ID-5100A

VHF/UHF Dual Band Digital 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

ICOM®

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

Icom ID-5100A Dual Band VHF/UHF FM Transceiver

Icom's top dual band mobile transceiver includes the latest D-STAR features.

Reviewed by Rick Palm, K1CE
QST *Contributing Editor*
k1ce@arrl.net

Icom's newest addition to the family of D-STAR digital and analog FM transceivers is the ID-5100A 2 meter/70 centimeters dual band mobile. In addition to a full range of analog FM features, the radio has D-STAR digital voice (DV) and data capability with Icom's latest enhancements. The ID-5100A has a large LCD touchscreen display, two independent receivers and up to 50 W output on both bands. The wideband receiver covers 118 to 137 MHz (AM mode), 137 to 174 MHz, and 375 to 550 MHz. It also has an SD card slot for voice and data storage and a built-in GPS receiver. The control head and main unit are separate and cannot be joined into one unit. Several optional mounting brackets are available, as are the UT-133 Bluetooth board and VS-3 Bluetooth headset.

First Impressions

Upon opening the box, my immediate reaction was one of relief to see the large display screen. Perhaps following smartphone industry trends toward larger displays, this screen (at 5.5 inches wide by 2 inches tall) is easier to read than previous models and allows for less clutter. It's easier to quickly discern the radio's settings and status. This holds true even while the radio is in dual watch mode, when two channels are monitored at the same time — one on the left-hand side of the screen and the other on the right.

After admiring the display, I was pleased to see the incorporation of touchscreen technology, which was inevitable following trends in the digital device market and inclusion on Icom's IC-7100 HF/VHF/UHF transceiver.

The monochrome touchscreen isn't the same as we've come to expect with smartphones and tablets — you don't swipe/flick inputs, or pinch in and out. Rather, the user interface is highly utilitarian. It's easy to operate and program by touching or pushing (for one second) on the various icons, menu selections, frequency readout numbers, and words. Characters are large enough even without my reading glasses. The display can also be customized for brightness, contrast, automatic dimming, backlight, and other characteristics in the menus. It would be nice to see a color screen in future models (I like that feature on my IC-7000). On the other hand, now I'm a bit less happy with my IC-7000's smaller screen size.

Bottom Line

The ID-5100A dual band mobile transceiver is fully featured and incorporates the latest D-STAR digital voice and data enhancements, yet its touchscreen and menu system are easy to use.

My third reaction was that it's easy to set up the radio and get it on the air quickly. Connect four cables — mic, power, controller to main unit, and antenna — and you are good to go. The ID-5100A is intuitive to use, but to get at the power of the radio's many features and functions, you'll need to review the documentation. There are two manuals — a *Basic Manual* and the *Full Manual*. No real hardship here — the instructions are organized and easy to read and use, with cartoon characters that demonstrate the particular function at hand. I used the printed copy of the *Basic Manual* as a guide, and then turned to my laptop for the *Full Manual* (PDF format) with browsing functionality, search capability, and links to various sections in the text.

The ID-5100A is another great step forward in D-STAR radio functionality, and most importantly, user friendliness — something Icom has been working on with recent models. As noted in my review of the ID-51A dual band handheld last year, I was involved as a user early on in D-STAR development here in the southeastern US. It seemed to take off more quickly here than in other parts of the country, thanks to the work of a few dynamic individuals such as ARRL Southeastern Division Vice Director Mike Lee, AA6ML, who personally conducted many seminars at club meetings and "Elmered" individual operators at conferences and on the air.

My initial experience with D-STAR was one of frustration after I installed the DV chip in my IC-2200H more than 10 years ago. Programming and operating the '2200H on D-STAR took some patience. Its successors each included improvements,

and the ID-5100A represents the zenith of this evolution, in my opinion. It is such a pleasure to operate.

Interesting Features

A central feature of the ID-5100A is the incorporation and application of a GPS receiver, one that does not require an external antenna. It enables the "Near Repeater" in the D-STAR repeater (DR) mode to find and select the closest D-STAR repeater, based on the operator's location and the repeater's GPS coordinates stored in the radio. The ID-5100A adds the feature of searching for nearby FM repeaters (in the DR mode only, however). The repeater listings are downloadable from Icom's website in a .csv format file and need to be saved on an SD card. The SD card is then inserted in the radio's card slot, and the data uploaded to the radio. The radio then searches for the nearest repeaters by the operator's location and coordinates listed in the repeater database.

