

ID-51A

VHF / UHF Dual Band Transceiver

QST Product Review

QST Magazine is owned and published by the American Radio Relay League (ARRL).

Icom America expresses its gratitude to the ARRL for the permission to reprint and post this review on our Website. This product review remains the copyright of the ARRL.

To join the ARRL, please visit www.arrl.org



Mark J. Wilson, K1RO, k1ro@arrl.org

Icom ID-51A Dual Band Handheld Transceiver with D-STAR

Analog FM, D-STAR and much more in a compact, dual-band handheld.

Reviewed by Rick Palm, K1CE
Contributing Editor
k1ce@arrl.org

Just when you thought the ubiquitous handheld transceiver, a staple of Amateur Radio since the early 1970s, had reached its evolutionary limit, it's time to think again. This has certainly been the case with the protocol Digital Smart Technology for Amateur Radio, more popularly known as D-STAR, and the parade of radios released by Icom over the years to support it. The ID-51A is the second in a new series of D-STAR capable handhelds from Icom. A 70 centimeter model, the ID-31A, was reviewed in the August 2012 issue of *QST*.¹

I was involved as a user early in D-STAR development here in the southeastern portion of the US, where it seemed to take off more quickly than in some other parts of the country. This was probably due to a few dynamic, enthusiastic individuals here who pushed it through, conducting seminars at club meetings and “Elmering” individual operators at conferences and on the air. That was the case with me as I drove down to my local ham radio supply store in Orlando several years ago to have a chip installed in my IC-2200H, which would give me access to the D-STAR system.

Programming and operating the IC-2200H

on D-STAR took some patience as there was frustration with entries in fields changing without operator knowledge, caused by some of the early system and radio nuances. The learning curve looked like a Nordic ski jump. Numerous D-STAR radios have succeeded the '2200H for user-friendliness and functionality. Icom's newest in this line is the ID-51A, the first D-STAR radio I've used since the '2200H. The evolution has been profound.

Major Innovations

For me, the single most significant enhancement in the ID-51 is the incorporation and application of a GPS receiver. The application that is most useful is when the operator is mobile and pushes the NEAR REPEATER button in the D-STAR Repeater (DR) mode to find and select the closest D-STAR repeater. With access to it, the operator can then proceed with the panoply of functions and networking available to the system. With the DR mode, programming is simplified with UP, DOWN, and ENTER buttons to be pushed while scrolling through the easy-to-read menus. In fact, it's the only way to go while away from your home area and home access repeater. (While in your home area, it's easier to simply program your local repeater and frequently used commands — such as linking to your favorite reflectors — into the rig's memory channels).

Sooner or later, almost every handheld will have a GPS receiver and an updatable, onboard directory for all repeaters, digital or analog. It's just a matter of time before mobile FM and digital operators will simply push the “find nearest repeaters” button, and start talking. (There's an app on my iPhone called *Freq Finder* that updates its repeater listings periodically and displays operating parameters for machines closest to me — it works great.)

Fun and Function

The ID-51A is laden (not burdened) with the most functions of any radio I've ever used. A bit daunting and intimidating at first, the radio comes with two manuals: A 54 page *Basic Instructions* manual, and a

whopping 369 page *Advanced Instructions* manual. But, the power is in the pushbuttons.

Six buttons and a “D-pad” in the middle of the front panel under the large display are all you need to control the radio. For the most part, operation is intuitive, especially if the operator already has D-STAR experience. The MENU key gives access to the comprehensive menu selections, while the QUICK key provides quick access to those functions that are used more frequently. The QUICK key is context sensitive for what the user is doing at the time (for example, character editing functions when entering data).

A MODE/SCAN key changes modes and starts scans. A MAIN/DUAL key selects the VFO band and frequencies to be displayed on the screen. A V/MHZ/CLR/LOW button puts the rig in the VFO mode versus the M/CALL/S.MW, which selects the memory channels and functions.

D-STAR-specific functions can be manipulated with the D-pad in the center of the face. Starting at the



Bottom Line

Icom's ID-51A dual band handheld is a feature laden analog FM and D-STAR digital transceiver with a GPS receiver and a host of available options. This is perhaps the most flexible handheld available, and you'll need to spend some time learning the radio's operation to get the most from it.

