

GAP

SUPER “C” ANTENNA

Installation and Assembly Instructions



GAP Antenna Products, Inc

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(561) 571-9922

WEBSITE <http://www.gapantenna.com>

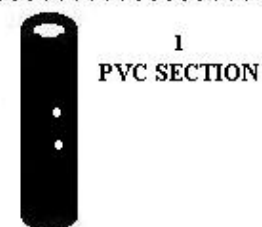
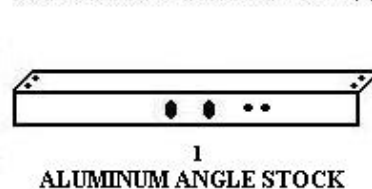
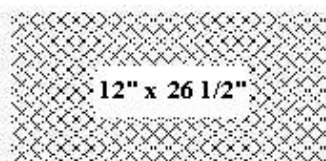
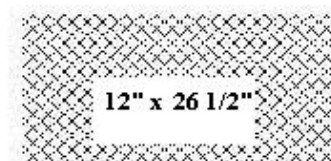
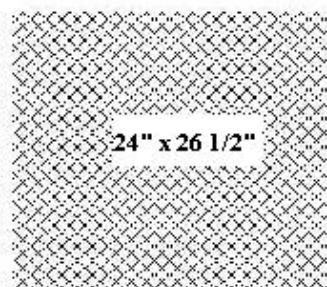
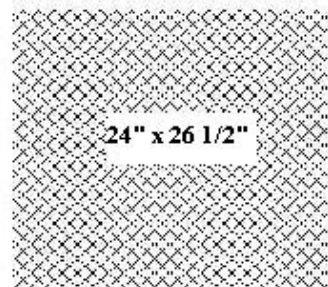
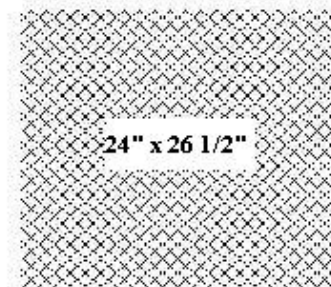
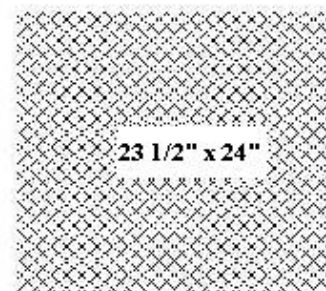
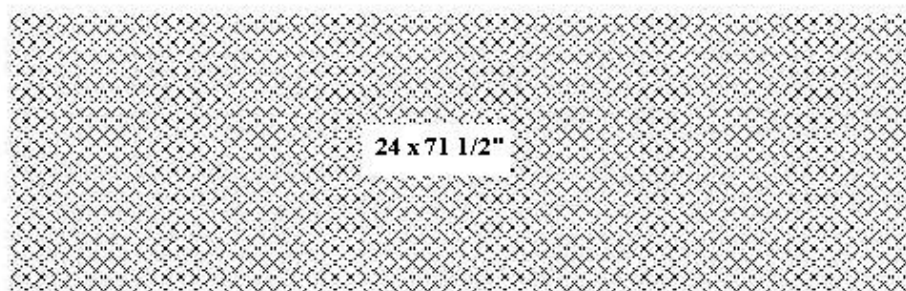
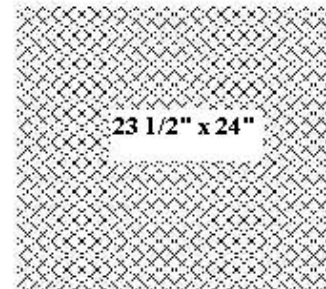
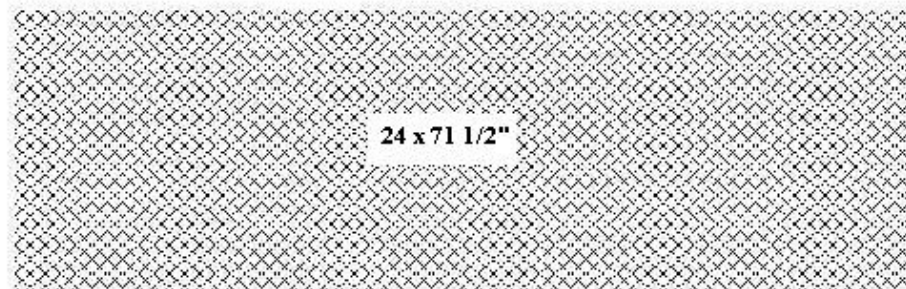
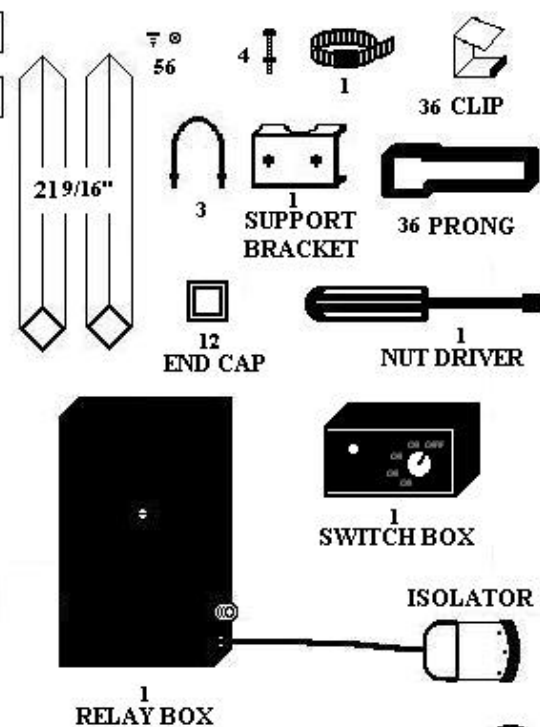
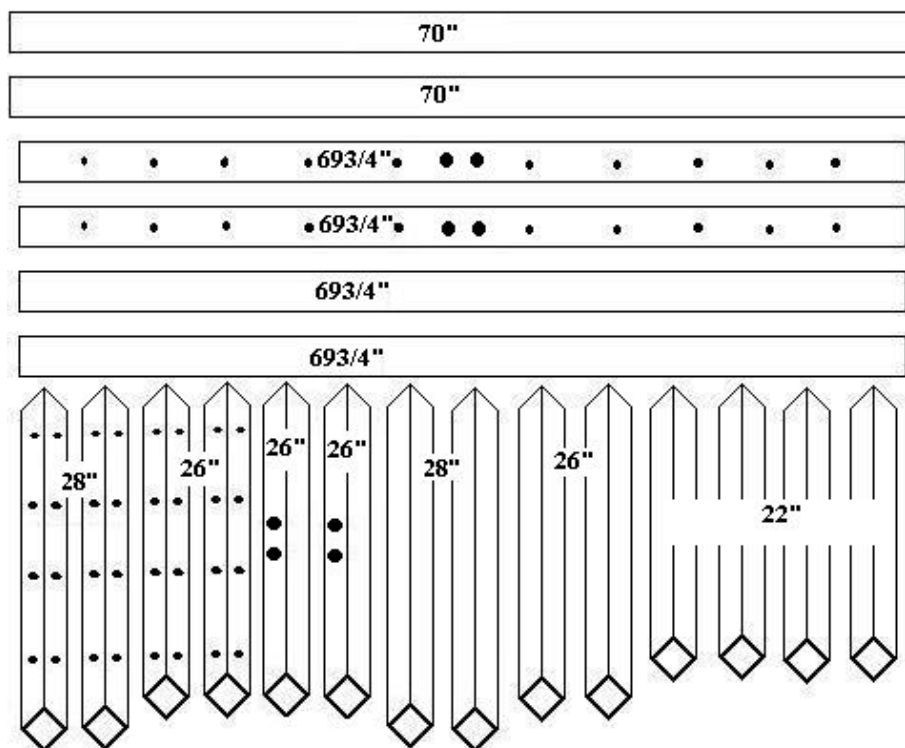
SAFETY NOTICE

