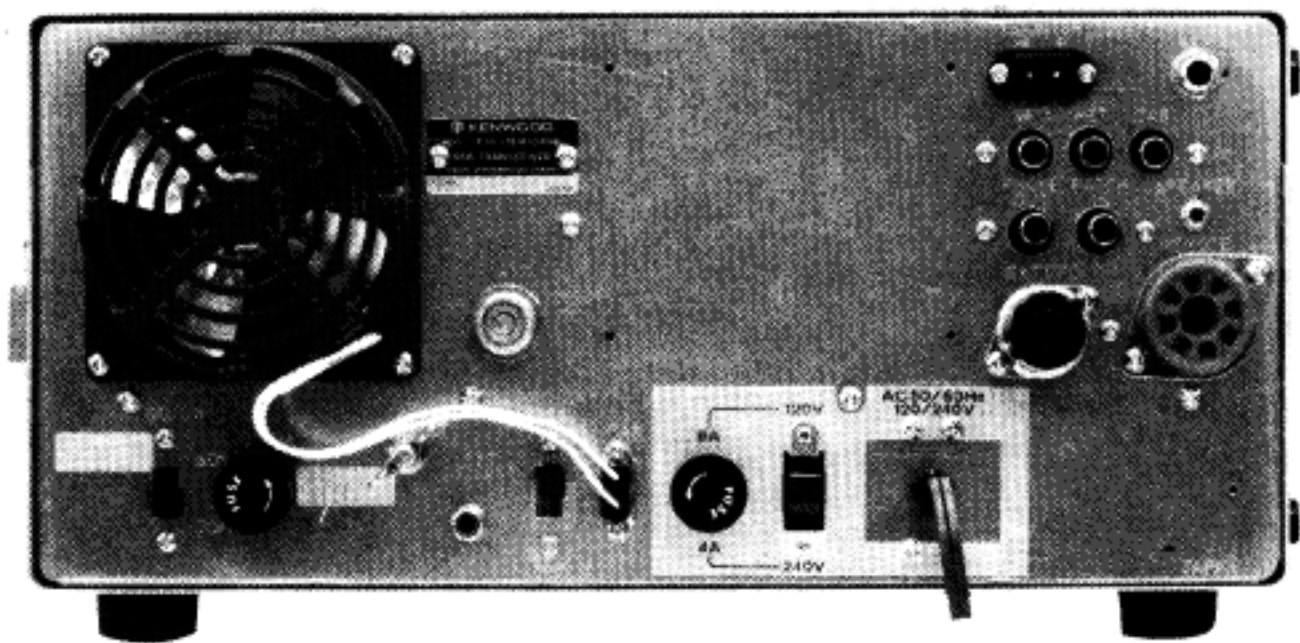


**KENWOOD**

# SERVICE MANUAL

## Model TS-520SE



### SSB TRANSCEIVER

# NOTICE

The differences from former 520S are as follows.

1. Modifications for the elimination of the DC power function
  - 1) The power transformer has been changed. (Windings for the converter have been eliminated.)
  - 2) The 12P concent plug has been eliminated.
  - 3) The 10P terminal board and its bracket have been eliminated. (For DC-DC converter.)
2. Modification for the elimination of the X-verter function
  - 1) The 12P connector has been eliminated. (For X-verter)
  - 2) The slide switch and stopper have been eliminated.
  - 3) Two 1P jacks have been eliminated. (X-verter, IN/OUT)
  - 4) The rear panel has been modified. (This modification is related to item 1.)
3. FIXCH.AVR unit modifications to eliminate the DC-DC converter (-6V).
  - 1) The oscillation transformer has been eliminated.
  - 2) The oscillation transistor, Capacitor and Resistor have been eliminated.
  - 3) A connecting wire kit and solid resistor have been newly added.
4. The marker unit has been redesigned to New circuit.
5. Modifications for the new introduction of the CW NARROW/WIDE switching function include
  - 1) The switch name plate
  - 2) The connecting wire kit to suit wiring modifications
  - 3) The paddle switch

## SPECIFICATIONS

### GENERAL

**Frequency Range:**

- 160 meter band — 1.80 to 2.00 MHz
- 80 meter band — 3.50 to 4.00 MHz
- 40 meter band — 7.00 to 7.30 MHz
- 20 meter band — 14.00 to 14.35 MHz
- 15 meter band — 21.00 to 21.45 MHz
- 10 meter band — 28.00 to 28.50 MHz (A)
- 28.50 to 29.10 MHz (B)
- 29.10 to 29.70 MHz (C)
- WWW — 15.0 MHz (receive only)

**Mode:** SSB ((USB, LSB) or CW

**Antenna Impedance:** 50 ~ 75 ohms

**Frequency Stability:**

- Within 100 Hz during any 30 minute period after warm-up
- Within ±1 kHz during the first hour after 1 minute of warm-up

**Tubes and Semiconductors:**

- Tubes ..... 3
- Transistors ..... 49
- FETs ..... 19
- IC ..... 1
- Diodes ..... 95

**Power Requirements:**

	120/220 VAC, or 220/240 VAC 50/60 Hz operation
Receive	45 watts
Transmit	280 watts (maximum)

**Dimensions:**

333 (13-1/8" wide x 153 (6.0" high x 335 (13-3/16" deep

**Weight:** 16 kg (35.2 lbs)

### TRANSMITTER

**RF Input Power:**

120/220 VAC, or 220/240 VAC 50/60 Hz operation
200 watts PEP for SSB operation 160 watts DC for CW operation

**Carrier Suppression:** Better than 40 db

**Side Band Suppression:** Better than 50 db

**Spurious Radiation:** Better than 40 dB.

**Audio Input Sensitivity:** -60 db (-50 db maximum)

**AF Response:** 400 to 2,600 Hz, within -6db

### RECEIVER

**Sensitivity:**

0.25 μV S+N 10 db or more

**Selectivity:**

- SSB — 2.4 kHz (-6 db)
- 4.2 kHz (-60 db)
- CW# — 0.5 kHz (-6 db)
- 1.5 kHz (-60 db)
- # (with optional CW filter installed)

**Image Ratio:** Better than 50 db

**IF Rejection:** Better than 50 db

**AF Output Power:**

1 Watt (8 ohms load, with less than 10% distortion)

**AF Output Impedance:** 4 to 16 ohms

# PARTS LIST

**Note 1:**

K: U.S.A.    W: Europe    T: Britain

**Note 2:**

Only special type of resistors (example: cement, metal film, etc.) and capacitors (example: electrolytic, tantalum, mylar, temp. coeff. capacitors) are detailed in the PARTS LIST. For the value of all common type components, refer to the schematic diagram of the PC board illustration. Resistors not otherwise detailed are carbon type (1/4 or 1/8W).

