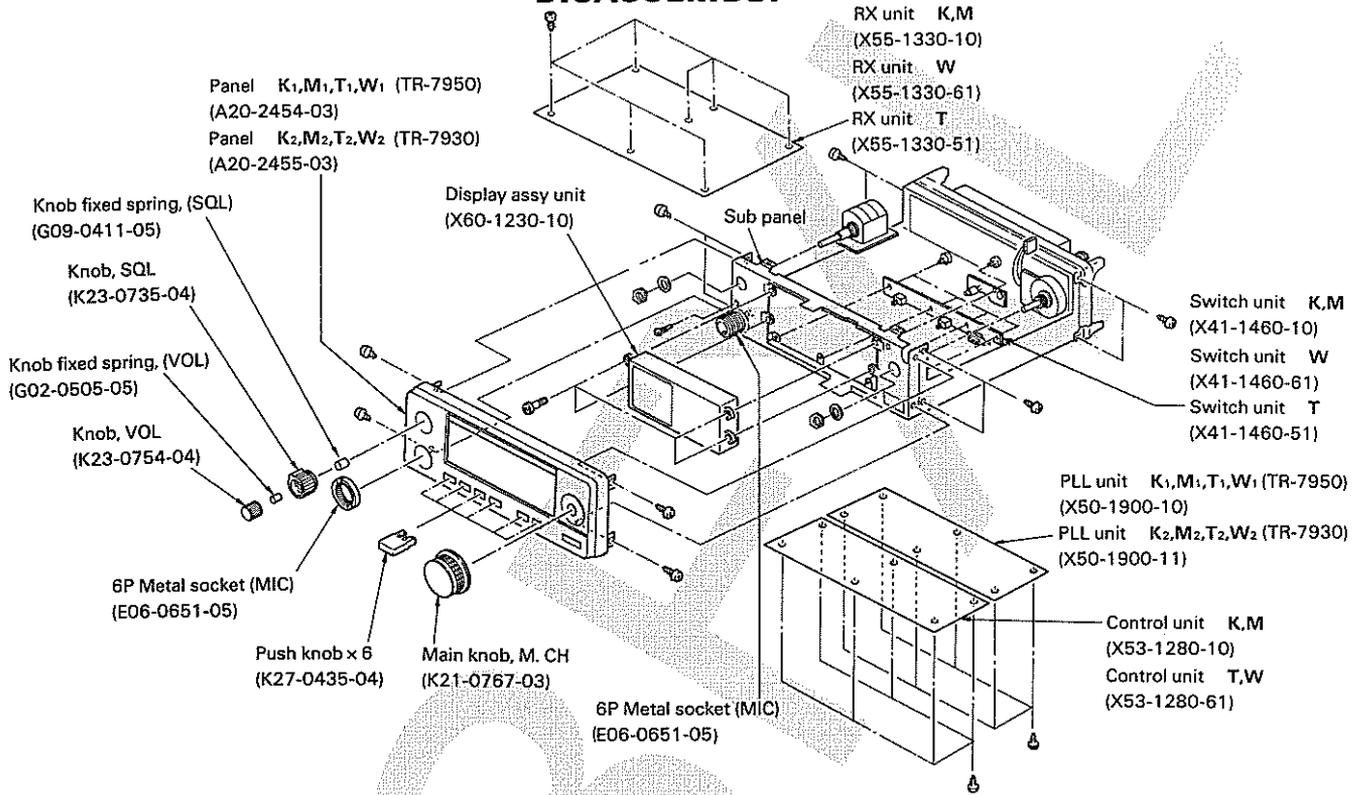


Fig 13. Front panel

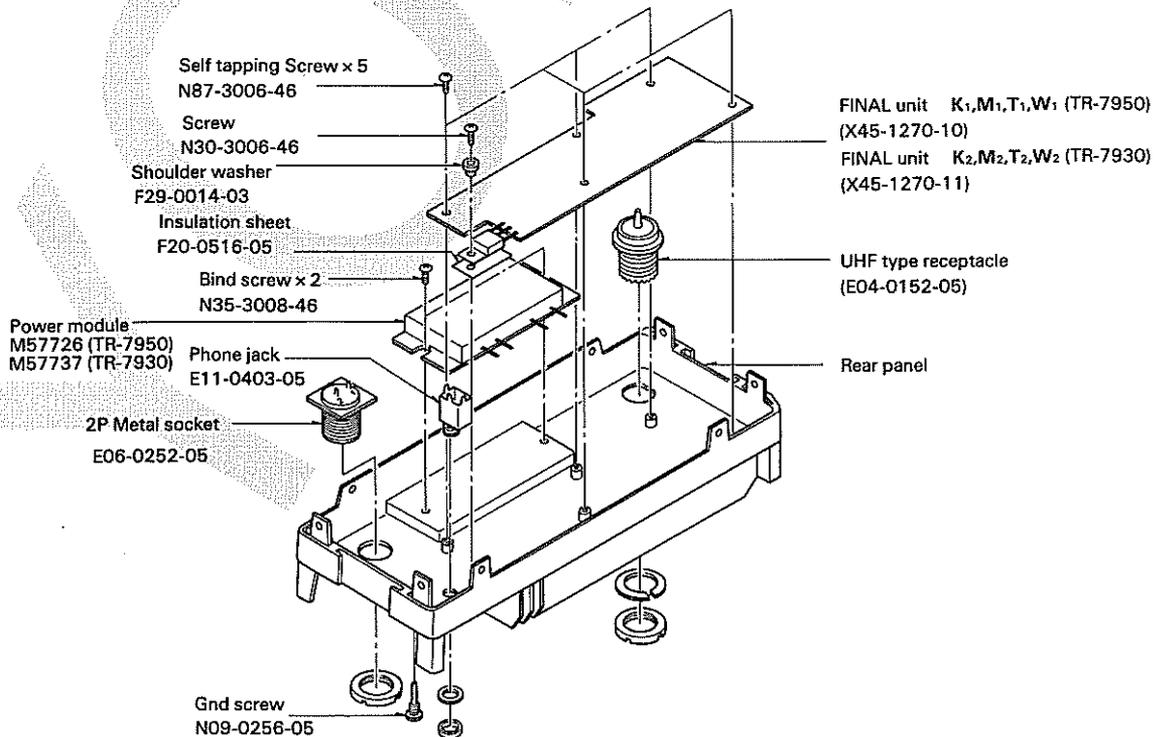


Fig 14. Rear panel

# TR-7950/TR-7930

