

# EXTRA! EXTRA!

What you've been waiting for... A laser helmet so easy to build that a kindergartener could build it!

Talking about LLLT is easy! Getting EXCITED about LLLT is easy! Even the Wiring is easy. The hard part?? What keeps people from taking advantage of this the most? ...**ACTUALLY MAKING THE HELMET!**

You get the principles, you understand the potential, and you want to be a part of this. Man... you even know what a joule is! However, the helmet part of the deal is daunting. Your choices with commercial options are still few and far between, and fabricating your own to meet all of the requirements sounds like a challenging ordeal requiring a lot of tools and a lot of skill. And if you don't have a lot of tools or skill?? You're pretty much S.O.L.

**...Until now!**

**THIS IS WHAT YOU'VE BEEN WAITING FOR!** No power tools, very limited hand tools -a hammer, a box cutter, and a hole punch (not even a saw!)- and it requires all the skill of a kindergarten class craft project! Also, it's made with materials that are locally available from stores that are located in most every city in the U.S. -Wal-Mart, Michaels, Joanne Fabric and Craft Stores, and Home Depot! AND IT'S DIRT CHEAP.

The practical knowledge that I've gained from my experience in do-it-yourself laser helmet projects has given me invaluable insight as to what is necessary to make an effective laser helmet. I can tell you that this one meets and surpasses all of them...

- The top is created to conform perfectly to the curvature of the head.
- The base is custom fitted around your head with plenty of padding.
- It's a full coverage device with enough diode holes for any conceivable arrangement.
- The diodes rest on brush bristles for a uniform height above the scalp.
- It's both comfortable, sturdy, and secure on your head.
- It looks good!

...And like I said, it's cheap and made from commonly found

materials! All of these reasons coupled with the fact that it's so easy to make is why I've dubbed this design the "Laser Messiah"... it's the saviour for people that either don't have a lot of tools and/or skill! And actually, in all likelihood it's as good if not BETTER than most other helmets out there.

I've divided these instructions into easy six steps, and you can easily finish each step after work, after dinner, or whenever! Think about it... you can have the HELMET -the hardest part of all of this- FINISHED IN SIX DAYS! Less than a week, baby!

As always, this information and much more is storehoused at the one major source of do-it-yourself laser therapy for hair loss in the world... OverMachoGrande.com! See you there!

## -O.M.G.

### Table of Contents:

- Supplies needed for building your own "Laser Messiah" laser helmet: - **PAGE 2**
- **Prologue:** Why I'm not actually using a store-bought, hardshell "helmet" for my 2.0! - **PAGE 2**
- **Step 1** - Manufacturing the Base... a soft, padded, velcro-tightenable "helmet". - **PAGE 3**
- **Step 2** - Making your tin foil "head mold"! - **PAGE 6**
- **Step 3** - The initial formation of the top part of the helmet! - **PAGE 8**
- **Step 4** - Making the diode holes in the top! - **PAGE 9**
- **Step 5** - Adding the Brush Bristles! - **PAGE 11**
- **Step 6:** Completing the Helmet! - **PAGE 13**



## Supplies needed for building your own "Laser Messiah" laser helmet:

These are the supplies that you'll need to construct everything for the laser helmet (without the wiring and diodes).

Also, obviously you can find some of these supplies in lots of different stores (and in countries other than the USA... you're going to have to!), but these are the best bets when you are stateside:

### From Joann Fabric and Craft Stores:

"Foamies" foam sheets (anywhere from 80 cents to a little over a buck a sheet... sometimes you can find the bigger 12"x18" sheets, but you can just use the smaller ones and glue them together like I did if they don't have your color):



Color A (White, in my case):

- 1 sheet of 3mm (used in bottom part for outermost layer)
- At least 2 sheets of 6mm (unless you can find the 12" x 18" size, and then you probably only need one. This is used for top diode holder, and will be glued together and cut to form a contoured shape)

Color B (Black on my helmet):

- 4 sheets of 6mm (one used for inside padding in bottom part, and three used for the inside rim padding of the top part [you could probably cut it more efficiently and only use one or two for that, but it's so cheap that I didn't care])
- 2 sheets of 3mm (used for for taller layer of bottom and the lip of the top, and will hold the eyelets for connection the top to the bottom)

### From Michael's:

- Tandy Maxi Punch Leather Hole Punch Set (About \$10. This is for punching holes for our diodes, and at the time I write this, the 17/64 size seems like the best. You \*can\* use a spade drill bit and a power drill, but I don't think it's as precise and you can tear the foam easier. This is actually a great find to make the diode holes for many reasons I won't mention here!)



Obviously, this is the size necessary to fit the diodes I use - the AiXiZ 5mm/650 nm ones I have on my site. If you get another brand, you'll have to see what their dimensions are and experiment a bit!

### From Walmart:

- TWO "Eyelet Kits" (Somewhere around \$2 or \$3 dollars at the most for each. You need two because one pack only has enough for 15 pairs of eyelets... WITHOUT MISTAKES! lol...)

CONTINUED ON PAGE 2...

## Prologue: Why I'm not actually using a store-bought, hardshell "helmet" for my 2.0!

This helmet \*is\* every bit as sturdy as using a bicycle-type helmet. However, I wanted to share with you the thought process behind my deciding to look elsewhere for a store-bought helmet solution (besides the fact that it takes tools to cut the helmet, and I wanted to make this as "tool free" as possible!). This will also help you with some considerations for determining what helmet you should look for if you decide to go that route.

Lemming and I have something in common... we both were pretty lucky in finding helmets for our needs! In fact, we didn't realize just how lucky we were! Finding a good helmet is actually a lot trickier than you might think.

For my Golden Boy -my first laser helmet- I needed a helmet that had a large flat side to build the "support structure" that would enable me to suspend my cluster rigidly in place as well as enable me to move it however I wanted to cover whatever part of my scalp I needed it to. I found a Tony Hawk skaters helmet that fit my needs pretty well. I had to buy it extra tight because I new that I was going to cut the top off the helmet, so all of the support would be on the sides. Basically, I have only an inch or so of helmet left on the front, and it diagonally climbs to a couple or three inches on the back. The extra padding this helmet had keeps it from sliding down.



So, I basically turned a thirty-something dollar helmet into nothing more than a rigid headband! Like I said, I needed that for my first plan.

Lemming was lucky because he found a bicycle helmet with an "adjustable headband" built in that had very low "mounts" -meaning the three or so spots that attached the headband to the helmet were low enough that he could cut a large enough section of the top off (and therefore exposing the necessary area of the scalp so you can treat it with lasers) without cutting the mounts. This picture obviously has the side support mounts I'm referring to.



I love the idea of having an adjustable headband. HOWEVER... for the life of me, I can't find a helmet like his or that has low mounts. Here is an analysis of two helmets that are typical out there.



This first one, shown right above is a Bell Adrenaline, and actually was the very first helmet I ever got -even before the Tony Hawk helmet. Once I got it home, even though it was damn comfortable and had a snug headband, I realized that cutting the necessary amount of top off of the helmet would cut away the support mounts from the headband. Actually, the distance between the two side mounts is only between 3 1/2" and 3 3/4", and that is nowhere near what my ginormous head requires. Basically, I put this helmet in the closet and I have it if, well... I ever decide to start biking! lol...

This second one I just bought recently. It has a greater area in between the mounts at almost 4 1/2", and I assumed this was the answer! But after I cut it -leaving the side mounts intact- I realized that NOPE... it was nowhere close to the size I needed! Another \$29 down the drain!



I've looked at pretty much all of the major places to find helmets, and I can't find them like Lemmings, and no matter the brand, they all seem to have these extremely high side mounts! Oh, and I should mention that the type of smooth, black plastic the mounts are made of is un-glueable. Mighty Putty won't even work on it! Therefore, you can't just cut the mounts and glue it on a little lower. Plus, since it's on the inside of the helmet, you can't really bolt it on or anything like that because the head of the screw or bolt would be potentially sticking in your head.

Therefore, I'm ruling out bicycle helmets.

So, I do have the option of spending another 30-something dollars on another Tony Hawk skaters helmet. Well, I couldn't find the one like I used before, but I only checked one spot. The greater point is this...

