PA-CB SWITCH

This switch is to select the operating mode of either CB or PA.

ANL SWITCH

Slide the ANL switch to ANL position. It will activate the automatic noise limiter in the audio circuits.

RECEIVE-O-SLIDE

This permits pinpoint tuning of receiver for reception of off-frequency stations. Every signal will come in sharp and clear.

OPERATING THE BOBCAT 23D

CAUTION

DO NOT PUSH TRANSMIT SWITCH WITHOUT FIRST CONNECTING A 52-OHM ANTENNA OR DUMMY LOAD.

Rotate SQUELCH CONTROL fully counterclockwise.

Rotate the VOLUME CONTROL clockwise, to apply power, and advance the VOLUME CONTROL until noise or signal is heard in the speaker. (Since your BOBCAT 23D uses all transistors, no warm up time is required.)

With no signal present, rotate the SQUELCH CONTROL clockwise to a position in which no noise is heard. Advance this control only far enough to prevent noise from being heard. Advancing it too far may result in a weak station being unable to open the squelch. Since the squelch has been adjusted, with no signal present, then when a station transmits on the channel to which your BOBCAT 23D is tuned, the squelch circuit will open and the station will be heard. When the station stops transmitting and no signal is received, the squelch gate will be closed and all sound will be turned "Off". Sometimes noise will build up as a result of a passing truck, etc. If this happens, the SQUELCH CONTROL should be advanced just far enough to keep the circuit Closed during these noise peaks.

Rotate the CHANNEL SELECTOR to the desired channel.

Adjust the volume as desired for the station you are listening to.

To transmit, hold the microphone 2 to 3 inches from your mouth. Normally, it is best to hold it so that you talk across it rather than directly into it. This will prevent the sound of your breathing being transmitted. Hold the Push-to-Talk button on the microphone in, and speak in a normal conversational level.

When your transmission is completed, release the button on the microphone and listen for your reply.

When listening to a weak signal, adjust your delta tune switch for strongest signal. The automatic noise limiter will ordinarily be kept on. When under conditions of low noise you may wish to turn it off for extra sensitivity.

SECTION 4
MAINTENANCE & SERVICING

CIRCUIT DESCRIPTION

Your BOBCAT 23D consists of the following circuits: the PEARCE-SIMPSON HetroSync™ circuit, which provides the receiver injection frequencies and the transmitter carrier frequency; a dual conversion superheterodyne receiver; and an AM-modulated transmitter. It is powered from 13.8V DC source. (See Block Diagram and schematic.)

HETROSYNC™ CIRCUIT

PEARCE-SIMPSON's method of frequency synthesis makes use of 14 crystals to provide crystal-controlled, 23 channel coverage on both transmit and receive functions. The circuit is composed of 16.965 to 17.215MHz master oscillator (Q2), 9.545 to 9.585 MHz receive oscillators (Q1), 10.000 to 10.040 MHz transmit oscillator (Q3) and a transmit mixer (D12). In the transmit function, the output of the master oscillator (Q2) and the transmit oscillator (Q3) are fed into the transmit mixer (D12). The two fundamental frequencies are combined in the mixer, whose output will contain the two frequencies fed in, plus the sum of the two and the difference of the two, as well as combinations of the harmonics of the input. We use only the difference frequency, Let us take Channel 1 as an example. The two input frequencies are 16.965 MHz and 10.000 MHz. The mixer outputs are 16.965 MHz, 10.000 MHz, 6.965 MHz and 27.065 MHz. The other frequencies present at much lower levels are the harmonics of the two input frequencies such as 20.000 MHz, 30.000 MHz, 42.540 MHz, etc. In addition to these, will be the sum and difference frequencies from the mixine of the various harmonic and fundamental frequencies. Of all these frequencies, only one falls within the pass band of the transmitter. This is 27.065 MHz which is the carrier frequency for Channel 9.

