

ME 447 Web Motion Control Experiment General System Description

What exists in the lab?

The implementation of the ME 447 Web Motion Control Experiment consists of 2 main components communicating with one another via the serial port. These two main components are a local CPU in the laboratory and the real-time hardware that controls.

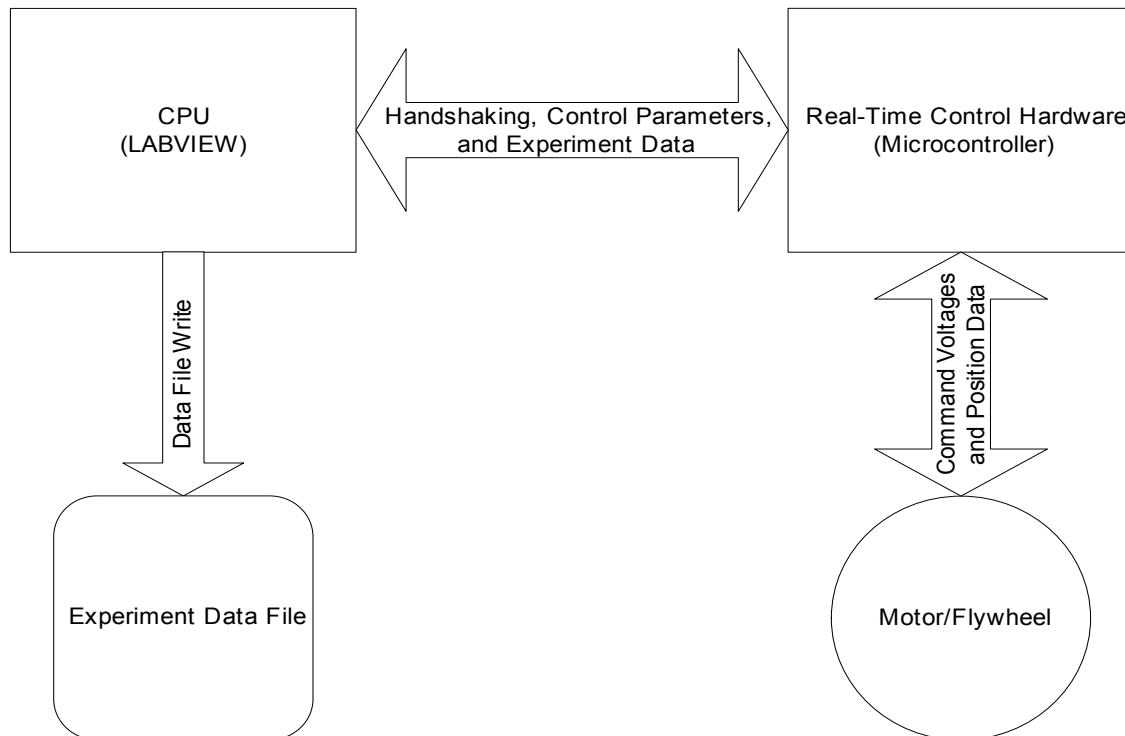


Figure 1: Block Diagram of Web Motion Control Experiment System

How do the components shown in the block diagram communicate via the serial port?

1. LABVIEW first sends a 'w' character, which tells the real-time control hardware that LABVIEW is ready (and waiting) to send control parameters for a new experiment.
2. When the real-time control hardware is ready to receive those parameters, it will send an 'r' character back to LABVIEW, to acknowledge that *it* is ready.
3. When LABVIEW receives this "ready" signal (i.e. the character 'r') from the real-time control hardware, it sends an 's' character immediately followed by the control parameters, in the order expected by the control hardware.
4. When the real-time control hardware recognizes the 's' character, it reads in the control parameters, and runs a new experiment.
5. After the real-time hardware acquires the specified number of samples (this number is one of the control parameters), it will send the flywheel position and motor control-voltage data corresponding to those samples back to LABVIEW.
6. When LABVIEW has received the requested data, the data is posted on the LABVIEW front panel, as well as spreadsheet formatted (with commas delimiting columns and end-lines delimiting rows) and written to a .csv file.

What can a student expect to see on-line?

When performing this lab on-line, students can expect to see a web page consisting of 3 basic parts: 1). a brief description of how to perform the lab, 2). a web cam showing the motor and flywheel being controlled, and 3). the LABVIEW front panel for entering control parameters and running experiments.

