

SURVIVAL RADIO 101

Many people are searching for a reliable means of communication and thus far have not found the answer. Many others place communications very low on the list of priorities. When times are tough and the systems currently in place are no longer functioning the survivor must be prepared to provide this most basic essential for himself. In my case, a reliable communication system is equal in importance to guns, ammo and a years supply of food. In this article I sincerely hope to pass on the knowledge and desire to provide for this important function.

I have read many different articles on the subject of survival communications and have not yet read one that I consider adequate. Some stress the advantages of ham radio, some the advantages of CB. In all actuality, neither of these is the perfect solution. I will go out on a limb and get everyone mad at me. I have been involved in military communications for about ten years and I am here to tell you nothing is 100% reliable all of the time. There are ways to approach that mark though. At this point I must advise you that the information in this article is presented for informational purposes only.

First let's discuss some problems with ham radio. The entry level license (no code technician) allows the licensed operator to communicate on the popular "two-meter" band it also allows communication on other band but two-meters is the most popular. This band is fantastic for local or distant communication, reception is generally clear and reliable. The problem here is that we are looking for communications during "bad times". During these times, the repeater networks that the "two-meter" band relies upon for distant communication will break down from lack of maintenance. The people who maintain these repeaters will have much better things to worry about such as where the next meal will come from. Another scenario is that the government may just decide that they really don't see the "legitimate purpose" for people to have access to the repeaters anymore (or for that matter any amateur radio). Ham radio operators would become a threat and the government will be able to simply go down the list of licenses and shut them down. Yet another problem I see with ham radio as a survival tool is simply that the average person is not a ham operator. When trying to gather information on a national scale, the operator will want to reach as diverse a group of people as possible. There are relatively few ham radio operators as compared to the population as a whole. If an operator upgrades his license to technician plus or general class he will have access to the HF portion of the spectrum which is useful to the survivor indeed. Communications of several thousand miles on some of the lower HF bands are routine.

Another option is the CB radio. This over-rated, under-powered means of communication in its stock form is best left to the interstates of our great nation. During certain atmospheric conditions, a user would be lucky to talk one mile. The band is filled with a great number of hopeful Romeo's, filthy mouthed lowlife's and too many radio checks. I can't even monitor the AM channels when my children are present due to the language and subject matter common on the AM frequencies. Some CB radios lend themselves well to modification. The Uniden Grant LX and the Cobra 148 GTL are very adaptable to upgrade. The power can be turned up and the frequencies can be expanded. There are also a multitude of other useful and useless modifications that can be made to these radios. These are the only CB radios I can recommend. There are many good books available on this subject.

There is available a type of radio sometimes referred to as an "export" radio. They may be somewhat difficult to find due to their illegal status. My suggestion is to buy a cheap CB first, get to know who's who in your area. The people who can obtain "exports" are there, it is just a matter of finding them. These radios are technological marvels. The normal CB is limited to only 40 channels which covers the frequencies 26.965 to 27.405. They are also regulated to 4 watts of output power on AM and 12 watts Single Side Band (more on this later). Export radios can operate in several modes of transmission over a much greater frequency range. Most are capable of nearly 20 watts AM and 40 watts side band. Many also have the capability to "slide" between channels, thus enabling the user to talk "between" channels so to speak. There is also another type of radio on the market that is even better in some ways. These radios are "10 meter" ham radios that can be internally modified to operate from well below the CB band to well above the "10 meter" ham band. One of these radio's is the Ranger Communications Incorporated, RCI model 2950 or it's more powerful big brother the model 2970. These radios have a frequency range of 26 MHz to 31.999 MHz (with a very simple modification) although most users stay within 26.000 to 27.999 for safety. The "10-meter" ham band begins at 28 MHz, don't mess around up there. Most of these radios are mobile radios; in order to use one as a base station a power supply is required to convert 120 vac to 13.8 vdc. I would recommend at least a 6 Amp power supply for an "export" or Ranger. Good power supplies cost about \$75.00 or less. There are also some export and 10 meter base stations available which plug directly into a wall. I feel that some versatility is lost because a mobile radio used as a base can still be a mobile if necessary. A walkie-talkie or two would also be useful when on foot. Although normally range is limited, when communicating with a base station they are capable of a surprising distance. An export walkie-talkie exists that can transmit and receive on the same frequencies as the other export radios.

