

VHF Radios: Sporty's, ICOM Excel— Vertex Disappoints

If VOR is important, the Sporty's SP-200 wins hands down. The ICOM IC-A6 is tops for comm only but we say pass on any Vertex radio.



by Chuck Forsberg

In the world of portable avionics, GPS navigators are the stars while VHF radios are the bench warmers. Yet every pilot we know has a portable comm radio, even if it's rarely used. It's the sort of basic equipment everyone seems to carry in a flightbag, like a pad or flashlight.

Why? Back-up communication is the reason most of us have VHF portables. Call this standby mode, if you like. You'll probably never need it, but for a couple of hundred bucks, you can have a radio to lean on if the panel goes dark during an IFR flight.

Ground ops and pre-flight are another good reason for having a handheld. We've all seen linemen with handhelds at FBOs and fly-ins and it seems silly not to be able to communicate with them, if the need arises. For airplanes with no electrical systems, a battery-powered portable can provide communications for flights into busy airspace where a radio is a must.






In the not-so-distant past, the VHF market was all but dominated by the Japanese electronic giant, ICOM. But competition in this narrow market segment has intensified, yielding price competition

VHF radios tested include, from left to right, the Vertex VXA-700, VX-210 and VX-300. ICOM's IC-A6 and A-24 performed well, as did the Sporty's SP-200, far right.

and radios with more features. Some years ago, even Sporty's got into the act, with a well-regarded portable radio first made by Japan Air Lines.

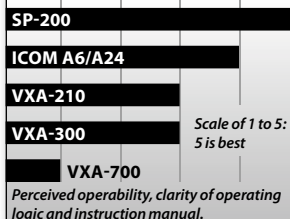
For this article, we've reviewed what we consider to be the six top contenders in the aviation VHF market, including ICOM's IC-A6 and IC-A24, the Sporty's SP-200, and the VXA-210, -300 and -700 models.

VHF RADIOS COMPARED

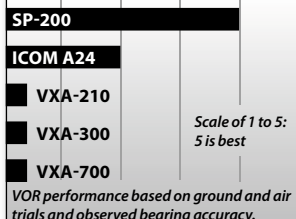
RADIO	PRICE/ STANDARD ACCESSORY SET	ADDITIONAL ACCESSORIES	STANDARD POWER	SIZE	CHANNEL SPACING	WX ALERT	121.5 KEY	WATER RESISTANCE
 ICOM A6/A24	IC-A6 \$295 (discount) IC-A24 \$390 (discount) Battery pack, belt clip, case, wall charger, headset adapter, antenna	Alkaline, Nicad, LI-ION packs, ship's power cable, desktop charger	Alkaline pack	5.7X2.1X1.6 (A6, A24)	25 kHz	YES	YES	YES
 SPORTY'S SP-200	\$299 (direct) Alkaline battery pack	Headset adapter, Nicad pack desktop charger, wall charger, ship's power cable, holster, ship's antenna adapter	Alkaline pack	7.2X2.3X1.5	8.33 kHz	NO	NO	NO
 VERTEX VXA-210	\$260 (discount) Nicad pack, charger, headset adapter, wall charger	PC programming kit, alkaline pack, SMA- to-BNC adapter, ship's power adapter, speaker mic, desktop rapid charger, Ni-MH battery pack, external PTT switch	Nicad pack	5x2.3X1.4	25 kHz.	YES	NO	YES
 VERTEX VXA-300	\$339 (discount) Headset adapter, charger, overnight desktop charger, belt clip	Ship's power adapter, alkaline pack, speaker mic, desktop charger, 220-volt charger, SMA- to-BNC adapter	Ni-MH pack	5.5X2.5X1.4	8.3 kHz (RX only)	YES.	YES	YES
 VERTEX VXA-700	\$375 (discount) Headset adapter, charger, belt clip	PC programming kit, ship's power adapter, alkaline pack, speaker mic, desktop charger, 220-volt charger, SMA- to-BNC adapter	Lithium ion pack	4.5X2.5X1.2	25 kHz.	YES.	YES	YES

PERFORMANCE POINTS

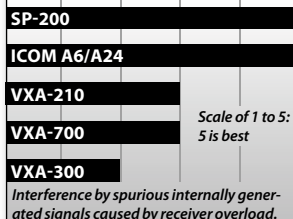
EASE OF USE



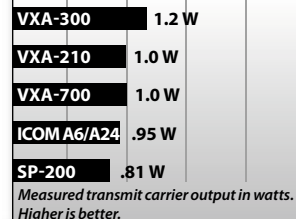
VOR PERFORMANCE



CROSS MODULATION



CARRIER POWER



Batteries: Alkalines vs. Rechargeables

Battery technology has come so far in the past five years that most of us are used to phones and computers powered by batteries that are generally trouble free. We plug them in, charge them up and don't think about it much. Life with batteries suitable for VHF radios is not so simple.

