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QST Compares: Dual-Band Mobile FM Transceivers
(Alinco DR-600T; ICOM IC-2410H; ICOM IC-3230H; Kenwood TM-732A; Standard C5608DA; Yaesu FT-5100)

Conducted By James W. Healy, NJ2L
Senior Assistant Technical Editor

QST Compares: Dual-Band Mobile FM Transceivers

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One very popular class of radios across the range of licensed Amateur Radio operators is the dual-band mobile FM transceiver. There's good reason for this: For the many hams interested in FM operation on more than one VHF/UHF band, dual-banders provide two bands in a well-integrated package about the same size as a single-band radio, and usually at significantly lower cost than two similarly equipped single-band rigs. Dual-banders are suitable for home, mobile or portable use, and although generally geared for voice use, they can be used for data modes.

The current batch of dual-banders consists of six basic platforms: the Alinco DR-600T, ICOM IC-2410 and IC-3230, Kenwood TM-732A, Standard C5608DA, and Yaesu FT-5100. We chose to review these 144- and 440-MHz radios, although current variations exist, and some older models are still on the market. For instance, Yaesu also manufactures the FT-5200, which differs from the FT-5100 principally in that the FT-5100 has dual-frequency, in-band reception capability, and doesn't share the '5200's detachable, remote-mountable face plate. A similar radio, the FT-6200, covers the 440- and 1260-MHz ham bands. Similarly, ICOM makes lower-power versions of the IC-2410H and IC-3230H; a 440/1260-MHz version of the IC-2410; and a 144/222-MHz version of the IC-3230. Other parallel models also exist. Much of this review is applicable to these similar models.

Six ARRL HQ staff members participated in this review: Features Editor Brian Battles, WS1O; Assistant Technical Editor Steve Ford, WB8IMY; Deputy Field Services Manager Luck Hurder, KY1T; Associate Technical Editor Joel Kleinman, N1BKE; *Repeater Directory* Editor Jay Mabey, NUØX; and Senior Assistant Technical Editor Larry Wolfgang, WR1B. Each reviewer put every radio through its paces, assessing and comparing their performance in mobile and home-station operation. This review is based on their comments and ARRL Lab testing.

ALINCO DR-600T

Including remote-control capability, extended receiver coverage and direct frequency entry from the mike—in addition to cross-band repeating and other capabilities common to all of these radios—the DR-600T's collection of features is impressive. Where many of the smaller radios use only a few front-panel keys and controls, the DR-600T uses quite a number of keys under its easy-to-read, dual-frequency display. The reviewers appreciated its panel layout and ergonomics, with one exception: The dual concentric knobs that control each band's volume and squelch settings are rather close together, which makes the squelch knobs particularly difficult to operate.

The review team deemed the DR-600T solidly built and attractive, an extension of Alinco's ever-improving image as a builder of high-quality radios. The radio's instruction manual needs some work, however. A nicely bound booklet, the manual clearly explains the radio's operation, and notes that cross-band duplex operation should be done on allocated simplex frequencies, but lacks an index; specific information is sometimes hard to find. The manual we received was devoid of illustrations and photographs, so navigating the radio took a little more work than it should have.[1] The "Quick Tour" section helps with this, however. Once they learned the DR-600's basic features, the

[1]The manual has been recently updated, including the addition of graphics. If you have an unillustrated manual, contact Alinco for a free replacement.

