

# Velox for Manual Probe Stations

## Taking Manual Measurements to the Next Level

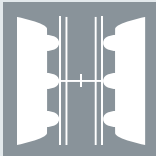
FormFactor introduces a new Velox Module for Manual Probe Stations. The new module comes with a feature set that has been optimized for the requirements of manual probe station users. Live vision of the probe tips improves speed and accuracy of probing, and measure on-screen capabilities assist design debug and presentation of measurement results.

For RF, mm-Wave and Terahertz measurements, Velox for Manual Probe Stations includes an exclusive new Augmented Align tool that improves measurement

accuracy and makes RF probe positioning as simple as can be – even for unexperienced users.

Additionally, optional pattern-recognition-based probe tip position detection automatically calculates probe-to-probe and probe-to-pad distance with  $\mu\text{m}$  resolution. This is particularly useful when performing TRL calibrations which require different lengths of line.

Velox for Manual Probe Stations includes a USB3 camera and can be installed on a customer PC or laptop.



### Augmented Align Tool

Improves RF, mmW and THz measurement accuracy and simplifies probe positioning



### Live Vision with Analytical Tools

Maximum ergonomics with Measure On-Screen and Snap Image



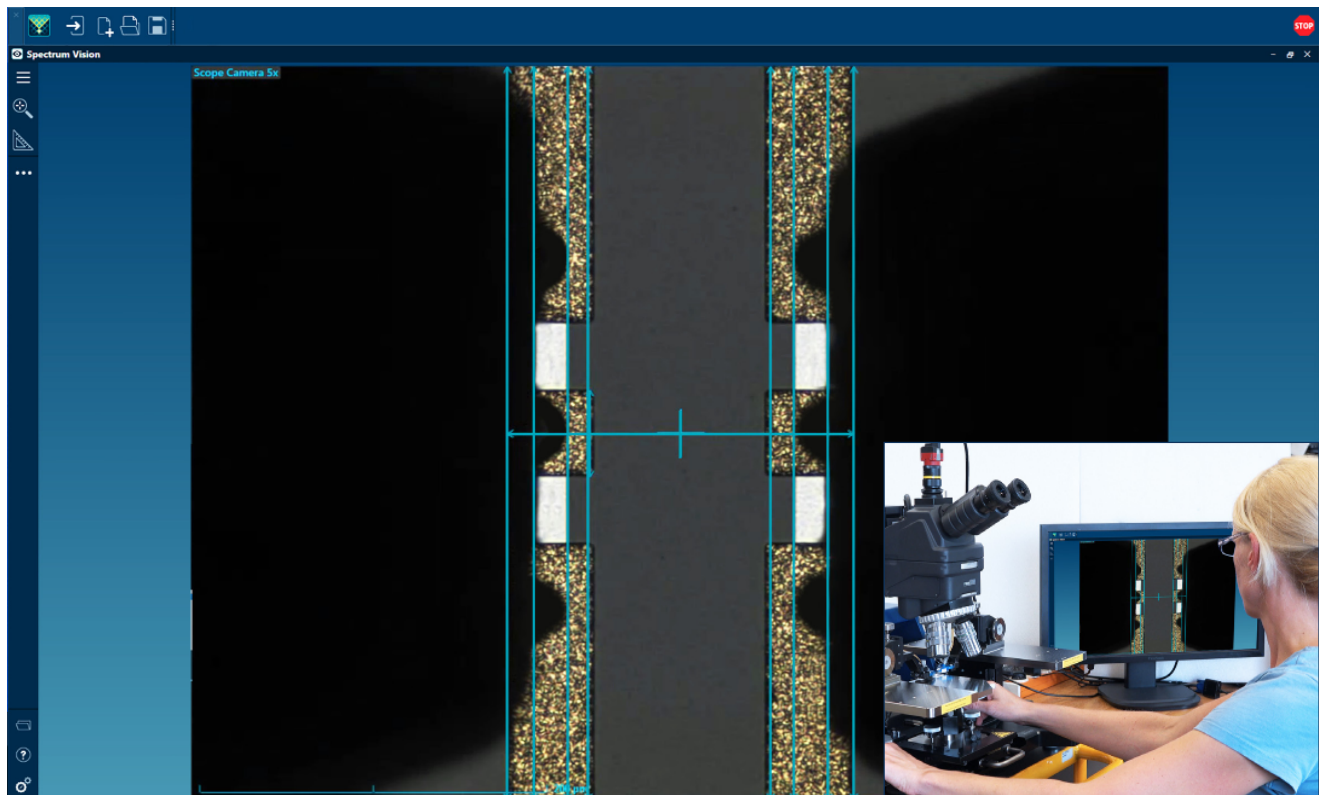
### Find Feature Tool

Pattern recognition-based dimensional feedback of probe position with  $\mu\text{m}$  resolution



