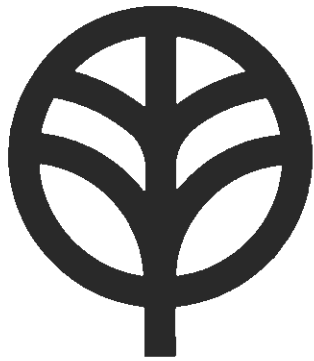


2004



KENWOOD

SERVICE MANUAL

Model R-599S



COMMUNICATIONS RECEIVER

CONTENTS

EXTERNAL VIEW	3
PARTS ALIGNMENT (CHASSIS TOP VIEW)	4
PARTS ALIGNMENT (CHASSIS BOTTOM VIEW)	4
TROUBLE SHOOTING	5
ADJUSTMENTS	
1. Voltage adjustment on AVR unit (X43-0010-00)	7
2. IF UNIT adjustment (X48-0011-00)	7
3. RIT adjustment	8
4. Main dial adjustment	8
5. RF UNIT adjustment	9
6. S METER adjustment	10
7. MONITOR circuit adjustment	10
8. SIDE TONE LEVEL adjustment	10
9. MARKER UNIT adjustment (X52-0005-01)	11
10. NB UNIT adjustment (X54-1080-10)	11
11. FILTER UNIT adjustment (X51-1050-10)	11
PARTS LISTS	
R-599S	12
X40-0016-08 (VFO UNIT)	14
X43-0010-00 (AVR UNIT)	15
X44-0020-00 (RF UNIT)	15
X46-0002-00 (2M CRYSTAL CONVERTOR UNIT)	16
X48-0011-00 (IF UNIT)	18
X49-1040-10 (AF UNIT)	19
X50-0002-00 (CARRIER UNIT)	20
X50-1140-10 (FIXED CHANNEL UNIT)	21
X51-1050-10 (FILTER UNIT)	22
X52-0005-01 (MARKER UNIT)	23
X54-1080-10 (NB UNIT)	23
PC BOARD	
X40-0016-08 (VFO UNIT)	25
X43-0010-00 (AVR UNIT)	25
X44-0020-00 (RF UNIT)	26
X46-0002-00 (2M CRYSTAL CONVERTOR UNIT)	26
X48-0011-00 (IF UNIT)	27
X49-1040-10 (AF UNIT)	27
X50-0002-00 (CARRIER UNIT)	28
X50-1140-10 (FIXED CHANNEL UNIT)	28
X51-1050-10 (FILTER UNIT)	29
X52-0005-01 (MARKER UNIT)	29
X54-1080-10 (NB UNIT)	30
SPECIFICATION	31
BLOCK DIAGRAM	32
SCHEMATIC DIAGRAM (2m CRYSTAL CONVERTER)	32
SCHEMATIC DIAGRAM	33

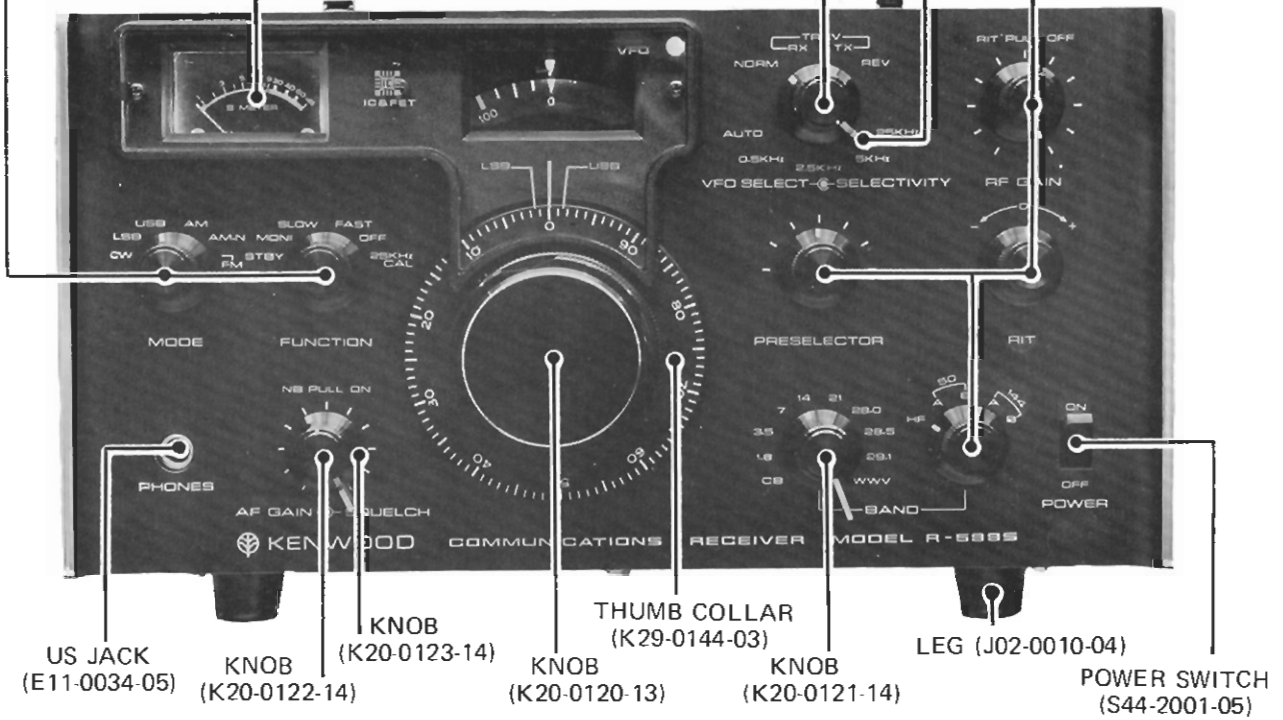
EXTERNAL VIEW

KNOB (K20-0125-04) S METER (B31-0004-15)

KNOB (K20-0124-14)

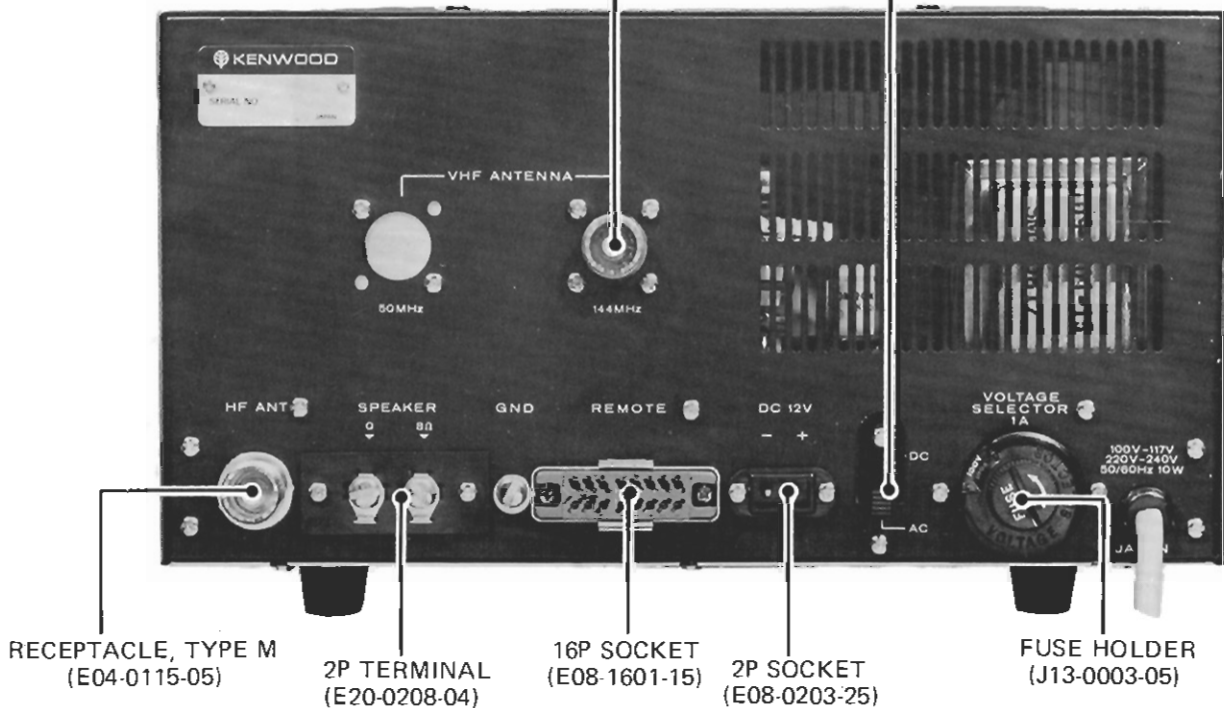
KNOB (K20-0122-04)

KNOB (K20-0125-04)

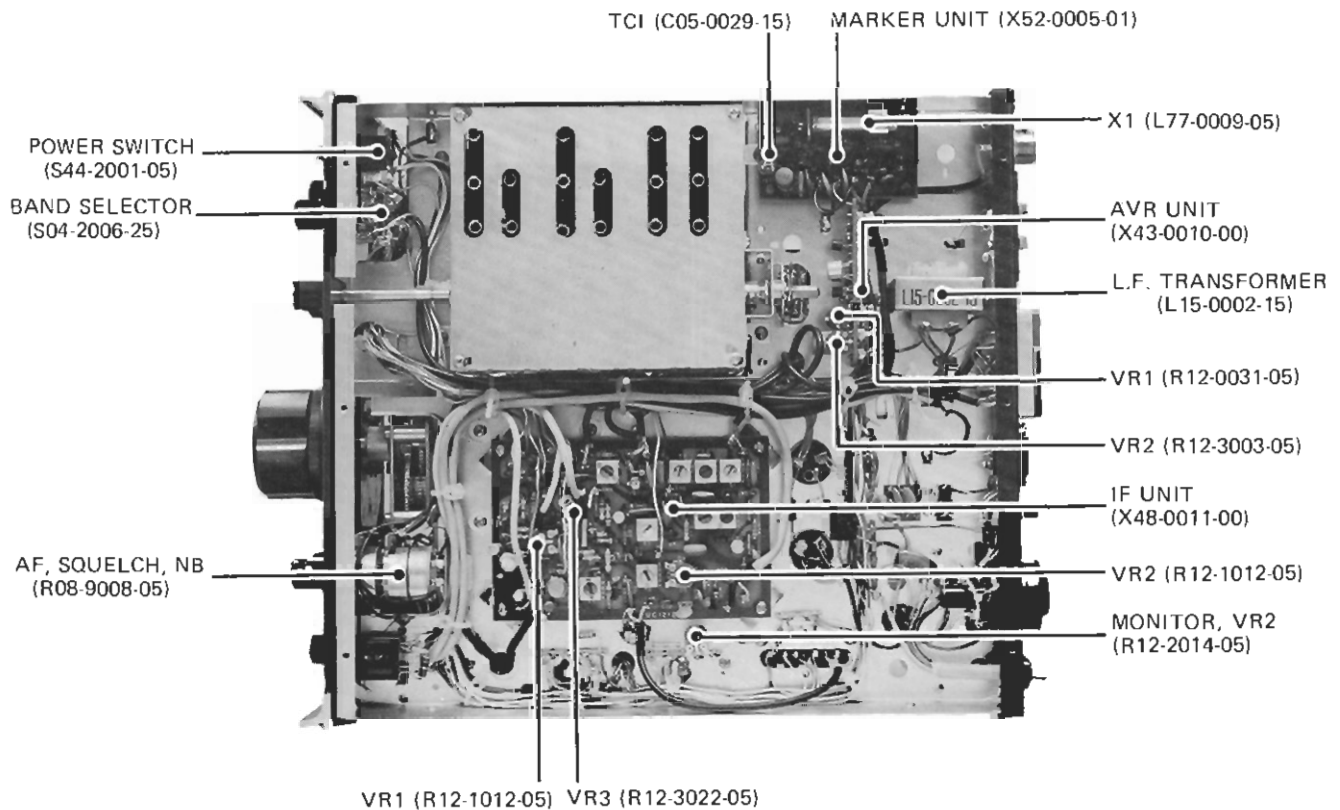
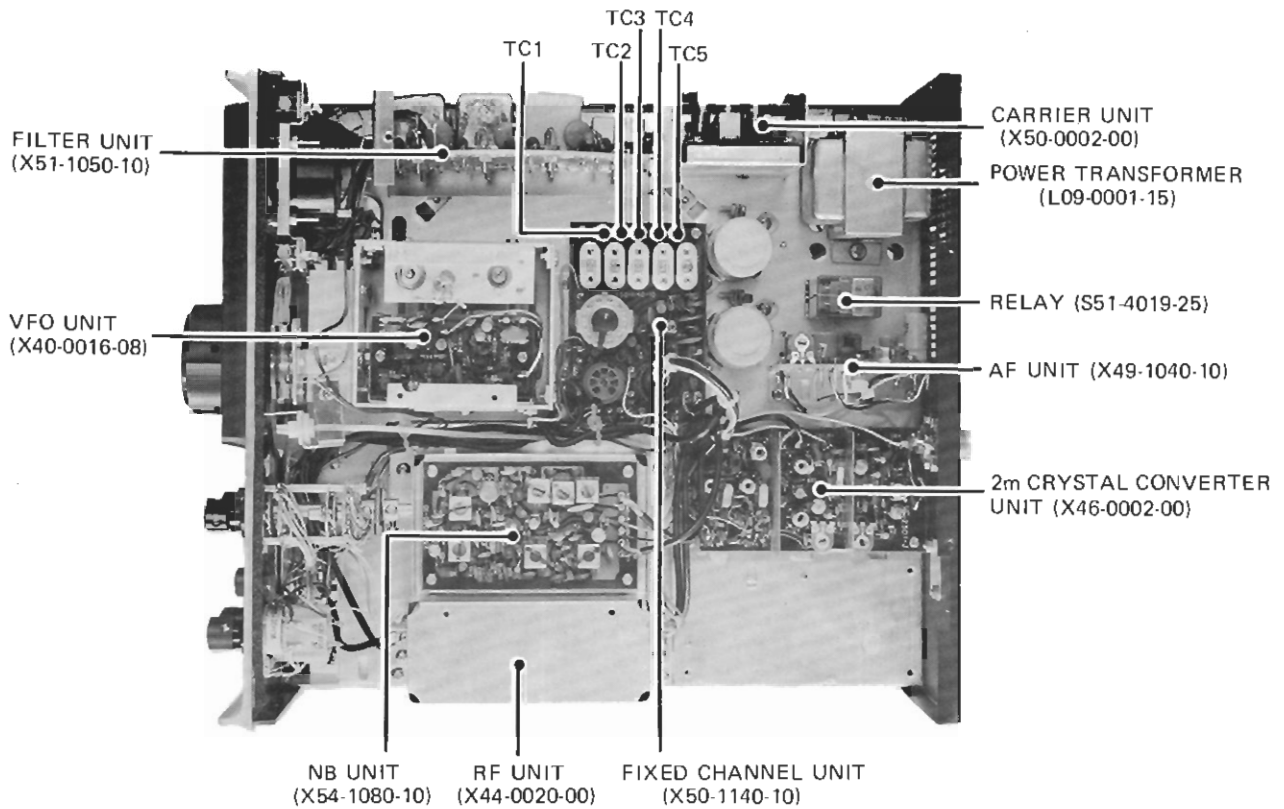


