Geared 1x1x4

Designed and custom made by Oskar Van Deventer, 2012.
(plastic, made on a 3D printer, 2.3" square;
red opposite orange, yellow opposite white, blue opposite green)

The puzzle has 4 layers where the sides are yellow (front), green (left), blue (right) and white (back). Layer 1 (top) is red on top and layer 4 (bottom) is orange on the bottom. In the top layer there is a 35 tooth center gear, three 10 tooth planet gears, and 55 teeth around the edge. In the bottom layer, using finer teeth, is again a 35 tooth center gear (but of a smaller diameter than the top one), three 21 tooth planet gears, and 78 teeth on the outside. The center gears are fixed to a common axle. The axles for the top planet gears are attached to layer 2. The axles for the bottom planet gears are attached to layer 3.

Basically playing with the puzzle involves confusing rotations seeking least common multiples of numbers based on the gears. Here are general properties:

- Hold the middle two layers and rotate the top layer 7 clockwise 180 degree turns and end up with the top and bottom layers rotated 180 degrees with respect to the middle two layers.

- Hold the bottom layer and rotate the top two layers together 8 clockwise 180 degree turns and end up with layer three rotated 90 degrees clockwise with respect to the other three layers.

- Hold the top layer and rotate the bottom two layers together 18 clockwise (as you look up) 180 degree turns and end up with layer two rotated 180 degrees with respect to the other three layers (9 clockwise 180 degree turns to rotate layer 2 counter clockwise 90 degrees with respect to the top layer and rotate the bottom two layers 180 degrees with respect to the top layer).