



TELEX COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO., MINNEAPOLIS, MN 55420 U.S.A.

# INSTRUCTION MANUAL

## ORDER NO. 411

Base Station,  
5-Element Beam Antenna

PN 801288-1

### General Description

This antenna is a five element, Citizens Band beam designed for maximum performance. It has a forward gain of 10 dB and a front-to-back ratio of 22 dB. It is constructed of high tensile strength aluminum tubing for a maximum strength and lightest weight. The beam features a beta match system which matches it to a 50 ohm feedline and puts the driven element at DC ground for noise-free operation and lightning protection. The beam rotates easily with any heavy-duty TV rotator for 360 degree coverage.

### VSWR and Feedline

This beam can be fed with any standard 52 ohm coaxial cable such as RG-213/u or RG-58/u. For runs over 50 feet in length RG-213/u is recommended because of its lower losses. The beam has a 1.5:1 or less SWR at resonance, if it is mounted in the clear in accordance with good antenna practice. The SWR will not exceed 2:1 over the entire CB frequency range.

### Installation

The beam is designed to fit a 1 1/2" O.D. mast. Plumbing pipe of 1 1/4" ID has a 1 1/2" O.D. and is highly recommended for masting material because of its high strength and relatively low cost. The antenna should be mounted in an area free from surrounding objects. The detrimental effect of surrounding objects is often underestimated in the average antenna installation. In particular, power lines and any other objects of any mass or length will deteriorate the performance of any antenna.

### Specifications

Boom length.....	17 feet (5.18 m)
Forward gain (over a dipole).....	10 dB
Front-to-back ratio.....	22 dB
VSWR at resonance.....	1.5:1 or less
Input impedance.....	52 ohms

### Unpacking

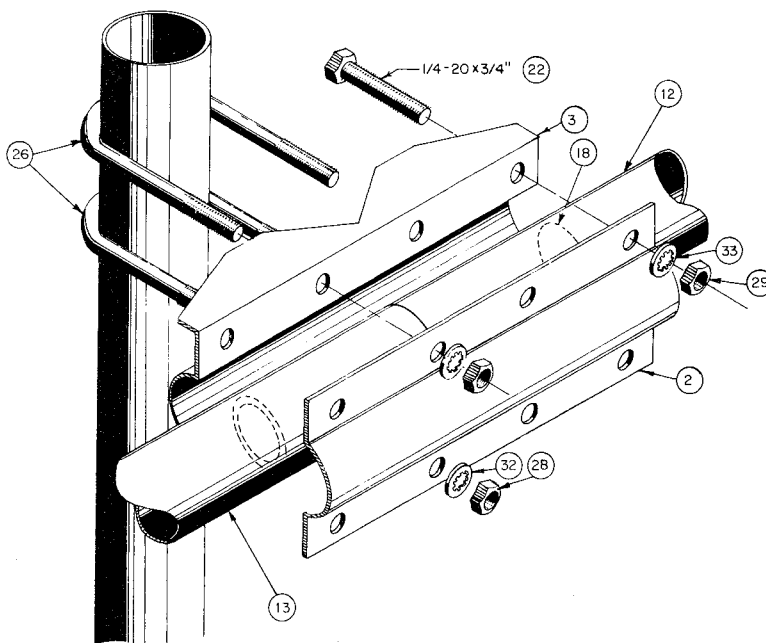
( ) Unpack the antenna and carefully check the parts against the Parts List. Compare the parts with the illustrations contained in this manual. This will help you become familiar with the parts and will aid in assembly.

### Boom Assembly

( ) Select the four boom sections (Items 11, 12 and 13) and the two boom-to-mast brackets (Items 2 and 3). Loosely fasten the boom-to-mast brackets together using the four screws (Item 22) nuts and lockwashers (Items 29 and 33) as shown in Figure 1.

