Electroencephalograph-recorder “Encephalan-EEGR-19/26”

CE 0086

Electroencephalograph for classic stationary use

Portable electroencephalograph for EEG monitoring in ER, ICU or hospital ward

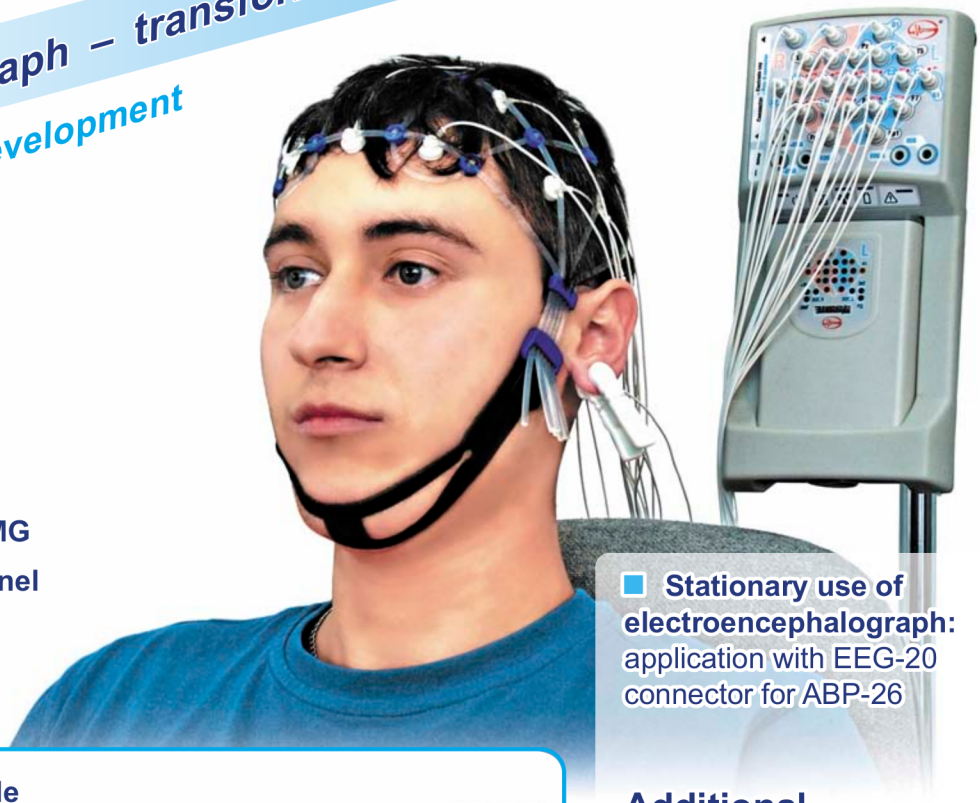
Autonomous EEG-recorder – Holter-EEG

New features

Electroencephalograph – transformer

Latest development

3 in 1



26 channels basic patient unit ABP-26:

- 20 EEG and slow cortical potentials
- 1 ECG
- 2 EOG
- 1EMG
- 1 respiration effort channel
- 1 body position channel

- **Stationary use of electroencephalograph:** application with EEG-20 connector for ABP-26

- **Portable electroencephalograph-recorder**
- **Holter-EEG**

Patient transceiver-recorder ABP-26

Additional wireless modules and sensors:

- pulse oximeter (SpO_2)
- 4 or 10-channel polygraphic modules
- 4-channel respiratory module
- 4-channel PG-ECG module (3 ECG, 1 impedance-based pneumogram)
- movement activity sensor

Multichannel multi-parameter record (over 50 parameters) and additional software provide use of electroencephalograph as a multifunctional neuromodular diagnostic system.

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Main characteristics of an electroencephalograph-recorder:

26-channel basic patient transceiver-recorder ABP-26:

- 20 channels of EEG (64 digital derivations minimum) with simultaneous record of very low frequency activity and electrode impedances. 6 polygraphic channels for record of additional parameters (ECG, EMG, EOG, respiration, body position).
- Wireless Bluetooth channel for PC communication, and additional wireless recording devices and sensors, as well as for control of wireless stimulation unit.
- Backup of all recorded data or its record for unattended use (Holter monitoring) on a removable internal memory card (over 48 record hours).

Technical characteristics:

- AD converter: 24 bit;
- Sampling rate: 2 kHz per channel;
- Allowable input DC offset voltage: at least ±300 mV;
- Sensitivity: 0,1-200 μV /mm (21 stages);
- Input resistance: at least 200 MΩ;
- High pass filter (HPF): 0,016–16 Hz;
- Low pass filter (LPF): 15; 30; 70 Hz;
- Extra-low noise level: 0,23 μV;
- Common-mode rejection ratio:

powering from accumulator - at least 140 dB

powering from USB-adapter - at least 120 dB

- Weight of ABP-26: 400 g (with accumulators).

