



Product Review and Short Takes from QST Magazine

November 2005

Product Reviews:

ICOM ID-800H Dual-Band FM and Digital Transceiver
LDG Electronics TW-1 Talking Wattmeter

Short Takes:

Electronics Genius

PRODUCT REVIEW

ICOM ID-800H Dual-Band FM and Digital Transceiver

Reviewed by Michael Tracy, KC1SX
ARRL Test Engineer

In recent *QST* Product Review columns, we evaluated two single-band ICOM products that can, as an option, be equipped with the new digital VHF and UHF feature called D-STAR.^{1,2} We also took an in-depth look at the D-STAR system, and installed and tested optional D-STAR modules in a pair of 2-meter FM transceivers.³⁻⁵ Taking the next logical step, ICOM has included native D-STAR digital voice and data features in their latest FM dual-band (2-m/70-cm) mobile transceiver, the ID-800H. While digital voice is still relatively new to the amateur bands, it is here to stay and is sure to grow in popularity as more digital-capable radios hit the market.

It is well known that FM has an advantage over AM in improving the signal-to-noise ratio of a wide range of signal levels. When it comes to voice and slow speed data communications, digital encoding and decoding of the modulation has a further advantage over FM. Indeed, with the intelligent, adaptive, vocoders (voice encode/decode) on the market and under development, the noise reduction on voice signals is especially impressive. The system is not without its limitations and drawbacks, but the technology is still being refined and improvements in algorithms are just a matter of time. All the same, it has definitely moved out of the “early adopter” stage and into the mainstream, as the ID-800H aptly proves.

¹J. Garcia, “ICOM IC-2200H 2 Meter FM Transceiver,” Product Review, *QST*, Nov 2004, pp 66-68.

²D. Henderson, “ICOM IC-V82 2 Meter Handheld Transceiver,” Product Review, *QST*, Jun 2005, pp 65-67.

³W. Silver, “D-STAR Digital Voice and Data—An Overview,” Product Review, *QST*, Jun 2005, pp 67-69.

⁴M. Tracy, “Installation and Test of UT-118 Digital Voice Modules,” Product Review, *QST*, Jun 2005, pp 69-70.

⁵J. Garcia, “Operating with the ICOM UT-118 Digital Voice and Data Unit,” Product Review, *QST*, Jun 2005, pp 70-71.



ID-800H Lineage

The most casual observer will note the remarkable resemblance of the ID-800H to the popular IC-208H dual-bander.⁶ If you take a quick look at the two side by side, you would probably think they are the same radio. In one sense, you would not be far wrong. The case and controls are nearly identical in appearance, as is the detachable control head, the heat sink and rear-mounted fan (Figures 1 and 2). Also, the performance figures of the two radios are within unit-to-unit variation on most Lab tests, with a slight slip in image rejection on 2 meters and some changes in 9600-baud bit-error-rate (BER) performance. Not surprisingly, the ID-800H has mostly the same analog feature set as the IC-208H. Let's take a closer look.

The first clue to the difference in the ID-800H appears on the BAND button in the

center of the tuning knob. This button now serves a second purpose—controlling the MODE as well. When you hold the button in for a few seconds, the characters NAR AM DV start flashing in the lower left-hand portion of the display, then you rotate the dial to select between FM, narrow FM, AM, narrow AM (AM modes are for receive only) and digital mode (for digital voice and low-speed data transfer). The second clue is the addition of the labels BK and EMR above the row of five buttons under the display (more on this later). The last clue appears on the back of the main unit. The usual 6-pin mini-DIN has been replaced with an 8-pin version (same diameter, different pin arrangement), adding two pins for RS-232 serial port input and output connections (no handshaking lines).

A Full Set of Analog Features

Since the analog portion of the '800H is based on the '208H, readers interested in a detailed rundown of the analog features of the radio should refer to that October 2003 review. For the benefit of those who missed it, here is a quick summary. Note that this is just a highlight of the features rather than a comprehensive list.

