

# Nihon Kohden Sleep Management Solutions

**N**ihon Kohden's long legacy in polysomnography continues with the introduction of the latest in sleep management technology. Our newest additions to the technologically superior Nihon Kohden amplifiers break new ground in polysomnographic hardware. The highest specifications are engineered into the Nihon Kohden amplifiers to give you the maximum in signal processing quality. The sleep management and diagnostic software packages are the industry standard when it comes to streamlining work flow and increasing flexibility. Choose between a wide variety of software and hardware combinations when customizing the diagnostic technology configuration for your sleep center or multi-disciplinary lab.

## Amplifier Solutions

Nihon Kohden amplifiers have long been regarded for delivering superior signal quality using the highest recording specifications available. Durability, innovation and superior signal processing have defined our amplifier engineering for decades. We offer PSG compatible amplifier choices ranging from 27-192 channels.

The flagship and newest addition to the Nihon Kohden amplifier family, the JE-921 (pictured top right), provides flexibility and configurability that is exclusive in the industry. With a full 10-20 electrode array, 14 bipolar inputs, built in End tidal CO<sub>2</sub> and SpO<sub>2</sub>, this new technology will increase ease of use and recording power for all types of EEG and polysomnographic recordings.

The well proven JE-912 provides flexibility with 10 DC channels,



20 uni-polar and 14 bipolar inputs. With built in SpO<sub>2</sub> this amplifier combines economic sense with flexibility.

The reliable AirPSG combines 802.11b wireless technology with the ultimate in flexibility and ease of use. AirPSG comes in a 24 channel dedicated sleep format designed specifically for use in the sleep lab. AirEEG 32 and 64 channel multi-modality configurations allow you to get the most out of your recordings with additional recording power. All formats are available with built in SpO<sub>2</sub> and external DC inputs.



# Polysmith™

Polysmith™ is the world's most all-inclusive PSG acquisition and analysis program. Patient data acquisition and analysis is available from a single application, letting the clinician learn just a single program. Multitasking is available with Polysmith™'s ability to simultaneously record data and score live recordings, as well as pre-recorded studies.

Polysmith™ also offers the most advanced analysis modules on the market today. In addition to sleep stage, respiratory events, leg movement, EKG, arousal and SpO2 analysis, Polysmith™ can analyze blood pressure, pulse transit time, optional advanced holter EKG analysis, EtCO2 and pH. These analyses are available for both adults and pediatrics.

