

SEP 22 1977

SST MOBILE SERVICE MANUAL

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PRICE - \$2.00

BROWNING LABORATORIES, INC. 1269 UNION AVENUE, LACONIA, N. H. 03246

1. GENERAL DESCRIPTION

This Service Manual is used for the SST Mobile by Browning which is a fully solid state 23 channel frequency synthesized 5 Watt transceiver for Class D Citizens Radio Service in compliance with FCC Rules and Regulations.

2. SPECIFICATIONS

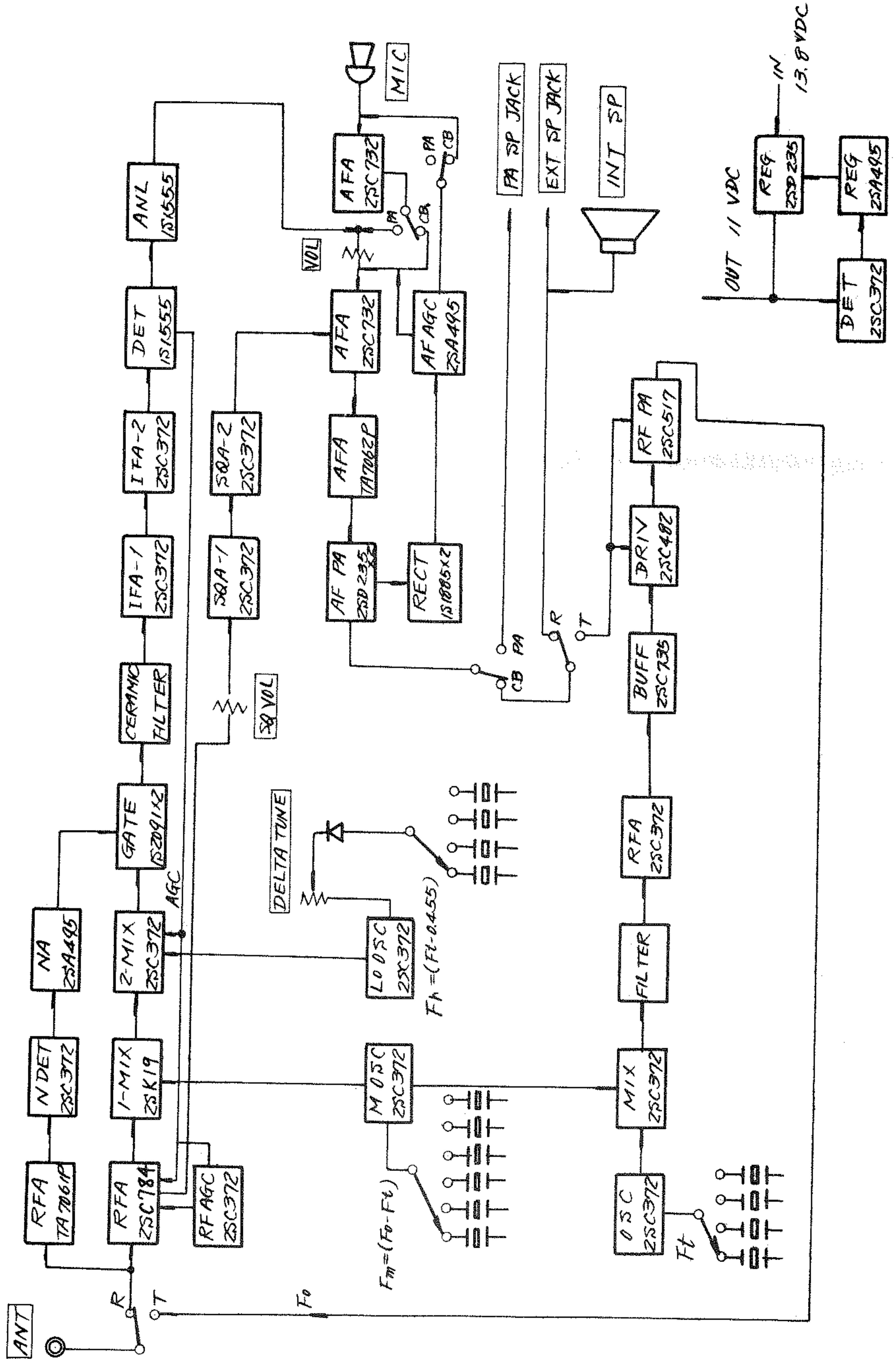
2-1. RECEIVER:

