



BY GORDON WEST,\* WB6NOA

*Anyone in the market for a new handheld has plenty to choose from, including some with built-in GPS, APRS and digital D-Star capabilities. (Photos by the author or courtesy respective manufacturers)*

**T**his should be a great year for the portable VHF/UHF market. Prices remain steady with Kenwood, Yaesu, ICOM, and Alinco—the big HT four. Chinese single-band and dual-band handhelds may appeal to the most frugal of HT buyers, coming in as low as \$69 for a two-band HT and \$49 for a single-band.

If your current HT runs on older nickel-cadmium (Ni-Cd) batteries, finding replacement Ni-Cds is getting tough. Sure, you can upgrade to Nickel Metal Hydrides (NiMH), but this pack may not be compatible with your old Ni-Cd charging system. Many of the new HTs that we will review in this article now incorporate lithium ion (Li-ion) sealed packs, along with the rapid charger cup, so this new gear may play for twice as long as your current trusty HT on Ni-Cds.

Our radio ranks have grown to over 700,000, with a spike of new hams coming on board from Community Emergency Response Team (CERT) programs. Plenty of CERT members studied and passed the ham tests as part of their continuing CERT upgrade education. Lots of these volunteer emergency responders are fascinated and enthusiastic about their new ham radio privileges, but have limited funds for this new hobby. CERT operators can get on the air for under \$100!

We will divide our HT market survey into the following categories: single-band HTs; two-band and dual-band HTs (there *is* a difference!); and tri-band, quad-band, and handheld D-STAR transceivers. Working alphabetically through each group, we will cover them *all*!

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**TIP:** If you are a member of Coast Guard Auxiliary, MARS (Military Auxiliary Radio System), or Civil Air Patrol, work with your local radio dealer to determine which handheld may do out-of-ham-band double duty *legally*. Regular ham radio handhelds may no longer be used on federal government frequencies, because of tighter specifications and  $\pm 2.5$  kHz bandwidth limitations. Check with your military communications officer to see which handhelds can be used for both ham and federal auxiliary operation.

### Single-Band HTs

**ALINCO.** This well-known company offers the DJ-V17 for 2 meters, the V27 for the 222-MHz band, and the V47 for the 70 cm (440-MHz) band, all with interchangeable accessories. Each of these “V”-series single-banders is rated submersible for 30 minutes under 3 feet of ocean or river water, perfect for mountain or ocean search-and-rescue teams! The Alinco “V” series comes with a “starter” NiMH battery pack, upgradeable to higher battery capacity and high-tech chemistry when purchased through a dealer or online.

**TIP:** *Submersible* means a handheld can survive an accidental dunking under 3 feet of water for up to 30 minutes. For ocean and river volunteer rescue responders, submersible is a rating that could save your life. With any dunked submersible, immediately remove the battery pack and dry it, dry out the battery contacts and the battery holder inside the radio's back cover. Even though the internal electronics may be bone dry, you still need to maintain a clean and dry battery compartment after a swim.

The Alinco DJ-175 is a 2-meter, 200-channel, full-size transceiver seen selling for *under* \$90! It has plen-



Alinco's DJ-175 is one of the company's four single-band handhelds, and it's selling for under \$90.



The ICOM IC-V82 continues to be a very popular 2-meter-only handheld with its 7-watt high-power output.



Kenwood's newest single-band handheld is the TH-K20A, featuring 5.5 watts and high sound pressure for clear audio.

ty of battery pack options, and can wire clone and computer-program just like the "V" series.

**ICOM.** ICOM America has two single-band 2-meter HTs, the mil-spec IC V-80 and the IC-V82. The V-82 puts out a whopping 7 watts of power, has 200 memory channels, and a land-mobile radio style keypad with recessed buttons. Sorry, there is no aircraft monitoring, but the ICOM V-82 *can* take a D-STAR digital board for the exciting D-STAR connection.

The single-band 2-meter band ICOM IC V-80 puts out 5½ watts on high power, has 207 alphanumeric memory channels, and can be purchased as the V-80 SPORT, which runs on AA alkaline batteries. For emergency volunteers, the AA battery pack makes great sense: There is no self-discharge such as you might find with a rechargeable pack. Also, at a disaster scene nearly everyone has (or should have!) an extra supply of AA alkaline cells.

**TIP:** *Alkaline Battery Holder.* This is a must for emergency communication responders. You may be extended for several days in your role as an emergency communicator. The area where you are assigned may not have battery charging AC or DC. Most everyone has spare AA alkaline cells, so a battery holder is an essential accessory to order.

New from ICOM is the ICOM ID-31, a 70-cm single-band specifically designed for compact HT 440-MHz D-STAR digital voice technology. It also has a built-in GPS receiver. It is submersible. *Best of all*, the new ID-31 self-locates via GPS and then self-loads D-STAR repeaters in the local area.

"We are using the repeater lists from <[www.dstarinfo.com](http://www.dstarinfo.com)> and <[www.dstarusers.org](http://www.dstarusers.org)> repeater directory for the memory channels. Local D-STAR repeaters will come up pre-programmed from the factory," explains Ray Novak, N9JA, of ICOM.

