Subject: Speaker Voice Coil Cooling System Valve
Posted by Wayne Parham on Mon, 27 Jun 2005 22:26:45 GMT
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The prototype valve for the speaker voice coil cooling system is in my hands, ready for testing.

Voice Coil Cooling Valve

Cooling Valve Inserted in Speaker Magnet

The prototype is longer than production versions will be, and it is also slightly larger diameter. If it proves to work well, we'll streamline the device and make it smaller and easier to fit inside loudspeaker cabinets.

Voice Coil Cooling Valve Input

Voice Coil Cooling Valve Output

You can see the shape of the orifices inside the fitting in these photos. Unidirectional flow is created because each duct makes airflow turbulent in one direction, impeding flow in that direction. Airflow is laminar going one way and turbulent the other. That makes it much easier to flow one way, and by using two ducts, a warm air outlet and cool air inlet are formed. You would be surprised how effective this is. The difference in flow is immediately obvious, even when just putting your hand over the ducts and feeling gusts of air.

The next step is to connect pipes to the fitting and install an intercooler. There are a two pressures to balance: The volume of air inside the ducts and the volume of air behind the speaker cone. Each of these will contribute to cooling effectiveness and to system tuning. The rear chamber volume will be increased by a small amount due to the additional volume in the cooling system. This will reduce fb. Also, the volume of the cooling system should be large enough that flow is encouraged instead of pressure.

Subject: Re: Speaker Voice Coil Cooling System Valve
Posted by ToFo on Tue, 28 Jun 2005 18:14:22 GMT
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Hi Wayne,that is really great looking. I will be excited to see what happens next. I have often scratched my head when simulating some of the long coil drivers, only to see that in my desired alignment (or any other in some cases) they can't reach xmax within thermal power limits. your package actually looks small enough to work with the small amount of air slug volume available from the dustcap back.too cool,Thomas

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Subject: Re: Speaker Voice Coil Cooling System Valve
Posted by Wayne Parham on Tue, 28 Jun 2005 20:46:54 GMT
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I still remember when you and I discussed this almost a year ago. It's pretty exciting to be working on it, and I'm more and more surprised it hasn't already been done.

Subject: Re: Speaker Voice Coil Cooling System Valve - Initial Tests
Posted by Wayne Parham on Tue, 28 Jun 2005 23:09:54 GMT
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I am running a LAB12 with the valve installed. The signal is 40Hz, 40VRMS, which is approximately 400WRMS. I am running the driver open, so there is no pneumatic load to help the driver mechanically but it is not reaching its mechanical limits. I've even put 50VRMS into the speaker, which is 625WRMS. That exceeds both electrical and mechanical limits, but not violently.I'm very excited about what we've done so far. We're really on to something here. There is obvious unidirectional flow. So that part is working. The heat generated by the speaker is tremendous, and my gut feel is that when the driver is used in a small sealed box such as the rear chamber of a basshorn, it must be superheating the air inside. I'm fairly confident that the majority of failures are thermal, provided it is used above the quarter-wave frequency, within the pass band of the basshorn. Whatever the case, we will certainly be reducing the heat inside by a lot.Now the question is how much is a lot. We were going to use an infrared sensor to get some readings of the voice coil and magnet today, but we ran out of time. We also learned enough to realize we need to make a change first. Then we'll get some quantified measurements.The thing we plan to change is the inlet. Right now, it's just a pipe. We plan to machine one from aluminum that has a lot of very small holes instead of one large one. The idea is to increase surface area. What we discovered today is that most of the voice coil heat is radiated onto the front plate and center pole instead of being convected into the air surrounding the coil. So we want to increase heat conduction from the center pole to the inlet, and use it as a heat exchanger from magnet to air going into the device. This will make total heat transfer better, and the system will be more effective. After we've made this change, we'll take heat measurements and make comparisons.

