Understanding the Role of Ultrasonic Welding in Wire Bonding

Speaker: **Lee Levine** – Process Solutions Consulting, Inc., New Tripoli, PA

E-Mail: levilr@ptd.net

Abstract

Wire bonding is a high-speed ultrasonic welding process that is the dominant chip interconnection method. More than 15 trillion wires are bonded annually. Ultrasonic energy is the principal process parameter affecting the deformation of the ball and the bond pad or substrate. Deformation of both the ball and the bond pad are required to form the intermetallic weld. Understanding of the process and the effect of ultrasonic energy on the deformation behavior of the materials is a key to achieving high-yield, high-reliability interconnections. This paper will discuss the role of ultrasonics in the deformation of a material and its relationship to weld formation. It will also explain a number of key machine dependent variables such as ultrasonic frequency and control mode (constant voltage versus constant current modes) and their relationship to weld formation.