

SRD RFID Antenna Assembly Drawing

5/31/2007

Part #: 1616

Revision: Rev A

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Revision History:

Revision	Changes	Revised By	Date
1.0	Initial Release	Gabe Mayo	1/30/07
1.1	Changed ferrite core length, included offset dimension	Mark W. Stevenson	5/29/07
A	Released	Ben Bachrach	5/31/07

Part Description:

The following part is the antenna for the SRD component of the BarMate project.

General:

The assembly shall meet the requirements of the European Union ROHS directives, and shall be capable of withstanding ROHS-compliant assembly temperatures.

Marking:

Packaging container shall be marked with part number and revision of this drawing, and a statement that this product is ROHS compliant.

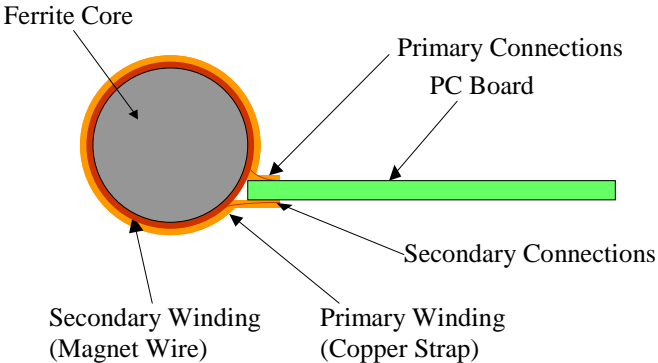
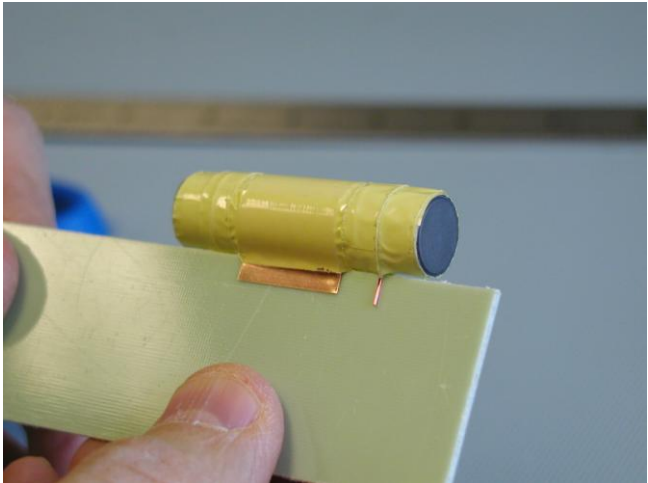
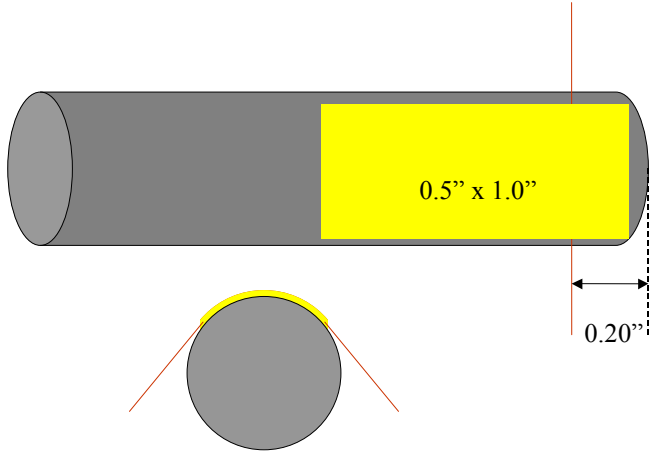
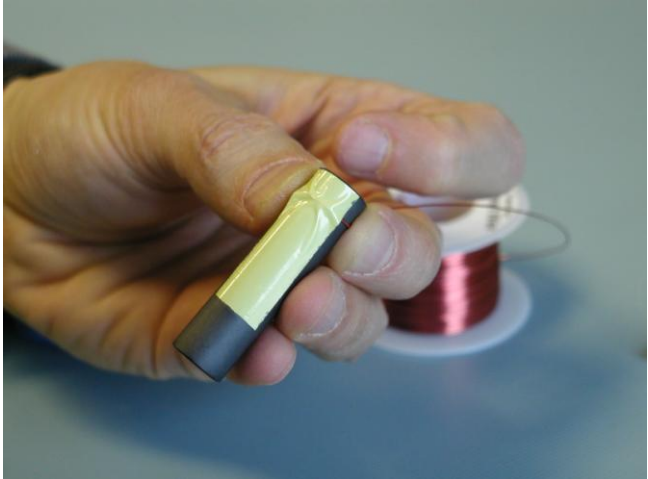
Electrical Characteristics:

Operating Frequency	13.560MHz
Primary Inductance, (secondary open)	64.2nH $\pm 4\%$
Secondary Resonant Frequency (25.70pF parallel cap).....	13.560MHz $\pm 2\%$ at 25C
Q-Factor (secondary resonant at 13.560MHz)	>110
Operating Temperature	0C to 60C

