



# VS 300A Transmatch

## DESCRIPTION AND FEATURES

The Barker & Williamson VS 300A Transmatch is designed to match virtually any receiver, transmitter or transceiver in the 160 to 10 meter range (1.8 to 30MHz) with up to 300 watts RF power to almost any antenna, including dipoles, inverted vees, verticals, mobile whips, beams, random wires and others, fed by coax cable, balanced lines or a single wire. A 1:4 balun is built in for connection to balanced lines.

The TUNER switch, on the front panel, provides switching to one of two coax fed antennas (direct or through the tuner), and either a balanced line or wire antenna. The BYPASS (BYP) position allows switching to a dummy load or a direct connected coax antenna. In the BYPASS, COAX 1 OUT or COAX 2 OUT positions, the tuner is bypassed, but not the meter circuit.

The wattmeter of the VS 300A can be used with the tuner or when in the direct modes. The wattmeter is between the transmitter and the tuner when the TUNER switch is in the COAX 1 IN, COAX 2 IN or WIRE positions. To read the transmitter output power, set the wattmeter switch to FOR 300W and read the forward power on the 300W scale. To read the reverse power, set the wattmeter switch to REV 30W and read the reverse power on the 30W scale.



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# BARKER & WILLIAMSON VS 300A TRANSMATCH INSTRUCTIONS

## 1.0 INSTALLATION

1.1 Install the VS 300A between the transmitter and the antenna(s). Connect a coax cable (RG-8 or equivalent recommended) between the transmitter and the coax connector marked TRANSMITTER on the back panel.

1.2 One or two coax fed antennas may be connected to the coax connectors marked COAX 1 and COAX 2.

**NOTE:** Coax 1 and Coax 2 antennas can be connected directly to the transmitter by setting the TUNER switch to COAX 1 OUT or COAX 2 OUT.

1.3 A random wire antenna may be connected to the binding post marked WIRE. The random wire should be at least 50 feet long, placed as high as possible and as clear of surrounding objects as possible. Make sure that the random wire antenna does not come in contact with any metal and that the VS 300A is well grounded to the transmitter. A binding post, marked GROUND, is provided for the ground connection.

1.4 A balanced line fed antenna may be connected to the binding posts marked BAL LINE, along with a jumper wire from the WIRE binding post to the adjacent BAL LINE binding post, as indicated by the dotted line on the VS 300A. This couples the VS 300A to the balanced line through a 1:4 balun.

**NOTE:** Either a balanced line or random wire antenna may be connected at one time. If a random wire antenna is used, make sure that there is not a jumper wire between the WIRE and BAL LINE binding posts.

1.5 Set the TUNER switch to WIRE when using a random wire or balanced line fed antenna.

1.6 A coax fed antenna or dummy load may be connected to the connector marked BYPASS. The TUNER switch on the BYPASS position will bypass the tuner and allow the VS 300A to be used as a wattmeter only.

## 2.0 OPERATION

2.1 The INDUCTANCE switch on the VS 300A presents a minimum of inductance at position A and a maximum of inductance at position L. Less inductance is needed at high frequencies for the same impedance. The ANTENNA and TRANSMITTER controls both present a maximum capacitance at position 6.

2.2 For optimum operation of the VS 300A, the transmitter must be tuned to present a 50 ohm output impedance for the frequency band in operation. Tune the transmitter as follows:

2.2.1. Connect a 50 ohm load to the BYPASS connector. An antenna can be used instead, but it is good practice to use a 50 ohm load to prevent possible interference to others.

2.2.2. Set the TUNER switch to the BYPASS position. The VS 300A now operates as a wattmeter.

2.2.3. Follow the transmitter tuning procedure for maximum output.

2.2.4. Reduce the transmitter power output to 10-20W.

2.3 After properly tuning the transmitter, set the TUNER switch to the desired antenna and tune the VS 300A for minimum reverse power as described below. Do not readjust the transmitter.

2.3.1. Set the TRANSMITTER and ANTENNA controls to 3.

2.3.2. Tune in a weak but readable station, then rotate the INDUCTANCE control until maximum signal is obtained.

2.3.3. With the wattmeter switch set to FOR, reduce the CARRIER control on the transmitter or set the transmitter to the TUNE position so as to provide 10-20 watts RF output.