Alinco DR-600T, Serial Number 0000577

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive, 135-174 MHz, 420-470 MHz; transmit, 144-148 MHz, 440-450 MHz.	Receive, 118-174 MHz, 420-470 MHz; transmit, 140-148 MHz, 440-450 MHz.
Power requirement: 13.8 V dc at 0.8 A max (receive, squelched); 10 A max (transmit).	Receive, 0.8 A max; transmit, 7.85 A max.
Size: 2 × 5.9 × 7 in. (HWD); 3.3 pounds.	
Receiver	*Receiver Dynamic Testing*
Receiver sensitivity: Better than 0.158 µV (–123 dBm) for 12 dB SINAD.	146 MHz, –123 dBm; 440 MHz, –125 dBm.
Two-tone third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 67 dB; 20 kHz offset from 440 MHz, 68 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 71 dB; 20 kHz offset from 440 MHz, 75 dB.
Image rejection: Not specified.	146 MHz, 85 dB; 440 MHz, 79 dB.
Squelch sensitivity: Not specified.	146 MHz, –116 to –129 dBm.
Receiver audio output: Approx 2.4 W into 8 Ω (distortion not specified).	2.3 W into 8 Ω at 5% THD.
Transmitter	*Transmitter Dynamic Testing*
Power output (low/med/high): 144 MHz, 5/10/45 W; 440 MHz, 4/8/35 W.	146 MHz, 5.4/10/43 W; 440 MHz, 5.4/9.5/32.3 W.
Spurious signal and harmonic suppression: Better than 60 dB.	As specified. The DR-600T meets FCC requirements for spectral purity for transmitters in its power-output class and frequency range.
Transmit-receive turnaround (PTT release to 90% of full audio output): Not specified.	Squelch on, approx 110 ms; squelch off, approx 110 ms.

Manufacturer: Alinco Electronics, Inc, 438 Amapola Ave, Unit 130, Torrance, CA 90501, tel 310-618-8616, fax 310-618-8758.

reviewers had no trouble programming or using the radio, noting that the microphone's keypad supports control of most of the rig's functions. A slight detraction from the mike's functionality is the amount of force required to hold in the PTT button; it's more difficult to keep closed than the others. Signal reports showed that the DR-600's transmitter audio is good, and its internal speaker delivers enough low-distortion sound for most cars.

This and all the other reviewed radios (except the Yaesu) exhibit an annoying characteristic during band-scanning: They stop short of a signal's center frequency, particularly if that signal is fairly strong.

The reviewers suggest that the radio could benefit from larger, better-spaced knobs and a slightly larger microphone.

ICOM IC-2410H

One of the smallest radios compared here, the IC-2410H combines DTMF remote-control and simultaneous dual-frequency receive capabilities with good transmitted audio and reasonably loud, clear receiver output. Programming the '2410 is similar to most ICOM mobile rigs, and drew a combination of praise and criticism from the reviewers. Those who hadn't used ICOM rigs before found it complex and challenging. In day-to-day use, however, they all considered it good.

This radio's dual-frequency, in-band reception feature was popular with the review team, but canceling this mode requires turning off the radio and holding a key while turning it back on. A selectable 20-dB RF attenuator, a feature shared by the two ICOM rigs reviewed here, can help to avoid desense and intermodulation distortion in areas crowded with strong signals. It can be selected automatically (in low-power operation) or manually. This rig's small package retains a relatively large amount of heat, but its external (and rather noisy) rear heat-sink cooling fan keeps it from overheating. The fan cycles even during extended reception.

The ICOM radios use a menuing system called Set Mode for controlling 10 functions per band, without requiring lots of front-panel buttons. To make operation easier, you can program the microphone's **UP** button to function in parallel with any of the rig's front-panel keys. The mike also features DTMF memories for making mobile autopatching a simple matter, and 20 buttons to control various aspects of the rig's operation. The labels on the rig's buttons and those on the mike aren't illuminated, however. Although the reviewers appreciated the rig's three power levels, they would have liked a continuous power-level display, rather than the present system of flashing the power level on the main display for ½ second when it's first selected.

The 48-page IC-2410 manual is clear, complete and well-illustrated, as is typical of ICOM documentation, but it lacks a detailed table of contents and index. One notable option for both ICOM radios reviewed here is the UT-66 voice synthesizer, which speaks the radio's display data in English or Japanese, and enhances remote-controlled operation.