The DV repeater list is comprehensive, but the FM repeater list, while an excellent idea, is far from extensive and cannot be searched in the FM mode (DR mode only). For example, there are only three FM repeaters listed for Florida! One alternative is to export a list of desired repeaters from ARRL's *TravelPlus* software and use RT Systems programming software to load the list in the ID-5100A.

D-PRS Features

A major new feature is a set of add-ons to the D-PRS function, which is similar to the popular Automatic Packet Reporting System (APRS) developed by Bob Bruninga, WB4APR, and indeed can be interfaced to the APRS network with a gateway and laptop. As the operator transmits a digital voice signal to the D-STAR repeater, an option to co-transmit slow-speed digital data (DD) along with the transmitter's GPS position can be executed to furnish various basic information sets, depending on the group selected: Object, Item, or Weather.

Selecting, editing, and transmitting the Object set includes the specific position of the transmitter, an event notice, earthquake information, satellite track information, and so on. A time stamp can be added to the Object set signal. The Item set transmits specific position data, not containing a time stamp. Position information such as a traffic accident, lighthouse, antenna or DV access point location, and so on, can be transmitted. The Weather set includes weather in-

Table 1
Icom ID-5100A, serial number 05001442

Manufacturer's Specifications	Measured in ARRL Lab
Frequency coverage: Receive, 118 – 137 MHz (AM),137 – 174, 375 – 550 MHz (FM); transmit, 144 – 148, 430 – 450 MHz (FM).	Receive and transmit, as specified.
Modes: FM, digital voice, data, AM (receive only).	As specified.
Power requirements: Receive, 1.8 A (max audio), 1.2 A (standby); transmit, 13 A (max power) at 13.8 V dc ±15%.	At 13.8 V dc: Receive, 630 mA (max audio no signal, for each receiver), 660 mA (max volume, no signal, both receivers), 450 mA (standby). Transmit, 146 MHz, 10.0/5.5/3.4 A (hi/med/low), 440 MHz, 12.0/6.7/3.5 A (hi/med/low). Operation confirmed at 11.7 V.
Receiver	**Receiver Dynamic Testing†**
Sensitivity: FM (12 dB SINAD), <0.32 µV (137 –160 MHz), <0.56 µV (160 – 174, 375 – 400 MHz),<0.32 µV (400 – 550 MHz); AM (10 dB S/N), < 0.56 µV (118 – 137 MHz).	FM (12 dB SINAD), 0.12 µV (144 and 440 MHz); 0.12 µV (weather band); AM (10 dB S+N/N), 0.54 µV.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset, 146 MHz, 68 dB*; 440 MHz, 70 dB*. 10 MHz offset, 146 MHz, 80 dB, 440 MHz, 78 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	146 MHz, 80 dB, 440 MHz, 107 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset, 146 MHz, 68 dB; 440 MHz, 70 dB.
Spurious response: Not specified.	IF rejection, 146 and 440 MHz, >135 dB. Image rejection, 146 MHz, 92 dB (A), 107 dB (B); 440 MHz, 79 dB (A), 88 dB (B).
Squelch sensitivity: 0.13 µV (144/430 MHz).	At threshold, 146 MHz, 0.08 µV, 2.95 µV (max); 440 MHz, 0.1 µV, 3.27 µV (max).
S-meter sensitivity: Not specified.	For full-scale signal, 146 MHz, 2.66 µV; 440 MHz, 3.02 µV (both receivers).
Audio output: 2 W at 10% THD into 8 Ω.	2.15 W at 9% THD into 8 Ω. THD at 1 V RMS, 1.3%.
Transmitter	**Transmitter Dynamic Testing**
Power output: 50, 15, 5 W (hi, med, low) at 13.8 V dc ±15%.	At 13.8 V dc (hi/med/low): 146 MHz, 50.0/15.2/5.6 W 440 MHz, 45.0/12.2/3.3 W
Power output at minimum specified operating voltage: Not specified.	At 11.7 V dc (hi/med/low): 146 MHz, 46.5/14.7/5.5 W 440 MHz, 43.3/12.0./3.2 W
Spurious signal and harmonic suppression: >60 dB.	>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, 75 ms; 440 MHz, 77 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	44 ms, for 146 and 440 MHz.
Size (height, width, depth): control panel, 3.2 × 7.2 × 1.4 inches; main chassis, 1.5 × 5.8 × 7.8 inches (including protrusions). Weight, control panel, 0.6 lb; main chassis, 2.9 lb.	
Price: ID-5100A, $750; UT-133 Bluetooth board, $100; VS-3 Bluetooth headset, $150.	

