

Gym Power Generation System: Exercise Bike Generator

Project

What?

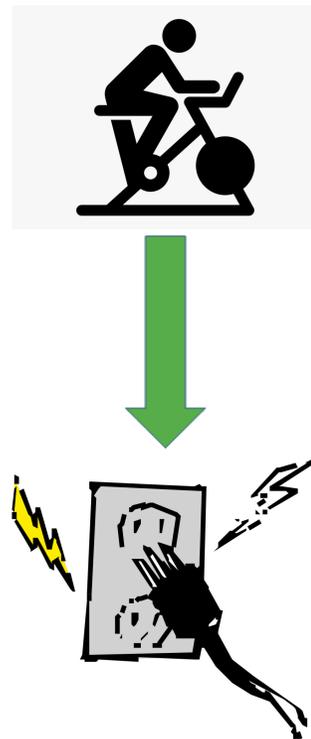
- Design and build an exercise bike that produces power!

Why?

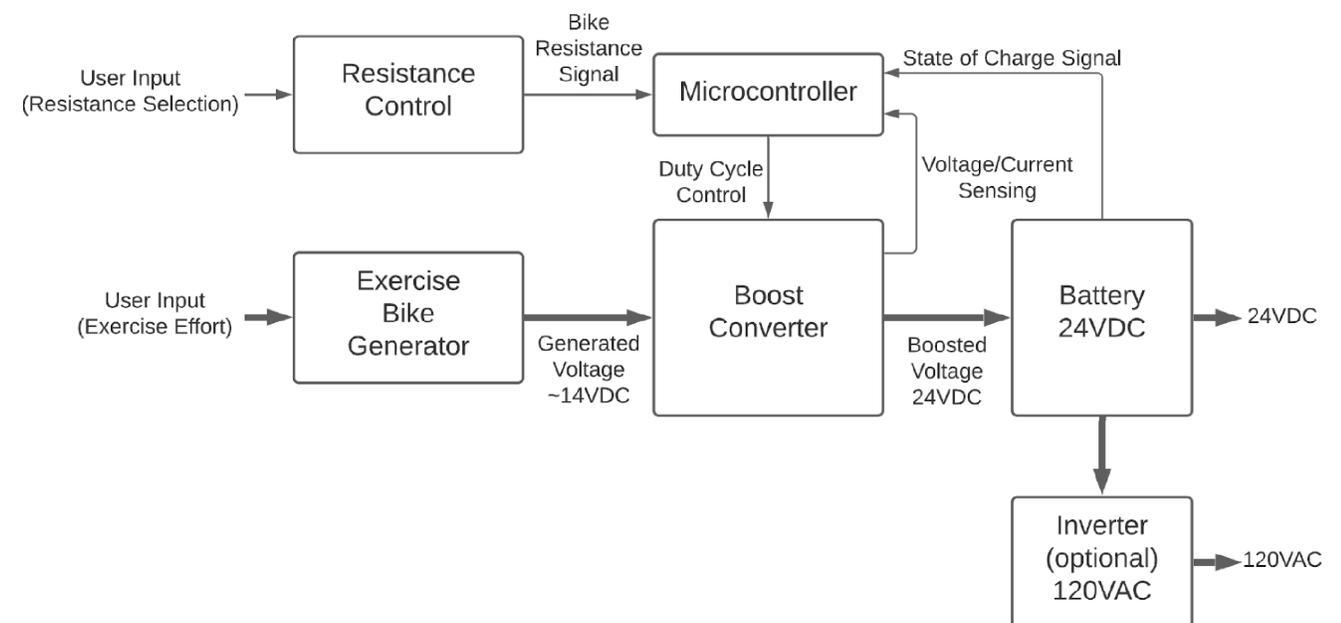
- Nobody likes pollution from burning fossil fuels.
- We need more renewable power sources.
- Energy from exercise is usually wasted.

Considerations:

- The bike needs to have adjustable resistance.
- The power produced needs to be usable.
- The system needs to be safe & user-friendly.



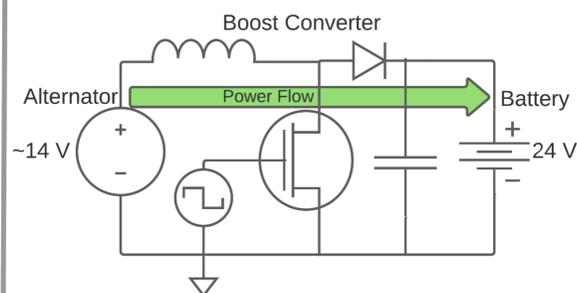
System



Methods

1.

We built our own stationary bike and attached an automotive alternator.



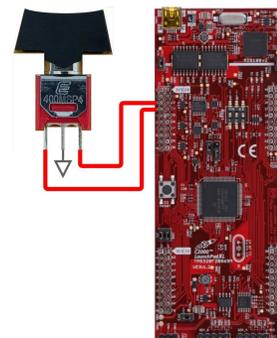
2.

We designed and built a boost converter to boost the ~14 V alternator output high enough to charge a 24 V battery.

We attached an inverter to the battery to produce 120 V AC power.

3.

We allowed the user to select resistance levels using a switch and microcontroller.



We regulated boost converter output with the microcontroller to achieve resistance control and optimal battery charging.

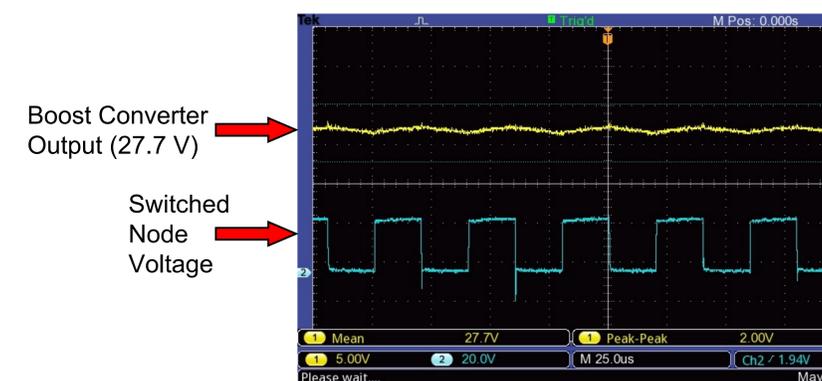
Conclusion



Fully functional exercise bike.

User-adjustable resistance control and battery charging.

95% efficient boost converter with low 3.3% output ripple.



Resistance Level	Power Output (W)	Input Current (A)
1	20	1.4
2	40	2.8
3	60	4.2
4	80	5.6
5	100	7.0
6	120	8.4