HFp Dipole Antenna

Upgrade from Vertical

User's Guide

The *HFp* Antenna

The original HFp design provides a highly efficient vertical antenna in an extremely portable package — the entire package weighs just over 2 pounds (1 kg). The antenna is highly configurable, and with the 80M Coil, covers all Amateur bands from 80M to 10M (as well as most frequencies in between).

The *HFp* Dipole

With the Dipole Option, the HFp elements can be configured as a horizontally-polarized dipole on any of the frequencies from 14MHz to 35 MHz . The Dipole Head also allows an "L" configuration of the elements – a setup which has advantages in certain situations.

The Dipole Option may be purchased in one of two ways:

1) As a dipole-only antenna. This kit allows dipole-only configurations for the HFp. The base plates, radial wires, and other parts necessary to set up the HFp as a ground mounted vertical are not included.
2) As an upgrade to the HFp Vertical kit. This kit contains the extra elements, the Dipole Head, and the extra parts necessary to allow the HFp Vertical to also be set up in Dipole configuration.

In its standard configuration, the Dipole kit covers 20M through 10M. A 40M option is available, as is an 80M Option.

As with the standard vertical HFp, the combinations of elements and the orientation of the loaded elements (the two- and three-stripe elements) either **IN** (toward the center) or **OUT** (away from the center) determines the operating frequency. In the configuration table you will see elements marked, for example,"2-stripe in". **If you assemble these elements in the wrong orientation, the antenna will not tune to the desired frequency.** The one-stripe elements have no orientation, and may be assembled into the antenna either "in" or "out".

In this User's Guide, you will find a table showing optimum configuration for each Ham band. There is also a laminated card in the HFp Dipole kit antenna bag, with the same configuration table on it. The card makes it easy to take the setup information with you on your portable operation trips.

The antenna is configured for different bands by the selection and orientation of the eight antenna elements that are part of the HFp Dipole kit. Six of the elements are marked with a single stripe and contain no loading coil. Two elements are marked with two stripes and contain a small inductive load.

HFp Dipole Upgrade Parts List

Before using your HFp Dipole antenna, verify that you have all the parts in the list below:

HFp Dipole Upgrade from Vertical Kit	
Inter-Element Connector	2
Element Rod - Zero-Stripe	1
Element Rod - 1-Stripe	2
Element Rod - 2-Stripe	1
End Whip Assembly	1
Dipole Center Insulator	1
Dipole Support Ring	1
Laminated Card	1

