V Groove Lighting Conditions

The measurement of a scoring application requires special care. Conventional top lighting fails miserably here. We at OPTEK accomplish this with our Z-Trac ring light. This is a lighting option where both the elevation and incident angle is programmable.

By lowering the ring to just above the substrate, and adjusting the incident angle of the light to nearly parallel with the surface, it is possible to get a reliable edge detection solution.

The top surface of the board is lit, and the groove is in shadow. This gives a light-to-dark contrast at the edge. By measuring the edge in a few locations along the length of the score, the edge roughness becomes insignificant.

To determine the width of the score, measure both edges at the surface of the board, and construct a distance across them. For the center, construct a bisector line between the edges.

If a depth (height) measurement is needed, construct a point on the centerline. Set a temporary zero there, so that a programmed location for the AutoFocus tool at X=0, Y=0, and Z=0 (at the expected depth) can be used to probe the bottom of the groove.

The measurement will also require an AutoFocus in a clear area on the board surface nearby. This establishes a primary plane of reference.

A high magnification is recommended for this measurement, 350X may or may not be high enough, depending on the sample. 700X is about right.

If QC5000 is being used the angle from the surface to the center of the score can also be determined as QC5000 is working as true 3D modeling software.

OPTEK
Applications Engineering