Measurement Devices

QUANTIFI PHOTONICS™

LASER COMPONENTS

Doppler

MODULAR PHOTONIC DOPPLER VELOCIMETRY

SPECIFICATION SHEET

AVAILABLE IN PXI

AVAILABLE IN MATRIQ

03/21 / V2 / AHHW / quantifi/matriq_doppler-1000

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LASER COMPONENTS

FEATURES

Velocity measurement of fast-moving materials is essential to a growing number of scientific and technical fields including shock physics, the study of material properties, hypervelocity impact testing, detonics and shock wave experiments.

The Quantifi Photonics Doppler combines the key optical components for Photonic Doppler Velocimetry (PDV) measurements in a compact instrument to enable streamlined low channel count PDV test setups.

Accurate control and measurement of target, probe and reference power.

All of your optical power management in a single-slot PXIe module. This purpose built Doppler instrument streamlines your PDV test setup.

Drastically reduce the footprint of your test setup.

Replace the stack full of bulky individual optical test instruments with one small instrument and save valuable lab space.

Easily build scalable, multi-channel systems

Combine with our Laser and O2E modules and fit up to 8-channels in a single 18-slot PXIe chassis.

Generate reliable, repeatable measurements.

Minimise the number of manual optical connections for reliable and repeatable measurements.

Simple, intuitive operation with COHESIONUI™.

COHESIONUI makes it simple to control the Doppler instrument from your PC or mobile device.

Versatile configuration.

Supports traditional homodyne and frequency-shifted heterodyne PDV testing.

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TARGET APPLICATIONS

- Study of material properties and impact response using shock physics.
- Replacement for Velocity Interferometer System for Any Reflector (VISAR) with an integrated fiber-based system.
- Measure velocities in dynamic experiments with high temporal precision.

A COMPLETE PDV MEASUREMENT SOLUTION

Combine the Doppler with the Laser and O2E to build a streamlined PDV test system. All you need to add is an optical probe and digitizer or oscilloscope with suitable bandwidth for the application.

LASER
Tunable Laser Source

Available in PXI
Available in MATRIQ

- Continuous Wave tunable laser source offering high-power output, narrow 100kHz linewidth and 0.01 pm resolution tunability.
- Whisper Mode is an optional feature to remotely disable frequency dither on each laser.

DOPPLER
Photonic Doppler Velocimeter

Available in PXI
Available in MATRIQ

- Available in standard and power-controlled models.
- Power meter, variable optical attenuator and coupler all in one compact, space saving unit.

O2E
Optical-to-Electrical Converter

Available in PXI
Available in MATRIQ

- High-bandwidth, broadband optical-to-electrical converter with 1 or 2 channels, AC or DC coupling, and various conversion gain and operating wavelength ranges.
- Built-in amplifier eliminates the need for additional RF amplifier for significant cost savings per channel.

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DOPPLER SCHEMATIC

FIGURE 1

Figure 1 represents the configuration of the Doppler 1001 in PXI or MATRIQ form. It incorporates many of the key fiber optical components required to accurately condition the target and the reference laser and to mix the probe with the reference.

