INTRODUCTION

The Heathkit Model SB-301 Receiver is capable of receiving SSB, AM, CW, and RTTY signals on all amateur bands from 3.5 to 30 megahertz*. Separate AM and CW crystal filters can be obtained. These crystal filters are switch selected from the front panel for these modes of operation to assure optimum selectivity and performance. If these optional filters are not obtained, AM signals are received using the exalted carrier method, and CW may be received in either SSB mode.

The preassembled, prealigned LMO (linear master oscillator) and crystal-controlled heterodyne oscillators assure highly accurate and stable operation. The use of circuit boards and a wiring harness provide a clean chassis layout.

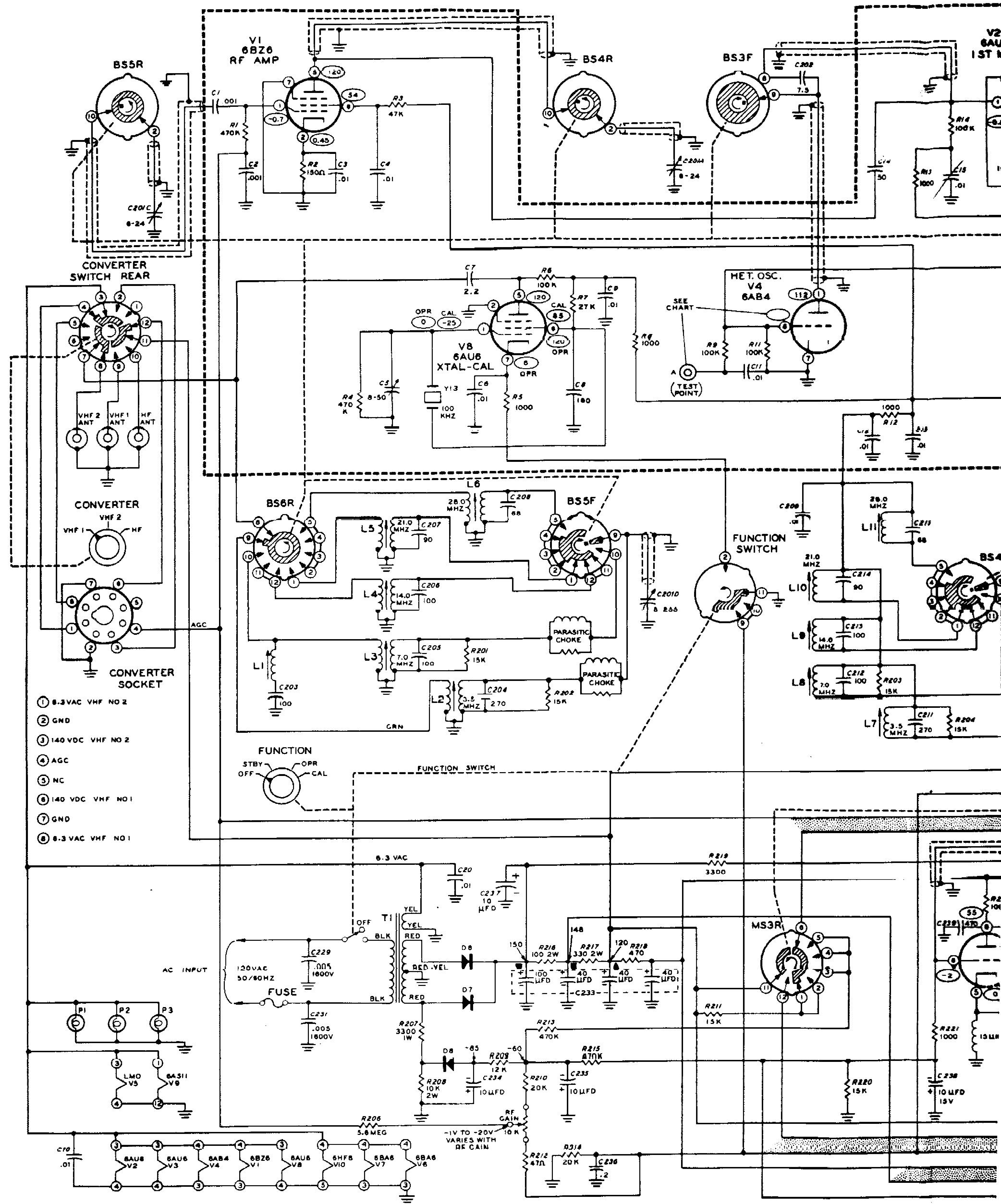
Other features of this Receiver are special antenna and power connections for VHF converters, a 100 kilohertz crystal calibrator, provisions for 15 MHz WWV reception, for transceiver operation with the SB-401 companion Transmitter, and a smooth, virtually backlash-free, dial tuning mechanism. The transformer-operated silicon diode power supply is a long-life, low-heat power source.

