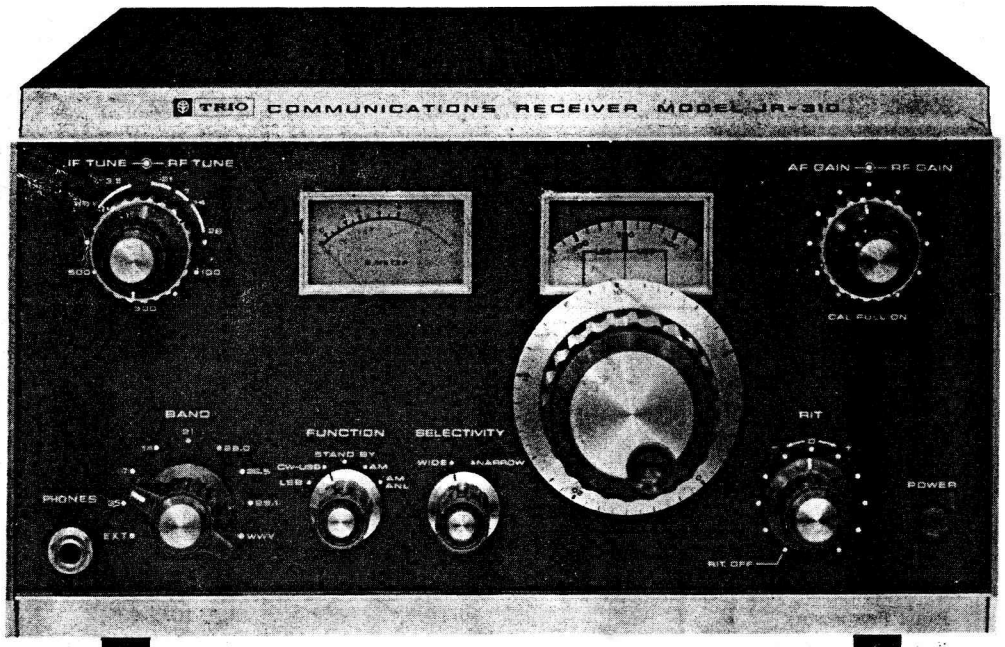
TRIO

SERVICE MANUAL

JR-310



COMMUNICATIONS RECEIVER

PARTS DESCRIPTION LIST

■ MAIN CHASSIS (LC1JM) SECTION

PRINTED CIRCUIT

–	VFO	Block	UC0116J1
–	IF	Block	UC1210J
–	BFO	Block	UC1211J
–	AF	Block	UC1306J
–	RF	Block	UC1117J

Symbol No.	Description	Part No.	Remarks
CAPACITORS			
C2	Ceramic 0.001μF +100%, –0%		
C3	Electrolytic Tubular 10μF 15WV		
C4	Ceramic 0.01μF +100%, –0%		
C5	Ceramic 0.05μF +100%, –0%		
C6～10	Ceramic 0.01μF +100%, –0%		
C11～13	Electrolytic Block 40μF 350WV		
C14	Electrolytic Tubular 20μF 350WV		
RESISTORS			
R1, 2	Fixed Carbon Composition 1kΩ ±10% 1/2W		
R3	Fixed Carbon Composition 3.3kΩ ±10% 1/2W		
R4	Metallic Oxide Film 1kΩ ±10% 8W		
R5	Resin Coated 2.2kΩ ±5% 8W		
R6	Metallic Oxide Film 22kΩ ±10% 3W		
R7	Fixed Carbon Composition 82Ω ±10% 1/2W		
R9	Metallic Oxide Film 4.7kΩ ±5% 8W		
R11	Fixed Carbon Composition 1.8kΩ ±10% 1/2W		
POTENTIOMETERS			
VR1	5kΩ (B) RF GAIN	R01-1130	
VR2	10kΩ RIT ADJ.	R10-59	
VR3	5kΩ (B) RIT VR	R01-1102	
VR4	500Ω (B) S-ADJ.	R01-0155	
VR5	500kΩ (A) AF GAIN	R01-1102	
SWITCHES			
S1	Selectivity (Rotary) M.1.4.3	S04-141	
S2	Function (Rotary) Y.2.4.6	S03-681	
S3	Power Switch (Push)	S11-22	
S4	Line Switch (Slide)	S10-22R	
DIODES/THERMISTOR			
D1	SZ-200-9		
D2, 3	SW-05-(Gray)		
D4	1N60		
TH1	5T-31		
MISCELLANEOUS			
–	Case	A01-LB0J	
–	Chassis	A03-LC1JM	
–	Panel Framework	A20-1052-03	
–	Panel	A20-0153-03	
–	Sole Plate	A08-LC1J	
–	Decorated Board	A67-12	
–	Spring	A62-12	

PARTS DESCRIPTION LIST

Symbol No.	Description	Part No.	Remarks
—	Bronzed Stick	A64-45	
—	Bronzed Pipe	A64-44	
—	Ammeter Holder (A)	A5053	
—	Ammeter Holder (B)	A5054	
—	Switch Holder	A5059	
—	Side Escutcheon	B01-0005-04	
—	A Certificate	B42-0009-04	
—	Pulley	D04-29	
—	U.S. Socket	E01-38A	
—	P.L. Holder x 2	E02-02F	
—	Lug	E04-101	
—	Terminal Block	E06-12J	
—	Terminal Block	E06-13C	
—	U.S. Plug	E09-580	
—	9P Plug	E09-890	
—	U.S. Juck	E16-09	
—	Beaded Band	E4099	
—	Rubber Band	G03-46	
—	Leg x 4	G10-02	
—	Leg x 2	G10-08	
—	Cord Bushing	G11-01	
—	Corrugated Cardboard Case	H01-0098-03	
—	Polyethylene Cover	H02-122	
—	Instruction Manual	H05-LC1JM	
—	Polyethylene Bag (for Accessory)	H08-04B	
—	Accessory of Corrugated Cardboard Case	H09-LB0JA	
—	Accessory of Corrugated Cardboard Case	H09-LB0JB	
—	Name Plate (for Adjustment)	H29-LC1J	
—	Instructions (for AC Power Supply)	H4190	
—	Instructions	H4191	
—	Knob	K21-0001-04	
—	Trap Coil	H13-159	
—	Decorative Screw (4φ) x 4	N11-41	
—	Colored Pipe	N13-510	
—	Thumb Screw	N4006	
—	Shaft Stopper	N4104	
—	Bearing	N4105	
—	Knob x 2	S14-275	
—	Knob	S14-332	
—	Knob x 2	S14-333	
—	Knob	S14-441	
—	Knob	S14-627	
—	Fuse Holder	S15-03B	
P.L.	Pilot Lamp x 2	S16-22	
F	Fuse (2A)	S17-02	
—	Acryl Board	S20-42	
—	Flange Knob	S4135	
—	Switch Stopper	S4103	
P.T.	Power Transformer	T01-222W	
M	S-Meter	T11-94	
—	Stranded Wire Yellow 0.2m	W01-34	
—	P.V.C. Insulated Wire (red 0.8φ) 0.2m	W02-82	

