

KENWOOD

SERVICE MANUAL

Model T-599S

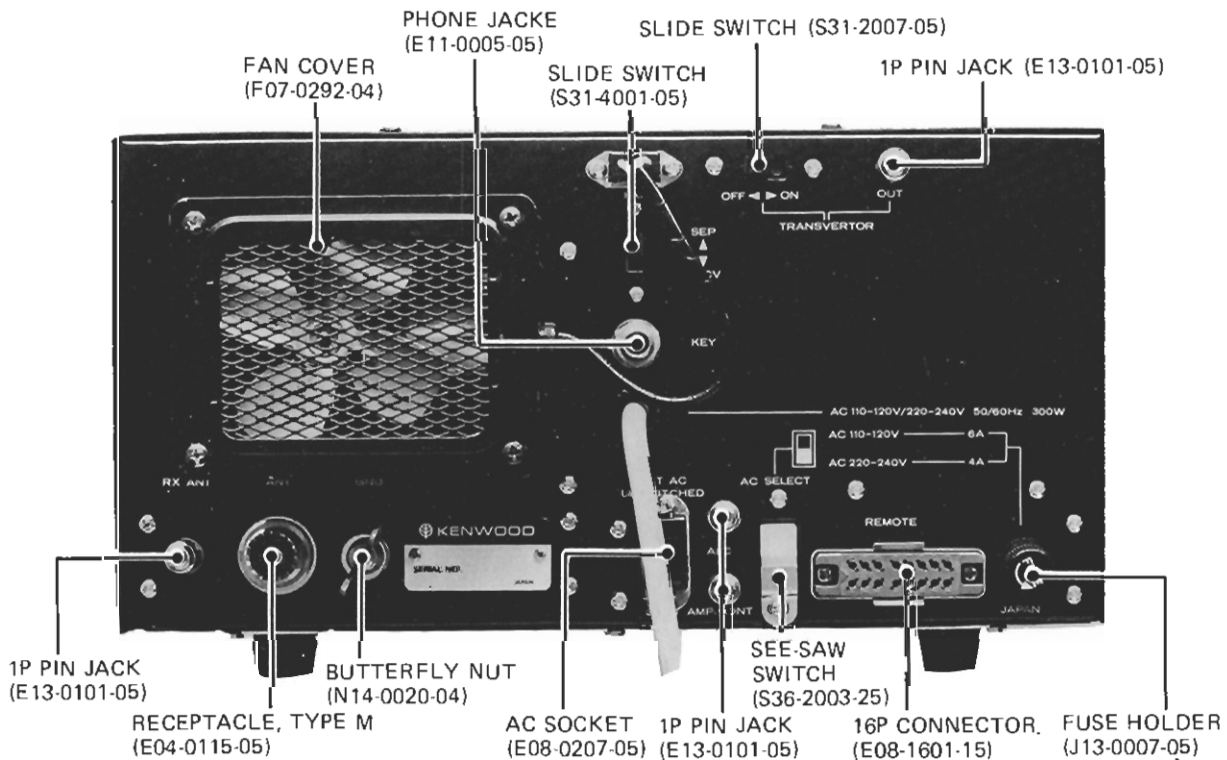
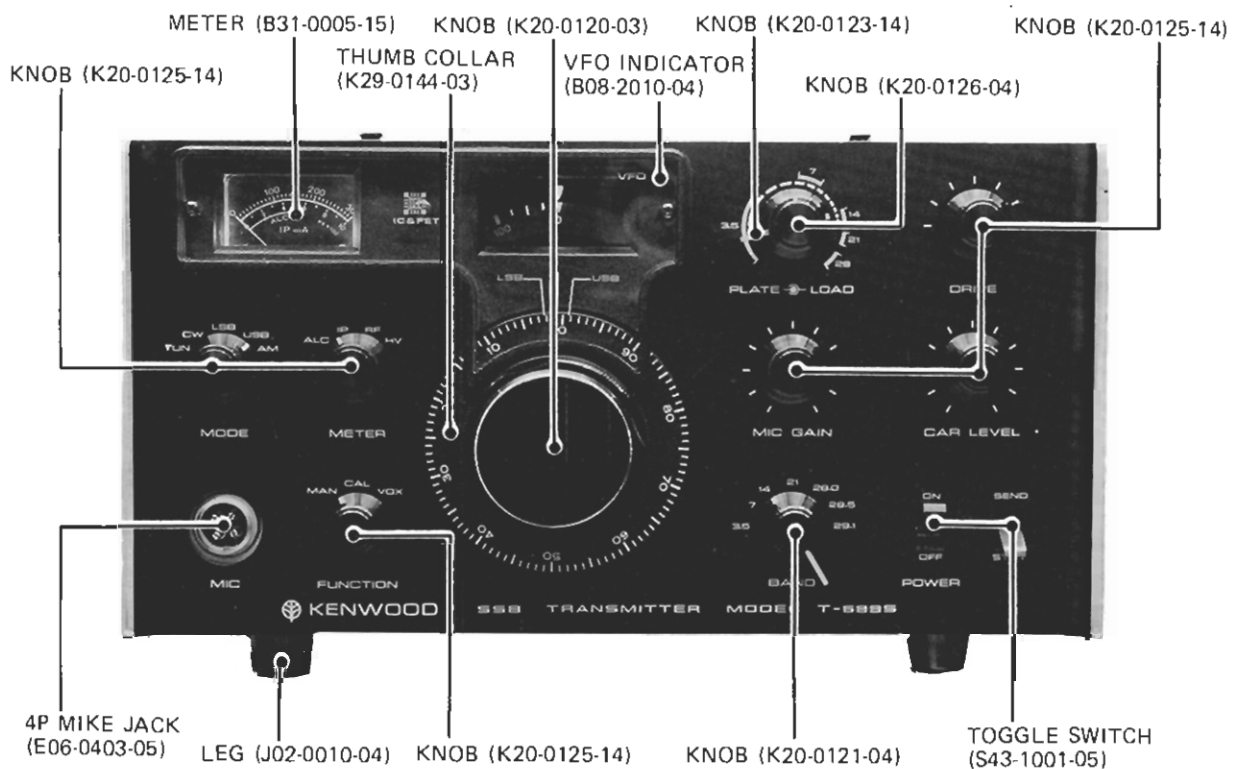


ALL BAND SSB TRANSMITTER

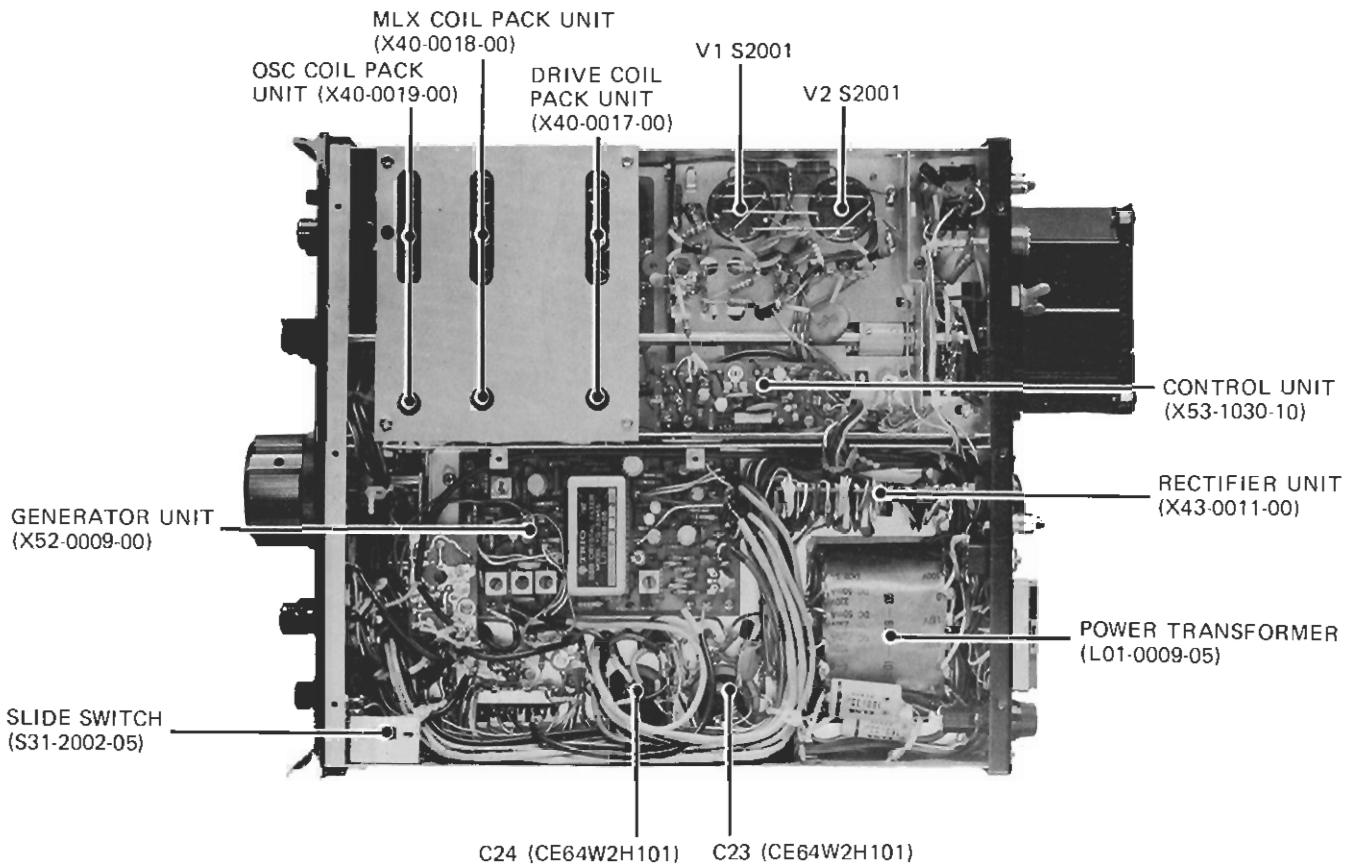
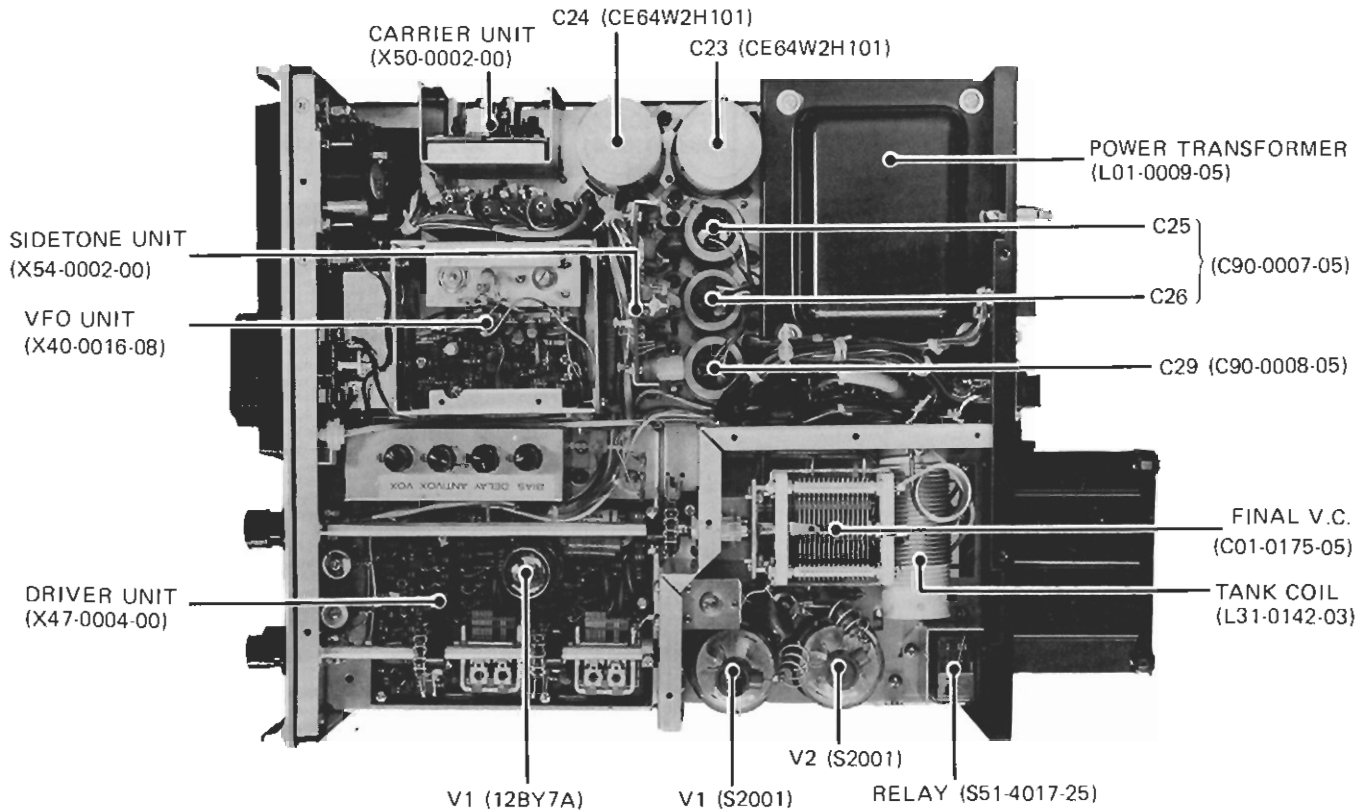
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EXTERNAL VIEW



PARTS ALIGNMENT



TROUBLESHOOTING

1. Trouble-shooting information given below will become more meaningful if you refer to ADJUSTMENTS information in pages 7-11, with the circuit diagrams at your elbow.
2. Check for possible causes, not just in any sequence but in the sequence of listing.
3. To check r-f voltages, use a vacuum-tube voltmeter or, alternatively, a detector-tester combination like the one shown on the right.

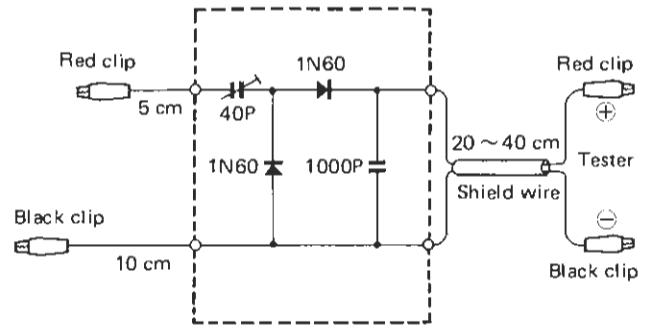


Fig. 1

Symptom	Service points	Possible causes	What to do for remedy
1. No power supply.	<ol style="list-style-type: none"> 1) Fuse 2) Power on-off switch 3) AC cord 	<ul style="list-style-type: none"> Blown fuse. Defective switch. Open-circuit near the plug. 	<ul style="list-style-type: none"> Refer to Symptom 2. Check for circuit continuity. Check for circuit continuity.
2. Fuse blows off too easily.	<ol style="list-style-type: none"> 1) Rectifier unit (X43-0011-00) 2) Final stage tube 	<ul style="list-style-type: none"> D1 ~ D4 (VO8J) shorted. S2001 electrode being touched. 	<ul style="list-style-type: none"> Disconnect HV850 (X43-0011-00) terminal and check for continuity. Check for continuity between pins 1, 4 or 6 and plate. Replace as necessary.
3. (A) No CW output.	<p>Read I_p (plate current):</p> <ol style="list-style-type: none"> 1) I_p normal or nearly normal. 2) I_p is zero. 3) Only base current is noted. 	<ul style="list-style-type: none"> Loading coil or its adjacent part is touching the chassis. Defective contact of relay (RL). Defective Q1, 2SC857 Q2 or 2SC856 in control unit (X53-1030-10). No voltage on plate or screen of S2001. Defective Q1, 3KS22 (in drive unit X47-0004-00), Q2 or 2SC535. No carrier oscillation (X50-0002-00) No oscillation of VFO unit (X40-0016-08). Q5 or Q6 is defective or T3 ~ T5 are off adjustment in generator unit (X52-0009-00). Coil not tuned, or defective crystal. Loading coil and its adjacent part is touching the chassis. 	<ul style="list-style-type: none"> Investigate and repair. Check for continuity; replace as necessary. Check for continuity; replace as necessary. Check voltage. Check for continuity, or replace. If Q2 or 2SC535 is suspected, check its voltage or oscillating voltage. (Oscillating voltage is to be checked with vacuum-tube voltmeter at G2 of Q1.) Check voltage at various parts of carrier unit (X50-0002-00), particularly the r-f voltage at OUT terminal on top of the unit. Check r-f voltage at O terminal of VFO unit. Check voltage or adjust.
Specific band	<ol style="list-style-type: none"> 1) No heterodyning oscillation. 2) Final stage 	<ul style="list-style-type: none"> Coil not tuned, or defective crystal. Loading coil and its adjacent part is touching the chassis. 	<ul style="list-style-type: none"> Tune coil, or replace crystal. Investigate and repair.
(B) Not enough CW output.	<p>All bands</p> <ol style="list-style-type: none"> 1) AVR unit (X43-0010-00) 2) Drive unit or final tube 3) Heterodyning oscillation (low output) 4) VFO (low VFO output) 	<ul style="list-style-type: none"> VR1 out of adjustment (regulated voltage too low). Deteriorated 12BY7A or S2001. Deteriorated Q2 or 2SC535 in drive unit (X47-0004-00). TC2 off adjustment. Deteriorated Q1, 3SK22 or Q3, 2SC460. 	<ul style="list-style-type: none"> Adjust VR1, and restore OUT voltage to normal 9 volts. Replace. Check oscillation voltage. Adjust Check voltage, and replace as necessary.

