

# ***Stowable VHF/UHF Ground Plane Antennas for Emergency Communications***

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## Introduction

The Glendora Emergency Response Communications (GERC) has a demonstrated need for portable and easily deployable VHF and UHF antennas for use in emergencies. The antennas should be easy to assemble, pre-tuned to Emcomm frequencies, and available to all GERC members at a reasonable price.

## Description of Project

The GERC Emergency communications antenna kit is based on the ***Super Simple Ground Plane (SSGP)*** plans as outlined in the November 2011 QST magazine. The kit includes pre-tuned radials for 146.715 MHz and 445.940 MHz, primary GERC Emcomm VHF and UHF Net frequencies, but operators have the option to purchase materials to prepare radials for other frequencies. Predrilled pvc mounting caps and adapters are included to fit a 1 inch ID pvc pipe mast. Coax or pvc pipe masts are not included. 1/8 inch brazing rods are used for the radials. The kit is packaged in a convenient cardboard tube.

Availability: February 2012

Cost : ~ **\$10.00**

## Construction

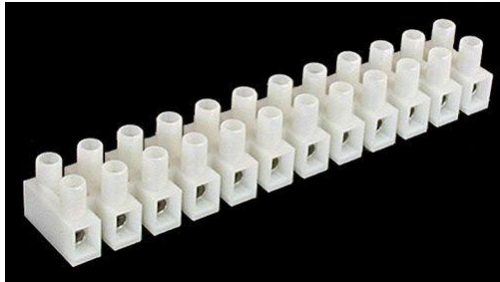
The November 2011 QST Magazine Hints and Kinks article on pages 66-67 features a Super Simple Ground Plane Antenna that can meet these requirements. The heart of this project is the use of the metal sleeves taken from a European style terminal block. These terminal blocks are readily available in different gauges to accommodate a wide range of radial diameters. It should be noted that this antenna is designed for portability and easy assembly and disassembly. The use of silicone sealant is recommended to weatherize this antenna if needed.

**PARTS LIST FOR GERC EMCOMM GROUND PLANE ANTENNA**

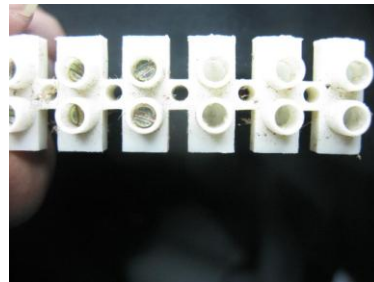
<b>Quantity</b>	<b>Cat #</b>	<b>Description/ Vendor</b>	<b>Unit</b>	<b>Ext</b>
1	SO-239	SO-239 UHF connector (chassis mount) All Electronics	\$1.00	\$1.00
5	TB-35	Insert from 12 position Terminal block All Electronics	\$.25	\$1.25
5	.79	1/8 in x 36 in R-45 brazing rod for VHF & UHF radials A and B-E Air Gas Co., Duarte	\$.79	\$3.95
1	049081137205	1 inch pvc pipe cap  Schedule 40  Home Depot	\$.73	\$.73
1	049081131784	1 inch pvc M adapter  Schedule 40  Home Depot	\$.63	\$.63
1	99962A	3 x 24 inch cardboard mailing tube  Kelly Paper	\$1.09	\$1.09
1	21257	5/8 inch O-ring  Dollar Store	\$.02	\$.02
2	99967A	3 inch end plugs	\$.28	\$.56
			subtotal	\$9.23
			tax	\$.79
			total	<b>\$10.02</b>

## Construction Details

### How to disassemble the terminal block sleeves

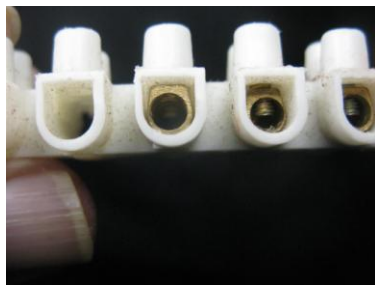


(photo by All Electronics – fair use clause)

