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QST Compares: Dual-band FM Mobile Transceivers
(Alinco DR-610T; ICOM IC-2700H; ICOM IC-2340H; Kenwood TM-742A; Kenwood TM-733A; Standard C5718DA; Yaesu FT-5200; Yaesu FT-8500)

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QST Compares: Dual-band FM Mobile Transceivers

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With stiff competition among manufacturers of dual-band FM mobile rigs, it's becoming more difficult to make a purchase decision. We could spend endless pages discussing the features that most of these radios share, but the benefit to you would be questionable. All dual-band transceivers in this price class have versatile scanning functions, DTMF keypads, CTCSS encoders, copious memories, simultaneous dual-band receive and other typical features. All these features work pretty much the same from one radio to another.

The challenge is to focus on the features and characteristics that *distinguish* one rig from another. Weighing the unique traits of one transceiver against another, along with the price, will better equip you to make an informed choice.

Seven ARRL HQ staff members participated in this review: Brian Battles, WS1O, Features Editor; Pete Budnik, KB1HY, Educational Assistant; Jean Wilson, N1OJS, Production Assistant; Jay Mabey, NUØX, Assistant Field Services Manager; Kate Cook, N1ODI, Educational Assistant; Harry White, N1QVE, Educational Assistant, and Steve Ford, WB8IMY, Assistant Managing Editor. We based this review on our impressions and ARRL Lab testing.

BER Testing and 9600-baud Packet

If an advertisement says that a radio is "9600-baud ready," does this mean it's necessarily a good performer? When it comes to overall performance, you can't cut corners at 9600 baud. The transmitter must be able to send the 9600-baud signal without distortion. The receiver must also be able to receive the 9600-baud signal without including distortion of its own. When you add distortion to packet signals, you begin to see errors in the bits of information being sent or received. We measure the effects of the distortion in terms of the *bit error rate*, or *BER*. The higher the BER, the poorer the performance.

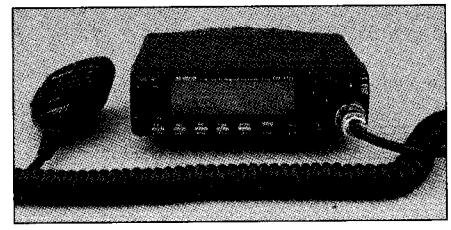
Beginning with the May 1995 issue, *QST* Product Reviews include the results of BER testing for transceivers that claim to be 9600-baud ready. (*QST* is the only Amateur Radio magazine that publishes BER tests.) BER testing is fairly complicated, and so are the results. (See "9600-Ready Radios: Ready or Not?" by Jon Bloom, KE3Z, in the May 1995 *QST*, page 24.) To make it easier for you to interpret the numbers, here are two rules of thumb:

For usable *receive* performance, look for a "BER @ –50 dBm" of 1×10^{-5} or less.

For usable *transmit* performance, look for a "BER @ 12 dB SINAD + 30 dB" of 1×10^{-5} or less.

Watch those exponential numbers! A BER of 1×10^{-3} is *worse* than a BER of 1×10^{-5}! Add the appropriate number of zeros, and you'll see what I mean. Would you rather own a transmitter with a BER of less than 1 bit for every 1,000 (1×10^{-3}), or less than 1 bit for every *100,000*? One faulty bit for every 100,000 bits (1×10^{-5}) looks much better to me!—*WB8IMY*

ALINCO DR-610T



The DR-610T is an extremely compact dual-band mobile transceiver. If you lack room behind the dashboard for the entire radio, the front panel detaches, giving you the option of placing the "guts" of the DR-610T elsewhere.

A compact design has its downside, though. In the case of the DR-610T, it's evident in the crowded controls. You'll need nimble fingers to avoid pressing the wrong buttons while on the road. The independent **VOLUME** and **SQUELCH** knobs for each band are concentric, and the concentric pairs are quite close together. Several reviewers found it difficult to adjust the **SQUELCH** without also moving the **VOLUME** controls.

The lime-green LCD display was readable in all lighting conditions. The DR-610T also included the ability to adjust display brightness. Each front-panel switch is backlighted for easy viewing.

VHF reception ranges from 108 to 174 MHz, with automatic AM detector selection from 108 to 138 MHz. The DR610T

Dual-band FM Mobile Transceiver Features

	Alinco DR-610T	*ICOM IC-2700H*	*ICOM IC-2340H*	*Kenwood TM-742A*	*Kenwood TM-733A*	*Standard C5718DA*	*Yaesu FT-5200*	*Yaesu FT-8500*
Extended 2-meter reception	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Extended 70-centimeter reception	Yes	No	No	Yes	Yes	Yes	No	Yes
AM aviation band reception	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Memory channels	120	100	100	100	72	40	32	100
Band, memory and programmed scan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power-output selections (VHF)	50/10/5	50/10/5	50/10/5	50/10/5	50/10/5	50/10/3	50/5	50/10/5
Power-output selections (UHF)	35/10/5	35/10/5	35/10/5	35/10/5	35/10/5	40/10/3	35/5	35/10/5
Automatic repeater offset	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DTMF decoder	Yes	Yes	Optional	Yes	Yes	Yes	Optional	Yes
DTMF autodialer	Yes	Yes	Yes	Yes	Yes	Yes	Optional	Yes
CTCSS encoder	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS decoder	Optional	Optional	Optional	Optional	Optional	Yes	Optional	Optional
Display dimmer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Detachable front panel	Yes	Yes	No	Yes	Yes	See text	Yes	Yes
9600-baud packet-ready	Yes	No	No	No	Yes	Yes	No	Yes
TNC jack	Yes	No	No	No	Yes	Yes	No	Yes
Suggested retail price*	$819	$1055	$744	$949	$799	$849	$839	$849
Typical selling price**	$645	$799	$599	$699	$610	$699	$639	$659

*Suggested retail prices are as of September 10, 1995.
**Typical selling prices are as of September 10, 1995, and do not include coupons or special promotions. Check with your favorite dealer for current prices.

