

# MiniSim EEG 2000

## User Manual



▶ **Compact**

▶ **Lightweight**

▶ **Easy to Use**

## EEG Waveform Simulator

(Simulation Instrument)



**NETECH**

Innovative Instruments Since 1987

# Table of Contents

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<b>Notices .....</b>	<b>3</b>
<i>Quality Assurance/Trademark .....</i>	3
<i>Unpacking and Inspection of the Unit .....</i>	3
<i>Refunds/Restocking/Repairs .....</i>	4
<i>General Contact Information .....</i>	5
<i>Warnings .....</i>	5
<b>Introduction.....</b>	<b>6</b>
<i>Description.....</i>	6
<i>MiniSim EEG 2000 Features.....</i>	6
<b>Preparation for Use .....</b>	<b>7</b>
<b>Specification.....</b>	<b>7</b>
<i>ECG Rate .....</i>	8
<i>Amplitude .....</i>	8
<i>General Specifications.....</i>	8
<b>Instrument Familiarization .....</b>	<b>9</b>
<b>Getting Started .....</b>	<b>10</b>
<i>Main Menu .....</i>	11
<i>ECG Menu .....</i>	12
<i>Performance Menu .....</i>	13
<i>Electrode Placement .....</i>	14
<i>EEG Output Connectors .....</i>	15
<b>EEG Simulation/Setup.....</b>	<b>16</b>
<b>ECG Simulation/Setup .....</b>	<b>16</b>
<b>Performance Wave Simulation.....</b>	<b>17</b>
<b>Warranty.....</b>	<b>18</b>

# Notices

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## Copyright

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## Quality Assurance

Netech is ISO 9001-2015 Registered. This instrument was thoroughly tested and inspected according to Netech's ISO 9001-2015 quality system and test procedures and found to meet those specifications when it was shipped from the factory. Calibration measurement Instruments are traceable to the NIST (National Institute of Standards and Technology).

## Trade Mark

Netech and EEG 2000 are trademarks of Netech Corporation. Any other trademark names used in this manual are only for editorial purposes and the benefit of the respective trademark owner with no intention of improperly using that trademark

## Unpacking and Inspection of the Unit

Before unpacking the MiniSim EEG 2000, inspect the shipping box for any visual damage. If damage is found, do not unpack the unit and immediately notify the shipping carrier. If no damage is found to the shipping box, open the box and perform a visual inspection of the MiniSim EEG 2000. If any damage to the unit is observed please contact Netech Customer Service.

## **Technical Support**

For technical support questions, either email

Techsupport@NetechBiomedical.com or Call 1-800-547-6557

or (1-631-531-0100)

## **Refunds and Credits**

A Return Material Authorization (RMA) number must be obtained from our service or customer service dept, before a product is returned for refund or credit. The RMA number should be clearly marked on the package along with a statement indicating the reason for return.

## **Restocking Charges**

Products returned within 30 days after purchase are subject to a restocking charge of 15%. Products must be shipped prepaid in original shipping cartons with all accessories and parts. Additional charges will be applied for any missing parts or accessories.

## **Repair and Recalibration**

Products returned for repair or recalibration must obtain a RMA (Return Material Authorization) from our service department after completing a service request form our website <https://www.NetechBiomedical.com/repair> or contact Netech Customer Service

Department at [CustomerService@NetechBiomedical.com](mailto:CustomerService@NetechBiomedical.com)

## **Calibration**

The MiniSim EEG 2000 is factory calibrated, thoroughly tested, and meets Netech's ISO 9001-2015 quality standards.

Any attempt to remove or tamper with the calibration seal will void the warranty.

## General Contact Information

Netech Corporation, 110 Toledo St, Farmingdale, NY 11735.

Phone: 631-531-0100, (or) 1-800-547-6557

Website: [www.NetechBiomedical.com](http://www.NetechBiomedical.com)

Email: [sales@NetechBiomedical.com](mailto:sales@NetechBiomedical.com)

## Warnings

SYMBOL	DESCRIPTION
	Caution: Important Safety Information
	Hazardous Voltage
	Conforms to European Union Directive

# Introduction

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## Description

MiniSim EEG 2000 is a versatile EEG waveform simulation instrument. It is designed exclusively for testing various EEG monitoring devices including recorders, Sleep Study Monitors, and multi-channel EEG monitoring systems.

This compact, microcontroller-based instrument simulates six different types of EEG waveforms, such as Alpha, Theta, Gamma, Delta, and ABR.

