



Smarter Motion

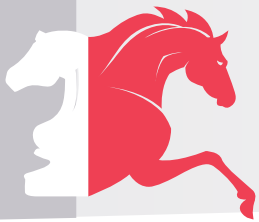
# High-Performance OEM Motion Control Solutions

**Better** Throughput | **Higher** Accuracy | **Faster** Development | **Greater** Flexibility



**35<sup>+</sup>** Years of  
Smarter  
Motion

**ACS**  
MOTION CONTROL



# Our Story

## ACS MOTION CONTROL

Since 1985, original equipment manufacturers in semiconductor, electronics assembly, laser processing, flat panel display, biomedical, and other high-tech industries have trusted ACS Motion Control to improve machine performance, enhance design flexibility, accelerate application development, and minimize time to market.

With headquarters in Israel, subsidiaries in the United States, Germany, and China, and a global network of distributors and partners, our organization is structured to meet the needs of OEMs operating globally. Since 2017, we are a proud member of The Physik Instrumente (PI) Group.

We are always ready to rise to the challenge to deliver smart, best-performing motion control solutions for the most demanding applications, developed and supported in partnership with you and in-line with your needs.



## ***Standard Products, Tailored Solutions***

ACS and its partners tailor motion control solutions with standard products to meet your unique requirements.

- Motion controllers
- Motion controllers with integrated drives
- Motor drives
- Drive interfaces
- Laser interfaces
- Auxiliary products

## ***Competencies to Address Challenging Applications***

Our unique mix of competencies enables you to solve the toughest motion control challenges of today and tomorrow.

- Advanced servo control algorithms and motor drive technology
- Sophisticated motion profile generation algorithms
- Motion-to-process event synchronization
- EtherCAT-based control systems
- Extensive application development tools and libraries
- Expert application and support engineering

# The Industries We Serve & Advance



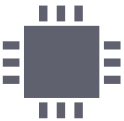
## ***Semiconductor***

Using our advanced development tools and capabilities, semiconductor OEMs and machine builders can better manage highly complex motion control applications, all while addressing the industry's high throughput, accuracy and resolution requirements.



## ***Flat Panel Display***

The latest generation of display panels rely on our advanced motion controllers and drives to achieve high levels of accuracy and throughput.



## ***Electronics***

Our motion controllers and drives address the needs of electronics manufacturing applications, including surface mount technology (SMT) assembly equipment, automated optical inspection (AOI) equipment and dispensing and coating systems.



## ***Laser Processing***

Our motion and laser control products, advanced control algorithms and sophisticated laser control solutions differentiate us from other suppliers in the market. These technologies enable laser systems to process workpieces with greater accuracy and speed.



## ***Biomedical Systems***

Our compact control solutions are ideal for biomedical system designers that require flexibility, high throughput and a small footprint for ever-shrinking biomedical machines.



## ***Industrial Printing***

Whether printing on large sheets or materials from roll to roll, our advanced multi-axis controllers, drives and high-speed motion-to-process synchronization capabilities improve machine throughput and accuracy in industrial printing applications.



## ***Additive Manufacturing***

Our unique motion control capabilities can help additive manufacturing OEMs achieve higher printing resolution, better machine throughput and shorter time to market in 3D printing systems.



## ***Medical Imaging and Treatment***

Our motion controllers and drives are ideal for medical imaging and treatment systems, which depend on advanced motion control products to position patients and radiation sources safely and reliably.