## DISASSEMBLY

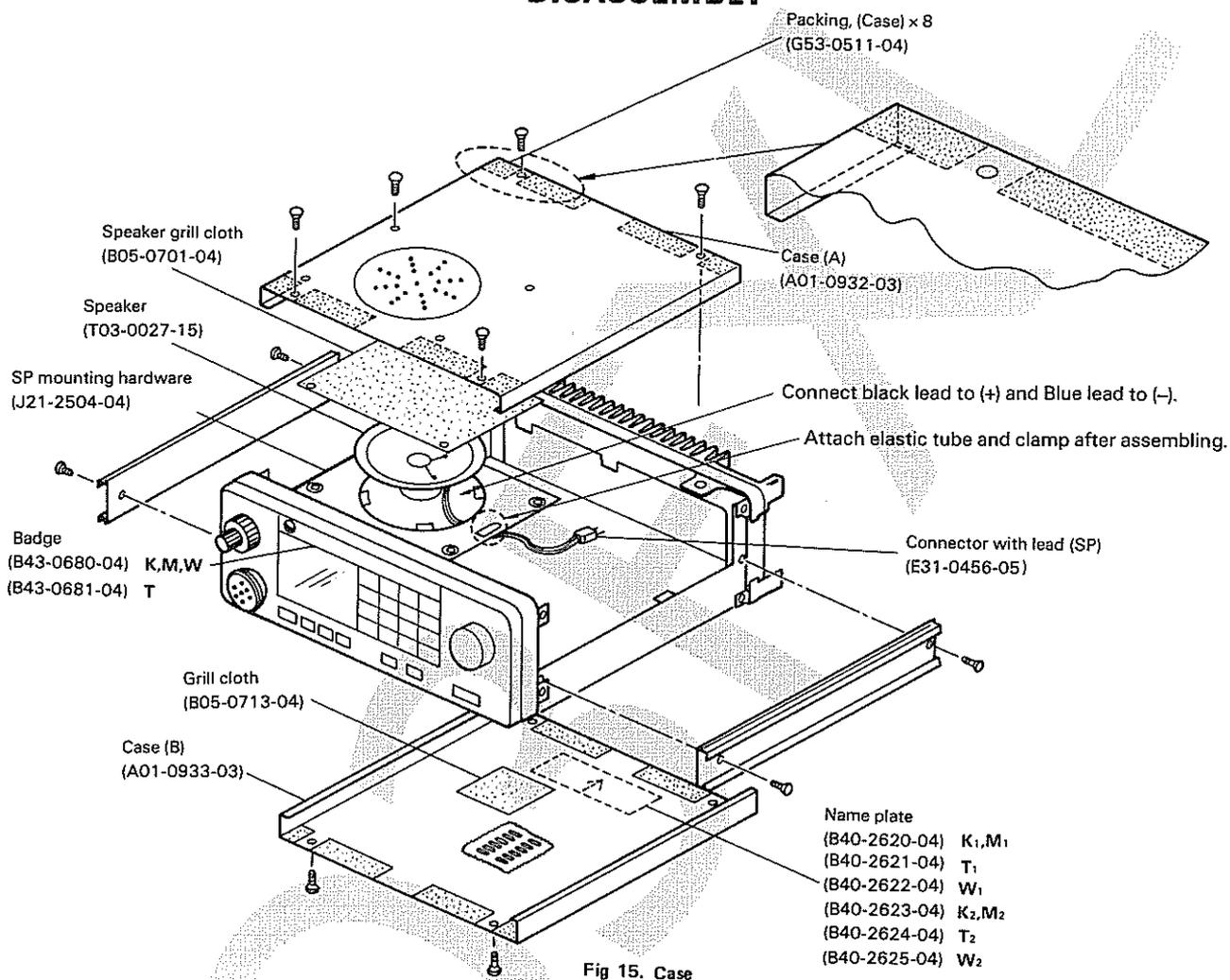


Fig 15. Case

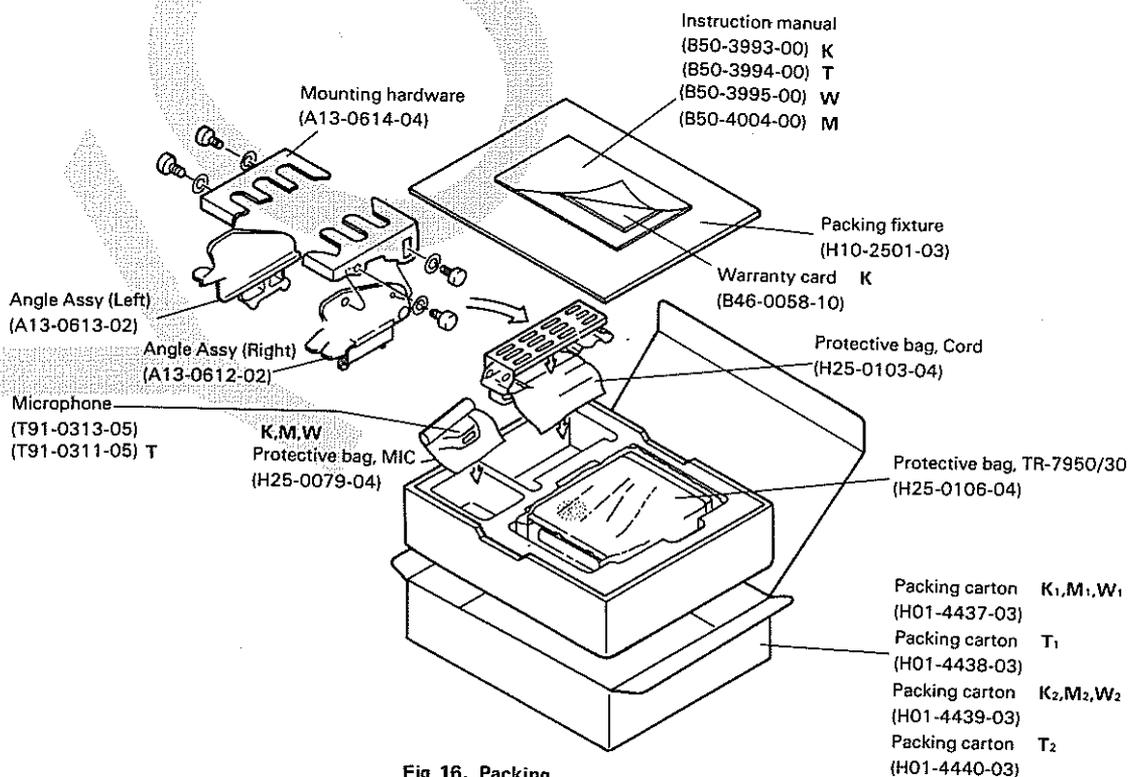
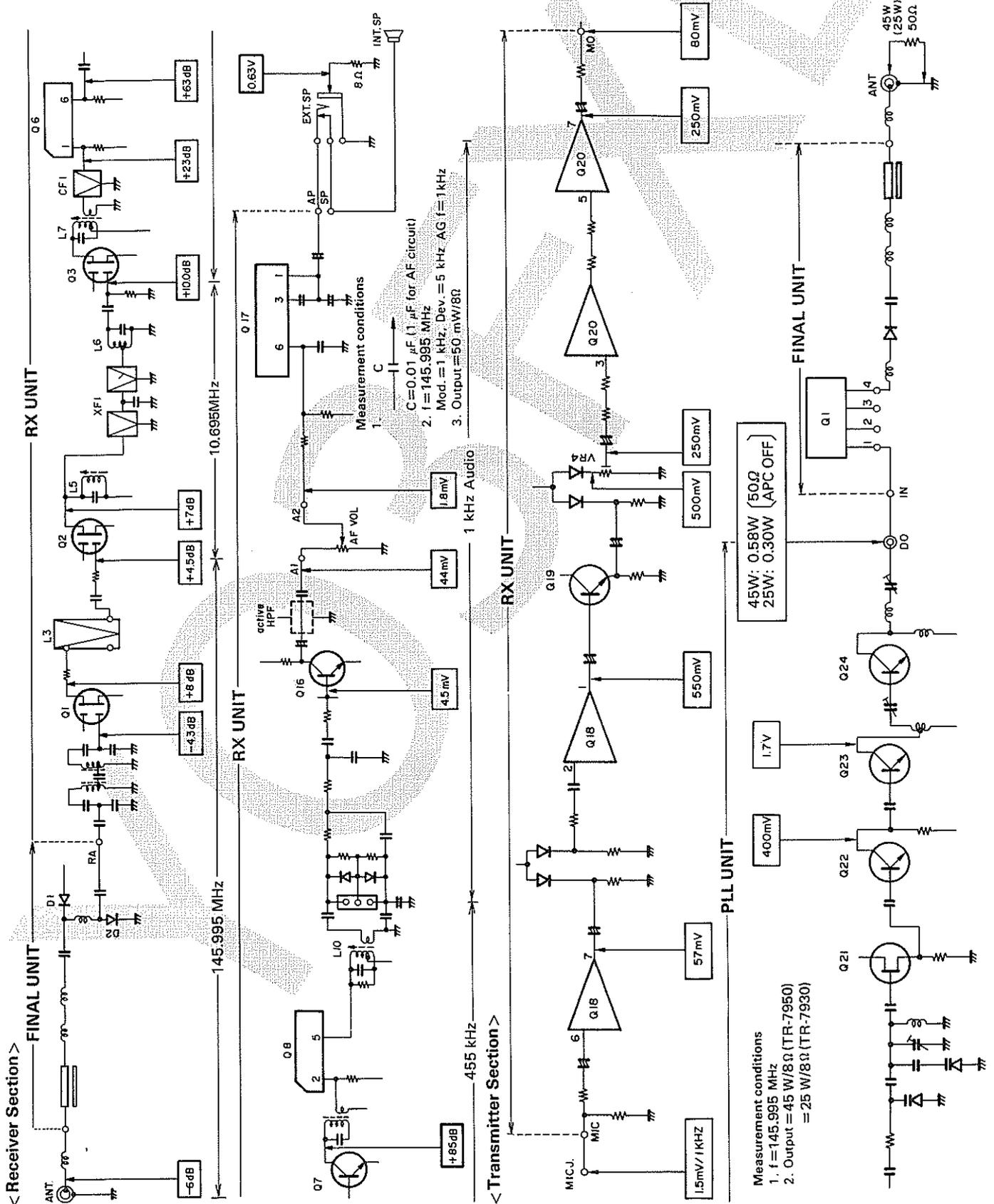


