

ACQUITY UPLC® FLR Detector Introduction



ACQUITY UPLC® FLR Detector

- The new ACQUITY UPLC® FLR Detector
- Intended for Service Engineers who are ACQUITY UPLC® and the 2475 Fluorescence Detector certified.
 - Basic understanding
 - Detector capabilities

ACQUITY UPLC® FLR Detector



TUV Detector



PDA Detector



ELS Detector

ACQUITY UPLC® FLR Detector

- What has changed from the 2475?
 - New lower volume flow cell
 - However a 13uL cell is available
 - New Mercury Xenon Lamp
 - New Lamp Power Supply
 - New Personality Board
 - New cuvette holder assembly
 - Leak Detection capability
 - More internal space for repair



Mercury Xenon Lamp



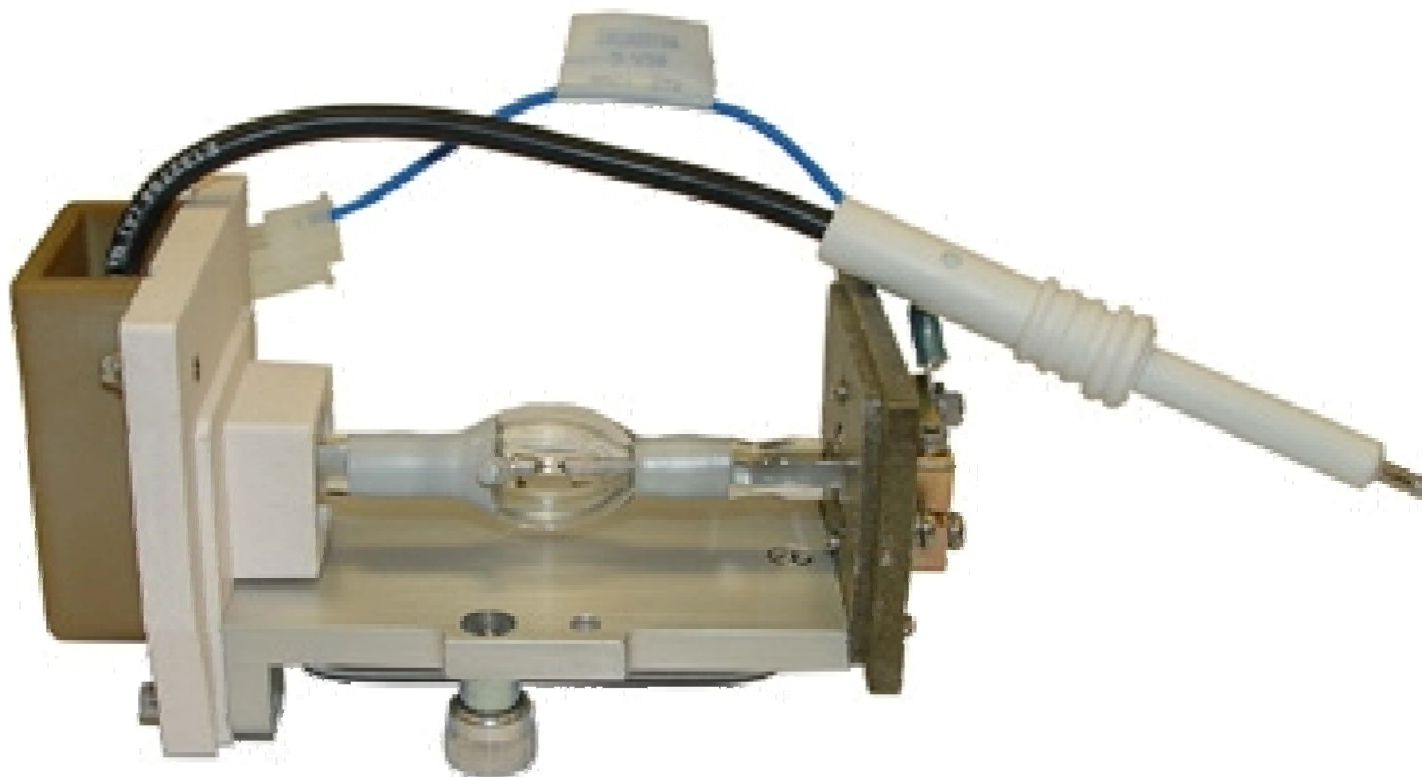
Warning: The lamp housing gets extremely hot during operation. To prevent burn injuries,

- allow the lamp to cool for 60 minutes before removing it.
- keep the lamp in the housing when handling the lamp.



Warning: To avoid eye injury from ultraviolet radiation exposure,

- power-off the detector before changing the lamp.
- wear eye protection that filters ultraviolet light.
- keep the lamp in the housing during operation.

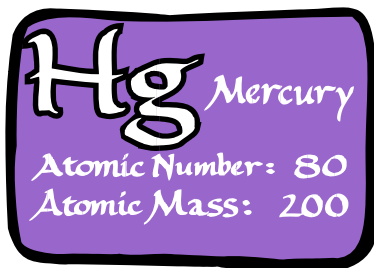


Mercury Xenon Lamp Warranty

- It offers two advantages over the Xenon
 - Provides better intensity
 - Provides sharp, distinct mercury lines for calibration and verification
- Life testing has shown useable lamp life beyond 2000 hours
 - Due to lamp vendor limitations, lamp warranty is limited to 1000 hours or one year.

Mercury Xenon Lamp Disposal

Local regulations must be followed to properly dispose of the lamp due to the addition of mercury.



Warning:

- Lamp gas is under positive pressure. To prevent shattering the glass, use care when disposing of the lamp. Waters suggests that you adequately cushion an old lamp by containing it in the packaging of its replacement before you dispose of it.
- The lamp contains mercury. Do not dispose of the lamp in municipal waste. Refer to your local environmental laws regarding disposal and recycling of lamps that contain mercury.



Caution: Do not touch the glass bulb of the new lamp. Dirt or fingerprints adversely affect detector operation. If the bulb needs cleaning, gently rub it with ethanol and lens tissue. Do not use abrasive tissue. Do not apply excessive pressure.

Mercury Xenon Lamp Power Supply

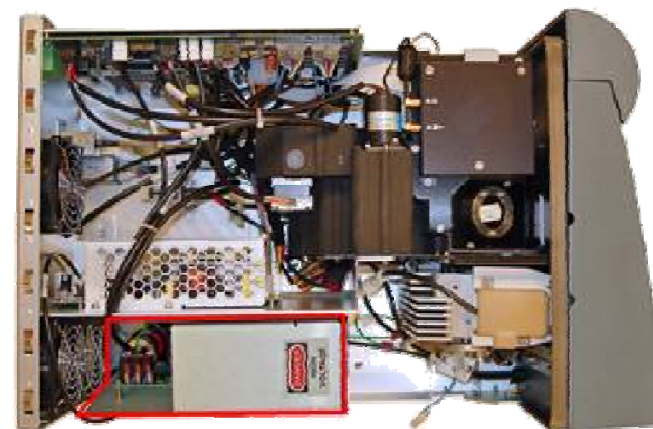


Lamp Power Supply



Warning: To avoid electrical shock:

- Use power cord SVT-type in the United States and HAR-type (or better) in Europe. For other countries, contact your local Waters distributor.
- Power-off and unplug the detector before performing any maintenance on the instrument.
- Connect all components of the ACQUITY UPLC system to a common ground.

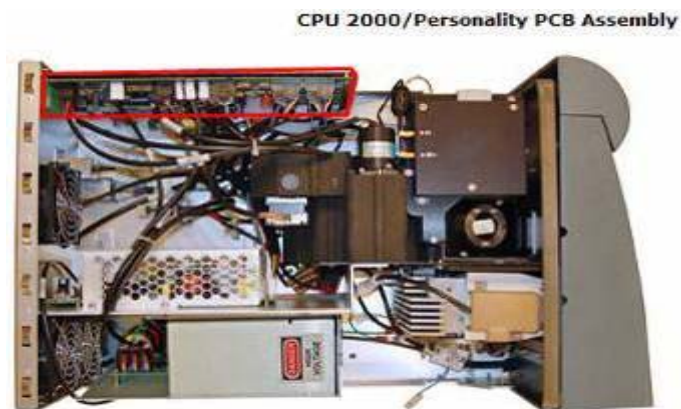


Mercury Xenon Lamp PS

- New lamp Power Supply.
- The lamp power supply is now backwards compatible with the 2475 detector with any firmware.
- The same safety concerns as 2475 Lamp Power Supply
 - Do not remove the board from the bracket if replacement is required.
- Part Number 700004124

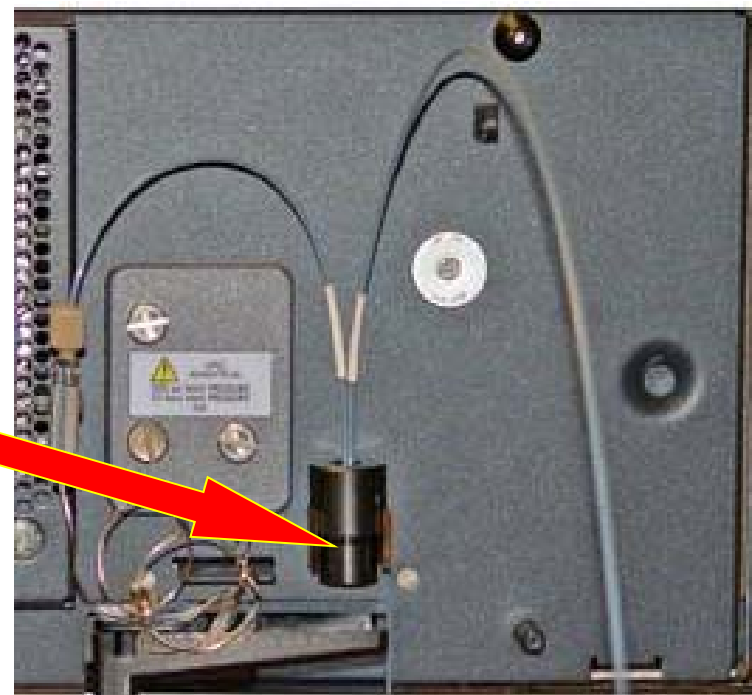
New Personality Board

- A new personality board has been created for the ACQUITY UPLC[®] FLR Detector.
 - Part Number 70000392
- Data rates of 80hz can be achieved
 - but increased noise is likely above 20hz.
- This personality board is also backwards compatible with the 2475 detector, but has to have V2.02 on CPU2000.

