

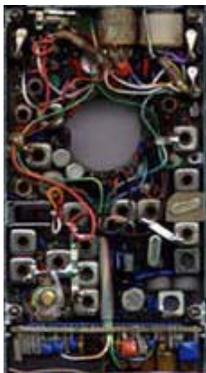
# HT220 PRESERVATION SOCIETY NEWSLETTER

## BACK IN THE 20<sup>TH</sup> CENTURY...



...when only women wore earrings and men walked the surface of the Moon, the Motorola HT-220 was the hottest handheld on the market when it was introduced in 1969. Tougher than a pit bull, this VHF or UHF business band handheld in a was the

envy of ham radio operators for its compact size and performance. It contained a very sensitive and selective receiver, and a transmitter that can deliver up to 5 watts all in a weatherproof housing. It is easily identified with a metal silver center frame with stellar blue hi-impact plastic front and back. Servicing HT220s are convenient as front and back covers can be removed to access component board from both sides.



The HT-220 was the second generation of 2-way FM handheld radio and the successor to Motorola's first business band handheld, the HT-200. Two custom-designed ICs were used in HT-220s which vastly reduced the number of components and the overall size of the radio from the 200 series. The HT-200, introduced in 1962, circuitry was all discrete components; HT-200 is big and scary.

As the years gone by and the HT-220 moved to the pages of history, many of the newer handhelds haven't become smaller or have more transmit power than the HT-220. They have become more sophisticated, and some of the newer radios may have a more selective and sensitive receiver (though many new have taken a downturn in noise rejection and many don't have the same audio performance).



HT220 was used on The History Channel as part of announcements for a program discussing law enforcement as seen on this video clip. They occasionally shown this actor portraying historical police officer during station ID breaks.

*HT-220 is Y2K compliant.*

In the history of the 220, there should be mention of the HT100, since it was a radio which was a 220 less the power amplifier. You hardly see HT-100's anymore -- they're just too exotic, what with the funny button-cell battery pack, the low, low power (100 mW), etc., but they do surface from time to time. Some people think the HT-100 is a nice radio for local plant operations but others considered it cute but impractical.

## HANDIE-TALKIE



"Handie Talkie," or HT, is a trademark name which is to only be used by the "Big ^/\^" and no one else for identifying handhelds. How serious is this? You can be rounded up with the usual group of suspects who misuse words like kneenex, band-aid, and xerox! 📻

"Handie Talkie" was introduced in World War II when Motorola designed a two-way radio small enough to be carried with one hand, as compared to the GI-styled backmounted radios (Army "breakie backies")

## HT-220 PRICES

It has been mentioned current market rates of HT-220s are \$10 per pound (“they make excellent doorstops!”) Typical prices range from \$10 to \$30 for both working and non-working. Cost can be higher if it comes with a charger, battery, and/or antenna. And other factors such as number of channels, PL, special model, etc. It also usually depends on how fast the seller wants to unload it or how much the buyer is determined to get a “police styled” radio as what Kojak used in the 1970s television series. Anything more than \$40 is way too much. \$30 should be considered the top price of an HT220.



Because prices are so depressed for any denomination of the HT220, many of them are simply being tossed out than presented on the used equipment lists by commercial vendors. Hamfests routinely include large boxes of old Motorola portable parts, with the HT-220s at the dirtiest bottom of the pile.

*“How does a radio that sold for big \$\$\$\$ go for so cheap these days?”*

Way back in the days of polyester clothes (the 1970s) the HT-220 price tag was \$600 to \$1400 (that’s 70s dollars). It’s a different world today and with programmable radios, nobody has a use for HT-220s, except for specific hobbyists. Most amateur radio operators carry programmable handhelds. Radios purchased new from Motorola are such that if you have to ask the price, you can’t afford it (exception cellphones and FRS).

An one old Motorola item that has become very difficult to obtain are the books they use to give out for free in the 1970s, the Communications Buyers Guide and the Parts and Data Handbook. Excellent resource for reference for all the great “boatanchors” and “doorstops.”

## HT-220 PRIVATE LINE SQUELCH

You get no privacy from “Private-Line.” This is a trademark by Motorola for their name of the tone-coded squelch feature (CTCSS).

## VISIT THE HT-220 WEBPAGE

<http://www.batnet.com/mfwright/HT220.html>  
or simply enter “HT-220” on google.com

This site has HT220 handheld information including model tables, specifications, frequency conversions, parts and accessories, manual numbers, troubleshooting guide, and more. There are articles by users, technicians, ham radio operators, and engineers that worked on the HT220 program.

