



## The Indianapolis Radio Club Newsletter

Founded 1914

*"The oldest continuously operating Amateur Radio Club in the United States"*

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### *Summer Edition Newsletter*

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#### **Congratulations to Trevor Fulk, N9YM**

Trevor Fulk N9YM of Indianapolis, has been awarded the Earl I. Anderson Scholarship Award of \$1, 250, from the ARRL Foundation Scholarship Committee. Congratulations, Trevor, and Good Luck!

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#### **Next Meeting:**

September 8, 7:00 P.M. EDT, at the Indianapolis Training Center, 2802 N. Meridian Street, Indianapolis. Scheduled presentation: *"Software Defined Radio (SDR) Transmitter"*

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#### **Review**

#### **LP-100 Digital Vector RF Wattmeter**

**Telepost Inc.**

**By: Lyman "Hank" Wolfla II – K9LZJ**

Over the past few years I have been watching Larry, N8LP design and build many projects for the general amateur radio population. He has been very active in writing programs for the control of amateur radio stations via the internet which was my original interest. Over the past couple years; Larry has been talking about a digital wattmeter that he was designing. At the 2005 Dayton Hamvention Larry had his first prototype available for the general ham population to see in the SteppIR booth. With input from this show he then submitted the LP-100 wattmeter project to QEX, and a full review and information on how to build the wattmeter became available in the January, 2006 issue of QEX.

Larry decided to make this wattmeter available in kit form in the early part of 2006.

I had already purchased a SteppIR controller from Larry, and have always wanted an accurate digital wattmeter, so I was one of the first to order the LP-100. In June I received my LP-100 wattmeter with the high serial number of 2.

The instruction manual was extremely clear, and the photos of the critical toroid coils, and circuit boards made construction easy. Larry estimated a construction time of approximately 8 hours, and I came very close to that number. The very small surface mount parts were already attached to the circuit board which was very helpful to my older eyes.

As you read these specifications please make note of the special features not offered by any wattmeter on the present market. These include Z, R, X display, and an accurate power range of 100 milliwatts to 2500 watts. This is the perfect wattmeter for measuring the power output of my Alpha amplifier, while also being able to measure the output of my 2 watt QRP psk rig. While you are measuring your power output and SWR, you can switch the display to display the actual impedance of the antenna and see the effect of adding inductance or capacitance while using an antenna tuner.

The key to Larry's success in building this wattmeter is the research he has done on the coupler. By careful design using the Tandem Match design and high permeability ferrite cores of large size (see picture) he has been able to achieve the wide range of power and frequency while still retaining "Bird" level accuracy. The display box contains the logarithmic detectors and the LP-100 controller which is the "brain" of the wattmeter. A serial port on the rear of the device allows the 16F876 PIC chip to be updated, and likewise provides serial data for graphing programs and remote computer display of the meter readings. To calibrate the meter, you will need an accurate power meter and a quality dummy load and of course your low band transceiver as a signal source.

Here is a summary of the features and specifications of the LP-100:

1 to 54 MHz with supplied coupler, useable to ~80 MHz  
Z, R, X display from 0-999.9 ohms each  
Separate coupler with 50 ohm ports for uncluttered desktop  
Three auto ranging scales... 0.01-24.99W, 0.1-249.9W, 1-2500W  
Perfect for QRPp through QRO  
Super fast PLED peak responding logarithmic bar graphs for power, SWR and RL  
Peak-hold numerical power readout with "hang" characteristic for power and SWR  
SWR display resolution is .01  
SWR error < .15 (5%) from about 50mW to 2500W, <.05 typical  
Return Loss (RL) display of 0 to 49.9 dB  
Separate scale for dBm measurements, +10.0 dBm to +64.0 dBm  
Overall power accuracy is 5% typical at any rated power level or frequency from .1W to 2500W  
Can be easily matched in the field to external standard to within 0.2% at 54 different frequencies

Power display is actual power delivered to the load (Fwd minus Ref power).  
SWR Alarm system with set points for Off, 1.5, 2.0, 2.5 and 3.0. Sounds alarm, lights LED and kills PTT loop to linear  
Windows freeware Virtual Control Panel for software control or remote control  
Support within TRX-Manager for direct remote monitoring  
Upcoming advanced charting capability for SWR, RL, Z, R, X and phase angle vs. frequency  
Built-in bootloader to allow for future software upgrades to be downloaded and installed.  
Call sign screen saver  
Conforms to FCC Part 15 A & B, ICAS and CE radiated emission limits, tested and verified by accredited lab.

