

**KENWOOD**

# SERVICE MANUAL

## Model R-599S

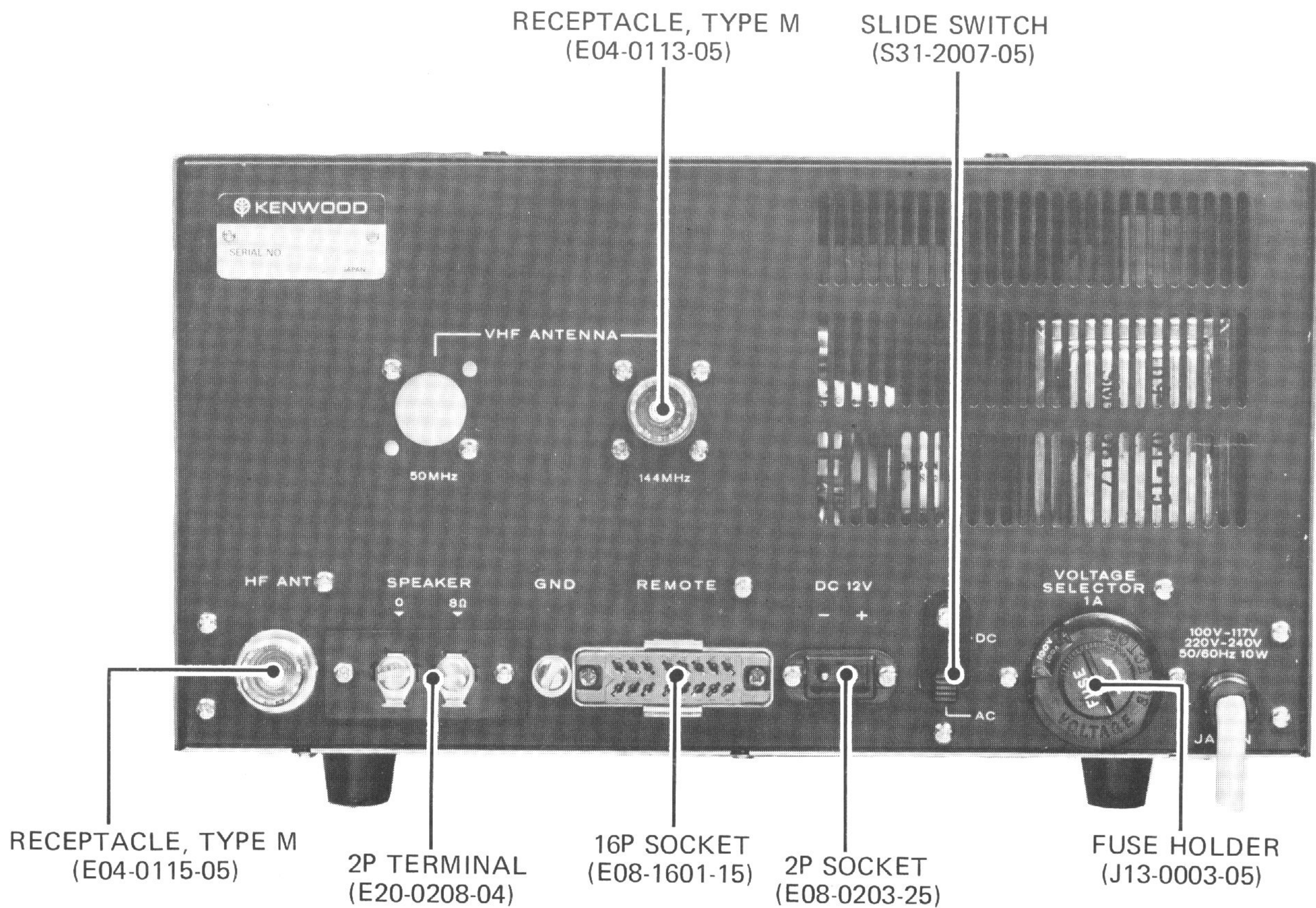
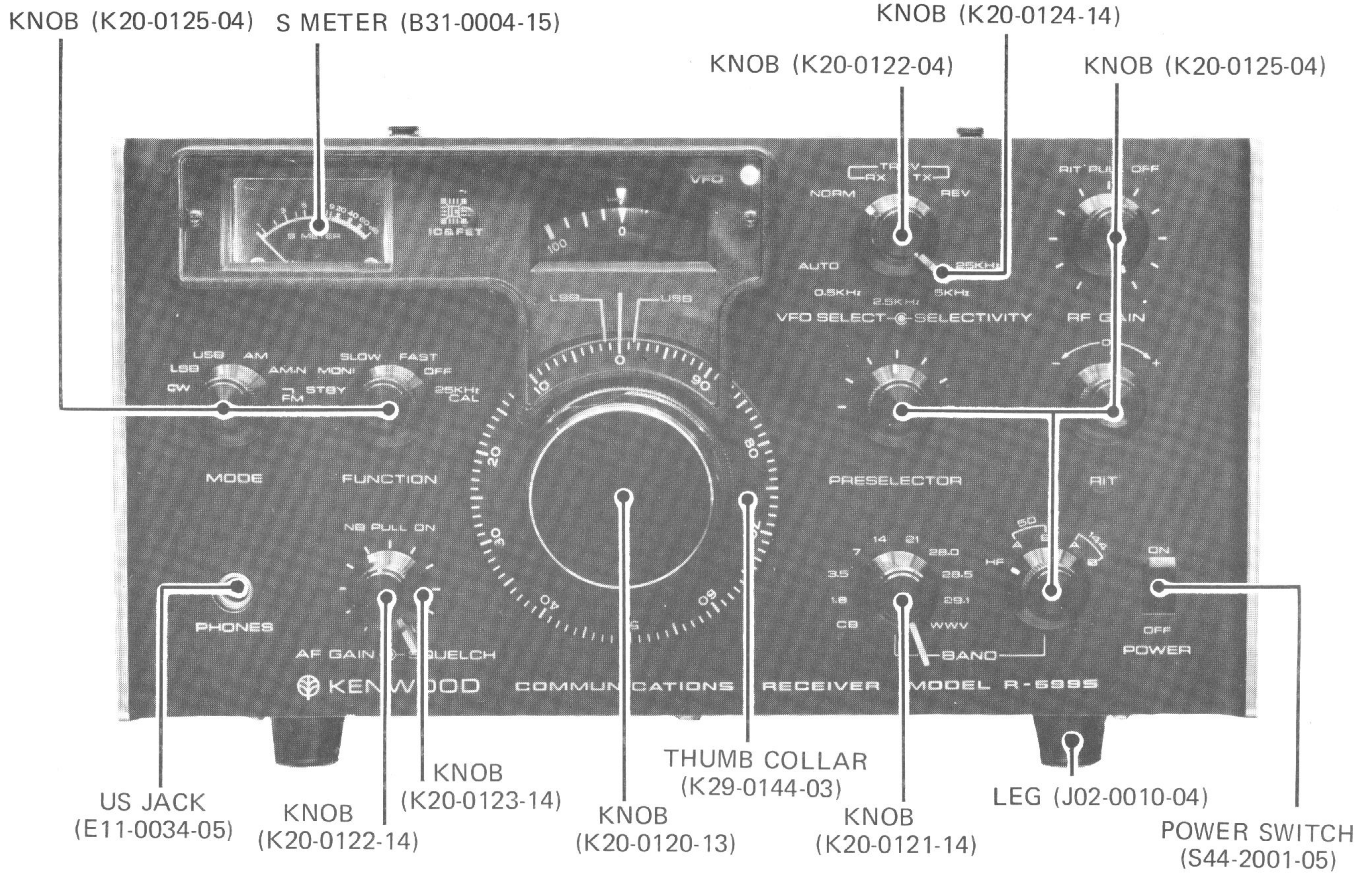


**COMMUNICATIONS RECEIVER**

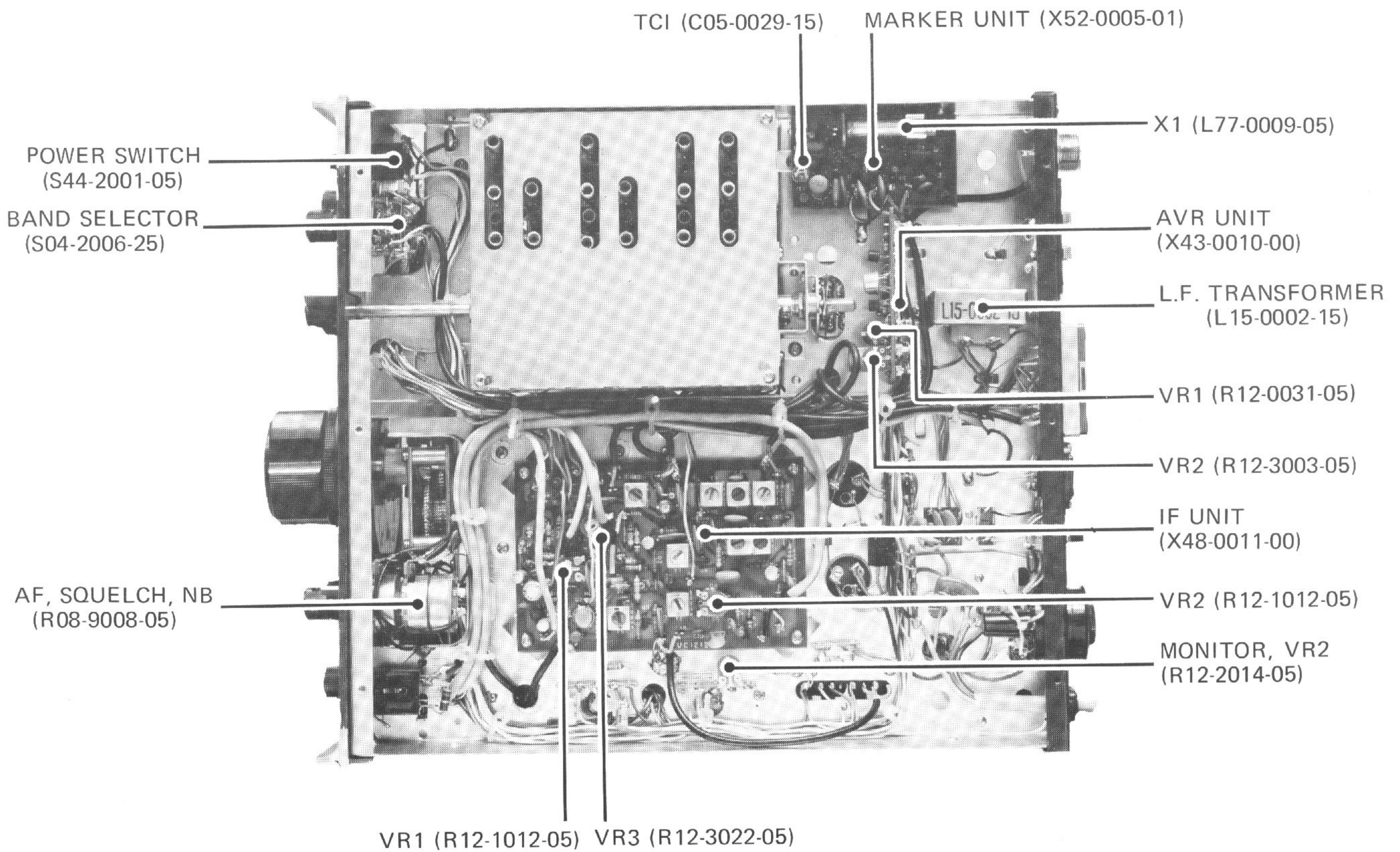
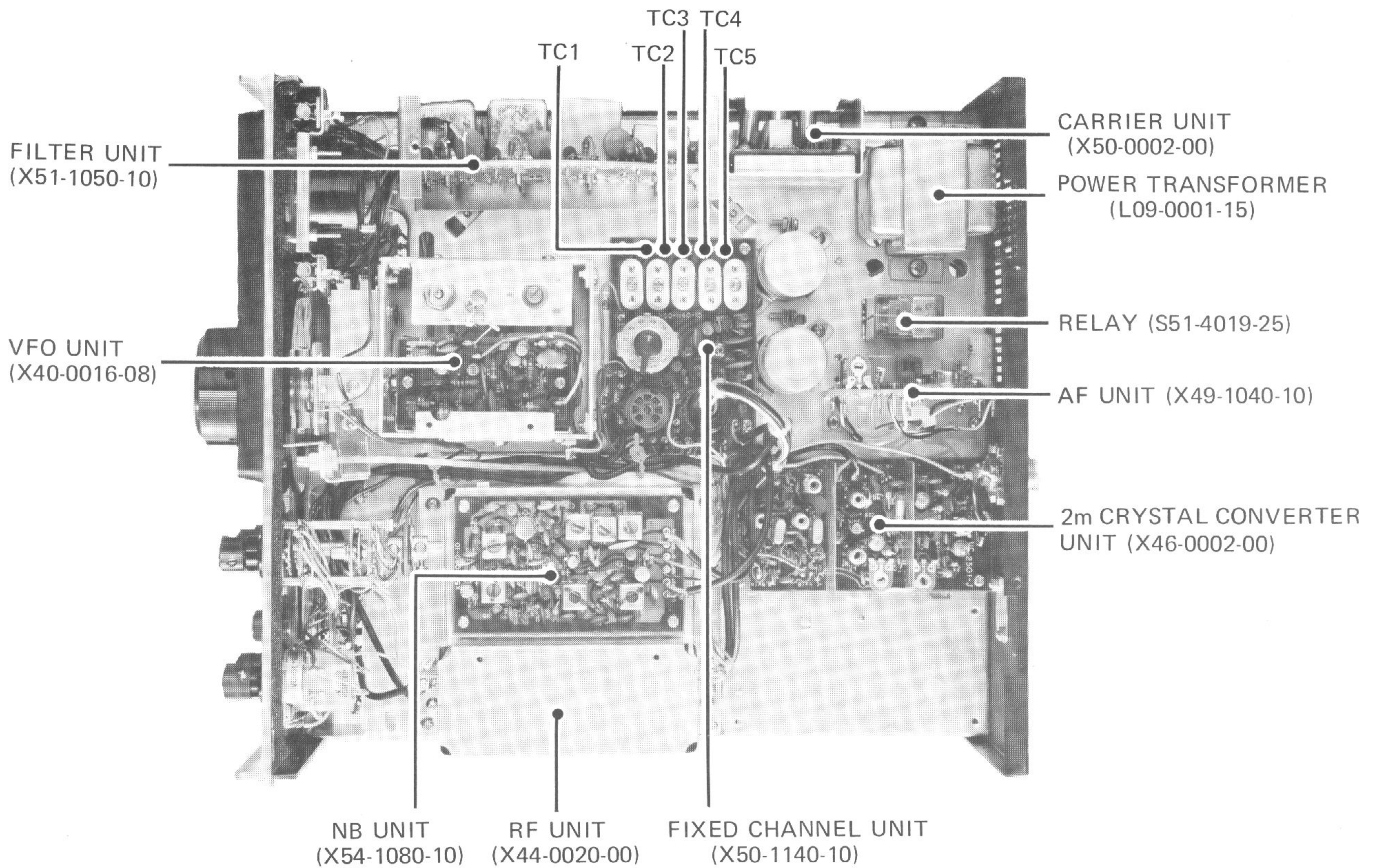
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# EXTERNAL VIEW



# 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 diagram 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.

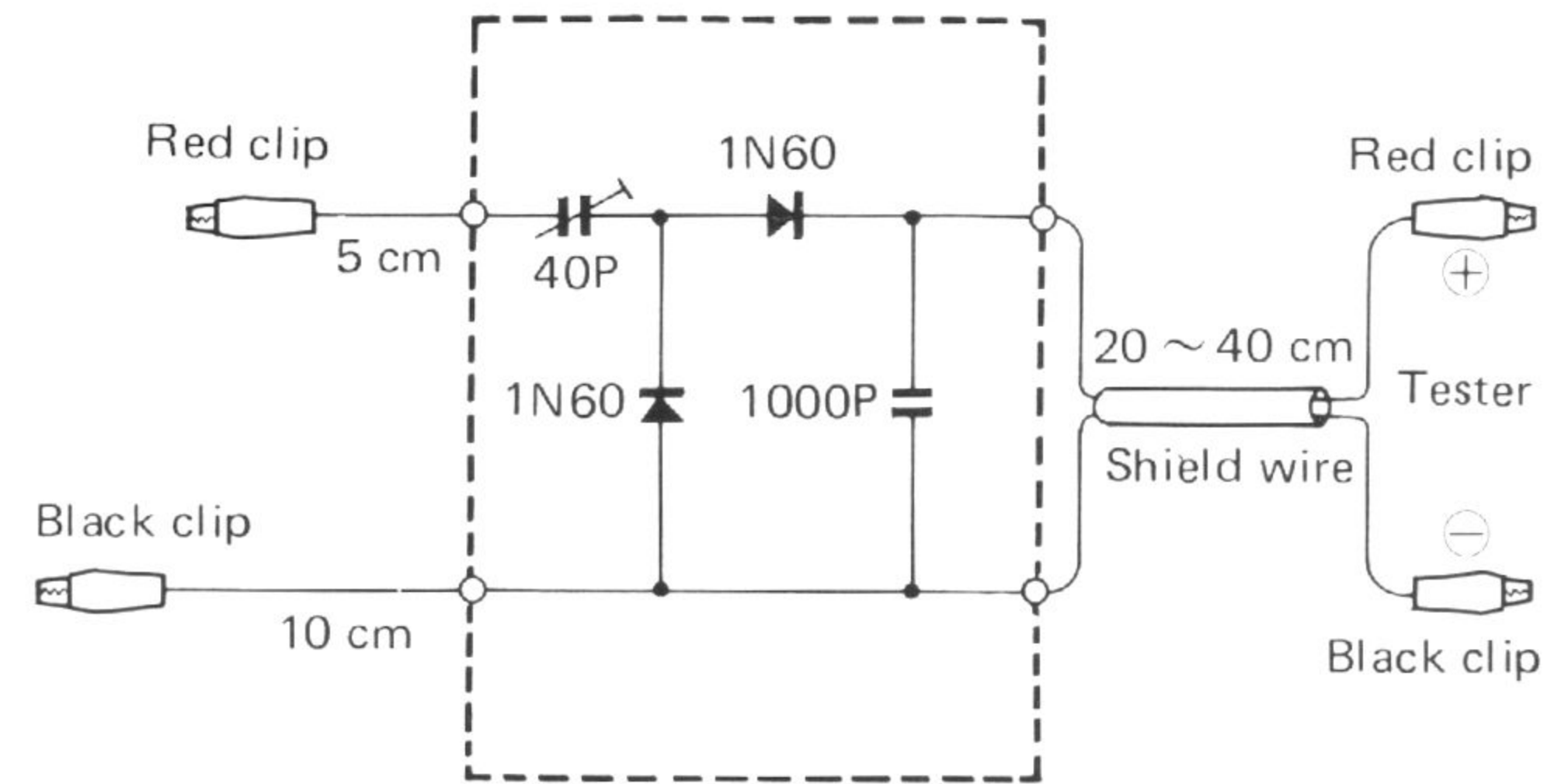


Fig. 1

Symptom	Service points	Possible causes	What to do for remedy
1. No power supply.	1) Fuse 2) Power on-off switch 3) AC cord	<ul style="list-style-type: none"> <li>○ Blown fuse.</li> <li>○ Defective switch.</li> <li>○ Open-circuit near the plug.</li> </ul>	<ul style="list-style-type: none"> <li>○ Refer to Symptom 2.</li> <li>○ Check for circuit continuity.</li> <li>○ Check for circuit continuity.</li> </ul>
2. Fuse blows off too easily.	1) Audio-frequency unit (X49-1040-10) 2) B circuit	<ul style="list-style-type: none"> <li>○ Defective Q3, 2SD90, Q4 or 2SB473.</li> <li>○ Short-circuited to the chassis.</li> </ul>	<ul style="list-style-type: none"> <li>○ Disconnect lead wire from B terminal and check.</li> <li>○ Investigate and repair.</li> </ul>
3. No signal reception.	No noise	1) AF unit	<ul style="list-style-type: none"> <li>○ Disconnect lead wire from B terminal and check.</li> <li>○ Check for continuity.</li> <li>○ Check oscillator voltage. Replace defective part if any.</li> </ul>
	Noise heard on all bands.	2) Phone jack 1) RF unit (X44-0020-00) 2) IF unit (X48-0010-00) 3) VFO (X40-0016-08)	<ul style="list-style-type: none"> <li>○ Adjust or replace.</li> </ul>
	Noise heard only on certain band.	4) Coil unit Coil unit	<ul style="list-style-type: none"> <li>○ Check output voltage or voltage at respective components.</li> <li>○ Inspect the switch.</li> <li>○ Adjust, or replace.</li> </ul>
	Noise heard only on SSB/CW.	Failure of carrier oscillation (X50-0002-00)	<ul style="list-style-type: none"> <li>○ Check oscillator voltage, or replace.</li> <li>○ Inspect the switch.</li> <li>○ Check voltage at OUT terminal or at respective components.</li> </ul>
Low sensitivity (poor S/N).	For all bands.	1) AVR unit (X43-0010-00) 2) RF unit (X44-0020-00)	<ul style="list-style-type: none"> <li>○ Adjust to restore OUT voltage to normal 9V level.</li> <li>○ Check voltage, or replace.</li> </ul>
	For certain band.	3) IF unit 4) VFO unit (X40-0016-08) Coil unit	<ul style="list-style-type: none"> <li>○ Check oscillator voltage, or replace.</li> <li>○ Adjust or replace.</li> <li>○ Adjust or replace.</li> <li>○ Adjust.</li> </ul>
4. S meter pointer will not deflect.	1) IF unit (X48-0011-00) 2) Not enough sensitivity	<ul style="list-style-type: none"> <li>○ VR3 off adjustment.</li> <li>○ Refer to Symptom 3 "Low sensitivity (poor S/N)".</li> </ul>	<ul style="list-style-type: none"> <li>○ Adjust.</li> </ul>

