



# HT Tips for New HAMs: Part 1

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*Ready to Serve and Sustain Our Community*

*This is the first of a three-part series of tips for new HAMs with HT radios. Part 1 has Basic tips for first time HT owners. Part 2 has tips for Intermediate HT owners seeking to advance their HT performance and knowledge of the hobby. Part 3 has tips for Advanced HT owners wanting more performance from their radio before buying a mobile radio. **Advisory Note:** There are many hyperlinks in these articles. This was a compromise between including too much materials and digressing or burdening the reader with hyperlinks taking them away from the article. We suggest reading through the article first. Resist using the hyperlinks unless you need immediate clarification. Consider the hyperlinks as additional resources which you can consult at your leisure. The products shown and mentioned are for illustrative purposes. GECO has no affiliation with radio equipment manufacturers, wholesalers, or retailers. We do not recommend, endorse, or promotion of these products.*

GECO is predicated on the basic philosophy of no cost/low cost especially when operating in a remote rural third world country conditions. We take this approach because major disasters can reduce highly developed countries to third world conditions post disaster. There are many [articles](#) for new HAMs on how to [select your first radio](#). We won't re-invent the wheel. Let's review some of the many factors influencing your decision. Combined with budget limitations are some other key factors.

1. **Budget, the Ultimate Reality:** Money sets the hard limit on the radio you buy. Several years ago, a mono band HT radio cost \$125+, a mobile radio was about \$200+, and an HF rig about \$600 and up. Now, HT prices start at \$35-\$80 for **dual band** radios!

2. **Your License**

**Privileges:** This is defined by law. The determines the bands / frequencies on which you can transmit / operate.

[**Note:** Since most new HAMs start with a [Technician](#) license,

Band	Frequencies (In MHz)	Modes You Can Use
80 meters	3.525 – 3.600	CW
40 meters	7.025 – 7.125	CW
15 meters	21.025 – 21.200	CW
10 meters	28.000 – 28.300 28.300 – 28.500	CW, RTTY/data, 200 watts PEP maximum power CW, phone, 200 watts PEP maximum power
6 meters	50.0-50.1 50.1-54	CW Only SSB, AM, FM, TV, CW, digital
Above 50 MHz	All amateur privileges	VHF, UHF (6-, 2-, and 1.25-meter bands, and the 70-, 33-, and 23-centimeter bands)

this article uses it as an example. Also, since the FCC eliminated the Morse Code requirement, most new HAMs are unlikely to be using CW. Thus, they would tend to operate at only a portion of the 10-meter band and be mostly operating in VHF and UHF bands.] **Do You Have a Car?** This may determine whether you buy a mobile radio or not. Keep in mind not all mobile radios are installed in cars (but that was the original intent in the design and naming of this type of radio).

3. **Do you use mass transit?** This usually means you need a light-weight compact radio / antenna system (e.g. HT).
4. **What is the operating range you need?** Look at the [Line of Sight](#) (LOS) distances from your location to nearby repeaters, your HAM friends, your local radio Net Control, etc. This can affect your choice of radio, operating power, and antenna. Don't forget the impact of terrain on your operating range.

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GECO also takes an incremental/modular approach to buying EmComm equipment. Each piece of equipment you buy should: 1) enhance your other equipment; 2) complement other radios, antennas; 3) be inter-operable with other equipment; 4) use your field battery packs; 5) be able to use your other antennas. These key traits help ensure EmComm operations are resilient.

GECO suggests starting with an HT radio. In fact, we suggest you seriously consider getting two of the same HT so you have a back-up spare. These radios are low cost. If you plan carefully, as your participation in the hobby grows, they will still be a useful. An HT has a limited range or about 2-5 miles under ideal conditions. In reality, it is more like 1-2 miles. But other things can be done to help increase the range. (More about this later.) **[Note:** GECO strongly suggests you keep all the original boxes, manuals, and papers for all radio equipment you buy. If you decide to sell your equipment, you can ask a higher price.] 🌱

### The Basic HT out of the Box

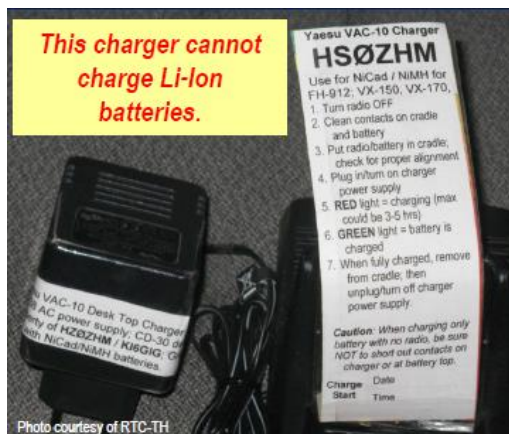
The Bao Feng UV5R is a basic dual band HT available for about \$40. The transceiver comes with a lithium ion battery, charging cradle and power brick, “rubber duck” dual band antenna, microphone/ear bud, belt clip, wrist lanyard, and user manual.

