



17 Meter Add-On Kit for Hustler BTV Series Verticals

DXE-AOK-17M

U.S. Patent 7,554,500

DXE-AOK-17M-INS Revision 4



DXE-AOK-17M Installed on a BTV

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The DX Engineering **DXE-AOK-17M** kit adds 17 meter coverage to the Hustler BTV series of vertical antennas without giving up any existing band coverage. This kit will operate across the entire 17 meter band with an SWR of 1.5:1 or less and adds negligible wind loading to the antenna.

No disassembly of the existing antenna is required, simply bolt this kit over the 10m trap, make some minimal tuning adjustments to the vertical and you're on the air with an additional band. If your BTV is installed on the roof or in an elevated position, 4 resonant radials for 17 meters should be added.

A Word About Power Levels

This kit was designed for use at power levels of 850-watts or less in either SSB or CW modes and duty cycles, with an SWR of 1.5:1 or less without the use of an antenna tuner. Use in any continuous power mode such as RTTY (radio-teletype) operation or extended tune-up at high power is specifically excluded from its recommended uses and voids any warranty.

Included Materials

The shipping tube contains the following components:

- 17 Meter Pre-assembled Loading Coil
- Two Stainless Band Clamps with threaded studs
- Long aluminum bracket
- Short aluminum grooved bracket
- Two 12 inch Hot Rodz with black vinyl covers for one end
- Two Black Vinyl end caps for coil
- 1 Large washer
- 1 Carriage Bolt
- 6 #10x24 Hex Nuts
- 6 #10 Flat Washers
- 7 #10 Split Washers
- 4 #10 External Tooth Washers
- 1 #10x24 Wing Nut
- Scotch-Brite® Pad for cleaning trap connections
- Penetrox A – Prevent oxidation between the trap and band clamps

All hardware is Stainless Steel

Installation

If you have tuned your vertical by adjusting the various sections of the antenna, we recommend that you return the dimensions of the vertical to the factory default settings before installing the 17m kit. These settings are located in the Hustler assembly instructions that came with the vertical. The instructions are also available for download on our website, www.dxengineering.com, under the Hustler BTV model you have.

The 17m kit will attach to the BTV vertical right over the 10m trap using special clamps. The trap aluminum cover should be cleaned prior to installation using the included Scotch-Brite® pad.

Assembly

The 17m kit is easy to assemble.



Figure 1 - Loading Coil Assembly

1. Using **Figure 1** for reference, take the two black vinyl end caps and put one at each end of the coil tube. These end caps may be pre-installed on some coil tubes.
2. Put one of the two small black vinyl end caps at one at the end of each Hot Rodz
3. Place an external tooth washer over each of 2 adjacent bolts on the coil assembly. It does not matter which end of the coil is used.
4. Attach the longer aluminum bracket to the coil. See **Figure 2**. Place the bracket over the bolts, install a flat washer, then a lock washer and nut over each bolt. Tighten firmly.
5. Insert the carriage bolt through the short aluminum bracket from the side opposite the grooves. The square hole will prevent the bolt from turning. Use the large flat washer over the carriage bolt, then a lock washer, then a wing nut. Tighten the wing nut just a few turns on the bolt so the Rodz will still slide underneath the large flat washer.
6. Place an external tooth washer over each of the remaining bolts on the coil assembly. Then attach the short aluminum bracket to the coil in the same manner as step 4. Make sure the grooves in the bracket are facing away from the coil. Tighten firmly.
7. As shown in **Figure 2**, attach the two band clamps to the longer aluminum bracket. The clamps should be mounted on the same side of the bracket as the coil. Orient the clamps so the screw adjusters face the same direction. Use a flat washer, lock washer and nut on each stud. Hand-tighten the clamp hardware. It will be fully tightened in a later step.
8. Insert the two 12 inch Hot Rodz into the grooves of the small bracket. Make sure they go between the large flat washer and the aluminum bracket. The end with the vinyl cap should face out. Hand-snug the wing nut to hold the Rodz in-place and adjust each one until there is 2 inches between the mounting carriage bolt and the short end of each rod. Tighten firmly but do not use pliers on the wing nut. Hand tight is sufficient.

Assembly of the 17m kit is complete. Firmly tighten the coil mounting hardware. Tighten the clamp mounting hardware after the 17m kit is attached to the vertical and the band clamps are tight.



