Subject: Direct Drive Revisited
Posted by jason on Sat, 17 Jul 2004 19:46:14 GMT
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Hi all, I saw a thread going back a few months on DD vs. belt drive. I am well aware of the well established audiophile notion that direct drive can muddy the sound because of lack of proper motor isolation, and yes, I have chosen to use a belt, (Rega), TT for several years, due to this. I have to admit, though, that the reason for the preference for belt never really sat well with me. I rememeber back in the day, some DDs that really had a sound, (even then), that made me prefer the sound of analog to digital. Also, as common sense would reason, I could not understand why it would be "impossible" for a well designed DD to work at least as well as the average belt drive table. The motor assembly and electronics used to control such a unit it seemed to me, could be, (if designed correctly), far more accurate, and therefore possibly better sounding than a belt drive. Recently, after being frustrated with the speed variations and weak transients of me Rega, I finally decided to "try" a DD table. What I ended up purchasing after quite some time and comaprison, was a rebuilt old Technics 1600, (late '70s), with Shure V-15Vxmr, (my Rega had the M-97, of which I liked very much), from the Turntable Factory, (www.turmtablefactory.com). Joel, the propriator there, was very helpful, and set me up with a like new, (for real), rebuilt unit. I have to say, while I expected this TT to do much better on piano notes and such, I was totally unprepared for the presentation. As far as "muddy" goes, that is nonsense. This table, was by FAR the most detailed I had heard on any source, (analog or digital), and had dynamics that would just slam the Rega. I find it somewhat amusing, (however, not surprising, that is why I posted here as opposed to AA), that the audiophile community can be so closed minded as to think that DD, (especially Technics DD), can't perforn good. The truth is, the so called entry level "audiophile" tables, such as the Rega or Music Hall, (and yes, I spent much time with both), really don't have anything on a GOOD DD table from years past.Even more so, (i hate to say), I'm also comparing this table to much more expensive units, (such as VPIs and Basis), that, sorry, aren't in the same leauge. I know I'm the new guy here and certainly don't wan't offend anyone. But, for those of you that know me, I'm NOT new to audio, by any means. Give a properly set up Technics DD a try. I doubt seriously that you will be disappointed.j

Subject: Re: Direct Drive Revisited
Posted by Wayne Parham on Sun, 18 Jul 2004 05:59:45 GMT
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You're obviously a good guy, Jason, and I appreciate your well considered and candid comments. I don't think anyone here is offended, as I think you summed it up pretty well by implying that a good implementation of either type should work well. They key phrase being "good implementation."I'm in agreement with you. I think I may be who brought up the discussion in a previous thread you are referring to. I view belt-drive turntables like engines with pushrods. The coolest customs bikes are all Hogs, and that means their engines have pushrods. But that doesn't mean that overhead cam technology is inferior. It's just what they're running, that's all.

Subject: Re: Direct Drive Revisited
Posted by Manualblock on Sun, 18 Jul 2004 13:49:54 GMT
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I don't know about muddy sound but I have always believed that the cheaper DD's sound better than the cheaper Belts and Vice Versa. DD's have the motor connected directly to the platter so the stylus is subject to motor vibration and noise. The DD is servo controlled so the speed is never right on. The belt isolates the platter from motor vibration and the play in the belt absorbs some of the speed variation. Belt drives allow the use of much heavier platters so that rotational inertia helps with the drag imparted to the platter by the stylus tracing the grooves. Compare a really good quality belt with a decent quality DD and the difference is readily apparent.The music has more depth and 3d like presentation and you get more information out of the grooves.
Turntable Factory, he's a good guy, and the prices seem fair and he does good work.

