*Aerotech's Nmark™ VCT and Nmark™ GRC products provide a comprehensive galvo control package for both vector and graphics based marking applications. Galvo motion and operating parameters can be controlled directly from within the Automation 3200 program space providing a single, integrated development environment for galvo and traditional linear/rotary axis applications.*

The Nmark™ products use the industry standard XY2-100 protocol to communicate with galvo heads from various suppliers. The software also has optional support for marking on-the-fly for web-type applications and Z-focus height control for 3D processing.

Nmark™ VCT

Cutting · Welding · Sealing · Ablation · Marking

Aerotech's Nmark™ VCT (vector) is designed for vector-type marking applications where the desired marking path is defined through a combination of linear and arc/circular segments. Galvo motion is programmed in industry standard RS-274 G-code language along with AeroBASIC command extensions for laser and I/O control. With all major CAD/CAM vendors supporting RS-274 output, Nmark™ VCT provides users with a direct conversion path from CAD data to galvo motion control.
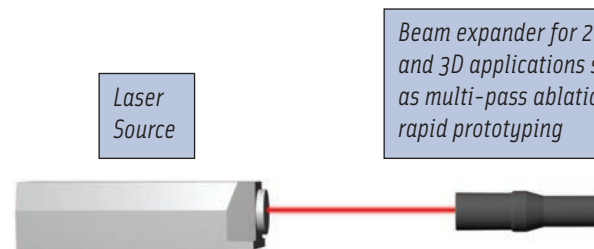
Laser Source

Beam expander for 2~ and 3D applications s~ as multi-pass ablatio~ rapid prototyping

Nmark™ is part of Aerotech's award-winning Automation 3200 software-based, distributed motion, vision, PLC, robotics, and I/O control platform.

Coordinate marking operations with Aerotech's extensive line of linear and rotary positioning stages. High-performance direct-drive or ball-screw-based products are available to satisfy a wide range of price/performance objectives.
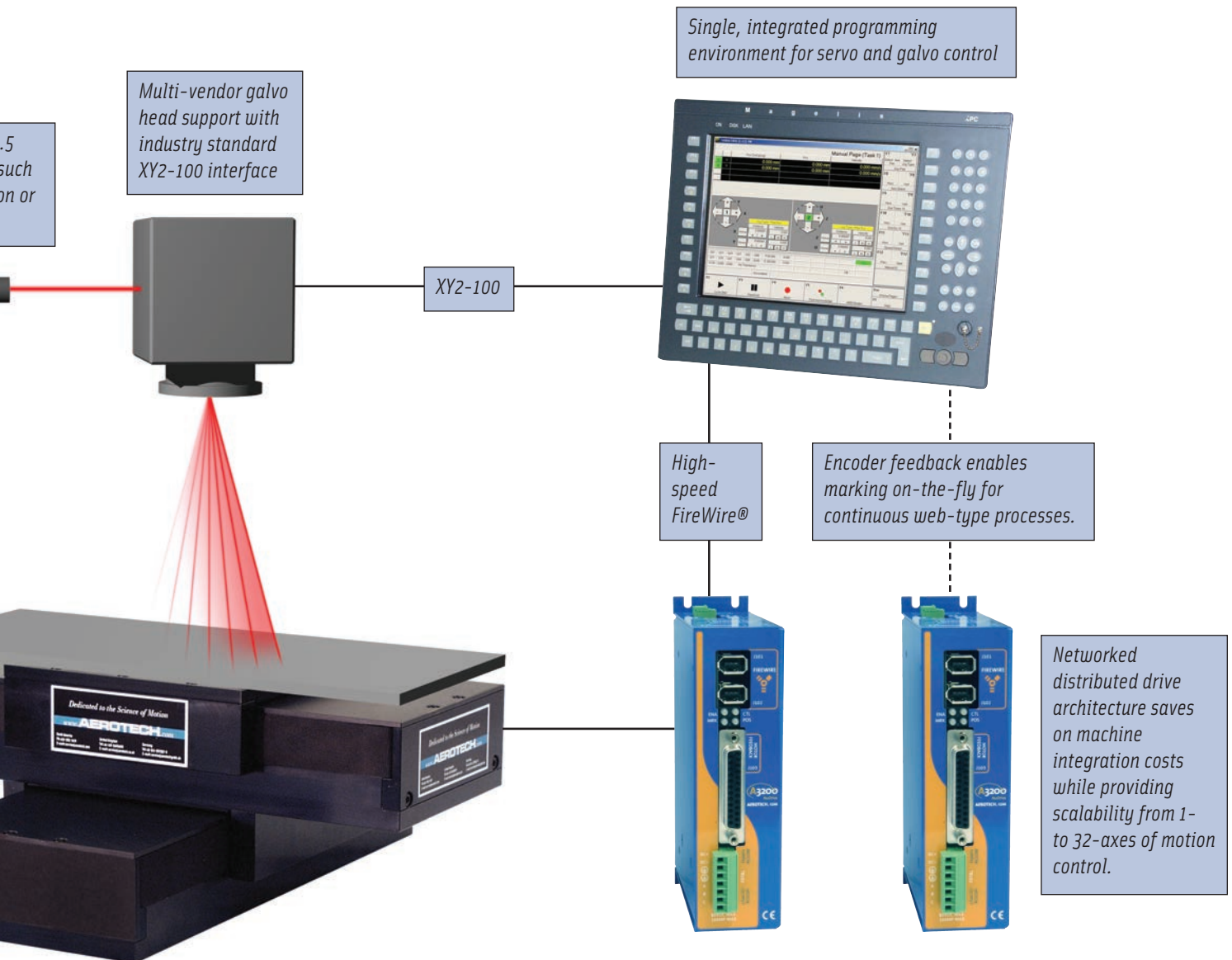
Nmark™ GRC

