NYE VIKING

INSTRUCTION MANUAL

Model MBIV

NYE VIKING 3000 WATT ANTENNA TUNER

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11582

WHY USE AN ANTENNA IMPEDANCE MATCHING NETWORK (MATCHBOX)

There are many reasons to use an antenna tuner---

1. To match the transmitter or amplifier output impedance with the antenna input impedance at various frequencies, thus insuring the greatest transfer of R.F. power at various frequencies to a given antenna.

2. A good tuner will reduce radiated interference. An antenna tuner properly adjusted will provide 20 or more DB attenuation at 2nd harmonics and above. This amounts to a reduction in harmonic output power of more than 100 to 1---something not accomplished with a standard low pass filter, which normally starts attenuating around 45 megahertz. Thus, your tuner will reduce the amount of spurious radiation from your amateur station and reduce or eliminate interference to other services.

3. An antenna tuner allows you to tune over a much wider range of frequencies and still maintain an excellent power transfer to a given antenna. This puts more power into your antenna with the least loss.

4. The final amplifier in any transmitter or linear is subject to greater loads as the SWR increases and often this extra load results in increased heat loss and shorter life of the equipment and results in poorer performance. Many of the new solid state finals have limiting circuits that reduce the power output if the SWR exceeds predetermined values. Some solid state finals will be damaged if the SWR is too great. The antenna tuner reduces the load on the final amplifier by providing a better impedance match.

5. Perhaps of equal importance and often overlooked is the attenuation of spurious signals into your receiver reducing the amount of interference into your receiver and thus improving reception. If the antenna impedance happens to be lower than the input impedance to your receiver, then the tuner will also give you an increase in signal voltage. The antenna tuner presents a tuned RF circuit to the input of your receiver.

An Antenna Tuner is an excellent and valued addition to any radio station.

NYE VIKING ANTENNA IMPEDANCE MATCHING NETWORK
MODEL MBIV

DESCRIPTION

The Nye Viking MBIV antenna impedance matching network is a Pi network system consisting of a large variable, silver plated copper ribbon inductor. A split section, high voltage variable capacitor, and a bank of high voltage fixed capacitors provide a wide range of input-output impedance ratios.

The unit is capable of tuning any antenna 1/8 wavelength or longer.

An automatic SWR meter and a forward reading Peak Watts meter provide constant monitoring of your antenna tuning.

The MBIV will handle power in excess of 3000 watts into loads between 40 and 2000 ohms impedance with an SWR reading below 1:1.1.

An accessory 3 kilowatt, trifilar wound, broad band balun, provides balanced output to twin lead feeders 200 to 1000 ohms and unbalanced output impedances down to 20 ohms.

The unit features 2¼" tuning knobs with 4" dials. 25 to 1 vernier readout over 360° on the variable inductor tuning plus 360° readout on the variable capacitor. The extra heavy gauge aluminum cabinet provides adequate shielding.

The input connector from the transmitter or linear is a standard SO-239 UHF fitting and the output terminal is a high voltage, porcelain feed through cone fitting and a SO-239A UHF coax fitting for 52 or 72 ohm coax cable.

Frequency range: 1.5 to 30 megaHertz (160 to 10 meters)

Size: 36.2 cm. wide, 17 cm. high, 34 cm. deep
(14¼" wide, 6 3/4" high, 12" deep)

Weight: 5.90 kilograms -- shipping wt.: 8.20 kilograms (18 lbs.)

INSTALLATION

The Nye Viking Matchbox should be installed as close to the transmitter or linear amplifier as possible -- the shorter the coax line, the better. In case of TVI, a Nye Viking "Low Pass Filter" should be installed between the Matchbox and transmitter or final amplifier.

A good ground system is essential when tuning single wire antennas. It should be as short and heavy as possible -- preferably grounded to an all-metal water pipe or installed to a low resistance grounding rod. If adequate ground connection cannot be achieved, a system of ground radials (see ARRL Handbook) should be installed. Too long a ground will also result in the transmitter and Matchbox being "hot" at the high frequencies, and contact with metal parts could cause an R.F. burn. Single wire antenna length is not critical but should exceed the minimum lengths shown on the chart for each wavelength. Too short an antenna will not tune to resonance, will not load properly, and will have a higher than 1:1 SWR.

Single wire and twin lead feeders are "hot" at the Matchbox end and should be well insulated where they pass through walls and partitions to the outside. Voltages of several thousand volts are easily possible at some frequencies.