As you unpack the radio, label all critical pieces so you know it belongs with this particular make/model radio. For example, the charging cradle and power cord as “Bao Feng UV5R charging cradle” and “Bao Feng UV5R charging cradle power supply”.

This will be very helpful as you get more equipment. You will find many radios and accessories come in basic black. Power cords and charging units will all begin to look alike. When you work with other HAMs, it is easy for equipment



**Do Not Transmit Without an Antenna.**



to get mixed together. Using the wrong power cord or a charger to charge a different radio could damage equipment. All of this can be readily avoided by taking the time to label your gear.

During emergencies, sharing resources may be necessary to keep all radios working. Clear labels such as the one on the left, make it easy for people unfamiliar with your equipment to know if it is safe to use with theirs. Clear labels on your equipment also helps eliminate confusion when packing things up after the event. In any group of HAMs, many charging cords, accessories, etc. look similar. It is easy to pick up

someone else’s gear or lose some of yours.

During emergencies and emergency preparedness, keep these thoughts in mind:

- Prepare for the worst; hope for the best.
- Whenever things are going smoothly, you’ve obviously overlooked something.
- The best made plans often go out the window once a disaster strikes.
- Always prepare back-up plans and have back-up equipment ready when things don’t go according to plan. 🌱

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**Suggested Basic HT options** (in no specific order) as your budget allows. These do not need to be bought all at once. You can build up the Basic GECCO HT kit over time as your budget permits. [Note: Links to items below are examples only and are not GECCO endorsements or recommendations for specific products.]:

**B-1. [Extra lithium ion battery](#).** The battery included is often a 7.4V 1800mAh.

Look for larger capacity batteries (e.g. 7.4V 3800mAh). These may cost about \$19 each.

**B-2. [Battery Eliminator](#):** This accessory lets you use your HT with 12 VDC power from your car's accessory socket (or any similar power source). Cost is about \$10-16.






**B-3. [AA Battery Pack & AA Batteries](#):** This \$16 unit lets you use regular AA Alkaline or rechargeable NiMH batteries to power the Bao Feng. This gives you one more power option for your radio.

**B-4. [Speaker/Microphone](#):** This \$16 unit connects to your HT and replaces the ear bud/mic. Some people find this handy to use in crowds and noisy conditions. Listed below are other options and comments on this topic. Remember, adapters may be needed. The connectors to an HT are usually quite different than for a mobile or base station set up. These are details to consider carefully when buying equipment. This can help you to get multiple use out of each piece of equipment.

### Notes

*These batteries tend to be proprietary for a particular radio. They usually will not fit with another make or model HT. Consider this when buying additional HTs for your inventory*

<p>Rob KE6YGF using a headset with a boom mic</p> 	Accessory	Situation
	HT only	Casual operating
	Ear bud	OK in office or car; HT held like a mic
	Ear bud w/ mic	Ok in office or car; HT is hands free
	Mic w/ speaker	HT is hands free; mic located as you like
	Waterproof mic w/ speaker	Same as above but used in a wet environment
	Headset	Noisy environment; HT held like mic
Headset with boom mic	Noisy environment; HT is hands free	

B-1	B-2	B-3	B-4	B-5	B-6
					

**B-5. [Programming Disc & Cable](#):** These are used to program the radio rather than manually entering in your operating frequencies from the keypad. Many people have problems finding functional discs and cables for their HTs. Jim KG6TQT suggests going to buy the CHIRP and Miklor Disc and the proper cable (~\$15-20). Use this link for the [UV5R](#).

**B-6. [Dual Band High Gain Whip Antenna](#).** The OEM rubber duck antenna has a -0.5-dB gain. Various high gain antennas (~\$20+ have 1.2-2.5 dB gain). [Note: A high quality antenna is a top priority. If your budget is tight, get the best antenna you can afford. It makes all the difference.] Get "O" rings as a weather seal between the antenna and the radio.



