

Waukesha Club Uses a Custom “Zoom Machine” to ease Tech Load

By Pete Bosch, April 13, 2023

Club meetings are more inclusive when delivered hybrid. But the equipment is time consuming and complicated to set up and take down. Also, it is often difficult to show the audience, the speaker and what the speaker is presenting, if they are including a PowerPoint in their program.

This article is about a simplified device and approach to hybrid meeting that my club uses. Setup and teardown both take less than 5 minutes.

You’ll need a projector that uses HDMI, and decent WiFi. If you don’t have those, most solutions are impossible. It also relies on a pull-down screen which in our case, is part of the venue. Of course, you can provide a screen yourself, but that’ll be an additional burden on setup and teardown.

The device we use is a bespoke “Zoom Machine.” It is a small (~3” x 3”) PC with a stripped-down Windows 11 installation. It is mounted together with a webcam on a vertical mast, side-mounted speakers and a wiring harness that is permanently mounted to the PC. On one end of the harness, it plugs into the outlet on the floor. At the other end, it has a power and an HDMI connector for the projector. It even has a place to store a recovery thumb drive.



The projector screen serves as a monitor, and a wireless keyboard with mouse pad is used for input. The webcam on the mast points back at the crowd.

We use a clamp at our podium to attach the club President's iPhone, with which we have them join the meeting – again, without audio. This serves as the speaker's camera. Their voice, transmitted over the room's speaker, is picked up by the microphone. You can use the webcam's microphone, or for a slightly larger room, purchase an area mic.

