

The General Procedure: Fixing Anything

-Is it turned on?

Turn it on. For specifics on this, read the appropriate section below.

-Are you sure its on?

If you turn it off and back on, you will probably fix whatever issue you have.

-Is it talking to the other things?

Make sure it is connected to whatever else it should be connected to. This is usually done via coaxial cable, and can be traced easily by following the wires. Also make sure the other things are on. The cable could be improperly mated or very rarely, bad. It can happen so keep this in the back of your mind and treat cables nicely, don't kink them especially near the connectors.

-Is the software working?

Is the correct port assigned to it? Is the correct program being used? Does the computer see it? If the answer to these questions are 'yes', you are doing pretty well.

-Is it still not working?

Read the COMnaming.doc file and consult the manual provided for the lab. After or during this you should also ask the help of a teaching assistant or the professor.

DAQ: Why isn't my DAQ working?

-Is it plugged in?

The DAQ should be connected via USB 2 cable into the computer, it receives power and info from this connection. Make sure it is plugged in both to the computer and its port.

-Is it connected to the signal?

Do you have your measurement signal actually connected to the DAQ? If not connect the appropriate ports with wires and connector probes.

-Is it the right DAQ?

If you have changed DAQs or updated software or sneezed near it there is a chance the computer recognizes the DAQ as a new copy of the device. The software is designed to update to the newest version, but sometimes leaves ghost instances of the DAQ in the MAX. You can remove these by right clicking on the ghost icon and selecting "Delete". In MAX the current version should have an icon that is colored in, and if this is selected it should work.

Is it actually working correctly?

You may think it is not working but DAQs can be shy and might not want you to know it is actually fine. The confusion may be associated with timing settings for the particular DAQ board.

Failure to See the Light: My monochromator is not responding.

-Is it plugged in?

The monochromator is powered by an AC/DC converter which is plugged into a power strip which in turn is plugged into the wall. Make sure the power strip is plugged in and is turned on, then make sure the power supply for the monochromator is plugged in and turned on. When this is turned on you should hear the monochromator preparing for use. Use your ear, don't be afraid to get close. If it does not start the initializing sequence, it does not have power.

-Is it connected to the serial port?

The monochromator communicates with the computer via the 9-pin cable hub. Make sure this hub is connected to the computer via USB cable, and make sure the monochromator itself is plugged into the hub via a 9-pin cable. It should be connected into port #1, as is labeled on the back of the hub, and should correspond to the COM 4 port.

-Do you have the correct COM port selected?

As is mentioned above, the 9-pin cable should be connected into port #1, which is COM 4. If you do not have COM 4 selected in your program, you should change it to COM 4. COM 4 is the default designation, but if the 9-pin hub is disconnected or another is plugged into the computer the ports could be reassigned. A tutorial for reassigning port names can be found in your resource folder or online.

-Do you have the light source on?

Although the light source does not need to be on to run the monochromator, it does allow for a visual check of grating tuning, and does need to be on for any testing. You should try and select an output wavelength you can easily see, somewhere on the visible spectrum. A guide to the light source can be found below.

Thor is Sore: Why isn't my halogen lamp on?

-Is the light source plugged in?

The light source for the monochromator is screwed onto the monochromator itself. It is powered by the power source which is plugged into the power strip. Make sure the powerstrip is plugged into the wall and is on, and that the power source is on.

-Is the power high enough to see?

The front of the power source has an intensity dial. Make sure you understand what the dial reads, but more importantly test the intensity of the lamp manually. You will need to control the brightness of the source light in later experiments, so familiarize yourself with the control mechanism.

Is the bulb burned out?

This is a distinct possibility, but can be avoided by treating the filament gently. For example, don't rapidly change the power settings or impact the lamp housing. Also try to limit the time spent at max output.

Unbeguile the Thermopile: Why is my detector not working?

-Is the thermopile connected?

The thermopile should be connected to the DAQ directly or through an amplifier via a coaxial cable. Make sure the coaxial cable is plugged in to both the thermopile and to the low noise amplifier then to the DAQ or lock in amplifier. If you need more coaxial cables or connectors you can find them hanging up or in the sorting module across from the file cabinet near the door.

-Is the thermopile pointed at the source you are measuring?

