Subject: Re: Basshorn or Transmission Line
Posted by Wayne Parham on Tue, 14 Jun 2005 07:46:56 GMT
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We're still working on the cooling system. Actually, I was busy doing other things during the whole first quarter of 2005, so it was on hold because of me for a while. But we're back on track now and I expect to have some samples pretty quick.Danley uses a cooling system that has a fan connected to the signal line. As I see it, this has its own set of advantages and disadvantages. It provides additional cooling when needed most, by virtue of the fact that the drive signal is also used to power the fan. So the fan won't spin until the drive current is relatively high. That's a simple setup and pretty cool, no pun intended. But the disadvantage as I see it is that the speaker output circuit is polluted by the presence of rectifiers and fan brushes and windings. In a prosound environment, that is probably not as much an issue, but I still think I'd prefer to use the speaker motor itself as the air pump. The linear motor is pretty strong, and it provides a pretty good blast of air that could probably be better utilized for cooling.You're right that the addition of ducting changes tuning, at least on drivers as they are made now. There is no seal between the area under the voice coil cap and the area behind the cone, so there is communication through the gap, a small pressure leak.A woofer could be made with a rubber spider that sealed these two areas, and then the pumping action of the cooling system I propose could be greatly improved, making a very efficient pump. Even then, the volume of air behind the cap would still affect the woofer's compliance if it were made small enough. But a woofer sealed this way could be used to form a much more efficient air pump when used with valves, and the vent could be ducted to free air so that the air behind the cap didn't make any impact. With no vent back pressure, the rear chamber could be tuned solely with the chamber behind the rear of the cone.Existing woofers aren't sealed this way, so the only solution is essentially a lossy pump. Also, since there is some pressure exchange between the area behind the cap and the area behind the cone, both of these areas become important to cabinet tuning. When they are both in the same chamber, it doesn't matter much but if the vent is ducted into an intercooler, it does. Some testing is required to knowm how much shift is produced when the intercooler is connected. But it is a pretty simple procedure. Just measure the shift in fb with the intercooler connected and displace some volume behind the cone to compensate. You're essentially adding rear chamber volume by having a volume of air in the intercooler, so if rear chamber volume is critical, it must be reduced to compensate.I'm pretty comfortable with this aspect. The new thing that has presented itself is the fact that there is not only a balance of pressures that comes into play for cabinet tuning, but also a balance of pressures that affects cooling airflow. The whole purpose of doing this is to provide more cooling airflow and more radiating surface area. But if the cooling system is too small, then pressures in the system will tend to reduce airflow in the ducts. There may be pressure instead of flow if the system is too small. My expectation is that if pressure behind the cone is as high or higher than pressure in the ducts, then the cooling system will probably work well. But if cooling vent pressure is higher, then it will probably start to choke the system. So that is another thing to consider besides acoustic tuning.

Rear chamber volume / Cooling vent volume