# Creating Nanomaterials

## Exhibit Description:

"Creating Nanomaterials" is an interactive, multimedia component of the *Intro to Nanotechnology* exhibit package that demonstrates how scientists are using the ability of molecules to self-assemble to create consumer goods with surprising properties.

Self-Assembly is an interactive where visitors place and observe "molecules" on an air hockey table. When the air hockey table is activated, the "molecules" hover and assemble into patterns all by themselves—just like molecules in Nanomaterials. The copy panel and side monitors explain how self-assembly is being used to create novel materials in real-world applications.

This exhibit component consists of one copy panel, the air hockey Self-Assembly interactive, and a flat-screen monitor slideshow that can be updated to keep the exhibit content current and relevant. Like all of the exhibit components in the *Intro* package, headphone listening stations with both English and Spanish audio description labels are included. These audio labels serve two functions—to explain the "Big Idea" content of the exhibit and to provide illustrative descriptions of the interactive experience

## Exhibit Interface:

**Interactive**

- Visitor sees six red hexagons and six blue squares, representing nanoparticles on the tabletop.
- Visitor separates the pieces over the playing area.
- Visitor presses the green “START” button.
- Fan under the table starts blowing air through the perforated tabletop.
- The disks start to float; magnets inside the disks cause them to snap together.
- A pattern of red and blue nanoparticles is revealed.
- The fan continues to blow for 30 seconds *(or site defined)* or until a visitor presses the red “Stop” button.

**Side Monitor**

The monitor, on the right side of the interactive, displays images of nanotechnology.

- Images self scroll.
- Visitors can press the “Next” button to scroll to the next image.

**Audio**

- Visitor wears the headphones.
- Visitor chooses to listen to English or Spanish by pressing the “English” or “Espanola” button.
    - Audio starts.
        - Audio explains the content of the exhibit
        - Audio provides instructions of the interactive.
- Visitors can adjust the volume of the audio.

# Exhibit Components:

The following lists of components combine to make the exhibit.