ICOM IC-3230H

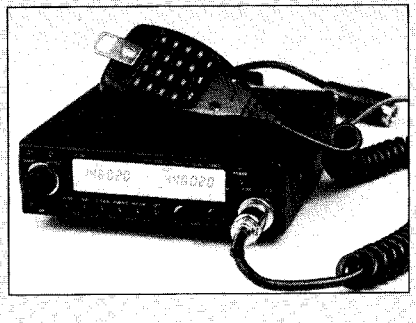
The IC-2410 and IC-3230 are very close relatives. They share a common set of accessories—their mounting bracket, standard programmable microphone and even physical size are the same. The '3230 has fewer front-panel buttons, but otherwise uses a similar control scheme, including the mike's **UP** key programmability. One major feature they don't share is the IC-2410's dual-frequency, in-band reception capability.

Like the IC-2410, the IC-3230 gave the reviewers some trouble at night, when its unlit button labels were hard to distinguish. Its small but loud fan cycles fairly frequently to cool the rig.

The IC-3230's liquid-crystal display prominently features the VHF and UHF operating frequencies. The LCD is generally easy to read, except that its smaller designators are hard to discern at normal viewing distances. Receiver audio is robust and clear, if a bit tinny, and transmitted audio reports were very favorable. Most reviewers deemed the IC-3230 fairly easy to program and quite easy to use, thanks in part to the rig's 64-page manual. Appropriately illustrated and clearly written, it explains operation well,

ICOM IC-2410H, Serial Number 03929

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive, 136-174 MHz,* 440-450 MHz; transmit, 140-150 MHz,* 440-450 MHz.	As specified.
Power requirement: 13.8 V ±15% at 1.8 A max (receive), 10.5 A max (transmit).	Receive, 1.1 A max; transmit, 9.8 A max.
Size: 1.6 × 5.5 × 6.9 in. (HWD); 3 pounds.	
Receiver	*Receiver Dynamic Testing*
Receiver sensitivity: Better than 0.16 µV (–123 dBm) for 12 dB SINAD.	146 MHz, –124 dBm; 440 MHz, –123 dBm.
Two-tone third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 66 dB; 20 kHz offset from 440 MHz, 71 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 66 dB; 20 kHz offset from 440 MHz, 69 dB.
Image rejection: More than 60 dB.	146 MHz, 84.5 dB; 440 MHz, 81 dB.
Squelch sensitivity: At least 0.13 µV (–125 dBm).	146 MHz, –122 to –131 dBm.
Receiver audio output: 2.4 W into 8 Ω at 10% distortion.	2.8 W into 8 Ω at 10% THD.
Transmitter	*Transmitter Dynamic Testing*
Power output (low/med/high): 144 MHz, 5/10/45 W; 440 MHz, 5/10/35 W.	146 MHz, 6/13/49 W; 440 MHz, 8/13/39 W.
Spurious signal and harmonic suppression: More than 60 dB.	As specified. The IC-2410H meets FCC requirements for spectral purity for transmitters in its power-output class and frequency range.
Transmit-receive turnaround (PTT release to 90% of full audio output): Not specified.	Squelch on, approx 175 ms; squelch off, approx 97-110 ms.

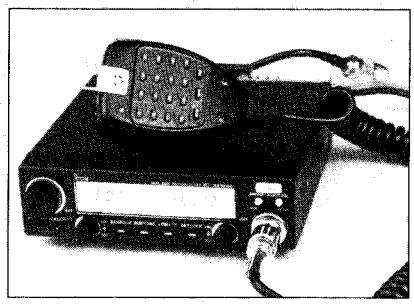


Manufacturer: ICOM America, Inc, 2380 116 Ave NE, Bellevue, WA 98004, tel 206-454-8976 or 800-999-9877.

*Specifications guaranteed only from 144-148 MHz.

