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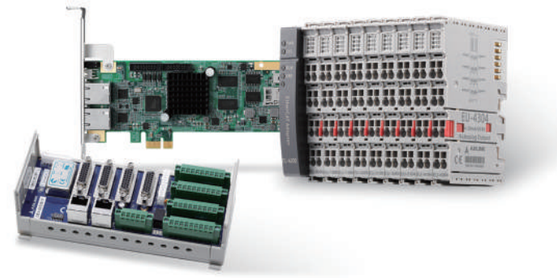
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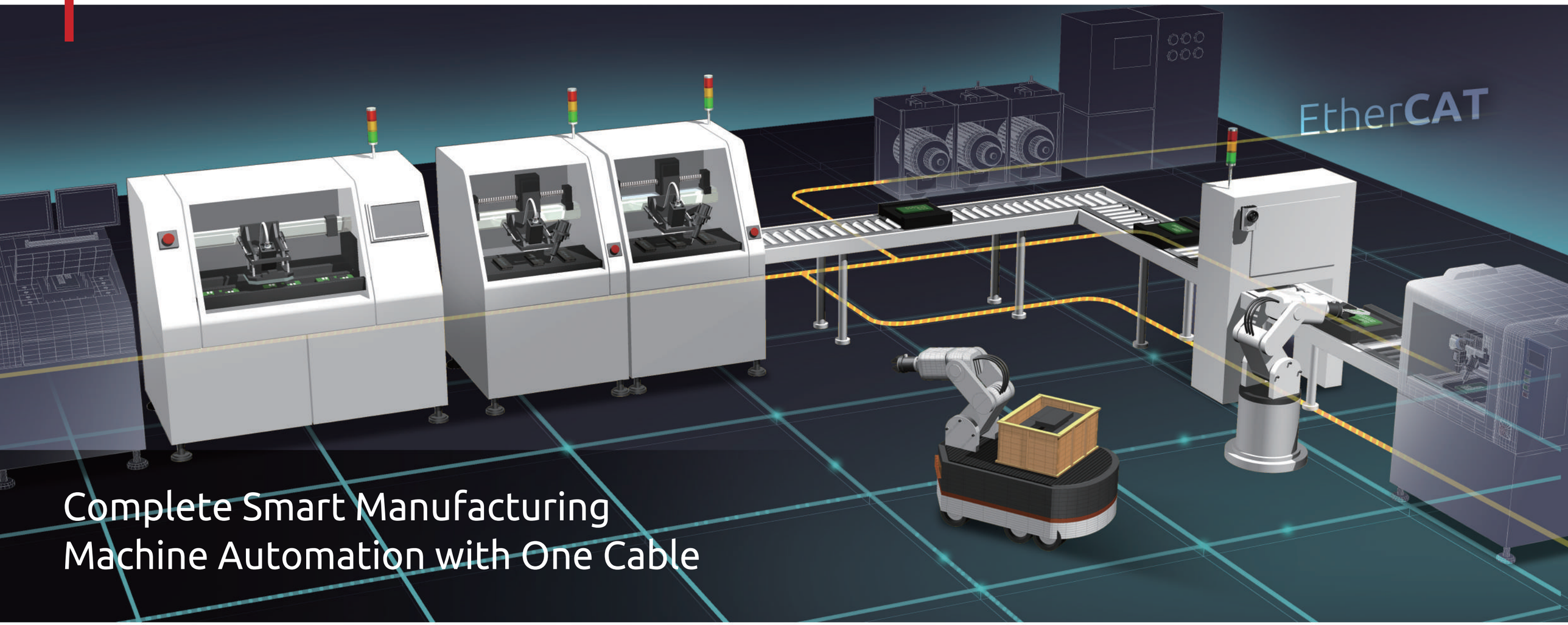


ADLINK EtherCAT Solutions



Product Brochure

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Complete Smart Manufacturing Machine Automation with One Cable

Factories and supply networks need better real-time solutions to meet quickly changing demand and guarantee reliable and smooth production. The rapidly growing global industrial automation market and expansion of automated production lines are helping them achieve this through increasingly extensive motion control.

Smart factories today are under enormous pressure to expand and must be able to scale quickly to seize new business opportunities. As those factories extend their capabilities, they need highly-synchronized motion control systems to keep all their machines running in sync. The open protocol EtherCAT fieldbus system uses Ethernet cables to connect all motion control systems in series for synchronous control, providing flexibility in matching different master-slave, IO sensing, and other subsystems. Customers can quickly deploy and maintain the automation system according to the needs of the original equipment, easily cope with different manufacturing conditions, and optimize the overall intelligent manufacturing efficiency. ADLINK has a unique ability to integrate hardware and software in motion control. Through the upgradable centralized management of motion control software, manufacturers can capture the long-term development potential of intelligent manufacturing.

