Zmotion®
正运动技术

做更好用的运动控制，智造美好生活
Better Motion Control, Smarter Life

Zmotion Laser Galvanometer Motion Control Products

Integrate Vision, Motion, Scan | Infinite-View Vision Linked

1D / 2D / 3D PSO | Open SDK Second-Program API

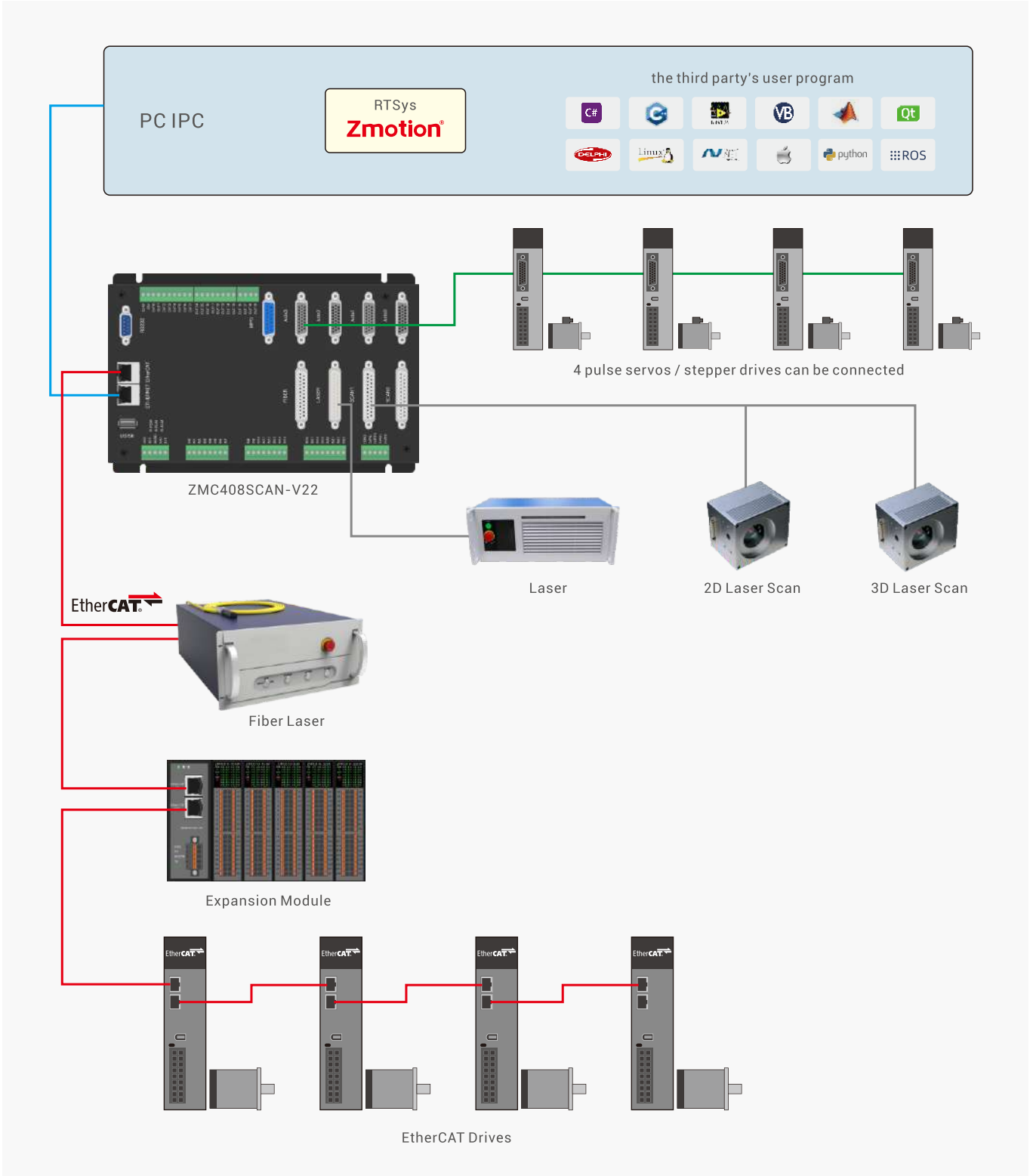
Laser Galvanometer Motion Controller

Introduction

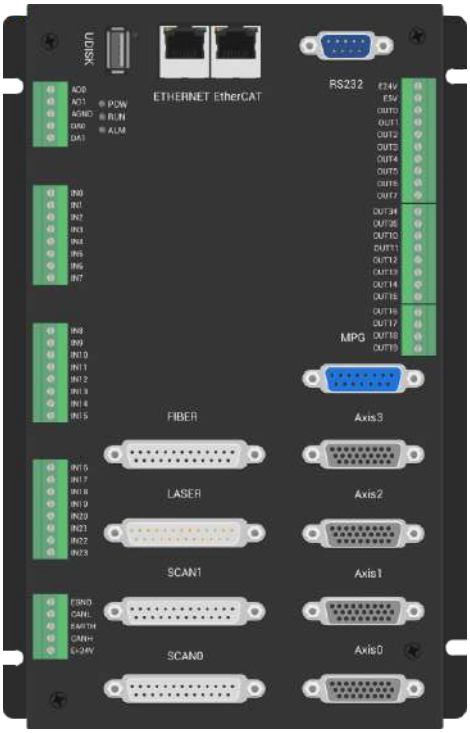
Zmotion laser galvanometer motion controller is one multi-axis high-performance controller that integrates motion control with laser scan control. It can be used in all kinds of laser applications, laser marking, laser engraving, laser welding, etc.