Figure 2 - Assembled 17m kit

Attaching to the Vertical

No matter which Hustler BTV model you have, installation of the 17m kit is identical. The kit attaches directly to the vertical on the 10m trap cover 2 inches below the bottom edge of black plastic trap cover, as shown in **Figure 3**, using the included band clamps. The trap cover where the clamps are located should be cleaned prior to installation using the included Scotch-Brite® pad to ensure a good connection. A small amount of the included Penetrox A anti-oxidizing compound should be used to prevent future oxidation. Poor connections between the 17m kit and the trap cover may result in a change of the resonant frequency or high SWR over-time.

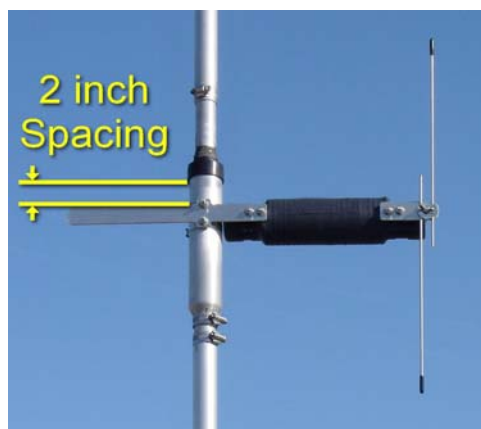


Figure 3 - 17m Kit installed on a BTV

The orientation of the 17m kit on the trap is important (see **Figure 3**). If you are using a DX Engineering Tilt-Base with your vertical, place the kit on the vertical so it does not interfere or touch the ground when the antenna is tilted-down.

Tuning

An antenna analyzer is the best way to adjust the resonant frequency of an antenna. Measurements should be made at the antenna using a short (5 or 6 ft) piece of 50 Ohm coax between the antenna and the analyzer. If you are too close to the antenna your presence can affect the tuning, if you are too far, the coax length may act as a radial and resonate. Taking readings close to the antenna also eliminates the possibility of a long or marginal feedline influencing the tuning or causing erratic readings. You should tune the antenna for resonance ($X=0$) rather than for low SWR, although they are often close or at the same point. Normally, the SWR goes down somewhat and the bandwidth increases once the feedline is reconnected and you measure the SWR at the operating position.

Tuning the 17M kit

The 17M kit should be added to the antenna and tuned first. Start with the dimensions shown in Figure 4. Because this kit has sufficient bandwidth to allow operation across the entire 17 meter band with a SWR of 1.5:1 or less, adjust the kit to resonate at the middle of the band, or around 18.1 MHz. Adjustment to the resonant frequency is done by slightly loosening the wing nut holding the Hot Rodz and adjusting the length of the Hot Rodz. Make both Hot Rodz longer to go lower in frequency, make them shorter to go higher in frequency, Both Hot Rodz should be adjusted equally and should not need to be adjusted more than a couple of inches. Make adjustments in small steps. 1/2 in. of adjustment should change the resonant frequency by about 75 kHz.

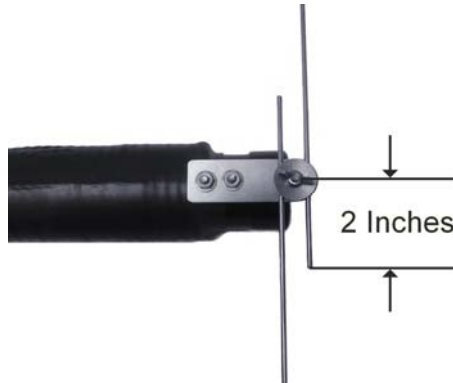


Figure 4 - Hot Rodz Initial Position

Tuning the Vertical

The 17m add-on kit electrically couples to the rest of the vertical and does have some influence on the tuning of adjacent bands. We recommend restoring the factory-set tubing dimensions of your BTV prior to making any adjustments. These dimensions are listed in the BTV series installation manual that came with your antenna. They are also available for download on our website, www.dxengineering.com, in the Hustler Antenna section.

In some installations, particularly those with very good soil conditions or a very good radial system, the traps themselves may have been changed from factory dimensions during the initial installation of the vertical to resonate the vertical in each band. In those cases where the traps have already been adjusted, leave them as-is for now. If you have doubts about the factory-set trap dimensions, use **Figure 5** to check them.

Check the vertical for resonance on each band and note each resonant frequency. This will help determine what adjustments are needed. After installation and tuning of the 17m kit, the BTV will likely resonate about the same frequency in the 10 meter band and a little higher in the 15 and 20 meter (and 30 meters if installed) bands. Little to no difference is likely on 40 or 80 meters. In most cases, re-tuning to the desired frequencies for each band can be accomplished by adjusting the tubing dimensions of each section as described in the Hustler installation instructions.

