

TCSPC System 2 ON/OFF Procedures

Sign In

Sign in for "Streak Camera" from the laptop computer

1. Turn on chiller.
2. Turn laser key switch to ON position.
3. Turn on "Lasers 3" power strip on overhead shelf.

Laser

Detector

1. Use the Hamamatsu C9727 high-voltage power supply to charge the MCP-PMT detector as follows.
2. Depress "HV OUT" button. LED will light up green. Use arrow keys to increase voltage in 1000 V increments to a final value of -3000
3. Power button is always on.

Program

1. Turn on power strip button next to the instrument labeled TCSPC II.
2. Launch **SPC Control Panel** program. Press "Launch Becker-Hickl" button to run data acquisition program.
3. Verify that SYNC count rate is 249 kHz. If different adjust variable ND filter in front of fast photodiode.

Sample & Optics

1. Verify that laser beam passes through sample properly.
2. Adjust mirror M1 to send beam thru Iris I3. Adjust mirrors M2 & M3 to send beam thru Iris I2 & I1.
3. Check excitation and emission polarization settings.
4. Manually adjust monochromator to proper wavelength.
5. While monitoring ADC signal on screen adjust ND filter to keep count rate under 8000 c/sec for signal and 2000 c/sec for IRF.

Monochromator

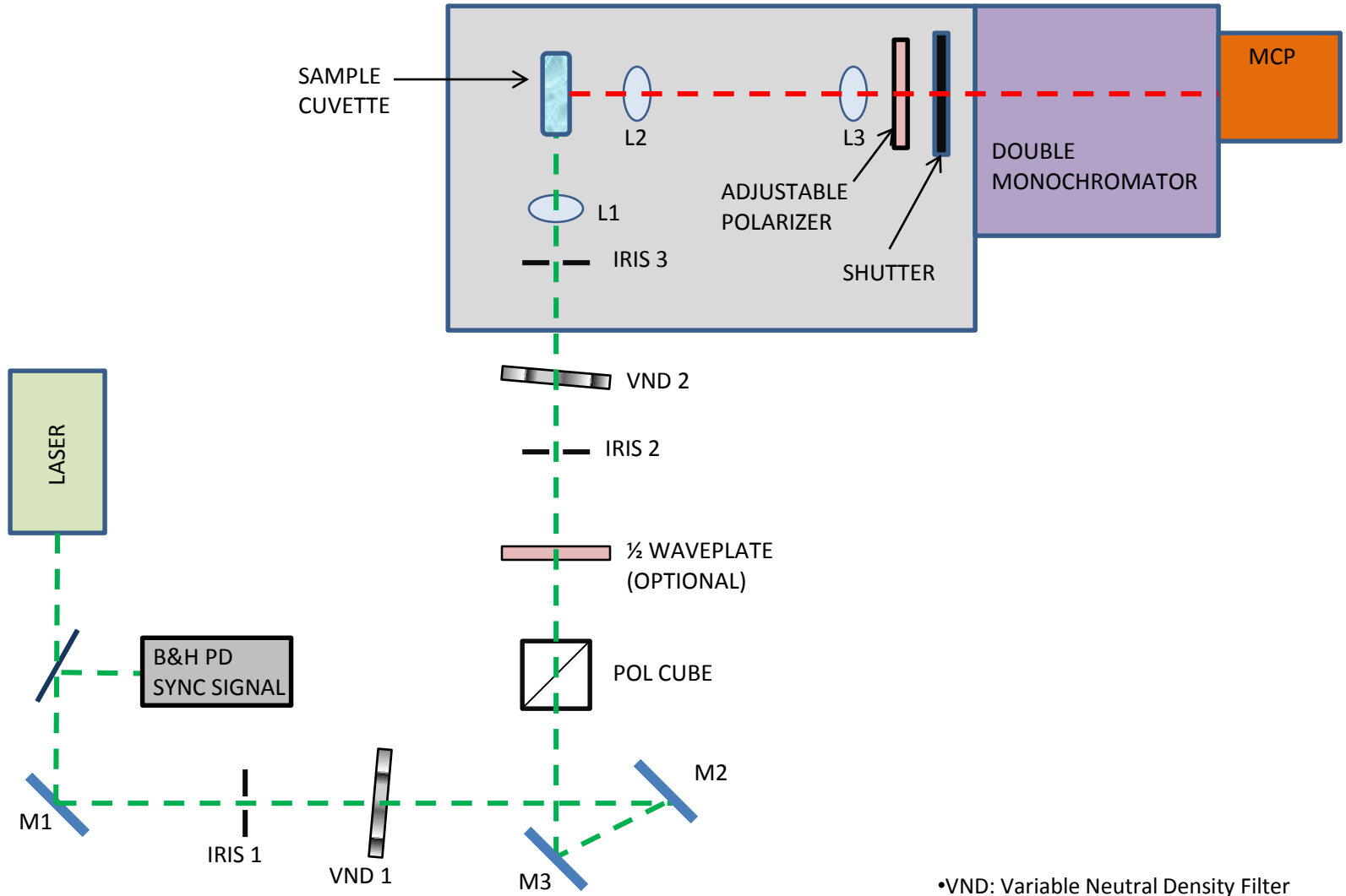
1. The 3 digit counter on the monochromator displays the wavelength setting in nanometers.
2. **Multiply reading on counter by 4 to get actual position of the grating.**
3. Turn handcrank to change wavelength .