Alinco DR-610T, serial no. T000959

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive, 108-174 MHz; 420-470 MHz; transmit, 144-148 and 438-450 MHz.	As specified for FM operation. AM receive range is 108-138 MHz.
Power requirements: At 13.8 V dc: 1.2 A max (receive); 11.5 A max (transmit).	At 13.8 V dc: 0.8 A max (receive); 9.4 A max (transmit).
Size (height, width, depth): 1.6×5.6×6.5 inches; weight, 2.4 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Main band, 0.16 μV or less for 12 dB SINAD; subband, 0.22 μV or less for 12 dB SINAD.	For 12 dB SINAD: 146 MHz, 0.16 μV; VHF subband, 0.19 μV; 440 MHz, 0.16 μV; UHF subband, 0.16 μV. AM (120 MHz): 1.9 μV for 10 dB (S+N)/N.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 73 dB. 20 kHz offset from 440 MHz, 75 dB. 10 MHz offset from 146 MHz,: 85 dB.
Adjacent-channel rejection: Not specified	20 kHz offset from 146 MHz, 70 dB 20 kHz offset from 440 MHz, 67 dB.
IF rejection: Not specified.	146 MHz: 86 dB; 440 MHz: ≥136 dB.
Image rejection: Not specified.	146 MHz: 99 dB; 440 MHz: 81 dB.
Audio output: ≥2 W at 5% THD into 8 Ω.	2.8 W at 6 % THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output (high/medium/low): 146 MHz: 50/ 10 / ≈5 W; 440 MHz: 35 / 10 / ≈5 W.	146 MHz: 51 / 9 / 5 W; 440 MHz: 35 / 9 / 4 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 245 ms; 440 MHz: Squelch on, 240 ms; 9600-baud packet: 146 MHz, 105 ms; 440 MHz, ≈105 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz, 104 ms; 440 MHz, 108 ms.
Bit-error rate (BER), 9600 baud: Not specified	146 MHz: Receiver: BER @ 12 dB SINAD, 1.0×10^{-3}; BER @ 16 dB SINAD, $<1.0\times10^{-5}$; BER @ –50 dBm, $<1.0\times10^{-5}$, Transmitter: BER @ 12 dB SINAD, 4.2×10^{-4}; BER @ 12-dB SINAD +30 dB, 4.2×10^{-4}. 440 MHz: Receiver, BER @ 12 dB SINAD, 7.2×10^{-4}; BER @ 16 dB SINAD, $<1.0\times10^{-5}$; BER @ –50 dBm, $<1.0\times10^{-5}$; Transmitter, BER @ 12 dB SINAD, 4.7×10^{-3}; BER @ 12-dB SINAD +30 dB, 5.6×10^{-4}.

treats the aviation portion of the VHF band as a separate band. So, when you press the buttons to toggle between bands, you step through *two* VHF selections.

UHF reception begins at 420 MHz and goes all the way to 470 MHz. This includes the downlink frequencies of the 9600-baud packet satellites. The radio features 9600-baud compatibility, but there's a catch. The DR-610T's minimum tuning rate is 5 kHz per step. That's a huge jump when you're attempting to "gently" correct for Doppler shift. One reviewer was able to copy data from KITSAT-OSCAR 23, but the coarse frequency steps make it impossible to achieve acceptable throughput. On the plus side, the same reviewer used the DR-610T to successfully communicate through AMRAD-OSCAR 27, the 2-meter/70-cm FM repeater satellite.

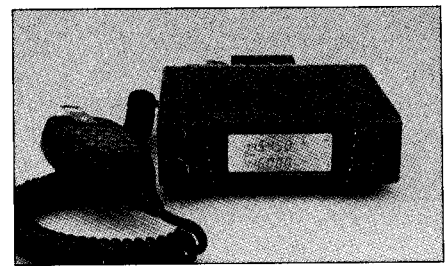
The DR-610T's *channel scope* drew praise from several reviewers. The channel scope acts somewhat like a spectrum analyzer. It provides a visual display of activity above and below a given frequency. For example, if you set the VFO to 146.52 MHz and the step tuning rate to 20 kHz, the channel scope will continually scan for signals at two 20-kHz intervals above and below 146.52 MHz. In this case, the radio will look for activity at 146.48, 146.50, 146.52 (the "center" frequency), 146.54 and 146.56 MHz. You can also set the channel scope to monitor up to *five* frequencies above and below the center frequency. If the channel scope detects activity, it displays the signal strength on the LCD display. You can use the channel scope for any band individually, or for VHF and UHF *simultaneously*.

Other noteworthy features of the DR-610T include a switchable receive attenuator. This could come in handy for those trips through "intermod alley." Intermod manifests itself as garbled signals in your receiver. These signals are the products of mixing between powerful transmitters, and they're often strong enough to block what you *want* to hear.

The DR-610T can also be remotely controlled in a limited fashion by *any* transceiver equipped with a DTMF keypad. You can switch frequencies, change memory channels or turn the crossband repeater on or off. But, there is no way to change the "entry" string, which is **# 4 5** for *all* DR-610Ts. This means that *anyone* can gain access to these functions whenever your DR-610T is in the remote-control mode. That's a troubling thought.

Finally, the Alinco engineers thoughtfully added *LiTZ*—Long Tone Zero—decoding in the DR-610T. LiTZ is an alerting system endorsed by the ARRL Board of Directors in 1992. You simply press and hold the **0** button on the keypad of any DTMF-equipped transceiver for three seconds. Every radio monitoring the frequency that has an active LiTZ decoder—such as the DR-610T—will respond by unmuting the audio. In a sense, LiTZ is a form of group paging, except that its application is universal. You don't need to know the special code sequence to alert a particular group. The LiTZ tone you send in Bangor, Maine, functions the same as it would in Missoula, Montana.

ICOM IC-2340H



The IC-2340H wins accolades for offering one of the most straightforward control panels among the rigs we tested. Separate **VOLUME**, **SQUELCH** and **VFO** controls for the 2-meter *and* 70-centimeter bands are at opposite sides of the front panel. There are even separate **MEMORY/CALL** channel **VFO MODE** switches for each band. Depending on how you configure the "Main" and "Sub" bands, most VHF controls will be on your left and most UHF controls will be on your right. What could be easier?

The bright amber display is easy to read. Signal strengths show up as horizontal bars at the right-hand side of the display. As with most modern FM rigs, you can adjust the display brightness to suit your taste.

The microphone plugs into a pigtail connector at the *rear* of the IC-2340H, which is a bit unusual. The microphone uses an 8-pin telephone-style plug. If you want to run 1200-baud packet with the IC-2340H, this is where you'll need to connect your TNC. Fortunately, the manual provides a wiring diagram for the jack.

On the rear panel you'll also find separate speaker output jacks for VHF and UHF, along with a single "pigtail" for the antenna. (The pigtail is simply a UHF connector at the end of a short piece of coax.) The cooling fan is mounted slightly above the large heat sink. You can select continuous or heat-activated operation of the fan through the program menu.

Adding the optional UT-55 module provides the usual DTMF and CTCSS paging functions. You can also control the IC-2340H remotely from any radio that's equipped the a DTMF keypad. About a dozen functions (such as frequency, power level and so forth) can be changed in this fashion. Access is password restricted.