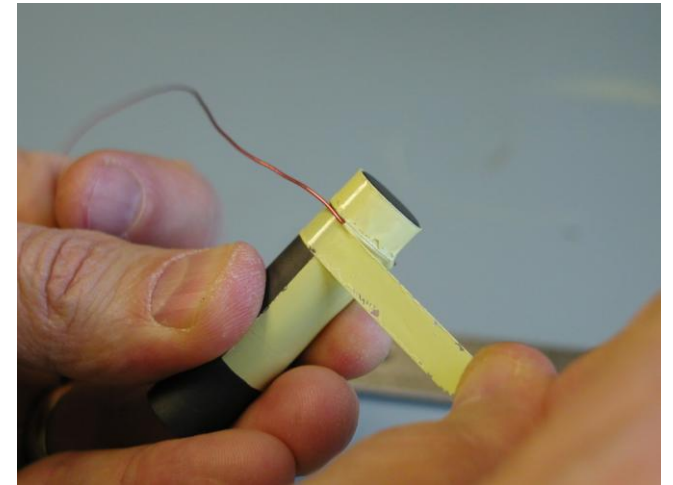
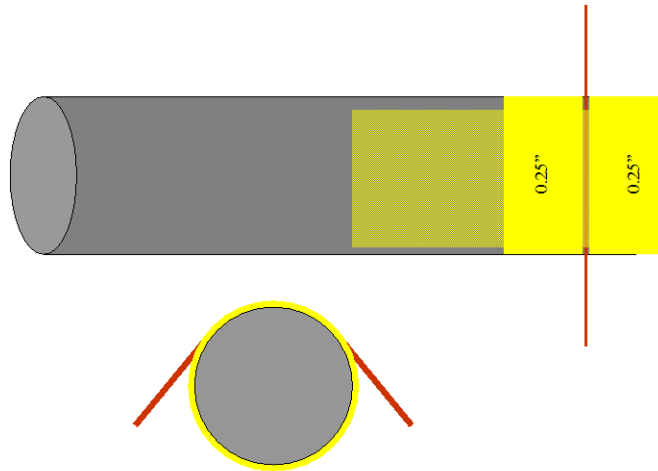
Materials:

- [1] Ferrite Core, 0.50"x1.772" (45.0 mm), #61 material, Fair-Rite #
- [2] Magnet Wire, 24 AWG, Solderable, Double Coated
- [3] Barrier Tape, Polyester film, 1" wide
- [4] Barrier Tape, Polyester film, 0.5" wide
- [5] Barrier Tape, Polyester film, 0.25" wide
- [6] Copper Strap, shim stock, 0.003", 0.75 wide, 2.188" long

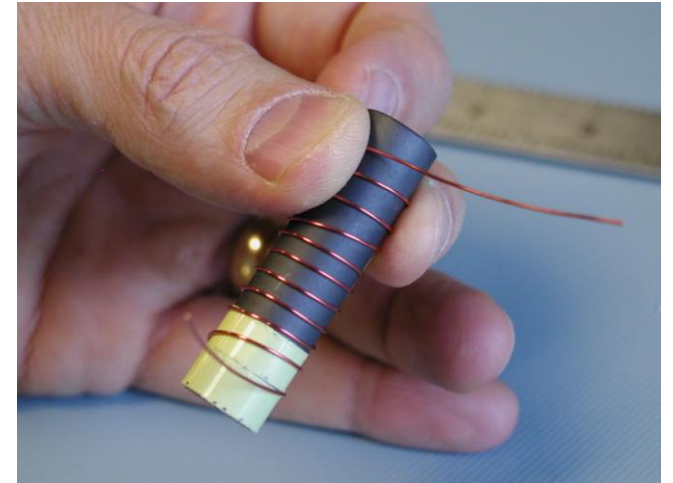
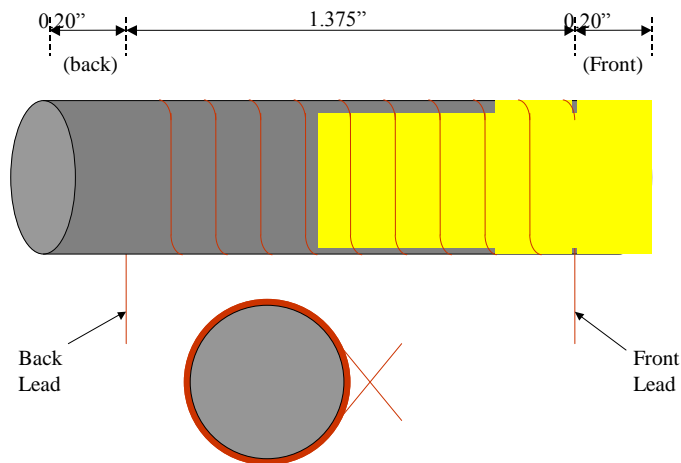
NOTE: Photographs in right column are for illustrative purposes only.

<p>The SRD antenna is constructed with a ferrite core, magnet wire, Copper shim stock, and transformer tape.</p> <p>The Antenna is surface mounted on the side of a PCB as shown</p>	 <p>A cross-sectional diagram of the SRD antenna assembly. It shows a grey circular ferrite core with an orange secondary winding (magnet wire) around its circumference. A green primary winding (copper strap) is attached to the side of the core. Labels with arrows point to the Ferrite Core, Primary Connections, PC Board, Secondary Connections, Secondary Winding (Magnet Wire), and Primary Winding (Copper Strap).</p>	 <p>A photograph showing the SRD antenna assembly mounted on a light green PCB. The assembly consists of a yellow ferrite core with a blue secondary winding and a green primary winding (copper strap) attached to the side.</p>
<p>Step 1a: Secure start of secondary winding lengthwise with tape of material [4]. The wire is located 0.20" from the end of the ferrite rod.</p>	 <p>A diagram illustrating Step 1a. It shows a grey ferrite rod with a yellow rectangular tape (0.5" x 1.0") applied to its side. A red line indicates the start of the secondary winding, which is located 0.20" from the end of the ferrite rod. A circular inset shows a close-up of the tape and the start of the winding.</p>	 <p>A photograph showing a hand applying a piece of yellow tape to the side of a grey ferrite rod. A spool of red wire is visible in the background.</p>

Step 1b: Secure the start of the winding by wrapping 2x transformer tape, material [5] (0.25") at both sides of the wire.