The software for EEG-studies "Encephalan-EEGR" ("elite" suite) provides main functional capabilities of electroencephalograph-recorder *(see further in this brochure.)*

Mobile or unattended application of electroencephalograph (Holter-EEG)

To perform EEG studies in patient bed, hospital ward, ICU, ER or other medical departments, in the ambulance car or at patient's home, the necessary mobile set contains patient transceiver-recorder ABP-26, phono-photostimulator, a set of electrodes, portable PC, and can be easily fitted into a compact bag for PC transportation.

Supplement of portable electroencephalograph-recorder with mobile kit for synchronized continuous EEG videomonitoring ensures its effective application in environment natural for the patient (at home) for the differential diagnosis of epilepsy, which is the "gold standard".

Continuous record of electroencephalogram (over 48 hours) onto the memory card integrated into the patient transceiver-recorder ABP-26, and a special set of electrodes "Encephalan-ES" provide comfortable carrying out of autonomous EEG studies (Holter-EEG) in natural patient environment, both in a hospital ward or at home, during active wakefulness and sleep.

When the study is completed, all the data is transferred from the memory card to the PC of electro-encephalograph for processing, analysis, diagnosis, and saving the results in a database, using the software EEG studies "Encephalan-EEGR".

Continuous EEG studies in environment natural for a patient may be effective for:

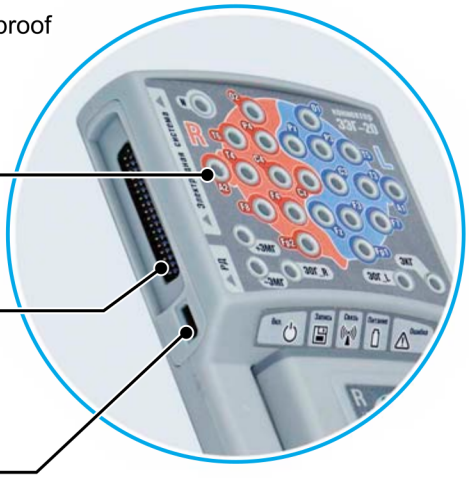
- Evaluation of psychogenic disorders of not defined genesis, which are manifested under conditions of natural environment and behavior.
- Detection of pathological manifestations, such as paroxysmal epileptic states, transient ischemic attacks, and others.
- Differential diagnosis of epilepsy, especially in irregular and ill-defined paroxysm.
- Control in drugs administration.

For the first time the company provides an autonomic video equipment kit for synchronized video record with the EEG data onto the internal video memory card of a recorder, which sets a new level of innovation in autonomous EEG studies.

Stationary use of electroencephalograph-recorder “Encephalan-EEGR-19/26”

For stationary use for routine EEG studies with functional tests (phono-photostimulation) in the rooms of functional diagnostics and neurophysiology, insert ABP-26 into connector EEG-20, which allows using EEG electrodes of different types with touchproof connector (cup or bridge) or electrode system with cloth caps from the set of EEG electrodes ES-EEG-10/20 “Encephalan-ES”.

End connection of EEG-20 connector



Electrode sets for EEG studies

Set of 25 EEG electrodes,
4 ear clipses and EEG cover-caps
(tubular silicone) of 3 sizes.

Bridge snap electrodes

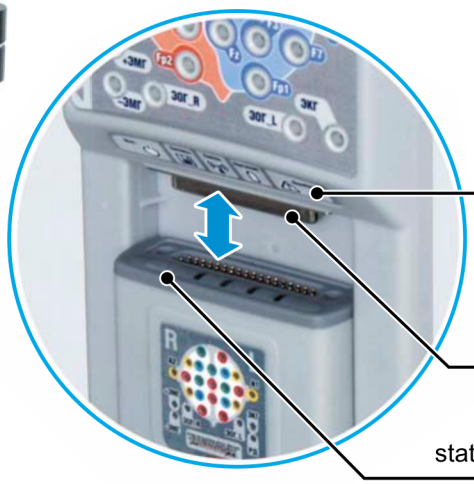
Cup EEG electrodes

bridge "alligator" electrodes

- Compact wireless stimulator unit is combined with the LED matrix for the photo-stimulation for functional tests.
- Phonostimulation is performed with calibrated headphones connected to stimulation control unit.
- The unit has autonomous battery power supply, control is performed from the doctor's PC via wireless channel.