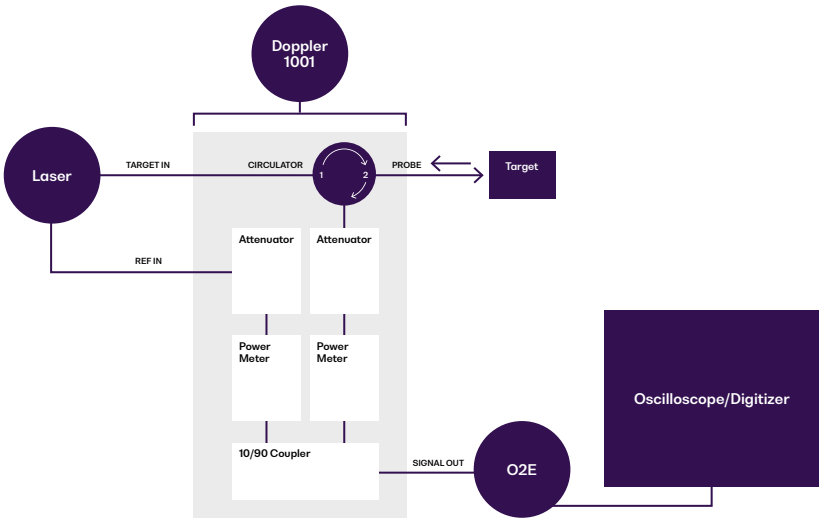
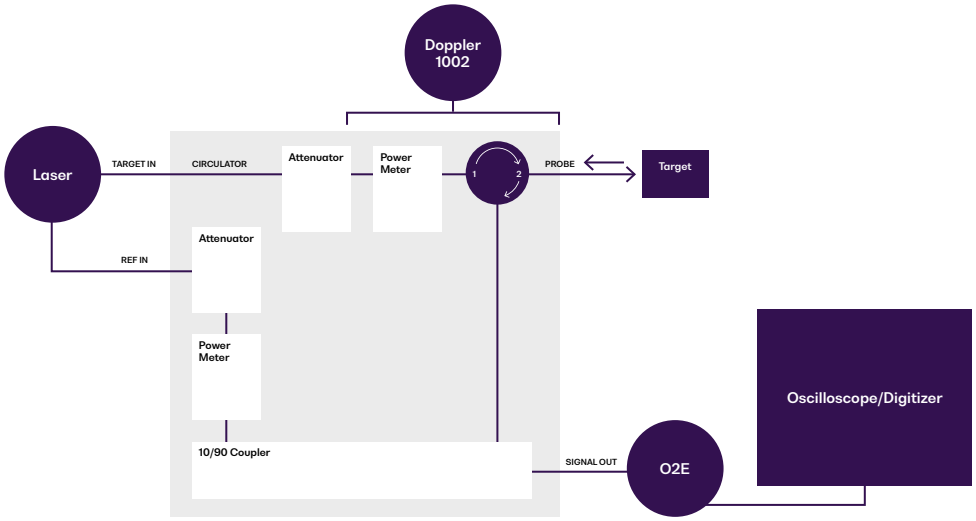


FIGURE 2

Figure 2 represents an alternative configuration of the Doppler instrument. The DOPPLER 1002 places the target input attenuator and power meter before the circulator. With the power control before the probe, this reduces the optical power transmitted to the probe and the DUT which may be desirable in some circumstances.



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LASER COMPONENTS

PXIe – MODULAR

Our expanding range of PXIe optical test solutions are used by customers in mixed-signal test and measurement systems, reducing complexity, lowering the cost of test and accelerating time to market.

- Multi vendor, open standard with over 1500 PXI modules available
- Advanced timing and synchronization capabilities across instruments
- Low latency, high performance processing and fast data throughput
- Design and build scalable, high channel count systems
- Small footprint and lower power consumption

MATRIQ – COMPACT & PORTABLE

The MATRIQ series provides the same high-performance test capabilities of our PXIe modules in an compact benchtop design. MATRIQ instruments are simple to setup and easy to operate, making them the perfect choice for your optical lab or test bench.

- Same performance and control as our PXIe modules
- Plug and play with USB or Ethernet connectivity
- Control via the web-based GUI, COHESIONUI, LabVIEW or SCPI commands
- Compact and portable design saves benchtop space

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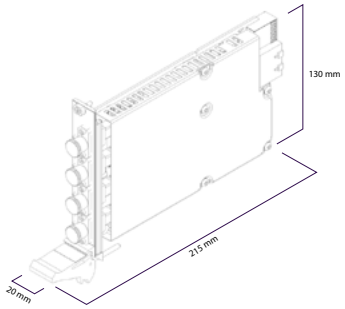
DOPPLER TECHNICAL SPECIFICATIONS