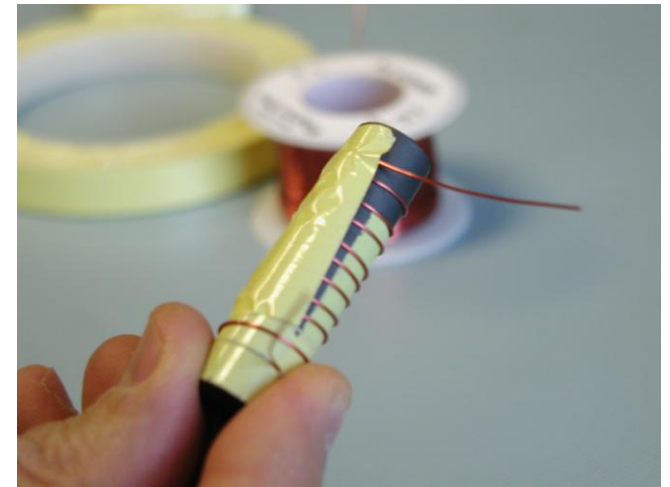
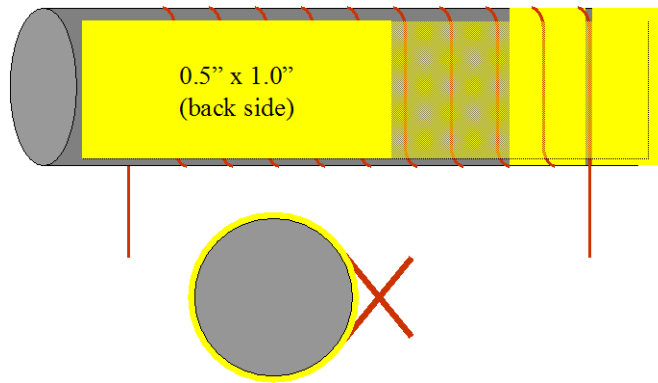


Step 2:
Wind 10 turns of magnet wire, material [2]. The winding should be evenly spread, centered and span 1.375"



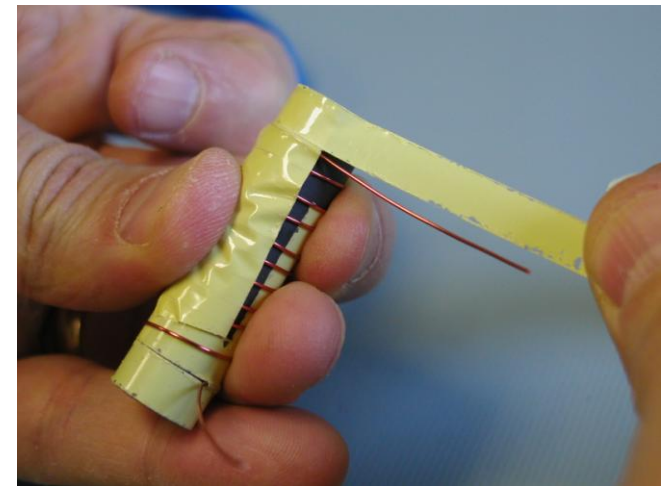
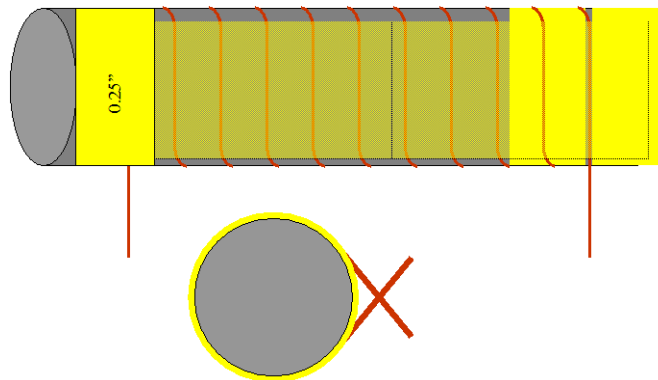
Step3a:

Secure the end of the winding by taping it down lengthwise with transformer tape of material [4].