- Comfortable placing of conector EEG-20 with connected ABP-26 and phono-photostimulator near the patient during EEG study.
- There is a system of fixation for wheels of electroencephalograph's trolley

Insertion of ABP into connector EEG-20



Power of ABP and wireless stimulator

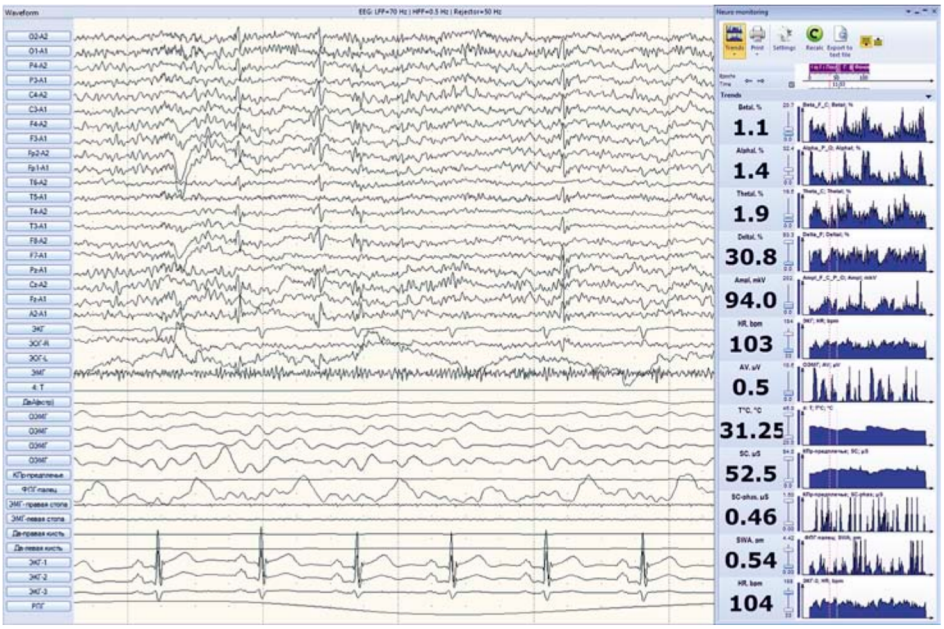
- 4 AA accumulators with minimal capacity 2700 A/h
- USB Medical class adapter

- Mains power adapter (220 V) with USB connector

The original concept of hardware and software unification for electroencephalograph-recorder “Encephalan-EEGR-19/26" allows using it as multifunctional neuromodular diagnostic system.

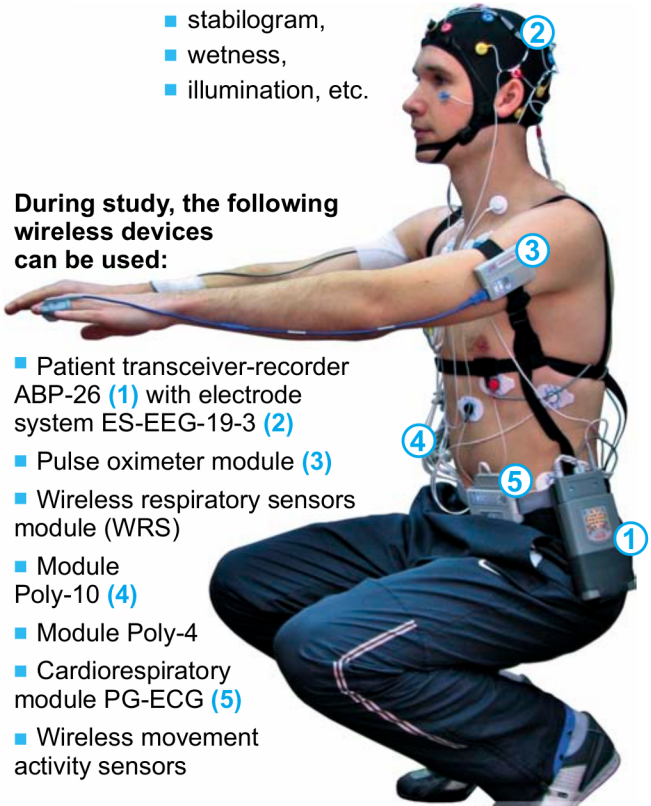
Version "Encephalan-EEGR-19/26" AT-PSG-Video-Poly

Depending on the availability of additional wireless devices, modules and sensors in the sales package, electroencephalograph-recorder can record up to 45 signals in various combinations, such as:



Sample of 40-channel synchronous record of parameters with simultaneous display of calculated parameters trends and their instant values using additional software for neuromonotoring “Encephalan-NM”

- electroencephalogram (EEG) (up to 30 derivations),
- DC-potential level in EEG derivations (up to 20 derivations),
- electrocardiogram (ECG) (up to 3 derivations),
- electromyogram (EMG),
- envelope EMG (EEMG),
- electrooculogram (EOG) (up to 2 derivations),
- respiration effort (abdominal and thoracic),
- breathing airflow (nasal, oronasal),
- snore,
- body position,
- movement activity,
- tremor,
- oxygen saturation (SpO2),
- skin conductance (EDA),
- galvanic skin response,
- photoplethysmogram (PPG),
- temperature,
- impedance-based pneumogram,
- impedance-based encephalogram,
- impedance plethysmogram (central hemodynamics),
- stabilogram,
- wetness,
- illumination, etc.



