

ASSEMBLING & INSTRUCTIONS MANUAL



Antena RH-DX640

Cobweb Antenna for portable or
base station operation in
6, 10, 12, 15, 17, 20, 30 and 40 meters

Designed and produced in Brazil by:

RADIOHAUS®

Radiohaus Radiocomunicação

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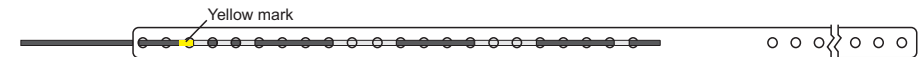
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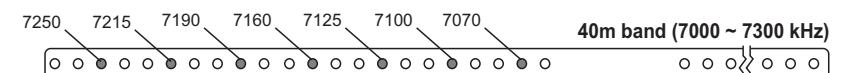
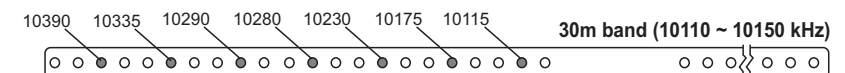
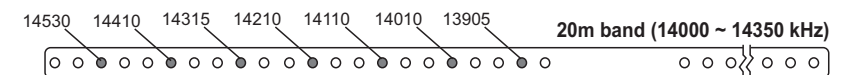
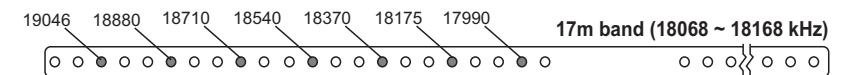
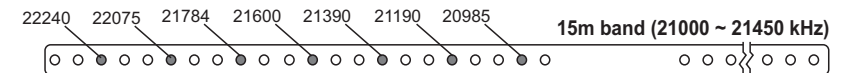
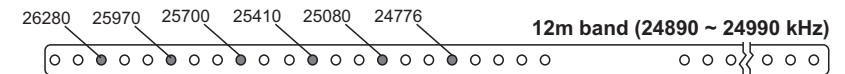
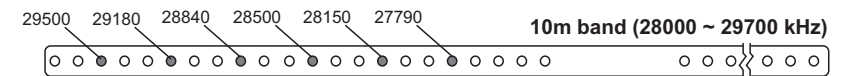
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Table 1

Example of how to fix the ends of the cables and adjust the frequencies in each band



(Braid the cable through the central plastic insulator as above. Do the same on both sides)



- 1) Pass the cable through hole 3 to the yellow mark and braid through the other holes as shown in the first figure above.
- 2) Return the remainder of the wire so that it is adjusted according to the frequency of each band (above).
- 3) For the 40 meter band, if you need to reach a lower frequency, leave the end of the wire hanging (dropped).

NOTE: The frequencies above were measured in the prototype and may suffer changes due to various factors. The frequencies indicated above are just a reference.

TECHNICAL SPECIFICATIONS

Type.....Omnidirectional "Cobweb»
Reception*500kHz to 50,000kHz (50MHz)
Transmission6, 10, 12, 15, 17, 20, 30 and 40 m
(11 m band can be adjusted)
Max. Power.....400W PEP
Gain.....4.7dBi, 6m (20 feet) off the ground @ 14.2MHz
Minimum SWR.....1:1
Impedance50 Ohm
ConectorPL-259 with coaxial cable 50 Ohm
Weight5.5 kg (12.1 lbs)
Dimension540 x 540 cm (212 x 212 inches)
Main material.....Fiberglass, stainless steel, aluminum
Wind resistance.....Moderate to strong winds
Mast diameter38 to 64mm (1-1/2" to 2-1/2")

*MW and SW reception reception with goog efficiency

COMMENTS

The RH-DX640 antenna prototype was mounted on a roof, on a 3 meter (10 feet high mast).

The antenna was tested on air for 60 days, suffering the effects of the weather such as sun, rain and wind. It proved to be quite stable and throughout this period, with an Icom IC-7300 and Elecraft KX-3 radios, hundreds of contacts were made in all bands.

It was noticed that when subjected to rain, the resonant frequency changes, from 50 to 100kHz above the adjusted one. As soon as it dried, the frequency returned to that previously set.

