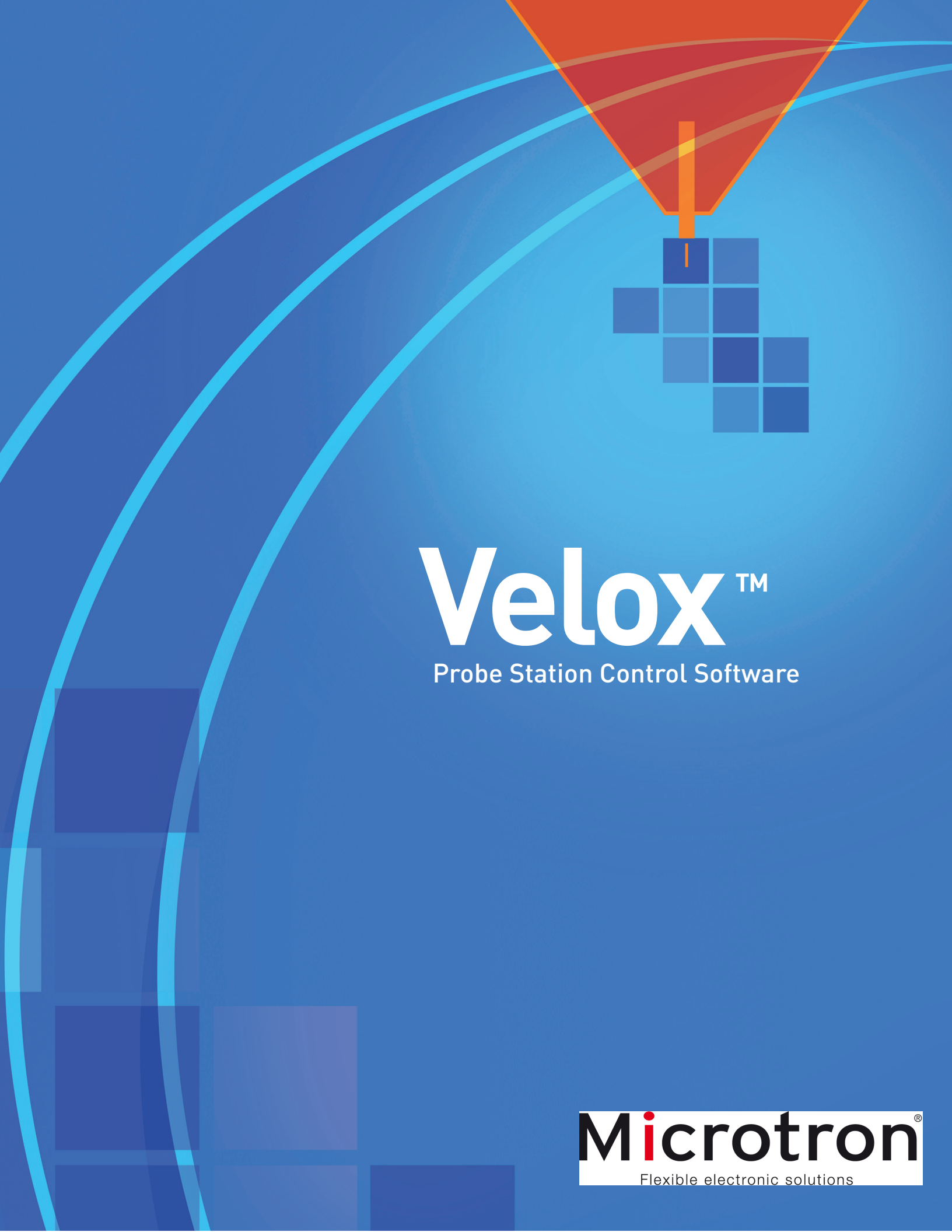


Velox™

Probe Station Control Software

Microtron®

Flexible electronic solutions

Introducing Velox:
It's Time to Rethink Time to Data

Emerging IC markets put mounting pressure on test facilities

New markets and new applications have created a nearly insatiable demand for devices. Just look at the numbers. The average smartphone contains 14 key IC components—and over a billion of these mobile devices will soon be sold every year. In all, nearly 60 billion ICs now ship worldwide every quarter. To meet this instiable demand, worldwide fab capacity is set to soar to over 220 million units when measured in 200 mm wafers. At the same time, fab costs will skyrocket to support processes shrinking down to 10 nm, 7 nm and 5 nm.

