

# Kevin Fronczak

Analog Circuit Designer

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## PROFESSIONAL

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### Synaptics Inc.

Rochester, NY

*Sr. Mixed Signal IC Design Engineer*

*February 2014 - Present*

#### Fingerprint Sensing

- Designed a small area, noise-optimized current-mode front-end which helped reduce die cost by nearly 50%
- Designed an innovative multi-level mixing topology to improve SNR
- Drove circuit and system implementation of a small area current-mode front-end in order to prove ability of the new technology to sense a fingerprint (stepping-stone for fingerprint sensor cost reduction)
- Led efforts to evaluate, track, and debug new silicon for any potential issues that could require a metal or all-layer revision, allowing for efficient evaluation of benefits/risks of a potential spin
- Designed a capacitive background cancellation circuit with sub-femtofarad resolution

#### Touch Sensing

- Designed a small-area current-mode baseline correction circuit for TDDI (Touch and Display Driver IC) in order to reduce die cost and maintain competitive edge in TDDI market
- Designed switched capacitor demodulator and sample-and-hold circuitry for TDDI analog front-ends

#### Low Power and Reference Circuits

- Architected and led the implementation of an experimental small area, nano-Amp reference architecture (current mirrors, oscillators, etc) with the goal of reducing standby power without sacrificing performance
- Designed a sub 1-V bandgap reference with innovative base-cancellation circuit for TDDI chips
- Aided in development of a top-level mixed-signal verification flow for capacitive fingerprint sensors, allowing teams to efficiently catch system-level bugs before tapeout

#### Display Drivers

- Experience with MIPI DSI from transistor-level design through top-level verification and production test

#### General

- Experience working closely and effectively with multidisciplinary teams to ensure smooth silicon design and bring-up all the way through to production
- Have designed circuits in 130nm and 55nm technologies
- Very familiar and comfortable with Cadence design flow for IC design
- Experience using MATLAB for both system design and for testing of ASICs
- Focus on fundamental understanding of circuits for architectural comparisons is a strength (i.e. pencil-and-paper analysis)
- Attended a week-long Continuous-Time Delta Sigma Converter course held by MEAD (taught by Drs. Pavan, Schreier, and Hanumolu).

### Synaptics Inc.

Rochester, NY

*Analog Design and Silicon Validation Contractor*

*June 2013 - February 2014*

- Performed extensive validation on LDOs, VCOM drivers, LCD level shifters, and high-speed MIPI DSI
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## EDUCATION

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### Rochester Institute of Technology

Rochester, NY

Master of Science and Bachelor of Science, August 2013

GPA: 4.0

#### **Thesis**

*Stability Analysis of Switched DC-DC Boost Converters for Integrated Circuits*

- Investigated small-signal modeling and stability requirements for boost converters, as well as a variety of OTA-based controller topologies, in order to aid in the measurement of boost converter stability on multiple ASICs. Also investigated use of optimization algorithms as a way to improve controller design.

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## **PATENTS AND PUBLICATIONS**

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- US 9,780,736 - Temperature compensated offset cancellation for high-speed amplifiers - Issued Oct. 3, 2017
- US 9,817,428 - Current-mode Bandgap Reference with Proportional to Absolute Temperature Current and Zero Temperature Current Generation - Issued Nov. 14, 2017
- US 15/685,937 - Mixer Circuit - Pending Aug. 24, 2017