OROS
TECHNICAL
SPECIFICATIONS

Instrument Specifications

OR10

4/8 ch. Mobile Data Acquisition System

Table of Content

General description

The following specifications concern the OR10 mobile data acquisition front-end/recorder. OR10 consists of a 4/8 channels Teamwork series instrument controlled by the NVGo Android application for mobile acquisition or a PC with Wi-Fi / Ethernet running the NVGate® software for real-time analysis.

Modules

The following tables detail the OR10 hardware. Optional or standard modules may fill the described slots.

Front-end	Dynamic analog inputs	2 slots of 4 inputs
	Input listening analog outputs	1 x 3.5 mm headphone jack, adjustable sound level
	External syncs.	2 trigger/tachometer inputs

Case

Mechanicals

Weight	**850 g** (1.9 lb)	
Dimensions	Case (w.h.d)	**115** mm x **170** mm x **33** mm (4.5 in x 6.7 in x 1.3 in)
	Overall (w.h.d)	**121** mm x **174** mm x **38** mm (4.75 in x 6.85 in. x 1.5 in)

Power supply

Power	< 15 VA	
Mains power supply/charger	Type	**USB-C 3.0** embedded power supply with JP/US, EU or China mains plug
	Voltage	90 to 264 V AC
	AC frequency	47 to 63 Hz
USB-C power plug	Protocols	**European** CoC v5 T2 & **USA** DoE VI **Compliant**
	Source(s)	Mains charger or Power bank
Battery	Type	**Li-Ion 9000 mA** - **UN38.3** certified
	Autonomy	**Recording** @25kS/s 8 inputs gap free: **4 h** **Standard usage** (15% recording, 60% idle, 25% setup): **6 to 8 h**

Connectivity

Inputs connectors	Dynamic inputs	1-6 LEMO A & B - 7-8 LEMO C
	Ext Sync trigger/tachometer	1-2 LEMO C - Ext Sync 1 & Input 8 on same BNC
	LEMO to BNC cables	1 x LEMO 9 pins to 3 x BNC - 3 cables (incl.)
GPS	Compatibility	**Glonass** - **Beidu** - **Gallileo**
	Refresh rate	**10 Hz**
	Antenna	Internal and **external** (incl.)
Ethernet	Wi-Fi	**IP V6** - **802.11 a, b, g, n, a/c**
	Wired	**100 Mb/s** - **IP V6** - **IX** connector to **RJ45** cable (incl.)
CAN Bus	Standards	**CAN 2.0A & CAN 2.0B**
	Rate	**125 kb/s**, **500 kb/s** and **1Mb/s**
	Connectors	Lemo 4 pins – Lemo to subD-9 cable (opt.)
	Channels	16 @ 10 Hz refresh rate / Synchronous with analyzer inputs

Storage

Card	Type	**Removeable µSD** card with SD card **adaptor** (incl.)
	Capacity	**16 GB** – **ExFAT** format, extendable up 2^{64} Bytes
	Record	**1 MB/s** all inputs @10 kHz BW, **unlimited file size**

Interfaces

Display	Type	High contrast **OLED - Touch screen**
	Size & resolution	**3.12" - 256 x 64** pixels
Keyboard	Type & touch	Soft layer, tactile feedback - **Up, Rec/Stop, Down**

Environmental specifications

Electrical and radio environments, compliance with standards

CE/CB	Indicates compliance with:	EMC Directive **2014/30/EU**
		Low Voltage Directive **2014/35/EU**
		Radio Directive **2014/53/EU**
Electrical Safety	**IEC 61010-1:2010** (3rd edition) **IEC 61010-2-30:2017**	Safety requirements for electrical equipment for measurement, control, and laboratory use
EMC	**IEC 61326-1**:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements
Radio	**ETSI EN 301 489 1 V2.1.1**	EMC for radio equipment and services – General Part
	ETSI EN 301 489 17 V3.1.1	EMC for radio equipment and services – WLAN transmitters
	ETSI EN 301 489 19 V2.1.0	EMC for radio equipment and services – GNSS receivers
	ETSI EN 300 328 V2.1.1	RF Transmission in the 2.4 GHz ISM band
	ETSI EN 301 893 V2.1.1	RF Transmission in the 5 GHz ISM band
	ETSI EN 303 413 V1.1.1	Radio equipment operating in 1 559 MHz to 1 610 MHz frequency bands (GPS/GNSS)
FCC	FCC **CFR47** part **15**, subpart **B**, Class **A**	Radiated and conducted emissions Contains FCC ID MCQ-CCIMX6UL
Materials	ROHS	**2011/65/EU**
	WEEE	**2012/19/EU**

OROS instruments are designed to operate in office, laboratory, on-board and industrial environments regarding electrical and radio disturbances.

