

Budget-friendly VHF Radios



The waterproof Cobra HH325 topped our test field of handheld VHF's. The portability of a handheld VHF marine radio often outweighs its drawbacks, like shorter battery life and limited operating range.

Quality handheld and fixed radios get the job done for about \$100.

To follow up *Practical Sailor's* recent report on mid-priced marine VHF radios (*PS*, February 2009), we decided to take a look at some inexpensive offerings on the market. These entry-level electronics are well-suited for small-boaters and those on a budget—and let's face it, “budget boater” applies to most of us these days.

Testers found several handheld and fixed model VHF's that will get the job done for about \$100. A fixed VHF is a better choice for boats that already have 12-volt systems in place. With a masthead antenna, they have better range than handhelds, and they aren't hampered by the battery-life issues of portable electronics. But for those without 12-volt onboard power or those looking for an inexpensive backup to a fixed unit, handheld radios can fit the bill. Their strength is their portability. Being able to communicate via VHF from the dinghy, life raft, or ashore is always handy.

The VHF's in this price group don't have many of the bells-and-whistles of their more costly brethren nor some of the advanced functions and safety features that full-time cruisers like. However, these basic marine radios do offer good transceiver performance wrapped in a weatherproof case and come with a three-year warranty, which is impressive for the price.

PS last looked at inexpensive fixed-mount VHF's in the July 15, 2005 issue and low-priced handhelds in the October 2006 issue.

WHAT WE TESTED

Practical Sailor testers evaluated three fixed-mount VHF's and three handhelds that fit the price point. Two of the fixed VHF makers, Cobra Marine and Midland Radio Corp., made a name for themselves in the citizens band (CB) radio market and in other electronics arenas. From Cobra, we tested the F55, and from Midland, the Regatta I. We rounded out the small field with the entry-level GX1000S from Standard Horizon, a well-known player in our tests and the marine electronics market.

In the handheld VHF category, testers evaluated Cobra's mid-sized MR HH325 VP, Midland's Nautico model NT3, and West Marine's VHF55. Since this test began, Standard Horizon released a new handheld in this price range; look for a performance review of the new unit in an upcoming article.

Although all of the fixed models

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ELECTRONICS

Testers Gauge Performance, Features, and Durability

Before testing began, all handheld test radios were fully charged using their associated AC chargers. Testers powered the fixed units with an Astron variable voltage DC power supply.

All test radios—fixed and handheld—were run through a series of bench tests using a Ramsey COM3010 monitor.

U.S. Federal Communications Commission (FCC) regulations restrict the maximum power output of a fixed-mount marine VHF transmitter to 25 watts, and a portable handheld VHF is limited to 5 or 6 watts. The FCC also specifies a low-power setting for harbor use, typically 1 watt, for all radios.

Practical Sailor tested each transmitter on channel 16, at the highest and lowest power settings, at room temperature (75 degrees) and after the radios faced temperature extremes. The less variation in power and frequency, the higher the radio was rated.

To chill the radios to their minimum operating temperature, testers put them in a freezer (at 15 degrees) for four hours. We used a fish smoker to get the handheld radios to high-temp extremes, and each was left to cook for two hours at 122 degrees. Because the fixed VHF's wouldn't fit in the smoker, testers instead used a truck dashboard—at mid-day on a sunny, South Florida day—as the heat chamber, baking the radios for two hours at about 122 degrees.

Frequency accuracy is defined as the ability of the transmitter to send signals out on the selected frequency. Frequency stability measures the transmitter's ability to maintain frequency accuracy over its entire temperature and voltage operating range. The closer to the selected frequency a transmitter stayed, the higher testers rated it. FCC regulations require an accuracy of 10 parts per million, which equates to about 1550 Hz in the marine band. Industry groups typi-



Bench testing evaluated each radio's transmitter power, frequency accuracy and stability, and receiver sensitivity.

cally call for half that amount.

Amperage draw was recorded using a Fluke 336 clamp-on ammeter when transmitting at both 13.8 and 11.0 volts DC, or the minimum voltage at which the radio would transmit. We also checked each unit's low-power setting, measuring both power input and output. Measurements were taken directly off the radios' antenna ports.

Receiver sensitivity is the ability of the receiver to hear a weak signal. Typical marine receiver sensitivity ratings run from .22 to .35 microvolts; industry groups recommend a minimum .50 microvolts. Each radio receiver was tested for the minimum signal it could receive at a specific industry standard setting between background noise and generated signal. All test radios were rated Good or better, meaning they are sensitive enough to pick up very weak incoming signals.

