![Scopen wireless oscilloscope logo]

Wireless Oscilloscope
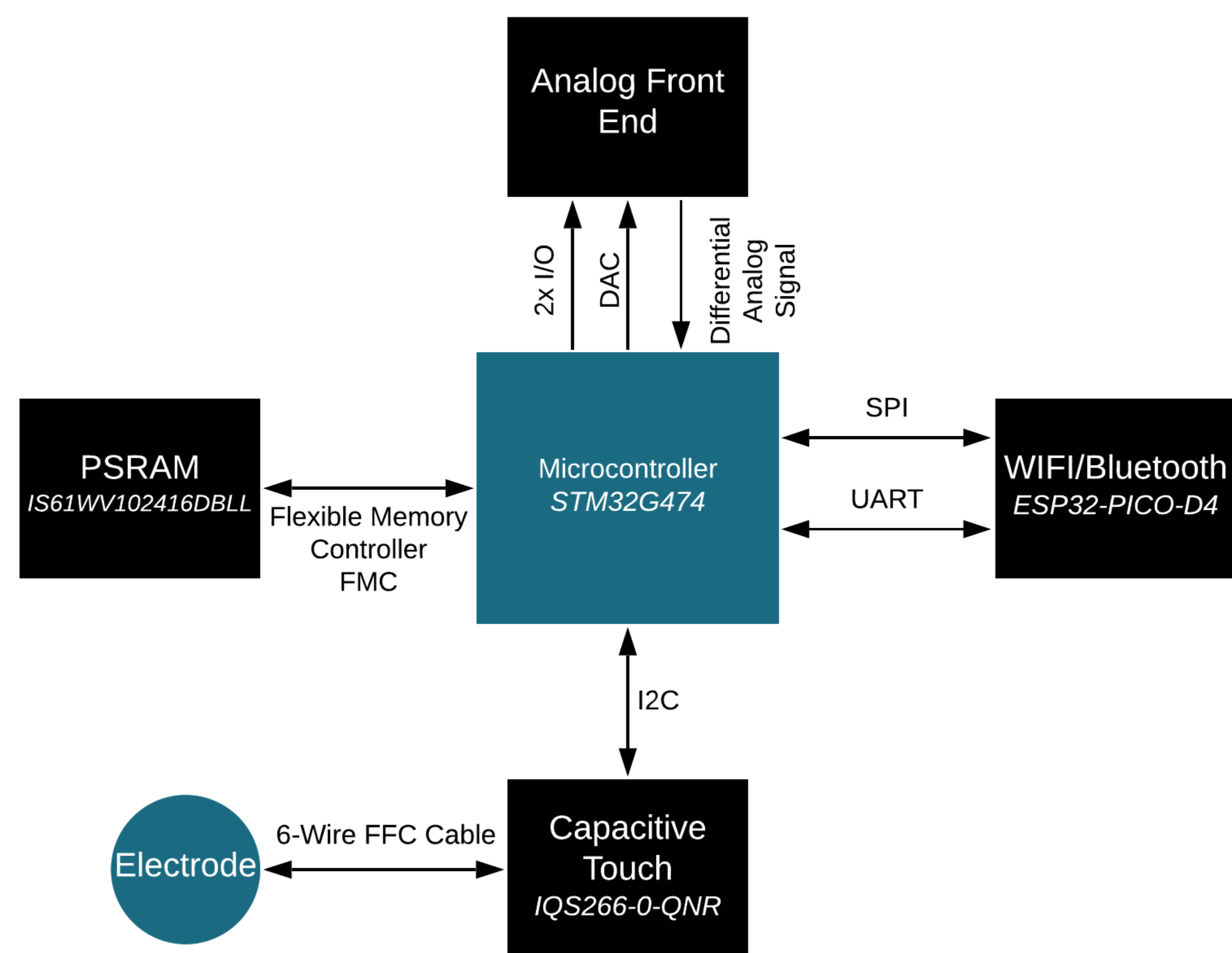
Boning Dong | Byron Aguilar | Cesar Gonzalez

