

APP NOTE # 16

MAY 20

INTEGRATION OF ORIGAMI XPS WITH GALVANOMETER SCANNERS

Our ORIGAMI XPS laser has been specifically designed for easy and cost-effective integration. A simple through-hole mounting system and high-precision mechanical referencing planes ensure smooth drop-in installation. The ORIGAMI XPS platform offers both internal as well as external control capabilities.

The laser is provided with a pulse-picker at the output. This allows modulation of pulse energy and pulse repetition rate on-the-fly either via internal software control or with external hardware control.

Internal remote-control capabilities

The ORIGAMI XPS is equipped with three different standard communication architectures:

- RS-232 Serial Interface
- SPI (Serial Peripheral Interface)
- CAN bus system (Control Area Network)

The laser is controlled by default through the RS-232 serial port using either the NKT GUI (Graphical User Interface) or the CLI (Command Line Interface). All available commands are listed and described in the User Manual.

External control capabilities

The ORIGAMI XPS can be easily externally controlled using the available BNC ports:

- DGI (Digital Gate Input)
- AMI (Analog Modulation Input)
- Trigger output

How to use the Digital Gate Input

The DGI is used to modulate the laser repetition rate on-the-fly using an externally applied voltage to control the pulse picker. The voltage level (0 V/3.3 V) will enable/disable laser emission.

1. Set the base laser repetition rate to the highest repetition rate required by your application. This will also set the maximum available pulse energy.
2. The laser will emit pulses based on the timing of the applied signal voltage. No further programming is required.
3. The repetition rate can be only modulated from pulse-on-demand up to the selected base repetition rate.
4. The DGI port is always active and the laser constantly monitors the input voltage level at the port.
5. NKT logic default is “Logic Low” (laser emission enabled if 0 V applied to the DGI). The logic can be set to “Logic High” (emission enabled if 3.3 V applied) against customer request.

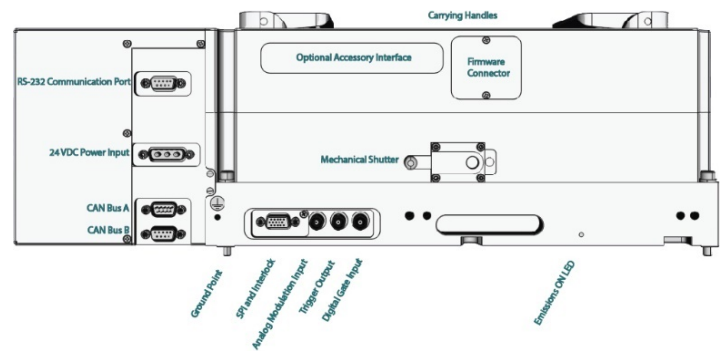


Figure 1. Showing the positions of the DGI, the AMI and the Output Trigger on the ORIGAMI XPS laser.

How to use the Analog Modulation Input

The AMI is used to modulate the pulse energy on-the-fly based on the level of an external voltage (0–2.6 V) applied to the pulse picker. The output intensity can be continuously varied from 0% (0 V) to 100% (2.6 V).

1. Select the “External” operating mode in the GUI or set the command “e_mode=3” using the command line interface.
2. Connect the voltage supplier to the AMI and apply the desired voltage function.
3. The maximum modulation rate is 1 MHz.

ORIGAMI XPS in set-up with galvanometer

Figure 2 shows the typical position of an ORIGAMI XPS laser when used with a galvanometer scanner for micromachining.

The micromachining sequence can be managed using either the marking software supplied with the scanner card or by writing customized software to allow the PC to control both the scanner and laser.

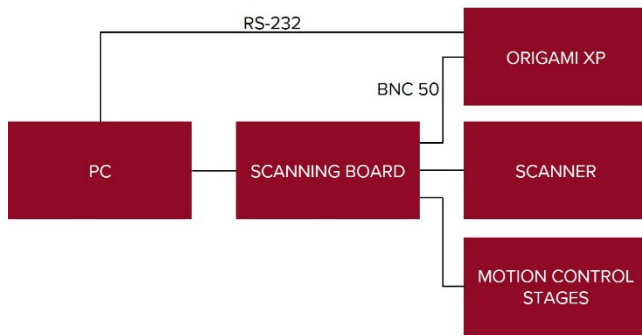


Figure 2. The ORIGAMI XPS' position in a typical galvano-meter scanner set-up for micromachining.

