



## Product Review and Short Takes from QST Magazine

November 2004

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## ICOM IC-2200H 2 Meter FM Transceiver

Reviewed by Joe Carcia, NJ1Q  
W1AW Station Manager

ICOM has introduced a new single band mobile transceiver with many functions and features. While some amateurs may not necessarily need all these “bells and whistles,” they will find that the IC-2200H will meet the requirements for nearly every 2 meter application.

“Wow, all heat sink!” was my first impression when I pulled the radio out of the box. To answer that first question—no, there’s no cooling fan! The IC-2200H does come with a remote control microphone; 3 meter long, fused dc cable; mobile mounting bracket with hardware, and microphone hanger.

This is a compact, no-nonsense, 2 meter FM mobile transceiver, weighing in at about 3 pounds. It includes all the features one would desire in an FM transceiver—CTCSS encoding and decoding (referred to as *Tone Scan*), DTCS or digital tone coded squelch, which performs a similar function to CTCSS using short sequences of sub-audible tones and is currently in favor with some emergency agencies, auto repeater offset, DTMF operation (DTMF decoding can be provided with the optional UT-108 Decoder Unit), programmable memory scan and band scan. The price is just above other single band radios, perhaps justified by the plug-in digital capability to be discussed later.

The radio includes expanded receive frequency coverage from 118 to 174 MHz, for both FM and AM modes. You can set the FM receive passband width from wide to narrow to match that of other services you may wish to monitor. The transmitter provides four power output settings: HIGH (65 W), MIDDLE (25 W), MIDDLE LOW (10 W) and LOW (5 W). I found the 5 W setting, appropriate for repeater operation in my area and used higher power just for some simplex operation.

The '2200H provides a total of 217 memory channels. This includes 6 scan edge memory channels (for scanning) and 1 call channel. There are 207 regular memory channels and 10 easily accessed memory *banks* (listed as A to J). Each memory can have up to a 6 character alphanumeric label including some symbols, such as *slash* or *star*.

### It's Not a *Busy* Radio!

The front panel includes nine non-



backlit buttons. With the exception of the POWER, S.MW(MW) and BANK (OFF) buttons, the functions of the remaining six buttons are labeled on the display. The POWER button is located to the left of the VOLUME control, with the S.MW(MW) below it. The RJ-45 modular style microphone jack is located beneath these two buttons. The BANK (OPT) button is located just below the MAIN dial. The letters in parentheses indicate those functions that are obtained through a menu procedure.

Reading from left to right on the display are the LOCK/SET, ANM/MONI, DUP/LOW, T-SCAN/TONE, PRIO/M/CALL and SCAN/V/MHZ functions. (The second listed functions are obtained by depressing the buttons for about a second.)

The LOCK/SET button toggles between locking the display or entering the SET mode. In the SET mode, the user may change various options, such as the color of the display (amber or green) or the CTCSS tone. The ANM/MONI button lets a user turn the monitor function or the channel names on or off (when using alphanumeric names for memories). The DUP/LOW changes the power settings as well the repeater offset, overriding the auto shift as needed. The T-SCAN/TONE button allows a user to select a tone function, whether it be the tone encoder (CTCSS), pocket beep, tone scan or even some of the functions related to digital mode operations (not available at press

time). The PRIO/M/CALL button enables priority watch on a selected watch channel or a change to weather channel mode. The SCAN/V/MHZ button enables scanning or toggles between the VFO and memory channels.

The S.MW(MW) button is used for memory channel programming including incrementing the channel number. The BANK (OFF) button is used to select among the 10 memory bank channels.

Three solid plastic knobs are used to control VOLUME, SQUELCH and MAIN DIAL functions. The knobs are indented and have a smooth feel. I found it easy to fly by a desired setting with the MAIN DIAL until I got the feel for it.

The multi-function LCD display (measuring about 1 × 3 inches) has clear, easy to read alphanumeric characters. The display’s brightness (DIM) level can be adjusted via a menu setting.

The display allows viewing from different angles. Even with it sitting atop my desk, I can look down and still read the display. When operating the radio from my truck, I found I was still able to see the display, although to me it appeared a bit easier if the display were amber—nice to have the choice. Speaking of the display, the front panel is not detachable.

On the rear of the radio, looking left to right you’ll find the two-pin standard locking power plug pigtail. Above that are jacks for the external speaker and for DATA IN. Next is the large heat sink. A standard SO-239 chassis-mounted antenna connector rounds it out. Since the antenna connector is somewhat recessed between some long cooling fins and a smaller one on the opposite side of the connector, screwing on the PL-259 takes nimble fingers.

As noted, this radio is like one big heat

### Bottom Line

With the IC-2200H ICOM has a solid 2 meter mobile radio ready to be upgraded to digital voice and data as soon as the optional module becomes available.

