# Best way to get a solid ground plane

4 REPLIES ✔

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MESSAGE 1 OF 5

tinkercadXSL49 737 Views, 4 Replies

07-31-2018 12:36 PM

## ✔ Best way to get a solid ground plane

Is there a way to "lock" a plane, so Eagle won't route signals through it under any circumstances, but will drop vias to it in order to use the plane properly ?

Locking the polygon just means you can't move it, and making the layer 'n/a' for routing makes the autorouter lay out GND signals as normal nets on the signal layers.

To be clear, I'm talking about a full-board plane here, not a small area on the board (which I guess *restrict could take care of).

I can set the 'route' cost for layers 2,15 to be '99', but that means going though 21 screens and individually typing '99' into each of the layer-2 and layer-15 dialogue boxes - is there a better way ?

Cheers

✔ Solved by rachaelATWH4. Go to Solution.

Report

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MESSAGE 2 OF 5

tinkercadXSL49 in reply to: tinkercadXSL49

08-01-2018 06:47 AM

## Re: Best way to get a solid ground plane

So, replying to myself (since no-one else seems to have this as an issue [grin])...

A little more background: I have a 4-layer board that routes out, but has voids in the ground plane, and a split power-plane, with the left/top of the power-plane being +5v and the rest being 3.3v. I'm ok with the split power-plane and I can handle ground loops and signal crossings etc. What I'm not ok with is the large voids in the ground plane because this board has 1GHz signals on it.

So, the plan is to go to 6-layers. I'd have hoped that there was some way to say to the autorouter:"reserve this plane for ground, if it doesn't route out, fine", but I can't find any way to actually do that. I've tried setting the cost for routing within polygons high, but that doesn't really help in any significant way. Usually my strategy with boards is to route out the high-importance signals myself (diff-pairs, busses, length-matched etc.) and let the autorouter do the rest, but going to 6-layers, it still uses all the layers to autoroute, and my ground plane is still not solid.

So, my next plan is:

- Manually add a named GND via next to each GND pin, and route the trace to the via.
- Do the same for the +3.3v and +5v power planes
- Standard strategy: route diff-pairs, length-matched etc. on the top layer
- Lock all the vias and routed traces
- Do an autoroute, specifying the GND and power-plane as 'N/A'
- Ignore the expected warning about placement (since I only have vias going there, which are also on other planes)
- Let the autorouter strut its funky stuff.

Before I go ahead and do that, which'll take a while, can anyone tell me if there's a reason the above wouldn't work ? Should I just cough up the cash and buy Electra ?

Cheers

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REPLY

MESSAGE 3 OF 5

rachaelATWH4 in reply to: tinkercadXSL49

08-01-2018 08:01 AM

## Re: Best way to get a solid ground plane

> @tinkercadXSL49 wrote:
>
> So, replying to myself (since no-one else seems to have this as an issue [grin])...

Yeah I don't have the issue as I don't use the auto router

> @tinkercadXSL49 wrote:
>
> So, my next plan is:
>
> - Manually add a named GND via next to each GND pin, and route the trace to the via.
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> - Let the autorouter strut its funky stuff.
>
> Before I go ahead and do that, which'll take a while, can anyone tell me if there's a reason the above wouldn't work ? Should I just cough up the cash and buy Electra ?

Yes that looks about right although it might not be too good about not routing through what you've already routed. You may need to experiment a little see how well it works. I'd go for a multiple phase approach to the autorouter too, set that off doing just the most important routes, working your way through them in order of importance before finally letting it have free reign to route all the remaining ones.

The way I look at the autorouter is it's a tool to aid you but it's not a substitute for manual routing altogether. Be prepared to have to route some stuff in yourself and also do tidying up afterwards.

