QUANTIFI PHOTONICS®
A Teradyne Company

IQRX

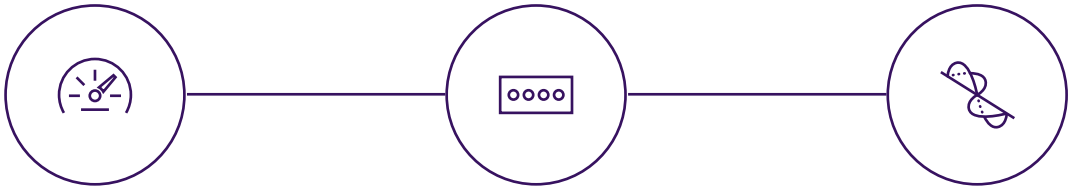
HIGH PERFORMANCE COHERENT OPTICAL RECEIVER

SPECIFICATION SHEET

quantifiphotonics.com

Gold-standard coherent optical receiver for the measurement of coherent modulation formats such as QPSK, 64QAM and OFDM.

- Dual polarization
- Supports single and dual polarization PSK, QAM and custom formats
- Narrow linewidth internal laser
- Single ended RF outputs
- C/L-Band and O-Band wavelength options



High-performance, low-noise coherent receiver

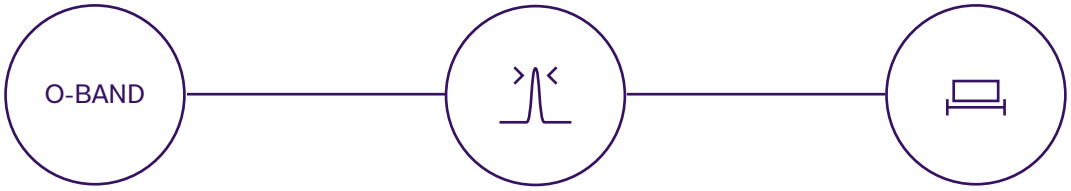
IQRX is designed and built using the highest-performing discrete fiber optic components to provide superior fidelity measurement of coherently modulated signals. To minimize noise, IQRX does not use a transimpedance amplifier (TIA), a component often found in commercially available ICRs.

Four single-ended outputs

Designed to be used with any real-time oscilloscopes with sufficient bandwidth and sampling rate, the single-ended outputs make it convenient to pair with the four input channels of most oscilloscopes.

Dual polarization measurement

IQRX houses polarization selective hardware to characterize polarization multiplexed signals. LO input, signal output and internal laser outputs all use polarization maintaining (PM) fiber for the highest versatility.



Now with O-Band coverage

The IQRX-1005 is the world's first commercially-available coherent receiver to enable coherent signal testing in the O-band, a new frontier for coherent optical communication.

Built-in narrow linewidth tunable laser*

IQRX comes with a built-in narrow 25 KHz instantaneous linewidth laser, making it perfect for coherent modulation formats that require high phase stability.

*Excludes O-Band models

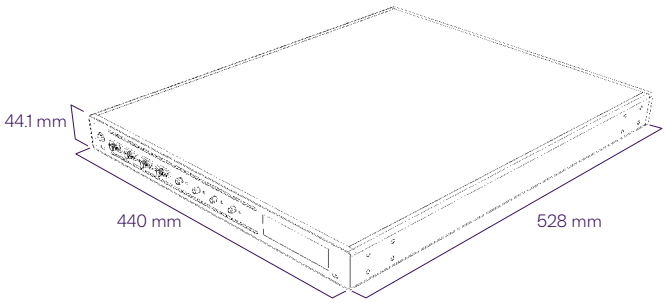
19 inch rack mountable

IQRX can be paired with the rack mount brackets for easy mounting in any 19 inch rack.