**Table 1**  
**ICOM IC-2200H, serial number 0501183**

<b>Manufacturer's Specifications</b>	<b>Measured in the ARRL Lab</b>
Frequency coverage: Receive, 118-174 MHz; transmit, 144-148 MHz.	Receive and transmit, as specified.
Power requirement: Receive, 1.0 A (max audio); transmit, 15 A (high power).	Receive, 0.6 A; transmit, 13 A. Tested at 13.8 V.
Modes of operation: FM, AM (receive only).	As specified.
<b>Receiver</b>	<b>Receiver Dynamic Testing</b>
FM sensitivity, 12 dB SINAD: 0.14 $\mu$ V typical.	For 12 dB SINAD, 0.13 $\mu$ V.
AM sensitivity: Not specified.	For 10 dB S+N/N: 120 MHz, 0.57 $\mu$ V.
FM adjacent channel rejection: Not specified.	73 dB.*
FM two-tone, third-order IMD dynamic range: Not specified.	73 dB. 10 MHz channel spacing: 91 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	90 dB.
S-meter sensitivity: Not specified.	S9 indication: 5.9 $\mu$ V.
Squelch sensitivity: 0.1 $\mu$ V typical.	At threshold: 0.09 $\mu$ V.
Receiver audio output: 2.4 W at 10% THD.	2.5 W at 10% THD into 8 $\Omega$ .
Spurious and image rejection: Not specified.	First IF rejection, 110 dB; image rejection, 86 dB.
<b>Transmitter</b>	<b>Transmitter Dynamic Testing</b>
Power output (H/M/ML/L): 65/25/10/5 W (approx).	69 / 26 / 9 / 4 W.
Spurious and harmonic suppression: $\geq$ 60 dB.	70 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time: Not specified.	PTT release to S9 signal, 164 ms, 50% audio output
Receive-transmit turnaround time (tx delay): Not specified.	112 ms.

Size (height, width, depth): 1.6 $\times$ 5.5 $\times$ 5.8 inches; weight, 2.8 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 indicators.

sink. With a maximum power output of 65 W and no cooling fan, you'll need this kind of sinking for proper heat dissipation. What's good about this is that you don't have a noisy cooling fan. The flip side is that since the radio's cabinet is used to dissipate heat, extra consideration must be given to where and how the radio is installed in either a mobile or base situation. The manual provides some basic installation tips with this in mind.

This quickly leads me to operating the radio. I tried running it on high power for quite some time (on simplex). The radio got quite warm, but never uncomfortably hot to the touch. It took some time for it to cool down afterwards, perhaps because there was little airflow in my shack at the time.

I reviewed this radio in late summer with popcorn thunderstorms, rain and humidity—welcome to summer in New England! With tropical storm Bonnie and Hurricane Charley knocking on our back door, it should come as no surprise that I listened with interest to the NOAA

weather broadcasts. The '2200H provides coverage of 10 NOAA weather channels with a *weather alert* function (selectable via a menu setting). By depressing the PRIOR/CALL button several times, you can select the weather group. You can activate the weather alert function by using the SET mode.

This weather alert function is one that many SKYWARN folk may find useful. In the event of an extreme weather situation, NOAA sends out a weather alert that is accompanied by a 1050 Hz tone, and then the weather report. You can set the '2200H to monitor (or scan) the 10 weather channels for this alert tone. If this tone is received, the '2200H will beep, and the display will indicate ALT (for *alert*) and the particular weather channel number.

You also do not need to be listening to a weather channel to receive this alert. You can be in casual QSO, but have the alert system running. However, be advised the '2200H will toggle back and forth about every 5 seconds between the weather chan-

nels and your listening frequency.

Another feature I like is the *Auto Repeater* function. When it is activated (the default is *On*), all you do is set the desired frequency and the radio sets the corresponding shift. (The shift is preset to conform to the accepted band plan of the country in which the radio is sold.) If a repeater has a nonstandard shift, you can disable this function and set the shift manually.

The *Channel Stepping* (tuning rate) is selectable from 5 (default) to 50 kHz in 8 steps via the SET system.

The '2200H provides for direct keypad frequency entry via the mic keypad. You depress the ENT/T-OFF (C) button first, and then you can key in the frequency. This occurs while in VFO mode. If you're in memory mode, you may enter a memory channel number instead of a frequency.

If a selected repeater supports phone patching or remote control of other functions, the 16 number DTMF MEMORY ENCODER can be quite handy. To memorize a DTMF sequence takes a few steps. It took me a couple of tries to get the process just right. The manual does a good job of explaining how to perform the programming and once you perform the actions a couple of times, it'll become second nature to set up.

