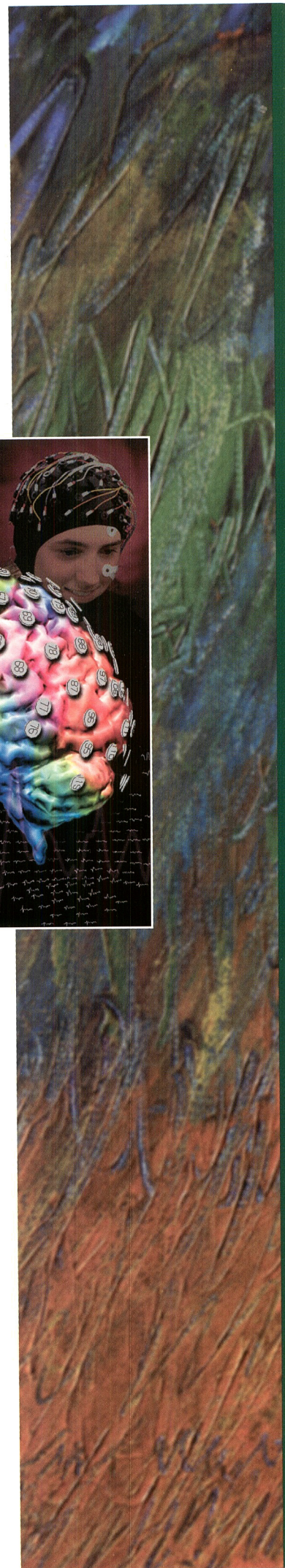
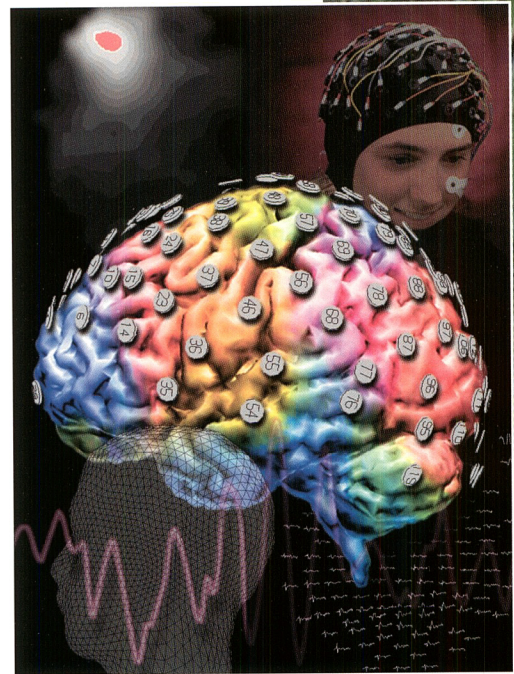


Electric Source Imaging ESI™

128 and 256 Channel
High-Resolution EEG/EP Systems



Electric Source Imaging ESI™

128 and 256 Channel High-Resolution EEG/EP Systems

ESI is a powerful and flexible system for measurement and analysis of high-resolution electroencephalography (EEG), evoked potential (EP) and event-related potential (ERP) signals. The system builds upon the foundation of a number of advanced components designed and built by Neuro Scan Labs specifically for EEG/EP research applications.

ESI includes all of the elements that you will need to measure EEG/ERP, perform advanced analysis of the complete data set, make statistical comparisons between individuals or groups and present the results as annotated signal plots or topographic/tomographic maps in a realistic 3D context. The system is well integrated and complete, minimizing the need for third-party software and "custom" solutions.

ESI Incorporates the Most Advanced Technology:

- True DC measurements for slow potentials
- Sampling rates up to 20 kHz per channel for short latency evoked potentials
- Ultra-low-noise amplifier design
- Integrated impedance measurement and calibration
- Modular configuration permits upgrades
- Integrated acquisition, analysis and source reconstruction software

Data Acquisition and Analysis Software - ESI

ESI incorporates advanced software for EEG/ERP acquisition and analysis (see the SCAN software product literature for a complete description).

