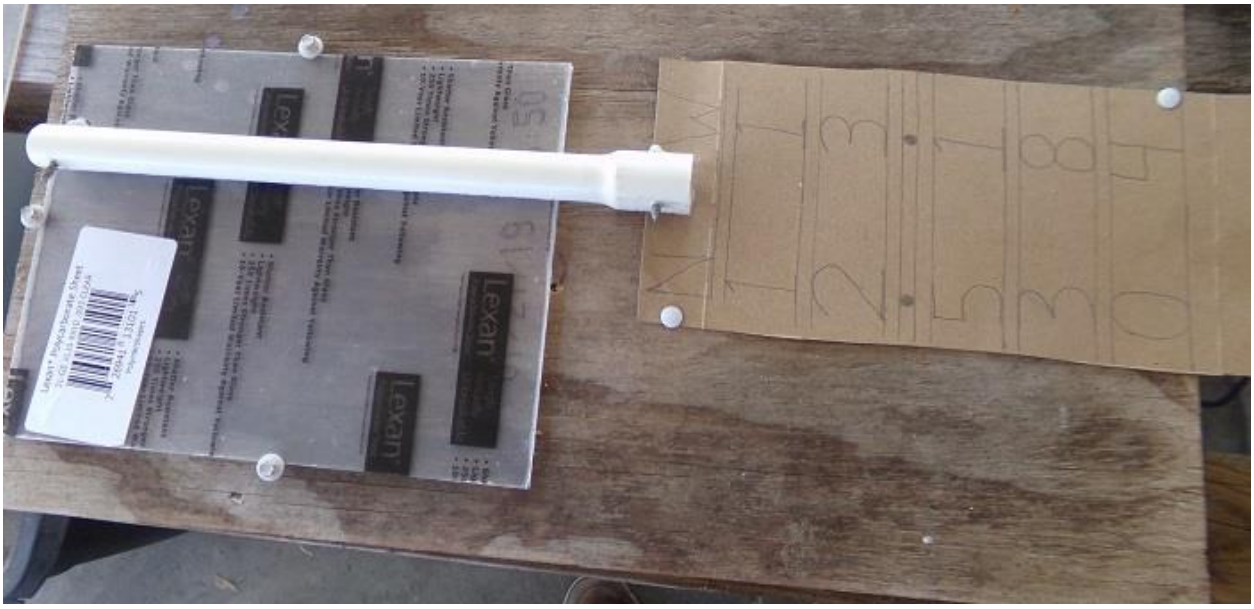
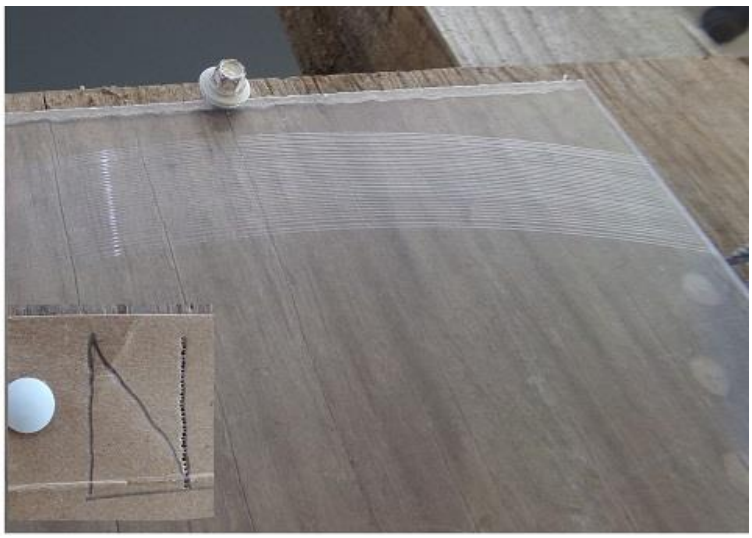
How to Create a Scratch Hologram

I use two plastic 8” x10” window panes purchased from a local home improvement store. One for the North Coordinates and one for the West. The coordinate numbers are one above the other down the 10" length, and I only use the five "decimal minute" numbers.
Each number is at least 1-inch high with at least 1/4” space between each number.
I tried using a commercial compass but it always self-adjusted to a different setting and ruined the creation. I ended up making a non-adjustable compass using a 12-inch length of 1/2 " PVC pipe. A small hole was drilled through the pipe about 1/2 inch from each end and a wood screw was screwed through each hole.
Measure 10 inches on a piece of paper (the length of the window pane.) Subdivide it into 6 sections for “N” and five numbers, and ¼ inch for the decimal point. Add ¼ inch space between each letter, number, and decimal point. Add ¼ inch at the bottom or the bottom number may slide off the bottom of the plastic as it makes the arc close to each edge. With all these ¼ inch spaces added, the numbers can be slightly over 1 inch high.
Remove the plastic film from the window pane and fasten the pane securely so it won’t move. Place the compass point at the top center of the pane. Adjust and center the paper with numbers so the other compass point is at the top center of the top Letter/number. Fasten the paper down so it can’t move. Now you are ready to start making the Hologram.