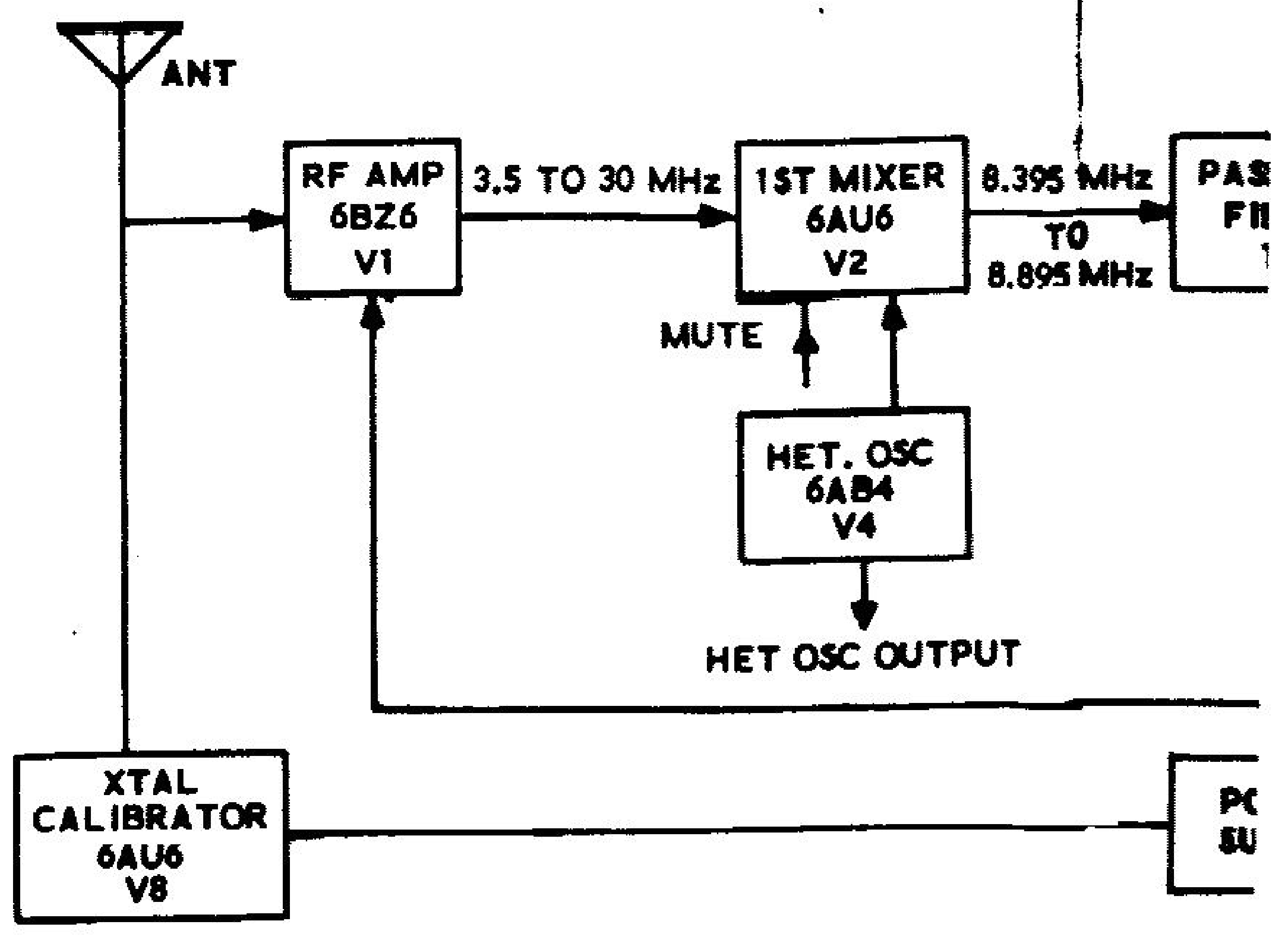
*This Manual uses the new IEEE (Institute of Electrical and Electronic Engineers) international standard term "hertz" as the basic unit of frequency. The terms are used as follows:

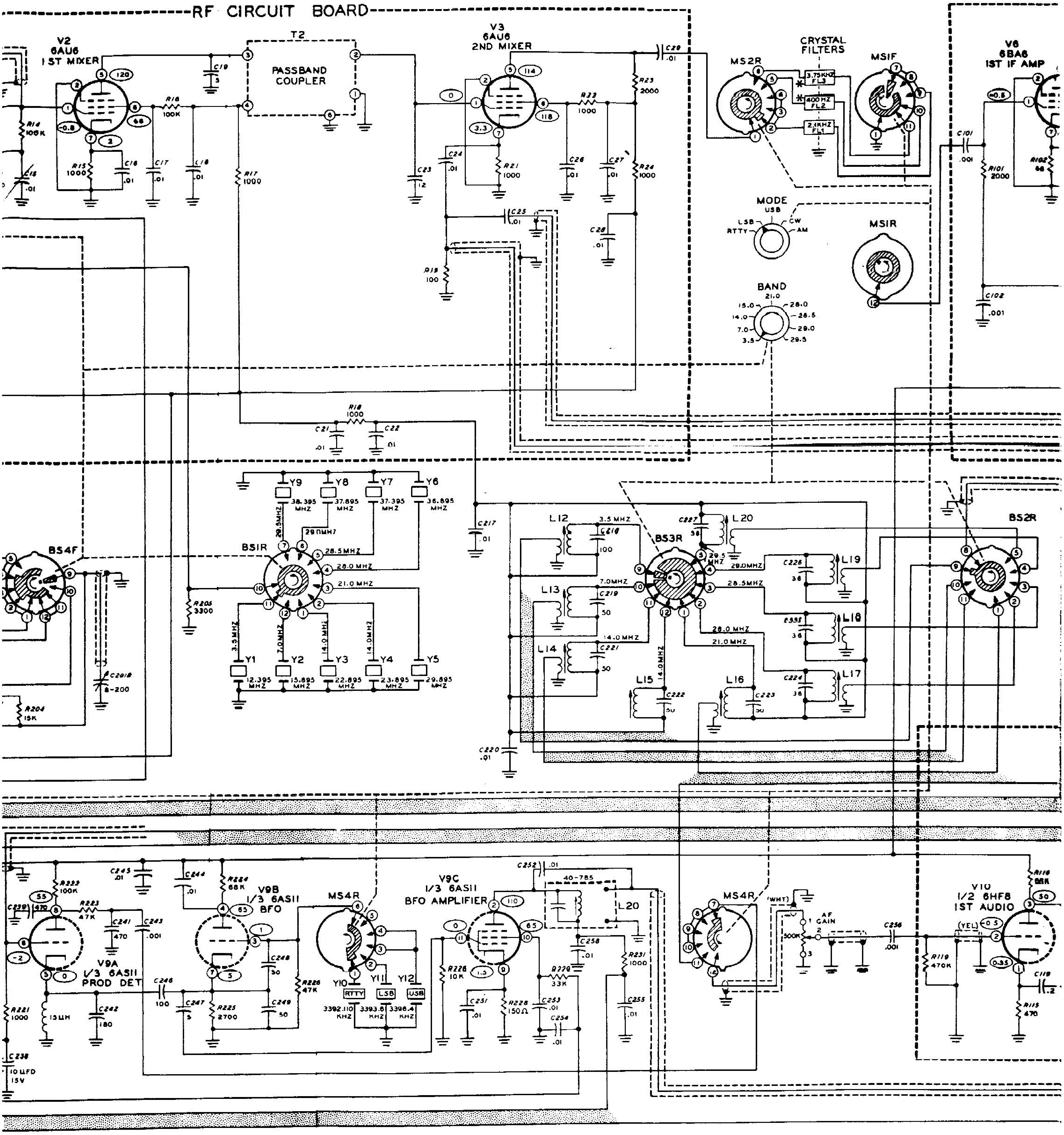
Hz (hertz) = cps (cycles per second).
kHz (kilohertz) = kc (kilocycles per second).
MHz (megahertz) = mc (megacycles per second).

