

Gravity Irrigation Subsystem for Watering Plants

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Plants need water to survive. One problem is knowing when and how much to water them. The overall purpose of this project was to design and engineer a simple and useful planter irrigation box that effectively waters plants the needed amount. This portion of the project was to develop a subsystem that brings water from a water reservoir to soaker hoses with a solenoid powered by an Arduino that controls when water goes through. The project also includes tubing, and a manifold 3D printed using CAD software (Creo, Parametric Technologies Corporation, Boston, Massachusetts)

The mechanical aspect of this project was simple. The water reservoir, a five-gallon bucket, had a hole drilled into it to fit a half inch fitting along with a nut and washer. Clear tubing was connected to this fitting with the other end connected to the solenoid. More tubing was connected to the other end of the solenoid and to a 3D printed manifold. Three outlets were designed on this manifold with soaker hoses connected to these outlets. The electrical aspect includes an Arduino coded to control the solenoid. The Arduino is connected to a relay on a breadboard using cables. More cables are connected to the solenoid, a power source, and a neutral ground source.

When the components were assembled, it was tested by putting water through the design. All aspects of the design held together and did not leak. When the Arduino was coded and connected it was tested by connecting it to a power source. The Arduino was able to control when the solenoid opened allowing water to come through and closed to stop the flow.

The finished project would include this and the other two subsystems to integrate to complete the electromechanical design. The other two subsystems are working properly as well.