LASER INTEGRATION FOR TYPICAL CONTROL BOARDS

RTC-5 (ScanLab)

To use an RTC-5 scanner control card to control the digital gate on the ORIGAMI XPS, identify the pins from the 15-pin SUB-D laser connector from the RTC manual and use LASER ON (LASERON) which refers to Ground 2 (GND2). These must be connected to the BNC and to the Digital Gate to Open/Close the AOM on demand.

The RTC5 provides two versatile analog Outputs. Use the 12-bit output ANALOG OUT1 to control the output power of the laser. The output voltage range of ANALOG OUT1 is set from 0 V–10 V and has PC ground (GND) as a reference point.

Set the range on the LaserDesk software to 26% using the laser wizard function and set the software to laser mode 5. Here, the logic signal active high or low can also be set accordingly.

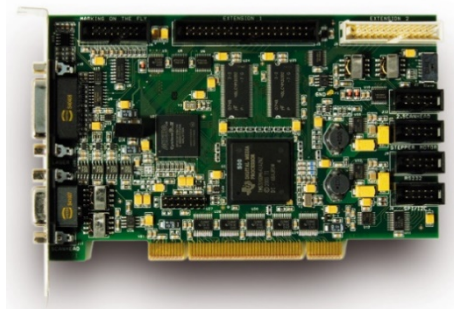


Figure 3. RTC-5 PCI, courtesy of SCANLAB.

USC-3 (SCAPS)

To use a USC-3 scanner control card to control the digital gate on the ORIGAMI XPS, identify the pins from the 37-pin connector from the USC manual and select

Laser_Gate, which refers to GND. These are connected to the Digital Gate by BNC.

For the analog control, use the pin for DAC_A which is referenced to GND. They are connected to the analog modulation input via BNC. The laserport defines the port that sends the power signal for the laser.

For DAC_A the voltage range is determined in the laserport settings in the software and can be 2.5 V, 5 V, or 10 V. For the ORIGAMI XPS, set the voltage range of DAC_A to 5V and use the Powermap to map it to 2.6 V.

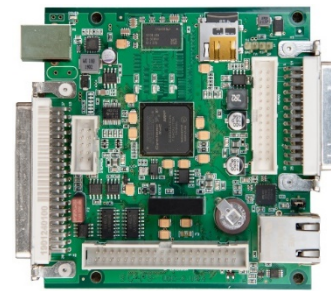


Figure 4. USC-3 card, courtesy of SCAPS.

SP-ICE3 (Raylase)

To use an SP-ICE-3 card to control the ORIGAMI XPS, identify the laser control port 'X097 Laser' using the SP-ICE-3 manual. The LM_GATE and GND are used to control the digital gate via the BNC connection. The inversion of the signal LM_GATE can be set accordingly via the laser configuration tab in the software.

ANA_OUT1 is an analog output dedicated to set the output emission level of the laser using the AOM and is referenced to GND. The maximum (2.6 V for 100% power) should be set in the software. You can control and monitor the laser via the SP-ICE-3 card's serial port, X802 RS-232, by the exchange of suitable messages and responses.

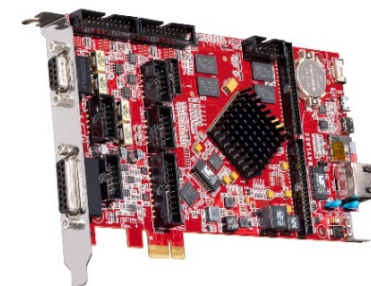


Figure 5. SP-ICE-3 card, courtesy of Raylase.

So, go ahead and integrate our Origami XPS into your scanner system – and of course we are here to help in case you need it!