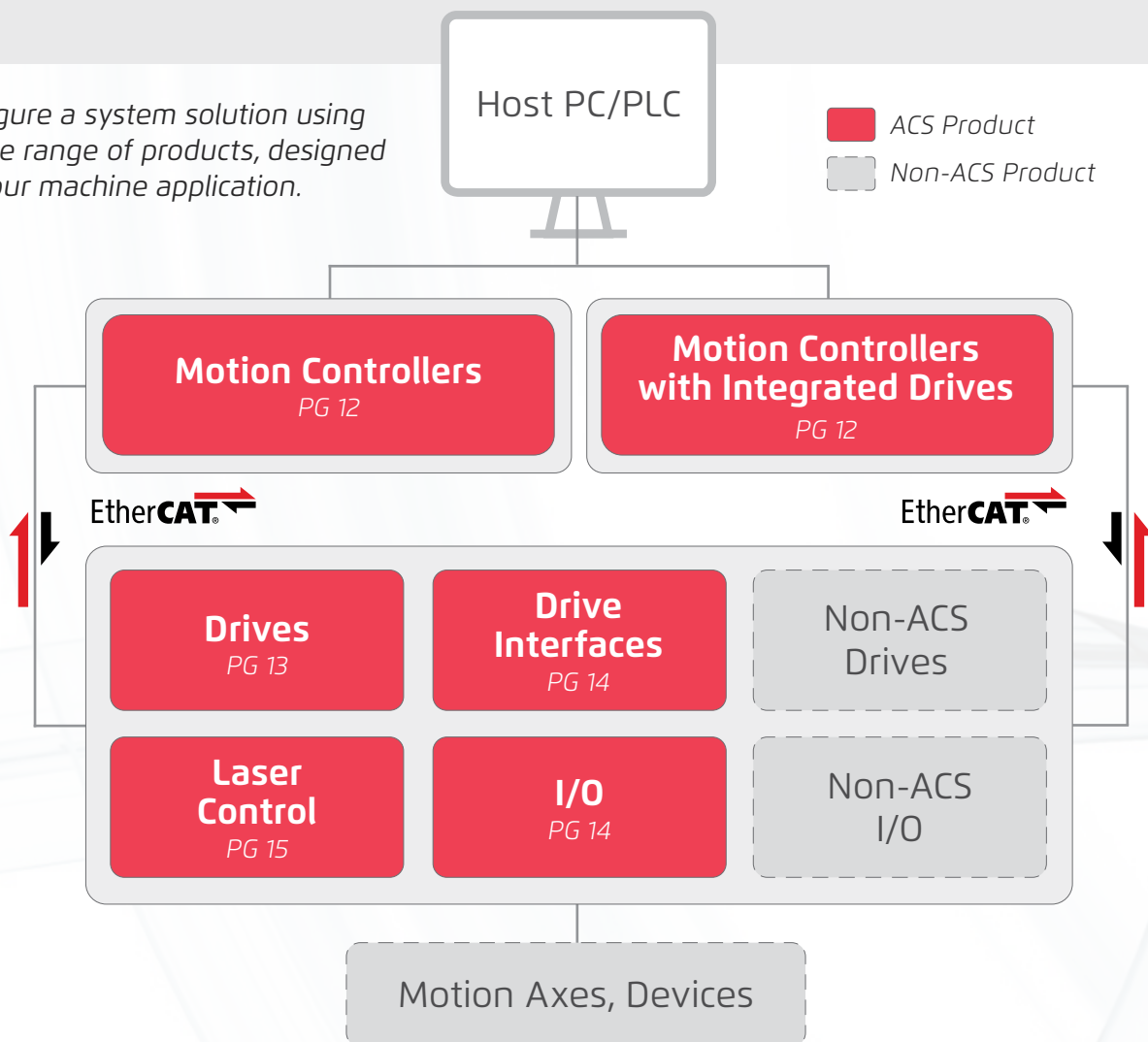
# Our Product Families



## The SPiiPlus Platform

Our flagship EtherCAT-based SPiiPlus motion control platform is designed to achieve the highest levels of motion performance while providing the flexibility and scalability required by sophisticated OEM applications. Featuring a wide range of powerful tools and advanced capabilities, the SPiiPlus ecosystem includes a robust offering of motion controllers, drives, interfaces, input/output modules, and laser control interfaces.

Configure a system solution using a wide range of products, designed for your machine application.







### ***The Economical Control Module (ECM) Series***

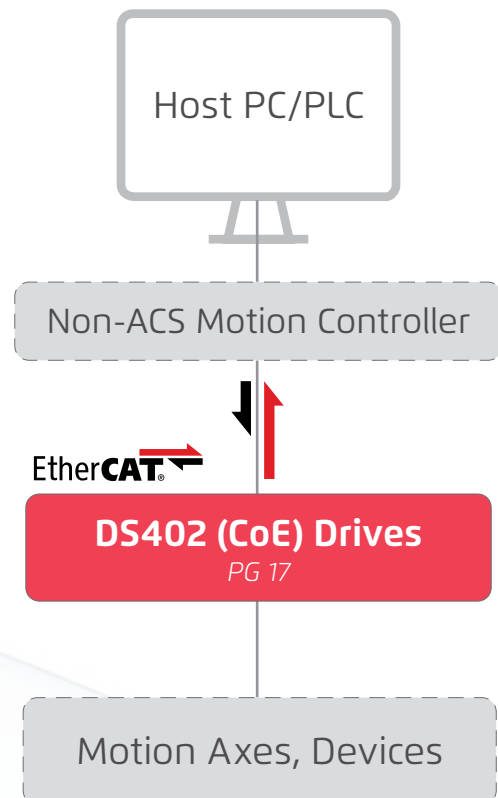
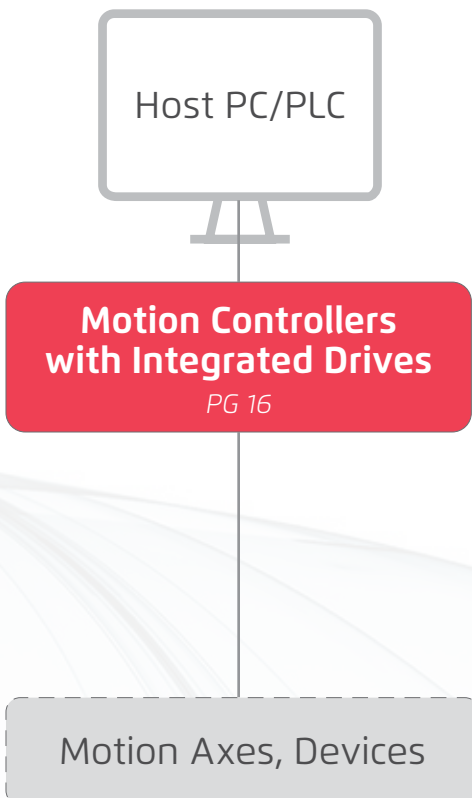
Our ECM Series of products feature all-in-one motion control and motor drive solutions for cost-sensitive single or multi-axis OEM applications. Designed to streamline machine integration at a cost-effective price point, ECM series products leverage the same powerful development, tuning, programming and performance analysis software tools as our SPiiPlus series. ECM products are compact, highly integrated, industrialized single-box solutions.



### ***The Intelligent Drive Module (IDM) Series***

The IDM Series of DS402 (CiA402) EtherCAT single-axis and multi-axis drives meets the needs of OEM machine builders using non-ACS EtherCAT controllers looking to increase motion accuracy and throughput. Its unique servo control algorithms and performance optimization tools are ideally suited for applications involving high-precision linear and rotary motion stages.

**EtherCAT**  
Conformance tested



# One Common Set of Development Tools

## The SPiiPlus ADK Suite

All three product families are supported by our **SPiiPlus ADK Suite**, which integrates all the development tools, software libraries and product resources you need to design, deploy and maintain your motion control application over the course of a machine's lifespan.

This comprehensive package includes our **MMI Application Studio**, which provides powerful, easy-to-use tools for configuring, tuning, programming, and measuring motion performance.

MMI Application Studio tools include:

- **Frequency Response Function (FRF) Analyzer**, offering sophisticated frequency domain measurement, analysis and design capabilities necessary for maximizing servo stability and bandwidth.
- **Smarter Autotuning**, helpful to both the novice and expert, this flexible tool accelerates motor tuning procedures.
- **3D Scope** for visualizing motion and analyzing data in three dimensions, streamlining development in pick-and-place, 3D inspection, metrology and other applications.
- **System Setup Tools** for single-click EtherCAT network configuration.
- **Adjuster Wizard** for step-by-step axis configuration and tuning.