Background

The oscilloscope is an essential tool for many engineers. Our project aims to place a convenient and affordable tool in the hands of those starting their study or pursuing their hobby in circuits.
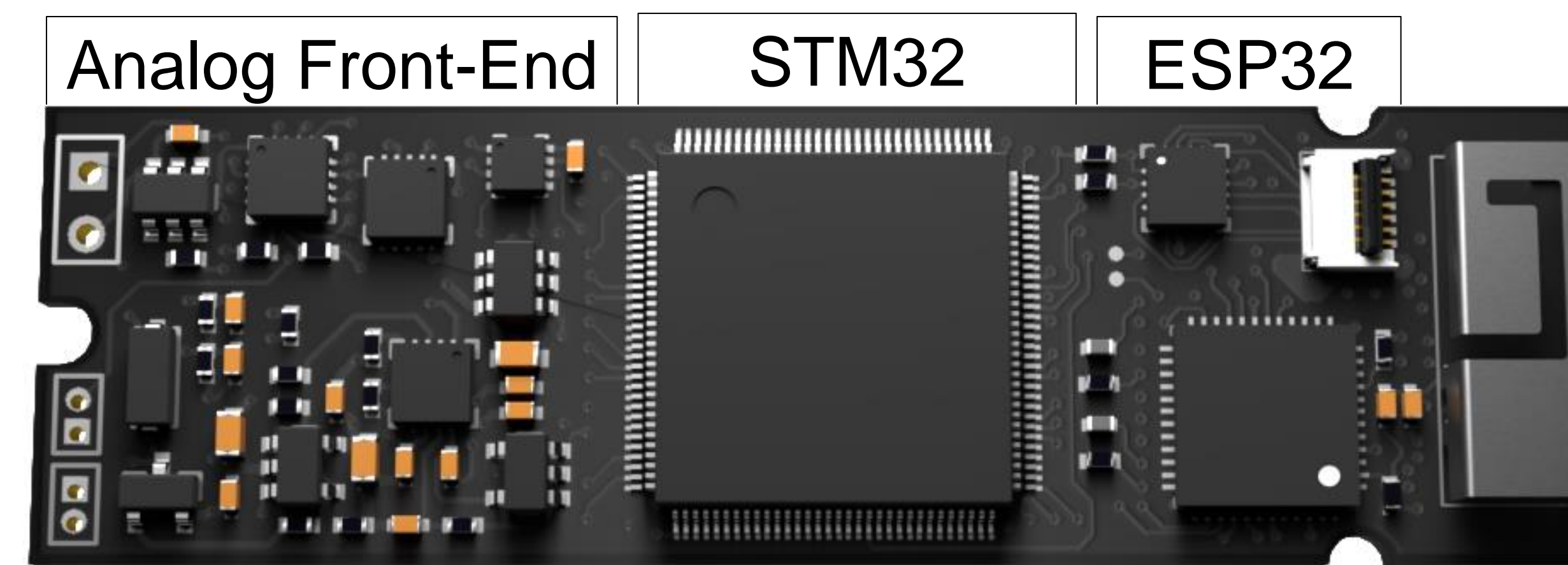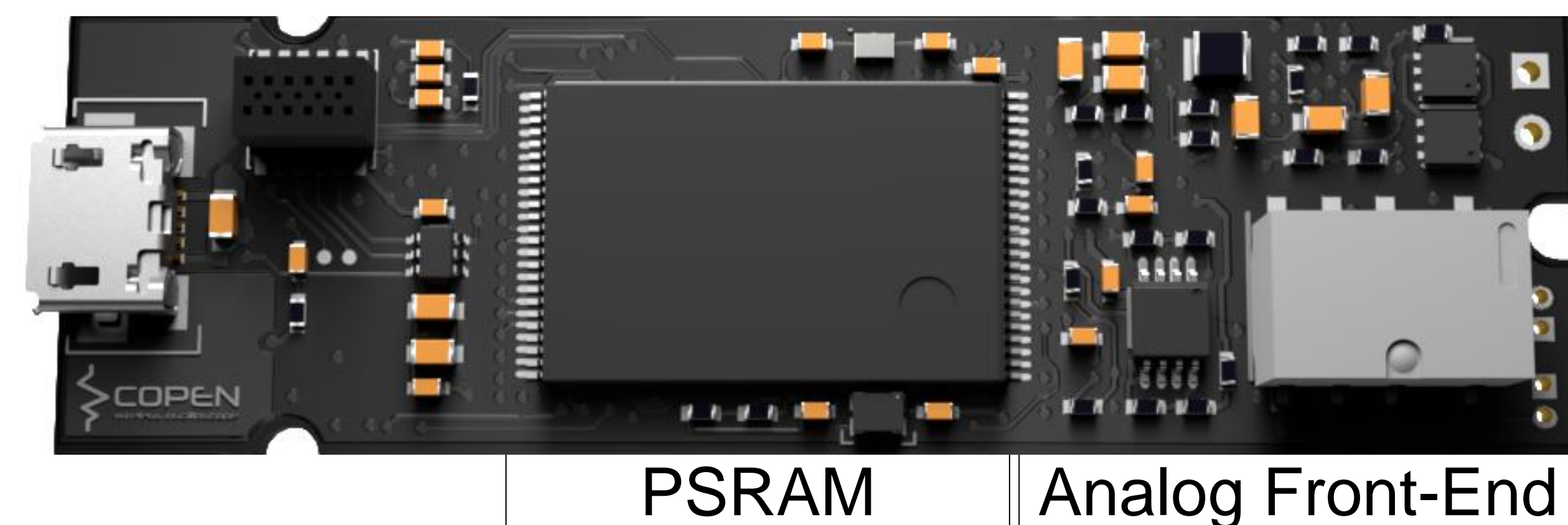
Overview