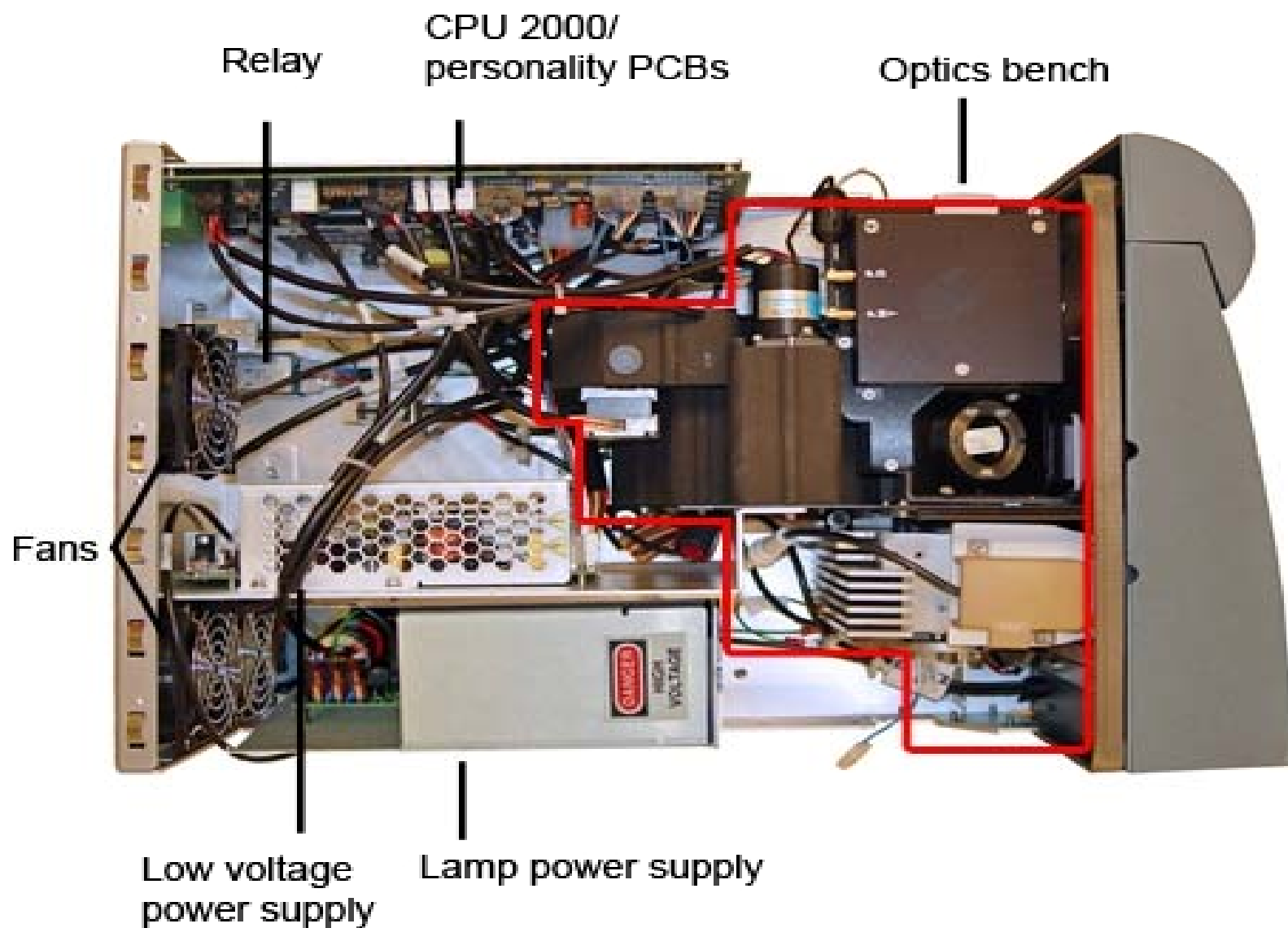


Backpressure Regulator

- The ACQUITY UPLC® FLR Detector is shipped with a 250PSI Backpressure Regulator.
- The Backpressure Regulator should be installed at startup
 - The ACQUITY FLR Detector should be the last detector in the system due to backpressure limitations of the flow cell.
- The backpressure rating for the ACQUITY UPLC® FLR flow cell is 500 PSI.



ACQUITY UPLC® FLR Detector Layout



ACQUITY UPLC® FLR Detector Chassis

- The ACQUITY UPLC® FLR Detector makes full use of the entire chassis width.
- Full chassis width eliminates the need for a side filler panel.
 - Allows better isolation of internal radiated emissions.
 - Provides more space for repairs or replacements.

Low Voltage Power Supply



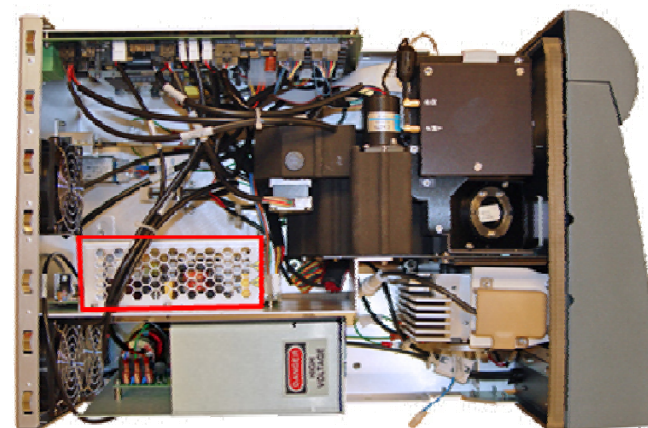
+5 Vdc @ 12A	Pins 1, 2, 3
+24 Vdc @ 3.5A	Pins 8, 9
-12 Vdc @ 1A	Pin 11
+12 Vdc @ 2A	Pin 13



Warning: To avoid electric shock:

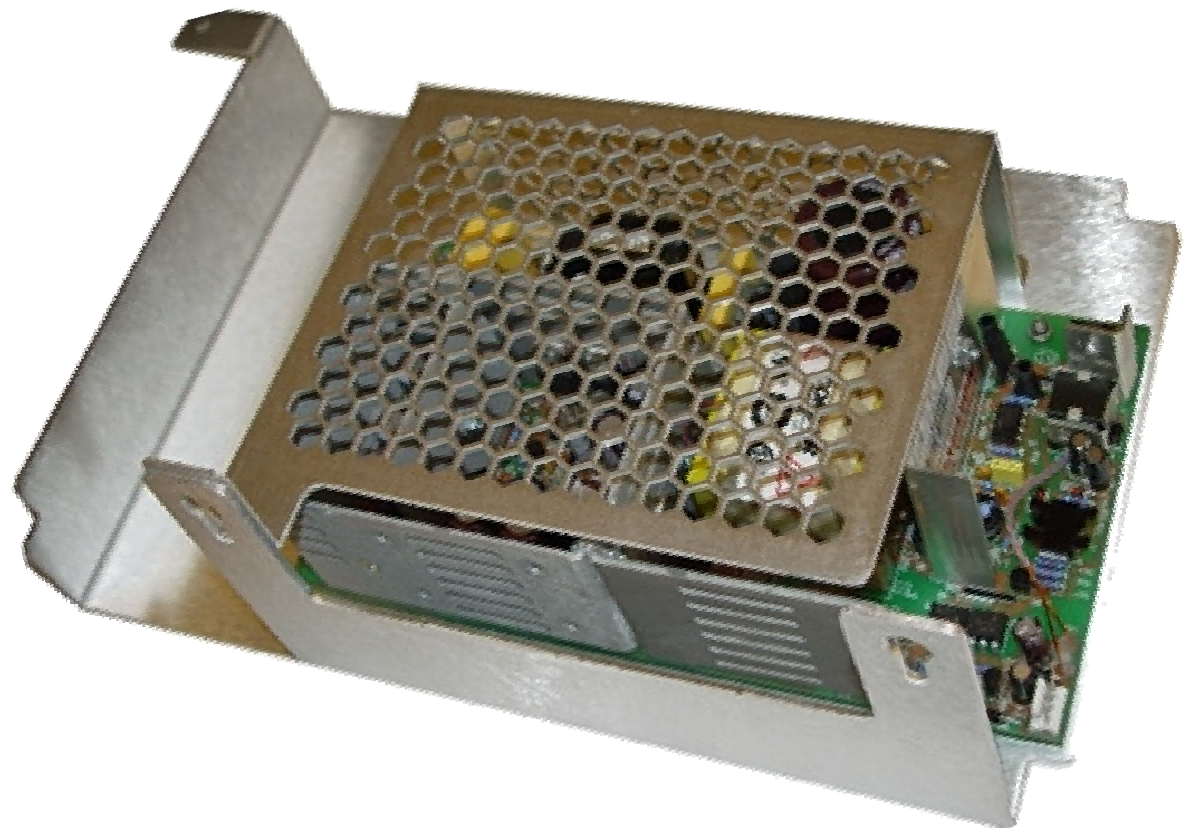
- Do not open the detector cover. The detector does not contain user-serviceable components.
- Power-off and unplug the detector before performing any maintenance on the instrument.

DC Power Supply

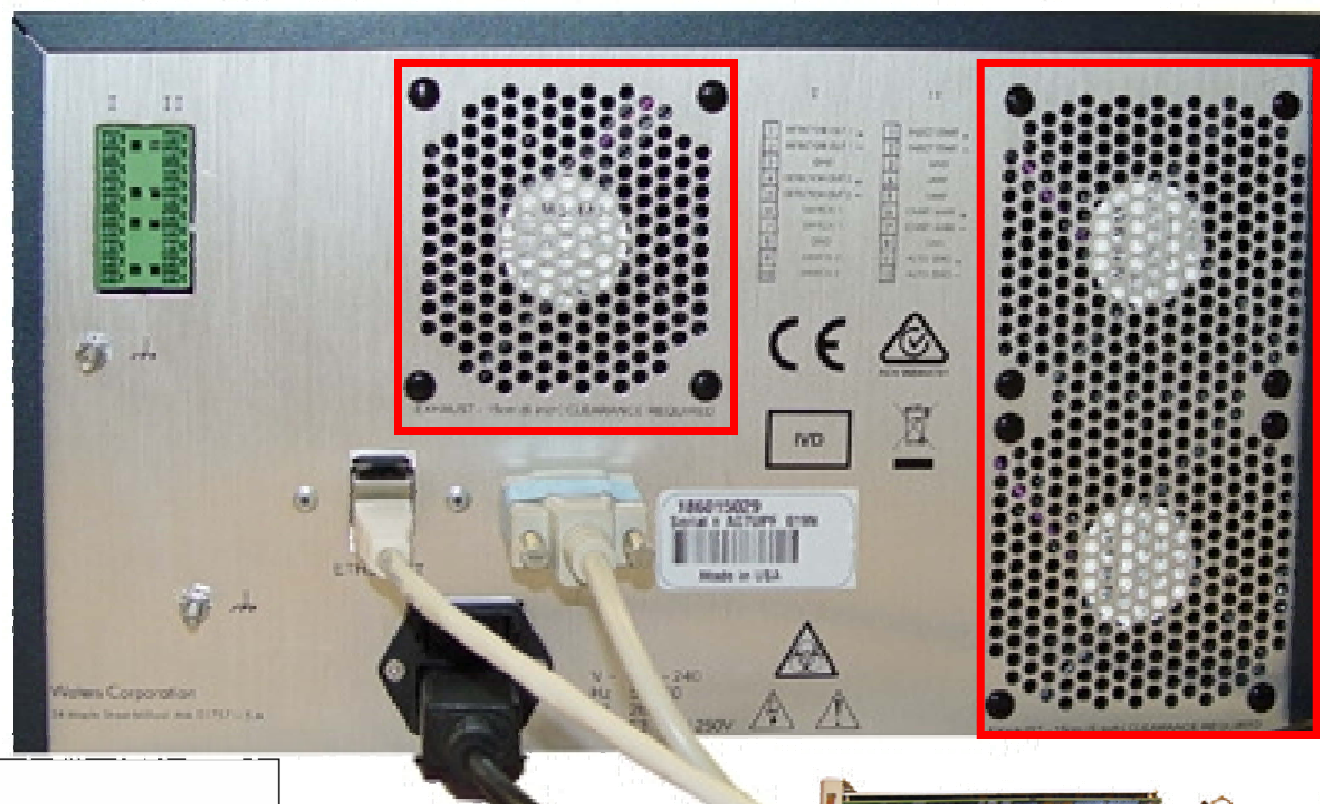


LVPS

- A new guard cage has been added to prevent accidental contact.
 - Whenever the detector is powered on, live AC voltage is present on the rear heat sink.