Subject: Re: Speaker Voice Coil Cooling System Valve - Initial Tests
Posted by Wayne Parham on Wed, 29 Jun 2005 01:28:17 GMT
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One other thing I forgot to mention. The venting system in the driver itself appears to introduce some unidirectional flow. The port tends to exit air more than it takes in. I expect there are turbulent regions that make the system tend to draw air in more around the spider and exit air more through the vent. The center pole gets extremely hot way down inside the motor, getting hotter as you get closer to the front plate. That's why we want to heat sink it to a metal duct that contains several small capillary-like passages. The metal duct will conduct heat away from the motor, and the capillary-like passages will have a large surface area to transfer this to the air.If I were installing a cooling device like this in a loudspeaker with one of the cabinet walls very near the magnet, I might be tempted to make a large plate that acted as a heat sink, and connect it to a heat-conductive metal duct inserted deep inside the motor. This would allow air to pass through the duct, but would also heat sink to the plate. So for basshorns made this way, that might be a very attractive option. It's a similar system, but it uses the access panel as the heat sink.Don't just place the heat sink near the speaker and hope convection will cool the motor. It won't. You'll need physical contact between the access plate and the vent, preferably via a metal duct that extends deep into the motor, and so has a lot of surface area contact with it. Also, I found that once a panel is placed within about 1/4" of the vent, it was shrouded so effectively that flow was reduced to almost nothing. So be careful that the vent isn't restricted and there is adequate flow.

Subject: Re: Speaker Voice Coil Cooling System Valve - Initial Tests
Posted by ToFo on Wed, 29 Jun 2005 14:55:53 GMT
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Wow, internal heatsink, crazy! As a quiet pc enthusiast I have considerable experiences to share in a couple of areas. You may already know these, but it can't hurt, so... Steel and iron are bloody awful as a heat sink material. About 1/4 of the efficiency of aluminum or copper. You will never get great cooling from a speaker pole, but you can make it better. A great thermal interface for your aluminum capilary or fluted pipe might do it. While we may never escape thermal runaway, we only need to significantly raise the threshold to be a success. My two cents is to go with the best thermal paste you can get. Using better paste will give you a 3-5 degree celcius advantage on a cpu. Most dismiss this seemingly tiny "advantage", but my experiments show that on otherwise identical systems, you would have to use twice the airflow to match the effect of the better paste. Try your best to get a really nice fit on the sink in the pole. Paste manufacturers say the thinner the paste the better the transfer, so close fit is it.Thomas

Subject: Re: Speaker Voice Coil Cooling System Valve - Initial Tests
Posted by Wayne Parham on Wed, 29 Jun 2005 17:28:09 GMT
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I was thinking along the same lines. The conductive paste material between transistor and heat sink comes to mind. We'll use a pressed-fit aluminum vent and drill it with several capillary holes. It fits snugly in the center pole, so conductive heat transfer is good. The one we already have worked very well to introduce unidirectional airflow, and now we want to augment this with improved thermal conductivity from the center pole. I'm extremely encouraged with our progress so far.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink
Posted by Wayne Parham on Thu, 30 Jun 2005 16:59:36 GMT
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Since the motor core becomes extremely hot from induction and radiation, one could sink the heat into a device like that shown below.

It's a simple device, just two parts.

One part is a large aluminum panel that attaches to the cabinet. If the system is a basshorn, this can double as the access panel. It is just a large sheet of aluminum, thick enough to prevent vibration or panel flex, since it will be used as part of the loudspeaker cabinet. Grooves may be cut in its surface to increase surface area. That's the key, because it will function as a heat exchanger, as a radiator of heat.

The second part is an aluminum rod, of diameter that fits snugly in the speaker vent hole. On one end, it is drilled with a threaded hole to accept a bolt, so it can be attached to the radiating panel. On the other end, it is drilled with a larger diameter hole, to act as the duct for cooling air. Holes are also cross-drilled along its shaft so that cooling vent air can pass through it.

The duct should fit snugly. When completely inserted, the internal end should be approximately flush with the front pole piece. That way the aluminum tube touches as much of the pole piece as possible, for most effective heat transfer. But it is not longer, so that it doesn't interfere with the cone or dust cap at high excursion.

These parts are simple and can be machined at any competent machine shop. Assembly is straight-forward. Put some heat-sinking compound on the open end of the tube and slide it into the speaker magnet vent. Use the same compound that is used on power transistors when mounting on a heat sink. Put some heat sink compound on the threaded end of the tube also, and attach it to the radiating panel with a bolt. Tighten the panel down and you're done.

