KENWOOD

# SERVICE MANUAL

## Model TS-700

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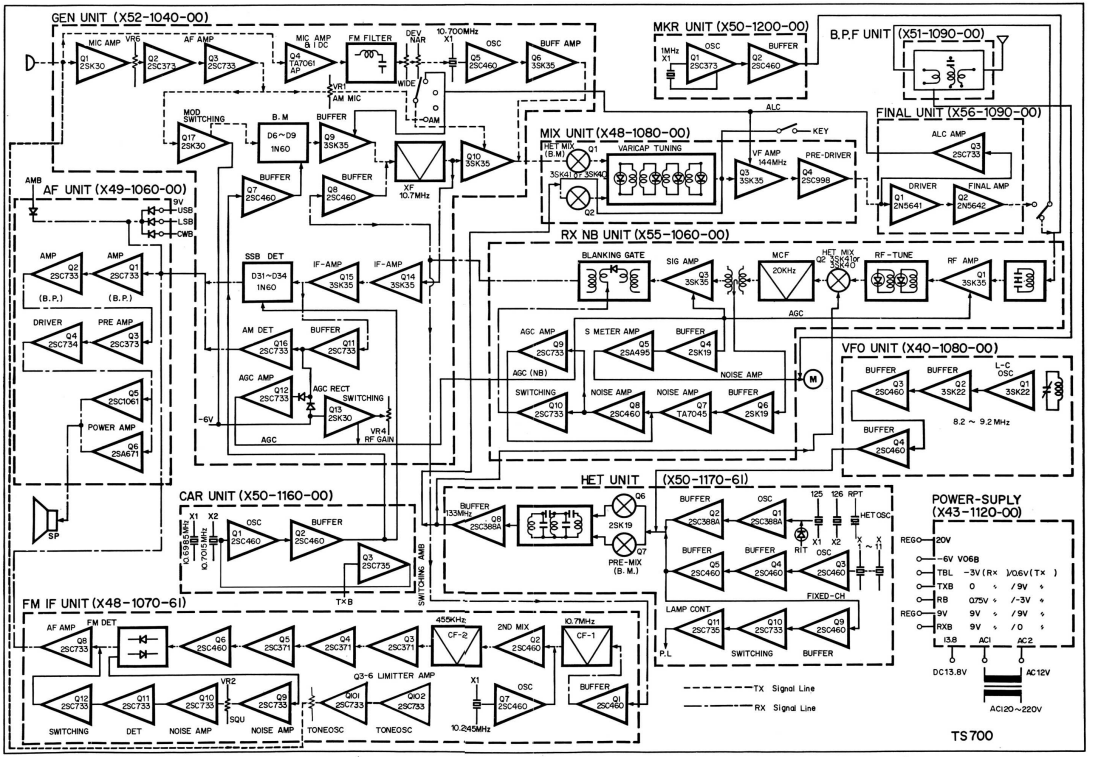
# SPECIFICATIONS

| | | | |
|---|---|---|---|
| **FREQUENCY RANGE** | 144 BAND | (T, R) | 144 ~ 145 MHz |
| | 145 BAND | (T, R) | 145 ~ 146 MHz |
| | RPT BAND | R | 145 ~ 146 MHz |
| | | T | 144.4 ~ 145.4 MHz |
| **MODE** | SSB, FM, CW, AM | | |
| **POWER OUTPUT** | 10 watts for SSB, CW and FM<br>3 watts for AM | | |
| **ANTENNA IMPEDANCE** | 50 ohms (unbalanced) | | |
| **CARRIER SUPPRESSION** | Carrier better than 40 dB down from the output signal | | |
| **SIDEBAND SUPPRESSION** | Unwanted sideband is better than 40dB down from the output signal | | |
| **SPURIOUS RADIATION** | Less than –60 dB | | |
| **MAX. FREQUENCY DEVIATION (FM)** | ±10 kHz and 5 kHz, ±5 kHz when shipped | | |
| **MODULATION** | Balanced modulation for SSB<br>Variable reactance frequency shift for FM<br>Low power modulation for AM | | |
| **MICROPHONE** | 500-ohm dynamic microphone | | |
| **AUDIO FREQUENCY RESPONSE** | 500 to 2500 Hz, within –6 dB | | |
| **RPT TONE FREQUENCY** | 1750 Hz | | |
| **RECEIVE CIRCUITRY** | Single superheterodyne for SSB, CW and AM<br>Double superheterodyne for FM | | |
| **INTERMEDIATE FREQUENCY** | 10.7 MHz for SSB, CW and AM<br>10.7 MHz, first IF; 455 kHz, second IF, for FM | | |
| **RECEIVER SENSITIVITY** | Less than 0.5$\mu$V for 10 dB S/N for SSB and CW<br>Less than 1$\mu$V for 26 dB S/N for FM<br>Less than 2$\mu$V for 10 dB S/N for AM | | |
| **IMAGE RATIO** | Image frequency better than 60 dB down from the output signal | | |
| **IF REJECTION** | IF frequency is 60 dB or more down from output signal. | | |
| **BANDPASS WIDTH** | More than 2.4 kHz at 6 dB down for SSB, CW and AM<br>More than 20 kHz at 6 dB down for FM | | |
| **RECEIVER SELECTIVITY** | Less than 4.8 kHz at 60 dB down for SSB, CW and AM<br>Less than 40 kHz at 60 dB down for FM | | |
| **SQUELCH SENSITIVITY** | 0.5$\mu$V | | |
| **AUDIO OUTPUT** | More than 2 watts across 8$\Omega$ load (10% distortion) | | |
| **AUDIO OUTPUT IMPEDANCE** | 8 ohms | | |
| **FREQUENCY STABILITY** | Within 200 Hz during any 30 minute period after warmup<br>Within ±4 kHz during the first hour after 1 minute of warmup | | |
| **POWER REQUIREMENTS** | AC 120/220 volts, 50/60 Hz;<br>DC 12 ~ 16 volts (13.8 volts as reference) | | |
| **POWER CONSUMPTION** | 95 watts (AC 220 V), 4A (DC 13.8 V) for full power transmission<br>45 watts (AC 220 V), 0.8 A (DC 13.8 V) for no-signal reception | | |
| **DIMENSIONS AND WEIGHT** | 10-15/16" (278 mm) wide x 4-7/8" (124 mm) high x 12-9/16" (320 mm) deep 24.2 lbs (11 kg) | | |

# BLOCK DIAGRAM



# TRANSCEIVER FEATURES

1. A fully solid-state, all-mode amateur transceiver, the Model TS-700 provides high-quality communications on SSB, FM, AM and CW in the 144-MHz band.
2. It operates with dual power supply, AC and DC, and is designed for two duties –STATIONARY and MOBILE– with emphasis on stationary duty.
3. The TS-700 is a highly sophisticated amateur radio transceiver with the frequency coverage in two bands, 144 to 145 MHz, and 145 to 146 MHz, respectively. Also included in the equipment are a built-in VFO circuit and an additional provision for RPT operation with the frequency coverage from 145 to 146 MHz for reception, and 144.4 to 145.4 MHz for transmission.
4. A newly developed two-speed dial mechanism facilitates tuning: MAIN TUNING knob (inner) for closer tuning covers a change of 25 kHz by one complete rotation; QUICK (COARSE) TUNING knob (outer) covers a change of 100 kHz similarly. You can tune in quickly with pin-point accuracy – the feature which will prove very useful in receiving single-sideband (SSB) signals.
5. MAIN DIAL is graduated to provide readings accurate to 1 kHz, presenting a circular (360 degrees) scale from zero to 100 kHz. SUB-DIAL is a similar scale graduated in intervals of 50 kHz to cover a total range of 1 MHz for a complete rotation.
6. A total of 11 fixed oscillator circuits (to be loaded with optional crystals) are provided: these selective circuits are good for each of the two selective bands, 144-MHz and 145-MHz, so that you virtually have a total of 22 fixed channels, each for making available a certain operating frequency and closely select the operating frequency within the assigned band. Moreover, a channel-in-use indicating device of our proprietary design is included to tell you visually which of the crystal-loaded channels is in service.
7. A noise blanker (NB) circuit of the type adopted in many other HF products of our make and widely acknowledge for excellent noise eliminating performance is included. Such pulse signals as those coming from automotive ignition systems are beautifully excluded from audio output.
8. For improved FM-mode operation, a squelch circuit of noise filter type is added to the FM unit.
9. Cross-talk and spurious-signal interferences are minimized by the high selectivity secured by, among other things, two special tuning circuits, one being of variable capacitance type built in the RF stage and the other being of High-Q type located on the antenna input side.
10. A balanced-type mixer circuit based on the use of field-effect transistors (FET) has been adopted for the pre-mixer and heterodyne mixer. These mixers assure improved rejection of spurious signals during transmission.
11. The IF stage (SSB, AM, CW) is provided with a 6-element crystal filter. The use of wide-band and narrow-band ceramic filters assures outstanding selectivity during FM reception.
12. The built-in RF gain control is of threshold type and, as such, ensures an optimized S/N ratio at all times in receiving SSB signals.
13. Speaker output is free from distortion: this owes to the amplifier-type AGC circuit. Signals transmitted are accompanied by little or no splutter and free from distortion: this owes to the advanced ALC circuit. The AGC circuit comprises such time-constant elements that this constant is "slow" in SSB mode but "fast" in FM, AM or CW mode.
14. A marker signal circuit, operating with a high-precision crystal oscillator which runs at 1 MHz, is included to enable you to calibrate the tuning dial extremely accurately at the edge of a frequency band.
15. The "S" meter is of our proprietary type, for which patents are pending.
    Its indication does not go beyond and "over the scale" even when an unusually intense signal comes in, as in FM-mode operation. This property of the meter enables you to verify the FM center frequency at the face of this meter.
16. The TS-700 is equipped with a tone oscillator which produces a low-frequency beat tone at 1,750 Hz to call in a repeater station.
17. The ON-AIR lamp lights up when the transceiver shifts itself into transmitting state. This feature keeps you informed of the state of operation at all times.
18. A receiver incremental tuning circuit (RIT) is included as a means of finer tuning. This circuit is particularly useful in SSB and CW modes, and is effective whether you have selected the VFO or any of the 11 fixed channel.
19. The built-in speaker is a large 9 cm by 6 cm one. An extra jack is provided, so that you can drive an external speaker from it.
20. Two kinds of power supply are accepted: AC 120/220 volts (50 or 60 Hz) and DC 13.8 volts. Supply connection is simplified. A DC voltage multiplier of our own development is contained in the transceiver: this multiplier is exceptionally compact and has contributed much to the space-economy design of this model.
21. Significant improvements are embodied in the panel design for making this transceiver much easier to control and use. Dials and knobs are of more advanced type in visual and functional senses; meter illumination and pilot lighting are included by assuming nighttime use of the transceiver; and controls and connectors are laid out according to the principles of human enginnering.
22. Visual aspects were taken as an important criterion in the designing of this transceiver, and have been worked out to present a sharp, high-quality appearance that this model has an appearance that bespeaks the advanced all-mode functions this model is capable of.

Mechanical features too have been treated similarly, with particular emphasis on their reliability.

23. For assuring easier access to the internals, the transceiver enclosure or case is in two parts, complete with special mechanical details to allow the front control panel to be detached. The top half of the case too is detachable; and the rear panel and final-stage unit are so arranged that this unit can be removed as an individual component by and from the rear panel.
24. The handle is provided for easy carrying and handling of this transceiver.
25. A microphone is included among the standard accessories.

# CIRCUIT DESCRIPTION

## GENERAL

The block diagram of the TS-700 transceiver is shown in page 5, to which the following description is referenced. The network of circuits comprises a total of 66 transistors, augmented by 20 field-effect transistors (FET), 3 ICs and 106 diodes. These circuit elements are arranged in unitized groups, each group being designed to perform a specific function, and are interconnected by printed-circuit conduction paths. An exception from this manner of interconnection is the band-pass filter (BPF).

The receiving section operates on single superheterodyne for SSB mode or on double superheterodyne for FM mode.

The transmitting section produces the SSB signal through a crystal filter circuit for the SSB mode of operation; it operates on direct voltage modulation by variable capacitance for FM mode, on low-power modulation for AM mode, and on block bias keying of double-conversion type for CW mode.

| Crystal oscillator frequencies | | |
|---|---|---|
| CARRIER UNIT | USB | 10.6985 MHz |
| | LSB | 10.7015 MHz |
| | AM & CW | 10.7006 MHz |
| GENERATOR UNIT | FM | 10.700 MHz |
| HET UNIT | 144 | 125.100 MHz |
| | 145 | 126.100 MHz |
| | RPT (R) | 126.100 MHz |
| | RPT (T) | 125.500 MHz |

## CARRIER UNIT (X50-1160-00)

This unit provides the carrier frequency for the generator unit in transmitting operation, but operates as a beat frequency oscillator (BFO) for ring-type detection in receiving operation.

Crystals are used for the oscillating elements in the 2-transistor solid-state circuit of this unit. Switching diodes are included for switching between USB, LSB and CW.

## GENERATOR UNIT (X52-1040-00)

The single sideband signal for transmitting operation originates in this unit. For the microphone output, a first-stage FET amplifier stage, followed by a two-transistor circuit, constitutes the audio-frequency amplifier, after which comes the 4-diode ring modulator and first-stage buffer. Other circuits are: a ring demodulator for SSB reception, a low-power AM modulator, a direct variable-capacitance modulator for FM transmission, an IF circuit for SSB, AM and CW modes, and an AM detector.

During SSB mode of operation, this unit generates a double sideband (DSB) signal, which casts off one of its sidebands by flowing through the crystal filter circuit, thereby turning to SSB signal.

The carrier for CW mode is obtained by biasing the ring modulator with a DC voltage to break the balance in this modulator.

## FM IF UNIT (X48-1070-61)

During receiving operation, this unit takes in the signal from the output of the RX NB unit. The input signal is then passed through its 10.7-MHz ceramic filter and, by mixing, is reduced to 455 kHz. The 455-kHz signal is passed through another ceramic filter, from which it enters the IF stage, in which the signal flows through a limiter circuit and then undergoes FM demodulation. The demodulated signal divides into a squelch circuit and a gate circuit. The squelched output signal is fed back into the gate circuit. TONE generator circuitry is also incorporated.

## MIX UNIT (X48-1080-00)

The heterodyne mixer, voltage amplifier and power amplifier of the transmitting section are included in this unit. With the signal coming from the generator unit, a 144-MHz signal is produced in the balanced mixer. This signal undergoes voltage amplification by passing through the pre-driver circuit.

For CW mode, the voltage amplifying FETs are block-biased for keying.

## FINAL UNIT (X56-1140-00)

This is a power amplifier unit capable of 10-watt output. Its circuit elements and mechanical parts are all in a compact cluster built on the chassis. It is complete with a heat sink for cooling and also with an ALC circuit.

## BPF UNIT (X51-1090-00)

The BPF unit couples the transceiver to the antenna during transmit-receive operation and eliminates spurious signals from the signal being transmitted out. In addition to these two functions, it detects the RF output level.

## MARKER UNIT (X50-1200-00)

A 1-MHz crystal oscillator is included, which is the circuit for producing the 1-MHz marker signal to be used for calibration purposes.

## RX-NB UNIT (X55-1060-00)

The received RF signal is amplified, beaten down by heterodyne mixing and then filtered in this unit before it is forwarded to the IF circuit terminating with a blanking gate. For the filtering action, a crystal filter is employed. The noise blanking gate is a part of the noise blanker (NB) circuit included in this unit. When the NB switch (on the panel) is OFF, the IF signal emerging from the filter flows through the IF circuit without encountering any obstruction. If this switch is ON, the path of the IF signal is turned on or off at the blanking gate according as the noise component of the RF signal is small or large.

Improved noise detection and elimination are secured here by subjecting both signal components —information and noise— to transistorized detection of amplitude and frequency. The noise blanking scheme so formed is particularly effective where the noise is radically dissimilar to the information signal in terms of frequency com-

position and amplitude. A good example of this is the SSB signal against the noise due to the ignition system of a motor car running nearby.
A high-level noise with its frequencies extending beyond the IF band to the information signal frequency is hard to discriminate for noise blanking. Interference noises coming from high-frequency welding machines or corona-discharge machines, for instance, are similar to SSB signals in the sense mentioned above, and are hard for the noise blanker circuit to isolate them from the desired signal; possible results are distorted output voices. The transceiver should not be blamed for such distortion.

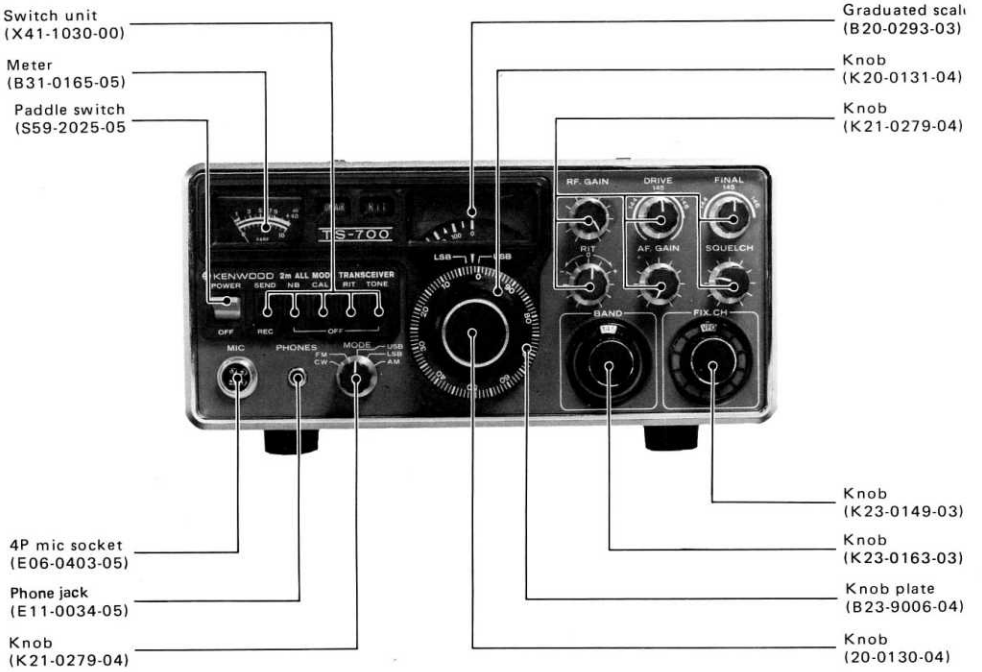
**HET UNIT (X50-1170-61)**
The 133-MHz band signal for hetrodyning purposes is made available from this HET unit. This signal is produced by mixing, in a balanced-type mixer circuit, the 125-MHz band oscillator output and the 8-MHz band VFO unit output or one of the fixed-channel crystal oscillators. The mixing stage is followed by a band-pass filter, which prevents leakage of high-frequency energy from the unit.

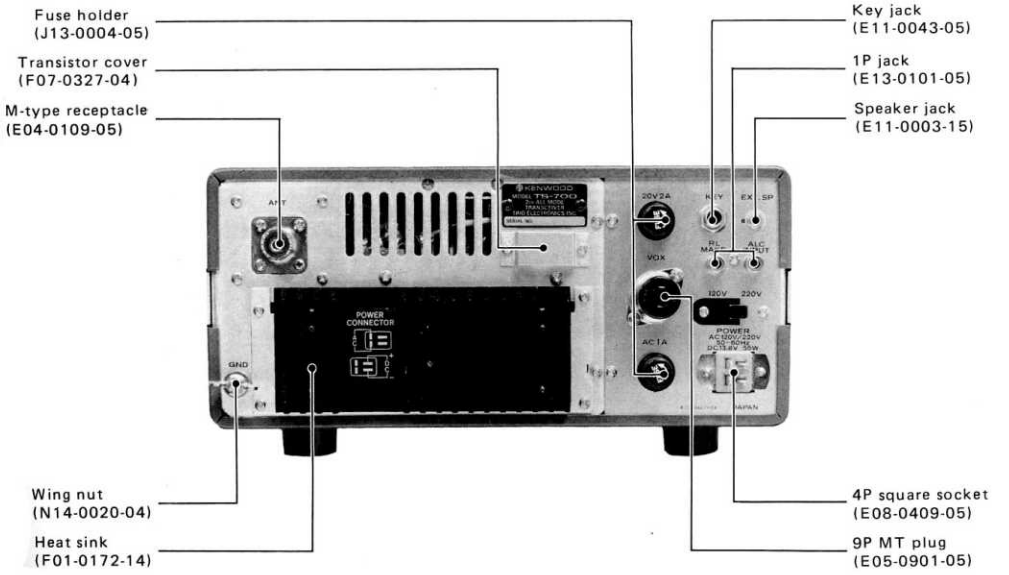
**VFO UNIT (X40-1080-00)**
A perfectly shielded unit, this voice frequency oscillator provides extra-stable oscillation by its circuitry designed with 2 FETs, 2 transistors and 2 diodes. It is of the same type that is used in the TS-900.
Several adjustments of extremely delicate nature are involved in this unit. The user is cautioned not to disturb these adjustments, which are accurately factory-set. Any circuit alteration of mechanical modification, if attempted by the user, shall release the manufacturer from all obligations under the warranty.