## SPiiPlus Simulator

The SPiiPlus Simulator accelerates application development at the controller and host levels without having to connect to any hardware. Using a robust simulation of your machine and motion control system, you can more quickly develop and debug process recipes, emulate responses to inputs and fault conditions and much more.

- Significantly reduce development and programming effort.
- Develop and test host applications in C, C++, C#, .NET, Linux, LabView, and more.
- Develop and test controller applications in ACSPL+ or G-code.
- Simulate machine input and fault conditions for more robust error handling.

## Host Application Development Libraries

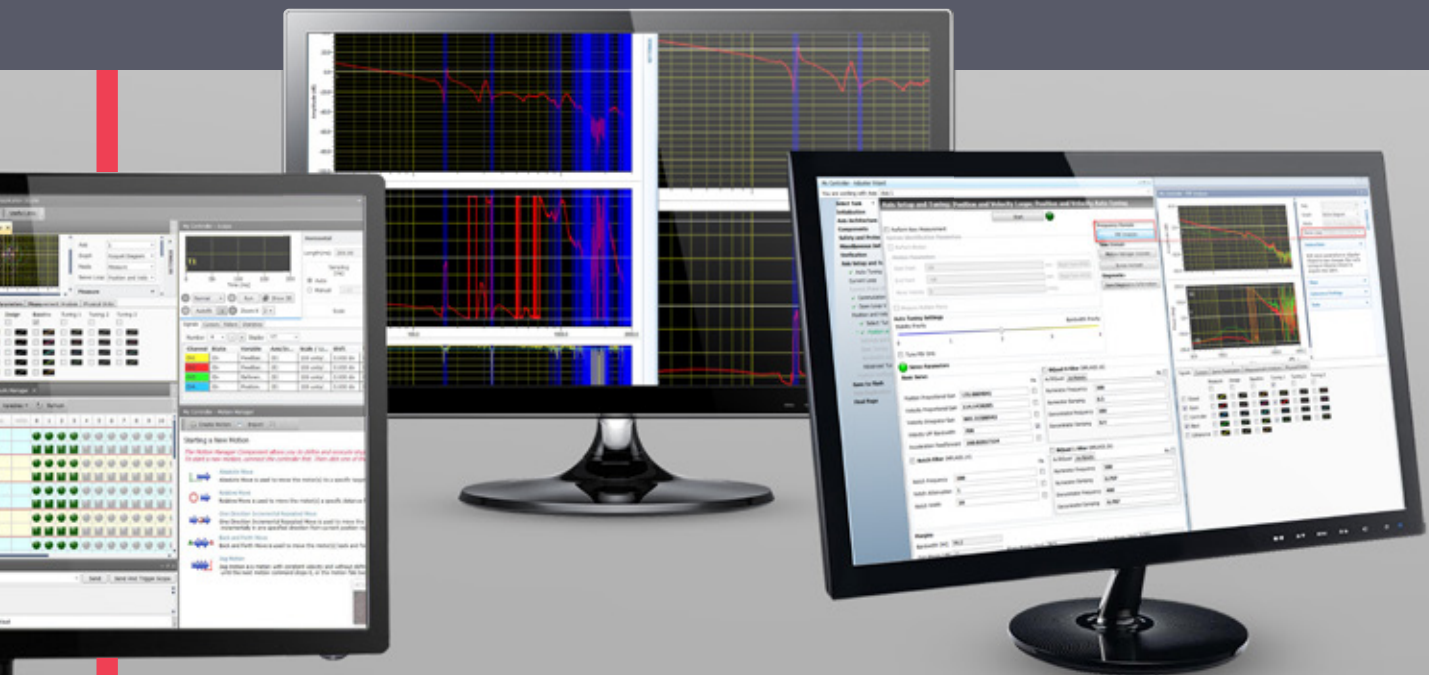
Reduce your time to market by taking advantage of our powerful host application libraries that work seamlessly with all controller models including the SPiiPlus Simulator. Available libraries include C/C++, COM, .NET, MATLAB, Linux, and low-level socket.

If you need to implement motion system measurement, design, and reporting functionality into your host application, leverage our **FRF Analyzer Library's** ready-made frequency response measurement and analysis capabilities to minimize software development effort.

## ACSPL+ Real-Time Programming

All of our motion controllers support ACSPL+, a powerful yet easy-to-use high-level real-time programming language with over 20 years of improvements designed to reduce complexity of multi-axis motion and machine control application development.

- Easily synchronize motion with events to maximize machine throughput
- Create customized data structures and functions to implement unique machine functionality
- Collect, gather, and process large amounts of data at high update rates



We Support:



# Servo Control & Drive Technology

## ServoBoost

The ServoBoost algorithm leverages powerful Servo Processor technology and modern control theory to outperform PID-based algorithms – a must-have for applications with demanding move and settle, standstill jitter, and constant velocity requirements.

## LearningBoost

This state-of-the-art control algorithm increases motion system accuracy and throughput by learning and pre-emptively compensating for system disturbances. Combine LearningBoost with other ACS Motion Control servo algorithms to maximize the performance of your motion system.

## NanoPWM

By combining the advantages of linear and PWM amplifiers, our proprietary NanoPWM technology provides sub-nanometer standstill jitter and nanometer-level positioning in applications that involve large format, high-precision motion systems.

## Smarter Gantry Control

Powered by unique, multi-axis servo processor technology, we offer advanced multi-input multi-output (MIMO) gantry control algorithms that simplify the configuration and tuning process of gantry stages, enhancing their accuracy, throughput and stability.

## Non-Linear Control

Use Non-Linear Control to outperform traditional linear PID and PIV control and address non-linear phenomena. It uses non-linear control laws to reduce move and settle times and improve overall motion system performance in high-accuracy positioning applications.