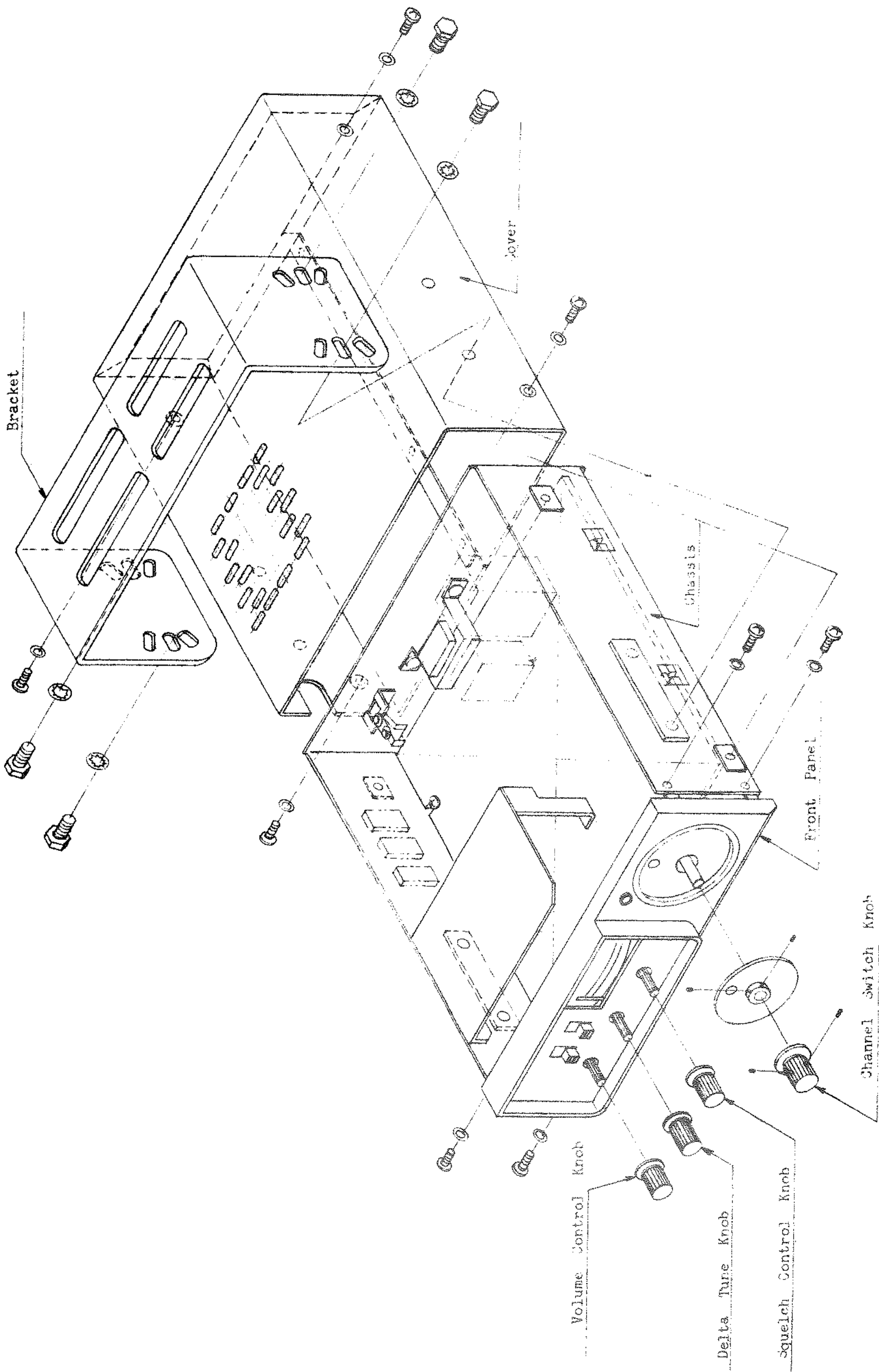
Sensitivity -	0.3 uv 10 DB S+N/N @ 30% modulation @ 1000 Hz
Selectivity -	4 kHz @ - 6 DB 20 kHz @ -50 DB
Image rejection -	Better than 55 DB
Squelch -	Minimum sensitivity 1 uv, maximum signal stop, factory setting, 100 uv.
Delta tune -	Variable \pm 1.5 kHz
Noise limiter -	Series gate approximately 65% clipping level
Audio output -	6 watts 8 ohm speaker high level Class B audio