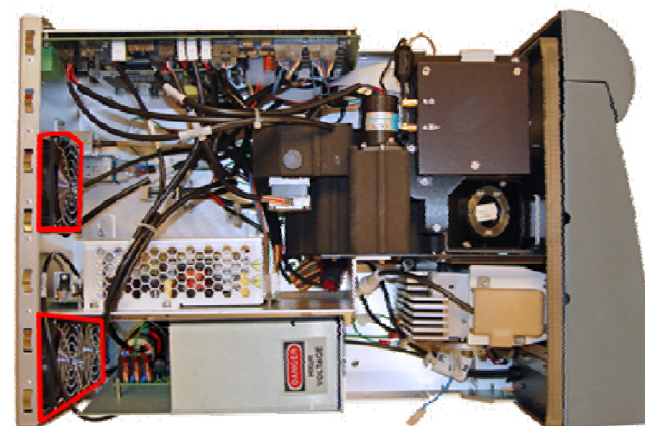


Rear Panel Fans



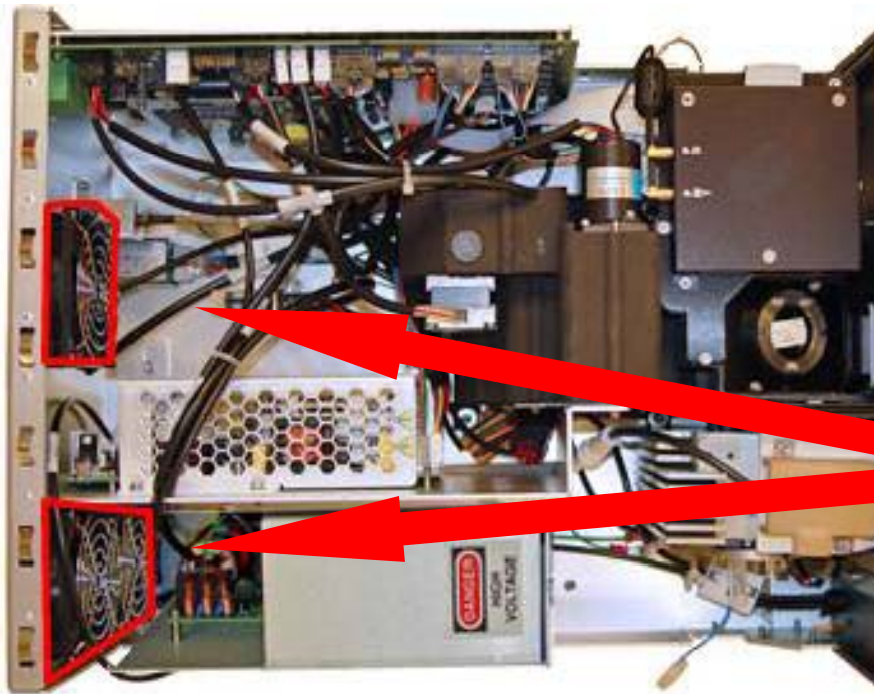
Fan, 24 VDC

Symbol	Definition
	Authorized representative of the European Community
	Confirms that a manufactured product complies with all applicable European Community directives
	For in vitro diagnostic use



Rear Panel

- It is important to remind the customers at startup the need for a minimum of 6 inches clearance for the rear panel.
 - In order for the 3 fans to dissipate heat generated by the lamp and electronics, maintaining the clearance is essential.



- It is recommended the interior of the detector be cleaned of any excess dust at each PM.

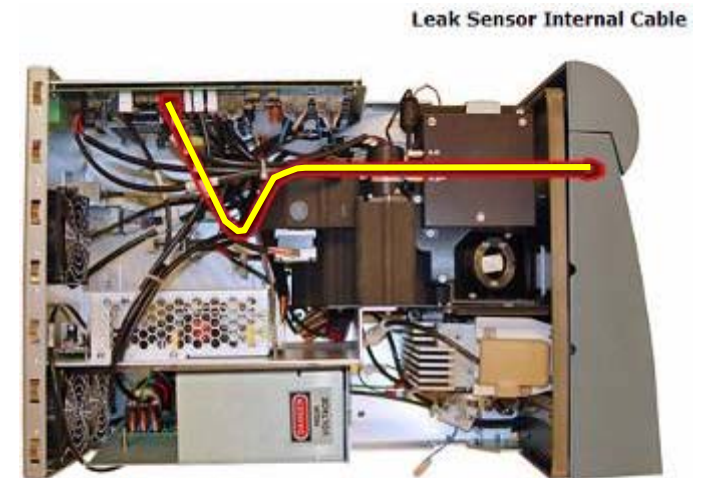
**Proper fan operation
should be verified.**

Leak Sensor



- The leak sensor internal connections are available in all the ACQUITY UPLC® FLR Detectors.

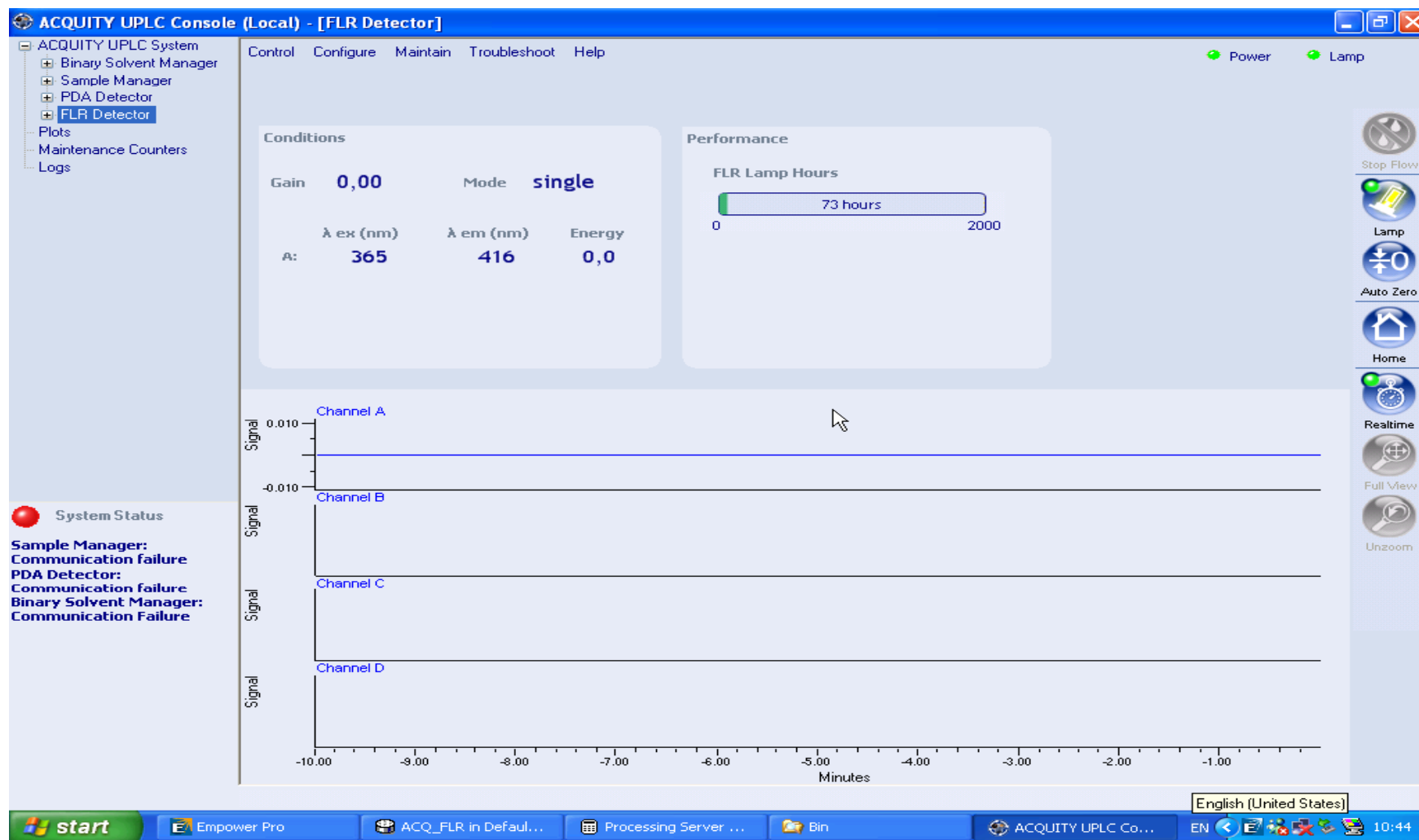
- The leak sensor made available during Q2 2007.
- The current plan is that the programming required for the operation of the leak sensor will be included in ICOP revision 1.3.



