Ham Tips

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Choosing an HT Power Source Strategy for Emergency Deployments

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When it comes time to purchase an HT, i.e., a hand-held FM transceiver, Hams frequently base their decision on three factors: band, output power, and memory channels. It seems that every new generation of HTs manufactured by Icom, Kenwood, Yaesu, as well as other ham radio equipment manufacturers, promote new features that can best be categorized as bells and whistles.

For emergency deployments, however, most of the bell and whistle features aren't all that important. What matters most is the ability to stay on the air while in the field for an extended period of time without having to rely on support from other sources. That is to say, if you're planning on using your HT during an emergency, you must choose an appropriate power source strategy before disaster strikes. It's important!

Understanding Battery Capacity

Battery capacity is the key parameter for determining how long a battery will last.

The capacity of a battery is measured by the amount of current it can deliver to a load (the HT) for a specified amount of time. For low-power devices like HTs, the unit of measure is the milliampere-hour.

Most HTs available today come with a rechargeable battery that has a capacity in the 600 to 800 milliampere-hour range. Having just one of these on hand is not sufficient.

Understanding Battery Types

Generally there are two types of batteries available for HTs, rechargeable and standard cell. Both are model-specific and designed to contain a group of Nickel-Cadmium (Ni-Cd), Nickel Metal Hydride (NiMH), Lithium-ion (Li-ion), or alkaline cells arranged and packaged in such a way that they are unique to a specific HT or family of HTs.

The standard cell battery is nothing more than a model-specific battery case, designed to accommodate two or more AA or AAA alkaline cells.

Understanding Short Term Life Expectancy

Some manufacturers estimate the short term life expectancy (life per charge) of a battery by employing the 80-10-10 rule. What this means is that the manufacturer bases his estimate on the assumption that 80% of the time the HT will be in standby mode (turned on but not receiving or transmitting); 10% of the time the HT will be receiving a signal; and, 10% of the time the HT will be transmitting a signal at full RF power output.

As technology marched forward, more digital circuitry found its way into HTs, This provided feature-rich products but at the cost of reduced battery life. As a result, some manufacturers changed the rule to 90-5-5. Doing this gave the appearance that life expectancy would be the same as the previous generation of HTs; but this is misleading.

Consider, for example, how this plays out. If a manufacturer specifies the battery should be expected to last for 10 hours, that translates to 8 hours standby plus 1 hour receive and 1 hour transmit using the 80-10-10 rule compared with 9 hours standby plus 1/2 hour receive and 1/2 hour transmit using the 90-5-5 rule.

Understanding Long Term Life Expectancy

While any battery can be rendered useless if it is mistreated, there are some general rules of thumb regarding the long term life expectancy of different battery types.

Lithium-ion batteries provide the longest service life and alkaline batteries the shortest. Ni-Cd and NiMH batteries both have similar life expectancies, however, Ni-Cd batteries can fail sooner due to what's commonly called memory effect.

When a Ni-Cd, NiMH, or Lithium-ion battery is properly cared for, it should be able to be recharged 300 or so times before it fails to hold a charge and needs to be replaced. Alkaline batteries are considered disposable and should not be recharged.

Understanding Your Battery Options

Obviously the single battery supplied with the HT will not be sufficient for emergency deployments except the most ephemeral. To be effective, you must adopt a power source strategy that will allow you to be self-sufficient and remain on the air for 36 hours or longer. Let's consider some options.

For rechargeable model-specific batteries, most manufacturers offer optional batteries that have the same or higher capacity as the battery supplied with the HT. The higher the milliampere-hour rating, the longer the battery should last between charges. For example, if a 600 mA-hr battery provides 8 hours of use, then an 1800 mA-hr battery used in the same HT should last for 24 hours.

One option, then, would be to purchase several model-specific batteries and rotate them during normal HT use. That way all of the batteries will be fully charged and ready to go when a disaster strikes.

Another option would be to purchase the optional battery case for standard cells. Then, you can load the case with alkaline cells (AA or AAA as appropriate) as it was intended, or you can load it with individual rechargeable Ni-Cd or NiMH cells.

If you choose to use alkaline cells, you will need to maintain an ample supply of fresh cells on hand to see you through an emergency. On the other hand, if you choose to use rechargeable cells, you will need to purchase several sets of Ni-Cd or NiMH cells. Either way, purchasing multiple battery cases would make it easier to swap batteries in the field.

Tips for Maximizing Short Term Battery Life

Besides adopting a strategy and stocking up on batteries, there are other techniques you can use to maximize short term battery life.

Use low power. Don't waste your battery using high power if you don't need it. When low power is all it takes to work stations on simplex or through a nearby repeater, by all means switch to low power.

Use low volume. An HT draws more current when the volume is cranked up thus causing the battery to discharge sooner than it would otherwise. To avoid this situation, keep the volume as low as possible. In noisy, close-quarter environments, consider using an earpiece or headset.

Use battery saver features. Most modern HTs have a battery saver feature that lowers the overall current consumption by activating the receiver circuitry periodically (once every 200 milliseconds or so) instead of leaving it on constantly. Some even have a feature that automatically reduces the RF output power of the next transmission when a strong signal is being received. Use these features to your advantage to maximize short term battery life.

Use an external battery. Buy a sealed lead acid battery of the correct voltage and with a 4 ampere-hour or better capacity, stuff it in a fanny pack, and wear it around your waist camera-man style. Use an accessory dc power cable to connect this external battery to the power port on your HT.

Use a gain antenna. The antenna that came with the HT may be convenient but not necessarily efficient. While some are definitely better than others, you may be able to improve your range by upgrading to a better one. If you're using the HT in a fixed or mobile environment, consider connecting it to a 1/2 or 5/8 wavelength whip on a magnetic mount.

Use an HT extender. One of the best ways to increase the useful life of HT batteries at an incident site is by using a cross-band repeater. For example, assume a team of Hams with HTs need to pass traffic on the 2 meter Red Cross repeater. By setting up a mobile radio configured as a cross-band repeater on site, the team members can access the two meter repeater via a simplex channel in the 70 cm band. Since the cross-band repeater is on site, all of the team members can use low power instead of high power as before. By adopting this scheme, everyone's HT batteries last longer than they would have otherwise.

Summary

Hams with dual band (2 meter and 70 centimeter) HTs are an invaluable resource during emergency deployments but only if they can stay on the air for extended periods of time.

To meet this goal, you must adopt a power source strategy that allows you to stay on the air for days not hours. This might take the form of multiple model-specific rechargeable batteries; a battery case stuffed with individual AA or AAA cells; or an external battery connected to the HTs power port.

No matter what strategy you adopt, you can maximize the short term life of your batteries by: running low power whenever possible; using the battery saver features available to you; using a better antenna to increase the effective radiated power if necessary; and using cross-band repeaters as range extenders so HTs only need to use low power to communicate over longer than normal distances.

When the power goes out, battery life is a significant factor. To be on the scene carrying a feature-packed super-duper HT with a dead battery is, well, embarrassing to say the least.

73 from KH6CQ

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