The ID-31 also does conventional FM, and you can manually load up FM repeaters as well. However, on the D-STAR side of this new single-band UHF HT, all D-STAR UHF repeaters pop in as the internal GPS determines the transceiver's position. It also comes with an SD memory card for storing settings and audio recordings.

More on D-STAR opportunities later!

**KENWOOD.** Phil Parton, N4DRO, of Kenwood, has news of a new product from his company, the TH-K20A, a 5.5-watt VHF portable. The "K20" ships with a Li-ion battery pack and a drop-in rapid charger. Its features include 200 alpha memories, adjustable mic sensitivity, cross-tone, built-in VOX, weather alert, and backlit LCD and keypad. It is also capable of narrow-band operation.



The Yaesu FT-250R (pictured), as well as its sibling, the FT-270R, has been upgraded with 200 memory channels and nickel metal hydride batteries.



## SINGLE BAND

Mfr	Alinco	Alinco	Alinco	Alinco	ICOM	ICOM	ICOM	Kenwood	Yaesu	Yaesu	Yaesu
Model	DJ-V17T	DJ-V27T	DJ-V47T	DJ-175	ID-31	IC-V82	V-80	TH-K20A	FT-250R	FT-270R	FT-277R
Bands	2 m	222 MHz	70 cm	2 m	70 cm	2 m	2 m	2 m	2m	2 m	70 cm
RX	130–174	216–250	410–470	136–174	420–470	138–174	136–174	136–174	136–174	136–174	420–470
Air	No	No	No	No	No	No	No	No	No	No	No
Memories	200	200	200	200	SD card	200	207	200	209	201	201
Alpha	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual RX	No	No	No	No	No	No	No	No	No	No	No
Auto Repeater	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Illum. Keypad	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Clone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital	—	—	—	—	D-STAR	D-S Opt	—	—	—	—	—
Ant. Connector	SMA	SMA	SMA	SMA	SMA	BNC	BNC	SMA	SMA	SMA	SMA
12 VDC	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
DCS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Out	5 W	5 W	4.5 W	5 W	5 W	7 W	5.5W	5.5W	5 W	5 W	5 W
Audio	0.5 W	0.5 W	0.5 W	0.5 W	0.7 W	0.5 W	0.75 W	0.80 W	0.5 W	0.5 W	0.5 W
Battery Type	NiMH	NiMH	NiMH	NiMH	Li-Ion	Varies	Varies	Li-Ion	NiMH	NiMH	NiMH
Cost	\$135	\$159	\$149	\$99	\$TBA	\$149	\$145	\$150	\$120	\$130	\$150
Weight	9.9 oz	9.9 oz	9.9 oz	8.7 oz	9.0 oz	14 oz	4.9 oz	12 oz	12 oz	14 oz	14 oz
H2O	Sub	Sub	Sub	Wea	Sub	Wea	Wea	Wea	Wea	Wea	Sub

**\*Note:** In the H<sub>2</sub>O specifications, Sub = Submersible and Wea = Weatherproof.

Price listings are based on advertised prices as of press time and are subject to change. Please check with your dealer for updated pricing information.

"Another feature is high sound pressure—not quite the same as volume—delivering audio output clarity that is unmistakable. Just listen once to hear the difference the Kenwood audio makes," adds Parton.

**TIP:** Turn off BS (Battery Saver)! If you are planning on doing fast exchanges of radio traffic, battery saver turned ON may cause important syllables at the beginning of a message to be missed.

**YAESU.** Yaesu upgrades a pair of 2-meter HTs with the FT-250 and FT-270, each with 200 channels of memory, 5 watts of power out, and shipped with rechargeable NiMH batteries. The Yaesu FT-277R is the company's 70-cm model, upgraded with 5 watts of power output and 200 channels. Yaesu provides commercial-grade submersible construction for the FT-270R, and the compact -250R with top-mounted LCD is rated as waterproof.

**TIP:** Antenna info—The SMA connector is becoming more popular than the BNC connector. If you're going to hook up your handheld to an external antenna, be sure to order the spaghetti-thin adapter cable. This takes the pressure off the SMA or BNC antenna connector. Also, remember that most of the new Chinese radios take a reverse SMA.

**CHINESE SINGLE-BANDERS.** Single-band transceivers are popping up by the container load. Brands offered for sale by dealers in the U.S. include: Wouxun, TYT, Baofeng, Puxing, Yshon, Linton, Baojie, FDC, NKT, and Nanfone.

Each Chinese brand handheld will also carry a specific model number, and if it just has a V or a U in the model number, it is *only* a 2-meter or 70-cm transceiver. If you see a "VU" in the model number, it is a two-band transceiver with active audio on one band at a time.

At last year's Consumer Electronics Show (CES), we saw a lot of Chinese two-way radios ready for import. It was only a matter of time before the single-band and two-band HTs would arrive, sporting FCC Part 90 certification.