Thank you for choosing the Cobweb Antenna model **RH-DX640**, a lightweight and versatile antenna to be used in 8 amateur radio bands (6, 10, 12, 15, 17, 20, 30 and 40 meters).

Ideal for portable operation in field days, expeditions, camping, portable operations as well as fixed stations. One of the main advantages is the possibility of operating in the main amateur radio bands, and not taking too much space.

This is an omnidirectional antenna and does not require a rotator. It has an excellent SWR on all 8 bands. It can be mounted on a mast or tower and works very well a few feet above the ground (3 meters - 10 ft. or higher).

**Do not hesitate to contact us in case of any suggestion or questions.
Have good Dxs with your new Cobweb Antenna RH-DX640.**

BEFORE STARTING!

This antenna is very light and can be easily assembled by one person. The estimated time of assembly is 60 to 90 minutes and to disassemble, 40 minutes. If you have a tripod with a mast or a pipe approximately 1.7m long (5.5 feet), it could be a good idea to use it as a provisory structure to easily assemble and set the initial adjustments.

Always remember that safety comes first! That's why you need to find a clear and open space away from power lines. As part of the antenna is made of fiberglass, wear gloves to handle the tubes to avoid skin irritation. Its also important to be aware of loose and sharp pieces, as they may hurt your eyes. .

Children may be able to help you with the assembly, but pets will certainly get in the way. You have no idea how much cats love playing with the wires and parts of this antenna! Keep the kitties away!

If you intend to mount this antenna in a vacant lot or in a yard covered with grass or dirt, we suggest extending a tarpaulin that will help a lot not to lose any parts that might fall off.

Follow all these steps and safety instructions to properly set up your Cobweb and go on air!



- Do not handle or install your antenna near power lines
- Always use protective equipment when installing this product in high places
- Do not touch the antenna when the radio is transmitting
- Wear gloves when handling fiberglass tubes to avoid possible irritations or allergies that may be provoked by fiberglass particles



TOOLS AND ACCESSORIES NEEDED (not supplied)

- Small plier
- Wrench or 8 and 10mm nut driver
- Silicone sealant
- Mast, tower or tripod and mounting hardware
- Coaxial cable with male connector (PL-259)



Be careful not to overstretch each wire of the 10 to 40 meter bands when attaching the ends to the spacers so as not to stress the fiber structure. It is normal for each antenna element to have a certain sag. This will not affect the operation.

- () In case of the 12 meter antenna, the adjustment can be very critical and laborious. That's because it's a very small bandwidth (only 100 kHz) from 24,890 to 24,990 kHz. A few inches can move the resonant frequency many kHz. You will need a lot of patience to adjust this band.
- () 15 meter band has a bandwidth of 450kHz. Choose a sub-band of your preference and try to adjust it in that segment.
- () In 17 m band, we have the same situation as the 12 m. A bandwidth of just 100kHz (28,068 to 28,168 kHz). Adjust in the center of the band.
- () In 20 meter (14,000 to 14,350kHz) adjust in the segment of your preference. Remember that a few inches can move the resonant frequency many kHz.
- () The 30 meter band is the shortest of all. With only 50kHz (10,100 to 10,150kHz) be very patient to adjust right in the center.
- () The largest antenna is the 40 meter band and has a 300kHz bandwidth. You will notice that the adjustment is not so sensitive. Adjust to the segment of your choice. If needed, you can leave the ends of the wire suspended (dropped) to reach the frequency of the beginning of the band.

Example of how to adjust the wires over the plastic spacer



Use the table on the last page of this manual to adjust the center frequencies of each band. This table was based from our prototype and may change in a function of various factors such as antenna height and closer objects.

The table below shows measurements taken on our prototype. For each band we have the smallest SWR obtained, and the bandwidth (BW) obtained with a SWR of 2:1 and 3:1.