*Comments by visitors to the HT220 webpage:*

“THOUSANDS STILL IN USE.”  
 “I never thought the old rig would attract a cult following!”  
 “They hardly ever die! (batteries, of course are a different story)”  
 “I cut my teeth on the HT-200 and went on to the HT-220.”  
 “I remember drooling over the HT220 25 years ago at swap meets.”  
 “I use both VHF and UHF models everyday.”  
 “I’ve taken VHF units up to 220 MHz (a real 220 220).”  
 “I thought I was the only HT-220 nut in the world.”  
 “HT220 is truly an object deserving of such a shrine!”  
 “It was and still is a engineering marvel.”  
 “It is the nicest looking, most purposeful radio ever produced.”  
 “I remember the 70s the envy we felt for the BMOC that had a 220.”  
 “What is that?!?” (from a generation X-er first seeing a HT220)

*Reaction of seeing someone with an HT-220:*

circa 1971: “You must be a police officer or government agent of some sort.”  
 circa 2001: “Wow! That’s a big cellphone!”

## HT-220 TRUE TALES

*by Linda Olmstead, CHP dispatcher*  
<http://www.gryeyes.com>

Officer gets into a foot pursuit of a residential burglar, through this yard, down that alley, over this fence. One of the fences over which he clambered was a chain-link fence and as he fell over the other side, he lost his weapon.... but didn’t know it. He continues to chase the bad guy and they’re both pretty winded. Guy turns around with a knife in his hand, officer reaches for his gun... he’s managed to keep his HT220 in his hand screaming his locations to dispatch and he’s shocked that he has no gun. He pitches the HT into the bad guy’s face, and it smacks right into the guy’s jaw. Bad guy drops his knife!

A local radio vendor kept a database of all the HTs sold to which agencies, and whenever a citizen showed up wanting batteries for one, he’d check the serial numbers. Managed to recover two HTs for the departments that way.

## HT220: A DREAM COME TRUE

Contributed by Jerry Zacker, *Design Engineer for Motorola (ret.)*  
by Eugene Kopczynski, *originally published in Voice of Motorola, August 15, 1969.*



(seated L to R) Dave Michalak, Bill Cole and Len Bennett. (standing) Joe Bartelme, Dick Lunquist, Tony Tutins, Larry Fiery, Jerry Zacker, Bill Jeffrey, Randall West, Ed Clark, Lyn Peterson and Ed Doyle. (an HT220 is centered in front of Bill Cole).

Once again Motorola engineers have proven the impossible can be done! They've built a two-way radio the size of a pack of cigarettes and called it the HT-100 model "Handie-Talkie" two-way radio. They've also cut down the HT-200 "Handie-Talkie" two-way radio to one-half its predecessor's size.

This duo "dream come true" is the pride and joy of the Motorolans on the Portable Products team and Marty Cooper, director of product operations. The dream first began to take shape back in 1967 when Dave Michalak, manager of "Handie-Talkie" marketing, suggested that such a unit would substantially enhance our position in the market place. Thanks to the progress in integrated circuits, smaller resistors, transistors and circuit boards, etc., it was decided that there was a chance Motorola's engineering department could come up with a "Handie-Talkie" 2-way radio half the size, or less, than the portable two-way radios then being built.

Marty Cooper himself was sure that it could be done, and the project was undertaken. He assigned Bill Cole, manager of "Handie Talkie" products engineering, and his staff, to go to work on this project and selected the men needed to work full time on this new line, which would change the entire portable two-way radio market.

Working with Bill Cole on the electrical end of the new unit was Len Bennett, section manager, and eight other top-notch electrical engineers. Next came Dom Errichiello, chief mechanical engineer, and Tom Hutchinson, mechanical engineer, who both worked on the body design of the unit. Responsible to them were many other mechanical

engineers who worked on the housing design and other mechanical parts.

During the many months of putting together the two models, a variety of engineers worked on the project. They handled all different phases needed to make this dream come true. Len Bennett described some of the problems that were faced and how they were overcome. "Perhaps the main problem we faced was designing, the small printed circuit board to hold all the parts needed," he said. "Once we had the board designed we then had the problem of finding a company which would make it for us. The circuit board is not new to the world, but the design of this type of board was a real challenge for our mechanical engineering department, and with it they really proved themselves."