PARTS DESCRIPTION LIST

Symbol No.	Description	Part No.	Remarks
–	P.V.C. Insulated Wire (blue 0.8φ) 0.6m	W02-86	
–	P.V.C. Insulated Wire (white 0.8φ) 1m	W02-89	
–	P.V.C. Insulated Wire (black 0.5φ) 0.8m	W02-50	
–	P.V.C. Insulated Wire (red 0.5φ) 3.5m	W02-52	
–	P.V.C. Insulated Wire (yellow 0.5φ) 2m	W02-54	
–	P.V.C. Insulated Wire (blue 0.5φ) 1.8m	W02-56	
–	P.V.C. Insulated Wire (white 0.5φ) 2.3m	W02-59	
–	Tinned Wire 0.8φ 1.1m	W03-08	
–	Tinned Wire 1.2φ 2.5m	W03-12	
–	Insulating Sleeve 1.2m	W06-154	
–	AC Cord	W09-01	
–	Single-Core Shielded Wire 2.5m	W11-010B	
–	Single-Core Shielded Wire 2.5m	W11-012	
–	Double-Core Shielded Wire 0.45m	W51-020	
–	Reticular Wire 0.03m	W14-01	
–	Decorative Screw (⊕ MH3 x 6 – F.B) x 3		
–	Screw (M6 x 18 – F)		
–	Washer (Special W6 x 13 x 1 – F) x 2		
–	Nut (N6 – F)		
–	Spring Washer (SW6 – S)		
–	Pan Head Screw (⊕ P3 x 4 – F) x 25		
–	Pan Head Screw (⊕ P3 x 6 – F) x 40		
–	Tapping Screw (⊕ TM3 x 6 – F) x 75		
–	Tapping Screw (⊕ TS3 x 6 – F) x 2		
–	Nut (N3 – F) x 10		
–	Nut (N32.6 – B)		
–	Flat Head Washer (W3 – F) x 6		
–	Spring Washer (SW2.6 – S)		
–	Nut (N3 – F – ISO) x 4		
■ UC1117J			
	CAPACITORS		
C1～8	Ceramic 0.01μF +100%, –0%		
C9	Ceramic 100pF ±10%		
C10	Ceramic 0.01μF +100%, –0%		
C11	Ceramic 2pF ±0.5pF		
C12～14	Ceramic 0.01μF +100%, –0%		
C15～17	Ceramic 100pF ±10%		
C18	Ceramic 0.002μF ±20%		
C19	Ceramic 0.01μF +100%, –0%		
C20	FM Capacitor 82pF ±10%		
C21～24	Ceramic 0.01μF +100%, –0%		
–	Variable Capacitor	D01-167	
–	Variable Capacitor	D01-168	
–	Trimmer	C09-40E	
–	Trimmer	C4047	
	RESISTORS		
R3	Fixed Carbon Composition 1MΩ ±10% 1/2W		
R4	Fixed Carbon Composition 33Ω ±10% 1/2W		
R5	Fixed Carbon Composition 220Ω ±10% 1/2W		
R6	Fixed Carbon Composition 1kΩ ±10% 1/2W		
R7	Fixed Carbon Composition 3.3kΩ ±10% 1/2W		

PARTS DESCRIPTION LIST

Symbol No.	Description				Part No.	Remarks
R8	Fixed Carbon Composition	10Ω	±10%	1/2W		
R9	Fixed Carbon Composition	1MΩ	±10%	1/2W		
R10	Fixed Carbon Composition	330Ω	±10%	1/2W		
R11	Fixed Carbon Composition	470kΩ	±10%	1/2W		
R12	Fixed Carbon Composition	1kΩ	±10%	1/2W		
R13	Fixed Carbon Composition	47kΩ	±10%	1/2W		
R14	Fixed Carbon Composition	1MΩ	±10%	1/2W		
R15	Fixed Carbon Composition	3.9kΩ	±10%	1/2W		
R16, 17	Fixed Carbon Composition	1kΩ	±10%	1/2W		
R18	Fixed Carbon Composition	8.2kΩ	±10%	1/2W		
R19	Fixed Carbon Composition	68kΩ	±10%	1/2W		
	COILS/QUARTZ-OSCILLATORS					
X1	35.055 MHz				L77-0001-05	
X2	34.455 MHz				T13-112	
X3	33.955 MHz				T13-111	
X4	26.955 MHz				T13-110	
X5	19.955 MHz				T13-109	
X6	12.955 MHz				T13-108	
X7	9.455 MHz				T13-107	
—	Coil Pack				L60-0001-02	
L7	OSC Coil				L11-93	
L6	OSC Coil				L11-94	
L5	OSC Coil				L11-95	
L4	OSC Coil				L11-96	
L3, 8	OSC Coil				L11-97	
IFT1	IFT				L01-91	
L11	Trap Coil				L13-155	
—	Ferri-Inductor FL5H-102J					
	TUBES					
V1	6BZ6					
V2	6BL8					
V3	6CB6					
	MISCELLANEOUS					
—	Sub-Chassis				A04-UC1117J	
—	V.C. Cover				A90-UC1117J	
—	V.C. Holder (A)				A5053	
—	V.C. Holder (B)				A5054	
—	7P Molded Socket x 2				E01-17A	
—	9P Molded Socket x 2				E01-19A	
—	Lug x 4				E04-101B	
—	Lug x 3				E04-202	
—	Lug x 5				E04-202B	
—	Shield Case				E24-01	
—	Shield Case Washer				E24-02	
—	Shield Case				E24-06	
—	Shield Case Washer				E24-07	
—	Rubber Cushion x 2				G13-0002-04	
■ **UC0116J1**						
	CAPACITORS					
C1	Temperature Compensating Ceramic 47pF		±5%			

PARTS DESCRIPTION LIST

Symbol No.	Description				Part No.	Remarks
C2, 3	Temperature Compensating Ceramic	150pF	±5%			
C4	Temperature Compensating Ceramic	70pF	±5%			
C5	Temperature Compensating Ceramic	470pF	±5%			
C6	Temperature Compensating Ceramic	220pF	±5%			
C7, 8	Super Mica	1500pF				
C9	Hi Q Mica	3pF	±0.5pF			
C10	Ceramic	0.02μF	+80%,	−20%		
C11, 12	Cermiac	0.04μF	+80%,	−20%		
C13	Ceramic	0.02μF	+80%,	−20%		
C14	Ceramic	33pF	±0.5%			
C15	Ceramic	5pF	±0.5pF			
C16	Ceramic	10pF	±0.5pF			
C17	Ceramic	5pF	±0.5pF			
C18	Ceramic	0.01μF	+80%,	−20%		
C20	Temperature Compensating Ceramic	(CC94CG1H100J)				
	RESISTORS					
R1	Fixed Carbon Composition	270kΩ	±5%	1/4W		
R2	Fixed Carbon Composition	100Ω	±5%	1/4W		
R3, 4	Fixed Carbon Composition	1MΩ	±5%	1/4W		
R5	Fixed Carbon Composition	330Ω	±5%	1/4W		
R6	Fixed Carbon Composition	33kΩ	±5%	1/4W		
R7	Fixed Carbon Composition	47kΩ	±5%	1/4W		
R8	Fixed Carbon Composition	1kΩ	±5%	1/4W		
R9	Fixed Carbon Composition	100Ω	±5%	1/4W		
	COILS					
L2~4	Ferrite Inductor	(FL5H-102K)				
L5	Ferrite Inductor	(FL5H-220K)				
L6~7	Ferrite Inductor	(FL5H-102K)				
L	OSC Coil				L11-78	
	TRANSISTORS/DIODES					
Q1	3SK22 (Y)					
Q2	2SK19 (Y)					
Q3, 4	2SC460 (B)					
D1	SD111					
D2, 3	1N60					
	MISCELLANEOUS					
–	Printed Circuit Board				J25-0019-04	
–	Dial Scale				A07-UC0110J	
–	Name Plate				B42-0010-04	
V.C.	Variable Capacitor				C01-0001-05	
V.C.	Midget Capacitor				C03-0001-05	
–	Trimmer	(ECV-1ZW 10P12)			C4036	
–	Dial				C4036	
–	V.F.O. Box	(A)			F11-0004-13	
–	V.F.O. Box	(B)			F11-0005-04	
–	V.F.O. Box	(C)			F11-0006-03	
–	V.F.O. Box	(D)			F11-0007-04	
–	V.F.O. Box (	(E)			F11-0008-04	
–	V.F.O. Box	(F)			F11-0013-04	
–	V.F.O. Box	(G)			F11-0010-04	