During study, the following wireless devices can be used:

- Patient transceiver-recorder ABP-26 (1) with electrode system ES-EEG-19-3 (2)
- Pulse oximeter module (3)
- Wireless respiratory sensors module (WRS)
- Module Poly-10 (4)
- Module Poly-4
- Cardiorespiratory module PG-ECG (5)
- Wireless movement activity sensors

Detailed information on possible sales package of electroencephalograph-recorder, wireless devices, sensors and accessories is given in additional illustrated catalogue.

The main transceiver-recorder ABP-26 provides EEG record, obtaining data from wireless devices and sensors with saving information onto internal memory card during autonomous (Holter-type) working mode or provides data transition via wireless Bluetooth® channel to the personal computer during study carrying out.

Main software features

EEG registration and visual analysis

- Recording and visualization with high resolution of up to **64 digital EEG derivations**, software control of phono- and photostimulation.

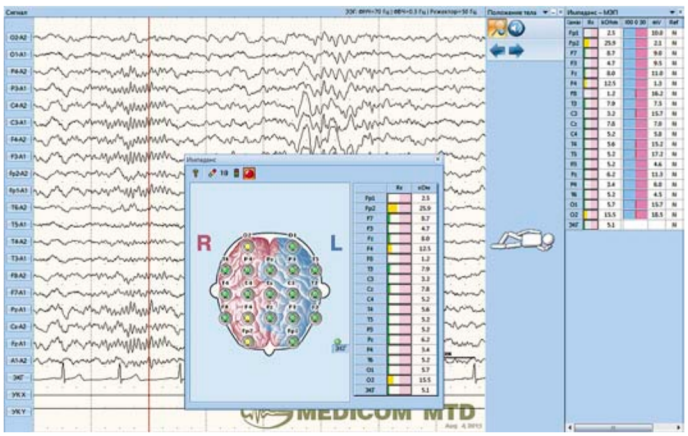
- **Channels configuration** (up to **45**) includes a list of types of channels and their quantity, as well as the signal filter settings individually for each channel (HPF, LPF, rejector).

- **EEG montages** are stored in a special expandable library (**over 40 montages**). **The montage editor** allows changing the existing montages or creating new ones. Virtual (with the option of returning to initial state) montage changing is available both during EEG recording and analyzing.

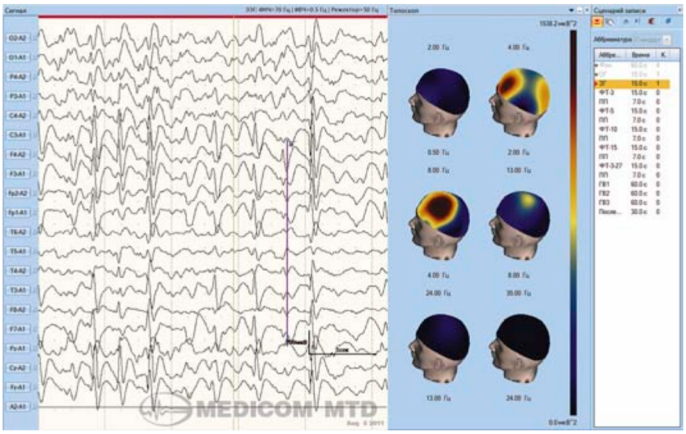
- **The record scenario** determines the sequence of hardware and software functional tests, as well as the configuration of stimulators.

- **Study profile library** includes common profiles of the study carrying out, including **the channels configurations, the montage and record scenario**. There is an option of changing profiles and creating new ones.

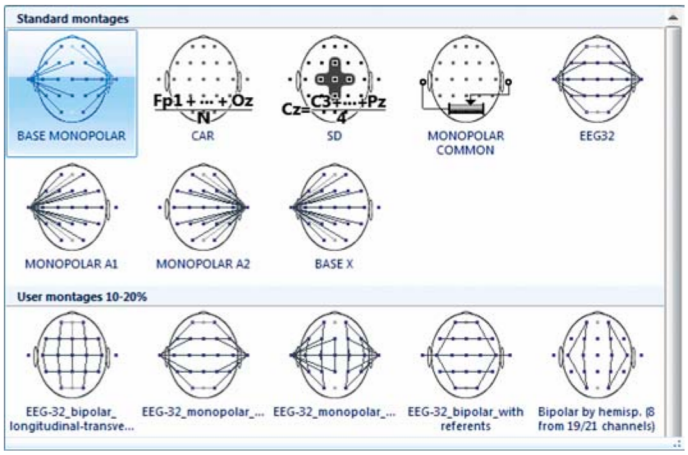
- **Impedance and potentials (DCp) control** during electrodes attachment. The values are recorded along with the EEG during real time record and used for subsequent analysis.