Symptom	Service points	Possible causes	What to do for remedy
5. Sound distortion. Occurring in all MODES. Occurring in FM. Occurring in SSB.	1) AF unit. (X49-1040-10)  1) IF unit. (X48-0011-00)  1) IF unit.  2) Carrier oscillator unit (X50-0002-00)	<ul style="list-style-type: none"> <li>○ Defective Q3, 2SD90, Q4 or 2SB473.</li> <li>○ T7 or T8 off adjustment.</li> <li>○ VR2 off adjustment.</li> <li>○ Frequency deviation, or output voltage too low.</li> </ul>	<ul style="list-style-type: none"> <li>○ Disconnect lead wire from B terminal and check, or replace.</li> <li>○ Adjustment.</li> <li>○ Adjust.</li> <li>○ Adjust TC2, TC3 or T1.</li> </ul>
6. RIT zero point off adjustment.	AVR unit (X43-0010-00)	<ul style="list-style-type: none"> <li>○ VR2 off adjustment.</li> </ul>	<ul style="list-style-type: none"> <li>○ Adjust.</li> </ul>
7. Loss of match between marker and WWV.	Marker unit (X52-0005-01)	<ul style="list-style-type: none"> <li>○ TC1 off adjustment, or defective crystal (X1).</li> </ul>	<ul style="list-style-type: none"> <li>○ Adjust, or replace.</li> </ul>
8. Not enough output in transceiver operation.  Deviation of transmitter or receiver frequency.	1) VFO unit (X40-0016-08)  2) T-599 heterodyne oscillator circuit 1) Carrier oscillation  2) RIT	<ul style="list-style-type: none"> <li>○ TC2 off adjustment.</li> <li>○ Deteriorated Q3 or 2SC460 in drive unit (X47-0004-00).</li> <li>○ Frequency deviation on R-559 or T-559.</li> <li>○ VR2 off adjustment in AVR unit (X43-0010-00).</li> </ul>	<ul style="list-style-type: none"> <li>○ Adjust.</li> <li>○ Replace.</li> <li>○ Check and adjust.</li> <li>○ Adjust.</li> </ul>

# ADJUSTMENT

## Preparatory steps

- Set the knobs as follows:  
Front panel

Knob	Position
MODE	USB
FUNCTION	FAST
RF GAIN	MAX
VFO SELECT	NORM
SELECTIVITY	AUTO
SQUELCH	OFF
RIT	0
BAND	14
NB	OFF
POWER	ON

- Inside the set, have the selector switch on fixed channel turned to "VFO".
- On the rear panel, connect an 8-ohm dummy to SPEAKER terminal.

## 1. Voltage adjustment on AVR unit (X43-0010-00)

### A. Voltage adjustment

- Purpose**  
To establish the +9-volt line voltage.
- Instrument to be used**  
DC voltmeter
- Adjusting procedure**
  - Connect the voltmeter terminal (+) to 9V terminal of AVR unit (X43-0010-00), and terminal (-) to the ground.

- Check to be sure that the voltmeter is indicating +9V.
- If voltmeter indication is off +9V, adjust VR1 on AVR unit to obtain this voltage value. VR1 is a 500-ohm variable resistor.

## 2. IF UNIT adjustment (X48-0011-00)

- Purpose**  
To secure the specified bandwidth by adjusting the band-pass filter (B.P.F.).
- Instruments required**
  - Sweep generator, producing the marker preferably at these 3 points: 8.295, 8.595 and 8.895 MHz.
  - B.P.F. detector
  - Oscilloscope
- Adjusting procedure (Refer to Fig. 1)**
  - Connect the output terminal of sweep generator to T.P terminal of RF unit (X44-0020-00) through a 0.01 $\mu$ F capacitor.
  - Through the B.P.F. detector, connect the oscilloscope to T.P terminal on IF unit (X48-0011-00).
  - Display the waveform (shown in Fig. 3) on the oscilloscope by adjusting T1, T2 and T3 on IF unit.

### B. IFT adjustment

- Purpose**  
To adjust the intermediate-frequency transformer in IF unit.
- Instruments required**
  - SSG
  - AF vacuum tube voltmeter
  - Oscilloscope

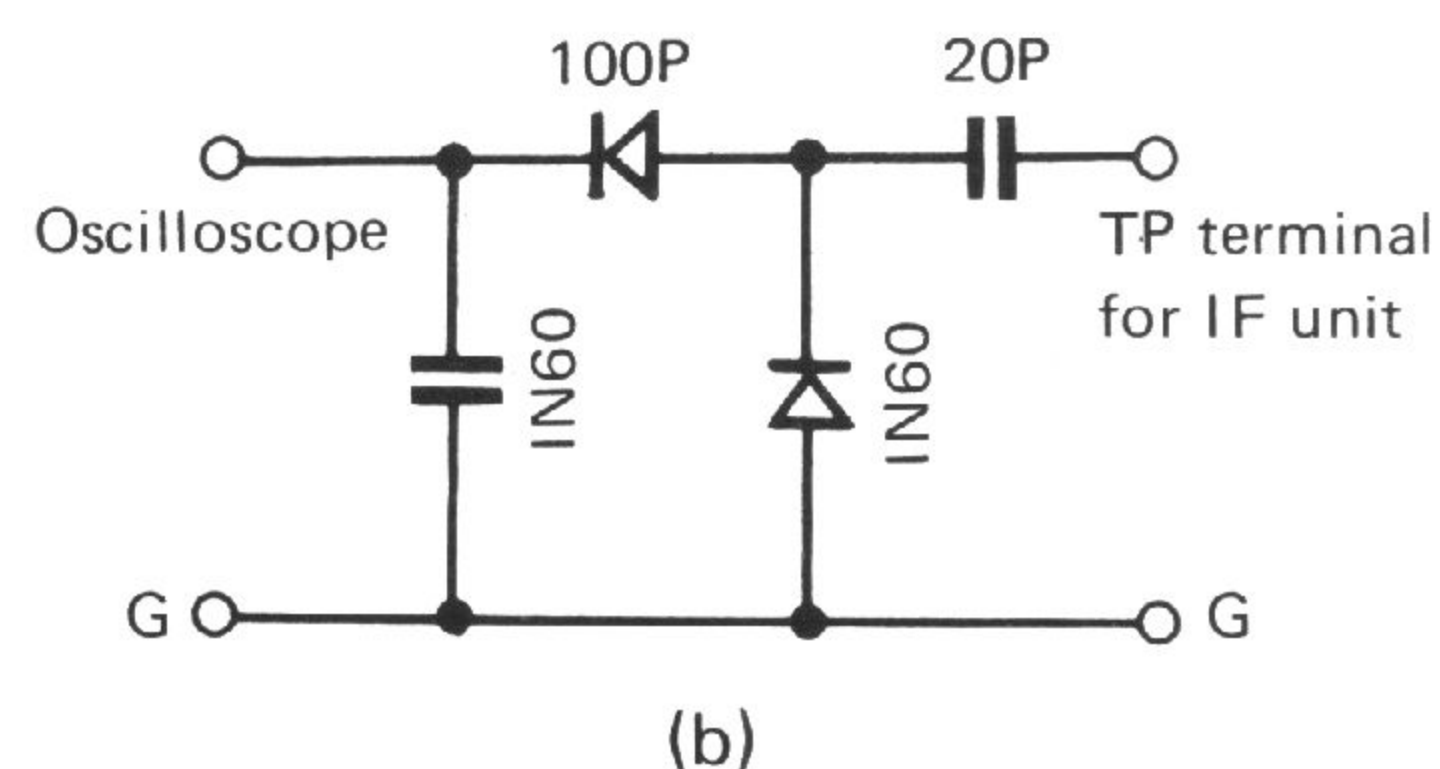
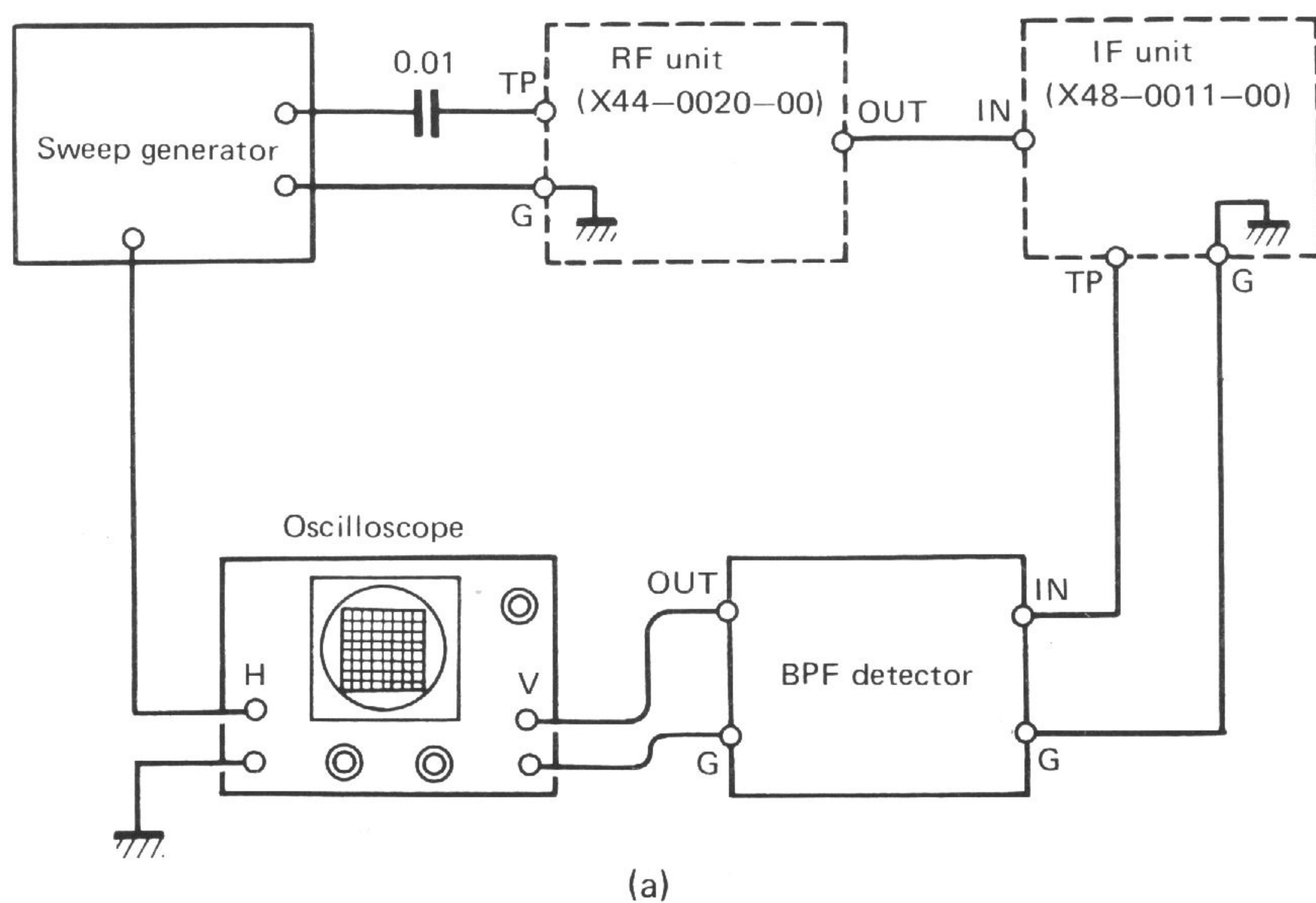


Fig. 2

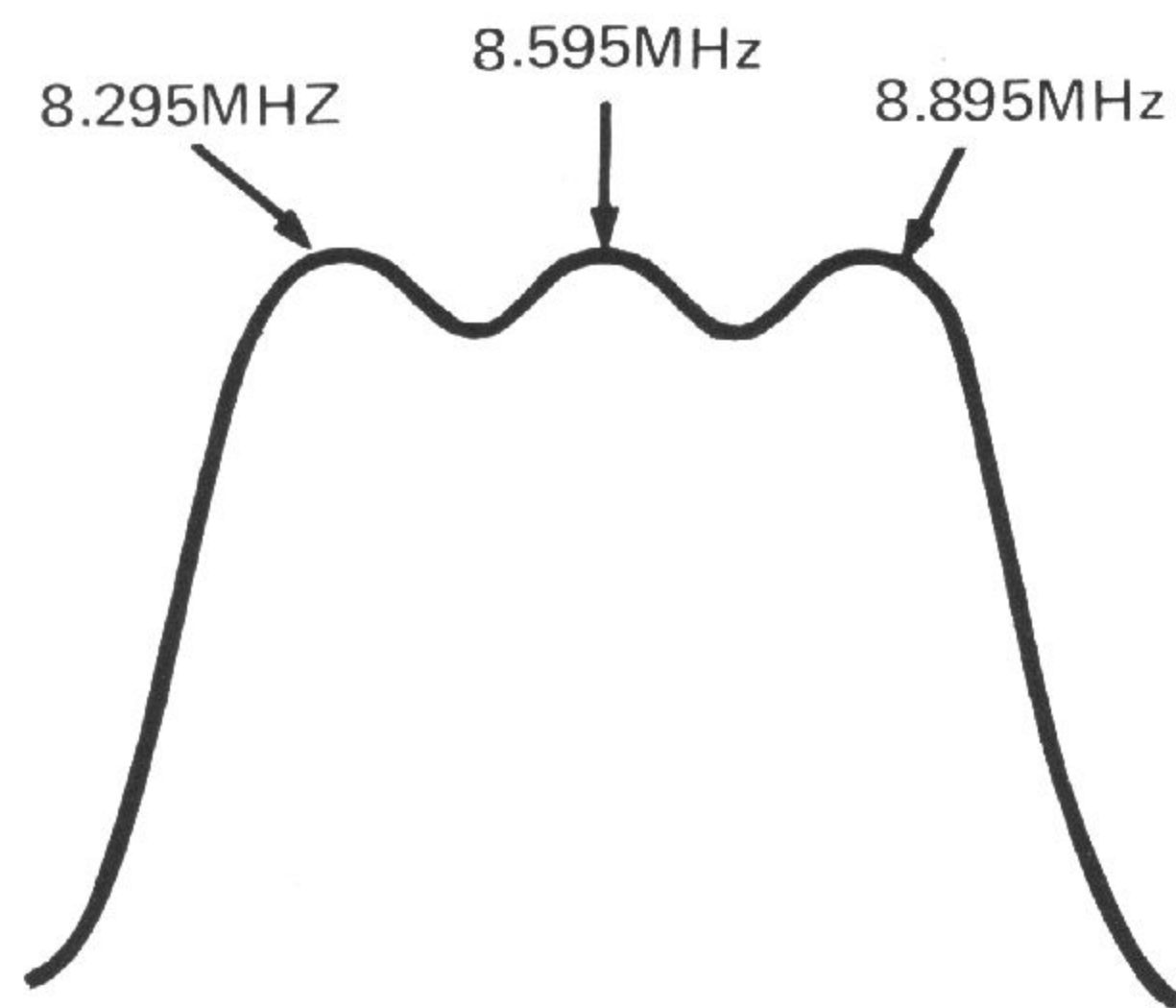


Fig. 3

### (3) Adjusting procedure

- 1) Apply a signal to ANT terminal from SSG. Any frequency will do for this signal; its intensity should be such as to deflect the S meter pointer slightly.
- 2) Turn MODE switch to USB or LSB, and adjust VFO and PRESELECTOR for maximum sensitivity.
- 3) Adjust T4, T5 and T6 on IF unit for maximum sensitivity.
- 4) Adjust T7 to minimize AF output.
- 5) Connect AF vacuum-tube voltmeter to AF2 terminal of IF unit (X48-0011-00).
- 6) Set the SSG output level at 60 dB (1 mV).
- 7) Adjust VR1 (1 kilohm) to obtain a 15 mV indication on AF voltmeter.