Symptom	Service points	Possible causes	What to do for remedy
3.5 ~ 14M band 21 ~ 28M band	5) Generator unit (X52-0009-00). 6) Final stage 1) Final stage 2) Coil unit 1) Drive unit or final tube 2) Final stage 3) Coil unit	<ul style="list-style-type: none"> ○ Defective crystal filter. ○ Deteriorated Q4, TA7045M or Q5, 3SK22. ○ Loading coil or its adjacent part is touching the chassis. ○ Loading coil or its adjacent part is touching the chassis. ○ Mixer or drive coil is off adjustment. ○ Deteriorated 12BY7A or S2001. ○ Loading coil or its adjacent part is touching the chassis. ○ Ruptured C3, C4 or C7 ~ C9. ○ Loading coil or its adjacent part is touching the chassis. ○ Ruptured C3, C4 or C7 ~ C9. 	<ul style="list-style-type: none"> ○ Level check. Replace as necessary. ○ Check voltage. Replace as necessary. ○ Investigate and repair. ○ Investigate and repair. ○ Adjust. ○ Replace. ○ Investigate and repair. ○ Replace. ○ Investigate and repair. ○ Replace.
4. No SSB output	1) Microphone side 2) Generator unit (X52-0009-00) 3) Carrier oscillator unit (X50-0002-00)	<ul style="list-style-type: none"> ○ Open in lead wire, near its plug. ○ Defective Q1, 2SC871 or Q2, Q3, 2SC733. ○ Defective X2 or X3 	<ul style="list-style-type: none"> ○ Inspect and repair. ○ Check voltage. ○ Check OUT voltage.
5. Distortion in sound output. SSB AM	1) Drive knob 2) Abnormal oscillation 2) Abnormal oscillation ○ AM SET	<ul style="list-style-type: none"> ○ Knob not properly set. ○ Ruptured C3, C4 or C7 ~ C9 in final stage circuit. ○ VR3 out of adjustment. 	<ul style="list-style-type: none"> ○ Set CW for maximum ALC deflection ○ Check by CW. ○ Adjust.
6. No ALC deflection.	1) Carrier level 2) Insufficient drive	<ul style="list-style-type: none"> ○ Improper carrier level. ○ Refer to Symptom 3 "No CW output." 	<ul style="list-style-type: none"> ○ Set in correct position by CW. ○
7. Ip meter pointer deflects too much or too little.	○ Final stage circuit	<ul style="list-style-type: none"> ○ Ohmic value of R4 or R5 has changed. ○ Ohmic value of R6 has changed. 	<ul style="list-style-type: none"> ○ Replace. ⊗ Replace.
8. When transceiving: Not enough output. Frequency deviation in transmitting and receiving.	1) Heterodyne oscillator circuit 2) VFO output of R-599. 1) Carrier oscillation 2) RIT zero point off adjustment	<ul style="list-style-type: none"> ○ Deteriorated Q3, or 2SC460 in drive unit (X47-0004-00). ○ TC2 off adjustment. ○ Frequency deviation at R-599 or T-599. ○ VR2 off adjustment in AVR unit (X43-0010-00). 	<ul style="list-style-type: none"> ⊗ Replace. ⊗ Adjust. ○ Check and adjust. ○ Adjust.

ADJUSTMENT

1. CARRIER LEVEL and R-F METER SENSITIVITY

(1) Purpose

To set the carrier level (CW and AM) and the r-f meter sensitivity.

(2) Instrument to be used

Power meter (at least 100 watts in measuring capacity)

(3) Adjusting procedure

- 1) Connect power meter to ANT terminal.
- 2) Set controls as follows:

Knob	Position
MODE	CW
BAND	14 MHz
VFO (dial)	175
DRIVE	12 o'clock
METER	I_p

- 3) Turn SEND/STBY switch to SEND position and quickly read I_p dip.
Adjust DRIVE, PLATE and LOAD knobs to obtain maximum power.
- 4) Turn METER switch to ALC, and adjust CAR LEVEL (VR2) to deflect the meter pointer to the highest position.

NOTE 1.

Tuning should be completed in the shortest time possible. Slow tuning may damage S2001 if the final stage happens to be working wild.

NOTE 2.

If I_p of 150 mA or more is present, adjustment should be carried out turning power supply on and off, ON for one minute and OFF for 30 seconds.

- 5) Turn METER switch to RF position, and adjust RF LEVEL VR (VR4, 10 kilohms) to obtain a 200 mA indication on the meter.
- 6) Turn BAND switch to 28.5 MHz position, MODE switch to AM position. Adjust AM SET VR (VR3, 500 kilohms) to obtain a 12 watts indication on the power meter. If this indication will not show up, set VR2 (5 kilohms) CAR LEVEL VR in maximum position, and re-adjust VR3.
- 7) Turn BAND switch to 3.5 MHz position, and set VFO dial to 30. Adjust DRIVE, PLATE and LOAD knobs and make sure a power of at least 80 watts is available: do not disturb CAR LEVEL VR.
- 8) Similarly make sure 80 watts is available at 7.050 MHz, and 70 watts at 28.3 MHz, 28.8 MHz and 29.1 MHz, respectively.

2. BM (BALANCED MODULATOR) and CARRIER position (Refer to Fig. 2, 3)

(1) Purpose

To balance the balanced mixer and to adjust the carrier position.

(2) Instruments to be used

- 1) Power meter (at least 100 watts in measuring capacity)
- 2) R-F vacuum-tube voltmeter
- 3) A-F generator
- 4) A-F vacuum-tube generator

(3) Adjusting procedure

- 1) Connect power meter and r-f vacuum-tube voltmeter (maximum range) to ANT terminal.
- 2) Turn MODE switch to CW and, with the frequency set at 14.175 MHz, adjust knobs to read maximum power on the power meter.
- 3) Next, move MODE switch to LSB, and adjust the carrier balancing VR (VR1, 100 ohms) on top of generator unit (X52-0009-00) to minimize the vacuum-tube voltmeter indication.
- 4) With the vacuum-tube voltmeter set in the maximum range, apply the signal of A-F generator (5 mV, 1500 Hz) to AF1 terminal of the generator unit. Adjust MIC GAIN to obtain 50 watts output.
- 5) Switch A-F generator signal to 400 Hz and 2600 Hz. Make a fine adjustment of TC3 (on the carrier unit, X50-0002-00) in such a way that the difference in output for these two frequencies will be not greater than 5 watts.
- 6) Turn MODE switch to USB, and switch A-F signal to 400 Hz and 2600 Hz. Carry out a fine adjustment on TC2 (on the same carrier unit) in such a way that the difference in output for these two frequencies will be not greater than 5 watts.
- 7) Disconnect A-F generator from AF1 terminal, and turn MIC GAIN knob counterclockwise as far as it will turn.
- 8) Again turn MODE switch to LSB, and adjust VR1 and TC1 on top of generator unit (X52-0009-00) to minimize the indication of R-F vacuum-tube voltmeter.
- 9) Move MODE switch to USB and, as R-F vacuum-tube voltmeter indication rises, adjust VR1 and TC1 on the generator unit to bring meter indication to one and the same lowest possible point for both USB and LSB. Let "A" stand for this meter indication.
If the indication of R-F vacuum-tube voltmeter should fall when the switch is so turned from LSB to USB, let "A" stand for the indication obtained for LSB.
- 10) Set R-F vacuum-tube voltmeter in the highest range.

- 11) Apply 5-mV 1500-Hz A-F signal to MIC terminal (on front panel). Check to be sure that a power of at least 80 watts is available with this signal coming in through MIC terminal. Let "B" stand for what R-F vacuum-tube voltmeter indicates at this time.
- 12) Make sure that the difference between "A" and "B" is not less than 40 dB.

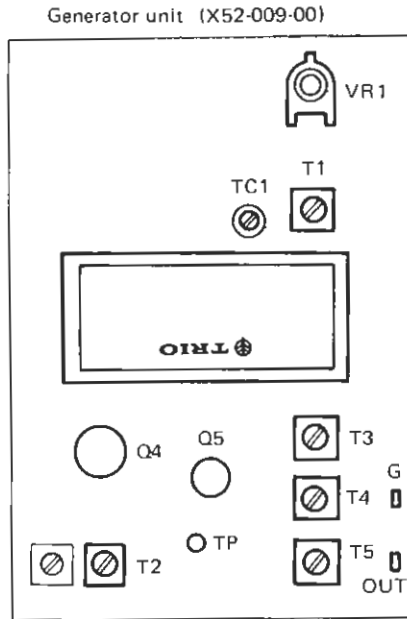


Fig. 2

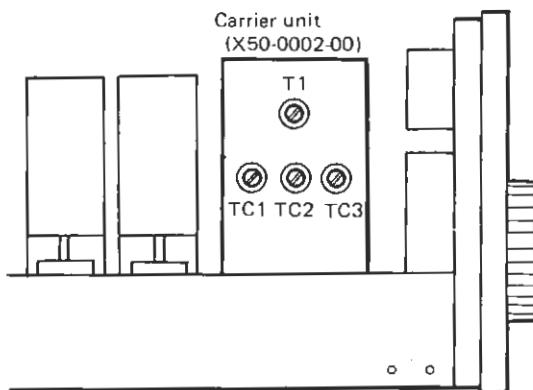


Fig. 3

3. VFO adjustment (X40-0016-08)

(1) Purpose

To set the VFO output voltage and to adjust the oscillating frequency.

(2) Instruments required

- 1) R-F vacuum-tube voltmeter
- 2) Frequency counter

(3) Adjusting procedure (Refer to Fig. 5.)

- 1) Connect R-F vacuum-tube voltmeter and frequency counter to OUT terminal of VFO unit (X40-0016-08), as shown in Fig. 4.
- 2) Adjust TC2 to obtain output voltage of 1 volt.
- 3) Turn VFO dial, indexing it to "0" graduation. Check to be sure the oscillating frequency is 5.5 MHz. If the oscillator is found to be operating off this frequency value, set it right by adjusting TC1.
- 4) Turn VFO dial to "600" and check to be sure the oscillator is working at 4.9 MHz: if not, set it right by adjusting L1.
- 5) Repeat the steps 3) and 4) twice or thrice.

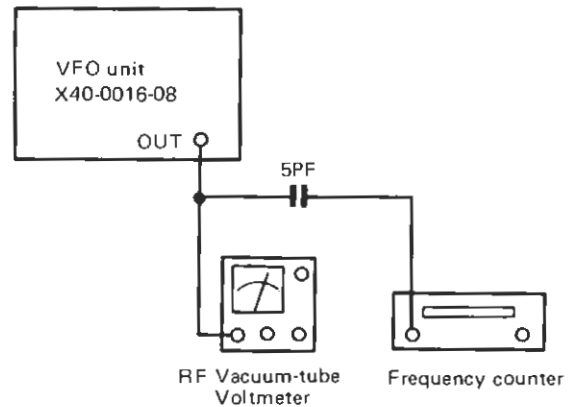
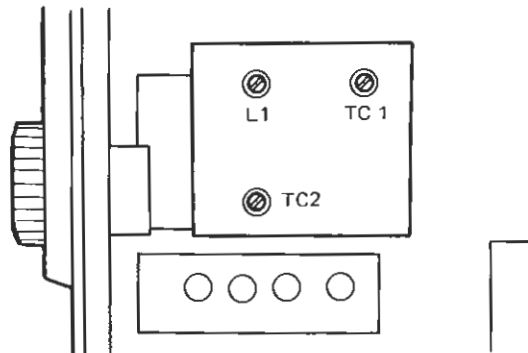


Fig. 4



POSITIONING DRAWING OF L1, TC1 AND TC2 OF INNER VFO

Fig. 5

4. HETERODYNE OSCILLATOR adjustment

(1) Purpose

To make sure that the heterodyning crystal is working properly, producing the desired frequency.

(2) Instrument to be used

R-F vacuum-tube voltmeter

(3) Adjusting procedure (Refer to Fig. 6)

- 1) Connect R-F vacuum-tube voltmeter to MD terminal, which is located on the driver unit (X47-0004-00).
- 2) Set BAND switch to 3.5 MHz.
- 3) Move SEND/STBY switch into SEND position.
- 4) Adjust in such a way that the oscillator output will be 0.5 dB below the maximum value, with the core of the 3.5-MHz oscillator coil sticking out.
- 5) Similarly adjust the oscillator coil for each of 7, 14, 21 and 28.5 MHz bands.
- 6) Make sure oscillation is normal for 28.0 and 29.1 MHz bands. If oscillation is not available or if too much a difference in level is noted, adjust the 28.5-MHz oscillator coil in such a way that the output will remain the same for 28, 28.5 and 29.1 MHz bands.

- 2) Set DRIVE knob in 12 o'clock position, making sure that there is no positional offset on either side of this knob. Accurately setting it in 12 o'clock position is important.

3) Position controls as follows:

Knob	Position
MODE	TUN or CW
FUNCTION	MAN
METER	ALC
SEND/STBY	SEND

- 4) Set BAND switch to 3.5-MHz position, and index VFO dial to "250". Adjust MIX coil pack unit (X40-0018-00) and driver coil pack unit (X40-0017-00) to maximize R-F vacuum-tube voltmeter indication.
- 5) As soon as ALC meter pointer starts deflecting, disconnect R-F voltmeter. As in step 4) above, adjust the two coil pack units (MIX and DRIVER) to maximize ALC meter indication.
- 6) Repeat the foregoing procedure for each of 28.5, 21, 14 and 7 MHz bands, adjusting the coil pack units each time.

VFO dial is to be positioned as follows:

Frequency	Graduation
28.5 MHz	300
21 MHz	225
14 MHz	175
7 MHz	150

5. Adjustment of SECOND MIXER and DRIVE PLATE COIL

(1) Purpose

To tune the coil for each band.

(2) Instrument required

R-F vacuum-tube voltmeter

(3) Adjusting procedure (Refer to Fig. 6)

- 1) Connect vacuum-tube voltmeter to the grid (Pin No. 5) of S2001 through a 1-pF capacitor.

NOTE:

Carry out this adjustment in the following sequence: 3.5; 28.5; 21; 14; and 7 MHz.

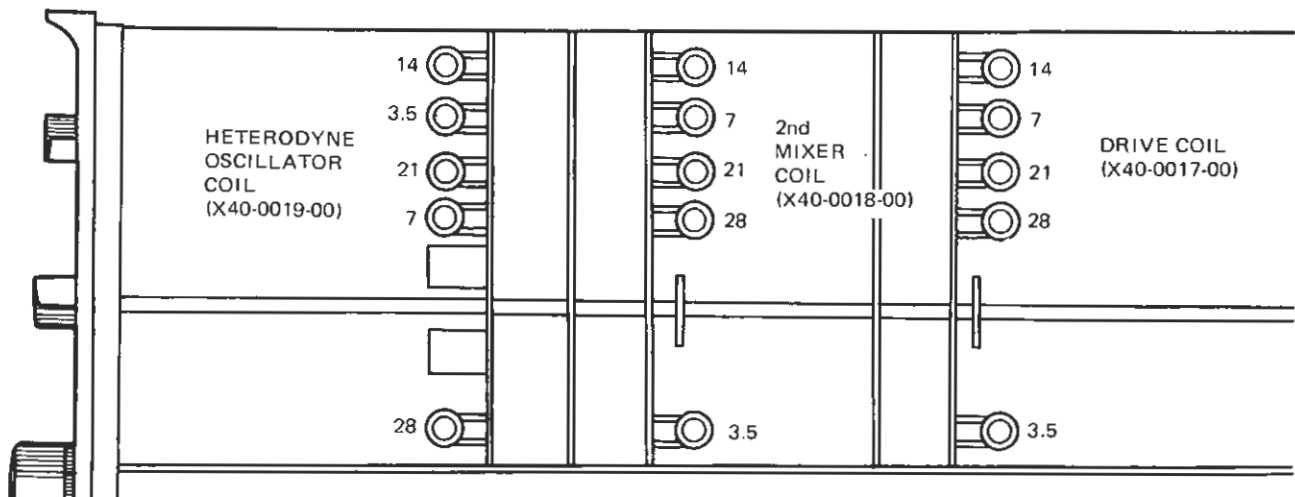


Fig. 6

6. BPF adjustment

(1) Purpose

To secure the prescribed bandwidth by adjusting the band-pass filter (BPF).