Frequency Scanning is simple to set up. There are three scan types—full scan, programmed scan and memory bank scan. There are four scan resume options. The two I found most useful were timer scan; with pauses of 5, 10 or 15 seconds until scan resumed, or busy resume in which the scan will hold the frequency until the signal disappears.

To start scanning, you select the scan type and then press and hold the SCAN/V/MHZ button for at least 2 seconds. To stop the scan, you can either quickly depress the mic PTT button, or just depress any of the mic or display buttons. You can also control either scanning direction with the MAIN DIAL.

The IC-2200H has the standard fare of a priority watch function, pocket beep "common pager" function, time-out-timer, auto mute, auto power off. In terms of settings, there are 30 SET menus from which to choose.

### A Mic of Many Functions

The DTMF 25-key backlit microphone (model HM-133V) performed as expected. Some microphone buttons can be programmed to operate some of the front panel control functions. I did have to get used to the UP and DOWN buttons being on the front of the microphone. But since they're located next to the PTT button, I can control the frequency (or any other

setting) with just a twitch of the thumb—very handy while driving. Audio reports from this microphone were all good.

### So How Did It Perform?

Although it's one thing to receive good signal reports, it's another to actually hear "yourself" and how you sound on a radio. I always swap the radio with another ham so I can hear how well the audio sounds. As I expected, I found the transmit audio to be clean. (Reports from QSOs both on simplex and repeaters told me about the same.)

I used this radio both in my truck and at home. In both cases, I found the receive audio levels to be acceptable. The speaker is mounted underneath the radio, so when it was on my bench I had to prop it up. If this radio were to be mobile-mounted, however, I would see no need for an external speaker—unless the vehicle itself were really noisy.

I tried the old "operating the radio when WIAW came on frequency" while I was in the ARRL HQ parking lot under the antenna. I heard no intermod from WIAW. Yes, the signal appeared a bit wider than normal, but that is to be expected given the power of the ARRL code practice and my location. When I drove around town, I did not experience any other interference.

I could not find any mention of operating packet radio with the basic IC-2200H, although it should be capable of 1200 bps analog packet. Yes, you have the pin out for the microphone, and there is a pin for *Data In*. But I found no discussion about packet radio. With the UT-115 digital module (when available), the radio promises to handle data to 9600 bps and digital voice.

### Programming

In general, there are two ways to program a memory channel—by using the display buttons or by the microphone keys. As with most radios, you select your frequency and settings (tones, offset, etc) first and then you go through the process of

assigning that information to a memory channel. It's quite simple, actually. In VFO mode, set the frequency and settings. Depress the S.MW(MW) button momentarily. Then rotate the MAIN DIAL to the desired memory channel, and depress S.MW(MW) again to write the information.

When you're pushing a button to perform a function, there is certainly a difference between the terms "momentary" and "second." So don't be too surprised if you find that a function is missed simply because the "momentary" was a tad longer than it needed to be. But once you get used to it, it's a snap.

### Send in the Clones

The IC-2200H can clone configuration data to and from another IC-2200H, or from a PC using the optional CS-2200H software and the optional OPC-478 serial cable. (The OPC-478U is a USB cable.) There is little information in the manual on exactly how to clone. The manual indicates that one should consult the cloning software help file for details.

### A Manual, and a Half

The 94 page manual is laid out in a straightforward manner. You begin with *Foreword, Precautions, Supplied Accessories, Index* and then a *Quick Reference Guide* on installation and operation. The operation section starts with the general operation of the radio, including how to set up various functions. The rear of the section is devoted to menu functions and programming.

With the radio package, you also receive a book of *Ham Radio Terms*. This makes a nice little addition to help understand ICOM's terminology, or you may wish to give it to a family member.

### What's New but Not Yet Available?

The IC-2200H is the first member of a family of ICOM VHF and UHF radios equipped for the yet to be released UT-115 digital voice and data module.

We were hoping to have the module available for this review, but since it wasn't available we will provide an evaluation later. This module promises direct digital data transmission and digital voice operation simultaneously when used with another UT-115 equipped radio. When that is installed, the DATA JACK on the rear of the radio will be activated and allow connection to either a PC or a GPS receiver with an RS-232C serial port.

In order to install the UT-115, you will need to remove the front panel. It's as simple as removing two screws and the MAIN DIAL knob.

The following are the features expected to be supported when the digital option is installed: digital voice, digital call received retention, digital break-in (allows breaking into digital communications between two other digital mode stations), digital code/call sign squelch, 4800 and 9600 bps data communications (using a PC) and GPS operation.

### A Closing Thought

Aside from not being able to play with packet, or with the digital option, I was quite pleased with the performance of this radio. I found I was able to handle many of the settings/menus without difficulty. Of course, not having it so chock-full of the "extra" features of a multiband radio didn't hurt. (Sometimes, too many is *too much!*) I believe that most hams would find that this radio would work fine for just about every application, especially if they wanted to be positioned for digital voice when the option becomes available. Although there are a few functions that some hams may never use, having them available is a selling feature.