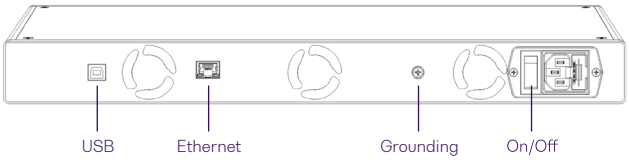
IQRX INSTRUMENT AND DIMENSIONS

IQRX-1002-FC

Instrument dimensions



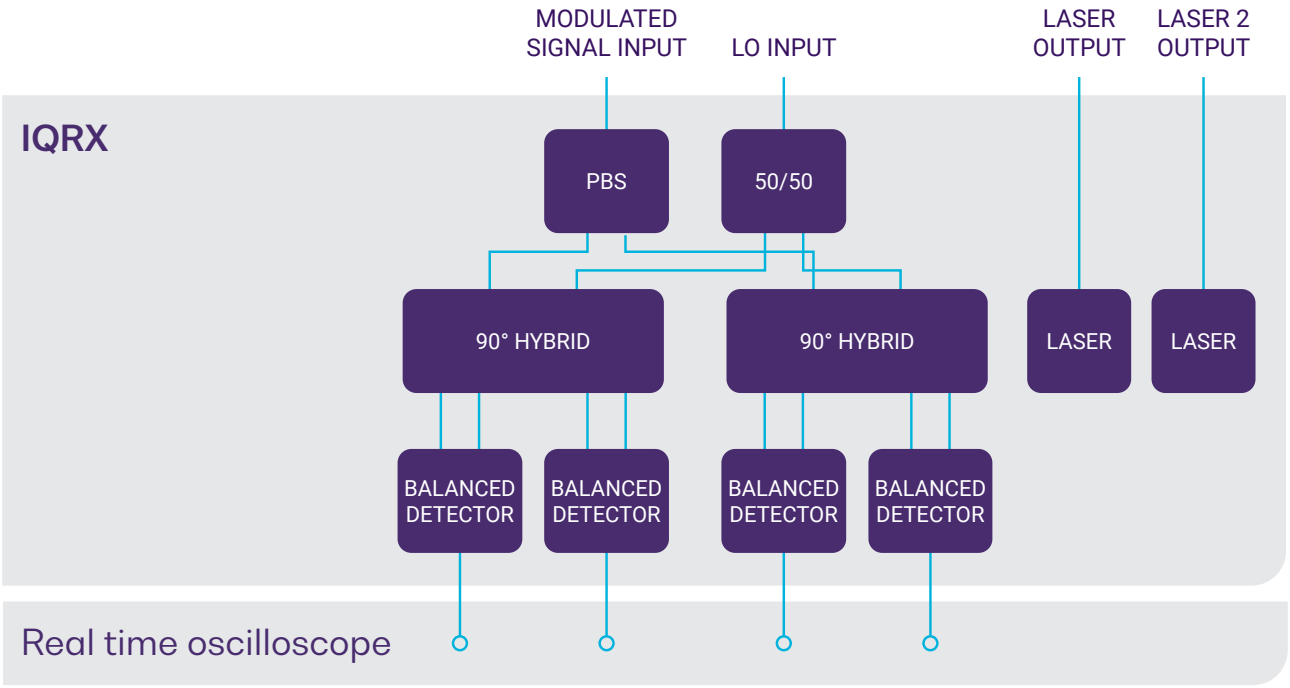
Rear panel connections



TARGET APPLICATIONS

- Coherent DSP development
- Coherent transmitter testing
- Custom modulation format development
- Mil / Aero communications R&D