The LP-100 now sits in my shack, and does a great job of measuring the actual power output to my antenna as well as giving a bar graph that indicates SWR. The bar graph makes it very easy to tune my antenna tuner since all I need to do is adjust the controls for a dip on the digital bar graph. Since the unit is auto ranging, I can measure my power from below 1 watt to the full output of my amplifier. A screen saver flashes my call when not in use. Likewise the unit is connected to my computer (LP-100 Virtual Control Panel) so that I can use Larry's software to see the measurements, and also use a graphic program to plot my SWR over a range in frequencies. Larry continues to add features to the meter, and in the next few provide an accurate measurement of field strength in dBm down to microwatt levels.

Anyone interested in ordering an LP-100 out of the 2nd production run should contact Larry at [larry@telepostinc.com](mailto:larry@telepostinc.com), or at 734-455-3716 for details on ordering. The present price is \$310 kit / \$410 assembled. \$12-17 shipping and handling depending on your location.

Larry also has a digital dummy load and handheld SWR bridge that uses the same technology which can be viewed on his WEB site:

[www.telepostinc.com](http://www.telepostinc.com)

This WEB site also includes the complete instruction manual with excellent pictures of the unit. If you would like to learn more about the meter, please feel free to drop me a note at [hwolfla@insightbb.com](mailto:hwolfla@insightbb.com).

Bottom line, this is an inexpensive laboratory grade digital vector and RF wattmeter for your shack or workshop.

73,  
Hank Wolfla - K9LZJ  
Greenfield, IN  
7/11/06

## Upcoming Area Radio Events:

- **August 25 through Sept. 1: IRC Express License classes:**  
The Indy Radio Club will sponsor an express "no code Tech" license class and express General Class plus code class. These will be held at the ITC facility, 2820 N. Meridian St. For more information, go to <http://www.indyradioclub.org/indyclasses.htm>.
  - **September 24: Hancock County Hamfest:**  
The annual Hancock County Amateur Radio Club's Hamfest will be September 24, 2006 from 8 A.M. to 1 P.M. at the Hancock County 4-H Fairgrounds. For more information, go to <http://www.w9atg.org/hamfest.php>
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## Current IRC Club Officers:

- Vice Pres.: Dave Miller - ..EMAIL [dmiller@ivytech.edu](mailto:dmiller@ivytech.edu)
  - Secretary: Mike Henney - ..EMAIL [mhenney1@comcast.net](mailto:mhenney1@comcast.net)
  - Treasurer: Judy Gardner - ..EMAIL [aa9gw@juno.com](mailto:aa9gw@juno.com)
  - Chief Operator: Ed Conder - ..EMAIL [n9izn@sbcglobal.net](mailto:n9izn@sbcglobal.net)
  - Director: Dave Jarvis - .....EMAIL [n9kzj@earthlink.net](mailto:n9kzj@earthlink.net)
  - Dir. at Large: Tom Chance - ..EMAIL [mailto:k9xv@arrl.net](mailto:mailto:k9xv@arrl.net)
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## A note to anyone needing QSL cards made up:

**Heather Heininger, KB9ZLB, is doing a fine job of designing QSL cards for area hams. Contact Heather at [kb9zlb@arrl.net](mailto:kb9zlb@arrl.net) for more information.**

**If anyone has any items for the newsletter, please send them to Ken Bandy at [kc9glq@arrl.net](mailto:kc9glq@arrl.net)**