TRANSMITTER CIRCUIT

The transmitter circuit makes use of the carrier frequency signal output of the transmit mixer (D12), which is part of the HetroSync™ circuit. The signal is amplified by the buffer (Q15), which is a voltage amplifier, whose output is fed to the Predriver (Q16). Bandpass transformers L4 through T8 provide the selectivity to select the desired carrier frequency from the mixer (D12) output. The driver is a low level Class C power amplifier which supplies the necessary RF power at the carrier frequency to drive the final power amplifier (Q18). The final supplies RF power to the antenna through a double pi-matching network. The primary purpose of a transmitter is to transmit intelligence from one place to another. The function of the modulator is to put the intelligence on the carrier. To do this, the microphone

changes sound (mechanical energy) to electrical energy which is an audio frequency signal. Mic amplifier (Q11) and audio driver (Q12) amplify this signal and drive the audio power amplifier (Q13 & Q14). This audio power amplifier varies the supply voltage fed to the driver and signal at on audio rate. This variation of the supply voltage varies the amplitude of the carrier output thus producing amplitude modulation.

RECEIVER CIRCUIT

The receiver in the BOBCAT 23D is a dual conversion superheterodyne circuit. Channel 9 (27.065 MHz) will be used as an example to show how the receiver circuit works. A signal at 27.065 MHz is received at the antenna and amplified by RF amplifier (Q4) and fed into 1st receiver mixer (Q5). The 27.065 MHz signal is mixed with 17.065 MHz injection from the HetroSync^{R} circuit. The 10.000 MHz 1st IF output from the 1st receiver mixer is fed into the 2nd receiver mixer (Q6) along with the 9.545 MHz injection from the HetroSync^{R} circuit. The 455 kc 2nd IF output from the 2nd receiver mixer is amplified by the IF amplifiers Q7 and Q8. Then, the signal is detected by detector diode D5, D6 to remove the audio from the IF carrier. The audio is coupled from the detector through the automatic noise limiter network to the 1st receiver audio amplifier (Q10). This amplifier also acts as a squelch gate. If the squelch control has been properly adjusted, this amplifier is biased off and will not allow any noise to be passed. When a signal is received, the amplifier is biased on and audio is allowed to be passed on to the 2nd audio driver (Q12). Q12 in turn, feeds the audio to the audio power amplifier (Q13 & Q14) which drives the speaker.

ALIGNMENT-TRANSMITTER

A. EQUIPMENT REQUIRED:

a) RF OUtput Power meter (50 ohm, 5 watts)
b) Frequency counter
c) DC milli ampere meter (500/1000 mA)
d) Power supply (DC 13.8V)
e) Field strength meter.
f) RF V.T.V.M.
g) AF signal generator

B. PROCEDURE:

Remarks: Warm up the unit and test equipments at least 15 minutes before starting alignment.
RF output meter or 50 ohm dummy load must be connected to antenna jack.
Coupling to frequency counter should be as loose as possible, to prevent frequency drift by connection.

STEP	SET CONDITION	CONNECTIONS	ADJUSTMENT	REMARKS
1.	Transmitting no modulation CH13	RF VTVM to Base Q15	L4 & T8	Adjust for max. output
2.	Same as Step 1	RF output power meter to antenna jack	T9, T10, L6, L8, L10	Adjust for 4W output
3.	Same as Step 1	Field Strength to ant. Jack	VC1	Adjust for min. point to element spurious radiation near 54MHz.
4.	Same as Step 1	Same as Step 1	VR6	Adjust so that needle of meter on the unit advances a little bit into red zone and comes over "+" between 9 and 10 as calibrated on meter face.
5.	Same as Step 1	Frequency counter to ant. through a suitable attenuator		Check frequency of all channels

ALIGNMENT-RECEIVER

A. EQUIPMENT REQUIRED:

a) Signal Generator: 27MHz Band.
1.000Hz, 30% AM Modulation and
Output Impedance 50 ohm.

b) AF Output Meter (V.T.V.M.)

c) Power supply (DC 13.8V)

d) Dummy load (8 ohm, 5 watts, Resistive)

B. PROCEDURE:

Remarks: Warm up the unit and test equipments at least 15 minutes before staring alignment.