**AF UNIT (49-1060-00)**
This is the final stage in the receiving section; it amplifies the audio-frequency signal derived from the received signal; it is by this amplified AF signal that the speaker is driven. Two stages of band amplification and 2 stages of AF amplification, plus a complementary amplifier, constitute the circuitry of this unit. Load impedance is 8 ohms.

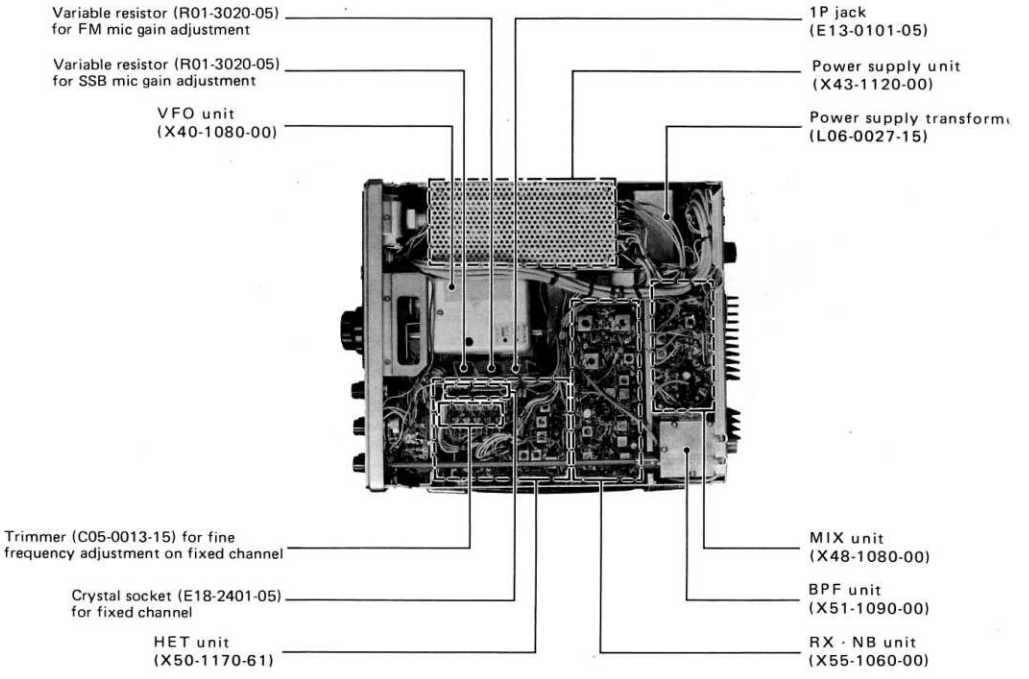
**POWER SUPPLY UNIT (X43-1120-00)**
So that the TS-700 transceiver can be operated on two kinds of power, AC and DC, an AC bridge rectifier is built in this unit. The rectifier provides 13.8 volts DC, which is multiplied to 20 volts – the voltage needed by the AF unit and FINAL unit.
The 9-volt DC power supply for some units is made available by reducing the 13.8 volts through an IC chip having voltage stabilizing capability.
The other supply voltages are derived by tapping from the 20-volt and 9-volt supply circuits.
In order to facilitate wiring work for interconnecting the units thus far described, interconnecting terminals are marked with symbols. Terminals with like symbols are connected to each other except where this manner of terminal identification is not practical or permissible.

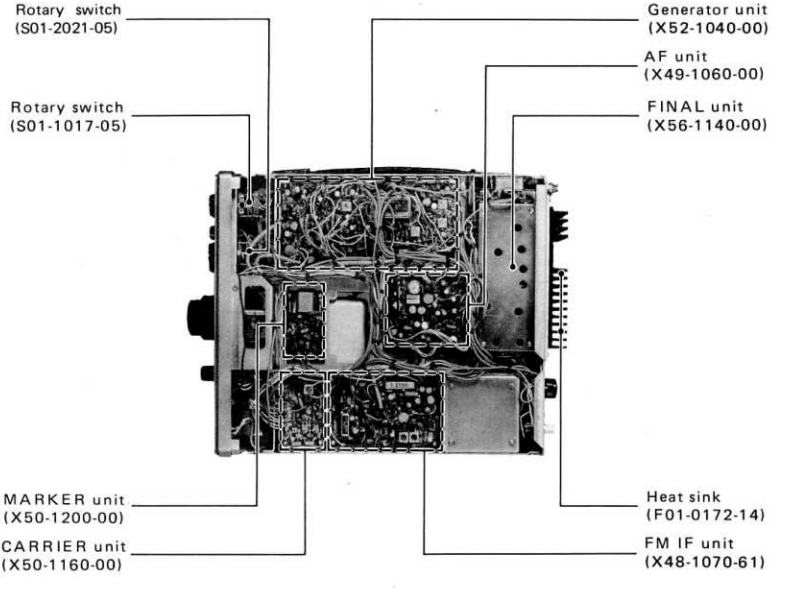
# EXTERNAL VIEW



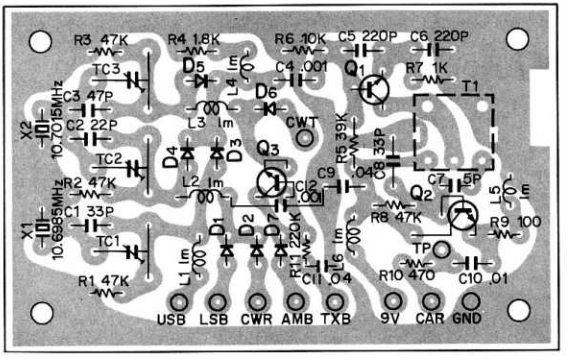
# PARTS ALIGNMENT



# PC BOARD

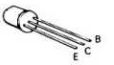
## CARRIER UNIT (X50-1160-00)



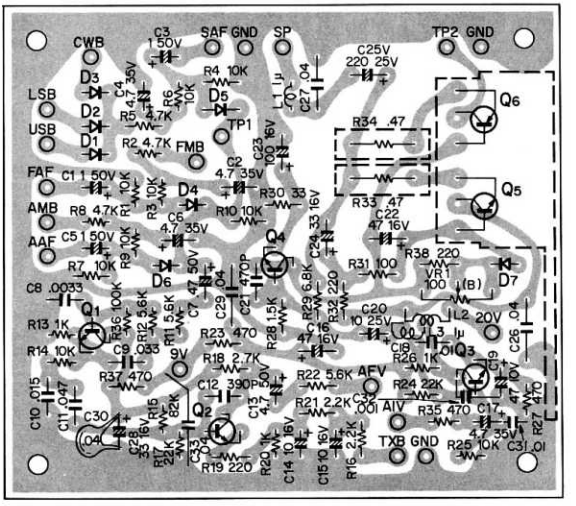

Q1, 2 : 2SC460(B) Q2 : 2SC733(Y) D1 ~ 7 : 1S155

Q1, 2 : 2SC460(B)


Q3 : 2SC733(Y)



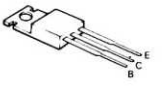

## AF UNIT (X49-1060-00)



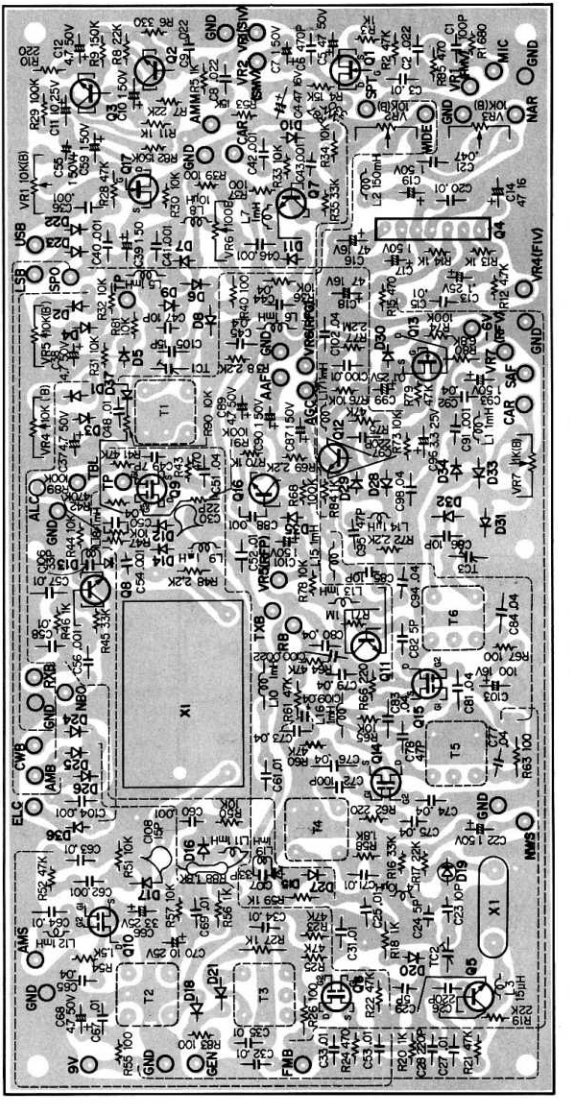

Q2,2 : 2SC733(O) Q3 : 2SC373 Q4 : 2SC734(Y)
Q5 : 2SC1061(A) Q6 : 2SA671(A) D1 ~ 6 : 1S155 D7 : RV-1

Q1, 2 : 2SC733(O)
Q3 : 2SC373
Q4 : 2SC734(Y)

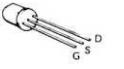

Q5 : 2SC1061(A)
Q6 : 2SA671(A)



## GENERATOR UNIT (X52-1040-00)

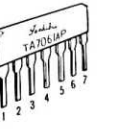


Q1, 13, 17 : 2SK30



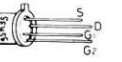
Q2 : 2SC373
Q3, 11, 12, 16 : 2SC733(Y)

Q4 : TA7061AP



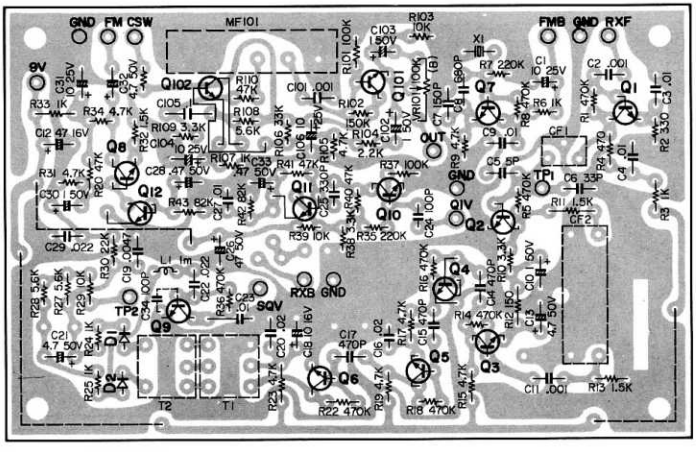
Q5, 7, 8 : 2SC460(B)

Q6, 9, 10 : 3SK35(GR or BL)
Q14, 15 : 3SK35(GR)



Q1, 13, 17 : 2SK30(O) Q2 : 2SC373 Q3, 11, 12, 16 : 2SC733(Y)
Q4 : TA7061AP Q5, 7, 8 : 2SC460(B) Q6, 9, 10 : 3SK35(GR or BL)
Q14, 15 : 3SK35(GR) D1 ~ 5, 10, 18, 20 ~ 26, 30, 35 : 1S1555 D6 ~ 9
28, 29, 31 ~ 34 : 1N60 D11 ~ 17, 27 : 1S73(A) D19 : 1S2208 D36 : V06C

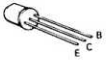
## FM-IF UNIT (X48-1070-61)



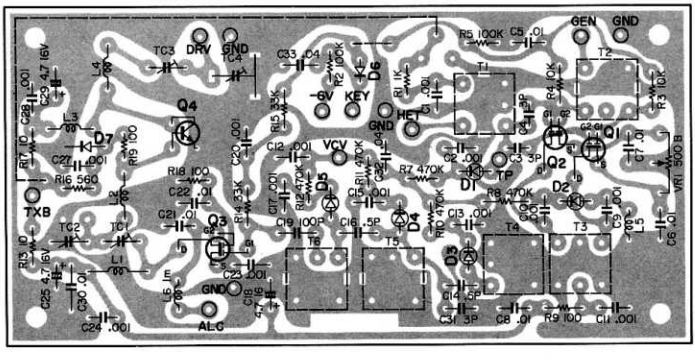

Q1, 2, 6, 7 : 2SC460B Q3 ~ 5 : 2SC371(O) Q8 ~ 12 : 2SC733(Y)
D1, 2 : 1N60 D3 : 1S1555

Q1, 2, 6, 7 : 2SC460(B)


Q3 ~ 5 : 2SC371(O)
Q8 ~ 12 : 2SC733(Y)

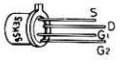



## MIX UNIT (X48-1080-00)



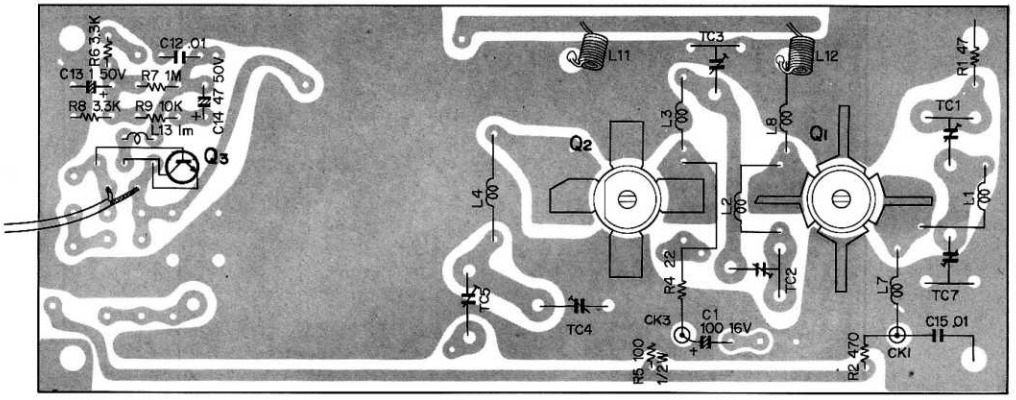

Q1, 2 : 3SK41 (L or M) Q3 : 3SK35 (GR or BL) Q4 : 2SC998 D1 ~ 1S2208
D6, 7 : 1S1555

Q1, 2 : 3SK41 (L) or (M)
Q3 : 3SK35 (GR) or (BL)



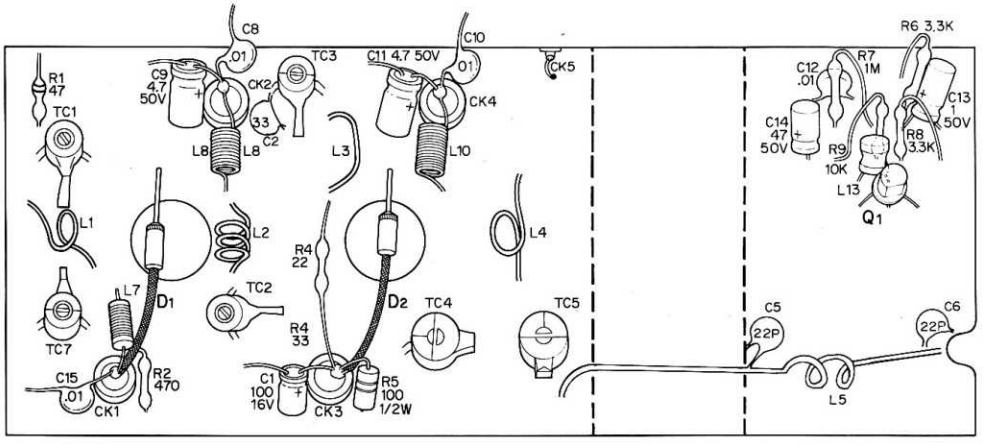

Q4 : 2SC998

## FINAL UNIT (X56-1140-00 (A))



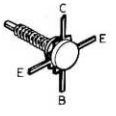

Q1 : 2N5641 Q2 : 2N5642 Q3 : 2SC733(Y)

## FINAL UNIT (X56-1140-00 (B))

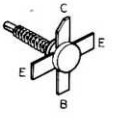



D1, 2 : 1S1555

Q1 : 2N5641

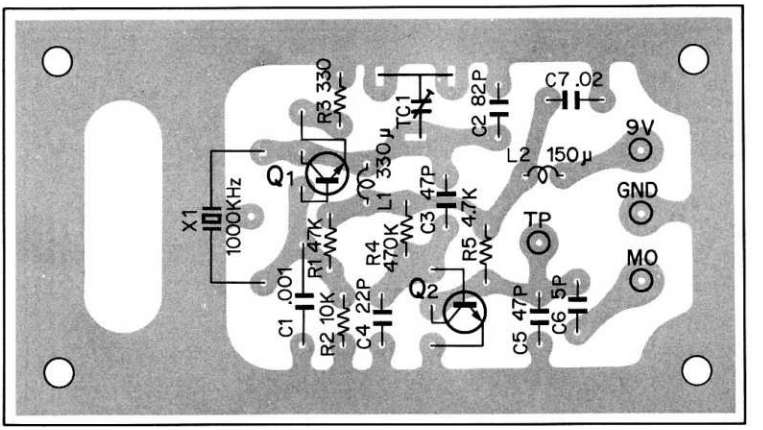



Q2 : 2N5642



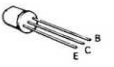

Q3 : 2SC733(Y)

## MARKER UNIT (X50-1200-00)



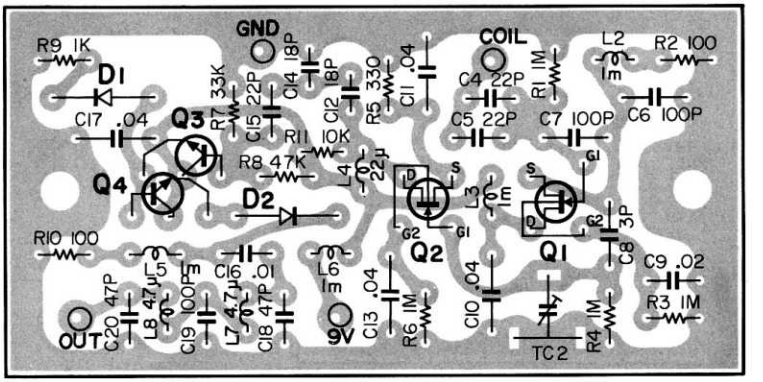

Q1 : 2SC373 Q2 : 2SC460(B)

Q1 : 2SC373



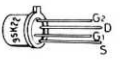

Q2 : 2SC460(B)