BAND	Min.SWR	BW. 2:1	BW. 3:1
6 meters	1.0:1	1240kHz	2.240kHz
10 meters	1.0:1	180kHz	350kHz
12 meters	1.2:1	130kHz	268kHz
15 meters	1.0:1	170kHz	255kHz
17 meters	1.2:1	186kHz	340kHz
20 meters	1.2:1	122kHz	250kHz
30 meters	1.2:1	77kHz	145kHz
40 meters	1.2:1	83kHz	178kHz

USE THE TABLE ON THE LAST PAGE FOR ADJUSTMENT

In a first step check the resonant frequency of each band. If it's what you expected, raise the antenna as high as possible and it's ready to use. If not, proceed to fine-tuning, band by band.

- () Start by setting the 6 meter band (50 to 54 Mhz). Start checking the resonance frequency. If it is below 50 MHz you will need to move the releasable cable tie further towards outside the center of the antenna. If the frequency is above 54MHz or above the frequency you prefer, move the cable tie towards the inner of the center, causing a smaller piece of wire to staying loose.
- () The 10 meter band has a range of 1,700kHz and it is essential that you choose the preferred segment. Adjust to increase or decrease the ends of the wires. Thread the wire through the first hole of the spacer and collect the leftover weaving through the remaining holes. A few inches more or less can cause a big shift in the center frequency.

IDENTIFICATION OF THE PARTS INSIDE THE BOX

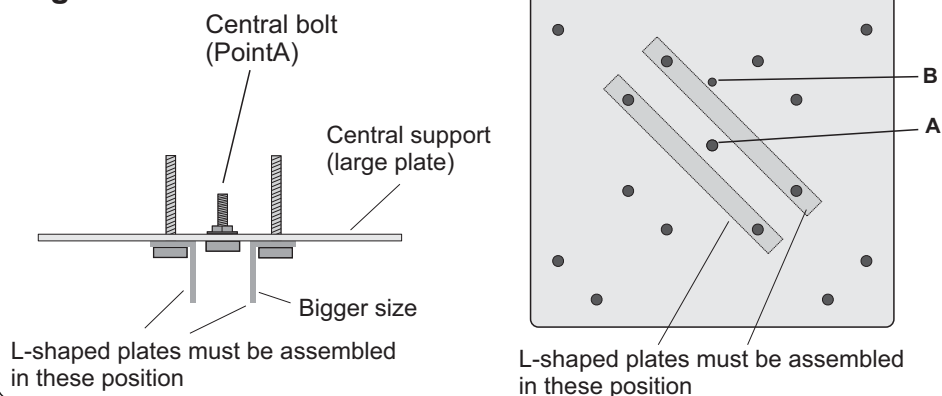
- () 4 telescopic fiberglass tubes (element arms)
- () 1 Matching box with feed arm
- () 1 Central mast with support ropes and tighteners
- () 1 Central support set in stainless steel and aluminum
- () Miscellaneous parts for assembly:
 - () 33 Hex nut, nylon, M5
 - () 3 Hex bolt, nylon, M5
 - () 5 Cable clamp, nylon
 - () 30 Nylon fastening elements
 - () 3 Releasable Cable Tie, nylon
 - () 24 Snap Rivet, nylon
 - () 8 Tube clamp, 25mm (1 inch - large)
 - () 1 Tube clamp, 21mm (27/32 inch - small)
 - () 18 M6 x 40mm Hex Bolt (large)
 - () 3 M6 x 25mm Hex Bolt (small)
 - () 21 M6 Flat washers
 - () 21 M6 nuts
 - () 2 M6 Split washers
 - () 2 "U-64" Clamps
 - () 7 Plastic band spacers (10 to 40m)
- () 2 Sets of antenna elements (6, 10 and 12 meter)
- () 2 Sets of antenna elements (15, 17, 20, 30 and 40 meter)

