Control and Steer Your Machine

The Materialise Control Platform is a modular, software-driven, embedded hardware solution, that allows you to take full control over your laser-based AM machine. It embeds a large amount of AM specific R&D opportunities leading to a fast time-to-market and a great control over quality and process repeatability. In addition, it is fully compatible with the Materialise Magics 3D Print Suite.

- Specifically developed for AM
- Enables to extend your IP
- Shortens the lead time of new machines
- Numerous research applications
- Integrated end-to-end platform

“We, at Sentrol, greatly appreciate and value our partnership with Materialise because it provides us with build processing and control solutions that are customized for our products. This in turn enables us to offer optimal and complete hardware and software solutions to our own customers.”

Casey HJ Kim
Vice President, Sentrol Co., Ltd.
Materialise Control Platform Empowers

**Machine Development & Control**
- Fast time-to-market with an off-the-shelf controller
- Build your own IP and build on top of Materialise know-how
- Easily expand, modify and develop new versions of the AM machine
- Easily migrate from your R&D platform to market
- Experiment with and finetune your toolpath strategies using the Build Processor

**R&D Applications**
- Examine the AM process
- Adapt the AM process to your needs
- Monitor and log data in real time
- Benefit from real-time closed loop data processing

**Process-Controlled Production**
- Track & trace the complete production process in combination with Materialise Streamics
- Connect to your machine and extract data using standard protocols at real time

An Integrated Platform

![Diagram showing the integration of software and hardware components]

**Hardware**

**SUPPORTED COMMUNICATION PROTOCOLS**
- XY2-100
- SL2-100
- PWM, Frequency, Analog Laser interfaces
- Analog and Digital I/O
- Stepper interface
- RS232

- RS485
- USB
- Modbus (RS485 and TCP/IP)
- Proﬁbus
- OPC-UA
- and many more...
Software

BUILD PROCESSOR
Fine-tune your research process

The Machine Control Platform comes with its own dedicated Build Processor* for doing research and defining the optimal parameters for your process. It offers access to more than 250 parameters and you can experiment with different zones and patterns of the Material Development Module.

- It processes and transfers the build data to your controller without any human interaction.
- It automatically reads out your controller configuration in order to stay within the physical limits of your machine.
- It’s compatible with multi-optics machines
- It allows you to generate different build styles

TOOLBOX
Easily configure and set up your machine control system

With this toolbox, you can easily communicate with your hardware components.

- Configure your hardware devices via easy tree structures
- Write your scripts in a Lua embedded environment with parallel processing
- Set up the correct communication services
- Rely on an integrated debugging feature
- Calibrate your entire optical set-up

INTERFACE
Directly interact with your machine in an intuitive way

The interface allows you to operate the AM machine and monitor the build status from anywhere on your network.

- Start or stop your build
- Run your custom scripts
- Manually control your hardware components
- Adapt the interface to the controller configuration
- Monitor the control system parameters

INSPECTOR
Speed up quality control based on build images

You have the option to include Materialise Inspector. This software can process large amounts of images and apply this for accurate quality inspection.

- Increase your process understanding
- Parameterize error detection
- Analyze big data faster than before
Datasheet

- Machine type: laser-based powder/resin systems (Stereolithography, Laser Sintering and Laser Melting)
- Recommended power supply: 100 W, 24 VDC
- Temperature limits: 0 to 40°C
- International Protection Rating: IP20

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### Hardware Modules

<table>
<thead>
<tr>
<th>Description</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Controller</strong></td>
<td>cRIO 1,33 GHz – NI 9035\nDual-Core CPU, 70T FPGA, 1 GB DDR3 memory, 4 GB storage, equipped with 32 GB SD card</td>
</tr>
<tr>
<td></td>
<td>cRIO 1,91 GHz – NI 9039\nQuad-Core CPU, 325T FPGA, 2 GB DDR3 memory, 16 GB nonvolatile storage, equipped with 32 GB SD card</td>
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<tr>
<td><strong>Motion</strong></td>
<td>Modbus TCP/IP - RS485\nVia ethernet connection or RS485</td>
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<tr>
<td></td>
<td>Stepper\nSISU-1004 module support</td>
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<tr>
<td></td>
<td>Profibus\nComsoft Profibus Master support</td>
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<tr>
<td><strong>Scanning</strong></td>
<td>SL2 – 100\nSupporting SL2-100 protocol (preferred protocol), steers Scanhead + Z – Axis</td>
</tr>
<tr>
<td></td>
<td>XY2 – 100\nSupporting XY2-100 protocol, steers Scanhead + Z – Axis</td>
</tr>
<tr>
<td><strong>Laser</strong></td>
<td>Digital Laser – NI 9401\n8 DO high speed TTL for up to 4 lasers</td>
</tr>
<tr>
<td><strong>AO</strong></td>
<td>Analog Laser\n4 Analog Output signals, V</td>
</tr>
<tr>
<td><strong>Sensors</strong></td>
<td>Digital Input – NI 9425\n32 Digital Input connection points, 24VDC input</td>
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<td></td>
<td>Digital Output – NI 9477\n32 Digital Output connection points, sinking to ground (60 VDC max)</td>
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<td></td>
<td>Analog Input – NI 9205\n32 Analog Input : 16 V (+/- 10 V), 16 A (+/-20 mA) or V (+/- -10V)</td>
</tr>
<tr>
<td></td>
<td>Analog Output – NI 9263\n4 Analog output signals, +/- 10V</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td>General Purpose\nRS232, RS485, 2 USB, 2 Gigabit Ethernet</td>
</tr>
<tr>
<td><strong>Embedded Software Services</strong></td>
<td>Lua script Service\nEmbedded Lua environment, Script editor, debugger, example codes</td>
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<td></td>
<td>OPC-UA Service\nFreely configurable, pre-configuration included</td>
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<tr>
<td></td>
<td>Modbus API/Service\nModbus RS485 and TCP-IP are supported in Lua</td>
</tr>
<tr>
<td><strong>Scanning</strong></td>
<td>Scanning Technology\nMicrovectoring, laser gating (hardware and software gating), calibration</td>
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<tr>
<td></td>
<td>Scanfield Technology\n1 scanfield is single optics, more scanfields are multi-optics</td>
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<td></td>
<td>Calibration IP\nCubic calibration interpolation algorithms</td>
</tr>
<tr>
<td><strong>Toolbox</strong></td>
<td>I/O Interface\n(Lua and OPC-UA)\nMemory table of input/output data, accessible via Lua/OPC-UA</td>
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<td></td>
<td>MCP Toolbox\nToolbox for complete configuration, scripting and software updates</td>
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<tr>
<td><strong>Standard Services</strong></td>
<td>Pre-Configuration\nAll I/O’s, OPC-UA and standard components are preconfigured</td>
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<td>Burn-in Testing\nComplete software and hardware testing by Materialise</td>
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</tbody>
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### Services

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<tbody>
<tr>
<td><strong>Training &amp; consultancy</strong></td>
<td>Offered trainings and consultancy\nBasic training for MCP, machine set-up and calibration service, scripting service</td>
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**Powered by Materialise**

The ‘Powered by Materialise’ program unites leaders of the 3D printing industry into Materialise’s extensive eco-system of partners, and allows them to exchange their knowledge, share ideas and bring the 3D printing experience of the AM community to the next level.

For more information, contact us at: software@materialise.be or visit our website materialise.com/en/software/control-platform

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