High-Definition EEG

A DC-coupled, digital amplifier system with a high input range and 24-bit resolution providing amplification and digitization of electroencephalographic physiologic signals from surface, cortical and depth electrodes. The amplifier provides 40 channels (32 isolated high-frequency referential channels, 8 bipolar channels), an integrated pulse-oximeter and event button input. The unit has a POE 100BASE-TX network connection for both power and communication.
Technical specifications

**ISOLATION SPECIFICATIONS**
Complies with IEC 60601-1 CF patient Inputs

**ANALOGUE TO DIGITAL CONVERTER**
24 bit resolution

**SAMPLE AND DATA RATES CHANNELS 1 TO 40**
Data sampled at 16384 samples per second and decimated to data rates shown below. Actual data rate sent is determined by controlling PC software application.

| Output data rate | 4096, 2048, 1024, 512 or 256 samples per second |

**COMMUNICATION INTERFACE**
Network Type: 802.3/802.3u twisted pair Ethernet with auto MDIX; RJ45 connector.

**OXIMETER**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPO2 range</td>
<td>25 to 100%</td>
</tr>
<tr>
<td>Heart rate range</td>
<td>18 to 300 pulses per minute</td>
</tr>
<tr>
<td>SPO2 accuracy</td>
<td>70 – 100% ±2.5 digits within 1 standard deviation</td>
</tr>
<tr>
<td>Heart rate accuracy</td>
<td>±1% ±1 digit</td>
</tr>
</tbody>
</table>

**Sample rate (SPO2, HR, status)**
1 sample per second, up sampled to match the other channels

**Sample rate (plethysmograph)**
256 samples per second, up sampled to match the other channels

**EVENT BUTTON CHANNEL x 1**

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**INPUTS**
32, DC-coupled, fully isolated, referential (monopolar);
8 user-defined, DC-coupled, fully isolated, bipolar inputs

**INPUT IMPEDANCE**
>100 MΩ 1-32;
>20 MΩ 33-40

**BIAS CURRENT**
Typically 1nA

**INPUT NOISE**
< 2 μVpp typical (referential ch)

**INPUT RANGE**
300mVpp, 600mVpp, 1200mVpp, 3000mVpp user selectable

**CMRR**
>100dB

**CROSSTALK**
< -60dB to adjacent channels FSR

**HIGH PASS FILTER**
DC coupled on all channels

**LOW PASS FILTER** (3dB):
71 Hz at 256 s/s
143 Hz at 512 s/s
284 Hz at 1024 s/s
580 Hz at 2048 s/s
1150 Hz at 4096 s/s

**NOTCH FILTER**
Software based display filtering of 50Hz, 60Hz, or off

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**DIMENSIONS**

<table>
<thead>
<tr>
<th>Grael EEG System Component</th>
<th>Size L x W x H</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplifier</td>
<td>240mm x 144mm x 50mm</td>
<td>700 grams</td>
</tr>
<tr>
<td></td>
<td>9.45in x 5.66in x 1.97in</td>
<td>24.7 ounces</td>
</tr>
<tr>
<td>Jackbox</td>
<td>200mm x 83.1mm x 49mm</td>
<td>250 grams</td>
</tr>
<tr>
<td></td>
<td>7.87in x 3.27in x 1.92in</td>
<td>8.81 ounces</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL REQUIREMENTS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Ambient operating temperature range: 0°C - 40°C (32°F - 104°F)</td>
</tr>
<tr>
<td></td>
<td>Storage temperature range: -10°C - 50°C (-4°F - 122°F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>20% - 90%-relative humidity (non-condensing)</td>
</tr>
<tr>
<td>Altitude</td>
<td>Less than 3,000m</td>
</tr>
</tbody>
</table>

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>All power provided by the network connection using Power Over Ethernet (either mid-span injector or POE Switch, per IEEE 802.3af standard)</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>48 volts</td>
</tr>
<tr>
<td>Power consumption</td>
<td>&lt;10 watts</td>
</tr>
</tbody>
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