Bar Code · Serialization · Engraving · Character Scribing

Nmark™ GRC (graphic) is targeted at applications that require raster-type marking for bar codes, bitmaps, and character scribing. An intuitive, easy-to-use tool is provided for importing and manipulating images and text, and storing the resulting marking profile in a project file. AeroBASIC commands are used to download a specific project file at run time. Additional commands are available to manipulate properties of objects such as text strings or bar code values during the marking process for serialization applications.
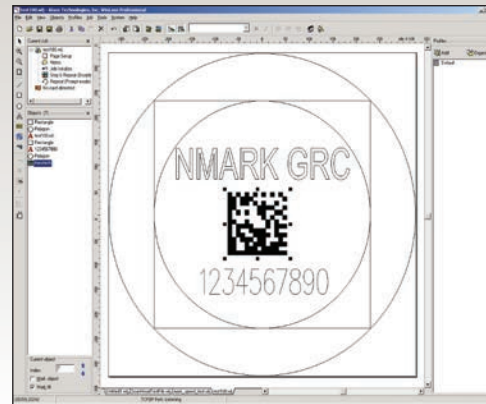
Intuitive, easy-to-use programming tool for bitmap, graphics, bar code, and text marking applications

Single, integrated programming environment for servo and galvo control

Multi-vendor galvo head support with industry standard XY2-100 interface

XY2-100

High-speed FireWire®

Encoder feedback enables marking on-the-fly for continuous web-type processes.

Networked distributed drive architecture saves on machine integration costs while providing scalability from 1- to 32-axes of motion control.

Nmark™ VCT Programming Commands*

| Galvo Commands	
G0	Linear motion with the laser off
G1	Linear motion with the laser on
G2	Clockwise circular arc motion with the laser on
G3	Counterclockwise circular arc motion with the laser on
G4	Dwell command
G82	Removes the software home position of a previously executed G92 command
G90 (ABS)	Position values specified in absolute mode
G91 (INC)	Position values specified in incremental mode
G92	Set software home
Laser Control	
SET_LASER_MODE	Configure for CO_2 or YAG operation
SET_FIRSTPULSE_KILLER	Define the pulse width for the pulse kill signal
SET_LASER_TIMING	Define pulse width and frequency for triggered lasers
SET_LASER_DELAYS	Define on/off delays for the laser trigger output
Other Commands	
SET_MATRIX	Define a rotation and scaling matrix
SET_WAIT	Suspend list execution until released by A3200
SET_WOBBLE	Add a circular motion pattern to the programmed galvo path

* Partial listing of commands

Nmark™ GRC Programming Commands*

LOAD_JOB_FROM_FILE	Load a previously defined marking operation from a file on the PC
GALVO_RUN_JOB	Mark all objects in the currently loaded project file
GET_BUSY_STATUS	Check status of current marking operation
TERMINATE_MARK	Stop current marking operation
SET_OBJ_NUM_PASSES	Set the number of passes for a particular object
SET_BITMAP_ATTRIBUTES	Specify the name of the bitmap to mark along with pixel size, brightness, etc.
SET_TEXT_ATTRIBUTES	Set the font, orientation, justification, and pulse count for the specified text object
SET_BAR_CODE_ATTRIBUTES	Set the encoding method, pixel spacing, pulse per pixel, and other attributes
SET_OBJ_CHAR_STRING	Specify the string value to be encoded in the bar code or marked in the text object
SET_OBJ_FILL	Sets the fill pattern information for a closed object
SET_MOTF_CONFIG	Set the mark on the fly configuration parameters
SCALE_OBJ	Scale the size of the specified object
ROTATE_OBJ	Rotate the specified object
OFFSET_OBJ	Shift the specified object in the galvo field of view
NEW_TEXT/RECT/POLYGON/ LINE/BARCODE/BITMAP/DRILL	Add a new marking object to the current project
LOAD_LASER_CFG_FILE	Sets the laser communication mode and operating parameters