All of the radio manuals caution against leaving a charger on for more than eight to 12 hours. Your phone might be a charge-and-forget gadget, but not your radio. And if you elect to use rechargeables for a radio in a back-up role, you'll need a battery management strategy. All batteries have self-discharge rates and rechargeables, if ignored long enough, will simply discharge to the point of uselessness.

The best way to avoid this is to use an alkaline battery back with a spare set or two of alkalines. High-current alkalines, such as the Duracell Ultra, will give more talk time than cheaper batteries and alkaline batteries have a much lower self-discharge rate than rechargeables. If you use the radio frequently, rechargeables are certainly acceptable. But if it's a back-up device you seldom pick up, we recommend alkalines as the best on-the-shelf choice. Check them occasionally for charge state and leakage.

As for rechargeables, the lithium-ion battery in the Vertex Standard VXA-700 Spirit was the winner in the first battery life test we conducted, with 25 hours of operation. (Credit goes to Vertex's battery saver.) But Li-ion batteries are controversial, given their low output when cold and reports of the odd battery overheating or exploding.

We used two different protocols for testing battery life. The first simu-

lated waiting for a call, while the second simulated transmitting. The first test was two hours, simulating navigation with VOR after a power failure. Then, we periodically transmitted for one minute and measure carrier power. The second test repeated this, but with five minutes of transmit time. After the five minutes, we measured carrier power and percent modulation speaking into the mic.

Sporty's SP-200 was still chugging along, albeit at reduced power, for quite some time after the rest quit, as shown in the chart below. Suffice it to say, Sporty's and Duracell Ultra won the second test. A third battery test similar to the second tested alternative combinations of radios and batteries.

The ICOM A24 with six ordinary Energizer Alkalines gave 20 minutes of transmit time but 30 minutes with Duracell Ultras. With eight used NiMH camera batteries, the SP-200 did 70 minutes. Very impressive.

Two things are worth considering here. One, these radios can and do draw current when they're turned off, so in addition to the batteries self-discharging, the radio draws them down, too. The proprietary battery packs used by handheld radios can and do become unavailable long before the radio itself dies. Even if you elect to use rechargeable batteries, buy an alkaline battery pack for insurance. Check www.imaging-resource.com for more information on batteries.

There are others to pick from but, frankly, we think these six are so price competitive and capable that any buyer will have no trouble finding a model to suit at an attractive price point. Speaking of price, they vary somewhat, according to vendor. At the high end is the ICOM IC-A24 at \$390 discounted—it's a full-up navcomm—while the Vertex Standard VXA-210 is a compact comm-only unit that sells for \$230 to \$260, typically. All the other products fit between these two price points.

Although our testing for this article is relatively comprehensive, choosing a radio should be defined

by what features you want and how well the radio meets these requirements. Do you really need, for instance, 20 memory channels, automatic scanning and a built-in VOR? Our guess is probably not. With that mind, our top criteria for best value

lean toward solid comm performance, easy-to-understand features and controls and a reliable, convenient battery charging system.

How We Tested

We obtained sample ICOM and Vertex radios through the courtesy of Gulf Coast Avionics (www.gulfcoast-avionics.com) and, directly from Sporty's, an SP-200. We examined and photographed each one and tested real-world performance of both the comm section and—if so equipped—the VOR section in both the air and on the ground. Using properly calibrated test equipment, we looked at things like current drain and battery life, transmitter output power, comm sensitivity and so on. Our goal was to sketch a general picture of the technical competence of each receiver without getting too wrapped up in the finer points. We think features and oper-



BATTERY TEST 1 (SHORT XMT)		BATTERY TEST 2 (LONG XMT)	
27	VERTEX VXA-700	80	SPORTY'S SP-200
24	VERTEX VXA-300	45	VERTEX VXA-300
20	SPORTY'S SP-200	45	VERTEX VXA-700
19	VERTEX VXA-210	35	ICOM IC-A24
19	ICOM IC-A24		VERTEX VXA-210 NOT TESTED
ENDURANCE IN HOURS		ENDURANCE IN MINUTES	
10	20	30	40
		20	40
		60	80

ability of the radios are the primary determinant of value and should drive the purchase decision as much as technical performance.

