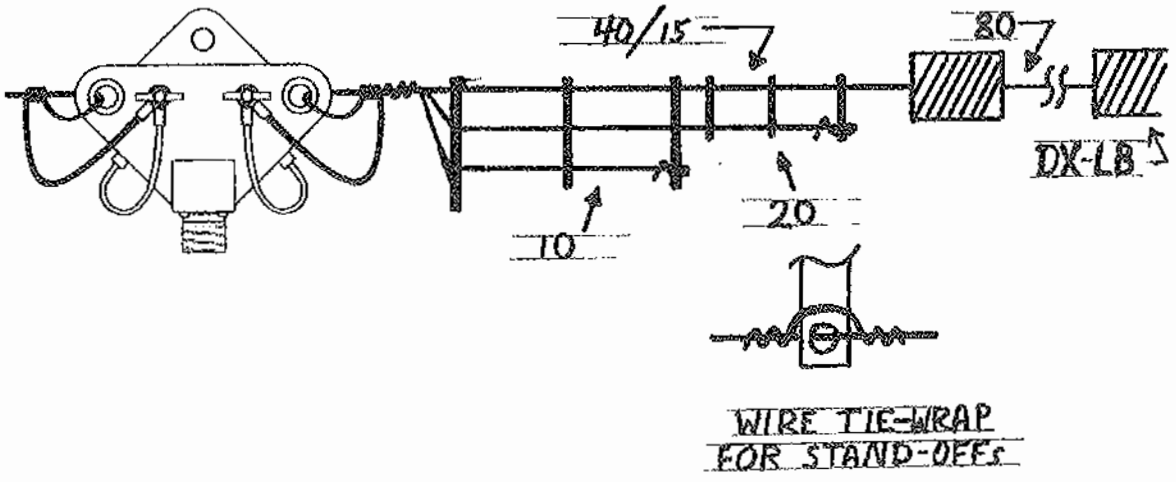
ALPHA DELTA COMMUNICATIONS, INC.

Multi-Band Wire Dipole Instruction Sheets for Models:

- **DX-CC** 80/40/20/15/10 meter parallel dipole, 82 ft. Overall
- **DX-DD** 80/40 meter single wire dipole, 82 ft. Overall
- **DX-EE** 40/20/15/10 meter parallel dipole, 40 ft. Overall
- **DX-LB** 160/80/40 meter single wire dipole, 100 ft. Overall
- **DX-LB Plus** Same as Model DX-LB above, but adds 20-10 meters with parallel wires.

Alpha Delta HF wire dipoles are precision made products, manufactured in the U.S.A in our ISO-9001 certified facility for the highest quality possible. Due to the design of the ISO-RES inductor coils (not traditional lossy traps), the efficiency of the antennas is outstanding and they are used worldwide with great DX results around the globe! Stainless steel hardware and insulated high tensile strength solid copper 12 ga. wire is used to withstand the most severe environments. When you put it up, it STAYS up!



Models DX-CC, DX-DD and DX-EE employ Model SEP gas tube static discharge modules for added safety. They are not used in models DX-LB and LB Plus, since these antennas are used with wide range tuners that have wide SWR voltage swings which could "false trigger" the Model SEP.

CAUTION! CAUTION! CAUTION! Never install antennas near power lines or drop lines as contact with these lines is DANGEROUS and could cause bodily injury or death! Think SAFETY!

Any HF antenna should be installed in the "clear", away from surrounding objects (metal objects or roof tops) which could de-tune the antenna and impair performance. Any antenna wire should not be closer than 4-6 ft. from any tree, branch or limb (yes, they will de-tune an antenna). Clearance should be at least 20 ft. from any metal objects or roof tops. Our test height is 35 ft., "in the clear" but lower heights can be useable depending on the installation site and terrain. Specific SWR bandwidths for each model and each band are a function of the installation "site" conditions, except as noted in the instruction sets below.

BE SURE to read the attached document "Problem Solvers for Wire Antenna Installations" before installing your antenna. Also, read the sheet "Alpha Delta Model DELTA-C Antenna Hardware Kit" for information on the operation of the Model SEP gas tube static protector. Although the sheet was written for the "kit", the information applies to the assembled antennas as well. Balanced feed line can be used with the antennas, but the SEP must be removed to prevent "false triggering" of the gas tube.