Order carbon resistors and capacitors according to the following example:

A carbon resistor's part number is RD14BY 2E222J.

A ceramic capacitor's number is CK45F1H103Z, CC45TH1H220J.

**RESISTOR**

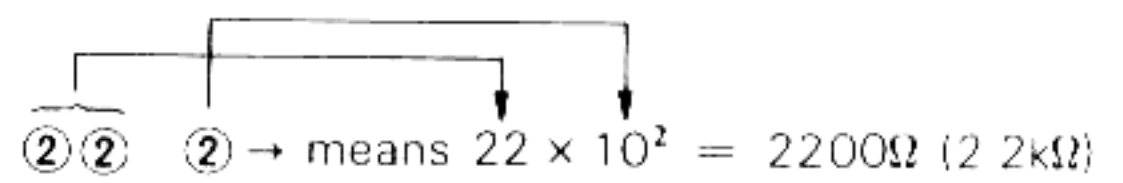
**1. Type of the carbon resistor**



**2. Warrage**

1/4W → 2E  
1/8W → 2B

**3. Resistance value**



Significant figure	Multiplier
Example: 221	→ 220 Ω
222	→ 2.2 kΩ
223	→ 22 kΩ
224	→ 220 kΩ
225	→ 2.2 MΩ

**4. Tolerance**

J = ±5% (Gold)  
K = ±10% (Silver)

**CAPACITORS**

**Type I**

CK	45	F	1H	103	Z
1	2	3	4	5	6

**Type II**

CC	45	TH	1H	220	J
1'	2	3'	4	5	6

- 1 = Type .... ceramic, electrolytic, etc.
- 2 = Shape ... round, square, etc.
- 3 = Temp. range
- 3' = Temp. coefficient
- 4 = Voltage rating
- 5 = Value
- 6 = Tolerance

**6 = Tolerance**

Cord	C	D	G	J	K	M	X	Z	P	No cord
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10μF -10 ~ +50 Less than 4.7μF -10 ~ +75

**Less than 10 pF**

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

**5 = Capacitor value**

Example: 010 → 1 pF  
100 → 10 pF  
101 → 100 pF  
102 → 1000 pF = 0.001 μF  
103 → 0.01 μF

**3 = CK45F**

Ceramic capacitor (type I) 3

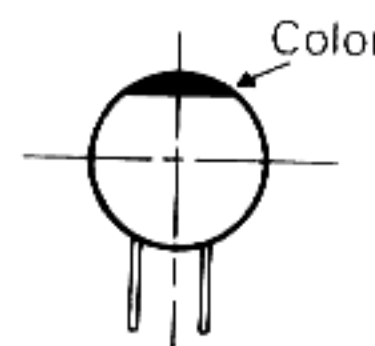
Cord	B	D	E	F
Operating temperature °C	-30 +85	-30 +85	-30 +85	-10 +70

**3' = CC4500 ....**

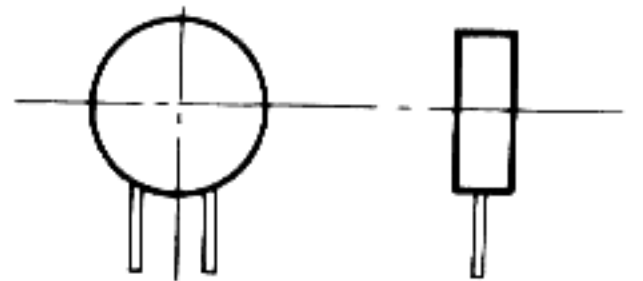
Ceramic capacitor (type II) temperature coeff. capacitor 1' 3'.

1st word (Color)	CH (Black)	LH (Red)	PH (Orange)	RH (Yellow)	SL (Green)	TH (Blue)	UH (Violet)
ppm/°C	0	-80	-150	-220	-330	-470	-750

CC45 ....



CK45 ....



Type II 45

# PARTS LIST

## GENERAL ☆ : New Parts

Ref. No.	Parts No.	Description	Re- marks
<b>CAPACITOR</b>			
C1	C90-0186-05	Ceramic 1000pF 3kV	
C2	C90-0187-05	Ceramic 4700pF 1.4kV	
C4	C91-0017-05	Ceramic 390pF 3kV	
C5	C91-0401-05	Ceramic 100pF 3kV	
C30	C90-0187-05	Ceramic 4700pF 1.4kV	
C40	C90-0172-05	Ceramic 12pF 3kV	
<b>TUBE/SEMICONDUCTOR</b>			
V1.2	V40-0150-00	Tube S2001A × 2	
D1.2	V11-0076-05	Diode 1S1555 × 2	
D3	V11-0051-05	Diode 1N60	
<b>POTENTIOMETER</b>			
—	R01-0040-05	300Ω (B) ANTI VOX	
—	R01-3014-05	10kΩ (B) RF	
—	R01-4014-05	50kΩ (B) × 2 VOX, BIAS	
—	R01-6009-05	250kΩ (B) DELAY	
—	R03-2004-05	5kΩ (B) RIT	
—	R08-3012-15	10kΩ (A), 10kΩ (B) × 2 AF, RF	
—	R19-3401-05	10kΩ (A), 10kΩ (B) × 2 with SW, MIC, CAR	
<b>VARIABLE CAPACITOR/TRIMMER</b>			
—	C01-0084-05	Variable capacitor (B) LOAD	
—	C03-0060-05	Variable capacitor (A) FINAL	
—	C03-0002-05	Trimmer 7pF (MAX)	
S1	S29-1006-05	Rotary switch METER	
S2	S01-4017-05	Rotary switch FUNCTION	
S3	S04-5016-05	Rotary switch MODE	
S4	S10-1107-05	Rotary switch CHANNEL	
S5	S01-3401-05	Rotary switch FINAL	
—	S31-2007-05	Slide switch × 2	
—	S40-2023-05	Push switch × 2 RIT, ATT	
—	S44-2015-05	Paddle switch (AGC SW)	
—	S44-2020-05	Paddle switch (Black) × 4	
RL1	S51-4016-15	Relay	
RL2	S51-4017-15	Relay (Final)	
—	S59-2017-05	Switch (Voltage selecting)	
—	S59-2020-05	Rocker switch (Power)	
<b>COIL/SPEAKER</b>			
L1	L33-0032-05	Choke coil 3μH	
L2	L33-0218-15	Choke coil (Final)	
L3	L34-0561-05	Final coil (B) 28MHz	
L4	L34-0560-15	Final coil (A)	
L5	L40-2225-04	Ferri-inductor 2.2mH	
L7	L33-0259-05	Choke (Safety) 470μH	
—	L01-8076-05	Power transformer	
—	L15-0002-15	Choke coil (Low frequency)	
PS1.2	L39-0046-05	Parastic suppressor	
—	T03-0027-15	Loud speaker 8Ω 1W	
<b>MISCELLANEOUS</b>			
—	A01-0211-02	Top case	
—	A20-2369-03	Panel ass'y Front K, W	☆
—	A30-0602-13	Dial back plate	
—	A33-0401-04	Reflection plate	
—	A40-0120-31	Bottom case	

