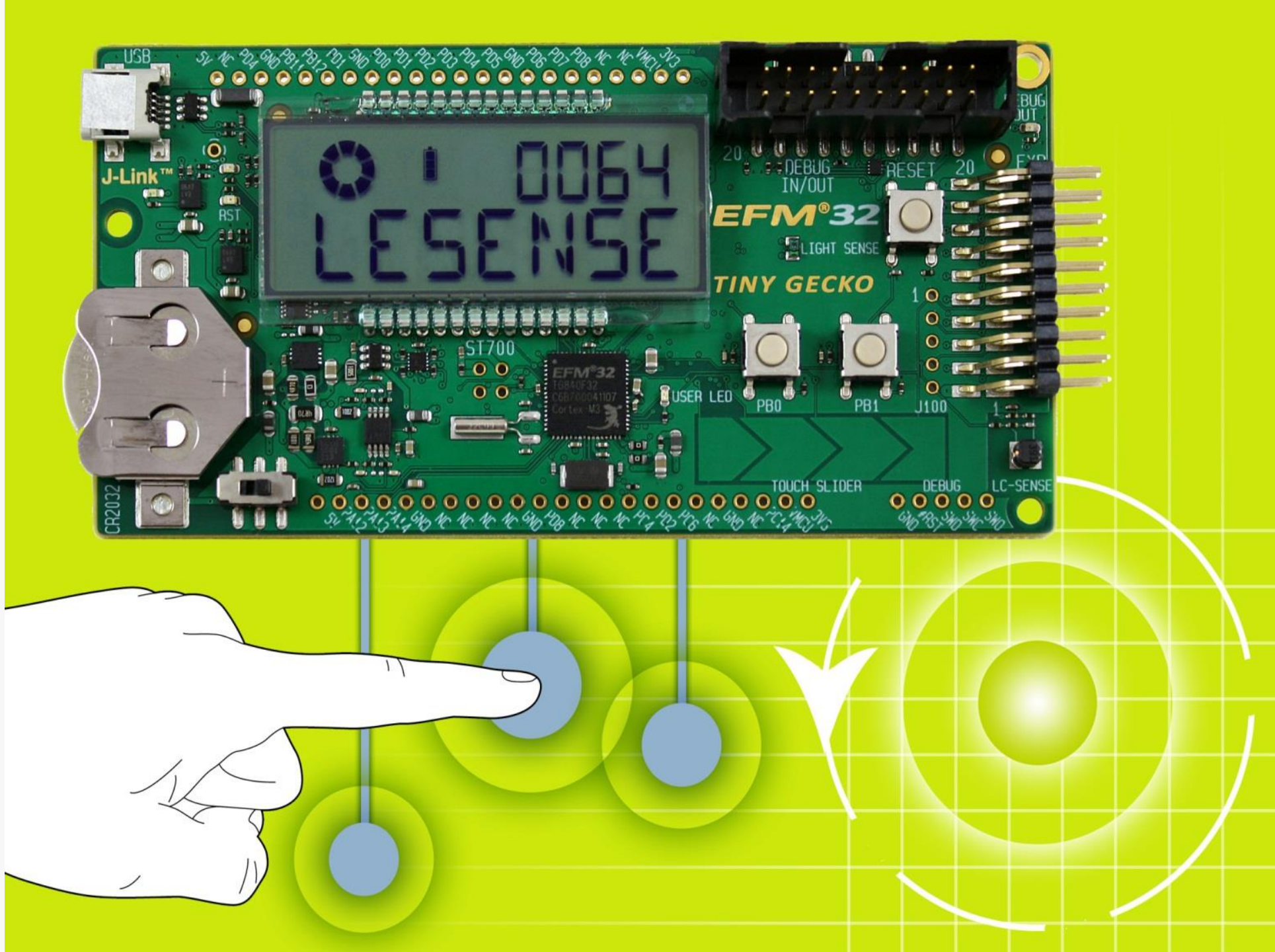




EFM32 Series 0: Low Energy Sensor (LESENSE) Interface

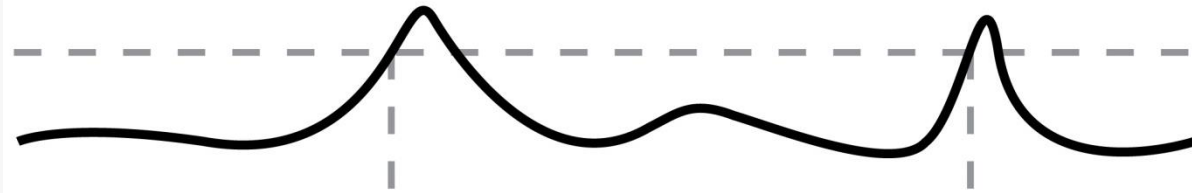




LESENSE – Low Energy Sensor Interface

Analog events

Capacitive, inductive or resistive sensors



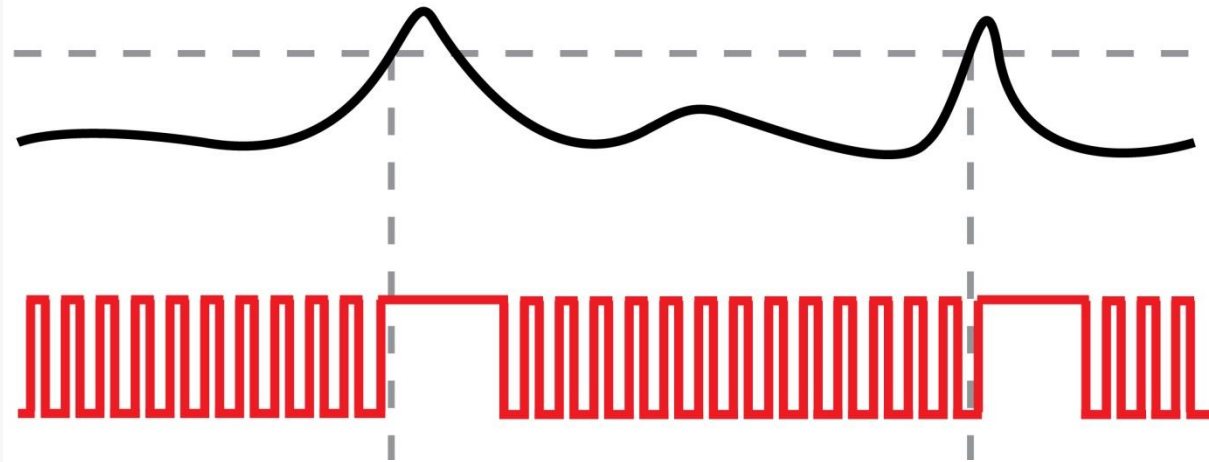
LESENSE – Low Energy Sensor Interface

Analog events

Capacitive, inductive or resistive sensors

Generic MCU

Wake-up periodically to detect the events



