Graphic data required for test adapter assembly

Dear Customer,

Due to increasingly higher component densities and the more frequent need to use very small or milled hold-down devices, we should pay much more attention to the integrity and reliability of graphic data, even more with regards to the risk caused by inadequately place hold-down devices.

Our efforts in further optimizing the data preparation and controls for the positioning of hold-down devices are supported by our Customers, who always give their feedback and require the two following matters:

- They wish to implement a broader data entry spectrum, including CAD data for the test adapter assembly.

- They wish not only to test automatically the fabricated test adapter themselves, but also perform automatic collision controls during the positioning of the hold-down devices and bearings.

When comparing the many approaches for a solution we feel that currently the best way is to position the hold-down devices on the basis of your data which are directly produced by the layout assistant. Generally, these are 2D data from the CAD electronics system which also include all placement variants. For this purpose, the comprehensive inclusion of component contours and assembly pads is crucial. Very often, 3 D data contain only one placement variant and do not include pads, so that 3 D data are rather supplementary to the full 2D data, but they do not replace them. Another important problem is that so far with 3D often detailed faults are present, which are not detected at first sight, so that the data are no longer useful for the connective placement of hold-down devices.

Furthermore, it is advantageous to use data containing component, housing and pad information still in text form, such as is the case with generic (universal) data and most of the direct CAD-ASCII-files. Plain drawing data lead to many pseudo-errors in collision controls and are thus less adequate in practice.

Based on the high reliability requirements ATX considers it an important step to test the converted CAD-data against a reference you provide. This reference should be a current assembled board. If this is not possible, we will initially make a comparison with an applicable unassembled board and then we need a subsequent delivery of a current assembled board as quick as possible.

As an annex we have drawn up the following list of CAD-data formats (classified with „a“ as most favourable and „e“ as unfavourable alternatives), which we can use for the positioning of the hold-down device and bearings as well as for the automatic collision control.

a) GenCAD Format (.CAD) as a universal and easily understandable data format. It contains all component, pad and mechanical data which are required for the mechanical adapter assembly tasks. Ideally with completed .HEIGHT fields for the maximum component height. This format is the data format preferred at ATX, to which we directly access with our analysis software. This format can be directly generated by numerous CAD-systems and also by additional software such as CLink, VPlan, D2B etc.

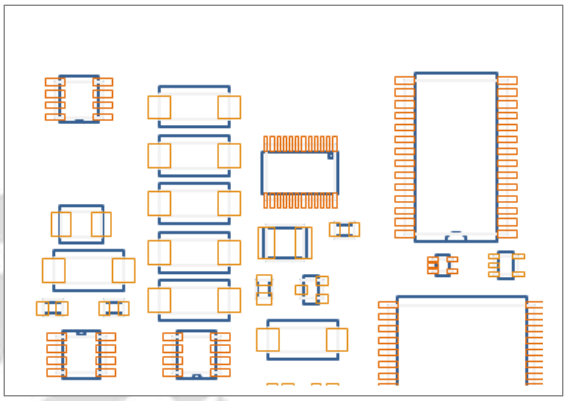

Figure 1: Extract from the graphic illustration of data which are directly generated from a GenCad file. All component contours and pads are important here,

b) Direct CAD ASCII files are e.g. ADIF, data of Zuken Board Designer, Mentor Neutral File, data of Cadence, Eagle, Calay, PADs, PCAD and SciCards, as well as files of additional software such as Unidat or Fabmaster FATF, IDF, CCZ or PDIF. For their analysis at ATX these files are converted with a software to the GenCAD format.

c) ODB++ and IPC-2581 Files: It is also possible to convert these broadened but unfortunately complex formats with partially integrated binary data formats in the data structure in GenCAD and then we can use these as a data reference.

Only very compressed are adequate:

d) DXF-files with mapped components and pads: These files are used for the positioning of the hold-down devices and bearings, but not for automatic controls But as we mentioned before, DXF-files provide an appropriate reference for the control of converted CAD-data, in case there are no validly assembled or eventually unassembled boards available.

e) Gerber files: These can be converted to DXF-files and positioned as in d), but they are not adequate for automatic controls. Due to the frequently great amount of layers their processing is difficult and liable to faults. Another problem is that top pads as well as strip conductors and copper planes represent a common unit and they cannot be separated for the mapping. If no mounting pressure is foreseen, or it is only limited, Gerber files also lack complete component contours.

(*)While during the assembly a failure of a valid board may be disadvantageous, these can be bypassed, but a meaningful end control of the fabricated adapter without a validly assembled board is not possible. Therefore, a prerequisite for the delivery of a test adapter is the subsequent delivery of an assembled board.