

## Some uses for everyday items in holography

### ***About the author***

John Pecora is a computer specialist and a certified Microsoft Systems Engineer. He made his first holograms using a sandbox holography kit in 1980. He has worked for holographic companies making photoresist holograms for embossing. He is now an amateur holographer fabricating his own DCG emulsions. He has always liked reverse engineering, and enjoys taking an idea from concept to final product.

Here are some tips for saving money on 'lab' equipment. It is surprising how many everyday objects can be used effectively in holography. These are just suggestions. Please remember that it is your responsibility to pay attention to safety, and use common sense.

- ★ Heating pads used with three or more settings can be used as adjustable heaters for processing trays. Simply put the heating pad under the tray and turn the pad on to the desired setting.
- ★ Black foam board can be used for blocking stray light. The type that is black throughout is best as the edges stay black even when they are cut. This material can also be used for making an iris.
- ★ A shutter can be made from most old 8 mm movie cameras. They have a low voltage electric shutter. Remove this unit and set up a circuit with the original voltage of the camera, and a switch.
- ★ A thick piece of glass, 1/4" or thicker, can be used as a beam splitter. Using the thick piece of glass allows a small piece of electric tape to be placed over the glass to block the secondary reflection off the back.
- ★ Sandwich boxes can be use as processing trays and also as storage for the chemistry without having to pour the liquids back into bottles after each session. They come in many sizes and shapes with airtight lids. Store sealed containers with chemicals in a dark, dry, cool place when not being used.
- ★ Rubber inner tubes can be used as the dampening mechanism between a holographic table and the support legs.
- ★ A slab of granite can be used as a holographic table.

- ★ Most old overhead projectors contain large front surface mirrors and large Fresnel lenses. They can be purchased at yard sales and flea markets for just a few dollars.
- ★ Most photocopiers and fax machines contain front surface mirrors.
- ★ New Jefferson Nickels have a weight of 5 grams and new Lincoln Pennies have a weight of 2.5 grams. Standard paper clips have a weight of 1 gram. To verify the weight of the paper clips put a nickel on one side of the balance and find 5 paper clips of the same size that equals the nickel. These can be used on a balance for measuring out chemicals.
- ★ A hair dryer can be used to dry a piece of holographic film or plate after processing. Drying intensity and heat is variable with very inexpensive dryers.
- ★ Polarizers can be found in polarizing sun glasses. These can be used to slightly modify the intensity of throughput laser light by inserting it into the beam path and rotating. They can also be used to compare the polarization of light at different locations in an optical set-up.
- ★ Two pieces of window pane glass and binder clips can be used to sandwich a piece of holographic film. This will hold the film rigid and flat.
- ★ A microwave can be used to heat the deionized or distilled water needed for mixing up processing chemistry. But please be careful to keep chemical-contaminated containers separate and secure. One method is to heat the water in a clean container in the microwave and then pour it into the chemical container for mixing, always keeping the clean container free of any chemicals.
- ★ Two-part, fast-hardening epoxy is great for securing two pieces of metal without the need for drilling and tapping. This also allows the disassembly with just a small sharp blow to one of the pieces.
- ★ A pinhole can be made by sandwiching 5 or 10 pieces of aluminum foil together and poking with a pin while the pile is on a hard piece of rubber. Each piece of foil will have a slightly different size of pinhole.
- ★ Automobile windshield wiper blades can be used as a squeegee. If you epoxy two blades to a pair of scissors then, when the scissors are closed 3/4 of the way, you can squeegee both sides of the film at the same time. For plates this is not necessary as you can do one side at a time with a single blade.

- ★ Clothes pegs on a line can be used to hang up films to dry. After clamping the film at two corners with the pegs, clamp two more at the bottom corners to keep the film straight while drying.
- ★ Dishwasher drying agent can be in place of Photoflo™ in the final rinsing bath. Use an agent that does not have fragrance and, preferably, that is clear.
- ★ Sodium carbonate can be purchased cheaply as a chemical for *increasing* the pH of swimming pools and spas.
- ★ Sodium bisulfate can be purchased cheaply as a chemical for *decreasing* the pH of swimming pools and spas.
- ★ Sulfuric acid can be purchased as car battery acid. Most formulas call for concentrations that are lower than that sold as auto battery acid.
- ★ Black Sanford Sharpie markers, which come in different sizes, are ideal for blackening optics, mounts and anything small you want to reduce reflections on. They are permanent markers that write on almost anything.
- ★ Paper Mate™ liquid paper correction is great for painting objects for holography. It dries to a flat white and diffuses the light very well.