LESENSE – Low Energy Sensor Interface

Analog events

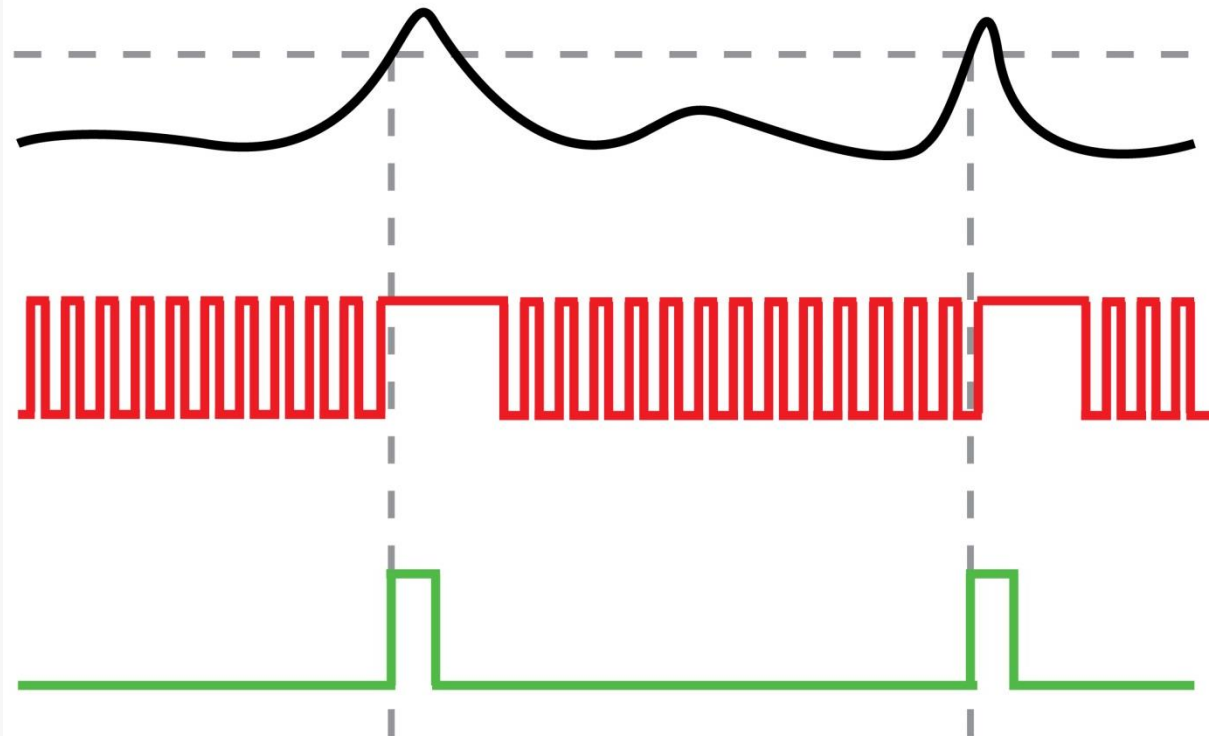
Capacitive, inductive or resistive sensors

Generic MCU

Wake-up periodically to detect the events

EFM32 MCU

Wake-up only on the events



LESENSE – Low Energy Sensor Interface

Analog events

Capacitive, inductive or resistive sensors

Generic MCU

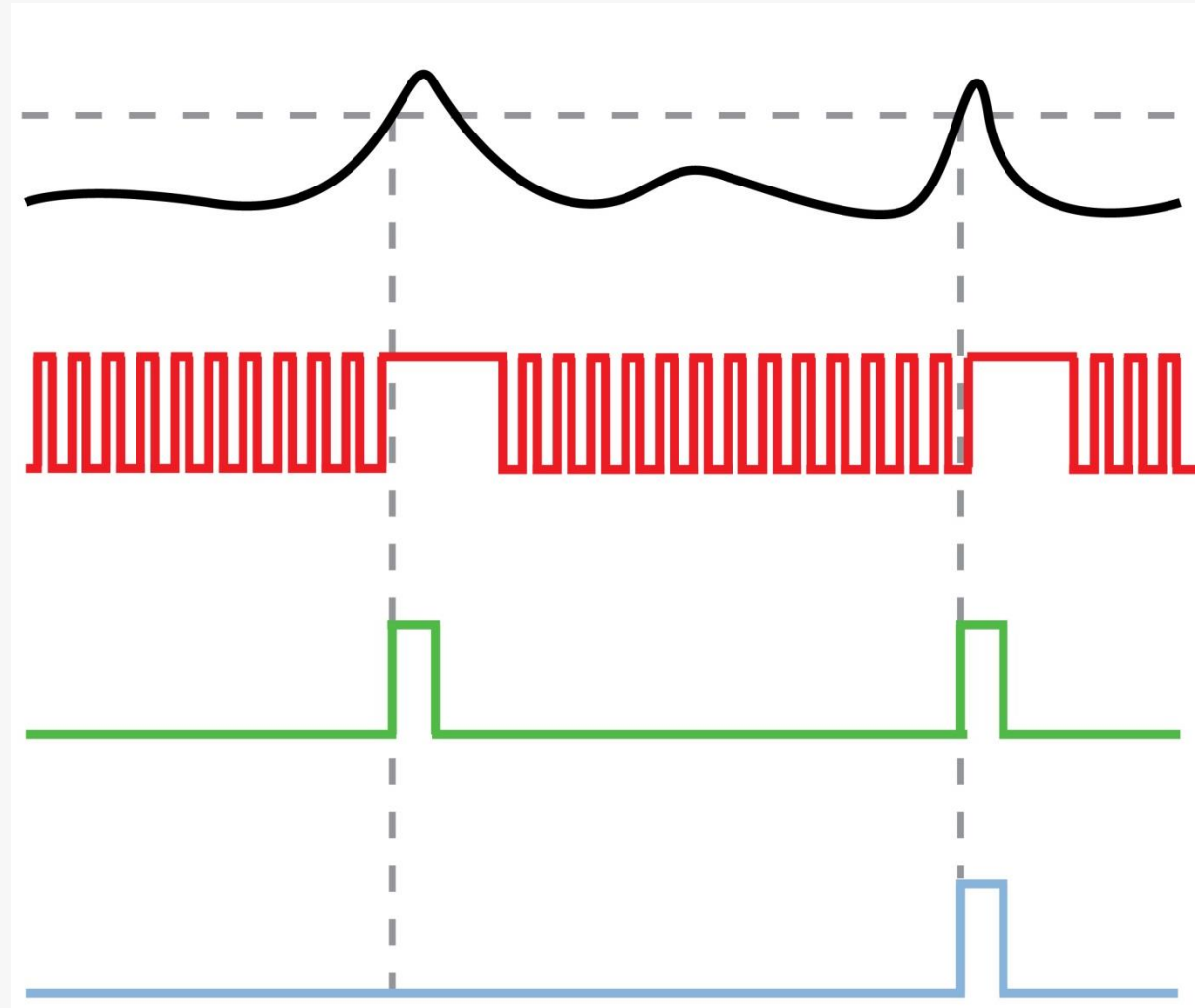
Wake-up periodically to detect the events