6 o'clock position is the DR key, which turns on the D-STAR Repeater mode and doubles as the down arrow selector. Clockwise, at the 9 o'clock position is the CD (call sign display) button, which, when held down for a second, places received calls on the display with messages and repeater info. It also serves as the "back" key. At the 12 o'clock position is the RX->CS button, which captures the received station's call sign and repeaters and places the call sign into the UR field for call sign routing. The key also serves as the up arrow key. And at the 3 o'clock position is the CS or call sign select button, which, when held down for one second, displays the call sign information currently stored in the four ubiquitous D-STAR operating fields that are at the heart of the system: UR call, MY call, Repeater 1, and Repeater 2. This is a handy feature to have as the operator can quickly confirm that the proper information is coded into the four slots. I used it all of the time. The button also serves to select different menu tiers as does the CD key. At the center of these four buttons is the ENTER key. All of these keys and the menus they are associated with worked very well.

Power levels are selectable from the V/MHz key described above — there are five levels (SLO, LO1, LO2, MID, and HIGH).

Audio Quality

There have been critical comments circulating about the transmitted audio quality, which some have categorized as "muffled." This was caused by the membrane that is apparently incorporated into the microphone to allow for some measure of water resistance. While the first production units had the thicker membrane, Icom was quick to implement a fix with an upgrade plan that solved the issue in short order. You can tell if you have the new material by looking into the mic opening. If it is white, it is the new membrane. I looked: The test unit has the white membrane and the audio was not at all muffled.

You can check your transmitted audio by two methods. By using the echo function on your local D-STAR repeater, you can hear your audio repeated back to you. Or, you can record transmissions (and indeed both sides of a complete QSO) by using the radio's record function (recordings are made onto a microSD card that is inserted into a slot on the side of the radio). There's even a voice recorder function for simply recording your own notes — reminders, lists, anything. You can evaluate your own audio and compare it to others participating in the QSO. I tried both methods, and the audio quality seemed absolutely fine to me.

Review of Functions

Some might question the utility of recording

your QSO onto your radio's SD card, but I immediately realized its value in the context of disaster response and public service communications for served agencies. It helps to have a hard record of messages sent and received during the heat of battle on the disaster field for not only the after-action hotwash, but also in case questions arise. Incident Commanders won't need to rely on subjective answers when they can hear the actual messages themselves. Not as dramatic as all that, listening to your QSOs after the fact can help you hone your basic QSOing and social skills on the air! And, well, truth be told, it's just plain fun, too. This function worked well for me: you can automatically parse the QSO recording into transmissions and receptions, or just keep the recording running.

The GPS receiver discussed briefly at the outset of this review works well, not only for the benefit of finding and entering your nearest D-STAR repeater for almost instant access to the system when mobile, but it also does a fine job of providing your position, elevation, and speed. This information can be transmitted automatically via D-PRS in the Digital Voice mode every time you key the mic, if desired. Software installed in most D-STAR gateways will convert the D-PRS data packet into standard APRS packets and send it on the Internet, allowing your position to be viewed on APRS servers. The GPS logger function stores positions along your course on the microSD card for display using mapping software.

