



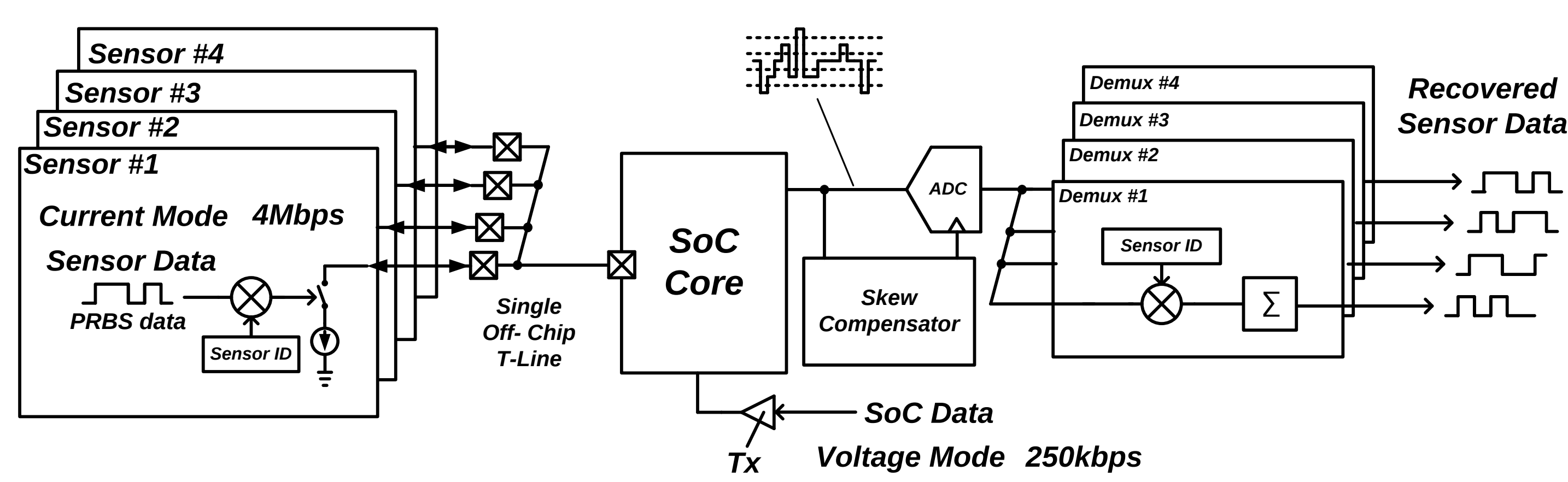
Single-wire, Bi-Directional, Simultaneous, Self skew-compensated and Multi-access Interface Architecture for Sensor System

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I. Abstract

- In general, multiple access sensor systems require additional physical wires(SPI) or receive sensor data sequentially(I2C).
- Proposed architecture uses single signal line for bi-directional, simultaneous and multi-access transceiver circuit for sensor system.
- By compensating skew, the system can receive sensor data without additional start, stop bit of sensor data code.
- The system communicates 1Mbps sensors data & 250kbps SoC configuration data.
- SoC/Sensor transceiver is implemented in 65nm CMOS process.
- Successfully simulated in data communication.

