



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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Computerized DAS for Somato Sensory Evoked Potential (SSEP) :

Hardware specifications

- High speed USB (2.0) based 8 channel universal data recording system to primarily record bio potential signals like ECG, EEG, EMG etc. It should also be capable of recording various other physiological signals after upgradation.
- Should have facility to upgrade up to 32 channels
- High sampling rate of 400 KHz aggregate or more
- High ADC resolution of 16 bits or more and input voltage range of at least ± 20 mV to ± 10 V
- Should have built-in analog output amplifier with 16 bits resolution for software controlled stimulation or pulse generation
- System should have at least 8 channels Digital input and output for external device interface
- System should be supplied with 4 channel universal bio amplifier with input range of ± 100 μ V to ± 100 mV, input impedance of >1 G Ω and noise <1.5 μ V
- Bio amplifier should have wide range of filters as follows.
 - Low pass filter: software selectable 50, 100, 200, 500, 1000, 2000, 5000, 10000 Hz, Off
 - High pass filter: software selectable DC, 0.0003, 0.001, 0.003, 0.01, 0.03, 0.1, 0.3, 1, 3, 10, 30, 100, 200, 300 Hz
 - Mains filter: 50Hz
- Should have software controlled filters, trigger, gain and sampling rate
- Should have CMRR of minimum >100 dB at 100 Hz
- Should be supplied with following accessories for SSEP recording
 - Tendon Hammer – Should be able to provide triggering, timer or marker signals. The output signal should be proportional to the force of the strike. The hammer should be able to be used for mechanical triggering in human somatosensory studies to stimulate muscle spindles which elicit muscle contractions. Sensor type: Piezo-electric & Output voltage: 0 to 10 V
 - EEG Electro Cap System – Should include 1 medium & 1 large cap with suitable Body Harness, Ear Electrode, Disposable Sponge disks, Electro gel and other necessary accessories.
 - Electrode impedance tester to check the integrity of the electrode placement
 - EEG Flat Electrodes - Gold plated, hat-shaped, disk recording electrodes
- Should have the facility to integrate with multiple amplifiers for recording various physiological signals for Biomedical applications
- Should be compact and light weight and highly reliable system for research applications with citations in highly indexed journals
- Analog input channels should be suitable to interface with wide range of transducers including powered transducers
- System should be suitable to record the signals from both human and animals

Software specifications

- User friendly software for recording, analyzing and printing the data, the software should allow calibration of transducers, display of actual values, controllable gain, filter settings, baseline, settings for event marking and annotation
- Software should be capable of measuring time interval between user selected points, display of data value at user selected point, editing of the records and re-annotation
- Software should have averaging feature to overlay / average multiple waveforms
- Software should have real time FFT / Spectrum analysis
- It should display data in scope mode and chart mode. It should allow calculation of rate, period, frequency, min, max, count, integral, derivative, height etc. from raw channels in offline as well as online mode
- Software should allow the export of raw data in .txt, .mat, .wav, .abf, .pxp, binary and .edf formats
- Should have an option to integrate video camera for subject monitoring during the recording
- Software should allow OLE linking of data to MS Excel
- System should allow Macro programming for custom functionalities
- Software should support real time streaming of raw data to MATLAB
- Software should have option to share the recorded data with distant users for collaboration
- System should have possibility to upgrade to meet GLP standards
- Software should have 5 years of free updates and upgrades

Quality, Safety and Documentations

- System should have CE / FDA and IEC certificates
- Power supply should be medical grade
- Should be certified safe for human connections
- Should comply with environmental safety standards such as RoHS

Installation, Training, and Support

- Installation should be done free of charge
- Necessary training should be provided during the installation
- Company should have direct offices in India for sales and after sale support
- Company should be able to provide telephonic/online support whenever required
- Details of the Office and concerned personnel should be provided for immediate contact

Accessories required

Name	Quantity
Tendon Hammer	1
EEG flat electrodes (185 cm)	1 set
Electrode Paste (3 pack)	1
Checktrode with Lead selector	1
EEG electro-cap (large & medium cap)	1