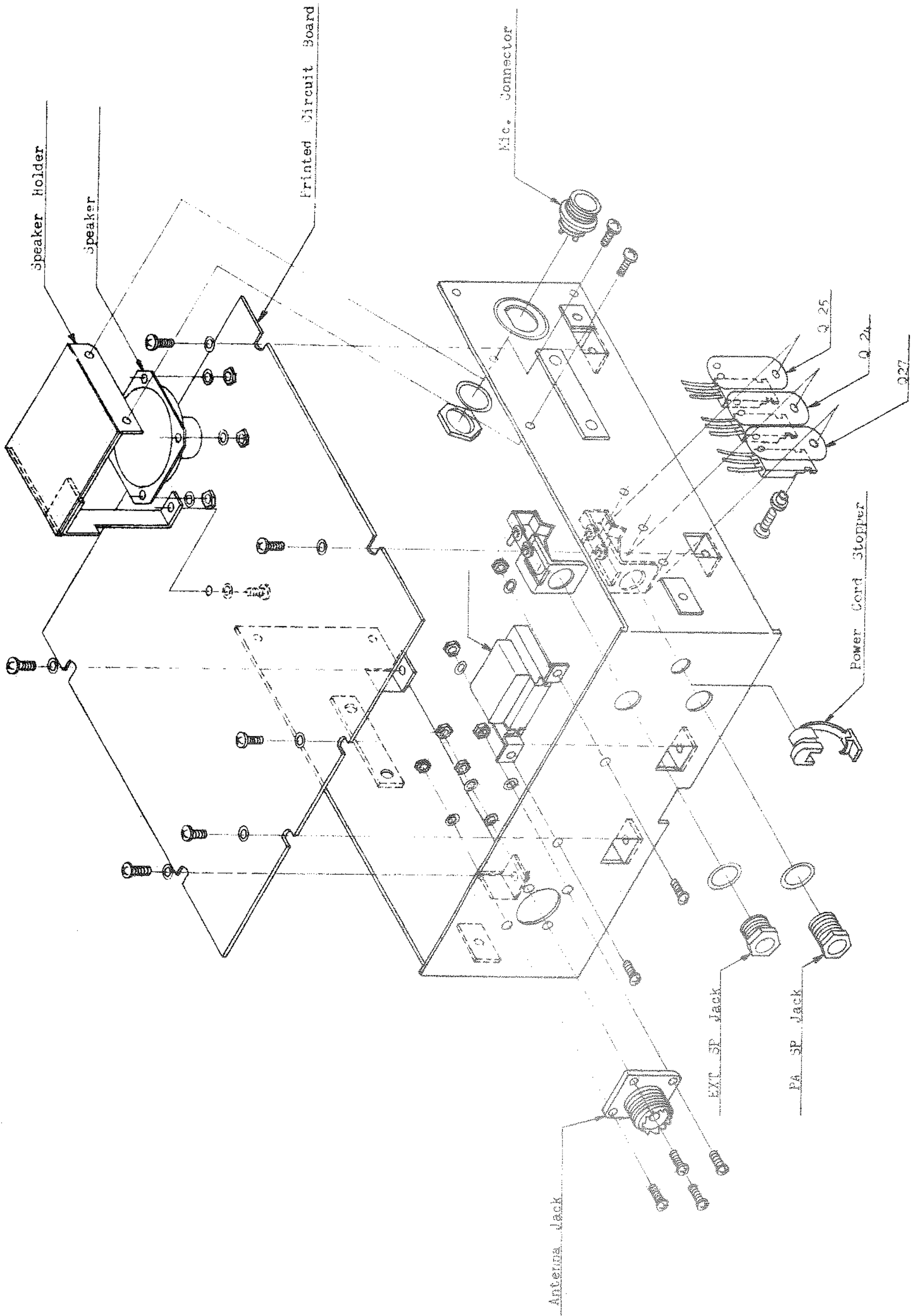
2-2. TRANSMITTER:

Power output -	Better than 3.5 watts @ 13.8 volts. Modulation 85% minimum guaranteed sine-wave 100% average speech.
2-3. Microphone -	High output dynamic
2-4. Weight -	5 1/2 lbs. with microphone
2-5. Size -	2 3/8"(H) x 6 1/2"(W) x 8 1/4"(D)