(2) Instruments required

- 1) Sweep generator (producing markers for 8.295, 8.595 and 8.895 MHz, respectively)
- 2) BPF detector (see Fig. 7)
- 3) Oscilloscope

(3) Adjusting procedure

- 1) Connect the output terminal of sweep generator to TP terminal on generator unit (X52-0009-00).
- 2) Connect the detector to OUT terminal of generator unit, and connect the oscilloscope to the output terminal of the detector.
- 3) Adjust T3, T4 and T5 to obtain the characteristic curve shown in Fig. 8.

7. MIC GAIN adjustment

(1) Purpose

To set MIC GAIN (VR1).

(2) Instruments required

- 1) A-F generator
- 2) A-F vacuum-tube voltmeter

(3) Adjusting procedure

- 1) Turn on TRANSVERTOR located on the rear panel.
- 2) Turn MODE switch to LSB or USB.
- 3) Apply, 5-mV 1500-Hz to MIC terminal (front panel) from A-F generator.
- 4) Move SEND/STBY switch to SEND position. Connect A-F vacuum-tube voltmeter to AF6 terminal on generator unit (X52-0009-00). Adjust MIC GAIN to obtain a 0.3-V indication on A-F voltmeter.

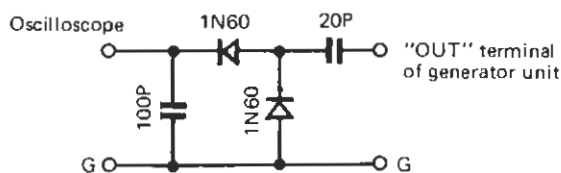


Fig. 7

8. FINAL BIAS adjustment

(1) Purpose

To establish final base current.

(2) Instrument required

(No instrument is needed for this adjustment.)

(3) Adjusting procedure

- 1) Turn MODE switch to LSB or USB.
- 2) Set DRIVE knob in 9 o'clock position.
- 3) Set BAND switch to 14 MHz, turn off TRANSVERTOR, and move SEND/STBY switch into SEND position.
- 4) Turn METER switch to I_p position. Adjust BIAS VR (VR5, 50 kilohms) to obtain an I_p of 60 mA.
- 5) Turn PLATE knob to observe the I_p value indicated. Make sure this indication does not vary as PLATE knob is turned.
- 6) Turn SEND/STBY switch back to STBY.

9. Neutralizing adjustment

(1) Purpose

To stabilize the action of S2001 in the final stage.

(2) Instruments required

- 1) Power meter
- 2) R-F vacuum-tube voltmeter

(3) Adjusting procedure

- 1) Turn MODE switch to CW, BAND switch to 21 MHz position, and the dial to "225".
- 2) Move SEND/STBY switch into SEND position, and adjust the respective knobs to obtain maximized power output.
- 3) Under this condition, turn on TRANSVERTER switch on rear panel. This will shut off the screen voltage of S2001.
- 4) Connect R-F vacuum-tube voltmeter to ANT terminal. Adjust the neutralizing variable capacitor TC1 (located in the final shielded box) to minimize R-F voltmeter indication.
- 5) Bring back SEND/STBY switch to STBY, and disconnect R-F voltmeter from ANT terminal. Turn off TRANSVERTOR switch.
- 6) Again move SEND/STBY switch into SEND position and check to be sure the same maximized output power is available.

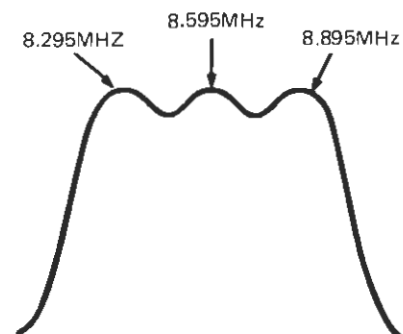


Fig. 8

10 SIDE TONE adjustment

(1) Purpose

To set the output level of side tone and to verify semi-break-in action.

(2) Instruments required

- 1) Power meter (not less than 100 watts in capacity)
- 2) A-F vacuum-tube voltmeter
- 3) Oscilloscope
- 4) 50-kilohm resistor
- 5) Key

(3) Adjusting procedure

- 1) Connect the power meter to ANT terminal, and connect A-F voltmeter, oscilloscope and 50-kilohm dummy to pins 15 and 16 of REMOTE terminals.
- 2) Turn MODE switch to CW, BAND switch to 14 MHz position, and the dial to "175". Adjust respective knobs to obtain a maximum output power reading on the meter.
- 3) Insert the key into KEY jack. Make sure this insertion reduces R-F output to zero.
- 4) After checking to be sure that pushing in the key restores R-F output to the original power level, make sure that the side tone A-F output is 1 volt ± 2 dB.
- 5) Move SEND/STBY switch back to STBY position, and turn FUNCTION switch to VOX. Push in the key to be sure that this results in a semi-break-in keying.

11. VOX action adjustment

(1) Purpose

To set VOX circuit gain and time constant.

(2) Instruments required

- 1) A-F generator
- 2) A-F vacuum-tube voltmeter
- 3) Clock (with a second hand)

(3) Adjusting procedure

- 1) Turn on TRANSVERTOR switch.
- 2) Move FUNCTION switch to VOX position.
- 3) Connect A-F generator to MIC terminal, and adjust its output to 5 mV at 1500 Hz. With this A-F signal coming in, adjust VOX GAIN (located on top face of the chassis) to trip the relay.
- 4) With the relay having been so tripped, remove the A-F signal. Check to be sure that, shortly afterward, the relay resets itself. Set this delay time, that is, VOX holding time to the specification value by adjusting DELAY (located on top face of the chassis).
- 5) Move FUNCTION switch back to MAN position.

12. Voltage check

(1) Purpose

To obtain proper voltage from the power source and AVR unit.

(2) Instrument required

Voltmeter or tester

(3) Check voltage at the following points:

(Refer to circuit diagrams.)

Check point	Voltage
A	DC 930 volts ± 50 volts
B	DC 330 volts ± 20 volts
C	DC 240 volts ± 20 volts
D	DC 15 volts ± 1 volt
E	DC 9 volts ± 0.2 volt
F	DC -95 volts ± 20 volt
G	AC 6.3 volts ± 0.5 volt
RIT	DC 5.8 volts

NOTE

If the voltage at check point E is off ± 0.2 volt of 9 volts, bring this voltage into the tolerance by adjusting VR1 (500 ohms) located on the AVR unit (X43-0001-00). RIT voltage can be similarly set right by adjusting VR2 (10 kilohms) on the same AVR unit.

PARTS LIST

■ PARTS LIST OF T-599S

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CM93F2H101J	Mica	100pF ±5%
C2	CK45E2H102P	Ceramic	0.001μF +100%, -0%
C3, 4, 7, 8	CK45F1E403Z	Ceramic	0.04μF +80%, -20%
C9	CK45E2H103P	Ceramic	0.01μF +100%, -0%
C11	C90-0127-05	Ceramic	1000pF ±10%
C13, 14	C90-0125-05	Ceramic	4700pF +100%, -0%
C15	CM93F2H151J	Mica	150pF ±5%
C16	CM93F2H821J	Mica	820pF ±5%
C17, 19	CK45E2H103P	Ceramic	0.01μF +100%, -0%
C20,21	CK45F1E403Z	Ceramic	0.04μF +80%, -20%
C22	CK45E2H103P	Ceramic	0.01μF +100%, -0%
C23, 24	CE64W2H101	Electrolytic block	220μF x2 500WV
C25, 26	C90-0007-05	Electrolytic block	22μF 350WV
C27, 2B	CE02W2C330	Electrolytic	33μF 160WV
C29	C90-0008-05	Electrolytic	1000μF x2 25WV
C30, 31	CK45F1E403Z	Ceramic	0.04μF +80%, -20%
C32 ~ 35	C90-0125-05	Ceramic	4700pF +100%, -0%
C36, 37	CE04W1E100	Electrolytic	10μF 25WV
C38	CK45E2H103P	Ceramic	0.01μF +100%, -0%
C39	CM93D2H150J	Mica	15pF ±5%
C41, 42	CK45F1E103Z	Ceramic	0.01μF +80%, -20%
C43, 44	CM93D1H330JZ	Mica	33pF ±5%
C45	CK45E2H103P	Ceramic	0.01μF +100%, -0%
RESISTOR			
R1	PD14BY2E393J	Carbon	39kΩ ±5% 1/4W
R2	PD14BY2E681J	Carbon	680Ω ±5% 1/4W
R3	PD14BY2E472J	Carbon	4.7kΩ ±5% 1/4W
R4, 5	RC05GF3A100J	Carbon	10Ω ±5% 1W
R6	PD14BY2E272J	Carbon	2.7kΩ ±5% 1/4W
R7	PD14BY2E104J	Carbon	100kΩ ±5% 1/4W
RB	PD14BY2E102J	Carbon	1kΩ ±5% 1/4W
R9	RN14AB3D103J	Metal film	10kΩ ±5% 2W
R10 ~ 12	PD14BY2H684J	Carbon	680kΩ ±5% 1/2W
R13	PD14BY2E104J	Carbon	100kΩ ±5% 1/4W
R14	PD14BY2E474J	Carbon	470kΩ ±5% 1/4W
R15	PD14BY2E103J	Carbon	10kΩ ±5% 1/4W
R16, 17	RC05GF2H474K	Carbon	470kΩ ±10% 1/2W
R18	R92-0050-05	Metal film	15kΩ ±5% 7.5W
R19	R92-0049-05	Metal film	10kΩ ±5% 7.5W
R21	PD14BY2E272J	Carbon	2.7kΩ ±5% 1/4W
R22	PD14BY2E101J	Carbon	100Ω ±5% 1/4W
R23	PD14BY2E103J	Carbon	10kΩ ±5% 1/4W
R24	PD14BY2E224J	Carbon	220kΩ ±5% 1/4W
R25	RN26B3U471J	Metal film	470Ω ±5% 7.5W
TUBE/SEMICONDUCTOR			
V1, 2		S2001	
D1		1N60	
D2		V06E	
D3		YZ-140	
D4		1N60	
POTENTIOMETER			
VR1	R01-301B-05	Potentiometer	10kΩ (A) MIC
VR2	R01-2007-05	Potentiometer	5kΩ (B) CAR
VR3	R12-7008-05	PC trimmer	500kΩ (B)
VR4	R12-3011-05	PC trimmer	10kΩ (A)
VR5	R01-4019-05	Potentiometer	50kΩ (B) BIAS
VR6	R01-0038-05	Potentiometer	300Ω (B) ANTIVOX
VR7	R01-4019-05	Potentiometer	50kΩ (B) VOX
VR8	R01-6007-05	Potentiometer	250kΩ (B) DELAY

Circuit No.	Parts No.	Description	Remarks
VARIABLE CAPACITOR			
—	C01-0084-05	Variable capacitor (LOAD)	
—	C01-0175-05	Variable capacitor (FINAL)	
—	C03-0002-05	Variable capacitor (Neutralization)	
MISCELLANEOUS			
—	A01-0192-02	Case	
—	A10-0022-32	Main chassis	
—	A11-0004-12	RF chassis	
—	A20-0641-03	Panel	
—	A22-0123-03	Sub panel	
—	A23-0392-03	Rear panel	
—	A40-0106-02	Bottom plate	
—	B07-0007-14	Indicator x2	
—	B07-0098-03	Dial escutcheon	
—	B08-2010-04	Indicator	
—	B19-0015-04	Filter (for meter)	
—	B19-0139-04	Acrylboard	
—	B20-0267-04	Dial board	
—	B30-0015-15	Pilot lamp x3	
—	B30-0057-05	Pilot lamp	
—	B31-0005-15	Meter	
—	B40-0425-04	Name plate	
—	B42-0009-04	Passed sticker	
—	B42-0287-04	Caution sticker (HIGH VOLTAGE)	
—	B42-0239-04	Name plate of adjustment (bottom)	
—	B42-0382-04	Name plate of volume	
—	B50-0965-00	Operating manual	
—	D13-0032-03	Sprocket x4	
—	D13-0036-04	Gear A	
—	D13-0037-04	Gear B	
—	D16-0024-04	Chain assembly A x2 (DRIVE)	
—	D16-0025-04	Chain assembly B (LOAD)	
—	D21-0026-04	Drive shaft	
—	D21-0031-04	Rotary shaft	
—	D21-0298-04	Final shaft	
—	D21-0299-04	Final pipe shaft	
—	D22-0002-04	Shaft coupling	
—	D23-0048-04	Bearing x4	
—	D23-0061-04	Bearing	
—	D32-0018-04	Shaft stopper x3	
—	D32-0064-04	Shaft stopper	
—	D32-0065-04	Stopper	
—	E01-0801-05	US socket x2	
—	E03-0301-05	Plug	
—	E04-0115-05	Receptacle, type-M	
—	E06-0403-05	4P mike jack	
—	E07-0403-05	4P mike plug	
—	E08-0204-05	2P jack	
—	E08-0207-05	AC socket	
—	E08-1601-15	16P connector (jack)	
—	E09-1601-05	16P connector (plug) x2	
—	E11-0005-05	Phone jack	
—	E13-0101-05	1P pin jack x4	
—	E14-0101-05	1P pin plug x4	
—	E22-0207-05	Lug board x8	
—	E22-0306-05	Lug board	
—	E22-0405-05	Lug board x9	
—	E22-0603-05	Lug board	
—	E90-0004-15	Plate cap x2	

Circuit No.	Parts No.	Description	Remarks
--	F05-4022-05	Fuse	
--	F05-6021-05	Fuse	
--	F07-0288-03	Final cover	
--	F10-0027-04	Shield plate (A) (DRIVE)	
--	F10-0028-04	Coil pack shield plate	
--	F10-0029-04	Relay shield plate	
--	F10-0052-04	Shield plate (B) (DRIVE)	
--	F10-0305-04	Rotary shield plate	
--	F11-0172-03	Final shield case	
--	F14-0002-04	Shading plate	
--	F31-0090-04	Reinforcement	
--	G03-0006-04	Spring	
--	H01-0930-04	Carton case (Inside)	
--	H03-0225-04	Carton case (Outside)	
--	H10-0849-02	Polystyrene formed fixture	
--	H10-0850-04	Polystyrene formed fixture	
--	H10-0851-04	Protection board	
--	H20-0359-04	Protection cover	
--	H25-0016-00	Polyethylene bag	
--	H25-0036-00	Polyethylene bag	
--	H25-0078-00	Instruction bag	
--	J02-0005-04	Sub leg x2	
--	J02-0010-04	Leg x4	
--	J11-0020-05	Cramper (16P connector)	
--	J13-0002-05	Fuse holder (Pilot lamp) x3	
--	J13-0007-05	Fuse holder	
--	J20-0008-14	VFO stopper	
--	J20-0244-04	Line filter	
--	J21-0047-04	PC board mounting hardware x2	
--	J21-0066-04	VOX mounting hardware	
--	J21-0072-04	Switch mounting hardware	
--	J21-1059-04	Variable capacitor mounting hardware (A)	
--	J21-1060-04	Variable capacitor mounting hardware (B)	
--	J21-1061-04	Variable resistor mounting hardware	
--	J21-1062-04	Meter mounting hardware	
--	J32-0021-04	Boss	
--	J32-0029-04	Screw, with hexagon hole x3	
--	J32-0122-04	Screw, with hexagon hole	
--	J41-0024-00	Cord bushing	
--	J59-0001-05	Grommet x2	
--	J59-0002-05	Plunger	
--	J61-0018-05	Beaded band x7	
--	K20-0125-14	Knob x6	
--	K20-0123-14	Knob	
--	K20-0121-04	Knob	
--	K20-0126-04	Knob	
--	K20-0120-04	Knob (MAIN)	
--	K23-0057-04	Rubber	
--	K29-0144-03	Thumb collar	
--	L01-0009-05	Power transformer	
--	L15-0002-15	Choke coil	
--	L31-0038-05	Output coil (B)	
--	L31-0142-03	Output coil (A)	
--	L33-0032-05	Choke coil	
--	L33-0048-05	Choke coil	
--	L33-0098-05	Ferri-inductor x4	
--	L33-0104-05	Ferri-inductor x4	
--	L33-0161-05	Line filter	
--	L33-0010-05	Parasitic suppressor coil	
--	L39-0030-04	Parasitic suppressor coil x2	