PARTS DESCRIPTION LIST

Symbol No.	Description	Part No.	Remarks
–	V.F.O. Box (H)	F11-0011-04	
–	V.F.O. Box (I)	F11-0012-04	
–	Lug	E04-101B	
–	Acme Terminal	E4071	
–	Terminal x 5	N4085	
–	Earth Lug	N28-0.32	
–	Shaft Coupling	S4082	
–	P.V.C. Insulated Wire 0.5/s. 0.3m	W02-50	
–	P.V.C. Insulated Wire 0.2m	W02-52	
–	P.V.C. Insulated Wire 0.3m	W02-54	
–	P.V.C. Insulated Wire 0.2m	W02-56	
–	Tinned Wire 0.8/s. TCW 0.2m	W03-08	
–	Pan Head Screw (⊕P2 x 4-F) x 3		
–	Pan Head Screw (⊕P3 x 6-F) x 38		
–	Flat Head Washer (W3-F) x 4		
–	Pan Head Screw (⊕P3 x 4-F)		
■ UC1210J			
	CAPACITORS		
C1	Ceramic 0.01μF +100%, –0%		
C2	Polystyrene Film 470pF ±5%		
C3	Ceramic 0.01μF +100%, –0%		
C5～13	Ceramic 0.01μF +100%, –0%		
C14	MP Capacitor 0.5μF ±20%		
C15～17	Ceramic 0.01μF ±100%, –0%		
C18	Ceramic 0.1μF		
C19	Ceramic 2pF ±5pF		
C20	Ceramic 100pF ±10%		
C21	Ceramic 0.01μF +100%, –0%		
C22	MP Capacitor 0.1μF ±20%		
C23～25	Ceramic 0.01μF +100%, –0%		
C26	Ceramic 0.001μF +100%, –0%		
	RESISTORS		
R1, 2	Fixed Carbon Composition 10kΩ ±10% 1/2W		
R3	Fixed Carbon Composition 100kΩ ±10% 1/2W		
R4	Fixed Carbon Composition 220Ω ±10% 1/2W		
R5	Fixed Carbon Composition 22kΩ ±10% 1/2W		
R6	Fixed Carbon Composition 1kΩ ±10% 1/2W		
R7	Fixed Carbon Composition 2.2MΩ ±10% 1/2W		
R8	Fixed Carbon Composition 100kΩ ±10% 1/2W		
R10	Fixed Carbon Composition 22kΩ ±10% 1/2W		
R11	Fixed Carbon Composition 1kΩ ±10% 1/2W		
R12, 13	Fixed Carbon Composition 470Ω ±10% 1/2W		
R14～17	Fixed Carbon Composition 330Ω ±10% 1/4W		
R18	Fixed Carbon Composition 1MΩ ±10% 1/2W		
R19, 20	Fixed Carbon Composition 470kΩ ±10% 1/2W		
	TUBE/DIODES		
V1, 2	6BA6		
D1～12	1N60		
	MISCELLANEOUS		
–	Printed Circuit Board	S23-304	

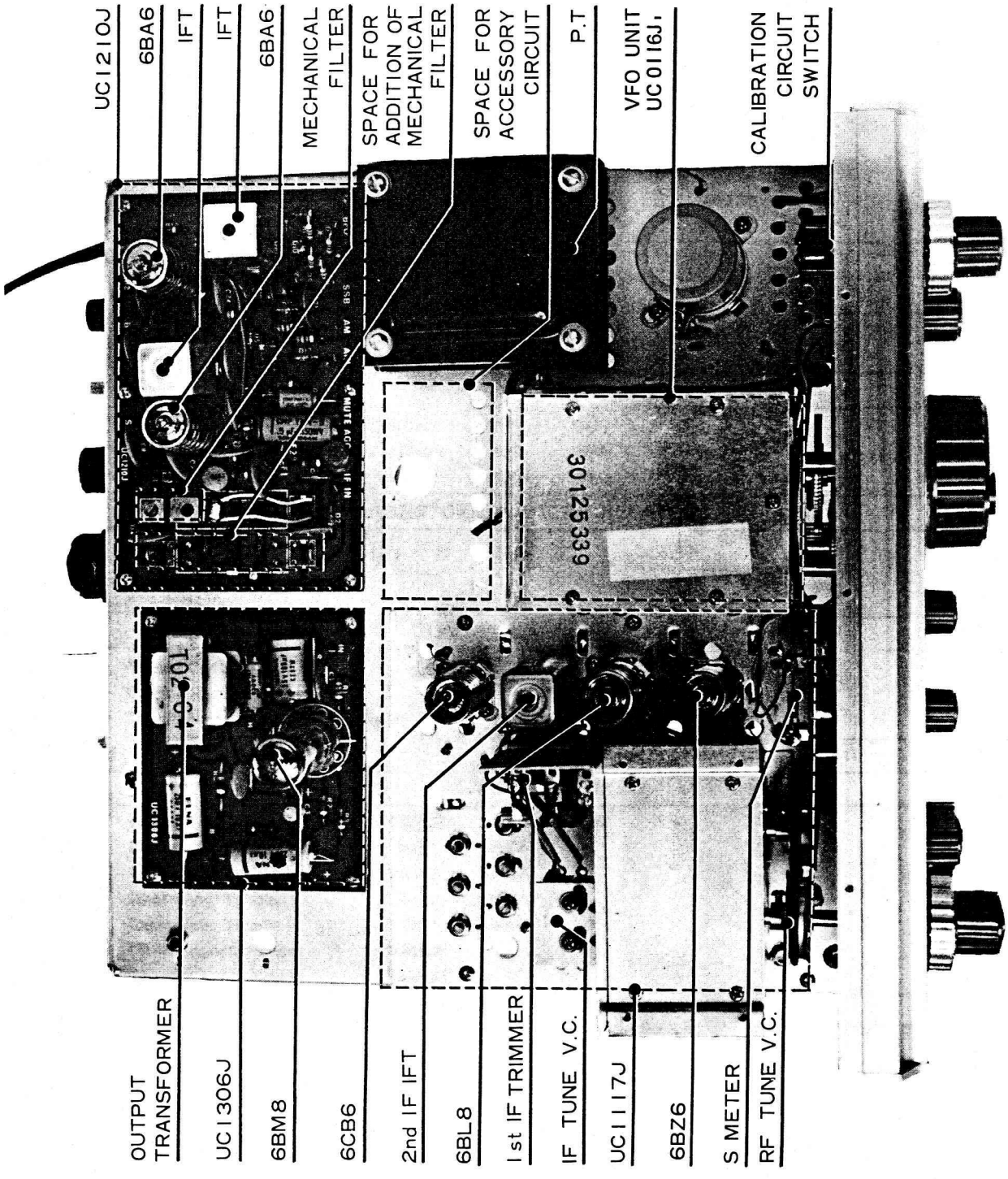
PARTS DESCRIPTION LIST

Symbol No.	Description	Part No.	Remarks
–	Ferri-Inductor FL-5H102J		
–	Ferri-Inductor FL-10H563J		
–	IFT	L01-66	
–	IFT	L01-92	
–	Ceramic Filter	L4016	
–	Matching Transformer	L51-19	
–	Shielding Case	E24-06	
–	7P Socket (for Printed Circuit Board)	E51-71A	
–	Terminal (for Printed Circuit Board) x 13	N4085	
–	P.V.C. Insulated Wire (yellow 0.5φ) 0.2m	W02-54	
–	P.V.C. Insulated Wire (blue 0.5φ) 0.2m	W02-56	
–	Tinned Wire 0.8φ 0.1m	W03-08	
■ UC1211J			
	CAPACITORS		
C1	Polystyrene Film Capacitor 1000pF ±5%		
C2, 3	Ceramic 0.04μF +80%, –20%		
	RESISTORS		
R1	Fixed Carbon Composition 47kΩ ±10% 1/4W		
R2	Fixed Carbon Composition 3.3kΩ ±10% 1/4W		
R3	Fixed Carbon Composition 1.5kΩ ±10% 1/4W		
	TRANSISTOR/QUARTZ-OSCILLATORS		
Q1	2SC 373		
X1	453.5kHz	T13-113	
X2	456.5kHz	T13-114	
	MISCELLANEOUS		
–	Printed Circuit Board	S23-306	
T	Output Transformer	T02-65	
–	Terminal (for Printed Circuit Board) x 7	N4085	
■ UC1306J			
	CAPACITORS		
C1, 2	Ceramic 0.01μF +100%, –0%		
C3	Electrolytic Tubular 10μF 16WV		
C4	Electrolytic Tubular 10μF 350WV		
C5	Electrolytic Tubular 100μF 25WV		
C6	Electrolytic Tubular 10μF 350WV		
C7	Oil Impregnated Paper 0.005μF		
C9	Ceramic 0.001μF		
	RESISTORS		
R1	Fixed Carbon Composition 470kΩ ±10% 1/2W		
R2	Fixed Carbon Composition 1kΩ ±10% 1/2W		
R3	Fixed Carbon Composition 100kΩ ±10% 1/2W		
R4	Fixed Carbon Composition 470kΩ ±10% 1/2W		
R5	Fixed Carbon Composition 330Ω ±10% 2W		
R6	Fixed Carbon Composition 1kΩ ±10% 1/2W		
R7	Fixed Carbon Composition 3.3kΩ ±10% 1/2W		
	TUBE		
V1	6BM8		