With the UT-55 module installed, the microphone also provides *wired* remote

ICOM IC-2340H, serial no. 01674

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive and transmit, 144-148 MHz; 440-450 MHz .	As specified.
Power requirements: At 13.8 V dc: 1.8 A max (receive); 10.5 A max (transmit).	At 13.8 V dc: 1.1 A (receive); 9.2 A max (transmit).
Size (height, width, depth): 1.6×5.5×6.5 inches; weight, 2.9 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Less than 0.16 µV for 12 dB SINAD	For 12 dB SINAD: 146 MHz, 0.13 µV; 440 MHz,0.14 µV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 62 dB. 20 kHz offset from 440 MHz, 64 dB. 10 MHz offset from 146 MHz, 91 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 60 dB; 20 kHz offset from 440 MHz, 68 dB.
IF rejection: Not specified.	146 MHz: 109 dB; 440 MHz: ≥137 dB.
Image rejection: Not specified.	146 MHz: 82 dB; 440 MHz: 94 dB.
Audio output: >2.4 W at 10% THD into 8 Ω.	3 W at 10% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: 146 MHz: 45 / 10 / 5 W; 440 MHz: 35 / 10 / 5 W.	146 MHz: 46 / 11 / 5 W; 440 MHz: 33 / 11 / 5 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 220 ms; 440 MHz: Squelch on, 200 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz; 225 ms; 440 MHz: 240 ms.

control. You can program the microphone **UP** button to activate a particular front-panel switch. For example, you can program the **UP** to activate the **MUTE** function when pressed. Now you can temporarily kill the audio when you need to hear something else—such as the shouted greetings of the angry driver you've just cut off.

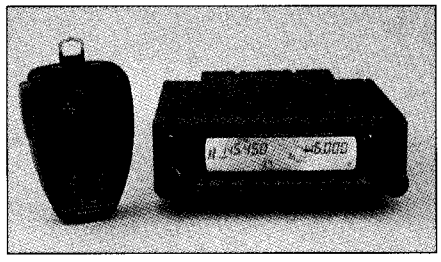
The rugged IC-2340H was a great performer on the road. Audio output was sufficient to overcome the usual open-window highway noises. Receive sensitivity was very good, even in the AM aviation band. The front-panel layout made it relatively easy to change channels. With the repeater coverage we enjoy in New England, the IC-2340H's 5-W power level was adequate. Still, it was nice to know that you could jump to 50 W if necessary (35 W on UHF).

The only serious complaints about the IC-2340H concerned its tiny microphone. Some reviewers felt that the keypad buttons were too small. Unless you're using the IC-2340H *autodialer* function to place a call, punching in a telephone number on this mike was difficult, especially when in motion.

On the other hand, the IC-2340H's user's manual is a gem. It doesn't assume that you're already familiar with FM operating. The writers took the time to throw in operating tips, along with explanations of terms like "simplex" and "duplex." More manufacturers should write their manuals this way!

Just before this review went to press, ICOM announced the release of the IC-2350H transceiver. The IC-2350H is quite similar to the IC-2340H. Notable differences in the claimed features include expanded scanning functions and an improved ability to reject intermod interference. In addition, the IC-2350H microphone plugs into the *front* of the rig, rather than into a rear-panel pigtail.

ICOM IC-2700H



The rugged design of the IC-2700H inspires confidence from the moment you remove the radio from the box. This dual-bander is a compact rig with a heavyweight feel. When you hold it in your hands, it seems about as dense as a paving brick!

The detachable front panel features separate **VOLUME** and **SQUELCH** controls for each band. Interestingly, the IC-2700H employs *stepped potentiometers*. None of the reviewers complained about the stepped controls. The 35 or so step positions are more than enough for smooth operation. Still, the slightly "bumpy" feel takes you by surprise at first.

The bright LCD display offers all the usual information including frequency, transmit offset, signal strength and so on. As a bonus, the display *visually* indicates volume and squelch levels as dual vertical bar graphs, one set for each band. Several reviewers enthused about this feature. One commented: "While I was driving on the highway with the windows down, I had the 2-meter receive volume cranked way up. There wasn't much activity on the repeater. In fact, it was essentially dead at that time. Not long after I exited to the quieter surface streets, I happened to glance at the IC-2700H. The volume-level display was indicating the high-output setting. I had forgotten to turn it down! If someone had called on the repeater, it would have blown me out of my seat."

You can remotely control the IC-2700H from any DTMF-equipped transceiver. Control access is password protected (you set your own password). After setting the proper password sequence, you can change the IC-2700H's frequency settings, power levels, and many other parameters. (This has some intriguing possibilities, especially for

ICOM IC-2700H, serial no. 02097

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive and transmit, 144-148 MHz; 440-450 MHz.	As specified.
Power requirements: At 13.8 V dc: 1.8 A max (receive); 12 A max (transmit).	At 13.8 V dc: 1.4 A (receive); 10.8 A max (transmit).
Size (height, width, depth): 1.6×5.5×7 inches; weight, 3.2 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Less than 0.16 µV for 12 dB SINAD	For 12 dB SINAD: 146 MHz, 0.13 µV; 440 MHz,0.13 µV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 73 dB. 20 kHz offset from 440 MHz, 70 dB. 10 MHz offset from 146 MHz, 77 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 58 dB; 20 kHz offset from 440 MHz, 59 dB.
IF rejection: Not specified.	146 MHz: 68 dB; 440 MHz: ≥138 dB.
Image rejection: Not specified.	146 MHz: 90 dB; 440 MHz: 97 dB.
Audio output: >2 W at 10% THD into 8 Ω.	>2 W at 5% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: 146 MHz: 50 / 10 / 5 W; 440 MHz: 35 / 10 / 5 W.	146 MHz: 52 / 10 / 4 W; 440 MHz: 37 / 11 / 5 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 300 ms; 440 MHz: Squelch on, 300 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz: 225 ms; 440 MHz: 225 ms.

remote base applications.)

The rear panel of the IC-2700H is dominated by a cooling fan—over which you have some control via the microprocessor—and a coaxial pigtail antenna connector. (If you wish to use separate 2-meter and 70-centimeter antennas, you'll need to purchase a diplexer.) There are two external speaker jacks as well, one for each band.

The IC-2700H is a 1200-baud packet transceiver *only*; it can't deal with 9600-baud signals. Furthermore, the IC-2700H lacks a packet TNC jack. Not only that, the manual doesn't describe how to use the IC-2700H for packet. For example, there is no wiring diagram for the microphone jack in the manual.

