

A SELECTIVELY GOLD PLATED PRINTED CIRCUIT BOARD AND METHOD FOR MANUFACTURE THEREOF

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Field of the Invention

This invention relates to a printed circuit board having at least two thicknesses of gold plated pads and a method for manufacture thereof.

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Background of the Invention

Pads on Printed Circuit Boards (PCBs) for electrical connections are typically copper with a plating of a conductive and non-corrosive metal such as gold. These pads are plated by either electrolytic or electroless gold plating process. Electroless gold plating, although an easier process than electrolytic gold plating, can only plate the pads with gold up to a fixed maximum thickness. On the other hand, electrolytic gold plating can plate gold thicker than is possible with electroless gold plating. Hence, when a PCB requires some pads to have a thickness more than is possible with electroless gold plating, electrolytic gold plating is used. Accordingly, when using electrolytic gold plating, all gold plated pads on the PCB will be identical in thickness.

Unfortunately, in applying electrolytic gold plating for a PCB, excessive gold can be added to some of the pads that only require thin gold plating. As gold is expensive, this unrequired gold adds to costs of the PCBs and any device that uses such PCBs.

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Summary of the Invention

It is an object of this invention to provide a printed circuit board with pads having at least two thicknesses of gold plated pads and a method for manufacture thereof.

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According to one aspect of the invention, there is provided a method for selectively gold plating pads on a printed circuit board comprising the steps of:

5 (i) gold plating one or more said pads on the printed circuit board;

 (ii) masking with a protective layer at least one of said pads, said masking resulting in one or more masked pads and one or more
10 unmasked pads;

 (iii) gold plating said unmasked pads on the printed circuit board, said unmasked pads having gold of a different thickness to that of said masked pads; and
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 (iv) removing the protective layer.

Preferably, the step of (i) gold plating can be electrolytic gold plating.

20 Alternatively, the step of (i) gold plating can be electroless gold plating.

 Suitably, the step of masking includes forming the protective layer with a resin.

25 Preferably, the step of (iii) gold plating can be electroless gold plating.

 Alternatively, the step of (iii) gold plating can be electrolytic gold plating.

30 According to another aspect of the invention, there is provided a printed circuit board comprising at least two groups of pads plated with gold wherein said groups are plated with gold of a different thickness.

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Brief Description of the Drawings

In order to describe the invention and to put it into practical effect, reference will now be made to preferred embodiments as illustrated with
5 reference to the accompanying drawings in which:

FIG. 1 is a flow diagram of a method for selectively gold plating a PCB in accordance with the invention;

10 FIG. 2 is a cross-sectional view of the PCB of FIG. 1 before gold plating in accordance with the invention;

FIG. 3 is a cross-sectional view of the PCB of FIG. 2 after gold plating one or more pads in accordance with the invention;
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FIG. 4 is a cross-sectional view of the PCB of FIG. 3 after masking at least one of the gold plated pads with a protective layer in accordance with the invention;

20 FIG. 5 is a cross-sectional view of the PCB of FIG. 4 after gold plating unmasked pads in accordance with the invention; and

FIG. 6 is a cross-sectional view of the PCB of FIG. 5 after removal of the protective layer in accordance with the invention.
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Detailed Description of the Invention

FIG. 1 shows a method 100 for selectively gold plating pads on a
30 Printed Circuit Board (PCB) in accordance with the invention. The method begins with gold plating one or more pads on the PCB in step 104. This gold plating is accomplished by electrolytic gold plating. Thereafter, masking with a protective layer at least one of said pads takes place in step 106. The masking provides a set of masked pads and a set of unmasked
35 pads. The masked pads are protected by the protective layer from being detrimentally affected by subsequent gold plating. After the masking, gold

plating the unmasked pads on the PCB takes place in step 108. The unmasked pads are gold plated electrolessly and to a different thickness to that of the one or more pads in step 104. Upon gold plating the unmasked pads, the protective layer is removed in step 110.

5 The method 100 is further illustrated by referring to FIGs. 2 to 6. Prior to any gold plating, FIG. 2 shows a cross-sectional view of a PCB having pads 202,204,206,208 disposed on a substrate 210. Gold plating the one or more pads in step 104 results in pads 202,204 having a first thickness of gold 302,304. The pads 202,204 having the first thickness of gold 302,304
10 are then masked with a protective layer 402,404 as illustrated in FIG. 4. Thereafter, as illustrated in FIG. 5, the unmasked pads 206,208 are then gold plated with a second thickness of gold 506,508. Removal of the protective layer 402,404 for the pads 202,204 completes fabrication of the PCB having the first thickness of gold 302,304 on the pads 202,204 and
15 the second thickness of gold 506,508 on the pads 206,208.

 Fabricating PCBs having at least two pads requiring plating with gold of different thickness is advantageously accomplished by the method 100 in accordance with the invention. For such PCBs, gold plating is applied only to a thickness necessary to meet requirements. Hence, gold plating is
20 not done unnecessarily as in conventional methods whereby a single gold plating process limits gold plating to a single thickness. Therefore, advantageously, the method 100 in accordance with the invention, reduces gold usage for PCB pad plating to achieve cost savings.

CLAIMS

We claim:

- 5 1. A method for selectively gold plating pads on a printed circuit board comprising the steps of:
- (i) gold plating one or more said pads on the printed circuit
10 board;
- (ii) masking with a protective layer at least one of said pads, said masking resulting in one or more masked pads and one or more unmasked pads;
- 15 (iii) gold plating said unmasked pads on the printed circuit board, said unmasked pads having gold of a different thickness to that of said masked pads; and
- (iv) removing the protective layer.
- 20 2. The method as claimed in Claim 1 wherein the step of (i) gold plating comprises the step of electrolytically gold plating said pads.
3. The method as claimed in Claim 1 wherein the step of (i) gold
25 plating comprises the step of electrolessly gold plating said pads.
4. The method as claimed in Claim 1 wherein the step of (ii) masking comprises the step of forming the protective layer with a resin.
- 30 5. The method as claimed in Claim 1 wherein the step of (iii) gold plating comprises the step of electrolessly gold plating said unmasked pads.
6. The method as claimed in Claim 1 wherein the step of (iii) gold
35 plating comprises the step of electrolytically gold plating said unmasked pads.



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7. A printed circuit board comprising:

at least two groups of pads plated with gold wherein said groups are plated with gold of a different thickness.

5 8. A method for selectively gold plating pads on a printed circuit board substantially as described herein with reference to and as illustrated by the accompanying drawings.

10 9. A printed circuit board manufactured substantially as described herein with reference to and as illustrated by the accompanying drawings.