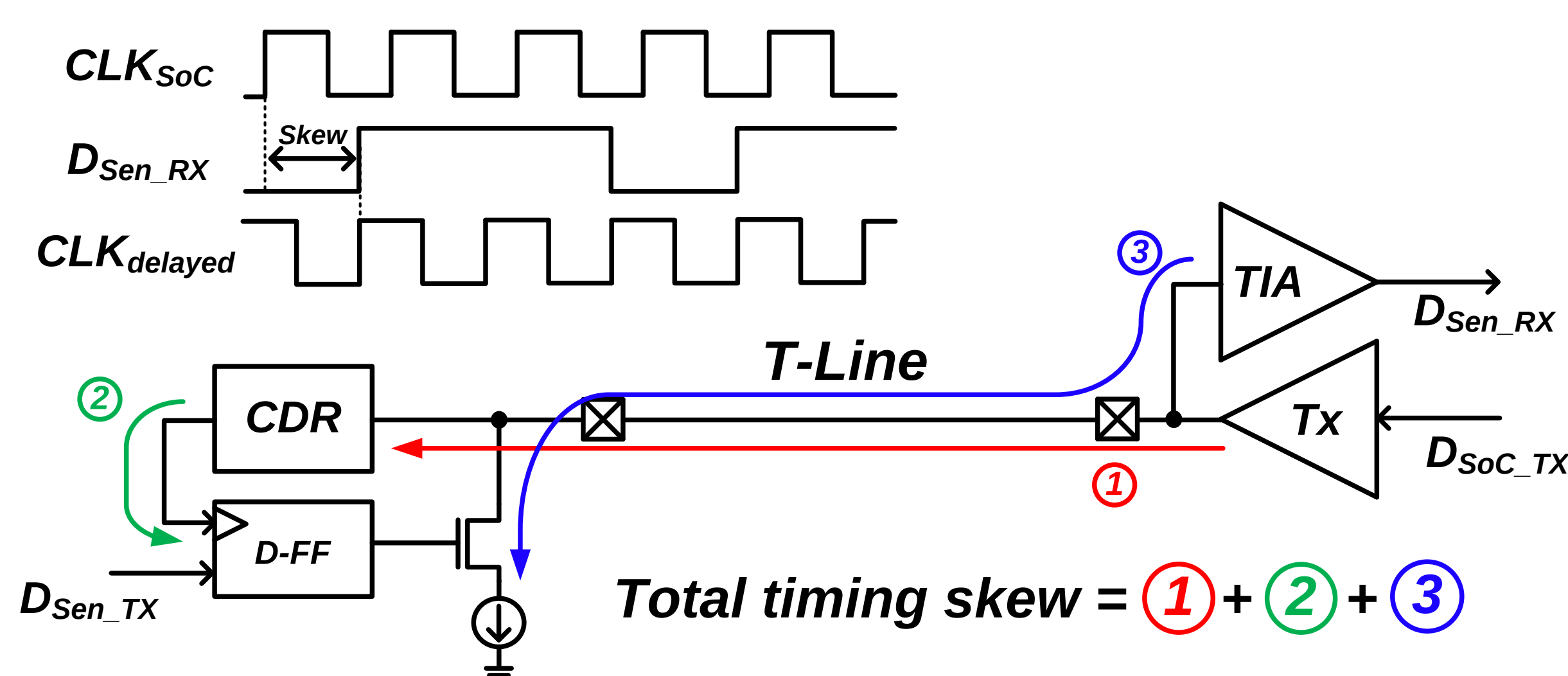
II. Proposed System



< Fig1. Proposed multi-access transceiver interface architecture >

Proposed System

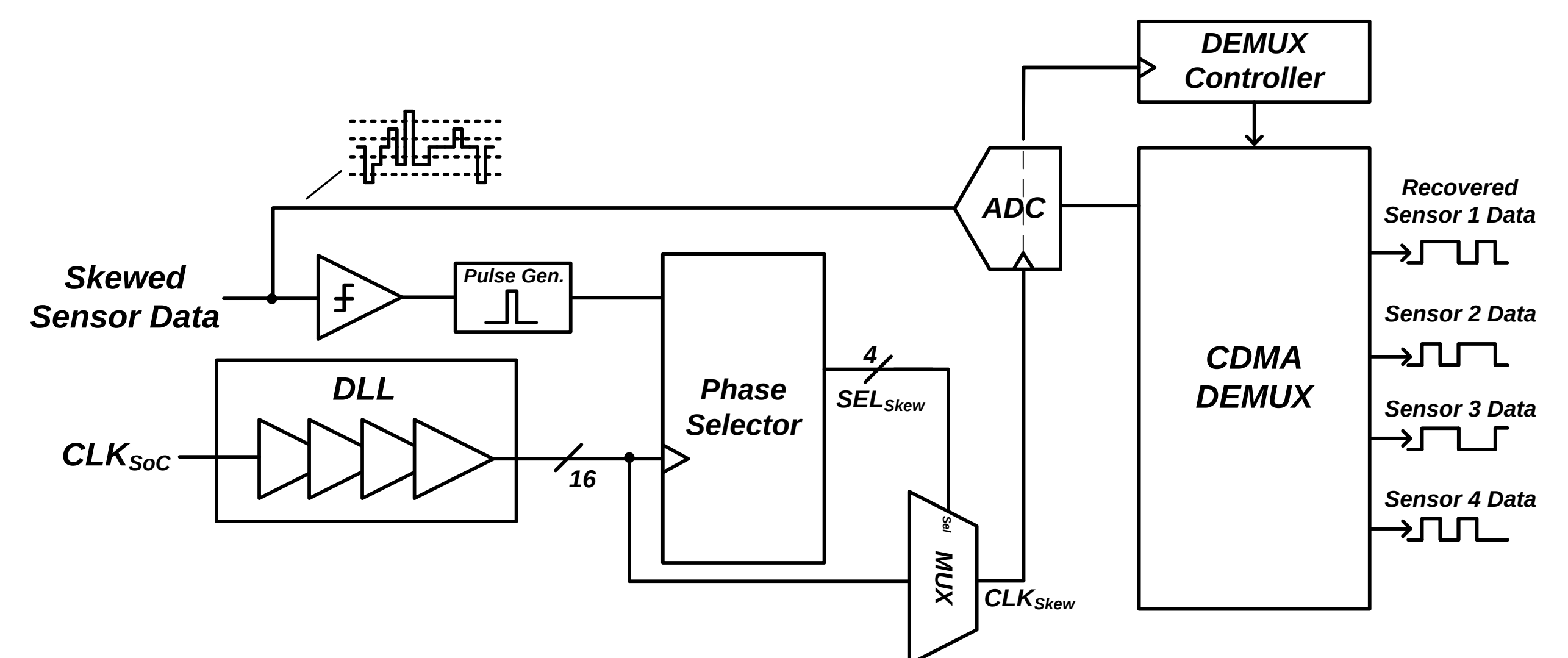
- Only one signal line for multi sensor data communication.
- Bi-directional, simultaneous communication through the current and voltage mode.
- Small system size, low power consumption and low noise.



