CLAIMS

1. A printed circuit board (PCB), comprising:

a set of stacked metallization layers separated by a set of stacked electrical-insulating layers, respectively, wherein the set of stacked metallization layers includes an upper metallization layer, a lower metallization layer, and an intermediate metallization layer;

a via electrically coupled to the upper metallization layer, the intermediate metallization layer, and the lower metallization layer~~; and~~

~~an electromagnetic absorbing material coupled to the via.~~, wherein a stub of the via below the intermediate metallization layer produces an insertion loss notch at a particular frequency of a data signal propagating between the upper and intermediate metallization layers; and an electromagnetic absorbing material coupled to the stub to reduce the insertion loss notch, wherein the electromagnetic absorbing material is attached coaxially around a portion of the stub, and wherein the electromagnetic absorbing material is configured to reduce an intensity of a reflected signal resulting from the data signal propagating downward along the stub of the via and reflecting off the lower metallization layer.

2. The PCB of claim 1, wherein the upper metallization layer, a portion of the via between the upper metallization layer and the intermediate metallization layer, and the intermediate metallization layer are configured to route ~~a~~the data signal between a signal-in and a signal-out.

3. ~~——~~The PCB of claim 1~~, wherein the electromagnetic absorbing material configured to reduce an intensity of a reflected signal resulting from the data signal propagating downward along a stub of the via and reflecting off the lower metallization layer.~~

~~4. The PCB of claim 3~~, wherein the electromagnetic absorbing material is attached to the lower metallization layer directly underneath the stub.

~~5. The PCB of claim 3, wherein the electromagnetic absorbing material is attached to a dielectric material situated between the lower metallization layer and the electromagnetic absorbing material directly underneath the stub, wherein a dielectric constant of the dielectric material is between a dielectric constant of the stacked electrical insulating layers and a dielectric constant of the electromagnetic absorbing material.~~

~~6. The PCB of claim 3, wherein the electromagnetic absorbing material is attached coaxially around a portion of the stub.~~

~~7. The PCB of claim 6~~4. The PCB of claim 1, further comprising a second electromagnetic material attached to the lower metallization layer directly underneath the stub.

~~8. The PCB of claim 6, further comprising a second electromagnetic absorbing material attached to a dielectric material situated between the lower metallization layer and the second electromagnetic absorbing material directly underneath the stub, wherein a dielectric constant of the dielectric material is between a dielectric constant of the stacked electrical insulating layers and a dielectric constant of the electromagnetic absorbing material.~~

~~9~~5. The PCB of claim 1, further comprising a ground plane associated with the upper and intermediate metallization layers, wherein the electromagnetic absorbing material is coupled to the ground plane.

~~10~~6. The PCB of claim 1, wherein the electromagnetic absorbing material has a material loss factor greater than a material loss factor of the stacked electrical insulating layers for at least a portion of a frequency spectrum of the data signal.

~~11~~7. The PCB of claim 1, wherein the electromagnetic absorbing material has a dielectric constant less than a dielectric constant of the stacked electrical insulating layers for at least a portion of a frequency spectrum of the data signal.

~~12~~8. The PCB of claim 1, wherein the electromagnetic absorbing material comprises urethane, silicone, or epoxy.

~~13. A method~~9. The PCB of ~~manufacturing~~claim 1, wherein the electromagnetic absorbing material has a material loss factor greater than one (1) at the particular frequency.

10. A printed circuit board ~~(PCB),~~, comprising:

~~forming~~ a set of stacked metallization layers separated by a set of stacked electrical-insulating layers, respectively, wherein the set of stacked metallization layers includes an upper metallization layer, a lower metallization layer, and an intermediate metallization layer;

~~forming~~ a via electrically coupled to the upper metallization layer, the intermediate metallization layer, and the lower metallization layer~~, wherein the upper metallization layer, a portion of the via between the upper metallization layer~~; and ~~the intermediate metallization layer, and the intermediate metallization layer are configured to route a data signal between a signal-in and a signal-out; and~~

~~forming~~ an electromagnetic absorbing material coupled to the via, wherein the electromagnetic absorbing material is configured to reduce an intensity of a reflected signal resulting from ~~the~~a data signal propagating downward along a stub of the via and reflecting off the lower metallization layer~~.~~

~~14. The method of claim 13~~, wherein ~~forming the electromagnetic absorbing material comprises attaching~~ the electromagnetic absorbing material ~~to the~~ is attached to a dielectric material situated between the lower metallization layer ~~directly underneath the stub.~~

~~15. The method of claim 13, further comprising attaching a dielectric material to the lower metallization layer directly underneath the stub, wherein forming the~~ and the electromagnetic absorbing material ~~comprising attaching the electromagnetic absorbing material to the dielectric material~~ directly underneath the stub, wherein a dielectric constant of the dielectric material is between a dielectric constant of the stacked

electrical insulating layers and a dielectric constant of the electromagnetic absorbing material.