## *Polysmith™ DMS (Data Management Solutions) Scheduler and Database*

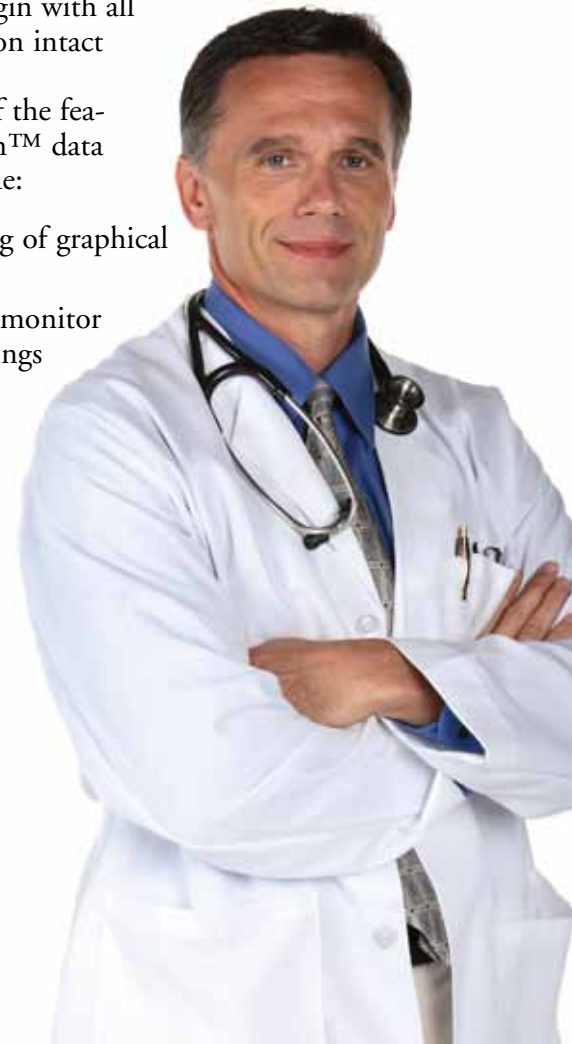
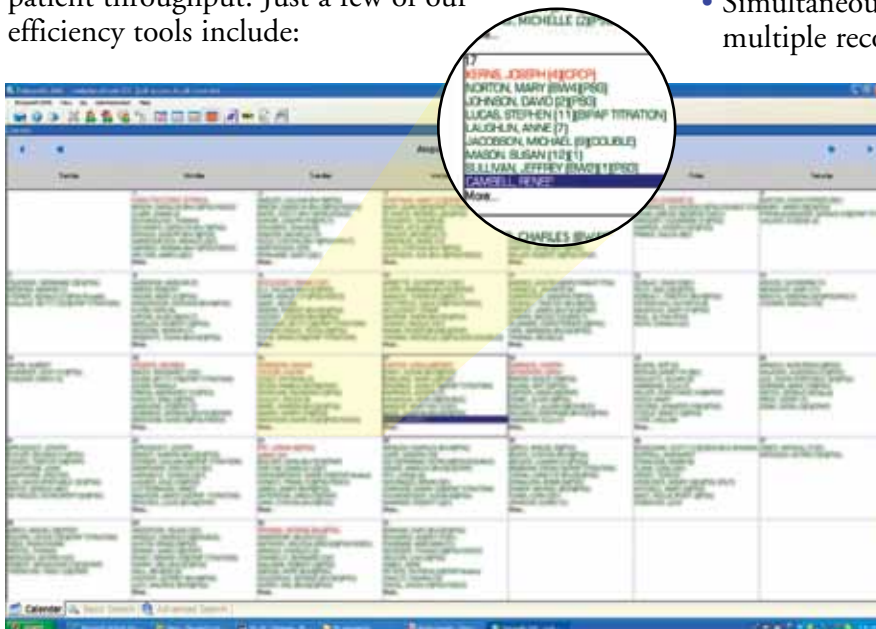
The Polysmith™ database management system combines data management, acquisition, analysis and report generation into a single portal. Available in a basic and advanced package Polysmith™ DMS gives caregivers the ability to process sleep studies anywhere, anytime. An interactive calendar displays scheduled recordings in monthly, weekly or daily views. Open recordings, launch recordings or schedule new recordings directly from the calendar interface. Polysmith™ DMS streamlines data archival, simplifies scheduling and automates record location allowing your staff to efficiently manage administrative tasks while optimizing patient throughput. Just a few of our efficiency tools include:

- Patient Scheduler
- Secure customizable log in and access rights
- Recording status management
- Patient status management
- Selectable block out dates
- Room and bed number display
- Study type display
- Customizable database fields
- Drop down menus for easy data entry
- Patient and recording search engine
- Dozens of patient information fields
- Easy to use patient information dialog
- Automatic archiving
- Electronic attachments
- Optical HL7 ADT/Results Interface
- Home Sleep Testing (HST) interface

## *Data Acquisition*

Seamless data acquisition is the basis for the Polysmith™ recording interface. A direct interface with Polysmith™ DMS scheduler eliminates the need for patient information entry to begin a recording. Point and click and the recordings begin with all patient information intact and stored in the database. Some of the features of Polysmith™ data acquisition include:

- On-line trending of graphical data
- Simultaneously monitor multiple recordings



- On-line computer scanning, scoring and editing
- Live synchronized compressed digital video
- Configurable digital video quality with various frame rates and resolutions
- Multiple data scroll speeds
- Live AHI
- Secure remote monitoring
- Multiple recording file size choices

### Data Analysis

Fast and accurate data analysis is the foundation of any sleep disorders facility. As the field of sleep medicine evolves so has Polysmith™ analysis. Combining superior signal processing and advanced display algorithms Polysmith™ can show you the clearest picture of your data. Many display options allow you to easily configure your screen the way you like. Background watermarks indicate the patient's body position, sleep stage and treatment level in a position that allows maximum visual scanning speed. Intuitive scoring is easy to use and fast to learn.