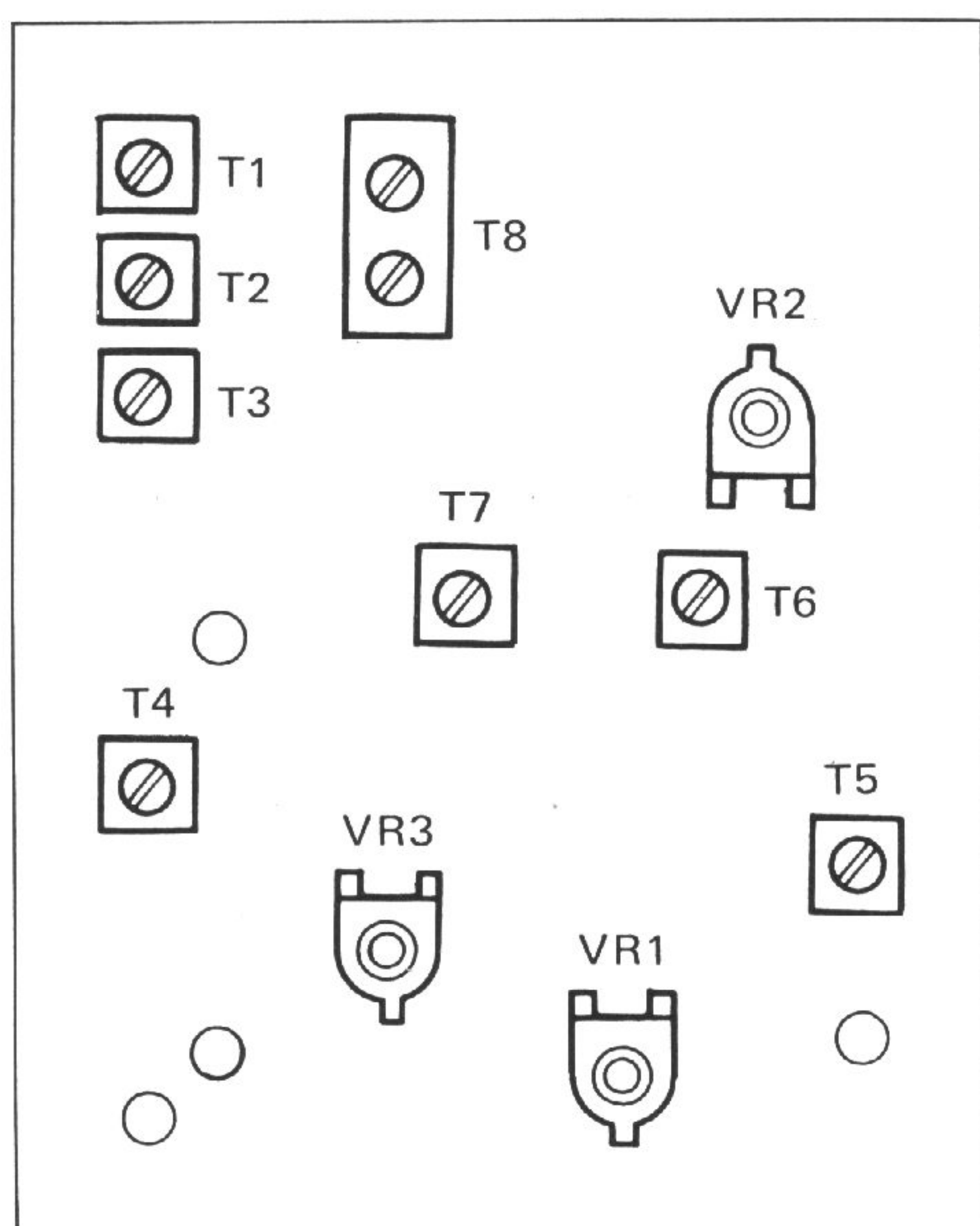


Fig. 4 IF UNIT

- 8) Disconnect the AF voltmeter; connect the oscilloscope to AF2 terminal and observe the waveform displayed. By referring to this display, adjust VR2 for maximized output and minimized distortion.
- 9) Switch SSG to FM mode with 7-kHz deviation on center frequency of 10 MHz, and turn down its output level to a proper value.
- 10) Move MODE switch into FM position.
- 11) Adjust at primary side of T7 and T8 (red) to maximize AF output.
- 12) Switch SSG to AM mode. At secondary side (black) of T8, adjust to minimize AF output.

#### NOTE:

At this time, switch over SELECTIVITY to 0.5 kHz and 2.5 kHz to be sure that the SSG frequency is right on the center.

### 3. RIT adjustment

#### (1) Purpose

Set RIT knob in 0 position, and operate RIT switch on and off.

The purpose is to make sure the VFO frequency remains the same as the switch is so operated.

#### (2) Instrument required

DC voltmeter

#### (3) Adjusting procedure

- 1) Connect the voltmeter to R terminal of VFO unit.
- 2) Operate RIT switch on and off and observe the voltmeter indication.

So that the indication will not change with on-off operation of RIT switch, adjust VR2 (10 kilohms) on AVR unit (X43-0010-00).

### 4. Main dial adjustment

#### (1) Purpose

To calibrate the main dial at 14 MHz band.

#### (2) Instrument required

Marker generator

#### (3) Adjusting procedure

- 1) Set the marker generator at 14 MHz and apply its output to the antenna input side of R-599.
- 2) Reduce the beat to zero between the marker signal and the VFO frequency, by turning the main tuning knob.
- 3) Index "0" graduation mark of the main dial to the red line on the tuning dial.



## 5. RF UNIT adjustment

### A. OSC coil adjustment (Refer to Fig. 5)

(1) Purpose

To tune OSC coil.

(2) Instrument required

RF vacuum-tube voltmeter

(3) Adjusting procedure

- 1) Connect RF voltmeter to OSC terminal on RF unit (X44-1020-00).
- 2) Set BAND switch in 1.8 MHz position.
- 3) Adjust the core of 1.8 OSC coil to such a position that will give an indication 1 dB below the maximum value on the RF voltmeter.
- 4) Make a similar adjustment on each of the bands 3.5 ~ 29.1.

### B. Adjustment of ANT and RF COILS

(1) Purpose (Refer to Fig. 5)

To tune ANT and RF coils.

(2) Instruments required

- 1) SSG
- 2) AF vacuum-tube voltmeter

(3) Adjusting procedure

Make connections as shown in Fig. 6 Turn MODE knob to AM position.

Turn the dial to "0".

1) 1.8 MHz band

- a) Set the SSG to 1.8 MHz.
- b) Set PRESELECTOR in 10 o'clock position.
- c) Adjust 1.8 MHz ANT and RF coils to maximize output voltage.

2) 3.5 MHz band

- a) Set the SSG to 3.5 MHz.
- b) Set PRESELECTOR in 30 minutes-after-10 o'clock position.

(Leave PRESELECTOR in this position for the subsequent adjustments.)

- c) Adjust 3.5 MHz ANT and RF coils to maximize output voltage.

- d) Set the SSG to 3.395 MHz.

- e) Adjust L4 trap coil to minimize output voltage.

3) 7 MHz band

- a) Set the SSG to 7.0 MHz.

- b) Adjust 7 MHz ANT and RF coils to maximize output voltage.

- c) Set the SSG to 8.895 MHz.

- d) Adjust L1 trap coil to minimize output voltage.

- e) Set the SSG to 8.295 MHz.

- f) Turn the dial to "500".

- g) Adjust L2 trap coil to minimize output voltage.

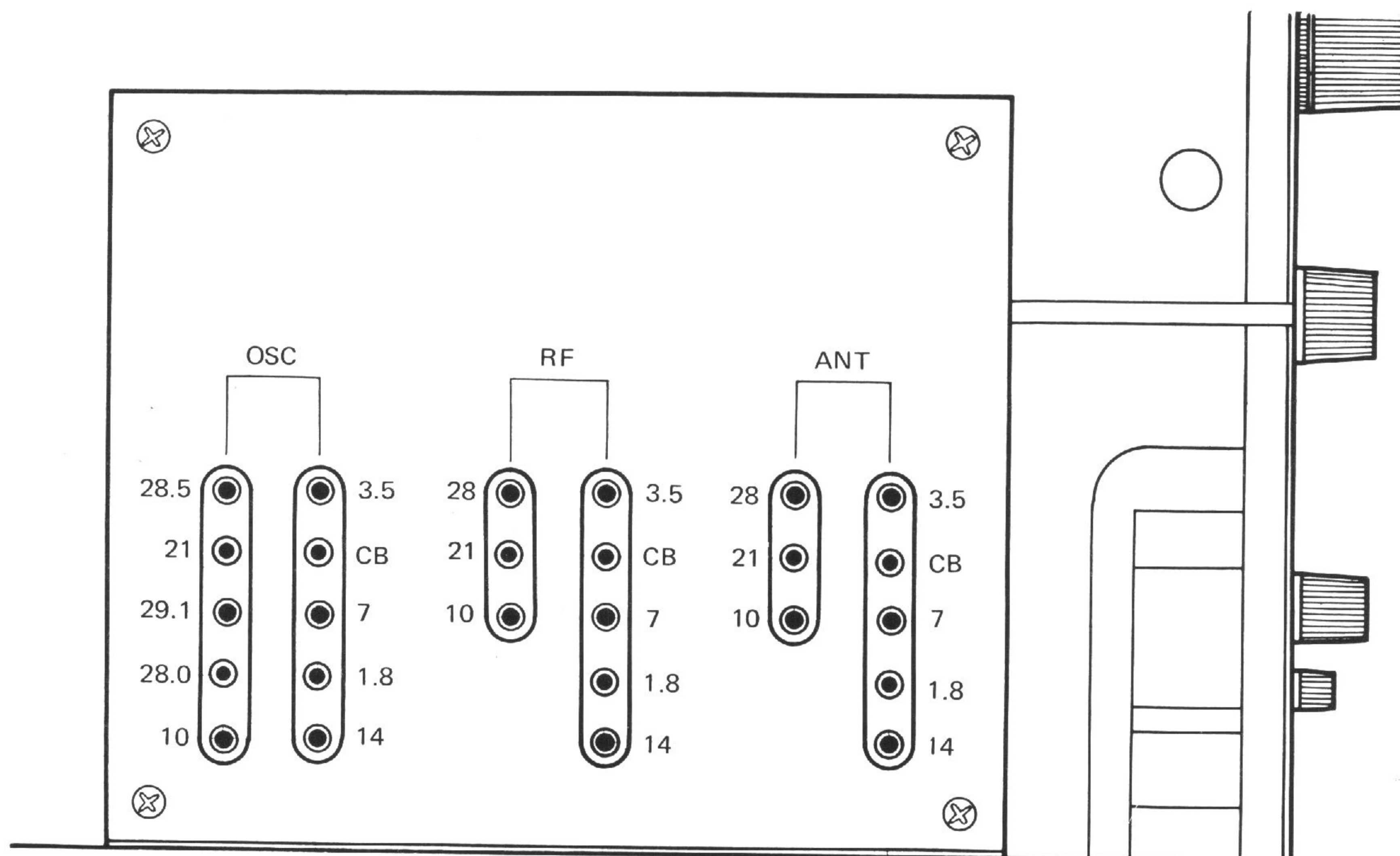


Fig. 5

SSG { Modulation frequency: 1000 Hz  
Percentage modulation: 30%

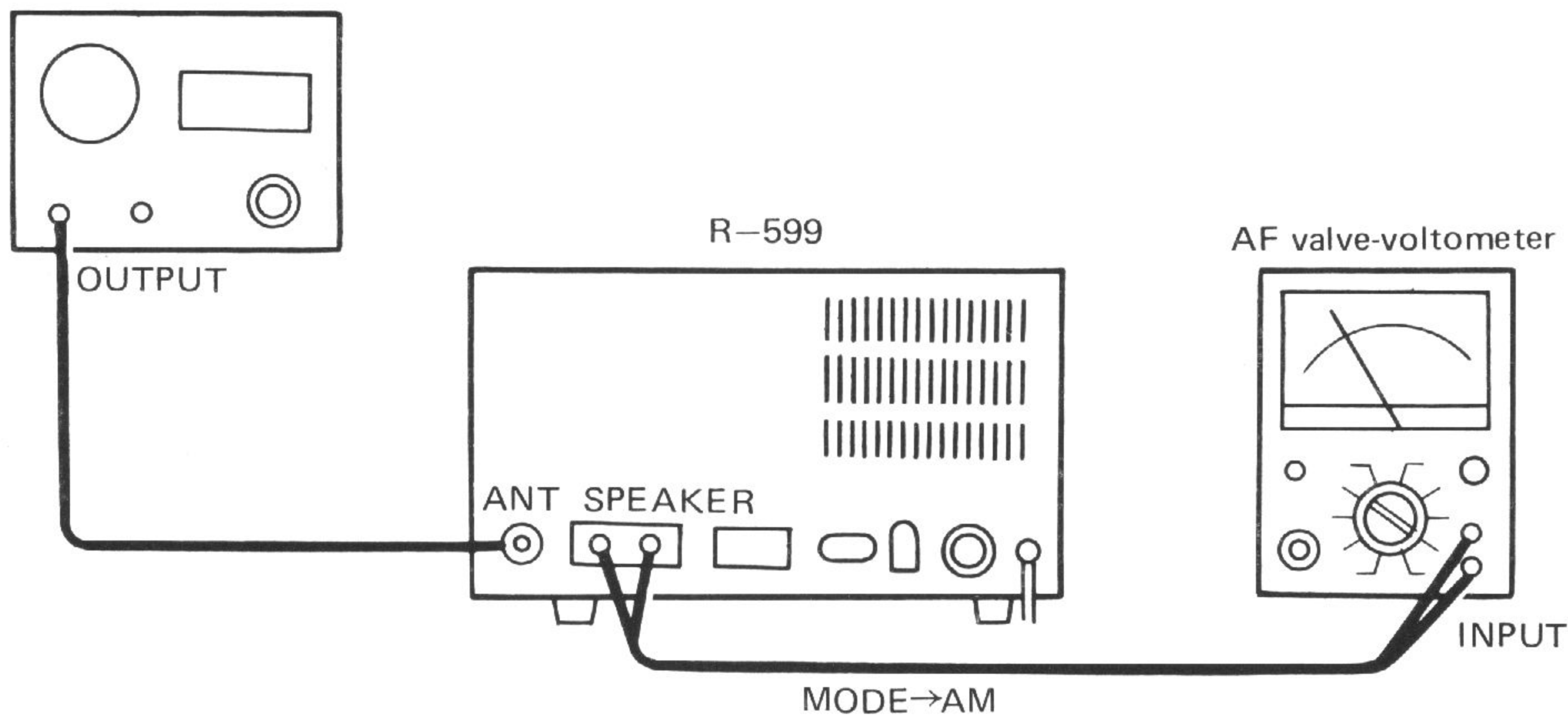


Fig. 6

- 4) 14 MHz band
  - a) Set the SSG to 14.0 MHz.
  - b) Turn the dial to "0".
  - c) Adjust 14 MHz ANT and RF coils to maximize output voltage.
- 5) For 21 MHz, 28.0 MHz, CB and WWV bands, carry out the steps outlined for (4) above, adjusting respective ANT and RF coils.

**NOTE:**

The foregoing adjustments are for ensuring that the AGC characteristic will maintain the receiver output at a constant value for changes in input from the antenna. For this reason, ATT should be kept turned CCW all the way on the SSG.

## 6. S METER adjustment

### (1) Purpose

To make the S meter indicates S9 with the specified input.

### (2) Instrument required

SSG

### (3) Adjusting procedure

- 1) Connect SSG output terminal to ANT.
- 2) Turn BAND switch to 14.
- 3) Move MODE switch into USB position.
- 4) Turn the dial to "200".
- 5) Set the SSG to 14.2 MHz, with its output steadied at 20 dB ( $10\mu\text{V}$ ) in non-modulating mode.
- 6) Turn PRESELECTOR knob to maximize S meter indication.
- 7) Raise the SSG output level to 100 dB (0.1V).
- 8) Adjust IF unit (X48-0011-00) VR3 to bring S meter indication down to 60 dB. VR3 is a 10-kilohm variable resistor located on top of IF unit.
- 9) Adjust the SSG output to 40 dB ( $100\mu\text{V}$ ).
- 10) Adjust VR1 (100-kilohms) on RF unit (X44-0020-00) to bring S meter indication to 9.

## 7. MONITOR circuit adjustment

### (1) Purpose

To set the receiver sensitivity in monitoring mode at a level 60 dB below the normal level.

### (2) Instrument required

SSG

### (3) Adjusting procedure

- 1) Carry out the steps 1) to 4), (3), 6. "S METER adjustment".
- 2) Set the SSG to 14.2 MHz, with its output at 40 dB. (Check to be sure that S meter indication is 9 with this setting of SSG.)
- 3) Move FUNCTION switch to MONI position.
- 4) Raise SSG output to 100 dB.
- 5) Adjust VR2 (5 kilohms) make the S meter indicate 9.

## 8. SIDETONE LEVEL adjustment

### (1) Purpose

To set the side tone output level.

### (2) Instruments required

- 1) AF generator
- 2) 8-ohm dummy
- 3) AF vacuum-tube voltmeter

### (3) Adjusting procedure

- 1) Set AF CAIN knob in 12 o'clock position.
- 2) Connect the 8-ohm dummy to SPEAKER terminal.
- 3) Connect the output terminal of AF generator to pins 15 and 16 of REMOTE terminal.
- 4) Adjust AF generator output to 1V (1 kHz).
- 5) Connect AF vacuum-tube voltmeter across the 8-ohm dummy.
- 6) Adjust VR1 (50-kilohms) on AF unit (X49-1040-10) to produce a 0.63V AF output.

## 9. MARKER UNIT adjustment (X52-0005-01)

### (1) Purpose

To set the crystal oscillator frequency.

### (2) Instrument required

Frequency counter

### (3) Adjusting procedure

- 1) Set FUNCTION switch in "25 kHz CAL" position.
- 2) Connect the frequency counter to MO and GND terminals of the marker unit.
- 3) Adjust the TC1 trimmer (50 PF) on the marker unit to obtain a  $25\text{ kHz} \pm 2\text{ Hz}$  indication on the frequency counter.

## 10. NB UNIT adjustment (X54-1080-10)

### (1) Purpose

To tune the noise blanker circuit.

### (2) Instruments required

- 1) SSG
- 2) RF vacuum tube voltmeter
- 3) DC voltmeter

### (3) Adjusting procedure

- 1) Turn BAND switch to 14 MHz, MODE switch to USB, and NB switch (NB PULL ON) to "ON" position.
- 2) From SSG, apply a non-modulated signal, 14.175 MHz and  $-6\text{ dB}$  ( $0.5\mu\text{V}$ ).
- 3) Connect RF vacuum-tube voltmeter to OUT terminal on NB unit.
- 4) Maximize the output voltage by adjusting T1 through T5 on NB unit.  
Repeat the adjustment twice or thrice to maximize output as much as possible.
- 5) Adjust the SSG output voltage to 60 dB (1mV), and adjust T6 and T7 to minimize the collector voltage of Q6.

## 11. FILTER UNIT adjustment (X51-1050-10)

### (1) Purpose

To set the center frequency of the filter unit.

### (2) Instrument required

SSG

### (3) Adjusting procedure

- 1) From SSG, apply a non-modulated signal. Any frequency will do for this signal; the signal level should be high enough only to deflect the S meter pointer slightly.
- 2) Move MODE switch into USB or LSB position, and adjust VFO and PRESELECTOR for maximized sensitivity.
- 3) Switch over SELECTIVITY to 25 kHz, and adjust T1 and T2 (X51-1060-10) on filter unit to maximize sensitivity.

#### NOTE:

Do not disturb SSG and VFO: it is the center frequency that is being set and, for this purpose, both SSG and VFO must remain undisturbed.

