John Wagner's Shortwave Tips & Tricks

The short wave listening (SWL) hobby is great fun. Please remember that first line, especially the word "fun". Further, SWL'ing is "a hobby". Fun and hobby are the two common threads that bind these Tips & Tricks together. We hope they are of some value. Time and resources will not allow for my personally answering every inquiry. However, questions received on particular issues in significant numbers will be addressed.

Shortwave Books Everyone Should Have.
World Radio TV Handbook. This respected annual serves both the hobbyist and the commercial international broadcasting audiences.

Just a Bit About Shortwave Portable Receivers
I have never met a receiver I didn't like, especially the portables. But, there is no one perfect receiver, portable or otherwise. There are some portable receivers made better than others, but they cost more too. Performance of any portable receiver is dependent upon two simple factors, the user's understanding of RF and, the antenna used to feed signal to that portable. But, using large antennas on portable receiver's can not only degrade their performance it can ruin them.

Portable receivers come with built in whip antennas for use on the SW and FM broadcast bands and a ferrite rod for medium wave signals (MW). That is their design intent. We'll begin with a few tips & tricks for improving upon signal control and antenna use with the portable receivers. Later on we'll address certain operational tricks for specific portables and other receivers. No discussion about antennas and receivers is possible without covering a few basics. Among the basics needed for these topics are sensitivity (ability to hear) of the portable, signal to noise ratio of the received signal and the S-Meter.

Sensitivity.
Many, if not most SWL's will always ask about a receivers sensitivity, meaning how small of an RF signal is needed in micro volts are required to hear weak signals. On it's face this seems like a proper concern. But, sensitivity is a double bladed sword. Higher sensitivity can cause more problems than lower sensitivity in the form of receiver overload and intermodulation (both are unwanted). Given a choice I'll chose a receiver with a lower sensitivity every time. You can more easily manipulate and control a signal entering a receiver. Not so once that signal/noise enters your receiver. Proper antennas and devices give you that all-important "element of control".

Signal to noise ratio.
The ratio of the signal vs. the corresponding amount of noise that enters a receiver while you are trying to hear a given thing is the most important concept to be understood. All wanted signal entering your receiver will be accompanied by a corresponding amount of noise! The art of hearing the desired signal is won or lost through the concept of "knowing how to increase the signal at the expense of the noise". The antenna has the major role in this S/N ratio!

The S-Meter.
Second only to antennas, the S-Meter tends to cause the most SWL confusion! Many SWL's believe that for good reception the signal meter must be all the way to the top of it's scale, or close thereto. That concept is very wrong. It is amount of audio you hear, and the quality of that audio that counts, nothing else. The higher the s-meter also the higher the noise. Only bring in enough signal to allow for good audio and ignore the s-meter. The s-meter will have uses later on. Concentrate on audio quality, not signal strength.

Antennas for Portable Receivers.
Portable receivers will perform very well using their already provided antennas. Keeping in mind the potential to overload, or even harm a portable receiver here are some tried and true antenna improvements.
(1) There are two primary sources of noise that impede our ability to hear our wanted signals, interior noise (inside the receiver) and exterior noise. We can only control exterior noise, the noise in our listening environment.
(2) The best way to control exterior noise is (gulp) "to whenever possible use an antenna not inside of the listening area" (your home/office). Until and unless one learns the hard won fact that antennas outside of a house or building always out perform indoor antennas, first try wrapping three or four wraps of any old "insulated wire" (bare wire will short out) around the whip and snake about 15 feet or so feet around a window. Doing this has the effect of making the length of the whip longer and therefore to capture more signal. Again, too much wire will cause bad things, overload/intermod.
(3) When possible put a small insulted wire outdoors. Using 15 to 20 feet of wire outside 10 to 20 feet high will do very well. To bring the wire inside, open the widow, place a length of weather stripping (felt or foam rubber) along the length of the widow sill so as not to damage nor short out the wire, then connect it to the whip and shut window. Some portables have "mini jack or RCA phono" antenna inputs. Try using both and pick the one that sounds best! Note: You'll now find why I've warned against big antennas on portables. As a safety precaution against the use of potentially damaging big antenna the manufactures put a switch here to turn off the amplifier to the whip inside if the portable. That amp off reduces signal strength (to test this just stick your head phone jack into the antenna input while a strong signal is present).
(4) Use "the Wagner Active Preselector" antenna! (see Active Preselector at end of this section)
(5) Buy a Loop Antenna. Loop antennas work very well with all portable receivers (and many other receiver types seen later on in these pages). Some excellent loop antennas are readily available. Among the best are the former model AOR LA-320, current model AOR LA-390, also the former Kiwa Pocket Loop (more on this great Kiwa later also), or former Palomar Loop. There is also the excellent Palstar LA30 medium wave loop antenna that features an optional Tropical Band element (but covers *only* 1480-7500 kHz). It is also possible to build your own loop antenna, but not advisable for newbie's.

