

Technical Note

Microscope optics with PI160 and PI4xx

Application

For a temperature measurement of small objects on electronic boards the PI cameras can be equipped with a microscope optic. For this purpose an additional lens of the same type has to be arranged inverted like shown in fig. 1.

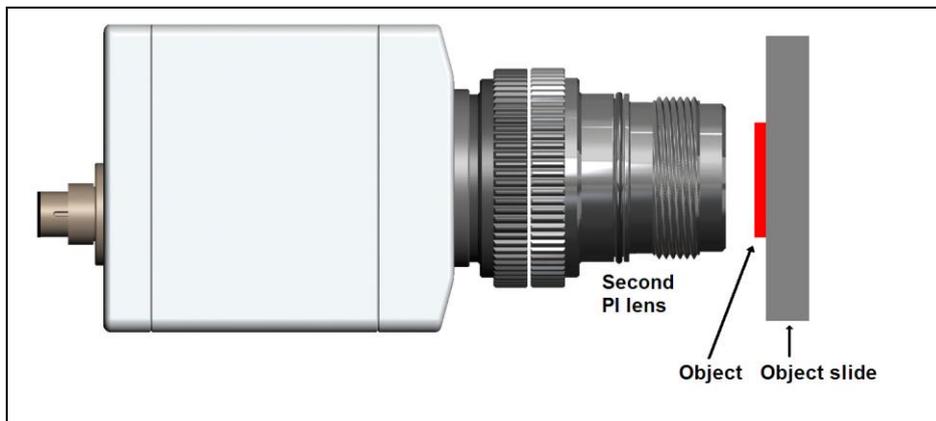


Fig. 1: PI camera with second lens with the same focus

With this lens arrangement you get a 1:1 image of the detector which results in a nominal IFOV (pixel size at object level) of 25 μm . For a correct temperature measurement the object size should be at least 100 μm . Fig. 2 shows recommended lens combinations.

PI models	PI160	PI4xx
recommended	2 x 6°x5°	2 x 13°x10°
lens combinations	2 x 23°x17°	

Fig. 2: Recommended lens types for build up microscope optics

Setup

1. Take the PI160/ PI4xx, equipped with one lens, and adjust focus to infinity (∞).
2. Take the second lens and turn it 180°. Connect both optics using a tape or similar (fig. 3).

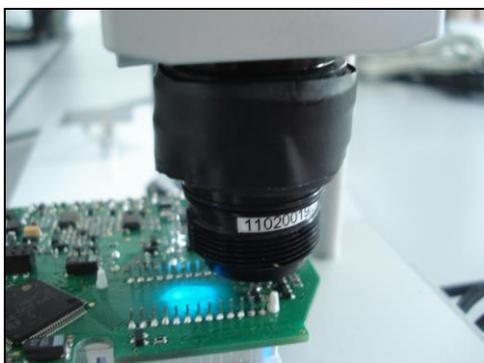


Fig. 3: Lens arrangement on PI

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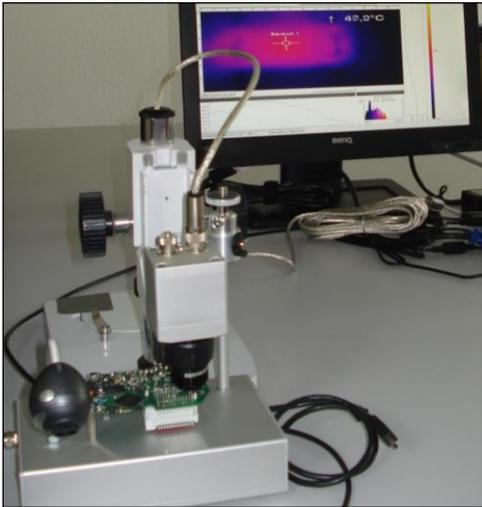


Fig. 4: PI mounted on a microscope rack

3. Use a tripod or a microscope rack to adjust the distance to the measuring object. The optimum distance is approx. at 4-10 mm. The focus depth on a microscope optics is very low, therefore the focus has to be adjusted by varying the distance.

4. The transmission (PIConnect software) has to be set to **0,7** as the second lens is not calibrated.

Sample pictures

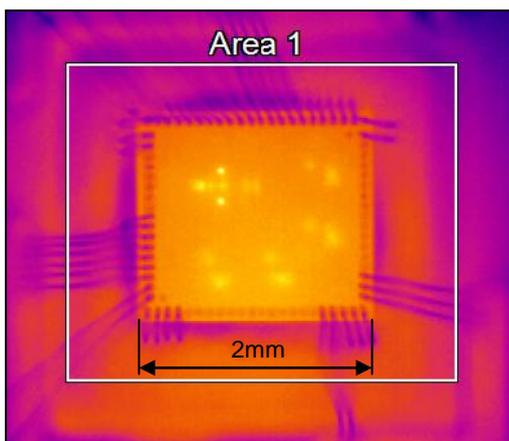


Fig. 5: Electronic chip with size 2 x 2mm

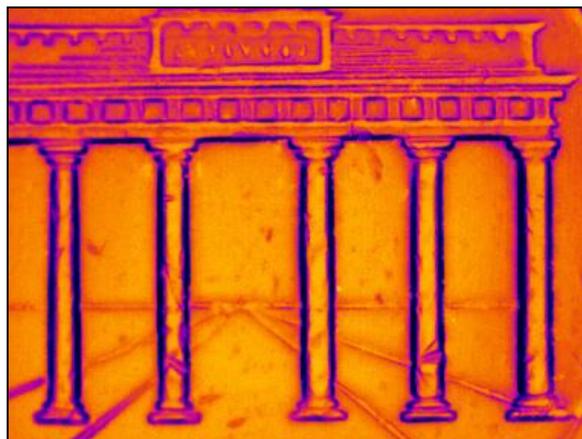


Fig. 6: Brandenburg gate from a 10 cent coin



Fig. 7: Part of a Euro coin