I don't NEED to have this Tony Hawk skater's helmet if I'm not going to have a side structure. This device is going to be a "full coverage device", so I don't need to be able to move the cluster around. Plus, it's going to rest on foam and brush bristles. So why spend almost \$40 on a helmet that I'm essentially cutting down to the size of a headband??

So there you go! I'm not going to use an actual helmet. Why does this matter, and why am I bothering to write this post?

Because if the solution I have thought up actually WORKS (and I'm not 100% sure it will yet, but hey...



## SUPPLIES CONTINUED...

You'll make some mistakes and might want more than that anyway. It's found in the sewing section, and it has everything you need to make the eyelets)



- 2" x 4' or 5' Velcro Strips (\$6.98 or something. This was actually right next to the eyelet kit in the sewing section!)



- Thick hiking shoe laces (at the time I'm writing this, I haven't gotten this far or purchased any yet so I can't be specific except you want it to be thick, but thin enough to fit through the eyelet holes).

- Super Glue Gel (this is for gluing the foam diode holder together, and it needs to be Gel because you have to hold it in a way that makes regular liquid super glue prone to run! Oh, don't get the slow-drying type... just get the regular gel)

- TWO Paddle Brushes (we are using this for the plastic bristles only! Just get the cheapest paddle brush with regular, plastic bristles that are normal sized (about 2cm), and it'll be about \$4. If you are intersted, I bought the Goody "So Gelous" model)



### Other supplies you will need:

- Electric Tape the same color as BOTH color A and color B (not necessary to have both, but the top will probably look better if you do. I think both Home Depot and Walmart have a variety of colors, but I'm not sure about Walmart's selection)
- Box cutter or exacto knife
- Scissors
- Hammer
- Glue (like "Goop")
- Tin Foil
- A thin nail about the thickness of the brush bristles (if you use one THINNER than the bristles, it may be slightly more secure but it's a pain in the ass to push hundreds of bristles in through that small of a hole. If you use one slightly THICKER than the bristles, it's much easier to push the bristles in, but it's going to be slightly less secure. It's up to you, and you may want to test one of each. I ended up using one slightly THICKER)
- Optional, but "Gutter Guard" from Home Depot (we are only going to use this for diode spacing. You can print out the gutter guard sheet on my site if you want to use that instead. I mention "Gutter Guard" in a million places on my site, so I won't mention it more about it here. In the store it's only about 80 cents to a dollar or something)

-O.M.G.

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work just fine)... it's going to be REALLY EASY AND CHEAP TO MAKE.

When you see the steps laid out, you'll realize that "Oh my god, I can totally make this". And without many tools at all. In fact, you don't not even need a drill or a saw.

So, I'm hoping that this design ends up to be the "theoretically easiest design" that I've been fantasizing about for a long time! I think this design will take out a tremendous part of the "intimidation factor" involved in these, and I really do think it'll give hope to even the most "tool retarded" of us!

I know you can't see into my head so you don't know what the design looks like, but you can comically imagine a yamika full of diodes attached to a headband for support for the time being, except it should actually be quite decent looking and be fairly strong...and COMPLETELY FUNCTIONAL! lol... That'll do for now, and I PROMISE that when you actually see it in action, you won't think of it that way at all! You'll dig it! And at the end of step one, I think you'll start getting a better picture!

Oh, if you have a helmet that you've found that seems to meet the criteria that I've laid out, by all means... use it! Helmets \*are\* indeed nice!

Back to the point, this is what I and a few others are going to do... we are going to do this together, and not everyone even has their diodes yet to put in! INCLUDING ME! We are just going to build the shell -the hardest part because wiring is simple- and have it ready for when the time comes. Like I said, it'll be cheap and it will use supplies you find in Wal-Mart and a craft store... so I hope more people take part in this project! If you are still waiting to take the plunge, it wouldn't hurt to have the shell waiting for you!

-O.M.G.

[PS - Step 1 will be making the bottom headband part. I'll put it together tomorrow, make sure it works (and that I didn't just waste my time here writing all of this), and tell you how to do it!

### Step 1 - Manufacturing the Base... a soft, padded, velcro-tightenable "helmet".

You will finish this section in less than half an hour! It's so simple, and if you are just scanning through these directions and think they look confusing... STOP THINKING!



There are two parts of this helmet... the base and the top, and this is for lightweight but sturdy base! It will be a soft, padded, velcro-tightenable "helmet" that custom fits your head perfectly. Also, this WILL BE THE ACTUAL HELMET I will use for my 2.0! Let me say something... it'll take you longer to read this

than it will to make it. It's SIMPLE, and takes virtually zero tools or skill.

Remember, this is for the manufacturing of the theoretically easiest helmet imaginable that does allow for OverMachoGrande's minimum requirements of:

- Contouring to the scalp,
- Uniform spacing above the scalp,
- Full coverage,
- COMFORTABLE
- Secure and sturdy on your head.
- ...And CHEAP AS DIRT.

This design takes the most minimal amounts of both tools and skills possible, and it still should look pretty decent. I'm not going to cover other ideas in this post, but I may get to other ones (like the construction helmet idea) later on!

When I mean "minimal tools and skills", I mean just that... **you don't even need a saw or a drill.** And one more thing... *trust me!* Trust me that I made sure that this design is not only PURPOSEFUL and well thought out, it's going to be pretty cool! OK! Let's roll....

I'm going to list only the things that you need for this step, but at the bottom I'll tell you other things that you can pick up from the same stores so you only have to make one trip!

### This step requires:

**1) 2" wide velcro strips with adhesive backing.** You need them to be long enough to wrap around your head, and the 4' package I got is plenty. You can get this at Wal-Mart for \$6.96 or something (and actually I found this in the sewing section right next to the "Eyelet Kit" that you need, so see below).



**2) Foam!** You get these sheets from craft stores (JoAnn and Michael's both have them, although I liked JoAnn's selection a little better), and they are called "Foamies". They sell it in a variety of thicknesses and colors, as well as a couple of different sizes. They are VERY CHEAP... like a \$1.50 a sheet maximum. Get the biggest sizes they have in the color you want, but more than likely you'll have to glue a couple of sheets together. You can make it in whatever colors you want, but I chose white and black for illustrative purposes, the fact that white will be used for the diode cluster and it's more reflective, and that yes... it'll look like a Stormtrooper's helmet a little when we are done (especially the speeder bike ones).

The thicknesses are pretty important because we will have to make padding with them at a much later step that has to be a certain height, but just mimic what I bought in terms of thickness. Cat's like to lay on the foam, by the way.



For this step, I used one 6mm black 9" x 12", one 3mm black 9" x 12", and one 3mm white 12" x 18" (they had a bigger size here so I got it).

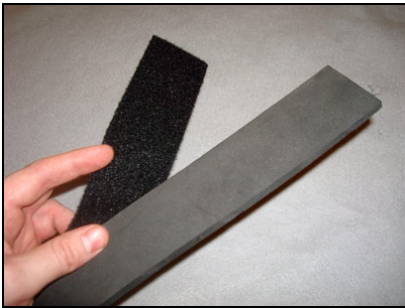
**3) Misc:** Glue (I used "Goop"), a box cutter/exacto knife, a straight edge so you can cut a straight line with it, scissors, and some tape (I used electric tape).

#### METHOD:

This method requires cutting foam strips, which you use a box cutter/exacto knife and a straight edge on a hard surface that you don't mind scratching up...



**1) Cut the 6mm black strip as wide as the velcro (2")...**



...and cut enough strips so that it will fit all the way around your head (two should do it... and slightly less is ok), and then glue those strips together, and you can cover the seam with tape (I used electric tape because it's pretty flexible) to make the seam stronger...

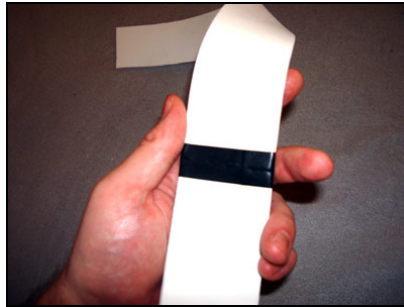


By the way, it's the camera flash that's making the black 6mm foam look grey... don't worry, I still only have two colors! This strip will be the inner liner that goes up against your head.

**2) Cut the 3mm white as wide as the velcro (2")...**



...and once again, cut two so that it will stretch all the way around your head and glue/tape them together...