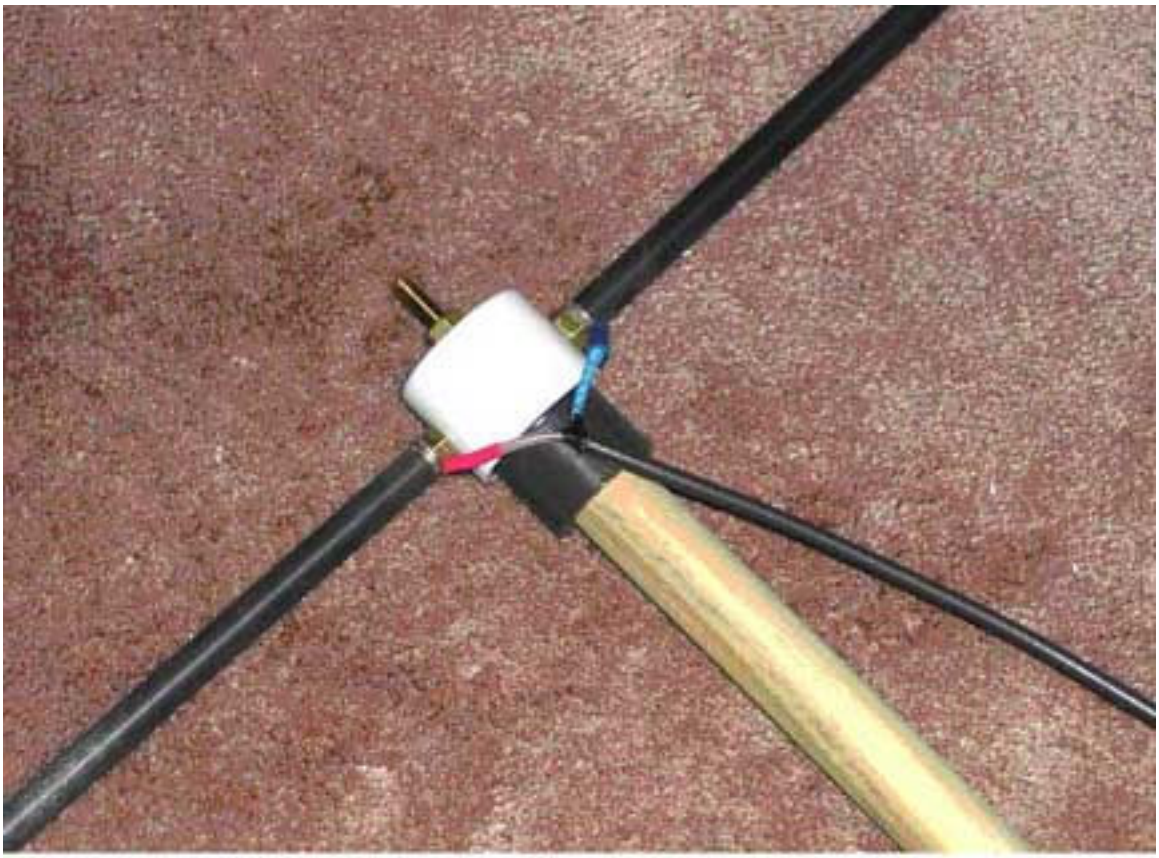
Not provided is a mounting pole on which to mount the Dipole Head. The Dipole Head has internal Acme ¾ x 5 threads which match the threads on a standard painter's extension pole. These poles are available at any hardware or home improvement store, and can be obtained in lengths as long as 18 feet or so. Price is in the $15 to $40 range, depending on length and strength of the pole.

The Dipole Head and a support pole

Assembling the HFp Dipole for Use

1. From the Configuration Chart, determine the element configuration for the band you wish to use. Get two of the Element-1 sections. Be sure to note if the chart specifies stripes in or out.
2. Install the coax pigtail on the center insulator by placing the lugs over the side studs. Screw one of the elements (stripes correctly oriented) onto each of the studs. The picture shows the completed assembly on a support mast section.

Note – If you are setting up the HFp Dipole by yourself, you may find it more convenient to assemble the antenna on the ground, without the support mast attached, and screw the mast into the center insulator after the elements and whips are installed.



Center Insulator, Pigtail and Elements

3. Following the Configuration Chart, continue to install the elements in the correct sequence, using the Inter-Element Connectors to connect adjacent elements. Install one of the collapsible whips at each end of the antenna.
4. Screw the support pole into the center insulator, and connect your coax to the coax pigtail. Carefully raise the antenna and attach the pole to some support.