The controller supports EtherCAT and pulse axes, and it has high-precision interpolation function and real-time respond performance, then complex graphics can be processed rapidly, processing can be smooth and accurate. The most core technology is "motion control & scan control integrated", which means it can provide reliable and powerful drive and control support for advanced laser processing equipment because of impact structure and stable system.

Open Structure



ZMC Series Laser Scan Controller – ZMC408SCAN-V22



ZMC408SCAN-V22	
Power Method	external DC24V
Scan Control	2 (4 axes), XY2-100 protocol, 3D, closed-loop scans are valid.
Laser Control	2 laser interfaces
Laser Types	Fiber, CO2, YAG, UV, QCW, etc.
Differential Pulse Axis	4 pulse axes (5M pulse + encoder feedback)
EtherCAT	1 EtherCAT (communication period of 250u-4000u)
Handwheel	1
General DO	20 NPN DO, they are powered by inner 24V; 4 support high-speed; OUT0-3 support PWM / precision output / PSO functions
General DI	c
DA	2 voltage (0-10V) analog outputs of 12-bit resolution
AD	2 voltage (0-10V) analog inputs of 12-bit resolution
Communication Interfaces	1 Ethernet: to interact with host computer 1 CAN: to expand resources of / IO / AIO 1 RS232: MODBUS_RTU / self-defined protocol 1 RS485: MODBUS_RTU / self-defined protocol
U Disk	1 USB, for interacting with U disk data
Dimensions	235*149*37mm

ZMC408SCAN—V22 is one high-performance laser galvanometer embedded motion controller, which can effectively optimize laser processing through its high-integration, powerful multi-axis motion, and high-precision synchronized control, promoting the processing efficiency, accuracy, and quality. In this way, help you build specialized advanced laser processing system. Suit to large-format linked processing, multi-scan, multi-station, etc.

Product Specification

ZMC408SCAN - V22 - XXX

Mark	Description
XXX	customized function

Mark	Description
V22	controller version No.

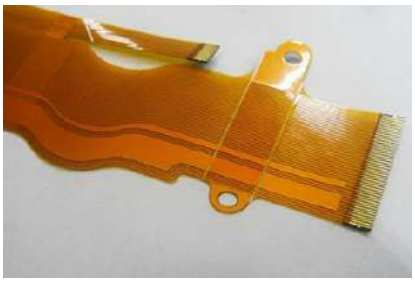
Mark	Description
SCAN	laser galvo series

Mark	Description
08	8-axis

Mark	Description
ZMC408SCAN-V22	ZMC laser scan motion controller

Typical Applications

paint removal / hole making

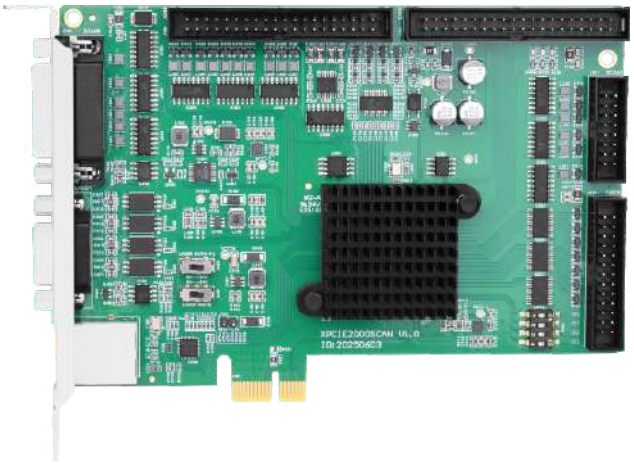


PCB / FPC drilling / cutting

multi-scan processing

XPCIe Vision Laser Scan Control Card

XPCIE2000SCAN laser galvo motion control card is highly integrated, which supports EtherCAT, pulse, machine vision, PCIe, specialized for the application that needs industrial laser, galvanometer, motion control and vision control. It can do motion control from 6-axis to 64-axis, valid functions include multi-axis point motion, interpolation, trajectory planning, handwheel control, encoder position measurement, IO control, position latch, etc.



XPCIE2000SCAN	
Comm-Interfaces	PCIe*1
Scan Control	2 interfaces (4 axes), XY2-100 protocol, 3D scan is valid.
Laser Control	2 laser interfaces
Laser Types	1 standard Fiber / 2 lasers of CO2, YAG, UV, QCW, etc.
EtherCAT	1 EtherCAT of max 64 axes (period of 120u-2000u)
General DO	20 NPN DO, powered by inner 24V; 4 support high-speed; OUT0-3 support PWM / precision output / PSO functions
General DI	24 NPN digital inputs, they are powered by inner 24V; among them, 4 support high-speed; IN0-3 support latch.
DA	2 voltage (0-10V) analog outputs of 12-bit resolution
Dimensions	168*120mm

Product Specification

XPCIE2000SCAN-AX64-ZV-XXX

Mark	Description
XXX	customized function

Mark	Description
ZV	machine vision algorithm
NC	NC-G code function
R6	6-joint / special manipulator