Electrode impedance measurement



To specify parameters of spatial distribution of spectral parameters of EEG activity, the application uses the mode of 3D and 2D topographic mapping ("toposcope").



Montages library

Elimination of noise pick-up using another montage.
Split mode demonstrates:
on the left – artifact from A1 reference in the left hemispheres channels,
on the right – elimination of artifacts by applying "Monopolar A2" montage.

- Using the **"microscope" tool**, you can view any signal zoomed in, measure its amplitude on selected fragment, and also estimate the frequency characteristics of a signal.

- **Manual and automatic setting of markers** of various types while EEG recording, performing tests and subsequent analysis.

- **Markers** set during the study are displayed on a special list indicating the type and time of setting. The selection of the marker allows the user to visualize the corresponding fragment for analysis.

- **Split mode** (splitting screen into 2 or more parts) allows viewing data of one study (the one part may demonstrate the current record process, the other one – previously recorded EEG), or several studies, including an option of presenting results and their math analysis in various forms.

- **The application supports 2 or more monitors**, which allows distributing visual information in the most optimal way for effective EEG study. The main monitor displays native signals, others – results of math analysis in different forms, trends, video from cameras (up to 4), etc.

- **EEG study** carrying out **control** from a remote computer via **Ethernet**.

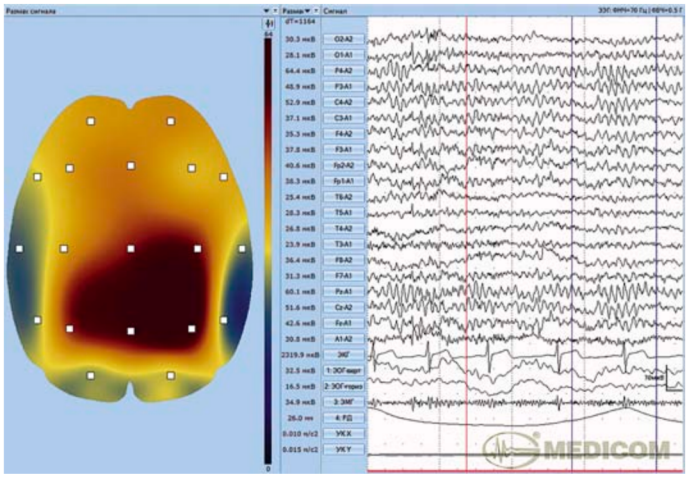
Main software features

Quantitative methods of EEG analysis

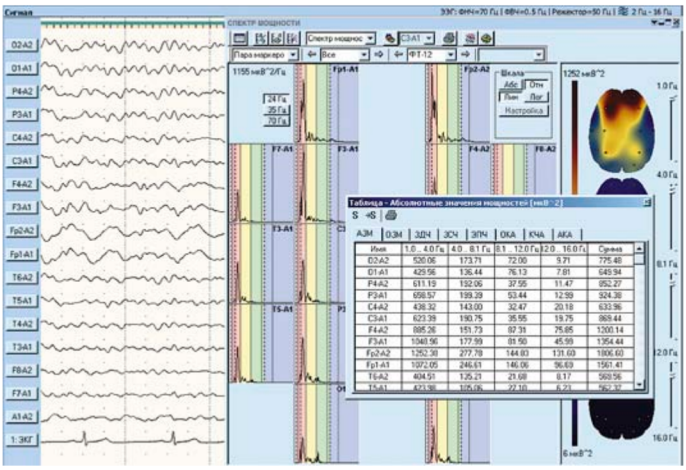
- **For EEG analysis, the most common mathematical treatments are applied:** power, amplitude spectrum; cross-spectrum, coherence function, auto- and cross-correlation with the formation of the tables of quantitative parameters and topographic mapping.

- Mathematical processing can be performed for the selected EEG fragments of various duration or required frequency range.

