

New Products

ICOM'S IC-701 ALLBAND ALL-SOLID-STATE TRANSCEIVER

When an Icom IC-701 transceiver arrived at the 73 shack, I was pleasantly surprised by the size of the three boxes that the rig, its companion power supply, and several other accessories were packed in. Times had certainly changed from when I stumbled through the door with a brand new tube-type rig just a few years ago. The 701's size (111 mm x 221 mm x 311 mm) and 7.3-kg weight make it an ideal competitor in the growing mobile radio market.

There is no tune-up to worry about, since the radio is broadbanded. You just set the band and frequency and start talking. It's almost as easy as operating a 2-meter rig. The 701 has full coverage of the HF spectrum in the USB, LSB, CW, and RTTY modes. Receive capability for the 15-MHz WWV signal is also included.

After the rig was unpacked, there was concern as to how such a small box could possibly do so much. The controls seemed to be crowded and it looked easy to make a mistake. A month of operating has proven this to be an ill-founded fear. The front panel is well laid out—Icom certainly engineered it well.

The solid-state finals don't need any coaxing to reach their rated 200-Watt input level. A thermostatically controlled fan is included, but in normal SSB use it has never had to kick in. This rig runs cool. It is important to use a well matched antenna with your 701, a small price to pay in an age when many ham shacks have antenna tuners already. If the transmitter does overheat, the flashing frequency display lets you

know that it's time to pull the switch and find out what's wrong.

Versatile Vfos

Anyone who operates 73's IC-701 mentions the synthesized tuning as an outstanding feature. The computer-compatible tuning system allows 110-Hz increments in frequency selection. Even the most discriminating amateur should be pleased with being no more than 50 Hz from the desired frequency. The musical effect that occurs when a heterodyne is tuned in always brings a smile to the face of a first-time user.

The tuning knob has a 5-kHz per revolution change, but a "fast tune" position allows the band to be covered in seconds. The only analog readout available is from the 100-Hz and 1-kHz dial markings. The idea of being totally dependent on a digital display doesn't seem so bad when you remember that dial backlash and the like are things of the past with the IC-701. No external vfo is needed, since the rig contains two independent ones. It is handy to set vfo "A" on a particular receive channel and use vfo "B" for transmitting when working DX. Total flexibility is the best way to describe it.

This rig stands apart from the rest when an Icom IC-RM2 is hooked to the accessory socket. It is a whole new world of operating when you can change bands and enter frequencies from a keypad. Push a button and you are on a completely different band and predetermined frequency; push another button and the 701 scans to the band edge, all in less time than it takes to say your callsign. The RM2 pro-

vides a second digital readout that is smaller than the 701's display, but it is still very useful. Four frequencies may be stored in memory and three different scanning rates are available. Any number of schemes involving remote operation, crossband repeaters, etc., are possible, thanks to the computer-compatible tuning system.

Helpful Extras

No matter how versatile the Icom IC-701 synthesizer is, the rest of the rig must also be considered. Despite the lack of any pre-select control, the receiver seems to offer a sensitivity that is comparable to tuned rigs. SSB reception lacks any tinny or echoing quality, and the external speaker does a more than adequate job. The passband and RIT features are very smooth and go a long way in eliminating troublesome QRM. The instruction manual honestly states that the noise blanker works best with pulse-type noise, but may not be effective in all cases. Mobile operators may not be interested in features like a 10-dB attenuator and selectable agc, but Icom includes them for amateurs who take their operating seriously.

Speech processors have become more than just an option with most new transceivers, and the 701 is no exception. Icom advertisements suggest that the rf processor may be left on all the time without worrying about the final transistors. However, we found that the added punch given by the processor means slightly less fidelity for the operator on the other end. Processing is definitely used when I am in a pileup or similarly tough situation. The proper adjustment of the speech processor and microphone gain can be a bit confusing at first, especially when you switch to CW and the process control knob sets the output level. Hams who split their time between SSB and CW will be pleased with the 701's separate VOX delay values for each mode. No compromise here—there is even a separate volume control for the sidetone.

