CLAIMS

1. A method for manufacturing a z-directed component for insertion into a mounting hole in a printed circuit board, comprising:

adding a substrate material to a mold defining the shape of a layer of the z-directed component;

leveling a top surface of the substrate material in the mold;

treating the substrate material in the mold and forming the layer of the z-directed component;

applying a conductive material to at least one surface of the formed layer; and

forming the z-directed component, the z-directed component including a stack of component layers that includes the formed layer.

2. The method of claim 1, wherein the mold includes a cavity formed in a plate and a plug forming a bottom surface of the cavity, the plug having at least one extension into the cavity, the at least one extension corresponding with a void in the shape of the layer.

3. The method of claim 2, wherein the at least one extension extends to a top edge of the cavity and corresponds with a channel through the layer.

4. The method of claim 2, wherein the plug includes a recess formed in an end thereof having a tapered rim around a periphery of the recess that forms a corresponding taper in a surface of the layer facing the plug.

5. The method of claim 1, wherein the mold includes a cavity formed in a plate and a bottom portion of the cavity includes a tapered rim around a periphery thereof that forms a corresponding taper in a bottom surface of the layer.

6. The method of claim 1, wherein the substrate material added is a powder and treating the substrate material includes compressing the powder in the mold.

7. The method of claim 1, wherein the substrate material added is a liquid based material and treating the substrate material includes curing the liquid based material in the mold.

8. The method of claim 1, wherein applying the conductive material to the at least one surface of the formed layer includes:

applying a mask to a top surface of the formed layer, the mask restricting the application of conductive material to selected portions of the formed layer; and

screening conductive material through the mask onto the formed layer,

wherein the mask includes one of a physical mask placed on the top surface of the formed layer and a photoresist layer applied to and developed on the top surface of the formed layer.

9. The method of claim 1, wherein applying the conductive material to the at least one surface of the formed layer includes spin coating a top surface of the formed layer with liquid conductive material and then selectively etching conductive material from the top surface of the formed layer.

10. The method of claim 1, wherein applying the conductive material to the at least one surface of the formed layer includes:

positioning the formed layer in a constraining plate having a side wall surface that is spaced from a side wall channel in the formed layer forming a gap therebetween; and

applying conductive material in the gap formed between the side wall surface of the constraining plate and the side wall channel in the formed layer to plate the side wall channel in the formed layer with the conductive material.

11. The method of claim 1, wherein forming the z-directed component includes heating and compressing a stack of component layers to form an aggregate part.

12. A method for manufacturing a z-directed component for insertion into a mounting hole in a printed circuit board, comprising:

adding a substrate material to a first cavity portion that defines the shape of a first layer of the z-directed component;

leveling a top surface of the substrate material in the first cavity portion;

treating the substrate material in the first cavity portion and forming the first layer of the z-directed component;

applying a conductive material to at least one surface of the first formed layer;

adding the substrate material to a second cavity portion positioned on top of the first cavity portion, the second cavity portion defining the shape of a second layer of the z-directed component;

leveling a top surface of the substrate material in the second cavity portion;

treating the substrate material in the second cavity portion and forming the second layer of the z-directed component stacked on top of the first layer; and

forming the z-directed component, the z-directed component including a stack of component layers that includes the first and second layers.

13. The method of claim 12, wherein the first cavity portion is formed in a first plate and the second cavity portion is formed in a second plate, the second plate being stacked on top of the first plate so that the second layer of the z-directed component is formed stacked on top of the first layer.

14. The method of claim 12, wherein the first cavity portion is formed in a cavity in a plate, the bottom surface of the first cavity portion is formed by a raisable elevator therein, and the second cavity portion is formed by lowering the elevator to create additional space in the cavity in the plate after the first layer of the z-directed component is formed so that the second layer of the z-directed component is formed stacked on top of the first layer.

15. The method of claim 14, wherein the raisable elevator includes at least one extension into the cavity in the plate that corresponds with a channel through at least one of the first layer and the second layer of the z-directed component.

CLAIMS

1. A method for manufacturing a z-directed component for insertion into a mounting hole in a printed circuit board, comprising:

adding a substrate material to a first cavity portion that defines the shape of a first layer of the z-directed component;

leveling a top surface of the substrate material in the first cavity portion;

treating the substrate material in the first cavity portion and forming the first layer of the z-directed component;

applying a conductive material to at least one surface of the first formed layer;

adding the substrate material to a second cavity portion positioned on top of the first cavity portion, the second cavity portion defining the shape of a second layer of the z-directed component;

leveling a top surface of the substrate material in the second cavity portion;

treating the substrate material in the second cavity portion and forming the second layer of the z-directed component stacked on top of the first layer; and

forming the z-directed component, the z-directed component including a stack of component layers that includes the first and second layers,

wherein the first cavity portion is formed in a cavity in a plate, the bottom surface of the first cavity portion is formed by a raisable elevator therein, and the second cavity portion is formed by lowering the elevator to create additional space in the cavity in the plate after the first layer of the z-directed component is formed so that the second layer of the z-directed component is formed stacked on top of the first layer.

2. A method for manufacturing a z-directed component for insertion into a mounting hole in a printed circuit board, comprising:

adding a substrate material to a first cavity portion that defines the shape of a first layer of the z-directed component;

leveling a top surface of the substrate material in the first cavity portion;

treating the substrate material in the first cavity portion and forming the first layer of the z-directed component;

applying a conductive material to at least one surface of the first formed layer;

adding the substrate material to a second cavity portion positioned on top of the first cavity portion, the second cavity portion defining the shape of a second layer of the z-directed component;

leveling a top surface of the substrate material in the second cavity portion;

treating the substrate material in the second cavity portion and forming the second layer of the z-directed component stacked on top of the first layer; and

forming the z-directed component, the z-directed component including a stack of component layers that includes the first and second layers,

wherein the first cavity portion is formed in a first plate and the second cavity portion is formed in a second plate, the second plate being stacked on top of the first plate so that the second layer of the z-directed component is formed stacked on top of the first layer.

3. The method of claim 1, wherein the raisable elevator includes at least one extension into the cavity in the plate that corresponds with a channel through at least one of the first layer and the second layer of the z-directed component.

4. The method of claim 1 or claim 2, wherein the substrate material added to the first cavity portion and the second cavity portion is a powder and treating the substrate material includes compressing the powder in the first cavity portion and in the second cavity portion.

5. The method of claim 1 or claim 2, wherein the substrate material added to the first cavity portion and the second cavity portion is a liquid based material and treating the substrate material includes curing the liquid based material in the first cavity portion and in the second cavity portion.

6. The method of claim 1 or claim 2, wherein forming the z-directed component includes heating and compressing the stack of component layers to form an aggregate part.