ASSEMBLY

1. Central support bracket assembly

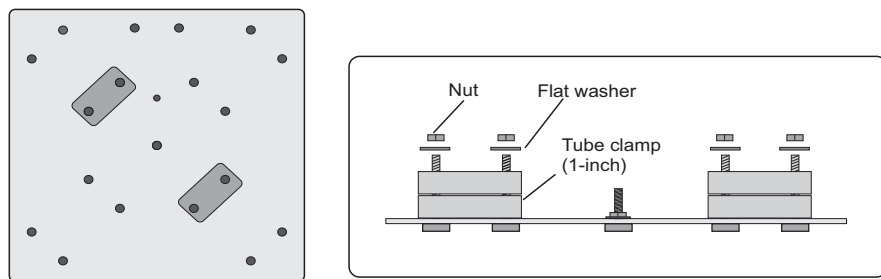
- () Place the large mounting plate on a table or worktop.
- () Pass an M6 x 25mm bolt (small) into the center hole (A). Place an M6 flat washer over the bolt and tighten gently with a nut. Over the bolt, thread the support mast with ropes and make the white dot face the point "B". Tighten the nut in this position and remove the mast.
- () Take the two L-shaped plates (small) and place them on the under side of the large plate as shown in figure 1.
- () Pass two M6 x 40mm hex bolt (large) into each L-shaped plate.

Figure 1



- () On the four threads of these bolts (figure 2), place two 25 mm (1-inch) plastic tube clamps (large).
- () Pass flat washers and nuts but do not tighten. Just insert the nut so it doesn't fall out.

Figure 2



ADJUSTMENTS

Adjusting your Cobweb antenna is a process that requires a lot of patience and time to get the best performance.

The development of the first prototypes required a lot of dedication and time until we could achieve a good efficiency of this antenna. All this work was rewarded with many QSOs and DX on all bands with the antenna installed a few meters (feet) from the ground.

We deliver the antenna with a pre-set mark on each band. Note the yellow mark on the end of each wire. But this is just a reference based on the results obtained from the prototypes and so you will need to check it out and fine tune it to your operating preference. And always remember this basic rule: to lower the resonant frequency, increase the length of the antenna. To increase frequency, decrease length.

BASIC RULE TO ADJUST

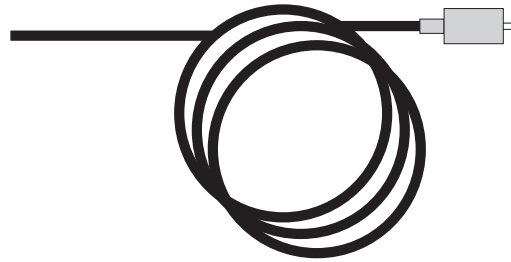
Higher frequency - Decrease the length
Lower frequency - Increase the length

- () You must have assembled your antenna in a wide place. Make sure that when raising the antenna it is not too close to obstacles such as trees, walls and fences. Leave at least a 2 meter (6 ft.) distant from these obstacles that could interfere with performance.
- () If you have an antenna analyzer, it would be ideal for you to make adjustments more easily. If an analyzer is not available, use a transceiver with power reduced to 5W.

This antenna has limited bandwidth with an acceptable SWR. Thus, it is important that you define which is the preferred segment of operation in each band and try to leave each band adjusted to your preference. But, you will have a better result using an antenna tuner.

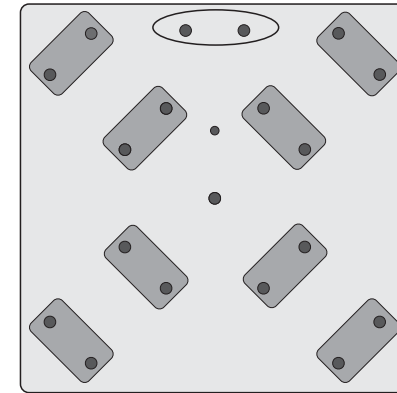
- () Connect a good quality 50 Ohm coaxial cable with the shortest possible length between the antenna and the radio. Roll up a balun on the coaxial cable itself, keeping the coils together with tape. This balun should have 6 turns in a diameter of approximately 8cm (3") and should be close to the connector (fig. 8).
- () Secure the coaxial cable to the matching box tube with the last releasable cable tie.
- () If your goal is to keep the antenna in a fixed installation, protect the coaxial connector with self fusion tape or silicone sealant.

