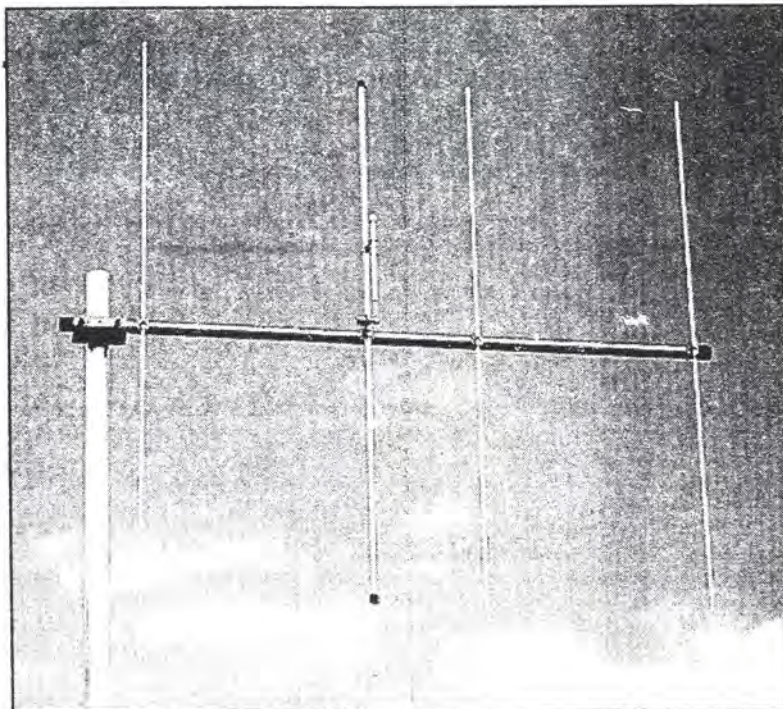


ASSEMBLY AND INSTALLATION



4 Element Economy Yagis



951339(11/94)

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INSTALLATION SUGGESTIONS

Your Cushcraft VHF beam is designed 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 antenna may be mounted on a mast diameter up to 2 inches (5.1 cm).

MOUNTING: When mounting more than one beam on the same mast, they should be mounted at least 1/2 wave-length (of the lower frequency) away from other antennas. Generally, it is best to mount these beams above lower frequency antennas.

LOCATION: Location of the antenna is very important. Surrounding objects such as trees, power lines, other antennas, etc. will seriously reduce efficiency. To minimize the effects of surrounding objects, mount the antenna as high and in the clear as possible. If metal guy wires are used, they should be broken into non-resonant lengths with strain insulators.

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 PAMPHLET THAT CAME WITH YOUR ANTENNA.

ASSEMBLY INSTRUCTIONS

ELEMENT ASSEMBLY: The elements except for the dipole are taped together. They are progressively shorter from reflector to directors. Using figure 1 mount the longest element near the holes for the u-bolts. Next using figure 2 mount the dipole. Now mount the longer of the remaining elements next to the dipole and then mount the remaining element at the end of the boom.

MAST MOUNT: The boom is designed for either vertical or horizontal polarization. Refer to figure 3 and mount the u-bolt to the boom and mast. When vertically polarized, the Reddi-Match rod should be pointing up.

TUNING: The Reddi-Match is set at the factory for 50-ohm and center band operation. If retuning becomes necessary use a good quality watt meter. It is not necessary to cut your feedline or prune it to a particular length; any length cable may be used with the beams. However, the cable should be as short as possible to reduce feedline losses. Your cable should be equipped with a standard PL-259 coaxial fitting, to connect to the Reddi-Match, figure 2.

Tune the antenna at your center frequency; using a 50-ohm feedline from your transmitter, and a watt meter. Connect the watt meter to the antenna with a short length of 50 ohm coaxial cable. Set the watt meter for reflected power. If the reflected power is high, loosen the tuning strap and adjust it slightly in either direction. Move away from the antenna and check the reading. If the reflected power increased, move the strap back to its original position and adjust in the opposite direction. If the reflected power dropped, repeat the adjustment procedure until you achieve minimum reflected power on the watt meter. Disconnect the cable and watt meter, and tighten the tuning strap securely. Use the vinyl boot on the coaxial cable to the boom to insure a weather proof connection. Coat the outside of the aluminum connector threads and the PL-259's with the silicone grease provided. Do not coat the connector center pin or socket with silicone. Slide the vinyl boot over the connector and against the bracket for a good weather tight connection, figure 2B. Run the coaxial feedline along the boom and down the mast using electrical tape to hold it in position.