EFM32 MCU

Wake-up only on the events

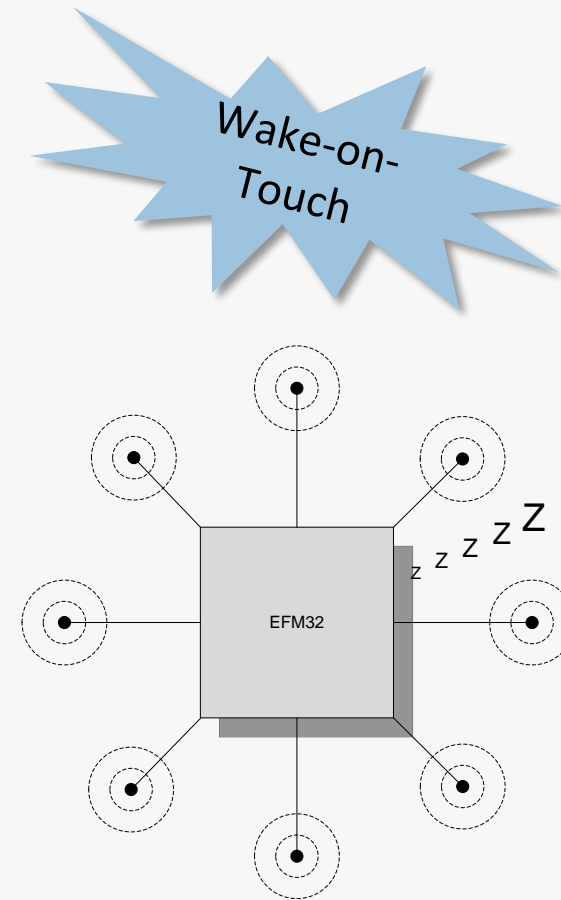
EFM32 MCU

Conditional wake-up
(e.g. on every 2nd event)

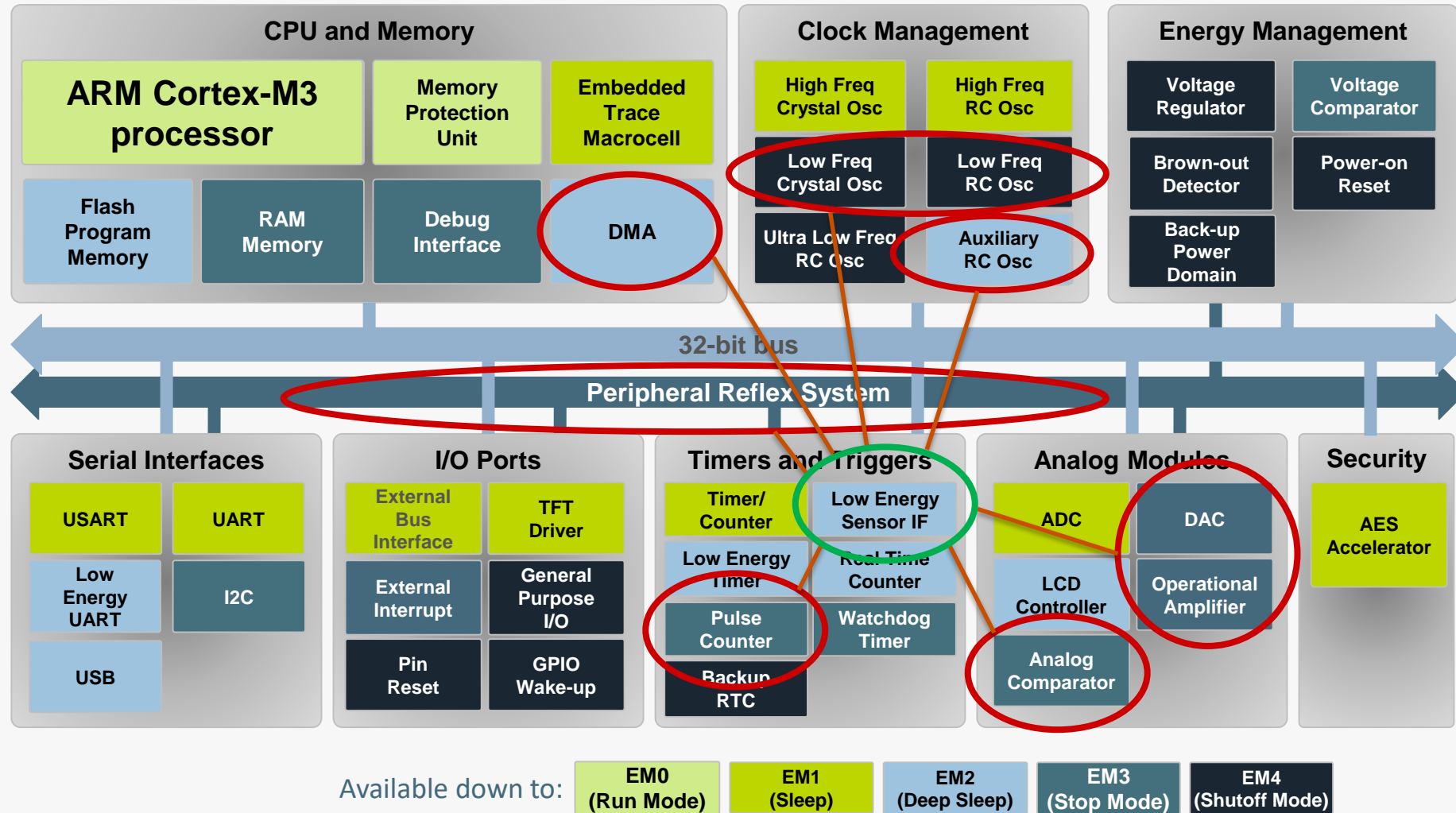


LESENSE – Low Energy Sensor Interface

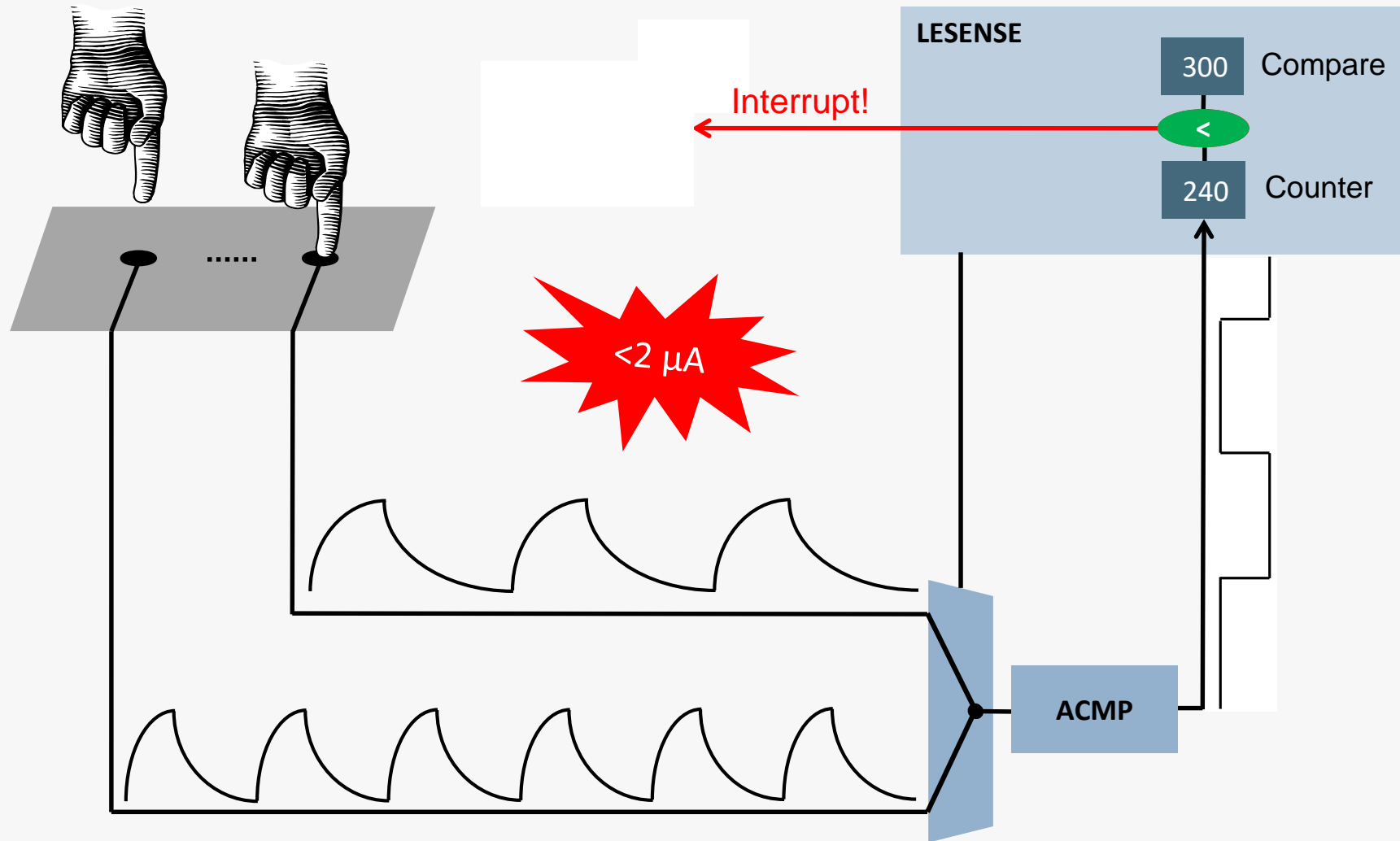
- **Autonomous sensing in Deep Sleep**
 - **LESENSE with central control logic**
 - **ACMP for sensor input**
 - **DAC for reference generation**
- **Measure up to 16 sensors**
 - **Inductive (LC)**
 - **Capacitive (eg. capacitive buttons)**
 - **General analog sensors (e.g. resistive)**
- **Programmable state machine**
 - **16 states, 4 input channels**
 - **Can do quadrature decoding**
- **Interrupt/PRS on sensor events**



