LCI

Laser Control Interface

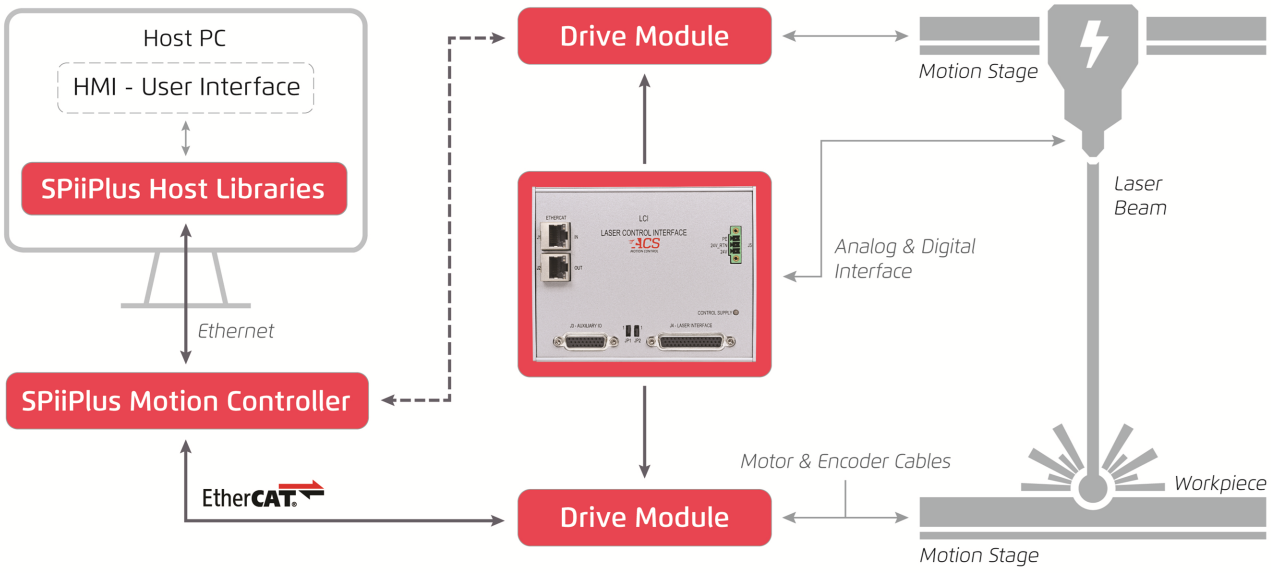
The LCI is designed to meet the needs of the most demanding laser processing applications. Working as part of a SPiiPlus EtherCAT motion control system, the LCI tightly synchronizes laser control with high-precision multi-axis motion to enable the highest laser processing accuracy and throughput.

Product Highlights

- Sub-micron accuracy position-based laser triggering
- Flexible laser power control options
- Synchronize laser control with up to 5 coordinated motion axes
- Analog and high-speed digital interfaces
- Compact DIN rail mount footprint

Applications

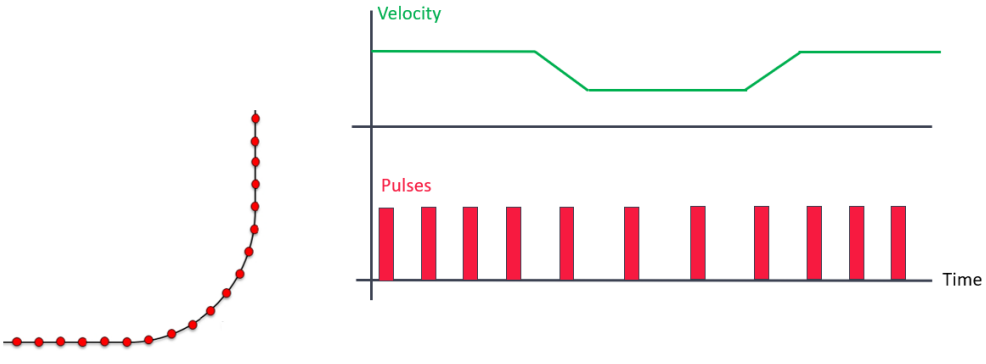
- OLED and Micro-LED display panel processing
- Semiconductor wafer processing
- Glass, PCB, FPC cutting and drilling for electronics manufacturing
- Sheet metal and tube cutting for automotive, aerospace, biomedical
- Biomedical device and electric vehicle battery welding