EtherCAT®

Why ADLINK

ADLINK Technology Inc. has many years of market-proven expertise in automation technology, with the domain knowledge and field experience to meet and exceed customer needs, and a wealth of highly integrated automation solutions and industrial motion control products for real-time I/O and motion control.

Scalability

For future expansion of smart factories

Synchronization

For multi-axis simultaneous motion control

Flexibility

For deployment without communication issues

Performance

For optimized smart manufacturing

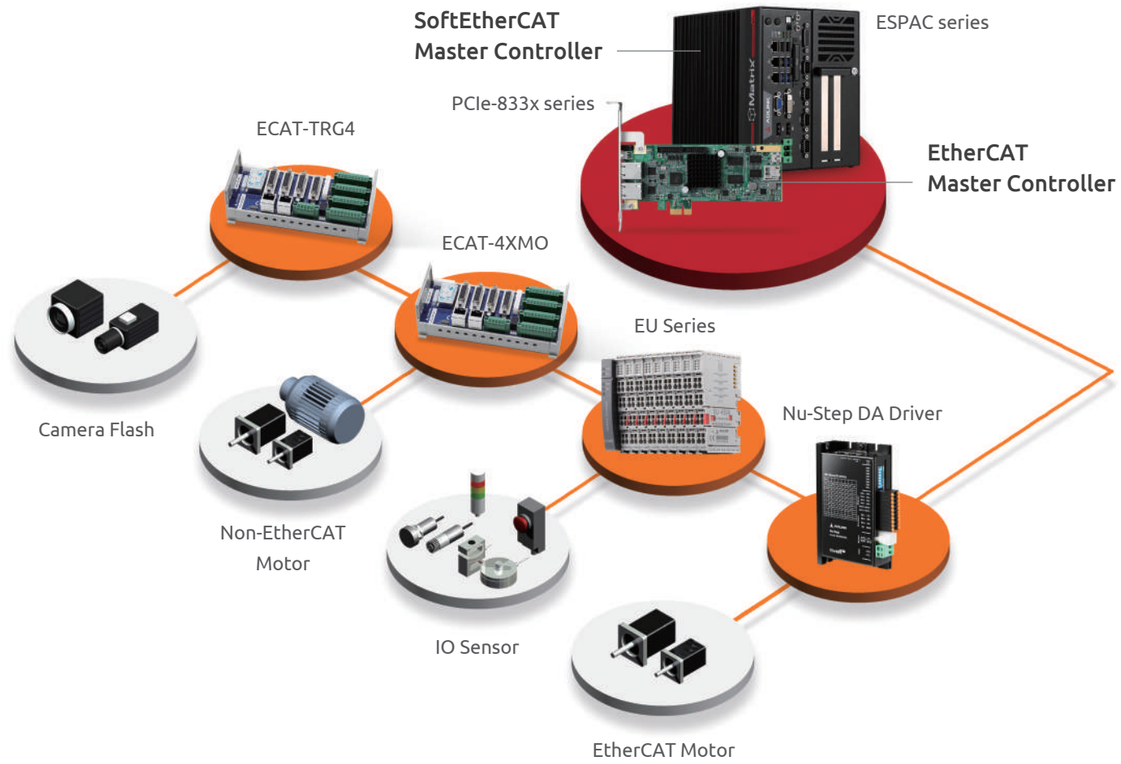
Software

For centralized management and faster development

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One-stop Shop for Open, Powerful, and Scalable PC-based EtherCAT Motion Control Systems

ADLINK provides a comprehensive one-stop shop with EtherCAT hardware and software for deploying suitable motion control systems in different fields, from the master controller, slave system, and drivers and motors to universal software. The EtherCAT open communication provides easy connections using standard Ethernet cables, making it ideal for developing optimal systems to build and scale smart factories.



Expertise for any industrial manufacturing process

Machine automation is at the core of smart manufacturing, and control capabilities have improved to meet the increased demands of more sophisticated machines and greater automation. ADLINK's proven support resources help customers overcome even the most critical industrial automation challenges for semiconductors, electric vehicle, AOI, and more.



