

SIMPLE HINGED ELEVATION MOUNT FOR A SINGLE LONG YAGI

INTRODUCTION

Since 2009, I have very successfully used a heavy duty manual elevation mount with my 6M8GJ yagi on 6m EME DXpeditions. Many people asked for details about the mount and the extension mast for guying the boom. In response to these inquiries, I documented the mount construction in detail and made this information available on my website:

<http://www.bigskyspaces.com/w7gj/ElMount.pdf>

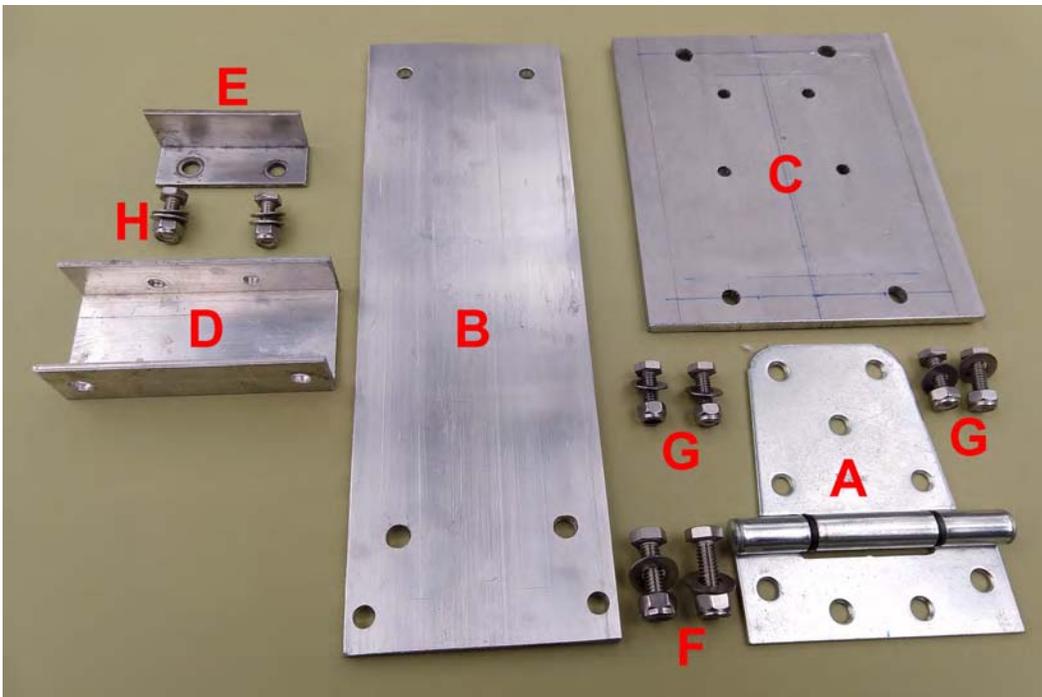
However, I realize that many people were looking for something simpler that they could very easily reproduce with basic hand tools and readily available materials. And with the growing number of 6m EME DXpeditions needing simple, lightweight manual elevation mounts, I wanted to provide a solution that was easier to duplicate. When I saw the National Hardware 3-1/2" Heavy Duty Gate Hinge (pictured below) at a local store, I decided to build a very simple manual elevation mount using that convenient hinge.



This mount is designed to be installed directly on the top of a mast, so the weight of a large yagi is less likely to cause the mast to bend. In addition, the mast actually supports the weight of the mount and the yagi, so the U bolts are only required to keep the antenna from turning on the mast. The mount is lightweight and has a small number of parts, many of which can be obtained at a local hardware store. But perhaps the most attractive feature about the mount is that it can be built in an evening using only an electric drill, a hack saw and some wrenches.



All the parts are shown below, and identified with letters corresponding to their descriptions and sourcing information on the parts list at the end of this article. The only difference between the G and H bolts is that two washers are used with the H bolts. Certainly, hardware and aluminum angle can be found at the local hardware store. If you need to mail order some of the parts, that information is also shown on the parts list.



