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.

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 / 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

**User Interface**

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

**Acknowledgements:**
Special thanks to Professor Yoga, Adi, and Kyle for constantly providing their support and guidance.