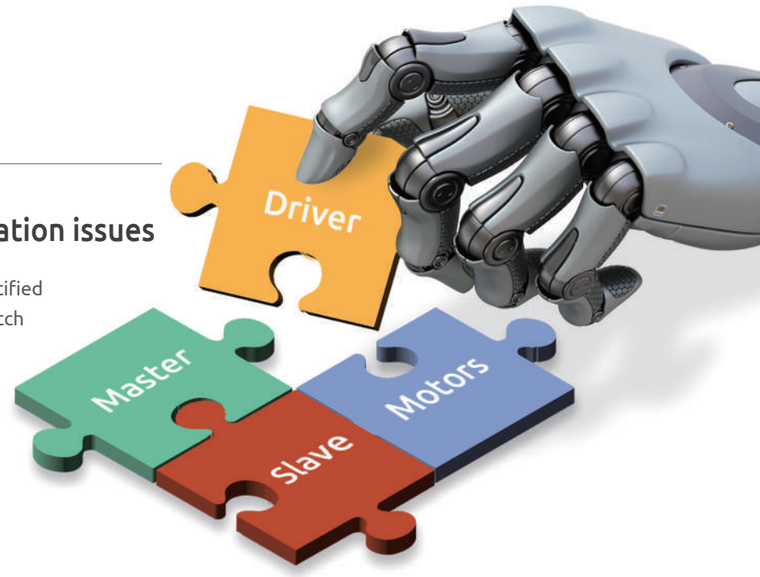


Tight synchronization improves productivity

ADLINK EtherCAT provides high synchronization capability ≤ 200 nS with performance of 64-axis movement, maximizing throughput.

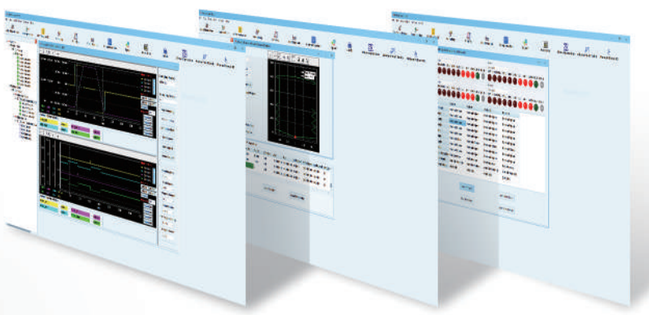
Compatibility cuts communication issues

ADLINK's EtherCAT system supports 100+ certified EtherCAT slave modules so customers can match their own suitable slave systems without compatibility problems.



Universal software optimizes motion control management

ADLINK APS SDK provides dependable motion control management that allows existing motion control systems to upgrade to EtherCAT-based motion control without complicated program modifications or application redevelopment.



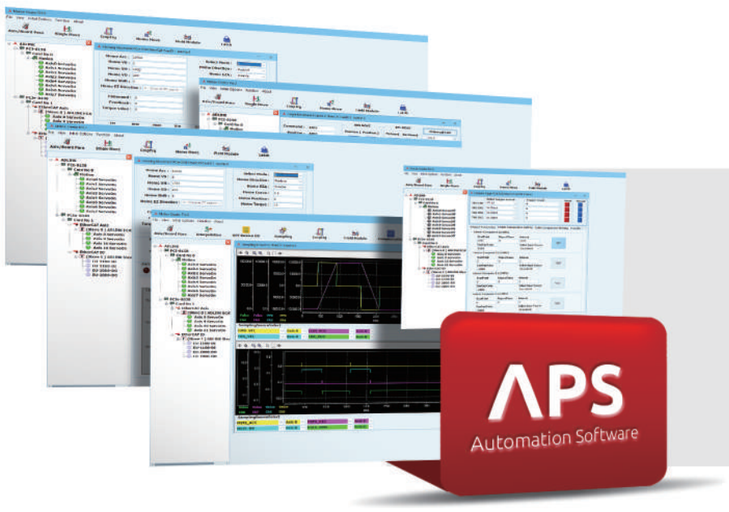
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Automation Product Software SDK

All-you-can-control on APS SDK from development, execution to maintenance

Automation Product Software SDK (APS SDK) is an integrated motion control software with a uniform interface designed for centralized deployment, execution, and maintenance, supporting EtherCAT and Pulse types of motion control cards. APS SDK provides rich function libraries supported by various application development environments and enables operators to develop or upgrade their specific motion functions. ADLINK's exclusive MotionCreatorPro2 utility has a no-code testing tool that allows operators to do a simple feasibility test, saving time on comprehensive inspection. ADLINK motion control cards with APS SDK bring the advantages of rapid development, deployment, and cost reduction to all users.



