

Instrument Specifications

O4

4 Channels USB Compact Analyzer



Table of Content

| | |
|---|---|
| General description | 3 |
| Modules | 3 |
| Case | 3 |
| Mechanicals | 3 |
| Power supply | 3 |
| PC requirements | 3 |
| Environmental / Compliance with standards | 3 |
| Front-end | 4 |
| Dynamic inputs | 4 |
| Dynamic outputs | 5 |
| External sync | 6 |
| Notes | 6 |

General description

The following specifications concern the O4 USB compact analyzer. O4 consists of a 4 channels instrument controlled by a PC running the NVGate software for real-time analysis.

Modules

The following tables detail the complete capacity of O4 hardware. Optional or standard modules may fill the described slots.

| | | |
|------------------|------------------------|---|
| Front-end | Dynamic analog inputs | 4 inputs (BNC) |
| | Dynamic analog outputs | 1 output (mini Lemo), delivered with mini-Lemo to BNC adaptor |
| | External syncs. | 2 trigger/tachometer inputs (BNC) |

Case

Mechanicals

| | | |
|-------------------|------------------|---|
| Weight | 534 g (1.17 lb) | |
| Dimensions | Overall (L.W.H.) | 185 mm x 110 mm x 35 mm (7.3 in x 4.3 in. x 1.4 in) |

Power supply

| | | |
|------------------|---------------------------------|--|
| Power | < 8 W | |
| From PC | Port format | Port 1, USB-3 |
| | USB-PD 3.0 technology compliant | 5 V |
| From main | Voltage | Port 2, AC to USB-PD 3.0 tech compliant |
| | Power | < 8 W |
| USB Port | USB-C x 2 | Port 1 for data and supply, Port 2 for supply only |

PC requirements

| | | |
|--------------------------|--|--|
| Minimum | 1 GB ¹ of RAM / 250 MB free on HD + storage for measurements and signals / 1024 x 768 display | |
| Recommended | Quad core processor (e.g.: Intel Core i5) / 6 GB of RAM / GPU / 1920 x 1080 display / 1 GB free on SSD + storage for signals | |
| Connections | USB 3.0 for data & Power > 7 watts | |
| Operating systems | Windows 10 / Windows 11 / MS Office: 32 bits only | |

Environmental / Compliance with standards

| | | |
|------------------|------------------------------------|---|
| CE | Indicates compliance with: | EMC Directive 2014/30/EU |
| EMC | IEC 61326-1:2013 | Electrical equipment for measurement, control and laboratory use - EMC requirements |
| Materials | ROHS | 2011/65/EU |
| | WEEE | 2012/19/EU |
| Humidity | Max 93 % RH at 40°C non-condensing | |

¹) Waterfall depth depends on available memory.

| | | |
|--------------------------|-----------------------------|---|
| Temperature | Operating | 0 °C to 40 °C (32 °F to 104 °F) |
| | Storage | -20 °C to 65 °C (-4 °F to 149 °F) |
| | Absolute maximum rating | -35 °C to 70 °C (-31 °F to 158 °F) |
| Shocks & bump | Operating | 40 g (6 ms, ½ sine, 3 shocks, all axes, IEC 60068-2-27) |
| | | 60 g (3 ms, ½ sine, 3 shocks, all axes, IEC 60068-2-27) |
| | Storage | 40 g (6 ms, ½ sine, 1k shocks, IEC 60068-2-29) |
| | | 60 g (11 ms sawtooth, 3 shocks 3 axes MIL-STD-810F 516.5) |
| Vibrations | Operating | 2.5 g (sine, 15-500 Hz, all axes, IEC 60068-2-6) |
| | | 5 mm (sine, 5-15 Hz, all axes, IEC 60068-2-6) |
| | | 7.7 grms (random, 20-2k Hz, 30 min, MIL-STD-810F 514.5) |
| Altitude | Operating, non-tested above | ≤ 2000 m (6562 feet) |
| Enclosure | | IP 40 |