This kind of system can be used on basshorns with access panels near the speaker magnet. It can also be used in standard direct-radiating cabinets, by making a version with a longer rod that reaches from the cabinet to the magnet.

Speakers with exposed magnets, such as dipoles, isobaric and push-pull configurations may benefit from ducted arrangements since they serve to muffle vent noises in addition to assiting in cooling. But if the magnet isn't exposed, then this simple heat sink radiator might be more attractive.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink
Posted by ToFo on Fri, 01 Jul 2005 03:20:36 GMT
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I like this concept. I am not a master of heat, but I read from what I consider a good source, that beyond a certain short distance, heat conduction falls off rapidly. From what I remember it seemed like the inverse square law with shorter dimesions.(suposed to be the reason for heat pipes) Is this true? Would that force you to have a really short pipe? would a more heat conductive metal like copper help out? Maybe copper to move the heat and aluminum to get it into the air.(also read that copper is great for sucking up heat and crappy at disipating it into air. didn't understand exactly why)Food for though (or not, I am not sure)Thomas

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Subject: Re: Speaker Voice Coil Cooling System - Heat Sink
Posted by Wayne Parham on Fri, 01 Jul 2005 03:49:26 GMT
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The M.E. would be the one to answer that, but one thing is certain. Aluminum is a better conductor of heat than air.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink
Posted by ToFo on Fri, 01 Jul 2005 05:11:12 GMT
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YUP!Anyways, I am glad I haven't built subs yet. I am real happy about all of these recent developments. I am not only going to shake up the living room. I now have DJ and live duty to think about. Loud enough mid/high for the size crowd I'm looking at is no mystery, but with todays expectations of bass performancve this sort of development could make a difference. Real world stuff like me using my little trailer, or having to borrow/rent a bigger trailer and/or truck. Low and

loud PI subs = tasty treats!Keep the coolness coming,ThomasP.S. I did a party with just my Theater 4's and my Brothers Theater 3's and a little help from 1200 watts. We had people asking what made it sound so sweet. cool huh?

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink
Posted by bgavin on Sun, 03 Jul 2005 02:03:56 GMT
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Computer processors specifically use copper to wick the heat away from the core, then use aluminum fins to dissipate that heat to the atmosphere.Copper has a superior heat transfer coefficient, and aluminum has a superior heat dissipation function.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink
Posted by Wayne Parham on Sun, 03 Jul 2005 05:08:23 GMT
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You could build it out of copper instead of aluminum if you wanted to do that. Either is better than none.The pole piece of a loudspeaker pushed to its limits gets very hot. The air rushing back and forth in the vent is not heated much at all, but the magnet gets hotter and hotter, with the center pole and front pole piece getting the hottest. The air inside the cabinet can become hot, in which case the air surrounding the voice coil is hot too. So the idea is to transfer the heat into some kind of heat exchanger and get it out of the box.

Subject: Thermal limits vs Excursion Limits
Posted by Wayne Parham on Fri, 22 Jul 2005 17:18:33 GMT
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I'm very excited about this cooling device. It is turning into a very simple and inexpensive option, less than half the cost of the woofer. So we are anticipating being able to increase the power handling enough to represent doubling the number of woofers at a cost of half that of the woofers. That's two times the punch for half the cost!I don't know if you've followed the threads, because I've had discussions here, on the AudioRoundTable.com ProSpeakers forum and on ProSoundWeb. But the amount of heat we've been able to dissipate is significant.I'm still testing, so I'm just leaking information out right now as I get it. We're building a prototype horn now, to test the device as it will be used rather than on a bench. But what we have found out so far is startling.There has been a common misconception that excursion was the primary cause of failure, and that power levels could be increased some four-fold when horn loaded. But that is not true. While horn-loading increases efficiency, it doesn't do it enough to turn all electrical energy