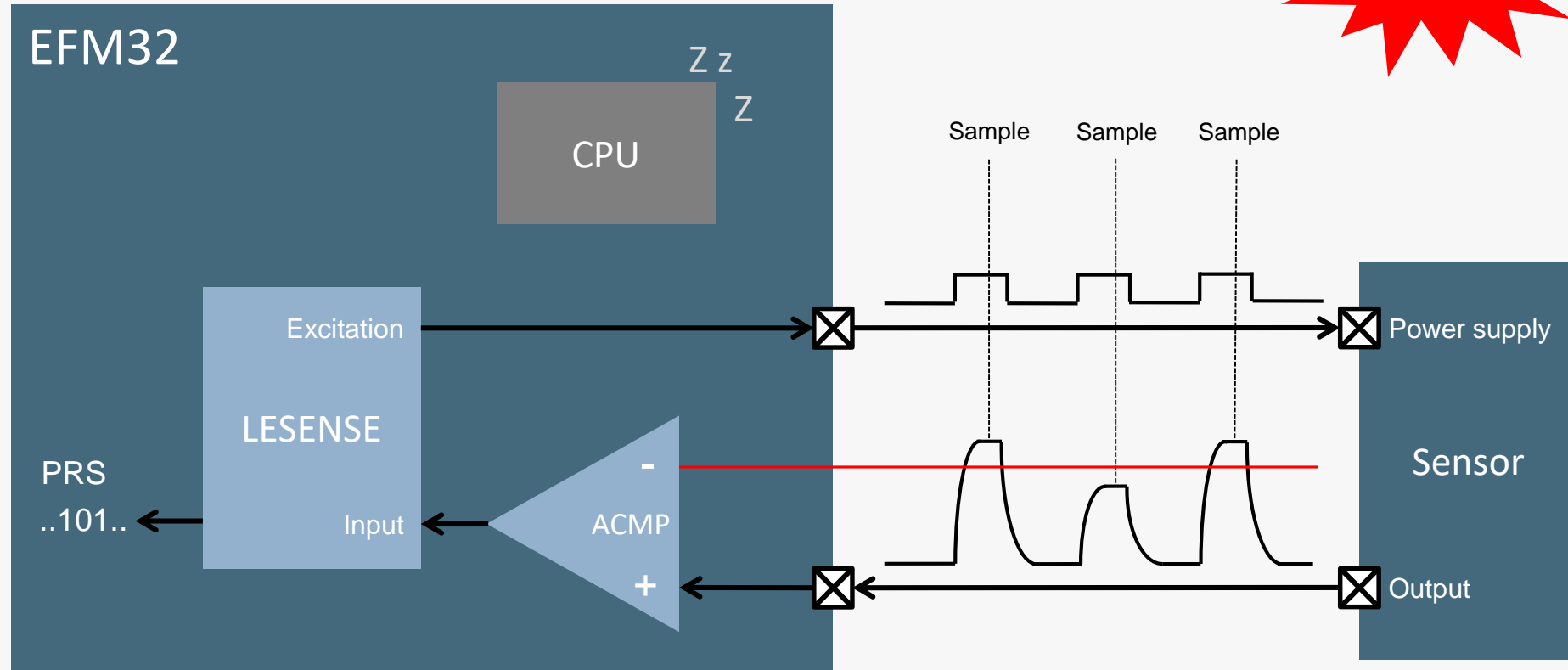
LESENSE – Requirements & Interactions



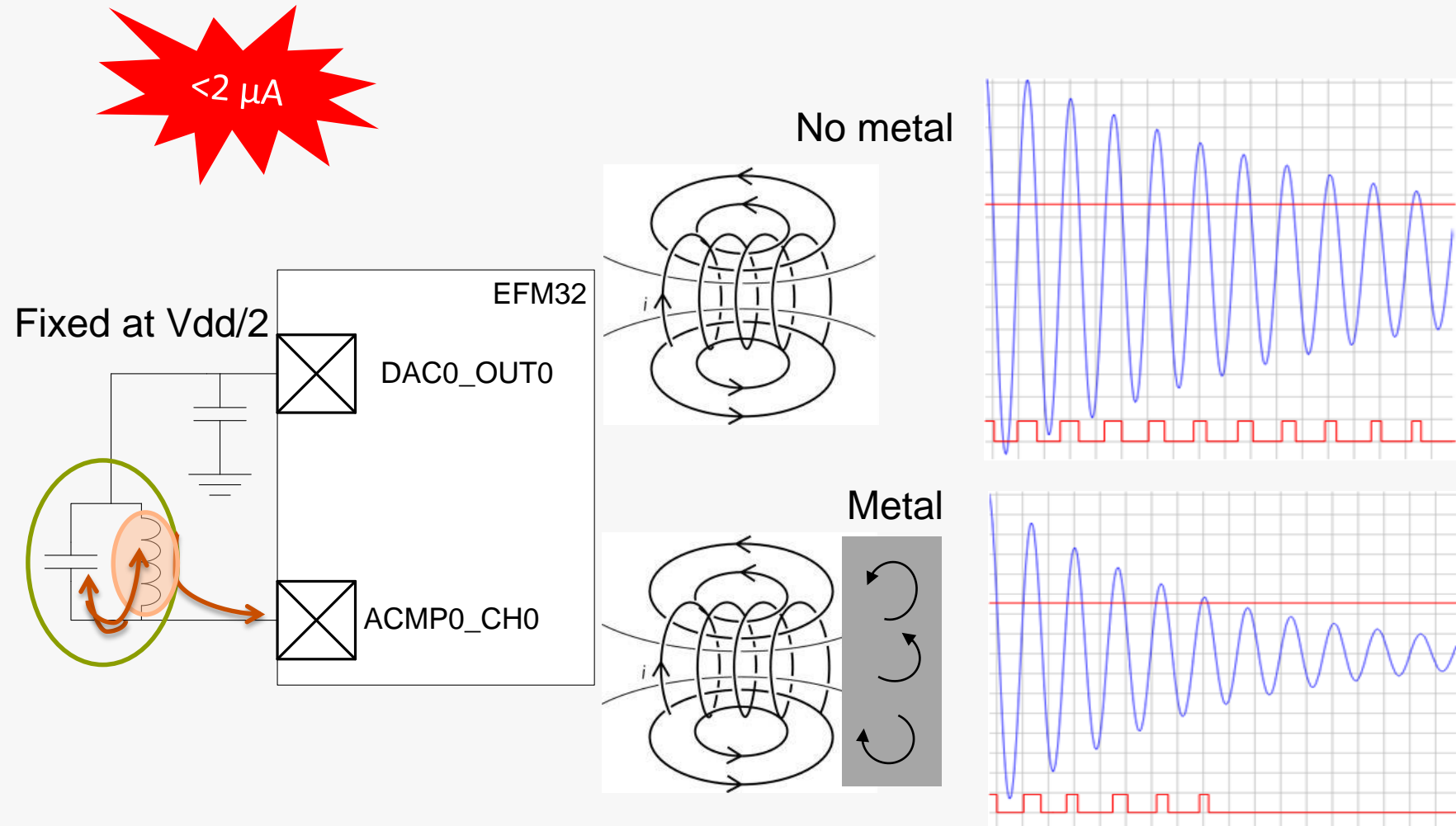
Capacitive Measurement



Resistive/General Measurement

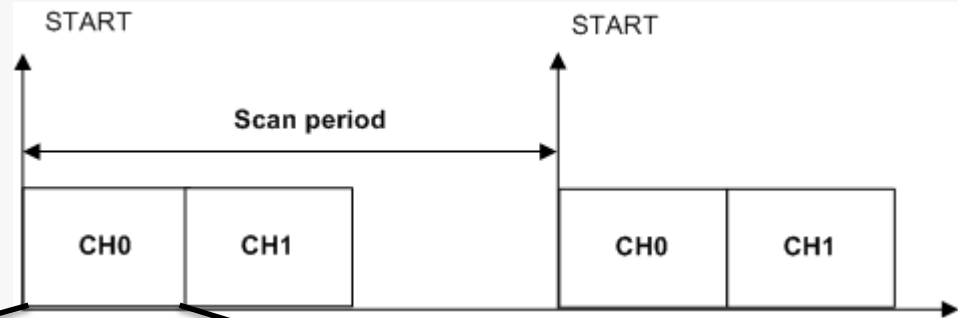


LESENSE Inductive Measurement