Mark	Description
AX04	4-axis
AX06	6-axis
AX08	8-axis
Ax16	16-axis
AX32	32-axis
AX64	64-axis

Mark	Description
SCAN	laser galvo series

Mark	Description
XPCIE	PCIe interface

Typical Applications

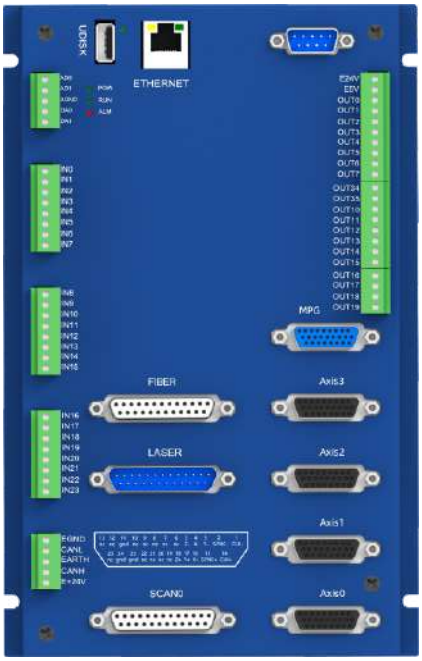
vision laser marking

multi-station production line processing

ECI Series Laser Scan Control Card

The ECI series laser galvanometer control card is an Ethernet type card, which integrates laser control, galvocontrol, and pulse axis control. And there are high real-time performance, like, high-speed PWM, hardware position comparison output (PSO), synchronous tracking, etc. Compared to traditional solutions that combine a motion control card with a laser galvanometer card, the ECI significantly improves system response speed and data processing efficiency, enabling high-precision control of laser galvanometers and multi-axis systems.

The ECI406SCAN is suitable for laser machining applications using an XYZ 4-axis motion platform + the galvanometer, efficiently enabling complex processes such as multi-station machining and large-format splicing machining.



ECI406SCAN	
Power Method	external DC24V
Scan Control	1 SCAN interface (2 axes), each one is XY2-100 protocol.
Laser Control	2 laser interfaces
Laser Types	Fiber, CO2, YAG, UV, QCW, etc.
Differential Pulse Axis	4 pulse axes (5M pulse + encoder feedback)
Handwheel	1
General DO	20 NPN DO, they are powered by inner 24V; among them, 4 support high-speed; OUT0-3 support PWM / precision output / PSO functions
General DI	24 NPN DI, powered by inner 24V; 4 support high-speed; IN0-3 support latch.
DA	2 voltage (0-10V) analog outputs of 12-bit resolution
AD	2 voltage (0-10V) analog inputs of 12-bit resolution
Communication Interfaces	1 Ethernet: to interact with host computer 1 CAN: to expand resources of / IO / AIO 1 RS232: MODBUS_RTU / self-defined protocol 1 RS485: MODBUS_RTU / self-defined protocol
U Disk	1 USB, for interacting with U disk data
Dimensions	235*149*37mm

Product Specification

ECI406SCAN-XXX

Mark	Description
XXX	customized function

Mark	Description
SCAN	laser galvo series

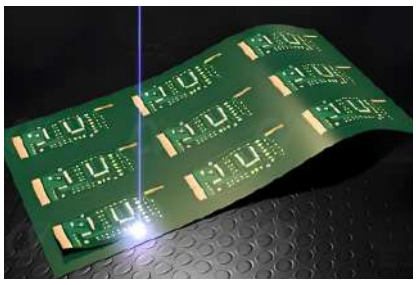
Mark	Description
04	4-axis
06	6-axis

Mark	Description
ECI406SCAN	ECI laser galvo control card

Typical Applications

assembly line making

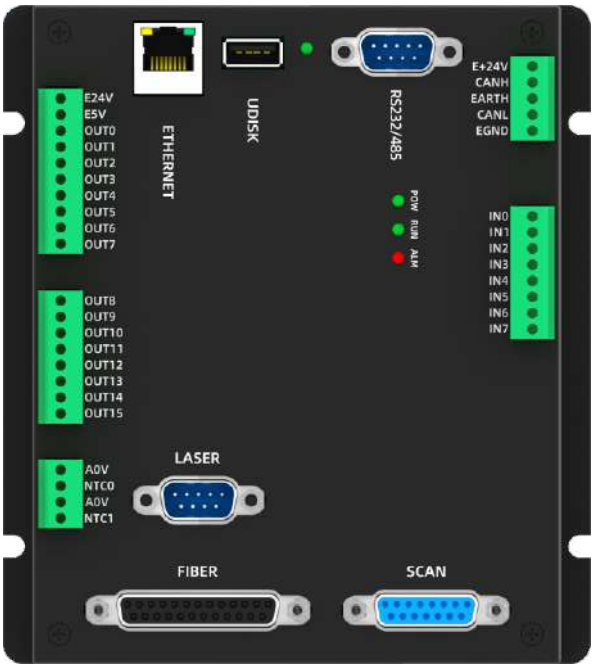
platform & scan welding



PCB codes cutting

ZMC Series Laser Scan Controller – ZMC304SCAN

The ZMC304SCAN is a compact embedded laser galvanometer controller designed specifically for industrial laser + galvanometer + motion control. It supports 4-axis motion control, including linear interpolation, arbitrary circular interpolation, spatial circular interpolation, helical interpolation, electronic cam, electronic gear, synchronous following, virtual axis settings, etc. And it can operate independently offline, it is primarily suitable for laser cleaning, marking, and others.