Yeah, the black tape on white might potentially bug me later, but I can fix that with white electric tape if I really feel the need! lol... This layer is going to be the outside layer of the bottom (and is frankly functionally unnecessary, but it'll make it look a lot better, and looks are somewhat important to your happiness with it).

**3) Cut the 3mm BLACK strip to be 1/2" wider than the velcro...**

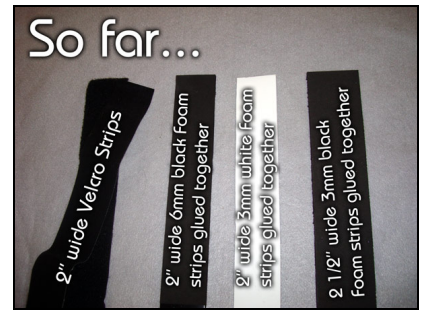


...and you guessed it, glue and tape:



The reason that this layer is wider is because it is going to hold grommets for fastening the top and bottom together.

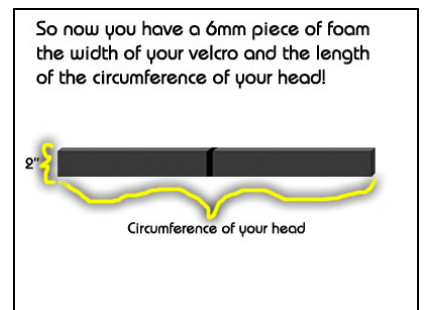
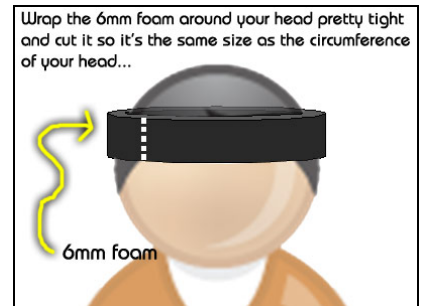
So... this is a good time to show what we have so far:



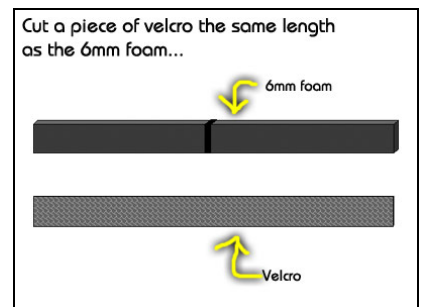
**4) Now comes the assembly time.** Due to the fact that I've been informed that this part is a little hard to follow because it's hard to see which foam pieces I'm talking about -and I want to go out of my way to show that this step is simply three pieces of foam glued to two pieces of velcro- I'm going to add graphics interlaced with the pictures to help people visualize the simplicity of this!

Once again, If you are just reading through this and you think it's confusing... STOP THINKING! lol... *Just make it*, and you will see that it's not confusing at all!

Wrap the 6mm black foam strip that you assembled TIGHTLY around your head and trim is so it's there is no overlapping, and maybe even slightly smaller. Basically, you are making it so that this strip is now the same circumference as your head (or slightly smaller).



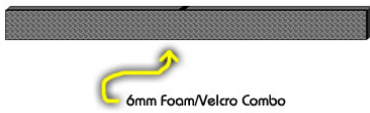
**5) Peel of the adhesive backing of one of the velcro strips and press it to the 6mm black for strip...**





I used a little bit of glue because I don't know how strong that adhesive actually is, even though it's supposed to be "industrial strength"!

Peel off the adhesive backing of the velcro (and put some glue on it if you want to), and stick them together!



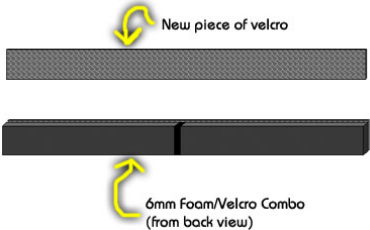
When you are through, you are left with...



...one solid piece. This piece passed inspection from my cat!

6) Cut the other side of the velcro to the same length...

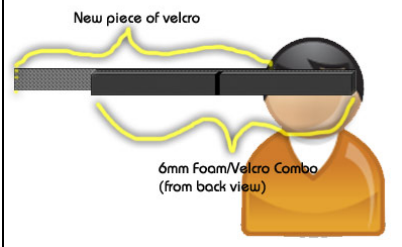
Cut the matching side of the Velcro to be the same size as the other 6mm Foam/Velcro Combo...



...so now you have two pieces of velcro the same length, and one is glued to the 6mm black.

7) Next, you are going to put the pieces together, BUT... you are going to offset the newly cut velcro approximately the WIDTH OF YOUR FOREHEAD. TRUST ME... you'll see why soon:

Put them together, but OFFSET THEM THE SIZE OF YOUR FOREHEAD!



The other end...

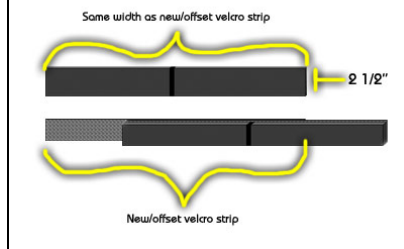


8) This is pretty optional... I put a dab of glue on the ends of the velcro (is gluing velcro even legal??) just because the velcro that's joined together isn't ever supposed to come apart again... only the offset edges are!



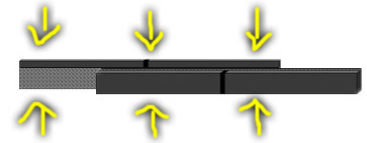
9) Now is the time for the 2 1/2" 3mm black layer - the WIDER piece!

Cut the 2 1/2" wide 3mm piece to the same length as the velcro strips...



You are going to tear off the back of the sticky velcro and press on (extra glue may or may not be necessary) that wider piece over the entire sticky velcro back. This is important, you will MAKE THE BOTTOM FLUSH! The wider 1/2" material is going to be sticking out on the top....

...Peel the adhesive off of the new/offset velcro, and adhere the 2 1/2" wide piece to ONLY the new/offset velcro:



...And trim the ends to make it nice and neat. So basically, what you've done is add the wider foam piece ONLY to the newer velcro layer.

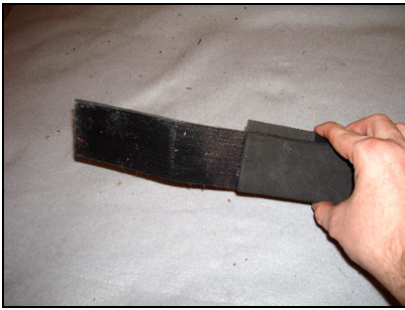
Oh, and yes, the bottom side is all flush! The graphics I show are done from a 3-D angle that is supposed to show width and depth a little better, and I realize it occasionally looks like the bottom is offset or something. It's NOT... all of the layers are flush on the bottom!

10) Ok, trim the end on the offset side to be the same size of the velcro strap...

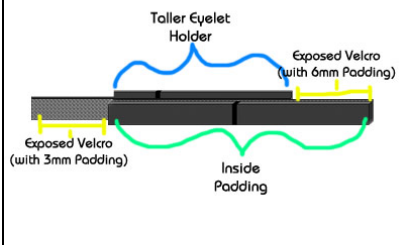
Now we are going to cut away ONLY the part of the 2 1/2" foam that is on the offset edge of the newer velcro piece (and do NOT cut the velcro):



...so it looks like this:



So now we have this...



11) Now is the time for the white strip! You are going to glue the white strip on the outside (covering all of the outside foam you just put on a second ago), FLUSH with the bottom. Obviously, this is going to take a lot more gluing than the others, so I'd glue the back of the white and then CAREFULLY put it on and trim the ends to make it look pretty...

Here's the back view of what we have so far...



Get the 2" x 3mm white piece and trim it to the same size as the new velcro piece/3mm taller foam combo...



And glue it on....



Like I said before, this step really isn't necessary, but it'll make it look MUCH better and adds some necessary strength to it. Also, make sure this layer dries thoroughly before you move on!

12) Ok, well it's already functional as it is for a base, but I want it to fit a little more "down" on my head to make sure it's not too tall to end up with the top part... but my ears get in the way! And also, when you pull it down it's so close to your eyes you look like the singer of "Suicidal Tendencies"! lol...

