Looking to get some more mileage out of an old CB antenna? Look no further, for N1BEP shows us how to convert one for use on 2 meters.

How To Convert A CB Antenna To 2 Meters

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As I change interest from one aspect of radio to another, I frequently find that I have an excess of equipment for one application and a need for equipment elsewhere. As with a lot of us, I have a lot of old CB gear, some of which has been converted to 10 meters. With poorer propagation on 10, I have been more active on VHF and have a need for equipment there, particularly antennas for the house and cars to access repeaters. While sorting through some of the very valuable excess baggage in the junkbox, I found a good VHF antenna application for my numerous baseloaded CB vehicle antennas.

A half-wave dipole on 2 meters has the advantage of better radiation and less of a requirement for a good RF ground system than a quarter-wave vertical. The CB hardware turned out to be ideal for the half-wave conversion. In addition, CB hardware is certainly strong enough for an application like this. The loading coil is protected with a sleeve of insulating plastic, as shown in the photograph. This sleeve provides part of the mechanical strength of the assembly, and should be removed and preserved intact for replacement when the conversion is completed. It is removed in the model shown by siding it down over the base mounting ferrule.

Construction

The schematic for the baseloaded quarter-wave CB antenna is shown in fig. 1(A). Fig. 1(B) illustrates the 2 meter adaptation made from it. The loading coil consisted of two turns spaced about ¼ inch to the tap for the 50 ohm input, and about 16 turns closewound for the base load of the whip. In order to make the

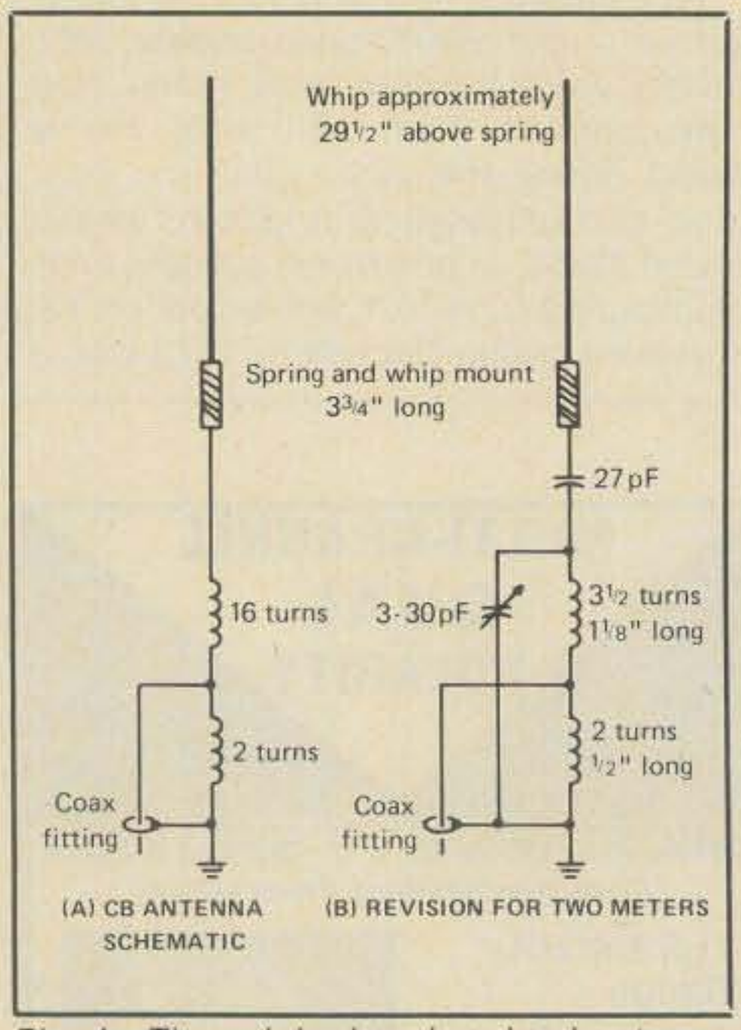

Fig. 1– The original and revised antenna wiring.

change, the lower two turns and the tap remain as before. Turns are removed from the series baseloading coil to make it parallel resonant on 2 meters, as can be seen in the photograph. It will be necessary to modify the coil form as shown in fig. 2 and the photograph in order to accommodate the series capacitor C1. A flat is filed in the coil form just below the top of the form so that the small capacitor will nest there and not interfere with the outside cover when it is replaced. A small hole is drilled through the form at 1¾ inches to secure the last turn of the revised coil. A larger hole, large enough to accommodate the tuning capacitor, is then drilled through the form in the space between the tap and the top coil. In the model a 5/16 inch diameter hole was adequate to accept a miniature printed circuit trimmer capacitor. All parts and soldered connections are recessed enough so that the outer sleeve can be replaced. A clearance hole is drilled in the outer sleeve so that the trimmer capacitor C2 may be adjusted after final assembly.