Fig 16. Packing

LEVEL DIAGRAM



# TR-7950/ TR-7930

## ADJUSTMENTS

### < Test Equipment >

1. Tester
    - Input Sufficient
  2. RF VTVM (RF V.M.)
    - Input impedance 1 MΩ and less than 2 pF
    - Voltage range FS = 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 8A min
  5. RF Power Meter
    - Dissipation 50W
    - Impedance 50Ω
    - Frequency range 144 MHz
  6. AF VTVM (AF V.M.)
    - Input impedance 1 MΩ or greater
    - Voltage range FS = 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. Directional coupler
  10. Oscilloscope
    - With horizontal input and high sensitivity
  11. Standard signal generator (SSG)
    - Frequency range 144 ~ 149 MHz
    - Modulation amplitude and frequency modulation
    - Output -20 dB ~ 100 dB
  12. AF Dummy load
    - 8Ω, 5W (approx)
  13. Sweep generator
    - Frequency range 144 ~ 149 MHz
- 13.8 V Power  
 Low power 7W 3.5 amp  
 High power 50W 9 amp  
 Receiver (no-SND) .4 amp

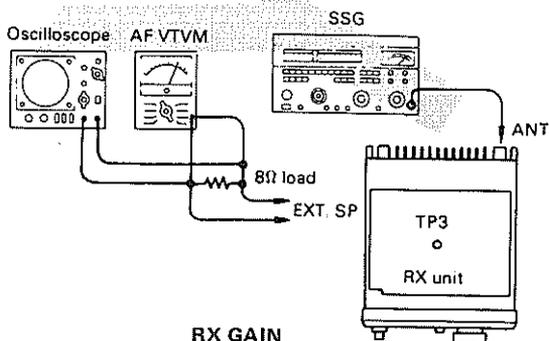


Fig 18.

### < Preparation >

Unless otherwise specified, set the controls as follows

|                   |     |
|-------------------|-----|
| POWER/ VOL SW     | ON  |
| SEND/ REC ( MIC ) | REC |
| AF VOL            | MIN |
| SQUELCH VOL       | MIN |
| SELECT            | KEY |
| SCAN              | TO  |
| HI/ LOW SW        | HI  |
| PRIORITY          |     |
| ALERT             | OFF |
| OPER              | OFF |
| TONE              | OFF |
| REV               | 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. 17

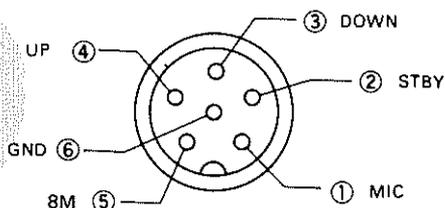


Fig 17. MIC terminals (view from front panel side)

- The output level of SSG is indicated as SSG's open circuit.

