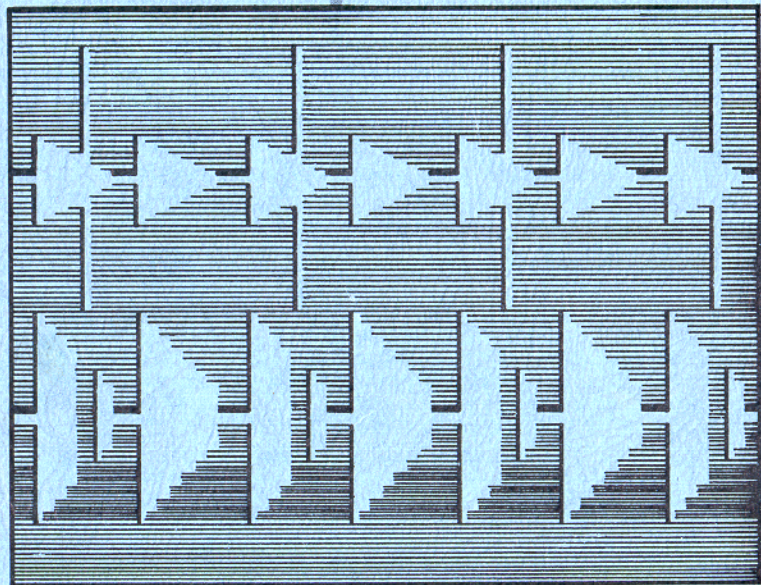


INSTRUCTION MANUAL

DRAKE MODEL **9-NB**

**NOISE
BLANKER**



PRICE

Instruction Manual

\$200

STANDARD WARRANTY

3-4-71

TIME
IN 6281

R. L. DRAKE COMPANY warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use, and service discloses such defect, provided the unit is delivered by the owner to us or to our authorized radio dealer or wholesaler from whom purchased, intact, for our examination, with all transportation charges prepaid to our factory, within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgement that it is thus defective. Should a malfunction be suspected, write in detail to our Service Department for suggestions concerning the operation, repair or return of your unit if it should prove necessary.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside our factory, nor in cases where the serial number thereof has been removed, defaced or changed, nor to units used with accessories not manufactured or recommended by us.

Any part of a unit approved for remedy or exchange hereunder will be remedied or exchanged by the authorized radio dealer or wholesaler without charge to the owner.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products.

The R. L. DRAKE COMPANY reserves the right to make any improvements to its products which it may deem desirable without obligating itself to install such improvements in its previously manufactured products.

TABLE OF CONTENTS

I.	General Description	2
II.	Unpacking	3
III.	Installation	4
IV.	Operation	5
V.	Theory of Operation	5
VI.	Service Information	7
VII.	Alignment Instructions	9

ILLUSTRATIONS

Fig. #1	- Top View of TR-6 with 9-NB installed.	10
Fig. #2	- 9-NB Board - Component Side.	11
Fig. #3	- Block Diagram	12
Fig. #4	- Schematic Diagram	13

I. GENERAL DESCRIPTION

The 9-NB is a solid state noise blanker to be used in TR-6 transceivers .

The purpose of the 9-NB noise blanker is to blank out noise pulses which otherwise prevent reading a wanted signal. The 9-NB was designed to perform this function with a perfection previously unknown in amateur radio equipment. This was achieved by designing optimum blanking performance without compromising.

Unlike noise clippers or limiters commonly found in communication equipment, the 9-NB is an advanced noise blanker which actually mutes the receiver for the duration of the noise pulse. Between noise pulses full receiver gain is restored. (The receiver AGC is affected only by the desired signal strength, not by the noise at the antenna.)

The 9-NB is most effective on strong, periodic noise pulses such as ignition noise or noise generated by power lines. The blanker is less effective on random noise (e.g., atmospheric or contact noise). This noise is continuous in time and the information it masks cannot be recovered by either blanking or limiting techniques.

Low-level signals masked by noise pulses without the noise blanker can be copied when the blanker is used. The 9-NB is a must for the mobile operator because he can now blank ignition noise generated by other cars as well as his own car.

II. UNPACKING

When handling the 9-NB during unpacking and installation, care should be taken not to disturb the circuit components of the 9-NB. The 9-NB has been carefully aligned at the factory and proper alignment is an essential requirement for the functions of the 9-NB.