In addition to the EEG waveforms, it simulates ECG waveforms as well as performance waveforms such as Sine, Square and Triangle.

MiniSim EEG 2000 provides 16 independent outputs.

## MiniSim EEG 2000 Features

- Simple to use, utilizing dedicated function keys and menu-driven interface.
- Compact, lightweight and battery operated.
- Ideal for performance testing of all EEG instrumentation
- User selectable waveforms
- User-selectable amplitude from 10  $\mu$ V to 1mV.
- Patented EEG cup electrodes for easy hookup of cup electrodes.
- 16 channel independent EEG output.
- Performance waves -SINE, SQUARE, TRIANGLE
- User selectable amplitudes.
- 3 lead ECG output
- Battery operated (7.4 Volt LI Ion rechargeable battery).

## Preparation for Use

The MiniSim EEG 2000 is shipped with the following items included in the customized hard case:

- MiniSim EEG 2000
- Li-Ion Rechargeable Battery Charger (110/220 V input)
- User Manual

## Specification

### EEG Waveforms:

ABR: Alpha Beta Rhythm - 1Khz-4Khz (Frequency Band Width)

Alpha: - 3-13Hz (Frequency Band Width)

Theta - 4-8Hz (Frequency Band Width)

Delta - 1-4 Hz (Frequency Band Width)

Gamma - 30-200 Hz (Frequency Band Width)

### Amplitude:

User selectable amplitudes from 10  $\mu$ V to 1mV (Peak to Peak).

### Performance Waveforms:

Sine, Square, Triangle:

Rate: 1, 2, 3, 4, 5, 6, 7, 8, 10, 20, 40, 60 Hz.

Amplitude: 10, 20, 30, 40, 50, 100, 200, 400, 500, 1000  $\mu$ V (micro volt).

### Output Amplitude Calibration:

- All outputs waveforms are calibrated with 1000  $\mu$ V Square wave (full scale).
- Amplitude accuracy:  $\pm 5\%$  (Square Wave -All channels)

### ECG Rate

Rate: User selectable: 30, 60, 90, 120 BPM

### Amplitude

User selectable 0.1, 0.25, 0.50, 0.75, 1.0, 1.5, 2.0, and 2.5 mV.

## General Specifications:

### Temperature Range:

Operating: +15°C to +35°C.

Storage: 0°C to +50°C.

### Display:

Type: 128 x 64 graphics display with LED backlighting.

### Power:

7.4 Volt Li-Ion Battery. 100-230 VAC input 8.5V Battery Charger.

**Housing:** High impact ABS plastic case.

**Dimensions:** 7.75 x 4 x 1.5 in. (19.7 x 10.2 x 3.8 cm)

**Weight:** 0.45 kg / 1 lbs. with Battery.

## Part Numbers and Ordering Information

**Part Number:**      **333:** MiniSim EEG 2000

### Standard Accessories (Included with the unit):

**960-USB:** User Manual MiniSim EEG 2000

**950-CASE:** Hard Carrying Case

**660-HHS-002:** Li-ion Battery Charger (7.4V)

### Optional Accessories:

**333-EEG-CABLE:** 16 Cup Electrode Cables

**333-ECG-CABLE:** 3 Lead ECG Cable with  
Snap Button

# Instrument Familiarization

Before getting started, it is important to get familiar with the control and operation of the unit.

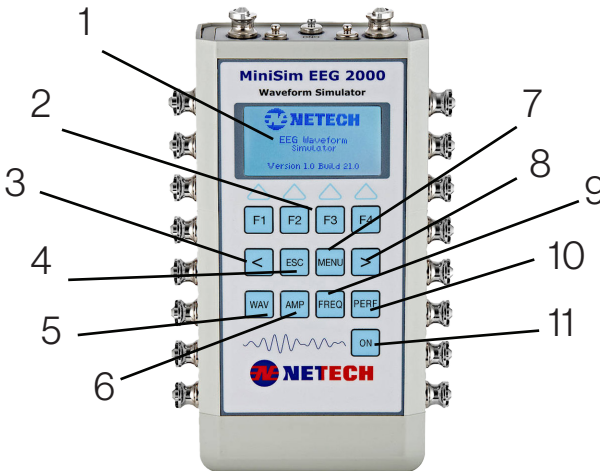


Figure 1. EEG Simulator Controls

Number	Description
1	Graphics LCD Window
2	Function Keys, F1, F2, F3, F4
3	Arrow Key < (Left)
4	ESC Key
5	WAV - EEG Waveform Selection
6	AMP - Amplitude Selection
7	Menu Key
8	Arrow Key > (Right)
9	FREQ -Frequency Selection (Performance Waveforms)
10	PERF-Performance Waveforms (Sine, Square, Triangle)
11	On/Off Key

## Display

The MiniSim EEG 2000 incorporates a high contrast 128 X 64 LCD with LED backlighting for easy viewing.