< Fig2. Timing skew between SoC and sensor system >

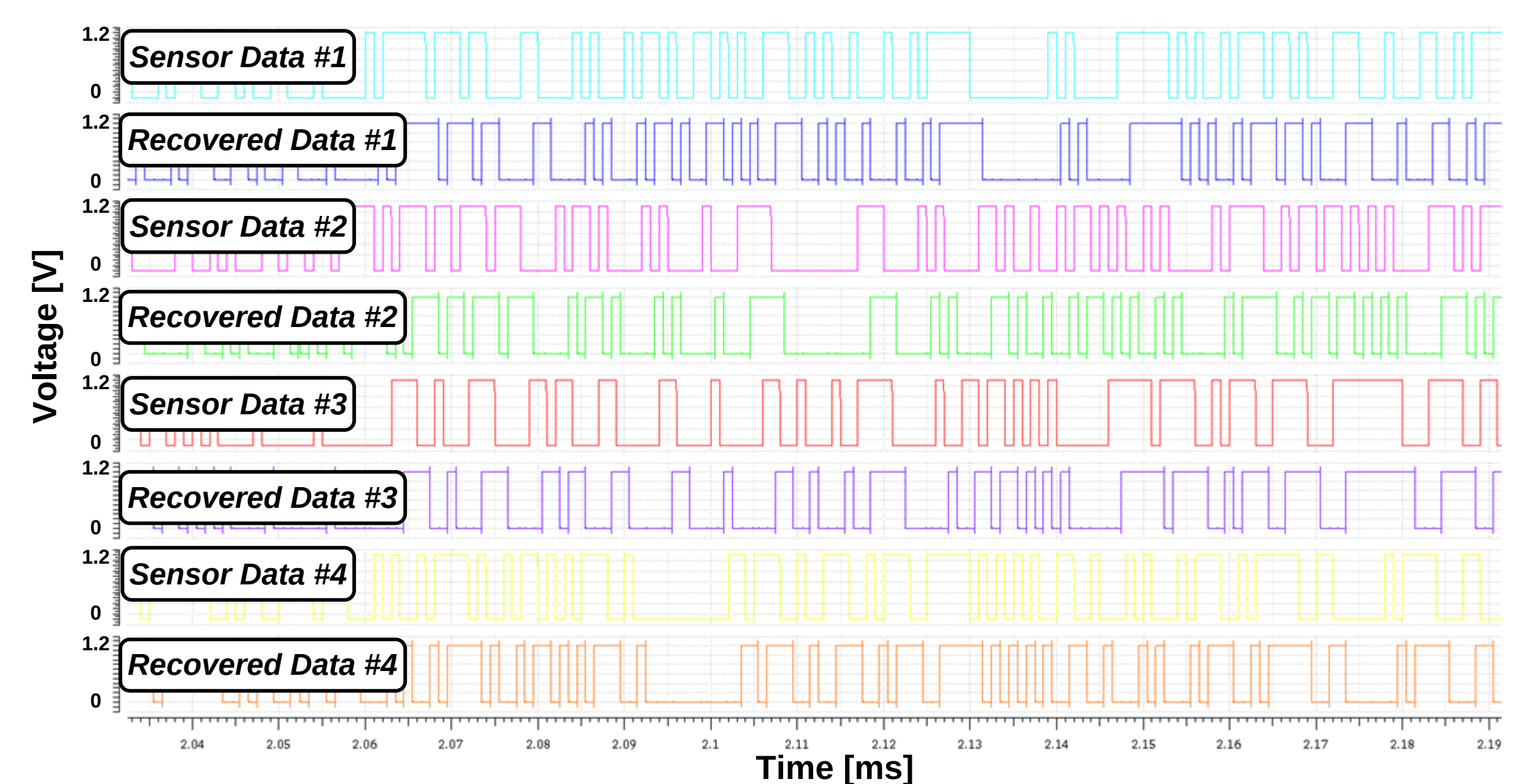
Timing Skew

- SoC receives sensor data delayed by skew.
- Skew must be compensated to know where the start point of sensor data.