System Shutdown

- Slowly decrease MCP voltage to 0V, then press "HV OUT" button. LED should go out.
- Close data collection and SPC Control Panel program. Turn off PC.
- Turn laser key switch to Standby position.
- Turn off power strips labeled "TCSPC II" and 'Lasers 3 '.
- Logoff laptop computer.

*Save data in "Data" folder on desktop.

BASIC OPTICS SETUP

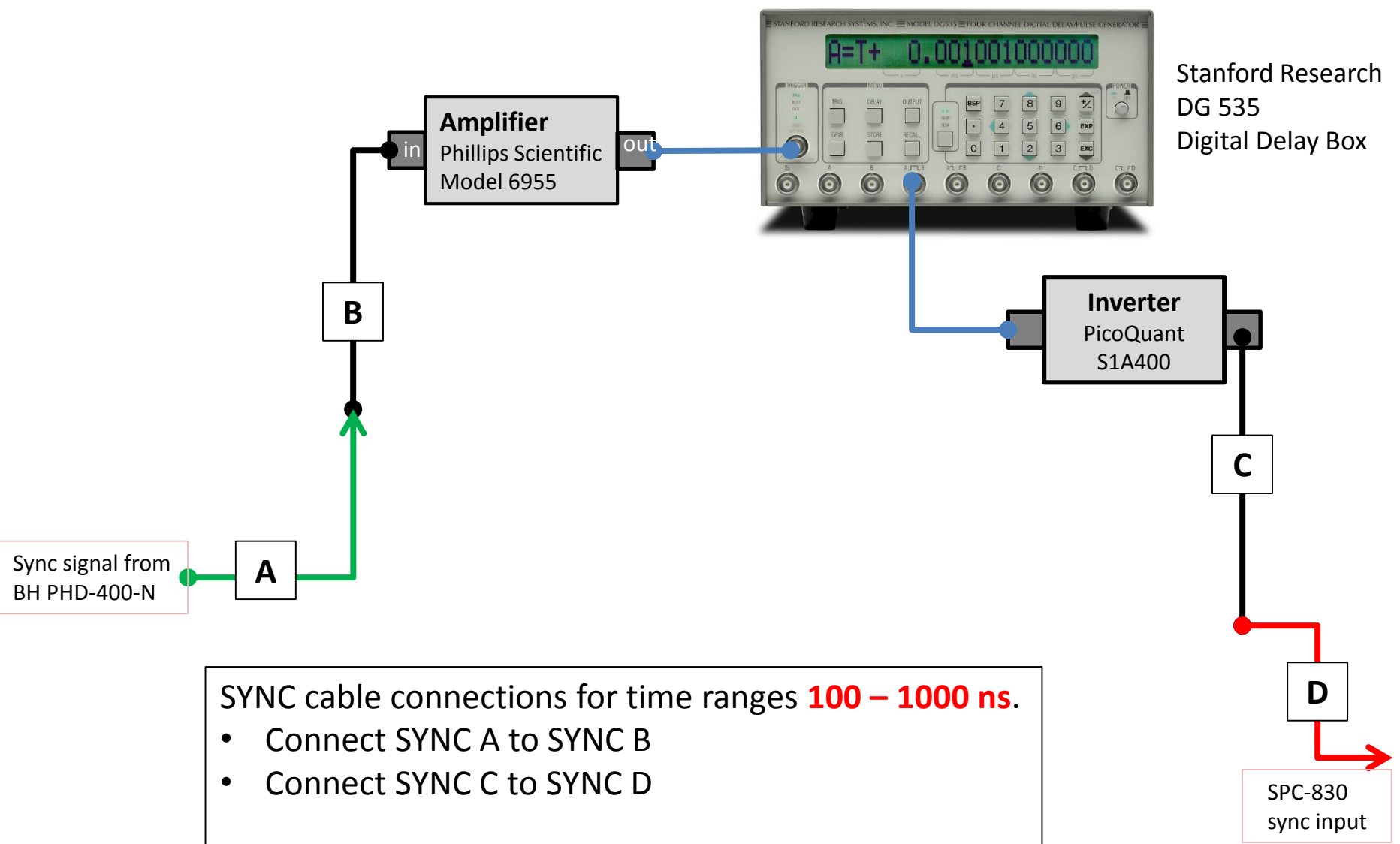


System Alignment

1. Adjust M1 to direct laser through center of IRIS 1
2. Adjust M2 to center beam through IRIS 2.
3. Adjust M2 to center beam through IRIS 3.
4. Repeat steps 2 & 3 until laser is passes through center of IRIS 2 & 3.
5. Check that beam is focused on sample cuvette.
6. Using a trimmed white business card, insert in sample cuvette so it is oriented at 45° with respect to the incoming beam.
7. Check that light reflected off the card is collimated after passing LENS 2. If not then adjust LENS 2 by moving micrometer mount to achieve collimation.
8. LENS 3 is to focus light onto entrance slit of monochromator.
9. **NOTE:** Optical height for system is $5\frac{5}{16}$ inches.

