One problem in having such a transducer, e.g. a microphone, is that the wires used for transferring the signal from the transducer to the base part will gather electromagnetic interference. The electrical signal generated in e.g. a microphone may be relatively weak, e.g. 1 - 5 μV, and therefore rather sensitive to noise.

This problem is larger when a receiver is arranged in the electrode part, since the wires supplying the receiver signal, which may be 2 V at peak level, will be arranged close to the wires transferring the signal from the EEG electrodes and e.g. from a transducer. Therefore, it is likely that the receiver signal will induce noise into the wires carrying the EEG signal and any transducer signal.

US 2004/0116151 A1 describes a databus which can be applied for a hearing aid between a base part and a peripheral component. This databus is described as needing transfer of power, clock and synchronization signal.

One problem is that the number of wires should be as low as possible in order to keep the total diameter of the bundle of wires connecting the two parts as small as possible. Each wire is connected both to the electrode part and to the base part, e.g. through a connector. This connection will take up some space, and will in general be a weak point in the construction, i.e. there is a risk of losing the electrical connection at this point. Furthermore the connectors typically applied are relatively expensive components. Therefore, keeping the necessary number of connections to a minimum is to be preferred.

The above problems are solved by the present invention by providing an EEG monitor having a databus comprising two electrical wires adapted for transmission of signal from the EEG electrode part to the base part and further adapted for providing power supply from one part to the other part through the two electrical wires.

In a first aspect, the invention is related to a personal wearable EEG monitor with power supply means, said EEG monitor comprises a base part having signal processing means, an electrode part with at least two electrodes for measuring an EEG signal of a person, said electrode part comprises means for converting the EEG signal into a digital signal, and a databus for transferring data between said base part and said electrode part and for providing power from one part to the other, said databus being adapted for application of two electrical wires.

A databus is here understood to be a digital communication line which can be set up for communication between different units, suitable for carrying signals in one or two

In an embodiment of the EEG monitor a clock frequency generator is arranged in either the base part or in the electrode part of the EEG monitor, and wherein a clock frequency is regenerated, by a clock frequency regenerator, in the part of the EEG monitor without clock frequency generator. Preferably, this regenerated clock frequency is synchronized with the clock frequency of said clock frequency generator. Usually the clock frequency generator is arranged in the base part of the EEG monitor, and often the synchronization is performed by a phase-locked loop.

In an embodiment of the EEG monitor the electrode part is an ear canal plug comprising at least two electrodes on the external surface, said electrodes being arranged for having contact with the ear canal of the user in order to be able to detect electrical potentials from the person being EEG monitored.

In an embodiment of the EEG monitor the electrode part is connected with a transducer for measuring a physical or physiological parameter. Such a transducer could be adapted for measuring temperature, blood pressure, movement e.g. acceleration, orientation, i.e. is the person lying down. Preferably such transducer is connected to the electronic module of the electrode part and is prepared for transferring data to the signal processing means in said base part through the serial databus. When the electrode part is arranged as an ear plug, an appropriate transducer for detecting the correct placement of the ear plug in the ear canal could also be applied. This could be a capacitive transducer.

In a second aspect the invention is related to a method for communicating between two parts of an EEG monitor comprising power supply means, and comprising the following steps. 1) Arranging a base part outside the ear canal of a person to wear an EEG monitor, where the base part comprises signal processing means. 2) Arranging an electrode part in the ear canal of a person to be monitored, where the electrode part comprises EEG electrodes. 3) Connecting the electrode part with the base part through a databus, where the databus comprises two electrical wires adapted for transmission of ~~the~~ signal to a~~the~~ receiver in said electrode part~~or speaker~~, and for transmission of ~~the~~ signal from ~~the EEG~~a transducer in said electrode part

~~electrodes~~ to the base part, and the databus is adapted for providing power supply either from the base part to the electrode part, or, from the electrode part to the base part, through the two electrical wires. 4) Applying two different states of the two wire databus sequentially in different time spans, where a first state is for transfer of power, a second state is for transmission of signal from the electrode part to the base part.

In an embodiment of the method for communicating between two parts, at least three different states of the two wire databus are applied sequentially in different time spans, where a first state is for transfer of power, a second state is for transmission of signal from the base part to the electrode part, and a third state is for transmission of signal from the electrode part to the base part.

Embodiments of the invention will now be explained in further detail with reference to the figures.

Figure 1 illustrates an embodiment where an EEG monitor is provided with a databus between the base part and the electrode part.

Figure 2 illustrates the setup of an EEG monitor in three different states of the databus.

Figure 3 illustrates the bidirectional digital communication through a databus, panes (a) through (k) signifying respective signals.

Figure 4 illustrates different states for controlling the bidirectional digital communication, panes (a) through (e) signifying respective signals.

Figure 5 illustrates a phase locked loop circuit applied in an embodiment of the invention.

Figure 6 illustrates an example of a mechanical layout of an EEG monitor.