### Python-based Scripting Console

Allows user code for control of WinCal, VNA and more



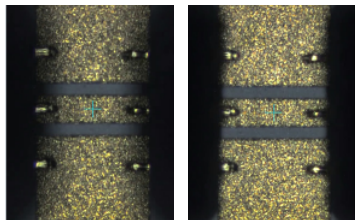
Velox for Manual Probe Stations: The exclusive Augmented Align tool provides on-screen markers that improve measurement accuracy and make RF probe positioning as simple as can be.

# Velox for Manual Probe Stations



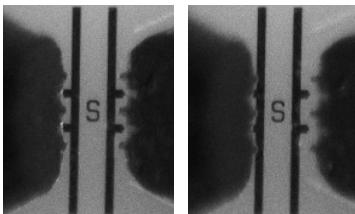
## Augmented Align Tool

Getting accurate concentricity between RF probes and a calibration standard takes time and practice, especially with stereo microscopes. Anticipating the landing point of RF probes can be challenging when the probes are lifted up and therefore out of focal plane. This is particularly important on THRU structures as it can be difficult to find the registration between the probe tip and the end of the standard.



When the probes are lifted up and out of focal plane, it can be difficult to anticipate their landing point.

One of the main benefits of a stereo microscope is 3D visualization due to its two separate optical paths. However, cost-efficient entry-level stereo microscopes\* can create an apparent position shift of the probes when not in contact, caused by the inclined plane of the microscope's optical paths (parallax). In order to get accurate placement often some mental offsetting is needed.

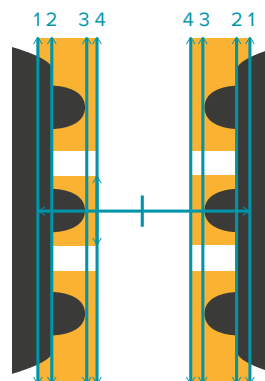


Images captured with a camera looking down the optical path of an entry-level stereo microscope. When the platen lever is raised the probes appear to move sideways, which is a typical optical effect of such microscopes.

FormFactor's **Augmented Align** tool provides location markers on the screen that help the user know exactly where the probes will land, even if they cannot be seen due to being out of focus. This is particularly helpful on THRU standards where the standard geometry makes it difficult to judge the offset from the edge of the pad.

*“Augmented Align enables faster calibration and improves accuracy and repeatability.”*

To ease usability, Augmented Align interacts with WinCal: depending on their calibration substrate, users can either read FormFactor-predefined overlays from WinCal or add a custom grouping of overlays and associate them with a name.



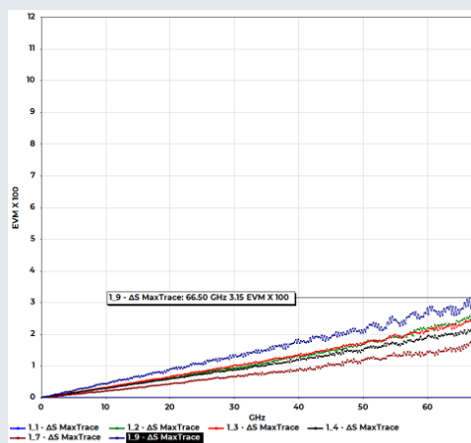
### Augmented Align Tool:

The outermost lines (1) align to the outer edges of all standards.

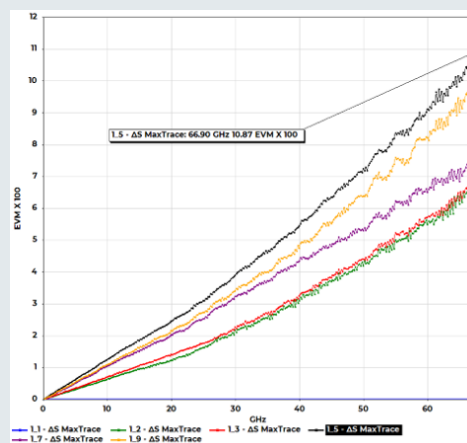
Next line in (2) is the initial contact point of the probe, and line (3) shows its final location. The lines allow the user to scrub their probes into contact by a known amount.