RECEPTACLE, TYPE M (E04-0113-05)

SLIDE SWITCH (S31-2007-05)



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.

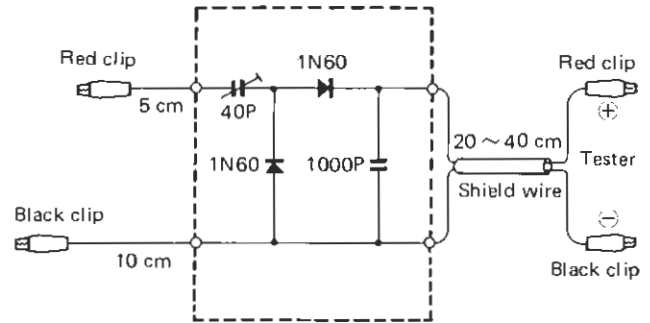


Fig. 1

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"> ○ 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.	1) Audio-frequency unit (X49-1040-10) 2) B circuit	<ul style="list-style-type: none"> ○ Defective Q3, 2SD90, Q4 or 2SB473. ○ Short-circuited to the chassis. 	<ul style="list-style-type: none"> ○ Disconnect lead wire from B terminal and check. ○ Investigate and repair.
3. No signal reception.	Noise heard on all bands.	1) AF unit 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"> ○ Defective Q3, 2SD90, Q4 or 2SB473. ○ Poor contact. ○ Failure of heterodyning oscillation because of defective Q3 or 2SK19. ○ T1 ~ T3 widely off adjustment.
	Noise heard only on certain band.	4) Coil unit Coil unit	<ul style="list-style-type: none"> ○ Failure of oscillation because of defective Q1, 3SK22, O3 or 2SC460. ○ Defective rotary switch. ○ Antenna coil, RF coil or OSC coil widely off adjustment or open-circuited.
	Noise heard only on SSB/CW.	Failure of carrier oscillation (X50-0002-00)	<ul style="list-style-type: none"> ○ Defective crystal. ○ Defective rotary switch. ○ T1 off adjustment, or defective Q1 or 2SC460.
	Low sensitivity (poor S/N).	For all bands.	1) AVR unit (X43-0010-00) 2) RF unit (X44-0020-00)
	For certain band.	3) IF unit 4) VFO unit (X40-0016-08) Coil unit	<ul style="list-style-type: none"> ○ T1 ~ T3 off adjustment. ○ TC2 off adjustment, or deteriorated Q1 or 3SK22, resulting in low output from VFO unit. ○ Antenna coil, RF coil or oscillator coil off adjustment.
4. S meter pointer will not deflect.	1) IF unit (X48-0011-00) 2) Not enough sensitivity	<ul style="list-style-type: none"> ○ VR3 off adjustment. ○ Refer to Symptom 3 "Low sensitivity (poor S/N)". 	<ul style="list-style-type: none"> ○ Adjust.

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"> ○ Defective Q3, 2SD90, Q4 or 2SB473. ○ T7 or T8 off adjustment. ○ VR2 off adjustment. ○ Frequency deviation, or output voltage too low. 	<ul style="list-style-type: none"> ○ Disconnect lead wire from B terminal and check, or replace. ○ Adjustment. ○ Adjust. ○ Adjust TC2, TC3 or T1.
6. RIT zero point off adjustment.	AVR unit (X43-0010-00)	<ul style="list-style-type: none"> ○ VR2 off adjustment. 	<ul style="list-style-type: none"> ○ Adjust.
7. Loss of match between marker and WWV.	Marker unit (X52-0005-01)	<ul style="list-style-type: none"> ○ TC1 off adjustment, or defective crystal (X1). 	<ul style="list-style-type: none"> ○ Adjust, or replace.
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"> ○ TC2 off adjustment. ○ Deteriorated Q3 or 2SC460 in drive unit (X47-0004-00). ○ Frequency deviation on R-559 or T-559. ○ VR2 off adjustment in AVR unit (X43-0010-00). 	<ul style="list-style-type: none"> ○ Adjust. ○ Replace. ○ Check and adjust. ○ Adjust.

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 μ 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

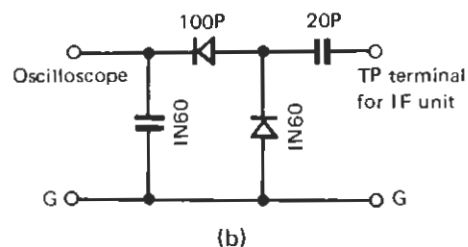
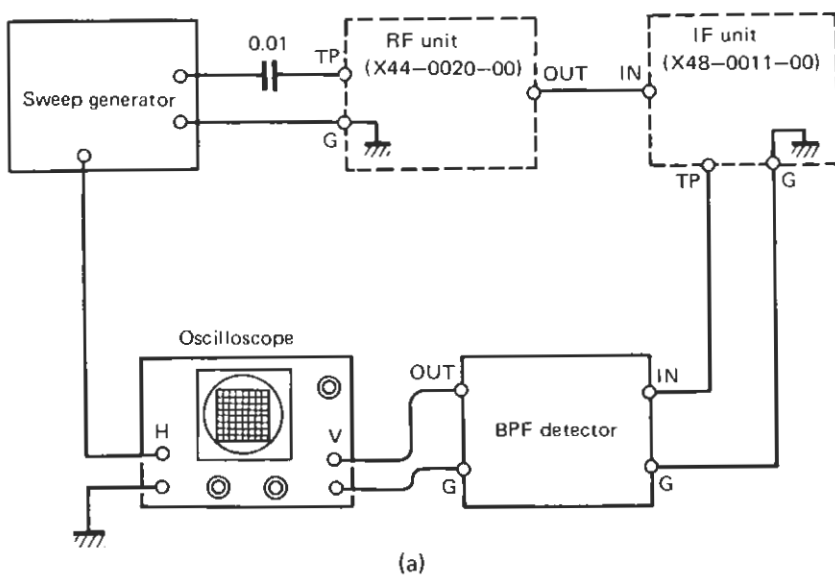


Fig. 2

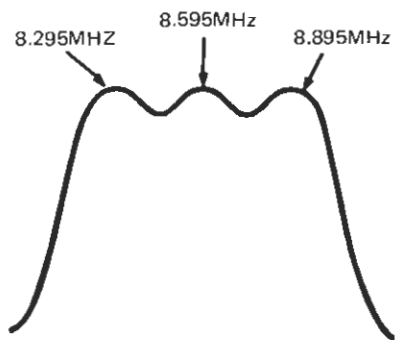


Fig. 3

(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.

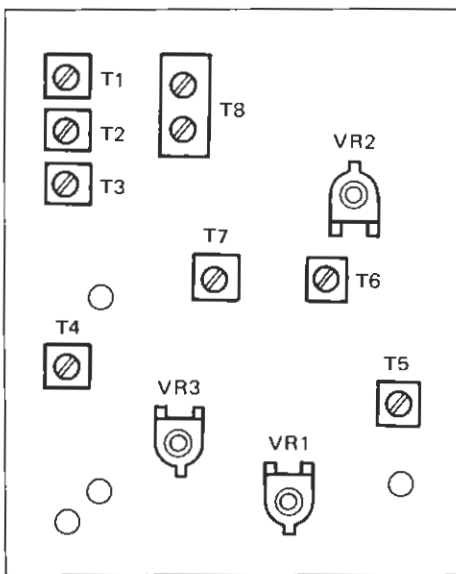


Fig. 4 IF UNIT

- 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.

