

From clinic to daily routine: Ultra-low-power, RF-driven ASIC enabling continuous glaucoma monitoring

Business challenge

Glaucoma patients require continuous IOP monitoring, especially outside clinic hours when dangerous spikes may go undetected. However, contact lenses cannot house traditional batteries, making power supply and data transmission major hurdles.

The client needed a compact, ultra-low-power solution capable of operating 24/7 without disrupting patient activities or comfort.

Overview

A leading Swiss medical device microsystems designer needed to overcome a critical challenge in glaucoma management, capturing intraocular pressure (IOP) fluctuations that occur outside clinical settings. With no room for batteries in smart contact lenses, traditional monitoring methods couldn't deliver real-time, continuous data.

Cyient's AnSem team delivered a custom ASIC solution that digitizes sensor data and wirelessly transmits it to an external recorder, all powered via an RF link. This innovation enabled patients to monitor IOP seamlessly throughout their daily routines, revolutionizing glaucoma care.

The Cyient solution

Cyient's semiconductor team, AnSem, engineered a custom ASIC that delivered power-efficient, continuous monitoring through:

Battery-less RF operation:

Powered entirely via an external RF link, no internal battery required.

MEMS sensor integration:

Captured intraocular pressure readings from an embedded MEMS sensor.

High-precision data conversion:

Digitized the output using a high sample rate and high ENOB.

Compact design for smart lenses:

Engineered to fit within the tight spatial and power constraints of a contact lens.

Wireless data transmission:

Transferred digitized IOP data seamlessly to an external recorder for analysis.



The results

Cyient's custom ASIC solution transformed IOP monitoring by delivering:

24x7 real-life monitoring:

Enabled glaucoma patients to capture pressure fluctuations throughout daily and sleep cycles, beyond clinic hours.

Non-invasive design:

Integrated into a contact lens for continuous monitoring without interfering with patient comfort or routine.

High-fidelity data output:

Achieved superior signal accuracy with a high ENOB and elevated sampling rates for reliable diagnostics.

Power-efficient innovation:

Eliminated the need for onboard batteries through RF-powered operation, solving space and energy challenges.

Actionable insights for clinicians:

Provided continuous pressure data for better-informed treatment decisions and early intervention.

From ultra-low-power chips to patient-friendly design, Cyient creates healthcare technologies that are efficient, precise, and built for tomorrow.

**Enable continuous monitoring without compromising power, precision, or patient experience.
Speak with our experts today.**

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