Skipper assembled PCB design documentation requirements

Date: **2019-02-22**
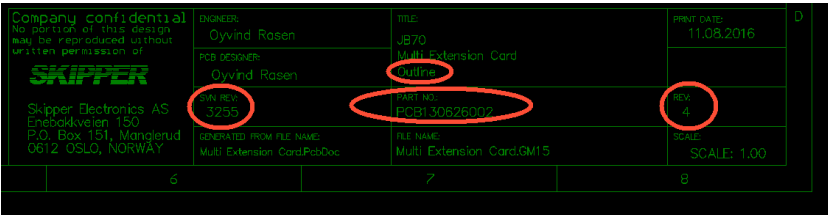**Rev:**   **1**

Introduction

This document describes the PCB design documentation requirements in order to ease the overhead of sharing developing, servicing and selling of HW products among Skippers collaborators.

Design files shall be documented using English written language.

Title field or file headings

All readable files shall, if possible, contain title field or text heading with relevant information like title, file name, board name, date of change, assemble revision, bare board revision and/or VCS file revision, if applicable for each case and each file.

Example of title field from the PCB outline Gerber file:

Example of BOM title field:

File names

In general file names shall not be changed between different versions because VCS (Version Control System) are using the name for to identify files. That means that file names cannot contain variable revision / version or dates. For the same reason it is important to use the correct name first time. To differentiate files for different assemble options, the variant may be added as a part of the file name.

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Packing Design Files

Design files shall be packed into two separate ZIP-files, one for bare board production and one for assembling of the boards. The ZIP-files shall contain only generated production files, that means not any CAD source files. The ZIP-file name shall set together of the P/N followed by its revision.

ZIP-fil with bare PCB production files (Gerber files including PCB outline, + fabrication drawing/PCB Specification and Drill drawing)

ZIP-fil with assembly PCB files (Schematic, BOM, Component placement, Pick & Place, Special mounting instruction..)

If there are several variants of the bare board PCB or the assembled PCB each variant is given its own P/N.

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The CAD source files are the source of the design. However, that is the production files which are the source of the production units. The production files are in turn a result of the CAD source files and the current available component data collected at the time of generation. It is important to store and keep control of all generated files for all production revisions. It is necessarily not possible to regenerate the same production files later.

PCB Doc Req.docx
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CAD source files must be stored separated from generated production files. Source files are intended for development purposes only. The source files must be tagged and stored so that it is possible to retrieve source files for all produced versions of the PCBs.

If the source files are to be sent physically or by email the files can be retrieved and added to a separate ZIP file. Then the ZIP file shall be named with the board name followed by its revision number.

Typical source file types for Altium files (SchDoc, PcbDoc, PrjPCB, SchLib, PcbLib, BomDoc, OutJob)

Variants

If design files are used for several optional variants, each variant shall have its own ZIP-file followed by the revision. It is practical to keep revision in sync across all variants, even though some revision/variant combinations are out of interest.

ECO (Engineering Change Order) and revisions

An ECO shall be made for all changes in schematic, PCB and/or assembly of a board. The ECO shall describe the background/reason for all changes.

Revision numbers sequences for bare boards and assembled boards shall be designed so that it is possible to understand the order of different revisions. All boards must use the same revision number series.

Skipper revision number rules for bare PCBs:

1, 2, 3..n

The revision is written as integers and stepped with any minor or major bare PCB design file change. With all bare PCB changes there must be a schematic and BOM update since the bare PCB revision is updated and the that the bare PCB is a part of the assembled PCB.

Skipper revision number rules for assembled PCBs:

A1, A1A..A1Z, A2, A2A..A2Z..A99Z, B1, B1A..B1Z, B2, B2A..B2Z..B99Z..Z99Z, AA1,AA1A..AA1Z..ZZ99Z

The first position letters (A..Z, AA..AZ..ZZ) indicates the revision level of the PCB. The second position number (1..99) indicates the revision level of the BOM/Schematic (the source of BOM is the schematic pages, all connected databases and the BomDoc). The optional third position letter (A..Z) is used if there exist a modification on the two character production revision. Modifications shall not change any production documents except the ECO itself. Added modifications means that the third letter is stepped and existing applicable ECO's are included in new ECO level. When the first letter is stepped the second number shall be set to 1. When a third letter exist and the first or second

character is stepped, the third letter shall be dropped only if changes include all modifications. If not, the third letter is set to A.

Skipper ECO examples

Example1: If a resistor value is changed after production for a board with revision level C2, the ECO that describes the modification will be given revision level C2A. If the BOM and schematic are updated with the new resistor value, the revision level will be C3.