So, let's fix the problem. Put it on your head for the first time and line up the helmet so the taller foam is "centered" in the sides and back. Then, push it down so it give you Barack Obama ears (Obam-ears), use something to mark where your ears are, and then cut

ear slots! Then, put it back on and mark your forehead so you can cut the part that covers it so it's out of your eyes.

Here is the final deal, and yes... this is me after a long day without a shower:



So yes, it's padded, it's comfortable as hell, you can get it as tight as a mo-fu because it's velcroable! ...And it will attach to the top part that we will make soon!

Oh, and yeah, the black area on the velcro front is simply because I made it a little too short... if I did it perfectly, the white would extend all the way to the other white. ...But I'm not going to worry about it! lol...

I'm going to post tomorrow a summary of what supplies you need to get from each store so you won't have to make multiple trips when we get to other steps!

-O.M.G.

## Step 2 - Making your tin foil "head mold"!

Without a doubt my favorite pictures for ANY project I've ever done! lol...

This is the preliminary step for making the top part of our laser helmet! I can't take credit for this step at all... I simply put two great ideas together from Lemming and thSman!

Lemmings idea was to make a "forming bowl" out of tin foil that matched the shape of your head and then glue together rubber brush bristle pieces inside of it. ThSman's idea -based on cutting apart a swimmer's cap- basically was to make a helmet out of an acrylic material, and it only had one seam).

My idea is to use the tin foil forming bowl actually as a "head mold" and cut it similar to how thSman cut the swim cap and molded the acrylic! However, we can't make the entire helmet like thSman because we want the addition of brush bristles to give our undiffused diodes some room to spread. That means we need two separate pieces -the top and the base- and it also means that we are going to have to make the "head mold" slightly larger than our head to allow for the brush bristles!

In this step, all we are going to do is make the slightly-bigger-than-our-head "head mold", and cut it! It's a very easy day today! lol...

Let's roll...

1) We need to make our head BIGGER. It doesn't have to be two centimeters bigger (the length of the brush bristles) because we'll have some built in extra room, but it does have to be a little bit bigger.

The best way to do this would be to put on two or three knit caps (without the ornamental fuzzy ball on top, of course! lol...). Well, I don't live in an area that has weather conducive to owning ONE knit cap, much less two or three, and I'm not "gangsta" or "emo" so it's not

a part of my wardrobe.... but we do take baths here. So, I'm going to put three towels over my head.

So step one is simply to...



...put towels or knit caps over your head!

2) This is where we start with the tin foil! I actually use the larger, extra strength tin foil, but I think the smaller, regular tin foil will work just as well.

Take a sheet of tin foil and crunch it over your head!



3) Now, even though you \*think\* you might be able to get away with one layer here, it's so much better to work with multiple layers of tin foil glued together. You'll see when you do it... after every single layer, it because a much different feeling thing and it holds it's shape much better. So, step three is to glue another layer on.

What I did first is that while I still had the towels on my head, I bent up the edges so it basically fits me like an Indiana Jones hat would...



...and then I took it off so I could put glue on it. Yes, my bathroom floor is absolutely disgusting! Get over it! lol...

And you can see that it really doesn't have that "head-like" shape really, so more layers are definitely necessary. Ok, so why did I make it like a hat?? Because it's easy to see where you need to glue it that way! Plus, we're going to end up cutting it at about that point anyway.

Make sure when you take it off, you remember which side is the front! Then...





...just glue it wherever. The more the better, but you certainly don't have to cover every square inch!

Now, crunch a second layer of tin foil down on your head...



Isn't this fun!

4) Repeat the gluing and crunching steps until you are least have five layers. You can see the definite shape of your head coming out with each layer. And yes... your head is very misshapen and ugly and everybody notices. You can do up to 10 layers if you want, but I stopped at 5 because I'm using that thicker, bigger tin foil, although it probably would have been a little better to do a couple of more.

5) When you do your last layer, really focus on folding the brim to be like a fedora hat...



Then take it off, and you might want to mark the front of it so you can remember:



Now... it's BREAK TIME! Chill out and do something else for a while and let the glue dry! We're almost completely finished with this step.

6) Ok, so you've let the glue dry, so it's time to do some rough trimming! That's right, Cut that brim right off...



7) Now that we've done the rough trimming, we need to do the fine trimming! Put the base that you constructed on your head to where it would normally fit comfortably. Remember, we had the towels on our head before to allow for the spacing of the bristles. Well, since we need to see what we are doing this time, we can't use towels again so we need to stick something on the top of our heads to act as a spacer.

I found that the roll of electrical tape was about the width of the bristles, so hey, why not...

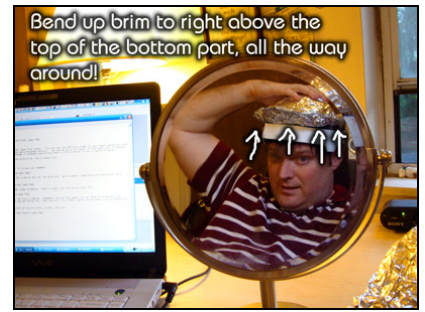


Put the roll of electric tape on your head, and then...



...put the tin foil head mold on your head!

Now you are ready to fold the brim up again all the way around, maybe to just right above the top of the bottom part:



Yes, it'll look like a Huck Finn hat (or a Pet Shop Boy's hat or something), but now you can cut it! So, cut off your Huck Finn brim...

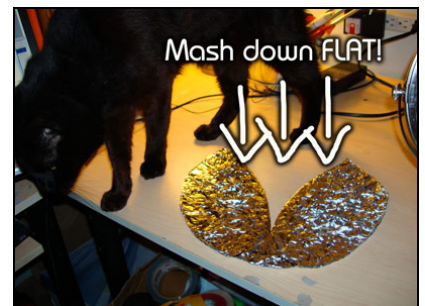


...and you are left with this! Remember, the roll of electric tape is still on my head here. Also, yes, this is slightly bigger than what the final foam product will be. We will have another chance to trim it up in the next section.

8) This is the last step for this stage! This is where I have stolen the brilliance of thSman. Cut the foil head mold FROM THE BACK TO THE FRONT right down the center, leaving a few inches at the front:



The, you are going to smash it down flat, and you are left with something that looks very much like Bunny Ears!



That's it for this step! Keep that in a safe place, and I'll have "Step Three" ready either tomorrow or the next day!

-O.M.G.



PS- ...And yes, those \*are\* Brainy's glasses from my "Gargamel's Revenge" smurf video up on the wall! lol...

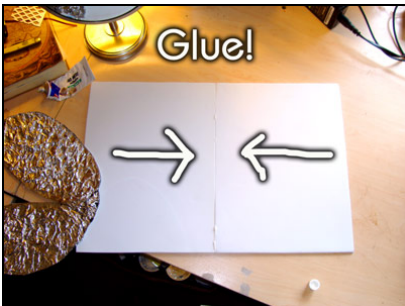
### Step 3 - The initial formation of the top part of the helmet!

In this step we are forming the helmet out of 6mm white, thick foam, doing the final trimming (if necessary), and adding reinforcement and markers for later steps. Ok, let's jump right into this...

1) You will notice that our "tin foil bunny ears" from the previous step are probably going to be a little bigger than your foam sheet.



So, duh... glue two sheets together!



And then tape the seam (notice that I'm using electrical tape the same color as my foam for aesthetic purposes)...



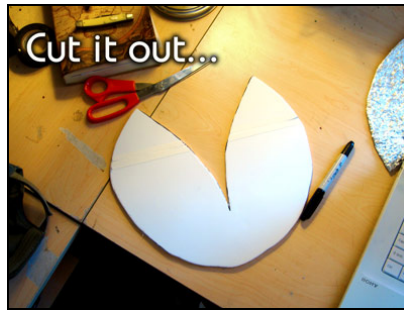
You can use the Super Glue Gel if you want to here. I didn't, but Super Glue works AMAZING with foam.

So let the glue dry for a while, and then we are ready to move on!

2) Trace the "bunny ears"...



3) Cut out the "bunny ears"...



Don't worry about permanent marker being on the edges because those edges will either be taped over or trimmed. You won't be able to see them!

4) Get your Super Glue Gel out! SLOWLY and CAREFULLY -like an inch at a time, start gluing the seam together...



Take your time really pressing the edges together! Here is mine fully glued:



...And DON'T WORRY IF ONE SIDE IS BIGGER OR MORE LOPSIDED THAN THE OTHER! We'll fix that soon enough! lol...

