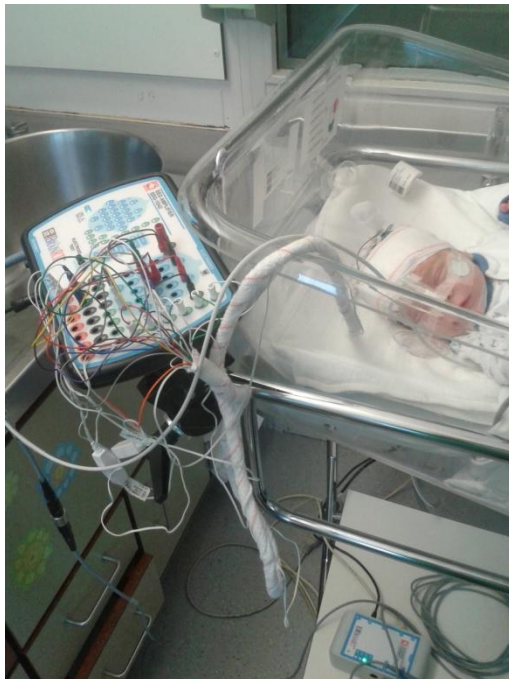


SleepRT fixed PSG system Braintronics: Technical Specifications

SleepRT EEG-1042 Ethernet system



EEG-1042 amplifier Braintronics



Figure 1: EEG-1042 amplifier

Channel configuration: AASM compatible

- 32 EXG channels per amplifier
- 8 DC channels per amplifier
- SpO2 input for NONIN X-POD pulse-oximetry
- EVENT input

Possibility to extend number of recording signals (64 additional channels)

It is possible to add an additional amplifier of 64 channels to the 44 recording channels. These channels will be synchronized with the signals of the 44 channel amplifier. Please contact OSG for more information.

Features

- Real input calibration.
- Electrode Impedance check.
- LED indication of Impedance check.
- Multipin connector for convenient connection of Electrode Caps.
- Integrated Isolator to separate the patient applied part from the mains connected pc.

Ground reference method

The BRAINBOX® EEG-1042 has two Ground Reference Systems.

- **Normal Ground Reference, input marked "R":**
This is the most widely used ground reference connection. It is hard wired to the ground connection of the amplifiers.
- **Active G1/G2 Ground Reference:**
In situations where there is a large common mode mains interference signal, especially in difficult situations, this active G1/G2 Ground reference can be used.

Dimensions

20 x 15 x 3 cm.

Weight

550 grams

Safety classification

EN60601-1 Class II, CF applied part.
MDD 93/42/EEC Class 2A.

Power requirements

Voltages of +24V DC \pm 10% and GND.
Total Current approx. 100 mA.

EMI Protection

- Electrostatic Discharge : All inputs and outputs are protected against:
 - Direct Discharge of 6 kV, according to EN 61000-4-2, level 2.
 - Air Discharge of 8 kV, according to EN 61000-4-2, level 4.
- EMC radiation shielding : 6 layer PCB with ground plane and chokes.

- EMC filtering of EEG inputs : All EEG inputs are filtered with a LC filter.

Full scale input range

- Max input signal EEG amps: 10 mV pk/pk for undistorted output.
- Max. input signal DC Amps : 2.5 V pk/pk for undistorted output.

Analog to Digital conversion

- Range referential channels 10 mV pp
- Resolution 16-bits
- Acquisition rates 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024 samples/s/channel (software selectable)
- Sensitivity EEG amps 11.73 mV for full scale of 16 bits, resulting in 65536 levels. One LSB step corresponds to approx. 0.17895 μ V. Accuracy max. 3% error.
- Sensitivity DC amps 2.5 V Pk/Pk for full scale of 16 bits, resulting in 65536 levels. One LSB step corresponds to approx. 38.147 μ V. Accuracy max 10% error
- Max. DC offset of electrodes : + or -300 mV DC. At 300 mV DC, max. undistorted input is 8.4 mV pk/pk. The SleepRT software runs a calibration cycle to correct the total sensitivity error.

Input impedance

Input Impedance EEG channels : 10 M Ω \pm 1 %

Input Impedance DC Amps : 1 M Ω \pm 10 %

Impedance check

- Impedance check of electrodes on PC screen.
- Impedance check of electrodes on integrated LED's
- Impedance check signal :
 - Sine wave of approx. 128 Hz.
 - With a measuring current < 4 μ A pk/pk.
 - Duty cycle per electrode is 1/64

Noise (referred to input)

EEG channels: Less than 1 μ V rms. at a bandwidth of 1 - 70 Hz.

