

The **ECO-FRIENDLY GUIDE** for today's **TECHNO-CRAFTER**

# 62 PROJECTS TO MAKE WITH a **DeAD** COMPUTER



(and other Discarded  
Electronics)



Make your own  
**TERRARIUM**  
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- ✓ Make a first-aid kit out of a broken **iPOD**
- ✓ Turn your dead **MOUSE** into a pencil sharpener
- ✓ Upcycle an old **LAPTOP** into a digital photo frame
- ✓ Raise a **FLAT-SCREEN** ant farm
- ✓ Plus six ways to reuse a **HARD DRIVE**

By **Randy Sarafan**

## **A Brief Word on Safety**

This project description is intended to provide you with ideas and techniques for repurposing electronic equipment that might otherwise be discarded. While the directions are intended to help you move in a step-by-step way toward the finished project, you should always use caution, sound judgment and common sense whenever handling electronic equipment. Be sure to always familiarize yourself with the safety warnings and instructions for any tools, equipment, and other materials you may use in any projects. And, if you are uncertain about your ability to safely perform any of the techniques described in this project selection, seek the advice of a professional.

# #48 IR camera

**LEVEL 2:** Intermediate | **TECH TRASH:** Digital Camera

Over the years, I have collected a number of digital cameras that are not quite broken, but are definitely no longer quite working as they should. And as it turns out, a somewhat-broken camera is the perfect device for dabbling your feet in camera hacking. You already don't expect it to work exactly as it should, so if you make a mistake, there isn't the greatest loss. On the other hand, when you succeed in modifying it, the results are often phenomenal and result in experimental pictures that often far exceed all expectations.

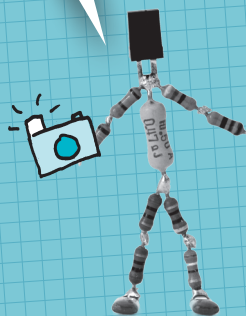
With this in mind, I present to you a beginner's camera hack. With a little bit of alteration, you can convert your camera to take pictures with nonvisible light in the near-infrared spectrum. The results are both fun and spectacular.

## MATERIALS

- ▶ Digital camera that can still take pictures
- ▶ Small screwdriver (for opening the camera)
- ▶ Needle-nose pliers
- ▶ Scissors
- ▶ Toothpick
- ▶ Craft glue
- ▶ 3" processed, but unexposed, 35mm color film negatives (This is the part at the beginning and end of a processed roll of film that is neither white nor black.)

### Mr. Resistor Man Says:

All digital cameras have an IR filter built in to prevent infrared light from reaching the CCD. To make this near-IR camera, you are going to need to remove this filter so that infrared light is allowed to pass through.



## MAKE IT

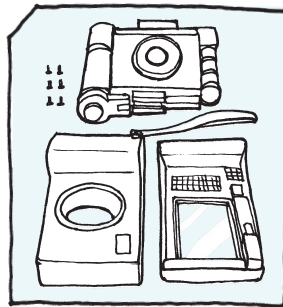


### SAFETY FIRST

>> Be careful not to touch the large capacitor connected to the camera flash; it can give you a nasty shock.

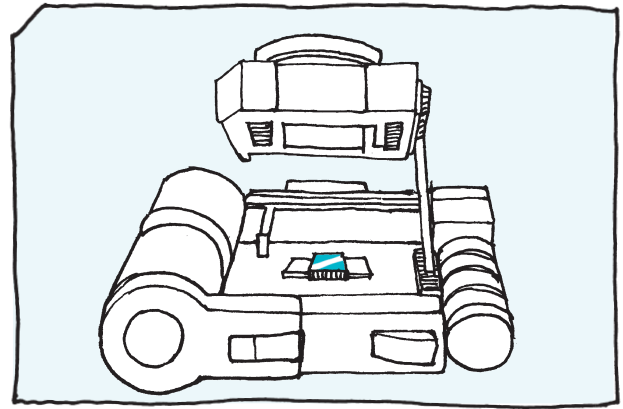
### 1. OPEN THE CAMERA CASE

Using your screwdriver, carefully open up the plastic camera case and remove as much of it as you can. Don't unplug any wires or cables. Neatly set aside the screws for later reassembly.



### 2. LOCATE THE CCD

The CCD is the sensor array that takes the pictures. It should be located on a circuit board directly behind the lens and will look like a small box with a shiny glass front. To get to it, carefully separate the lens assembly from the circuit board. This may require removing a few key screws from the assembly.

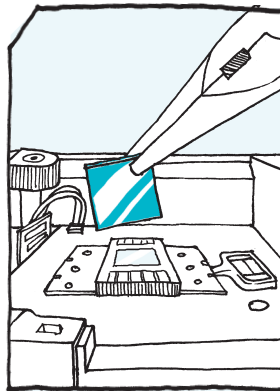


### 3. LOCATE THE IR FILTER

The IR filter is a small piece of glass that gives off a distinct red and/or blue glare when tilted back and forth under any normal light source. All digital cameras are built differently, but the IR filter is usually located in one of two places and formats: as a small glass square directly on top of the CCD sensor or a small, round glass piece directly behind the lens assembly.