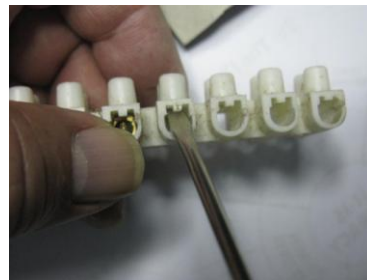


(photo courtesy G. Lee)

### TB-35 12 position European style terminal block



(photo courtesy G. Lee)



(photo courtesy G. Lee)

### Remove set screws



(photo courtesy G. Lee)

### Push out sleeves



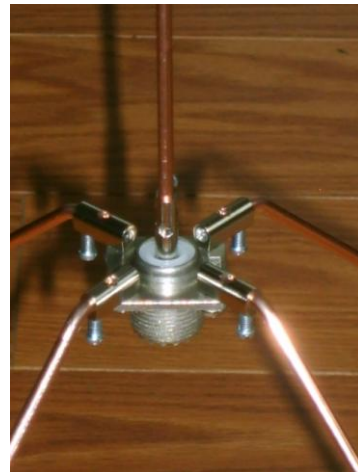
(photo courtesy G. Lee)

### Remove sleeves

### Attach sleeves to SO-239



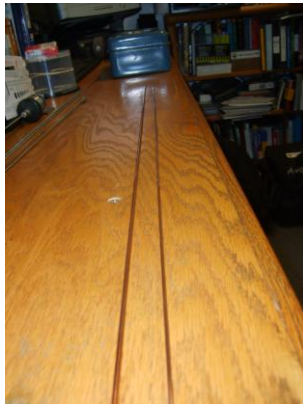
(photo by author)



(photo by author)

## SO-239 radial attachment

### The Elements



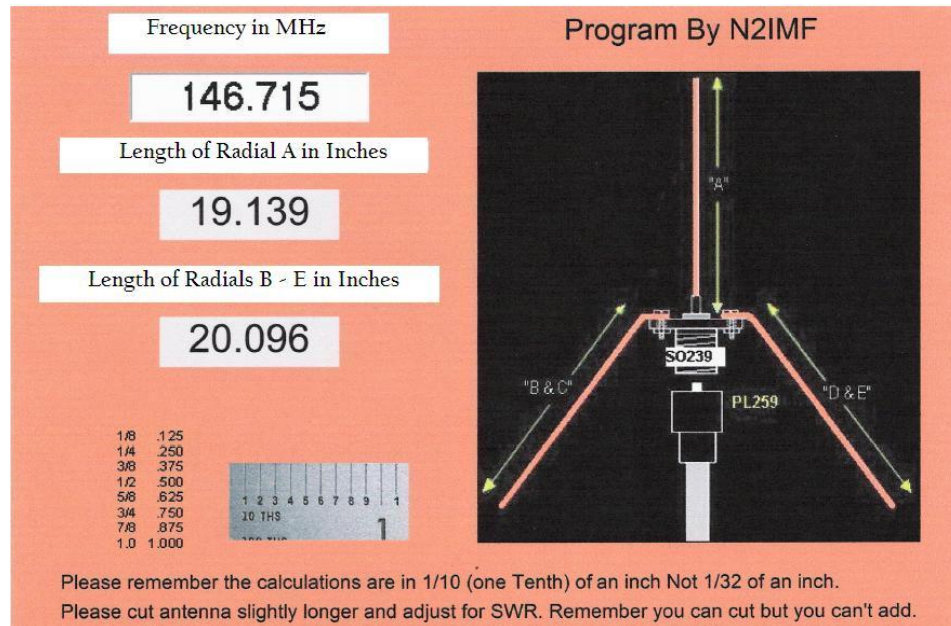
Radials are made from 1/8 inch diameter brazing rod

