Materialise Control Platform

"We are delighted to empower our brand new S200 machine with the Materialise Control Platform. Having an **embedded control platform** tailored for Additive Manufacturing opens up many opportunities to explore much **better quality and efficiency**."

Xue Lei, CEO of Bright Laser Technologies

Control and Steer Your Machine

The Materialise Control Platform answers to the growing need for broader and more straightforward control over the AM process. It is engineered towards machine manufacturers, R&D institutes, and those who want to control or adapt the production process to their specific needs.

With this modular, software-driven, embedded hardware solution, you can 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 great control over quality and process repeatability. In addition, it is fully compatible with the Materialise Magics 3D Print Suite.

Version 2016 Release 1

software.materialise.com

materialise magics
3D print suite

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 R&D 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
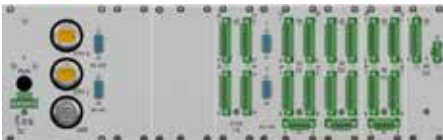
Hardware

SUPPORTED COMMUNICATION PROTOCOLS

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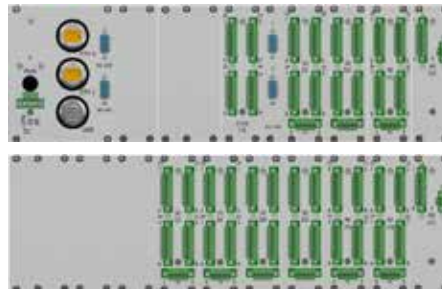- Analog and Digital I/O
- Stepper interface
- RS232

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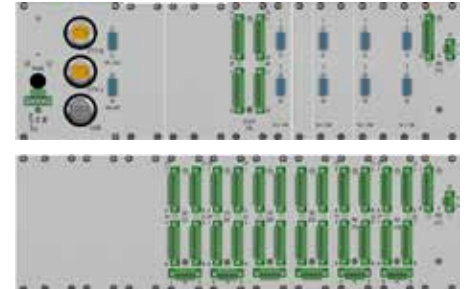- OPC-UA
- and many more...

Standard Configurations

Single Rack

Processor	1,33 GHz dual core OR 1,91 GHz quadcore
Motion	Modbus RS485/ICP/IP
Scanning	SL2-100
Laser	Analog, PWM and Frequency Laser
I/O	1 x 32 Digital Input 1 x 32 Digital Output 1 x 32 Analog Input
General	PS 24VDC, RS232, RS485, 2 USB, 2 Gigabit Ethernet

OPTIONS

Motion	Stepper, Profibus
Sensors	1 x 4 Analog Output

2-Rack R&D

Processor	1,33 GHz dual core OR 1,91 GHz quadcore
Motion	Modbus RS485/ICP/IP
Scanning	SL2-100
Laser	Analog, PWM and Frequency Laser
I/O	3 x 32 Digital Input 3 x 32 Digital Output 3 x 32 Analog Input 2 x 4 Analog output
General	PS 24VDC, RS232, RS485, 2 USB, 2 Gigabit Ethernet

OPTIONS

Motion	Stepper, Profibus

2-Rack Multi-Optics

Processor	1,91 GHz quadcore
Motion	Modbus RS485/ICP/IP
Scanning	4 x SL2-100
Laser	Analog, PWM and Frequency Laser
I/O	2 x 32 Digital Input 2 x 32 Digital Output 2 x 32 Analog Input 2 x 4 Analog output
General	PS 24VDC, RS232, RS485, 2 USB, 2 Gigabit Ethernet

OPTIONS

Motion	Stepper, Profibus

Software

BUILD PROCESSOR

Fine-tune your research process

Rescaling | Slicing | Sub-Division | Hatching | Job File

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 MDM.

- 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.

* Build Processor for LS, LM and SL technology.