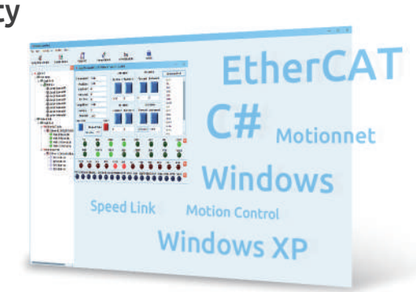
Application-ready functions streamline development

Supports over 400 motion functions with a range of general, advanced, and application-ready motion functions to help developers dramatically reduce development and maintenance costs by lowering the technical threshold of manufacturing automation applications.



Uniform interface with quick configuration reduces operational complexity

APS SDK has a uniform interface with an intuitive interactive configuration, so users can operate ADLINK motion products simply and consistently without the need to reprogram if the hardware, operating system, or programming language are different.



No-code testing speeds up automation application development

ADLINK's exclusive visualization utility, Motion CreatorPro2, allows users to tune device performance and verify control results and hardware functions without coding. The universal visual interface reduces the effort needed for product testing, system development, and debugging, making the deployment process faster and easier.





APS SDK supports 15+ motion and 30+ I/O products



Abundant application-ready functions in one library



Uniform interface with intuitive interactive configuration



No-code testing with ADLINK exclusive MotionCreatorPro2 utility

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Lithium-ion Vehicle Battery Manufacturing



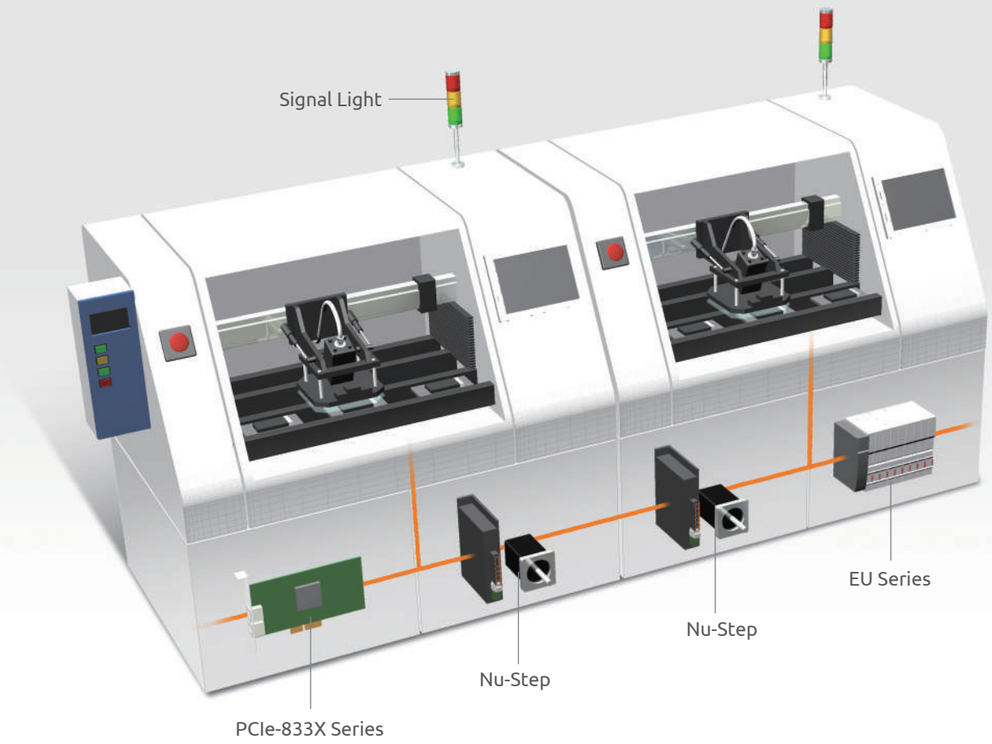
Challenges

As the electric vehicle market expands, so does the demand for front-end process equipment and materials, such as lithium ions, mixers, coaters, roll presses, or lamination machines with many control axes and I/O points. The synchronization of those multiple axes and I/O points is essential to improving overall operation. However, the transmission efficiency of traditional distributed control communication protocols is not ideal, requiring a long period of motion control signal exchange, and it is difficult to achieve synchronization.