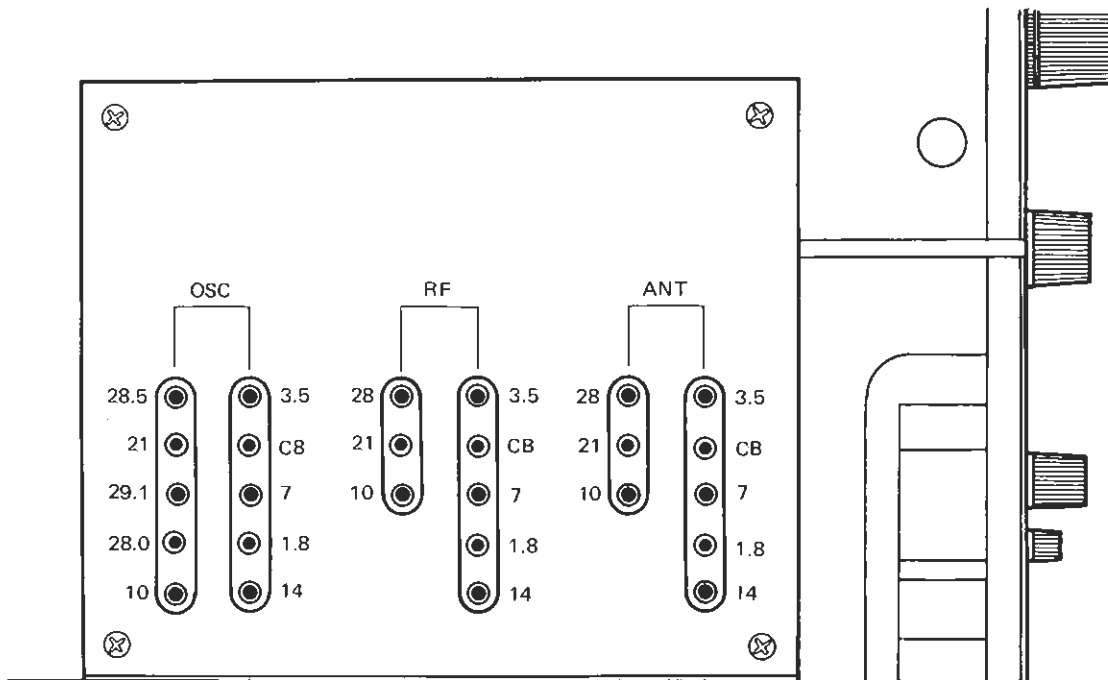


Fig. 5

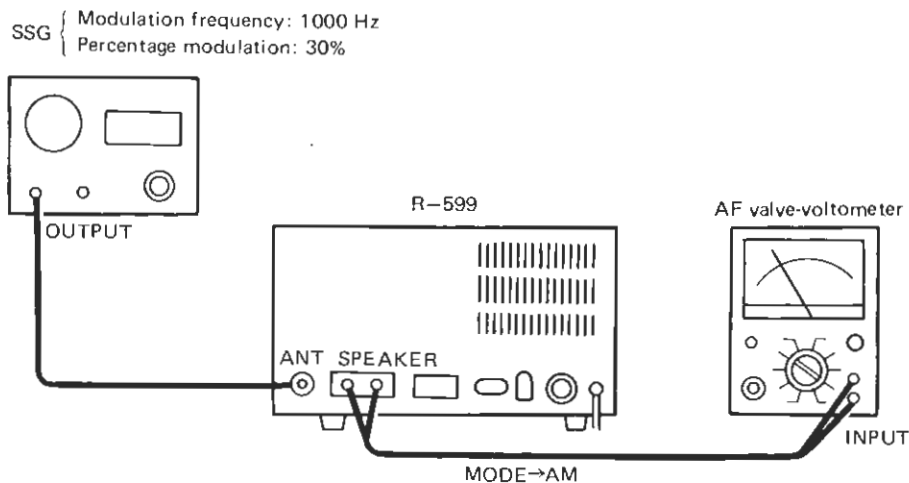


Fig. 6

- 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 μ 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 μ 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 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
MISCELLANEOUS			
—	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	
—	B42-039B-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	
CAPACITOR			
C1	CE04W1H010	Electrolytic	1 μ F 50WV
C2	CE04W1E4R7	Electrolytic	4.7 μ F 25WV
C3~5	CK45F1E403Z	Ceramic	0.04 μ F +80%, -20%
C6~8	C90-0074-05	Electrolytic block	1000 μ F 25WV
C9	C90-0145-05	Polyester	0.01 μ F \pm 20%
C10	CK45F1E103Z	Ceramic	0.01 μ F +80%, -20%
C11	CK45F1E403Z	Ceramic	0.04 μ F +80%, -20%
C12	CC45SL1H470K	Ceramic	47pF \pm 10%
C13	CK45F1E103Z	Ceramic	0.01 μ F +80%, -20%
C14	CK45D1H102M	Ceramic	0.001 μ F \pm 20%
RESISTOR			
R1~3	PD14BY2E472J	Carbon	4.7k Ω \pm 5% 1/4W
R4	RC05GF2H100J	Carbon	10 Ω \pm 5% 1/2W
R5	RC05GF2H560J	Carbon	56 Ω \pm 5% 1/2W
SEMICONDUCTOR			
D1		S1B02-01C	
D2~4		1N60	
POTENTIOMETER			
-	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
CAPACITOR			
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%	
RESISTOR			
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	
SEMICONDUCTOR			
Q1		3SK22 (Y)	
Q2		2SK19 (Y)	
Q3, 4		2SC460 (B)	
D1		SD111	
D2, 3		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)	

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
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	PD14BY2E821J	Carbon 820 Ω \pm 5% 1/4W	
R6	PD14BY2E222J	Carbon 2.2k 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	
POTENTIOMETER			
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
CAPACITOR			
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 μ F +80%, -20%	
C6, 7	CK94YG1E403Z	Ceramic 0.04 μ 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 μ F +80%, -20%	
C12	CC94SL1H020D	Ceramic 2pF \pm 0.5pF	
C13	CM93D1H050J(Z)	Mica 5pF \pm 5%	
C14	CK94YG1E403Z	Ceramic 0.04 μ F +80%, -20%	
C15	CK94YG1E103Z	Ceramic 0.01 μ 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
RESISTOR					
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
SEMICONDUCTOR					
Q1, 2		3SK22 (GR)			
Q3		2SK19 (GR)			
Q4		2SC460 (B)			
D1, 2		1N60			
D3		MZ1004			
COIL					
-	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			
MISCELLANEOUS					
-	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
CAPACITOR					
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 μ F	+80%, -20%	
C19	CC45CH1H220J	Ceramic	22pF	\pm 5%	
C20, 21	CK94YG1E103Z	Ceramic	0.01 μ F	+80%, -20%	
C22	CC45CH1H220J	Ceramic	22pF	\pm 5%	
C23	CK94YG1E103Z	Ceramic	0.01 μ F	+80%, -20%	
C24	CC45CH1H220J	Ceramic	22pF	\pm 5%	
C25, 26	CK94YG1E103Z	Ceramic	0.01 μ F	+80%, -20%	
C27	CC45CH1H220J	Ceramic	22pF	\pm 5%	
C28	CK94YG1E103Z	Ceramic	0.01 μ F	+80%, -20%	
C29	CC45CH1H220J	Ceramic	22pF	\pm 5%	
RESISTOR					
R1, 2	PD14CY2E104J	Carbon	100k Ω	\pm 5%	1/4W
R3	PD14CY2E394J	Carbon	390k Ω	\pm 5%	1/4W
R4	PD14CY2E332J	Carbon	3.3k Ω	\pm 5%	1/4W
R5	PD14CY2E101J	Carbon	100 Ω	\pm 5%	1/4W
R6	PD14CY2E104J	Carbon	100k Ω	\pm 5%	1/4W
R7	PD14CY2E332J	Carbon	3.3k Ω	\pm 5%	1/4W
R8	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R9	PD14CY2E471J	Carbon	470 Ω	\pm 5%	1/4W
R10	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R11	PD14CY2E391J	Carbon	390 Ω	\pm 5%	1/4W
R12	PD14CY2E683J	Carbon	68k Ω	\pm 5%	1/4W
R13	PD14CY2E682J	Carbon	6.8k Ω	\pm 5%	1/4W
R14	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R15	PD14CY2E391J	Carbon	390 Ω	\pm 5%	1/4W
R16	PD14CY2E683J	Carbon	68k Ω	\pm 5%	1/4W
R17	PD14CY2E682J	Carbon	6.8k Ω	\pm 5%	1/4W
R18	PD14CY2E824J	Carbon	820k Ω	\pm 5%	1/4W
R19	PD14CY2E562J	Carbon	5.6k Ω	\pm 5%	1/4W
R20	PD14CY2E104J	Carbon	100k Ω	\pm 5%	1/4W
SEMICONDUCTOR					
Q1, 2		3SK22 (GR)			
Q3, 4		2SC535 (B)			
Q5		2SC460 (B)			
D1, 2		1N60			
D3		MZ1004			
D4, 5		1S-85 (W)			
COIL					
L1	L34-0028-35	VHF coil			
L2	L33-0027-04	Choke coil			
L3	L34-0029-45	VHF coil			
L4	L31-0039-04	Tuning coil			
L5, 6	L31-0040-04	Tuning coil			
L7	L34-0030-04	VHF coil			
MISCELLANEOUS					
-	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 Ω (B)		
CT1 ~ 3	C05-0009-15	Trimmer			

■ PARTS LIST OF X48-0011-00 (IF UNIT)

Circuit No.	Parts No.	Description				Remarks
CAPACITOR						
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%		
RESISTOR						
R1	PD148Y2E332J	Carbon	3.3kΩ	±5%	1/4W	
R2	PD148Y2E103J	Carbon	10kΩ	±5%	1/4W	
R3	PD148Y2E331J	Carbon	330Ω	±5%	1/4W	
R4, 5	PD148Y2E102J	Carbon	1kΩ	±5%	1/4W	
R6	PD148Y2E223J	Carbon	22kΩ	±5%	1/4W	
R7	PD148Y2E683J	Carbon	68kΩ	±5%	1/4W	
R8	PD148Y2E473J	Carbon	47kΩ	±5%	1/4W	
R9	PD148Y2E103J	Carbon	10kΩ	±5%	1/4W	
R10	PD148Y2E102J	Carbon	1kΩ	±5%	1/4W	
R11	PD148Y2E153J	Carbon	15kΩ	±5%	1/4W	
R12	PD148Y2E472J	Carbon	4.7kΩ	±5%	1/4W	
R13	PD148Y2E104J	Carbon	100kΩ	±5%	1/4W	
R14 ~ 16	PD148Y2E103J	Carbon	10kΩ	±5%	1/4W	
R17	PD148Y2E104J	Carbon	100kΩ	±5%	1/4W	
R18	PD148Y2E473J	Carbon	47kΩ	±5%	1/4W	
R19	PD148Y2E105J	Carbon	1MΩ	±5%	1/4W	
R20	PD148Y2E330J	Carbon	33Ω	±5%	1/4W	
R21, 22	PD148Y2E103J	Carbon	10kΩ	±5%	1/4W	
R23	PD148Y2E184J	Carbon	180kΩ	±5%	1/4W	
R24	PD148Y2E330J	Carbon	33Ω	±5%	1/4W	
R25	PD148Y2E473J	Carbon	47kΩ	±5%	1/4W	
R26, 27	PD148Y2E472J	Carbon	4.7kΩ	±5%	1/4W	
R28	PD148Y2E332J	Carbon	3.3kΩ	±5%	1/4W	
R29	PD148Y2E473J	Carbon	47kΩ	±5%	1/4W	
R30	PD148Y2E472J	Carbon	4.7kΩ	±5%	1/4W	
R31	PD148Y2E102J	Carbon	1kΩ	±5%	1/4W	
R32	PD148Y2E471J	Carbon	470Ω	±5%	1/4W	
R33, 34	PD148Y2E102J	Carbon	1kΩ	±5%	1/4W	

Circuit No.	Parts No.	Description	Remarks
R35	PD14BY2E 153J	Carbon 15k Ω \pm 5%	1/4W
R36	PD14BY2E472J	Carbon 4.7k Ω \pm 5%	1/4W
R37, 38	PD14CY2E 104J	Carbon 100k Ω \pm 5%	1/4W
SEMICONDUCTOR			
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	
TRANSFORMER/COIL			
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	
POTENTIOMETER			
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
CAPACITOR			
C1	CE04W1H010(RL)	Electrolytic 1 μ F	50WV
C2	CQ92M1H4 73K	Polyester 0.047 μ F \pm 10%	
C3	CE04W0J101(RL)	Electrolytic 100 μ F	6.3WV
C4	CS04E1ER47M	Tantulum 0.47 μ F	25WV
C5	CE04W1C100(RL)	Electrolytic 10 μ F	16WV
C6	CE04W1H010(RL)	Electrolytic 1 μ F	50WV
C7	CQ93M1H4 72K	Polyester 0.0047 μ F \pm 10%	
C8	CE04W1A470(RL)	Electrolytic 47 μ F	10WV
C9	CE04W1C330(RL)	Electrolytic 33 μ F	16WV
C10	CE04W1C221(RL)	Electrolytic 220 μ F	16WV
C11	CK45F1H103Z	Ceramic 0.01 μ F +80%, -20%	
C12	CE04W1C470(RL)	Electrolytic 47 μ F	16WV
RESISTOR			
R1	PD14BY2E474J	Carbon 470k Ω \pm 5%	1/4W
R2	PD14BY2E103J	Carbon 10k Ω \pm 5%	1/4W
R3	PD14BY2E223J	Carbon 22k Ω \pm 5%	1/4W
R4	PD14BY2E102J	Carbon 1k Ω \pm 5%	1/4W
R5	PD14BY2E471J	Carbon 470 Ω \pm 5%	1/4W
R6	PD14BY2E102J	Carbon 1k Ω \pm 5%	1/4W
R7	PD14BY2E153J	Carbon 15k Ω \pm 5%	1/4W
R8	PD14BY2E102J	Carbon 1k Ω \pm 5%	1/4W
R9	PD14BY2E332J	Carbon 3.3k Ω \pm 5%	1/4W
R10	PD14BY2E682J	Carbon 6.8k Ω \pm 5%	1/4W

