

## Short-pulse Startup Checklist S-AB-P-215 Rev A

**Intent:** This procedure is used to prepare for Laser Sources for short-pulse shot operations as part of the LSO Shot Preparation Checklist (S-AB-P-086) and a copy of this procedure should be completed for each Laser Source.

**Select:**        **LS1**         **or**        **LS2**

**Checklist:**

Run the Sources configuration macro(s):

- Select **Restore** ⇒ **LS(1,2)\_SP\_ Preshot**, then
- 1** • Select **Compare** ⇒ **LS(1,2)\_SP\_ Preshot** from the Macros pull-down menu.
- Review the macro reports for errors. (Do not proceed until the macro is clean.)

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- 2** Insert the Regen output beam dump in the long-pulse beam path and verify the throttle is set to maximum for short-pulse.

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- 3** Insert the switchyard mirror into the beam path.

Activate IFES (per S-AB-P-023).

- 4** Pulse Shape is \_\_\_\_\_, delay is \_\_\_\_\_ ns.

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- 5** Confirm that the SBSS Failsafe Trigger Interrupt mode is “Bypass”.

Activate the regen (per S-AB-P-025).

Report regen characteristics to the LSO after 30 min. warm up:

**6**

Energy	mJ	<input type="checkbox"/>
Energy Stability	%	
Spatial Profile Normal	(Y / N )	
Pulse Train Normal	(Y / N )	
Regen Output (SP)	Pointing <input type="checkbox"/> Centering <input type="checkbox"/>	
(continues)		

Activate the SPO (per S-AB-P-027).

Report SPO characteristics to the LSO after 30 min. warm up:

7	Power	mW	□
	Spectrum	nm	
	Central Wavelength	nm	
	Spatial Profile Normal	(Y / N)	
	Pulse Width	fs	
	Synchronizer Jitter	ps	
	SPO/Stretcher	Pointing <input type="checkbox"/> Centering <input type="checkbox"/>	

Verify the OPCPA Throttle positions to be at minimum transmission.

	Throttle Positions	Completed	
8	Stage 1 Pump	<input type="checkbox"/>	□
	Stage 2 Pump	<input type="checkbox"/>	
	OPCPA Output	<input type="checkbox"/>	

9 Insert the Green diagnostic mirror before the Pellin-Broca prism. □

Run the Sources configuration macro(s):

- Select **Restore** ⇒ **LS(1,2)\_SP\_CLARA Alignment**, then
- 10 • Select **Compare** ⇒ **LS(1,2)\_SP\_CLARA Alignment** from the Macros pull-down menu. □
- Review the macro reports for errors. (Do not proceed until the macro is clean.)

Verify pointing and centering at the CLARA.

11	CLARA Alignment	Pointing <input type="checkbox"/>	□
		Centering <input type="checkbox"/>	

Insert Pointing blocking flipper and filtration for full energy CLARA nearfield.  
 (continues)

Note: Preamp must be shut down (per S-AB-P-064) before activating the CLARA

Activate the CLARA (per S-AB-P-029).

- Wait till ED indicates stability.
  - Create tab for new day and record energies in BL(1/2)\_OPCPA\_Energy\_Logbook.
  - Refer to logbook for appropriate final operating voltage.
  - Instruct the LST to increase voltage in 0.1 kV steps with greater than 30 seconds between steps while watching ED for stability.
- 12 • Compare with *Baseline* data in logbook for each step.

Report CLARA performance after 30 min warm up

CLARA Voltage	kV
Energy Stability (1 $\omega$ )	%
Energy (1 $\omega$ )	J
Spatial profile normal (1 $\omega$ )	(Y / N)
Energy Stability (2 $\omega$ )	%
Energy (2 $\omega$ )	J
Save spatial profiles for CLARA & SHG (2 $\omega$ )	(Y / N)

- 13 Reduce CLARA voltage to 1.0 kV.
- 14 Deactivate the Regen Slicer Pockels Cell and verify the output pulse is no longer present.
- 15 Remove the Green diagnostic mirror before the Pellin-Broca prism.
- 16 Re-activate Regen Slicer Pöckels Cell and verify regen output pulse is present.