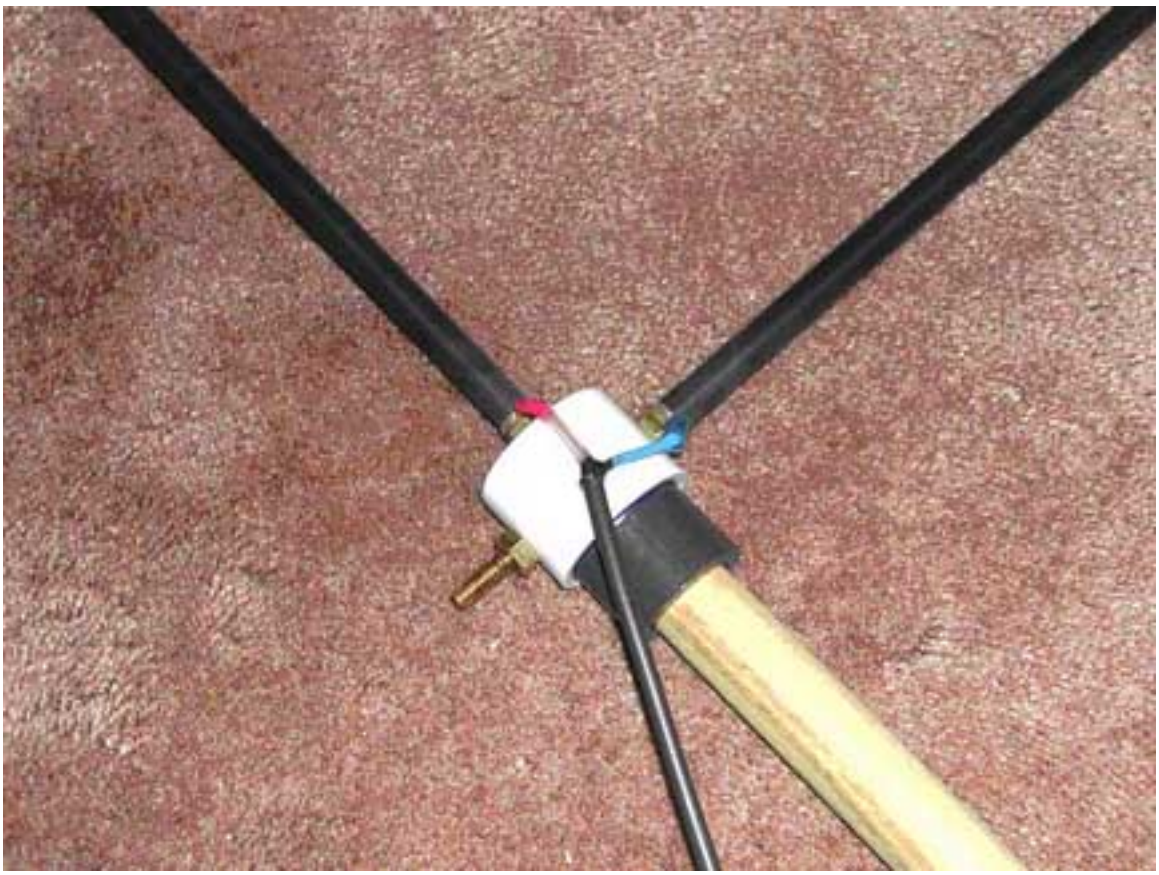
Note – The brass stud on the top of the center insulator can be used with the accessory HFp Guy Lines to guy the raised HFp Dipole, or with the accessory Center Ring Support. Simply slip the Guy Line lugs over the stud, and secure the ends of the lines to some secure points.

Other Setup Options

The Dipole Head allows the HFp Dipole to be set up in some other configurations beside the normal dipole configuration. Options include an "L" configuration, and an elevated vertical with ground plane.

For the elevated vertical, the ground plane can consist of two groups of HFp elements, arranged on opposite sides of the Dipole Head, or accessory HFp radial wires used in a "normal" ground-plane arrangement.

The picture shows the antenna set up as an "L", with the vertical section being the "hot" section (connected to the coax center), and the horizontal section as the counterpoise. Users report that pointing the horizontal portion of the "L" at the target station will give the best results.



Center Insulator, Pigtail and Elements, set up in "L" configuration

HFp Dipole Configuration Chart

Note that the length specifications for the extendable whip in the Configuration Chart are in "Sections". The whip fully collapsed is one "section" long. The whip fully extended is six "sections" long.

Each configuration calls out a specific setting for the whip, although it is important to remember that these lengths were determined with the HFp set up in an open area, away from any nearby objects. The antenna may be affected by nearby objects in any particular setup location, and the specified lengths may need to be changed. Thus the lengths in the Configuration Tables may be deemed "starting points" for resonating the HFp Dipole at your frequency.

In some situations, where there are nearby objects affecting the antenna's resonant frequency, shortening the whip all the way may still not bring the SWR to its lowest level. If this is the case, simply remove the end element, and move the whip to the end of the (now shorter) HFp Dipole. Then, once again, fine-tune the whip for the best SWR.

Be sure to notice the orientation of the stripes on the two-stripe and three-stripe elements. They are always specified as "stripes – in" or "stripes – out". Remember that the one-stripe elements may be assembled either "in" or "out".