The control panel (Figure 3) has three knobs (VOL, SQL, and tuning) and nine buttons (SET LOCK, S.MW MW, BAND MODE, V/MHZ SCAN, M/CALL PRIO, TONE T-SCAN, LOW DUP, MONI DTMF and PWR). The functions of the knobs are mostly self-evident, although squelch is a bit more than just that. At the 12 o'clock position, squelch is at maximum and

Bottom Line

ICOM's ID-800H pushes the future of digital voice by integrating D-STAR compatible digital voice and data features, a full-featured dual-band analog FM transceiver, and wideband and AM receive features in one convenient package.

Table 1
ICOM ID-800H, serial number 0501245

Manufacturer's Specifications	Measured in ARRL Lab
Frequency coverage: Receive, 118-174, 230-550, 810-1000 MHz (cell blocked); transmit, 144-148, 440-450 MHz.	Receive, as specified; transmit, 144-148, 420-450 MHz.
Power requirement: Receive, 1.1 A (max audio); transmit, 12.5 A (high power).	Receive, 0.61 A; transmit, 10 A. Tested at 13.8 V.
Modes of operation: FM, GMSK (digital), AM (receive only).	As specified.
Receiver	Receiver Dynamic Testing
AM sensitivity, 10 dB S/N: 118-174 MHz, 0.45 μ V; 230-300 MHz, 0.79 μ V; 300-500 MHz, 0.63 μ V.	For 10 dB S+N/N: 120 MHz, 0.4 μ V.
FM sensitivity, 12 dB SINAD: 118-174 MHz, 0.18 μ V; 230-300, 500-550 MHz, 0.32 μ V; 300-500 MHz, 0.22 μ V; 810-1000 MHz, 0.45 μ V.	For 12 dB SINAD, 144 and 430 MHz, 0.13 μ V.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 146 MHz, 69 dB; 440 MHz, 66 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 146 MHz, 69 dB*; 440 MHz, 66 dB*; 10 MHz channel spacing: 146 MHz, 88 dB; 440 MHz, 82 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	92 dB.
S-meter sensitivity: Not specified.	S9 indication: 146 MHz, 1.7 μ V; 440 MHz, 2.0 μ V.
Squelch sensitivity: < 0.13 μ V.	At threshold: 146 MHz, 0.06 μ V; 440 MHz, 0.09 μ V.
Audio output: >2 W at 10% distortion into 8 Ω .	2.3 W at 10% THD into 8 Ω .
Spurious and image rejection: >60 dB.	First IF rejection, 146 MHz, 98 dB; 440 MHz, 103 dB; image rejection, 146 MHz, 118 dB; 440 MHz, 78 dB.
Transmitter	Transmitter Dynamic Testing
Power output (H/M/L), 144 MHz: 55/15/5 W; 430 MHz, 50/15/5 W.	146 MHz, 54/13/4.2 W; 440 MHz, 48/14/4.7 W.
Spurious-signal and harmonic suppression: >60 dB.	VHF, 69 dB; UHF, 72 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	S9 signal, 146 and 440 MHz, 173 ms.
Receive-transmit turnaround time (tx delay): Not specified.	146 and 440 MHz, 55 ms.
Bit-error rate (BER), 9600-baud: Not specified.	146 MHz: Receiver: BER at 12 dB SINAD, 1.6×10^{-3} ; at 16 dB SINAD, 3.9×10^{-5} ; at -50 dBm, 2.2×10^{-5} ; transmitter: BER at 12 dB SINAD, 4.2×10^{-4} ; at 12 dB SINAD + 30 dB, 1.5×10^{-4} . 440 MHz: Receiver: BER at 12 dB SINAD, 8.0×10^{-4} ; at 16 dB SINAD, 1.3×10^{-4} ; at -50 dBm, 7.1×10^{-5} ; transmitter: BER at 12 dB SINAD, 4.0×10^{-4} ; at 12 dB SINAD + 30 dB, 1.4×10^{-4} .
Size (height, width, depth): 1.6x5.6x7.3 inches; weight, 2.6 pounds.	
Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.	
*Measurement was noise limited at the value indicated.	

further rotation of the control adds a variable RF attenuator (up to 10 dB) to the squelch, raising the required signal level to open it. As the manual warns, the attenuator is active even when the monitor function is being used, so it is suggested

that you use this feature only when needed. When the attenuator is active, the display shows an ATT indicator.

