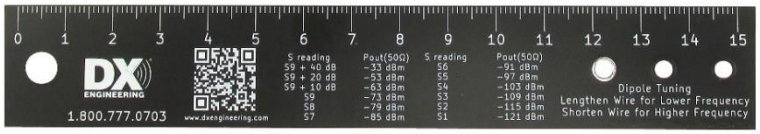
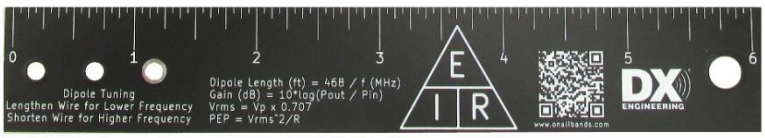
Single-Band Low Power Dipole Kit

DXE-DWK One Dipole Kit
DXE-DWK-10 Ten Dipole Kits
DXE-DWK-25 Twenty-Five Dipole Kits

DXE-DWK-INS Rev 1





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Introduction

The **DXE-DWK** dipole kit contains a center insulator, two end insulators and a right angle BNC connector. **Ideal for low power portable use.** Easy to build, add your light guage wire, only 6 points to solder and it is ready to use.

The light weight center insulator and end insulators are basically a printed circuit boards. When completed, the center insulator also acts as a wire winder for easy storage between operating events.

Both the center insulator and end insulators have handy information printed on them.

A quick and easy project for any ham radio operator or an ideal project for a group of ham radio operators.

Dipoles are one of the best low-cost antenna options available for Amateur Radio use. They are easy to construct, install and provide reliable communications. Having been a proven style of antenna for decades, dipole antennas will get you on-the-air either from your home QTH or in a portable operation area. For more details on antenna design, feedline and radiation angles, consult a reliable text such as the "*ARRL Antenna Book"* (https://www.dxengineering.com/parts/arr-1113).

DX Engineering Single-Band Dipoles are designed lightweight. The kits include a combination center insulator, 2 special end insulators and a right angle BNC connector.

Tools Required

Soldering iron, Solder, Wire cutter, Tape measure

Parts needed but not supplied

Coax cable with BNC female on one end and the proper connector on the other end to match your transceiver. DXE Engineering has a number of pre-made, ready to use BNC to BNC coax cables in various lengths. https://www.dxengineering.com/parts/dxe-8xdb050 or you can get a custom length made using the Custom Cable Builder at https://www.dxengineering.com/cableconfigurator/cabletype

Wire for the dipole elements. Wire size - 14 AWG or smaller. DX Engineering has wire available in various sizes and lengths: https://www.dxengineering.com/search/part-type/wire?fr=part-type&SortBy=BestKeywordMatch&SortOrder=Ascending&keyword=dxe-viz

Lightweight Rope for center support and end insulators. DX Engineering has rope available in various sizes and lengths: https://www.dxengineering.com/search/part-type/rope?N=brand%3Amastrant%2Brope-diameter-fractional%3A1-8-in-approx&SortBy=Default&SortOrder=Ascending&keyword=rope&kr=rope

Single-Band Dipole Wire Lengths

Use this chart to determine the dipole wire lengths that cover the desired band and resonant points.

Both the center insulator and end insulators have the formula for determining the wire overall length for a dipole. Dipole length (ft) = 468/f (MHz).

When cutting dipole element wire, add about 4 to 8 inches on each wire end to allow some extra wire for tuning as described on page 6.