TOOLBOX

Easily configure and set up your machine control system
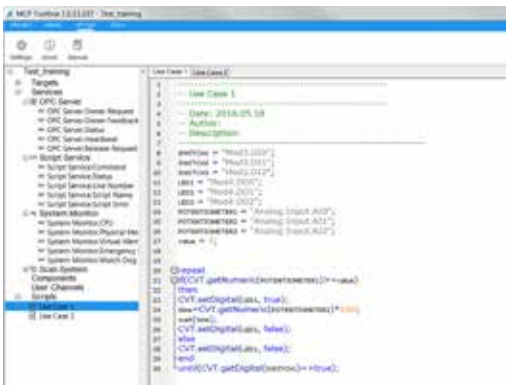
With this toolbox, you can easily communicate with your hardware components.

- 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

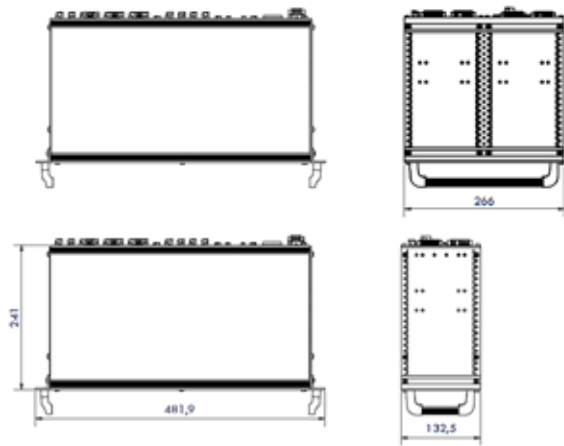### Directly interact with your machine in an intuitive way

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

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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
- Size single rack: 482.1 x 132.5 x 241 mm
  Size double rack: 481.9 x 241 x 132.5 mm
- Weight:
  1-rack: 8-10 kgs, 2-rack: 12-15 kgs
- OS: real time Linux/x64

Hardware Modules	Description	Info
Controller	cRIO 1,33 GHz – NI 9035	Dual-Core CPU, 70T FPGA, 1 GB DDR3 memory, 4 GB storage
	cRIO 1,91 GHz – NI 9039	Quad-Core CPU, 325T FPGA, 2 GB DDR3 memory, 16 GB nonvolatile storage
Motion	Modbus TCP/IP - RS485	Via ethernet connection or RS485
	Stepper	SISU-1004 module support
	Profibus	Comsoft Profibus Master support
Scanning	SL2 – 100	Supporting SL2-100 protocol (preferred protocol), steers Scanhead + Z – Axis
	XY2 – 100	Supporting XY2-100 protocol, steers Scanhead + Z – Axis
Laser	Digital Laser – NI 9401	8 DO high speed TTL for up to 4 lasers
AO	Analog Laser	4 Analog Output signals, V
Sensors	Digital Input - NI 9425	32 Digital Input connection points, 24VDC input
	Digital Output - NI 9477	32 Digital Output connection points, sinking to ground (60 VDC max)
	Analog Input - NI 9205	32 Analog Input : 16 V (+/- 10 V), 16 A (+/-20 mA) or V (+/- 10V)
	Analog Output - NI 9263	4 Analog output signals, +/- 10V
General	General Purpose	RS232, RS485, 2 USB, 2 Gigabit Ethernet
Embedded Software Services	Lua script Service	Embedded Lua environment, Script editor, debugger, example codes
	OPC-UA Service	Freely configurable, pre-configuration included
	Modbus API/Service	Modbus RS485 and TCP-IP are supported in Lua
Scanning	Scanning Technology	Microvectoring, laser gating (hardware and software gating), calibration
	Scanfield Technology	1 scanfield is single optics, more scanfields are multioptics
	Calibration IP	Cubic calibration interpolation algorithms
Toolbox	I/O Interface (Lua and OPC-UA)	Memory table of input/output data, accessable via Lua/OPC-UA
	MCP Toolbox	Toolbox for complete configuration, scripting and software updates
Standard Services	Pre-Configuration	All I/O's, OPC-UA and standard components are preconfigured
	Burn-in Testing	Complete software and hardware testing by Materialise

Services	Description	Info
Training & consultancy	Offered trainings and consultancy	Basic training Advanced Lua Training and Lua libraries On-site consultancy and start-up of your machine Go to software.materialise.com/control-platform for more info.
Standard Service Package	Maintenance	Our maintenance package includes upgrades, debugging and online support.

For more information, contact us at: software@materialise.be
or visit our website software.materialise.com