## VFO UNIT (X40-1080-00)



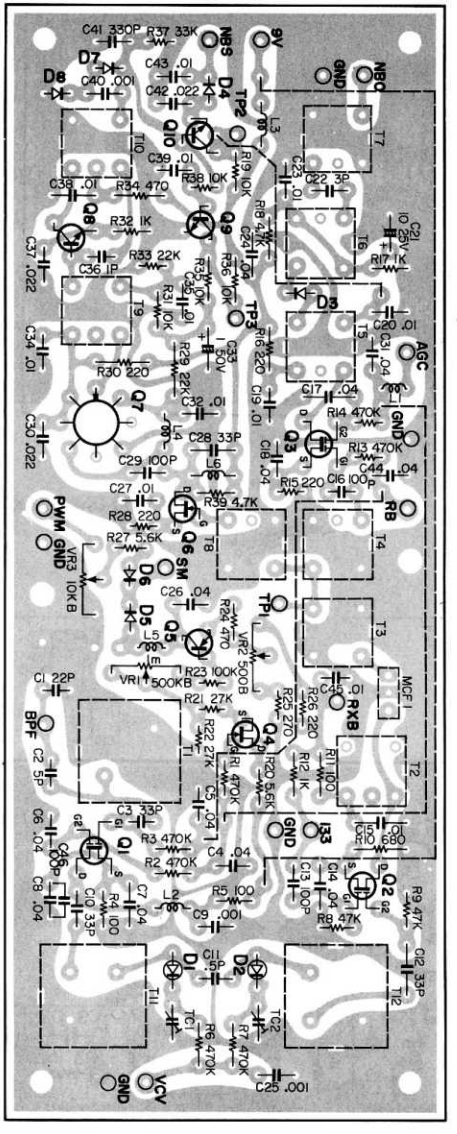

Q1, 2 : 3SK22(Y) Q3, 4 : 2SC460(B) D1, 21N60

Q1, 2 : 3SK22(Y)




Q3, 4 : 2SC460(B)

## RX · NB UNIT (X55-1060-00)

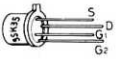


Q1 : 3SK35(GR or BL) Q2 : 3SK41(M)
Q3 : 3SK35(GR) Q4, 6 : 2SK19(GR)
Q5 : 2SA495 Q7 : TA7045M(R) Q8 : 2SC460(B)
Q9, 10 : 2SC733(Y) D1, 2 : 1S2208 D3 : 1S73A
D4 ~ 8 : 1N60

Q8

Q9, 10

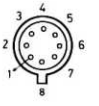
Q1 : 3SK35(GR) or (BL)
Q2 : 3SK41(M)
Q3 : 3SK35(GR)



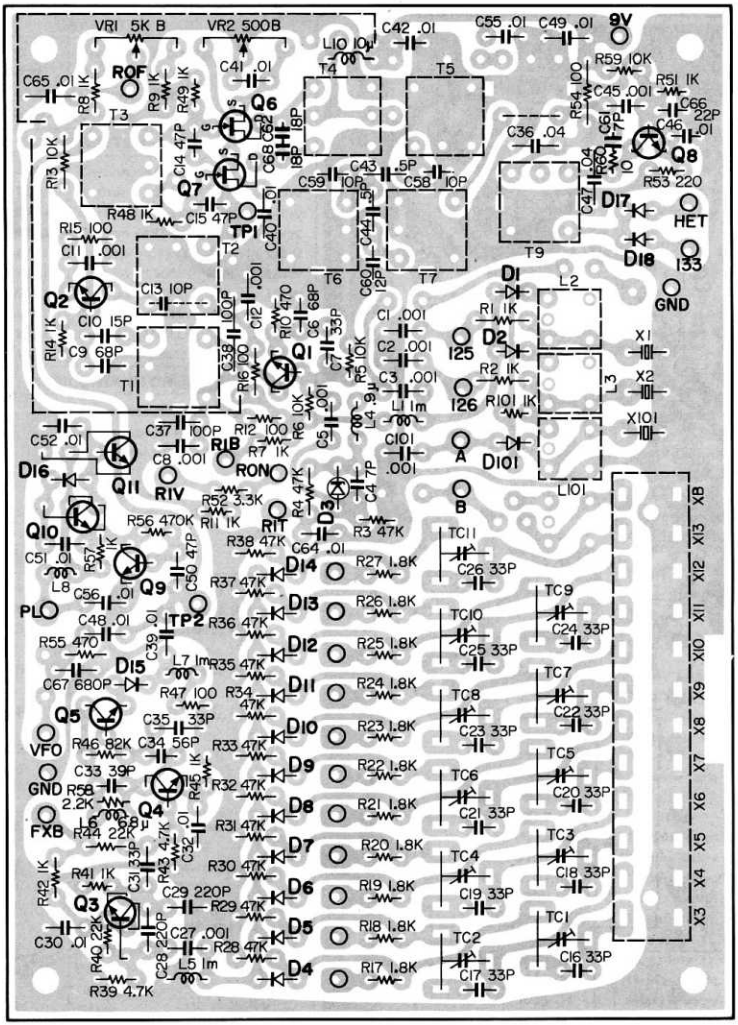
Q4, 6 : 2SK19*GR)

Q5 : 2SA495

Q7 : TA7045M(R)

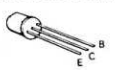


## HET UNIT (X50-1170-61)




Q1, 2, 8 : 2SC388A Q3～5, 9 : 2SC460B Q6, 7 : 2SK19(GR) Q10 : 2SC733(Y)
Q11 : 2SC735(Y) D1, 2, 4～14, 17, 18 : 1S1555 D3 : 1S2208 D15, 16 : 1N60

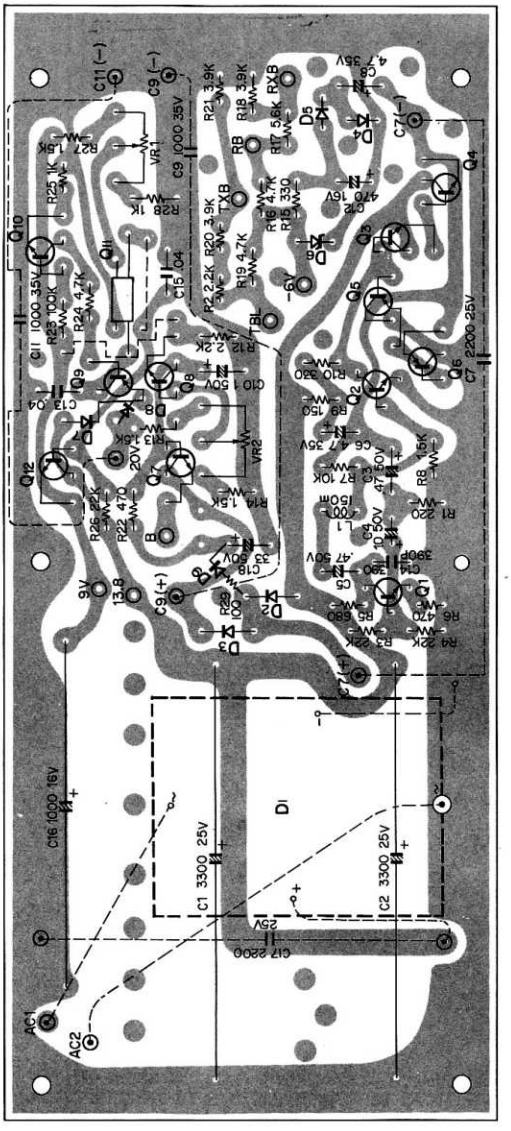
Q1, 2, 8 : 2SC388A
Q10, 11 : 2SC733(Y)




Q3～5, 9 : 2SC460B

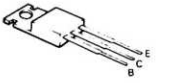

Q6, 7 : 2SK19(GR)

## POWER SUPPLY UNIT (X43-1120-00)

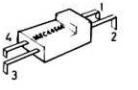


Q1, 3, 7, 8, 10 : 2SC733(Y)
Q2 : 2SC734(Y)
Q5, 9 : 2SA495

Q4, 12 : 2SD235(Y)
Q6 : 2SA671(B)



Q11 : MFC4060A



Q1, 3, 7, 8, 10 : 2SC733(Y) Q2 : 2SC734(Y)
Q4, 12 : 2SD235(Y) Q5, 9 : 2SA495 Q6 : 2SA671(B)
Q11 : MFC4060A D1 : DS10BN-L D2, 3 : U05B
D4, 5, 10 : V06B D6 : WZ061 D7 : 1S1555

# PARTS LIST

## TS-700 TRANSCEIVER (overall parts list)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | C90-0187-05 | Ceramic 0.0047μF | |
| C2 | CK45E1H103P | Ceramic 0.01μF +100% −0% | |
| C3 | CK45F1H103Z | Ceramic 0.01μF +80% −20% | |
| C4 | CC45SL1H050D | Ceramic 5pF ±0.5pF | |
| | | **RESISTOR** | |
| R1, 2 | PD14BY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R3 | PD14BY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R4 | PD14BY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R5 | PD14BY2E470J | Carbon 47Ω ±5% 1/4W | |
| R6 | PD14BY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R7 | PD14BY2E331J | Carbon 330Ω ±5% 1/4W | |
| R8 | PD14BY2E561J | Carbon 560Ω ±5% 1/4W | |
| R9 | PD14BY2E471J | Carbon 470Ω ±5% 1/4W | |
| R101 | PD14BY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R102 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| | | **SEMICONDUCTOR** | |
| Q1 | | Transistor 2SD235 (Y) | |
| Q2 | | Transistor 2SA671 (A) | |
| Q3 | | Transistor 2SC733 (Y) | |
| D1, 2 | | Diode Y06J (yellow) | |
| D4 | | Diode WZ061 | |
| D5 | | Zener diode RD7A | |
| D6 | | Diode 1N60 | |
| | | **POTENTIOMETER** | |
| VR1 | R03-4035-05 | Potentiometer 50kΩ (A) for AF | |
| VR2 | R03-3055-05 | Potentiometer 10kΩ (B) for SQU | |
| VR3 | R08-3014-05 | Potentiometer 10kΩ (B) for DRIV | |
| VR4, 5 | R03-3055-05 | Potentiometer 10kΩ (B) for RF, RIT | |
| VR6, 7 | R01-3020-05 | Potentiometer 10kΩ (A) for FM, MIC, SSB MIC | |
| VR8 | R12-3022-05 | Potentiometer | |
| VR101 | R12-5014-05 | Potentiometer 100kΩ | |
| | | **SWITCH AND RELAY** | |
| S1 | S01-1015-15 | Rotary switch 1-step 2-circuit 5 points for MODE | |
| S2 | S01-1017-05 | Rotary switch 1-step 4-circuit 3 points for BAND | |
| S3 | S01-2021-05 | Rotary switch 2-step 2-circuits 12 points for FIX. CHAN. | |
| S101 | S31-2027-05 | Supply voltage selector switch | |
| S1 | S59-2025-05 | Power on-off switch (paddle) (orange) | |
| RL1 | S51-1012-05 | Relay | |
| RL2 | S51-6001-05 | Relay | |
| | | **COIL AND TRANSFORMER** | |
| T1 | L06-0027-15 | Power transformer | |
| L1 | L33-0101-05 | Ferri-inductor | |
| | | **MISCELLANEOUS** | |
| – | A01-0226-03 | Case (a) upper | |
| – | A01-0227-03 | Case (B) lower | |
| – | A13-0079-02 | Frame (A) (Power supply, VFO) | |
| – | A13-0080-03 | Frame (B) (Marker, AF) | |
| – | A13-0081-03 | Frame (C) (FM-IF) | |
| – | A13-0082-03 | Frame (D) (Side board right) | |
| – | A13-0083-13 | Frame (E) (Mix, BPF, RXNB) | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| – | A21-0159-03 | Ornament panel | |
| – | A23-0454-03 | Rear panel (A) | |
| – | A23-0467-04 | Rear panel (B) | |
| – | A30-0084-04 | Dial backing plate | |
| – | B01-0083-05 | Panel escutcheon | |
| – | B01-0081-03 | Escutcheon (A) | |
| – | B01-0082-03 | Escutcheon (B) | |
| – | B07-0108-02 | Dial escutcheon | |
| – | B07-0125-04 | Switch grille | |
| – | B10-0140-04 | Front glass | |
| – | B19-0156-04 | Filter x 2 | |
| – | B20-0293-03 | Dial calibration | |
| – | B21-3033-04 | Meter hand | |
| – | B23-3011-04 | Indicating plate | |
| – | B23-9006-04 | Knob plate | |
| – | B30-0007-05 | Lamp | |
| – | B30-0079-05 | Lamp x 4 | |
| – | B31-0165-05 | Meter | |
| – | B40-0938-04 | Nameplate | |
| – | B42-0477-04 | Connector nameplate | |
| – | B42-0478-04 | Mic adjustment nameplate | |
| – | B42-0481-04 | Lettering sheet | |
| – | B43-0199-04 | Batch | |
| – | B50-1160-00 | Instruction manual | |
| – | B58-0158-00 | Caution sheet for supply voltage | |
| – | D21-0341-04 | Shaft | |
| – | D22-0002-04 | Shaft coupling | |
| – | D23-0048-04 | Bearing | |
| – | D32-0021-04 | Switch stopper | |
| – | | | |
| – | E01-0903-05 | 9PMT socket | |
| – | E05-0901-05 | 9PMT plug | |
| – | E06-0403-05 | 4P mic socket | |
| – | E08-0409-05 | 4P square socket | |
| – | E09-0204-05 | 2P plug | |
| – | E11-0003-15 | Speaker jack | |
| – | E11-0034-05 | Horn jack | |
| – | E11-0043-05 | Key jack | |
| – | E12-0001-05 | Ear phone plug | |
| – | E13-0101-05 | 1P pin jack x 3 | |
| – | E14-0101-05 | 1P pin plug x 4 | |
| – | E15-0038-05 | Lamp socket | |
| – | E22-0207-05 | Lug plate 1L 2P x 2 | |
| – | E22-0405-05 | Lug plate 1L 4P x 3 | |
| – | E22-0603-05 | Lug plate 1L 6P | |
| – | E23-0015-04 | Oval lug terminal | |
| – | E23-0037-04 | Shaft grounding fitting | |
| – | F05-1023-05 | Fuse 1A x 2 | |
| – | F05-2023-05 | Fuse 2A x 2 | |
| – | F05-5022-05 | Fuse 5A | |
| – | F07-0326-04 | Power supply shield cover | |
| – | F07-0327-04 | Transistor cover | |
| – | F14-0072-04 | Light-shield socket x 2 | |
| – | F15-0164-04 | Speaker mask | |
| – | F15-0165-04 | Switch mask | |
| – | F20-0078-05 | Insulator (mica) | |
| – | G01-0230-04 | Coil spring | |
| – | H01-1119-04 | Packaging case (inner) | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| – | H03-0320-04 | Packaging case (outer) | |
| – | H10-0570-04 | Polystyrene foamed fixture | |
| – | H10-0998-14 | Polystyrene foamed fixture x 2 | |
| – | H10-1000-04 | Polystyrene foamed fixture | |
| – | H10-1002-13 | Polystyrene foamed fixture x 2 | |
| – | H10-0570-04 | Polystyrene foamed fixture | |
| – | H20-0378-04 | Protective cover | |
| – | H25-0016-00 | Accessory bag | |
| – | H25-0036-00 | Accessory bag | |
| – | J02-0022-05 | Leg, 15φ x 4 | |
| – | J02-0049-14 | Leg, 28φ x 6 | |
| – | J13-0004-05 | Fuse holder x 2 | |
| – | J19-0381-04 | Meter retainer | |
| – | J19-0382-04 | Socket retainer | |
| – | J19-0383-04 | Lamp retainer | |
| – | J19-0408-04 | Lead wire retainer | |
| – | J21-0448-04 | Speaker retainer | |
| – | J21-1191-04 | PC board retainer | |
| – | J21-1192-04 | Rotary switch retainer | |
| – | J21-1193-04 | Mounting metal | |
| – | J30-0061-04 | Rubber spacer x 2 | |
| – | J31-0110-04 | Collar | |
| – | J32-0188-04 | Hexagonal boss (D) | |
| – | J32-0189-04 | Hexagonal boss (A) x 4 | |
| – | J32-0190-04 | Hexagonal boss (B) x 4 | |
| – | J32-1030-14 | Round boss x 2 | |
| – | J39-0028-04 | Spacer x 2 | |
| – | J59-0001-05 | Grommet x 2 | |
| – | J59-0002-05 | Plunger x 2 | |
| – | J61-0018-05 | Beads band x 5 | |
| – | J61-0019-05 | Vinyl tie x 60 | |
| – | K01-0055-05 | Handle | |
| – | K20-0130-04 | Knob (A) | |
| – | K20-0131-04 | Knob (B) | |
| – | K21-0279-04 | Knob (C) x 7 | |
| – | K23-0057-04 | Knob (rubber) x 2 | |
| – | K23-0147-04 | Knob (F) x 5 | |
| – | K23-0149-03 | Knob (E) | |
| – | K23-0163-03 | Knob | |
| – | T13-0006-05 | Speaker | |
| – | T91-0029-05 | Microphone | |
| – | X40-1080-00 | VFO unit | |
| – | X41-1030-00 | Switch unit | |
| – | X42-1070-60 | Power cord assembly | |
| – | X42-1050-00 | DC cord assembly | |
| – | X43-1120-00 | Power supply unit | |
| – | X48-1070-61 | FM IF unit | |
| – | X48-1080-00 | MIX unit | |
| – | X49-1060-00 | AF unit | |
| – | X50-1160-00 | CARRIER unit | |
| – | X50-1170-61 | HET unit | |
| – | X50-1200-00 | MARKER unit | |
| – | X51-1090-00 | BPF unit | |
| – | X52-1040-00 | GENERATOR unit | |
| – | X55-1060-00 | RX NB unit | |
| – | X56-1140-00 | FINAL unit | |

## BPF UNIT (X51-1090-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | CE04W1H4R7 | Electrolytic 4.7μF 50WV | |
| C2 | CC45CH2H020C | Ceramic 2pF ±0.25pF | |
| VC1 | C03-0061-05 | Mideget-type variable capacitor | |
| | | **SEMICONDUCTOR** | |
| D1 | | Diode 1N60 | |
| | | **COILS** | |
| L1 | L33-0089-05 | Ferri inductor | |
| L2 | L34-0440-05 | Coil (B) | |
| L3 | L34-0441-05 | Coil (C) | |
| | | **MISCELLANEOUS** | |
| J5 | E04-0109-05 | Type M receptacle | |
| – | E22-0207-04 | Lug terminal | |
| – | E23-0001-05 | Hermetic terminal x 2 | |
| – | F07-0323-04 | BPF shield cover (A) | |
| – | F07-0324-04 | BPF shield cover (B) | |
| – | F11-0193-03 | BPF shield case | |

## CARRIER UNIT (X50-1160-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C2 | CC45SL1H220J | Ceramic 22pF ±5% | |
| C3 | CC45SL1H470J | Ceramic 47pF ±5% | |
| C4 | CK45E1H102P | Ceramic 0.001μF +100% –0% | |
| C5, 6 | CC45SL1H221J | Ceramic 220pF ±5% | |
| C7 | CC45SL1H050D | Ceramic 5pF ±0.5pF | |
| C8 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C9 | CK45F1H403Z | Ceramic 0.04μF +80% –20% | |
| C10 | CK45F1H103Z | Ceramic 0.01μF +80% –20% | |
| C11 | CK45F1H403Z | Ceramic 0.04μF +80% –20% | |
| C12 | CK45E1H102P | Ceramic 0.001μF +100% –0% | |
| TC1 ~ 3 | C05-0013-15 | Trimer 20pF | |
| | | **RESISTOR** | |
| R1 ~ 3 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R4 | PD14CY2E182J | Carbon 1.8kΩ ±5% 1/4W | |
| R5 | PD14CY2E393J | Carbon 39kΩ ±5% 1/4W | |
| R6 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R7 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R8 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R9 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R10 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R11 | PD14CY2E224J | Carbon 220kΩ ±5% 1/4W | |
| | | **SEMICONDUCTOR** | |
| Q1, 2 | | Transistor, 2SC460 (B) | |
| Q3 | | Transistor, 2SC733 (Y) | |
| D1 ~ 7 | | Diode, 1S1555 | |
| | | **COIL AND TRANSFORMER** | |
| T1 | L30-0265-05 | Intermediate-frequency transformer (IFT), 10.7 MHz | |
| L1 ~ 6 | L33-0104-05 | Ferri-inductor | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| – | E23-0047-04 | Wrapping terminal x 10 | |
| – | J25-0942-04 | Printed-circuit board | |
| X1 | L77-0355-05 | Crystal oscillator, 10.6985 MHz | |
| X2 | L77-0356-05 | Crystal oscillator, 10.7015 MHz | |

