

Modulo Quattro

Multi-point Laser Ultrasound Receiver
All Surface Types



LASER ULTRASONICS FOR NON-DESTRUCTIVE TESTING

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Technology

A modular future for non-contact non-destructive testing

Based on our experience working with teams developing next-generation non-destructive testing solutions, we recognize that unlocking the full potential of laser-ultrasound technology requires a system that is rugged, multi-point, and highly adaptable. The new Modulo platform embodies this vision—a modular instrument design that leverages our proven Multi-Channel Random Quadrature (MCRQ) technology to power a new generation of instruments with multiple detection points.

MCRQ multiplied

The Quatro features four Multi-Channel Random Quadrature measurement channels, each an independent measurement point. MCRQ does not rely on a standard quadrature detection scheme (which requires the detection of two complimentary signals with a 90° phase difference). Instead, it takes advantage of the random optical phase distribution, assuming that statistically half of signals registered by the photodetectors are in-quadrature and half are out-of-quadrature.

In the Modulo design, the combined sample and reference beams necessary for interferometry are directed straight onto a single detector array which collects both the vertically and horizontally polarized components, allowing us to make an instrument that is remarkably compact per measurement channel, all while remaining both highly sensitive and rugged.

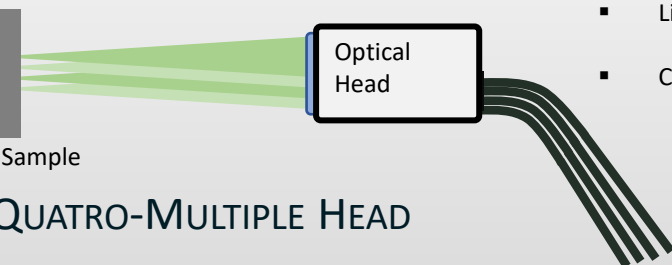
As in the Quartet, the signals from the detector arrays are demodulated separately then summed together. This way the overall sensitivity of the measured signal remains high without the need for stabilization, as the out-of-quadrature signals will not contribute to the resulting signal.

One or Multiple Optical Heads

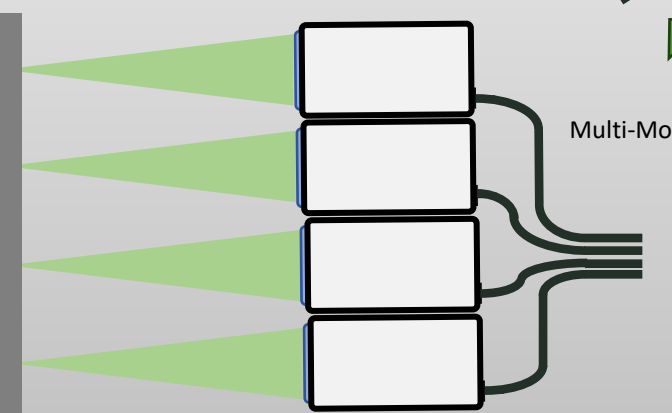
A multi-point Modulo can be built to run multiple closely spaced measurement points through a single optical head or feature four separate optical heads. Closely spaced measurement points drastically increase scan speeds (x 4) and reduces localized heating from the optical probe (the heat is distributed among measurement points). On the other hand, multiple optical heads provide a broader measurement range, as well as the possibility of measuring at different angles, such as to extract the 3D component.

QUATRO-SINGLE HEAD

Multiple detection points for close spacing (1-2mm)

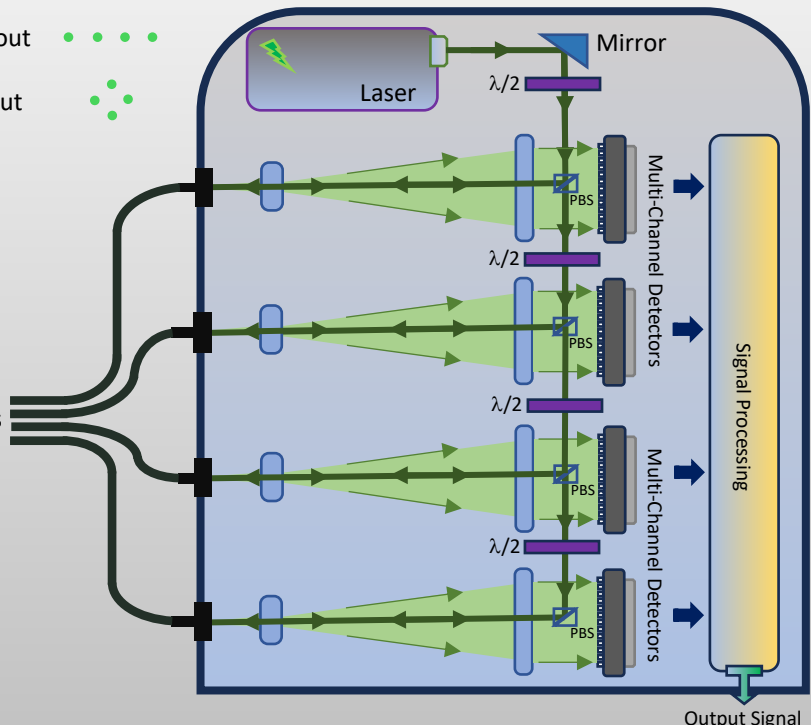


QUATRO-MULTIPLE HEAD



- Linear layout
- Cross layout

Modulo Quatro Receiver



Specifications

NESD (Noise Equivalent Surface Displacement)	The NESD varies based on the model specifications, material composition, and measurement setup. Please contact us for more information.
Standard Detection Bandwidth	Up to 60MHz
Internal Laser	400mW to 3W
Laser wavelength	532nm (Visible), 1064nm (IR)
Fiber	Multimode / Length does not affect performance
Spot diameter on sample	50µm to 1.5mm (depend on stand-off & wavelength)
Optical stand-off	From 70mm to a few meters
Diameter of collecting aperture	2" (50mm) for standard optical head
Analog Outputs	Calibrated output – 100mV/nm Direct output, Calibration level and DC level
Digital Output	Sampling Rate 125 Ms/s Resolution 14 Bits Ethernet Output Rate 1Gbit/s
Options	2D scanning set-up including PC, software, and X-Y translations
Demodulator Dimensions	490 x 450 x 450 mm
Optical Head Dimensions	65 x 85 x 170 mm
Demodulation Weight	17 kg
Optical Head Weight	0.75 kg

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