

Automated Spider Build Guide

Step by step instructions to build a motion detecting spider dropper

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Welcome to the Spider Dropper Project! This guide provides comprehensive instructions for building this exciting project. The guide is divided into the following sections

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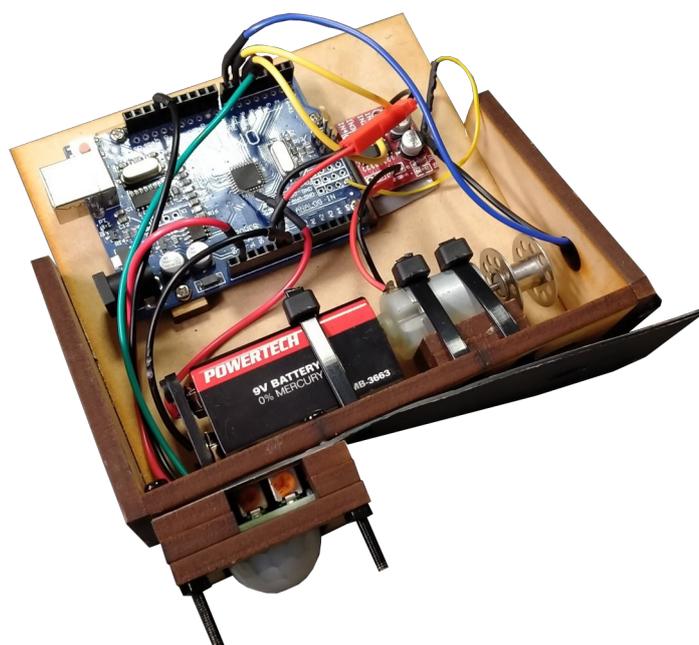
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Project Overview

The Arduino Spider Drop Prank Project is a fun and interactive Arduino-based creation that combines motion detection with motor control to deliver a surprising and entertaining experience. This project uses a Passive Infrared (PIR) sensor to detect movement in its vicinity. When the PIR sensor senses movement, it triggers an Arduino Uno to swing into action.

Key Components:

Arduino Uno: The brain of the project, responsible for controlling the entire setup.

PIR Sensor: Detects motion in its detection range.

Motor: Driven by an H-bridge, responsible for unraveling and raveling a cotton spool.

Cotton Spool: Attached to the motor shaft, used for releasing a plastic spider.

Plastic Spider: The star of the show, attached to the cotton spool.

H-Bridge: Controls the motor's direction.

Limit Switch: Halts the motor after the spool completes a cycle.

9-Volt Battery: Provides power for the entire project.

Project Functionality:

Motion Detection: The PIR sensor continuously scans its surroundings for movement. When it detects movement, it sends a signal to the Arduino Uno.

Arduino Control: Upon receiving a signal from the PIR sensor, the Arduino Uno comes to life. It decides to activate the motor.

Spider Drop: The motor starts running in one direction, causing the cotton spool to unwind. As the spool unwinds, it lowers the plastic spider.

Limit Switch: A limit switch is activated when the spool completes a cycle, stopping the motor. It is optional to use a limit switch. You may choose to just set the running time of the motor rather than use a limit switch. The limit switch does add a level of complexity but the pay off is a fully automated spider.

Entertainment Factor: This project is designed for entertainment and surprise. When someone approaches the sensor, the Arduino activates the spider drop sequence, creating a delightful and amusing scare for unsuspecting individuals.

Overall, the Arduino Spider Drop Prank Project combines technology, craftsmanship, and a dash of humor to create a memorable and engaging experience for friends, family, or anyone seeking a playful scare.

New to Arduino?

This is the perfect project for you as I step you through the whole process. You will have everything you need to get the project working. (Hardware sold separately)

Setting Up Your Workspace

Before you dive into building your Arduino Spider Drop Prank Project, it's essential to establish a well-organized workspace. A tidy and well-prepared workspace ensures safety, efficiency, and a smoother project experience. Here's a step-by-step guide to setting up your workspace:

1. Choose a Suitable Location

Select a quiet, well-lit, and spacious area for your project. It's ideal to have a dedicated workspace to avoid interruptions and protect your project from dust, moisture, or other potential hazards.

2. Gather Your Tools and Equipment

Before you start, ensure you have all the necessary tools and equipment within easy reach. Here's a list of essential items to have on hand:

Workbench or Table: A stable surface for assembling and testing your project.

Lighting: Adequate lighting is essential for accurate assembly. A desk lamp or overhead lighting can be helpful.