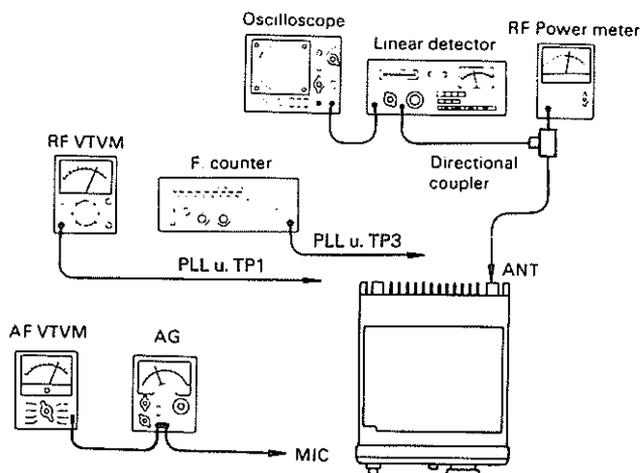
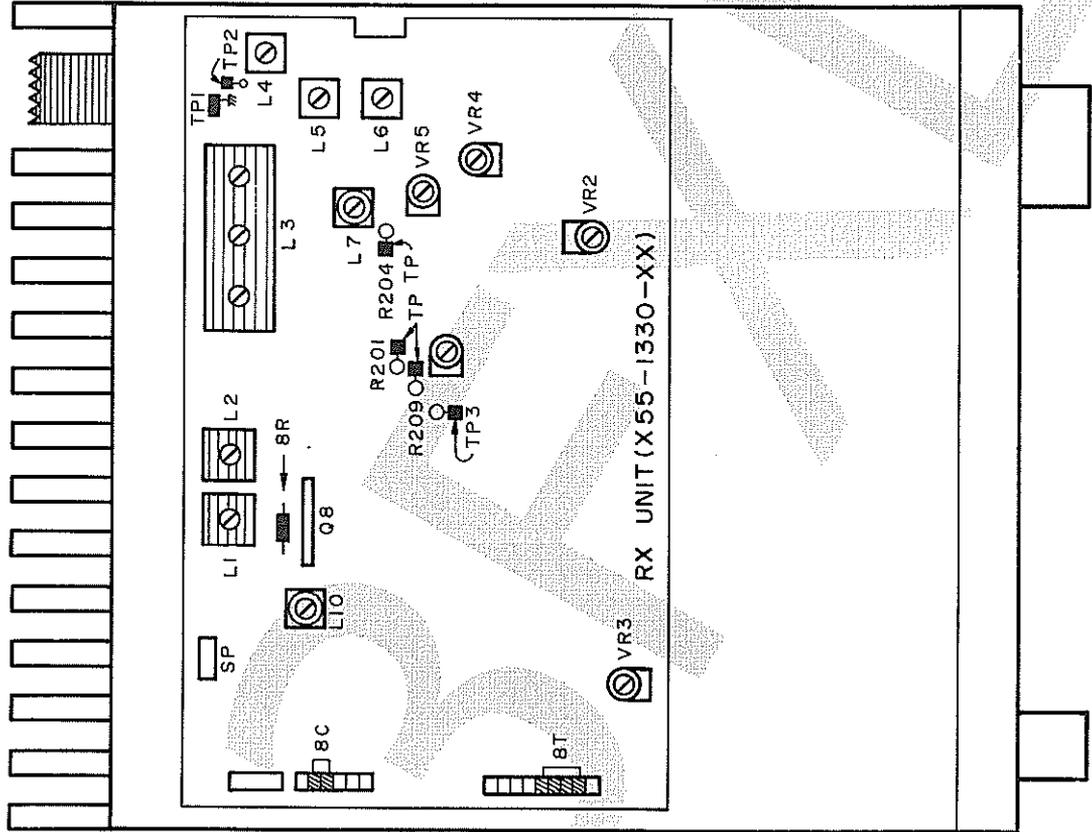


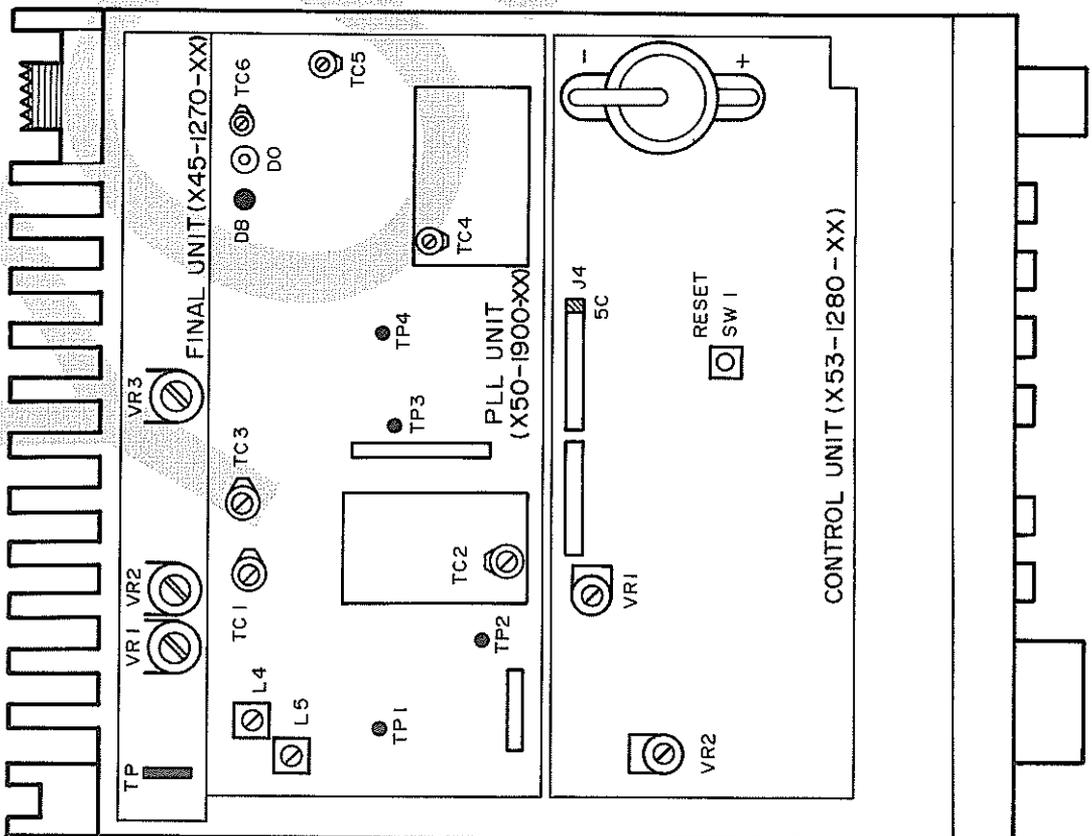
Fig 19. PLLU, DRIVE, Deviation

ADJUSTMENT POINT

TOP VIEW

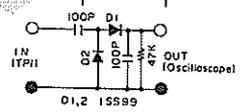
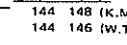


