


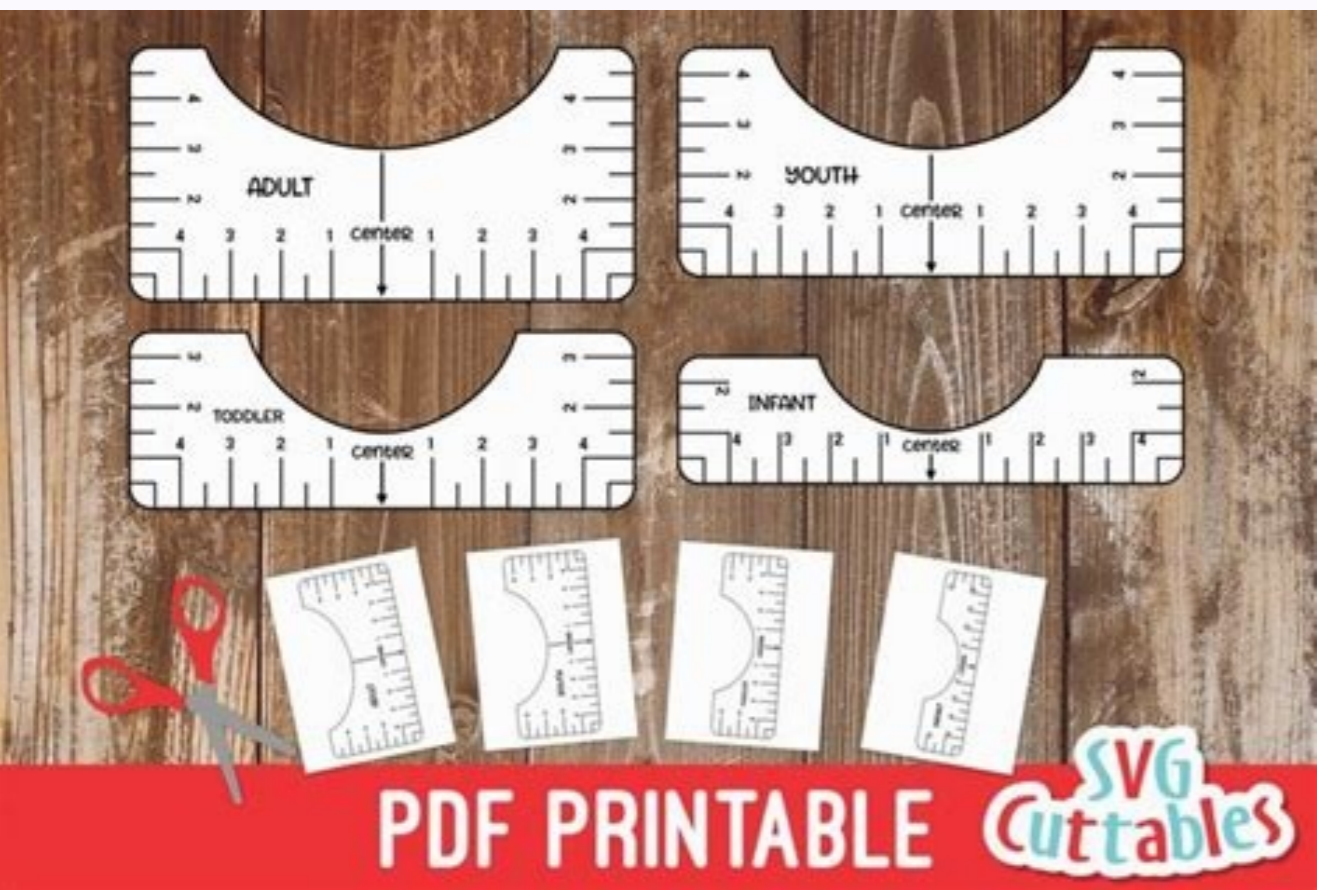
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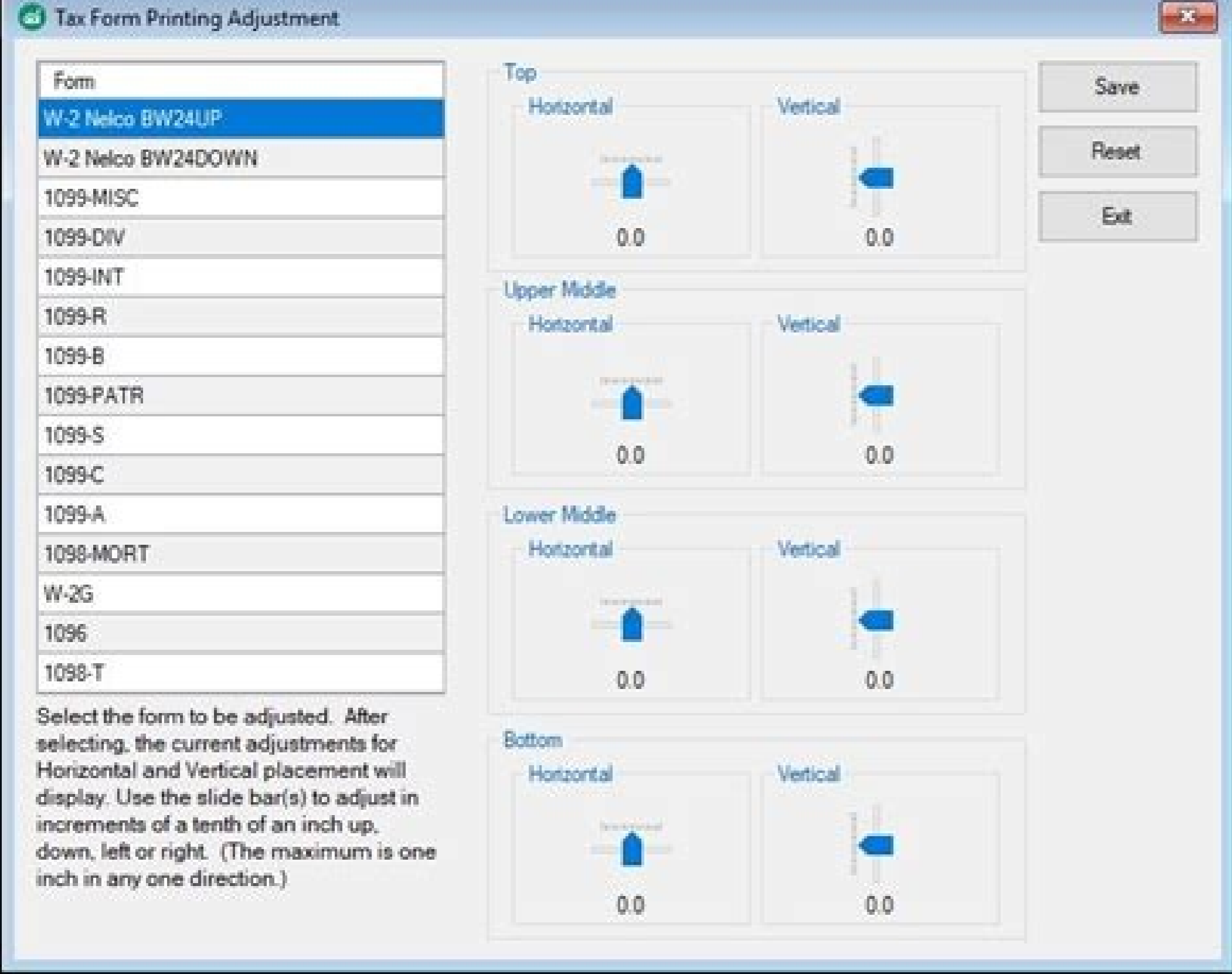
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LADIES





A Baerwald protractor will not be compatible with a Stevenson alignment, as used by many Japanese turntable manufacturers. This is an important step when setting up a record player. The geometry can be set to the same specifications for either alignment tool, so the results should be the same if carefully done. You'll find some interesting designs floating around out there with alignment geometry's based on something entirely different from either Løfgren "A" or "B." For advanced spreadsheet users, the Excel "Solver" function is a very powerful tool that can be used advantageously with this spreadsheet. Which alignment geometries and groove areas can I choose from? To double check an alignment performed with an overhang gauge, please make sure to generate a protractor that matches the alignment specified by the turntable manufacturer precisely. Use one of the protractor generators on this site, open the browser's printing dialogue and select "save as PDF" instead of a printer. Thank you. At these points the tracking error is zero, so no additional distortion is caused by the stylus being at an angle. There are many ways "Solver" can be used to enhance and expand the capabilities of complex spreadsheets. The protractors generated by this site will help to set the correct stylus overhang for the chosen geometry: On an arc protractor, the overhang is set correctly when the stylus can follow the arc all the way. The arc protractor generator can even figure out null points from the pivot to spindle distance, overhang and offset angle as specified by turntable manufacturers. What you may need to do is mount the cartridge a bit loose and slightly move it forward or back and see how it aligns on both points. How do you measure a stylus overhang? What makes arc protractors so easy to use? Does every cartridge need precise alignment? Precise alignment minimizes noise and inner groove distortion. If it is unknown, a universal protractor will do the trick just fine. Free Protractor To Align Your Turntable Cartridge! Well, there's no place like home. As an additional precaution, I recommend you archive a copy of the spreadsheet and always use a different working copy, just in case something goes wrong and you want to return to the original. Other than that, have fun calculating. The alignment tools on this site support them all. It takes time and patience to get it just right, but the results are worth it! Click here for cartridge alignment tool Click here to view the two point protractor in action. Outputs are angular offset, linear offset, stylus overhang, pivot-to-spindle mounting distance, inner null-point, and outer null-point. This means they are easier to set up, but you should still try to align them well for best results. 