Product Review

ICOM IC-211 Multimode 144-MHz Transceiver

Think ham radio is expensive? On the contrary, a good argument can be made that amateur gear is reasonably priced and is getting more reasonable all the time, at least as a long-term trend. Consider this: Back in 1961, when the ham population on 2-meter a-m reached its peak, the standard of comparison for self-contained 144-MHz rigs was the Gonset Communicator IV. According to the *QST* review published in that year, for $375 the purchaser of a fourth-generation Communicator got a 20-watt input a-m transmitter with six crystal-controlled frequencies, a tunable a-m receiver covering the entire band, and a self-contained ac/dc power supply. Thousands of hams who were using earlier "Gooney Boxes" and "Benton Harbor lunch boxes" (Heath Twoers) must have drooled over the features of this little beauty.

There's no need to dwell on what the ensuing years have done to the Consumer Price Index, except to say that for today's equivalent of 375 1961-dollars you can select one of several multimode 2-meter rigs having features undreamed of in that year. The one that probably best illustrates our point — that your Amateur Radio dollar buys a lot more these days — is the ICOM IC-211. This handsome black and gray box sports capabilities which were simply inconceivable in the days before manned space flight and large-scale integrated circuits. The IC-211 will not operate on a-m; but that's about all it won't do. This is a reflection of the changes in mode preference on the band, not of the capabilities of the ICOM engineers.

The key word in any description of the IC-211 is *versatility*. It's equally at home on the local repeater (regardless of what "split" is being used), on OSCAR, chasing DX or ragchewing on ssb/cw at the low end. The heart of this versatility is found behind the VFO tuning knob. Here reside not one, but two VFOs, controlled by a common knob, yet capable of completely independent operation. For normal repeater operation, one VFO can be programmed to track the other, 600 kHz away. If you encounter an oddball split — something other than 600 kHz — just uncouple the VFOs. A front-panel switch reverses the transmit and receive frequencies instantaneously, so you can monitor the repeater input frequency or go from a "low-in" to a "high-in" repeater. The two VFOs also permit you to select one of two calling frequencies on ssb without touching the tuning knob. On fm (and on any mode above 146 MHz) the VFOs tune in 5-kHz steps; on ssb and cw below 146 MHz, in 100-Hz steps. A push button near the tuning knob overrides the 100-Hz step tuning if you want to go to the other end of the band in a hurry; another push button locks the frequency so it won't change if the knob is accidentally bumped. The accuracy of the frequency readout appears to be extremely good; comparisons with several other IC-211s never resulted in as much as a 1-kHz discrepancy.

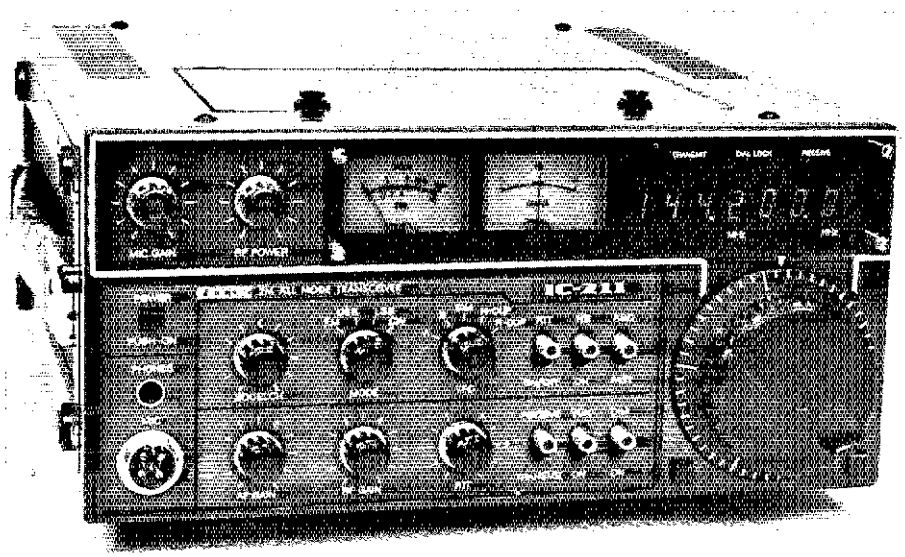
The tuning knob itself has two different degrees of "drag" that are automatically selected, depending on how fast the knob is being spun. At normal tuning speeds there is enough resistance to give "feel" to the knob, but if you want to QSY in a hurry, a faster spin on the knob releases an electrical brake and allows the knob to freewheel with a minimum of resistance.

In addition to the features you might expect to find in a 2-meter multimode transceiver in this price range, the IC-211 has separate signal strength and discriminator meters, selectable age (fast or slow), a front-panel control to adjust fm power output for anything from 1 to 10 watts, a built-in SWR indicator, separate delay controls for cw and VOX operation, and some limited — but nonetheless impressive — ability to be controlled remotely. The last of these is worth special mention. What ICOM has done is to provide access to the frequency-control LSI through a rear panel connector. Ingenious amateurs already have used this feature to good advantage in such applications as mountaintop installations of "remote bases" and the like.