CONSTRUCTION

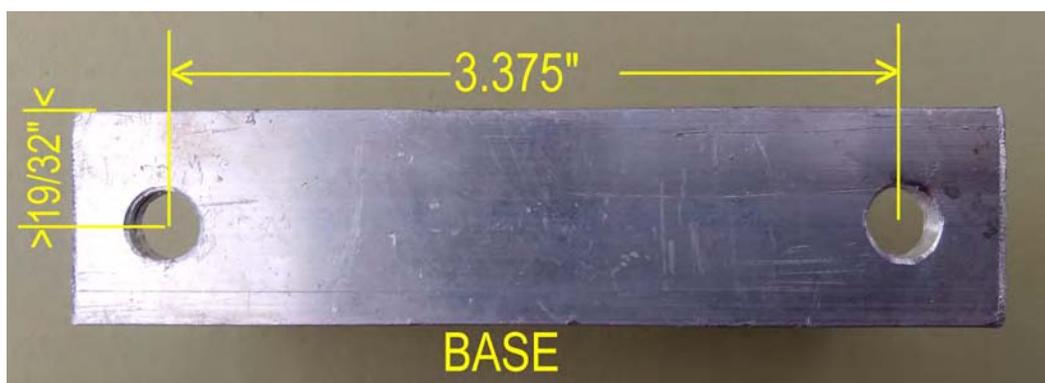
The holes drilled for the mast and boom mounting U bolts in parts A (mast mounting plate) and B (boom mounting plate) were for the clamps provided with the M² 6M8GJ yagi (5/16" x 2" U bolts and saddles for the mast mounting and 5/16" 2.5" U bolts and saddles for the boom mounting). Of course, you will want to drill appropriate size holes for whatever mounting clamps you are using with your particular mast and antenna boom diameters. However, you still should follow the dimensions shown for locating the clamps along the center line of the mounting plates, and at the distances shown from the ends of the plates.

STEP 1. Draw lines down the centers of pieces A and B. Mark the center edge of the 4.25" wide rectangular piece of the hinge (part A). Center the rectangular part of the hinge on the end of part B so the aluminum plate butts tightly up next to the round hinge section. You can use the outer holes in the hinge plate to mark corresponding holes to be drilled in plate B. Those two holes will be drilled out in both pieces for the two 5/16" bolts. These holes will be 3-3/8" apart and 1/2" in from the end of the aluminum plate.

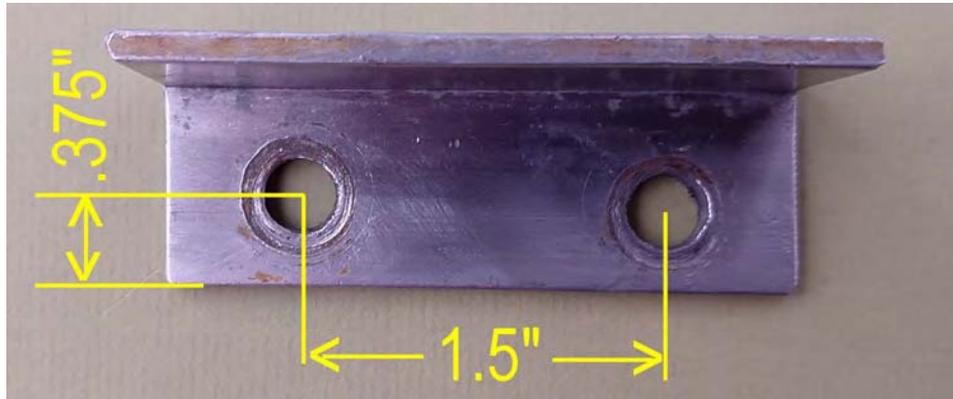


STEP 2. The mounting holes for the mast clamp U bolts should be located 1-5/8" in from the hinge (top) end of the plate and 7/8" in from the lower end of the plate.