The four VOX adjustments, plus seven other controls, are found under the access cover which is conveniently located on top of the radio. Icom has included an swr metering circuit. Unfortunately, it is easy to leave the "set" switch on, canceling the power-out (PO) metering. The swr meter is nice for making occasional antenna checks, but it can't compete with the external variety. Another frill is the dimmer switch. This allows the frequency display and meter illumination to automatically change when the

room lighting shifts.

A Few Bugs

The IC-701's most noticeable deficiency was revealed when it came time to interface the rig to the real world. Use with many linear amplifiers will require the addition of a small 12-volt relay for switching and a 10k pot to control the ALC level. A more frustrating problem occurred when I tried to use an electronic keyer. The instruction manual dictates that the terminal voltage of any external keying device must be less than .4 volts dc. Since many keyers use electronic switching, they will not work here. When I contacted an Icom representative about this problem, he suggested that the keyer output circuit be modified. It was also mentioned that Icom does not consider this to be a fault of the 701, and no changes are planned.

To save space, a miniature phone jack is used for the key rather than the universally accepted ¼-inch type. If you want to use the IC-RM2 remote controller in addition to other accessories, it will be necessary for you to modify the 24-pin accessory plug or obtain the IC-EX1 extension terminal. The EX1 overcomes the switching relay problem and offers a ¼-inch-jack-to-miniature-phone-plug combination for CW keying. Although the interfacing problems are not insurmountable, they can mean an unneeded delay for the amateur who expects easy hookup.

Since the IC-701 relies heavily on digitally-based circuitry, rf shielding is very important. Correspondence with other hams—and on-air testing—have shown that feedback problems may occur, especially when the IC-RM2 remote controller and high-power amplifier are used. Good grounding practices and careful attention to the audio lines help to cure these bugs. The instruction manual gives adequate information on problems that may result from misadjustment of the normal user controls, but little information is available about other difficulties that may crop up.

Icom has incorporated more than 470 solid-state devices in the 701. The theory documentation provides a general outline of the design, but with a few exceptions, it does not give a detailed description of individual circuits. Because of the complexity and small size of the IC-701, it is doubtful that most hams would want to service it. Some instructions for internal adjustments are given. These often require a frequency counter, rf voltmeter, signal generator, or oscilloscope. A highly competent dealer or



Icom's IC-701 transceiver.

Icom distributor is the best source of help for the less adventuresome owner.

Being limited to admiring the rig's outward appearance is not an unpleasant pastime. The IC-701 is a sharp looking, highly functional unit. Except for peeling lamination on the faceplate of the RM2, our 701, with accessories, has performed well during daily use for the past month. Although Icom's compact "black box" seems dwarfed by the nearby antenna tuner, it is a real performer. Icom, 3331 Towerwood Drive, Suite 304, Dallas TX 75234; (214)-620-2780.

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30-MEGAHERTZ, DUAL-TRACE, PORTABLE MINISCOPE

Non-Linear Systems has increased the number of their Miniscope oscilloscopes to three with the introduction of their Model MS-230 30-megahertz, battery-operated, dual-trace miniscope. Its size is 2.9 inches high by 6.4 inches wide by 8.5 inches deep. The weight is 3.5 pounds, including batteries.

The MS-230 features alternate, chopped, and separate sweep modes. Internal and external trigger modes are included. There are 12 vertical gain settings for each channel's range, from 0.01 to 50 volts per division. Timebase settings range from 0.05 microseconds to 0.2 seconds per division. Verniers are provided for timebase and vertical amplifier adjustment.

The MS-230 Miniscope includes a horizontal input channel and an internal calibrator. The graticule consists of .25-inch divisions arranged 5 across and 4 high.

The MS-230 comes complete and ready to use. Included are input cables and a battery charger permitting battery or line operation. Accessories include a 10:1, 10-megohm probe and a leather carrying case with shoulder strap and belt loop.

For further information, contact Non-Linear Systems, PO Box N, Del Mar CA 92014; (714)-755-1134. Reader Service number N22.