2.3.4. Set the wattmeter switch to REV for the reverse power reading. See the chart below which relates percent reflected power and SWR.

**PERCENT REFLECTED POWER/SWR CHART**

Percent Reflection	SWR
5%	1.6:1
10%	1.9:1
20%	2.6:1
30%	3.5:1
40%	4.5:1
50%	5.8:1
60%	7.8:1
80%	17.9:1

$\% \text{ Reflection} = \frac{\text{Reverse Power}}{\text{Forward Power}} \times 100$

**CAUTION:** Do not use the VS 300A for over 300 watts of RF output power, even in the BYPASS or COAX OUT positions.





2.3.5. If the meter reading is greater than 0 (0=SWR of 1:1 or flat), tune the VS 300A for a minimum reading as outlined in the next step.

2.3.6. While transmitting with the INDUCTANCE control set as in step 2.3.2., alternately adjust the TRANSMITTER and ANTENNA controls for a minimum reading with the wattmeter switch set to REV. Since these two controls interact, they can best be adjusted by turning the TRANSMITTER control in small increments each time turning the ANTENNA control for the minimum reverse power. Repeat as necessary until a minimum reading is obtained.

2.3.7. Set the wattmeter switch to FOR. If the reading is reduced considerably from that in step 2.3.3., increase the power output to 10-20W and repeat step 2.3.6. When the REV reading is minimum with little or no reduction in the FOR reading, proceed to step 2.3.8.

2.3.8. If a reading of 0 in the REV mode is not obtained, increase or decrease the INDUCTANCE control one position and repeat step 2.3.6. for each INDUCTANCE control position. Again, do this at a low CARRIER control setting or in the TUNE mode of the transmitter.

2.3.9. After a 0 or minimum reading is obtained, set the wattmeter switch to FOR and increase the transmitter power to its maximum or 300 watts, whichever is less.

2.3.10. Recheck the reverse power reading. The ANTENNA and TRANSMITTER controls may need fine adjustments if the REV reading is not 0 at the higher power.

**NOTE:** On the 160 meter band, excessive heating or arcing may occur, due to the high voltage present when tuned to this band. Reduce the transmitter output power as necessary to stop this condition.

2.3.11. A reverse power reading of 0 can occur from more than one combination of control settings on the VS 300A. When a reading of 0 is obtained, be sure to check the transmitter power and make sure that it is relatively high. If the transmitter power has decreased substantially, try another INDUCTANCE control setting and repeat step 2.3.6.

2.3.12. When using the VS 300A for receiving only, tune as in steps 2.3.1. and 2.3.2.

### 3.0 ABRIDGED OPERATING INSTRUCTIONS

3.1 Set the TRANSMITTER and ANTENNA controls to 3.

3.2 Tune the receiver to a weak signal.

3.3 Rotate the INDUCTANCE, TRANSMITTER and ANTENNA controls for maximum received signal.

3.4 Tune the transmitter to a clear frequency. Set the wattmeter switch to FOR and adjust the transmitter output to approximately 20 watts.

3.5 Set the wattmeter switch to REV and tune the TRANSMITTER and ANTENNA controls for a minimum reading. If necessary, increase or decrease the INDUCTANCE control one step and repeat.

