



To Go Kits

Dick Drew, K0HMO

August, 2002

When an emergency arises, we as members of a trained, emergency response team must be able to respond in a short period of time. We must be prepared to take to the “field” and establish any communications that may be required.

It is no time to be asking “what should I take” or “where did I put the....”.

You should know what equipment you are taking, where it is and what other items you need. Equipment, cables, antennas and the other items needed to operate in an “emergency” mode need to be pre-assembled and ready to go.

In addition to the radio equipment, you need to consider the personal side. Depending on the length of time you will be out, you will need to think about food, clothing and shelter. As members of an emergency response team, we need to be self-sufficient so we do not put an additional burden on already strained resources.

This document will deal with the hardware part of the equation.

Considerations when preparing “to go kits”

One of the first things to think of is the mode you will be responsible for. Are you going to be setting up VHF/UHF or HF? Is digital a consideration?

While many of the items needed will be the same there are some things to think about for each mode.

Another thing to think of is your responsibility. Are you going to set up and operate the equipment, or are you going out to assist with an operation that is being set up by someone else.

It is important to remember that in any even that will run over a period of time, operators can work only a few hours at a time before their effectiveness declines. Relief operators are vital.

As the Capital Area Amateur Radio Response Team, we are most likely to be asked to set up VHF links. We will talk about that first.

VHF kits

Consider the following:

- Will I be working from my car?
- Will I need to be riding with someone else...and have communications?
- Will I need to be outside the car and at a fixed location?
- How far from the repeater do I expect to be?

You need to consider all the above when building your kit. We would suggest, you need to be prepared for any and all of the above.

If you know, in advance, what you will be doing then you may wish to take only those items necessary for that event.

An example would be storm spotting. When you are assigned a location you can assume you will be working from your car. Have only those items you will need to work from the car.

Writing material.

This applies equally to all operations. You must write down messages and record time and places when things happen.

You should have pens, pencils and paper for any event. You may want to keep some of those items in your car for storm spotting. In addition, keep a supply in your kit. A good idea is to keep them in a plastic bag, such as a sandwich bag. They have a habit of falling to the lowest spot in a kit and may be hard to find when you need them. A plastic bag makes them easier to find and keeps them in better shape.

In any event, you will need to record information. Times and places where and when things happen (“hail started at 8:55 PM local”). It is a good idea to write down all assignments, where other members are located and any number of things you may need to refer to later.

Types of radios

HT's. Generally the HT with a rubber duck antenna is only useful when in town or near a repeater. (A rubber duck antenna is often referred to as a dummy load on a stick !)

The usefulness of the HT can be greatly expanded with the use of an external antenna, such as a 5/8 mag mount. A small "brick" amplifier is not expensive and can greatly expand the range of the HT.

If using an HT you should think of spare battery packs. Other items would include; a cable to let you plug into a car lighter and a portable gel cell or other larger portable battery.

Consider this. You have been assigned to ride with a Red Cross worker. You have your HT, portable power and a mag mount antenna. You then find you are in a PLASTIC CAR. The mag mount antenna will not work. What now? (This has happened to us in public service events)

There are several sources of antennas that will mount on a car window. (Radio Shack is one source) You may want to invest in one for your kit.

Another good piece of equipment for the HT or any radio is an earpiece. It can get quite noisy during an event and earphones can be a great asset. Many HT's have available a combination earpiece and microphone. These will often let you operate hands free.

Note: HT earpieces/mic are often quite small. Put them a plastic bag in you kit and they will be much easier to find.

Mobile VHF radio

The mobile VHF radio may be used in your car, your house or at a remote location requiring a base station. It would be the choice for use at a command post.

The mobile unit is the choice for a net control station or when you are further from the repeater.

These radios will generally have an output power up to 50 watts, compared to a maximum of 5 watts from an HT.

They are considerably more rugged and will handle sustained operation more reliably.

Remember these units consume considerably more power than an HT. You will need a substantial power source, such as a deep cycle marine battery. Run on low power, if possible to, maximize battery life.

I keep a large deep cycle battery in the garage on a “smart charger”.

As mentioned before, earphones are a good idea for noisy environments.

I have several VHF radios, any of which could be used for an event. They have a common power connector about two feet from the radio.

There are several different pre-made power connectors for the other end. These include a cable that can plug into a cigarette lighter, a cable with large alligator clips, a cable with just wire that can hook to a battery.

Your to go kit can look like a rat nest of wires in just a short time. If you put each adaptor in a small plastic bag they will be easier to find.

VHF Antennas

There is no end to the variety of antennas that you can use for emergency communications.

You can use commercial antennas or build one to suit your individual taste.

A copper “J” pole can be build for under \$10.00.

You might be able to run a coax cable from the mag mount on the car to the radio.

I use a commercial antenna called a Ringo Ranger. It is used with two sections of PVC pipe that go together to make up a 10 foot mast. It can be “bungeed” to any post, or it can be erected with set of guy wires kept in the kit.

Another antenna we use is a 5/8 whip, with a ground plane kit. (I purchased these from AES in Milwaukee) It is mounted on a camera tri pod and is about five feet off the ground. It has proved to be very effective.

