

Echo 4RP™



Portable and flexible high bit depth and fidelity
Multi-frequency GNSS record and playback system

Putting the «real» into Real World Tests

Whether developing new components, improving algorithms, working on the integration of an entire receiver system, or analyzing any kind of phenomenon in the real life, ECHO 4RP GNSS Recorder & Player is the perfect fit for your testbed environment.

Based on specific features below, Echo is customizable, scalable and evolutive to support your current and future GNSS Record and Playback requirements.

Available options:

- 4x1.92TB SSD drives
- 4x3.84TB SSD drives
- 4x7.68TB SSD drives
- 4x15.36TB SSD drives
- External Battery
- Laptop with control software
- Delivery

Embedded in a vehicle or in an aircraft, it can then precisely analyze the different phenomenon encountered: electromagnetic environment disruptions (from natural sources or generated by the human activity), reflections & masking, reflectometry or any other specific application.

Don't hesitate to contact us for more information about the ECHO 4RP.

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- ▶ 1 single unit for record and playback
- ▶ Up to 4 RF channels configured either as Input or Output
- ▶ Portable < 10kg (excl. battery)
- ▶ All GNSS spectrum covered + C band
- ▶ Flexible and scalable: each RF channel is configurable: resolution, sampling frequency/ bandwidth, AGC settings, Signal Spectrum
- ▶ Ability to record or replay up to 4 RF channels @16bit I&Q and 93.75MHz sampling rate (each) simultaneously, in a single rack or 187.5MHz @ 8 bits
- ▶ Possibility to couple multiple ECHO 4RP equipment, with synchronization (up to 8)
- ▶ Synchro phase: No phase drift between channels during acquisition or replay

Echo 4RP™

Specifications

ECHO-4RP
GNSS RECORDER &
PLAYBACK SYSTEM



General

| | |
|--------------------------------------|--|
| Flexible product structure | Depending on configuration : number of concurrent bands, bit depth, sampling frequency, bandwidth, storage size (8 TB, 16TB, 32 TB), customization for external sensors... |
| Multiple constellations | GPS, GLONASS, Galileo, BeiDo, IRNSS, QZSS |
| Multiple frequencies | L1, L2, L5, S band, C band |
| Multiple bands | Up to 4 bands in a same rack |
| Frequency bands | GNSS 1100MHz to 2550MHz, C Band (LEO PNT) from 5010 to 5030 MHz |
| Center frequency for RF channels | Selectable (ex L1, L2, L5, S, C), for each individual band or all, possible to configure a center frequency only shifted of a few hundreds of kilohertz from the targeted one. |
| Number of RF channels | Up to 4 simultaneously. Each channel can be configured as Input for recording or as output for playback |
| Recording & Playback power level | -130dBm to 0dBm |
| Output power control during playback | Better than 1dB resolution |

Storage

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|--------------------------|--------------------------------|
| Standard | 4 x 3.8 TB SATA removable SSDs |
| Options | 4 x 7.6 TB 4 x 15.3 TB |
| Max Write and Read Speed | Up to 368 MB/s per channel |

Interfaces

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|---------------------------|---|
| RF Channels | SMA |
| Internal / external 10MHz | BNC Female |
| High speed interface | Ethernet 10Gb/s PCIe Gen2x4 over cable |
| Trig & Interfaces | 1 PPS Trigger |
| Serial | RS422, RS485, RS232 |
| Other | Ethernet 1 Gb/s for equipment control |

RF & Digital Quality

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|----------------------------------|--|
| Bit depth (quantization) | 16 bits for I 16 bits for Q Possible decimation to 8, 4, 2 or 1 bit |
| Bandwidth of each RF band | Up to 150MHz effective bandwidth with 187.5MHz sampling (I/Q) on 8 bits IQ. 75MHz effective bandwidth with a 93.75MHz sampling (I/Q) on 16 bits IQ. |
| ADC sampling frequency | 187.5 MHz |
| ADC - ENOB | 16 bits ADC (11,95 bits) |
| Maximum voltage gain | 80dB (typ.) |
| Maximum Dynamic | 100dB |
| AGC – Harmonic Spurious (Record) | < -60dB |
| AGC – RMS jitter | < 150 fs |
| AGC – Group Delay Variation | < 15 ns |
| Level resolution | +/- 0,1 dB |
| Level precision | +/- 0,5 dB |
| Synthesis Step | 1,5 Hz |
| Harmonic Spurious (Replay) | < -65dBc min |
| Non-Harmonic Spurious (Replay) | < -55 dBc (SF dependent) |
| RMS Jitter | 104 fs |
| Group Delay Variation | < 15 ns @ BW = 55 MHz |
| Group Delay Stability | < 10 ps/°C @ BW = 55 MHz |

Control

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|--|---|
| Built-in real-time IQ display and spectrum analyzer | SMA |
| In-built GNSS receiver acquisition —to verify performance | A L1C/A real time software receiver is provided to see the presence of satellite signals on L1C/A in real-time. |
| LEDs, control buttons and simple display | Front panel |
| Graphical user interface available through the connection of a remote laptop | Laptop and GUI for configuration and signal quality analysis before recording |

Physical & Environmental

| | |
|-------------------------------|---|
| Size (approx.) | 350 mm x 300 mm x 125 mm (max) |
| Weight | <10 kg excl battery |
| Power Supply | 20 to 36V DC (an AC adapter is delivered) |
| Power consumption | 60W + 3W per SSD disk |
| Operating/Storage Temp. Range | +0 to +70°C / -20 to +85°C |
| Attachable Battery in option | 2 hours autonomy minimum |

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