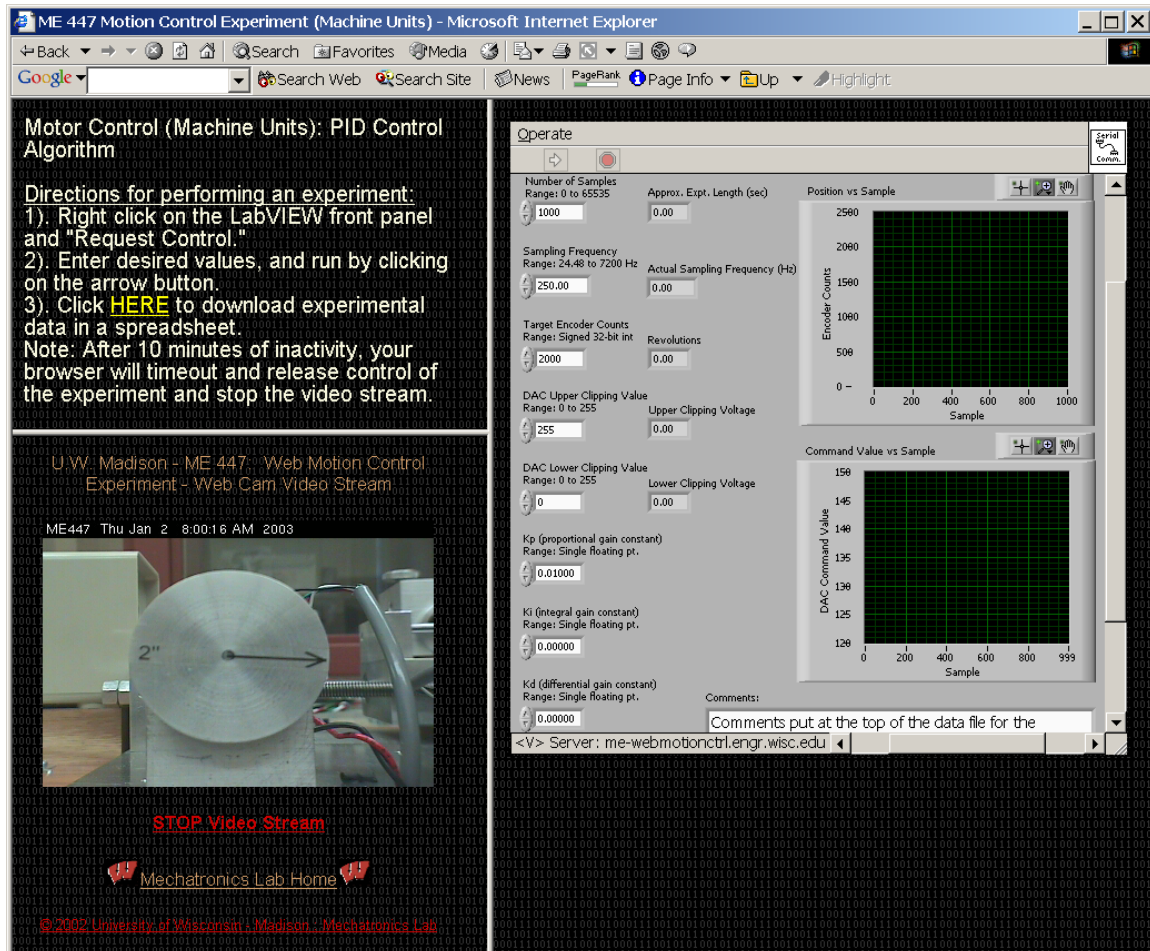


Figure 2: Screen Shot of Web Motion Control Experiment Interface

How can a student get to this web page to perform experiments?

1. Go to the Mechatronics Lab home page at <http://mechatronics.me.wisc.edu/>.
2. Click the "ME447" link.
3. Follow the link to the web motion control experiment home page.

Clicking the "Physical Units Experiment" link will link to the page shown in Figure 2 above, while clicking the "Machine Units Experiment" will link to a "machine units" version of this page. The "machine units" version simply requires the control parameters to be specified in machine units (such as a register value) as opposed to physical units (such as a voltage).