The advent of the 0201 and the much dreaded 01005 have led to ever increasing PCB density and complexity. From a process perspective, smaller SMT components mean smaller pad layouts, which mean smaller optimal solder paste deposition which leads to, you guessed it, process problems. Combine this with the introduction of lead-free solder materials, and you have the makings of a very serious challenge for today’s PCB manufacturers.

As the manufacturing process becomes increasingly complex, there is an ever increasing probability for defects to occur on finished PCB assemblies. This provides an equal level of complexity for the inspection process. In order to achieve consistently high quality and maximum efficiency, many PCB manufacturers are relying upon the use of Automatic Optical Inspection (AOI) Equipment.

In order to deal with the level of complexity of today’s PCB assemblies, an AOI system must be extremely accurate and repeatable. Certain AOI companies recognize the absolute requirement for these two qualities and place an emphasis on the engineering and development of optics and lighting technology necessary to achieve these goals. State of the art, CCD-based electro-optic cameras, lenses, illumination systems, digital motion control modules and robust software, are the sub-systems which make up an exceptional AOI system. These technically advanced systems bring unprecedented performance, quality and cost-effectiveness to the inspection environment. Missing or misaligned components, improper polarity, bent leads, insufficient, excessive or inaccurate solder joints and solder bridges can all be detected and analyzed automatically without slowing down the assembly line and impacting production yields. Some AOI systems also offer built in SPC data collection software which promotes continuous process improvement by allowing the user to track and eliminate defects on inspected assemblies.

As the electronic industry accelerates toward smaller, denser and ever more complex PCB assemblies, manufacturers are being forced to re-define the PCB inspection process. For many of today’s manufacturers, Automatic Optical Inspection has become an indispensable tool which provides consistently high quality, quick turn around time and continuous process improvement.

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