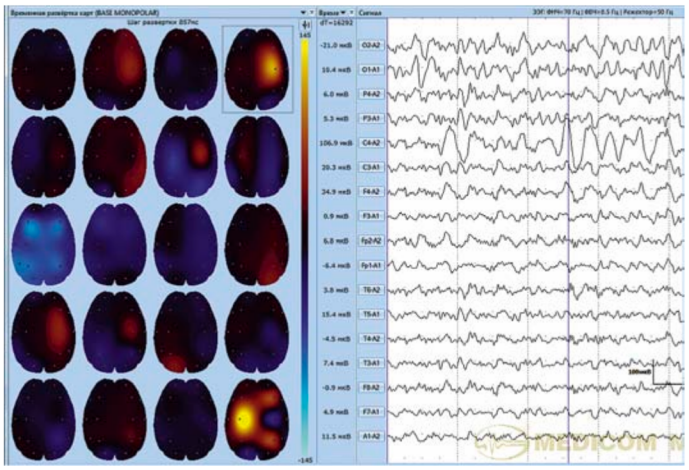
- **Automatic detection and marking of fragments of non-stationarities or epileptiform activity** are performed during recording and EEG processing. Detected fragments are highlighted, saved and available for quick search for expert evaluation.



Amplitude mapping in post-real time

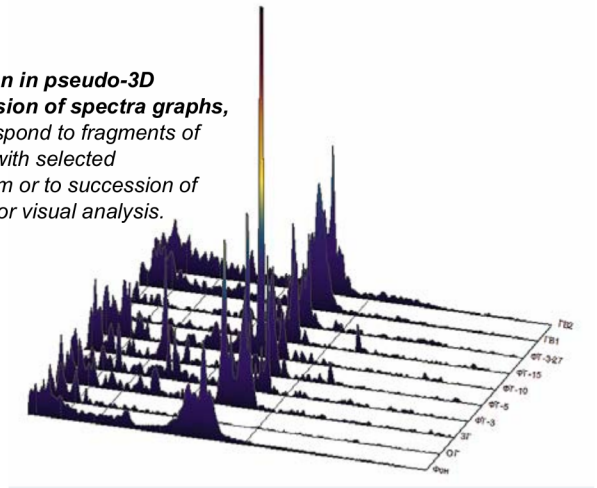


Analysis results are presented in the form of graphs, tables and topographic maps

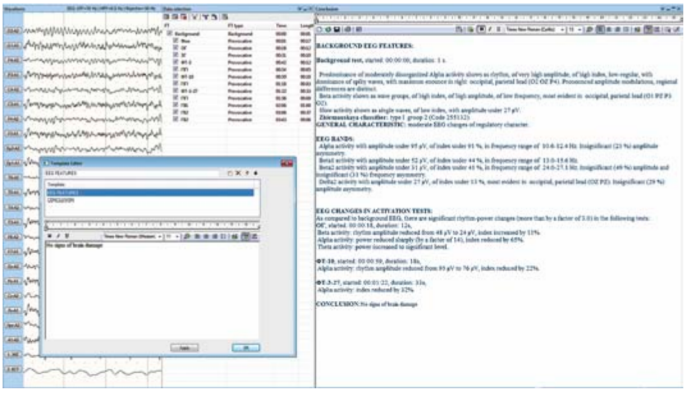


Amplitude mapping with presenting in "sweep" form of maps with set time rate

Presentation in pseudo-3D the succession of spectra graphs, *which correspond to fragments of EEG study with selected time quantum or to succession of various FT for visual analysis.*



*In the split mode, on the right – the result of **automatic artifact suppression from EOG** by 2 channels (vertical and horizontal components of eye movements)*



Report editor

- Record of ECG, EOG and EMG simultaneously with EEG provides **automatic suppression of possible artifacts** associated with cardio signal, eye movements and muscle activity.

- **Automatic report generation**, based on the description of the selected background fragment and comparison of its characteristics with the selected EEG fragments. There is an option of **editing the report** and forming neurophysiological conclusion using the function of **built-in text editor and a glossary** containing common phrases used by a doctor.

Main software features

Ergonomic interface Ribbon of “Encephalan” software

Software “Encephalan” uses updated ergonomic interface “Ribbon” similar to MS Office 2007/2010 interface, in which menu elements and buttons are grouped in tabs for their functional purpose. This allows a user to switch the tabs with buttons in order to optimize the number of control elements according to qualification level or type of performed studies.

Ribbon tab “Analysis” gives wide range of opportunities for data processing of both the main software “Encephalan-EEGR” and additional software.

EEG print options

Convenient preparation and printing of informative EEG fragments, results of processing in tables and graphs, conclusions on a study with a special Print Manager tool.