It's no wonder that labs everywhere are under mounting pressure. Often, an entire fab line stays idle while waiting to tweak its process based on your lab's test results. You need to deliver the right data, and you need to deliver it right now.

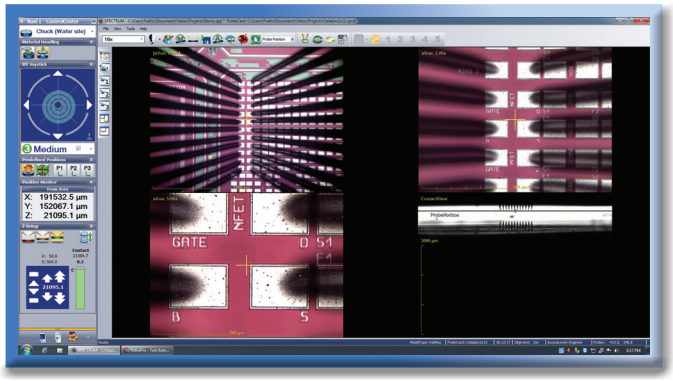
At the same time, you're expected to extract the utmost efficiency from your equipment. You need to keep costs at a minimum, yet produce maximum performance in terms of speed and accuracy during testing. All of your hardware needs to continually earn a solid return on investment. Each operator needs the means to contribute their individual best, regardless of their particular skill level.

And if all this isn't enough, you need to keep your eye on the future and plot a reliable course for anticipated growth, both in people and technology.

Velox integrates and focuses your lab's performance like never before

Velox delivers a universal software solution that applies to all probe stations from Cascade Microtech. It incorporates the best of the previous generation of probe station control software—Nucleus™ and ProberBench™—and then goes a big step further by compressing your time-to-data to an absolute minimum. Velox focuses the lab's operations and engineering expertise, and promotes closer collaboration.

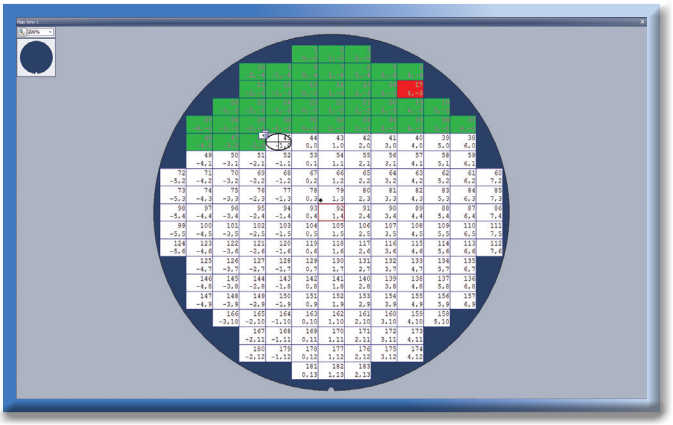
It permits broad flexibility in terms of operation. It accommodates scalable levels of automation, from programmable stage movements, to automated wafer handling. It gets the most out of your probe station hardware. And Velox provides a solid and secure operating platform, giving you long-term continuity. Velox accommodates future requirements that preserve your knowledge base going forward.



One lab, one software solution

Numerous studies have shown that when groups of professionals interface with applications through a single operating platform, it enhances their efficiency. Windows and the Mac OS are the classic examples, but wafer-level test applications are no exception. By merging the outstanding features of Nucleus and ProberBench, Velox creates a single control system for your entire lab. Engineers exchange their expertise on common ground. New users come up to speed faster. Experienced users mine the depth of the Velox feature set quickly. And all users find their individual style of operation easily accommodated.

The Velox probe station control software runs on Microsoft's Windows 7, an established standard in both industry and business. This way, you gain long-term continuity when it comes to future versions of Velox. Accordingly, we have committed to upgrades that both refine and expand the software's capabilities. With Velox, you can anticipate future requirements with confidence. And since Velox is backwards compatible with your Cascade Microtech probe stations, you can preserve and protect your current hardware investment.