BOTTOM VIEW



# TR-7950/TR-7930

## ADJUSTMENT

| Item                         | Condition                                                                                                                                           | Measurement                    |             |                                                                                      | Adjustment          |               |                                                                                       | Specifications                                                                        |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------|--------------------------------------------------------------------------------------|---------------------|---------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                              |                                                                                                                                                     | Test equipment                 | Unit        | Terminal                                                                             | Unit                | Part          | Method                                                                                |                                                                                       |
| 1. Voltage check             | 1) DC power supply: 13.8V<br>Power SW: ON<br>SQL control: MIN. (fully CCW)                                                                          | DVM<br>(Digital volt meter)    | RX          | 8R                                                                                   |                     |               |                                                                                       | 7.6 ~ 8.2V                                                                            |
|                              |                                                                                                                                                     |                                |             | 8C                                                                                   |                     |               |                                                                                       | 7.7 ~ 8.3V                                                                            |
|                              |                                                                                                                                                     |                                |             | 8T                                                                                   |                     |               |                                                                                       | 0.3V or less                                                                          |
|                              | 2) Transmit                                                                                                                                         |                                |             | 8T                                                                                   |                     |               |                                                                                       | 7.6 ~ 8.2V                                                                            |
|                              |                                                                                                                                                     |                                |             | 8R                                                                                   |                     |               |                                                                                       | 0.1V or less                                                                          |
| 3) Receive                   |                                                                                                                                                     |                                | PLL         | DB                                                                                   |                     |               | 7 ~ 13V                                                                               |                                                                                       |
| 2. Reset                     | 1) Depress (CONTROL unit) SW1,<br>RESET SW ON, 2 ~ 3 times.                                                                                         | Display                        |             |                                                                                      |                     |               |                                                                                       | 4,000                                                                                 |
|                              | 2) SELECT: M. CH<br>MEMORY: b                                                                                                                       |                                |             |                                                                                      |                     |               |                                                                                       | 7,995 (K, M)<br>5,995 (W, T)                                                          |
| 3. Lithium Backup Battery    | 1) Solder the Lithium Battery to the CONTROL unit when Power SW is ON.                                                                              | DVM                            | CONTROL     |                                                                                      |                     |               |     | Do not short the Lithium Battery.<br>3V                                               |
| 4. "Beeper"                  | 1) VOL: 12:00 SQL: 12:00<br>MIC: Connect and press the MIC UP or DOWN continuously.                                                                 | AF<br>VTVM                     | Rear Panel  | SP                                                                                   | RX                  | VR3           | 0.5V                                                                                  |                                                                                       |
| 5. PLL                       | 1) Dial: 2.000<br>4.000 (W, T)                                                                                                                      | RF<br>VTVM                     | PLL         | TP1                                                                                  | PLL                 | L4, 5         | MAX.                                                                                  | 1.5V or more                                                                          |
|                              |                                                                                                                                                     | DC, VM                         |             | TP2                                                                                  |                     | TC2           | 6.2V<br>5.2V (W, T)                                                                   | ± 0.1V                                                                                |
|                              | 2) Transmit                                                                                                                                         |                                | TP4         | TC4                                                                                  | 2.5V<br>3.5V (W, T) | ± 0.1V        |                                                                                       |                                                                                       |
|                              | 3) Receive<br>Dial: 5.000                                                                                                                           | f.counter                      | TP3         | TC1                                                                                  | 134.305 MHz         | ± 100 Hz      |                                                                                       |                                                                                       |
|                              | 4) Transmit                                                                                                                                         |                                | D0          | TC3                                                                                  | 145.000 MHz         |               |                                                                                       |                                                                                       |
| 6. DRIVE                     | 1) Dial: 6.600<br>5.995 (W, T)<br>Transmit                                                                                                          | Power<br>-meter                |             | D0                                                                                   |                     | TC5, 6        | MAX.                                                                                  | 0.5W or more<br>0.2W or more<br>(K2, W2, T2, M2)                                      |
| 7. HELICAL                   | 1) ANT: Sweep Gen.<br><br>Output 10dB                                                                                                               | Detector                       | RX          | TP1                                                                                  | RX                  | L1, 2, 3      | Adjust to obtain the waveform shown.                                                  |  |
|                              |                                                                                                                                                     | Oscilloscope                   |             |  |                     |               |                                                                                       |                                                                                       |
| 8. GAIN                      | 1) Dial: 6.000<br>5.000 (W, T)<br>ANT: SSG<br>Output 10 dBμ<br>Mod. 1 kHz, DEV/5 kHz<br>f: 146 MHz<br>145 MHz (W, T)                                | DC<br>VTVM                     | RX          | TP3                                                                                  | RX                  | L4, 5<br>6, 7 |  | 0.8V or more                                                                          |
| 9. S-meter                   | 1) Dial: 6.000<br>5.000 (W, T)<br>ANT: SSG<br>Output 15 dBμ<br>Mod. 1 kHz, DEV/5 kHz                                                                | S-LED<br>S-meter               | Front-panel |                                                                                      | RX                  | VR1           | All LED's ON.                                                                         |                                                                                       |
|                              |                                                                                                                                                     | C,TUNING<br>LED                |             |                                                                                      |                     |               | LED should light.                                                                     |                                                                                       |
| 10. Discriminator<br><br>S/N | 1) ANT: SSG<br>Output 60 dBμ<br>Mod. 1 kHz, DEV/5 kHz                                                                                               | AF<br>VTVM<br>Oscilloscope     | Rear Panel  | SP                                                                                   | RX                  | L10           | MAX.                                                                                  |                                                                                       |
|                              | 2) SSG<br>Output: -6 dBμ                                                                                                                            |                                |             |                                                                                      |                     |               | Check                                                                                 | S/N 20 dB or more                                                                     |
| 11. POWER                    | 1) Final unit<br>VR2, 3: MAX. (fully CW)<br>2) Dial: 6.600<br>5.000 (W, T)<br>Connect coax. cable to D0 terminal in the PLL unit.<br>Then transmit. | Ammeter<br>in the DC<br>supply |             |                                                                                      | PLL                 | TC6           | MAX.                                                                                  |                                                                                       |