"We also had to develop a new line of transistors to meet our needs. This was done with the help of Motorola engineers at our Phoenix facility. To add to this, a special RF transmitter was designed for the HT220. We also needed to design new batteries for the HT100 and HT220 units."

Concerning the work that went into the housing and case designing, Dom Errichiello and Tom Hutchinson said it took them and their staff many months of effort to design the housings and cases for the new HT units. "Into the designs of the housings and covers went new lightweight zinc alloys and high impact plastics," said Dom. "The use of these high impact plastics and zinc alloys is one of the main reasons the new HTs will be the talk of the communications field. First of these new units was sent to NYPD to test in service. Reaction was so great they immediately ordered 630 of the HT220s followed by 2,200 more of these marvels of the Motorola Communications Division."



Helping to make possible the HT-100 and HT-220 radios were (L to R) Doug Sam, manufacturing engineering; Tom Morris, tooling; Wayne Roethier and Larry Manning, manuf. engineering; Mary Ginter, process engineering; Rodney Boum, manufacturing engineering group leader; Tony Knapp, process engineering; Jerry Huinker, process engineering group leader; and Frank Freyre, tooling.

**HT-220 WANNABE***By Edison Fong, WB6IQN*

Here is an interesting find. Jan found this HT220 on eBay. It looked great in the picture on eBay but when he received it, it was not an HT220 at all. It was only an HT220 case with a Japanese radio inside? Now why would someone do this? Well, it turns out out back in the 1970's the HT220 was a status symbol. After all, the FBI and secret service was using them. This was the radio to have. Some lucky hams were fortunate to have rejected Motorola boards which Spectronics Inc. offered for about \$100. It was pot luck though. Some of the boards could be repaired and others could not. Believe me, I have worked on some of those rejected boards and the problems are endless. The printed circuit board shorts and opens can usually be found quickly but the reverse leads on transistor and wrong component placement are almost impossible to find. Once one got the board working, they would order the case fronts, speaker, push to talk switch, back cover, etc. from Motorola. This ended up costing about another \$100 (in 1970's dollars). So if you were lucky, one could have an HT220 with a brandnew case for about \$200. Evidently, Motorola stopped providing the boards to Spectronics when it was found that some hams were reselling the rejected boards that they repaired back into the commercial market. These after market radios were rumored to sell for about \$800-\$1000.



Well, maybe this guy got frustrated or didn't have access to the Spectronics boards but still wanted the status symbol of an HT220. Who knows? Certainly a unique find for the HT220 history museum.

**MORE ON HT220 PERFORMANCE INCONSISTENCIES***by Byron Smith, WA6YLB*

*... a very sensitive and selective receiver, and a transmitter that can deliver up to 5 watts.*

Heck, I have seen this 5 watt module put out 10W plus in HT220s... YIKES.

*Was this deliberate or accidental? Hazards of frying the PA?*

I was surprised to see an HT220 come in this way. I did turn it down. What surprised me is the 10 watts was the same output our ham rigs did in the 70's. The transistor is a high power transistor.

*Additional note from Bob Guerrette, K1QGF:*

Back in the 220 days, Motorola used a "guaranteed minimum value" spec for it's products. Out of curiosity, I once took a 110 W low band Micor, and decided to see what it could do... Got it to 275 watts OUT. I had to try for 300, but the PA transistors didn't like it when I took the voltage up to 20 volts.

On the subject of transmitter power, if you can't get the rated power out, check the 1.2uh chokes in the power leads of the internal 1.8 watt transistor. They "short" and don't offer any isolation of RF onto the power bus. When this happens, you can tune and tune and won't get the correct power out. Replace the molded coils, and your power returns.

*What about poor RF sensitivity and audio quality?*

The majority of receive sensitivity problems stem from the crystal filters on the 455KC lines. These filters usually "lose it" when the HT has taken a bad fall. One way of telling, is to place the unit on a signal generator, and then tap the radio in and around these curved white domed crystal filters. If you hear the sensitivity change, the filter is bad. These were primitive filters, with one filter cut lower than IF and one above IF. This will also cause the audio to be distorted, as if one filter is "lossy" and the other isn't, the audio suffers.

**HT220 NEWSLETTER** is published by the  
HT-220 Preservation Society  
Website: <http://www.batnet.com/mfwright/HT220.html>

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