



# ZONE PULSE AI DEVICE

## Wearable PPG Heart Rate Training Assistant

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### Motivation

Zone Pulse AI is a smart, affordable heart rate device that guides you with sounds through personalized workout zones. It adapts to your fitness for effective, distraction-free training.



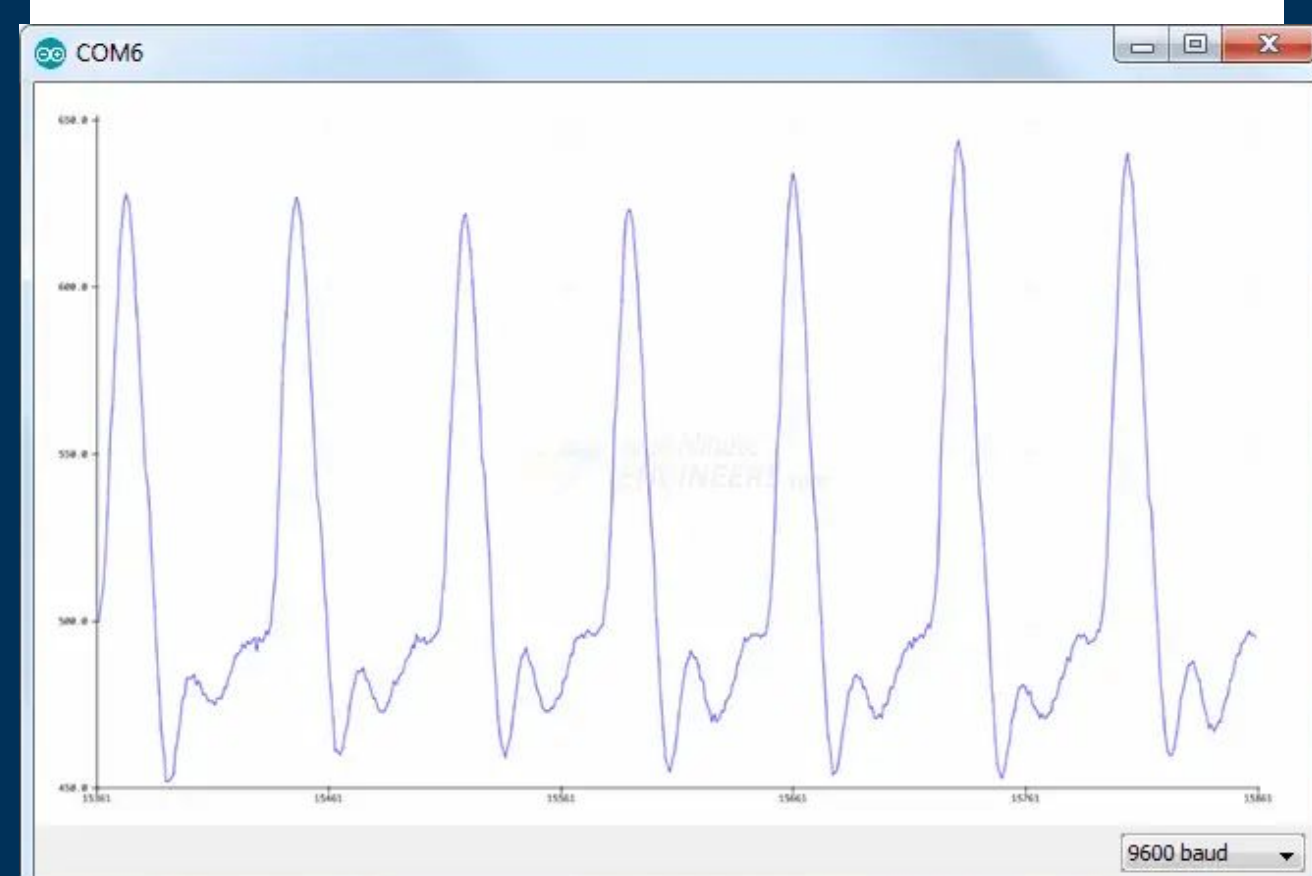
### Study Parameters

- Wearable PPG-based heart rate sensor
- Seed Studio Xiao ESP32S3 microcontroller
- 1.8' TFT display
- Piezo buzzer for feedback
- No smartphone or internet required