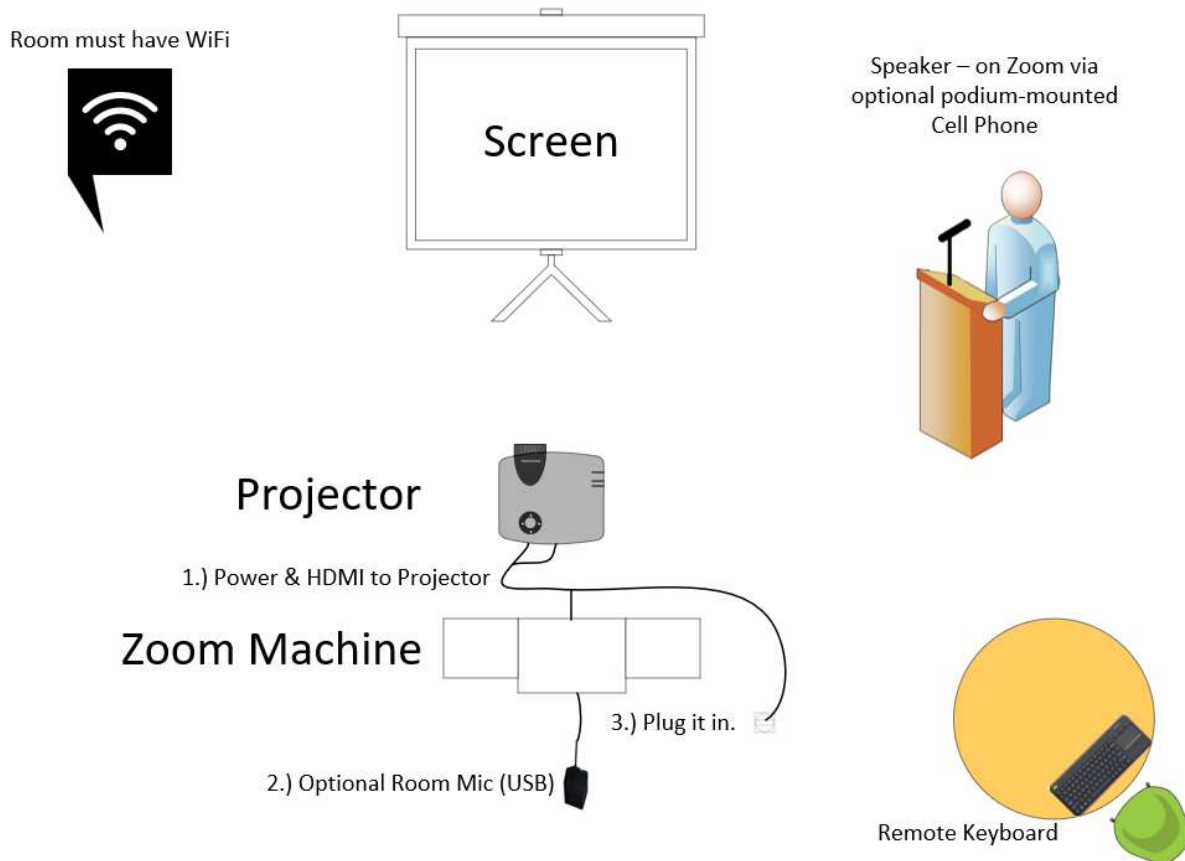


Figure 1 : System Layout

If the speaker has a PowerPoint, or video, or other presentation, we ask them to join the Zoom meeting – without audio – and share their presentation just as they would normally on a Zoom meeting. When they share their presentation, it shows up full-size on the screen, and on all remote attendees' screens as well.

Setup is very simple – see figure 1 above, and 2, below. If you don't add a conferencing/room mic, you can skip step 2.

