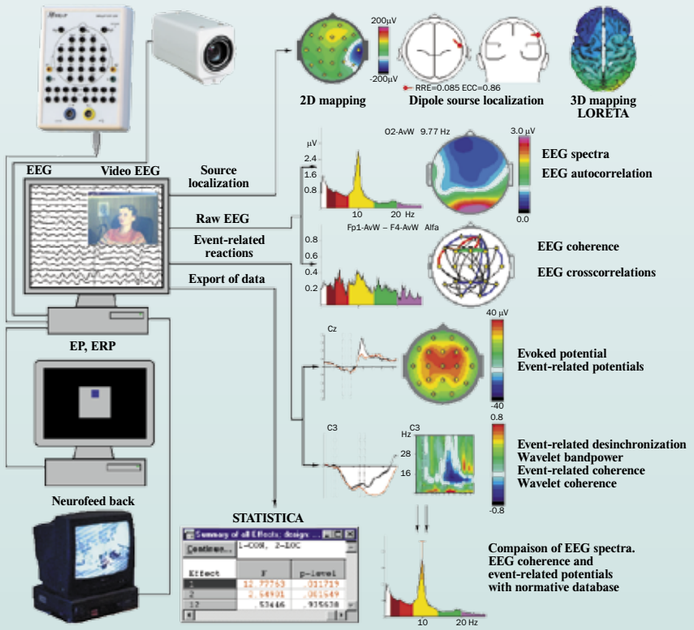
TECHNICAL FEATURES OF MITSAR AMPLIFIERS:

Technical features	Mitsar-EEG-201	Mitsar-EEG-202
Channels	21 EEG + 1 active/reference pair	31 EEG +1 active/reference pair 24 EEG +8 active/reference pairs
Frequency band	0.32 – 70 Hz	0.16 – 150 Hz or DC – 150 Hz
Supported electrodes	Gold, Ag/AgCl, Tin electrodes with Touch Proof (DIN 42-802) style connectors. ElectroCap electrode positioning system (USA) or analog	Gold, Ag/AgCl, Tin electrodes with Touch Proof (DIN 42-802) style connectors. ElectroCap electrode positioning system (USA) or analog
Input impedance	Greater than 200 MOhm	Greater than 200 MOhm
Noise	<3 V P - P	< 1.5 V P -P
CMMR	Typically 100dB at 50 or 60 Hz	Typically 100dB at 50 or 60 Hz
Input range	-500 - +500 V	300 mV
A/D Resolution	16 bit	24 bit
Sampling rate	250 or 500 Hz/channel	2000 Hz/channel
Interface	USB	USB
Low cut filter (digital)	0.32, 0.5, 1.6, 5 Hz	DC, 0.16, 0.32, 0.5, 1.6, 5 Hz
High cut filter (digital)	15, 30, 50, 70 Hz	15, 30, 50, 70, 150 Hz
Notch filter (digital)	-40 dB at 50 or 60 Hz	-40 dB at 50 or 60 Hz
Photo Stimulator	High intensity LED (red and/or white color)	High intensity LED(red and/or white color)
Flash rate	1Hz to 50Hz in 1Hz step	1Hz to 50Hz in 1Hz step
Digital input	Yes	Yes
Power Supply	3-6 V DC. 4 Batteries AA or rechargeable batteries	90-240V AC 50/60 Hz
Safety	Type BF	Class II, Type BF

Mitsar Co. Ltd. products are CE marked in conformity with Directive 93/42/EEC concerning medical devices and designed, developed and manufactured under DIN EN ISO 13485:2003 and DIN EN ISO 9001:2000 certified quality system.