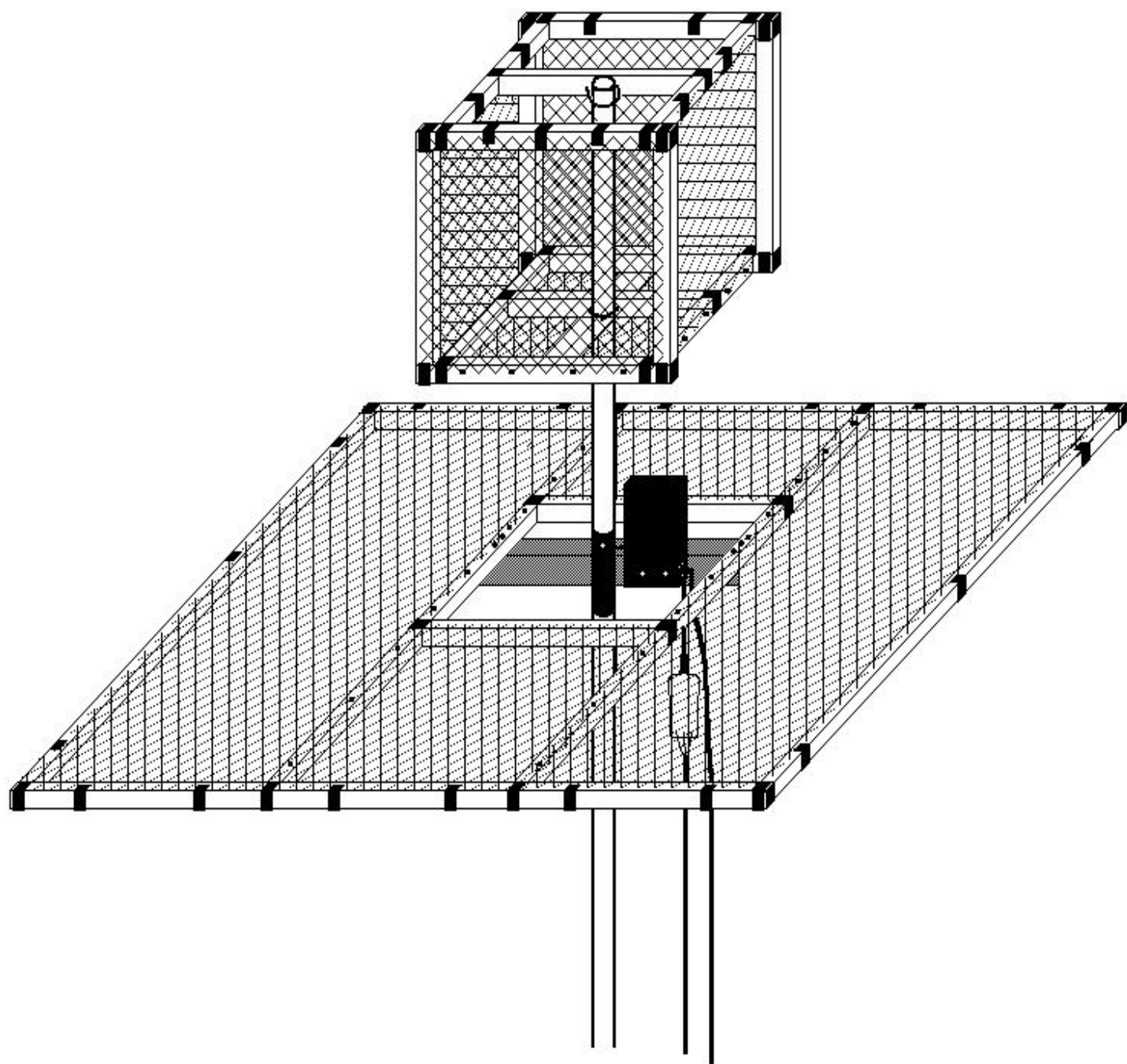
WARNING POWER LINES CAN KILL YOU

**DO NOT ERECT THIS ANTENNA NEAR ANY OVERHEAD WIRES,
UNDER ANY CIRCUMSTANCES.**

Do to the unique nature of this antenna and it's very small size, there should be no reason to significantly elevate your Super "C" antenna.

- 1) Do not erect this antenna near any overhead wires. Assume all such wires to be power lines and deadly.
- 2) Do not transport this antenna from an assembly location to the installation site if you must travel near or under overhead wires.
- 3) Request advice from your local power company if power lines are anywhere near the proposed location.
- 4) If the antenna falls, DO NOT try and stop it. Get out of the way.
- 5) If any part of the antenna should ever come in contact with power lines. DO NOT TOUCH IT OR ATTEMPT TO MOVE IT. IMMEDIATELY CALL THE POWER COMPANY.
- 6) In the event of an accident involving power wiring DO NOT TOUCH THE VICTIM DIRECTLY. Send someone for help.
- 7) Select a site which limits public access to the antenna. During operation the antenna has a high RF potential. If the possibility exists that people or animals could touch the antenna, place a wooden fence around it.
- 8) Choose a calm, dry day to erect the antenna.
- 9) Always enlist the aid of at least one competent person to aid in the assembly and placement of your antenna.
- 10) Never use a ladder to help in the placement of your antenna. A ladder is not needed and could be dangerous.
- 11) Do not connect the antenna until it is completely assembled and firmly and safely mounted.
- 12) If you have any questions regarding the assembly or mounting of your antenna please call; (561) 571-9922. We will be more than happy to assist you.





Super “C”

Introduction

1-1 Congratulations on your purchase of the GAP Super “C” Antenna. You will shortly experience the ultimate in low-profile antenna technology. Your GAP antenna has been designed and manufactured to provide superior performance and trouble-free operation.

