



Biomedical Science

- Cardiology
- Defibrillation
- Neurology
- Hemodialysis



Technologies

- GSM/GPRS/EDGE
- CDMA
- WiFi
- RF
- RF Sensors

Overview & Future:

Medical science has taken enormous leap due to its innovations. Integrating technology with medical science will be a next leap. **Cardiology** with integration of **GSM or CDMA** technology will give birth to various solutions and medical electronic products. This will bridge the gap of different geographies in monitoring cardiac patients by physicians and make it possible to monitor patients at remote locations.

Neurology with wireless technology with state-of-the-art sensing elements will prove to be the best solution for neuro-physicians and neuro-surgeons. Analyzing DNA structures remotely is a probable application in this area.

We at Afttek understand the potential and future of all above and are committed to developing innovative products and providing design services in this cutting edge technology. We having a strong background on various **wireless technogies** will help to get the new innovative products to market at rapid pace.

Case Studies:

Remote Monitoring of Cardiac Patients

We have built the system which helps the cardiac patients to be monitored remotely with the use of GSM as signaling technology. Entire system architecture and hardware development has been done in-house. Key parts involved are as follows:

- Use of pencil cells to keep the unit small and battery operated.
- Use of GSM technology for remote communication with physician.
- Due to pencil cell usage excellent power management required.
- Entire hardware design process including mixed signal.
- Analog frontend design with considerations for common mode and minimal amount of current passing passing through human body to meet FDI requirements.
- Instrumentation and signal conditioning design.
- Critical form factor board layout design.
- Component selection to meet the low power & FDI requirements.
- Board bring up and power on self test for the same
- ECG lead failure detection.

ECG Data Acquisition System

We have built a data acquisition system for ECG. This involved signal conditioning of the low voltage analog human body signals and transforming the same into the digital domain for analysis purpose. Entire system architecture and hardware development has been done in house. Key parts involved are as follows:

- Analog input signal conditioning and use of instrumentation amplifier for the gain stage of the same.
- Multiple human body signals conditioning with minimal analog frontend variation from channel to channel.
- Gain linearity from channel to channel.
- Defibrillation protection.
- Mixed signal critical board layout.
- Data and power isolation for the same.
- Component selection to satisfy the FDI requirements and human body protection.
- Analog section board layout and digital section board layout with proper ground plane and separation between digital and analog sections.
- Length matching and possible impedance matching on board layout for avoiding analog section variations and high speed digital interface.
- Firmware development for demonstrating the various challenges mentioned above, functionality and data acquisition on host PC.