Antennas fed with a 52 to 72 ohm coax cable should present a reasonable match at the antenna to cable junction or there will be strong standing waves on the coax with attendant losses and possible cable failure. Antenna systems of this type should be cut to frequency and matched to the cable either with a balun or matching stub. Short lengths of 10' or less to a matching network should present no problem.

Connect single wire antennas to the stand-off insulator in the rear. On the MBIV-02, single wire antennas terminating at less than 50 ohms (i.e. ¼ wave or shorter) can be connected to the coax output - leave the jumper connnected.

The 3 kilowatt balun on the MBIV-02 is designed to feed twin lead feeders 200 to 1000 ohms and to provide a lower output impedance at the coax output fitting.

The MBIV-01 without balun can be used to feed twin lead if standing waves on the feeder can be tolerated by connecting one lead to the ground terminal and the other to the antenna output terminal. No loss of power results, but the radiation pattern will be changed.

The SWR and Watt meter require a 9 volt battery to operate. A battery has been installed at the factory. To replace the

battery, remove the screws holding the cover on the battery compartment in the rear panel. The meter combination has an automatic R.F. switch that turns the battery on and off with about 10 watts forward power. Both meters will return to zero if the forward power drops below 8 to 10 watts.

The watts forward meter is scaled 0 to 300 watts, peak forward power. To increase the range to 0 to 3000 watts, move the slide switch in the rear of the unit to the 3000 watt position and multiply the dial reading by 10. To arrive at RMS watts, multiply the meter reading by .707, or if you desire "average" watts, multiply the meter reading by .636.

Your new Nye Viking Automatic SWR and Peak Reading Watts meters require no adjustment during tune up and use. The R.F. switch shuts the battery off if the forward power drops below 8 watts and both meters drop to zero.

RECOMMENDED ANTENNA LENGTHS

160 meter	60 feet or longer (100 to 200 ideal)
80 meter	30 feet or longer (45 to 150 ideal)
40 meter	15 feet or longer (25 to 100 ideal)
20 meter	10 feet or longer (20 to 100 ideal)
10 and 15 meter	8 feet or longer (10 to 50 ideal)

Short antennas (less than 3/4 wave) will be directional broadside to the major length of the antenna. Long antennas (over 2 wavelengths) will tend to be directional off the ends.

CAUTION

The "hot" end of an antenna cut close to ½ wavelength, or multiple thereof, will have relatively high voltages at moderate power; i.e., 2000 watts P.E.P. at 2000 ohms impedance will have over 2800 volts peak at each end of a ½ wave antenna or multiple thereof. At 600 ohms, twin lead, there will be over 1500 volts. Adequate insulation should be provided at all feed-thru points at the antenna free end. Care should be exercised to avoid contact to prevent R.F. burn.

Installations with relatively long (with respect to wavelength) ground leads from the Matchbox to adequate ground may find the transmitter and Matchbox slightly "hot" when tuning low impedance input single wire, i.e., multiples of ¼ wavelength

long and close to these lengths.

The capacitor switch should never be turned while power is on. All tuning should be done at low power.

Do not apply power with the tuning coil knob removed -- the shaft is "hot".

OPERATION

With all connections completed; antenna, transmitter, receiver, etc., tune the receiver to the desired frequency and tune in a signal. Tune the inductor coil and capacitor dials on the antenna tuner for maximum signal strength. If the capacitor tuning gives maximum signal at 0 or 100 on the dial, rotate the capacitor switch for maximum signal and retune the variable capacitor. (The switch adds or subtracts parallel capacitance to the variable -- subtract parallel capacitor if dial reads 0 and add if it reads 100.) Low impedance antennas will require more capacity and high impedance antennas less. (#1 position of capacitor switch is minimum capacity in the output circuit and #5 position is maximum capacity.)

If a linear is used, be sure it is off during the tune-up procedure. Set the transmitter for low power output or "tune-up" and adjust for resonance. Note the SWR and watt meter readings.

Tune the inductor and capacitor tuning knobs for minimum reading on the SWR meter. Again, if the capacitor reads 0 or 100 for minimum current, rotate the capacitor switch for a lower reading. It may be necessary to retune your final to maintain at least 10 watts forward power, the minimum required to maintain meter readout.

CAUTION

Be sure power is off while changing the capacitor switch. When the tuner has been adjusted for minimum SWR, retune the transmitter for maximum watts forward reading. The linear can now be turned on and adjusted for maximum output. Little or no change should be necessary to the antenna tuner. Even though your output power may exceed 3000 watts on peaks during SSB transmission, the inertial damping in the meter plus the overload protection will prevent the meter from reading excessive power.