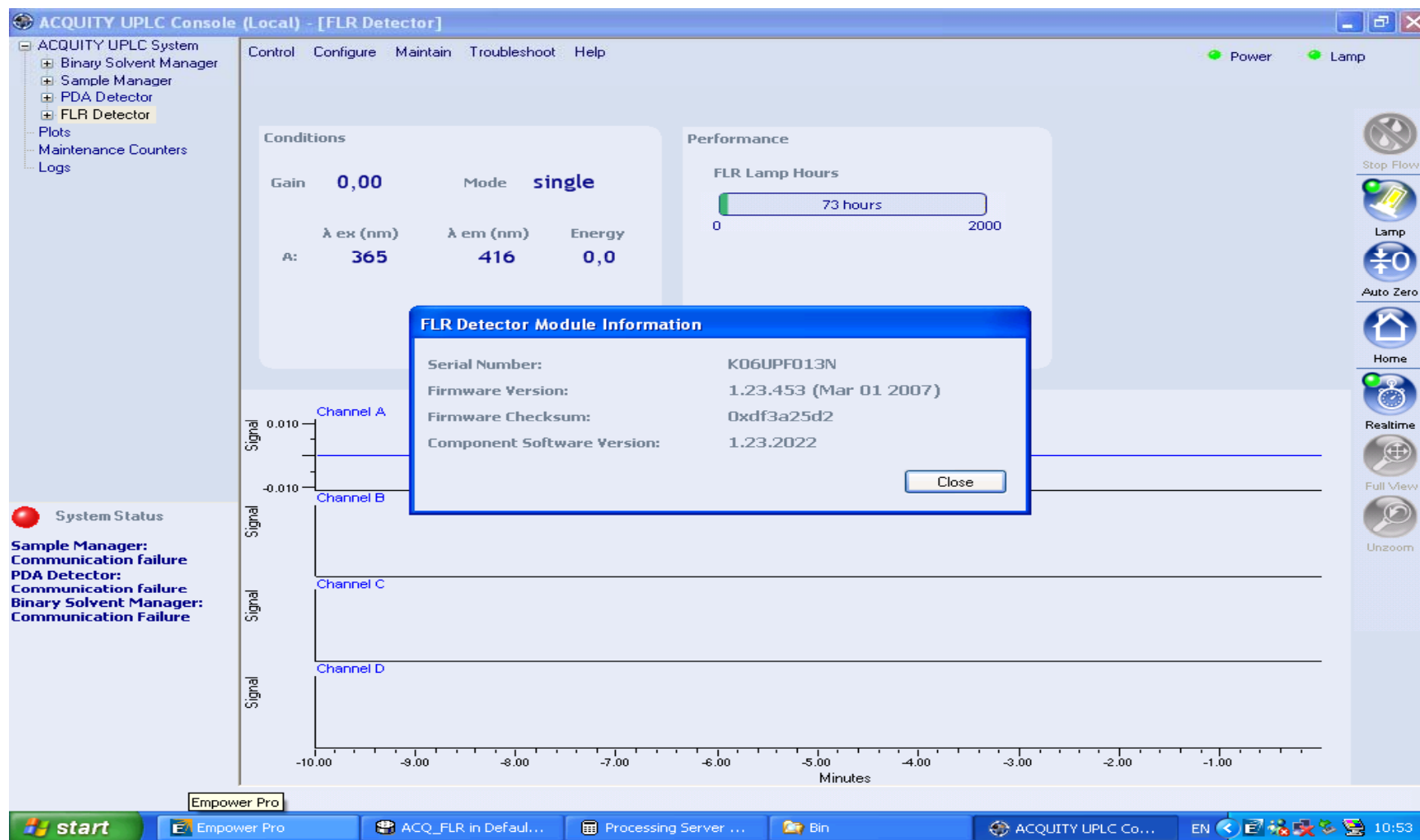
Detector Console Operation

ACQUITY UPLC® FLR Detector console screen captures

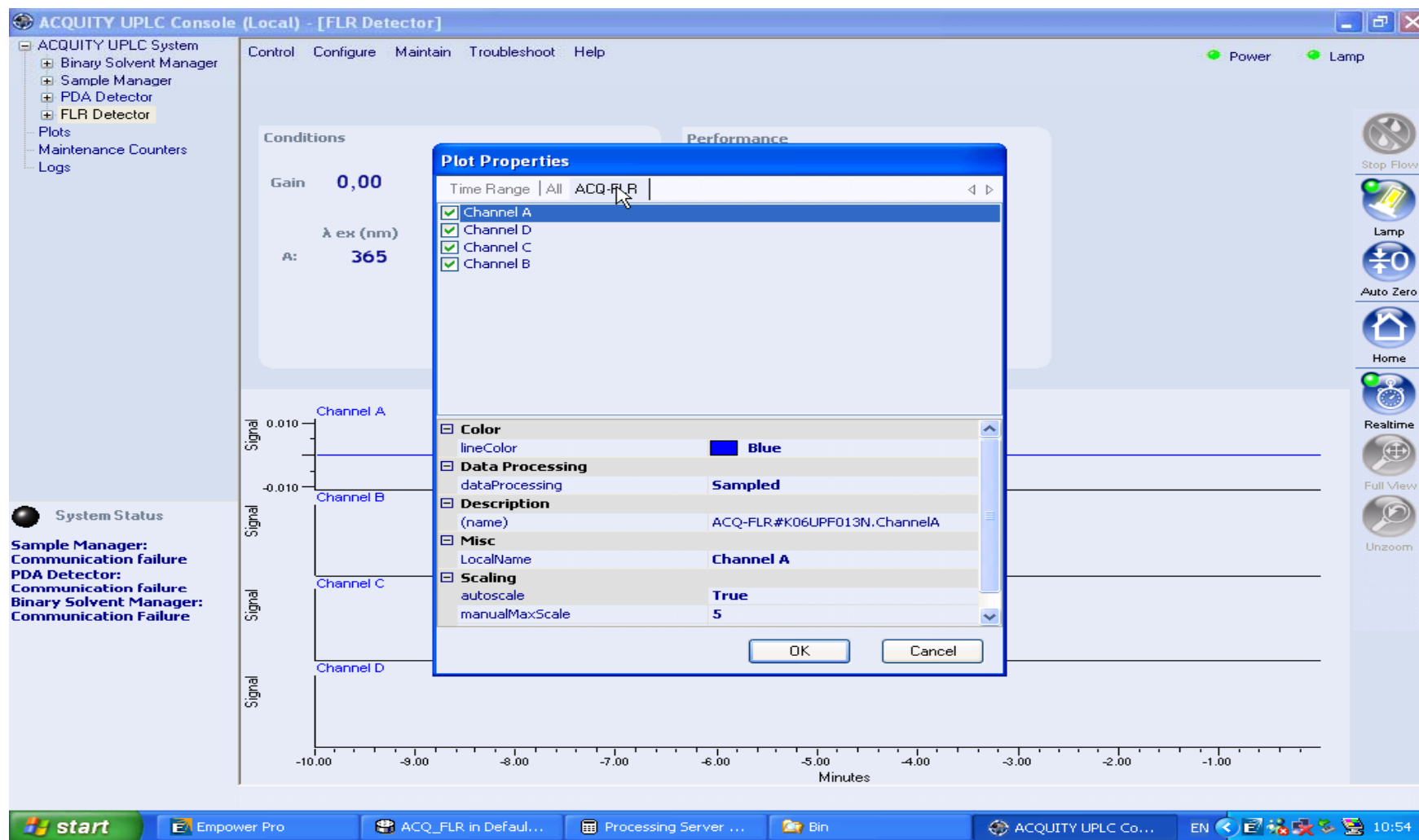
ACQUITY UPLC® FLR Detector – Main Page



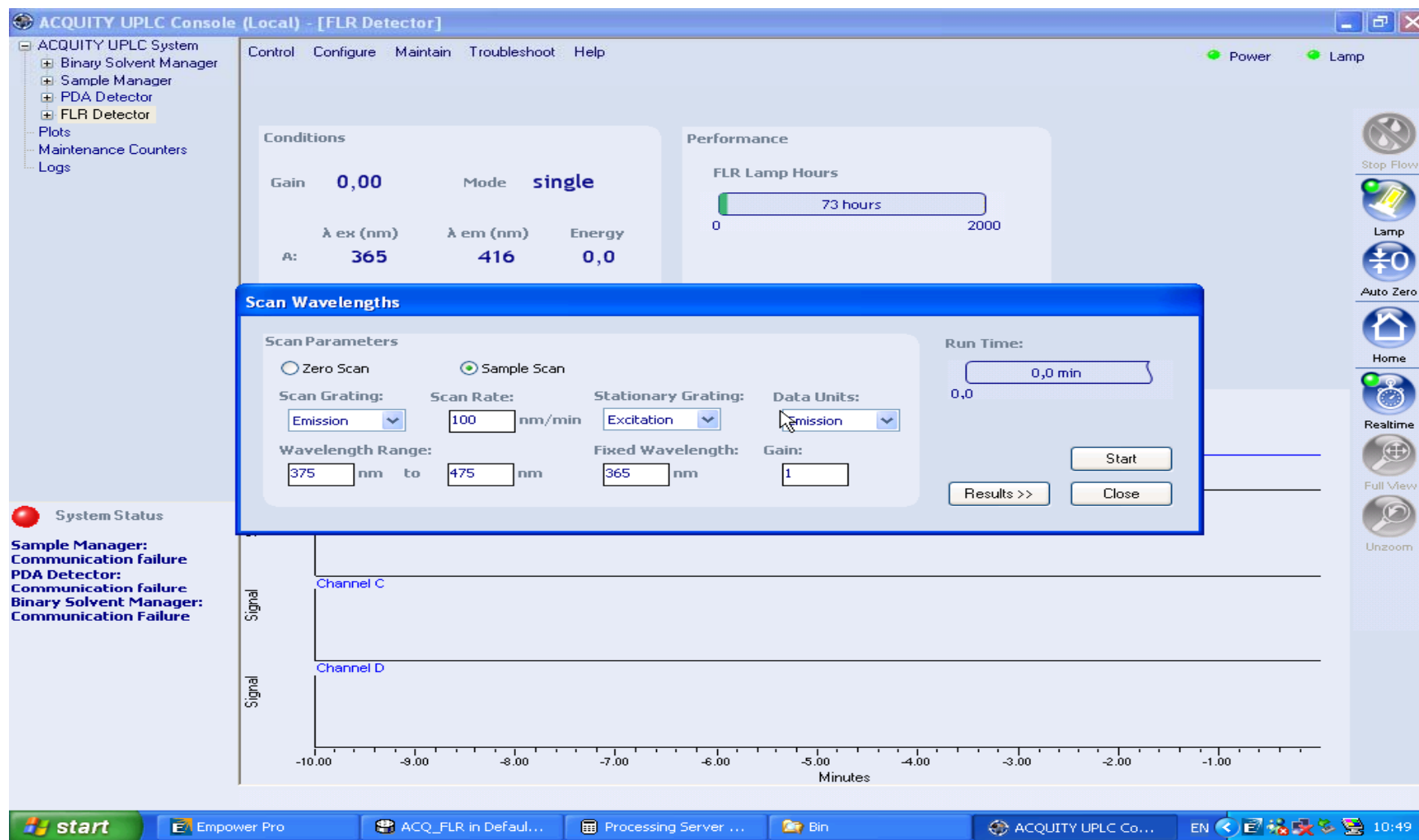
ACQUITY UPLC® FLR Detector – Module Info



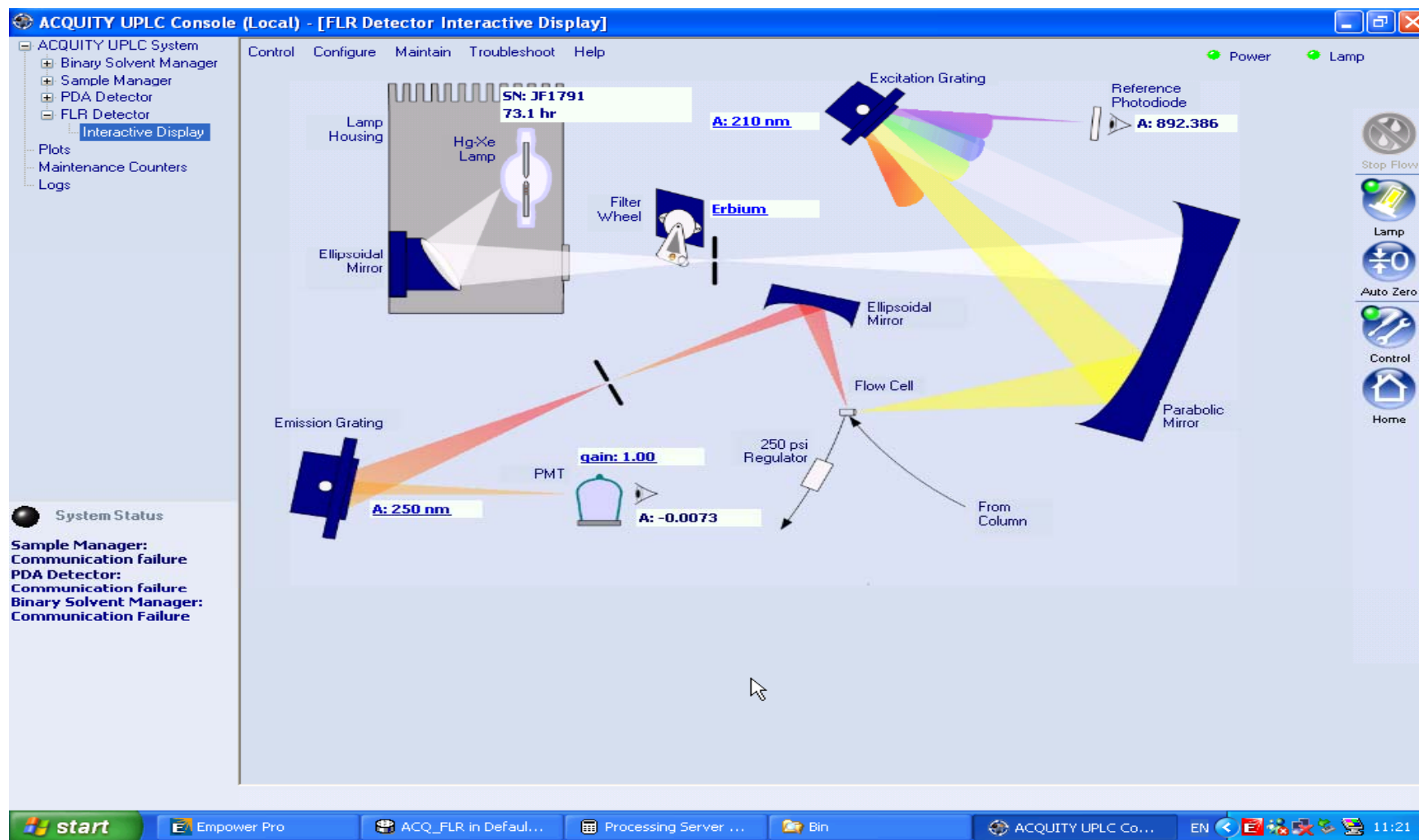
ACQUITY UPLC® FLR Detector Plot Properties