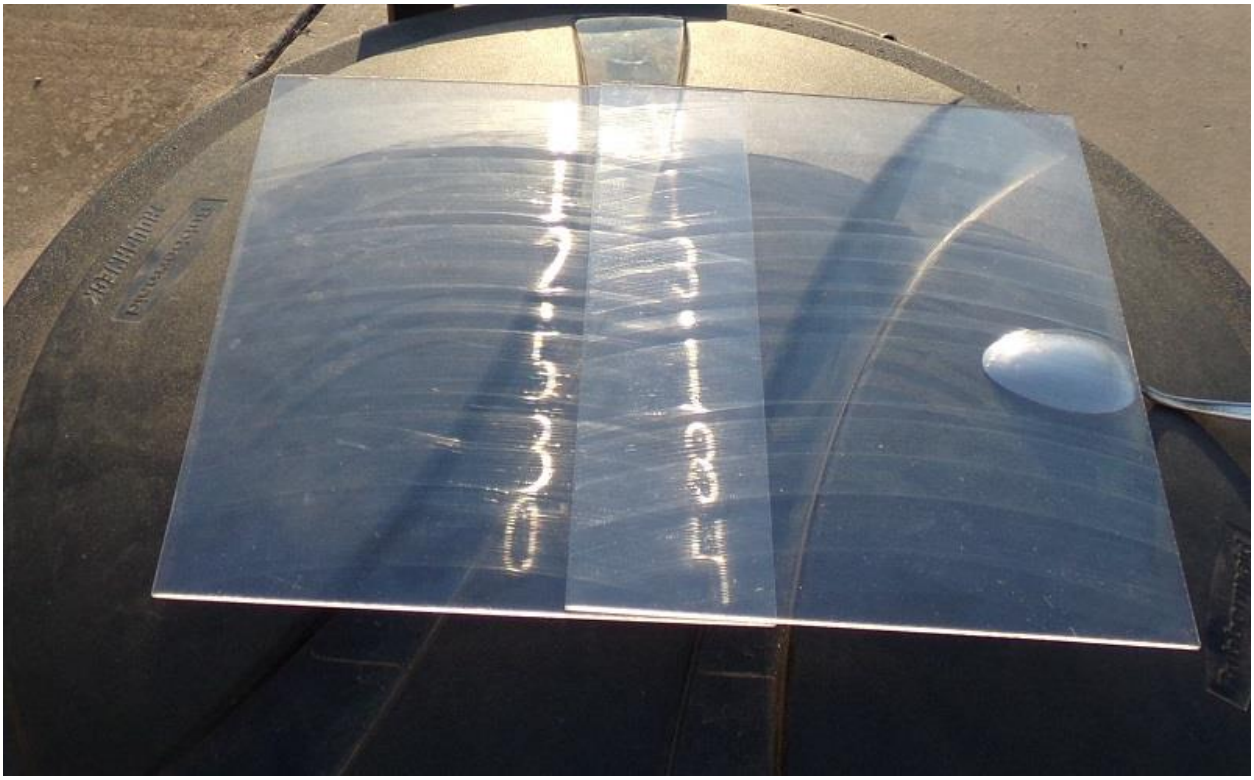


These lines in the plastic you are producing are just dents in the plastic. If you press too hard, you will score plastic dust or even curls from the plastic and the hologram won't work. You barely have to press. Think about drawing a line on thin paper. If you press too hard you tear the paper. As long as you can see the line in the plastic, you have probably pressed hard enough. If you are gentle and it still scores, turn the screw 90 degrees and try again. There may have been a sharp edge on the point of the screw. Plan to ruin at least one piece of plastic while learning, and you can turn it over to practice more on the back side if needed.
Make as many lines as you can. They should be no more than 1/16th inch apart. The closer the better and the easier it is to read the final product. The curved lines will overlap as they go from one side of the plastic to the other. That's normal and does not alter the effect.

Each line produces only one dot of light. It's all those dots close together that creates the effect you want. A single line accidently scored into the plastic won't ruin it. If you have to many scored lines, the effect will be blurry.



In the photos above, the left photo shows the first three lines produced. The right photo shows all the lines produced as the compass is moved down the right leg of the “N” and a line is drawn with each move. A flashlight was set to produce the series of light dots each line will produce.
As you continue to move the compass point on the “N” and produce more lines, these lines will be drawn over the lines already there. These new lines will reflect the light at a different angle, thus creating the N in reflected light when finished.
Continue working your way down through the numbers until finished. For the decimal point, make a circle around the outer edge, then an inner circle, and finally fill in the center with random dots as needed.
When you have finished, remove the window pane. Install a new pane, move the West numbers to the center and adjust the compass distance, as above instructions, before securing it again.



As you move the window panes, the numbers will move across the pane following the arc. At this moment you can see that the West coordinates are at the left side of the pane and the right coordinates are slightly to the right of center. The Sun reflection is just off the window pane above the N/W end. If you move the window so the Sun is just off the window by the 0/4, you will see reverse images. This is because the Sun is now reflecting off the opposite wall of the grooves you created.

These holograms can also be produced on flat solid plastic of any type. #5 Plastic that holds a sandwich from the deli counter. #1 or #2 plastic if you can find flat pieces. Old refrigerator drawers. As you see in the above photo, a black background makes it easier to see. Colored plastic will work the same way. A small piece can have a single number on it for creating parts of a Multicache. Pringle can lids do not work! They are slightly concave / convex which distorts the Suns reflection.

Remember that plastic does degrade. The surface oxidizes in time. The edges of the grooves then create a foggy reflection which may be unreadable. My cache window panes are 6 years old. When I wrote this guide, I first went out and retrieved them for photos. They were so foggy I almost could not read them. Above are the replacements.

Good Luck and have fun.