

## ANTENNA MORGAIN 40/80M

Hello to all.

In the Technical forum of U.R.E, to requirement of a friend radio ham, I responded to a question that considered referring to a information of an antenna of reduced dimensions for 80 and 40 Meters, offering him my personal experience in this subject that in principle are, in my opinion, quite extensive. I never imagined, by no means, the "chicken" that would arm itself with my answer already I have received so much of Spanish Radio hams as of foreigners, tropecientas and tip of requests so that it sends the scheme and my manual to them of assembly and adjustment of this antenna, which I have done with very many pleasure. To requirement of several colleagues, also I have received questions on this antenna referring to adjustments, modifications, extensions of bands, addiction of but bands and a pile of things but that as well as I have been able I have responded all of them. In the Technical Forum also one commented to me that since with my answer had caused to as much stir and they had asked for me so many schemes as consultations of all type it exceeds since best the serious thing than I published in the magazine "RADIO HAMS" the scheme, my opinions and conclusions and the instructions of assembly created by my so that she arrived to the maximum from possible people since according to it seems there is but people with problems of space to install "a Decent" Dipole, with a good yield for 80-40 Meters, than I thought. To summarized accounts and before exposing everything what I am related to this antenna I must clarify several things: This antenna, at least in its modality Base HF See-band, 160-80, 80-40, etc, etc, IS NOT DESIGNED NEITHER INVENTED BY MY, you formulate nor them to calculate it ARE FRUIT OF MY KNOWLEDGE EITHER, although but of one it thinks that I am the inventor of this antenna. The exhibition that I do of this antenna bases on a personal compilation of information of public dominion that they are in several means and information found in Internet, although as you will verify, if you finish reading this article, the detached information and developed that I expose in this writing much more it is elaborated, extended and experimented that the one that is scattered by several means at the disposal of all. In the case of the personal Modifications in a matter of Extension and addition of Bands to the scheme of the Original antenna See-band IF that I can affirm that they have been fruit of my knowledge on antennas



of HF applied to the original scheme See-band of this antenna, although as you can verify all you formulate, them to calculate and to add but bands either are then not invented by my, if not that you formulate are them Basic and known by all to find the length of a dipole of  $\frac{1}{2}$  Honda of any band to choose, to be able to add it to the Original design increasing therefore I number of bands that can cover this antenna. The unique thing that I have contributed to the design of this antenna, is Solely the idea to add more bands to him to choose and the manual elaborated from my extensive personal experience with this antenna. Having clarified everything what I believe that tapeworm that to clarify, step to set out all the particularities and everything what I know in relation to this antenna, their possible Modifications and the manual of assembly and fit.

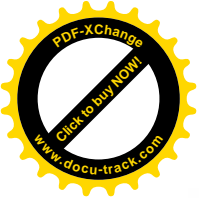
**DESCRIPTION OF THE ANTENNA:** This antenna is type Dipolo in spiral denominated MORGAIN, by the one of translation of nombrecito, although sincerely not very right and a little "miserly", would be "MAS GAIN", and that according to many they affirm that it has, although personally I believe that they are a little optimistic data, about 4 Db of gain in his band superior of the two bands of Diseño original See-band and 2 Db of gain in his band inferior of the two bands of Diseño original See-band, although by my experience and only by way of a personal opinion without being based on data stated with no measurer nor electronic device to measure it, it has an angle of low exit but and 2'5 Db and 1'5 Db respectively of gain in relation to a simple dipole of  $\frac{1}{2}$  wave for the same bands and that have the Baluns to the same height. way to see the things, the gain of this dipole in spiral, with respect to a classic dipole in "inverted V" cut  $\frac{1}{2}$  wavelength, must to that the arms of this dipole are longitudinally but short and for this reason but high and are moved away enough of the ground, having very many less lost by proximity to the ground and improving so much in gain as in a low and favorable output angle quite but for DX that a traditional dipole in which their ends are much more near the ground, doing case to theory of the antennas that the antenna says at the most that high far better. By its condition of Dipole in spiral, this antenna much less receives noises that a normal dipole and for that reason mainly in 80 Meters thanks for much. This antenna can be fed directly with 50 or 75 coaxial cable of omhns. since soon its impedance can be varied



