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HANDBOOK
OPERATING INSTRUCTIONS

DEMODULATOR TYPE 104 MODEL 3

(NORTHERN RADIO CO., INC.)

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AND ACCEPTED BY THE CHIEF OF THE BUREAU OF AERONAUTICS

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TABLE OF CONTENTS

Figure 1–1. Demodulator Type 104 Model 3

SECTION I
GENERAL DESCRIPTION

1–1. SCOPE OF HANDBOOK.

1–2. This handbook describes the operating procedures and minor repairs that operating personnel may perform on Demodulator Type 104 Model 3, manufactured by the Northern Radio Company, Incorporated, New York, N. Y.

1–3. PURPOSE OF EQUIPMENT.

1–4. The demodulator, shown in figure 1–1 is used in communication systems where messages are transmitted by means of amplitude-modulated audio tones. It converts these tones into d-c pulses that can be used to operate teleprinters, tape recorders, frequency shift keyers, etc. It is a rack-mounted unit which requires relatively little attention. Installation and maintenance personnel pre-set most of the front panel controls to supply the type output required by the other equipments in the system. Operating personnel are required to maintain the correct output level, and to set the SPEED W.P.M. control according to the speed at which the signals are received.

1–5. The demodulator operates as follows. Incoming amplitude-modulated audio tones are applied to a circuit which increases their electric energy level. These tones are then applied to circuits which change them to pulsing direct currents. These d-c pulses are the demodulator's output signals.

SECTION II
OPERATING PROCEDURES

2–1. DESCRIPTION OF CONTROLS.

2–2. Table 2–1 lists each operating control and its function. Refer to figure 2–1 for the physical location of these controls.

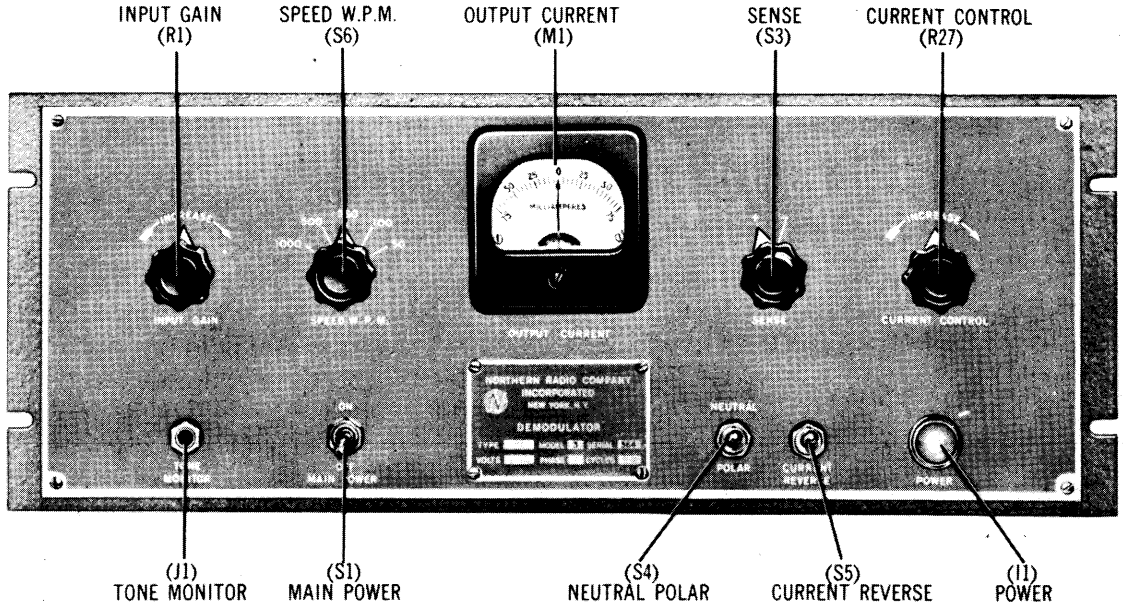

Figure 2–1. Demodulator, Operating Controls

2–3. OPERATION.

2–4. The operation of the demodulator is very simple because most of the controls are pre-set to supply the type output required by the equipments to which it is connected. The sequence in which the operating controls are manipulated is unimportant.

CAUTION

Non-operating controls such as the SENSE S3), CURRENT REVERSE (S5), and POLAR-NEUTRAL (S4) switches, shown in figure 2–1, are pre-set. Do not change the settings of these controls.

TABLE 2–1

CONTROLS

Control	Function
INPUT GAIN (potentiometer R1)	Varies the amplitude of modulated signal input to amplifier stages.
SPEED W.P.M. (switch S6)	Adjusts a noise-limiting filter network. Is set sufficiently above the word per minute rate of the received input signal to provide optimum noise rejection and signal performance.
OUTPUT CURRENT (meter M1)	Visual monitoring device used to determine whether or not sufficient output is being supplied to the load.

TABLE 2–1 (cont)

CONTROLS

Control	Function
CURRENT CONTROL (potentiometer R27)	Adjusts load current to the required value (+60 ma for NEUTRAL operation, or ±30 ma for POLAR operation).
TONE MONITOR (jack J1)	Used to monitor the incoming signal.
MAIN POWER (switch S1)	In ON position applies the a-c line voltage to the demodulator, thus placing it in operation.
POWER (lamp I1)	When lit, indicates that a-c power is being applied to the demodulator.

2–5. Perform the step-by-step operating procedure, as described in Table 2–2, to place the demodulator in operation.

TABLE 2–2

OPERATING PROCEDURE

Step	Description
1	Throw MAIN POWER switch S1 to ON. The POWER lamp (I1) should light.
2	Set INPUT GAIN control R1 one-third clockwise.