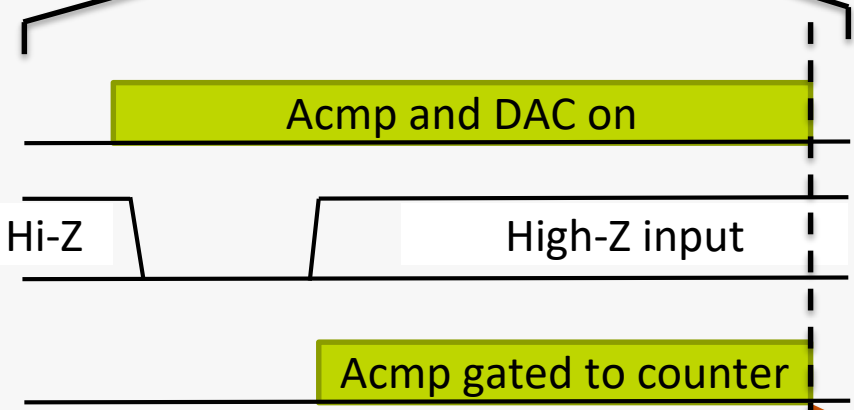


LESENSE Inductive Measurement – Timing

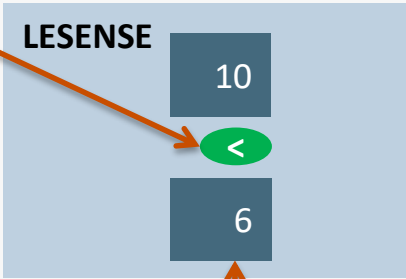
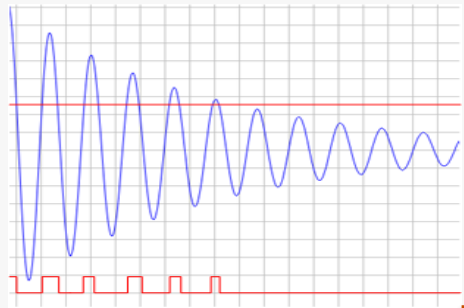
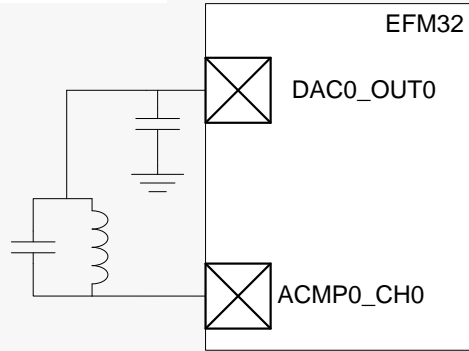
• **LESENSE scans all the enabled channels at a configurable frequency.**