Polysmith™ analysis also allows you to customize your scoring by allowing you to create and design your own events. Decide on the name, event associations, and properties of your event. Count them in reports and graphs, as well as include them in math expressions to customize indices, percentages, and a virtually unlimited number of other calculations. This, combined with customizable workspaces and a powerful data management system, will provide the most configurable and commanding data analysis available.

Just a few of Polysmith™'s data analysis features include:

- Single click scoring and editing
- Multiple synchronized time base
- Navigate data by graphical interface, comment query, event query and scroll bar
- Customized event creator
- Custom event trend plots and hypnograms

- View AHI, HDI or ADI live or at any point in the record
- View AHI by every treatment level
- Automatic or custom event associations
- Custom work spaces
- Complete post-study re-montaging and re-filtering
- Remote access scoring



- Open XDF™ EDF compatible file format
- Customizable colors for events and most aspects of the software
- Study Creator file wizard
  - Create a slide show from multiple recordings
  - Extract Sleep studies from LTM or epilepsy recordings
  - Combine fragmented recordings
  - Custom create MSLT files for physician review
- File Migrator changes file size (with little or no data loss) for archiving
- Background watermark displays body position, sleep stage and treatment level
- Built in DVD and multi-session burning
- Auto and manual scoring for
  - Sleep stage
  - Arousal
  - Leg movement
  - Respiratory events
  - Snoring
  - SpO2
  - EtCO2
  - pH
  - Pulse Transit Time
  - Blood Pressure
  - EKG analysis
- European Data Format import/export capability

# Infant Data Analysis

At Nihon Kohden we realize that recording and analyzing children and infants requires special technical and diagnostic considerations. This is why we have created particular features to help you deal with these issues. These exceptional features include:

- Active, Quiet, Transitional and Wake scoring
- Pediatric staging according to AASM rules
- Infant staging, trending and graphics
- Periodic breathing analysis
- pH analysis and reporting
- Flexible and easy to use DC Channel set up and calibration
- Automatic amplifier reset for quick disconnect
- Complete infant database with correlations of all types of clinical event with infant staging

## Surveysmith Report Generator

The definitive reflection of the quality of your sleep disorders facility is the data it produces. Final reports and physician interpretation reports are the realization of that quality. Surveysmith was designed with this excellence in mind. Surveysmith is more than just a report generating software. It is a tool by which your facility can produce reports, impression and recommendation templates, and view the extensive data that is stored in the Polysmith™ database. Its simplicity and comprehensiveness is demonstrated by:

- Hot links that allow jumping from the report directly to locations in the recording designated by the link e.g. click on sleep latency in the report and immediately jumps to that point in the record
- Auto complete text that allows you to easily locate any of the thousands of fields available for reporting



- Auto pop-up field descriptions that will define what is in every field
- Customizable bar and pie graphs
- Create customized dictation fields that will allow you to automatically update the database with your impressions, recommendations and many other text fields
- Seamless remote connectivity allowing you to create reports anywhere
- HTML format can be read and edited in many programs
- Auto e-mail connects to your e-mail organizer and allows you to e-mail reports as soon as they are completed
- Insert hypnograms and customizable plots
- Secure documents with digital signature
- Scorer comparison reports
- Spell checker
- ICSD coding
- HL7 results capable

## Privacy and Security

Although network security is ultimately the responsibility of your facilities' IS department, Nihon Kohden provides you with the tools to make your patient's data secure. There are many levels of security that your individual network can supply, however; the



Nihon Kohden Polysomnographic solutions can also provide you with:

- Front end log in that requires user name and complex password to access data
- Administrative dialog which allows you to set the data rights of every individual that uses the system
- Installation of program allows you to limit use of the sleep software to those who log into windows with a specific user name and password
- Anonymous archiving of data
- Restrict access to data files to those who are involved with the study
- Time out when software is idle

### Combining EEG, Long Term Epilepsy and Sleep Testing

Multi-disciplinary software such as our sleep analysis software, spike detection and localization programs, spectral analysis utilities and EEG acquisition and review programs reside on and may be launched from a single computing platform, with your choice of PSG compatible amplifiers ranging from 27-192 channels. In an epilepsy monitoring unit, you can now clip a night time sleep study recording segment from a long term study and perform a polysomnographic analysis.



