



# Echo R&P™

## GNSS Recorder & Playback

### Choose the best recorder & playback solution for GNSS signals For DESIGN, VALIDATION and PRODUCTION

Whether developing new components, improving algorithms or working on the integration of an entire receiver system, Echo™ GNSS Recorder is the perfect fit for your testbed environment.

Space agencies & industry leaders already benefit from our GNSS Record & Playback system.

Echo™ singularity lies in the alliance of SDR (Software-Defined Radio) and a state-of-the-art RF Analog front-end. Top-end processing performance and superior RF quality are now met into a COTS appliance with utmost flexibility in recording control.

#### Constellations & Bands

- ▶ Galileo E1, E5a/b, E6HAS
- ▶ GPS L1C/A, L2, L5, L6, P(Y), M-Code
- ▶ GLONASS G1, G2, G3,
- ▶ QZSS L1C/A, L1C, L1S, L1-SAIF, L2C, L5, LEX
- ▶ IRNSS NavIC L5, S-Band
- ▶ BeiDou B1, B2, B3
- ▶ SBAS EGNOS, WAAS, GAGAN, MSAS

#### Highest-Fidelity

- ▶ 16-bit I&Q
  - ▶ 200 MHz Sampling Rate
  - ▶ Up to 1.6 GB/s write/read speed
  - ▶ Ability to record 3 RF channels at 8-bit I&Q and 200 MHz sampling rate simultaneously
- OR
- ▶ Ability to record 3 RF channels at 16-bit I&Q and 100 MHz sampling rate simultaneously

#### Flexible & scalable

- ▶ 2 independent units: 1 to record & 1 to playback
- ▶ Starting with GNSS L1, 50 MHz, 4 bit, 8 TB SSD swappable disks
- ▶ Each RF channel is configurable (resolution, sampling frequency/bandwidth, AGC settings, Signal Spectrum & GPS L1 PRN analysis)
- ▶ Ability to record 3 RF channels at 8-bit I&Q and 200 MHz sampling rate simultaneously
- ▶ Flexible quantization and sampling rate
- ▶ Quick data dump on local or network storage
- ▶ No limit on recording time and playback

#### Easy to setup and use

- ▶ Signal spectrum & GPS L1 PRN analysis software included
- ▶ Simple local or remote control
- ▶ Quick setup, including for multi-antenna or multi-receiver
- ▶ Extensive documentation, examples available & local support
- ▶ Field software updates

#### Options

- ▶ Up to 128 TB SSD internal storage (swappable) and sync to external NAS
- ▶ Network adapter 10 or 20 Gb/s
- ▶ **Customization on Demand** (Signals, quantization, sampling rate, external sensors like odometer or IMU...)



**Powerful, Flexible, Scalable, Easy to use, Affordable**

# Echo R&P™

## Specifications



### ● Echo™ Recorder



#### RF Input

Channels	Up to 3
Frequency Range	1100 MHz to 2550 MHz
Antenna Power Supply	Filtered 5 VDC, 100 mA Max.
Connector	N Female

#### Synthesizer - Internal 10MHz Reference

Stability	5x10 <sup>-9</sup> from +10°C to +40°C
Int. 10MHz Reference Output	BNC female
Aging	0.5 ppb/day and 50 ppb/year
Connector	SMA Female

#### RF Quality

Maximum voltage gain	80 dB (typ.)
Baseband Bandwidth (I & Q)	up to 160 MHz
Max. Dynamic	60 dB
AGC - Harmonic Spurious	< -60 dB
AGC - RMS Jitter	< 150 fs
AGC - Group Delay Variation	< 15 ns

#### Digital Output

Bit Quantization (I & Q)	16bit
Bus Transfer Rate	Up to 1.6 GB/s

#### Digital Quality

ADC - Sampling Frequency	Up to 200 MHz
ADC - ENOB	11.95 bit

#### General

Storage (SATA)	
Standard	8, 16, 32, 64 128 TB removable SSD
Max. Capacity	128 TB removable SSD 192 TB and above thanks to NAS compatibility
Max. Write & Read Speed	1.6 GB/s