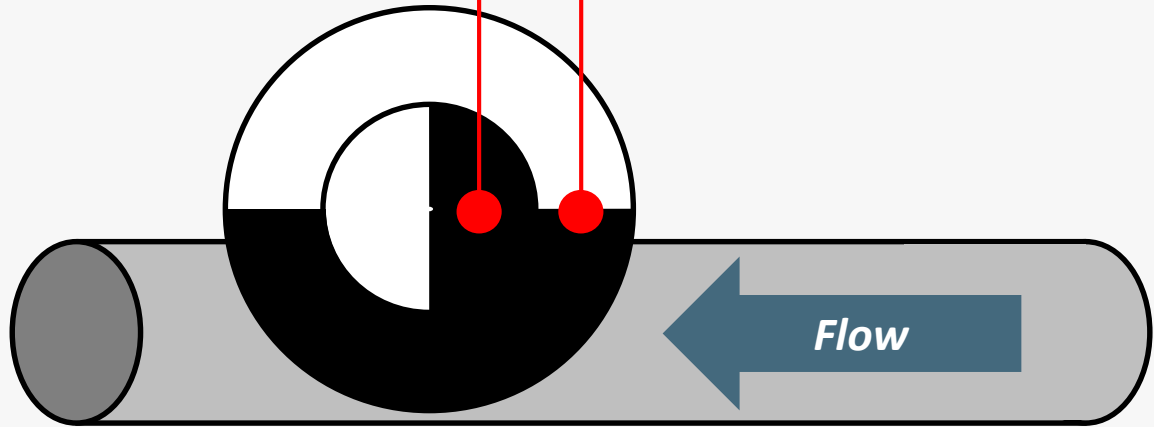
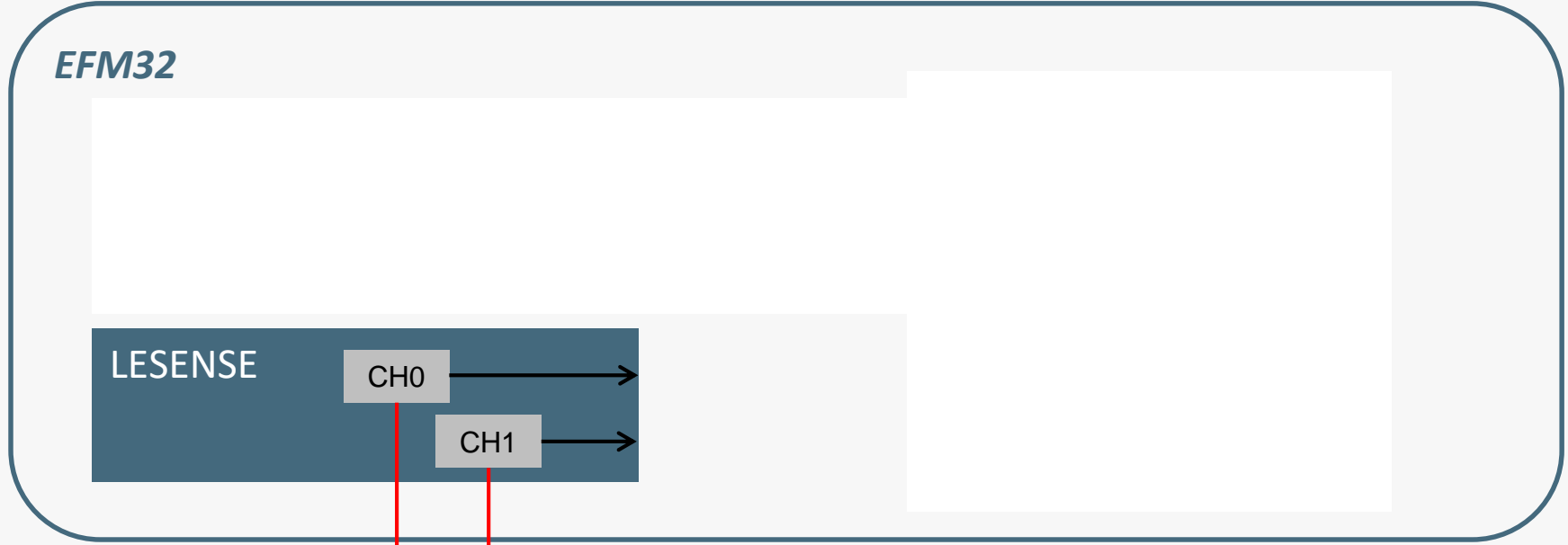
Analog Comparator and DAC Enabled
Excitation (pull CH0 pin low)



Sampling Window

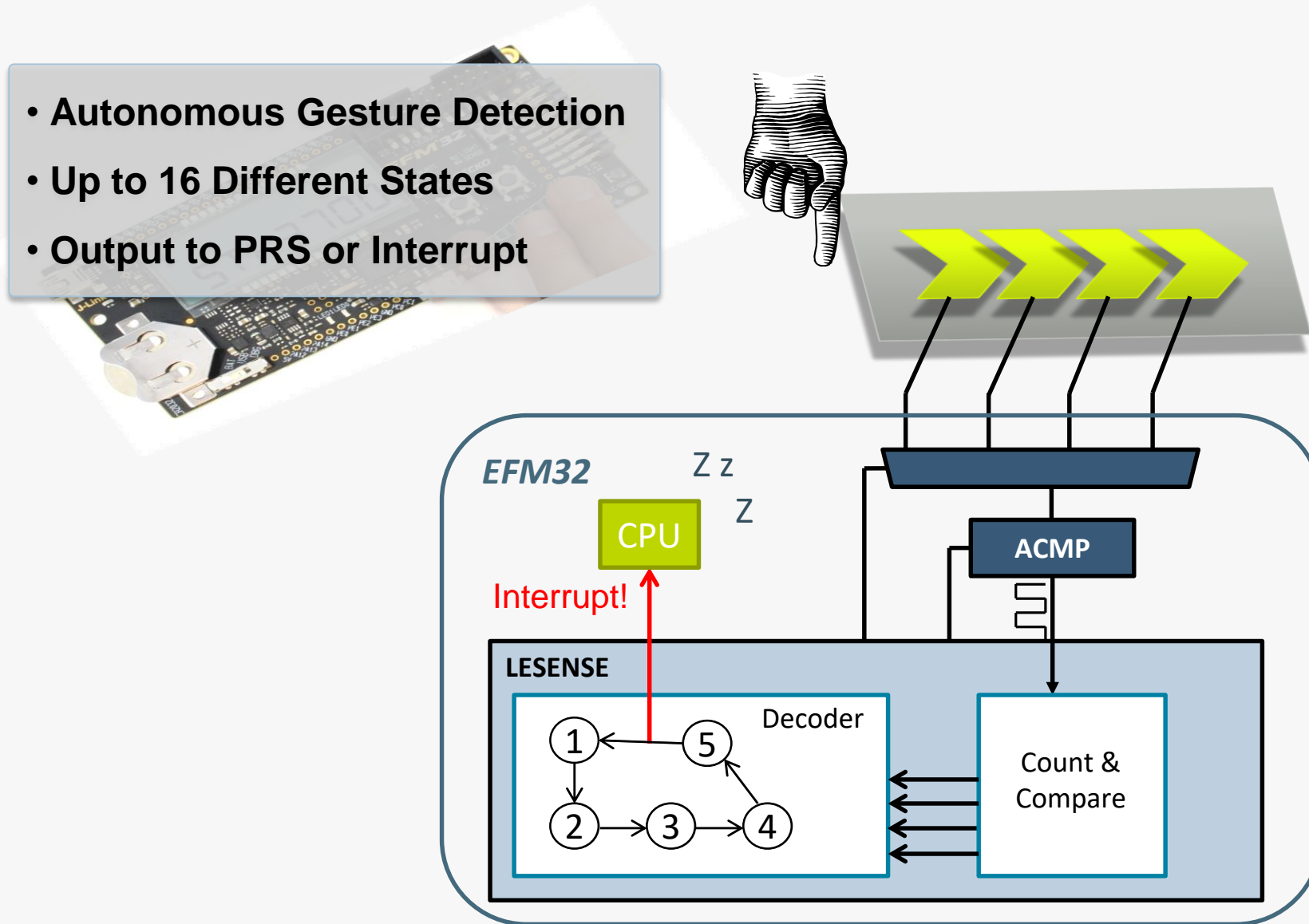


Feel the flow!!