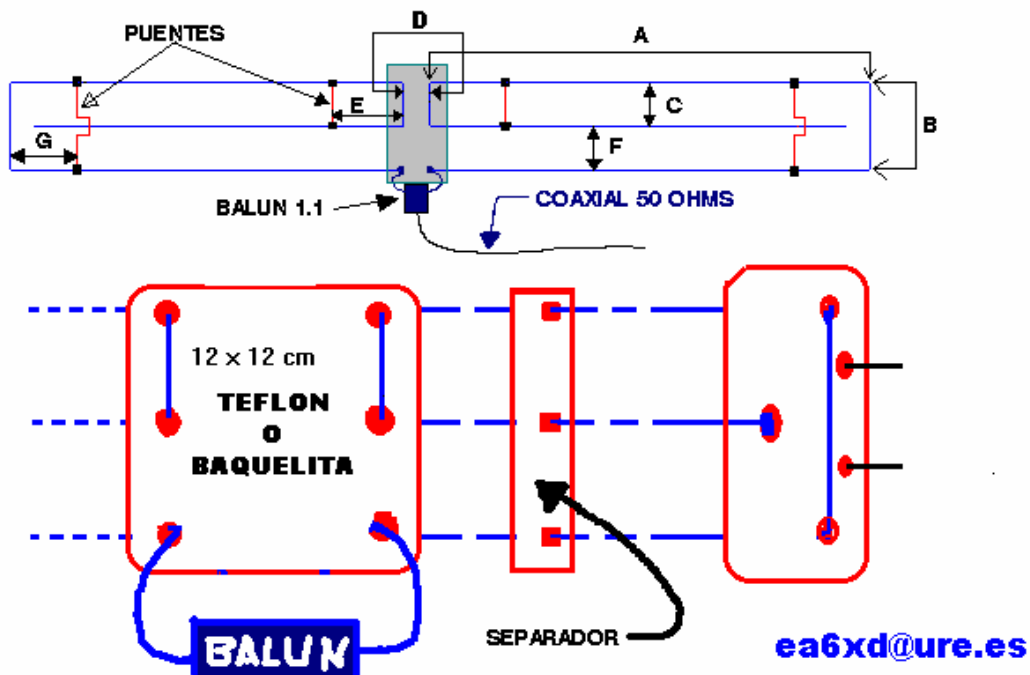
modifying the degrees of inclination of its arms obtaining therefore the adaptation to the used coaxial cable, although the best results me a given with cable of 50 omhns. RG-213u or similars. This antenna can be used with or without balun but I advise to put balun to him by the reasons that all we know and of relation 1:1. A very great advantage for all the experimenters of antennas, is that this antenna takes to neither Coils nor Traps nor no device complicated to fit nor to make, something that stops those that does not have much knowledge in the accomplishment of these devices because they will be thankful very many so that the antenna is super easy and simple to mount and that in addition it has the advantage that is that to fit this coarse antenna with moving the bridges specified in the assembly manual to take it to resonance in the portion of band that interests to us.

#### MY ADVICE:

I PERSONALLY OS RECOMMEND THAT APLIQUEIS MEASURES THAT OS I ADVISE BUT DOES NOT DO LACK THAT THE TENGAIS IN ACCOUNT "TO THE MILLIMETRE" SINCE IN THE END WHEN FITTING THE ANTENNA ADJUSTED IN THE PORTION OF BAND THAT OS INTERESTS WITH THE BRIDGES ALTHOUGH THE MEASURES OF CABLES AND THE SEPARATIONS OF CABLES ARE, WITHIN A LITTLE AND "REASONABLE" MARGIN, SOMETHING DIFFERENT FROM WHICH I OS EXPOSE. THE ONLY MEASUREMENT THAT I RECOMMEND WARMLY NOT TO MODIFY IS THE MEASUREMENT "TO" THAT IT EXACTLY MUST BE 10 METERS FOR AN ANTENNA DESIGNED FOR THE BANDS OF 80 AND FOR 40 METERS.



## ANTENA MORGAIN 40 Y 80 Metros. EA6XD



In the following image it is possible to be seen in the scheme, the situation of the bridges and all the details for the manufacture of the antenna.

MEASURES TO ESTABLISH FOR an ANTENNA Meters BASE OF 80-40.