**Base Cabinet:**

- Weighing, 100 lbs.
- Dimension, 57” H x 66” W x 32”D

**Graphic Panel:**

- Weighing, 20lbs.
- Dimension, 34”H x 38” W x 2”D

**Side Monitor:**

- Weighing 10 lbs.
- Dimension, 22”H x 19” W x 6”D

**Interactive Properties:**

- Six red squares
- Six blue hexagons

---

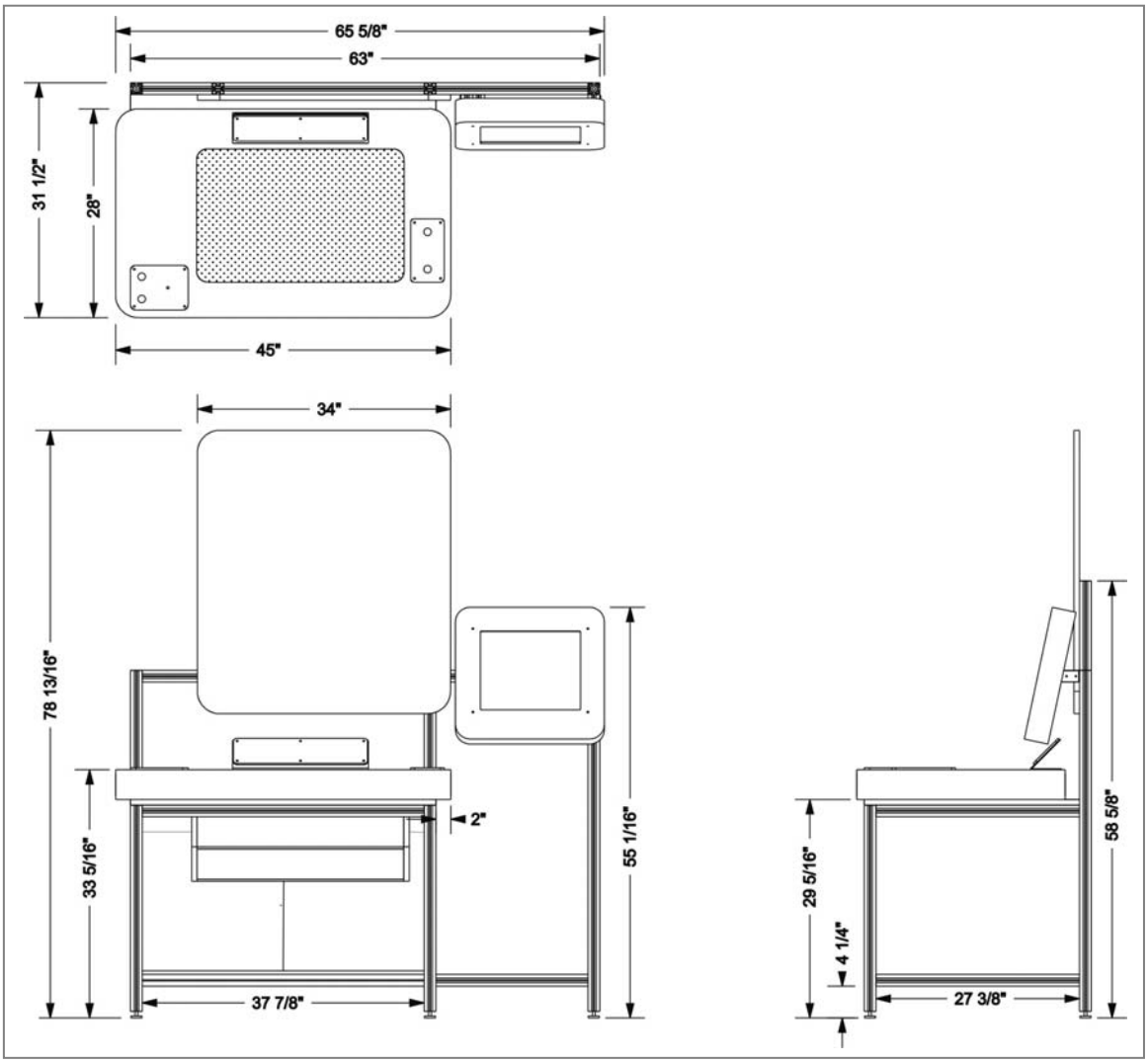
# Exhibit Specifications

**Dimensions:**

- Exhibit Dimensions
  - 79”H x 66”W x 31”D
- Exhibit Foot Print
  - 66”W x 31”D
- Recommended Exhibit Floor Space
  - 72”W x 62.5”D

**Power Requirements:**

- 110-volt, 15-amp
  - Accessed through base cabinet of the exhibit


65 5/8"
63"
31 1/2"
28"
45"
34"
78 13/16"
33 5/16"
2"
55 1/16"
37 7/8"
29 5/16"
4 1/4"
27 3/8"
58 5/8"

**Tools and Hardware:**

Tools and Hardware needed for installation, maintenance and repairs to the exhibits.

**Key**

- 415-A.
  - To open base cabinet

**Cam Wrench**

- Cam locks
  - Securing Side Monitor to exhibit frame
  - Securing exhibit frame

**9/64" Allen Wrench**

- All ¼ x 20 button head bolts
  - Securing the exhibit monitor to interactive cabinet
  - Securing the Graphic Panel to the exhibit frame

