CLAIMS

1. An apparatus, comprising:

a first body portion including:

a processor,

a memory operably coupled to the processor,

at least one light-emitting diode operatively coupled to the processor, and

at least one optical sensor configured to detect, during operation, a reflected portion of light emitted from the at least one light-emitting diode;

a second body portion including a grommet; and

a connection portion disposed between the first body portion and the second body portion, the memory storing instructions to cause the processor to:

cause light to be emitted from the at least one light-emitting diode when the apparatus is positioned on an ear of a wearer and during operation of the apparatus, and

calculate a blood oxygen saturation level of the wearer based on the reflected portion of light.

2. The apparatus of claim 1, wherein the second body portion further includes a flexible earpad.

3. The apparatus of claim 1, wherein the first body portion includes a flexible earpad.

4. The apparatus of claim 1, further comprising a vibration motor operatively coupled to the processor, the memory further storing instructions to operate the vibration motor in response to detecting an event.

5. The apparatus of claim 4, wherein the event includes at least one of:

detecting an alarm condition;

detecting a low battery condition; or

detecting a successful positioning of the apparatus on the ear of the wearer.

6. The apparatus of claim 1, wherein the connection member includes nylon.

7. The apparatus of claim 1, wherein the first body portion includes a flexible earpad, and the at least one optical sensor is positioned within a cavity defined in the flexible earpad.

8. The apparatus of claim 7, wherein the at least one optical sensor is secured within the cavity by an epoxy.

9. The apparatus of claim 1, wherein the processor and the memory are positioned on a circuit board, and the at least one optical sensor is electrically coupled to the circuit board via a flexible conductor.

10. The apparatus of claim 9, wherein the flexible conductor is substantially S-shaped.

11. The apparatus of claim 1, further comprising at least one of a microphone or a speaker operatively coupled to the processor, the memory further storing instructions to cause the processor to activate the at least one of the microphone or the speaker in response to detecting an alarm condition.

12. The apparatus of claim 1, further comprising a wireless transceiver, operatively coupled to the processor and configured to communicate with a mobile software application, the memory further storing instructions to cause the processor to send signals representing measurement data to the mobile software application via the wireless transceiver.

13. The apparatus of claim 1, wherein the memory further stores instructions to cause the processor to send signals, according to a predetermined schedule, to a mobile software application, the signals representing measurement data.

14. The apparatus of claim 1, further comprising at least one sensor operatively coupled to the processor, the at least one sensor including at least one of: a body temperature sensor, an air quality sensor, a humidity sensor, an altimeter, or a barometric pressure sensor, the memory further storing instructions to cause the processor to store, in the memory, data collected by the at least one sensor.

15. The apparatus of claim 1, further comprising at least one sensor operatively coupled to the processor, the at least one sensor including at least one of: a body temperature sensor, an air quality sensor, a humidity sensor, an altimeter, or a barometric pressure sensor, the memory further storing instructions to cause the processor to send signals, according to a predetermined schedule, to a mobile software application, the signals representing data collected by the at least one sensor.

16. The apparatus of claim 1, wherein the reflected portion of light is a first reflected portion of light and the instructions to cause the processor to calculate the blood oxygen saturation level of the wearer include instructions to cause the processor to calculate the blood oxygen saturation level of the wearer based on the first reflected portion of light and a second reflected portion of light.

17. The apparatus of claim 1, further comprising an alert mechanism operatively coupled to the processor, the memory further storing instructions to cause the processor to generate and send a signal representing an alert in response to detecting a user interaction with the alert mechanism.

18. The apparatus of claim 1, wherein the apparatus is waterproof.

19. The apparatus of claim 1, wherein the second body portion does not include any electronic components.

20. A kit, comprising:

an apparatus configured to be positioned on an ear of a wearer, the apparatus including a first body portion, a second body portion, and a connection member mechanically coupled to each of the first body portion and the second body portion, the first body portion having a processor, a memory operably coupled to the processor, at least one light-emitting diode, and at least one optical sensor configured to detect, during operation, a reflected portion of light emitted from the at least one light-emitting diode, the reflected portion of light being reflected from a surface of the ear of the wearer, the memory storing instructions to cause the processor to calculate a blood oxygen saturation level of the wearer based on the reflected portion of light;

a charger case configured to contain and supply power to the apparatus; and

a plurality of flexible earpads, each flexible earpad from the plurality of flexible earpads configured to be mechanically coupled to the second body portion.

21. The kit of claim 20, wherein the second body portion includes an annular opening, and each flexible earpad from the plurality of flexible earpads configured to be mechanically coupled to the second body portion via the annular opening.

22. The kit of claim 20, wherein the apparatus and the charger case are configured such that data can be exchanged between the apparatus and the charger case.

23. The kit of claim 20, wherein the apparatus and the charger case are configured such that at least one of data or power can be exchanged between the apparatus and the charger case via a pair of electrical contacts.

24. The kit of claim 20, wherein the wearable device further includes a haptic actuator operatively coupled to the processor, the memory further storing instructions to operate the haptic actuator in response to detecting an event.

25. The kit of claim 24, wherein the event includes at least one of:
an alarm condition;
a low battery condition; or
a successful positioning of the wearable device on the ear of the wearer.

26. The kit of claim 20, wherein the connection member includes nylon.

27. The kit of claim 20, wherein the connection member includes plastic.

28. The kit of claim 20, wherein the at least one optical sensor is secured within a cavity of the first body portion by an epoxy.

29. The kit of claim 20, wherein the processor and the memory are positioned on a circuit board, and the at least one optical sensor is electrically coupled to the circuit board via a flexible conductor.

30. The kit of claim 29, wherein the flexible conductor is substantially S-shaped.

31. The kit of claim 20, wherein the wearable device further includes at least one of a microphone or a speaker operatively coupled to the processor, the memory further storing instructions to cause the processor to activate the at least one of the microphone or the speaker in response to detecting an alarm condition.

32. The kit of claim 20, wherein the wearable device further includes a wireless transceiver, operatively coupled to the processor and configured to communicate with a mobile software application, the memory further storing instructions to cause the processor to send signals representing measurement data to the mobile software application via the wireless transceiver.

33. The kit of claim 20, wherein the memory further stores instructions to cause the processor to send signals, according to a predetermined schedule, to a mobile software application, the signals representing measurement data.

34. The kit of claim 20, wherein the wearable device further includes at least one additional sensor operatively coupled to the processor, the at least one additional sensor including at least one of: a body temperature sensor, an air quality sensor, a humidity sensor, an altimeter, or a barometric pressure sensor, the memory further storing instructions to cause the processor to at least one of: (1) store, in the memory, data collected by the at least one additional sensor, or (2) send signals, according to a predefined schedule, to a mobile software application, the signals representing data collected by the at least one additional sensor.

35. The kit of claim 20, wherein the second body portion does not include any electronic components.

36. The kit of claim 20, wherein the wearable device is waterproof.

37. The kit of claim 20, wherein the memory further stores instructions to generate and send a signal representing an alert in response to detecting a user interaction with an alert actuator.

38. The kit of claim 20, wherein the memory further stores instructions to initiate a predefined emergency plan in response to detecting a user interaction with an alert mechanism.

39. The kit of claim 20, wherein the memory further stores instructions to initiate a telephone call in response to detecting a user interaction with an alert mechanism.

40. A method, comprising:

bonding an electronics board to an earpad using at least one of silicone or epoxy such that the electronics board is affixed to the earpad within a cavity defined in a surface of the earpad; and

attaching the earpad to a chassis.