Trouble Shooting

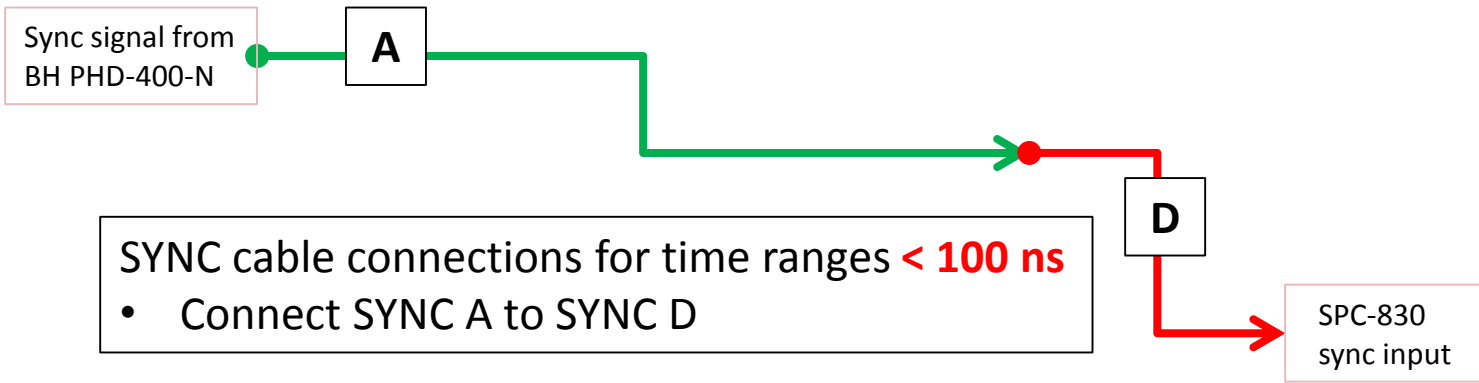
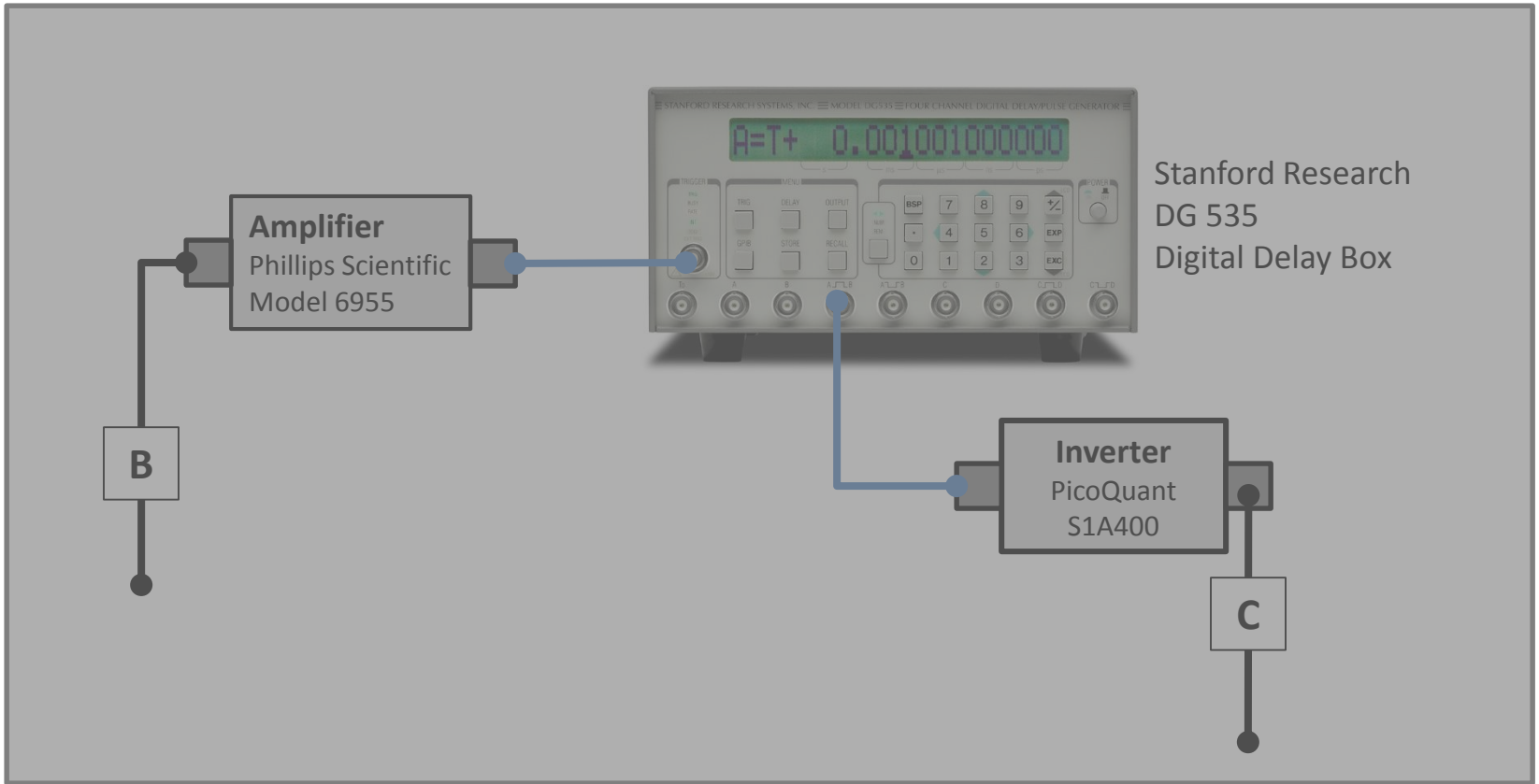
- *Shutter not responding to program commands.* Check that serial cable is connected to computer; it sometimes pulls loose.
- *Double-peak in IRF.* Usually caused by optical misalignment or multiple reflections. Use a card to reflect excitation beam onto shutter. It should be close to the center. If not check the following.
 - Excitation beam $5 \frac{5}{16}$ inches height
 - Both lenses after cuvette centered at $5 \frac{5}{16}$ inches height.
 - Check that cuvette and detection optics are inline with the monochromator slit. This position is easily found by following the line of $\frac{1}{4}$ -20 tapped holes on which the translation stage is mounted.
- *Wrong SYNC rate.* Adjust ND filter in front of the BH fast photodiode. SYNC signal should read 249 kHz.