The thermopile needs to be able to "see" what it is measuring. If it does not have a line of sight to the light, it will not read it. It might also be advisable to increase the intensity incident on the thermopiles active region using lenses, or to create a light shield for it. Doing so will allow for more delicate readings, with less noise from ambient light sources.

Locked out: The lock-in (LI) amplifier is misbehaving

-Is the lock-in amp plugged in?

The lock in (LI) amplifier should be plugged into the power strip which in turn is plugged into the wall. Make sure the power strip is plugged in and turned “On”, and make sure the LI amp is plugged into the strip. The on switch for the lock-in amp is on the right side, and if it is on various lights should light up on the front.

-There is no signal

Make sure the LI amplifier is connected to the signal and reference signals correctly. The reference signal from the optical chopper should be connected from the driver via coaxial cable and attached to the “Reference - > Input” connector on the LI. The signal itself should be connected via coaxial cable to the “Signal Input” connector, and the output coming from the “Output” connector. Make sure all the coaxial cables are connected to the appropriate inputs and that the output is going to the appropriate measurement device (e.g. the DAQ).

-There is still no signal, although everything is connected.

If you are sure everything is connected to the LI amplifier correctly but are still not receiving a signal, double check that all needed other pieces of the equipment are on. This may include the light source, the monochromator, the thermopile, the optical chopper, the DAQ, the Keithley, and your computer. If all of these are functioning, check in particular that the optical chopper is functioning, that the reference frequency you are using matches the chopper's frequency, and that filter settings are appropriate. If the problem persists consult the manual and ask your TA or your professor.

The Optical Chopper is not cutting it

-Is it plugged in, and turned on?

The optical chopper gets its power from the power strip which is plugged into the wall. Make sure the power strip is plugged in and turned on, and that the optical chopper is plugged into the power strip. The power button for the chopper controller is on the bottom left, make sure it is pushed in.

-Is it connected to the physical chopper?

The windmill looking thing is the physical chopping mechanism. If the optical chopper is on, the wheel should be spinning. If it is not, make sure the physical mechanism is plugged into the controller. If the controller is plugged in and is on, it should spin, at some speed.

-My blade is spinning too fast/slow?

There is a dial controlling the speed of the chopper on the front of the controller. By adjusting this dial you control the speed, so change it to change the speed of the blade.

-My signal is not what it should be, (as indicated by the LI)

Make sure that the controller of the chopper is connected to the lock-in amplifier. A coaxial cable should connect the “Output” connector of the chopper controller to the “Reference” connector for the lock-in amplifier.

Keithley is as it should not be

-Is the Keithley plugged in?

The Keithley gets its power from the power strip plugged into the wall. Make sure the power strip is plugged in and turned on, and that the Keithley itself is plugged into the strip. The “On”

button for the Keithley can be found on the bottom left hand side of the face of the Keithley. Make sure it is in the “On” position as described near the button.

-Is the Keithley connected to the computer?

The Keithley should be connected via 9-pin cable to the serial port hub that is in turn connected to the computer. Make sure both the hub and the 9-pin cable are connected. The hub should be attached via USB to the computer, and the Keithley should be in port #2 as is labeled on the hub. The name of this port on the computer should be COM 5.

-Is the COM port named properly?

As is mentioned above in a companion document (COMnaming.doc), port #2 should be named COM 5 by convention, but if the serial port is disconnected or changed the computer may reassign COM names. In this case please see the COM port naming guide. You can check on the names of the COMs by right clicking on “Computer” in the start menu, selecting “Properties” then opening the “Device Manager” link found on the top left. Under “Ports (COM & LPT)” there should be several COM ports listed. If they are not listed, reconnect the serial port hub. If they are listed but are not labeled COM 4 – COM 7, please see the renaming guide.

-Is the software talking to the correct thing?

Make sure your software matches the correct COM port and integrates with the Keithley as is demonstrated in the sample program.

-Is the Keithley connected to the signal?

Make sure the Keithley is connected to the appropriate physical signal sources. This will vary based on the lab, but double check physical connections between the Keithley and the signal measurement. This includes alligator clips, banana connectors, coaxial connections and probe contacts.

If you have any questions that are not addressed in this troubleshooting guide, please ask the professor or the Teaching Assistant associated with the course. If you come up with a problem please write down what happened, and what steps were taken to fix it so it can be added to the guide. If you have any question, comments or concerns about the guide itself please feel free to let the instructors know, and we will address them to improve the course.