ACS MOTION CONTROL

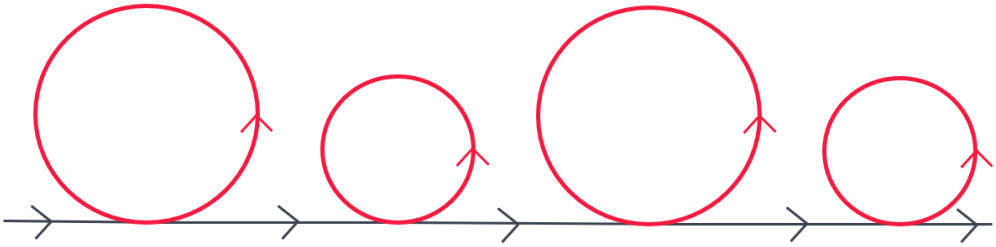
Position Based Triggering Modes

Fixed Distance Pulsing

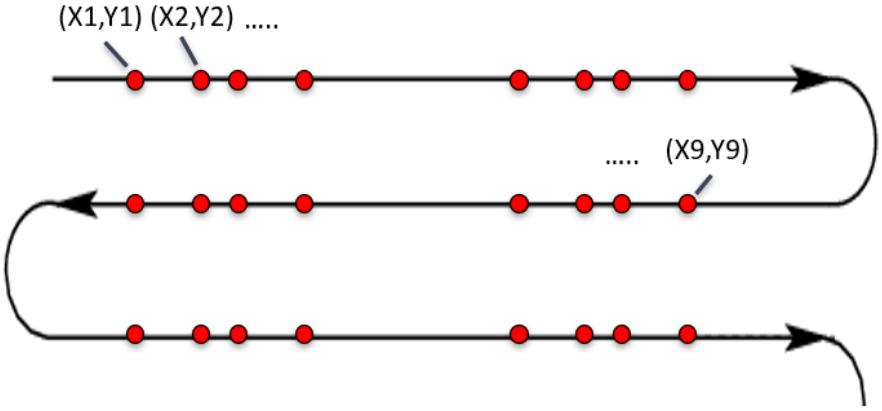


Segment-Based Gating

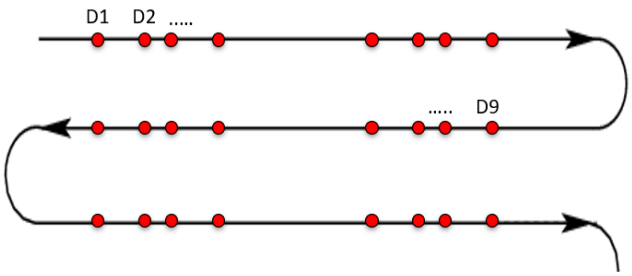
Specify Laser On/Off per motion segment
for high-accuracy on the fly processing