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

■ 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	

Circuit No.	Parts No.	Description	Remarks
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 LISTS OF X50-1140-10 (FIXED CHANNEL UNIT)

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

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

Circuit No	Parts No.	Description			Remarks
CAPACITOR					
C1	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C2, 3	CK45F1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C4	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C5	CC45SL1H050D	Ceramic	5pF	\pm 0.5pF	
C6	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C7,8	CK45F1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C9	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C10, 11	CC45SL1H050D	Ceramic	5pF	\pm 0.5pF	
C12	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C13, 14	CK45F1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C15	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C16, 17	CC45SL1H050D	Ceramic	5pF	\pm 0.5pF	
C18	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C19, 20	CK45F1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C21	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C22	CC45SL1H050D	Ceramic	5pF	\pm 0.5pF	
C23	CM93D1H220J(Z)	Mica	22pF	\pm 5%	
C24	CK45D1H102M	Ceramic	0.001 μ F	\pm 20%	
C25, 26	CC45SL1H050D	Ceramic	5pF	\pm 0.5pF	
RESISTOR					
R1	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R2	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R3	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R4	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R5	PD14CY2E223J	Carbon	22k Ω	\pm 5%	1/4W
R6	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R7	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R8	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R9	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R10	PD14CY2E223J	Carbon	22k Ω	\pm 5%	1/4W
R11	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R12	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R13	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R14	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R15	PD14CY2E223J	Carbon	22k Ω	\pm 5%	1/4W
R16	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R17	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R18	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R19	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R20	PD14CY2E223J	Carbon	22k Ω	\pm 5%	1/4W
R21, 22	PD14CY2E222J	Carbon	2.2k Ω	\pm 5%	1/4W
SEMICONDUCTOR					
D1 ~ 14		1S73A			
MISCELLANEOUS					
L1, 2	L33-0104-05	Ferri-inductor			
XF1	L71-0017-05	Crystal filter (CW)			
XF2	L71-0018-05	Crystal filter (SS8)			
XF3	L71-0002-05	Crystal filter (AM)			

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

Circuit No.	Parts No.	Description			Remarks
CAPACITOR					
C1	CQ93M1H103K	Mylar	0.01 μ 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 μ 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 μ F	+80%, -20%	
C13	CM93D2H470J(Z)	Ceramic	47pF	$\pm 5\%$	
RESISTOR					
R1	PD14CY2E473J	Carbon	47k Ω	$\pm 5\%$	1/4W
R2	PD14CY2E103J	Carbon	10k Ω	$\pm 5\%$	1/4W
R3	PD14CY2E101J	Carbon	100 Ω	$\pm 5\%$	1/4W
R4	PD14CY2E473J	Carbon	47k Ω	$\pm 5\%$	1/4W
R5	PD14CY2E472J	Carbon	4.7k Ω	$\pm 5\%$	1/4W
R6	PD14CY2E224J	Carbon	220k Ω	$\pm 5\%$	1/4W
R7	RC05GF2H105J	Carbon	1M Ω	$\pm 5\%$	1/2W
R8 ~ 10	PD14CY2E472J	Carbon	4.7k Ω	$\pm 5\%$	1/4W
SEMICONDUCTOR					
Q1		2SC373 or 2SC458 (B)			
Q2, 3		2SC373			
Q4		2SC373 or 2SC458 (8)			
D1		1N60			
MISCELLANEOUS					
L1	L33-0118-05	Ferri-inductor			
X1	L77-0009-05	Crystal oscillator (100kHz)			
-	C05-0029-15	Ceramic trimmer			
-	J19-0013-04	Crystal oscillator holder			

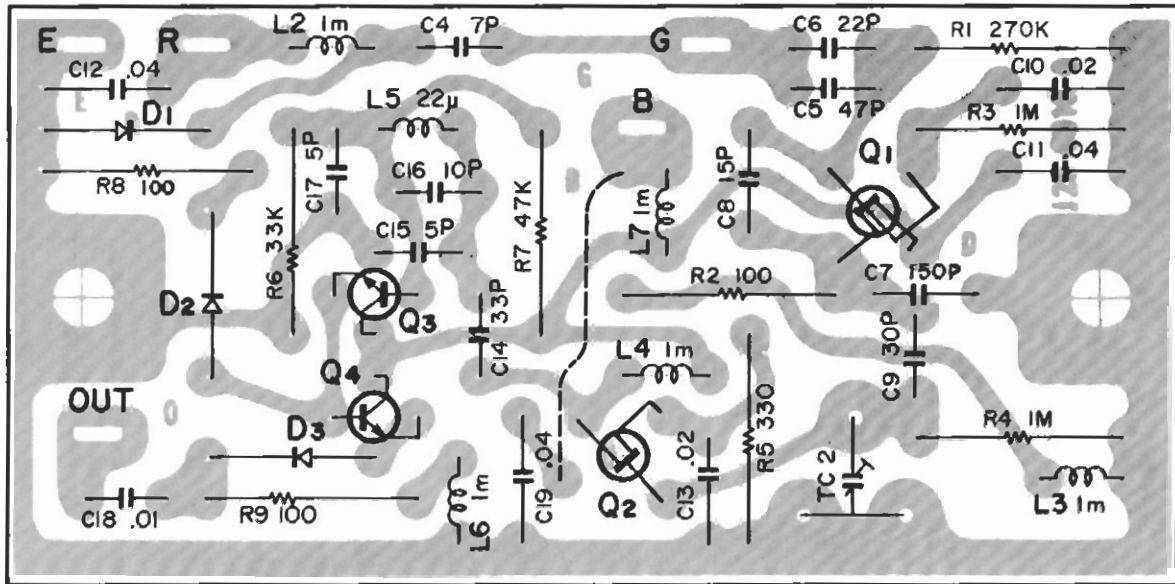
■ PARTS LISTS OF X54-1080-10 (NB UNIT)

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

Circuit No.	Parts No.	Description			Remarks
C21	CK45F1E403Z	Ceramic	0.04 μ F	+80%, -20%	
C22	CK45F1H203Z	Ceramic	0.02 μ F	+80%, -20%	
C23, 24	CK45F1H103Z	Ceramic	0.01 μ F	+80%, -20%	
RESISTOR					
R1	PD14CY2E151J	Carbon	150 Ω	\pm 5%	1/4W
R2	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R3	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R4	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R5	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R6	PD14CY2E472J	Carbon	4.7k Ω	\pm 5%	1/4W
R7	PD14CY2E682J	Carbon	6.8k Ω	\pm 5%	1/4W
R8	PD14CY2E221J	Carbon	220 Ω	\pm 5%	1/4W
R9	PD14CY2E223J	Carbon	22k Ω	\pm 5%	1/4W
R10	PD14CY2E333J	Carbon	33k Ω	\pm 5%	1/4W
R11	PD14CY2E683J	Carbon	68k Ω	\pm 5%	1/4W
R12	PD14CY2E102J	Carbon	1k Ω	\pm 5%	1/4W
R13	PD14CY2E471J	Carbon	470 Ω	\pm 5%	1/4W
R14, 15	PD14CY2E103J	Carbon	10k Ω	\pm 5%	1/4W
R16	PD14CY2E333J	Carbon	33k Ω	\pm 5%	1/4W
R17	PD14CY2E103J	Carbon	10k Ω	\pm 5%	1/4W
R18	PD14CY2E222J	Carbon	2.2k Ω	\pm 5%	1/4W
SEMICONDUCTOR					
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			
COIL/TRANSFORMER					
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)			
MISCELLANEOUS					
-	E23-0046-04	Wrapping terminal			
-	J25-0836-04	PC board			

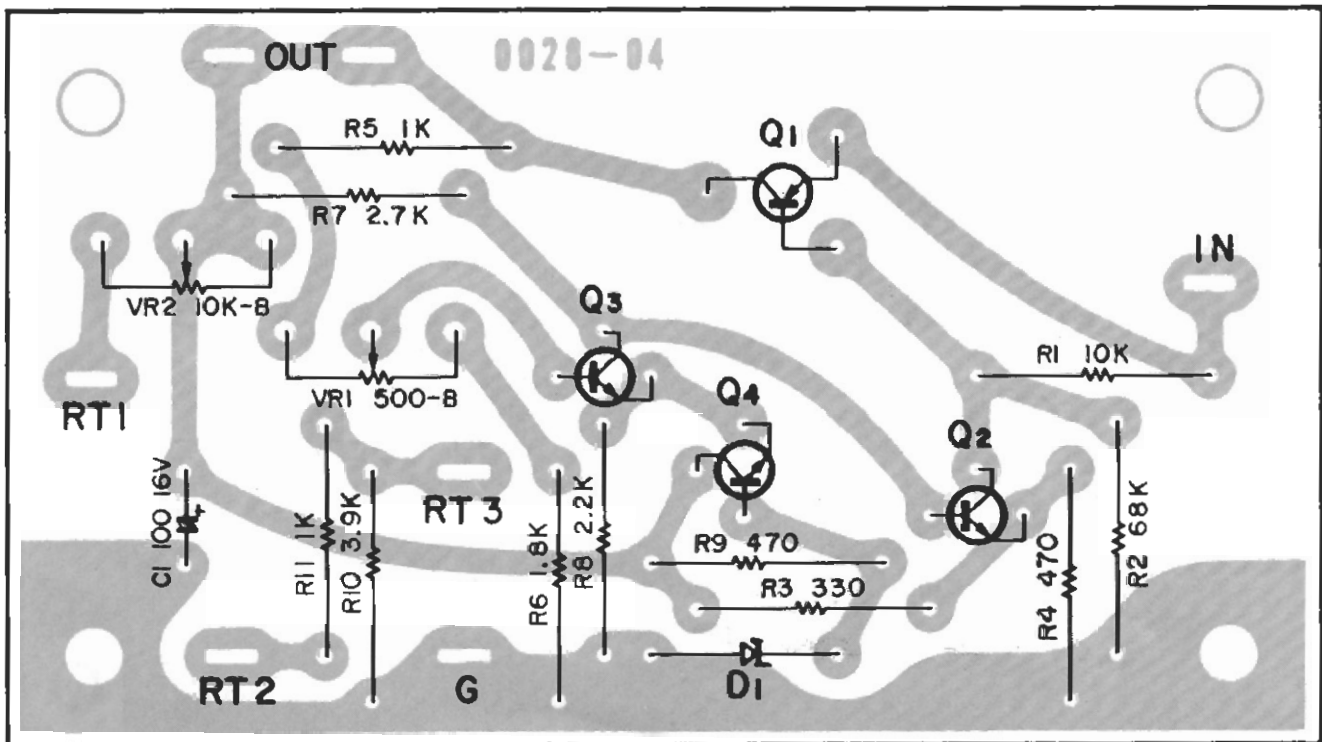
PC BOARD

■ PC BOARD OF X40-0016-08 (VFO UNIT)