Band(s)	Desired Center Frequency *	Length of each Dipole Leg	Overall Dipole length from end insulator to end insulator
160m	1.800 MHz	130 feet (39.62m) x 2	260 feet (79.25m)
	1.870 MHz	125 feet (38.1m) x 2	250 feet (76.2m)
	1.940 MHz	120 feet, 7 inches (36.76) x 2	241 feet, 2 inches (74.07m)
80m	3.500 MHz	67 feet (20.42m) x 2	132 feet (40.23m)
	3.600 MHz	65 feet (19.81m) x 2	130 feet (39.62m)
	3.700 MHz	63 feet, 3 inches (20.12m) x 2	126 feet, 6 inches (38.56m)
75m	3.800 MHz	61 feet, 7 inches (20.71m) x 2	123 feet, 2 inches (37.54m)
	3.900 MHz	60 feet (18.29m) x 2	120 feet (36.58m)
60m	5.332 MHz USA Channel 1	43 feet, 10 inches (13.36m) x 2	87 feet, 8 inches (26.72m)
40m	7.000 MHz	33 feet, 5 inches (10.19m) x 2	66 feet, 10 inches (20.37m)
	7.150 MHz	32 feet, 9 inches (9.98m) x 2	65 feet, 6 inches (19.96m)
30m	10.125 MHz	23 feet, 2 inches (7.06m) x 2	46 feet, 4 inches (14.12m)
20m	14.000 MHz	16 feet, 9 inches (5.11m) x 2	33 feet, 6 inches (10.21m)
	14.175 MHz	16 feet, 6 inches (5.03m) x 2	33 feet(10.06m)
17m	18.118 MHz	12 feet, 11 inches (3.94m) x 2	25 feet, 10 inches (7.87m)
15m	21.225 MHz	11 feet (3.35m) x 2	22 feet (6.71m)
12m	24.940 MHz	9 feet, 5 inches (2.87m) x 2	18 feet, 10 inches (5.74m)
10m	28.000 MHz	8 feet, 5 inches (2.57m) x 2	16 feet, 10 inches (5.13m)
	28.400 MHz	8 feet, 3 inches (2.51m) x 2	16 feet, 6 inches (5.03m)
	29.000 MHz	8 feet, 1 inch (2.46m) x 2	16 feet, 2 inches (4.93m)
6m	50.000 MHz	4 feet, 6 inches (1.37m) x 2	9 feet (2.74m)

* Resonant Frequencies will vary with overall dipole height above ground.

Assembling a Single-Band Dipole

The Center has pre-drilled holes for attachment of the optional wire elements, pre-drilled holes for the included right angle BNC connector and a predrilled hole for a rope support. The special end insulators are also predrilled for the optional dipole wire and rope support.

1. Insert the included right angle BNC connector (**DXE-HP0138**) into the center insulator flush to the board surface as shown.

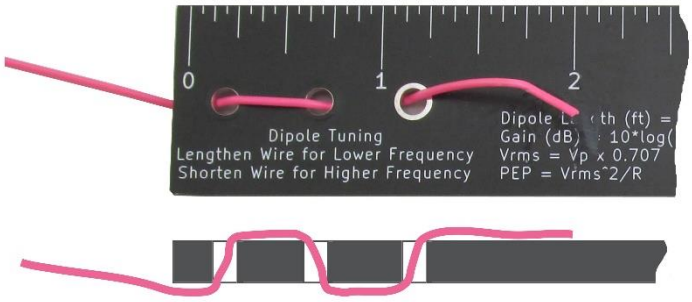
2. Turn the board over and solder the four pins for the right angle BNC connector as shown.

3. Once the dipole wires lengths are determined, trim the insulation from one end of one leg of the dipole element wire going into the center insulator about 1/4 inch. Insert the trimmed wire dipole leg into the center insulator in a serpentine route as shown with a small amount of slack. Insert the trimmed element wire into the hole, turn the board over and solder in place as shown.

   The wire used in this example is **DXE-VIZ26-P150** high visibility, 26 AWG pink insulated wire. If you are using 14AWG – Solder the wire in the holes marked 14AWG.

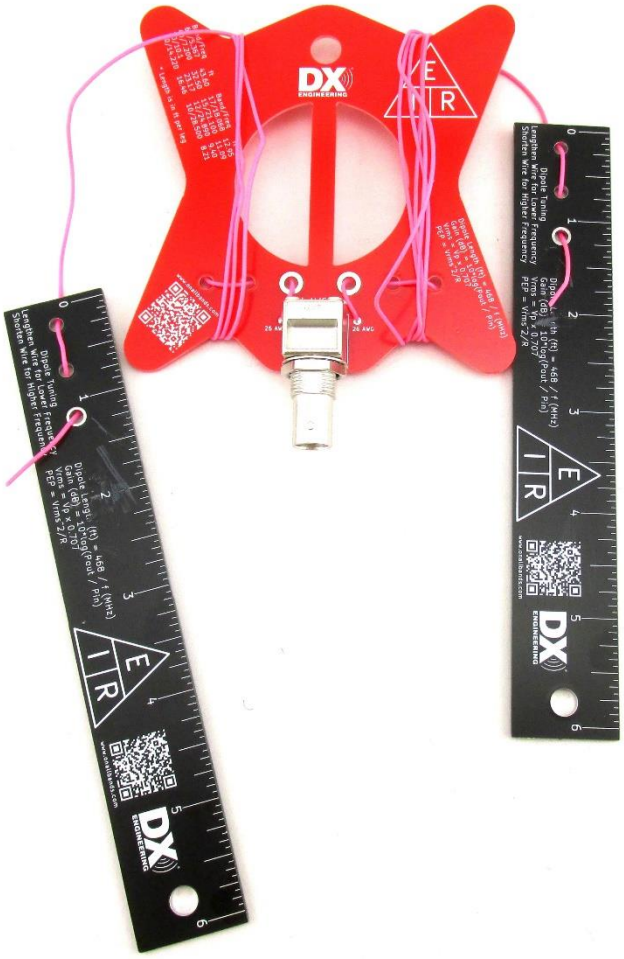
4. Repeat step 3. for the other dipole element.

