

# **DU-3000T / DU-3000TB**

## **Antenna Tuners**

### **User's Manual**



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## Features

The DU 3000T and DU3000TB tuners optimize the performance of your antenna and transmitter or SWL receiver by providing adjustable impedance matching. The DU 3000 series also measure the Power and Standing Wave Ratio (SWR), which allows you to tune the indicated SWR to the lowest possible value for the selected transmit frequency.

## Specifications

### Front Panel Indicators and Controls

Meter .....	Crossed needles Power and SWR meter
Input Tuning.....	Continuous rotation 4.5 kV capacitor 330 pF
Output Tuning.....	Continuous rotation 4.5 kV capacitor 330 pF
Antenna Switch Selector.....	Five position ceramic switch: COAX 1, Tuned and COAX 2 Tuned and BYPASS, COAX 1 DIRECT, COAX 2 DIRECT
Power Range Switch .....	Two positions: 300 W / 3 kW

### Rear Panel Connectors

Coax 1 .....	SO-239 Teflon connector
Coax 2 .....	SO-239 Teflon connector
Balanced Line.....	Dual high voltage ceramic terminals Includes 4:1 balun <b>(Only the DU3000TB)</b>



Left: Interior view of the DU3000TB.

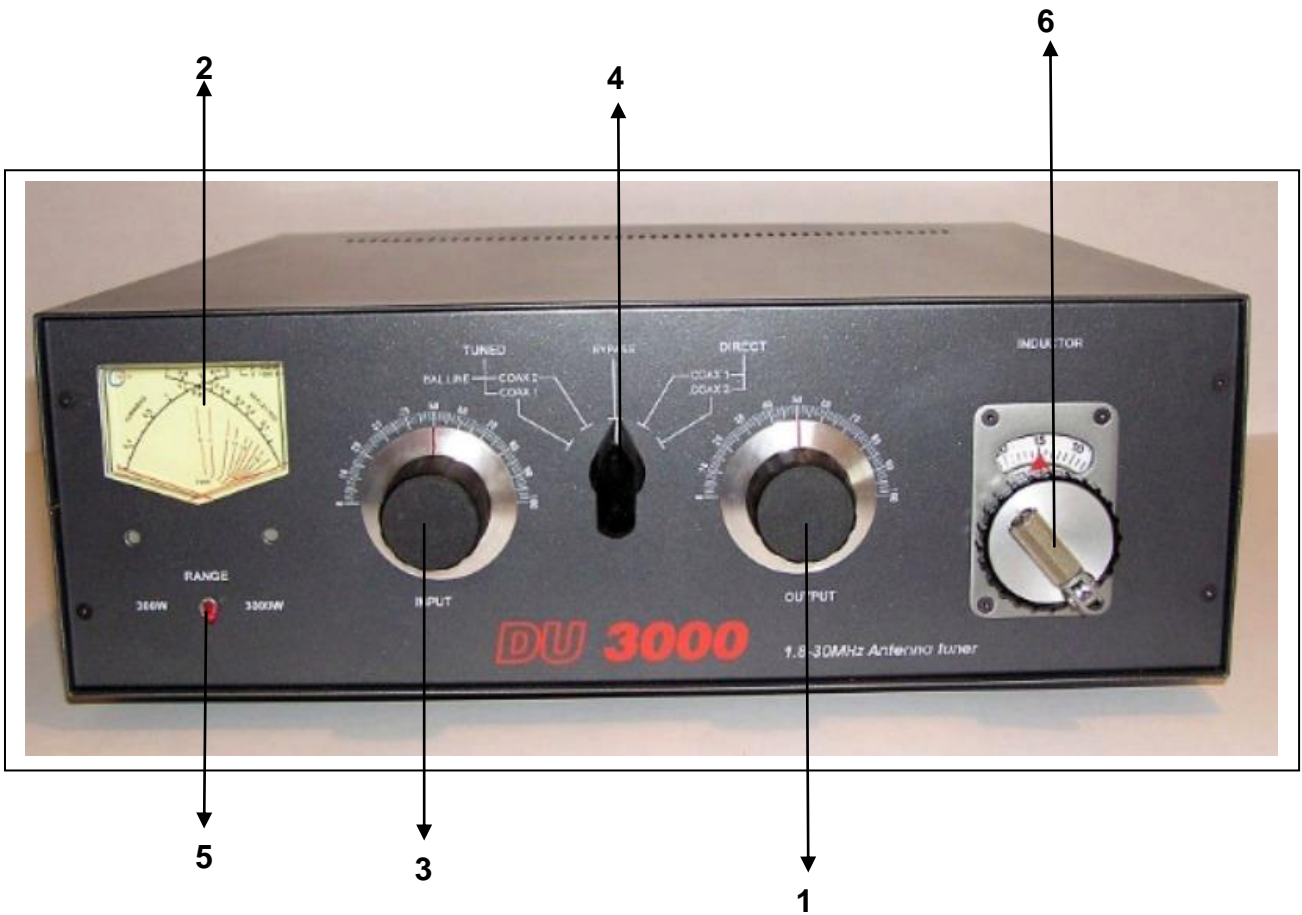
Right: Interior view of the DU3000T

Note that the DU3000TB has a toroidal dual core 4:1 balun at the right rear corner while the DU3000T does not have it.