Circuit No.	Parts No.	Description	Remarks
-	S10-1002-05	Rotary switch (FINAL)	
-	S29-1006-05	Rotary switch (METER)	
-	S29-2001-05	Rotary switch (FUNCTION)	
-	S29-3002-05	Rotary switch (MODE)	
-	S43-1001-05	Toggle switch (power) x 2	
-	S31-2002-05	Slide switch (MIC)	
-	S31-2007-05	Slide switch (TRVTR)	
-	S31-4001-05	Slide switch (TRCV)	
-	S36-2003-25	See-saw switch	
-	S51-4017-25	Relay	
-	X40-0016-08	VFO UNIT	
-	X40-0017-00	DRIVE COIL PACK UNIT	
-	X40-0018-00	MIX COIL PACK UNIT	
-	X40-0019-00	OSC COIL PACK UNIT	
-	X40-1040-00	AVR-SIDETONE ASSY	
-	X43-0011-00	RECTIFIER UNIT	
-	X47-0004-00	DRIVER UNIT	
-	X50-0002-00	CARRIER UNIT	
-	X51-1070-10	VFO FILTER UNIT	
-	X52-0009-00	GENERATOR UNIT	
-	X53-1030-10	CONTROL UNIT	
-	X54-0001-00	VOX UNIT	
-	X54-1090-10	FAN UNIT	

■ PARTS LISTS OF X40-0017-00 (DRIVE COIL PACK UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CM93D2H100J	Mica 10pF	±5%
C2	CM93D2H330J	Mica 33pF	±5%
C3	CM93D2H151J	Mica 150pF	±5%
C4	CM93D2H330J	Mica 33pF	±5%
C5, 6	CK45E2H103P	Ceramic 0.01μF	+100%, -0%
RESISTOR			
R1, 2	PD148Y2E151J	Carbon 150Ω	±5% 1/4W
MISCELLANEOUS			
L1	L31-0031-04	Tuning coil 3.5 MHz	
L2	L31-0032-04	Tuning coil 7MHz	
L3	L31-0033-04	Tuning coil 14 MHz	
L4	L31-0034-04	Tuning coil 21 MHz	
L5	L31-0209-04	Tuning coil 28 MHz	
L6	L33-0097-05	Ferri-inductor	
-	J25-0049-04	PC board	
S1-1, 1-2	S29-1052-05	Rotary wafer	

■ PARTS LISTS OF X40-0018-00 (MIX COIL PACK UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CM93D2H220J	Mica 22pF	±5%
C2	CM93D2H330J	Mica 33pF	±5%
C3	CM93D2H151J	Mica 150pF	±5%
C4	CM93D2H330J	Mica 33pF	±5%
C5, 6	CK45E2H103P	Ceramic 0.01μF	+100%, -0%

Circuit No.	Parts No.	Description	Remarks
MISCELLANEOUS			
L1	L31-0036-04	Tuning coil 3.5 MHz	
L2	L31-0032-04	Tuning coil 7 MHz	
L3	L31-0033-04	Tuning coil 14MHz	
L4	L31-0034-04	Tuning coil 21 MHz	
L5	L31-0209-04	Tuning coil 28 MHz	
L6	L33-0095-05	Ferri-inductor	
S2~1,2~2	S29-1052-05	Rotary wafer	
-	J25-0050-04	PC board	

■ PARTS LISTS OF X40-0019-00 (OSC COIL PACK UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CM93D2H121J	Mica 120pF	±5%
C2	CM93D2H680J	Mica 68pF	±5%
C3	CM93D2H560J	Mica 56pF	±5%
C4	CM93D2H100J	Mica 10pF	±5%
C5 ~ 7	CK94YG1E403Z	Ceramic 0.04μF	+80%, -20%
RESISTOR			
R1	PD14BY2E102J	Carbon 1kΩ	±5% 1/4W
MISCELLANEOUS			
L1, 2	L31-0032-04	Oscillator coil (3.5, 7 MHz)	
L3	L31-0033-04	Oscillator coil 14 MHz	
L4	L32-0011-04	Oscillator coil 21 MHz	
L5a, b	L32-0138-15	Oscillator coil 28 MHz (A)	
L6	L32-0012-04	Oscillator coil 28 MHz (B)	
X1	L77-0141-05	Crystal oscillator 12.395 MHz	
X2	L77-0142-05	Crystal oscillator 15.895 MHz	
X3	L77-0143-05	Crystal oscillator 22.895 MHz	
X4	L77-0144-05	Crystal oscillator 29.895 MHz	
X5	L77-0145-05	Crystal oscillator 36.895 MHz	
X6	L77-0146-15	Crystal oscillator 37.395 MHz	
X7	L77-0147-05	Crystal oscillator 37.995 MHz	
S3 ~ 1,3 ~ 2	S29-1005-05	Rotary wafer	
-	J25-0051-04	PC board	

■ PARTS LISTS OF X43-0011-00 (RECTIFIER UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1 ~ 7	CK94YZ2H103P	Ceramic 0.01μF	+100%, -0%
RESISTOR			
R1 ~ 4	RC05GF2H474K	Carbon 470kΩ	±10% 1/2W
R5, 6	RN14AB3D471J	Metal film 470Ω	±5% 2W
R7	RC05GF2H102K	Carbon 1kΩ	±10% 1/2W

Circuit No.	Parts No.	Description	Remarks
SEMICONDUCTOR			
D1 ~ 6 D7 D8		V08J V06E S1B02-01B	
MISCELLANEOUS			
—	J25-0055-04	PC board	

■ PARTS LISTS OF X47-0004-00 (DRIVER UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1,2	CK94YG1E403Z	Ceramic	0.04 μ F +80%, -20%
C3	CM93D2H330J	Mica	33pF \pm 5%
C4	CM93D2H070J	Mica	7pF \pm 5%
C5, 6	CK94YG1E403Z	Ceramic	0.04 μ F +80%, -20%
C7	CK94YG1E103Z	Ceramic	0.01 μ F +80%, -20%
C8	CK94YG1E403Z	Ceramic	0.04 μ F +80%, -20%
C9	CM93D2H050J	Mica	5pF \pm 5%
C10, 11	CK45E2H103P	Ceramic	0.01 μ F +100%, -0%
C12	CM93D2H471J	Mica	470pF \pm 5%
C13	CK94YY2H472M	Ceramic	0.0047 μ F \pm 20%
C14	CK94YG1E403Z	Ceramic	0.04 μ F +80%, -20%
C15 ~ 17	CK45E2H103P	Ceramic	0.01 μ F +100%, -0%
C18	CE02W2W010	Electrolytic	1 μ F 450WV
C19	CK45E2H103P	Ceramic	0.01 μ F +100%, -0%
C20, 21	CK94YY2H102M	Ceramic	0.001 μ F \pm 20%
C22,23	CM93D2H561J	Mica	560pF \pm 5%
C24, 25	CK94YG1E403Z	Ceramic	0.04 μ F +80%, -20%
RESISTOR			
R1	PD14CY2E472J	Carbon	4.7k Ω \pm 5% 1/4W
R2	PD14CY2E223J	Carbon	22k Ω \pm 5% 1/4W
R3	PD14CY2E102J	Carbon	1k Ω \pm 5% 1/4W
R4	PD14CY2E331J	Carbon	330 Ω \pm 5% 1/4W
R5	PD14CY2E682J	Carbon	6.8k Ω \pm 5% 1/4W
R6	PD14CY2E333J	Carbon	33k Ω \pm 5% 1/4W
R7	PD14CY2E104J	Carbon	100k Ω \pm 5% 1/4W
R8	PD14CY2E471J	Carbon	470 Ω \pm 5% 1/4W
R9	PD14CY2E104J	Carbon	100k Ω \pm 5% 1/4W
R10	PD14BY2E104J	Carbon	100k Ω \pm 5% 1/4W
R11	PD148Y2E151J	Carbon	150 Ω \pm 5% 1/4W
R12	RN14A83F393J	Metal film	39k Ω \pm 5% 3W
R13	RN14AB3F153J	Metal film	15k Ω \pm 5% 3W
R14	PD14CY2E820J	Carbon	82 Ω \pm 5% 1/4W
R15	PD14BY2E102J	Carbon	1k Ω \pm 5% 1/4W
SEMICONDUCTOR/TUBE			
Q1 Q2 Q3		3SK22(GR), 2SC535 (A) 2SC460 (B)	
D1 V1		1S1555 12BY7A	
MISCELLANEOUS			
VC1, 2	C01-0127-05	Variable capacitor	
—	D15-0013-14	Pulley x2	
—	E06-0406-05	Transistor socket	

Circuit No.	Parts No.	Description	Remarks
—	E10-1902-05	9P MT mould socket	
—	F10-0022-14	Shield plate	
—	F11-0020-05	9P MT shield case	

■ PARTS LISTS OF X50-0002-00 (CARRIER UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CK94YG1E102Z	Ceramic	0.001 μ F +80%, -20%
C2	CM93D2H220J	Mica	22pF \pm 5%
C3	CK94YG1E102Z	Ceramic	0.001 μ F +80%, -20%
C4	CM93D2H220J	Mica	22pF \pm 5%
C5	CK94YG1E102Z	Ceramic	0.001 μ F +80%, -20%
C6	CM93D2H220J	Mica	22pF \pm 5%
C7	CK94YG1E102Z	Ceramic	0.001 μ F +80%, -20%
C8	CK94YX1H471K	Ceramic	470pF \pm 10%
C9	CC94TH1H221J	Ceramic	220pF \pm 5%
C10	CC94SL1H101K	Ceramic	100pF \pm 10%
C11	CM93D2H100J	Mica	10pF \pm 5%
C12	CK94YG1E403Z	Ceramic	0.04 μ F +80%, -20%
C13	CM93D2H220J	Mica	22pF \pm 5%
C14	CK94YG1E103Z	Ceramic	0.01 μ F +80%, -20%
RESISTOR			
R1 ~ 4	PD14BY2E103J	Carbon	10k Ω \pm 5% 1/4W
R5	PD14BY2E333J	Carbon	33k Ω \pm 5% 1/4W
R6	PD14BY2E682J	Carbon	6.8k Ω \pm 5% 1/4W
R7	PD14BY2E102J	Carbon	1k Ω \pm 5% 1/4W
R8	PD14BY2E683J	Carbon	68k Ω \pm 5% 1/4W
R9	PD14BY2E101J	Carbon	100 Ω \pm 5% 1/4W
SEMICONDUCTOR			
Q1, 2		2SC460	
D1 ~ 4		1S1555	
MISCELLANEOUS			
TC1 ~ 3	C05-0013-15	PC trimmer	
—	F10-0012-04	Shield plate	
—	F11-0015-04	Shield box	
T1	L32-0003-05	Oscillator coil	
L1 ~ 6	L33-0104-05	Ferri-inductor	
X1	L77-0123-05	Crystal oscillator (3395.0 kHz)	
X2	L77-0122-05	Crystal oscillator (3396.5 kHz)	
X3	L77-0120-05	Crystal oscillator (3393.5 kHz)	
—	J25-0029-04	PC board	

■ PARTS LIST OF X51-1070-10 (VFO FILTER UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CC45SL1H151J	Ceramic	150pF \pm 5%
C2	CC45SL1H330J	Ceramic	33pF \pm 5%
C3, 4	CC45SL1H331J	Ceramic	330pF \pm 5%

Circuit No.	Parts No.	Description	Remarks
C5,6	CC45SL1H101J	Ceramic 100pF ±5%	
COIL			
T1	L31-0251-05	Filter coil	
T2	L31-0252-05	Filter coil	
T3	L31-0284-05	Filter coil	
-	J25-0841-04	PC board	

■ PARTS LISTS OF X52-0009-00 (GENERATOR UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1, 2	CC94SL1H101K	Ceramic 100pF ±10%	
C3	CE04W1H010	PC electrolytic 1μF 50WV	
C4	CE04W1C4R7	PC electrolytic 4.7μF 16WV	
C5	CK94YG1E103Z	Ceramic 0.01μF +80%, -20%	
C6	CE04W1H010	PC electrolytic 1μF 50WV	
C7	CK94YG1E103Z	Ceramic 0.01μF +80%, -20%	
C8	CE04W1H010	PC electrolytic 1μF 50WV	
C9	CE04W0F470	PC electrolytic 47μF 3.15WV	
C10	CE04W1C100	PC electrolytic 10μF 16WV	
C11	CE04W1C101	PC electrolytic 100μF 16WV	
C12 ~ 15	CK94YG1E103Z	Ceramic 0.01μF +80%, -20%	
C16	CM93D2H470JZ	Mica 47pF ±5%	
C17, 19	CM93D2H330JZ	Mica 33pF ±5%	
C20	CK94YG1E403Z	Ceramic 0.04μF +80%, -20%	
C21	CM93D2H221JZ	Mica 220pF ±5%	
C22 ~ 24	CK94YG1E102Z	Ceramic 0.001μF +80%, -20%	
C25	CK94YG1E403Z	Ceramic 0.04μF +80%, -20%	
C26, 27	CK94YG1E102Z	Ceramic 0.001μF +80%, -20%	
C26, 29	CM93D2H101JZ	Mica 100pF ±5%	
C30	CM93D2H820JZ	Mica 82pF ±5%	
C31	CK94YG1E103Z	Ceramic 0.01μF +80%, -20%	
RESISTOR			
R1	PD14BY2E102J	Carbon 1kΩ ±5% 1/4W	
R2	PD14BY2E104J	Carbon 100kΩ ±5% 1/4W	
R3	PD14BY2E223J	Carbon 22kΩ ±5% 1/4W	
R4	PD14BY2E562J	Carbon 5.6kΩ ±5% 1/4W	
R5	PD14BY2E102J	Carbon 1kΩ ±5% 1/4W	
R6	PD14BY2E101J	Carbon 100Ω ±5% 1/4W	
R7	PD14BY2E223J	Carbon 22kΩ ±5% 1/4W	
R8	PD14BY2E102J	Carbon 1kΩ ±5% 1/4W	
R9	PD14BY2E223J	Carbon 22kΩ ±5% 1/4W	
R10	PD14BY2E154J	Carbon 150kΩ ±5% 1/4W	
R11	PD14BY2E102J	Carbon 1kΩ ±5% 1/4W	
R12	PD14BY2E221J	Carbon 220Ω ±5% 1/4W	
R13	PD14BY2E471J	Carbon 470Ω ±5% 1/4W	
R14	PD14BY2E153J	Carbon 15kΩ ±5% 1/4W	
R15	PD14BY2E103J	Carbon 10kΩ ±5% 1/4W	
R16, 17	PD14BY2E221J	Carbon 220Ω ±5% 1/4W	
R18, 19	PD14BY2E472J	Carbon 4.7kΩ ±5% 1/4W	
R20	PD14BY2E474J	Carbon 470kΩ ±5% 1/4W	
R21	PD14BY2E272J	Carbon 2.7kΩ ±5% 1/4W	
R22	PD14BY2E153J	Carbon 15kΩ ±5% 1/4W	
R23	PD14BY2E223J	Carbon 22kΩ ±5% 1/4W	
R24	PD14BY2E473J	Carbon 47kΩ ±5% 1/4W	
R25	PD14BY2E562J	Carbon 5.6kΩ ±5% 1/4W	
R26	PD14BY2E104J	Carbon 100kΩ ±5% 1/4W	
R27	PD14BY2E334J	Carbon 330kΩ ±5% 1/4W	

Circuit No.	Parts No.	Description	Remarks
R28	PD14BY2E102J	Carbon 1k Ω \pm 5% 1/4W	
R29	PD14BY2E331J	Carbon 330 Ω \pm 5% 1/4W	
R30	PD14BY2E102J	Carbon 1k Ω \pm 5% 1/4W	
R31	PD14BY2E104J	Carbon 100k Ω \pm 5% 1/4W	
R32, 33	PD14BY2E153J	Carbon 15k Ω \pm 5% 1/4W	
SEMICONDUCTOR			
Q1		2SC871 (E)	
Q2, 3		2SC733 (Y) (GR)	
Q4		TA7045M	
Q5		3SK22 (GR)	
Q6		2SA495 (Y)	
Q7		2SC460 (B)	
D1 ~4		1N60	
COIL			
T1	L30-0021-05	IFT	
T2	L30-0012-05	IFT	
T3	L30-0241-05	IFT (B.P.F)	
T4	L30-0242-05	IFT	
T5	L30-0241-05	IFT	
L1 ~3	L33-0104-05	Ferri-inductor	
X-F	L71-0018-05	Crystal filter	
MISCELLANEOUS			
TC1	C05-0015-15	Ceramic trimmer	
VR1	R12-0054-05	PC trimmer	

