

MISSING DIE DETECTION

ABSTRACT

5 An indication of whether or not a target object is present at a site of a collet
assembly is derived by monitoring light reflected from the site. The use of
reflected light enables the presence of objects to be detected, especially
transparent objects. In a preferred arrangement for determining if a sapphire die is
present in a die-handling collet assembly, light from a source is collimated or
10 focused into a narrow beam and directed through a beam splitter at the target site
of the collet assembly. Light reflected from the surface of the die is further
reflected by the beam splitter toward a photo-sensor. The reflected light is
measured when the collet passes over a dark background while on the way to
deliver a die at a bonding position and again while returning after attempting to
15 place the die at the bonding position. A determination of a die present in the
former and absent in the latter is indicative of a well-placed die at the bonding
position.

(Figure 3)