5) Don't like the nasty looking seams and want to minimize the ridge? Me neither! FLIP IT INSIDE OUT!



POP! Looks much better and has a much better shape now, huh!

6) Snip the back if necessary, if you have one side that's longer than the other...



Don't worry about trimming the rest yet! We'll get to that in a second.

7) This step is for reinforcement of the seams! Tape the top of the seam...



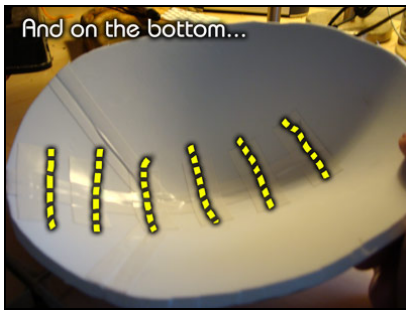
...and the bottom:

Now you are going to make it look like a football! ...An American Football, by putting cross-stitches of electrical tape on it on both the top:



...And the on bottom:





Ok, this is probably enough support for the seam!

8) Now comes the "trimming and evening the sides" part. Gently bend it together right at the seam (don't completely fold it), and analyze the unevenness:



I'm always quite surprised how even it actually is, but anyway.... mark it, and trim it up!

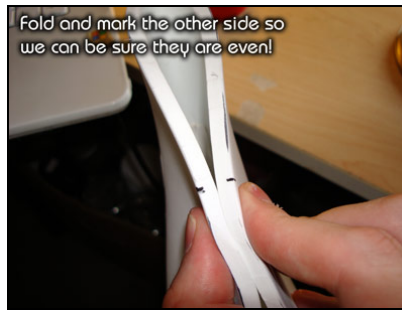


9) This the second-to-the-last bit we are doing today, because "Step 4" is time consuming and tedious - actually marking the diode holes, making the holes, and inserting the brush bristles and supporting foam!

Ok, put on BOTH the bottom of your helmet and the top part of your helmet (and put roll of electric tape under the top part again for spacing), MAKE SURE BOTH OF THEM ARE CENTERED (you can tell by the seams!), and make a mark on the top part on one side right where the taller lip of the bottom part is...



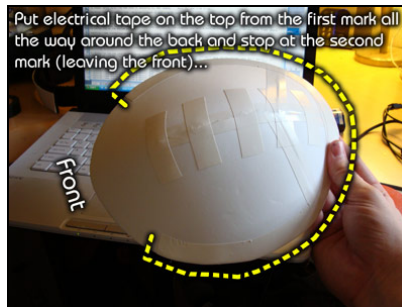
Then, take of the top and fold it together and make a mark on the other side....



I simply did it this way because I wanted the marks to be even because this step is harder than it looks (and you should try to take a picture of it!)

Oh, I realize the top part at this point looks like a hat that a Chinese farmer of old would wear in the fields, but don't worry... it won't end up looking like that! The edges will not be "bowed out" like that, and the ridge won't be as pronounced! Trust me! lol...

10) Last step for today! Put electrical tape around the edge of the top part from the first mark, around the back, and stopping at the second mark:



This tape is strictly for spacing! This will tell us where NOT to put diode holes and brush bristles, and where to put the foam support and top "lip" to hold the eyelets that match up with the base!

That's it for now! ...and the next step is a pain in the ass. It's not hard, it's just LONG, and you will be seeing spots by the time you are done!

-O.M.G.

PS- Just for you to see the comparison, here is the original gutter guard thing I glued together to determine how many diodes I needed to cover my thinning areas held up to the "foam dome" I just made (as best as I can... it's hard because the gutter guard isn't flexible)...



As you can see, not only does it fit the areas I need, it has room for many more diodes than the 210 I need (if I so desire). No... most people aren't even going to need 200, or probably even too many over 100 for that matter, but I'm just saying that this thing will have room enough to make any sort of diode pattern you want!

## Step 4 - Making the diode holes in the top!

Ok, only two main parts of this step... MARKING the diode holes and MAKING the diode holes! Sounds easy, right? Yeah, easy... but it's LOOOOONG because you have to make hundreds of holes (well, you don't HAVE TO, but I think a device with the most options is better)! But you've got to do it in pretty much every helmet design out there so it's not like you wouldn't have to in most other designs.

This step is where the Tandy "Maxi Punch" leather hole punch set comes in that you can but in Michael's for about ten bucks. You can use a power drill, but if you do, you need to use a "spade" drill bit. Look... this is FOAM we are using, so you are running a big risk of tearing it with a drill, so I am completely trying to dissuade you from using that and using a whole punch instead!

Also, if you want to, you can just mark and punch holes in the areas that you think you'll need them, however I wanted to make one with the most options possible. You're on your own -don't even ask me- in figuring out how to do that apart from the method I spell out on my website on how to determine your ballpark coverage area!

Finally, just a reminder, this is the size necessary to fit the diodes I use -the AiXiZ 5mm/650 nm ones I have on my site. If you get another brand, you'll have to see what their dimensions are and experiment a bit!

Ok, let's get going, baby...

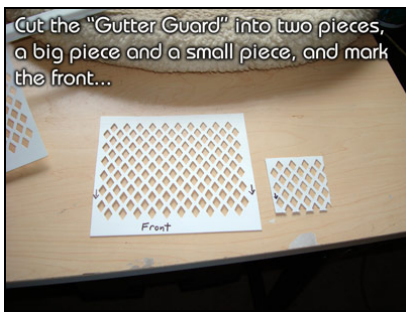
1) Get you "Gutter Guard". If you don't have "Gutter Guard" you can download my printout that I made of it on my site and use that.



Some quick notes about this, I use the wider orientation as the "front". It's because the vertical spacing is slightly closer than the horizontal spacing when the "Gutter Guard" is oriented this way, and this is a little bit better for our scalp when you factor in the curvature, etc.

Also, the gutter guard is simply "good" for our purposes. It's certainly not perfect, but it's gives decent spacing to allow for decent coverage with diffused diodes at our ~2cm height. Yes, there will be some gaps in the coverage, but yes... it's good enough! So, for the record, it is NOT the "be all, end all" standard for diodes... it's just something that works. If you want to try something else -or just eyeball the diode spacing- that's up to you and it could be vastly superior or horribly worse than ours, and I have no idea how to gauge that! Got it? Good!

2) Cut the "Gutter Guard" into two pieces, a big piece (I just made it a full section of it) and a small piece...



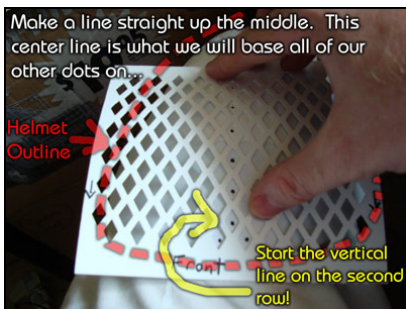
...and mark what we consider the "front" -the end you will always point towards the front of the helmet- on both of them. I just simply put an arrow on the smaller one.

3) It's time to make dots! And don't worry about it... go ahead and get it in your head that this is NOT going to be perfect! lol...

By the way, I've mentioned this before, but there is a reason that we didn't go ahead and make the dots and holes before we glued it, and it's because 1) we'd lose diode holes around the seams, and 2) the diode holes could possibly bend when we formed the dome shape, causing the diodes not to want to point straight down (as well as adding to warpage).

Ok, the glued seam is the center mark of our helmet. We are going to hold up the bigger piece of "gutter guard" over this and make marks directly up the center ridge! These dots up the center will serve as a reference to make all of our other dots from!

Now, first of all, (and you'll have to look at the picture here for clarification because I don't really know how to word this), but on the actual gutter guard, you can choose the middle to be on the first row or the second row. Like I said you'll have to look at the picture, but I chose the SECOND ROW because I liked the way it would make the diodes look on the first row...



So make tiny dots with the tip of your permanent marker. Obviously, the diode holes are going to be much bigger, but we just want to mark the center point of each mesh "diamond" so we will know where to put the hole. Oh, I'm sorry if you still don't understand what I'm talking about with that whole "use the second row for the center" thing after you've seen that picture, but I can't do EVERYTHING for you! Look at it again and figure it out!