†The A and B receivers measured identically unless noted.
*Measurement was noise limited at the value indicated.

formation from a connected meteorological monitoring device.

Your information is displayed on the receiver's radio display during a QSO, and if the other operator has incorporated digital data on his or her signal, you will see it on your screen. With an interface program and cable, you can plot the other operator's information on a map screen. You can also plot routes on a map screen from saved GPS coordinates in the log.

Dual Watch Mode

In the dual watch mode, the user can monitor two bands/frequencies simultaneously, including two band monitoring in the DV mode. For example, you can monitor your local D-STAR repeater in the sub receiver position on the right half of the screen, while operating DV simplex in the main receiver position on the left half of the screen. The display screen is so large that it is easily readable, even with all of that status information shown.

My normal configuration is to have my local D-STAR repeater/gateway on the main band position on the left, and my local ARES analog FM repeater on the right. I can monitor both repeaters at the same time. When there is activity on one of the repeaters that I am interested in, I can quickly (with a touch of the screen) convert the radio screen to the single watch mode so that the active repeater's status (signal strength, frequency information, and other parameters) takes up the full screen. The dual watch left side band becomes the A band in the single watch mode, and the dual watch right side band becomes the B band in the single watch mode. The whole thing worked great for me.

Memory Manager: Easy Street

There are multiple ways of entering memory channels as discussed, but the MANAGE MEMORY function selectable from the main menu, and the BANK SELECT from the QUICK menu work are efficient methods of managing your frequency/channel selections.

Calling Through a Reflector

The ID-5100A incorporates the now ubiquitous commands associated with the dPlus reflector system that has evolved to become the default method of networking D-STAR users locally, regionally, nationally, and internationally. The dPlus commands such as the LINK and UNLINK REFLECTOR, INFORMATION, and ECHO are very easy to implement by simply touching the TO field, selecting REFLECTOR, and touching the desired command.

Bluetooth Operation

An optional Bluetooth headset is available, as well as an app for Android devices for controlling the controller, sending text messages and photos in different resolutions, plotting positions on maps, and so on. There isn't an app for iOS devices yet, but I hope to see one someday for my iPhone 5. Android users should take a look at Icom's very cool RS-MS1 app in Google Play. There's an interesting and informative educational video on the Icom website's ID-5100A page for the radio, which devotes a good section on Bluetooth headset and smartphone device interface and applications. Don't miss it, when you are considering purchasing the radio. There is no TNC connector for this radio. Interface with APRS can be achieved through the Android device and app, or another interface gateway.

Operation and Menus

The ID-5100A, like most radios nowadays, is menu-driven with sets, subsets, layers, and sub-layers of operating parameters, all well-organized for user ease of access and use. Users can choose between different methods of menu access. There are several ways of sifting through and setting operating parameters based on user preference. A front panel MENU button gives access to the comprehensive set of parameters organizing by group and subgroups, including settings that are not adjusted regularly. A QUICK menu button gives access to commonly manipulated settings, and the quick menus are "smart," adapted and appropriate to each operating mode selected.

For the most part, operation is intuitive, especially if the operator already has D-STAR experience.