Output level: Keep signal generator output low enough to prevent AGC overload.
(Below appox. 2 volts on output meter)

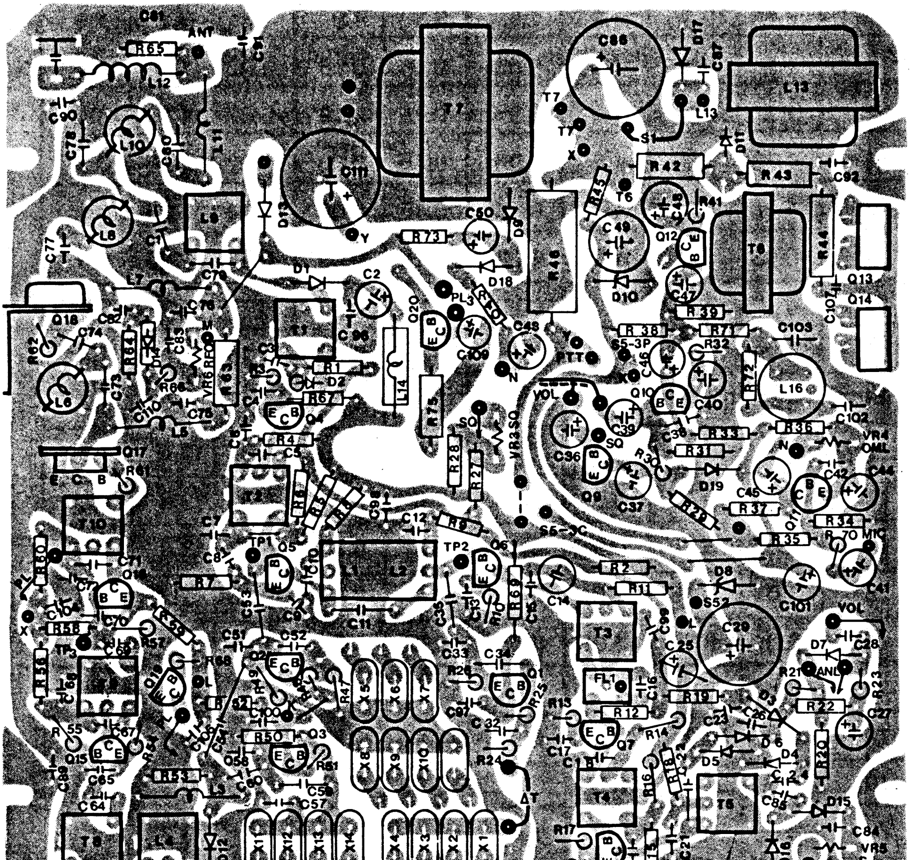
Step	SG Connection & Frequency	Set Condition	Output Meter Condition	Adjustment	Remarks
1.	To antenna jack (J1). Freq: 27.115MHz	SQ: Min. VOL: Max. DELTA TUNE: 0 ANL: OFF	To EXT. SP. jack (J3).	T1, T2, L1, L2, T3, T4, T5	Adjust for max. point
2.	Same as Step 1. and output level 300 μV	SQ: Max. VOL: Max. ANL: OFF	Same as Step 1.	VR 3	Adjust for a open squelch point
3.	Same as Step 1. and output level: 100 μV	Same as Step 1.	Same as Step 1.	VR 5	Adjust for "S-9" on "S" meter of the unit.
4.	Repeat the above adjustments, in order to make sure that adjustments have been made correctly.				

