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Title:

Real Time Detector For Accurate Touch Down Position And Applied Force
On Precision Equipment.

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Abstract:

The system uses strain gauges to measure the physical deformation of the geometry of the bonding head or other parts whenever that part encounters an obstacle and stops moving. Since a force continues to be applied for some time, a small deformation on the head will always exist. So, a voltage on the strain gauges will be generated and it can be measured to detect the beginning of a deformation (touchdown) or amplified and treated digitally in order to filter undesirable noise and interface with the driving mechanism for indication of applied force.

This invention solves the lack of a know existing sensor for easy feedback of real force applied on the Bond Heads of Die Attach Bonders, Wire Bonders or other equipment with a need for close detection of touchdown positioning and real force applied. It may also be used for dynamic measuring of damping characteristics of moving parts.

Note:

The existing systems have some problems such as calibration requirements, poor quality, cost, and do not translate the real force applied, only the position. Normally the force is indirectly measured by difference between the control and feedback of a galvanometer or not measured.

Within the existing TI Bonding equipments and other commercial equipments, the detection is not possible and the calibration is done manually or by measuring the position of a galvanometer.

This invention also allows for closed-loop control of applied force, being this one programmable dynamically.

There is one application already developed here in TI Porto, the *Die Bonding Touchdown Detector*. The prototype is ready and is being used in production equipment for tests.

This system is being reviewed by the Patent Committee in TI Dallas which will decide whether or not a patent application will be filed.