ZMC304SCAN	
Power Method	external DC24V
Scan Control	1 SCAN interface (2 axes)
Laser Control	2 laser interfaces
Laser Types	Fiber, CO2, YAG, UV, QCW, etc.
Pulse Axis	2 pulse axes (single-ended pulse 500K)
General DO	16 NPN DO, powered by inner 24V; among them, 8 support high-speed; OUT0-3 can be set as single-ended pulse.
General DI	8 NPN digital inputs, they are powered by inner 24V; among them, 2 support high-speed; IN0-1 support latch.
DA	1 voltage (0-10V) analog output of 12-bit resolution
AD	1 voltage (0-10V) analog input of 12-bit resolution
NTC Thermistor	2 (input impedance 10KΩ)
Communication Interfaces	1 CAN: to expand resources of / IO / AIO 1 RS232: MODBUS_RTU / self-defined protocol 1 RS485: MODBUS_RTU / self-defined protocol
U Disk	1 USB, for interacting with U disk data
Dimensions	155.6*139*30.5mm

Product Specification

ZMC304SCAN-XXX

Mark	Description
XXX	customized function

Mark	Description
SCAN	laser galvo series

Mark	Description
04	4-axis
03	3-axis
02	2-axis

Mark	Description
ZMC304SCAN	ZMC laser galvo motion controller

Typical Applications

handheld laser cleaning

laser marking machine

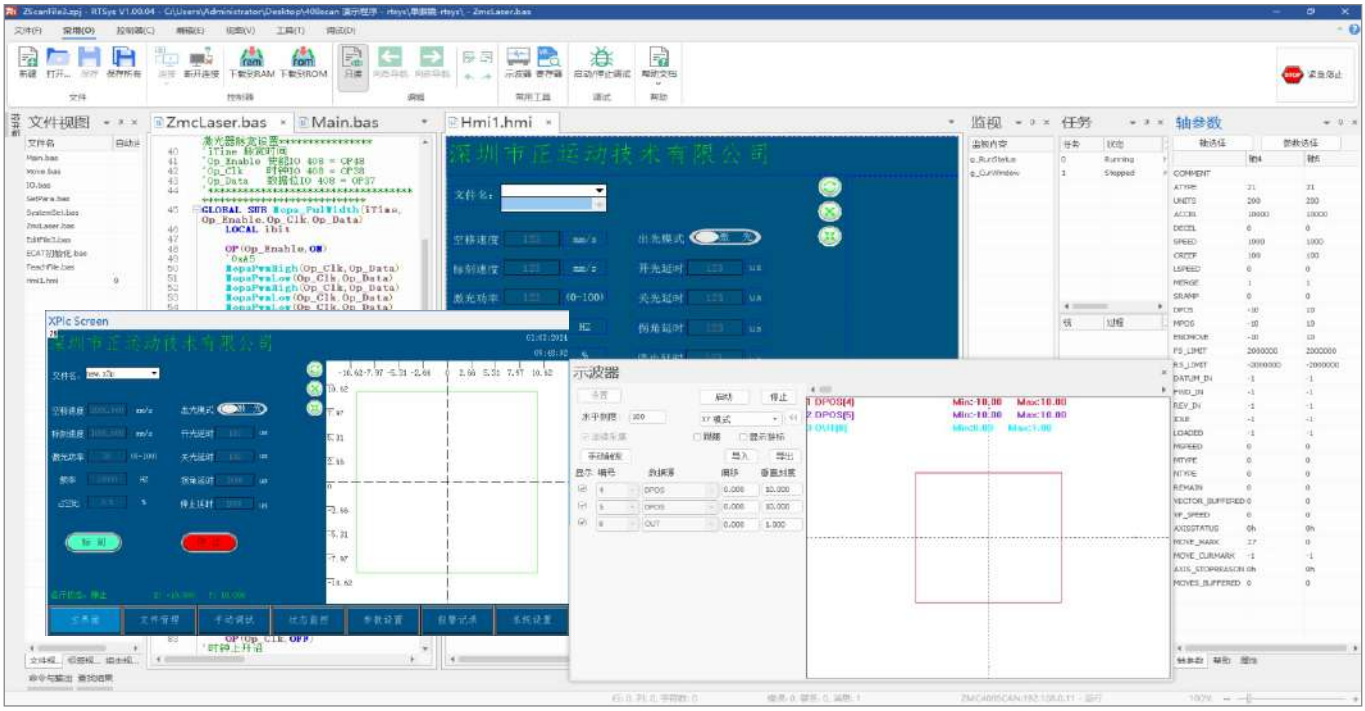
Second-Development & Programming

Development Environment Easy to Use | RTSys

All In One -- Development & Debug & Diagnosis

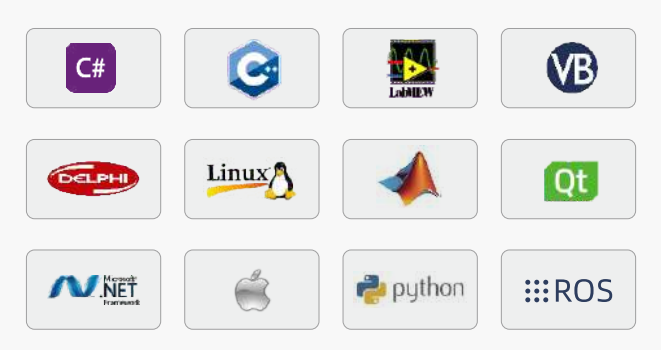
RTSys is one PC program development, debugging and diagnosis software for Zmotion motion controllers. Through RTSys, you can edit and configure controller's program easily. At the same time, it can real-time debug program that is running. In addition, real-time processing curve can be checked through oscilloscope tool, including, 2D or 3D processing trajectory.