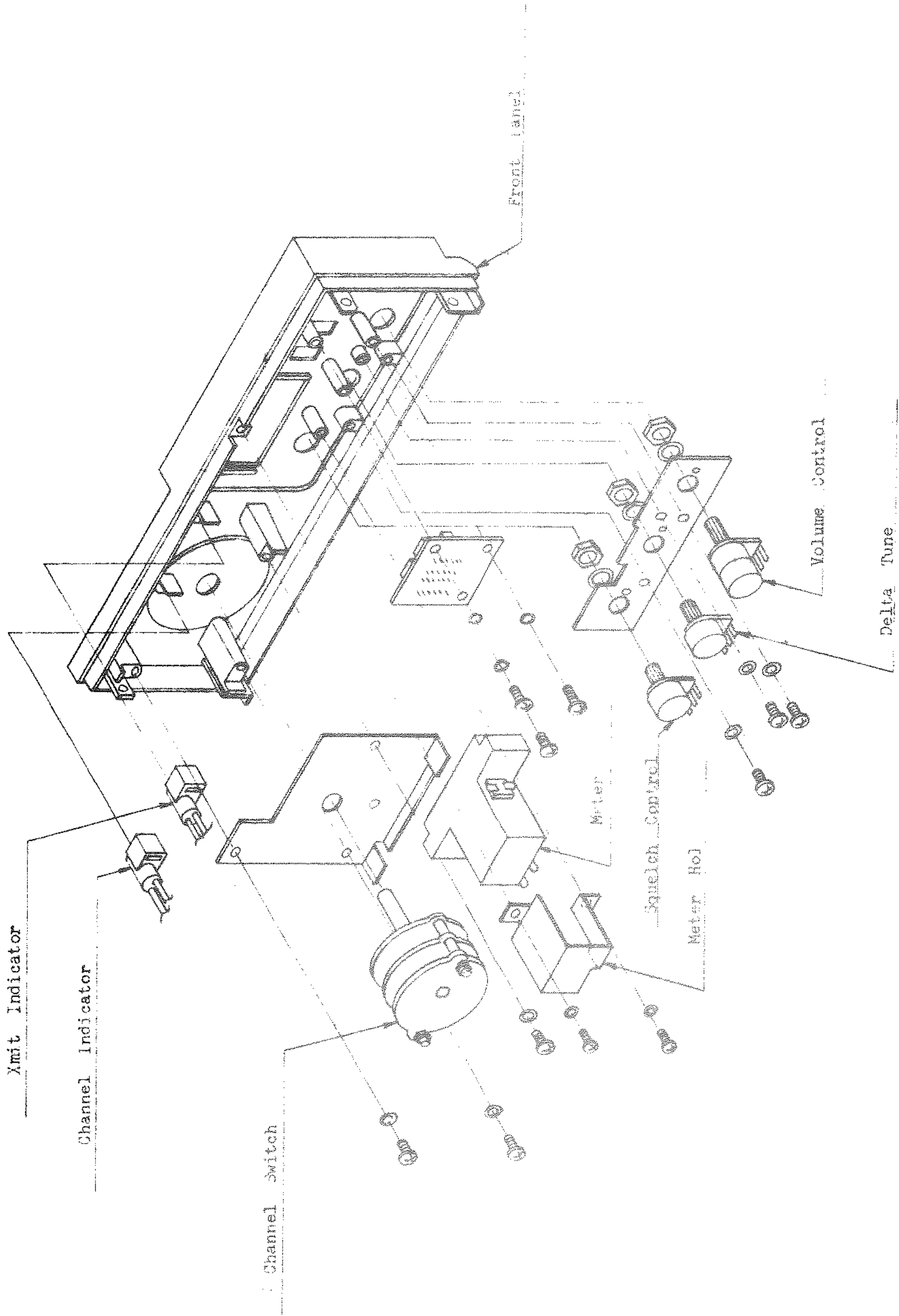
3. BLOCK DIAGRAM OF TRANSCIEVER







4. DISASSEMBLY - B



5. ALIGNMENT INSTRUCTIONS

NOTE: This transceiver meets all requirements of FCC Rules and Regulations Part 95, Subpart "C" and requires station license.

Only those persons properly licensed by the FCC are permitted to repair or adjust any malfunctioning unit found to be transmitting or radiating illegally. Adjustment by unauthorized persons is illegal.

5-1. RECEIVER:

- a. Connect an oscilloscope or VTVM to test point \textcircled{D}
- b. Inject 455 kHz 30% modulated signal at test point \textcircled{B} using a 0.01 mfd capacitor in series with the signal generator cable.
- c. Adjust 2nd IF transformers T6, T7, T8 and T9 for maximum deflection.
- d. Connect a signal generator to J1. Inject 27 MHz 30% modulated signal of about 1000 uv.
- e. Adjust 1st IF transformers T4 and T5 decreasing the signal generator output.
- f. Adjust RF transformers T1, T2 and T3 decreasing the signal generator output.
- g. Check the receiver specifications.

5-2. TRANSMITTER:

- a. Connect 50 ohms dummy load to J1.
- b. Connect an oscilloscope to test points \textcircled{G} .
- c. Depress the push-to-talk switch on microphone and make sure 2 ± 0.2 peak to peak synthesizer output.
- d. Disconnect the oscilloscope from test points \textcircled{G} .
- e. Connect the oscilloscope to J1 and adjust T16, T17 and L4 for maximum deflection.
- f. Adjust C62 for 3.5W RF output.

6. TROUBLE SHOOTING

6-1. Test Equipment:

- a. RF signal generator, with a frequency range of at least from 455 kHz to 30 MHz, from 1 microvolt to 100 millivolts.
- b. Oscilloscope, with a range of 30 MHz.
- c. DC power source, 10 - 15 volts 2 ampere.
- d. RF power meter with 50 ohms dummy load, with a full scale of at least 5.0 watts.
- e. Multimeter
- f. VTVM with a full scale of at least 50 volts.
- g. 8-ohm dummy load with plug.