Best Regards,

Rachael



2 LIKES

REPLY

MESSAGE 4 OF 5

tinkercadXSL49 in reply to: rachaelATWH4

08-01-2018 11:07 AM

## Re: Best way to get a solid ground plane

Good to know the general idea isn't wrong, I'll give it a go over the next few days - thanks ☺

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REPLY

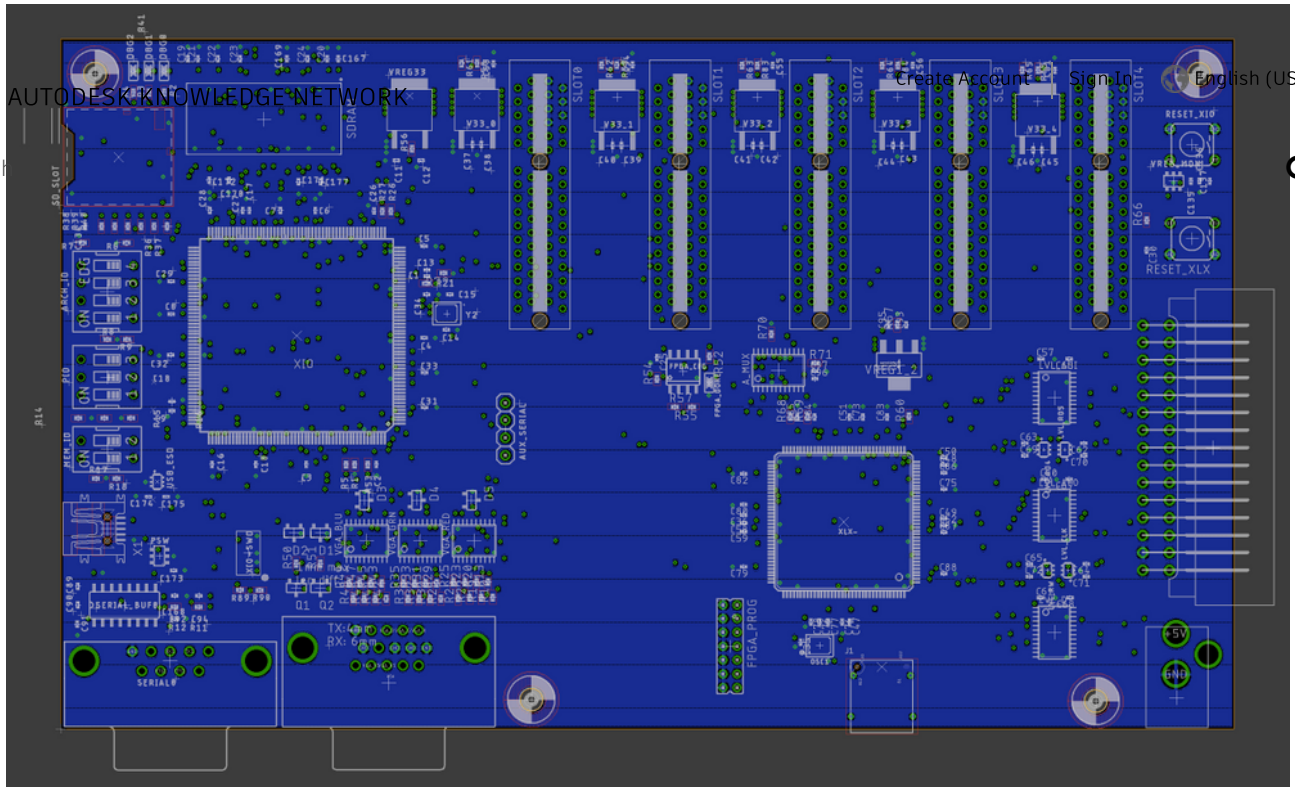
MESSAGE 5 OF 5

tinkercadXSL49 in reply to: rachaelATWH4

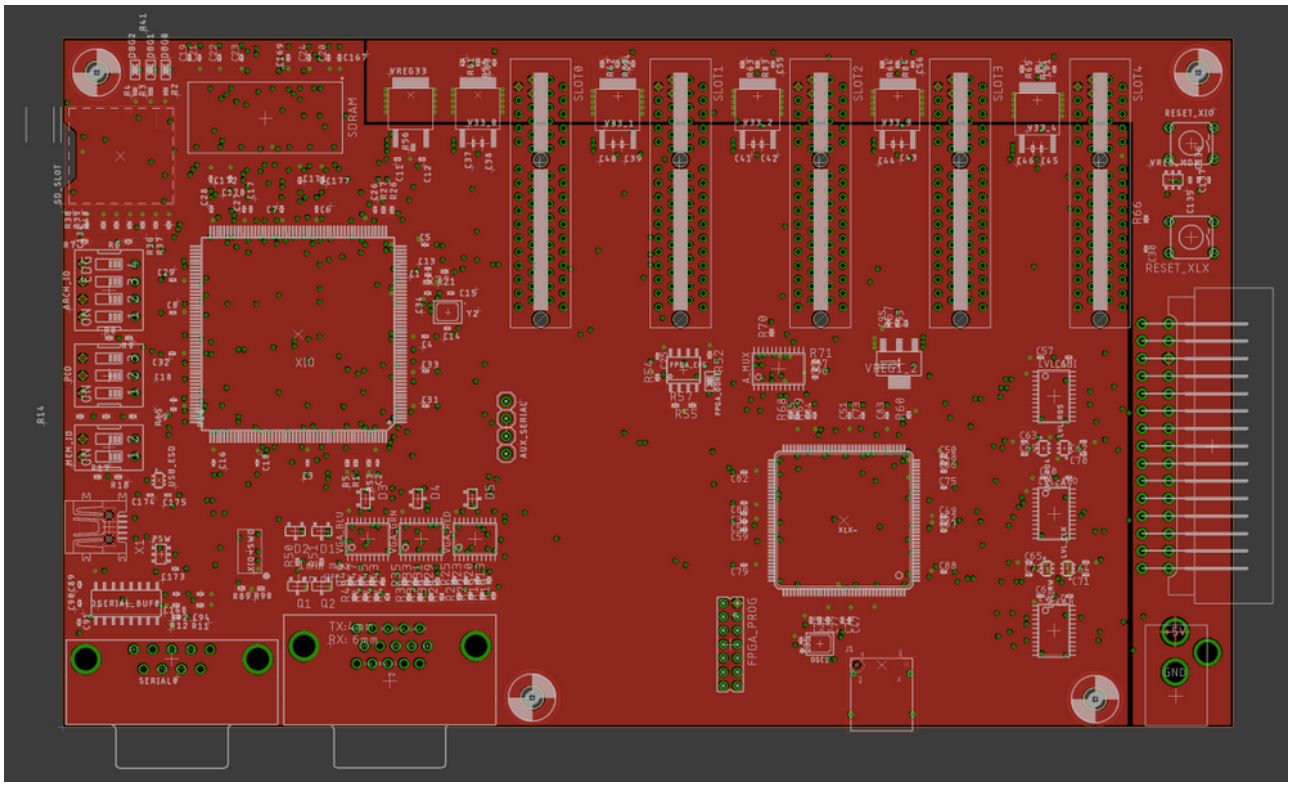
08-06-2018 07:57 AM

## Re: Best way to get a solid ground plane

Just to circle back on this, the method above works like a dream. Placing the vias and locking them so they don't get removed with a global ripup means I can experiment with hand-routing without fear of losing all the prep-work, and telling the autorouter to ignore the layers where I've draw a polygon associated with a ground/power net makes perfect ground planes, you end up with planes looking like:



*The ground plane - the horizontal lines are just a rendering artefact*



*The power plane - split between 3.3v (main area) and 5v for the regulators*

I'm sufficiently happy with this that I'm going to do it this way from now on ☺

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