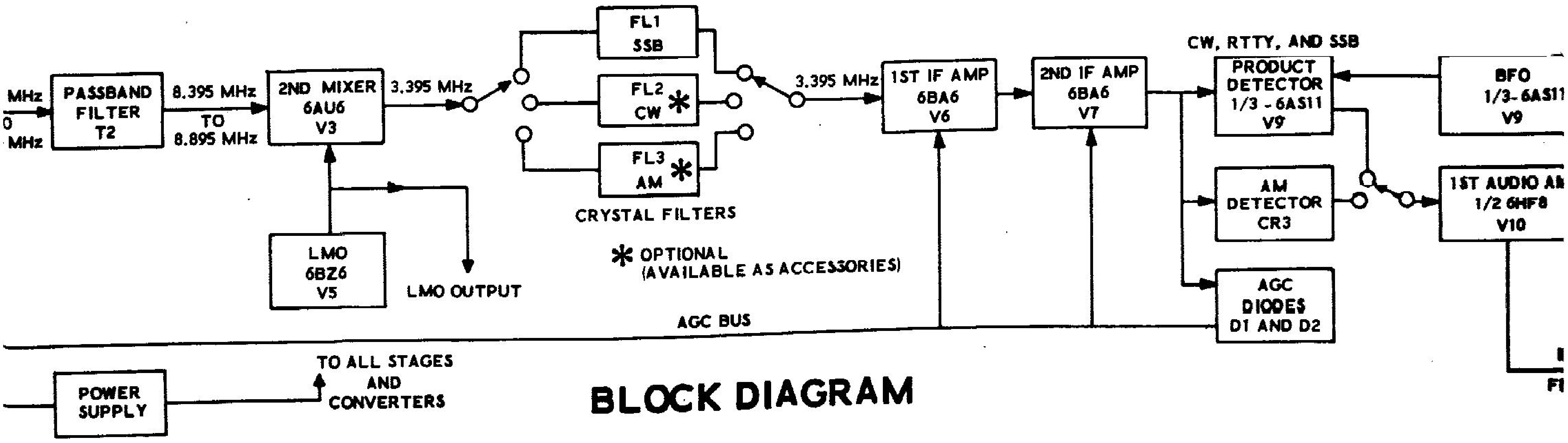
BAND	HETERODYNE OSCILLATOR FREQUENCY (CRYSTAL FIXED)	RECEIVED SIGNAL FREQUENCY	PASSBAND SIGNAL FREQUENCY (BETWEEN 8.395-AND 8.895)	LMO MIXER OUTPUT CRYSTAL FILTERS AND IF (FIXED)	LMO (BETWEEN 5 AND 5.5 MC)
3.5 to 4	12.395	3.895	8.5	3.395	5.105
7 to 7.5	15.895	7.2	8.695	3.395	5.3
14 to 14.5	22.895	14.2	8.695	3.395	5.3
15.0 to 15.5	23.895	15.2	8.695	3.395	5.3
21 to 21.5	29.895	21.3	8.595	3.395	5.2
28 to 28.5	36.895	28.1	8.795	3.395	5.4
28.5 to 29	37.395	28.7	8.695	3.395	5.3
29 to 29.5	37.895	29.2	8.695	3.395	5.3
29.5 to 30	38.395	29.6	8.795	3.395	5.4

