ArmGeometer

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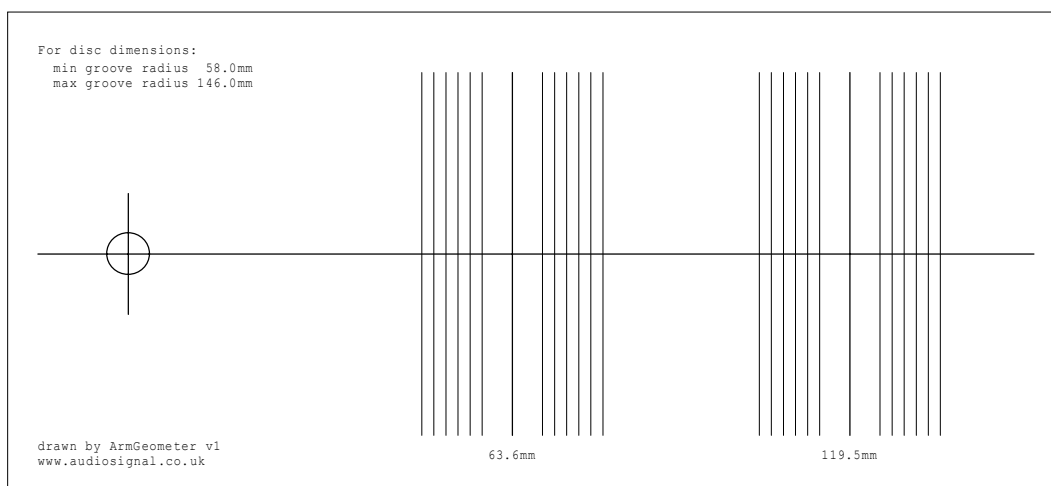ArmGeometer is supplied as a zip file, armgeometer.zip. When unzipped it should contain:

> ArmGeometer.exe
> CT_Pro.dll

and this information file.

Description

ArmGeometer performs pickup arm alignment calculations based on the self-consistent Baerwald equations. It is also able to generate an enhanced metafile drawing of a two-point arm alignment protractor calculated according to maximum and minimum extents of the modulated record groove supplied by the user. An example protractor is shown in the diagram below.

Example two-point alignment protractor (not to scale)

System requirements

ArmGeometer should run under any Windows 32-bit operating system, from Windows 95 onwards. It has been tested on Windows 95, Windows ME and Windows NT4.

To run, ArmGeometer requires that the supplied CT_Pro.dll be installed in the same directory as the executable. This file contains the runtime files of Perfect Sync Inc's Console Tools Pro (http://perfectsync.com) which provides enhanced control over the console window's appearance and function.

In order to print an alignment protractor drawing created by ArmGeometer you must have an application that will import and print Windows Enhanced Metafiles (.emf). This can be achieved, for example, using any version of Word that is less than ancient.

Operation

ArmGeometer's operation is self-explanatory: simply enter the data and follow the instructions detailed on each screen. Note that if you wish to generate an alignment protractor metafile you do

so via option 2 in the opening menu. Be warned that the degree of error trapping incorporated within the program is minimal, so you should take care to enter data accurately. Garbage in will almost certainly pass unmolested to garbage out.

Option 2 in the main menu allows the user to generate an enhanced metafile drawing of a two-point alignment protractor, which is saved as protractor.emf in the same directory as the ArmGeometer executable. When printing out an alignment protractor generated by ArmGeometer it is **vital** that the protractor be printed at 100% its original size, which may require landscape rather than portrait page alignment. To ensure that the metafile is correctly scaled when imported into Word, double click on the image to bring up the Format Picture dialog. Click on the Size tab and then on the Reset button. The Height and Width dimensions shown at the top of the dialog should then match the original dimensions specified near the Reset button. You may also care to check the printed protractor using an accurate ruler to measure the distances from the centre of the spindle hole to the two zero tracking error radii. The correct dimensions are printed on the protractor below each setting point to facilitate this process.

It is suggested that the printed protractor be trimmed to size and mounted on card or laminated. The accuracy of the finished protractor depends on the spindle hole being punched precisely where indicated. A hole diameter of 7mm should provide a tight fit over the turntable centre spindle. To ensure that the stylus is correctly located during the alignment process it will help if a small indentation is made with a pin where the protractor centre line intersects each central setting line. Placing the stylus gently in each indentation will ensure it is correctly located.

The pickup cartridge is correctly aligned when its front-rear axis is parallel with the protractor's setting lines at *both* zero tracking error radii. To ensure this it will generally be necessary to adjust both the overhang (by either moving the cartridge backwards or forwards within the headshell slots or moving the arm pillar within the arm base) and the offset (by rotating the cartridge within the headshell). It is the *cartridge* which should be aligned with the protractor's setting lines, not the arm's headshell.

Throughout the alignment process you should take every care not to damage the cartridge's delicate stylus and cantilever. I take no responsibility whatever for such damage however caused. If you do not feel confident that you can perform the alignment process correctly and without risk to your equipment then you should not undertake it.

Option 3 in the main menu allows the user to generate tabular data of lateral tracking error and lateral tracking error distortion versus groove radius for specified alignment parameters. Two text files are written to the same directory as ArmGeometer.exe, containing equivalent output data but differently formatted. In data.txt the data is arranged in tabular form for easy reading; in graph.txt it is comma delimited to facilitate easy importation into graphing software. In all cases the distortion data is for second harmonic distortion assuming a disc speed of $33\frac{1}{3}$ rpm and a recorded velocity of 10cm/s RMS. For different rotational speeds and recorded velocities the absolute distortion values will be different but the form of the distortion curve will be the same.

For a more detailed description of optimal arm geometry and the self-consistent Baerwald alignment equations please refer to the article I wrote on the subject for *Hi-Fi News*, published in the September 2003 issue of the magazine.

Licence

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Keith Howard
August 2003

History

altered 30/8/03 – clarification of the distortion data added