GAP technology produces highly efficient, wide band and very low loss performance. Excessive antenna loss is not used to produce wide bandwidth performance. This manual is organized to minimize the time necessary to assemble and install your Super “C” vertical. No special tools are necessary. It is recommended that you follow the instructions step by step using the figures only as a guide. Please read the text.

Before proceeding any further take the time to match up all the parts depicted on your parts list with the actual parts received in your box. If ANYTHING is missing contact GAP Antenna Products, Inc to arrange for a replacement.

The use of an antenna tuner is not required. Tuners will not improve the performance of the Super “C”, however, they may permit a solid state transmitter to maintain full output power. If VSWR is less than 2:1; using a tuner is permitted. Never run more than 200 watts PEP or 100 watts continuous duty cycle.

Site Safety

2-1 Ideally, it is best to locate the Super “C” in a clear area away from buildings, metal fences, sheds etc. As a practical matter, many amateurs must compromise in locating their antennas. Unlike all linear antennas, the Super “C” is virtually independent of nearby metal objects in so far as detuning of the antenna is concerned. However, it is not wise to place a Super “C” next to a large metal surface such as the side of an aluminum sided house and expect it to radiate through the building.

Since the antenna can be placed almost anywhere one must carefully consider that others might be able to touch the antenna. Installing something to prevent direct access is very important. For example, a snow fence, or similar wood structure would provide safety by restricting access. If touched while in operation a severe burn or worse could result.

RESTRICT ALL ACCESS TO THE ANTENNA

It is acceptable to cover the antenna with a thin plastic cover. Fiberglass screening supported by non conductive corner masts will also work. Restricting human and animal access is very important and should be the prime consideration. To determine a proper RF safety plan treat the antenna as you would a halfwave dipole.

Should you elect to place the antenna on your roof, porch roof, or main roof, assemble and test the Super “C” on the ground first. It is easier to locate and correct assembly problems while on the ground. After determining the antenna is working properly you can paint your antenna with a non conductive paint to reduce it’s visibility.

The stressed aluminum screening utilized in the design of the Super “C” can yield sharp edges. Please take whatever precautions are necessary to ensure your safety. Wearing a pair of gloves when working with the aluminum mesh would be a good idea.

3 - Antenna Assembly

3-0 General

The Super "C" Antenna is a compact surface area, radiating device. It is composed of 1" x 1" aluminum box tubes and "stretched" aluminum sections. Unique PVC "corners" are provided to transform the individual 1" x 1" aluminum tubes into a rigid, rugged, lightweight rectangular box assembly. A unique PVC "clip" is also provided. The clips secure the aluminum mesh sections to the 1" x 1" tubular structures.

The basic Super "C" assembly has been separated into two simple operations the collector grid and the basket. The assembled antenna is shown in figure 1. A pictorial parts list is shown as figure 2.

3-1

A. Grid Assembly- The grid is a rigid 6 foot by 6 foot mesh structure. This is the base of the Super "C" Antenna. It does not radiate. It is a capacity hat.

B. Basket Assembly- The Basket is a rigid 24" x 29" rectangular aluminum mesh basket. It and its 12" support mast are the radiating elements on the Super "C" antenna.

3-2 PVC Corners and Clips

1. PVC Corners- A unique PVC corner developed by GAP Antenna Products, Inc. is shown below. It is a simple device to use requiring no screws, bolts or adhesives. The corner is composed of two interrelated sections - a clamping section and an insert section identified as a prong. PVC corners are used to form the Super "C" frames.

2. Installing the corner is a two-step process.

A) Locate and insert a 1" x 1" aluminum box tube into the square "clamp" portion.

B) When forming a corner, slide this tube through the opening to the far side and stop.

C) Locate a second 1" x 1" aluminum box tube. Slide the prong of the corner into the open end of this tube. Observe that as you push the prong into the aluminum tube, the clamp section will begin to tighten and the force required to push will increase as this second tube nears the first tube.

D) The insert must be pushed into the second tube until it is flush with the clamping portion of the corner. If you should find this process difficult you can use a wooden mallet or equivalent to gently "rap" the second tube in place. This seating action is called "snugging".

E) After snugging a corner do not try to move it. It will clamp with enough force that if you try to slide it chances are good you will snap the corner. Likewise, if you put any lateral force on the tube after the clamp has been snugged chances are you will cause the corner to rip.

CORNER

CLAMPING PART

PRONG

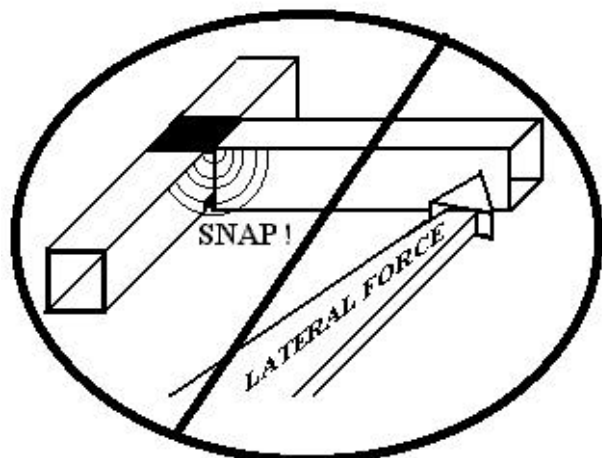


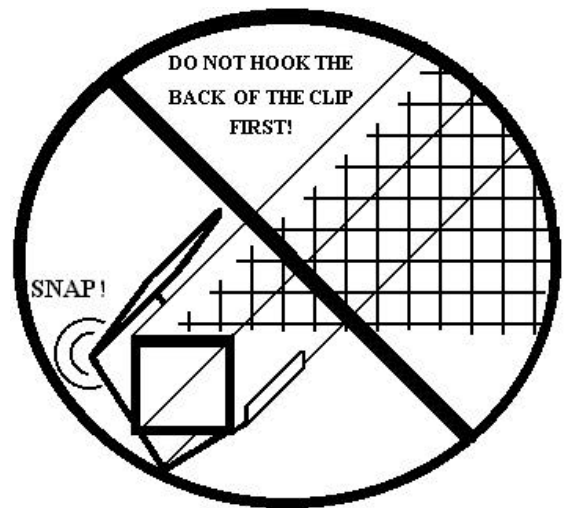
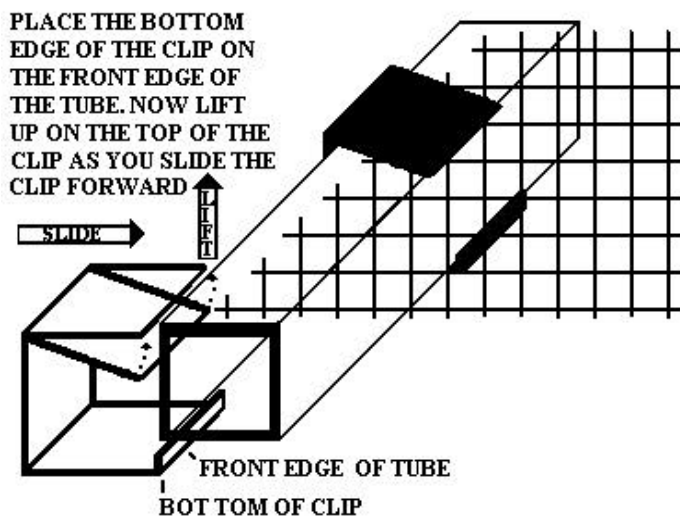
SECOND STEP

CORNER

OPEN
END

SLIDE THE OPEN END OF THE SQUARE TUBE
OVER THE PRONG. THIS WILL TIGHTEN THE
CORNER AROUND THE FIRST TUBE LOCKING IT
IN PLACE. DO NOT BEND OR TWIST THE TUBES.
DOING SO MAY SNAP THE CORNER.