ACQUITY UPLC® FLR Detector Scans



ACQUITY UPLC® FLR Detector – Interactive



ACQUITY UPLC® FLR Detector – Change Lamp

ACQUITY UPLC Console (Local) - [FLR Detector]

Control Configure Maintain Troubleshoot Help

Power Lamp

Conditions

Gain 0,00 Mode single

λ ex (nm)

A: 365

Performance

FLR Lamp Hours

Change Lamp

Currently Installed Lamp

State: On

Good ignitions: 19

Total ignitions: 19

Date Installed	Serial Number	Hours
01/03/2007	new 3_1_07	35
06/03/2007	JF1791	72

New Lamp... Print... Close

Channel A

Channel B

Channel C

Channel D

Signal

Signal

Signal

Signal

Minutes

System Status

Sample Manager: Communication failure

PDA Detector: Communication failure

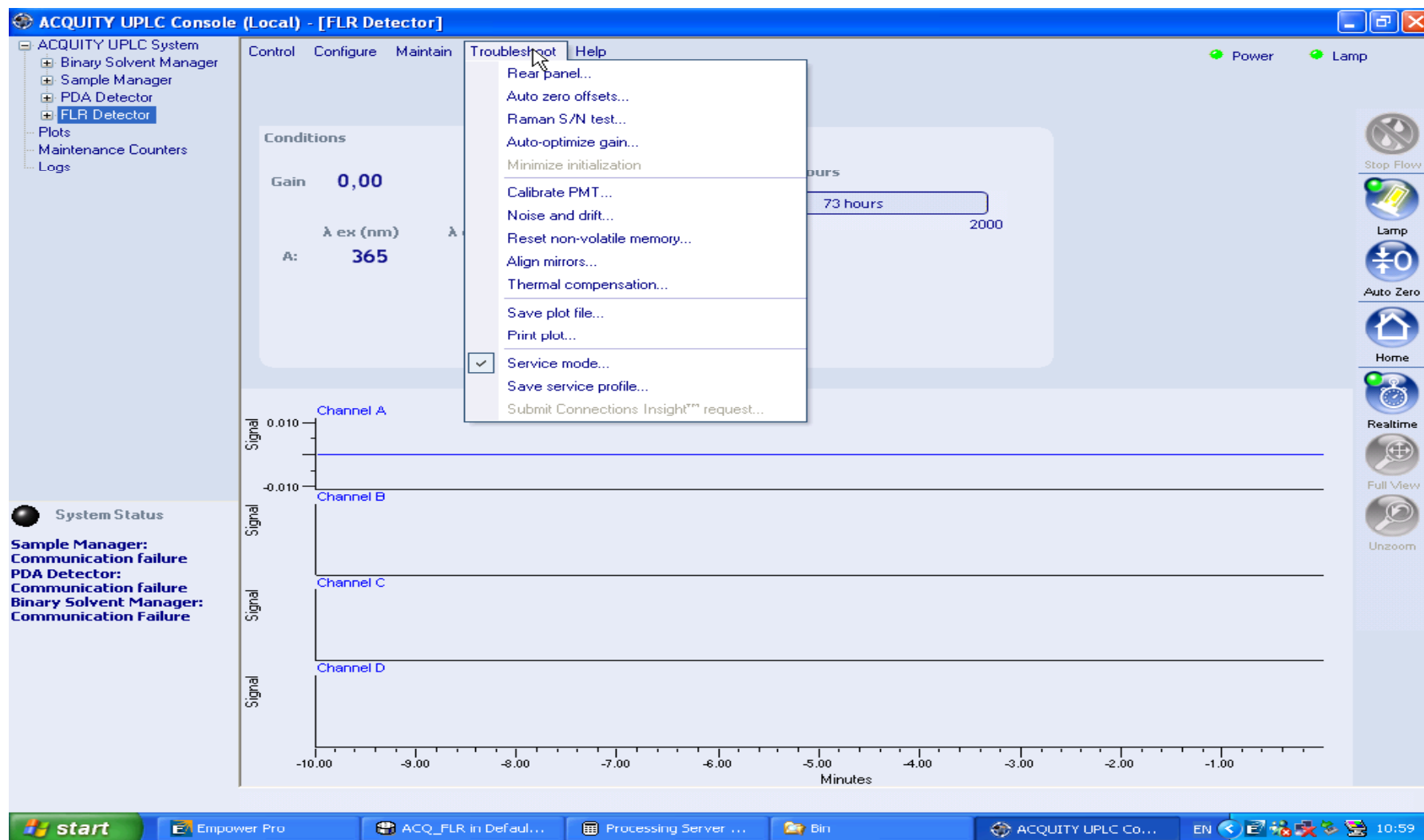
Binary Solvent Manager: Communication Failure

start Empower Pro ACQ_FLR in Defaul... Processing Server ... Bin ACQUITY UPLC Co... EN 10:56

ACQUITY UPLC® FLR Detector

Service level diagnostics console screens

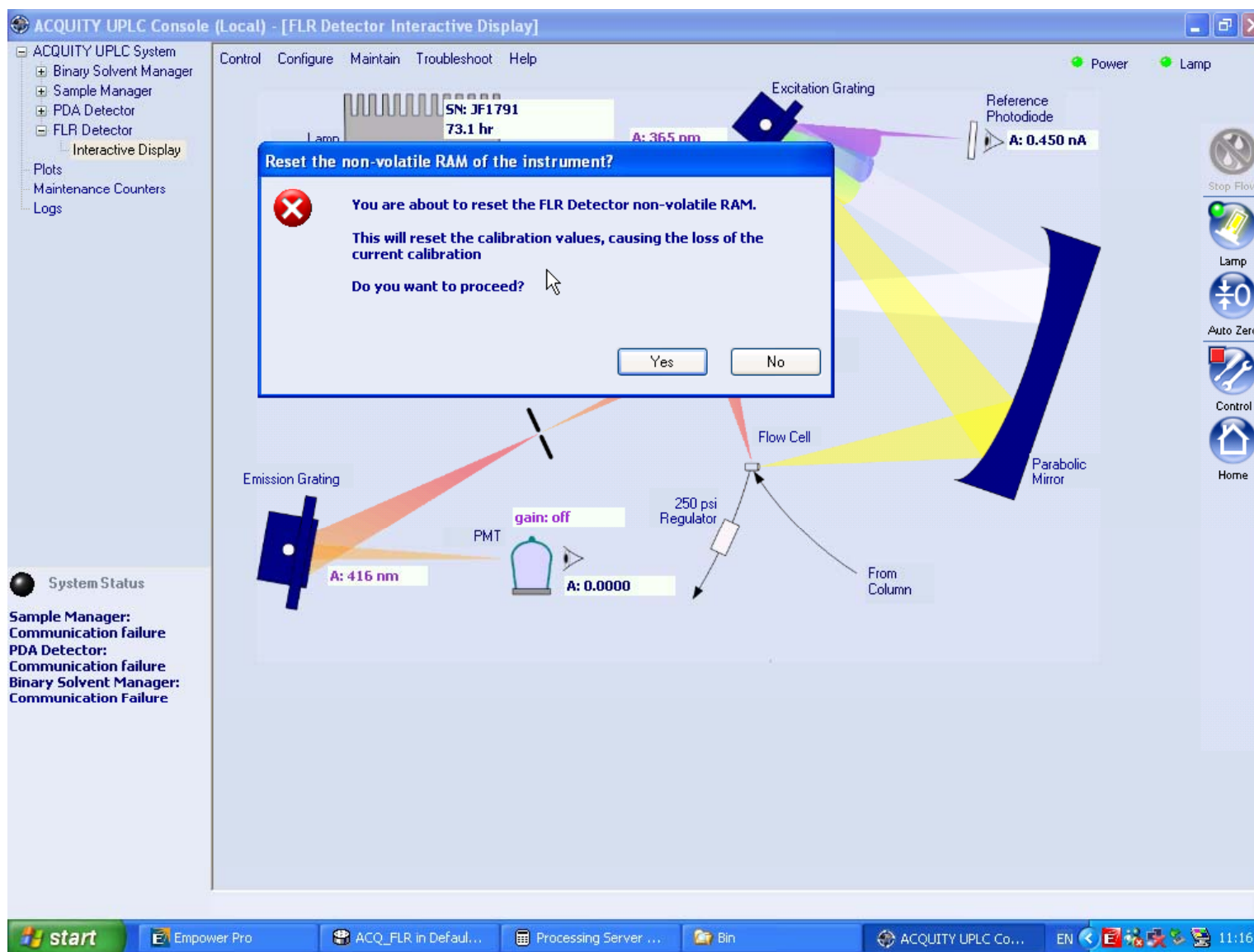
ACQUITY UPLC® FLR Detector – Troubleshoot