Ref. No.	Parts No.	Description	Re- marks
—	B05-0201-04	Speaker net	
—	B09-0003-05	Coupling × 2 Universal	
—	B10-0607-14	Front glass	
—	B20-0287-44	Sub-dial	
—	B21-0007-04	Pointer, Plate	
—	B30-0079-05	Pilot lamp × 4 12V 40mA	
—	B31-0164-15	Meter	
—	B42-1672-24	Switch name plate K, W	
—	B43-0628-04	Panel name plate TS-520SE	
—	B42-0447-04	VR adjustment name plate	
—	B46-0058-00	Warranty card	
—	B50-2683-00	Operating manual K, W	☆
—	B58-0181-00	Caution sticker (Final section)	
—	B58-0617-00	Caution card W (Source voltage,	
—	B58-0188-00	Caution card K (Source voltage)	
—	D13-0032-03	Sprocket × 3	
—	D21-0326-24	Shaft (A) LOAD	
—	D21-0415-14	Shaft (B) PLATE	
—	D21-0802-04	Shaft (C) DRIVE	
—	D22-0004-04	Shaft coupling × 2 6φ-6φ Bakelite	
—	D22-0027-14	Shaft joint	
—	D23-0048-04	Bearing × 2 (Metal)	
—	D23-0061-04	Bearing (Mold)	
—	D23-0116-05	Swivel shaft bearing ass'y	
—	D32-0018-04	Shaft stopper × 2	
—	D32-0075-04	Switch stopper × 2 Slide type	
—	D40-0602-05	Vernier mechanism PLATE	
—	D40-0206-05	Fan ass'y	
—	E01-0801-05	8P (OCTAL) Socket	
—	E01-0903-05	9P socket (EXT/VFO)	
—	E04-0102-05	UHF type receptacle	
—	E05-0901-05	9P plug (EXT/VFO)	
—	E06-0403-05	4P MIC socket	
—	E07-0403-05	4P MIC plug	
—	E08-0203-25	2P polarized jack 14V OUT	
—	E08-0204-05	2P socket × 2	
—	E09-0204-05	2P plug × 3	
—	E11-0003-15	Ext. speaker jack 1/8"	
—	E11-0003-15	3P phone jack KEY 1/4"	
—	E11-0034-25	Jack with 2P switch PHONES 1/4"	
—	E12-0001-05	Phone plug (Ext. SP) 1/8"	
—	E13-0101-05	1P phono jack	
—	E13-0205-05	2P phono jack (Phone patch)	
—	E13-0361-05	3P phono jack (Counter)	
—	E14-0101-05	1P phono plug × 2	
—	E14-0801-05	8P OCTAL plug	
—	E20-0512-05	5P terminal strips	
—	E22-0206-05	Lug 101 × 2	
—	E22-0405-05	Lug 202 (B)	
—	E23-0037-04	Shaft grounding × 2	
—	E23-0088-04	Lug (ANT-GND)	
—	E30-0181-05	AC cord K	
—	E30-0585-05	AC cord W	
—	E90-0004-15	Plate cap × 2	
—	F05-2023-05	Fuse 2A × 2	
—	F05-4022-05	Fuse 4A × 2 K	
—		4A × 3 W	
—	F05-6021-05	Fuse 6A × 3 K	
—	F10-0402-04	Relay shield plate	
—	F19-0134-04	Side cover VOX, RF, BIAS	
—	F20-0504-04	Insulator	
—	F29-0014-05	Insulating washer × 2 (Fix Ch Ret.)	

# PARTS LIST

Ref. No.	Parts No.	Description	Re- marks
—	G11-0044-04	Cushion Rubber, relay	
—	H01-2650-04	Carton (Inside) K, W	☆
—	H03-1729-04	Carton (Outside) K, W	☆
—	H10-0931-12	Front packing fixture (F)	
—	H10-0932-22	Rear packing fixture (R)	
—	H10-1276-04	Accessory box	
—	H10-1393-04	Cushion SIDE	
—	H12-0405-04	Cushion FRONT	
—	H20-0439-03	Protective cover	
—	H25-0016-00	Polyethylene bag	
—	H25-0036-00	Polyethylene bag	
—	J02-0022-05	Foot (Small) × 4	
—	J02-0049-14	Foot (Large) × 6	
—	J13-0033-15	Fuse holder × 2	
—	J19-0004-04	SW stopper toggle type	
—	J19-1301-04	Diode holder × 3	
—	J21-0392-04	Lead holder	
—	J21-0934-15	Handle retainer × 2	
—	J21-1155-04	Fix ch. retainer	
—	J21-1497-04	Bobbin angle × 2	
—	J32-0074-04	Hex. boss × 6	
—	J32-0182-04	Hex. boss × 4	
—	J32-0220-04	Hex. boss × 6	
—	J32-0709-04	Hex. boss 4 mm	
—	J32-1030-14	Round boss × 2	
—	J41-0020-04	Knob bushing × 2	
—	J41-0006-05	Cord bushing K	
—	J41-0024-15	Cord bushing W	
—	J59-0001-05	Grummet × 2 (Quick release catch)	
—	J59-0002-05	Plunger × 2 (Quick release catch)	
—	J61-0402-05	Free up belt W	
—	K01-0049-15	Handle LEATHER	
—	K23-0239-04	Knob × 2 BAND, MODE	
—	K21-0266-04	Knob LOAD 2, 6φ	
—	K21-0267-04	Knob × 3 DRIVE, RIT, FUNCTION	
—	K21-0268-04	Knob × 2 AF GAIN, MIC	
—	K21-0269-04	Knob × 3 FIXCH, CAR, RF GAIN	
—	K21-0279-14	Knob METER	
—	K21-0315-04	Knob PLATE	
—	K21-0709-04	Knob MAIN	
—	K29-0166-04	Knob × 2 PUSH	
—	K29-0207-13	Dial scale	
—	N09-0256-05	Screw (GND) × 16	
—	N09-0601-05	Screw (Case) × 17 4 × 8 mm	
—	N14-0020-04	Wing nut, GROUND	
—	W01-0005-04	Tuning tool	

