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Getting Started in HF Operating

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The basic material you must learn to get your license is only a starting point. There are many aspects of Ham Radio and the test questions only provide an overview. I encourage new hams to try different activities before investing in a lot of equipment and antennas. You can do this by using club equipment or spending time with other hams and using their equipment. Once you have a good idea where your interests lie you can get serious about setting up a station.

My interest is mostly in HF communications. In this article I'll tell you a little about my background and why I like HF. I'll provide an overview of HF activities and discuss how to select a transceiver. I've written a companion article about *Basic HF Antennas*, so I won't spend time on that here. I'll finish by discussing some considerations that go into setting up a station.

My parents bought me an electronics experiment kit when I was about 12 years old. I had fun building and testing the basic circuits it contained. I wanted to understand how they work but had no one to ask. I heard about a volunteer group that provided emergency communications called RACES. I showed up at the next RACES meeting at our local city hall and met some bright young engineers who became my Elmer's. I was off and running. Through RACES I met other local hams as well.

I earned my Novice license as a high school freshman. In those days you put in your time on CW to get up to 13wpm for the General ticket which I got the following summer. We were budget limited so I stayed on CW. SSB didn't become practical until the 70s and by then I was busy working as an EE. We really didn't pay much attention to performance, as long as we had fun making contacts. Tube gear was very forgiving as well.

Fast forward to the late 1980's when I had time to get back into the hobby in a serious way. The new solid-state radios required a low VSWR to work properly and prevent damage to the output transistors. Receiver performance parameters were becoming better understood and the dynamic range competition began. The ARRL began testing for dynamic range as part of the product reviews.

Antenna analysis software with easy to use interfaces became available as well. Hams were now equipped to analyze the performance of their stations. Reliable propagation prediction software became available too. These things appealed to the techie in me.

I was determined to learn all I could about what was available in Ham Radio. I was mostly a CW operator but dabbled in SSB, satellite communications, VHF/UHF weak signal, repeaters and digital modes. I always came back to HF.

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Why HF?

- I enjoy meeting other hams from across the USA and the rest of the world
- DXing was especially exciting, both CW and SSB
- I like CW the best and the challenge of working weak signals
- There is a sense of adventure because we really don't know everything about HF propagation.
- I can find someone to talk with almost any time of day or night
- If you like contesting, there are many to choose from
- Long distance communications can be done mobile or portable

The most important piece of equipment you need is a transceiver. There are models to fit everyone's budget and performance requirements. The following is a partial list of requirements:

- Price
- Frequency coverage
- Operating modes
- Dynamic range
- Output power
- Size and weight
- Antenna tuner
- Spectrum scope
- Noise reduction features
- Keyer
- Computer interface
- Audio equalization
- Amplifier compatibility
- Coverage of new LF/MF bands

Then there are ergonomic considerations:

- Does the front panel layout make sense *to you*?
- Is the screen readable?
- Are the controls large enough and far enough apart to use with *your* hands?

I listed price as number 1 because it is often a deal breaker. I did a little catalog search and then read the QST reviews for beginner's transceivers. The following are basic radios with enough features to make casual operating fun, however they are not designed to operate on a crowded band:

- IC-718 (\$640)
- IC-7200 (portable) (\$720)
- FT-450 (mobile) (\$680)
- TS-480SAT (mobile) (\$850)

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- Alinco DX SR9T (\$570)

If you have a bigger budget the following radios are worth considering:

- FTdx1200 (\$880) (81dB DR3, rudimentary spectrum scope, lowest cost)
- IC-7300 (\$1100) (95dB DR3, excellent spectrum scope, no front-end filters)
- TS-590SG (\$1400) (94dB DR3, excellent front end filters, no spectrum scope)

If you want both HF and VHF/UHF, the following multi-mode radios are available:

- IC-7100 (\$770) (68dB DR3)
- FT-991A (\$1200) (75dB DR3, improved spectrum scope)

A good used radio can often be found for ~\$500. Many of these will have better performance (i.e.: more features) than the basic models listed above. Some popular radios in their day:

- IC-765 (1989)
- TS-440 (1986, very popular beginner radio)
- TS-850 (1991)
- TS-950 (1991, dual receive)
- FT-1000D (1991, 200W), 1000MP (1996, 200W, DSP), 1000 Mark V Field (2002, 100W)
(all are dual receive)

Not all of these will be in the \$500 range. I have friends who use these radios on a daily basis. I see them on eBay often. Avoid the older tube radios, they are often difficult to keep running.