### How to cut your own radials

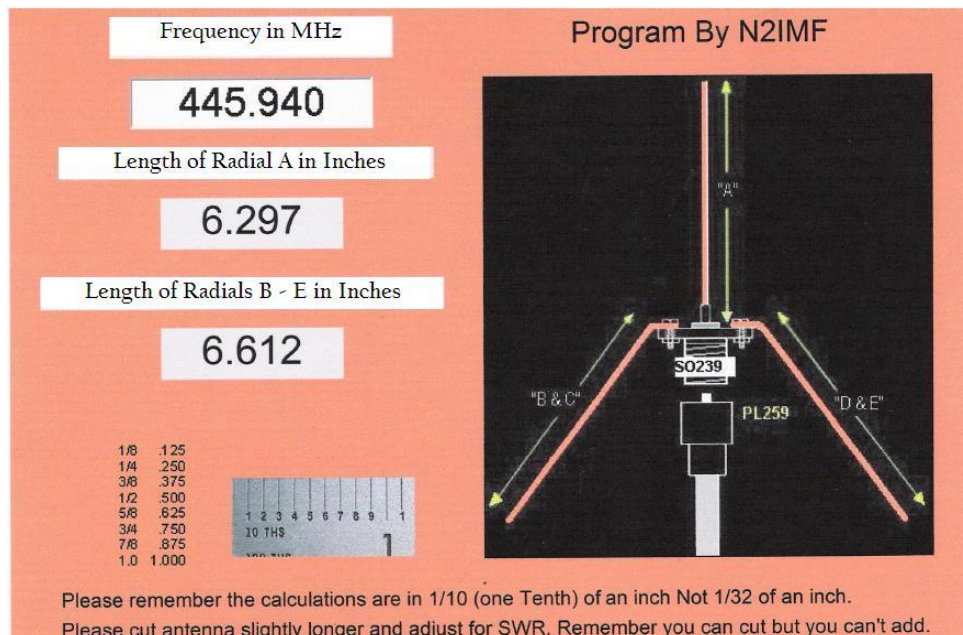
Radials for this kit are made from 1/8 inch brazing rod which is supplied in 3 foot lengths by most metal supply dealers. The exact length of the radials can be calculated using a simple program by N2IMF which is available at <http://www.hamuniverse.com/2metergp.html>. It is advisable to first cut the radials an inch longer than prescribed by the calculator. Next connect the antenna to an S-meter which is in turn connected to a radio transmitting on

the desired frequency while carefully trimming the radials for the best match. Or use an antenna analyzer without a radio. Remember you can cut but you can't add!

## Antenna Calculations for GERC Emcomm VHF and UHF antennas



### Element dimensions for the GERC Primary VHF Net 146.715 MHz



### Element dimensions for Los Angeles Storehouse ERC UHF Net 445.940 MHz



## Preparation of the Radiator and the Radials



The elements were cut from 1/8 in R-45 copper coated steel gas welding rods. One inch was added to the calculated measurement, to allow for trimming.



And the radials were bent to 45 degrees with a special rod bending tool

## Assembly of pvc end cap and adapter mount



A 1 inch pvc pipe cap and M adapter is used to mount the antenna on a pvc pipe.

A 5/8 inch hole was drilled in the cap for the SO-239.



SO-239, O-ring and PL-259



Tighten PL 259 with a needle nose pliers



Attach M adapter



Assembled antenna mount



Assembled UHF antenna

#### **TUNING STEPS**

(1) assemble antenna and connect coax, (2) raise on a telescoping mast to 21 feet, (3) test for SWR using 5 watts, (4) lower antenna, (5) disassemble antenna, (6) trim radiator and radials  $\frac{1}{8}$  inch. Repeat steps 1 -6 until the desired SWR is attained.





## Assembled VHF antenna

### Tuning the Antennas



The antennas were tuned using a MFJ-862 SWR meter and a Kenwood TM-V7 dual band transceiver



RG-8x coax on left was connected to transmitter, and 27 feet of RG-8x coax on the right was connected to the antenna

