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Lebel et al.

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(54) **AMBULATORY MEDICAL APPARATUS AND METHOD USING A ROBUST COMMUNICATION PROTOCOL**

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(51) **Int. Cl.**[7] **A61B 5/00**; G08B 23/00

(52) **U.S. Cl.** **600/300**; 340/573.1

(58) **Field of Search** 600/300; 340/573.1, 340/573.2, 573.3, 573.4; 434/258; 604/131, 132

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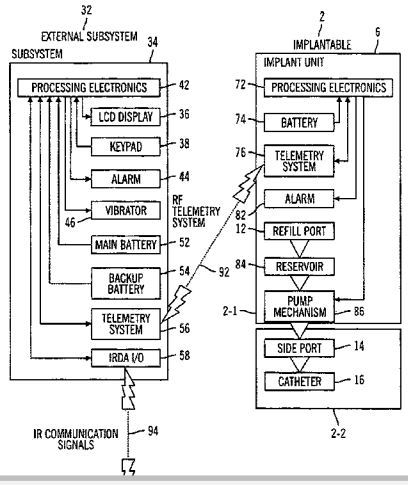
(57) **ABSTRACT**

An implanted medical device (e.g. infusion pump) and external device communicate with one another via telemetry wherein messages are transmitted under a robust communication protocol. The communication protocol gives enhanced assurance concerning the integrity of messages that impact medical operations of the implantable device. Messages are transmitted using a multipart format that includes a preamble, a frame sync, a telemetry ID, data, and a validation code. The data portion of the message includes an op-code that dictates various other elements that form part of the message. The data portion may also include additional elements such as sequence numbers, bolus numbers, and duplicate data elements. A telemetry ID for the transmitting device may be implicitly embedded in the message as part of the validation code that is sent with the message and that must be pre-known by the receiver to confirm the integrity of the received message.

38 Claims, 3 Drawing Sheets



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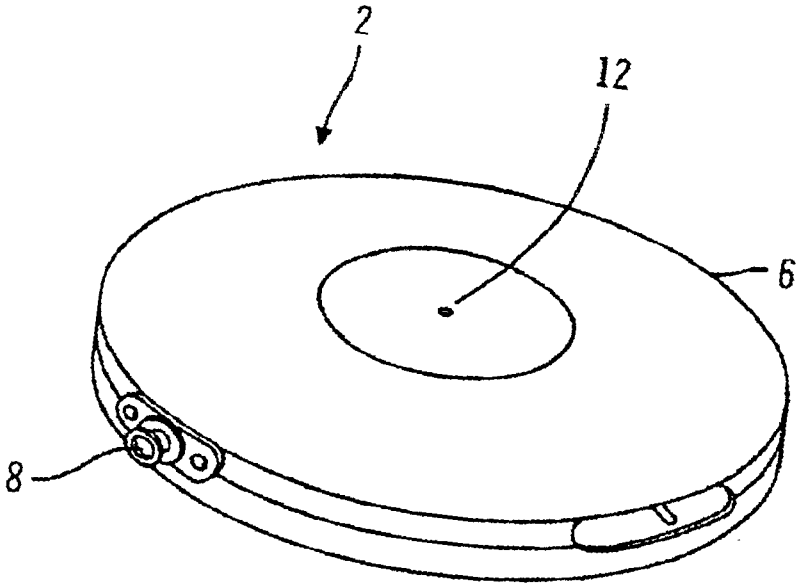