The best performing of the indoor antennas are the loop antennas. As my house is quiet now that the kids are raised and I'm retired I use the three commercial loops listed above plus the discontinued Sony ANLP-1. The first three loops listed above all work in a similar way and are very effective. Excepting for the Kiwa Pocket Loop and the Sony ANLP-1, the loops will have special plug in units called "lop heads". Each separate loop head covers a section of frequencies

and you buy various loop heads depending upon the Bands you wish to tune.

The advantages of the loop antenna are many. The loop antennas are small and therefore can be rotated while sitting next to the portable so as to locate the best angle of signal arrival and to "null out" noise. Also, they employ a variable capacitor that allows you to "peak the signal" you are tuned to "reject" signals not desired (this is called "preselection"). This ability to "peak and null" makes the loop antenna a great choice and to not require one to be as apt to need an outdoor antenna, parish the thought. Loops are also very safe to use. The Kiwa Pocket Loop does not require "plug in loop heads". The changing of bands is done by adjustment of some five DIP switches inside the control box. The Kiwa can also tune higher in frequency than other similar loops. The Kiwa can even be used on older table tops without the need for power or peaking at every frequency change (little known tip). The new Sony AN-LP1 loop is a good performer and looks for all the world like a giant ping-pong paddle made of cloth! Don't let the looks fool you as it works very well when stuck on a window!
(6) Commercially made antennas for portables are available and also work very well. The active antennas (active means the use of amplifiers and power supplies to enable the use of a small receive element such as a whip) that work well with most all higher price portables are the RadioMasters A-50 or RadioMasters A-108 (The A-108 covers BCB-FM also) or the Sony AN-1. I use all of these and they do very well for active antennas (see "active vs. passive antennas" later).

Some great passive antennas for portables are the RF Systems EMF, RF Systems Mini-Windom, or the former RF Systems EMF-P wire antennas. These three different antennas are well made, weather proof for outdoor use, super easy to install (use weather stripping on window to feed in) and work very well. In fact, if you like MW DX you'll need to see "MW DX" later in these pages). The EMF antenna has two 35mm film canister looking objects connected to it. The canister on the far end is actually an excellent "tuned ferrite rod" designed for MW (medium wave) and really helps any receiver without a built in MW antenna rod. Canister two (in middle) is a balun that helps SW reception very much.

(7) "The Wagner Active Preseletor Antenna". No, I am not the inventor of this great SWL antenna! But, I use them so often with my patients, and have explained to so many SWL's how to use one of these I've been forced into finally putting the design/use to print! In fact, it was this antenna that caused me being drafted into doing these pages (a labor of love). Also, this antenna could legitimately be called "the if you want to make any receiver, in any tough location work better"antenna! This one is my absolute favorite, but I get to make a few rules "that no one is gonna change"! If the SWL's do not learn one other thing in this article it is going to be:
(A) A preselector and a "tuner" (ATU, Match box etc.) are two COMPLETELY DIFFERENT devices! A "preselector, in the words of one of my SW Idols-John Wilson (formerly of Lowe Ent., UK), is "an RF Gate". When a "preselector" is properly set it only allows a very narrow swath of RF in and severely attenuates all others. The design purpose of a preselector is to allow the receiver operator to select the signals they want to enter their receiver by deselecting all other signals. This RF "selection/de-selection" only allows the set narrow swath of RF into the signal processing circuits of the receiver. Absent those other "out of band strong signals", you vastly improve the Signal-to-noise ratio and get a cleaner audio.
(B) The so called "Tuner" is an altogether different device, having the design capability and

intent on adjusting the antenna impedance "as seen by the in put/out put's of a transceiver! While there may be some value in the use of an ATU for SWL'ing, it is very limited. Transmitting is not a subject to be broached here.
(C) The last rule is "there are but two reasons under which this antenna will not work! Reason one for this not to work is "where ever the wire is located is already noise polluted (lots of interference in the location). Reason two for it's failure is "Pilot Error". Number two is by far the most common problem, as the proper use of any device requires careful adjustment.

What is needed for making "the Wagner Antenna".
(1) A 20 foot or so long piece of insulated stereo or hook up wire (try to buy the wire at Sears, Best Buy, Circuit City of similar audiovisual store. It comes already to use with RCA phono jacks in each end for connecting to a preselector). (2) An MFJ-1020B, or MFJ-1045C, Grove TUN-4A, Ameco TPA, or Palomar's P-508. These are all "preselectors". (older Palomar P-405 or P-408's are great too). (3) One 18 inch to 2 foot mini-coax jumper cable to connect the two together.

