# Nox A1 - Special Features and Benefits

## Customer Support Document

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## Overview

This knowledge base article describes the special features and benefits of the Nox A1 PSG System. It is intended to help users understand the true value of using the A1 system and how it can reflect on their daily work.

## Common Issues Being Solved With the Nox A1 PSG System

The company's mission is to improve health by improving sleep diagnostic by making it more simple, efficient and comfortable in all patient groups, especially children.

In our aim to simplify sleep diagnostics, our engineering team identified multiple issues with traditional PSG systems which are available in the field. The intention of releasing the A1 system was to address many of these issues to advance sleep medicine in general. Examples of common issues with traditional PSG systems are:

- **Equipment size and bulkiness**
  This makes many PSG systems uncomfortable for patients and impractical for pediatric use.
- **Tethered patients**
  In many cases, patients need to be tethered to the bed with electrodes, wires, and cables. This makes many patients uncomfortable and makes it difficult for them to use the restroom at night.
- **Cables get tangled**
  Many PSG systems rely on long cables which easily get in the way of patients natural flow of movement. This makes patients uncomfortable and increases the risk of cables getting tangled and even pulled off the patients, increasing risk of lost studies.
- **Lost studies**
  Do to complexities in setting up many traditional PSG systems and their reliance on a few key sensors, many studies are lost. Electrodes may fall off, the signal quality may deteriorate throughout the night or patients might lose sleep because of discomfort. Redoing sleep studies can be very expensive.

The Nox A1 PSG system addresses all of these common issues with multiple features. Below you will find a list of the key features and their benefits. After reviewing this list you will be able to understand the key benefits of the Nox A1 PSG System.

## NOX PSG – special features and benefits

| Feature | Benefit | Target |
|---|---|---|
| Smallest and most lightweight PSG recorder | Patient comfort and flexibility for ambulatory and pediatric studies → study patients in their natural sleep environment | Patient comfort,<br>System flexibility |
| Reduced complexity - simplified PSG setup | Time and effort saving | Reduced hookup time |
| Ergonomic setup with minimum number of cables and straps | Minimum of patient impact → comfort for study acceptance, easy setup enabling home sleep testing | Patient comfort |
| Unique EEG leads setup | One multi-lead cable from recorder<br>- minimize electrode pull → reduced risk of lost EEG electrodes<br>- minimize cable tangling<br>- intuitive lead choice / placement | Study integrity,<br>Patient comfort,<br>Reduced hookup time |
| New ECG and EMG leg movement cables | Double lead structure to minimize number of single cables and quicker setup | Patient comfort,<br>Reduced hookup time |
| EEG and chin EMG:<br>• Continuous impedance control<br>• Independent floating reference (automatic reference adjustment) | High signal quality for all well conducted EEG / EMG signals independent from any impedance issues or lost electrodes | Signal quality,<br>Study integrity |
| Simultaneous digitalization for all channels | Signal synchrony, minimizing crosstalk and noise introduction by sampling skewing | Signal quality |
| Sampling frequency 256 kHz | Extreme oversampling for high-end noise reduction and anti-aliasing, allow clean signals free of signal disturbance | Signal quality |
| Floating PSG system | No power cable → no power-line disturbance → no need for extra filtering and lost information e.g. in EEG based on bandpass stop filters | Signal quality<br>→ especially complete EEG signal information |
| 32 bit signal processing (16 bit dynamic storage) | High signal quality by minimizing quantification noise and by using arithmetic in highest available resolution before storing | Signal quality |
| Build-in calibrated Microphone | Recording of calibrated sound – dbA (decibel audio) similar to high end microphones – allows true sound playback and detailed snoring frequency analysis | Reliable snoring analysis |
| High quality RIP allowing calibrated RIP technology | Current RIP technology usually used for backup flow calculation based on correction for phase angle, calibrated RIP would replace such correction by a true flow calculation (also offering flow volume loop visualization) → enhanced flow analysis – esp. UARS, enhanced titration options, reliable backup flow | Signal quality for enhanced analysis (diagnostic and titration),<br>Study integrity |
| Integrated ambient light sensor | Light off / on detection for easier analysis, especially for ambulatory studies | Scoring support |
| Bipolar channels with programmable current source | Possibility to switch from passive bipolar sensor recording to actively drive special sensors (Galvanic Skin Response Sensors – night sweating recording) | Flexible system use |

## Hardware related software features

| Feature | Benefit | Target |
|---|---|---|
| Nox calibrated RIP Flow (based on high quality RIP technology) | Reliable flow calculation to analyze the complete respiratory system breathing information (independent of nose or mouth breather), enhanced apnea, hypopnea and flow limitation scoring | Reliable Flow Analysis, Study integrity |
| Flow Volume Loops (based on calibrated RIP Flow derived on high quality RIP technology) | Improved analysis of UARS, extended titration possibilities to titrate back to a signature breath | Enhanced analysis, extended parameters during titration |
| Video integration (synchronized) for ambulatory studies (based on specific available signal information) | Easy setup video for any kind of ambulatory study setup (HST or hospital) | Flexibility on HST |
| Tablet application (based on build in Bluetooth) | Direct study setup and signal control | Flexibility on HST, study success rate |

## Special PSG software features

| Feature | Benefit | Target |
|---|---|---|
| Unique PSG related "Recording Results Page" | Easy complete PSG data overview for physician and technician | Reduced time for quick study overview |
| Extremely powerful workspace and scoring handling | Prepared customized views to load / change quickly between workspaces, split screens, scoring screens and overview windows | Flexibility for scoring and analysis views |
| Powerful and flexible reporting engine | Design reports like Word documents, easy calculation of new parameters from existing variables, reporting of various customizable event and/or signal associations, load existing Word reports into Noxturnal | Flexibility for reporting |
| Automatic event control | Avoid scoring or reporting on concurrent events | Accuracy on scoring and reporting |
| Automatic sleep staging | Allow quick sleep staging by automatic pre-staging and manual correction | Reduced time for quick analysis |
| Simplified user and administrator settings | Software setup customization and protection, easy portability of custom settings | Reduced installation time, enhanced user customization and settings control |
| Data export as signal / event grids | Export structures can customized and saved as sheet templates | Scientific use: export signal and event information |