Toolset: A basic toolkit, including screwdrivers, pliers, wire cutters, and a soldering iron (if needed).

Safety Gear: Safety glasses and, if using a soldering iron, heat-resistant gloves.

Containers and Organizers: Small containers or organizers for storing components, screws, and other small parts to prevent them from getting lost.

Cleaning Supplies: Clean rags or tissue for wiping down surfaces and hands during the project.

Waste Disposal: Have a designated area or container for disposing of scraps, packaging, and other waste materials.

3. Electrical Safety

Working with electronics requires careful consideration of safety. Make sure to:

Turn Off Power: Ensure that any power outlets are turned off when not in use, and unplug any tools or devices when finished with them.

Stay Organized: Keep your workspace organized to avoid tripping on wires or causing accidental shorts.

Proper Wiring: If you need to make electrical connections, do so with care and attention to detail, following best practices for wiring.

Ventilation: If soldering or using chemicals, ensure good ventilation in your workspace.

Tool Placement: Keep your tools close at hand, ensuring they're easily reachable without having to search for them.

5. Safety First

Always keep safety in mind. Be aware of your surroundings and avoid rushing through tasks. Take your time and double-check your work to prevent accidents and ensure a successful project.

With your workspace properly set up, you're now ready to begin gathering the materials and components for your Arduino Spider Drop Prank Project. Having a well-organized workspace will make the process more enjoyable and productive, allowing you to focus on the exciting project ahead.

4. Workspace Layout

Arrange your components and tools in a logical and accessible layout. This will help you work efficiently and reduce the risk of misplacing parts.

Component Layout: Lay out your components, such as the Arduino Uno, PIR sensor, motor, H-bridge, and power source, in a way that allows you to easily access and connect them.

Tool Placement: Keep your tools close at hand, ensuring they're easily reachable without having to search for them.

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Gathering Materials

Before you start building your Arduino Spider Drop Prank Project, it's crucial to gather all the necessary materials and components. Ensuring you have everything in place will streamline the construction process and help you avoid any unnecessary interruptions. Here's a detailed list of the components and materials you'll need for this project. Check the end of the guide for amazon links to all the items.

Arduino Spider Drop Prank Project Materials List:

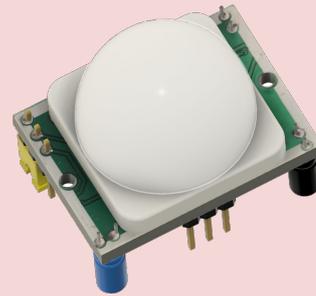
Arduino Uno :

The central control unit for your project.



Passive Infrared (PIR) Sensor:

To detect motion and trigger the spider drop sequence.



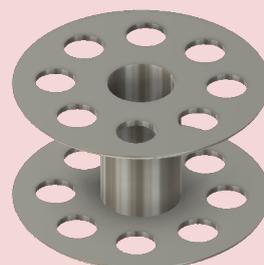
Motor:

A DC motor used to control the rotation of the cotton spool.

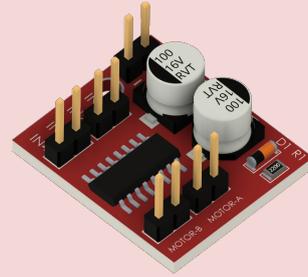


Cotton Spool:

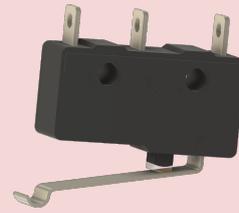
To release and retract the spider. The cotton spool should fit securely onto the motor shaft.



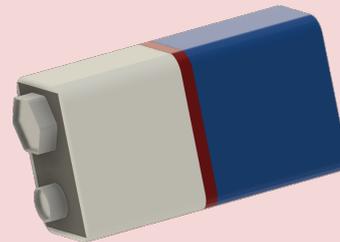
H-Bridge: An H-bridge motor driver to control the motor's direction (for winding and unwinding the cotton).



Limit Switch: To halt the motor when the spool reaches its limit. This prevents overwinding or unwinding. (Optional)



9-Volt Battery: Provides the power source for your project. Ensure it's in good working condition.



Battery Clip and Connector: For connecting the battery to the Arduino and motor circuit.



Plastic Spider:

The star of the prank, which hangs from the cotton thread. Make sure it's lightweight for a successful drop.



Miscellaneous

Header Wires: Assorted jumper wires for making connections between components.

Wood Chassis Components: The design is based around 4mm particle board but any wood this thickness will do. Check later in the guide for more details.