into kinetic energy so heat is still a big problem. In fact, it may be worse because of the confined spaces the drivers are used in and the fact that horns reduce excursion which reduces vent air movement.There has been another common misconception that heat is carried away mostly by air conduction or convection, and that radiation is not significant. The idea seems to be that if the voice coil were hot enough to be radiant, it would be such a problem that this possibility is overlooked. But the fact is that is the way most voice coil heat is transferred, by black body radiation into the pole piece, and not by convection or conduction into the surrounding air. The best thing you can do to remove heat is to conduct it away from the pole piece, so the voice coil is in the coolest environment possible. Of course, keeping the air cool is also important for the same reason.Sure, you can over-extend the driver by feeding it a 20Hz signal at 45 volts, but it will sound like an engine running without oil and it will fail very quickly. When a driver is sent a signal that moves to beyond xmech, it suffers mechanical interference. You're basically beating the driver to a pulp and damage is quick and certain. This can happen from a quick burst of low frequency energy. The solution is high-pass subsonic filtering. As for continuous use at high power levels, the real culprit is heat, not excursion.Thermal limits are less obvious than mechanical limits. A voice coil failure is usually the result of long term exposure to heat. You could fuse the coil by a quick burst of energy, but that's not what usually happens. The normal failure mode is failure of the glue that holds the voice coil in place. Voice coil heat expands the metal and also weakens the glue. Eventually, the over-heated voice coil shifts enough to rub or come undone entirely. Once a part of it moves away, it can fuse or flex break so sometimes it fails that way too.To give you an idea how hot things get, we measured the LAB12 driver in free air, temperature at 72º Fahrenheit. This is a considerably cooler operating environment than a small sealed chamber in a basshorn.We generated a test signal for 20 minutes and then measured temperatures after that period of time. The speaker was presented a 40VRMS, 40Hz signal cycled 15 seconds on, 15 seconds off, ambient temperature of 72º in free air. This is a fairly conservative level, less than 400WRMS when running and plenty of cool down time between signal bursts. But even at this level, there was a noticeable burning smell and a considerable amount of heat produced. The driver is not at its thermal or mechanical limits though, so it is not at risk of failure.The center pole piece measured 165º Fahrenheit under these relatively mild operating conditions. It actually rises a couple of degrees over the course of the 15 second on time, then after the signal shuts off, it quickly rises another two or three degrees to a maximum of about 170º. It then begins to cool, and over the course of the next 15 seconds, it drops about five degrees back to the 165º point.I wouldn't be surprised if you measure the same thing inside a basshorn with a small sealed motor chamber, you'll probably find the pole piece is hot enough to boil water.We considered running at 400WRMS continuous, with no cooldown cycle every 15 seconds but we did not want to risk damaging the woofer. We will do destructive tests later.The cooling system appears to be enormously effective at removing heat from the motor chamber. This is exciting, since having cool air surrounding the voice coil is important. Getting heat out of the pole piece and magnet keeps them from being heat soaked and prevents average voice coil temperatures from continually rising to the point of failure. I'm expecting system power ratings to double, but we'll not know for sure until we've built the prototype horn with the cooling device, so we can test the entire system. We'll find out soon enough.The venting techniques used to cool drivers are good, but it is just as important to keep the metal surrounding the voice coil cool too. Especially in the case of basshorns with small back chambers, doing something to get the heat out of the box is important for long-term high-power use. And the same piece used to conduct heat out of the motor structure might be used as a shorting ring as well, which serves to reduce harmonic distortion. So this is a very exciting concept indeed.

Subject: Re: Thermal limits vs Excursion Limits
Posted by ToFo on Sat, 23 Jul 2005 06:32:21 GMT
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I am excited as well. Many times I have simulated with various long excursion drivers, only to find that some don't do xmax in band until 2x thermal power in the desirable boxes. I was beginning to wonder about the designers intensions. Now you're talking about getting all the travel these drivers promise, and not replacing them all the time. I know all too well about frozen, open and detached VC's. The shop I used to work at sold competition car audio as well as hi-fi. I have seen VC's deform into the gap, but I never saw a "backplated" coil or ripped suspension in a good box.I really want to build a pair of these horns your working on. I have done enough simulation and real world stuff in the last few years to already see the potential. I want subs that can modulate my voice.(so please test that capacity while you are torturing the prototype)Thomas

Subject: Re: Thermal limits vs Excursion Limits
Posted by Wayne Parham on Sat, 23 Jul 2005 15:11:25 GMT
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two LAB12 drivers and two of the cooling plates. I've got the best prices on Eminence drivers of anyone I know of, so I've got you covered on the LAB12s. You can either have a local machine shop make the parts for the cooling plate or you can get them from me. I sent out quote requests to about 50 machine shops across the country and I think I found a pretty good deal, especially when buying in moderate quantities. All told, you're looking at $500-600 in materials costs (wood, speakers, aluminum and machining), depending on the price of wood in your area.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Thu, 04 Aug 2005 04:23:53 GMT
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Here are some photos of the prototype device:

Cooling plug

Top View

Bottom View

The prototype was made using a piece of 6061 aluminum tubing, lathed down to fit into the woofer cooling vent. It is sized to fit snug, not so snug that it is difficult to insert cold but when the aluminum heats up, it expands more than the iron of the pole piece, so it is difficult to move unless it is cold.