Now, let's get back to that Side Band statement that I made. If you could look at the signal generated by the average CB radio it could be described as having three layers. The two outside layers are the Single Side Bands (SSB) and the middle is the carrier wave. When the microphone is keyed on an AM CB radio a carrier wave is emitted from the radio, this carrier is there whether you talk or not just wasting power. On a side band radio, the carrier and one of the side bands is eliminated thus concentrating more power into a narrower signal. These side bands are referred to as the upper side band (USB) and the lower side band (LSB). Some CB radios are capable of side band communication but, are still restricted to the 40 channels of the radio. Even with this limitation a CB equipped for side band in effect, gives you 80 side band channels and 40 AM channels to choose from. Within the CB band, most side band communication is on the LSB of channels 35-40. Outside the CB band, many people use the frequency 27.5550 USB as a long distance call frequency. This frequency is located in the so-called "freeband" which extends from 27.4150 to 27.9990, this frequency band is an area of spectrum which is used very little by the primary users. Much of the best side band long distance communication takes place in this area.

Side-banders as they are commonly referred to are a different breed entirely that the AM operator. They have a protocol for operating that makes the side bands a much more pleasant place to communicate. These people are usually very knowledgeable about equipment and also sources of "the good stuff" especially when talking about free-banders. On the sidebands, the use of a "handle" is taboo. They normally identify themselves with a three or four digit number. These numbers can be obtained through sideband organizations or, if like me you want to stay off the lists, just make one up. Having a number will give you credibility so other sidebanders will talk to you. Another major difference between SSB operation and AM operation is the use of "Q" codes instead of "10" codes. If an operator tries to use the "10" codes on SSB he will usually be in for a ribbing and, told to go back to

AM. A complete listing of the international "Q" codes will be available in any book about beginning Ham radio. The best advice I can give is to monitor the side bands, see how they operate and when you have it down make your first contact. Another good idea is to find a local sidebander or freebander and treat him like a brother. This person can guide your decisions and prevent some very expensive mistakes. He will also be able to relate to you information which is not available in print.

The antenna is the most important part of the system. Within the myriad of mobile antennas, all of my research has led me to one antenna that is worthy of consideration. This is the Wilson 1000 antenna. This antenna can handle up to 3000 watts of power and can be purchased in three different configurations; a magnetic mount, a hardmount (a hole must be drilled in the vehicle) and a trunk lip mount. This antenna transmits and receives better than any whip antenna I have ever seen or used. Since it is simply a thin, steel whip, it is unobtrusive as well. They may seem a little pricey at first but, the advantages gained in performance, durability and lack of maintenance more than make up for the costs. I have personally talked from the Southwestern United States to Alaska from my car with one of these antennas. An alternative to the Wilson 1000 is the Wilson Trucker 2000. This antenna will handle 3500 watts of power and is essentially the same as the 1000. The primary difference being the type of mounting hardware necessary. It is sometimes a better choice for vehicles where a roof top mount is not desired or possible as it will mount to mirrors or the body or anywhere that you can fasten a standard 3/8 by 24 pitch antenna mount.