The tuning knob has detents that provide a very positive feedback to the touch, with each click giving one frequency step

up or down. Two of the buttons are adjacent to the tuning knob, one is in the center of the knob, five are in a row along the bottom of the display and the last (PWR) is between the volume and squelch knobs. Except for the power button, all the buttons are either backlit or lighted, and their feel is good, with a distinctly audible click when pushed.

The set menu is for items you would normally change less frequently (such as the display color, which has options of amber, yellow or green) whereas the control panel button functions are for items you typically use more often (programming memories, changing bands, scanning, changing transmit power level and so on). Each button has two functions, with the alternate functions activated by pushing and holding the button for a few seconds.

There are 500 main memory channels, organized into a maximum of 10 banks. The arrangement is totally up to the user—you can have one bank of 500 or 10 banks of 50 or any combination you can come up with that adds up to 500. Each memory can be assigned an alphanumeric title. The other memories consist of five pairs of scan edges and two call channels, bringing the total to 512. There are also 10 preset NOAA weather broadcast channels, and a weather alert function that monitors a selected weather frequency every 5 seconds for NOAA weather alert tones.

The controls relating to repeater operation include the same ones found on most current VHF and UHF transceivers. The handy auto repeater function sets the transmit frequency offset direction, and the amount of shift can be programmed for repeaters that use something other than the standard 600 kHz separation on 2 meters and 5 MHz separation on 440 MHz. The subaudible tone functions include CTCSS (with 50 tone options) for both encode and decode, DTCS squelch, and pocket beep for paging type operating. Tone scan can pick off a transmitted signal's CTCSS or DTCS tone. The audible tone functions include standard DTMF tones and the 1740 Hz call signal tone. The '800H also has automatic power off and a transmit time-out timer, along with scanning functions *Priority Watch*, *Memory Scan Watch* (increments memory channel between scans) and *Call Channel Watch*. An NTX menu function (narrow FM transmission) switches between two deviation settings (± 5 kHz or ± 2.5 kHz) on transmit.

D-STAR Digital Capabilities are Built In

The digital capabilities of the ID-800H



Figure 1—The ID-800H with front panel removed. Standard and optional cables allow a wide variety of mounting options. Most common radio functions can be controlled from the standard HM-118N microphone.

include the same D-STAR features provided by the UT-118 option module for the IC-2200H, IC-V82A and IC-U82A transceivers. The ID-800H provides for digital voice communication with other ID-800s and the aforementioned UT-118 equipped transceivers.

Low speed data transfer (950 bps) is also supported, and digital voice and data can be exchanged simultaneously on the same frequency. Unlike packet, data transmissions are not bunched into groups, but rather sent as a constant stream of bits. The optional OPC-1384 data communication cable provides the connection between the appropriate pins on the transceiver's 8-pin mini-DIN and the RS-232 port of a data source (a personal computer, PDA, GPS receiver, dumb terminal or other device). The only data handshaking provided is

Xon/Xoff flow control. The data rate between the radio and the device can be set to 4800 or 9600 baud, but this should definitely *not* be confused with 9600 baud packet data rates. (The ID-800H does support 9600 baud packet in the analog mode only.)

There is also a GPS position reporting capability. While the data format is a standard NMEA 0183 type that is used by most GPS receivers, the system can't exchange position reports with typical APRS systems because of the different transmitted data scheme. Typical packet systems use two audio tones to represent a binary data stream, but the D-STAR system uses a multiple tone system for digital communications. The data format is different as well—APRS transmissions contain more information. GPS data can be used between D-STAR systems, how-

ever, to provide similar tracking capability with a little help from software. (As of this writing, mapping software was not yet available for D-STAR GPS.) Although the ID-800H does not include any sort of TNC, you can still view the GPS information from other D-STAR stations on the display, one at a time and without retaining prior data. Of course, folks who want to use the radio on APRS can still communicate in the analog mode with appropriate software and external TNC.