Log the readings of frequency, inductor switch, and capacitor dial for future reference.

Slight differences in tuning settings will be noted during rainy periods as compared to dry, and also when other objects are brought closer or farther away from the antenna.

Once dial settings for each band have been logged for a given antenna, it will be a simple matter to tune up on any frequency.

If you tune up and log the lower, middle, and high end of each band, it should be very simple to tune up on any frequency. A separate log will have to be made for each antenna.

If your MBIV has the balun accessory installed at the factory and you intend to use balanced line feeders, connect the balun input lead to cone #3 and connect the balanced line to terminals 1 and 2. Discount the balun when feeding single wire antennas.

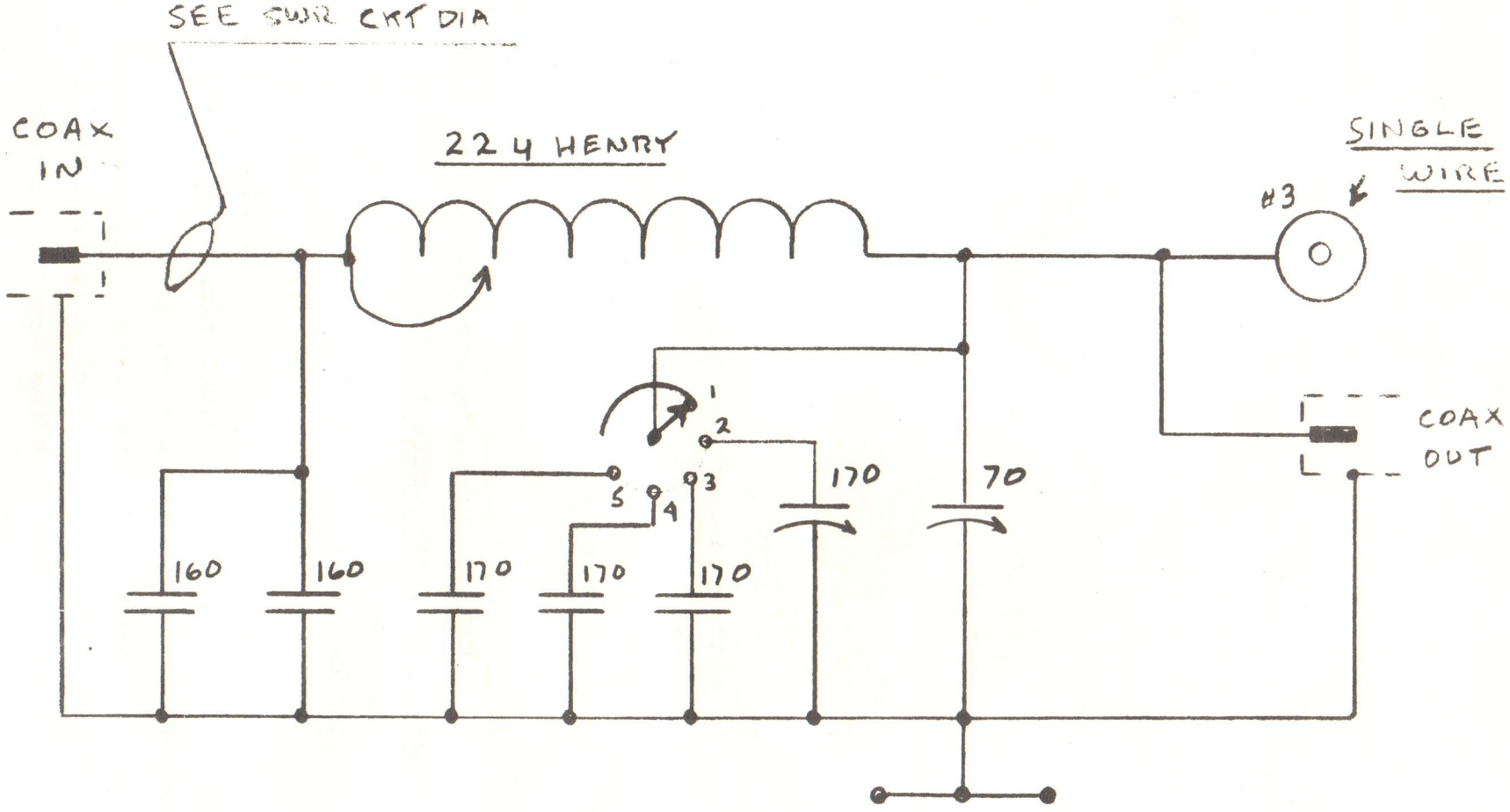
On Model MBIV-02, leave the balun connected when using the coax fitting. Some short, single wire antennas will present a lower impedance at the match-box than can be tuned at terminal #3. Connect these antennas to the coax fitting. (A banana plug makes a good connector for single wire into the coax fitting.)