Part 90 radios—certified for public safety and commercial land-mobile use—are not permitted to have a keypad that end users could use to change frequencies. They also must land narrow-banded and must have no capabilities for inter-

net software to expand the frequencies. The FCC is carefully monitoring this incoming equipment.

**TIP:** FCC Certification—FCC certification is not required for amateur gear operating under Part 97 of the FCC rules. However, most manufacturers design VHF/UHF gear for both the amateur and land-mobile markets, with only small differences among models. A rig with Part 90 certification provides a higher level of assurance that the amateur version also meets FCC technical standards.

Some incoming Chinese gear is specifically peaked for ham radio VHF and UHF bands, and frequencies outside of the ham bands are computer-transmit locked out. On the other hand, some equipment comes in wide open for transmit and receive nearly anywhere, and hopefully the USA importers will fine-tune the gear so the 2-meter band harmonics are well within the FCC rules. At the same time, we have seen several importers as well as dealers not only insist on clean operation on 2 meters and 440, but also load popular repeater channels and their associated CTCSS tones for specific regions of the country.

Local dealers selling a \$50 Chinese single-bander might charge an additional \$25 to get this equipment pre-loaded with open ham repeater channels, simplex, and weather station receive.

**TIP:** The knowledgeable ham operator working with new CERT communications volunteers could order inexpensive handhelds for the group, computer-program a master unit to clone for ham-licensed CERT members, and set it to the memory mode for a couple of simplex channels and a few repeater channels. This gets the new operators on the air for weekly nets and training exercises using their new ham radio systems. Some of these CERT volunteers may really turn on to ham radio and grow into satellite, APRS, and digital modes found in step-up gear. These inexpensive units, under \$100, get them on the air as new hams.

Some Chinese HTs are shipped with 1500-mAh lithium ion battery packs and rapid chargers, 4 watts of clean (and sometimes not so clean) power out, narrow-band capability by rolling off the lows on transmit, very loud staccato speaker output, bright LED band indicators on two-band gear, and

maybe even an LED flashlight as part of the package.

Everybody is getting in on this low-cost, low-profit, low-maintenance action. Once ham marketplace distribution settles in, and those selling the gear take steps to lock out speech inversion scramblers and out-of-band transmit, as well as spot checks for second harmonics on the 2-meter band and perhaps pre-loading local repeater frequencies, hams on a budget may find this new Chinese equipment only slightly less expensive than gear already here from Kenwood, Yaesu, ICOM, and Alinco.

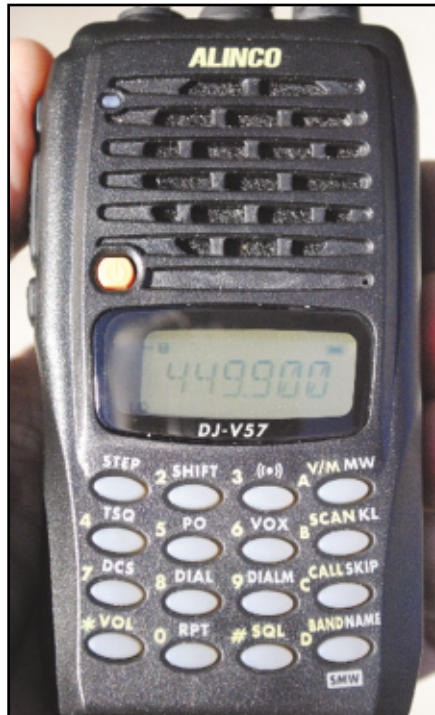
Need repair on one of these low-cost handhelds? The seller may simply swap it (assuming you've bought it from a known, reputable dealer). Is it too time-consuming to program by hand? Yes, indeed, so best get the software, or work with a local who can clone some local channels. If you're looking for a single-band or two-band HT, you can program in the field. This may become paramount in your buying decision when selecting Made in Japan or Made in China.

## Two Bands and Dual Bands

Two meters and 70 centimeters are the two most popular ham bands in the world. The 2-meter band is a great place for the new operator to get started, and become familiar with his/her local club's repeater. The 440-MHz band (70 cm) is the most popular spot for EchoLink and IRLP repeaters. These repeaters may link into the internet, and a short "hello" with your callsign on the WIN System ([www.winsystem.org](http://www.winsystem.org)) may tie you in simultaneously to 30 or 40 repeaters throughout the country and a few others around the world! The WIN system welcomes newcomers to try out IRLP. If you get hooked, and become a WIN regular, we hope you will contribute to the WIN System regular-user membership.

**TIP:** A handheld rated as *dual band* in this HT survey incorporates two running receivers with two or more display read-outs. This allows for crossband full-duplex when working satellites, or cross-banding with an associated mobile unit. The true dualband HT may also include simultaneous monitoring of two separate channels within the same band (V/V, U/U).

A *two-band* HT can only receive one active band at a time. This is a great way to go if you're working a public-service event and don't need to worry about which band just asked for you by callsign! Scanning two separate bands squelched is two-band operation, *not* dual band.



New from Alinco is the two-band DJ-V57T, putting out 5 watts on both 2 meters and 70 centimeters.