**WARNING:**

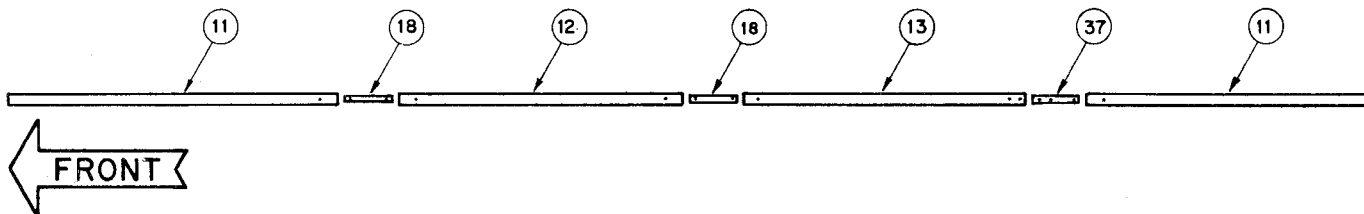
**When installing your system, take extreme care to avoid any accidental contact with power lines or overhead obstructions. Failure to exercise this care could result in serious or fatal injury.**



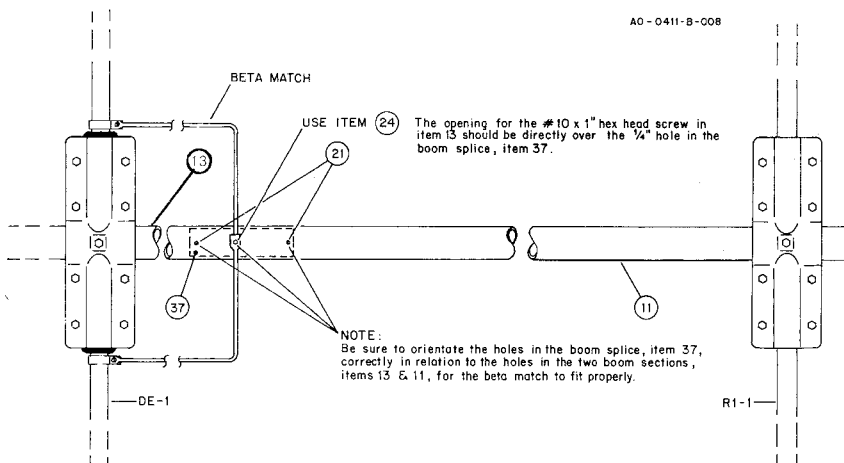
**Figure 1**  
**Boom-to-Mast Bracket**

( ) Refer to Figure 2 and assemble the boom sections. Use the six #10 x 1/2" Type A screws (Item 21) and the splices (Items 18 and 37) for securing the sections together.

( ) The two holes in Item 37 should mate with the two holes in Item 13.



**Figure 2**  
**Boom Detail**



**Figure 2A**

**Boom-to-Mast  
Assembly**

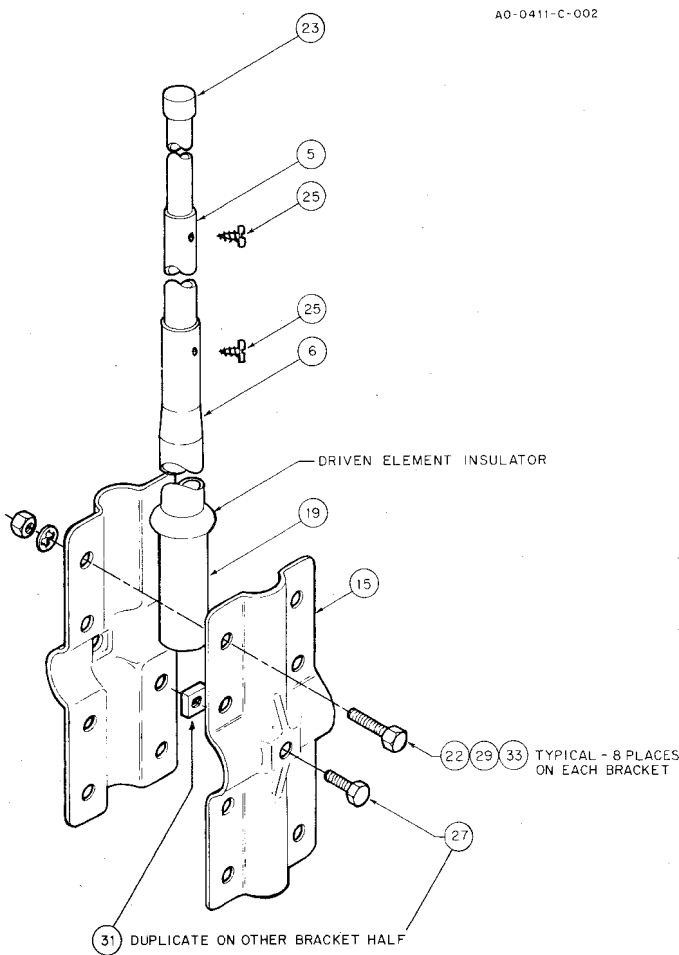
( ) Slip the entire boom into Items 2 and 3 and tighten securely using the four screws (Item 22), nuts and lockwashers as shown in Figure 1.