A = 10 Meters

B = 8.5 Centimeters

C = 4.25 Centimeters

D = 10 Centimeters

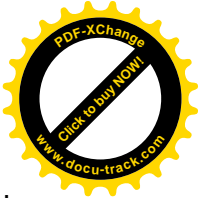
E = 74 Centimeters

F = 4.25 Centimeters

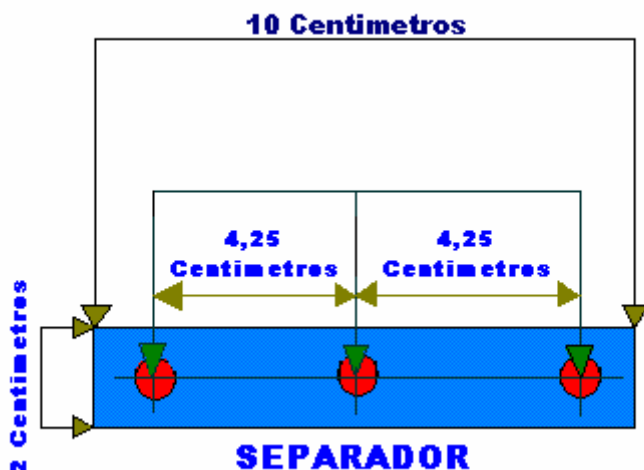
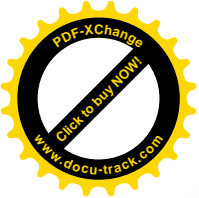
G = 1.4 Meters

INSTRUCTIONS AND ADVICE OF ASSEMBLY.

The BRIDGE that is but near the letter "G" is the bridge of adjustment for the band of 80 Meters and the BRIDGE that is but near the letter "E" is the bridge of adjustment

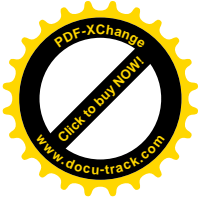


for the band of 40 Meters. In order to come to the adjustment of each band separately it must move to Left or to right to center the minimum SWR in the part of the band that interests to us to cover, considering that the measurement of the displacement of the bridge of adjustment of each band as much must be in an arm as in the other in the same measurement and you consider that the adjustment of a band usually does not affect for anything the other although I recommend to fit the first high band but, in this concrete case the one of 40 Meters and soon the one of 80 Meters and once we have the antenna fit to the portion of wished band can be welded the bridges to the cable. To pay attention that the bridge that is but near letter "G", the one of 80 Meters, because it does not have to touch nor one is due to weld to the cable of means since one only bypasses for the 80 Meters outer cables without touching the interior, since if you also bypass the cable of in the middle the ANTENNA IT WILL NOT WORK. For more data of band amplitude, particularly WITHOUT coupler it covers All the band to me with 40 Meters and practically All the band with 80 Meters. Since the antenna, of the Balun to each end of the dipole has 10 Meters I I advise to make with a strong and insulating material separators so that the distance between cables stays homogenous, putting the separators approximately each 50 Centimeters that in the end will be about 20 Separators by each arm. These separators can be realised with billets of a resistant, light and obligatorily insulating material, like the plastic one it last, teflon, nylon, bakelite, etc, of approximately 10 Centimeters in length by 2 Centimeters in width, although instead of billets also tube of plastic or P.V.C or similars can be used. To these billets or the tubes cut as a separators, next they must to him practice 3 wide Holes 1 Millimeter but that the outer measurement of the electrical cable used to make this antenna, separated of the center of these holes among them approximately 4.25 Centimeters, as it is possible to be appreciated in the following Image A



A TRICK: So that the separators always stay to the same measurement and distances of the other and so that they do not move nor they lower for down, you can put, tightening the centre point pennant to each side of the hole of the center of each separator, a strip or bridle Unex type or similars, habitually of black or white color, of which the electricians use to join electrical cables and that are used so that they stay together in a cable mallet, of which they tighten when crossing the tail of this strip the mind of the same and that all if you pay attention to the walls of the streets there is of puttings tightening and joining cables of several electrical companies or telephone communications.

