

# **LDG TW-1 Talking Wattmeter**



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## **Introduction**

Congratulations on selecting the LDG TW-1 talking wattmeter. The TW-1 is a breakthrough product, providing accurate and precise RF power and SWR readings aurally, by synthesized voice over a self-contained speaker. It is ideal for situations when you need to watch something else while making an adjustment, or for visually impaired hams.

LDG pioneered the automatic, wide-range switched-L tuner in 1995. From its laboratories in St. Leonard, Maryland LDG continues to define the state of the art in this field with innovative automatic tuners and related products for every amateur need.

### **Jumpstart, or “Real hams don’t read manuals!”**

Ok, but at least read this one section before you transmit:

1. Attach the RF input jack (right connector when viewed from back) to your transmitter or transceiver with a 50 ohm coaxial jumper cable.
2. Attach your antenna to the RF output (left connector when viewed from back).
3. Connect a 12 volt power supply capable of delivering 200 ma to the 2.5 x 5.5 mm coaxial power jack (center positive).
4. While transmitting RF, press and release the left-hand button. The unit will speak the forward power level. Adjust the volume to the desired level.
5. While transmitting RF, press and release the center button. The unit will speak the reverse power level.
6. While transmitting RF, press and release the right-hand button. The unit will speak the SWR.
7. The unit will turn itself off after use.

### **Specifications**

- **0 - 2,000 watts, auto-ranging**
- **+/- 5% accuracy (measured on 14 MHz), 10% on 6 meters**
- **1 watt or 1% power resolution**
- **Adjustable volume**
- **Verbose or terse speech**
- **Tone mode for continuous feedback**
- **Speaks in English, Spanish or German**
- **Size: 5 x 4.5 x 3 inches**
- **Requires 12 volts at 200 ma, 2.5 x 5.5 mm jack, center positive**

## Getting to know your TW-1

Your TW-1 is a quality, precision instrument that will give you many years of outstanding service; take a few minutes to get to know it. On the front panel, there is a volume knob and three pushbuttons:

- Volume: adjusts the volume of the synthesized voice
- Forward: measures forward power in watts (FWD Button)
- Reverse: measures reverse power in watts (REV Button)
- SWR: measures the standing wave ratio (SWR Button)

Readout resolution is 1 watt or 1% of the reading, whichever is larger. For example, if the reading is 75 watts, 1% would be 0.75 watts, so the achieved resolution would be 1 watt. The readout would go from "Seventy Five Watts" to "Seventy Six Watts" as you increase power. At a reading of 245 watts, 1% would be 2 watts (rounded off), so the resolution would be 2 watts; the reading would go from "Two Hundred Forty Five Watts" to "Two Hundred Forty Seven Watts".

There is no range switch; the TW-1 auto-ranges from 0 to 2,000 watts. There is no On/Off switch; the TW-1 automatically turns itself on during use and off after use. The idle current is less than 100  $\mu$ A.



On the rear panel, there are two SO-239 RF connectors. The right-hand connector is the RF input (labeled Radio) for connection to your radio, and the left-hand connector is the output to your tuner or antenna (labeled Antenna).

The 2.5 x 5.5 mm jack coaxial DC power connector is on the right.



## **Installation**

The TW-1 is intended for indoor use only; it is not water resistant. If you use it outdoors (Field Day, for example) you must protect it from rain.

Position your TW-1 in a convenient spot on your operating desk, as close to your transceiver or transmitter as practical. Connect the input jack to your transceiver with a 50 ohm coaxial jumper (not provided) of suitable power handling capacity. Connect the output to your tuner or antenna.

Your TW-1 requires 12 volts DC at 200 ma. Connect a suitable power supply to the 2.5 x 5.5 mm coaxial DC input jack using the provided 2.5 x 5.5 mm jack coaxial power connector (center positive).

Caution: High RF voltages may be present on internal components when transmitting. Never operate your TW-1 with the cover removed.

## **Setup**

Setup options are selected by pressing and holding buttons or combinations of buttons while you apply DC power. The simplest way to apply power for setup is to unplug the DC power plug, wait 10 seconds, then re-insert the DC power plug from the back of the TW-1, but you could also turn the DC power supply off then on again. Setup options are retained indefinitely, even if DC power is removed.

### Language

Your TW-1 will speak in English, Spanish or German; the default is English. To set the language, press and hold a button while connecting DC power:

FWD Button: English  
REV Button: Spanish  
SWR Button: German

To reset to a different language, simply remove DC power, press and hold the appropriate button and reconnect DC power.

### Speech mode

Your TW-1 will speak in one of two different modes: Verbose and Terse. In Verbose mode, the TW-1 speaks in full sentences, as in "The forward power is ninety seven watts". In Terse mode, only the numerical value is spoken, as in "ninety seven". The default is Verbose mode.

After you become accustomed to your TW-1, you will likely want the shorter readouts, without all the extra chit-chat. To select "Terse" mode, press the REV and SWR buttons together while you apply DC power. Thereafter, on pressing a button when RF is present, only the numerical value will be spoken.



Verbose Mode



Terse Mode

To return to "Verbose" mode, press the FWD and REV buttons together while you apply DC power.

### Volume

Simply adjust the volume control to the desired audio level as you use your TW-1.



