



# Net Amps 400 series amplifiers

the heart of the Geodesic EEG System 400 series products



The Net Amps 400 series of amplifiers power the new Geodesic EEG System (GES) 400 series products. Engineered with a vision for the future, the Net Amps 400 series amplifiers provide a strong foundation for the growing neuroscience laboratory or clinic.

The Net Amps 400 and 405 amplifiers use EGI's new ADAPT technology, which builds on-board computing directly into the amplifier and introduces several new hardware and firmware upgrades. ADAPT includes:

- a built-in Intel processor that supports computing capabilities, including remote software and firmware updates
- upgraded, more robust electronics for faster processing
- fiber optic signal input and output for optimal digital bandwidth and an extra level of safety isolation
- built-in clock sync port for MR and MEG applications, and for synchronous acquisition by multiple amplifiers (note: NA 405 is not MR compatible.)
- support for 32 extra channels of physiological measurements using EGI's Physio16 input box



The Net Amps 400 series amplifiers are specifically designed for EEG acquisition using EGI's Geodesic Sensor Nets. The Net Amps 400 supports 32, 64, 128, or 256 EEG channels, and the Net Amps 405 supports 32 channels only. Both have capabilities for input from an additional 32 bipolar channels.



a component of EGI's Geodesic EEG System



The Net Amps 400 and 405 use the new ADS1298 chip designed especially for EEG, with low noise, exceptional sensitivity, and a sampling rate of 8 KHz. The Net Amps 405 amplifier is a more affordable option for those who do not require more than 32 EEG channels.

## Hardware Specifications

Feature	Net Amps 400	Net Amps 405
bipolar channel count	32, 64, 128, or 256	32
coupling	DC	DC
chip for A/D conversion	ADS1298	ADS1298
A/D resolution	24 bits	24 bits
on-board microprocessor	Intel ATOM 1.6 GHz 32-bit	Intel ATOM 1.6 GHz 32-bit
FPGA	DSP FIR filter signal processor	DSP FIR filter signal processor
embedded operating system	Linux	Linux
I/O connection	fiber optic Ethernet	fiber optic Ethernet
digital (TTL) inputs	16 bits (8 supported in software)	16 bits (8 supported in software)
input impedance	$\geq 1 \text{ G ohm}$	$\geq 1 \text{ G ohm}$
sampling rate supported	8 kHz*	8 kHz*
sensitivity (AC mode)/precision	0.023 $\mu\text{V/bit}$	0.023 $\mu\text{V/bit}$
bandwidth	DC to 2,000 Hz	DC to 2,000 Hz
input noise	$< 0.8 \mu\text{VRMS}$	$< 0.8 \mu\text{VRMS}$
input range	$\pm 200 \text{ mV}$	$\pm 200 \text{ mV}$
synchronize multiple amplifiers	yes	yes
common mode rejection rate	$\geq 90 \text{ dB}$	$\geq 90 \text{ dB}$
isolation mode rejection rate	$\geq 120 \text{ dB}$	$\geq 120 \text{ dB}$
MR compatible	yes, with upgrade package	no
power consumption	15 Watts	12 Watts

Net Amps 400 and 405 are compatible with Net Station 4.5.5 and beyond.

\*Amp Server Pro SDK is required to realize the highest sampling rates.

## Physiological measurement capability with optional Physio16 input box

Feature	Net Amps 400	Net Amps 405
auxiliary channels supported	up to 32 bipolar	up to 32 bipolar
SpO2 measurement supported	yes	yes
auxiliary channel input range/ dynamic range	$\pm 2.0 \text{ V}$ (adjustable to up to $\pm 10.0 \text{ V}$ )	$\pm 2.0 \text{ V}$ (adjustable to up to $\pm 10.0 \text{ V}$ )

## Products

The Net Amps™ amplifiers are sold only as a part of a complete Geodesic EEG System™, which includes the Geodesic Sensor Net™, computer with monitor, and Net Station™ software for acquisition, review, and analysis.

Geodesic EEG System™ (GES) 400

Geodesic EEG System™ (GES) 405

Geodesic EEG System™ (GES) 400 MR

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