Subject: Re: Direct Drive Revisited
Posted by jason on Mon, 19 Jul 2004 00:57:24 GMT
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Wayne- I'd say that about sums it up.j

Subject: Re: Direct Drive Revisited
Posted by Manualblock on Mon, 19 Jul 2004 18:33:10 GMT
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Hi Wayne; I must say I am a bit surprised at this post. Let me see if I understand it correctly. Are you saying that DD is a more modern technology and Belt Drive is antiquated? Here is my question. Both technologies have been active for at least 40 yrs. In that time there have been untold no's. of objective and subjective tests done on both iterations. The concepts have been engineered to within an inch of their lives. The ultimate outcome has very clearly favored belt drive as witness the entire field of quality audio committed to belt driven TT. Now the only explanations require that we either accept that the vast majority of people in this hobby have been duped and are victims of audio hype and do not really hear the huge differences in sound quality they claim to hear; and as a result have spent their 2000$ on quality belt driven TT foolishly, since they can get equally good sound from their 200$ DD or their 350$ CD players. Or we accept that there are many people who need to gratify their own ego's by overspending on worthless "improvements" that aren't there.Also that TT manufacturers who can produce DD's cheaper than belt drives and stand to make more money by pushing that technology are all in collusion to create an untenable market.If both methods were equally able to resolve music would there not be some 2000$ DD's out there? This scenario holds true for every other aspect of audio. Each part of the chain has any number of adherents and all can sound great. So how to explain the lack of interest and availability of anything other than DJ tables such as Technics sl 1200? By disinvalidating the

whole concept that TT's can have an impact on sound and that there are very good reasons, of which I won't repeat here, for designing them with belt driven platters do we now pursue that line of reasoning down the chain? Thanks ,J.R.

Subject: Re: Direct Drive Revisited
Posted by Wayne Parham on Mon, 19 Jul 2004 21:59:53 GMT
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It really is a lot like pushrods and overhead cams to me. I think the analogy works well. Just like engines with pushrods and overhead cams, turntables with belts and those with direct drive each have design strengths and weaknesses.Some of the best engines use pushrods, and custom buiders of both Harley's and automotive V-8's use 'em. I can't tell you how much technology there is available for this kind of application. If you want to build the best custom Harley in the world, you're probably going to use an engine with pushrods. It will be really cool and provide stomping power. It will turn every head. You can solve every technical hurdle so that you exploit the strengths of the engine while reducing its weaknesses. But that doesn't mean overhead cams are inferior by design. It's the specific implementation that's great.

Subject: Re: Direct Drive Revisited
Posted by Manualblock on Mon, 19 Jul 2004 22:45:21 GMT
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Thats fine I love Harleys also, I frequently post on the Antique Motorcycle forum. Lets talk about TT's. (The second bike I ever owned was an old 750 KHK flathead)

Subject: Re: Direct Drive Revisited
Posted by Wayne Parham on Tue, 20 Jul 2004 05:15:30 GMT
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Where's the motorcycle forum? That sounds cool! Your old flathead sounds cool too! That's a WWII era bike, isn't it? Maybe just before?About turntables, the point I want to make is that I don't think either drive type is inherently superior and that both have strengths and weaknesses. I think the belt drive can take advantage of pulley ratios but has to overcome the fact that the drive motor has mechanical contact with the needle through the platter and belt. The direct drive has advantage that it can made to have complete isolation between motor and cartridge but it has less torque and no pulley leverage. Each issue can be dealt with, and so I guess the engineer has different issues to concern himself with depending on the basic design type chosen. But since turntables have become less popular, there are fewer engineers working on them.If I were