ICOM IC-3230H, Serial Number 01218

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive, 136-174 MHz,* 440-450 MHz; transmit, 140-150 MHz,* 440-450 MHz.	As specified.
Power requirement: 13.8 V ±15% at 1.8 A max (receive); 10.5 A max (transmit).	Receive, 1.1 A max; transmit, 9.0 A max.
Size: 1.6 × 5.5 × 6.5 in. (HWD); 2.8 pounds.	
Receiver	*Receiver Dynamic Testing*
Receiver sensitivity: Better than 0.16 mV (–123 dBm) for 12 dB SINAD.	146 MHz, –125 dBm; 440 MHz, –124 dBm.
Two-tone third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 68 dB; 20 kHz offset from 440 MHz, 69 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 69 dB; 20 kHz offset from 440 MHz, 71 dB.
Image rejection: Better than 60 dB.	146 MHz, 82 dB; 440 MHz, 86 dB.
Squelch sensitivity: At least 0.13 μV (–125 dBm).	146 MHz, –122 to –132 dBm.
Receiver audio output: 2.4 W into 8 Ω at 10% distortion.	2.8 W into 8 Ω at 10% THD.
Transmitter	*Transmitter Dynamic Testing*
Power output (low/med/high): 144 MHz, 5/10/50 W; 440 MHz, 5/10/25 W.	146 MHz, 5/11/47 W; 440 MHz, 6/11/35 W.
Spurious signal and harmonic suppression: Better than 60 dB.	As specified. The IC-3230H meets FCC requirements for spectral purity for transmitters in its power-output class and frequency range.
Transmit-receive turnaround (PTT release to 90% of full audio output): Not specified.	Squelch on, approx 195-210 ms; squelch off, approx 190-210 ms.



Manufacturer: ICOM America, Inc, 2380 116 Ave NE, Bellevue, WA 98004, tel 206-454-8976 or 800-999-9877.

*Specifications guaranteed only from 144-148 MHz.

but like the IC-2410 manual, needs an index or more detailed table of contents.

Both ICOM dual-banders reviewed here save front-panel space by giving two functions to each button, but without the need for a separate second-function button. Each button's main function is accessed by briefly pressing the button; the second function is performed by holding the button down for a second or so. One disadvantage of this approach is that it takes one hand away from the steering wheel for a bit longer than the more common two-button technique.

KENWOOD TM-732A

Another member of the very-small-radio family, the TM-732A has almost the same footprint as the two ICOM radios reviewed here, and is even lighter at a scant 2.4 pounds. (Only the Yaesu weighs less—2.2 pounds). The '732 features a time-out timer that you can set to cut the transmitter off after a given period of time, as well as the popular dual-frequency, in-band receive capability. Its transmitted audio received good reports, and its receiver audio output is adequate for most mobile installations.

The reviewers had trouble with programming the radio, partly because some programming steps aren't explained particularly well in the manual, and partly because some steps involve cycling the **POWER** switch while holding other buttons.

This radio uses a rather unique microphone connector, unlike the 8-pin jacks used by most Kenwood radios. Similar in style to the standard US telephone system connector, this plastic-bodied connector doesn't share the wide availability of the 8-pin versions, and raised reviewers' doubts about

Dual-Band FM Mobile Transceiver Features

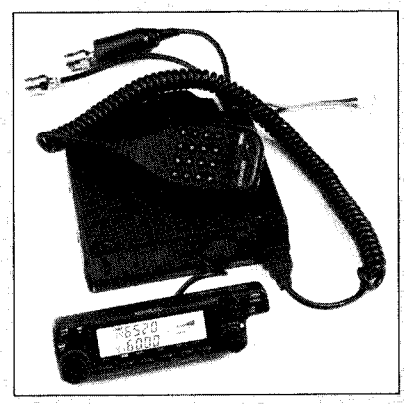
	DR-600T	*IC-2410H*	*IC-3230H*	*TM-732A*	*C5608DA*	*FT-5100*
Expanded receiver coverage	S*	S†	S†	S†	S*	S†
Memory channels	28	36	30	51	46	94
Separate VHF/UHF antenna jacks	S	X	X	S	S	X
Band, memory and programmed-scan modes	S	S	S	S	S	S
Power-output selections	3	3	3	3	3	2
Automatic repeater-offset selection	X	X	X	S†	X	S*
DTMF decoder	S	O	O	S	S	O
CTCSS decoder	O	S	O	O	S	O
Remote-mountable	S**	X	X	S**	S	X
Display dimmer	M	M	M	M	M	A/M
Remote-controllable via radio	S	O	O	S	X	X
Simultaneous dual-band/in-band reception	S/X	S/S	S/X	S/S	S/X	S/S
Simultaneous dual-band scanning	S	X	X	S	S	S
Cross-band repeat and full-duplex operation	S	S	S	S	S	S
Manufacturer's suggested retail price	**$629.95**	**$949**	**$859**	**$769.95**	**$849**	**$699**
Typical selling price as of 4/29/93‡	$617	$765	$700	$605	$720	$565