5. At the far end of each dipole element, insert the wire into the end insulators in a serpentine manner as shown. Excess wire length, from the desired dipole length, can be wrapped back over the element. This is extra length is used during tuning if needed.



6. Connect a coaxial cable with a Male BNC connector and your low power dipole is ready to put up and tune (see page 6 for tuning the dipole). The larger hole at the top of the center insulator and at the ends of the end insulators are for light weight rope to secure the dipole in position.

Photo below shows the DXE-DWK dipole ready to go with element wires attached and wound on the center insulator for travel and storage.



Safety Considerations

WARNING!
INSTALLATION OF ANY ANTENNA NEAR POWER LINES IS DANGEROUS

Warning: Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death.

Overhead Power Line Safety

Before you begin working, check carefully for overhead power lines in the area you will be working. Don't assume that wires are telephone or cable lines: check with your electric utility for advice. Although overhead power lines may appear to be insulated, often these coverings are intended only to protect metal wires from weather conditions and may not protect you from electric shock. Keep your distance! Remember the 10-foot rule: When carrying and using ladders and other long tools, keep them at least 10 feet away from all overhead lines - including any lines from the power poles.

Mounting Considerations

When planning the location of your antenna, consideration should be given to the height, location of suitable support structures and feedline positioning and length.

Generally speaking, these antennas should be mounted as high as possible for best performance. Antenna height will affect the exact resonance point, radiation pattern, and takeoff angle. The higher the antenna, the lower the takeoff angle to the horizon, which increases the effective range of the antenna.

For DX, the minimum height above ground should be 1/2-to 1-wavelength at the lowest operating frequency. On the low bands, this height becomes impractical for most hams. For example, an 80m dipole at 70 feet is about 1/4-wavelength above the ground. This antenna would be good for local and short distance communications, but not optimal for DX, due to the high takeoff angle and ground absorption. A 40M dipole at 70 feet is approximately 1/2-wavelength high and is likely to be good for DX and less optimal for local or short range communications. For more information on antenna design, feedline and radiation angles, consult a reliable text such as the "*ARRL Antenna Book"* (https://www.dxengineering.com/parts/arr-1113).

The antenna should also be mounted as far from other structures as possible. This includes the ends of the wire elements, which are actually the most sensitive part of the antenna. Any objects, tree limbs, foliage, metal in particular, within the near-field radiation pattern can affect the impedance and radiation pattern of the antenna.

The feedline should also come away from the antenna at right angles for at least 1/2-wavelength for best performance.

Most installations involve compromises due to local terrain, available supporting structures, or other restrictions. Do the best you can with what you have.

Tuning the Dipole

Once completed, raise the antenna to the operating height. Connect an antenna analyzer to the coax cable coming from the dipole. Scan the antenna and locate the resonant point for the dipole.

If you need to lower the resonant point, un-wrap the wires at each end of the dipole to make the legs a bit longer about an inch at a time on both sides of the dipole. Re-wrap any excess length back over the element wire.

If you need to raise the resonant point, un-wrap the wires at each end of the dipole to make the legs a bit shorter, about an inch at a time on both sides of the dipole. Re-wrap any excess length back over the element wire.

Raise the dipole into position, rescan the antenna with the analyzer to determine the new resonant frequency.

Remember, this low power dipole kit mainly used for portable temporary installations.
Ideal for POTA and SOTA trips.
Get out - put it up - make contacts - have fun !

Maintenance

The Portable Dipole Antenna should be examined on a routine schedule.