Carefully remove the 9-NB from its packing carton and examine it promptly for signs of shipping damage. Should any be apparent, notify the delivering carrier immediately, stating full extent of damage.

Fill out and mail the enclosed registration card so that your warranty will be effective.

Save the packing material and examine it closely before putting it away to be sure you have not overlooked hardware shipped with the 9-NB.

III. INSTALLATION

Remove top and bottom covers of the TR-6 as described in the TR-6 instruction book (Section IX). Place the TR-6 right side up with the front panel facing you.

Place the 9-NB behind the VFO can (T-1) on top of the TR-6 chassis with the cable pointing inward (i.e., to the left) being close to the top of the unit such that the perforated part of the 9-NB case sits on the TR-6 chassis (see figure 1).

Line up the mounting holes on the TR-6 chassis and the 9-NB case respectively. Viewing from top with TR-6 front panel still facing you, these holes are located near the rear right and front left corners of the bottom side of the 9-NB case, i.e., near V-17 and T-11 of the TR-6 chassis. Fasten the 9-NB case to the TR-6 chassis using two (2) #6 screws, lock washers, and nuts provided.

Remove the jumper plug from the jack marked "J-11-NB" on top of the TR-6 chassis. Insert the plug on the end of the 9-NB cable into this jack (temporarily removing V-3 and V-7 will facilitate this). Save the dummy plug removed for later use. Replace the TR-6 top and bottom covers.

IV. OPERATION

To activate the 9-NB, place the AGC switch located in the lower right hand corner of the TR-6 front panel into one of the two counter-clockwise positions marked "NB". When transmitting the switch position is unimportant.

V. THEORY OF OPERATION

The 9-NB noise blanker system can be broken down into three major parts for the purpose of this discussion.

The first part, the transmitting path, is the simplest. It consists of a single untuned 9 MHz amplifier stage which passes the signal through the unit as well as making up for any loss in the matching networks. It also acts as a T/R switch disabling the transmit path when receiving. From this amplifier a signal passes through the crystal filter into the transmit mixer V-7.

The second part is the receiving path. Referring to the block diagram, figure 3, a signal first passes through a crystal filter with a bandwidth of 10 kHz and moderately steep skirts. The response of this filter is such as not to cause any undesirable lengthening of noise pulses but narrow enough to keep strong adjacent signals from overloading the 9-NB pulse detector.

The signal then enters a delay circuit which compensates for the inherent delay in the noise processing section. The following 9 MHz receiving amplifier provides some gain to make up for losses in the crystal filter, the delay circuit, or the balanced gate which passes the signal to the TR-6 crystal filters. This gate is a noiseless electronics series switch that opens for the duration of noise pulses but closes at all other times to allow the signal to pass.

The third part is the noise processor, and the most complicated of all. From the crystal filter, the signal passes through a tuned 9 MHz amplifier into a balanced mixer. This mixer converts the 9 MHz signal to an IF frequency of 2.15 MHz and prevents the high level 6.85 MHz oscillators from reaching the amplifier strip. This amplifier strip consisting of two stages, passes the signal to the AGC and pulse detectors. The AGC system through properly chosen time constants enables the pulse detector to distinguish between the desired signal and noise pulses. The switching signal derived from the noise pulses in the pulse detector operates the balanced gate through the gate driver. The complexness of the design is due to the fact that the noise blanker is inserted into the signal strip at an early stage where the receiving signal is still at low level because it has not passed through many amplifying stages. Inserting the noise blanker in this fashion before the main receiving selectivity made it possible to design a noise blanker for ultimate performance.

Although this approach is more expensive, it was decided not to cut corners but to design the 9-NB for maximum performance, something the mobile operator especially will appreciate.

VI. SERVICE INFORMATION

We will check and factory realign your 9-NB for a nominal fee of \$5, plus transportation charges if the set has not been tampered with. If repairs are necessary, an additional charge will be made. Units that have been tampered with or misaligned will be repaired on a time and material basis only. Careful consideration has been given in the design of the 9-NB to keep maintenance problems to a minimum. In the following, a list of faults and possible trouble areas is given. In case of incurable malfunction, we suggest that you either return your unit to your dealer or write directly to our Customer Service Department describing your problem in detail. Include full information concerning connections, switch settings, etc. Always disclose your serial number when requesting service information. Do not return equipment to the factory without prior authorization.