Key
S = Standard
O = Optional
X = Not available
A = Automatic
M = Manual
*Both bands
†144 MHz only
**Requires optional separation kit

‡Prices vary, and manufacturers and dealers run promotions. Check with *QST* advertisers for current prices.

Kenwood TM-732A, Serial Number 30702194

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: 144-148 MHz, 438-450 MHz.	Receive, 118-136 MHz (AM), 136-174 MHz; otherwise as specified.
Power requirement: 13.8 V ±15% at 1.2 A max (receive); 11.5 A max (transmit).	Receive, 0.83 A max; transmit, 9.1 A max.
Size: 1.65 × 5.5 × 6.9 in. (HWD); 2.4 pounds.	
Receiver	*Receiver Dynamic Testing*
Receiver sensitivity: Better than 0.16 μV (–123 dBm) for 12 dB SINAD.	146 MHz, –125 dBm; 440 MHz, –124 dBm.
Two-tone third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 71 dB; 20 kHz offset from 440 MHz, 65 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 71 dB; 20 kHz offset from 440 MHz, 65 dB.
Image rejection: Not specified.	146 MHz, 140 dB; 440 MHz, 85 dB.
Squelch sensitivity: Less than 0.1 μV (–127 dBm).	146 MHz, –116 to –130 dBm.
Receiver audio output: 2 W into 8 Ω at 5% distortion.	2.1 W into 8 Ω at 5% THD.
Transmitter	*Transmitter Dynamic Testing*
Power output (low/med/high): 144 MHz, 5/10/50 W; 440 MHz, 5/10/35 W.	146 MHz, 6/12/48 W; 440 MHz, 7/11/35 W.
Spurious signal and harmonic suppression: Better than 60 dB.	As specified. The TM-732A meets FCC requirements for spectral purity for transmitters in its power-output class and frequency range.
Transmit-receive turnaround (PTT release to 90% of full audio output): Not specified.	Squelch on, approx 111-130 ms; squelch off, approx 105-140 ms.



Manufacturer: Kenwood Communications Corp, PO Box 22745, Long Beach, CA 90801, tel 310-639-4200, fax 310-604-4487.

durability compared to the all-metal 8-pin connector. Because the TM-732A doesn't include dedicated data jacks, it's quite challenging to connect a packet TNC to the rig. An optional adapter cable helps by making the rig compatible with Kenwood mikes that use 8-pin connectors, or other devices wired for Kenwood radios.

The 79-page TM-732A manual is thorough and well-illustrated. Although it doesn't discuss the legal issues regarding cross-band repeater operation, it wisely points out that using its DTMF remote-control feature on 2 meters is illegal in the US (but is legal on the 440-MHz band).

The TM-732A is attractive and solidly built. Its large, high-contrast display is easy to read. Despite its size and attendant small buttons, it's fairly easy to use.