ADLINK Solutions

The EtherCAT solution with PCIe-833X series master motion controller:

- Supports up to 64-axis synchronous control and controls 1000+ motion functions.
- Increases the output of electric vehicle battery equipment suppliers by 20%-30% with multi-axis synchronization
- Reduces production cost by 15% through higher performance



Warehouse Logistics



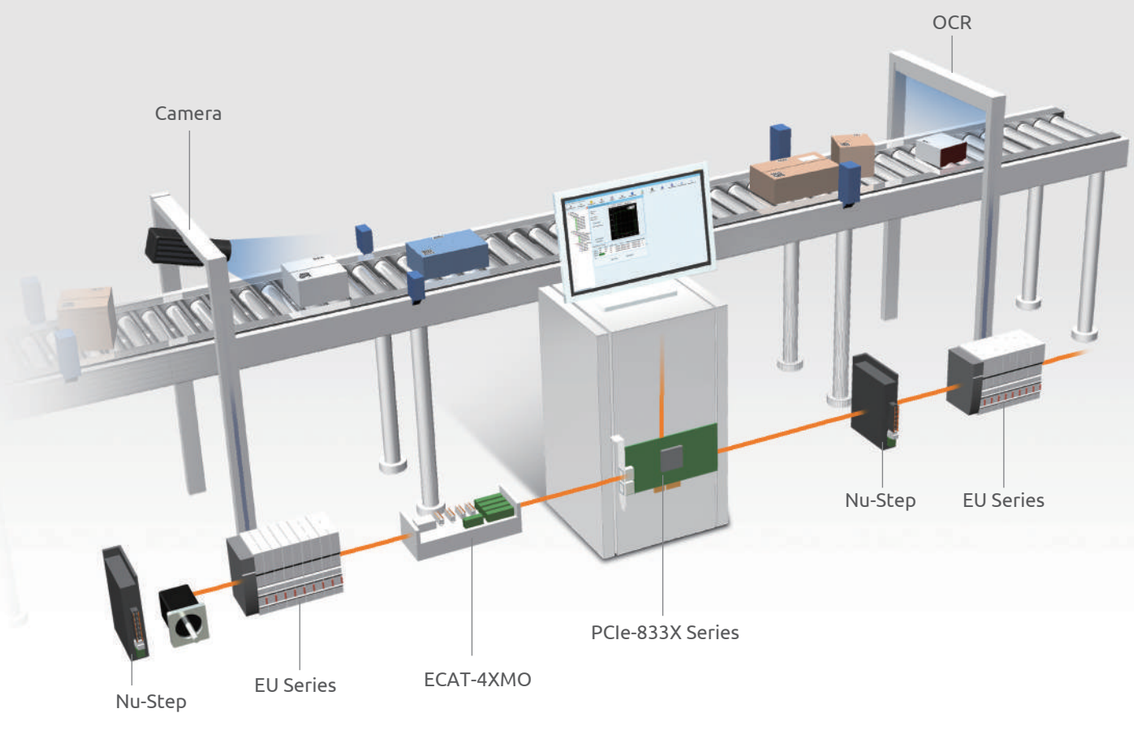
Challenges

Belt conveyors are not a standardized system, embodying a nearly limitless array of configurations with different lengths and paths to suit different environmental layouts. Some operations also use photo interrupters or electronic scales to measure package dimensions, or cameras to scan barcodes and verify product traceability. Hence the need to support an increasing number of precisely synchronized axes and I/O.

ADLINK Solutions

The EtherCAT solution with PCIe-833X series master motion controller:

- Supports up to 64-axis synchronous control, which enables pick-and-place on a moving conveyor belt during sorting and increases productivity by 20%
- Works with the ECAT-4XMO and EU series to support a wide range of third-party slave modules, allowing the use of different motors and I/Os based on cost-effectiveness considerations, thereby building a more efficient operating environment with lower procurement costs