6-2. Precautions in trouble shooting

- a. Tests are made on DC 13.8V.
- b. Antenna connector must be connected to signal generator or 50-ohm dummy load.
- c. EXT connector is connected to 8-ohm dummy load to measure audio output.

6-3. RECEIVER (RF - IF Stage)

<u>STEP</u>	<u>TROUBLE</u>	<u>CAUSE</u>
1.	Zero or excessive low voltage at RF-IF stage circuit power source line.	Defective R26, broken Q6 or short circuited T7, T9.
2.	No signal output (455 kHz)	Defective Q4, Q5, Q6, CD2, CD3, short circuited T6, T7, T8, T9.
3.	No signal output (10 MHz band)	No oscillation of Q10, defective Q3 short circuited T4, T5.
4.	No signal output (27 MHz band)	No oscillation of Q9, defective Q2, short circuited T1, T2, T3.

6-4. RECEIVER (Audio circuit)

<u>STEP</u>	<u>TROUBLE</u>	<u>CAUSE</u>
1.	No signal output	Defective Q23, IC2, Q24, Q25.
2.	Excessive distorted signal-	Defective CD18

6-5. TRANSMITTER

<u>STEP</u>	<u>TROUBLE</u>	<u>CAUSE</u>
1	Zero or excessive low voltage at RFPA stage	Bad contact of S2c, K1b, disconnection of T20
2.	No RF output (Final 5 stages)	Defective Q14, Q15, Q16, Q17, Q18
3.	No RF output	No oscillation of Q9, Q13.
4.	Normal RF output but no modulation	Layer short circuited T20, broken connection of MK1.

6-6. Others:

<u>STEP</u>	<u>TROUBLE</u>	<u>CAUSE</u>
a. RF Compressor		
1.	No, or excessive small signal at over 1 volt RF signal.	Defective Q1, CD10, CD11, No AGC behavior
b. AF Compressor (Transmitter)		
1.	Excessive modulation or excessive distorted modulation wave form.	Defective Q22, CD19, CD20,
c. Squelch control		
1.	Squelch control does not function (does not quiet the receiver even in ON position)	Disconnected CD17, defective R49
2.	Squelch control does not function (quiets even in OFF position)	Shorted CD17, defective R49.
d. Delta tune		
1.	No deviation of frequency	Defective CD9, R38
e. Transmission and modulation lamp		
1.	Lamp does not light	Defective PL2, Q19, CD13
f. S Meter		
1.	Meter does not swing	Defective CD4, M1, R20, CD12.
g. RF Meter		
1.	Meter does not swing	Defective CD12, M1, R73.

h. Noise blanker

<u>STEP</u>	<u>TROUBLE</u>	<u>CAUSE</u>
1.	NB does not function (RF stage)	Defective 1C1, layer shorted T10, T11
2.	NB does not function (NA, SW stage)	Defective Q7, Q8
3.	NB does not function effectively	Defective CD2, CD3.