## Universal Servo Drive Technology

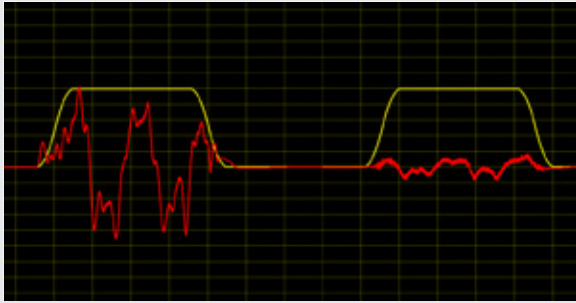
For systems that combine various motor technologies, our Universal Servo Drive Technology provides a common platform for controlling all motor and stage technologies in the machine. This capability offers you the flexibility to select the best mechanical solutions for your application.

## Servo Algorithm Customization

For exceptionally unique and demanding applications, contact your ACS representative to learn about leveraging our competency in servo control algorithms to enable your motion system to exceed its performance requirements.

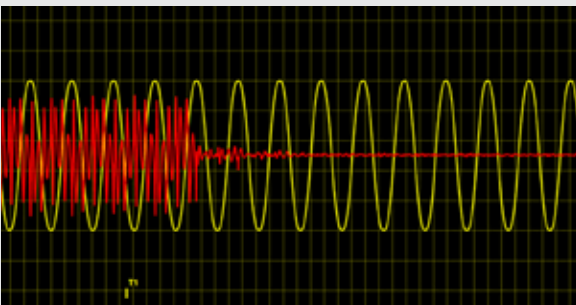


# Motion Profile Generation



## ServoBoost

Improve motion system performance with a unique servo algorithm



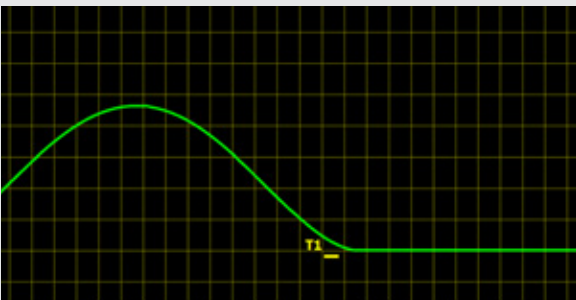
## LearningBoost

Increase throughput by pre-emptively compensating for system disturbances



## NanoPWM

Optimize motion system performance for nanometer resolution applications



## MotionBoost

Increase throughput with advanced motion profiles

## MotionBoost

Semiconductor and flat panel display equipment must perform static measurements at thousands of points across the wafer or panel. In these applications, every millisecond counts. MotionBoost generates advanced motion profiles that minimize the energy injected into the stage, reducing vibration and settling time.

## Segmented Motion

Many laser processing and additive manufacturing applications require coordinated motion along a multi-axis path. Segmented Motion provides this functionality in systems with up to six axes and includes sophisticated look-ahead velocity adjustment, corner rounding, and synchronization of digital outputs to motion segments.

## SmoothPath

SmoothPath increases throughput and reduces jerk and other disturbances caused by complex CAD/CAM-generated poly-line motion paths in laser processing and additive manufacturing applications. It also improves constant velocity control, all while synchronizing process tasks to motion.

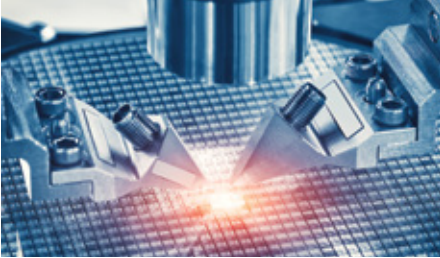
## Jerk-Limited Motion

Second-order, acceleration-limited profiles are not suitable for many motion control applications, as the changes in acceleration can create disturbances that limit throughput and accuracy. ACS controllers offer standard third-order jerk-limited motion profiles with the ability to dynamically adjust profile parameters and endpoints.

Visit us online to learn more.

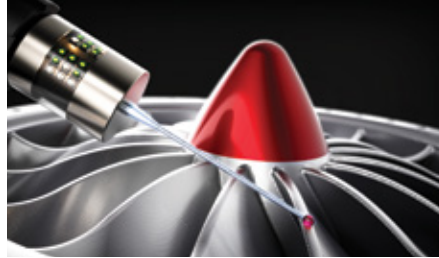
# Motion Process Synchronization

## High-Speed Position Event Generation



➔ High-resolution inspection, metrology, patterning, and printing applications rely on the motion control system to accurately trigger devices including cameras, inspection heads, and lasers based on encoder position at high speed. ACS products provide this capability via Position Event Generation (PEG). Flexible operating modes include incremental fixed distance pulsing and array-based random distance pulsing.

## High-Speed Position Capture



➔ Measurement applications like probing, semiconductor packaging and coordinate measurement machines (CMM) rely on motion control systems to capture axis positions at the precise moment a measurement is taken. ACS products provide registration mark position capture (MARK) functionality with sub-microsecond latency to enable the highest throughput.

## Multi-Axis Position-Based Triggering



➔ In laser processing, industrial digital printing and additive manufacturing applications, motion systems must activate and synchronize lasers and print heads with multi-axis motion. Systems with our Laser Control Interface provide pulsing or gating signals with sub-microsecond synchronization, enabling micron-level process accuracy even at high speeds.

# Controller Application Development

## G-Code Programming



➔ SPiiPlus motion controllers can perform high-end CNC functions through native G-Code programming. Developed to meet the needs of demanding laser processing applications, our G-Code programming support includes rich motion profile generation options.

## Duplicate Machine



➔ This built-in feature automates the controller configuration process in a production or field service setting. It consolidates the entire motion control system's configuration files and parameters into a single directory, and it also detects hardware inconsistencies.

