Converting a standard Webcam to an Infra-Red Webcam (Friday Delight)

This process is all about converting a standard USB webcam to an infrared webcam. This procedure can be used to modify most modern day digital cameras, but I suggest using an old, (cheap) webcam, just in case it doesn't work, once reassembled. Besides, once the cool factor has worn out, you'll probably never use it again.

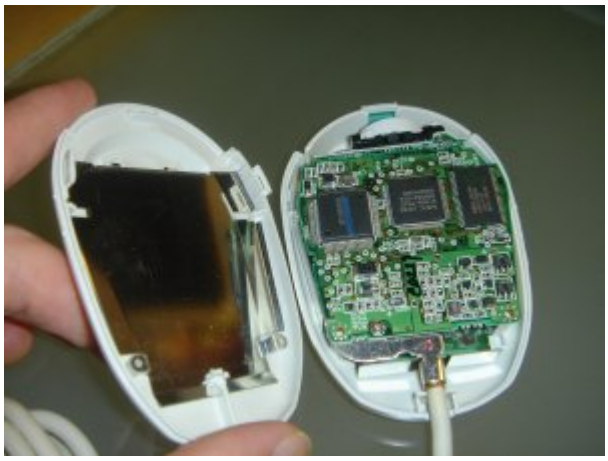
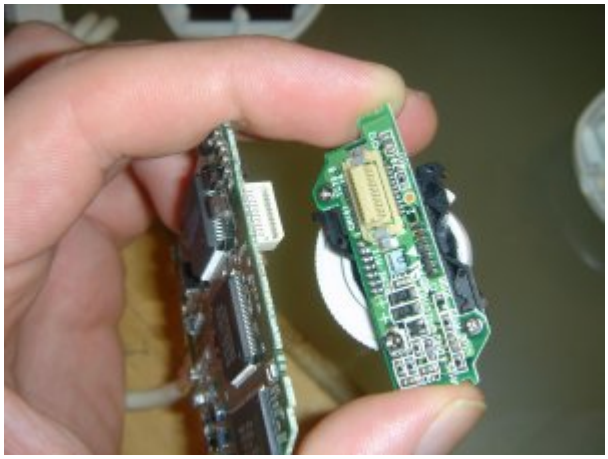
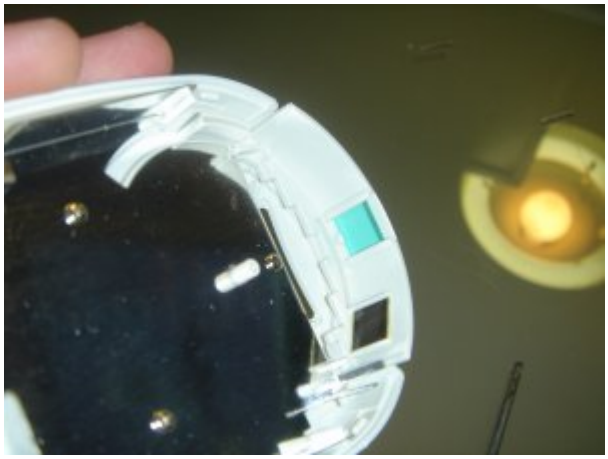
For this project, I chose to use an old Intel YC76 Webcam. I had it laying around, and no longer used it, so it made for a perfect victim subject. Cheap webcams and most digital cameras have a small electronic light sensor called a CCD, which is the part of the camera the detects the light reflected off of surfaces in front of the camera and into the lens. CCDs (or Charge-coupled Devices) that are installed in most consumer grade cameras can see more than the visible spectrum though. Most can also see into the infrared spectrum, or the spectrum of energy longer than visible light waves.

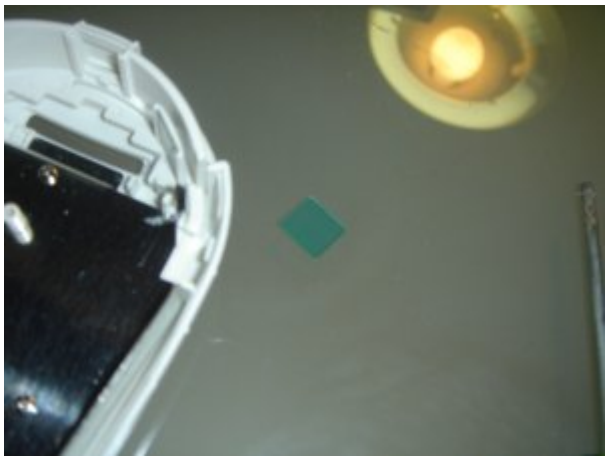
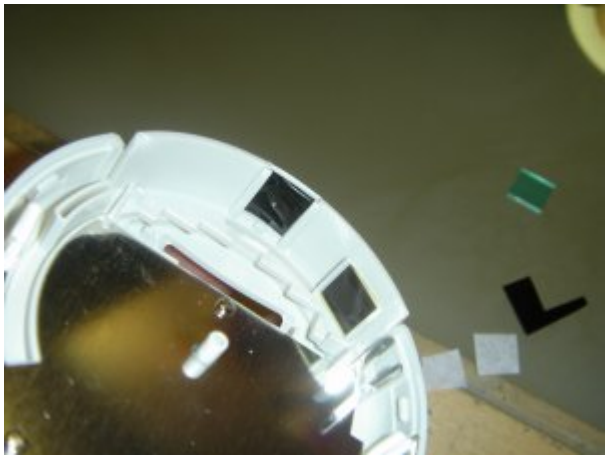
For this project, you're going to need:

- A cheap Digital Camera or Webcam
- A small piece of film negative (from the end of a roll)
- Patience and some time

With the right tools in hand, let's get started:

	First, start with your camera and a level working space
	For this camera, flip the camera over and remove the screw holding it together

	Remove the bottom cover of the camera which will expose the internal electronics inside the camera
	Carefully remove the internal circuit board of the camera. As you flip it over, you'll notice that the camera has a smaller circuit board attached to it. This secondary board holds the camera assembly. You don't have to separate the boards, but I did to see how they were connected
	Look at the inside of the camera housing (the external shell of the camera). See the small blue lens in the camera housing? This is what we're after

	Carefully remove the small blue shield. This shield is actually an Infrared filter! This filter keeps IR light from entering the camera lens and skewing the picture. Once we remove this lens, the camera will be able to see both the IR and visible spectrums. What we want, is to remove this filter, and install our own.
	Using the small blue filter as a template, cut a new filter the same size and shape from our film negative. I suggest using a small piece of film negative from the end of the roll, where there are no pictures. You'll notice that the film negative is not 'see-through'. In fact, if you hold it up to the light, the negative filter blocks all visible light. That's the point!
	Insert the new filter you made into the slot where the IR filter was. Again, this is going to block out all visible light, but the film negative will let all IR light though. Visible light will now be blocked by the filter from entering into the camera lens, while IR light will no longer be blocked by the factory installed filter, and will be allowed into the camera lens.

	Go ahead and re-assemble the camera, carefully re-installing the camera assembly, and then re-closing the camera housing. Install the screws into the housing, and our assembly is not complete. Time to plug the camera in and see what kind of monster we've built.

Taking IR Pictures

Here are a couple of pictures taken with both a normal light camera and then the IR camera we've built. Note the difference between the two photographs of each subject. And yes, the IR camera can actually SEE THROUGH the glass of Coca Cola!

Normal Light Camera	IR Light Camera