Fig. 8 - Coaxial cable balun



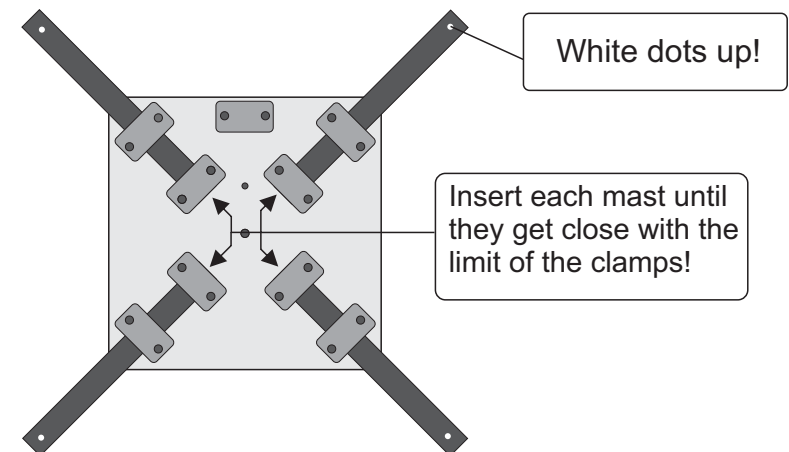
- () Insert another 14 large hex bolts into the remaining holes. In the place indicated with the circle (figure 3) insert a 21mm (27/32") tube clamp. Note that this clamp is smaller than the others.
- () In the remaining holes, insert six 25mm (1") tube clamps (large).
- () Note that all bolt heads must be on the same side of the plate.
- () Pass washers and nuts on each screw. Don't tighten at that time. Just insert the nuts so they don't fall out.

Figure 3

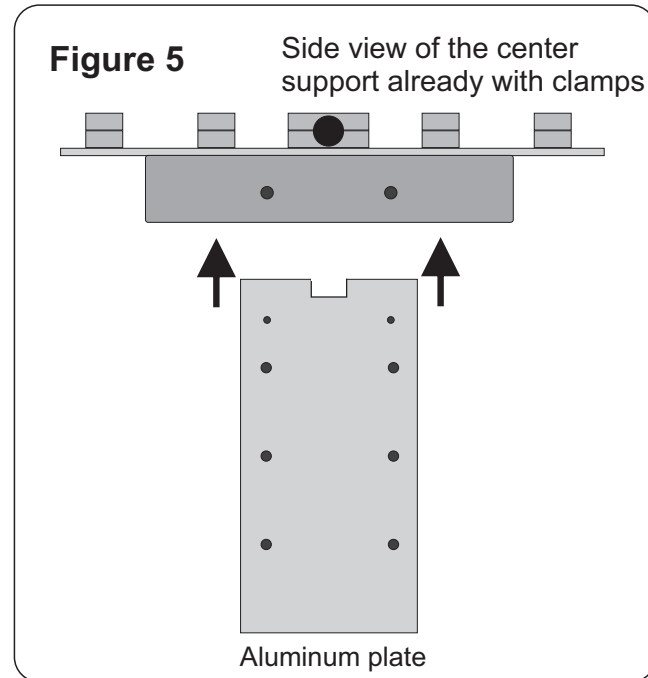


- () Pick up the 4 telescopic fiberglass masts. Keep them closed and insert a tube into each pair of clamps. Note that the masts must be introduced until they are flush with the innermost clamp (figure 4).

Figure 4



- () Using a 10mm (3/8 inch) wrench securely tighten all hex bolts. If necessary, lock the nuts in position using pliers.
- () Note that the two L-shaped plates will be at the bottom and its four bolts also serve to fix two tube clamps.
- () Take the aluminum plate (fig. 5) and insert it into the underside of the previously assembled set between the "L" plates.



- () Pass two M6 x 25mm hex bolts (small), two flat washers, two spring washers and two nuts.
- () Tighten firmly so that the set is very stable and fixed.
- () If your intention is to use this antenna in portable operations, we suggest that you keep the central support always mounted to facilitate temporary installation.
- () Use four of the six remaining holes to secure the set to a 38 to 64mm (1-1/2" to 2-1/2") telescopic pole, mast or pipe. Use two "U-64" clamps provided. The plate has six holes but you will only need to use 4 holes to keep the assembly tight and secure.
- () Keep the antenna as high as you can reach to finish mounting.

