Gordo unveils a full-featured, two-band HT which offers everything from weather channel alerts to a built-in fluxgate compass, 100 channels of memory, AO-27 satellite capabilities, and some other undocumented features that emergency communicators will love...

CQ Reviews:

The RadioShack HTX-420 2 meter/440 MHz Handheld

BY GORDON WEST,* WB6NOA

Thousands of amateur radio operators have discovered ham radio and found the resources for earning their licenses at their local RadioShack store. I am told that 95 percent of our country's population lives within five minutes of a RadioShack. It is no wonder their amateur radio products and training materials have attracted to our hobby many newcomers who maybe were just stopping in for parts and shortwave sets or scanners.

Many new ham operators first made it on the airwaves with the entry-level, 2 meter HTX-202 handheld. RadioShack has brought in new models of HTs, but its latest two-band, "big radio" handheld, the HTX-420, really caught me by surprise. It was uncomplicated, with *all* of the big-league features, including some discovered capabilities (not in the manual) that will certainly appeal to hams involved in emergency communications.

In the Box

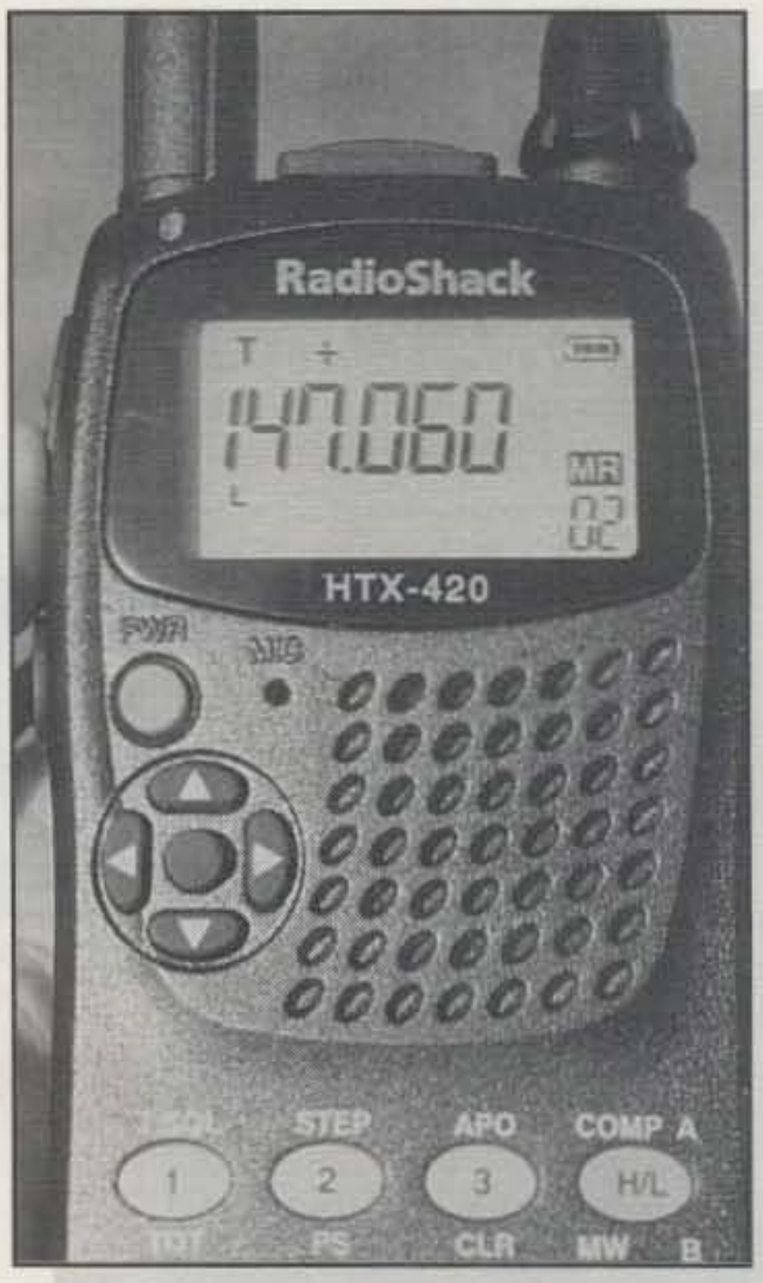
For $269.99 plus your local sales tax, you get the following in the HTX-420 package:

- 2 meter/440 MHz, 5 watt capable handheld
- 7.2 volt, 1200 mAh lithium-ion battery with wall charger
- AA 4-cell battery holder
- 2 meter/440 MHz SMA rubber-duck antenna
- Belt clip and lanyard
- Intelligently written, 48-page instruction manual

"We designed this radio with the beginner as well as the well-seasoned amateur radio operator enthusiast in mind," comments RadioShack buyer Wayne Wilson, WR5S. Wayne is active in amateur radio and product design, all the way back to the early Heathkit days. "We designed this radio after our ham radio engineers worked with over 15 *other* amateur radio products, and no one can say that this radio is just a 'beginner model,' " adds Wilson.