2-point protractors and sightline protractors are universal and can be used on any turntable (provided the slots in the headshell are long enough to allow for the chosen alignment geometry). The great advantage of arc protractors is that overhang and offset angle are set independently. This makes aligning the cartridge easier than with a 2-point protractor. Why not use an overhang gauge instead? This system will resonate at a subsonic frequency. Inputs are effective length, innermost groove, and outermost groove. On a two point protractor it is set correctly when the cartridge is aligned at both null points. Interestingly, from all the reading I've done recently on the subject, it seems that Professor Erik Løfgren was actually the person who developed modern tonearm alignment geometry back in 1938. Home is where my turntable is and everyone should have a two point protractor. It pretty much acts like a spring and is part of a mechanical system that involves the entire tonearm. Where can I download a protractor for cartridge alignment? In Use: The trick is to have the cartridge mounted so that the needle aligns perfectly on BOTH dots without moving the protractor. The graph is a visual representation of the columns of numbers on the left, which are a function of three specific tonearm parameters, effective length, angular offset, and stylus overhang as displayed in the tan colored cells, A3, B3, and C3. Please do not enter numbers into any other cells; otherwise you may destroy important equations that enable the spreadsheet to function properly. As a word of caution, only six cells on the spreadsheet should be used for entering numbers. In other words, Løfgren's "A" alignment minimizes peak distortion while Løfgren's "B" alignment minimizes RMS distortion. If this is done, the calculator operates autonomously from the rest of the spreadsheet. The output values change in accordance with the equations listed in the instruction area below the graph when new numbers are entered into any of the yellow input cells. Which kind of turntable protractor is the best? This site allows to generate all types of alignment protractor free of charge. Baerwald, Stevenson, and others came along later, and each published alignment geometry equations which have been shown to be identical to those published by Løfgren, and yet they included no recognition that Løfgren had already published the same equations. Well, the easiest way to operate the spreadsheet is by using the Løfgren "A" or "B" calculator at the top of the spreadsheet page. Are alignment protractors universal? Universal 2-point, sightline or arc protractor? What is a phono cartridge alignment protractor? To save a protractor for future