

INSTALLATION INSTRUCTIONS
FOR
FLUSH WING TIP ANTENNAS

RNC MASTER

1. INTRODUCTION

1.1 General. These antennas have been designed by Bob Archer of Torrance, California utilizing concepts common to military aircraft and space vehicles. The antenna performance is superior to most in use today in private aircraft. The only requirement for maximum performance is that the antennas must be installed in accordance with the installation instructions contained herein. The wing tips into which these antennas are installed must be built of dielectric (plastic) material and the internal dimensions must be at least 11 inches deep by 24 inches long.

1.2 Installation. If at any time there is a conflict in the technique of installation this document shall take priority, unless the conflict is of a mechanical nature. If the latter is true, the installation mechanic shall make the decision. Follow the rules contained herein for electrical information and for any mechanical techniques, an aircraft mechanic should be consulted.

2. ANTENNA DESCRIPTION

2.1 General. The wing tip omni antenna is designed for reception of horizontally polarized energy in the range of frequencies, 108 to 127 mhz. Since some types of radio equipment use horizontally polarized antennas in the omni and communications range of 108 to 127 mhz, it was decided that the omni antenna should also cover the range of 108 to 127 mhz. The antenna is constructed of .020" thick aluminum strips riveted together with appropriate pieces for impedance matching. The voltage standing wave ratio (V.S.W.R.) is less than 2:1 over the frequency range of 108 to 136 mhz, and less than 1.5:1 over the frequency range of 108 to 127 mhz. There may be variations in V.S.W.R. due to installation variations. The antennas may be mounted in either right or left wing tip and on either top or bottom surface. If two radios are being installed one antenna may be installed in each wing tip and connected one antenna to each set. This type of installation would give twice as much signal level in each set as one antenna connected to both sets through a two set coupler. This much increase in signal strength would mesa a 25% increase in omni reception range.

3. INSTALLATION INSTRUCTIONS

3.1 Coaxial Cable. A length of coaxial is required for the flush mounted antennas in the plastic wing tips. The coaxial cable is not supplied. It is recommended that RG-58 C/U (50 ohm coaxial cable) be used for the antennas. This cable has a stranded center conductor which contributes to a longer life. Any other coaxial cable which has the same electrical

characteristics (or better) and physical properties may be used. RG-58 C/U cable is approximately 0.25 inches in diameter. A compatible coaxial connector for the radio end of the cable is also required. A check at the local electronic sales house will reveal all necessary information.

3.2 Cable Installation. Run sufficient cable through wing to reach from radio equipment to the antenna with enough excess cable at the antenna for the cable to run forward with approximately a six inch loop. (Check installation drawing.) Secure cable where possible to minimize cable movement in wing.

3.3 Mounting Antenna in Wing Tip. Before beginning this section remove the three flathead screws and clamps from the front antenna strip.

1. Lay antenna inside the wing tip with the heads of the rivets and screws toward the inner surface of the wing tip with the bottom strip (grounding portion) toward the open end of the wing tip. The antenna ~~can~~ be mounted on either top or bottom surface of the wing tip but will generally lie flatter on the bottom surface.

2. While keeping the bottom (grounding) strip parallel to the open edge of the wing tip slide the antenna as far forward as practical while maintaining antenna as flat as possible and clear of wing tip light etc.

3. Temporarily tape antenna to the wing tip in this position while marking the three mounting holes in the forward antenna strip.

4. Remove the antenna from the wing tip and drill the three mounting holes in the wing tip with a number 33 drill (clearance for a number 4 screw). Countersink the three mounting holes on the outside surface of the wing tip if the flat head screws are being used.

5. Install the antenna in the wing tip with the three screws, clamps, washers, and nuts. If the wing tip light wires have connectors that are too large to pass through the clamps, install the wires prior to tightening the nuts on the clamps. If the wires were allowed to get across the antenna elements, the r.f. energy would tend to be shorted to ground destroying the efficiency of the antenna. The outer portion of the antenna (the part nearest the tip) may be fastened in at the installers discretion, screwed, riveted, or merely taped down. The portion of the antenna nearest the open edge of the wing tip will be sandwiched between the end of the wing and the fiberglass wing

tip or grounded to the end of the wing at the installer's discretion. It is important that this strip be very well grounded and fastened at three points along the strip at a minimum. Check installation drawing.

6. Drill appropriate mounting holes in the wing tip and the antenna grounding strip.

3.4 CONNECTION OF CABLE TO ANTENNA. Before proceeding with the connection of the cable to the antenna the installer might like to cover the end of the wing with a cloth to keep from scratching the finish. We have found that the handiest way to do this portion of the installation is to lay the wing tip with the installed antenna on the tip of the wing with the open end of the tip facing outward.

1. Remove 1.25" of outer insulation from the coaxial cable. Be careful when cutting the insulation not to ^{cut} braid underneath.

2. Comb out the coaxial cable metallbraid and then twist into a wire for insertion into the provided lug. Trim braid wire to 0.75 inches.

3. Strip 0.25 inches of insulation from the coaxial cable center conductor.

4. Remove the large wire terminal from the ground side of the antenna connections and install the lug on the twisted braid by using a standard crimping tool.