Front-end

Dynamic inputs

| | | |
|--|---|---|
| Sampling | Sampling frequencies (Additional decimators allow analysis bandwidth down to 0.8 Hz) | 256 kHz, 204.8 kHz, 131.072 kHz, 102.4 kHz, 65.536 kHz, 51.2 kHz, 37.768 kHz, 25.6 kHz, 16.384 kHz, 12.8 kHz, 8.192 kHz, 6.4 kHz, 5.12 kHz, 4.096 kHz, 3.2 kHz, 2.048 kHz |
| | Converters | One 24 bit sigma-delta ADC for each input |
| | Frequency relative precision | $0.5 \cdot 10^{-4}$ (typical $1 \cdot 10^{-5}$) |
| | Synchronization | All inputs synchronized on the same sampling clock |
| Anti-aliasing filter | Type | Over-sampled digital filters |
| | Slope | > 400 dB/octave |
| | Pass band ripple | < ± 0.005 dB |
| | Rejection of parasites bands | > 100 dB (@ frequency > 0.57 x FS) |
| | Effective bandwidth | 0.45 x FS (ex: 23.4 kHz @ 51.2 kS/s) |
| Range (peak) | With amplifier (included) | ±100 mV, ±300 mV, ±1 V |
| | Direct | ±10 V |
| | With attenuator (included) | ±40 V |
| Absolute accuracy | Resolution | 24 bits (144 dB) |
| | All input ranges at 1 kHz | ±0.05 dB (typical ±0.015 dB) |
| | Temperature variability | < 0.002 dB / 10 °C |
| DC offset | ±100 mV, ±300 mV and ±1V ranges | < ± 100 µV |
| | ±10 V range | < ± 1 mV |
| | ±40 V range | < ± 2 mV |
| Frequency flatness and phase response² | ±10 V range, DC to 20 kHz | < ±0.02 dB / < ±0.02 ° |
| | ±10 V range, 20 kHz to 40 kHz | < ±0.05 dB / < ±0.05 ° |
| | ±10 V range, 40 kHz to 100 kHz | < ±0.05 dB / < ±0.08 ° |
| | ±0.3 V, ±1 V ranges, DC - 20 kHz | < ±0.02 dB / < ±0.1 ° |
| | ±0.3 V, ±1 V ranges, 20 kHz - 100 kHz | < ±0.05 dB / < ±0.2 ° |
| | ±0.1 V range, DC to 20 kHz | < ±0.02 dB / < ±0.4 ° |
| | ±0.1 V range, 20 kHz to 40 kHz | < ±0.1 dB / < ±0.6 ° |
| | ±0.1 V range, 40 kHz to 100 kHz | < ±0.15 dB / < ±0.8 ° |
| | ±40 V range, DC - 20 kHz | < ±0.1 dB / < ±0.4 ° |
| | ±40 V range, 20 kHz - 40 kHz | < ±0.1 dB / < ±0.6 ° |
| Cross-talk | ±40 V range, 40 kHz - 100 kHz | < ±0.15 dB / < ±0.8 ° |
| | <i>Between N (N is odd) and N+1 inputs:</i> | |
| | @ 1 kHz: < -120 dB, @ 20 kHz: < -96 dB, @ 40 kHz: < -90 dB | |
| | <i>Between any inputs excluding: N (N is odd) and N+1 inputs:</i> | |
| | @ 1 kHz: < -140 dB, @ 20 kHz: < -114 dB, @ 40 kHz: < -108 dB | |

²) Includes channel to channel match with different ranges

| | | |
|------------------------------|---|--|
| Signal to noise ratio | <i>With 50 Ω terminators:</i> | |
| | ± 10 V range, 100 kHz bandwidth: > 100 dB, spurious lines < -115 dB of full scale | |
| | ± 10 V range, 20 kHz bandwidth: > 104 dB, spurious lines < -125 dB of full scale | |
| Input noise | <i>With 50 Ω terminators:</i> | |
| | ± 100 mV range | 20 kHz BW < 3.5 μ V rms, 80 kHz BW < 5 μ V rms, 100 kHz BW < 6 μ V rms |
| Impedance | | 1 M Ω ± 1 %, < 100 pF |
| Protection | Overvoltage | ± 60 V peak without damage - On any input ⁱ |
| Dynamic | Spectral domain | > 140 dB ³ |
| Coupling | AC | Cut-off frequency 1.13 Hz $\pm 10\%$ (analog filter) |
| | DC | |
| | ICP | 2 mA or 4 mA power supply with AC coupling ($\pm 10\%$) |
| | ICP + TEDS | ICP + reverse current on TEDS reading operations |
| | GND | Shortcut to ground - Automatic current limitation to 50 mA |
| Floating | Coupling | AC or DC / All ranges / Overall voltage < ± 40 V |
| TEDS | Standards | IEEE 1451.4 2001 revision 1 |
| | Supported templates | Accelerometer/Force meter (25) Microphones (27, 28 and 29) |