3. PVC Clip - The PVC clip is shown above. It is also quite simple. The clip is used to secure the aluminum mesh to the various 1" x 1" box beams. Aluminum stretched mesh is placed on the top surface of the 1" x 1" beam or frame. The mesh should cover most of this surface.

To apply the clip see the figure above. Slide the surface with the small right angle bend under the 1" x 1" box beam so it is approximately in the middle on the beam. Lift up on the top of the clip as shown, increasing the opening in the clip and as you slide it over the mesh on the top of the box beam. Once over the mesh, push the clip until the bottom of the clip catches the back of the box tube and locks into place. Caution- do not lock the bottom of the clip on the back of the tube first. If you do this it will force the clip to be spread more than is required and could result in it snapping.

Other considerations- The twisted nature of stretched aluminum creates a high coefficient of friction assisting the clip in holding the mesh in place. Please note that the PVC clips do not perform any electrical function. Where electrical conductivity is required self-tapping stainless screws are used.

The nature of the clips is such that if excessive force is applied to the mesh, for example, ice, snow and wind. The clips will allow the mesh to release and loose it's load. If this happens remove the clips, reposition the mesh and reapply the clips. If this occurs in frigid weather, bring the clips indoors until they reach room temperature before reapplying otherwise they may snap. It is suggested you practice placing a clip on the 1" x 1" box beam without mesh to learn the technique.

Just in case extra clips and corners have been provided for your use.

3-3 Super "C" grid Assembly

1. Grid overview - The control grid is a 6 foot by 6 foot aluminum mesh surface supported by a rugged 1" x 1" box beam frame structure. Six roughly 70" two approximately 22" beams form the frame. Two of the long beams possess numerous 1/8" drill holes as well as two 1/4" holes on one side.

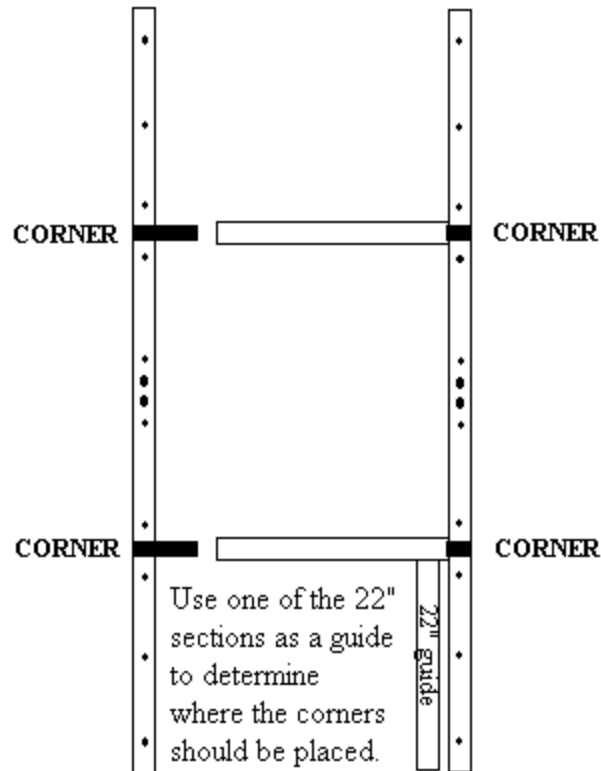
2. Grid Assembly - First, find a flat surface, a garage floor or driveway are perfect. Locate the two long tubes with drill holes and place them side by side about 2 feet apart with their drill holes facing up.

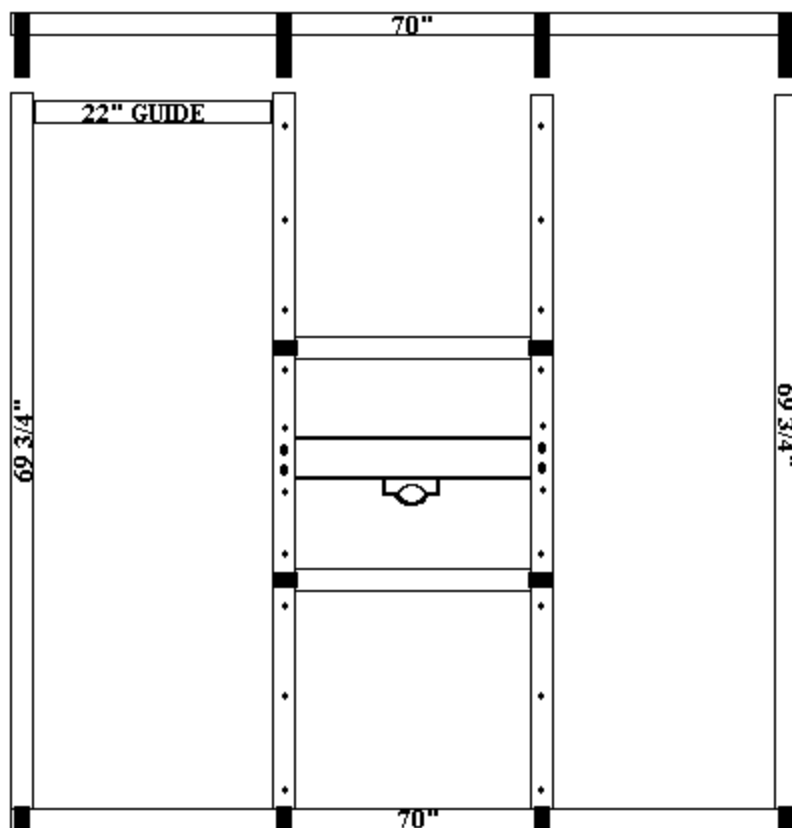
A. Locate four of the PVC corners. Slide two on each of these long tubes with their prongs facing the other tube, slide these corners toward the middle of each beam.

B. Locate two of the 1" x 1" x 22 inch beams. They have no holes in them. Place one of each of these tubes parallel with a long tube and even with the end of the long tube. These are to be used as a guide for establishing final placement of the corners, see the next page.

C. Slide the nearest corners to meet the end of the 22" tube. Now locate the 21 9/16" 1" x 1" tubes and slide them over both prongs locking the corners in place.