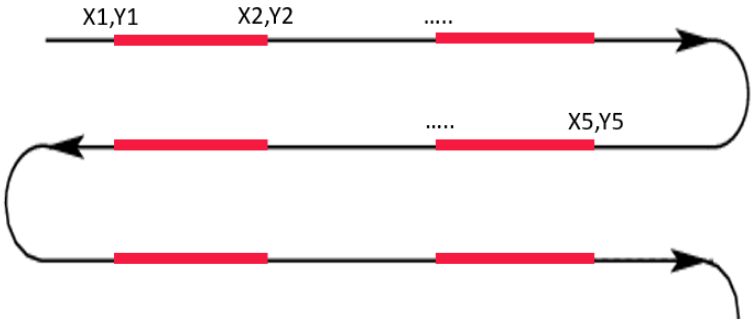
Coordinate Array Pulsing



Distance Array Pulsing



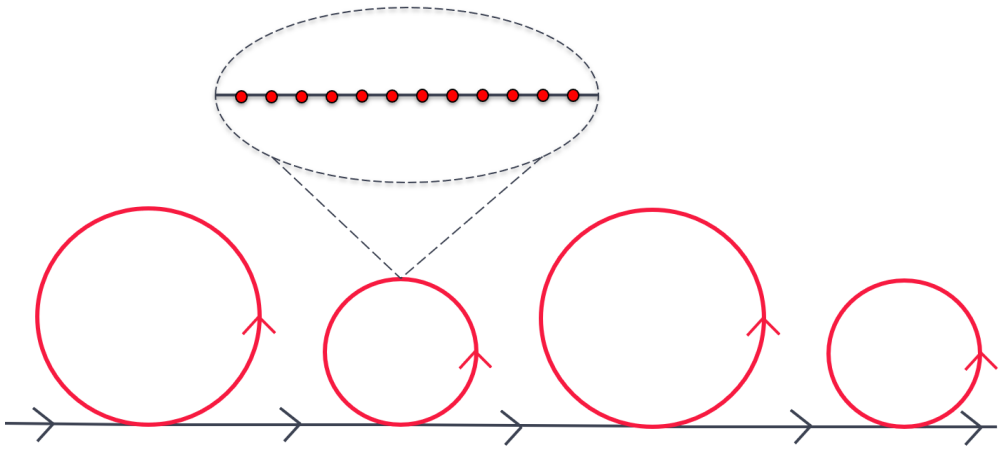
Coordinate Array Gating



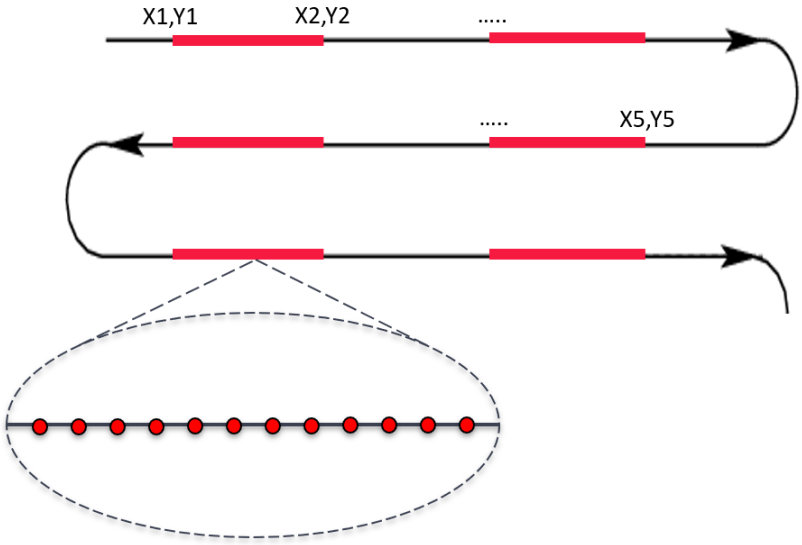
Distance Array Gating

Position Based Triggering Mode Combinations

Fixed Distance Pulsing AND Segment-Based Gating



Fixed Distance Pulsing AND Coordinate Array Gating



Other Possibilities

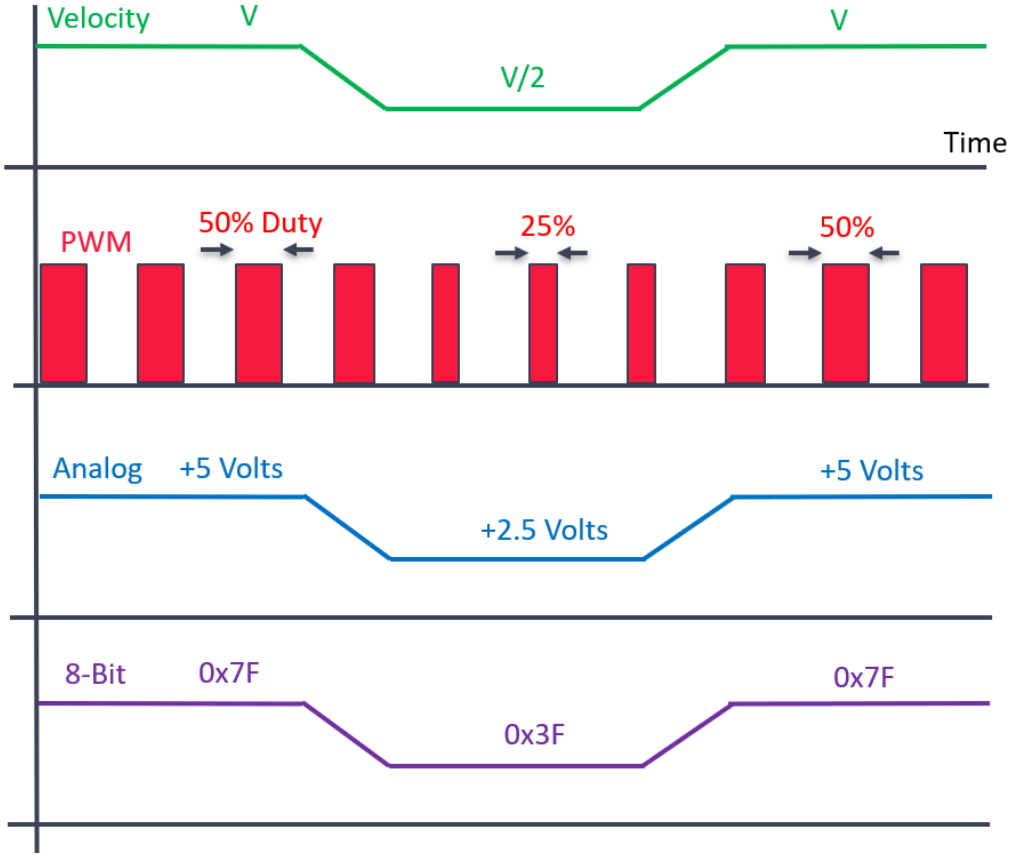
Velocity Based Power Control

Power Control Outputs

- PWM
- Analog
