



Instructions

Model A-18-24

Butternut Electronics Co's Instruction Manual for:
Model A-18-24 — 1983

NOTE:

The A-18-24 12 and 17 meter kit previously manufactured by Butternut Electronics Co. was discontinued in 1989. Parts are no longer available for this accessory. This instruction is made available as a reference.

ASSEMBLY AND TUNING INSTRUCTIONS
 Model A-18-24 (18 and 24 MHz Conversion
 Kit for Model HF5V-III and HF6V antennas
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The Model A-18-24 conversion kit consists of two clamp, rod and capacitor assemblies, one assembly for each of the 18 and 24 MHz bands. When assembled and adjusted according to the following instructions each assembly will form a parallel-tuned circuit consisting of a ceramic capacitor and the inductance of a portion of the antenna radiator. When placed at a point along the radiator that is approximately an electrical quarter wavelength from the antenna feedpoint the parallel-tuned circuit may be tuned for anti-resonance at or near the operating frequency to produce a very high impedance that effectively decouples the balance of the radiator from the antenna circuit in the same manner as more conventional "trap" circuits but without requiring that the radiator be broken at any point. Further, the high ratio of capacitance to inductance in the A-18-24 contributes only negligible "loading" to the antenna structure on other frequency bands and will not significantly upset adjustments that have been made for the other frequency bands.

PARTS LIST:

<u>24 MHz</u>	<u>18 MHz</u>
1--24-in./61-cm rod, 3/16-in. diameter	1--36-in./91-cm. rod, 3/16 in. diameter
1--double clamp for <u>1</u> -in. tubing and 3/16-in. rod with ceramic capacitor	1--double clamp for 3/4-in. tubing and 3/16-in. rod with ceramic capacitor
1--double clamp for <u>1</u> -in. tubing and 3/16-in rod <u>without</u> capacitor	1--double clamp for 3/4-in. tubing and 3/16-in rod <u>without</u> capacitor

HARDWARE PACKET: 8--#8 x 3/4-in. machine screws; 8--#8 lock washers; 8--#8 hex nuts

ASSEMBLY PROCEDURE (Refer to Drawings):

1. Slide each end of the shorter (24-inch) rod into the small end of the two double clamps for 7/8-inch tubing and align the clamps as shown. Space the clamps along the rod according to the dimension given in the drawing and secure them to the rod by means of the #8 hardware. This completes the assembly of the 24 MHz circuit which will later be attached to the antenna.
2. Slide each end of the longer (36-inch) rod into the small end of the two double clamps for 3/4-inch tubing and align them along the rod as in the previous step and according to the dimension given in the drawing. This completes the assembly of the 18 MHz circuit. In the following steps both the 18 and 24 MHz circuits will be attached to the antenna.
3. Clamp the 18 MHz assembly onto the 3/4-in. tubing of the antenna (section G of the HF6V) at the points indicated in the drawing. Make sure that the clamp with the ceramic capacitor is at the top of the assembly. Also make sure that the rod is placed on the side of the antenna opposite to the 15 meter decoupling stub. Secure the 18 MHz assembly to the antenna by means of #8 hardware.
4. Clamp the 24 MHz circuit onto the 7/8-in. tubing section of the antenna (section F of the HF6V) at the point indicated in the drawing, again making sure that the clamp with the capacitor is at the top of the assembly. The position of the 24 MHz circuit with respect to the 15 meter decoupling stub or other parts of the antenna is unimportant. Secure the 24 MHz assembly to the antenna as in the preceding step. This completes the assembly and installation of the A-18-24 conversion kit.

FINAL ADJUSTMENT:

The above settings should provide reasonably low SWR over the 18 and 24-MHz bands and should thus be entirely satisfactory for SWL work in those areas where amateur operation on these bands is not yet authorized. For transmitting purposes, however, SWR of 2:1 or less may be required, in which case slight departures from the above settings may have to be made. It will be found that tuning on 18 and 24 MHz is quite a bit sharper than on the other bands and that slight changes in the spacing between the upper and lower clamps of each unit will cause the SWR curve to move considerably. Final adjustment for lowest SWR is covered in the following steps:

1. Construct an SWR curve for each band, plotting SWR vs. frequency. If lowest SWR occurs at the lower edge of either band, loosen the hardware of the upper clamp for that band and slide the clamp downward along the antenna and the 3/16-inch rod in order to decrease circuit inductance and thus raise the frequency of lowest SWR. If, on the other hand, lowest SWR occurs at the upper edge of a band, slide the upper double clamp upward along the antenna and the 3/16-inch rod in order to increase circuit inductance and thus lower the frequency of lowest SWR. In either case, these adjustments should be made in steps of no more than one-half inch/ one cm. or so.
2. Please bear in mind that the antenna ground system, whatever form it might take, can have a good deal to do with antenna resonance and SWR. Lossy ground systems can cause unusually high feedpoint impedances and high SWR on coaxial lines. Elevated ground systems can be both lossy and reactive, depending on the length of the wires that make them up, their proximity to the earth or to other conductors, and so on. If the ground system is reactive it may be found that the antenna system as a whole is so far from resonance that the SWR may remain unacceptably high across an entire band regardless of the adjustments made to the vertical radiator and its tuning circuits. In general, however, a ground-level radial system or a slightly elevated capacitive counterpoise system that permits low-SWR operation on the other HF bands will also suffice for 18 and 24 MHz, although an elevated ground system that uses resonant radials for these same pre-WARC bands only may require additional resonant radials for these new bands. For antenna base heights of a quarter-wavelength or more above ground the length of resonant quarter-wave radials may be calculated from the formula:

$$\text{Length (in feet)} = 240/\text{Frequency in MHz}$$

To obtain the correct length in meters simply multiply the result by .3048. A minimum of two resonant radials per band should be used with elevated vertical antennas, and all radials should be separated from adjacent radials by as great a distance as practicable.

NOTES:

Dimensions (1), (2), (3), and (4) may be used to adjust the standard models of the HF5V-III and HF6V; dimensions (2), (4), (5) and (6) may be used for the HF5V-III and HF6V "export" models.

- * measured from lower edge of lower clamp to end of preceding tube
- ** measured from upper edge of upper clamp to lower edge of lower clamp
- † measured from lower edge of lower clamp to antenna feedpoint
- †† measured from lower edge of upper clamp to upper edge of lower clamp