The digital mode also provides the following features:

- text messages up to 20 characters (much like the cell phone equivalent);
- digital calling (with which you can select a particular call sign to “connect” to as in packet communications);
- CSQL (digital code squelch);
- DSQL (digital call sign squelch—to set the squelch to open when a particular call sign is received);
- call sign memories (stores the call sign heard on the frequency and up to two digital repeater call signs);
- BK (digital break in—allows breaking in on a digital voice or data QSO between other stations);
- EMR (emergency communication mode—bypasses call sign setting requirements);
- digital pocket beep (similar in concept to the analog equivalent) and a standby beep (which causes the radio to beep when the communicating station finishes transmitting).

In the review of the UT-118 digital module in the June issue, we tried an experiment using the digital mode through an analog repeater. It wasn't really expected to work, but we did learn a thing or two. One of the notable drawbacks was that when the transceiver was set to digital mode and it was receiving an analog transmission, no audio

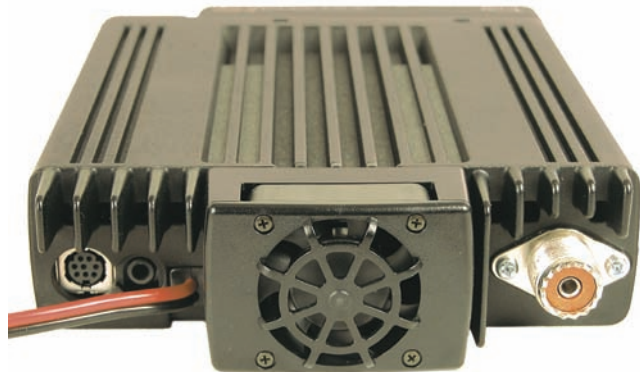


Figure 2—A cooling fan and heat sink dominate the rear panel of the ID-800H. The SO-239 antenna connector is used for both bands. The 8-pin jack on the far left is for packet and RS-232 connections. The other jack is for an external speaker.



Figure 3—The ID-800H control head packs a lot of features into a small space. Dual-purpose push buttons control most of the commonly used functions, while many others are selected via the set menu.

could be heard. One of the nicer features of the ID-800H is that ICOM has now included an "Analog Monitor" function so that analog transmissions can be heard while you are in the digital mode, helping prevent interference to ongoing analog QSOs.

Read the Manual!

Whenever the Product Review Editor hands me a new transceiver, I always try to figure out how to do a few basic things on my own. Then, when I get stuck, I grab the manual and read through it, experimenting with new functions after reading about them (very much an, "ah-ha, so *that's* how that works!" process). Although I've tested well over a hundred radios in eight years of product testing for this column, there is always something I learn from every new piece of equipment, so I find that the time spent giving the manual a good read is well worth it.

The 132-page ID-800H instruction manual is concise, well-illustrated and easy to read, but like many recent manuals could use a little improvement in organization. It's split into three main sections and then subsections. The main sections describe how to set up the radio for your first contact, how to work the more advanced functions (this is the bulk of the book), and diagrams showing how to access and use the various set menu functions. This approach is fairly logical, but it describes the same functions in multiple places so a bit of page flipping is required to find out all there is to know about some of the features. I'm used to this, but it can be a little frustrating for folks new to modern VHF/UHF FM equipment—even when they have extensive experience with other types of transceivers. The flow chart description of the set mode and initial set mode menus was very helpful—it might be a good idea to make laminated copies of them to have on hand as a quick reference. The separate 13-page "Ham Radio Terms" pamphlet was a nice touch for anyone unfamiliar with commonly used abbreviations.

As noted in previous reviews of D-STAR capable equipment, the task of describing the digital system is rather more complex than dealing with analog voice communications, and the required menu settings are another level of unfamiliarity that even seasoned Amateur Radio operators may find difficult at first. ICOM's documentation on D-STAR continues to develop, and the 19 pages of text in the ID-800H manual are the quite an improvement over the somewhat cryptic text of the D-STAR sections in the manuals of the IC-2200H and IC-V82A we reviewed earlier.