## VFO UNIT (X40-1070-01)

Ref. No.	Parts No.	Description	Re- marks
<b>SEMICONDUCTOR</b>			
Q1	V09-0020-05	FET 3SK22 (Y)	
Q2	V09-0011-05	FET 2SK19 (Y)	
Q3,4	V03-0079-05	Transistor 2SC460 (B)	

Ref. No.	Parts No.	Description	Re- marks
D1	V11-0053-05	Diode SD111 (Varicap)	
D2,3	V11-0051-05	Diode 1N60	
<b>VC/COIL</b>			
TC1	C03-0001-05	Variable capacitor (Small)	
TC2	C05-0013-15	Ceramic trimmer	
VC	C01-0001-25	Variable capacitor	
L1	L32-0098-05	OSC COIL	
L2~4	L40-1021-03	Ferri-inductor 1mH	
L5	L40-2201-03	Ferri-inductor 22μH	
L6,7	L40-1021-03	Ferri-inductor 1mH	
<b>MISCELLANEOUS</b>			
—	D22-0011-05	Shaft coupling	
—	D40-0099-25	Gear mechanism	
—	E08-0204-05	2P polarized socket	
—	E13-0101-05	1P phone jack	
—	E22-0207-05	Lug strips	
—	E23-0021-04	Wire-wrap terminal × 5	
—	G03-0009-04	Spring	

## RECTIFIER UNIT (X43-1090-02)

Ref. No.	Parts No.	Description	Re- marks
<b>CAPACITOR</b>			
C1,2	CE02W2C330	Electrolytic 33μF 160WV	
<b>RESISTOR</b>			
R5,6	RS14AB3D471J	Metal film 470Ω ±5% 2W	
<b>SEMICONDUCTOR</b>			
D1~6	V11-0282-05	Diode V08J	
D7	V11-0285-05	Diode V06E	
D8~11	V11-0290-05	Diode V03C	

## FIX CH, AVR UNIT (X43-1100-00)

Ref. No.	Parts No.	Description	Re- marks
<b>SEMICONDUCTOR</b>			
Q1~3	V03-0079-05	Transistor 2SC460 (B)	
Q4	V01-0048-05	Transistor 2SA606 (L)	
Q5~6	V03-0099-05	Transistor 2SC372	
D1,2	V11-0051-05	Diode 1N60	
D3	V11-0243-05	Zener diode WZ-061	
D8	V11-0243-05	Zener diode WZ-061	
<b>POTENTIOMETER</b>			
VR1	R12-0042-05	Semi-fixed resistor 500Ω (B)	
VR2	R12-3036-05	Semi-fixed resistor 10kΩ (B)	
VR3	R12-4020-05	Semi-fixed resistor 50kΩ (B)	
<b>COIL/TRIMMER</b>			
TC1~4	C05-0030-15	Ceramic trimmer 20pF (Blue)	
TC5	C05-0015-15	Ceramic trimmer 40pF (Brown)	
L1	L40-1001-03	Ferri-inductor 10μH	
L2~4	L40-1021-03	Ferri-inductor 1mH	
<b>MISCELLANEOUS</b>			
—	E18-0401-05	4 Crystal socket ass'y	

# PARTS LIST

## OSC COIL UNIT (X44-1160-00)

Ref. No.	Parts No.	Description	Re- marks
<b>CRYSTAL</b>			
X1	L77-0725-05	Crystal 10.695MHz 1.9MHz	
X2	L77-0141-15	Crystal 12.395MHz 3.5MHz	
X3	L77-0142-15	Crystal 15.895MHz 7MHz	
X4	L77-0143-15	Crystal 22.895MHz 14MHz	
X5	L77-0144-15	Crystal 29.895MHz 21MHz	
X6	L77-0145-15	Crystal 36.895MHz 28MHz A	
X7	L77-0146-15	Crystal 37.395MHz 28MHz B	
X8	L77-0147-15	Crystal 37.995MHz 28MHz C	
<b>COIL</b>			
L1	L32-0005-05	OSC coil 1.9MHz	
L2,3	L31-0032-05	OSC coil 3.5, 7MHz	
L4	L31-0033-05	OSC coil 14MHz	
L5	L32-0011-05	OSC coil 21MHz	
L6	L32-0138-15	OSC coil 28MHz (A)	
L7	L32-0012-05	OSC coil 28MHz (B)	
L8	L33-0025-05	Choke coil 1 $\mu$ F	
<b>MISCELLANEOUS</b>			
—	S01-1402-05	Rotary switch wafer	

## ANTENNA COIL UNIT (X44-1170-00)

Ref. No.	Parts No.	Description	Re- marks
<b>COIL</b>			
L1	L34-0620-05	Tuning coil 1.9MHz	
L2	L34-0621-05	Tuning coil 3.5MHz	
L3	L31-0032-05	Tuning coil 7MHz	
L4	L31-0033-05	Tuning coil 14MHz	
L5	L31-0034-05	Tuning coil 21MHz	
L6	L31-0209-05	Tuning coil 28MHz	
<b>MISCELLANEOUS</b>			
—	S01-1403-05	Rotary switch wafer	
—	S01-1404-05	Rotary switch wafer (for terminal)	
—	D21-0801-05	Band switch shaft	
—	E23-0006-04	Wire-wrap, Edge $\times$ 6 terminal	
—	E23-0015-04	Grand lug $\times$ 2	

## MIXER COIL UNIT (X44-1180-00)

Ref. No.	Parts No.	Description	Re- marks
<b>COIL</b>			
L1	L34-0619-05	Tuning coil 1.9MHz	
L2	L34-0621-05	Tuning coil 3.5MHz	
L3	L31-0032-05	Tuning coil 7MHz	
L4	L31-0033-05	Tuning coil 14MHz	
L5	L31-0034-05	Tuning coil 21MHz	
L6	L31-0209-05	Tuning coil 28MHz	
L7	L40-4711-03	Ferri-inductor 470 $\mu$ H	
<b>MISCELLANEOUS</b>			
—	S01-1403-05	Rotary switch wafer	