ICOM IC-A6 and IC-A24

Among all the radios handled by various pilots during this review, these two proved the most popular. And with good reason. They're solidly made, with nice tactile feel and small size. They're fairly simple to use, which is a plus for something that might come out of your flight-bag once a year, if that.

The two models are essentially identical, except the A24 has a VOR function and the A6 is comm only. Both share identical manuals and accessories, too. These radios have a top-mounted volume control, a large multi-purpose knob and a standard BNC antenna connector. An adaptor cable for external microphone and headphone attaches to the weather protected connectors on the right side of the radio. This cable has a redundant mini-jack to connect to a push-to-talk switch.

There's a NOAA weather-alert monitor which can be operated from the wall-hugger power supply with the battery removed. This is important, given that the battery must not be recharged for more than 12 hours at a time. Only the A6 and A24 have the ability to monitor NOAA weather alerts when tuned to a comm frequency.

Although we like the alkaline packs, we think they could use some design work. We find it difficult to remove the pack and change the batteries, a bad thing if you have to do it in flight under duress. In an airplane where the ICOMs might do duty as primary navcomms, the cigarette lighter cable operates the radio or recharges from 12 and 24 volts.

Although earlier aviation handhelds tended to be tender, these newer radios are designed to be submersible according to the JIS-4 standard, which means they're supposed to resist one hour of driving rain.

Although the IC-A24 is technically a navcomm, it has no localizer and compared to the Sporty's SP-200, it doesn't do a good job of extracting usable navigation information from a marginal VOR signal, which is often the case when

only a portable antenna is available. We found that ignition noise interferes with the VOR demodulator. Even with the engine stopped, clicks from a strobe beacon disrupted VOR readings. On the comm side, the ICOM radios revealed no birdies—strange squeals, pops or snaps—and the audio quality is good.

The ICOMs have the largest and easiest-to-read frequency display, clearly readable from most angles. This, the weatherproofing and supplied headset adapter, make ICOM the choice for aircraft without avionics. But for top performance, plan on installing an external antenna.

Sporty's SP-200

Although we're not privy to the sales numbers, we wouldn't be surprised if this radio is the market leader in volume. It's inexpensive—\$299 directly from Sporty's—performs well and is easy to use, which is to say it hits all the high notes effectively, even if it's not as good as the other radios in certain performance characteristics.

The SP-200's boxy appearance is dominated by the large battery pack. The battery pack can be removed when optional external power is used. This radio is the largest of the lot, thanks to the eight AA battery pack. But with antenna attached, there isn't that much difference in size between these radios, so who cares? The extra batteries give the Sporty's a decided edge in transmit time endurance. Sporty's has a long list of optional accessories for this

In some older airplanes, handhelds are the sole means of communication, as in the Ercoupe, top. To make that work, antennas should have BNC connectors, not screw connectors, such as on Vertex radios, third photo. We tried radios with headset adapters and external mics, lower photo.



Sporty's New Gyro Bests RC Allen

An electric back-up gyro for under two grand? You gotta be kidding. Not really. Sporty's AIM-based gyro is a terrific performer at a bargain price.

radio, including headset adapter, antenna coupler, spare battery case and a NiCad rechargeable battery pack and charger system. There's also a ship's power accessory for 12-, 24- and 28-volt options.

The SP-200's form factor has top-mounted squelch and power/volume controls, a flip-flop memory button and standard BNC antenna connector. External mic and phone connectors are on the top and are not weather protected, as with the ICOMs. The SP-200 is the only radio we tested that doesn't have keyboard beep, except for illegal keys. This is a bit of a nuisance if you're used to a beep or tactile feedback but it's offset by the slightly larger keyboard, which reduces fat-finger mistakes. The SP-200 tunes up to 142.975 MHz in 8.33 KHz steps.

Sporty's was the best of the group in VOR performance, hands down. In a pinch, you could actually navigate with it. Further, it's the only portable radio that displays a LOC signal, something that might come in handy some day. The VOR mode automatically sets a course TO the VOR as soon as the VOR signal is decoded, although the initial course is sometimes inaccurate. When this happens, change frequency momentarily to force a retrain.