Flexible Mounting Options

The control head is compact, yet simply laid out for ease of use and features large frequency digits that are easy on the eyes. When the first crop of remote head transceivers came out, I thought that having separate mounting locations was more novelty than practical, but now I have to say I prefer remote mounting, as it gets the main body of the radio away from the driver (out of the way of knees and hands) and out of the sight of potential thieves. The in-trunk mounting that the ID-800H permits goes a step further, also getting the transceiver out of the way of the feet of back seat passengers.

When unpacking the transceiver, my attention was drawn to the remote head mounting cable, which is 11.5 feet long. Several years ago, I bit the bullet and drilled a hole in the middle of the trunk of my car, so it is now the default antenna mounting location. Since then, I've wanted to try a remote mount radio installation to see how well it would work out. The length of the supplied cable will accommodate most in-trunk installations, and a 23-foot cable is available as an option. The standard cable is also a good length for under-seat mounting. Even if the transceiver's body is console mounted, you may want the control head more conveniently placed so you can readily see it from the driver's seat. With the transceiver's cooling requirements, in-dash mounting is not recommended. The remote cable mounts flush with the back of the control head, so the latter can be mounted on a convenient location on the dashboard. If mounting elsewhere is preferred, several mounting bracket options for the control head are available.

The ID-800H does not include an extension cable for the microphone, but the coiled cord of the supplied HM-133 microphone is about 5 feet, suitable in most cases for under-seat or console mounting. If something longer is needed, ICOM offers two optional cables, 8.2 feet and 16.4 feet. Although it may seem odd that these lengths do not match the control head separation cable length, most folks would not mount the microphone right next to the control head anyway. Ever since manufacturers switched over to RJ-45 microphone connectors for most mobile transceivers, I've wondered if another cable using the same connector might also work as an extension. Remote-mounting the ID-800H seemed an opportune time to experiment, so I tried a 10-foot length of shielded CAT5 network cable with an appropriate shielded gender changer. The combination seemed to work fine, apart from being rather stiffer than a microphone extension cable would be.

Only one speaker extension cable is offered, but it is 16.4 feet in length, more than adequate for most installations. Obviously, a longer power cable is also required for trunk mounting in most vehicles, but ICOM has that covered too—an optional 23-foot power cable is available (the standard cable is 9.8 feet).

For those who prefer a simple hand microphone with only up/down buttons, an optional one (HM-118N) is available, relegating control functions back to the front panel. I found that having the control functions right on the HM-133 microphone was fairly addicting, and I preferred the way some of the microphone controls worked compared to the control head buttons. For example, the HM-133 has individual buttons for high, medium and low power so you can directly select the desired power without stepping through an extra choice. I found it so handy that I even wished for an addition or two (such as the 1 MHz tuning step accessible only via the control panel—very useful for quick frequency changes on 70 cm). I should note that there are two user programmable buttons on the microphone that can control a selection of functions. With all that control in the palm of your hand, you might be tempted to take your eyes off the road while driving, but that is *never* a good idea!

On-Air Impressions

I used the ID-800H in both mobile and fixed communications in the analog mode. As with the IC-208H, there was plenty of receive audio on tap, and it was readily understood with low distortion at fairly high volume levels. Transmitted audio was also clean and crisp according to those I conversed with, both on simplex and local repeaters. Unfortunately, a digital QSO could not be arranged in time for this Product Review. For more information about the on-air capabilities of D-STAR, see the June 2005 Product Review column⁵.

I found the balance of features and ease of use to be just about right, and I think ICOM has a real winner here, combining a versatile dual-band mobile transceiver with the extensive digital capabilities of D-STAR.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; tel 425-454-8155, fax 425-454-1509; www.icomamerica.com. Price: ID-800H, \$748; OPC-601R 23-foot separation cable, \$68; OPC-440 16.4 foot microphone extension cable, \$85; OPC-441 16.4 foot speaker extension cable, \$33; OPC-347 23-foot dc cable, \$47; SP-10 mobile speaker, \$69; MB-17A quick release mounting bracket, \$50.