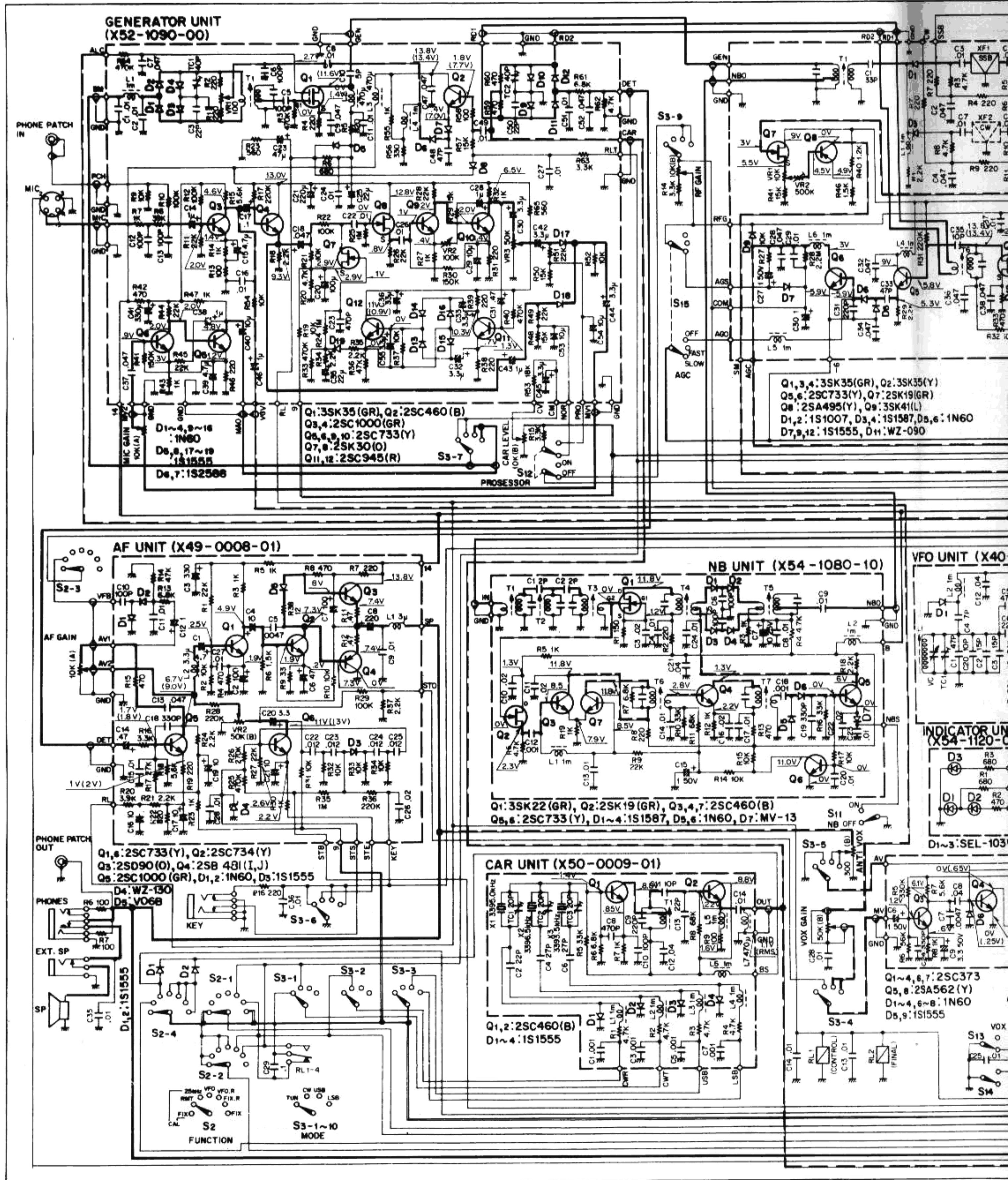
## DRIVE COIL UNIT (X44-1190-00)

Ref. No.	Parts No.	Description	Re- marks
<b>COIL</b>			
L1	L34-0625-05	Tuning coil 1.9MHz	
L2	L34-0621-05	Tuning coil 3.5MHz	
L3	L31-0032-05	Tuning coil 7MHz	
L4	L31-0033-05	Tuning coil 14MHz	
L5	L31-0034-05	Tuning coil 21MHz	
L6	L31-0209-05	Tuning coil 28MHz	
L7	L40-4711-05	Ferri-inductor 470 $\mu$ H	
<b>MISCELLANEOUS</b>			
—	S01-1403-05	Rotary switch wafer	