Screws, wood glue, cable ties, high bond tape and wood glue: 4 small screws are required to screw the Arduino into position. 2 small screws are required to screw the limit switch into position. A good wood glue is all that is required to glue the chassis together. Cable ties will hold the battery and motor in place. Washer with a 8mm ID.

Soldering Equipment (if required): Soldering iron and solder for making electrical connections, as necessary.

As discussed in the "Setting Up Your Workspace" section, ensure your workspace is organized and well-lit.

Building the chassis

The chassis is typically constructed using 4.75mm thick Medium-Density Fiberboard (MDF), though other materials, such as wood or plastic with a thickness ranging from 4mm to 5mm, can be used effectively. Many consumer-grade laser cutters and engravers available today can effortlessly handle wood of this thickness.

Depending on your resources and equipment, there are two templates available on the following pages to assist you in creating the chassis.

Option 1 - Manual Cutting:

One template is designed for those who prefer manual assembly. Simply glue the template directly onto the chosen wood surface. Once the adhesive has dried, you can accurately cut out the wood chassis using a coping saw or a scroll saw. To complete this step successfully, you will also require drill bits in the following sizes: 2mm, 3mm, 5mm, 8mm, and 10mm.

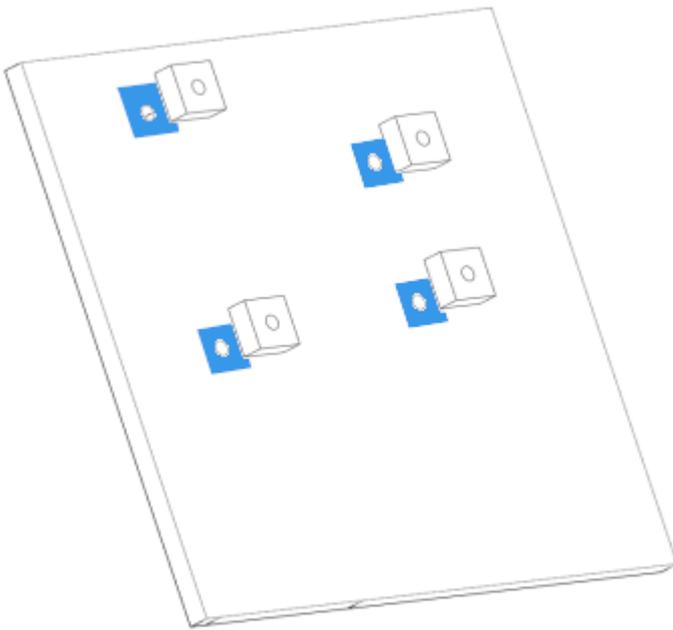
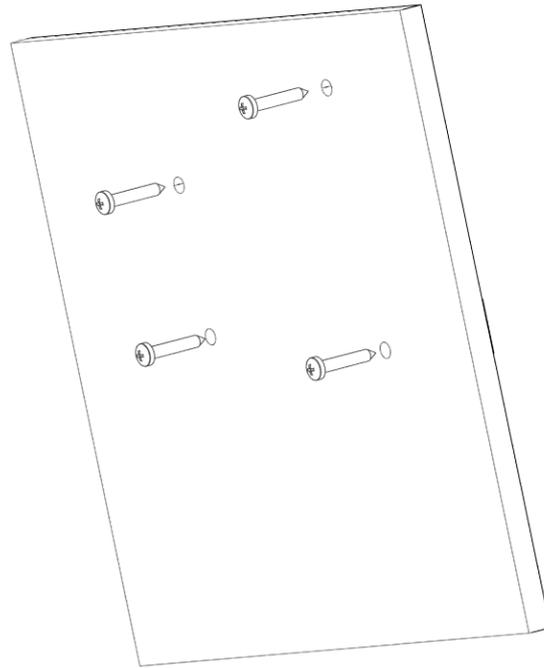
Option 2 - Laser Cutting:

For those fortunate enough to have access to a laser cutter, a PDF template with blue lines is provided. These blue lines represent the precise cut lines necessary for your project. You can use this template either to send to a professional laser cutting service or to process it on your own laser cutter.

Whichever method you choose, the key is to ensure precise and accurate cuts for a successful chassis assembly.



Step 1. Screw four 3x10mm screws into the back side of the chassis, following the orientation in the diagram.



Step 2. Take the four small square cut-outs (stand-offs) with holes in the middle. Place these on top of the screws. Apply wood glue to the backside of the small cubes (as indicated in blue on the diagram). Screw them in place using the screws from the rear. This should insure the stand-offs are lined up after drying.

Progress check: At the end of this step your project should look like this.