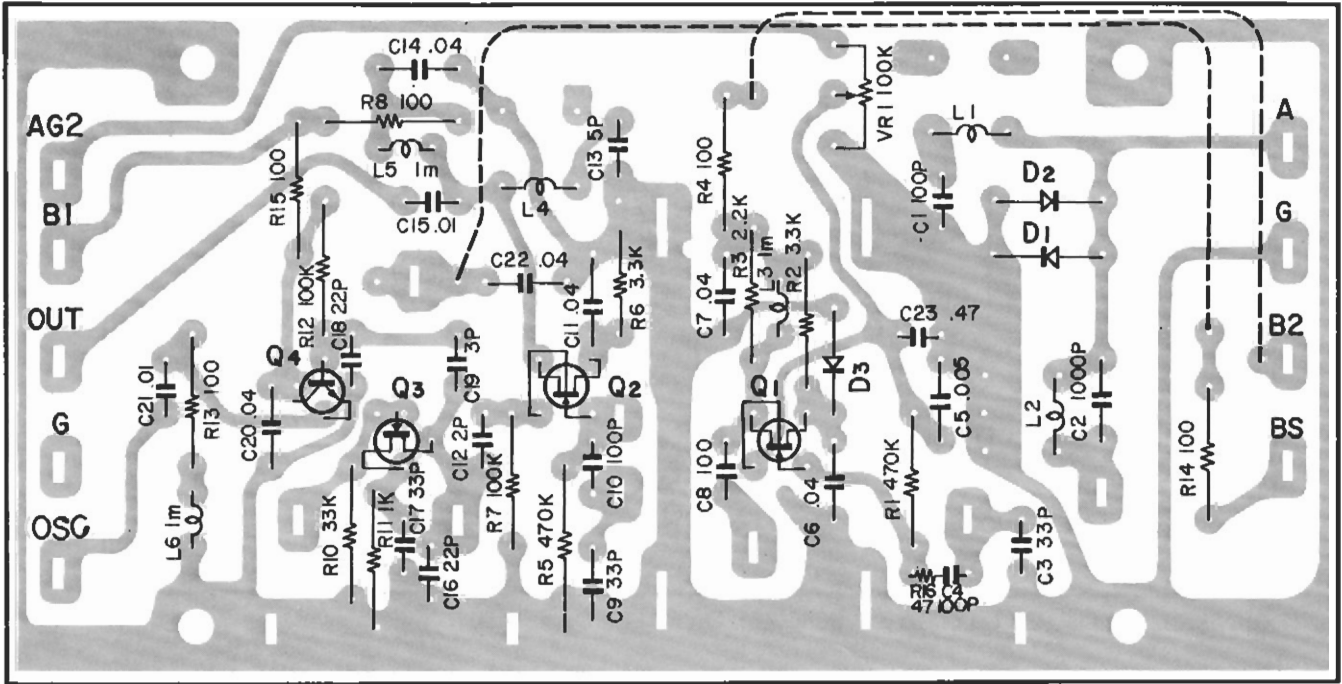
Q₁: 3SK22(Y), Q₂: 2SK19(Y), Q_{3,4}: 2SC460(B), D₁: SD111, D_{2,3}: IN60

■ PC BOARD OF X43-0010-00 (AVR UNIT)



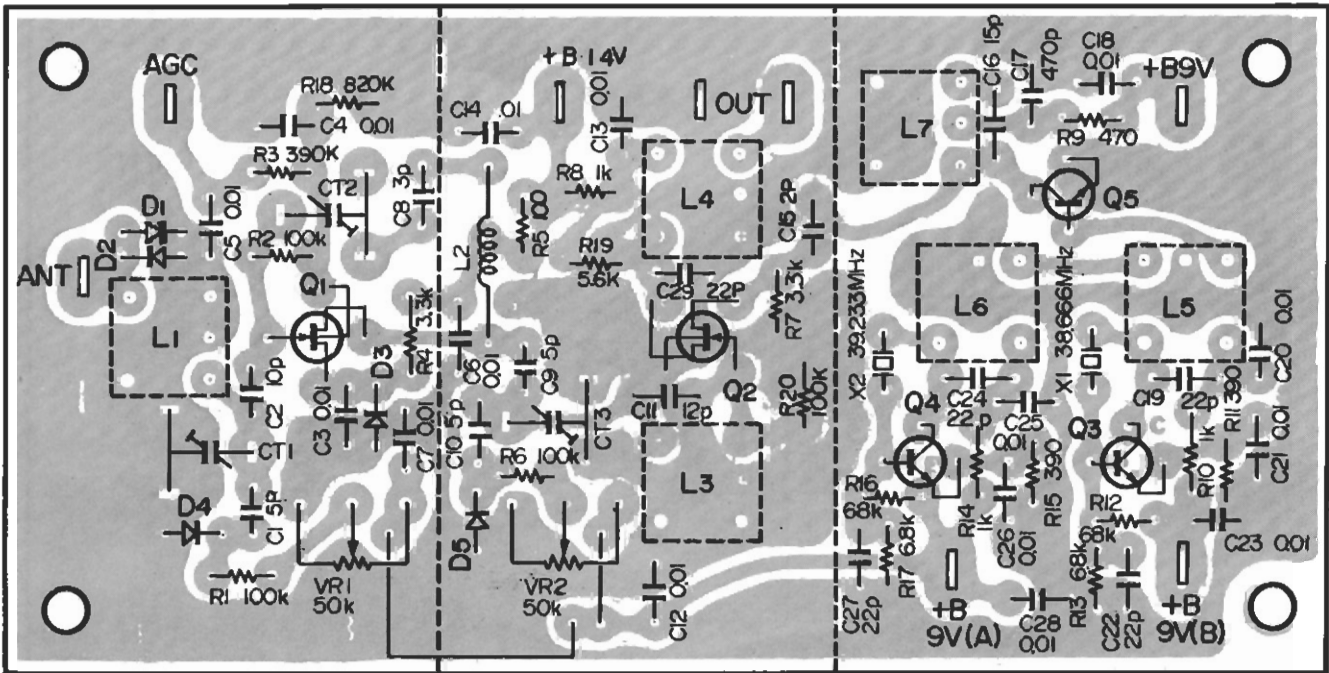
Q₁: 2SA606(L), Q_{2 ~ 4}: 2SC372, D₁: WZ-061

■ PC BOARD OF X44-0020-00 (RF UNIT)



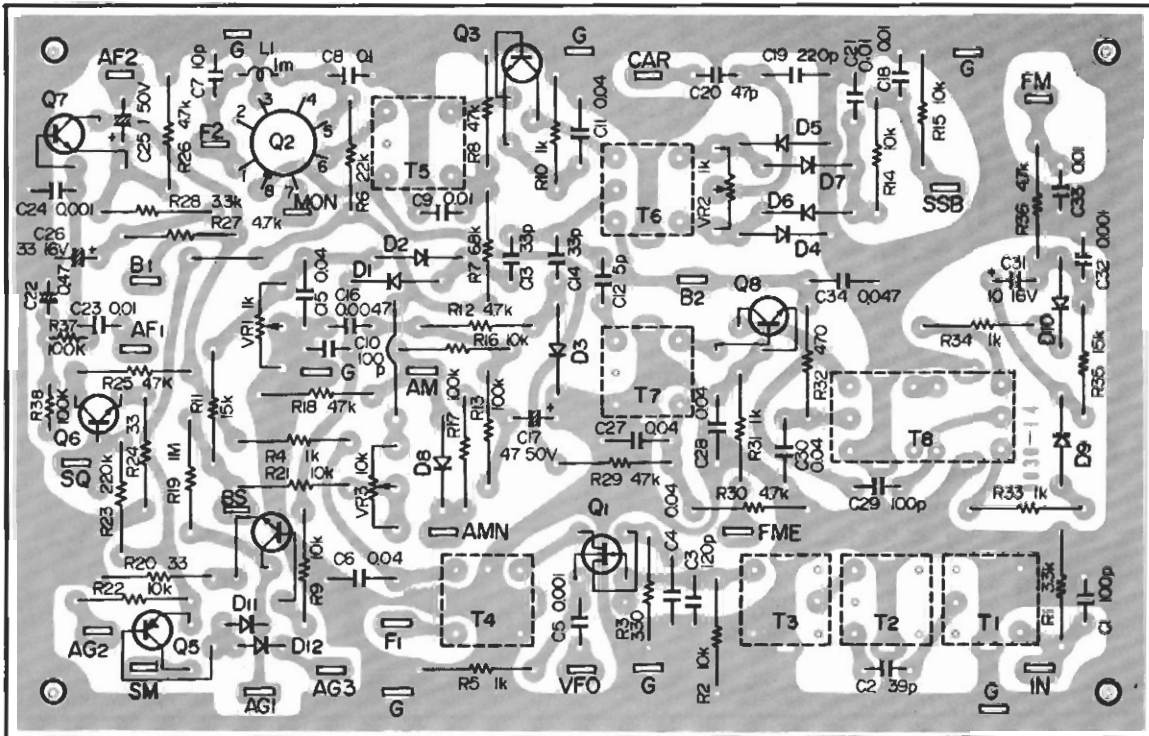
Q1,2: 3SK22(GR) Q3: 2SK19(GR) Q4: 2SC460(B)

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



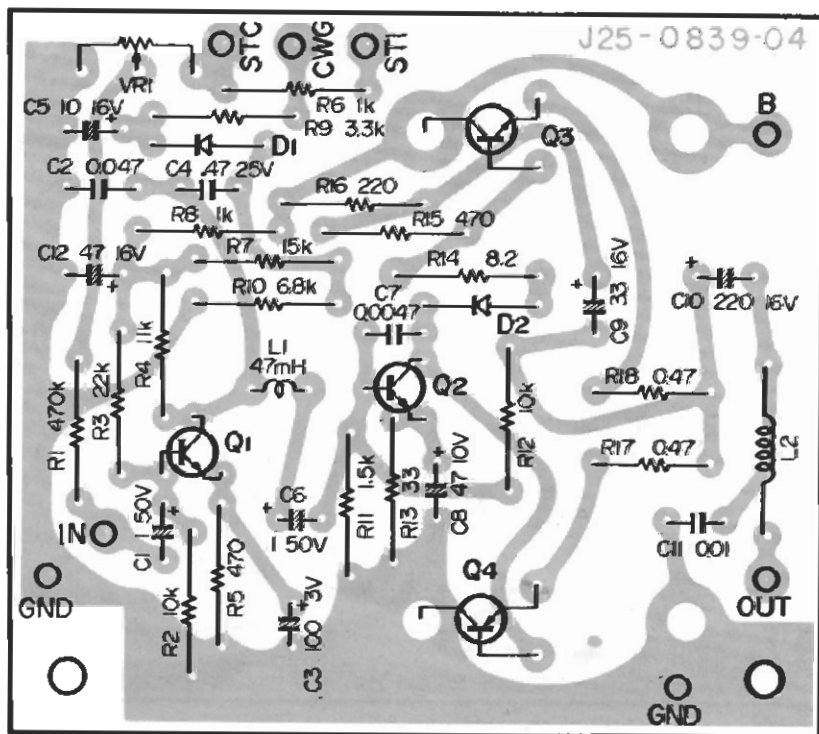
D1,2: IN60 D3: MZ1004 D4,5: IS-85(W) Q1: 3SK22(GR) Q3,4: 2SC535 Q5: 2SC460(B)

■ PC BOARD OF X48-0011-00 (IF UNIT)