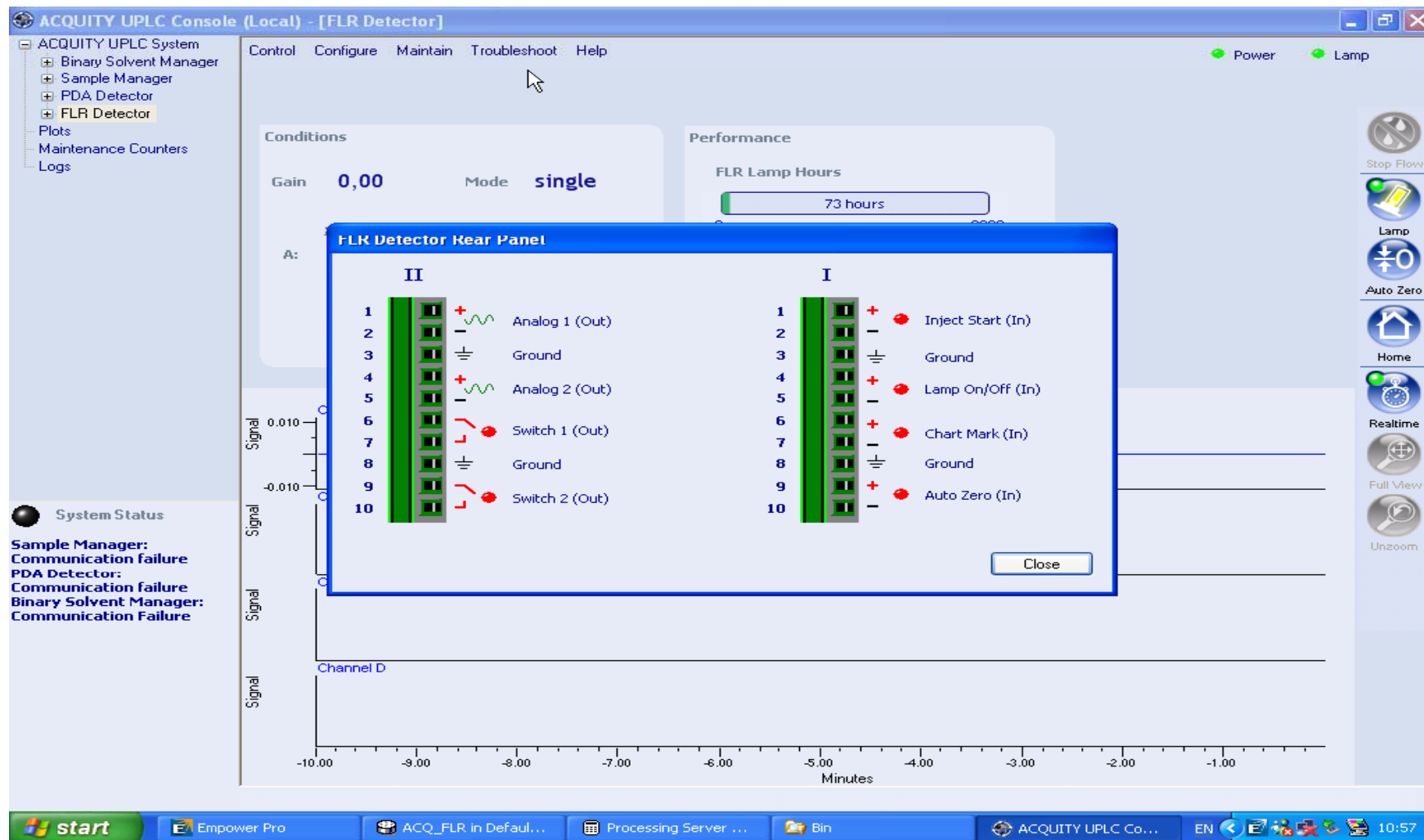
ACQUITY UPLC® FLR Detector – NV-RAM

- Resetting the non-volatile RAM parameters will delete the Calibration, PMT Calibration and the Normalize Units values.
 - To restore these values run, in order:
 - The calibration routine
 - PMT calibration
 - The normalize units diagnostic
 - The normalize units must be performed even if the customer does not plan to run in emission units mode.
- It is also advisable to run the Raman S/N diagnostic after restoring the values.
 - Specification for Raman S/N is greater than 1000.

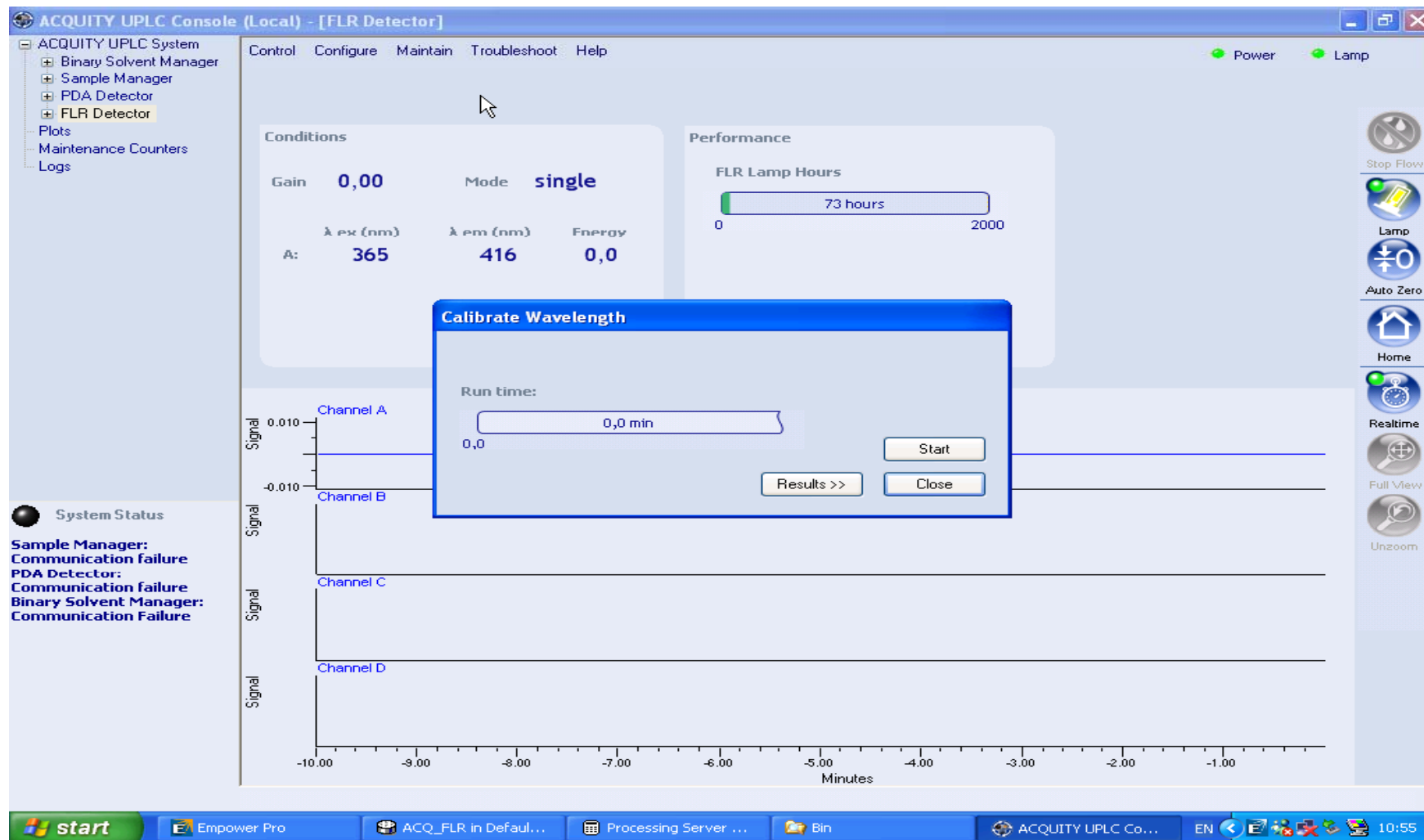
ACQUITY UPLC® FLR Detector – Reset Error