EEG records storage

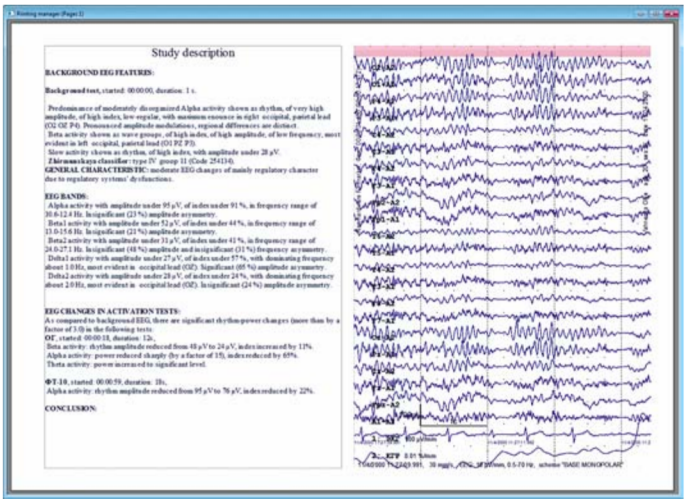
Storage of studies in a database "Cardfile" with an option of export and import of studies, and archiving of data on a variety of external media. There is an option of arrangement of the "Cardfile" database in the network on a dedicated server.

Viewing study results on any computer

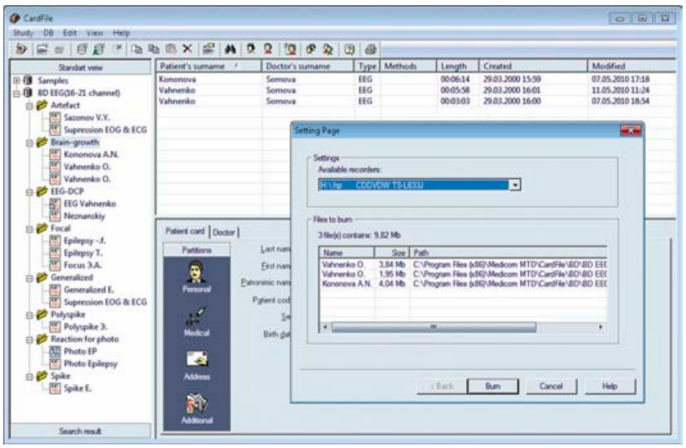
(without installed "Encephalan" software)

Specialized application "Encephalan-EEG-Viewer" is uploaded onto any external data storage in addition to recorded EEG study for results exchange among specialists and to hand out the results to the patient in order to get an independent medical consultation or prepare presentations and reports, and provides the basic functions for visual analysis of EEG (viewing data, reference reconstruction, scaling and selecting of EEG signals) on any computer.

There is an option of creation videos with informative fragments of the study (in common *.avi format), which can be viewed by standard players such as Windows Media or CD / DVD-player.

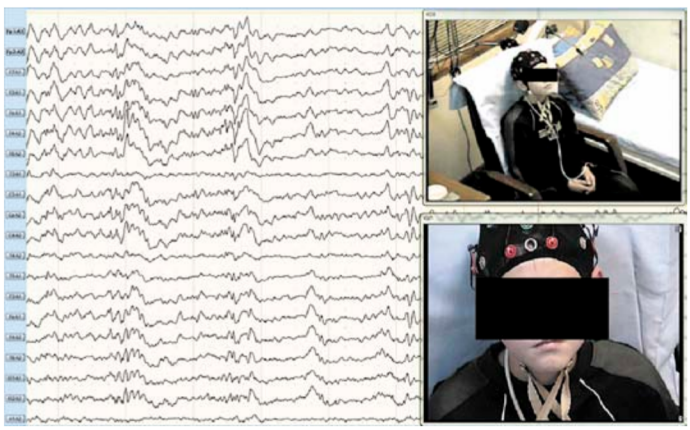


Print Manager



Database “Cardfile”

Additional EEG-Videomonitoring Kit and "Encephalan-Video" software



Detailed information see in a specific brochure

The kit (mobile, stationary or autonomous) contains network (Ethernet, WiFi) day and night video cameras with IR illumination and switching of camera mode "day" to "night", and the software "Encephalan-Video".

Synchronization accuracy of EEG signals with video data during recording and playback is 1 frame.

Simultaneous viewing of video and EEG-record during monitoring or subsequent analysis can be performed on one or two monitors.

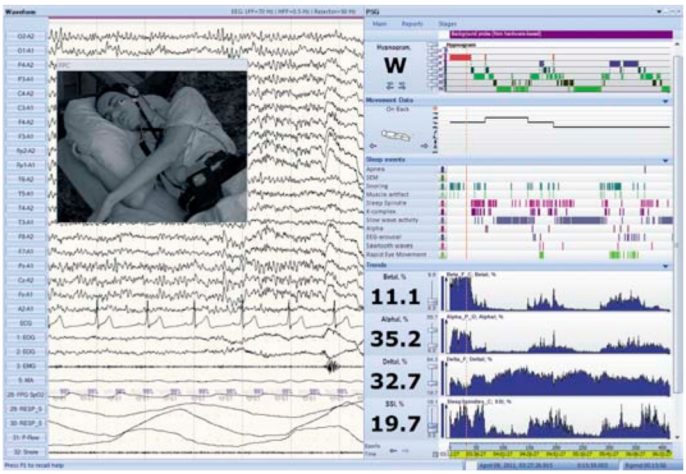
All recorded data can be stored on a variety of media (built-in or removable memory card, including hard drives of large capacity), in the PC database (Cardfile).