Alphabetically, here is the latest from the manufacturers:

**ALINCO** continues to maintain stock of the credit-card-size, half-watt handheld, the DJ-C17. It even includes the FM music band, and ships with a 3.7-volt lithium ion battery. With 200 memory channels, this 4-ouncer is shirt-pocket ready!

The Alinco DJ-V57T is new to the company's two-band product line and boasts a large, 40-mm internal speaker for crisp, clean, and loud audio. It has 5 watts of power output, with 200 alphanumeric memory channels. Like many of the Alinco "V" series models, the new DJ-V57T two-bander is submersible for 30 minutes and offers separate encode and decode "split" for special repeater tone requirements. It also features an internal VOX (voice-operated switching), which works well with the accessory headset. It is priced about the same as the Alinco single-banders, so I bet this will be a hot seller for under \$140.

Alinco continues to announce its plans for the DJ-G29T two-band transceiver with unique frequencies of 222 and 900 MHz. While there are several 222-MHz FM handhelds from other manufacturers, this may become a "cult" item for its added 902–928 MHz FM operation. It is sized much like Alinco's current G7 tribander, and



The Baofeng UV-3R is one of many Chinese newcomers to the U.S. ham market. This rig covers 2 meters and 70 centimeters and sells for less than \$100.

Alinco tells me it has 5 watts output on 222 MHz and 2.5 watts on 902 MHz. It will ship with a lithium-ion battery and 100 channels of memory for your favorite repeaters.

**TIP:** Much-taller, flexible *accessory antennas* may help boost range and reduce repeater drop-outs. These flexible whips have a little rubber stopper at the tip end of the whip for eye protection. *Never, ever* use one of these thin whips without the eye protecting rubber tip in place!

**BAOFENG.** This company has the UV3R Mark II to offer, two bands plus the FM music band, 100 channels of memory, and shipped with a 1500-mAh lithium-ion battery with amazing prices seen from \$60 to \$75! It provides 2 watts power output and is small. Best get it computer-loaded with your local repeater channels and buy it from a source where you can be assured of spectral and harmonic rules compliance.

**ICOM.** The ICOM America T-70A is a two-band transceiver with 300+ memories that may also take alphanumeric. The audio out of this compact transceiver is over 700 mW, thanks to a bridge-tied load amplifier to greatly boost HT audio intelligibility when worn on your belt. (This unique amplifier circuit is found in several ICOM HTs.)

It ships with a nickel-metal-hydrate battery and can take an optional lithium-ion battery as well as run on an optional AA alkaline battery case for emergency responders. This radio also contains its own built in VOX function to be used with a headset.

**TIP:** *Handheld headsets* are great for the EOC room and evacuation shelter. You will never miss a call and you can speak quietly into the boom mic. Only *you* hear the incoming audio. However, most of the microphone elements on the inexpensive headsets are overly sensitive, and most are *non-noise* canceling when you are working in a noisy environment. Also, some handheld transceivers now have built in VOX, and the super-sensitive headset may lock up on transmit in a crowd and you won't even know it. Do not use an overly sensitive mic headset in a crowd without first checking audio transmit clarity with net control.

The IC-80AD is both a digital D-STAR-ready transceiver and a conventional FM handheld. It is also a scanner and shortwave receiver! 1052 memory channels will recall any great frequencies you may hear from the bottom of the AM broadcast band all the way through 999 MHz (cellular blocked). The shortwave is AM-only but sensitive enough to pick up time signals and some double-sideband commercial shortwave broadcasts. The optional GPS receive/speaker microphone simply plugs in, and the 80AD will point toward the direction of a received D-STAR station. It has plenty of accessories and is sized small enough that in the conventional FM mode you're not packing extra weight, even though digital D-STAR capabilities are built-in!

The IC-92AD is the big brother, offering full-duplex dual-band capabilities for working the FM satellites. This unit can also simultaneously receive two frequencies within the same band. Add the optional GPS microphone, and you'll never lose track of other D-STAR systems in your area. You can take it swimming, too; it's submersible! The -92 is ICOM's most elaborate true dual-band transceiver with full built in D-STAR functions.

**KENWOOD.** The Kenwood TH-D72A, with its built in GPS receiver, is instantly on the air with the Automatic Packet



The IC-92AD is ICOM's top-of-the-line dual-band HT, with full-duplex capability for operating FM satellites, and D-STAR capability built in. You can also get an optional GPS microphone.