STANDARD C5608DA

The C5608DA's most prominent feature, its full-function remote-control microphone—complete with frequency display, power switch and audio-gain control—sets this radio apart from its peers. This large,

Dual-Band FM Mobile Transceiver Options

Alinco DR-600T

EJ-7U	CTCSS decoder
EDC-19	3-m face-plate extension kit
EDC-20	5-m face-plate extension kit

ICOM IC-2410H and ICOM IC-3230H

SP-7, SP-10, SP-12	External speakers
SM-6, SM-8	Desk microphones
HS-15	Flexible mobile microphone
HS-15SB	Switch box for the HS-15
AH-32	Dual-band antenna
AHB-32	Trunk mount for AH-32
HM-58, HM-59	Hand microphones
UT-55	Tone encoder/decoder (necessary for pager and tonesquelch functions)
UT-66	Voice synthesizer
UT-67	Tone-squelch unit

Kenwood TM-732A

TSU-7	CTCSS unit
PG-4K	Detachable front panel kit (4-m faceplate cable, 2-m microphone cable)
PG-4L	Detachable front panel kit (7-m faceplate cable, 5-m microphone cable, 5-m speaker cables)
PG-3G	Line-noise filter
SP-41, SP-50B	External speakers
MJ-88	Mike-plug adapter (accepts 8-pin Kenwood microphones)

Standard C5608DA

CAW560	Dual-microphone cable
CAW561	Microphone-cable extension (6.5 ft)
CAW562	Microphone-cable extension (13 ft)
CSK12	External speaker

Yaesu FT-5100

AD-3	VHF/UHF diplexer for separate-antenna operation
FTS-22	Tone-squelch unit
MH-15, MH-26, MH-27	Hand microphones
MW-1	Wireless remote controller with DTMF microphone
SB-10	PTT switch unit for MF-1 or YH-1
SP-7	External speaker
YH-1	Headset

rugged radio takes up considerably more mounting space than its competition, but is more conveniently remotely controlled than the others that support this feature: Instead of buying a cable-extension kit that allows you to mount the microphone, external speaker(s) and the radio's faceplate some distance from the transceiver itself, you simply extend the mike cable and speaker to a convenient distance and use the mike's display in place of the one on the radio.

This radio's large size contributes to high-quality receiver audio by allowing for a comparatively large speaker. Transmitted-audio reports were good. Receiver coverage is outstandingly wide—the widest of the group, in fact—giving access to the aircraft band starting at 118 MHz, and almost 180 MHz of the UHF spectrum starting at 320 MHz.

Programming the C5608 was not particularly easy for most of the reviewers, but they found the rig easy to use once programmed—thanks to the remote-control mike. A benefit of the radio's relatively large front panel is that it relies less on multifunction keys and closely spaced buttons and knobs than other radios. The 10-button group on the front panel is softly lit, but not well enough to allow reading the button labels in the dark. Separate, wide-spaced volume and squelch knobs for each band, one pair on each side of the front panel, are particularly easy to use. Standard has done good work on the C5608's 66-page manual, backing the excellent, illustrated operating instructions with a detailed table of contents.

YAESU FT-5100

With the FT-5100, Yaesu won friends with the reviewer team. They appreciated its automatic repeater-offset selection on both bands, its dedicated **DATA IN/OUT** jacks for packet-radio TNC interfacing, and its excellent manual. The rig also got raves for its transmitted audio quality (subjectively, the best of the bunch), easy operation once programmed, the vast number of memory channels, in-band dual-frequency reception, and automatic display dimming. The FT-5100 is the only rig in this bunch that always stops on a signal's center frequency during band scanning. Another Yaesu exclusive is the backlit keypad on the microphone.

Yaesu's documentation for the FT-5100, like their other recent manuals, is clearly written and uses diagrams and photos to illustrate operation. Sidebars cover specific topics, such as using the rig's two memory banks per band in conjunction with dual-frequency reception. Each page is prominently indexed by subject along its outside edge. The manual even includes a wiring diagram for packet TNC connections. A pull-out quick-reference chart concisely covers operation.

On the front panel, the rig uses four knobs and 12 buttons for function control. A second **D/MR** button mounted on the microphone speeds some operations. The reviewers found the front-panel controls a bit tightly spaced, and sometimes confusing (some buttons have *three* functions!). Shutting off the radio is also a chore—the recessed **POWER** button must be held in for a couple of seconds. Like the other small radios with external, rear-mounted cooling fans, the FT-5100 gets rather warm during operation.