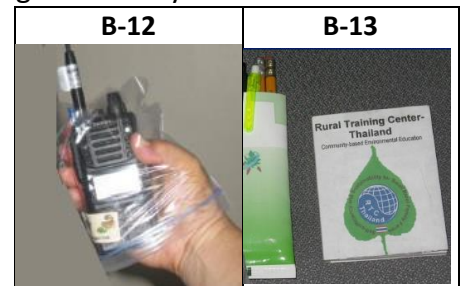
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- B-7. “O” Rings for HT Antennas:** Weatherize your HT antenna by sealing a possible gap between the antenna base and the radio antenna mount. An “O” ring can give resistance against vibration loosening your antenna by adding tension on the connector threads.
- B-8. [Magmount Dual Band Antenna:](#)** These range in size of 1”-2.5” diameter magnets with about 19 “whips. Prices range from \$19-\$30. Large magmount bases (~\$35) and dual band antennas can be purchased separately for better performing antennas (~\$79+).
- B-9. [HT Quick Reference Guide:](#)** This handy tri-folded Reference Card is about \$12. It is a laminated foldout pocket guide, six panels of information about the radio does. Folds to credit card size. You can also make your own radio “cheat sheet.”



- B-10. [Tigertail:](#)** This is a simple [DIY project](#) that can improve the performance of your HT’s rubber duck antenna. This project can be easily adapted for mono, dual, or tri-band HT antennas. Click [here](#) for a good explanation of how and why it works.
- B-11. [Battery Care Kit:](#)** HT radios need battery power to work. Keeping battery terminals clean is a simple process to assure good electrical contact. A thin layer of oxides, invisible to your eyes, can create enough resistance to create problems. Leaking batteries can cause corrosion of contacts. Putting together a simple kit and having it handy can get you back on the air. HTs tend to use dry cell batteries. A simple kit for an HT is shown in photo #10 below. At some point your inventory could include wet cell batteries as well.
- B-12. [Emergency Dust/Rain Cover:](#)** Find a clear plastic bag large enough to cover your HT while holding it for use. Cut a small hole for the antenna but tape it well to keep water out. This works well with a speaker/mic. Keeping water and dust off the HT helps prolong its working life. For more information on HT care, click [here](#).
- B-13. [Notepad & Pen/Pencil:](#)** It is always handy to have a notepad and pen or pencil with your radio. In an emergency, it is challenging to remember everything. Notes can help. 🌱



### Basic HT Skills

The tips in this section of the paper are based on GECO’s focus on Emergency Communications (EmComm). Many of the comments here are common to EmComm in general and are not unique to GECO. We won’t cover general radio operating skills. These are mainly for HT users (but could be adapted to radio operators in general).

- 1. Know Your Radio:** Keep your radio’s instruction manual handy. Get or make your own quick reference notes. [Note: Here is a good orientation to the [Bao Feng UV5R](#).] Tom Morgon, KB6JVE suggests these “Eight Things You Must be Able to Do with Your HT.” (Refer to your radio manual and fill in the page #s in the spaces below.)



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1.1 How to turn your radio on. Is there a button to hold down? My manual explains this on page # \_\_\_\_\_

1.2 How to select a memory bank. My manual explains this on page # \_\_\_\_\_

1.3 How to get into VFO mode. My manual explains this on page # \_\_\_\_\_

1.4 How to put in a frequency. My manual explains this on page # \_\_\_\_\_

1.5 How to change the offset. My manual explains this on page # \_\_\_\_\_

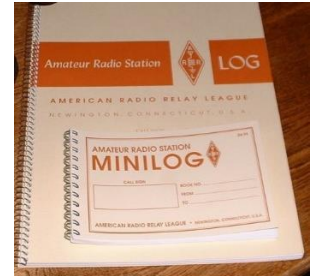
1.6 How to set the PL (CTCSS). My manual explains this on page # \_\_\_\_\_

1.7 How to select a memory number. My manual explains this on page # \_\_\_\_\_

1.8 How to store a frequency in memory. My manual explains this on page # \_\_\_\_\_

**Know how to turn VOX "Off." Do not use VOX during EmComm operations or when in noisy environments.**

**2. Know Your Radio's Performance:** Use your radio to contact your HAM friends, local repeaters, and your local radio net. Keep a log to include: **A)** call sign of the station contacted; **B)** their location / distance / direction (azimuth) to your location; **C)** their signal strength/quality (using [RST reporting system](#)); **D)** and how they receive your signal (strength/quality); **E)** information about their radio/antenna/TX power setting; **F)** notes about your radio / antenna/TX power setting; **G)** record the date/time of day /weather conditions. This information is valuable as signal propagation varies with the time of day, season and weather. In an emergency you can use this data to know who you can contact and what signal quality you might experience. [Note: When operating outdoors, batteries are affected by the ambient temperature. This can affect your radio performance.]