# PARTS LIST

## ■ PARTS LISTS OF R-599S

Circuit No.	Parts No.	Description	Remarks
<b>MISCELLANEOUS</b>			
—	A01-0008-02	Case	
—	A10-0016-32	Chassis	
—	A20-0640-03	Panel	
—	A23-0394-03	Rear panel	
—	A40-0003-02	Bottom plate	
—	B07-0007-14	Indicator	
—	B07-0098-03	Dial escutcheon	
—	B08-2010-04	Indicator	
—	B09-0003-05	Shaft coupling	
—	B19-0015-04	Filter (for meter)	
—	B19-0139-04	Acrylboard	
—	B20-0267-04	Dial board	
—	B30-0005-05	Pilot lamp x3	
—	B30-0079-05	Pilot lamp (VFO indicator)	
—	B31-0004-015	Meter	
—	B40-0425-04	Name plate	
—	B42-0009-04	Passed sticker	
—	B42-0386-04	Name sticker	
—	B42-0398-04	Name sticker (RF adjustment)	
—	D21-0025-04	Shaft	
—	D23-0061-04	Bearing	
—	D32-0021-04	Switch stopper	
—	E03-0301-05	Plug	
—	E04-0113-05	Receptacle, type M	
—	E04-0115-05	Receptacle, type M	
—	E05-0701-05	Plug (7P)	
—	E08-0203-25	2P socket	
—	E08-1601-15	16P socket	
—	E09-0203-15	2P plug	
—	E09-1601-05	16P plug	
—	E11-0034-05	US jack	
—	E20-0208-04	2P terminal	
—	E22-0206-05	Lug board	
—	E22-0207-05	Lug board	
—	E22-0405-05	Lug board x4	
—	F05-5013-05	Fuse (0.5A)	
—	F07-0067-04	Plate x2	
—	F07-0291-04	Shield plate	
—	F11-0014-14	Shield case	
—	F14-0002-04	Shading plate	
—	J02-0010-04	Legs x4	
—	J02-0005-14	Sub-legs x2	
—	J11-0020-05	Clamper	
—	J13-0002-05	Fuse holder x3	
S10	J13-0003-05	Fuse holder	
—	J20-0008-14	VFO mounting plate	
—	J20-0245-04	Meter mounting plate	
—	J21-0047-04	Mounting hardware	
—	J21-1057-04	Lamp mounting hardware	
—	J21-1058-04	Lamp mounting hardware	
—	J21-1069-04	PC board mounting hardware	
—	J32-0015-04	Screw, with hexagon hole x4	
—	J32-0078-04	Screw, with hexagon hole x4	
—	J41-0024-14	Cord bushing	
—	J59-0001-05	Grommet	
—	J59-0002-05	Plunger	

Circuit No.	Parts No.	Description	Remarks
—	J61-0018-05	Beeded band x9	
—	J61-0036-05	Belt	
—	K20-0120-13	Knob (MAIN)	
—	K20-0121-14	Knob	
—	K20-0122-04	Knob x2	
—	K20-0123-14	Knob	
—	K20-0124-14	Knob	
—	K20-0125-04	Knob x6	
—	K29-0144-03	Thumb collar	
—	L09-0001-15	Power transformer	
—	L15-0002-15	Low frequency transformer	
—	L33-0110-05	Ferri-inductor	
—	S03-1002-05	Rotary switch	
—	S04-2006-25	Rotary switch	
—	S29-3001-05	Rotary switch	
—	S31-2007-05	Slide switch	
—	S44-2001-05	Power switch	
—	S51-4019-25	Relay	
—	X40-0016-08	VFO UNIT	
—	X43-0010-00	AVR UNIT	
—	X44-0020-00	RF UNIT	
—	X46-0002-00	2m CRYSTAL CONVERTOR UNIT	
—	X48-0011-00	IF UNIT	
—	X49-1040-10	AF UNIT	
—	X50-0002-00	CARRIER UNIT	
—	X50-1140-10	FIXED CHANNEL UNIT	
—	X51-1050-10	FILTER UNIT	
—	X52-0005-01	MARKER UNIT	
—	X54-1080-10	NB UNIT	
<b>CAPACITOR</b>			
C1	CE04W1H010	Electrolytic	1 $\mu$ F 50WV
C2	CE04W1E4R7	Electrolytic	4.7 $\mu$ F 25WV
C3 ~ 5	CK45F1E403Z	Ceramic	0.04 $\mu$ F +80%, -20%
C6 ~ 8	C90-0074-05	Electrolytic block	1000 $\mu$ F 25WV
C9	C90-0145-05	Polyester	0.01 $\mu$ F $\pm$ 20%
C10	CK45F1E103Z	Ceramic	0.01 $\mu$ F +80%, -20%
C11	CK45F1E403Z	Ceramic	0.04 $\mu$ F +80%, -20%
C12	CC45SL1H470K	Ceramic	47pF $\pm$ 10%
C13	CK45F1E103Z	Ceramic	0.01 $\mu$ F +80%, -20%
C14	CK45D1H102M	Ceramic	0.001 $\mu$ F $\pm$ 20%
<b>RESISTOR</b>			
R1 ~ 3	PD14BY2E472J	Carbon	4.7k $\Omega$ $\pm$ 5% 1/4W
R4	RC05GF2H100J	Carbon	10 $\Omega$ $\pm$ 5% 1/2W
R5	RC05GF2H560J	Carbon	56 $\Omega$ $\pm$ 5% 1/2W
<b>SEMICONDUCTOR</b>			
D1		S1B02-01C	
D2 ~ 4		1N60	
<b>POTENTIOMETER</b>			
—	R03-2012-05	RIT	
—	R03-3052-05	RF GAIN	
—	R08-9008-05	AF SQUELCH	
VR1	R12-2014-05	PC trimmer	

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

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C1	CC94PG1H470J	Ceramic 47pF ±5%	(Adjustment) (Adjustment)
C2, 3	CC94LG1H150J	Ceramic 15pF ±5%	
C3	CC94PG1H150J	Ceramic 15pF ±5%	
C3	CC94CG1H150J	Ceramic 15pF ±5%	
C4	CC94SG1H070J	Ceramic 7pF ±5%	
C5	CC94LG1H470J	Ceramic 47pF ±5%	
C6	CC94LG1H220J	Ceramic 22pF ±5%	
C7, 8	CM93F2A151J(DM)	Mica 150pF ±5%	
C9	CM93D1H030D(Z)	Mica 3pF ±0.5pF	
C10	CK94YG1E203Z	Ceramic 0.02μF +80%, -20%	
C11, 12	CK94YG1E403Z	Ceramic 0.04μF +80%, -20%	
C13	CK94YG1E203Z	Ceramic 0.02μF +80%, -20%	
C14	CC45SL1H330J	Ceramic 33pF ±5%	
C15	CC94SL1H050D	Ceramic 5pF ±0.5pF	
C16	CC94SL1H100D	Ceramic 10pF ±0.5pF	
C17	CC94SL1H050D	Ceramic 5pF ±0.5pF	
C18	CK94YG1E103Z	Ceramic 0.01μF +80%, -20%	
C19	CK94YG1E403Z	Ceramic 0.04μF +80%, -20%	
C20	CC94CG1H100J	Ceramic 10pF ±5%	
<b>RESISTOR</b>			
R1	PD14BY2E274J	Carbon 270kΩ ±5% 1/4W	
R2	PD14BY2E101J	Carbon 100Ω ±5% 1/4W	
R3, 4	PD14BY2E105J	Carbon 1MΩ ±5% 1/4W	
R5	PD14BY2E331J	Carbon 330Ω ±5% 1/4W	
R6	PD14BY2E333J	Carbon 33kΩ ±5% 1/4W	
R7	PD14BY2E473J	Carbon 47kΩ ±5% 1/4W	
R8	PD14BY2E102J	Carbon 1kΩ ±5% 1/4W	
R9	PD14BY2E101J	Carbon 100Ω ±5% 1/4W	
<b>SEMICONDUCTOR</b>			
Q1		3SK22 (Y)	
Q2		2SK19 (Y)	
Q3, 4		2SC460 (B)	
D1		SD111	
D2, 3		1N60	
<b>MISCELLANEOUS</b>			
—	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)	

Circuit No.	Parts No.	Description	Remarks
L1	L32-0098-05	Oscillator coil	
L2 ~ 4	L33-0104-05	Ferri-inductor	
L5	L33-0091-05	Ferri-inductor	
L6, 7	L33-0104-05	Ferri-inductor	

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

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C1	CE04W1C101	Electrolytic 100 $\mu$ F 16WV	
<b>RESISTOR</b>			
R1	PD14BY2E103J	Carbon 10k $\Omega$ $\pm$ 5% 1/4W	
R2	PD14BY2E683J	Carbon 68k $\Omega$ $\pm$ 5% 1/4W	
R3	PD14BY2E331J	Carbon 330 $\Omega$ $\pm$ 5% 1/4W	
R4	PD14BY2E471J	Carbon 470 $\Omega$ $\pm$ 5% 1/4W	
R5	PD14BY2E821J	Carbon 820 $\Omega$ $\pm$ 5% 1/4W	
R6	PD14BY2E222J	Carbon 2.2k $\Omega$ $\pm$ 5% 1/4W	
R7	PD14BY2E272J	Carbon 2.7k $\Omega$ $\pm$ 5% 1/4W	
R8	PD14BY2E222J	Carbon 2.2k $\Omega$ $\pm$ 5% 1/4W	
R9	PD14BY2E471J	Carbon 470 $\Omega$ $\pm$ 5% 1/4W	
R10	PD14BY2E392J	Carbon 3.9k $\Omega$ $\pm$ 5% 1/4W	
R11	PD14BY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
<b>SEMICONDUCTOR</b>			
Q1		2SA606 (L)	
Q2 ~ 4		2SC372	
D1		WZ-061	
<b>POTENTIOMETER</b>			
VR1	R12-0031-05	PC trimmer	
VR2	R12-3003-05	PC trimmer	

■ PARTS LISTS OF X44-0020-00 (RF UNIT)

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C1	CM93D1H101J(Z)	Mica 100pF $\pm$ 5%	
C2	CM93D2A102J	Mica 1000pF $\pm$ 5%	
C3	CM93D1H330J(Z)	Mica 33pF $\pm$ 5%	
C4	CC94SL1H101K	Ceramic 100pF $\pm$ 10%	
C5	CK94YG1E502Z	Ceramic 0.005 $\mu$ F +80%, -20%	
C6, 7	CK94YG1E403Z	Ceramic 0.04 $\mu$ F +80%, -20%	
C8	CC94SL1H101K	Ceramic 100pF $\pm$ 10%	
C9	CM93D1H330J(Z)	Mica 33pF $\pm$ 5%	
C10	CC94SL1H101K	Ceramic 100pF $\pm$ 10%	
C11	CK94YG1E403Z	Ceramic 0.04 $\mu$ F +80%, -20%	
C12	CC94SL1H020D	Ceramic 2pF $\pm$ 0.5pF	
C13	CM93D1H050J(Z)	Mica 5pF $\pm$ 5%	
C14	CK94YG1E403Z	Ceramic 0.04 $\mu$ F +80%, -20%	
C15	CK94YG1E103Z	Ceramic 0.01 $\mu$ F +80%, -20%	
C16	CM93D1H220J(Z)	Mica 22pF $\pm$ 5%	
C17	CM93D1H330J(Z)	Mica 33pF $\pm$ 5%	
C18	CC94SL1H220K	Ceramic 22pF $\pm$ 10%	

Circuit No.	Parts No.	Description			Remarks
C19	CC94SL1H030D	Ceramic	3pF	±0.5pF	
C20	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C21	CK94YG1E103Z	Ceramic	0.01μF	+80%, -20%	
C22	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C23	CE04W1HR47	Electrolytic	0.47μF		50WV
<b>RESISTOR</b>					
R1	PD14BY2E474J	Carbon	470kΩ	±5%	1/4W
R2	PD14BY2E332J	Carbon	3.3kΩ	±5%	1/4W
R3	PD14BY2E222J	Carbon	2.2kΩ	±5%	1/4W
R4	PD14BY2E101J	Carbon	100Ω	±5%	1/4W
R5	PD14BY2E474J	Carbon	470kΩ	±5%	1/4W
R6	PD14BY2E332J	Carbon	3.3kΩ	±5%	1/4W
R7	PD14BY2E104J	Carbon	100kΩ	±5%	1/4W
R8	PD14BY2E101J	Carbon	100Ω	±5%	1/4W
R10	PD14BY2E333J	Carbon	33kΩ	±5%	1/4W
R11	PD14BY2E102J	Carbon	1kΩ	±5%	1/4W
R12	PD14BY2E104J	Carbon	100kΩ	±5%	1/4W
R13 ~ 15	PD14BY2E101J	Carbon	100Ω	±5%	1/4W
R16	PD14BY2E470J	Carbon	47Ω	±5%	1/4W
<b>SEMICONDUCTOR</b>					
Q1, 2		3SK22 (GR)			
Q3		2SK19 (GR)			
Q4		2SC460 (B)			
D1, 2		1N60			
D3		MZ1004			
<b>COIL</b>					
—	L31-0010-05	8.3 Trap coil			
—	L31-0011-05	8.8 Trap coil			
—	L31-0012-05	12.3 Trap coil			
L3, 5, 6	L33-0104-05	Ferri-inductor			
—	L60-0002-12	Coil pack			
<b>MISCELLANEOUS</b>					
—	C01-0002-15	Variable capacitor			
VR1	R12-5016-05	PC trimmer			
—	F10-0009-04	Shield plate (B)			
—	F10-0010-04	Shield plate (C) x2			
—	F10-0011-04	Shield plate (D) x2			
—	F10-0309-02	Shield plate (A)			

■ PARTS LISTS OF X46-0002-00 (2m CRYSTAL CONVERTOR UNIT)

Circuit No.	Parts No.	Description			Remarks
<b>CAPACITOR</b>					
C1	CC45CH1H050D	Ceramic	5pF	±0.5pF	
C2	CC45CH1H100D	Ceramic	10pF	±0.5pF	
C3 ~ 7	CK94YG1E103Z	Ceramic	0.01μF	+80%, -20%	
C8	CC45CH1H030D	Ceramic	3pF	±0.5pF	
C9, 10	CC45CH1H050D	Ceramic	5pF	±0.5pF	
C11	CC45CH1H220J	Ceramic	22pF	±5%	
C12 ~ 14	CK94YG1E103Z	Ceramic	0.01μF	+80%, -20%	
C15	CC94SH1H020D	Ceramic	2pF	±0.5pF	
C16	CC45CH1H150J	Ceramic	15pF	±5%	
C17	CK94YX1H471K	Ceramic	470pF	±10%	



Circuit No.	Parts No.	Description			Remarks
C18	CK94YG1E103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C19	CC45CH1H220J	Ceramic	22pF	$\pm$ 5%	
C20, 21	CK94YG1E103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C22	CC45CH1H220J	Ceramic	22pF	$\pm$ 5%	
C23	CK94YG1E103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C24	CC45CH1H220J	Ceramic	22pF	$\pm$ 5%	
C25, 26	CK94YG1E103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C27	CC45CH1H220J	Ceramic	22pF	$\pm$ 5%	
C28	CK94YG1E103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C29	CC45CH1H220J	Ceramic	22pF	$\pm$ 5%	
<b>RESISTOR</b>					
R1, 2	PD14CY2E104J	Carbon	100k $\Omega$	$\pm$ 5%	1/4W
R3	PD14CY2E394J	Carbon	390k $\Omega$	$\pm$ 5%	1/4W
R4	PD14CY2E332J	Carbon	3.3k $\Omega$	$\pm$ 5%	1/4W
R5	PD14CY2E101J	Carbon	100 $\Omega$	$\pm$ 5%	1/4W
R6	PD14CY2E104J	Carbon	100k $\Omega$	$\pm$ 5%	1/4W
R7	PD14CY2E332J	Carbon	3.3k $\Omega$	$\pm$ 5%	1/4W
R8	PD14CY2E102J	Carbon	1k $\Omega$	$\pm$ 5%	1/4W
R9	PD14CY2E471J	Carbon	470 $\Omega$	$\pm$ 5%	1/4W
R10	PD14CY2E102J	Carbon	1k $\Omega$	$\pm$ 5%	1/4W
R11	PD14CY2E391J	Carbon	390 $\Omega$	$\pm$ 5%	1/4W
R12	PD14CY2E683J	Carbon	68k $\Omega$	$\pm$ 5%	1/4W
R13	PD14CY2E682J	Carbon	6.8k $\Omega$	$\pm$ 5%	1/4W
R14	PD14CY2E102J	Carbon	1k $\Omega$	$\pm$ 5%	1/4W
R15	PD14CY2E391J	Carbon	390 $\Omega$	$\pm$ 5%	1/4W
R16	PD14CY2E683J	Carbon	68k $\Omega$	$\pm$ 5%	1/4W
R17	PD14CY2E682J	Carbon	6.8k $\Omega$	$\pm$ 5%	1/4W
R18	PD14CY2E824J	Carbon	820k $\Omega$	$\pm$ 5%	1/4W
R19	PD14CY2E562J	Carbon	5.6k $\Omega$	$\pm$ 5%	1/4W
R20	PD14CY2E104J	Carbon	100k $\Omega$	$\pm$ 5%	1/4W
<b>SEMICONDUCTOR</b>					
Q1, 2		3SK22 (GR)			
Q3, 4		2SC535 (B)			
Q5		2SC460 (B)			
D1, 2		1N60			
D3		MZ1004			
D4, 5		1S-85 (W)			
<b>COIL</b>					
L1	L34-0028-35	VHF coil			
L2	L33-0027-04	Choke coil			
L3	L34-0029-45	VHFcoil			
L4	L31-0039-04	Tuning coil			
L5, 6	L31-0040-04	Tuning coil			
L7	L34-0030-04	VHF coil			
<b>MISCELLANEOUS</b>					
-	F10-0031-14	Shield plate (A)			
-	F10-0032-14	Shield plate (B)			
X1	L77-0033-05	Crystal oscillator (38.666 MHz)			
X2	L77-0034-05	Crystal oscillator (39.233 MHz)			
VR1, 2	R12-4015-05	PC trimmer	50k $\Omega$ (B)		
CT1 ~ 3	C05-0009-15	Trimmer			

■ PARTS LIST OF X48-0011-00 (IF UNIT)

