

# SP-ICE-3



CONTROL CARD FOR LASERS AND DEFLECTION UNITS

FOR CHALLENGING INDUSTRIAL APPLICATIONS



- Controls 2-, 3-, 4- and 5-axis deflection units and all common laser sources
- Speed- and position-dependent laser control
- Extended Marking-and-processing-On-The-Fly functionality (MOTF)
- Can be used as external control card via Gigabit Ethernet
- Support of RL3-100 protocol

## UNIVERSAL CONTROL WITH 20 BIT POSITION RESOLUTION AND 10 $\mu$ s STEP PERIOD

### YOUR BENEFITS

The SP-ICE-3 control card is the universal solution for every laser system with deflection units. With its multiple individually configurable ports it fits everywhere, even at highly specific requirements. Thanks to the .NET programming environment and the flexibility of the SP-ICE-3 control card a broad variety of applications can be solved quickly.

### PRECISE CONTROL WITH FEEDBACK

The SP-ICE-3 controls up to 2 deflection units via the SL2-100 or RL3-100 protocol with 20 bit position resolution and 10  $\mu$ s step period. It can log up to 24 million measurements from the deflection unit. This allows for system optimization during development and continuous monitoring during operation.

### ANYTHING YOU WANT

With its 1 GB RAM and a 32 GB MicroSD-card users may upload and store numerous highly complex laser programs to the card at once. Five configurable I/O-ports with up to 24 bit, two quadrature decoders, a USB 2.0 and a RS232 interface make the SP-ICE-3 your central control unit for laser processes.

### INNOVATION AND QUALITY

Innovation and maintaining high product quality standards are our priorities at RAYLASE. All our products are developed, built and tested in our own laboratories and production facilities. Through our world-wide support network we can offer best maintenance and rapid service for our customers.

## FURTHER PERFORMANCE FEATURES<sup>1</sup>

- Controls up to 5-axis deflection units or 2x3-axis deflection units with RL3-100 protocol
- Tracking Error compensation for all axes individually
- 10  $\mu$ s step period and 20 bit position resolution for the control of deflection units. This corresponds to a resolution in mirror positioning of 0.75  $\mu$ rad
- Supports up to 16 MHz laser frequency
- Speed- and position-dependent control of the laser power
- Equidistant laser pulses due to laser frequency control in accordance to the current scanning speed
- Various shapes such as circular arcs, ellipses as well as text in different fonts. Marking of continuous serial numbers, the current date or time
- User-defined dash-dotted line patterns
- Bitmap mode with up to 1 MHz pixel frequency and 15 ns resolution
- Reliable Marking-and-processing-On-The-Fly (MOTF) employing two quadrature decoders with differential inputs to track the movements of a belt in conveying and orthogonal direction. Buffer of up to 32 workpieces between detection and processing. Offers internal programmable quadrature generators for the simulation of MOTF applications and setups without movement encoders
- Debounce and suppress function for MOTF part sensor
- Virtual processing field (8 x larger)
- Variable Jump Delay
- Sky Writing
- Power ramping (option to have 2 individual ramp designs for both analog outputs)
- Configurable Lissajous curve for wobble welding patterns
- Power calibration for laser linearization
- Logging of up to 24 million measurements from different selectable sources, e.g. for target and actual position, laser power and modulation for system optimization and monitoring. Sampling can be started and stopped via list or control commands.
- Arbitrary number and size of lists, limited only by the amount of RAM
- Flow control commands such as loops, jumps and sub-routines
- Conditional execution of lists dependent on input signals at I/O ports
- Independent monitoring of deflection units
- Execution of customer specific lists and .NET programs on the card, which can also access the card's processing functions

## BOARD CONFIGURATION

### Memory

- 1 GB DDR3 RAM
- 1 GB DDR3 RAM for 2D- and 3D-field corrections
- 32 GB MicroSD-card for settings, programs and lists

### Interfaces

- PC installation:  
PCIe-x1 Version 2.1; arbitrary number of cards can be installed in a single PC
- Stand-alone operation:  
1-Gbit/s Ethernet; power supply 12 V / max. 2 A
- To deflection units:
  - SL2-100 protocol with 20 bit position resolution
  - XY2-100 protocol with 16 bit position resolution (via additional adapter board)
  - RL3-100 protocol with 20 bit position resolution
- To laser sources:
  - 15-pin interface with two analog outputs
  - Additional connector with differential 0 V – 10 V analog outputs

### Universal I/O-Interfaces to Peripherals

- 2x16 bit I/O ports, 3.3 V or 5 V TTL
- 2x24 bit 3.3 V LVCMOS ports, also for customized adapter boards
- 1x16 bit input port, 5 V or 24 V
- 2x Quadrature decoders with differential inputs for Marking-and-processing-On-The-Fly (MOTF)
- RS232 V.24
- USB 2.0, e.g. for the connection of external memory sticks

The I/Os are flexibly configurable via software. The polarity of all input and output signals can be defined by the software.

### Software

- Driver for 32 bit and 64 bit Windows 11, 10, 8, 7
- DLLs for .NET and Windows Native available
- C# and C++ code examples

<sup>1</sup> The mentioned features are related to Software-/Firmware-Version v3.x or later.  
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