D. Move the 22" short tubes to the other tube and repeat the entire process. The result is an "H" frame as shown below.



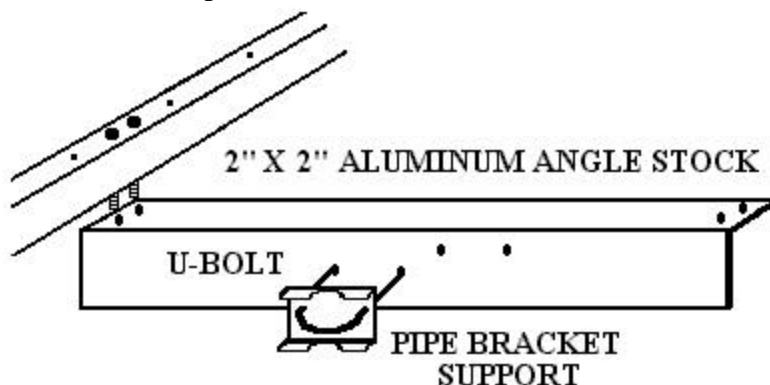


E. Locate the remaining two 69 $\frac{3}{4}$ " inch tubes. Place these tubes parallel to the H assembly just created, one tube on each side. Slide four PVC corners on the two remaining 70" 1" x 1" tubes with the prongs all facing the same way. Space two corners at the ends of each tube and space the other two corners 22 inches from the ends.

F. To properly place the middle two corners use the 22" tubes as a guide again. This allows you to position the middle two corners on each long tube, 22" from the corners positioned on the ends. See above. Place these 70" assemblies perpendicular to the ends of the four tubes referenced below.

G. Now align the "H" frame tubes and the two parallel 69 $\frac{3}{4}$ " inch beams with the prongs on the 70" tube. Slide all four prongs into the open ends of 1" x 1" tubes at the same time and snug. Make sure all corners are properly positioned.

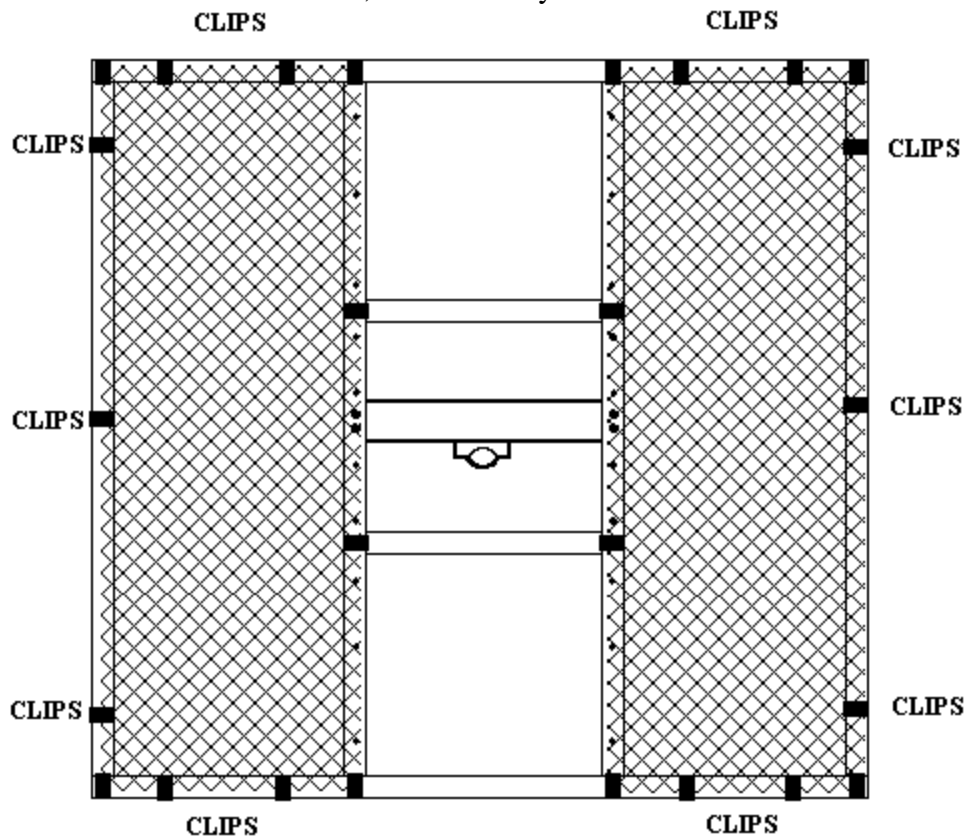
H. A support bracket is required to interface the control grid and the basket assembly. Locate the 2" x 2" x 24" right angle aluminum bracket. Attach the pipe support bracket to the 2" x 2" angle aluminum bracket with one of the U-bolts. Use the holes in the middle of the bracket and attach the pipe support bracket to the face of the 2" x 2" aluminum stock with the supplied U-bolt. Now line up the large holes on your H frame with the holes at the ends of the 2" x 2" angle stock, insert the 4 stainless bolts and tighten. The frame is complete!



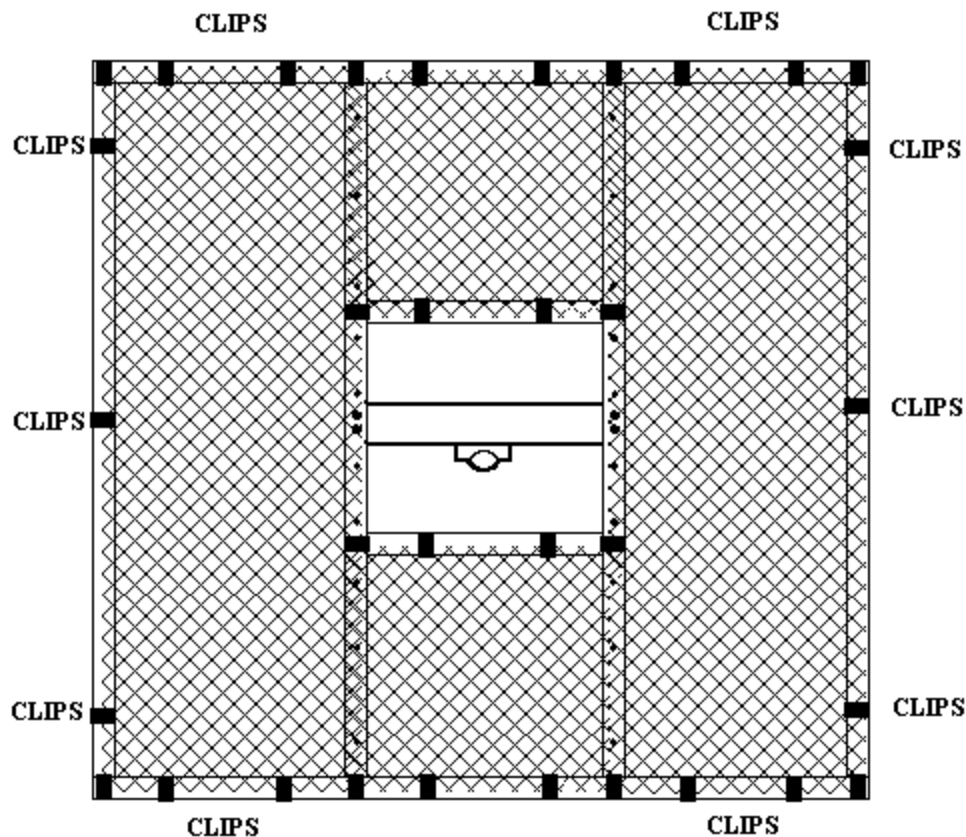
3-4 Mesh Assembly

1) Locate the 2 pieces of 24" x 71 $\frac{1}{2}$ " and 24" x 23 $\frac{1}{2}$ " stretched aluminum mesh sections. Place the two 24" x 71 $\frac{1}{2}$ " pieces over the 24" x 72" frame. Use the figure below as a guide. Make sure the long edge of the mesh entirely covers the

