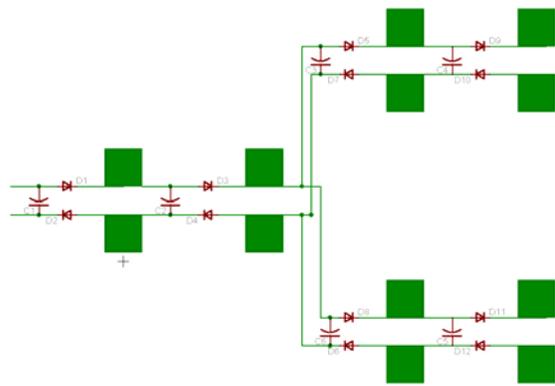
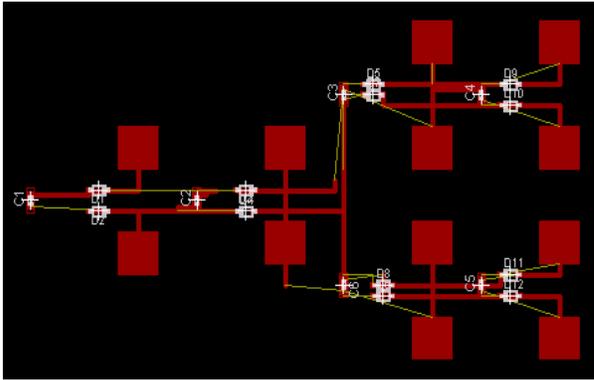
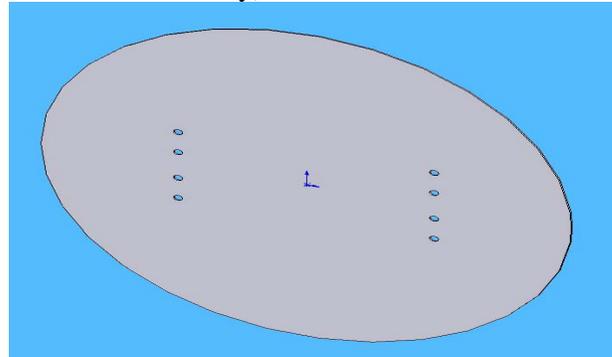
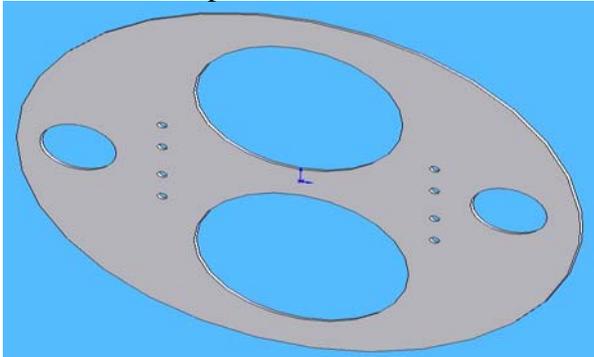


Materials

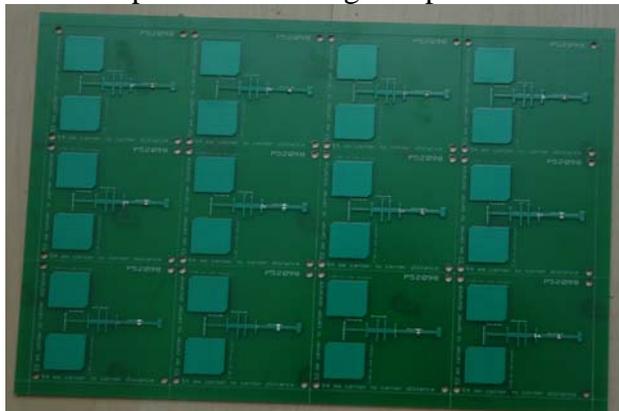
Method of Fabrication



The PCB will be manufactured using a standard practice known as etching. A substrate is coated with copper, and then a trace, or temporary mask is printed onto the board. The most accessible method for printing the trace is by using silk screen printing, which prints etch-resistant ink onto the board. This coats parts of the copper, so that when the entire board is dipped into chemical solvents, the copper not covered by the mask disintegrates. After this, holes are drilled for through-hole components (although in this case all the components are surface mount, and this is not necessary).



The two mounting plates (the structural plate and the shielding plate) will be fabricated using the waterjet. Using the Omax layout file, the water/abrasive mixture will dispense at high pressure along the cut line. These two plates will be attached together using bolts, and the climber legs will attach to the holes laid out near the center. The PCB panels will be mounted to the shielding layer using thermal double-sided foam adhesive. The power outputs on these boards will be connected in a combination of series/parallel configurations dependant on voltage-output from the test results.



Material Choice

There are three different materials need for design. These are the PCB board, a shielding material and a structural material.

The structural material needs to be lightweight and capable of taking a large amount of tension. As a result carbon fiber was chosen as the material

The shielding material needs to be capable of absorbing 5.8 GHz radiation. This means that it has to both be conductive and be a certain thickness (dependent on the material chosen) Fortunately the wavelength is so large that the minimal thickness of the shielding for most materials is so small that it is unlikely to be reached without precision machining. The deciding factor among the different metals was the strength of the material. The more support the material can offer the less support the support structure has to provide. Thus a steel sheet with .1 inch thickness was chosen.

For the PCB the largest concern was that it didn't react to the microwave and heat up excessively. Fortunately a material was suggested in lecture that does not heat up in reactions to the frequency we are using, that being Arlon FoamClad. Thus we are using that material as the third layer which holds the rectenna.

Cost Estimate

DESCRIPTION	RATE	QYT	TOTAL COST
Design and Engineering			
Labor Rate for each Designer	\$60/hr	12	\$720
Labor Rate for CAD/CAM/Altium workstation	\$40/hr	5	\$200
Materials Costs			
Steel Sheet (36"x48"x0.1")	\$36.12	1	\$36.12
Carbon Fiber Sheet (39"x47"x0.25")	\$215	1	\$215
PCB Manufacturing			
Advanced Circuits Quote	\$2.88	156	\$449.28
Waterjet Machining			
Labor Rate	\$30/hr	1.5hr	\$45
Machine Use	125/hr	~.1hr	\$12.5
Assembly			
Labor Rate	\$10/hr	2	\$20
Testing			
Labor and Test Facility Operating Cost (to be determined)	TBD	-	-
		HOURS	COST
TOTAL		20.5	\$1697.90