FIG. 1A

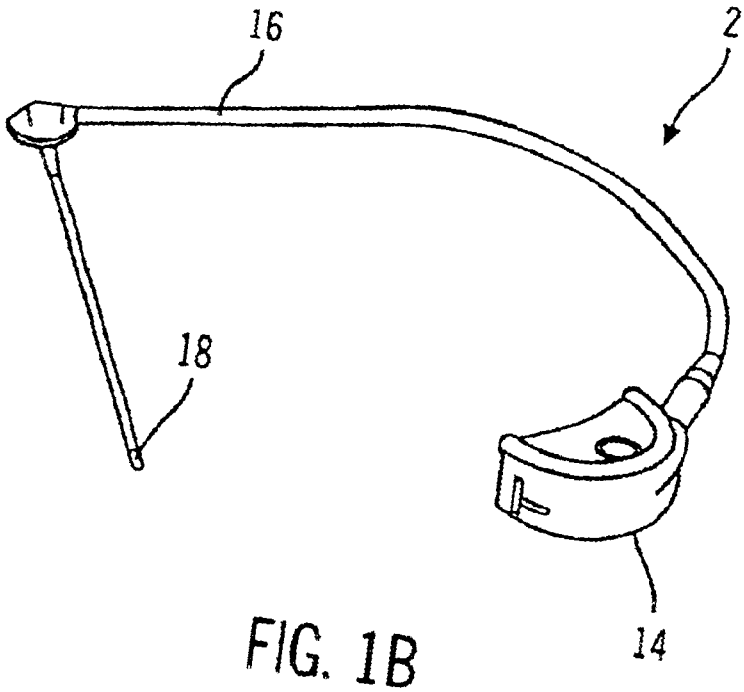

FIG. 1B

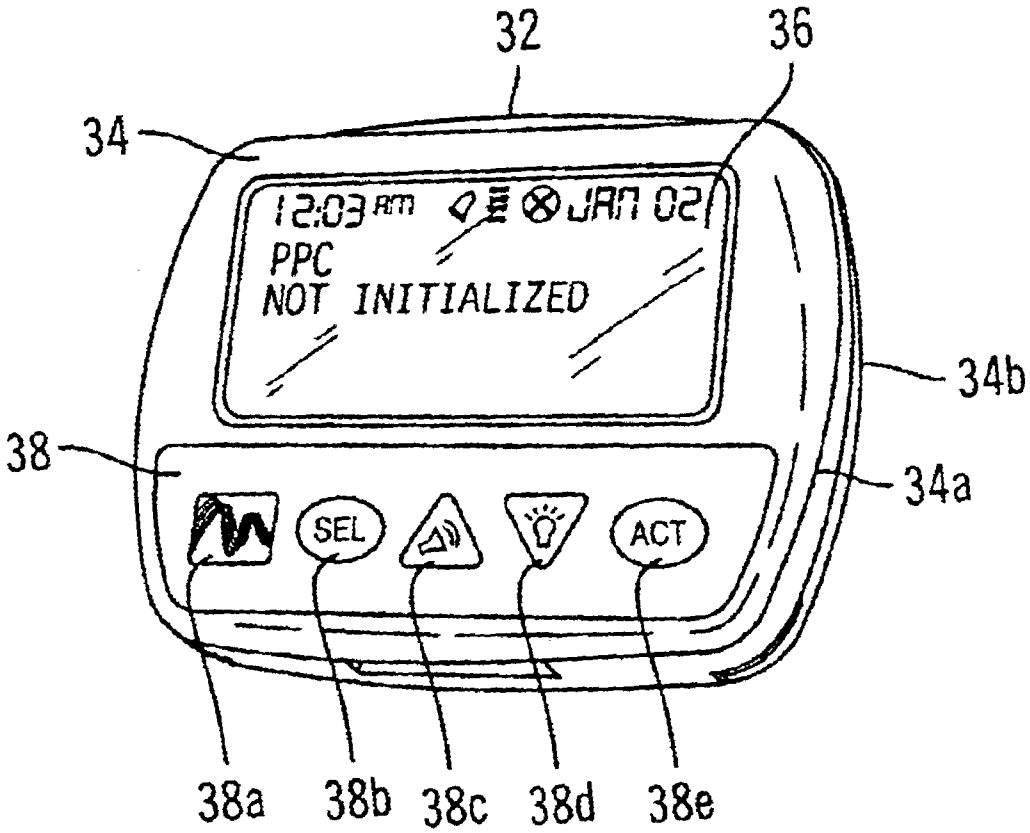

FIG. 2