## GENERATOR UNIT (X52-1040-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | CC45SL1H101J | Ceramic 100pF ±5% | |
| C2 | CK45F1H223Z | Ceramic 0.022μF +80%–20% | |
| C3 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C4 | CE04W1C470(RL) | Electrolytic 47μF 16WV | |
| C5 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C6 | CK45B1H471J | Ceramic 470pF ±5% | |
| C7 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C8, 9 | CQ92M1H223K | Mylar film 0.022μF ±10% | |
| C10 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C11 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| C12 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C13 | C90-0076-05 | Tantalum 0.1μF 25WV | |
| C14 | CE04W1C470(RL) | Electrolytic 47μF 16WV | |
| C15 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C16 | CE04W1C470(RL) | Electrolytic 47μF 16WV | |
| C17 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C18 | CE04W1C470(RL) | Electrolytic 47μF 16WV | |
| C19 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C20 | CQ92M1H103K | Mylar 0.01μF ±10% | |
| C21 | CQ92M1H473K | Mylar 0.047μF ±10% | |
| C22 | CE04W1H010(RL) | Chemical 1μF 50WV | |
| C23 | CC45SL1H100D | Ceramic 10pF ±0.5pF | |
| C24 | CC45CH1H050D | Ceramic 5pF ±0.5pF | |
| C25 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C26 | CC45CH1H221J | Ceramic 220pF ±5% | |
| C27 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C28 | CC45CH1H221J | Ceramic 220pF ±5% | |
| C29 | CC45CH1H050D | Ceramic 5pF ±0.5pF | |
| C30 | CC45CH1H220J | Ceramic 22pF ±5% | |
| C31 ~35 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C36 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C37, 38 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C39 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C40 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C41 | CK45D1H103M | Ceramic 0.01μF ±20% | |
| C42,43 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C44,45 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C46 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C47 | CC45CH1H100D | Ceramic 10pF ±0.5% | |
| C48 | CK45D1H103Z | Ceramic 0.01μF +80%–20% | |
| C49 | CC45CH1H070D | Ceramic 7pF ±0.5pF | |
| C50,51 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C52,53 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C54 | CC45D1H102M | Ceramic 0.001μF ±5% | |
| C55 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C56 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C57,58 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C59 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C60 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C61 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C62 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C63,64 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C65 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C66 | CE04W1E330(RL) | Electrolytic 33μF 25WV | |
| C67 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C68 | CE04W1H4R7 | Electrolytic 4.7μF 50WV | |
| C69 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C70 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| C71 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C72 | CC45SL1H101K | Ceramic 100pF ±5% | |
| C73~77 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C78 | CC45SL1H470J | Ceramic 47pF ±5% | |
| C79~81 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C82 | CC45CH1H050D | Ceramic 5pF ±0.5pF | |
| C83,84 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C85,86 | CC45CH1H100D | Ceramic 10pF ±0.5% | |
| C87 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C88 | CQ92M1H102J | Mylar 0.001μF ±10% | |
| C89 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C90 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C91 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C92 | CK45F1H403Z | Ceramic 0.04μF 50WV | |
| C93 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C94 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C95 | CC45CH1H470J | Ceramic 47pF ±5% | |
| C96 | CE04W1E3R3(RL) | Electrolytic 3.3μF 25WV | |
| C97 | CC45CH1H221J | Ceramic 220pF ±5% | |
| C98 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C99 | C90-0076-05 | Tantalum 0.1μF 25WV | |
| C100 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C101 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C102 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C103 | CE04W1C101(RL) | Electrolytic 100μF 16WV | |
| C104 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C105 | CC45CH1H150J | Ceramic 15pF ±5% | |
| C106, 107 | CC45C1H330J | Ceramic 33pF ±5% | |
| C108 | CC45CH1H150J | Ceramic 15pF ±5% | |
| C109 | CK45F1H403Z | Ceramic 0.04μF +80%–20% | |
| C110 | CK45F1H223Z | Ceramic 0.022μF +80%–20% | |
| TC1 | C05-0030-15 | Ceramic trimmer 20pF | |
| TC2 | C05-0031-15 | Ceramic trimmer 10pF | |
| TC3 | C05-0030-15 | Ceramic trimmer 20pF | |
| | | **RESISTORS** | |
| R1 | PD14CY2E681J | Carbon 680Ω ±5% 1/4W | |
| R2 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R3 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R4 | PD14CY2E153J | Carbon 15kΩ ±5% 1/4W | |
| R5 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R6 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R7, 8 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R9 | PD14CY2E154J | Carbon 150kΩ ±5% 1/4W | |
| R10 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R11 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R12 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R13 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R14 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R15 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R16 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |
| R17 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R18 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R19 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| R20 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R21~23 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R24 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R25 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R26 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R27 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R28 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R29 | PD14CY2E104J | Carbon 100kΩ±5% 1/4W | |
| R30~34 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R35 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |
| R36 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R37 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R38 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R39,40 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R41 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R42 | PD14CY2E474J | Carbon 470kΩ±5% 1/4W | |
| R43 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R44 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R45 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |
| R46 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R47 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R50 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R51 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R52 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R53 | PD14CY2E153J | Carbon 15kΩ ±5% 1/4W | |
| R54 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R55 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R56 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R57 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R58 | PD14CY2E182J | Carbon 1.8kΩ ±5% 1/4W | |
| R59 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R60 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R61 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R62 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R63 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R64 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R65 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R66 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R67 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R68 | PD14CY2E104J | Carbon 100kΩ±5% 1/4W | |
| R69 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R70 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R71 | PD14CY2E105J | Carbon 1MΩ ±5% 1/4W | |
| R72 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R73 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R74 | PD14CY2E104J | Carbon 100kΩ±5% 1/4W | |
| R75 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R76 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R77 | RC05GF2H225J | Carbon 2.2MΩ±5% 1/4W | |
| R78 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R79 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R80 | PD14CY2E682J | Carbon 6.8kΩ ±5% 1/4W | |
| R81 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R82 | PD14CY2E154J | Carbon 150kΩ±5% 1/4W | |
| R83 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R84 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R85 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R86 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R87 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R88 | PD14CY2E182J | Carbon 1.8kΩ ±5% 1/4W | |
| R89,90 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R91 | PD14CY2E105J | Carbon 100kΩ±5% 1/4W | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| **SEMICONDUCTOR** | | | |
| Q1 | | FET 2SK30 (O) | |
| Q2 | | Transistor 2SC373 | |
| Q3 | | Transistor 2SC733 (Y) | |
| Q4 | | Integrated circuit TA7061AP | |
| Q5 | | Transistor 2SC460B | |
| Q6 | | FET 3SK35 (GR or BL) | |
| Q7, 8 | | Transistor 2SC460B | |
| Q9, 10 | | FET 3SK35 (GR or BL) | |
| Q11, 12 | | Transistor 2SC733 (Y) | |
| Q13 | | FET 2SK30 (O) | |
| Q14,15 | | FET 3SK35 (GR) | |
| Q16 | | Transistor 2SC733 (Y) | |
| Q17 | | FET 2SK30 (O) | |
| D1~5 | | Diode 1S1555 | |
| D6~9 | | Diode 1N60 | |
| D10 | | Diode 1S1555 | |
| D11~17 | | Diode 1S73A | |
| D18 | | Diode 1S1555 | |
| D19 | | Diode 1S2208 | |
| D20~26 | | Diode 1S1555 | |
| D27 | | Diode 1S73A | |
| D28, 29 | | Diode 1N60 | |
| D30 | | Diode 1S1555 | |
| D31~34 | | Diode 1N60 | |
| D35 | | Diode 1S1555 | |
| D36 | | Diode V06C | |
| D37 | | Diode 1S1555 | |
| **POTENTIOMETER** | | | |
| VR1~5 | R12-3025-05 | Potentiometer 10kΩ (B) | |
| VR6 | R12-0048-05 | Potentiometer 100Ω (B) | |
| VR7 | R12-1020-05 | Potentiometer 1kΩ (B) | |
| **COIL/TRANSFORMER** | | | |
| T1~6 | L30-0264-05 | IFT | |
| L1 | L33-0104-05 | Ferri-inductor 1mH | |
| L2 | L33-0127-05 | Ferri-inductor 150mH | |
| L3 | L33-0090-05 | Ferri-inductor 15μH | |
| L4 | L33-0089-05 | Ferri-inductor 10μH | |
| L5~7 | L33-0104-05 | Ferri-inductor 1mH | |
| L8 | L33-0089-05 | Ferri-inductor 10μH | |
| L9~13 | L33-0104-05 | Ferri-inductor 1mH | |
| L14 | L33-0085-05 | Ferri-inductor 1μH | |
| L15~19 | L33-0104-05 | Ferri-inductor 1mH | |
| L20 | L33-0096-05 | Ferri-inductor 100μH | |
| **MISCELLANEOUS** | | | |
| – | E23-0047-04 | Wrapping terminal x 29 | |
| – | F10-0330-04 | Shield plate | |
| – | F10-0334-04 | Shield plate | |
| – | J25-0943-13 | Printed-circuit board | |
| XF | L71-0022-05 | Crystal filter 10.7 MHz | |
| X1 | L77-0357-05 | Crystal oscillator 10.745 MHz | |

## FM IF UNIT (X48-1070-61)

| Ref. No. | Parts No. | Description | Re-marks |
|---|---|---|---|
| **CAPACITORS** | | | |
| C1 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| C2 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C3, 4 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C5 | CC45CH1H050D | Ceramic 5pF ±0.5pF | |
| C6 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C7 | CC45CH1H151J | Ceramic 150pF ±5% | |
| C8 | CM93D1H681J(Z) | Mica 680pF ±5% | |
| C9 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C10 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C11 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C12 | CE04W1C470(RL) | Electrolytic 47μF 16WV | |
| C13 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C14,15 | CC45SL1H471J | Ceramic 470pF ±5% | |
| C16 | CK45F1H203Z | Ceramic 0.02μF +80%–20% | |
| C17 | CC45SL1H471J | Ceramic 470pF ±5% | |
| C18 | CE04W1C100(RL) | Electrolytic 10μF 16WV | |
| C19 | CQ92M1H472K | Mylar film 0.0047μF ±10% | |
| C20 | CK45F1H203Z | Ceramic 0.02μF +80%–20% | |
| C21 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C22 | CQ92M1H223K | Mylar film 0.022μF ±10% | |
| C23 | CQ92M1H103K | Mylar film 0.01μF ±10% | |
| C24 | CC45CH1H101J | Ceramic 100pF ±5% | |
| C25 | CC45SL1H331J | Ceramic 330pF ±5% | |
| C26 | CE04W1H470(RL) | Electrolytic 47μF 50WV | |
| C27 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C28 | CE04W1HR47(RL) | Electrolytic 0.47μF 50WV | |
| C29 | CQ92M1H223K | Mylar 0.022μF ±10% | |
| C30 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C31 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| C32 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C33 | CE04W1HR47(RL) | Electrolytic 0.47μF 50WV | |
| C34 | CC45SL1H101K | Ceramic 100pF ±10% | |
| C101 | CQ92M1H103K | Mylar 0.001μF ±10% | |
| C102, 103 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C104 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| C105 | CQ92M1H104K | Mylar 0.1μF ±10% | |
| C106 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| **RESISTOR** | | | |
| R1 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R2 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R3 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R4 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R5 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R6 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R7 | PD14CY2E224J | Carbon 220kΩ ±5% 1/4W | |
| R8 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R9 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R10 | PD14CY2E332J | Carbon 3.3kΩ ±5% 1/4W | |
| R11 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R12 | PD14CY2E151J | Carbon 150Ω ±5% 1/4W | |
| R13 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R14 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R15 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R16 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R17 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R18 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R19 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R20 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |

| Ref. No. | Parts No. | Description | Re-marks |
|---|---|---|---|
| R22 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R23 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R24,25 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R27,28 | PD14CY2E562J | Carbon 5.6kΩ ±5% 1/4W | |
| R29 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R30 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R31 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R32 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R33 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R34 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R35 | PD14CY2E224J | Carbon 220kΩ ±5% 1/4W | |
| R36 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R37 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R38 | PD14CY2E332J | Carbon 3.3kΩ ±5% 1/4W | |
| R39 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R40, 41 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R42,43 | PD14CY2E823J | Carbon 82kΩ ±5% 1/4W | |
| R101 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R102 | PD14CY2E154J | Carbon 150kΩ ±5% 1/4W | |
| R103 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R104 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R105 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R106 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |
| R107 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R108 | PD14CY2E562J | Carbon 5.6kΩ ±5% 1/4W | |
| R109 | PD14CY2E332J | Carbon 3.3kΩ ±5% 1/4W | |
| R110 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R111 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| **SEMICONDUCTOR** | | | |
| Q1,2 | | Transistor 2SC460B | |
| Q3~5 | | Transistor 2SC371 (O) | |
| Q6,7 | | Transistor 2SC460B | |
| Q8~12 | | Transistor 2SC733 (Y) | |
| Q101, 102 | | Transistor 2SC733 (Y) | |
| D1,2 | | Diode 1N60 | |
| **COIL** | | | |
| T1 | L30-0006-05 | DESCRI coil (D) 455kHz | |
| T2 | L30-0007-05 | DESCRI coil (E) 455kHz | |
| L1 | L33-0104-05 | Ferri inductor 1mH | |
| **POTENTIOMETER** | | | |
| VR101 | R12-5014-05 | Potentiometer 100kΩ (B) | |
| **MISCELLANEOUS** | | | |
| CF1 | L72-0015-05 | Ceramic filter SFC-10.7MA | |
| CF2 | L72-0016-05 | Ceramic filter CFR-455D | |
| MF101 | L79-0015-05 | Piezo-electric tuning fork | |
| X1 | L77-0327-05 | Crystal oscillator | |

## MIX UNIT (X48-1080-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1,2 | CK45E1H102P | Ceramic 0.001μF +100%–0% | |
| C3,4 | CC45SL1H030C | Ceramic 3pF ±0.25pF | |
| C5~8 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C9~13 | CK45E1H102P | Ceramic 0.001μF +100%–0% | |
| C14 | CC45SL1H0R5C | Ceramic 0.5pF ±0.25pF | |
| C15 | CK45E1H102P | Ceramic 0.001μF +100%–0% | |
| C16 | CC45SL1H0R5C | Ceramic 0.5pF ±0.25pF | |
| C17 | CK45E1H102P | Ceramic 0.001μF +100%–0% | |
| C18 | CE04W1C4R7 | Electrolytic 4.7μF 16WV | |
| C19 | CC45SL1H101J | Ceramic 100pF ±5% | |
| C20 | CK45E1H102P | Ceramic 0.001μF +100%–0% | |
| C21,22 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C23,24 | CK45E1H102P | Ceramic 0.001μF +100%–0% | |
| C25 | CE04W1C4R7 | Electrolytic 4.7μF 16WV | |
| C27,28 | CE45E1H102P | Ceramic 0.001μF +100%–0% | |
| C29 | CE04W1C4R7 | Electrolytic 4.7μF 16WV | |
| C30 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C31 | CC45SL1H030C | Ceramic 3pF ±0.25pF | |
| C32,33 | CK45F1E403Z | Ceramic 0.04μF +80%–20% | |
| TC1~3 | C05-0030-05 | Trimmer capacitor 20pF | |
| TC4 | C05-0015-15 | Trimmer capacitor 40pF | |
| | | **RESISTOR** | |
| R1 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R2 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R3,4 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R5 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R7,8 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R9 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R10~12 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R13 | PD14CY2E100J | Carbon 10Ω ±5% 1/4W | |
| R14,15 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |
| R16 | PD14CY2E561J | Carbon 560Ω ±5% 1/4W | |
| R17 | PD14CY2E100J | Carbon 10Ω ±5% 1/4W | |
| R18,19 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| | | **SEMICONDUCTOR** | |
| Q1,2 | | FET 3SK41 (L or M) | |
| Q3 | | FET 3SK35 (GR or BL) | |
| Q4 | | Transistor 2SC998 | |
| D1~5 | | Diode 1S2238 | |
| D6,7 | | Diode 1S1555 | |
| | | **POTENTIOMETER** | |
| VR1 | R12-0042-05 | Potentiometer 500Ω (B) | |
| | | **COIL AND TRANSFORMER** | |
| T1 | L31-0180-05 | IFT 133MHz | |
| T2 | L30-0264-05 | IFT 10.7MHz | |
| T3 | L31-0321-05 | IFT 144MHz | |
| T4 | L31-0322-05 | Tuning coil 144MHz | |
| T5 | L31-0266-05 | IFT 144MHz | |
| T6 | L31-0323-05 | Tuning coil 144MHz | |
| L1 | L34-0353-05 | VHF coil | |
| L2 | L34-0442-05 | VHF coil | |
| L3 | L34-0448-05 | VHF coil | |
| L4 | L34-0352-05 | VHF coil | |
| L5 | L33-0220-05 | RFC choke coil 2.4μH | |
| L6 | L33-0104-05 | Ferri-inductor | |
| L7 | L33-0232-05 | Choke coil 0.7μH | |
| | | **MISCELLANEOUS** | |
| – | E23-0047-04 | Wrapping terminal x 11 | |
| – | F02-0004-05 | Cooler | |
| – | J25-0946-13 | Printed-circuit board | |

## FINAL UNIT (X56-1140-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | CE041A101(RL) | Electrolytic 100μF 10WV | |
| C2 | CC45SL2H330K | Ceramic 33pF ±10% | |
| C5,6 | CM93D2H220J-(DM) | Mica 22pF ±5% | |
| C8 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C9 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C10 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C11 | CE04W1H4R7(RL) | Electrolytic 4.7μF 50WV | |
| C12 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C13 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C14 | CE04W1HR47(RL) | Electrolytic 0.47μF 50WV | |
| C15 | CK45E2H103P | Ceramic 0.01μF +100%–0% | |
| CK1~5 | CK18E2H102P | Ceramic 0.001μF +100%–0% | |
| TC1 | C05-0029-15 | Trimmer capacitor 50pF | |
| TC2 | C05-0056-05 | Trimmer capacitor 30pF | |
| TC3 | C05-0029-15 | Trimmer capacitor 50pF | |
| TC4,5 | C05-0054-05 | Trimmer capacitor 60pF | |
| | | **RESISTOR** | |
| R1 | PD14BY2E470J | Carbon 47Ω ±5% 1/4W | |
| R2 | PC05GF2E471J | Carbon 470Ω ±5% 1/4W | |
| R4 | PD14BY2E220J | Carbon 22Ω ±5% 1/4W | |
| R5 | RC05GF2H101J | Carbon 100Ω ±5% 1/4W | |
| R6 | PD14CY2E332J | Carbon 3.3kΩ ±5% 1/4W | |
| R7 | PD14CY2E105J | Carbon 1MΩ ±5% 1/4W | |
| R8 | PD14CY2E332J | Carbon 3.3kΩ ±5% 1/4W | |
| R9 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| | | **SEMICONDUCTOR** | |
| Q1 | | Transistor 2N5641 | |
| Q2 | | Transistor 2N5642 | |
| Q3 | | Transistor 2SC733 (Y) | |
| D1,2 | | Diode 1S1555 | |
| | | **COIL** | |
| L1 | L34-0432-05 | VHF coil (A) | |
| L2 | L34-0433-05 | VHF coil (B) | |
| L3 | L34-0435-05 | VHF coil (D) | |
| L4 | L34-0444-05 | VHF coil (E) | |
| L6 | L31-0325-05 | Coil | |
| L7 | L33-0219-05 | RFC choke coil 0.2μH/100Ω | |
| L8 | L33-0222-05 | Choke coil | |
| L10~12 | L33-0222-05 | Choke coil | |
| L13 | L33-0104-05 | Ferri inductor | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| – | E23-0001-05 | Terminal x 9 | |
| – | F01-0172-14 | Heat sink | |
| – | F01-0173-13 | Heat sink (B) | |
| – | F07-0325-04 | Final shield cover | |
| – | F11-0196-03 | Shield case | |
| – | G02-0056-04 | Grounding spring x 2 | |
| – | J25-0941-03 | Printed-circuit board | |
| – | J31-0109-04 | Spacer ring x 4 | |
| – | J32-0191-04 | Hexagonal boss (C) x 4 | |