STACKING FOR MORE GAIN

Two Economy beams may be stacked for 3dB increase using the P14-VPK stacking kit. The kit includes a horizontal support boom, hardware and RG-59/U cable harness.

Four beams may be stacked with two P14-VPK kits and a power divider for 6dB improvement in gain.
See figure 5 for stacking dimensions and illustrations.

ELEMENT ASSEMBLY

| P/N | KEY | DISPLAY | DESC. | SIZE | QTY |
|--------|-----|---|------------------|----------------------|-----|
| 020021 | 21 |  | Machine Screw | #10-24 x 2" (5.08cm) | 3 |
| 020022 | 22 |  | Hex Nut | #10-24 | 3 |
| 190025 | 25 |  | Aluminum Bracket | 3/8" (2.22cm) | 3 |
| 190028 | 28 |  | Half Washer | 1" (2.54cm) | 3 |
| 020029 | 29 |  | Lock Washer | #10 | 3 |
| | E# |  | Element | See Element Chart | |

ELEMENT CHART

FREQUENCY RANGE AND ELEMENT LENGTHS

| MODEL | P134-4 | | P138-4 | | P142-4 | | P146-4 | | P150-4 | | P154-4 | |
|--------------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|------|
| Frequency | 130-134.5 | | 134-138.5 | | 138-142.5 | | 142-146.5 | | 146-150.5 | | 150-154.5 | |
| | in | cm | in | cm | in | cm | in | cm | in | cm | in | cm |
| #1 Reflector | 44 1/4 | 112.1 | 42 1/4 | 108.9 | 41 1/4 | 105.7 | 40 3/4 | 102.6 | 39 3/4 | 100.0 | 38 3/4 | 97.5 |
| #2 Dipole | 42 | 106.7 | 40 13/16 | 103.7 | 39 1/4 | 100.3 | 38 1/2 | 97.8 | 37 1/2 | 95.3 | 36 1/2 | 92.7 |
| #3 Director | 39 11/16 | 101.4 | 38 1/4 | 98.4 | 37 3/8 | 95.6 | 36 1/4 | 93.0 | 35 3/4 | 90.5 | 34 3/4 | 87.9 |
| #4 Director | 39 11/16 | 100.8 | 38 1/2 | 97.8 | 37 3/8 | 94.9 | 36 3/4 | 92.4 | 35 3/4 | 89.9 | 34 3/4 | 87.3 |

| MODEL | P158-4 | | P162-4 | | P166-4 | | P170-4 | | P174-4 | |
|--------------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
| Frequency | 154-158.5 | | 158-162.5 | | 162-166.5 | | 166-170.5 | | 170-174.5 | |
| | in | cm | in | cm | in | cm | in | cm | in | cm |
| #1 Reflector | 37 1/4 | 94.9 | 36 3/4 | 92.4 | 35 3/4 | 89.9 | 34 9/16 | 87.8 | 33 13/16 | 85.9 |
| #2 Dipole | 35 1/2 | 90.2 | 34 1/4 | 87.6 | 33 3/4 | 85.7 | 33 | 83.8 | 32 1/4 | 81.9 |
| #3 Director | 33 3/4 | 85.4 | 32 3/4 | 83.5 | 32 1/8 | 81.6 | 31 3/4 | 79.7 | 30 3/4 | 77.8 |
| #4 Director | 33 3/4 | 84.8 | 32 3/4 | 82.9 | 31 3/4 | 81.0 | 31 3/4 | 79.1 | 30 3/4 | 77.2 |

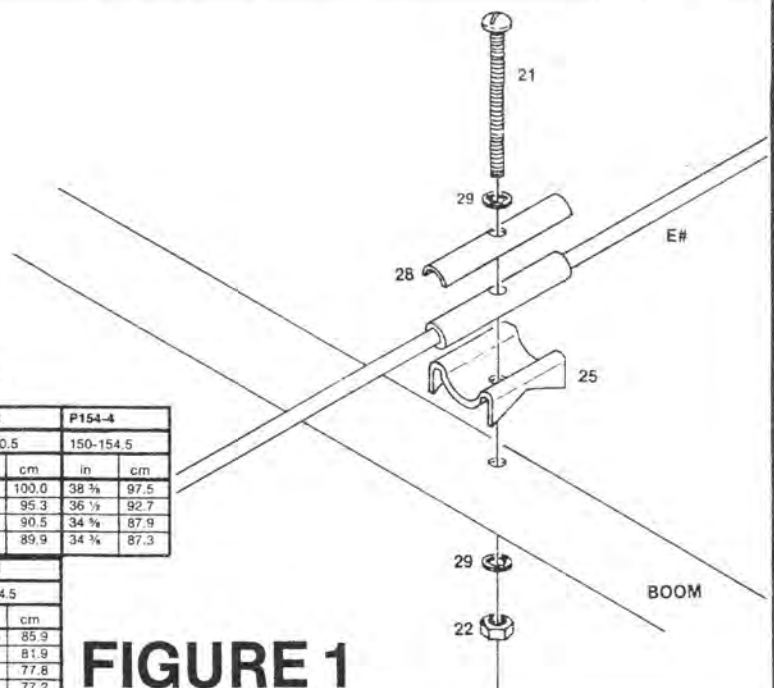
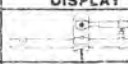