beam with the 1/8" holes. Install 14 clips to hold the mesh as shown below. When applying the clips keep the mesh taut to obtain a flat surface mesh. A flat surface looks nice, but electrically it doesn't matter



B. Locate the two 24" x 23 1/2" mesh pieces. Place them over the 24" x 24" frame. In so doing you will place one edge over the mesh already covering the 1/8" holes. Refer to the figure below.



D. Now locate the 5/16" stainless steel hex self-tapping screws and washers. Secure both meshes to the box beams, using the screws, washers and nut driver supplied. A total of 20 screws are required.

E. Again, using the figure above as a guide, secure the remaining mesh edges with the PVC clips. A total of 18 PVC clips are required overall. Their position is indicated above.

4.0 Basket Assembly

(14) 1" x 1" tubes form the frame for the Super "C" basket. To simplify the assembly and minimize mistakes divide these tubes into three groups.

Group 1 - all the five tubes with 1/8" screw holes on at least one surface.

Group 2 - four tubes all 22" in length

Group 3 - all the remaining tubes

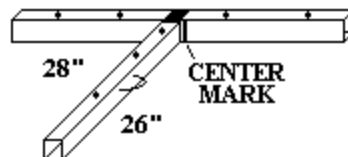
You will need a flat surface again for the basket assembly.

A. Basket - base frame- Collect the tubes. Locate the two 28" tubes with 1/8" holes on two surfaces. Place them opposite each other with holes facing up and out.

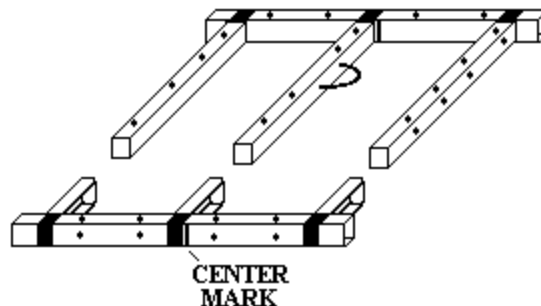
1) Locate the 26" pieces with the 1/8" holes and place them opposite each other and between the 28" tubes with the holes again facing up and out.

2) Using a ruler find the center of the two 28" tubes and mark with a pencil. Locate two PVC corners and slide one over each of the 28" tubes set one edge of the prong next to the center mark just created with the pencil. The prongs should face in or away from the screw holes on the other side of the tube.

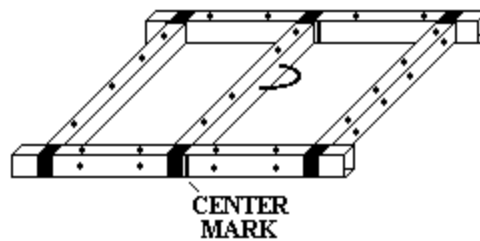
3) Locate the 26" 1" x 1" tube and attach a "U" bolt through the holes in the center of this tube. Now attach this tube to one of the prongs on the 28" tubes. The U part of the U-bolt should face the same side as your penciled center mark. Make sure the 1/8" holes are facing up, like the holes on the other tubes. Now slide one end of the 26" tube over the prong on the 28" tube and snug the corner. You have formed a T frame.



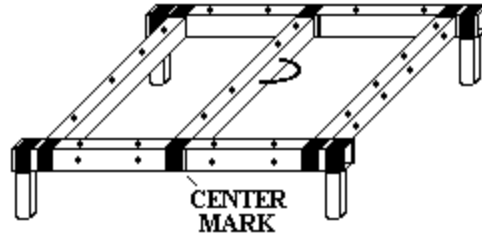
4) Locate four more PVC corners. Place a corner on each of the four ends of the 28 inch tubes. The prongs on one end should face the prong on the opposite tube. All these corners should be placed 1 inch in from the end of each tube or roughly the width of another corner or tube.



5) Carefully without moving the corners, insert the two 26" tubes into the remaining two prongs of your T frame. Now, carefully line up the other ends of these tubes with the prongs on the other 28" gently slide all three of these tubes over the prongs on the other 28" tube and snug. You have formed a rigid rectangle.



6) Slide one corner over the end of each tube. These prongs should point down or away from the screw holes thus creating a little table.

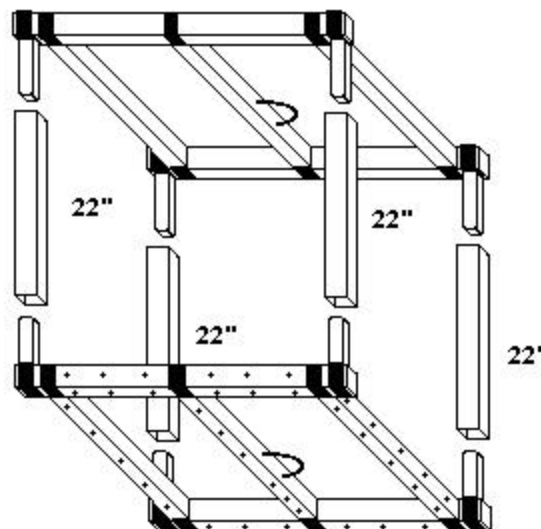


7) Repeat the entire procedure a second time with the third group of tubes that are the same as group one but have no drill holes except for the one with the U-bolt.

8) To complete assembly of the basket frame; place the original frame with drill holes back on the flat surface with its drill holes still facing down and the prongs of the four corners facing up.

9) Locate the four remaining 22" tubes. Place one over each of the four PVC corner prongs and snug tight.

10) To complete the frame assembly pick up the second frame and position this frame such that its prongs are directly above the four 22" tubes attached to the lower frame. Align the prongs with the open ends of the 22" tubes, make sure your U-bolts are facing the same direction, now slide these assemblies together and snug all four tubes.