Faster time to data through advanced automation

Velox puts a wide range of automation capabilities right at your fingertips. You can easily automate tasks such as wafer alignment, probe navigation, temperature control and pattern recognition of multiple instances. Plus, the VeloxPro™ option enhances full automation of wafer processing through customizable sequencing of loading, aligning and wafer stepping. In effect, the entire test sequence and data extraction process can be automated from end-to-end.

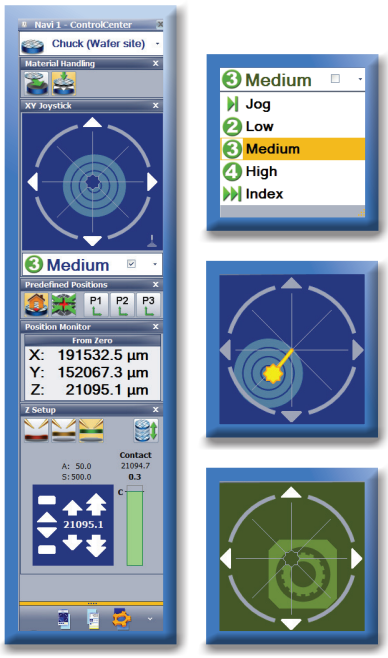
With Velox, you can accelerate your test cycles to their peak—and still have the utmost confidence in your data.

Know Where You're Going Before You Get There

The most efficient path from one operation to the next

When designing Velox, we envisioned a central hub and applied it to the operation of probe stations. The idea is simple enough: You work better if you have a single location that you always arrive and depart from as you progress through probe setup and execution.

The Velox ControlCenter gives you a conceptual anchor as you work. No matter what you're doing, you have the entire spectrum of probe station controls just a single click away. No detours, no delays.

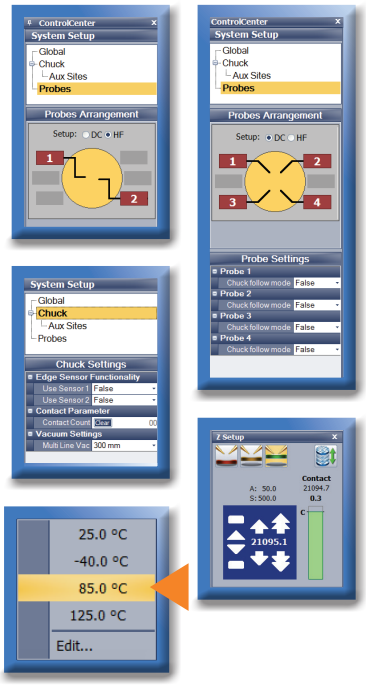


Continuous Visual Monitoring of Probe Locations

Fast, simple visual reference points

The toolbar is the central point of all project management, while the ControlCenter aides with wafer loading and device-specific settings. It's graphical and intuitive as well as customizable. You have a single visual representation in the form of an iconic joystick to initiate probe movements in the X and Y axes. It includes sliders that ensure you move with precision and accuracy in the anticipated direction. All the while, you're presented with continuous numerical feedback on your present location in the X, Y and Z axes. And at the outset, wizards provide assistance to automate alignment and index calculations.

At the same time, ControlCenter graphically represents Z-axis moves with three buttons for contact, separation and alignment. There are three additional buttons for continuous Z-up/ Z-down movements. Probe placement speed, jog size, separation and alignment can all be individually adjusted.



The ControlCenter interface also gives you access up to six motorized probe positioners, so you can even automate multi-product or multi-device testing.