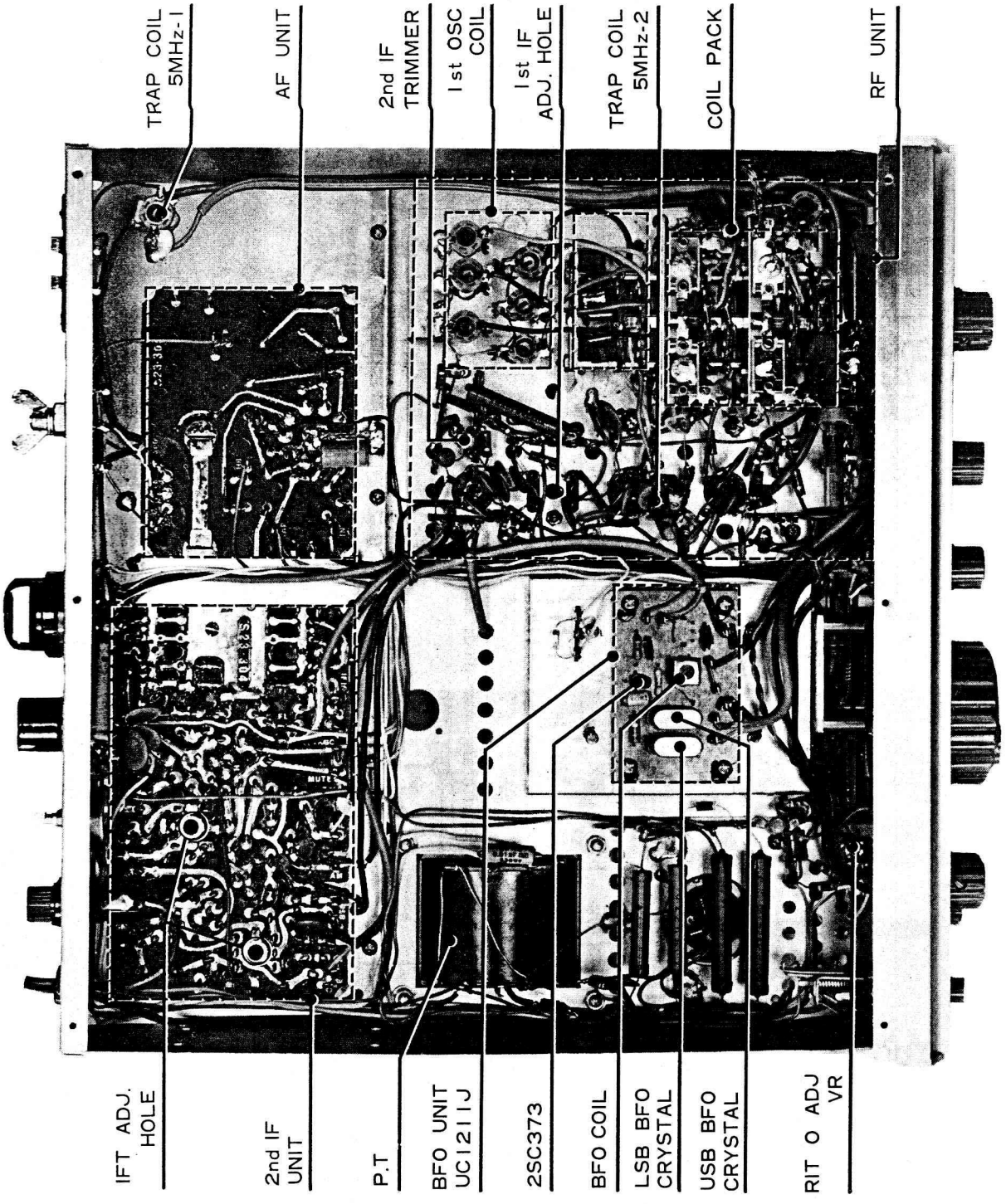
PARTS DESCRIPTION LIST

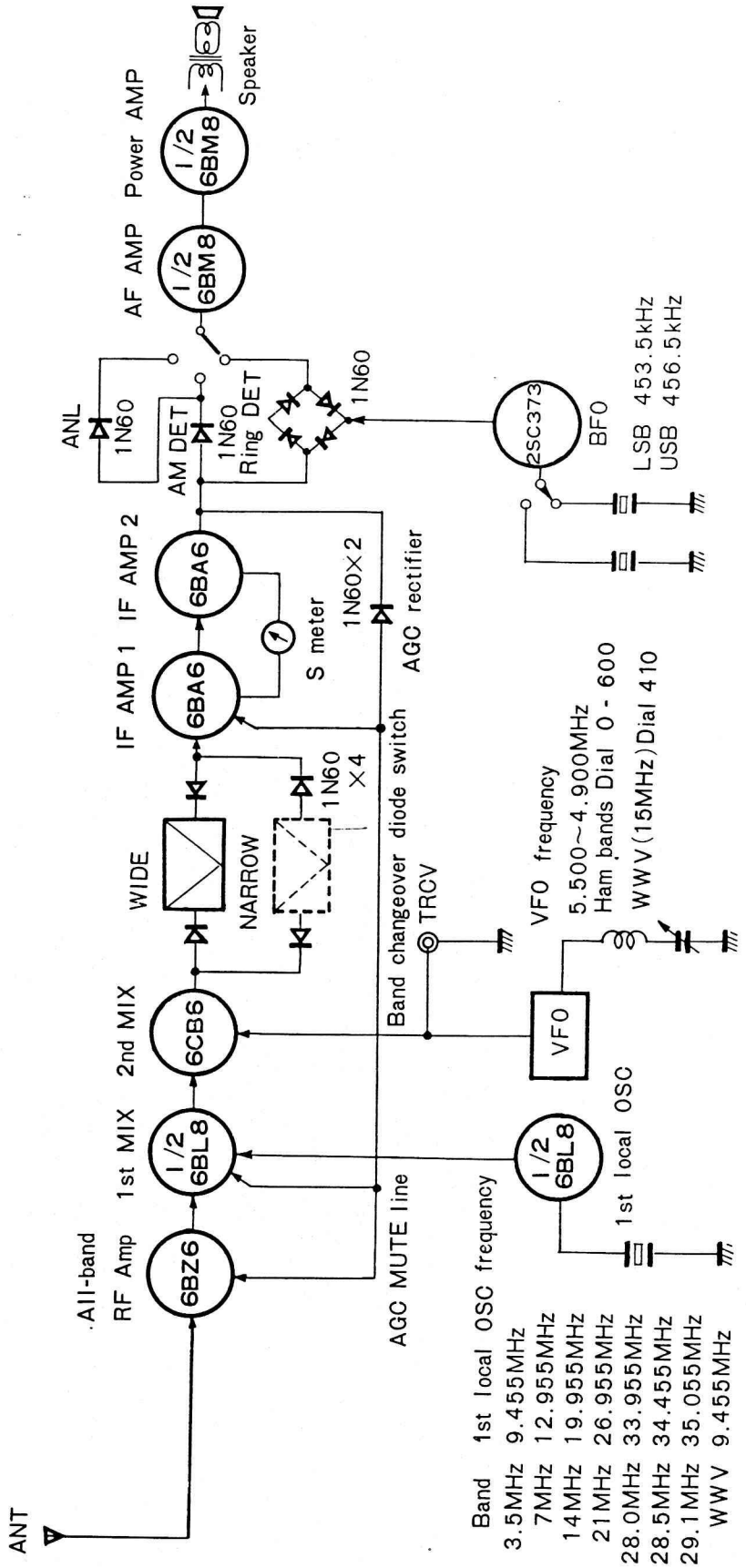
Symbol No.	Description	Part No.	Remarks
	MISCELLANEOUS		
–	Printed Circuit Board	S23-305	
–	Output Transformer	T02-64	
–	9P Socket (for Printed Circuit Board)	E51-91B	
–	Terminal (for Printed Circuit Board) x 7		

