

Project Design Specification—Wireless Oximetry

September 17, 2010

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Function:

Design a wireless transmitter and receiver for existing pulse oximeter hardware mostly intended for pediatric use. This device should be compatible with existing hardware.

Client Requirements:

- Patient should be unable to remove via wire
- Patient should retain full range of motion
- Minimal power consumption
- Minimal final product weight

Design Requirements:

- 1) Physical and Operational Characteristics
 - a) *Performance requirements* – Less than 5 second delay between data transmissions
 - b) *Safety* – Device must be enclosed in electrical-safe material with no loose, swallowable, parts
 - c) *Accuracy and Reliability* – Minimal transformation of data between conversions of analog to digital
 - d) *Life in Service* – Should be functional for 5 hours with native power supply and device must be functional for 5 years
 - e) *Shelf Life* – Should be able to be stored indefinitely with discharged power supply and in a clean, dry environment
 - f) *Operating Environment* – Transmitter must be able to withstand large motion artifact. Prototype should function well in a normal hospital environment

with consideration for higher than normal operating temperatures and possible residual fluid contact

- g) *Ergonomics* – Should be comfortable for long periods of time on the patient. Receiver should not require excessive force to remove from pulse oximeter.
 - h) *Size* – Should be small enough to be used with babies and small children
 - i) *Mass* – Should be less than a few ounces
 - j) *Materials* – Cannot irritate skin and should not have sharp edges
 - k) *Aesthetics, Appearance, and Finish* – All parts should be fully enclosed
- 2) Production Characteristics
- a) *Quantity* – One, but should be designed with the intent of mass production
 - b) *Target Product Cost* – Under \$100.00
 - c) *Target Prototype Cost*- Under \$1,000.00
- 3) Miscellaneous
- a) *Standards and Specifications* – None aware
 - b) *Customer* – Physicians working with babies and small children
 - c) *Patient-related Concerns* – Should not contain easily accessible parts. Device not intended for patient repair.
 - d) *Competition* –
 - i. *CMS-50E (Wifi)*-\$389.00
 - ii. *Nonin 4100 (Bluetooth)*-\$495.00