INSTALLATION and ASSEMBLY INSTRUCTIONS

Refer to the graphic drawings when assembling any model, as they apply to all models, with specfic differences noted for the individual model instructions. All models are designed to be used with 50 ohm coax cable. No balun is required for proper operation. The antennas are rated for 1 kW SSB/CW output, assuming a FEEDPOINT SWR of 2:1 or less.

If RF on the coax is a problem, simply wind a "choke balun" with the coax that's used for your feed line. Wind approx 8 turns, at about an 8 inch diameter and tape (with outdoor rated black electrical tape), like a donut, and place this "donut" near the feedpoint of the antenna. You should leave about 2 ft. of your coax sticking out of this "donut" for connection to the antenna. Then attach the end of your coax to the antenna connector on the DELTA-C center insulator, with the coax connector that is already on your feed line. Secure this "donut" to the mast or support to provide strain relief for the coax connector on the Model DELTA-C center insulator.

The ISO-RES coils have been coated with a special UV light block polymer and require no further coating. However, be sure to remove any packing material around them.

• Model DX-DD

1. **Unroll the wire elements, removing any kinks that may have been induced in packaging.**

2. **This antenna is a single wire dipole (each side approx 41 ft. long) covering 80 and 40 meters. It does not use parallel wires, and is essentially the "top wire" of the antenna shown in the drawing.**

3. **Since it is a shortened HI-Q antenna on 80 meters, it has a narrow SWR bandwidth of about 65-70 kHz. Do an SWR "run" about every 20 kHz to determine where the minimum is. Then, it can be adjusted to your desired frequency with the "end" wires which go from the coils to the end insulators, or be used with a wide range antenna tuner. Check for the resonant point first, before trimming.**

4. **The 80 meter wire sections can be shortened (to raise the resonant freq) by pulling them through the end insulators and twisting them back on themselves like a "bread wrapper tie". About 6 inches will move the freq from about 3700 kHz into the 3900 range. Based on your installation site, it may be a different amount. They do not need to be cut. 40 meter bandwidth is quite broad and requires little, or no tuning. You will find an efficient**

wide range antenna tuner is a very handy device to broaden out the bandwidth of an antenna.

• Model DX-CC

1. Unroll the wire elements, removing any kinks that may have been induced in packaging.

2. At *each* side of the center insulator you will find 3 wires: (A.) The 80/40/15 meter wire with an ISO-RES coil and 3 long and 3 short stand-offs installed. It is approx 41 ft. long. (B.) The 20 meter wire, approx 16 ft. long. (C.) The 10 meter wire, approx 8 ft. Long.

3. With the antenna wires laid out on the ground, fully extended, run the 20 and 10 meter wires through the stand-offs as shown in the graphic with the 20 meter wires running through the center holes of the 3 long stand-offs, and the bottom holes of the 3 short stand-offs. The end of the 20 meter wire should be twisted back on itself (about 2 inches) through, and around the last short stand-off for proper support.
The 10 meter wires run through the bottom holes of the 3 long stand-offs, as shown. The end of the 10 meter wire should be twisted back on itself (about 2 inches) through, and around the last long stand-off.

All of the stand-offs should be spaced as equally as possible for best support. When all the wires and stand-offs have been positioned properly, tightly wrap wire-ties around the top and bottom of each stand-off and antenna wire to prevent movement. For the wire-ties, cut approx 6 inch lengths from the 12 ft. coil of wire provided. See the graphic for example.

4. For 80 meter tuning and operation, see para. 3 and 4 for the Model DX-DD antenna. The same information applies to the Model DX-CC.

5. It should be noted that there is no separate tuning or adjustments for 15 meters. This band operates as a third harmonic from the 40 meter section. As a result of this design, there is usually an upward shift of resonance on 15 meters, instead of the usual mathematical "times 3". Since there is no

adjustment for this band, just use an antenna tuner to adjust to resonance. The efficiency is not impaired.