TRANSISTOR VOLTAGE CHART

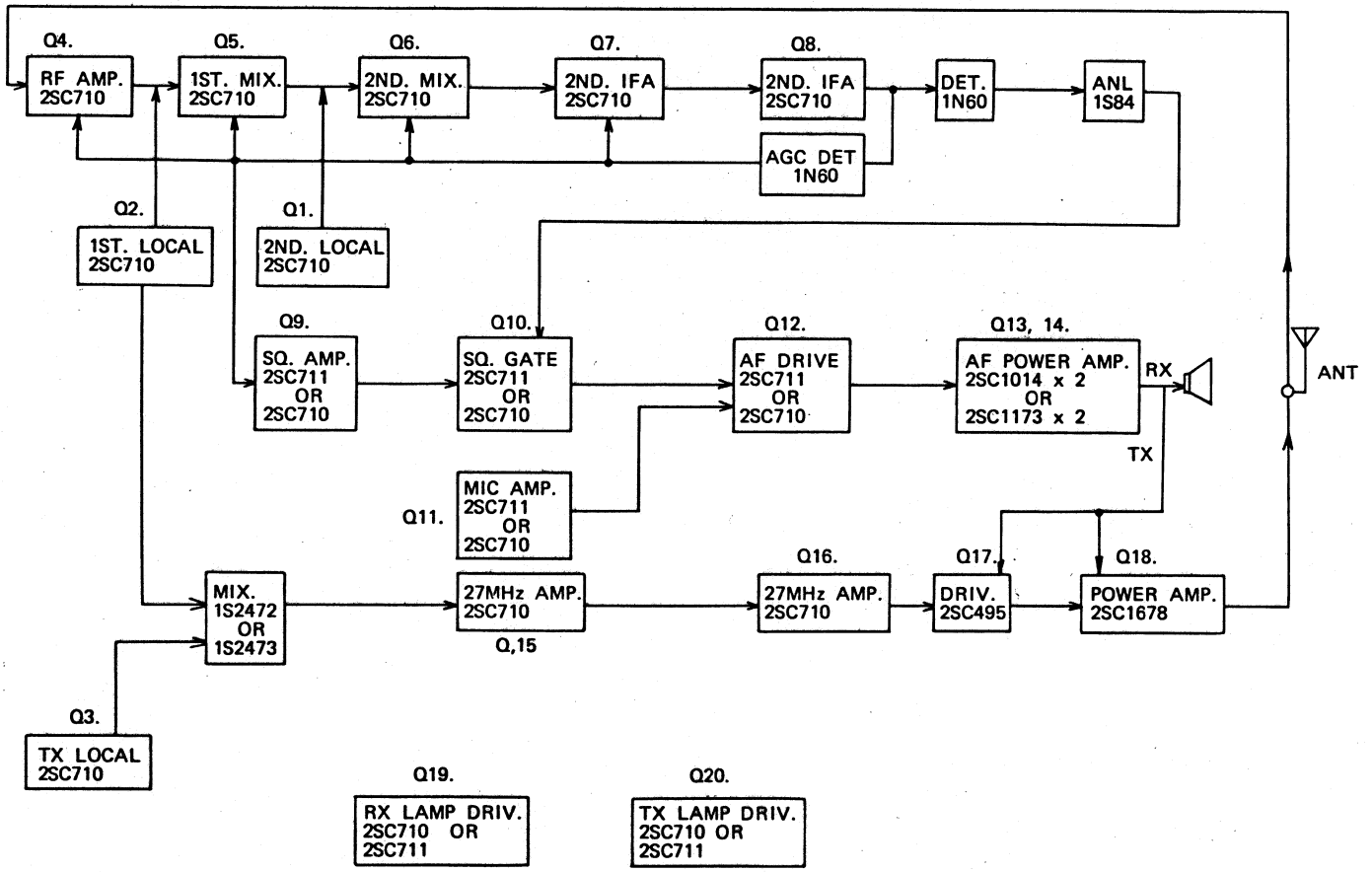
	Rx			Tx			PA		
No.	E	C	B	E	C	B	E	C	B
1	2.9	8.7	3.1	0.09	0.16	0.07	0.21	1.25	0.4
2	2.7	9.1	3.2	2.7	9.1	3.2	2.7	9.1	3.2
3	9.6	9.1	1.9	1.5	9.1	1.9	1.5	9.1	1.9
4	1.2	6.5	1.8	0.08	0.15	0.08	0.02	1.25	0.4
5	1.3	7.7	1.9	0.9	0.15	0.18	0.02	1.25	0.4
6	1.35	8.9	1.8	0.05	0.15	0.08	0.02	1.25	0.3
7	1.3	8.7	1.8	0.08	0.15	0.08	0.02	1.25	0.3
8	0.95	8.1	1.6	0.08	0.15	0.08	0.02	1.25	0.3
9	0	4.4	0	0	0.4	0.08	0	4.4	0
10	1.25	3.9	1.75	0.06	0.1	0.18	1.25	4.0	1.8
11	8.9	8.9	1.4	1.4	5.2	1.45	8.9	8.9	1.4
12	1.3	1.24	1.85	1.3	12.4	1.85	1.3	12.4	1.85
13	0.02	13.8	0.05	0.08	13.8	0.7	0.03	13.8	0.65
14	0.02	13.8	0.05	0.08	13.8	0.7	0.03	13.8	0.65
15	0.07	2.35	0.8	0.14	2.4	0.85	0.75	2.35	0.8
16	9.0	8.5	1.55	0.9	12.3	1.5	1.25	11.5	1.55
17	0	13.8	0	0	12.0	0	0	13.8	0
18	0	13.8	0	0	12.3	0.75	0	13.8	0
19	0	1.1	0.8	0	12.2	0.1	0	9.1	0.6
20	0.02	13.8	0	1.5	4.5	2.0	0	13.8	0

