OMEGA SSD Arbitrary Waveform Generation
Installation and Activation

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OMEGA SSD Arbitrary Waveform Generation

An AWG was installed on the OMEGA SSD driver to replace the existing ACSL pulse-generation system.

The AWG makes it possible for the facility to design and produce pulse shapes that better meet the users’ requests.

A new Omega Laser Facility pulse-shape naming convention was introduced with the activation of an AWG on the OMEGA SSD driver.

Several pulse-shape family names and picket definitions have been changed.

The new pulse-shape naming convention eliminates the use of pulse-shape request (PSR) numbers to identify picket pulse-shape variations.

Several pulse-shape family names and picket definitions have been changed.

Updated pulse-shape request numbers can be found at the OMEGA pulse-shape library at http://omegaops.lle.rochester.edu/pulseShapes.

New convention pulse-shape naming examples

Example: SS1404Tv001

OMEGA and OMEGA EP pulse-shape naming convention

Using the old convention, both pulse shapes were named HE140401T; the PI would need to specify the PSR for the desired shape.

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The AWG makes it possible for the facility to design and produce pulse shapes that better meet the users’ requests.

- Improved picket-to-drive contrast
- Better able to dial in drive-pulse features
- Drive modulation is an artifact of the SSD bandwidth

Graph showing time in ps on the x-axis and power/beam (TW) on the y-axis, comparing AWG, ACSL, and Template.
A new Omega Laser Facility pulse-shape naming convention was introduced with the activation of an AWG on the OMEGA SSD driver.

OMEGA and OMEGA EP pulse-shape naming convention

{System}{Family}{Drive length}{Contrast*}{Pickets*}v{Version}
Ex: SS1404Tv001

- Information about the pulse-shape naming convention can be found on the PI (Principal Investigator) Portal at http://omegaops.lle.rochester.edu/pi_portal.htm

*If applicable
Several pulse-shape family names and picket definitions have been changed

<table>
<thead>
<tr>
<th>New convention family names</th>
<th>Old convention family names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super-Gaussian (SG)</td>
<td>Super-Gaussian (SG)</td>
</tr>
<tr>
<td>Step, single (SS)</td>
<td>Low adiabat (LA)</td>
</tr>
<tr>
<td>Step, double (SD)</td>
<td>High energy (HE)</td>
</tr>
<tr>
<td>Step, triple (ST)</td>
<td>Fast-ignition spike (FIS)</td>
</tr>
<tr>
<td>Picket, single (PS)</td>
<td>Picosecond pulse (PS)</td>
</tr>
<tr>
<td>Picket, double (PD)</td>
<td>N/A</td>
</tr>
<tr>
<td>Picket, triple (PT)</td>
<td>N/A</td>
</tr>
<tr>
<td>Ramp (RM)</td>
<td>Ramp (RM)</td>
</tr>
<tr>
<td>Reverse ramp (RR)</td>
<td>Reverse ramp (RR)</td>
</tr>
<tr>
<td>Modified square (MS)</td>
<td>Modified square (MS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of pickets</th>
<th>SSD picket designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
</tr>
<tr>
<td>3</td>
<td>T</td>
</tr>
<tr>
<td>4</td>
<td>Q</td>
</tr>
</tbody>
</table>

- A conversion list from the old pulse-shape names to the new pulse-shape names can be found in the pulse-shape library at http://omegaops.lle.rochester.edu/cgi-script/pulseShapes
The new pulse-shape naming convention eliminates the use of pulse-shape request (PSR) numbers to identify picket pulse-shape variations.

Using the old convention, both pulse shapes were named HE140401T; the PI would need to specify the PSR for the desired shape.
New convention pulse-shape naming examples

OMEGA and OMEGA EP pulse-shape naming convention

\{Family\}\{Pulse length\}\{Contrast*\}\{Pickets*\}v\{Version\}

Example:  SG10v001 (ACSL equivalent SG1018)
{Family} = SG (Super-Gaussian)
{Drive length} = 10 (1.0 ns)
{Contrast} = N/A
{Pickets} = N/A
{Version} = 1

Example:  SS1404Tv001 (ACSL equivalent HE140401T)
{Family} = SS (step, single)
{Drive length} = 1.4 ns
{Contrast} = 4× (from foot to peak)
{Pickets} = 03
{Version} = 001 (Original picket timing/energy configuration)