## PLC/PAC Integration



➔ Using our comprehensive PLC/PAC resources, leverage powerful motion control capabilities by integrating an ACS controller into your EtherCAT, Ethernet/IP, or Modbus machine architecture.

# Machine Safety, Security & Uptime

## Diagnostics & Preventive Maintenance



➔ To address the demands of Industry 4.0, many OEMs and machine builders are developing advanced machine monitoring capabilities to gain deeper insights into their machines. We provide these OEMs with the tools they need to build intelligent machines with greater diagnostic and preventive maintenance functions.

## Application Protection



➔ Protect your application code and machine and motor settings with our built-in security features. Use password protection to define user access privileges for developers, engineers and field service technicians, temporarily disable controller protection for troubleshooting, re-enable protection without rebooting and more.

## Drive Functional Safety



➔ PLe/SIL3-certified Safe Torque Off (STO) and Safe Stop 1 (SS1) functionalities are available in select ACS Motion Control drives — offering a simple, cost-effective way to implement machine safety. You can connect inputs to the safety PLC or directly to safety sensors, eliminating the need to disconnect power from the drive through expensive relays.

# Support & Service

## Customized OEM Training



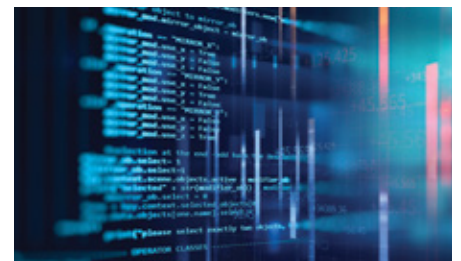
➔ To help you take your machine's performance to the next level, we offer both remote and onsite training programs for OEMs and machine builders. Our goal is to help you bring new technologies to market quicker and deepen your understanding of motion controller platforms.

## Application Development Services



➔ For machine builders with limited in-house development resources, we offer application development services that tap into our engineers' expertise in multi-axis motion control systems.










## Third Party-to-ACS Controller Code Conversion



➔ To reduce your cost, effort and risks associated with switching motion control platforms, our motion control experts offer controller conversion services. **Contact us to get started.**



# SPiiPlus Platform: Hardware

Motion Controllers		SPiiPlus EtherCAT master motion controllers are available in PC-based (software only) and standalone models. Units support up to 128 axes and feature EtherCAT cycle rates up to 5 kilohertz (model-dependent).						
Product	Max. Controller Axes	Host PC/PLC/PAC Communication		Max. EtherCAT Cycle Rate		Mounting		
 SPiiPlusES	64	EtherCAT TCP/IP Ethernet/IP Modbus RS-232		5 kHz		Panel DIN Rail		
 SPiiPlusEC	64	TCP/IP Ethernet/IP Modbus RS-232		5 kHz		Panel DIN Rail PCB		
 SPiiPlusSC-HP	128	TCP/IP Shared RAM		5 kHz		Embedded in PC		
 SPiiPlusSC-LT	8	TCP/IP		1 kHz		Embedded in PC		
Motion Controllers with Integrated Drives		ACS' Control Modules combine a SPiiPlus EtherCAT master motion controller and up to eight integrated drives. Units feature a unique multi-processor architecture that leverages powerful servo control algorithms and universal servo drive technology.						
Product	Max. Controller Axes	Host PC/ PLC/PAC Communication	Max. EtherCAT Cycle Rate	Drive Data		Encoder Channels	Mounting	Functional Safety Options
 MP4Unt	64	EtherCAT TCP/IP Ethernet/IP Modbus RS-232	5 kHz	Drive Axes: Up to 8 Drive Supply Input: 100-240 Vac Bus Voltage*: 48 or 96 Vdc Max. Current Per Axis: 13.3/40 A		Max. 16^ any combination AqB: 16^ Absolute: 8 SinCos: 16^	Rack	STO
 MC4Unt	64	TCP/IP Ethernet/IP Modbus RS-232	5 kHz	Drive Axes: Up to 8 Drive Supply Input: 85-400 Vac Bus Voltage*: 24-560 Vdc Max. Current Per Axis: 45/90 A @ 4 axes Max. Current Per Axis: 20/40 A @ 8 axes		Max. 8 any combination AqB: 8 Absolute: 4 SinCos: 8	Panel Rack	STO
 SPiiPlus CMxa	64	TCP/IP Ethernet/IP Modbus RS-232	5 kHz	Drive Axes: 1, 2 or 3 Drive Supply Input: 85-265 Vac Bus Voltage: Vin x 1.414 Max. Current Per Axis: 15/30 A		Max. 4 any combination AqB: 4 Absolute: 3 SinCos: 3	Panel	STO, SS1
 SPiiPlus CMhv	32	TCP/IP Ethernet/IP Modbus RS-232	2 kHz	Drive Axes: 1 or 2 Drive Supply Input: 230 or 400-480 Vac Bus Voltage: Vin x 1.414 Max. Current Per Axis: 20/60 A @ 230 Vac Max. Current Per Axis: 15/30 A @ 400-480 Vac		Max. 4 any combination AqB: 4 Absolute: 2 SinCos: 2	Panel	STO
 SPiiPlus CMnt	32	TCP/IP Ethernet/IP Modbus RS-232	2 kHz	Drive Axes: 1 or 2 Drive Supply Input: 85-230 Vac Bus Voltage: Vin x 1.414 Max. Current Per Axis: 7.5/15 A		Max. 4 any combination AqB: 4 Absolute: 2 SinCos: 2	Panel	STO

All control modules support onboard real-time multi-threading programming (ACSPL+, G&M Code optional). Current values are in units of Amps peak of sine. ^Value of 16 assumes 4x NPM3U drive cards in the MP4U (4 channels per drive card). For 4x UDM3U drive cards, value is 8 (2 channels per drive card). \*Value depends on power supply module selected.