ACQUITY UPLC® FLR Detector – Rear Panel

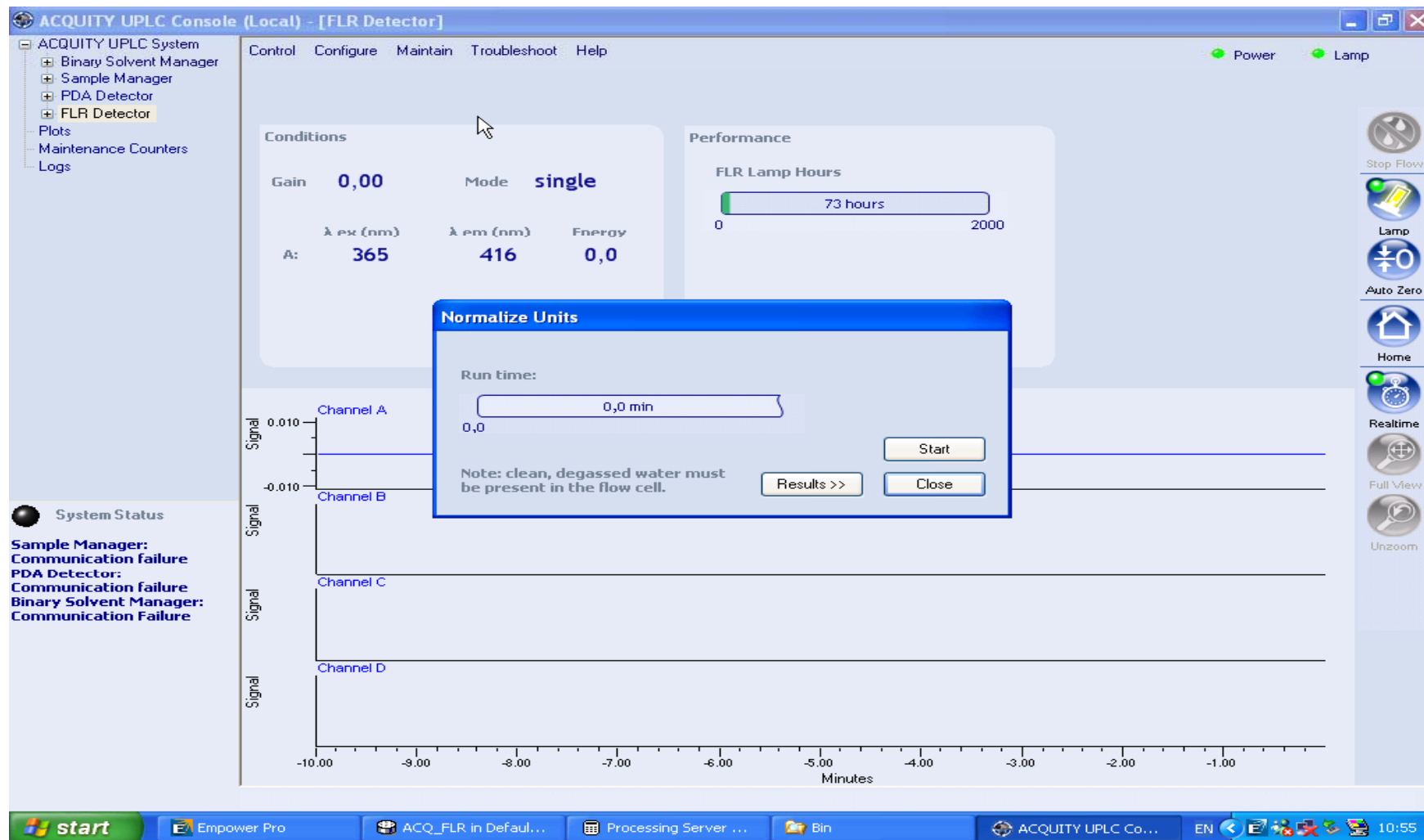


ACQUITY UPLC® FLR Detector – Calibrate

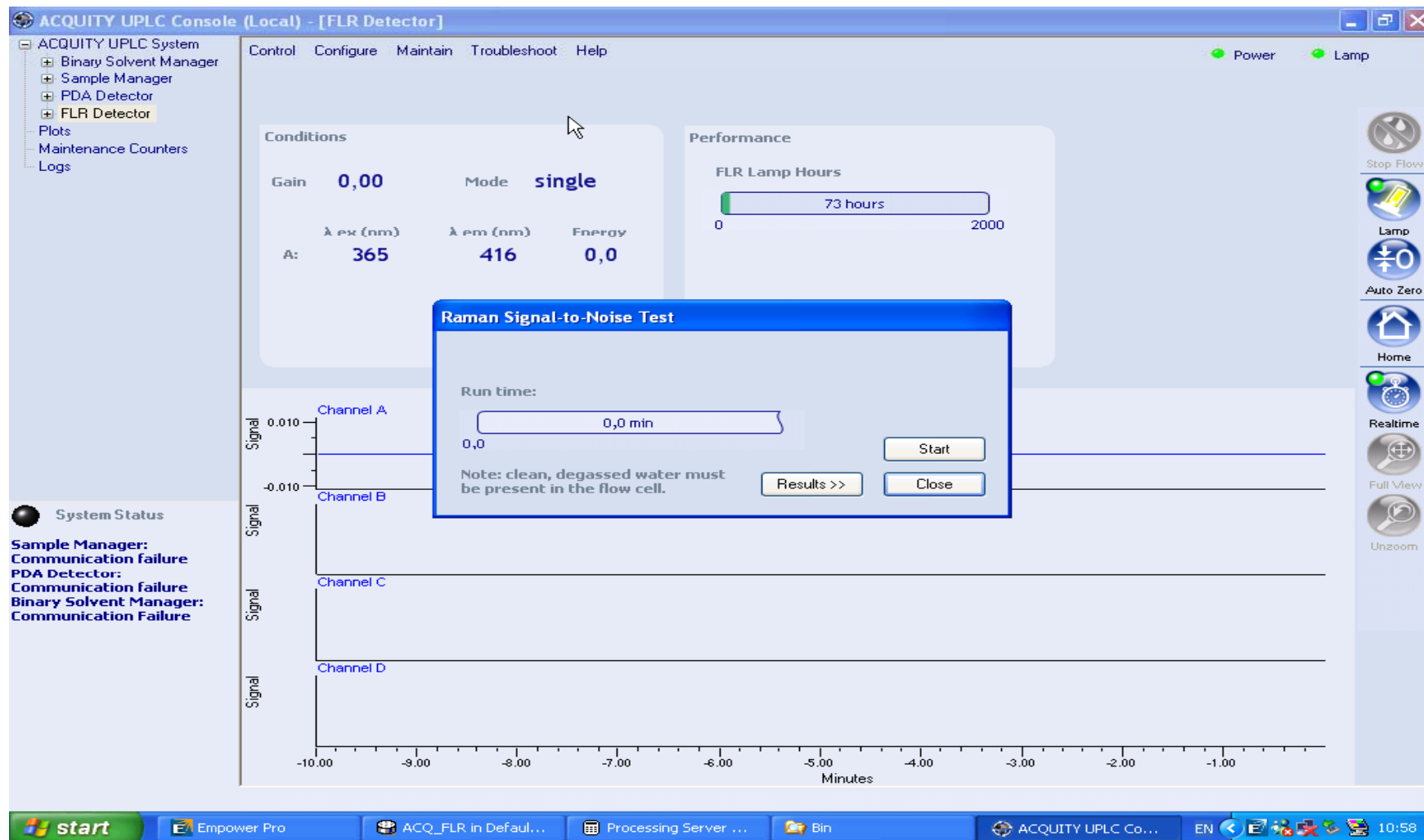


ACQUITY UPLC® FLR Detector – Normalize

Normalize Units Wavelength should = 416nm + / - 3nm



ACQUITY UPLC® FLR Detector – Raman S/N Test



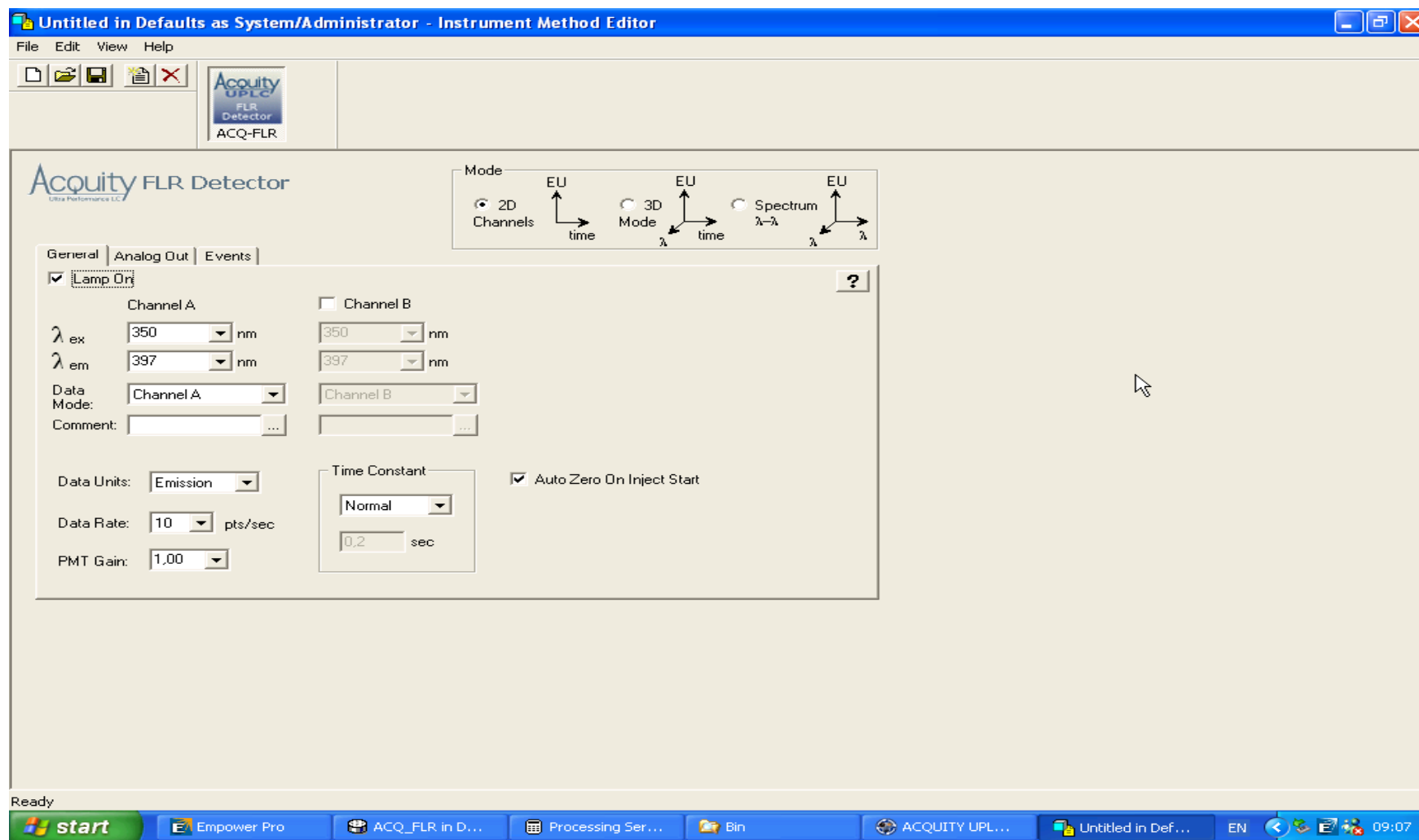
ACQUITY UPLC® FLR Detector

Empower Instrument Editor

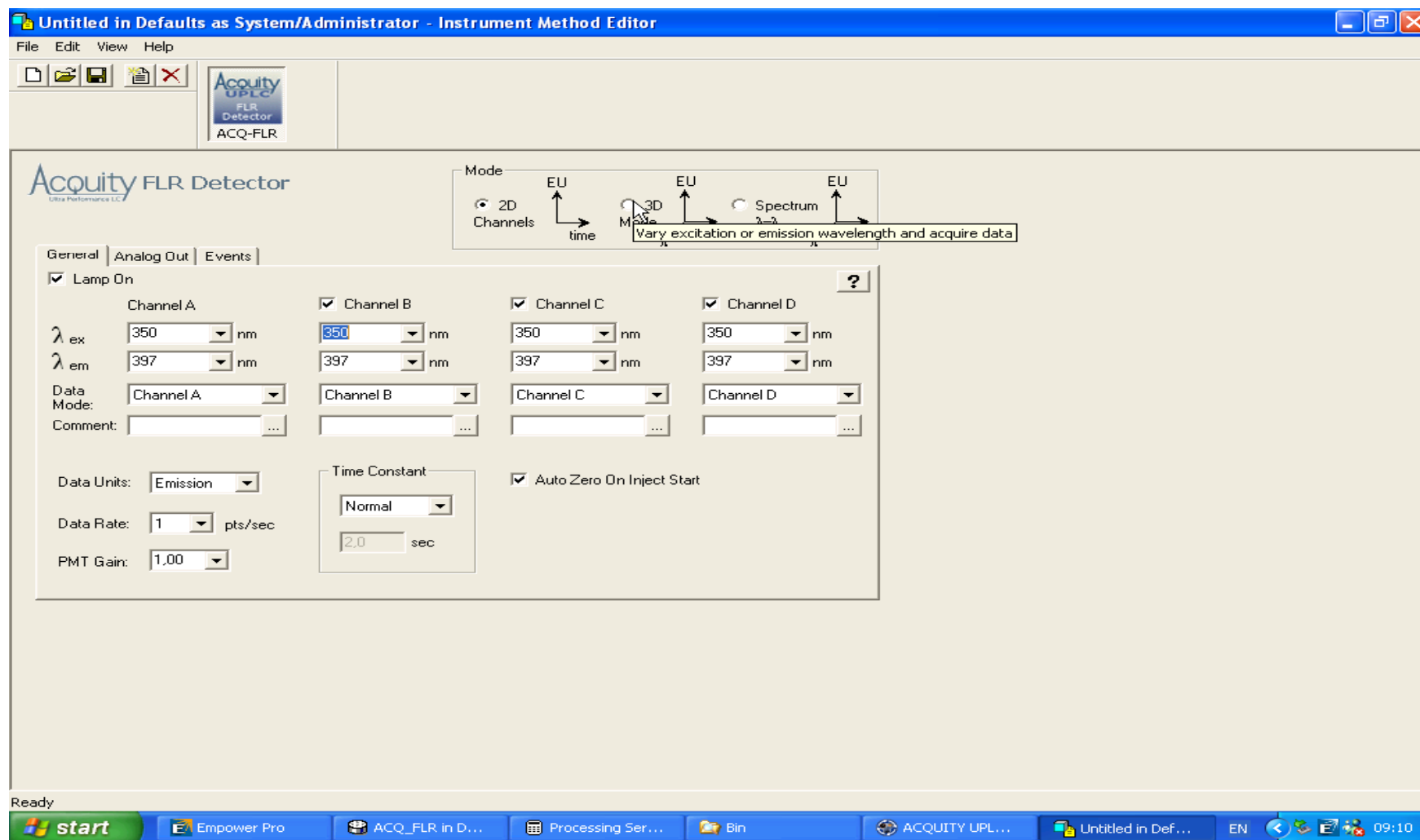
ACQUITY UPLC® FLR Detector

- The Instrument Editor for Empower screen captures.
- There are three modes of operation
 - 2D Mode with up to 4 channels
 - (additional channels become available when the preceding channel is enabled).
 - 3D Mode
 - Spectrum Lambda/Lambda
 - Useful for scanning unknowns using the optional cuvette holder assembly to be released in 3Q 2007.