7 FREQUENCY SYNTHESIS

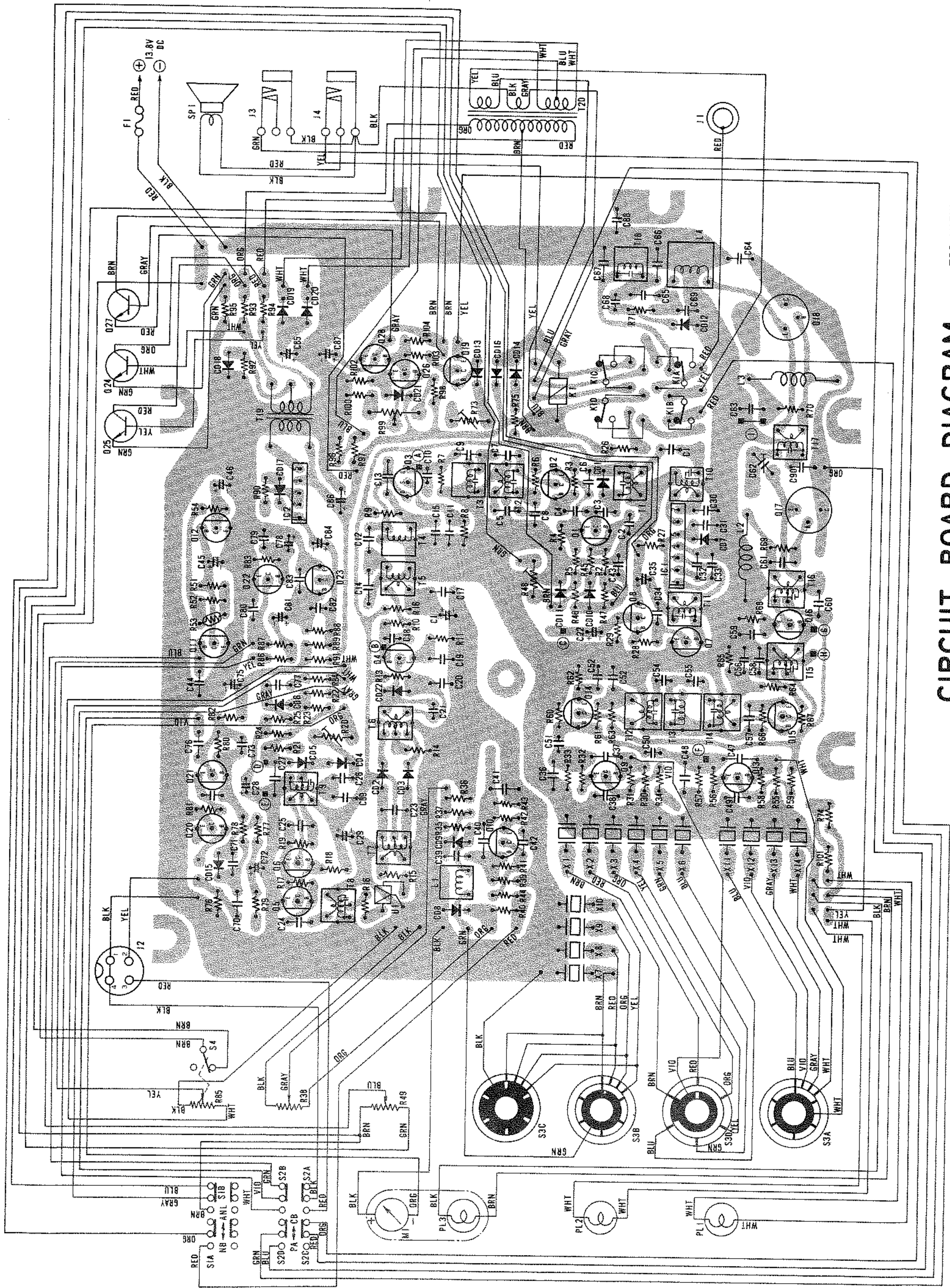
Channel	(Fo) Frequency (MHz)	MO3C (Fm)						RO3C(Fr)				TO3C (. Fr)			
		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
		16.965	17.015	17.065	17.115	17.165	17.215	9.545	9.555	9.565	9.585	10.000	10.010	10.020	10.040
1	26.965	○						○				○			
2	26.978	○							○				○		
3	26.985	○								○				○	
4	27.005	○									○				○
5	27.015		○					○				○			
6	27.025		○						○				○		
7	27.035		○							○				○	
8	27.055		○								○				○
9	27.065			○				○				○			
10	27.075			○					○				○		
11	27.085			○						○				○	
12	27.105			○							○				○
13	27.115				○			○				○			
14	27.125				○				○				○		
15	27.135				○					○				○	
16	27.155				○						○				○
17	27.165					○		○				○			
18	27.175					○			○				○		
19	27.185					○				○				○	
20	27.205					○					○				○
21	27.215						○	○				○			
22	27.225						○		○				○		
23	27.255						○				○				○