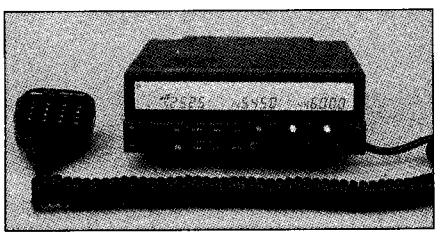
Other than this relatively minor oversight, the rest of the IC-2700H manual is a winner. All the information is written with new hams in mind. It even details how to install your mobile antenna, including instructions on how to solder a PL-259 connector!

Overall, the IC-2700H earned high marks from the review team. RF output power is adequate for almost any situation (50 W maximum on 2 meters, 35 W maximum on 70 centimeters). The receivers are sensitive, and the audio has plenty of punch.

One "option" that came free with the unit we tested was the HM-90A infrared wireless microphone. It looks like a standard microphone and does, in fact, have a coiled cord. Simply disconnect the cord and you have full wireless control. This clever add-on works well if the radio is in the clear and "visible" to the infrared emitter. In some under-dashboard installations, however, we noticed drop-outs when the the the steering wheel or other object blocked the beam. Depending on how you hold the microphone, you may even find your fingers getting in the way of it. If you don't plan to use the infrared mike, you must pop the cover on the mike case and change the settings of a tiny DIP switch inside. Otherwise, the internal NiCd battery powering the infrared transmitter continues to charge through the mike cord.

The only feature that raised some eyebrows was the ability to activate "one-touch" push-to-talk operation. Essentially, this is a push-push toggle between transmit and receive. When the IC-2700H is in the one-touch mode, you only need to tap the microphone PTT button once and let it go to transmit. Tap it again to receive. This feature has a high Murphy Quotient! No doubt it is very convenient, but we wonder how many hams will tap it into transmit and unintentionally leave it there. Yes, the time-out timer eventually will take the IC-2700H out of transmit—assuming you have enabled it as well! One-touch keying is a feature to use with caution!

KENWOOD TM-742A



The TM-742A is a dual-band FM transceiver that can be expanded to a *tri-band* rig. Every TM-742A comes equipped for operation on 2 meters and 70 centimeters, but you can purchase modules to add 10 meters, 6 meters, 222 MHz or 1296 MHz. We added the 6-meter module to the TM-742 used for this review. The installation was relatively easy. It took about 30 minutes (and two Phillips screwdrivers) to attach the module (typical selling price, $325).

The rig is relatively compact and features a remote front panel. This allows you to install the TM-742A just about anywhere. With its rear-panel cooling fan, the TM-742A manages to shed heat remarkably well. This is a decided advantage in mobile installations where air circulation is poor.

Each band section has its own coaxial pigtail antenna connection. This design was obviously incorporated with maximum flexibility in mind. For example, if you own a tri-band 146/222/440-MHz antenna, you can connect all three pigtails to a triplexer. The antenna connects to the other side of the triplexer and you're in business. However, if you prefer separate antennas for each band, you can connect each antenna directly to the appropriate pigtail. One reviewer owned a 6-meter mobile antenna and a dual-band 146/440-MHz antenna. He connected the 2-meter and 70-centimeter pigtails to the dual-band antenna via a diplexer, and ran the 6-meter coax directly to the TM-742A.

With three bands to handle from the front panel, the Kenwood engineers clearly decided to minimize the number of controls to avoid clutter. There are separate **VOLUME** and **SQUELCH** controls for each band. If you choose to use the TM-742A's internal speaker, you can combine the audio from all three bands at once for the ultimate in sheer pandemonium. On the other hand, you can connect three independent speakers to the dedicated rear-panel jacks. It's the same level of confusion, just a lot louder! (You can also activate the TM-742A's *mute* function to automatically kill the audio on other bands whenever a signal is received on the "active" band.)

Minimal controls are fine until you enter the programming arena. That's where most reviewers started throwing brickbats. The TM-742A is cumbersome to program and makes liberal use of the **FUNCTION** button to step through various menus. Some functions, such as masking a channel in the memory-scan mode, require switching off the radio, holding a button, switching the radio back on and so forth.

The TM-742A uses an amber LCD display that's very readable. The S-meter display is particularly well designed, although a little unorthodox. S-meter segments for each band are arranged *vertically* in a kind of lazy funnel shape. Despite their odd appearance, the S-meter displays are remarkably easy to

Kenwood TM-742A, serial no. 61000060

Manufacturer's Specifications	***Measured in ARRL Lab***
Frequency coverage: 50-54 MHz; 144-148 MHz; 438-450 MHz.	Receive, 46-57 MHz; (FM); 118-136 MHz (AM/FM); 136-174 (FM); 410-470 MHz (FM). Transmit, as specified.
Power requirements: At 13.8 V dc: 1.2 A max (receive); 11.5 A max (transmit).	At 13.8 V dc: 1.2 A (receive); 9.5 A max (transmit).
Size (height, width, depth): 2×6×7 inches; weight, 3.3 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Less than 0.16 µV for 12 dB SINAD	For 12 dB SINAD: 52 MHz, 0.13 µV; 146 MHz, 0.12 µV; 440 MHz, 0.14 µV; AM (120 MHz): 1.4 µV for 10 dB (S+N)/N.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 52 MHz, 71 dB. 20 kHz offset from 146 MHz, 71 dB. 20 kHz offset from 440 MHz, 70 dB. 10 MHz offset from 52 MHz, 92 dB. 10 MHz offset from 146 MHz, 85 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 52 MHz, 79 dB; 20 kHz offset from 146 MHz, 73 dB; 20 kHz offset from 440 MHz, 66 dB.
IF rejection: Not specified.	50 MHz: 138 dB; 146 MHz: 122 dB; 440 MHz: 100 dB.
Image rejection: Not specified.	50 MHz: 76 dB; 146 MHz: 78 dB; 440 MHz: 74 dB.
Audio output: >2 W at 5% THD into 8 Ω.	2.2 W at 5.5% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: 52 MHz: 50 / 10 / ≈5 W; 146 MHz: 50 / 10 / ≈5 W; 440 MHz: 35 / 10 / ≈5 W.	52 MHz: 53 / 11 / 4 W. 146 MHz: 50 / 11 / 5 W. 440 MHz: 33 / 11 / 4 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	All bands: Squelch on, 110 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	52 MHz: 48 ms; 146: 100 ms; 440 MHz: 104 ms.

interpret at a single glance—important for mobile operation.

The TM-742A turned in outstanding performances on all three bands. Its 6-meter transceiver drew quite a bit of attention, with some reviewers enjoying long-distance contacts through repeaters and on simplex. Six-meter FM mobile operation was particularly enjoyable and, at times, surprising. (On my way to work one morning, I had a brief chat with a fellow on 52.525 MHz. Nothing remarkable about that, except that the other station was 200 miles away!)