Frequencies In Megahertz

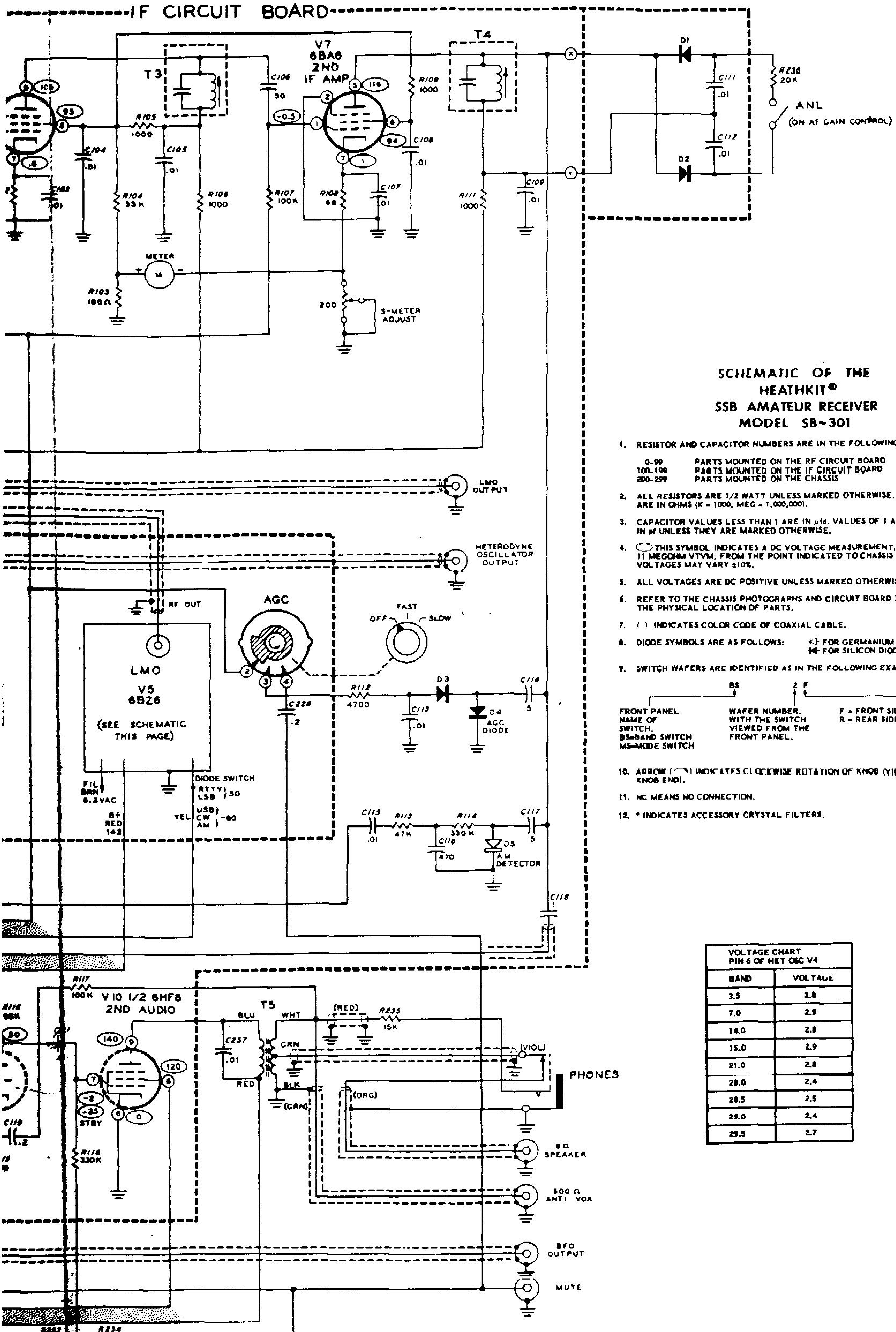

V1
6BZ6
RF AMP
BS5R
BS4R
BS3F
V2
1ST
C1 .001
R1 470K
C2 .001
R2 150Ω
C3 .01
R3 47K
C4 .01
C201C 8-24
C201A 8-24
C202 7.5
C14 50
R13 1000
C15 .01
R14 100K
CONVERTER SWITCH REAR
HET. OSC.
V4
6AB4
SEE CHART
R9 100K
R11 100K
C11 .01
A
(TEST POINT)
C7 2.2
R6 100K
R7 27K
C9 .01
R8 1000
OPR 0
CAL -25
CAL 85
OPR 120
OPR 8
V8
6AU6
XTAL-CAL
R4 470K
C5 8-50
Y13 100 KHZ
C6 .01
R5 1000
C8 180
VHF 2 ANT
VHF 1 ANT
HF ANT
R12 1000
C12 .01
C13 .01
CONVERTER
VHF 1
VHF 2
HF
AGC
CONVERTER SOCKET
① 6.3 VAC VHF NO 2
② GND
③ 140 VDC VHF NO 2
④ AGC
⑤ NC
⑥ 140 VDC VHF NO 1
⑦ GND
⑧ 6.3 VAC VHF NO 1
BS6R
BS5F
L6 28.0 MHZ
C208 68
L5 21.0 MHZ
C207 90
L4 14.0 MHZ
C206 100
L3 7.0 MHZ
C205 100
R201 15K
L2 3.5 MHZ
C204 270
R202 15K
L1
C203 100
PARASITIC CHOKE
C201D 8-266
GRN
FUNCTION SWITCH
C209 .01
L11 28.0 MHZ
C215 68
L10 21.0 MHZ
C214 90
L9 14.0 MHZ
C213 100
L8 7.0 MHZ
C212 100
R203 15K
L7 3.5 MHZ
C211 270
R204 15K
BS4
FUNCTION
STBY
OFF
OPR
CAL
6.3 VAC
C20 .01
C237 10 µFD
T1
YEL
RED
BLK
RED-YEL
AC INPUT
120VAC 50/60HZ
FUSE
C229 .005 1600V
C231 .005 1600V
OFF
D6
D7
150
R216 100 2W
148
R217 330 2W
120
R218 470
40 µFD
100 µFD
C233
R219 3300
MS3R
R211 15K
R207 3300 1W
D8
-85
-60
R209 12K
R213 470K
R215 470K
C235 10 µFD
R208 10K 2W
C234 10 µFD
R210 20K
R220 15K
R221 1000
C238 10 µFD 15V
C239 470
55
-2
P1
P2
P3
LMO V5
6AS11 V9
R206 5.6 MEG
RF GAIN 10K
-1V TO -20V VARIES WITH RF GAIN
R212 47Ω
R214 20K