use, you may also bookmark it or save the URL. The exact location of the null points also determines where on the record one will hear the most tracking distortion. IEC, DIN, JIS standards for the grooved area of the record can be selected as well as custom dimensions for the groove area and custom null points. Baerwald even lists Løfgren's paper in his references. It is also possible to share your protractor with others by simply sending them a link. Choose between Baerwald, Løfgren B and Stevenson alignment geometries. There are various types of overhang gauges that come with turntables. Excel Spreadsheet Versions! Excel Spreadsheet To Make Your Own Protractor! You'll find an Excel file at the link located below this article. The graph and the rest of the spreadsheet are controlled by inputs to cells A3, B3, and C3 only. "Solver" lets you turn output cells into input cells through an indirect iterative mathematical process. With a pivoted tonearm and the phono cartridge mounted at an offset angle, there are usually two null points at which the stylus is perfectly tangent to the grooves on the record surface. The advantage of Løfgren's "B" alignment is lower tracking distortion during more playing time at the expense of slightly higher distortion at the beginning and end of the record. Gauges are tools for setting a certain headshell tail to stylus tip distance. Cartridge alignment is important, but it's only one of many steps in setting up your turntable. Arc protractors on the other hand are designed for a particular record player's pivot to spindle distance. Use the resonance calculator to figure out whether a cartridge will work well for your record player. These are also spreadsheet input cells, but initially they are linked to the corresponding calculator cells, I3, O3, and Q3 so the calculator controls the entire spreadsheet. A turntable protractor is a tool for aligning the stylus at the null points. Help support our efforts via Amazon. An alignment protractor is a tool for aligning the stylus of a turntable cartridge as precisely as possible. However, the tan colored cells may easily be unlinked from the calculator simply by entering numbers into them. You know you have it perfect when both points are perfect without moving the protractor. What is cartridge compliance? Løfgren's "A" alignment minimizes and equalizes the distortion peaks at the innermost groove, in-between the null-points, and at the outermost groove. We do get a bit of commission with each sale. No download of software required. The difference between the two alignments is that Løfgren's "A" alignment minimizes the weighted tracking error curve directly while Løfgren's "B" alignment minimizes the area underneath the squared weighted tracking error curve. You could ask "Solver" to find new innermost and outermost groove radii