ASSEMBLY FOR IBA-5
(See diagram on reverse side)

Firestik Indoor CB Base Antenna System
w/ 5 Foot Tunable Tip Antenna

1. Note that the four (4) base radials have the plastic covering cut away from the drilled hole on one side only. THIS IS THE FACE-DOWN SIDE. Start assembly by placing one screw through the face-down side of one radial, through one of the holes in the lower base plate and thread it into one of the (4) four stand-offs.

2. Mount the remaining three (3) radials to the lower base plate and tighten all four (4) screws.

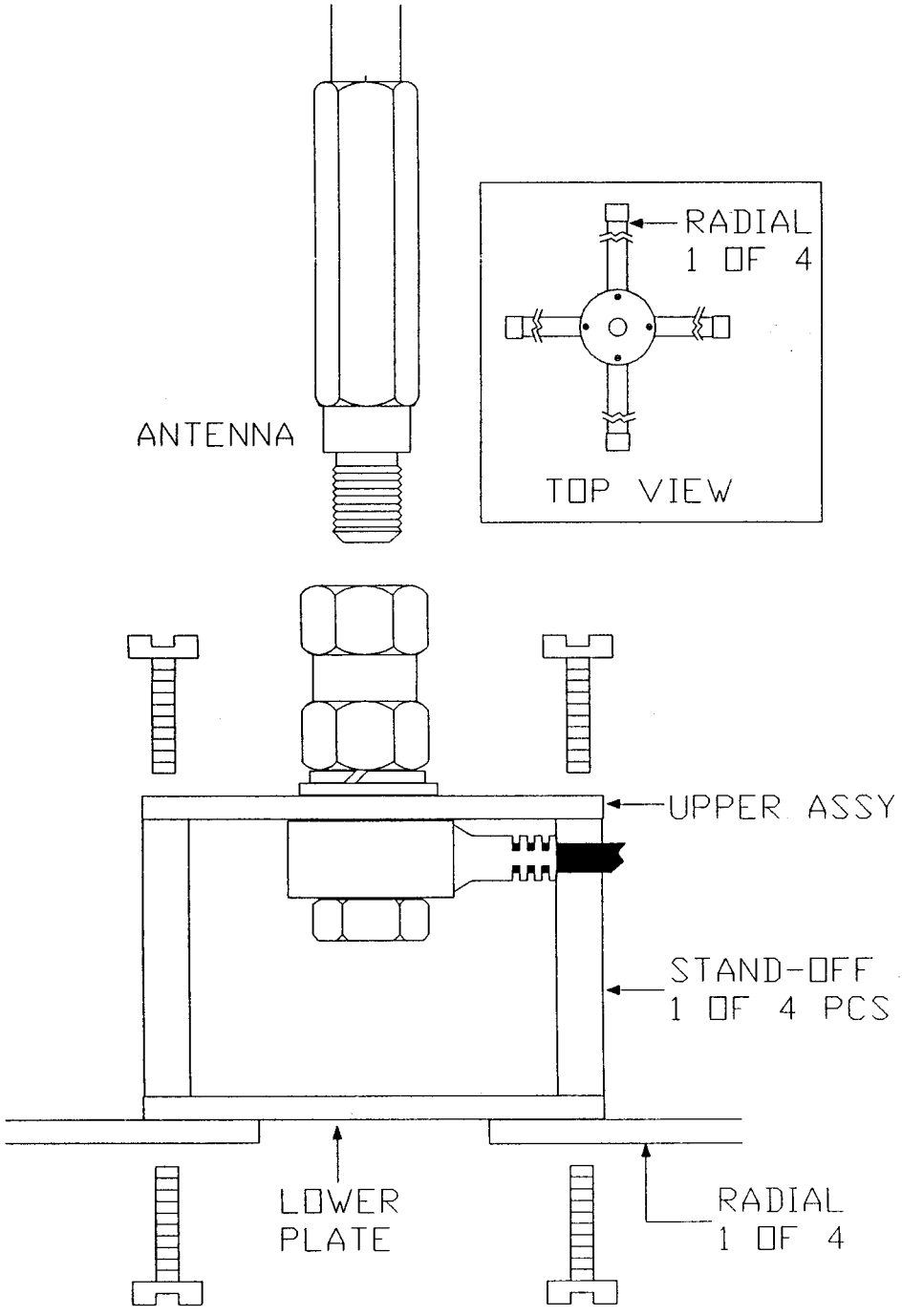
3. With the radials flat on the floor, set the upper assembly on top of the stand-offs and thread and tighten the four remaining screws.