FIGURE 1

DRIVEN ELEMENT ASSEMBLY

| P/N | KEY | DISPLAY | DESC. | SIZE | QTY |
|--------|-----|---|------------------|-------------------|-----|
| | E2 |  | Dipole Assembly | See Element Chart | 1 |
| 050053 | 53 |  | Plastic Cap | 1/2" (1.27cm) | 2 |
| 050115 | 115 |  | Vinyl Boot | | 1 |
| 240116 | 116 |  | Silicone Package | | 1 |
| 290326 | 326 |  | Danger Label | | 1 |

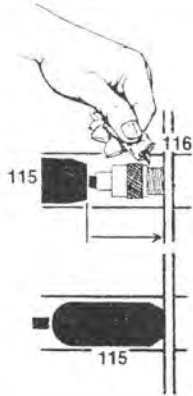


FIGURE 2B

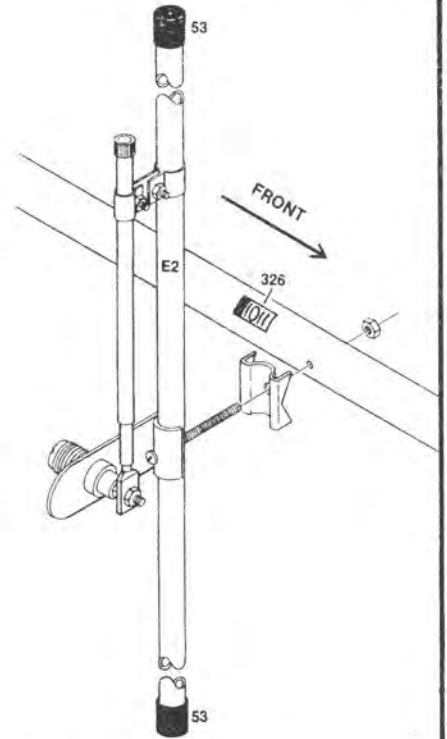




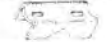


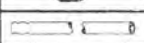


FIGURE 2A

MOUNT ASSEMBLY

| P/N | KEY | DISPLAY | DESC. | SIZE | QTY |
|--------|-----|---|----------------------|------------------------------|-----|
| 020005 | 5 |  | Lock Washer | 3/16" (0.79cm) | 2 |
| 020006 | 6 |  | Hex Nut | 3/16" (0.79cm) | 2 |
| 020015 | 15 |  | Flat Washer | 3/16" (0.79cm) | 2 |
| 020142 | 142 |  | U-Bolt | 2" x 4" (5.08 x 10.16cm) | 1 |
| 190032 | 32 |  | U-Bolt Bracket | 3 1/2" (8.89 cm) | 1 |
| 190033 | 33 |  | U-Bolt Backing Plate | 3 1/2" (8.89cm) | 1 |
| 050061 | 61 |  | Plastic Cap | 1/4" (2.22cm) | 2 |
| | BA |  | Boom | 3/8" x 44" (2.22 x 111.76cm) | 1 |