Additional software and functional capabilities

Analysis of functional brain asymmetry "Encephalan-FBA" provides visualization of intercentral connections map basing on the calculation of mutual functions (cross-correlation, cross-spectrum, coherence function) in order to diagnose inter- and intrahemispheric interaction during different types of action.

"Encephalan-VLFA" software for analysis of very low frequency activity (patent RF 2252692). Trends of very slow potentials dynamics and topographic maps of instant values and reactive changes of DC-potentials' level to functional tests carried out allow evaluating indirectly the cerebral energy exchange and metabolic changes dynamics.

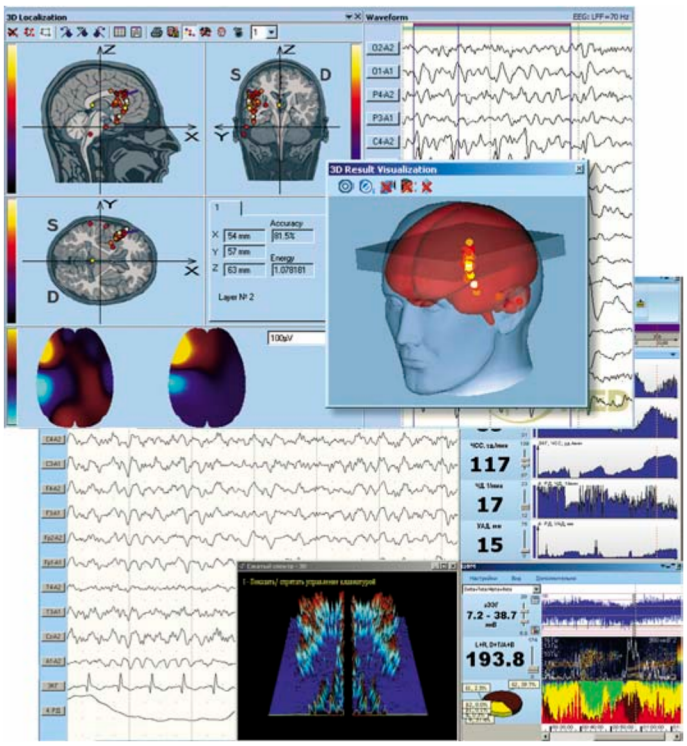
"Encephalan-CA" Software for analysis of signals from polygraphical channels in combination with EEG signals (patent RF 2252692) provides calculation and visualization of trends, which display cardio-cyclic dynamics (averaging from cycle to cycle) of different physiological parameters of cardio-vascular, vegetative and central nervous systems, which provides visual evaluation of their interconnection.



"Encephalan-PSG" software for somnological studies is designed for sleep stages analysis, for automatic hypnogram building, search for sleep events and forming reports on sleep statistics, sleep stages distribution and respiratory disorders, etc. the application analyzes EEG, EOG, EMG and other physiological signals recorded by polygraphic channels.

"HRV" software for heart rate variability analysis for evaluation of VNS and neurohumoral regulation of a patient in initial (background) state and considering vegetative response to provoking actions. Provides the evaluation of adequacy of physical and psycho-emotional stresses, and drugs effect and treatment efficiency control.

"Encephalan-3D" software for 3D localization of the electrical activity sources provides display of nominal source of electric activity on three projections of brain cut in the form of spatial dipole cloud, which allows localizing focus of EEG epileptiform activity or EP components source.



"Encephalan-CFM" software for cerebral functions monitoring in ICU and reanimation provides continuous dynamic analysis of amplitude-integrated EEG (aEEG) to detect perinatal asphyxia and epileptiform activity in neonatology, and for neurophysiological control in ischemic strokes and unconscious post-comatose states.

"Encephalan-NM" software for neuromonitoring in ICU and reanimation is designed to calculate and visualize trends (time quantum duration from 10 to 300 sec) of different physiological parameters of CNS, VNS and cardio- respiratory system in one time scale. Software gives infor-mation in digital and graphic forms to evaluate the state of a patient.

"Encephalan-EP" software for EP-studies – studies of long-latency visual and auditory evoked potentials, somato-sensory and visual EP for chess pattern, and cognitive EP (MMN, CNV, P300).

"Encephalan-AVS" software suite for EEG and EP studies using audiovisual stimulation uses different scenarios of cognitive stimulation. Sub-sensory (unconscious) stimuli presentation with masking and response control are available.

Contact information

Distributore esclusivo per l'Italia:

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