*Manufacturer:* ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; tel 425-454-8155; [www.icomamerica.com](http://www.icomamerica.com). Price: IC-2200H, \$229.99; OPC-478 serial programming cable, \$45.99; OPC-478U USB programming cable, \$60.99; UT-108 DTMF decoder, \$35.99.

## Yaesu FT-897D and FT-857D MF/HF/VHF/UHF All-Mode Transceivers

Reviewed by Bob Schetgen, KU7G  
Senior Assistant Technical Editor

### It's Been Fun . . .

I reviewed the FT-897 in the spring of 2003.<sup>1</sup> My review experience and the re-

sults of our Lab tests sold me. I bought one, and I've not regretted it.

I had not yet completed a mobile installation, while on vacation in Maryland, so I operated on the Yaesu's internal battery from the back of my wagon with the hatch open and an old Hustler whip clamped to the hatch. A contact in Michigan from under a water tower was a good start.

While CW QRP with a reasonable

antenna is great fun, operating ARRL Field Day from my father-in-law's yard taught me that 20 W fed to a mobile whip greatly limits SSB contacts. The flexibility of being able to operate the '897 either as a self-contained low power transceiver using the (optional) internal batteries or as a full 100 W transceiver from an auto battery or ac supply (optional internal FP-30 supply that fits in

<sup>1</sup>R. Schetgen, "Product Review: Yaesu FT-897 MF/HF/VHF/UHF All-Mode Transceiver," QST, May 2003, pp 63-67.

## Bottom Line

The “D” models offer useful enhancements to make us consider an upgrade or make it a desirable choice for a first-time buyer—at the same prices as the original models without accessories.

the battery compartment or external supply) has contributed to its popularity.

My desire for a mobile station came from my wife’s business. I support her, but the trips take me far from home with a lot of time on my hands. My old Hustler now resides on the wagon with a coax line that reaches the front seat or the hood. I can operate from inside or outside the vehicle comfortably with only a moment’s notice.

One such trip found me in the rain outside a restaurant near Boston. The result was a wonderful contact with Argentina. We had landline quality, and the OM on the other end asked what I was running. The circuit ran from his amplifier and four-element Yagi to my FT-897 and the whip!

Okay, you know I’m happy with the old rig. The question for me, and many other users, is “why do I need a D?”

### What’s a “D” Model?

When the initial demand for the FT-100 began to diminish, Yaesu introduced a “D” model with some of the most popular accessories as standard equipment. The result was an enduring product that remains in their catalog.

Continuing that strategy, they have introduced the FT-857D and FT897D. Both operate *conveniently* on the five new 60 meter channels authorized for US hams. Also included is the temperature-controlled crystal oscillator stage that was optional on the previous models. In addition, the ’857D includes the DSP circuit that was formerly an extra-cost option. The rest of the features and performance of the D models are comparable with the previous models. See the earlier reviews for the basic features, which remain unchanged in the new versions. Table 2 is the lab data taken to verify that the performance is similar to the original units. We installed the optional 500 Hz CW filters in one of the two open filter slots of each radio for testing. As noted there were some changes in receiver performance. Yaesu has made an attempt to improve dynamic performance through a change in roofing filter design, resulting in a significant improvement in wide-spaced dynamic range. Other data is similar to the earlier version.

### 60 Meter Operation

The conditions for use of the 60 meter channels are unusual for amateur operation and are spelled out at [www.arrrl.org/FandES/field/regulations/faq-60.html](http://www.arrrl.org/FandES/field/regulations/faq-60.html). The five channels are specified by their center frequencies, bandwidth, mode and radiated power. The D models

come factory programmed with five memories set indicating the channel center frequencies and in USB mode. Manually entered memory locations show the suppressed carrier frequency rather than the center of the channel and there has been some confusion resulting from this. The ARRL Lab confirmed that the

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Figure 1—Front view of FT-897D with MH-59 Remote Control Microphone.



Figure 2—Front view of FT-857D with standard mic.

Figure 3—View of FT-857D with panel removed. The YSK-857 Separation Kit can be used to allow the front panel to be remotely mounted.



60 meter channels are indeed on the allocated frequencies when the factory provided channels are selected.

This makes 60 meter operation as simple as switching from VFO mode to memory mode and selecting the desired

channel. Note that the FCC regulations limit output power to 50 W effective radiated power (ERP) compared to a dipole. If you have a dipole with no transmission line loss, you need to set your output power to 50 W to be compliant.

With any other type of antenna you will need to compute and record the allowable power to be compliant.