4. Hand thread the antenna into the upper assembly coupling nut and connect the PL-259 cable connector to your CB radio.

5. The antenna was pre-adjusted at the factory, but should be fine tuned on location. For best results, spread radials out into a cross formation. If cosmetically desirable, you may make a slit in a rug and lower it over the entire assembly with little or no effect on performance. However, if you are using a linear amplifier and notice any heat build up in the cable, radials or other components, DO NOT cover the assembly and DO NOT use on a carpeted area. Think!

6. To adjust antenna, measure SWR on channel 1 and channel 40. If SWR is higher on channel 1 than on channel 40. lengthen the tuning screw. If the SWR is higher on channel 40 than on channel 1, shorten the tuning screw. When SWR on channel 1 and channel 40 are the same, no further adjustment is required. An extra 2-inch and 3-inch tuning screw is included with the IBA-5. If the installed tuning screw reaches its maximum length and SWR on channel 40 is still lower than channel 1, then try using one of the longer tuning screws.

   NOTE: If you plan to leave the plastic tip on the antenna during normal operation, make sure all tuning is performed with the tip in place. If you tune the antenna without the tip and then install it, the SWR will change.


ANTENNA
RADIAL
1 OF 4
TOP VIEW
UPPER ASSY
STAND-OFF
1 OF 4 PCS
LOWER
PLATE
RADIAL
1 OF 4

IBA-5 Tuning

If you experience high SWR across all channels, the first thing you should check is the cable connection at the hub assembly. Make sure that you installed it correctly. If SWR remains high, the problem is probably ground plane related. There can be several reasons why a particular location can cause this problem. You might try placing the IBA-5 in a different location, or rearrange the four metal legs in various configurations. If SWR will not fall below 2.0:1 with the existing brass tunable tip, remove it and replace it with one of the longer screws in this kit. Start with the 2" screw and if necessary, use the 3" screw. The vinyl tip is optional. If you want to use it, cut a hole in the top for the longer screw to pass through. Remember, if you use the tip, ALL measurements must be made with the tip in place. If you adjust the antenna without the tip and put it on afterwards, the SWR will change.

Firestik Antenna Company

Indoor CB Base Antenna System

Introduction

The Firestik indoor antenna was designed for two basic reasons: (1) to allow CB radio operation where outside antennas are not allowed or, (2) for the CB'er who does not want to put up an outside antenna. In either case, the operator should be aware that this type of antenna is normally a compromise between rules, space and optimum performance. In most cases the performance will not match that of a good outdoor antenna. However, in many instances, the indoor antenna by virtue of its elevation, as well as the scattering effect the building has on its radiating field, has been known to out perform antennas of equal design on a vehicle at street level. Excellent performance can be recognized in spite of absorption by various building materials. DXing long range communications may not always be possible but is certainly a reality.

This indoor convenience is not without its limitations and some compromise. An awareness of possible restraining conditions (e.g. building design, construction materials etc.) under which

Tuning Techniques & Considerations

the antenna will be expected to perform can be appreciated more for an intuitive approach rather than an endless list of do's and don'ts. With respect to indoor base antennas, the Firestik Indoor Base Antenna has gained a reputation for unexcelled performance and you should not let its limitations deter you from using it. When you are in a situation which limits your choices down to an indoor antenna, be confident that the Firestik Indoor Base Antenna will satisfy or surpass most persons expectations of how it should work. Keep in mind that it was specifically designed to work indoors.

Limitations

Unfortunately, indoor antennas will not and can not be expected to radiate energy at high radio frequencies through all metal buildings. Buildings of all steel construction (top and sides) resting on earth or concrete slabs can be expected to reflect virtually all incoming and outgoing transmitted energy without penetration.

Buildings with steel siding resting on earth but with wood frame roofs covered with wood shingles, composition or tar paper will allow radiation--largely upwards. Some outwards radiation from the effects of scattering of the radio frequency field will depend on roof shape and height above the sheet metal siding.

Aluminum mobile homes can be treated the same as the all steel buildings above. The difference, if any, will be in thin grade aluminum where, in addition to reflection, some absorption and re-radiation may occur, but direct penetration will be reduced.

Other limitations can occur in buildings where penetration and range is otherwise excellent under dry conditions. Reduction of radiated power will result from saturated wetting of top and sides due to rainfall and heavy dampness. Under these conditions, limited talkable range can be expected. Buildings constructed of concrete and steel, concrete block, cinder block or red brick will all appear earthy wet and will severely restrain radio transmissions. Otherwise dry, a large amount of scattering can be expected due to the combined effect of reduced penetration, absorption and re-radiation resulting in an unpredictable radiation pattern. Local horizontal distance may very well be restricted, yet, skip range expanded.