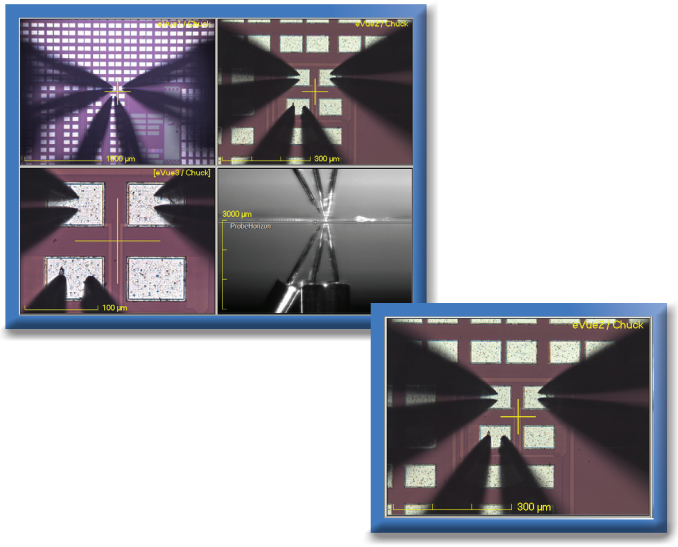
Automated temperature control

Many probe scenarios call for testing over a range of temperatures, and ControlCenter responds with a feature set that enables automation of the process. You can preset four different temperatures, define the soak time between each setting, and compensate for thermal expansion.

Maintain a large field-of-view during probe placement

The Velox Vision System acts as a powerful aid in wafer navigation, probe placement, wafer alignment, and sub-die navigation. It gets you where you want to go faster, and delivers more information once you arrive. Velox seamlessly works with the eVue™ multi-camera architecture to provides the perfect balance of optical resolution, digital zoom and live-motion video. You realize a new level of optical clarity all the way from the whole die down to the smallest structures.

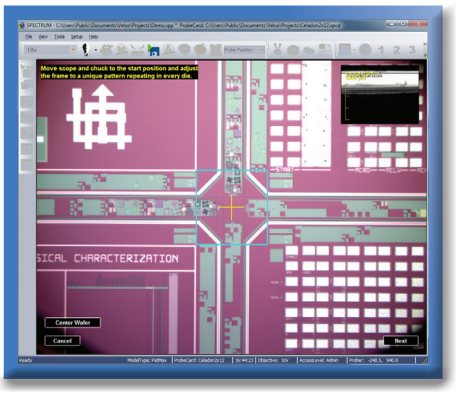
The Vision System's multiple views give you an instant context for the probe needle's position on the wafer. eVue's multi-camera mode presents you with simultaneous low-, medium- and high-magnification video of the probe needle in its current position. Seamless zoom through the camera's full optical and digital range gives you added speed and precision during probe-to-pad alignment. And the eVue PRO option adds a 2048 x 1536 megapixel mode, plus auto-focus and auto-exposure.



***ControlCenter:** Puts you in complete control. A central dashboard for project management, wafer loading and device-specific settings.*

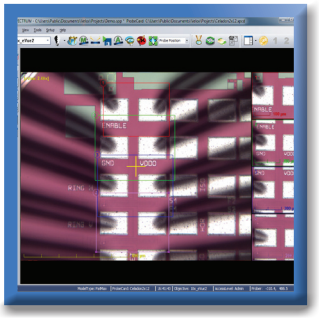
Powerful wafer alignment tools

The Velox Vision System brings a new level of automation to wafer alignment and pre-contact probe placement. The key to this advance is innovative pattern recognition software, which provides a built-in point of reference on the wafer surface. With this geometrical anchor established, it goes on to perform the required calculations for die size and corrective maneuvers.



Wafer alignment becomes automatic, and corrected XY placement is performed on-the-fly before contact occurs. Our eVue Digital Imaging System extends this capability to the Z-axis, resulting in faster, safer probe placement than previously possible.

For all probe placement and wafer alignment tasks, the Velox Vision System features point-and-shoot navigation, which streamlines and simplifies maneuvering on the wafer surface.

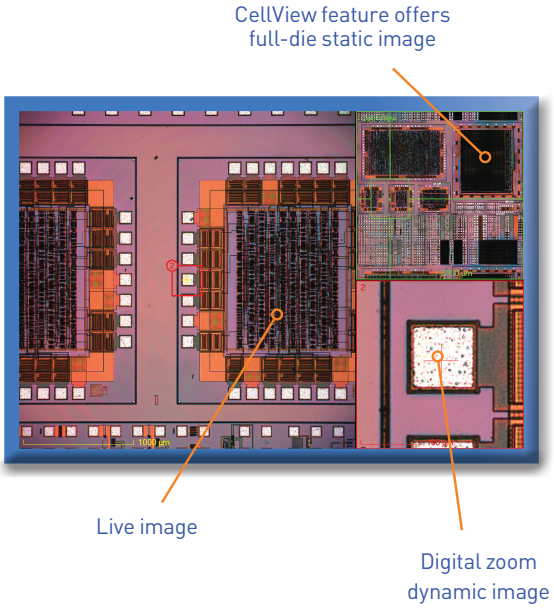


With CellView, you maintain a constant point of reference

A common problem has been the loss of visual reference points during sub-die navigation. You have to leave the area of interest and zoom out to re-orient yourself. Once you have obtained your next touchdown location, then zoom in.