C236 .2
C10 .01
6AU6 V2
6AU6 V3
6AB4 V4
6BZ6 V1
6AU6 V8
6HF6 V10
6BA6 V7
6BA6 V6
FUNCTION SWITCH


ANT
RF AMP 6BZ6 V1
3.5 TO 30 MHz
1ST MIXER 6AU6 V2
8.395 MHz TO 8.895 MHz
PAS FI
MUTE
HET. OSC 6AB4 V4
HET OSC OUTPUT
XTAL CALIBRATOR 6AU6 V8
PO SU





BLOCK DIAGRAM



SCHEMATIC OF THE HEATHKIT®
SSB AMATEUR RECEIVER
MODEL SB-301

1. RESISTOR AND CAPACITOR NUMBERS ARE IN THE FOLLOWING GROUPS:

0-99	PARTS MOUNTED ON THE RF CIRCUIT BOARD
100-199	PARTS MOUNTED ON THE IF CIRCUIT BOARD
200-299	PARTS MOUNTED ON THE CHASSIS

2. ALL RESISTORS ARE 1/2 WATT UNLESS MARKED OTHERWISE. RESISTOR VALUES ARE IN OHMS (K = 1000, MEG = 1,000,000).

3. CAPACITOR VALUES LESS THAN 1 ARE IN μfd. VALUES OF 1 AND ABOVE ARE IN pf UNLESS THEY ARE MARKED OTHERWISE.

4. ⬭ THIS SYMBOL INDICATES A DC VOLTAGE MEASUREMENT, TAKEN WITH AN 11 MEGOHM VTVM, FROM THE POINT INDICATED TO CHASSIS GROUND. VOLTAGES MAY VARY ±10%.

5. ALL VOLTAGES ARE DC POSITIVE UNLESS MARKED OTHERWISE.

6. REFER TO THE CHASSIS PHOTOGRAPHS AND CIRCUIT BOARD X-RAY VIEWS FOR THE PHYSICAL LOCATION OF PARTS.

7. ( ) INDICATES COLOR CODE OF COAXIAL CABLE.

8. DIODE SYMBOLS ARE AS FOLLOWS: ⊣▷⊢ FOR GERMANIUM DIODES.
   ⊣▶⊢ FOR SILICON DIODES.

9. SWITCH WAFERS ARE IDENTIFIED AS IN THE FOLLOWING EXAMPLE:

   BS 2 F

   FRONT PANEL NAME OF SWITCH.
   BS=BAND SWITCH
   MS=MODE SWITCH

   WAFER NUMBER, WITH THE SWITCH VIEWED FROM THE FRONT PANEL.

   F = FRONT SIDE OF THE WAFER.
   R = REAR SIDE OF THE WAFER.