## TWO BAND

Mfr	Model	Alinco DJ-C7T	Alinco DJ-V57	Alinco DJ-G29	Baofeng UV3R II	ICOM IC-T70A	ICOM IC-80AD	ICOM IC-92AD	Kenwood TH-D72	TYT UVF1A	Wouxun UV-3D	Yaesu FT-60R	Yaesu VX-3R	Yaesu VX-8GR
Bands		2m/70cm 78-174 380-511	2m/70cm 136-174 400-511	222/902 216-249 902-928	2m/70cm 87-108 136-174 400-470	2m/70cm 136-174 400-479 420-470	2m/70cm 0.5-999 — 420-470	2m /70cm 0.9-999 — —	2m /70cm 118-174 320-524 —	2m/70cm 70-108 136-174 —	2 m/70cm 76-108 136-174	2m/70cm 108-512 700-999	2m/70cm 0.5-999 —	2m/70cm 108-199 420-470
	Air		No	No	No	No	Yes	—	—	—	No	Yes	Yes	Yes
	Memories	200	200	100	100	392	1052	1304	1000	128	128	1000	1286	1300
	Alpha	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Dual RX	No	No	Yes	Sort of	No	No	Yes	Yes	Sort of	Sort of	No	No	Yes
	Auto Repeater	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Illumi. Keypad	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	Clone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Digital	—	—	—	—	—	Yes	Yes	Yes	Yes	Yes	—	—	APRS/GPS
	Ant. Connector	SMA	SMA	SMA	SMA	SMA	SMA	SMA	SMA	R SMA	R SMA	SMA	SMA	SMA
Power Levels		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	DCS	No	Yes	TBA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		0.3 W	5.0 W	5/3 W	2 W	5.0 W	5.0 W	5.0 W	5.0 W	5.0 W	5.0 W	5.0 W	3.0 W	5.0 W
	Audio	0.2 W	0.5 W	0.6 W	0.3 W	0.7 W	0.6 W	0.7 W	0.7 W	0.6 W	0.9 W	0.6 W	0.4 W	0.3 W
	Battery Type	NIMH	Li-Ion	Li-Ion	Li-Ion	NIMH	Li-Ion	Li-Ion	Li-Ion	Li-Ion	Li-Ion	NIMH	Li-Ion	Li-Ion
	Cost	\$149	\$139	\$TBA	\$70	\$239	\$350	\$579	\$459	\$99	\$119	\$149	\$189	\$349
	Weight	3.2 oz	12 oz	14 oz	6 oz	13 oz	10 oz	11 oz	13 oz	9 oz	9 oz	13 oz	4.6 oz	9 oz
	Water	Wea	Wea	Wea	Wea	Wea	Water	Sub	Wea	Wea	Wea	Wea	Wea	Water

Note: In the H<sub>2</sub>O specifications, Sub = Submersible and Wea = Waterproof. Water = Waterproof. Price listings are based on advertised prices as of press time and are subject to change. Please check with your dealer for updates pricing information. Water = Waterproof. RSMA = Reverse SMA.



Reporting System (APRS). The Terminal Node Controller (TNC) uses the AX.25 protocol, providing full access to APRS mapping and position tracking on a laptop. Up to five targets can be tracked in real time. Tune in



Kenwood's TH-D72 has GPS and APRS capabilities built in. It can also control a TS-2000 HF rig using Kenwood's Sky Command system.



Another new entry from China, the TYT TH-UVF1A packs two bands into a tiny footprint (handprint?) with a tiny pricetag to boot.

144.390, and as soon as it detects an APRS data burst you will see all the details of the reporting station on the high-visibility LCD screen, including how fast it is moving, how far away it is, and, if it's a weather squawker, wind and temperature data as well. The D-72 simply plugs into the AVMap GPS navigation system and is a fun way to go mapping fox-hunting. The D72 will also control the Kenwood TS-2000 as an HF remote base using the Kenwood Sky Command feature. In addition, it is the only handheld that has a standard USB jack on the radio.

The D-72 offers true dual-band operation, with two in-band receive capabilities, and is shipped with an 1800-mAh lithium-ion battery and the USB cable if you plan to tie it to your computer or iPad™.

**TYT.** The tiny Chinese TYT TH-UV F1A two-band transceiver ships with a 1500-mAh lithium-ion battery pack, 128 memory channels, and a healthy 700 mW of audio output.

**WOXUN.** The most recognized two-band Chinese handheld is manufactured by Wouxun, model UV3 XX. the double x's standing for a myriad of models sold by various outlets in the USA.



Also joining the U.S. ham market from China is Wouxun KG-UV3D, one of several two-band models from this manufacturer. The KG-UV3D has FCC Part 90 certification.

**TIP:** If you are outfitting your communications team with the new breed of low-cost Chinese handhelds, make sure they get programmed before they get put into the field. This includes memorizing the channels your team will most likely be using, establishing a second bank of popular channels for good net training, locking out out-of-band transmit, turning off VOX, and disabling (for good) scramblers.

For about \$119 you get a two-band transceiver with VHF and UHF capabilities, plus, like the TYT, the Wouxun also allows for FM music reception from 76–108 MHz. The Wouxun ships with a 1700-mAh lithium-ion battery and the associated battery-charger cup. It comes in Part 90 compliant. Local dealers bring in the Wouxun peaked for dual-band ham radio use, plus they might also arrange for local clubs to acquire these in quantity, preprogrammed for the local open repeaters.

Remember, many of the incoming Chinese radios take a land mobile radio reverse SMA, so keep this in mind if you plan to run an external antenna on your vehicle.