LDG Electronics TW-1 Talking Wattmeter

Joel R. Hallas, W1ZR
QST Technical Editor

A quick look at the TW-1 and you know this is no ordinary wattmeter! The first clue is that there's no meter or digital display. Instead, there's a speaker and a volume control. The concept is simple and a wonderful idea, especially for people with vision impairments, but also for a number of other applications we will discuss in the paragraphs that follow.

Hook it Up and Off You Go!

This station accessory is simple to set up and get running. LDG even has a seven-step section titled *Jumpstart* or "Real Hams don't read manuals!" A summary of the steps are: hook it to your transmitter and antenna feed, connect a 12 V dc power source (wall wart supplied), and transmit. While you are transmitting, push FWD, REV or SWR to hear the value of the parameter. There is no power range selection—the TW-1 is autoranging to 2000 W. There is no ON/OFF switch. The TW-1 automatically turns itself on and then off after use. It couldn't be much simpler, but if you stop there you miss a lot of what this clever device can say and do.

Smarter Than the Average Meter

Not only does this wattmeter talk, but it also can speak any of three languages—English, German or Spanish. I am not an expert in other languages, but I could recognize the numbers in German, and others have confirmed that the Spanish does well also. These are not the "mechanical" robot voices we've come to dislike, but sound like real people with pleasant sounding voices. English is a male sounding voice, while the other languages have a definite female sounding voice.

The default language is English. To change to Spanish, remove power and then power up while the REV button is pressed. For German, power up with the SWR button depressed. To return to English just do

Bottom Line

This novel station accessory is especially useful for vision impaired operators, but its unique features will be welcome in many mobile or home stations.



the same with the FWD button. The language will stay in force with power on and off cycles, until you change it.

The next choice is to decide between the difference syntax forms provided. (You don't often find this covered in an Amateur Radio equipment manual!) The default is *verbose* mode. In this mode the meter speaks full sentences such as "the forward power is ninety seven watts," or "the SWR is four point two." Push REV and SWR while powering up and you enter *terse* mode. In terse mode the corresponding readings would be "ninety seven," or "four point two." Terse mode is probably what you want once your fingers learn the positions of the three front panel buttons.

Tired of small talk? Another option is tone output. If you hold any of the buttons for 3 seconds it will move to tone mode for the parameter you pushed. The next time you apply RF power (about 0.5 W is enough), the TW-1 will emit a tone that increases with pitch as the power increases. If you pick SWR, the tone will lower in frequency as SWR decreases (while adjusting your antenna tuner, for example). Fortunately, the minimum is not 0 Hz, which would be hard to null to, but what

sounds like about 600 Hz. If the SWR exceeds 3:1, the tone pulses to warn of excessive SWR. After 30 seconds without RF input, the unit returns to your previously selected speech mode.

Why Would You Want One?

The usefulness of the TW-1 for the vision impaired operator is obvious, but I think it goes further. There are many occasions when being able to use more senses for tuning and adjustment would be beneficial. The TW-1 allows eyes, if available, to focus where needed. The manual mentions tuning a mobile "screwdriver" antenna, for example. Now I've done enough HF mobile operation to know that it's remarkably easy to get a close view of a trunk ornament during mobile operation at high speed. Running the motor of a screwdriver between bands while watching an SWR meter could easily result in undesired sheetmetal mods. By using a TW-1 in tone mode, the process can happen without taking your eyes from the road.

Another application is amplifier tune-up. If you've tried to tune a tetrode linear amplifier while watching power out and screen

Table 2
LDG TW-1 Talking Wattmeter

Manufacturer's Specifications

Frequency range: 1.8-54 MHz.
Power range: 0-2000 W PEP, autoranging.
Accuracy: $\pm 5\%$ of reading measured at 14 MHz, $\pm 10\%$ at 6 meters.
Resolution: 1 W or 1% of reading.
Insertion loss: Not specified.
Power requirements: 11-15 V dc at 200 mA max; $<100 \mu\text{A}$ at idle.
Size (height, width, depth): 3x4.5x5 inches; weight, 1 pound.