**3. Keep a Station/Equipment Journal:** This is different from the regular radio logbook. This is your record of your station set up, equipment inventory, and changes/modifications to your station or equipment. Overtime, many items and actions you thought you'd always remember get forgotten. For example, we keep notes on antenna installations, SWR measurements, additions of new equipment, when fuses are replaced, layout and wiring



diagrams of the station, etc. We suggest keeping records and receipts of purchases. Do a photo inventory and periodically update it and consider joining American Radio Relay League (ARRL) to get their [insurance](#) for your equipment.

**4. Diligently Charge Your Batteries:** It is a good idea to set a battery maintenance schedule. Get into the habit of putting a "date" tag on each battery to show when it was last fully charged. Joe N6WZK normally keeps his HTs in the charging cradle. Once a week, he turns on the charging cradles. The Li-ion batteries are "topped off" and tend to last longer. [Note: He found that some HT batteries will hold their charge longer if he detaches the battery from the radio.] Don't forget to charge your spare batteries as well.



**5. Prepare Your Go Bag:** The typical "Go Bag" is a complete set of radio and survival gear.

Depending on your circumstances, this could be provisioned for a 72-hour response. Some HAMs expand this to be a "Bug Out Bag" to support themselves if they need to evacuate their station.

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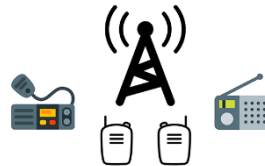
Others set up their Go Bag based on the EmComm duty to which they perform (e.g. base station, mobile station, field portable station, pedestrian mobile operator). The supplies are in separate kits of 3-days, 1-week. This makes it easier to rotate perishable items into our daily living without disturbing the radio gear.

GECO has Basic Radio Kits (i.e. radio, antenna, battery) only. The photo on the right is a simple HT Go Pouch.



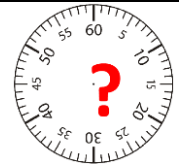
A very simple HT Go Pouch for pedestrian mobile operating.

6. **Practice Using Your Radio:** Make it a point to get on the air often. Join a weekly radio Net. The idea is to use your radio often. This practice helps develop your on-the-air speaking skills, familiarity with your radio, learning HAM radio protocols, etc. [Note: If you haven't got a radio yet, but you have your license, you can "get-on-the-air" using a free program for HAMs called [EchoLink](#). The program can be installed on a cell phone, tablet, or computer. We used EchoLink when living overseas for several years. It was hard navigating the foreign government's regulations to setting up our amateur radio station. The program can be used with a computer linked to your radio to reach HAMs around the world. Imagine, international contacts with a 5-watt HT! [More about this in Part 3 of this series.]



**VOX Warning:** Voice Operated Exchange (VOX) is a voice operated switch. When this function is turned on, sound over a certain threshold will activate your microphone and begin transmitting. It frees you from pushing the PTT (Push-to-Talk) switch. **Do not use VOX in EmComm operations or when operating in noisy surroundings.** The noise will cause your radio to transmit and block others from using the frequency.

7. **Set Your EmComm Readiness Guidelines:** Every HAM and group has different priorities and agendas for EmComm. At a minimum, GECO follows Gordon West, WB6NOA suggestion to activate our station within 60-minutes of an emergency notification. Reviewing many major post-disaster reports, our minimal operational capability is set for 72-hours before needing to be re-supplied. Learn from past disasters in your area to see how quickly help arrived. It is your responsibility to prepare for your own rescue. We also adhere to the Glendora Emergency Response Communications (GERC) Emergency Communicator's Creed:



Can you get on the air in 60 minutes

- My own house is in order, I have all the resources to get my family through an emergency.
  - I am well informed on what to do and how to respond in an emergency. I keep my skills in First Aid, CERT, and Disaster Communications Training up to date.
  - I maintain well equipped personal and communications response bags and keep items in them current.
  - I practice my communications and survival skills by participating in at least yearly outdoor camping and communications events.
8. **Make a Contact Directory:** Include: 1) phone numbers / radio frequencies (if available) and street addresses for local police, fire, paramedics, hospitals, search & rescue; 2) list of HAM contacts and frequencies; 3) local repeaters. [Note: Beware certain types of disasters/emergencies may put repeaters out of service. Be prepared to operate simplex.] Periodically update your contact directory as numbers and change. Indicate "Last updated" date.