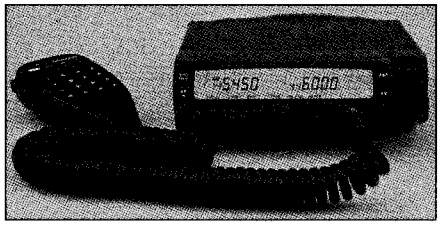
Two-meter operating was a breeze with the TM-742A's flexible memories and scanning functions. The rig automatically switches to an AM detector whenever you tune below 136 MHz, making aircraft monitoring a snap. Performance on 440 MHz was equally good. In fact, the receiver section was sensitive enough to allow one reviewer to work the OSCAR 27 satellite from his car. At the time, the satellite had an RF output of only 600 mW at 436.800 MHz.

Mobile operating with this tri-band rig is enhanced by its automatic bandswitching. You can configure the TM-742A to automatically switch transmit functions to the band that's active at the moment. Let's say you've installed the 10-meter FM module, but you're monitoring 2 meters. The instant the TM-742A receives a signal on 10 meters—someone calling CQ on one of the many repeaters, for example—you can pick up the microphone and reply without worrying about whether you're transmitting on the correct band. At the other extreme, you can set the radio to display *only* the band you desire.

Kenwood TM-733A, serial no. 70104551

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: 144-148 MHz; 438-450 MHz.	Receive, as specified, plus 118-136 MHz (AM/FM); 136-174 MHz (FM); 410-470 MHz (FM), with reduced sensitivity beyond specified range. Transmit, as specified.
Power requirements: At 13.8 V dc: 1.2 A max (receive); 11.5 A max (transmit).	At 13.8 V dc: 0.8 A (receive); 8.8 A max (transmit).
Size (height, width, depth): 1.7×5.6×6.5 inches; weight, 2.4 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Mainband, 0.16 μV or less for 12 dB SINAD; subband, 0.25 μV or less for 12 dB SINAD.	For 12 dB SINAD: 146 MHz, 0.16 μV; VHF subband, 0.13 μV; 440 MHz, 0.15 μV; UHF subband, 0.15 μV; AM (120 MHz): 0.53 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 67 dB. 20 kHz offset from 440 MHz, 64 dB. 10 MHz offset from 146 MHz, 73 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 71 dB; 20 kHz offset from 440 MHz, 67 dB.
IF rejection: Not specified.	146 MHz: 99 dB; 440 MHz: ≥136 dB.
Image rejection: Not specified.	146 MHz: ≥136 dB; 440 MHz: 87 dB.
Audio output: ≥2 W at 5% THD into 8 Ω.	2.8 W at 5.5% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: 146 MHz: 50 / 10 / ≈5 W; 440 MHz: 35 / 10 / ≈5 W.	146 MHz: 50 / 12 / 5 W; 440 MHz: 36 / 12 / 5 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 160 ms; 440 MHz: Squelch on, 105 ms. 9600-baud packet: 146 MHz, ≈170 ms; 440 MHz, ≈80 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz: 110 ms; 440 MHz: 125 ms.
Bit-error rate (BER), 9600 baud: Not specified	146 MHz: Receiver: BER @ 12 dB SINAD, 1.5×10^{-3}; BER @ 16 dB SINAD, 4.8×10^{-5}; BER @ –50 dBm, $<1.0\times10^{-5}$. Transmitter: BER @ 12 dB SINAD, 1.7×10^{-3}; BER @ 12-dB SINAD, +30 dB, 8.0×10^{-5}. 440 MHz: Receiver, BER @ 12 dB SINAD, 1.5×10^{-3}; BER @ 16 dB SINAD, 6.2×10^{-5}; BER @ –50 dBm, $<1.0\times10^{-5}$; Transmitter, BER @ 12 dB SINAD, 3.4×10^{-3}; BER @ 12-dB SINAD, +30 dB, 3.3×10^{-4}.

KENWOOD TM-733A



The TM-733A differs substantially from its cousin, the TM-742A. The TM-733A is strictly a dual-band (2-meter/70-centimeter) transceiver; you cannot add a third band. Even so, the TM-733A more than compensates by adding a number of innovative features, plus 9600-baud packet interfacing.

The TM-733A display is easy on the eyes. The dark numbers and characters stand out sharply on the amber LCD display. Not only can you set the brightness of the display, you can even activate a function that automatically increases illumination when you're pressing a button or twisting a knob.

Frequencies for both bands can appear on the display, or you can choose to display just one band. A separate set of **VOLUME** and **SQUELCH** controls regulates audio output for each band. To assign the transmit function to one band or the other, you simply press the appropriate **VOLUME** knob. The display also indicates the function of six front-panel switches.

The entire front panel is detachable for remote installations. All you have to do is press and hold a tiny latch release that looks like a slide switch. The panel pops off in less than a second. However, the microphone stays with the main unit. To install the TM-733A in your trunk, you'll have to run separate cables to your dashboard for the front panel *and* the microphone.

Unlike the TM-742A, the TM-733A is equipped for 1200 and 9600-baud packet operating. You connect your TNC to the 6-pin miniature DIN jack on the front panel. (A small plastic piece covers the jack when you're not using it.) The manual provides a wiring diagram for the plug if you want to build your own. An optional "data cable" (the PG-5A) is available from Kenwood. Twelve-hundred baud is the default. To operate at 9600 baud, you must switch packet functions via the program mode.

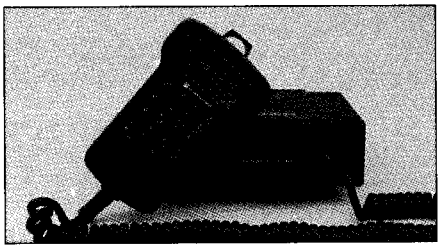
On the rear apron are separate pigtails for 2-meter and 70-centimeter antennas. As with the TM-742A, this gives you the option of using separate antennas or a single dual-band antenna (with a diplexer, of course). Separate speaker jacks also are available on the rear panel.

One neat feature drew considerable attention: the *Automatic Simplex Checker*, or *ASC*. When you're communicating through a repeater, the TM-733A checks the input frequency every three seconds. If the signal strength of the other station increases to the point where you could talk to each other *without* the repeater, a symbol begins flashing on the display. This is your cue to sign off the repeater and go to a simplex channel to continue your conversation.

Receive audio was ample and clean. The VHF AM aircraft receiver was quite sensitive, although the audio level was considerably lower than that for FM reception. Many reviewers also commented favorably on the TM-733A's advanced intercept point function, which substantially improves intermod rejection.