**5/32" Allen Wrench**

- Security screws
  - Securing all second surface graphic panels

**3/32" Allen Wrench**

- Machine screws that secure Side Monitor shroud

**#2 Phillips Screwdriver**

- Machine screws
  - Securing Side Monitor shroud back panel

**6" Crescent Wrench**

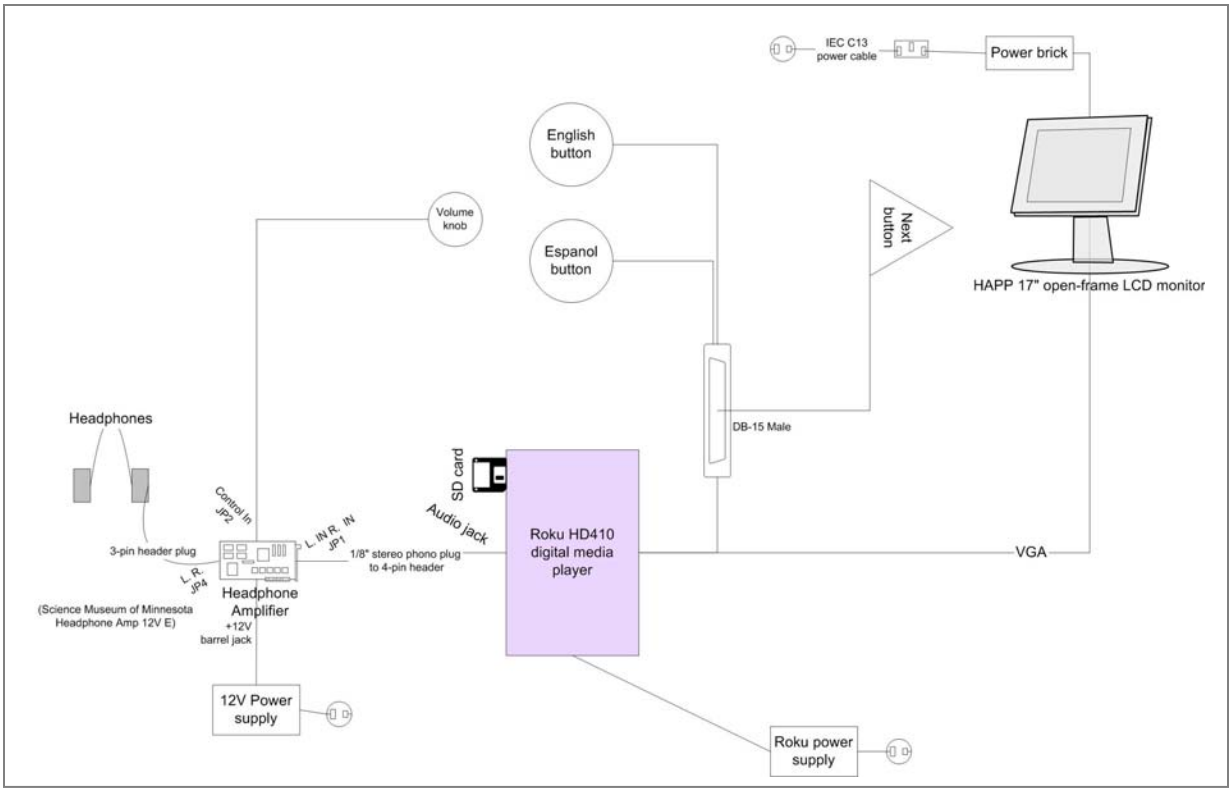
- To adjust leveling feet

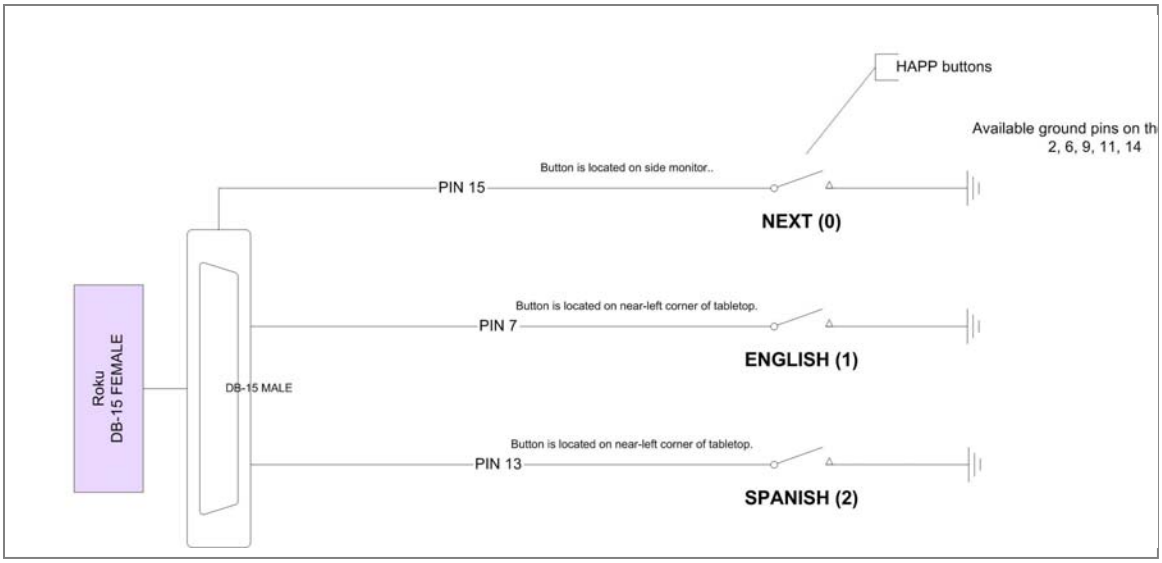
**Parts:**

Parts needed for installation, maintenance and repairs to the exhibit.

