A 3-D Dual-Platform Mapping System for Neural Coding Studies

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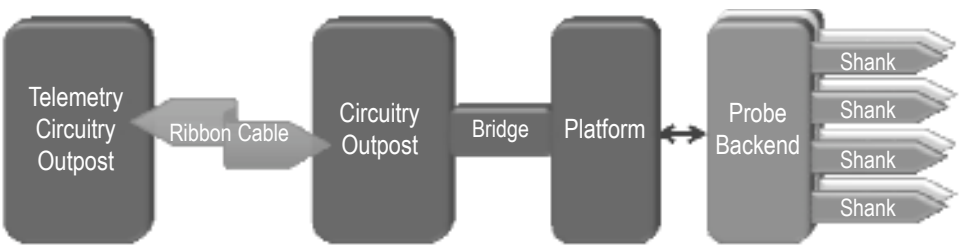
A WIMS microsystem is being developed as a neuroscience research tool for mapping neural connections and other impulse studies. This system incorporates two, three-dimensional probe devices with circuitry to provide flexible stimulation/recording site selection, as well as reduced platform size. The 32 sites of each platform are situated with a 200μm pitch in all three directions to maximize the neural space from which single units are recorded. Consideration is currently being given to incorporating amplification, multiplexing, and neural data processing in the implanted circuitry. The transcutaneous link will use the wireless chip and user interface designed for the present WIMS ERC cortical testbed.

Illustration of the system front-end.



Block diagram of the wireless microsystem.

Although this is a new project, significant progress has already been made. A comprehensive literature review was done in order to understand the design challenges inherent in this work. The overall project approach has been developed and individual designs of the necessary components for the first stage are in progress. Additionally, the design and layout of test structures for the characterization of high-density, probe-platform, lead transfers have been completed. Novel probe-platform designs for simplifying the assembly requirements are currently underway. This project is supported by the Engineering Research Centers Program of the National Science Foundation under award number EEC-9986866 and by a gift from Ms. Polly Anderson.