**TIP: Break the Fall.** Many of us have done it—juggling a clipboard and a handheld, when the HT slides off and heads for the pavement below. Stick out your foot to break the fall of the radio and it may survive. Letting a handheld slam into the pavement, nose first, likely will break off the channel selector and/or the concentric volume/squelch knob in an instant. Try to have sturdy shoes when this happens, as your toes are also breakable!

**YAESU** continues with the FT-60R and its very small VX-3R. The 60R is a two-band handheld, professionally sized, with 1000-plus memories with alphanumerics. Not many handhelds tune in to the AM aircraft band, but this Yaesu does! The FT-60R is also easy to hand-program, its offsets are automatic, and the tone-code changing is done effortlessly. It then memorizes channels automatically to an open memory spot.

**TIP: Alphas or Frequency?** We need to know which frequency we are working. In an emergency, the communications IC (Incident Commander) may ask you to switch to 146.520, the national simplex channel. Can you get to it quickly? If your radio simply states "NAT SIM," do you know that is 146.520 MHz? Don't rely on alphanumerics if you don't know the associated frequency, or can get to the frequency with just a single button push.



Yaesu's new VX-8GR (not to be confused with the VX-8DR) is a dual-bander with built-in GPS, plus 1300 memory channels.

The shirt-pocket-size Yaesu VX-3R remains popular because of its ability to transmit and receive on two bands, with nearly unlimited wide-band AM and FM reception from 500 kHz to 999 MHz. A super-thin 1000-mAh lithium-ion battery can run this radio for more than a day.

New from Yaesu is its line of APRS-ready radios, with the new dual-band,

full-duplex VX-8GR featuring a built-in GPS receiver and antenna system.

Don't get confused: The VX-8GR is new, remembering the letter "G" for built-in GPS. The Yaesu VX-8DR, with four-band capability, needs the optional GPS antenna or optional GPS speaker-microphone to work APRS. The brand new 8GR, builds in everything for APRS. It also includes wide-band receive from 108-999 MHz, including wide band FM for music, AM for aeronautical and military, and FM with cellular blocked. The VX-8GR offers 1300 (!) memory channels, lithium-ion battery pack, nice loud audio output, and that fabulous LCD display which shows which APRS station is squawking on 144.390, bearing and distance to that station, and a simple way of listing all the parameters of that station, including speed, direction, and, for weather stations, everything except the nautical almanac!

The GPS receiver is so sensitive that there is no problem with wearing it on your belt.

**TIP:** On the Kenwood, Yaesu, and ICOM portables that incorporate GPS, a menu item lets you turn off the GPS receiver when not actively using APRS. This will conserve battery power. When you are conducting a local event, such as working with a team of APRS-equipped operators covering a parade downtown, we suggest picking a non-voice UHF (not VHF) frequency so you don't tie up a local I-Gate with local city block radio traffic.

It is likely that 2012 will see an influx of more small two-band transceivers from China. None of these units is likely to have many of the step-up features that we have just reviewed. However,

what is coming in from China should not be considered inferior in design. Explore carefully the China connection, validate your supplier, and if you plan to do the programming yourself for family and friends, or as a business, make sure you lock out full-band transmit.

## Tri-Band

ALINCO offers the DJ-G7T tri-band handheld transceiver with full-duplex dual-band capability. The tri-band receiver covers 2 meters, 440 MHz, and the 1.2-GHz FM bands. It also tunes continuously from the bottom of the AM broadcast band through 1300 MHz. This full-spectrum tuning offers AM and FM reception but not single sideband.



Alinco's DJ-G7T covers 2 meters, 70 centimeters and 23 centimeters (1.2 GHz), plus a wide-band receiver ranging from the AM broadcast band through 1300 MHz (AM/FM only).

	Tri-Band			Quad Band		Digital			
Mfrgr	Alinco	Kenwood	Yaesu	Yaesu	Yaesu	ICOM	ICOM	ICOM	ICOM
Model	DJ-G7T	TH-F6A	VX-6R	VX-7RB	VX-8DR	IC-V82D	IC-80AD	IC-92AD	ID-31
Bands	2m/70cm/1.2 GHz	2m/1.2m/70cm	2m/1.2m/70cm	6m/2m/1.2m/70 cm	6m/2m/1.2m/70cm	2m	2m/70cm	2m/70cm	70 cm
RX	0.5 - 1300	0.1-1300 +SSB	0.5 -999	0.5 - 999	0.5 - 999	138 -174	0.5 - 999	0.5 - 999	420 -470
Air	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Memories	1000	435	900	900	1003	200	1052	1304	SD card
Alpha	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual RX	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Auto Repeater	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Illuminated Keypad	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Clone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital	—	—	—	—	APRS, Opt GPS	Opt D-STAR	D-STAR, Opt GPS	D-STAR, Opt GPS	D-STAR, GPS
Antenna Connector	SMA	SMA	SMA	SMA	SMA	BNC	SMA	SMA	SMA
12 VDC	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
DCS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Levels	5/5/1 W	5 All	5/1.5/5W	5/5/0.3/5W	5/5/0.5/5 W	7 W	5 W	5 W	5 W
Audio	0.5 W	0.5 W	0.6W	0.5W	0.6 W	0.7 W	0.7 W	0.7 W	0.7 W
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion	Li-Ion	Ni-Cd	Li-Ion	Li-Ion	Li-Ion
Cost	\$279	\$304	\$259	\$349	\$399	\$350	\$434	\$529	TBA
Weight	9 oz	8.8 oz	9.5 oz	9.2 oz	8.5 oz	14 oz	9 oz	9 oz	9 oz
H2O	Wea	Wea	Sub	Sub	Sub	Wea	Wea	Sub	Sub

\*Note: In the H<sub>2</sub>O specifications, Sub = Submersible and Wea = Weatherproof.