- () Using the plastic tighteners, stretch the five ropes so that the elements are slightly up.
- () In the case of the 6 meter antenna (the innermost one), align the wires about 40 cm (16") over the tube in the inner direction and secure (Point B in figure 9) with a releasable cable tie. Allow excess of wires to hang downward.
- () For 10, 12, 15, 17, 20, 30 and 40 meters antennas, a plastic band spacer must be installed symmetrically.
- () Note that at the end of each wire there is a yellow mark. This marking represents the approximate center frequency of each band.
- () Place the plastic spacers at the ends of each band wires.
- () Pass the wire through the first hole of the spacer and pull until reaching the mark. Pass the wire through the third hole so that the spacer does not come loose. Braid the rest of the wire every 2 or 3 holes as shown in photo 4.
- () Do not pull excessively to avoid straining the end of the fiber tubes. It is normal for the wires to have a sag.
- () Repeat the same operation on both ends of all bands from 10 to 40 meters.

Photo 4 - How to attach the wires to the spacers

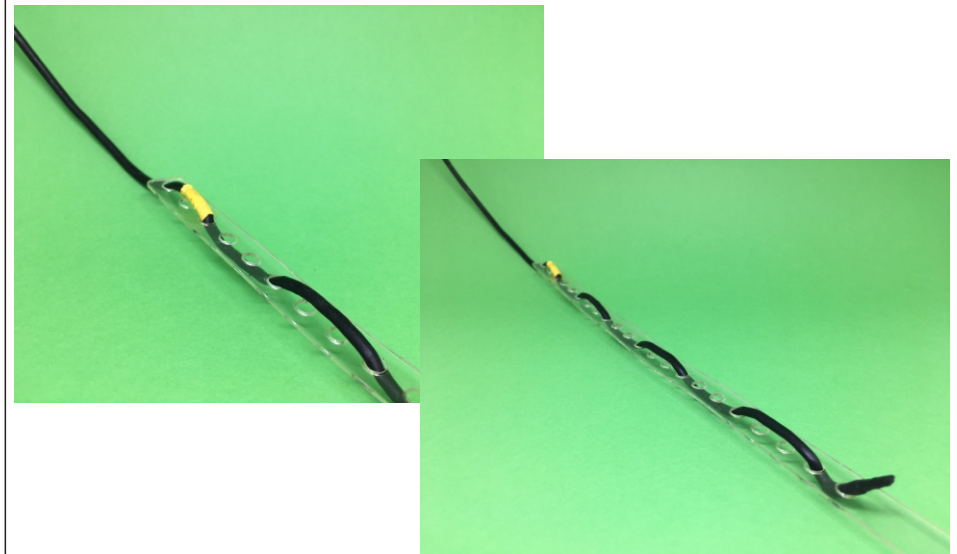
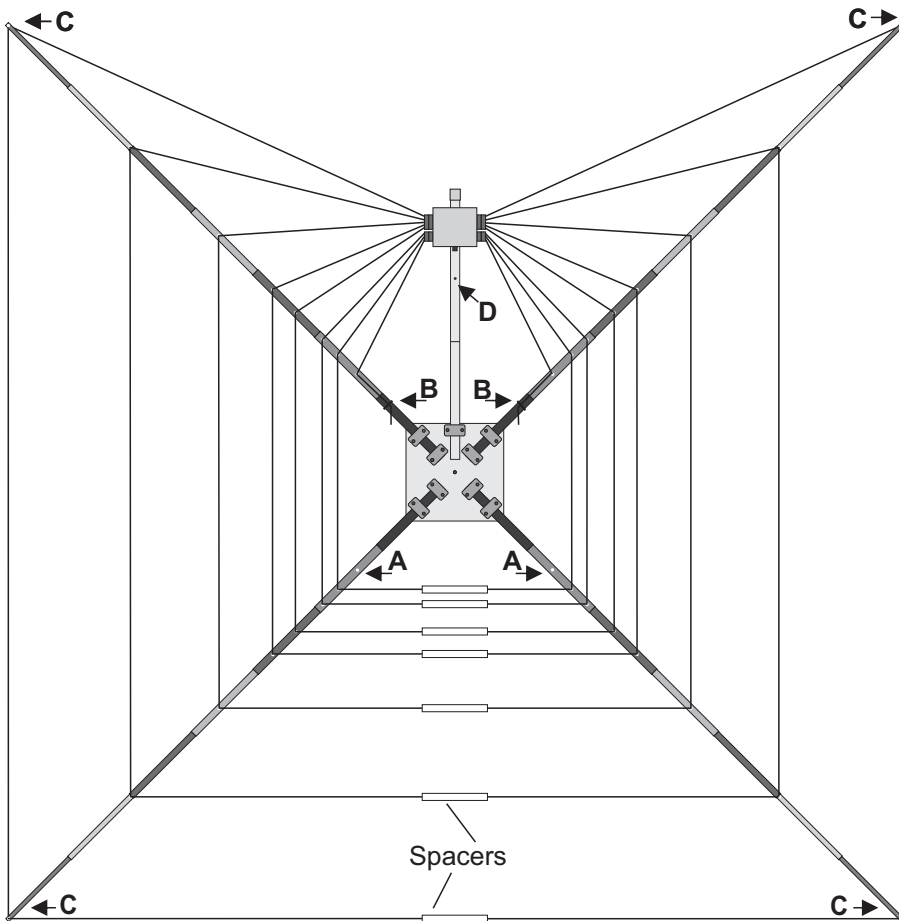