## MARKER UNIT (X50-1200-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITORS** | |
| C1 | CM93D1H102J(Z) | Mica 0.001μF ±5% | |
| C2 | CC45TH1H820J | Ceramic 82pF ±5% | |
| C3 | CC45CH1H470J | Ceramic 47pF ±5% | |
| C4 | CC45CH1H220J | Ceramic 22pF ±5% | |
| C5 | CC45CH1H470J | Ceramic 47pF ±5% | |
| C6 | CC45CH2H050D | Ceramic 0.5pF ±0.25pF | |
| C7 | CK45F1H203Z | Ceramic 0.02μF +80%–20% | |
| | | **RESISTORS** | |
| R1 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R2 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R3 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R4 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R5 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| | | **SEMICONDUCTORS** | |
| Q1 | | Transistor 2SC373 | |
| Q2 | | Transistor 2SC460 (B) | |
| | | **COIL** | |
| L1 | L33-0100-05 | Ferri inductor | |
| L2 | L33-0098-05 | Ferri inductor | |
| | | **MISCELLANEOUS** | |
| – | E23-0047-04 | Wrapping terminal x 4 | |
| – | J25-0978-04 | Printed-circuit board | |
| X1 | L77-0366-05 | Crystal oscillator | |

## RX NB UNIT (X55-1060-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | CC45CH1H220J | Ceramic 22pF ±5% | |
| C2 | CC45CH1H050D | Ceramic 5pF ±0.5pF | |
| C3 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C4~6 | CK45D1E403Z | Ceramic 0.04μF +80%–20% | |
| C7,8 | CK45F1E403Z | Ceramic 0.04μF +80%–20% | |
| C9 | CK45D1H102M | Ceramic 0.001μF ±20% | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| C10 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C11 | CC45SL1H0R5C | Ceramic 0.5pF ±0.25pF | |
| C12 | CC45SL1H330L | Ceramic 33pF ±5% | |
| C13 | CC45SL1H101J | Ceramic 100pF ±5% | |
| C14 | CK45D1E403Z | Ceramic 0.04μF +80%–20% | |
| C15 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C16 | CC45SL1H101K | Ceramic 100pF ±5% | |
| C17,18 | CK45D1E403Z | Ceramic 0.04μF +80%–20% | |
| C19,20 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C21 | CE04W1E100(RL) | Electrolytic 10μF 25WV | |
| C22 | CC45SL1H030C | Ceramic 3pF ±0.25pF | |
| C23 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C24 | CK45D1E403Z | Ceramic 0.04μF +80%–20% | |
| C25 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C26 | CK45F1E403Z | Ceramic 0.04μF +80%–20% | |
| C27 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C28 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C29 | CC45SL1H101J | Ceramic 100pF ±5% | |
| C30 | CK45D1H223P | Ceramic 0.022μF +100%–0% | |
| C31 | CK45D1E403Z | Ceramic 0.04μF +80%–20% | |
| C32 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C33 | CE04W1H010(RL) | Electrolytic 1μF 50WV | |
| C34,35 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C36 | CC45SL1H010D | Ceramic 1pF ±0.5pF | |
| C37 | CK45D1H223P | Ceramic 0.022μF +100%–0% | |
| C38,39 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C40 | CK45D1H102M | Ceramic 0.001μF ±20% | |
| C41 | CC45SL1H331J | Ceramic 330pF ±5% | |
| C42 | CK45D1H223P | Ceramic 0.022μF +100%–0% | |
| C43 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C44 | CK45F1E403Z | Ceramic 0.04μF +80%–20% | |
| C45 | CK45F1H103Z | Ceramic 0.01μF +80%–20% | |
| C46 | CC45SL1H101J | Ceramic 100pF ±5% | |
| TC1,2 | C05-0030-15 | Ceramic Trimmer 20pF | |
| | | **RESISTOR** | |
| R1~3 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R4,5 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R6,7 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R8,9 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R10 | PD14CY2E681J | Carbon 680Ω ±5% 1/4W | |
| R11 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R12 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R13,14 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R15,16 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R17 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R18 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R19 | pd14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R20 | PD14CY2E562J | Carbon 5.6kΩ ±5% 1/4W | |
| R21,22 | PD14CY2E273J | Carbon 27kΩ ±5% 1/4W | |
| R23 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R24 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R25 | PD14CY2E271J | Carbon 270Ω ±5% 1/4W | |
| R26 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R27 | PD14BY2E562J | Carbon 5.6kΩ ±5% 1/4W | |
| R28 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R29 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R30 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R31 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R32 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R33 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R34 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R35,36 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R37 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| R38 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R39 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| | **SEMICONDUCTOR** | | |
| Q1 | | FET 3SK35 (GR or BL) | |
| Q2 | | FET 3SK41 (M) or 35K40 (M) | |
| Q3 | | FET 3SK35 (GR) | |
| Q4 | | FET 2SK19 (GR) | |
| Q5 | | Transistor 2SA495 | |
| Q6 | | FET 2SK19 (GR) | |
| Q7 | | IC TA7045M (R) | |
| Q8 | | Transistor 2SA460 (B) | |
| Q9, 10 | | Transistor 2SC733 (Y) | |
| D1,2 | | Diode 1S2208 | |
| D3 | | Diode 1S73A | |
| D4~8 | | Diode 1N60 | |
| | **POTENTIOMETER** | | |
| VR1 | R12-7013-05 | Potentiometer 500kΩ (B) | |
| VR2 | R12-0042-05 | Potentiometer 500Ω (B) | |
| VR3 | R12-3025-05 | Potentiometer 10kΩ (B) | |
| | **COIL AND TRANSFORMER** | | |
| T1 | L31-0319-05 | Coil (A) 144MHz | |
| T2,3 | L30-0265-05 | IFT 10.7MHz | |
| T4~8 | L30-0264-05 | IFT 10.7MHz | |
| T9,10 | L30-0265-05 | IFT 10.7MHz | |
| T11 | L31-0320-05 | Coil (B) 144MHz | |
| T12 | L31-0324-05 | Coil (C) 144MHz | |
| L1 | L33-0104-05 | Ferri inductor 1mH | |
| L2 | L33-0220-05 | Choke coil 2.4μH | |
| L3~5 | L33-0104-05 | Ferri inductor 1mH | |
| L6 | L33-0220-05 | Choke coil 2.4μH | |
| | **MISCELLANEOUS** | | |
| – | E23-0047-04 | Wrapping terminal x 17 | |
| – | F11-0113-04 | Shield case x 3 | |
| – | J25-0949-13 | Printed-circuit board | |
| MCF | L71-0021-05 | Monolithic filter 10F20AG | |

## HET UNIT (X50-1170-61)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | **CAPACITOR** | | |
| C1~3 | CK45B1H102K | Ceramic 0.001μF ±10% | |
| C4 | CC45SL1H070D | Ceramic 7pF ±0.5pF | |
| C5 | CK45B1H102K | Ceramic 0.001μF ±10% | |
| C6 | CC45SL1H680J | Ceramic 68pF ±5% | |
| C7 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C8 | CK45B1H102J | Ceramic 0.001μF ±10% | |
| C9 | CC45SL1H680J | Ceramic 68pF ±5% | |
| C10 | CC45SL1H150J | Ceramic 15pF ±5% | |
| C11,12 | CK45B1H102K | Ceramic 0.001μF ±10% | |
| C13 | CC45SL1H100D | Ceramic 10pF ±0.5pF | |
| C14,15 | CC45SL1H470J | Ceramic 47pF ±5% | |
| C16~26 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C27 | CK45B1H102K | Ceramic 0.001μF ±10% | |
| C28,29 | CC45SL1H221J | Ceramic 220pF ±5% | |
| C30 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C31 | CC45SL1H330J | Ceramic 33pF ±5% | |
| C32 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C33 | CC45SL1H390J | Ceramic 39pF ±5% | |
| C34 | CC45SL1H560J | Ceramic 56pF ±5% | |
| C36 | CK45F1H403Z | Ceramic 0.04μF +80%,–20% | |
| C37,38 | CC45SL1H101J | Ceramic 100pF ±5% | |
| C39~42 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C43,44 | CC45SL1H0R5C | Ceramic 0.5pF ±0.25pF | |
| C45 | CK45B1H102K | Ceramic 0.001μF ±10% | |
| C46 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C47 | CK45F1H403Z | Ceramic 0.04μF +80%,–20% | |
| C48,49 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C50 | CC45SL1H470J | Ceramic 47pF ±5% | |
| C51,52 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C55,56 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C58,59 | CC45SL1H100D | Ceramic 10pF ±0.5pF | |
| C60 | CC45SL1H120J | Ceramic 12pF ±5% | |
| C61 | CC45SL1H070D | Ceramic 7pF ±0.5pF | |
| C62 | CC45SL1H180D | Ceramic 18pF ±0.5pF | |
| C64,65 | CK45F1H103Z | Ceramic 0.01μF +80%,–20% | |
| C66 | CC45SL1H220J | Ceramic 22pF ±5% | |
| C68 | CC45SL1H180D | Ceramic 18pF ±0.5pF | |
| C101 | CK45B1H102K | Ceramic 0.001μF ±10% | |
| TC1~11 | C05-0013-15 | Ceramic trimmer 20pF | |
| | **RESISTOR** | | |
| R1,2 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R3,4 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R5,6 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R7~9 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R10 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R11 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R12 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R13 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R14 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R15,16 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R17~27 | PD14CY2E182J | Carbon 1.8kΩ ±5% 1/4W | |
| R28~38 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R39 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R40 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R41,42 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R43 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R44 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R45 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R46 | PD14CY2E823J | Carbon 82kΩ ±5% 1/4W | |
| R47 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R48,49 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R51 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R52 | PD14CY2E332J | Carbon 3.3kΩ ±5% 1/4W | |
| R53 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R54 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R55 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R56 | PD14CY2E474J | Carbon 470kΩ ±5% 1/4W | |
| R57 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R58 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R59 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R60 | PD14CY2E100J | Carbon 10Ω ±5% 1/4W | |
| R101 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **SEMICONDUCTOR** | |
| Q1,2 | Transistor | Transistor 2SC388A | |
| Q3~5 | | Transistor 2SC460B | |
| Q6,7 | | FET 2SK19 (GR) | |
| Q8 | | Transistor 2SC388A | |
| Q9 | | Transistor 2SC460B | |
| Q10 | | Transistor 2SC733 (Y) | |
| Q11 | | Transistor 2SC735 (Y) | |
| D1,2 | | Diode 1S1555 | |
| D3 | | Diode 1S2208 | |
| D4~14 | | Diode 1S1555 | |
| D15,16 | | Diode 1N60 | |
| D17,18 | | Diode 1S1555 | |
| D101 | | Diode 1S1555 | |
| | | **POTENTIOMETER** | |
| VR1 | R12-2015-05 | Potentiometer 5kΩ (B) | |
| VR2 | R12-0042-05 | Potentiometer 500Ω (B) | |
| | | **COIL AND TRANSFORMER** | |
| T1,2 | L31-0180-05 | IFT 144MHz | |
| T3 | L30-0268-05 | IFT 8.7MHz | |
| T4 | L31-0321-05 | Tuning coil 144MHz | |
| T5 | L31-0322-05 | Tuning coil 144MHz | |
| T6 | L31-0179-05 | IFT 144MHz | |
| T7 | L31-0180-05 | IFT 144MHz | |
| T9 | L31-0180-05 | IFT 144MHz | |
| L1 | L33-0104-05 | Ferri inductor | |
| L2,3 | L34-0437-05 | Oscillator coil 125, 126MHz | |
| L4 | L34-0438-05 | Coil 0.9μH | |
| L5 | L33-0104-05 | Ferri inductor 1mH | |
| L6 | L33-0144-05 | Ferri inductor 6.8μH | |
| L7 | L33-0104-05 | Ferri inductor 1mH | |
| L8 | L33-0085-05 | Ferri inductor 1μH | |
| L101 | L34-0437-05 | Oscillator coil 1mH | |
| | | **MISCELLANEOUS** | |
| – | E18-2401-05 | Crystal socket 12P | |
| – | F23-0047-04 | Wrapping terminal x 34 | |
| – | J25-0947-13 | Printed-circuit board | |
| X1 | L77-0358-05 | Crystal 125. 109-1/3MHz | |
| X2 | L77-0359-05 | Crystal 125. 109-1/3MHz | |
| X101 | L77-0363-05 | Crystal 125. 509-1/3MHz | |

## VFO UNIT (X40-1080-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1 | CC45PG1H180J | Ceramic 18pF ±5% (temp. compensation) | |
| C2 | CC45PG1H220J | Ceramic 22pF ±5% (temp. compensation) | |
| C3 | CC45PG1H390J | Ceramic 39pF ±5% (temp. compensation) | |
| C4 | CC45PG1H220J | Ceramic 22pF ±5% (temp. compensation) | |
| C5 | CC45LG1H220J | Ceramic 22pF ±5% (temp. compensation) | |
| C6,7 | CM93F2A101J (DM) | Mica 100pF ±5% | |
| C8 | CM93D1H030D (Z) | Mica 3pF ±0.5pF | |
| C9 | CK45E1H203P | Ceramic 0.02μF +100%,–0% | |
| C10,11 | CK45E1H403P | Ceramic 0.04μF +100%,–0% | |
| C12 | CM93D1H180J (Z) | Mica 18pF ±5% | |
| C13 | CK45E1H403P | Ceramic 0.04μF +100%,–0% | |
| C14 | CM93D1H180J (Z) | Mica 18pF ±5% | |
| C15 | CM93D1H220J (Z) | Mica 22pF ±5% | |
| C16 | CK45E1H103P | Ceramic 0.01μF +100%,–0% | |
| C17 | CK45E1H403P | Ceramic 0.04μF +100%,–0% | |
| C18 | CC45SL1H470J | Ceramic 47pF ±5% | |
| C19 | CC45SL1H101J | Ceramic 100pF ±5% | |
| C20 | CC45SL1H470J | Ceramic 47pF ±5% | |
| VC1 | C01-0177-05 | Variable capacitor | |
| TC1 | C03-0001-05 | Midget variable capacitor | |
| TC2 | C05-0013-15 | Ceramic trimmer 20pF | |
| | | **RESISTOR** | |
| R1 | PD14CY2E105J | Carbon 1MΩ ±5% 1/4W | |
| R2 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R3,4 | PD14CY2E105J | Carbon 1MΩ ±5% 1/4W | |
| R5 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R6 | PD14CY2E105J | Carbon 1MΩ ±5% 1/4W | |
| R7 | PD14CY2E333J | Carbon 33kΩ ±5% 1/4W | |
| R8 | PD14CY2E473J | Carbon 47kΩ ±5% 1/4W | |
| R9 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R10 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R11 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| | | **SEMICONDUCTOR** | |
| Q1,2 | | FET 3SK22 (Y) | |
| Q3,4 | | Transistor 2SC460 (B) | |
| D1,2 | | Diode 1N60 | |
| | | **COIL** | |
| L1 | L32-0166-05 | Oscillator coil | |
| L2,3 | L33-0104-05 | Ferri inductor 1mH | |
| L4 | L33-0091-05 | Ferri inductor 22μH | |
| L5,6 | L33-0104-05 | Ferri inductor 1mH | |
| L7,8 | L33-0167-05 | Ferri inductor 4.7μH | |
| | | **MISCELLANEOUS** | |
| – | X41-1020-00 | Gear unit | |
| – | A01-0169-03 | VFO case | |
| – | B42-0010-04 | Nameplate | |
| – | D22-0011-05 | Shaft coupling | |
| – | E08-0204-05 | 2P jack | |
| – | E13-0101-05 | 1P jack | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| – | E22-0207-05 | Lug plate | |
| – | E23-0015-04 | Oval lug terminal x 2 | |
| – | E23-0046-04 | Wrapping terminal x 4 | |
| – | F07-0231-04 | VFO cover | |
| – | F10-0249-04 | VFO shield plate | |
| – | F11-0010-04 | VFO box (G) | |
| – | J21-0895-03 | VFO variable capacitor retainer | |
| – | J21-1156-03 | VFO mounting fitting | |
| – | J25-0950-04 | Printed-circuit board | |

## AF UNIT (X49-1060-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| **CAPACITOR** | | | |
| C1 | CE04W1H010 (RL) | Electrolytic 1μF 50WV | |
| C2 | CE04W1V4R7 (RL) | Electrolytic 4.7μF 35WV | |
| C3 | CE04W1H010 (RL) | Electrolytic 1μF 50WV | |
| C4 | CE04W1V4R7 (RL) | Electrolytic 4.7μF 35WV | |
| C5 | CE04W1H010 (RL) | Electrolytic 1μF 50WV | |
| C6 | CE04W1V4R7 (RL) | Electrolytic 4.7μF 35WV | |
| C7 | CE04W1HR47 (RL) | Electrolytic 0.47μF 50WV | |
| C8 | CQ93M1H332K | Mylar 0.0033μF ±10% | |
| C9 | CQ93M1H333K | Mylar 0.033μF ±10% | |
| C10 | CQ93M1H153K | Mylar 0.015μF ±10% | |
| C11 | CQ93M1H473K | Mylar 0.047μF ±10% | |
| C12 | CC45SL1H391K | Ceramic 390pF ±10% | |
| C13 | CE04W1H4R7 (RL) | Electrolytic 4.7μF 50WV | |
| C14,15 | CE04W1C100 (RL) | Electrolytic 10μF 16WV | |
| C16 | CE04W1C470 (RL) | Electrolytic 47μF 16WV | |
| C17 | CE04W1V4R7 (RL) | Electrolytic 4.7μF 35WV | |
| C18 | CQ93M1H103K | Mylar 0.01μF ±10% | |
| C19 | CE04W1A470 (RL) | Electrolytic 47μF 10WV | |
| C20 | CE04W1E100 (RL) | Electrolytic 10μF 25WV | |
| C21 | CC45SL1H471K | Ceramic 470pF ±10% | |
| C22 | CE04W1C470 (RL) | Electrolytic 47μF 16WV | |
| C23 | CE04W1C101 (RL) | Electrolytic 100μF 16WV | |
| C24 | CE04W1C330 (RL) | Electrolytic 33μF 16WV | |
| C25 | CE04W1E221 (RL) | Electrolytic 220μF 25WV | |
| C26,27 | CK45F1H403Z | Ceramic 0.04μF +80%,–20% | |
| C28 | CE04W1C330 (RL) | Electrolytic 33μF 16WV | |
| C29 | CK45F1H403Z | Ceramic 0.04μF +80%,–20% | |
| C30 | CK45F1E403Z | Ceramic 0.04μF +80%,–20% | |
| C31 | CK45D1H103M | Ceramic 0.01μF ±20% | |
| C32 | CK4501H102M | Ceramic 0.001μF ±20% | |
| C33 | CK45F1H403Z | Ceramic 0.04μF +80%,–20% | |
| C34 | CC45SL1H101K | Ceramic 100pF ±10% | |
| **RESISTOR** | | | |
| R1 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R2 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R3,4 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R5 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R6,7 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R8 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R9,10 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R11,12 | PD14CY2E562J | Carbon 5.6kΩ ±5% 1/4W | |
| R13 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R14 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R15 | PD14CY2E823J | Carbon 82kΩ ±5% 1/4W | |
| R16 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R17 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R18 | PD14CY2E272J | Carbon 2.7Ω ±5% 1/4W | |
| R19 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R20 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R21 | PD14CY2E221J | Carbon 2.2kΩ ±5% 1/4W | |
| R22 | PD14CY2E562K | Carbon 5.6kΩ ±10% 1/4W | |
| R23 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R24 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R25 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R26 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R27 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R28 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R29 | PD14CY2E682J | Carbon 6.8kΩ ±5% 1/4W | |
| R30 | PD14CY2E330J | Carbon 33Ω ±5% 1/4W | |
| R31 | PD14CY2E101J | Carbon 100Ω ±5% 1/4W | |
| R32 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R33,34 | R92-0041-25 | Metal plate 0.47Ω 1W | |
| R35 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R36 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R37 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R38 | PD14CY2E270J | Carbon 27Ω ±5% 1/4W | |
| **SEMICONDUCTOR** | | | |
| Q1,2 | | Transistor 2SC733 (O) | |
| Q3 | | Transistor 2SC373 | |
| Q4 | | Transistor 2SC734 (Y) | |
| Q5 | | Transistor 2SC1061 (A) | |
| Q6 | | Transistor 2SA671 (A) | |
| D1~6 | | Diode 1S1555 | |
| D7 | | Diode RV-1 | |
| **POTENTIOMETER** | | | |
| VR1 | R12-0048-05 | Potentiometer 100Ω (B) | |
| **COIL** | | | |
| L1,2 | L33-0025-05 | Choke coil 1μH | |
| L3 | L33-0086-05 | Ferri-inductor 1μH | |
| **MISCELLANEOUS** | | | |
| – | E23-0047-04 | Wrapping terminal x 19 | |
| – | F01-0161-04 | Heat sink | |
| – | J25-0948-03 | Printed-circuit board | |

