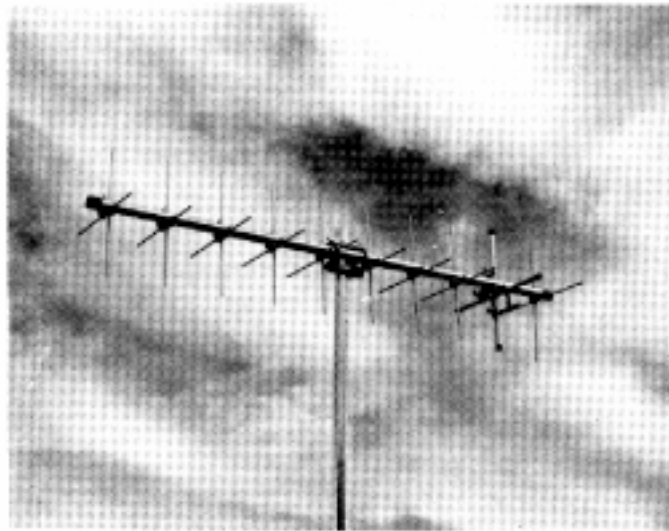




ASSEMBLY INSTRUCTIONS



VHF TWIST

A144-10T A144-20T
A147-20T P137-20T

PARTS PACKAGE

PART NO.	DESCRIPTION	QUANTITY		
		A144-10T	A144-20T P137-20T	A147-20T
73	1-1/2" U-bolt x 3"	2	2	2
5	5/16" lock washer	--	--	--
6	5/16" hex nut	--	--	--
15	1/4" flat steel washer	8	8	8
16	1/4" lock washer	8	8	8
17	1/4" - 20 hex nut	8	8	8
21	10-24 x 2" RH machine screw	8	18	18
22	10-24 hex nut	8	18	18
25	7/8" formed alum. bracket	8	18	18
28	Alum. half washer	8	18	18
29	#10 internal-tooth lock washer	8	18	18
31	2" x 4" U-bolt	--	--	--
32	3-1/2" U-bolt bracket	--	--	--
33	3-1/2" U-bolt backing plate	--	--	--
38	1" plastic cap	--	--	--
39	3/8" aluminum spacer	4	4	4
53	1/2" plastic cap	4	4	4
61	7/8" plastic cap	1	2	2
G-9	7/8" telescope clamp	1	--	--
G-10	1" telescope clamp	1	2	2
3	1-1/2" U-bolt x 3-3/4"	2	2	2

PARTS LIST	DESCRIPTION	QUANTITY		
		A144-10T	A144-20T P137-20T	A147-20T
MAST MOUNT	4" x 6" formed alum. plate	1	1	1
BOOM:	1" x 48" boom section	1	1	1
	7/8" x 48" boom section	--	2	2
	7/8" x 57" boom section	--	--	--
	7/8" x 24" boom section	1	--	--

ELEMENTS: 3/16" solid rod
Cutting tolerance of 1/16" on all elements

		A144-10T	A144-20T	A147-20T	
				Vert.	Horiz.
#1	Reflector	39-7/8"	39-7/8"	40"	40-1/4"
#2	Dipole w/Reddi Match	38"	38"	37-7/8"	38-1/2"
#3	Director	36"	36"	36"	36-1/2"
#4	Director	35-7/8"	35-7/8"	35-7/8"	36-3/8"
#5	Director	35-3/4"	35-3/4"	35-3/4"	36-1/4"
#6	Director	-----	35-5/8"	35-5/8"	36-1/8"
#7	Director	-----	35-1/2"	35-1/2"	36"
#8	Director	-----	35-3/8"	35-3/8"	35-7/8"
#9	Director	-----	35-1/4"	35-1/4"	35-3/4"
#10	Director	-----	35-1/8"	35-1/8"	35-5/8"

There are two elements for each length given above. The A147-20T has separate sets of elements cut for 144.5 and 146.5 MHz. The P137-20T elements are cut to length for the frequency ordered.

INSTALLATION SUGGESTIONS

Your Cush Craft Twist antenna is engineered and manufactured to give top performance and trouble free service. The antenna will perform as specified if the instructions and suggestions are followed and if care is used in assembly and installation.