Figure 9

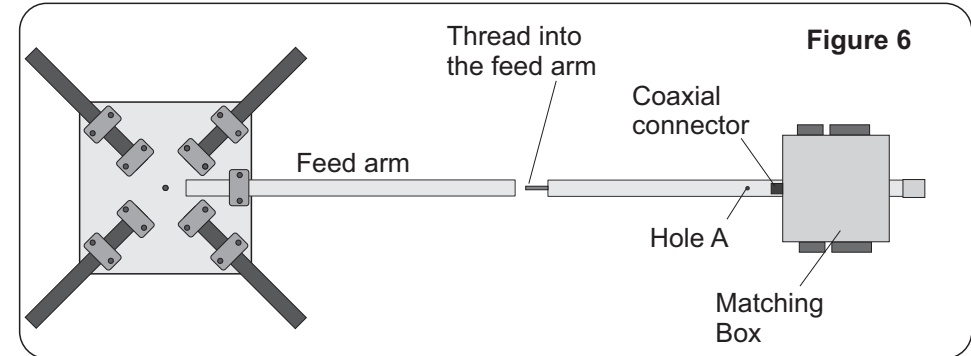


- A - Fix only one hex nylon bolt and nut
- B - Fasten with a releasable cable tie
- C - Thread the rope through the nylon clip and fasten together with the fastening element
- D - Thread the rope through a nylon clamp and secure with a hex nylon bolt and nut

In the remaining 30 points, fix the fastening elements with the clamps facing the outside of the antenna.
It is normal for each antenna wire to have a certain sag. This will not affect the operation.

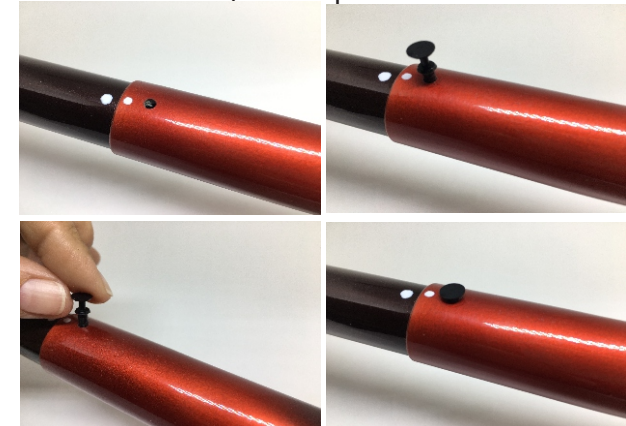
2. Assembly of the Matching Box and antenna elements

- () Take the feed arm and screw it firmly onto the matching box tube (figure 6).
- () Insert this tube into the remaining tube clamp, so that the hole "A" faces the top.
- () Firmly tighten this clamp.