WARRANTY

"Nye Viking" products manufactured by the Wm. M. Nye Company, Inc., are guaranteed for a period of two (2) years from the date of original purchase against mechanical breakdown and/or electrical failure, except for damage caused by willful act or destruction by fire. The Company's liability shall be limited to the repair or replacement of the defective item, at the Company's discretion, F.O.B. the Company's factory in Bellevue, Washington.

This warranty gives specific legal rights, and you may also have other rights which vary from state to state.

In accordance with the Magnuson-Moss Warranty Act, effective January 1, 1977.



MB IV-01

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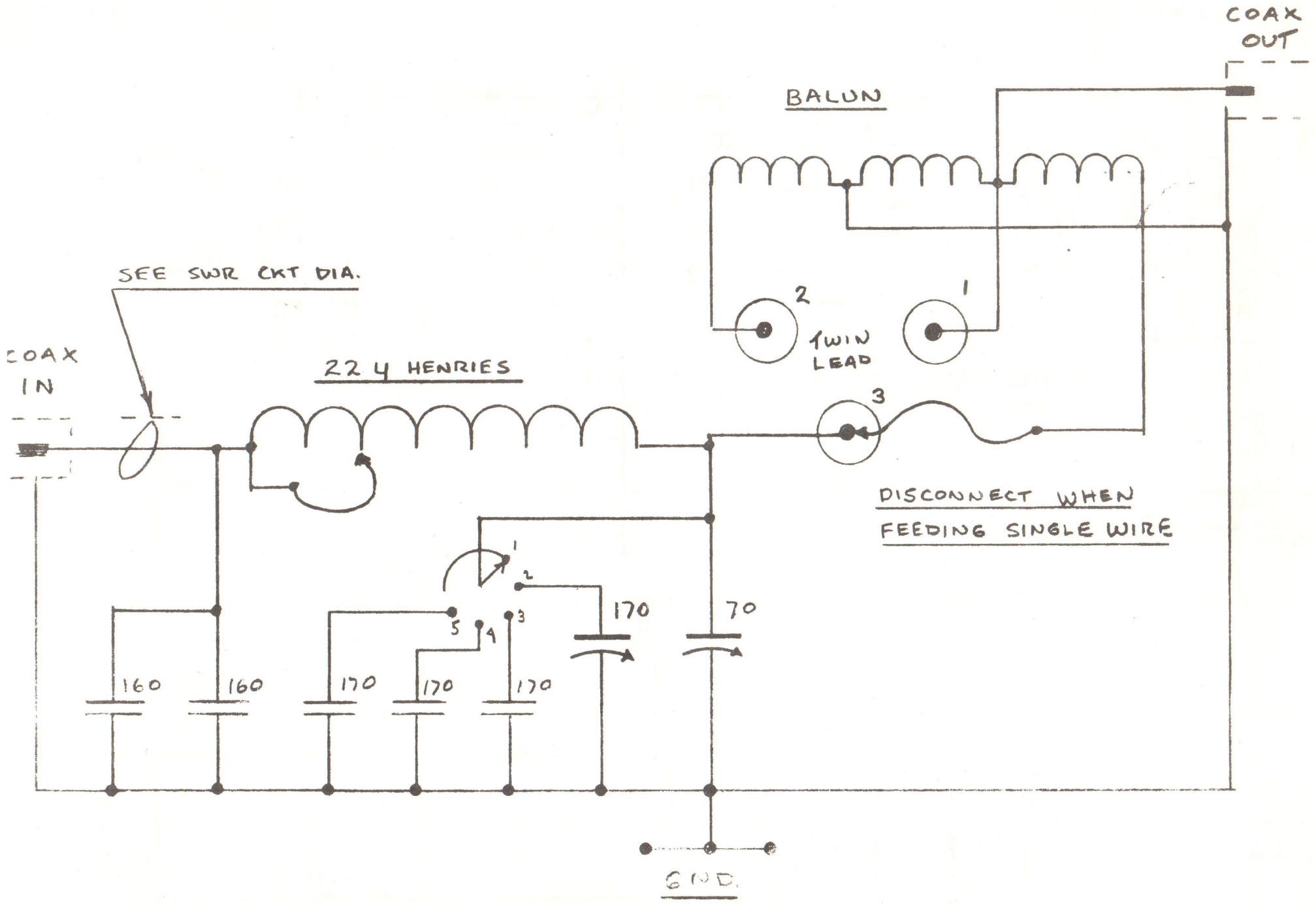