* Formulae at frequency synthesis

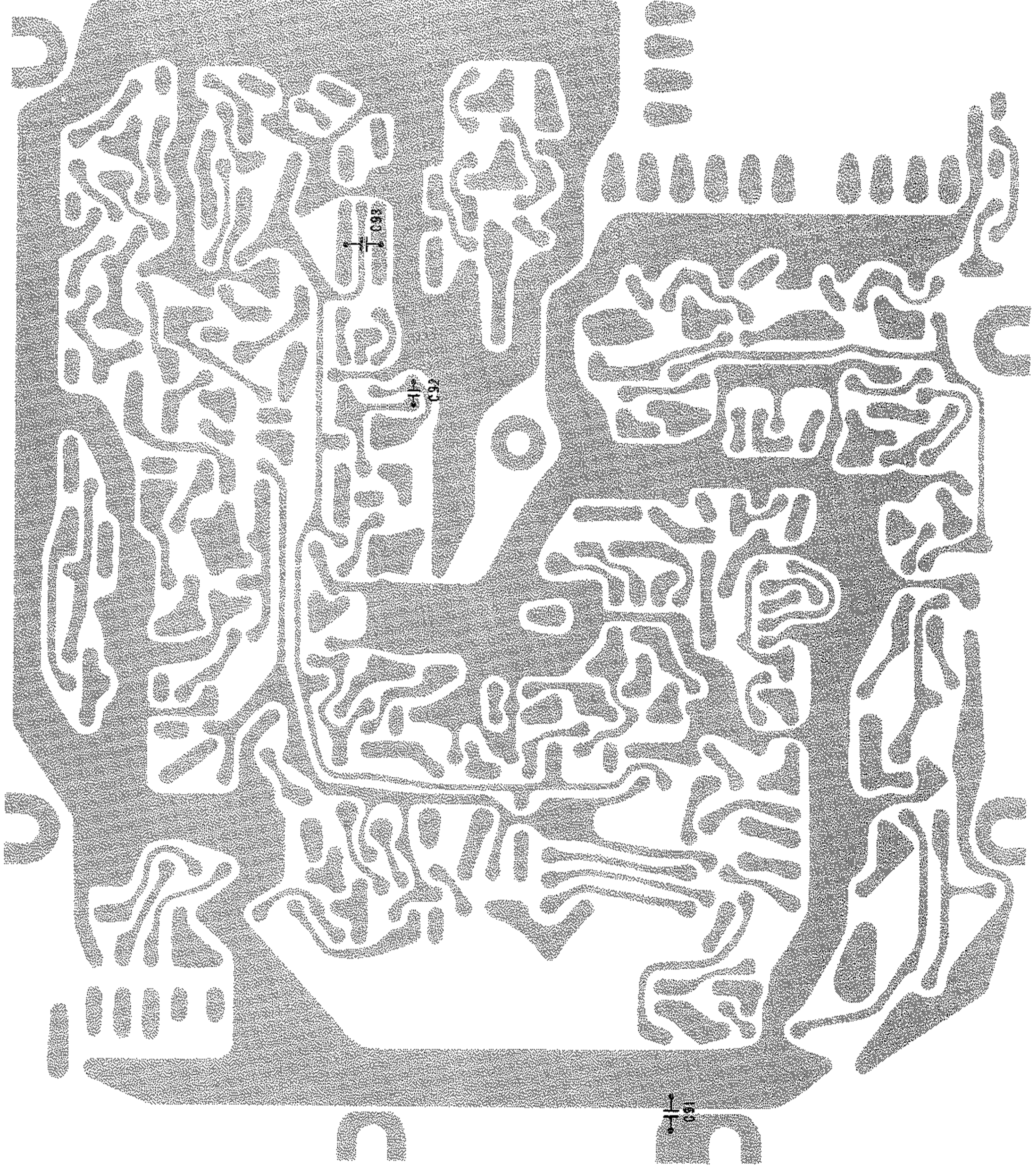
$F_o = F_m + F_t$ (circle mark in the table)

$455 \text{ kHz} = F_o - F_m - F_r = F_t - F_r$

(circle mark in the table)