## Why TCXO?

The TCXO option is popular because many operators want a temperature-compensated crystal oscillator reference to ensure that their operating frequency stays constant over a wide range of ambient temperatures. It is also a good idea considering the close frequency tolerances for 60 meter operation and V/UHF on CW and SSB. The option is also useful when the radio is used as a microwave IF. Finally, it's a necessity for narrow-bandwidth work such as the JT modes for EME at VHF and higher.

## To Buy or Not to Buy?

Before purchasing the FT-897, I considered the FT-857, but I was looking for more than a mobile radio. Since then, the '897 has become my radio of choice and inspired a renewed interest in operating. I've put up a 525-foot-perimeter horizontal loop in the trees around the house, and now operate from home when I get the chance. Hence, I need to disconnect, carry and reconnect the rig for every trip. What a drag! How about a dedicated mobile rig for the car? Shortly after the FT-897, Yaesu introduced its mobile-dedicated counterpart, the FT-857.<sup>2</sup>

## FT-857

Electronically, the two are nearly identical. The '857 gives up the compartment for internal batteries or power supply to achieve a *much* smaller package designed especially for mobile, rather than portable operation. The DSP board became an extra-cost accessory (now standard in the D model). The '857 also takes an accessory remote control microphone (MH-59A8J) that puts most of the radio's features in the operator's hand. (The microphone works with '897s, as well.<sup>3</sup>) The '857 has a removable front panel

<sup>2</sup>R. Arland, "Product Review: Yaesu FT-857 MF/HF/VHF/UHF Transceiver," *QST*, Aug 2003, pp 63-67.

<sup>3</sup>To work with the microphone, early (before about June 2003) FT-897s require a Yaesu firmware update. For the update, you must send the radio to a Yaesu repair facility. If the radio's warranty has expired, there is a small charge for the service.

You can determine whether a particular radio needs the update by repeatedly pressing the DSP button on the front panel. If the action simply brings up the DSP multifunction menu and leaves you there, the radio needs the upgrade. If repeated presses toggle between the current multifunction menu and the DSP menu, the radio should work with the microphone.

**Table 2**  
**Yaesu FT-857D, serial number 4H0260120**

### Manufacturer's Specifications Receiver

SSB/CW sensitivity, bandwidth not specified, 10 dB S/N: 1.8-30 MHz, <0.2 μV; 50-54 MHz, <0.13 μV; 144-148, 430-450 MHz, <0.13 μV.

Blocking dynamic range: Not specified.

Two-tone, third-order IMD dynamic range: Not specified.

Third-order intercept: Not specified.

Second-order intercept: Not specified.

### Transmitter

Power output: HF and 50 MHz: SSB, CW, FM, 100 W, AM, 25 W (carrier); 144 MHz, SSB, CW, FM, 50 W, AM, 12.5 W (carrier); 430 MHz, SSB, CW, FM, 20 W, AM, 5 W (carrier).

Spurious-signal and harmonic suppression: ≥50 dB on HF; ≥60 dB on VHF and UHF.

SSB carrier suppression: >40 dB.

Undesired sideband suppression: >50 dB.

Third-order intermodulation distortion (IMD) products: Not specified.

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

**Bold type** indicates data from the original FT-857 review.

\*Measurement was noise-limited at the value indicated.

### Measured in the ARRL Lab Receiver Dynamic Testing

Noise floor (mds), 500 Hz filter:

	Preamp off	Preamp on
3.5 MHz	-126 dBm	-135 dBm
14 MHz	-128 dBm	-137 dBm

Noise floor (mds), 2.4 kHz filter:

	Preamp off	Preamp on
5.3 MHz	-121 dBm	-129 dBm

Blocking dynamic range, 500 Hz filter:

Spacing	Preamp off/on	Preamp off/on
20 kHz		5 kHz

3.5 MHz	125*/123* dB	96/95 dB
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<b>orig</b>	<b>111/109</b>	<b>99/102</b>
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14 MHz	122*/120* dB	96/95 dB
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<b>orig</b>	<b>109/106</b>	<b>96*/89*</b>
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Blocking dynamic range, 2.4 kHz filter:

Spacing	Preamp off/on	Preamp off/on
20 kHz		5 kHz

5.3 MHz	116*/116* dB	91/91 dB
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IMD dynamic range, 500 Hz filter:

Spacing	Preamp off/on	Preamp off/on
20 kHz		5 kHz

3.5 MHz	84/83 dB	68/67 dB
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<b>orig</b>	<b>91/90</b>	<b>68/67</b>
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14 MHz	88/88 dB	68/67 dB
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<b>orig</b>	<b>86/89</b>	<b>67/65</b>
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IMD dynamic range, 2.4 kHz filter:

Spacing	Preamp off/on	Preamp off/on
20 kHz		5 kHz

5.3 MHz	81/80 dB	64/63 dB
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Spacing	Preamp off/on	Preamp off/on
20 kHz		5 kHz

3.5 MHz	+2.3/-6.8 dBm	-18/-26 dBm
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<b>orig</b>	<b>+5.6/-1.9</b>	<b>-21/-29</b>
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14 MHz	+4.1/-4.9 dBm	-20/-29 dBm
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<b>orig</b>	<b>+1.3/-6.7</b>	<b>-24/-32</b>
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5.3 MHz	+3.5/-5.6 dBm	-19/-27 dBm
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Preamp off, +78 dBm; on, +77 dBm.