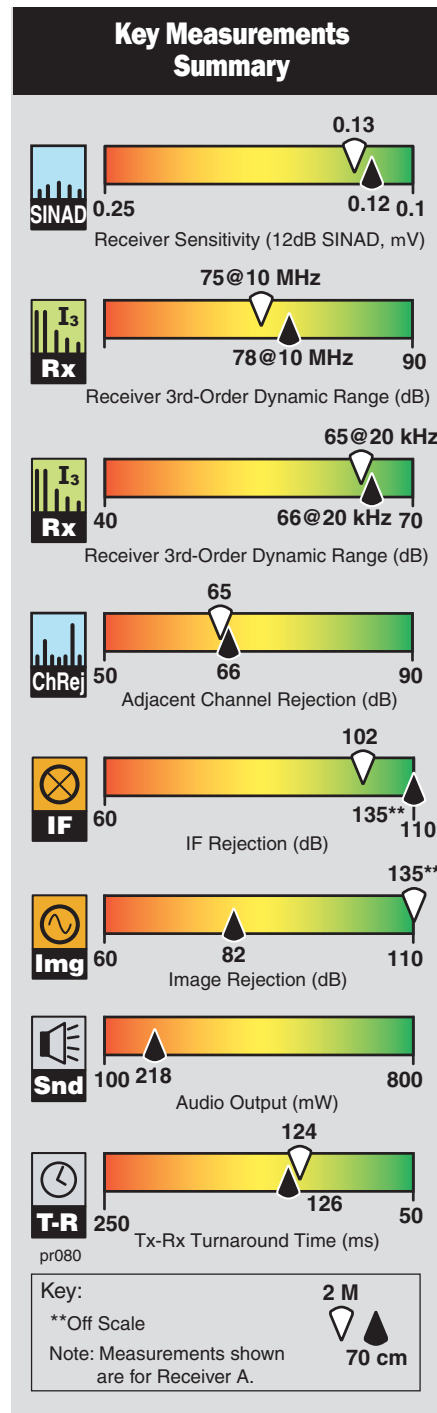
BC Radio and Two Band Monitoring

As with many radios nowadays, the operator can monitor two bands at once, along with the broadcast radio receiver incorporated into this radio. The operator can listen to each one separately, too, of course. The broadcast radio works fine, and it sounds better than my car's FM radio. Both AM and FM bands are available and favorite stations can be stored in memory. Again, from the perspective of an emergency or disaster response communications operator, having access to the AM and FM broadcast bands for general disaster information and alerts is very useful.

Memory Channels

The transceiver has 500 regular memory channels, 50 scan edge channels (25 pairs) and 4 call channels. Also, 26 memory banks, A to Z, can be used to store groups of operating channels, and so on. Up to 100 channels can be assigned to a bank.

I programmed memory channels using the RT Systems (www.rtsystemsinc.com) software and cable, with thanks to Scott Freudenthal, K2LSF, from Jacksonville, Florida, for sending me his incredible memory channel file, and for his patient mentoring — you can catch



him on Reflector 037C. The software and cable work great with the ID-51A. It is easy to use, and will have your memories uploaded and in use within just minutes. All of the necessary memory channel data fields are there, and many more.

Icom's CS-51 programming software comes on the CD packed with the radio. Further, a programming cable is not absolutely necessary because the .icf programming file can



Figure 1 — Despite the size constraints of a handheld radio, the ID-51A's display resolution is high enough to show quite a bit of data clearly.



Figure 2 — The built-in broadcast band radio is a plus for public service operators who need to keep an ear on local news updates.

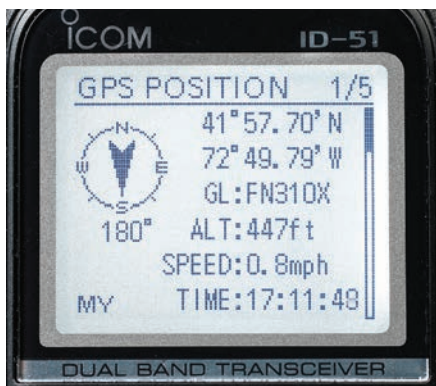


Figure 3 — The ID-51A features a built-in GPS receiver. The receiver is used to determine which D-STAR repeaters are closest to you. The transceiver can also use the GPS receiver to track your position and share the information over the network.