MAST: The mast mount bracket will take up to a 1-1/2" O.D. mast. A 1-1/4" O.D. television type tubing is satisfactory for the twist.

LOCATION: The location of the antenna is very important. To minimize the effects of surrounding objects, mount the antenna as high and in the clear as possible.

ROTATOR: A good quality television rotor will easily handle the antenna. For tracking purposes, two mast through rotors can be used to give azimuth and elevation control. A balanced mechanical arrangement is desirable.

A14T-MB: The 50" boom section supports the A144-20T or A144-10T, figure 6. The mounting plate is pre-drilled to fit the Alliance U-100 Rotator. The kit includes a 50" x 1-3/8" boom, two 2" x 4" U-bolts, two 3-1/2" Vee blocks, four 5/16" lock washers, four 5/16" hex nuts and two 1-3/8" plastic caps. The hardware which comes with the U-100 completes the assembly.

BOOM ASSEMBLY: The A147-20T and A144-20T: Slide the 7/8" sections (as far as the black line) into the 1" center sections. A144-10T: Slide the 7/8" section (as far as the black line) into the 7/8" section. Be sure to align the element mounting holes. When the holes are aligned both ways, tighten the boom sections securely with the telescope clamp(s).

References to the A144-10T and A144-20T also apply to P157-10T and P157-20T.

ELEMENT ASSEMBLY: The elements (not including the dipole) are taped in two bundles. They are progressively shorter to improve bandwidth. The A147-20T element bundles are marked Hi-146 MHz and Lo-144.5 MHz. Mount the reflectors (longest elements) at one end of the boom. Mount dipoles next, then each progressively shorter element up to the front director #10, which is the shortest element, figures 1 & 2. The A147-20T Lo elements should be mounted for horizontal polarization.

MOUNTING: A144-20T and A147-20T: The 4" x 6" mounting plate is positioned between the No. 5 and 6 elements and on the opposite side of the boom from the vertical elements, figures 1 & 4. A144-10T: The 4" x 6" mounting plate is positioned behind the reflectors.

The A147-20T uses two separate 52-ohm feed lines. The harness/delay line is included with all other models. Before connecting the harness or feed line, tune the individual Reddi Match driven elements. When tuning the antenna at ground level, it can be mounted with the boom in a vertical position with the reflectors approximately 1 wave length from and parallel to the ground.

- (1) Connect a 52-ohm feed cable to the driven element with a PL-259 fitting.
- (2) Insert the standing wave ratio bridge in the line between the transmitter and the antenna. Set the transmitter to your center operating frequency.
- (3) Adjust the bridge for maximum forward power. Check the standing wave ratio with the bridge in the reverse position. If the VSWR is high, loosen the tuning strap, move the strap a quarter of an inch either way and take a second VSWR reading. If the VSWR has increased, move the strap back to its original position and adjust in the opposite direction. If the VSWR dropped, repeat the adjustment procedure until there is little or no reflected power indicated on the bridge.

- (4) When the antenna is completely assembled and tuned, tighten the feed line connections, tape them and coat them with a clear acrylic spray or equal. Run the coaxial feed line along the boom and down the mast with electrical tape to hold it in position.

The A144-20T and A144-10T utilize our standard coaxial stacking harness of RG-59/U coax with a 1/4 wave length delay line to induce the various methods of polarization. The harness can be utilized to provide left or right hand circular polarization or axial radiation as outlined in the following paragraphs. This type of harness arrangement cannot be used with the A147-20T because the horizontal and vertical elements are cut to different frequencies.

For installations where only one mode of polarization is required, the phasing harness can be permanently mounted at the antenna using one of the methods shown in figure 5. With this arrangement, only one feed cable is required from the antenna/harness to the transmitter.

The delay line RG-58/U section can be removed and the stacking harness permanently mounted at the antenna, figure 5. In this case, a single feed cable is run from the transmitter to the stacking harness center to provide axial radiation - both horizontal and vertical polarization at the same time.

The complete phasing harness can be used to switch polarization at the operating position by running two exactly equal lengths of 52-ohm coax from the antenna to the operating position. The cables can be any length, but they must be equal. One cable is connected to the vertical Reddi Match and the other cable is connected to the horizontal Reddi Match. The harness is then transposed on the cables at the operating position as shown in figure 5, and outlined in the next paragraph. It will be necessary to utilize a short stub of any length 52-ohm coax connected from the transmitter to the harness center insulator.