Compromises

The five foot antenna is especially designed to work against a non-resonant radial ground plane, comprising four 30 inch ground plane stabilizers. The ground plane stabilizers are made short deliberately for ease of assembly and placement around any room, corner, furniture or even a closet or attic. The ground effect (apparent length) of the short radials is therefore affected by proximity to earth ground, electrical wiring or metal beams immediately beneath the aligned radials.

Concrete slabs represent good earth ground surfaces at CB band frequencies. The ground effect is diminished on wood frame ground level floors over high crawl spaces, and more so over basement areas. Ground effect is further diminished on wood flooring at second story levels and higher, except where as stated above, when placement happens to be in alignment immediately over electrical wiring or metal beams.

While a mast mounted ground plane or dipole antenna is exposed to radiate into free space, the indoor antenna is surrounded by obstructions tending to interfere with its ability to be tuned. An area should be chosen where it best works from the standpoint of SWR. When a spot is selected and the antenna is finally tuned in the spot, it should generally remain or be reassembled in that same spot. Visitors should be cautioned to steer clear of the antenna when "on the air." Surroundings within 2 or 3 feet of the antenna should remain unchanged once it is tuned. Invasion of its close radiating field will de-tune the antenna unless it was specifically tuned with the obstruction at that point.

Tunability and performance will be best if the antenna can be located away from interfering objects. Undesirable conditions can be greatly reduced if near field objects are only on one side and at least 4 inches away from the antenna at the base, 8 inches away at one foot up, 12 inches away at two feet up and so on (see Figure 1).

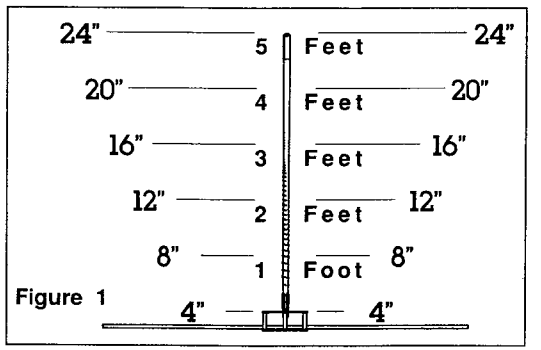


Figure 1

The closer to the top of the antenna, the more critical is the proximity of other objects since the antenna design creates maximum radiation at the top loaded section. Altering the location of the 'antenna ground plane system' will least affect its tuned condition when over ground level slab floors.

Tuning the antenna for the lowest possible SWR is accomplished in the same manner as on a vehicle. Surroundings and ground plane area may not permit a SWR dip as low as that achievable on a vehicle or a resonant ground plane. Measurements reportedly have been as low as 1.2:1, however, 2.0:1 is by all means tolerable... By CB standards where the latter SWR figure appears high, it represents a power loss of about 11% which is less than ½ db.

Tuning Aids Where Difficulty is Encountered

Do an initial assembly on a sheet or blanket. While an associate is keying up and advising on change of SWR readings, slide the assembly over the desired or best working area. Stop at the location where SWR appears lowest and carefully revolve the blanket with assembly (no more than ¼ turn) to detect any perceptible SWR improvement. Remove the blanket and fine the tune antenna at its best location. Keep your distance from the antenna during the sliding around process.

For those who like to scheme a little, a 16 to 18 foot length of wire or flat braid in a squared off Z form, obscured under a loose carpet, should work well to improve ground effect on upper level wood floors. Dress and tape opposing ends of wire to opposite corners of the room. Align one of the sets of radials directly over the center section of wire and fine tune the antenna in that location. If you use this method to increase your ground plane area then care should be taken if you are running high power radio equipment (linear amplifiers). High power directly relates to heat dissipation. If the wire cannot easily release the power caused heat, the wires in the additional ground plane can become hot.

Properly assembled and tuned on a ground level slab floor, the IBA-5 should show well under 1.5:1 SWR at the dip point (normally channel 20). On elevated floors where the SWR dip may remain insidiously high, indicating the antenna/ground plane network is quite reactive, the coax cable then also becomes a part of the network and is said to contain standing waves or a fractional part thereof. Some of that reactance may be reduced by folding a one to three foot length of the cable back on itself in an S form. If a problem is still noted, try a smaller or greater amount of cable in the double-back process and do it in a different place along the cable itself until you find the combination which offers the lowest SWR. This technique may sometimes be improved by adding RG-58/U type coax to the existing length totaling 24 feet from the mount center and increasing double-back length.

Technical assistance is available on all Firestik products. We will be happy to assist you by phone or mail.

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