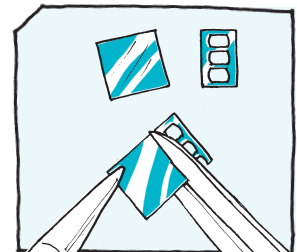
### 4. REMOVE THE IR FILTER

Use needle-nose pliers or tweezers to carefully pull the IR filter off the camera without scratching the lens or CCD sensor.



### 5. MAKE A LIGHT FILTER

Take the 35mm film negative and cut out two identical pieces slightly bigger than the IR filter that you just removed. Try to keep fingerprints and other dirt from getting on the filter, since these may show up in future pictures.

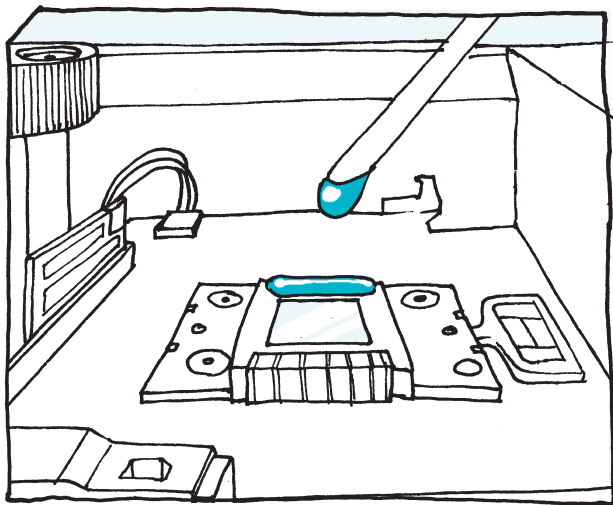


### HELPFUL HINT

To view near-IR light, it is important to filter out most light from the visible spectrum. That is what the filter you are making is designed to do. For better results you can try using four to six layers of "Congo Blue" photo filters.

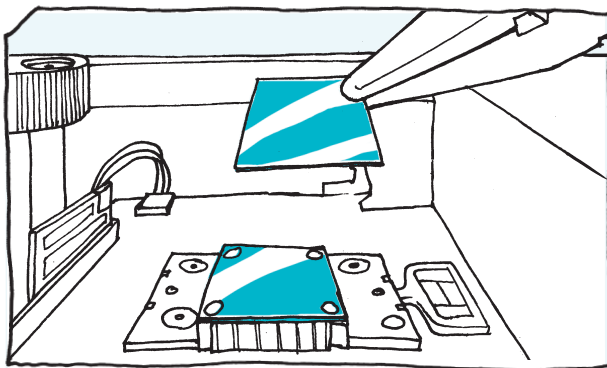
## 6. APPLY GLUE

With a toothpick, spread a minuscule amount of glue on the edges of the frame where you removed the IR filter. Be careful not to get any glue on the CCD or the lens itself, or it will show up in the pictures that you take.



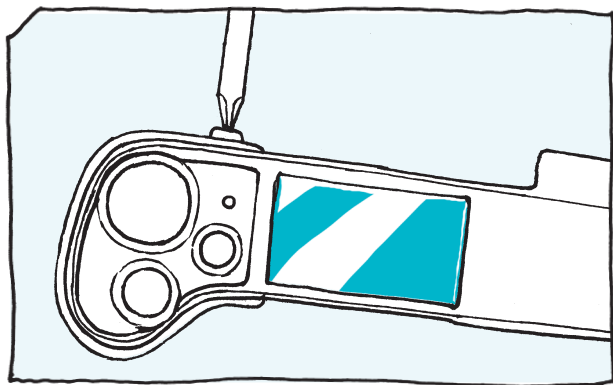
## 7. GLUE DOWN THE FIRST LIGHT FILTERS

Once the glue is in place, press one of the film filters onto the glue. Again, try to avoid getting fingerprints on the filter or scratching any surfaces. Wait for the glue on the first filter to dry (if the filter shifts while the glue is still drying, you risk getting glue on the CCD sensor or one of the lenses). After you are sure it's dry, drop four tiny dabs of glue in each corner of the first filter and stick down the second filter.



## 8. REASSEMBLE THE CAMERA

Locate the tiny screws you neatly set aside in Step 1 and reassemble the camera pieces in the order in which you took them apart. Remember to take your time.



## 9. TESTING! TESTING!

Go try out your new camera in a variety of environments.

### IR CAMERA

## >> Variations

\* This modification can be easily done to webcams and digital video cameras. It can even be not-so-easily done to some cell phone cameras.

## Try This

You can now take pictures of the light coming from a remote control. In fact, you can even slightly illuminate subjects in what appears to be a pitch-black room using the light from the remote control. To do this, turn off all the lights, point the remote at something close by, press any remote button, and take a picture.