Whatever antenna you select, you should should check it out with an SWR meter and then practice setting it up.

We would suggest that the next time we have an exercise, such as a bike race, instead of operating from your car, set up your station and operate from there. You will need some sort of table for the equipment and a couple of chairs. This is great practice and if you are required to set up this equipment in a real disaster you will have ironed out any kinks.

It is common, when first setting up such an operation that you find out you are missing a connector or some small item that keeps the whole thing form working.

Practice is the key to having things work.

HF equipment

We generally think in terms of communications on a local basis where VHF will be the rule.

There are times, however where we may need to communicate out of the local area. This may be around the state or around the nation.

In recent times we have seen large scale fires in the Western states. Hundreds of ham operators have been involved. They have provided VHF communications for the local area and HF communications to provide a link between the more distant fires

Everyone in a local emergency response team does not need a portable HF setup. Two or three units should be adequate to handle any event

If you have a portable HF rig, it does not take a lot of extra work to add this capability to your emergency kit.

The first item is of course the HF radio. That choice is yours. A mobile rig might be a choice because of its' smaller size. A radio with a build in antenna tuner would be preferred to keep the number of item needed in your kit to a minimum. A unit that runs on 12 VDC would seem to be mandatory. A deep cycle battery or generator and power supply will work will provide the power.

As we discussed before a good set of earphones will make operating much easier..

This type of equipment is by nature a bit larger than a VHF and needs to be protected when moving around.

I found a metal camera case fit the bill for carrying this unit. I got a large piece of rubber and cut it to fit the case. I then set the radio on top of that and cut it to fit.

I use the mobile HF radio in my shack. When I need to take it on an event it is a simple matter of removing the cables and dropping it in its' carrying case.

HF Antennas

Here again, you are limited only by your imagination.

I know of ARES groups that have a trailer with a fold up tower and a three element beam.

My personal choice is a G5RV dipole. It is about 100' long and you need trees to get it up in the air. It could also be set as an inverted V. My to go kit includes a sling shot, fishing line and nylon rope to get the antenna in the air. This is a commercial antenna that can be purchased for about \$35. I have worked the world from the field with this antenna. The G5-RV antenna will work 80 to 10 meters and does require a tuner.

Another antenna to consider is a vertical. You could get a commercial antenna that will set up and can be self supporting or used with a few guy wires. Some units require a set of ground radials others do not. You would need to find a unit that can collapse into a size your can transport.

At a recent field day, one of the folks used a MFJ push up mast. He taped wire to the mast for the vertical and ran a set of ground wires. This was a great 20 meter antenna.

For most of the HF requirements we expect, 40 and 80 meters would be most used.

Digital modes

Digital modes may be increasingly important in emergency communications. Police and other public service agencies are not anxious to have names and addresses broadcast where people with scanners may intercept messages.

Digital makes it more difficult but not impossible for someone to monitor.

In VHF communications, Packet is the exclusive mode. You can count on having two of everything; two rigs, two antennas. Add a laptop computer and an interface. A Rigblaster sound card interface or a small TNC (terminal node controller) will work. A Kantronics KPC-3 is a good choice for a packet TNC as it is small and easy to use.

HF is more problematic as there are few standards.

One of the newest modes is PSK-31. This requires no TNC. You can build the interface for about \$10 with part readily available at Radio Shack. You can download software from the internet. A program called "digipan" is the most commonly used software. A circuit diagram is included with the documentation file.

This is a good mode as it has a very narrow bandwidth and is effective with little power. It has no error correcting so can be a problem in noisy conditions.

Amtor is commonly used by the NTS. It has some error correction. It can use the Rigblaster (so can PSK-31) or a TNC such as the Kantronics Kam or the AES PK-232 MBX.

Military MARS has standardized on Pactor an improved version of Amtor. Pactor has full error correction but can slow down considerably in noisy conditions.

We expect digital modes to receive more emphasis in emergency communications.

Misc. items

Here are a few items that should be in any “to go” kit.

- A copy of your FCC license
- Your Emergency Response Team credentials
- Basic tool kit
- Electrical tape
- Duct tape
- Soldering iron
- Flashlight
- Photocopy of the manual for any of your field equipment
- Coax cables of various lengths. 25’ 50’ 100’ with connectors
- jumper cables of various lengths with connectors. Suggest you have RG-8/U and RG-58/U.
- a box of connectors of various types
 - barrel connectors
 - PL-259 to bnc(the object here is to be able to connect any radio to any antenna.)
- various power connectors.

Your “to go kit” should be assembled and packed so that you can pick it up and travel in a short period of time. You can put it in any type of carrying kit that seems best to you. A duffel bag, a Tupperware container or a brief cases will work. It is quite possible that you will need several cases to accommodate all your items.

However you decide to assemble your kit. You need to keep things together and ready to travel.

Is this “everything you ever wanted to know about building a to go kit?”.
No way.

Hopefully it will get you started. As you use your equipment for drills and exercises you will add to or remove those items to fine tune your personal kit.

Good luck !