Set-up and Use.
All of these preselectors share a common design design/use traits. Most can be powered by a 9 volt battery (not TUN-4 or Palomar P-508 or 408). All have the three same front panel adjustments. All will work well "if simple set up" is followed.
(1) Attach the 20 foot speaker wire to rear RCA or SO-239 marked "antenna in put" and connect the 18" jumper wire to "antenna out" on preselector. Connect mini-coax to receiver "antenna in put".
(2) With preselector off tune receiver to a known weak but hearable signal (try the signal you have always wanted to come in better).
(3) Set preselectors "gain" to 1/3 to ½ way on (9 to 12 o'clock). Set middle knob (the course preselection knob) usually marked "Band" in MHz that your receiver is already tuned to. The middle knob will have a range of freq.'s marked in a range of 4 or 5 positions such as 1.8 to 4 MHz, 4 to 10 MHz, 10 to 16 MHz, & 15 to 30 MHz, Chose the MHz, range you are tuned to. Turn the preselector on.
(4) Now, to "where the rubber meets the road"! Take the far right knob, usually marked "tune" (ignore the "silk screened numbers above this knob" for the most part as they are only intended to serve as guides, not the actual "Sweet Spot"! Slowly turn the "tune" knob back & forth along it's turning range. You will hear many weird noises and "one click" (usually, but not always a muted click). If you don't hear a click, you'll hear your once weak freq. "jump out" to your ear! That is "the Sweet Spot"! That is "what you are looking for! Lastly, ever so sloooowly rock that last knob back & forth until spot on! Set left "gain" knob to lowest setting needed to pleasantly hear your frequency!

BUILD A SHORTWAVE ANTENNA
"The Search For The Perfect Shortwave Antenna"
by N4UJW Webmaster Hamuniverse.com

Follow these simple plans to build a multiband shortwave antenna
and be on your way to world band radio excitement!
Hear shortwave signals live as they happen directly from around the world!

Many years ago, my dad sparked my interest in shortwave radio, which led to me becoming a licensed Amateur Radio Operator in 1989. Lots of us "Hams", listen to the shortwave bands when we are not in the "talk" mode ON THE AIR. I have enjoyed shortwave radio since a small child!

The excitement of listening to voices, music, news and other fascinating information and radio signals of all types from around the world can by yours too. You, my friend are probably just getting started in this fascinating hobby or you just want to improve your reception..... WELCOME!

Just follow these simple instructions below to build either an outdoor or indoor multiband shortwave antenna. These antenna types described below can generally be used either outdoors or indoors, but lots depends on the room you have for the wire. They have been broken down into their most common use and simple antennas. For the most part, they will outperform or at least equal commercial made shortwave antennas for a lot less money and you will have the satisfaction of saying, "I built it myself"! You don't have to know antenna theory to build these antennas, but included is one very simple formula that all Hams use in designing these types of antennas.
Let's get started.

A NOTE ABOUT WIRE FOR SHORTWAVE ANTENNAS:
An antenna is composed of a conductor that carries the electrical signals to your receiver. There are many kinds and types of wire starting with single wires made of copper and stranded wire made from steel with a copper coating on the outside. Many "wires" have multiple conductors like telephone wire used for adding extra telephones or regular speaker wire with only 2 conductors side by side.

Most shortwave antennas require only one conductor or wire in the "elements" of the antenna so when using "wire" for antennas, you can use the least expensive types.

The size of the wire can be an important thing if the antenna is designed to be used outdoors in the weather. Use a minimum wire size of about #20 to #18 outside. When you use sizes much smaller than these, you get into problems with breakage from ice, wind, birds, etc.
Wire sizes are numbered by their gauge, larger sizes are the smaller gauges. A #14 wire is larger in diameter than a #20 wire gauge. Most ham radio operators use # 12 to #14 wire sizes outdoors!

So when we refer to "wire" in the article and projects below, use the appropriate wire size.

OUTDOOR GENERAL PURPOSE MULTBAND SHORTWAVE (WORLD BAND) ANTENNAS

THE LONG WIRE SHORTWAVE ANTENNA

The simplest multiband shortwave antenna for shortwave listening is probably the longwire for most newcomers to building antennas. It is literally, a random long length of wire stretched out from the shortwave receiver antenna connection and attached with some form of an insulator on the opposite end.
No bells or whistles and usually very easy to do.
Your shortwave radio probably has either a short telescoping (pull-up) antenna and or a connection point for an external antenna usually on the rear.
A very simple method of drastically increasing the signal strength to your shortwave radio is to simply add about 50 to 70 feet or more of insulated wire of small diameter, (size not critical, it must support it's own weight), attached to either the telescoping antenna with an alligator clip or a suitable connector to the rear external antenna connection and stringing it out across or from the house to the appropriate support as high as possible on each end with some form of insulator along the entire length, (a non-metal device that will not pass electricity). In other words, don't run it along a water pipe, conduit, metal house siding, rain gutters, etc. It can be tacked along the ceiling or snaked up into the attic or around the roof. Just don't run it close to metal. Use your imagination. Make sure that you have removed the insulation when adding the connector or alligator clip.