Figure 5 (looking from the reflector end of the antenna) illustrates the cable connected with the delay line section to the vertical Reddi Match. In this case, the polarization is left circular. To change to right circular polarization, simply reverse the harness with the delay line (RG-58/U section) to the horizontal Reddi Match. For axial radiation, remove the delay line section and attach an end of the stacking harness to each antenna. Connect the feed cable to the center terminal and both the horizontal and vertical sections will radiate at the same time. Either horizontal or vertical polarization can be utilized by removing the phasing harness and connecting the feed line directly to the horizontal or vertical Reddi Match.

Coax phasing harness is supplied with all antennas except the A147-20T.

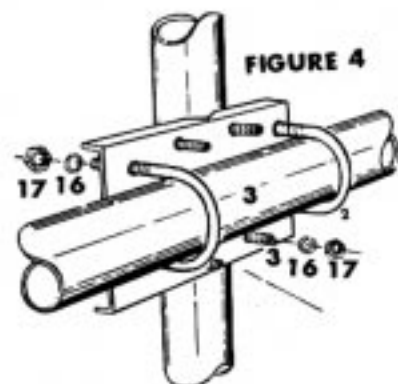
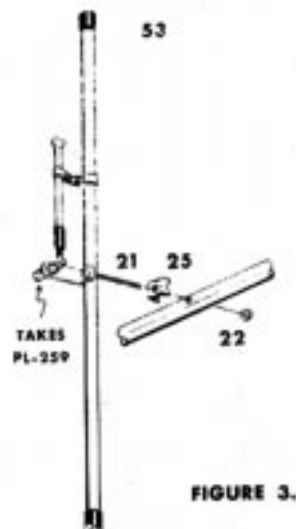
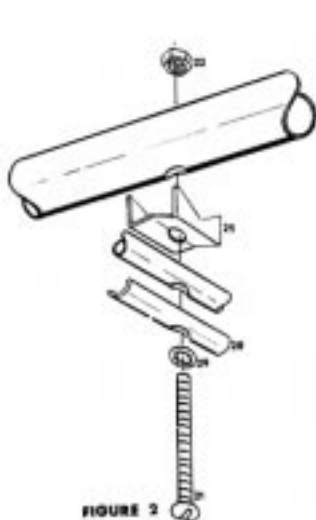