Adjustment

There are four possible electrical adjustments to the assembly. The inductance of the coil with the trimmer capacitor C2 must resonate at 2 meters, and this should be possible with the values shown. It may be necessary to spread or compress the spacing of the turns of the coil to center the frequency on 2 meters. At final tune-up the resonance is quite sharp, so that a final adjustment is made with the antenna mounted in position. The value of coupling capacitor C1 is not very critical. Any reasonably close value can be used, since the tolerance can be compensated for by coil or whip tuning. The last adjustment to be made is the length of the whip. This is also quite critical, and for initial adjustment a piece of number 12 AWG antenna wire as substituted for the stainless steel whip. It was made longer than required and cut to length as the tuning progressed. Finally, the stainless steel whip was cut to the same length for the final assembly.

Tune-up was done in the shack by using a piece of aluminum foil about 18 inches square for a ground plane. An SWR meter was used, and the tuned circuit first resonated for a minimum SWR at about 146 MHz. The SWR was then checked at 144 and 148 MHz. If the SWR was lower at 144, the temporary antenna was shortened about ½ inch at a time to reach the desired frequency. If minimum SWR occurs at the high end of the band, then lengthen the antenna systematically

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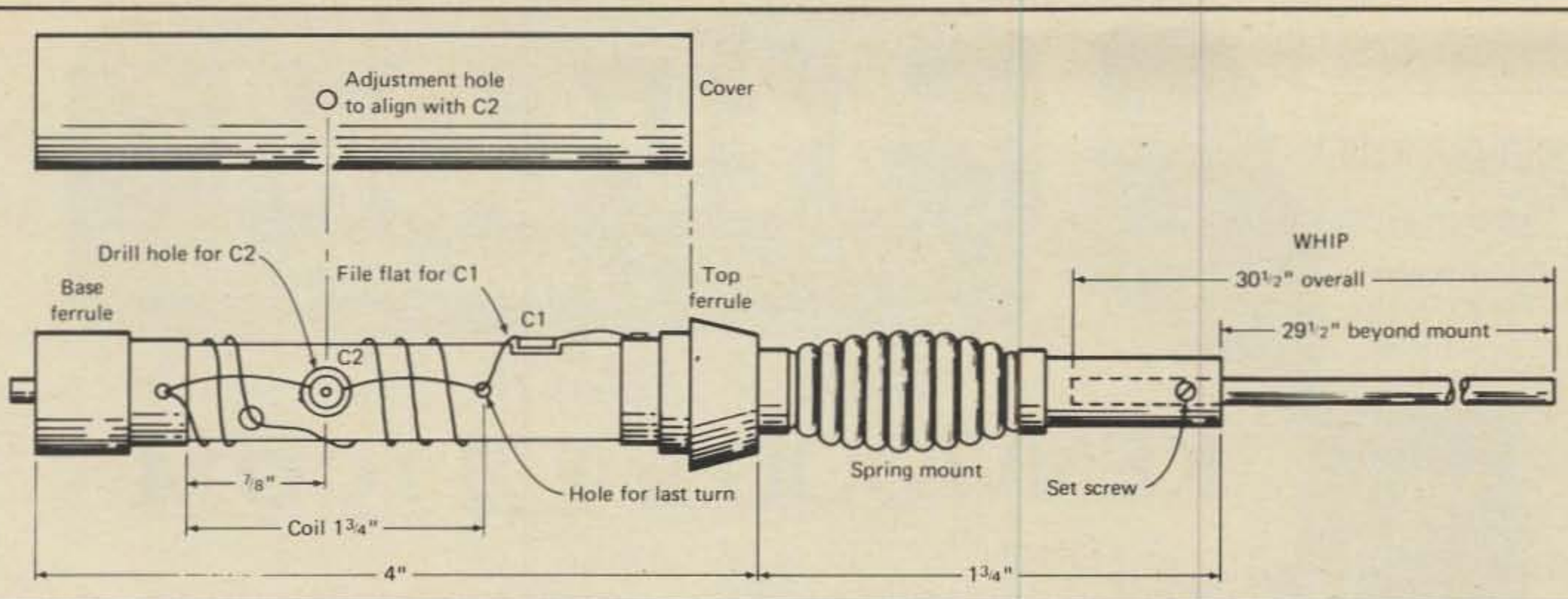
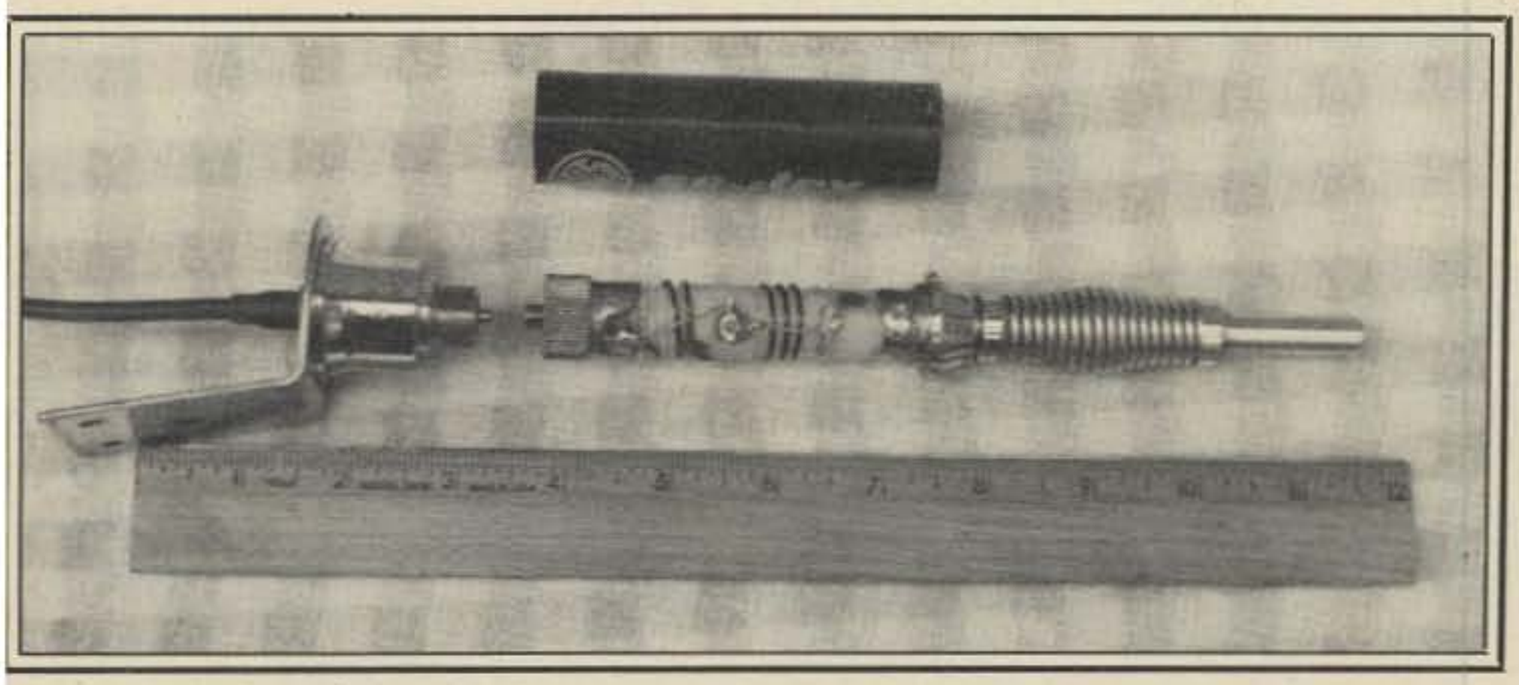


Fig. 2– Mechanical dimensions and modifications of the whip base assembly for the 2 meter conversion.



Exploded view of the whip base assembly showing the modifications to the coil.