Another receiver standard is selectivity, or the ability of the receiver to reproduce only the signals on the selected channel, not those on other channels. Our test equipment did not allow us to test each radio for this, so we've listed manufacturers' specs in the Value Guides on pages 18-21; a higher number is better.

The displays were rated on screen size, the quality and readability of the data displayed, and backlighting.

A marine VHF transmission must be heard over wind, seas, or any other noise. Testers measured sound pressure at max



volume while inputting a 1 KHz tone. The measurements were taken at a distance of 1 meter from the fixed-mount radios and one foot from the handhelds. Testers also monitored a weather channel and rated the quality of sound.

Handheld radios typically face more abuse than fixed models and must be able to stand up to drops and falls, and the occasional dousing with rain or sea spray, not to mention the likelihood they may take a dip overboard. We conducted a series of tests on only the handhelds to gauge their ruggedness.

To check the radios' water resistance, each was submerged in fresh water for 30 minutes, then operated immediately after and again the next day. The radios were dropped from a height of 4 feet onto concrete. Testers used a pass/fail rating system for these tests.

One noted drawback of handheld radios is their limited battery life. To get an idea of how long the test models could be expected to operate on one charge of their rechargeable battery, testers allowed them to run for 15 hours. Testers accomplished full power transmissions and voice reception every hour until the battery died or the unit began to malfunction.

Some of the test radios also can operate on alkaline batteries. Although alkalines rarely have as long a run time as rechargeables, they are handy to have for emergency power when the main battery goes.

PS VALUE GUIDE INEXPENSIVE FIXED VHF RADIOS			
MAKER	COBRA	MIDLAND	STANDARD HORIZON
MODEL	MR F55	Regatta 1 	Eclipse (GX1000S) 
PRICE	\$120	\$110	\$85
PRICE SOURCE	canyonrivermarine.com	radioshack.com	consumersmarine.com
WARRANTY	3 years	3 years	3 years
MIC CONTROLS*	1,2,3	1	1
HAILER/PA	No	Yes	No
AUTOMATIC FOG SIGNALS VIA HAILER	N/A	No	N/A
DSC CLASS TRANSCEIVER	SC-101	SC-101	SC-101
DISPLAY LAT/LONG	Yes	No	Yes
DISPLAY CURRENT TIME	No	No	No
CHANNEL COMMENTS	No	No	Yes
WATERPROOF	Yes (JIS7)	Yes (JIS7)	Yes (IPX7)
FOOTPRINT (W X H)	6.3 x 2.4 inches	7.1 x 2.6 inches	6.2 x 2.4 inches
DISPLAY SIZE (W X H)	2.2 x .6	2.2 x 1.5	1.6 x 1.0
SELECTIVITY	60	70	70
AUDIO OUTPUT (1 meter)	86 dBA	91 dBA	84 dBA
DRAW (high/low transmit power at 13.8 volts)	4.6 / 1.1	4.3 / 0.8	4.7 / 0.9
DRAW (high transmit power at 11 volts)	3.5	4.2	4.3
RATINGS			
TRANSMITTER POWER STABILITY	Fair	Excellent	Good
TRANSMITTER FREQUENCY STABILITY	Excellent	Good	Good
RECEIVE SENSITIVITY	Good	Good	Excellent
DISPLAY RATING	Good	Good	Good
AUDIO QUALITY	Good	Good	Good

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* Mic control index: 1= Push to talk, 2= Channel change, 3= Quick 16/9, 4= Distress key, 5= Volume adjust, 6= High/Low power

receiver listening for both voice communications and DSC digital data coming in over channel 70. DSC Class D radios have dual receivers—one to monitor voice channels and one to continuously monitor for digital data—but those radios are typically more expensive.

All of the fixed-mount VHF's we tested are submersible (rated for one meter for 30 minutes), but only two of the handhelds, the Cobra and the West Marine, can survive taking a dive. The Midland Nautico NT-3 handheld is only splash-resistant (JIS4), a significant limitation for a portable marine device.

All of the radios tested come with three-year warranties.

None of the inexpensive VHF's tested will float. We recommend attaching a buoyant lanyard or fob to any portable electronics, including these handhelds. Inexpensive does not mean disposable, and having a lanyard that can be snagged with a boathook will make the retrieval process easier.