■ PARTS LISTS OF X53-1030-10 (CONTROL UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	C90-0154-05	Polyester film 0.22 μ F 250WV	
C2	CE04W1HR47	Electrolytic 0.47 μ F 50WV	
C3	CK45F1E403Z	Ceramic 0.04 μ F +80%, -20%	
C4	CK45F1E472Z	Ceramic 0.0047 μ F +80%, -20%	
C5, 6	CQ93M1H104K	Polyester film 0.1 μ F \pm 10%	
C7	CK45E2H103P	Ceramic 0.01 μ F +100%, -0%	
RESISTOR			
R1	PD14CY2E473J	Carbon 47k Ω \pm 5% 1/4W	
R2	PD14CY2E104J	Carbon 100k Ω \pm 5% 1/4W	
R3	PD14CY2E102J	Carbon 1k Ω \pm 5% 1/4W	
R4	PD14CY2E103J	Carbon 10k Ω \pm 5% 1/4W	
R5	PD14CY2E153J	Carbon 15k Ω \pm 5% 1/4W	
R6	PD14CY2E103J	Carbon 10k Ω \pm 5% 1/4W	
R7	PD14CY2E102J	Carbon 1k Ω \pm 5% 1/4W	
R8	PD14CY2E473J	Carbon 47k Ω \pm 5% 1/4W	
R9	PD14CY2E393J	Carbon 39k Ω \pm 5% 1/4W	
R10	PD14CY2E682J	Carbon 6.8k Ω \pm 5% 1/4W	
R11	PD14CY2E473J	Carbon 47k Ω \pm 5% 1/4W	
R12	PD14CY2E682J	Carbon 6.8k Ω \pm 5% 1/4W	
R13	PD14CY2E104J	Carbon 100k Ω \pm 5% 1/4W	
R14	RC05GF2H680J	Carbon 68 Ω \pm 5% 1/2W	
R15	PD14CY2E103J	Carbon 10k Ω \pm 5% 1/4W	
SEMICONDUCTOR			
Q1		2SC857	
Q2		2SC856	
Q3		2SC735 (Y)	
D1, 2		S-1.5-01	
D3		MZ1004	

POTENTIOMETER			
VR1	R12-4015-05	PC trimmer potentiometer	
MISCELLANEOUS			
-	J25-0840-04	PC board	

■ PARTS LISTS OF X54-0001-00 (VOX UNIT)

Circuit No.	Parts No.	Description			Remarks
CAPACITOR					
C1	CK94YG1E103Z	Ceramic	0.01 μ F	+80%, -20%	
C2	CE04W0F470	Electrolytic	47 μ F		3.15WV
C3	CK94YG1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C4	CK94YG1E203Z	Ceramic	0.02 μ F	+80%, -20%	
C5	CE04W1H3R3	Electrolytic	3.3 μ F		50WV
C6	CE04W1H010	Electrolytic	1 μ F		50WV
C7	CK94YY1H472M	Ceramic	0.0047 μ F	\pm 20%	
C8	CK94YG1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C9, 10	CE04W1H3R3	Electrolytic	3.3 μ F		50WV
RESISTOR					
R1	PD14CY2E104J	Carbon	100k Ω	\pm 5%	1/4W
R2	PD14CY2E223J	Carbon	22k Ω	\pm 5%	1/4W
R3	PD14CY2E334J	Carbon	330k Ω	\pm 5%	1/4W
R4	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R5	PD14CY2E334J	Carbon	330k Ω	\pm 5%	1/4W
R6	PD14CY2E563J	Carbon	56k Ω	\pm 5%	1/4W
R7	PD14CY2E562J	Carbon	5.6k Ω	\pm 5%	1/4W
R8	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R9	PD14CY2E222J	Carbon	2.2k Ω	\pm 5%	1/4W
R10	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R11	PD14CY2E103J	Carbon	10k Ω	\pm 5%	1/4W
R12	PD14CY2E153J	Carbon	15k Ω	\pm 5%	1/4W
R13, 14	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R15	PD14CY2E471J	Carbon	470 Ω	\pm 5%	1/4W
R16	PD14CY2E100J	Carbon	10 Ω	\pm 5%	1/4W
R17	PD14CY2E473J	Carbon	47k Ω	\pm 5%	1/4W
SEMICONDUCTOR					
Q1 ~ 4		2SC373			
Q5		2SA562Y			
Q6, 7		2SC373			
Q8		2SA562Y			
D1 ~ 4		1N60			
D5		S-1.5-01			
D6 ~ 8		1N60			
MISCELLANEOUS					
T1	L13-0001-05	Input transformer (500 Ω : 20k Ω)			
-	J25-0037-04	PC board			

■ PARTS LISTS OF X54-0002-00 (SIDETONE UNIT)

Circuit No.	Parts No.	Description	Remarks
CAPACITOR			
C1	CK94YG1E203Z	Ceramic	0.02 μ F +80%, -20%
C2	CE04W1C100	Electrolytic	10 μ F 16WV
C3, 4	CQ93M1H123K	Mylar	0.012 μ F \pm 10%
C5	CK94YG1E203Z	Ceramic	0.02 μ F +80%, -20%
C6, 7	CQ93M1H123K	Mylar	0.012 μ F \pm 10%
C8,9	CE04W1HR47	Electrolytic	0.47 μ F 50WV
C10	CK94YG1E103Z	Ceramic	0.01 μ F +80%, -20%
C11	CE04W1C100	Electrolytic	10 μ F 16WV
C12	CE04W1C101	Electrolytic	100 μ F 16WV
C13	CK94YG1E103Z	Ceramic	0.01 μ F +80%, -20%
RESISTOR			
R1	PD14BY2E153J	Carbon	15k Ω \pm 5% 1/4W
R2	PD14BY2E224J	Carbon	220k Ω \pm 5% 1/4W
R3	PD14BY2E223J	Carbon	22k Ω \pm 5% 1/4W
R4	PD14BY2E103J	Carbon	10k Ω \pm 5% 1/4W
R5	PD14BY2E102J	Carbon	1k Ω \pm 5% 1/4W
R6	PD14BY2E103J	Carbon	10k Ω \pm 5% 1/4W
R7 ~ 9	PD14BY2E224J	Carbon	220k Ω \pm 5% 1/4W
R10 ~ 12	PD14BY2E103J	Carbon	10k Ω \pm 5% 1/4W
R13	PD14BY2E392J	Carbon	3.9k Ω \pm 5% 1/4W
R14	PD14BY2E102J	Carbon	1k Ω \pm 5% 1/4W
R15	PD14BY2E151J	Carbon	150 Ω \pm 5% 1/4W
R16	PD14BY2E101J	Carbon	100 Ω \pm 5% 1/4W
R17	PD14BY2E153J	Carbon	15k Ω \pm 5% 1/4W
R18, 19	RC05GF2H2R2K	Carbon	2.2 Ω \pm 10% 1/2W
SEMICONDUCTOR			
Q1		2SC733 (Y), (GR)	
Q2		2SC734 (Y)	
Q3		2SC735 (Y)	
Q4		2SA562 (Y)	
D1		1S1555	
MISCELLANEOUS			
VR1	R12-3003-05	PC trimmer potentiometer	
-	J25-0054-04	PC board	

■ PARTS LIST OF X54-1090-10 (FAN UNIT)

Circuit No.	Parts No.	Description	Remarks
-	E09-0204-05	2P Plug	
-	F07-0292-04	Fan cover	
-	F09-0022-05	Fan	
-	J21-1070-04	Fan mounting hardware	
-	J32-0117-04	Screw, with hexagon hole x2	
-	J41-0006-00	Cord bushing	
-	T40-0012-05	Fan motor	

■ PARTS LIST OF X43-0010-00 (AVR UNIT)

Circuit No.	Parts No.	Description				Remarks
CAPACITOR						
C1	CE04W1C101	Electrolytic	100 μ F	16WV		
RESISTOR						
R1	PD14BY2E103J	Carbon	10k Ω	\pm 5%	1/4W	
R2	PD14BY2E683J	Carbon	68k Ω	\pm 5%	1/4W	
R3	PD14BY2E331J	Carbon	330 Ω	\pm 5%	1/4W	
R4	PD14BY2E471J	Carbon	470 Ω	\pm 5%	1/4W	
R5	PD14BY2E102J	Carbon	1k Ω	\pm 5%	1/4W	
R6	PD14BY2E182J	Carbon	1.8k Ω	\pm 5%	1/4W	
R7	PD14BY2E272J	Carbon	2.7k Ω	\pm 5%	1/4W	
R8	PD14BY2E222J	Carbon	2.2k Ω	\pm 5%	1/4W	
R9	PD14BY2E471J	Carbon	470 Ω	\pm 5%	1/4W	
R10	PD14BY2E392J	Carbon	3.9k Ω	\pm 5%	1/4W	
R11	PD14BY2E102J	Carbon	1k Ω	\pm 5%	1/4W	
SEMICONDUCTOR						
Q1		2SA606 (L)				
Q2 ~4		2SC372				
D1		WZ-061				
MISCELLANEOUS						
VR1	R12-0031-05	PC trimmer	500 Ω (B)			
VR2	R12-3003-05	PC trimmer	10k Ω (B)			
—	J25-0028-04	PC board				

■ PARTS LISTS OF X40-0016-08 (VFO UNIT)

Circuit No.	Parts No.	Description				Remarks
CAPACITOR						
C1	CC94PG1H470J	Ceramic	47pF	\pm 5%		(Adjustment) (Adjustment)
C2, 3	CC94LG1H150J	Ceramic	15pF	\pm 5%		
C3	CC94PG1H150J	Ceramic	15pF	\pm 5%		
C3	CC94CG1H150J	Ceramic	15pF	\pm 5%		
C4	CC94SG1H070J	Ceramic	7pF	\pm 5%		
C5	CC94LG1H470J	Ceramic	47pF	\pm 5%		
C6	CC94LG1H220J	Ceramic	22pF	\pm 5%		
C7, 8	CM93F2A151J(DM)	Mica	150pF	\pm 5%		
C9	CM93D1H030D(Z)	Mica	3pF	\pm 0.5pF		
C10	CK94YG1E203Z	Ceramic	0.02 μ F	+80%, -20%		
C11, 12	CK94YG1E403Z	Ceramic	0.04 μ F	+80%, -20%		
C13	CK94YG1E203Z	Ceramic	0.02 μ F	+80%, -20%		
C14	CC45SL1H330J	Ceramic	33pF	\pm 5%		
C15	CC94SL1H050D	Ceramic	5pF	\pm 0.5pF		
C16	CC94SL1H100D	Ceramic	10pF	\pm 0.5pF		
C17	CC94SL1H050D	Ceramic	5pF	\pm 0.5pF		
C18	CK94YG1E103Z	Ceramic	0.01 μ F	+80%, -20%		
C19	CK94YG1E403Z	Ceramic	0.04 μ F	+80%, -20%		
C20	CC94CG1H100J	Ceramic	10pF	\pm 5%		
RESISTOR						
R1	PD14BY2E274J	Carbon	270k Ω	\pm 5%	1/4W	
R2	PD14BY2E101J	Carbon	100 Ω	\pm 5%	1/4W	
R3, 4	PD14BY2E105J	Carbon	1M Ω	\pm 5%	1/4W	
R5	PD14BY2E331J	Carbon	330 Ω	\pm 5%	1/4W	
R6	PD14BY2E333J	Carbon	33k Ω	\pm 5%	1/4W	
R7	PD14BY2E473J	Carbon	47k Ω	\pm 5%	1/4W	
R8	PD14BY2E102J	Carbon	1k Ω	\pm 5%	1/4W	
R9	PD14BY2E101J	Carbon	100 Ω	\pm 5%	1/4W	

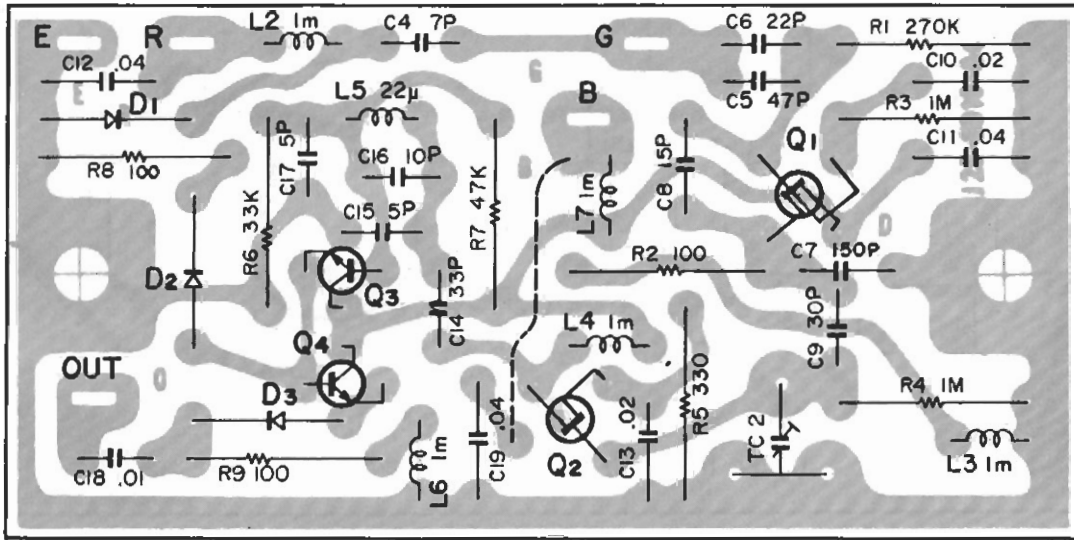
SEMICONDUCTOR			
Q1 Q2 Q3, 4		3SK22 (Y) 2SK19 (Y) 2SC460 (B)	
D1 D2, 3		SD111 1N60	
MISCELLANEOUS			
—	B42-0010-04	Name plate	
—	C01-0001-25	Variable capacitor	
—	C03-0001-05	Variable capacitor	
—	C03-0001-05	Variable capacitor	
TC2	C05-0013-15	PC trimmer	
—	D40-0161-05	VFO gear mechanism	
—	D22-0011-05	Shaft coupling	
—	E22-0207-05	Lug board	
—	E23-0014-04	Terminal	
—	F11-0004-23	VFO Box (A)	
—	F11-0005-04	VFO Box (B)	
—	F11-0007-14	VFO Box (D)	
—	F11-0008-04	VFO Box (E)	
—	F11-0010-04	VFO Box (G)	
—	F11-0011-04	VFO Box (H)	
—	F11-0012-04	VFO Box (I)	
—	F11-0121-14	VFO Box (C)	
—	F11-0175-05	VFO Box (F)	
—	J25-0019-04	PC Board	
L1	L32-0098-05	Oscillator coil	
L2~4	L33-0104-05	Ferri-inductor	
L5	L33-Q091-05	Ferri-inductor	
L6, 7	L33-0104-05	Ferri-inductor	

■ PARTS LIST OF X40-1040-00 (AVR – SIDETONE UNIT)

Circuit No.	Parts No.	Description	Remarks
	J21-0067-04	PC board mounting hardware (A)	
	J21-0068-04	PC board mounting hardware (B)	
	X43-0010-00	AVR UNIT	
	X54-0002-00	SIDETONE UNIT	

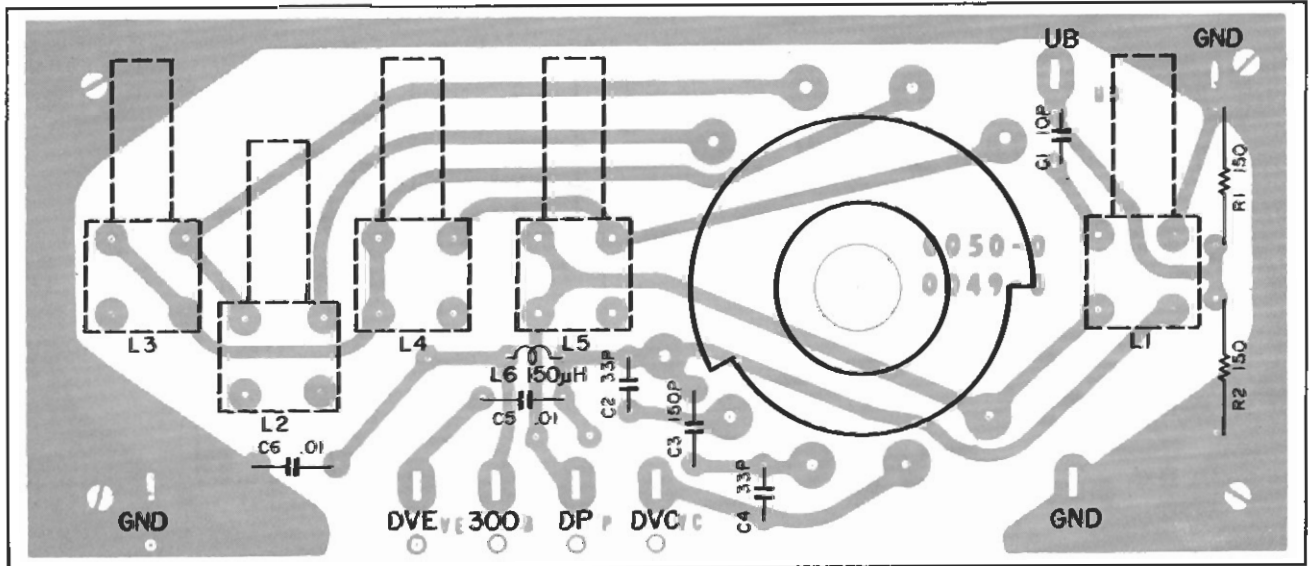
PC BOARD

■ PC BOARD OF X40-0016-08 (VFO UNIT)