Check OPCPA S1 centering for pump:

- Insert the following Centering Filtration for OPCPA S1:
    - NG 9 – 2 mm
    - NG 4 – 2 mm
- 17 • Insert beam block in TBWP beam.
- Insert OPCPA S1 Centering mirror flip-in.
  - View pump on OPCPA S1 centering.
    - Confirm pump is centered on reference square.
    - If not, contact Laser Sources Manager or CLARA expert.
- (continues)

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Check OPCPA S1 centering for TBWP:

- Insert the following Centering Filtration for OPCPA S1:
  - NG 9 - 2 mm
  - NG 4 - 2 mm
  - NG 3 - 2 mm
  - NG 4 - 1 mm

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- Remove beam block from TBWP beam.
- View TBWP on OPCPA S1 centering.
  - Confirm intensity is centered on reference square used for pump.
  - Use OPCPA S1 centering mirror for alignment.
- Remove OPCPA S1 Centering mirror flip-in.

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Check OPCPA S1 pointing for TBWP:

- Unblock OPCPA S1 pointing diagnostic.
- Deactivate the Regen Slicer Pöckels Cell and verify the output pulse is no longer present.
- View TBWP on OPCPA S1 pointing in *Fine Pointing* mode.
  - Use OPCPA S1 pointing mirror for alignment.
  - If alignment was required, go back to OPCPA S1 centering alignment for TBWP (previous step).

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Check OPCPA S1 pointing for pump:

- Reactivate the Regen Slicer Pöckels Cell and verify output pulse is present.
- Insert beam block in TBWP beam.
- View pump on OPCPA S1 pointing in *Coarse Pointing* mode.
  - Verify pump is reasonably centered on crosshair.
  - If not, contact Laser Sources Manager or CLARA expert.
  - Return OPCPA S1 pointing to *Fine Pointing* mode.
- Insert OPCPA S1 pointing diagnostic block.
- Remove beam block from TBWP beam.

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Increases voltage in 0.1 kV steps with greater than 30 seconds between steps while watching ED for stability.

21

Verify CLARA voltage and output energy is consistent with step 12.  
(continues)

Slowly increase OPCPA Stage 1 Pump to the desired Pump energy specified in BL(1/2)\_OPCPA\_Energy\_Logbook.

- 22
- Verify OPCPA Stage 1 spectrum and energies are nominal. If not, contact Laser Sources Manager or OPCPA expert.
  - Record OPCPA Stage 1 Pump/Residual energies and waveplate position in logbook.

Check Switchyard Centering and Pointing:

- Unblock Switchyard diagnostic cameras.
- Increase OPCPA Output Throttle to appropriate viewing energy.
- Verify Pointing and Centering at the Switchyard.

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Switchyard	Pointing <input type="checkbox"/> Centering <input type="checkbox"/>	<input type="checkbox"/>
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- Block Switchyard diagnostic cameras.

Verify alignment of OPCPA beam throughout the system:

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Glass Amplifier Input	Pointing <input type="checkbox"/> Centering <input type="checkbox"/>	<input type="checkbox"/>
Glass Amplifier Output	Pointing <input type="checkbox"/> Centering <input type="checkbox"/>	<input type="checkbox"/>

Run the Sources configuration macro(s):

- 25
- Select **Restore** ⇒ **LS(1,2)\_SP\_ Qualshot** from the Macros pull-down menu.
  - Select lock from the commands menu.
  - Select **Compare** ⇒ **LS(1,2)\_SP\_ Qualshot** from the Macros pull-down menu.
  - Review the macro reports for errors. (Do not proceed until the macro is clean.)

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Slowly increase OPCPA Stage 2 Pump to the desired Pump energy specified in BL(1/2)\_OPCPA\_Energy\_Logbook.

- 26** • Verify OPCPA Stage 2 spectrum and energy are nominal.   
If not, contact Laser Sources Manager or OPCPA expert.  
• Record OPCPA Stage 2 Pump energy and waveplate position in logbook.

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- 27** File this checklist in the days Shot folder with S-AB-P-086.

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(done)

**LST:** \_\_\_\_\_ **Date:** \_\_\_\_\_