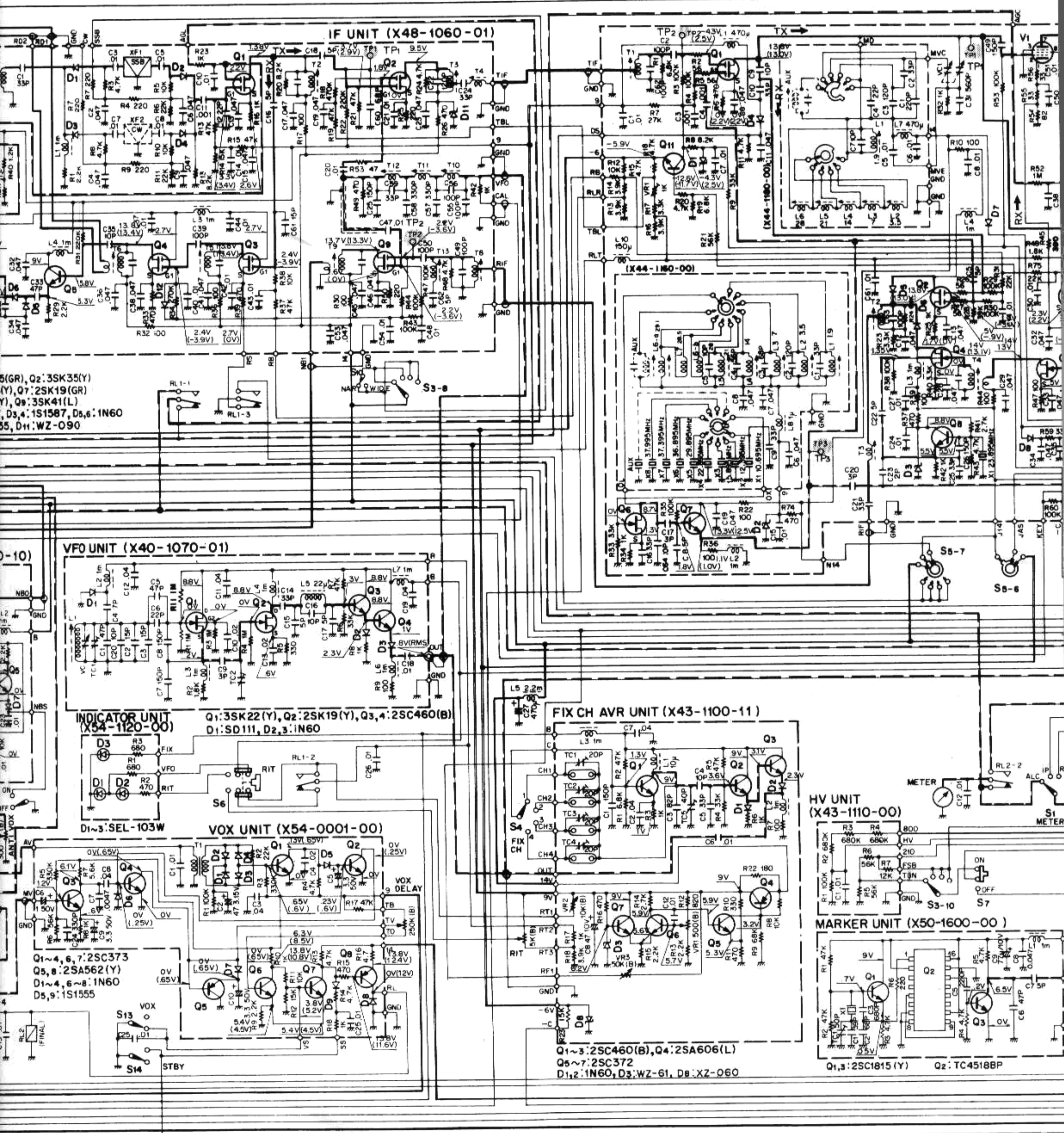
## RF UNIT (X44-1200-00)

Ref. No.	Parts No.	Description	Re- marks
<b>TUBE/SEMICONDUCTOR</b>			
V1	V40-0114-00	Driver tube 12BY7A	
Q1,2	V09-0057-05	FET 3SK41 (L) or 3SK40 (L)	
Q3	V09-0036-05	FET 3SK35 (GR)	
Q4	V09-0023-05	FET 3SK22 (GR)	
Q5,6	V09-0012-05	FET 2SK19 (GR)	
Q7~9	V04-0079-05	Transistor 2SC460 (B)	
Q10	V03-0450-05	Transistor 2SC1515 (K)	
Q11	V03-0123-05	Transistor 2SC733 (Y)	
D1~3	V11-0240-05	Zener diode WZ-090 9.0V W	
D4	V11-0414-05	Diode 1S2588	
D5,6	V11-0370-05	Diode 1S1587	
D7	V11-0076-05	Diode 1S1555	
D8,9	V11-0219-05	Diode V06B	
D10	V11-0076-05	Diode 1S1555	
D11,12	V11-0414-05	Diode 1S2588	
D13	V11-0240-05	Zener diode WZ-090 9.0V W	
D14,15	V11-0219-05	Diode V06B	
D16	V11-0370-05	Diode 1S1587	
D17	V11-0076-05	Diode 1S1555	
<b>POTENTIOMETER/VC</b>			
VR1	R12-1012-05	Semi-fixed resistor 1k $\Omega$	
VC~3	C01-0127-15	Variable capacitor	
<b>COIL/CRYSTAL</b>			
L1	L40-4711-03	Ferri-inductor 470 $\mu$ H	
L2~4	L40-1021-03	Ferri-inductor 1mH	
L5	L40-4711-03	Ferri-inductor 470 $\mu$ H	
L6	L40-1021-03	Ferri-inductor 1mH	
L7	L40-1511-03	Ferri-inductor 150 $\mu$ H	
L8	L33-0074-05	Heater choke 0.22 $\mu$ H	
L9	L40-4711-03	Ferri-inductor 470 $\mu$ H	
L10	L40-1511-03	Ferri-inductor 150 $\mu$ H	
T1,2	L30-0008-05	BPF coil	
T3	L30-0009-05	BPF coil	
T4,5	L34-0622-05	Tuning coil 15MHz WWV	
T6	L31-0010-05	Trap coil 8.6MHz	
T7	L31-0011-05	Trap coil 8.6MHz	
X1	L77-0180-05	Crystal 23.895MHz WWV	