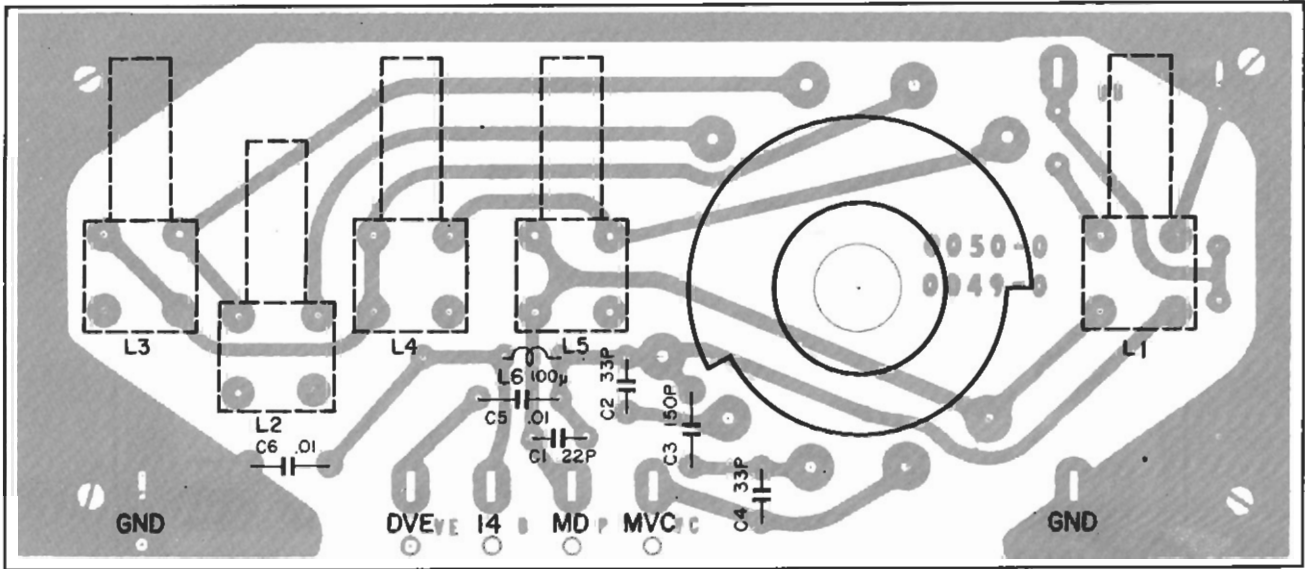


Q1: 3SK22(Y), Q2: 2SK19(Y), Q3, 4: 2SC460(B), D1: SK111, D2, 3: 1N60

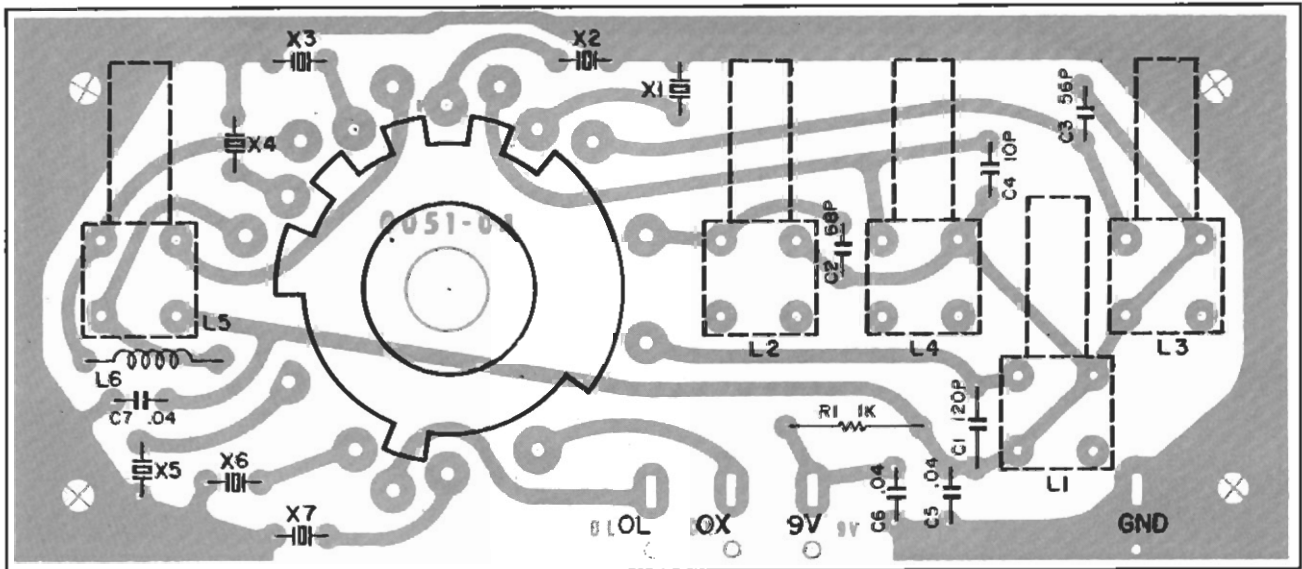
■ PC BOARD OF X40-0017-00 (DRIVE COIL PACK UNIT)



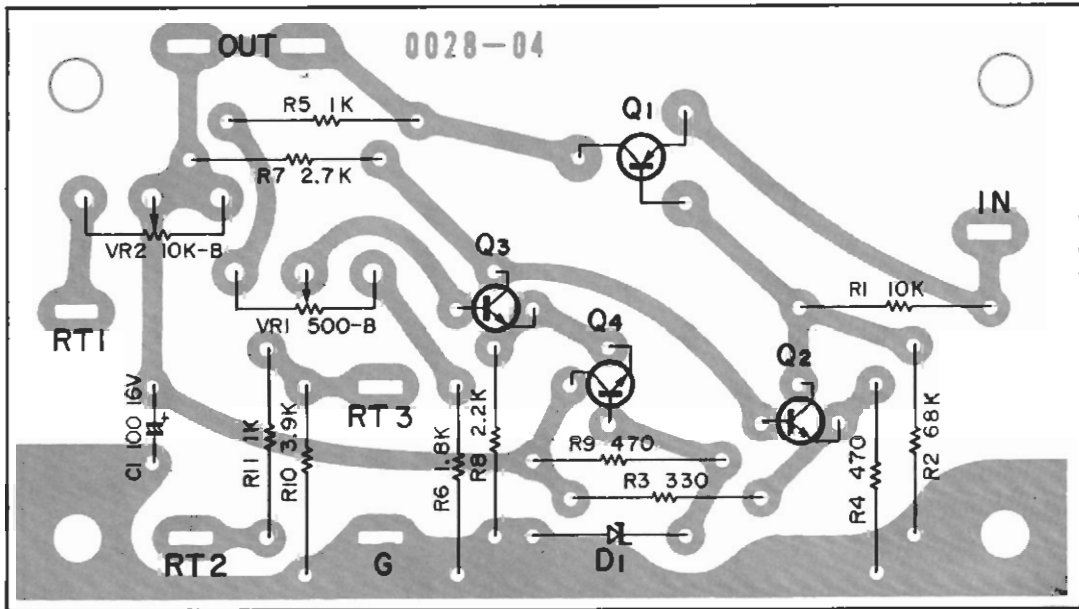
■ PC BOARD OF X40-0018-00 (MIX COIL PACK UNIT)



■ PC BOARD OF X40-0019-00 (OSC COIL PACK UNIT)

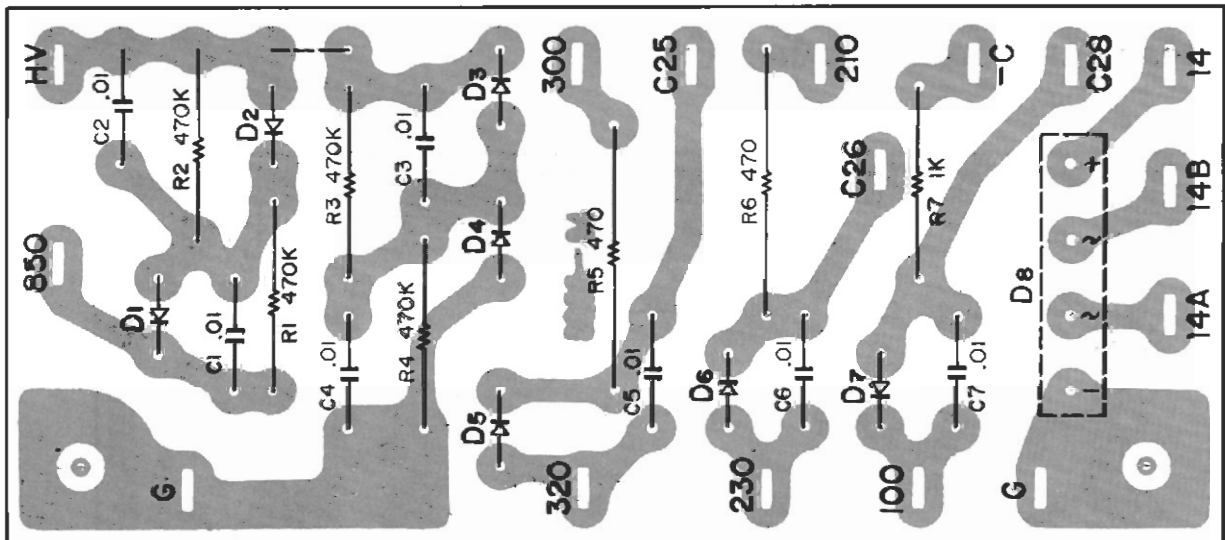


■ PC BOARD OF X43-0010-00 (AVR UNIT)



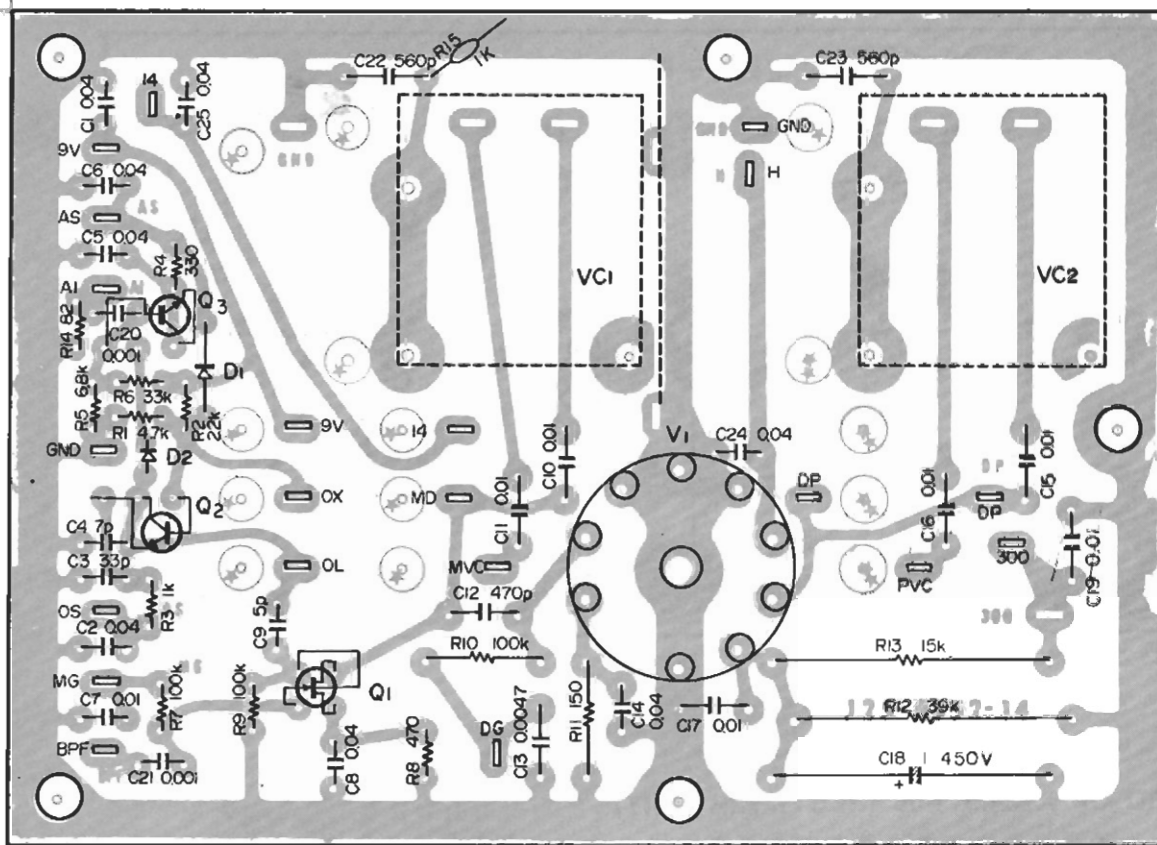
Q1: 2SA606(L), Q2 ~ 4: 2SC372, D1: RD6AM

■ PC BOARD OF X43-0011-00 (RECTIFIER UNIT)



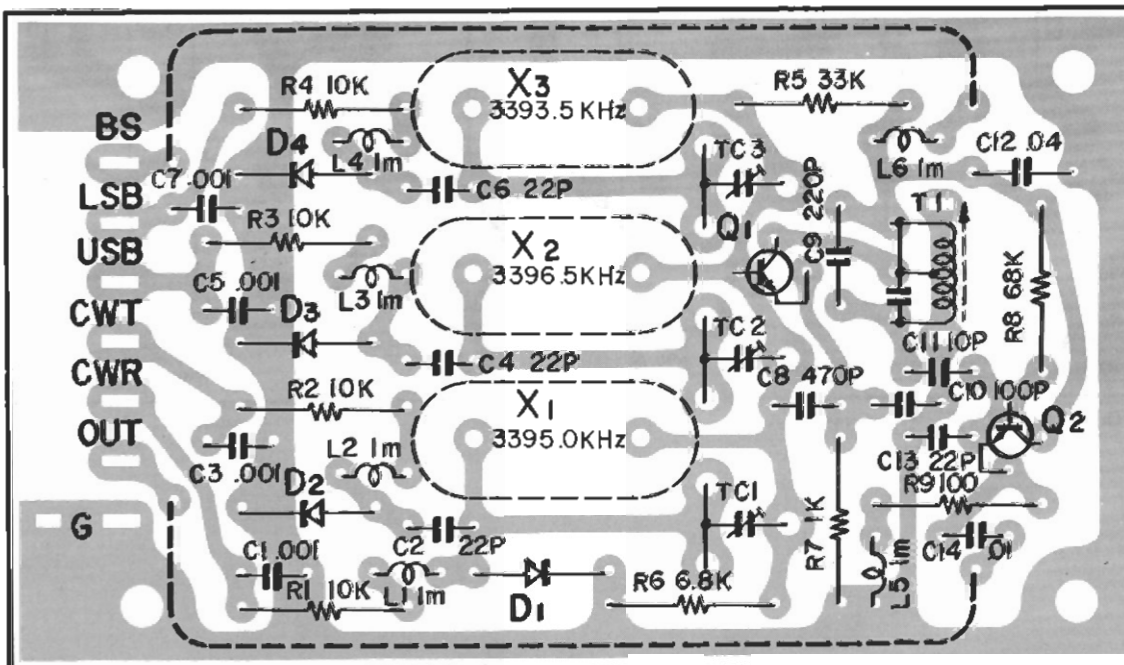
D1 ~ 6: V08J D7: V06E D8: S1B02-01B

■ PC BOARD OF X47-0004-00 (DRIVER UNIT)



