

Invention: Implement for Sensing, Processing and Conveying Data from a Biological Source in a Body.

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Invention: A manufacturing method has been developed to provide an interactive method for retrieving information and conveying therapeutic treatment to internal organs and structural members of the body.

The manufacturing method is such that small mechanical devices which interact with the internal mechanisms of a body (in this case but not limited to the human body), can be derived by the employment of laser ablative technology to form very small sensory implements.

Method: An electrical circuit is designed for the purpose of sensing biological signals from the body, amplifying and processing those signals and conveying the information to a external port existent within the surface tissue of the body or by conveying the information through radio frequency to the outside of the body. Components of this electrical circuit would be (but not limited to): (fig 01)

- a. Signal amplifier
- b. Micro controller
- c. SRAM
- d. Battery
- e. Flash memory
- f. RF controller interface
- g. ROM

The electrical circuit would be manufactured on a flexible substrate. For the purposes of internal embedding LCP (liquid crystal polymer)

would be the substrate of choice. Upon the substrate an electrical circuit is imaged by a rasterized laser imaging system resulting in an interconnecting circuit pattern for the electrical components plus sensory circuits for retrieving information. The sensory circuits are employed for gathering data from: (fig 02)

- a. Thermal signature of muscle tissue, fluids, organs
- b. Electrical impulse in neural systems and muscle tissue
- c. Internal pressure in organs
- d. Flow rate – arterial system
- e. Hydro solubility
- f. Rheology

The electrical circuit assembly is strategically implanted in the body by surgical procedure and the sensory circuit probes are attached to the internal organ or skeleton member to be monitored / regulated by the electronic device. A catalog of mechanical circuit terminals has been designed to gather information. Several of these devices are illustrated in this document: (fig 03)

- a. Probe – piercing and anchoring into muscle tissue or inserted in a drilled hole in skeletal member.
- b. Spade – crimp onto a neural member or vascular component
- c. Buckle – thermal sensing and non invasive monitoring of neural members and vascular components

d. Hook – thermal sensing and non invasive monitoring of neural members and vascular components

When data has been gathered via the sensory terminals, the information is conveyed to the electronic circuit and processed to derive the information intended to be employed for monitoring and treatment of the subject. Information gathered by the sensory device may include but not be limited to:

- a. stress analysis of implanted orthopedic implements
- b. elevated pressure of internal organs
- c. attenuated blood flow in arterial systems
- d. chemical changes in tissue
- e. degradation of muscle fiber

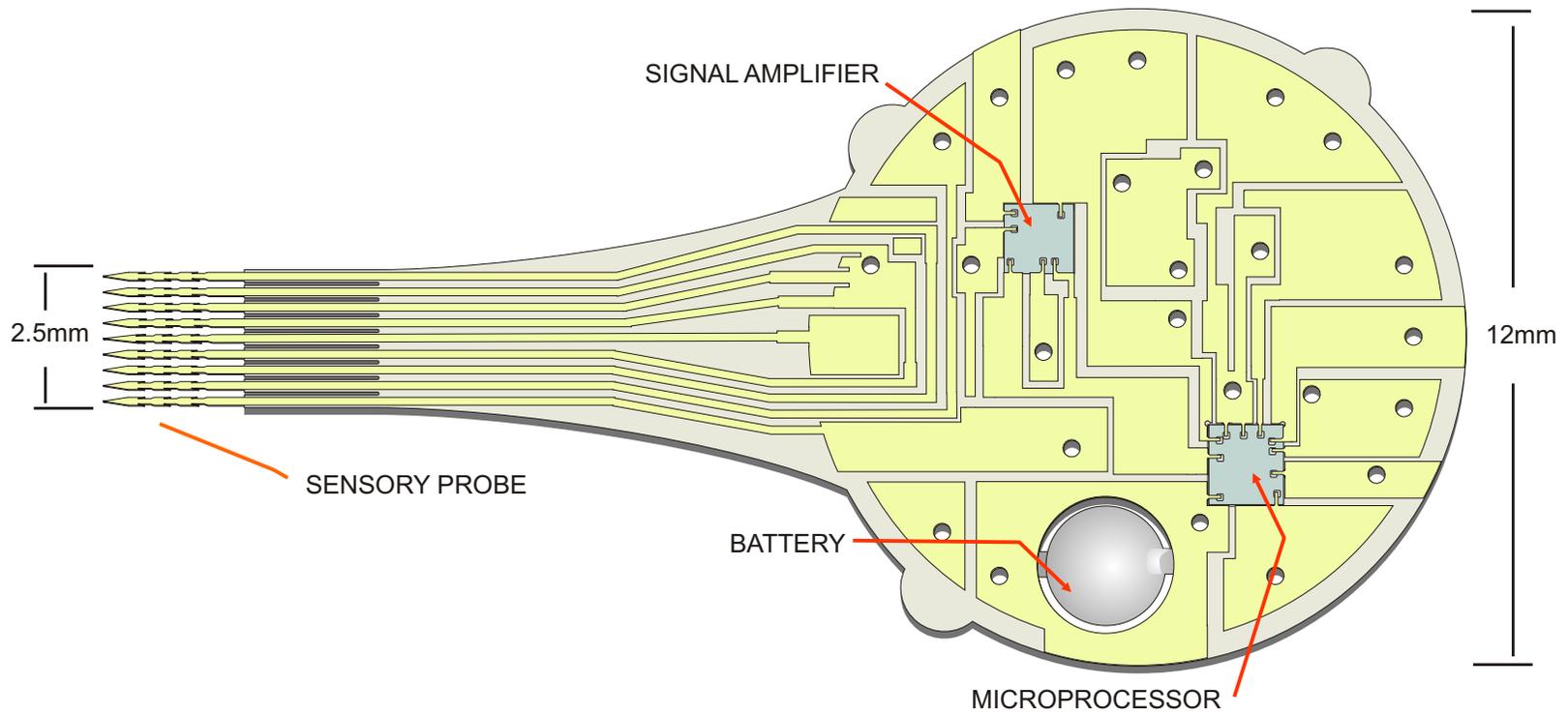
After the data has been gathered and processed by the implanted electrical circuit, it is prepared for transmittal to an external computer. Conveyance of the information may be through a physical input / output port affixed to the external tissue of the body or it may be conveyed via a radio frequency transponder on the implanted electrical circuit. Either method for conveying data is specific to the application for which it employed and the complexity of the monitoring system.

