

The IC-703 Plus, a user review.

By Matt Erickson, KK5DR



QRP, with style;

Up to 10 watts out when operated on 13.8Vdc, and up to 5 watts out when operated on the optional 9.6Vdc battery pack. It has an internal relay type ATU (with a connection for external tuner also), and AF-DSP, standard gear. This radio is ideally suited to the operator who likes back-packing portable HF, or the QRP hobbyist. Not to mention Field Day/ battery powered operations (extra points).

This radio operates much the same as the 706 series, it even looks much like it with minor differences in appearance and features.

Power consumption/DC current load;

For the hiking/back-packer/QRP radio operator, battery power is one of the most important considerations. How much time you have on the battery, how much RF power output can you use for a given current load. If the operator knows how many AH (AmpHours) the battery has, it would be a good thing to know how much DC current the radio will use at a given RF power output. This is why I carefully measured these levels on my 703 in CW (key-down) mode. SSB or any other mode should follow the same levels at the given power out selection level. A Fluke DMM was used to measure the DC current, and Schlumberger 4031 service monitor was used to measure the RF power output levels. A variable DC power supply was used for all these tests.

Line one is DC current and RF output with 13.8Vdc applied to the 703. Receive steady current draw is 620mA. All total current readings include 620mA plus PA current. (#) is the RF power level selection on the 703 menu.

(L) = 1230mA @ 93mW RF out	(1) = 1300mA @ 354mW RF out	(2) = 1400mA @ 812mW RF out	(3) = 1550mA @ 1.25W RF out	(4) = 1640mA @ 1.84W RF out	(5) = 1800mA @ 2.53W RF out	(6) = 1900mA @ 3.16W RF out	(7) = 2000mA @ 4.21W RF out	(8) = 2400mA @ 5.3W RF out	(9) = 3000mA @ 6.55W RF out	(H) = 3300mA @ 8.28W RF out
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Line two is DC current and RF output with 9.6Vdc applied to the 703. Receive steady current draw is 350mA. All total current readings include 350mA plus PA current. (#) is the RF power level selection on the 703 menu.

(L) = 1300mA @ 93mW RF out	(1) = 1400mA @ 198mW RF out	(2) = 1450mA @ 298mW RF out	(3) = 1500mA @ 474mW RF out	(4) = 1550mA @ 595mW RF out	(5) = 1600mA @ 668mW RF out	(6) = 1650mA @ 959mW RF out	(7) = 1700mA @ 1.22W RF out	(8) = 1750mA @ 1.41W RF out	(9) = 1800mA @ 1.66W RF out	(H) = 1850mA @ 2.05W RF out
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Now that we know how much DC current the 703 (or at least my 703) draws on both receive and transmit, it would be nice to know how far I can draw down my battery, I have also tested this for you.

My 703 switches from DC power supply mode (full power), to "battery" mode at 10.9Vdc. The "low battery" alarm trips at 9.12Vdc. The transmitter shuts down at 8.0Vdc. The radio completely shuts down at 7.8Vdc. Unfortunately, batteries don't have much regulation, and under load the voltage tends to drop pretty drastically (this varies greatly dependent on the current capacity of the given battery), which could cause the 703 to trip off-line while transmitting. Lead-acid batteries have pretty high voltage drops under load, but also have high current capacity, deep-cycle marine batteries are better for voltage regulation under relatively low current loads. Ni-Cad batteries are good at regulation but will drop off very suddenly when the depletion level is reached. The use of a small solar panel to charge and or offset the steady state current rate of the 703 would be a good idea if the operator wants to extend his batteries without shutting down the radio. There are a few hand-cranked generators available, that could be used to replenish a battery (I have one, and it really works nice). The range of possibilities is vast for powering your 703, out in the "bush".

There is an additional "power saving" feature wherein the receiver is shutdown when no signal is present for various periods of milliseconds. This will extend the time the radio can be left in receive mode. This feature is user selectable via a menu.

The information above should prove very useful to those who like to run battery power on the 703.

CW performance;

Most QRP guys will agree, if you plan to stay in the QRP game, you must get good with CW, because SSB is not always going to make the contact at these power levels. So, this makes CW performance a pretty important part of a QRP radio's overall performance. The following tests will help you know if the 703 is up to the task.

Dit truncation begins at about 45WPM in full break-in mode, and becomes severe at about 50WPM. An adjustment of the weighting on my keyer to the heaviest weighting helped to greatly reduce the dit truncation to a very tolerable level while in full break-in mode. This adjustment also helped to reduce the key click at the beginning of each sent character.