Also, make sure you don't put the dots too close to the bottom rim!!! If you can see the edge through the "diamond" shape, then you probably are too close! Here is a shot of with the "gutter guard" removed of what I just did...



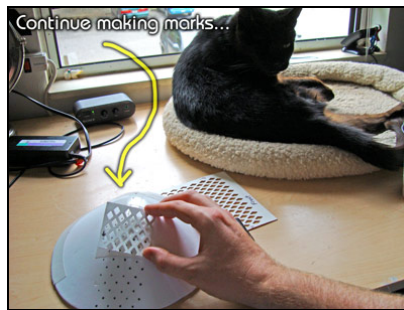
Ok, continue making the marks up the entire glued seam:



...and stay away from the electrical tape around the edge! We treat that like it's the edge of the helmet, and we aren't going to put dots or holes there (the padding is going to be under that).

Yeah, it's tricky to get the hang of bending the "Gutter Guard"! ...and now you know why we cut the smaller piece!

4) Put dot's everywhere using the small "Gutter Guard" piece, using the center as a reference point...



Look, you aren't going to get this perfect! ...But do your best and stay away from the edge (including the electrical tape on the edge!)

In fact, you'll more than likely be faced with situations like this...



...when you pull up the "gutter guard" and you have dot's right next to each other! lol... So what?? When it

comes time to make the holes, just pick which one is best, or put it in the middle of the two!

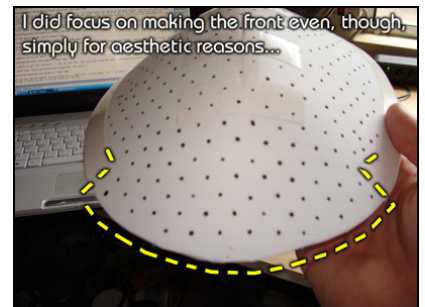
Here is what it looks like when you are finished:



...And look, I have a CRAPLOAD of areas that have, ummm... let's say "less than uniform" dots! Lol...



However, I will say that I took the time to make it even in the front. That's the area you'll be able to see the most, and, well... I just wanted it even there...



5) Time to start making holes! Like I said, I recommend against using drill bits because of the risk of tearing the foam (although spade drill bits seem to be the best for this). The reason hole punches are good is because they actually remove the foam, and don't just rip it or whatever. The problem is with this laser helmet stuff -as all experienced builders know- there is a "warp factor" when you stick the diodes in so close to each other. This helmet has some defenses against that, and one of them is using the Tandy "Maxi Punch" set.

What's really good about this set is that it has three sizes that can be good for other projects with diodes that we may do... 1/4" (a good size for just inserting the threaded tip of the diode in the material), 17/64" (a great size to snugly fit the entire diode, and what we are using for this project), and 5/16" (the size for the entire diode if for some reason 17/64" is too snug).

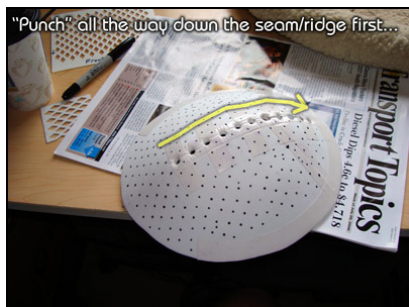
Obviously, I'm talking about sizes that are good for the diodes I use -the AiXiZ ones that are on my site! If you use different ones, you'll have to figure out which hole size is best for you!

Ok, so grab your hammer and assemble the hole punch with the 17/64" bit! I started at the top, right on the seam...





Obviously, I can't take very illustrative pictures because I'm lacking a third arm to hold the camera, but you get it! lol... Here is the finished ridge:



The reason doing the seam/ridge first is because -since you have to press down on the top so much- doing this ridge section puts THE MOST STRAIN on the helmet! Yes, it will resist it and come out ok, but the chances it WON'T resist this are minimized when the rest of the helmet is still solid! Also, yes, it is MUCH HARDER to use the whole punch on the taped sections. Once you finish with those, you will be moving like greased lightning!

Oh, I put a piece of scrap foam and newspaper (and decided I didn't need the newspaper later) under the helmet because I think the hole punch may stay sharper if it's not being bashed directly into a hard surface.

6) Continue "building out" from the center seam/ridge...



...and the electrical taped areas are the hardest anyway so it's good to go ahead and get those first!

7) After you have done a decent amount from the middle ridge, I think it's probably best to go to the front and then the back...



8) The sides are the least important, so it's best to do our "creative punching" to compensate for our not-so-perfect dot marks on the least important areas! So save those for last...

ALLLLLMOST THERE...



...And you are done with the holes!



Yes... this is more diode holes than you will probably ever need, but you have every conceivable placement option available to you now!



Here's the view from the bottom...



...and you can see where the foam spacers are going to go!

Ok, that's it for this step! Next step we add the brush bristles and the foam supports, and then the last step is adding the eyelets so we can fasten the two parts together! So yes... we are almost finished with the entire helmet!

-O.M.G.

## Step 5 - Adding the Brush Bristles!

In this step, we are only going to put in the brush bristles, which obviously serve the purpose of keeping the diodes a uniform distance off of the scalp. It's simple to do, but it can be a little time consuming. Therefore, we are going to save gluing the foam spacers on, making the eyelets, and connecting the two helmet parts for another step! However, even if it \*is\* time consuming to do this step, remember this very important rule:

YOU ONLY HAVE TO MAKE IT *ONCE*! lol...

This step will require probably two paddle brushes and a thin nail about the thickness of the brush bristles. NOTE: If you use a nail slightly THINNER than the bristles, it may be more secure but it's a pain in the ass to push hundreds of bristles in through that small of a hole. If you use one slightly THICKER than the bristles, it's much easier to push the bristles in, but it's going to be slightly less secure. It's up to you, and you may want to test one of each! I ended up using a nail that was slightly THICKER.

Here is the type of paddle brush I used:



It's the Goody "So Gelous". I don't have a clue if other brands of brushes' bristles will work better/worse/whatever, but these worked fine, and I'm assuming they are all pretty much the same thing. Just make sure the bristles are standard plastic paddle brush bristle size... roughly 2cm!

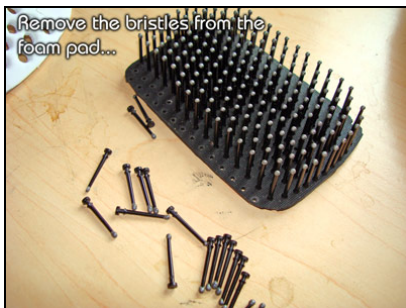
Ok, let's do this...



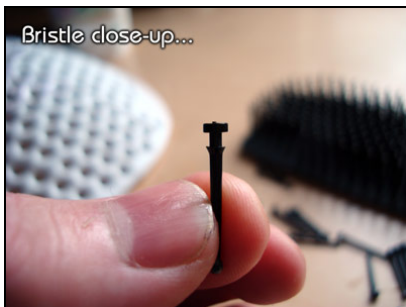
1) Carefully cut the pad off of the paddle brush (and I borrowed this picture from my original laser brush instructions because I've already removed the pad and I can't find the handle anymore):



2) Remove the bristles from the pad:

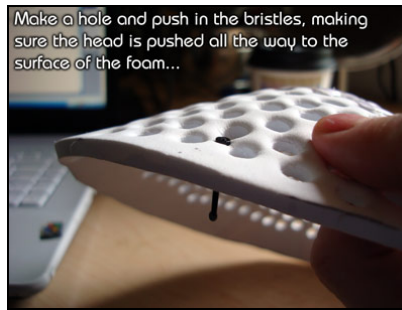


Just push hard and they will pop right out the back. Also, notice the bristles have an edge on them that secured them to the rubber pad:

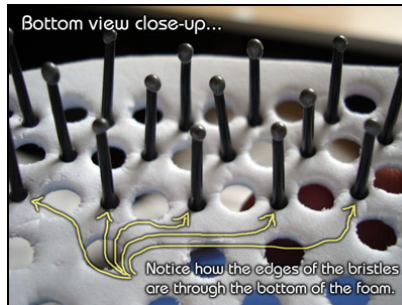


Obviously, our foam *\*was\** thicker than the rubber pad, but you will find that in the areas that we smashed the foam into oblivion by punching holes, the edge will indeed come out the bottom and secure the bristle to the foam good enough for our purposes! that's not likely if you use a small, thin nail). If it *\*doesn't\** go all the way through to the bottom -as it does in the areas with electrical tape- it will still be secure enough (and if not... you can put one drop of super glue on it although I never had to).