ADVICE: Another thing to consider at the time of fixing the antenna to its ends is that the separator of each end of each arm must subject with two threads nonconductors instead of whom is what we habitually make dipoles normal of a prim thread since itself we put a thread isolated in center of the insulator of each end of the dipole to tighten each arm because we have many possibilities that the spiral of the cable remains fact churro and that the arms occur returns on itself and causing that the antenna does not work. Each arm approximately has about 30 Meters of Flexible copper cable Covered of plastic of used habitually by installers the electricians of 2.5 Millimeters of inner diameter of copper, although I advise for whom are going to use



the Dipole in house, to use one of 4 Millimeters of inner diameter of copper, although with one of 2.5 Millimeters of Diameter then already it goes well. I advise you do not cut the cable to you of 30 Meters in three pieces of 10 Meters and soon to weld them to make a spiral of 30 Meters since total resistance is lost and has but possibilities that with a day of wind the welds are broken and spoil the antenna to us, although this will give you but work, in my opinion is worth the pain to put it in practice. Also it is very important not to forget that when finalizing the assembly and once fit, held and verified EVERYTHING, isolating of the inclemency with grazes or silicone of good quality, ALL THE CONNECTIONS AND WELDS, "Super important the one to isolate all good", to avoid disagreeable surprises. For that they want to use this antenna in Portable, the antenna in the fixed QTH will be due to fit and when installing it in stationary the portable QTH if it sees that they are had something the SWR can be varied to fit the antenna in the portion of band that to us interests inclining the arms of the antenna put in "inverted V" until fitting the antenna in the portion of the wished band, although as you will verify, you fit if it in house and soon you transfer the antenna to another portable QTH or in expeditions then the stationary ones do not vary much.

OTHER VERY INTERESTING DATA TO ADD: This antenna I have modified to him voluntarily as a experimentation, always thinking that this could be to the benefit of all, so that does not fail the "Roof", ji, ji, ji, to verify to what extent this antenna could resist variant, really drastic and real technical changes and of construction in relation to the original design on the part of people with minds little, as I and without intention would say to offend nobody, little "Illuminated", ji, ji, ji, for the interpretation of practical schemes and manuals and for the construction of antennas and similars. Of the original design I have practically modified All the measures, from the lengths of cables to the separations of the same, almost always within "Reasonable" margins and like no, also realising some Totally crazy Antenil modification and that would be catalogued by many of you like authentic "animalada" an originating one of a super-twisted mind, if you knew of them, for that reason I have preferred not to expose in this writing such "animaladas" and to reserve them to me for use and enjoys own. After experimenting with the modifications, as much the "Reasonable ones" as the "Crazy ones" on the original design, I have reached the conclusion that the yield is



practically the same all as much original designs as in the modified ones and that the adjustment of the antenna will be established by where and to that measured the bridges are located, being these those that command in the final adjustment and not by the type of design of the antenna. To today in my address I have installed one of these antennas for 80 and 40 Meters and for daros some data but I will say in particular you that in my case the separations between I have them to cables to 2.5 Centimeters for demostraros that the original measures pertaining to the measures "C" and "F" that I say to you that they are 4.25 Centimeters are not nothing criticisms and that admit practically any reasonable difference in relation to the original design not appreciating as for me no improvement or no lost one of yield whether is the original measurement as if the established measurement is another one by which it constructs this antenna since I have exposed in this writing the antenna adjusts with the bridges. I have also tried to extend or to shorten the measurement of cables referred custom-made "To" that I say to you that they are for the bands of 80 and 40 meters then in this concrete case are of 10 Meters and in my opinion this is the unique measurement that is due to maintain the measurement to the maximum original since following the variation in relation to the original measurement because the resonance frequency can vary in such amount that although we move the bridges in a sense or in another it is impossible to fit it to us in the portion of wished band so that the antenna is cut so that something but or something but underneath the frequencies resonates above for which we wished that it works.

**CONCLUSION REFERRING TO THE DONE MODIFICATIONS AND THE RESULTS OBTAINED AFTER THESE.** After the modifications that already I have commented to you I have reached the conclusion that this antenna resists practically everything and I affirm if place to it to doubts that is an antenna totally on approval of "clumsy", (I first), + ji, ji, ji. **MORE DATA:** Since I have commented in previous paragraphs, I am going to give an explanation of how to calculate this antenna for any double band to taste of the interested one and soon I will expose like adding but bands to the two main bands, transforming this original See-band into a Tri-band, Cuatri-band, or a Multi-band to taste of each.