IQRX schematic diagram



IQRX TECHNICAL SPECIFICATIONS

General Specifications	IQRX	
Dimensions (H x W x D)	44.1 x 440 x 528 mm | 1.74 x 17.32 x 20.79 inch	
Weight	~ 9.2 kg | ~ 20.3 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	**1002**	**1004**
Operating wavelength range	1527 to 1630 nm	1527 to 1630 nm
Number of polarizations	2	2
RF outputs	4: Xi, Xq, Yi, Yq	4: Xi, Xq, Yi, Yq
RF connector type	2.4 mm female	1.85 mm female
System analog bandwidth (-3 dB) [1]	35 GHz (Typical)	50 GHz (Typical)
System analog bandwidth (-6 dB) [1]	42 GHz (Typical)	60 GHz (Typical)
Photodetector bandwidth (-3 dB) [2]	45 GHz (Typical)	70 GHz (Typical)
RF imbalance @ 2GHz	± 5% (Typical) | ± 12% (Max)	± 4% (Typical) | ± 12% (Max)
RF impedence	50 ohms	50 ohms
Low frequency cutoff	0 Hz	0 Hz
Conversion gain into 50 ohm load	11.25 V/W	11.25 V/W
Channel skew	± 4 ps (Typical) | ± 10 ps (Max)	± 4 ps (Typical) | ± 10 ps (Max)
Quadrature error	± 5 deg	± 5 deg
Damage level external LO input	+25 dBm	+25 dBm
Damage level signal input	+25 dBm	+25 dBm
Polarization extinction ratio LO input	20 dB	20 dB
Local Oscillator	**1002**	**1004**
Maximum optical CW output power	15 dBm	15 dBm
Minimum optical CW output power	8 dBm	8 dBm
Wavelength range	1527.605 to 1567.132 nm	1527.605 to 1567.132 nm
Minimum wavelength step	~1 ppm	~1 ppm
Minimum frequency step	100 MHz	100 MHz
Tuning time/sweep speed	< 30 s	< 30 s
Absolute wavelength accuracy	10 ppm	10 ppm
Linewidth (short term)	< 100 kHz, 25 kHz (Typical)	< 100 kHz, 25 kHz (Typical)
Sidemode Suppression Ratio (SMSR)	55 dB (Typical)	55 dB (Typical)
Relative Intensity Noise (RIN)	-145 dB/Hz (10 MHz to 40 GHz)	-145 dB/Hz (10 MHz to 40 GHz)

Model Number	1005[3]
Operating wavelength range	1290 nm to 1330nm
Number of polarizations	2
RF outputs	4: Xi, Xq, Yi, Yq
RF connector type	1.85 mm female
System analog bandwidth (-3 dB) [1]	45 GHz (Typical)
System analog bandwidth (-6 dB) [1]	55 GHz (Typical)
Photodetector bandwidth (-3 dB) [2]	65 GHz (Typical)
RF imbalance @ 2GHz	± 4% (Typical) | ± 12% (Max)
RF impedence	50 ohms
Low frequency cutoff	0 Hz
Conversion gain into 50 ohm load	11.25 V/W
Channel skew	± 4 ps (Typical) | ± 10 ps (Max)
Quadrature error	± 5 deg
Damage level external LO input	+25 dBm
Damage level signal input	+25 dBm
Polarization extinction ratio LO input	20 dB

Notes
1. Bandwidth of complete coherent receiver including standard cables without any digital compensation.
2. Bandwidth of individual photodetectors in balanced pair.
3. Advanced specs.

ORDERING INFORMATION

IQRX - XXXX - XX - EPIQ

Model number
1002 = 35 GHz, C+L-Band
1004 = 50 GHz, C+L-Band
1005 = 50 GHz, O-Band

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

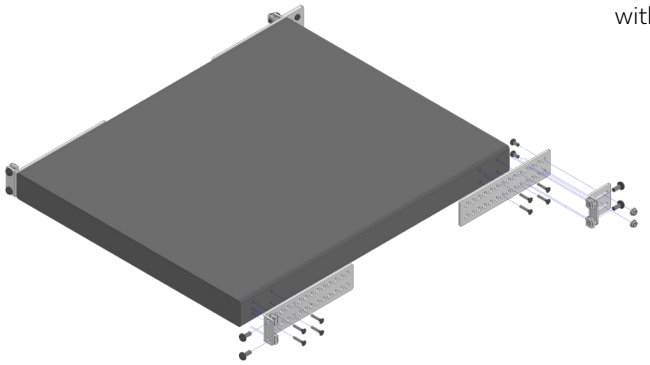
ACCESSORIES

RF cables

IQRX - XXXX

Options
9001 = A set of **four** phase-matched RF cables for use with IQRX. **1.85 mm male & 1.85 mm female** RF connectors.
9002 = A set of **four** phase-matched RF cables for use with IQRX. **2.92 mm male & 2.4 mm male** RF connectors.
9003 = A set of **four** phase-matched RF cables for use with IQRX. **1.85 mm male & 2.92 mm male** RF connectors.