**Element Brackets  
Assembled**

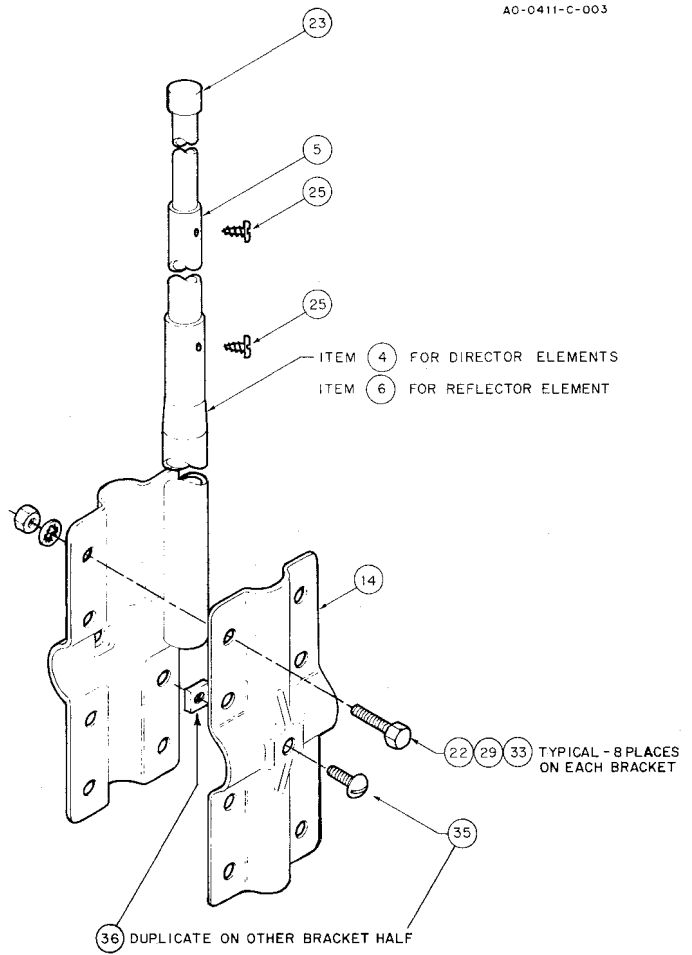
( ) Select the largest set of boom-to-element brackets (Item 15). Loosely assemble the brackets on the reflector end of the boom  $39\frac{1}{8}$ " from the center of the boom-to-mast bracket to the center of the element using Items 22, 29 and 33. *Do not tighten* at this time.

( ) Select a set of small element-to-boom brackets (Item 14) and loosely assemble on the boom approximately  $61\frac{3}{8}$ " from the center of the first set of element-to-boom brackets. See Figure 4 and Figure 5.

( ) Select the second set of small element-to-boom brackets (Item 14) and loosely assemble on the director end of the boom approximately  $51\frac{1}{2}$ " from the first largest set of element-to-boom brackets. Refer to Figure 4 and Figure 5.