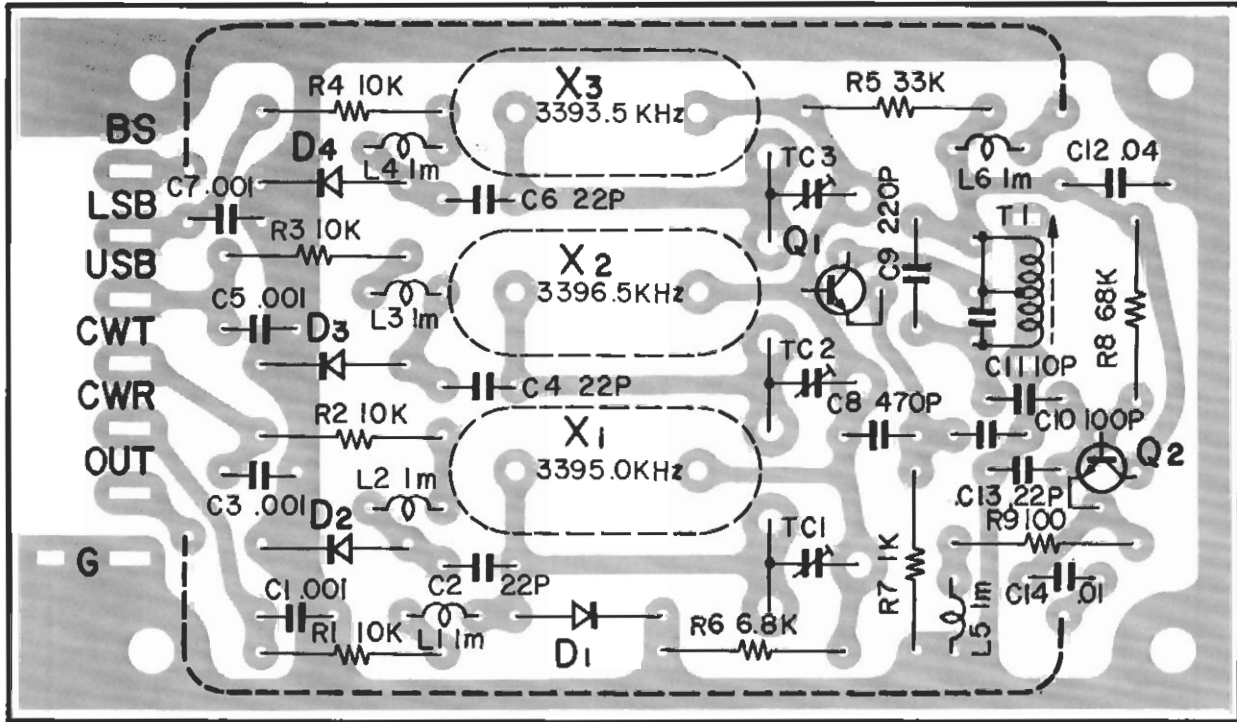
D1 ~ 10: IN60 Q1: 3SK22 (GR) Q2: TA7045M(R) Q3,8: 2SC460(B)
 Q4,6: 2SC733(Y) Q5: 2SA495(Y) Q7: 2SC1000(GR)

■ PC BOARD OF X49-1040-10 (AF UNIT)



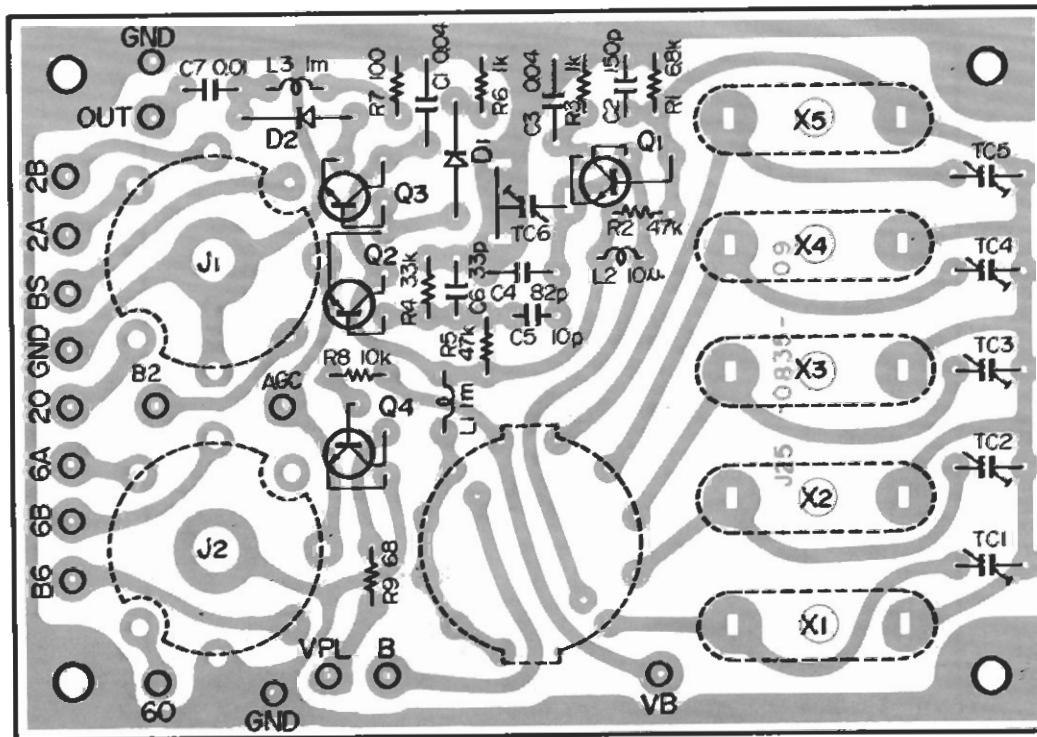
D1,2: 1S1555 Q1: 2SC1000(GR)
 Q2: 2SC734(Y) Q3: 2SD90(O) Q4: 2SB473(C, D, N)

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



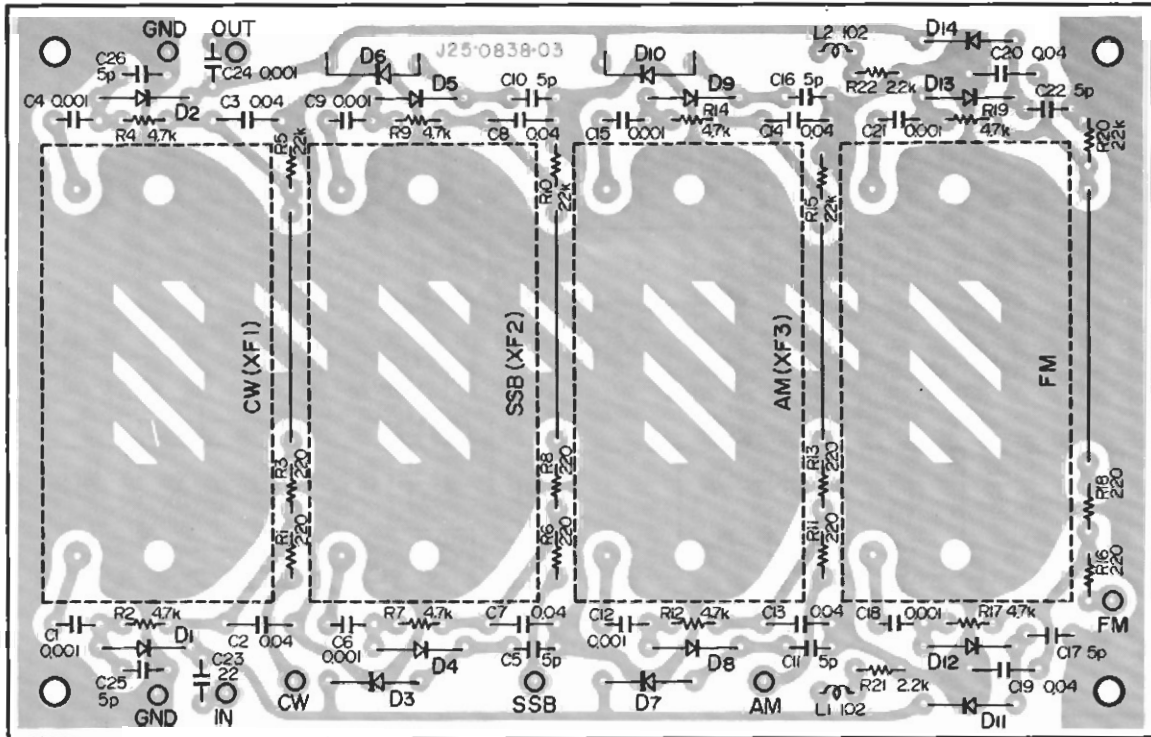
D1 ~ 4 : 1S1555 Q1, 2 : 2SC460(B)

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



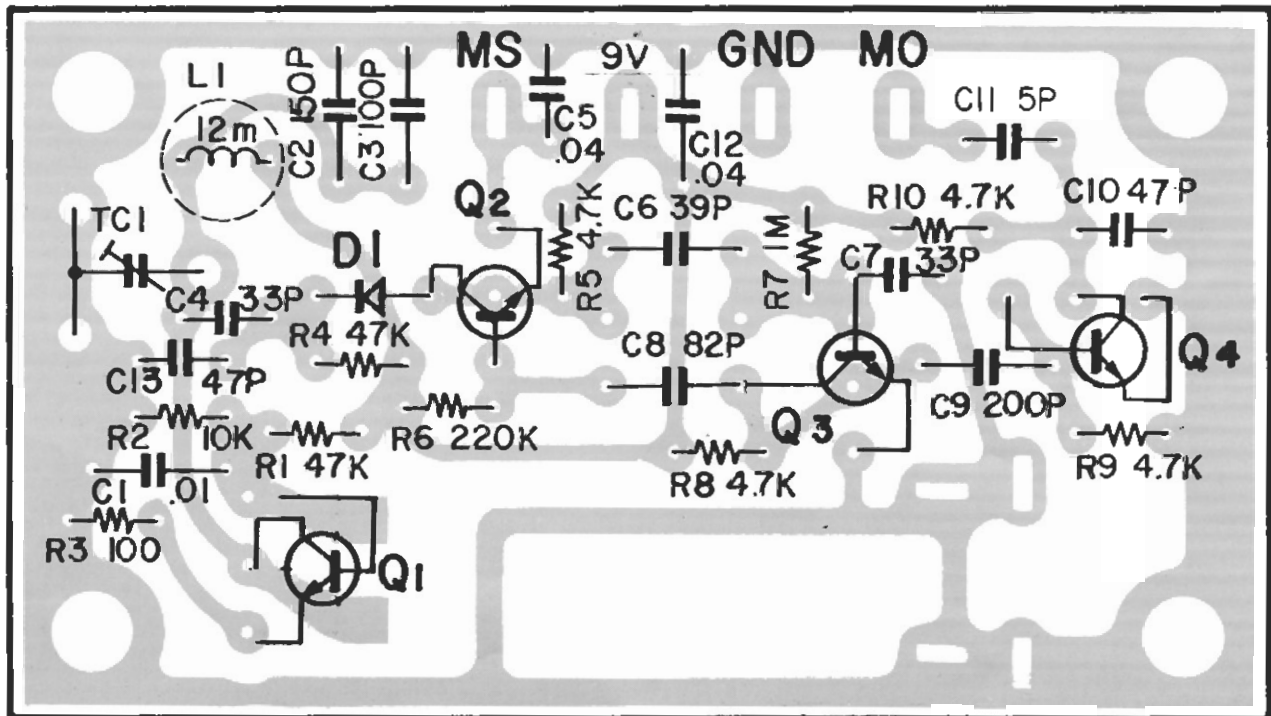
D1, 2 : IN60 Q1, 3 : 2SC460B Q4 : 2SC735(Y)

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



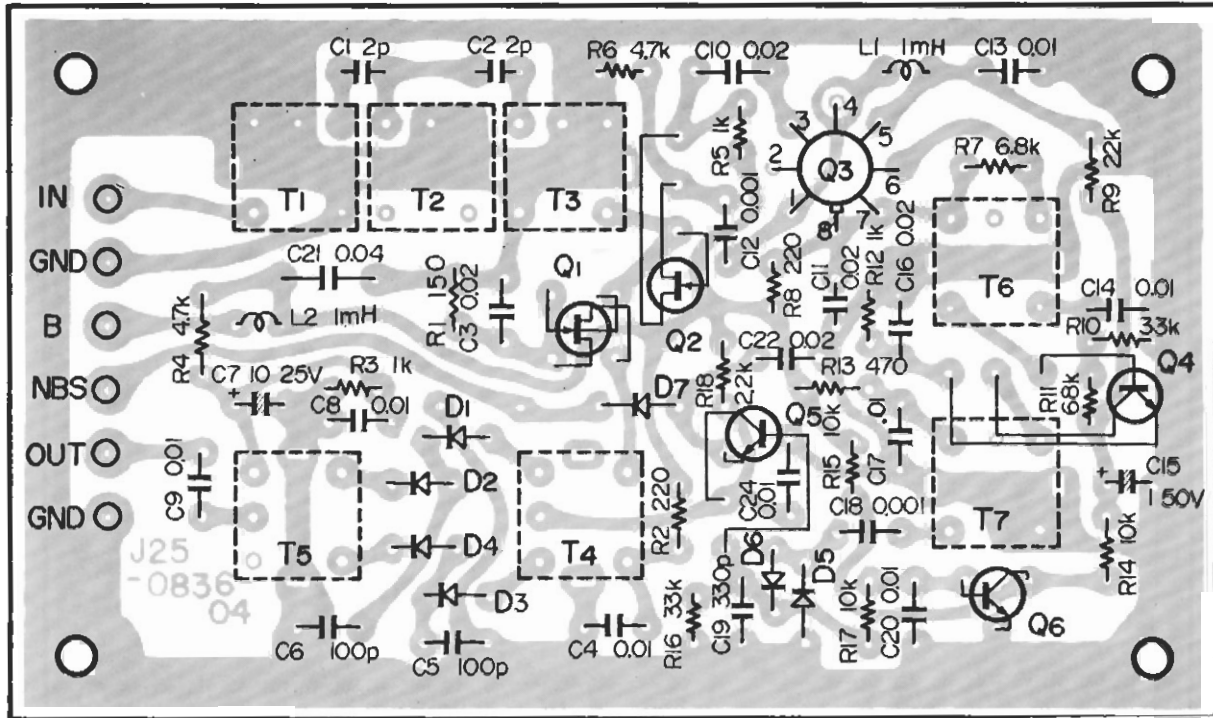
D1 ~ 14: 1S73A

■ 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)