19" rack mounts



EPIQ - XXXX

Options
9001 = A set of **rack mountable plates/brackets - 2 x front brackets, 2 x rear brackets, 2 x rear plates**, with all required screws & nuts. **16 x M4x16 counter-sunk** screws, **8 x M6** screws & nuts and **4 x M5** screws & nuts.

WARRANTY INFORMATION

This product comes with a standard 1 year warranty.

EXTENDED WARRANTIES AND CALIBRATION PLANS

With an **extended warranty and calibration plan** you'll spend more time focused on your priorities and less time worrying about maintenance.

Add a **3 or 5 year extended warranty** when you purchase your Quantifi Photonics instruments.

Guarantee performance

Ensure your equipment is operating at the best it can be for reliable and accurate results.

Lower cost of ownership

Lock in savings and maximise your testing budget with a lower base cost of ownership.

Peace of mind

Spend less time worrying about maintenance and more on generating results.

CALIBRATION PLANS FOR ADDITIONAL DISCOUNTS

Order a **calibration plan** when purchasing your Quantifi Photonics instruments and get additional discounts.

10% Discount — On calibrations ordered at the time of purchase.

25% Discount — Add on an extended warranty and receive a 25% discount on calibrations.

Over time and with regular use, all optical parts and connectors require re-calibration and maintenance to guarantee accurate and reliable performance. We recommend Quantifi Photonics optical instruments are re-calibrated every 12 months. With an instrument calibration performed by Quantifi Photonics technicians you receive:

- Comprehensive calibration to factory specifications
- End-to-end inspection to ensure all instrument functions are working and connectors are clean
- Firmware, software and documentation updates
- Certificate of calibration which includes detailed test results

How to do I **secure my extended warranty or calibration plan**?

Contact your Quantifi Photonics sales representative or email **sales@quantifiphotonics.com**

Extended warranties and calibration plans must be ordered at the time of purchase and are available only for Quantifi Photonics' products. The 25% calibration discount only applies to calibrations while the product is covered by the extended warranty period.

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

For more details visit **quantifiphotonics.com/products**

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.

Fixed Wavelength Laser Sources

Highly-customizable DFB or FP laser sources available in a wide range of wavelengths and powers up to 24 dBm. Supports SMF, MMF and PMF.

Swept, Tunable Continuous Wave Laser

Swept, tunable continuous wave (CW) laser source with 0.01 dB power stability and 400 nm/s high-speed scan rate for R&D and production testing.

Superluminescent Diode Broadband Light Source

Super-luminescent LED light source with high output power, large bandwidth and low spectral ripple and various wavelengths.

Erbium-Doped Fibre 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.

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. 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.

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)

Cost-effective, spectral measurement in a compact module with built-in analysis for: SMSR, OSNR & spectral width. Targeted wavelengths for specific applications in O band, C band & 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.

Digital Sampling Oscilloscope (DSO)

Digital equivalent-time sampling oscilloscope (DSO) with high-quality precision timebase and low jitter mode, available in 1 or 2 channels in a compact benchtop instrument.

Bit Error Rate Tester (BERT)

4 or 8-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.

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.

Optical Switch

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

Photocurrent Amplifier

Versatile photodiode amplifier to measure photocurrent in photonic integrated circuit (PIC) applications. Digital and analog measurement.

Passive Component Integration

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

Test. Measure. Solve.™

Quantifi Photonics provides test solutions to help customers unlock scalable and cost-effective high-volume manufacturing of photonic integrated circuits (PICs), co-packaged optics and pluggable optics. The company's portfolio includes a wide range of photonic test instruments, and digital sampling oscilloscopes, available as benchtop or the industry-standard PXI format to support cost-effective, high-throughput design verification testing and high-volume manufacturing.

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

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