A number of reviewers enjoyed the S-meter squelch function. Through a simple programming step you can "link" the S-meter reading to the squelch operation. For example, if you only want to hear signals that are S 5 or stronger, you can set the S-meter squelch accordingly. This is a blessing when you live in an area where weak signals from distant repeaters constantly break the squelch.

STANDARD C5718DA



Standard C5718DA, serial no. 47U090093

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: 144-148 MHz; 438-450 MHz.	Receive, 118-142 MHz (AM/FM); 142-185 MHz (FM). 250-327.5 MHz (AM/FM); 327.5-500 MHz (FM); 800-1000 MHz (FM; cellular telephone frequencies blocked). Reduced sensitivity beyond specified ranges. Transmit, 144-148 MHz (FM); 420-450 MHz (FM).
Power requirements: At 13.8 V dc: 0.9 A max (receive); 11 A max (transmit).	At 13.8 V dc: 1.0 A (receive); 9.7 A max (transmit).
Size (height, width, depth): 1.6×5.6×5.4 inches; weight, 2.2 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 0.20 μV for 12 dB SINAD	For 12 dB SINAD: 146 MHz, 0.16 μV; VHF subband, 0.18 μV; 440 MHz, 0.14 μV; lower UHF subband, 0.14 μV; upper UHF (800 MHz), 0.22 μV. AM (120 MHz): 2.7 μV for 10 dB (S+N)/N.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 77 dB. 20 kHz offset from 440 MHz, 72 dB. 10 MHz offset from 146 MHz, 87 dB.
Adjacent-channel rejection: Not specified	20 kHz offset from 146 MHz, 66 dB; 20 kHz offset from 440 MHz, 65 dB.
IF rejection: Not specified.	146 MHz: 93 dB; 440 MHz: 106 dB.
Image rejection: Not specified.	146 MHz: 85 dB; 440 MHz: 68 dB.
Audio output: 3 W at 10% THD into 4 Ω.	As specified.
Transmitter	*Transmitter Dynamic Testing*
Power output: 146 MHz: 50 / 10 / 3 W; 440 MHz: 40 / 10 / 3 W.	146 MHz: 53 / 10 / 3 W; 440 MHz: 35 / 8.5 / 3 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 175 ms; 440 MHz: Squelch on, 175 ms. 9600-baud packet: 146 MHz, ≈80 ms; 440 MHz, ≈80 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz: 150 ms; 440 MHz: 150 ms.
Bit-error rate (BER), 9600 baud: Not specified	146 MHz: Receiver: BER @ 12 dB SINAD, 7.0×10^{-4}; BER @ 16 dB SINAD, $<1.0\times10^{-5}$; BER @ –50 dBm, $<1.0\times10^{-5}$. Transmitter: BER @ 12 dB SINAD, 4.3×10^{-3}; BER @ 12-dB SINAD, +30 dB, 3.4×10^{-4}. 440 MHz: Receiver, BER @ 12 dB SINAD, 1.0×10^{-3}; BER @ 16 dB SINAD, 1.4×10^{-5}; BER @ –50 dBm, $<1.0\times10^{-5}$; Transmitter, BER @ 12 dB SINAD, 2.6×10^{-3}; BER @ 12-dB SINAD, +30 dB, 2.0×10^{-4}.

The Standard C5718DA transceiver puts *all* the controls—including the LCD display—on the microphone! You can hide the main body of this dual-band transceiver under the seat or in another convenient location. Although clearly intended for mobile installations, the C5718DA's remote capability is great for home stations, too. You can shove the radio under your operating desk, for example, leaving only the microphone in plain sight.

The rubber-like coating on the C5718DA's microphone won praise from several reviewers. If you've ever operated mobile with sweaty hands and a slick plastic mike, you can appreciate the importance of a sure grip!

The microphone LCD display is small, but still easy to read. Audio was superb—and this came as a surprise. Most of us associate speaker/mikes with weak, tinny audio. Not so with the C5718DA. A couple of reviewers opined that the C5718DA's audio was actually clearer than other transceivers with chassis-mounted speakers.

Receive sensitivity was very good on both bands. (One reviewer used the C5718DA to successfully work OSCAR 27.) Extended receive coverage includes the AM aviation band and—in noncontiguous segments—even reaches all the way up to 999 MHz, although cellular telephone frequencies, by law, are blocked. The C5718DA's receiver exhibited extraordinary resistance to inter-mod. Despite the fact that we have a number of intermod "killing zones" in our area, the C5718DA seemed relatively unaffected.

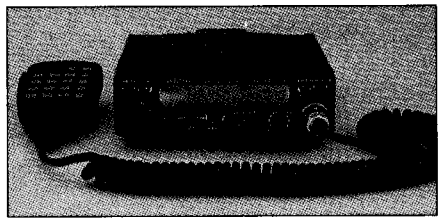
CTCSS (subaudible) encoding *and decoding* are provided in the C5718DA, the only radio in the group to include CTCSS decoding as a standard feature. Although it isn't an item you'll use often, CTCSS decoding is incredibly convenient when you're trying to access a repeater and you can't figure out which subaudible tone to program into your radio. By monitoring the repeater (or the input of a station accessing the repeater) with the CTCSS decoder and tone scan activated, the C5718DA will display the correct tone frequency for you. Of course, this assumes the repeater doesn't block the tone from being retransmitted.

The C5718DA is 9600-baud packet-ready with a dedicated TNC jack. As with all the other rigs included in this review, the C5718DA is primarily designed for only terrestrial 9600-baud packet. Because you can't change frequencies in anything less than 5-kHz steps, it's impossible to compensate for Doppler shift on the 9600-baud PACSATs without losing a *lot* of data.

Forty memory channels (20 per band) are standard in the C5718DA. Our reviewers found this to be more than adequate. If you need even more memory capacity, however, Standard offers an option to upgrade to 200 memory channels.

Other C5718DA features drew compliments as well. DTMF autopatch dialing is standard with six memories for frequently called numbers. You have your choice of eight different scanning modes, including priority and CTCSS scanning. When a signal appears on one band, the C5718DA can automatically mute the audio from the opposite band. Not only that, you have your choice of three muting levels: –6, –12 and –18 dB. This is an excellent feature for monitoring two bands at once!

YAESU FT-5200



The FT-5200 takes a somewhat different approach to dual-band FM transceiver design. Rather than pack a constellation of features into this small rig, Yaesu opted for a back-to-basics approach.

The detachable front panel has an impressive array of knobs and buttons, but the layout is straightforward and simple. Six keys to the right of the large **SELECTOR** knob control most of the operating features. Yes, there is the obligatory **FUNCTION** button that toggles between programming levels, but its use is kept to a minimum. The control layout is so logical and well-labeled that our review team was able to get the radio on the air and make contacts without resorting to the manual.