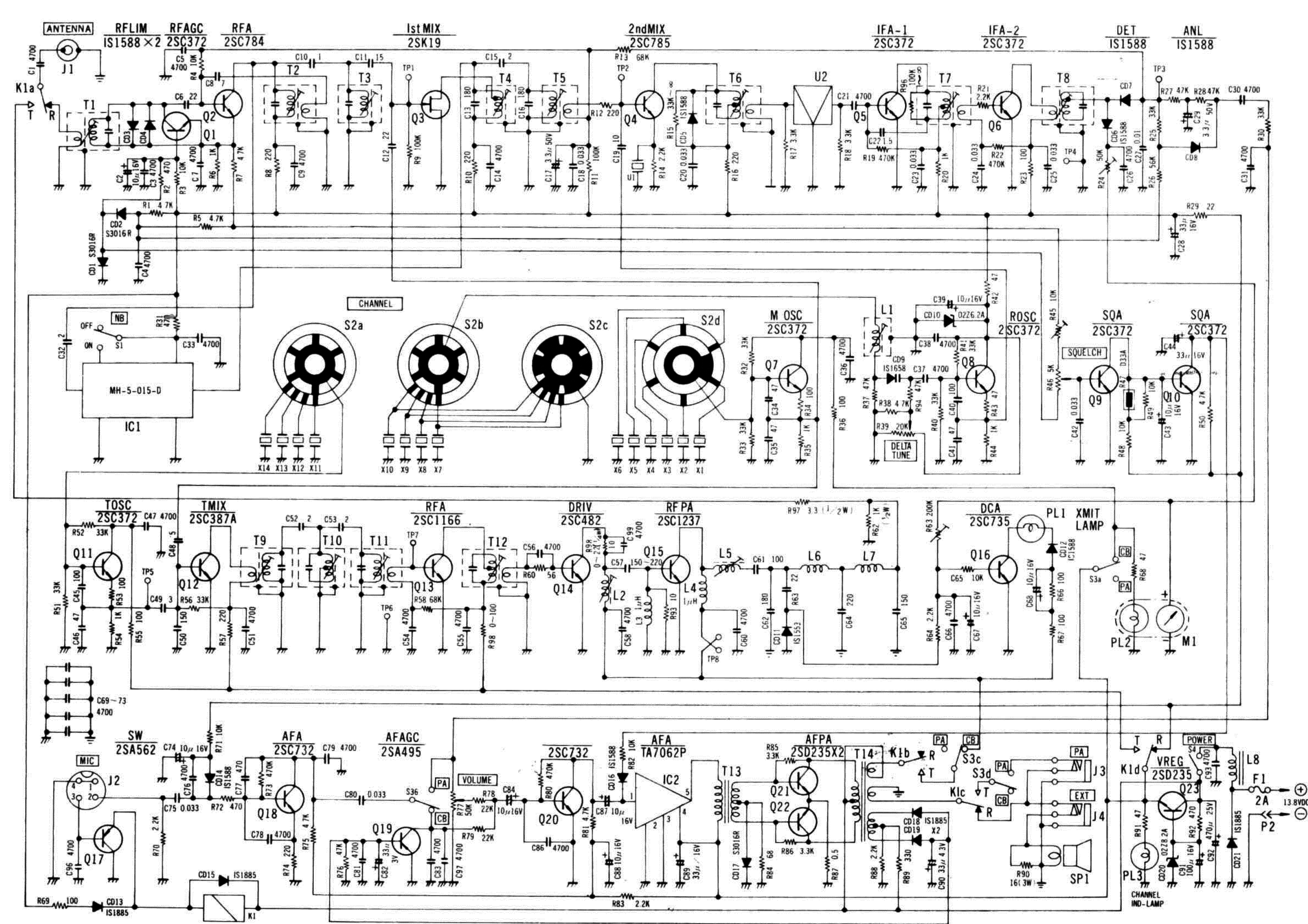


CIRCUIT BOARD DIAGRAM TOP VIEW



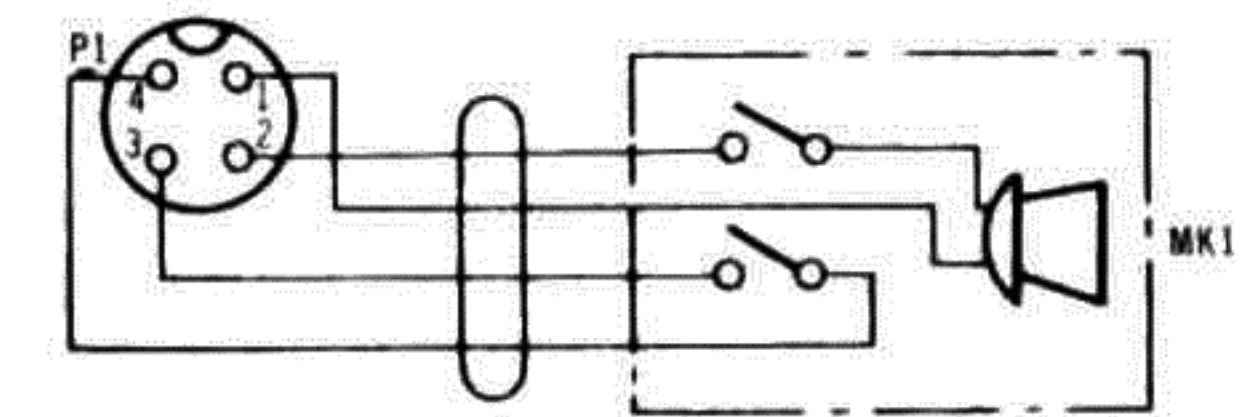
CIRCUIT BOARD DIAGRAM

BOTTOM VIEW



- NOTES
1. ALL RESISTORS ARE IN OHMS AND 1/8W UNLESS OTHERWISE NOTED.
 2. ALL MYLARFILM CAPACITORS INDICATED AS 0.033, etc. ARE IN μF .
 3. ALL CERAMIC AND POLYSTERENE CAPACITORS INDICATED AS 4700, etc. ARE IN pF.
 4. FREQUENCY SYNTHESIZER CRYSTAL FREQUENCIES ARE AS FOLLOWS:

X1 - 16.965 MHz	X8 - 9.555 MHz
X2 - 17.015 MHz	X9 - 9.565 MHz
X3 - 17.065 MHz	X10 - 9.585 MHz
X4 - 17.115 MHz	X11 - 10.000 MHz
X5 - 17.165 MHz	X12 - 10.010 MHz
X6 - 17.215 MHz	X13 - 10.020 MHz
X7 - 9.545 MHz	X14 - 10.040 MHz



SCHMATIC DIAGRAM MODEL SST
BROWNING LABORATORIES