


HOLOhow-to.

SHOEBOX HOLOGRAPHY with Frank DeFreitas

With the #25 Make Magazine article on DIY holography, you have everything you need to make your own first hologram.

Use this free supplement to begin to improve the quality of your images, so that your holograms will be better than ever!



2011:
The Year of
DIY Holography

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10 TIPS TO IMPROVE YOUR HOLOGRAMS

(For the beginner, of course)

A supplement to the 2011 Make Magazine article

by Frank DeFreitas

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As you can imagine, there are many ways to go about creating a hologram. The method in the #25 Make Magazine article is based on the Shoebox Holography system, taken from my book of the same name. There are three main “stations” in the Shoebox Holography system: (1) The laser and its adjustable mount; (2) The lens and its adjustable mount; and (3) The recording platform that also functions as: (a) a vibration isolation system, (b) a hologram plate holder, and (c) a place to sit the object being recorded.

The function of the individual stations noted above include: (1) The laser supplies the necessary light to record the hologram; (2) The lens takes the narrow beam of the laser and spreads it out to cover both the plate and the object; and (3) The light sensitive holographic plate records the laser light reflected from the object.

Making Improvements

Perhaps you have made a few holograms using the article, and you wish to make your holograms look better. It’s possible that you may not have been successful (yet) at all. Either way, I believe that the tips that I give to you below will help. If you’ve already made a hologram, it should boost the quality of your final image. If you have not yet made a successful hologram, perhaps the following suggestions will be just what you need to put that first holographic image over the top.

For the beginner, I have listed the most important factors in improving your holograms. The list is by no means exhaustive. The tips represent foundational steps that all great holograms share, from the earliest holograms to those of the present. It is a list of constants. As you advance in your craft, you will undoubtedly learn many more not mentioned here (like correct polarization, for instance).

Read this section slowly and carefully. If you follow these tips, along with the instructions in the article, you will have a much better chance at success at going from good holograms, to great holograms. Good luck!

MY TOP 10 TIPS FOR GREAT HOLOGRAMS

1. HAVE FUN

Most importantly, if you attempt to make a hologram and it doesn't turn out right away, it's okay to be disappointed. Come back later. Or better yet, come back the next day to try again. Not everyone has success making holograms right out of the gate. In my 28 years of teaching holography, I have known a few people who have never made a successful hologram at all. I also know that there can be a high level of frustration at times. I'm here

to say that knowing when to take a break is just as important to success, as working hard. Sometimes the only thing that's needed to break that barrier is a fresh start.

2. KEEP THINGS QUIET

You cannot make successful holograms in a noisy environment. Sound is vibration and vibration ruins holograms. Your area should be quiet. No radios, no television, no one jumping around the house during the exposures. Exposure times are relatively short — so try to have everyone cooperate for this time. Listen for traffic on the street. If you're in the city, know when the bus is scheduled to go past your house. If you have traffic all day (such as the center of a city), try working at night when volume of traffic is less.

3. KEEP THINGS STABLE

The best place to set up your system is on a concrete floor in the basement or garage. If you must use the floor of an upper floor, set up close to a wall instead of the middle of the room. The floor is much more stable next to the wall. If you use a table, make sure that it doesn't wobble.

Try to avoid direct air currents from air conditioning and heating ducts. Air currents ruin otherwise successful holograms more than any other culprit. Place some cardboard baffling around your set-up, to divert any air currents in the room. If you have walked around the room, there are air currents present that need to settle down. Think of the air

in the room as water. How long do you think it would take the water to go completely calm after you walked from one side to the other?

Do not bring your object and/or materials in from outdoors to indoors, or from one room to another, or from one floor to another, and immediately begin to make a hologram.

Everything, including the object and film or plates, should be in the room for several hours so it can adjust to the ambient temperature of its new environment.

Learn to think like this at all times, and you will be thinking like a holographer.

4. CHOOSE YOUR SUBJECT WISELY

Not everything can be made into a hologram. The object must be stable. Items such as feathers, flowers, fabric, will not record well because they are not stable (special pulsed-lasers are needed). Items such as ocean coral, porcelain figurines, ceramics, pewter, metal car models, etc. work great.

Make certain that it is set firmly in place. It should not be easy to shift, or rock, or wobble. If you wish, use some hot glue (or other tack) to hold it more firmly in place.

5. USE DISTILLED WATER

This tip may already have come with your processing chemistry, but if it hasn't I will mention it here: mix your processing chemistry using distilled water. Tap water contains

chlorine. The presence of chlorine can make an otherwise great hologram look dim. If you can, use distilled water in your rinsing trays too. Distilled water can be found at any supermarket or drug store.

6. KEEP YOUR LENS CLEAN

You'll be using a simple lens to spread the light out. In order to get the highest quality holograms you must keep your lens clean and free of dust, fingerprints, etc. A simple lens will work great if kept in good condition. Some of you may be using a laser diode that does not contain a lens, and the light spreads out naturally. In this case, keep your diode clean at all times. Put it away when finished working with it. Be very, very careful cleaning the window of a raw diode. It can scratch very easily.

7. USE FRESH BATTERIES

The small batteries that laser pointers use last a short time (approx. 2 hours or so continuous operation). An option for longer-life and more reliable power is to run your pointer off of two "AA" batteries. You can find "AA" holders at any Radio Shack or other electronics store. Typical runtime: 72 hours or more. Always be certain that you have the wires connected properly or you may short your pointer, so figure this out **before** you hook them up.

8. FOR A BRIGHT HOLOGRAM

The more light that your object can reflect back to the holographic plate, the brighter your hologram will be. Dark objects make dark holograms. A dark-blue coffee cup will be very dim. A white coffee cup will be bright. Place your object in the laser light and see if it looks nice and bright. If it doesn't, choose a new object. If it does, great! Of course, a white, bright object that is not stable will not work (see #4 above), so make sure that it is stable. Also, note that I said bright, not shiny. Those objects that are shiny like a mirror do not work as well as those that send back a soft, diffuse light. Stay away from highly polished brass, etc.

9. AIR DRY

After the final rinse, allow your hologram to air dry. It may take up to an hour to dry if the weather is humid. Try not to use a hair dryer when you're looking for the best results. A hair dryer may fluff your hair, but it may also collapse the emulsion — leaving very little holographic information to recreate your image. So keep the hair dryer for what it was made for — drying hair. If you do, you'll have great looking hair AND great looking holograms!

10. BE SAFE

All photographic chemistry needs to be handled with care, so wear gloves, goggles and an apron when working around it. Read all instructions carefully, and follow them closely. Keep your work area clean. Keep all chemistry, mixed and unmixed, away from the reach of small children.

When you're ready to improve your holograms, it would be a good idea to check back on these important items. You might even want to make a check list that you can refer to, and check each item off as being noted.

PLEASE NOTE:

Sometimes for the simplest, overlooked reason, a project gets stuck. You feel as if you have done everything correctly, yet there is no image. I would say that eight out of ten times there is an image there, but the person does not orient the plate correctly to see it. For the other two out of ten times, someone may need help. I can help troubleshoot, but please realize that holography is a full-time occupation for me. This translates into "I will have to charge for my time". Sometimes it is best to send one of your holograms to me, so that I can see it and examine it personally. Every hologram has a story to tell: regardless of it being a successful one or not. If you would like to have a consultation, please contact me and we can make arrangements.

As another option, you could also attend one of my workshop programs at my lab in Allentown, PA. Offered year-round, they are one-on-one sessions where you will make a hologram, and take part in the process, step-by-step, from start to finish. You'll find workshop information at my holoworld.com web site, or call 610-770-0341.

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