ADJUSTMENT

| Item                                                  | Condition                                                                                                                    | Measurement             |             |          | Adjustment |       |                                | Specifications                       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------|----------|------------|-------|--------------------------------|--------------------------------------|
|                                                       |                                                                                                                              | Test equipment          | Unit        | Terminal | Unit       | Part  | Method                         |                                      |
| 12. PROTECTION null                                   |                                                                                                                              | DC Multi meter          | FINAL       | TP       | FINAL      | VR1   | MIN.                           | 0.5V or less                         |
|                                                       |                                                                                                                              | Power -meter            | Rear -Panel | ANT      |            |       |                                |                                      |
| 13. RF. LED                                           |                                                                                                                              |                         |             |          |            | VR2   | 25W (TR-7950)<br>15W (TR-7930) |                                      |
|                                                       |                                                                                                                              | RF-LED                  | Front-Panel |          | RX         | VR2   | All RF-LED's should light.     |                                      |
| 14. POWER SET-1 (TR-7950 only)                        | 1) Final unit<br>VR2: MAX. (CW)<br>Increase the DC supply voltage until output becomes 55W.<br>Dial: 8.995<br>5.995 (W1, T1) | Power -meter            | Rear -Panel | ANT      | FINAL      | VR2   | 52W                            |                                      |
|                                                       | 2) Reset voltage to 13.8V                                                                                                    |                         |             |          |            |       | Check                          | 4.5W or more (144 ~ 148MHz)          |
| 15. POWER SET-2 (TR-7930 only)                        | 1) Dial: 8.995<br>5.995 (W2, T2)                                                                                             |                         |             |          | FINAL      | VR2   | 28W                            |                                      |
| 16. LOW POWER                                         | 1) HI/LOW SW: LOW                                                                                                            | Power -meter            |             | ANT      |            |       | Check                          | 3 ~ 7W (TR-7950)<br>2 ~ 6W (TR-7930) |
|                                                       |                                                                                                                              | RF-LED                  |             |          |            |       |                                | 2 ~ 4 LED's should light.            |
| 17. PROTECTION Current                                | 1) ANT: Open                                                                                                                 | DC Power Supply Ammeter |             |          | FINAL      | VR3   | 4A (TR-7950)<br>2.5A (TR-7930) |                                      |
| 18. DEV                                               | 1) MIC 30 mV/1 kHz<br>2) MIC 3 mV/1 kHz                                                                                      | Linear -Detector        |             |          | RX         | VR4   | 4.6 kHz                        | ± 100 Hz                             |
| 19. SCAN                                              | 1) SCAN SW: TO<br>Confirm (CONTROL unit) VR1 at 12 o'clock.<br>SQL CONTROL: MIN (CCW)<br>KEY Board: Press "SC"               |                         |             |          |            |       | Check                          | Should be SCAN<br>3 ~ 7 seconds      |
|                                                       | 2) KEY Board: Press "C"                                                                                                      |                         |             |          |            |       |                                |                                      |
| 20. TONE (W1, W2 only)                                | 1) Same as item 18.<br>TONE SW: ON                                                                                           | f counter               |             |          | RX         | VR5   | 1,750 Hz                       | ± 10 Hz                              |
|                                                       |                                                                                                                              | Linear Detector         |             |          |            |       | Check                          | 2.5 kHz or more                      |
| 21. TONE Buarst (T1, T2 only)                         | 1) Same as item 18.<br>Connect a short jumper to R204, R201, R209 in the RX unit.<br>Transmit                                | f counter               |             |          | RX         | VR5   | 1,750 Hz                       | ± 10 Hz                              |
|                                                       |                                                                                                                              | Linear -Detector        |             |          |            |       | Check                          | 2.5 kHz or more                      |
|                                                       |                                                                                                                              | Monitor                 |             |          |            |       | Check                          | Should be monitored 0.5 ~ 1 second.  |
| 2) Disconnect short jumper<br>Transmit<br>TONE SW: ON |                                                                                                                              |                         |             |          |            | Check |                                |                                      |
| 22. Touch TONE (K1, K2, M1, M2 only)                  | 1) Transmit<br>KEY Board: Press "S"                                                                                          | Linear -Detector        |             |          | CONTROL    | VR2   | 3 kHz                          | ± 1 kHz                              |

## TR-7950/TR-7930

## &lt; Micro-processor operational check &gt;

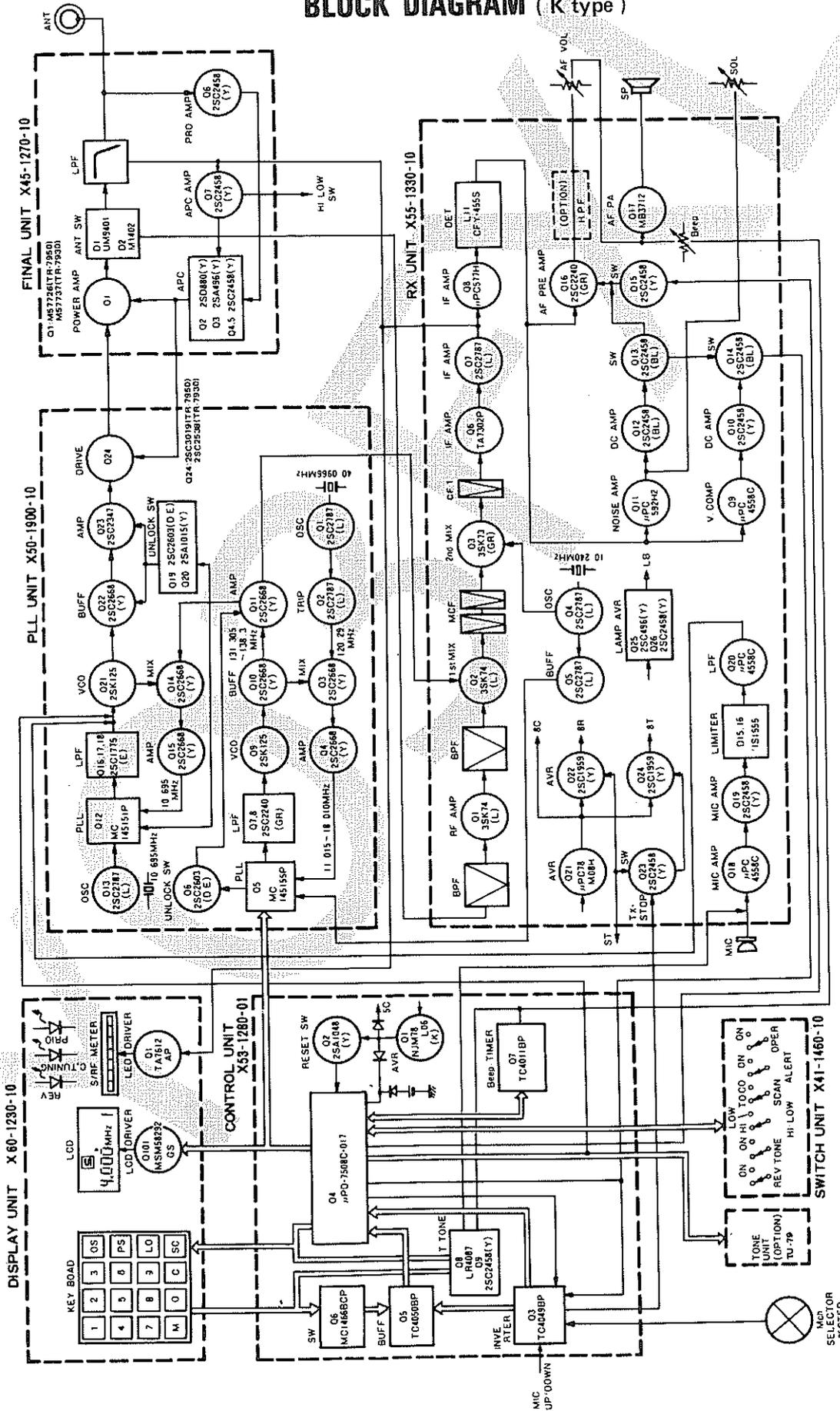
| Item         | Condition                                                                       | Operation check                                                                                                                                                                                   |                         |
|--------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. KEY BOARD | 1) SELECT SW: KEY<br>SQL control: MIN (CCW)<br><br>POWER SW: ON<br>RESET SW: ON |  4.000 1                                                                                                         |                         |
|              | 2) KEY 1, 9, 0, PS, LO<br>1, 2, 3, 6, 7, 8, 9, 0,<br>PS, LO (W, T)              |  4.000 1                                                                                                         |                         |
|              | 3) KEY<br>2, 2, 2, 2,<br><br>2, 2, 2, 2, (W, T)                                 |  2.220 1<br> 4.220 1 (W, T)     | Tone sounds<br>4 times. |
|              | 4) KEY<br>3, 3, 3, 3,<br><br>4, 3, 3, 3, (W, T)                                 |  3.330 1<br> 4.330 1 (W, T)     | Tone sounds<br>4 times. |
|              | 5) KEY<br>4, 4, 4, 4,                                                           |  4.440 1                                                                                                         | Tone sounds<br>4 times. |
|              | 6) KEY<br>5, 5, 5, 5,                                                           |  5.555 1                                                                                                       | Tone sounds<br>4 times. |
|              | 7) KEY<br>6, 6, 6, 6,<br><br>5, 6, 6, 6, (W, T)                                 |  6.665 1<br> 5.665 1 (W, T) | Tone sounds<br>4 times. |
|              | 8) KEY<br>7, 7, 7, 7,<br><br>5, 7, 7, 7, (W, T)                                 |  7.775 1<br> 5.775 1 (W, T) | Tone sounds<br>4 times. |
|              | 9) KEY<br>8, 8, 8, 8,<br><br>5, 8, 8, 8, (W, T)                                 |  8.885 1<br> 5.885 1 (W, T) | Tone sounds<br>4 times. |
|              | 10) KEY<br>8, 9, 9, 9,<br><br>5, 9, 9, 9, (W, T)                                |  8.995 1<br> 5.995 1 (W, T) | Tone sounds<br>4 times. |
|              | 11) KEY<br>5, 0, 0, 0                                                           |  5.000 1                                                                                                       | Tone sounds<br>4 times. |
|              | 12) KEY<br>OS                                                                   |  5.000 1                                                                                                       | The tone sounds.        |