CellView solves this problem by automatically tracking your present location at multiple scales of reference. You always have a static image of the full die, along with a live image of the area of interest, and a dynamically zoomed view of the pad or feature in question. Click on any feature in the die overview, and the chuck automatically travels there on the live video and memorizes the location. It makes sub-die alignment nearly instantaneous.

CellView builds a stitched image of the overall device and allows quick on-screen navigation across the entire die layout. You realize ultra-fast sub-die alignment through point-and-shoot image capture.

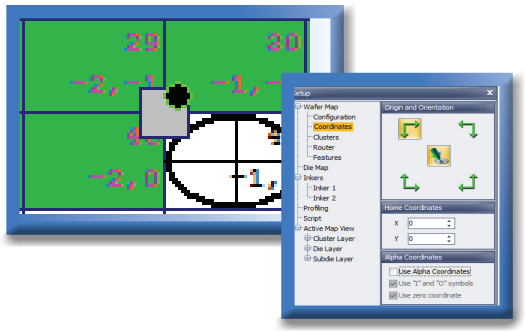


***Velox Vision System:** Complete and continuous visual access to probes and wafer surfaces. Realize quicker navigation and improved accuracy.*

Chart Your Journey Across the Wafer with Unparalleled Accuracy

Wafer Map gives you a global point of view

To create an optimized probing pattern, you need to have the big picture in plain view. Wafer Map does this through a graphic representation of the entire wafer surface. Easily identify your current location, and from this global perspective you can rapidly define the probe's path of travel during testing. A concise setup window lets you identify starting locations, probing patterns and stepping sequences, all optimized for maximum efficiency. Plus Wafer Map lets you test die all the way to the wafer's edge.



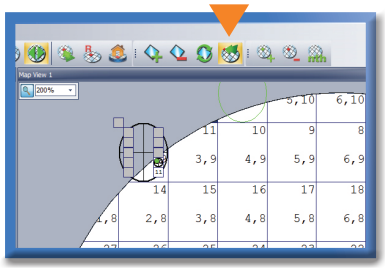
Also, you can stay on top of complex probing operations with automatic binning, automated statistical accumulation, and the storage of unlimited die and sub-die definitions. No wafer is too complicated - no probe strategy too dense.

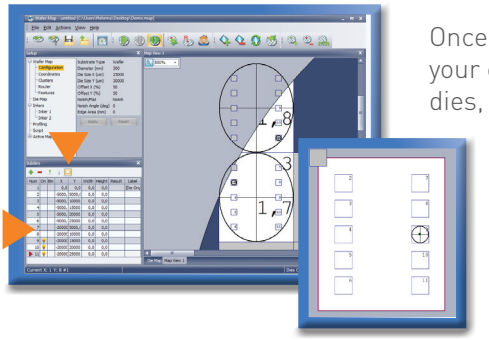
Sub-die mapping clarifies a wafer's outer edge

Once you reach the edge of a wafer, you have to deal with different subsets of the probe points assigned to each die. Further, each of these sub-die variants will differ in how critical they are to gathering relevant test data.

***Wafer Map:** Quickly develop an optimized probing strategy for die, sub-die and Z-axis.*

Velox's sub-die mapping feature streamlines both the definition and ranking of all sub-dies on the wafer. Sub-dies can easily be configured and adjusted to each individual die and gather data from the critical edge dies. You have a choice of both automatic and manual operation. In the manual mode, you can travel along the wafer's edge and graphically define contact points through simple point-and-shoot navigation. The automatic mode offers a time-saving alternative when applicable.