During comm band scan, nine birdies were detected at an aggressive squelch setting. Turning up the squelch eliminated them. The birdies don't seem as strong as the birdie on the VXA-700. Squelch level is controlled by a real knob, not keys or sliders. Frequency display and CDI are easy to read in the handheld position—antenna pointing slightly away from you and the display is optimized for this angle of view. Contrast is poor when viewed from above, as would be the case if the radio were attached to the panel. Overall, for the price, the Sporty's SP-200 offers a lot of value and plenty of add-on accessories.

Vertex Radios

Among amateur radio enthusiasts, Yaesu is a well-known Japanese brand and Vertex Standard is the new name for that line. Building on its experience with portables for

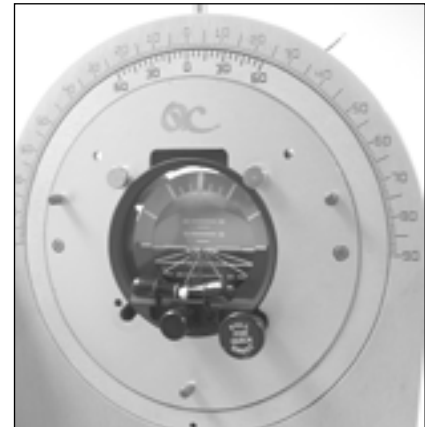
As general aviation marches bravely forward into the dawn of the electronic flight display revolution, you'd think the days of the iron gyro would be numbered. Who in their right mind would design and build a new one? Answer: the world's most well-known pilot boutique, Sporty's Pilot Shop, along with an equally well-known instrument maker, Castleberry Instruments of Austin, Texas.

Have these guys come adrift or is there really a market for such a thing? As with all things in aviation, there's a market for everything if the price is right and on this new instrument, the price is definitely

right, a bargain-basement \$1595 for a fully lighted, well-designed electric attitude gyro suitable for back-up in airplanes with vacuum systems.

We know a thing or two about the economics of instruments and avionics and like a few of our readers, one question occurs to us: At that price, can this product possibly survive and make enough profit to sustain itself? Sporty's CEO Hal

Dave Vorsas, below, at Triumph Instruments and Avionics (formerly JDC) prepares the Sporty's gyro for a wring-out on the gyro table. The gyro did well in a series of basic tests.



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VHF RADIOS

(continued from page 12)

hams, Vertex markets three radios for aviation use, the VXA-210, the VXA-300 navcomm and the VXA-700, which combines navcomm functions with 2-meter amateur band capability.

All of the Vertex products share some common traits, such as a dot-matrix display, magnesium die-cast construction and rechargeable batteries as the standard power source. All of the Vertex radios use a screw-in SMA antenna connector.

This saves a bit of space but sacrifices compatibility with other avionics connectors. The Vertex radios have a battery saver feature that works by hibernating the receiver when no signal is present, waking up at times to check the frequency. This seems like a good idea, but it means that the beginning of a transmission may be missed, an annoyance.

As we go to press, the VX-210 may be about to be discontinued. We're not sure because Vertex Standard is, in our view, terrible at sales, marketing and support. They declined to provide sample radios and couldn't be bothered to return our query calls. In our view, this kind of lack of response is unacceptable in the competitive environment in which these radios live.

The VX-210 has a large power/volume control and a multifunction knob. Depressing the multifunction knob combines with a function key to navigate its menu system. An unmarked multilevel menu system must be negotiated to adjust squelch. The radio's 700 MaH NiCD battery gave it the shortest battery life of all the units tested, so powering with optional alkalines is the way to go. An optional alkaline pack holds six cells. Performance-wise, the radio proved susceptible to cross modulation, which harms signal reception quality. The VXA-210 receives weather but has no weather alert.

Vertex Pilot VXA-300

The VXA-300 is similar in design to the VXA-210, with a top-mounted SMA antenna connector, screw-in external mike/headphone connector and concentric power/volume

and multifunction knob. Menus are navigated by depressing the volume control and the function key. The 300 has a four-position tone control (pitch function) to optimize receiver intelligibility for various conditions, something unique and useful.

The receive channel step can be set to 8.33 kHz, but this disables the transmit function so we're not sure how useful it is. The selectivity of this radio—and the others—isn't up to the demands of 8.33 KHz spacing anyway. It's a neat bit of advertising but not useful, in our estimation.

As with the other Vertex radio, the keyboard lock doesn't prevent the large knob from changing frequency and during our modulation tests, we noted that like the less expensive VXA-210, the 300 also suffers from cross modulation. This radio, like the ICOMs, is claimed to be rain resistant according to the JIS-4 standard.