## Key Pads

The keypad utilizes soft-touch tactile keys. The dedicated key functions and interactive menu make it easier to use.

The following are the description of the key functions and their menu abbreviations:

**WAV**- Waveform Selection Key.

**AMP** – Amplitude Selection key.

**FREQ** – Frequency Selection key.

**PERF** – Performance wave (Sine, Square, Triangle) selection key.

**F1, F2, F3, F4**, <, and >. These keys are interactively associated with the respective function selections.

Menu Abbreviations:

[**ABR**] = ABR, [**Alfa**] = Alpha, [**Beta**] = Beta, [**DLTA**], [**Gamma**] = Gamma, [**Thet**] = Theta, **CONF**

**CONF**: Exclusively for factory calibration settings.

## Getting Started

Prior to the initial operation, make sure to charge the built-in Li-ion battery by plugging in the Charger to the battery input Jack. The battery charging status is indicated by the yellow LED next to the input jack. It takes 3-4 hours to fully charge the battery. When the battery is fully charged the Red LED on the Charger will turn Green.

The Waveform Simulator can be turned ON by momentarily pressing the “ON” key. Pressing and holding the ON key for a few moments will turn the unit OFF.

When the unit is first powered, the screen momentarily shows the software version and the build number. It will then will display the Main Menu as shown below.

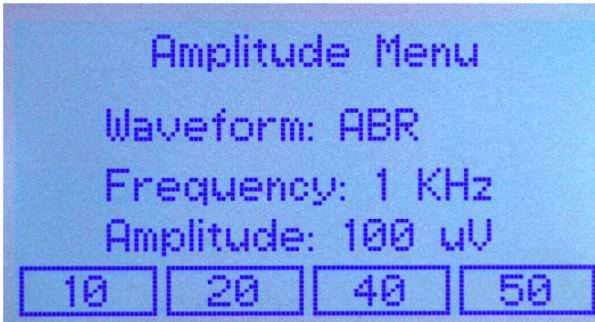


## Main Menu

The default waveform Amplitude and the frequency of the waveform. (Please note that the frequency of the waveform is fixed for each waveform).

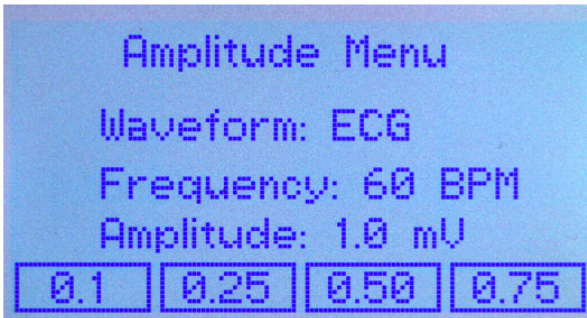


The desired amplitude can be selected by pressing the “AMP” key and using the F1, F2, F3, F4 keys. Use the <, > keys for more amplitudes.



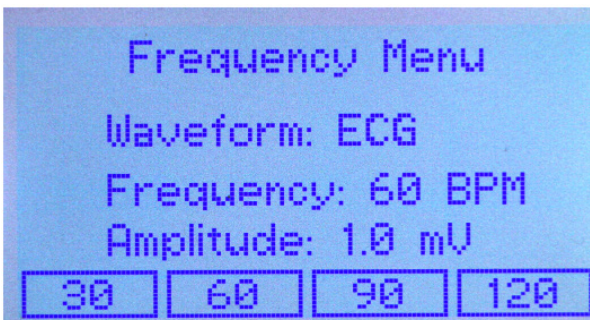
## ECG Menu

The ECG waveform can be selected from the Main Menu. Use > key and F3 key. The default ECG rate and amplitude will be displayed as below.