#### Other

Power Supply	100V to 240V AC 50 Hz to 60 Hz +/- 5%
Power Consumption	88 W
Operating / Storage Temp.	0 °C to +50°C / -20 °C to +70°C
Dimensions	2 x 2U 19" rack, 16kg
Trig & interfaces	10 MHz IN/OUT + Trig
Relative Humidity (Operating/Storage/Transit)	10-93%, @ 40 °C, non condensing
Operating Altitude	5000 m
Shock (according to EN 60068-2-27)	Operating: 15 G 11 ms duration Non-operating: 30 G 11 ms duration

### ▶ Echo™ Player



#### RF Output

Channels	Up to 3
Frequency Range	1100 MHz to 2550 MHz
RF Bandwidth	up to 160 MHz
RF Power (@50 Ohm)	From -30 to -130 dBm
Output VSWR	< 1.3

#### Synthesizer - Internal 10MHz Reference

Signal	Sinus
Stability	5x10 <sup>-9</sup> from +10°C to +40°C
Aging	0.5 ppb/day and 50 ppb/year
Allan Variance (1s)	2x10 <sup>-12</sup>

#### RF Quality

Level Resolution	+/- 0.1 dB
Level Precision	+/- 0.5 dB
Synthesis Step	1.5 Hz
Harmonic Spurious	< -65 dBc min
Non-harmonic Spurious	< -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

#### General

Storage (SATA)	
Standard	8, 16, 32, 64 128 TB removable SSD
Max. Capacity	128 TB removable SSD 192 TB and above thanks to NAS compatibility
Max. Write & Read Speed	1.6 GB/s

Vibration (according to EN 60068-2-6)	Operating: 10-150 Hz: 1G/3 axis Non-operating: 10-150 Hz: 2G/3 axis
MTBF	> 50.000 hrs

# Echo R&P™

## Order entry point



Whether the objective of your GNSS appliance is to protect critical infrastructures and/or become a business driver, Echo™ R&P are speeding up your time to market by saving time, money and testing efforts.

Based on specific features below, Echo™ R&P are customizable, scalable and evolutive to support your current and future GNSS Record & Playback requirements.

### ● Echo™-R

2 (2U)

4 (4U)

### ▶ Echo™-P

2 (2U)

4 (4U)

## Features

### RF Channels

- ECHO-R-1RF
- ECHO-R-2RF
- ECHO-R-3RF
- ECHO-R-S-Band

### RF Channels

- ECHO-P-1RF
- ECHO-P-2RF
- ECHO-P-3RF
- ECHO-P-S-Band

### Quantization

- ECHO-R-4 Bits
- ECHO-R-8 Bits
- ECHO-R-16 Bits

### Quantization

- ECHO-P-4 Bits
- ECHO-P-8 Bits
- ECHO-P-16 Bits

### Sampling Rate

- ECHO-R-50 MHz
- ECHO-R-100 MHz
- ECHO-R-200 MHz

### Sampling Rate

- ECHO-P-50 MHz
- ECHO-P-100 MHz
- ECHO-P-200 MHz

### Network Adapter Options

- ECHO-R-10 Gb/s
- ECHO-R-20 Gb/s
- ECHO-R-Maintenance-1Y

### Network Adapter Options

- ECHO-P-10 Gb/s
- ECHO-P-20 Gb/s
- ECHO-P-Maintenance-1Y

# The future of navigation is software

Since 2015, Syntony has become a leader in the GNSS industry. Syntony offers unique location solutions allying Software-Defined Radio (SDR) and state-of-the-art RF Analog front-end.

Easy to setup and use, the Syntony solutions are built to evolve with our clients needs, and inherit from 20 years of R&D and collaboration with space agencies and industry leaders.

## For more information

Visit our website:  
**syntony-gnss.com**

Contact us:  
**contact@syntony.fr**



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## Syntony Offices



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Certifications Safety

Emissions

Echo-R

EN/IEC 62368-1:2014  
ROHS, 2011/65/EU

EN 62368-1:2014

FCC Part 15 : 2016 – Verification  
(Section 2.902 47 CFR)

Echo-P

EN/IEC 61010-1:2010  
ROHS, 2011/65/EU

EN 61326-1:2012

FCC Part 15 : 2016 – Verification  
(Section 2.902 47 CFR)