



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

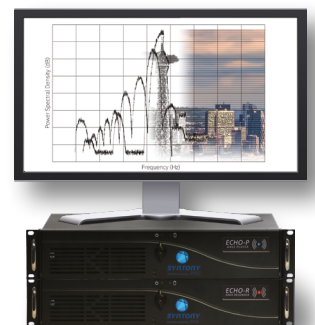
Easy to setup and use

- ▶ 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 ⁻⁹ 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 ⁻⁹ from +10°C to +40°C
Aging	0.5 ppb/day and 50 ppb/year
Allan Variance (1s)	2x10 ⁻¹²

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

Quantization

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

Sampling Rate

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

Network Adapter Options

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

RF Channels

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

Quantization

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

Sampling Rate

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

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:
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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)