C297-E103

SHIMADZU
Excellence in Science

NEUROSPEC
Research Neurosciences

Portable functional Near-Infrared Spectroscopy System for Research

LIGHTNIRS

Expanding the Possibilities for the Future

Shimadzu Portable functional Near-Infrared Spectroscopy (fNIRS) System for Research*

LIGHTNIRS

fNIRS offers exciting new opportunities for brain science research.
The portability enables measurements in a natural, unrestricted environment.

*For research use only. Not for use in diagnostic procedures.

Portability Expands Range of Research Applications

Neuromarketing research

Communication research

Brain-machine interface (BMI) research

Rehabilitation research

Near infrared light, which readily diffuses easily through biological tissue, can be used to measure localized blood oxygenation levels of the brain to monitor where activity occurs in response to a task or stimulus.

The portability of LIGHTNIRS allows visualizing brain function activity in real time in a more natural state than other methods. Consequently, it is being used in a wide range of applications including medical research, developmental psychology, education, cognitive science and engineering.

Flexible Measurements
Two kinds of holders to measure various sites

Greater Degrees of Freedom in Measurement Locations

Flexible, comfortable and secure, LIGHTNIRS holders fit the whole head closely to transmit and measure light at maximum efficiency.
Flexible fiber placement allow users to select positions ideal for their applications.

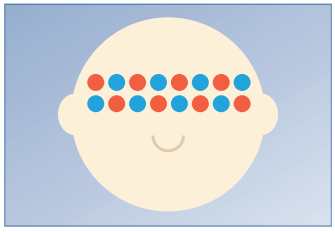
Holder Type A

Measurements focused on the forehead. Suitable for a variety of cognitive tasks.

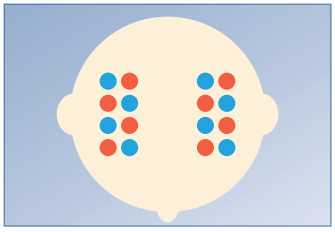
Holder Type B

Measurements focused on the frontal, temporal, parietal, occipital regions. Suitable for multi-purpose measurements such as motion, somatic sensing, and vision.

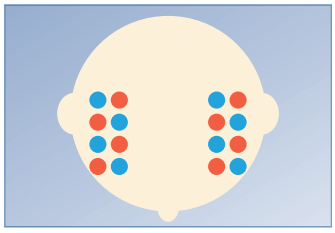
Examples of Measurement Region Selection



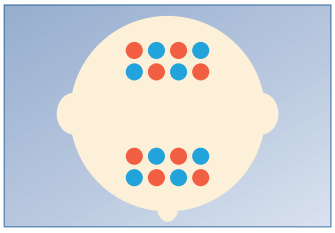
Forehead
2×8(22ch)



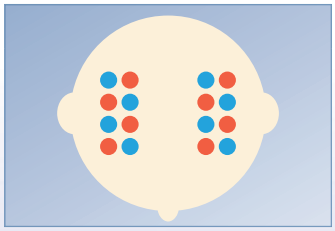
Temporal area(bilateral)
2×4(10ch)×2



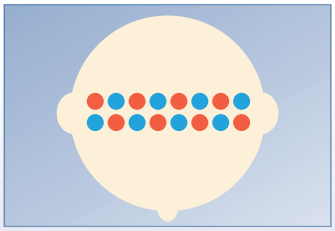
Dorsolateral prefrontal area
2×4(10ch)×2



Visual area and Frontal pole
2×4(10ch)×2



language area
2×4(10ch)×2



Primary motor area
2×8(22ch)

User specified fiber placement configurations are practically limitless. Some of the standard configurations are depicted above.

Wearable Design Brings New Research to Light Easy Measurements in Almost Any Environment

Higher Measurement Freedom

Portability

Due to its light-weight and compact design, measurements can be taken while carrying the main unit.

A specialized carrying bag (included standard) provides two ways to carry the unit.

Communication Between Computers

Multiple people can be measured at the same time.