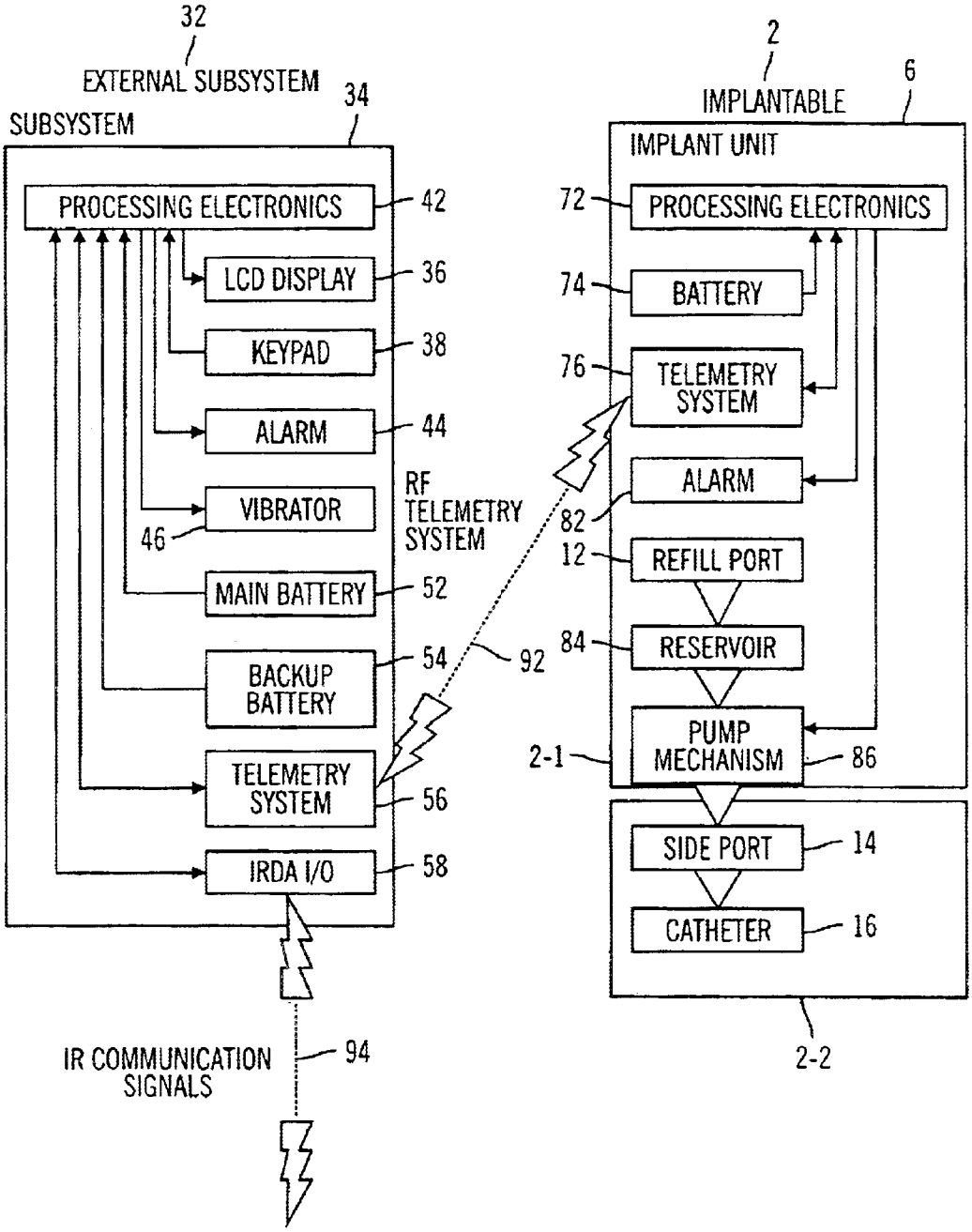

FIG. 3

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