# A Controller for Robots to Autonomously Control Fog Machine






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# Background

- Projector-based AR **requires** flat surfaces.
- What **if** there are no flat surfaces? How would robot communicate?

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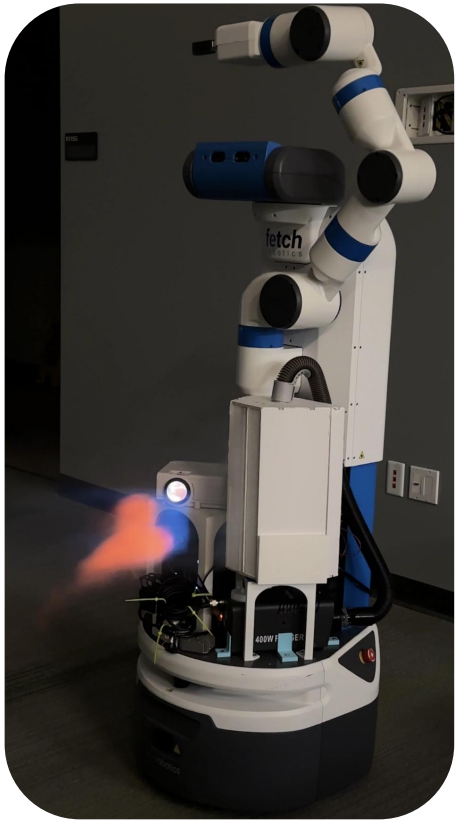
- What **if** there are no flat surfaces? How would robot communicate?

- ***Solution:*** Create a fog screen with fog machine

**Full paper presentation on Wed 1:30 pm (Extended Reality)**



# Problem: Manual Controller

- Typical fog machine controller
- Manual activation only
  - Can’t be controlled by robot

# What if robots want to use a fog machine to communicate?

## How to control fog machines autonomously?

# Our Custom Fog Machine Controller

Replaces manual remote with automated controller

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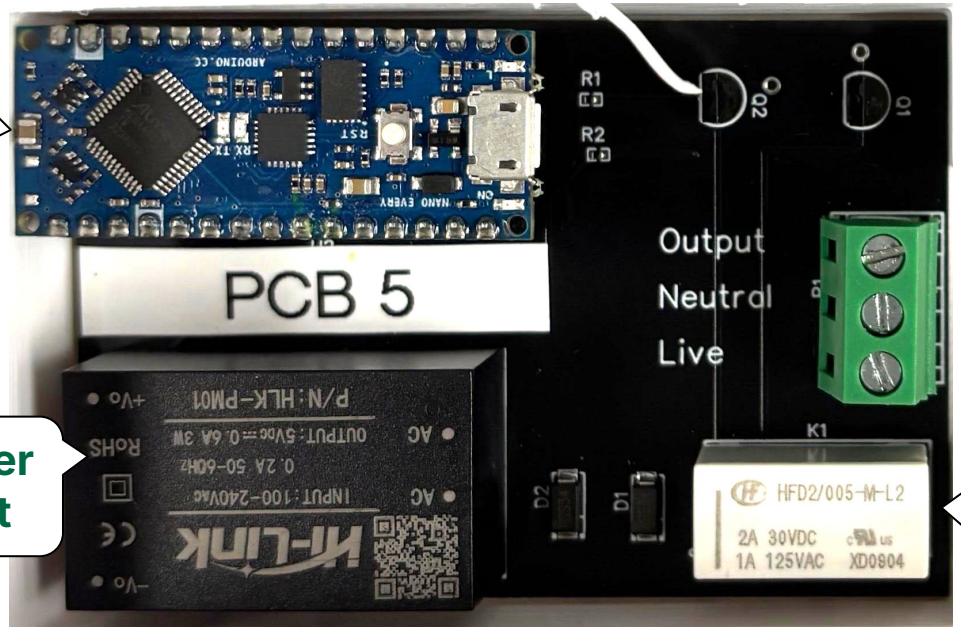
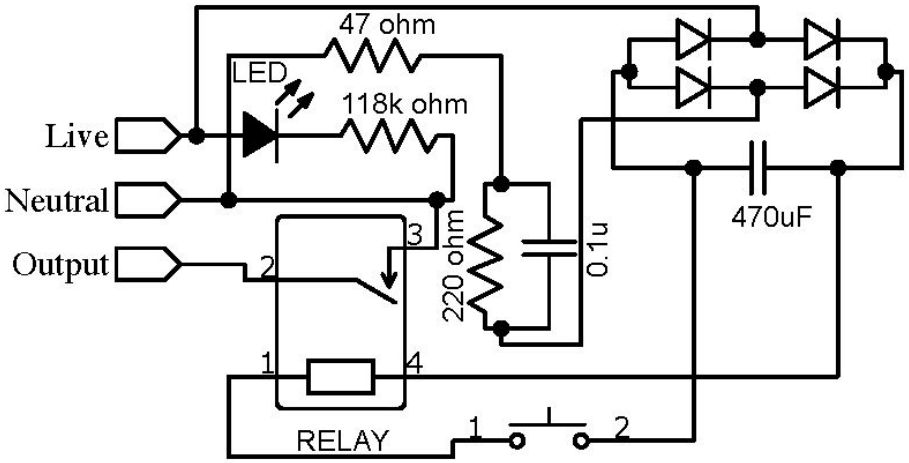