### Transmitter Dynamic Testing

CW, SSB, FM, typically 107 W high.

144 MHz: CW, typically 49 W high;

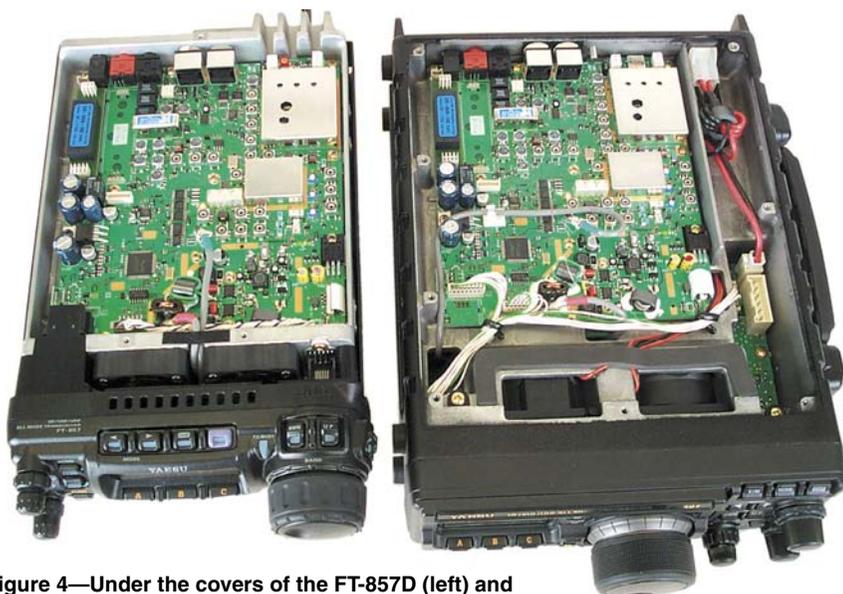
432 MHz: CW, typically 19 W high.

HF, 53 dB; 50/144 MHz, 61/63 dB. Meets FCC requirements.

>70 dB.

56 dB.

3.5 MHz, third order, -21 dB PEP, fifth order, -32 dB PEP. (5.3 MHz data, -23 and -37 dB PEP).



**Figure 4—**Under the covers of the FT-857D (left) and FT-897D. Their common ancestry is evident in spite of the difference in size. The optional CW filters are plugged in at the upper left of each radio.

that can be remotely mounted, as is common with many mobile transceivers, but with a couple of twists. Many mobile radios forgo a front-panel headphone jack to save panel space, but there is a front-panel 1/8 inch headphone jack on the '857, as well as a speaker jack on the rear panel. By spacing several control buttons around the perimeter of the front panel—including the circular area behind the tuning knob—Yaesu has made them easier to locate by touch.

With FT-857D street prices below \$800, I'll be looking when the payments on that new wagon are finished.

### The MH-59 Microphone—Now That's Control

Figure 5 shows front and Figure 6 the side views of the mic. Anyone familiar with an '897 will recognize that many of the button labels match those on the '897 front panel. Some buttons serve three

functions—as a tone pad in the DTMF mode, as a number keypad in frequency entry mode and specific functions when commanding the transceiver.

A small thumbwheel at the upper right of the mic also performs several functions controlled by the nearby AF/SEL/DIAL button. After a short press of the button, the wheel adjusts frequency as if it were the main dial on the front panel. Fast and slow tuning rates apply according to the action of the power buttons on the mic and front panel. A long press of the mic D/F button puts the radio in menu mode, and the thumbwheel acts as the SEL dial to select the various menus. After a long press of the AF/SEL/DIAL button, the wheel sets the AF gain.

