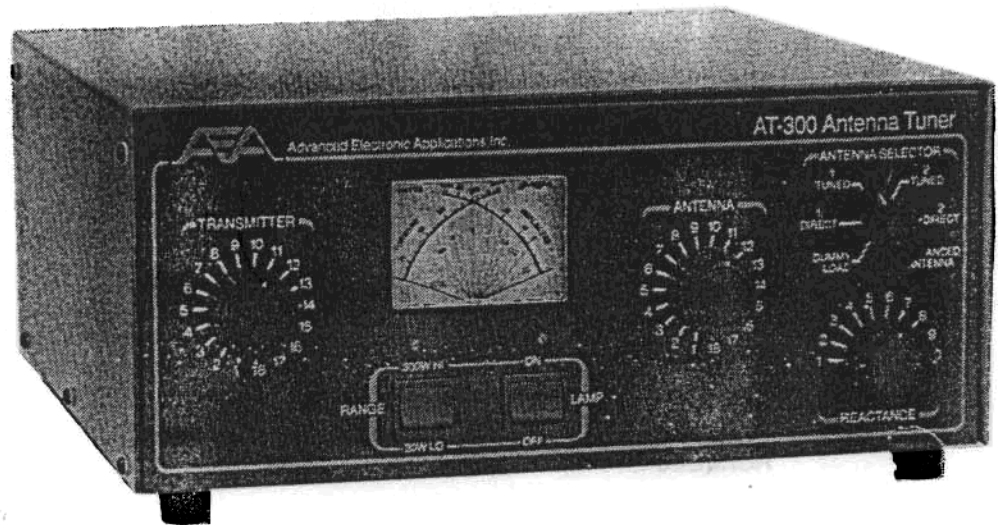


AT-300

HF Antenna Tuner

Owner's Manual



FOREWORD

Congratulations on choosing the Advanced Electronic Applications AT-300 HF Antenna Tuner to enhance your station's performance.

The AT-300 is another quality product developed by AEA where **Engineering Makes the Difference**. It should provide you with years of operating enjoyment.

To fully enjoy the benefits of the AT-300 HF Antenna Tuner please read this owner's manual thoroughly before operating the unit. If you have any questions, I encourage you to contact an AEA authorized dealer or one of our technical service representatives at:

Advanced Electronics Applications, Inc.
P.O. Box C2160
Lynnwood, WA 98036-0918
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73,

C. Mike Lamb N7ML
President
Advanced Electronic Applications

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1. FEATURES

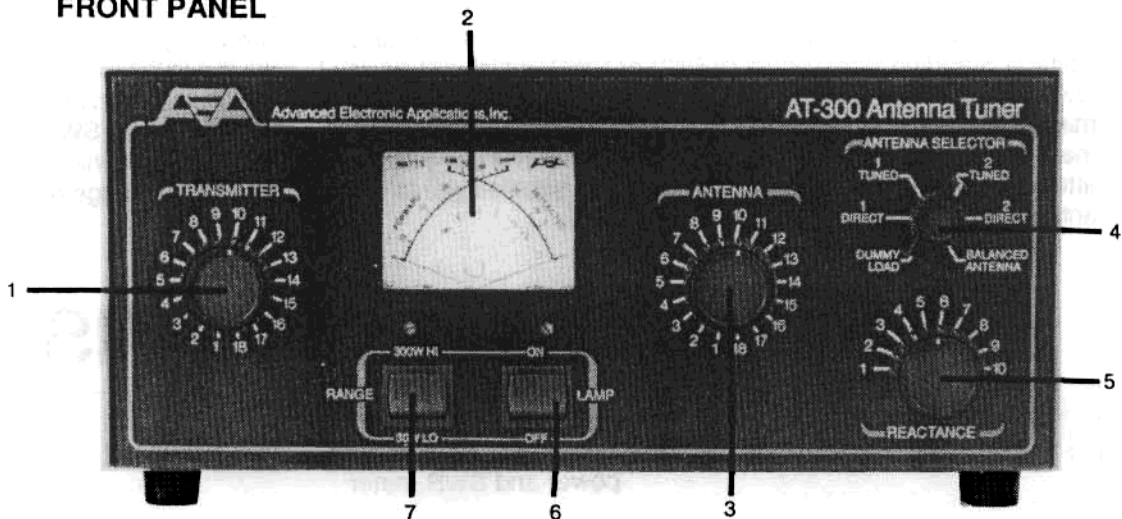
The AT-300 Antenna Tuner optimizes the performance of your antenna and transmitter by providing adjustable impedance matching. The AT-300 also measures the power and Voltage Standing Wave Ratio (VSWR or SWR) which allows you to tune the SWR to the lowest ratio possible for the selected transmission frequency. With ease of operation in mind, the AT-300 also features a precision-frequency compensated dual-movement SWR meter and adjustable high/low power selector. The low-pass design provides harmonic attenuation for lower TVI potential. This also enables you to match a much wider range of antenna impedances.