Price listings are based on advertised prices as of press time and are subject to change. Please check with your dealer for updates pricing information.



The keypad is backlit, and the unit may hold 1000 channels, displaying your choice of frequency or alphanumeric. Power output is the customary 5 watts on 2 meters, 4 1/2 watts on the 440 band, and 1 watt up at 1.2 GHz. The DJ-G7 ships with a 1200-mAh lithium-ion battery, and the associated battery cup for a quick charge.

It is a great performer to run full duplex on an FM easy satellite. The built-in duplexer does a nice job of avoiding desensitizing during the other band's transmit. We used the G7 at the ham radio booth at our local county fair, and it worked satellites quite nicely.

**TIP: External Power.** Use only the manufacturer-recommended DC power cord when operating your handheld from a 12-volt power source. The brand-name accessory cords usually incorporate a series alternator filter to minimize alternator whine on transmit. Some power cords also step down 12 volts to a lower voltage required for DC operation. Using an aftermarket DC plug that just happens to fit could instantly toast your new investment. Stick with the brand name recommended for your specific handheld.

**KENWOOD** continues with its popular tri-band TH-F6A. It covers the 2-meter band, the 222-MHz band, and the 440-MHz band for transceive. Plus, it offers multimode reception from 100 kHz to 1300 MHz! That's right, the little Kenwood can act as a dandy high-frequency SSB/CW receiver when you are out mobile and just want to check the bands.

The high-frequency SSB receive side of this radio does better on a small



The popular Kenwood TH-F6A covers the 222-MHz band as well as 2 meters and 70 centimeters, with broadband receive (including CW/SSB) from 100 kHz to 1300 MHz.

antenna than trying to hook it up to your home antenna, which can cause significant overload.

The Kenwood F-6 is full duplex, and it's a great unit to work the FM satellites where you can actually hear your own downlink signal. A really good headset is available for the satellite setup, and with it you won't get feedback. You can set up and memorize the satellite channels to compensate for Doppler shift, with over 400 channels open for memorizing favorite frequencies. For its small size, the supplied 2000-mAh lithium battery pack will keep this rig running for days!

The F-6 has 5 watts output on all three bands, including the 222-MHz band. The receiver is all-mode, including AM, FM, NFM, SSB, and CW. For AM broadcast radio reception, the Kenwood F-6 includes a built-in ferrite bar antenna.

**TIP: Lithium-ion Reigns.** Although a lithium-ion battery pack requires its own special charging, it offers nearly double battery capacity than older-chemistry nickel cadmium and nickel metal hydride. You must charge your lithium ion battery *only* with the recommended handheld transceiver's charging cable.

The tri-bander from **YAESU** is called the VX-6R, and it includes the 2-meter band, 1.5 watts of power on 222 MHz, and 5 watts on the 440 band. You can even add the optional barometric-pressure sensor to make sure you don't get caught out in the open when a low-pressure system blows in. The VX-6R holds 900 frequencies with alphanumeric capability, is completely submersible for the emergency responder, and ships with a 1500-mAh lithium-ion battery pack. It will tune in shortwave from the bottom of the AM broadcast band through 1000 MHz, double sideband AM and FM.

## Quad Band

**YAESU** continues with its VX-7RB submersible quad-band transceiver with 5 watts out on 6 meters FM, 2 meters, and 440 MHz, and about a quarter watt out on the 222-MHz band. This quad-bander also offers full AM shortwave receive from 500 kHz to 1000 MHz, holding over 900 memory channels. It is fully submersible, if you plan to take it swimming. By the way, the VHF marine band is pre-programmed for receive, as well as pre-programmed for weather channels and 89 shortwave broadcast channels. It's one amazing little radio!

Another quad-bander from Yaesu is the VX-8DR portable APRS-capable



Yaesu has the only quad-band HTs on the market today, the VX-7R and the VX-8DR (pictured). Both cover 6 and 2 meters, plus 222 and 440 MHz. The VX-8DR has a built-in TNC for APRS, and an optional GPS receiver is available.

transceiver, working on 6 meters, 2 meters, 222 MHz (1 1/2 watts out), and 440 MHz. The wideband receiver covers from the AM broadcast band through 999 MHz with 1200 memory channels! The VX-8DR has a built-in terminal node controller, so it is ready for you to purchase the GPS receiver antenna, or the GPS receiver antenna tied in to the plug-in external microphone. Full dual-band monitoring, including same-band-receive on both sides of the radio, is included.