The top section is not lathed down, which acts as a stop. Holes are cross-drilled so that vent air is free to pass. An aluminum plug is fitted into the top and is press fit and pinned in place. It is threaded to accept the bolt for mounting the heat exchanger, which doubles as an access panel on basshorns.

Production units will probably be a one-piece design, cut from a billet of aluminum on a CNC machine. It will depend which is more cost effective. The two-piece design is fine, as long as the slug in the top is press fit so the interface is good for thermal transfer. The two-piece design is probably more labor intensive, so we'll see.

If you have a shop, you can build these for very little money. McMaster-Carr sells the aluminum tubing, and you only need a few inches per speaker. Measure the depth of the center pole, and cut it so that the length matches when fully inserted. Then drill holes in the top so cooling air passes through and press fit an aluminum slug to seal the hole. Drill and tap the top and viola! You have a heat transfer tube that will cool the motor a lot better than air cooling alone would do.

If you don't have a machine shop, contact me and I'll get some prices for you. I'll probably make these available on the shopping cart soon, and we'll add sizes for popular models as time allows.

When installing the device, be sure to use heat conductive grease. It is very important that the interface between the pole piece on the motor and the cooling plug is good. You want a lot of surface area contact, so the entire length of the cooling plug should be inserted and it should be covered with conductive grease. You also want the interface between the cooling plug and the heat exchanger to be good, so use conductive grease there too, and snug the panel down well. Both surfaces should be straight and smooth to maximize contact surface area.

Heat conductive grease on pole piece, in vent hole

I would suggest removing the paint from the pole piece inside the vent hole with sandpaper. It is painted black, and this may prevent the cooling plug from sliding freely, as well it may restrict heat flow.

Use very fine sandpaper, like 600 grit, and rub slowly. Make a few swipes and remove the sandpaper and check your surface. Wipe it clean with your finger to see if you've removed the paint and see shiny metal.

Once you're through the paint, stop. It goes pretty quick. If you sand the metal, the tiny filings will stick to the surface. So wipe it down pretty good after you're done.

Next, cover the surface with heat conductive grease. This will both protect the exposed metal and serve to improve heat transfer. Apply it as a thin uniform film. Insert the clean cooling plug and

pull it right back out. Inspect the tube to see where you have contact. It will be white where there is contact and not where there isn't. If the tube is white all along it's surface, reapply the film and reinsert. if not, apply a slightly thicker film and try again.

The point of this is to make sure there is plenty of conductive grease and that there is no space between tube and pole piece that isn't filled with conductive grease. We want contact all along the surface. But we don't want so much grease on the pole piece that the cooling plug pushes it down into the area behind the dust cap.

Once the cooling plug is inserted, you can mount the speaker in the cabinet, and then mount the heat exchanger onto the cooling plug.

Cooling plug inserted, ready to attach to the heat exchanger

Heat conductive grease applied to cooling plug prior to attaching heat exchanger plate

Fastening the plate to the cooling plug

Heat exchanger assembled and ready

Heat exchanger assembly inserted in woofer

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Sat, 06 Aug 2005 02:39:04 GMT
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Ahhh, and they say a picture is worth a thousand words....yup, I'm going to throw one together. Maybe even make a nice SW drawing just for the hell of it.does it have to use the giant heat exchanger plate? I plan one using this on a Tuba30slim, where the access panel would be one large chunk of alumn. (a very expensive chunk of alumn.)