DANGER! DO NOT STRING THIS ANTENNA OR ANY ANTENNA OVER, UNDER or NEAR ANY ELECTRIC POWER LINES OF ANY TYPE! YOUR LIFE WILL BE IN YOUR HANDS, NOT MINE and I assume no liability. Repeat....never OVER, UNDER or NEAR POWER LINES! This includes the service drop wire from the utility power pole to your electric meter! Have adequate space allowed to insure that if a power line falls, it will not fall on your shortwave antenna! Use this rule of thumb....
If it is under the power line.....the power line WILL FALL! If it is over it, the antenna WILL FALL! You don't want either happen!

Now back to shortwave antennas.
The longwire type of antenna is a compromise as ALL antennas are. Don't expect the same reception 100% of the time from the same station. Mother nature and man-made variables will surely destroy your expectations.
This type of antenna generally "picks up" stations better in the direction of the wire, so if you live in the U.S.A., you can string it in a Northeast Southwest direction and get the European stations somewhat better. Don't worry if your layout is not perfect....just put it up and have fun listening.

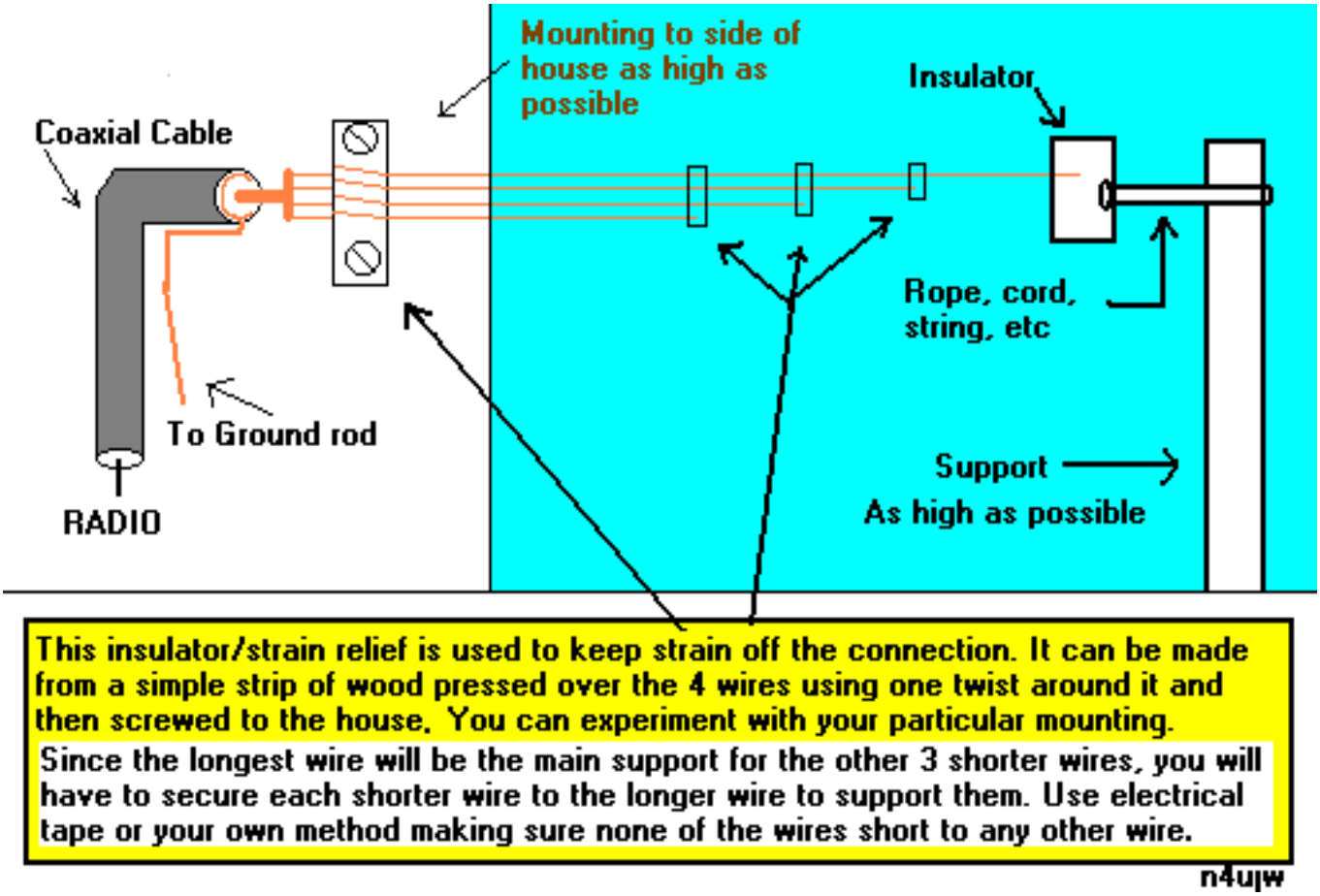
THE MULTIBAND LONG WIRE SHORTWAVE ANTENNA

A Much Better But More Complicated Antenna

This antenna is end supported and designed to receive the major shortwave bands between 90 meters and 16 meters. It uses only 4 wires and a unique antenna property called harmonics to get 8 bands using only 4 wires! Again, it is a compromise but an excellent performer....the perfect antenna does not exist. We "Hams" are working on it constantly!