Stanford Research
DG 535
Digital Delay Box

SYNC cable connections for time ranges **100 – 1000 ns.**

- Connect SYNC A to SYNC B
- Connect SYNC C to SYNC D



Parameter Settings

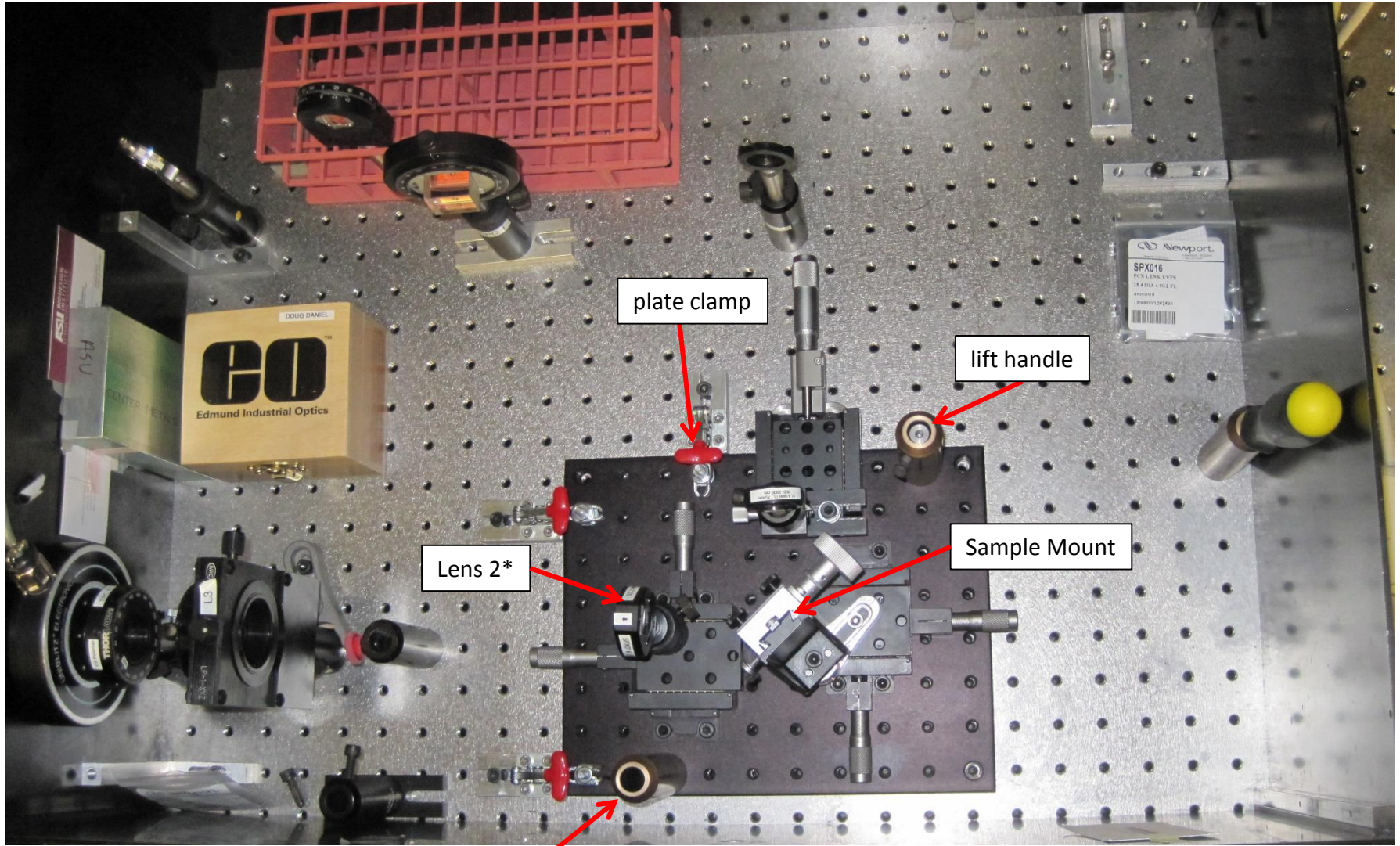
Measurement Range (ns)	TAC SETTINGS			DG 535 Delay Setting (X)
	Range	Gain	Offset	A = T + X(ns)
3.3	5E-8	15	82.7	NA
5	5E-8	10	80.0	NA
10	1E-7	10	36.56	NA
20	1E-7	5	29.5	NA
25	1E-7	4	26.0	NA
50	1E-7	2	7.0	NA
100	1E-6	10	10.0	35
250	1E-6	4	10.0	170
500	1E-6	2	10.0	410
1000	1E-6	1	10.0	900

Settings for Stanford Instruments DG535

- Trigger
 - External
 - Threshold: -.080 V
 - Slope: -
 - Trigger Term: 50 Ω
- Delay
 - A = T + X(variable)
 - B = A + 2 ns
- Output
 - AB
 - AB & -AB Loads = 50 Ω
 - VAR
 - AB: Amplitude = +0.50 V
 - AB: Offset = +0.00 V

To change the delay press the “delay” button on the DG535 unit repeatedly until the display for the delay A = T0 + XXX.XXX.XXX.XXX seconds. Set the desired delay with the arrows and numeric keypad.