## Drives




*SPiiPlus series motor drives are highly configurable and offered in numerous form factors, sizes, voltages, and current levels. Design your next motion system with flexibility and confidence knowing that all support almost any motor and encoder technology. SPiiPlus drives offer low noise and jitter, high resolution and impressive dynamic current range. Control any SPiiPlus series motor drive with any SPiiPlus series motion controller.*




Product	Drive Data	Encoder Channels	Mounting	Functional Safety Options
 <b>UDMsA</b>	Drive Axes: 1 Drive Supply Input: 12-150 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 15/30 A	Max. 2 any combination AqB: 2 Absolute: 2 SinCos: 2	Panel	STO, SS1
 <b>UDMsm</b>	Drive Axes: 2 or 4 Drive Supply Input: 12-48 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 5/10 A	Max. 4 any combination AqB: 4 Absolute: 4 SinCos: 4	Panel	STO, SS1
 <b>MP4Udc</b>	Drive Axes: Up to 8 Drive Supply Input: 100-240 Vac Bus Voltage*: 48 or 96 Vdc Max. Current Output Per Axis: 13.3/40 A	Max. 16^ any combination AqB: 16^ Absolute: 8 SinCos: 16^	Rack	STO
 <b>MC4Udc</b>	Drive Axes: Up to 8 Drive Supply Input: 85-400 Vac Bus Voltage*: 24-560 Vdc Max. Current Per Axis: 45/90 A up to 4 axes Max. Current Per Axis: 20/40 A up to 8 axes	Max. 8 any combination AqB: 8 Absolute: 4 SinCos: 8	Panel Rack	STO
 <b>NPMpm</b>	Drive Axes: 1 or 2 Drive Supply Input: 12-100 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 13.3/40 A	Max. 4 any combination AqB: 4 Absolute: 2 SinCos: 4	Panel	STO
 <b>UDMxa</b>	Drive Axes: 1, 2 or 3 Drive Supply Input: 85-265 Vac Bus Voltage: Vin x 1.414 Max. Current Output Per Axis: 15/30 A	Max. 4 any combination AqB: 4 Absolute: 3 SinCos: 3	Panel	STO, SS1
 <b>UDMhv</b>	Drive Axes: 1 or 2 Drive Supply Input: 230 Vac or 400-480 Vac Bus Voltage: Vin x 1.414 Max. Current Output Per Axis: 20/60 A @ 230 Vac Max. Current Output Per Axis: 15/30 A @ 400-480 Vac	Max. 4 any combination AqB: 4 Absolute: 2 SinCos: 2	Panel	STO
 <b>UDMpm</b>	Drive Axes: 1 or 2 Drive Supply Input: 85-230 Vac Bus Voltage: Vin x 1.414 Max. Current Output Per Axis: 7.5/15 A	Max. 4 any combination AqB: 4 Absolute: 2 SinCos: 2	Panel	STO
 <b>UDMmc</b>	Drive Axes: 2 or 4 Drive Supply Input: 12-80 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 20/40 A	Max. 4 any combination AqB: 4 Absolute: 4	Panel	STO
 <b>UDMlc</b>	Drive Axes: 2 or 4 Drive Supply Input: 12-48 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 5/10 A for 2 axis Max. Current Output Per Axis: 2.5/5 A for 4 axis	Max. 4 any combination AqB: 4 Absolute: 2	Panel DIN Rail	

Current values are in units of Amps peak of sine. \*Value of 16 assumes 4x NPM3U drive cards in the MP4U (4 channels per drive card). For 4x UDM3U drive cards, value is 8 (2 channels per drive card). \*Value depends on power supply module selected.

Drives				
Continued.				
Product	Drive Data	Encoder Channels	Mounting	Functional Safety Options
 UDMsD	Drive Axes: 2 or 4 Drive Supply Input: 12-48 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 2.5/5 A	Max. 4 any combination AqB: 4 Absolute: 2	Panel DIN Rail	
 UDMpa	Drive Axes: 1 or 2 Drive Supply Input: 12-100 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 13.3/40 A	Max. 2 any combination AqB: 2 Absolute: 2 SinCos: 2	Panel	STO
 UDMnt	Drive Axes: 1 or 2 Drive Supply Input: 12-80 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 10/20 A	Max. 2 any combination AqB: 2 Absolute: 2 SinCos: 2	Panel	
 UDMcb	Drive Axes: 1 or 2 Drive Supply Input: 12-100 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 13.3/40 A	Max. 2 any combination AqB: 2 Absolute: 2 SinCos: 2	PCB	STO

Current values are in units of Amps peak of sine. \*Value of 16 assumes 4x NPM3U drive cards in the MP4U (4 channels per drive card). For 4x UDM3U drive cards, value is 8 (2 channels per drive card). \*Value depends on power supply module selected.

Drive Interfaces		Controllable by any SPiPlus EtherCAT master, our two- and four-axis drive interfaces enable open or closed loop control of third-party drives via +/-10 V analog torque or pulse/direction commands.		
Product	Axes of Drive Commands	Command Type	Encoder Channels	Mounting
 UDIhp UDIlt	2 or 4	+/-10V Analog (torque, 16-bit) (hp, 12-bit lt)	Max. 4 any combination AqB: 4 Absolute: 2 SinCos: 4 (hp only)	Panel DIN Rail
 PDMnt	4	Pulse/Direction (position)	None	Panel DIN Rail
 PDIcl	2 or 4	Pulse/Direction (position)	Max. 4 any combination AqB: 4 Absolute: 2	Panel DIN Rail

I/O Modules		Controllable by any SPiPlus EtherCAT master, our digital and analog I/O modules feature a distributed clock functionality that provides sub-millisecond synchronization to motion, achieving higher levels of throughput.		
Product	Max. Digital Inputs/Outputs	Max. Analog Inputs/Outputs	EtherCAT Specs	
 IOMnt	32/32 (Source/PNP type)	0/0	Max. Cycle Rate: 5 kHz Distributed Clock: Yes	
 IOMps-EA0004	0/0	0/4 (16 bit, +/-10V single ended)	Max. Cycle Rate: 5 kHz Distributed Clock: Yes	
 IOMps-EA0400	0/0	4/0 (16 bit, +/-10V single ended)	Max. Cycle Rate: 5 kHz Distributed Clock: Yes	

## Laser Control

### Laser Control Interface



Working under any SPiiPlus Platform EtherCAT master controller, our Laser Control Interface (LCI) tightly synchronizes the control of a fixed beam laser with motion. Its sub-microsecond latency enables highly accurate laser micromachining, while high-pulse frequencies increase throughput. The LCI supports a variety of different operating modes, including combined modes. Synchronize your laser and motion control up to five axes.