Nope, definitely not a beginner two-band handheld!

- 100 erase-safe memory channels
- CTCSS encode/decode *easily set* (no complicated menus to fret over)
- Pre-programmed weather channels plus S.A.M.E. weather alert (more on this later)
- Dual-conversion intermod-free receiver
- Full-size feel, major-size LCD frequency readout (of course, back-lit keys and readout at night)
- 16-key DTMF with six autopatch speed -dial locations, *easily set*
- Lithium-ion battery pack with dry-cell holder included (or plug into your mobile 12 volt source and pump up the power output)
- Built-in fluxgate compass (in case you get lost)
- Speaker-mic common jack (other than a Kenwood mic)
- Scanning options (way too many for me to figure out right now)
- Packet radio hook-up diagram



The big LCD readout on the RadioShack HTX-420 shows that the radio is tuned to 147.060 MHz, using tone and a positive shift, on low power, in memory position 2, and that the battery is in good shape. (Photos by the author)

- Power save
- Loud audio (that you can hear on your belt)
- Timeout timer and automatic power off (so you don't go hoarse)
- Crossband for working the FM "easySATs"

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The HTX-420 comes standard with a 7.2 volt, 1200 mAh lithium ion battery pack (with wall charger), plus a holder for four AA batteries of your choice. Using an optional power cord, you may also plug into a 12 volt DC supply.

Satellite Operating with the HTX-420

Working the FM satellites was no problem with this two-band radio. You can select a transmit frequency in the VHF band and a receive frequency in UHF, or vice versa. When you press the "XBO," the main frequency is duplicated at the sub-frequency display. "XB" appears to the right of the main frequency display. I then entered the transmit frequency on the main frequency display. I can push the reverse key to exchange the main frequency display and the sub-frequency display. Pressing the push-to-talk button on the side of the new RadioShack transceiver cycles to the other band for transmit. Here is how I loaded crossband FM satellite frequencies:

AO27	UO14
436.805 RX, 145.850 TX	435.080 RX, 145.975 TX
436.800 RX, 145.850 TX	435.075 RX, 145.975 TX
436.795 RX, 145.850 TX	435.070 RX, 145.975 TX
436.790 RX, 145.850 TX	435.065 RX, 145.975 TX
436.785 RX, 145.855 TX	435.060 RX, 145.980 TX

Now you have the five channels plus five more channels for each FM satellite. Your crossband transmit remains relatively set, but as the satellite approaches and then descends into loss of signal, you simply rotate the top knob on the RadioShack HT to optimize the receive frequency, which may shift as much as a total of 15 kHz because of Doppler shift. Not having simultaneous receive in the crossband mode won't slow you down a bit when working the FM easySATs. In fact, on other handhelds with simultaneous receive of the other band, I usually turn it down all the way so I don't get feedback if I'm not using a separate earphone.

- Airband reception, AM mode
- Out-of-band VHF reception, plus MARS and Coast Guard Auxiliary keypad TX mods
- UHF out-of-band reception, including FRS, GMRS, public safety, and air/wind profiler
- Emergency-only *full* UHF operation
- "T" band public-safety reception

Almost Everything

Before I get started with some interesting discoveries on the new he-man RadioShack HT, let me point out some obvious things that a $270 handie would not include.

The first thing is what you might not expect when you look at the outside box containing the equipment: While it shows *both* 2 meters and 440 MHz in the window, it receives *either* band but *not* both at once. The dual-band display indicates one band for receive and the other band for transmit. This would allow you to set FM satellite uplink and downlink frequencies to compensate for ascending, overhead, and descending passes (see "Satellite Operating with the HTX-420"). The only thing you would not get would be *simultaneous* reception of your own uplink signal—no big deal with the FM easySATs.

You don't get the optional speaker microphone or DC power cord. The DC power cord is a whopping couple of bucks. For the speaker mic, several I had from other pieces of equipment, other than Kenwood, worked well in the twin-hole socket.

Boaters, you won't get emergency marine VHF boat-to-Coast-Guard transmit. On the VHF side, out-of-band transmit starts at 142 and ends at 149.8. On UHF, the out-of-band transmit keystroke modification unbelievably goes wide open from 420 MHz to 470 MHz! ***Warning:*** *If you are caught using this equipment transmitting on any frequency outside of the amateur radio band (other than MARS or Coast Guard personnel), even running low power on Family Radio Service and GMRS frequencies, you would be in violation of the rules that prescribe* ***only*** *type-approved radio transmitters in this region.* Keep this in mind when you find the two-key TX unlock steps for this very wide-open-capable handheld with an unbelievably sensitive receiver at bandedge extremes.