A CRITICAL REVIEW OF THE DRAKE UV-3

Drake's three-band VHF/UHF FM transceiver has gotten a good deal of attention and discussion. I've had one since Christmas, and I'd like to pass on comments about my experiences with it.

Vital Statistics

The UV-3 is a synthesized unit with 5-kHz steps. Coverage is all of 2 meters, all of 220, and

440 to 450 MHz. The unit can be ordered with any one band, any two, or all three. Built-in offsets are zero, plus or minus 600 kHz on 2 meters, plus or minus 1.6 MHz on 220, and plus or minus 5 MHz on 440. Up to three additional offsets may be programmed on a plug-in diode board, and the same three are shared between all bands. The frequency may be set up on front-panel switches, or up to four frequencies in each band can be diode-programmed. A master switch selects either the front panel or any of the programmed frequencies. The bandswitch is unconditional. There are no tune-up controls.

Each band uses a separate rf section, each adding 2½" to the depth of the case. Each band has a separate antenna jack. Maximum power is 25 W on 2 meters and 10 W on the other bands. The "low" setting of the power switch is about 10% of full power, and this can be changed by resistor substitution. There is a scan function which allows either programmed frequency #4 or the front-panel frequency to be checked every few seconds—momentarily interrupting the selected frequency—and locks in if carrier is present. A non-encoding mike is supplied, but the jack is wired to accept a Drake encoding mike. A mobile mounting bracket is included. There is an accessory jack.

Viewpoint

To make use of a theater review, it's necessary to be aware of the critic's prejudices and biases in order to put his comments in proper context. The same is true of a product review.

I take the attitude that any piece of equipment built for a serious purpose, of which repeater communication is sometimes a prime example, should have a set of features and specifications that follow with logical precision from that purpose. That is, it should do exactly what it's supposed to do.

There should be sufficient reserve performance to allow for expected component deterioration. It should be free of quirks that get in the way of its intended use or which require attention from the user beyond that which is inherently required by the function being fulfilled. It should be rugged, in the sense that conditions to be expected during use will not cause failure or degradation. It should be maintainable; assembly and disassembly needed to reach components should be easy, straightforward, and quick; parts should be readily available; and the design should be comprehensible, at



The Model MS-230 Miniscope.

least to the extent of avoiding peculiar tricks.

This is the standard by which a commercial workhorse is judged. There's an awful lot of ham gear around that wouldn't begin to measure up to that level. The first thing to say about the UV-3, though, is that it's a serious piece of engineering. The things that I will be criticizing probably would not even be mentioned in a review of a lesser piece of gear.