- Position Based Triggering
- Velocity Based Power Control
- Integrated Triggering and Power Control

## SPC: Smart Processing Commander

This advanced user interface software is designed for laser processing and additive manufacturing machine builders looking for an out-of-box solution to provide complete machine control including motion axes, lasers, galvo scanners, cameras and other automation components. SPC supports 2D and 3D processing, flexible CAD-to-Motion import and design, and is easily customizable using C# plugins. Use SPC to control XLSCAN (see page 19).



- Control Motion Stage and Galvo Scanner from a single interface
- Comprehensive environment for manual and automated machine control



# The ECM Series



## Economical Control Modules

**Connect.  
Command.  
Control.**



Our **ECM Series** of products feature all-in-one motion control and motor drive solutions for cost-sensitive single or multi-axis OEM applications. Designed to streamline machine integration at a cost-effective price point, ECM series products leverage the same powerful development, tuning, programming and performance analysis software tools as our SPiiPlus series. ECM products are compact, highly integrated, industrialized single-box solutions.

### Economical Control Modules: All-in-One Controller and Drives

Product	Controller Axes	Host PC/PLC/PAC Communication	Max. Controller Cycle Rate	Drive Data	Encoder Channels	Mounting	Functional Safety Options
 <b>ECMsa</b>	1	TCP/IP Ethernet/IP Modbus RS-232	1 kHz	Drive Axes: 1 Drive Supply Input: 12-150 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 15/30 A	Max. 2 any combination AqB: 2 Absolute: 2 SinCos: 2	Panel	ST0, SS1
 <b>ECMsm</b>	2, 4	TCP/IP Ethernet/IP Modbus RS-232	1 kHz	Drive Axes: 2 or 4 Drive Supply Input: 12-48 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 5/10 A	Max. 4 any combination AqB: 4 Absolute: 4 SinCos: 4	Panel	ST0, SS1





# The IDM Series



## Intelligent Drive Modules

### The Drive to Win

The **IDM Series** of DS402 (CiA402) EtherCAT single-axis and multi-axis drives meets the needs of OEM machine builders using non-ACS EtherCAT controllers looking to increase motion accuracy and throughput. Its unique servo control algorithms and performance optimization tools are ideally suited for applications involving high-precision linear and rotary motion stages.



### Intelligent Drive Modules: High Performance DS402 EtherCAT Drives

Product	Controller Interface	Max. EtherCAT Cycle Rate	Drive Data	Encoder Channels	Mounting	Functional Safety Options
 IDMsa	EtherCAT (DS402 CoE protocol)	4 kHz	Drive Axes: 1 Drive Supply Input: 12-150 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 15/30 A	Max. 2 any combination AqB: 2 Absolute: 2 SinCos: 2	Panel	STO, SS1
 IDMsm	EtherCAT (DS402 CoE protocol)	4 kHz	Drive Axes: 2 or 4 Drive Supply Input: 12-48 Vdc Bus Voltage: Equal to Vin Max. Current Output Per Axis: 5/10 A	Max. 4 any combination AqB: 4 Absolute: 4 SinCos: 4	Panel	STO, SS1

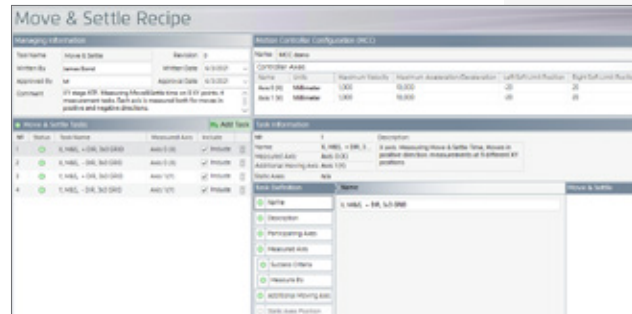
# Smarter Motion Tools: SMT



**Smarter Motion Tools** is a windows-based program that simplifies the process of defining motion performance specification requirements, automating and executing repeatable measurements, and analyzing the measured performance of motion systems managed by any ACS motion controller. SMT software is offered in three different operating versions. Each operating version is supported by the same download package.

- Streamline motion stage performance measurement, verification and analysis
- Eliminate the need to develop and maintain custom motion stage performance analysis software
- Simply create complex measurement, testing and analysis processes — no programming required
- Define and execute one common Acceptance Test Procedure to use during all life phases from development to field maintenance

## Design Measure Verify



RECIPE

Test Name	Start	End	Total Time	Success Count	Log
1. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
2. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
3. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
4. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
5. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
6. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
7. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
8. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
9. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
10. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
11. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
12. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
13. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
14. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
15. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
16. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
17. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
18. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
19. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
20. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
21. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
22. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
23. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
24. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
25. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
26. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
27. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
28. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
29. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
30. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None

