FLEXIBLE BATTERY CONNECTION

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ABSTRACT

A flexible battery connection method can be used to connect one end of a flexible printed circuit board (PCB) strip with a small battery cell to maximize space within a small form factor electronic device. One end of the PCB strip can be plugged into the device circuit board through a flexible printed circuit connector (FPC) or through a board to board connector (B2B). The other end of the flexible PCB strip can be spot welded to the battery. In this way, the flexible PCB strip can be wrapped around the battery. Alternatively, or additionally, the flexible PCB strip can also be spot welded to the side of the battery.

PROBLEM STATEMENT

In small form factor electronic devices, such as wearable electronic devices, the devices are powered by batteries connected to the device circuit board with a small cable or a spring clip. The batteries can be in the form of coin cells, square cells, pouch cells, etc. Traditional approaches to connecting the battery to the circuit board require dedicated circuit board area or dedicated connectors. As a result, valuable space in a small form factor electronic device is occupied by these connectors, resulting in thicker and larger form factor than desired for small form factor devices. An improved method for connecting a battery to a device circuit board that minimizes device form factor size is disclosed.
DETAILED DESCRIPTION

The methods and techniques described in this disclosure relate to a flexible printed circuit board that connects a device’s battery with the device’s circuit board. The device can be any small form factor electronic device, such as a smartwatch, smart thermostat, electronic fitness band, electronic wearable device, etc.

Fig. 1 illustrates an example method 100 to connect a flexible printed circuit board (PCB) strip with a small form factor battery cell. The battery cell can be a small lithium-ion battery cell, e.g., a circular coin cell. The figure depicts a bottom side view of the circular lithium-ion coin cell 110 placed in small form factor electronic wearable device such as a smartwatch. A flexible PCB strip 108 is connected with the coin cell 110. The flexible PCB strip 108 is a patterned arrangement of printed circuitry and components that utilizes flexible based material with or without flexible overlay. The flexible PCB strip 108 is connected to the coin cell 110 via spot welds. As depicted, the flexible PCB strip 108 is welded to the coin cell 110 on the bottom surface of the cell via three spot welds 106, and on the periphery of the cell via two spot welds 104. The flexible PCB strip 108 can be wing shaped to wrap around the side surface of the cell 110. The flexible PCB strip 108 can connect to a nearby main circuitry (or a main device PCB) through a board to board (B2B) connector 112. Alternatively, the flexible PCB strip 108 can connect to the main circuitry via a flexible printed circuit (FPC) connector as well.
Fig. 2 illustrates a side view 200 of a flexible PCB strip 208 connected with a small lithium-ion coin cell 210. The flexible PCB strip 208 is spot welded to the top of the coin cell 210 via two spot welds 204 and to the bottom of the cell 210 via three spot welds 206. The flexible PCB strip 208 is connected to the main PCB 214 of the wearable electronic device via a B2B connector 212. Alternatively, B2B connector 212 can be a FPC connector as well.
The subject matter described herein in this disclosure can be implemented in hardware (for example, computers, circuits, or processors). Specific examples disclosed are provided for illustrative purposes and do not limit the scope of the disclosure.