3.6 Set the wattmeter switch to FOR and increase the transmitter output to its maximum or 300 watts, whichever is less.

3.7 Set the wattmeter switch to REV and touch up the TRANSMITTER and ANTENNA controls as necessary.

### 4.0 ADDITIONAL NOTES AND CAUTIONS

4.1 Do not use the VS 300A for over 300W of RF output power even in the BYPASS or COAX OUT positions.

4.2 Do not operate the TUNER or INDUCTANCE switches while transmitting.

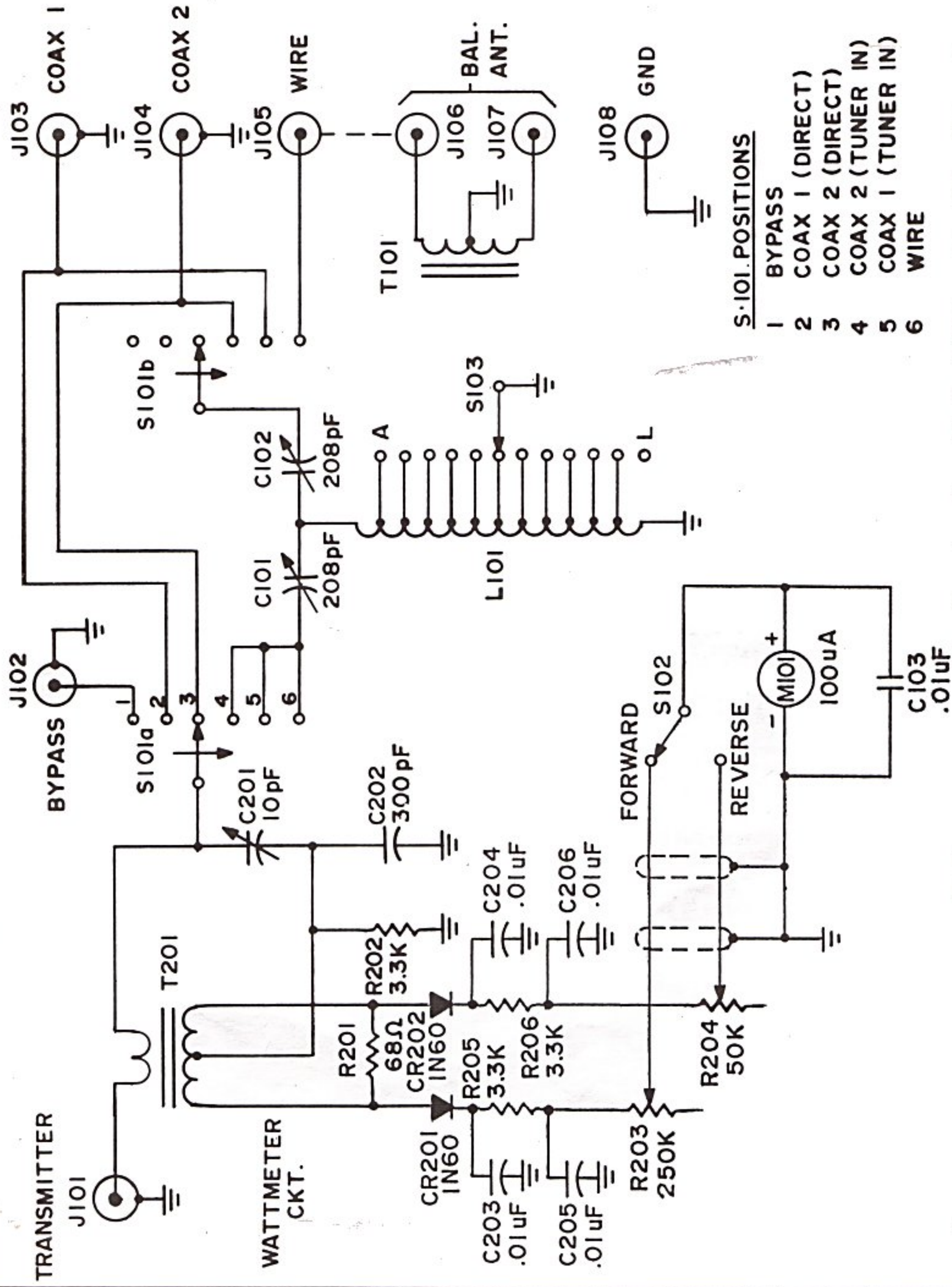
4.3 The VS 300A has to be completely retuned as above for each frequency band and each antenna. It is a good idea to record the control settings for each band and antenna on a chart to permit quick adjustment when switching bands and/or antennas.

### WARRANTY

All goods sold hereunder are warranted to be free from defects in material and workmanship, for a period of 90 days from date of shipment, and this express warranty is in lieu of and excludes all other warranties whether expressed or implied by operation of law or otherwise including any warranty on the merchantability or fitness for a particular purpose. Defective material may be returned to the seller after inspection by the seller and upon receipt of definite shipping instructions by the seller. Goods so returned will be replaced or repaired without charge, but the seller shall not be liable for loss, damage or expense directly or indirectly arising from the use of material or from any other cause, the exclusive remedy against the seller being to require the replacement or repair of defective material. Every claim on account of defective material or workmanship or from any other cause shall be deemed waived by the purchaser unless made in writing prior to the expiry date of the warranty.

**NOTE: Warranty void if seal is broken.**





# Antenna Tuner Model VS 300A