SYDOR

TECHNOLOGIES

PICOSECOND GATED OPTICAL IMAGER

COMPLEX MEASUREMENTS—CRITICAL RESULTS

FEATURES

- Image from multiple perspectives with a customizable number of imaging heads
- Low-jitter triggers enable precise independent gating for each MCP
- User-friendly software interface that integrates data collection, scripting and data export

APPLICATIONS

- 2D VISAR
- Plasma Diagnostics
- Time-dependent Interferometry
- Imaging LIDAR

ABOUT THE PICOSECOND GATED OPTICAL IMAGER (psGOI)

The Picosecond Gated Optical Imager (psGOI) is an ultra-fast imaging system that captures events at exposure times down to 80 ps with repetition rates up to 100 Hz. The design of the gating electronics allow performance with very low jitter and a small trigger delay. The modular design of the system enables easy gate time selection and the ability to add additional GOI imaging heads over time.

Standard configurations are offered with 1, 2, 4, or 8 heads. The imaging heads contain an image intensifier, permanent magnets to generate an axial-magnetic field, and an air-cooled CCD. The intensifier options include: input window of glass, fiber optic, or quartz. Photocathode materials may be selected from S20, S25, or S1. These options allow solutions to for imaging from the visible to NIR wavelengths.

Users can precisely control trigger delay from 0 to 50 ns via a computer controlled passive delay line with options to set the relative timing of multiple channels. This independence allows the system to be configured for sequential, overlapped, or staggered acquisition. When 8 heads are used to capture sequential frames, this gives an equivalent frame rate of >10 giga-frames per second.

Each 18 mm image intensifier is housed in a unique enclosure that incorporates an axial magnetic field that ensures high spatial resolution at the fastest gate-times. Alternative fast gating systems use mesh to propagate the gate signal across the photocathode. This design presents a problem for imaging, particularly when illuminated by coherent light, since use of the mesh results in noticeable interference. Sydor's psGOI overcomes this problem by using a ring electrode. Users observe a maintained level of highresolution throughout high-speed imaging events, even for coherent light applications.

There are four operation modes for gating the imager: DC on, slow gate, medium gate, and fast gate to allow for alignment of the intensifier, as well as a range of exposure times. See reverse for details on the available speeds in each mode.

PRODUCT SPECIFICATIONS

GOI Trigger Module

- Number of Channels: 4 or 8
- Output: 500 V into 50 Ω on each of 4 channels
- Jitter: SD <20 ps, typical figures <4 ps
- Trigger Requirements: 5 V into 50 Ω with <5 ns rise
- Pulse Repetition Frequency (PRF): 100 Hz
- Dimensions: 1U, 19” x 400 mm

Controller & Heads

- Remote Control Interface: Ethernet & RS232
- Controllers: 2 heads per unit, up to 4 units
- Image Intensifier: 18 mm
- Photon Gain: Up to 1000 watts/watt
- Photocathode: S20 on quartz, others available
- Phosphor: P43 on fiber optic output, others available
- Spatial Resolution: >15 lp/mm
- Power Requirements: 110/240 VAC <100 W
- PRF: 100 Hz
- Gating Modes:
  - Fast Mode: <100, 100, 120 ps
  - Medium Mode: 250, 500, 1000, 2000, 3000, 4000, 5000 ps
  - Slow Mode: 100 ns to 1 ms
  - DC Mode: Cathode on for 5 seconds from software trigger
- Trigger Delays (Typical): Fast Mode 54 ns, Medium Mode 65 ns, Slow Mode 104 ns
- Trigger Delay Adjustment: 0 to 50 ns in nominal 25 ps steps each channel
- Jitter: < 4 ps typical
- Trigger Requirements: 500 V into 50 Ω with <1 ns rise
- Dimensions of Controller: 3U, 19” x 500 mm
- Length of Umbilical: Nominally 3 m