Frequencies may be entered directly by pressing the ENT button followed by numbers from the keypad (D serves as the decimal point), with ENT pressed again to complete the entry. (The microphone



**Figure 5—**Details of the MH-59 Remote Control Microphone front panel.



**Figure 6—**Tuning wheel on the side of the MH-59 Remote Control Microphone.

essentially functions as a small CAT control pad, and it works with '897s, as well.<sup>3</sup>

*Manufacturer:* Vertex Standard, 10900 Walker St, Cypress, CA 90630; tel 714-827-7600; [www.vxstdusa.com](http://www.vxstdusa.com). *Price:* FT-857D, \$769.99; YF-122C 500 Hz CW filter, \$159.99; MH-59A8J Remote Control Microphone, \$64.99; YSK-857 Separation Kit, \$54.99; FT-897D, \$879.99; FP-30 internal power supply, \$209.99, FNB-78 Ni-MH battery pack (one or two can be used) \$99.97; CD-24 charge adapter \$119.99. **QST**

## 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 are the minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty.

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

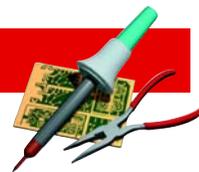
- Ten-Tec Orion HF transceiver with built-in antenna tuner,
- Kenwood TS-480 HX 200 W mobile or fixed HF and 6 meter transceiver,
- MFJ-991 Automatic Antenna Tuner, SGC MAC-200 Automatic Antenna Tuner and control console,
- LDG Z-100 Automatic Antenna Tuner,
- LDG RT-11 Automatic Antenna Tuner with remote control head,
- Sounds Sweet Communications Speaker.

## NEW PRODUCTS

### STAINLESS STEEL MOBILE WHIP ANTENNAS

◇ MFJ has announced the availability of solid 72 inch and 108 inch stainless steel mobile whip antennas. Both sizes have standard 3/8 inch×24 threaded studs for use with standard mobile mounts. Prices: MFJ-1964, 72 inch antenna, \$19.95; MFJ-1966, 108 inch antenna \$24.95. For more information, contact MFJ Enterprises, Inc, 300 Industrial Park Rd, Starkville, MS 39759; tel 800-647-1800; fax 662-323-6551; [www.mfjenterprises.com](http://www.mfjenterprises.com).

From November 2004 QST © ARRL



## PowerPort 73 Portable Power Supply

With the increasing interest in emergency communication, and portable operating in general, batteries are popular topics of conversation. And why not? He who has the biggest battery operates longest, depending on how much current the equipment demands. Of course, with expanding battery capacity comes expanding size and weight. Still, it is possible to squeeze a lot of power into a relatively small space.

Cutting Edge Enterprises offers a varied lineup of batteries and charging systems. Among the products that attracted my attention was the PowerPort 73, a compact dc power supply specifically designed for long-term portable operating and overall ease of use.

Summertime was just around the corner when this review was written. The hardy among us operate portable throughout the year, but wimp that I am, I prefer Amateur Radio *al fresco* when the temperatures aren't so *freddo*. So, with warm weather beckoning, I decided to give portable hamming a try with the PowerPort 73.

### Simple, But Handy

At its heart, the PowerPort 73 is a rechargeable 8 amp-hour 12-V gel cell. The gel cell in the PowerPort 73 is a dense, featureless block with a significant amount of heft. Nothing out of the ordinary.

What makes the product so interesting is what Cutting Edge has built around the battery. The PowerPort 73 sports three cigarette-lighter-jack outputs within a plastic "head" attached to the battery. This greatly simplifies the task of hooking up transceivers and other devices.

There is no ON/OFF switch as such. Instead, there is a cigarette lighter plug and socket that, when joined, complete the circuit path to the output head. (A green LED lights to indicate that the ports are "hot.") The reason for this unusual arrangement is to allow the PowerPort 73 to be easily recharged from a cigarette lighter jack in a vehicle, or from any other similarly equipped power source. You only need to separate the PowerPort 73 plug and jack assembly, then insert the plug into any convenient cigarette-lighter jack. (The PowerPort 73 package includes a "wall wart" charger with

a cigarette-lighter jack.) The PowerPort recharges in 8 to 10 hours.

Everything except the wall charger fits into a nylon carrying case with a strap handle and foam padding. The entire battery weighs 6 pounds and is only 7 × 4 × 3 inches. When you're ready to use the PowerPort, you simply remove the top cover and connect the cigarette light plug/jack. This maneuver requires all of about 30 seconds.

### On the Air with the PowerPort

For this review, I used the PowerPort in two portable on-the-air applications.

During Field Day 2004, the PowerPort 73 powered my little 20-meter MFJ Cub transceiver. With the low current demand of the Cub, the PowerPort had no problem keeping me on the air throughout the entire event. I connected a voltmeter to the PowerPort to observe the performance and the needle barely budged.

A more demanding application involved powering my Yaesu FT-897 transceiver during a recent vacation outing. I operated CW and PSK31 with the '897 output reduced to 20 W. The PowerPort was able to keep me on the air continuously for about 4 hours before I had to resort to a recharge.