TABLE 2-2 (cont)

OPERATING PROCEDURE

Step	Description
3	Connect a headset to TONE MONITOR jack J1 to determine whether or not a good quality tone is being received.
4	Set the SPEED W.P.M. switch S6 to the next higher setting than the number of words being sent (i.e., if the received signal rate is approximately 75 words per minute, set the switch to 100).
5	*Adjust the CURRENT CONTROL knob R27 to obtain the following readings on the OUTPUT CURRENT meter M1, provided that the SENSE switch is set to + and the CURRENT REVERSE switch is in its down position.

NEUTRAL Operation	POLAR Operation
60 ma for mark frequencies.	+30 ma for mark frequencies. −30 ma for space frequencies.

*Or adjust the CURRENT CONTROL knob to obtain the current value required by associated equipment.

TABLE 2-2 (cont)

OPERATING PROCEDURE

Step	Description
	a. Set the SPEED W.P.M. switch. b. Adjust the CURRENT CONTROL knob (see Step 5, Table 2-2).

SECTION III
OPERATING CHECKS AND ADJUSTMENTS

3-1. GENERAL.

3-2. Perform the steps below, as required.

SECTION IV
EMERGENCY OPERATION AND REPAIR

4-1. EMERGENCY OPERATION.

4-2. Emergency or alternate methods of operation are not possible.

4-3. REPAIR.

4-4. FUSE REPLACEMENT. Turn the fuseholder, shown in figure 4-1, counterclockwise. Pull the holder out and replace the fuse.

4-5. PILOT LAMP REPLACEMENT. Pull out the glass jewel of the pilot lamp assembly, shown in figure 2-1. Turn the exposed bayonet base lamp a quarter of a turn counterclockwise. It will pop out of its holder. To replace the lamp, push down gently and turn clockwise. Replace the glass jewel.

4-6. TUBE REPLACEMENT. All tubes, shown in figure 4-1, are replaceable from the top of the chassis. Rock the tube gently in its socket while exerting an upward pressure. No circuit readjustments are necessary after replacing tubes.

Note

Be sure to replace the 6H6GT (V3) with a 6H6GT/G *only*. Do *not* use a 6H6 metal tube.

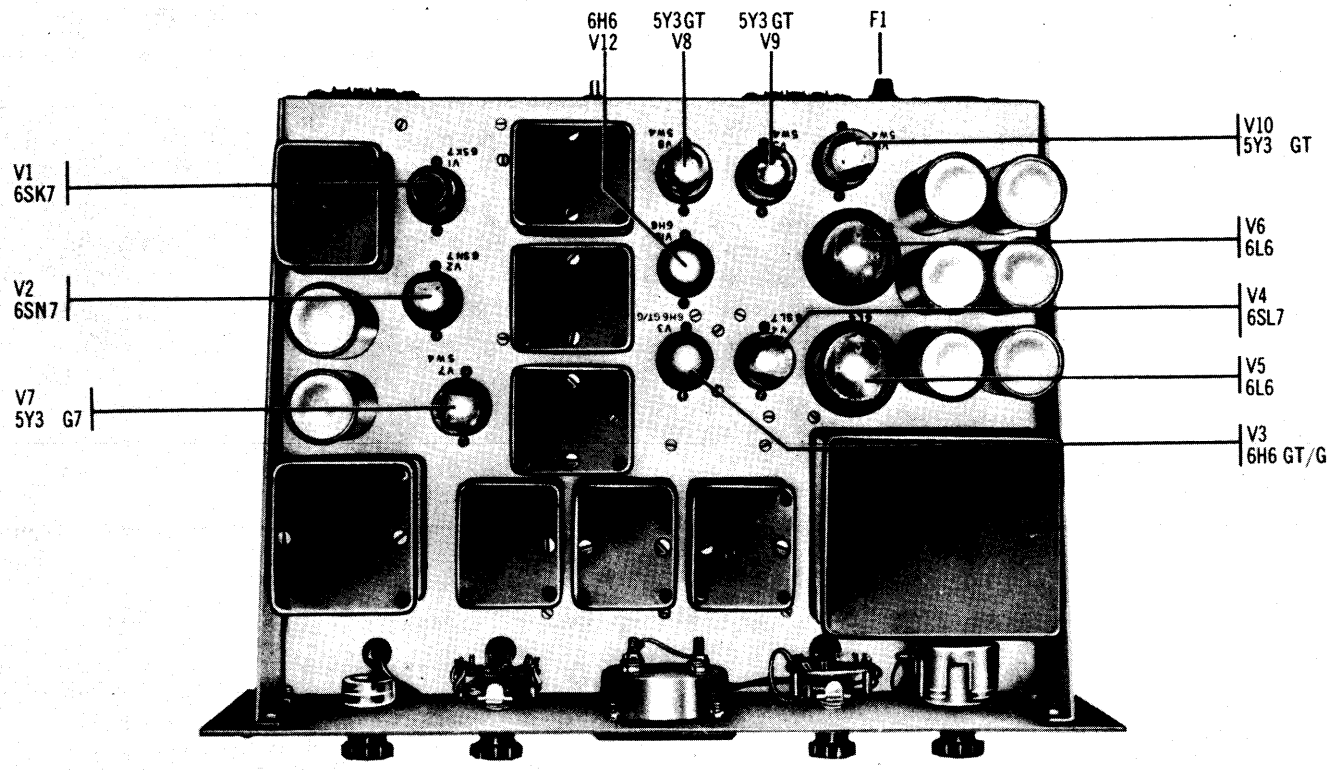

Figure 4–1. Demodulator, Tube and Fuse Locations