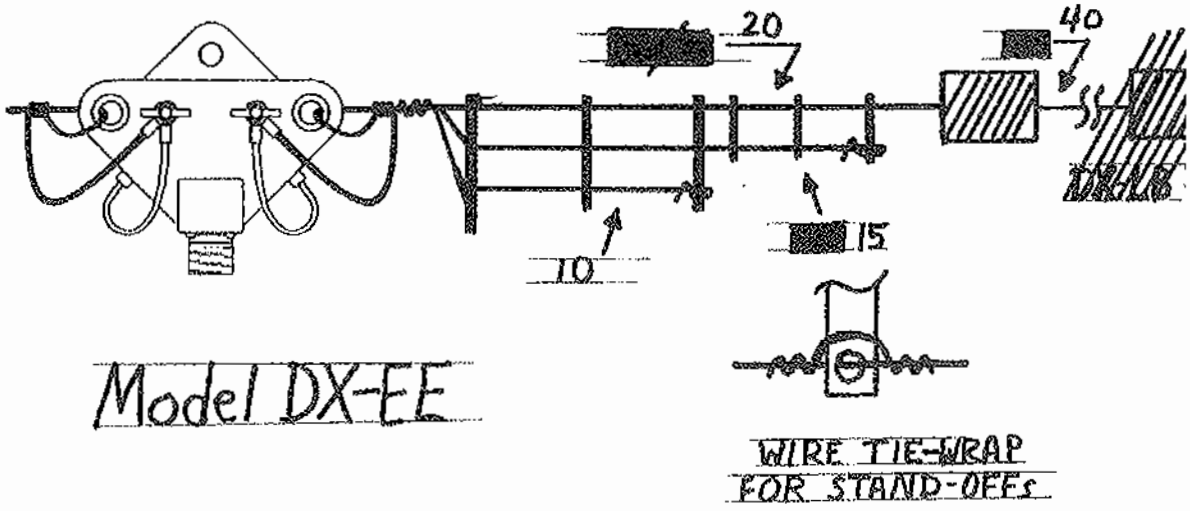
Model DX-EE

1. **Unroll the DX-EE wire elements, removing any kinks that may have been induced during the packaging operation.**

2. **At *each* side of the DELTA-C center insulator, you will find 3 wires:**
   (A.) The 40/20 meter wire with an ISO-RES inductor and 3 long and 2 short stand-off insulators (not 3 as shown on the graphic). This wire is approx 20 ft. Long.
   (B.) The 15 meter wire, approx 11 ft. Long.
   (C.) The 10 meter wire, approx 8 ft. Long.

3. In the case of the Model DX-EE, and referring to the graphic, the "top wire" and coil of the DX-EE is for 20 and 40 meters. The length from the center insulator to the coil tunes 20 meters and the length from the coil to the end insulator tunes 40 meters. The "middle wire" tunes 15 meters and the "bottom wire" tunes 10 meters.

With the antenna wires laid out on the ground in a fully extended condition, run the 15 and 10 meters through the stand-offs, with the 15 meter wires running through the center holes of the 3 long stand-offs and the bottom holes of the 2 short stand-offs. The end of the 15 meter wire should be run through, and around the last stand-off and twisted back on itself (about 2 inches) for



support. The 10 meter wire is run through the bottom holes of the 3 long stand-offs. The end of the 10 meter wire should be run through, and around the last long stand-off and twisted back on itself (about 2 inches) for support.

4. All of the stand-offs should be spaced as equally as possible along the wires for the best support. When all the stand-offs and wires have been positioned properly, tightly wrap wire-ties around the top and bottom of each stand-off and antenna wire to prevent movement. See the example in the graphic. For the wire-ties, cut approx 6 in. lengths from the 12 ft. coil of wire provided.

Since the Model DX-EE is a shortened HI-Q antenna on 40 meters, it has a narrow SWR bandwidth of about 50-60 kHz. The 40 meter sections can be shortened to the SSB section of the band by pulling the wires through the end insulators an additonal 3 inches each side, and twisted back on themselves. This length will vary due to the installation site, so check the SWR resonance first. The wires don't have to be cut. Then, a wide range antenna tuner should be employed to broaden out its bandwidth.

• Model DX-LB and LB Plus

1. **The Model DX-LB antenna is the same as the Model DX-DD, but with the addition of an extra coil and extender wire for 160 meters. Read the information on the Model DX-DD instruction set. The antenna is greatly shortened on 160 meters (100 ft. Vs. 260 ft.) and its SWR bandwidth is about 20 kHz. It can be trimmed to your section of the band or used with a wide range antenna tuner to broaden it out. However, its efficiency is excellent and we have had many reports of good DX being worked on 160 meters. For this band, install the antenna as high as possible, greater than 40 ft., for best results. Due to the extra coil, the SWR bandwidth on 80 meters is narrowed to about 40 kHz and a tuner should be employed.**

2. **The Model DX-LB Plus is the same as the Model DX-LB but with the addition of parallel wires for 20-10 meters. For assembly of these wires, follow the instruction set for the Model DX-CC, since they are the same. Also, read the information for the Model DX-DD and the information for the basic Model DX-LB. These instruction sets will provide information for assembly and operation for the bands 160-10 meters.**

IMPORTANT INFORMATION!

