CLAIMS

1. A test-plug hardware-platform, comprising:

at least one input/output (I/O) connector;

a configurable control system to provide command and operational signals through the I/O connector, the control system further to collect data through the I/O connector from at least one electrical component under test, the at least one electrical component configured to generate and receive a plurality of signals selected from signals including digital signals and analog signals; and

a wireless-mesh network configured within the test-plug hardware-platform to interface wirelessly with ~~at least~~ the at least one electrical component under test.

2. The test-plug hardware-platform of claim 1, wherein the configurable control system is configured to capture actual input/output signals to and from the at least one electrical component under test.

3. The test-plug hardware-platform of claim 1, wherein the configurable control system further comprises universal I/O circuitry to interface with the at least one I/O connector, one or more programmable logic devices (PLDs) to build reconfigurable digital circuits, one or more microcontroller units (MCUs) to direct data received from and sent to the at least one electrical component, and a radio source.

4. The test-plug hardware-platform of claim ~~1~~3, wherein the radio source is configured to operate under at least one communications standard.

5. The test-plug hardware-platform of claim 4, wherein the

communications standard includes at least one standard protocol selected from IEEE 802.15.4, Zigbee®, XBee®, and Bluetooth®.

6. The test-plug hardware-platform of claim 1, wherein the configurable control system is configured to test ~~substantially~~ simultaneously the functionality of all inputs and outputs of the at least one electrical component.

7. The test-plug hardware-platform of claim 1, wherein the configurable control system is configured to test each connector on the at least one electrical component via software within the test-plug hardware-platform.

8. The test-plug hardware-platform of claim 1, wherein the at least one electrical component is operating within a production tool.

9. The test-plug hardware-platform of claim 1, wherein the test-plug hardware-platform is configured to test multiple ones of the at least one electrical components within a production tool ~~substantially~~ simultaneously.

10. The test-plug hardware-platform of claim 1, wherein the test-plug hardware-platform is configured to test analog signals and digital signals ~~substantially~~ simultaneously.

11. The test-plug hardware-platform of claim 10, wherein at least one of the analog signals and digital signals include video signals.

12. The test-plug hardware-platform of claim 1, wherein the test-plug hardware-platform is configured to supply power to the at least one electrical component.

13. The test-plug hardware-platform of claim 1, wherein the test plug is configured to test low-level communication with the at least one electrical component connected to ~~the actual~~ hardware in which each of the at least one electrical component is located.

14. The test-plug hardware-platform of claim 1, wherein configuration of software within the configurable control system includes an existing signal list and an interlock table for a particular tool in which the at least one electrical component is located.

15. A test-plug hardware-platform, comprising:

at least one input/output (I/O) connector; ~~and~~

a configurable control system to provide command and operational signals through the I/O connector, the control system further to capture actual input/output signals to and from at least one electrical component under test, the at least one electrical component configured to generate and receive a plurality of signals selected from signals including digital signals and analog signals, the at least one electrical component being operated within a production tool; and

a wireless-mesh network to interface wirelessly with the at least one electrical component under test.

16. The test-plug hardware-platform of claim 15, further comprising a wireless electronic control system ~~and a wireless-mesh network to interface wirelessly with the at least the electrical component under test~~.

17. The test-plug hardware-platform of claim 15, wherein the test-plug hardware-platform further comprises power and ground connections to supply to the at least one electrical component, the power and ground connections being configurable as an

output to the at least one I/O connector via software.

18. The test-plug hardware-platform of claim 15, further comprising a test computer, the test computer being configured to:

run a number of simulated devices; and

monitor actual I/O from the each of the at least one electrical component.

~~19. A test-plug hardware-platform, comprising:~~

~~a wireless electronic control system; and~~

~~a configurable control system to provide command and operational signals through the wireless electronic control system, the control system further to collect data through the wireless electronic control system from at least one electrical component under test, the at least one electrical component configured to generate and receive a plurality of signals selected from signals including digital signals and analog signals, the control system further to capture actual input/output signals to and from the at least one electrical component under test with the at least one electrical component being operated within a production tool.~~

~~20. A test-plug hardware-platform, wherein the wireless electronic control system is configured to provide communications between test-plug hardware-platform via wireless communications with the production tool.~~