Circuit No.	Parts No.	Description			Remarks
<b>CAPACITOR</b>					
C1	CM93D2H101JZ	Mica	100pF	±5%	
C2	CM93D2H390JZ	Mica	39pF	±5%	
C3	CM93D2H121JZ	Mica	120pF	±5%	
C4	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C5	CK94YG1E102Z	Ceramic	0.001μF	+80%, -20%	
C6	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C7	CM93D2H100J	Mica	10pF	±5%	
C8, 9	CQ92M1H103K	Mylar	0.01μF	±10%	
C10	CC94SL1H101K	Ceramic	100pF	±10%	
C11	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C12	CC94SL1H050D	Ceramic	5pF	±0.5pF	
C13, 14	CC94SL1H330K	Ceramic	33pF	±10%	
C15	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C16	CQ93M1H472K	Mylar	0.0047μ	±10%	
C17	CE04W1HR47	Electrolytic	0.47μF		50WV
C18	CK94YG1E103Z	Ceramic	0.01μF	+80%, -20%	
C19	CC94SL1H221K	Ceramic	220pF	±10%	
C20	CC94SL1H470K	Ceramic	47pF	±10%	
C21	CQ92M1H103K	Mylar	0.01μF	±10%	
C22	CE04W1HR47	Electrolytic	0.47μF		50WV
C23	CQ92M1H103K	Mylar	0.01μF	±10%	
C24	CK94YG1E102Z	Ceramic	0.001μF	+80%, -20%	
C25	CE04W1H010	Electrolytic	1μF		50WV
C26	CE04W1C330	Electrolytic	33μF		16WV
C27, 28	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C29	CM93D2H101JZ	Mica	100pF	±5%	
C30	CK94YG1E403Z	Ceramic	0.04μF	+80%, -20%	
C31	CE04W1C100	Electrolytic	10μF		16WV
C32	CK94YG1E102Z	Ceramic	0.001μF	+80%, -20%	
C33	CK94YG1E103Z	Ceramic	0.01μF	+80%, -20%	
C34	CQ93M1H473K	Mylar	0.047μF	±10%	
<b>RESISTOR</b>					
R1	PD14BY2E332J	Carbon	3.3kΩ	±5%	1/4W
R2	PD14BY2E103J	Carbon	10kΩ	±5%	1/4W
R3	PD14BY2E331J	Carbon	330Ω	±5%	1/4W
R4, 5	PD14BY2E102J	Carbon	1kΩ	±5%	1/4W
R6	PD14BY2E223J	Carbon	22kΩ	±5%	1/4W
R7	PD14BY2E683J	Carbon	68kΩ	±5%	1/4W
R8	PD14BY2E473J	Carbon	47kΩ	±5%	1/4W
R9	PD14BY2E103J	Carbon	10kΩ	±5%	1/4W
R10	PD14BY2E102J	Carbon	1kΩ	±5%	1/4W
R11	PD14BY2E153J	Carbon	15kΩ	±5%	1/4W
R12	PD14BY2E472J	Carbon	4.7kΩ	±5%	1/4W
R13	PD14BY2E104J	Carbon	100kΩ	±5%	1/4W
R14 ~ 16	PD14BY2E103J	Carbon	10kΩ	±5%	1/4W
R17	PD14BY2E104J	Carbon	100kΩ	±5%	1/4W
R18	PD14BY2E473J	Carbon	47kΩ	±5%	1/4W
R19	PD14BY2E105J	Carbon	1MΩ	±5%	1/4W
R20	PD14BY2E330J	Carbon	33Ω	±5%	1/4W
R21, 22	PD14BY2E103J	Carbon	10kΩ	±5%	1/4W
R23	PD14BY2E184J	Carbon	180kΩ	±5%	1/4W
R24	PD14BY2E330J	Carbon	33Ω	±5%	1/4W
R25	PD14BY2E473J	Carbon	47kΩ	±5%	1/4W
R26, 27	PD14BY2E472J	Carbon	4.7kΩ	±5%	1/4W
R28	PD14BY2E332J	Carbon	3.3kΩ	±5%	1/4W
R29	PD14BY2E473J	Carbon	47kΩ	±5%	1/4W
R30	PD14BY2E472J	Carbon	4.7kΩ	±5%	1/4W
R31	PD14BY2E102J	Carbon	1kΩ	±5%	1/4W
R32	PD14BY2E471J	Carbon	470Ω	±5%	1/4W
R33, 34	PD14BY2E102J	Carbon	1kΩ	±5%	1/4W

Circuit No.	Parts No.	Description	Remarks
R35	PD14BY2E153J	Carbon 15k $\Omega$ $\pm$ 5% 1/4W	
R36	PD14BY2E472J	Carbon 4.7k $\Omega$ $\pm$ 5% 1/4W	
R37, 38	PD14CY2E104J	Carbon 100k $\Omega$ $\pm$ 5% 1/4W	
<b>SEMICONDUCTOR</b>			
Q1		3SK22 (GR)	
Q2		TA7045M	
Q3		2SC460 (B)	
Q4		2SC733 (Y), (GR)	
Q5		2SA495 (Y)	
Q6		2SC733 (Y)	
Q7		2SC1000 (GR)	
Q8		2SC460 (B)	
D1 ~ 10		1N60	
D11, 12		1S1555	
<b>TRANSFORMER/COIL</b>			
T1	L30-0008-05	IFT (B.P.F)	
T2	L30-0009-05	IFT (B.P.F)	
T3	L30-0008-05	IFT (B.P.F)	
T4, 5	L30-0010-05	IFT	
T6	L30-0011-05	IFT	
T7	L30-0012-05	IFT	
T8	L30-0013-05	IFT	
L1	L33-0104-05	Ferri-inductor	
<b>POTENTIOMETER</b>			
VR1, 2	R12-1012-05	PC trimmer	
VR3	R12-3022-05	PC trimmer	

■ PARTS LISTS OF X49-1040-10 (AF UNIT)

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C1	CE04W1H010(RL)	Electrolytic 1 $\mu$ F 50WV	
C2	CQ92M1H473K	Polyester 0.047 $\mu$ F $\pm$ 10%	
C3	CE04W0J101(RL)	Electrolytic 100 $\mu$ F 6.3WV	
C4	CS04E1ER47M	Tantulm 0.47 $\mu$ F 25WV	
C5	CE04W1C100(RL)	Electrolytic 10 $\mu$ F 16WV	
C6	CE04W1H010(RL)	Electrolytic 1 $\mu$ F 50WV	
C7	CQ93M1H472K	Polyester 0.0047 $\mu$ F $\pm$ 10%	
C8	CE04W1A470(RL)	Electrolytic 47 $\mu$ F 10WV	
C9	CE04W1C330(RL)	Electrolytic 33 $\mu$ F 16WV	
C10	CE04W1C221(RL)	Electrolytic 220 $\mu$ F 16WV	
C11	CK45F1H103Z	Ceramic 0.01 $\mu$ F +80%, -20%	
C12	CE04W1C470(RL)	Electrolytic 47 $\mu$ F 16WV	
<b>RESISTOR</b>			
R1	PD14BY2E474J	Carbon 470k $\Omega$ $\pm$ 5% 1/4W	
R2	PD14BY2E103J	Carbon 10k $\Omega$ $\pm$ 5% 1/4W	
R3	PD14BY2E223J	Carbon 22k $\Omega$ $\pm$ 5% 1/4W	
R4	PD14BY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
R5	PD14BY2E471J	Carbon 470 $\Omega$ $\pm$ 5% 1/4W	
R6	PD14BY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
R7	PD14BY2E153J	Carbon 15k $\Omega$ $\pm$ 5% 1/4W	
R8	PD14BY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
R9	PD14BY2E332J	Carbon 3.3k $\Omega$ $\pm$ 5% 1/4W	
R10	PD14BY2E682J	Carbon 6.8k $\Omega$ $\pm$ 5% 1/4W	

Circuit No.	Parts No.	Description	Remarks
R11	PD14BY2E152J	Carbon 1.5k $\Omega$ $\pm$ 5% 1/4W	
R12	PD14BY2E103J	Carbon 10k $\Omega$ $\pm$ 5% 1/4W	
R13	PD14BY2E330J	Carbon 33 $\Omega$ $\pm$ 5% 1/4W	
R14	PD14BY2E8R2J	Carbon 8.2 $\Omega$ $\pm$ 5% 1/4W	
R15	PD14BY2E471J	Carbon 470 $\Omega$ $\pm$ 5% 1/4W	
R16	PD14BY2E221J	Carbon 220 $\Omega$ $\pm$ 5% 1/4W	
R17, 18	R92-0041-25	Metal film 0.47 $\Omega$ $\pm$ 10% 1W	
<b>SEMICONDUCTOR</b>			
Q1		2SC1000 (GR)	
Q2		2SC734 (Y)	
Q3		2SD90 (O)	
Q4		2SB473 (C,D,N)	
D1, 2		1S1555	
<b>MISCELLANEOUS</b>			
L1	L33-0187-05	Magnetic shield inductor	
L2	L33-0025-05	Heator choke	
	R12-4016-05	PC trimmer	

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

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C1	CK94YG1E102Z	Ceramic 0.001 $\mu$ F +80%, -20%	
C2	CM93D2H220J	Mica 22pF $\pm$ 5%	
C3	CK94YG1E102Z	Ceramic 0.001 $\mu$ F +80%, -20%	
C4	CM93D2H220J	Mica 22pF $\pm$ 5%	
C5	CK94YG1E102Z	Ceramic 0.001 $\mu$ F +80%, -20%	
C6	CM93D2H220J	Mica 22pF $\pm$ 5%	
C7	CK94YG1E102Z	Ceramic 0.001 $\mu$ 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 $\mu$ F +80%, -20%	
C13	CM93D2H220J	Mica 22pF $\pm$ 5%	
C14	CK94YG1E103Z	Ceramic 0.01 $\mu$ F +80%, -20%	
<b>RESISTOR</b>			
R1 ~4	PD14BY2E103J	Carbon 10k $\Omega$ $\pm$ 5% 1/4W	
R5	PD14BY2E333J	Carbon 33k $\Omega$ $\pm$ 5% 1/4W	
R6	PD14BY2E682J	Carbon 6.8k $\Omega$ $\pm$ 5% 1/4W	
R7	PD14BY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
R8	PD14BY2E683J	Carbon 68k $\Omega$ $\pm$ 5% 1/4W	
R9	PD14BY2E101J	Carbon 100 $\Omega$ $\pm$ 5% 1/4W	
<b>SEMICONDUCTOR</b>			
Q1, 2		2SC460	
D1 ~4		1S1555	
<b>MISCELLANEOUS</b>			
TC1 ~3	C05-0013-15	PC trimmer	
-	F10-0012-04	Shield plate	
-	F11-0015-04	Shield box	

Circuit No.	Parts No.	Description	Remarks
T1 L1 ~ 6	L32-0003-05 L33-0104-05	Oscillator coil Ferri-inductor	
X1 X2 X3	L77-0123-05 L77-0122-05 L77-0120-05	Crystal oscillator (3395.0 kHz) Crystal oscillator (3396.5 kHz) Crystal oscillator (3393.5 kHz)	
—	J25-0029-04	PC board	

■ PARTS LISTS OF X50-1140-10 (FIXED CHANNEL UNIT)

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C1	CK45F1E403Z	Ceramic 0.04 $\mu$ F +80%, -20%	
C2	CC45SL1H151J	Ceramic 150pF $\pm$ 5%	
C3	CK45F1E403Z	Ceramic 0.04 $\mu$ F +80%, -20%	
C4	CM93D2H820J(Z)	Mica 82pF $\pm$ 5%	
C5	CM93D2H100J(Z)	Mica 10pF $\pm$ 5%	
C6	CM93D2H330J(Z)	Mica 33pF $\pm$ 5%	
C7	CK45F1H103Z	Ceramic 0.01 $\mu$ F +80%, -20%	
<b>RESISTOR</b>			
R1	PD14CY2E682J	Carbon 6.8k $\Omega$ $\pm$ 5% 1/4W	
R2	PD14CY2E473J	Carbon 47k $\Omega$ $\pm$ 5% 1/4W	
R3	PD14CY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
R4	PD14CY2E333J	Carbon 33k $\Omega$ $\pm$ 5% 1/4W	
R5	PD14CY2E473J	Carbon 47k $\Omega$ $\pm$ 5% 1/4W	
R6	PD14CY2E102J	Carbon 1k $\Omega$ $\pm$ 5% 1/4W	
R7	PD14CY2E101J	Carbon 100 $\Omega$ $\pm$ 5% 1/4W	
R8	PD14CY2E103J	Carbon 10k $\Omega$ $\pm$ 5% 1/4W	
R9	RC05GF2H680J	Carbon 68 $\Omega$ $\pm$ 5% 1/2W	
<b>SEMICONDUCTOR</b>			
Q1 ~ 3 Q4 D1, 2		2SC460B 2SC735 (Y) IN60	
<b>COIL</b>			
L1 L2 L3	L33-0104-05 L33-0089-05 L33-0104-05	Ferri-inductor Ferri-inductor Ferri-inductor	
<b>MISCELLANEOUS</b>			
TC1 ~ 5 TC6	C05-0030-05 C05-0015-15	Ceramic trimmer 20pF Ceramic trimmer 40pF	
J1, 2 — — —	E10-0702-05 E18-0203-05 E23-0046-04 K23-0069-04	7P socket Crystal oscillator socket Wrapping terminal Knob	
S1	S04-1031-05	Rotary switch	

■ PARTS LISTS OF X51-1050-10 (FILTER UNIT)

Circuit No	Parts No.	Description			Remarks
<b>CAPACITOR</b>					
C1	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C2, 3	CK45F1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C4	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C5	CC45SL1H050D	Ceramic	5pF	$\pm$ 0.5pF	
C6	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C7,8	CK45F1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C9	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C10, 11	CC45SL1H050D	Ceramic	5pF	$\pm$ 0.5pF	
C12	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C13, 14	CK45F1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C15	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C16, 17	CC45SL1H050D	Ceramic	5pF	$\pm$ 0.5pF	
C18	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C19, 20	CK45F1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C21	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C22	CC45SL1H050D	Ceramic	5pF	$\pm$ 0.5pF	
C23	CM93D1H220J(Z)	Mica	22pF	$\pm$ 5%	
C24	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C25, 26	CC45SL1H050D	Ceramic	5pF	$\pm$ 0.5pF	
<b>RESISTOR</b>					
R1	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R2	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R3	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R4	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R5	PD14CY2E223J	Carbon	22k $\Omega$	$\pm$ 5%	1/4W
R6	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R7	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R8	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R9	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R10	PD14CY2E223J	Carbon	22k $\Omega$	$\pm$ 5%	1/4W
R11	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R12	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R13	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R14	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R15	PD14CY2E223J	Carbon	22k $\Omega$	$\pm$ 5%	1/4W
R16	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R17	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R18	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R19	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R20	PD14CY2E223J	Carbon	22k $\Omega$	$\pm$ 5%	1/4W
R21, 22	PD14CY2E222J	Carbon	2.2k $\Omega$	$\pm$ 5%	1/4W
<b>SEMICONDUCTOR</b>					
D1 ~ 14		1S73A			
<b>MISCELLANEOUS</b>					
L1, 2	L33-0104-05	Ferri-inductor			
XF1	L71-0017-05	Crystal filter (CW)			
XF2	L71-0018-05	Crystal filter (SSB)			
XF3	L71-0002-05	Crystal filter (AM)			

■ PARTS LISTS OF X52-0005-01 (MARKER UNIT)

Circuit No.	Parts No.	Description			Remarks
<b>CAPACITOR</b>					
C1	CQ93M1H103K	Mylar	0.01 $\mu$ F	$\pm$ 10%	
C2	CM93D2H151J(Z)	Mica	150pF	$\pm$ 5%	
C3	CC94TH2H101J	Ceramic	100pF	$\pm$ 5%	
C4	CM93D2H330J(Z)	Mica	33pF	$\pm$ 5%	
C5	CK94YG1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C6	CM93D2H390J(Z)	Mica	39pF	$\pm$ 5%	
C7	CM93D2H330J(Z)	Mica	33pF	$\pm$ 5%	
C8	CM93D2H820J(Z)	Mica	82pF	$\pm$ 5%	
C9	CM93D2H201J(Z)	Mica	200pF	$\pm$ 5%	
C10	CC94SL1H470K	Ceramic	47pF	$\pm$ 10%	
C11	CC94SL2H050D	Ceramic	5pF	$\pm$ 0.5pF	
C12	CK94YG1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C13	CM93D2H470J(Z)	Ceramic	47pF	$\pm$ 5%	
<b>RESISTOR</b>					
R1	PD14CY2E473J	Carbon	47k $\Omega$	$\pm$ 5%	1/4W
R2	PD14CY2E103J	Carbon	10k $\Omega$	$\pm$ 5%	1/4W
R3	PD14CY2E101J	Carbon	100 $\Omega$	$\pm$ 5%	1/4W
R4	PD14CY2E473J	Carbon	47k $\Omega$	$\pm$ 5%	1/4W
R5	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R6	PD14CY2E224J	Carbon	220k $\Omega$	$\pm$ 5%	1/4W
R7	RC05GF2H105J	Carbon	1M $\Omega$	$\pm$ 5%	1/2W
R8 ~ 10	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
<b>SEMICONDUCTOR</b>					
Q1		2SC373 or 2SC458 (B)			
Q2, 3		2SC373			
Q4		2SC373 or 2SC458 (B)			
D1		1N60			
<b>MISCELLANEOUS</b>					
L1	L33-0118-05	Ferri-inductor			
X1	L77-0009-05	Crystal oscillator (100kHz)			
-	C05-0029-15	Ceramic trimmer			
-	J19-0013-04	Crystal oscillator holder			

■ PARTS LISTS OF X54-1080-10 (NB UNIT)

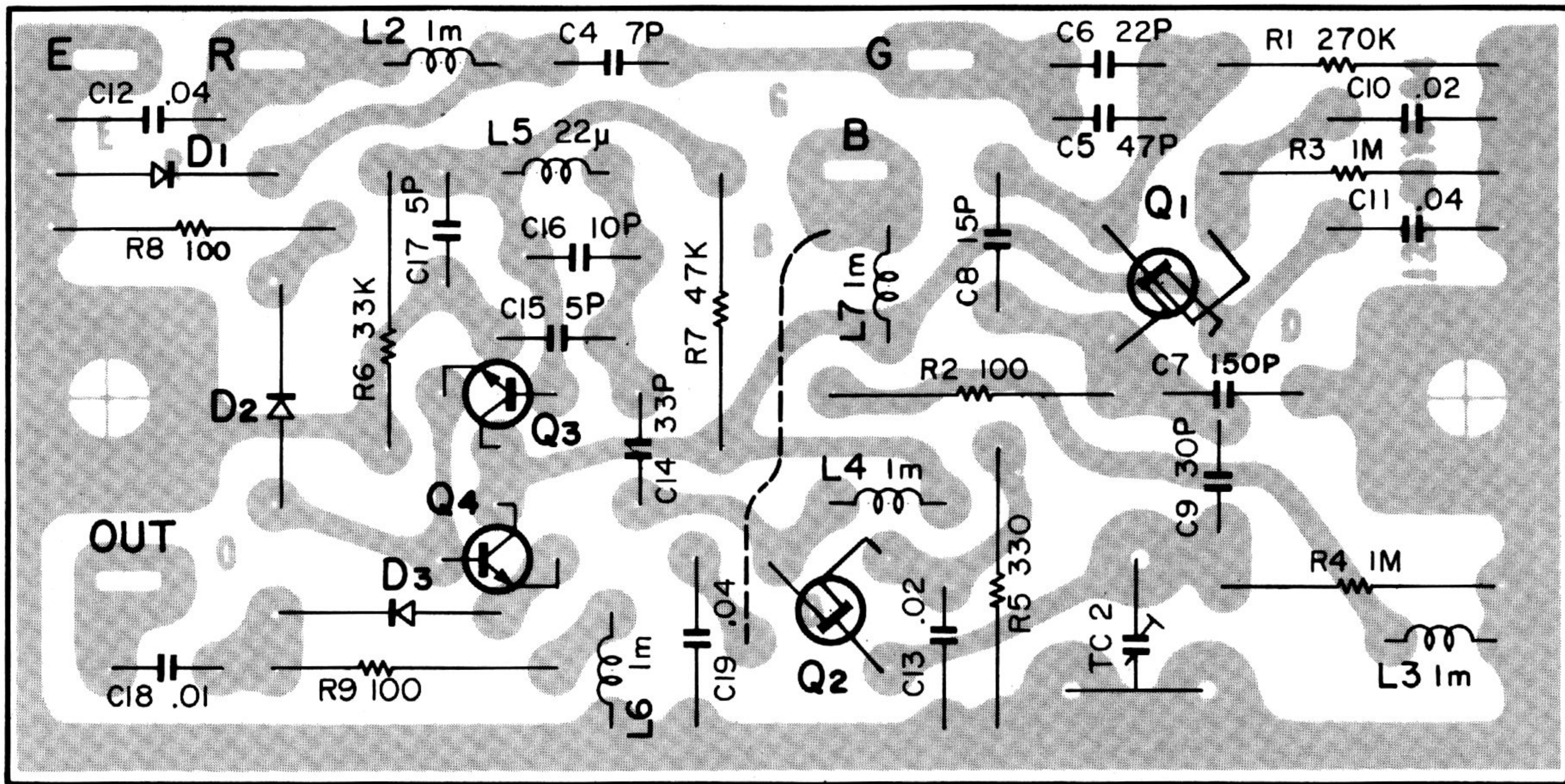
Circuit No.	Parts No.	Description			Remarks
<b>CAPACITOR</b>					
C1, 2	CC45SL1H020D	Ceramic	2pF	$\pm$ 0.5pF	
C3	CK45F1H203Z	Ceramic	0.02 $\mu$ F	+80%, -20%	
C4	CK45F1H103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C5, 6	CC45SL1H101J	Ceramic	100pF	$\pm$ 5%	
C7	CE04W1E100(RL)	Electrolytic	10 $\mu$ F		25WV
C8, 9	CK45F1H103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C10, 11	CK45F1H203Z	Ceramic	0.02 $\mu$ F	+80%, -20%	
C12	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C13, 14	CK45F1H103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C15	CE04W1H010 (RL)	Electrolytic	1 $\mu$ F		50WV
C16	CK45F1H203Z	Ceramic	0.02 $\mu$ F	+80%, -20%	
C17	CK45F1H103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
C18	CK45D1H102M	Ceramic	0.001 $\mu$ F	$\pm$ 20%	
C19	CC45SL1H331J	Ceramic	330pF	$\pm$ 5%	
C20	CK45F1H103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	