NOTE: 1. In PA mode the PTT switch should be depressed when making measurements.
2. B: Base E: Emitter C: Collector
3. Operating Voltage: 13.8V
4. Unit: V

PC BOARD DETAIL

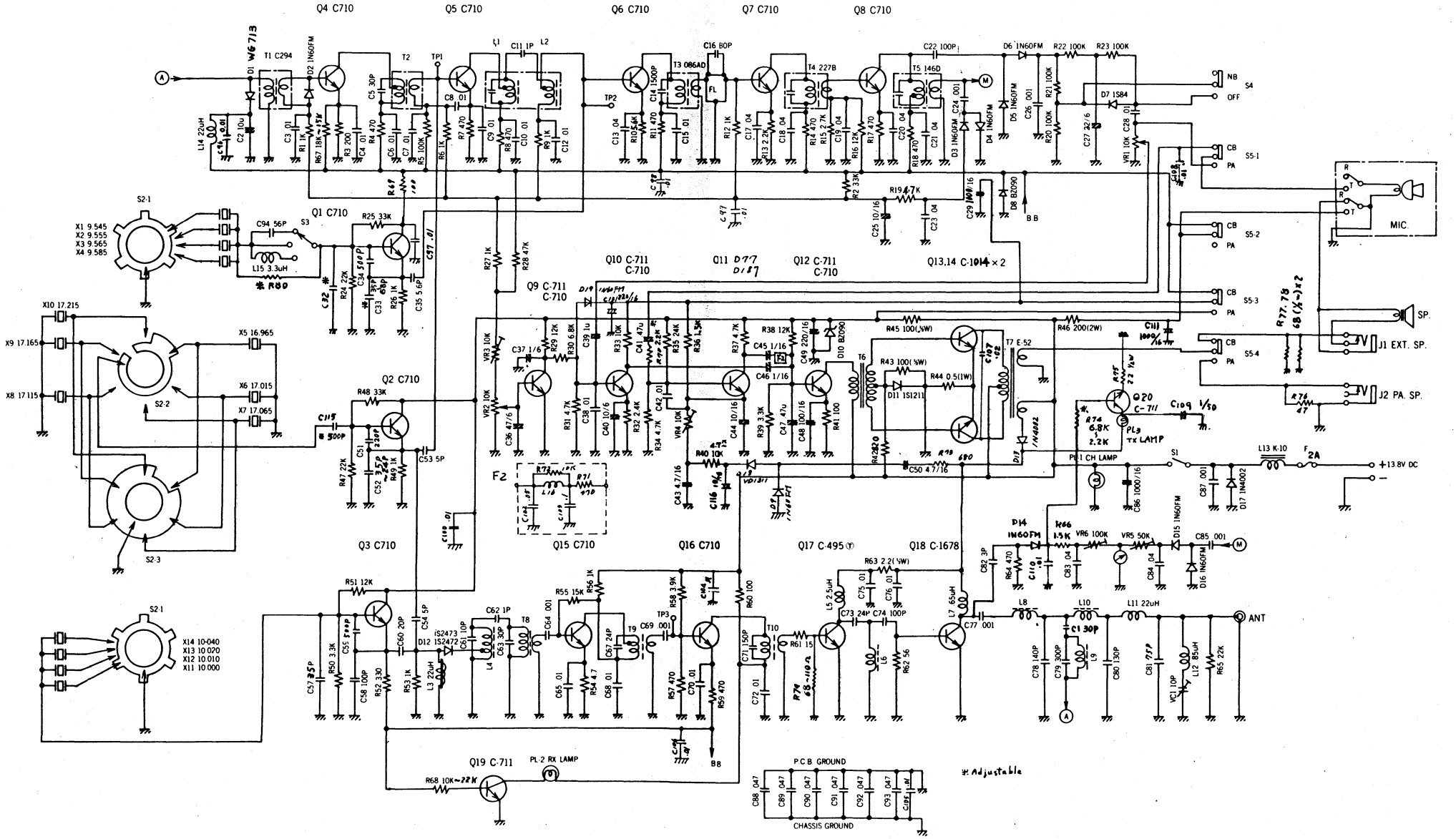


BOBCAT 23D BLOCK DIAGRAM



BOBCAT 23D

SCHEMATIC DIAGRAM



BOBCAT 23D