Mitsar-EEG-201 (202) for recording and analysis of EEG and event-related EEG responces



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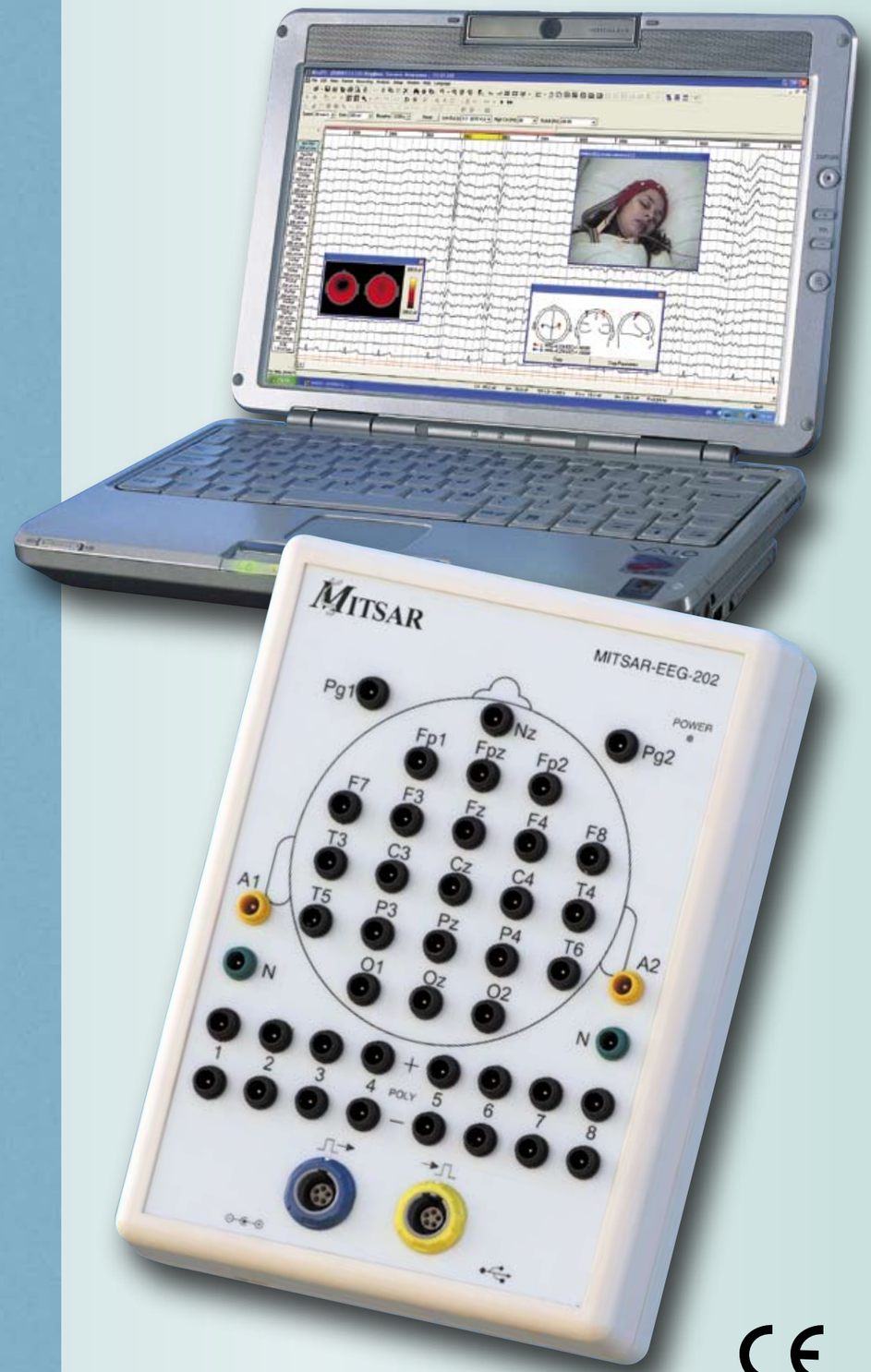
MITSAR-EEG MITSAR-EEG

Systems for QEEG, video EEG monitoring, ERP and neurofeedback.



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DIGITAL ELECTROENCEPHALOGRAPHS «MITSAR-EEG-201» AND «MITSAR-EEG-202»

The devices are intended for the clinical observation of electroencephalogram (EEG), video EEG monitoring and evoked (event related) potentials recording for the diagnostic of brain diseases. The software package for MS Windows XP/VISTA allows to perform an advanced computerized analysis of the EEG on the standard personal computer or Notebook including digital filtering, montage reformatting, spectra and coherence analysis, topographic maps and etc.