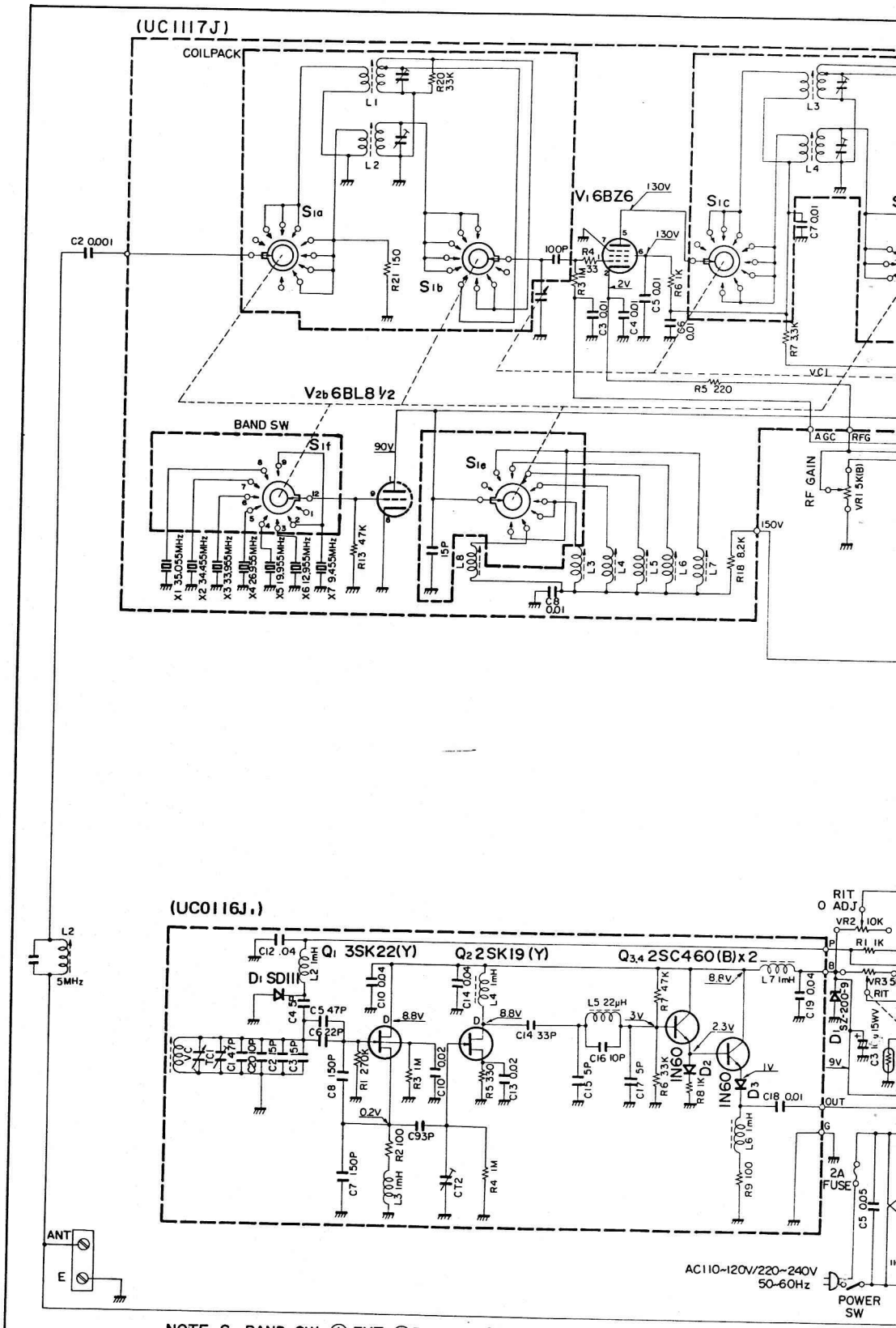
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW

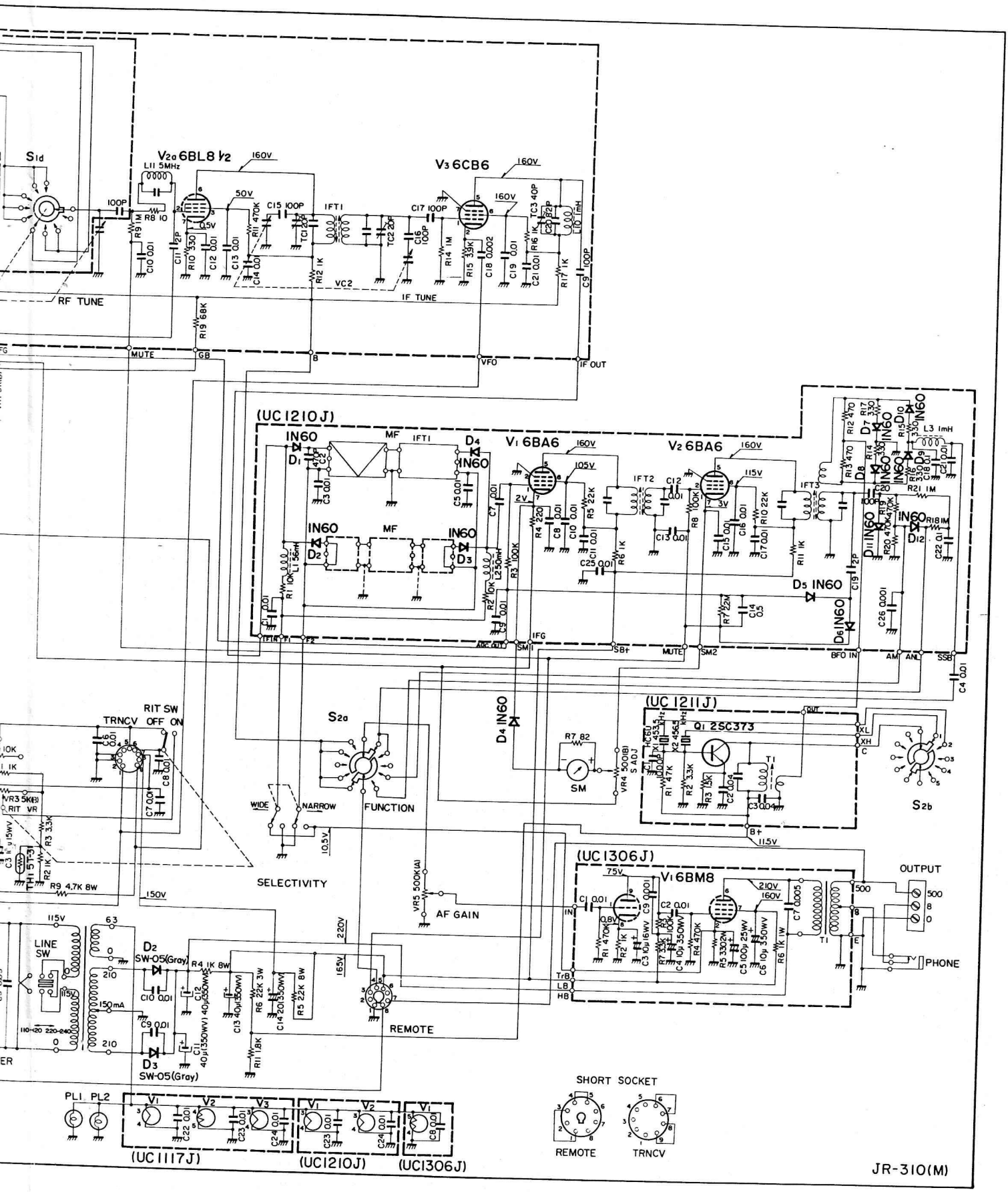



ANT
All-band
RF Amp
6BZ6
1st MIX
1/2 6BL8
2nd MIX
6CB6
WIDE
NARROW
1N60 ×4
IF AMP 1
6BA6
IF AMP 2
6BA6
S meter
1N60×2
AGC rectifier
AGC MUTE line
Band changeover diode switch
TRCV
VFO
1st local OSC
1/2 6BL8
VFO frequency
5.500~4.900MHz
Ham bands Dial 0 - 600
WWV(15MHz)Dial 410
ANL
1N60
AM DET
1N60
Ring DET
1N60
2SC373
BFO
LSB 453.5kHz
USB 456.5kHz
AF AMP
1/2 6BM8
Power AMP
1/2 6BM8
Speaker
Band 1st local OSC frequency
3.5MHz 9.455MHz
7MHz 12.955MHz
14MHz 19.955MHz
21MHz 26.955MHz
28.0MHz 33.955MHz
28.5MHz 34.455MHz
29.1MHz 35.055MHz
WWV 9.455MHz