- 8-bit Port

- Standard vector or user-defined velocity calculation
- Analog inputs for power monitoring

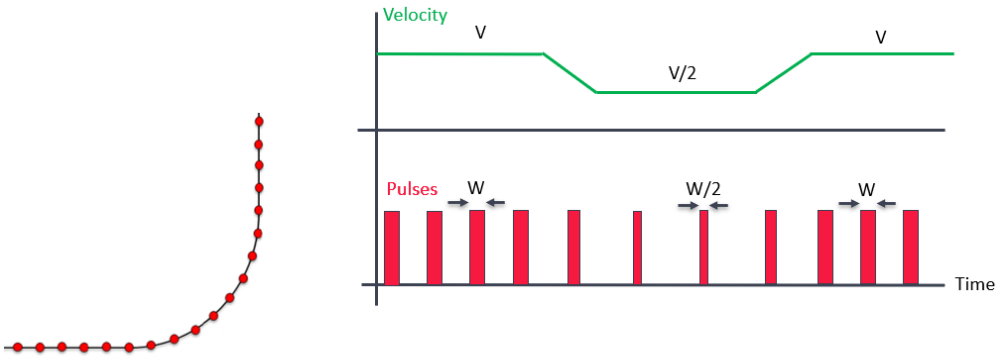
Power control output(s) and laser triggering output can be activated simultaneously



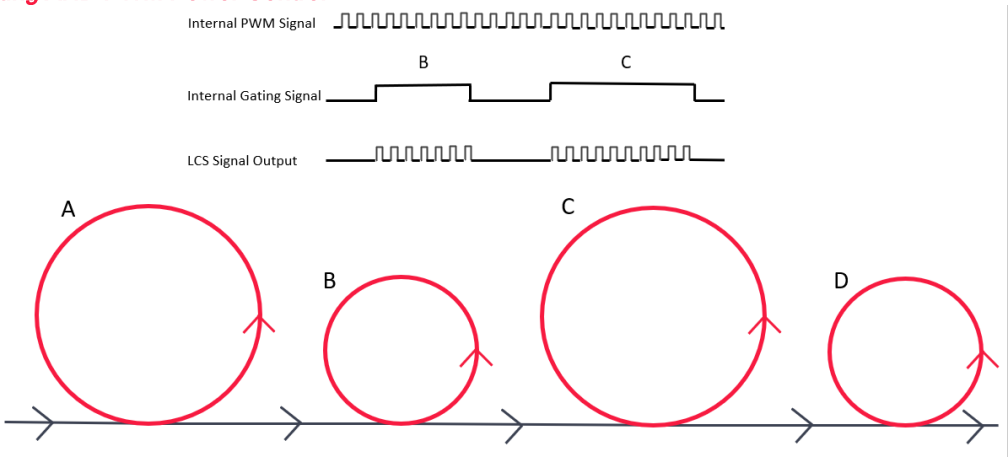
Integrated Triggering and Power Control

Use mode combinations to control laser triggering and power from a single high-speed LCS trigger output

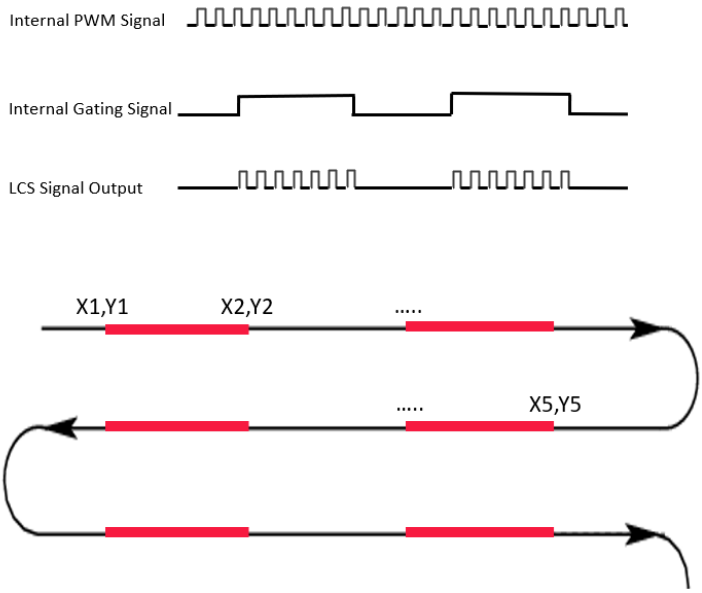
Fixed Distance Pulsing with Dynamic Pulse Width