Unlike the other radios, the FT-5100 uses a **BALance** control to set the mix of audio from each band that's delivered to the speaker. This and its other front-panel ergonomics drew criticism from some reviewers, who found the controls and buttons harder to operate than those of some other radios. They also felt that direct frequency entry and control of more of the rig's features via the microphone would make the rig easier to use.

Wrap-Up

All of these radios deliver good basic radio performance and lots of useful features. Your choice of a dual-bander is mostly a function of your specific needs for these features. Do you need a remote-mountable or remotely controllable rig? Is simultaneous reception of two in-band signals important to you? Do you use one or two antennas in your installation? Some of these radios require an external diplexer to use separate antennas, and vice versa.

The manufacturer's suggested retail prices and street prices for these six radios span a range of about $250, which impacts how you look at them. Provided that one of these rigs has all the features you want or need, your decision probably won't be limited by price.

Because these radios all cost about the same, it's very hard to pick a clear winner. But the one that seems to pack the most

Standard C5608DA, Serial Number 26u 040089

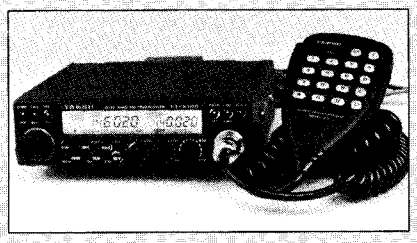
Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: 144-148 MHz, 438-450 MHz.	Receive, 115-142.5 MHz (AM), 142.5-180 MHz, 320.075-496.365 MHz; otherwise as specified.
Power requirement: 13.8 V ±15% at 0.7 A typical (receive); 10.5 A max (transmit).	Receive, 1.1 A max; transmit, 11 A max.
Size: 2 × 5.8 × 8.3 in. (HWD); 4.5 pounds.	
Receiver	*Receiver Dynamic Testing*
Receiver sensitivity: Better than 0.158 µV (–123 dBm) for 12 dB SINAD.	146 MHz, –123 dBm; 440 MHz, –123 dBm.
Two-tone third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 66 dB; 20 kHz offset from 440 MHz, 60 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 74 dB; 20 kHz offset from 440 MHz, 66 dB.
Image rejection: Not specified.	146 MHz, 81 dB; 440 MHz, 86 dB.
Squelch sensitivity: At least 0.112 µV (–126 dBm).	146 MHz, –113 to –134 dBm.
Receiver audio output: 3 W at 10% distortion (load impedance not specified).	2.8 W into 4 Ω at 4% THD.*
Transmitter	*Transmitter Dynamic Testing*
Power output (low/med/high): 144 MHz, 3/10/50 W; 440 MHz, 3/10/40 W.	146 MHz, 4/11/48 W; 440 MHz, 4/11/42 W.
Spurious signal and harmonic suppression: Better than 60 dB.	As specified. The C5608DA meets FCC requirements for spectral purity for transmitters in its power-output class and frequency range.
Transmit-receive turnaround (PTT release to 90% of full audio output): Not specified.	Squelch on, approx 200 ms; squelch off, approx 200-225 ms.

Manufacturer: Standard Amateur Radio Products, Inc, PO Box 48480, Niles, IL 60648, tel 312-763-0081.

*Measured at 4% THD because distortion rapidly increases to well over 10% at approximately 3 W.