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TFT-LCD Production Process



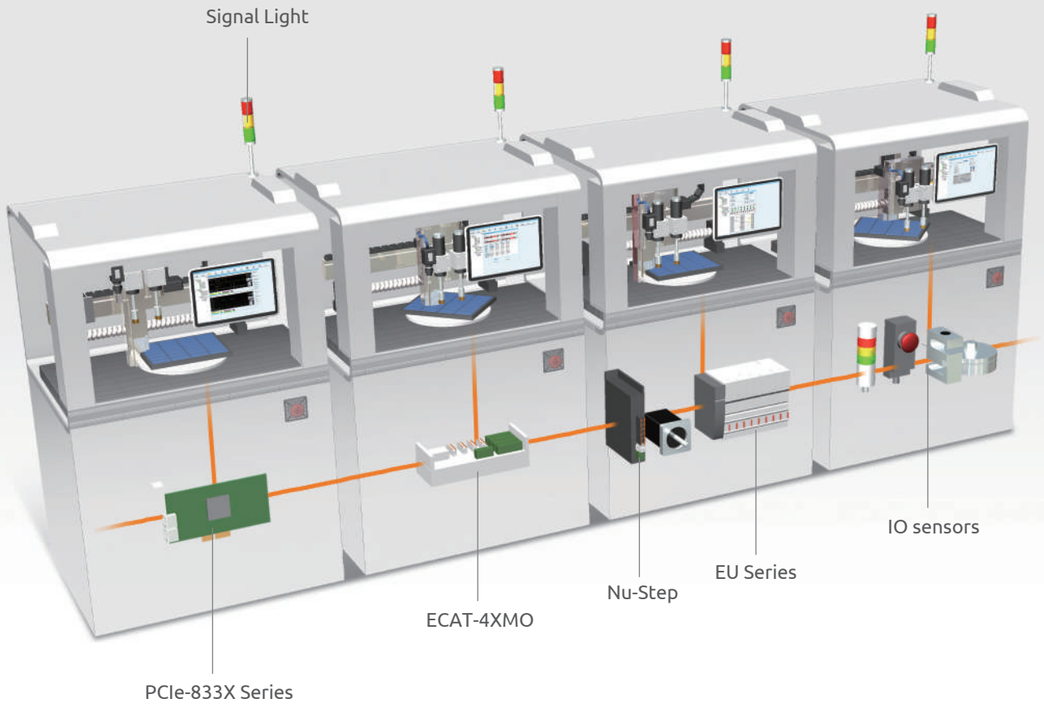
Challenges

Large-size panels have been the trend in recent years, and in the manufacturing process, these panels require more motion control axes for handling. However, expanding into multi-axis poses a major challenge to machine control and accuracy. It requires more powerful synchronization to avoid LCD panel cracks and distortions caused by asynchrony during the manufacturing process, affecting the overall quality.

ADLINK Solutions

The EtherCAT solution with PCIe-833X series master motion controller:

- Supports up to 64-axis synchronous control with latency of less than 200nS, achieving a 20% boost in production efficiency
- Works with the ECAT-4XMO to enable powerful synchronization control and high-speed trigger function, which can meet the needs of moving or screen bonding in the LCD manufacturing process
- Achieves higher performance, higher quality, and reduces production cost by up to 30%