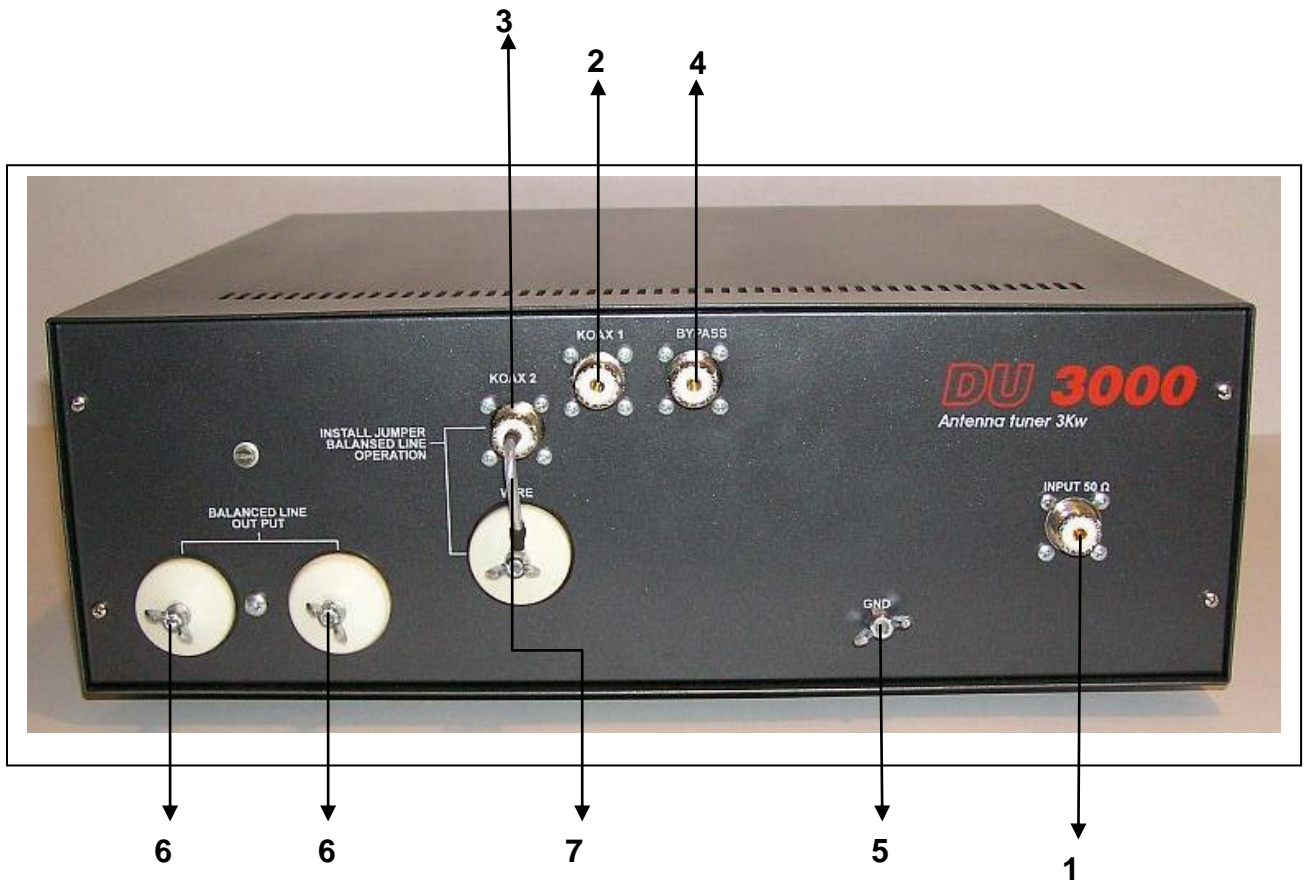
### Other

Frequency Coverage .....	1.8 - 30 MHz, continually tunable
Power Rating .....	3000 W
Input impedance .....	50 $\Omega$
Output impedance .....	25 – 600 $\Omega$ for coax and 2000 $\Omega$ for wire
Dimensions (WDH).....	400 mm x 380 mm x 130 mm (15-3/4" x 15" x 5-1/8")
Weight .....	6.0 kg (13.2 lb)

Front Panel Control knobs location (see Page 5)



**Rear Panel Connectors location (see Page 6)**



# Control knobs and Connectors

## Front Panel Functions (Refer to page 3)

### 1. OUTPUT (Antenna)

Continuously adjustable output capacitor

### 2. POWER/SWR METER

Dual needle meter displays FORWARD and REFLECTED Power in Watts. The SWR is measured where the two needles intersect on the red scale.

### 3. INPUT (Transmitter)

Continuously adjustable input capacitor.

### 4. DIRECT-TUNED OUTPUT SELECTOR

Five-position rotary switch an output coaxial connector.

1. TUNED COAX 1 selects the COAX 1 connector through the impedance matching circuit.
2. TUNED COAX 2 selects the COAX 2 connector through the impedance matching circuit.
3. DIRECT BYPASS selects BYPASS COAX connector by passing the impedance matching circuit but providing SWR, FORWARD and REFLECTED power meter readings.
4. DIRECT COAX 1 selects the COAX 1 connector bypassing the impedance matching circuit but providing SWR, FORWARD and REFLECTED meter readings.
5. DIRECT COAX 2 selects the COAX 2 connector bypassing the impedance matching circuit but providing SWR, FORWARD and REFLECTED meter readings.
6. TUNED WIRE/BAL selects the BAL. LINE+COAX 2 connector through the impedance matching circuit.

### 5. POWER RANGE SWITCH

Two-position switch selects the range (300 W or 3 kW) of FORWARD and REFLECTED Power displayed on the power meter.

When the METER (power range) switch selects 300 W the FORWARD meter scale reads 300 W at full scale and the REFLECTED meter scale reads 40 W at full scale.

When the METER switch selects 3 kW, the FORWARD meter scale reads 3 kW at full scale and the REFLECTED meter scale reads 400 W at full scale.

### 6. INDUCTOR Ceramic body

## **Rear Panel Connectors (Refer to page 4)**

### **1. RF INPUT**

Coaxial connector for input from SWL receiver or transmitter.

### **2. COAX 1**

Coaxial connector for output to Antenna One or Wire Antenna

### **3. COAX 2**

Coaxial connector for output to Antenna Two.