## POWER SUPPLY UNIT (X43-1120-00)

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| C1,2 | CE02W1V332 | Electrolytic 3300μF 35WV | |
| C3 | CE04W1HR47 (RL) | Electrolytic 0.47μF 50WV | |
| C4 | CE04W1H100 (RL) | Electrolytic 10μF 50WV | |
| C5 | CE04W1H47 (RL) | Electrolytic 0.47μF 50WV | |
| C6 | CE04W1V4R7 (RL) | Electrolytic 4.7μF 35WV | |
| C7 | CE02W1E222 | Electrolytic 2200μF 25WV | |
| C8 | CE04W1V4R7 (RL) | Electrolytic 4.7μF 35WV | |
| C9 | CE02W1V222 | Electrolytic 2200μF 35WV | |
| C10 | CE04W1H010 (RL) | Electrolytic 1μF 50WV | |
| C11 | CE02W1V102 | Electrolytic 1000μF 35WV | |
| C12 | CE04W1C471 (RL) | Electrolytic 470μF 16WV | |
| C13 | CK45F1H403Z | Ceramic 0.04μF +80%,−20% | |
| C14 | CC45SL1H391J | Ceramic 390pF ±5% | |
| C15 | CK45F1H403Z | Ceramic 0.04μF +80%,−20% | |
| C16 | CE02W1C102 | Electrolytic 1000μF 16WV | |
| C17 | CE02W1E222 | Electrolytic 2200μF 25WV | |
| C18 | CE02W1H330 (RL) | Electrolytic 33μF 50WV | |
| CK1~12 | C90-0194-05 | Ceramic 0.001μF 500WV | |
| | | **RESISTOR** | |
| R1 | PD14CY2E221J | Carbon 220Ω ±5% 1/4W | |
| R2 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R3,4 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R5 | PD14CY2E681J | Carbon 680Ω ±5% 1/4W | |
| R6 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R7 | PD14CY2E103J | Carbon 10kΩ ±5% 1/4W | |
| R8 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R9 | PD14CY2E151J | Carbon 150Ω ±5% 1/4W | |
| R10 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R12 | PD14CY2E222J | Carbon 2.2kΩ ±5% 1/4W | |
| R13,14 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R15 | PD14CY2E331J | Carbon 330Ω ±5% 1/4W | |
| R16 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R17 | PD14CY2E562J | Carbon 5.6kΩ ±5% 1/4W | |
| R18 | PD14CY2E392J | Carbon 3.9kΩ ±5% 1/4W | |
| R19 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R20,21 | PD14CY2E392J | Carbon 3.9kΩ ±5% 1/4W | |
| R22 | PD14CY2E471J | Carbon 470Ω ±5% 1/4W | |
| R23 | PD14CY2E104J | Carbon 100kΩ ±5% 1/4W | |
| R24 | PD14CY2E472J | Carbon 4.7kΩ ±5% 1/4W | |
| R25 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R26 | PD14CY2E223J | Carbon 22kΩ ±5% 1/4W | |
| R27 | PD14CY2E152J | Carbon 1.5kΩ ±5% 1/4W | |
| R28 | PD14CY2E102J | Carbon 1kΩ ±5% 1/4W | |
| R29 | PD14BY2E101J | Carbon 100Ω ±5% 1/4W | |
| | | **SEMICONDUCTOR** | |
| Q1 | | Transistor 2SC733 (Y) | |
| Q2 | | Transistor 2SC734 (Y) | |
| Q3 | | Transistor 2SC733 (Y) | |
| Q4 | | Transistor 2SD235 (Y) | |
| Q5 | | Transistor 2SA495 | |
| Q6 | | Transistor 2SA671 (B) | |
| Q7,8 | | Transistor 2SC733 (Y) | |
| Q9 | | Transistor 2SA495 | |
| Q10 | | Transistor 2SC733 (Y) | |
| Q11 | | Integrated circuit MFC4060A | |
| D1 | | Rectifier DS-10BN-L | |
| D2,3 | | Diode U05B | |
| D4,5 | | Diode V06B | |
| D6 | | Zener diode WZ061 | |
| D7,8 | | Diode 1S1555 | |
| D9 | | Diode 1N60 | |
| D10 | | Diode V06B | |
| | | **POTENTIOMETER** | |
| VR1,2 | R12-1012-05 | Potentiometer 1kΩ (B) | |
| | | **COIL** | |
| L1 | L33-0127 | Ferri inductor | |
| | | **MISCELLANEOUS** | |
| – | E23-0047-04 | Wrapping terminal x 24 | |
| – | F01-0167-04 | Heat sink (A) | |
| – | F01-0168-04 | Heat sink (B) | |
| – | F11-0194-03 | Power source shield case | |
| – | F20-0078-05 | Insulating mica | |
| – | J25-0944-13 | Printed-circuit board | |

## SWITCH UNIT (X41-1030-00)

| Ref. No. | Parts NO. | Description | Remarks |
|---|---|---|---|
| S2~5 | S36-2026-15 | Lever switch x 4 | |
| S6 | S36-2029-05 | Lever switch (non-lock) | |
| | | **MISCELLANEOUS** | |
| – | E23-0047-04 | Wrapping terminal x 10 | |
| – | J25-0976-04 | Printed-circuit board | |

## DC CORD ASSEMBLY (X42-1050-00)

| Ref. NO. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| – | E09-0426-05 | 4P square plug | |
| – | F05-5022-05 | Fuse 5A | |
| – | J13-0029-05 | Fuse holder | |
| – | J41-0006-00 | Cord bushing | |

## POWER CORD ASSEMBLY (X42-1070-60)

| Ref. No. | Parts No. | Description | Re-marks |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| – | E03-0301-05 | Plug | |
| – | E09-0426-05 | 4P square plug | |
| – | J61-0014-05 | Belt | |

# DISASSEMBLY

## (1) Separating upper and lower cases

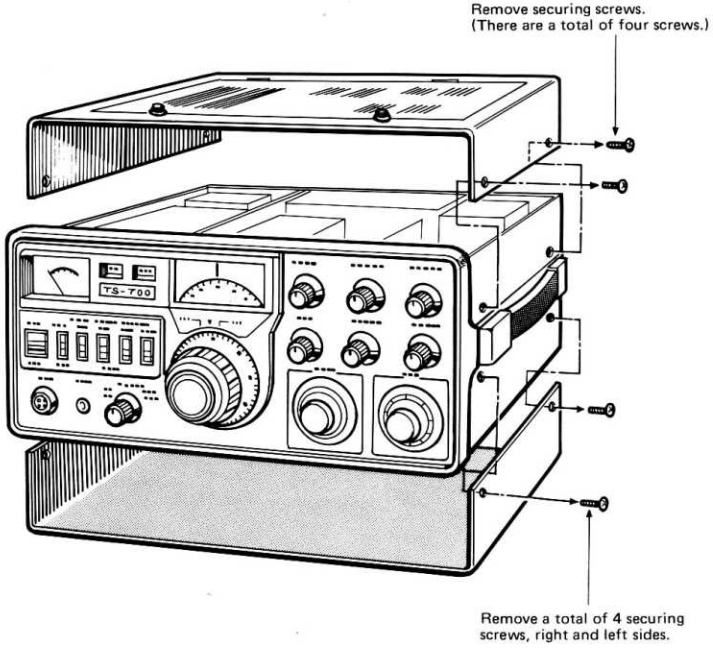
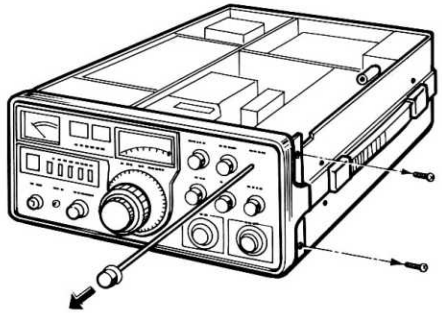


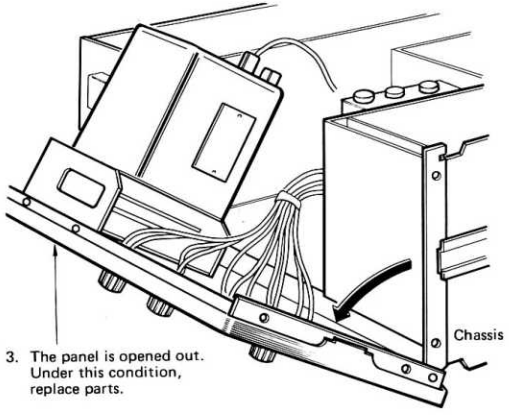

Fig. 1

## (2) Opening the panel



1. Draw out FINAL shaft. (Do not remove the knob mounted on the coupling showing up on the side of BPF case.)
2. Remove 4 pan-head screws on both sides of the panel. (Remove alternately to preserve symmetry.)

Fig. 2




3. The panel is opened out. Under this condition, replace parts.

Fig. 3

## (3) VFO removal

**Procedure**

1. Remove double knob on panel. At the same time, remove the dial calibration, spring and knob flange.
2. Remove 4 screws securing the VFO mounting fixtures on top and bottom of panel escutcheons.
3. Remove lamp holder.
   (The holder may be removed first.)

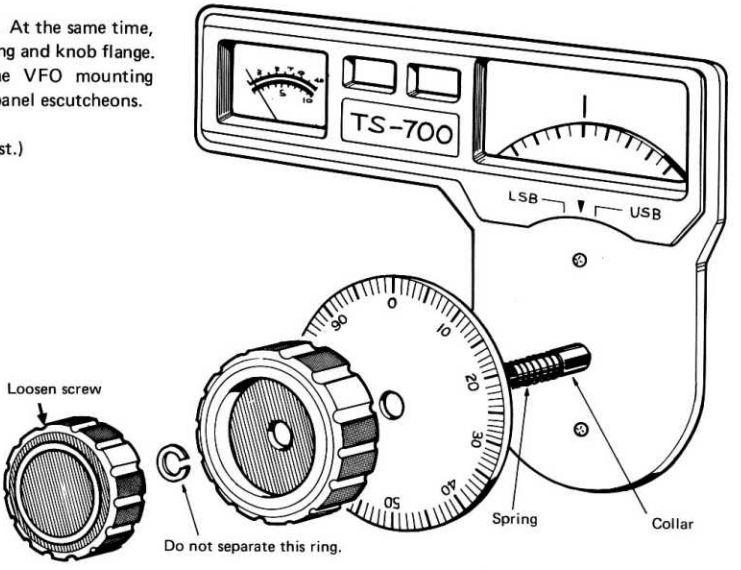



Fig. 4

## (4) Dial escutcheon replacement

Remove double knob and knob flange on VFO gear.

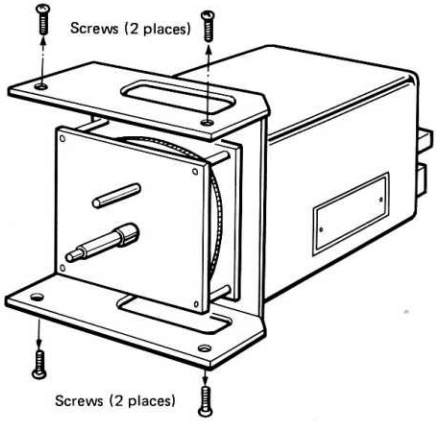



Fig. 5

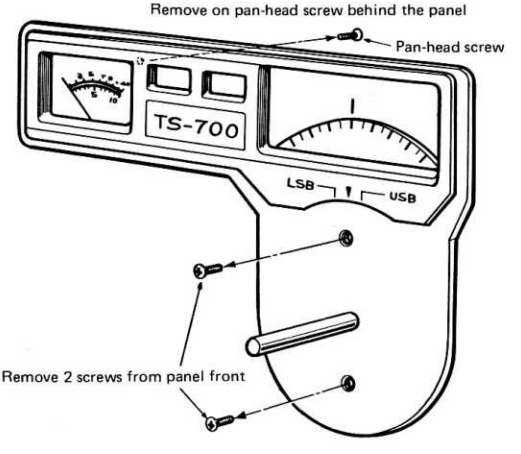
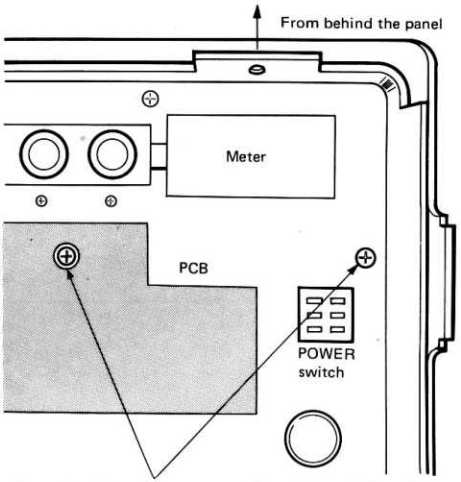



Fig. 6

## (5) Replacement of POWER switch and lever switch

**5-1 Remove switch grille.**
**(Have the meter removed beforehand)**




Removing these two screws allows the switch grille to come off.

Fig. 7

**5-2**

**Power switch replacement**

After removing switch grille, push the switch out to the front by holding down its mounting fingers.

**Lever switch replacement**

After removing switch grille, remove 4 screws securing the switch to the panel.

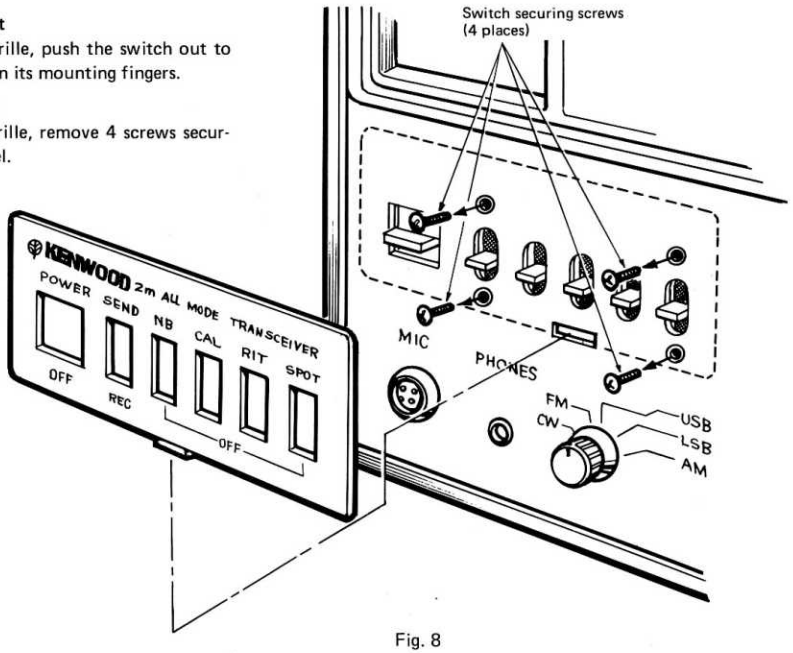



Fig. 8

## (6) POWER unit removal

**Procedure**

1. Remove 4 screws securing the top shield cover.
2. Remove 4 hexagonal bosses.
3. Remove one screw securing the side escutcheon (left as viewed from front side). This screw is at the center of the escutcheon.
4. Remove the power source shield case by pulling it upward.

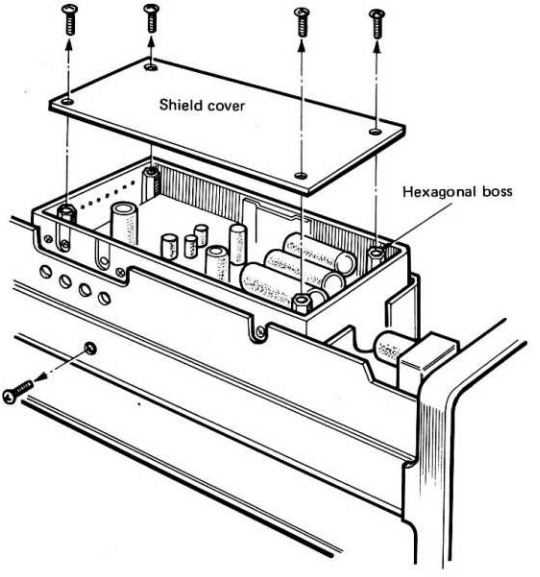



Fig. 9

## (7) Replacement of power transformer and rear terminal parts

Remove the separate part of the rear panel. Removing 2 screws on the rear and 2 on the side allows this part to come off.

## (8) FINAL unit replacement

Remove 4 screws securing the final-unit heat sink to the rear panel, and pull out FINAL unit.
Parts on the rear panels are to be removed similarly if replacement is required.