2. SPECIFICATIONS

FRONT PANEL INDICATORS AND CONTROLS	
Meter	Dual-movement D'Arsonval cross needle power and SWR meter
CONTROLS	
Transmitter Tuning	18 position
Antenna Tuning	18 position
Reactance	Continuous
Antenna Selector	6 position: Antenna 1 tuned and tuner bypass, antenna 2 tuned and tuner bypass, dummy load (external) and balanced antenna
Power Switch	2 position high/low
Lamp	Light control for meter
REAR PANEL CONNECTORS	
Antenna 1	SO239 connector
Antenna 2	SO239 connector
Dummy load	SO239 connector
Transmitter Input	SO239 connector
Balanced Output	Ceramic feed-through insulators
Power	12 VDC for meter lamp
OTHER	
Frequency Coverage	3.5-30 MHz
Power Maximum	300 W continuous
Dimensions	5.8"H x 12.8"W x 15"D
Weight	9.0 lbs.

3. CONTROL

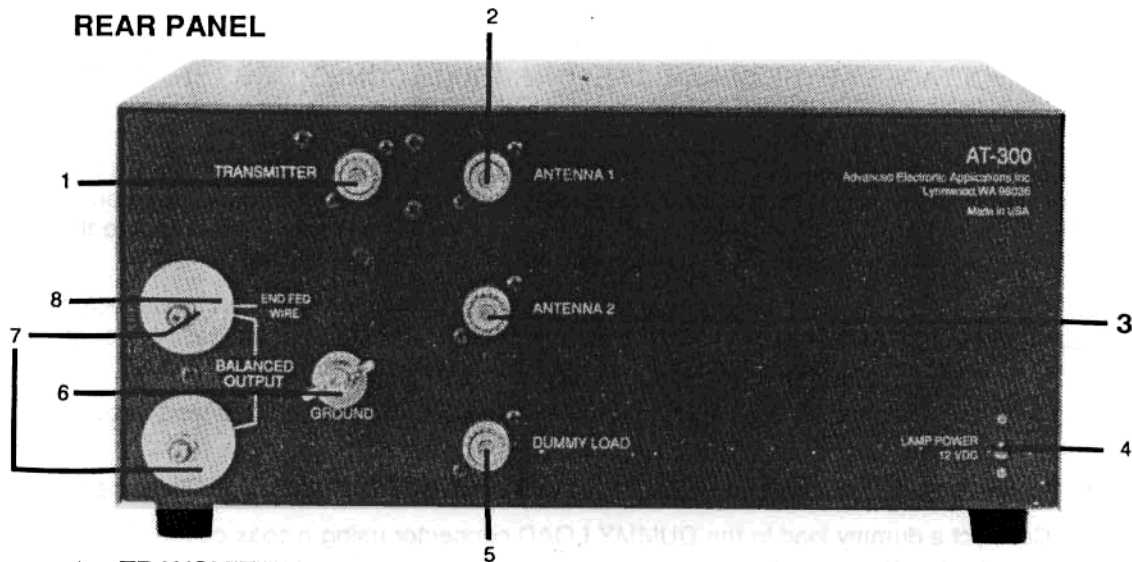
FRONT PANEL



1. **TRANSMITTER**
Eighteen-position rotary switch varies the inductance of the input inductor.
2. **POWER/SWR METER**
Dual-needle meter displays FORWARD and REFLECTED power in watts. SWR is measured where the two needles intersect on the red scale.
3. **ANTENNA**
Eighteen-position rotary switch varies the inductance of the output inductor.
4. **ANTENNA SELECTOR**
Six-position rotary switch selects an output coaxial connector.
 - 1 TUNED selects ANTENNA 1 connector through the impedance matching circuit.
 - 2 TUNED selects ANTENNA 2 connector through the impedance matching circuit.
 - 1 DIRECT selects ANTENNA 1 connector bypassing the impedance matching circuit but providing SWR, FORWARD and REFLECTED power meter readings.
 - 2 DIRECT selects ANTENNA 2 connector bypassing the impedance matching circuit but providing SWR, FORWARD and REFLECTED power meter readings.
 - DUMMY LOAD selects DUMMY LOAD connector bypassing the impedance matching circuit but providing SWR, FORWARD and REFLECTED power meter readings.
 - BALANCED ANTENNA selects BALANCED OUTPUT connectors or END FED WIRE connector through the impedance matching circuit.
5. **REACTANCE**
Continuously variable rotary control to vary the capacity of the tuning capacitor. Ten-position settings are for reference only.
6. **LAMP SWITCH**
Two-position rocker switch to turn meter lamp ON or OFF.

7. POWER RANGE

Two-position rocker switch selects the range of FORWARD and REFLECTED power displayed on the power meter. HIGH selects FORWARD range of 300 watts full scale and REFLECTED range of 60 watts full scale. LOW selects FORWARD range of 30 watts full scale and REFLECTED range of six watts full scale.