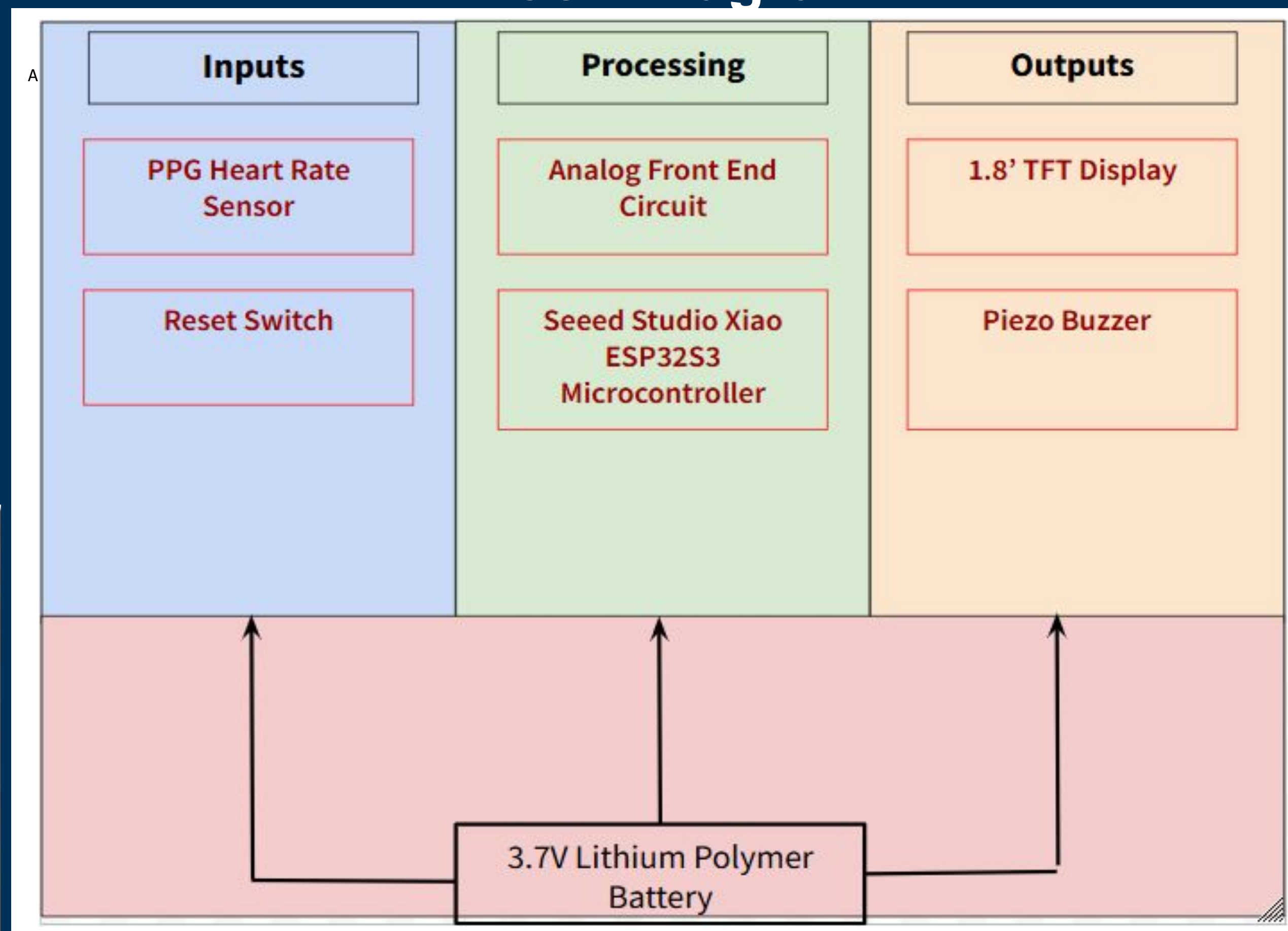
### Data Collection

Heart rate data from MAX30102 PPG sensor logged via onboard memory for each session:

- Continuous Cardio
- Alternating Intensity Restorative Session



### Block Diagram



### Applications

- Personalized zone training for optimized results
- Prevents overtraining
- No distractions from phones or smartwatches
- Ideal for gym workouts, running, and interval training
- Keeps track of your heart rate

### References

- [1] N. Mitro *et al.*, "Ai-enabled smart wristband providing real-time vital signs and stress monitoring," *Sensors*, vol. 23, no. 5, Mar. 2023. doi:10.3390/s23052821
- [2] A. Burrello *et al.*, "Q-PPG: Energy-efficient PPG-based heart rate monitoring on wearable devices," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 15, no. 6, Oct. 2021. doi:10.1109/tbcas.2021.3122017