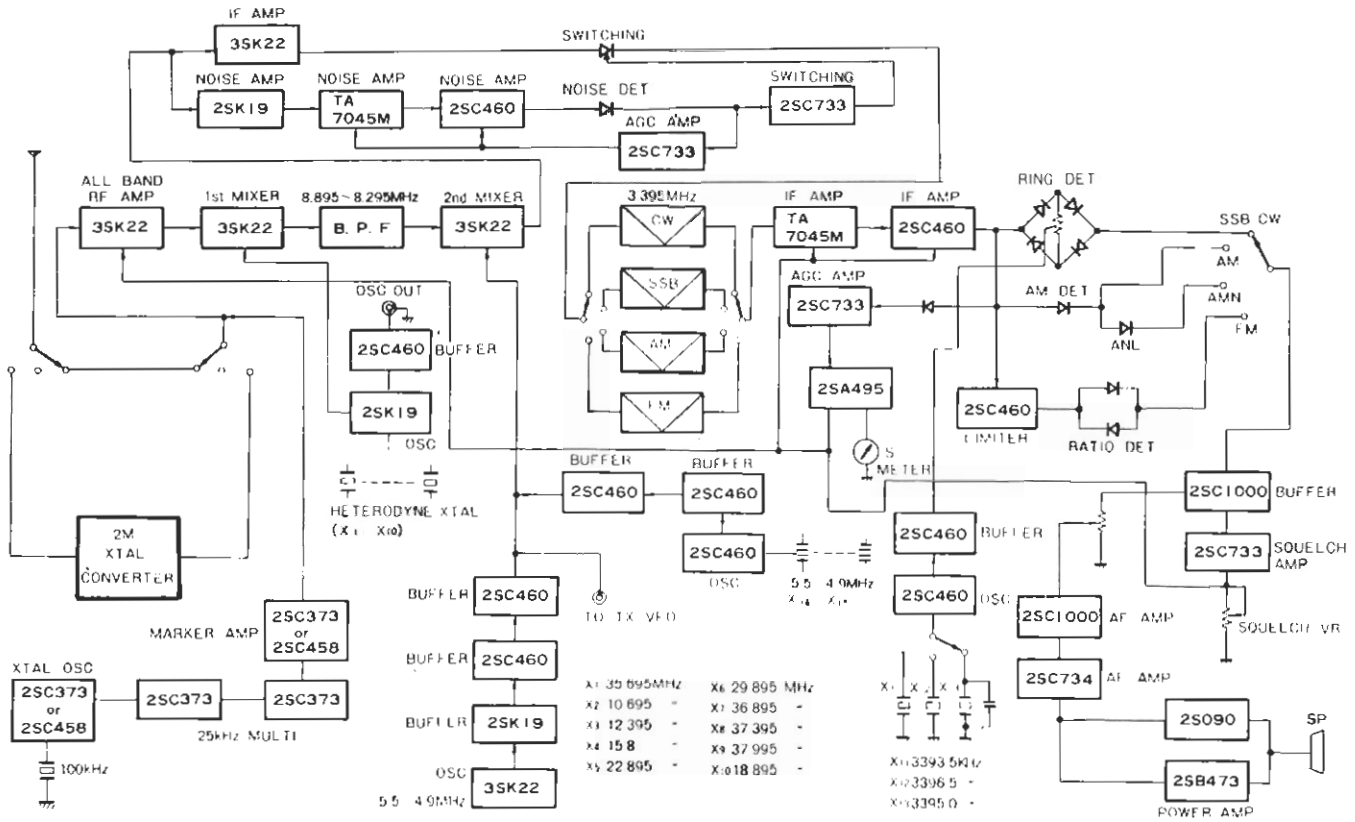


D_{1 ~ 4}: 1S73A D_{5,6}: 1N60 D₇: MV-13 Q₁: 3SK22(GR)
 Q₂: 2SK19 (GR) Q₃: TA7045M(R) Q₄: 2SC460B Q_{5,6}: 2SC733(Y)

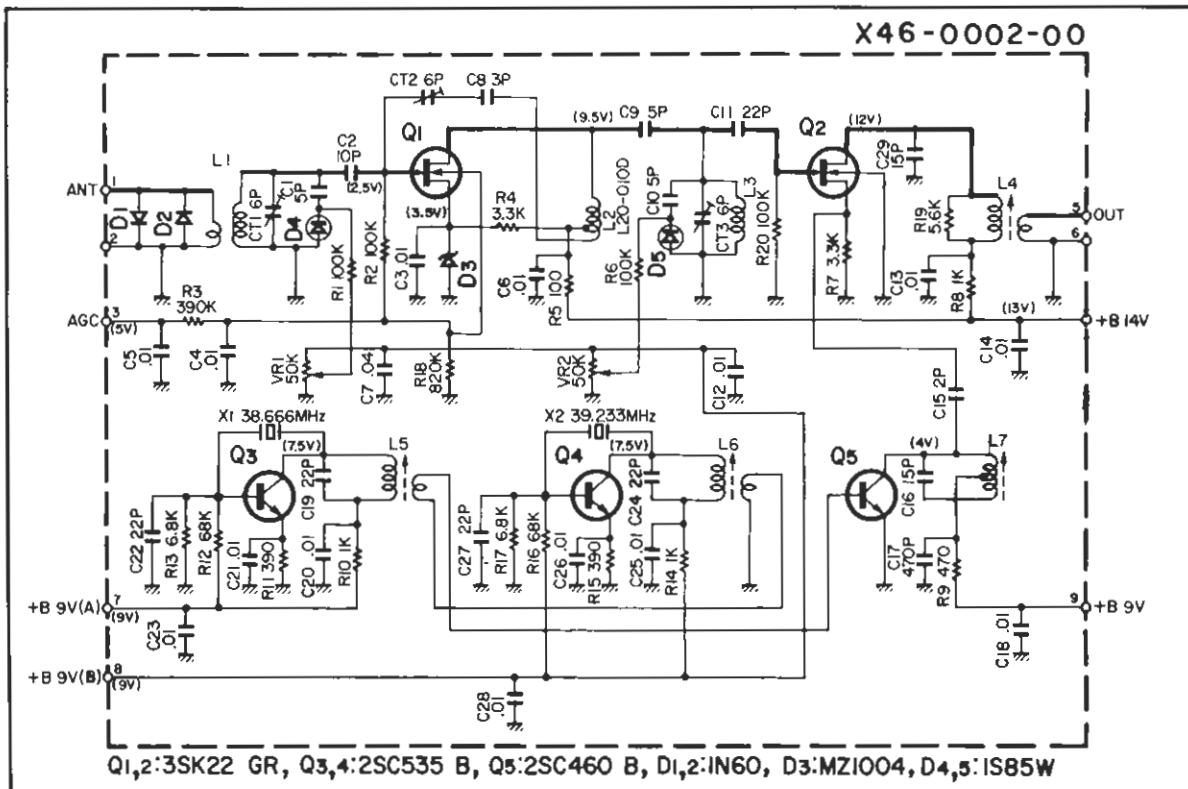
SPECIFICATION

RECEIVING FREQUENCY RANGE	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
TYPE OF RECEPTION	SSB, CW, AM and FM			
ANTENNA INPUT IMPEDANCE	50 ~ 75 Ω (Unbalanced)			
SENSITIVITY				
	SSB			
	1.8 ~ 28 MHz BAND	0.5 μ V S/N	10dB or more.	
	144 MHz BAND	1 μ V S/N	10dB or more.	
	CB BAND	0.5 μ V S/N	10dB or more.	
	WWV	0.5 μ V S/N	10dB or more.	
AM				
	1.8 ~ 28 MHz BAND	3 μ V S/N	10dB or more.	
	144 MHz BAND	6 μ V S/N	10dB or more.	
	CB BAND	3 μ V S/N	10dB or more.	
	WWV	3 μ V S/N	10dB or more.	
IMAGE RATIO	More than 50dB			
IF INTERFERENCE	More than 50dB			
SELECTIVITY				
	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)	
FREQUENCY STABILITY	Within ± 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.			
AF OUTPUT	More than 1 W (at 10% distortion)			
LOAD IMPEDANCE	4 to 16 Ω			