TYPE OF MALFUNCTION

POSSIBLE TROUBLE AREAS

- | | |
|---|--|
| 1. Receives and transmits OK. Will not blank. AGC voltage developed on pin 8, J-11, TR-6 as described under alignment instructions for C-8, C-21. | 1. Diodes 1N270 (short), T-4, T-5, Q-10, Q-11, and associated circuitry. |
| 2. As before, no AGC voltage developed, AGC voltage developed upon turning R-24. | 2. Q-5, T-6, Q-17. |
| 3. As before, no AGC voltage developed at all. | 3. Q-6, Q-7, T-7, Q-8, Q-9, Q-12, Q-13, Q-14, Q-15, Q-16. |
| 4. Receiving OK, blanking OK, no transmitting. | 4. Q-3, Q-4. |
| 5. No receiving, transmitting OK, AGC voltage generated. | 5. Q-1, Q-2, T-2, T-3, T-4, T-5, Diodes 1N270 (open). |
| 6. No receiving, transmitting OK, no AGC voltage generated. | 6. Q-4, if Q-4 OK, see 2, 3, 5. |
| 7. No receiving nor transmitting, AGC generated. | 7. See 4, 5. |
| 8. Receiving OK, no blanking, no transmitting. | 8. See 1, 2, 3, 4. |
| 9. No function at all. | 9. T-1, check for B+ (approximately +12 volts) on either side of R-60. |
| 10. Sideband filter response skewed. | 10. Q-3, R-12, diode, Q-4, T-5. |

VII. ALIGNMENT INSTRUCTIONS

The 9-NB should not require any realignment. If realignment appears necessary, refer to the following instructions. (For location of alignment positions, refer to figure 2.)

1. Let the TR-6 with the 9-NB installed warm up for at least 15 minutes so that the 9-NB reaches operating temperature.
2. With the noise blanker installed in the TR-6 and activated by use of the TR-6 AGC switch, attach a DC VTVM to pin 8 of J-11 (the noise blanker jack) of the TR-6. With no signal received, the voltage on this point should be approximately +12 volts. If this is not the case, adjust R-24 for maximum positive voltage.
3. Tune in a calibrator signal. You will observe the positive voltage measured in step 2 to decrease until it saturates at approximately +4 volts. Reduce the RF gain of the TR-6 by use of the receiving RF gain control (R-113) until the voltage on pin 8 of J-11 increases to approximately +9 volts.
4. Adjust C-8 and C-21 for minimum positive voltage on pin 8, J-11. Keep this DC voltage above saturation (+4 volts) by reducing the TR-6 gain with the receiving RF gain control if necessary.
5. With the calibrator signal still tuned in, restore the full RF gain of the TR-6 by placing the receiving RF gain control on the TR-6 fully clockwise. Adjust C-10 and C-19 for maximum S-meter reading.

