XNC – a breath of fresh air for CAD software developers

Ucamco, KiCad and Pentalogix have developed XNC, a format for PCB drill data, with the support of Graphicode, Cuprum and ZofzPCB. XNC is a strict subset of the ubiquitous NC or Excellon data. Freely available and simple to implement, XNC takes all the confusion out of CAD software development and the CAD-CAM drill data exchange process.

Gent, Belgium – February 20th, 2019 – From CAD development to CAM engineering processes, existing NC drill data CAD-CAM transfer processes are deeply flawed thanks to the use of inappropriate data format specifications. The simplest solution would be to use the Gerber format to transfer drill data instead of NC formats. But old habits die hard: for decades drill information has been transferred using formats such as Excellon that are similar to the 1985 IPC-NC349 specification, and a lot of legacy software is still in use, so NC files will be with us for a while.

The problem is that so many NC files are of deplorable quality. This is because the NC format, designed as a machine driver rather than for data transfer, contains all sorts of information that is confusing and irrelevant for CAD-CAM. Not least for the CAD software developer, whose job it is to wade through overcomplicated formats and pick the parts that could serve the CAD-CAM data transfer process, inevitably including more than necessary, thereby adding further confusion, for fear of missing out on important elements.

Despite the developers' best efforts, it's not always clear how to use parts of the NC formats or if they are even capable of transferring certain data. CAD users will simply leave these parts out of their Excellon files and express the relevant information as sidecar information in comments, or in separate text files.

The biggest problem with current NC specifications is that, thanks to an ages-old space-saving convention, the drilling co-ordinates lack a decimal point. In Excellon files, there is no standard for saying where it should be. Similarly there is no standard for expressing whether the designs are in imperial or metric measurements. All of which places the final responsibility on the CAM engineer to try different iterations until the drill files fit with the copper files.

The first step towards improving the NC drill chaos is to develop a simple, clear specification based on an existing format that can be read by all decent PCB drill input software. To this end, some of the world's leading CAD software houses have together developed the CAD/CAM Exchange NC format (XNC), a complete, compact and unequivocal subset of IPC-NC-349 that transfers CAD/CAM drill information without the need for additional sidecar files. And they've added to this the power of Gerber-type attributes which provide machine-readable metadata on complete files, tools or individual holes, that describe their characteristics in a standard, flexible way. XNC files can be added seamlessly to Gerber X2 data sets, while also ensuring that the format is compatible with software that does not read attributes.

With XNC, CAD developers can create output software easily and quickly, using formats that are already well known but without having to choose from a bewildering array of possibilities and functionalities, or reverse engineer from multiple incomplete and confusing NC files. Its designers guarantee that if CAD developers limit themselves to using just the XNC format, they will give their clients exactly what they need: a tight, unequivocal problem-free specification that will improve the CAD-CAM data transfer process overnight, and an NC reference that paves the way to a common standard for NC files.

Simple and easy to implement in CAD software, a first version of the specification of the XNC format can be found at
https://www.ucamco.com/the_xnc_file_format_specification.pdf

The XNC format is supported by