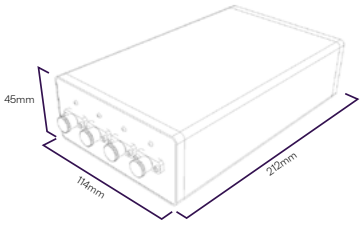
PXI – MODULAR

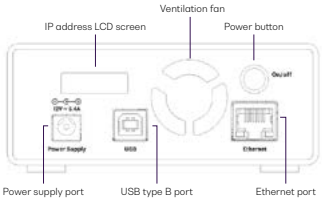
DOPPLER-1001-1-FC-PXIE



MATRIQ – COMPACT & PORTABLE

DOPPLER-1001-1-FC-MTRQ





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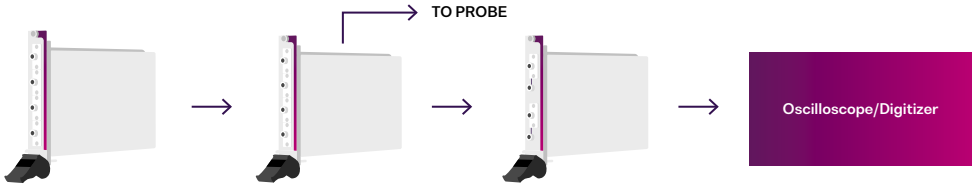
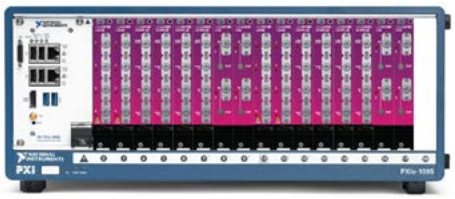
PXI – 8-CHANNEL PDV SETUP

The below shows an example configuration of an 8-channel Doppler setup. It consists of four Laser 1002 laser sources (Target and Reference), and eight Doppler 1001 modules. The output of the Doppler 1001 module is sent to a four high channel and high bandwidth O2E 1101 where the probe and reference laser beat. The electrical beat signal is then digitized with an oscilloscope.



4 x Laser-1002 | 8 x Doppler-1001 | 4 x O2E-1101



8-channel PDV system in a single 18-slot chassis

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DOPPLER TECHNICAL SPECIFICATIONS

General Specifications	PXI	MATRIQ
Bus connection	PXIe	USB and Ethernet
Number of PXI slots	1	-
Fiber type	SMF-28	SMF-28
Optical connector type	FC/PC,SC/PC,FC/APC or SC/APC	FC/PC,SC/PC,FC/APC or SC/APC
Dimensions H x W x D	130 x 20 x 215 mm | 5.1 x 0.8 x 8.5 inch	45 x 114 x 212 mm | 1.7 x 4.5 x 8.3 inch
Weight	~ 1 kg | ~ 2.2 lbs	~ 1.1 kg | ~ 2.4 lbs
Operating temperature range	5 °C to 45 °C | 41 °F to 113 °F	
Storage temperature range	-40 °C to 70 °C | -40 °F to 158 °F	

Model Number	1001	1002	1001	1002
Wavelength	1520 to 1650 nm		1520 to 1650 nm	
Probe output operating range	-50 to +20 dBm		-50 to +20 dBm	
Reference output operating range	-60 to +10 dBm		-60 to +10 dBm	
Damage level	+23 dBm		+23 dBm	
Insertion loss[3] target input to probe output	< 3 dB	< 5 dB	< 3 dB	< 5 dB
Insertion loss[3] probe input to output	< 5 dB	< 3 dB	< 5 dB	< 3 dB
Insertion loss[3] reference input to output	< 14 dB	< 14 dB	< 14 dB	< 14 dB
Wavelength dependent loss	< 0.02 dB/nm		< 0.02 dB/nm	
Return loss[3]	> 45 dB		> 45 dB	
Circulator Directivity	> 45 dB		> 45 dB	
Warm-up time	< 20 minutes		< 20 minutes	

Attenuator	1001	1002	1001	1002
Calibration wavelength	1550 nm		1550 nm	
Attenuation range typical[5]	> 46 dB		> 46 dB	
Attenuation range guaranteed[5]	> 40 dB		> 40 dB	
Resolution	0.01 dB		0.01 dB	
Attenuation speed	0.1 to 1000 dB/s		0.1 to 1000 dB/s	

Power Meter	1001	1002	1001	1002
Calibration wavelength	1550 nm		1550 nm	
Polarization dependent responsivity [2,3]	< 0.2 dB		< 0.2 dB	
Linearity[2,5]	± 0.1 dB		± 0.1 dB	
Total uncertainty[2,3,5]	± 0.34 dB (Typical); ± 0.55 dB (Max)		± 0.34 dB (Typical); ± 0.55 dB (Max)	
Averaging time	100 µs to 10 s		100 µs to 10 s	
Resolution	0.01 dB		0.01 dB	
Data logging	1 to 1024 per channel		1 to 1024 per channel	