Optical Lens Manufacturing



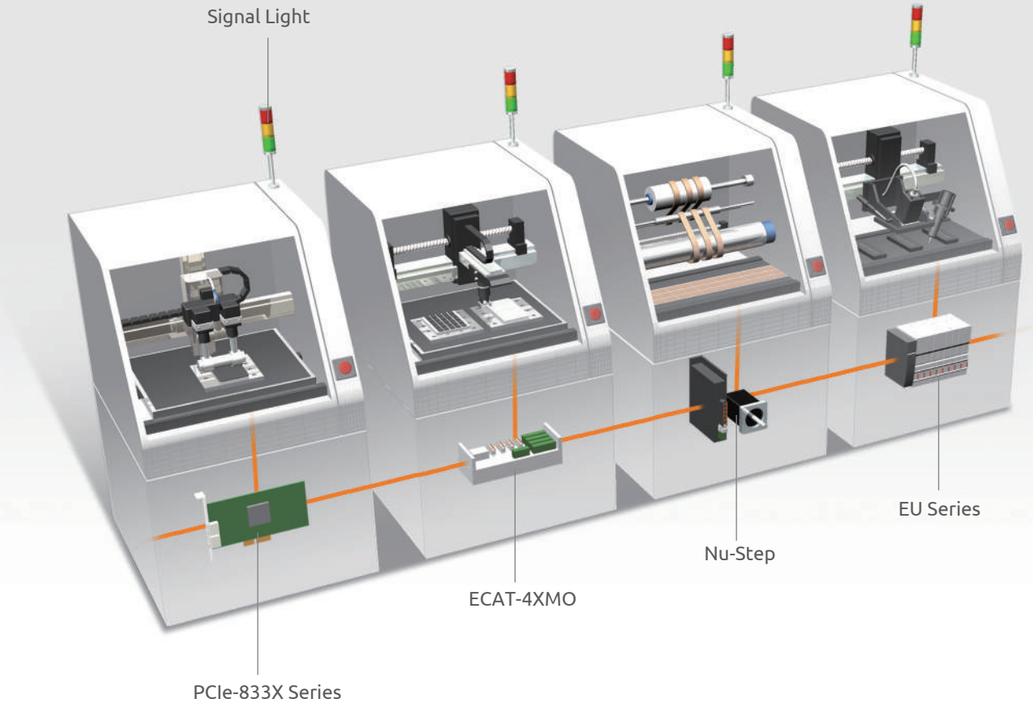
Challenges

In the optical lens industry, manufacturers protect their trade secrets by developing their own production equipment through the independent research and development of the automation team. Instead of buying equipment from suppliers to increase production capacity, they need to find ways to improve the equipment's ability to respond to rapid production line changes and fully meet the precision control requirements. Camera modules come in a variety of configurations and require precise assembly work. If the positions and bonding angles between the lenses are not exact, misalignment of the optical axis may occur, resulting in blurred images and poor quality.

ADLINK Solutions

The EtherCAT solution with PCIe-833X series master motion controller:

- Supports up to 64-axis synchronous control, and the availability of 10,000 DIO and 2,500 AIO allows for ample expandability.
- Takes full advantage of synchronous control command latency of less than 1ms, achieving a 20% boost in production efficiency



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EtherCAT®

Software-defined EtherCAT Controller

SuperCAT—the ideal option for fast response machine automation

ADLINK's SuperCAT series is a software-defined motion controller with the EtherCAT motion control function built into the Windows architecture of the industrial computer. No add on motion control card is necessary, and the industrial computer acts as the EtherCAT master controller, which controls all slave systems.
The SuperCAT series is equipped with a high-performance Intel® CPU to support a large number of axes with better synchronization, making it suitable for complex, high-speed applications such as EMS and semiconductors.

Multi-axis Synchronization

Supports up to 128 axes synchronously to execute more motion functionalities

High Response Control

Shortens response time from 4ms~125μs for high-speed applications

Space-saving and Flexible Configuration

Compact size and no motion control card, increase free space for other functions, lower overall costs by 30%

Platform Selections:



Ultra-compact embedded platform with optimum I/O design for maximum connectivity



Fanless industrial computer with flexible configuration



Industrial ATX motherboard with 4U rackmount industrial chassis



Embedded robotic controller for autonomous mobile application



Software-defined EtherCAT for Mobile Robots

Compact, Responsive, and Configurable

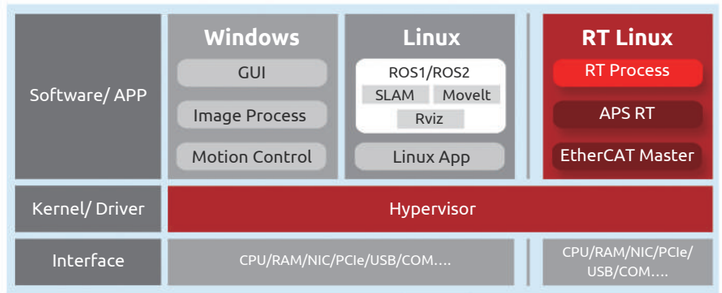
Cardless design with application-ready software package

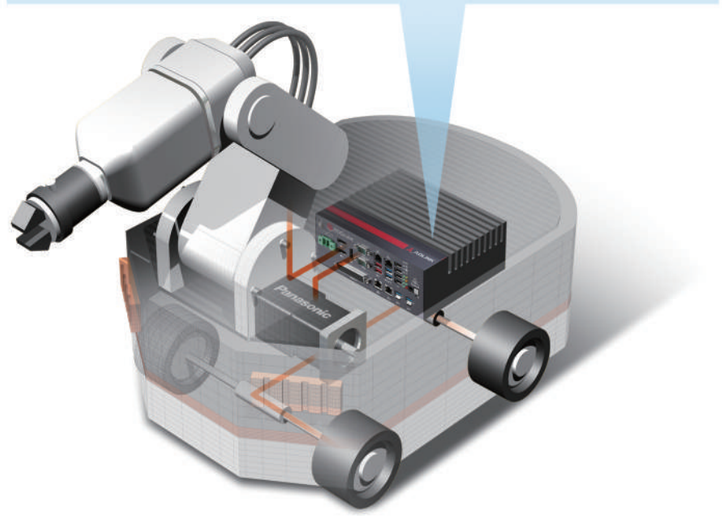
Autonomous mobile robot (AMR) manufacturers are developing increasingly intelligent AMRs that must fit high-precision motion controllers, such as robotic arms, wheels, and environmental detection devices into the AMR's space-limited interior. Panasonic's AMR combines ADLINK's softEtherCAT and ROS with its EtherCAT motors for more responsive and precise synchronous control. Application-ready apps and utilities accelerate IT and OT integration for different application scenarios, reducing development time by at least two months. Manufacturers now have more options without relying on system integrators for minor configuration changes, maintenance, and updates.