Wire antennas cannot be returned for credit as they cannot be sold as new. In over 20 years of providing these models, we have found that nearly EVERY case of poor tuning and performance can be traced to problems with the installation site (surrounding objects and height above ground), or installations or assembly that have not followed instructions. Shorted coax connectors at one end or the other of the coax feed line, or even shorted coax "jumpers" are a fairly common problem too. Unlike small VHF/UHF antennas, HF antennas are VERY sensitive to installation site coupling to surrounding objects. This is due to the longer HF wavelengths being similar to lengths of gutters, roofs, guy wires, other wire antennas or "earth coupling" when low to the ground.

Before contacting the factory, check for shorts in your coax cables and do an SWR "run" across each band in question, moving your SWR meter dial slowly so as not to miss variations in SWR (every 20 kHz from band edge to edge, then in smaller increments to find the exact SWR minimum, even if it's high). This specific data will help us find clues to the situation.

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ALPHA DELTA COMMUNICATIONS

Problem Solvers for Wire Antenna Installations

Of the many questions we get concerning wire dipoles and slopers here at the Alpha Delta antenna facility, many deal with the same common issues of antenna installations and performance problems. Indeed, many of the "problems" turn out not to be problems at all when provided with additional information about the situation and installation site.

Fundamental antenna theory, and installation experience we have gained over many, many years of dealing with these antennas may provide the answers you are seeking. No engineering formulas and complex theory here, just practical information gained from customers themselves, in addition to our own test results and operator knowledge as hams.

We have formal engineering educations, but that isn't what you're looking for here. You're looking for how, why and what to do! Some of the following points will be very basic for some of you, but in talking to our customers of all levels of experience, we hope you will find it useful and time saving.

A. Slopers (quarter wave) have a unique set of installation requirements compared to the typical half wave dipole. Basically, they require operation on a support/tower (35 feet or higher) with an HF size beam on top to act as a "capacity hat", sort of like an upside down vertical where the beam elements are like the radials of a ground mounted vertical. Also, there needs to be a good ground return path down the tower. Metal guy wires that are not "broken" with insulators and other wire antennas on or near the tower can cause serious problems (SWR).

Refer to our web site home page "1/4 Wave Slopers, How to do it Right" for essential information on sloper installations. Without following these requirements, tuning and SWR are most likely going to be a problem. Sometimes, an external, wide range tuner can help.

B. Dipoles are a relatively simple design and usually easy to install and tune with good SWR, but they too require some thought for proper operation. Dipoles operating on 20 through 10 meters should be at 30 feet, or more, in the air. Dipoles operating on 160/80/40 meters should be at least 40 feet in the air for good SWR and at least average performance.

Higher heights on the low bands significantly improve performance. We have many customer reports of good operation at lower heights, but that depends on how high the "site" is electrically above ground at what's under the antenna. We can't predict that. Even at decent heights, both slopers and dipoles need to be in a clear "site", electrically uncluttered. See "Site Location" below.

C. Site Location. These antennas need to be as far as possible from any surrounding metal objects. Our tests, and those of customers, show that any antenna wire should be at least 15 feet from gutters and metal house siding or fascia. Metal guy wires should be "broken" with insulators at non-resonant lengths. Odd as it may seem, attics have a certain capacity characteristic and antenna wires should be no closer than 10 feet from any roof top, even if it's a non-conductive roof material. Antenna wires should be at least 20 feet from other similar frequency HF antennas, even verticals. Power lines must be avoided at all costs, and any antenna that may fall as a result of a storm or support failure must be positioned to NEVER fall across a power line. To reduce power line noise pick up, the antenna must be as far as possible from a line run. 30 feet, or more, is preferable.