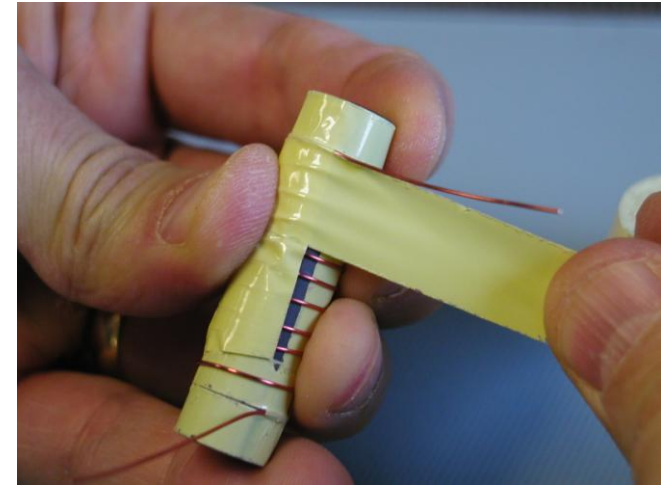
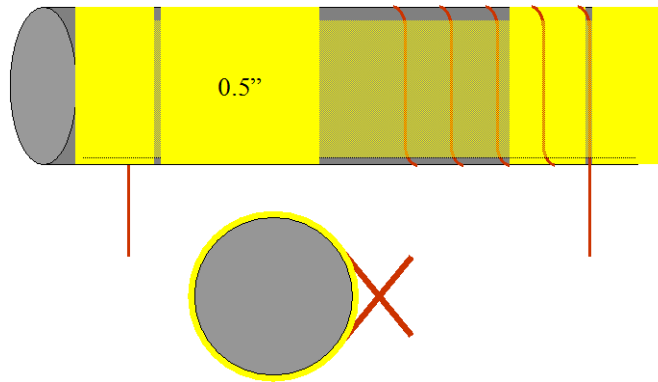
Step3b:

Secure the end of the winding by wrapping 2x transformer tape, material [5] (0.25") just beyond the end of the winding.



Step3c:

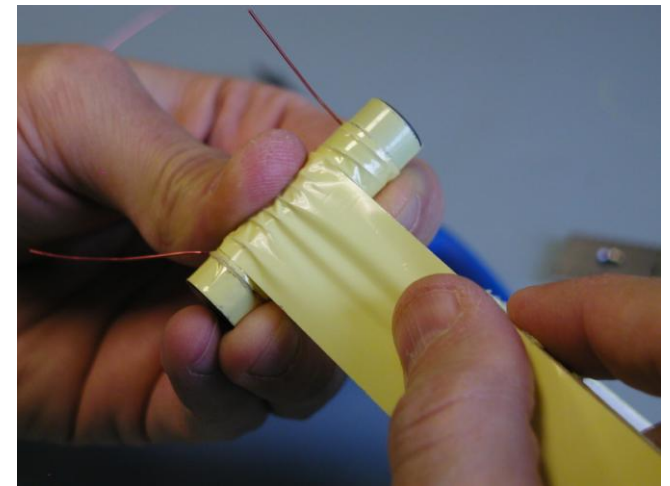
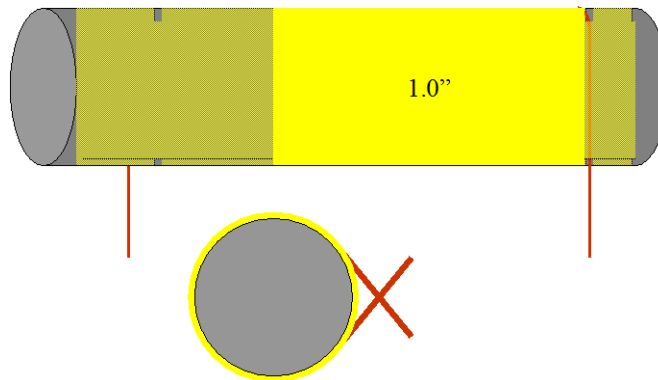
Wrap 2x material [4] (0.50") just inside the end of the winding.

