Subject: Netlist auditing question
Posted by rcini on Sun, 11 Aug 2024 17:34:56 GMT
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All --

This question isn't specific to a particular Retrobrew project, but after having done many successful ECB boards, I'm bedeviled by a reproduction S100 board I'm working on and at this point I think I need to do a net-by-net comparison of the prototype to the reproduction. Because I started this project over a year ago, I'm on KiCAD 6. KiCAD has the ability to export a netlist, but it's really not user friendly. What I need is a very easy listing of each device pin and where it connects so I can ohm-out the board and check it off as I go.

For perspective, it's a very dense board -- 4 layer with 67 ICs -- and it has a bunch of manual ECOs on it. If anyone has a particular solution for this, I'd like to hear about it.

Thanks!
Rich

Subject: Re: Netlist auditing question
Posted by jayindallas on Fri, 16 Aug 2024 15:46:32 GMT
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The ideal solutions requires a CAD generated netlist and often that is not easily accessed. The next diminished level of solutions is to use a spreadsheet for everything you can type in. Being able to SORT the list for same net contacts or sort by IC will help you maintain sanity.

I did one recently for the 8051 project here. There are 3 example files of its evolution, attached to this message. Its done in Linux LibreOffice CALC and I've done many in the past in Microsoft EXCEL (EXCEL is a lot less 'quirky' as a spreadsheet).

Having a previously used example spreadsheet, should boost your efficiency in choosing how you might do your own. If you've done a lot of spreadsheet work, it will help you avoid data loss and the normal amount of chaos that Murphy's Law flings at us, regularly.

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Some advice of using spreadsheets for netlist verification or PCB point-to-point connections:

The additional new thing about using spreadsheets is you can quickly copy and paste data, like a 16 pin block pattern for an IC. I often add cell formulas to do something automatically instead of doing more tedious typing. It can also be used to sanity check values or to call attention to IC pins that are nearly completed. I usually have an extra sheet of patterns I can cut and paste when adding another chip into the spreadsheet.

The other thing that helps visually organize things in your spreadsheet is the ability to add color. Its not art, its there to communicates faster than reading. And bright bold colors might keep you awake when your working late.

In business applications, I've found the final point-to-point verification (before sending it out for PCB) is better done with two people. The assistant does not have to be knowledgeable. Put the assistant on the spreadsheet (save a copy or protect the cells from user error). Their job is the read the information for you to verify the connection on the schematic or with the PCB and ohm meter.

Its best if you give the assistant a cell to type "OK" into, so the spreadsheet has the validations too; better than just highlighting schematics. Before going to the next data, have them read the IC and Pin number to validate that "OK" went into the correct place. You can write a cell formula that detects the "OK" and then displays the IC and pin number next to the OK.

You have to use some skill to manage the situation and not make your assistant feel like they're not doing a good job; they have no idea what they're doing, so any criticism will put unfair stress on them, and they'll likely become useless quickly.

Never say anything negative about what they are doing. Its wiser to say, "Oh, I think I typed that spreadsheet line wrong, so lets take a break and I'll fix my mistake." When you start off, take a break after 10 minutes and later ask if they feel ok working a little longer; they usually do. Make it pleasant for them and they'll be ready to help you next time you ask.

Start with the GND and VCC nets as its usually quick work and it will seem easier for the assistant.

Having two people do the job, helps you to avoid your own assumptions about the data; sometimes we sit in front of the data so long we feel that we know what it says and assume rather than reading it. One way to combat this is to change the data sort order so it seems less familiar.

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The 3 example files are below. #1 is mostly useless. #2 shows some constructs that help you find pins when ohming out a board. #3 is the useful file for netlists.
One thing you'll notice in the rightmost column, NET LIST/CONFIRMED, I didn't need to keep the netlist as it wasn't my design, so I just pasted in a "CONFIRMED BY J" of each Netlist I had completed. If it was my own design I would have maintained that full Netlist data.

File Attachments

1) Example_1_Start-with-BOM-to-Build-Netlist.ods, downloaded 113 times
2) Example_2_Component-Pinout_Spreadsheet.ods, downloaded 77 times
3) Example_3_Netlist-Spreadsheet.ods, downloaded 95 times