Dynamic outputs

| | | |
|----------------------------------|--|--|
| Sampling | Converters | One 24 bit DAC for each output |
| | Synchronization | Same sampling clock as the dynamic inputs |
| Range | Direct | ± 10 V peak |
| | With attenuator (included) | ± 1 V peak |
| | Clipping | User selectable in the output range |
| | Digital gain | From 10^{-5} to 10^3 |
| | Resolution | 24 bits (144 dB) |
| Absolute accuracy | All output ranges at 1 kHz | ± 0.05 dB |
| | Temperature variability | < 0.1 dB / 10 °C |
| | <i>Variation relative to 0 dB @ 1kHz</i> | |
| Frequency response | All ranges, at 10 kHz | < ± 0.05 dB |
| | All ranges, at 20 kHz | < ± 0.15 dB |
| | All ranges, at 40 kHz | < ± 0.8 dB |
| | All ranges, at 80 kHz | < ± 2 dB |
| | All ranges, at 100 kHz | < ± 3 dB |
| | | |
| Noise floor level | 10 V range, 20 kHz bandwidth | -110 dB of full scale, spurious lines < -125 dB of full scale |
| | 10 V range, 100 kHz bandwidth | -105 dB of full scale, spurious lines < -125 dB of full scale |
| | 1 V range, 20 kHz bandwidth | -99 dB of full scale, spurious lines < -110 dB of full scale |
| | 1 V range, 40 kHz bandwidth | -94 dB of full scale, spurious lines < -110 dB of full scale |
| | 1 V range, 100 kHz bandwidth | -90 dB of full scale, spurious lines < -107 dB of full scale |
| Impedance | User selectable | 50 Ω or Grounded |
| Current | Max | ± 10 mA |
| Protection | Sum of injected + generated voltages | ± 15 V peak, On any output ⁱ Permanent short circuit supported |
| Total harmonic distortion | THD @ 1 kHz | < 0.002% or -94dB at 20 kHz BW |
| | THD @ 5 kHz | < 0.005% or -86dB at 20 kHz BW |
| Cross-talk | Output 0 dBV to 50 Ω terminated input | Lower than measurable noise |

³) 25601 lines / 30 sec. averaging

External sync

| | | |
|------------------------|-----------------------------------|--|
| Sampling | Frequencies | 128 times over-sampling of the current input sampling (up to 32.8 MHz) |
| | Converters | High speed voltage comparator and time counter |
| Range (peak) | Direct | $\pm 300 \text{ mV}$, $\pm 1 \text{ V}$, $\pm 3 \text{ V}$, $\pm 10 \text{ V}$, $\pm 40 \text{ V}$ |
| threshold | Amplitude precision | $\pm 1 \%$ of range |
| Setting | Hysteresis | 1% (of input range) to input range |
| | Hold off | 0 s to 500 s |
| | Slope | Rise or fall |
| | Hardwired pre-divider | From 1 to 255 |
| Time resolution | | $> 160 \text{ ns}$ (0.06° at 1kHz and 1.2° at 20kHz) |
| Pulse rate | Max | 375k pulse/s |
| Coupling | AC | Cut-off frequency $0.35 \text{ Hz} \pm 10\%$ (analog filter) |
| | DC | |
| Impedance | | 1 M Ω , $< 100 \text{ pF}$ |
| Protection | on any external sync ⁱ | $\pm 60 \text{ V}$ peak without damage |

Notes

The above specifications describe all the guaranteed capacities and performances of the instrument and are applicable to an O4 hardware, powered through USB port, at a stabilized room temperature of $23^\circ\text{C} \pm 5^\circ\text{C}$ and calibrated since less than one year.

The adapted control software NVGate is described separately.

ⁱ Exceeding absolute maximum ratings damages the system and voids guarantee.

OROS, Leadership through Innovation

About Us

OROS has been designing and manufacturing noise and vibration testing systems (instruments and software) for more than 35 years, meeting the requirements and expectations of automotive, aerospace, marine energy & process, manufacturing and automation industries.

Our Philosophy

Reliability and efficiency are our constant ambition. We know you have the same requirements for your measurement instruments: comprehensive solutions providing guaranteed performance, designed to meet the challenges of your demanding environments.

Our Emphasis

Constantly in tune with your needs, OROS collaborates with a network of proven scientific affiliates to offer the latest in technology in this field, always based on innovation.

Global Presence

OROS products are marketed in more than 35 countries, through our authorized network of representatives, offices and accredited maintenance centers.

Want to know more?

| OROS Headquarters | OROS Americas Inc. | OROS French Sales Office | OROS GmbH | OROS China |
|-----------------------|----------------------|--------------------------|---------------------------|----------------------|
| Tel: +33.476.90.62.36 | Tel: +1.616.202.7349 | Tel: +33.169.91.43.00 | Tel: +49.261.133.96.50 | Tel: +86.10.59892134 |
| info@oros.com | sales@oros.com | info@oros.fr | info@oros-deutschland.com | info@oroschina.com |
| www.oros.com | www.oros.com | www.oros.fr | www.oros.com/de | www.oroschina.com |