Circuit No.	Parts No.	Description			Remarks
C21	CK45F1E403Z	Ceramic	0.04 $\mu$ F	+80%, -20%	
C22	CK45F1H203Z	Ceramic	0.02 $\mu$ F	+80%, -20%	
C23, 24	CK45F1H103Z	Ceramic	0.01 $\mu$ F	+80%, -20%	
<b>RESISTOR</b>					
R1	PD14CY2E151J	Carbon	150 $\Omega$	$\pm$ 5%	1/4W
R2	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R3	PD14CY2E102J	Carbon	1k $\Omega$	$\pm$ 5%	1/4W
R4	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R5	PD14CY2E102J	Carbon	1k $\Omega$	$\pm$ 5%	1/4W
R6	PD14CY2E472J	Carbon	4.7k $\Omega$	$\pm$ 5%	1/4W
R7	PD14CY2E682J	Carbon	6.8k $\Omega$	$\pm$ 5%	1/4W
R8	PD14CY2E221J	Carbon	220 $\Omega$	$\pm$ 5%	1/4W
R9	PD14CY2E223J	Carbon	22k $\Omega$	$\pm$ 5%	1/4W
R10	PD14CY2E333J	Carbon	33k $\Omega$	$\pm$ 5%	1/4W
R11	PD14CY2E683J	Carbon	68k $\Omega$	$\pm$ 5%	1/4W
R12	PD14CY2E102J	Carbon	1k $\Omega$	$\pm$ 5%	1/4W
R13	PD14CY2E471J	Carbon	470 $\Omega$	$\pm$ 5%	1/4W
R14, 15	PD14CY2E103J	Carbon	10k $\Omega$	$\pm$ 5%	1/4W
R16	PD14CY2E333J	Carbon	33k $\Omega$	$\pm$ 5%	1/4W
R17	PD14CY2E103J	Carbon	10k $\Omega$	$\pm$ 5%	1/4W
R18	PD14CY2E222J	Carbon	2.2k $\Omega$	$\pm$ 5%	1/4W
<b>SEMICONDUCTOR</b>					
Q1		3SK22 (GR)			
Q2		2SK19 (GR)			
Q3		TA7045M (R)			
Q4		2SC460 (B)			
Q5, 6		2SC733 (Y)			
D1 ~ 4		1S73A			
D5, 6		1N60			
D7		MV-13			
<b>COIL/TRANSFORMER</b>					
L1, 2	L33-0104-05	Ferri-inductor			
T1 ~ 3	L30-0010-05	IFT (3395 kHz)			
T4	L31-0286-05	NB coil (A) (3395 kHz)			
T5	L31-0287-05	NB coil (B) (3395 kHz)			
T6	L30-0010-05	IFT (3395 kHz)			
T7	L30-0021-05	IFT (3395 kHz)			
<b>MISCELLANEOUS</b>					
—	E23-0046-04	Wrapping terminal			
—	J25-0836-04	PC board			



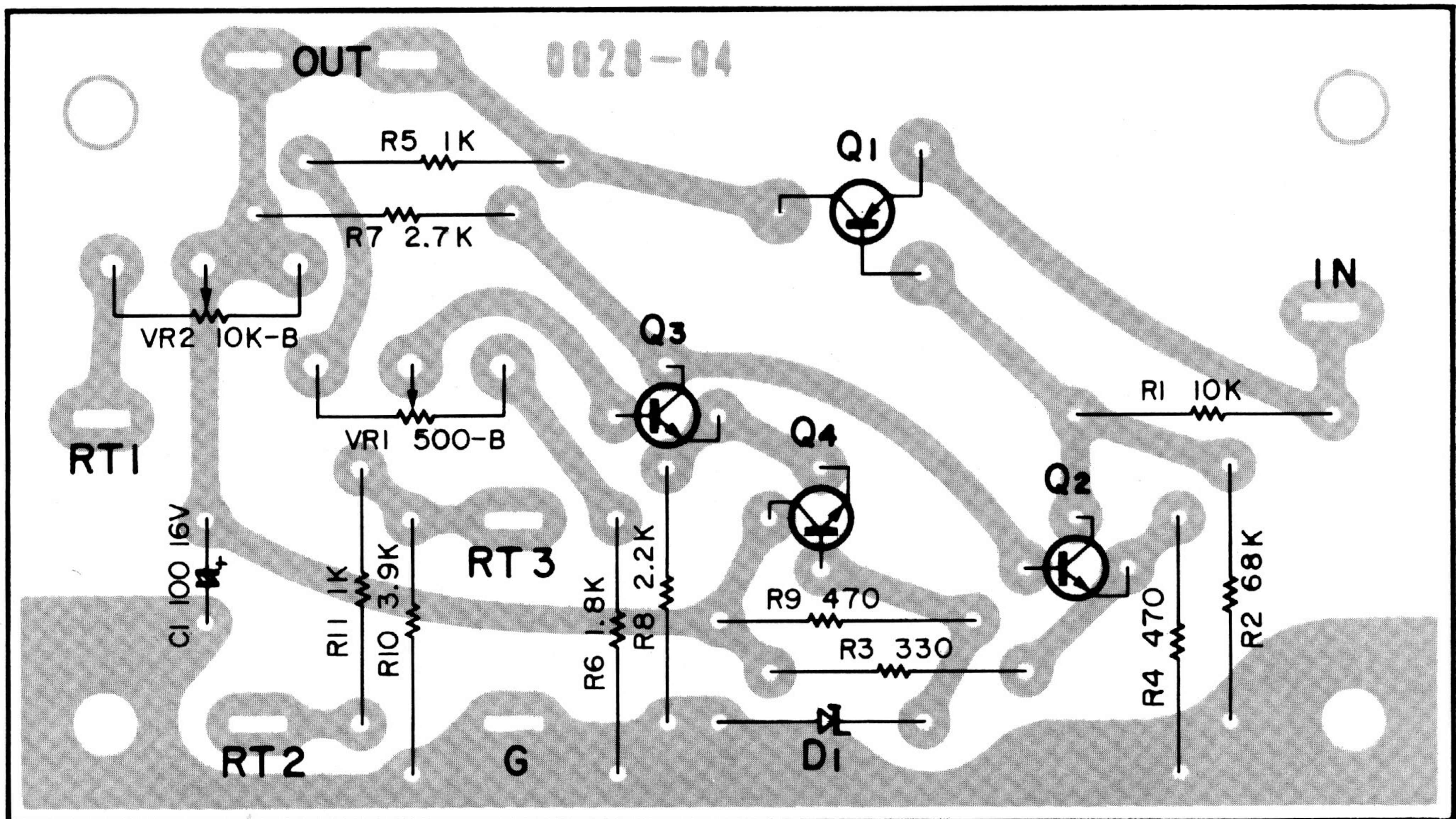
# PC BOARD

## ■ PC BOARD OF X40-0016-08 (VFO UNIT)



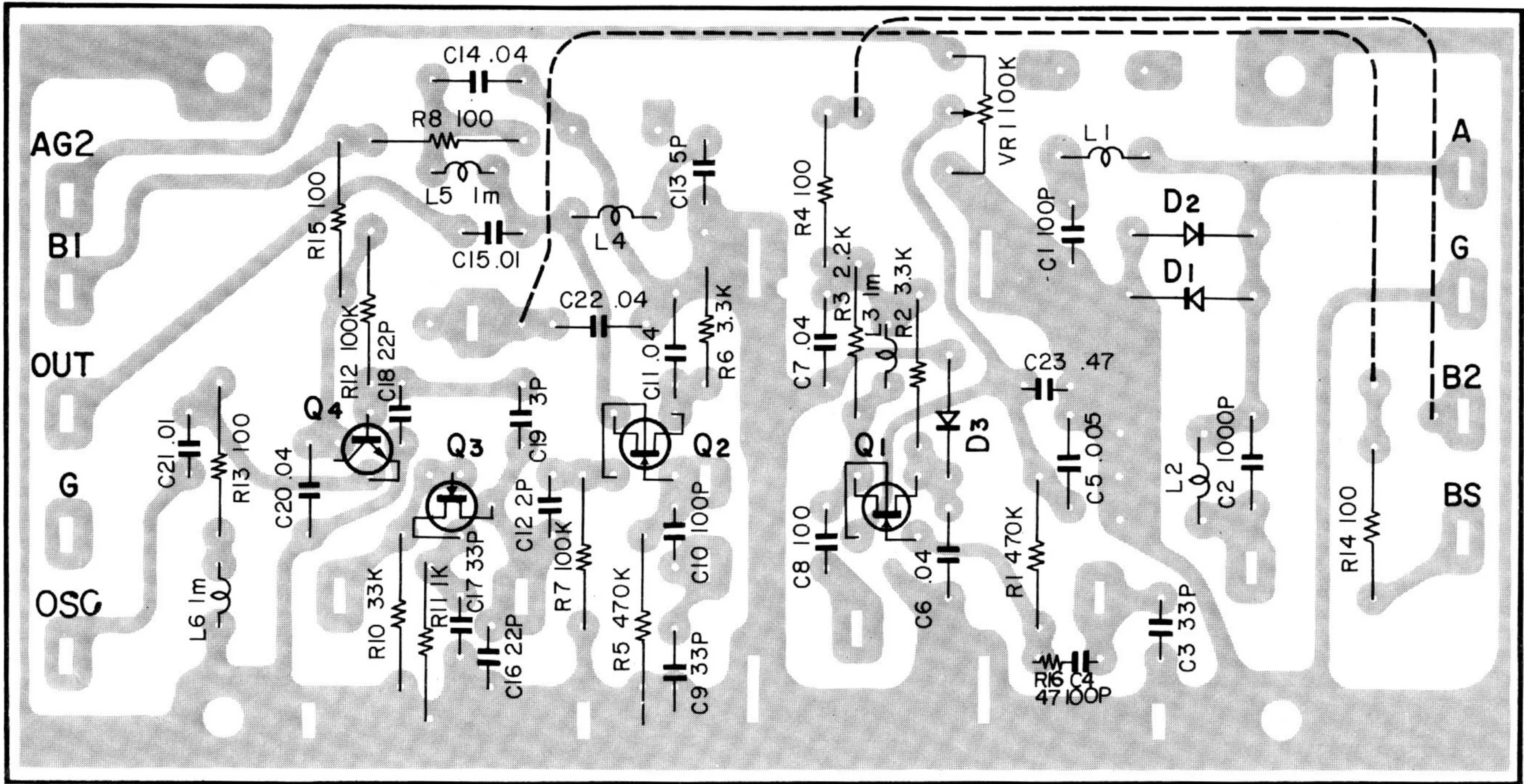
Q<sub>1</sub> : 3SK22(Y), Q<sub>2</sub> : 2SK19(Y), Q<sub>3,4</sub> : 2SC460(B), D<sub>1</sub> : SD111, D<sub>2,3</sub> : IN60

## ■ PC BOARD OF X43-0010-00 (AVR UNIT)



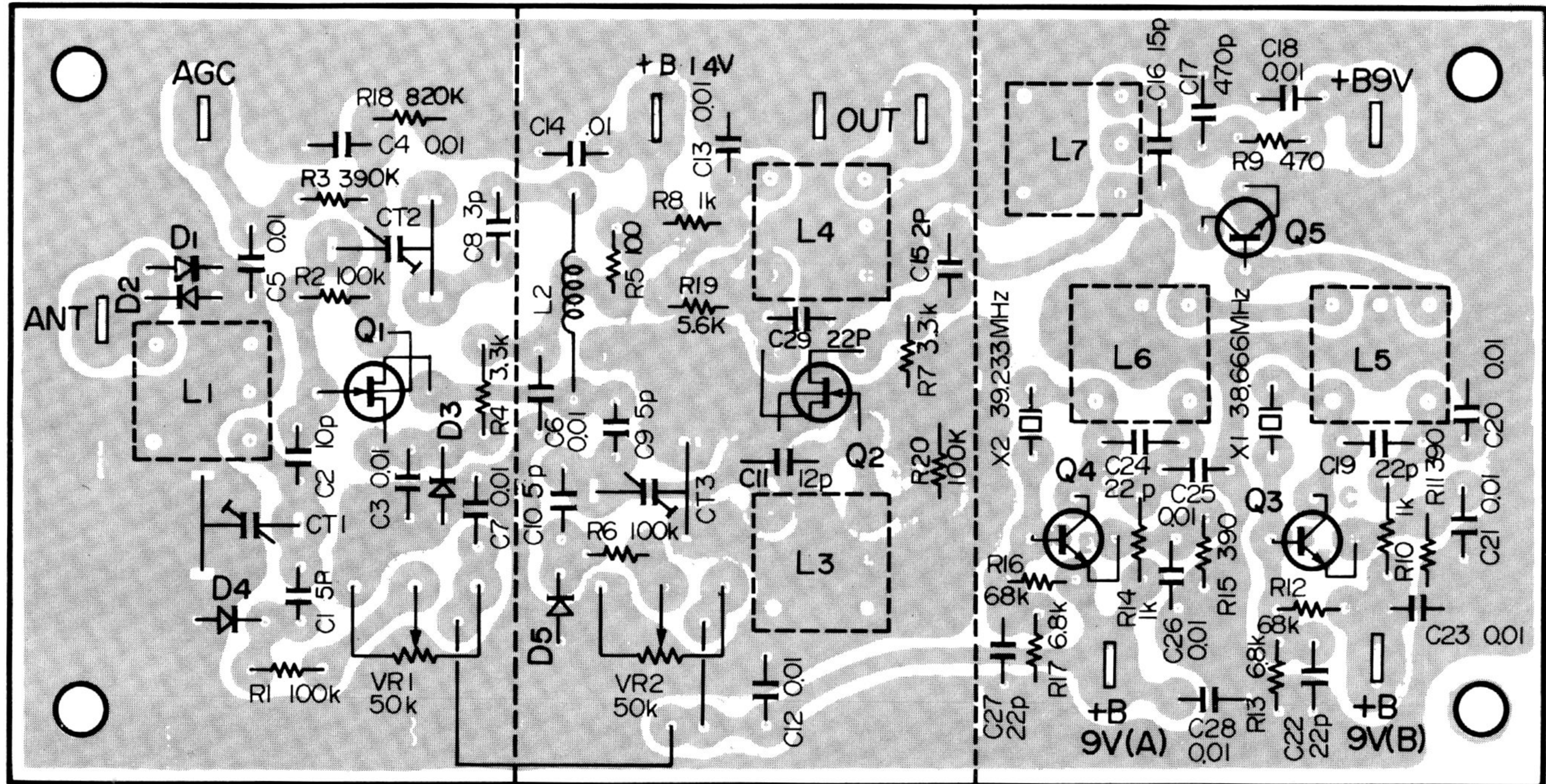
Q<sub>1</sub> : 2SA606(L), Q<sub>2 ~ 4</sub> : 2SC372, D<sub>1</sub> : WZ-061

■ PC BOARD OF X44-0020-00 (RF UNIT)



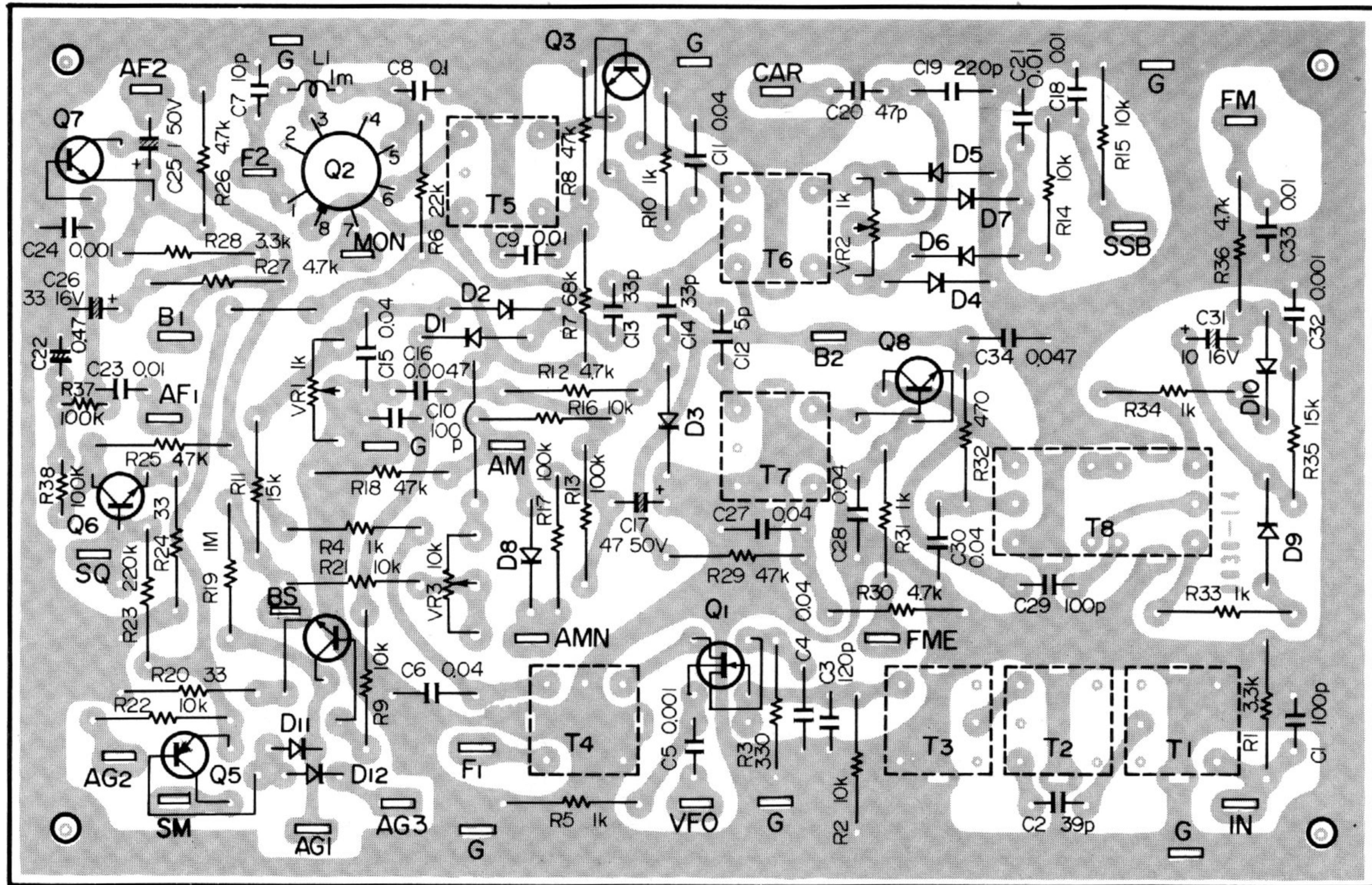
Q<sub>1,2</sub>: 3SK22(GR) Q<sub>3</sub>: 2SK19(GR) Q<sub>4</sub>: 2SC460(B)

