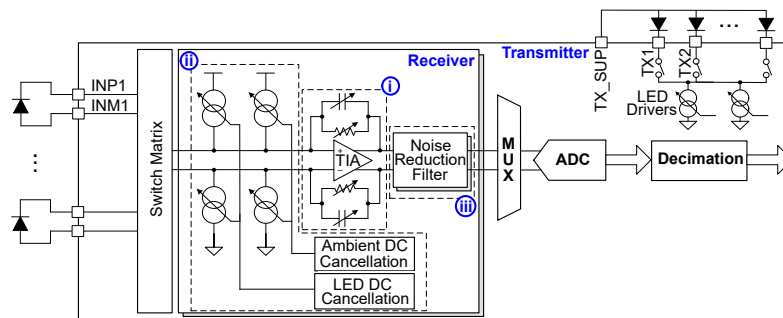
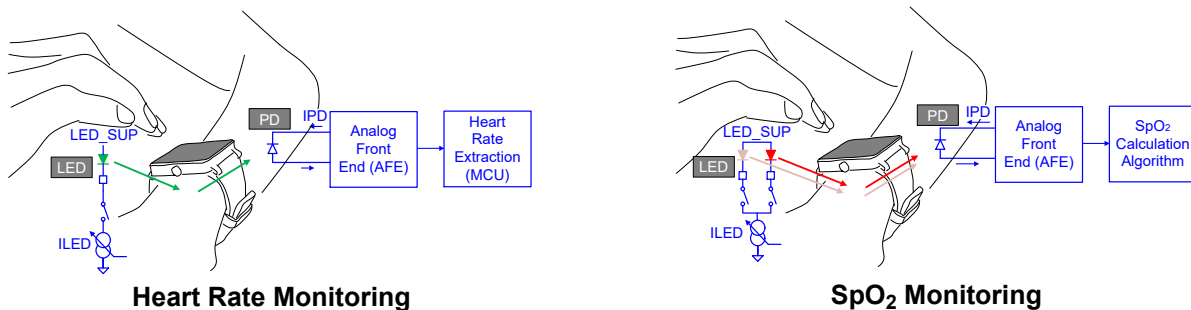


Photoplethysmography (PPG) With Integrated AFE for Optical Biosensing



Applications like optical heart rate and SpO₂ monitoring are based on the principle of Photoplethysmography (PPG). The primary challenges in PPG signal acquisition on a wrist-worn variable are: (i) small sensor size, (ii) relatively weak signal on wrist (low perfusion index), and (iii) interferers like ambient light and motion artifacts. TI's signal chain for PPG signal acquisition has 3 unique characteristics that help achieve excellent signal quality even in the most challenging conditions: (i) high gain transimpedance amplifier (TIA) to improve the SNR, (ii) DC offset cancellation DAC at the input, and (iii) noise reduction filter to reduce the optical noise bandwidth. These unique features help achieve excellent dynamic range at extremely low power consumption.



Block Diagram

Recommended Parts

Device	Description
AFE4432	Ultra-small, ultra-low-power, high-SNR, integrated analog front ends (AFE) for wearable optical biosensing with FIFO
AFE4460	High-SNR, ultra-low-power, integrated AFE for wearable optical biosensing with FIFO
AFE4950	Ultra-small integrated AFE for wearable optical heart-rate monitoring and SpO ₂
AFE4500	Integrated analog front end (AFE) for bioimpedance analysis and electrical and optical biosensing

TI Resources

- [Optical Heart Rate Monitoring \(OHRM\) on Wearables](#) Application Brief
- [Measuring Oxygen Saturation \(SpO₂\) on Wearables](#) Application Brief
- [DC Estimation for SpO₂ using TI AFEs](#) Application Note (under NDA)

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