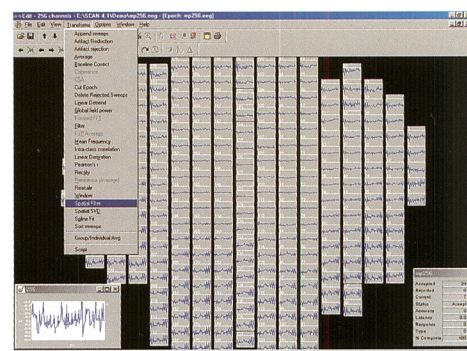
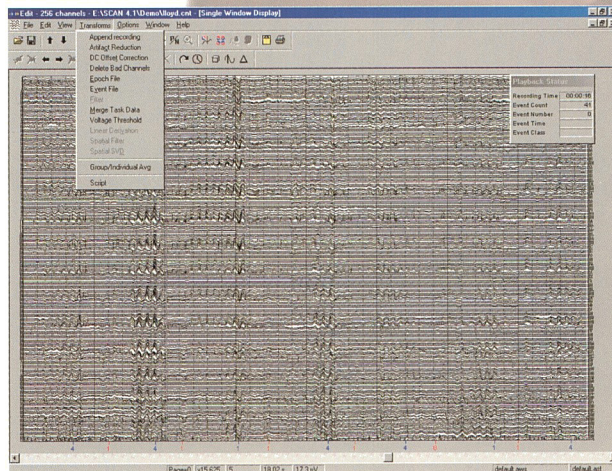
Special Acquisition Features

ESI includes specialized features that simplify the process of recording and analyzing the immense quantities of data that can be generated in a high-resolution recording. ESI's sophisticated acquisition module allows the user to calibrate the acquisition system at the touch of a button and view a topographic display of electrode impedance at each channel. The software also permits on-line display of continuous data from all channels or a subset of channels, raw unaveraged data epochs, multiple average "bins" and FFT histograms.

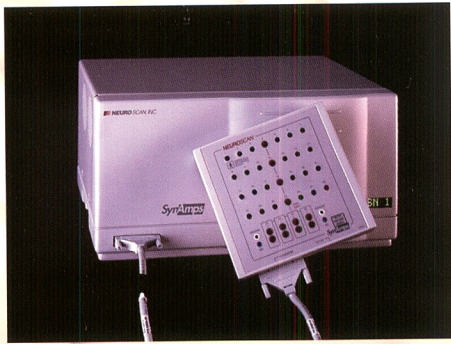
Off-line Analysis

The software includes basic off-line analysis features required for EEG/ERP research, such as artifact removal, zero phase-shift filtering, time and frequency domain signal averaging, and statistical comparisons between individuals and groups. In addition, the software incorporates a host of more advanced off-line analysis features, such as time-frequency analysis, event-related synchronization/desynchronization, event-related coherence of dipole derived time series, spatial principal components analysis, local scalp current density (local Laplacian) and radial current imaging.

All channels, or a selected subset of channels of continuous data can be stored and reviewed before transformations are applied.



ESI provides an intuitive user interface for review and transformation of results.



SYNAMPS provide DC/AC coupling, low-noise amplification and high-speed A/D conversion.

EEG Amplifiers and Data Acquisition Hardware - SYNAMPS™

Each ESI system includes an array of SYNAMPS for EEG amplification and digitization (see the SYNAMPS product literature for a complete description).

SYNAMPS are more than just the highest quality EEG amplifiers; they also make up a sophisticated parallel signal processing system that performs digitization and on-line processing of signals, leaving the host computer free for other operations. SYNAMPS' parallel processing design permits high-speed simultaneous sampling from large electrode arrays, making it possible to measure even the shortest latency potentials. In addition, the system's sophisticated analog and digital circuitry permit the measurement of slow potentials by means of true DC coupling. Finally, SYNAMPS also include built-in calibration and impedance testing circuitry to streamline these routine laboratory procedures.

Source Reconstruction and 3D Imaging - SOURCE™

ESI incorporates advanced tools for electrode localization, 3D surface reconstruction, topographic mapping, and EEG source analysis.