Summary

Imaging technology and material science are enabling the creation of very small electronic circuitry which can be employed to sense, enhance and influence physiology within the body. The invention can be employed to bridge trauma areas in the nervous system or monitor and offer digital imaging of a degrading internal organ. This invention embodies the fabrication of interconnect systems for the electronic

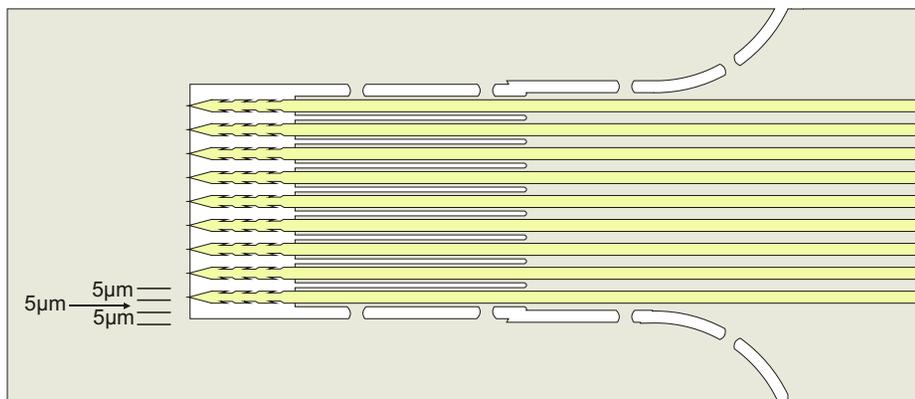
monitoring apparatus and the creation of semiconductor sites and sensory terminals created by but not limited to laser machining and ablation of the circuit material.

(fig01)

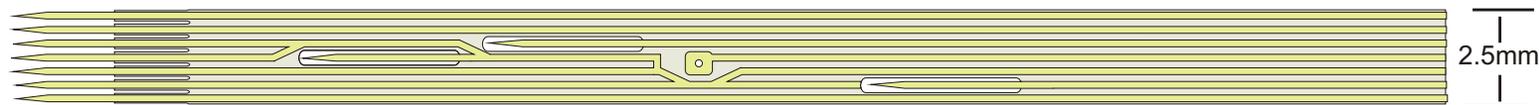
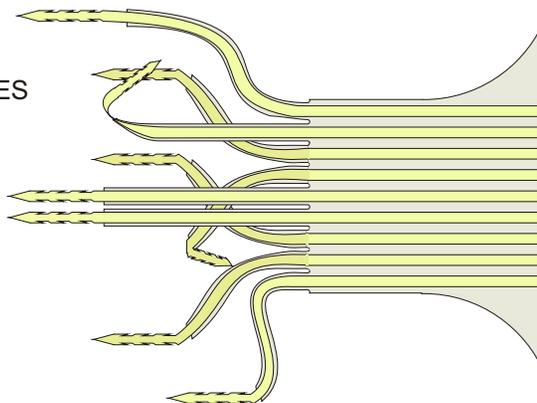


(fig02)

MANUFACTURING PALLET



FLEXIBLE CIRCUIT PROBES



ARTICULATED FLEXIBLE CIRCUIT PROBES



(fig03)