Performance

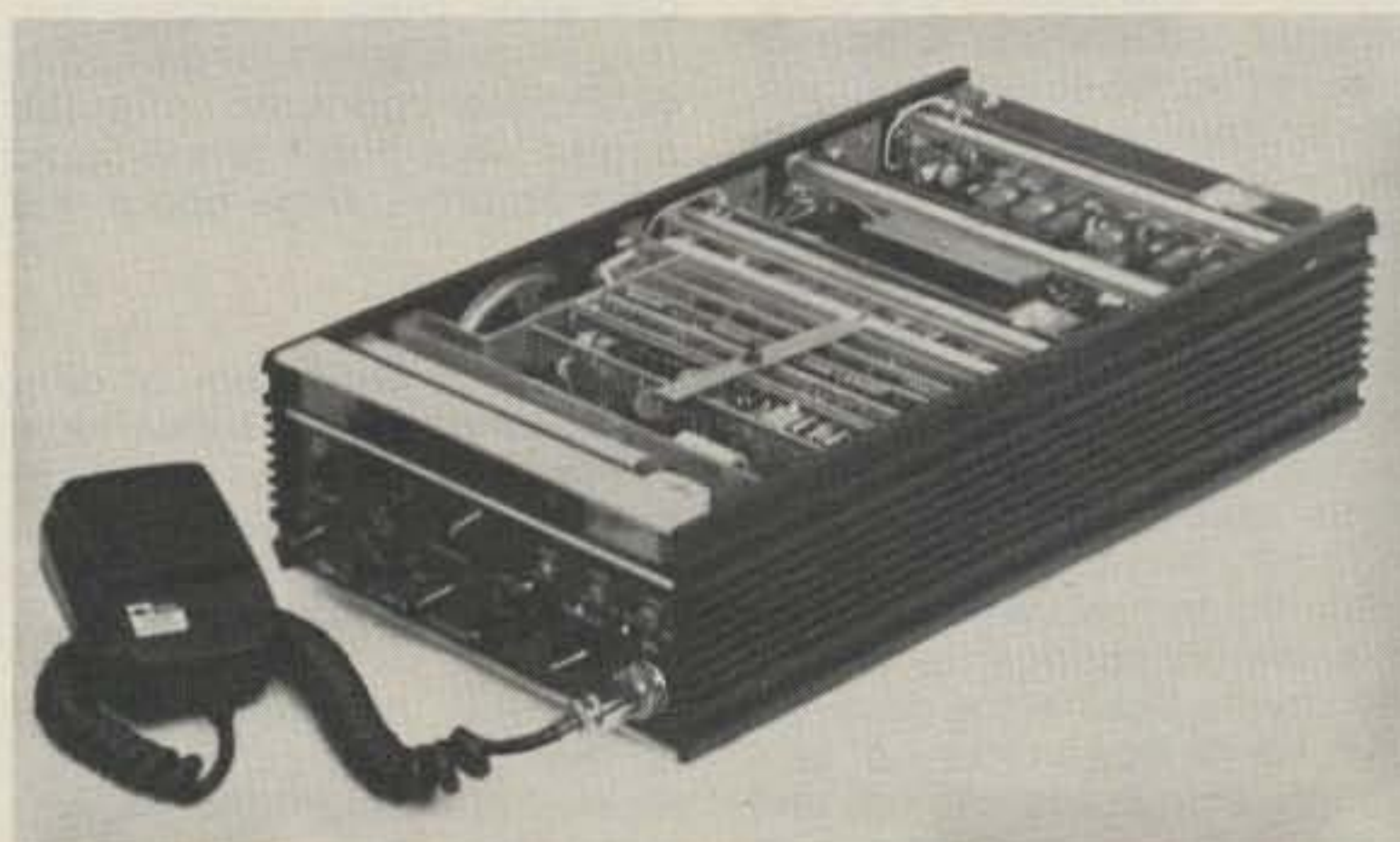
The UV-3's strong suit seems to be raw performance. There is no heterodyne synthesis; instead, a single vco for each band is retuned in going from receive to transmit. While I have not had the opportunity to check the spurious output specs with the spectrum analyzer, this approach tends to eliminate most spurs right at the source. The spec is -60 dB on 2 meters and 220, and -40 dB on 440. The lock range of the vco's easily exceeds spec; on the 2-meter band it held almost from 142 to 150 MHz.

Although the rf section is broadbanded and needs no tuning adjustments (except for dialing up the synthesizer), the output power was about 5%

above specs across the rated bandwidth and didn't drop off too badly until the vco lost lock.

An apparent instability in power output turned out to be an effect of running off a storage battery with the charger turned off. Power is somewhat sensitive to supply voltage, but this is not a criticism. It just likes to be run off rated voltage, which is 11.5 to 15 volts. Incidentally, the negative side is grounded to the chassis, as are the antenna jacks. It requires a positive supply.

The audio is very good, to the point of attracting attention. I've repeatedly been asked, "That rig sounds pretty good; what is it?" To the ear, the response sounds smooth and distortion is not noticeable. There are no special audio shaping circuits; this makes it possible to wire the touch-tone™ encoder directly across the mike and have the correct twist relationship. On receive, the sound reminds the listener of the music receiver, allowing, of course, for the 12-kHz i-f bandwidth. The unusually large magnet in the speaker has to be one reason for this. If anything keeps you from communicating, it won't be the rig's audio. I



Drake's UV-3 VHF/UHF FM transceiver.