RUN

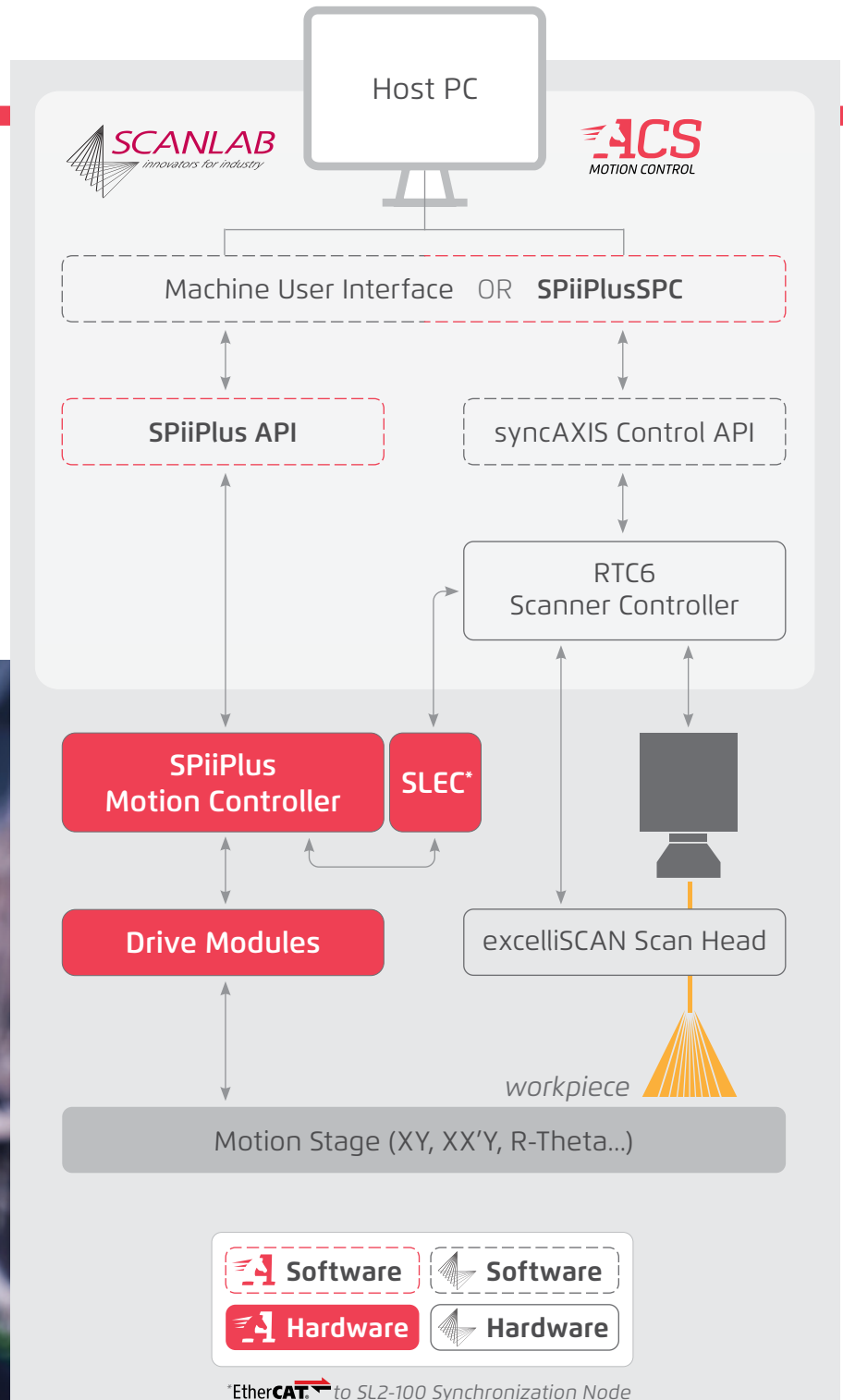
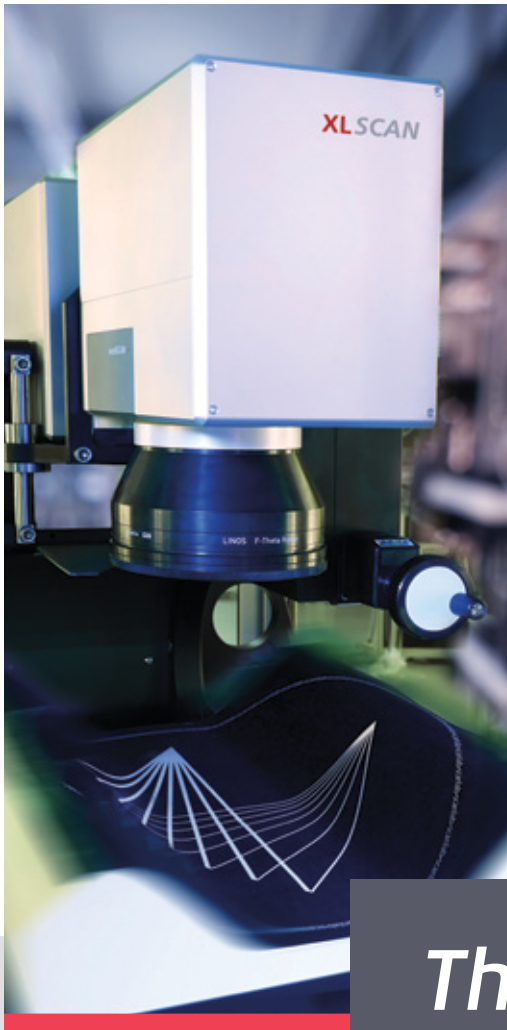
Test Name	Start	End	Total Time	Success Count	Log
1. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
2. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
3. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
4. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
5. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
6. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
7. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
8. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
9. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
10. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
11. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
12. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
13. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
14. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
15. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
16. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
17. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
18. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
19. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
20. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
21. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
22. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
23. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
24. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
25. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
26. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
27. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
28. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
29. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None
30. S.MBL - 100, 300, 300, 300	00:00:00	00:00:00	00:00:00	0	None

RESULTS



# XL Scan: Extra Large Field Laser Scanning

Using galvo scanners and motion stages to laser-process large workpieces involves a step-and-scan approach that can limit throughput and is prone to stitching errors. To address these issues, we jointly developed **XL SCAN**, which synchronizes the control of galvo scanners and motion stages and provides laser processing OEMs with the most precise large-format processing solution on the market.



## Think Big. Scan Large.



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