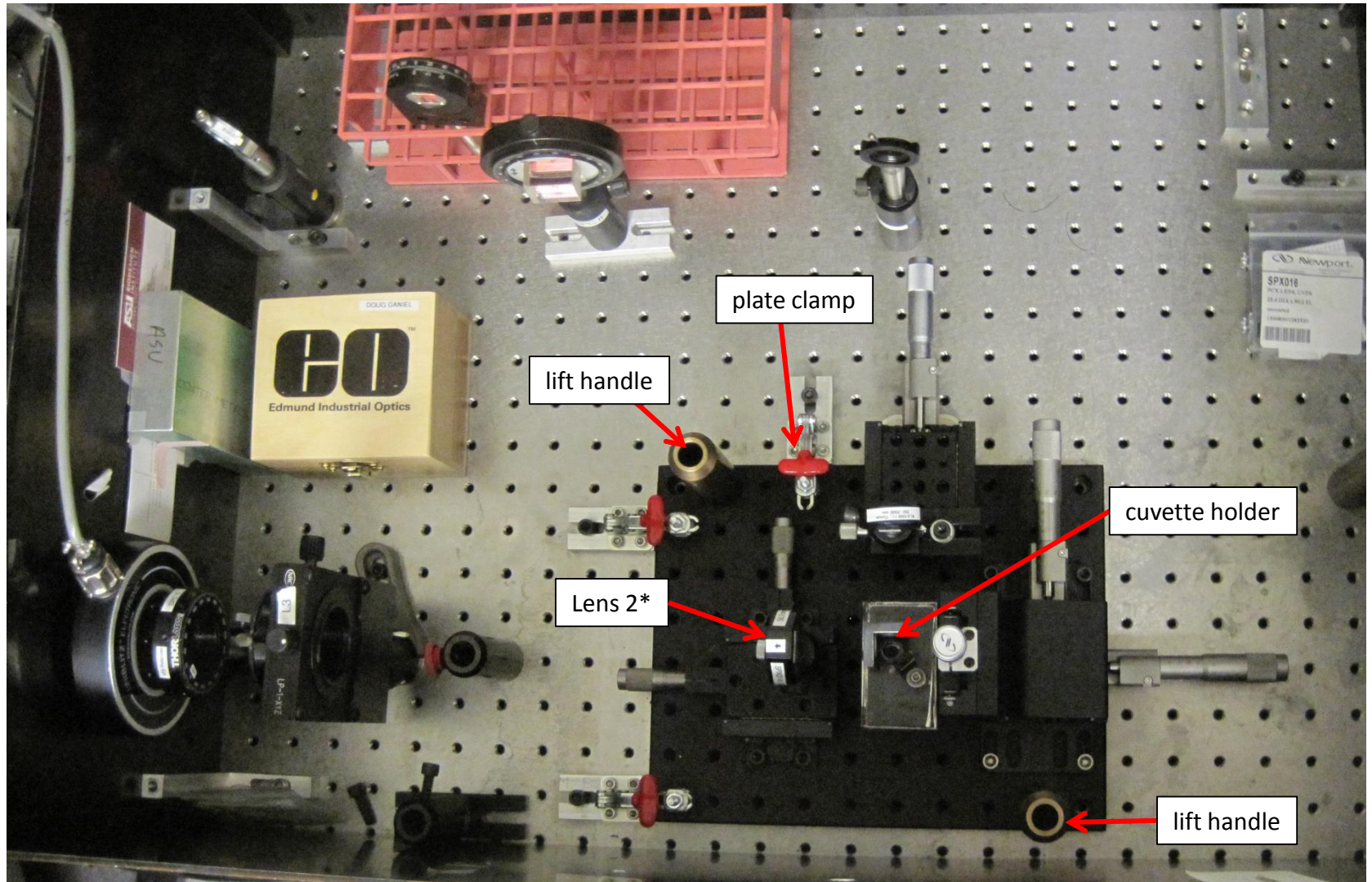
Setup for Surface Measurement



lift handle

* Lens 2 is shared with base plate for liquid based measurements. Orient lens with arrow pointing towards detector.

Setup for Liquid Measurement



* Lens 2 is shared with base plate for liquid based measurements. Orient lens with arrow pointing towards detector.

Switching Setup Between Liquid and Surface Based Measurements.

1. Release the three toggle clamps holding the breadboard base plate. Open toggle handle completely to allow base plate to clear the clamps during removal and installation.
2. Remove baseplate with all attached components. Take care to angle the plate such that components do not crash into one another. Done correctly it is simple to accomplish.
3. Install the other base plate with all mounted components similarly but in reverse. Adjust position of the base to that it makes firm contact with all three of the toggle clamp mounting bases.
4. Close all three toggle clamps to secure platform.
5. Transfer lens 2 from the original setup to the one just installed. Height is set by the post clamp and normally should not need to be adjustment for height. Orient lens such that the arrow points towards the detector.