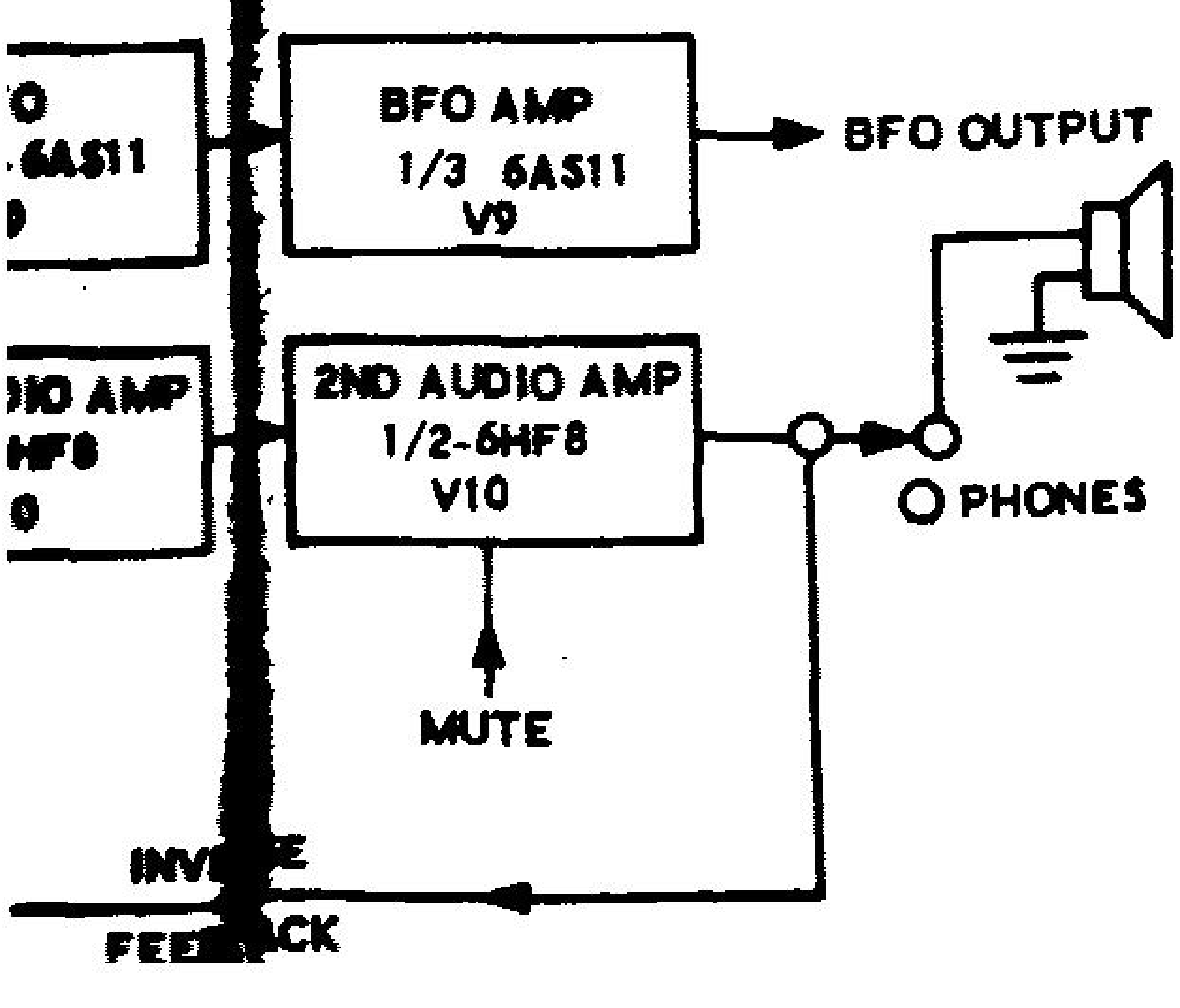
10. ARROW (⌒) INDICATES CLOCKWISE ROTATION OF KNOB (VIEWED FROM KNOB END).

11. NC MEANS NO CONNECTION.

12. * INDICATES ACCESSORY CRYSTAL FILTERS.

VOLTAGE CHART
PIN 6 OF HET OSC V4

BAND	VOLTAGE
3.5	2.8
7.0	2.9
14.0	2.8
15.0	2.9
21.0	2.8
28.0	2.4
28.5	2.5
29.0	2.4
29.5	2.7



LMO SCHEMATIC