There were no automatic repeater splits, and no documentation about cloning or computer control. I have been told that cloning and computer-control data requirements are in the technical specs of the equipment, but it probably will be organizations such as RT Systems that will figure out how to clone and how to computer-enter all of those 100 channels. The software protocol and construction for a PC interface cable is available in the 19-1108 service manual. You can order a service manual through your local RadioShack store. Hopefully, the unit will clone from one HT to another, but this equipment is so new even the factory does not know if this is possible without the use of a computer.

Finally, no alphanumerics. Therefore, with 100 possible channels of memory, keep a black book on all of those channels previously stored.

And How It Operates!

With most RadioShack handhelds you need to really scour the instruction manual for subtle things such as setting CTCSS encode and decode. This radio is different: Pressing the left

Setting CTCSS tones on the HTX-420 is easy, and the display lets you know if you are setting a transmit (TX) or receive (RX) tone.

A belt clip and lanyard strap are standard with the HTX-420. Be careful not to lose the two tiny screws for the belt clip. They are not *packed in a separate plastic bag.*

or right arrow "bull's eye" lets you step through repeater offsets, receive CTCSS tone, transmit CTCSS tone, DTMF slots, weather warning settings, and finally, a simple automatic squelch adjustment. The up/down arrows select the individual parameters of each of these functions.

I was delighted to see a straight-forward approach to calling out CTCSS functions. With *other* handhelds a statement such as "repeater tone" doesn't give much clue as to whether or not this is Transmit CTCSS or Receive CTCSS. With this unit they simply say "TX" and "RX." Good for RadioShack!

The bull's-eye center button toggles among AM airband reception, preset weather-channel reception, 2 meter band, 70 cm band, and back to airband.

When you get to the weather channels, this new RadioShack handheld follows a convention that I have seen in some new FRS weather-channel receive circuits: Instead of weather channel 1 being 162.550 MHz, WX-1 is the lowest weather-channel frequency of 162.400, and WX-7 is the highest weather-channel frequency, 162.550. This differs from what the National Weather Service calls its weather channels 1, 2, and 3. No big deal. This little RadioShack handheld also offers Specific Area Message Encoding weather alert, and this SAME code identifies a specific geographic area so your handheld will sound an alert only when a weather emergency is declared in your own area. You can look up your six-digit SAME code at <http://www.nws.noaa.gov/nwr/indexnw.htm>. I see this as a handy feature, particularly for SkyWarn operators in the Midwest and elsewhere.

A function key on the right side of the radio allows you to bring up secondary keyboard functions. These sub-functions give you the works, from power save to keyboard beep, automatic power off to keyboard lock, and all sorts of relatively fast memory and frequency scan and search functions.

The big LCD display shows a battery-level icon, power level, CTCSS settings, big numbers for the frequency or channel you are on, and a blinking "S" illustrating the power-save mode. With power save ON, the unit goes into the power-save sampling mode after 8 seconds of monitoring a squelched channel. The book says it samples every 8 seconds for activity, but what they really mean is it automatically turns on after 8 seconds of frequency *inactivity*. The sampling rate is extremely fast, so no syllables are lost when someone comes up on channel when in the power-save mode.

What a feel! Take the battery off the radio and it still feels relatively heavy—because it is! No plastic case here! The radio is all die-cast aluminum, and this keeps it almost stone cold during long periods of transmit.

When you first turn on the equipment or rotate or push any one of the dials or keys, backlighting comes up, including the keyboard. Backlighting goes off approximately 5 seconds later. I haven't figured out how to keep backlighting on for continuous illumination, and they probably have no way of doing this in order to prevent accidental battery drain. The top knob changes frequency or memory channels, and at the base of the knob is a concentric volume control. Volume output was judged refreshingly loud at full tilt—another great feature when you wear this equipment on your belt with the supplied belt clip.

Direction Finding

I went hiking with the radio, and after a few electronic compass calibration maneuvers I could sort of get the built-in fluxgate compass to work. A fluxgate is an electronic sensor that is able to detect a magnetic field—in this case, the Earth's magnetic field. You must hold the radio absolutely flat, and it takes the electronic compass a couple of seconds to lock in on which magnetic direction the rubber-duck antenna is pointed. The bearings were relatively accurate, but I suggest you bring along your Boy Scout compass as a back-up!

Final Impressions

During the test I was interrupted and accidentally left the handheld facing straight up into some very hot southern California sunshine. The radio was so warm that I could barely pick it up, yet the huge LCD display did *not* turn black. This is good news; an LCD display that can be seen at all angles is truly a quality LCD panel that can take the harsh environment.

Finally, the receiver is right up there with twice as expensive handhelds when it comes to sensitivity and intermod rejection. I have a big commercial VHF antenna with which I test handhelds, and any handheld that shows me less than two signal-strength units of background hash independent of where I am dialed is considered good rejection for a handheld. With all of its out-of-band capabilities, I was impressed. The HTX-420 is priced at $269.99.

It's certainly a keeper! Congratulations, RadioShack.