**CALCULATION OF THIS ANTENNA IN DUAL-BAND:** This antenna can be calculated of the following way formulates applying it by the way due and, formulates





nothing criticism, since soon the antenna with the bridges will adjust and applying it to the 2 bands that interest to us to cover: In order to calculate the antenna For 160 and 80 Meters, 80 and 40 Meters, 40 and 20 Meters and for 20 and 10 Meters, altar of the following form:

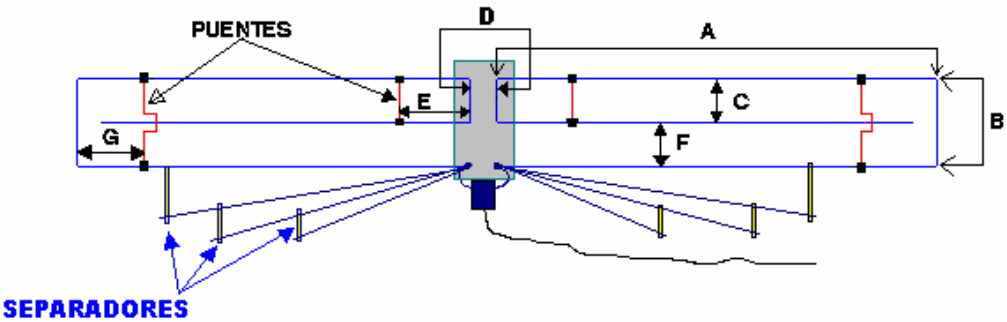
Calculation to establish the Measurement in section A: For this tactical mission or to apply to any other See-band. P.E: - for 160 and 80 meters serious: First to calculate  $\frac{1}{4}$  of wave for the high band but to use: (Eye, the high band but to use, low it but not to use, in this case for 80 Meters)  $(285/3,7) /4 = 77.02 /4 = 19.25$  Meters by arm. Where 285 are the turn out to clear to him at the speed of the light, (300,000 k/s), the 3 zero last ones, being the equal number to 300 and reducing to 300 5% to him by lost of speed of transmission since the speed of the light or the radio frequency is a slow 5% but by the cable of the antenna that by the air. The 3.7 are the central frequency to use in MHZ of the highest band of the two chosen bands. And I number 4 is to divide the result that it will give us to find  $\frac{1}{4}$  of wave of the length of the complete wave of the frequency to use custom-made applying the set out result like MEASUREMENT TO ESTABLEER FOR A:

In this tactical mission the measurement to establish for A: serious A=19,25 Meters. (Measured criticism) Measurement B: 8.5 Centimeters + or -. (Noncriticism) Measurement C: 4.25 Centimeters + or -. (Noncriticism) Measurement D: 10 Centimeters + or -. (Noncriticism) In order to find measurement E: it will be obtained of the following way: The measurement corresponding to A: Divided per 13,5.  $19,25/13.5 = 1.42$  Meters Measurement E: It will be in this tactical mission = 1.42 Meters approximately. Measurement F: It will be in this tactical mission = 4.25 Centimeters approximately. In order to find measurement G: it will be obtained of the following way: The measurement of E: Multiplied by 2.  $1.42 \times 2 = 2.84$  Meters. Measurement G: It will be in this tactical mission 2.84 Meters approximately. To summarized accounts an antenna For 160 and 80 Meters will have the following measures. MEASURES TO ESTABLISH: A = 19.25 Meters. B = 8.5 Centimeters. C = 4.25 Centimeters. D = 10 Centimeters. E = 1.42 Meters. F = 4.25 Centimeters. G = 2.84 Meters. IN ORDER TO CALCULATE THIS ANTENNA FOR OTHER BANDS THAT ARE NOT 160-80 METERS COARSE WITH APPLYING IN THE SAME WAY



IT FORMULATES IT OR EXPOSED TO OTHER BANDS LIKE FOR 80-40, 40-20 or FOR 20-10 METERS. AS TO ADD TO MAS BANDS TO THE MAIN BASEBANDS: This is relatively simple since they will only have to add to a dipole or dipoles to choose calculated in  $\frac{1}{4}$  of wave by arm, found with formulates habitual, 285 divided by the Frequency in Mhz to use and the turn out to divide it by 4 to find the length of an arm of the Dipole, for the band or bands that also we want to use as a whiskers, approximately as I expose in the following image, considering that or Dipoles additions always they must be for a frequency or band superior to the band superior for which the antenna is calculated Base See-band and that they must always go below the dipole See-band and always in the order of the long dipole but above and but the short ones always below this.