## Speech Operation

Spoken readouts are available on demand; the readout is spoken on button release. There is no need to set the power range; your TW-1 auto-ranges from 0 - 2,000 watts. With RF present, press and release a button to produce the following spoken readouts:

### **FWD Button: forward RF power**

(Verbose mode example: "The forward power is ninety seven watts")

(Terse mode example: "ninety seven")

### **REV Button: reverse RF power**

(Verbose mode example: "The reverse power is three watts")

(Terse mode example: "three")

### **SWR Button: SWR**

(Verbose mode example: "The SWR is two point one")

(Terse mode example: "two point one")

Your TW-1 works best with a constant RF carrier. Using a voice mode (SSB for instance) would require you to talk and listen at the same time.

## Tone Operation

When adjusting a manual tuner or vacuum tube transmitter or amplifier, it is often desirable to have a continuous readout of power or SWR. Your TW-1 provides this by playing a tone whose pitch goes up and down with the power or SWR.

To place your TW-1 in Tone mode, simply press and hold any of the three buttons for more than three seconds before applying RF. The TW-1 will beep to indicate it has changed to Tone mode; release the button when you hear the beep. When you apply RF, the TW-1 will emit a continuous tone whose pitch is proportional to the power; the higher the power, the higher the pitch. You can select either Forward (FWD Button) or Reverse (REV Button) power for tone readout.

You can also select SWR for tone readout, as above (SWR Button). The pitch of the tone is proportional to the SWR; the higher the SWR, the higher the tone. If the SWR is above about 3:1, the tone will pulse to indicate that the SWR is excessive.

After 30 seconds with no RF present, the TW-1 automatically reverts to Speech mode (verbose or terse, whichever you have set). You can also manually reset it to Speech mode by pressing and releasing any of the buttons. The TW-1 will beep to indicate that it has returned to Speech mode.

## Application Notes

The TW-1 is primarily intended for visually impaired hams, and those of us more "experienced" hams who must resort to bifocals, making small meters hard to see at any distance.

The TW-1 is also very useful for special situations when you need to "watch" more than one meter, as when you are tuning the output stage of a vacuum tube transmitter or amplifier. With your TW-1 in Tone mode, you can easily watch the plate current meter on the transmitter or amplifier while listening to the power output on your TW-1 in Tone mode.

The TW-1 is perfectly suited to mobile use. Simply install it in a convenient location near your operating position, and provide 12 volts DC through a fused line (fuse not included; LDG recommends a 2 amp fast-blow fuse). SWR Tone mode is especially useful when tuning a "screwdriver" antenna while watching the road. LDG strongly recommends pulling over to a stop before adjusting your antenna, but we realize that not everyone does this; you know who you are.

	Press and Release (RF Present)	Press and Hold 3 sec	Press and Hold On Power-Up
<b>FWD Button</b> ● ○ ○	Forward Power	Forward Power Tone Mode	English
<b>REV Button</b> ○ ● ○	Reverse Power	Reverse Power Tone Mode	Spanish
<b>SWR Button</b> ○ ○ ●	SWR	SWR Tone Mode	German
<b>REV + SWR</b> ○ ● ●	–	–	Terse Mode
<b>FWD + REV</b> ● ● ○	–	–	Verbose Mode

Button Summary

## Care and Maintenance

Your TW-1 tuner is essentially maintenance-free; just be sure to observe the power and voltage limits discussed in this manual. The outer case may be cleaned as needed with a soft cloth slightly dampened in a mild household cleaning solution. As with any modern electronic device, your TW-1 can be damaged by temperature extremes, water, impact or static discharge. LDG strongly recommends that you use a good quality, properly installed lightning arrestor in the antenna lead.

You should never have to remove the cover, but if you do, be sure that no wires are within 2" of the SWR sensor or the SO-239 connectors when you reassemble the unit.

## Technical Support

We are happy to help you with your product. For detailed tech support, submit our Tech Support form on our web site under Support/Manuals, then Tech Support. You can find us at [www.ldgelectronics.com](http://www.ldgelectronics.com).

## Warranty and Service

Your product is warranted against defects in parts or workmanship for two years from purchase. The warranty does not cover damage due to abuse or exceeding specifications. This warranty applies to the original purchaser only; it is not transferable. A copy of the receipt showing the purchaser's name and the date of purchase must accompany units returned for warranty service. All returns must be shipped to us pre-paid; we will not accept units with postage due. Please fill out and print the return form from our web site under Support/Manual, then Tech Support-Warranty.

If you need to return your unit to us for service, package it carefully, keeping in mind that we will re-use your packaging to return the unit to you. Include a full description of the problem, along with your name, address and a phone number or e-mail address on the web form. Repairs average about 3 to 6 weeks.

We will be glad to service your unit after the warranty period has ended. We will notify you of repair charges by phone or e-mail, and bill you after repairs are completed.

## Feedback

If you have an idea to improve our software or hardware, please send us a description. If we incorporate your idea in the TW-1, we'll send you a free upgrade as a "thank you".

We encourage everyone who uses the TW-1 to contact us (card, letter or e-mail preferred) telling us how well it works for you. We are also always looking for photographs of our products in use; we frequently place such pictures on our Web site ([www.ldgelectronics.com](http://www.ldgelectronics.com)).

