

SERIAL STREAM DESCRIPTION -----

The following info was obtained from the Neurosky mindset_communications_protocol.pdf document.

SIGNAL QUALITY

The signal quality is an unsigned one-byte integer whose value describes how poor the signal is. It ranges in value from 0 to 200. Any non-zero value indicates that some sort of noise contamination is detected. The higher the number, the more noise is detected. A value of 200 has a special meaning specifically that the EEG contacts are not touching the user's skin. This value is typically output every second.

For all the different types of eSenses (i.e. Attention, Meditation), the meter value is reported on a relative eSense scale of 1 to 100. On this scale, a value between 40 to 60 at any given moment in time is considered "neutral", and is similar in notion to "baselines" that are established in conventional EEG measurement techniques (though the method for determining a baseline is proprietary and may differ from conventional EEG). A value from 60 to 80 is considered "slightly elevated", and may be interpreted as levels being possibly higher than normal (levels of Attention or Meditation that may

MEDITATION (RELAXATION)

MEDITATION is an unsigned one-byte value that reports the current eSense Meditation meter of the user which indicates the level of a user's mental "calmness" or "relaxation". Its value ranges from 0 to 100. Note that Meditation is a measure of a person's mental levels, not physical levels, so simply relaxing all the muscles of the body may not immediately result in a heightened Meditation level. However, for most people in most normal circumstances, relaxing the body often helps the mind to relax as well.

Meditation is related to reduced activity by the active mental processes in the brain, and it has long been an observed effect that closing one's eyes turns off the mental activities which process images from the eyes, so closing the eyes is often an effective method for increasing the Meditation meter level. Distractions, wandering thoughts, anxiety, agitation, and sensory stimuli may lower the Meditation meter levels. It is typically output once a second.

ATTENTION

ATTENTION is an unsigned one-byte value that reports the current eSense Attention meter of the user, which indicates the intensity of a user's level of mental "focus" or "attention", such as that which occurs during intense concentration and directed (but stable) mental activity. Its value ranges from 0 to 100. Distractions, wandering thoughts, lack of focus, or anxiety may lower the Attention meter levels. It is typically output once a second.

The 'eegPowers' roughly indicate the following:

Delta (1-3Hz): sleep

Theta (4-7Hz): relaxed, meditative

Low Alpha (8-9Hz): eyes closed, relaxed

High Alpha (10-12Hz)

Low Beta (13-17Hz): alert, focused

High Beta (18-30Hz)

Low Gamma (31-40Hz): multi-sensory processing

High Gamma (41-50Hz)