The innermost lines (4) align to the inner edge of reflect standards.

Vertical arrows align to width of lines for vertical alignment.



Error set  $S_y$  EVM max. variation, Augmented Align on.



Error set  $S_y$  EVM max. variation, Augmented Align off.

The graphs shown look at the error set comparison between the best six of first to  $n^{\text{th}}$  calibration cycle. Ideally, with a perfectly repeatably system without drift and perfect probe placement the difference would be zero.

With the benefit of Augmented Align, a significant improvement can be seen.

\* FormFactor provides a wide range of microscopes - from high-resolution digital with state-of-the-art optics to entry-level, cost-efficient microscopes.

# Velox for Manual Probe Stations



## Live Vision with Analytical Tools

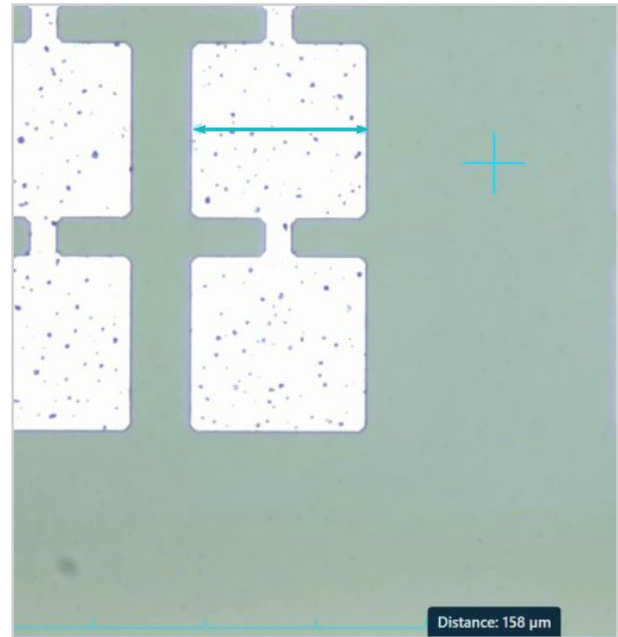


Velox for Manual Probe Stations comes with real-time live vision that improves speed and accuracy of probing. Several analytical tools enable comprehensive documentation of the measurement process and assist design debug. On-screen measurements are available with  $\mu\text{m}$  resolution and snap image function captures the live image with all overlays and markers.



**USB<sup>3</sup>**  
VISION

*Velox for Manual Probe Stations comes with a USB3 camera that enables real-time live vision without any latency.*



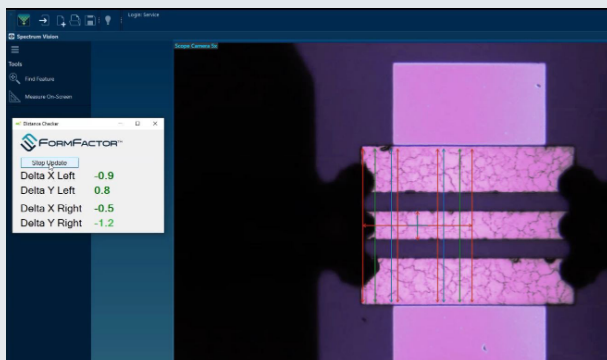
*Analytical tools like Measure On-Screen enable comprehensive documentation of the measurement process and assist design debug.*

## Find Feature Tool (Option)



Find Feature allows even manual stations to carry out pattern recognition and provide optical dimensional feedback of probe positions.

It can be used to precisely calculate probe-to-probe and probe-to-pad distance with  $\mu\text{m}$  resolution. This is particularly useful when performing TRL calibrations where the probe should be offset a known displacement.



*Application example displays probe offset from trained position. Multiple recognition targets allows full analytical freedom.*

## Python-based Scripting Console



For advanced control, Velox for Manual Probe Stations comes with a Python-based Scripting Console. It allows user code to take images at time intervals, to coincide with measurements in WinCal, and more. Measurements can be synchronized by controlling the VNA and WinCal directly from Python inside the Scripting Console.

## Easy Installation on Customer PC or Laptop

Velox for Manual Probe Stations can be installed on a customer PC or laptop with minimum:

- / 8GB RAM
- / USB3 interface
- / Windows 10 operating system