FIXED MOUNT COBRA F55

Cobra Marine's F55, a compact, entry-level VHF, provides for one-button operation of a number of key features, including making a DSC distress call, quick-selecting channel 16 or 9, initiating scans, setting channel group, and opening the menu page. Channel selection is made with up/down buttons on the radio or microphone, which also has a quick 16/9 button.

Menu-controlled functions include: display adjustment, weather alert, DSC calling, and DSC information entry. Small rotary knobs control power, volume, and squelch. Squelch did not function on weather channels.

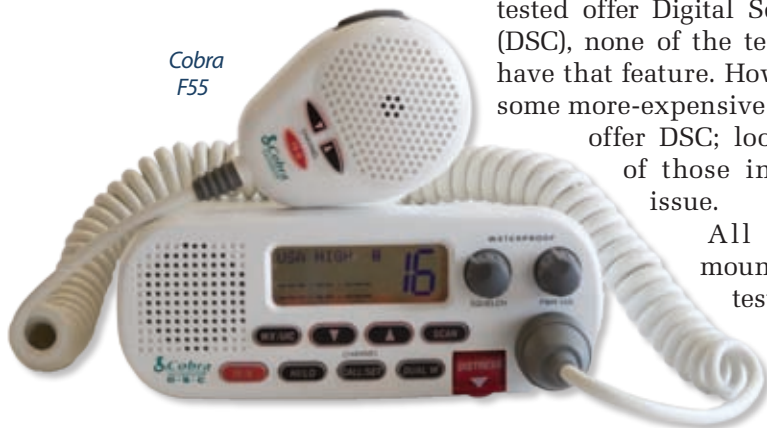
The microphone connects to the radio with a metal, six-pin connector. Although the connector has a plastic cover, it is a possible point of corrosion in a saltwater environment.

The F55 will send and receive DSC distress, individual, and all ships

Continued from page 16

tested offer Digital Selective Calling (DSC), none of the tested handhelds have that feature. However, there are some more-expensive handhelds that offer DSC; look for a review of those in an upcoming issue.

All of the fixed-mount radios in this test are DSC class SC101, which means they have a single



Cobra
F55

What's Playing on the Big Screen?



Cobra MRF55



Standard Horizon Eclipse GX1005



Midland Regatta I

Unlike the handheld VHF radios in this report, which all had similar display screens, the screens on the fixed-mount VHF's we tested varied in size and information displayed. Less than an inch tall, the Cobra MRF55's screen was the smallest, but its channel numbers were still easy to read and it displayed channel group, power setting, and position data (when connected to a GPS). Measuring 1 inch tall by 1.6 inches wide,

the screen on the Best Choice Standard Horizon Eclipse was mid-sized, comparatively, and very easy to read. It displays a variety of data, including time and ship's position, and it was the only fixed VHF tested that shows channel comments. The largest screen of all—more than 2 inches wide and 1½ inches tall—belongs to the Midland Regatta. The easy-to-read screen does not display as much information as the Eclipse.

calls, and will send and receive position data when it's integrated with any NMEA 0183-capable GPS. Its directory can store up to 10 individual Maritime Mobile Service Identity (MMSI) numbers. The F55 also will display position data on screen when it's hooked to any GPS with an NMEA 0183 output.

The F55 has two scan modes: all channels, which scans them in order, and dual-watch, which monitors channel 16 and the channel the radio was on when the scan was initiated.

The F55 transceiver was rated Excellent for frequency stability, but its transmitter output varied during testing and earned a Fair rating. At 86 decibels, audio output was average.

The F55 has a smallish screen, but testers found the large, block-style channel numbers easy to read. The screen also indicates the channel group selected, transmitter power setting, and when the radio is transmitting. Channel comments are not displayed, and the radio does not have a low-battery warning.

Bottom line: The Cobra exhibited average transceiver and audio performance, and it was the most expensive of the fixed models tested.

MIDLAND REGATTA I

The Midland Regatta I is a mid-sized, no-frills VHF radio from Midland Radio Corp., a world-leader in two-way radio communications.

Operating the Regatta is super simple. There are no menus to dig through, and most functions—DSC distress call, quick-select channel 16/9, scanning modes, and turning public address (PA) mode on or off—are operated with a single button push. The only operation that has any semblance of a menu is the DSC function.