planning to do a new turntable design project, I would ask for support from a mechanical engineer to quantify some of the torque and speed issues and what not. But just shooting from the seat of the pants, here are some of my thoughts.On the low end, under $1K turntables, I've been very happy both with my Rega P2 belt drive table and a couple of old Technics direct drive tables. One of my old Technics had a speed control and no servo feedback. It was completely open loop. The other kept constant speed, and so did have a feedback loop, which means it was interpolating or "hunting" to regulate speed. But to be honest, I was happy with each of them, and while I like the Rega the best, I think a lot of it is because it's my newest one and I got it from a great guy, David Cope at Triode & Co. But I was also very happy with my old Technics direct drive table with the manual speed control and the Audio Technica AT20SL cartridge. That was a real nice sounding turntable too.On the high end, I can only do a thought experiment because I don't know of any truly high end direct drive tables. And like I said, if we're making a statement product and willing to spend $20K, I'm pretty sure that we'll do a really great job with our turntable either way we go. We've all seen some stunning belt drive tables for $20K. Beautiful craftsmanship and high quality components.So but lets look at what we might do if we were going to make a money-is-no-object direct drive turntable. We can put these ideas in the wishbox and throw it over to the mechanical engineers to make it happen. Since we're comparing drive types, let's not consider the tone arm and cartridge right now. If we were really building this thing, that would be a pretty big part of the deal but for the purpose of comparing drive types, I think we can put that aside for a moment.If I were making a price-no-object turntable, I'd have both platter and base machined from a solid block. Make 'em heavy and make 'em attractive too. There are many suitable materials, I'm sure. But I would want them to be heavy and the platter would also need some area that could be machined for balancing and for embedding motor components.The thing I'd place most focus on would be the suspension, both for the platter and for the base. I would want the platter to be suspended completely without contact. No spindle, no bearings, no shaft, no contact whatsoever. I'd look into pneumatic or magnetic levitation or other means to hold it in place without requiring physical contact with the base. With a $20K budget, I think that could be done, particularly if I had quantities of a small production run to spread development costs on. If not, then perhaps a more traditional platter mount could be investigated. But the point is that I'd want to isolate the platter as much as possible, with complete isolation the goal. Isolating the base from the mounting surface would be the next step, and it would be important too.As for motor drive, I would want initial starting torque from one mechanism, like a start winding and capacitor. But this would cut out and leave only the main motor. This wouldn't require much torque, as it is only needed to maintain speed of a high mass platter on a nearly frictionless axis. The majority of the speed regulation would be done by virtue of the fact that the platter is massive and very little torque is applied. So it would be a mass/momentum regulated system. I don't know if I would investigate any sort of feedback system or leave it open loop, but the regulation would be largely provided by the fact that there was very little torque compared to mass. Any speed changes would happen extremely slowly, whther they be accelerations or decelerations. In fact, there may be a brake that should be added for shutdown. Maybe a clutch style brake should be used so the thing didn't spin for a lengthy time after the turntable is shut off.The point is that the design goal of complete isolation between needle and motor (and base) is possible with a direct drive, but it is not possible with a belt drive turntable. A belt drive table can take advantage of platter mass, and it has an additional advantage of pulley ratio to reduce motor speed fluxuations. But a massive load in this case will tend to flex the belt and might make it wear prematurely. Even if the belt is a long wear item, it is still something that must be maintained and will eventually break. So there are some things that make a really nice direct drive implementation very attractive.Still, belt drive has been the preferred technology of high-end tables. It's inherent

strengths have obviously been pushed to the Nth degree. I never meant to say that I thought a five hundred dollar commercial direct drive turntable from the 70's would outperform a $20K belt drive turntable made today. I just think that there are some advantages to direct drive tables too, and that a high end design that exploited them might really be great.

Subject: Re: Direct Drive Revisited
Posted by Manualblock on Tue, 20 Jul 2004 12:39:14 GMT
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Now you're talking. It sounds like you are describing the Platine Verdier, Which uses a magnetically suspended platter that is driven by a thin thread like belt. The platter is massive and must be push started after which the belt takes over. BTW, 20k tables while nice to see are not practical, 2k is more reasonable. The magnetic coupling of the DD motor, does that not impact the stylus through field effects? As implemented in all DD's I am aware of the ultra-light platters must ring like hell no? Thanks for giving this subject the respect it deserves. J.R.

Subject: Re: Direct Drive Revisited
Posted by Wayne Parham on Tue, 20 Jul 2004 16:44:46 GMT
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Certainly, any magnetic energy that is coupled into the cartridge coils would create noise, so that's an issue that must be considered in any potential design. Platter weight stores energy, forming a mechanical capacitance that resists speed fluxuations, so a heavier mass can be taken advantage of in this regard. Good discussion, thanks!

Subject: Re: Direct Drive Revisited
Posted by jason on Thu, 22 Jul 2004 14:37:09 GMT
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I stongly believe that one of the things that most audiophiles don't consider here is the cost of manufacture of DD turntables. A DD motor assembly, and the electronics it employs is neither inexpensive to design nor manufacture. Basically, unless a manufacturer can mass produce it, it is not cost effective. This for the most part rules out high end small company makers. They have neither the capital nor expertise to design a DD that would sound as good as they can make a belt sound, so they don't bother, and rather, choose to focus their efforts in other areas, such as tomearm, plinth isolation, etc. Companies like Technics, (Panasonic), on the other hand have invested $$$ in designing their DD systems, and they did that a long time ago. They can still do it cost effectively today, due to the thousands of TTs they sell to the DJ market. VPI, Oracle, Linn,