**Figure 3  
Element-to-Boom Bracket  
for Driven Elements**



**Figure 4  
Element-to-Boom Bracket  
for Director and Reflector Elements**

( ) Select the third set of small element-to-boom brackets (Item 14) and loosely assemble on the director end of the boom approximately  $43\frac{3}{4}$ " from the D1 brackets.

( ) Select the remaining set of brackets and assemble on the director end of the boom as before approximately  $44\frac{5}{8}$ " from the previous set.

## **Element Tubes Assembled**

### ***Driven Elements:***

- ( ) Select two element tubes (Item 6) and the driven element insulators (Item 19). Slip the unswaged end of the tube into the insulators as shown in Figure 3.
- ( ) Select two element tubes (Item 5) and insert into the ends of Item 6.
- ( ) Select two element tubes (Item 9) and insert into the end of Item 5.
- ( ) Align the holes in the end of the tubes and secure using the #6 x  $\frac{3}{8}$ " Type A screws (Item 25).
- ( ) With a felt tip pen, mark the two assemblies "DE".

### ***Reflector Elements:***

- ( ) Select two Item 6 element tubes and two Item 5 element tubes. Slip the end of Item 5 into the swaged end of Item 6.
- ( ) Select the two Item 10 element tubes and slip the drilled end into the end of Item 5. Align the holes and secure using #6 x  $\frac{3}{8}$ " Type A screws (Item 25).
- ( ) Mark these two assemblies "R1".

### ***Director Elements:***

- ( ) Select two each of element tubes (Items 4, 5 and 1) and assemble as before. Align and secure by using Item 25. Mark these two assemblies "D1".
- ( ) Select two each of element tubes (Items 4, 5 and 8) and assemble as you did previously. Mark these two assemblies "D2".
- ( ) Select two each of element tubes (Items 4, 5 and 7) and assemble as before. Mark these two assemblies "D3".

## **Element-to-Boom Assembly**

**NOTE:** The antenna will not operate effectively unless the elements are assembled on the boom at exactly the dimension called for in the assembly view.

### ***Driven Element:***

- ( ) Referring to Figure 5 of the antenna select the two assemblies marked "DE" and insert into the large set of element-to-boom brackets. Carefully recheck the  $39\frac{1}{8}$ " dimension, measuring from the center of the boom-to-mast bracket to the center of the DE bracket. Then tighten all screws securely.

See Figures 2A and 6.

### ***Reflector Elements:***

- ( ) Select the two assemblies marked "R1" and insert into the set of element-to-boom brackets located on the reflector end of the boom. Carefully recheck the  $61\frac{1}{8}$ " dimension, measuring from the center of the boom-to-mast bracket to the center of the reflector brackets. Then tighten all screws securely.