Regarding base station antennas you have two types to choose from: The beam antenna and the vertical element. My choice is to use both through the use of a switch box. The vertical element is better for local communications and, the beam is better for long distances. Many times an operator is able to talk to a distant station that would otherwise be unheard without the use of a beam. The beam antenna is mounted on a rotor which is controlled by a control box next to the radio. The operator simply rotates the beam until the best signal is received. The vertical element antenna is better for local communications because the radiation pattern into and out of the antenna is omni-directional. The beam will only receive and transmit in the direction it is pointed. Beams are designed to multiply the transmit and receive strength and are said to have a higher "gain". Whichever type of antenna you use, it is important to securely ground the mast. I use a minimum of 8 feet of steel or copper ground rod driven into the earth and connected to the mast with 8 gauge wire or copper braid. Make sure all clamps are tight. Popular brands for base antennas are Maco and Moonraker. The Solarcon A-99 is a very good omni-directional as is the V58 by Maco. Whenever an Omni is used make sure to include the ground plane radials. These extend out from the base of the antenna and increase the efficiency dramatically.

An important area of concern for the radio operator is a term called Standing Wave Ratio (SWR). This is simply the amount of output power being reflected back into the radio. The higher the SWR the less efficiently your equipment is functioning. If the SWR is too high you will eventually cook your radio. An SWR reading of 2.0 or less is generally considered acceptable, this number should be as low as possible. Anything 3.0 or higher will eventually damage valuable equipment. The SWR is adjusted with the antenna, usually by sliding the radiating element in or out of an adjusting sleeve or by trimming the radiating element. In any case, follow the manufacturers directions or seek the advice of an experienced operator. The coax which connects the radio to the antenna to the radio is very important and deserves mention. In order to achieve an efficient system a good quality coax should be used at the minimum I would recommend using MINI 8/U or RG-8/U if the diameter is not a problem. The very best money can buy is called RG-213/U. It is almost a half inch in diameter and well worth the money. It

isn't too terribly expensive at about \$30.00 for 50 feet. The others are substantially less. Operators using a linear amplifier need to be unusually careful of a high SWR.

A linear amplifier can significantly increase the operating distance of a radio. These amplifiers are used to boost the power of an outgoing signal as high as the operator's budget will allow. I have heard it said that amplifiers normally cost about a dollar a watt; I think this estimate is too high. The average I would recommend for a reliable system is about 500 watts. This power will increase local reliability by allowing communication over the "skip" coming in and also allow you to talk very clearly to out of state or even out of country stations when skip conditions are good. When skip conditions are favorable Channel 6 (27.0250 MHz) on the CB band is a very good example of the benefits of a linear amplifier. Many of these stations, even from thousands of miles away, will sound like they are in your back seat. Most of the stations on channel 6 are running 1000 watts or more.

Skip is an atmospheric condition in which your signal can travel thousands of miles and reach a distant station. For the SSB operator, skip is pretty reliable. On any given day an operator should be able to talk out of state to somewhere. Sometimes this condition will last only a few hours but, it happens almost every day. Skip occurs on the AM band as well but, it fades in and out so fast that meaningful conversations are almost nonexistent. I have had or heard many conversations on side band which lasted an hour or more. Atmospheric skip makes the radio a good source of information on a national scale. This oversight probably has the FCC fuming but, there is an unenforceable law which states that it is illegal to attempt to make contact with another station that is over 150 miles away in the Citizens Band. Even a totally stock, out of the box CB has the capability to make contact with other states occasionally.

There is currently a government agency called the Federal Communications Commission (FCC), which regulates and enforces all forms of inter-communication in the United States. These people are to free communication what the BATF is to firearms. Two-way communication is only legal through strict government guidelines. The very nature of the "ham license" only adds to the "law and order" society which the bureaucrats want to create. This licensing process is simply a means of keeping tabs on two-way communication. Nazi Germany was also interested in controlling communication as are all totalitarian regimes. In many countries simply possessing a means of two-way communication is as serious of an offense as possession of an unauthorized gun. Don't worry though, "it can't happen here, the republicans are here to save us".

The situation we find ourselves in now in the United States is becoming more precarious each day. The Republican revolution, for the most part, has turned into just another scam on the American people. Our currency is teetering on the brink of collapse. The committed survivor must be prepared to provide this important asset to his family or group. One day when you pick up your "cell-phone" and nothing happens what will you do? Hopefully you will just reach down and turn on the radio, but if you don't have one...

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