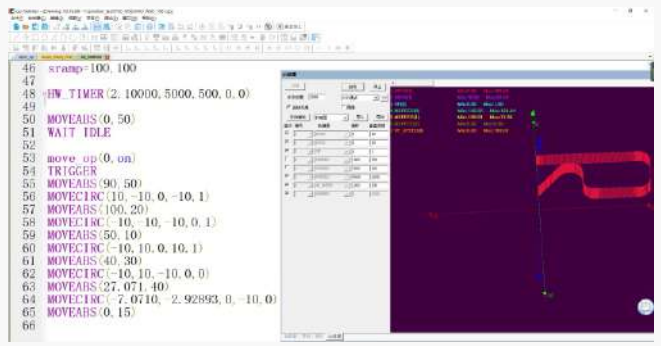
In addition, it can do motion control offline. Applications can be laser handheld / automatic cleaning devices.

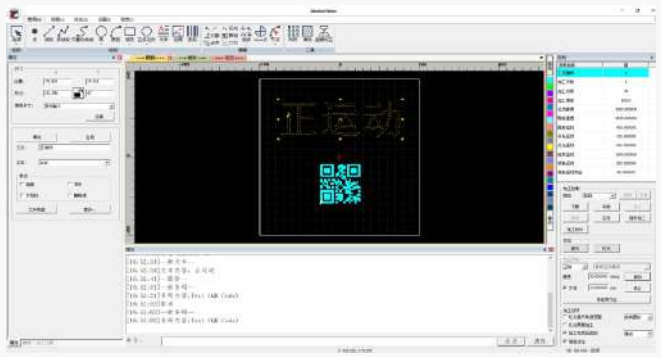


Rich PC Motion Control API Function Interfaces

support all kinds of operation systems and programming languages.







Specialized Laser Technology API

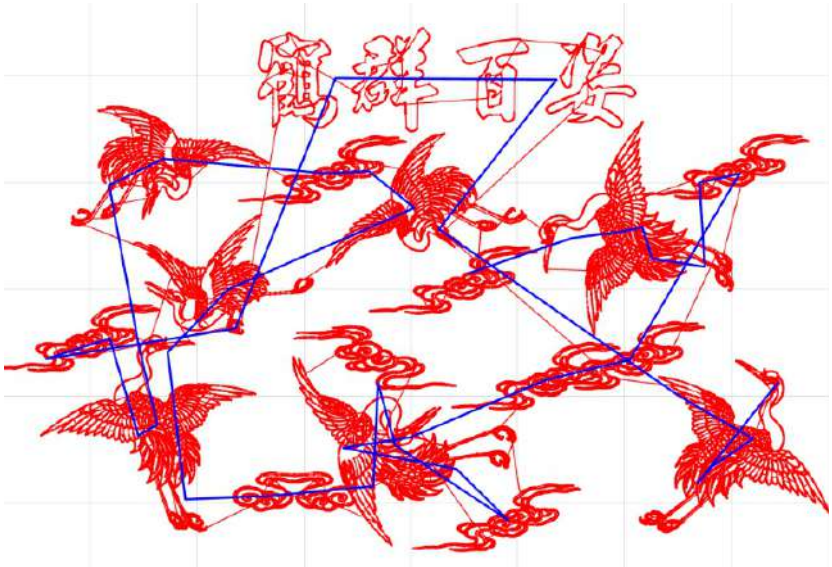
Laser process library includes Zmotion motion controller supported motion commands that are converted from graphic trajectory. Multiple graphics can be transferred into trajectory curves, like, curve, text, barcode, QR code, CAD vector, etc. In addition, it can do filling, curve distortion, and so on.

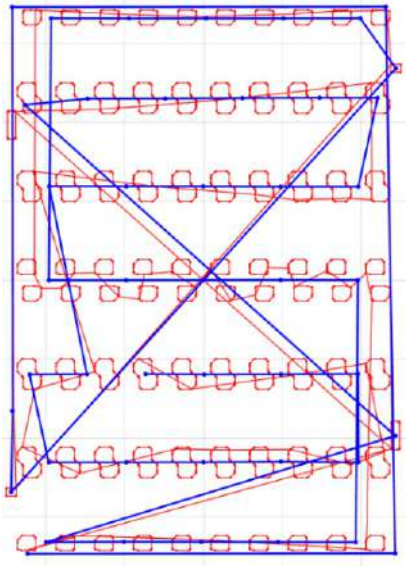
Graphic Process

- Basic Graphic
- Bar /QR Code
- CAD Vector
- Fond / Text
- Trajectory Fill
- Path Distortion

Second-Development API of Scan & Platform Linked Library

It provides Zmotion self-developed graphic trajectory planning algorithm, supporting unlimited field-of-view linkage secondary development interface libraries in high-level languages such as C++ and C#, facilitating deep customization and significantly enhancing development flexibility. This algorithm can intelligently analyze graphic trajectories, automatically generate the coordinated motion path of the platform and galvanometer, and there are multiple trajectory decomposition modes to flexibly adapt to diverse processing needs. It can quickly achieve system integration, significantly shortening project development cycles and improving development efficiency.



