Claims

What is claimed is:

1. A system comprising:

~~a controller disposable~~a computing device positionable 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 cable and the at least one downhole device and ~~the controller by converting an information format between any~~positionable to communicate with the at least one downhole device using differing types of native signals, wherein the network interface unit comprises:

a first interface for communicating with a first downhole device using a first type of native signal of the differing types of native signals, wherein the first type of native signal is associated with a first communication format;

a second interface for communicating with a second downhole device using a second type of native signal of the differing types of native signals, wherein the second type of native signal is different from the first type of native signal and is associated with a second communication format that is different from the first communication format, and wherein the second interface comprises an inductive coupler communication port; and a processing device communicatively coupled to the first interface and the second interface, the processing device being configured to translate between communication formats by: converting first messages received in the first communication format from the first downhole device into a power line communication message format for transmission over the cable to the computing device; converting second messages received in the second communication format from the second downhole device into the power line communication message format for transmission over the cable to the computing device; and converting third messages received in the power line communication message format from the computing device into the first communication

format or the second communication format for transmission to the first downhole device or the second downhole device, respectively.

2. The system of claim 1 wherein the network interface unit further comprises a data memory operable to store data from the at least one downhole device.

3. The system of claim 1 further 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 further comprises a stored node address.

5. The system of claim 1 wherein the ~~controller shapes~~computing device is configured to shape 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~~is configured to shape a power line communication message to reduce complexity of decoding by the ~~controller~~computing device.

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 of a network interface unit, signaling with ~~at least two~~a first downhole device of the plurality of downhole devices using ~~differing types~~a first type of native ~~signals;~~signal that is associated with a first communication format;

establishing, by the processing device, signaling with a second downhole device of the plurality of downhole devices using a second type of native signal that is different from the first type of native signal and that is associated with a second communication format that is different from the first communication format, wherein the

network interface unit includes a first interface coupled between the first downhole device and a cable, wherein the network interface unit includes a second interface coupled between the second downhole device and the cable, and wherein the first interface or the second interface includes an inductive coupler communication port;

establishing, by the processing device, communication with the controller at the surface of the wellbore using power line communication~~;~~ over the cable;

~~———~~receiving ~~a message~~, by the processing device~~;~~, a first message in a power line communication message format over the cable;

~~———~~converting, by the processing device, ~~an information format for the message between any of~~ the ~~differing types of native signals and a~~first message from the power line communication message format~~; and~~ into the first communication format;

~~———~~forwarding ~~the message~~, by the processing device~~.~~, the first message in the first communication format to the first downhole device via the first interface using the first type of native signal;

~~———~~receiving, by the processing device, a second message in the power line communication message format over the cable;

converting, by the processing device, the second message from the power line communication message format into the second communication format;

forwarding, by the processing device, the second message in the second communication format to the second downhole device via the second interface using the second type of native signal;

receiving, by the processing device, a third message from the first downhole device via the first interface;

decoding, by the processing device, the first message from the first communication format associated with the first type of native signal;

encoding, by the processing device, the first message into the power line communication message format; and

transmitting, by the processing device, the first message in the power line communication message format uphole to the controller via the cable.

9. The method of claim 8 wherein said establishing the communication with the controller comprises monitoring a plurality of electrical properties of a network by ~~a~~the

network interface unit, and wherein the controller shapes ~~the~~a message in a power line communication format to reduce complexity of decoding.

10. The method of claim 8 wherein said establishing the communication with the controller comprises monitoring a plurality of electrical properties of a network by ~~a~~the network interface unit, and wherein the network interface unit shapes ~~the~~a 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~~first message includes at least one node address stored in ~~a~~the network interface unit.

~~13.~~12. The method of claim ~~12~~11 further comprising: receiving, by the processing device, a message in ~~a~~the 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 one or more additional node addresses.

13. ~~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~~operations comprising:

establishing signaling with ~~at least two~~a first downhole device of a plurality of downhole devices using ~~differing types~~a first interface configured to communicate with the first downhole device via a first type of native ~~signals~~signal that is associated with a first communication format;

establishing signaling with a second downhole device of the plurality of downhole devices using a second interface configured to communicate with the second downhole device via a second type of native signal that is different from the first type of

native signal and that is associated with a second communication format that is different from the first communication format;

establishing communication with a controller at a surface of a wellbore using power line communication~~;~~ over a cable;

~~———~~receiving a first message~~;~~

~~———converting an information format for~~ from the ~~message between any of the differing types of native signals and~~ controller in a power line communication message format~~; and~~ over the cable;

converting the power line communication message format into the first communication format;

forwarding the first message in the first communication format to the first downhole device via the first interface using the first type of native signal;

receiving a second message in the power line communication message format over the cable;

converting the second message from the power line communication message format into the second communication format;

forwarding the second message in the second communication format to the second downhole device via the second interface using the second type of native signal;

receiving a third message in the first communication format from the first downhole device via the first interface;

decoding the first message from the first communication format associated with the first type of native signal;

encoding the first message into the power line communication message format; and

transmitting the first message in the power line communication message format uphole to the controller via the cable.

~~— forwarding the message.~~

~~15.~~ 14. The non-transitory computer-readable medium of claim ~~14~~13 wherein the ~~method~~operations further ~~comprises~~comprise storing data from at least one of the plurality of downhole devices.

~~16.~~15. The non-transitory computer-readable medium of claim ~~14~~13 wherein said establishing the communication with the controller comprises monitoring a plurality of electrical properties of a network, and wherein the ~~method~~operations further ~~comprises~~comprise shaping ~~the~~a message in the power line communication message format to reduce complexity of decoding.

~~17.~~16. The non-transitory computer-readable medium of claim ~~14~~13 wherein ~~converting an information format between any of~~ the ~~differing types of native signals and power line communication messages~~first message includes at least one node address stored in a network interface unit that comprises~~:~~

~~decoding a message from a native signal format; and~~

~~encoding~~ the ~~message into the power line communication message format~~processing device.

~~18.~~17. The non-transitory computer-readable medium of claim ~~14~~16 wherein the ~~message includes at least one node address stored in a network interface unit.~~ operations further comprise:

~~19. The non transitory computer readable medium of claim 18~~receiving a message in the power line communication message format from the controller, 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 one or more additional node addresses.

~~20.~~18. The non-transitory computer-readable medium of claim ~~14~~13 wherein the ~~method~~operations further ~~comprises~~comprise controlling an electrical power connection from ~~a~~the cable to at least one of the plurality of downhole devices.