

Claims

What is claimed is:

1. Apparatus comprising:
 - a network-interface unit disposable in a wellbore, the network-interface unit further comprising:
 - a plurality of interfaces for communicating between a surface controller and one or more downhole devices;
 - a memory device; and
 - a signal capture module for acquiring and storing in the memory device, a diagnostic parameter corresponding to at least one of a downhole device signal or a surface controller signal in a downhole network.
2. The apparatus of claim 1, wherein the plurality of interfaces comprises an inductive coupler communication port.
3. The apparatus of claim 1, wherein the network-interface unit further comprises a switch to segment the downhole network for power control, current control, or to isolate failures in the downhole network.
4. The apparatus of claim 3, further comprising at least a second network-interface unit connectable to the downhole network to be segmented in response to the switch.
5. The apparatus of claim 1, wherein the network-interface unit further comprises a processing device and instructions that are executable by the processing device for causing the processing device to detect an anomalous condition by analyzing the diagnostic parameter at the network-interface unit.
6. The apparatus of claim 1 further comprising a surface controller, the surface controller including a processor and a non-transitory computer-readable medium that includes instructions that are executable by the processor for causing processor to send a diagnostics command

downhole, receive the diagnostic parameter, and at least one of display or store the diagnostic parameter.

7. The apparatus of claim 6, wherein the diagnostic parameter includes at least one of a voltage value, a current value, or a signal waveform.

8. The apparatus of claim 6, wherein the instructions are executable by the processor for causing processor to detect an anomalous condition by analyzing the diagnostic parameter at the surface controller.

9. A method comprising:

establishing, by a processing device downhole, a communication link with a surface controller;

receiving, by the processing device, a diagnostics command from the surface controller at a network-interface unit over a downhole network;

capturing, by the processing device, at the network-interface unit in response to the diagnostics command, a diagnostic parameter corresponding to a signal at the network-interface unit; and

transmitting, by the processing device, the diagnostic parameter from the network-interface unit to the surface controller.

10. The method of claim 9, further comprising:

receiving the diagnostic parameter from the network-interface unit at the surface controller; and

at least one of storing or displaying the diagnostic parameter.

11. The method of claim 10, wherein the diagnostic parameter comprises at least one of a voltage value, a current value, or a signal waveform.

12. The method of claim 11, further comprising detecting an anomalous condition at the surface controller by analyzing the diagnostic parameter.

13. The method of claim 12, further comprising sending a segmentation command from the surface controller to the network-interface unit in response to analyzing the signal waveform.

14. The method of claim 9 further comprising:

analyzing the diagnostic parameter at the network-interface unit; and
segmenting, by the network-interface unit, in response to analyzing the diagnostic parameter, the downhole network for power control, current control, or to isolate failures in the downhole network.

15. The method of claim 14, wherein segmenting the downhole network comprises disconnecting a portion of the downhole network behind an inductive coupler.

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

establishing signaling with a network-interface unit over a downhole network;
sending a diagnostics command to the network-interface unit over the downhole network;
receiving a diagnostic parameter from the network-interface unit in response to the diagnostics command, the diagnostic parameter corresponding to a signal at the network-interface unit; and
storing the diagnostic parameter.

17. The non-transitory computer-readable medium of claim 16, wherein the diagnostic parameter comprises at least one of a voltage value, a current value, or a signal waveform.

18. The non-transitory computer-readable medium of claim 16, wherein the operations further comprise detecting an anomalous condition by analyzing the diagnostic parameter.

19. The non-transitory computer-readable medium of claim 16, wherein the operations further comprise displaying the diagnostic parameter.

20. The non-transitory computer-readable medium of claim 16, wherein the operations further comprise sending a segmentation command to the network-interface unit to cause the network-interface unit to segment the downhole network.