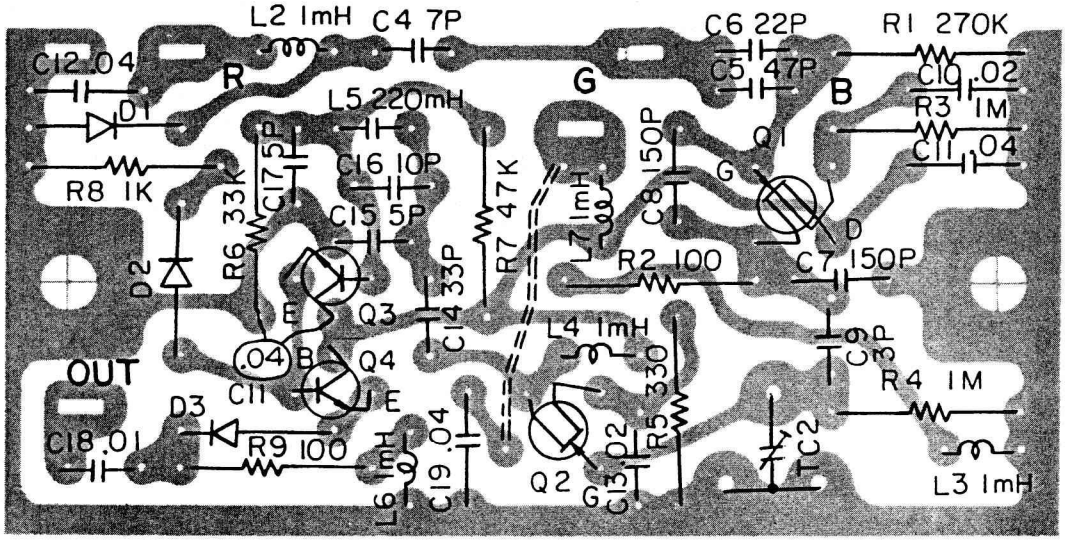
NOTE S1 BAND SW ① EXT ;②3.5MHz ;③ 7MHz ;④ 14MHz ;⑤21MHz ;⑥ 28.0MHz ;
⑦ 28.5MHz ; ⑧ 29.1MHz ; ⑨ WWV
S2 FUNCTION ① LSB.CW ;②USB.CW ;③STAND BY ;④ AM ;⑤ AM ANL

SCHEMATIC DIAGRAM



SEALED CIRCUIT ASSEMBLIES-PHANTOM VIEWS

UC0116J1



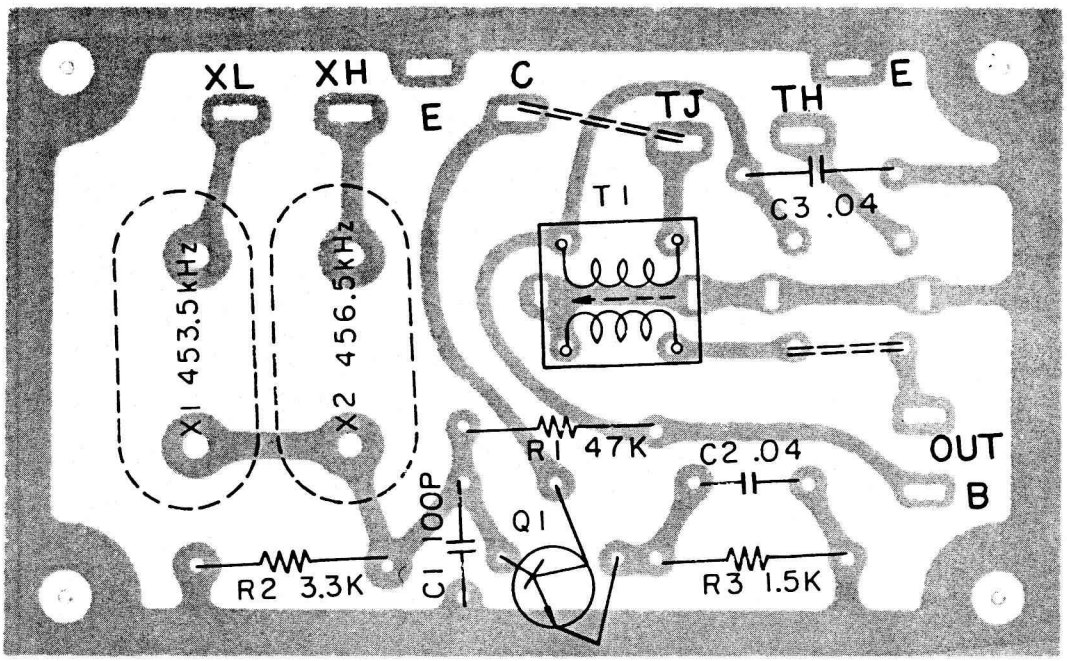
Q1 3SK22(Y), Q2 2SK19(Y), Q3,4 2SC460(B), D SD111, D2,3 IN60

3SK22(Y)

2SK19Y

2SC460(B)