There is only one **VOLUME** and one **SQUELCH** control to control audio for whatever band is active at the time (2 meters or 70 centimeters). For simultaneous dual-band receive with the FT-5200, you use the **BALANCE** control to mix the audio from the two bands. You can make the levels equal in volume, or one band louder than the other.

It's worth noting that the FT-5200 offers

Yaesu FT-5200, serial no. 4K500025

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive, 140-174 MHz ; 430-450 MHz. Transmit, 140-150 MHz; 430-450 MHz.	As specified.
Power requirements: At 13.8 V dc: 0.6 A "typical" (receive); 11.5 A max (transmit).	At 13.8 V dc: 0.9 A (receive); 8.5 A max (transmit).
Size (height, width, depth): 1.6×5.6×6.2 inches; weight, 2.2 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Less than 0.16 μV for 12 dB SINAD.	For 12 dB SINAD: 146 MHz, 0.22 μV; 440 MHz, 0.18 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 77 dB. 20 kHz offset from 440 MHz, 69 dB. 10 MHz offset from 146 MHz, 88 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 64 dB; 20 kHz offset from 440 MHz, 70 dB.
IF rejection: Not specified.	146 MHz: 90 dB; 440 MHz: 129 dB.
Image rejection: Better than 65 dB.	146 MHz: 128 dB; 440 MHz: 62 dB.
Audio output: 3 W at 5% THD into 4 Ω.	3.6 W at 5% THD into 4 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: 146 MHz: 50 / 5 W; 440 MHz: 35 / 5 W.	146 MHz: 50 / 4 W; 440 MHz: 33 / 4 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 145 ms; 440 MHz: Squelch on, 75 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz: 93 ms; 440 MHz: 64 ms.

only **HIGH** and **LOW** power settings: 50 or 5 W on 2 meters; 35 or 5 W on 70 centimeters. Most users will not miss the **MEDIUM** setting, which is usually 10 W. However, some RF power amplifiers in the 150-W class require a 10-W input to achieve full output. Using such an amplifier with the FT-5200 could be a problem.

A diplexer is built into the FT-5200, so the rear apron has but one coaxial pigtail. Since most mobile installations use dual-band antennas these days, this configuration is ideal. Simply connect the coax from your antenna to the FT-5200 and you're under way. However, some home stations use separate antennas for 2 meters and 70 centimeters. In a dual-antenna system you'd have to insert another diplexer ahead of the FT-5200 to direct the output to the appropriate antennas.

Receive audio is clean and full-bodied and more than powerful enough to overcome noisy environments. You can use the internal speaker in the FT-5200 (most reviewers did), but you also have the option of attaching separate external speakers for each band. Jacks on the rear panel make this a simple operation.

Of the features not included in the FT-5200, we truly missed only two: Extended UHF reception and 9600-baud packet capability. If you live in an area where there is a reasonable amount of radio activity above 450 MHz, it's fun to eavesdrop on the action while you're cruising around town. And although the manual describes how to wire a packet TNC into the microphone jack, you can't use the FT-5200 for 9600-baud transmissions.

There are many other features you *won't* find in the FT-5200 and probably won't *miss* either. Unless you purchase the FRC-4 paging/SelCall option, you won't be able to decode paging calls from other stations. Most FM operators we've talked with throughout the country tell us they rarely use this function, even when it's available. The FT-5200 offers "only" 32 memories (16 per band), but our review team never filled them all. You won't find a "spectrum analyzer" display function in the FT-5200 either.

The point is that the FT-5200 provides everything you'll need for basic FM voice operating, and it will also function as a 1200-baud packet transceiver. It doesn't waste space with other features. This is not to say that all modern FM transceiver features are frivolous (although some clearly are), but they add substantially to the complexity of the radio and to the price.

YAESU FT-8500

Several reviewers affectionately dubbed this rig "Mister Potatohead" after the popular children's toy. Take one look at the FT-8500's "smart controller" and you'll understand why. Yaesu has taken the traditional microphone/DTMF keypad combo and stretched it to the limit. What was once a simple microphone has been transformed into a "controller" festooned with buttons, knobs and even a joystick.

Like Mister Potatohead, the controller is roughly the size of a small spud and covered with nearly as many bumps and projections. It is a comfortable fit for large hands, but could be a bit much for those with smaller palms and shorter fingers. Getting the knack of the controller takes practice. Although both sides of the controller are populated with buttons and switches, one-handed operation is possible. You simply have to learn how to hold the controller in a way that allows you to flip sides quickly with your fingers. (Once again, this takes practice.)

The joystick is meant to be worked by your thumb to tune and program the FT-8500. Moving the joystick in one direction zooms you through your chosen band (2 meters or 70 centimeters) in whatever frequency steps you've selected. The **VOLUME** and **SQUELCH** controls, on the side of the unit, can be operated by your thumb or fingers.

Moving most of the controls to the microphone leaves plenty of room for a large LCD display on the detachable front panel. The upper half of the display shows the frequency readout and other indications. The lower half is devoted to the *Spectra Analyzer* display, programming menus, and so on. The LCD displays all operations of the FT-8500. You can even monitor your dc supply voltage! Brightness and contrast are selectable. Display brightness also adjusts automatically according to the amount of light in your car. (There is a photocell sensor on the front panel.)

Multiple-frequency monitoring systems such as the FT-8500's Spectra Analyzer have turned up on many radios this year. They exploit the ability of the microprocessor-controlled rigs to rapidly "sample" several receive frequencies for possible activity. In the case of the FT-8500, you can monitor a number of frequencies (or memory channels) above and below the one you're listening to at the moment. If activity is present, the LCD display indicates it according to signal strength. You can do this on one band alone, or on both bands simultaneously. What you get is capsule view of nearby activity without having to actually listen to the signals. You can pop over to the other frequencies and check out the conversations, or just sit tight and watch the display. (Think of it as a form of "silent scanning.")