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Sat, 06 Aug 2005 06:20:19 GMT

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Anything can function as a heat exchanger, but it's best to have a lot of surface area. A wide plate or even better, one with fins or grooves machined into it is best.I'm using the access panels as heat exchangers, just like you've described. You can have them machined out of 5052 alloy and not get beat up too bad on the price.We've taken bids from several machine shops across the country and Canada and gotten prices that range from about $50.00 to over $300.00. I'm planning to have the plates and heat tubes made in quantity to get the costs down. Unless you use the most expensive machine shops, even if you do it in single quantity, your cost shouldn't be more than about half the cost of the woofer, even if precision machined. If you do the machining yourself, the cost is even less.Let us know how yours works out.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Sat, 06 Aug 2005 15:23:19 GMT
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I was planning on DIY, the shop I work in has a lathe and a vertical mill.thats still one large peice of alumn.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Sun, 07 Aug 2005 07:39:50 GMT
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Sounds good, keep us posted.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Sun, 07 Aug 2005 16:58:11 GMT
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Will doWhere'd you get the greese from? Any way to find it locally?

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Sun, 07 Aug 2005 17:09:59 GMT
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Check the local electronic supply in your area. Ask 'em for heat sink compound. It's the same stuff you apply to the back of a power transistor when mounting it on a heat sink.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Sun, 07 Aug 2005 18:19:33 GMT
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I knowI've just never seen a tub of the stuff (It usually comes in small tubes)I suppose RatShack would have it; At a price.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Tue, 09 Aug 2005 01:23:01 GMT
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http://www.radioshack.com/product.asp?catalog%5Fname=CTLG&product%5Fid=276-1372about 3ish tubes should do?Now (upon acually getting started on building the cab) It looks as if room is limited. I cant wait to get the mag's here and startup this project.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Tue, 09 Aug 2005 03:10:51 GMT
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That's the stuff.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Tue, 09 Aug 2005 20:57:01 GMT
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Got the stock today.Mine are going to be made out of 1 Inch roundstock, and will be one solid piece.I dont know how I'm going to do the holes (I'm not all to good with the indexing head)

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Tue, 09 Aug 2005 21:15:07 GMT
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Very good, sounds like you're on your way.How far is the panel from the magnet in your basshorn?

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Wed, 10 Aug 2005 21:38:34 GMT
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I'll tell ya when the speakers get here.I cant afford a gaint peice of alumn. but I do have some heatsinks here that look to be a good size for it.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Mahendra Palesha on Mon, 15 Aug 2005 02:17:15 GMT
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There r two poles of the voice coil. If we make one pole directly earthed to the body of the woofer then what will be the effect? will the body of the woofer not work as a heatsink?

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Mon, 15 Aug 2005 02:39:16 GMT
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Yes it will, and it seems to me that might be a good idea. The trick would be to make it in such a way that it can conduct heat away without fusing. Might also be good to use materials and fabrication techniques that promote heat transfer from the coil to the former to the cone and spider. Possibly these can be made to function as heat radiators. The proposed solution is attractive because it is easy to implement on existing speakers, and measurements show that it works very well at removing heat from the motor.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Thu, 18 Aug 2005 17:25:49 GMT

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I just received the drivers.Their's this nice well-built grill over the vent. I cant see going at a nice expensive with a pick to pry it off.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Thu, 18 Aug 2005 21:12:44 GMT
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Nothing to it. They all have that mesh, but it's just pressed in. It is very easy to pop out.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Monomer on Fri, 19 Aug 2005 00:31:59 GMT
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It all sounded good until I got the speaker here...I'm having second thoughts now, the value of the speakers is far to high for me (even taking the sandpaper to it...)But I do have a peice of alumn. (enough to make 3ish) I'll do a bit of work on the horns (I still dont know the clearence) and then make up my mind. My boss brought up a good point, if you need a few made just send me some prints I'm real handy on the lathe (until you get your cnc setup) - Just a thought.

Subject: Re: Speaker Voice Coil Cooling System - Heat Sink - Photos
Posted by Wayne Parham on Fri, 19 Aug 2005 01:58:34 GMT
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Maybe you would feel better buying a pair of inexpensive drivers to try it out on. Of course, the lower power models won't get as hot, but it will at least allow you to get the feel for what's required.As I said in my last post, the mesh is only press fit in the vent. There isn't even a groove that they fit in, so the only thing that holds them is friction. I've had them come out all by themselves after a few years.