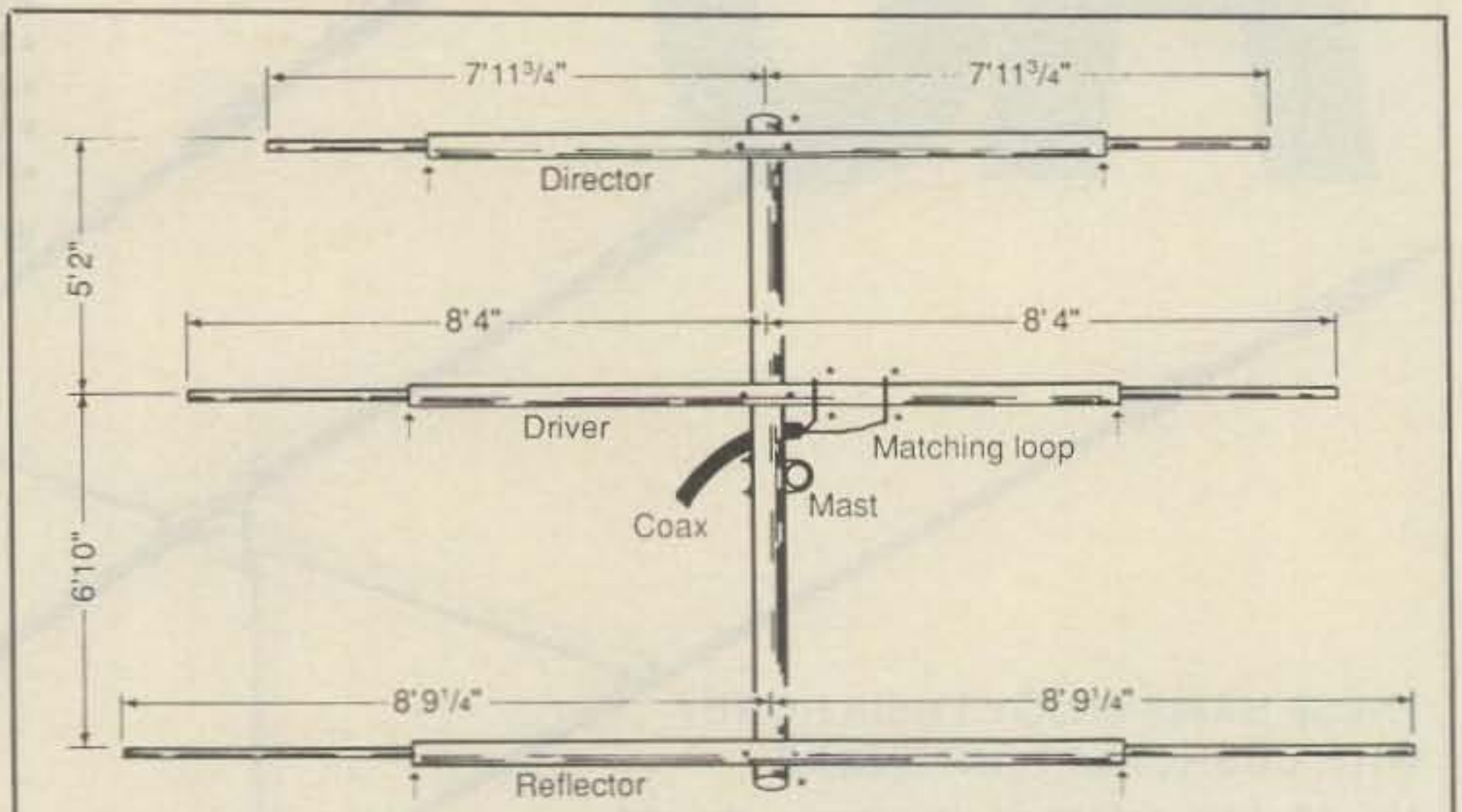
There's a lot of CB beams out there either not being used or being changed. N4QXK gives us some tips on buying them and converting their use to 10 meters.

How To Modify A CB Beam For The Novice 10 Meter Band

BY DON RATCLIFF*, N4QXK

With Novice Enhancement now a reality, as well as new openings on ten meters, many newcomers are beginning to crowd the 28.3 to 28.5 MHz portion of the spectrum. For several evenings recently it was wall to wall contacts, with almost every state being heard at this Southeastern QTH.

While a dipole can work wonders on the band, the extra punch of a beam can pay off when the band is marginal for the place you wish to reach (or in a pileup). Good antennas for ten meters can be expensive; I priced a new three element ten meter beam at well over $100 and used ones are nearly that. I found a neat, cheaper solution: Modify a used CB beam (which often go for $50 or less).



NOTES:
Sand elements, U clamps and bars at (*)
† indicates where elements are to be pulled apart, sanded, put together and clamped.

*Fig. 1– The dimensions for the converted 3-element 10-meter Novice beam. Be sure to clean and sand all the metal to metal contact points (indicated by a *). The arrows indicate the element construction. At these points, where tubing goes into tubing, separate the tubing and sand and clean all surfaces. When the elements are reassembled with the new dimensions, all mating surfaces should be clean, polished metal.*

Finding the Antenna

My first step was to put an ad in the local paper, "Wanted: a CB beam." I received a half dozen calls or more from people who wanted to sell what I call "monster" antennas. Monster antennas are those five element, double stacked, multiple polarization things that probably sound the same as the simple three element variety on the air, but bring a "shazam" from anyone that sees the monstrosity. By asking the CB'ers for the names of other CB'ers who had simpler three element beams, I was finally able to track down just what I wanted at the price I wanted to pay.