Our product, Scopen, is capable of many of the functionalities found in a conventional bench-top oscilloscope. It can measure arbitrary waveforms with up to a 5 MHz bandwidth and 50 Vpp measurement capabilities. Its sleek, pen-like design makes it easy and interactive to use with a single hand. Wireless design allows for the user interface to be displayed on the user's personal device. The embedded touch sensor permits setting division characteristics on screen.
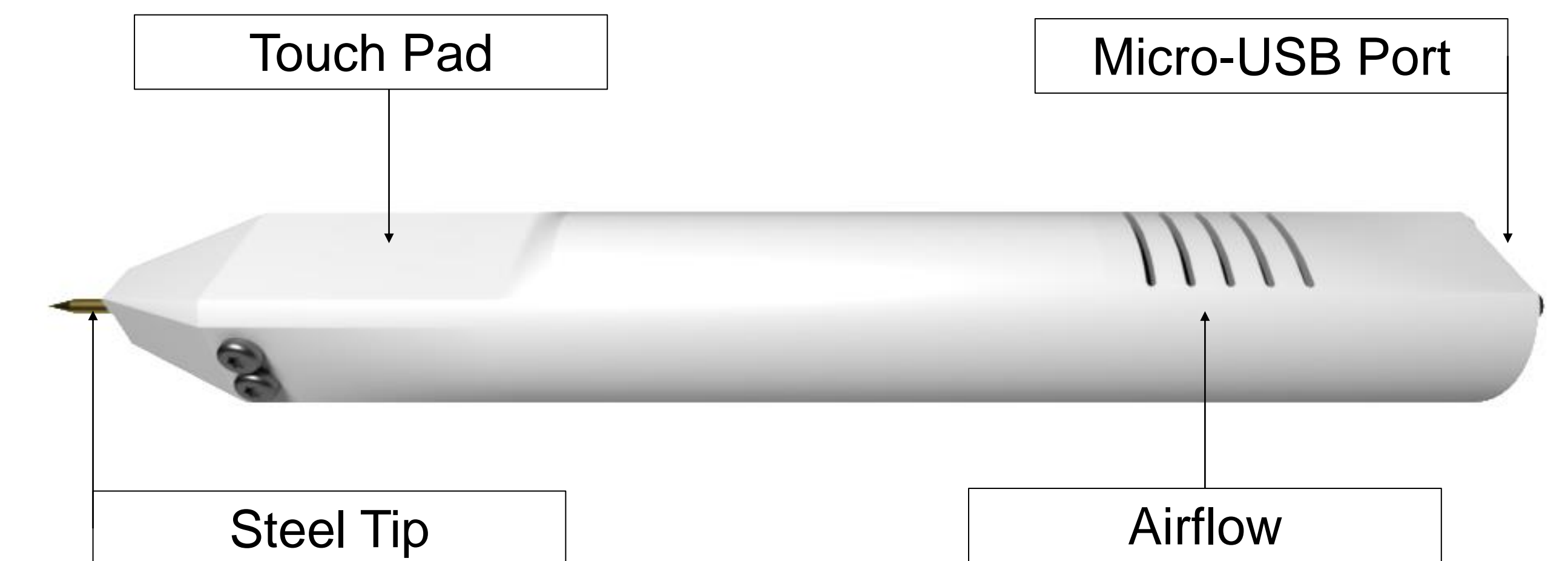
Hardware Block Diagram

