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NS7633

Advanced GNSS Recording, Playback, Forwarding, and Testing Solutions

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Product Overview

The NS7633 is a professional device for Global Navigation Satellite System (GNSS) signal recording, playback, and forwarding, designed specifically for applications such as laboratory testing, in-vehicle trials, and field signal acquisition. It offers flexible RF configurations, high-precision quantization capabilities, and convenient data management features, thereby meeting a wide range of GNSS R&D and testing requirements. Furthermore, the device's integrated forwarding functionality supports the verification of indoor test scenarios involving J-code (Official Code) signals.

Product Function

The NS7633 is an advanced Global Navigation Satellite System (GNSS) recording, playback, forwarding, and simulation system. It is specifically designed to capture and simulate GNSS signals within the L-band (including its upper and lower extensions) and the S-band, as well as other signals present within these frequency ranges.

All three RF channels of the NS7633 can be configured independently, allowing for precise adjustment of the quantization level and bandwidth for each individual channel (supporting a maximum configuration where all three RF signals are processed in a 12-bit, 56 MHz mode). Furthermore, the NS7633 features synchronized acquisition, recording, and playback capabilities for external data—including CAN, RS232, and digital event captures—thereby meeting user requirements for scenarios involving RTCM, RTK, and similar protocols.

The NS7633 facilitates easy device configuration and operation through either a user-friendly web-based interface or the front-panel controls. To accommodate diverse operational needs, the device configuration is categorized into "Basic" and "Advanced" modes. The Basic configuration comes pre-loaded from the factory; it covers the

requirements of most customer use cases, enabling one-touch data acquisition, recording, and playback. For users with more demanding requirements, the device offers Advanced configuration options and recording features; once a custom configuration has been saved to the device, users can subsequently execute that specific custom setup with a single touch for acquisition, recording, and playback.

Internally, the NS7633 integrates a convenient and efficient data import/export module. Users can directly transfer data between the device's internal hard drive and external storage media using a standard USB Type-C cable, enabling real-time acquisition and playback of data directly to or from an external hard drive.

The device can be used to record, replay, and forward the following GNSS signals:

GPS: L1, L2, L5

Galileo: E1, E5a/b, E6

GLONASS: G1, G2, G3

BeiDou: B1, B2a/b, B3

QZSS: L1, L2, L5, L6

NavIC: L1, L5, S-Band

SBAS: L1, L5

Additionally, further signals in the high L-band, low L-band, and S-band can be configured via a web-based interactive interface. Custom requirements — such as Iridium and SiriusXM radio bands—can be provided upon request.

Key Features

✧ **Flexible RF Bandwidth Configuration**

Each RF channel can be independently configured with a bandwidth, supporting multiple options—including 3 MHz, 6.5 MHz, 12.5 MHz, 25 MHz, and 56 MHz—to optimize recorded file sizes.

✧ **Adjustable RF Quantization Level**

Supports recording at 1-, 2-, 3-, 4-, 6-, 8-, or 12-bit I&Q quantization levels, allowing users to select the appropriate setting based on signal quality requirements.

✧ **High-Speed Data Transmission**

It supports data reading and writing via high-speed interfaces. The device features a built-in 2TB SSD and allows for storage expansion via an external PCIe-to-USB device, enabling real-time data acquisition, recording, and playback at transfer speeds of ⩾100 MB/s. Furthermore, utilizing a PCIe-to-USB connection, the device facilitates the rapid import and export of data between its internal drive and a PC, achieving transfer speeds of ⩾600 MB/s.

✧ **Compact and Portable Design**

The device dimensions are 165 mm x 126.85 mm x 49.7 mm (including foot pads) and 165 mm x 126.85 mm x 45 mm (excluding foot pads), with a weight of approximately 1.209 kg (including the built-in battery and SSD), making it convenient for portability and on-site deployment.

✧ **Powered by a removable battery**

Equipped with a detachable battery pack, it supports PD fast charging, offers an operating duration of ⩾1.5 hours, and operates within a wide DC voltage range of 8V to 30V.

✧ **Internal Monitoring Receiver**

It supports an integrated monitoring receiver, offering optional configurations based on either the UBLOX solution (GPS L1, GLONASS L1, GALILEO E1, BDS B1) or the UM980 solution (supporting virtually all GNSS frequencies) for real-time signal quality monitoring.