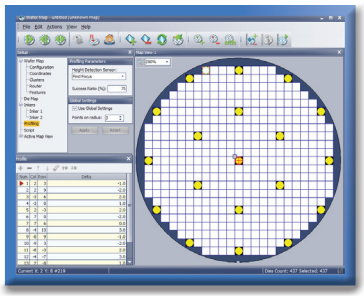


Once you've completed your census of sub-dies, you can quickly organize them in order of priority during probing, and disable those that don't contribute to test results.

Keep your Z-axis within normal limits

The closer you get to a wafer's surface, the more variable its topography becomes. And microscopic differences can quickly create macroscopic problems if you don't properly account for variations in the contact height. Velox resolves this issue with Z-Profiling, which substantially improves the probe's contact consistency, preserving data integrity.

Z-Profiling employs auto-focus and edge sensing to automatically define Z-axis offsets for different points on the wafer. It then goes a step further by interpolating the Z-axis delta as you move between these profile points. For repeatable chuck positions, you now have a complete picture of probe height, including compensation for thermal changes and wafer flatness.

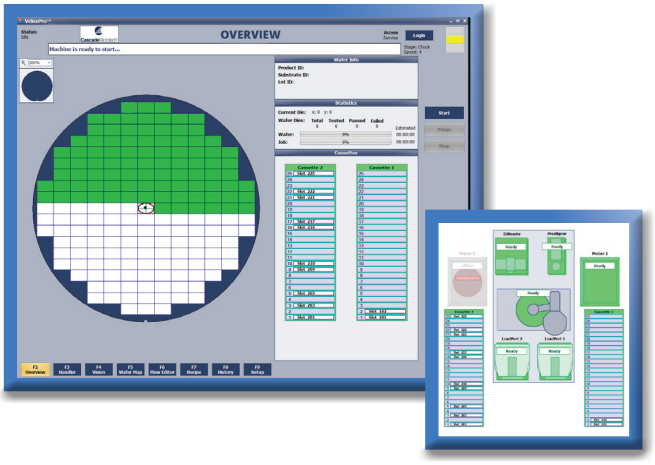


We've Automated the Process of Automation

VeloxPro enables true test cycle automation

It's one thing to have the capability to automate an entire test cycle, and quite another to actually make it happen. In response, we offer VeloxPro, a unique software option that simplifies and automates many of the steps required to define a fully-automated probe sequence. VeloxPro is a SEMI E95-compliant user interface.

From wafer handling through stepping and probe contact, VeloxPro provides a guided user workflow to achieve full automation. Alignment, temperature control and Z-Profiling are also defined along the way. A set of graphical windows display the wafer and cassette maps, and updates to reflect pass/fail progress when the test cycle executes. VeloxPro even supports multiple wafer types within a cassette to enable the automation of measurements on multiple devices. The wafer hot swap feature allows removal of the cassette and replacement of the wafer during the test cycle without interrupting the test process. With VeloxPro, you get the fastest possible time-to-job-completion, even in mixed-signal environments.



Two-way traffic with test instrumentation

No probe station control software lives in a vacuum, and neither does VeloxPro. WaferSync™ provides the final step to integrate Velox probe station control software and test executive programs. VeloxPro lets you build a bridge to Keysight Technologies' WaferPro Express for automated over temperature test. You achieve a two-way channel of communication that synchronizes data acquisition with probing processes such as locating the wafer's home die, stepping to each die, conducting sub-die operations and automatic calibration with WinCal XE™. No need for additional programming. All described and executed while you are connected to WaferPro Express.

With WaferSync, connected to WaferPro Express, your time to first automated measurement is reduced to an absolute minimum.

***VeloxPro:** The fastest, simplest path to automation of the entire test cycle, from wafer loading to data acquisition*

Velox keeps you at the forefront in wafer-level test

Today's relentless advances in IC technology require an extraordinary effort from engineering labs worldwide. Velox delivers a comprehensive and systematic means of achieving the highest possible levels of performance and accuracy in virtually any engineering test environment.

It focuses all your staff's knowledge and skill via a single system of control and operation that extends across the entire spectrum of wafer-level test scenarios, from manual probe placement to fully-automated test sequences. In every instance, you realize a maximum return on your hardware while minimizing time-to-data.

For more information on Velox, contact Cascade Microtech at 1-800-550-3279.

CascadeMicrotech®

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Flexible electronic solutions

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