CMRR

- With "GND" reference : >120 dB.
- With "G1/G2" reference : >140 dB.

Filters

- **High pass filter EEG Amps** : Fixed time constant of 1 second. (min.0.78 sec./max. 1.2 sec.)
- **Low pass filter EEG Amps** : 1500 Hz. \pm 15% (-3dB). The filter is 2nd order (-12dB/octave).
- **Low pass filter DC Amps** : 70 Hz. \pm 15% (-3dB). The filter is 1st order (-6dB/octave).

Electromagnetic compatibility

- Applicable standards : EN 60601-1-2, EN 55011, EN 61000-4-2, EN 61000-4-3

- Radiated emission : Below limits for Class B, group I equipment. Tests are carried out in accordance with standard EN 55011.
- ESD Immunity : BRAINBOX® ETHERNET SYSTEM meets performance criterion B of EN 61000-4-2.
- Air discharge : Max amplitude ± 8 kV.
- Equipment output is not influenced during discharge.
- No degradation of performance after discharge.
- Contact discharge : Max amplitude ± 6 kV.
- Equipment output is influenced during discharge tests.
- No degradation of performance after discharge tests.
- Immunity against RFE fields : BRAINBOX® ETHERNET SYSTEM meets performance criterion A at the following test levels:
 - 1.5 Vrms in the range of 150 KHz to 80 MHz;
 - 2.5 V/m in the range of 80 MHz – 2.5 GHz.

Tests are carried out in an anechoic room, in accordance with EN 61000-4-3

Environment

- Operating temperature range : Lower limit +5°C. Upper limit +40°C.
- Storage temperature range : Lower limit -10°C. (*Allow for sufficient warm up time after cold storage before unit is switched on !*) Upper limit +50°C.
- Humidity range : max. 80 % non-condensing.
- Atmospheric pressure range : 700 – 1060 hPa.

Cleaning of the box

The box can be cleaned with a moist cloth.

Ethernet Interface

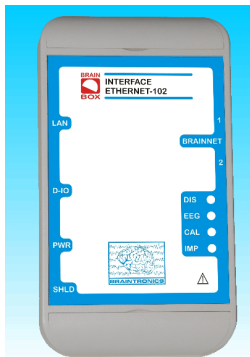


Figure 2: Ethernet Interface V-102

Ethernet Interface V-102 performs communication between EEG-amplifier and computer. Fixed IP address.

Specifications

- 10/100 Mbit capability.
- Simple interfacing by using the proprietary Brainbox® Protocol over the standard ETHERNET TCP/IP protocol.
- Simultaneous sampling of all channels even when multiple amplifiers are used and divided over two Brainnet connections.

- Selectable 50 Hz or 60 Hz Notch filter for mains interference suppression.
- LED indications for operating mode of system
- Extra general purpose Digital in- and outputs on the non floating side of the ETHERNET-102.
 - Digital I/O: Connector type: DVI-D Digital. Protocol: Digital "1" (HI) or "0" (LO).
- RS-232 Serial I/O interface: Interface protocol: RS-232
 - Includes possibility to directly attach Philips IntelliVue serial output port to the RS-232 with special cable
- 4 DC channels
 - A/D resolution: 16 bits
 - 2.5 V input range pp
- FIFO buffer.
- 2 BRAINNET connections for amplifier and photic stimulator
- Connection cable: UTP kabel with RJ45 connector

Default IP address

10.0.0.160

Safety requirements

- **Classification of equipment** : EN60601-1 Class II, CF applied part. MDD 93/42/EEC Class 2A.
- **Creeping distance** : More than 8 mm. between floating parts and interface output (according to EN60601-1).
- **Air clearance** : More than 5 mm. between floating parts and interface output (according to EN60601-1).

Dimensions

15.7 x 8.7 x 5 cm

Weight

370 grams

EMI Protection

- **Electrostatic Discharge** : All inputs and outputs are protected for:
 - Direct Discharge of 6 kV, according to EN 61000-4-2, level 2.
 - Air Discharge of 8 kV, according to EN 61000-4-2, level 4.
- **EMC radiation shielding** : The inner box is metal shielded where needed.
- **EMC conducted radiation** : Blocked with chokes in power and signal lines.

Functional Gnd to suppress capacitively coupled mains disturbances

Connection : 4 mm safety connector on ETHERNET-102.

This connection is on the non-floating side of the system and must not come into direct contact with the patient.

Standard for PSG system (optional)



Figure 3: Headbox standard

Headbox or flash clamp for PSG system (optional)



Figure 4: Superclamp