

Claims

What is claimed is:

1. A system comprising:  
a controller disposable at a surface of a wellbore to send and receive messages in a power line communication format over a cable;  
at least one downhole device; and  
a network interface unit, the network interface unit couplable to the cable and comprising:  
a plurality of interfaces for communicating downhole using differing types of native signals; and  
a processing unit including instructions, which, when executed by the processing unit, cause the network interface unit to communicate between the at least one downhole device and the controller by converting an information format between any of the differing types of native signals and a power line communication message format.
2. The system of claim 1 wherein the network interface unit comprises a data memory operable to store data from the at least one downhole device.
3. The system of claim 1 comprising a switch for controlling an electrical power connection from the cable to the at least one downhole device.
4. The system of claim 1 wherein the network interface unit comprises a stored node address.
5. The system of claim 1 wherein the controller shapes a power line communication message to reduce complexity of decoding by the network interface unit.
6. The system of claim 1 wherein the network interface unit shapes a power line communication message to reduce complexity of decoding by the controller.

7. The system of claim 1 wherein the network interface unit further comprises an equalizer module for compensating for a cable transfer distortion within the cable.

8. A method of communicating between a plurality of downhole devices and a controller at a surface of a wellbore, the method comprising:  
establishing, by a processing device, signaling with at least two of the plurality of downhole devices using differing types of native signals;  
establishing, by the processing device, communication with the controller at the surface of the wellbore using power line communication;  
receiving a message by the processing device;  
converting, by the processing device, an information format for the message between any of the differing types of native signals and a power line communication message format; and  
forwarding the message by the processing device.

9. The method of claim 8 wherein establishing communication with the controller comprises monitoring a plurality of electrical properties of a network by a network interface unit, and wherein the controller shapes the message in a power line communication format to reduce complexity of decoding.

10. The method of claim 8 wherein establishing communication with the controller comprises monitoring a plurality of electrical properties of a network by a network interface unit, and wherein the network interface unit shapes the message in the power line communication message format to reduce complexity of decoding.

11. The method of claim 8 wherein converting an information format between any of the differing types of native signals and power line communication format comprises:  
decoding the message from a native signal format; and  
encoding the message into a power line communication message format.

12. The method of claim 8 wherein the message includes at least one node address stored in a network interface unit.

13. The method of claim 12 further comprising receiving the message in a power line communication message format from the controller, wherein the message includes one or more additional node addresses such that the network interface unit repeats the message to at least a second network interface unit comprising at least one of the additional node addresses.

14. A non-transitory computer-readable medium that includes instructions that are executable by a processing device for causing the processing device to perform a method comprising:

- establishing signaling with at least two of a plurality of downhole devices using differing types of native signals;
- establishing communication with a controller at a surface of a wellbore using power line communication;
- receiving a message;
- converting an information format for the message between any of the differing types of native signals and a power line communication message format; and
- forwarding the message.

15. The non-transitory computer-readable medium of claim 14 wherein the method further comprises storing data from at least one of the plurality of downhole devices.

16. The non-transitory computer-readable medium of claim 14 wherein establishing communication with the controller comprises monitoring a plurality of electrical properties of a network, and wherein the method further comprises shaping the message in the power line communication format to reduce complexity of decoding.

17. The non-transitory computer-readable medium of claim 14 wherein converting an information format between any of the differing types of native signals and power line communication messages comprises:

decoding a message from a native signal format; and  
encoding the message into the power line communication message format.

18. The non-transitory computer-readable medium of claim 14 wherein the message includes at least one node address stored in a network interface unit.

19. The non-transitory computer-readable medium of claim 18 wherein the message includes one or more additional node addresses and the method further comprises repeating the message in the power line communication message format to at least a second network interface unit comprising at least one of the additional node addresses.

20. The non-transitory computer-readable medium of claim 14 wherein the method further comprises controlling an electrical power connection from a cable to at least one of the plurality of downhole devices.