Speaking of microprocessor control, we were pleasantly surprised to discover that the FT-8500 can be controlled via a PC. Yaesu does not provide software, but it's available from other sources. You need the Yaesu FIF-232C interface to connect your computer to the FT-8500. We did not have the interface during this review, so we did not test the computer control function. With the optional Yaesu ADMS-2 software kit, you can exploit the FT-8500's "clone" feature and program the entire radio from any PC that's running Microsoft *Windows*—including *Windows 95*. The ADMS-2 kit is

Yaesu FT-8500, serial no. 50021141

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive, 110-174 MHz; 410-500 MHz. Transmit, 144-148 MHz; 430-450 MHz.	As specified for FM operation. The AM coverage is 110-137 MHz. Transmit, as specified.
Power requirements: At 13.8 V dc: 1.0 A max (receive); 11.5 A max (transmit).	At 13.8 V dc: 0.9 A (receive); 9.1 A max (transmit).
Size (height, width, depth): 1.6×5.6×6.4 inches; weight, 2.4 lb.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: Main band, better than 0.18 μV for 12 dB SINAD; subband, better than 0.25 μV for 12 dB SINAD.	For 12 dB SINAD: 146 MHz, 0.16 μV; VHF subband, 0.2 μV; 440 MHz, 0.16 μV; UHF subband, 0.19 μV. AM (120 MHz): 0.58 μV for 10 dB (S+N)/N.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 76 dB. 20 kHz offset from 440 MHz, 62 dB. 10 MHz offset from 146 MHz, 90 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 74 dB; 20 kHz offset from 440 MHz, 70 dB.
IF rejection: Not specified.	146 MHz: 92 dB; 440 MHz: ≥136 dB.
Image rejection: Better than 70 dB.	146 MHz: 80 dB; 440 MHz: 92 dB.
Audio output: 2 W at 5% THD into 8 Ω.	2.3 W at 5.4% THD into 8 Ω.
Transmitter	*Transmitter Dynamic Testing*
Power output: 146 MHz: 50 / 10 / 5 W; 440 MHz: 35 / 10 / 5 W.	146 MHz: 49 / 10 / 4 W; 440 MHz: 32 / 9 / 4 W.
Spurious signal and harmonic suppression: –60 dB or better.	As specified. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	146 MHz: Squelch on, 145 ms; 440 MHz: Squelch on, 142 ms; 9600-baud packet: 146 MHz, ≈45 ms; 440 MHz, ≈45 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	146 MHz: 25 ms; 440 MHz: 70 ms.
Bit-error rate (BER), 9600 baud: Not specified	146 MHz: Receiver: BER @ 12 dB SINAD, 5.1×10^{-4}; BER @ 16 dB SINAD, $<1.0\times10^{-5}$; BER @ –50 dBm, $<1.0\times10^{-5}$. Transmitter: BER @ 12 dB SINAD, 2.4×10^{-3}; BER @ 12-dB SINAD, +30 dB, 1.2×10^{-4}. 440 MHz: Receiver, BER @ 12 dB SINAD, 4.1×10^{-4}; BER @ 16 dB SINAD, $<1.0\times10^{-5}$ BER @ –50 dBm, $<1.0\times10^{-5}$; Transmitter, BER @ 12 dB SINAD, 2.7×10^{-3}; BER @ 12-dB SINAD, +30 dB, 6.6×10^{-4}.

packet. If you are serious about 9600-baud packet, you're better off buying a radio engineered for that mode.

If you're a real channel demon who needs to know what's happening on the bands every second, take a look at the "spectrum-analyzer" functions available on the DR-610T and the FT-8500. You'll never go hungry for information again!

For three-band operation, the only choice in this group is the TM-742A. But remember: Adding that third band is an *option*—at an extra price.

Many rigs offer extended receive coverage above and below the amateur bands. This is a nice if you like to hear something other than the usual ham chatter. You'll also discover that a number of radios allow you to listen to AM transmissions in the VHF aviation band. One caveat: Do not expect stellar sensitivity while listening beyond the specified frequency ranges. Our Lab tests suggested some of these radios were worse than others in this regard.

Most of these radios were crammed with the latest bells and whistles, but some were more feature-filled than others. If you have the need to explore every possible transceiver innovation, try the FT-8500 or the C5718DA. Either rig will keep you busy for some time.

If ease of use is your chief criterion, look closely at the IC-2340H and the IC-2700H. Our review team gave both of these ICOM radios high marks for headache-free operation.

Dual-band transceivers are never inexpensive. The radios we've reviewed have typical selling prices of $600 to $800. Special promotions and coupons often bring these prices down a bit, so check with your favorite dealer when you're ready to buy. QST

available from authorized Yaesu dealers. You don't need the FIF-232C for this function.

The FT-8500 is equipped with a 6-pin mini-DIN plug to hook up a packet TNC. You can operate 1200 or 9600-baud packet. Just be sure to enter the program mode and switch to 9600-baud as necessary. (The default setting is 1200 baud.)

Like most modern FM transceivers, the FT-8500 is equipped with a DTMF autopatch "autodialer." The twist is in the fact that you can assign alphanumeric "labels" to your autodialer memories—such as HOME, POLICE, or whatever. These labels appear on the LCD display whenever you use the controller to step through the autodialer memories.

Even the ubiquitous DTMF decoder is implemented with a pinch of whimsy in the FT-8500. The rig will respond to a page by performing a factory-programmed melody. If you don't care for Yaesu's taste in music, you can compose your own ditty! And if you don't want music at all, how about a little CW? The FT-8500 will decode the incoming page message or caller identification and play it as CW.

Once you're beyond the bells and whistles, though, how does the FT-8500 really work? The answer is: very well. The receive performance is impressive. Despite the small speaker, there is plenty of receive audio. In terms of usability, the FT-8500 has a steep learning curve. It is a complex radio, and—at least at first—the controller literally is a handful.

SUMMARY

In this comparison review, *quality* was a constant. That is, every radio performed to its critical specifications during our Lab testing and would do just as well in your home or car. As I said at the outset, the challenge is to sort out the aspects (features, price and so on) that are important to you.

Do you want to operate packet as well as FM voice? Consider the FT-8500, TM-733A, C5718DA or the DR-610T. These rigs give you an easy way to get packet active, along with the ability to bump the throttle up to 9600 baud. But anyone considering one of these transceivers primarily for that mode should carefully review the BER data first. The 9600-baud transmitting performance was typical of other mainly FM-voice transceivers we have tested and falls far short of radios specifically designed for 9600-baud

New Products

LOOK MA, NO MIC!

◊ Handheld users can now be even more inconspicuous when they use *Eartalk*, offered by Electro Automatic Corporation. A single earplug contains both the microphone and earphone. One thin lead from the earpiece goes through a combination PTT (push-to-talk) switch and receive volume control to a plug for your handheld. Models are available for Yaesu, Icom, Kenwood, Standard, Alinco and other radios. The manufacturer says the quality of the transmitted audio is indistinguishable from that heard from a more conventional internal mic or speaker mic.

Since a hand is not needed to hold the mic, *Eartalk* works well with outdoor activities. Wind noise is reduced, and the PTT control can be mounted on the handlebars of a bicycle, motorcycle or perhaps even on the top of a ski pole. However, passers-by may give you curious looks when it appears you are talking to yourself, with no mic or radio visible.

Price: $39.95. Contact Electro Automatic at 599 Canal Street, Lawrence MA 01840. Telephone 508-687-6411, fax 508-687-6493. QST