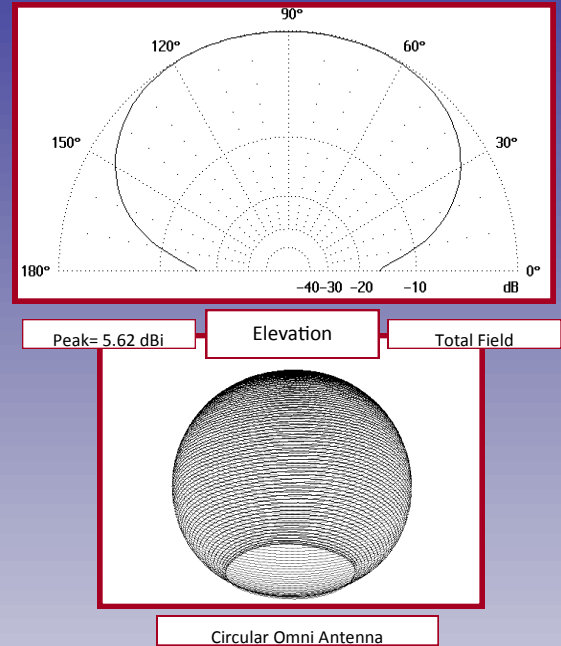
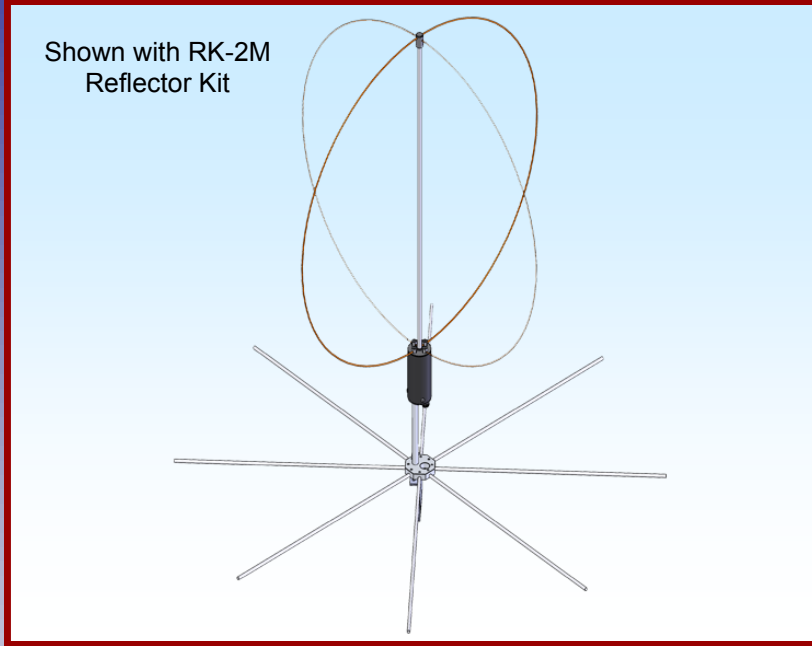




# M2 Antenna Systems, Inc.

## Model No: EB-144/RK2M

### Eggbeater Satellite Antenna



#### SPECIFICATIONS:

Model ..... EB-144/RK2M  
 Frequency Range..... 135 To 150 MHz  
 Gain, Overhead 90° ..... 5.5 dBic Typical  
 Impedance ..... 50 OHMS  
 VSWR ..... < 2.0:1  
 VSWR ..... 1.2:1 @ 144 -148 MHz  
 Pattern..... Omni Directional  
 Polarity ..... RH Circular Overhead  
 Polarity ..... Horizontal @ Horizon

Power Handling..... 500W Max  
 Mounting ..... 2" Nom.  
 Connector..... SO-239  
 Size ..... 34" H x 28" W  
 Wind Survival ..... 100 MPH  
 Weight / Ship Wt. .... 4 Lbs. / 5 Lbs.

#### FEATURES:

The **EB-144 EGGBEATER** offers exciting new performance characteristics for both fixed and mobile operations. The **EGGBEATER** produces smooth omnidirectional HORIZONTAL polarity at the horizon. Above the horizon, the pattern transforms to RIGHT HAND CIRCULAR, making it a natural for OSCAR satellite use. By spacing the **EGGBEATER** 1/8 wave above a metal surface or adding the RK-2M Reflector kit, now standard, for base installations, the **circular** lobe increases by 6 dB, producing a hemispherical pattern. No rotation or steering is required. For terrestrial mobile, base, net control, contest or field day operation, increasing the distance above ground or over a metallic surface improves the horizontal radiation by 6 dB. This produces instantaneous communications in all directions. Hams with little room or budget for larger antennas will experience a new standard of performance with the **EB-144/RK2M**.