that would yield Steven's alignment null-points, and you would also get a graphical representation of Steven's tracking error and distortion curves. If the technical parameters are well matched, the frequency response will be close to linear. Overhang gauges make alignment quick and easy, but they are not the most accurate tools. They can simply be printed out with a home printer. The cartridge compliance needs to match the tonearm well, otherwise this resonance may cause problems. This weighted curve places more emphasis on tracking error for inner grooves than for outer grooves, which is representative of the actual distortion caused by tracking error. For example, suppose you wish to evaluate Steven Rochlin's alignment tool, which has alignment null-points at approximately 70mm and 127mm. And Stevenson protractors will only be good for double checking when designed for the right inner and outer groove dimensions. If the pivot to spindle distance is known, using an arc protractor generator is highly recommended. Accuracy is easier to achieve than with a sightline protractor. At the core of Løfgren's alignments lies the weighted tracking error curve, which is essentially tracking error per unit of groove radius. The phono cartridge forms a resonant filter with the input of the phono preamp. The actual alignment geometry depends on the dimensions and shape of the tonearm. The cantilever of a turntable cartridge has a certain stiffness. The calculator has three yellow input cells and six green output cells. Don't forget about anti-skate, vertical tracking force (VTF), vertical tracking angle (VTA), stylus rake angle and azimuth. Okay, so how does the spreadsheet work? The tiny microline stylus of an AT-VM95ML phono cartridge requires precise alignment. What else do I need to know to set up my turntable? Spherical styli are less sensitive about alignment than more advanced types such as elliptical, microline or Shibata styli. What is cartridge loading and why does it matter? Vinyl records sound better and last longer with a well aligned needle. They are the three yellow cells, I3, J3, and K3 in the calculator at the top of each page, and the three tan cells, A3, B3, and C3, which control the graph and the rest of the spreadsheet. The default or initial input values are 228.6mm (9") for tonearm effective length and the IEC standard innermost and outermost groove radii of 60.325mm and 146.05mm, respectively. Where can I get a protractor for my turntable? It is a two page spreadsheet-one page for Løfgren "A" alignment and one page for Løfgren "B" alignment. One reason for unlinking the calculator might be to evaluate a tonearm's geometry by inputting effective length, angular offset, and stylus overhang directly into cells A3, B3, and C3, respectively.

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