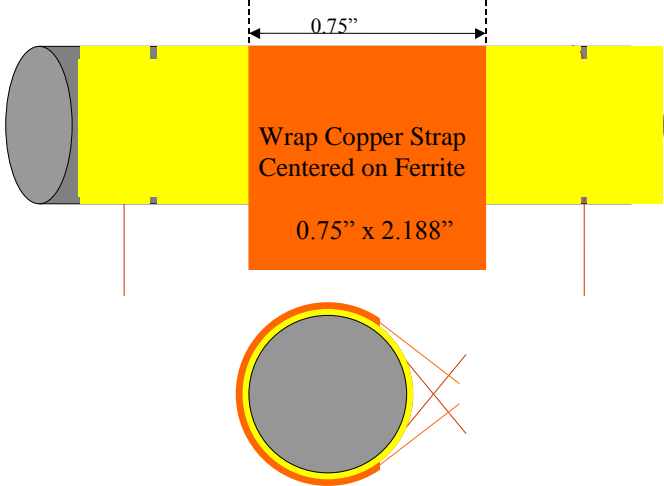
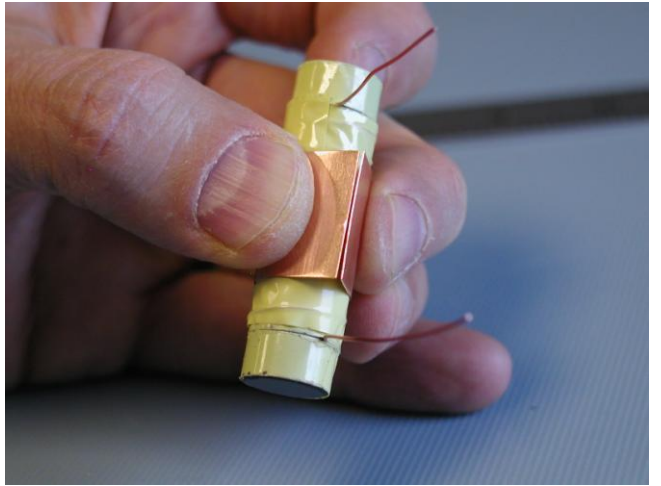
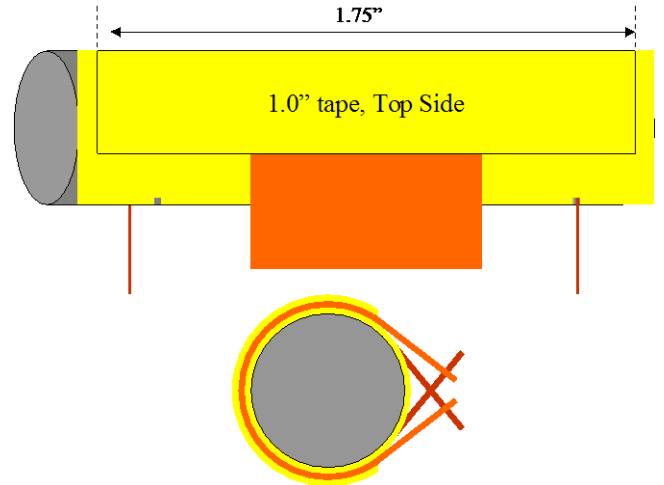
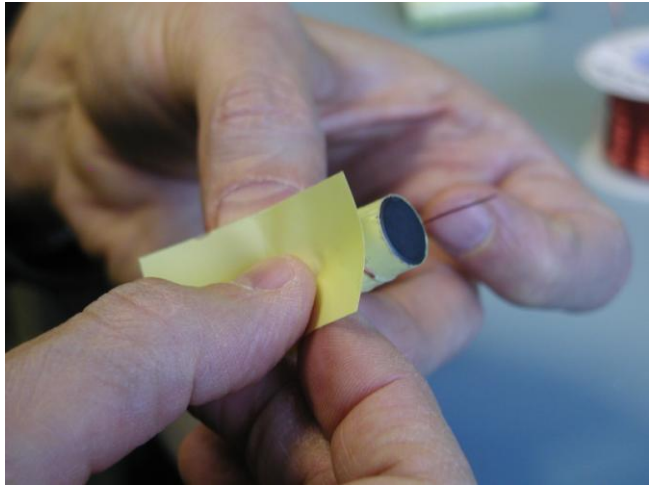


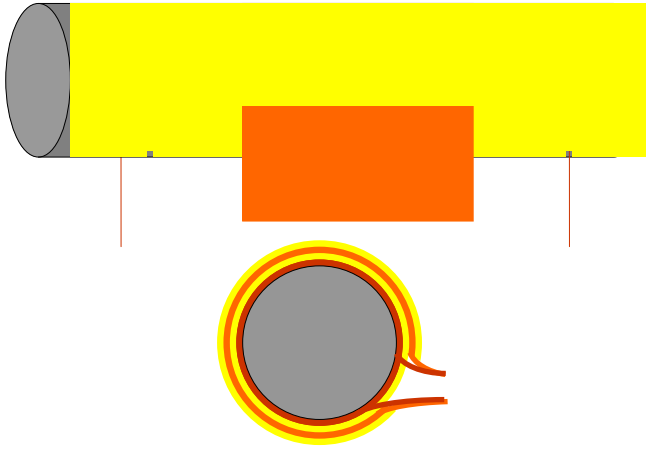
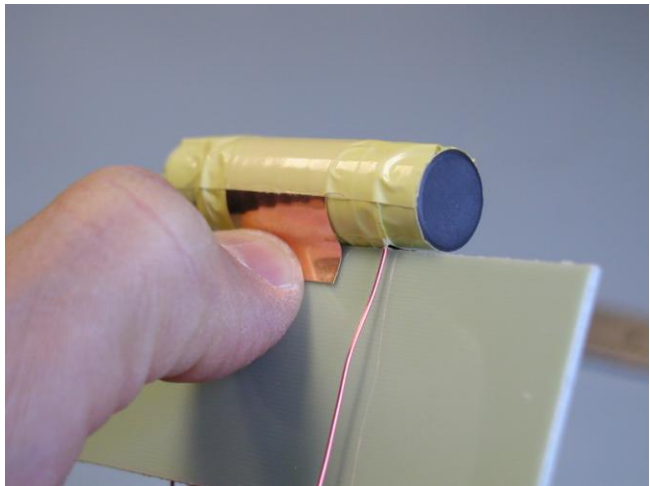
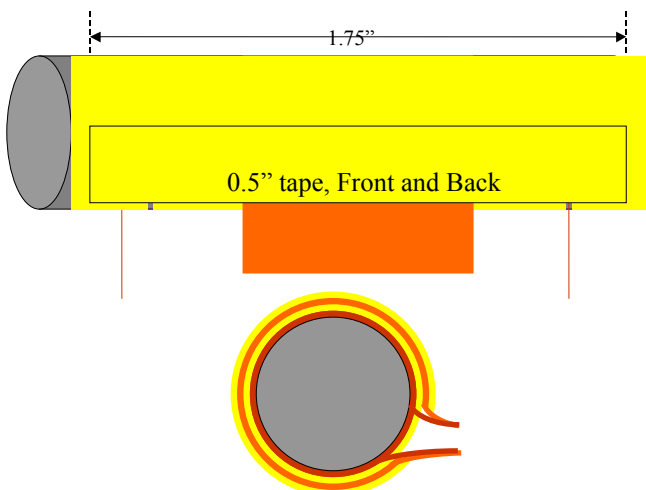
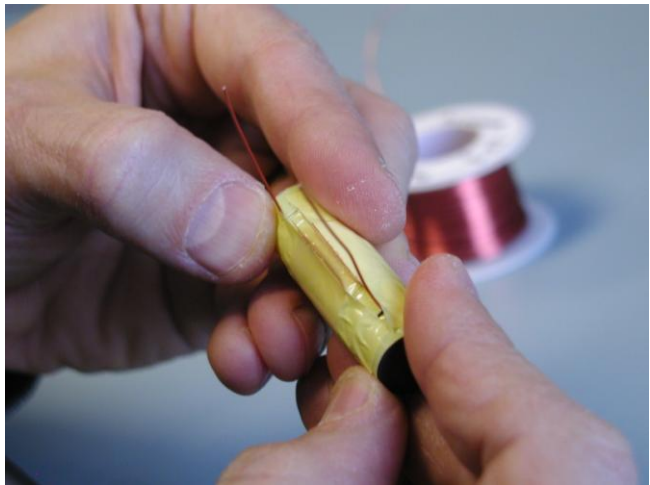
Step3d:

Wrap 2x material [3] (1.00") just inside the opposing end of the winding.

Note: Leads should exit through the gap between the wrappings.

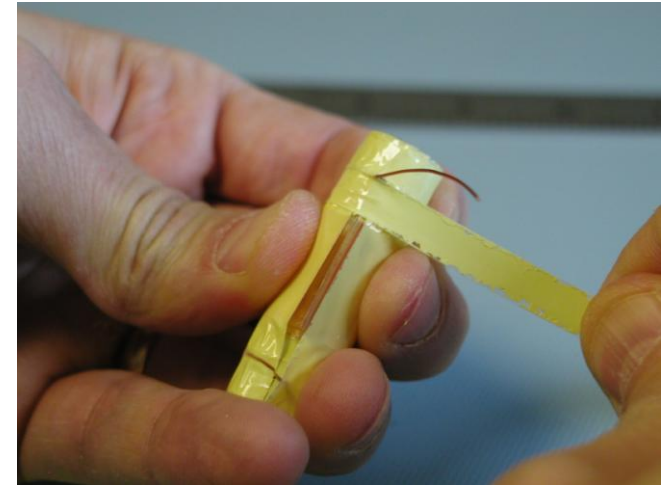
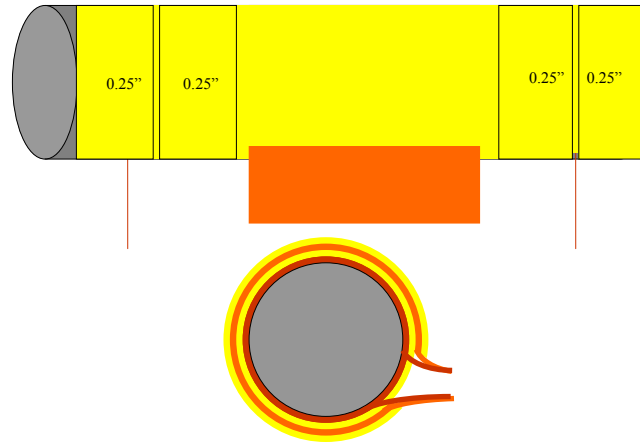


<p>Step 4:</p> <p>Wrap 0.75" copper strap, Material [6]</p>	 <p>0.75"</p> <p>Wrap Copper Strap Centered on Ferrite</p> <p>0.75" x 2.188"</p>	
<p>Step 5:</p> <p>Secure Strap lengthwise with 1.0" transformer tape, Material [3] as shown.</p>	 <p>1.75"</p> <p>1.0" tape, Top Side</p>	

<p>Step 6a:</p> <p>Form leads on Magnet wire and copper strap to mate 0.062" thick spacer, offset by 0.132" below center. Dimensions for offset are shown end of document.</p> <p>Note: Leads are formed on front and back of spacer.</p>	 <p>The diagram shows a side view of a yellow cylindrical component with a grey circular end. An orange rectangular spacer is positioned below the cylinder. Two red lines indicate the offset of the leads from the center. Below this is a cross-sectional view showing a grey circle surrounded by a yellow ring, with two red lines representing the leads extending from the bottom.</p>	 <p>A photograph showing a person's hands holding a yellow cylindrical component with a blue circular end. A thin red wire is being inserted into the component, and a copper strap is visible on the side.</p>
<p>Step 6b:</p> <p>Secure ends of formed leads by taping them down lengthwise with transformer tape of material [4].</p>	 <p>The diagram shows a side view of the yellow cylindrical component with a grey circular end. An orange rectangular spacer is positioned below the cylinder. A yellow rectangular tape is shown wrapped around the cylinder, with the text "0.5" tape, Front and Back" written on it. A dimension line above the tape indicates a length of 1.75". Below this is a cross-sectional view showing a grey circle surrounded by a yellow ring, with two red lines representing the leads extending from the bottom.</p>	 <p>A photograph showing a person's hands holding a yellow cylindrical component with a blue circular end. A thin red wire is being inserted into the component, and a copper strap is visible on the side.</p>