For operating from a fixed-station location, the IC-211 leaves little to be desired. An ac supply is built in. For mobile operation, however, its versatility actually becomes something of a disadvantage. Unlike a set of click-stop switches, the continuous-tuning knob that controls the frequency gives no clue as to where you are in the band unless you take your eyes off the road to look at the digital readout display — a display that is not easy to read in bright sunlight. There are enough other controls and switches on the front panel to cause confusion if you're reaching for the squelch or audio gain without looking down. The SWR-protection circuitry can cause some strange effects on ssb when the rig is operating into an antenna with a high SWR, as sometimes encountered in mobile operation. If you remove the rig from its source of power, such as to stow it in the trunk when parked, the programming of the VFOs is erased and you have to start all over again — a job that takes only a few seconds, but which is still an annoyance. While the IC-211 is very compact, considering all of its features, it is substantially larger and heavier than the average fm rig. If your mobile operating is limited to occasional forays, the IC-211 will fill this need, but you're more likely to consider it for fixed-station operation than for regular mobile use.

Chances are, if you are interested in

Front-panel view of the ICOM IC-211 144-MHz multimode transceiver.

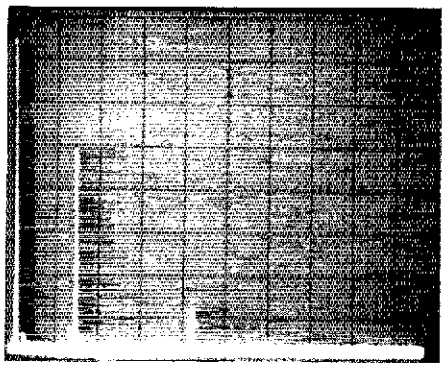


ICOM IC-211 Specifications

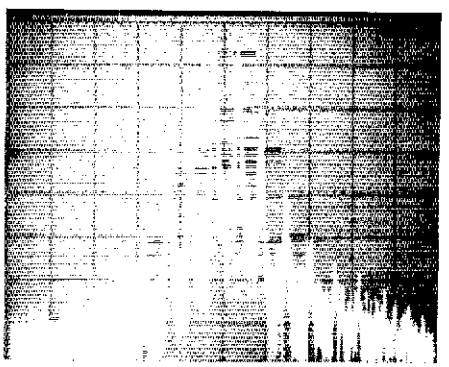
	Claimed by manufacturer	*Measured in ARRL lab*
Power output (minimum, 144-148 MHz):	10 watts.	15 watts.
Spurious radiation	Better than −60 dB.	Better than −66 dB (third harmonic)
Maximum current drain @ 13.8 V:	3.3 A (tx). 1.1 A (rx).	3.0 A. 1.2 A.
Receiver sensitivity (ssb):	0.5 microvolt for 10 dB S+N/N.	0.14 microvolt for 10 dB S+N/N.

Size (HWD): 4-3/8 × 9-1/2 × 10-3/8 inches (111 × 241 × 264 mm) exclusive of knobs, connectors, and feet.
Weight: 15 pounds (6.8 kg).
Price class: $850.

Importer: ICOM West, Inc., Suite 3, 13256 Northrup Way, Bellevue, WA 98005.



Spectral display of the IC-211 transmitted signal at 15 watts output on 146.52 MHz. The vertical axis is calibrated in steps of 10 dB per division; horizontal scale is 100 MHz per division. The large pip at the far left edge of the display is generated internally by the analyzer. The fundamental shown here was attenuated approximately 30 dB by a two-cavity notch filter to prevent overload distortion in the analyzer. The most significant spurious output, at 439 MHz, is down approximately 66 dB with respect to the unnotched fundamental. Other spurious outputs are all down at least 75 dB. The IC-211 complies with the FCC regulations regarding spurious emissions.



The IC-211 output during a two-tone IMD test. The horizontal scale is 2 kHz per division; vertical scale is 10 dB per division. Third-order distortion products are down approximately 28 dB from the PEP output. Individual tone outputs are down 6 dB from the PEP output.

investing this much money in a 2-meter rig you intend to do something more than just key up local repeaters. Operation on cw and ssb with the IC-211 is very much like what it would be on hf with a similar transceiver. The 100-Hz step tuning is not too difficult to get used to, and the receiver incremental tuning (RIT) can be used for fine adjustments of the receive frequency. (Incidentally, the RIT goes off automatically whenever the main tuning knob is turned.) For cw and ssb operation, a transceiver such as the IC-211 has a couple of disadvantages when compared with an hf transceiver and transverter. For one, there is no provision for a cw filter. For another, receiver noise figure (sensitivity) likely will not be as good as can be obtained with a high-quality converter. Finally, there is no provision for actuating an external amplifier; if you want to boost your power, you will have to use an additional switch or an rf-sensing circuit. On the other hand, for many operators these disadvantages are more than outweighed by the desirability of having a complete station in one small, independent, attractive package. This reviewer caught his first-ever 2-meter Es opening because the IC-211 happened to be tuned to the new ssb calling frequency of 144.2 MHz on a Saturday morning. The main station was tuned up on hf at the time, since everybody *knows* nothing is happening on 2 meters at that hour. Four stations in Florida were worked as a result, including one who was using a barefoot IC-211 and an indoor antenna! — *David Sumner, K1ZZ*

ALDA 103 HF TRANSCEIVER AND PS-130 POWER SUPPLY

There is a trend today toward solid-state hf-band transceivers. In general, they're smaller, lighter and easier to operate than their tubed counterparts, the most obvious convenience being no-tuneup operation. The Alda 103 is a fully solid-state newcomer to this area.