The Regatta has very limited DSC capability. It will send and receive DSC distress, individual, and all ships calls, but it does not have a call directory. Having to manually enter the nine-digit MMSI number each time an individual DSC call is made (and keep those numbers stored elsewhere) is a drawback, but it will be of little importance to those who don't make frequent DSC calls.

The Regatta, like the Cobra, is compatible with all GPS units that have NMEA 0183 outputs, but—unlike the other fixed models—the Midland does not display

position information or transmit it on DSC.

The Regatta has two scan modes, tri-watch and all channels. Tri-watch monitors channels 16 and 9 and whatever channel the radio was on when tri-watch was selected. The radio also has a basic hailer function that provides voice over a public address horn by simply pressing the "PA" button. Small rotary knobs control power, volume, and squelch, and channel selection is made with up/down buttons.

This radio performed well in our testing, earning an Excellent for transmitter power stability and a Good for transmitter frequency stability. With a measured audio output of 91 dBA, it bested all radios in its price range.

The Midland Regatta earned



Midland Regatta I

a Good for its large display with very large block-style channel numbers. On-screen icons appear for transmitter power, channel group, transmitting, scan, and tri-watch. Channel comments are not displayed, and the radio lacks a low-battery warning.

Bottom line: The Midland Regatta I bested the competition in overall performance and user-friendliness. It's a great buy for the sailor who likes the hailer function and doesn't plan to integrate navigation and communications systems, and so it gets our recommendation.

STANDARD HORIZON ECLIPSE

The Standard Horizon Eclipse GX1000S is a compact, easy-to-operate, entry-level marine VHF.

Rotary knobs control power, volume, and squelch. Channel selection is made with up/down arrow keys. Dedicated buttons can toggle between the last selected channel and 16/9, between voice and weather channels, change transmitter power, and operate scanning functions. Some scanning options, backlight adjustment, weather alert on/off, and setting time/location and offset are handled via menu.

The Eclipse will send and receive DSC distress, individual, and all ships calls, and send and receive position data when connected to a GPS (any with an NMEA 0183 output). It will store up to 15 boat names and MMSI numbers for DSC.

This radio's scan modes differ from the other fixed models. The Eclipse offers memory and priority scanning, once the desired

channels are entered into the radio's memory. Memory scan looks at all channels in memory in numerical order. Priority scan inserts a stop at channel 16 between each memory channel.

We found transmitter power output and frequency accuracy to be stable throughout our tests. At 70 decibels, receiver selectivity is very good. However, audio output was a bit weak, measuring only 84 dBA in our testing. This radio has a low-battery indicator that signals when power drops low enough to affect transmission capabilities at high power. In our tests, increasing the voltage above 12.4 turned the warning off.

The Eclipse display shows large block channel numbers with alpha indicated for the appropriate channels. It was the only fixed VHF tested that displayed channel comments; they scroll across a five-character line at the bottom of the screen. When the radio is connected to a GPS, time and position can be displayed on the comment line.

Frequency group, transmitter power, and transmit/receive icons are also shown on screen. We rated the display Good.

Bottom line: The Standard Horizon Eclipse has a small footprint, good features, and good transceiver performance, and it was the cheapest in its category. Its audio system is a bit weaker than the others in this test, but it earns our overall pick for Best Choice among inexpensive, fixed VHF's.

VHF HANDHELDS COBRA HH325 VP

The Cobra MR HH325 VP is solidly constructed on a die-cast aluminum frame. At 15.5

ounces—about twice as heavy as the other handhelds tested—it certainly is no lightweight.

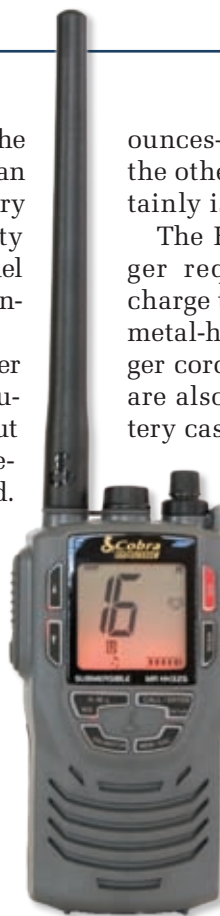
The HH325's supplied AC charger requires 14 hours to fully charge the unit's 1500 mAH nickel metal-hydride battery. A DC charger cord, belt clip, and wrist strap are also included, but the AA battery case is optional.