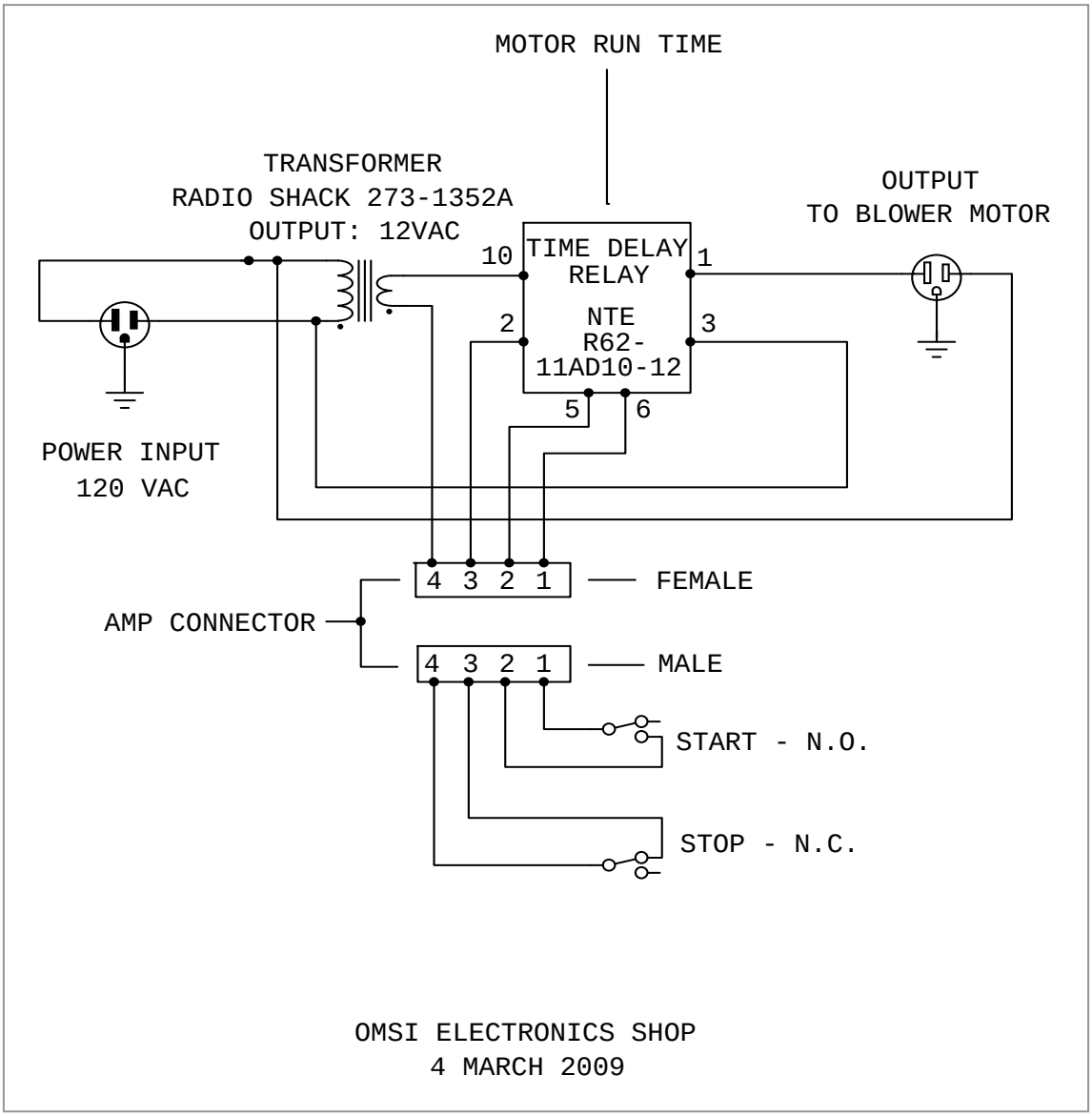
- Headphones
  - AKG K77
- Monitor
  - 17" Happ, 49-2603-30
- Media Player
  - Roku HD410
- Amplifier
  - Produced by Science Museum of Minnesota (SMM)
- Blower
  - Dayton 1TDT2
- Props
  - Six red squares
  - Six blue hexagons
  - Produced by The Oregon Museum of Science and Industry (OMSI)

**Media:**


IEC C13
power cable
Power brick
English
button
Volume
knob
Espanol
button
Next
button
HAPP 17" open-frame LCD monitor
DB-15 Male
Headphones
SD card
Audio jack
Roku HD410
digital media
player
Control In
JP2
L. IN R. IN
JP1
3-pin header plug
1/8" stereo phono plug
to 4-pin header
VGA
L. R.
JP4
Headphone
Amplifier
(Science Museum of Minnesota
Headphone Amp 12V E)
+12V
barrel jack
12V Power
supply
Roku power
supply


HAPP buttons
Available ground pins on th
2, 6, 9, 11, 14
Button is located on side monitor..
PIN 15
NEXT (0)
Button is located on near-left corner of tabletop.
PIN 7
ENGLISH (1)
Roku
DB-15 FEMALE
DB-15 MALE
Button is located on near-left corner of tabletop.
PIN 13
SPANISH (2)