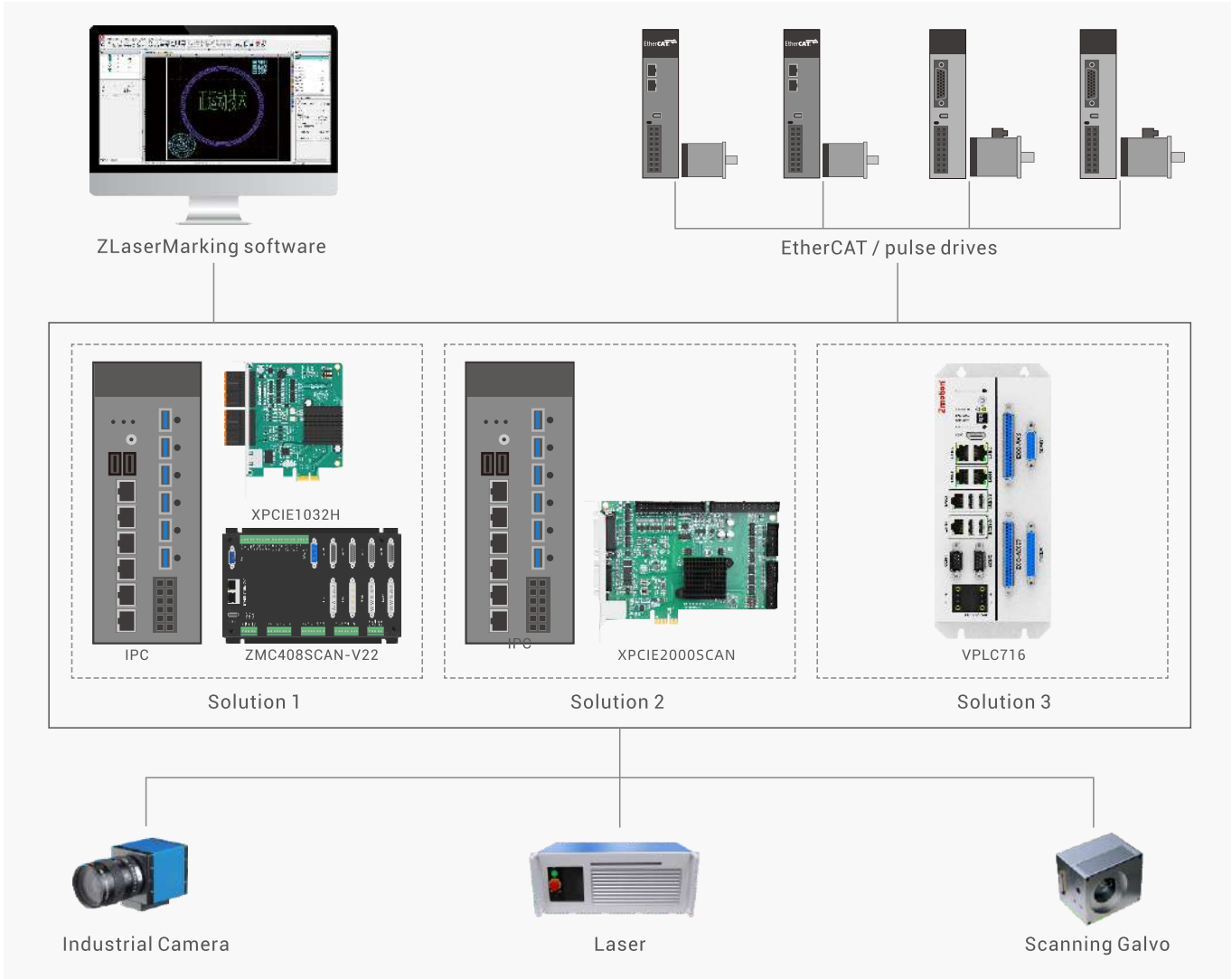


Infinite-View Linked Processing

"infinite-view linked motion" means scan axes and XY platform axes linked, promoting laser processing efficiency and processing accuracy.

It breaks through the limitations in traditional processing methods, and achieves large-scale, high-precision laser processing by precisely controlling the coordinated movement of the scanning galvanometer and the XY platform.

Hardware Structure



Solution Advantages

Processing Efficiency

For large-format processing, it uses "platform motion & scan motion linked". Because it is hard to achieve large acceleration and deceleration due to heavy platform mechanical structure load under traditional splicing processing mode, plus it may cause mechanical shaking at the corner during high-speed motion. Moreover, too large spot size of the telephoto galvanometer will cause lower processing accuracy. Therefore, "large-format" processing uses continuous motion mode, which greatly increase the efficiency.

Processing Accuracy

In the aspect of precision, it can solve "uneven energy" problem when ON / OFF light, including the problem of "misalignment", avoiding splicing errors.