3) Make holes with the small nail in between the diode holes and push in the bristles...



Make sure you press them all the way in, so the head of the bristle is touching the surface, and take the time to get that bristle edge through the bottom...



By the way, I started my bristles in between the first and second rows.

Obviously, because our diode holes are often placed "creatively" and less-than-uniform, there will be a few areas that we can't fit a bristle. So what?! lol... It'll be fine! There will be plenty of bristles.

Also, you don't have to put them right next to the electrical tape rim along the side. This is because the foam spacer is actually going to be slightly TALLER than the bristles, so the bristles right there probably wouldn't even be touching your scalp.

One brush got me a little further than 3/5ths through (maybe actually even more like 5/7ths), and here is what it looks like so far from the top...



...and on the bottom:



Note that in the bottom, some of the bristles are pointing in to each other or slightly in random directions. That's ok, too! We are going for the "big picture" here, and besides... of course some of the bristles are going to be pointing into each other -it's a concavely curved surface!

Here is me going to Wal-Mart when I realized that only one brush wasn't going to have enough bristles to do the job...



And here is the brush that I saw that really pissed me off...



I could have used WHITE BRISTLES! lol... Hey, in my defense, I bought that brush over 7 months ago when I made my fist helmet!

TA-DA!!! You're finished...







And MAN, it really conforms to your head very well...



Of course, we BUILT IT THAT WAY, so that's no surprise! Here's how many bristles I used if you are curious...



That's it for this step! The next step we finish everything involved in the pre-wiring stage, and the hardest part -the helmet- will be complete!

-O.M.G.

### Step 6: Completing the Helmet!

In this step, we finish the "Laser Messiah" helmet! Let me tell you... it is EXTREMELY SOLID! When the pieces are together, they support each other and it's every bit as supportive as a hard shell, store bought helmet... but with all the benefits of a custom fit, cheap cost, and everything else we've spelled out!



Yep...

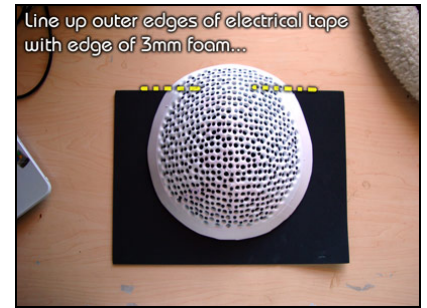


...my cat was there for this last step, too. DEAL WITH IT!!! lol...

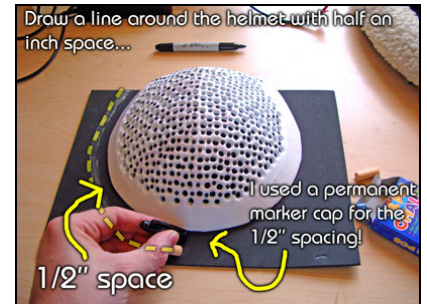
You will need one sheet of 3mm foam and three sheets of 6mm foam -one for each layer- the one or two eyelet sets from Wal-Mart, and shoe laces. Ok, Let's finish this thing!

1) This is for cutting the top eyelet holding foam, so it requires the 3mm black. Unfortunately with this step, you can't just cut a strip and conform it to the bottom due to the shape of your helmet, so you have to cut it in a pattern that mimics the helmet!

Put the top part of the helmet on the 3mm black foam, lined up at the start of the electrical tape on each side:



Then draw a line with a HALF INCH SPACE around the helmet...



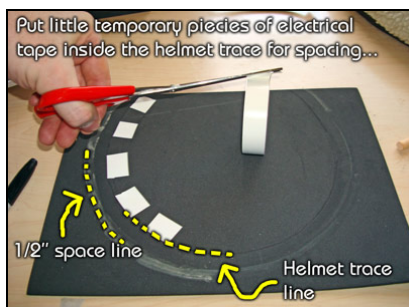
I used the permanent marker cap as a "spacer" because it's about half an inch! Also, I tried to use chalk here because I thought it might show up a little better in the picture, but it didn't really. I used permanent marker after this (and yes, it shows up on the black!).

Then, on the same piece of 3mm foam, draw an line right around the helmet (no space):

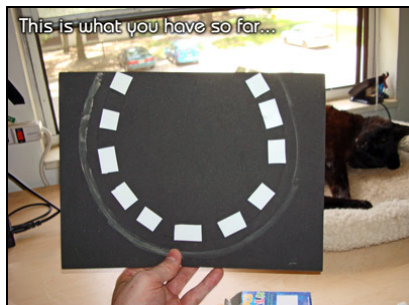


Ok, remember we want the foam to be the width of the electrical tape under the top (that's why we put the top electrical tape rim and didn't put diode holes or brush bristles there), so I thought that the best way to do this was to actually use temporary pieces of electrical tape to mark that width...

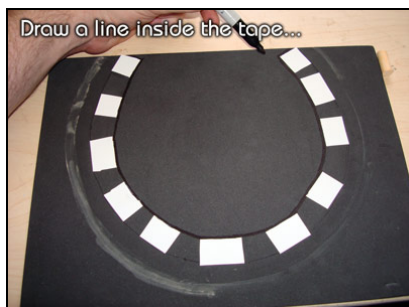




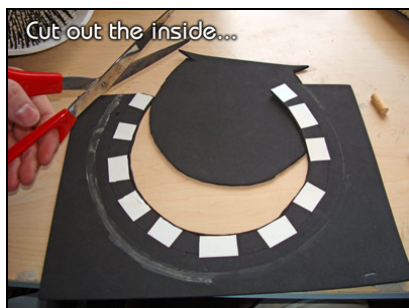
Don't press hard on them because you *\*will\** remove them! This is what you have after you do this step (remember, the chalk was just an attempt to show you guys what I was doing a little better):



Make a line with your permanent marker around the inside of the tape:



Grab your scissors and cut out the inside...



...And then cut out the outside:



Peel off the tape, and you are left with this:



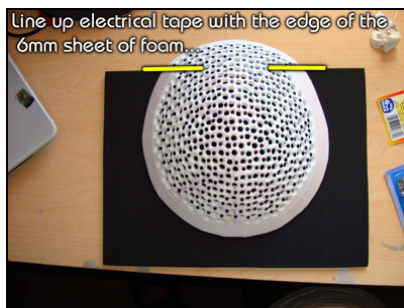
You can see that it will fit in the inside of the helmet (BUT DON'T GLUE IT YET!!!)...



You are through with the top eyelet holder!

2) Now is the time for the three foam spacers, using the three sheets of 6mm foam! THREE?! Why do you want to use three? Simple... we want the foam padding to be **TALLER** than the bristles because we want as much weight as possible from the future diodes to shift OFF OF THE BRISTLES and on to the foam padding! Trust me, we need this!

Ok, this step is very similar to what we just did, but we don't need a 1/2" spacer! So, we start by putting the helmet on the 6mm foam and aligning the electrical tape of the helmet to the edge of the foam:



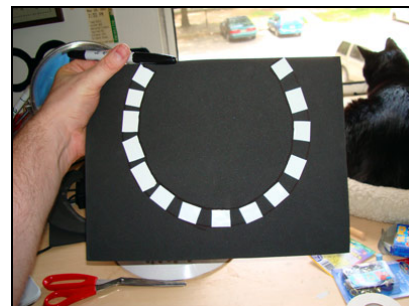
Trace the helmet on the sheet with the foam marker:



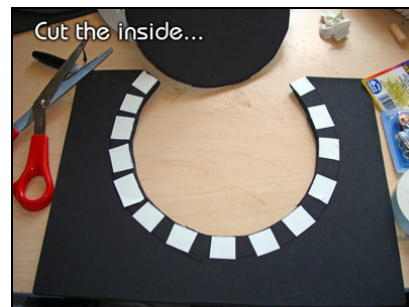
Then do the same electrical tape trick that we did before:



And you have this:



So cut the inside...



...And the outside, and you are finished with the first 6mm foam padding layer!





Ok, now that you have one complete, save some time and just use the finished first 6mm foam padding layer to trace the other two directly on the other 6mm sheets:



If you notice, I wrote "UP!" on all the pieces just to make sure (and that's the side I'm going to put the glue on, too!).