# EB-144/RK2M ASSEMBLY MANUAL

**Caution:** The copperweld steel loop elements are packed in a tightly wrapped condition. Use extreme care while unpacking the loops. Work in a clear area and be sure no one is standing near during unpacking.

Tool Required: 5/32 and 3/32" Allen wrench (provided) and 9/16 end wrench.

1. To facilitate shipping, the loops are bent slightly in the middle. Straighten these, and any other bends, so the elements form round circles. Thread the loop elements through the crossed holes in the tip to their midpoints.

NOTE: be sure the loop elements are not shorted together at the crossover point; the pattern will be distorted.

2. Align the elements carefully with the terminals at the top of the balun case. Install the set-screws with the 3/32" Allen wrench, if necessary, and insert the ends of the loop wires into the appropriate terminals. Insert wires until ends butt against the Delrin collar at the base of the fiberglass rod. Tighten the 3/32" set-screws. This completes assembly. A 3/8-24 threaded hole in the bottom of balun case is used for mounting the EB-144.

## MOBILE INSTALLATION:

For best **TERRESTRIAL** results in a horizontally polarized mobile installation, the Eggbeater should be at least two feet above the top of the vehicle and preferably higher. To prevent damage to the antenna or mount, a heavy duty spring should be installed 4" to 26" below the threaded insert on the balun case. Another mast section can be added below the spring if additional height is desired. To enhance the overhead circular pattern for **SATELLITE COMMUNICATIONS**, mount the EB-144 at 1/8 wave above the auto roof - or about 10".

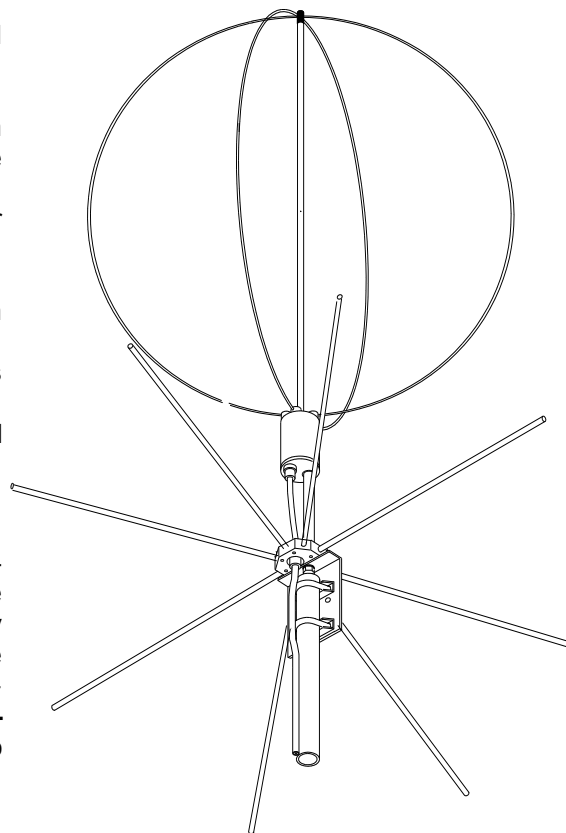
## FIXED LOCATION INSTALLATION:

For best **TERRESTRIAL** results, no reflector is required. Mount the EB-144 as high as possible and preferably on top of a mast. Side mounts on horizontal arms next to masts or towers can also be achieved with the revised "L" bracket. The U-bolts fit the "L" bracket both ways.

For mostly **SATELLITE COMMUNICATIONS** use, add the **RK-2M REFLECTOR KIT** as shown above. Alternately, mounting the EB-144 10" above a large metal surface or mesh 40" x40" or larger, laid on your flat patio roof will produce excellent results. Mounting above a flat reflective surface or using the REFLECTOR KIT will reduce your terrestrial performance by about 6 dB and increase your overhead signal by about the same amount. The Eggbeater produces an omnidirectional, horizontally polarized pattern at the horizon and **RIGHT HAND CIRCULAR** off the top so no particular orientation is necessary. The feedline should be routed down the rear of the mast to minimize wind load in mobile applications.