PCB Design

PSRAM | Analog Front-End

Analog Front-End | STM32 | ESP32

2.45 inches, Six Layers
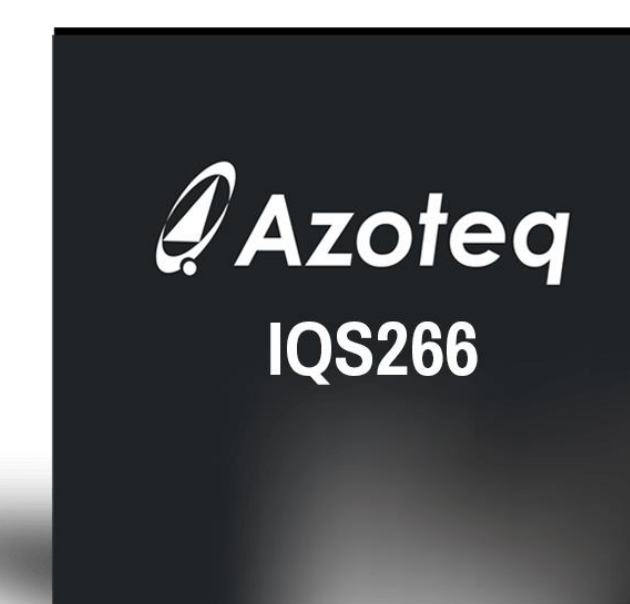
Hardware / Key Components

MCU: STM32G474
- 4 to 48 MHz crystal oscillator
- Multiple communication interfaces
- Built in ADCs and DACs for data sampling, small package