MB IV – 02

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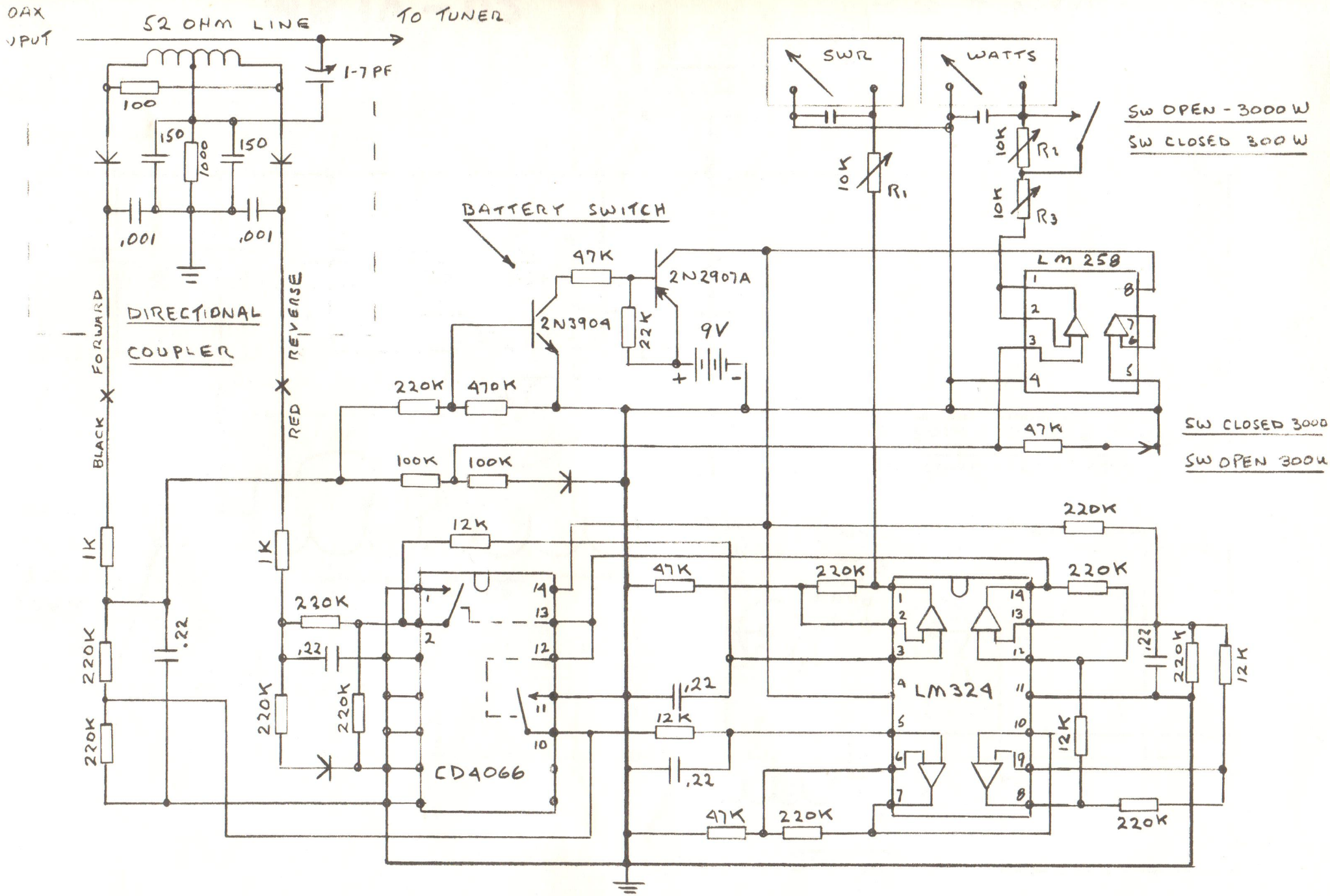

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SWR-001 AND MDIV

DWG NO. 39497

NYE VIKING MB IV LOG

ANTENNA NO. _____					ANTENNA NO. _____				
FREQ.	DIAL SETTINGS			SWR	FREQ.	DIAL SETTINGS			SWR
	Inductor	Switch	Capacitor			Inductor	Switch	Capacitor	