UC1211J

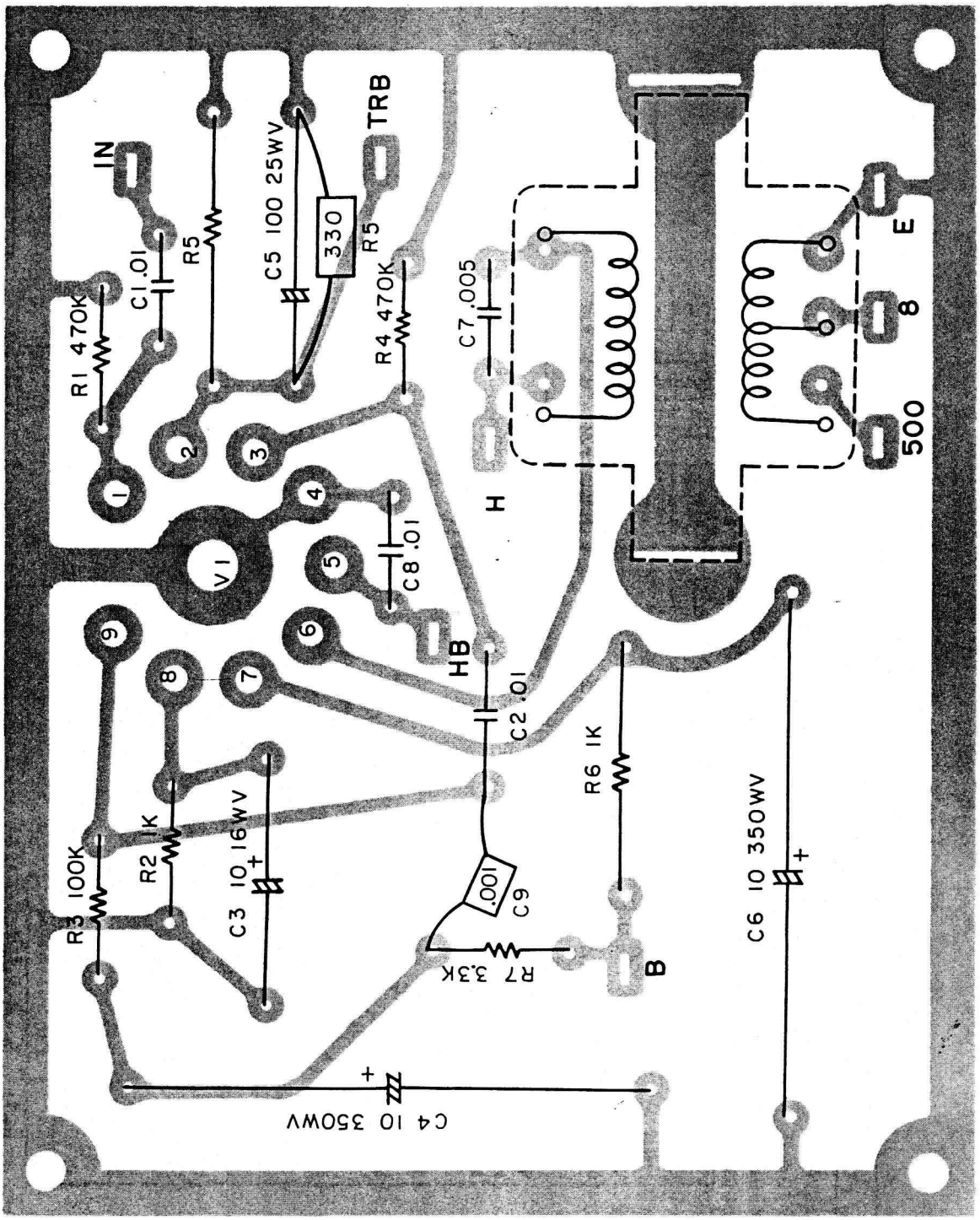


Q1 2SC373

2SC373

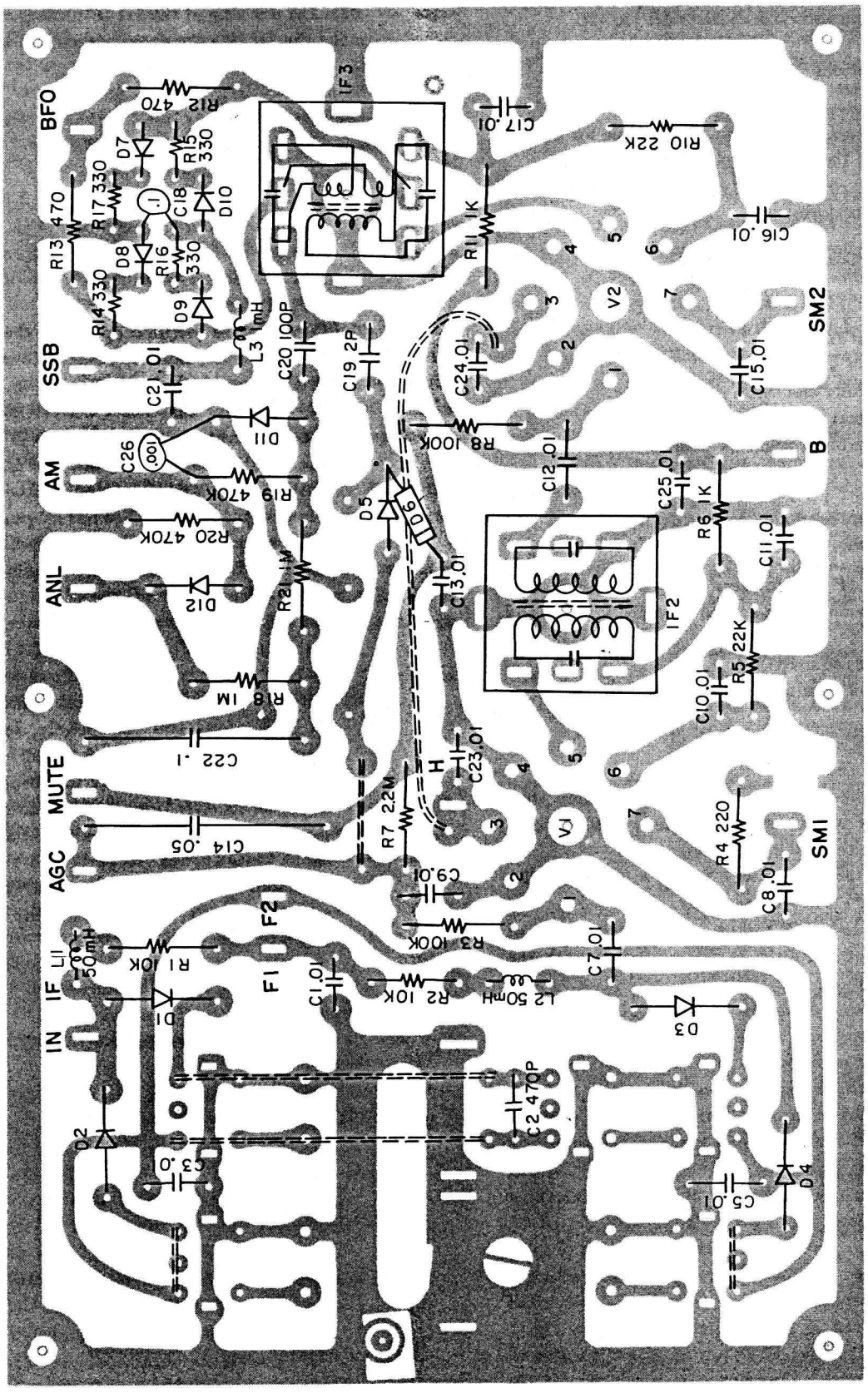
SEALED CIRCUIT ASSEMBLIES-PHANTOM VIEWS

UC1306J



SEALED CIRCUIT ASSEMBLIES-PHANTOM VIEWS

UC1210J



V1,2 6BA6 D1~12 IN60

ALIGNMENT PROCEDURE

I. General

This manual contains information for the alignment and adjustment of communications receiver model JR-310.

II. Preliminary Operations

1. Check of Parts
   1) Check the REMOTE ant TRCV terminals for normal attachment of the plugs supplied.
   2) Check the PHONE terminal for normal connection of a 8Ω, 3W dummy resistor.

2. Setting Operating Controls
   1) Front panel.
      BAND at 3.5
      FUNCTION at AM
      SELECTIVITY at WIDE
      RF GAIN at fully clockwise position
   2) S · ADJ at center position.
   3) Set other controls at arbitrary positions.

III. Adjustment

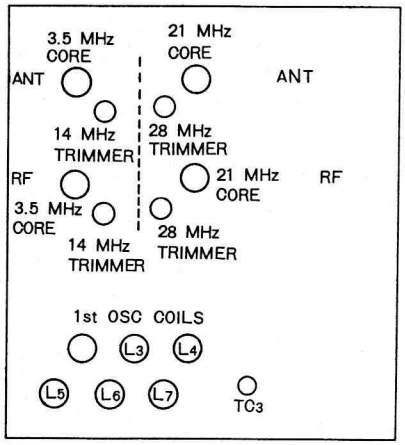
1. The 2nd IF Stage
   1) Purpose
      To adjust all IF transformers so as to make the 2nd IF stage provide the specified selectivity, gain and sensitivity.
   2) Measuring sets required
      Standard signal generator (SSG)
      Oscilloscope
      AF vacuum tube voltmeter (VTVM)
   3) Alignment procedure
      (1) Connect the oscilloscope and AF vacuum tube voltmeter across the 8Ω dummy resistor connected to the PHONE terminal.
      (2) Connect the SSG output to pin 1 (G1) of 6CB6 type tube V3 in RF unit UC-1117J.
      Set up the SSG for an output frequency of 455kHz at 1,000Hz, 30% modulation with the ATT set at approx. 50dB.
      (3) Check to see that the FUNCTION switch is in the AM position, the SELECTIVITY switch is in the WIDE position, and the RF GAIN control is in the fully clockwise position. Turn the AF GAIN control to the fully clockwise position with other controls left in arbitrary positions.
      (4) Adjust IF trimmer TC3 in RF unit UC-1117J and the mechanical filter and the cores of matching transformers IFT 2 and 3 in IF unit UC-1210J until the receiver provides the maximum output.
      (5) Repeat step 4 about three times. If some item is aligned properly and the receiver is saturated with the test signal, continue the alignment with the ATT on the SSG turned down to around 30dB.

2. The 1st IF Stage
   1) Purpose
      To make tracking of the 1st IF turning circuit so as to make the 1st IF stage provide the specified gain.
   2) Measuring sets required
      Standard signal generator (SSG)
      Oscilloscope
      AF vacuum tube voltmeter (VTVM)
   3) Alignment procedure
      (1) Connect the SSG output to pin 2 (G1) of 6BL8 type tube V2 in RF unit UC-1117J.
      Set up the SSG for an output frequency of the 5MHz order at 1,000Hz, 30% modulation with the ATT set at approx. 30dB.
      (2) Connect the oscilloscope and the AF VTVM across the 8Ω dummy resistor connected to the PHONE terminal.
      Check to see that the FUNCTION switch is in the AM position, the SELECTIVITY switch is in the WIDE position, and the RF GAIN and AF GAIN controls in the fully clockwise positions. Leave other controls in arbitrary positions.
      (3) With the main dial and the IF TUNE control knob set to graduations 500 respectively, set the output frequency of the SSG to 5.455MHz. Adjust both the upper and lower cores of IF transformer IFT1 in RF unit UC-1117J until the receiver provides the maximum output.
      (4) With the main dial and the IF TUNE control set to graduations 100 respectively, set the output frequency of the SSG to 5.855MHz. Adjust 1st IF trimmers TC1 and TC2 in RF unit UC-1117J until the receiver provides the maximum output.
      (5) Repeat steps (3) and (4) about three times. If some item aligned properly and the receiver is saturated with the test signal, continue the alignment with the ATT on the SSG turned down to around 10dB.

3. BRO
   1) Purpose
      To check the ring detector for normal carrier oscillation.
   2) Measuring set required.
      RF vacuum tube voltmeter (VTVM).
   3) Alignment procedure
      (1) Set the FUNCTION switch at the USB position with other controls left arbitrary positions.
      (2) Connect the probe of the RF VTVM to the OUT pin in BFO unit UC-1211J. Adjust the core of BFO tuning coil T1 until the BFO delivers the maximum output. Note that the RF VTVM should be used with its measuring range set to the 1V range.