STEP 3. Again use the rectangular section of the hinge plate as a template to drill 5/16" holes in one of the legs of part D (the channel). As shown below, the holes should be slightly more than halfway down the edge of the open channel legs, so that leg will also fit up tightly against the rounded hinge section when the parts are assembled.

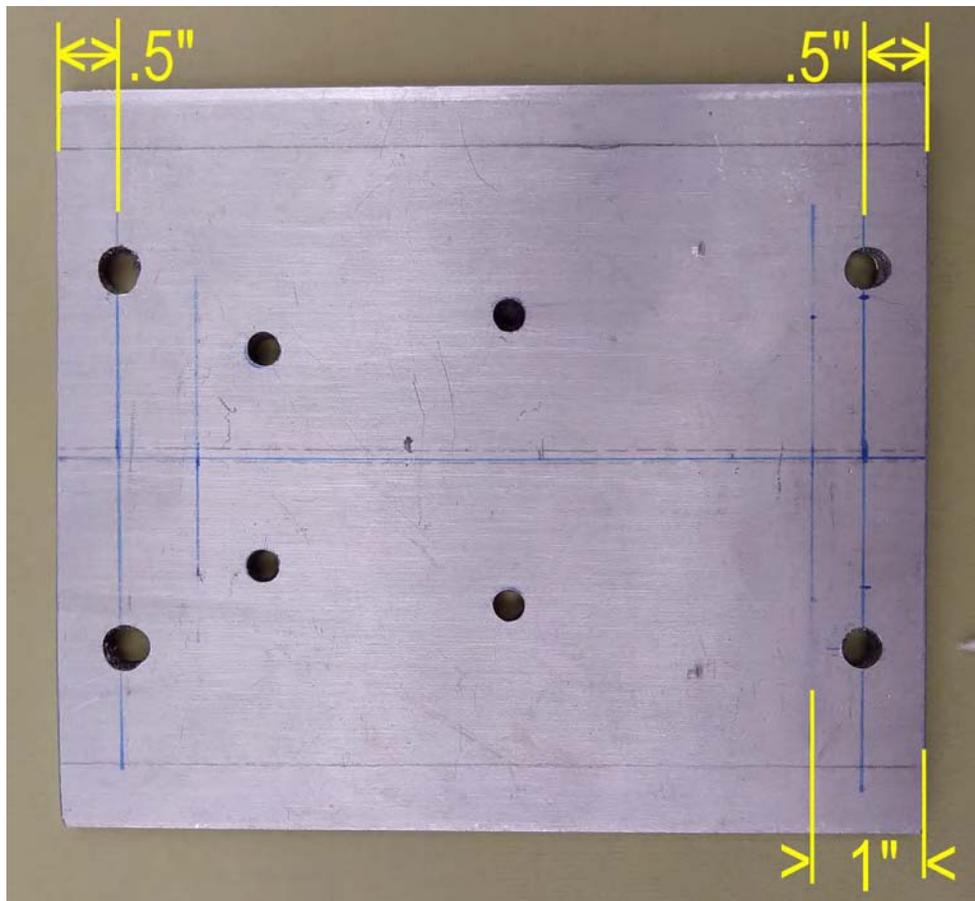


STEP 4. Drill two 5/16" diameter holes in the aluminum angle as shown.