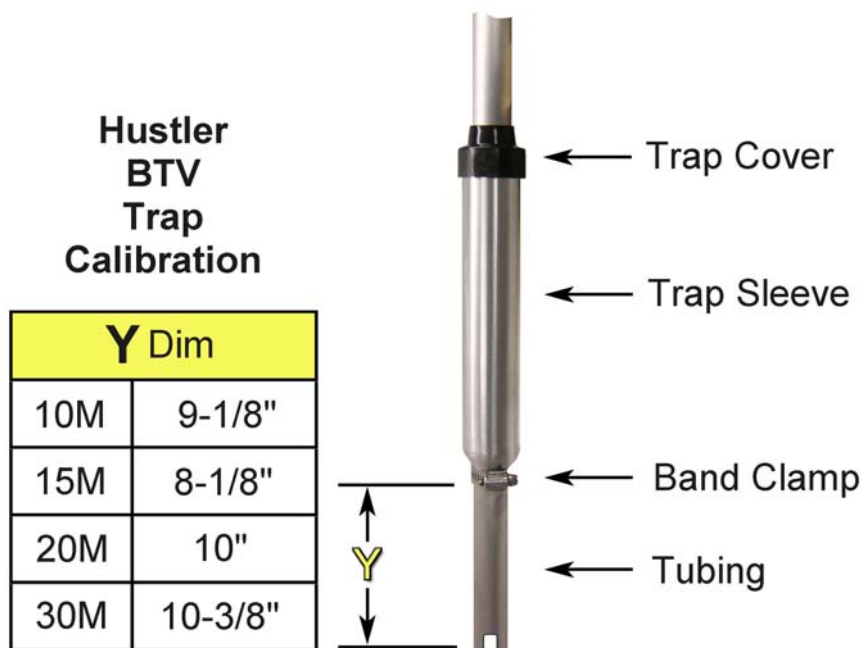


Figure 5 - Factory-Set Trap Calibration Dimensions. (Newer style trap)

Trap Adjustments – only when tubing adjustments are insufficient

In a few cases, where the vertical is installed over electrically superior ground or where radials have been installed the adjustments of the resonant frequencies provided by lengthening or shortening the tubing may be insufficient to achieve the frequencies desired. This can occur with or without the addition of the 17M kit and is easily rectified as described below.

When a desired resonant point cannot be achieved by the normal adjustments outlined in the Hustler manual, re-tuning the vertical for in-band resonance is best done by adjusting the traps. Trap adjustment is accomplished just like the adjustment of other parts of the antenna: by loosening a stainless clamp, making an adjustment and tightening the clamp again. The main difference is that trap adjustments are a very coarse adjustment. A little movement results in a big change in the resonant frequency for that band.

Referring to **Figure 5**, the general rule-of-thumb is that increasing dimension Y results in a lower frequency and decreasing dimension Y results in a higher frequency.

Just like other antenna adjustments trap adjustments are not permanent and can be restored easily. You can always return the trap to its previously resonant frequency by simply returning it to its previous adjustment point.



Figure 6 - Marking the tube

A good suggestion is to mark the position of the trap with a pencil before starting so that returning to the initial point will simply a matter of lining up the marks or referring to **Figure 5**.

Always start with the 10 meter trap because any adjustment done there affects the rest of the antenna. If the 10M section requires no further adjustment move up the antenna to the 15M trap, then the 20M trap, etc.

Slightly loosen the clamp that secures the trap cover to the tubing as seen in **Figure 7**. Grasp the trap at the end with the black plastic cap and exert a slight twisting motion while at the same time moving the trap cover up or down depending on whether the frequency needs to be higher or lower (**Figure 8**).



Figure 7 - Trap Cover Clamp



Figure 8 - Adjusting the Trap

The typical movement usually works out to about 1/8 to 1/4-inch but sometimes more is needed. 1/4 to 1/2 inch of adjustment will result in about 500 kHz of change. Firmly tighten the trap clamp and re-test the antenna for resonance. Continue this procedure until the antenna has resonance near the desired frequency.

Note: *Be sure that the connection between the trap cover and the tubing is clean and the clamp is tight. Some surface film may have developed on the BTV tubing over-time. Poor connections here can cause erratic readings.*

Next, move up the antenna to the each successive trap and make similar adjustments until the antenna resonates near the desired frequencies. Fine tuning can be accomplished by adjusting the tubing dimensions of each section as described in the Hustler installation instructions.

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.

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