1. TRANSMITTER
Coaxial connector for input from transmitter or linear amplifier.
2. ANTENNA 1
Coaxial connector for output to antenna one.
3. ANTENNA 2
Coaxial connector for output to antenna two.
4. LAMP POWER 12 VDC
Connector (2.1mm) for +12 VDC to power meter lamp.

CAUTION: USE +12 VDC FOR THE METER LAMP. USE A SEPARATE SOURCE FROM THAT USED FOR OTHER EQUIPMENT, SUCH AS THE PK-232, PK-88, ETC.

5. DUMMY LOAD
Coaxial connector for output to dummy load.
6. GROUND
Post/wing-nut type ground connector.
7. BALANCED OUTPUT
Two ceramic feed-through post connectors for output to RF balanced twin-lead antennas.
8. END FED WIRE
Top terminal of BALANCED OUTPUT pair for output to a single-wire antenna.

4. INSTALLATION

Unpacking

Carefully unpack your AT-300 from the packing carton and inspect it for signs of damage. If any damage is apparent, notify the transportation carrier or dealer immediately. We recommend keeping the packing carton for moving, storing or reshipping the tuner.

Location Selection

Select a location for the AT-300 that allows the BALANCED OUTPUT connectors to be free from any possible contact during operation.

WARNING: SOME BALANCED OR END-FED ANTENNAS WILL PRODUCE HIGH RF VOLTAGES AT THE CERAMIC FEED-THROUGH CONNECTORS. RF BURNS MAY RESULT IF TOUCHED DURING TRANSMISSION.

Installation Procedures

1. Connect a coax cable from your transmitter to the TRANSMITTER connector on the rear panel. Keep the cable as short as possible. If you use a linear amplifier, connect your transmitter to the linear amplifier input and the linear amplifier output to the AT-300.
2. Connect coax cable(s) from your antenna to ANTENNA 1 or ANTENNA 2 connectors on the rear panel. These connectors are either direct from the transmitter or through the tuned circuit depending on the setting of the ANTENNA SELECTOR switch.
3. Connect a balanced line antenna to the BALANCED OUTPUT ceramic feed-through connectors.
4. Connect a single-line antenna to END FED WIRE (top BALANCED OUTPUT) connector.
5. Connect a dummy load to the DUMMY LOAD connector using a coax cable. This lets you select the dummy load from the ANTENNA SELECTOR switch.
6. Connect a +12 VDC cable from your transmitter to the LAMP POWER 12 VDC connector. This provides lamp power for the meter.

