How does your HMI work?

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The term HMI is an acronym for Human Machine Interface which is the device, or group of devices, that allows an operator to control, interact with, or adjust a “machine”. For a computer, the principal HMI is the monitor screen, keyboard, mouse and a sound card with speakers. For a two-meter rig, HMI devices typically include knobs or up/down switches to control frequency, audio volume and squelch as well as some sort of a display. Other HMI parameters which are less often used, once programmed into the rig, are repeater offset (or simplex), tone encryption, power output, and display parameters among others.

When designing HMI, a manufacturer of equipment must take a number of things into consideration, including the features of the product, the linearity of the devices that will be used with it, the variability of conditions in the field where it will be used, and the skill of the operator using it. This analysis will produce different HMI requirements for similar products which is well-illustrated when considering the differences between a two-meter and HF transceiver.

A modern HF rig will generally be used in a greater variety of operating conditions and modes than a VHF transceiver. Therefore, it will likely have adjustable mic gain, continuously variable power output, operating frequency resolution down to 10 Hz or less (compared to 5 KHz typically used on two meters), AF gain control, RF gain control, RF attenuation, incremental receiver tuning, CW pitch control, Voice Operated Switching (VOX), antenna tuner, speech compression, noise blanking, selective metering switch, automatic gain control (AGC) response (fast, slow, medium or continuously variable), mode selection (SSB, SSB rev, CW, AM, RTTY, FM – not all are available in all rigs), memory channel selection and assignment, a mechanism to calibrate the digital display of the transceiver by zero beating against WWV, and an on/off switch among other things, depending upon the make and model of the transceiver. If you are moving down to HF bands from VHF, this range of HMI can be a little intimidating. However a couple of general points should help in getting on the air for the first time, and are based upon the fact that you will probably be operating in the SSB mode:

1. Make sure that you have an antenna attached to the rig and that it is not an open circuit or shorted at the operating frequency or band that you wish to operate. As a general rule, never transmit into an antenna that does not appear to be functional. You should be able to hear other signals on the transceiver before transmitting!

2. Use the base transceiver without any linear device. Linears should be used only after basic mastery of the transceiver is achieved.

3. Use the microphone designed for the transceiver, assuming that you have it. Set your mic gain for approximately mid scale (midway between min and max). Yes, they are designed to operate in this range. In this case more is definitely not better!!!

4. Turn the RF gain (receiver) to full maximum. You may eventually find listening more pleasant with less than a maximum gain setting. Lower gain settings will have the effect of improving the signal to noise ratio if adjusted properly. Lower gain settings will reduce the sensitivity of the rig as well as the S-meter and will bias the S-meter to a full scale position if turned too low on most rigs.

5. Turn the AF gain to a comfortable noise or listening level.

6. Set the AGC control to slow or medium. If set too fast, static will seem to “pop” in the receiver and any noise received will have a “harsh” sound to it.

7. Try the noise blanker in both the on and off positions, or try varying degrees of settings if it is continuously adjustable. Ideally, do this while listening to a QSO to get a feel for the improvement that it may make in listening conditions. In some rigs, if the noise blanker is adjusted to too high of a setting, it will produce distortion on stronger signals being received.

8. Be sure that any incremental tuning controls for the transmitter and/or receiver are set to zero or are turned off. Otherwise you will be transmitting on an unknown frequency or at least a different one from which you are listening.

9. Make sure that you do not have the “split” function on if you have a rig with dual VFOs. Otherwise you may operate in the VFO mode or Memory mode for this initial QSO. Having the split function on will cause you to transmit and receive on two different frequencies as defined by the respective setting of each of the two VFOs.

10. Turn off all receiver filters. You can experiment with these later once you have become familiar with the basic operation of the rig.

11. Turn off the speech compressor! These tend to be very controversial and many tend to distort your transmitted signal, hurting intelligibility more than offsetting the intended benefit of increasing your average transmitted power. Many hams will not work a station that has a distorted signal.

12. Set the VOX control to off which will require you to use your Mic push to talk (PTT) switch to activate the transmitter. VOX can be used later as you get experience with the transceiver. Proper VOX operation will also require setting of other controls which affect sensitivity, time delay for drop out, and the possibility of being activated by a received signal heard back through the transceiver’s speaker.

13. Consult the band plan you intend to work and write down the frequency range for which you have authorization to transmit. Make sure that you are on the correct side band for the band of operation (LSB for 160 through 40; USB 20 through 10). Stay at least 5 KHz away from the band edges initially. (It will be possible to get closer to either the upper or lower edge depending on which side band that you are using, but for now this is an unnecessary detail as long as you are at least 5KHz away from the band edges – assuming that your frequency readout is reasonably well calibrated and you are not “splattering” because of too high of mic gain).

14. At this point, find an unused frequency near where you intend to operate. Turn down the RF power output to near minimum. Turn on the automatic antenna tuner if you have one. Set the rig to RTTY or CW (if in CW, the key must be closed to transmit). Hit the transmit button and watch the meter (set in the power output position) automatically reach rated output. If this fails to happen within a few moments, turn off the transmitter. You likely have an antenna impedance condition that is outside of the tuning range of the automatic antenna tuner. Otherwise return the power output to its maximum position, pick up the mic and state “This is <your call> testing”. Note you could also state “testing while given your call” when the power is in the lower position. Either situation is OK; however by returning to maximum power when making the statement, you may have someone call you back directly and initiate a QSO.

OK, you are almost ready to go. Find a QSO or net in progress and listen to it extensively. Get the flow of the conversation. Is this a group of people that will welcome someone breaking in to say hello or are they likely to want to continue in their tight group?

A net offers a good way to get on and get a signal report in a low-key manner. Check in when they call for guests or visitors. The net control (NCS) will acknowledge your transmission and most likely ask for you name and location. It is usually OK to ask for a brief signal report in this situation if the net is not too busy with pending traffic or running late. Possible candidates are the Columbian Basin Net at 3960 KHz or the NW Single Side Band net at 3945 KHz. I have not given the times of these daily nets which tend to be early evening since they are changed frequently during the winter months to reflect band conditions (Google them on the Internet for current data). Instead of finding a QSO or Net to join, call a fellow ham from the club to be your first contact. Ask them to meet you on a specific frequency. Don’t be too disappointed if you do not hear one another well. Closein HF does not always produce the best signal reports but yet can confirm that you are getting out with a clean signal. He or she can help you deal with any issues directly on the air which is often the most effective method of problem solving.

Consider maintaining a log. You will want to remember your first contact and have some documentation for the QSL cards that will begin to find you or that you may choose to

send. A log is a good way to maintain this data and can be done with a homemade spread sheet, an ARRL printed log, or a computer based log sheet program.

Sounds like you’re all set for the HF bands. Hopefully this discussion on HMI has helped in that preparation.

Oh yes, I almost forgot, the most important HMI component is you! Nothing will substitute for a little knowledge, common sense, patience, and courtesy as you begin operating on the high frequency bands.