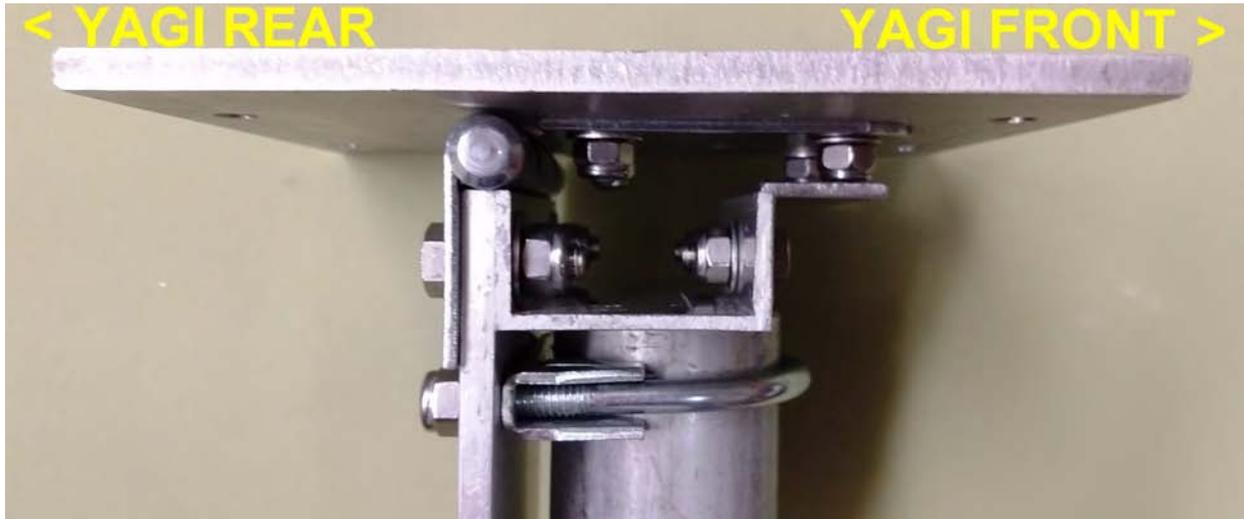
STEP 5. Center the holes for the boom mounting clamps on 6" wide part C (boom mounting plate), 1/2" in from the ends; that will leave 6" between the clamps. All further holes will be 1/4" diameter.

STEP 6. Lay out the hinge on the boom mounting plate so the flat rectangular end is 1" from one of the plate ends. Make sure the hinge is centered along the center line that you used to mark the center line for the boom clamps. Mark the four outside holes in the tapered part of the hinge and drill the holes for 1/4-20 bolts. Bolt the hinge to the plate with four 3/4" long 1/4-20 bolts, placing a washer and lock nut on the hinge side of the plate.



STEP 7. Use the two 5/8” bolts (parts F) to connect parts A, B, C and D. Be sure to hold parts B and D tightly against the round part of the hinge as you tighten the bolts. Part B goes in the middle of the “sandwich”, as show in photo below.

STEP 8. Use a square to make sure mounting plates B and C are held at a 90 degree angle. Then hold part E (the angle aluminum elevation stop) up against the bolts coming down through part C and the hinge and mark the hole positions from part E where they are against part D. Drill 1/4” holes at the marked locations in the leg of part D.



STEP 9. Use the two remaining bolts (part F) to bolt part E onto part D, placing a washer on each side of the channel leg. Tighten them while holding parts B and C at a small amount of adjust the position of the aluminum stop slightly- this is what prevents the yagi from pointing below zero degrees elevation.

STEP 10. You probably will need a boom support strut and boom guy lines to hold your yagi boom straight. Unlike my original elevation mount, this mount has no place to attach a small mast to support the boom guy lines. You will have to fabricate something similar to what I used on my original elevation mount, but attach it to the yagi boom immediately in front of this mount with a U bolt and saddle clamp. Details on how such a mast and spreader was constructed can be found in the previously mentioned document describing the original elevation mount construction.

CONCLUSION

This sturdy elevation mount is easily constructed and can be used to manually elevate a single long yagi. Small nylon lines can be used to aim and elevate the yagi. If the center of gravity of the yagi (with the feedline, boom guy lines and support mast installed) is located in the center of the above mounting plate, the yagi will be slightly front heavy, and will naturally rest on the horizon.

