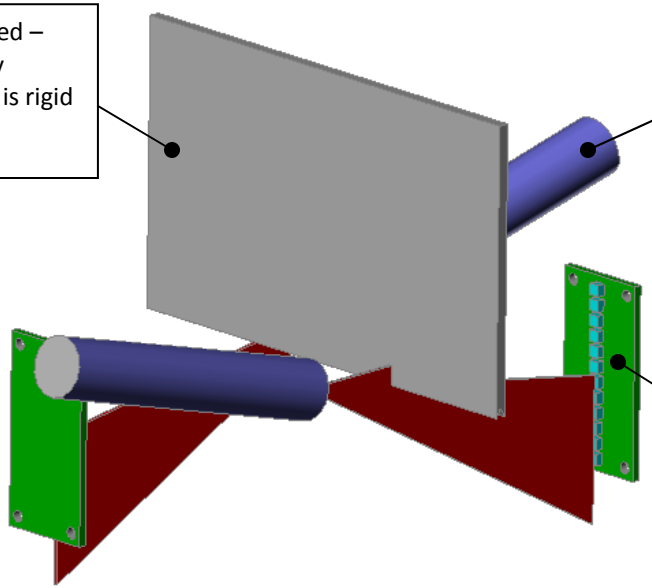
3D VIEW



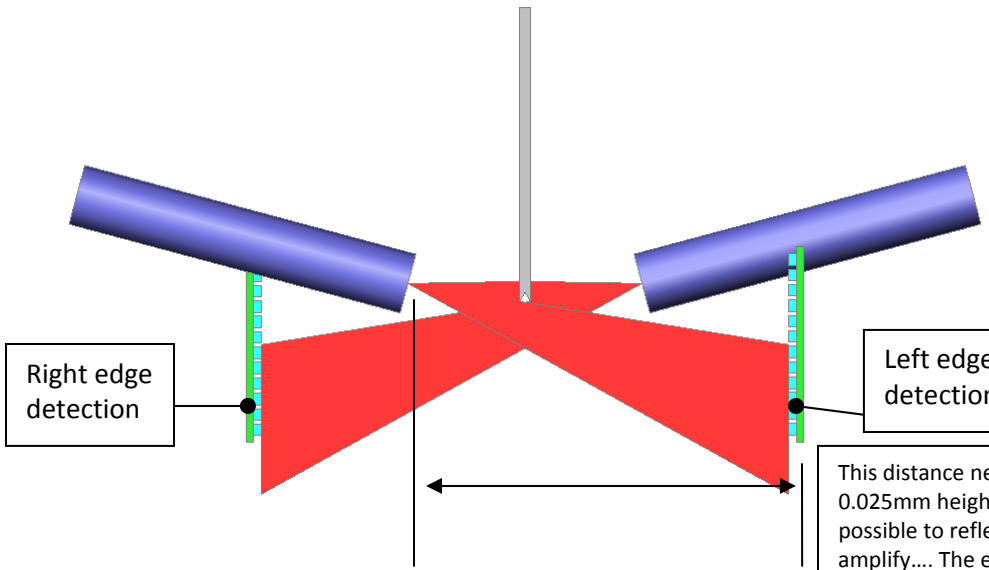
Tile to be measured – lower edge is only critical edge. Tile is rigid and opaque.

Laser source – similar to that of a laser chalk line from co's like Makita

Photodiode Array or other sensor arrangement. Surface mount diodes on a PCB. Compare # of diodes active on left and right side to compare relative height of Tile edges.

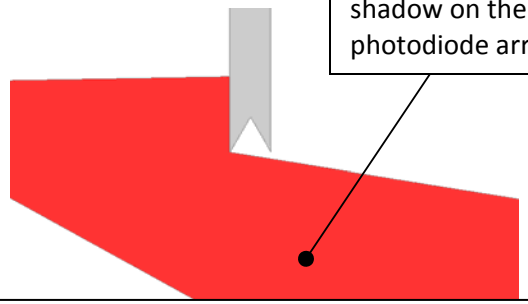
Additional Details:

- The approximate thickness of the tile is 3mm. The length and width are unimportant.
- The "good" and "bad" on the previous page relate to the even-ness of the height of the two edges on the bottom edge of the tile. If the heights are even, this is good. If the heights are off by greater than 0.0254mm (.001") this is bad. This measurement system needs to detect the amount the heights are off.
- There are two lasers because this is the only way I could imagine measuring the relative heights in a non-contact fashion (low cost is key).
- More brute force approaches such as measuring mechanically (subject to wear, misalignment) or with a profilometer/rangefinder/camera (too expensive) are not practical.
- This measurement system needs to be inexpensive because it is part of a consumer product. A good example product would be a keurig or tassimo coffee maker. Embedded electronics in a consumer product.
- I am considering collapsing and expanding the laser chalk line to compress and then amplify the "signal" because the distance that my photodiode array needs to be from the tile to pick up a 0.0254" height difference is impractical for my enclosure size.
- The tile is held rigid & perfectly vertical as it passes through the stationary laser/sensor pair.



Right edge detection

Left edge detection



Left edge shown. This chalk line picks up the edge on the left side and casts a light and shadow on the photodiode array.

This distance needs to be too long (left and right on this view) in order to detect a 0.025mm height diff with sensors spaced apart a few mm's center on center. It would be possible to reflect the back and down in order to gain more distance for the signal to amplify…. The enclosure has less restrictions in size in height (up and down in this view).