Yaesu FT-5100, Serial Number 21040032

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: Receive, 140-174 MHz, 430-450 MHz; transmit, 140-150 MHz, 430-450 MHz.	As specified.
Power requirement: 13.8 V dc ±15% at 0.6 A typical (receive); 11.5 A typical (transmit).	Receive, 0.84 A max; transmit, 8.4 A max.
Size: 1.6 × 5.5 × 6.1 in. (HWD); 2.2 pounds.	
Receiver	*Receiver Dynamic Testing*
Receiver sensitivity: Better than 0.158 μV (–123 dBm) for 12 dB SINAD.	146 MHz, –123 dBm; 440 MHz, –123 dBm.
Two-tone third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 66 dB; 20 kHz offset from 440 MHz, 75 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 62 dB; 20 kHz offset from 440 MHz, 70 dB.
Image rejection: Better than 60 dB.	146 MHz, 94 dB; 440 MHz, 73 dB.
Squelch sensitivity: At least 0.1 μV (–127 dBm).	146 MHz, –118 to –127 dBm.
Receiver audio output: 3 W into 4 Ω at 5% distortion. Load range: 4-16 Ω.	2.8 W into 4 Ω at 5% THD.
Transmitter	*Transmitter Dynamic Testing*
Power output (low/high): 144 MHz, 5/50 W; 440 MHz, 5/35 W.	146 MHz, 5.7/50 W; 440 MHz, 5.4/33.9 W.
Spurious signal and harmonic suppression: Better than 60 dB.	As specified. The FT-5100 meets FCC requirements for spectral purity for transmitters in its power-output class and frequency range.
Transmit-receive turnaround (PTT release to 90% of full audio output): Not specified.	Squelch on, approx 110 ms; squelch off, approx 110 ms.



Manufacturer: Yaesu USA, Inc, 17210 Edwards Rd, Cerritos, CA 90701, tel 310-404-2700.

versatility and an impressive collection of nice features into a very small, lightweight package is the FT-5100, at a street price of about $565. If you need remote control or remote-mounting capability, however, you'll have to look elsewhere. The larger, solid Standard C5608DA, with its especially wide receiver coverage, makes a lot of sense if you're looking for a mobile or even home-station, FM-only radio. Each of the others has its strengths as well.

As you'll find with most mobile rigs, these dual-banders generally don't deliver particularly loud, clear audio through their small speakers. Adding an external speaker (or one for each band, as the Alinco, ICOMs, Kenwood and Standard allow) is a good idea.

A couple of things the reviewers wished for in the documentation department warrant mentioning here. Only the FT-5100 manual includes specific instructions for connecting a packet-radio TNC to the rig. Considering packet's popularity, this is a significant oversight on the part of the other manufacturers. Also, although each of these rigs supports full duplex and cross-band repeating, none of the manuals adequately discuss the legal issues of such operation, and the need for repeater coordination. (The ARRL's *FCC Rule Book* and *Repeater Directory* cover these rules.) Although these issues differ from country to country and the manuals are produced for at least the entire North American market, which encompasses several countries with different regulations, at least some mention of their significance is warranted.

If you're in the market for a dual-bander, be sure to follow these simple steps to help you make the right choice: Identify the features most important to you; get and read the manuals for each radio you're considering; and spend some time looking closely at each one at a dealer or hamfest before making your purchase. You may learn things that no review can tell you! Good luck.

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

[In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review or New Products columns. —*Ed.*]

The ARRL-purchased Product Review equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices.

A&A Engineering ViewPort VGA interface (see Product Review, February 1993 *QST*). Minimum bid: $162.

ICOM IC-728 MF/HF transceiver with optional AT-160 external antenna tuner, UI-7 AM/FM unit and PS-30 power supply (see Product Review, February 1993 *QST*). Sold as a package only. Minimum bid: $1167.

ICOM IC-729 MF/HF/VHF transceiver with 500-Hz CW filter (see Product Review, February 1993 *QST*). Sold as a package only. Minimum bid: $883.

ICOM IC-R7100 HF/VHF/UHF scanning communications receiver (see Product Review, April 1993 *QST*). Minimum bid: $826.

SSB Electronic SP-70 70-cm mast-mount preamplifier (see Product Review, March 1993 *QST*). Minimum bid: $148.

Ten-Tec Omni VI MF/HF transceiver with model 961 power supply/speaker, two 500-Hz CW filters and 1.8-kHz SSB filter (see Product Review, January 1993 *QST*). Sold as a package only. Minimum bid: $1948.

Sealed bids must be submitted by mail and must be postmarked on or before June 26, 1993. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, please clearly identify the item you are bidding on, using the manufacturer's name, model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. The successful bidder will be advised by mail. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding final price or identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111.