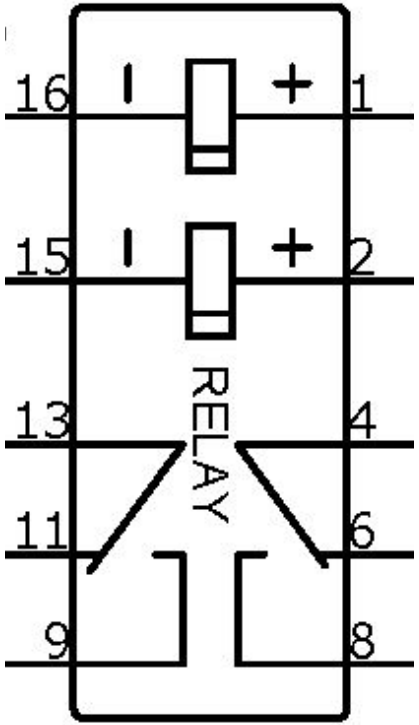
# First: Reverse-Engineering Manual Controller

- Manual controller
  - Uses 120VAC signals
  - LED indicator for readiness
- Reverse-engineered circuit



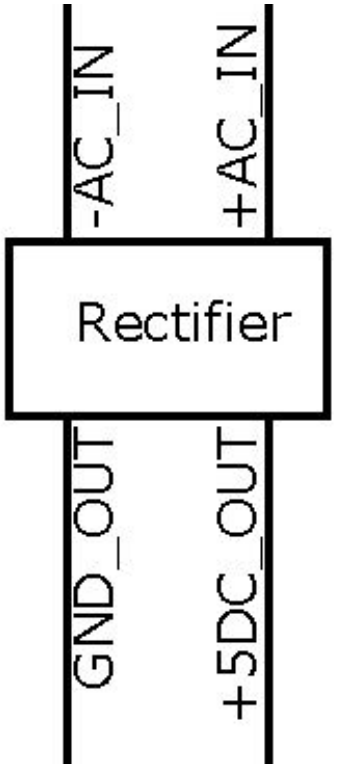
# Latching Relay

- “presses” the manual button
- Isolates Arduino from high-voltage signals
- Dual-coil relay saves energy – only powered when switching



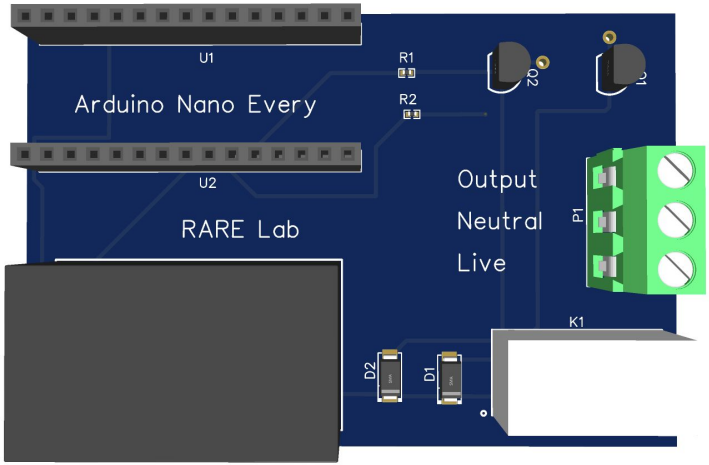
# Rectifier Circuit

- Converts 120VAC readiness signal to 5VDC
- Indicates fog machine status: Ready/not ready

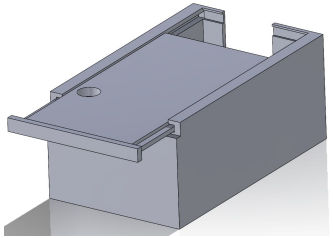


# PCB

- Easy and safe assembly
  - Arduino headers (no soldering)
  - Screw terminals for connections
  - Uploaded the gerber file

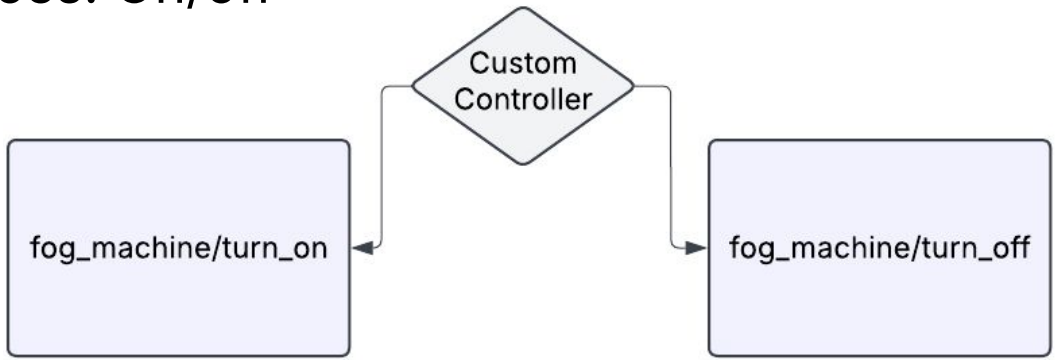



- 3D-printed enclosure for protection



# ROS Integration

- Seamless robot-fog machine communication using ROS
- ROS services: On/off




- Used rosserial package to interface with Arduino

# Testing & Application

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## Key Takeaways

- **Enables autonomous fog machine control** for anywhere communication
- **Open-source** on GitHub: Hardware (PCB) & software (ROS)
- **Immediate research utility** for VAM-HRI community

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