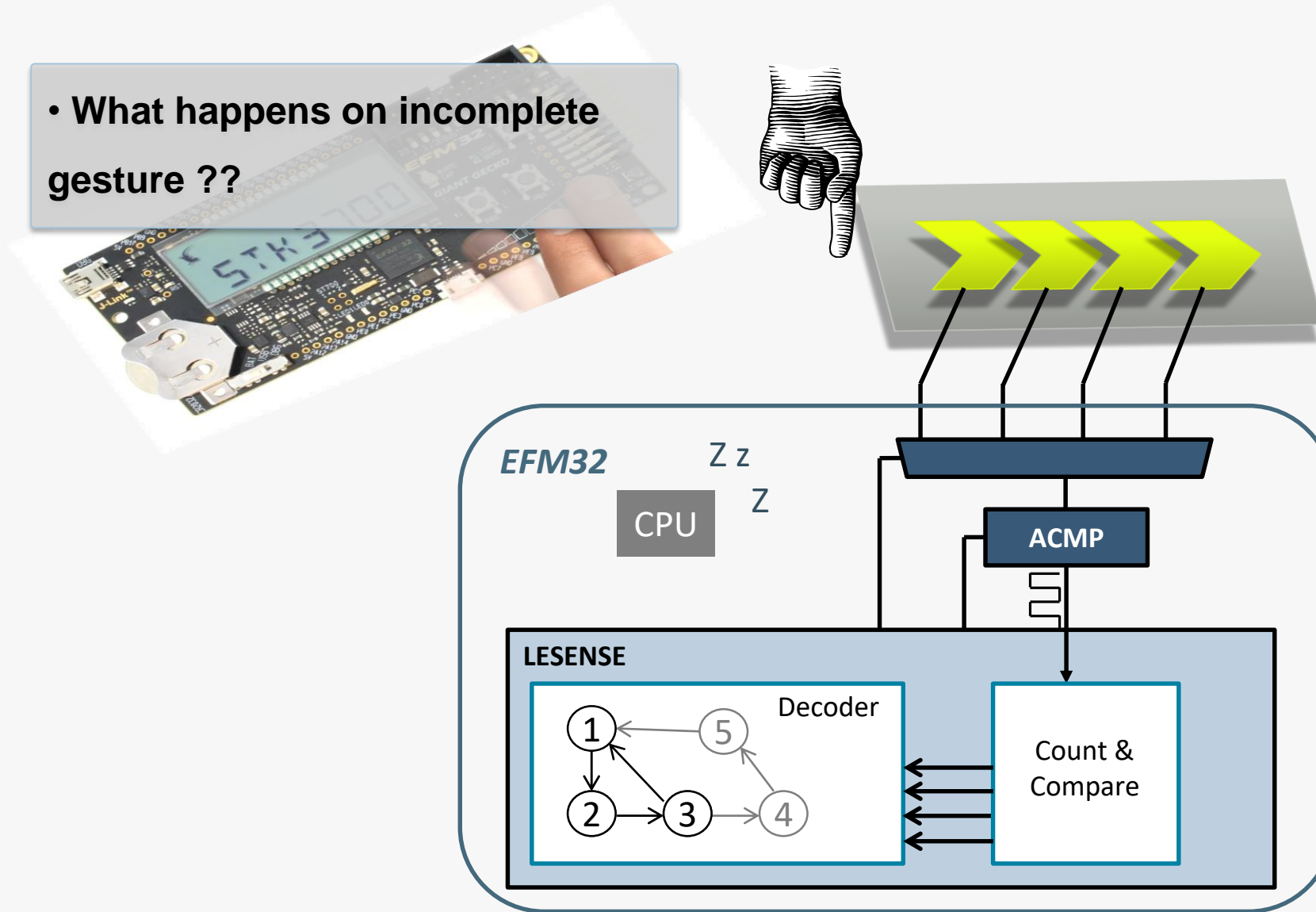
State Machine - Slide to Wake up!

- **Autonomous Gesture Detection**
- **Up to 16 Different States**
- **Output to PRS or Interrupt**



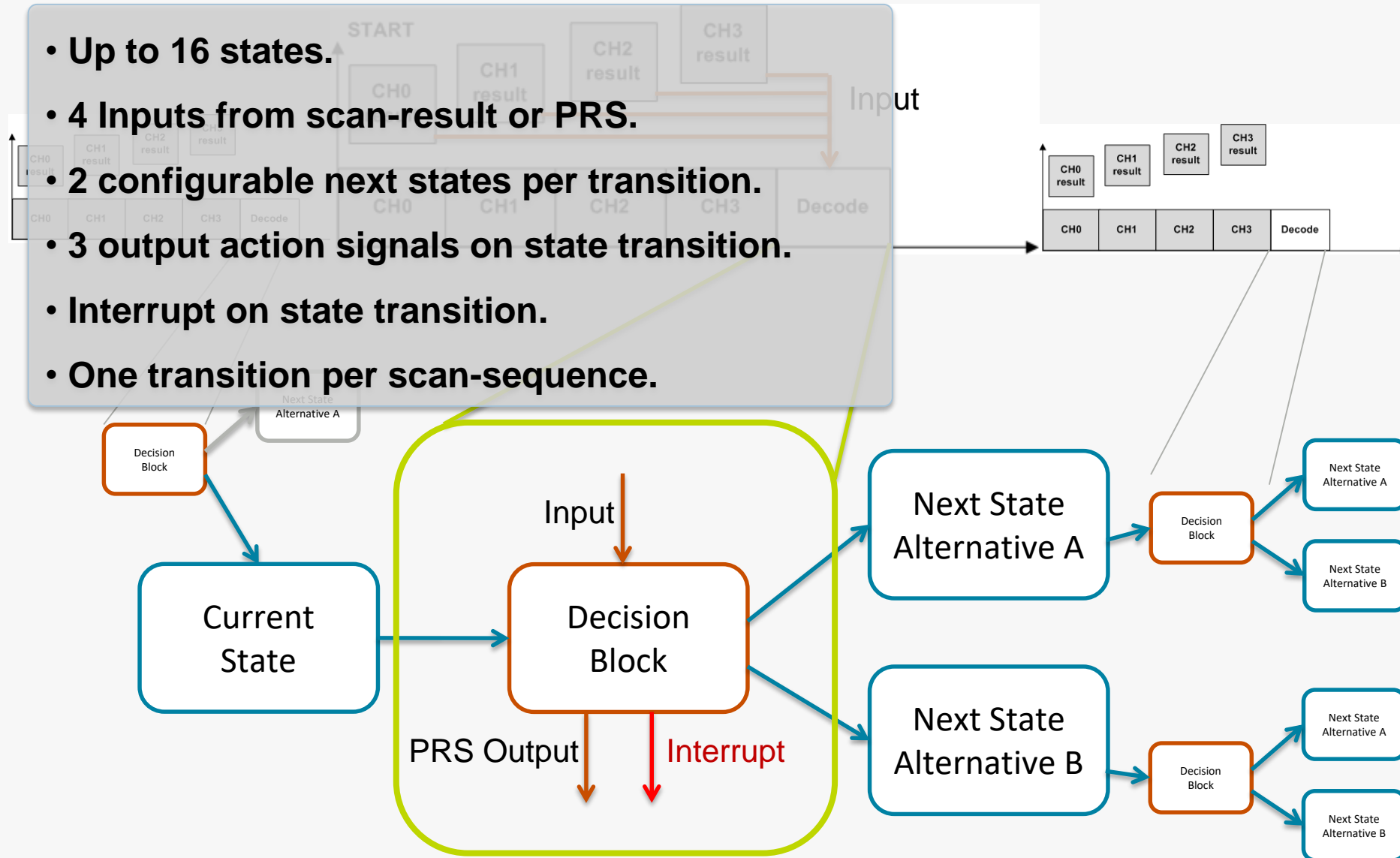
Slide to Wake up!