Minor changes of a PCB, where there is no intention of functional changes, can be handled as a new assembly revision by stepping the second position number and changing the revision number of the PCB itself. If the changes are functional or the changes are found comprehensive, even though they are none functional, the first position letter shall be stepped.

When a modification of an existing assembled PCB is needed a modification ECO shall be issued. The modification ECO and the assembled PCB will have a third letter added to the revision number indicating the modification level. For later modification changes the third letter is stepped. All applicable modification is documented in the latest ECO. Later redesign ECO's may or may not compensate for current modification ECO's. However, redesign ECO will change the first or second revision letter/number. The third letter is removed. However, if modification is still applicable with after current redesign, both modification and redesign ECO must be issued. The third letter will in this case be reset to its starting character A.
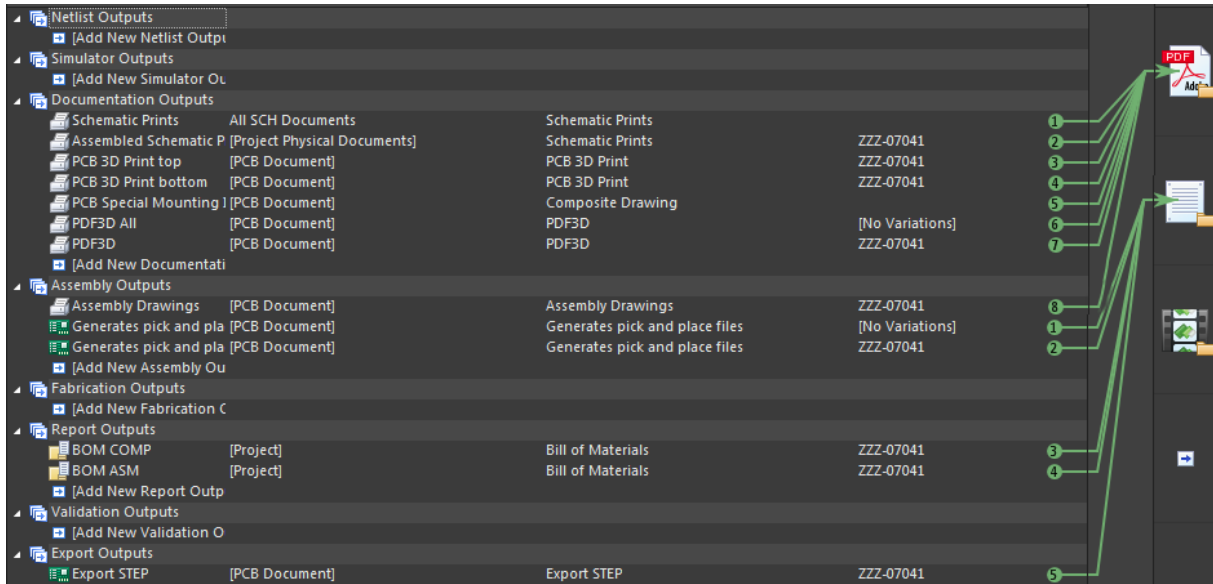
Bare PCB production revision release

The following files and group of files must be generated with each release:
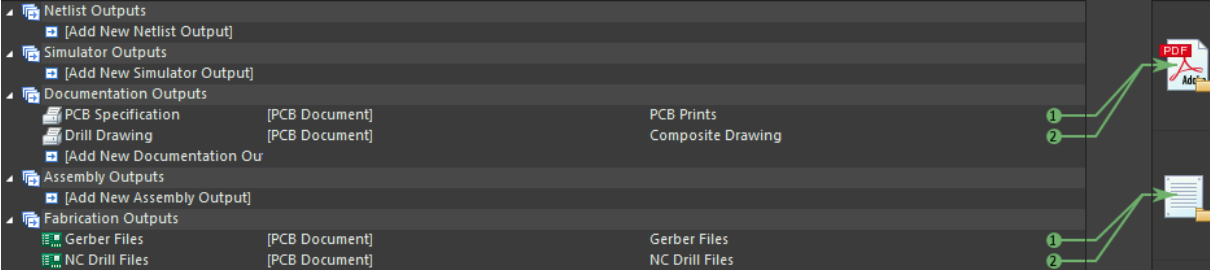
Assembled PCB production revision release

The following files and group of files must be generated with each release:

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Necessary CAD files with releases or design transfers

The following files are necessary with each release and complete design transfer between Skippers collaborators:

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