5. Remove the small wire hole terminal from the antenna and install the lug to the center conductor of the coaxial cable by using the crimping tool.

6. Replace the terminal lugs on their respective terminals on antenna and tighten nuts on lock washers and lugs. Make sure the lug on the braid side of the coaxial cable goes to the ground side of the antenna,

3.5 FINAL ASSEMBLY OF WING TIP. Before continuing check all steps and procedures contained herein and check all screws and connections for tightness.

1. Place wing tip on end of wing being careful to get antenna grounding strip between wing tip and end of wing.

2. Make sure coaxial cable leads run forward from antenna and then makes a loop before going rearward and joining with tip light wires. (CHECK INSTALLATION DRAWING.) Try to get all wires and cables to lay smoothly against end of wing. Tape or clamp as desired.

3. Temporarily fasten wingtip to end of wing making sure antenna is well grounded.

4. Connect antenna cable to radio equipment in aircraft; turn on radio and check out equipment. Check wing tip lights also.

5. After complete check out, fasten wing tip permanently to wing.

4.0 SUMMARY. Flight test the new installation and note the improved OMNI reception of the new antenna and the increased range of reception.

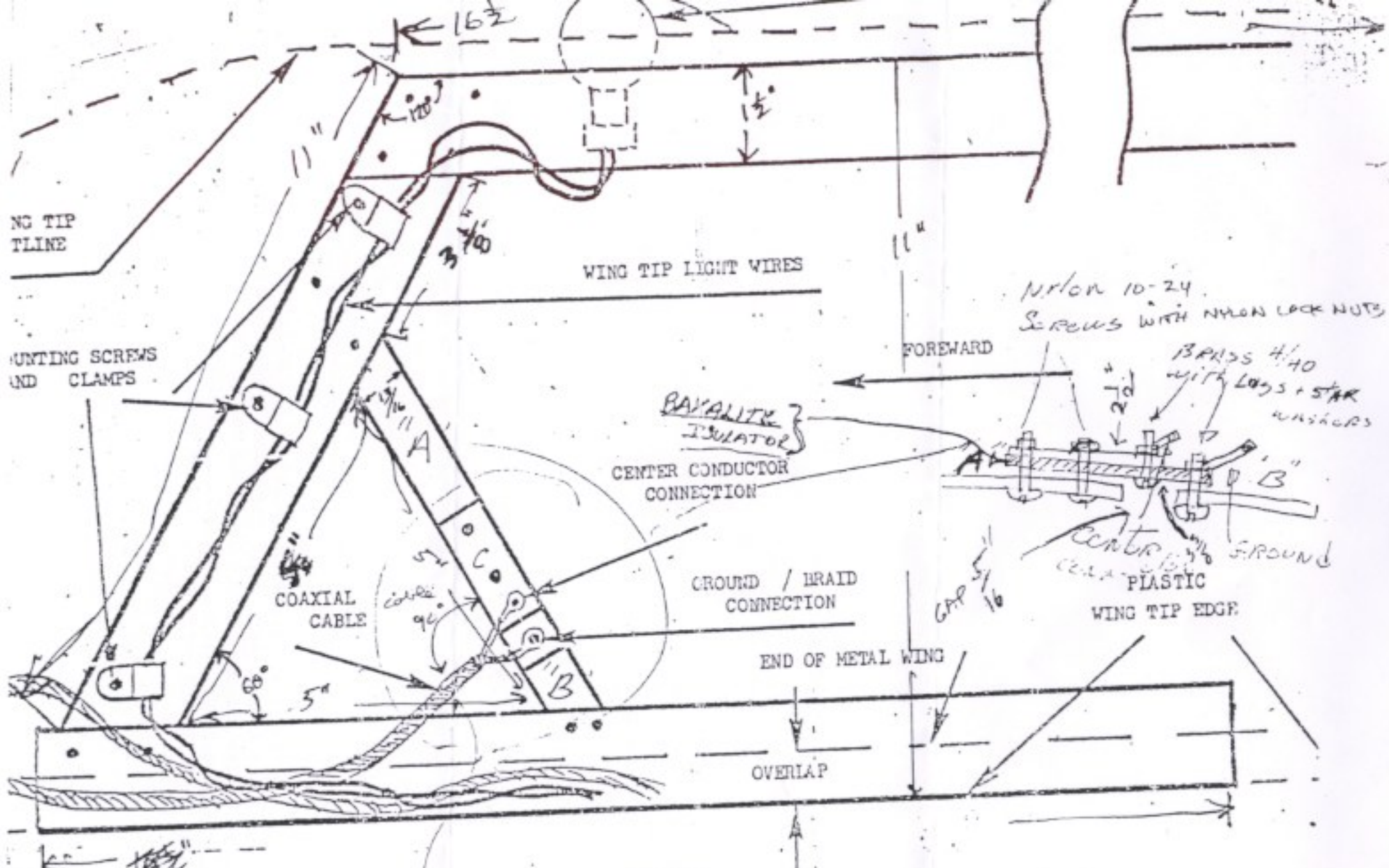


FIGURE 1.
INSTALLATION DRAWING

*This cable must
Remain 90° to 'A' 'B' LEG*

12"