

= ODB ++ =

ODB ++ is a proprietary CAD @-@ to @-@ CAM data exchange format used in the design and manufacture of electronic devices . Its purpose is to exchange printed circuit board design information between design and manufacturing and between design tools from different EDA / ECAD vendors . It was originally developed by Valor Computerized Systems , Ltd . (acquired in 2010 by Mentor Graphics) as the job description format for their CAM system .

ODB stands for open database , but its openness is disputed , as discussed below . The ' ++ ' suffix , evocative of C ++ , was added in 1997 with the addition of component descriptions . There are two versions of ODB ++ : the original (now controlled by Mentor) and an XML version called ODB ++ (X) that Valor developed and donated to the IPC organization in an attempt to merge GenCAM (IPC @-@ 2511) and ODB ++ into Offspring (IPC @-@ 2581) .

= = Introduction = =

Inside almost every electronic device is a PCB onto which the semiconductor and other components are mechanically and electrically connected by soldering . These PCBs are designed using a computer @-@ aided design (CAD) system . To physically realize the design , the computerized design information must be transferred to a photolithographic computer @-@ aided manufacturing (CAM) system . Since the CAD and CAM systems are generally produced by different companies , they have to agree on a CAD @-@ to @-@ CAM data exchange format to transfer the data . ODB ++ is one such file format for performing this transfer . Other formats are compared and contrasted below . After the bare board is manufactured , the electronic components are placed and soldered , for example by SMT placement equipment and wave or reflow soldering .

= = File structure = =

When in use , ODB ++ data is stored in a hierarchy of files and file folders . However , for transmission it is convenient to use common operating system commands that create a single , compressed file that preserves the hierarchy information . For example , on Unix tar and gzip commands can be used . In ODB ++ (X) , the database is contained in a single XML file by default .

ODB ++ covers the specification of not only conductor layer artwork and drill data , but also material stack up , netlist with test points , component bill of materials , component placement , fabrication data , and dimension data .

= = History = =

Valor was founded in 1992 and it released ODB in 1995 . It added the ++ suffix when component names were added in 1997 . The XML version was developed beginning 2000 , and ended in 2008 with the donation to IPC . Valor was acquired by Mentor in 2010 .

= = Adoption = =

In the late 1990s it became clear to industry participants that a second @-@ generation data transfer format would be more efficient than the prevalent , first @-@ generation Gerber format . However , it was very difficult to reach a consensus over which of two candidates should be selected :

ODB ++ : proven but proprietary

IPC @-@ 2511 GenCAM : not widely used but open

In 2002 , a compromise format , ODB ++ (X) , was recommended by National Electronics Manufacturing Initiative (NEMI ; an industry body , subsequently renamed International Electronics Manufacturing Initiative , iNEMI) after a two @-@ year mediation effort between the GenCAM and

ODB ++ camps . Companies that supported the recommendation at the time included Cadence , Hewlett @-@ Packard , Lucent , Easylogix , Mentor (which acquired Valor some eight years later) , Nokia and Xerox . But in fact adoption to date has been minimal . As a result , and as detailed below , the industry is still divided .

=== Advocacy ===

Lists of EDA tools that support import and / or export of ODB ++ have been compiled by Artwork Conversion Software , Mentor itself , and on the Comparison of EDA packages table . Some companies that have adopted the ODB ++ format are advocates for its use . Streamline Circuits reports that ODB ++ provides much greater efficiency than the competing Gerber format , stating that " an 8 @-@ layer printed circuit board can take up to 5 hours to plan and tool using Gerber and only 1 hour when using ODB ++ . " According to Streamline , manufacturers are adopting it to overcome the limitations of the simpler Gerber format . DownStream Technologies calls ODB ++ " the defacto standard for intelligent data exchange in EDA " In 2002 , Dana Korf of Sanmina / SCI called ODB ++ " the prevalent non @-@ Gerber format . " Kent Balias of Viasystems , states of ODB ++ " ... really we don ' t need anything else . "

=== Opposition ===

==== Lack of need ====

Ucamco , the developers of the Gerber format , argue that the prevalent Gerber @-@ based flow (with some additions) can be as complete and efficient as ODB ++ .

==== Concerns ====

ODB ++ is a proprietary format controlled by Valor and now Mentor , and so , like all proprietary standards , it comes with the risk of vendor lock @-@ in . CAD companies had some concerns about this when ODB ++ was controlled by Valor , a CAM company , but these concerns were magnified when a rival CAD company , Mentor , acquired Valor . Although Mentor claims that it " ... openly supports inclusion of ODB ++ and updates for other EDA tool vendors , " it used to restrict access to the specification and required a non @-@ disclosure agreement . The application form used to include a requirement to : " ... Demonstrate a customer need for this integration through references from mutual customers . Provide a recommendation from a Mentor Graphics product division or demonstrate the incremental value of this integration to both Mentor Graphics and the partner company . " Some direct competitors inferred this meant restricted access . This was a source of frustration not only for competitors but also for the Mentor user community .

In 2012 , Julian Coates , director of business development at Mentor 's Valor division claimed that , so far , all ODB ++ partners , including competitors to Mentor , who have applied for assistance to build and maintain ODB ++ interfaces via the ODB ++ Solutions Alliance have been accepted without reservation or cost . In addition , the format specification is now openly available via the ODB ++ Solutions Alliance without the need for NDA . Membership of the ODB ++ Solutions Alliance is free of charge and open to anybody who registers . A no @-@ charge ODB ++ Viewer and other software utilities are available to registrants .

==== Potential resolution ====

Critics of the proprietary nature of ODB ++ point to several more open formats as models for a future consensus format :

RS @-@ 274X (" extended Gerber format ") : Although it is nominally proprietary to Ucamco , the specification can be downloaded freely making it de facto an open standard .

IPC @-@ 2511 (" GenCAM ") which resulted from a donation of certain technologies by Teradyne / GenRAD to IPC .

IPC @-@ 2581 (" Offspring ") an attempt to merge GenCAM with ODB + + (X) . The specification can be downloaded freely . In 2011 , an industry consortium was created to support it , motivated in part by frustration with the proprietary nature of ODB + + . Cadence Design Systems , Zuken , Artwork Conversion Software and the owners of Gerber format , Ucamco , joined it , but , initially , not Mentor . However , in 2012 , Mentor did join . This , combined with the 2012 announcement by Zuken that it would join the ODB + + Solutions Alliance , creates the possibility that PCB designers will have a choice of format no matter which EDA tool they choose .

OpenAccess , which resulted from a transfer of certain technologies by Cadence to the Si2 organization . Although it was originally designed for integrated circuits , it is now finding application for IC package and PCB design also .

JPCA @-@ EB02 (" Fujiko ") based on work by Prof. Tomokage of Fukuoka University .

EDIF - Electronic Design Interchange Format