* Partial listing of commands

Example Nmark™ VCT Program (G-Code):

```
GALVO SET_START_LIST 1          G01 X-156.7 Y25.0
GALVO SET_JUMP_SPEED 1.0        G3 X-156.7 Y-25.0 I-43.3 J-25.0
GALVO SET_MARK_SPEED 0.5        G01 X-25.0 Y-25.0
G00 X156.7 Y-25.0               G01 X-25.0 Y-156.7
G3 X156.7 Y25.0 I43.3 J25.0     G3 X25.0 Y-156.7 I25.0 J-43.3
G01 X25.0 Y25.0                 G01 X25.0 Y-25.0
G01 X25.0 Y156.7                G01 X156.7 Y-25.0
G3 X-25.0 Y156.7 I-25.0 J43.3   GALVO SET_END_OF_LIST
G01 X-25.0 Y25.0                GALVO EXECUTE_LIST 1
```
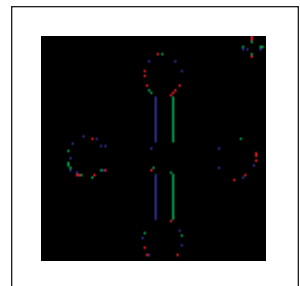
AEROTECH

Automation Solutions for Motion Control and Positioning

Motion Controllers

Aerotech motion controllers are used in our own positioning systems and in motion control and positioning systems throughout the world. We offer a complete line of controllers including the Automation 3200 software-based, 1- to 32-axis motion, vision, PLC, robotics, and I/O platform; the Soloist™ single-axis servo controller; the Ensemble™ multi-axis stand-alone controller; and our PC-card-based multi-axis controllers for both PCI and ISA buses.

Soloist™

Ensemble™

Automation 3200

Drives

Aerotech manufactures drives that power our own high-performance servomotors and complement Aerotech motion controllers in applications as diverse as laser machining, industrial robots, vision systems, assembly machines, machine tools, semiconductor manufacturing equipment, electronic manufacturing, and in a variety of other industrial control solutions. Aerotech drives, controllers, and linear and rotary servomotors are perfectly matched to provide the ideal solution to your motion control application. Aerotech drives are available in PWM and linear output, with from 10 to 100 amps peak current.

Linear and Rotary Motors

Aerotech's "U-channel" and "flat" brushless linear servomotors are ideal for many industrial automation applications. The noncontact design of the forcer and magnet track results in a maintenance-free system. Aerotech's rotary motor family addresses the needs of both ultra-precision positioning and high-throughput industrial automation applications. Our motors have among the highest torque to inertia ratios available. Aerotech manufactures brushless, brush, and frameless motors.
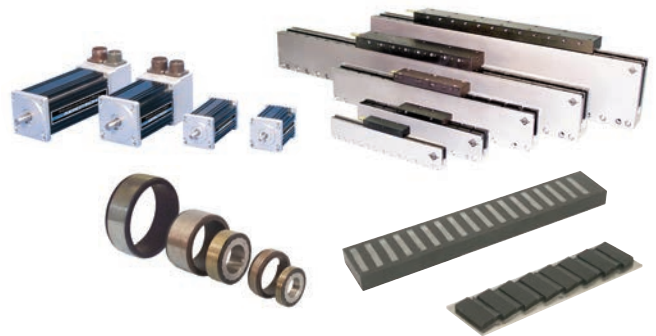
Complete Motion Subsystems

Aerotech has over 35 years of experience manufacturing custom-engineered systems for use in semiconductor, medical, laboratory, photonics and fiberoptics, lasers, automotive, packaging, and other applications. We are well versed in vacuum and clean room techniques. We use over 35 years of motion control and positioning system experience to engineer systems tailor-made for our customers' operations, while employing the most accurate, highest performance motion control and positioning components available.