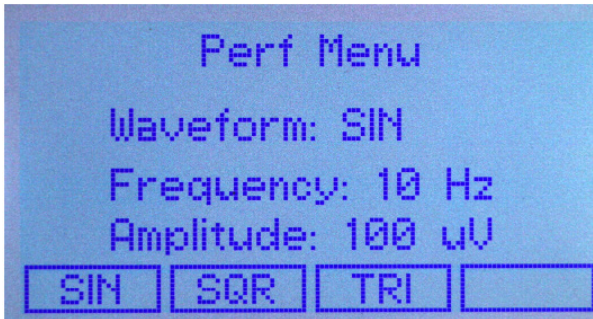


To change the Amplitude, press "AMP" key and any of the F1, F2, F3, F4 Keys for the desired amplitude.

To change the BPM (Rate), use the "Frequency" key and any of the F1, F2, F3, F4 and <, > keys for the desired BPM rate.



## Performance Menu



Select any of the desired waveform using the F1, F2, F3 keys.

The default amplitude is 500 micro-Volt. To Change the amplitude press "AMP" key and using the F1, F2, F3, F4 keys.

Please Note:

*The new amplitude selection is saved into the memory and will show in the next powerup.*

Press "ESC" to go back to the previous menu.

The default frequency is 10 Hz. To Change the frequency, press "FREQ" key and using the F1, F2, F3, F4 keys.

Please Note:

*The new frequency selection is saved into the memory and will show in the next powerup.*

Press "ESC" to go back to the previous menu.

# Electrode Placement

The following is a general representation of the electrode placement. A1 and A2 are marked REF on the unit.

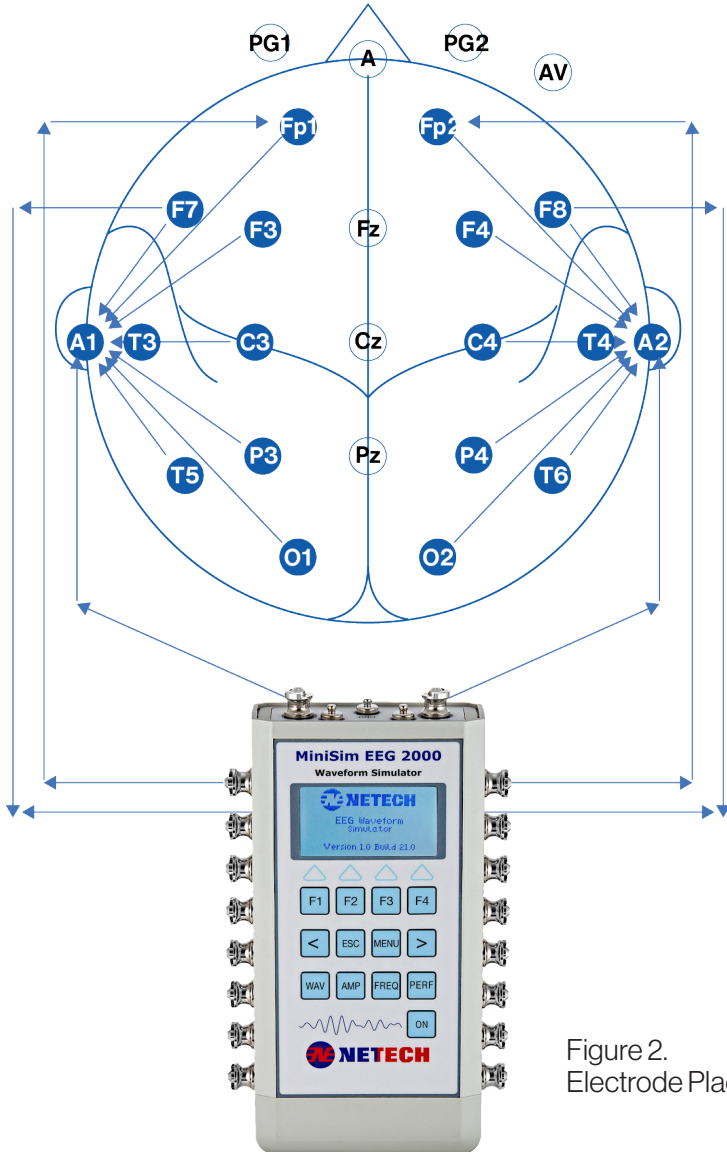


Figure 2. Electrode Placement

## **EEG Output Connectors:**

16 universal patient lead connectors labeled according to general EEG electrode placement left side and right side as shown on the diagram in Figure 2.

## **ECG Output Connectors:**

ECG output connectors are marked on the side panel next to the ECG leads.

## **Power On/Off Switch**

The power On/Off switch is located on the face of the unit. The switch powers the unit on/off.