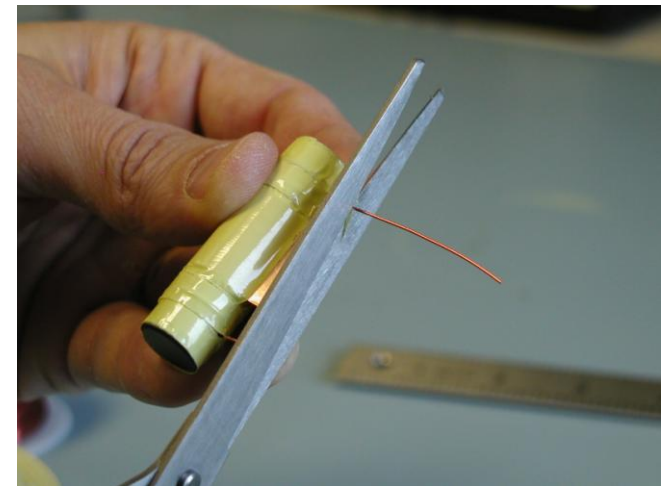
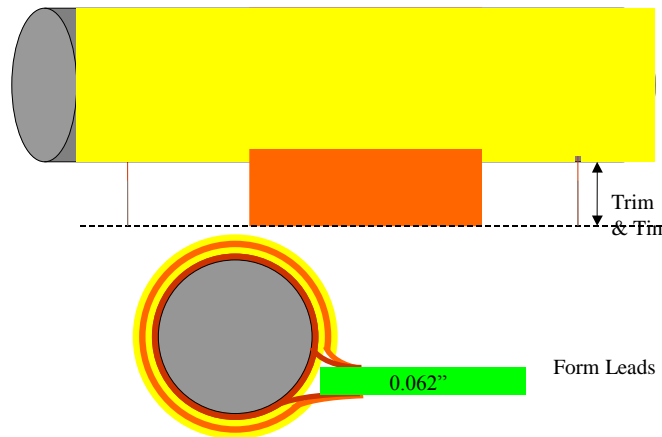
Step 6c:

Secure the ends by wrapping 2x transformer tape, material [5] (0.25") just at both sides of each lead (4 wrappings).



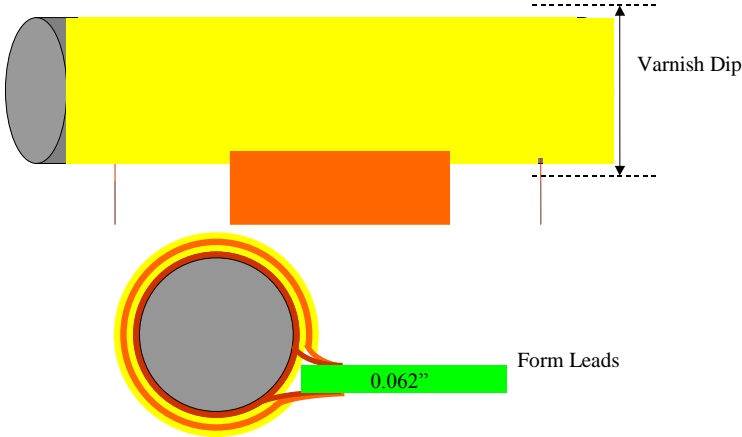
Step 7a: Trim Leads

Note: Trimming may take place at an earlier or later step.

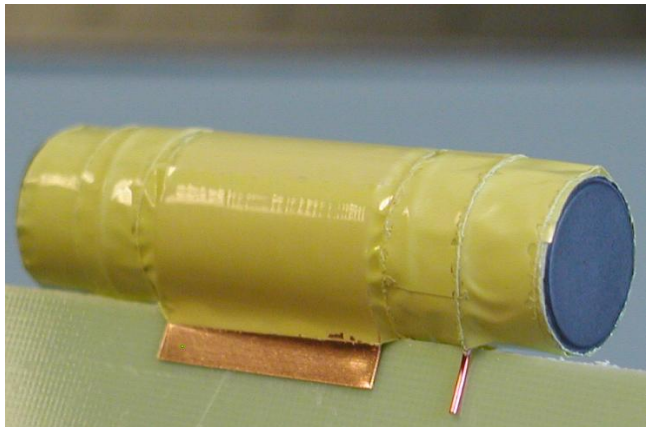
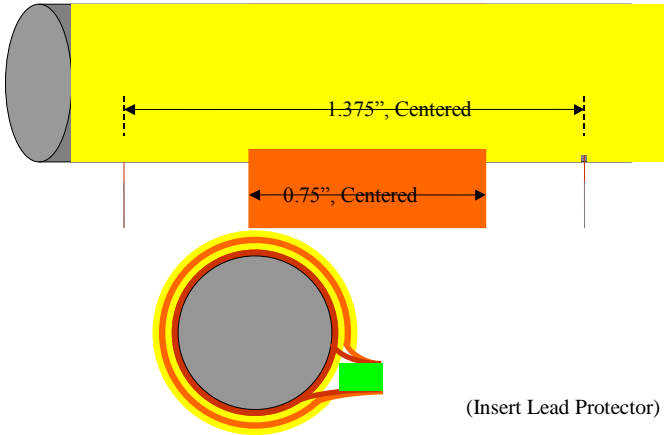