Japan Radio Compliance:

R 202-LSF056
T D 17-0014 202

Environmental limits

Humidity	Max **93 % RH** at 40°C non-condensing	
Temperature	Operating on power supply	**0 °C to 40 °C** (14 °F to 113 °F)
	Operating on battery only	**-10 °C to 40 °C** (14 °F to 131 °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 chocks, all axes, IEC 60068-2-27)
		60 g (3 ms, ½ sine, 3 chocks, 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	With rubbers fixed	**IP 40**

Front-end

Dynamic inputs

Sampling	Sampling frequencies (Additional decimators allow analysis bandwidth down to 0.8 Hz)	**102.4, 51.2, 25.6, 12.8, 6.4, 5.12, 3.2 kS/s** **65.536, 37.768, 16.384, 8.192, 4.096, 2.048 kS/s**
	Converters	One **24 bits sigma-delta ADC** for each input
	Frequency relative precision	**0.5 10^{-4}** (typical 1 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 (Internal)	**±300 mV, ±1 V**
	Direct	**±10 V**
	With attenuator (Internal)	**±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	±300 mV and ±1V ranges	**< ± 100 µV**
	±10 V range	**< ± 1 mV**
	±40 V range	**< ± 2 mV**
Frequency flatness and phase response[1]	*Inside one front-end*	
	±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°**
	±0.3 V, ±1 V ranges, DC - 20 kHz	**< ±0.02 dB** / **< ±0.1°**
	±0.3 V, ±1 V ranges, 20 kHz - 40 kHz	**< ±0.1 dB** / **< ±0.5°**
	±40 V range, DC - 20 kHz	**< ±0.1 dB** / **< ±0.4°**
	±40 V range, 20 kHz - 40 kHz	**< ±0.1 dB** / **< ±0.8°**
Cross-talk	*Between N (N is odd) and N+1 inputs:*	
	@ 1 kHz: **< -120 dB,** @ 20 kHz: **< -96 dB,** @ 40 kHz: **< -90 dB**	
	Between any inputs excluding: N (N is odd) and N+1 inputs:	
	@ 1 kHz: **< -140 dB,** @ 20 kHz: **< -114 dB,** @ 40 kHz: **< -108 dB**	
Signal to noise ratio	*With 50 Ω terminators:*	
	±10 V range, 40 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	*With 50 Ω terminators:*	
	Thermal input noise	**20nV/√Hz**
	±300 mV range	20 kHz BW **< 3.5 µV** rms, 40 kHz BW: **< 5 µV** rms
	±1 V range	20 kHz BW **< 5.4 µV** rms, 40 kHz BW: **< 8.5 µV** rms
	±10 V range	20 kHz BW **< 44 µV** rms, 40 kHz BW: **< 70 µV** rms
Impedance		**1 MΩ ±1 %, < 100 pF**
Protection	Overvoltage	**±60 V peak** without damage - On any input[ii]
Dynamic	Spectral domain	**> 140 dB**[2]

[1]) Includes channel to channel match with different ranges

[2]) FFT 25601 lines / 30 sec. averaging

Dynamic inputs (continued)

Coupling	AC	Cut-off frequency **0.35 Hz** ±10% (analog filter)
	DC	
	ICP	**1 mA** or **2 mA** power supply with AC coupling (±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**
	Common mode voltage (all ranges)	Max: **±12 V**
TEDS	Standards	**IEEE 1451.4 2001** revision **1**
	Supported templates	Accelerometer/Force meter (**25**) Microphones (**27**, **28** and **29**)