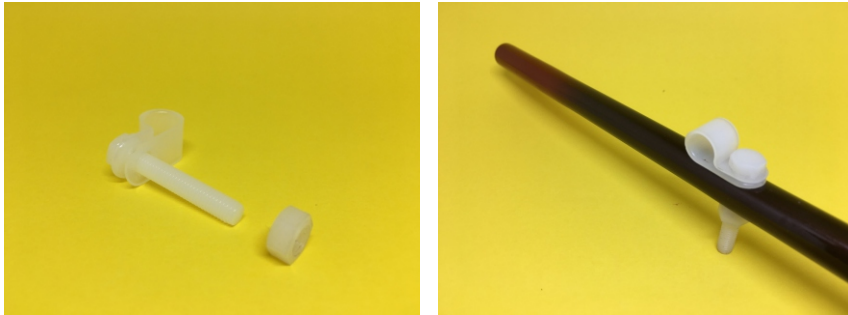
- () Fully open the four fiber telescopic masts.
- () With a little patience, make the smaller holes coincide between the outer and inner tube (photo 1). To make it easier, note the white dots that should line up.
- () Insert a removable snap rivet into each of these 24 holes. If you intend to use your antenna for portable operations (subject to assembly and disassembly) be careful when removing the rivets so that they are not damaged.

Photo 1 - Detail of the positioning of the small holes, placement and removal of the nylon snap rivet

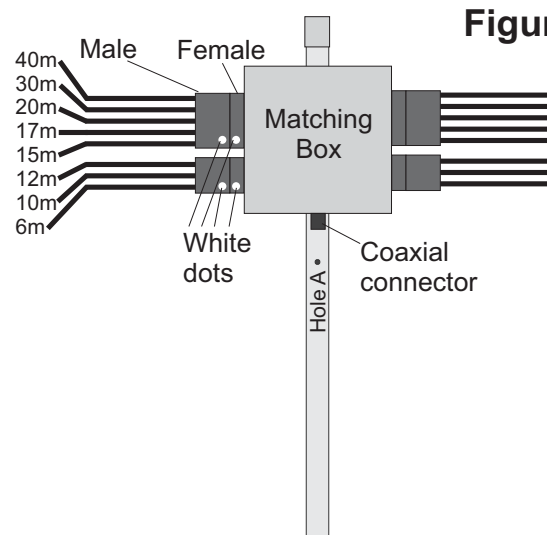


- () Insert a nylon hex bolt in each of the two points "A" (figure 9) and secure with a nylon nut. Do not tighten too much to prevent damage to the fiberglass.
- () In all other large holes, attach an nylon fastening element using a nylon nut to secure. Place all the cable clamps towards the end of the tubes (photo 2). Do not tighten too much.

Photo 2 - How to fix the fastening elements to tubes



- () Identify the pair of 3-wire antenna elements (6, 10 and 12m).
- () Connect to the corresponding female connector on the matching box. Note that one of the connectors has a white dot that must match the marking on the box connector (figure 7)



- () Connect both sides, respecting the identification.
- () Identify the 5-wire antenna pair (15, 17, 20, 30 and 40m).
- () Connect the male connector that has the white dot to the female connector that has the white dot and the other one to the remaining connector.
- () Pass all the wires inside each of the nylon clamps, according to each band. With the weight of the wires, it is natural for the tubes to bend.
- () Install the central mast with support ropes on the central thread of the plate. Simply screw the mast firmly.
- () Release all five ropes. The shorter rope must be attached to the matching box tube (point "D" in figure 9). Use a nylon clamp and nylon nut.
- () The other ropes must be attached to each of the four 40 meter band fastening element (the larger antenna) using a nylon clamp that must be attached to the each fastening element (photo 3).

Photo 3 - Cable clamp assembly detail

