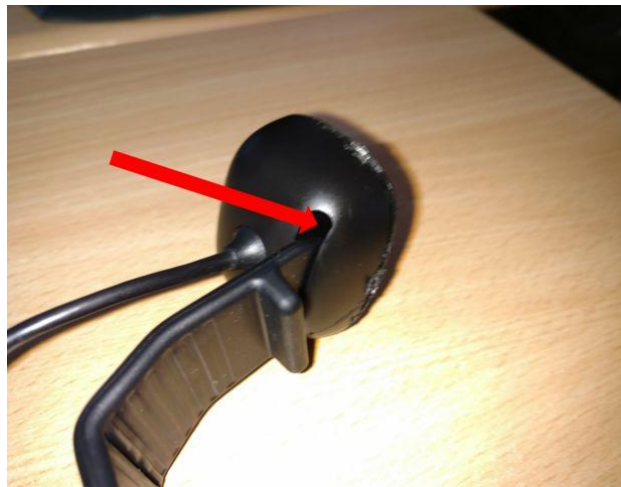


# Camera Supplemental Info

## Microsoft HD-3000 Camera

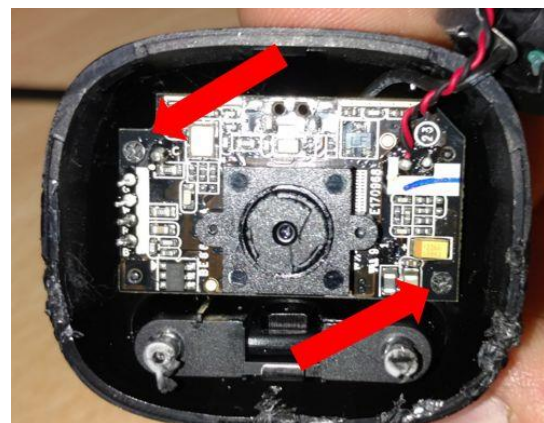
### Removing IR filter (if desired)

Without removing the IR filter, you can still use the camera to process visible light. The vision program in this manual is executed with no IR filter. It is the only way to see the beacon which has an IR light inside. Remove the two screws on either side of the flexible tab in Figure 1. You must rotate the tab to the left to access the right, and vice versa.



**FIGURE 1. LOCATION OF FASTENER ON CAMERA**

The camera front shell can be removed with a light prying force, near the arrows in the next image.



Next, unscrew the circuit board (two screws)

- Again get a well-fitting screwdriver. Make sure to not get any dust on the sensor. With all the cables still attached the board should be in a facing-down position.
- Get a sharp knife and prepare the edges. The IR filter is on the sensor facing side of the lens. It reflects red. Be careful: it's glass and brittle. Cut from the edges of the filter towards and through the plastic ring. This way you will have some gaps to jam your knife in and pry the IR filter out more or less in one piece.
- Pry the filter out. Be careful not to scratch the underlying lens.
- Reassemble Lens and board, but don't close the case yet.
- Adjust the lens. When you look at the assembled lens you will notice it looks a bit like a triangular screw. And that's what it is. Get some pliers and gently, carefully adjust the lens to make up for the changed focal length. Careful so you don't scratch the lens with the pliers. To find the proper adjustment open a video capture app (eg the skype config menu or win10 camera app) and look at an object a few meters behind you. You will notice that if you turn in one direction everything right in front of the camera will be very sharp, if you turn in the other direction stuff that is far away will be in focus. The autofocus can change the focus a bit. It's trial and error now until you find a position that's good for your desired range.

### Removing the Flexible Grip

This grip will need to be removed to mount the camera on the robot. The figure below shows the parts which hold the grip inside the camera.

1. Spring clip
2. Pin
3. Flex grip

In order to remove the flex grip, you'll open the camera, remove the circuit board (two screws) which holds the camera sensor, and then use a small flat screwdriver to remove the silver clip (part no.1) which will allow the pin (2) to fall out and then the grip (3) to be removed.



**FIGURE 2. PIN COMPONENTS OF THE CAMERA FLEXIBLE GRIP**