Applications

Glass Industry: glass sandblasting, paint removal, drilling

Metal Processing: large-format stainless steel, elevator doors, nameplate marking

PCB Industry: FPC, cover film, cutting

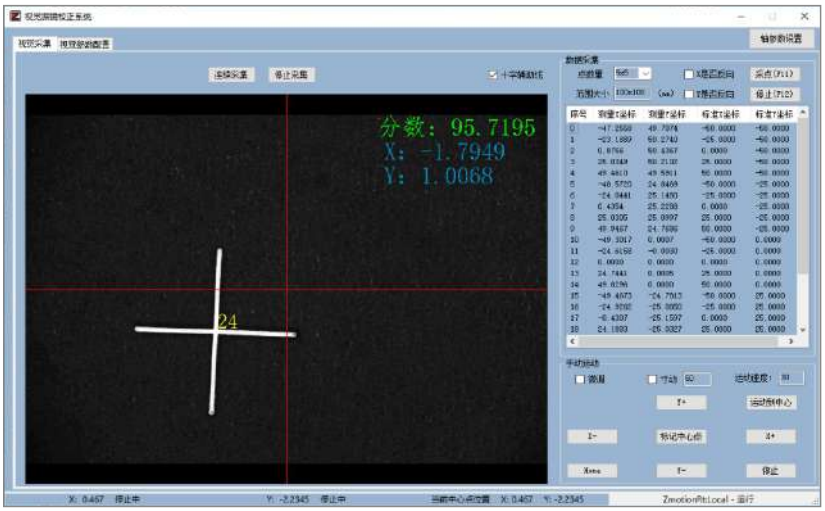
Display Industry: ITO film cutting, LED paint removal and cleaning

Galvanometer Correction

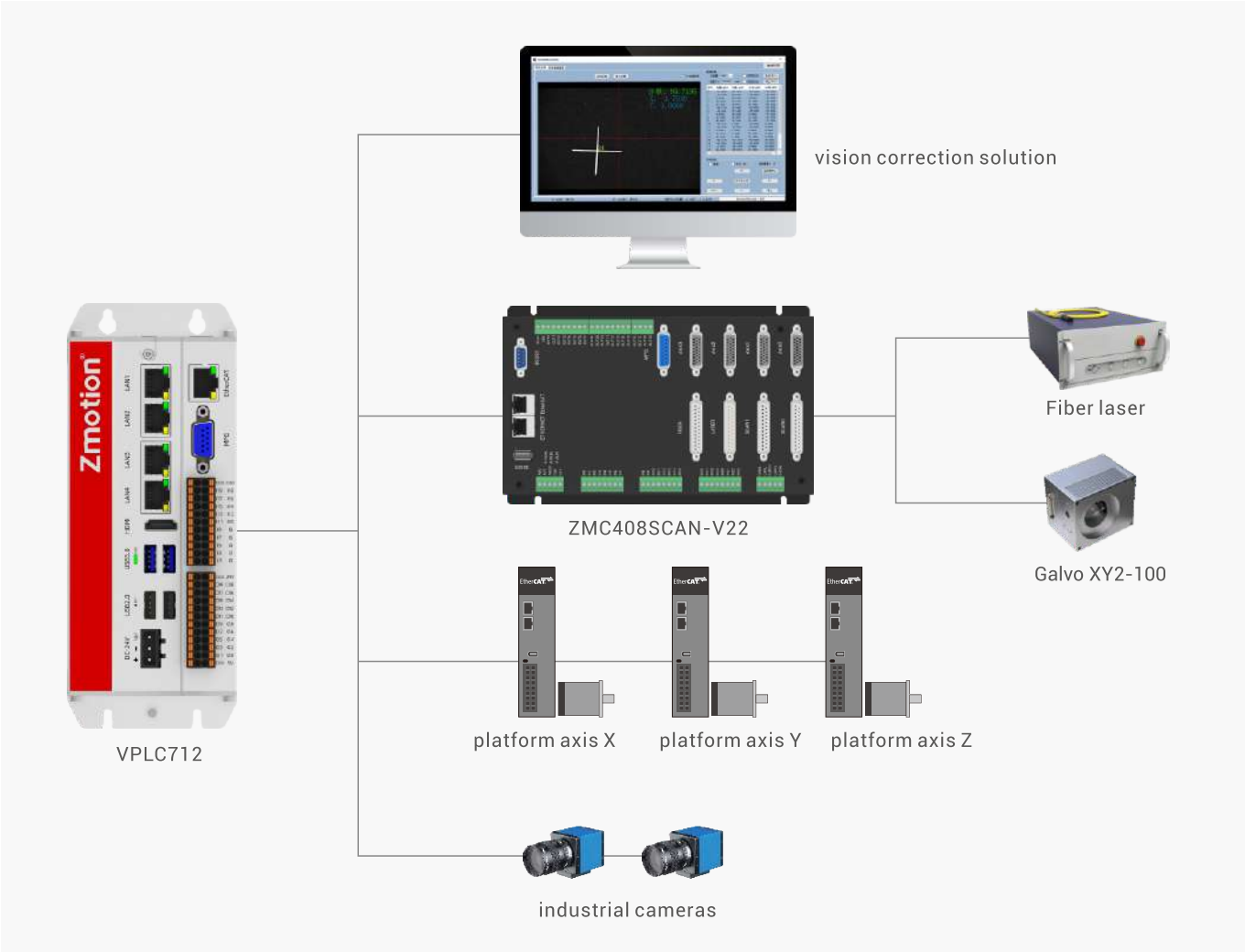
For galvanometer scanning distortion, there are specialized correction software and API interfaces, including BOX correction, 9-point & 25-point correction, multi-point graphic correction of scanner, multi-point correction of vision platform, etc.

