

Echo

Putting the "real" into Real World Tests



High Fidelity Record & Replay

Whether developing new components, improving algorithms or working on the integration of an entire receiver system, there comes a time when GNSS receivers must be tried in real world conditions. Whether developing new set of real world conditions again and again allows monitoring and validation of receiver performance improvements. Supporting that process is the job of GNSS record and playback equipment.

Only real world conditions tests can reveal how a receiver will react to the untidy RF environment awaiting it during its service life, from background noise to signal reflection, interference, masking or loss... The ability to replay the same

Performing so-called real world tests on a GNSS receiver with a coarse reproduction of reality misses the point entirely. Muffling out noise or neglecting and flattening weak signals will mask potential issues and introduce significant risks into the receiver's performance during its service life.

Extensive options

- ✓ 2 separate machines: one for recording, one for replaying
- ✓ Robust design
- ✓ Best fidelity world-wide of replay
- ✓ 3 tightly synchronized channels
- ✓ 16 bit I&Q resolution
- ✓ Up to 100MHz sampling rate
- ✓ Highly configurable through powerful GUI
- ✓ Up to 128TB storage (SSD) & 192TB and above thanks to NAS compatibility
- ✓ 1.2GB/s write speeds
- ✓ Highly configurable through powerful GUI

That is why we built ECHO R&P.

From its RF components through its software, Syntony built ECHO R&P to provide the most accurate recording and reproduction of reality available, and to give testers enough space to store a large sample of the real world.

In particular, ECHO R&P is used to test very demanding and mission critical GNSS receivers for the aerospace industry.

Perfectly reproducing reality's imperfections



Echo

Specifications



Recorder

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

RF Quality

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

Synthesizer - Internal 10MHz Reference

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

Digital Output

Bit Quantization (I & Q)	16bit
Bus Transfer Rate	1.2 GB/s

Digital Quality

ADC - Sampling Frequency	Up to 100MHz
ADC - ENOB	11.95bit

Constellation

	Signal
GPS	L1, L2, L5, C/A, C, P code, M-code
Galileo	E1 (a/b/c), E5, E5a, E5b, E6
GLONASS	G1, G2, G3
BeiDou	B1, B2, B3
QZSS	L1 C/A, L1C, L1-SAIF, L2C, L5, LEX
SBAS	WAAS, EGNOS, GAGAN, MSAS

Player

RF Output	
Channels	Up to 3
Frequency Range	1100MHz à 2550MHz
RF Bandwidth	120MHz
RF Power (@50 Ohm)	From -30 to -130dBm
Output VSWR	< 1.3

RF Quality

Level Resolution	+/- 0.1dB
Level Precision	+/- 0.5dB
Synthesis Step	1.5Hz
Harmonic Spurious	< -65dBc min
Non-harmonic Spurious	< -55dBc (SF dependent)
RMS Jitter	104fs
Group Delay Variation	< 15ns @ BW = 55MHz
Group Delay Stability	< 10ps/°C @ BW = 55MHz

Synthesizer - Internal 10MHz Reference

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

General

Storage (SATA)	
Standard	8, 16, 32, 64 128TB removable SSD
Max. Capacity	128TB removable SSD 192TB and above thanks to NAS compatibility
Max. Write & Read Speed	1.2GB/s

Other

Power Supply	100V to 240V AC 50Hz to 60Hz +/- 5%
Power Consumption	88W
Operating / Storage Temp.	+10 to +40°C / -20 to +55°C
Dimensions	2 x 2U 19" rack, 12 kg per machine (24 kg total)
Trig & interfaces	10MHz IN/OUT + Trig



For more information:
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