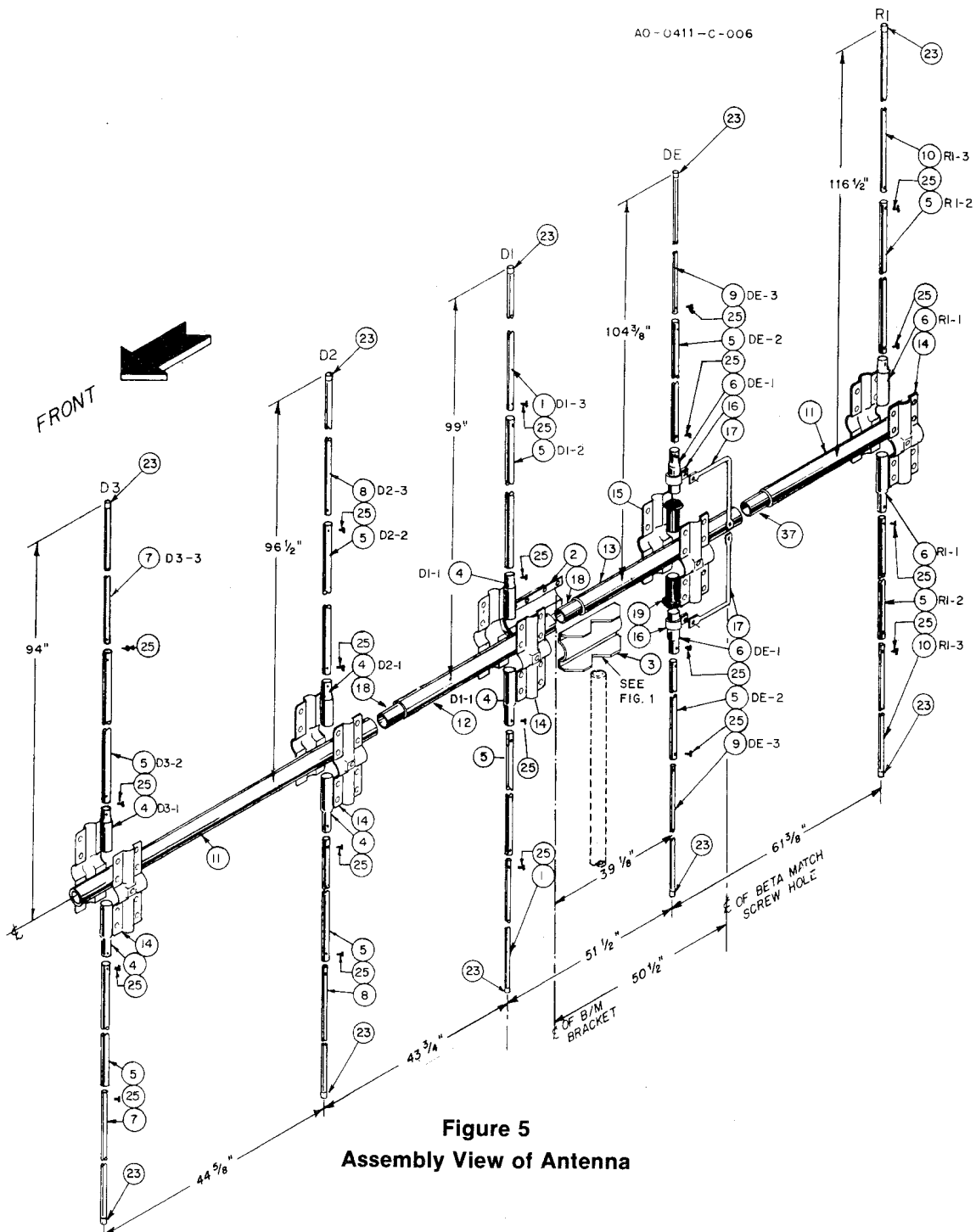
**Director Elements:**

( ) Select the two assemblies marked "D1" and insert into the set of element-to-boom brackets located  $51\frac{1}{2}$ " from the DE element brackets. Carefully recheck this dimension and then tighten all screws securely.

( ) Select the two assemblies marked "D2" and assemble into the brackets as before. Carefully recheck the  $43\frac{3}{4}$ " dimension. Then tighten securely.

( ) Select the final set of tube assemblies marked "D3" and assemble using the same procedure as before. Carefully recheck the  $44\frac{5}{8}$ " dimension and tighten all screws securely.

( ) Install a  $\frac{3}{8}$ " caplug (Item 23) on the end of each element.