## GENERAL INFORMATION

No grounding or ground plane is required for operation of the Eggbeater. However if lightning is Feedline should be good quality 50 ohm coax cable. Times LMR-400 or Belden 9913F are excellent low-loss foam cables and RG-8X is also good for mobile or short run installations. Connect the PL-259 to the EB-144 connector and secure the cable to the mast with tape or nylon ties, beginning 2-4inches below the connector and repeating every 12" down the mast. For mobile installations, be sure to leave a little slack where the cable passes the spring.



# EB-144/RK2M ASSEMBLY MANUAL

For best **TERRESTRIAL** performance, 80 watts, or more, are recommended for mobile operation. Contacts with base stations over 100 miles away are common and communications are possible for over 350 miles when the terrain permits propagation. The Eggbeater will handle a full Kilowatt in base station applications. Base station, contest and field day operations with the Eggbeater allows rapid fire communication with all horizontally polarized stations, in all directions. Its also great for nets and emergency stations requiring instant communications in all directions. The Eggbeater is not designed to replace a good directional antenna, but where space, time, or budget are strong factors, it will prove a valuable addition to any fixed or mobile station. It was originally designed for the DOD for mobile use.

Any distortion or bends in the loops incurred during mobile use can and should be straightened out as soon as practical. AS WITH ANY ANTENNA FED WITH RF ENERGY, AVOID CONTACT OR CLOSE PROXIMITY WHILE TRANSMITTING.

## **SATELLITE APPLICATIONS:**

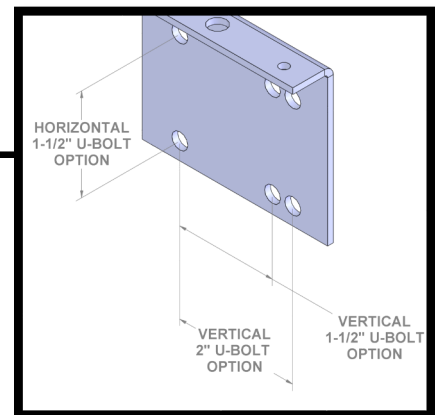
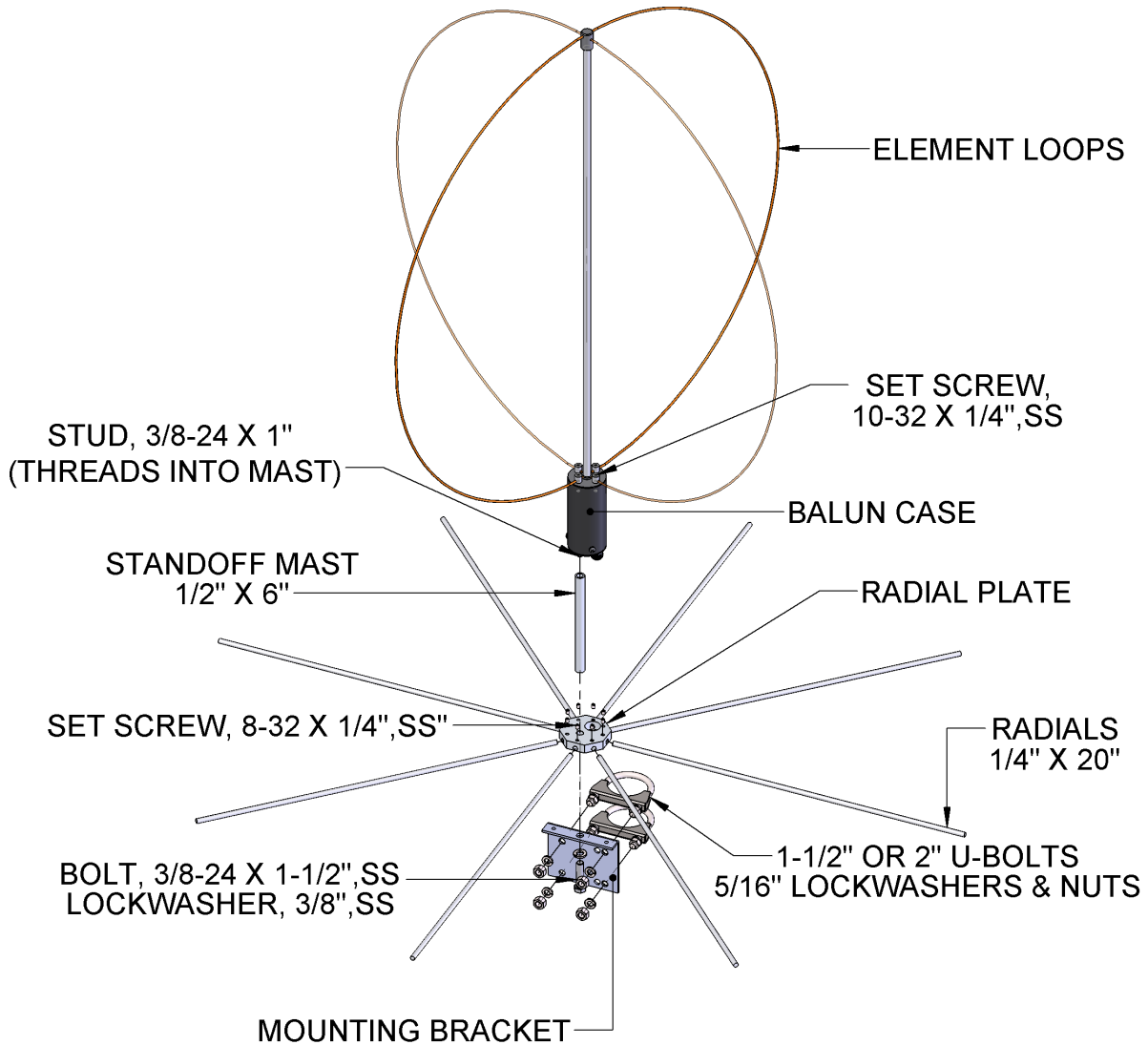
The Eggbeater is very effective as a omnidirectional satellite antenna because it produces Right-Hand Circular polarization off the top. When mounted 1/8 wave above an auto roof or **M<sup>2</sup>'s RK-2M Reflector Kit** for base installations, the signal level off the top lobe increases by as much as 6 dB. No rotation or steering is necessary. Circularity is optimized in the 144-146 MHz region but is still effective from 135 to 150 MHz.