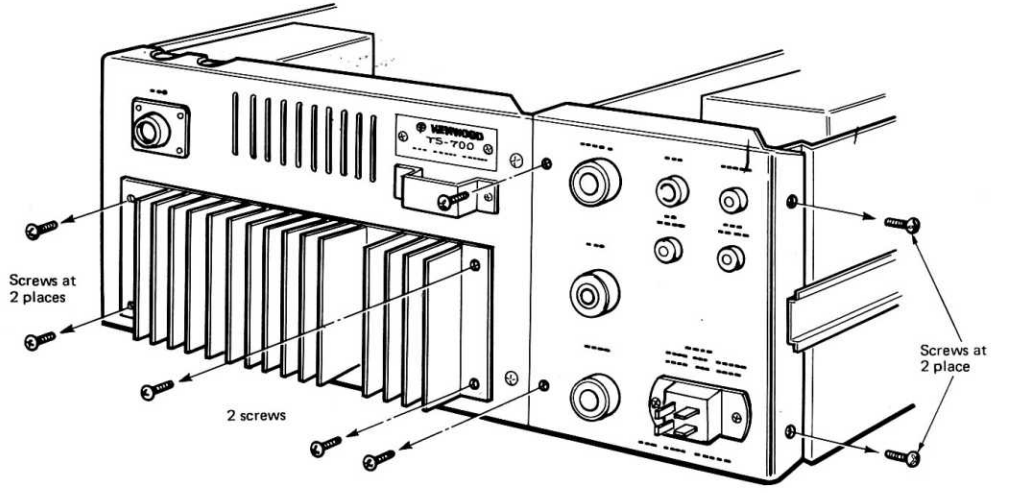



Fig. 10

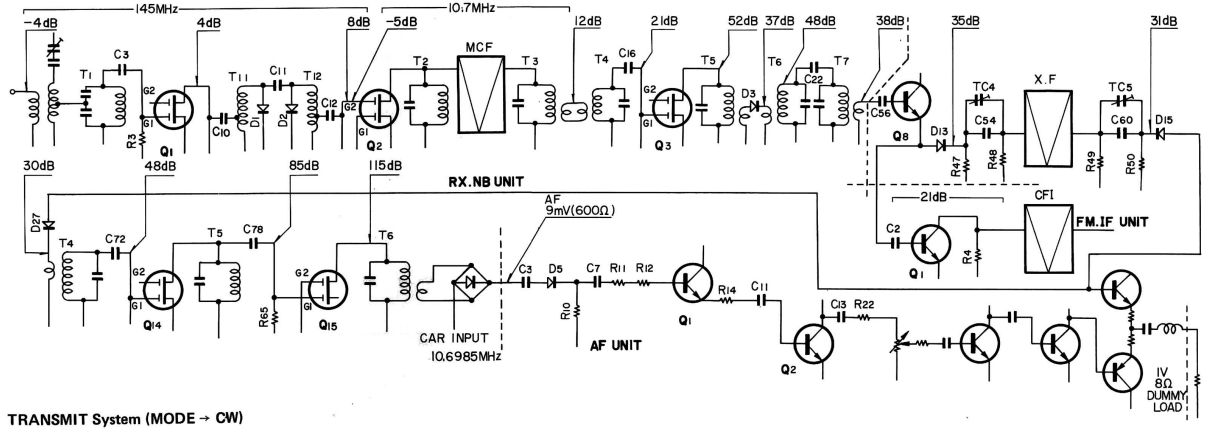
# TROUBLESHOOTING

| Symptom | Condition | Service Point | Possible Cause | Remedy |
|---|---|---|---|---|
| 1. Turning on the power switch has no effect. | | 1) Fuse | ○ Blown fuse. | ○ Replace. Refer to Symptom 2. |
| | | 2) Power on-off switch | ○ Defective switch. | ○ Check. Repair or replace. |
| | | 3) Power supply cord | ○ Broken cord near the plug end. | ○ Check. Repair or replace. |
| 2. Replacement fuse gets blown off in no time. | Power supply fuse (1 A) | 1) "B" circuit | ○ Circuit faulted to chassis. | ○ Check. Repair. |
| | | 2) Power supply unit | ○ Defective rectifier. | ○ Replace. |
| | 20-V circuit (2 A) | 1) Final unit | ○ Q1 (2N5641) or Q2 (2N5642) is defective. | ○ Replace. |
| | | 2) AF unit | ○ Defective Q5 (2SC1061(A)). ○ Defective Q6 (2SC671(A)). | ○ Replace. |
| 3. No signal reception. | Even noise is not heard. | 1) AF unit | ○ Defective Q5 (2SC1061(A)). | ○ Check by disconnecting lead wire from "B" terminal. Replace as necessary. |
| | | | ○ Defective Q6 (2SC671(A)). | ○ Check and, as necessary, replace. |
| | | 2) Phone jack | ○ Poor contact in the jack. | ○ Check for continuity. ○ Repair or replace. |
| | | 3) Speaker connector | ○ Poor contact. | ○ Check for continuity. ○ Repair or replace. |
| | Noise is heard in all modes. | 1) RX NB unit | ○ Mixer failure due to defective Q2 (3SK41). | ○ Check. Replace Q2. |
| | | 2) HET unit | ○ Loss of oscillation. | ○ Check oscillator voltage. ○ Repair. |
| | | | ○ Defective rotary switch. | ○ Replace. |
| | | 3) IF circuit | ○ Coil is off adjustment. | ○ Re-adjust or replace. |
| | | 4) VFO failure | ○ Q1 (3SK22), Q2 or Q3 (2SC460) is defective. | ○ Check voltage at output and other places. Replace defective transistor. |
| | Noise is heard on some bands (CW1, SSB, AM). | 1) HET unit | ○ Defective crystal. | ○ Check oscillator voltage. ○ Replace as necessary. |
| | | | ○ Defective rotary switch. | ○ Check and repair or replace. |
| | | 2) CARRIER unit | ○ T1 is mistuned, or Q1 or Q2 (2SC460(B)) is defective. | ○ Check output voltage and adjust T1. Check voltage and replace defective transistor. |
| | (FM) | 1) FM IF unit | ○ Defective Q3, Q4 or Q5 (2SC371). | ○ Check, re-adjust or replace. |
| 4. Low sensitivity (poor S/N ratio). | On 2 bands | 1) AVR unit | ○ Stabilized voltage too low. | ○ Adjust 9-volt voltage. |
| | | 2) RX NB unit | ○ Deteriorated Q1 (3 3SK35). | ○ Check voltage. Replace. |
| | | | ○ Deteriorated Q2 (33K41). | ○ Check voltage. Replace. |
| | (FM) | 1) FM IF unit | ○ Defective CF1 or CF2. | ○ Check and replace as necessary. |
| | (SSB, CW, AM) | 1) GEN unit | ○ Deteriorated Q14 or Q15 (3SK35). | ○ Adjust or replace. |
| | | 2) VFO output too low. | ○ Trimmer off adjustment. | ○ Re-adjust or replace. |
| | | | ○ Deteriorated Q1 (3SK22). | ○ Adjust or replace. |
| 5. "S" meter pointer will not deflect. | | 1) RX NB unit | ○ Improperly set volume. | ○ Adjust. |
| | | 2) Sensitivity too low. | ○ Refer to Symptom 3. | ○ Adjust. |
| | | 3) GEN unit | ○ AGC circuit not operating properly. | ○ Check, adjust or replace. |
| 6. Distorted output sound. | In all modes | 1) AF unit | ○ Defective Q5 (2SC1061) or Q6 (2SA671). | ○ Check by disconnecting "B" terminal. Replace as necessary. |
| | (FM) | 1) FM IF unit | | ○ Check. |
| | | 2) RX NB unit | ○ Coils off adjustment. | ○ Re-adjust. |
| | (SSB, A1, CW) | 1) GEN unit | ○ Coil off adjustment. | ○ Re-adjust. |
| | | 2) RX NB unit | ○ Coil off adjustment. | ○ Re-adjust. |
| | | 3) CAR unit | ○ Low output due to frequency deviation. | ○ Adjust T1 or TC. |

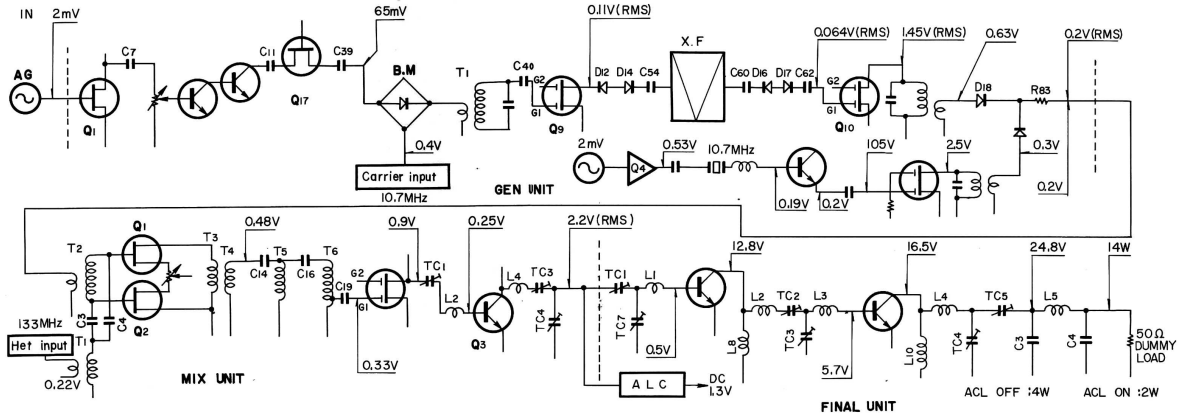
| Symptom | Condition | Service Point | Possible Cause | Remedy |
|---|---|---|---|---|
| 7. RIT setting is off zero point. | | 1) HET unit | ○ VR1 off adjustment. | ○ Re-adjust. |
| 8. MARKER unit setting is off zero point. | | 1) MARKER unit | ○ TC1 off adjustment or defective crystal. | ○ Adjustment or replace. |
| 9. No CW output. | On all bands | 1) Check supply voltage. | | |
| | | 2) Voltage is normal or close to normal level. | ○ BPF unit coil is faulted to chassis. | ○ Check and repair. |
| | | | ○ Defective relay contact points. | ○ Check for continuity. ○ Replace as necessary. |
| | | 3) Voltage is too low or down at zero level. | ○ Defective FINAL unit. | |
| | | | ○ Defective Q1 (2N5641). | ○ Check and replace. |
| | | | ○ Defective Q2 (2N5641). | ○ Check and replace. |
| | | 4) FM output is normal. | ○ Defective GEN unit. | |
| | | | ○ Defective Q9 or Q10 (3SK35). | ○ Check and replace. |
| | | | ○ Oscillator failure in CARRIER unit, due to: | ○ Check the various parts of CARRIER unit. |
| | | | ○ Defective Q1 or Q2 (2SC460). | ○ Check and replace. |
| | | | ○ Defective crystal oscillator. | ○ Check and replace. |
| | On some bands | 1) Failure of heterodyne oscillator. | ○ Coil mistuned. | ○ Adjust. |
| | | | ○ Defective crystal. | ○ Replace. |
| | | 2) FINAL unit | ○ Defective BPF unit. | ○ Check and repair. |
| 10. Not enough CW output. | On all bands | 1) POWER SUPPLY unit | ○ Voltage too low. | ○ Check 20-volt line. |
| | | | ○ VFO output too low, or VFO oscillation has failed. | ○ Check and repair. |
| | | 2) FINAL unit | ○ Not enough drive because of defective 2SC998, 2N-5641 or 2N5642. | ○ Replace. |
| | | 3) HET unit | ○ Not enough heterodyne oscillator output. | ○ Check output voltage. |
| | | 4) GEN unit | ○ Coil off adjustment. | ○ Re-adjust. |
| | | | ○ Defective crystal filter. | ○ Check the level, and replace as necessary. |
| | | | ○ Defective Q7 (2SC460). | ○ Check voltage. Replace. |
| | | | ○ Defective Q9 (3SK35). | ○ Check voltage. Replace. |
| | | | ○ Defective Q10 (3SK35). | ○ Check voltage. Replace. |
| | | 5) BPF unit | ○ Coil is faulted to chassis or adjacent part. | ○ Check and repair. |
| 11. No SSB output. | | 1) Microphone | ○ Open in the cord, at or near its plug end. | ○ Check and repair. |
| | | 2) GEN unit | ○ Defective Q1 (2SK30), Q2 (2SC373), or Q3 (2SC733). | ○ Check voltage. Replace |
| | | 3) CAR unit | ○ Defective X1 or X2. | ○ Check output voltage. |
| 12. No FM output. | | 1) GEN unit | ○ Defective 10.7-MHz crystal. | ○ Check. Replace. |
| | | | ○ Defective Q5 (2SC460) or Q6 (3SK35). | ○ Check. Replace. |
| 13. Distorted output sound. | (SSB) | 1) Drive knob | ○ Out of adjustment. | ○ Adjust to obtain maximum output level on CW. |
| | | 2) FINAL unit | ○ Ruptured capacitor, resulting in abnormal oscillation. | ○ Check on CW. Replace as necessary. |
| | (AM) | 1) GEN unit | ○ VR1 off adjustment. | ○ Re-adjust. |
| 14. Pointer deflection in RF meter is too large or too little. | | 1) BPF unit | ○ Defective diode. | ○ Check. Replace. |
| | | 2) RX NB unit | ○ Volume off adjustment. | ○ Re-adjust. |

# LEVEL DIAGRAM

## RECEIVE System (MODE → USB)




## TRANSMIT System (MODE → CW)



# ADJUSTMENTS

## TEST EQUIPMENT

1. **Frequency counter**
   Frequency range: Up to 150 MHz or more
2. **SSG (standard signal generator)**
   Capable of generating frequencies centering on 144 MHz, variable in amplitude, and also of frequency modulation.
   Output voltage: −10 dB ~ 100 dB
   AM: 30% modulation at 1 kHz
   FM: 7.5 kHz (1 kHz)
3. **Oscilloscope**
   High-sensitivity oscilloscope, synchronizable to external sources.
4. **AF Vacuum-tube voltmeter**
   Frequency range: 50 Hz ~ 10 kHz
   Input resistance: 1 megohm minimum
   Voltage range: F.S. = 10 mV up to 30 volts
5. **RF Vaccum-tube voltmeter**
   Frequency range: 150 MHz or more
   For such adjustments not requiring a high degree of precision as those on CARRIER unit and HET unit, a test circuit arranged as shown in Fig. 11, with a circuit tester, may be used as a substitute.

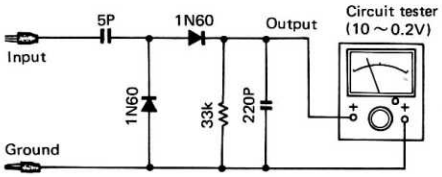



Fig. 11

6. **Vacuum-tube voltmeter**
   Input impedance: 10 megohms or more
   Voltage range: F.S. = 1.5 up to 1000 volts, AC and DC.
   A circuit tester (25 K/V, DC) may be substituted for this voltmeter to check voltage on low-impedance circuits. Generally, a circuit tester does not provide accurate voltage readings on high-impedance circuits.
7. **Power meter**
   Capable of measuring up to 20 watts, 150 MHz. Imput impedance of the meter should be 50 ohms.
8. **Linear detector**
   Frequency range: 150 MHz or more
   Frequency deviations: 20 kHz or more
   The detector need not be used where high accuracy of measurement is not required.
9. **AG (audio generator)**
   Output frequencies: 300 Hz ~ 10 kHz
   Output voltage: 1 volt minimum
10. **AF Dummy load**
    8 ohms and 3 watts approximately.

## GENERAL INFORMATION

1. Have the controls positioned according to Table 1; keep them in the indicated positions at all times unless otherwise instructed in the procedure.

| Control | Position |
|---|---|
| POWER SWITCH | ON |
| STANDBY SWITCH | REC |
| NB SWITCH | OFF |
| CAL SWITCH | OFF |
| RIT SWITCH | OFF |
| SPOT SWITCH | OFF |
| FIX. CH SWITCH | VFO |
| RF GAIN | Clockwise end |
| AF CAIN | Counterclokwise end |
| SQUELCH | Counterclockwise end |

Table 1

2. For the adjusting tools to be used on such as trimmers, a rod made of an insulating material such as bakelite should be made available.
3. When carrying out an adjustment on the receiving section with the use of the SS generator, be careful not to turn STBY switch to "SEND" position. This precaution is for protection of the SSG. The safest way is to have the 9-pin plug at the rear face pulled off.
4. When adjusting on the transmitting section, have the power meter connected to this section: this is for protection of the transistors in the final stage.

## ADJUSTMENT OF POWER SUPPLY UNIT (X43-1120-00)

Adjust the voltage to the values indicated in Table 2 by referring to Fig. 12. First to be set right is VR1; adjusting this variable resistor will affect VR2. So, be sure to adjust VR2 too after adjusting VR1.

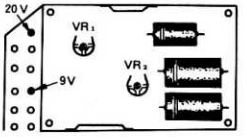



Fig. 12

| Terminal | ADJ | DC voltage |
|---|---|---|
| 9 | VR1 | 9V ±0.1V |
| 20 | VR2 | 21V $\pm^{0V}_{1V}$ |

Table 2

**ADJUSTMENT OF CARRIER UNIT (X50-1160-00)**

Hook up the instruments (frequency counter and RF vacuum-tube voltmeter) as shown in Fig. 13, and adjust to obtain the target values listed in Table 3. When adjusting TC3 (for CW), be sure to have the fixed channel empty. Adjustment with TC1 and TC2 here is tentative; final setting is to be effected according to 7. CARRIER POSITION ADJUSTMENT in **ADJUSTMENTS ON TRANSMITTING SECTION.**

| MODE | STBY | ADJ | OUTPUT RF VOLTAGE OR FREQUENCY |
|---|---|---|---|
| USB | REC | T 1 | Maximum RF voltage |
| USB | REC | TC1 | 10.6985 MHz |
| LSB | REC | TC2 | 10.7015 MHz |
| C W | SEND | TC3 | 10.7006 MHz |

**Table 3**

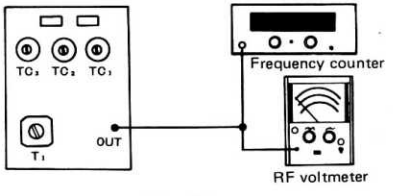



Fig. 13

**ADJUSTMENT OF VFO UNIT (X40-1080-00)**

Refer to Fig. 14 and Table 4. The dial position "1000" (Table 4) is reached by turning the main dial clockwise and backing it away by one rotation from the stopper point. One rotation corresponds to an interval of 25 kHz.

Connect the frequency counter to VFO terminal of HET unit. The location of this terminal is indicated in Fig. 15.

| DIAL | ADJ | OUTPUT FREQUENCY |
|---|---|---|
| 0 | L1 | 8.200 MHz |
| 1000 | TC1 | 9.200 MHz |

**Table 4**

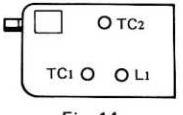



Fig. 14

**ADJUSTMENT OF HET UNIT (X50-1170-61)**

Connect the RF vacuum-tube voltmeter and frequency counter to the HET unit as shown in Fig. 15. With RIT control accurately positioned at "0", the dial at "0" position and VR2 set at its neutral position, adjust according to Table 5.

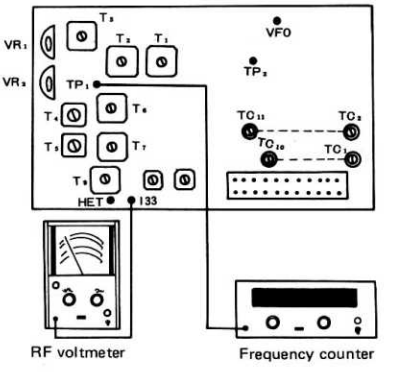



Fig. 15

| Sequence | BAND SW | RIT SW | ADJ | Output RF voltage or frequency |
|---|---|---|---|---|
| (6) | 145 | OFF | T.4,5,6, 7 and 9 | Maximized RF voltage |
| (1) | 144 | ON | L2 | 125.100 MHz |
| (2) | 144 | OFF | VR1 | 125.100 MHz |
| (3) | 145 | OFF | L3 | 126.100 MHz |
| (4) | Connect RF voltmeter to TP1; adjust T1 to maximize output voltage at 126.100 MHz; and adjust T2 in such a way that the output voltage at 125.100 MHz will come to within 1 dB of the voltage level already obtained at 126.1 MHz: try to minimize the difference between the two voltage levels. | | | |
| (5) | Adjust T3 to maximize the RF voltage applying to the gate of Q6 (2SK19) or Q7, with VFO set at "500" on the graduated scale. So that the RF voltmeter pointer will not deflect beyond the 1.3-V point at this time, adjust the TC2 on VFO unit (Fig. 14). | | | |

**Table 5**

Note:

When adjusting L2, VR1 or L3, make sure that the VFO output voltage is not applying to the VFO terminal. This can be accomplished by having the FIX CH switch turned to an empty channel position. Be sure to have VR2 set at its neutral position.

**ADJUSTMENT OF FIXED CHANNEL**

With the frequency counter connected to TP2 (Fig. 15), adjust each trimmer for a fixed channel to obtain the target value indicated in Table 6. There are a total of 11 trimmers, TC1 through TC11, inclusive.

| Band 1 (144) | Band 2 (145) | (AM,FM, CW) fo (MHz) | fUSB | fLSB |
|---|---|---|---|---|
| – *144.00 | 17 145.00 | 8.200 | | |
| – 144.04 | 18 145.04 | 8.240 | | |
| – 144.08 | 19 145.08 | 8.280 | | |
| – 144.12 | 20 145.12 | 8.320 | 8.3215 | 8.3185 |
| – 144.14 | – 145.14 | – | 8.3415 | 8.3385 |
| – 144.15 | – 145.15 | – | 8.3515 | 8.3485 |
| – 144.16 | 21 145.16 | 8.360 | 8.3615 | 8.4585 |
| – 144.20 | 22 145.20 | 8.400 | 8.4015 | 8.4985 |
| – 144.24 | 23 145.24 | 8.440 | 8.4415 | 8.5385 |
| – 144.28 | 24 145.28 | 8.480 | 8.4815 | 8.5785 |
| – 144.32 | 25 145.32 | 8.520 | 8.5215 | 8.5185 |
| 1 144.36 | 26 145.36 | 8.560 | 8.5615 | 8.6585 |
| 2 144.40 | 27 145.40 | 8.600 | 8.6015 | 8.5885 |
| 3 144.44 | 28 145.44 | 8.640 | 8.6415 | 8.6385 |
| 4 144.48 | – 145.48 | 8.680 | 8.6815 | 8.6785 |
| 5 144.52 | 145.52 | 8.720 | | |
| 6 144.56 | – 145.56 | 8.760 | | |
| 7 144.60 | – 145.60 | 8.800 | | |
| 8 144.64 | – 145.64 | 8.840 | | |
| 9 144.68 | – 145.68 | 8.880 | | |
| 10 144.72 | – 145.72 | 8.920 | | |
| 11 144.76 | – 145.76 | 8.960 | | |
| 12 144.80 | – 145.80 | 9.000 | | |
| 13 144.84 | – 145.84 | 9.040 | | |
| 14 144.88 | – 145.88 | 9.080 | | |
| 15 144.92 | – 145.92 | 9.120 | | |
| 16 144.96 | – 145.96 | 9.160 | | |
| 17 145.00 | – 146.00 | 9.200 | | |

* IMPORTANT: Not to be sent out on air.

**Table 6**

## ADJUSTMENT OF THE RECEIVING SECTION

1. AF unit (X49-1060-00)

With the circuit tester connected as shown in Fig. 16, adjust VR1 to read 22 mA ±2 mA on the tester.