Solution Features:

- *Compact size computing platform meets AMR space constraints and increases battery space*
- *High response with SoftEtherCAT by eliminating communication issues between different motion controller*
- *Flexible configuration of computing power optimizes deployment, providing different CPU options*
- *Easy integration of IT and OT speeds up development time and reduces costs with EtherCAT and application-ready ROS app and utility for applications such as factory automation, warehouse, and retail*

ROS EtherCAT®





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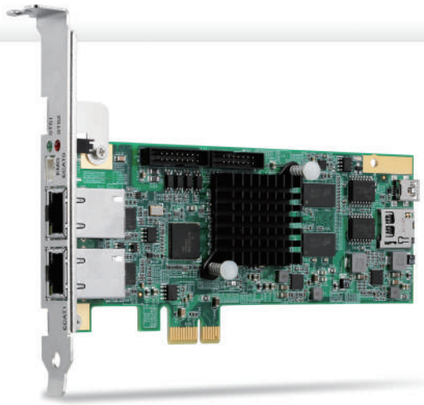
EtherCAT Motion Control System Selection Guide

Master Controllers

PCIe-833X series

PCIe EtherCAT master motion controllers

- ***Up to 64-axis motion control and 10,000 I/O point control***
- ***EtherCAT cycle times up to 250µs***
- ***Broad range of compatible EtherCAT slaves***
- ***Dedicated emergency stop input***
- ***4CH isolated digital input/4CH isolated digital output***

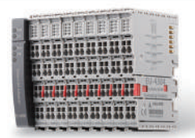


EtherCAT Communication			
EtherCAT Cycle Time	1CH @250µs / 500µs / 1000µs / 2000µs		
Max. Number of Axes	16	32	64
Motion I/O Interface Signals			
Emergency Stop In	1CH		
Isolated I/O Signals			
Digital Input	4CH (2CH configured as Pulsar Input)		
Pulsar Input Mode	CW/CCW; 1x/2x/4x AB Phases		
Pulsar Input Frequency	Up to 1MHz		
Digital Input Voltage	24Vdc (typ.) / 5Vdc for pulsar connection		
Digital Input Type	Sourcing type		
Digital Output	4CH, Isolated		
Digital Output Voltage	24V (typ.)		
Digital Output Type	90mA, NPN sinking type		
General Specification			
Operating Temp.	0°C to +60°C (32°F to 140°F)		
Humidity	5% to 95%, non-condensing		
Environmental Specification			
Safety Compliance	CE/FCC, RoHS		

Motion Slave System

Model	ECAT-4XMO	ECAT-TRG4	Nu-step
			
Description	Supports 4-channel motion control and high-speed trigger EtherCAT slave	Supports 4-channel high-speed trigger EtherCAT slave	EtherCAT stepper driver with CMP trigger
Key functions	• Convert EtherCAT to pulse train motion control with up to 12MHz pulse output frequency • Supports full trigger as ECAT-TRG4	• Up to 10 MHz table/linear CMP trigger and 3 Mhz position latch • Supports 2D CMP trigger (MT type only) • Hardware encoder re-driver to next EtherCAT slave	• Supports 1KHz table/linear CMP trigger • Supports closed loop motion control (EC type only)
IO interface	HW EL / ORG / EMG / Pulsar / LTC	HW EMG / LTC	Programmable IO for EL / EMG / ORG / DIO
Features	• Up to 12 MHz pulse output for 4 axes motion control • Up to 20 MHz encoder input @4xAB • Up to 4-channel, 3Mhz position latch	• Up to 10 Mhz table/linear comparison trigger out on 4 channels • Up to 20 MHz encoder input @4xAB	• Up to 1KHz table/linear comparison trigger for inspection
Application	EMS assembly, New energy, Semiconductor industry	EMS assembly, New energy, Semiconductor industry	EMS assembly, Passive components packaging and testing, Packaging test, AOI

IO System

Model	EU series
	
Description	EtherCAT DIO / AIO slave modules
I/O support	512-channel DI / 512-channel DO
AI/O	128-channel
Cycle time	250 µs
Input/output type	Sourcing / Sinking
Features	• Optimization with ADLINK EtherCAT master • Compliance with industrial IEC standard • Excellent scalability powered by modularized and slice-type design
Application	Cutting machine / Gluing / Probing

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