Experimenters: Try combining the Eggbeater with other vertical antennas. The fiberglass spacer mast is not required for operation except to insulate the crossover points. It could be replaced with a metallic element to act as a vertical radiator on 70 centimeters or any other frequency, or simply be used as a support for a vertical above the Eggbeater. It may be possible to combine the Eggbeater with an HF mobile antenna so that optimum performance of both would be preserved. As you can see from the APPLICATIONS, the EGGBEATER is a versatile antenna.....let your imagination run free! Write and tell us what you have done with your Eggbeater.

Note: #10 Copperweld (steel copper-clad wire) is used in the loops for maximum efficiency. The steel is exposed at the ends and may show signs of rust in various environments. This effect is cosmetic only but can be reduced by coating the ends of the wire with epoxy, RTV, Penetrox or equivalent after assembly.

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# EB-144/RK2M PART LAYOUT



**NOTE:**  
OTHER MOUNTING OPTIONS

# EB-144/RK2M PARTS & HARDWARE

DESCRIPTION.....	QTY
EB-144 BODY ASSEMBLY.....	1
LOOP ELEMENTS, #10 COPPERWELD.....	2
SET-SCREW, 10-32 X 1/4, SS.....	4
3/32" ALLEN WRENCH.....	1
ASSEMBLY MANUAL.....	1
<b>RK-2M REFLECTOR KIT</b>	
M2AEB0010 RADIAL PLATE, 1/2" X 2.5", 8 SIDED, ALUM.....	1
RADIAL RODS, 1/4 X 20".....	8
U-BOLT, 1-1/2".....	2
U-BOLT, 2".....	2
MAST BRACKET, 4 X 4.....	1
STANDOFF MAST, 1/2" X 6" ALUM ROD.....	1
<b>HARDWARE BAG:</b>	
5/16-18 NUTS, SS.....	4
5/16 LOCK WASHERS, SS.....	4
BOLT, 3/8-24 X 1-1/2" SS.....	1
STUD, 3/8-24 X 1" SS.....	1
LOCK WASHER, 3/8" SS.....	2
FLAT WASHER, 3/8" SS.....	1
8-32 X 1/4" SET SCREW.....	8
5/64 ALLEN WRENCH.....	1

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