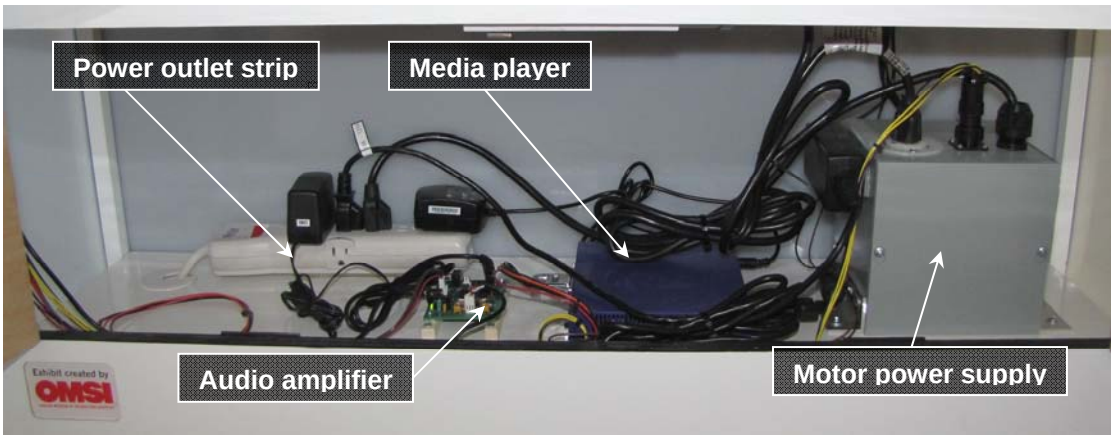
**Electronics:**

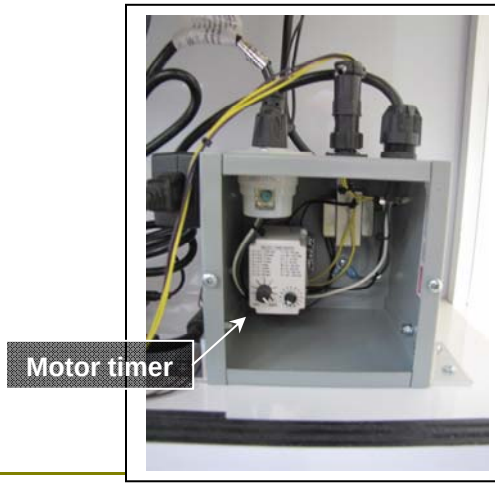


# Service Access

**Base Cabinet Access**

- Accessed with a 415-A key
- Contains
  - Power outlet strip
  - Media player
  - Amplifier
  - Motor
  - Motor timer



# Trouble-Shooting

**Interactive:**

- No air when the start button is pressed.
  - Ensure there is power to the exhibit.
  - Ensure power strip is switched to the “ON” position.
  - Check to ensure all power plugs are securely connected.
  - Check to ensure timer is set to desired setting.
  - Check to ensure all plugs are securely connected to the “Start” button and the signal cable is securely connected to the Roku.

  ➲ **If the above conditions are met contact a qualified electrician to test the timer and blower to see if either is faulty, replace as needed.**

- Blower runs to long.
  - Adjust timer to desired run time.

- Blower doesn’t blow long enough.
  - Adjust timer to desired run time.

**Side Monitor:**

- No Picture.
  - Ensure there is power to the exhibit.
  - Ensure power strip is switched to the “ON” position.
  - Check to ensure all power plugs are connected to power strip and to the back of the Monitor.
  - Check to ensure source plug is connected to the media player and to the back of the Monitor.
  - Check to ensure media card is securely inserted into the media player.

  ➲ **If the above conditions are met the media card, media player, or side monitor may be faulty, replace as needed.**

- Pictures do not advance when prompted.
  - Check to ensure all plugs are securely connected to the “NEXT” and button and the Signal cable is securely connected to the media player.
  - Check to ensure media card is securely inserted into the media player.

  ➲ **If the above conditions are met the media card, Headset, media player, or buttons may be faulty, replace as needed.**

**Audio:**

- No Sound
  - Check to ensure all plugs are securely connected to the Amplifier.
  - Check to ensure plugs are securely connected to the “ENGLISH” and “ESPANOLA” buttons and the Signal cable is securely connected to the Roku.
  - Check to ensure media card is securely inserted into the media player.

  ➲ **If the above conditions are met the media card, or buttons may be faulty, replace as needed.**