Table 1
Icom ID-51A, Serial Number 05001656

Manufacturer's Specifications	Measured in ARRL Lab
Frequency coverage: Receive, 108-174, 380-479 MHz, 0.520-1.710 MHz, 76-108 MHz; transmit, 144-148, 430-450 MHz.	Receive: 137-174, 380-479 MHz (FM, DV); 76-108 MHz (WFM); 0.520-1.710, 108-136.995 MHz (AM). Transmit: as specified.
Modes: FM, NFM, DV, AM (receive only).	As specified.
Power requirements: At 7.4 V dc: receive, FM, <350 mA (internal speaker), <200 mA (external speaker); DV, <450 mA (internal speaker), 300 mA (external speaker); transmit, <2.5 A (5 W output).†	Battery power: FM, receive, internal speaker, 225 mA (max volume, backlight on), 82 mA (standby), 59 mA (standby, backlight off). Transmit: 146 MHz, 1.79 A (high), 1.28 A (medium), 0.98 A (low2), 0.62 A (low1), 0.41 A (s-low); 440 MHz, 2.69 A (high), 1.88 A (medium), 1.21 A (low2), 0.91 A (low1), 0.53 A (s-low). External power (13.8 V dc): Receive, 138 mA (max vol, backlight on), 107 mA (max vol, backlight on, external speaker). Transmit: 146 MHz, 1.76 A (high), 1.25 A (medium), 0.88 A (low2), 0.61 A (low1), 0.35 A (s-low); 440 MHz, 2.59 A (high), 1.79 A (medium), 1.15 A (low2), 0.86 A (low1), 0.48 A (s-low).*
Receiver	Receiver Dynamic Testing**
Sensitivity, FM (12 dB SINAD): <0.178 μV; DV, 0.282 μV.	FM, for 12 dB SINAD, 146 MHz, 0.13 μV, 440 MHz, 0.12 μV; 162.4 MHz, 0.127 μV, 100 MHz, 0.45 μV.
Sensitivity, AM (10 dB (S+N)/N): Not specified.	AM, for 10 dB S+N/N, 1.0 MHz, 0.7 μV, 120 MHz, 0.3 μV.
FM two-tone, third-order IMD dynamic range: Not specified.	146 MHz, 20 kHz offset, 65 dB, 10 MHz, offset, 75 dB; 440 MHz, 20 kHz offset, 66 dB, 10 MHz offset, 78 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	146 MHz, 69 dB, 440 MHz, 108 dB.
Adjacent-channel rejection: >55 dB.	20 kHz offset, 146 MHz, 65 dB, 440 MHz, 66 dB.

be written to the micro SD card by the CS-51 software on a PC and then read by the radio after transferring the card to the radio's card slot. You also have the ability to utilize the SD card storage to backup your configuration. In fact, the SD card can hold multiple .icf files allowing you the ability to restore any configuration file in the field without the need for a computer or cable.

Other Features

The microphone audio can be recorded. It worked fine for me, with some 68 hours of recording available per the display note; I can't imagine listening to myself for all 68 hours! But, for 15 seconds, I could stand it.

Two band monitoring from the two VFOs works well, and the broadcast band radio can be monitored, too, all at the same time: The volume control adjusts the BC radio output to

a level where the operator can hear the channel output versus the radio output as a matter of operator preference. This worked well.

An Auto Position Reply function can automatically send your call sign, with or without a GPS position and brief (10 second limit) voice message, when you receive a call and cannot immediately answer. A Voice TX function allows the operator to transmit recorded audio once or repeatedly, from either the main MENU key, or the QUICK menu. It works fine, although I question the utility of repeating the voice memo transmission over and over again for up to 10 minutes — I couldn't figure out why anyone would want to do that.

The Speech function allows the various modes, frequencies, and call signs (DV) to be announced, which is nice while driving — you don't have to look at the radio's display to