### **4. BYPASS**

Coaxial connector for output to dummy load or third coax output.

### **5. GROUND**

Post and Wing-nut ground connector.

### **6. BALANCED OUTPUT**

Two feedthrough ceramic posts for output to RF balanced twin-lead antennas.

### **7. INSTALL JUMPER - when using Balanced Output**

## Installation

Select a location for the DU 3000 that allows the connectors to be free of any possible contact during operation.

**WARNING: Some balanced or end fed antennas will produce high RF voltages at the feedthrough connectors. Severe RF burns may result while in transmission if these connectors get in contact with the skin.**

1. Connect a coaxial cable from your transmitter or receiver to the RF INPUT connector on the rear panel. Keep the cable as short as possible. If you use a linear amplifier, connect the linear amplifier output to the DU 3000 input connector
2. Connect coaxial cables from your antenna to COAX 1 or COAX 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 OUTPUT SELECTOR switch on the front panel.
3. If you are using a balanced feed antenna, connect the INSTALL JUMPER in the COAX 1 connector and switch band switch TUNED COAX 1.
4. If using a single wire antenna, connect it to post COAX 1 without installing the jumper.
5. Connect a dummy load to the BYPASS CONNECTOR using a coax cable. This lets you select the dummy load from the OUTPUT SELECTOR switch. Any antenna that does not require the use of the antenna tuner may be connected to the BYPASS connector, if desired.

## Before Operation

1. To avoid possible damage to the DU 3000, set INPUT, OUTPUT, BAND SWITCH and POWER RANGE switches as outlined in the next section before applying transmitter power (see Tuning Section).
2. Begin tuning with your transmitter set to a low power setting (50 W is more than enough)

**WARNING: Do not operate the DU3000 with the cover removed!**

## Tuning

1. Select the band and frequency of desired operation.
2. Set INPUT, OUTPUT and INDUCTOR controls to the suggested settings before applying transmitter power. Actual settings may vary from one antenna to the other.
3. Set up your transmitter to a low power output. If your transmitter has a TUNE or RTTY position, select that position.
4. If you use a linear amplifier, set it to STANDBY.

**\*\* Do not use the linear amplifier until the DU 3000 is tuned \*\***

**WARNING: Do not exceed 3000 W (Single tone or key down).**

5. Set POWER RANGE switch to 300 W.
6. Set the OUTPUT SELECTOR switch to BYPASS, or the position matching your antenna connection. To tune your antenna, the switch selection must be set to: COAX 1 TUNED, COAX 2 TUNED, or BAL. LINE+COAX 2. Selecting COAX 1 DIRECT, COAX 2 DIRECT, or BYPASS.
7. Rotate the INPUT and OUTPUT controls for maximum noise or signal as heard on your receiver.
8. Key your transmitter and adjust the power level for a reading of maximum 50 watts on the FORWARD scale. Adjust the INPUT and OUTPUT controls for a minimum REFLECTED reading while maintaining a FORWARD reading of 50 watts using your transmitter power control.
9. Read the SWR on the red scale at the point where the two needles intersect. Repeat step 8 until the lowest SWR reading is obtained. The SWR should be 2:1 or lower.

NOTE: This procedure takes patience the first time. The INPUT and OUTPUT Controls vary the capacitors and provide fine adjustments.



## Notes

1. An SWR of 1:1 is best, but an SWR as high as 2:1 may be acceptable. Check your transmitter manual for details.
2. If you can't get an acceptable SWR, lengthen or shorten your antenna and/or feedlines and retune.
3. If you get low SWR readings at more than one setting, use the setting that:
  - Gives the highest FORWARD power reading.
  - Gives the lowest REFLECTED power reading.
  - Uses the largest capacitance (highest number) on the TRANSMITTER and ANTENNA controls.
4. Any time a new or different antenna is connected, it is necessary to repeat the tuning procedure for each antenna.