FIGURE 1

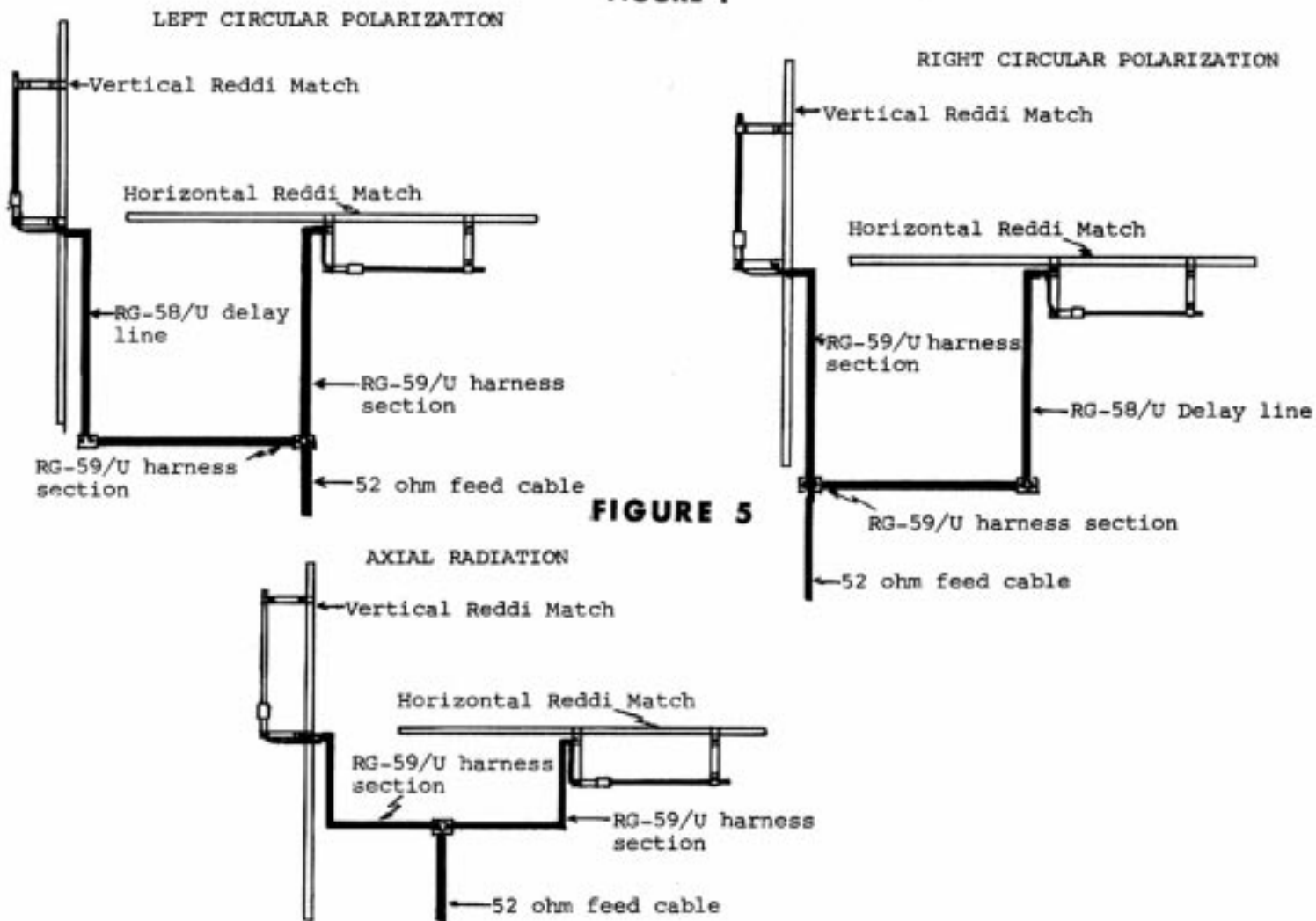


FIGURE 5

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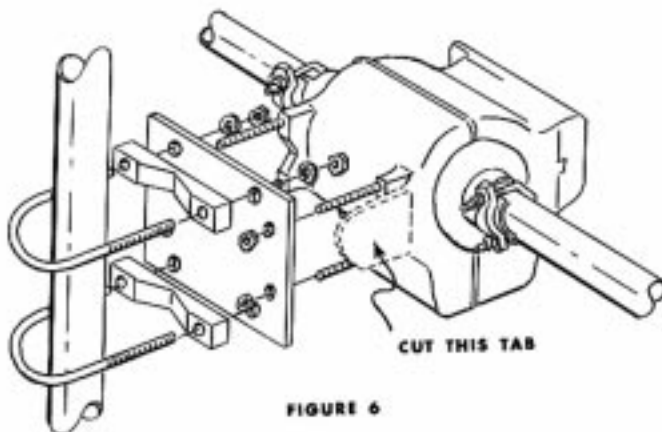


FIGURE 6

WARNING:

THIS ANTENNA IS AN ELECTRICAL CONDUCTOR, CONTACT WITH POWER LINES CAN RESULT IN DEATH, OR SERIOUS INJURY. DO NOT INSTALL THIS ANTENNA WHERE THERE IS ANY POSSIBILITY OF CONTACT WITH OR HIGH VOLTAGE ARC-OVER FROM POWER CABLES OR SERVICE DROPS TO BUILDINGS. THE ANTENNA, SUPPORTING MAST AND/OR TOWER MUST NOT BE CLOSE TO ANY POWER LINES DURING INSTALLATION REMOVAL OR IN THE EVENT PART OF THE SYSTEM SHOULD ACCIDENTALLY FALL. FOLLOW THE GUIDELINES FOR ANTENNA INSTALLATIONS RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION AND LISTED IN THE ENCLOSED PAMPHLET.

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THE ANTENNA COMPANY
48 Perimeter Road, P.O. Box 4680
Manchester, NH 03108

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