**ANTENA MORGAIN MULTIBANDA**



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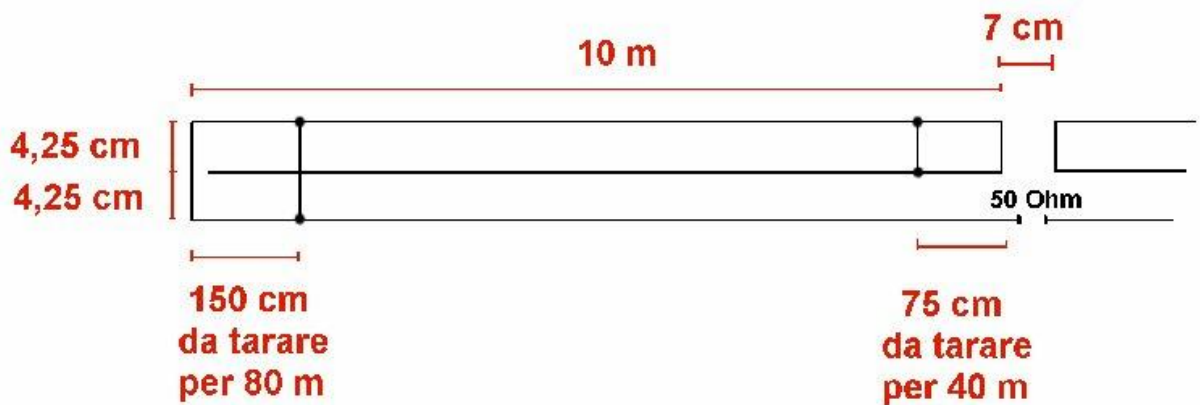
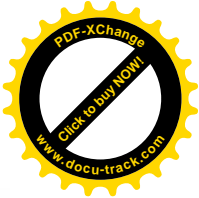
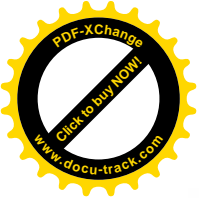
ONE MORE A VARIANT OF THIS ANTENNA: To that they have a high-frequency radio with a coupler with a margin of connects very ample, if, of which connects until the Somier of the bed of the grandmother to be able to transmit in 160 Meters, ji, ji, ji,



because a modification of the original antenna exists that can be done and be obtained that to this antenna although this calculating for, for example 80 and 40 meters, since also it is possible to be used without no problem of 80 Meters for above until the 10 meters with a quite good yield. In order to cause that this antenna can be used of 80 to 10 Meters coarse with changing balun original of 1:1 and changing it by one of 6:1 and to both eliminate bridges of adjustment of each arm. If the coupler is able to connect the antenna will be able to be transmitted, without having to fit nothing, of 80 to 10 meters, that if, with a yield somewhat inferior, less, to the yield that we would secure with that same antenna with the bridges put for each one of the two basebands. Have proven I it calculated for 80 and 40 Meters and without the bridges of adjustment and the yield for these two bands were quite good but the yield in 20-15 and 10 meters did not convince, that absolutely to me if, comparing it with my antenna of 5 elements I hope not to have left no point to touch to for 10-15 and 20 Meters. me, but by any thing somebody has some doubt, although I sincerely believe that my clear and concise exhibition to be sufficiently because I am at the disposal of all to clarify any not set out point in particular in this writing. I am QRV for any doubt, suggestion or "reasonable" complaint, ji, ji, ji. 73. For all from Majorca Guillermo Valls. EA6XD ea6xd@ure.es ed6xd@wanadoo.es Proverb of own harvest.... BAD NOR GOOD ANTENNAS DO NOT EXIST ..... ANTENNAS EXIST BETTER THAT THE OTHER!

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The Morgain ċ the simplest and extremely economic antenna that only demands a po' of attention in phase of calibration, but once installed and put to point it works optimally in two bands with a low level of stationary. These are the measures:



It conviene to manufacture of long spacers 12 cm of PVC or other resistant plastic material to the inclemencies, to practice 3 holes and to insert the thread, to the center and the estremit  will be necessary finishes them pi  large for l' anchorage and in order to lodge the connector that andr  opportunely protect with silicone. For the calibration it conviene to manufacture 4 fragments of thread with two spilli everyone to the estremit , cos  from being able to move them along l' antenna trying the precise points where to connect them. Obviously this operation goes made in symmetry, cio  putting the ponticelli of the 40 to the same distance from the center, ditto for those of the 80 then once found the point pu  to spelare the thread, to tin the ponticelli and to cover with silicone. L' operation   a po' long and it demands patience, but once made the calibration does not change and l' antenna   in a position to working for decades. Good I listen to and good divertimento.

<http://i4ewh.altervista.org/ShortWaves/Morgain/Morgain.htm>