After construction, this shortwave antenna should be stretched out in a straight line as high as possible as in the long wire antenna above, and about 140 feet straight out from the house! Don't fret! If you cant', you can't. Utilize your existing space. More supports may be required for a zig zag layout but performance may suffer a bit. Don't worry, it will certainly outperform that built in poor excuse for an antenna!

It consists of 4 separated insulated wires, (measurements below), all connected (soldered) on one end, leaving the opposite end unconnected and insulated at the support. If you do not know how to solder, then scrap all the coating from the wire down to bare copper and tie the ends together using several knots. You really should learn to solder though!. This will make for a more permanent and much better electrical connection.
The soldered end must be between an insulator and the radio for mechanical strength.
You don't want much stress on the soldered connection other than the coax leading to the radio. The end that has all wires connected should be soldered to the center wire of a suitable length of 50 - 75 ohm coaxial cable leading to the short wave radio with a suitable connection. A ground wire is soldered to the shield only of the coax at the same end that you soldered all the wires together and attached to a ground rod driven into the ground near the house. Seal and tape all outdoor connections from the weather. This antenna is called an end fed half wave antenna.
See picture, formula and wire measurements for bands below:
(The lengths are not extremely critical, but try to get them as close as possible.)



Note: In the instruction box above, the last sentence refers to the long portion of the wires, not at the connection point to the coax feed line to the receiver. All wires are connected together at the connector center conductor wire!

(frequencies shown below are approximate shortwave band centers):

Wire 1 (LONGEST WIRE) 3.25 MHz (90 meter band) 09.75 MHz (31 meter band 3rd harmonic)
468 divided by 3.25 = 144' 0"

Wire 2 3.95 MHz (75 meter band) 11.85 MHz (25 meter band 3rd harmonic)
468 divided byi 3.95 = 118' 6"

Wire 3 5.10 MHz (60 meter band) 15.30 MHz (19 meter band 3rd harmonic)
468 divided by 5.10 = 91' 9"

Wire 4 (SHORTEST WIRE) 5.90 MHz (49 meter band) 17.70 MHz (16 meter band 3rd harmonic)

468 divided by 5.90 = 79' 3"
The number 468 divided by the frequency above is the formula for calculating a half wave antenna length used all the time by Amateur radio operators in building many different kinds of antennas.
You'll need about 435 feet of wire for this antenna plus appropriate length of coaxial cable. Check with Lowe's, Home Depot, Radio shack, Wal Mart, farm supply stores and other stores that might have wire bargains. Dual conductor speaker hookup wire can be purchased in rolls and split in half to double the length. Multiconductor tv antenna rotor wire can be used the same way. Electric fence wire is also a good alternative.

The wires are spread 3-4 inches apart, held in place with simple non-conductive spacers.
Just cut a few pairs of the acrylic, Plexiglas, plastic strips or other non-conductive material that will not be damaged by moisture long enough to attach the wires keeping the spacing about 3 to 4 inches or further if you want.
Use your own ingenuity with the attachment method while keeping them separated.
To accomplish all of this, you stretch the antenna on the ground, assemble it, then get it up to the support with your own best way.

OUTDOOR CENTER FED MULTIBAND (FAN) DIPOLE SHORT WAVE ANTENNA
NOTE: For use with the higher quality table model communications receivers that have standard antenna connectors capable of using direct coaxial cable connectors.

This antenna type is used by many Ham Radio Operators worldwide and is very popular but the lengths for the Ham bands are entirely different.
The entire length of the antenna is about the same as the one above and the coaxial cable is connected in the center of the span with the center conductor connected to one side of the antenna and the shield connected to the other side then at the other end, to the receiver.
The formula used for this antenna is the same as the Multiband Long Wire above:

468 / by frequency in mhz = total length in feet. This resulting length is cut in half!

One antenna per band stacked.