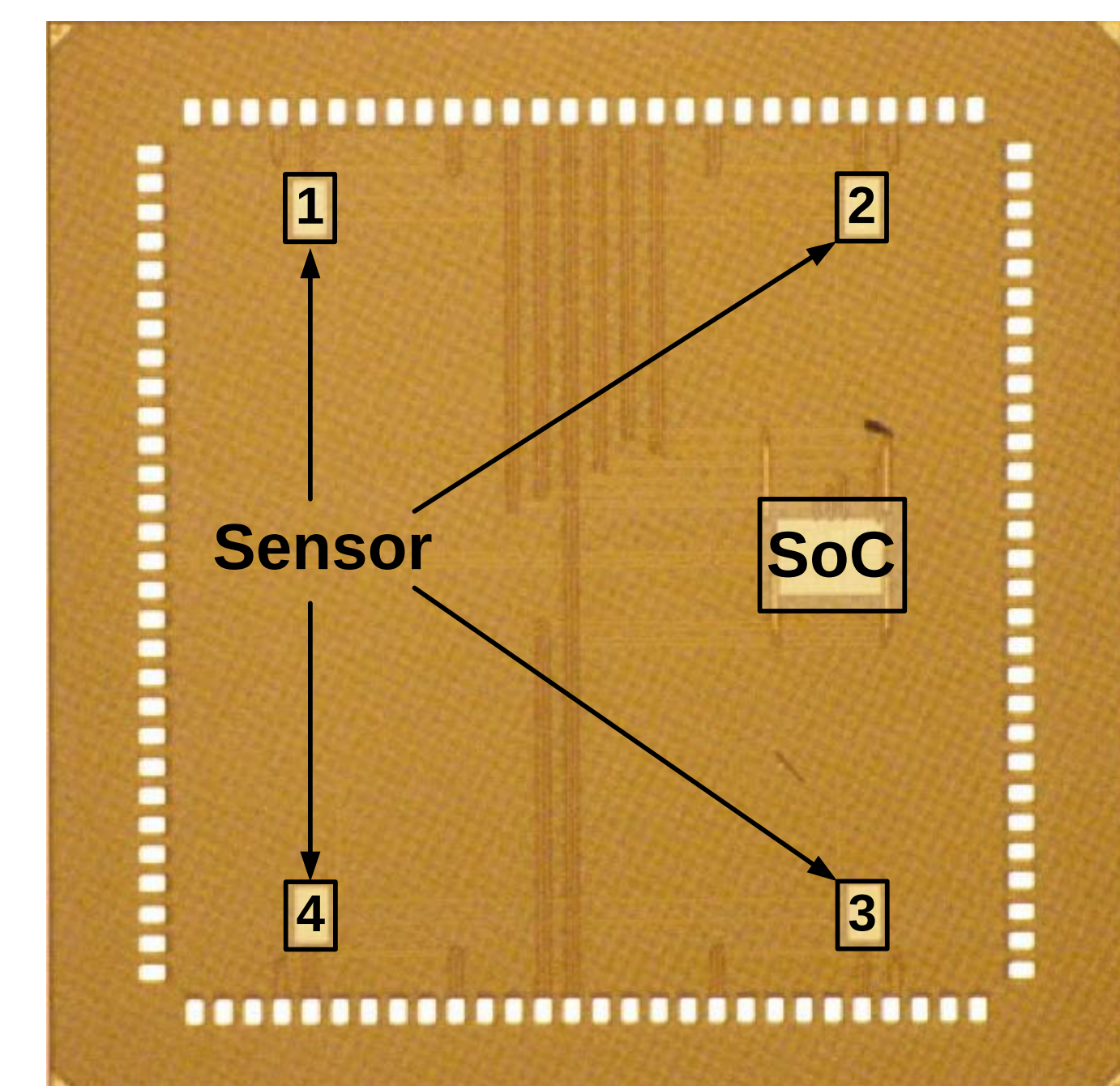


< Fig3. Self skew compensator architecture >

III. Measurement result



< Fig4. Simulated results transmitted and received signals >



< Fig5. Proposed transceiver chip photomicrograph >

IV. Result

- Proposed transceiver system use only single signal line for bi-directional, simultaneous and multi-access data communication
- 4 sensor data are successfully recovered through skew compensation