Segment Based Gating AND PWM Power Control



Coordinate Array Based Gating AND PWM Power Control



Other Possibilities

Specifications

Laser Control Signal (LCS) High-SpeedTrigger Output

- Interface: RS422 differential OR 5 or 24V single-ended
- Output Modes:
  - Fixed Distance Pulsing
  - Segment-Based Gating
  - Coordinate Array Pulsing
  - Distance Array Pulsing
  - Coordinate Array Gating
  - Distance Array Gating
  - Fixed Distance Pulsing AND Segment-Based Gating
  - Fixed Distance Pulsing AND Coordinate Array Gating
  - Fixed Distance Pulsing with Dynamic Pulse Width
  - Segment Based Gating AND PWM Power Control
  - Coordinate Array Based Gating AND PWM Power Control
  - Other Possibilities
- Max. Frequency:
  - Fixed Distance Pulse Mode: 1 MHz / 10 MHz (Single Ended / Differential)
  - Segment-Based or Array-Based Pulse/Gate Mode: 16 kHz (Differential or Single Ended)
- Latency & Jitter: 1µs

Laser Power Control PWM Output:

- Interface: 5 or 24V single-ended
- Max Modulation Frequency: 100 kHz
- Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

Laser Power Control Analog Output

- Interface: 0-10V, Single Ended, 12 bit resolution
- Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

Laser Power Control 8-Bit Output

- Interface: 5 or 24V single-ended
- Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

Other Dedicated Laser Interface Digital I/O

- Laser On Output – For lasers with dedicated "On" input that is separate from trigger input
- Laser Fault Input – When this input changes state (representing a fault condition), the Laser On Output is set low)
- Laser Enable Input – For lasers with dedicated "Enabled" status output
- Interface: 5 or 24V single-ended

General Purpose Analog Outputs

- Quantity: 1
- Interface: 0-10V, Single Ended, 12 bit resolution
- Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

General Purpose Analog Inputs

- Quantity: 2
- Interface: 0-10V, Single Ended, 12 bit resolution
- Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

Digital I/O

- Digital Inputs: Eight general purpose inputs. Single ended, opto-isolated, 5Vdc or 24Vdc, sink or source, automatic voltage detection. Maximum input frequency: 5kHz (equal to EtherCAT network cycle rate)
- Digital Outputs: Eight general purpose outputs. Single ended, opto-isolated, 5Vdc or 24Vdc, sink or source (default). Output current: 50mA each.

External Synchronization Input Clock

- Quantity: One
- Interface: RS 422 differential
- Maximum Input Frequency: 10 MHz

Configurable High-Speed Outputs

- Configurable as virtual encoder outputs
- Quantity: Eight
- Interface: RS 422 differential
- Maximum Output Frequency: 10 MHz

Communication

- Two EtherCAT ports, In and Out, RJ45 connector.
- Supported Network Cycle Rates: 1, 2, 4, 5 kHz

Environment

- Operating range: 0 to + 50°C.
- Storage and transportation range: -25 to +60°C.
- Humidity (operating range): 5% to 90% non-condensing.

Physical

- Dimensions: 134 x 75.4 x 31 (mm^3)
- Weight <300g

Additional Features

- Laser On and Laser Off delay compensation
- Pierce mode – longer pulse width for initial pulses
- Tickle mode – short pulses to keep laser "warm" when not processing
- Virtual Encoder (AqB) Output(s) for Subsystem Synchronization
- Skywriting compensation

Ordering Options

Ordering Options	Field	Example User Selection	Values
Segment and Array Based Triggering Modes	1	Y	Y-Yes, N-No
External Clock Synchronization	2	N	Y-Yes, N-No
Virtual Encoder Output	3	N	Y-Yes, N-No
Reserved for Future	4	N	N=N/A
Reserved for Future	5	N	N=N/A

EXAMPLE: LCI-YNNNN

Field		1	2	3	4	5
PN	LCI	Y	N	N	N	N