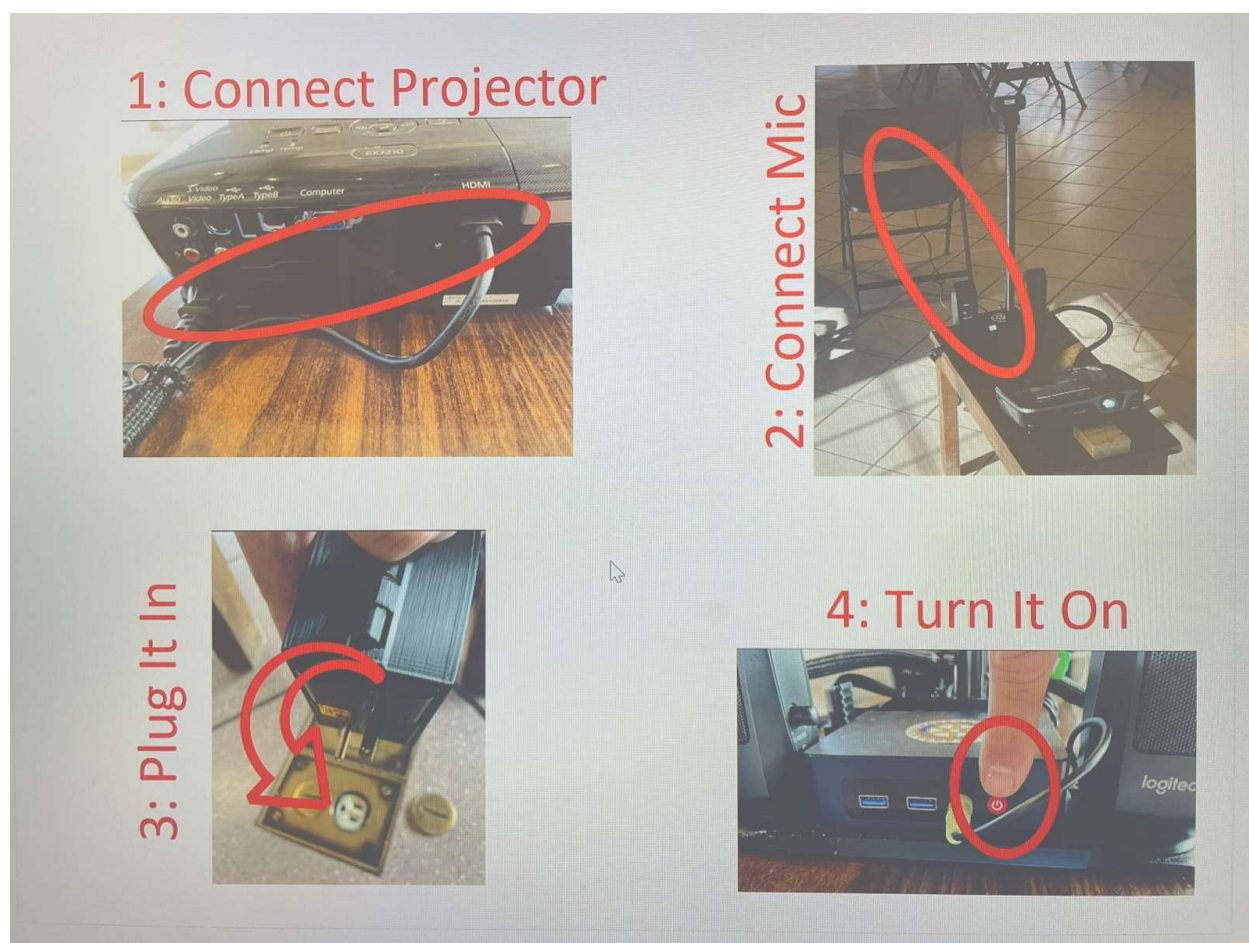


Figure 2 : Setup and Startup

Once the PC is turned on, it boots up, logs in and starts our weekly Zoom meeting, all automatically. If you have multiple regular meetings, create a shortcut to each Zoom meeting on the desktop, and use the appropriate shortcut to start the meeting. After that, running the system is nothing more than running a zoom meeting.

We offer the following advice to each guest speaker:

You will be presenting over Zoom, for the benefit of both those in attendance and those online. As such, you should be familiar with Zoom and presenting your material that way. There are nuances to this, such as sharing your screen or specific content, that are different from simply attaching a projector directly to your laptop.

A few things to keep in mind are:

- 1.) Please make sure your laptop is adequately charged, or that your power brick has a cord long enough to reach the wall from the podium (~10 feet)

- 2.) We have a microphone and a camera at the podium for the benefit of those online. Please plan to use them.
- 3.) If you're sharing a video or other material with audio, you must tell zoom to "share audio" when you share the desktop or window.
- 4.) Please don't let your laptop go to sleep, or you'll drop off the zoom meeting.
- 5.) If you're doing a lot of content sharing in different windows, it's best to just share your desktop, rather than futzing about with individual windows.

Caveats:

Do not install office, acrobat, or anything else on the PC. Its sole purpose is to run Zoom. Period. It should have the absolute bare minimum required to do that. Anything else increases the chances of bollixing up and/or slowing down the machine.

Pause updates so that they don't interrupt the meeting startup. But make sure that from time to time, you let them run, so that you don't miss any security updates. There should be minimal risk, since only one thing is happening on the machine, ever. Zoom.

The podium cell phone can't have audio enabled, or there will be feedback. Therefore, their voice will have to be picked up by the webcam mic (works in a small setting) or the optional conferencing mic (works best if there's a PA system, or you choose an omnidirectional mic instead).

Parts List:

All told, the parts cost less than \$400. We added a high sensitivity conferencing mic and a gooseneck for mounting a cell phone on our speakers' podium – which also joins the zoom meeting, and acts as the speakers' camera.

<https://www.amazon.com/hz/wishlist/ls/3F4XS6EDQ8VEP> - total cost at present, \$390. There is also about \$50 in coupons associated with the products as well. The gooseneck and conferencing microphone are optional.

It also requires a few nuts and bolts to attach the speaker shelves to the base, a 2' piece of PVC pipe and some black electrical tape. You'll also probably want to strip down the Windows 11 installation that comes with the PC, so you'll need to know how to do that. Google is your friend.

Oh – and a 3D printer. If you have one, I'll share the design, and if you don't, talk to me about printing the parts for you. Probably about \$10, or \$50 to RI in my name. Either way, I'll use my own stock of nuts, bolts and zip ties to offset the cost of the PVC. Shipping probably won't be much either, if it's even needed.

If there is interest and need, I will also create assembly and operating instructions. And if you're thinking about a modification to the design, I'm all ears. 😊