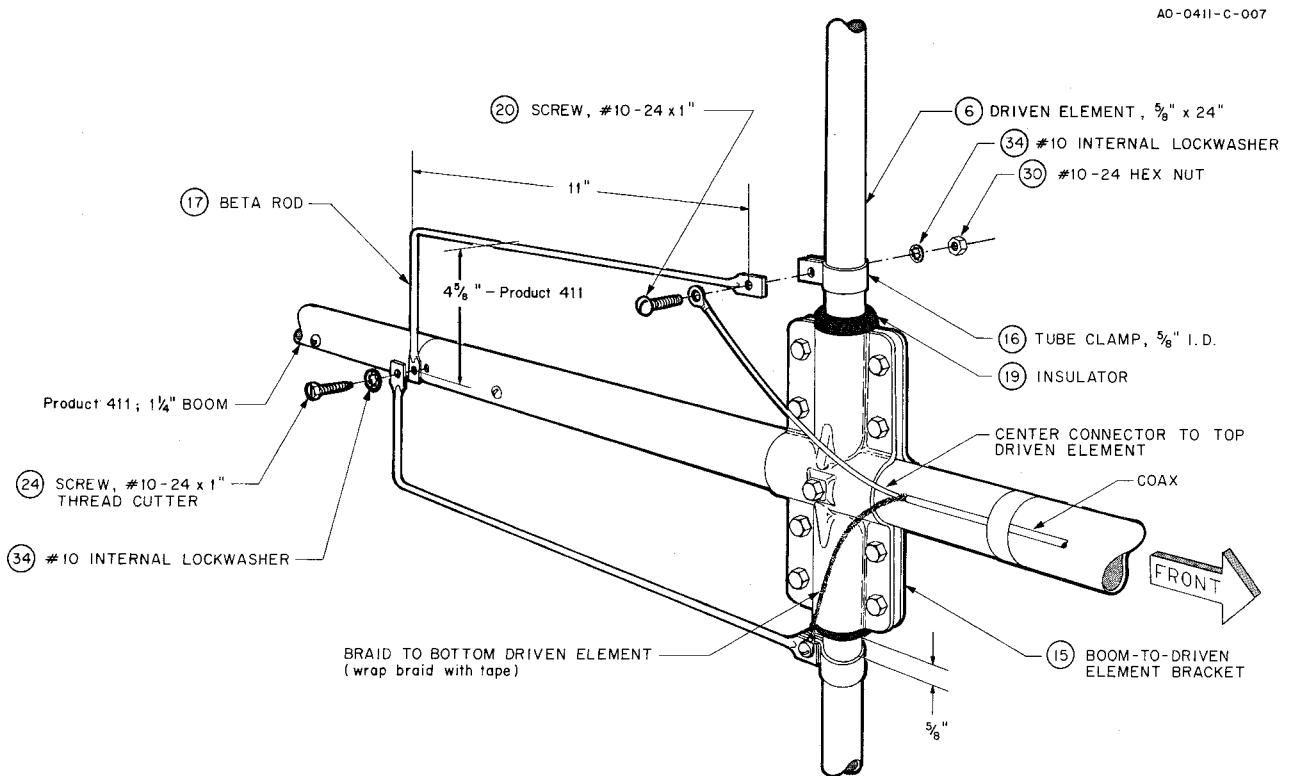
## Beta Match Assembly

( ) Select the two tubing clamps (Item 16) and slip them over the driven element approximately  $\frac{5}{8}$ " from the insulator. See Figure 6.

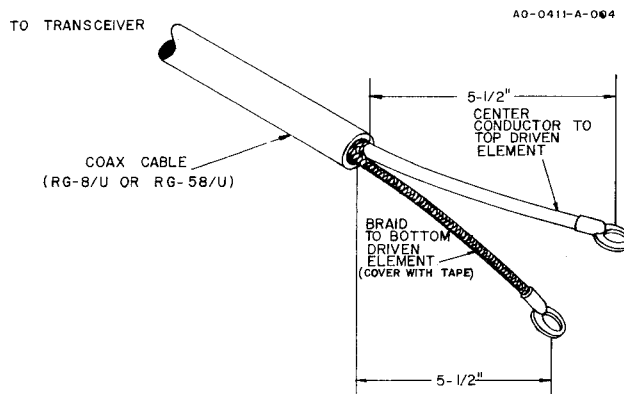
( ) Select the two beta rods (Item 17) and assemble using #10 hardware. Refer to the Beta Match Detail, Figure 6.

( ) Strip your coax in the manner shown in Figure 7 and separate the braid from the center conductor.