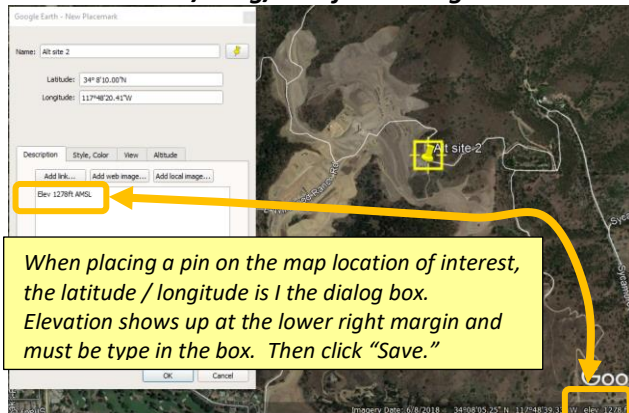


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- 9. Create a Geo-Reference File:** They say “a picture is worth a thousand words.” We suggest you use Google Earth and other mapping programs to show your location and operating area. **A)** Get into the habit of recording locations in latitude, longitude, and elevation. These data will help you do terrain analyses and LOS calculations to other stations. **B)** Use Google Earth to create terrain profiles between your station and other stations on your contact list. **C)** Take photos of operating locations with directions to/from the sites as well as alternative routes. This information makes it easier to direct others to these sites. The photo can help them readily recognize the site. You use the “street view” function on Google Earth / Google Maps.

**9-A: Lat/Long/Elev from Google Earth**

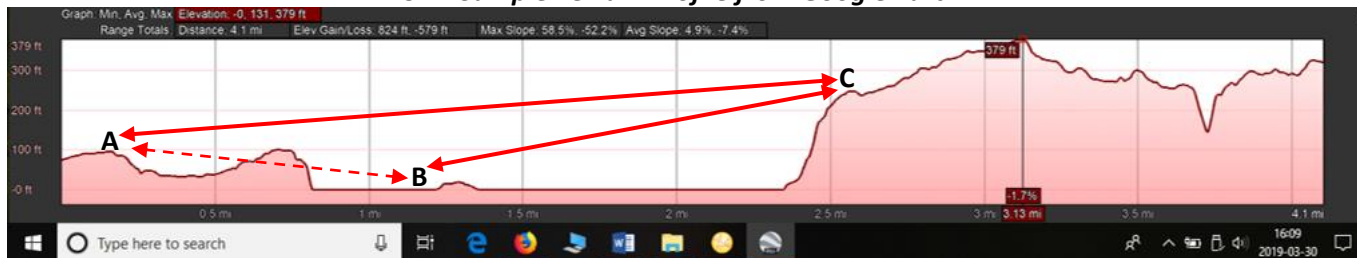


**9-C: Sample Site Photo**



Street view from Google Earth of site of Net Control for the annual Covina Christmas parade.

**9-B: Sample Terrain Profile from Google Earth**



A terrain profile is a quick estimate of possible obstructions between HAM stations. Station A can talk with C; C can talk with B, but A and B may not be able to talk with each other. Actual ground tests should be conducted.

We hope you found these tips useful. If you cannot afford to do all the suggestions, don't worry. Do as much as you can. Heed the advice of experienced HAMs: A great radio with a poor antenna will not sound great. A great antenna can make a mediocre radio sound great. 🌱

### Acknowledgments

This paper draws of notes compiled over several years from my Elmers (mainly Mark N7YLA, Joe N6WZK), friends (e.g. Jim KG6TQT, Jimmy KE7FXM, Don N4UJW) and many others whose names and articles I failed to record in my notebooks and papers. Elmering is a long-standing tradition in HAM radio. As a fairly new HAM, this is my way of perpetuating that tradition.