Aerotech's Worldwide Sales and Service Locations
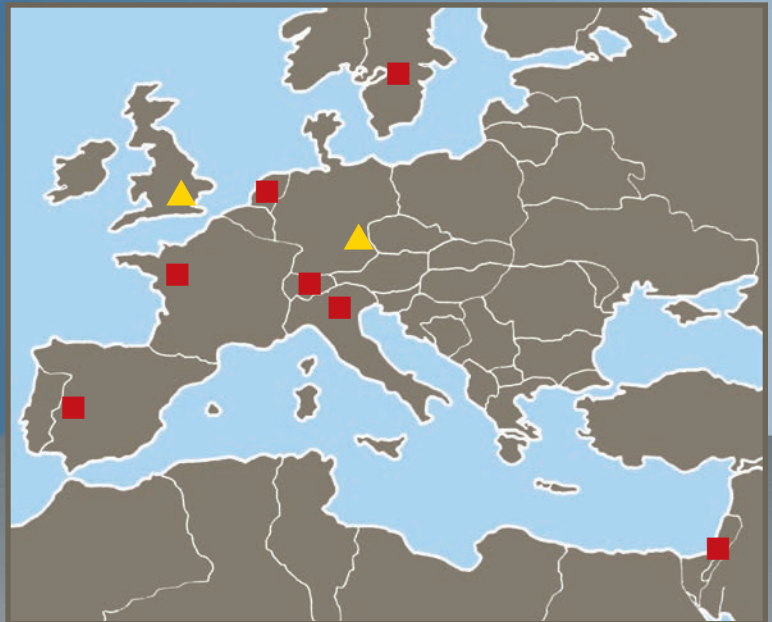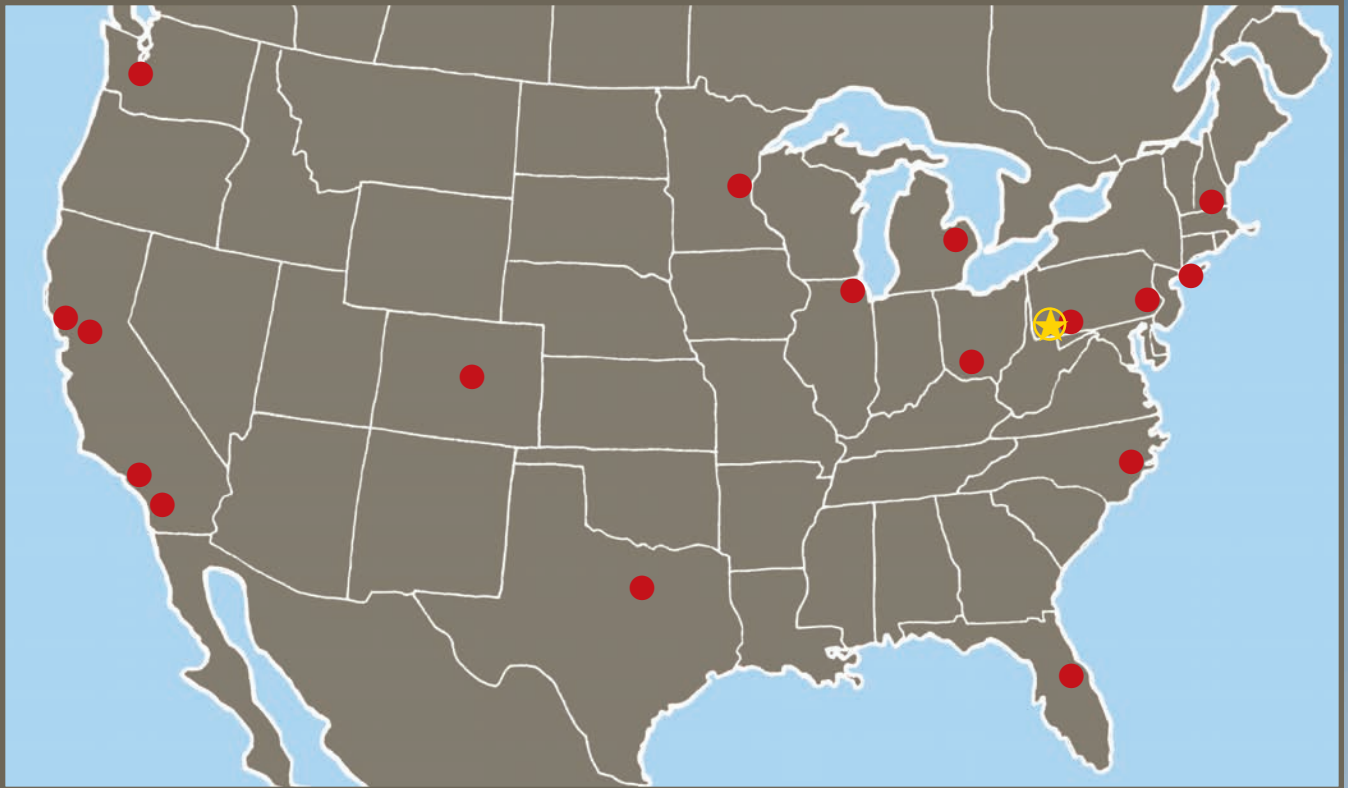
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