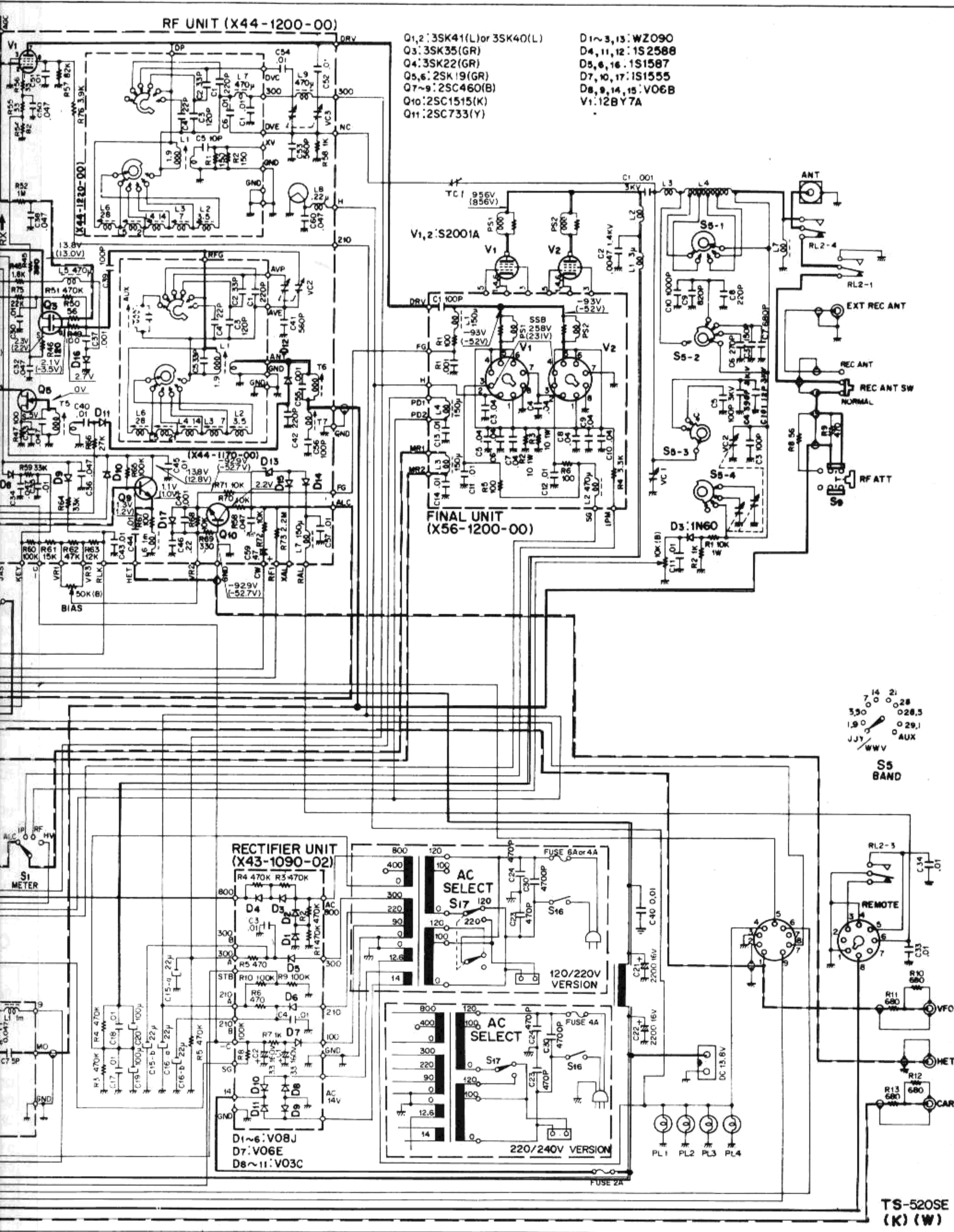
— Signal Line — — — Control Line — Voltage Line ( ) TX Voltage



# SCHEMATIC DIAGRAM







# PARTS LIST

Ref. No.	Parts No.	Description	Re- marks
<b>MISCELLANEOUS</b>			
—	D13-0032-03	Sprocket × 3	
—	D16-0033-04	Chain ass'y × 3	
—	E06-0406-05	FET socket × 3	
—	E10-1902-05	9P tube socket	

## F UNIT (X48-1060-01)

Ref. No.	Parts No.	Description	Re- marks
<b>SEMICONDUCTOR</b>			
Q1	V09-0036-05	FET 3SK35 (GR)	
Q2	V09-0066-05	FET 3SK35 (Y)	
Q3,4	V09-0036-05	FET 3SK35 (GR)	
Q5,6	V03-0123-05	Transistor 2SC733 (Y)	
Q7	V01-0012-05	FET 2SK19 (GR)	
Q8	V01-0037-05	Transistor 2SA495 (Y)	
Q9	V09-0057-05	FET 3SK41 (L)	
D1,2	V11-4160-66	Diode 1S1007	☆
D3,4	V11-0370-05	Diode 1S1587	
D5,6	V11-0051-05	Diode 1N60	
D7	V11-0076-05	Diode 1S1555	
D8	NOT USED		
D9	V11-0076-05	Diode 1S1555	
D10	NOT USED		
D11	V11-0240-05	Zener diode WZ-090 9.0V W	
D12	V11-0076-05	Diode 1S1555	

### POTENTIOMETER

VR1	R12-3025-05	Semi-fixed resistor 10kΩ (B)	
VR2	R12-7013-05	Semi-fixed resistor 500kΩ (B)	

### FILTER/COIL

XF1	L71-0018-05	Crystal filter, SSB	Option
XF2	L71-0017-05	Crystal filter, CW	
L1~6	L40-1021-03	Ferri-inductor 1mH	
L2	NOT USED		
T1	L30-0263-05	IFT	
T2	L30-0010-05	IFT	
T3	L30-0008-05	BPF coil	
T4	L30-0009-05	BPF coil	
T5	L30-0010-05	IFT	
T6	L30-0021-05	IFT	
T7			
T8	L30-0008-05	BPF coil	
T9	L30-0010-05	IFT	
T10	L31-0284-05	Filter coil (Blue)	
T11	L31-0252-05	Filter coil (Green)	
T12	L31-0251-05	Filter coil (White)	
T13	L31-0012-05	Trap coil 12.395MHz	

## AF UNIT (X49-0008-01)

Ref. No.	Parts No.	Description	Re- marks
Q1	V03-0123-05	Transistor 2SC733 (Y)	
Q2	V03-0126-05	Transistor 2SC734 (Y)	
Q3	V04-0008-05	Transistor 2SD90 (Y) or (G)	
Q4	V02-0481-16	Transistor 2SB481 (I,J)	
Q5	V03-0355-05	Transistor 2SC1000 (GR)	
Q6	V03-0123-05	Transistor 2SC733 (Y)	
D1,2	V11-0051-05	Diode 1N60	
D3	V11-0076-05	Diode 1S1555	
D4	V11-0297-05	Zener diode WZ-130	
D5	V11-0219-05	Diode V06B	
<b>POTENTIOMETER/COIL</b>			
VR1	R12-4015-05	Semi-fixed resistor 50kΩ (B)	
L1	L33-0032-05	Heater choke 3μH	
L2	L40-3391-03	Ferri-inductor 3.3μH	

## CARRIER UNIT (X50-0009-01)

Ref. No.	Parts No.	Description	Re- marks
Q1,2	V03-0079-05	Transistor 2SC460 (B)	
D1~4	V11-0076-05	Diode 1S1555	
<b>TRIMMER/COIL</b>			
TC1~3	C05-0013-15	Ceramic trimmer 20pF	
X1	L77-0123-05	Crystal, CW T13-98 3395.0kHz	
X2	L77-0122-05	Crystal, USB T13-97 3396.5kHz	
X3	L77-0120-05	Crystal, LSB T13-95 3393.5kHz	
L1~6	L40-1021-03	Ferri-inductor 1mH	
L7	L40-4711-03	Ferri-inductor 470μH	
T1	L32-0003-05	OSC coil	

