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Bruker Elemental

X-Ray Ops

User Guide

For use with Tracer III-V^{+}, Tracer III-SD and Tracer IV-SD

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Introduction

The Tracer analysis programs on the PC require preset voltage and current settings (six are stored in the instrument memory). The program ***X-Ray Ops*** is used to set and optimize these settings. In addition to selecting voltage and current settings, X-Ray Ops also provides pulse length and beam filter preset options for each of the voltage and current settings. Once the preset is completed, each new voltage/current and filter setting should be checked using the procedure defined on page 6, *Checking X-Ray Tube Setup and Count Rates with PXRF Program.*

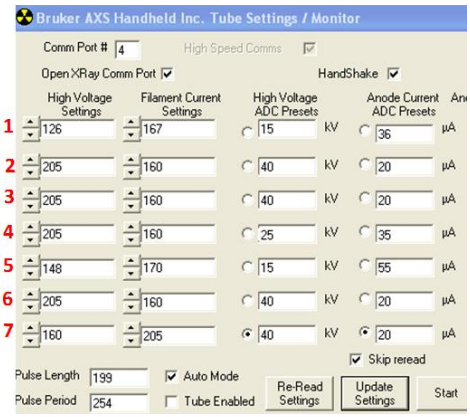


Figure 1. Tube Settings, Lines 1-7

Use X-Ray Ops to set the values for voltage, current, filter and pulse length for a particular application. It is recommended that you use line 2 for your custom configuration.

Line 7 is the active tube settings ONLY. When the Tracer is used with the PDA, starting a measurement will change the settings stored in Line 7. The tube settings must be stored in Lines 1 to 6 (as viewed from X-Ray Ops) to be used in PXRF. ***Line 7 will not be saved and can be overwritten.***

Using X-Ray Ops

Opening Communications

To open communications between the Tracer and the X-Ray Ops software stored on your computer, follow these steps:

1. **PLACE** the unit in a bench-top stand.
2. **REMOVE** the battery (if installed).
3. **PLUG** the AC Power supply into Power Connector located in the handle.
4. **PLACE** the opposite end of the Power supply into a power outlet that fits the range of the AC adapter.
5. **ENSURE** the unit's trigger is not activated.
6. **TURN** power on.
7. **ALLOW** the instrument to warm up for at least 60 seconds.
   a) If using the Tracer IV, **LISTEN** and **WAIT** for filter wheel to spin and initialize.
   b) If using the Tracer III, **ENSURE** that the correct filter is in place.
8. **CONNECT** the multi-pin (7-pin LEMO) connector from the download cable into the connector located on the instrument face below the PDA cradle.
   a) To connect, **ALIGN** red dot on the LEMO connector with the red dot on the instrument.

9. **CONNECT** the serial connector of the download cable into the serial port of the PC or into the serial-to-USB Adapter. Ensure that the USB end of the serial-to-USB Adapter is inserted into a USB port of the PC.
10. **START** X-ray Ops.
11. **ENTER** the appropriate Comm Port number (Figure 2 A).
12. **SELECT** *Hi Speed Comm* B.
13. **CLICK** *Open X-Ray Comm Port* C. The program will read the present settings from the instrument.
    a) If communication fails, **VERIFY** the com port number.

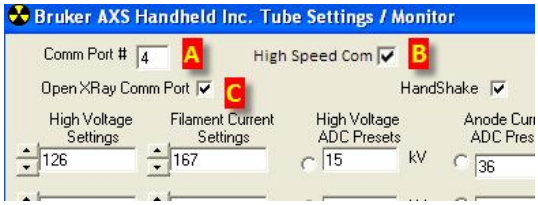


Figure 2

Altering the Voltage, Current, and Pulse Settings

To create a custom setting, **ENTER** the High Voltage Setting, Filament Current Setting, High Voltage ADC Preset, Anode Current ADC Preset, Pulse Length, and Filter number on Line 2. The Pulse Length target will be 200 ± 2. The High Voltage and Filament Current settings will be approximations based on other known settings. These settings will be adjusted (see Optimizing Settings, page 5).