I really enjoyed the compact design and durability of the PowerPort 73. When it was time to move, I just closed the cover and grabbed the strap. I did manage to bump it off a table once. Fortunately, the PowerPort landed on its base without injury—other than to my eardrums due to a resounding *thud*—rather than on the top of the case where the power head would have taken the brunt of the impact.

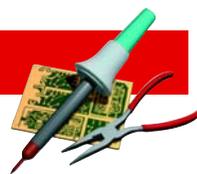
### Power to Go

If my experience is typical, I think the PowerPort 73 would be a highly capable portable power source. It can power anything that requires 12 V, and do it for quite a while. We tend to think of power sources in terms of radios, but I also used the PowerPort

73 and a voltage converter to run a laptop PC. The PowerPort kept the computer running for about 6 hours. If only my laptop's internal battery could do that!

Manufacturer: Cutting Edge Enterprises, 1717 Seventh St, Los Osos, CA 93402; tel 800-206-0115; [www.powerportstore.com](http://www.powerportstore.com). \$76.95.





## SGC SG-211 Automatic Antenna Tuner

The SG-211 has finally solved one of the annoying issues with remote automatic antenna tuners: *dc power*. With most automatic antenna tuners you have to string a dc power cable to wherever the tuner is located. Not so with the SG-211, because this little tuner is *battery powered*.

The SG-211 ships with a AA alkaline battery pack already installed in the case. SGC claims that the batteries will last for years of normal use. Obviously, I wasn't able to put this claim to the test!

Another interesting feature of the SG-211 is that it is designed to accommodate balanced feedlines (such as 450- $\Omega$  ladder line) and long-wire antennas. The SG-211 will also work with unbalanced feed lines (coaxial cable) if you wire up an SO-239 connector as an adaptor.

### Installation and Use

Since you don't have to worry about supplying power to the SG-211, installing the tuner is as simple as it gets. Should you ever need to refresh your memory, you'll find clear instructions printed on the case itself. There are no buttons or adjustments of any kind. Attach the coax, attach the antenna, apply RF and the SG-211 tunes.

The SG-211 has a frequency range of 1-60 MHz, so it is compatible with popular MF/HF/6-meter rigs. It is important to point out, however, that the SG-211 is designed to handle only 60 W PEP or 20 W continuous duty. This means that you have to be careful when using the SG-211 with 100-W transceivers.

My first on-air test was with radioteletype (a 100% duty cycle mode) using a 70-foot ladder-line fed dipole antenna. Taking care to keep my transceiver output below 20 W, I keyed the rig on 160 meters and listened as the '211's relays chattered away. The LED on the front of the '211 flashed several times, then the tuner fell silent and the LED held steady—the SG-211 had found an acceptable match resulting in a 1.5:1 SWR.

The SG-211 found a match on every band, 160-6 meters, although some complex impedances seemed to be more challenging for the little tuner than others. In this initial test, I was able to trigger the SG-211 into its tuning mode with my RF output reduced all the way down to 1 W.

In subsequent tests on SSB and CW, I found that it was best to tune the SG-211 using the mode I intended to operate. For instance, I once tuned the SG-211 using RTTY, then switched to SSB. To my dismay, the SG-211 entered the tune mode again as soon as I began talking. On the other hand, if I used SSB to trigger the tuner from the beginning (by saying "helloooooo," etc), the SG-211 was less prone to jump to the tune mode when I was transmitting normal speech.

### ARRL Lab Testing

With a 50- $\Omega$  load on the bench, the RF loss in the SG-211 averaged 15% on 160-6 meters. Using a 3- $\Omega$  load, the Lab measured loss of about 30% on 40 and 20 meters, and about 20% on 10 and 6 meters.

Finally, with an 800- $\Omega$  load, the loss was measured at 30% on 160, 80 and 20 meters, and about 20% for 40 meters. The loss caused by this severe mismatch on 6 and 10 meters was 65%.



Interior view of the SG-211 antenna tuner.

### Conclusion

The SG-211 is an important innovation in automatic antenna tuners. The tuner is bound to appeal to portable operating enthusiasts, but I think it also has excellent potential for hams who must enjoy their avocation from apartments, condos and other antenna-restricted settings. You can toss the SG-211 into a small attic, or outside a window, with a wire antenna and get on the air right away. Just remember that the SG-211 is not weather-proof, so you'll need to provide a waterproof enclosure if the tuner is going to be outdoors around the clock.

And what about the RF power limitation? In my tests, I was making just as many contacts with 60-W PEP SSB as I was at 100 W. Using 20 W for RTTY and PSK31 certainly was a serious step down from 100 W, but I only noticed the difference when propagation was marginal, or when the band was crowded.

Manufacturer: SGC, 13737 SE 26th St, Bellevue, WA 98005; tel 425-746-6310; [www.sgcworld.com](http://www.sgcworld.com). \$179.95. 