In each table, "Element 1" is the first element – the one screwed onto the center insulator.

With time, the element ends may become dirty, or develop corrosion. One of the "Scotchguard" abrasive sponges works very well at cleaning the element ends to assure good electrical contact. The threaded inter-element connectors may also occasionally require cleaning, as well as the threaded center studs.

HFp Dipole Configuration Chart

Band	Element 1	Element 2	Element 3	Element 4	Whip Length
20M	1-stripe	2-stripe IN	1-stripe	1-stripe	5 Sections
17M	1-stripe	1-stripe	1-stripe	2-stripe IN	4 ¼ Sections
15M	1-stripe	1-stripe	2-stripe IN	None	2 ¼ Sections
12M	1-stripe	1-stripe	1-stripe	2-stripe OUT	1 ¾ Sections
10M	1-stripe	1-stripe	1-stripe	None	Out all the way

IMPORTANT – This configuration defines ONE SIDE of the dipole! You must assemble the same configuration of elements on both sides of the center insulator.

Fine Tuning the Dipole

Using a radio to set up the antenna, the procedure is as follows:

1. Set up the HFp according to the chart for the band of interest.
2. Set the radio to AM mode, and for SWR indication. Use a low power setting.
3. Transmit a very short carrier at the low end of the band. Note the SWR reading.
4. Transmit a very short carrier in the middle of the band. Note the SWR reading.
5. Transmit a very short carrier at the top end of the band. Note the SWR reading.

Ideally, the SWR should be lowest at the middle of the band, and higher toward the top and the bottom of the band. If the SWR is not acceptable in the band, then do the next steps.

6. If the SWR is lower at the bottom of the band, and increases through the band, then the antenna is resonant at too low a frequency. Shorten the antenna whips one section, and do steps 3) through 5) again.
7. If the SWR is lower at the top of the band, and increases through the band, then the antenna is resonant at too high a frequency. Lengthen the antenna whips one section, and do steps 3) through 5) again.

If changing the whip lengths does not get the SWR to an acceptable level at your operating frequency, then the antenna will need to be re-configured. Use the techniques in Frequency Adjustments to change the antenna configuration to raise or lower the antenna's frequency. After each change, do steps 3) through 5) again. When you get close, use the whip adjustment to refine the SWR to the best reading.

Note - If you have one of the MFJ or AEA antenna SWR analyzers, setting up the HFp Dipole becomes a very easy task, and doesn't involve transmitting unidentified or possibly interfering signals on the air.

Frequency Adjustments

Note - If you need to adjust the resonant frequency of the HFp because nearby objects are affecting it, most likely the resonant frequency will have to be raised.

1. **Lowering the resonant frequency** – Moving an inductive load position "in" will lower the frequency. This can be accomplished by flipping over one of the loaded elements (putting the stripes "in"), or moving it toward the center in the assembly of elements. Adding a 1-stripe element will also lower the resonant frequency. Extending the whip will lower the resonant frequency.
2. **Raising the resonant frequency** – Moving an inductive load position "out" will raise the frequency. This can be accomplished by flipping over one of the loaded elements (putting the stripes "out"), or moving it away from the center in the assembly of elements. Removing a 1-stripe element will also raise the resonant frequency. Shortening the whip will raise the resonant frequency.

Note that a change on one side of the antenna should usually be duplicated on the other side, to maintain symmetry. But, see also the section on Offset Feeds.

HFp Dipole Notes

The following hints and kinks can ease your setup, as well as provide you with ideas for experimentation. While we have defined configurations for the ham bands, you can arrange the elements into other configurations to cover the same, or other bands. We encourage you to experiment. If you find interesting configurations, please email us and tell us about your experiments at HFp@ventenna.com. There is also a User's Group at http://groups.yahoo.com/group/HFp_Users where HFp users exchange interesting ideas.

Antennas

Any antenna truly worth the name will exhibit as large a "capture area" as possible. That is, it will present the largest possible amount of resonant structure to capture (or radiate) signals. The larger the "capture area" the better the antenna works. The HFp Dipole configurations shown in the configuration chart were designed to have large capture areas, but it is possible to achieve a resonant antenna in a smaller assemblage of the elements, if having a smaller physical structure is desired. Experimenting with the mix of elements may result in different combinations of elements for any particular frequency. Just remember that the shorter antenna won't reach out as far as the longer one.