■ PC BOARD OF X46-0002-00 (2M CRYSTAL CONVERTOR UNIT)



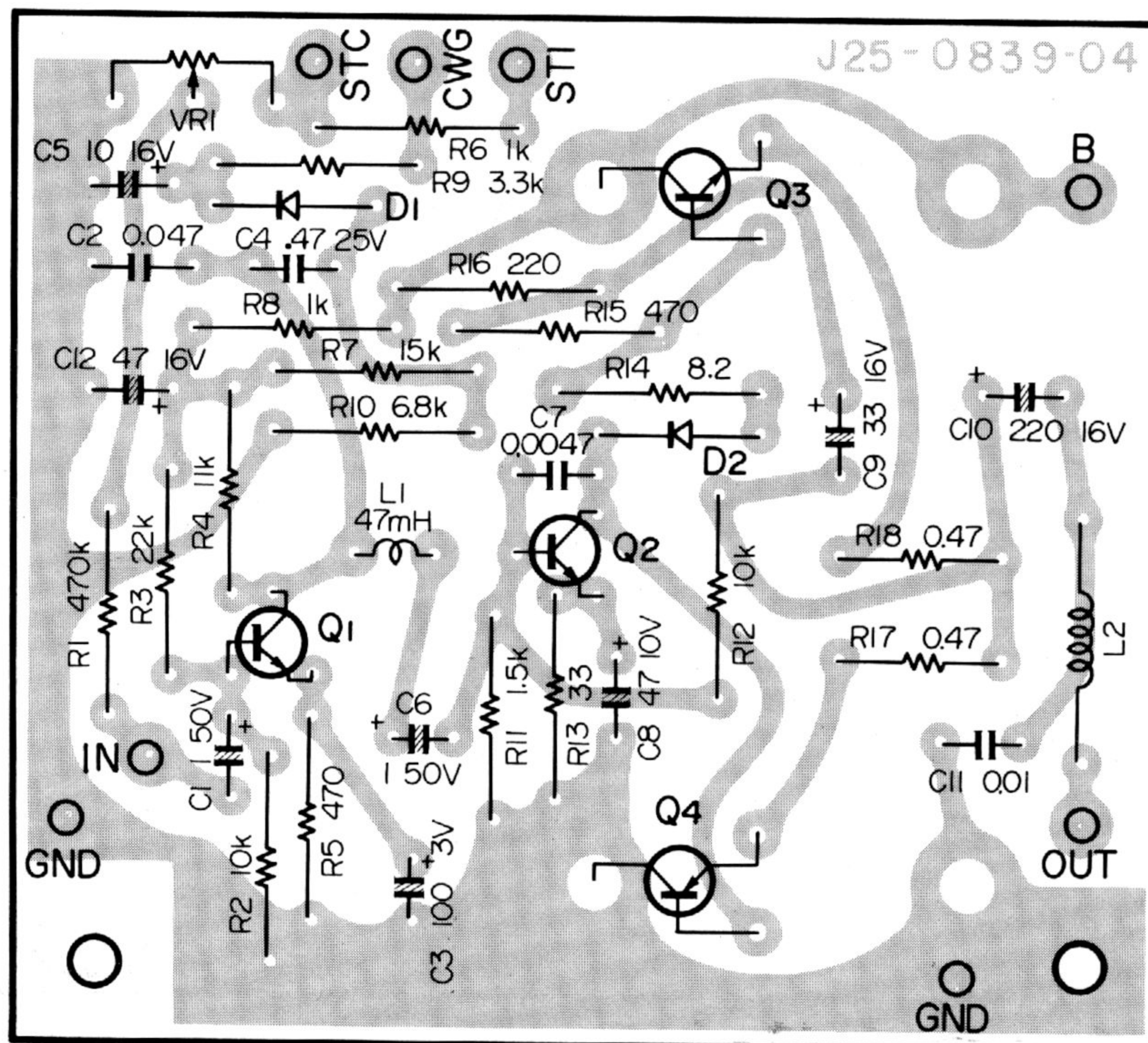
D<sub>1,2</sub>: IN60 D<sub>3</sub>: MZ1004 D<sub>4,5</sub>: IS-85(W) Q<sub>1</sub>: 3SK22(GR) Q<sub>3,4</sub>: 2SC535 Q<sub>5</sub>: 2SC460(B)

■ PC BOARD OF X48-0011-00 (IF UNIT)



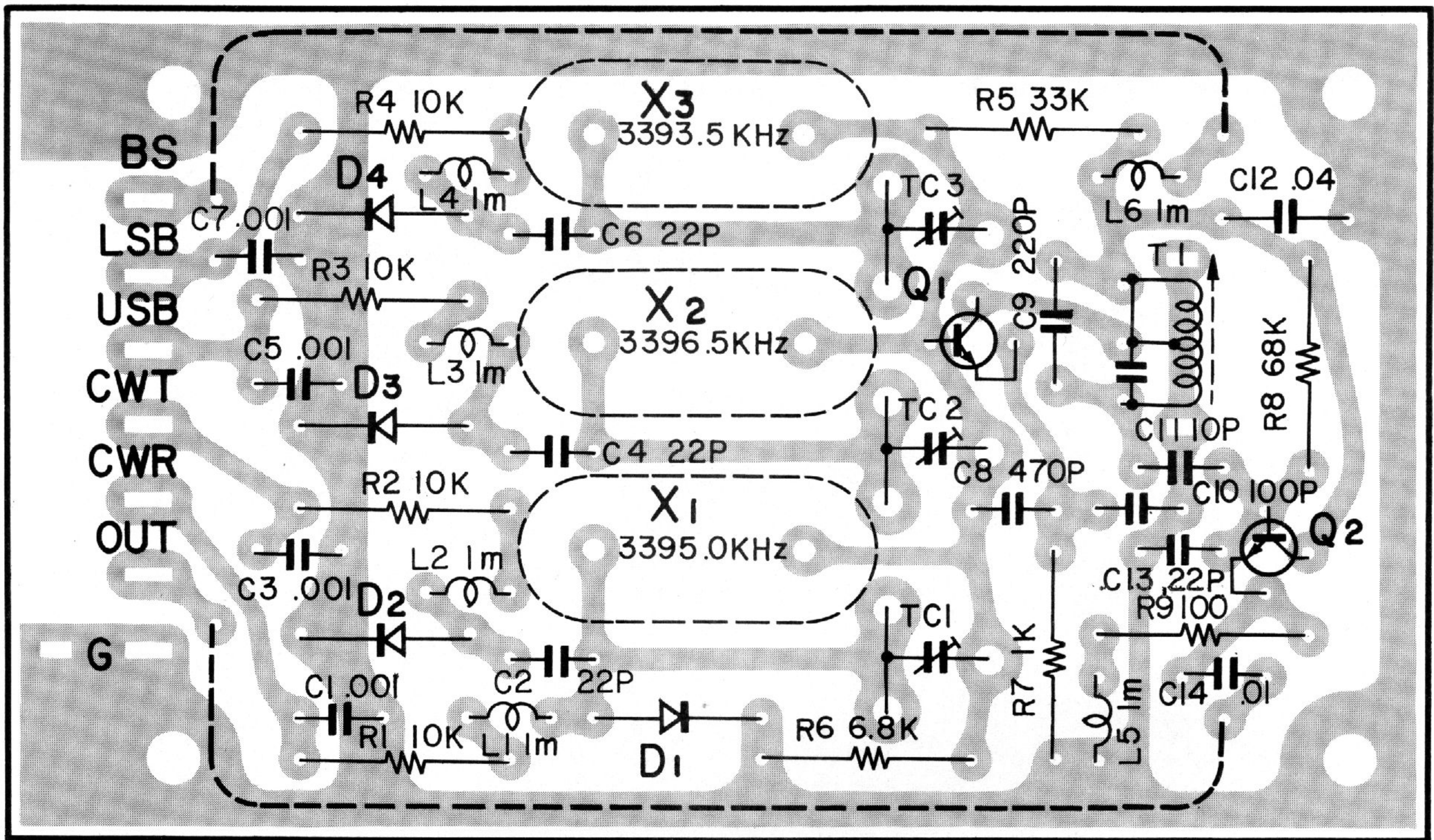
D1 ~ 10: IN60    Q1: 3SK22 (GR)    Q2: TA7045M(R)    Q3,8: 2SC460(B)  
 Q4,6: 2SC733(Y)    Q5: 2SA495(Y)    Q7: 2SC1000(GR)

■ PC BOARD OF X49-1040-10 (AF UNIT)



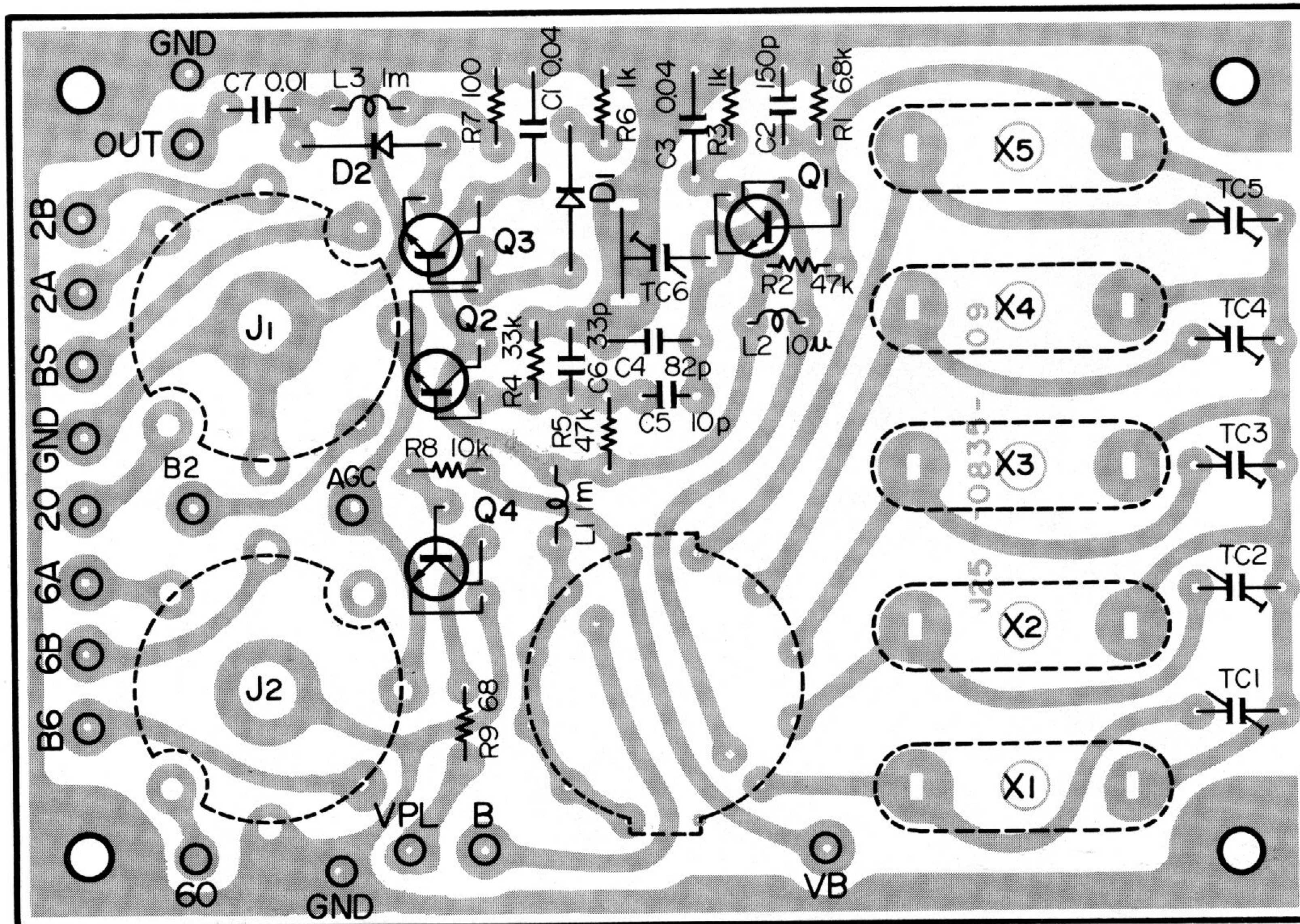
D1,2: 1S1555    Q1: 2SC1000(GR)  
 Q2: 2SC734(Y)    Q3: 2SD90(O)    Q4: 2SB473(C, D, N)

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



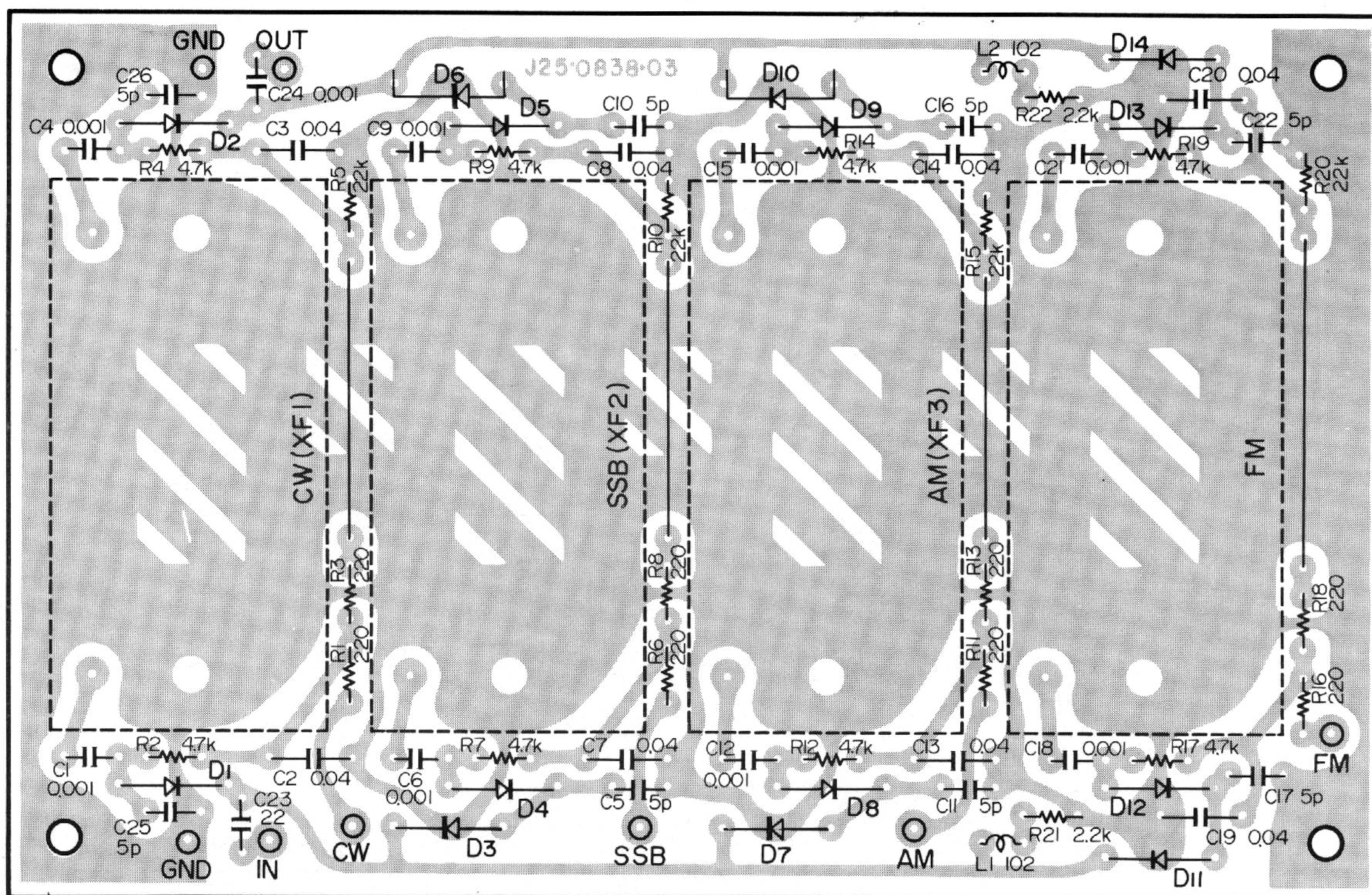
D1 ~ 4 : 1S1555 Q1, 2 : 2SC460(B)

■ PC BOARD OF X50-1140-10 (FIXED CHANNEL UNIT)



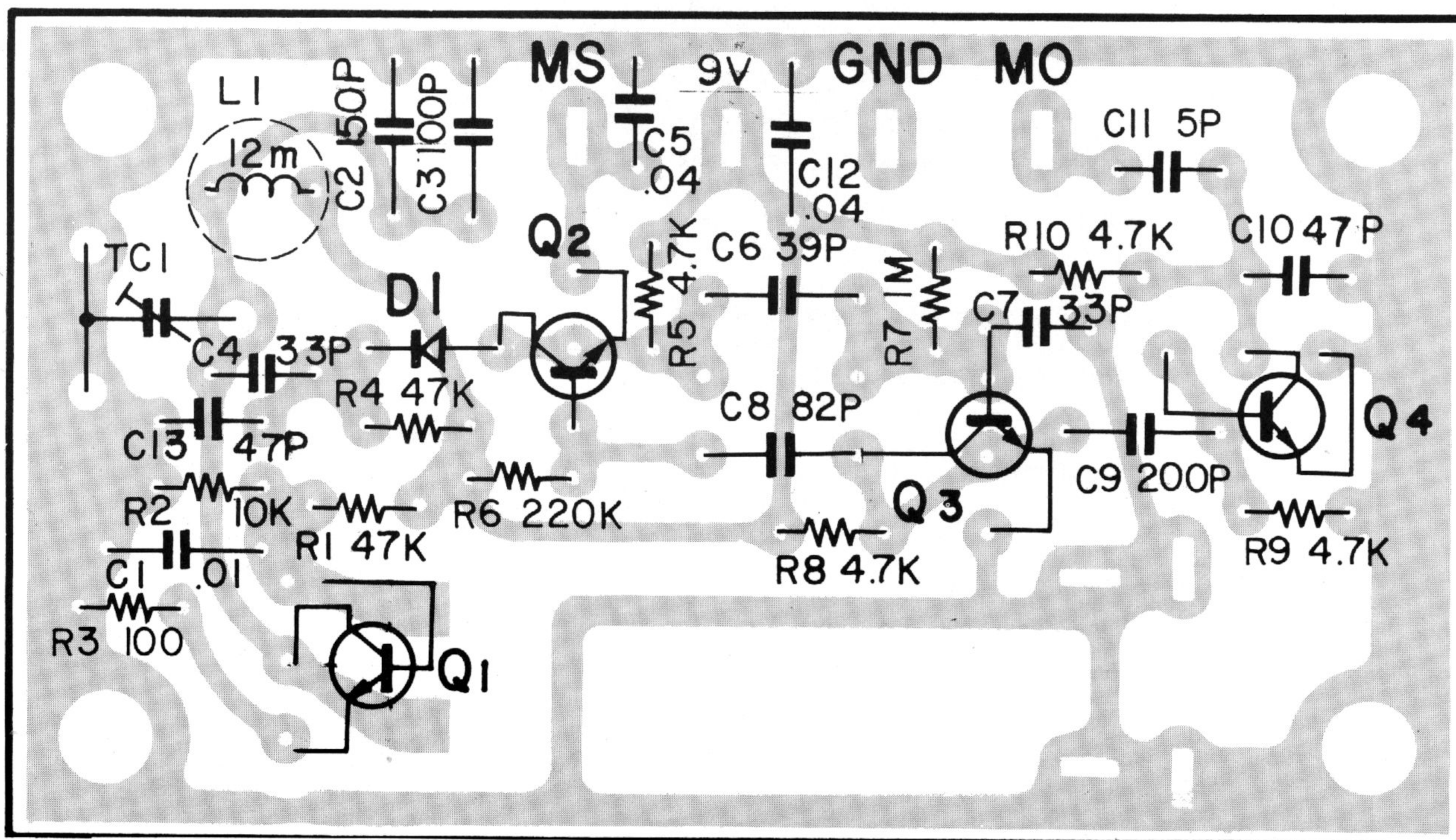
D1, 2 : 1N60 Q1, 3 : 2SC460B Q4 : 2SC735(Y)