External sync

Sampling	Frequencies	**64 times over-sampling** of the current input sampling (up to **6.4 MHz**)
	Converters	High speed voltage comparator and time counter
Ranges (peak)		**±300 mV**, **±1 V**, **±3 V**, **±10 V**, **±40 V**
Resolution	Amplitude accuracy	**±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	**1** to **255**
Accuracy	**Time resolution**	**> 160 ns** (0.06° at 1 kHz and 1.2° at 20 kHz)
Pulse rate	Max	**375** kpulse/s
Coupling	**AC**	Cut-off frequency 0.35 Hz ±10% (analog filter)
	DC	
Impedance		**1 MΩ**, < 100 pF
Protection	on any external sync[ii]	**±60 V peak** without damage

Notes

The above specifications describe all the guaranteed capacities and performances of the instrument and are applicable to an OR10 hardware, powered for more than 15 minutes, at a stabilized room temperature of 23°C ±5°C and calibrated since less than one year.

The adapted control software NVGate® and NVGo are described separately.

---

[i] Prepared for future use: the related specifications or options are in development.

[ii] Exceeding absolute maximum ratings damages the system and voids guarantee.

Specifications not binding; OROS reserves its right to change these specifications without notice.

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

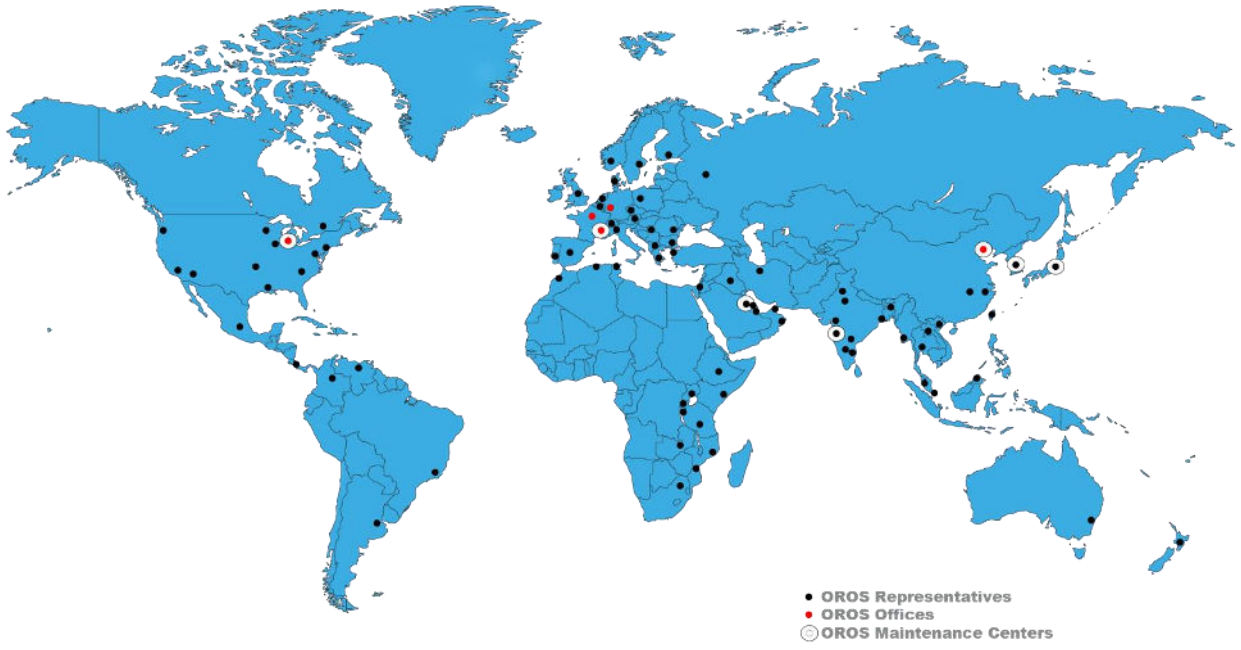
Constantly in tune with your needs, OROS collaborates with a network of proven scientific affiliates to offer the latest in technology in this field, always based on innovation.

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 info@oros.com www.oros.com	Tel: +1.616.202.7349 sales@oros.com www.oros.com	Tel: +33.169.91.43.00 info@oros.fr www.oros.fr	Tel: +49.261.133.96.50 info@oros-deutschland.com www.oros.com/de	Tel: +86.10.59892134 info@oroschina.com www.oros.com/cn



ISO 9001:2015 BUREAU VERITAS Certification