WIFI: ESP32-PICO-D4
- Protocol: 802.11 b/g/n
- Freq. Range 2.4 ~ 2.5 GHz
- Small package size
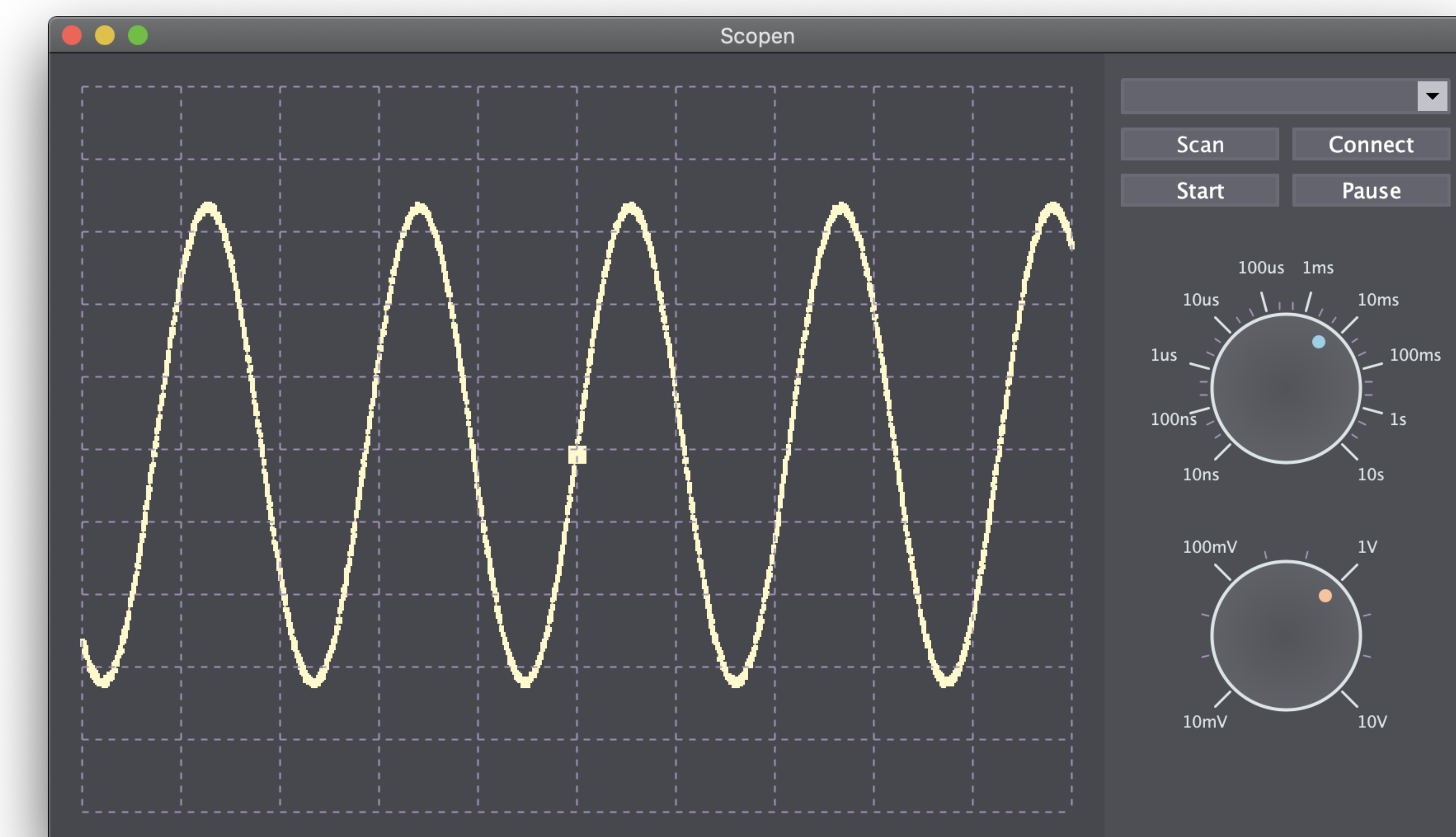- SPI interface to quickly transfer data

Touch Sensor: IQS2662-0-QNR
- Gesture controlled sensor
- Allows mapping of gestures to actions on the waveform

Static Ram: IS61WV102416BLL
- High-speed access times: 10, 20 ns
- 16M-bit static RAMs, low power
- Store sampled data and send to WiFi module

Scopen

Touch Pad | Micro-USB Port

Steel Tip | Airflow

Scopen Product
50 Vpp Measuring Capabilities
Total Length: 5.9 inches
Micro-USB Charging
Stainless Steel Tip
5 MHz Bandwidth
Touch Pad

User Interface

Interface provides a variety of functions:
- Adjust Voltage per Division setting
- Adjust Time per Division setting
- Start/Pause display

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