High-Precision Vision Platform Correction Solution

Match high-precision XY platform with vision camera to capture coordinates data, then generate correction data through galvanometer correction algorithm, at last, high-precision scan correction file will be produced.

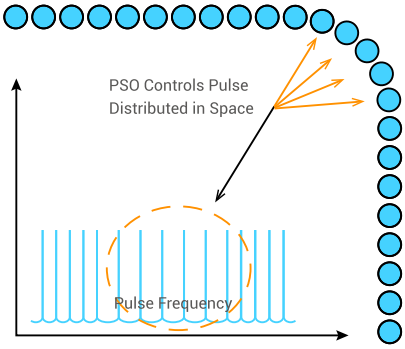


Hardware Structure

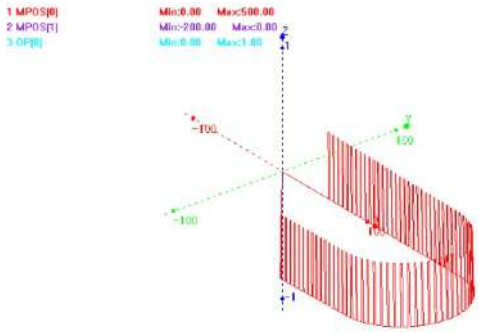


Open PSO in Laser Processing

PSO (Position Synchronization Output). It triggers the laser pulse at precise position to switch on / off with one fixed distance, then achieves laser precision control. At the same time, it captures encoder feedback (or pulse) to do position comparison in real-time, then do phase synchronization with the laser signal output. In the process of processing trajectory motion, trigger laser output switch according to one fixed or customized distance interval, including stages of acceleration, deceleration, and constant speed, then pulse energy can be distributed in processed object uniformly.



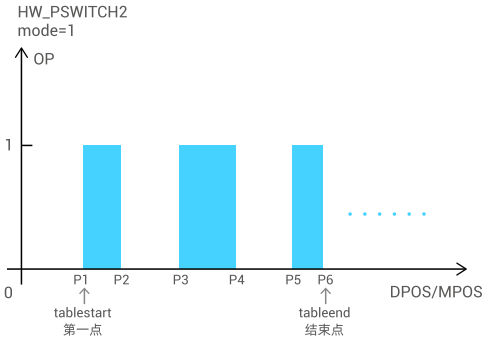
PSO Laser Out & Motion Control



Oscilloscope Simulation: PSO Laser Output

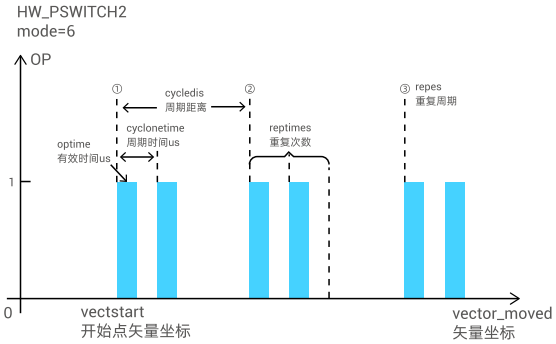
1. Customized Position Output

Invert electric level according to set position.



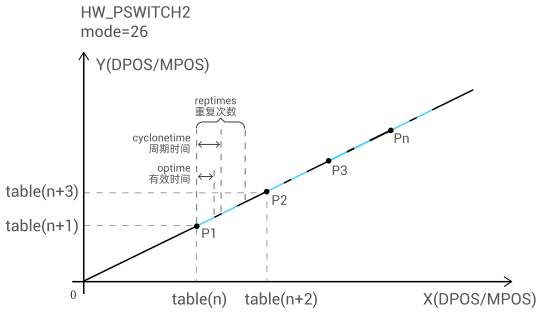
2. Period Out Mode at Fixed Distance

Set fixed distance, each place inverts once / multi-time in cycle.



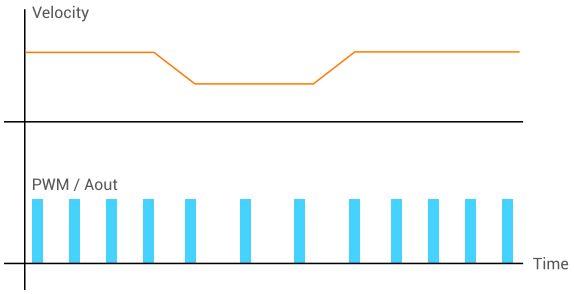
3. XYZ 3D Position Comparison Output

Self-define XYZ position output, and XYZ 3D position comparison output can be achieved synchronously.



4. PWM & Analog & Speed Output Synchronously

There is one proportional change among PWM duty ratio, analog output, and laser beam path speed.



Applications:

Laser Galvanometer Marking, Large Field Splicing Marking, Fly-Marking, Large Field Laser Cutting, Laser Fly-Cutting, Laser Welding, Laser Punching Molding, Linkage Marking of Scan-Axis and Motion Axis, Laser Cleaning, Laser Polishing, Laser Cladding, Laser Additive Manufacturing, Wafer Marking, PCB and FPCB Drilling, 3D processing, etc.

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