Notes
1. Specifications are valid at 23 °C ± 3 °C
2. + 10dBm to -40dBm, 23 °C
3. Excluding connectors
4. At calibration wavelengths

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ORDERING INFORMATION

DOPPLER - XXXX - 1 - XX - PXIE
DOPPLER - XXXX - 1 - XX - MTRQ

Model number
1001 = Standard configuration
1002 = Probe and DUT power controlled configuration

Connector type
FC = FC/PC
FA = FC/APC
SC = SC/PC
SA = SC/APC

WARRANTY INFORMATION

This product comes with a standard 3 year warranty.

An optional 5 year extended warranty is also available, please discuss with your sales representative at the time of purchase.

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LASER COMPONENTS

CATALOGUE

Our portfolio of optical and electrical test modules is rapidly expanding to meet a wide range of customer requirements and applications.

Tunable Laser Sources
Versatile telecom laser sources with full tunability across C or L bands. Narrow 100 kHz linewidth, up to 16.5 dBm of power, optional whisper mode to disable frequency dither.

Erbium-Doped Fiber Amplifier (EDFA)
High power Erbium-Doped Fiber Amplifier for signal power amplification in C and L bands with various control modes, including automatic gain control.

Fixed Wavelength Laser Sources
Highly customizable DFB or FP laser sources available in a wide range of wavelengths and powers. Models support SMF, MMF and PMF.

Variable Optical Attenuator (VOA)
Fast attenuation speed with low insertion loss and built-in power monitoring. Operates in fixed attenuation or constant output power modes. Models support SMF, MMF and PMF.

Optical Power Meters
Fast terminating or inline monitoring of optical signal power from -60 to +10 dBm across 750 – 1700 nm wavelengths. Model with logarithmic analog output for applications such as silicon photonics fiber alignment.

Optical Spectrum Analyzer (OSA)
Low cost, fast spectral measurement in a compact module with built-in analysis including SMSR, OSNR and spectral width. Targeted wavelengths for specific applications in O band, C band and L band.

Optical-to-Electrical Converter
High bandwidth, broadband O-to-E converter. Available in a range of configurations; choose from 1 or 2 channels, AC or DC coupling and various conversion gain and operating wavelength ranges.

Bit Error Rate Tester (BERT)
2 or 4-channel Pulse Pattern Generator and Error Detector at rates up to 29 Gbps for the design, characterization and production of optical transceivers and opto-electrical components.

Pulse Pattern Generator (PPG)
4 channel Pulse Pattern Generator from 0.3 to 30 Gbps for high-density multichannel applications. With integrated clock synthesizer and programmable de-emphasis and CTLE processor.

Optical Switch
Proven reliability and fast switching time. Wide variety of switch onfigurations: 1x4, 1x16, 16x16 and more. Models support SMF, MMF and PMF.

Polarization Controller & Scrambler
High-speed automated polarization control with broad wavelength coverage from 1260nm to 1650nm, low insertion loss and back reflection. Full remote control via intuitive GUI, LabVIEW or SCPI.

Photonic Doppler Velocimeter (PDV)
Purpose-built module for Photonic Doppler Velocimetry (PDV). A circulator, two VOAs and a passive coupler all built into one compact module.

Passive Component Integration
Integrate passive optical components of your choice such as WDM couplers, splitters, band-pass filters, PM beamsplitters and circulators. Models support SMF, MMF and PMF.

Passive Component Storage
Protect and store your own passive fiber optic components such as splitters, connector adaptor patchcords, WDM couplers, and isolators in one handy module.

PXI – TEST MODULES | MATRIQ – TEST MODULES

We provide these products as PXIe modules and compact MATRIQ benchtop instruments.

See our website for more details
quantifiphotonics.com/products

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WHY CHOOSE QUANTIFI PHOTONICS

Test. Measure. Solve.

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with optimal solutions.

To find out more, get in touch with us today.

QUANTIFI PHOTONICS™

Version 1.9.1

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