- Verify the wires are intact and have no breaks
- Verify the ropes being used have not frayed or need replacement.
- Verify the coaxial cable is in good condition and there are no cuts in the jacket which would allow moisture to enter the coax cable.

The Dipole Kit is also available in packages of 10 kits (DXE-DWK-10) and 25 kits (DXE-DWK-25). Ideal for a club project.

Common Questions and Answers

Q: Does the dipole have to be straight i.e.: flat top?

A: No, the dipole antenna does not have to be what is referred to as flat top. The ends can slope downward. An inverted-vee can have each leg angled down from the feedpoint at a 22 to 45 degree angle from horizontal, with corresponding tuned resonant lengths that are about 2 to 5% shorter for the inverted-vee than a horizontal dipole which will reduce the overall physical length needed to hang the dipole. Be aware that if used in a portable situation, you may have to slightly adjust the dipole lengths from location to location since you may not completely match a previous installation.

Q: Do Dipole antennas really work?

A: Yes. Dipole antennas have been around a long time. While most hams dream of towers and big beams, the majority of hams use dipole antennas. Even the 'Big Gun Super Stations" started out with dipole antennas. They work, and they work very well. Not only for home stations, but when going portable as well. Never underestimate how good dipole antennas can be.

Q: If I get the kit and make it for 80 meters and later find out I would rather be on 20 meters, can I shorten the dipole to operate on 20 meters?

A: Yes, you can easily shorten the overall antenna length to make it resonant on a higher band. Likewise, if you add wire you can also make the dipole resonate on a lower band. In either case, use the chart that shows the various lengths required for each band.

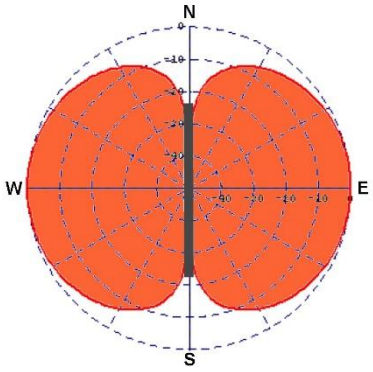
Q: Can I use this dipole in my attic?

A: That depends. Your antenna height will be restricted by the height of your attic and may not perform to ideal expectations. Do you have enough room (length) for the dipole you want to use? You want to have the dipole legs in a straight line if at all possible and not double back on each one of them. Additionally, the presence of HVAC equipment, metal ductwork, electrical wiring or metal foil insulation will adversely affect antenna performance. If you have a metal roof, an attic mounted wire antenna will not work.

Q: Do I really need to support the center of the dipole - can I just hang it by the ends?

A; Yes, the antenna should be supported in the center either on a pole, The weight of the antenna and Coax Cable will put a strain on the dipole wires and over time will stretch the wire and cause possible tuning problems. Or worse yet, with windy back and forth motions, break the antenna wire.

Q; What is the ideal orientation of a dipole?



A: Dipoles radiate the best off of the sides of the antenna. This example shows the dipole antenna installed along a North South path. The best results from this antenna orientation are from the East and West.

Q: If my dipole is installed North to South, will I miss stations that are North or South of my location?

A: No, surprising enough you will still hear and be able to communicate with stations located off the ends of the dipole antenna. Their signal strength may not be the best, but it can be done.

Manual Updates and Information

Every effort is made to offer the latest manual revision with each product. To keep the cost low for this kit, the manual is downloadable from the DX Engineering website. Occasionally a manual will be updated between the time your DX Engineering kit is shipped and when you receive it. Please check the DX Engineering web site (www.dxengineering.com) for the latest revision manual.

Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also e-mail us at: DXEngineering@DXEngineering.com

For best service, please take a few minutes to review this manual before you call.

Warranty

All products manufactured by DX Engineering are warranted to be free from defects in material and workmanship for a period of one (1) year from date of shipment. DX Engineering's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by DX Engineering. If DX Engineering's products are claimed to be defective in material or workmanship, DX Engineering shall, upon prompt notice thereof, issue shipping instructions for return to DX Engineering (transportation-charges prepaid by Buyer). Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing. The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation, damaged from severe weather including floods, or abnormal environmental conditions such as prolonged exposure to corrosives or power surges, or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's specifications. In addition, DX Engineering's warranties do not extend to other equipment and parts manufactured by others except to the extent of the original manufacturer's warranty to DX Engineering. The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR DX ENGINEERING ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.