Improved Light-Blocking Characteristics

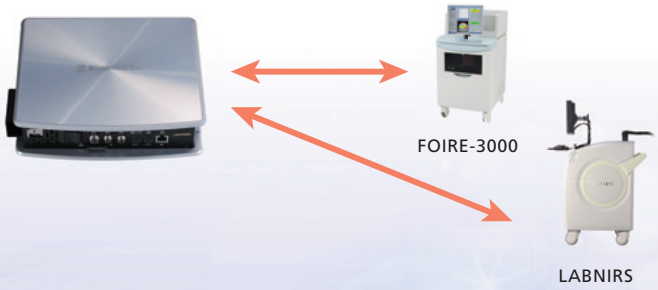
The lightweight material is efficient at blocking light. It is comfortable and easy to set-up on the test subject.

Selectable optical fiber (8 pairs)

Fiber length is selectable from 1m and 2m.

Data Continuity

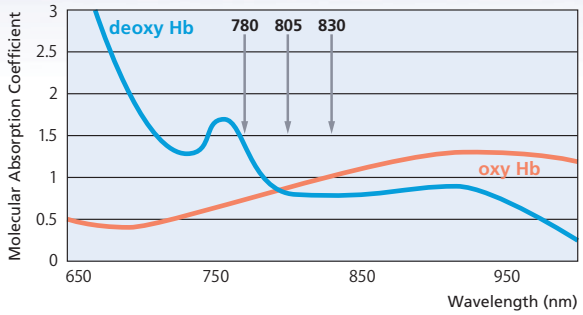
Data acquired using a Shimadzu FOIRE-3000 or LABNIRS functional near-infrared spectroscopy system can be loaded directly by the data analysis software included with the LIGHTNIRS system for comparison. Consequently, it can take advantage of existing data sets.



High Performance fNIRS Measurements

Triple Wavelength Semiconductor Laser Ensures Stable Measurements

Three wavelengths are used to measure variations in the concentration of Oxygenated, deoxygenated and total hemoglobin, which are used as indicators for brain activity.



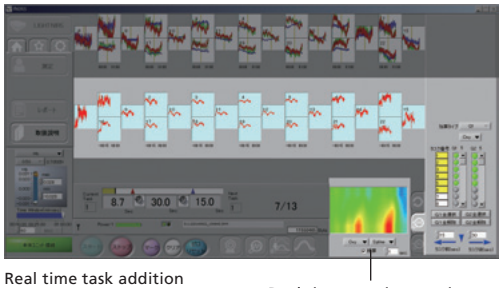
Easy Operability Via a Graphical User Interface

An intuitive user interface allows setting advanced measurement and analysis parameters.

[Measurement Mode]

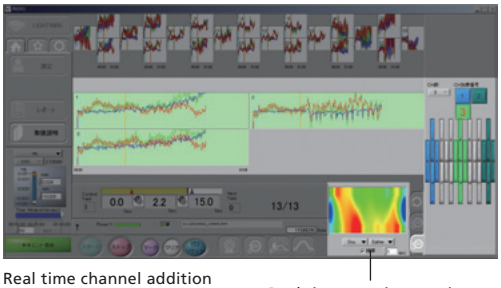
■ Real Time Monitoring Process Functions

Trend graphs are added for each task or channel, and mapping information is simultaneously integrated during measurements.



Real time task addition

Real time map integration



Real time channel addition

Real time map integration

[Analysis Mode]

■ Comprehensive Data Processing Functions

The software provides various data analysis and data processing tools, including independent component analysis (ICA*), frequency filtering, adding tasks, adding channels, as well as centroid and integral values.

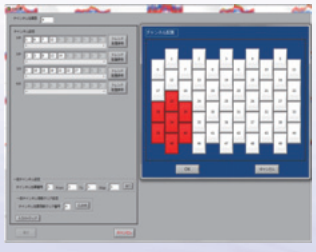
■ Statistical Analysis Functions

General linear model (GLM) statistical processing offers simple statistical analysis and evaluations at the point of measurement.

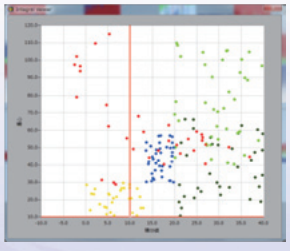
■ Batch Processing Functions

Permits batch processing with predetermined analysis procedures.