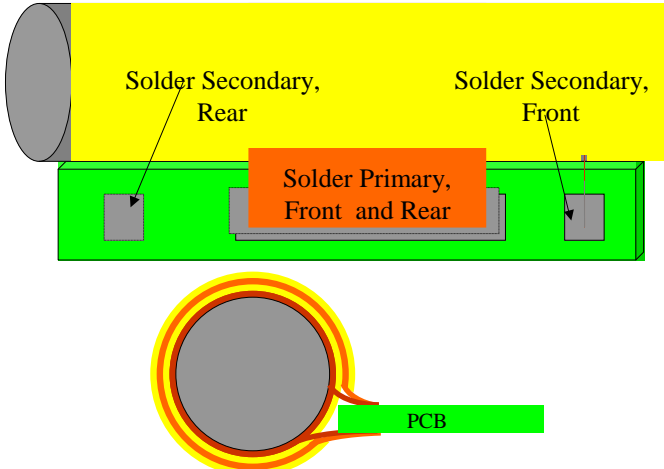
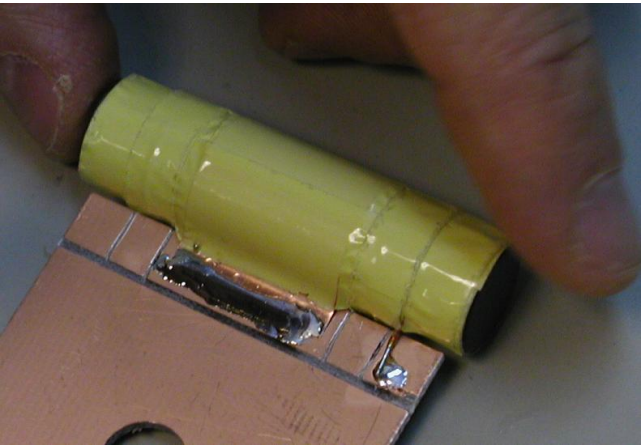
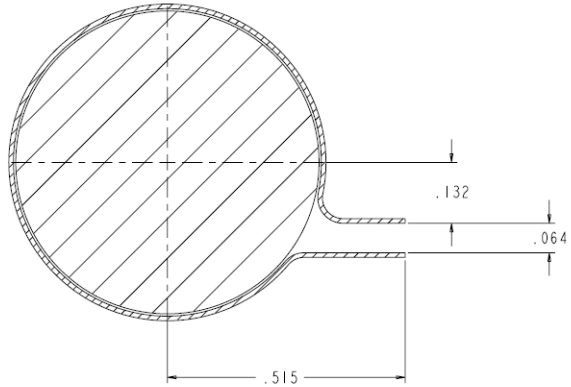
Step 7b: Tin the leads and dip in Varnish

Note: Tinning and Varnish may take place at an earlier or later step.

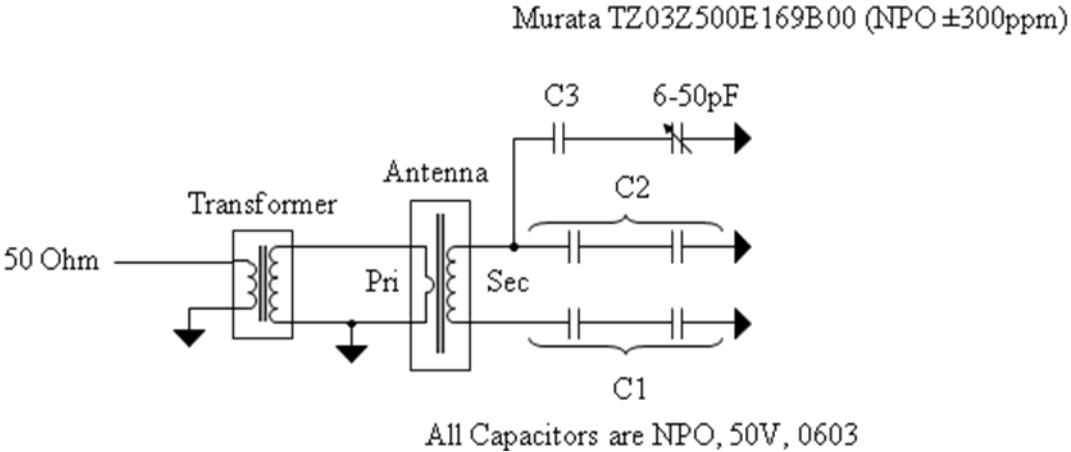


Step 7c: Insert 0.062" spacer to protect formed leads.



<p>PCB Mounting Example</p>	 <p>The diagram illustrates the PCB mounting process. It shows a cross-section of a cylindrical component being soldered to a green PCB. Labels indicate 'Solder Secondary, Rear' and 'Solder Secondary, Front' on the yellow component, and 'Solder Primary, Front and Rear' on the orange solder pads. A circular inset shows a top-down view of the component with a green PCB strip attached, labeled 'PCB'.</p>	 <p>A photograph showing a person's fingers holding a yellow cylindrical component, which is being soldered onto a green PCB. The solder is visible at the base of the component.</p>
<p>SRD antenna Copper Strap detail: Copper strap needs to be formed according to the following drawing to comply with plastics design.</p> <p>Revised 05/07/07</p>		 <p>SECTION A-A</p> <p>The drawing is a cross-section of a circular copper strap. It shows a circular body with a diameter of .515. A rectangular strap extends from the side of the circle. The strap has a width of .132 and a thickness of .064. The section is labeled 'SECTION A-A'.</p>

Antenna Circuit Example



Operating Frequency	13.560MHz
Typical Thermal Stability (0C to 60C)	±15kHz
Typical Q-Factor	110 to 130 at 25C
Input Impedance	50 Ohm
Max Input Power	+30dBm
C1,C2,C3 values (pF)	47,47,47..