Measured in ARRL Lab

As specified.
Tested to 1000 W.
See Table 3.
As specified.
<0.1 dB on all bands.
At 13.8 V dc, 200 mA max; $90 \mu\text{A}$ at idle.

Table 3
LDG TW-1 Talking Wattmeter Power Readings

Applied CW Power	Measured Power by Band			
	160 Meters	20 Meters	10 Meters	6 Meters
5 W	6.5 W	6.5 W	6.5 W	4.6 W
100 W	104 W	96 W	84 W	63 W
1000 W	1236 W	958 W	852 W	Not tested*

*No 1000 W source available for 6 meters.

Figure 4—The rear panel of the TW-1 has RF input and output jacks and a power connector.



current at the same time, you will immediately realize the benefits of having your ears on one of the parameters. The cost of one melted high-power tetrode could buy a number of TW-1s!

So How's it Work?

The TW-1 works very well indeed. Table 3 provides a comparison between readings of the TW-1 and the ARRL Laboratory calibrated Bird wattmeter with an accuracy of $\pm 5\%$. The TW-1 is not quite a laboratory standard device, but it's right up there with other general purpose meters we've examined and more accurate than many.

What it does offer is unparalleled resolution compared to wattmeters equipped with analog meters. For most operational, non-laboratory applications, resolution is at least as important as accuracy, since tuning is generally intended to make the most difference, not to obtain a particular power level. While the specified resolution is the larger of 1 W or 1%, mine is actually better, reading to 0.1 W below 10 W (for example, "five point one, five point two" and so on). It rounds to the closest 1 W up to above 100 W. At the top of its range, 2 kW, the steps open up to 20 W, still a lot closer

than I can read with my trusty Bird 43.

Documentation

The TW-1 comes equipped with well-illustrated 10-page instruction manual describing interconnections, operation and applications. It is well written and provides all that is needed to hook it up and get it working. The only omission, in my view, is the lack of a schematic diagram.

So What's Not to Like?


Very little. This is a well considered and executed product that will appeal to many. I did wonder about the lack of a power switch. The TW-1 is powered through a typical coaxial power connector on the rear panel, as shown in Figure 4. In my installation, I pulled the 12 V from a jack on the back of my transceiver. No problem—the power went off whenever I turned off the radio. I asked ARRL Laboratory Engineer Michael Tracy, KC1SX, to measure the standby (non-talking) power drain to see what was happening when it wasn't being actively used. It drew a mere 90 μ A when the TW-1 is being quiet. This means that the wall wart, if used, it likely will not notice the difference between being turned on or not, so I guess a

power switch may not be really required. If you wake to hear it reading the Gettysburg Address some night, it would probably be good to unplug it!

The only potential improvement I could envision would be to have provision to run the audio into a common point with receiver audio. This would take a headphone jack on the TW-1. I tried listening to the TW-1 speaker while wearing my well padded headphones. I turned up the volume and heard the TW-1 just fine. My long suffering spouse Nancy, W1NCY, noted that the neighbors probably heard it too! I guess this would only be a problem in a multioperator environment, or a location with folk who would just as soon not listen to "radio talk." This could likely be resolved in a few minutes in the typical workshop.

More to Come

The LDG Web site has announced a TW-2, likely available by the time this gets to you. The TW-2 will be similar to the model we reviewed, except that it will cover the bands 50 through 450 MHz and will handle 250 W.

Manufacturer: LDG Electronics, 1445 Parran Rd, St Leonard, MD 20685; tel 410-586-2177, fax 410-586-8475; ldg@ldgelectronics.com; www.ldgelectronics.com. Price: \$149. 

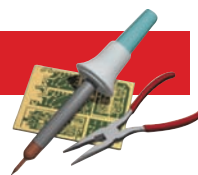
Going Once, Going Twice...

In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review, Short Takes or New Products columns—Ed.

The ARRL-purchased equipment listed below is for sale to the highest bidder. Prices quoted on the Web page are the minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty except as noted.