Integrating multiple testing capabilities within a single platform allows the staff to monitor a variety of neurodiagnostic procedures in the most cost effective manner, maximizing instrumentation utilization and revenue generation for your facility.

- Simultaneously monitor live data with an EEG montage in Nihon Kohden EEG acquisition software while monitoring a sleep montage with live trending and on-line scoring in Polysmith™
- Create sleep studies from Long Term epilepsy studies.
- Convert files to EDF format for use with outside research utilities

### The Complete Solution

Nihon Kohden combines the Polysmith™ suite of software products with a family of hardware recording platforms to offer you a complete PSG solution tailored to assist your facility in delivering superior patient care in the most cost-effective manner. Our advanced analysis software and comprehensive data management tools allow you to produce accurate comprehensive data results, efficiently and quickly.

Our PSG solutions have set industry standards in both signal processing hardware and data management software. Nihon Kohden amplifiers have been used for EEG and sleep studies for decades with constant attention to producing high quality recordings. The

Polysmith™ produced clinical data management software was the first commercially successful database on the market. With hundreds of installations, this database has led the way for integrating data management into routine sleep studies.

Expandable in both hardware and software applications, we won't leave you feeling left behind as technology moves forward. Nihon Kohden and Polysmith™ sleep assessment solutions remain the benchmark and standard that all others must try to measure up to.

**Polysmith™ and Polysmith™ DMS have been expanded to meet with current AASM standards for data recording and analysis.**





### JE-912 PSG Amplifier

Number of Inputs:  
 20 Unipolar  
 14 Bipolar  
 Optically Isolated  
 Input Impedance: 100 M $\Omega$   
 Input Circuit Current: <5 nA  
 CMRR: > 105 dB or greater at 60 Hz  
 (Bipolar Input: 60 dB or greater)  
 Internal Noise Level:  
 < 1.5  $\mu$ V p-p (0.53 to 60 Hz)  
 High Cut Filter: 120 Hz (-18 dB/oct)  
 Low Cut Filter: 0.08 Hz (TC = 2 s)  
 Offset Tolerance:  $\pm$ 600 mV  
 Sampling Frequency: Up to 500 Hz  
 USB Interface  
 Cat 5 Connectivity

### JE-921 Multimodality 10-20 System Amplifier

Number of Inputs:  
 32 Channels Total  
 10-20 Input Layout  
 3 Dedicated Bipolar Channels  
 4 Programmable Bipolar Channels  
 4 DC Channels  
 Optically Isolated  
 Input Impedance: 100 M $\Omega$   
 CMRR : > 105 dB  
 Internal Noise Level:  
 <3uV p-p (0.53-120Hz)  
 High Cut Filter:  
 300 Hz (-18 dB/oct)  
 Low Cut Filter:  
 0.016-160 Hz  
 Sampling Frequency:  
 Up to 1000 Hz  
 USB Interface  
 Cat5 Connectivity



### Data Acquisition

Input impedance:  
 EEG input/extra input: 200 M $\Omega$   
 DC input: 1.5 M $\Omega$   
 Input circuit current: 10 nA or less  
 Internal noise level:  
 EEG input/extra input: 3 $\mu$ Vp-p or less  
 DC input: 10 mVp-p or less  
 CMRR:  
 EEG input/extra input:  
 105 dB or greater (60 Hz)  
 Bipolar input:  
 100 dB or greater (60 Hz)  
 Low-cut filter: 0.08 Hz ( $\tau$  = 2s)  
 High-cut filter: 60 Hz (-18 dB/oct)  
 A/D conversion: 16 bits (97nV/LSB)  
 Sampling and hold:  
 All electrodes at the same time  
 Sampling frequency: 200 Hz  
 Impedance threshold:  
 2, 5, 10, 20 and 50 K $\Omega$



*Polysmith is a registered trademark of Neurotronics, Inc.*

*The information contained on this product roadmap is not a commitment or legal obligation to deliver any of the described features or functionality described herein.*



90 Icon Street, Foothill Ranch, CA 92610  
 (800) 325-0283 • (949) 580-1555 • Fax: (949) 580-1550  
 www.nkusa.com