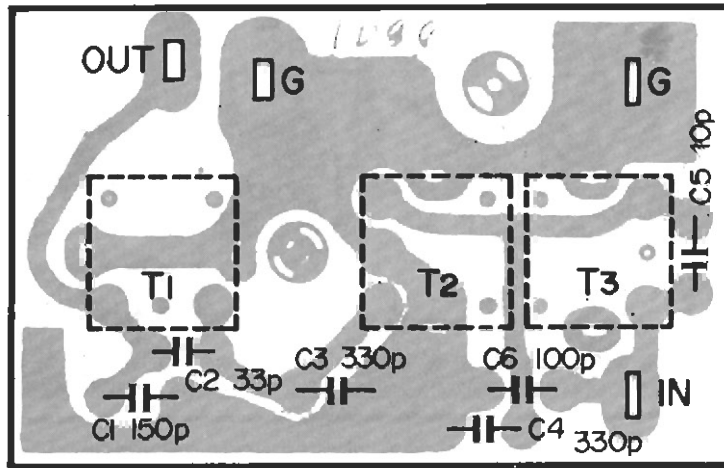
D1, 2: 1S1555 Q1: 3SK22(GR) Q2: 2SC535 (A) Q3: 2SC460 (B) V1: 12BY7A

■ PC BOARD OF X50-0002-00 (CARRIER UNIT)

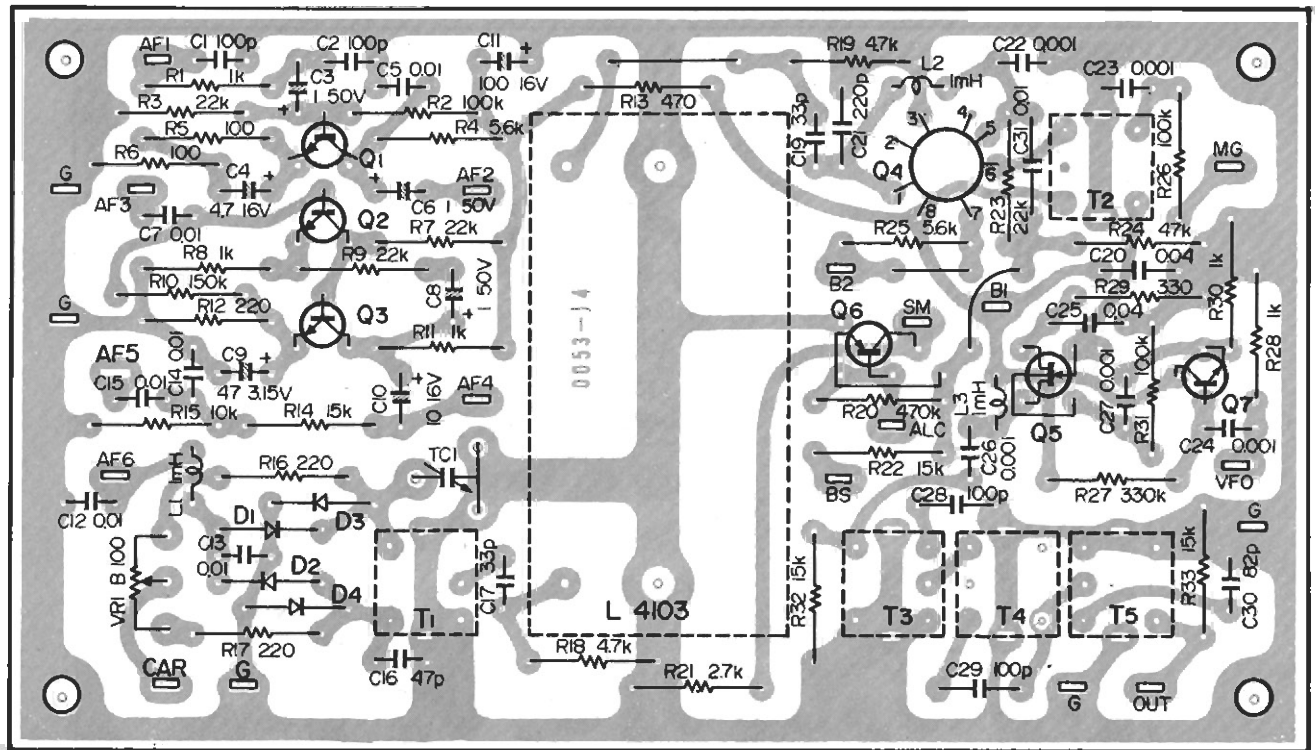


D1 ~ 4 1S1555, Q1, 2 2SC460(B)

■ PC BOARD OF X51-1070-10 (VFO FILTER UNIT)

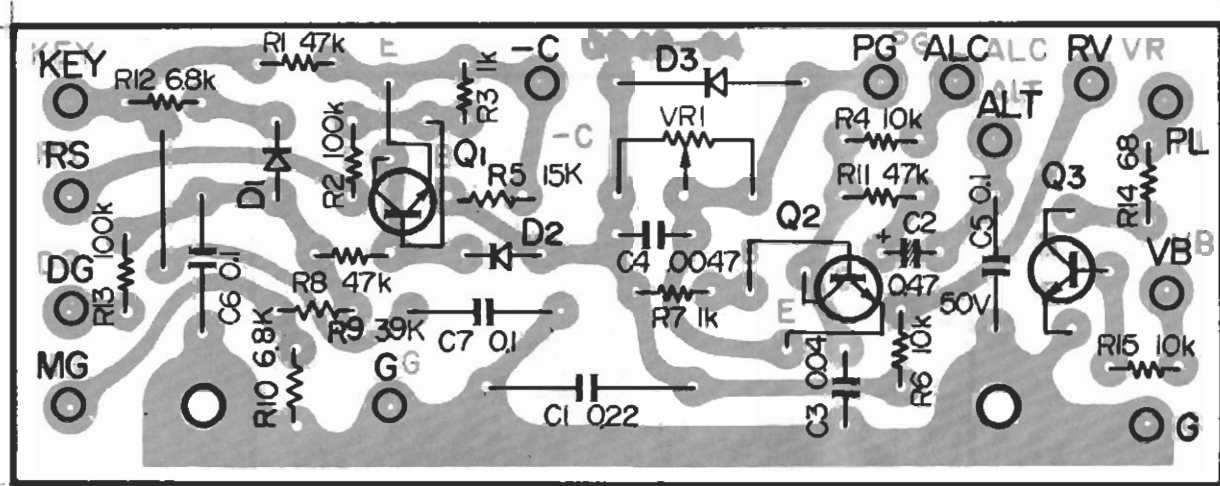


■ PC BOARD OF X52-0009-00 (GENERATOR UNIT)



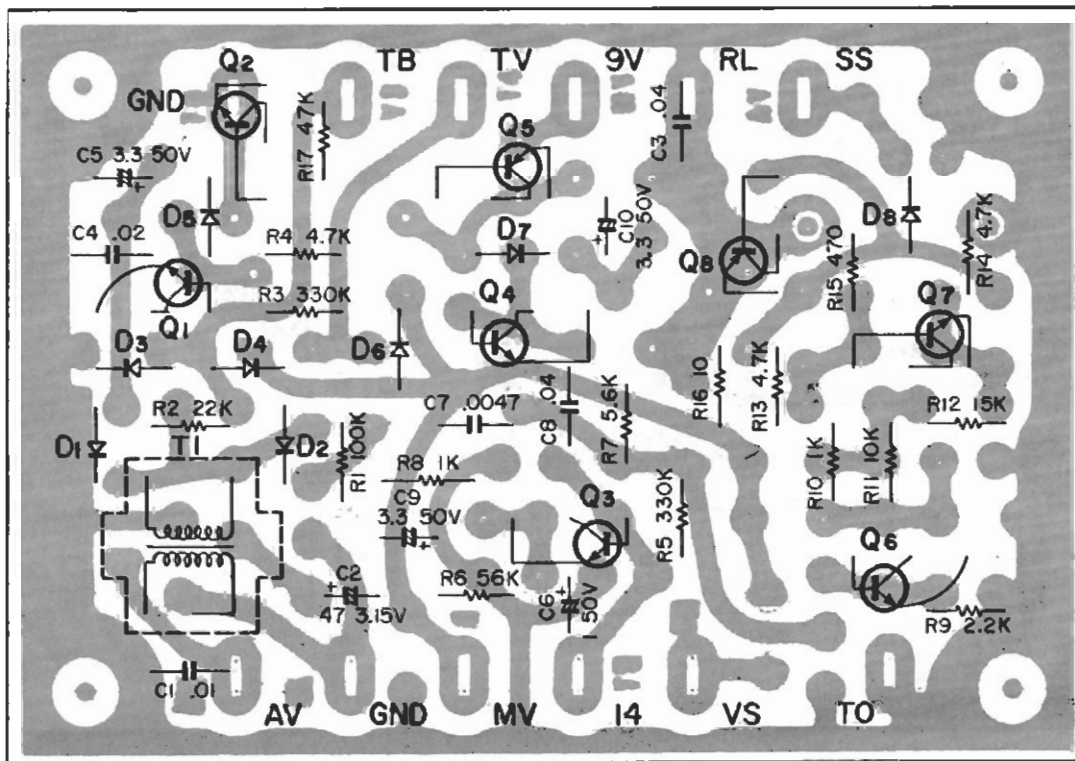
D1~D4: 1N60 Q1: 2SC871 Q2,3: 2SC733Y.GR Q4: TA7045M Q5: 3SK22 GR Q6: 2SA495Y
 Q7: 2SC460B

■ PC BOARD OF X53-1030-10 (CONTROL UNIT)



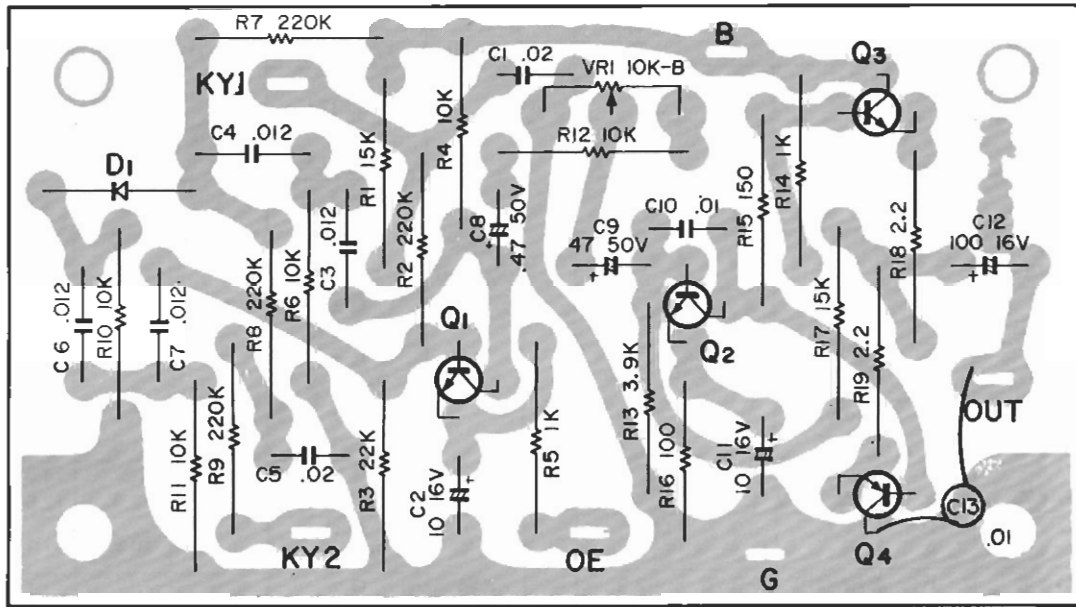
D1, 2: S-1.5-01 D3: MZ-1004 Q1: 2SC857 Q2: 2SC856 Q3: 2SC735(Y)

■ PC BOARD OF X54-0001-00 (VOX UNIT)



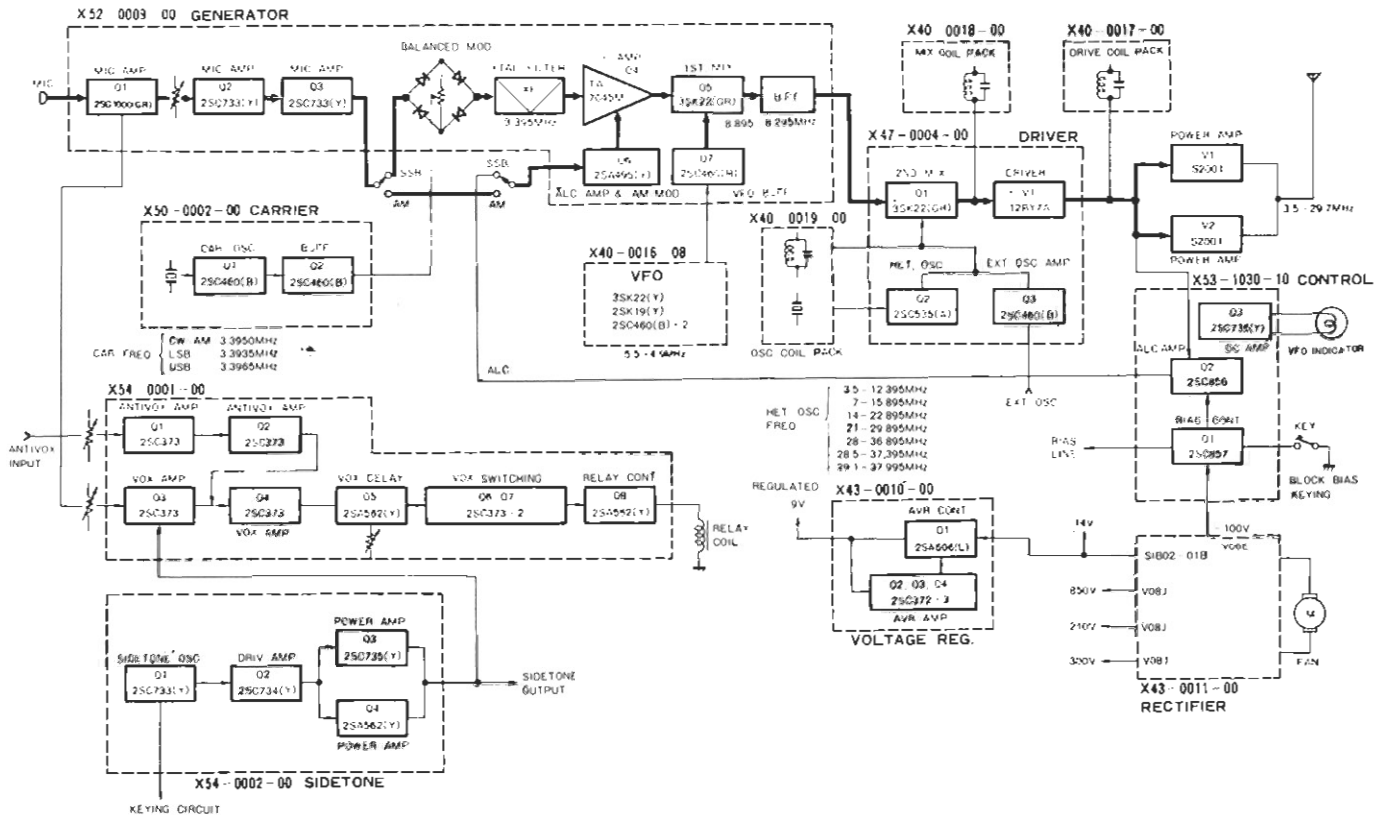
Q1 ~ 4, 6, 7: 2SC373, Q5, 8: 2SA562(Y) D1~4, 6~8: 1N60, D5: 2-1.5-01

■ PC BOARD OF X54-0002-00 (SIDETONE UNIT)



Q1: 2SC733(Y) or (GR), Q2: 2SC734(Y), Q3: 2SC735(Y), Q4: 2SA562(Y), D1: 1S1555

■ BLOCK DIAGRAM



T-599S Block Diagram

BATTERY CHART

TABLE 2

(A)