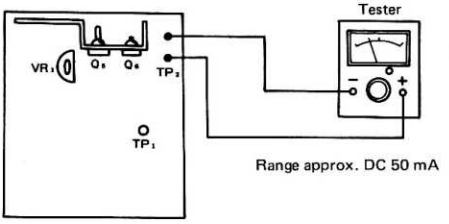



Fig. 16

2. Adjusting procedure for AM reception

Instruments are to be connected as shown in Fig. 17.
Have controls set as follows:
MODE: AM
DRIVE: 12 o'clock position sharp (145)
BAND: 145
DIAL: "O"
AF GAIN:
Adjust, from time to time, to read about 0.63 volt on the AF vacuum-tube voltmeter.

1) Set TC1 and TC2 (of RX NB unit) to (half capacitance) position.
2) Adjust the SS generator to produce a 145.0 MHz signal at a level anywhere between 10 and 20 dB and feed this signal into the transceiver through its antenna terminal, as shown. Throttle down the SSG output gradually until AGC disappears. Adjust T4, T5 and T6 (of the GEN unit, Fig. 19), T1, T2, T3, T4, T5, T7, T11 and T12 (of the RX NB unit, Fig. 18) in such a way that the pointer of the AF vacuum-tube voltmeter will deflect to the farthest possible position on the scale. Hold the SSG output always at such a level as will not cause the "S" meter pointer to deflect
3) Adjust TC1 and TC2 (of the RX NB voltmeter) just a little to maximize the deflection of the AF voltmeter pointer.

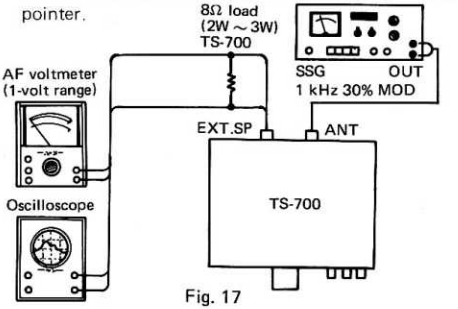



Fig. 17

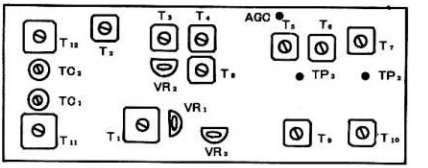



Fig. 18

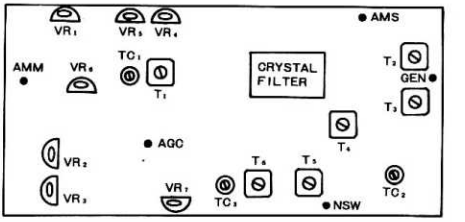



Fig. 19

3. Noise blanker (NB)
   1) Connect the vacuum-tube voltmeter to TP3 (Fig. 18).
   2) Set the SSG output (unmodulated) to 40 dB, and feed this output signal (145 MHz) into the transceiver set to receive on USB mode.
   3) Minimize the DC voltage at TP3 by adjusting T8, T9 and T10 (Fig. 18).

4 "S meter
   1) Adjust VR2 (Fig. 18) to make the pointer of this meter stay at "O" on the scale in the condition of non-reception of the signal.
   2) Set the SSG output (unmodulated) to 20 dB, 145 MHz, and feed this signal into the transceiver set to receive on USB mode.
   3) Adjust VR1 (Fig. 18) to deflect the meter pointer to "9". Repeat the process, steps 1) to 3), two or three times.

5. Adjusting procedure for SSB reception (CARRIER balancing)
   1) Receive a 145-MHz signal, not modulated, delivered at 30 dB by the SSG. Have the transceiver set for USB or LSB mode of reception.
   2) Adjust VR7 and TC3 (Fig. 19) to minimize and equalize the "S" meter deflection for the two sideband signals, USB and LSB.

6. Adjusting procedure for FM reception
   1) Connect the vacuum-tube voltmeter to TP2 (Fig. 20).
   2) Referring to Fig. 17, feed the SSG output of 145 MHz, not modulated, at 30 dB into the transceiver set for FM mode reception. The input level should be such that the pointer of "S" meter will swing to and stay at the middle position on the scale.
   3) Change the SSG output signal, making it exhibit a frequency deviation of 1 kHz or 7.5 kHz. Adjust T1 and T2 (Fig. 20) to obtain the best possible waveform display and to maximize the FM output in each case of frequency deviation.

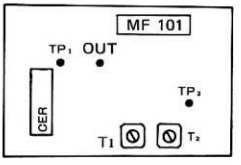



Fig. 20

7. MARKER unit (X50-1200-00)
   Connect the frequency counter as shown in Fig. 21. With CAL control set in ON position, adjust TC1 to read 1 MHz ±20 Hz on the counter. (If the pointer of the counter will not deflect adequately, the counter input may be taken from TP1.)

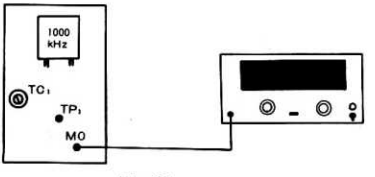



Fig. 21

8. RIT setting
   1) Have controls set as follows:
      MODE: USB
      CAL switch: ON
      RIT: O (Set sharp to this position.)
      RIT switch: ON
      Feed the marker signal (beat signal) into the transceiver.
   2) Adjust VR1 (of the GEN unit, Fig. 15) in such a way that turning off the RIT switch will not affect the beat sound.

9. Main dial
   (For more accurate adjustment, refer to Adjustment on VFO unit, page 46.)
   1) Start with the following control settings:
      MODE: USB
      MAIN DIAL: (As shown in Fig. 22)
      CAL switch: ON
   2) Receive the marker signal. Adjust L1 in such a way that "zero" beat will occur with the sub-dial brought to "O" position.
   3) With the sub-dial set in "1000" position, adjust TC1. Repeat the process, steps 1) through 3), several times.

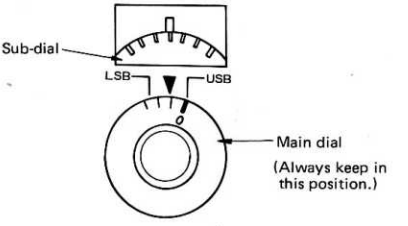



Fig. 22

## ADJUSTMENT OF THE TRANSMITTING SECTION

1. MIX unit (X48-1080-00)
   1) Connect the power meter to ANT terminal of the transceiver.
   2) Have controls set as follows:
      BAND: 145
      DRIVE: 12 o'clock (145)
      MODE: FM
      MAIN DIAL: O
      VR1: Center
      STBY: SEND
      VR8 (for ALC): Clockwise end
      Have the RF voltmeter connected as shown in Fig. 23. Adjust T1, T2, T3, T4, T5, T6, TC1, TC2, TC3 and TC4 are here tentative; these are to be adjusted finally when adjusting the FINAL unit.
   3) Leave VR1 set in its approximately middle position.

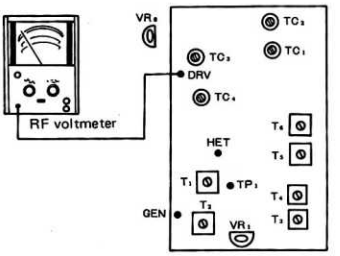



Fig. 23

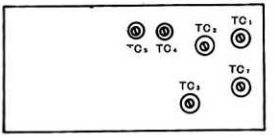



Fig. 24

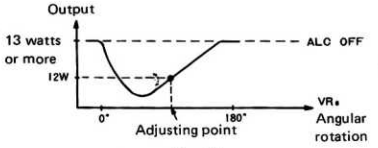



Fig. 25

2. FINAL unit (X56-1140-00)
   1) Connect the power meter to ANT terminal.
   2) Have controls set as follows:
      BAND: 145
      DRIVE: 12 o'clock (145)
      MODE: FM
      MAIN DIAL: 0
      ALC (VR8): OFF
      STBY: SEND
   3) Adjust TC1, TC2, TC3, TC4, TC5 and TC7, shown in Fig. 24, and also TC3 and TC4, shown in Fig. 23, to obtain the largest possible output. (Repeat the foregoing sequence several times, each time adjusting the FINAL control to maximize the output.)
3. ALC adjustment

   Note:

   This adjustment is to be carried out when the GEN unit, MIX unit and FINAL unit have all been adjusted.

   Rotate VR8 (located on the side lag plate of the MIX unit) to its counterclockwise end position; this turns off ALC. Under this condition, check to be sure that an output of at least 13 watts is available. Then reduce the output to 12 watts by adjusting VR8. (Make sur that the ALC voltage is capable of changing between 4 volts and 1.0 volt.)
4. RF meter
   1) With the transceiver set for FM mode transmission, maximize its output.
   2) Adjust VR3 (Fig. 18) in such a way that the RF meter pointer will deflect to "7" (S9 position).
5. Adjusting procedure for FM transmission
   1) Referring to Fig. 19, connect the frequency counter and RF vacuum-tube voltmeter to the GEN terminal.
   2) With MODE in FM position and STANDBY (STBY) in SEND position, adjust T3 (Fig. 19) to maximize the RF output voltage.
   3) Adjust TC2 (Fig. 19) to obtain a frequency of 10.700 MHz.
   4) Referring to Fig. 26, adjust to obtain an AG output of 2 mV and 1.5 kHz.
   5) Turn FM-MIC-GAIN clockwise all the way in order to obtain the largest possible output.
   6) If the frequency deviation is noted to be too narrow, enlarge it to 5 kHz by adjusting VR3 (Fig. 19).

   Note:

   Where the linear detector is not available a monitoring receiver may be substituted for it. With such a receiver, the first step is to connect the SSG to it to feed an SSG output with a frequency deviation of 10 kHz or 5 kHz; then read the receiver output for reference. The next step is to replace the SSG by the TS-700 transceiver being adjusted and change its VR2 or VR3 in such a way that the monitoring receiver will give an output reading equal in value to the first reading.

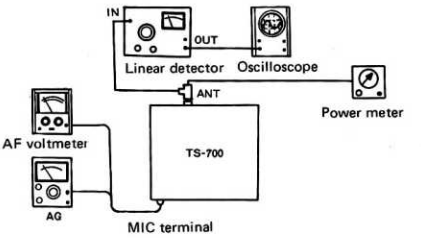



Fig. 26

   7) Leave FM-MIC-GAIN-VR turned clockwise.
6. Adjusting procedure for CW and AM transmission
   1) Connect the RF voltmeter to the GEN terminal shown in Fig. 19.
   2) With MODE set in CW position and STBY in SEND position, adjust T1 and T2 (Fig. 19) to maximize the RF voltage as read on the voltmeter.
   3) With BAND set in "145" position and MAIN DIAL in "0" position on the scale, maximize the RF output level.

4) Adjust VR5 (Fig. 19) to obtain the same output level as the FM output level previously noted.
5) With MODE left in AM position, adjust VR4 (Fig. 19) to obtain a 145-MHz output of 5 watts.
6) Turn SSB-MIC-GAIN closkwise all the way. As shown in Fig. 26, connect the AF vacuum-tube voltmeter and audio generator (AG) to the MIC terminal.
7) Supply a 1.5-kHz AG output of 2 mV, and adjust VR1 (Fig. 19) so that an AF voltage of 200 V will be read at the AMM terminal (Fig. 19).
8) With the 1.5-kHz AG output of 2 mV kept supplied, adjust SSB-MIC-GAIN control in such a way that an output of 260 mV will be read at the D terminal of Q17 (2SK30).

7. Adjustment of CARRIER position
1) Produce the largest possible output, with MODE set in CW position, BAND in "145" position and MAIN DIAL at "0" position.
2) With the transceiver set for USB mode transmission, adjust TC1 (of the GEN unit) in such a way that 400-Hz output and 2600-Hz output will both be about 5 watts, the difference being not greater than 1 watt.
3) With MODE set in LSB, adjust TC2 in the same way.
4) At SPOT position, be sure that the output is 3 watts or above with USB and LSB MODE.

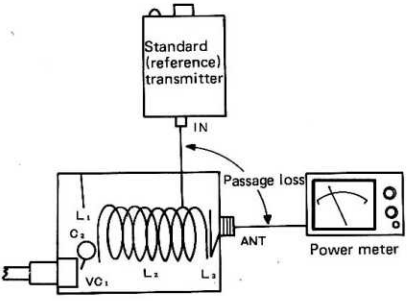



Fig. 27

8. CARRIER balancing
1) With MODE in CW position, produce the largest possible output.
2) Switch MODE to USB or LSB position. Connect the RF voltmeter to the ANT terminal.
3) Adjust TC1 and VR6 (Fig. 19) in such a way as to minimize and equalize the RF voltage read on the voltmeter for USB and LSB modes of transmission.

9. Adjustment of the tone generator
1) Connect the VTVM to "OUT" (Fig. 20) terminal on the FM-IF unit (X48-1070-61).
2) Turn the TONE switch on and adjust the potentiometer VR101 (100 kΩ) on the FM-IF unit (X48-1070-61) so that the VTVM indicates 5mV.

**ADJUSTMENT ON BPF UNIT (X51-1090-00)**

This adjustment is to be effected with a standard transmitter (such as TR-7200G) connected as shown in Fig. 27. The standard transmitter is assumed to have been accurately calibrated and adjusted to produce a 145.0-MHz output of about 10 watts at 50 ohms.

1) Referring to Fig. 27, have FINAL set in "145" position.
2) Reduce the distance between L2 and L3 as much as possible.
3) Adjust C2 position and L2 spacing so that the passage loss will be less than 10%, that is, will not exceed 1 watt where the standard transmitter, mentioned above, is used in the hook-up illustrated in Fig. 27.

# SCHEMATIC DIAGRAM

* —— Signal flow
---- Control, OSC, common flow

* —— +20V DC, +9V DC
---- –6V DC
* ( ) shows the levels for transmission.
* ■ shows TEST POINT.

2SC460B
2SC458

2SC371
2SC373
2SC388A
2SC733
2SC734
2SC735
2SA495

2SC998

2SA671
2SC1061
2SD235

2SK19

2SK30

2SK22

3SK35

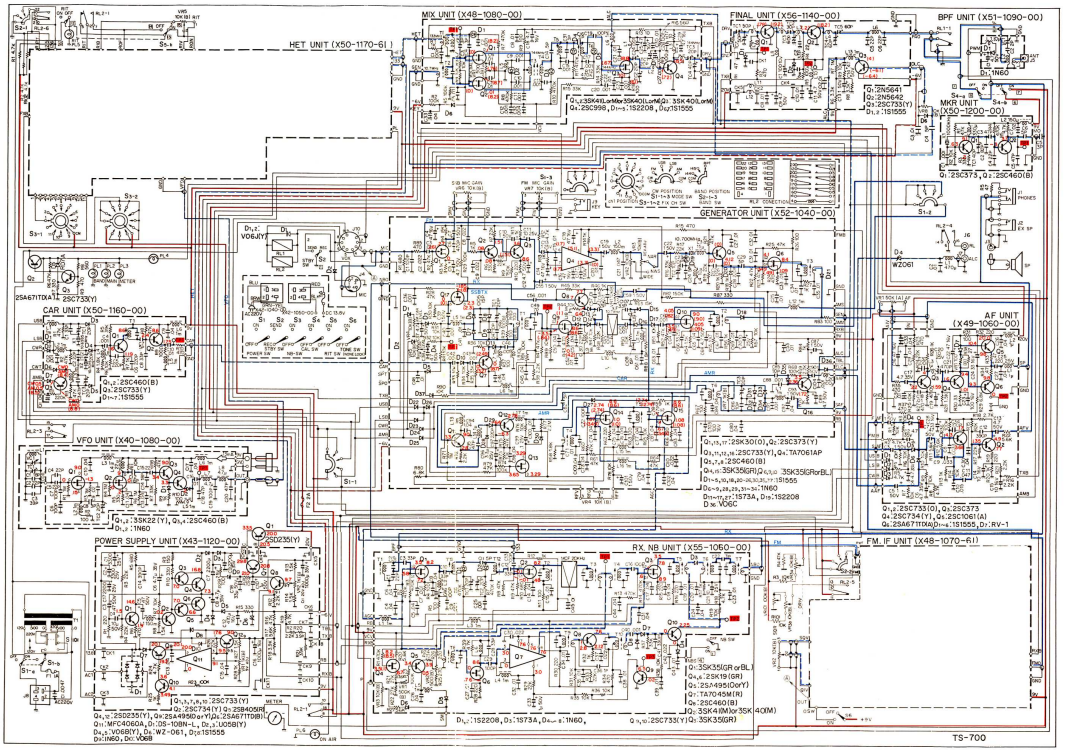
TA-7045

MFC4060A

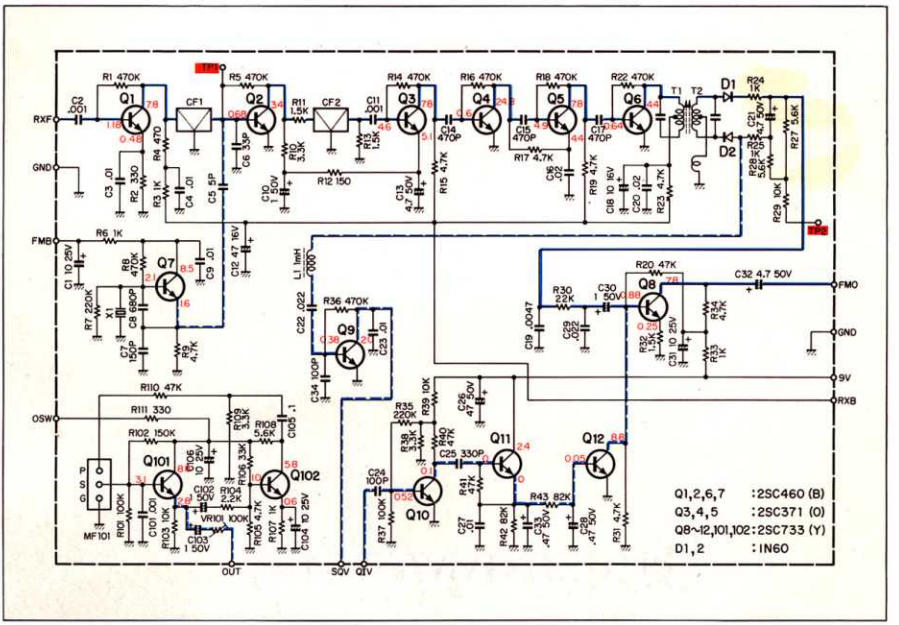
TA7061AP

2N5641

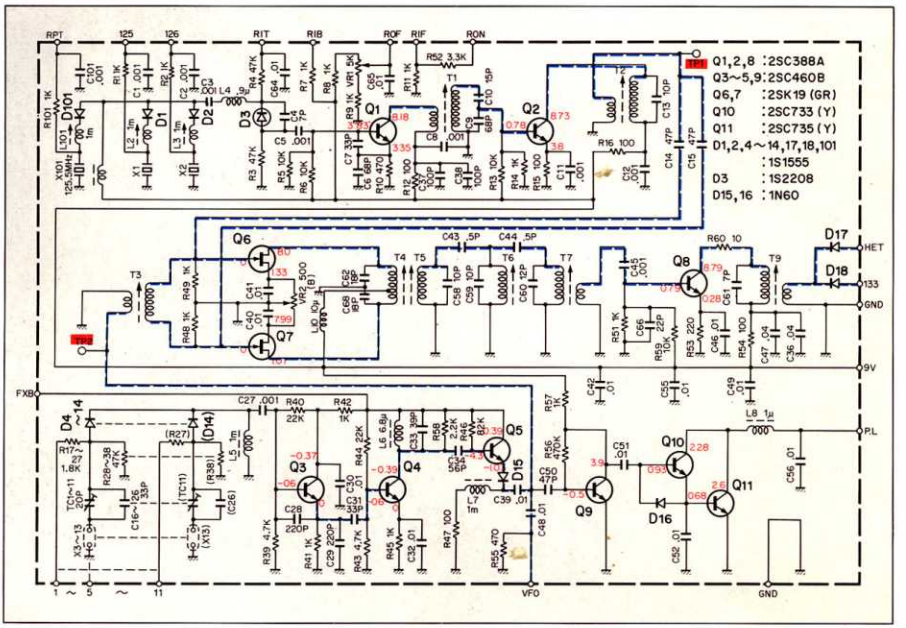
2N5642



## FM-IF UNIT (X48-1070-61)




## HET UNIT (X50-1170-61)



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