( ) Connect the center conductor to the top driven element and the braid to the bottom driven element as shown. Tape the exposed portions of the braid to prevent it from shorting out on the boom.



**Figure 6**  
**Beta Match Detail**



**Figure 7**  
**Stripping Measurements for Coax**

## Weatherproofing

Weatherproof the coax where the center conductor and the braid separate using Pli-O-Bond, Neoprene or some similar substance. This will prevent water from entering and possibly ruining your coaxial cable.

( ) This completes your installation.

## Parts List

Item	Part No.	Description	Qty
1	175057	Tubing, $\frac{3}{8}$ " x 48", 1 hole at 2 $\frac{1}{2}$ "	2
2	385144	Bracket, 1 $\frac{1}{4}$ ", boom-to-mast	1
3	385142	Bracket body, 1 $\frac{1}{4}$ "	1
4	175270	Tubing, $\frac{5}{8}$ " x 7 $\frac{7}{16}$ ", drilled	6
5	175272	Tubing, $\frac{7}{16}$ " x 48", drilled	10
6	175050	Tubing, $\frac{5}{8}$ " x 24", drilled	4
7	175055	Tubing, $\frac{3}{8}$ " x 43", 1 hole at 2 $\frac{1}{2}$ "	2
8	175056	Tubing, $\frac{3}{8}$ " x 46", 1 hole at 2 $\frac{3}{8}$ "	2
9	170371	Tubing, $\frac{3}{8}$ " x 36", 1 hole at 1 $\frac{7}{8}$ "	2
10	170372	Tubing, $\frac{3}{8}$ " x 48", 1 hole at 1 $\frac{1}{2}$ "	2
11	175054	Tubing, 1 $\frac{1}{4}$ " x 51", 1 hole drilled (boom)	2
12	175052	Tubing, 1 $\frac{1}{4}$ " x 51", 2 holes drilled (boom)	1
13	170373	Tubing, 1 $\frac{1}{4}$ " x 51", 3 holes drilled (boom)	1
14	161422	Bracket, 1 $\frac{1}{4}$ " to $\frac{5}{8}$ ", boom-to-element	8
15	165141	Bracket, 1 $\frac{1}{4}$ " to $\frac{7}{8}$ ", boom-to-driven element	2
17	170367	Beta rods	2
18	175051	Boom splice, 1 $\frac{1}{8}$ " x 8", 2 holes drilled	2
19	471069	Insulator, $\frac{5}{8}$ " ID	2
37	170366	Boom splice, 1 $\frac{1}{8}$ " x 8", 3 holes drilled	1
	878955	411 Parts Pack (contains the following:)	1
16	171329	Tube clamp, $\frac{5}{8}$ " ID	2
20	506455	Screw, #10-24 x 1", round head	2
21	516470	Screw, #10 x $\frac{1}{2}$ ", round head, Type A	6
22	506325	Screw, $\frac{1}{4}$ "-20 x $\frac{3}{4}$ ", hex head	45
23	455655	Caplug, $\frac{3}{8}$ "	10
24	523057	Screw, #10-24 x 1", hex head	1
25	516681	Screw, #6 x $\frac{3}{8}$ ", pan head, Type A	23
26	545146	U-bolt, $\frac{5}{16}$ " x 1 $\frac{3}{8}$ " x 2 $\frac{3}{4}$ "	2
27	505540	Screw, $\frac{1}{4}$ "-20 x $\frac{3}{8}$ ", hex head	1
28	556945	Nut, $\frac{5}{16}$ "-18, hex, jam	4
29	556960	Nut, $\frac{1}{4}$ "-20, hex	45
30	556970	Nut, #10-24, hex	2
31	558685	Nut, $\frac{1}{4}$ ", square	1
32	567075	Lockwasher, $\frac{5}{16}$ ", internal	5
33	567110	Lockwasher, $\frac{1}{4}$ ", internal	47
34	567125	Lockwasher, #10, internal	3
35	506485	Screw, #10-24 x $\frac{1}{2}$ ", round head	4
36	555362	Nut, #10-24, square	4