## **Battery Charger Input Connector**

DC jack (2.1mm) - Li Ion battery charger Input connection.

### Battery Charging

When the unit is powered, it checks the battery condition and if it detects a low battery condition a warning message will appear on the display.

To continue operation, connect the charger supplied with the unit to the charger input. The amber light indicated that charging is on. When the battery is fully charged, the red LED on the charger will turn green.

# EEG Simulation

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The MiniSim EEG 2000 simulates EEG, and performance waveforms. The amplitude and rate of these waveforms are user-selectable from the menu as described elsewhere.

## Setup

1. Connect the EEG cup electrodes to the EEG snap studs by pulling the color and insert the cup electrode.
2. Select the desired waveform using WAV.
3. Select the desired rate or amplitude using AMP or FREQ.
4. Use > < keys to scroll for additional selection.
5. The selected waveform, rate, and amplitude is displayed and the waveform can be observed on the EEG monitor.
6. The selected waveform and the rates and Amplitudes are saved and displayed until it is changed.
7. Use the “ESC” key to back out of the menu.

# ECG Simulation

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The MiniSim EEG 2000 simulates ECG. The amplitude and rate of these waveforms are user-selectable from the menu.

Select the ECG simulator function from the main menu. Use “>” arrow keys and “F3” to select “ECG “.

## Setup

1. Connect the ECG leads to the top panels’ ECG+, ECG- and ground.

2. Select the desired rate or amplitude using AMP or FREQ (BPM).
4. Use > < keys to scroll for additional selection.
5. The selected waveform, rate, and amplitude is displayed and the waveform can be observed on the ECG monitor.
6. The selected rates and Amplitudes are saved as defaults on next powerup.
7. Use the “ESC” key to back out of the menu

## **Performance Wave Simulation**

In addition to EEG and ECG simulation, MiniSim EEG 2000 simulates Sine, Square and Triangle. The selected waveforms will be output to all 16 channels.

These waveforms help the user for checking the frequency response of the EEG systems. Performance waveform frequencies are user selectable from 10 HZ to 1 KHz. The user selectable amplitudes are from 10 uV (micro-Volt) to 1 mV.

### **Setup**

1. Connect the ECG leads to the top panels' ECG+, ECG- and ground.
2. Select the desired rate or amplitude using AMP or FREQ (BPM).
4. Use > < keys to scroll for additional selection.
5. The selected waveform, rate, and amplitude is Displayed and the waveform can be observed on the ECG monitor.
6. The selected rates and Amplitudes are saved as defaults on next powerup.
7. Use the “ESC” key to back out of the menu.

# Warranty

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*Netech warrants this instrument to the original purchaser, as purchased from a Netech distributor or dealer, will conform to the written specification as of the date of its manufacture, for two years from the date of purchase. The second-year warranty is contingent upon returning the unit to the factory for the annual recalibration at the end of the first year warranty. Netech warrants this instrument against defects in materials and workmanship. If the instrument fails to conform to these warranties, Netech will repair or replace the unit and/or its components within a reasonable period; if the MINISIM EEG 2000 is returned, shipping prepaid, to Netech's facility at Farmingdale, NY, USA within the warranty period as expressed above.*

*These warranties are made upon the expressed condition that:*

- 1. The purchaser promptly notifies Netech in writing of any nonconformity with the above warranty including a detailed explanation of the alleged deficiencies.*
- 2. The MiniSim EEG 2000 is returned to Netech at the buyer's expenses only after obtaining the proper RMA authorization from Netech.*
- 3. Netech will not be liable for any incidental or consequential damages.*
- 4. In the opinion of Netech upon inspection, the MiniSim EEG 2000 has not been misused, altered, or damaged due to the abnormal handling and/or operation.*
- 5. Repairs to the MiniSim EEG 2000 and/or its components have not been made by anyone other than Netech or one of its authorized repair agents.*
- 6. The MiniSim EEG 2000 has not been modified, altered, or changed in any manner by anyone other than Netech or one of its authorized repair agents.*
- 7. All shipping and handling charges will be billed to the purchaser.*

*THIS WARRANTY EXCLUDES ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, ORAL OR WRITTEN, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. NETECH IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES FROM ANY MISUSE OF THE INSTRUMENT.*

*To receive free software and firmware updates, please fill out and send the warranty registration card or fill out online warranty registration: - <http://www.NetechBiomedical.com/warranties>*

## **Appendix: A**

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*Current Revision: R4 04/18/25*

*Pages revised from the previous Revision (R3).*



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