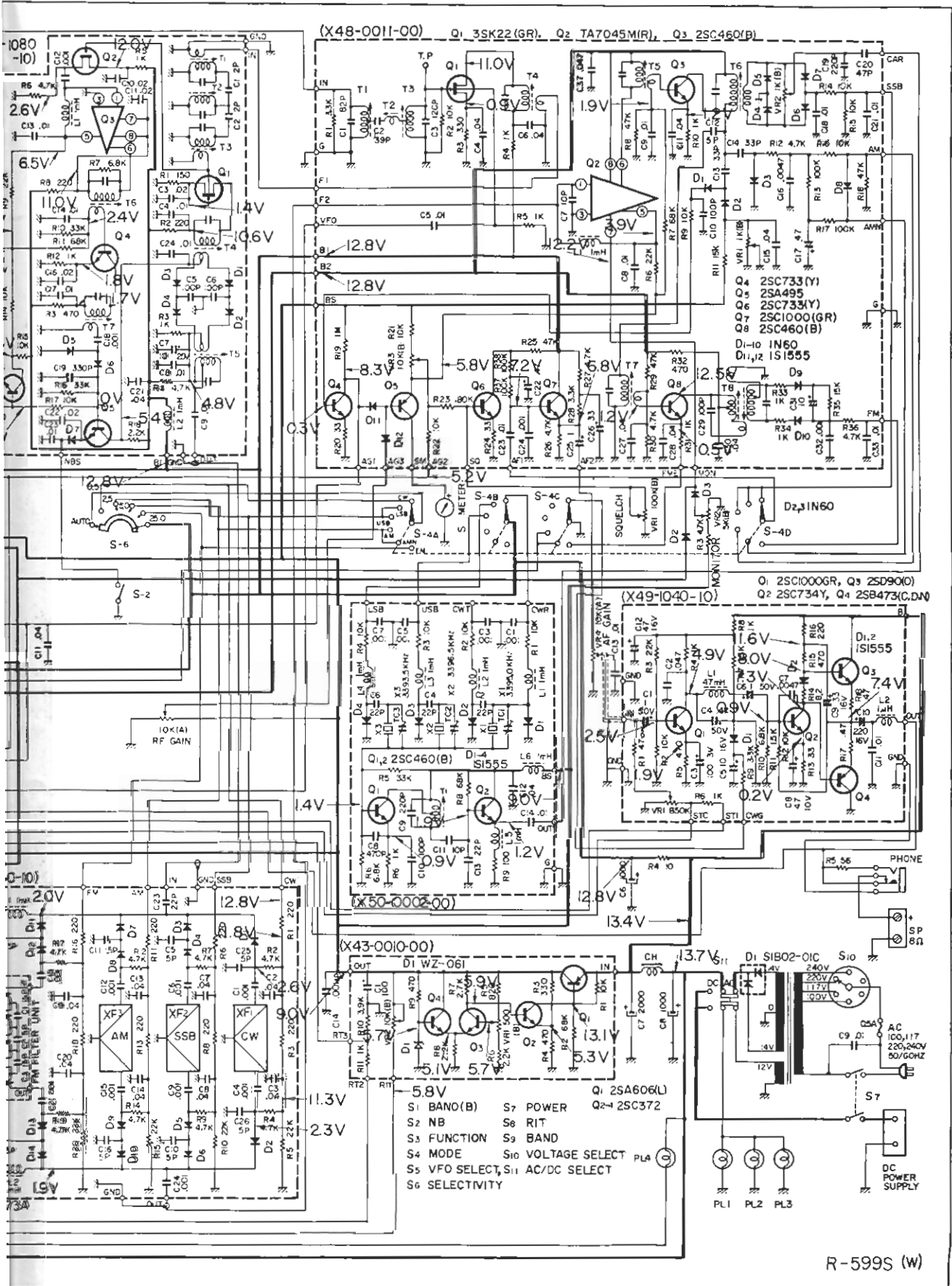
BLOCK DIAGRAM



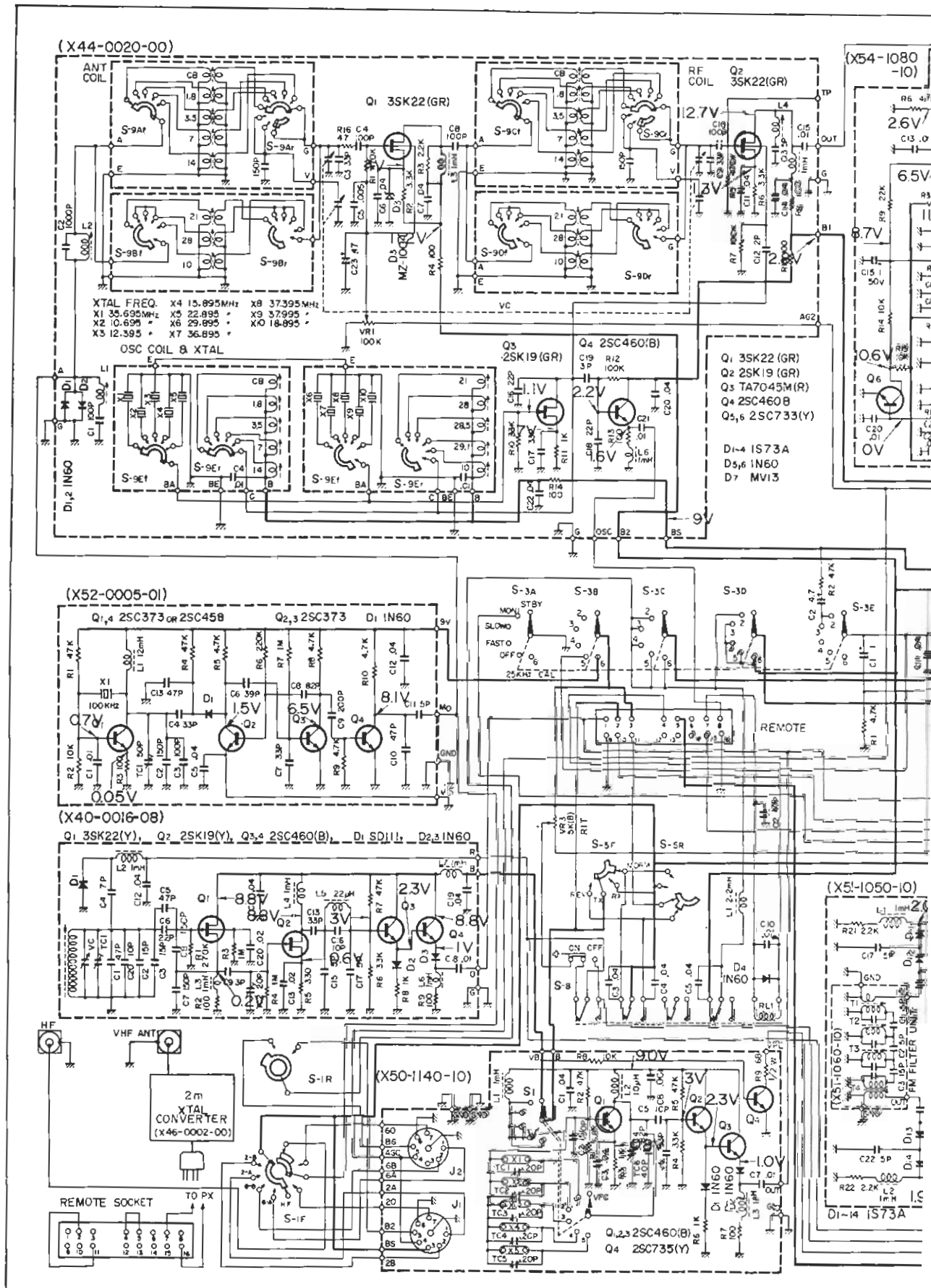
SCHEMATIC DIAGRAM (2m CRYSTAL CONVERTER)



SCHEMATIC DIAGRAM



SCHEMATIC





Manufactured by TRIO ELECTRONICS, INC., Tokyo, Japan

■ PARTS LIST OF L60-0002-02 (COIL PACK)

R-599A

Circuit No.	Parts No.	Description	Remarks
-	D21-0028-05	Rotary switch shaft	
-	D29-0001-04	Shaft joint	
-	F10-0015-04	Shield plate	
-	F10-0016-04	Bottom shield plate	
-	F11-0018-03	Shield case	
-	J20-0009-04	Cam stopper	
X1	L77-0326-05	Crystal oscillator	(HC-18/U, 35.695 MHz)
X2	L77-0010-25	Crystal oscillator	(HC-18/U, 10.695 MHz)
X3	L77-0011-25	Crystal oscillator	(HC-18/U, 12.395 MHz)
X4	L77-0012-25	Crystal oscillator	(HC-18/U, 15.895 MHz)
X5	L77-0014-35	Crystal oscillator	(HC-18/U, 22.895 MHz)
X6	L77-0015-35	Crystal oscillator	(HC-18/U, 29.895 MHz)
X7	L77-0016-35	Crystal oscillator	(HC-18/U, 36.895 MHz)
X8	L77-0017-35	Crystal oscillator	(HC-18/U, 37.395 MHz)
X9	L77-0018-35	Crystal oscillator	(HC-18/U, 37.995 MHz)
X10	L77-0013-35	Crystal oscillator	(HC-18/U, 18.895 MHz)
L1	L31-0013-04	ANT tuning coil	(1.8 MHz)
L2	L31-0014-04	ANT tuning coil	(3.5 MHz)
L3	L31-0015-04	ANT tuning coil	(7 MHz)
L4	L31-0016-04	ANT tuning coil	(14 MHz)
L5	L31-0017-04	ANT tuning coil	(21 MHz)
L6	L31-0018-04	ANT tuning coil	(28 MHz)
L7	L31-0019-04	ANT tuning coil	(10 MHz)
L8	L31-0020-04	RF tuning coil	(1.8 MHz)
L9	L31-0021-04	RF tuning coil	(3.5 MHz)
L10	L31-0022-04	RF tuning coil	(7 MHz)
L11	L31-0023-04	RF tuning coil	(14 MHz)
L12	L31-0024-04	RF tuning coil	(21 MHz)
L13	L31-0025-04	RF tuning coil	(28 MHz)
L14	L31-0026-04	RF tuning coil	(10 MHz)
L15	L32-0004-04	OSC coil	(1.8 MHz)
L16	L32-0005-04	OSC coil	(3.5 MHz)
L17	L32-0006-04	OSC coil	(7 MHz)
L18	L32-0007-04	OSC coil	(14 MHz)
L19	L32-0008-04	OSC coil	(21 MHz)
L20 ~ 22	L32-0009-04	OSC coil	(28 MHz)
L23	L32-0010-04	OSC coil	(10 MHz)
L24	L31-0018-04	ANT tuning coil (28MHz)	
L25	L31-0025-04	RF tuning coil (28MHz)	
L26	L32-0009-04	OSC coil (28MHz)	
S1	S29-1002-05	Rotary switch wafer (2)	
S2	S29-1001-05	Rotary switch wafer (1)	
S3	S29-1002-05	Rotary switch wafer (2)	
S4	S29-1001-05	Rotary switch wafer (1)	
S5	S29-1002-05	Rotary switch wafer (2)	
S6	S29-1001-05	Rotary switch wafer (1)	

■ PARTS LIST OF L60-0002-02 (COIL PACK)

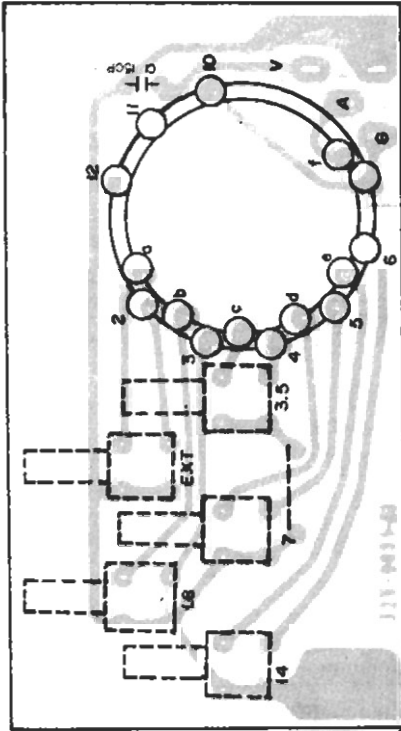
R-599A

Circuit No.	Parts No.	Description	Remarks
-	J25-0031-03	PC board (A)	
-	J25-0032-03	PC board (B)	
-	J25-0033-03	PC board (C-1)	
-	J25-0034-03	PC board (C-2)	
C1, 2	CM93D1H151J	Mica 150pF ±5%	
C3, 4	CK94YZ1H103P	Ceramic 0.001μF +100%, -0%	
-	D12-0017-05	Rotary switch cam	
-	D23-0048-04	Bearing	
-	E23-0021-04	Terminal	
-	E23-0037-04	Shaft grounding hardware	
-	N30-3004-11	Pan head screw	
-	N30-3006-11	Pan head screw	

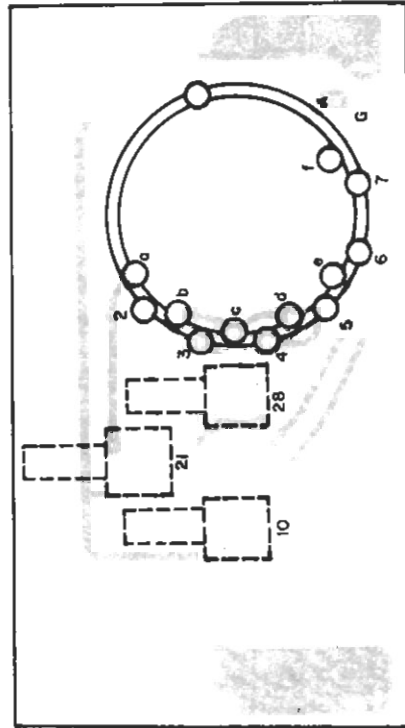
PC BOARD OF L60-0002-02 (COIL PACK)

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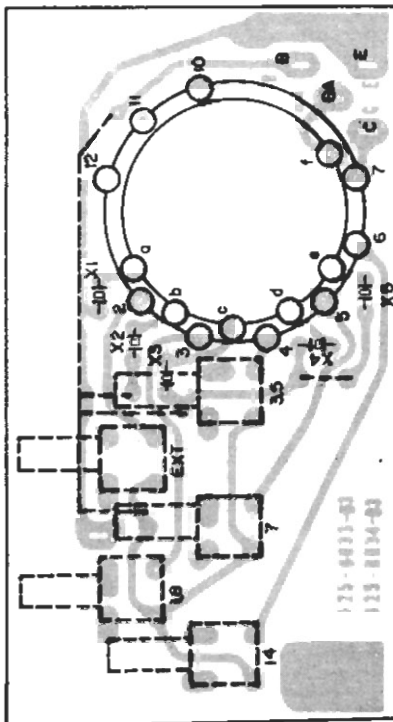
▼ J25-0031-03



▼ J25-0032-03



▼ J25-0033-03



▼ J25-0034-03