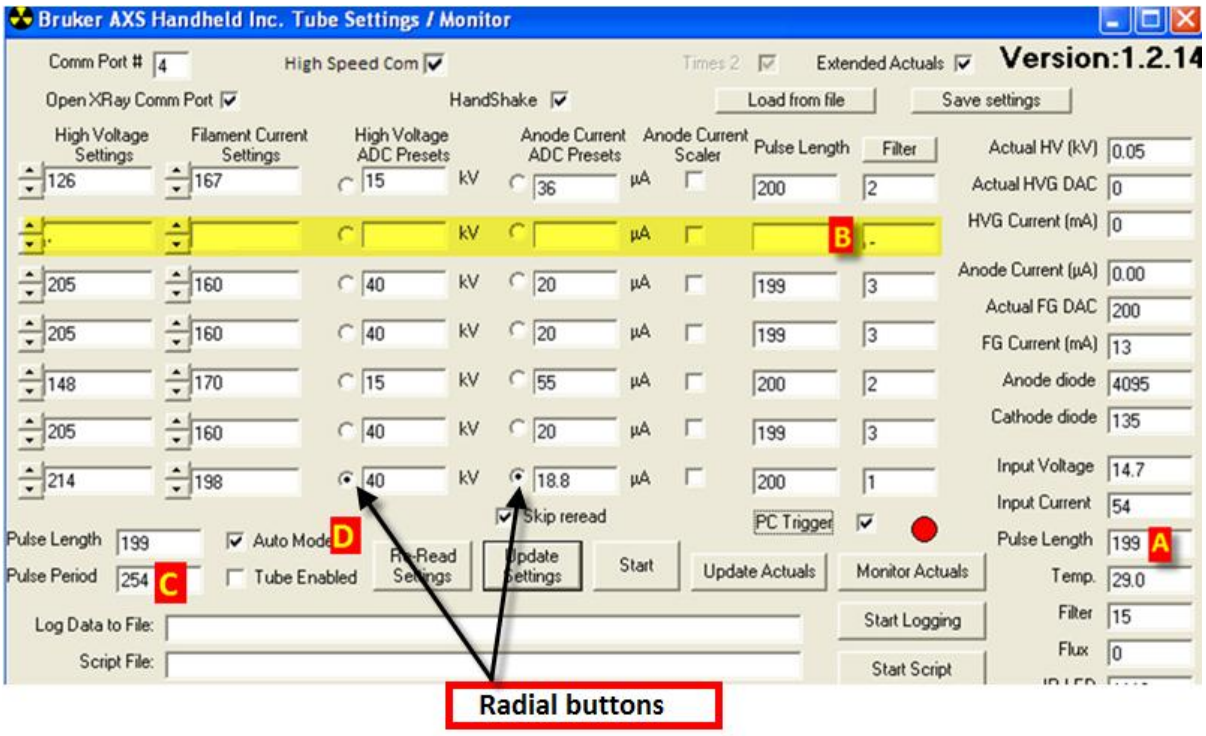


Figure 3

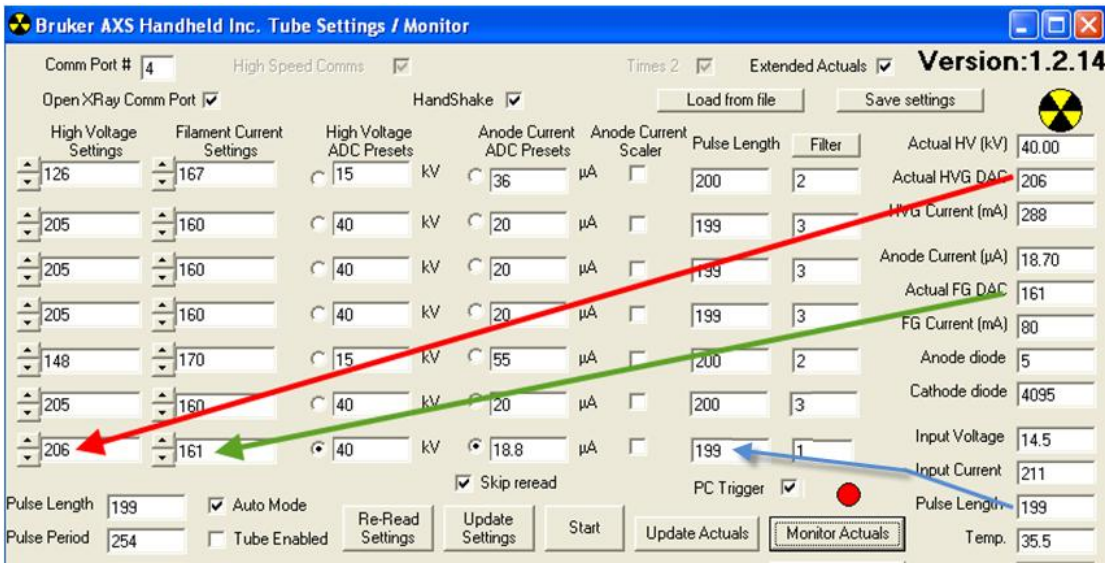
Optimizing Settings

After the initial customized setting has been established, the setting will need to be optimized.