I observed the CW signal on my Tektronix 100MHz scope, the signal is clean and well formed. with a good rise time and decay time. A barely detectable key click was observed on the leading edge of the RF envelope.

I made several CW contacts on 17 and 20 meters, at 1 watt out. It was pretty easy when the antenna I used is a 12 element LPDA at 60 ft. When you operate QRP it is all about the best antenna you can put up, or you must work harder at making the contacts. Signal reports were very good, the CW note was clean and clear. I do wish the RIT was a little more smoothly adjustable instead of the detented knob that it is. The side-tone is adjustable from 600-900Hz, I set mine at 700Hz and it was perfect. Responding stations were exactly on center and little or no RIT adjustment was needed. While tuning around the bands, the 703 is well behaved and nearby strong signals did not cause undue distortion in the receiver. A ham could do allot worst than getting a 703 for CW operation.

During full break-in CW operation there is a fair bit of relay chatter, if this bothers you, the 703

might not be your radio. I find semi break-in operation less distracting, this is a user selectable item in the menu.

I installed an FL-53A narrow CW filter, which really makes this little radio shine as a CW QRP rig. Copy with the filter is just beautiful, there is virtually no ringing as one would normally expect with such a narrow filter. You can work weaker stations right next to big strong stations with this filter, so the “close-in” behavior of the 703 is very good once a narrow filter is installed. This is not to say that the performance without the filter is not good, it is just better with it.

SSB;

The operation of the 703 is virtually the same as the 706 series, just less RF power. It even uses the same HM-103 hand mic. I made several SSB contacts on various bands with good results. A few minor adjustments were needed to make the transmit audio sound good. The compression can be used to strengthen the output, but it is important not to use too much. I found that a setting of 1 or 0 was enough for good rag-chew contacts. Slightly more can be used on a crowded band or when conditions are poor, but settings higher than 5 should never be used. The mic gain should be adjusted so that the ALC peaks at mid range on voice peaks, this setting will be different for each operator. There is a carrier frequency setting as well (same as the 706), this allows the operator to make adjustments that compensate for voice and microphone variance in frequency response, this adjustment will likely be different for each operator too. I found a setting of +150 on USB and -150 on LSB was ideal. A report from a friend I talked to using the 703, said that it sounded as good as my 756ProIII. AM & FM transmit audio reports were also very good.

Basic receiver;

The ham that buys a 703 can not expect the unit to perform as well as much more expensive models, but it does very well, its receiver was designed as an improvement on the 706 design. The RF "front-end" of the 703 is rather unique, should you wish to read more about it click the [link](#). The main thing to remember about the 703 is that it is relatively inexpensive and small, but packs a very good amount of performance in that tiny package. You can't expect the radio to work miracles, it can often work wonders. The radio is designed to operate under tough physical conditions so compromises had to be made to allow it to perform in those environments without becoming unstable and or difficult to operate. With all these things in mind the 703 is an excellent unit for its design purpose & price.

DSP;

Yes, the 703+ comes with DSP installed. It is an AF DSP system with certain limitations of that design but it does very well. The random Noise Reduction works very well with minimal distortion effects. The Automatic Notch Filter works very well. I used them to good effect on those noisy bands with weak signals. This system is the same as the 706 series with an improved firmware installed. It works well, but like any AF DSP system it has its limits.

Hot radio?

Don't worry about fans or cooling, this radio never gets hot! There is no fan inside it, and even at full RF power out for extended periods it gets only slightly warm to the touch. The entire

chassis of the unit is heat-sink so heat is conducted to the outer skin of the radio and dissipated into the air. There is no need to worry about overheating this little radio, it can't be done (unless you place it on a hotplate, or seal it inside an airtight box).

Conclusion;

What will I use the 703+ for? Well, anything I want, like Field Day, camping, emergency communications when I don't have AC mains power, and only a car or marine battery, general purpose QRP operations, and mobile. Is the radio worth the money? I say yes, you are getting a lot of basic performance with many neat features (that work), and a small package, that consumes very little power. If you like the idea of all these items, then the 703+ might be a great buy for you.

Some of the things I did not like or thought could be changed on the 703+;

Cost; it could stand to be a few hundred dollars less, this would make it more competitive with other QRP offerings on the market.

DC current; I think the transmit DC current draw could be lower at RF power out levels below half scale. The PA design is the limiting factor here.

RIT control; Either no detent knob or a user selectable tuning rate.

NB; could be better.

73 de Matt

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