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

- portable
- modular
- transformable

- Continuous EEG monitoring
- Autonomous EEG record (Holter-EEG)
- Mobile or stationary variants (more than 50 channels, including 30 EEG)
- Synchronous video-EEG monitoring (for epileptology and somnology)

Wireless modules
- pulse oximeter
- respiratory module
- 4–channel polygraphic module (Poly-4)
- 10–channel polygraphic module
- movement activity sensor

Multichannel multiparameter record,
additional software provide use of electroencephalograph-recorder
as a multifunctional neuromodular diagnostic system

www.medicom-mtd.com Taganrog
MEDICOM MTD
Research & Development Limited Company

See catalogues on the website
www.medicom-mtd.com
Mobile, telemetric or autonomous (Holter–EEG) use of the electroencephalograph

- For EEG studies in the hospital room, emergency room, and intensive care or at patient’s home, the mobile set includes a patient transceiver-recorder, a phono-photo stimulator, a set of electrodes, a portable PC and it easily fits in a compact computer carrying bag.

- Additional mobile kit for synchronized long-term EEG-video monitoring provides effective use of portable electroencephalograph in telemetric mode for differential diagnosis of epilepsy.

- The ability to record EEG (over 48 h) on the memory card built into autonomous patient transceiver-recorder ABP-26, provides carrying out of a comfortable long-term outpatient EEG study in environment natural for the patient during active wakefulness or sleep.

Sets of EEG electrodes “Encephalan-ES” are used for long-term comfortable registration of EEG via 6, 11 and 20 derivations, in versions “baby”, “child” and “adult”

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

- Evaluation of psychogenic disorders of undefined 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.

The main characteristics of the electroencephalograph–recorder:

The patient transceiver-recorder ABP-26 has 20 channels for standard EEG derivations with simultaneous registration of extra low brain activity and electrode resistances, and 6 additional polygraphic channels for registration of ECG, EMG, EOG, breathing, body position of the patient.

The additional transceiver-recorder ABP-10 increases the number of channels for 10 EEG derivations or for 10 different sensors and channels for standard EEG derivations with electrodes. Simultaneous registration of extra low brain activity and electrode resistances.

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

Technical characteristics of the patient transceiver-recorder ABP-26 and ABP-10 during EEG registration:

- 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 ABP-10: 200 g

Manafacturer of kits LLC "Medical computer systems" www.mcscap.ru

When ordering directly at the manufacturer’s, it is necessary to specify a variant of use - with the electroencephalograph-recorder “Encephalan-EEGR-19/26”
Stationary use of electroencephalograph–recorder “Encephalan–EEGR–19/26”

For stationary use of the electroencephalograph for registration of EEG, connector EEG-20 is used for 20 EEG derivations (system “10-20”), or for 30 derivations with additional 10 EEG channels.

The study requires:
- electrode systems “Encephalan-ES” or similar connected to electrode system connector;
- MCScap kits for 32 EEG derivations;
- single EEG electrodes of various types connected to the slots of a touchproof connector.

Electrode sets for EEG studies
- Set of 25 EEG electrodes, 4 ear clipses and caps of rubber straps of 3 sizes.
- Cup EEG electrodes
- Cup adhesive EEG electrodes
- Bridge snap electrodes

Patient transceiver-recorder ABP-26 inserted into EEG-20 connector
- Electrode system connector
- Connector of respiratory effort sensor
- Power button and state indicators of ABP-26
- LED-indicators of electrodes contact quality
- Quick connect or disconnect of ABP-26 with connector EEG-20

Wireless Stimulator (autonomous photostimulator)
- Compact unit is combined with the LED matrix for the photostimulation for functional tests.
- The unit has autonomous battery power supply.
- Control is performed from the doctor’s PC via wireless channel.
The original concept of hardware and software unification for electroencephalograph-recorder “Encephalan–EEGR–19/26” allows using it as multifunctional diagnostic system.

Depending on the availability of additional wireless devices, modules and sensors in the sales package, electroencephalograph-recorder can record up to 50 signals in various combinations, such as:

- electroencephalogram (EEG) (up to 30 derivations),
- DC-potential level in EEG derivations,
- electrocardiogram (ECG) (up to 3 derivations),
- electromyogram (EMG),
- envelope EMG (EEMG),
- electrooculogram (EOG) (up to 2 derivations),
- respiratory 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.

Depending on the availability of additional wireless devices, modules and sensors in the sales package, electroencephalograph-recorder can record up to 50 signals in various combinations, such as:

- 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.
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 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.

- **Elimination of noise pick-up using another montage.** Split mode demonstrates:
on the left – artifact from A1 reference in the left hemisphere 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.
Quantitative methods of EEG analysis

- For EEG analysis, most of the generally accepted mathematical treatments are used: power, amplitude spectrum, cross-spectrum, periodometric analysis, coherence functions, auto- and cross-correlation with the formation of tables of quantitative indicators and their 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.

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.

Amplitude mapping in post-real time

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

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)

- Registration of ECG, EOG and EMG synchronously with the electroencephalogram allows performing automatic suppression of possible artifacts associated with cardiosignals, eye movements and muscle activity, the analysis of independent components is also used for the suppression of artifacts.

- Automatic formation of neurophysiological conclusions based on the description of the selected background and comparison of its characteristics with the selected EEG fragments, using the built-in text editor and glossary containing typical phrases performed by the doctor.

Report editor
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.

- **EEG print options**
  
  Convenient preparation and printing of informative EEG fragments, results of processing in tables and graphs, conclusions on a study with a specific 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. The software provides autonomous visual EEG analysis (data viewing, montage, scaling and selection of EEG signals) on any third-party 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.

**Additional EEG–Videomonitoring Kit and "Encephalan–Video" software**

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. 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 provides calculation and visualization of trends, which display cardio-cyclic dynamics (averaging from cycle to cycle) of different physiological parameters of cardio-vascular, autonomic 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 ANS and neurohumoral regulation of a patient in initial (background) state and considering autonomic 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, ANS and cardiorespiratory system in one time scale. Software gives information in digital and graphic forms to evaluate the state of a patient.

- Software for the study of evoked potentials “Encephalan-EP”, such as long-latency visual and auditory EP, somatosensory and visual EP for reversed pattern, as well as cognitive EP (MMN, CNV, P300).

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

---

**Contact information**

Medicom MTD Ltd., Frunze Str., 68, Taganrog, Russia, 347900
Phones: +7 (8634) 62-62-42, -43, -44, -45
Fax: +7 (8634) 61-54-05 (24 hours)
e-mail: office@medicom-mtd.com
© Medicom MTD Ltd., 2022 All rights reserved.

Data given is of an informative character and can be changed without preliminary notice. To get correct specification for the equipment and additional ads, address the manufacturer or its authorized representative.

The company’s products marked by ⚪ are certified in the compliance with the European Directive 93/42/EEC.