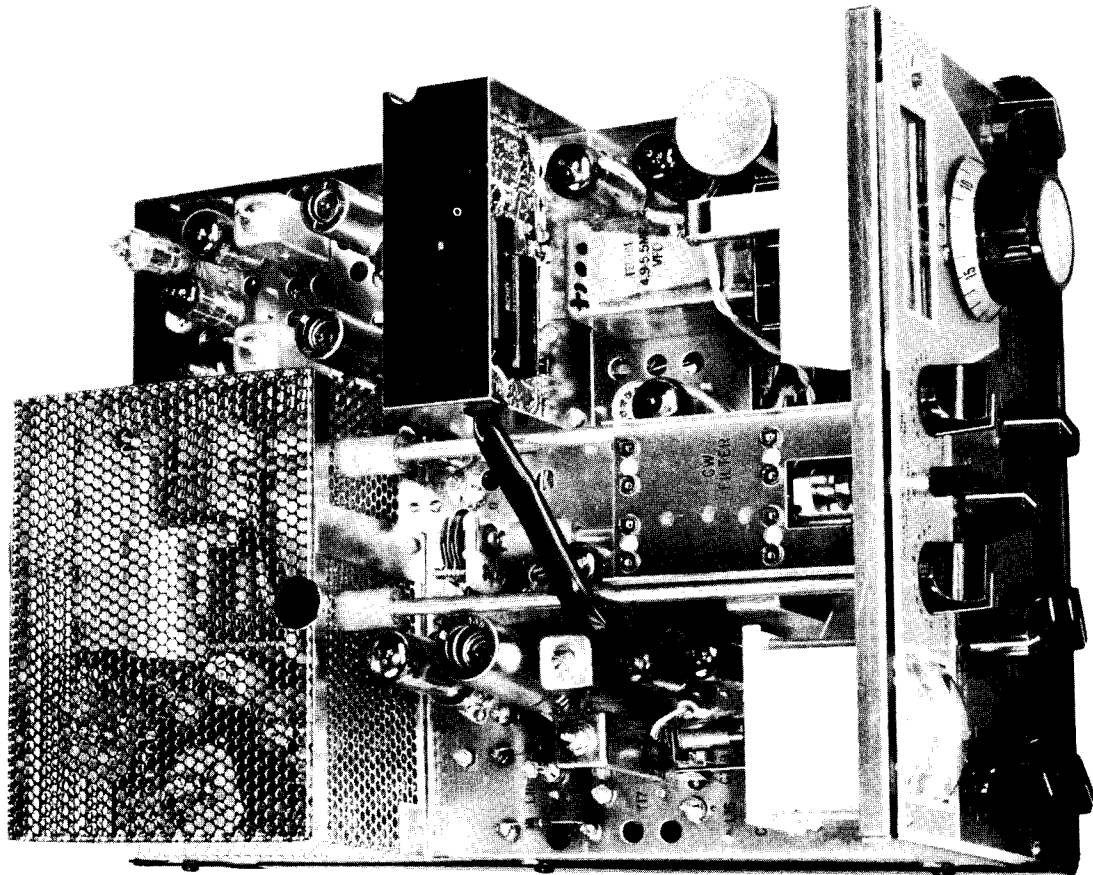


Fig. 1 - Top view of TR-6 with 9-NB installed.

