Optalysys

Staff Analogue IC Design Engineer – Data Converters & Photonics Drivers

Job Specification

About Optalysys

Optalysys is a pioneering UK-based deep-tech company developing new ways to power the future of computing. By harnessing light, we are creating advanced photonic technologies that help the world's most demanding systems run faster and more efficiently. Our work supports breakthroughs in areas such as artificial intelligence, cybersecurity and scientific discovery. At Optalysys, we're bringing together talented people who are passionate about building technology that expands what computing — and humanity — can achieve

We are committed to building a home for exceptional talent.

Optalysys

About the Role

Role: Staff Analogue IC Design Engineer – Data Converters & Photonics Drivers
Department: IC Design / Mixed-Signal Engineering
Location: US (Hybrid / Onsite / Remote)
Employment Type: Permanent, Full-Time
Level: IC4

The Staff Analogue IC Design Engineer will lead the design of precision mixed-signal building blocks supporting photonics-enabled computing systems. The role focuses on data converters, precision references, biasing circuits, and actuator drivers used to control and tune integrated photonic components.

This position involves system-level architecture and transistor-level design, along with integration of third-party IP blocks to deliver robust mixed-signal subsystems. The engineer will work closely with photonics teams to develop control circuits and monitoring systems for photonic devices.

Key Responsibilities

System Architecture & Circuit Design
- Define system-level architecture for mixed-signal subsystems supporting photonic control and monitoring.
- Design and implement **ADC and DAC architectures**, including:
    - SAR ADCs
    - Pipeline ADCs
    - Current-steering DACs
    - Resistor-string DACs
- Design **precision references and biasing circuits**, including:
    - Bandgap references
    - Current references
    - Bias networks
    - LDO regulators

Photonics Control Circuits
- Design **heater drivers and current sources** for thermal tuning of photonic components.
- Develop monitoring and feedback circuits for photonic actuator control.
- Support electro-optic and thermal tuning mechanisms used in integrated photonic devices.

Third-Party IP Integration
- Integrate external IP blocks including:
    - ADC/DAC IP
    - SerDes / PHY interfaces
    - Memory blocks

- Map system specifications to IP capabilities and adapt interfaces accordingly.
- Perform subsystem integration verification and sign-off.

Mixed-Signal Verification
- Develop and maintain **AMS verification environments**.
- Perform simulations using **Spectre / AMS Designer**.
- Create behavioral models using **wreal or Verilog-A**.
- Evaluate performance through:
  o Corner analysis
  o Monte Carlo simulations
  o Noise analysis
  o Linearity measurements (INL, DNL, SNDR, ENOB)

Test & Characterisation
- Define **test strategy and design-for-test (DFT) hooks**.
- Support silicon **characterisation and production test correlation**.
- Assist in silicon validation and performance analysis.

Cross-Disciplinary Collaboration
- Work with photonics engineers to develop models for photonic components such as modulators and resonators.
- Support development of control algorithms and tuning strategies for photonic subsystems.

Required Experience & Skills

- MEng, MSc, or PhD in Electronic Engineering, Electrical Engineering, or a related discipline.
- 8–10+ years of mixed-signal IC design experience.
- Proven ADC/DAC tape-out experience.
- Experience designing precision references and biasing circuits.
- Practical experience with heater drivers or precision current sources.
- Experience integrating third-party IP into complex mixed-signal systems.
- Strong understanding of top-level AMS verification methodologies.
- Expertise in Cadence Virtuoso design environment.
- Experience with Spectre / AMS simulation flows.
- Scripting capability in Python or MATLAB for modeling and data analysis.

Preferred / Additional Experience

- Familiarity with silicon photonics components, including:
  o Ring resonators
  o Mach-Zehnder interferometers (MZIs)
  o Thermal tuning elements
  o Phase shifters
- Experience with calibration and control techniques, including:

- o   Background calibration
- o   Trimming
- o   Temperature compensation
- Knowledge of power management architectures including LDOs and DC-DC converters.
- Experience designing noise-isolated mixed-signal floorplans.

Benefits

We offer competitive compensation. The base salary range for this role determined based on location, experience, educational background, and market data.

Salary Range: total compensation goes beyond base salary, it also includes comprehensive health care plan, retirement savings matching program, generous time off, annual performance-based bonus, and other rewards that recognise your impact and contribution.

Benefits eligibility may vary depending on your employment status and location. Optalysys recruits, employs, trains, compensates, and promotes regardless of race, religion, color, national origin, sex, disability, age, veteran status, and other protected status as required by applicable law.

How to apply

Please send a copy of your CV to recruitment@optalysys.com with a cover letter