| Item                   | Condition                                                                                 | Operation check                                                                                                                                                                                                                  |
|------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 13) MEMORY<br>Turn the dial to the<br>right 1 step.                                       |  5.000 2                                                                                                                                      |
|                        | 14) KEY<br>M                                                                              |  5.000 2 The tone sounds.                                                                                                                     |
|                        | 15) Turn MEMORY Dial to<br>the right.<br>2, 3, 4 ... 19, A, b, 1, 2                       | LCD MEMORY CH number<br>should indicate.<br>The tone sounds.<br>b → 1 (or 1 → b)                                                                                                                                                 |
| 2. SELECT SW           | 1) SELECT SW: M. CH                                                                       |  5.000 2                                                                                                                                      |
|                        | 2) Turn MEMORY Dial left<br>1 step.                                                       |  4.000 1 The tone sounds.                                                                                                                     |
|                        | 3) KEY<br>LO                                                                              |  4.000 * 1 The tone sounds.                                                                                                                   |
| 3. REV & PRIORITY SW's | 1) SELECT SW: KEY                                                                         |  5.000 1                                                                                                                                      |
|                        | 2) REV SW: ON.                                                                            | 5.600 1                                                                                                                                                                                                                          |
|                        | 3) REV SW: OFF<br>OPER SW: ON                                                             |  4.000 * 1 REV-LED should<br>extinguish.<br>PRIORITY-LED should light.                                                                      |
| 4. ALERT               | 1) OPER SW: OFF<br>SQL control: MIN (CCW)<br>ALERT SW: ON<br>VOL control:<br>9:00 ~ 10:00 | PRIORITY-LED goes off.<br>Noise should momentarily<br>mute approx. 0.3 second,<br>every 6 ~ 7 seconds.                                                                                                                           |
| 5. PS KEY              | 1) Turn MEMORY Dial to<br>CH b.<br>KEY PS: ON                                             |  5.000 b The tone sounds.                                                                                                                   |
|                        | 2) ALERT SW: OFF<br>OPER SW: ON                                                           |  7.995 b<br>5.995 b (W, T)                                                                                                                  |
| 6. SCAN SW             | 1) OPER SW: OFF<br>KEY "SC": ON                                                           | PRIORITY-LED goes off.<br> 6 SCAN<br>4.000 b<br>The tone sounds.<br>The display should step up<br>in 5 kHz steps approx<br>every 6 seconds. |
|                        | 2) KEY "C": ON                                                                            |                                                                                                                                                                                                                                  |

## &lt; REFERENCE &gt;

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

BLOCK DIAGRAM ( K type )





# TR-7950/ TR-7930

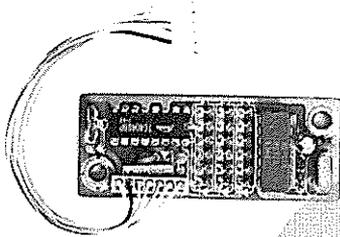
## TU-79

TU-79 TONE UNIT (K, M only)

### TU-79 SPECIFICATIONS

Oscillator frequency ..... 1 MHz  $\pm$  0.1%  
 Output frequency ..... 37 band within 67.0 Hz ~ 250.3 Hz

NOTE: To Control Unit J5



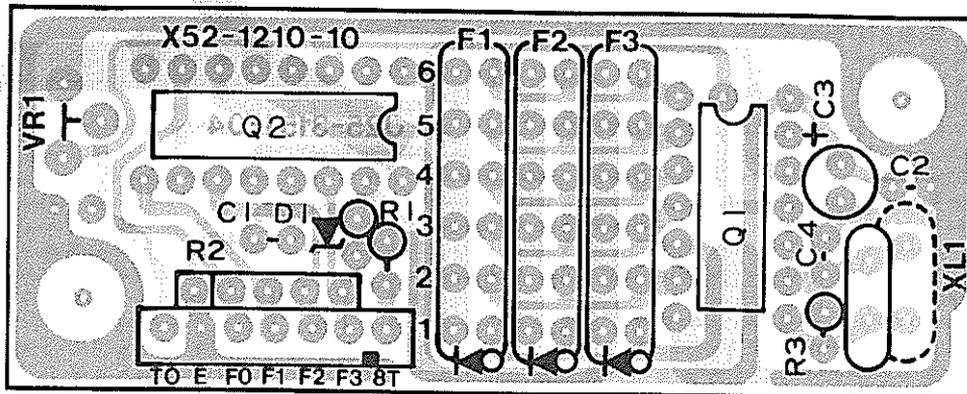
### TU-79 PARTS LIST

N: New Parts

| Part.No.                       | Re-<br>marks | Description                      | Ref. No.                       |
|--------------------------------|--------------|----------------------------------|--------------------------------|
| <b>GENERAL</b>                 |              |                                  |                                |
| B50-4020-00                    | N            | Instruction manual               |                                |
| H01-4459-03                    | N            | Packing carton                   |                                |
| H25-0029-04                    |              | Protective bag                   |                                |
| N87-3012-46                    |              | Self tapping screw x 2           |                                |
| X52-1210-10                    | N            | Tone unit                        |                                |
| <b>TONE unit (X52-1210-10)</b> |              |                                  |                                |
| CC45CH1H220J                   |              | C, 22P                           | C4                             |
| CE04W1A470M                    |              | E, 47                            | C3                             |
| C91-0131-05                    |              | C, 0.01                          | C1,2                           |
| E02-0110-05                    | N            | IC socket 14P                    |                                |
| E31-2160-05                    | N            | Connector with lead              |                                |
| J31-0502-04                    |              | PC board collar                  |                                |
| J42-0404-05                    |              | PC board bush                    |                                |
| L77-0983-05                    |              | Crystal 1 MHz                    | XL1                            |
| MX315                          |              | IC                               | Q1                             |
| TC4049BP                       |              | IC                               | Q2                             |
| XZ-055                         |              | Zener Diode                      | D1                             |
| 1S1555                         |              | Diode                            | D11 ~ 16<br>21 ~ 26<br>31 ~ 36 |
| R12-1419-05                    |              | Trim. Pot. 3 k $\Omega$          | VR1                            |
| R90-0124-05                    |              | Resistor block 47 k $\Omega$ x 4 | R2                             |