CAUTION: USE +12 VDC FOR THE METER LAMP. USE A SEPARATE SOURCE FROM THAT USED FOR OTHER EQUIPMENT SUCH AS THE PK-232, PK-88, ETC.

Before Operating

1. To avoid possible damage to the AT-300 Antenna Tuner, set TRANSMITTER, ANTENNA and POWER RANGE switches as outlined in the next section before applying transmitter power.
2. Begin tuning with your transmitter set at a low output power setting (10 to 20 W).
3. **Do not operate the AT-300 with the cover off.**

WARNING: DO NOT CHANGE TRANSMITTER, ANTENNA OR ANTENNA SELECTOR SWITCHES WITH MORE THAN 30 WATTS OF APPLIED POWER.

5. TUNING

1. Select the band and frequency of desired operation.
2. Set TRANSMITTER, ANTENNA and REACTANCE controls to the suggested settings before applying transmitter power.

BAND/FREQUENCY	TRANSMITTER		ANTENNA		REACTANCE	
	Sug.	Actual	Sug.	Actual	Sug.	Actual
75M/3.75 MHz	16		17		8	
40M/7.15 MHz	12	13	13	11	4	5
30M/10.125 MHz	12	8	13	8	3	6
20M/14.175 MHz	9		10		3	
17M/18.118 MHz	7		7		1	
15M/21.225 MHz	6		6		3	
12M/24.940 MHz	5		5		3	
10M/28.850 MHz	2		3		4	

3. Set your transmitter to a low power output. If your transmitter has a TUNE position, select that position.
 4. If you use a linear amplifier, set it to Standby. Do not use the linear amplifier until the AT-300 is tuned.
 5. Set POWER RANGE switch to 30 W LOW.
 6. Set ANTENNA SELECTOR switch to DUMMY LOAD or the position matching your antenna connection. To tune your antenna, the switch selection must be set to: 1 TUNED, 2 TUNED or BALANCED ANTENNA. Selecting 1 DIRECT and 2 DIRECT bypasses the tuning section.
 7. Transmit using low power, but enough power to allow tuning.
 8. Adjust the TRANSMITTER and ANTENNA switches left and right for maximum FORWARD power reading and watching for dips in REFLECTED power readings.
 9. Adjust the REACTANCE control, also tuning for maximum FORWARD power and minimum in REFLECTED power.
 10. Read the SWR on the red scale at the point where the two needles intersect. Repeat steps eight and nine until the lowest SWR reading is obtained. The SWR should be 2:1 or lower.
- NOTE:** THIS PROCEDURE TAKES PATIENCE THE FIRST TIME. THE TRANSMITTER AND ANTENNA SWITCHES CONTROL THE INDUCTORS AND PROVIDE COARSE ADJUSTMENTS. THE REACTANCE CONTROL PROVIDES BOTH COARSE AND FINE ADJUSTMENTS AND WILL PROVIDE THE FINAL FINE-TUNING ADJUSTMENT.
11. When you have tuned your antenna to the best SWR, record the settings of the TRANSMITTER, ANTENNA and REACTANCE settings on the chart above for future reference. When you retune, use these settings as your starting point.

6. NOTES

1. An SWR of 1:1 is best, but an SWR as high as 2:1 may be acceptable.
2. Check your transmitter manual for details.
3. If you cannot get an acceptable SWR, lengthen or shorten your antenna and/or feedlines and retune.
4. If you get low SWR readings at more than one setting, use the setting that gives:

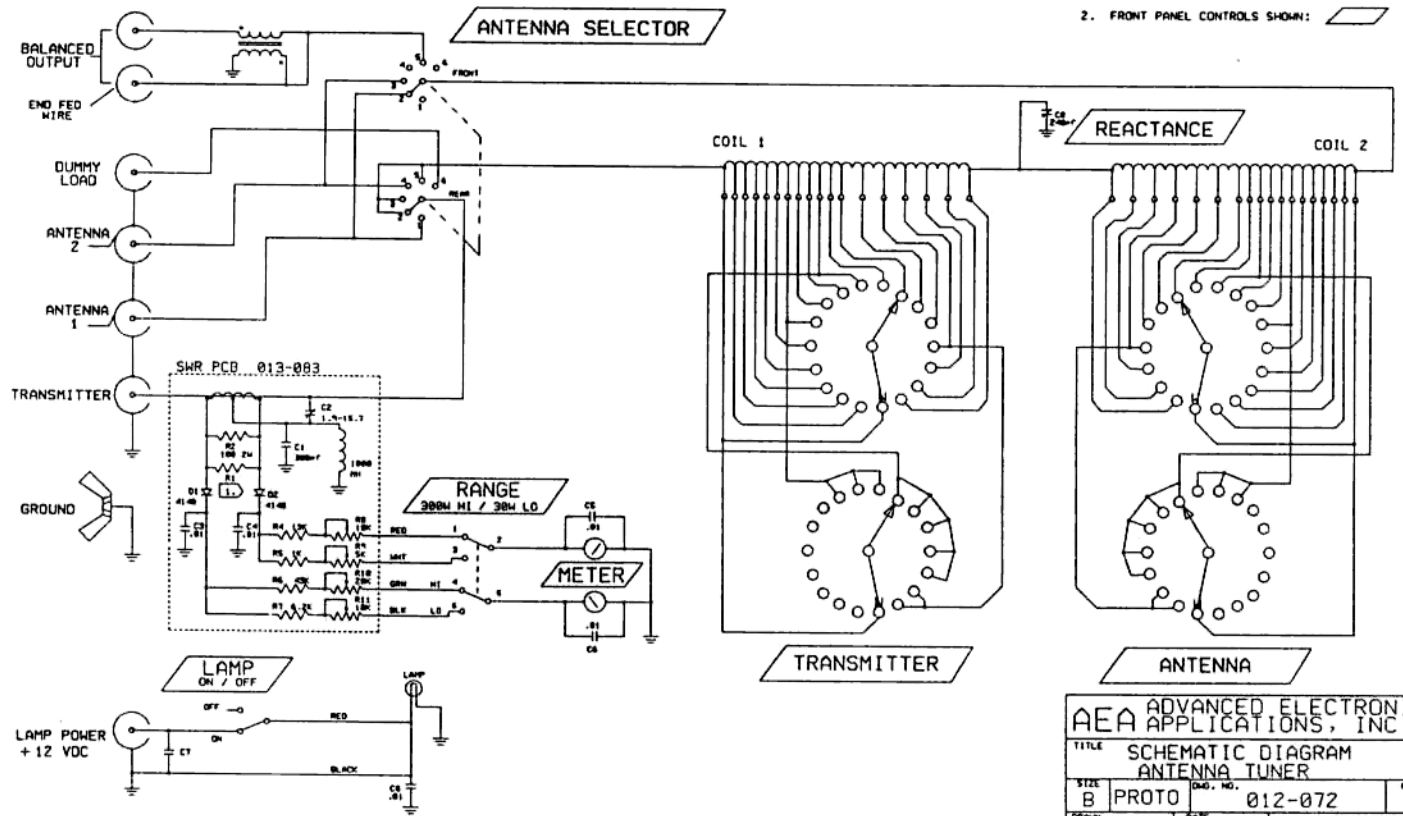
The highest FORWARD power reading.

The lowest REFLECTED power reading.

Uses the least inductance (lowest number) on the TRANSMITTER and ANTENNA switches.

7. SCHEMATIC DIAGRAM

REAR PANEL CONNECTORS



NOTES:

1. R1 NOT USED ON AT-300 ASSEMBLY.
2. FRONT PANEL CONTROLS SHOWN:

AEA ADVANCED ELECTRONIC APPLICATIONS, INC.			
TITLE SCHEMATIC DIAGRAM ANTENNA TUNER			
SIZE B	PROTO	DWG. NO. 012-072	REV. C
DRAWN P. HARTLEY	DATE 6-5-88	SHEET 1	OF 1



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All stated specifications are approximate and subject to change.

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