4. The 1st OSC
   1) Purpose
      To insure the stable operation of the 1st local oscillator in the 1st mixer circuit.
   2) Measuring set required
      RF vacuum tube voltmeter (VTVM)
   3) Alignment procedure
      (1) Connect the probe of the RF VTVM to pin 2 (G1) of 6BL8 type tube V2 in RF unit UC-1117J. Set the VTVM to a measuring range of approx. 10V.
      (2) Place the BAND switch in position 3.5. Set the FUNCTION switch at the AM position with other controls left at arbitrary positions.
      (3) Adjust the core of 3.5MHz oscillator coil L7 until the 1st OSC provides the maximum output. Rotate the core counterclockwise one complete turn from the above position to make the oscillator operation stable and fix the core in that position.
      (4) Turn the BAND switch to position 7. Adjust the core of 7MHz oscillator coil L6 in the same manner as mentioned in step 3 above.
      Adjust oscillator coil L5 for Band 14, oscillator coil L4 for Band 21 and oscillator coil L3 for Band 28.0 in the same manner as described in steps (2) and (3).
      For Band 28.5, check the 1st OSC for normal operation only.

5. Coil Pack
   1) Purpose
      To make tracking of the receiver for its operation with the maximum sensitivity through tuning of each coil trimmer in the coil pack to a desired receiving frequency.
   2) Measuring sets required
      Standard signal generator (SSG)
      Oscilloscope
      AF vacuum tube voltmeter (VTVM)
   3) Alignment procedure
      (1) Set the panel controls as follows:
         a) IF TUNE at graduation 300
         b) Main dial at graduation 300
         c) RF GAIN at fully clockwise position
         d) AF GAIN at fully clockwise position
         e) FUNCTION at AM
         f) SELECTIVITY at WIDE
         g) RIT at a counterclockwise position (position RIT OFF)
         h) Operate the BAND switch and the RF TUNE control as instructed for each alignment.
      (2) Connect the oscilloscope and AF VTVM across the 8Ω dummy resistor connected to the PHONE terminal.
      (3) Connect the SSG output to the ANT terminal on the rear panel. Set up the SSG for 1,000Hz, 30% modulation with the ATT set to around 40dB.
      (4) Alignment of low-band ANT and RF coils
         a) With the BAND switch placed in position 3.5, set the RF TUNE control around the center of the 3.5 scale band.
         b) Set the output frequency of the SSG to 3.8MHz and adjust the 3.5MHz cores for the ANT and the RF coils until the receiver provides the maximum output.
         c) With the BAND switch turned to position 14, set the RF TUNE control around the center of the 14 scale band.
         d) Set the output frequency of the SSG, and adjust the 14MHz trimmer for the ANT and the RF coils.
      Repeat steps a) through d) three times to complete the alignment of the low-band ANT and RF coils.
      (5) Alignment of high-band ANT and RF coils
         a) With the BAND switch placed in position 21, set the RF TUNE control around the center of the 21 scale band.
         b) Set the output frequency of the SSG to 21.3MHz and adjust the 21MHz cores for the ANT and the RF coils until the receiver provides the maximum output.
         c) With the BAND switch placed in position 28.0, set the RF TUNE control near the left limit of the 28 scale band.
         d) Set the output frequency of the SSG to 28.3MHz and adjust the 28MHz trimmer for the ANT and the RF coils.
      Repeat steps a) through d) three times to complete the alignment of the high-band ANT and RF coils.



Reference: Layout of ANT. and RF Coil trimmers in RF Unit UC-1117J.

(6) Where the receiver sensitivity is raised with progress of the alignment, continue the alignment with the ATT on the SSG turned down to approx. 10dB. Also, adjust the AF GAIN control so that it is roughly set for the standard output.

6. S Meter
   1) Purpose
      To set the S meter for zero deflection.
   2) Measuring set required
      No measuring set is required.
   3) Alignment procedure
      (1) Set up the receiver for a condition where the alignment of the 14MHz band is completed in the coil pack alignment given in item (5). above.
      (2) With the ANT terminals short-circuited, adjust the S.ADJ control until the needle of S meter is set to zero. In this case, be sure that the meter is not set to an apparent zero point, because the meter incorporates an anti-deflection circuit which prevents the needle from deflecting in the minus direction beyond the zero point.

7. 5MHz Trap Coil
   1) Purpose
      To attenuate the interference signal having the same frequency as the 5MHz order of the 1st IF for improvement of the IF interference ratio.
   2) Measuring sets required
      Standard signal generator (SSG)
      Oscilloscope
      AF vacuum tube voltmeter (VTVM)
   3) Alignment procedure
      (1) Adjustment of 5MHz trap coil by ANT terminals
         a) Place the receiver in the condition where the alignment of the low-band ANT and RF coils are completed in the coil pack alignment given in item 5 and receive the 7MHz band with the maximum sensitivity.
            Set up the SSG for an output frequency of 7.3MHz at 1,000Hz, 30% modulation with the ATT set to 10dB.
            With the BAND switch set at position 7 and the main dial and IF TUNE control at graduations 300 on the receiver, turn the RF TUNE control to a setting around graduation 7 to tune the receiver for the output frequency of the SSG.
         b) Leave the receiver under the above condition and change the output frequency of the SSG to 5.655MHz with the ATT set around 60dB. Apply the output of the SSG to the receiver and check to see that the receiver delivers an output.
            Adjust the 5MHz trap until the receiver provides the minimum output.
            Note that the ATT setting on the SSG may be varied within the range where the minimum output of the receiver is easily checked up.
      (2) Adjustment of 5MHz trap coil in RF unit UC-1117J
         a) Place the receiver in the condition where the alignment of the low-band ANT and RF coils are completed in the coil pack alignment given in item 5.
            Proceed just in the same manner as described in (1), a) to receive the 7.1MHz output of the SSG except that the output frequency of the SSG is set to 7.1MHz and that the main dial and the IF TUNE control on the receiver are set to graduations 100.
         b) Turn the RF TUNE control counterclockwise by about 20° from the setting for the 7.1MHz to the point where noise appears. Fix the RF TUNE control to the point where the maximum noise appears. This noise is the 5MHz order noise. So, adjust the 5MHz trap coil in the UC-1117J until the receiver delivers the minimum noise output.

8. RIT
   1) Purpose
      To coincide the transmitting and receiving frequencies with each other at the 0 position of RIT switch when this receiver is operated with the model TX-310 on a combined transmitter-receiver basis.
   2) Measuring sets required
      Standard signal generator (SSG)
      Oscilloscope
      AF generator
   3) Alignment procedure
      (1) Place the receiver in the condition where the alignment of the high-band ANT and RF coils are completed in the coil pack alignment given in item 5. and receive the 14MHz band with the maximum sensitivity.
         Set up the SSG for an output frequency of 14.2MHz under no modulation with the ATT set at 40dB.
         With the BAND switch set at position 14 and the main dial and IF TUNE control at graduations 200 on the receiver, turn the RF TUNE control to a setting around graduation 14 to tune the receiver for the output frequency of the SSG.
         Note that the FUNCTION switch should be switched from AM to USB.
      (2) With the oscilloscope set for sweep range EXT

HORIZONTAL, apply the 1,000Hz, 1V output of the AF generator to terminal H.

(3) Set the RIT control to 0 correctly and then finely adjust the main tuning dial until the Lissajous' figure on the oscilloscope comes to a standstill to form a circular pattern.

(4) Turn the RIT control counterclockwise to the RIT OFF position. Adjust the RIT 0 ADJ control until the Lissajous' figure turns into the circular pattern again. Mind that step (4) should be completed within one min. Otherwise, repeat steps (3) and (4).

(5) Additional matter
RIT may be accomplished by zero beating the VFO with the test signal in lieu of its zero adjustment, which is conducted through the use of an oscilloscope set up for representation of Lissajous' figure.

III. Specifications of Measuring Sets Required

1) Standard signal generator (SSG)
   Frequency: 250kHz to 30MHz
   Output: 0 to 100dB/μV
   Should contain little FM component under no modulation.
2) Oscilloscope — Equivalent to model CO · 505S
3) AF vacuum tube voltmeter (VTVM)
   Frequency: 100Hz to 10kHz
   Input resistance: More than 1MΩ
   Range: 10mV to 30V FS
4) AF generator
   Output impedance: Less than 600Ω
   Output voltage: 1V max.
   Frequency: 300Hz to 5kHz
   Distortion factor: Less than 0.5% (1,500Hz)
5) RF vacuum tube voltmeter (VTVM)
   Input impedance: More than 1MΩ; Less than 20pF
   Range: 10mV to 300V, FS (Operable with ATT)