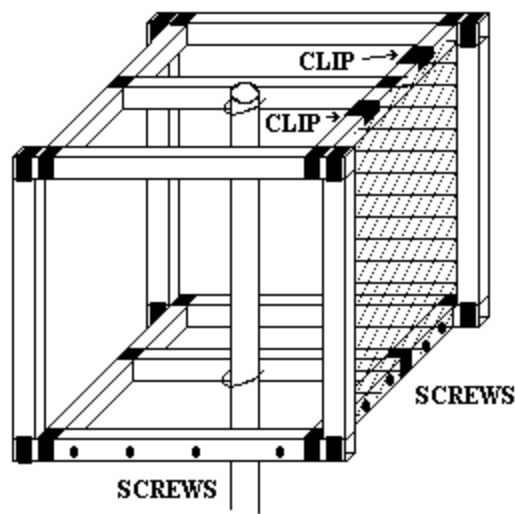


11) Invert the rigid basket frame such that the screw-holes on the bottom of the box are now on top and visible. Locate the double wall aluminum mast with stainless steel hose clamp. Loosen the stainless clamp on the 1 3/8" mast and pull the 1 1/4" inner aluminum tube out from the 1 3/8" section approximately 10 1/2". Tighten the hose clamp to secure these two tubes in place. Insert the larger or 1 3/8" end down through the "U" bolts until the mast rests on the flat surface and is even with the frame. Tighten the "U" bolt closest to the flat surface. Now slightly tighten the second U-bolt.

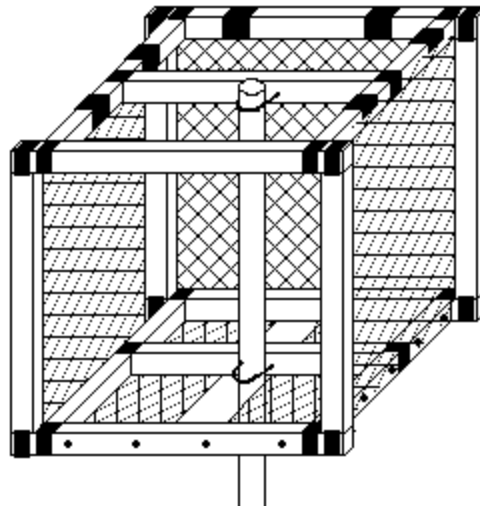
4.2 Attaching the mesh to the basket

Locate the four mesh sections that are 24" x 26 1/2". Place the rigid basket on its side, any side.

1) Place a single mesh piece over the frame. Align one edge over the 1/8" drill holes. Using four 5/16" self tapping screws and washers secure the mesh to the 1" x 1" box beam using the nut driver supplied.



- 2) Locate 2 PVC clips. Go to the mesh end opposite the self-tapping screw. Pull the mesh tight and secure the mesh to the 1" x 1" box beam with the two PVC clips. Place a clip at each edge. Please note the remaining sides of the mesh are not secured to the frame.
- 3) Repeat the procedure with the remaining 3 sides of the basket, securing the remaining 24" x 26 1/2" mesh sections.
- 4) Now orient the mesh basket exposing the bottom and the multitude of 1/8" screw holes on the 1" x 1" beams or top side down. Locate the remaining two mesh pieces that are 12" x 26 1/2". Place these two pieces over the bottom of the basket aligning the mesh edges with the frame edges on three sides. Make sure that the mesh does not touch the aluminum mast with the hose clamp. This will not happen if the mesh is placed so it just covers the frame.



- 5) Twenty screws attach the two 12" x 26 1/2" mesh sections to the frame and complete the mechanical assembly.

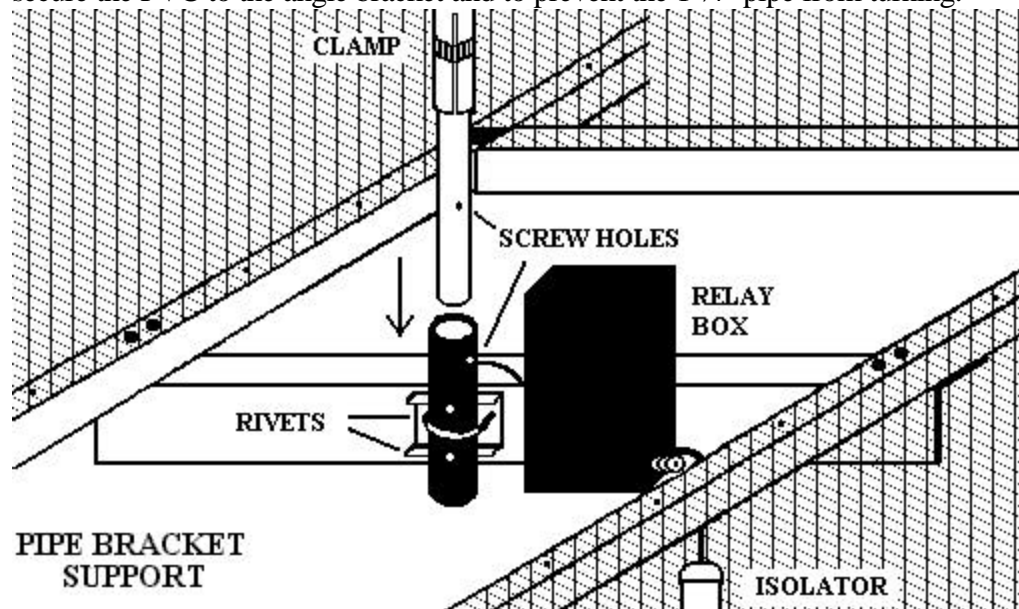
5.0 Flat mount configuration

The flat mount configuration will allow the antenna to sit on a roof, the ground, in an attic, patio or porch. To facilitate this, it is recommended you put something similar to four cinder blocks under each corner of the collector grid.

- 1) Find the PVC section with the hole and rivets. Place the PVC in the mount bracket on the 2" x 2" x 24" angle bracket, so the U-bolt on the mount bracket sits in between the two rivets on the PVC. Rotate this PVC section, to line the hole in the PVC with the two Relay Bracket holes on the angle bracket. Gently snug the U-bolt to secure the PVC it will be tightened later.