✧ **Web User Interface**

The NS7633 provides a user-friendly web-based interface that is accessible via most web browsers. This interface supports full access to and control of the device, including:

- Predefined scenario recording settings
- Manage the scenario library stored on the internal Solid State Drive (SSD)
- Flexible scenario selection and playback
- Comprehensive control over attenuation levels for each scenario
- Independently adjust key parameters for each RF channel—such as quantization level, center frequency, bandwidth, sampling rate, etc.—during both the recording and playback phases

✧ **Multi-Signal Synchronous Recording**

The NS7633 supports the synchronized recording of additional signals, including:

- 2x CAN Channels
- 4x Digital Channels
- 1x RS232 Channel
- 1x CAN-FD Channel

✧ **MGC/AGC Dual-Mode Support**

The RF input features dual operating modes — Manual Gain Control (MGC) and Automatic Gain Control (AGC) — providing users with a comprehensive solution that spans the full spectrum from convenient operation to precise analysis. In AGC mode, intelligent anti-distortion technology ensures effortless operation by automatically adjusting the input gain to maintain signal strength within the optimal range, thereby effectively preventing signals from becoming too weak or suffering from overload saturation. This mode is particularly well-suited for complex outdoor environments characterized by dynamic changes and fluctuating signal strengths (such as vehicular

field testing), allowing users to capture clear, usable recording data without the need for manual intervention, thereby significantly lowering the barrier to entry. In MGC mode, high-fidelity recording ensures data authenticity; users can manually set and lock the gain value to guarantee that the recorded signal retains its absolute and relative power information in its entirety. This mode provides the foundational capability for advanced applications — such as antenna performance comparisons, multipath analysis, interference testing, and regulatory certification — that demand absolute data fidelity and precise scenario reproducibility, making it an indispensable feature for scientific research and precision testing.

Product Specifications

Specification Items	**Technical Parameters**
Supported Constellations and Frequencies	GPS L1, L2, L5; Galileo E1, E5a/b, E6; GLONASS G1, G2, G3; BeiDou B1, B2a/b, B3; QZSS L1, L2, L5, L6; NavIC L1, L5, S-Band; SBAS L1, L5; Additional signals in the High L-Band, Low L-Band, and S-Band can be configured via a web-based interactive interface; customized requirements—such as for Iridium and SiriusXM radio bands—can be provided upon request.
Rated Output Signal Power	-93 dBm/MHz @ 0 dB attenuation. During playback, the variable internal attenuator provides an adjustment range of +20 dB to -69 dB.
Number of RF Channels	3
RF Channel Center Frequency	User-selectable

Bandwidth		Each RF channel supports variable bandwidths of 3 MHz, 6.5 MHz, 12.5 MHz, 25 MHz, and 56 MHz.
Sampling frequency		3.75 Msps, 7.5 Msps, 15 Msps, 30 Msps, 60 Msps (Automatically adapts bandwidth)
Quantization Level		1-, 2-, 3-, 4-, 6-, 8-, 12-bit I&Q
Data Format		I&Q
Other Recorded Content		2x CAN Channels, 4x Digital Channels, 1x RS232 Channel, 1x CAN-FD Channel
User-Defined Simulation Capabilities		Support
Active Antenna Voltage Feed		5V
Reference Crystal Oscillator		OCXO: Frequency Stability: ±0.0005 ppm
Storage		2TB Solid-State Drive (SSD), supporting data import and export via external USB devices (≥100 MB/s) and PCIe-to-USB adapters (≥600 MB/s).
Operating Voltage		PD Fast Charging
Dimension		165 mm x 126.85 mm x 49.7 mm (including feet) 165 mm x 126.85 mm x 45 mm (excluding feet)
Weight		1.209 kg (including built-in battery and SSD)
Battery Runtime		≥ 1.5 hours
Storage	Data Acquisition and Playback Modes	① Built-in 2TB SSD; ② External drive storage expansion (PCIe-to-USB, ≥100 MB/s)
	Data Import and Export Modes	Data Import/Export (PCIe-to-USB, ≥600 MB/s)
Supported Frequencies for the Internal Monitoring Receiver		Supports optional UBLOX (GPS L1, GLONASS L1, Galileo E1, BDS B1) or UM980 (supports nearly all GNSS frequencies) solutions.