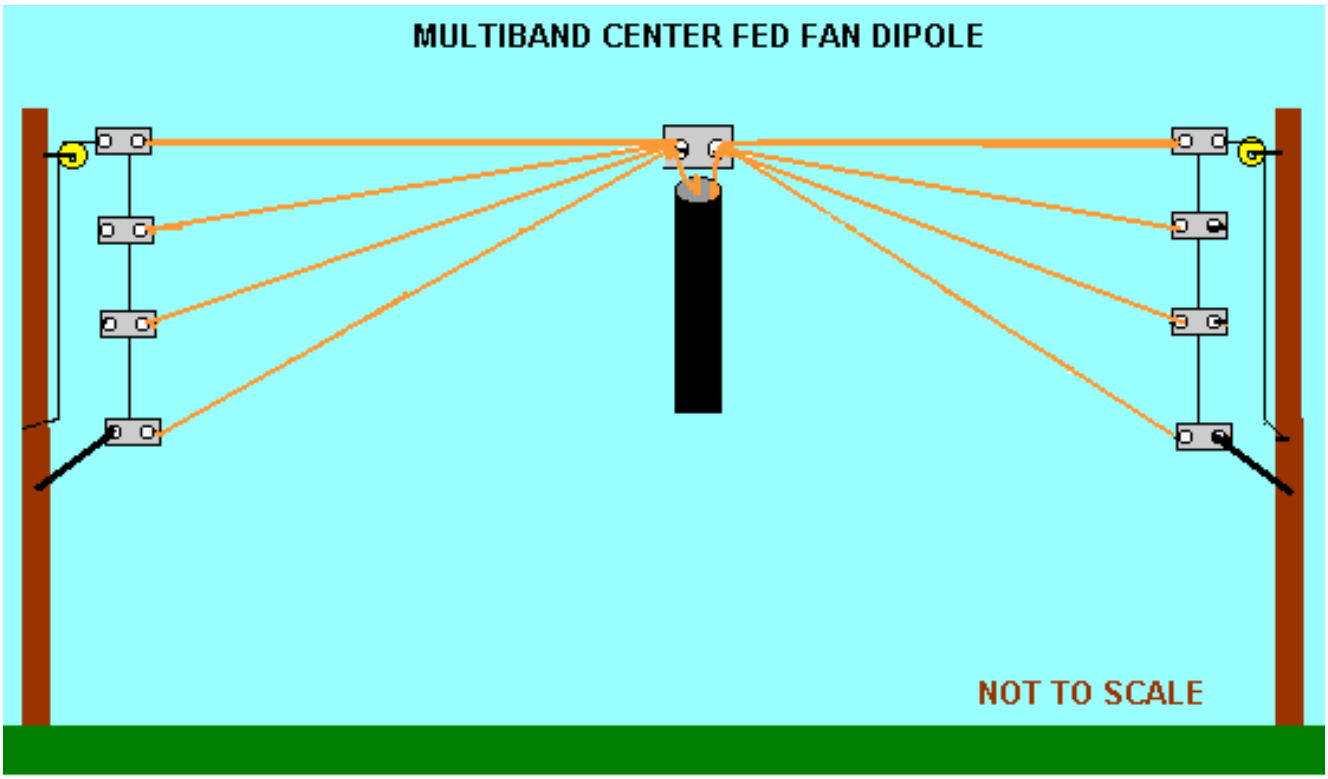
It is somewhat more complicated in construction due to the center connection and requires support in three places....each end plus the center. The preferred method for using this antenna is drawn in the picture below with the wires "fanned" apart with at least a foot of separation between the ends.
All of the wire elements can be close spaced but some interaction will occur. Insulated wire is best so the individual wires do not connect on the longer lengths of the antenna.

Choose the antenna of your choice depending on your constructions skill and needs.

Either way, they both will be much better than the little telescoping antenna that comes with most portable receivers.

The center fed multiband dipole antenna (drawn below) consists of 2 separate sections of 4 wires on each side of the center connection at the support consisting of 4 wires connected to the center conductor of the coax and the other 4 connected to the shield.

In this arrangement, one half of the antenna is feeding the center conductor and the other half is feeding the shield. Each side must be insulated....not connected....to the other side. The other end of the coax is connected to the radio with the appropriate connector.
Use lengths in the above multiband antenna with total length split in half using the formula....half on one side and half on the other for each wire length per band. The coax can be anything from 50 ohm to 75 ohm.
Not critical on receive! **You will have to use the proper connector on the end of the coax for your receiver antenna jack**.



Shown supported between two wooden poles. Gray rectangles are insulators.
Yellow circles are pulleys.
Orange lines are dipole elements.
Heavy black vertical line in center is coax leading to radio.
Note that one side of antenna is connected to center of coax, shield to the other side.

Note in the drawing above that the small gray rectangles represent insulators!

The final assembled antenna can be installed with the center section higher than the ends, making it look like an inverted V, like this /\ . Make the angle of the V about 90 degrees or more.
Or it can be horizontal to the earth or anywhere in between.
The inverted V configuration is more omni-directional, (all directions), than the horizontal method which tends to receive best, broadside to the wire. Less real estate is required for the inverted V method. Center supporting also has less tension on the antenna so smaller wire size may be used to save money.