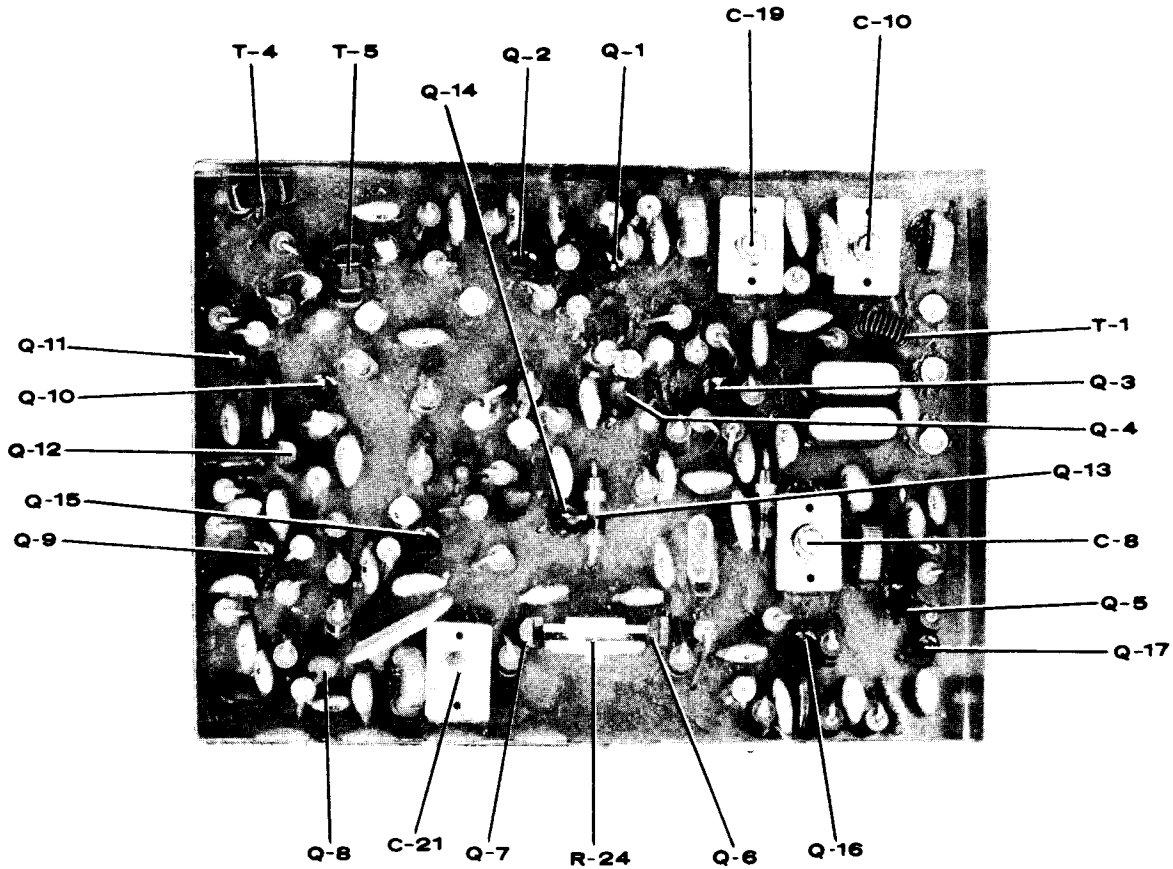


Fig. 2 - 9-NB board, component side

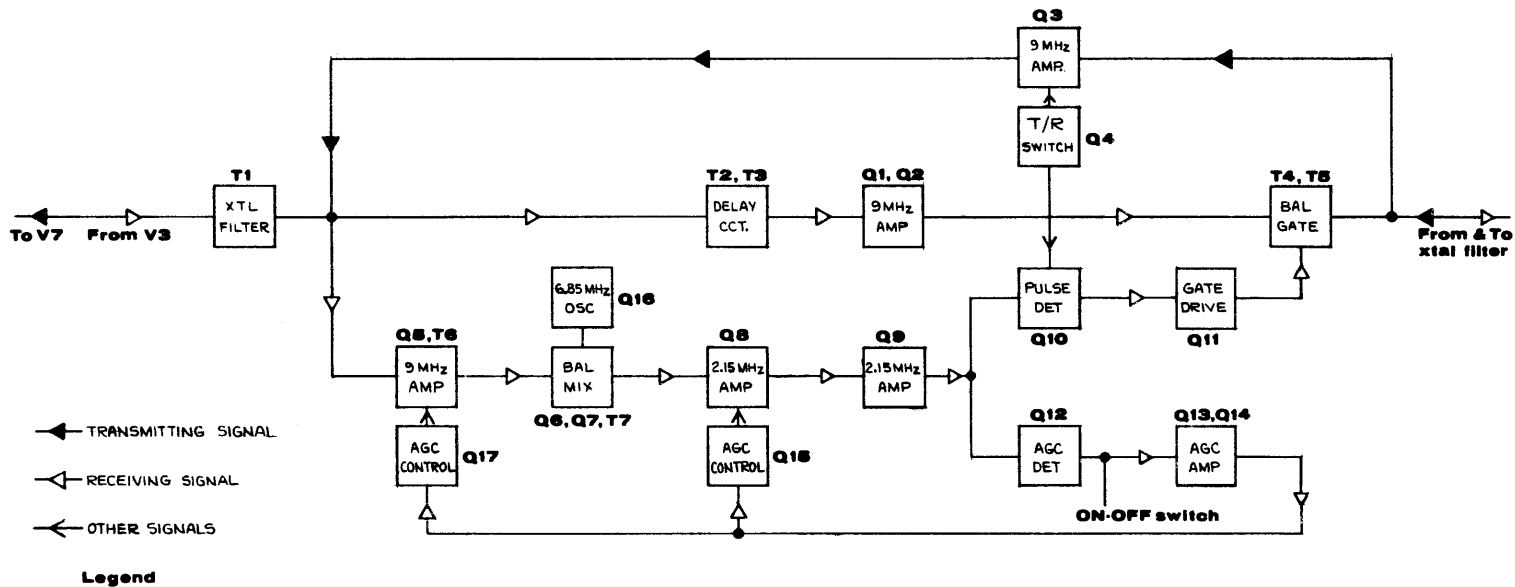


Fig.3 9NB Block Diagram