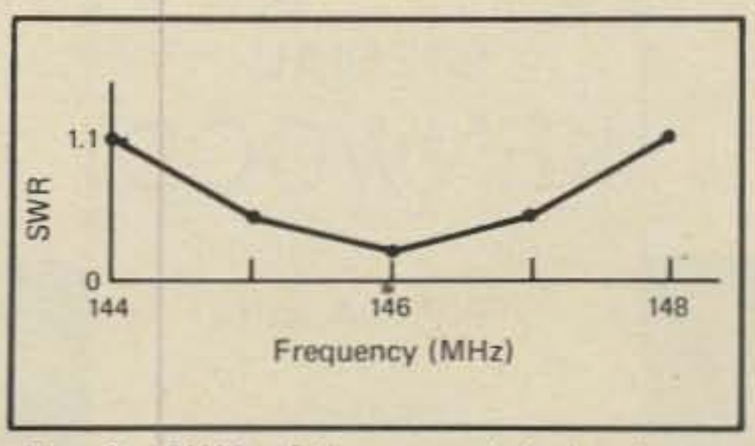
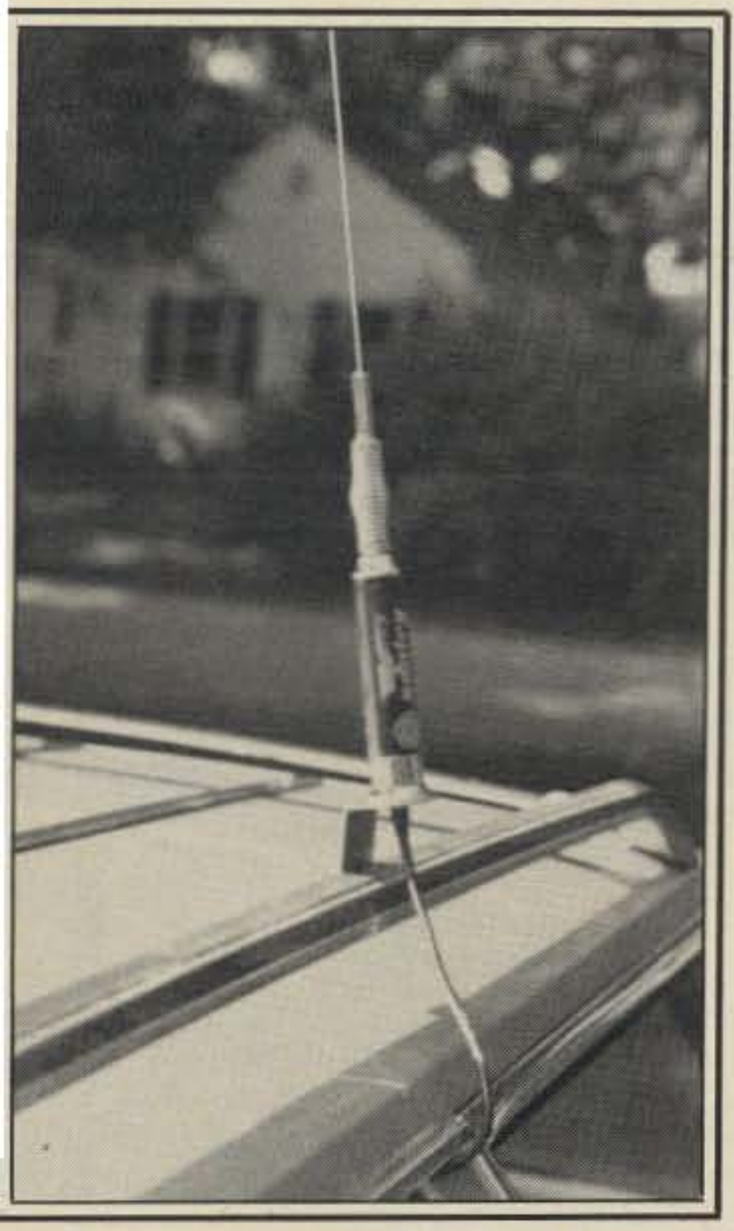


Fig. 3– SWR of the completed antenna. Tuning is quite broad and SWR is better when mounted on the car than when measured in the shack.

until the desired resonant point is reached. The SWR versus frequency curve for the model is shown in fig. 3. When the antenna is finally assembled, small adjustments in length are made by loosening the set screw holding the whip until the best SWR is obtained.

Conclusion

A base-loaded CB mobile whip can be converted to 2 meters to make a strong, efficient antenna for mobile use or for "out the window" use at home. A minimal RF ground is required, unlike a quarter-wave antenna. As an added bonus, the antenna does not advertise the 2 meter equipment in the car, which should reduce the exposure to theft. The project should easily be completed in a weekend.



The antenna mounted on the luggage rack of the family wagon. SWR as shown is very low, indicating a good match.