A low frequency dipole (80/40 meters) can be put up to within 10 feet or so under a higher frequency (20/15/10 meters) beam with little if any problems. In an inverted-V configuration, the end of the wires should be about 10 feet, or higher, from the ground. The center feedpoint of an inverted-V should be offset from a metal support or tower leg by about 18 inches, on a non-conductive arm, to minimize coupling and thus higher minimum SWR. It is also important to note that antenna wires should not touch, or come closer than about 6 feet from any tree branch/limb or leaves. This may not be readily known but they can really upset resonant frequency or SWR.

If a dipole is fed with balanced line, the balanced line itself should be at least 6 feet from any metal objects, throughout the length of its run. It should never touch any metal, like window or door frames, as it enters the property. Close coupling of any metal to balanced line will significantly upset the system. Also, balanced line running down along side a metal tower leg or mast will cause serious coupling problems. If the balanced line is feeding a tower mounted dipole, it should come away from the tower at about a 45 degree angle and not near any guy wires or other wire antennas.

D. Attic installations. We have many successful customer reports of attic installations, particularly with the Model DX-EE, 40 foot long, 40 meter thru 10 meter dipole. HOWEVER--and this is a BIGGIE! Attic installations and performances (SWR) are unpredictable due to the fact that antennas in attics are upset by attic wiring and heat/air ducting being nearby. Also, metal gutters and roof/wall material can be a factor. The height above ground (single story, multi-story) is also an important consideration as with any site conditions.

Depending upon your residence, RFI coupling into stereos, TVs, burglar alarms and even garage door openers can be a problem. Due to the coupling effect of attic

installations, an external wide range tuner is usually required for proper SWR operation.

E. Notes regarding the Model DX-DD, DX-CC on 80 meters and DX-LB on 160/80 meters. We get many questions regarding resonance, bandwidth and SWR on these bands with these models. It should be noted that on these bands, these antenna models are physically shortened from full size antennas operating on these bands. As a result, they are high-Q, narrow bandwidth designs and do not cover the full bandwidth on these bands. Actually, full size antennas don't either, but do have a broader SWR bandwidth.

They operate extremely efficiently in their ranges, but must be adjusted (trimmed) for other ranges (add lengths to lower resonant freq., shorten to raise freq., several inches at a time using an SWR meter.) and a tuner should be used to "broaden" out a range once it has been set. The DX-DD/DX-CC have 2:1 SWR bandwidths approx. 65 kHz on 80 meters. The DX-LB is about 40 kHz wide on 80 and about 20 kHz on 160 meters, depending on site location and height above ground.

Before calling the factory, **BE SURE** to do an SWR "run" across each band. Do about 10 kHz at a time on 160 meters and 20 kHz at a time on 80 meters, turning the dial slowly, with the tuner bypassed, to develop a resonance/SWR curve for each band. Without this data we cannot find clues or help with suggestions as to what might be going on. Comments like "my antenna won't tune", or "my antenna has high SWR" do not help us find solutions. Do a "run" as above, and provide us the data.

Of course, there are exceptions to all antenna "advice" and installation suggestions, but the above points are the ones we get the most often and cover nearly all our customer calls over the last several years. We hope you will find this information helpful and useful in order to maximize your antenna performance.

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ALPHA DELTA Model DELTA-C Antenna Hardware Kit

This kit contains 1 DELTA-C Center Insulator, antenna connecting hardware, 1 Model SEP Arc-Plug™ static Electricity Protector (installed on the back of the Delta-C) and 2 Model DELTA-CIN End Insulators.

DELTA-C components are molded of high impact UV and RF resistant material called DELTALLOY™. It is tough and practically indestructible. Only stainless steel is used for exposed hardware.

For proper installation, feed the antenna wire through the strain relief holes on each side of the DELTA-C Center Insulator, wrap it back on itself approximately 3-5 turns, then route the end of the antenna wire to the solder lug on each set of connection hardware.

A small loop may be formed from the wrap to lug to relieve tension. See Fig. 1 for suggested connection method (be sure to reinstall the hardware in the same sequence as provided -- washers, nuts, etc. and do not over tighten the wing nuts).

Approximate antenna lengths can be determined for ½ wavelength antennas (necessary when feeding in the center with coax cable) by using the formula:

Length (feet) = 468
Frequency (in MHz)

Some typical antenna lengths (overall total for both sides of dipole) are listed in table 1. (See fig. 2).