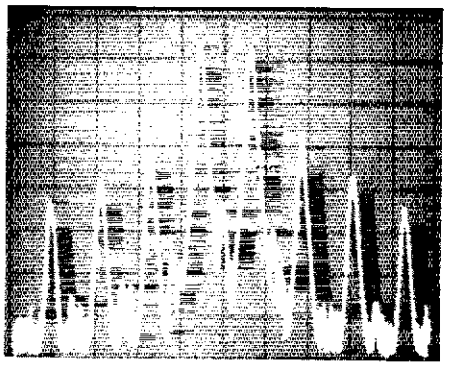
The '103 offers up to 250 watts input on cw or ssb with a power requirement of 13.8 V dc at 15 A. Cw operation is semi break-in. The power level is adjustable from the front panel; the operator can have any level he wishes, from QRP to full output.

The broadband final amplifier stage, cooled by a large heat sink, gives reasonable power output even with a mismatched load. Approximately 80 watts output has been measured at this writer's QTH with an SWR level of approximately 3:1. Also, the PA is completely protected against transistor failure due to excessive SWR. I encountered an open-circuit condition temporarily with full output applied: No damage occurred! It was discovered that the manufacturer regularly demonstrates this feature at conventions by operating the '103 on, and then off a dummy load! The unit has a sidetone that is adjustable for a comfortable level via the audio-gain control. Ssb operation is by means of push-to-talk only, as no VOX is available on this transceiver. Alc is built-in, so the microphone gain is not particularly critical except under conditions of high background noise. Band coverage on 80/75 meters goes up to 4050 kHz, making the '103 suitable for MARS use, and additional coverage is provided up to 7500 and 14,500 kHz.

Cw operation is afforded by tone modulation of the ssb transmitter, using audio from the sidetone oscillator — approximately a 1000-Hz note. The initial tests with the spectrum analyzer showed a pair of discrete spurs (related to this oscillator) about 35 dB down with respect to the carrier. The manufacturer was informed of this, and adjustment instructions were promptly sent to correct the difficulty. There have been no further problems, and the unit meets current FCC requirements for spectral purity of emissions.

The receiver section of the Alda 103 is impressive for such a small rig. RIT, often standard on more elaborate hf transceivers, is also incorporated in the Alda. It is effective for minimizing QRM in crowded bands. Frequency readout resolution is to 5 kHz on 80 meters, and to 10 kHz on 40 and 20. The dial drive is a two-speed device: The user tunes past the desired signal at a 6:1 ratio, then can back up at a much slower 30:1 ratio — more than adequate for careful tuning, even during mobile use.

Two options worth noting were included in the review unit: a noise blanker and a two-position crystal calibrator. The blanker has



The Alda 103 transmitter output as displayed on a spectrum analyzer. The photos were both taken with the '103 operating at full rated input power. In the top picture, the operating frequency was 3.9 MHz. The vertical axis is calibrated in steps of 10 dB per division; the horizontal scale is 2 MHz per division. The large pip at the far left edge of the display is generated internally by the analyzer. The fundamental is shown here full scale, and the most significant spurious output, at 7.8 MHz, is down approximately 46 dB with respect to the fundamental. All other spurious outputs are down at least 60 dB. The Alda 103 complies with FCC regulations regarding spurious emissions. For the bottom photo, the Alda was operated at 7 MHz during a two-tone IMD test. The vertical scale is 10 dB per division; the horizontal scale is 1 kHz per division. Third-order distortion products are down approximately 30 dB from the PEP output. Individual tone outputs are down 6 dB from the PEP output.

Alda 103 Transceiver

Frequency range: 3.5- to 14.35-MHz amateur bands.
Modes: Cw, lsb and usb.
Maximum power input: 250 W PEP, ssb; 250 W, cw.
VFO stability: Less than 100 Hz/hour drift from cold start to approx. one hour later, at 25°F to 65°F (3°C to 18°C).
Sensitivity: Approx. 0.5 watt audio output for 0.5-μV input.
Selectivity at −6 dB: 2.5 kHz, ssb or cw.
Audio output: Approx. 3 watts at 8 ohms.
Power requirement: 13.8 V dc at 15 A, nominal, negative ground.
Dimensions (HWD): 3.25 × 9 × 12.5 inches (83 × 229 × 317 mm). Weight, 8-1/4 pounds (3.66 kg).
Color: Two-tone gray with brushed aluminum front panel.
Price class: $500, transceiver only. 30-A supply, $150.
Available options: Noise blanker; 100/25 kHz crystal calibrator; 15-A unregulated power supply; 30-A regulated supply.
Manufacturer: Alda Communications, Inc., 215 Via El Centro, Oceanside, CA 92054.