So, do all of that twice so you now have a final total of one wider 3mm piece and three 6mm pieces!



3) Now... we GLUE THEM ON!

For the first layer, it is EXTREMELY IMPORTANT that you make sure you have at least a 1/2" hanging out for the eyelets. Therefore, I used the slower drying glue -even though it was a pain- just so I could "play around" with the location (if think you are good at this, then you can go straight to the Super Glue Gel!).

So, put the glue on the wider 3mm layer (on the side with the markings, and on the inside part where the electrical tape was)...

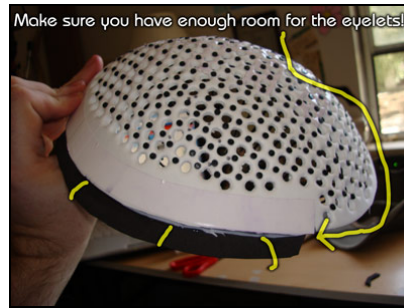


...And if you are using the slower drying glue like I was, you will want to let it get a little tacky first before you glue it, so let it sit for a few minutes! THEN press it on, BEING VERY SURE TO GIVE YOURSELF ENOUGH SPACE FOR THE EYELETS! I can't stress enough how important that is! lol...

When you are finished, trim up the ends if necessary...



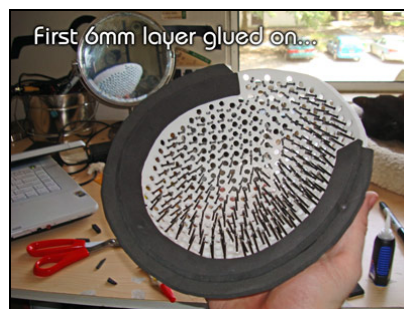
...And make sure, once again, that you have enough room for the eyelets:



Glue the first layer of 6mm on with the Super Glue Gel (flush with the inside of the 3mm layer)...



...and you have this:



Yes, I trimmed up the edges to make sure it fit. [If for some reason it's *too short*, you can always stretch it a little!]

Glue and trim the second layer...



...and finally the third layer!



Ok, you'll probably have glue mess everywhere:



Don't worry, you won't be able to see it! lol... HOWEVER, I want you to notice that squared end. I didn't like this because it was sort of blocking the edges of my temples a little bit. So, what I did was angled the scissors and cut it...



Yes, believe it or not you can do that and it works! So now it looks and functions better, and here's what you have...





Ok, you are DONE with everything having to do with gluing foam! lol...

#### 4) Determine the location of the eyelet holes!

As you see, the top and the bottom 3mm foam for the eyelets match up pretty well:



So, if we put the eyelet holes on the top a certain way, then they should match up no problem with the holes on the bottom.

Ok, I said before that I thought TWO eyelet packs from Wal-Mart were necessary, and this holds true here because the best way I could figure to make the eyelet wholes even without putting too much work into it and by simply eyeballing it required 17 pairs! There are only 15 pairs in each eyelet pack. With two packs, you also have extras in case you mess up later putting them in (I messed up on probably 6 or 7! lol...).

Here's how I determined that I needed 17, and don't let this graphic confuse you...



All I did was put 1 at the top left, 2 at the top right, and 3 at the bottom middle, and then I kept putting eyelet holes in the center of where I put other eyelet holes. Follow the numbers and colors on the graphic above and you'll figure out what I'm talking about. If you can't figure out what I'm doing, then just put them wherever the hell you want to and make sure they line up on the bottom, ok?! It's not a big deal.

#### 5) Make the eyelet holes!

This step was a little awkward! lol... maybe a drill would have been better, but I didn't use it in the spirit of making this completely "power tool free"! Yep, rig up whatever way necessary to do it like the instructions

in the eyelet pack, and grab your hammer. I started with using the tool provided...



...but I eventually used the hole punch (with whatever size tip that matched up with the tool) because it's a better tool!



I also went back to using a scrap layer of foam under it. For some reason that seems to work a lot better for me.

Finally, you are finished with the top:



Do the same thing with the bottom, and figure out whatever way is best for you to make the holes...



And finally you are through with all of this holes on the bottom part, too:



Like I said, the holes should match up close enough if you are doing it the way I did it.

#### 6) Put the eyelets in the hole and smash them on!

Ok, you will probably mess up a few times on this step because it takes some getting used to! Usually, you CAN get the messed up eyelets out without a problem, but I will admit that I have one eyelet that might have a little Super Glue on it! lol...

A word of advice... you need to hit it HARD with the hammer. The ones that I messed up on I'd say for the most part were because I didn't hit them hard enough! Like I said... you'll get used to it and be a pro in no time! And even if you do find it agonizing and tedious, remember...

You only have to make this once!

Oh, FYI... if you got the eyelet kit like mine, then you will have half brass and half silver eyelets. I just alternated silver/brass/silver/brass etc, and mirrored that pattern on the bottom part as well. This helps you quickly identify which holes match up with each other!

Ok, follow the instructions provided in the eyelet kit, and use the tool and smash the eyelets in on the top:



Here's the finished top:

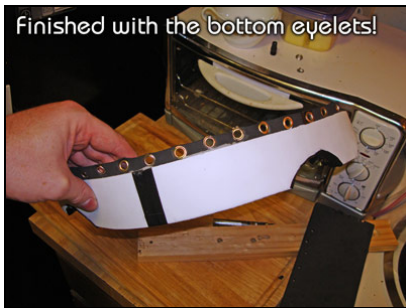


Smash the eyelets in the bottom:





And you are finally finished with the eyelets!



#### 7) LAST PART! WOHHOO!

Ok, you can see that the eyelet holes match up pretty well:



So now, we are going to get shoe laces and lace them up! One word of advice -no matter how you lace it- you may want to lace it up in three separate parts with three separate laces -one for each side and the back. This is because it'll be easier to adjust if one side needs a little tweaking! Since I had 17 pairs of holes, I used 6 holes on the left side, six holes on the right side, and five holes on the back.

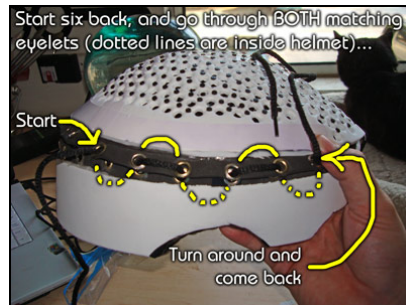
Ok, so lace them up WITH WHATEVER STLYE YOU WANT, and in which ever way will work best for your design!

For instance, if you figure out that you have a lot of space between the two sections, you could lace it up just like a shoe...



If at all possible, though, I wouldn't do it that way. I'd lace it like I did, which makes it so the headband and the top part are "fused together", and adds much more support. I did this by lacing it this way...

I started from six holes back, went through both matching holes, alternated my way to the front...



...turned around and came back..., stopping at the eyelet before the one I started on:



Now we can tie it later!

Lace up the second side...



...and finally lace up the back:



Test it to make sure it fits! Note: my headband fits slightly higher in the back now, but that doesn't matter. It still gets tight, and the fact that the two parts are now "fused together", it adds a ton of support that I wouldn't have had otherwise.

Ok, if it fits... now, you can tie it, cut it, and burn or tape the ends or whatever so it doesn't unravel!



...AND YOU ARE FINISHED!!!





In the future -maybe even sooner than later- I might make a "**Part II - How to determine how many diodes you need and the proper power supply**" and a "**Part III - How to wire the Laser Messiah**". All that stuff is the *EASY PART*, and it's all over my site how to do it, but I still may take the time to spell it for everyone so there will be NO DOUBT how easy this stuff is!

Now, go forth and multiply [your hair]!

**-O.M.G.**

**PS-** I don't know, but this could potentially happen to some due to the uniqueness of our designs. After you have completed the helmet and after you've installed all the diodes, if for some reason you find that the diodes are still too heavy and are causing the bristles to press down too hard on your scalp, all you have to do is simply "annex" some of the area with diode holes and bristles on the sides (where you more than likely won't be using diodes anyway), and put a little bit of foam there, too! Just make sure that it's "taller" than the bristles, and a little piece on each side will go a long way. But you are officially a "do-it-yourselfer" now anyway! Lol... You didn't need \*me\* to tell you that!