- What happens on incomplete gesture ??

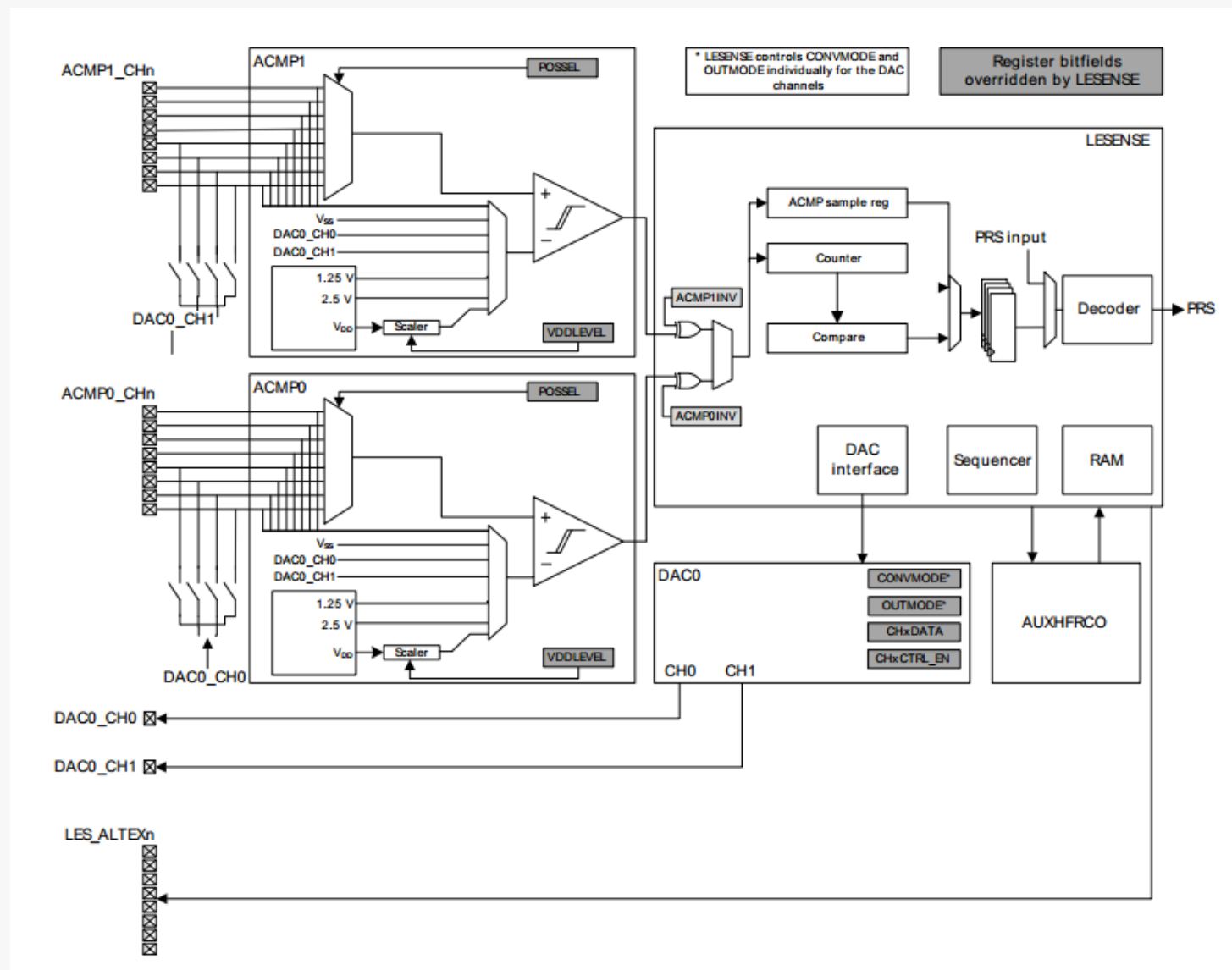


LESENSE – Statemachine / Decoder

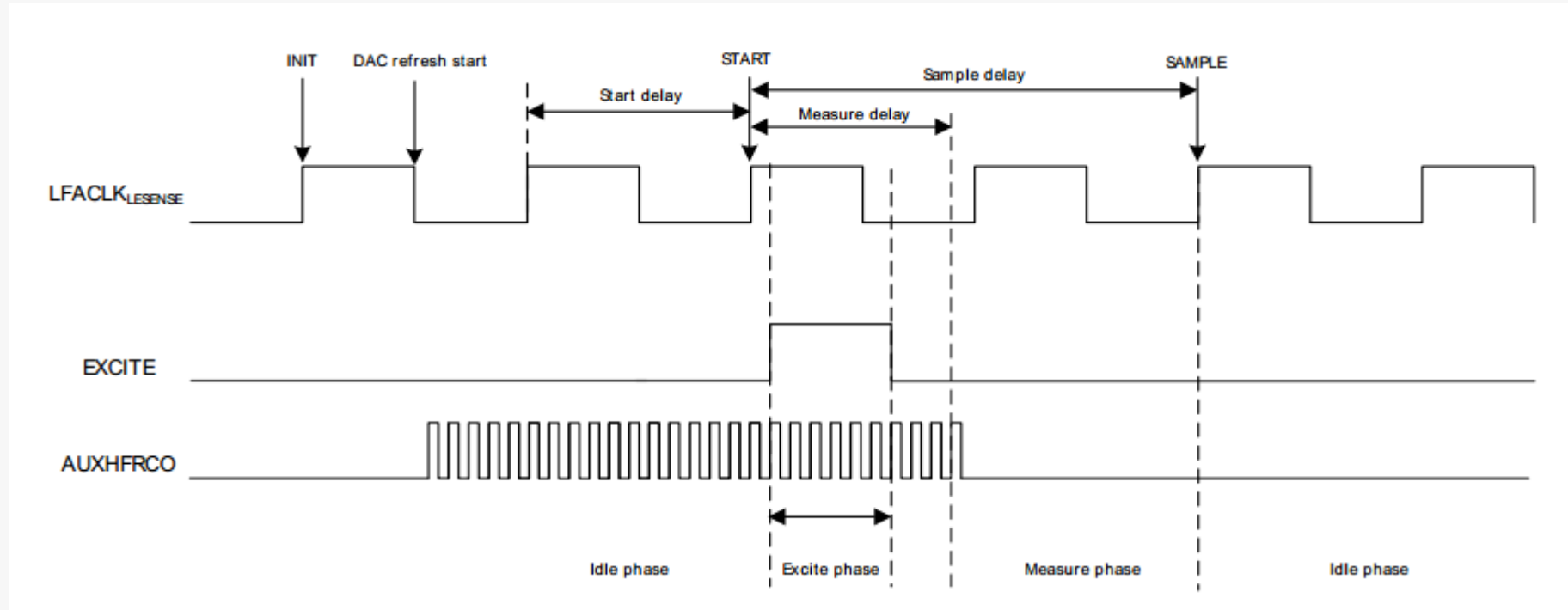
- Up to 16 states.
- 4 Inputs from scan-result or PRS.
- 2 configurable next states per transition.
- 3 output action signals on state transition.
- Interrupt on state transition.
- One transition per scan-sequence.



LESENSE Overview



Measurement Timing





www.silabs.com/efm32