WinEEG SOFTWARE FUNCTIONS:

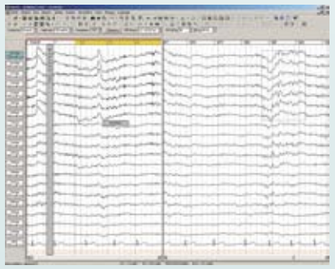
RECORDING
The EEG (up to 32 channels) is stored on the hard disk and available for subsequent analysis. During recording, the signals are continuously displayed on the screen. The software emulates the “moving” paper mode. Display screen uses paper EEG aspect ratio to simplify reading. EEG can be recorded synchronously with visual and acoustic stimuli presentation for ERP/ERD studies. ERPs and ERDs are computed in psychological tasks of various designs. The task design is performed by Psytask or by the conventional presentation software (Presentation, E-Prime). During EEG recording photoflash may be controlled manually or using predefined program. Automatic impedance measurement procedure helps to control a quality of electrodes setting.

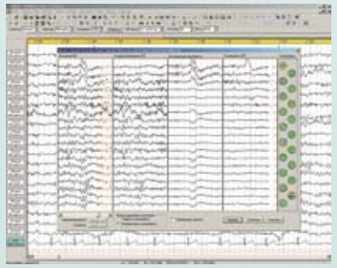
VIDEO EEG
The EEG can be recorded synchronously with video movie from one or two cameras and audio signal from microphone. Together with on-line MPEG4 compression of video signal and on-line MPEG3 compression of audio signal this feature provides long-term video EEG recording. Fast positioning to any selected time moment of video EEG record and playback of all recorded signals provide effective analysis of data.

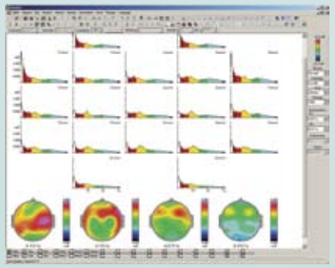
DISPLAY
A flexible review program allows fast display of the EEG on the computer monitor and immediate access to any part of the recording. Ten user definable labels may be used to mark EEG recordings for future quick access to this part.

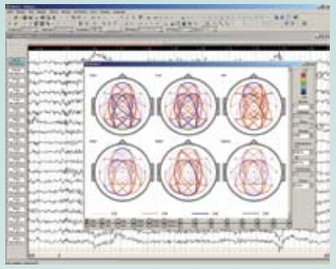
MONTAGES AND FILTERS
Recorded EEG can be displayed in different montages: monopolar, bipolar, average reference, weighted average reference and etc. EEG can be filtered by IIR digital filters to change frequency band of recording and to eliminate environmental noise (50 or 60 Hz). Also EEG can be filtered by high order FIR filters.

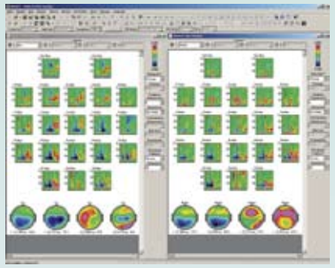
ARTIFACTING
Advanced artifact rejection mode provides easy and fast search and elimination of bad EEG epochs. Artifact correction procedures are based on PCA or ICA decomposition of raw EEG and special filtering helps to increase quality of EEG record.

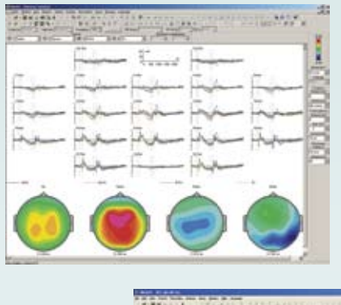


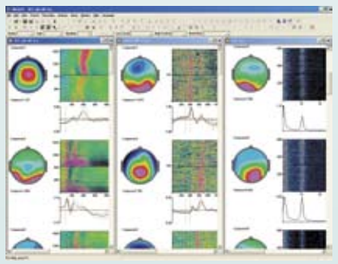


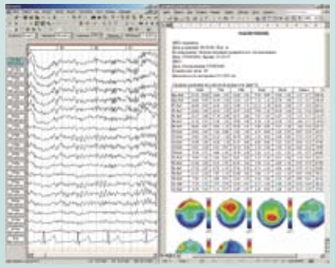












SPECTRAL ANALYSIS AND BRAIN MAPPING
Power spectra and coherence can be computed for any selected part of recorded EEG. Different parameters of spectra computed for predefined frequency band ranges can be displayed as histograms, maps and tables. The spectra data can be exported to other applications (STATISTICA or SPSS) by using ASCII format for a future statistical analysis.