Unit No.	Transistor	(Note1)	E	B	C
X50-0002-00	Q 1 2SC460		0.85	1.4	9.0
	Q 2 2SC460		1.55	2.2	9.0
X52-0009-00	Q 1 2SC1000		1.2	1.9	4.5
	Q 2 2SC733		0.35	0.9	2.1
	Q 3 2SC733		1.50	2.1	3.8
	Q 4 TA7045M		Refer to next page "C" table.		
	Q 5 3SK22	R S	(Note2)0 0.95	-4.8 0	-2.0 0
	Q 6 2SA495	R S	6.8 (Note3)2.2	6.2 1.5	0
	Q 7 2SC460	R S	2.7 3.1	3.3 3.8	14.5 13.5
X47-0004-00	Q 1 3SK22	R S	(Note2)0 0.75	-3.75 0	-2.8 -0.5
	Q 2 2SC535	SEP TRCV	1.7 0	1.25 0.2	7.5 8.0
	Q 3 2SC460	SEP TRCV	2.7 0.87	1.55 1.48	7.5 8.0
	V 1 12BY7A		Refer to next page "C" table.		
X53-1030-10	Q 1 2SC857	R S	-94 -95	-94 -95	-94 0
	Q 2 2SC856	R S	-94 -50	-94 -50	6.3 (Note3)1.5
	Q 3 2SC735	ON OFF	0	0.74 0	0.09 14.5
X54-0001-00	Q 1 2SC373	R A	0	0.65 0.6	0.13 0.65
	Q 2 2SC373	R A	0	0.23 0.67	0 0
	Q 3 2SC373		0.6	1.2	6.1
	Q 4 2SC373	R V	0	0 0.25	8.5 0.65
	Q 5 2SA562	R V	8.5 0.65	8.5 0.65	0
	Q 6 2SC373	R V	5.4 4.5	6.0 0.65	6.3 8.6
	Q 7 2SC373	R V	5.4 4.5	3.8 5.2	14.5 11.7
	Q 8 2SA562	R V	14.5 13.3	14.5 12.5	0 13.2
X54-0002-00	Q 1 2SC733		0.55	1.10	8.9
	Q 2 2SC734		0.68	1.33	6.3
	Q 3 2SC735		7.0	7.6	14.5
	Q 4 2SA562		7.0	6.3	0
X43-0010-00	Q 1 2SA606		14.5	13.8	9.0
	Q 2 2SC372		5.3	5.9	13.8
	Q 3 2SC372		5.5	5.7	5.9
	Q 3 2SC372		5.5	6.15	9.0

(B)

Unit No.	Terminal	(Note1)	Voltage	
X52-0009-00	AF5	(Note4)	1.4	
	AF6	(Note5)	0.4	
	CAR		[1.0]	
	MG	R S	-7.0 0	
	B1	R S	14.5 13.5	
	B2	R S	0 13.5	
	SM		0	
	ALC	R S	6.2 (Note3)1.5	
	BS		9.0	
	VFO		[1.0]	
	OUT	R S	[0] (Note6)[0.5]	
	X50-0002-00	BS		9.0
		LSB		-0.4
		USB		-0.7
X40-0016-08	CWT	R S	14.5 13.5	
	OUT		[1.0]	
	R		5.4	
X47-0004-00	B		9.0	
	OUT		[1.0]	
	14	R S	14.5 13.5	
X47-0004-00	9		9.0	
	AS	SEP TRCV	3.0 0	

Unit No.	Terminal	(Note1)	Voltage	
X53-1030-10	VR	R S	-37 -20	
	X54-0001-00	SS	R V	14.8 12.0
RL		R V	0 13.2	
9V			9.0	
TV		(Note8)	8.5	
TB		R V	8.5 0.65	
TO		R V	8.5 0.65	
VS		R V	3.8 5.2	
14		R V	14.8 14.0	
		X54-0002-00	KY1	K C
KY2			K C	-60 0
OE	K (Note9)		0 1.6	
B	K C		14.5 13.5	
X43-0010-00	IN	R S	14.5 13.5	
	OUT		9.0	
	RT1		5.4	

Unit No.	Terminal	(Note1)	Voltage	
X47-0004-00	OS	SEP TRCV	0 0.17	
	MG	R S	-7.1 0	
	OX	SEP TRCV	1.25 0.5	
	OL		7.5	
	MD	R S	14.5 13.5	
	MVC	(Note7)	14.5	
	DG	R S	-46.0 0	
	H		(6.3)	
	DP	R	318	
	300	R S	318 290	
	DVC	(Note7)	330	
	X53-1030-10	MG	R S	-7.0 0
		DG	R S	-46.0 0
		RS	R S	0 -94
KEY		R C	0 -60	
-C			-94	
PG		R S	-94 -50	
ALC		R S	6.2 (Note3)2.1	

Unit No.	Terminal	(Note1)	Voltage
X43-0011-00	HV	R S	
	850	R S	
	300	R S	
	C25	R S	
	210	R S	
	C26	R S	
	-C	R S	
	C28	R S	
	14	R S	
	14B	R S	
	14A	R S	
	100	R S	
	230	R S	
	320	R S	

- Note 1 R: Under stand-by condition.
S: Under maximum CW transmitting output.
SEP: SEP ◀▶ TRCV switch at SEP Position.
TRCV: SEP ◀▶ TRCV switch at TRCV Position.
A: ANTI-VOX input Signal with 0.5 V input.
V: VOX and CW side tone Operate.
K: CW operation with Stand-by Key inserted.
C: CW operation with Key downed.
ON: VFO on
OFF: VFO off
- Note 2 Read E, B and C as S, G1 and G2 respectively.
D is same as 14 V Supply line.

* Measurement is made using a vacuum tube voltmeter. The value shows the voltage
The value in () denotes the AC voltage and that in [] the RF voltage.

- Note 3 Approx. 5.5 V
Note 4 MODE Switch
Note 5 MODE Switch
O at Position
Note 6 Value varies d
Note 7 3.5 MHz band
Note 8 DELAY VR co
wise position.
Note 9 Operations oth

(Note4)	Voltage
R	(338)
S	(310)
R	910
S	815
R	315
S	290
R	335
S	315
R	235
S	215
R	242
S	228
R	-94
S	-97
R	-102
S	-100
R	14.8
S	14.0
R	(6.8)
S	(6.6)
R	(5.7)
S	(5.5)
R	(75)
S	(72)
R	(187)
S	(178)
R	(260)
S	(255)

(C)

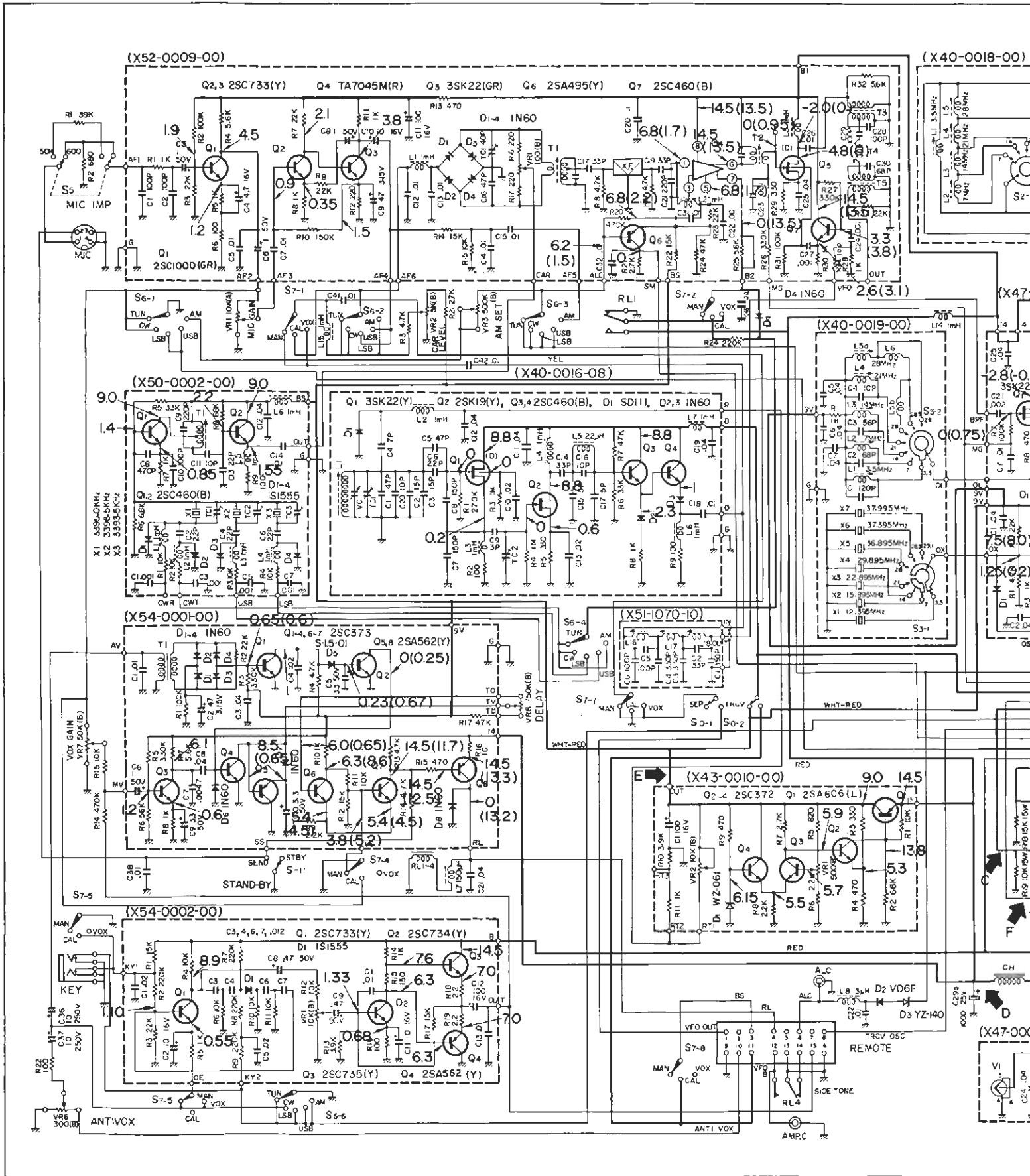
Pin	(Note1)	Q 4 TA7045M	V 1 12BY7A	V 1 S2001	V 2 S2001
1	R S	6.8 (Note3)1.7	0 2.6	0 1.1	0 1.1
2	R S		-46 0	(6.3)	(6.3)
3	R S	0	0	235 215	235 215
4	R S		0	0 1.1	0 1.1
5	R S	6.8 (Note3)1.7	0	-94 -50	-94 -50

Pin	(Note1)	Q 4 TA7045M	V 1 12BY7A	V 1 S2001	V 2 S2001
6	R S	14.5 13.5	(6.3)	0 1.1	0 1.1
7	R S	0 13.5	318 290	0	0
8	R S	14.5 13.5	200 150	0	0
9	R S		0		
P	R S			910 815	910 815

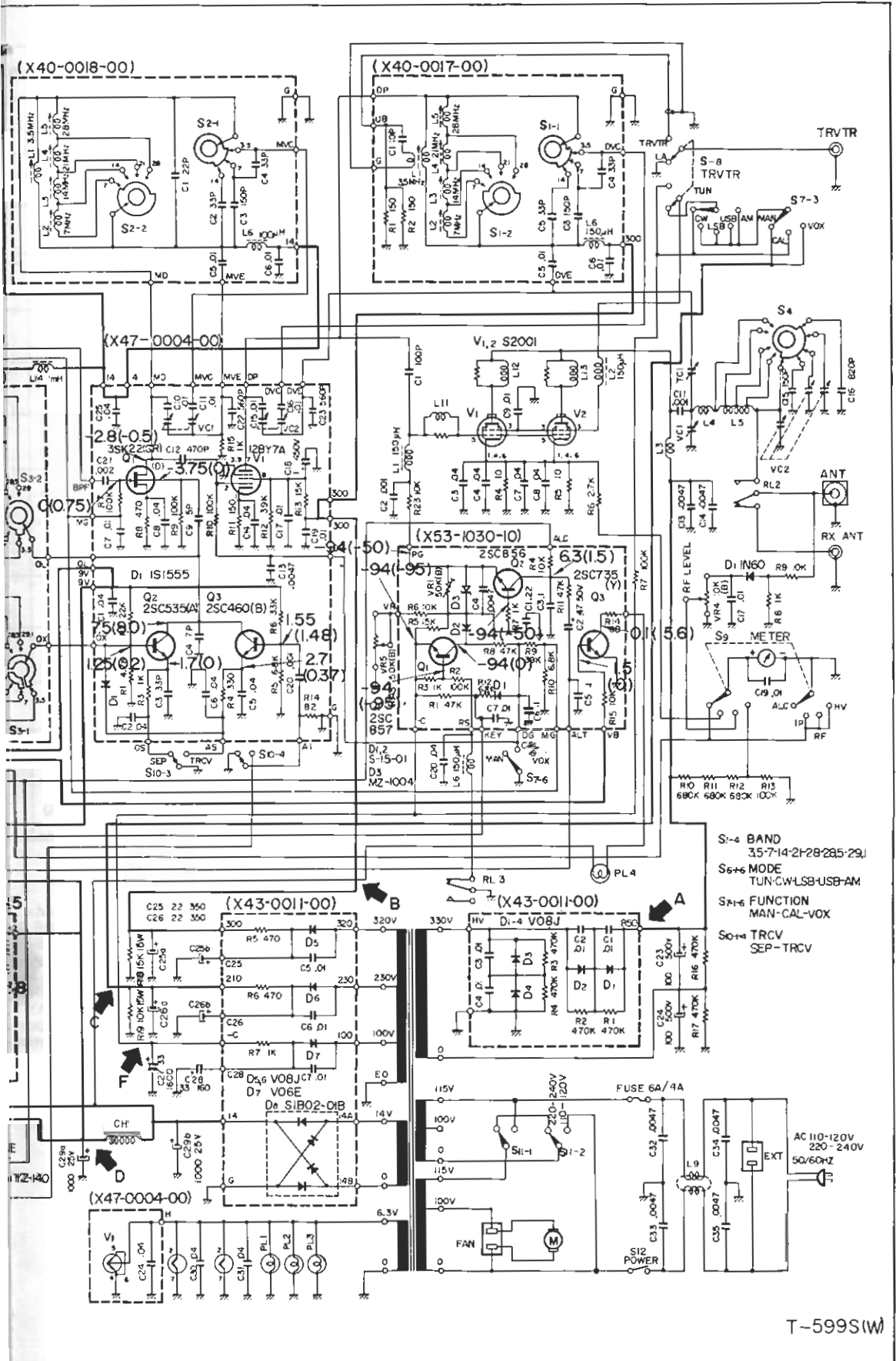
x. 5.5 V if meter set at ALC range does not deflect.
 Switch set at AM. O at positions other than AM.
 Switch set at Position TUN, CW and AM.
 Position other than TUN, CW and AM.
 varies depending on how ALC circuit functions.
 Hz band. O for the band other than 3.5 MHz band.
 Y VR control placed in the extreme counterclock-
 position.
 tions other than CW operation.

the voltage to the chassis.

SCHEMATIC DIAGRAM



DIAGRAM



SPECIFICATION

TRANSMITTING FREQUENCY RANGE	3.5 MHz band	3.50 ~ 4.00 MHz
	7.0 MHz band	7.00 ~ 7.30 MHz
	14.0 MHz band	14.00 ~ 14.35 MHz
	21.0 MHz band	21.00 ~ 21.45 MHz
	28.0 MHz band	28.00 ~ 28.50 MHz
	28.5 MHz band	28.50 ~ 29.10 MHz
	29.1 MHz band	29.10 ~ 29.70 MHz
TYPE OF EMISSION	SSB (A3J), CW (A1) and AM (A3)	
RATED INPUT TO FINAL STAGE	SSB, CW	3.5 ~ 21 MHz 160W
		28 MHz 140W
	AM	3.5 ~ 21 MHz 80W
		28 MHz 60W
CARRIER SUPPRESSION	40 dB or more	
UNWANTED SIDEBAND SUPPRESSION	40 dB or more	
HARMONICS RADIATION	-40 dB or less (under CW operation)	
OUTPUT IMPEDANCE	50 ~ 75 Ω	
MICROPHONE INPUT IMPEDANCE	600 and 50 k Ω , as selected by a selector switch	
MODULATION SYSTEM	Balanced modulation for SSB and low power modulation for AM	
SSB GENERATION SYSTEM	Filter system	
TRANSMITTING FREQUENCY CHARACTERISTIC	400 ~ 2600 Hz/-6 dB	
KEYING	Block bias keying	
FREQUENCY STABILITY	Within ± 2 kHz from one minute after switching on the set to 60 minutes and later within 100 Hz per 30 minutes.	
TUBES AND SEMICONDUCTORS EMPLOYED	3 vacuum tubes, 4 FET, 1 IC, 30 transistors, 34 diodes, 3 zener diodes & 1 varicap.	
POWER CONSUMPTION	350 W max.	
DIMENSIONS	10-5/8" W x 5-1/2" H x 12-3/16" D (inches)	
	270 W x 140 H x 310 D (mm)	
WEIGHT	12.5 kg (27 lbs.)	



Manufactured by TRIO ELECTRONICS, INC., Tokyo, Japan