## MARKER UNIT (X50-1600-00) NEW PC BOARD

Ref. No.	Parts No.	Description	Re- marks
<b>CAPACITOR</b>			
C1	CC45CH1H390J	Ceramic 39pF ±5%	
C2	CC45CH1H680J	Ceramic 68pF ±5%	
C3	CK45B1H681K	Ceramic 680pF ±10%	
C5	CC45SL1H221J	Ceramic 220pF ±5%	
C6	CC45CH1H470J	Ceramic 47pF ±5%	
C7	CC45CH1H050C	Ceramic 5pF ±0.25pF	
C8	C90-0456-05	Ceramic 0.047μF 25V	
C9	CW04W1A470Q	Electrolytic 47μF 10WV	
<b>RESISTOR</b>			
R1~10	RD14CY2E000J	Carbon 000Ω ±5% 1/4W	
<b>SEMICONDUCTOR</b>			
Q1	V03-1815-06	Transistor 2SC1815 (Y)	
Q2	V30-1039-06	IC TC4518BP	
Q3	V03-1815-06	Transistor 2SC1815 (Y)	

Ref. No.	Parts No.
X1	L77-085
TC1	C05-00
L1	L40-102

## GENERATOR

Ref. No.	Parts No.
R1~65	RD14CY
Q1	V09-00
Q2	V03-00
Q3,4	V03-03
Q5,6	V03-01
Q7,8	V09-00
Q9,10	V03-01
Q11,12	V03-02

D1~4	V11-00
D5	V11-00
D6,7	V11-04
D8	V11-00
D9~16	V11-00
D17~19	V11-00

VR1	R12-04
VR2	R12-54
VR3	R12-45
TC1,2	C05-00
L1	L40-10
L2,3	L40-47
L4	L40-10
T1	L30-00

## OX UNIT (X

Ref. No.	Parts No.
Q1~4	V03-00
Q5	V01-00
Q6,7	V03-00
Q8	V01-00
D1~4	V11-00
D5	V11-00
D6~8	V11-00
D9	V11-00
T1	L13-00

# PARTS LIST

Ref. No.	Parts No.	Description	Re- marks
<b>CRYSTAL/TRIMMER/COIL</b>			
X1	L77-0851-05	Crystal 2.5MHz	
TC1	C05-0029-05	Ceramic trimer 50pF	
L1	L40-1021-05	Ferri-inductor 1mH	

## GENERATOR UNIT (X52-1090-00)

Ref. No.	Parts No.	Description	Re- marks
<b>RESISTOR</b>			
R1~65	RD14CY2B000J	Carbon 000Ω ±5% 1/8W	
<b>SEMICONDUCTOR</b>			
Q1	V09-0036-05	FET 3SK35 (GR)	
Q2	V03-0079-05	Transistor 2SC460 (B)	
Q3,4	V03-0355-05	Transistor 2SC1000 (GR)	
Q5,6	V03-0123-05	Transistor 2SC733 (Y)	
Q7,8	V09-0015-05	FET 2SK30 (O)	
Q9,10	V03-0123-05	Transistor 2SC733 (Y)	
Q11,12	V03-0270-05	Transistor 2SC745 (R)	
D1~4	V11-0051-05	Diode 1N60	
D5	V11-0076-05	Diode 1S1555	
D6,7	V11-0414-05	Diode 1S2588	
D8	V11-0076-05	Diode 1S1555	
D9~16	V11-0051-05	Diode 1N60	
D17~19	V11-0076-05	Diode 1S1555	
<b>POTENTIOMETER</b>			
VR1	R12-0401-05	Semi-fixed resistor 100Ω (B)	
VR2	R12-5401-05	Semi-fixed resistor 100kΩ (B)	
VR3	R12-4503-05	Semi-fixed resistor 50kΩ (B)	
<b>TRIMMER/COIL</b>			
TC1,2	C05-0015-15	Ceramic trimmer 40pF	
L1	L40-1021-03	Ferri-inductor 1mH	
L2,3	L40-4711-03	Ferri-inductor 470μH	
L4	L40-1021-03	Ferri-inductor 1mH	
T1	L30-0021-05	IFT 3395kHz	

## OX UNIT (X54-0001-00)

Ref. No.	Parts No.	Description	Re- marks
<b>SEMICONDUCTOR</b>			
Q1~4	V03-0042-05	Transistor 2SC373	
Q5	V01-0038-05	Transistor 2SA562 (Y)	
Q6,7	V03-0042-05	Transistor 2SC373	
Q8	V01-0038-05	Transistor 2SA562 (Y)	
D1~4	V11-0051-05	Diode 1N60	
D5	V11-0076-05	Diode 1S1555	
D6~8	V11-0051-05	Diode 1N60	
D9	V11-0076-05	Diode 1S1555	
<b>MISCELLANEOUS</b>			
T1	L13-0001-05	Input transformer 500Ω : 20kΩ	

## NB UNIT (X54-1080-10)

Ref. No.	Parts No.	Description	Re- marks
<b>SEMICONDUCTOR</b>			
Q1	V09-0023-05	FET 3SK22 (GR)	
Q2	V09-0012-05	FET 2SK19 (GR)	
Q3,4	V03-0079-05	Transistor 2SC460 (B)	
Q5,6	V03-0123-05	Transistor 2SC733 (Y)	
Q7	V03-0079-05	Transistor 2SC460 (B)	
D1~4	V11-0370-05	Diode 1S1587	
D5,6	V11-0051-05	Diode 1N60	
D7	V21-0041-05	Varister MV-13	
<b>COIL</b>			
L1,2	L40-1021-03	Ferri-inductor 1mH	
T1~3	L30-0010-05	IFT 3395kHz	
T4	L31-0286-05	NB coil (A) 3395kHz	
T5	L31-0287-05	NB coil (B) 3395kHz	
T6	L30-0010-05	IFT 3395kHz	
T7	L30-0021-05	IFT 3395kHz	

## INDICATOR UNIT (X54-1280-00)

Ref. No.	Parts No.	Description	Re- marks
<b>SEMICONDUCTOR</b>			
D1~3	V11-0304-05	LED SEL-103W	
<b>MISCELLANEOUS</b>			
—	F15-0609-04	Shading rubber × 3	
—	F20-0501-04	Insulator × 3	

## FINAL UNIT (X56-1200-00)

Ref. No.	Parts No.	Description	Re- marks
<b>COIL</b>			
L1	L40-1511-03	Ferri-inductor 150μH	
L2	L40-4711-03	Ferri-inductor 470μH	
L3,4	L40-1511-03	Ferri-inductor 150μH	
PS1,2	L33-0110-05	Parastic suppressor	
<b>MISCELLANEOUS</b>			
V1,2	E01-0801-05	8P (OCTAL) socket	

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