~~16~~11. The ~~method~~printed circuit board of claim ~~13~~10, wherein ~~forming~~ the electromagnetic absorbing material ~~comprises attaching the electromagnetic absorbing material coaxially around a portion of the stub.~~

~~17. The method of claim 16, further comprising attaching a second electromagnetic material to the lower metallization layer directly underneath the stub.~~

~~18. The method of claim 16, further comprising:~~

~~attaching a dielectric material to the lower metallization layer directly underneath the stub; and~~

~~attaching a second electromagnetic absorbing material to the dielectric material situated directly underneath the stub, wherein a dielectric constant of the dielectric material is between a dielectric constant of the stacked electrical insulating layers and a dielectric constant of the electromagnetic absorbing material.~~

~~19. The method of claim 13, further comprising coupling the electromagnetic absorbing material to a ground plane associated with the upper and intermediate metallization layers.~~

~~20. The method of claim 13, wherein forming the electromagnetic absorbing material comprises selecting a material that~~ has a material loss factor greater than a material loss factor of the stacked electrical insulating layers for at least a portion of a frequency spectrum of the data signal.

~~21~~12. The ~~method~~printed circuit board of claim ~~13~~10, wherein ~~forming~~the dielectric constant of the electromagnetic absorbing material ~~comprises selecting a material that has a dielectric constant~~ is less than ~~a~~the dielectric constant less of the stacked electrical insulating layers for at least a portion of a frequency spectrum of the data signal.

~~22~~13. The ~~method~~ printed circuit board of claim ~~13, wherein forming the electromagnetic absorbing material comprises spraying electromagnetic absorbing material over the lower metallization layer.~~

~~23. The method of claim 13~~10, wherein the electromagnetic absorbing material comprises urethane, silicone, or epoxy.

~~24. An apparatus, comprising:~~
~~a first device~~

14. The printed circuit board of claim 10, further comprising a second electromagnetic absorbing material attached coaxially around a portion of the stub.

15. The printed circuit board of claim 10, wherein the upper metallization layer, a portion of the via between the upper metallization layer and the intermediate metallization layer, and the intermediate metallization layer are configured to ~~generate a~~route the data signal~~;~~
~~a second device configured to receive the data~~ between a signal~~;~~-in and
~~a~~ a signal-out.

16. A printed circuit board ~~(PCB),~~ comprising:

a set of stacked metallization layers separated by a set of stacked electrical-insulating layers, respectively, wherein the set of stacked metallization layers includes ~~upper metallization layer, lower metallization layer, and intermediate metallization layer;~~

an upper metallization layer, a lower metallization layer, and an intermediate metallization layer; a via electrically coupled to the upper metallization layer, the intermediate metallization layer, and the lower metallization layer; an electromagnetic absorbing material coupled to the via, wherein the electromagnetic absorbing material configured to reduce an intensity of a reflected signal resulting from a data signal propagating downward along a stub of the via and reflecting off the lower

metallization layer; and a second electromagnetic absorbing material attached to a dielectric material situated between the lower metallization layer and the second electromagnetic absorbing material directly underneath the stub, wherein a dielectric constant of the dielectric material is between a dielectric constant of the stacked electrical insulating layers and a dielectric constant of the electromagnetic absorbing material.

17. The printed circuit board of claim 16, wherein at least one of the electromagnetic absorbing material or the second electromagnetic absorbing material has a material loss factor greater than a material loss factor of the stacked electrical insulating layers for at least a portion of a frequency spectrum of the data signal.

18. The printed circuit board of claim 16, wherein at least one of the dielectric constant of the electromagnetic absorbing material or a dielectric constant of the second electromagnetic absorbing material is less than the dielectric constant less of the stacked electrical insulating layers for at least a portion of a frequency spectrum of the data signal.

19. The printed circuit board of claim 16, wherein at least one of the electromagnetic absorbing material or the second electromagnetic absorbing material comprises urethane, silicone, or epoxy.

20. The printed circuit board of claim 16, wherein the electromagnetic absorbing material is attached coaxially around a portion of the stub.

21. The printed circuit board of claim 16, wherein the upper metallization layer, a portion of the via between the upper metallization layer and the intermediate metallization layer, and the intermediate metallization layer are configured to route the data signal between a signal-in and a signal-out.

22. An apparatus, comprising: a first device configured to generate a data signal; a second device configured to receive the data signal; and a printed circuit board (PCB),

comprising: a set of stacked metallization layers separated by a set of stacked electrical-insulating layers, respectively, wherein the set of stacked metallization layers includes an upper metallization layer, a lower metallization layer, and an intermediate metallization layer; a via electrically coupled to the upper metallization layer, the intermediate metallization layer, and the lower metallization layer, wherein the upper metallization layer, a portion of the via between the upper metallization layer and the intermediate metallization layer, and the intermediate metallization layer are configured to route the data signal from the first device to the second device, wherein a stub of the via below the intermediate metallization layer produces an insertion loss notch at a particular frequency of the data signal; and

an electromagnetic absorbing material configured to reduce the insertion loss notch, wherein the electromagnetic absorbing material is attached coaxially around a portion of the stub, and wherein the electromagnetic absorbing material is configured to reduce an intensity of a reflected signal resulting from the data signal propagating downward along ~~a~~the stub of the via and reflecting off the lower metallization layer.

~~25~~23. The apparatus of claim ~~24~~22, wherein the electromagnetic absorbing material comprises a polystyrene material.

24. The apparatus of claim 22, wherein the electromagnetic absorbing material has a material loss factor greater than one (1) at the particular frequency.