CAUTION

- The Filament Current must not exceed 250.
- Modify the Pulse Length (Figure 3 B) to match the actual Pulse Length A.
- DO NOT LEAVE Pulse length B at 200 unless it is the actual pulse length A from the right hand column.
- DO not change the Pulse Period C. It should remain set at 254.
- Auto Mode D should always be checked.

1. **CHECK** the *High Voltage* and *Anode Current* radial buttons (see Figure 3) for the row you wish to update (generally, this will be Line 2).
2. **ACTIVATE** *PC Trigger* **TO START** X-rays.
3. **CLICK** *Monitor Actuals*.
4. **MONITOR** the actual readings (see far right column of figure below). Optimal High Voltage, Filament Current, and Pulse Length are achieved when, within 1-2 seconds of trigger pull, the ACTUAL voltage and current are obtained and remain stable to within ±0.5 kV and ±1.0 µA for 2 minutes.

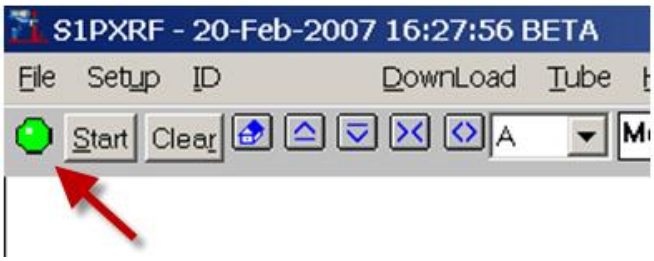


5. **REPLACE** preliminary numbers with actual numbers in each of the three fields.
6. **UNCHECK** PC Trigger.
7. **CLICK** *Monitor Actuals* to stop monitoring process.
8. **CLICK** *Update Settings*.
9. **CLICK** *Re-Read Settings* **TO ENSURE** that the settings have been updated.

10. **REPEAT** steps 3 through 9 for each row you wish to optimize.
    a) **TO ADJUST** pulse length up or down, **VARY** the filament current down or up until a value of 200±2 is reached.
    b) **CONTINUE TO MODIFY** the above settings UNTIL the voltage and current are stable at the desired flux AND the settings match the actual values.

Checking X-Ray Tube Setup and Count Rates with PXRF Program

1. **EXIT** X-Ray Ops.
2. **START** the PXRF Program.
3. **SELECT** Setup/Instrument Setup.
4. **REFER** to the PXRF User Guide (Bruker Document 030.0006) **TO CHECK** the following setup parameters:
    a) 1024 Channels for Tracer III-V, and 2048 for Tracer III-SD and Tracer IV-SD
    b) 2 Bytes per channel
    c) Advanced Header (under Setup menu/DPP Board)
    d) Accumulation Mode
    e) Ensure "S1 TURBOSD LE Mode" is NOT selected
    f) PC Trigger (this allows the Start/Stop to activate the X-ray tube)
    g) The PC Port number (under Download)
    h) A Baud Rate of 57,600 for Tracer III-V (under Download); for Tracer III-SD and Tracer IV-SD, Baud Rate is 115,200
5. **ENSURE** the trigger is not activated/squeezed.
6. **PLACE** your desired sample on the aperture of the instrument.
    a) **ENSURE** the sample is centered over the aperture.
    b) **ENSURE** the sample covers the entire opening located in the center of the instrument's nosepiece.
7. **PLACE** the Sample Radiation Shield Cover on the nose of the instrument.
8. On the PXRF menu, **CHECK** the color of the radial dial indicator under the File Menu.



    a) If radial dial is green, then communication with the unit is open.

b) If radial dial is red, then communication with the unit is not taking place. **CLICK** the radial dial. If it does NOT turn green, **CHECK** setup and download settings.

9. From the PXRF menu, **SELECT** Tube, then **SELECT** *Read*.
10. **SELECT** your custom setting (generally Line 2)
11. **CLICK** Start button in PXRF. (The button should change from Start to Stop).
12. **Press** and **hold** the trigger.
13. **OBSERVE** the spectrum of the Setup Standard in the PXRF Program.

    a) If a spectrum does not appear, **ENSURE** the radial dial is green.

14. **RELEASE** the trigger and check the Raw and Valid count rates.
15. **EXIT** PXRF and **RE-OPEN** X-ray Ops, and then **ADJUST** current to achieve desired count rate.

    a) **OPTIMIZE** tube settings.
    b) **REPEAT** as necessary.

16. **CLICK** Save Settings.
17. **SAVE** file.