



Project

Battery-Powered Control Circuitry

Application

Prosthetic Limb

Customer Need

Amputees have the ability to create myo-electric signals by flexing muscles which can be sensed and used to control the movement of prosthetic limbs. Sensors detect these very low level signals which require electronics to control motors for movement. These circuits must be small, accurate, and able to run from battery power.

AVID's Solution

AVID developed a very compact analog circuit which amplifies the myo-electric signals, and outputs control signals suitable to accurately control a motor. These motors may be used to control the opening and closing of a mechanical hand or may rotate a mechanical elbow joint.

Value Added or Technologies Applied

- Myo-Electric Sensing and Requirements
- Hardware Design and Implementation
- Prototyping and Validation
- Low-Volume Production



Project

System Electronics

Application

Volumetric CT/PET/SPECT Diagnostic System

Customer Need

Electronics to detect and collect sensor data from a large photo-sensor array excited by X-rays. Unique requirements were pixel sizes eight times smaller than previous generation systems as well as a large XY array instead of the prior single slice.

AVID's Solution

In addition to the quantity and execution speed that pushed the electronic design, there were also major challenges from power, signal distribution, and thermal management that needed to be addressed. Advanced packaging was required to achieve the circuit density, and special consideration for the mechanical design included the ability to remove heat from the electronics. A mass amount of parallel signal processing was implemented as stand-alone subassemblies with dedicated ASICs, DSPs, communication interfaces to centralized memory arrays, and power conversion. The memory data on the rotor side was then organized and packed for transmission across the rotating interface and stored on the stator side for use by the post processing imaging engines. The front end processing subassemblies provided a means for modular testing and system maintenance.

Value Added or Technologies Applied

- Electronic System Requirements/Architecture
- Data Flow Diagrams. Memory Architecture and Management, Speed Performance Analysis
- Hardware Design; Advanced Packaging Concepts (Ceramic Carriers, COB, Rigid/Flex)
- In-Line Real-Time Signal Processing and Combination, VHDL and DSP Techniques
- Thermal Management; Fluid-Based and Thermo-Electric Cooling
- High-Speed Data Transfer Method (20GBps) Across a Rotating Interface
- Proof of Concept Modeling
- Manufacturing Techniques and Process Research/Definition



Project
Set Top Box

Application
In-Home Patient Monitor

Customer Need

More people are addressing health care at home. However, these same people are not trained care givers and require automated monitoring, reminders for medications and other tasks, and alert systems to notify for assistance. Collected data can be downloaded to doctors for analysis, adjustments to medication and other diagnosis. Some monitoring equipment is worn by the patient with wireless reporting ability. The use of a set top box allows on TV screen instructions, and interfaces via broadband modem and the Internet to the professional care giver.

AVID's Solution

A high end Power PC-based design was implemented, capable of running a high level Linux operation system. This allowed the use of library functions for communication, encryption, graphics, sound, and others. ISM-band RF interfaces were designed to collect data from remote, patient-worn monitor devices and panic keypad remotes. Ethernet was included as the link to the remote care giver locations; as well an option was included to add CDMA. Audio alarms alerted the patient if action was required. A modulation circuit allowed for custom screens to be displayed on specific TV channels. Multiple DSPs were implemented off a PCI bus from the PPC to allow for real time video processing.

Value Added or Technologies Applied

- Hardware Architecture
- Hardware Design and Advanced PCB Layout; PPC High-Speed DRAM, Daisy-Chained DSP Array, External Interfaces (RF and Ethernet), NTSB Video and Audio, USB 2.0
- Prototype and Validation
- Software Integration Support