

Olympus Camedia D-360L
Digital Camera Full-spectrum (or Infrared) Conversion Procedure
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Introduction

The purpose of this procedure is to modify a particular 1.3-megapixel digital camera, the Olympus Camedia D-360L, by removing the infrared (IR) cut filter, which is installed by the manufacturer, and replacing the factory-installed filter with a clear piece of optical glass, or an IR pass filter.

For full-spectrum photography that captures ultraviolet, visible, and infrared (UV-VIS-IR) energy, a filter is not needed. A clear piece of flat optical glass can be used as a window to replace the original IR cut filter. Ideally, the replacement glass should be coated on both sides with an anti-glare optical coating. The replacement glass must be the same exact thickness as the original IR cut filter, in order to maintain focus. It should be cut to the same physical dimensions (length x width) also.

For IR-only imaging, an IR pass filter with 50% transmission at greater than 700nm should work fine. Here is a link for a potential \$6 solution:

<http://www.edmundoptics.com/onlinecatalog/displayproduct.cfm?productid=1918>.

This IR pass filter is 1.5mm thick.

Optionally, you can keep the camera modified for full-spectrum, and use an external 1-inch diameter IR pass filter (see the link above).

The modified camera can be used for a broad range of experimental purposes, such as night photography, astronomy, thermal imaging, and even paranormal activity. For night and thermal use, you'll want an IR pass filter (see the link above). The IR pass filter may prove to be interesting for photographing backyard flora and fauna too.

Procedure

1. Remove all four AA-type batteries, and the SmartMedia memory card, before disassembling the camera.
2. From the back of the unit, remove four black phillips-head screws: top and bottom right side (bottom one is inside battery compartment), and top and bottom left side (top one is on silver side of case). Then remove the black (back) section of the case, preferably in a clean, dust free environment.
3. Remove one black phillips-head screw from below the LCD display, and unplug the green ribbon cable from above the LCD display. Then, remove the LCD display section, folding the wires downward, out of your way to continue the remaining steps.

4. Remove three gold phillips-head screws from the PC board that is visible on the left side. Then remove the PC board (held in place by header-type connectors), by prying it loose from the right side of the board.

5. The IR cut filter is the blue-tinted, rectangular glass lens. It is made of four fused glass layers, with the third layer of blue glass being closest to the front of the camera. Replace the IR cut filter with the new IR pass filter or clear optical glass (for full-spectrum photography). Remember that the replacement glass must be the same thickness as the original filter to retain focus.

The clear IR filter replacement should be **9.30mmL x 8.45mmW x 2.75mmD (thick)** for the Olympus D-360L.

The clear sheet (lexan, acrylic, polycarbonate, plexiglass) found at most hardware stores is about 2.25mm thick, and the commonly available plate glass (sometimes called float glass due to the manufacturing process) is about 2.5mm or 3.0mm thick. None of these products will be useful as a filter replacement.

The author ordered the solution from www.anchoroptics.com, which is actually part of Edmund Optics.

You can use the following items to replace the original filter:

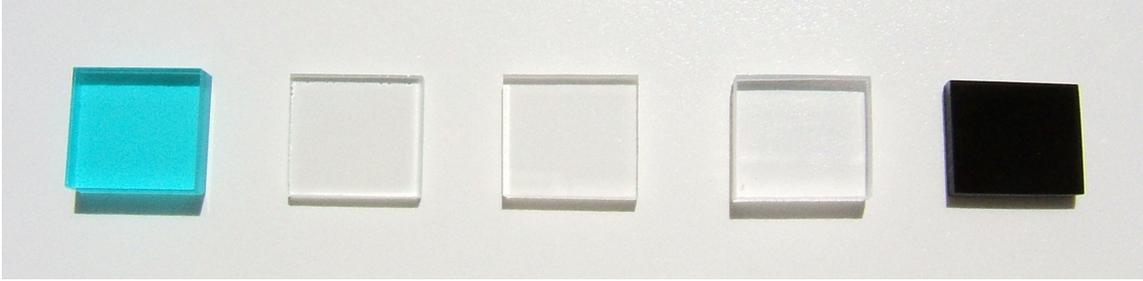
1.5mm thick Cast Thermoset ADC Plastic IR Filter 2" x 2" for \$6.75

1.5mm thick Clear Cast Thermoset ADC Plastic Window 2" x 2" for \$6.50

1.2mm thick Clear Optical Glass Window 39.5mm x 60mm for \$7.00

Once all three materials are cut and the edges are ground to the proper size, the glass window can be used in conjunction with either the plastic window for full-spectrum photography, or the plastic filter for infrared photography. Simply stack the two components.

Wearing work gloves and safety glasses, the author initially cut the material into approximately 10.5mm x 9.5mm pieces. The glass was cut with a hand glass cutter (Fletcher 01-122) and a square, and the plastic was cut with a small hack saw, before using a combination 1-inch belt/5-inch disc power sander (Delta 31-080) to finish the edges to almost the final dimensions. The sander tends to chip the glass edges, so final dimensions were achieved by hand sanding the edges using a very fine grit (220) aluminum oxide sandpaper, which worked well for both types of material. Measurements were made with a 6-inch vernier caliper, and later verified with a 1-inch micrometer.



From left to right: 1) Original IR cut filter 2.75mm, 2) Clear glass window 1.2mm, 3) Clear plastic window 1.5mm, 4) Clear plastic window 2.25mm (made for practice), 5) Dark plastic IR pass filter 1.5mm.

6. Reverse the above process to reassemble the camera.

WARNING: You are responsible for your own safety, property, and success in attempting this procedure. If you follow the above steps, you do so at your own risk. You should be aware of the possibilities of personal injury, including but not limited to electrical shock. You should also be aware of the possibilities of permanent property loss, including but not limited to equipment damage.

See some sample photographs (below) that were taken with the modified digital camera.

Results

The following unedited photos were taken to show some simple comparisons.



Before modification: original IR cut filter in place.



During modification: IR cut filter removed and no replacement installed.



After modification: clear window installed for full-spectrum.



Stovetop (normal): with unmodified camera (actually taken with a FujiFilm FinePix E550 with resolution reduced).



Stovetop (full-spectrum): with modified camera (Olympus Camedia D-360L).



Stovetop (infrared): with IR pass filter on front of modified camera.

CAUTION: Use the ideas and techniques in this document at your own risk! This document was shared for the sole purpose of invoking your own creative ingenuity to apply similar principles and practices in your own applications.

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AfterSpirit
P.O. Box 1849
Point Pleasant, NJ 08742-1849 USA
info@afterspirit.com
www.afterspirit.com

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