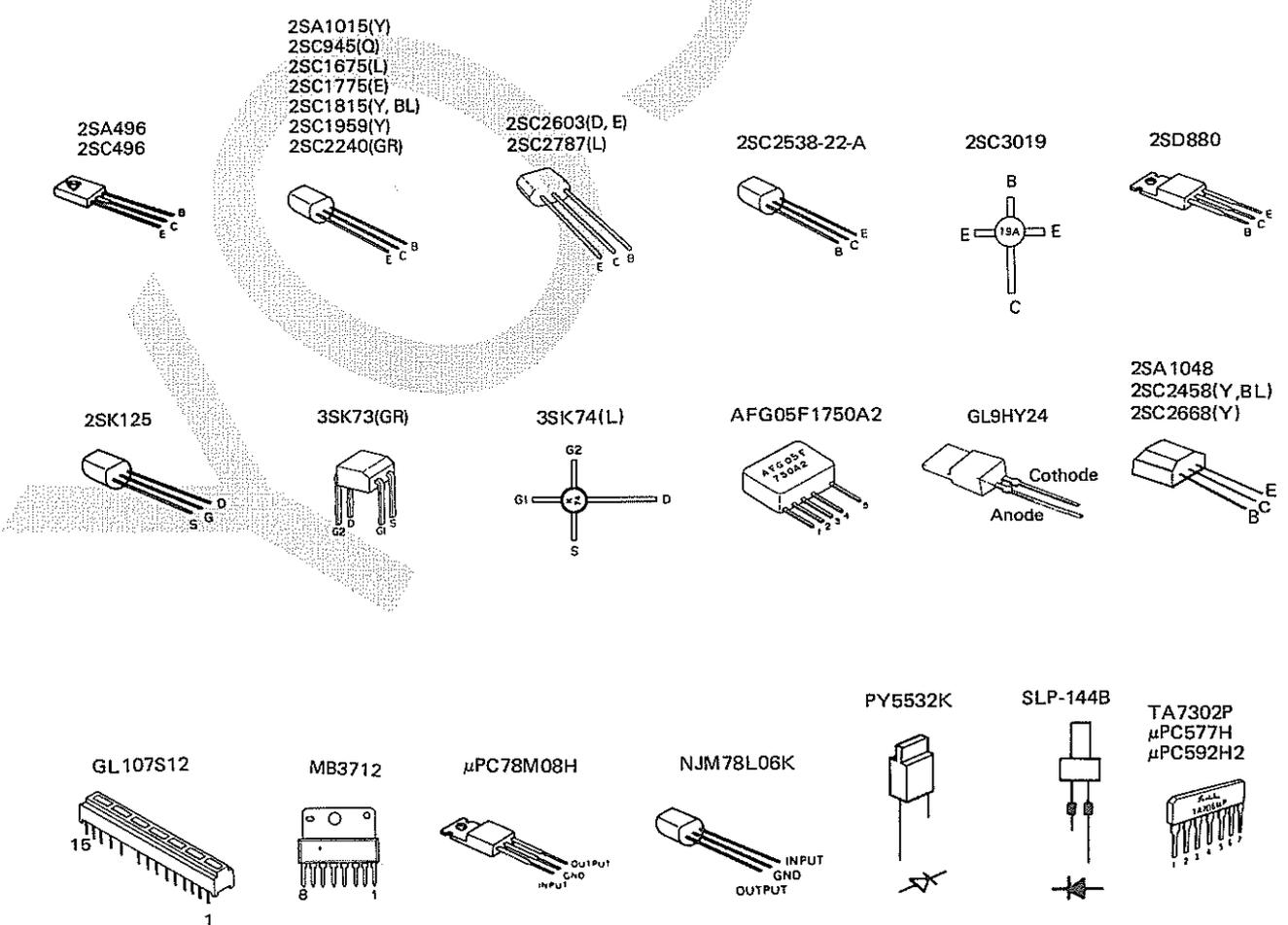
### TU-79 PC BOARD (X52 - 1210 - 10)

Component side view



## ABBREVIATION

|         |                                |     |                            |     |                             |
|---------|--------------------------------|-----|----------------------------|-----|-----------------------------|
| AL      | Alert                          | KB  | Key Board "Row"            | RM  | RF Meter                    |
| AP      | Audio Power Output             | KC  | Key Board "Row"            | RO  | Reference Oscillator Output |
| A1      | Top of AF Control              | KD  | Key Board "Row"            | SP  | Speaker                     |
| A2      | Arm of AF Control              | KG  | Key Board GND              | SQ  | Squelch Control             |
| B       | +13.8V                         | K1  | Key Board "Column"         | SS  | SCAN Stop                   |
| BD      | Busy Light                     | K2  | Key Board "Column"         | ST  | Stand by Switch             |
| BZ      | Buzzer                         | K3  | Key Board "Column"         | SWB | Switched +B                 |
| B1      | Tone Unit Switched +B W.T only | K4  | Key Board "Column"         | TL  | TX Light                    |
| B2      | Tone Unit +B W. T only         | LB  | Lamp +B                    | TO  | Tone Output                 |
| CB      | Common +B                      | LD  | LCD IC Data                | TT  | Touch Tone Signal           |
| CD      | LCD IC Data                    | LP  | PLL IC Data                | TXS | TX Stop                     |
| CP      | PLL IC Data                    | LP1 | Rotary Lamp 1              | UP  | MIC Up Switch               |
| DB      | Drive +B                       | LP2 | Rotary Lamp 2              | 5C  | +5V Common                  |
| DD      | LCD IC Data                    | LR  | RX Local                   | 8C  | +8V Common                  |
| DO      | MIC Down Switch                | M   | Meter                      | 8T  | +8V in TX                   |
| DP      | PLL IC Data                    | MO  | Modulator Out              | 10  | $\mu$ -proc. port-1         |
| E       | GND                            | PC  | Power Control              | 11  | $\mu$ -proc. port-1         |
| E1      | Rotary Encoder                 | PR1 | Priority Light             | 12  | $\mu$ -proc. port-1         |
| E2      | Rotary Encoder                 | QS  | Squelch Switch             | 22  | $\mu$ -proc. port-2         |
| E3      | Rotary Encoder                 | RA  | RX Antenna                 | 23  | $\mu$ -proc. port-2         |
| FO ~ F3 | Tone Select Code               | REV | Reverse Light              |     |                             |
| KA      | Key Board "Row"                | RI  | Reference Oscillator Input |     |                             |





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A product of

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