MAKE SURE THE U-BOLT DOES NOT CONTACT EITHER RIVET

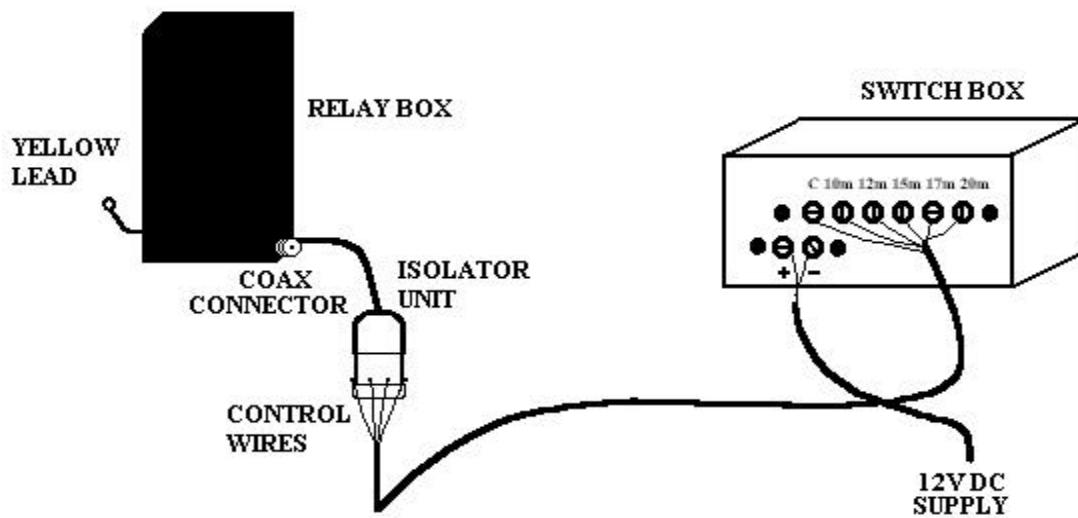
- 2) With the help of an assistant tip the collector grid up on one end and rest it against a wall or other similar structure. This will make it easier to secure the basket. If this is not practical, using the above referenced assistant, lift the completed basket assembly over the collector grid and line up the 1 1/4" aluminum support with the PVC pipe secured to the angle bracket. Slide this 1 1/4" pipe in until it is stopped by the rivet in the PVC.
- 3) Rotate the aluminum pipe and basket assembly until the hole in the PVC lines up with the hole in the aluminum mast. Insert a 5/16" stainless steel self tapping screw in and finger tighten. Fully tighten the mount bracket to secure the PVC to the angle bracket and to prevent the 1 1/4" pipe from turning.



6.0 Final Assembly

If you wish to mount the Super "C" on a short mast we have provided you with one. After securing this mast, simply place the bottom end of your open PVC tube with the rivets over this supplied 1 1/4" mast. Nothing else is required. As mentioned before you can set the Super "C" on four supports, such as cinder blocks to slightly elevate the antenna. It is recommended that you slightly elevate the Super "C", 8" or more to stabilize the antenna and prevent water from getting into the Relay Box and Isolator.

- 1) To complete assembly of the Super "C" locate the Relay Box and Isolator and Super "C" Switch box. The Relay Box attaches to the 2" x 2" x 24" bracket via (2) 1/4" holes in the bracket. Place the Relay Box and its two protruding studs into the matching holes on the bracket and secure with the stainless steel wing nuts provided.
- 2) Remove the 5/16" stainless steel screw from the PVC tube and use it to attach the yellow ring terminal from the Relay Box to the Super "C" mast. Now you can securely tighten that screw!
- 3) Attach your coax feed line to the SO 238 coax connector on the Relay Box.



- 4) To power up your Relay box and enable multiband operation you need to hook up a control cable. Six conductor cable is ideal for this. Attach one conductor to each stud on the isolator unit. These lines carry 12 volts d. c. with very little current, typically 50 ma. The studs on the isolator unit are marked 20m, 17m, 15m, 12m, 10m and C.
- 5) The rear of the Super “C” switch box is also marked 20m, 17m, 15m, 12m, 10m and C. You can use just about any wire to run from the antenna isolator to the switch box at your station. If you use color coded wires attachment will be easier. Make sure that the wire you attach to the stud on the isolator is attached to the corresponding terminal on the Super “C” switch box. 10m to 10m, C to C, etc...
- 6) The Super “C” switch box requires 12 v dc nominal. It can be obtained from your transceiver’s power supply or from any other 12 vdc source such as a wall transformer. 12 vdc “+” and “-” terminals are provided at the rear of the switch box.
- 7) If the led on the front panel is lit, you know that the required 12 volts dc is being supplied. Band selection is simple, simply rotate the band selector switch on the switch box to the band you wish to operate. When the led on the front panel lights 12 vdc is available and the relays are being energized.

DO NOT switch bands while transmitting.

ALWAYS switch the box to the “off” position when not in use.

7.0 Final Check - Out

- 1) It is suggested that you position the Super “C” where it can be easily reached for testing. Once check out is successfully completed you can move the Super “C” to its final location, which should be inaccessible to human or animal contact.
- 2) Connect your transceiver to the antenna using 50 ohm coax of the length you expect to use in the Super “C”’s final location.. Apply 12vdc power to the switch box via your power source.
- 3) Set the band switch on the switch box to the 20 meter position.. Observe that the yellow LED is lit. If not check to make sure the 12vdc power supply is turned on or if you are using a wall unit that the unit is plugged into the wall socket. Switch the band select switch to “off” and note the LED turns “off.” Return to 20 meters. Set the transmitter to 20 meters. Apply R.F. power to the antenna and measure VSWR. Vary the frequency to obtain

the 2:1 frequency limits. The 2:1 bandwidth on 20 meters should be 250 kHz minimum. Find the center of the band.

4) If you desire to move the center of a band you can by loosening the stainless steel hose clamp on the Super “C” mast and changing the position of the basket relative to the collector grid. Raising the basket 1” should increase the center frequency approximately 70 KHZ. To lower the frequency lower the basket. Yes lower the basket! Continue the measurement process on 17m, 15m, 12m and 10 meters remember to switch both the selector knob on the Super “C” switch box as well as your transceiver.

5) Using an antenna tuner when the vswr is less than 2:1 is permitted. Remember an antenna tuner does not tune the antenna but stops the reflected R.F. from reaching the transmitter and causing a power reduction in the transmitter’s output.

Antenna Characteristics

Operating Bands - 20m, 17m,15m, 12m and 10

Bandwidth @ 2:1 - 250 kHz 20 meters >1.4 MHz 10 meters

Full band 17,15,12

Antenna Type - E field dominant vertically polarized

Radials - none

Size - 1/6 of ¼ wave vertical

Switch line radiation - 20db

Signal Performance - exceeds typical full size ¼ vertical

Feed line radiation - 20db

Earth loss - Approaching zero on the ground

Allowance Input Power - 100 watts max. AM-FM-RTTY

200 watts SSB with minimal compression

Elevation Angle - less than conventional vertical

Efficiency - > 90%

WARRANTY

GAP Antenna Products, Inc. Provides a limited warranty on its' products against any defects in material and workmanship for a period of 90 days after date of purchase/shipment. This warranty applies to the original purchaser only. Purchaser should return defective product freight prepaid. GAP reserves the right to repair or replace product at its' discretion. Repaired or replaced product will be shipped freight prepaid within 30 days of customer return. This warranty is provided in lieu of any other warranty expressed or implied. The warranty is void, if the product is subject to misuse, improper installation, accident, neglect, modification, repairs, or act of God.

GAP Antenna Products, Inc. Shall assume no liability for incidental or consequential damages resulting from the purchaser's ownership of its' products.

REPLACEMENT PARTS

Replacement parts are available for any portion of the antenna.
Contact factory for details.

DESIGN BASELINE

GAP Antenna Products, Inc. Reserves the right to incorporate improvements and changes in the design without obligation to update previously manufactured units.

