CLAIMS

What is claimed is:

1. A receiver for body channel communication comprising:

an electrode configured to receive an incoming signal transmitted as a multi-level transmission signal from a transmitter through a body channel;

a differentiator configured to obtain a time derivative of the incoming signal for extracting a plurality of data transitions in the incoming signal, wherein the time derivative comprises pulses corresponding to the plurality of data transitions;

an integrator configured to integrate the time derivative for converting the time derivative to a voltage signal; and

an analog to digital converter configured to generate a multi-level representation signal representing the multi-level transmission signal based on the ~~time derivative~~ voltage signal.

~~2. The receiver according to claim 1, further comprising an integrator configured to integrate the time derivative of the incoming signal.~~

~~3~~2. The receiver according to claim ~~2~~1, wherein the integrator is configured to integrate the time derivative of the incoming signal with respect to a clock signal operating at a predetermined duty cycle.

~~4~~3. The receiver according to claim ~~3~~2, further comprising a clock recovery circuit configured to determine the clock signal.

~~5~~4. The receiver according to claim ~~4~~3, wherein the clock recovery circuit is configured to generate athe clock signal based on the incoming signal.

~~6~~5. The receiver according to claim ~~5~~4, the clock recovery circuit further comprising an injection-locked oscillator configured to receive the time derivative of the incoming signal and to generate the clock signal therefrom.

~~7~~6. The receiver according to claim ~~6~~5, further comprising a feedback loop wherein the multi-level output signal is provided to a correlator for a phase selection correlation to be provided to the phase selector.

~~8~~7. The receiver according to any one of claims 1 to 6, wherein the analog to digital converter is a multi-level detector configured to generate a plurality of digital words by comparing each of the plurality of data transitions represented in the voltage signal to a plurality of thresholds in generating the multi-level output signal.

~~9~~8. The receiver according to any one of claims 1 to 7, further comprising a variable resistor coupled to the electrode, the variable resistor configured to adjust the impedance of the receiver with respect to the body channel.

~~10~~9. The receiver according to claim ~~9~~8, wherein the variable resistor is configured to adjust the impedance of the receiver to configure the characteristics of the body channel to represent a band pass filter.

~~11~~10. A method of controlling a receiver for body channel communication, comprising:

receiving an incoming signal transmitted as a multi-level transmission signal from a transmitter through a body channel;

obtaining a time derivative of the incoming signal for extracting a plurality of data transitions in the incoming signal, wherein the time derivative comprises pulses corresponding to the plurality of data transitions;

integrating the time derivative for converting the time derivative to a voltage signal; and

generating a multi-level representation signal representing the multi-level transmission signal based on the ~~time derivative~~voltage signal.

~~12~~11. The method according to claim ~~11~~10, further comprising integrating the time derivative with respect to a clock signal.

~~13~~12. The method according to claim ~~12~~11, further comprising integrating the time derivative with respect to the clock signal operating at a predetermined duty cycle.

~~14~~13. The method according to claim ~~11~~12, further comprising generating ~~a~~the clock signal based on the incoming signal.

~~15~~14. The method according to claim ~~12~~13, wherein generating the clock signal based on the incoming signal comprises receiving the time derivative of the incoming signal and generating the clock signal therefrom.

~~16~~15. The method according to claim ~~15~~14, wherein generating the clock signal further comprises carrying out a phase selection correlation based on the multi-level representation signal in a feedback loop and selecting a phase division based on the phase selection correlation.

~~17~~16. The method according to any one of claims ~~11~~10 to 15, further comprising generating a plurality of digital words by comparing each of the plurality of data transitions to a plurality of thresholds represented in the voltage signal in generating the multi-level output signal.

~~18~~17. The method according to any one of claims ~~11~~10 to 16, further comprising adjusting the impedance of the receiver with respect to the body channel.

~~19~~18. The method according to claim ~~19~~17, further comprising adjusting the impedance of the receiver to configure the characteristics of the body channel to represent a band pass filter.

~~20~~19. A transmitter for body channel communication comprising:

a driver configured to generate a multi-level transmission signal comprising at least three signal levels; and

a transmission electrode configured to transmit the multi-level transmission signal through a body channel to a receiver according to any one of claims 1 to 9.