■ PC BOARD OF X51-1050-10 (FILTER UNIT)



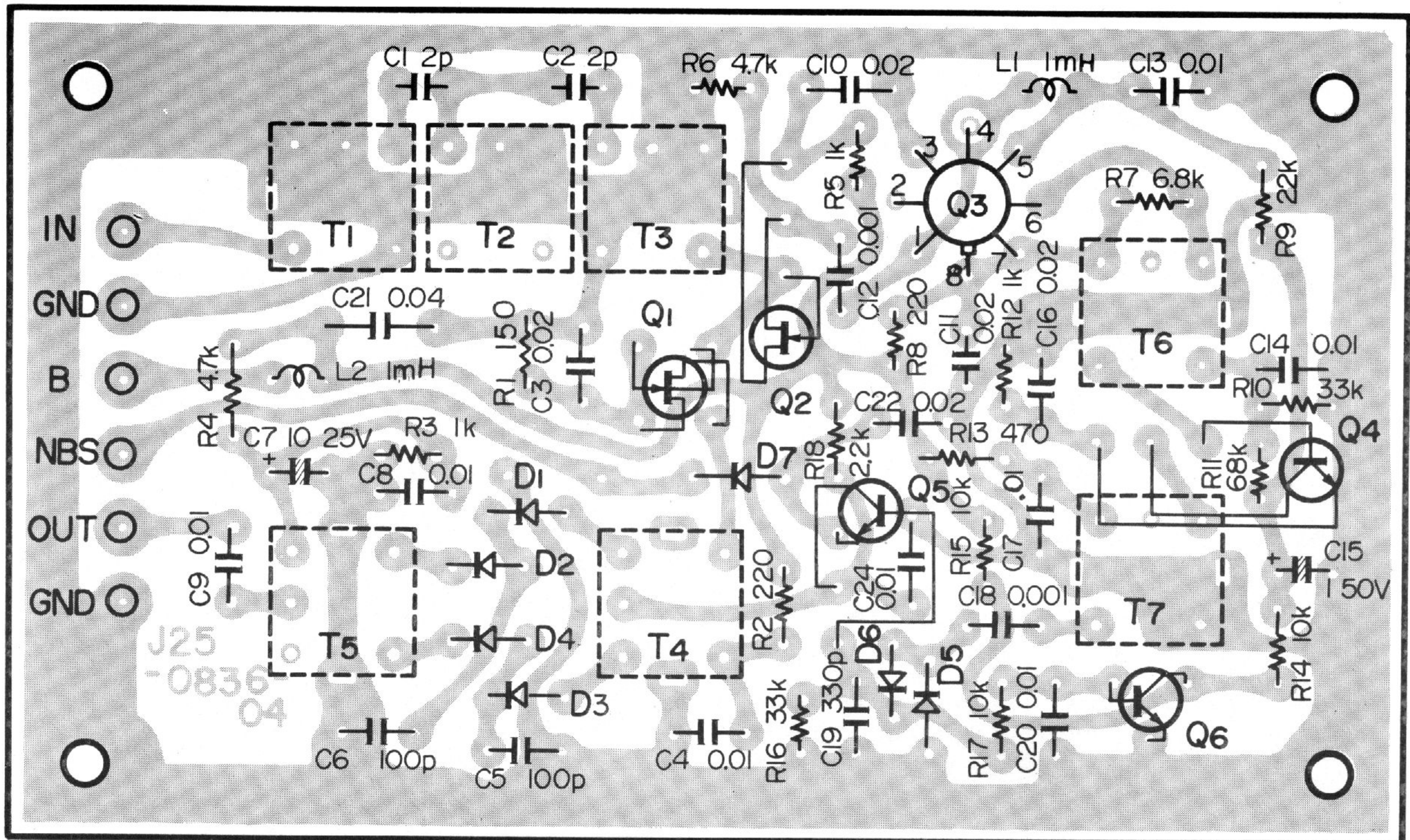
D1 ~ 14: 1S73A

■ PC BOARD OF X52-0005-01 (MARKER UNIT)



Q1 ~ 4: 2SC458 or 2SC373    Q2, 3: 2SC373    D1: 1N60

■ PC BOARD OF X54-1080-10 (NB UNIT)

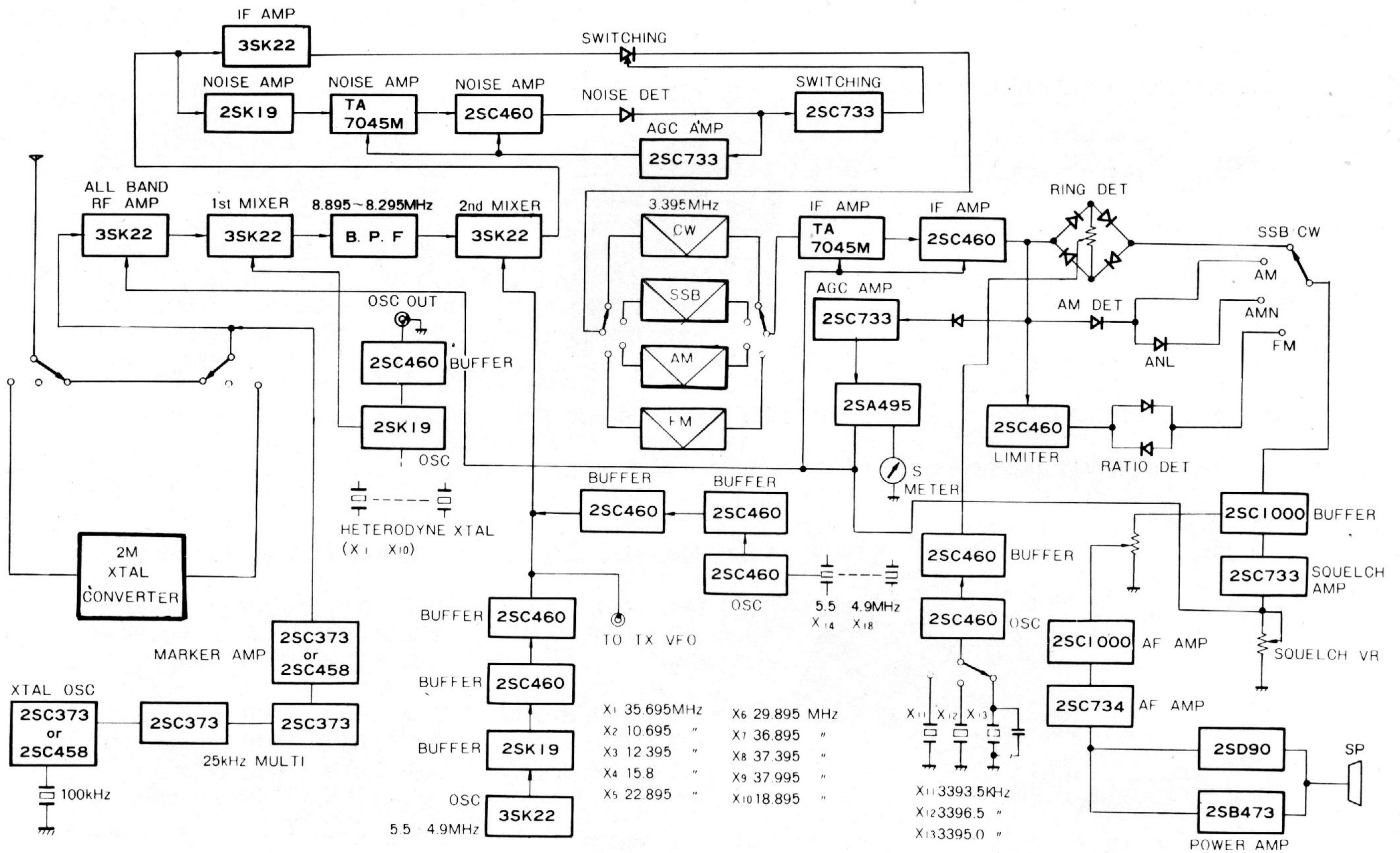


D<sub>1</sub> ~ 4: 1S73A    D<sub>5,6</sub>: 1N60    D<sub>7</sub>: MV-13    Q<sub>1</sub>: 3SK22(GR)  
 Q<sub>2</sub>: 2SK19 (GR)    Q<sub>3</sub>: TA7045M(R)    Q<sub>4</sub>: 2SC460B    Q<sub>5,6</sub>: 2SC733(Y)

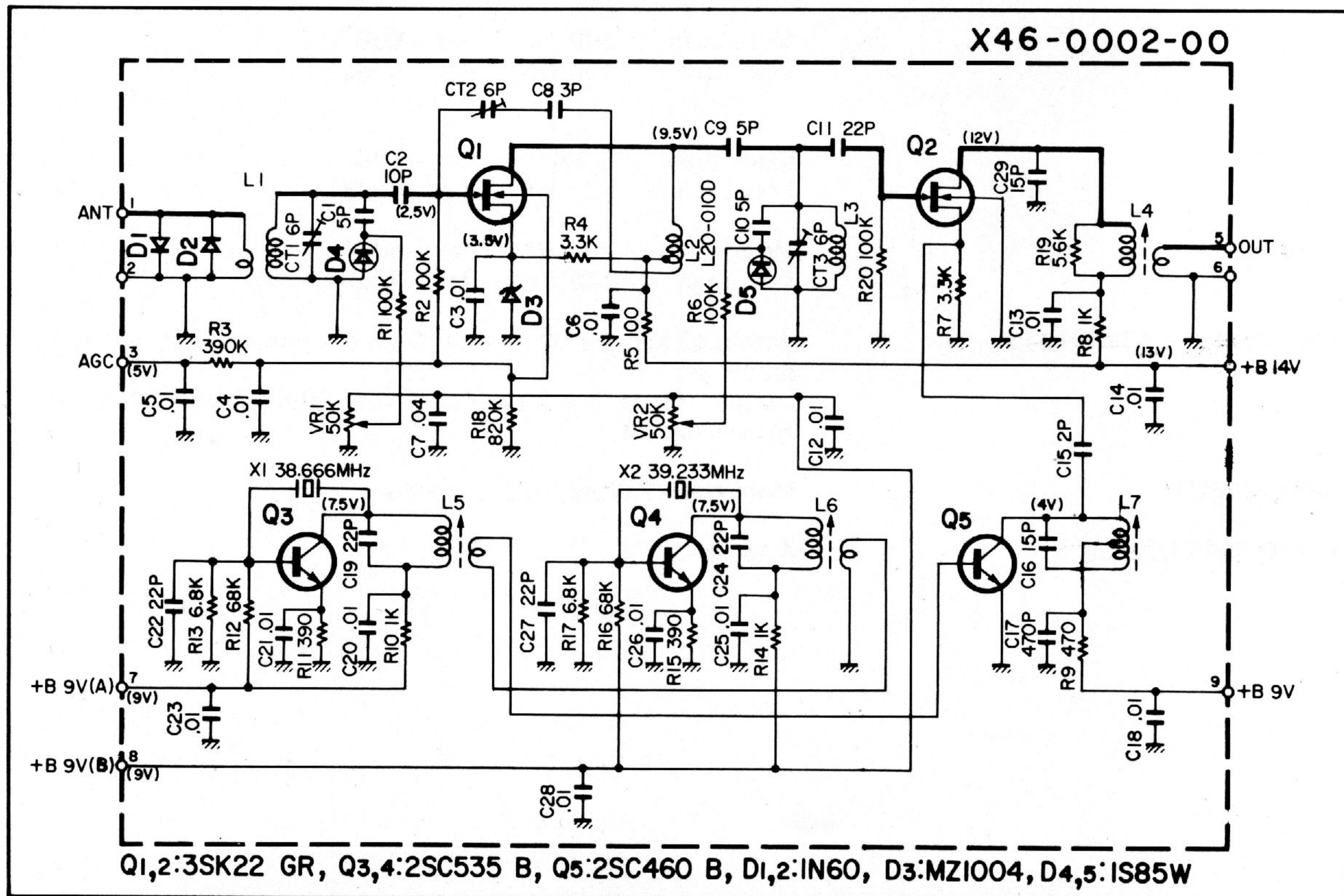
# SPECIFICATION

<b>RECEIVING FREQUENCY RANGE</b>	1.8 MHz BAND	1.80	~	2.30 MHz
	3.5 MHz BAND	3.50	~	4.00 MHz
	7.0 MHz BAND	7.00	~	7.50 MHz
	14.0 MHz BAND	14.00	~	14.50 MHz
	21.0 MHz BAND	21.00	~	21.50 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
	144.0 MHz BAND	144.00	~	147.40 MHz
	CB BAND	26.80	~	27.40 MHz
	WWV	10.00		MHz
<b>TYPE OF RECEPTION</b>	SSB, CW, AM and FM			
<b>ANTENNA INPUT IMPEDANCE</b>	50 ~ 75 $\Omega$ (Unbalanced)			
<b>SENSITIVITY</b>				
SSB	1.8 ~ 28 MHz BAND	0.5 $\mu$ V	S/N	10dB or more.
	144 MHz BAND	1 $\mu$ V	S/N	10dB or more.
	CB BAND	0.5 $\mu$ V	S/N	10dB or more.
	WWV	0.5 $\mu$ V	S/N	10dB or more.
AM	1.8 ~ 28 MHz BAND	3 $\mu$ V	S/N	10dB or more.
	144 MHz BAND	6 $\mu$ V	S/N	10dB or more.
	CB BAND	3 $\mu$ V	S/N	10dB or more.
	WWV	3 $\mu$ V	S/N	10dB or more.
<b>IMAGE RATIO</b>	More than 50dB			
<b>IF INTERFERENCE</b>	More than 50dB			
<b>SELECTIVITY</b>				
SSB	More than	2.4 kHz	(at -6dB)	
	Less than	4.4 kHz	(at -60dB)	
CW	More than	500 Hz	(at -6dB)	
	Less than	1.5 kHz	(at -60dB)	
AM	More than	5 kHz	(at -6dB)	
	Less than	12 kHz	(at -60dB)	
FM	More than	20 kHz	(at -6dB)	
	Less than	120 kHz	(at -40dB)	
<b>FREQUENCY STABILITY</b>	Within $\pm 2$ kHz for 60 minutes from one minute after switching on the set. Within 100 Hz for 30 minutes from 60 minutes after switching on the set.			
<b>AF OUTPUT</b>	More than 1 W (at 10% distortion)			
<b>LOAD IMPEDANCE</b>	4 to 16 $\Omega$			

# BLOCK DIAGRAM

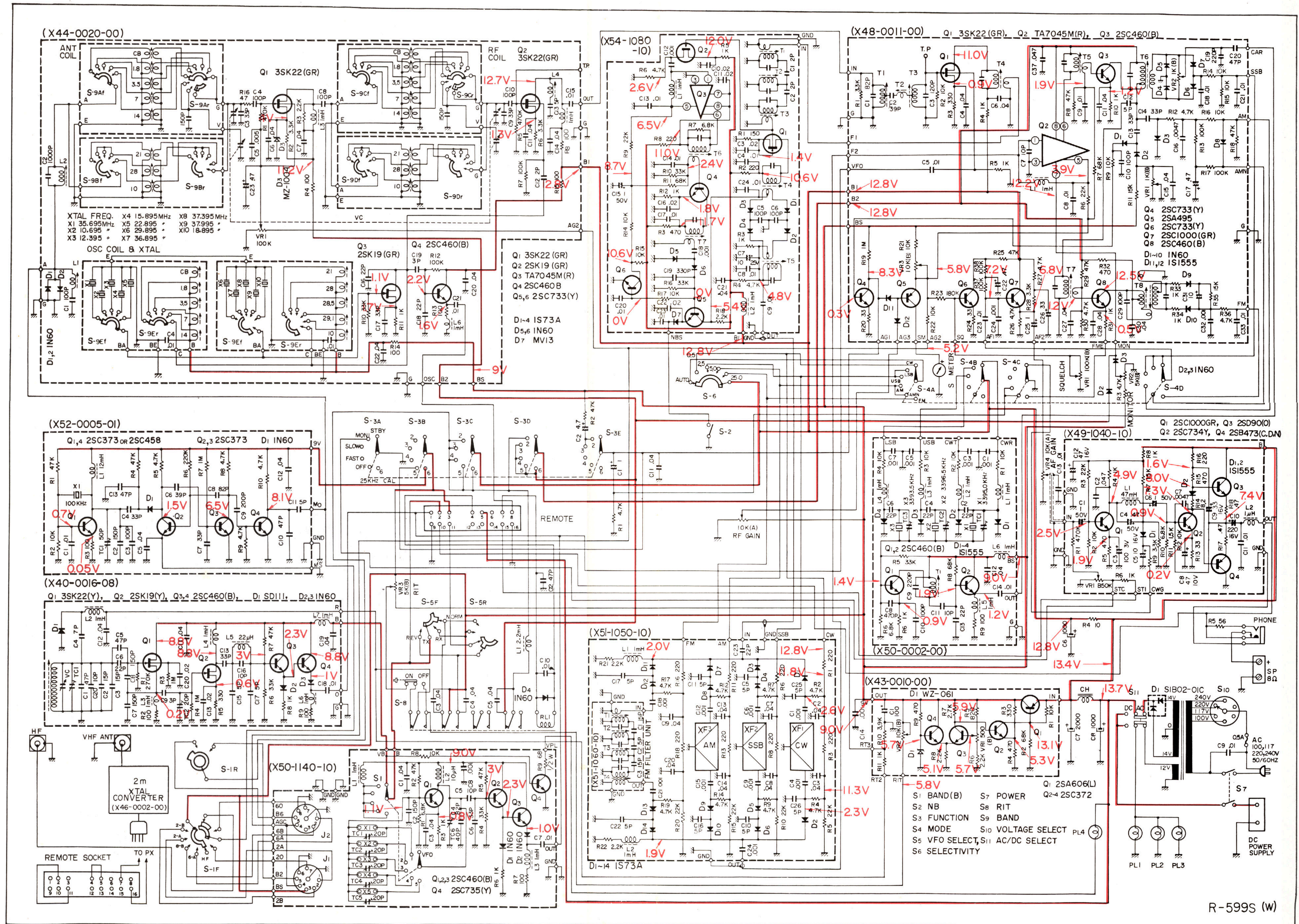


# SCHEMATIC DIAGRAM (2m CRYSTAL CONVERTER)





# SCHEMATIC DIAGRAM



R-599S (W)



Manufactured by TRIO ELECTRONICS, INC., Tokyo, Japan