even Rega or Thorens, can't do that, so again it just makes more sense for them to go with the "simpler is better approach". Again, I stress I own both a Rega 2, and a Technics 1600. I always liked the Rega, with exception of its speed variations, (which were VERY noticeable at times). I don't find ANY such "noticeable", (as proponents of belt claim), speed hunting variations in the presentation of the Technics. When I gave the Technics a try, it not only didn't have such speed issues, (and yes, I have a fairly revealing system to hear the difference), the detail, soundstage, (yes 3-D folks...), and dynamics, basically blew the Rega out of the water. Even the things that the Rega is supposedly good at, (the whole pace and rythym thing), the Technics is just simply better at. Most people don't remember, that just before "perfect sound forever" came out, many Japanese companies, such as Denon, Kenwood, and Nakaminchi, put out some overkill DD rigs. These are VERY sought after by those in the know about them today. Truth be known, most of the technology that those tables used did make it to the better mass produced units...Unfortunately, about the same time these same companies were beginning to put out a lot of plastic junk, that yes, made CDs sound much better. Some of the larger companies, such as Denon recently are discovering that there is a market once again for audiophile DD units. And they are capable of producing them cost effectively, (most price for about the same as a Rega 3 or less). There just may be a paradigm change yet folks...My system: Mac MA6100 integrated The Hornshoppe Horn loudspeakers Technics 1600 w/Shure V-15vxmr

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Subject: Re: Direct Drive Revisited
Posted by Manualblock on Fri, 23 Jul 2004 12:17:14 GMT
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Go on Bottlehead site. He has a Denon DPL 60 for sale for 400$. Can't seem to sell at that price. That's considered one of the best DD's ever. He replaced it with a belt drive. Guess he wanted good sound.

Subject: Re: Direct Drive Revisited
Posted by jason on Fri, 23 Jul 2004 13:04:15 GMT
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Good table. Not so good arm. Denons were never known for their tonearms. This is also the trouble with the Technics tables. The trick is finding a cartridge that plays well with the arm. If you can do that, that table is easily worth more than it's $400 price tag, (relatively speaking...)j

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Subject: Re: Direct Drive Revisited
Posted by Manualblock on Fri, 23 Jul 2004 14:58:48 GMT
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The s-shaped Tonearm from the DP 47 was a good arm for it's time. There are several guys who mounted good arms on the old Technics SP 10 tables with good results. There's a guy by me who mounted a Rega 250 on an SL 1200 and wrote it up in Audio Amateur. There is an alternative in idler wheel driven tables like the TD 124 or Garrard 301/401 but it all seems like a lot of work and money when you can get a used LP 12 for 650.00$ now or an old Thorens TD 160 and rebuild for a couple of hundred. I A/B'd my Technics SL 3300 with a Grado green on it the other day just for giggles. I listen to it every day since it resides in the basement studio. I have always maintained in this forum that the old Technics tables are a great bargain, especially for newcomers to vinyl who don't want to sink lots of cash into the front end. If you check the archives you will see old posts on this very subject. The arms are weak but servicable and they sound pretty good. But... up hear with the Linn there is no contest. The Linn just plays music while the Technics sounds two dimensional and flat. What can I say? I certainly would rather spend 200$ than 1500$ any day; but then I wouldn't hear Miles Davis sound sooo sweet!

Subject: Re: Direct Drive Revisited
Posted by jason on Mon, 26 Jul 2004 00:50:46 GMT
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I guess we will have to agree to disagree on this.. But anyway, if you are ever in the NYC area stop over and I'll give you a listen, (Bring over the Miles Davis), I'll bring the beers!j

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Subject: Re: Direct Drive Revisited
Posted by Manualblock on Mon, 26 Jul 2004 01:54:14 GMT
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Just so happens I am there on a regular basis so chill those suckers up. Short hop on the LIRR.J.R.

Subject: Re: Direct Drive Revisited
Posted by jason on Mon, 26 Jul 2004 10:35:56 GMT
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Cool. I'm in Jersey in Caldwell. Let me know...j