EVENT-RELATED POTENTIALS, EVENT-RELATED DE/SYNCHRONIZATION, WAVELET ANALYSIS
Visual and acoustic stimuli are presented on separate PC during the EEG recording so that event-related potentials (ERPs), event-related wavelet bandpower and coherence as well as parameters of task performance (omission, commission errors, reaction time and its variance, measuring by patient button) are computed off-line. A set of conventional psychological tasks is provided. Latencies, amplitudes and topographic maps of different types of ERPs components (such as P300, mismatch negativity, GO/NOGO…), of desynchronization and synchronization components in different frequency bands can be measured and statistically assessed.

INDEPENDENT COMPONENT ANALYSIS OF EEG AND ERP
The independent component analysis can be applied to both raw EEG and to averaged ERPs. Power spectra of independent component of EEG, evoked potentials of independent component of EEG (single trial analysis) and independent component of grand average ERPs can be displayed and analyzed at separate window.

AUTOMATIC SPIKE DETECTION
High effective algorithm of automated spike detection based on both estimation of amplitude-temporal parameters of waveforms and equivalent dipole source applying to both raw EEG and decomposition of multi channel EEG on components (using PCA or ICA) helps to search for paroxysmal activity in long-term EEG records. Manual correction of results of spike detection algorithm provides a possibility to eliminate artifacts. Averaging of similar spike waveforms increases an accuracy of measurement.

DIPOLE SOURCE LOCALIZATION
Build in equivalent dipole localization algorithm help to identify a brain location of source of paroxysmal activity.

3D MAPPING
3D mapping of equivalent current source density can be displayed by LORETA software to which mapped data is ease transferred.

AVERAGING AND DATA PROCESSING AUTOMATION
The spectra, coherence, ERP, ERD and etc. can be process in automated mode for collection of recording selected by user. The results of processing will be automatically stored to build-in database.
The spectra, coherence, ERP, ERD and etc. can be averaged automatically for collection of recording selected by user.

EXPORTING AND IMPORTING THE DATA
Raw EEG can be exported to files with different formats such as ASCII, Binary, EDF and etc. Raw EEG can be imported from file with next formats EDF, UDF, ASCII, LEXICOR, NeuroScan v.4.2.
EEG spectra, coherence, ERP, ERD and parameters of task performance can be ease exported to ASCII file for collection of recordings selected by user.

BUILD-IN DATABASE
All patient information including EEG waveform and video can be saved to build-in database or written on CD. Build-in database helps to search recording and provide automatically data processing, data averaging and exporting.

HUMAN BRAIN INSTITUTE (HBI) NORMATIVE DATABASE
EEG spectra, coherence and ERP components computed for a given patient can be compared with the Human Brain Institute (HBI) normative data base. The results of comparison are presented as graphics and maps of deviations from normality. The normative data base includes 3 minute fragments of EEG recorded in eye open, eyes closed conditions and in four different tasks (two stimulus GO/NOGO task, Math, Reading and Acoustic tasks).

FINAL REPORT
Final report can be written using MS Word. The corresponding file will be created and opened automatically. Both selected final report template, tables of processing results and different pictures (copies of windows content) can be ease placed in the text of final report.

EEG BIOFEEDBACK
The additional software package (BrainTuner program) is flexible enabling the user to choose standard protocols or to design a biofeedback protocol according to the client’s needs. The biofeedback can be performed in the different modes:
the visual mode: by changing the height of a bar on the computer screen
the audio mode: by changing the loudness of the audio signal played back from a compact disc inserted in the computer
the video mode: by adding noise to the video signal played back on a TV from a VCR/DVD