Choose the antenna of your choice above depending on your constructions skill and needs. Either way, they both will be better than the little telescoping antenna that comes with most portable receivers.
Enjoy!

INDOOR MULTBAND SHORTWAVE ANTENNAS

Attic Antennas

To begin with building and installing an attic antenna that helps your reception, you need to take stock of your attic's measurements, particularly the length of the attic at it's longest distance that you have easy access and your radio's location.
One of the more common house sizes is about 50 to 60 feet long and about 25 to 30 feet wide at the ground level. Your house or home may be entirely different. The accessible attic space usually is much less than this. You will have to really compromise with an attic antenna as far as the band coverage is concerned for a short wave antenna to perform adequately. Use the dimensions of your attic and compare them with the lengths of the long wire and dipole type antennas in this article above and choose the one that you can "fit" into the attic. You may not be able to use lengths for all the bands, but again, no matter what length your end result is, it will certainly outperform that little pip squeak of a poor excuse for an antenna that came with the radio! Just utilize the space that you have and don't worry about the length. Just use as much wire as you can and forget about that "perfect antenna". It still does not exist up to this point in this article! Hams are still working worldwide on it!

The best place to mount or attach the antenna is against the peak or highest part of the roof thereby keeping it away from ductwork, AC and heater systems, telephone and all the other metallic environment that exists in most attics. Once you have the location selected, then build the antenna while keeping in mind that the coax or wire will have to get to the radio. If you're working up on the roof, get a helper to assist, an adult, not children! Be careful on those ladders! You can push most small coaxial cable under the space where the carpet and wall come together and wire should be no problem, then to the nearest closet, up the wall and into the attic. You can work from the attic down or radio up....your choice. Lots of variables here too so you will have to choose your own route and method of installation. If you have to drill into a wall to feed the wire, use caution and don't drill into electrical wires! It may be the last time you do!

IN ROOM ANTENNAS!

In those cases where you can't put an antenna outside or up in the attic, then you can install it in the same room with the radio! They won't be as effective as those up in the attic or outside but will still get more signal to your radio which is what you want.
Simply use your own method to attach a random length wire, up next to the ceiling against the walls...around all sides of the room if possible. One other choice is to push a random wire between the carpet and the baseboard around the walls of the room. You will be surprised at the difference compared to that telescoping antenna that came with your radio. Just attach the antenna to the telescoping rod...don't forget to remove the insulation on the wire at the attachment point!

RANDOM WIRE SHORTWAVE ANTENNAS.

The name says it all.....
just use any length of wire and as long as possible.
Now wasn't that one simple. Use same construction techniques as in above for supports and connections.

Adding optional wind up reel antennas to your shortwave radio.
Many companies offer optional wind up "reel" type antennas that attach to the telescoping antenna that comes with most receivers and they may help to improve reception to portable shortwave radio receivers, but, many leave lots to be desired, so here is some simple information on how to modify most of them to increase the length of the antenna wire that comes with them. Easy to do.

Editors note: NONE OF THE ABOVE ANTENNAS ARE DESIGNED FOR TRANSMITTING....USE FOR RECEIVE ONLY!
DAMAGE TO TRANSMITTER MAY RESULT.

"As I have stated above a couple of times, don't worry too much if you can't get the lengths exact at the begining of this article or you don't have the ideal amount of real estate required for the longer antennas.
Just have fun and try to learn by doing. EXPERIMENT!
These longer length shortwave antennas may actually overload your receiver with too much signal on the less expensive short wave radios with telescoping antennas only. Just disconnect the alligator clip from the antenna and just wrap the wire several turns around it without the actual wire inside the insulation touching the antenna.
This will probably improve the overload."

"This author has helped the wire industry stay in business over the years as have other Amateur Radio Operators have done and I have enjoyed every minute of if. I have used just about every kind of material for an antenna for shortwave listening that would conduct a radio frequency including window frames, bed springs, rain gutters, conduit, aluminum tubing, coffee cans soldered together, old CB antennas, TV antennas, curtain rods, copper tubing, aluminum trim from kitchen counter tops and on and on..... and the old standby.....wire!
I hope this article and projects were of some small use to you in your quest for the perfect short wave antenna!" Experiment, experiment, experiment! Have fun!

Webmaster Hamuniverse.com....N4UJW

Extending the Wire Length of a Typical Wind Up Reel Type
Shortwave Antenna to Improve Shortwave Reception

This simple modification will help increase your shortwave reception!

A bonus is that it only cost pennies!

The optional shortwave antenna reel thay many people buy to increase the reception of their portable shortwave radio will help reception some, but due to the shorter length of the extention antenna inside the reel, it may still not provide you with an adequate signal for those weaker shortwave radio stations.

By using this modification to the length of the wire in the reel, it will certainly help more.