SIMPLE HINGED ELEVATION MOUNT PARTS LIST

A. National Hardware #287 Extra Heavy Duty 3-1/2" Gate Hinge or equivalent
(<https://www.natman.com/detail/287-extra-heavy-gate-hinges-n223-875>)

B. 12" long piece of 1/4" thick x 4" wide bar stock (Grainger Item # 2EYY7 or equivalent) 4.25" long piece of 2" aluminum channel with 1" legs and 1/8" thick walls (Grainger Item # 6ALY4 or equivalent))

C. 7" long piece of 1/4" thick x 6" wide bar stock (Grainger Item # 2ARH3 or equivalent, trimmed to length)

D. 4.25" long piece of 2" wide aluminum channel with 1" legs (Grainger Item # 6ALY4 or equivalent, trimmed to length)

E. 2.75" long piece of 1" aluminum angle stock with 1/8" thick walls (Grainger Item # 2EYP1 or equivalent)

F.

(2) 1" long 5/16-18 stainless steel bolts

(2) 5/16" stainless steel washers

(2) 5/16" stainless steel nylon insert lock nuts

G.

(4) 3/4" long 1/4-20 stainless steel bolts

(4) 1/4" stainless steel washers

(4) 1/4" stainless steel nylon insert lock nuts

H.

(2) 3/4" long 1/4-20 stainless steel bolts

(4) 1/4" stainless steel washers

(2) 1/4" stainless steel nylon insert lock nuts

MODIFICATION TO ENABLE EVEN HIGHER ELEVATION

STEP 2 of the above construction notes calls for the mounting holes for the top mast mounting clamp to be located 1.625" from the end of the plate (Part B). If they are instead located 2.25" from the top end of the plate, the nuts will not interfere with nuts on the Boom Mounting Plate when the antenna is elevated as high as possible.

EXTENSION MAST FOR SUPPORTING BOOM GUY LINES

INTRODUCTION

When a yagi is elevated, the boom guy lines need to be supported by an "Extension Mast" attached to the yagi, which is elevated along with the yagi. The preferred way to guy the boom of a long yagi is to use an insulated "spreader" to support a pair of insulated guy lines toward the front and a pair toward the rear of the yagi to keep the boom straight while it also is being prevented from sagging. Please note that the mount I am now using is made from 3/16" thick aluminum plates rather than the 1/4" plates specified in the prototype. The following notes on the length of the Extension Mast and the mounting of the Extension Mast Guide Block assume the use of 3/16" aluminum plates for construction of the Hinged Mount. If you used 1/4" thick material, your Extension Mast should be slightly lengthened and the U bolts used to mount the boom to the Hinged Elevation Mount may have to be slightly longer.

CONSTRUCTION

With the small simple hinged mount, which sits directly on top of the mast, the most practical way to provide an Extension Mast is to bolt it directly to the boom of the yagi. To use the guy lines from my previous Elevation Mount with the new Hinged Mount, I used a 39.75" long piece of 1.5" x 1.5" x .125" thick aluminum angle, mounted so that the 2.5" diameter boom of the yagi was centered 37.625" from the top of the elevation mount. That leaves just enough mast below the yagi so it can butt up against the front of the 3/16" thick Boom Mounting Plate on the Hinged Mount. The Extension Mast is mounted to the boom using a heavy duty galvanized saddle clamp (Part #CYT-CL2500SG from DX Engineering). The top of the Extension Mast and the Fiberglass Spreader for the guys are constructed exactly as shown for the original elevation mount:

<http://www.bigskyspaces.com/w7gj/ElMount.pdf>

To make it easier to align the Extension Mast so it is at a right angle to the Boom Mounting Plate of the Elevation Mount, a 3/16" thick Guide Plate was added to the underside of the front of the 3/16" thick Boom Mounting Plate, using the same U bolts used to secure the yagi boom to the Elevation Mount. The photos on the following page show the construction of the Guide Plate and how it helps to properly orient the Extension Mast. You may have to adjust the dimensions slightly, depending on the type of saddle clamp you use to attach your Extension Mast to the antenna boom.

The photo on Page 9 shows the 6M8GJ yagi with the new Hinged Elevation Mount Extension Mast, as it was first field tested during the grid activation at the confluence of DN55/56/65/66 in June, 2020.

EXTENSION MAST GUIDE BLOCK