It was a mangled but intact antenna that went for $25. It was structurally sound, but a bit rusted and had one broken element. The owner complained that it had a 6:1 SWR, but I suspected that might be from the rust, the broken element, lousy coax, or even from a defective SWR meter!

It's important that the CB antenna have elements that can be put together to meet the required dimensions. Sometimes a broken element can be salvaged because only a few inches have been lost (they often break at a junction point). If you can fish out the smaller broken section from the larger tubing and insert the remainder two or three inches, yet still have a long enough element, it's still worth buying (try it *before* you buy).

To get the antenna home, I loosened the U clamps holding the three elements to the boom. These were then tied together with a rope and attached to the side of the car for transporting.

Taking It Apart

Once home, I took all the sections of elements apart (see arrows in diagram). This was fairly easy for all but one element, after I had straightened them out the best I could. The rough one came apart with the help of a couple of buddies, vice-grips® (don't use them too tightly or the tubing will become unusable), and pliars. Twisting back and forth, as well as pulling, can help. A little mangling can be straightened out later, but be careful not to break off rusted or weak sections (they may then be too short to be usable).

I don't recommend the easier method of just cutting the ends of the elements because you might one day decide you want to lower the frequency resonance a bit, and it's hard to lengthen elements that are cut off! You also cannot be certain that the element sections are making

*1150 Scenic Dr., Tocca, GA 30577

good contact with one another, because of hidden corrosion and rust.

I then sanded the outside of smaller sections that fit into larger sections of each element, and sanded the inside of the larger sections. I took off all of the hardware and replaced most of screws and small clamps. You need to be very careful with the matching loop, that it isn't broken or bent very much. I cleaned the coax connector by spraying TV contact cleaner on and inside it. I also sanded every place metal touched metal, including the U clamps, so that everything made good electrical contact.

If you want to be extra careful, get some of the goop they put in car taillights to minimize corrosion (see a local car parts outlet). It's expensive—a small tube was priced $7, but it will prolong the life of the antenna. It should be applied where the sections of the element slide inside one another, and perhaps on the coax connector.

Putting It Together

Reassembly was a bit more difficult than disassembly (isn't it always?). Making sure the element ends that come together are as near round as possible and straight helps a great deal. The element that gave me problems in disassembly also proved to be troublesome in reassembly. A great deal of twisting and pushing with pliars and vice-grips® helped all but two very stubborn sections. These I took completely apart again, so I could focus on assembling the most stubborn sections (I hadn't forced the easier sections into their final position yet).

The stubborn sections went together only through brute force. This may make them look less than perfect, but with care the antenna can still work well. I had friends hold the element sections where they went together (to keep from bowing) while I placed the large end against the side of the house (with a block of wood to protect the siding). I then used a hammer on the smaller end until the two sections went together and were the correct total length. They may never come apart again (although one did,) the desired proportions were achieved after a lot of pounding.

Using an old antenna book, I calculated the lengths of the elements. My antenna was set for a frequency of 28.5 MHz, since I planned to do very little CW operating and it could be used after I upgraded. As it turned out, the SWR was 2:1 or less from 28.1 to 29.0 for my dimensions, with the lowest SWR at 28.6. If you want to catch the General-class CW band, the elements should each be ½ inch longer. You can also raise the range proportionately by shortening elements by ½ inch for each 100 kHz.

The measurements I used were: Director—15 feet 11½ inches, Driver—16 feet 8 inches, and Reflector 17 feet 6½ inches. The spacing was 5 feet 2 inches between director and driver, and 6 feet 10 inches between driver and reflector. The latter can be played with a bit, if your antenna doesn't allow this much spacing, but try to keep the same proportions.

Don't assume anything about the original antenna. I found that the elements on mine were not evenly positioned on the boom , the Driver was originally 16 feet 10½ inches, but one side was 3½ shorter than the other (and it was the unbroken element!).

I found the original location of the beta match, loosened and sanded the contact points, and then shortened that spacing by half an inch. Don't tighten it too tightly because you may have to experiment a bit with the correct spacing, since it may not have been set correctly at first.

Testing Out the Antenna

I checked out the antenna with a twenty-five foot section of mast, but I understand you don't have to raise it that high to get a fair reading. Set it up so it can be raised and lowered fairly easily, so you can adjust the matching section and perhaps element spacing and length.

Using an SWR meter (I found a local amateur who was glad to loan his; you really don't have to own one if your antenna works well), check the antenna at 28.11, 28.2, 28.3, 28.4, and 28.49 MHz. You should find a curve which starts at about 2.0 (at 28.11) and gradually decreases as you go up frequency. If the SWR is higher than 2.0 at 28.11, you need to loosen the adjustment on the match and make the loop larger. If the SWR is lower than 2.0, you probably need to make the loop smaller.

You may want to invite an amateur with a higher class license to check out the higher frequencies (above 28.5 MHz). Initially the SWR tested out as 2:1 at 28.1, 2:1 at 29.0, and the low point being 1.4:1 at 28.6.

I took the antenna down and made the elements as parallel as I could, using a level, and then secured the mast sections togethr more tightly. This time when the antenna was raised, the extremes measured the same, but the middle frequency was down to a 1.2:1 SWR. On-the-air performance was also excellent: the first contact was Toronto, Canada (not bad from Georgia) and my fourth contact was Santiago, Chile (off the back of the beam), both with excellent signal reports. My modification was a success! CQ