One unique feature of the HH325 is its battery saver mode. If no transmission is made after 10 seconds, the unit switches to this mode to conserve battery power. Volume and squelch knobs are mounted on top of the radio's casing, next to a jack for an external speaker or microphone. The push-to-talk switch and lock buttons are side-mounted.

Remaining functions are controlled using eight pushbuttons. One-button control is available for such functions as selecting transmitter power, channels, weather channels, quick channel 16/9, and some scanning options. Transmitter power can be set to 5, 3, or 1 watt(s).

Three scan modes are offered: numerical, memory, and tri-watch. In the tri-watch mode, channel 16 will always be one of the scanned channels; the other two are user-programmable. The HH325 is capable of sending a call tone to other VHF radios able to receive it. When it receives a call tone, it will respond with a vibration or tone alarm, as set by the user. The HH325 can use all Canadian, international, and U.S. channels and all 10 NOAA weather alert channels. In the event of threatening weather, the HH325 sounds an audible warning and displays a visual alarm, an impressive bonus feature.

The HH325 screen is big and displays much information. Large block-style numbers show the



Cobra HH325 VP



Standard Horizon
Eclipse

PS VALUE GUIDE INEXPENSIVE VHF HANDHELD RADIOS

MAKER	COBRA	MIDLAND	WEST MARINE
MODEL	HH325 VP ★	Nautico NT3	VHF55
PRICE	\$100	\$70	\$120
PRICE SOURCE	consumersmarine.com	basspro.com	westmarine.com
WARRANTY	3 years	3 years	3 years
RECHARGEABLE BATTERY	Nickel Metal Hydride	Nickel Cadmium	Lithium Ion
BATTERY WARRANTY	12 months	3 months	12 months
BATTERY CAPACITY	1500 mAH	700 mAH	1200 mAH
BATT. REPLACEMENT COST	\$20	\$18	\$43
MAXIMUM CHARGE TIME	14 hours	24 hours	12 hours
TESTED OPERATION TIME (SINGLE CHARGE)	11 hours	9 hours	15+ hours
12 DC / 120 AC CHARGER	Included	Included	Optional / Included
AA BATTERY PACK	Optional (6 AAs)	Included (4 AAs)	N/A (4 AAs)
HEADSET	No	Included	No
EXTERNAL SPEAKER/MIC	Optional	Optional	No
WATERPROOF	Yes (JIS7)	No (JIS4)	Yes (JIS7)
FLOATS	No	No	No
UNIT SIZE (W X H)	2.7 x 4.9 x 1.6 inches	2.5 x 4.2 x 1.4 inches	2.5 x 4.6 x 1.4 inches
WEIGHT	15.5 ounces	7.7 ounces	8.7 ounces
Wx ALERT	Yes	Yes	No
Tx SETTINGS	5, 3, 1 watts	5, 1 watts	5, 1 watts
SELECTIVITY	60 dB	Data not available	70 dB
AUDIO OUTPUT (1 foot)	93 dBA	86 dBA	94 dBA
RATINGS			
TRANSMITTER POWER STABILITY	Good	Fair	Excellent
TRANSMITTER FREQUENCY STABILITY	Fair	Good	Good
RECEIVE SENSITIVITY	Good	Good	Good
DISPLAY RATING	Excellent	Good	Good
AUDIO QUALITY	Good	Good	Good
DROP TEST	Pass	Pass	Pass
SUBMERSION TEST	Pass	Fail	Pass

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selected channel while a single, smaller letter tells which channel group is selected. A screen icon continuously gives the status of the battery, and illuminated function keys make night-time operations easier.

One notable feature on this radio is its signal-strength meter, which displays the power of the transmitted or received signal.

The HH325 transceiver performed

about average. It earned Good ratings for transmitter power stability and receiver sensitivity, but only a Fair for transmitter frequency stability. Audio performance was Good, as it managed a healthy 93 dBA reading during our output test.

This radio ran for 11 hours solid, then refused to transmit due to a weak battery. It passed both the drop and submersion tests with no glitches.

Bottom line: The Cobra HH325 offers decent performance, solid construction, and adequate features for the money. It's the *PS* Best Choice for inexpensive VHF handhelds.

MIDLAND NAUTICO NT3

Midland Radio is well-known for its CB radios and a variety of other radio and telemetry gear.