Details of equipment offered and bidding instructions can be found on the ARRL members' Web page at www.arrl.org/praction. The following items are available for bid in the November auction:

- MFJ-269 HF/VHF/UHF antenna measurement set.
- AlfaSpid antenna rotator and controller.
- Palstar WM-150 wattmeter.
- LDG Z-11 automatic antenna tuner.
- Electric Radio antenna tuning meter.



Electronics Genius

By Joel R. Hallas, W1ZR
QST Technical Editor

Have you ever scratched your head wondering what value, or even what type of component you had in your hand? If you're like most hams, you probably have bins, bags or boxes full of parts you have been saving to use in your next project. If you're like me, when it comes time for the project, you throw up your hands, get on the Internet and order a full set of parts, leaving the old parts where they were.

One reason for that may be that the profusion of marking and identifying schemes can make it difficult to identify the values of parts. One solution to this is to have a comprehensive reference on hand to make identification easy.

Enter *Electronics Genius*

Electronics Genius is just such a reference, in a handy software form. The opening page, Figure 1, can be accessed either by component type, along the top, or by comparison to the photos. Clicking on the middle picture in the top row, for example, brings up Figure 2—showing the coding for the mica capacitor. If you then click on the dots for each color element, the upper part of the figure will provide the value while the colors in the picture change to match the item you are trying to identify.

But Wait—There's More!

In addition to component identification, *Electronics Genius* provides a fairly comprehensive collection of tools for those who can't seem to remember those pesky formulas we all had to learn, or can't be bothered to dig out the calculator. There are tools that calculate reactance, resonant frequency, series and parallel combinations, antenna length and many other functions. To operate these, you merely plug the numbers in the

blanks provided, or use the "sliders" on many data entry points and the result appears right there in its own little block.

There are also tools that provide some information on semiconductors, transistors and even a bit about vacuum tubes, but don't expect details such as connection diagrams or ratings for most; this is just enough information to get you started.

Coming Attractions

In addition to the "production ready" tools, developer Steve Odell thoughtfully includes a BETA selection under the TOOLS tab and in some of the other menu areas. In the beta area are programs that have been developed, but are in the process of evaluation by customers. Those that I tried worked well, but weren't fully refined with tags and unit indicators as are the programs in final form.

Documentation

Electronics Genius is very intuitive, a good thing since there is no documentation for it. For me that wasn't a problem; however, some might want a bit of direction to get started. The *Electronics Genius* Web site is a bit difficult to navigate through, with lots of unrelated news feeds and other information. If you persevere to the bottom, you will find an icon for the program. I'm told by

Steve that he plans to put instructions and HELP screens on the Web page in the future.

Available Now on CD

Electronics Genius is available from Chester Electronic Supply Co, 311 Missouri Av N, Largo, FL 33770. Tel 727-585-4736, or www.electronicsgenius.com. Price \$49.95.



Figure 1—Compare a component to a picture or select the type from the tabs along the top to bring up the appropriate screen.

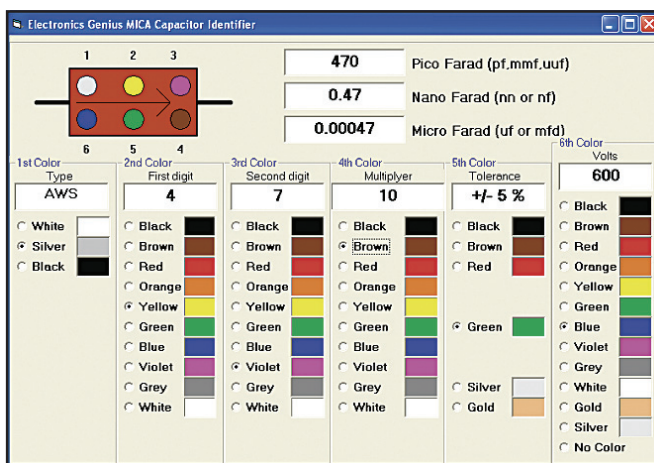


Figure 2—An example screen—a mica capacitor. Click on the colors you see on the device and up pops both a confirming picture and the value in multiple units.