This equipment features smart beaconing for APRS operation, 50 APRS station list memories, and 30 message memories. You can add the GPS function when you upgrade the equipment with a GPS antenna receiver system. The radio is well-proven in the field and is a favorite among emergency volunteer responders, because the GPS antenna receiver unit on an external mic can be placed up high on your shoulder for best GPS capture.

## Digital

**ICOM America** is the star when it comes to *Digital Smart Technologies for Amateur Radio*, better known as D-STAR. The digital signaling D-STAR is not proprietary to ICOM, but only ICOM has pioneered this technology to access the internet from a ham radio. With D-STAR you can communicate with another ham in another city, coun-



ty, or state with a direct call-up to his/her radio. You can text-message, know the callsign of the station calling you, and operate through gateways allowing the linking of D-STAR repeater sites over the internet. You can even work it in a foreign country.

Keyboard-to-keyboard text messaging plus GPS asset tracking can take place with D-RATS software.

**TIP:** Get started with digital D-STAR operation with a local D-STAR user. You can try it on your own, but local D-STAR users can help you avoid pitfalls. "Beaconing your position every minute through your local D-STAR repeater will very soon make you highly UNpopular with system users," comments Brian Roode, NJ6N, an active D-STAR "Elmer." "We recommend only sending your position report automatically along with your normal voice transmission," adds NJ6N.

For fun D-STAR voice net operation, I suggest that new D-STAR operators connect to Reflector 1, Module C, or Reflector 14, Module C. You can even monitor D-STAR activity without a radio! (See: <<http://www.wx4adx.com>> and <[www.radioreference.com/apps/audio/?feedId=9968](http://www.radioreference.com/apps/audio/?feedId=9968)>.) You can also e-mail Tim Barrett, K6BIV, at <[k6biv@mac.com](mailto:k6biv@mac.com)> for some quick D-STAR questions.



ICOM owns the D-STAR digital market in the U.S. and its newest entry is the single-band (2 meters) ID-31, which features built-in GPS and the ability to auto-load nearby D-STAR repeaters based on your location.

ICOM America offers four D-STAR handhelds, plus mobiles, base stations, and repeaters. The handhelds include the IC-V82, IC-80AD, IC-92AD, and, brand new, the ID-31. All operate traditional FM as well as D-STAR.

The V82 is a good utility D-STAR radio. It is perfect for mobilization where D-STAR is used simplex or on local repeaters.

The 80AD is more advanced and has an entry-level GPS/mic user interface with simple numerical latitude and longitude readouts.

The 92AD is the most advanced D-STAR handheld transceiver with the GPS/mic user interface, including a compass rose indication that can show direction and distance to a received transmission.

Each of these radios can show an alpha or frequency display, with the "92AD" including *both* alpha and frequency display!



The IC-80AD two-band transceiver operates D-STAR and conventional FM (like all of ICOM's other D-STAR radios). With the optional GPS mic installed, the display will point in the direction from which a D-STAR signal is arriving.

Brand new is the ICOM ID-31, UHF (only) 5-watt D-STAR transceiver with GPS *built in*. (See details under single-banders.)

Both ICOM America and ICOM Japan have been most generous in working with organizations expanding the D-STAR repeater network into the internet.

## In Closing

If you are new to ham radio, find a local club and see which radios its members are supporting. Does the club do cloning and programming before its meetings? Local amateur clubs are often associated around a specific repeater, so join in and, most importantly, support both the club and the repeater with a modest membership contribution. This will help make that new handheld an important investment in case of an emergency.

Use that handheld radio regularly. Can you work it in the dark? When an emergency hits, you'll need to find that handheld and come up quickly and automatically on your local repeater or simplex frequency. Support your local net with regular weekly check-ins. This makes you a "regular," someone to be counted on when an emergency really exists.

**TIP:** When operating your handheld in a vehicle, use an external magnetic antenna, and pick up 12 volts to conserve the HT battery. Next, switch to low or medium power—*never* high power. High power causes the HT to get hot, and if you are mobile using an external microphone, you could actually toast your favorite seat cover!

And finally, get your handheld from a reputable dealer who will back up the sale with service. The little HTs don't normally break, but if you need one fixed or replaced, you want that dealer to be there for you and your handheld!

## For more information:

To learn more about any of these radios, visit your favorite ham dealer or the following manufacturer websites:

Alinco: <[www.alinco.com/usa.html](http://www.alinco.com/usa.html)>

Baofeng: <<http://powerphone.com.cn/indexn.asp>>

USA: <[www.hawaiiiradiosales.com](http://www.hawaiiiradiosales.com)>

ICOM America: <[www.icomamerica.com](http://www.icomamerica.com)>

Kenwood: <[www.kenwoodusa.com](http://www.kenwoodusa.com)>

TYT: <[www.tyt.us](http://www.tyt.us)>

Wouxun: <[www.wouxun.com](http://www.wouxun.com)>

USA: <[www.powerwerx.com](http://www.powerwerx.com)>, <<http://www.wouxun.us>>

Yaesu: <[www.yaesu.com](http://www.yaesu.com)>