Typical Shortwave Reel type external antenna extension.

Pictured above is a typical wind up reel type shortwave antenna extension.

It is used to attach to the telescoping antenna that comes with most portable shortwave radio receivers to help increase the reception of shortwave stations an make better reception possible than using just the short telescoping portable radio antenna.
Most reel type antenna extensions are a typical length of about 20 feet or more extended, but sometimes leave much to be desired when the shortwave signals are weak.

This article describes how to add an additional length of antenna wire to the existing wire that comes rolled up inside the reel that should enhance your shortwave radio listening pleasure.

IMPORTANT!!! **First you must determine that the wire stored inside the reel is NOT spring loaded to help with winding back the extended antenna wire when**

storing the antenna wire when not in use. If it is, then you must take care when using this modification to NOT let the wire be pulled completely inside the real after the end is cut! If it does, then you may not be able to get it back out where you can add the extension to it!
You must assure that the wire WILL NOT BE PULLED BACK INSIDE THE REEL!

In this modification, you will be cutting the end of the antenna wire coming from the reel a few inches from the end clip that would normally attach to the telescoping antenna on the radio in this modification.

You should not need anything but an additional length of wire to extend the original length coming from the reel except some electrical tape. The wire you chose should be insulated and not bare. The choice of the length and diameter of the extra wire to be added is yours. Remember that the larger the diameter of wire, the more weight it has. Standard speaker type wire works well. Split the 2 conductors in half length wise and use one single length of it.

You can in most cases add wire from a few feet to as many as your room area will allow. A good length to experiment with is about 40 to 50 feet long including the wire that is extended from the reel. So if the original wire inside the reel extends to say 20 feet, then by adding an additional 20 to 30 feet for your antenna, it should work fine and help increase your reception of stronger signals.

If you are, as an example, using the radio in a room that is say, 15 by 15 feet, then the maximum wire to be added should not be more than about 15 times 4 or 60 feet if you spread the wire around the outer edges of the room near the ceiling. You will have to determine how to support the wire with whatever method you choose. Thumb tacks can be used as an example or those stick on picture hangers that remove from paint easily. You will have to decide if the wire will be temporary or permanent. Regardless of whatever method you use to support the wire, it is best to keep it away from house wiring that may be in the walls. High near the ceiling is usually the best location.

The choice of the "direction" or layout placement of the extra wire is yours since room dimensions vary from home to home. You can experiment with "straight" wire or placement around the edges of the room as needed for best reception. Even a zig zag pattern could work fine for you. Experiment for best results.

Now to the actual modification and addition of the extra length of wire. Refer to picture below.

Location of main cut in original reel antenna wire.

Measure about 4 to 5 inches from the end connector toward the reel wire and cut the wire.
Do not let the wire going to the reel go inside the reel!

Lay the end connector aside and save.

Now remove about 1 inch of the insulation from the wire coming out of the reel. Do not cut the inner wire if possible or you will have to start over. Remove any oxidation from the wire end. It should be bright colored after the oxidation is removed.

Now do the same procedure above with the wire you intend to add to the wire reel wire. You only need to do one end of it.

Connect the bare end of the additional wire you intend to add by twisting several turns around the wire end coming from the reel. Twist tightly and cover with

electrical tape. There is no need to solder the connection unless you have the skills. Just make sure the "splice" is good and tight.

Now you should see your wire reel with the added length of antenna wire leading to the connector.
Extend the full length from the reel, stretch out the completed longer wire, connect to your telescoping antenna on the radio and hang around your room as needed for the space you have...connect the antenna end clip to the radio antenna in whatever method works best for you. If by some chance the clip will not fit the telescoping rod, which is rare, then just cut of the end clip, bare the wire like in the above instructions and twist it around the telescoping rod several time to make it tight.

Notes:
You may solder the wire splice connection if you have the skills. You will get a better connection than twisting the wires together.

You may wish to store the "long wire" antenna by winding it back inside the reel....if there is room for the extra length of wire.

An option for this modification is to simply eliminate the reel and the wire it contains and simply just splice the original telescoping antenna connector to a longer wire that will extend the total length of the "new" antenna wire as long as you have room for it. This is the simplest modification.

It is highly recommended that you DO NOT put the antenna wire outside due to lightning hazards.
If you want to experiment with it outside, then get it up as high as possible to prevent trip hazards and to aid the reception of shortwave signals. Don't place it on or very near any large metal surfaces.

You may notice that after you use the longer wire that you have more noise, this is normal and shows that the antenna is improving the receiver!

See this link for how to build an effective out door shortwave multiband antenna!

DO NOT PLACE IT OVER, UNDER OR NEAR ANY POWER LINE. MURPHEY'S LAW STATES THAT.....THE POWER LINE *WILL FALL* AND CREATE MUCH DANGER FOR ELECTROCUTION OR FIRE!