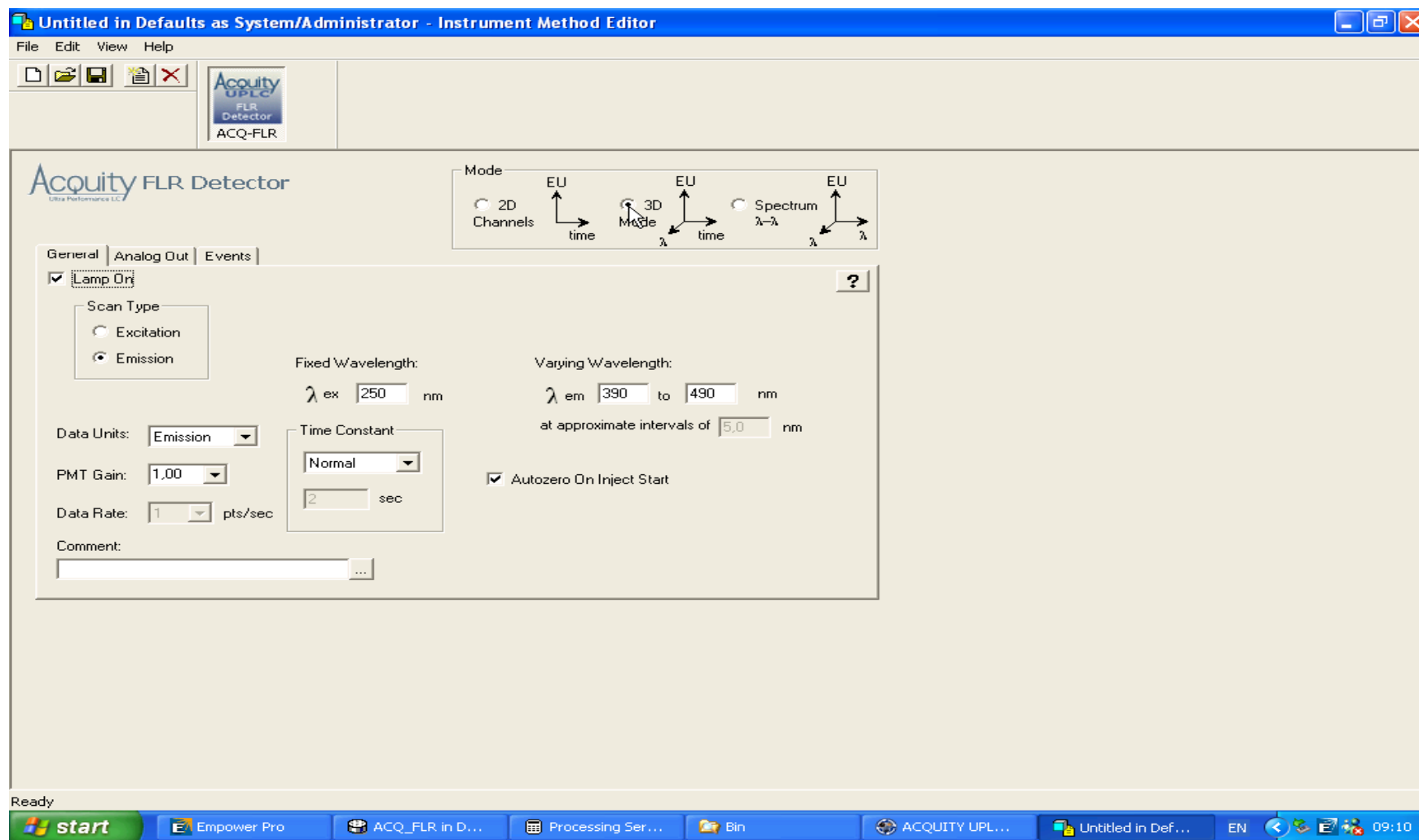
ACQUITY UPLC® FLR Detector – Instrument Method



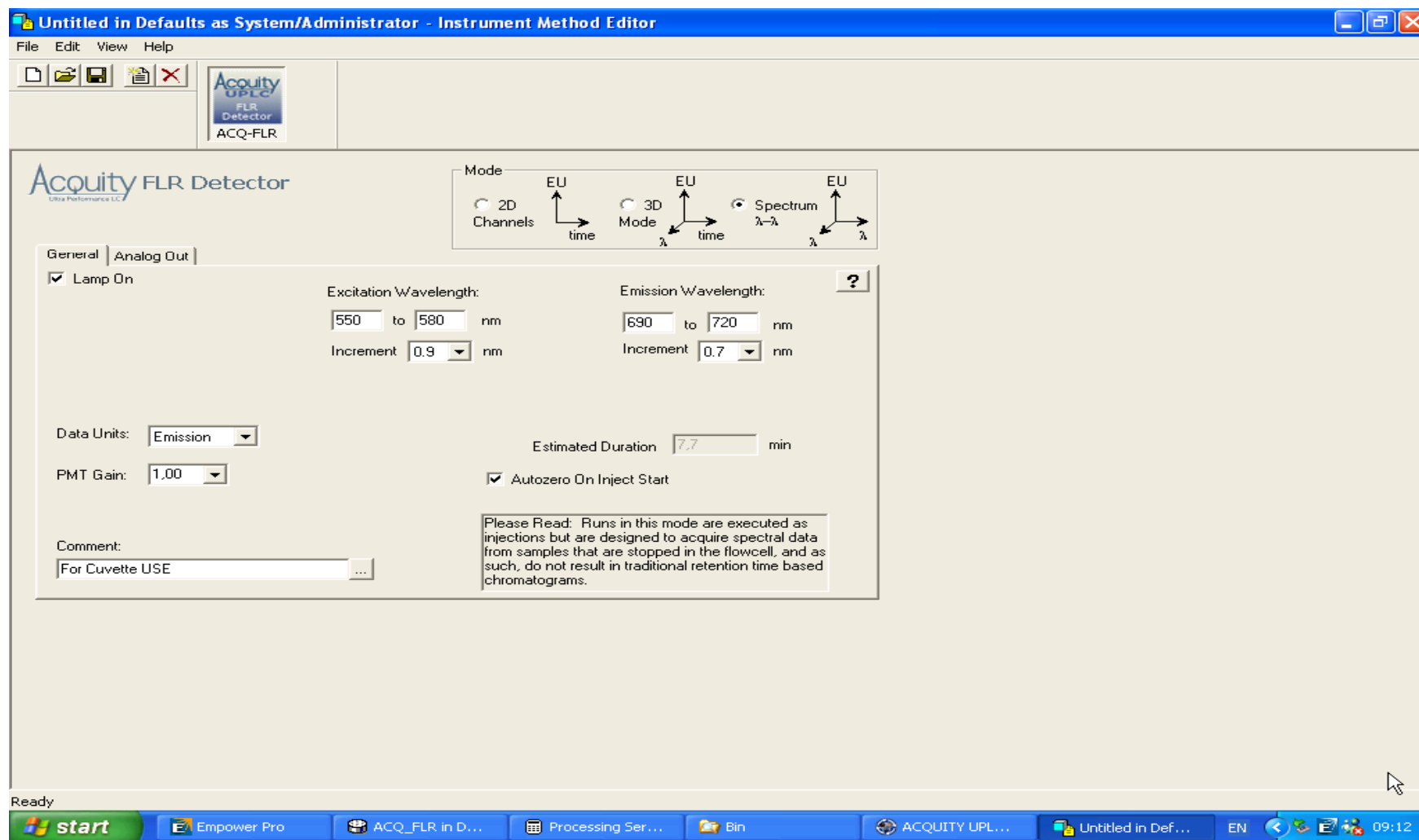
ACQUITY UPLC® FLR Detector – 2D



ACQUITY UPLC® FLR Detector – 3D Mode



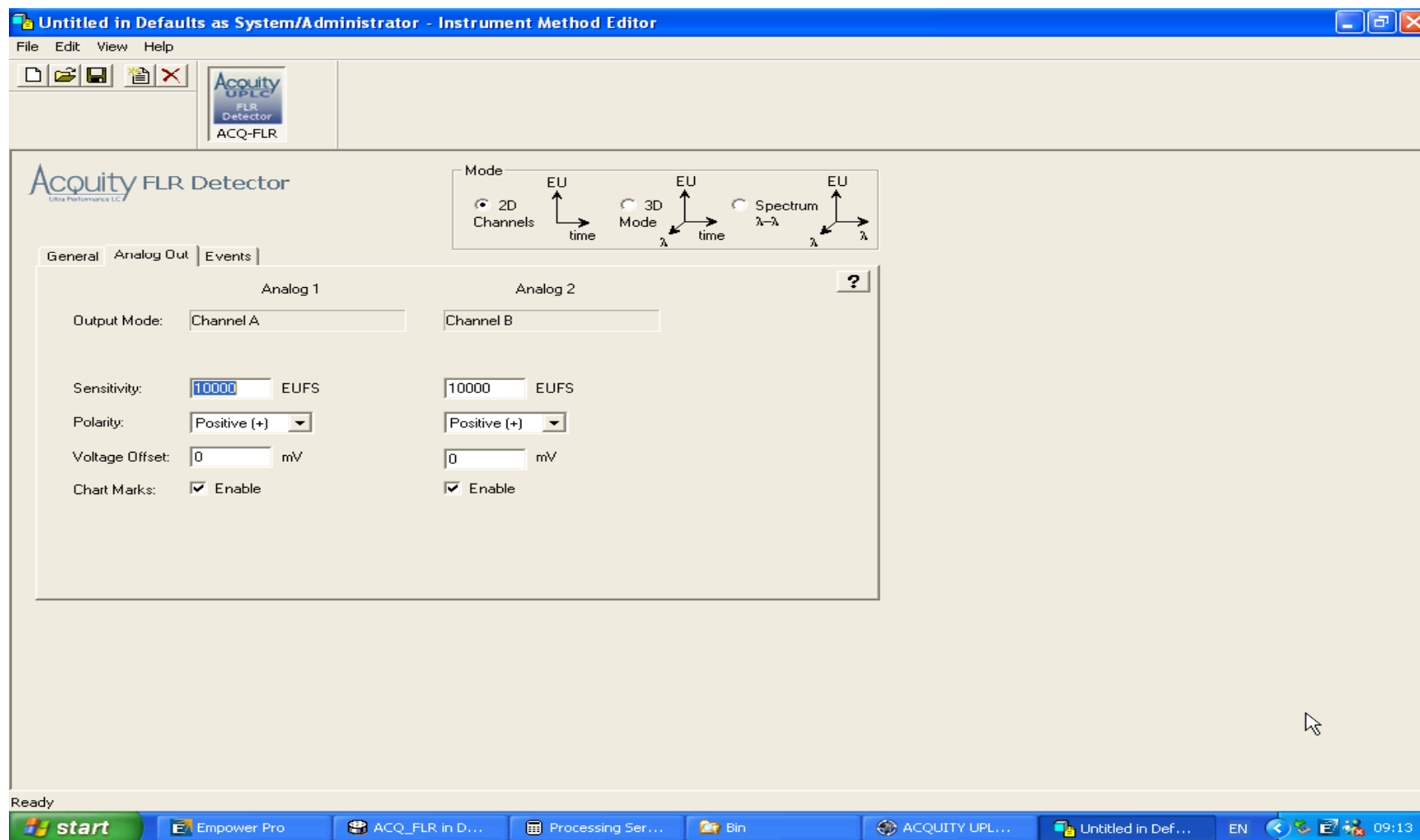
ACQUITY UPLC® FLR Detector - Spectrum Mode



Cuvette Holder



ACQUITY UPLC® FLR Detector – Analog Out



ACQUITY UPLC® FLR Detector – Events Tab

Untitled in Defaults as System/Administrator - Instrument Method Editor

File Edit View Help

Acquity UPLC
FLR Detector
ACQ-FLR

Acquity FLR Detector
Ultra Performance LC

Mode

2D Channels EU time
3D Mode EU time
Spectrum EU λ - λ

General | Analog Out | Events

Threshold Events

Switch 1 (Channel A) Off 100,0
Switch 2 (Channel B) Off 100,0

Auto Zero on Wavelength or Gain Changes: Maintain Baseline

Run Events

	Time (min)	Event	Parameter	Channel
1				
2				
3				
4				
5				
6				
7				
o				

Ex Wavelength
Em Wavelength
PMT Gain
Chart Mark
Auto Zero
Lamp
Switch 1
Switch 2
Threshold

Pulse Periods

Rect Wave Period (at 50% Duty Cycle): 0,2 sec
Pulse Width: 1,0 sec

Ready

start Empower Pro ACQ_FLR in D... Processing Ser... Bin ACQUITY UPL... Untitled in Def... EN 09:13

Summary

- ACQUITY UPLC® FLR Detector
- ACQUITY UPLC® FLR Flow Cell
- Mercury-Xenon Lamp
 - Mercury Xenon Lamp Power Supply
- New Personality Board
- Backpressure Regulator
- Low Voltage Power Supply
- Leak Sensor
- Detector Console Operation
- Empower Instrument Editor
- Cuvette Holder