Electrode Localization and 3D Imaging

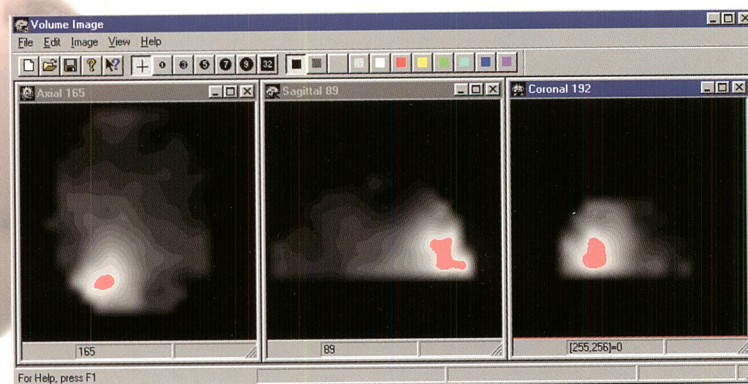
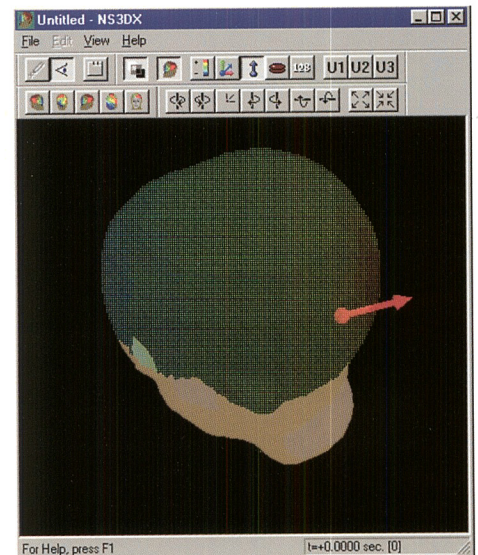
The Fastrak™ digitizer and the 3DSPACE software, both included with the ESI system, permit measurement of electrode locations and digitization of a 3-dimensional wireframe head model for each individual subject. In 3DSPACE, the individualized wireframe model or an idealized model then serves as the foundation for 3D topographic mapping of surface potentials and derived time series such as current density.

Dipole Solutions and Distributed Source Modeling

SOURCE, a software component that is unique to ESI, utilizes the wireframe head model to build an individualized volume conductor model. This software module performs single- or multiple equivalent current dipole modeling via source space scanning, a priori hypothesis testing, or seeding from a list of candidate locations (local combinatorial exhaustive search). It also offers

underdetermined tomographic/distributed solutions and selection of local maxima from tomographic solutions for automatic seeding of overdetermined dipole optimizations.

SOURCE also includes a number of advanced signal-processing algorithms that are useful in improving the performance of source reconstruction algorithms. These include spatial and spatio-temporal signal-to-noise ratio (SNR) transformations, principal component analysis in SNR space and utilization of background EEG covariance statistics for greater stability of solutions. Finally, the software also includes powerful statistical tests of source model adequacy, including the residual orthogonality test and the residual rank test.



SOURCE provides both tomographic 3D solutions and dipole solutions, each utilizing the 3D head-surface and electrode information gathered with the Fastrak digitizer.



Quik-Caps permit rapid, accurate application of 128 or 256 channel electrode arrays.

System Configuration

ESI-128 can be provided as a complete system, including the SCAN software, SYNAMPS EEG amplifiers, Fastrak 3D digitizer, Quik-Cap electrode caps, computer hardware and medical-grade carts, or it can be provided with only those components you need to purchase from us. If you plan to purchase your own computer, check our Minimum Computer Requirements guide before consulting your computer vendor and review your vendor's proposal with Neuro Scan Labs' sales department before proceeding. ESI-256 is available only as a complete system. The STIM™ system for cognitive and sensory stimulation and the CURRY Multimodal Neuroimaging software are sold separately.

ESI System Components

- Software CD
- User manuals
- Software key with 256 channel license
- SYNAMPS EEG amplifiers (4 ea. for ESI-128 or 8 ea. for ESI-256)
- Host computer *
- High-resolution monitor for data display *
- High-resolution monitor for impedance testing in subject chamber *
- Monitor splitter, switchbox and cabling *
- High-resolution color inkjet printer *
- Computer and monitor cart
- SYNAMPS cart (1 ea. for ESI-128 or 2 ea. for ESI-256)
- Fastrak 3D digitizer and accessories

Optional Components

- ESI Reader software license for remote review and analysis of data
- Quik-Cap electrode caps
- Quik-Cap accessory kit
- STIM visual/auditory stimulus delivery system for EP/ERP

* Specifications subject to change; contact Neuro Scan Sales for current information.

NEURO SCAN LABS
A division of Neurosoft, Inc.

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