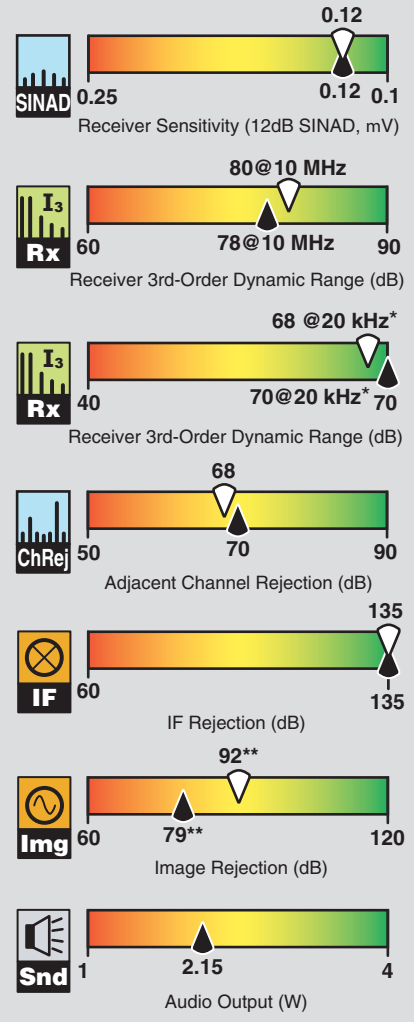
Audio Quality and Quantity

Reports on audio quality were fine. The operator can check his or her transmitted audio by two methods. By using the echo function on your local D-STAR repeater, you can hear audio repeated back. Or you can record transmissions (and indeed both sides of a complete QSO) by using the radio's record function (recordings are made onto an SD card that is inserted into a slot on the front of the main unit). You can evaluate your own audio and compare it to others participating in the QSO. I tried both methods and the audio quality seemed good. The receiver's audio output was more than adequate, with little distortion at the highest volumes.

Memory Channels and Operation

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

Key Measurements Summary



QS1502-PR092

Key:
70 cm 2 M
Values shown are for Receiver A and are the same for Receiver B except for Image Rejection.
* Noise limited at value shown.
** Receiver B image rejection is 107 dB at 146 MHz and 88 dB at 440 MHz

of operating channels, and so on. Up to 100 channels can be assigned to a bank.

I programmed memory channels using the RT Systems (Broomfield, Colorado) software and cable. You can have memories uploaded and in use within minutes. Don't forget the important first step of downloading the existing radio settings and memories first, before you send your own file to the radio — you will lose a lot of existing data, such as the large D-STAR repeater list preprogrammed into the radio at the factory!

But Wait, There's More — Much More

The radio comes with two manuals, as I've already noted: The *Basic Manual* is 90 pages, and the *Full Manual* is a whopping 352 pages. Hence, there is no way to cover every aspect of this radio in a short review. I have attempted to concentrate on the new functions and to give the potential buyer a feel for whether or not this radio would be a good choice as a first D-STAR radio or an upgrade. The functions are extensive.

Wish List

At home, I always mount my radios to the desktop, and no mounting bracket was supplied with the ID-5100A. That's a small complaint. The bracket for the main unit is available online for about $35. Icom offers a couple of options for the control head and suggests considering smartphone accessories, such as the RAM X-Grip, if you need a different solution.

Also, a video display output for monitoring the radio screen on a larger outboard display would be useful in an EOC or field operations center for the benefit of a larger audience. As discussed earlier, you could use an Android device with the Bluetooth interface for this purpose.

These are rather insignificant complaints. Overall I found that the radio is designed and programmed exceptionally well for user functionality and efficiency. There is ample opportunity for experimenting, playing, and just plain having fun!

Final Thoughts

Anyone considering the ID-5100A as a first D-STAR radio 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. In that subset, the URCALL field, with its myriad commands and modes, is the most critical to understanding and enjoying the system. So, before charging ahead with a new D-STAR radio, locate 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.

In closing, I'd like to thank Mike Lee, AA6ML, and the Northeast Florida D-STAR Repeater Network for their support for the system here in this region, and especially the KJ4RYH D-STAR repeater/gateway, which I used extensively during this review and for just plain having fun!

Manufacturer: Icom America, 12421 Willows Rd NE, Kirkland, WA 98034; tel 800-872-4266; fax: 425-454-1509; **www.icomamerica.com**.

See the Digital Edition of *QST* for a video overview of the Icom ID-5100A dual band VHF/UHF FM transceiver.