We tested its Nautico NT3 handheld. Before testing, we charged the Nautico's Ni-Cad battery for 24 hours with the supplied AC charger. (According to the manual, subsequent charges should take only about eight to 12 hours.) The radio can also operate on four AA batteries, but alkalines typically have a shorter life than Ni-Cad. It also comes with a holder, mounting hardware, a DC charger, and a mic headset.

The Nautico has a top-mounted knob for volume and power control. Both the push-to-talk button and jack (microphone/speaker jack/ battery charger) are under plastic covers. Five pushbuttons control the radio's limited functions, but they are not backlit, which makes operating the unit in the dark more of a challenge.

Squelch is not adjustable on this radio; it is controlled automatically for a "whisper quiet" radio, according to Midland. The Nautico can use all U.S., Canadian, and international channels, and all 10 NOAA hazards alert channels. The Nautico has only one scan option: all channels, in order.

Testers found the Nautico tedious to operate. Users must move from channel 16 and press "MENU"

Midland Nautico NT3





Though it's advertised as "waterproof," the Midland Nautico NT3 showed visible signs of water intrusion after being submerged 1 meter for 30 minutes.

before the arrow keys can be used to select a channel. They also must move from channel 16 in order for the "MENU" key to function on anything other than transmitter power.

The Nautico display screen is fairly small, but was rated Good for its readable block letters. No channel comments are displayed, but channel group and alpha channels are shown when selected. An on-screen icon indicates battery life.

The Nautico had average performance in our transceiver tests, but audio output was a rather anemic 86 dBA. The radio passed the drop test but stopped transmitting at Hour 9 of the battery life test. Even though it's advertised as "waterproof," the Nautico flooded during our immersion test and became inoperable. It's not rated for submersion, a major drawback in our eyes.

Bottom line: The Midland Nautico NT3 was difficult to operate and lacked adequate waterproofing for the marine environment.

WEST MARINE VHF 55

New Jersey-based BG Tech (www.bgtechamerica.com) manufactures the VHF55 for West Marine. At just under 9 ounces, the West Marine VHF55 is compact and lightweight. Not much larger

than a cell-phone, it fits in the hand nicely.

The included AC charger will fully charge the VHF55's Lithium Ion battery in about 12 hours. (An alkaline battery pack is not available for this radio.) This entry-level radio has only basic functions, and all are controlled by eight backlit pushbuttons. We like rotary knobs for volume and squelch control, but West Marine's "knobless" design allows the VHF to fit easily into a pocket or cell-phone belt clip, according to the retailer, and should protect the radio from water intrusion.

"The O-rings on knobs and the rubber plugs on sockets are typically the weakest links in a waterproof system on the handheld product," explained West Marine Category Manager Gary Williamson.

The VHF55 offers dual-watch and memory scan modes, and quick select channel 16/ 9. This radio operates on all Canadian, international, and U.S. channels.

The display—rated Excellent—uses large channel numbers and letters, and also offers battery level and volume meters, and a high/low transmitter icon.

Overall performance of the VHF55 was above average. Highlights included top ratings for transceiver performance and best-in-class results in our battery life test. It was still going strong at 15 hours. The audio system performed well too, hitting 94 dBA in our output test.

Some negatives testers noted were the VHF55's lack of weather alerts and lack of a provision for an external microphone or speaker. We also were unable to find a replacement battery for the VHF55. At presstime, West Marine was

out of stock but reported that units had been ordered.

Bottom line: The West Marine VHF55 is small, offers a long battery life, excellent display, and good performance. Its lack of a 12-volt charger and the battery replacement (for the moment) hold it back.

CONCLUSION

In this price range, you won't find THE perfect radio, but you can find one that's a good value. Small-boaters and weekend cruisers on a budget will get their money's worth with the Standard Horizon Eclipse fixed radio, an above-average performer with a low price, full DSC function, and the ability to link to the ship's GPS. A top performer with hailer capability but limited DSC, the Midland Regatta is recommended, but we continue to prefer the safety advantages of GPS-compatible DSC function.

Cobra's average performance and higher price kept it out of the winner's circle in the fixed category, but the company's HH325 led the pack among inexpensive handhelds. Its solid construction, large easy-to-read display, decent performance, and unique features earned it the *PS* Best Choice title for portable radios. ▲

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West Marine VHF55