Vertex VXA-700

At \$375 discounted, this radio is the most expensive of the group and it's a gadgeteer's delight, combining VHF aviation functions with a 2-meter amateur brand transceiver. If you find programming an IFR GPS a piece of cake, this is the radio for you. But in our view, the air band segment is mediocre, at best. The radio suffers from cross modulation, although not as badly as the VXA-300.

The VXA-700 comes standard with a custom form-fitting lithium ion battery and the transceiver itself is the smallest of this group of radios, with an antenna about the same size as the others. The power supply for charging the batteries is the largest of the group.

Between the cross modulation and mediocre VOR decoding, the VXA-700 had difficulty getting a bearing from the Newberg (UBG) VOR from Stark's Twin Oaks airport, from which you can see the VOR antenna a scant five miles away.

There's also a broadcast FM receiver aboard but we found that the reception was poor, with a tinny, mono sound that's just not impressive in an age of XM Radio and iPod stereo. The VXA-700 seems to clip the beginning of incoming transmissions, even when the battery saver is disabled. There's also a click or thump when squelch cuts in and

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VHF RADIOS

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out, which is annoyingly obvious when using headphones. We found a strong birdie at 122.325 MHz that interrupts scanning for weak signals.

Control-wise, the keypad is slightly smaller than the others and the 0 is in an annoying non-standard location. The large top knob is the easiest thing to disturb inadvertently. As with the other Vertex radios, the keyboard lock function doesn't prevent the large knob from changing frequency accidentally. An unmarked multilevel menu system must be negotiated to adjust squelch.

The optional alkaline battery holder for the VXA-700 holds two cells and doesn't allow transmitting. This oversight will be a deal breaker for many pilots. We were further turned off by the fact that the Vertex sales department returned none of our calls seeking additional technical information.

Recommendations

What to buy? First, what do you really need? A decade ago, a VHF portable with VOR capability was a must-have back-up for IFR. But now, portable GPS far outshines even panel-mount VOR units so for back-up nav, we say get a battery operated GPS. But if you still insist on VOR, the choice is relatively easy, in our view. Sporty's SP-200 is the Alpha dog, hands down. The SP-200's VOR reception is better than any of the competing units and at \$299, the radio is an excellent value.

But if you have GPS for back-up nav, the ICOM is a good choice for comm. The IC-A6 is small, rugged and has the choice of long-storage back-up with the alkaline battery pack. We've seen it priced as low as \$269, which makes it a bit cheaper than the SP-200.

With either of these two top radios, talk time can be extended with extra sets of inexpensive alkalines. The battery packs will also take a set of rechargeable AAs, as another option. (See *Aviation Consumer*, December 2004, for more on this topic.)

As for the Vertex radios, we found them to be a disappointment. The fact that the company simply wouldn't return our calls causes us to do something we rarely do: add these products to our "don't buy" list. You can do better with Sporty's and ICOM.

Chuck Forsberg is an electrical engineer and radio amateur. He owns a Cessna 182.

LETTERS

(Continued from page 3)

extracting work from that hot gas, the more air molecules you have, the more work can be extracted in the form of power to the crankshaft.

David Rosing
via e-mail

You're correct. We missed class the day this topic was discussed in Physics 101.

Three-Blade Props

I just received your August issue and

FEEDBACK WANTED

CESSNA 150/152



For the December 2005 issue of *Aviation Consumer*, our Used Aircraft Guide will be on the Cessna 150/52 series. We want to know what it's like to own these popular trainers, how much they cost to operate, maintain and insure and what they're like to fly.

If you'd like your airplane to appear in the magazine, send us any photographs you'd care to share. We accept digital photos in the tif or jpg format, e-mailed to the address below. We welcome information on mods, support organizations or any other pertinent comments. Please send correspondence on the 150/152 by October 10, 2005 to:

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was particularly interested in the article on three-blade props. But I must disagree with this statement: "If you have an older Cessna 180 or 182, a Comanche 250 ...we're wary of recommending three-blade props for these models..."

I own a 1961 Comanche 250 and when I decided on a field overhaul, I also went with a three-blade prop from McCauley. There is virtually no vibration at any engine power setting. You can lightly touch the yoke and it's as smooth as silk. I have noticed no difference in cruise. It's neither faster nor slower. The time it takes to rotate is improved and the climb rate is much improved. All in all, I think my decision to replace my worn out two-blade Hartzell with a three-blade McCauley was a good decision.

John A. Navarro
Moreno Valley, California