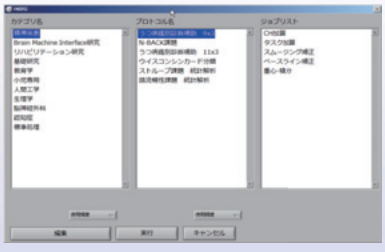
* Registered patent: 04379155



Channel addition



Centroid and integral analysis functions

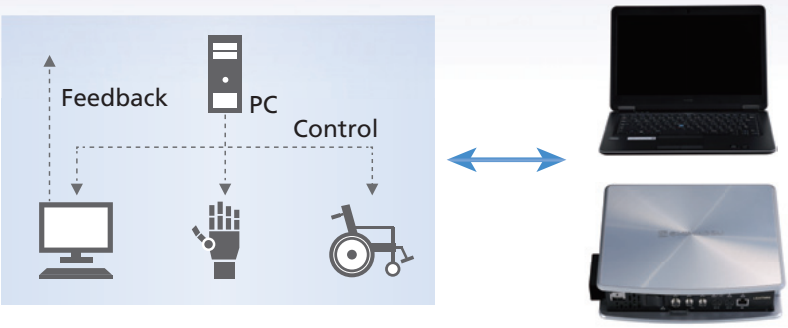


Batch processing functions

LIGHTNIRS Accessories

Real-Time Data Transfer Software

This supports biofeedback with the subject and brain-machine interface (BMI) to control external devices by transferring measured data to another PC in real time.

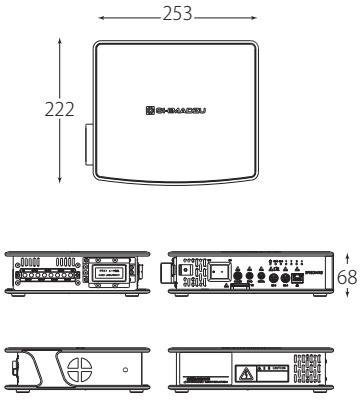


Video Recording Software

Records synchronized video images of a subject's body movements during measurements by USB camera. Movement artifacts can be identified and easily linked to the data.

Key Specifications

Measurement method	3-wavelength absorbance calculation
Measured item	Variations in Oxy-Hb, Deoxy-Hb, and Total-Hb
Light source	3-wavelength near-infrared semiconductor lasers, Class 1 [IEC-60825-1 (2007)]
Detector	Avalanche photodiode
Power supply	15 V input from AC adapter or lithium-ion battery
External inputs	3 digital channels and 10 analog channels
Dimensions	W253 × D222 × H68 mm (not including protrusions)
Weight	About 1600 g (not including computer, batteries, and probes)
Operating temperature	15 to 30 °C, providing temperature changes are within 5 °C/h during measurements
Operating humidity	45 to 85 % (with no condensation)



Related Product

functional Near-Infrared Spectroscopy System for Research

LABNIRS

LABNIRS has quickly become the most powerful and comprehensive fNIRS system for brain imaging research available.Measurements can be obtained using up to 40 fibersets, equaling 142 channels that can be distributed over a wide area of the brain or concentrated to use high-density mode. High quality signal can be obtained for the whole head in as little as 27 msec.
By using safe near-infrared light to measure the oxygen status in the brain surface, the system can be used to view, in real time, the active areas of the brain or their activity level during higher-order brain functions, such as seeing, hearing, or moving.

- Measured item: Variations in Oxy-Hb, Deoxy-Hb, and Total-Hb
- Number of measurement channels: LABNIRS from 4 pairs (10 channels) to 40 pairs (142 channels)
  Temporal resolution:6 msec / fiber or 27 msec for whole head measurement.

Product brochure: C297-E097A

Laser Safety

This product uses semiconductor lasers categorized as Class 1 under IEC-60825-1 (2007).Read the Instruction Manual carefully before using the product.

CLASS 1 LASER PRODUCT

- All values in this brochure are standard values. Actual values may differ slightly.
- Photographs in this brochure may include items and options not included with the system.

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