CLAIMS

1 . A lead-free, silver-free solder alloy comprising:

0.5 to 0.9 wt. % copper;

1 .0 to 3.5 wt. % bismuth;

0.02 to 0.08 wt. % cobalt;

0.0 to 0.09 wt. % antimony; and

balance tin, together with any unavoidable impurities.

2. The lead-free, silver-free solder alloy of claim 1 , further comprising 0.001 to 0.01 wt. % germanium.

3. The lead-free, silver-free solder alloy of claim 2, comprising 0.006 wt. % germanium.

4. The lead-free, silver-free solder alloy of claim 1 , further comprising 0.01 to 0.1 wt. % nickel.

5. The lead-free, silver-free solder alloy of claim 4, comprising 0.05 wt. % nickel.

6. The lead-free, silver-free solder alloy of claim 1 , comprising 0.7 wt. % copper.

7. The lead-free, silver-free solder alloy of claim 1 , comprising 1 .2 to 1 .8 wt. % bismuth.

8. The lead-free, silver-free solder alloy of claim 7, comprising 1 .5 wt. % bismuth.

9. The lead-free, silver-free solder alloy of claim 1 , comprising 0.05 wt. % cobalt.

10. The lead-free, silver-free solder alloy of claim 1 , comprising 0.05 wt. % antimony.