You need a budget of \$600-700 minimum to get started; a more realistic estimate with a new radio is \$1000. This will cover your transceiver, a simple wire antenna and feedline, a key and/or mic and a power supply.

Most modern radios offer 160-10M coverage, many have 6M too. They work for all operating modes and have a computer interface for digital modes. I always suggest a 100W radio to start with. You want a radio that will allow you to make contacts, lower power can be very frustrating for a beginner to HF. The antenna tuners in most radios will handle a 3:1 VSWR. That's enough to tune a dipole or vertical across a complete ham band but not enough for a ladder line fed multi-band antenna.

Dynamic range is a complex subject. There are a few rules of thumb for operating on crowded bands:

- On the 10M HF band, you need >85dB third order dynamic range for CW. SSB requires only 71dB. 10M is galactic noise limited.
- On the lower frequency bands atmospheric noise reduces the dynamic range requirements; for stations in residential areas:
 - On 20M CW 77dB, SSB 63dB
 - On 40M CW 67dB, SSB 53dB
- Don't get caught in the more is better thought process, more doesn't matter unless you have a contest superstation antenna system

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Most radios have built in keyers and receive/transmit audio equalization. You don't need an expensive key or mic when you are just getting started. If you are interested in the new LF/MF band allocations you will have to check the radio spec sheet; some radios do not tune that low.

There are two bands you need to operate on, 40 and 20M. 40M is a night time and early morning band and 20M is a daytime band. These bands will remain open during the low part of the sunspot cycle. There are also a lot of operators on these bands, so finding someone to talk to shouldn't be a problem. A wire dipole up >35' will work well.

Other bands worth considering are 80M at night, 30M during the day (CW only) and 17M. In 4-5 years conditions will get much better so having antennas for the higher bands is still worthwhile. Don't be discouraged if you don't hear anyone on a band, call CQ since there may be others listening.

This is probably a good place to talk about SSB. I personally have not enjoyed SSB operation on 20 or 40M. That's not to say good QSOs can't be had, but I have not had many interesting chats on those bands. I have enjoyed many SSB QSOs on 17 and 10M. 17M may open occasionally during the solar minimum, but 10M openings will be rare. 17M is a relatively new band that many crusty old timers have not embraced. 10M is full of enthusiastic new hams who are fun to talk to. Try these bands for yourself, I can only share my experience. As the old ham population dies off things will change.

Setting up a station:

This is more of a list than a how-to section. There are many books that cover these subjects. The ARRL Handbook is usually a good place to start.

So, now that you have a transceiver and an antenna you need to assemble your equipment to operate in a safe and comfortable location. A basic station will easily fit on a computer desk. A larger desk or table will allow for expansion. Make sure to have room behind the desk or table to run wires and cables. I keep mine at least 6" from the wall.

You should position your equipment so you have easy access to those items you touch often, like your transceiver. You need desk space for your mic, key, monitor, keyboard and a notepad. There are many examples on the internet, just Google 'ham shack photos' to get ideas.

A safety ground should be installed. This can be a heavy gauge wire (#6 or larger) connected to a 6' ground rod or a more elaborate system. Your antennas should be protected to prevent a lightning strike from entering your home as well. For a simple station simply connecting each piece of equipment to a common point ground usually works well.

I always recommend having line isolators on all antenna feedlines. This prevents RF and noise from getting on your equipment, RF could give you a mild shock. A 1:1 current balun is a line isolator.

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Summary:

Spend some time selecting your transceiver and antennas. Decide on your shack location and how you will get the feedlines routed to it. Moving it later may be difficult. Build your station slowly as you decide which activities you like. Ham Radio is a hobby and should be fun.

See you on the bands!

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