Set-Up

One of the AEA or MFJ portable SWR Analyzers will make setting up (or experimenting with) the HFp Dipole antenna very easy, especially if the antenna is being used in an enclosed space, or a location where there are large objects nearby, which may make the configuration different from the chart.

Offset Feeds

Some dipole experts have experimented with offset feeds, in which the dipole is set up with one side longer than the other. This supposed improper unbalance in the antenna can actually help in matching the coax to the antenna in situations where the balanced arrangement is not working as well as expected. Although the technical explanation as to why this works is beyond the scope of this User's Guide, for those with a little more expertise, this technique is, in effect, an implementation of the Delta Match. The ARRL Antenna Books offer some explanation of the Delta Match, as do other sources.

Basically, to experiment with the Offset Feed, you would first set up the dipole in normal "symmetric" configuration for the band of interest. Then, lengthen the elements on the "counterpoise" side of the antenna ("lower" its frequency), and shorten the elements on the "hot" side ("raise" its frequency), while monitoring the resonant frequency and the SWR. Review the techniques described in Frequency Adjustments to see the different methods of lengthening and shortening the elements.

Again, one of the antenna SWR analyzers will make this experimentation much easier.

NVIS

NVIS (for Near Vertical Incidence Skywave) is a propagation mode where the signal from your antenna is deliberately directed straight upward, rather than toward the horizon. This mode of operation, if done below a certain critical frequency, will result in the signal being reflected back down from the ionosphere in a nearby area, rather than hundreds or thousands of miles away. This nearby area is typically within a radius of about 100 miles – the area which is usually skipped over by horizon-directed signals. Using NVIS, communications may be established with stations that are usually not reachable by normally set up antennas.

NVIS antennas are typically horizontal dipoles, at a height of about 0.1 wavelength from the ground. This is typically between five and ten feet, although some folks place the antenna as low as one foot. The HFp Dipole lends itself to NVIS mode very handily, with its ability to be placed at varying heights above the ground, on a painter pole.

For a very good explanation of NVIS, and links to other sources of information, go to: http://www.qsl.net/wb5ude/nvis.

Guy Lines

If it is windy, you may wish to use the accessory guy lines to help prevent the dipole from turning. To do so, place one guy line lug under the whip at each end on the dipole. Fasten the ends of the lines to some convenient tie-down point, but be careful not to pull down too hard on the lines. You don't want to bend the elements down!

The guy lines may also be used to secure the dipole mounted on top of a 12-foot extension pole. Place the guy line lugs over the center stud on the Dipole Head, and fasten the ends to some secure tie points.

Inter-Element Connectors

The Inter-Element Connectors (IECs) are solid brass for best corrosion-free connections between element sections. But, after some use, they may collect some dirt. One of the "Scotchguard" abrasive sponges works well at cleaning the IECs and the element ends.

An IEC may sometimes be hard to remove from the end of an element, if it has been tightened too hard. The HFp Wrench is provided for the purpose of loosening stuck IECs.

Accessories

1) HFp Guy Lines

   This is a set of three guy lines, on a single plastic spool, with a cover. These lines may be used to guy an HFp Dipole set up on a support pole, or to secure the ends of the dipole, to prevent it from turning.

2) Center Ring Support

   This is a guy ring designed to screw on to the top stud on the Dipole Head. This ring allows the HFp Dipole to be suspended from a rope or other overhead support.

3) The HFp Wrench

   The HFp Wrench allows easy loosening of stuck IECs.

4) Guy Line Sliders

   The Guy Line Sliders make tensioning the HFp guy lines very easy. See the enclosed description for their use.

Options

1) 40M Extension kit – For operation on 30M and 40M.
2) 80M Option – For operation on 60, 75 and 80 meters. Requires the purchase of the 40M extension kit.
3) Balun Pigtail – for the purists. The HFp really doesn't need a balun, but some people like to use them.

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