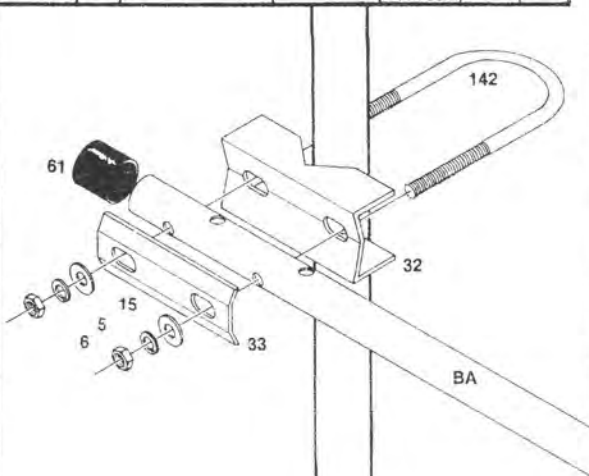


FIGURE 3

OVERALL VIEW

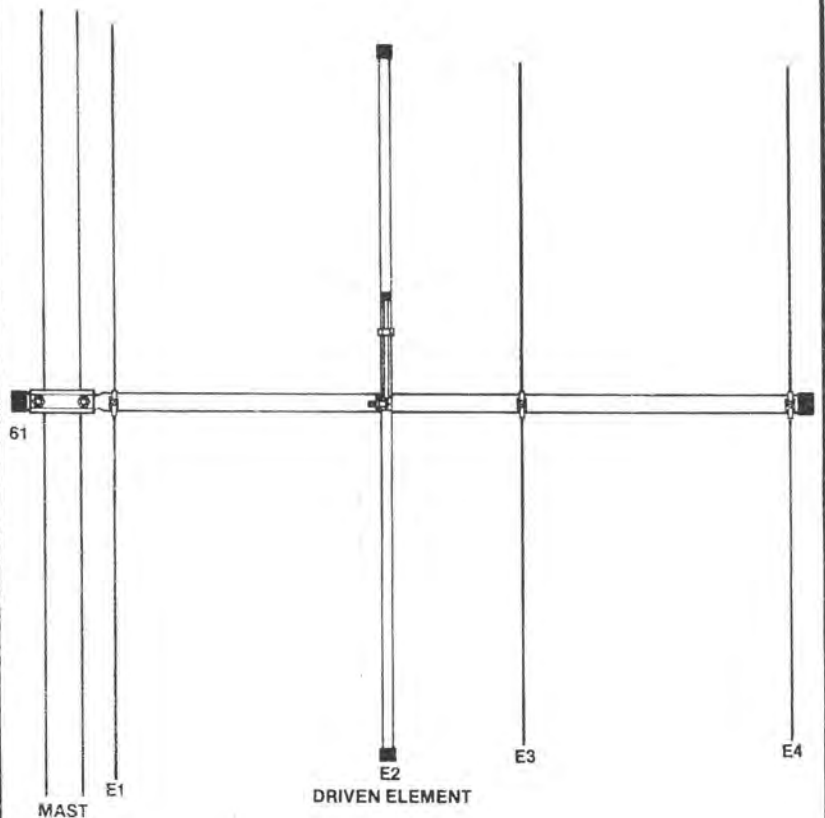


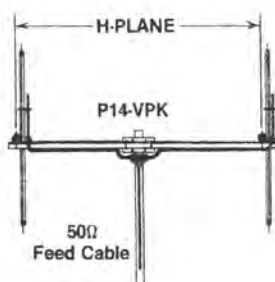
FIGURE 4

LIMITED WARRANTY

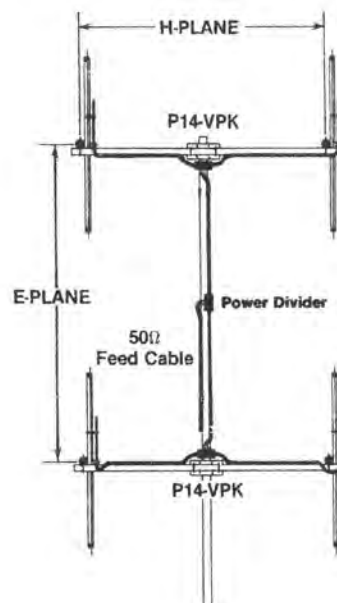
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STACKING INFORMATION

Dual Stacked



Quad Stacked



STACKING CHART

| Frequency Range | E-Plane Dimension | H-Plane Dimension |
|-----------------|-------------------|-------------------|
| 130-140 MHz | 70" (177.8cm) | 54" (137.16cm) |
| 140-150 MHz | 65" (165.1cm) | 50" (127.0cm) |
| 150-162 MHz | 60" (152.4cm) | 47" (119.38cm) |
| 162-174 MHz | 56" (142.24cm) | 43" (109.22cm) |

FIGURE 5

SPECIFICATIONS

| | |
|---------------------------|-------------|
| Frequency Range: MHz | 130 to 174 |
| FWD Gain: dBd | 9 |
| F/B Ratio: dB | 18 |
| 2:1 VSWR Bandwidth: MHz | 4 |
| E-Plane 3dB Beam width | 66° |
| H-Plane 3dB Beam width | 80° |
| Boom Length: in (cm) | 44 (111.76) |
| Weight: lbs (kg) | 3 (1.35) |
| Wind Surface: ft² (m²) | .43 (.04) |
| Wind Survival: mph (kph) | 80 (129) |
| Maximum Mast Od.: in (cm) | 2 (5.08) |



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