Spurious response: Not specified.	IF rejection: RX A, 146 MHz, 102 dB, 440 MHz, >135 dB; RX B, 146 MHz, 101 dB, 440 MHz, >135 dB. Image rejection, RX A, 146 MHz, >135 dB, 440 MHz, 82 dB; RX B, 146 MHz, >135 dB, 440 MHz, 98 dB.
Squelch sensitivity: < 0.178 μ V.	At threshold, 146 MHz, 0.3 μ V (min), 1.17 μ V (max), 0.1 μ V (auto); 440 MHz, 0.26 μ V (min), 1.05 μ V (max), 0.1 μ V (auto).
Audio output: at 10% THD, >200 mW into 8 Ω load (external speaker); >400 mW into 16 Ω load (internal speaker).	218 mW at 10% THD into 8 Ω ; THD at 1 Vrms, 1.4%.
Transmitter Transmitter Dynamic Testing	
Power output: 5.0 W (high), 2.5 W (medium), 1.0 W (low2), 0.5 W (low1), 0.1 W (s-low).	146 & 440 MHz, 4.7 W (high), 2.2 W (med), 0.9 W (low2), 0.4 W (low); 0.07 W (s-low, 146 MHz), 0.130 W (s-low, 440 MHz) at full charge and 13.8 V dc external power.
Spurious signal and harmonic suppression: >60 dB (high, med), -13 dBm (low, s-low).	>70 dB; meets FCC requirements.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 146 MHz, 124 ms, 440 MHz, 126 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz, 52 ms, 440 MHz, 64 ms.
Size (height, width, depth): 4.9 x 2.3 x 1.0 inches (with protrusions); antenna length: 7.0 inches.	
Weight: 9.0 ounces (with battery and antenna).	
Price: ID-51A, \$580; OPC-2218LU USB cable, \$70.	

†BP-271 7.4 V, 1150 mAh Li-ion battery and BC-167 wall charger supplied.
Available options: extra BP-271 battery, \$90; BP-272 7.4 V, 1880 mAh Li-ion battery, \$125; BC-202 drop-in charger, \$60; BP-273 battery case for 3 AA cells, \$60; CP-12L cigarette lighter dc power cable with filter, \$40.

*Power consumption in DV mode: receive equal to FM; transmit, \leq 25 mA greater than FM.
**Both Receiver A and Receiver B had equal performance, except when noted. DV not tested; PN9/GMSK signal generator was not available.

see what is happening. I liked this feature a lot. Hold down the QUICK/SPCH button for a second, and the voice tells you your operating parameters on the fly.

A Home CH (home channel) Beep function works well: you can program your favorite (your home repeater, for example) frequency as the Home CH and whenever your VFO dial, or DR, or memory channel selection hits the Home CH, a beep is emitted, letting the user know his/her home repeater has been selected. Again, the idea here is to free the eyes from having to look at the display, and again, that is a safety feature while driving.

Summary

The reader will note that this review is a few pages long, with lab results and graphics. The ID-51A comes with two manuals as I've already noted, for a total of more than 400

pages. Hence, there is no way to cover every nuance of this radio. I have, in this review, attempted to hit the hot buttons for this radio. The menu choices for many of the functions,

including the BC radio function, for example, are extensive and frankly, astounding. The programmers at Icom seemed to have left little to be desired in a radio like this. It is incredible, and that is no hyperbole.

The purchaser of this radio, like other D-STAR radios, will benefit from a good understanding of the D-STAR system network, and especially of the four main programmable parameters that are at the heart of the system. And in that subset, the UR call field, with its myriad commands and modes, is the most critical to understanding and enjoying the system. So, especially if you are new to D-STAR, while you are waiting for your package to arrive, get a good source of information (there is a plethora on the Internet) and bone up on it so you'll be able to enjoy this radio out of the box.

Roland Kraatz, W9HPX, adds: "The importance of the UR call field to the successful use of D-STAR's functionality cannot be over-emphasized. A lot of new users have difficulty setting up the DR mode so that their transmission passes through the repeater's gateway to the Internet. In that regard, the website www.dstarinfo.com/Data/Sites/1/GalleryImages/FullSizeImages/id-51-beginner.pdf has a lot of how-to info for the ID-31 D-STAR radio that is almost exactly applicable to the ID-51, particularly the 'Easy Repeater Operation' section. The other ID-31 sections are also useful for the beginning user."

For me, the ultimate litmus test for a review radio is whether or not I would actually buy one for myself. In this case, the answer is yes, even though the radio is not inexpensive compared to a standard dual band handheld. I loved this radio and opening the package and discovering all of its features and functions.

Manufacturer: Icom America, 2380 116th Ave NE, Bellevue, WA 98004; www.icomamerica.com.



See the Digital Edition of QST for a video overview of the Icom ID-51A.