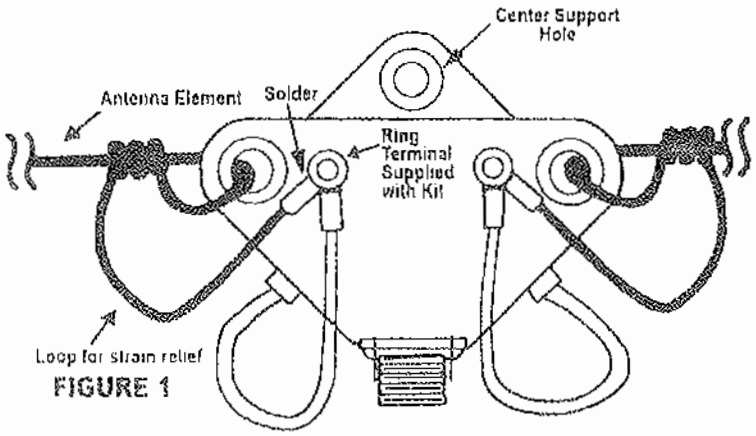

FIGURE 1

TABLE 1

½ Wave overall lengths (approximations)

Amateur Bands	Shortwave Broadcast Bands
160 Meters- 260 ft.	120 Meters- 195 ft.
80 Meters- 126 ft.	90 Meters- 142 ft.
40 Meters- 66 ft.	75 Meters- 120 ft.
30 Meters- 46 ft.	60 Meters- 98 ft.
20 Meters- 33 ft.	49 Meters- 79 ft
17 Meters- 26 ft.	41 Meters- 63 ft.
15 Meters- 22 ft.	31 Meters- 51 ft.
12 Meters- 19 ft.	25 Meters- 40 ft.
10 Meters- 16.5 ft.	22 Meters- 34 ft.
	19 Meters- 30 ft.
	16 Meters- 27 ft.
	15 Meters- 25 ft.
	13 Meters- 22 ft.

Model SEP Arc-Plug® Static Electricity Protector is a special gas tube component designed to "bleed off" slow rising static electricity build-up of the kind generated by thunderstorms, high wind driven snow or sand or by a harmless looking cloudy day. These static charges have been measured to several thousand volts and can damage or destroy sensitive components in receiver or transceiver front end circuitry.

For proper operation of the Protector, it will be necessary to ground the coax shield at the entrance to the building. Your station may already meet these requirements if your coax shield circuitry is grounded to a ground bus, bulkhead, strap, braid or ground rod through the connector on your coax. If the Model SEP protector takes a strong surge "hit" beyond its rating, it is designed to fail "shorted" to indicate the need for replacement. This will be indicated by a large increase in VSWR, or a "dead" receiver since the antenna will be shorted to ground at the Center Insulator. Your equipment will still be protected until removal or replacement.

To remove the Model SEP Protector, simply remove the antenna connection hardware and remove the SEP which is installed in the cavity on the back of the Model DELTA-C Center Insulator. Reinstall the hardware in the same sequence as provided.

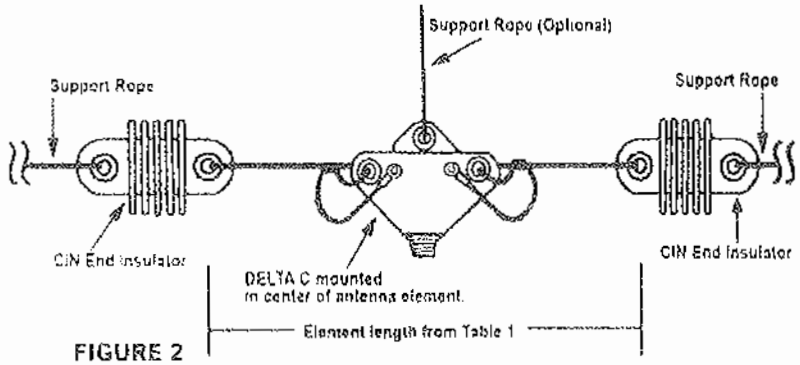

FIGURE 2

When using the DELTA-C for high power transmitting it may be necessary to remove the SEP Cartridge when VSWR exceeds 2:1.

Also, to assure the maximum protection of your sensitive equipment from lightning/EMP induced surges, we recommend the use of our Alpha Delta Transi-Trap Surge Protector at the point where the feedline enters the building.

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