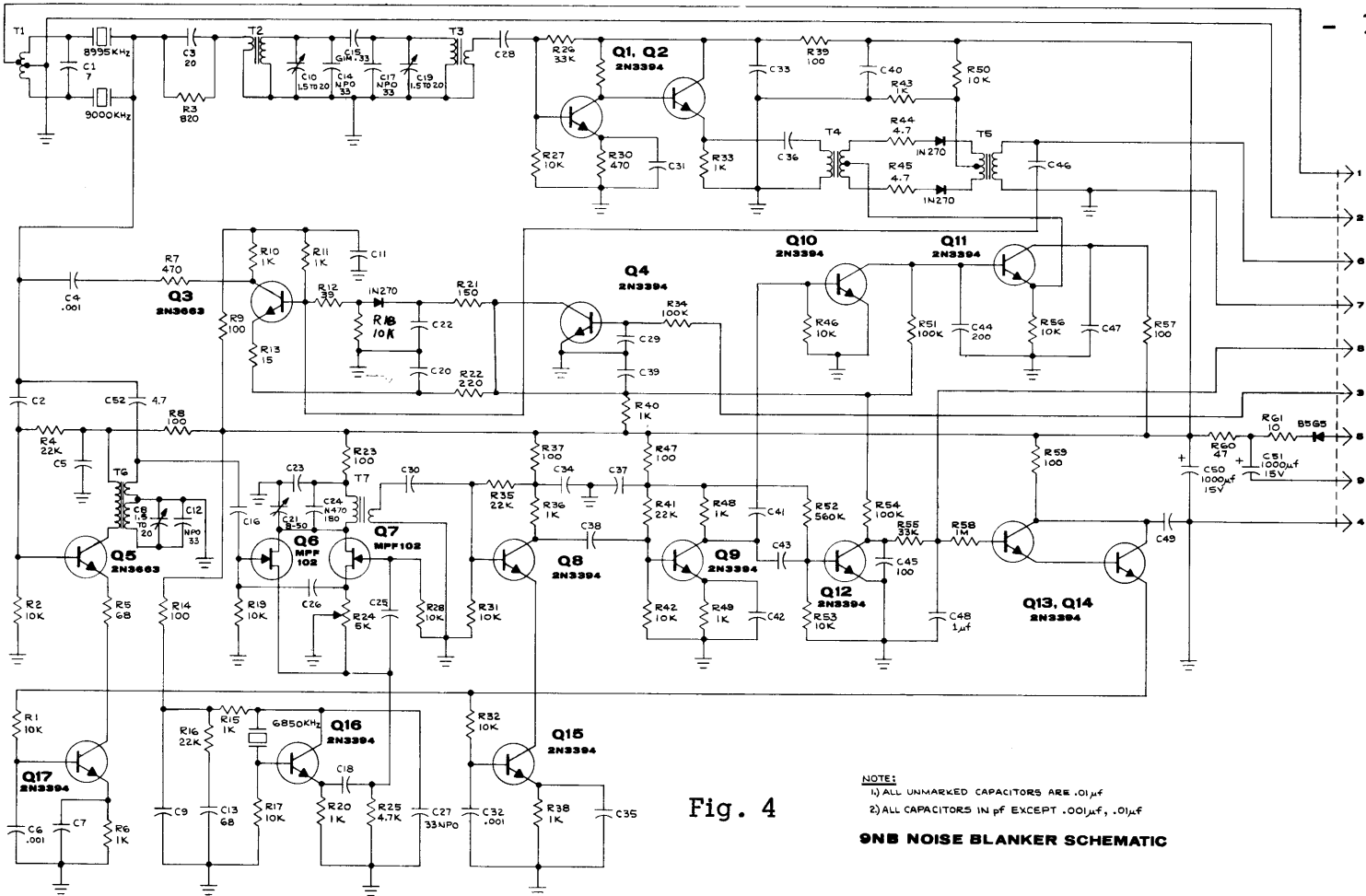


Fig. 4

- NOTES:
1) ALL UNMARKED CAPACITORS ARE .01 μ f
2) ALL CAPACITORS IN pf EXCEPT .001 μ f, .01 μ f

9NB NOISE BLANKER SCHEMATIC